MPE Report

Applicant	:	Askey Computer Corp
Product Type	:	Wi-Fi and Bluetooth functionalities module
Trade Name	:	ASKEY
Model Number	:	STI625X
Applicable Standard	:	47 CFR § 2.1091
Received Date	:	Aug. 17, 2021
Test Period	:	Aug. 27 ~ Sep. 07, 2021
Issue Date	:	Sep. 24, 2021

Issued by

Approved By : Kris Pan

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Taiwan Accreditation Foundation accreditation number: 1330
Test Firm MRA designation number: TW0010

Note:

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Revision History

Rev.	Issued Date	Revisions	Revised By
00	Sep. 24, 2021	Initial Issue	Nicole Chu

Contents

1. Reference Applicable Standard

Standard	Description	Version
IEEE C95.1	American National Standard safety levels with respect to human exposure to radio frequency electromagnetic fields, 300 KHz to 100 GHz, New York.	1992
47 CFR Part §2.1091	Radiofrequency radiation exposure evaluation: mobile devices.	-
47 CFR Part §1.1310	Radiofrequency radiation exposure limits.	-

2. Description of Equipment under Test (EUT)

Applicant	Askey Computer Corp 10F, No. 119, JIANKANG RD.ZHONGHE DIST, NEW TAIPEI CITY, Taiwan	
Manufacturer	Askey Computer Corp 10F, No. 119, JIANKANG RD.ZHONGHE DIST, NEW TAIPEI CITY, Taiwan	
Product Type	Wi-Fi and Bluetooth functionalities module	
Trade Name	ASKEY	
Model Number	STI625X	
FCC ID	H8N-STI625X	
Frequency Range	Operate Band	Frequency Range (MHz)
	IEEE 802.11b/g/n/ax 2.4 GHz 20 MHz	2412 - 2462
	IEEE 802.11a/n/ac/ax 5 GHz 20 MHz U-NII Band I	5180 - 5240
	IEEE 802.11a/n/ac/ax 5 GHz 20 MHz U-NII Band II-A	5260 - 5320
	IEEE 802.11a/n/ac/ax 5 GHz 20 MHz U-NII Band II-C	5500 - 5720
	IEEE 802.11a/n/ac/ax 5 GHz 20 MHz U-NII Band III	5745 - 5825
	IEEE 802.11n/ac/ax 5 GHz 40 MHz U-NII Band I	5190 - 5230
	IEEE 802.11n/ac/ax 5 GHz 40 MHz U-NII Band II-A	5270 - 5310
	IEEE 802.11n/ac/ax 5 GHz 40 MHz U-NII Band II-C	5510 - 5710
	IEEE 802.11n/ac/ax 5 GHz 40 MHz U-NII Band III	5755 - 5795
	IEEE 802.11ac/ax 5 GHz 80 MHz U-NII Band I	5210
	IEEE 802.11ac/ax 5 GHz 80 MHz U-NII Band II-A	5290
	IEEE 802.11ac/ax 5 GHz 80 MHz U-NII Band II-C	5530 - 5690
	IEEE 802.11ac/ax 5 GHz 80 MHz U-NII Band III	5775
	Bluetooth BR/EDR	2402 - 2480
	Bluetooth LE	2402 - 2480

Antenna Information	Band	Antenna	Model	Type	Frequency (MHz)	Max. Gain (dBi)
	2.4 GHz	ANT-0	STI6250-D315	Dipole Antenna	2400-2483.5	2.45
		ANT-1	STI6250-D315	Dipole Antenna	2400-2483.5	2.14
		G_{ant}			2400-2483.5	2.30
		Directional			2400-2483.5	5.31
	5 GHz	ANT-0	STI6250-D315	Dipole Antenna	5150-5250	4.71
			STI6250-D315	Dipole Antenna	5250-5230	4.61
			STI6250-D315	Dipole Antenna	5470-5725	3.74
			STI6250-D315	Dipole Antenna	5725-5850	3.96
		ANT-1	STI6250-D315	Dipole Antenna	5150-5250	3.58
			STI6250-D315	Dipole Antenna	5250-5230	3.33
			STI6250-D315	Dipole Antenna	5470-5725	4.38
			STI6250-D315	Dipole Antenna	5725-5850	5.21
		G_{ant}			5150-5250	4.18
					5250-5230	4.02
					5470-5725	4.07
					5725-5850	4.63
		Directional			5150-5250	7.17
					5250-5230	7.00
					5470-5725	7.08
					5725-5850	7.62
Antenna Delivery	IEEE 802.11b: 1TX / 1RX (Only) IEEE 802.11g/n/ax 2.4 GHz 20 MHz: 2TX / 2RX (CDD) IEEE 802.11a/n/ac/ax 20 MHz / 40 MHz / 80 MHz: 2TX / 2RX (CDD)					
RF Evaluation	0.076 mW/cm^2					
Operate Temp. Range	0 ~ +40°C					

The above equipment was tested by A Test Lab Techno Corp. For compliance with the requirements set forth in 47 CFR § 2.1091 / 47 CFR § 1.1310. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

3. Human Exposure Assessment

Due to the design and installation of this product, it is not possible to conduct SAR evaluation. This is because client either manufactures or supplies the antenna(s) that will be used in the installation of this product. Therefore, this product will be evaluated as a mobile device per 47 CFR § 1.1310 titled “Radiofrequency radiation exposure limits”, generally referred to as MPE limits.

In 47 CFR § 2.1091, paragraph (b) defines a mobile device as “a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 cm is normally maintained between the transmitter’s radiating structure(s) and the body of the user or nearby persons. ” This product is intended to be installed into a vehicle such that the unit is physically secured at one location. In the installation guide supplied with the product,

Client has made the following statement: “IMPORTANT: To meet the FCC’s RF Exposure Guidelines, the antenna should be installed so there is at least 20 cm of separation between the body of the user and nearby persons and the antenna”. Based on the installation of the transceiver and the antenna, the transmitters radiating structure is more than 20 cm from the user. Thus, this product is a “mobile device” as defined in section § 2.1091 paragraph (b).

Exposure evaluation
$$S_{eirp} = \frac{EIRP}{4\pi d^2} = \frac{PG}{4\pi d^2}\left(W/m^2\right)$$

Where

S: is the input power (W);

G: is the antenna gain;

d : is the distance between antennas and evaluation point (m).

4. Power Density Limit – RF Exposure Evaluation

Thv In 47 CFR § 1.1310, use of the device as based upon the user's awareness and ability to exercise control over human exposure. The two categories defined are Occupational / Controlled Exposure and General Population / Uncontrolled. These two categories are defined as follow:

Limits for General Population / Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time$\|E\|^2$,$\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824 / f	2.19 / f	($180 / f^2$)*	30
30-300	27.5	0.073	0.2	30
300-1500	-	-	F / 1,500	30
1,500-100,000	-	-	1.0	30
Limits for Occupational / Controlled Exposure				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time$\|E\|^2$,$\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1,842 / f	4.89 / f	($900 / f^2$)*	6
30-300	61.4	0.163	1.0	6
300-1,500	-	-	F / 300	6
1,500-100,000	-	-	5	6

4.1 *Conducted Power*

Band	Date Rate or Sub-test	CH	Frequency (MHz)	ANT-0	ANT-1	All ANT
				Average power		
				dBm	dBm	dBm
802.11b	1M	1	2412	---	20.30	---
		6	2437	---	23.09	---
		11	2462	---	20.31	---
802.11g	6M	1	2412	15.51	15.82	18.68
		6	2437	18.91	19.07	22.00
		11	2462	14.71	15.01	17.87
802.11n_HT20	13M	1	2412	13.53	13.76	16.66
		6	2437	18.65	18.71	21.69
		11	2462	13.14	13.36	16.26
802.11n_HT20 (256-QAM)	13M	1	2412	13.59	13.81	16.71
		6	2437	18.71	18.79	21.76
		11	2462	13.19	13.43	16.32

Band	Date Rate or Sub-test	CH	Frequency (MHz)	RU	RU Number	ANT-0	ANT-1	All ANT
						Average power		
						dBm	dBm	dBm
802.11ax_HE20	MCS 0	1	2412	242	1	13.65	13.89	16.78
		6	2437	242	1	18.78	18.85	21.83
		11	2462	242	1	13.23	13.50	16.38

Band	Date Rate or Sub-test	CH	Frequency (MHz)	ANT-0	ANT-1	ANT-(Total)
				Average power		
				dBm	dBm	dBm
802.11a	6M	36	5180	12.39	12.42	15.42
		40	5200	13.52	13.57	16.56
		44	5220	13.49	13.55	16.53
		48	5240	14.67	14.86	17.78
		52	5260	15.02	15.13	18.09
		56	5280	12.69	12.82	15.77
		60	5300	12.63	12.79	15.72
		64	5320	12.28	12.39	15.35
		100	5500	12.92	13.01	15.98
		104	5520	16.13	18.02	20.19
		108	5540	16.16	18.01	20.19
		112	5560	16.31	18.29	20.42
		116	5580	16.02	17.91	20.08
		132	5660	15.95	17.89	20.04
		136	5680	15.91	17.82	19.98
		140	5700	12.79	13.63	16.24
		144	5720	15.04	16.85	19.05
		144	5720	7.38	9.42	11.53
		149	5745	16.09	18.40	20.41
		153	5765	15.41	18.35	20.13
		157	5785	15.43	18.37	20.15
		161	5805	15.39	18.31	20.10
		165	5825	15.22	17.81	19.72
802.11n_5G_HT20	13M	36	5180	12.05	12.77	15.44
		40	5200	13.61	14.51	17.09
		44	5220	13.55	14.43	17.02
		48	5240	14.84	15.49	18.19
		52	5260	15.08	15.45	18.28
		56	5280	12.55	13.42	16.02
		60	5300	12.48	13.38	15.96
		64	5320	12.81	13.45	16.15
		100	5500	12.55	12.79	15.68
		104	5520	15.36	15.81	18.60
		108	5540	15.32	15.86	18.61
		112	5560	15.39	15.89	18.66
		116	5580	15.25	15.75	18.52
		132	5660	15.31	15.71	18.52
		136	5680	15.05	15.99	18.56
		140	5700	9.85	10.73	13.32
		144	5720	15.30	16.99	19.24
		144	5720	8.07	9.69	11.97
		149	5745	15.87	18.41	20.33
		153	5765	15.39	18.15	20.00
		157	5785	15.37	18.30	20.09
		161	5805	15.16	18.05	19.85
		165	5825	15.06	17.79	19.65

Band	Date Rate or Sub-test	CH	Frequency (MHz)	ANT-0	ANT-1	ANT-(Total)
				Average power		
				dBm	dBm	dBm
802.11n_5G_HT40	27M	38	5190	7.76	8.44	11.12
		46	5230	13.21	13.78	16.51
		54	5270	13.39	14.22	16.84
		62	5310	7.49	8.29	10.92
		102	5510	9.14	9.48	12.32
		110	5550	14.51	14.51	17.52
		134	5670	12.82	13.25	16.05
		142	5710	15.39	17.01	19.29
		142	5710	6.50	7.53	10.06
		151	5755	13.79	15.61	17.80
		159	5795	13.46	15.35	17.52
802.11ac_VHT20	13M	36	5180	12.18	12.90	15.57
		40	5200	13.67	14.53	17.13
		44	5220	13.64	14.45	17.07
		48	5240	14.91	15.61	18.28
		52	5260	15.14	15.53	18.35
		56	5280	12.68	13.49	16.11
		60	5300	12.62	13.50	16.09
		64	5320	12.94	13.54	16.26
		100	5500	12.61	12.81	15.72
		104	5520	15.42	15.86	18.66
		108	5540	15.39	15.92	18.67
		112	5560	15.42	15.95	18.70
		116	5580	15.29	15.81	18.57
		132	5660	15.33	15.79	18.58
		136	5680	15.20	16.10	18.68
		140	5700	9.89	10.79	13.37
		144	5720	15.62	17.13	19.45
		144	5720	8.28	9.82	12.13
		149	5745	15.92	18.54	20.43
		153	5765	15.45	18.23	20.07
		157	5785	15.49	18.39	20.19
		161	5805	15.30	18.18	19.98
		165	5825	15.15	17.82	19.70
802.11ac_VHT40	27M	38	5190	7.80	8.54	11.20
		46	5230	13.33	13.88	16.62
		54	5270	13.53	14.33	16.96
		62	5310	7.57	8.42	11.03
		102	5510	9.19	9.51	12.36
		110	5550	14.55	14.55	17.56
		134	5670	12.89	13.29	16.10
		142	5710	15.51	17.20	19.45
		142	5710	6.59	7.68	10.18
		151	5755	13.81	15.66	17.84
		159	5795	13.51	15.39	17.56
802.11ac_VHT80	58.6M	42	5210	8.19	9.19	11.73
		58	5290	8.44	9.61	12.07
		106	5530	8.66	8.84	11.76
		138	5690	11.01	11.94	14.51
		138	5690	-1.60	-0.74	1.86
		155	5775	11.31	12.88	15.18

Band	Date Rate or Sub-test	CH	Frequency (MHz)	RU	RU Number	ANT-0	ANT-1	ANT-(Total)
						Average power		
						dBm	dBm	dBm
802.11ax_HE20	MCS 0	36	5180	242	1	12.29	12.99	15.66
		40	5200	242	1	13.73	14.56	17.18
		44	5220	242	1	13.69	14.51	17.13
		48	5240	242	1	14.93	15.69	18.34
		52	5260	242	1	15.19	15.57	18.39
		56	5280	242	1	12.82	13.61	16.24
		60	5300	242	1	12.75	13.56	16.18
		64	5320	242	1	13.08	13.55	16.33
		100	5500	242	1	12.67	12.89	15.79
		104	5520	242	1	15.45	15.95	18.72
		108	5540	242	1	15.42	15.98	18.72
		112	5560	242	1	15.67	16.13	18.92
		116	5580	242	1	15.36	15.89	18.64
		132	5660	242	1	15.35	15.85	18.62
		136	5680	242	1	15.31	16.29	18.84
		140	5700	242	1	9.94	10.88	13.45
		144	5720	242	1	15.75	17.38	19.65
		144	5720	242	1	8.50	9.95	12.29
		149	5745	242	1	15.95	18.56	20.46
		153	5765	242	1	15.49	18.32	20.14
		157	5785	242	1	15.56	18.41	20.23
		161	5805	242	1	15.38	18.29	20.08
		165	5825	242	1	15.21	17.95	19.80
802.11ax_HE40	MCS 0	38	5190	484	1	7.90	8.58	11.26
		46	5230	484	1	13.37	14.00	16.71
		54	5270	484	1	13.56	14.34	16.98
		62	5310	484	1	7.58	8.53	11.09
		102	5510	484	1	9.21	9.55	12.39
		110	5550	484	1	14.59	14.61	17.61
		134	5670	484	1	12.92	13.36	16.16
		142	5710	484	1	15.59	17.37	19.58
		142	5710	484	1	6.66	7.74	10.24
		151	5755	484	1	13.88	15.69	17.89
		159	5795	484	1	13.57	15.41	17.60
802.11ax_HE80	MCS 0	42	5210	968	1	8.30	9.29	11.83
		58	5290	968	1	8.48	9.68	12.13
		106	5530	968	1	8.72	8.88	11.81
		138	5690	968	1	11.12	12.26	14.74
		138	5690	968	1	-1.54	-0.64	1.94
		155	5775	968	1	11.36	12.93	15.23

Data Rate	Frequency(MHz)	Packet Type	Average Power
			dBm
1Mbps (GFSK)	2402	DH1	7.29
		DH3	7.33
		DH5	7.47
	2441	DH1	7.87
		DH3	7.90
		DH5	8.03
	2480	DH1	8.11
		DH3	8.13
		DH5	8.16
2Mbps (π/4-DQPSK)	2402	DH1	6.25
		DH3	6.28
		DH5	6.31
	2441	DH1	6.61
		DH3	6.69
		DH5	6.70
	2480	DH1	7.15
		DH3	7.19
		DH5	7.21
3Mbps (8DPSK)	2402	DH1	6.27
		DH3	6.30
		DH5	6.36
	2441	DH1	6.63
		DH3	6.70
		DH5	6.71
	2480	DH1	7.26
		DH3	7.29
		DH5	7.32

5. Test Result

Antenna	Band	Frequency (MHz)	Limit (mW)/cm²	Distance (cm) [R]	Tune-up Power (dBm) [P]	ANT Gain (dBi)	Numeric Gain [G]	Duty Cycle	Power with Duty cycle (mW) [P]x[G]	Power Density (mW)/cm² [S]
Bluetooth Antenna	Bluetooth	2402-2480	1.0	20	8.50	2.45	1.76	1	12.46	0.002
Wi-Fi Antenna	WLAN 2.4GHz Main	2412-2462	1.0	20	19.00	2.30	1.70	1	135.04	0.027
	WLAN 5GHz Main	5150-5250	1.0	20	15.00	4.71	2.96	1	93.60	0.019
		5250-5350	1.0	20	15.50	4.61	2.89	1	102.54	0.020
		5470-5725	1.0	20	16.50	3.74	2.37	1	105.86	0.021
		5725-5850	1.0	20	16.50	3.96	2.49	1	111.22	0.022
	WLAN 2.4GHz Aux	2412-2462	1.0	20	23.50	2.30	1.70	1	380.58	0.076
	WLAN 5GHz Aux	5150-5250	1.0	20	16.00	3.58	2.28	1	90.77	0.018
		5250-5350	1.0	20	16.00	3.33	2.15	1	85.59	0.017
		5470-5725	1.0	20	18.50	4.38	2.74	1	193.98	0.039
		5725-5850	1.0	20	19.00	5.21	3.32	1	263.72	0.052

Note:

1. Mobile or fixed location transmitters, minimum separation distance is 20 cm, even if calculations indicate MPE distance is less.
2. We used the maximum power and gain to provide MPE results.
3. The Numeric Gain calculated by 10^(ant. Gain(dBi) /10).
4. The MPE results are evaluated by lowest data rate for WLAN.

Simultaneous Transmitting：

Total MPE = 0.002 + 0.022 + 0.052 = 0.076 (mW)/cm² < 1 (mW)/cm²

---END---