RF Exposure Evaluation Declaration

Report No.: S20240806134301E05
Issue Date: 09-23-2024

Applicant:	Xi'an NovaStar Tech Co., Ltd
Address:	Building 2, NovaStar Tech Park, No. 1699, Yunshui 3rd Road, Xi'an, Shaanxi, China
FCC ID:	2AG8JTU40P
Product:	LED Playback Control Processor
Model No.:	TU40 Pro
Trade Mark:	/
FCC Rule Part(s):	CFR 47, FCC Part 2.1091 Radio frequency radiation exposure evaluation: mobile devices.
Item Receipt date:	Mar. 20, 2023
Test Date:	Mar. 26, 2023~ Sep. 18, 2024

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FANGGUANG INSPECTION & TESTING CO.,LTD. APPROVED(02)

The test results relate only to the samples tested.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in KDB 558074 D01. Test results reported herein relate only to the item(s) tested.

Revision History

Report No.	Version	Description	Issue Date
S20240806134301E05	Rev. 01	/	09-23-2024

1. PRODUCT INFORMATION

1.1. Equipment Description

Product Name:	LED Playback Control Processor
Model Name:	TU40 Pro
Additional Model:	TU40 Proxxxxxx
Model Description:	TU40 Pro ,TU40 Proxxxxxx（Where 'X' can be any alphanumeric character or blank for marketing purpose, and do not affect product safety and EMC）
Trade Mark:	/
Input Voltage Range:	AC 100~240V 50/60Hz, 2-0.8A
Bluetooth Version:	5.0
Wi-Fi Specification:	WLAN: 802.11b/g/n20/ax20/n40(The sample has two WiFi Modules, one for WIFI-STA function(model:RTL8811CU) and that supports b/g/n20/n40, and the other for WiFi -AP function(model: AP6275S) that support b/g/n20/ax20) RLAN： 802.11a/n-HT20/n-HT40/ac-VHT20/ac-VHT40/ac-VHT80/ax-HE20/ax-HE40/ax-HE80(The sample has two WiFi Modules, one for WIFI-STA function(model:RTL8811CU) and that supports a/n20/n40/ac20/ac40/ac80, and the other for WiFi -AP function(model: AP6275S) that support a/n20/n40/ac20/ac40/ac80/ax20/ax40/ax80)

1.2. Product Specification Subjective to this Report

Frequency Range:	BT/BLE:2402~2480MHz 802.11b/g/n-HT20/ax-HE20: 2412 ~ 2462MHz 802.11 n-HT40: 2422 ~ 2452MHz For 802.11a/n-HT20/ac-VHT20/ax-HE20: 5180~5240MHz, 5745~5825MHz For 802.11n-HT40/ac-VHT40/ax-HE40: 5190~5230MHz, 5755~5795MHz For 802.11ac-VHT80/ax-HE80: 5210MHz, 5775MHz
Type of Modulation:	BLE: GFSK BT: GFSK, Π/4 DQPSK, 8DPSK 802.11b: DSSS 802.11g/n: OFDM

	802.11a/n/ac/ax: CCK/OFDM/BPSK/QPSK/DBPSK/DQPSK/16QAM/64QAM/256QAM/1024 QAM
Data Rate:	BLE:1Mbps&2Mbps BT:1Mbps(GFSK), 2Mbps(Π/4 DQPSK), 3Mbps (8DPSK) 802.11b: 1/2/5.5/11Mbps 802.11g: 6/9/12/18/24/36/48/54Mbps 802.11n: MCS0~MCS7 802.11a: 6/9/12/18/24/36/48/54Mbps 802.11n: up to 150Mbps 802.11ac: up to 433.3Mbps 802.11ax: up to 600Mbps
Antenna Type:	Dipole Antenna
Antenna Gain:	BT/BLE:2.27dBi 2.4G WiFi: Ant0:2.27dBi Ant1:2.27dBi Ant2:2.27dBi 5G RLAN: Ant0:2.83dBi Ant1:2.83dBi Ant2:2.83dBi
CDD Directional Gain:	2.4G WiFi: 5.28dBi 5G RLAN: 5.84dBi

2. RF Exposure Evaluation

2.1. Limits

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Average Time (Minutes)
(A) Limits for Occupational/ Control Exposures				
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/ Uncontrolled Exposures				
300-1500	--	--	f/1500	6
1500-100,000	--	--	1	30

f= Frequency in MHz

Calculation Formula: $Pd = (Pout*G)/(4*pi*r^2)$

Where

Pd = power density in mW/cm^2

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

r = distance between observation point and center of the radiator in cm

Pd is the limit of MPE, $1mW/cm^2$. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

2.2. Test Result of RF Exposure Evaluation

Product	LED Playback Control Processor
Test Item	RF Exposure Evaluation

Mode	Frequency (MHz)	Maximum Conducted OutputPower (dBm)	Antenna Gain (dBi)	PG		MPE (mW/cm^2)	MPE Limits (mW/cm^2)
				(dBm)	(mW)		
WLAN	2412 - 2462	17.37	Directional Gain: 5.28	22.65	184.077	0.036	1.00
U-NII	5150 - 5250 5745 - 5825	16.02	Directional Gain: 5.84	21.86	153.462	0.031	1.00
BT	2402 - 2480	8.83	2.27	11.10	12.882	0.003	1.00
BLE	2402 - 2480	7.20	2.27	9.47	8.851	0.002	1.00

Remark: 1. MPE use distance is 20cm from manufacturer declaration of user manual.

Remark: 2. Use the maximum gain of all bands when evaluating

Remark: 3. BT, 2.4G and 5G wifi can't transmit simultaneously.

Remark: 4. As the RF part is the same as the original project TU20 Pro, all conducted test data comes from the original report S20230316528501E08-G1.

CONCULISON:

The Max Power Density at R (20 cm) = $0.036mW/cm^2$ < $1mW/cm^2$.

So the EUT complies with the requirement.

The End