

RF Exposure Exemption Report

Manufacturer: Yunex Traffic
Model: ST60-2230C-PU

In accordance with FCC CFR 47 Part 1.1307

Prepared for: Yunex Traffic
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EXECUTIVE SUMMARY

The wireless devices described within this report are compliant at 65mm with the exemption criteria related to human exposure to electromagnetic fields laid out in FCC CFR Title 47 Part 1.1307.



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1 Report Summary

1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Issue	Description of Change	Date of Issue
1	First Issue	10-Oct-2025

Table 1

1.2 Introduction

Applicant	Yunex Traffic
Manufacturer	Yunex Traffic
Model Number(s)	ST60-2230C-PU
Specification/Issue/Date	FCC 47 CFR Part 1.1307: 2024
Order Number	PO4520016227
Date	08-October-2025
Related Document(s)	• KDB 447498 D04 v01 • FCC 47 CFR Part 2.1093: 2024



1.3 Brief Summary of Results

The wireless devices described within this report are compliant with the exemption criteria related to human exposure to electromagnetic fields laid out in FCC CFR Title 47 Part 1.1307.

The calculations shown in this report were made in accordance with the procedures specified in the applied test specification(s) for a separation distance of 65 mm.

1.4 Product Information

1.4.1 Technical Description

The EUT is a module capable of transmitting Bluetooth Classic, Bluetooth Low Energy, 2.4 and 5 GHz WiFi.

1.4.2 Transmitter Description

The following radio access technologies and frequency bands are supported by the equipment under test.

Radio Access Technology	Frequency Band (MHz)	Minimum Frequency (MHz)	Output Power (dBm)	Duty Cycle (%)
5G WLAN UNII-1	5150-5250	5180	21.61	100
5G WLAN UNII-2A	5250-5350	5240	18.92	100
5G WLAN UNII-2C	5470-5725	5500	21.00	100
5G WLAN UNII-3	5725-5850	5745	21.27	100
Bluetooth Classic	2400-2483.5	2402	10.79	100
2.4G WLAN	2400-2483.5	2412	21.41	100
Bluetooth Low Energy	2400-2483.5	2402	10.79	100

Table 2 - Transmitter Description - FCC

Note: Transmitter power includes upper bounds of uncertainty therefore maximum values are used.



1.4.3 Antenna Description

The following antennas are supported by the equipment under test.

Radio Access Technology	Antenna Model	Gain (dBi)	Antenna Length (cm)	Minimum Separation Distance (mm)
5G WLAN UNII-1	MobileMark SMW-303-3C3C2C-BLK-79	5.0	8.1	65
5G WLAN UNII-2A	MobileMark SMW-303-3C3C2C-BLK-79	5.0	8.1	65
5G WLAN UNII-2C	MobileMark SMW-303-3C3C2C-BLK-79	5.0	8.1	65
5G WLAN UNII-3	MobileMark SMW-303-3C3C2C-BLK-79	5.0	8.1	65
Bluetooth Classic	MobileMark SMW-303-3C3C2C-BLK-79	5.0	8.1	65
2.4G WLAN	MobileMark SMW-303-3C3C2C-BLK-79	5.0	8.1	65
Bluetooth Low Energy	MobileMark SMW-303-3C3C2C-BLK-79	5.0	8.1	65

Table 3 - Antenna Description

In the case of more than one type of antenna being supported by the equipment, the calculation is based on the maximum of the antenna gains. If other antennas can be used that have greater gains, the minimum separation distances will need to be recalculated.

Note: Antenna gain includes upper bounds of uncertainty therefore maximum values are used.

1.4.4 Equipment Configuration

Simultaneous transmission for the following configurations;

Combination 1 – 5G WLAN UNII-1 & Bluetooth Classic/Bluetooth Low Energy

Combination 2 - 5G WLAN UNII-2A & Bluetooth Classic/Bluetooth Low Energy

Combination 3 - 5G WLAN UNII-2C & Bluetooth Classic/Bluetooth Low Energy

Combination 4 - 5G WLAN UNII-3 & Bluetooth Classic/Bluetooth Low Energy

The worst case is: 5G WLAN UNII-1 & Bluetooth Low Energy



2 Assessment Details

2.1 Single RF Source Options for Determination of Exemption

Option	Reference	RF Exposure Test Exemptions for Single Source												
A (1-mW Test Exemption)	FCC 1.1307(b)(3)(i)(A)	The available maximum time averaged power is no more than 1 mW, regardless of separation distance.												
B (SAR-Based Exemption)	FCC 1.1307(b)(3)(i)(B)	The available maximum timeaveraged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P_{th} (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). P_{th} is given by: $P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$ Where $x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right) \text{ and } f \text{ is in GHz;}$ and $ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040 f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$ <i>d</i> = the separation distance (cm);												
C (MPE-Based Exemption)	FCC 1.1307(b)(3)(i)(C)	Or using Table 1 and the minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in Table 1 to apply, R must be at least λ/2π, where λ is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of λ/4 or if the antenna gain is less than that of a half-wave dipole (1.64 linear value). TABLE 1 TO § 1.1307(b)(3)(i)(C)—SINGLE RF SOURCES SUBJECT TO ROUTINE ENVIRONMENTAL EVALUATION <table><tr><th>RF Source frequency (MHz)</th><th>Threshold ERP (watts)</th></tr><tr><td>0.3–1.34</td><td>1,920 R².</td></tr><tr><td>1.34–30</td><td>3,450 R²/f².</td></tr><tr><td>30–300</td><td>3.83 R².</td></tr><tr><td>300–1,500</td><td>0.0128 R²f.</td></tr><tr><td>1,500–100,000</td><td>19.2R².</td></tr></table>	RF Source frequency (MHz)	Threshold ERP (watts)	0.3–1.34	1,920 R ² .	1.34–30	3,450 R ² /f ² .	30–300	3.83 R ² .	300–1,500	0.0128 R ² f.	1,500–100,000	19.2R ² .
RF Source frequency (MHz)	Threshold ERP (watts)													
0.3–1.34	1,920 R ² .													
1.34–30	3,450 R ² /f ² .													
30–300	3.83 R ² .													
300–1,500	0.0128 R ² f.													
1,500–100,000	19.2R ² .													

Table 4



2.2 Multiple RF Sources Options for Determination of Exemption

Option	Reference	
A 1-mW Test Exemption for Multiple Sources	FCC 1.1307(b)(3)(ii)(A)	The available maximum time averaged power of each source is no more than 1 mW and there is a separation distance of two centimeters between any portion of a radiating structure operating and the nearest portion of any other radiating structure in the same device, except if the sum of multiple sources is less than 1 mW during the time-averaging period, in which case they may be treated as a single source (separation is not required). This exemption may not be used in conjunction with other exemption criteria other than those in paragraph (b)(3)(i)(A) of this section. Medical implant devices may only use this exemption and that in paragraph (b)(3)(i)(A).
B Simultaneous Transmission with both SAR-based and MPE- Based Test Exemptions	FCC 1.1307(b)(3)(ii)(B)	In the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation. $\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure Limit_k} \leq 1$

Table 5



2.3 Individual Antenna Port Exposure Results

2.3.1 Single Source Calculation of Exposure at Specified Separation Distance FCC 1.1307(b)(3)(i)(B) 'Option B' (SAR Based Exemption)

RAT	Frequency (MHz)	Conducted Power Output mW	Duty Cycle %	Time Average Conducted Power Output mW	Antenna Gain Ratio	Maximum Power (EIRP) mW	Maximum Power (ERP) mW	Minimum Antenna to User Separation Distance (mm)	Pth (mW) 1.1307(b)(3)(i)(B)	Greater of Max time averaged conducted power or ERP?	1.1307(b)(3)(i)(B) Exemption (Yes/No) (300 MHz to 6 GHz, 0.5 cm to 20 cm)
5G WLAN UNII-1	5180	144.88	100	144.88	3.16	458.14	279.35	65	281.8	279.35	Yes
5G WLAN UNII-2A	5260	77.98	100	77.98	3.16	246.60	150.37	65	280.7	150.37	Yes
5G WLAN UNII-2C	5500	125.89	100	125.89	3.16	398.11	242.75	65	277.5	242.75	Yes
5G WLAN UNII-3	5745	133.97	100	133.97	3.16	423.64	258.32	65	274.5	258.32	Yes
Bluetooth Classic	2402	11.99	100	11.99	3.16	37.93	23.13	65	341.7	23.13	Yes
2.4G WLAN	2412	138.36	100	138.36	3.16	437.52	266.78	65	341.3	266.78	Yes
Bluetooth Low Energy	2402	11.99	100	11.99	3.16	37.93	23.13	65	341.7	23.13	Yes

Table 6 - Transmitter Result

The calculations show that the individual transmitters comply with FCC 1.1307(b)(3)(i)(B) SAR-based exemption at a minimum distance of 65 mm.



2.4 Combined Antenna Port RF Exposure Results FCC 1.1307(b)(3)(ii)(A)

2.4.1 Combination 1 - Option B or Option C Summation

RAT	Frequency (MHz)	Conducted Power Output mW	Duty Cycle %	Time Average Conducted Power Output mW	Antenna Gain Ratio	Maximum Power (EIRP) mW	Maximum Power (ERP) mW	Test Separation Distance (mm)	Pi / Pth	Sum of the fractional contributions to the applicable thresholds is less than or equal to 1. Compliant? (Yes/No)
5G WLAN UNII-1	5180	144.88	100	144.88	3.16	458.14	279.35	65	0.93	Yes
Bluetooth Low Energy	2402	11.99	100	11.99	3.16	37.93	23.13	65	0.06	Yes
Calculated RF exposure level at minimum compliance boundary of 65 mm as a fraction of the limit									0.99	

Table 7 - Transmitter Result

The calculations show that the multiple transmitters comply with FCC 1.1307(b)(3)(ii)(B) summation-based exemption at 65mm.