RF EXPOSURE REPORT

FCC

APPLICANT

Stryker Endoscopy

MODEL NAME

0240031065

FCC ID

SSH-SYNK4KTX

REPORT NUMBER

HA220502-SYK-001-R03

TEST REPORT

Date of Issue
August 2, 2022

Test Site
Hyundai C-Tech, Inc. dba HCT America, Inc.
1726 Ringwood Ave, San Jose, CA 95131, USA

Applicant	Stryker Endoscopy
Applicant Address	5900 Optical Court, San Jose, CA 95138, USA
FCC ID	SSH-SYNK4KTX
Model Name	0240031065
EUT Type	SYNK 4K Wireless Transmitter
FCC Classification	Unlicensed National Information Infrastructure (NII)
FCC Rule Part(s)	Part 1 (§1.1310 / §1.1307), Part 2 (§2.1091)
Test Procedure	KDB 447498 D04 v01

The device bearing the trade name and model specified above, has been shown to comply with the applicable technical standards as indicated in the measurement report and was in accordance with the procedures specified in §2.947. The results in this report apply only to the product which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Hyundai C-Tech, Inc. dba HCT America, Inc. certifies that no party to application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C 862

Tested By	**Reviewed By**
Yongsoo Park	Sunwoo Kim
Test Engineer	Technical Manager

REVISION HISTORY

The revision history for this document is shown in table.

TEST REPORT NO.	DATE	DESCRIPTION
HA220502-SYK-001-R03	June 22, 2022	Initial Issue
HA220502-SYK-001-R03	July 18, 2022	Updated with calculation including both 20/40 MHz
HA220502-SYK-001-R03	August 2, 2022	Updated frequency range for 40 MHz

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1. EUT DESCRIPTION

Model	0240031065	
Series Models	0240031061	
EUT Type	SYNK 4K Wireless Transmitter	
RF Specification	5 GHz proprietary : 20 MHz / 40 MHz	
Transmitter Chain	4x4 MIMO	
Exemption Analysis	☐	1-mW Test Exemptions
	☒	SAR-Based Test Exemptions
	☐	MPE-Based Test Exemptions
Antenna Specification [1)]	Antenna Type : Chip Antenna Peak Gain : 2.0 dBi (uncorrelated)	
Operating Environment	Indoor	
Operating Temperature	10 °C ~ 40 °C	

2. INTRODUCTION

2.1. RF Exposure Exemptions for Single Source

(A) 1-mW Blanket Exemption

Per § 1.1307(b)(3)(i)(A), a single RF source is exempt RF device if the available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption applies to all operating configurations and exposure conditions, for the frequency range 100 kHz - 100 GHz, regardless of fixed, mobile, or portable device exposure conditions. This is a standalone exemption, and it cannot be applied in conjunction with any other test exemption.

(B) SAR-Based Exemption

A more comprehensive exemption, considering a variable power threshold that depends on both the separation distance and power, is provided in § 1.1307(b)(3)(i)(B). This exemption is applicable to the frequency range between 300 MHz - 6 GHz, with test separation distances between 0.5 cm and 40 cm, and for all RF sources in fixed, mobile, and portable device exposure conditions. Accordingly, a RF source is considered an RF exempt device if its available maximum time-averaged (matched conducted) power or its effective radiated power (ERP), whichever is greater, are below a specified threshold (P_{th}).

$$P_{th}(mW) = ERP_{20cm}\left(\frac{d}{20}\right)^{x} \quad , where\ d \le 20\ cm$$

$$P_{th}(mW) = ERP_{20cm} \quad , where\ 20\ cm < d \le 40\ cm$$

$$x = -log_{10}\left(\frac{60}{ERP_{20cm}\sqrt{f}}\right)$$

$$ERP_{20cm}(mW) = 2040\,f \quad , where\ 0.3\ GHz \le f(GHz) < 1.5\ GHz$$

$$ERP_{20cm}(mW) = 3060 \quad , where\ 1.5\ GHz \le f(GHz) \le 6\ GHz$$

(C) MPE-Based Exemption

MPE-based exemption is provided in the table 1, § 1.1307(b)(3)(i)(C), for a much wider frequency range, from 300 kHz - 100 GHz. The table 1 applies to any RF source (i.e. single fixed, mobile, and portable transmitters) and specifies power and distance criteria for each of the five frequency ranges used for the MPE limits. These criteria apply at separation distances from any part of the radiating structure of at least λ/2π. The MPE-based test exemption condition is in terms of ERP, defined as the product of the maximum antenna gain and the delivered maximum time-averaged power.

RF Source Frequency f_L (MHz) – f_H (MHz)	Minimum Distance λ/2π (f_L) – λ/2π (f_H)	Threshold ERP (ERP_{th})
0.3 – 1.34	150 m – 35.6 m	1,920 R^2
1.34 – 30	35.6 m – 1.6 m	3,450 R^2 / f^2
30 – 300	1.6 m – 159 mm	3.83 R^2
300 – 1,500	159 mm – 31.8 mm	0.0128 R^2 f
1,500 – 100,000	31.8 mm – 0.5 mm	19.2 R^2

Table 1. § 1.1307(b)(3)(i)(C) – Single RF Source Subject to Routine Environmental Evaluation

2.2. RF Exposure Exemptions for Simultaneous Transmission

(A) 1-mW Blanket Exemption

Per § 1.1307(b)(3)(ii)(A), the 1-mW exemption mat be also applied to simultaneous transmission conditions, within the same host device, according one of the following criteria:

- When maximum available power each individual transmitting antenna within the same time averaging period is ≤ 1 mW, and the nearest parts of the antenna structures of the simultaneously operating transmitters are separated by at least 2 cm.
- When the aggregate maximum available power of all transmitting antennas is ≤ 1 mW in the same time-averaging period.

This exemption cannot be combined with other options (B) or (C).

(B) SAR-Based Exemptions and MPE-Based Exemptions

As described in § 1.1307(b)(3)(ii)(B) and covers the situations where both SAR-based and MPE-based exemption may be considered for test exemption in fixed, mobile, or portable device exposure conditions. For these cases, a device with multiple RF sources transmitting simultaneously will be considered an RF exempt device if the condition of the following formula is satisfied :

$$\sum_{i=1}^{a} \frac{P_i}{P_{th,i}} + \sum_{j=1}^{b} \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^{c} \frac{Evaluated_k}{Exposure\ Limit_k} \leq 1$$

3. RESULT

3.1. SAR-Based Exemptions Calculation

5 GHz (20 MHz)				
Frequency (MHz)	5.26 – 5.32 / 5.50 – 5.72	GHz		
Separation Distance (d)	20	cm		
P_{th}	3060.0	mW		
Max Conducted Output Power	18.00	dBm	63.10	mW
Antenna Gain	2.0	dBi	1.58	-
EIRP	20.00	dBm	100.00	mW
ERP (P)	17.85	dBm	60.95	mW
P / P_{th} Ratio	**0.01992**			

5 GHz (40 MHz)				
Frequency (MHz)	5.27 – 5.31 / 5.51 – 5.71	GHz		
Separation Distance (d)	20	cm		
P_{th}	3060.0	mW		
Max Conducted Output Power	23.97	dBm	249.46	mW
Antenna Gain	2.0	dBi	1.58	-
EIRP	25.97	dBm	395.37	mW
ERP (P)	23.82	dBm	240.99	mW
P / P_{th} Ratio	**0.07876**			

3.2. SUMMARY OF RESULTS

Mode	Frequency Range (MHz)	Threshold (P_{th}) (mW)	ERP (P) (mW)	P / P_{th} Ratio
5 GHz (20 MHz BW)	5180 – 5240 MHz 5260 – 5320 MHz 5500 – 5720 MHz 5740 – 5840 MHz	3060.0	60.95	0.01992
5 GHz (40 MHz BW)	5190 – 5230 MHz 5270 – 5310 MHz 5510 – 5710 MHz 5755 – 5795 MHz	3060.0	240.99	0.07876

Sample Calculation

The worst case RF Exposure at 20 cm distance from the body is at 40 MHz BW.
P / P_{th} = 240.99 / 3060.0 = **0.07876** < 1.0

END OF TEST REPORT

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