SAR EXEMPTION EXHIBIT

FCC

APPLICANT

Universal Electronics Inc

MODEL NAME

R328451A99-00001

FCC ID

MG3-R328451

REPORT NUMBER

HA201001-UEI-015-R07

TEST REPORT

Date of Issue
November 19, 2020

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

Applicant	Universal Electronics Inc
Applicant Address	201 East Sandpointe Ave 7th Floor, Santa Ana, CA 92707, U.S.A.
FCC ID	MG3-R328451
Model Name	R328451A99-00001
EUT Type	Universal TV Remote
FCC Classification	Digital Transmission System (DTS)
FCC Rule Part(s)	Part 2 (§2.1091)
Test Procedure	KDB 447498 D01 v06

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**
James Choi	Sunwoo Kim
Test Engineer	Technical Manager

REVISION HISTORY

The revision history for this document is shown in table.

TEST REPORT NO.	DATE	DESCRIPTION
HA201001-UEI-015-R07	11/19/2020	Initial Issue

Hyundai C-Tech, Inc. dba HCT America, Inc., 1726 Ringwood Avenue, San Jose, CA 95131, USA TEL: +1-510-933-8848 FAX: +1-510-933-8849

TABLE OF CONTENTS

1. EUT DESCRIPTION 4
2. INTRODUCTION 5
   2.1. LIMIT 5
3. RESULT 6
   3.1. SUMMARY OF RESULTS 6
   3.2. CONCLUSION 6

Hyundai C-Tech, Inc. dba HCT America, Inc., 1726 Ringwood Avenue, San Jose, CA 95131, USA TEL: +1-510-933-8848 FAX: +1-510-933-8849

1. EUT DESCRIPTION

Base Model	R328451A99-00001	ZIGGO
Series Model(s)	R328451A97-00001	UPC (DAP SWISS)
	R328451A99-00002	UPC POLAND
	R328451A99-00003	TELENET
	R328451A99-00004	VIRGIN MEDIA
	R328451A99-00005	T-MOBILE AUSTRIA
EUT Type	Universal TV Remote	
Power Supply	DC 3V (2 x AAA Alkaline Batteries)	
RF Specification	Bluetooth V4.2 LE (1 Mbps) / ZigBee	
Frequency Range	BLE 1M : 2402 MHz - 2480 MHz ZIGBEE : 2405 MHz – 2480 MHz	
Max. RF Output Power	Max Peak Power (BLE 1M) : 6.267 dBm (4.234 mW) Max Peak Power (ZIGBEE) : 6.272 dBm (4.238 mW) Max tune up power is 7 dBm for both BLE and ZIGBEE	
Modulation Type	GFSK (BLE) / OQPSK (ZigBee)	
Number of Channels	40 Channels (BLE) / 5 channels (ZigBee)	
Antenna Specification [2)]	Antenna Type : PCB trace Peak Gain : 3.57 dBi	
Transmitter Chain	1	
Operating Environment	Indoor only	
Operating Temperature	0 °C – 50 °C	

Note :
1. Antenna information is based on the document provided.

2. INTRODUCTION

2.1. LIMIT

The RF exposure from potable device, as defined by FCC, must be evaluated with respect to FCC-adopted limits for SAR in accordance with 47 CFR §2.1091.

If no other RF exposure testing or reporting are required, a statement of justification and compliance must be included in the equipment approval, in lieu of the SAR report, to qualify for SAR test exclusion.

SAR Test Exclusion Thresholds for 100 MHz – 6 GHz and ≤ 50 mm

Approximate SAR Test Exclusion Power Thresholds at Selected Frequencies and Test Separation Distances are illustrated in the following Table, Appendix A, KDB 447498 D01 v06, 'General RF Exposure Guidance'.

MHz	5	10	15	20	25	30	35	40	45	50	mm
150	39	77	116	155	194	232	271	310	349	387	SAR Test Exclusion Threshold (mW)
300	27	55	82	110	137	164	192	219	246	274	
450	22	45	67	89	112	134	157	179	201	224	
835	16	33	49	66	82	98	115	131	148	164	
900	16	32	47	63	79	95	111	126	142	158	
1500	12	24	37	49	61	73	86	98	110	122	
1900	11	22	33	44	54	65	76	87	98	109	
2450	10	19	29	38	48	57	67	77	86	96	
3600	8	16	24	32	40	47	55	63	71	79	
5200	7	13	20	26	33	39	46	53	59	66	
5400	6	13	19	26	32	39	45	52	58	65	
5800	6	12	19	25	31	37	44	50	56	62	

Note : 10-g Extremity SAR Test Exclusion Power Threshold are 2.5 times higher than the 1g SAR Test Exclusion Threshold indicated above. These thresholds do not apply, by extrapolation or other means, to occupational exposure limits.

For 100 MHz to 6 GHz and test separation distances ≤ 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following equation according to 4.3.1 a), KDB 447498 D01 v06 :

1-g SAR Test Exclusion Thresholds

$$\frac{(\text{max. power of channel, including tuneup tolerance, mW})}{(\text{min. test separation distance, mm})} \times \left[\sqrt{f(\text{GHz})}\right] \leq 3.0 \text{ for 1-g SAR}$$

10-g SAR Test Exclusion Thresholds

$$\frac{(\text{max. power of channel, including tuneup tolerance, mW})}{(\text{min. test separation distance, mm})} \times \left[\sqrt{f(\text{GHz})}\right] \leq 7.5 \text{ for 10-g Extremity SAR}$$

3. RESULT

3.1. SUMMARY OF RESULTS

Mode	Frequency (MHz)	Measured Level (dBm)	Max Power [1)] (dBm)	Max. Power (mW)	Calculated Threshold
BLE (1M)	2402	5.811	7.000	5.012	1.554
	2440	6.125	7.000	5.012	1.566
	2480	6.267	7.000	5.012	1.579

Mode	Frequency (MHz)	Measured Level (dBm)	Max Power [1)] (dBm)	Max. Power (mW)	Calculated Threshold
ZIGBEE	2405	5.707	7.000	5.012	1.554
	2450	6.028	7.000	5.012	1.569
	2480	6.272	7.000	5.012	1.579

Note :
1. Maximum output power including tune-up tolerance.

Sample Calculation (Worst case) :

BLE 1M :
(max. power of channel including tune-up tolerance in mW) / (min. test separation distance) x SQRT(frequency in GHz) = (5.012 mW) / (5 mm) x SQRT(2.480 GHz) = 1.579 ≤ 3.0

ZIGBEE :
(max. power of channel including tune-up tolerance in mW) / (min. test separation distance) x SQRT(frequency in GHz) = (5.012 mW) / (5 mm) x SQRT(2.480 GHz) = 1.579 ≤ 3.0

3.2. CONCLUSION

Since ZIGBEE and BLE (1M) are not operating simultaneously, the calculated worst-case threshold is 1.579 at the frequency 2480 MHz, which is less than 3.0 (1-g SAR Exclusion limit), therefore SAR evaluation is not required for the EUT.

END OF TEST REPORT

Hyundai C-Tech, Inc. dba HCT America, Inc., 1726 Ringwood Avenue, San Jose, CA 95131, USA TEL: +1-510-933-8848 FAX: +1-510-933-8849