



Radio Frequency Exposure Evaluation Report

For:
Universal Audio, Inc.

Model:
Golden Reverberator, Starlight Echo Station, Astra Modulation Machine

Product Description:
Guitar Effects Pedal

FCC ID: 2AXKQ2029
ISED ID: 26610-2029

Applied Rules and Standards:
CFR 47 Part 2 (2.1093),
FCC KDB 447498 D01 General RF Exposure Guidance v06
ISED RSS-102 Issue 5

Report number: EMC_UNIVE-003-20001_FCC_ISED_SAREX_Rev1

DATE: 2021-01-12



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3462B-1

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1. Assessment

The following device was evaluated against the limits for general population uncontrolled exposure specified in CFR 47 Part 2.1093 according to SAR evaluation exclusion requirements specified in FCC regulation as listed in KDB 447498, and ISED RSS-102 Issue 5.

The device meets the requirements for SAR exclusion as stipulated by the above given FCC/ISED rules.

Company	Description	Model #
Universal Audio, Inc.	Guitar Effects Pedal	Golden Reverberator, Starlight Echo Station, Astra Modulation Machine

Responsible for Testing Laboratory:

2021-01-12	Compliance	Cindy Li (Lab Manager)	
Date	Section	Name	Signature

Responsible for the Report:

2021-01-12	Compliance	Kris Lazarov (EMC Engineer)	
Date	Section	Name	Signature

The test results of this test report relate exclusively to the test item specified in Section 3.
CETECOM Inc. USA does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of CETECOM Inc. USA.

2. Administrative Data

2.1. Identification of the Testing Laboratory Issuing the Test Report

Company Name:	CETECOM Inc.
Department:	Compliance
Street Address:	411 Dixon Landing Road
City/Zip Code	Milpitas, CA 95035
Country	USA
Telephone:	+1 (408) 586 6200
Fax:	+1 (408) 586 6299
Lab Manager:	Cindy Li
Responsible Project Leader:	Cathy Palacios

2.2. Identification of the Client / Manufacturer

Client's Name:	Universal Audio, Inc.
Street Address:	4585 Scotts Valley Drive
City/Zip Code	Scotts Valley, CA 95066
Country	USA

Manufacturer's Name:	Same as Client
Manufacturers Address:	
City/Zip Code	
Country	

3. Equipment under Assessment

Model No	Golden Reverberator, Starlight Echo Station, Astra Modulation Machine - See Note 2
HW Version	10003755, 10003894, 10003897
SW Version	1.0.0 (same for all variants)
FCC-ID	2AXKQ2029
ISED-ID:	26610-2029
HVIN	GPM-GOLD, GPM-STAR, GPM-ASTRA
PMN	Starlight Echo Station, Golden Reverberator, Astra Modulation Machine
Product Description	Guitar Effects Pedal
Device Category	<input checked="" type="checkbox"/> Fixed Installation <input type="checkbox"/> Mobile <input type="checkbox"/> Portable <input type="checkbox"/> Mixed Mobile and Portable
Frequency Range / number of channels	BT LE: 2402 MHz (ch 0) – 2480 MHz (ch 39), 40 channels
Modes of Operation / Declared Output power	BT LE= 2.1 mW – See Note 1
Max. declared antenna gain	BT LE antenna = 0 dBi
Minimum distance of antenna or radiating parts to user	5mm
Power Supply/ Rated Operating Voltage Range	8.55 VDC (min) / 9 VDC (nom) / 9.45 VDC (max)
Operating Temperature Range	Tmin: 0 °C / Tmax: 40 °C
Co-located Transmitters / Antennas	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Sample Revision	<input type="checkbox"/> Prototype <input type="checkbox"/> Production <input checked="" type="checkbox"/> Pre-Production
Exposure Category	<input type="checkbox"/> Occupational/ Controlled <input checked="" type="checkbox"/> General Population/ Uncontrolled

Note 1: BLE output power is from CETECOM report # EMC_UNIVE-003-20001_15.247_DTS

Note 2: Universal Audio declares that all product line Models Golden Reverberator, Starlight Echo Station, and Astra Modulation Machine are electrically and mechanically identical with same Hardware and Firmware and Power Supply.

4. FCC and ISED Exemption Limits for Routine Evaluation

4.1. FCC SAR test exclusions per KDB 447498 4.3.1. Standalone SAR test exclusion considerations

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

Frequency (MHz)	d[mm]	SAR Test Exclusion Threshold (mW)
2480	5	9.5

4.2. ISED SAR test exclusions per IC RSS-102 Issue 5

ISED RSS-102 Section: 2.5.1 Exemption Limits for Routine Evaluation — SAR Evaluation
 SAR evaluation is required if the separation distance between the user and/or bystander and the antenna and/or radiating element of the device is less than or equal to 20 cm, except when the device operates at or below the applicable output power level (adjusted for tune-up tolerance) for the specified separation distance defined in Table 1. Output power level shall be the higher of the maximum conducted or equivalent isotropically radiated power (e.i.r.p.) source-based, time-averaged output power.

Table with limits for the frequencies off interest

Frequency (MHz)	d[mm]	Exemption Limits [mW]
2450	5	4

5. Stand-alone Transmission SAR Exclusion Evaluation

5.1. Justification for using the 5 mm Distance

The device is intended to be operated by foot. The conservative distance of 5 mm is an estimate of how close a human body can be to the device in its typical application.

5.2. SAR Exclusion Calculation Table

FCC / ISED Standalone Transmission SAR Exclusion Calculations								
Band	f [MHz]	Max Output Power [mW]	Max EIRP [mW]	Max Duty Cycle ²	Max Average Power [mW]	FCC Limit ¹ @ 5 mm [mW]	ISED Limit @ 5 mm [mW]	SAR Exclusion applicable (Yes/No)
BTLE	2480	2.1	2.1	0.1	0.21	9.5	4	Yes

Note 1: The FCC limit is calculated using the maximum output power passing the threshold for 1-g SAR exclusion

Note 2: BT duty cycle is worst case based on maximum packet size of 25 Bytes and minimum 7.5 ms connection interval.

6. Revision History

Date	Report Name	Changes to report	Report prepared by
2020-12-10	EMC_UNIVE-003-20001_FCC_ISED_SAREX	Initial version	Kris Lazarov
2021-01-12	EMC_UNIVE-003-20001_FCC_ISED_SAREX_Rev1	See list of updates below	Kris Lazarov

Rev1 changes:

Title Page -Change Product Description from Guitar effects pedal to Guitar Effects Pedal

Title Page -Change Model Name from GPM-GOLD, GPM-STAR, GPM-ASTRA to Golden Reverberator, Starlight Echo Station, Astra Modulation Machine

Page 1 – Change Product Description from Guitar effects pedal to Guitar Effects Pedal

Page 1 – Change Model from GPM-GOLD, GPM-STAR, GPM-ASTRA to Golden Reverberator, Starlight Echo Station, Astra Modulation Machine

Page 3 – Change Description from Guitar effects pedal to Guitar Effects Pedal

Page 4 – Change Street Address from 4585 Scotts Valley Dr to 4585 Scotts Valley Drive

Page 5 – Need to separate HVIN/PMN into separate rows so that the HVIN is declared as GPM-GOLD, GPM-STAR, GPM-ASTRA and the PMN is declared as Golden Reverberator, Starlight Echo Station, Astra Modulation Machine

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