



RF Exposure Evaluation Report

APPLICANT	BEI ELECTRONICS, LLC
ADDRESS	4100 N 24 TH STREET P.O. BOX 3606 QUINCY, IL 62305
FCC ID	DDEETG3500
IC	131A-ETG3500
MODEL NUMBER	ETG3500
PRODUCT DESCRIPTION	FM BROADCAST TRANSMITTER
DATE SAMPLE RECEIVED	2020-09-14
FINAL TEST DATE	2020-09-14
PREPARED BY	Tim Royer
TEST RESULTS	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL

Report Number	Report Version	Description	Issue Date
3286-20 MPE_TestReport_		Initial Issue	2020-09-30

THE ATTACHED REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN APPROVAL OF TIMCO ENGINEERING, INC.

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GENERAL REMARKS

Summary

The device under test does:

- ☒ Fulfill the general approval requirements as identified in this test report and was selected by the customer.
- ☐ Not fulfill the general approval requirements as identified in this test report

Attestations

This equipment has been tested in accordance with the standards identified in this test report. To the best of my knowledge and belief, these tests were performed using the measurement procedures described in this report.

All instrumentation and accessories used to test products for compliance to the indicated standards are calibrated regularly in accordance with ISO 17025 requirements.

I attest that the necessary measurements were made at:

Timco Engineering Inc.
849 NW State Road 45
Newberry, FL 32669
Designation #: US1070

Prepared by:

A blue ink signature of Tim Royer is written over a circular purple stamp. The stamp contains the text "TIMCO ENGINEERING, INC." around the perimeter and "US1070" in the center.

Name and Title	Tim Royer, Project Manager / EMC Testing Engineer
Date	09/28/2020

Applicant: BEI ELECTRONICS, LLC
FCC: DDEETG3500
IC: 131A-ETG3500
Report: 3285-20 MPE_TestReport

GENERAL INFORMATION

EUT Description	FM BROADCAST TRANSMITTER		
Model Number	ETG3500		
EUT Power Source	<input checked="" type="checkbox"/> 110–230Vac, 50–60Hz	<input type="checkbox"/> DC Power	<input type="checkbox"/> Battery Operated
Test Item	<input type="checkbox"/> Engineering Prototype	<input checked="" type="checkbox"/> Pre-Production	<input type="checkbox"/> Production
Type of Equipment	<input checked="" type="checkbox"/> Fixed	<input type="checkbox"/> Mobile	<input type="checkbox"/> Portable
Antenna Connector	External N Type		
Test Conditions	The temperature was 26°C Relative humidity of 50%.		
Modification to the EUT	No Modification to EUT.		
Applicable Standards	FCC CFR 47 Part 2.1091, RSS-GEN, RSS-102 Issue 5		
Test Facility	Timco Engineering Inc. at 849 NW State Road 45 Newberry, FL 32669 USA. Designation #: US1070, IC: IC2056A		

ANTENNA INFORMATION

Manufacturer Provides Antenna	Type	Max Gain (dBi)
No	Unspecified	0 dBi

POWER OUTPUT OF EUT

Frequency (MHz)	Rated Output Power (W)
88	3500

MPE CALCULATION

The minimum separation distance is calculated as follows:

$$E(V/m) = \frac{\sqrt{30 \times P \times G}}{d}$$

$$\text{Power density: } P_d(mW/cm^2) = \frac{E^2}{3770}$$

MPE Limits, Uncontrolled Environment

Table 4: RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m ²)	Reference Period (minutes)
0.003-10 ²¹	83	90	-	Instantaneous*
0.1-10	-	0.73/ <i>f</i>	-	6**
1.1-10	87/ <i>f</i> ^{0.5}	-	-	6**
10-20	27.46	0.0728	-2	6
20-48	58.07/ <i>f</i> ^{0.25}	0.1540/ <i>f</i> ^{0.25}	8.944/ <i>f</i> ^{0.5}	6
48-300	22.06	0.05852	1.291	6
300-6000	3.142 <i>f</i> ^{0.3417}	0.008335 <i>f</i> ^{0.3417}	0.02619 <i>f</i> ^{0.6834}	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ <i>f</i> ^{1.2}
150000-300000	0.158 <i>f</i> ^{0.5}	4.21 x 10 ⁻⁴ <i>f</i> ^{0.5}	6.67 x 10 ⁻⁵ <i>f</i>	616000/ <i>f</i> ^{1.2}

Note: *f* is frequency in MHz.

* Based on nerve stimulation (NS).

** Based on specific absorption rate (SAR).

MPE Limits, Controlled Environment

Table 6: RF Field Strength Limits for Controlled Use Devices (Controlled Environment)

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m ²)	Reference Period (minutes)
0.003-10 ²³	170	180	-	Instantaneous*
0.1-10	-	1.6/ f	-	6**
1.29-10	193/ $f^{0.5}$	-	-	6**
10-20	61.4	0.163	-10	6
20-48	129.8/ $f^{0.25}$	0.3444/ $f^{0.25}$	44.72/ $f^{0.5}$	6
48-100	49.33	0.1309	6.455	6
100-6000	15.60 $f^{0.25}$	0.04138 $f^{0.25}$	0.6455 $f^{0.5}$	6
6000-15000	137	0.364	50	6
15000-150000	137	0.364	50	616000/ $f^{1.2}$
150000-300000	0.354 $f^{0.5}$	9.40 x 10 ⁻⁴ $f^{0.5}$	3.33 x 10 ⁻⁴ f	616000/ $f^{1.2}$

Note: f is frequency in MHz.

* Based on nerve stimulation (NS).

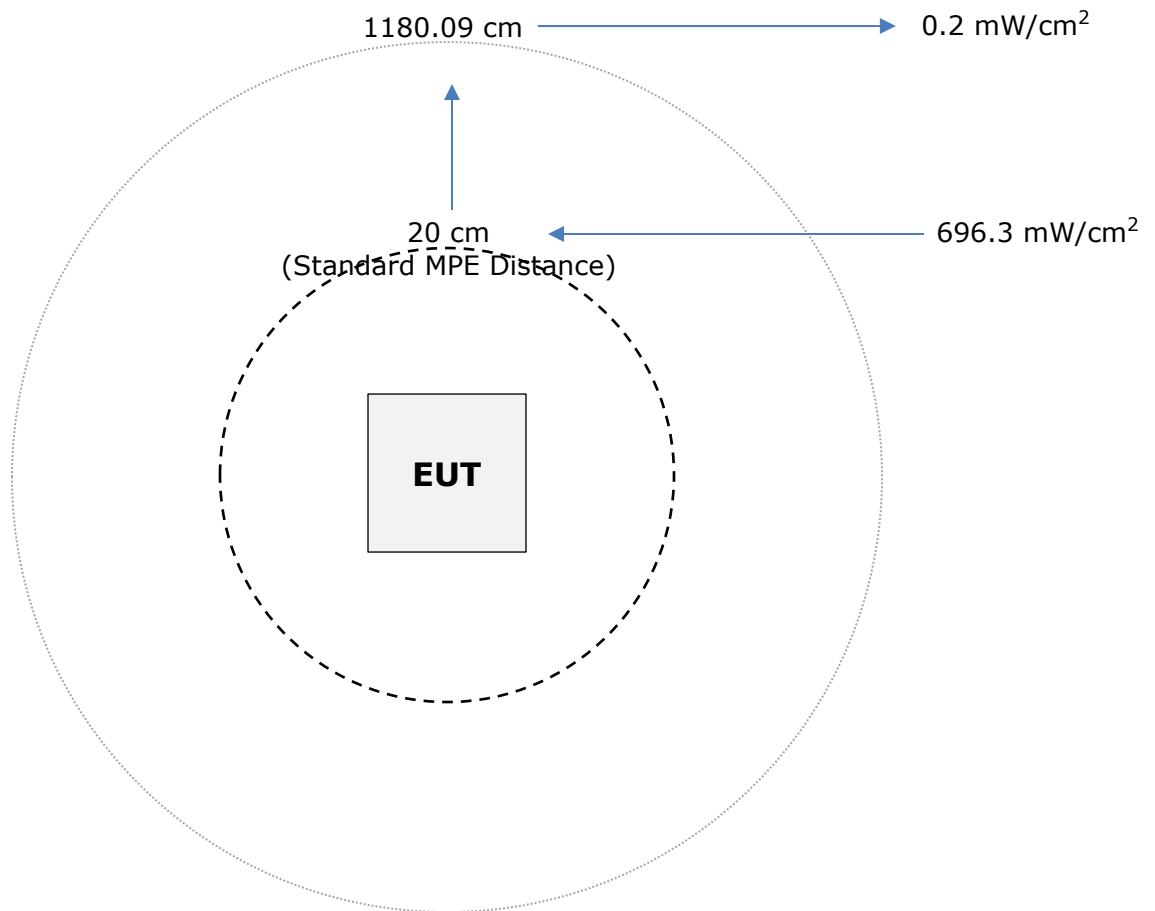
** Based on specific absorption rate (SAR).

MPE Table

General Uncontrolled Exposure

The limit for General Uncontrolled Exposure Environment is calculated as shown in FCC Pt. 1.1310, Table B:

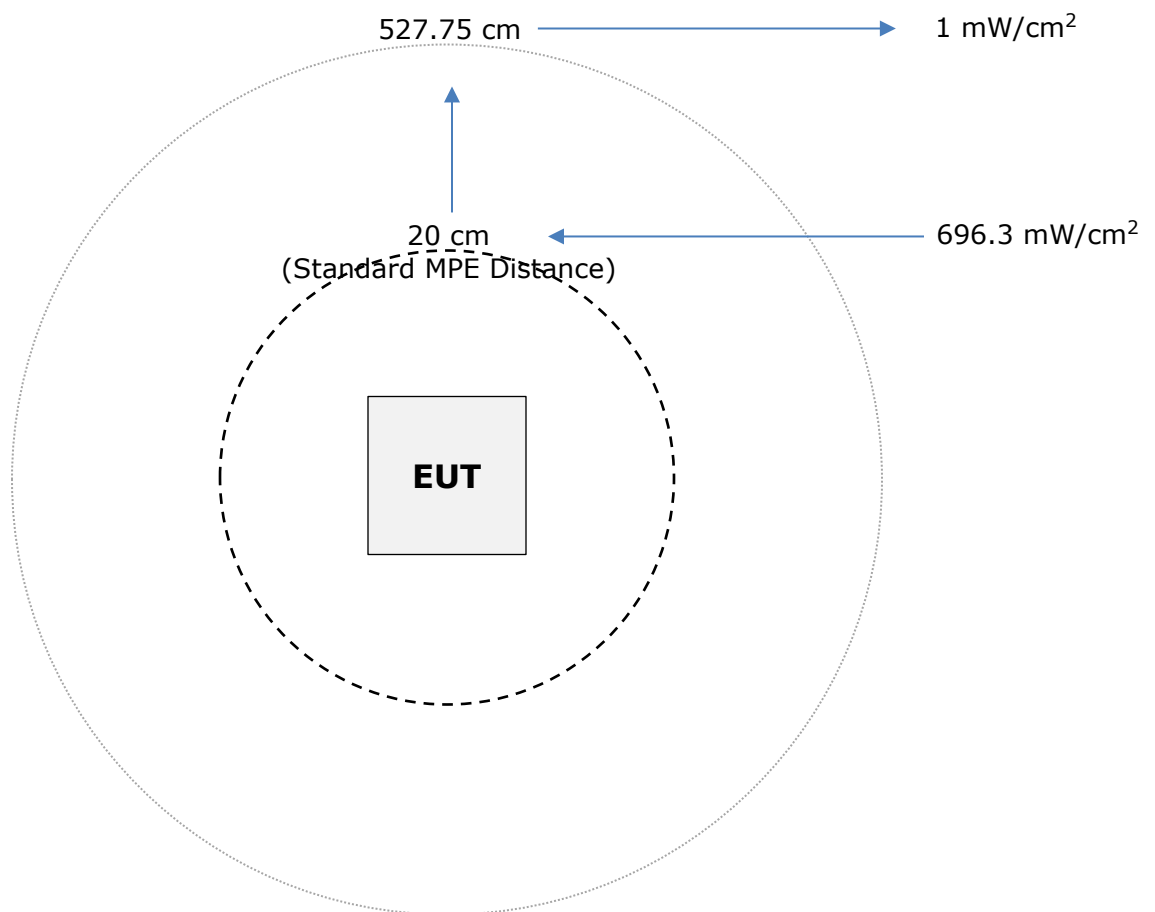
Variable	Value
Max Power	3500 W
Frequency Range	88.0 – 108 MHz
Duty Cycle (at full power)	100%
Max Antenna Gain	0 dB
Coax Loss	0 dB
Power Density	0.2 mW/cm ²
Minimum Separation Distance	1180.09 cm



General Controlled Exposure

The limit for General Controlled Exposure Environment is calculated as shown in FCC Pt. 1.1310, Table A:

Variable	Value
Max Power	3500 W
Frequency Range	88.0 – 108 MHz
Duty Cycle (at full power)	100%
Max Antenna Gain	0 dB
Coax Loss	0 dB
Power Density	1 mW/cm ²
Minimum Separation Distance	527.75 cm



MPE Table

General Uncontrolled Exposure

The limit for General Uncontrolled Exposure Environment is calculated as shown in RSS-102 Issue 5, Table 4:

Variable	Value
Max Power	3500 W
Frequency Range	88.0 – 108 MHz
Duty Cycle (at full power)	100%
Max Antenna Gain	0 dB
Coax Loss	0 dB
Power Density	1.291 W/m ²
Minimum Separation Distance	1468.81 cm

General Controlled Exposure

The limit for General Controlled Exposure Environment is calculated as shown in RSS-102 Issue 5, Table 6:

Variable	Value
Max Power	3500 W
Frequency Range	88.0 – 108 MHz
Duty Cycle (at full power)	100%
Max Antenna Gain	0 dB
Coax Loss	0 dB
Power Density	6.455 W/m ²
Minimum Separation Distance	656.87 cm

IC MPE Exposure Diagram

