



# RF Exposure Evaluation Report

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

Report Number	Report Version	Description	Issue Date
3286-20 <u>MPE_TestReport</u>		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:



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

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Report: 3285-20 MPE\_TestReport

## GENERAL INFORMATION

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

## ANTENNA INFORMATION

<b>Manufacturer Provides Antenna</b>	<b>Type</b>	<b>Max Gain (dBi)</b>
No	Unspecified	0 dBi

## POWER OUTPUT OF EUT

<b>Frequency (MHz)</b>	<b>Rated Output Power (W)</b>
88	3500

## MPE CALCULATION

The minimum separation distance is calculated as follows:

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

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 <sup>2</sup> )	Reference Period (minutes)
0.003-10 <sup>21</sup>	83	90	-	Instantaneous*
0.1-10	-	0.73/ $f$	-	6**
1.1-10	87/ $f^{0.5}$	-	-	6**
10-20	27.46	0.0728	-2	6
20-48	58.07/ $f^{0.25}$	0.1540/ $f^{0.25}$	8.944/ $f^{0.5}$	6
48-300	22.06	0.05852	1.291	6
300-6000	3.142 $f^{0.3417}$	0.008335 $f^{0.3417}$	0.02619 $f^{0.6834}$	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ $f^{1.2}$
150000-300000	0.158 $f^{0.5}$	4.21 x 10 <sup>-4</sup> $f^{0.5}$	6.67 x 10 <sup>-5</sup> $f$	616000/ $f^{1.2}$

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 <sup>2</sup> )	Reference Period (minutes)
0.003-10 <sup>23</sup>	170	180	-	Instantaneous*
0.1-10	-	1.6/ $f$	-	6 <sup>**</sup>
1.29-10	193/ $f^{0.5}$	-	-	6 <sup>**</sup>
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 <sup>-4</sup> $f^{0.5}$	3.33 x 10 <sup>-4</sup> $f$	616000/ $f^{1.2}$

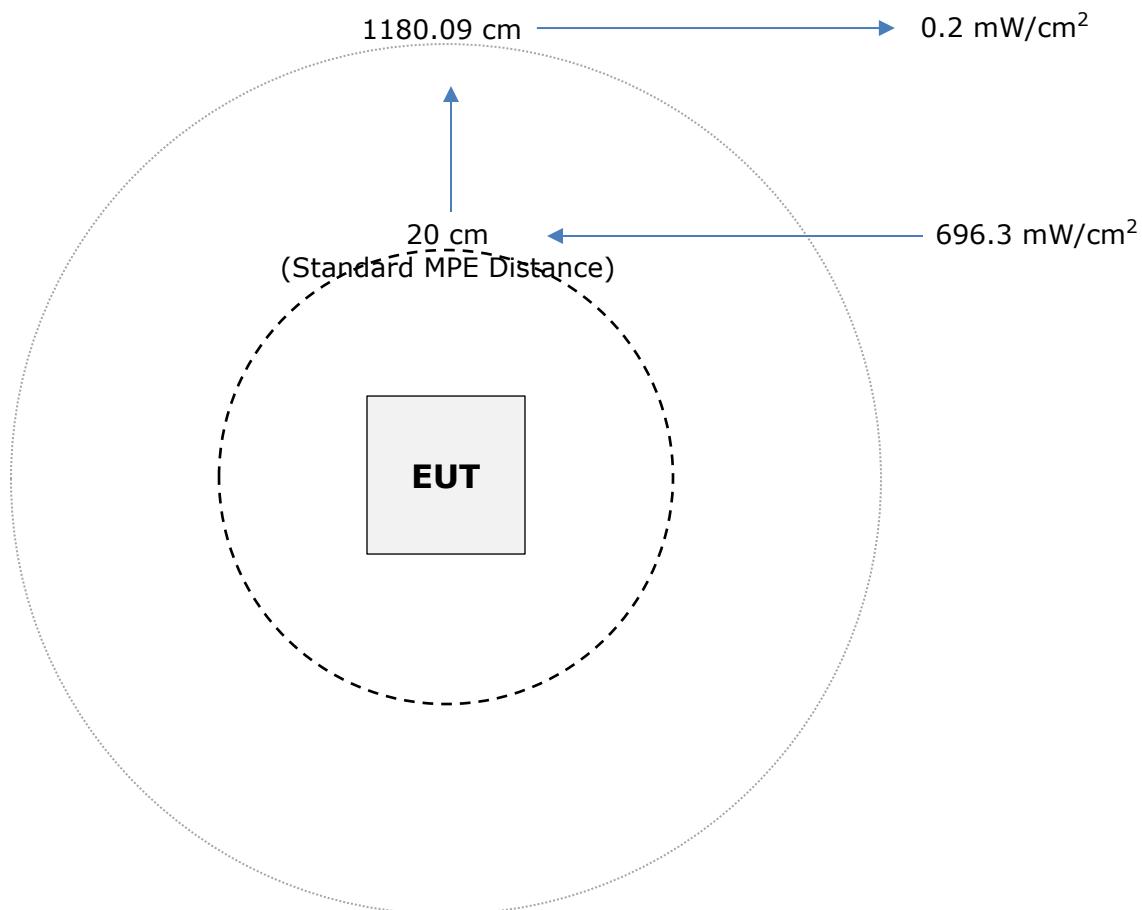
**Note:**  $f$  is frequency in MHz.  
 \* Based on nerve stimulation (NS).  
 \*\* Based on specific absorption rate (SAR).

## MPE Table

### General Uncontrolled Exposure

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

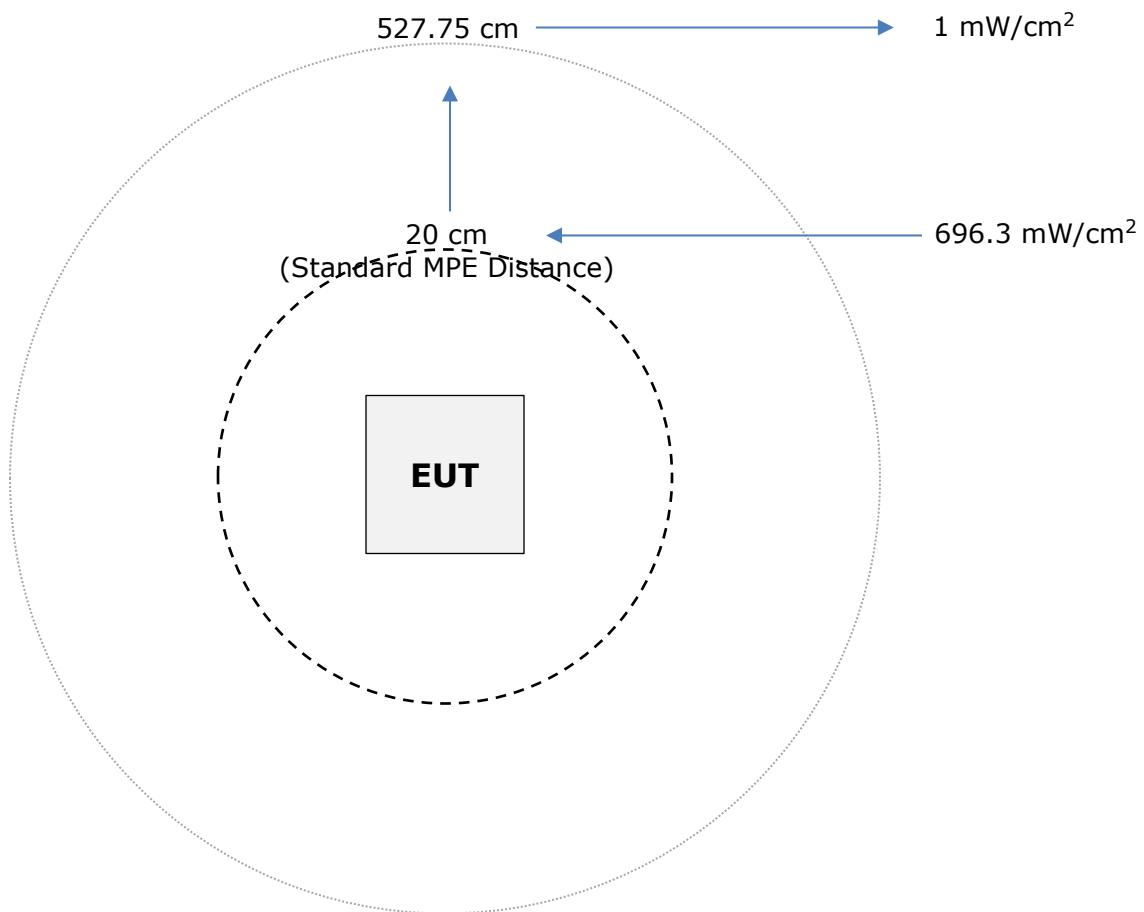
Variable	Value
Max Power	3500 W
Frequency Range	88.0 – 108 MHz
Duty Cycle (at full power)	100%
Max Antenna Gain	0 dB
Coax Loss	0 dB
Power Density	0.2 mW/cm <sup>2</sup>
Minimum Separation Distance	1180.09 cm



## 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 <sup>2</sup>
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:

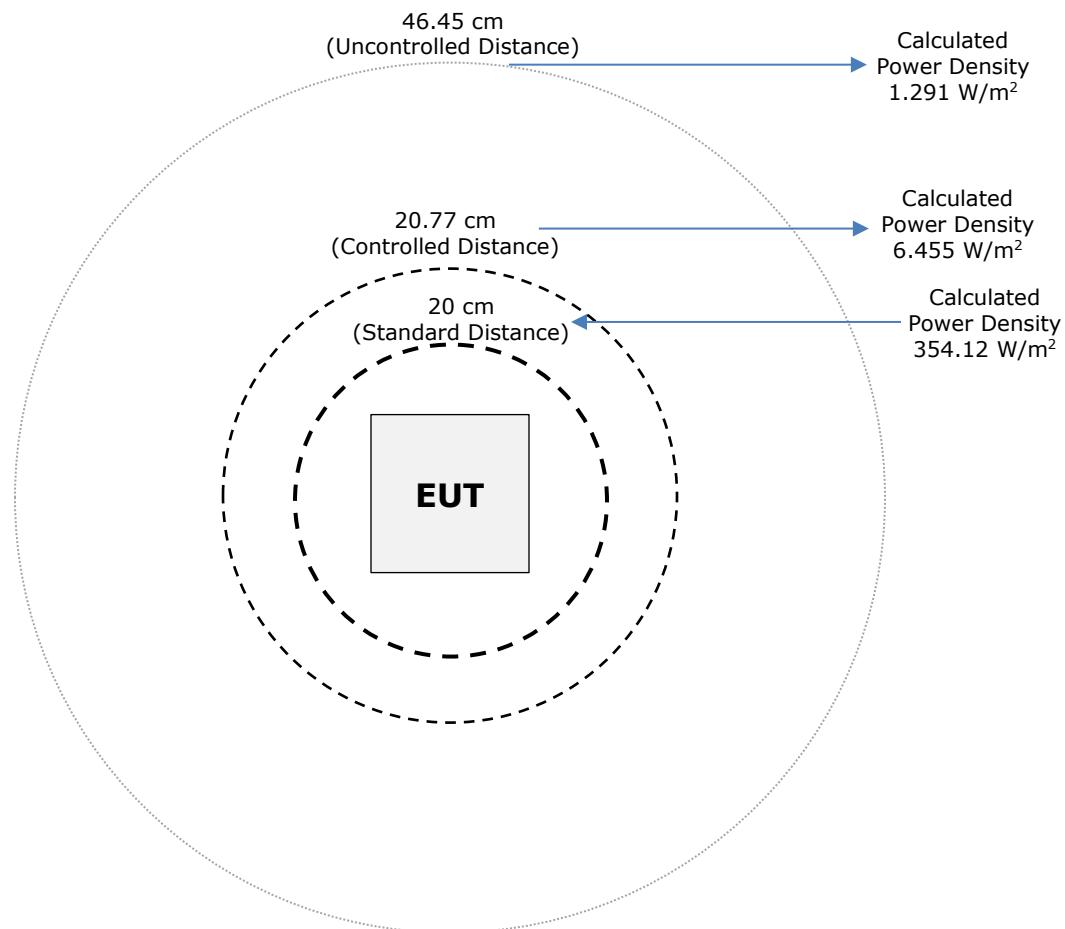
Variable	Value
Max Power	3500 W
Frequency Range	88.0 – 108 MHz
Duty Cycle (at full power)	100%
Max Antenna Gain	0 dB
Coax Loss	0 dB
Power Density	1.291 W/m <sup>2</sup>
Minimum Separation Distance	1468.81 cm

### 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 <sup>2</sup>
Minimum Separation Distance	656.87 cm

## IC MPE Exposure Diagram



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