TEST REPORT

of

FCC Part 15 Subpart C

☒ New Application; ☐ Class I PC; ☐ Class II PC

Product :	**TPMS Programming Tool**
Brand:	**Mobiletron**
Model:	**TX-PT004**
Model Difference:	**N/A**
FCC ID:	**ULZ-TXPT004**
FCC Rule Part:	**§15.209**
Applicant:	**Mobiletron Electronics Co., Ltd.**
Address:	**85, Sec.4, Chung-Ching Rd., Ta-Ya District, Taichung 428, Taiwan**

Test Performed by:

International Standards Laboratory Corp. LT Lab.
TEL: +886-3-263-8888 FAX: +886-3-263-8899
No. 120, Lane 180, Hsin Ho Rd., Lung-Tan Dist., Tao Yuan City 325, Taiwan

Report No.: **ISL-21LR278FDXX**
Issue Date : **2022/03/02**

Testing Laboratory
0997

VERIFICATION OF COMPLIANCE

Applicant:	Mobiletron Electronics Co., Ltd.
Product Description:	TPMS Programming Tool
Brand Name:	Mobiletron
FCC ID:	ULZ-TXPT004
Model No.:	TX-PT004
Model Difference:	N/A
Date of test:	2021/11/24 ~ 2022/02/26
Date of EUT Received:	2021/11/24

We hereby certify that:

All the tests in this report have been performed and recorded in accordance with the standards described above and performed by an independent electromagnetic compatibility consultant, International Standards Laboratory Corp.

The test results contained in this report accurately represent the measurements of the characteristics and the energy generated by sample equipment under test at the time of the test. The sample equipment tested as described in this report is in compliance with the limits of above standards.

Test By:	Weitin Chen	***Date:***	2022/03/02
	Weitin Chen / Senior Engineer		
Prepared By:	Gigi yeh	***Date:***	2022/03/02
	Gigi Yeh / Senior Engineer		
Approved By:	Jerry Liu	***Date:***	2022/03/02
	Jerry Liu / Assistant Manager		

Version

Version No.	Date	Description
00	2022/03/02	Initial creation of document

Measurement Uncertainty (K=2)

Description Of Test	Uncertainty
Conducted Emission (AC power line)	2.586 dB
Field Strength of Spurious Radiation	<=30MHz: 2.96dB 30-1GHz: 4.22 dB 1-40 GHz: 4.08 dB
Conducted Power	2.412 GHz: 1.30 dB 5.805 GHz: 1.55 dB
Power Density	2.412 GHz:1.30 dB 5.805 GHz: 1.67 dB
Frequency	0.0032%

Table of Contents

1. General Information

1.1 Product Description

General:

Product Name:	TPMS Programming Tool
Brand Name:	Mobiletron
Model Name:	TX-PT004
Model Difference:	N/A
Power Supply:	3Vdc for AAA Battery

Rule: 15.209 (TX)

Frequency Range:	125kHz
Tune-up Power:	82.23dBuV/m at 3m
Modulation type:	AM
Antenna Designation:	Monopole Antenna

1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: **ULZ-TXPT004** filing to comply with Section 15.209 of the FCC Part 15, Subpart C.

1.3 Test Methodology

All testing were performed according to the procedures in ANSI C63.10: 2013.

1.4 Test Facility

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of **International Standards Laboratory Corp.**<LT Lab.> No. 120, Lane 180, Hsin Ho Rd., Lung-Tan Dist., Tao Yuan City 325, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.10: 2013. FCC Registration Number is: 487532; Designation Number is: TW0997, Canada Registration Number: 4067B-4.

1.5 Special Accessories

Not available for this EUT intended for grant.

1.6 Equipment Modifications

Not available for this EUT intended for grant.

2. System Test Configuration

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The EUT (Transmitter) was tested with a test program to fix the Tx frequency that was for the purpose of the measurements. For more information please see test data and APPENDIX 1 for set-up photographs.

2.3 Test Procedure

2.3.1 Conducted Emissions (Not apply in the report)

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 7, 13 of ANSI C63.4-2014 and RSS-Gen issue 5. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and Average detector mode.

2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8/1.5 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” Is still within the 3dB illumination BW of the measurement antenna. According to the requirements in Section 8 and 13 and Sub-clause 8.3.1.2 of ANSI C63.10: 2013.

2.4 Limitation

(1) Conducted Emission

According to section 15.207(a) Conducted Emission Limits is as following.

Frequency range MHz	Limits dB (uV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
Note 1.The lower limit shall apply at the transition frequencies 2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

(2) Radiated Emission

(a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

(b) In the emission table above, the tighter limit applies at the band edges.

(c) The level of any unwanted emissions from an intentional radiator operating under these general provisions shall not exceed the level of the fundamental emission. For intentional radiators which operate under the provisions of other Sections within this Part and which are required to reduce their unwanted emissions to the limits specified in this table, the limits in this table are based on the frequency of the unwanted emission and not the fundamental frequency. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.

The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

Frequency (MHz)	Field strength μV/m	Distance (m)	Field strength at 3m dBμV/m
0.009-0.490	2400/F(kHz)	300	
0.490-1.705	24000/F(kHz)	30	
1.705-30	30	30	69.54
30-88	100	3	40
88-216	150	3	43.5
216-960	200	3	46
Above 960	500	3	54

Limit Table:

Number of Harmonic	Frequency (kHz)	Distance m	Limit at 300m (dBuV/m)	Limit at 30m (dBuV/m)	Distance Factor dB	Limit at 3im (uV/m)
1	125	300	25.67	--	80	105.67
2	250	300	19.65	--	80	99.65
3	375	300	16.12	--	80	96.12
4	500	30	--	33.62	40	73.62
5	625	30	--	31.69	40	71.69
6	750	30	--	30.10	40	70.10
7	875	30	--	28.76	40	68.76
8	1000	30	--	27.60	40	67.60
9	1125	30	--	26.58	40	66.58
10	1250	30	--	25.67	40	65.67

Limit Calculation and transfer to 1m test distance:
If the frequency between 9 – 490kHz,
Limit = 20log(2400/f(kHz) + 40log(300/3)

If the frequency between 490 kHz – 1.705MHz
Limit = 20log(24000/f(kHz) + 40log(30/3)

2.5 Configuration of Tested System

Fig. 2-1 Configuration of Tested System

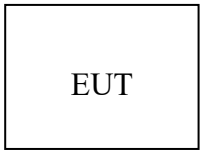


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/ Type No.	Series No.	Data Cable	Power Cord
1	N/A					

3. Summary of Test Results

FCC Rules	Description Of Test	Result
§15.207	Conducted Emission	N/A
§15.209	Radiated Emission	Compliant

4. Description of test modes

The EUT has been tested under continuous operating condition with a Test Kit. The Frequency 125kHz was chosen for testing.

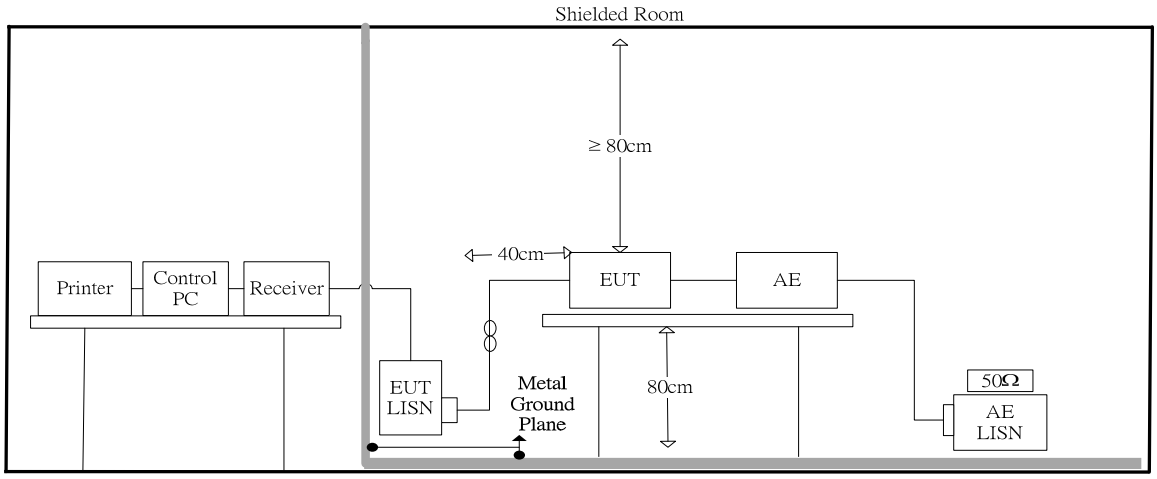
The field strength of radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1,E2 mode) three axis modes. Worse case H mode.

5. Conduced Emission Test

5.1 Measurement Procedure:

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

5.2 Test Setup



5.3 Measurement Equipment Used:

Location	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
Conduction 02	EMI Receiver 14	ROHDE& SCHWARZ	ESCI	101034	05/25/2021	05/25/2022
Conduction 02	Conduction 02-1 Cable	WOKEN	CFD 300-NL	Conduction 02 -1	10/13/2021	10/13/2022
Conduction 02	LISN 26	R&S	ENV216	102378	12/03/2021	12/03/2022
Conduction 02	LISN 21	R&S	ENV216	101476	07/05/2021	07/05/2022
Conduction 02	ISN T4 07	Teseq GmbH	ISN T400A	30449	07/16/2021	07/16/2022
Conduction 02	ISN T8 10	Teseq GmbH	ISN T800	42773	07/16/2021	07/16/2022
Conduction 02	ISN T8 CAT6A_01	SCHWARZBECK	NTFM 8158	8158 0123	01/25/2022	01/25/2023
Conduction 02	CDN ISN ST08A_1	Teseq GmbH	CDN ISN ST08A	43352	10/07/2021	10/07/2022
Conduction 02	Capacitive Voltage Probe 01	SCHAFFNER	CVP 2200A	18711	02/23/2022	02/23/2023
Conduction 02	Current Probe	SCHAFFNER	SMZ 11	18030	02/23/2022	02/23/2023

5.4 Measurement Result:

N/A

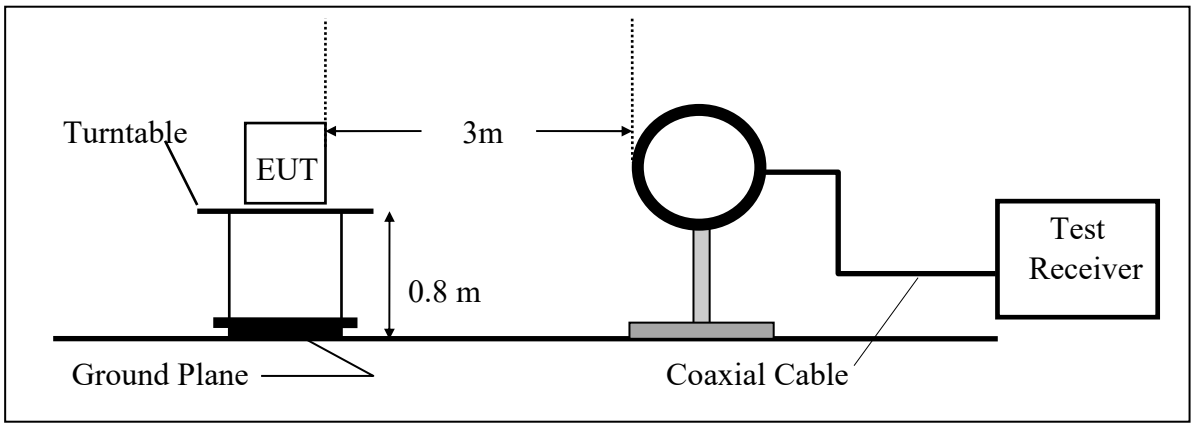
6. Radiated Emission Test

6.1 Measurement Procedure

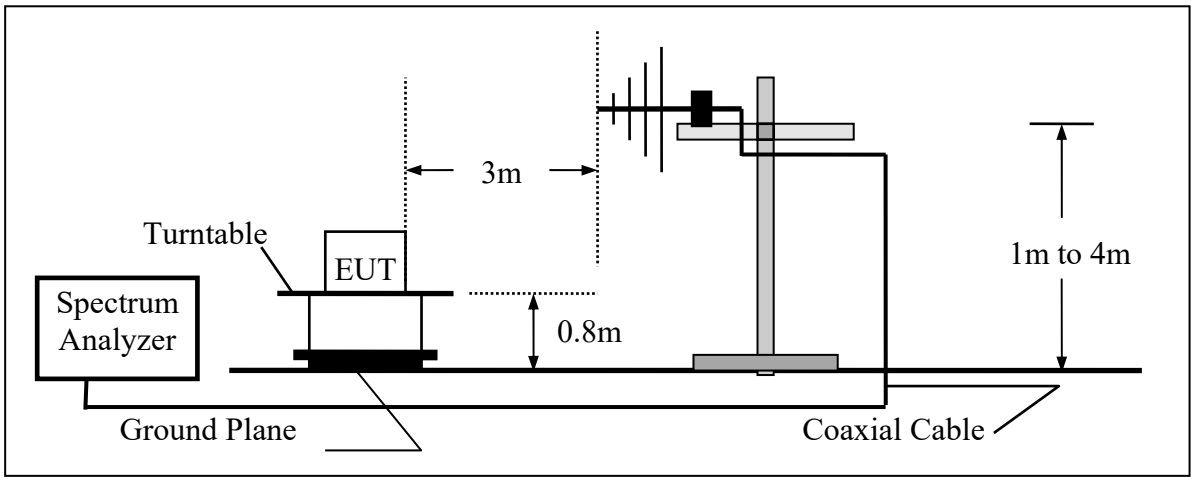
1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measured were complete.

6.2 Test SET-UP (Block Diagram of Configuration)

(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency Below 1000MHz



6.3 Measurement Equipment Used:

Location Conducted	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
Chamber 19	Signal analyzer	R&S	FSV40	101919	8/18/2021	8/18/2022
Chamber 19	EMI Receiver	R&S	ESR3	102461	5/05/2021	5/05/2022
Chamber 19	Loop Antenna	EM	EM-6879	271	09/29/2021	09/29/2022
Chamber 19	Bilog Antenna (30MHz-1GHz)	Schwarzbeck	VULB9168 w 6dB Att.	9168-736	2/22/2022	2/22/2023
Chamber 19	Horn antenna (1GHz-18GHz)	ETS	3117	00218718	10/12/2021	10/12/2022
Chamber 19	Horn antenna (18GHz-26GHz)	Com-power	AH-826	081001	11/30/2021	11/30/2022
Chamber 19	Horn antenna (26GHz-40GHz)	Com-power	AH-640	100A	03/11/2022	03/11/2023
Chamber 19	Preamplifier (9kHz-1GHz)	HP	8447F	3113A04621	06/22/2021	06/22/2022
Chamber 19	Preamplifier (1GHz - 26GHz)	EM	EM01M26G	060681	05/07/2021	05/07/2022
Chamber 19	Preamplifier (26GHz-40GHz)	MITEQ	JS4-26004000-27-5A	818471	05/07/2021	05/07/2022
Chamber 19	RF Cable (100kHz-26.5GHz)	Huber Suhner	Sucoflex 104A	MY1394/4A & 50886/4A	08/30/2021	08/30/2022
Chamber 19	RF Cable (18GHz-40GHz)	HUBER SUHNER	Sucoflex 102	27963/2&37421/2	11/17/2021	11/17/2022
Chamber 19	Signal Generator	Anritsu	MG3692A	20311	12/28/2021	12/28/2022
Chamber 19	Test Software	Audix	E3 Ver:6.12023	N/A	N/A	N/A

6.4 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Average Value = Peak Value + 20 Log (Ton/Tp) ……. Pulse Modulation

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

6.5 Measurement Result

Fundamental Measurement Result

Operation Mode	: TX CH	Test Date	: 2021/12/07
Fundamental Frequency	: 125kHz	Test By	: Weitin
Temp	: 25 ℃	Hum.	: 60%

Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
0.12	39.60	30.02	69.62	105.00	-35.38	Peak	VERTICAL
0.12	52.27	29.96	82.23	105.00	-12.77	Peak	HORIZONTAL

Remark:

1 Measurement distance is 3 m.

2 The IF bandwidth of SPA was 10kHz, VBW=30kHz.

Radiated Spurious Emission Measurement Result (9 kHz~30 MHz)

Operation Mode: Transmitting Mode
Test Date: 2021/12/07
Fundamental Frequency: 125kHz
Test By: Weitin
Temperature : 25 ℃
Humidity : 65 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	1.81	16.56	12.02	28.58	69.54	-40.96	Peak	VERTICAL
2	8.80	16.01	10.97	26.98	69.54	-42.56	Peak	VERTICAL
3	11.26	16.03	11.21	27.24	69.54	-42.30	Peak	VERTICAL
4	16.05	16.07	10.94	27.01	69.54	-42.53	Peak	VERTICAL
5	20.37	15.82	10.91	26.73	69.54	-42.81	Peak	VERTICAL
6	24.78	16.04	12.32	28.36	69.54	-41.18	Peak	VERTICAL
1	0.40	28.63	20.02	48.65	105.40	-56.75	Peak	HORIZONTAL
2	2.89	16.07	10.14	26.21	69.54	-43.33	Peak	HORIZONTAL
3	7.27	18.04	10.47	28.51	69.54	-41.03	Peak	HORIZONTAL
4	10.78	16.62	11.24	27.86	69.54	-41.68	Peak	HORIZONTAL
5	14.53	15.96	11.02	26.98	69.54	-42.56	Peak	HORIZONTAL
6	19.02	16.13	10.82	26.95	69.54	-42.59	Peak	HORIZONTAL

Remark:

1 Measurement distance is 3 m.

2 The IF bandwidth of SPA was 10kHz, VBW=30kHz.

Radiated Spurious Emission Measurement Result (30 MHz – 1 GHz)

Operation Mode: Transmitting Mode
Test Date: 2021/12/07
Fundamental Frequency: 125kHz
Test By: Weitin
Temperature : 25 ℃
Humidity : 65 %

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	167.74	26.97	-5.68	21.29	43.50	-22.21	Peak	VERTICAL
2	266.68	27.74	-6.01	21.73	46.00	-24.27	Peak	VERTICAL
3	363.68	27.09	-3.71	23.38	46.00	-22.62	Peak	VERTICAL
4	456.80	28.58	-1.69	26.89	46.00	-19.11	Peak	VERTICAL
5	517.91	36.83	-0.88	35.95	46.00	-10.05	Peak	VERTICAL
6	780.78	28.76	4.13	32.89	46.00	-13.11	Peak	VERTICAL
1	148.34	27.78	-5.74	22.04	43.50	43.50	Peak	HORIZONTAL
2	257.95	27.94	-6.42	21.52	46.00	43.50	Peak	HORIZONTAL
3	399.57	27.78	-2.97	24.81	46.00	46.00	Peak	HORIZONTAL
4	514.03	33.92	-0.96	32.96	46.00	46.00	Peak	HORIZONTAL
5	641.10	28.59	1.63	30.22	46.00	46.00	Peak	HORIZONTAL
6	764.29	28.63	3.88	32.51	46.00	46.00	Peak	HORIZONTAL

Remark:

1 Measuring frequencies from the lowest internal frequency to the 1GHz.

2 Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak / QP detector mode.

3 The IF bandwidth of SPA between 30MHz to 1GHz was 100kHz, VBW=300kHz.