



FCC PART 15.225

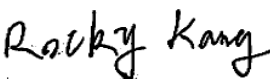
TEST REPORT

For

Cubic Transportation Systems, Inc.

5650 Kearny Mesa Road, San Diego, California 92111, United States

FCC ID: LVC310B

Report Type: Original Report	Product Type: 5300-10009
Report Number: RSZ181011005-00C	
Report Date: 2018-11-22	
Rocky Kang 	
Reviewed By: RF Engineer	
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The information marked # is provided by the applicant, the laboratory is not responsible for its authenticity.

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Cubic Transportation Systems, Inc.*'s product, model number: 5300-10009-2 (FCC ID: LVC310B) or the "EUT" in this report was a 5300-10009, which was measured approximately: 125.0 mm (L) * 33.6 mm (W) * 205.0 mm (H), rated with input voltage: DC 3.7 V or DC 12-24V.

Notes: This series products model: 5300-10009-4 and 5300-10009-2 are electrically identical. Model 5300-10009-2 was selected for testing, the detailed information can be referred to the declaration letter.

**All measurement and test data in this report was gathered from production sample serial number: 181011005. (Assigned by BACL, Shenzhen). The EUT supplied by the applicant was received on 2018-10-11.*

Objective

This Type approval report is prepared on behalf of *Cubic Transportation Systems, Inc.* in accordance with Part 2- Subpart J, and Part 15-Subparts A and C of the Federal Communication Commissions rules.

The objective is to determine the compliance of the EUT with FCC rules, section 15.203, 15.205, 15.209 and 15.225.

Related Submittal(s)/Grant(s)

FCC Part 15.247 DSS & DTS submissions with FCC ID: LVC310B.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		±5%
AC Power Lines Conducted Emissions		±1.95dB
Radiated Emissions	Below 1GHz	±4.75dB
	Above 1GHz	±4.88dB
Temperature		±1 °C
Humidity		±6%
Supply voltages		±0.4%

Note: Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, Guangdong, China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 342867, the FCC Designation No.: CN1221.

The test site has been registered with ISED Canada under ISED Canada Registration Number 3062B.

SYSTEM TEST CONFIGURATION

Justification

The system was configured for testing in a typical fashion (as normally used by a typical user).

EUT Exercise Software

No Exercise Software was used.

Equipment Modifications

No modification on the EUT.

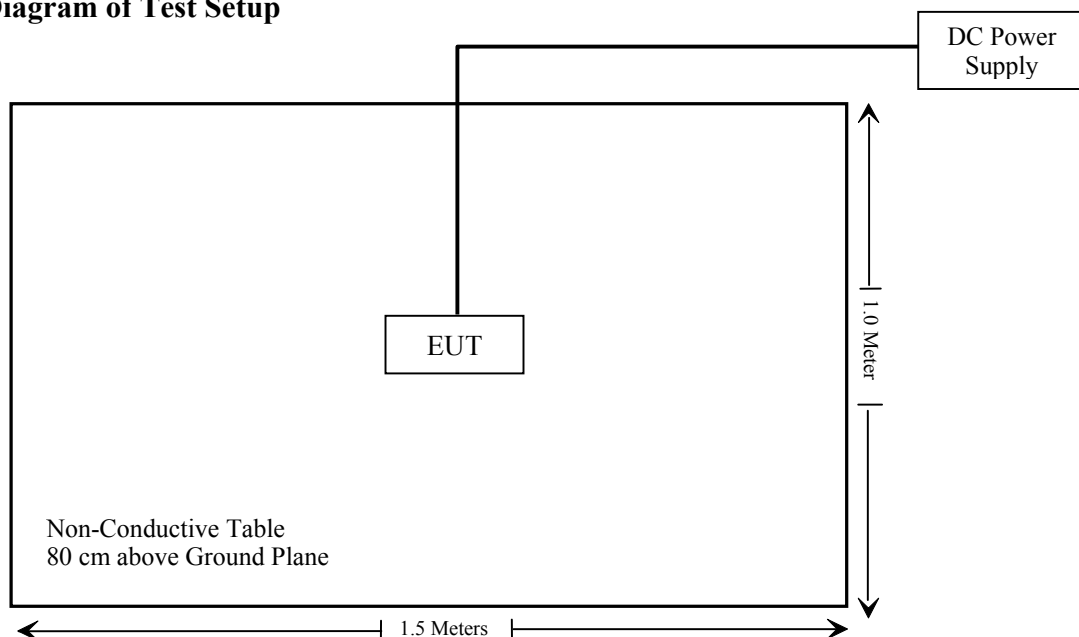
Local Support Equipment

Manufacturer	Description	Model	Serial Number
Pro instrument	DC Power Supply	pps3300	N/A

External I/O Cable

Cable Description	Length (m)	From Port	To
Un-shielding detachable DC Cable	1.2	EUT	DC Power Supply

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliance*
§15.207	AC Line Conducted Emission	Not Applicable
§15.225 §15.209 §15.205	Radiated Emission Test	Compliance**
§15.225(e)	Frequency Stability	Compliance*
§15.215(c)	20dB Emission Bandwidth	Compliance*

Note:

Not Applicable: EUT power by battery and used on vehicle.

Compliance*: Model 5300-10009-1, 5300-10009-3 (FCC ID: LVC312B) and this EUT have the identical main board except the EUT removing the 3G module, so adding the test item “RADIATED EMISSIONS TEST”, the other test data are referred to the report RSZ181011003-00C with model number 5300-10009-1, 5300-10009-3 (FCC ID: LVC312B), issued on 2018-11-22 by Bay Area Compliance Laboratories Corp. (Shenzhen). Please see details in the attestation letter for the differences.

Compliance**: Pre-test the radiated emission. For below 30MHz, the result is better than the data in RSZ181011003-00C. So only recorded the radiated emission data above 30MHz. Please refer to the RSZ181011003-00C for the data below 30MHz.

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test					
HP	Amplifier	HP8447E	1937A01046	2018-05-17	2018-11-19
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2018-01-11	2019-01-11
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2017-12-22	2020-12-21
ETS	Passive Loop Antenna	6512	29604	2018-03-07	2021-03-06
Sonoma instrument	Amplifier	310N	186238	2018-11-12	2019-11-12
Ducommun technologies	RF Cable	UFA147A-2362-100100	MFR64639 231029-003	2018-08-01	2019-02-01
Ducommun technologies	RF Cable	104PEA	218124002	2018-05-21	2018-11-21

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

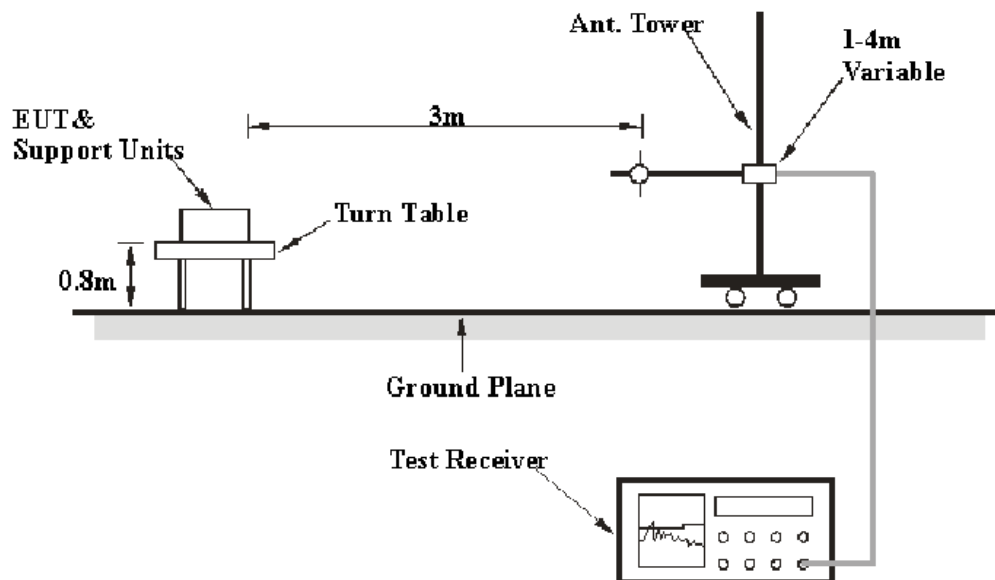
FCC§15.225, §15.205 & §15.209 - RADIATED EMISSIONS TEST

Applicable Standard

As per FCC Part 15.225

- (a) The field strength of any emissions within the band 13.553–13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.
- (b) Within the bands 13.410–13.553 MHz and 13.567–13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.
- (c) Within the bands 13.110–13.410 MHz and 13.710–14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.
- (d) The field strength of any emissions appearing outside of the 13.110–14.010 MHz band shall not exceed the general radiated emission limits in §15.209.

EUT Setup



Note: Antenna is set up at 1m during test for below 30MHz.

The radiated emission tests were performed in the 3-meter chamber a test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC Part Subpart C limits.

EMI Test Receiver Setup

According to FCC Rules, 47 CFR 15.33, the EUT emissions were investigated up to 1000 MHz.

During the radiated emission test, the EMI test Receiver was set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
9 kHz – 150 kHz	300 Hz	1 kHz	/	QP
150 kHz – 30 MHz	10 kHz	30 kHz	/	QP
30 MHz – 1000 MHz	100 kHz	300 kHz	/	QP

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\begin{aligned}\text{Corrected Factor} &= \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain} \\ \text{Corrected Amplitude} &= \text{Meter Reading} + \text{Corrected Factor}\end{aligned}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Results Summary

According to the data in the following table, the EUT complied with the FCC §15.209.

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level is in compliance with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

In BACL, $U_{(Lm)}$ is less than U_{cispr} , if L_m is less than L_{lim} , it implies that the EUT complies with the limit.

Test Data

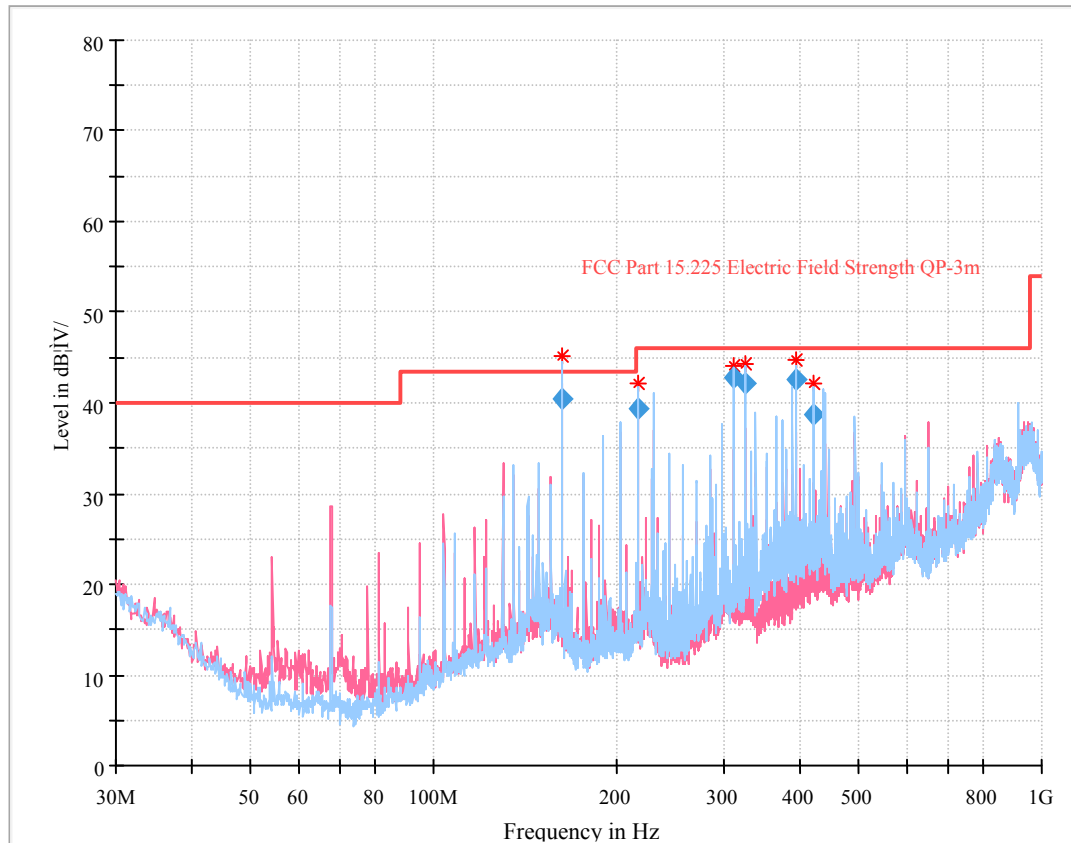
Environmental Conditions

Temperature:	25 °C
Relative Humidity:	52 %
ATM Pressure:	101.0 kPa

The testing was performed by Tracy Hu on 2018-11-13.

Test mode: Transmitting

Spurious Emissions (30 MHz~1GHz):



Frequency (MHz)	Corrected Amplitude (dBμV/m)	Antenna height (cm)	Antenna Polarity	Turntable position (degree)	Correction Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
162.737250	40.50	220.0	H	280.0	-14.6	43.50	3.00
216.968125	39.11	164.0	H	276.0	-13.9	46.00	6.89
311.885875	42.81	108.0	H	277.0	-10.7	46.00	3.19
325.447250	42.20	108.0	H	281.0	-10.7	46.00	3.80
395.203875	42.61	109.0	H	308.0	-10.4	46.00	3.39
420.351375	38.64	108.0	H	272.0	-9.5	46.00	7.36

Note:

- 1) Correction Factor = Antenna factor (Rx) + Cable Loss – Amplifier factor
- 2) Corrected Amplitude = Reading + Correction Factor
- 3) Margin = Limit – Corrected Amplitude

***** END OF REPORT *****