Produkte
Products

Prüfbericht-Nr.: *Test Report No.*:	**50286666 001**	**Auftrags-Nr.:** *Order No.*:	**158116242**	**Seite 1 von 13** *Page 1 of 13*
Kunden-Referenz-Nr.: *Client Reference No.*:	**N/A**	**Auftragsdatum:** *Order date*:	**23.08.2019**	
Auftraggeber: *Client*:	**Bulk Unlimited Corp** **199 Lee Ave. Suite 464 BROOKLYN, New York, United States**			
Prüfgegenstand: *Test item*:	**Short Range Device - Radio Control Toy Transmitter (49.860MHz)**			
Bezeichnung / Typ-Nr.: *Identification / Type No.*:	**2409**			
Auftrags-Inhalt: *Order content*:	**FCC Certification**			
Prüfgrundlage: *Test specification*:	**FCC Part 15 Subpart C** **ANSI C63.10-2013**			
Wareneingangsdatum: *Date of receipt*:	**05.09.2019**			
Prüfmuster-Nr.: *Test sample No.*:	**A000987050-002**			
Prüfzeitraum: *Testing period*:	**06.09.2019 - 19.09.2019**			
Ort der Prüfung: *Place of testing*:	**Hong Kong**			
Prüflaboratorium: *Testing laboratory*:	**TÜV Rheinland Hong Kong Ltd.**			
Prüfergebnis*: *Test result**:	**Pass**			

geprüft von / *tested by*:			**kontrolliert von** / *reviewed by*:		
04.10.2019	Joey Leung Project Manager		04.10.2019	Sharon Li Unit Senior Manager	
Datum *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*	**Datum** *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*

Sonstiges **FCC ID: 2AE67-2409**
Other:

Zustand des Prüfgegenstandes bei Anlieferung: Prüfmuster vollständig und unbeschädigt
Condition of the test item at delivery: *Test item complete and undamaged*

* Legende:	1 = sehr gut	2 = gut	3 = befriedigend	4 = ausreichend	5 = mangelhaft
	P(ass) = entspricht o.g. Prüfgrundlage(n)		F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
Legend:	*1 = very good*	*2 = good*	*3 = satisfactory*	*4 = sufficient*	*5 = poor*
	P(ass) = passed a.m. test specification(s)		*F(ail) = failed a.m. test specification(s)*	*N/A = not applicable*	*N/T = not tested*

Table of Content

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Product information

Manufacturers declarations

	Transmitter
Operating frequency range	49.860MHz
Type of modulation	ASK
Number of channels	1
Type of antenna	Integral Antenna
Power level	fix
Connection to public utility power line	No
Nominal voltage	V_{nor}: 3.0Vdc (2 x 1.5V “AA” battery)

Product function and intended use

The equipment under test (EUT) is a radio control toy transmitter operating at 49.860MHz. It is powered by 3.0VDC (2 x 1.5V “AA” battery).

FCC ID: 2AE67-2409

Models	Product description
2409	Short Range Device - Radio Control Toy Transmitter (49.860MHz)

Submitted documents

Circuit Diagram
Block Diagram
Technical Description
User manual
Label

Independent Operation Modes

The basic operation modes are:

- Transmitting mode

For further information refer to User Manual

Related Submittal(s) Grants

This is a single application for certification of the transmitter.

Remark

The test results in this test report are only relevant to the tested sample and does not involve any assessment in the production

Test Set-up and Operation Mode

Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

Test Operation and Test Software

Test operation should refer to test methodology.

- No testing software is provided by the applicant.

Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessories:

- None

Countermeasures to achieve EMC Compliance

- None

Test Methodology

Radiated Emission

The radiated emission measurements of the transmitter part were performed according to the procedures in ANSI C63.10-2013. The conducted emission measurements of the receiver part were performed according to the procedures in ANSI C63.4-2014.

For radiated emission measurement below 1GHz, the equipment under test (EUT) was placed at the middle of the 80 cm height turntable. For radiated emission measurement above 1GHz, the EUT was placed at the middle of the 1.5 m height turntable and RF absorbing material was placed on ground plane between turntable and measuring antenna. During the testing, the EUT was operated standalone and arranged for maximum emissions. The EUT was tested in three orthogonal planes.

The investigation is performed with the EUT rotated 360°, the antenna height scanned between 1m and 4m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained.

All radiated tests were performed at an antenna to EUT with 3 meters distance, unless stated otherwise in particular parts of this test report.

Field Strength Calculation

The field strength at 3 m was established by adding the meter reading of the spectrum analyzer to the factors associated with antenna correction factor, cable loss, preamplifiers and filter attenuation.

The equation is expressed as follow:

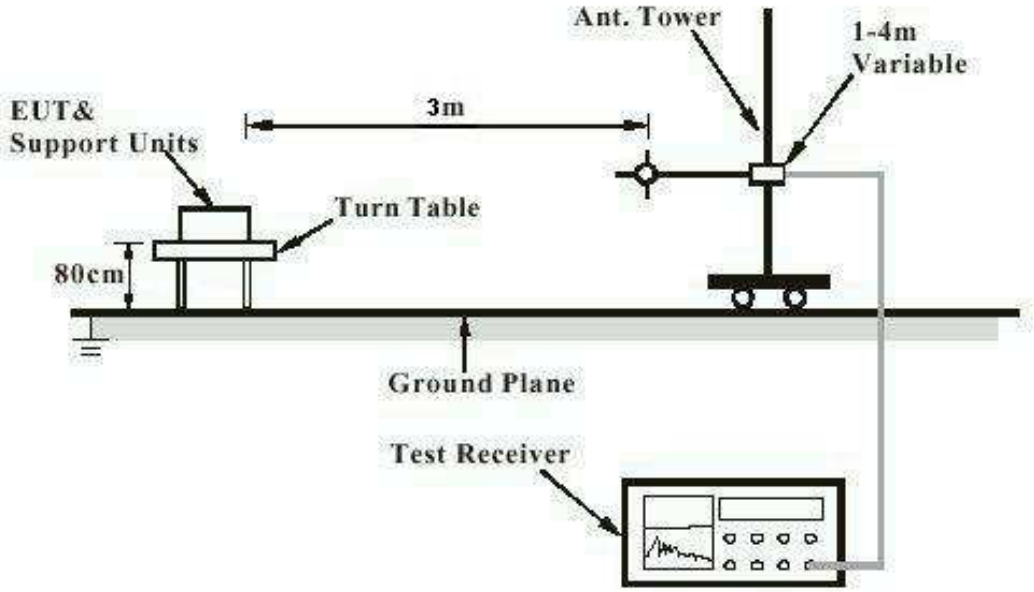
FS = R + AF + CF + FA – PA

Where FS = Field Strength in dBuV/m at 3 meters.
R = Reading of Spectrum Analyzer in dBuV.
AF = Antenna Factor in dB.
CF = Cable Attenuation Factor in dB.
FA = Filter Attenuation Factor in dB.
PA = Preamplifier Factor in dB.

FA and PA are only be used for the measuring frequency above 1 GHz.

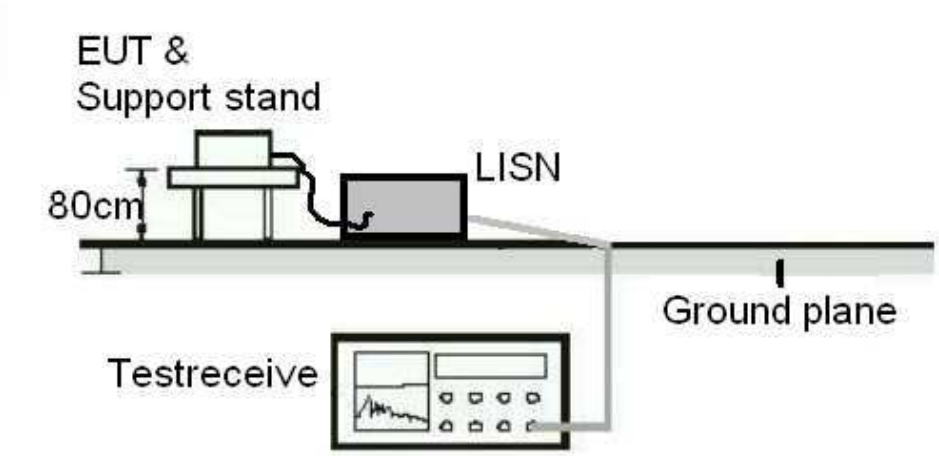
Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test



Note: Measurements above 1 GHz are done with a table height of 1.5m. In addition, there is RF absorbing material on the floor of the test site for above 1GHz measurement.

Diagram of Measurement Equipment Configuration for Mains Conduction Measurement (if applicable)



Test Facility

Test Laboratory Information

TÜV Rheinland Hong Kong Ltd.
Address: 3-4, 11/F., Fou Wah Industrial Building, 10-16 Pun Shan Street, Tsuen Wan, N.T., Hong Kong
Tel.: +852 2192 1000
Fax: +852 2192 1001
Email service-gc@tuv.com
Web: www.tuv.com

The test facility is recognized or accredited by the following organizations:

FCC

Type	:	Accredited Test Firm
Designation Number	:	HK0013
Test Firm Registration Number	:	371735
Scope	:	Intentional Radiators

List of Test and Measurement Instruments

Hong Kong Productivity Council

Radiated Emission

Equipment	Manufacturer	Type	S/N	Cal. Date	Cal. Due Date
Semi-anechoic Chamber	Frankonia	Nil	Nil	23 Apr 2019	23 Apr 2020
Test Receiver	R & S	ESU26	100050	11 Jun 2019	11 Jun 2020
Bi-conical Antenna	R & S	HK116	100241	21 Mar 2018	21 Mar 2020
Log Periodic Antenna	R & S	HL223	841516/017	22 Mar 2018	22 Mar 2020
Cable with I-Joint Conector	Huber+Suhner	CNM-NMCMILX800-473	A2803 #0001	04 Oct 2018	04 Oct 2020
Active Loop Antenna	EMCO	6502	9107-2651	25 Oct 2018	25 Oct 2019
Semi-anechoic Chamber (SiteVSWR)	Frankonia	Nil	Nil	16 May 2019	16 May 2020
Double-Ridged Waveguide Horn	EMCO	3116	00109210	05 Oct 2018	05 Oct 2019
Double-Ridged Waveguide Horn	EMCO	3117	00094998	30 Aug 2018	30 Aug 2020
Cable with I-Joint Conector	Huber+Suhner	CNM-NMCMILX800-473	A2803 #0001	04 Oct 2018	04 Oct 2020
Microwave Preamplifier	COM-POWER Corporation	PAM-118A	551091	25 Jun 2019	25 Jun 2020
Preamplifier 18GHz to 40GHz with cable (EMC656)	A.H. Systems, Inc.	PAM-1840VH	168	30 Jan 2019	30 Jan 2020
High Pass Filter (cutoff freq. =1000MHz)	Trilithic	23042	9829213	30 Oct 2017	30 Oct 2019
High Frequency Cable	Pasternack	PE3VNA4001-3M	20160707C02493	29 Jan 2019	29 Jan 2020
Horn Antenna	EMCO	3115	9002-3347	28 Mar 2018	28 Mar 2020

TÜV Rheinland Hong Kong Ltd

Radio Test

Equipment	Manufacturer	Type	S/N	Cal. Date	Cal. Due Date
Spectrum Analyzer	R & S	FSP30	100610	26 Jun 2019	25 Jun 2020

Measurement Uncertainty

The estimated combined standard uncertainty for power-line conducted emissions measurements is ±2.42dB.

The estimated combined standard uncertainty for radiated emissions measurements is ±4.81dB (9kHz to 30MHz) and ±4.62dB (30MHz to 200MHz) and ±5.67dB (200MHz to 1000MHz) and is ±5.07dB (1GHz to 8.2GHz) and ±4.58dB (8.2GHz to 12.4GHz) and ±4.78dB (12.4GHz to 18GHz)

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor of k=2, which for the level of confidence is approximately 95%.

Results FCC Part 15 – Subpart C

FCC 15.203 – Antenna Requirement 1		**Pass**
FCC Requirement:	No antenna other than that furnished by the responsible party shall be used with the device	
Results:	a) Antenna type:	Fixed Integral antenna
	b) Manufacturer and model no:	N/A
	c) Peak Gain:	N/A
Verdict:	Pass	

FCC 15.204 – Antenna Requirement 2	**Pass**
FCC Requirement:	An intentional radiator may be operated only with the antenna with which it is authorized. If an antenna is marketed with the intentional radiator, it shall be of a type which is authorized with the intentional radiator.
Results:	Only one integral antenna can be used.
Verdict:	Pass

FCC 15.215(c) – 20 dB Bandwidth	**Pass**
Test Specification : ANSI C63.10 – 2013 Test date : 18.09.2019 Mode of operation : TX mode Port of testing : Enclosure Temperature : 23ºC Humidity : 50%	
Requirement:	The intentional radiators must be designed to ensure that the 20dB bandwidth of the emission, is contained within the frequency band designated in the rule section under which the equipment is operated.
Results:	For test protocols refer to Appendix 1.

Frequency (MHz)	**20 dB left (MHz)**	**Limit (MHz)**	**20 dB right (MHz)**	**Limit (MHz)**
49.860	49.834	>49.82	49.887	<49.90

FCC 15.235(a) – Radiated Emission (Fundamental)		**Pass**
Test Specification : ANSI C63.10-2013 Test date : 11.09.2019 Mode of operation : TX mode Port of testing : Enclosure Supply voltage : 3.0VDC Temperature : 23ºC Humidity : 50%		
Requirement:	The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following limit.	
Results:	Pass	
Fundamental Frequency	Vertical Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
49.860	63.4	100 / PK
49.860	59.2	80 / AV
Fundamental Frequency	Horizontal Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
49.860	49.2	100 / PK
49.860	44.5	80 / AV

FCC 15.235(b) – Out Of Band Radiated Emissions			**Pass**
Test Specification : ANSI C63.10-2013 Test date : 11.09.2019 Mode of operation : TX mode Port of testing : Enclosure Supply voltage : 3.0VDC Frequency range : 9kHz to 1GHz Temperature : 23ºC Humidity : 50%			
Requirement:	The field strength of any emissions which appear outside the assigned bands shall not exceed the general radiated limits shown in §15.209.		
Results:	Pass		
Vertical Polarization			
Freq MHz		**Level dBuV/m**	**Limit/ Detector dBuV/m**
No peak found		---	40.0 / QP
99.721		28.5	43.5 / QP
No peak found		---	46.0 / QP
Horizontal Polarization			
Freq MHz		**Level dBuV/m**	**Limit/ Detector dBuV/m**
No peak found		---	40.0 / QP
99.721		22.7	43.5 / QP
No peak found		---	46.0 / QP

FCC 15.235(b) – Band-edge Emissions			**Pass**
Test Specification : ANSI C63.10-2013 Test date : 11.09.2019 Mode of operation : TX mode Port of testing : Enclosure Supply voltage : 3.0VDC Temperature : 23ºC Humidity : 50%			
Requirement:	The field strength of any emissions which appear outside the assigned bands shall not exceed the general radiated limits shown in §15.209.		
Results:	Pass		
Vertical Polarization			
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**	
49.820	36.68	40.0 / QP	
49.900	37.54	40.0 / QP	
Horizontal Polarization			
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**	
49.820	22.48	40.0 / QP	
49.900	23.34	40.0 / QP	