

ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR SUPERHETRODYNE TRANSMITTER

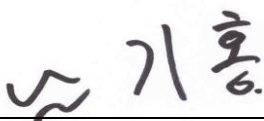
Test Report No. : E134R-074
AGR No. : A131A-203R1
Applicant : DAEDONG Co., Ltd.
Address : 424, Sinwon-ro, Danwon-gu, Ansan-si, Gyeonggi-do, Korea
Manufacturer : DAEDONG Co., Ltd.
Address : 424, Sinwon-ro, Danwon-gu, Ansan-si, Gyeonggi-do, Korea
Type of Equipment : Folding Transmitter
FCC ID : NYODD4TX1306-TFL
IC Certification No. : 3109A-DD4TX1306TFL
Model No. : DD4TX1306-TFL
Serial number : N/A
Total page of Report : 14 pages (including this page)
Date of Incoming : March 28, 2013
Date of issuing : April 17, 2013

SUMMARY

The equipment complies with the regulation; **FCC PART 15 SUBPART C Section 15.231 and IC RSS-Gen Issue 3 and RSS 210 Issue 8**

This test report contains only the result of a single test of the sample supplied for the examination. It is not a general valid assessment of the features of the respective products of the mass-production.

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1. VERIFICATION OF COMPLIANCE

APPLICANT : DAEDONG Co., Ltd.
 ADDRESS : 424, Sinwon-ro, Danwon-gu, Ansan-si, Gyeonggi-do, Korea
 CONTACT PERSON : Mr. Hak-Su, Khim / Quality Control Assistant Manager
 TELEPHONE NO : +82-2-6930-4215
 FCC ID : NYODD4TX1306-TFL
 IC CERTIFICATION NO. : 3109A-DD4TX1306TFL
 MODEL NAME : DD4TX1306-TFL
 DATE : April 17, 2013

EQUIPMENT CLASS	FCC: DSC - Part 15, Security/Remote Control Transmitter IC: Low Power Licence - exempt Radiocommunication Device Category I Equipment
E.U.T. DESCRIPTION	Folding Transmitter
THIS REPORT CONCERNS	Original Grant
MEASUREMENT PROCEDURES	ANSI C63.10: 2009 RSS-Gen Issue 3 and RSS 210 Issue 8
TYPE OF EQUIPMENT TESTED	Pre-Production
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	Certification
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 SUBPART C Section 15.231 and RSS 210 Issue 8
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	No
FINAL TEST WAS CONDUCTED ON	10 m, Semi Anechoic Chamber

The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC & IC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

2. GENERAL INFORMATION

2.1 Product Description

The DAEDONG Co., Ltd., Model: DD4TX1306-TFL (referred to as the EUT in this report) is a Transmitter that it controls locking and unlocking the door of a vehicle. Product specification information described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	Plastic
TX FREQUENCY	315MHz
MODULATION	FSK
LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>= 1 MHz)	13.558 MHz
ANTENNA TYPE	Built-in on the PCB in EUT
RATED SUPPLY VOLTAGE	DC 3 V from a battery
NUMBER OF LAYERS	2 Layers

2.2 Model Differences:

-. None

2.3 Related Submittal(s) / Grant(s)

Original submittal only

2.4 Purpose of the test

To determine whether the equipment under test fulfills the requirements of the regulation stated in FCC PART 15 SUBPART C Section 15.231 and IC RSS-Gen Issue 3 and RSS 210 Issue 8

2.5 Test Methodology

Radiated testing was performed according to the procedures in ANSI C63.10: 2009 and RSS-210, Issue 8 & RSS-Gen Issue 3 at a distance of 3 m from EUT to the antenna.

2.6 Test Facility

The 10 m, Semi Anechoic Chamber and conducted measurement facilities are located on at 301-14, Daessangryung-ri, Chowol-eup, Gwangju-si, Gyeonggi-do, 464-862, Korea. The Onetech Corp. has been accredited as a Conformity Assessment Body (CAB) with designation number KR0013 and was submitted to the Industry Canada on April 14, 2009.(Registration Number:IC3736A-2).

3. SYSTEM TEST CONFIGURATION

3.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
Main Board	DAEDONG Co., Ltd.	TF F/L TX V1.0	N/A

3.2 Peripheral equipment

-. None

3.3 Mode of operation during the test

-. To get a maximum radiated emission from the EUT, the button on the EUT was continuously pressed to transmit the signal. To activate continuous transmission, place a small plastic block between rubber band and the push button on the EUT. To get a maximum emission levels from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes. The worst case data is XY axis.

3.4 Equipment Modifications

-. None

3.5 Configuration of Test System

Line Conducted Test: It is not need to test this requirement, because the EUT shall be operated by DC battery.

Radiated Emission Test: Preliminary radiated emissions tests were conducted using the procedure in ANSI C63.10: 2009 to determine the worse operating conditions. Final radiated emission tests were conducted at 3 m semi anechoic chamber.

The turntable was rotated through 360 degrees and the EUT was tested by positioned three orthogonal planes to obtain the highest reading on the field strength meter. Once maximum reading was determined, the search antenna was raised and lowered in both vertical and horizontal polarization.

Occupied Bandwidth Measurement: This measurement is performed with the antenna located close enough to give a full-scale deflection of the modulated carrier on the spectrum analyzer. The plot is taken at 20 kHz/division frequency span, 10 kHz resolution bandwidth and 10 dB/division logarithmic display from the spectrum analyzer.

3.6 Antenna Requirement

For intentional device, according to FCC PART 15 SUBPART C Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device and the standard RSS-Gen Issue 3, section 7.1.2, the transmitter antenna shall be integral with the device, or the antenna coupling be so designed that no antenna other than that furnished by the party responsible for compliance shall be used.

Antenna Construction: The transmitter antenna of the EUT is a pattern antenna on the main board in the EUT, so no consideration of replacement by the user.

4. PRELIMINARY TEST

4.1 AC Power line Conducted Emissions Tests

During Preliminary Tests, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
It is not need to test this requirement, because the power of the EUT is supplied from a DC battery.	

4.2 Radiated Emissions Tests

During Preliminary Tests, the following operating modes were investigated

Operation Mode	The Worse operating condition (Please check one only)
TX Mode	X

5. FINAL RESULT OF MEASUREMENT

5.1 Field Strength of the Carrier Test

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 41 % R.H. Temperature: 21 °C
 Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.231(b), RSS 210 Issue 8
 Result : PASSED

EUT : Folding Transmitter Date: March 28, 2013
 Operating Condition : TX mode
 Distance : 3 m

Frequency (GHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
315.00	66.80	Peak	H	15.10	3.70	32.90	52.70	95.62	-42.92
	63.50	Peak	V				49.40	95.62	-46.22
	63.20	Average	H				49.10	75.62	-26.52
	60.20	Average	V				46.10	75.62	-29.52



Tested by: Hong-Kyu, Lee/ Engineer

5.2 Transmitter Transmission Duration

Humidity Level : 41 % R.H.

Temperature: 21 °C

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.231(b), RSS 210 Issue 8

Result : PASSED

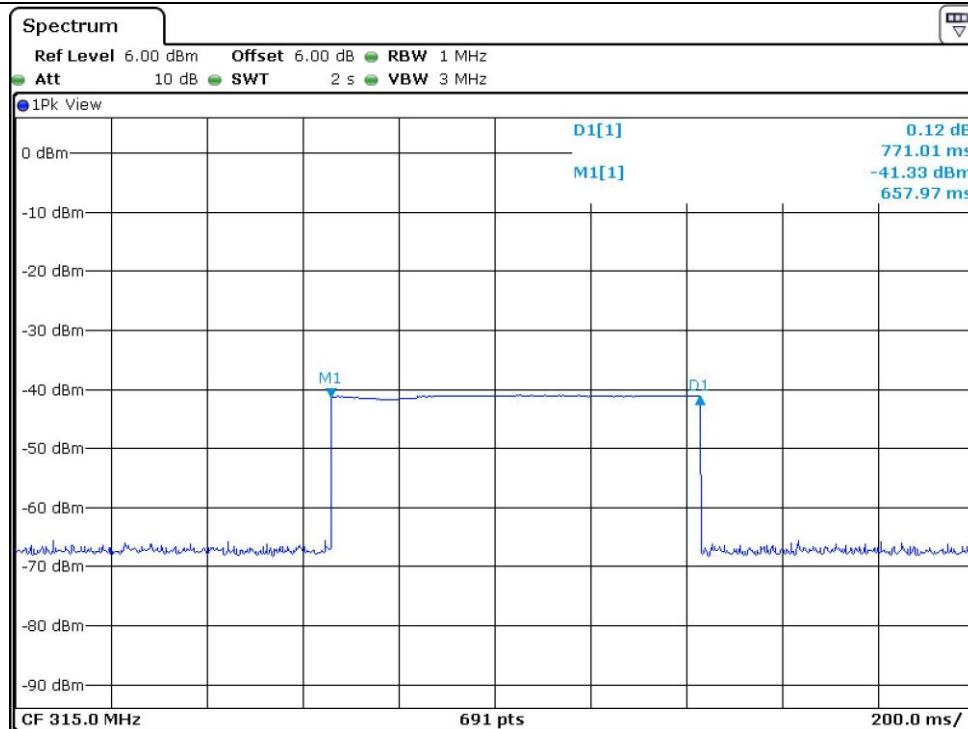
EUT : Folding Transmitter

Date: March 28, 2013

Operating Condition : TX mode

Distance : 3 m

Manually Activated Duration (s)	Limit (s)	Margin (s)	Result
0.771	5.0	4.229	Pass



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5.3 Spurious Emission Test

5.3.1 Test data for Blow 30 MHz

- Test Date : March 28, 2013
- Resolution bandwidth : 200 Hz (from 9 kHz to 0.15 MHz), 9 kHz (from 0.15 MHz to 30 MHz)
- Frequency range : 9 kHz ~ 30 MHz
- Measurement distance : 3 m

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBμV/m)	Limits (dBμV/m)	Margin (dB)
It was not observed any emissions from the EUT.									



Tested by: Hong-Kyu, Lee/ Engineer

5.3.2 Test data for 30 MHz to 1 000 MHz

- Test Date : March 28, 2013
- Resolution bandwidth : 120 kHz
- Frequency range : 30 MHz ~ 1 000 MHz
- Measurement distance : 3 m

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBμV/m)	Limits (dBμV/m)	Margin (dB)
It was not observed any emissions from the EUT.									



Tested by: Hong-Kyu, Lee/ Engineer

5.3.3 Test data for above 1 GHz

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 41 % R.H.

Temperature: 21 °C

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.231(b), RSS 210 Issue 8

Measurement Freq. Range : 1 GHz ~ 4 GHz

Result : PASSED

EUT : Folding Transmitter

Date: March 28, 2013

Operating Condition : TX mode

Distance : 3 m

Frequency (GHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
1 890.00	49.30	Peak	H	26.20	6.60	42.80	39.30	74.00	-34.70
	47.60	Peak	V				37.60	74.00	-36.40
	44.40	Average	H				34.40	54.00	-19.60
	42.60	Average	V				32.60	54.00	-21.40
2 205.00	53.00	Peak	H	26.70	7.20	43.00	43.90	74.00	-30.10
	50.40	Peak	V				41.30	74.00	-32.70
	47.20	Average	H				38.10	54.00	-15.90
	43.80	Average	V				34.70	54.00	-19.30

Tabulated test data for Restricted Band

Remark : "H": Horizontal, "V": Vertical



Tested by: Hong-Kyu, Lee/ Engineer

5.4 Bandwidth of the operating frequency

Humidity Level : 41 % R.H. Temperature: 21 °C
 Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.231(b), RSS 210 Issue 8
 Result : PASSED

EUT : Folding Transmitter Date: March 28, 2013
 Operating Condition : TX mode
 Minimum Resolution
 Bandwidth : 10 kHz

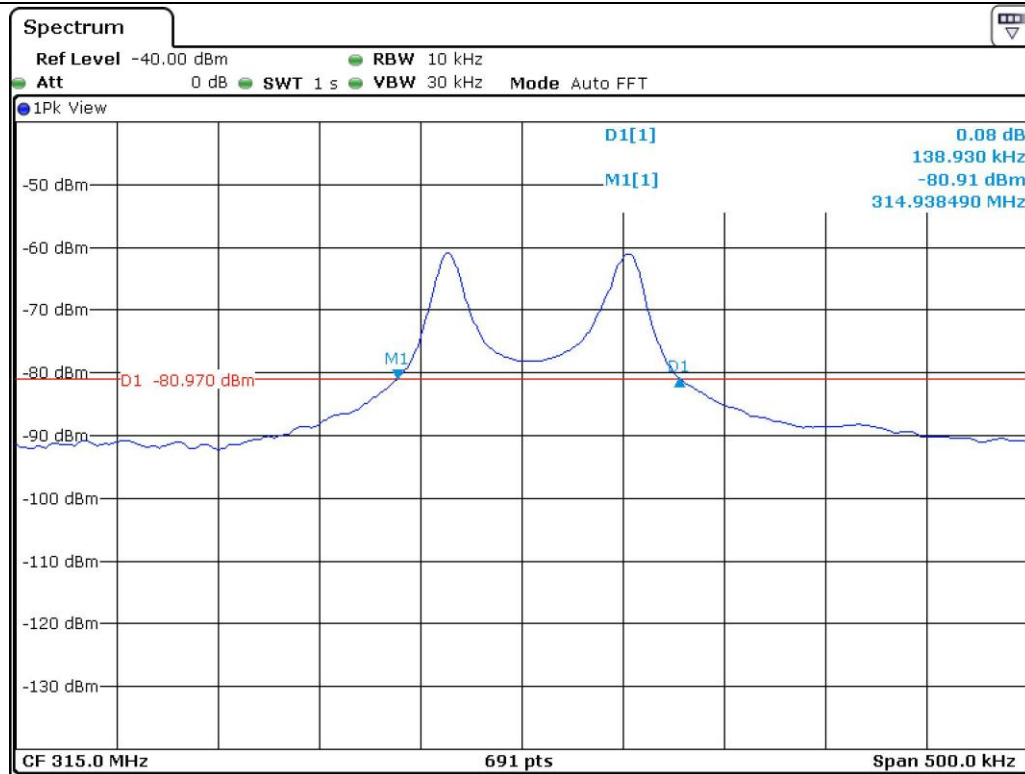
Carrier Freq. (MHz)	Bandwidth of the emission. (kHz)	Limit (kHz)	Remark
315.00	138.9	787.5	The point 20 dB down from the modulated carrier
315.00	256.3	787.5	99 %

Remark: Please refer to photo data for bandwidth for test data.

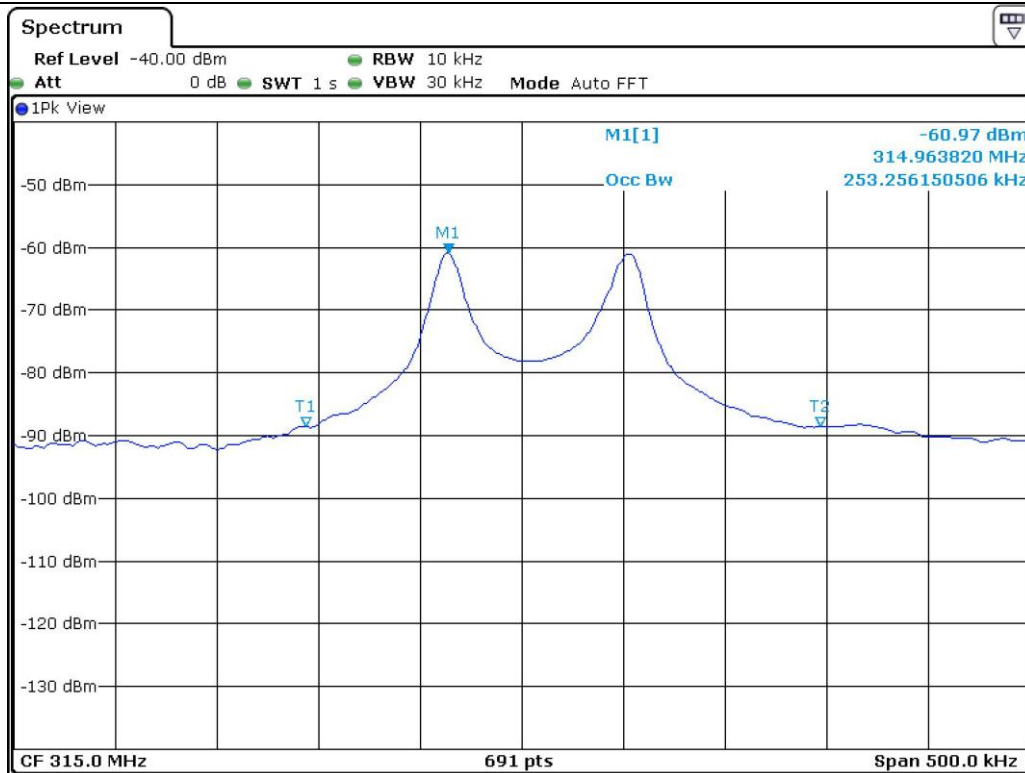


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Plotted Data for bandwidth



20 dB Bandwidth



99 % Bandwidth

6. FIELD STRENGTH CALCULATION

Meter readings are compared to the specification limit correcting for antenna and cable losses

+	Meter reading	(dBμV)
+	Cable Loss	(dB)
+	Antenna Factor (Loss)	(dB/m)
-	Amplifier Gain	(dB)
=	Corrected Reading	(dBμV/m)
-	Specification Limit	(dBμV/m)
=	dB Relative to Spec	(± dB)

7. LIST OF TEST EQUIPMENT

No.	EQUIPMENTS	MFR.	MODEL	SER. NO.	LAST CAL	DUE CAL	USE
1.	Test receiver	R/S	ESCI	101012	FEB/13	12MONTH	■
2.	Test Receiver	R/S	ESU	100261	SEP/13	12MONTH	■
3	Signal Analyzer	R/S	FSV30	101372	MAY/12	12MONTH	■
4.	Amplifier	Sonoma Instrument	310N	312544	MAY/12	12MONTH	■
5.	Amplifier	Sonoma Instrument	310N	312545	MAY/12	12MONTH	■
6.	TRILOG Broadband Antenna	Schwarzbeck	VULB9163	VULB9163-202	DEC/12	24MONTH	■
7.	TRILOG Broadband Antenna	Schwarzbeck	VULB9163	9163-419	FEB/12	24MONTH	■
8.	Controller	Innco System	CO2000	619/27030611/L	N/A	N/A	■
9.	Turn Table	Innco System	DT3000	930611	N/A	N/A	■
10.	Antenna Master	Innco System	MA4000-EP	3320611	N/A	N/A	■
11.	Antenna Master	Innco System	MA4000-EP	3350611	N/A	N/A	■
12.	Pre-Amplifier	R/S	SCU-18	10041	DEC/12	12MONTH	■
13.	Horn Antenna	Schwarzbeck	BBHA9120D	BBHA9120D294	AUG/11	24MONTH	■
14.	Loop Antenna	R/S	HFH2-Z2	889 285 / 26	AUG/12	24MONTH	■