
FCC Test Report

Report No.: AGC01A110201F1

TEST NAME : FCC Part 15
FCC ID : YMU-TCF200SP
PRODUCT DESIGNATION : FSK 12CH Cased Transmitter
BRAND NAME : RFRemotech
TEST MODEL : TCF200SP
CLIENT : RFRemotech Company
DATE OF ISSUE : Mar.03, 2011
STANDARD(S) : FCC Part 15 Rules

Attestation of Global Compliance Co., Ltd.

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VERIFICATION OF COMPLIANCE

Applicant:	RFRemotech Company 18E, No.445, Tianhe Bei Rd., Guangzhou 510610, China
Manufacturer:	RFRemotech Company 18E, No.445, Tianhe Bei Rd., Guangzhou 510610, China
Product Name:	FSK 12CH Cased Transmitter
Brand Name:	RFRemotech
Model Number:	TCF200SP
File Number:	AGC01A110201F2
Date of Test:	Feb.28 to Mar.03, 2011

We hereby certify that:

The above equipment was tested by Attestation of Global Compliance Co., Ltd. The data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C 63.4:2003. The sample tested as described in this report is in compliance with the FCC Rules Part 15

The test results of this report relate only to the tested sample identified in this report.

Checked By:

Jekey Zhang Mar.03, 2011

Authorized By

King Zhang Mar.03, 2011

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1. GENERAL INFORMATION

1.1 PRODUCT DESCRIPTION

A major technical description of EUT is described as following:

Power Supply	DC12V by battery
Transmitter Frequency	434.760 MHz
Channel Number	Only one channel
Transmit Power	78.24dBuV/m@3m
Modulation Technique	FSK
Bandwidth of Channels	133.57KHz
Duration of each transmission	170ms
Antenna Type	A permanent fixed antenna, which is built-out, designed as an indispensable part of the EUT

NOTE: For more details, please refer to the User's manual of the EUT.

1.2 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for FCC ID: YMU-TCF200SP , filing to comply with the FCC Part 15 requirements.

1.3 TEST METHODOLOGY

The radiated emission testing was performed according to the procedures of ANSI C 63.4: 2003 and FCC CFR 47 Rules of 15.207,15.209, 15.231,2.1057

1.4 TEST FACILITY

The test site used to collect the radiated data is located on the address of 2F., No.2 Building, Huafeng No.1 Technical Industrial Park, Sanwei, Xixiang, Baoan District, Shenzhen, China. The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003.

FCC register No.: 259865

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 Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT EXERCISE

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

2.3 GENERAL TECHNICAL REQUIREMENTS

- (1). Section 15.207: Conducted Limits (Not applicable)
- (2). Section 15.209: Radiated Emission
- (3). Section 15.231: Spurious Emission Limits
- (4). Section 15.231: The Duration of Each Transmission

2.4 CONFIGURATION OF TESTED SYSTEM

Fig. 2-1 Configuration of Tested System



Table 2-1 Equipment Used in Tested System

Item	Equipment	Model No.	Identifier	Note
1	FSK 12CH Cased Transmitter	TCF200SP	FCC ID: YMU-TCF200SP	EUT
2	LED USB lamp	--	--	AE
--	--	--	--	--

3. SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§15.207	Conducted Emission	N/A
§15.209	Radiated Emission	Compliant
§15.231	Spurious Emission Limits	Compliant
§15.231	The Duration of Each Transmission	Compliant

4. DESCRIPTION OF TEST MODES

The EUT (FSK 12CH Cased Transmitter) has been tested under normal operating condition. The faceplate of the transmitter is with an USB port for LED light that is not controlled by the Keyed Switch. 12 keys/buttons are operating at the same frequency, ALL operating modes (include the 12 keys/buttons and 3 Codes) have been taken into consideration and only worst case is reported. The device cannot be operated while charging.

5. CONDUCTED LIMITS (Not applicable)

5.1 PROVISIONS APPLICABLE

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the, the radio frequency voltage that is conducted back onto the AC power line on any frequencies within the band 150 KHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50uH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequencies ranges.

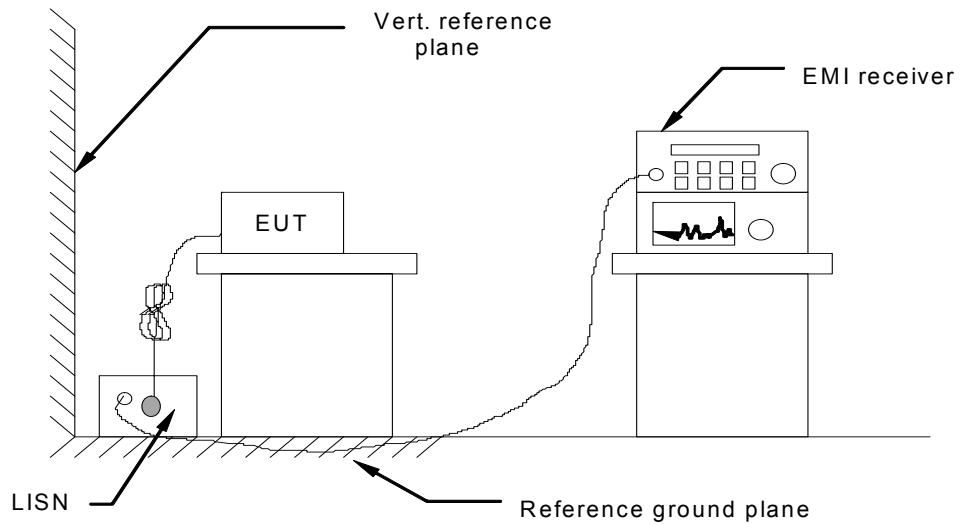
Frequency of Emission (MHz)	Conducted Limit(dBuV)	
	Quasi-Peak	Average
0.15 – 0.5	66 to 56 *	56 to 46 *
0.5 – 5	56	46
5 – 30	60	50

* Decreases with the logarithm of the frequency.

5.2 MEASUREMENT PROCEDURE

- (1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- (2) Support equipment, if needed, was placed as per ANSI C63.4.
- (3) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
- (4) The EUT received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- (5) All support equipments received AC power from a second LISN, if any.
- (6) The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- (7) Analyzer / Receiver scanned from 150kHz to 30MHz for emissions in each of the test modes.
During the above scans, the emissions were maximized by cable manipulation.

5.3 TEST SETUP BLOCK DIAGRAM



5.4 TEST EQUIPMENT USED

Conducted Emission Test Site				
Name of Equipment	Manufacturer	Model	Serial Number	Cal. Date
TEST RECEIVER	R&S	FCKL1528	A0304230	2010.06
LISN	SCHWARZBECK	NSLK8127	A0304233	2010.06

5.5 TEST RESULT

N/A

6. MEASURED BANDWIDTH

6.1 PROVISIONS APPLICABLE

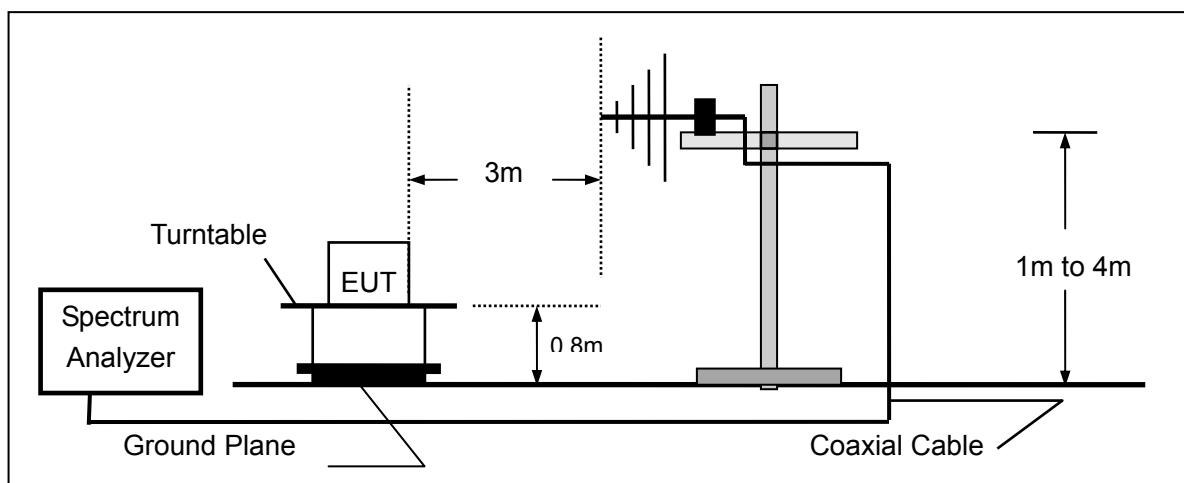
According to Section 15.231(c), The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

$$\text{Limit: } 434.76\text{MHz} \times 0.25\% = 1.08\text{MHz}$$

6.2 MEASUREMENT PROCEDURE

- 1).The EUT was placed on a turn table which is 0.8m above ground plane.
- 2).The EUT was operated with signal modulated.
- 3).Set SPA Center Frequency = fundamental frequency, RBW=VBW=51KHz, Span=500kHz
- 4).Set SPA Max hold. Mark peak, -20dB

6.3 TEST SETUP BLOCK DIAGRAM

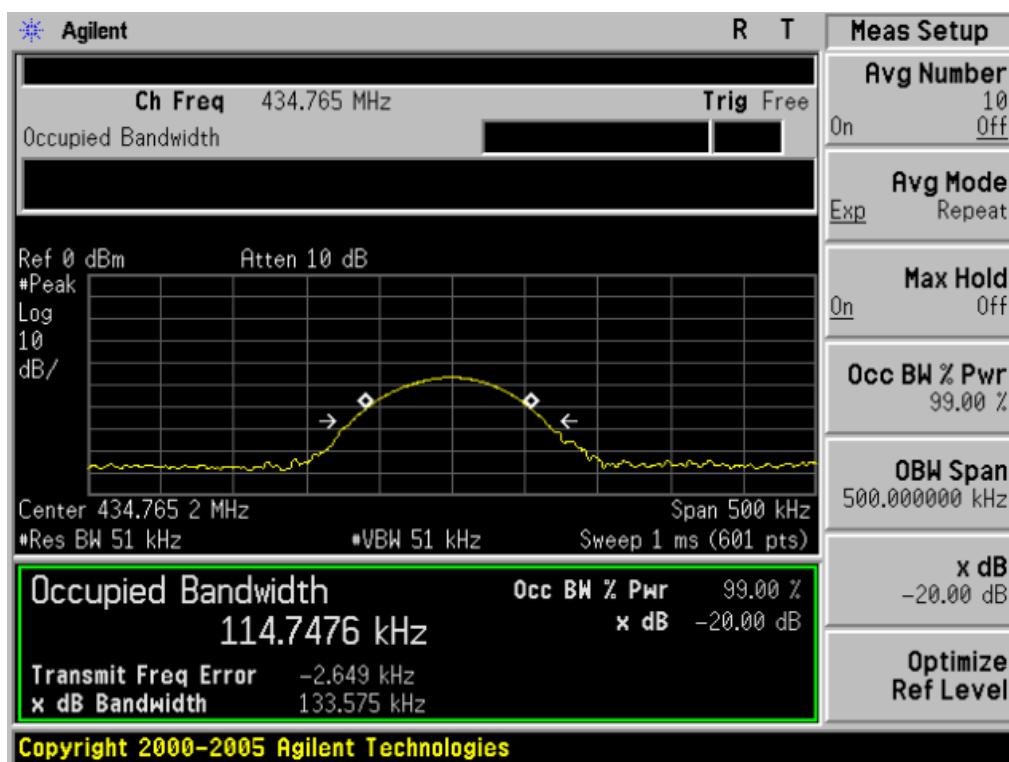


6.4 MEASUREMENT EQUIPMENT USED:

3M ANECHOIC CHAMBER RADIATION TEST SITE					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESCS30	100343	04/16/2010	04/15/2011
AMPLIFIER	HP	HP8447E	2945A02715	04/16/2010	04/15/2011
ANTENNA	Sunol Sciences Corp.	JB3	A021907	04/16/2010	04/15/2011
ANTENNA	Sunol Sciences Corp.	JB3	A021907	04/16/2010	04/15/2011
Spectrum Analyzer	Agilent	E4440A	US41421290	04/16/2010	04/15/2011

6.5 MEASUREMENT RESULT

Operation Mode:	TX	Test Date:	Mar.01, 2011
Temperature:	25°C	Tested by:	Jekey Zhang
Humidity:	55 % RH	Polarity:	--



20dB bandwidth	LIMIT	RESULT
133.57KHz	1.08MHz	PASS

7. RADIATED EMISSION

7.1 PROVISIONS APPLICABLE

According to Section 15.231(b)

Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz, $\mu\text{V/m}$ at 3 meters = $56.81818(F) - 6136.3636$; for the band 260-470 MHz, $\mu\text{V/m}$ at 3 meters = $41.6667(F) - 7083.3333$. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.

Limit: $\text{AV } 20\lg(41.6667*434.76-7083.3333) = 80.85\text{dBuV/m}$

PK 100.85dBuV/m

7.2 MEASUREMENT PROCEDURE

(1) On a test site, the EUT shall be placed on a turntable, and in the position closest to the normal use as declared by the user.

(2) The test antenna shall be oriented initially for vertical polarization located 3m from the EUT to correspond to the transmitter.

(3) The output of the antenna shall be connected to the measuring receiver and either a peak or quasi-peak detector was used for the measurement as indicated on the report. The detector selection is based on how close the emission level was approaching the limit.

(4) The transmitter shall be switched on; if possible, without the modulation and the measurement receiver shall be tuned to the frequency of the transmitter under test.

(5) The test antenna shall be raised and lowered through the specified range of height until the measuring receiver detects a maximum signal level.

(6) The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.

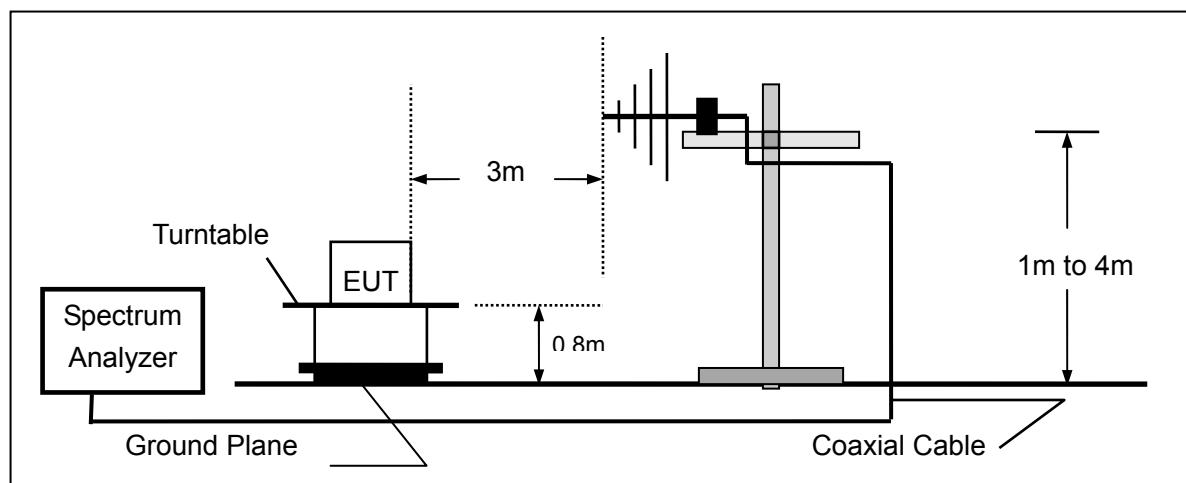
(7) The test antenna shall be raised and lowered again through the specified range of height until the measuring receiver detects a maximum signal level.

(8) The maximum signal level detected by the measuring receiver shall be recorded.

(9) The measurement shall be repeated with the test antenna set to horizontal polarization

(10) According to the above steps, three orthogonal planes (x, y, z) are operated.

7.3 TEST SETUP BLOCK DIAGRAM



7.4 MEASUREMENT EQUIPMENT USED:

3M ANECHOIC CHAMBER RADIATION TEST SITE					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESCS30	100343	04/16/2010	04/15/2011
AMPLIFIER	HP	HP8447E	2945A02715	04/16/2010	04/15/2011
ANTENNA	Sunol Sciences Corp.	JB3	A021907	04/16/2010	04/15/2011
ANTENNA	Sunol Sciences Corp.	JB3	A021907	04/16/2010	04/15/2011
Spectrum Analyzer	Agilent	E4440A	US41421290	04/16/2010	04/15/2011

The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Start Frequency	1000MHz
Stop Frequency	5000MHz
RB/VB	1MHz/1MHz for Ppeak

Receiver Parameter	Setting
Start Frequency	30MHz
Stop Frequency	1000MHz
RB/VB	120KHz/120kHz

7.5 MEASUREMENT RESULTS

Operation Mode:	TX	Test Date:	Mar.03, 2011
Temperature:	25°C	Tested by:	Mary Liu
Humidity:	55 % RH	Polarity:	--

X ORTHOGONAL PLANE IS THE STATE DATA OF THREE ORTHOGONAL PLANES (X, Y, Z)

RADIATED EMISSION – HORIZONTAL (30MHZ TO 5GHZ)							
Frequency	Antenna Pol.	Field Strength	Field Strength	Limit(PK)	Limit(QP)	Limit(AV)	State
MHz	H/V	dBuV/m (PK)	dBuV/m (AV)	dBuV/m	dBuV/m	dBuV/m	
434.760	H	76.29	--	100.85	--	80.85	pass
869.520	H	55.24	--	80.85	--	60.85	pass
1304.280	H	41.54	--	74.00	--	54.00	pass
1739.040	H	--	--	80.85	--	60.85	pass
4347.600	H	--	--	74.00	--	54.00	pass
--	H	--	--	74.00	--	54.00	pass

RADIATED EMISSION - VERTICAL(30MHZ TO 5GHZ)

Frequency	Antenna Pol.	Field Strength	Field Strength	Limit(PK)	Limit(QP)	Limit(AV)	State
GHz	H/V	dBuV/m (PK)	dBuV/m (AV)	dBuV/m	dBuV/m	dBuV/m	
434.760	V	78.24	--	100.85	--	80.85	pass
869.520	V	54.59	--	80.85	--	60.85	pass
1304.280	V	38.28	--	74.00	--	54.00	pass
1739.040	V	--	--	80.85	--	60.85	pass
4347.600	V	--	--	74.00	--	54.00	pass
--	H	--	--	74.00	--	54.00	pass

Note:

“-”indicate the test value is much lower to limit

8. THE DURATION OF EACH TRANSMISSION

8.1 PROVISIONS APPLICABLE

8.1.1 According to Section 15.231(a), A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

8.2 TEST SETUP

The same as 6.3

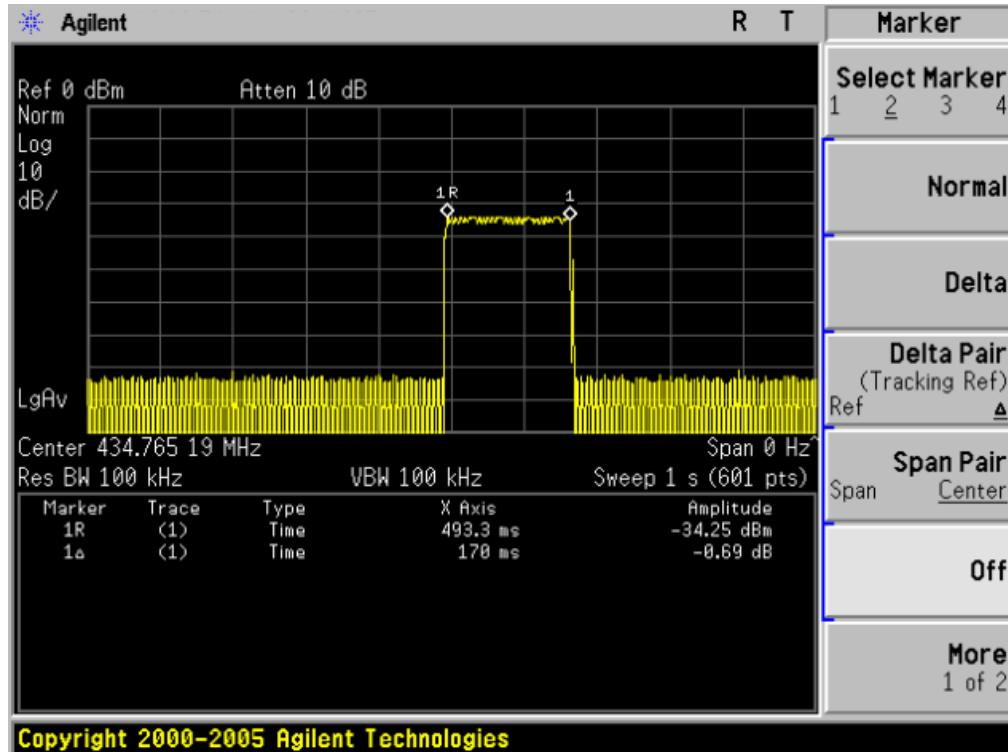
8.3 MEASUREMENT INSTRUMENTS

The same as 6.4

8.4 MEASUREMENT RESULT

Operation Mode:	TX	Test Date:	Mar.01, 2011
Temperature:	25°C	Tested by:	Mary Liu
Humidity:	55 % RH	Polarity:	--

THE DURATION OF EACH TRANSMISSION



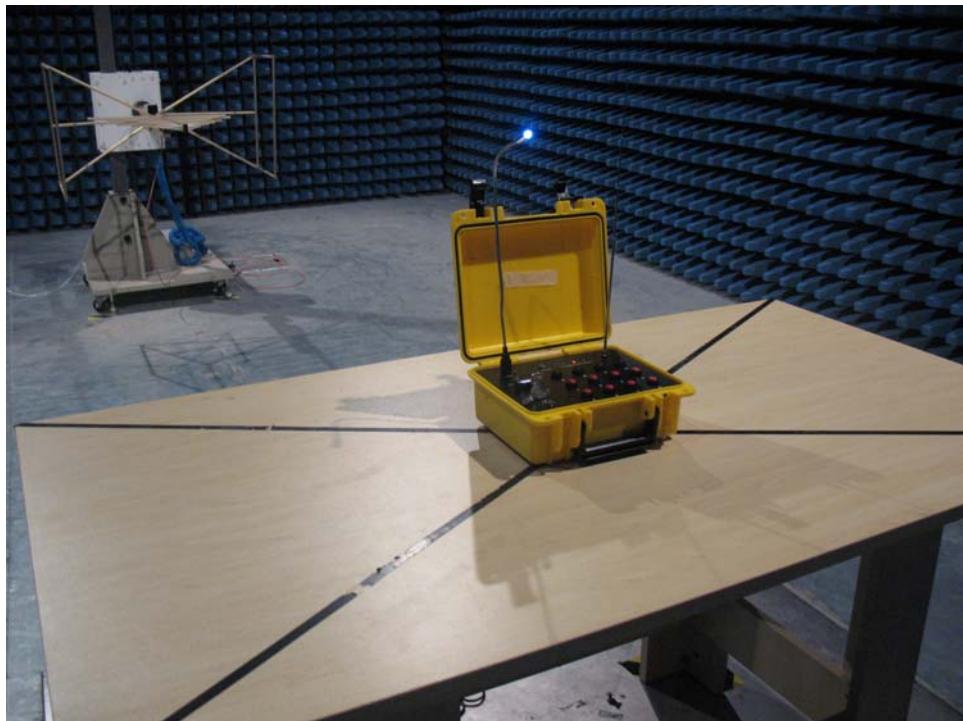
THE DURATION OF EACH TRANSMISSION	LIMIT	RESULT
170ms	<5s	PASS

NOTE: The shown duration (170 ms) is this duration independent of the duration any button is pressed. And any of the buttons is pressed for several seconds, The emission is also Automatically cut off within 170 ms.

APPENDIX I

PHOTOGRAPHS OF SETUP

RADIATED TEST SETUP



APPENDIX II

EXTERNAL VIEW OF EUT

VIEW OF EUT-1



VIEW OF EUT-2



INTERNAL VIEW OF EUT – 1



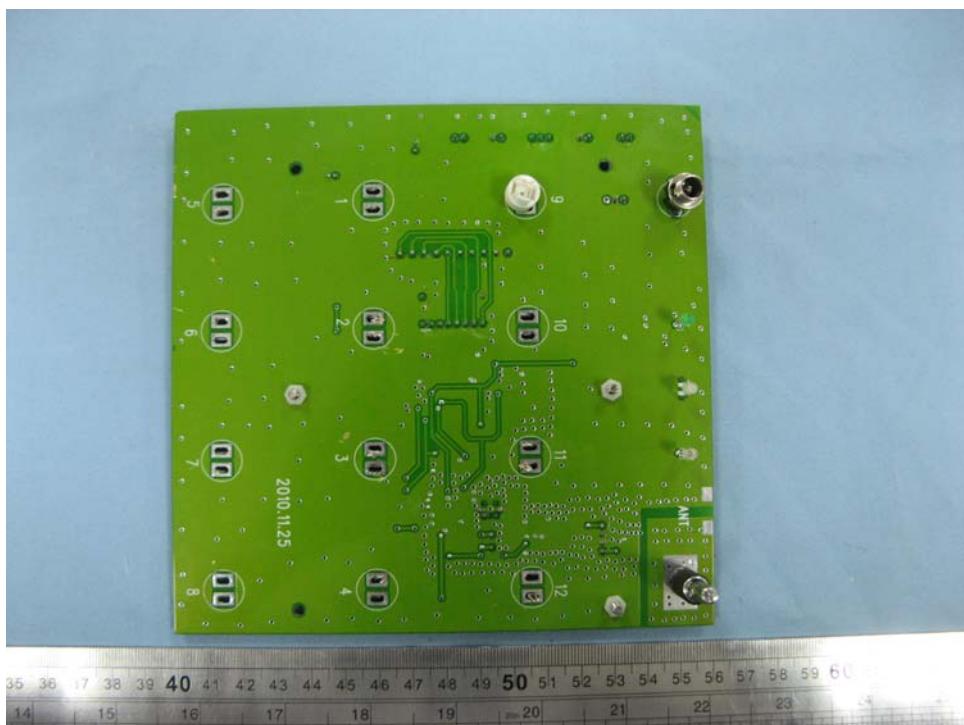
INTERNAL VIEW OF EUT – 2



INTERNAL VIEW OF EUT – 3



INTERNAL VIEW OF EUT – 4



----END OF REPORT----