





# ISO/IEC17025 Accredited Lab.

Report No: FCC0907271 File reference No: 2009-07-27

Applicant: Shenzhen Dynam Industrial&Trading Co., Ltd

Product: Racon 2.4g

Model No: DY-2X01 X=4, 6

Brand Name: dynam

Test Standards: FCC Part 15 Subpart C, Paragraph 15.249

Test result:

It is herewith confirmed and found to comply with the

requirements set up by ANSI C63.4&FCC Part 15 Subpart C, Paragraph 15.249 regulations for the evaluation of

electromagnetic compatibility

Approved By

Jack Chung

Jack Chung

Manager

Dated: July 27, 2009

Results appearing herein relate only to the sample tested The technical reports is issued errors and omissions exempt and is subject to withdrawal at

# SHENZHEN TIMEWAY TECHNOLOGY CONSULTING CO LTD

East 5/Block 4, Anhua Industrial Zone, No.8, Tairan Rd. CheGongMiao, FuTian District, Shenzhen, CHINA.

Tel (755) 83448688 Fax (755) 83442996

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# **Special Statement:**

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19.

The testing quality system of our laboratory meet with ISO/IEC-17025 requirements, which is approved by CNAL. This approval result is accepted by MRA of APLAC.

Our test facility is recognized, certified, or accredited by the following organizations:

# **CNAL-LAB Code: L2292**

The EMC Laboratory has been assessed and in compliance with CNAL/AC01:2002 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:1999 General Requirements) for the Competence of testing Laboratories.

# FCC-Registration No.: 899988

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 899988.

# IC- Registration No.: IC5205A-01

The EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration IC No.: 5205A-01.

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Photo of Test Setup and EUT View.

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# 1.0 General Details

#### 1.1 Test Lab Details

Name: SHENZHEN TIMEWAY TECHNOLOGY CONSULTING CO LTD

Address: 5/F,Block 4, Anhua Industrial Zone.,No.8 TaiRan Rd.CheGongMiao,FuTian District,

Shenzhen, CHINA.

Telephone: (755) 83448688 Fax: (755) 83442996

Site on File with the Federal Communications Commission – United Sates

Registration Number: 899988

For 3m & 10 m OATS

Site Listed with Industry Canada of Ottawa, Canada

Registration Number: IC: 5205A-01

For 3m & 10 m OATS

# 1.2 Applicant Details

Applicant: Shenzhen Dynam Industrial&Trading Co., Ltd

Address: Buliding 2 19B, CHENGSHI JIE ZUO, FUHUA ROAD, SHENZHEN CITY

Telephone: +86-769-87566018 Fax: +86-769-87555185

# 1.3 Description of EUT

Product: Racon 2.4g

Manufacturer: Shenzhen Dynam Industrial&Trading Co., Ltd

Brand Name: dynam

Model Number: DY-2X01 X=4, 6

Rating: Input: DC12 (8pcs AAA batteries)

Modulation Type: FSK

Operation Frequency 2404-2480MHz

Number of Channel 77

Antenna Designation A permanent fixed antenna

# 1.4 Submitted Sample

3 Sample

#### 1.5 Test Duration

2009-07-27 to 2009-09-23

The report refers only to the sample tested and does not apply to the bulk.

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1.6 Test Uncertainty

Conducted Emissions Uncertainty =3.6dB Radiated Emissions Uncertainty =4.7dB

1.7 Test Engineer

Terry Tang

The sample tested by

Print Name: Terry Tang

2.0		Test Equi	ipments		
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
ESPI Test Receiver	ROHDE&SCHWARZ	ESPI 3	100379	2008-12-05	2009-12-04
Absorbing Clamp	ROHDE&SCHWARZ	MDS-21	100126	2008-12-05	2009-12-04
TWO Line-V-NETW	ROHDE&SCHWARZ	EZH3-Z5	100294	2008-12-05	2009-12-04
TWO Line-V-NETW	ROHDE&SCHWARZ	EZH3-Z5	100253	2008-12-05	2009-12-04
Ultra Broadband ANT	ROHDE&SCHWARZ	HL562	100157	2008-12-05	2009-12-04
ESDV Test Receiver	ROHDE&SCHWARZ	ESDV	100008	2009-04-22	2010-04-21
4-WIRE ISN	ROHDE&SCHWARZ	ENY 41	830663/044	2009-02-18	2010-02-17
GG ENY22 Double 2-Wire ISN	ROHDE&SCHWARZ	ENY22	83066/016	2009-02-18	2010-02-17
Impuls-Begrenzer	ROHDE&SCHWARZ	ESH3-Z2	100281	2009-02-18	2010-02-17
System Controller	CT	SC100	-	2009-02-18	2010-02-17
Printer	EPSON	РНОТО ЕХЗ	CFNH234850	2009-02-18	2010-02-17
FM-AM Signal Generator	JUNG.JIN	SG-150M	389911177	2009-02-18	2010-02-17
Color TV Pattern Generator	PHILIPS	PM5418	LO621747	2009-02-18	2010-02-17
Computer	IBM	8434	1S8434KCE99BLX LO*	-	-
Oscillator	KENWOOD	AG-203D	3070002	2009-02-18	2010-02-17

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		12/	<i>₹</i>		
Spectrum Analyzer	HAMEG	HM5012	-	2009-04-26	2010-04-25
Power Supply	LW	APS1502	-	-	-
5K VA AC Power Source	California Instruments	5001iX	56060	2009-02-18	2010-02-17
CDN	EM TEST	CDN M2/M3	-	2009-02-18	2010-02-17
Attenuation	EM TEST	ATT6/75	-	2009-02-18	2010-02-17
Resistance	EM TEST	R100	-	2009-02-18	2010-02-17
Electromagnetic Injection Clamp	LITTHI	EM101	35708	2009-02-18	2010-02-17
Signal Generator	ROHDE&SCHWARZ	SMT03	100029	2009-02-18	2010-02-17
Power Amplifier	AR	150W1000	300999	2009-02-18	2010-02-17
Field probe	Holaday	HI-6005	105152	2009-02-18	2010-02-17
Bilog Antenna	Chase	CBL6111C	2576	2009-02-18	2010-02-17
ESPI Test Receiver	ROHDE&SCHWARZ	ESI26	838786/013	2009-02-18	2010-02-17
3m OATS			N/A	2009-02-18	2010-02-17
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170265	2009-08-14	2010-08-13
Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-631	2009-04-26	2010-04-25

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# 3.0 Technical Details

# 3.1 Summary of test results

The EUT has been tested according to the following specifications:

Standard	Test Type	Result	Notes
ECC Dout 15 Dougonous 15 207	Conducted	NT/A	NT/A
FCC Part 15, Paragraph 15.207	<b>Emission Test</b>	N/A	N/A
ECC Part 15 Submout C Paragraph 15 240(a)	Field Strength		
FCC Part 15 Subpart C Paragraph 15.249(a) & 15.249(b) Limit	of	PASS	Complies
	Fundamental		
FCC Part 15, Paragraph 15.209	Radiated Emission Test	PASS	Complies
FCC Part 15 Subpart C Paragraph 15.249(d)	Band Edge	DAGG	CP.
Limit	Test	PASS	Complies

# 3.2 Test Standards

FCC Part 15 Subpart C, Paragraph 15.249

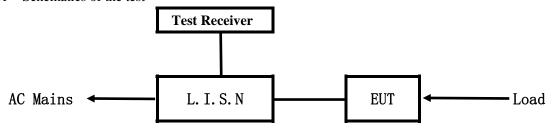
# 4.0 EUT Modification

No modification by Shenzhen Timeway Technology Consulting Co., Ltd



# 5. Power Line Conducted Emission Test

#### 5.1 Schematics of the test

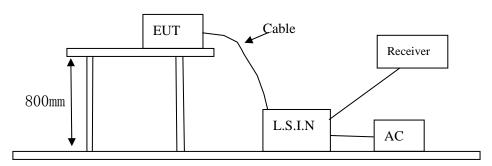


**EUT: Equipment Under Test** 

# 5.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.4-2003. The Frequency spectrum From 0.15MHz to 30MHz was investigated. The LISN used was 50ohm/50uH as specified by section 5.1 of ANSI C63.4 –2003.

# Block diagram of Test setup



# 5.3 Configuration of The EUT

The EUT was configured according to ANSI C63.4-2003. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

One channels are provided to the EUT

# A. EUT

Device	Manufacturer	Model	FCC ID
Racon 2.4g	Shenzhen Dynam Industrial&Trading	DY-2X01	TIVDYNAM-24-01
	Co., Ltd		

#### B. Internal Device

Device	Manufacturer	Model	FCC ID/DOC
N/A			

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# C. Peripherals

Device	Manufacturer	Model	FCC ID/DOC	Cable
N/A				

# 5.4 EUT Operating Condition

Operating condition is according to ANSI C63.4 -2003.

- A Setup the EUT and simulators as shown on follow
- B Enable AF signal and confirm EUT active to normal condition

# 5.5 Power line conducted Emission Limit according to Paragraph 15.207

Eroguanay (MHz)	Class A Lir	nits (dB µ V)	Class B Limits (dB µ V)	
Frequency(MHz)	Quasi-peak Level	Average Level	Quasi-peak Level	Average Level
$0.15 \sim 0.50$	79.0	66.0	66.0~56.0*	56.0~46.0*
$0.50 \sim 5.00$	73.0	60.0	56.0	46.0
$5.00 \sim 30.00$	73.0	60.0	60.0	50.0

Notes:

- 1. \*Decreasing linearly with logarithm of frequency.
- 2. The tighter limit shall apply at the transition frequencies

# 5.6 Test Results

The frequency spectrum from 0.15MHz to 30MHz was investigated. All reading are quasi-peak values with a resolution bandwidth of 9kHz.

Note: Owing to DC operation of EUT, this test item is not performed

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#### 6 Radiated Emission Test

- 6.1 Test Method and test Procedure:
- (1) The EUT was tested according to ANSI C63.4 –2003. The radiated test was performed at Timeway Laboratory. This site is on file with the FCC laboratory division, Registration No.899988
- (2) The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.4-2001.
- (3) The frequency spectrum from 30 MHz to 1 GHz was investigated. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 kHz. All readings are above 1 GHz, peak values with a resolution bandwidth of 1 MHz. Measurements were made at 3 meters.
- (4) The antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency.
- (5) Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limit), and are distinguished with a "QP" in the data table.
- (6) The antenna polarization: Vertical polarization and Horizontal polarization.

# Block diagram of Test setup Distance = 3m Computer Pre -Amplifier EUT Turn-table Receiver

- 6.2 Configuration of The EUT

  Same as section 5.3 of this report
- 6.3 EUT Operating Condition
  Same as section 5.4 of this report.

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6.4 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below:

# A FCC Part 15 Subpart C Paragraph 15.249(a) Limit

Fundamental Frequency	Field Strength of Fundamental (3m)			Field S	trength of Harmo	onics (3m)
(MHz)	mV/m	dBuV/m		uV/m	dBu	V/m
2400-2483.5	50	94 (Average)	114 (Peak)	500	54 (Average)	74 (Peak)

Note:

- 1. RF Field Strength  $(dBuV) = 20 \log RF \text{ Voltage } (uV)$
- 2.Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
- 3. The emission limit in this paragraph is based on measurement instrumentation employing an average detector.

# B. Frequencies in restricted band are complied to limit on Paragraph 15.209.

Frequency Range (MHz)	Distance (m)	Field strength (dB $\mu$ V/m)
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

Note:

- 1. RF Voltage  $(dBuV) = 20 \log RF \text{ Voltage } (uV)$
- 2. In the Above Table, the tighter limit applies at the band edges.
- 3. Distance refers to the distance in meters between the measuring instrument antenna and the EUT

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#### 6.5 Test result

#### **Fundamental & Harmonics Radiated Emission Data** A

Product:	Transmitter	Test Mode:	Low Channel
Test Item:	Fundamental Radiated Emission Data	Temperature:	25℃
Test Voltage:	12VDC	Humidity:	56%
Test Result:	Pass	Model:	DY-2X01

Frequency	Emission PK/AV	Horiz /	Limits PK/AV	Margin
(MHz)	(dBuV/m)	Vert	(dBuV/m)	(dB)
2404	59.6(PK)	Н	114/94	-34.4
2404	79.9(PK)	V	114/94	-14.1
1602.14	46.3(PK)	Н	74/54	-7.7
1602.14	47.7(PK)	V	74/54	-6.3
4808		Н	74/54	
4808		V	74/54	
7212		H/V	74/54	
9616		H/V	74/54	
12020		H/V	74/54	
14424		H/V	74/54	
16828		H/V	74/54	
19232		H/V	74/54	
21636		H/V	74/54	
24040		H/V	74/54	

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Product:	Transmitter	Test Mode:	Middle Channel					
Test Item:	Fundamental Radiated Emission Data	Temperature:	25℃					
Test Voltage:	12VDC	Humidity:	56%					
Test Result:	Pass	ModeL:	DY-2X01					

Frequency (MHz)	Emission PK/AV (dBuV/m)	Horiz / Vert	Limits PK/AV (dBuV/m)	Margin (dB)
2441	63.2(PK)	Н	114/94	-30.8
2441	79.6(PK)	V	114/94	-14.4
1625.25	46.3(PK)	Н	74/54	-7.7
1625.25	46.6(PK)	V	74/54	-7.4
4882		Н	74/54	
4882		V	74/54	-
7323		H/V	74/54	
9764		H/V	74/54	
12205		H/V	74/54	
14646		H/V	74/54	
17087		H/V	74/54	
19528		H/V	74/54	
21969		H/V	74/54	
24410		H/V	74/54	

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Product:	Transmitter	Test Mode:	High Channel					
Test Item:	Fundamental Radiated Emission Data	Temperature:	25℃					
Test Voltage:	12VDC	Humidity:	56%					
Test Result:	Pass	Model:	DY-2X01					

Frequency	Emission PK/AV	Horiz /	Limits PK/AV	Margin
(MHz)	(dBuV/m)	Vert	(dBuV/m)	(dB)
2480	63.2(PK)	Н	114/94	-30.8
2480	80.3(PK)	V	114/94	-13.7
1649.30	45.1(PK)	Н	74/54	-8.9
1649.30	45.8(PK)	V	74/54	-8.2
4960		Н	74/54	
4960		V	74/54	
7440		H/V	74/54	
9920		H/V	74/54	
12400		H/V	74/54	
14880		H/V	74/54	
17360		H/V	74/54	
19840		H/V	74/54	
22320		H/V	74/54	
24800		H/V	74/54	

Note: (1) PK= Peak, AV= Average

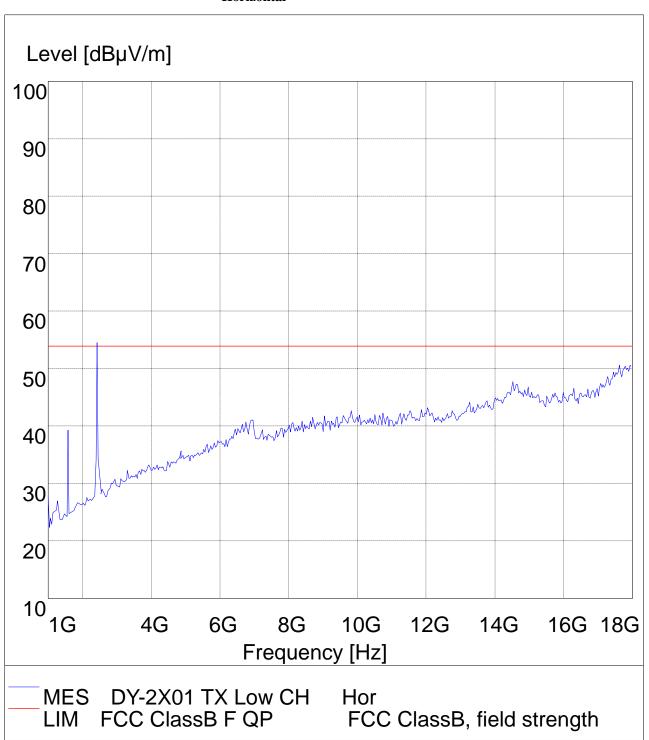
- (2) Emission Level = Reading Level + Probe Factor + Cable Loss-AMP.
- (3)Margin=Emission-Limits
- (4)According to section 15.35(b), the peak limit is 20dB higher than the average limit
- (5) Due to measured PK value less than the AV limit, the measured AV value must be less than AV limit



# Test Figure above 1G

Low Channel

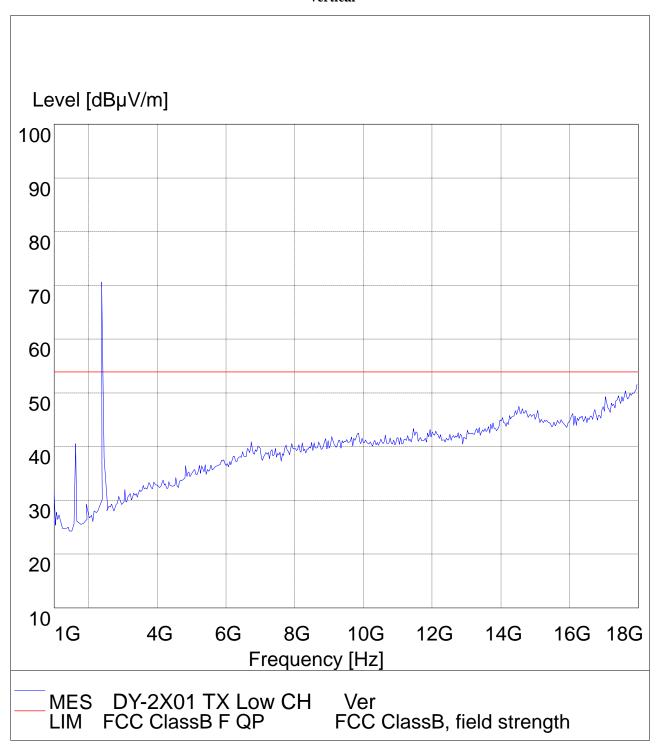
#### **Horizontal**





# **Low Channel**

# Vertical



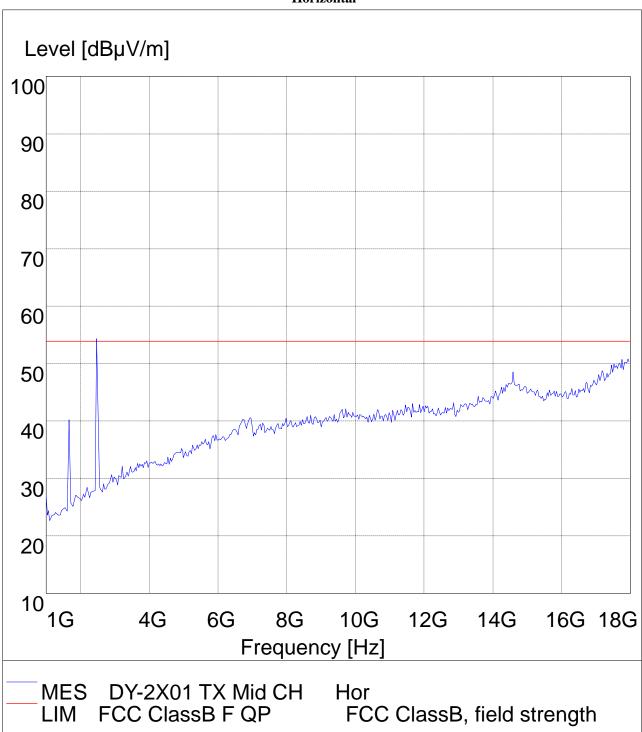
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# **Middle Channel**

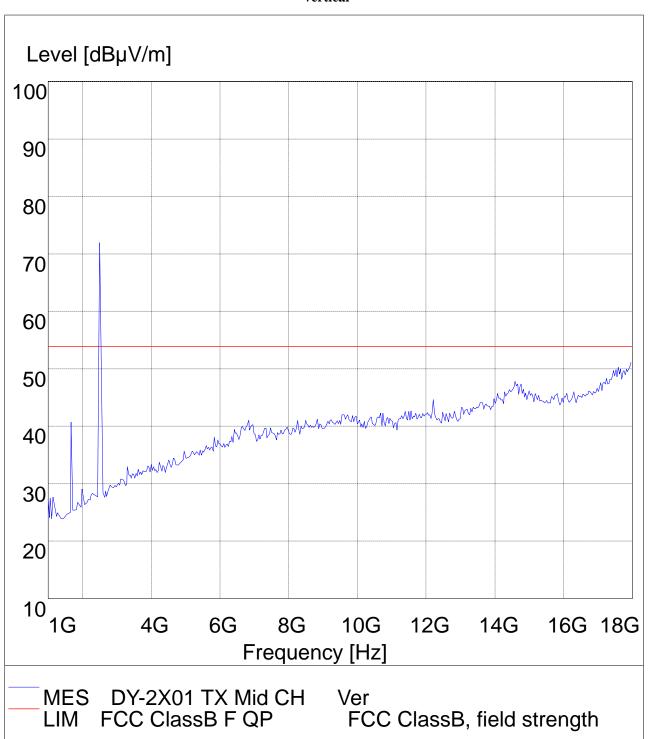
# Horizontal





# **Middle Channel**

#### Vertical



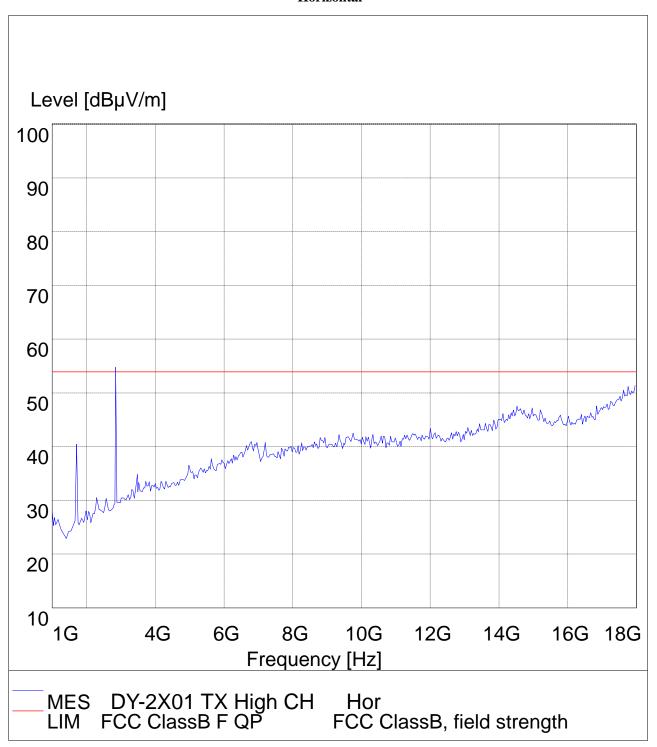
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# **High Channel**

# Horizontal



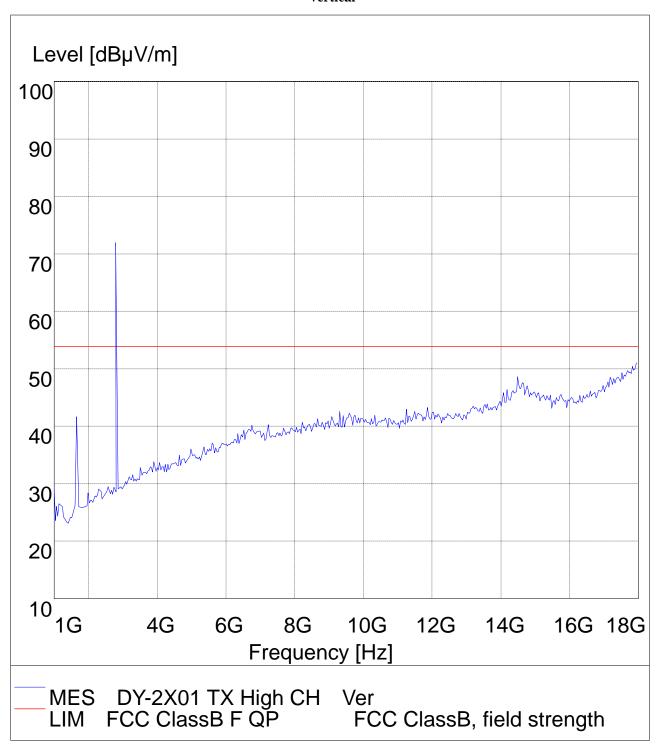
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# **High Channel**

#### Vertical



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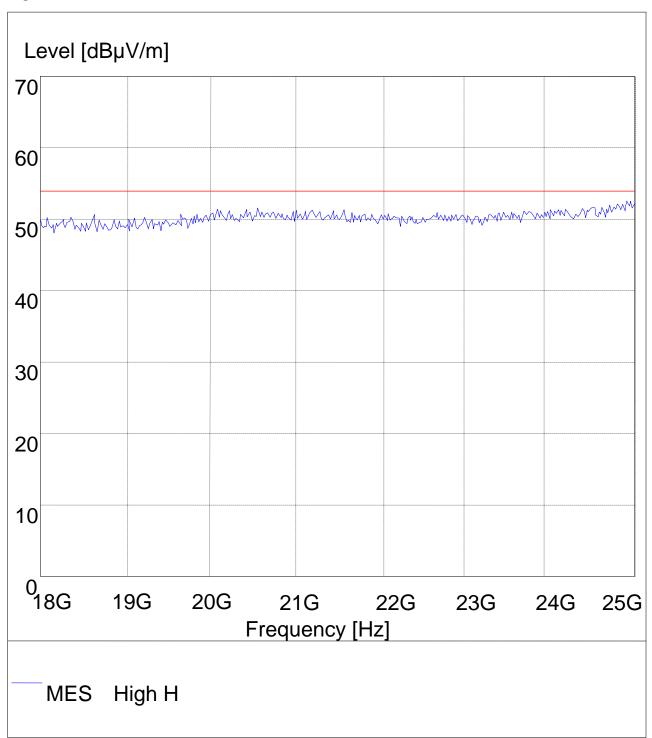
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# 18-25G High Channel



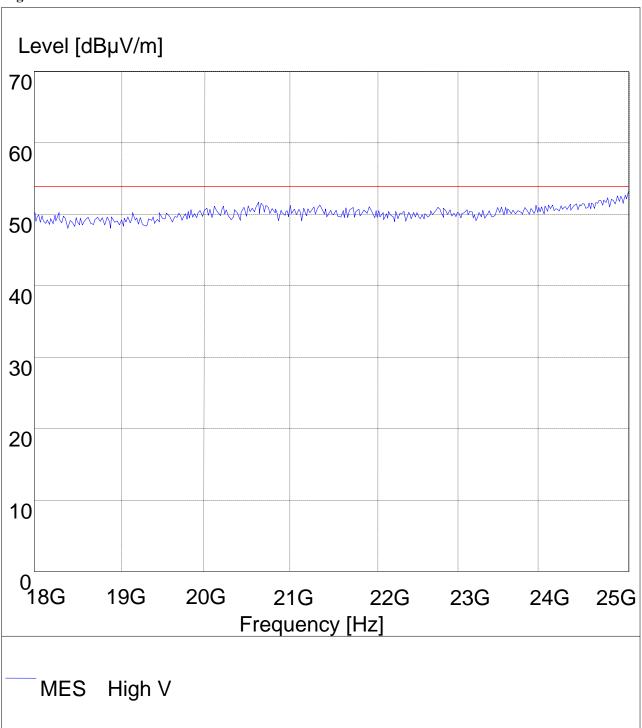
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# 18-25G

# **High Channel**



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#### Test result

# General Radiated Emission Data and Harmonics Radiated Emission Data

# Radiated Emission In Horizontal (30MHz----1000MHz)

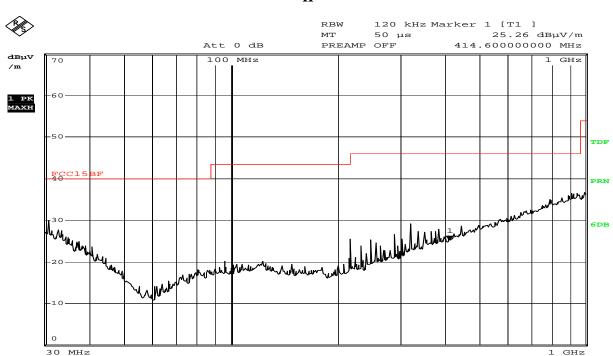
EUT set Condition: Low channel Model: DY-2X01

**Results:** Pass

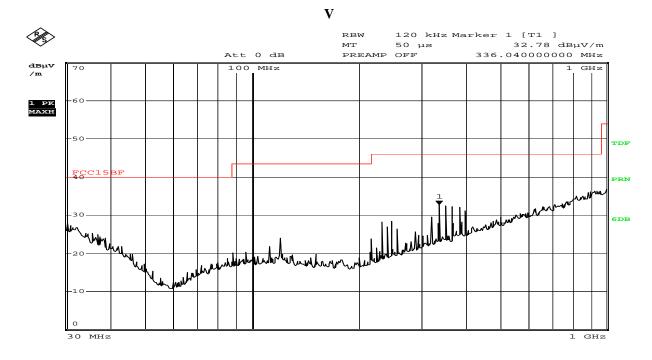
Frequency (MHz)	Frequency (MHz) Level@3m (dB \( \mu \) V/m)		Limit@3m (dB \( \mu \)V/m)
	-	Н	1
		V	



Test Figure: Low Channel



Date: 17.SEP.2009 22:59:02



Date: 17.SEP.2009 22:59:36

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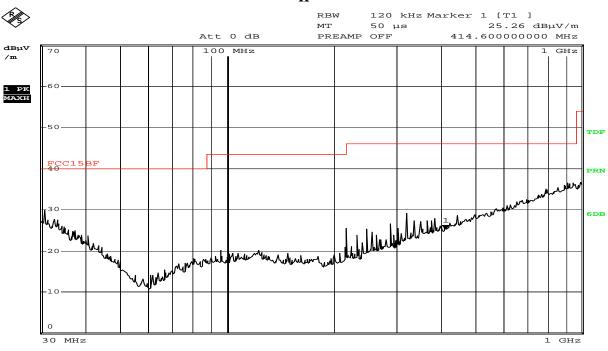
Middle Channel **EUT set Condition:** 

DY-2X01 Model; **Results: Pass** 

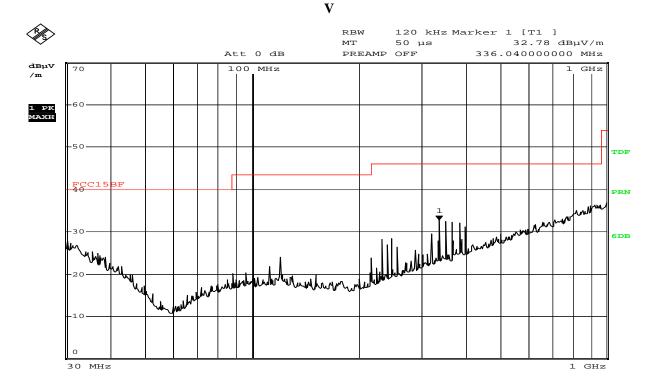
Frequency (MHz)	Level@3m (dB \u03b4 V/m)	Antenna Polarity	Limit@3m (dB µ V/m)
	-	Н	1
		V	



Test Figure: Middle Channel



Date: 17.SEP.2009 22:59:02



Date: 17.SEP.2009 22:59:36

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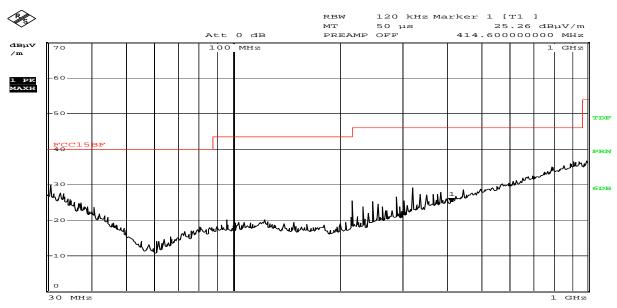
**High Channel EUT set Condition:** DY-2X01 Model;

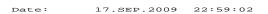
**Results: Pass** 

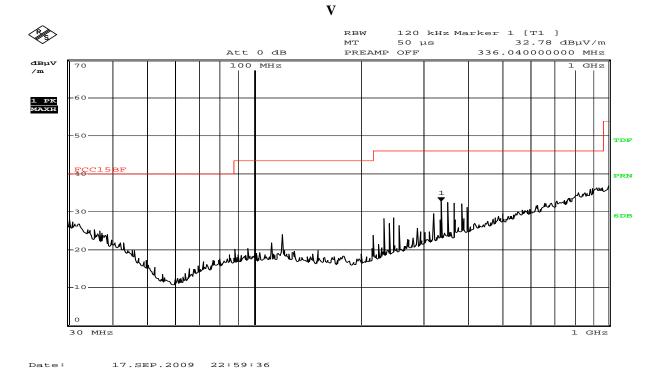
Frequency (MHz)	Level@3m (dB \u03b4 V/m)	Antenna Polarity	Limit@3m (dB µ V/m)
	-	Н	1
		V	



# Test Figure: High Channel







Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit

2. Remark "---" means that the emissions level is too low to be measured

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# 7. Band Edge

# **Band Edge Limit**

In any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 50dB below that in the 100kHz, bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

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#### **Test Result**

Test Result								
Product:	Transmitter		Tes	t Mode:	Low Channel			
			N	Model:		PG-2401		
Mode	Keeping '	Transmitting	Input Voltage		DC12V			
Геmperature	24 (	deg. C,	Humio	dity		56%	RH	
Test Result:	Pass		De	etector		Pl	K	
2390MHz	PK (dBμV/m)	40.96(V)/33.69(H)	1	Limit		74(dB <sub>l</sub>	μV/m)	
2390MHZ	$AV(dB\mu V/m)$		1	ZIIIIIt		54(dB <sub>l</sub>	μV/m)	
Test Figure only for	r reference							
Ref Lvl	Marker :	83.64 $dB\mu V$	RBW VBW	1 MH	łz	Att	0 dB	
97 dBμV 97	2.	.40523046 GHz	SWT	5 ms	s Ur	nit	dBµV	
90				<b>▼</b> 1	[T1]	83.	64 dBμV	Α
80				⊽2	[T1]	47. 2.39 <mark>0</mark> 00	44 dBμV 000 GHz	
—D1 74 dB	μ\							
70 1MAX 60								1 M A
50					2	4	W	
40			Ľuldíľ√∆					
	MAKAMIKAMIKA						עי עייו	
30								
20								
10								
0								
-3 <b>L</b> Start 2.3	1 GHz	11 MH	z/			Ston 2	.42 GHz	ı
		19:47						

# Note: Field Strength in restrict band measured in conventional manner

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Product:	Tran	nsmitter	Test Mode:	High Channel
			Model:	PG-2401
Mode	Keeping '	Transmitting	Input Voltage	DC12V
Temperature	24 (	deg. C,	Humidity	56% RH
Test Result:		Pass	Detector	PK
2483.5MHz	PK (dBμV/m)	69.61(V)/39.32(H)	Limit	$74(dB\mu V/m)$
21001011111	$AV(dB\mu V/m)$	41.21(V)/25.36(H)		54(dBμV/m)
Ref Lvl 107 dBμV	Marker 1	1 [T1] 86.74 dBμV .48120240 GHz	RBW 1 N VBW 1 N SWT 5 n	1Hz
107			<b>v</b> <sub>1</sub>	[T1] 86.74 dBµV
100			∀2	2.48120240 6Hz [T1] 66.39 dBμV 2.48350000 GHz
90				
1916 x7 4 dB	μ٧			1MA
70				
60	lle.			
50	Mary Mary Mary	My Marinalia and		
40	<del>                                     </del>	Market Commencer of the	Whatanhana	mand the land of t
30				
20				
10				
Start 2.4 Date: 23.		13 MH 06:18	Z/	Stop 2.6 GHz

Note: Field Strength in restrict band measured in conventional manner

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# 8.0 Antenna Requirement

# **Applicable Standard**

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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

This product has a permanent antenna, fulfill the requirement of this section.

Test Result: Pass

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60

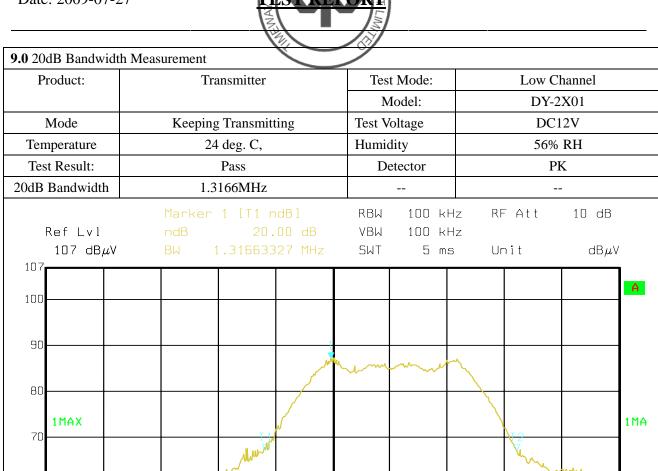
50

40

30

20

Date:



7 Center 2.404496994 GHz 300 kHz/ Span 3 MHz

17.SEP.2009 22:13:05

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Product:	Tra	ansmitter				Middle Channel			
				Model:			DY-2X01		
Mode		g Transmitt	ting		oltage		DC12V		
Temperature	esult: Pass		Humio				RH		
Test Result:			De	etector		P	K		
0dB Bandwidth	1.3	226MHz					_	-	
Ref Lvl	ndB		00 dB	RBW VBW	100 k 100 k	Hz	FAtt	10 dB	
$107 \text{ dB}\mu\text{V}$	BW :	1.322645	i29 MHz	SWT	5 m	is U	nit	dBµV	_
									F
100									ľ
90			1						1
			المسمر	hame	mamon	mly			
80			J. of			1			1
1MAX						V	<u> </u>		11
70		ما المالية	(				W <sub>2</sub>	1.1	
60	Agrado	W. L.					N.	Mary	1
	VIII Way								
50									l
40									l
30									1
20									1
10									l
Center 2.4	41483968 GH	 Z	300 k	<u></u> ×Hz∕			Spa	an 3 MHz	

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Product:	Transmitter				Test Mode:		High Channel		
26.1		<b>T</b>		_	Model:		DY-2X01		
Mode Temperature		Transmitt	ing	Test V Humio			DC12V 56% RH		
Test Result:				etector			PK		
20dB Bandwidth	1.3	587MHz							
Ref Lvl 107 dBμV	Marker 1 [T1 ndB] ndB 20.00 dB BW 1.35871743 MHz		RBW VBW SWT	100 k 100 k 5 m	:Hz	RF Att 10 dE		/	
107							1	<del></del>	1
100									
90			4						
30			۰۸۸۸	human	www.m	m			
80			N 200			4			ł
1MAX 70		Т 1	/				Wy.		11
70	.0.	A A A A A A A A A A A A A A A A A A A					My	Mulh	
60	Munn							M	Í
50	7								l
40									$\blacksquare$
30									
20									$\left\{ \right.$
10									
7 <u>L L</u> Center 2.48C	1		300 k					l an 3 MHz	j

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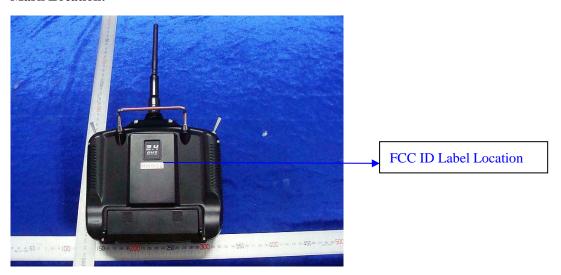
# 10.0 FCC ID Label

# FCC ID: TIVDYNAM-24-01

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The label must not be a stick-on paper label. The label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

# **Mark Location:**



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# 11.0 Photo of testing

# 11.1 Conducted test View—N/A

# 11.2 Radiated emission test view



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# 11.3 Photo for the EUT

#### Outside View





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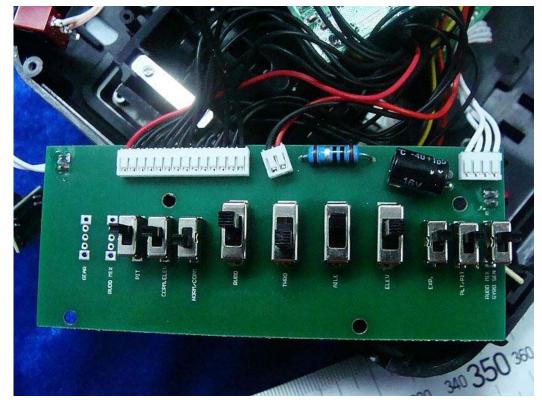
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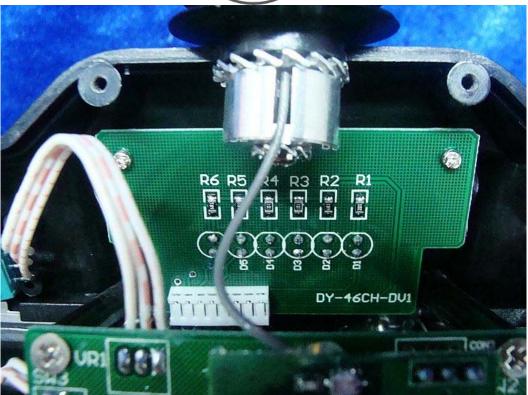
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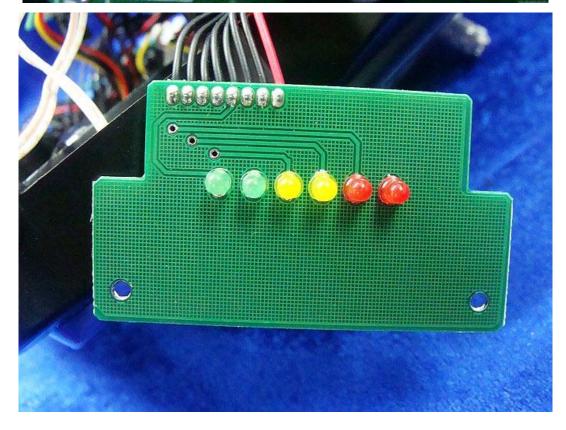
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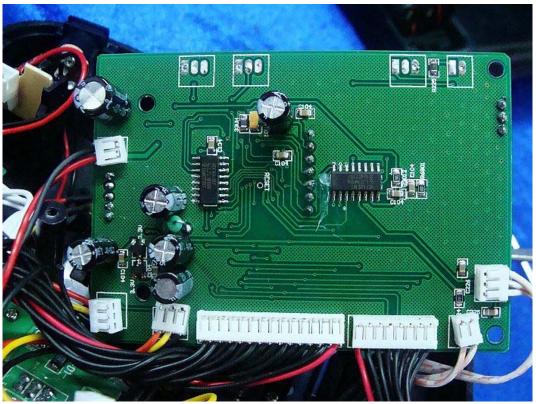
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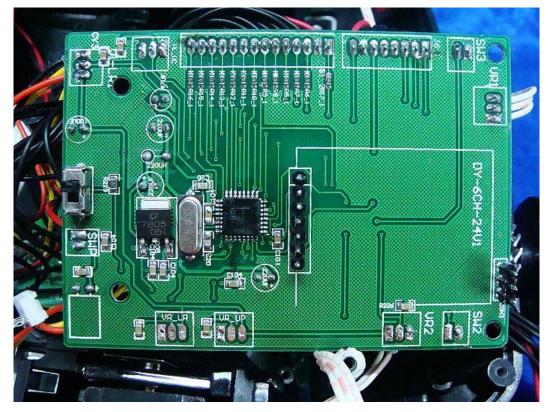
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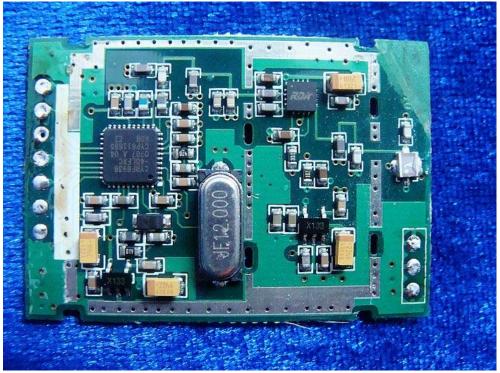
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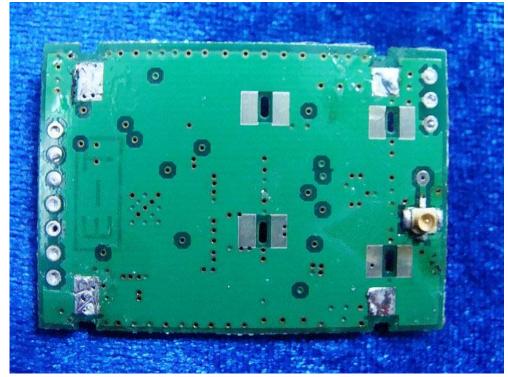
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