



**CENTRE OF TESTING SERVICE  
INTERNATIONAL**

**OPERATE ACCORDING TO ISO/IEC 17025**

# **FCC ID/IC TEST REPORT**

**TEST REPORT NUMBER : CGZ3130622-00511-EFI**



**CENTRE OF TESTING SERVICE CO., LTD.**

A101, No.65, Zhuji Highway, Tianhe District, Guangzhou, China



<b>TEST REPORT For FCC ID</b> <b>47 CFR PART 15 OCT, 2012</b> <b>RSS-210 Issue 8</b>	
<b>Report Reference No.</b> .....	CGZ3130622-00511-EFI
Date of issue.....	16 July 2013
<b>Testing Laboratory Name</b> .....	<b>CENTRE OF TESTING SERVICE CO., LTD.</b>
Address.....	A101, No.65, Zhuji Highway, Tianhe District, Guangzhou, China
Testing location/ procedure .....	Full application of Harmonised standards <input checked="" type="checkbox"/> Partial application of Harmonised standards <input type="checkbox"/> Other standard testing method <input type="checkbox"/>
<b>Applicant's name</b> .....	Horizon Hobby
Address.....	4105 Fieldstone Road, Champaign, IL 61822, USA
<b>Test specification</b> .....	
Standard .....	<b>47 CFR PART 15 OCT, 2012, RSS-210 Issue 8, RSS-Gen Issue 3</b>
<b>Test Report Form No.</b> .....	CTSEMC-1.0
TRF Originator.....	CENTRE OF TESTING SERVICE CO., LTD.
Master TRF.....	Dated 2009-01
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<b>Test item description</b> .....	: DUET TRANSMITTER
Trade Mark .....	/
Manufacturer.....	Horizon Hobby
Model/Type reference.....	HBZ5310
Ratings.....	Battery 1.5V*4
Operating Frequency.....	2405MMHz ~2480MHz
Result .....	<b>PASSED</b>

**Compiled by:**

Kate zhang / Fileadministrators

**Supervised by:**

Duke yang / Technique principal

**Approved by:**

Vincent yao / Manager

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**CENTRE OF TESTING SERVICE CO., LTD.**

A101, No.65, Zhuji Highway, Tianhe District, Guangzhou, China

Tel: +86-20-85543113 (32 lines)

Fax: +86-20-38780406

Complaint line: +86-20-85533471

E-mail: cts@cts-lab.com.cn

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## FCC ID/IC -- TEST REPORT

<b>Test Report No. :</b> CGZ3130622-00511-EFI	<u>16 July 2013</u> Date of issue
---	--------------------------------------

Type / Model.....	HBZ5310
EUT.....	DUET TRANSMITTER
<b>Applicant.....</b>	Horizon Hobby
Address.....	4105 Fieldstone Road, Champaign, IL 61822, USA
Telephone.....	+1-2174033542
Fax.....	/
Contact.....	Mr.Henry Lin
<b>Manufacturer.....</b>	Horizon Hobby
Address.....	4105 Fieldstone Road, Champaign, IL 61822, USA
Telephone.....	+1-2174033542
Fax.....	/
Contact.....	Mr.Henry Lin
<b>Test report holder.....</b>	Horizon Hobby
Address.....	4105 Fieldstone Road, Champaign, IL 61822, USA
Telephone.....	+1-2174033542
Fax.....	/
Contact.....	Mr.Henry Lin

The test report merely corresponds to the test sample.  
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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A101, No.65, Zhuji Highway,Tianhe District, Guangzhou, China

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Fax: +86-20-38780406

Complaint line: +86-20-85533471

E-mail: cts@cts-lab.com.cn

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## 1. TEST STANDARDS

The tests were performed according to following standards:

- 47 CFR PART 15 OCT, 2012
- RSS-210 Issue 8
- RSS-Gen Issue 3
- ANSI C63.4-2009

## 2. SUMMARY

### 2.1 GENERAL REMARKS

Date of receipt of test sample	22 June 2013
Testing commenced on	22 June~16 July 2013
Testing concluded on	16 July 2013

### 2.2 FINAL ASSESSMENT

The FCC requirements pertaining to the technical standards and tested operation modes are

- - fulfilled.
- - **not** fulfilled.

The equipment under test

- - fulfils the FCC requirements cited on page 1.
- - **does not** fulfil the FCC requirements cited on page 1.

## 3. EQUIPMENT UNDER TEST

### 3.1 Power supply system utilised

Power supply voltage : ■ Battery 1.5V\*4

### 3.2 Short description of the Equipment under Test (EUT)

Number of tested samples: 1

Serial number: Prototype

### 3.3 EUT operation mode

The equipment under test was operated during the measurement under the following conditions:

- - Standby
- TX- Y position
- TX- Z position
- TX- X position

Operation mode 1: TX-X Position Low (2405MHz) , TX-X Position Middle (2440MHz) ,  
TX-X Position High (2480MHz)

Note: TX -X position of EUT is the worst case, so only these test results be recorded in the test report.



### 3.4 EUT configuration

#### 3.4.1. Description of configuration (EUT)

Description	:	DUET TRANSMITTER
Model Number	:	HBZ5310
Operation frequency	:	2405 ~ 2480 MHz ISM Band
Radio Technology	:	GFSK
Modulation Technology	:	GFSK modulation
Antenna	:	External antenna, met requirement of FCC 15.203

#### 3.4.2. Tested Supporting System Details

N/A

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## 4. TEST ENVIRONMENT

### 4.1 Address of the test laboratory

A101, No.65, Zhuji Highway, Tianhe District, Guangzhou, China

Tel: +86-20-85543113 (32 lines) Fax: +86-20-38780406

### 4.2 Test facility

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

#### CNAS-Lab Code: L3394

CENTRE OF TESTING SERVICE CO., LTD has been assessed and proved to be in compliance with CNAS-CL01: 2006 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

#### IC-Registration No.: 8374A

The 3m Alternate Test Site of CENTRE OF TESTING SERVICE CO., LTD has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 8374A on June 6, 2011.

#### FCC-Registration No.: 971995

CENTRE OF TESTING SERVICE CO., LTD, 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.791995, July 13,2012.

### 4.3 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15~35 ° C
Humidity:	25~75 %
Atmospheric pressure:	86~106 kPa

### 4.4 Definitions of symbols used in this test report

- - The black square indicates that the listed condition, standard or equipment is applicable for this report.
- - The empty square indicates that the listed condition, standard or equipment is **not** applicable for this report.

### 4.5 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the CTS quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.



#### 4.6 Measurement Uncertainty

Test Item	Frequency Range	Uncertainty	Note
Conduction disturbance	150kHz~30MHz	±1.22dB	(1)
Power disturbance	30MHz~300MHz	±1.38dB	(1)
Radiation emission (3m)	30MHz~300MHz	±3.14dB	(1)
	300MHz~1000MHz	±3.18dB	(1)
	1GHz~26.5GHz	±3.54dB	(1)

(1).This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

### 5. Summary of standards and results

#### 5.1. Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below.

EMISSION		
Description of Test Item	Standard	Results
Radiated Emission Test	RSS-Gen:7.2 RSS-210 A2.9 FCC Part 15 C: 15.249 FCC Part 15 : 109 ANSI C63.4-2009	PASSED
Band Edge Compliance Test	RSS-210 Annex 8 FCC Part 15 C: 15.249 ANSI C63.4-2009	PASSED
20 dB Bandwidth test	FCC Part 15 C: 15.249 ANSI C63.4-2009 RSS-Gen:4.6.3	PASSED
99% Bandwidth	RSS-210 Annex 8 RSS-Gen 4.6.1	PASSED
N/A is an abbreviation for Not Applicable.		

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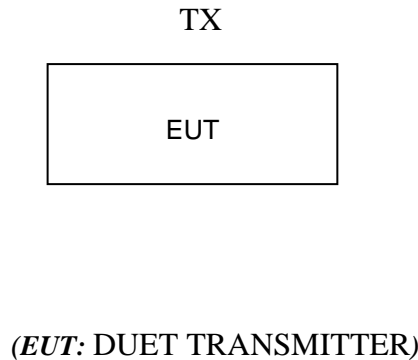
## 6. Radiated disturbance (electric field)

### 6.1. Test Equipment

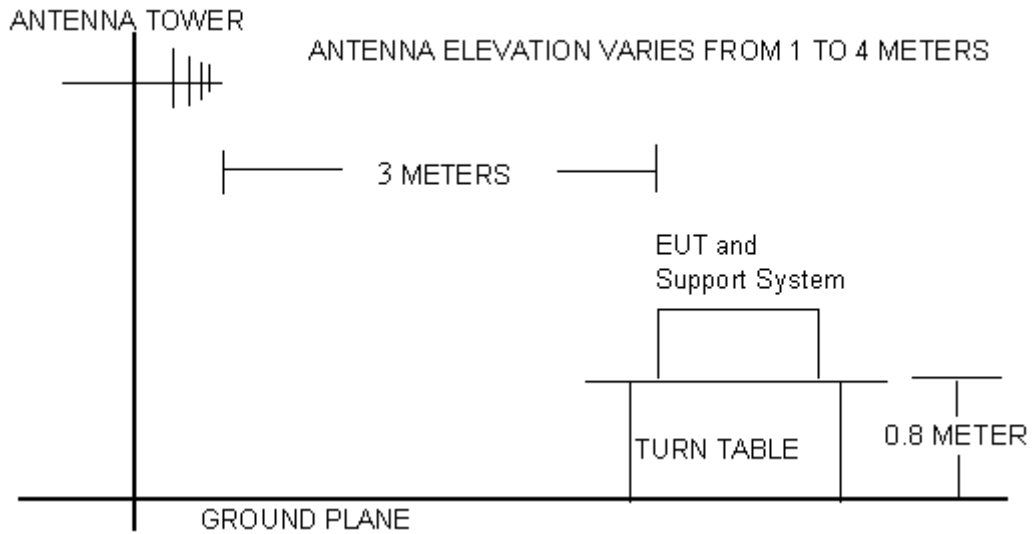
6.1					
Radiated disturbance (Electric field)					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Signal analyzer	ROHDE & SCHWARZ	FSIQ26	100311	2013/03
2	EMI Test Receiver	ROHDE & SCHWARZ	ESVS 10	842885/001	2012/11
3	Biconical Antenna	ROHDE & SCHWARZ	HK116	100221	2013/03
4	Log per Antenna	ROHDE & SCHWARZ	HL223	100226	2013/03
5	Log per Antenna	ROHDE & SCHWARZ	HL050	100186	2013/03
6	Loop Antenna	A.R.A	PLA-1030/B	1030	2012/11
7	EMI Test Software	Farad	EZ-EMC	N/A	N/A

### 6.2. Block Diagram of Test Setup

#### 7.2.1 Block Diagram of connection between EUT and simulators



**6.2.2 Anechoic Chamber Setup Diagram**



**6.3.Radiated Emission Limit :**

**Standard:FCC 15.249 , FCC 15.209, RSS-Gen:7.2,RSS-210 A2.9**

Except as provided in paragraph (a) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental (mV/m)	Field Strength of Harmonics (µV/m)
902-928	50	500
2400-2483.5	50	500
5725-5875	50	500
24000-24250	250	2500

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		µV/m	dB(µV)/m
0.009 ~ 0.490	300	2400/F(KHz)	----
0.490 ~ 1.705	30	24000/F(KHz)	----
1.705 ~ 30	3	30	----
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	Other:74.0 dB(µV)/m (Peak) 54.0 dB(µV)/m (Average)	

- Remark:
- (1) Emission level  $\text{dB}\mu\text{V} = 20 \log \text{Emission level } \mu\text{V/m}$
  - (2) The smaller limit shall apply at the cross point between two frequency bands.
  - (3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

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 Tel: +86-20-85543113 (32 lines) Fax: +86-20-38780406  
 Complaint line: +86-20-85533471 E-mail: cts@cts-lab.com.cn

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## 6.4. Test Procedure

The EUT and its simulators are placed on a turn table, which is 0.8 meter high above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. Both horizontal and vertical polarization of the antenna is set on Test. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4-2009 on radiated emission Test.

The frequency range from 30MHz to 1000MHz and above 1GHz. is investigated. Please see the following pages.

All measurements for radiated emissions within the restricted bands were performed using a Quasi-Peak detector with 120kHz RBW below 1GHz and a Peak and Average detector with 1MHz RBW above 1GHz,

All measurements for radiated emissions within the restricted bands were performed using a Quasi-Peak detector with 300kHz VBW below 1GHz and a Peak detector with 1MHz VBW above 1GHz, A average detector with 10Hz VBW above 1GHz

Pretest x, y, z position of EUT, final, select the worst case x position test and record the test results in the report.

The test modes (TX Mode) is tested in Anechoic Chamber and all the scanning waveforms are reported on section 7.5

## 6.5. Radiated Emission Test Results

**PASSED.**

The frequency range from 9KHz~30MHz, 30MHz to 230MHz, 230MHz to 1000MHz and above 1GHz. is investigated.

Please see the following pages.



Test Mode:	TX -X Position Mode	Result:	<input checked="" type="checkbox"/> - passed
Frequency range:	9KHz~30MHz		<input type="checkbox"/> - not passed

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBμV/m)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Det.
Remark:Other frequency no specific emission form the EUT (Margin > 10dB form the applicable Limit)							

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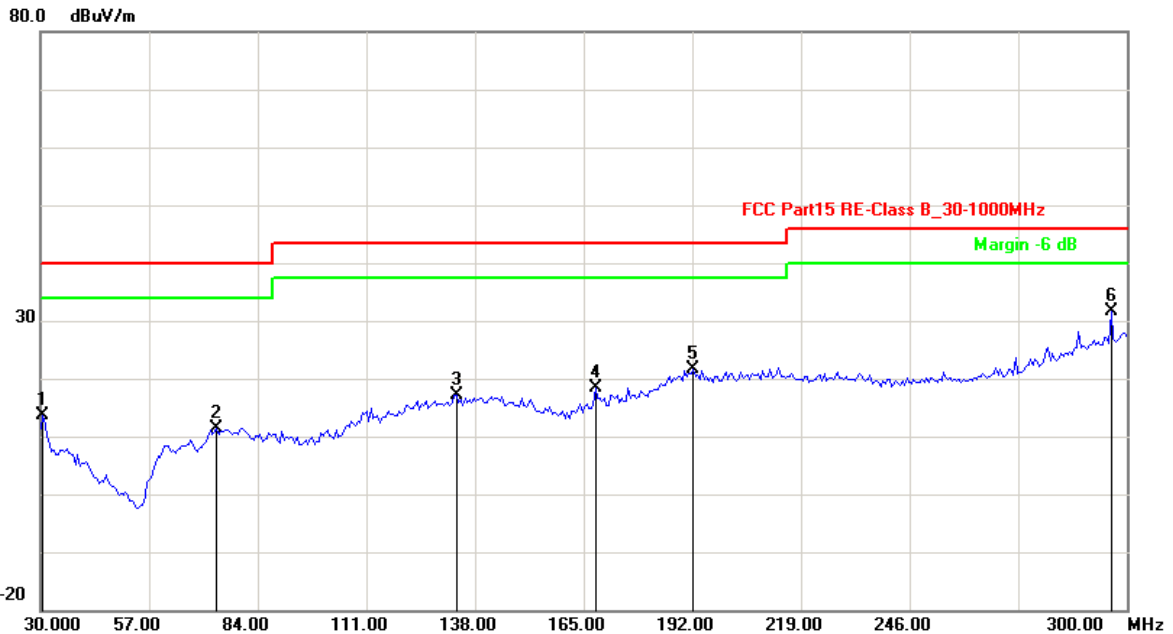
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Channel:	Low Channel	Result:	<input checked="" type="checkbox"/> - passed
Test point:	Horizontal		<input type="checkbox"/> - not passed
Frequency range:	30MHz~26.5GHz		

EUT	DUET TRANSMITTER
Firm Name	Horizon Hobby
Operating Condition	Battery 1.5V*4
Test Condition	Ambient Temperature: 25°C Humidity: 56%
Test distance	3 Meter
Test Date:	22 June~16 July 2013
Operator	Duke
MODEL NO	HBZ5310



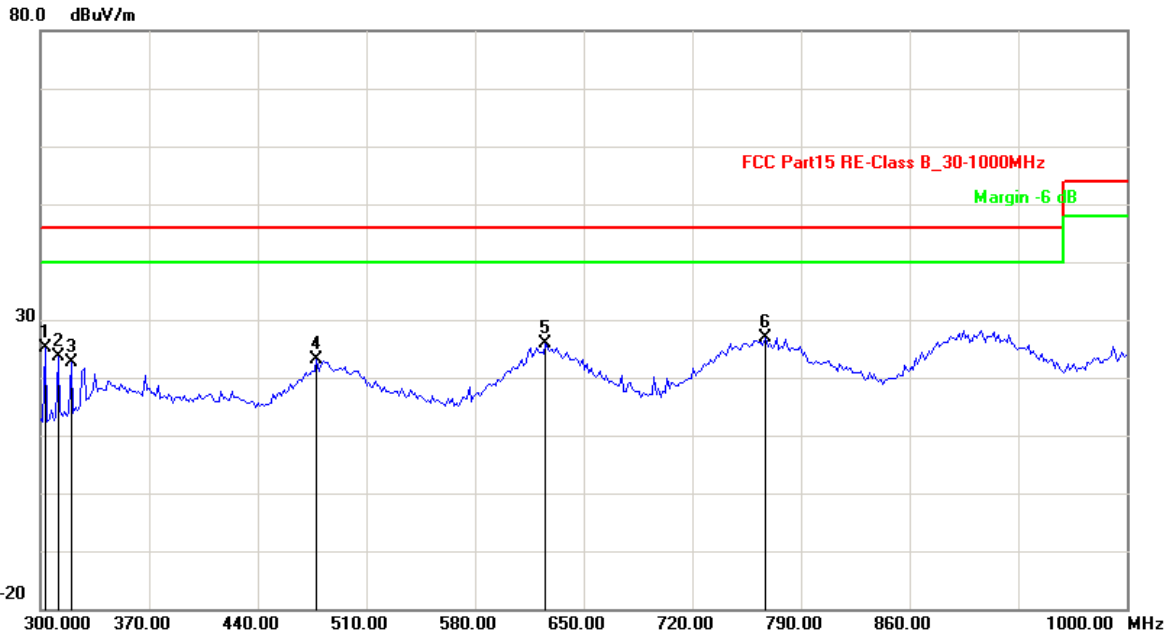
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBμV/m)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Det.
1	30.5411	-24.45	38.02	13.57	40.00	-26.43	QP
2	73.8277	-21.84	33.25	11.41	40.00	-28.59	QP
3	133.3466	-16.83	33.97	17.14	43.50	-26.36	QP
4	167.9760	-17.10	35.43	18.33	43.50	-25.17	QP
5	192.3246	-12.16	33.73	21.57	43.50	-21.93	QP
6	296.2124	-6.13	37.86	31.73	46.00	-14.27	QP

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No.	Frequency (MHz)	Factor (dB/m)	Reading (dBμV/m)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Det.
1	302.8056	-20.55	45.59	25.04	46.00	-20.96	QP
2	311.2223	-19.29	43.04	23.75	46.00	-22.25	QP
3	319.6393	-18.03	40.54	22.51	46.00	-23.49	QP
4	478.1563	-10.03	33.06	23.03	46.00	-22.97	QP
5	625.4509	-7.22	33.08	25.86	46.00	-20.14	QP
6	767.1342	-5.65	32.56	26.91	46.00	-19.09	QP

Above 1GHz

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBμV/m)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Det.
1	2405	-26.11	117.08	90.97	114.00	-23.03	peak
2	2405	-26.11	113.77	87.66	94.00	-6.36	AVG

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBμV/m)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Det.
1	2609.218	4.39	41.77	46.16	74.00	-27.84	peak
2	2609.218	4.39	26.86	31.25	54.00	-22.75	AVG
3	3006.012	6.62	41.77	48.39	74.00	-25.61	peak
4	3006.012	6.62	27.07	33.69	54.00	-20.31	AVG
5	5474.950	13.69	37.64	51.33	74.00	-22.67	peak
6	5474.950	13.69	21.09	34.78	54.00	-19.22	AVG
7	6334.669	16.19	40.36	56.55	74.00	-17.45	peak
8	6334.669	16.19	24.86	41.05	54.00	-12.95	AVG
9	7943.888	19.11	35.89	55.00	74.00	-19.00	peak
10	7943.888	19.11	21.01	40.12	54.00	-13.88	AVG
11	8869.740	21.64	35.93	57.57	74.00	-16.43	peak
12	8869.740	21.64	20.66	42.30	54.00	-11.70	AVG

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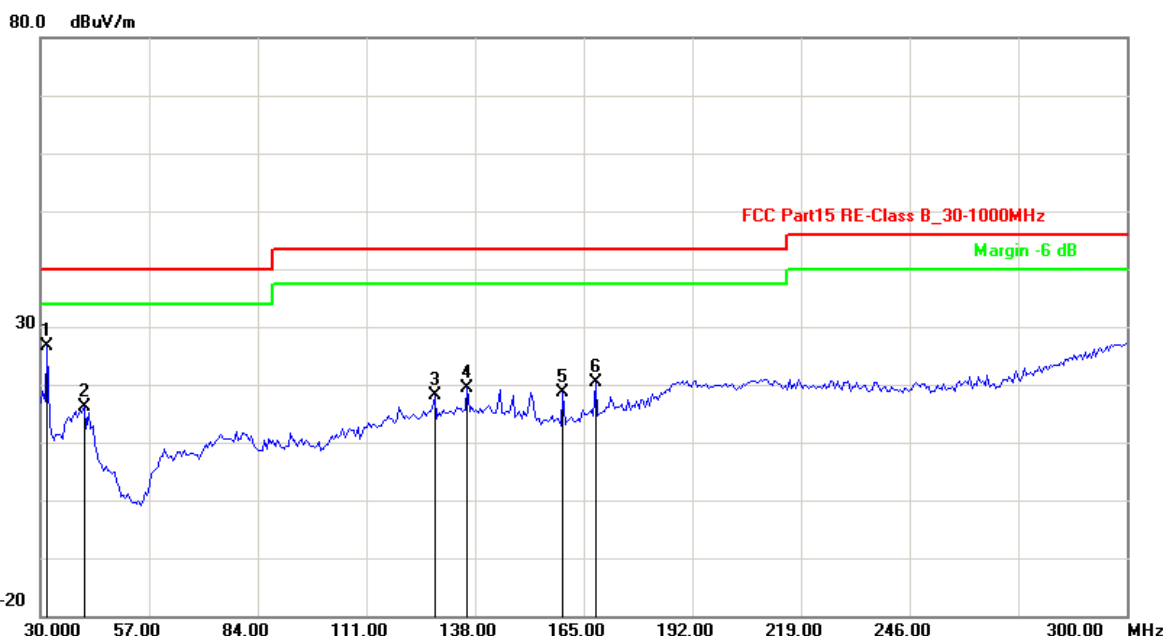
E-mail: cts@cts-lab.com.cn

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Channel:	Low Channel	Result:	<input checked="" type="checkbox"/> - passed
Test point:	Vertical		<input type="checkbox"/> - not passed
Frequency range:	30MHz~26.5GHz		

EUT	DUET TRANSMITTER
Firm Name	Horizon Hobby
Operating Condition	Battery 1.5V*4
Test Condition	Ambient Temperature: 25°C Humidity: 56%
Test distance	3 Meter
Test Date:	22 June~16 July 2013
Operator	Duke
MODEL NO	HBZ5310



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBμV/m)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Det.
1	31.6232	-24.40	51.01	26.61	40.00	-13.39	QP
2	40.8216	-26.49	42.67	16.18	40.00	-23.82	QP
3	127.9359	-17.28	35.53	18.25	43.50	-25.25	QP
4	136.0520	-16.65	36.15	19.50	43.50	-24.00	QP
5	159.8597	-18.91	37.61	18.70	43.50	-24.80	QP
6	167.9760	-17.10	37.46	20.36	43.50	-23.14	QP

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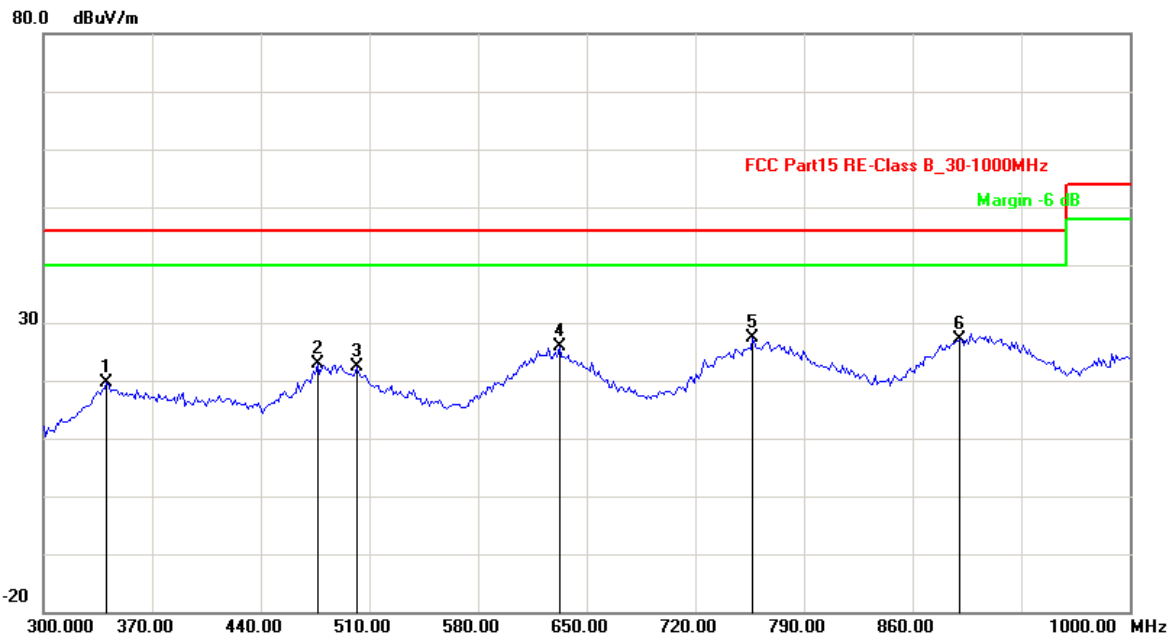
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Complaint line: +86-20-85533471

E-mail: cts@cts-lab.com.cn

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No.	Frequency (MHz)	Factor (dB/m)	Reading (dBμV/m)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Det.
1	340.6814	-13.14	32.84	19.70	46.00	-26.30	QP
2	476.7535	-10.28	33.15	22.87	46.00	-23.13	QP
3	502.0040	-10.47	32.92	22.45	46.00	-23.55	QP
4	632.4649	-7.41	33.40	25.99	46.00	-20.01	QP
5	757.3146	-5.72	33.14	27.42	46.00	-18.58	QP
6	890.5812	-4.40	31.42	27.02	46.00	-18.98	QP

Above 1GHz

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBμV/m)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Det.
1	2405	-26.11	119.37	93.26	114.00	-18.31	peak
2	2405	-26.11	116.36	90.25	94.00	-3.75	AVG

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBμV/m)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Det.
1	3336.673	7.68	41.34	49.02	74.00	-24.98	peak
2	3336.673	7.68	26.90	34.58	54.00	-19.42	AVG
3	4284.569	10.48	37.86	48.34	74.00	-25.66	peak
4	4284.569	10.48	23.21	33.69	54.00	-20.31	AVG
5	5254.509	12.98	37.56	50.54	74.00	-23.46	peak
6	5254.509	12.98	22.23	35.21	54.00	-18.79	AVG
7	8781.563	21.39	37.84	59.23	74.00	-14.77	peak
8	8781.563	21.39	22.63	44.02	54.00	-9.98	AVG
9	9993.988	24.01	38.30	62.31	74.00	-11.69	peak
10	9993.988	24.01	23.35	47.36	54.00	-6.64	AVG
11	11008.016	25.58	37.93	63.51	74.00	-10.49	peak
12	11008.016	25.58	23.09	48.67	54.00	-5.33	AVG

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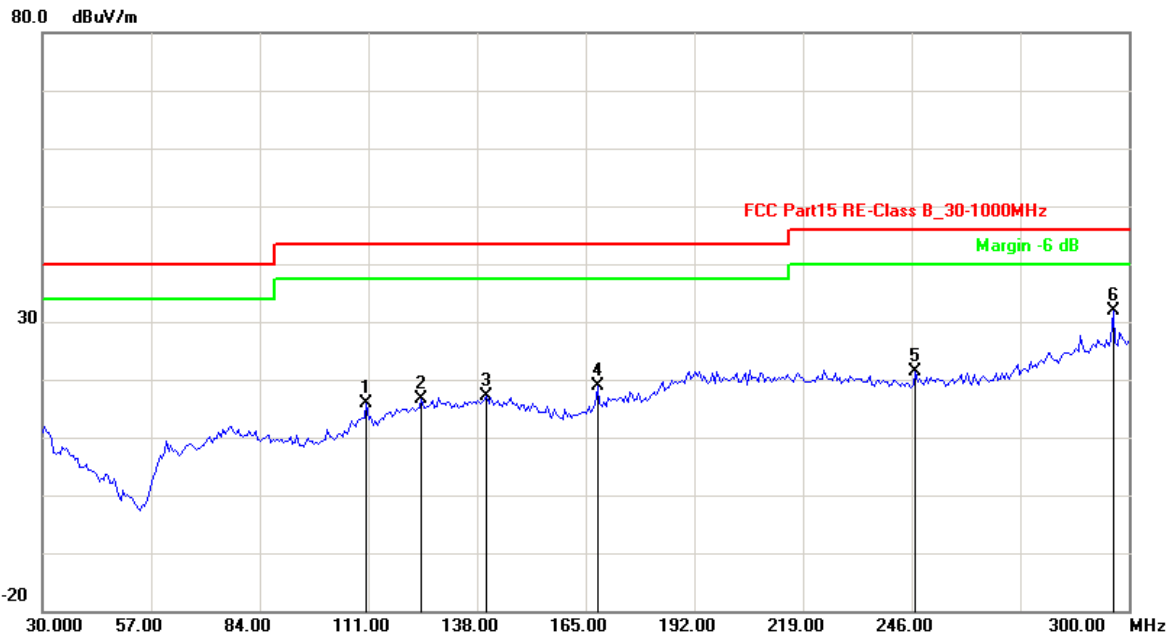
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Channel:	Middle Channel	Result:	<input checked="" type="checkbox"/> - passed
Test point:	Horizontal		<input type="checkbox"/> - not passed
Frequency range:	30MHz~26.5GHz		

EUT	DUET TRANSMITTER
Firm Name	Horizon Hobby
Operating Condition	Battery 1.5V*4
Test Condition	Ambient Temperature: 25°C Humidity: 56%
Test distance	3 Meter
Test Date:	22 June~16 July 2013
Operator	Duke
MODEL NO	HBZ5310



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.
1	110.6212	-20.40	36.22	15.82	43.50	-27.68	QP
2	124.1483	-17.69	34.25	16.56	43.50	-26.94	QP
3	140.3808	-16.42	33.53	17.11	43.50	-26.39	QP
4	167.9760	-17.10	35.97	18.87	43.50	-24.63	QP
5	246.9739	-12.88	34.25	21.37	46.00	-24.63	QP
6	296.2124	-6.13	38.05	31.92	46.00	-14.08	QP

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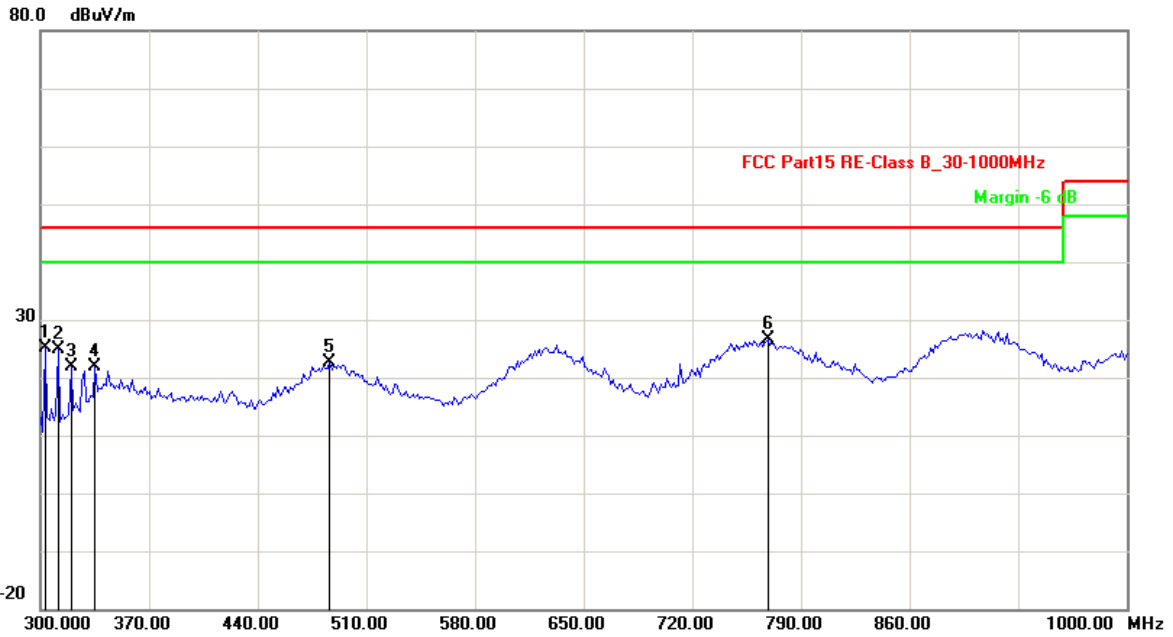
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No.	Frequency (MHz)	Factor (dB/m)	Reading (dBμV/m)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Det.
1	302.8056	-20.55	45.64	25.09	46.00	-20.91	QP
2	311.2223	-19.29	44.07	24.78	46.00	-21.22	QP
3	319.6393	-18.03	40.01	21.98	46.00	-24.02	QP
4	335.0701	-14.31	36.24	21.93	46.00	-24.07	QP
5	486.5731	-9.85	32.37	22.52	46.00	-23.48	QP
6	768.5371	-5.69	32.36	26.67	46.00	-19.33	QP

Above 1GHz

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBμV/m)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Det.
1	2440	-25.95	116.14	90.19	114.00	-23.81	peak
2	2440	-25.95	113.29	87.34	94.00	-6.66	AVG

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBμV/m)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Det.
1	2917.836	6.13	42.62	48.75	74.00	-25.25	peak
2	2917.836	6.13	29.01	35.14	54.00	-18.86	AVG
3	3160.321	7.11	42.01	49.12	74.00	-24.88	peak
4	3160.321	7.11	18.63	25.74	54.00	-28.26	AVG
5	4813.627	11.72	39.40	51.12	74.00	-22.88	peak
6	4813.627	11.72	24.76	36.48	54.00	-17.52	AVG
7	5519.038	13.83	39.72	53.55	74.00	-20.45	peak
8	5519.038	13.83	24.40	38.23	54.00	-15.77	AVG
9	7326.653	18.25	37.43	55.68	74.00	-18.32	peak
10	7326.653	18.25	21.77	40.02	54.00	-13.98	AVG
11	7987.976	19.17	37.87	57.04	74.00	-16.96	peak
12	7987.976	19.17	23.49	42.66	54.00	-11.34	AVG

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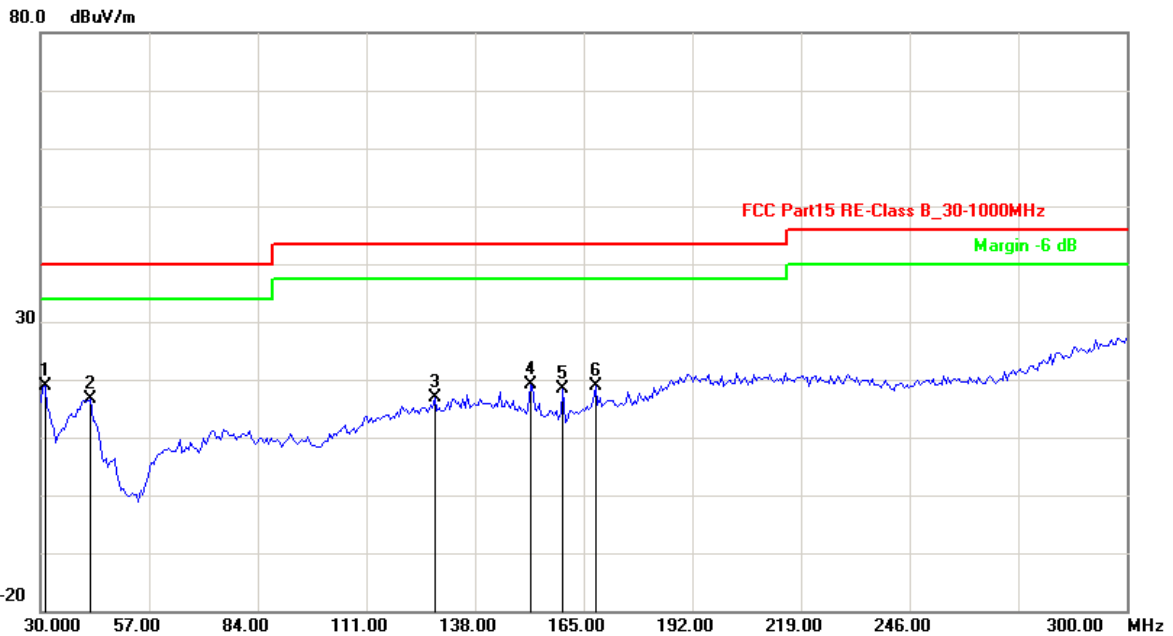
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Channel:	Middle Channel	Result:	<input checked="" type="checkbox"/> - passed
Test point:	Vertical		<input type="checkbox"/> - not passed
Frequency range:	30MHz~26.5GHz		

EUT	DUET TRANSMITTER
Firm Name	Horizon Hobby
Operating Condition	Battery 1.5V*4
Test Condition	Ambient Temperature: 25°C Humidity: 56%
Test distance	3 Meter
Test Date:	22 June~16 July 2013
Operator	Duke
MODEL NO	HBZ5310



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBμV/m)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Det.
1	31.0822	-24.45	43.23	18.78	40.00	-21.22	QP
2	42.4449	-27.42	43.96	16.54	40.00	-23.46	QP
3	127.9359	-17.28	34.13	16.85	43.50	-26.65	QP
4	151.7434	-17.62	36.69	19.07	43.50	-24.43	QP
5	159.8597	-18.91	37.27	18.36	43.50	-25.14	QP
6	167.9760	-17.10	35.88	18.78	43.50	-24.72	QP

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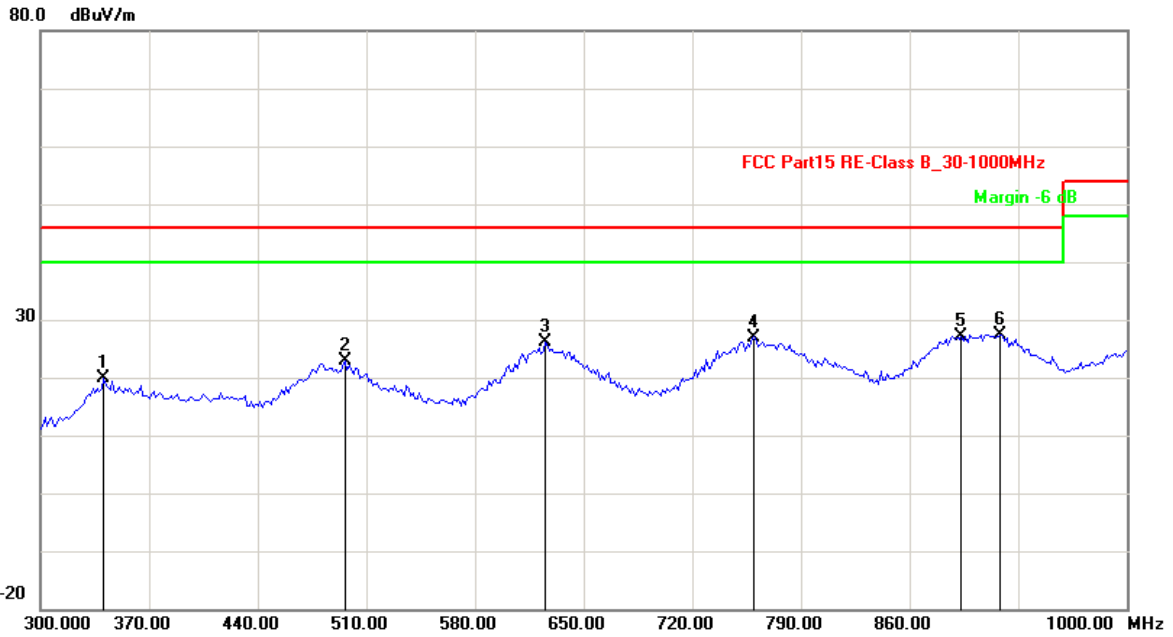
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No.	Frequency (MHz)	Factor (dB/m)	Reading (dBμV/m)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Det.
1	340.6814	-13.14	33.12	19.98	46.00	-26.02	QP
2	496.3928	-10.08	33.03	22.95	46.00	-23.05	QP
3	625.4509	-7.22	33.38	26.16	46.00	-19.84	QP
4	760.1201	-5.49	32.49	27.00	46.00	-19.00	QP
5	893.3868	-4.25	31.42	27.17	46.00	-18.83	QP
6	918.6373	-4.48	31.92	27.44	46.00	-18.56	QP

Above 1GHz

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBμV/m)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Det.
1	2440	-25.95	119.71	93.76	114.00	-20.24	peak
2	2440	-25.95	115.93	89.98	94.00	-4.02	AVG

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBμV/m)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Det.
1	3072.144	6.83	42.45	49.28	74.00	-24.72	peak
2	3072.144	6.83	27.29	34.12	54.00	-19.88	AVG
3	3336.673	7.68	41.74	49.42	74.00	-24.58	peak
4	3336.673	7.68	26.17	33.85	54.00	-20.15	AVG
5	4681.363	11.41	38.79	50.20	74.00	-23.80	peak
6	4681.363	11.41	23.71	35.12	54.00	-18.88	AVG
7	6026.052	15.44	40.42	55.86	74.00	-18.14	peak
8	6026.052	15.44	24.58	40.02	54.00	-13.98	AVG
9	7569.138	18.59	37.59	56.18	74.00	-17.82	peak
10	7569.138	18.59	22.49	41.08	54.00	-12.92	AVG
11	8737.475	21.27	38.17	59.44	74.00	-14.56	peak
12	8737.475	21.27	22.91	44.18	54.00	-9.82	AVG

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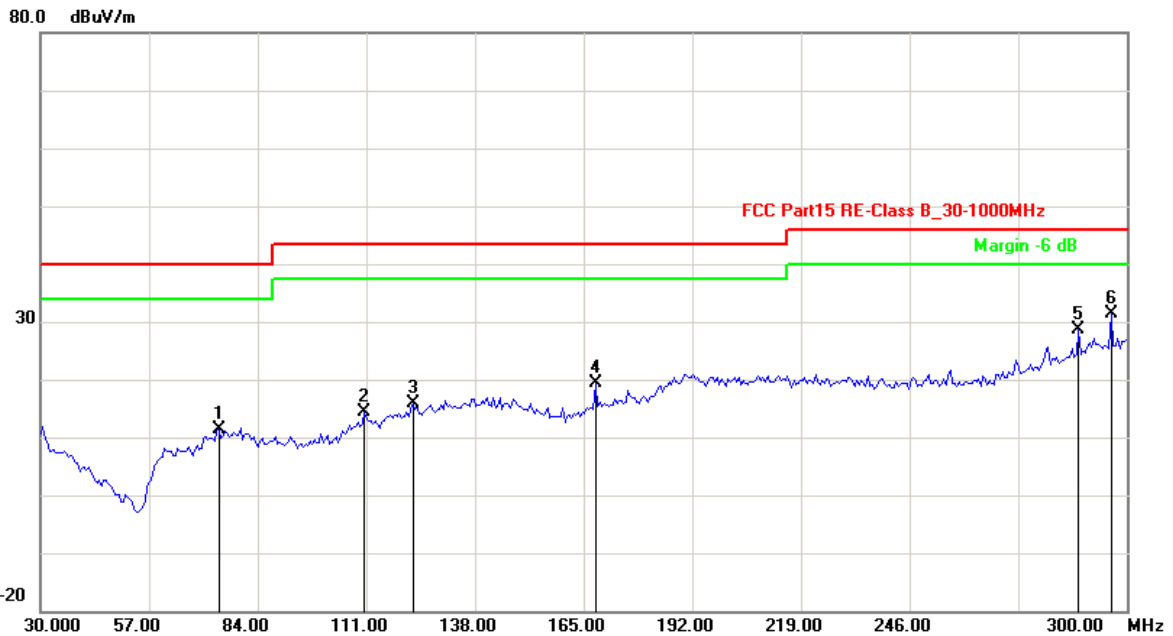
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Channel:	High Channel	Result:	<input checked="" type="checkbox"/> - passed
Test point:	Horizontal		<input type="checkbox"/> - not passed
Frequency range:	30MHz~26.5GHz		

EUT	DUET TRANSMITTER
Firm Name	Horizon Hobby
Operating Condition	Battery 1.5V*4
Test Condition	Ambient Temperature: 25°C Humidity: 56%
Test distance	3 Meter
Test Date:	22 June~16 July 2013
Operator	Duke
MODEL NO	HBZ5310



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.
1	74.3687	-21.66	33.02	11.36	40.00	-28.64	QP
2	110.6212	-20.40	34.70	14.30	43.50	-29.20	QP
3	122.5250	-17.86	33.83	15.97	43.50	-27.53	QP
4	167.9760	-17.10	36.43	19.33	43.50	-24.17	QP
5	288.0962	-7.50	36.08	28.58	46.00	-17.42	QP
6	296.2124	-6.13	37.62	31.49	46.00	-14.51	QP

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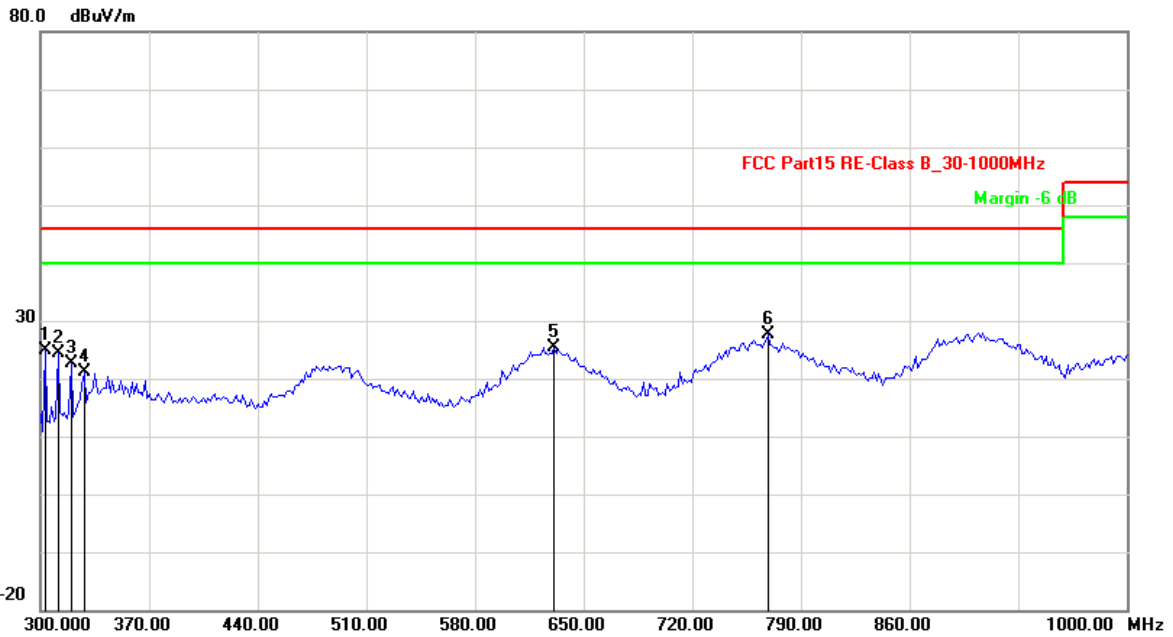
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No.	Frequency (MHz)	Factor (dB/m)	Reading (dBμV/m)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Det.
1	302.8056	-20.55	45.49	24.94	46.00	-21.06	QP
2	311.2223	-19.29	43.68	24.39	46.00	-21.61	QP
3	319.6393	-18.03	40.59	22.56	46.00	-23.44	QP
4	328.0561	-16.02	37.23	21.21	46.00	-24.79	QP
5	631.0621	-7.37	32.72	25.35	46.00	-20.65	QP
6	768.5371	-5.69	33.36	27.67	46.00	-18.33	QP

Above 1GHz

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBμV/m)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Det.
1	2480	-25.13	115.58	90.45	114.00	-23.55	peak
2	2480	-25.13	113.10	87.97	94.00	-6.03	AVG

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBμV/m)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Det.
1	2719.439	5.01	42.05	47.06	74.00	-26.94	peak
2	2719.439	5.01	27.64	32.65	54.00	-21.35	AVG
3	3314.629	7.61	41.09	48.70	74.00	-25.30	peak
4	3314.629	7.61	25.60	33.21	54.00	-20.79	AVG
5	4174.349	10.22	38.12	48.34	74.00	-25.66	peak
6	4174.349	10.22	22.97	33.19	54.00	-20.81	AVG
7	5541.082	13.90	37.93	51.83	74.00	-22.17	peak
8	5541.082	13.90	22.06	35.96	54.00	-18.04	AVG
9	6444.890	16.46	39.02	55.48	74.00	-18.52	peak
10	6444.890	16.46	23.67	40.13	54.00	-13.87	AVG
11	9090.180	22.19	37.25	59.44	74.00	-14.56	peak
12	9090.180	22.19	22.89	45.08	54.00	-8.92	AVG

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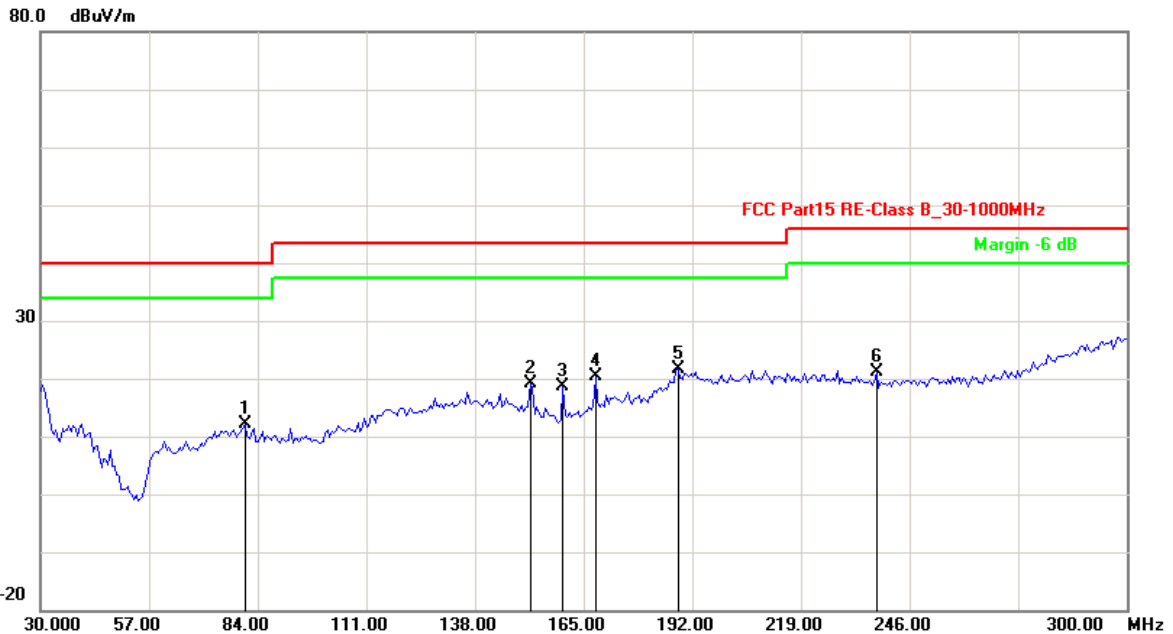
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Channel:	High Channel	Result:	<input checked="" type="checkbox"/> - passed
Test point:	Vertical		<input type="checkbox"/> - not passed
Frequency range:	30MHz~26.5GHz		

EUT	DUET TRANSMITTER
Firm Name	Horizon Hobby
Operating Condition	Battery 1.5V*4
Test Condition	Ambient Temperature: 25°C Humidity: 56%
Test distance	3 Meter
Test Date:	22 June~16 July 2013
Operator	Duke
MODEL NO	HBZ5310



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBμV/m)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Det.
1	80.8617	-21.60	33.82	12.22	40.00	-27.78	QP
2	151.7434	-17.62	36.75	19.13	43.50	-24.37	QP
3	159.8597	-18.91	37.53	18.62	43.50	-24.88	QP
4	167.9760	-17.10	37.60	20.50	43.50	-23.00	QP
5	188.5370	-12.53	34.05	21.52	43.50	-21.98	QP
6	237.7756	-12.95	33.98	21.03	46.00	-24.97	QP

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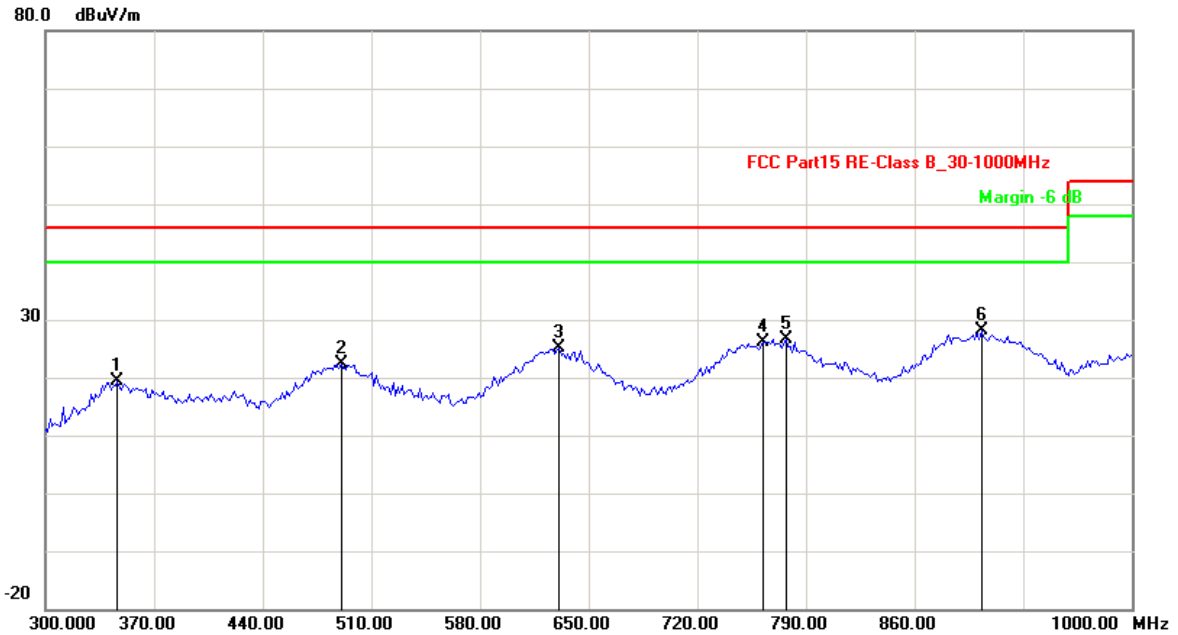
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No.	Frequency (MHz)	Factor (dB/m)	Reading (dBμV/m)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Det.
1	346.2926	-13.36	32.79	19.43	46.00	-26.57	QP
2	490.7816	-9.95	32.44	22.49	46.00	-23.51	QP
3	631.0621	-7.37	32.58	25.21	46.00	-20.79	QP
4	762.9259	-5.56	31.68	26.12	46.00	-19.88	QP
5	776.9539	-5.88	32.55	26.67	46.00	-19.33	QP
6	903.2064	-4.01	32.06	28.05	46.00	-17.95	QP

Above 1GHz

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBμV/m)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Det.
1	2480	-25.13	119.00	93.87	114.00	-20.13	peak
2	2480	-25.13	114.77	89.64	94.00	-4.36	AVG

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBμV/m)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Det.
1	2851.703	5.76	41.44	47.20	74.00	-26.80	peak
2	2851.703	5.76	26.93	32.69	54.00	-21.31	AVG
3	3755.511	9.03	39.09	48.12	74.00	-25.88	peak
4	3755.511	9.03	24.21	33.24	54.00	-20.76	AVG
5	4769.539	11.62	36.70	48.32	74.00	-25.68	peak
6	4769.539	11.62	21.56	33.18	54.00	-20.82	AVG
7	5871.744	14.97	38.58	53.55	74.00	-20.45	peak
8	5871.744	14.97	23.18	38.15	54.00	-15.85	AVG
9	7943.888	19.11	36.24	55.35	74.00	-18.65	peak
10	7943.888	19.11	21.01	40.12	54.00	-13.88	AVG
11	9905.812	23.83	37.36	61.19	74.00	-12.81	peak
12	9905.812	23.83	23.06	46.89	54.00	-7.11	AVG

Note:Level=Reading+Factor. Margin= Limit -Level.

Remark: Others frequency Radiated Emission level margin all >10dB of Limit.

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## 8. Band Edge Compliance test

### 8.1. Test Equipment

Band Edge Compliance test					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Log per Antenna	ROHDE & SCHWARZ	HL050	100186	2013/03
2	Signal analyzer	ROHDE & SCHWARZ	FSIQ26	100311	2013/03

### 8.2. Test Information

EUT	DUET TRANSMITTER
Firm Name	Horizon Hobby
Operating Condition	Battery 1.5V*4
Test Condition	Ambient Temperature: 25°C Humidity: 56%
Test distance	3 Meter
Test Date:	21 Dec. 2012~07 Jan. 2013
Operator	<b>Duke</b>
MODEL NO	HBZ5310

### 8.3. Test procedure

- 1、 The EUT operates at hopping-off test mode. The lowest or highest channels are tested to verify the largest transmission and spurious emissions power at the continuous transmission mode.
- 2、 Max hold the trace of the setp 1,and the EUT operates at hopping-on test mode to verify the largest spurious emissions power.

### 8.4. Test Results

#### PASSED.

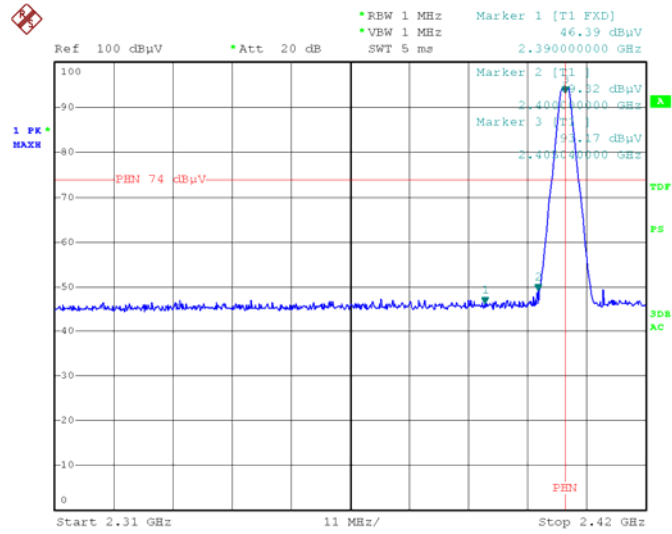
The EUT operates at hopping-off test mode. The lowest and highest channels are tested to verify the band edge emissions.

Test Mode	Channel Marked Frequency	Test Result Highest Emission (dBuv/m)			
		Horizontal		Vertical	
		Peak	Average	Peak	Average
Low Channel	2390MHz	46.39	34.24	45.78	34.46
	2400MHz	49.32	38.03	49.72	37.56
High Channel	2483.5MHz	61.06	50.68	62.06	52.31
	2500MHz	47.41	34.90	46.34	34.81



Band Edges(CH Low)  
 Detector mode:Peak

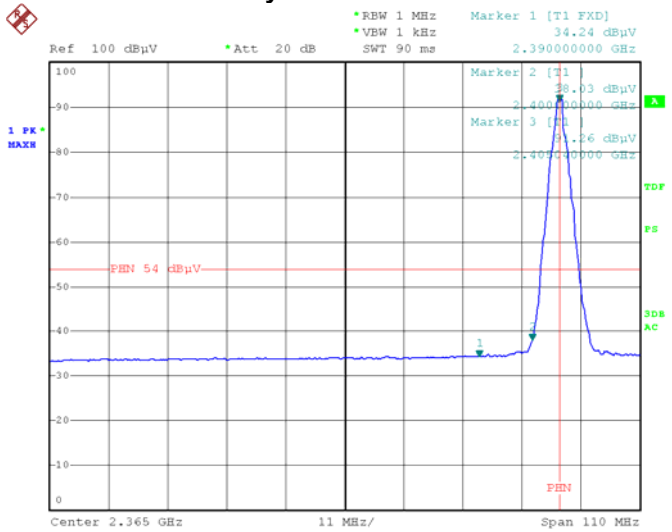
Polarity:Horizontal



Date: 8.JUL.2013 19:05:21

Band Edges(CH Low)  
 Detector mode:Average

Polarity:Horizontal



Date: 8.JUL.2013 19:08:34

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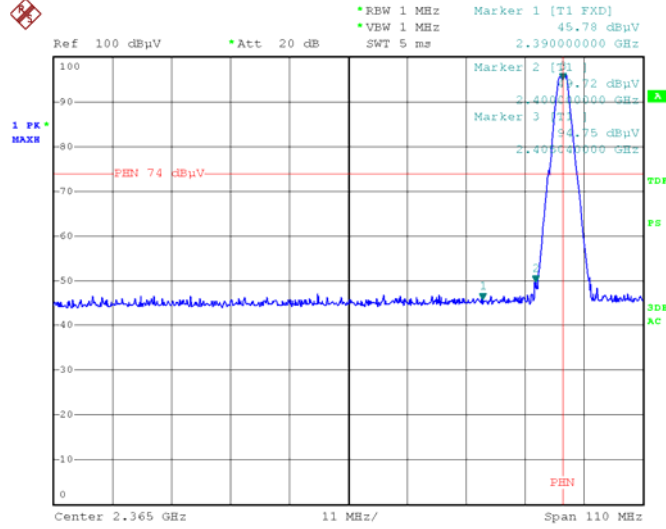
E-mail: cts@cts-lab.com.cn

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Band Edges(CH Low)  
 Detector mode:Peak

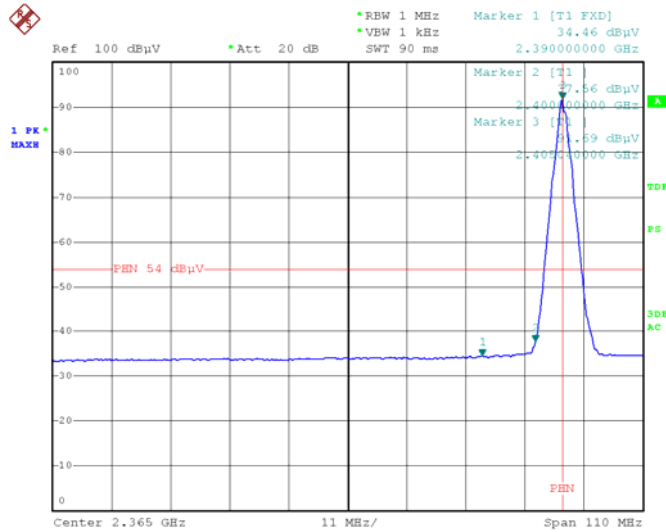
Polarity:Vertical



Date: 8.JUL.2013 19:10:21

Band Edges(CH Low)  
 Detector mode:Average

Polarity:Vertical



Date: 8.JUL.2013 19:06:59

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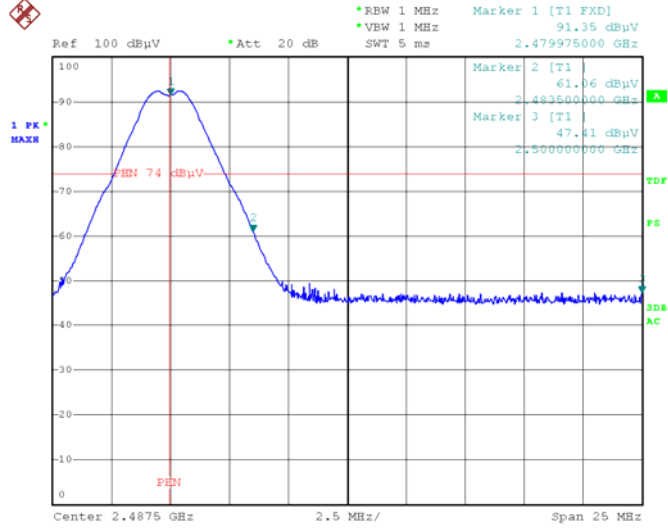
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Band Edges(CH High)  
 Detector mode:Peak

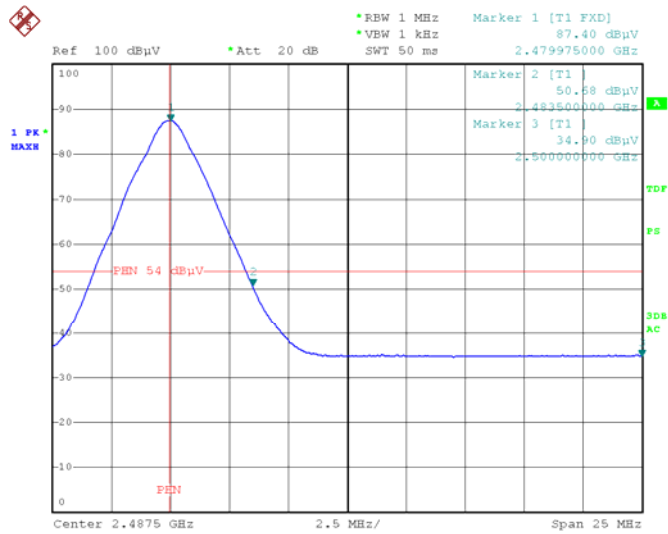
Polarity:Horizontal



Date: 8.JUL.2013 19:52:26

Band Edges(CH High)  
 Detector mode:Average

Polarity:Horizontal



Date: 8.JUL.2013 19:50:44

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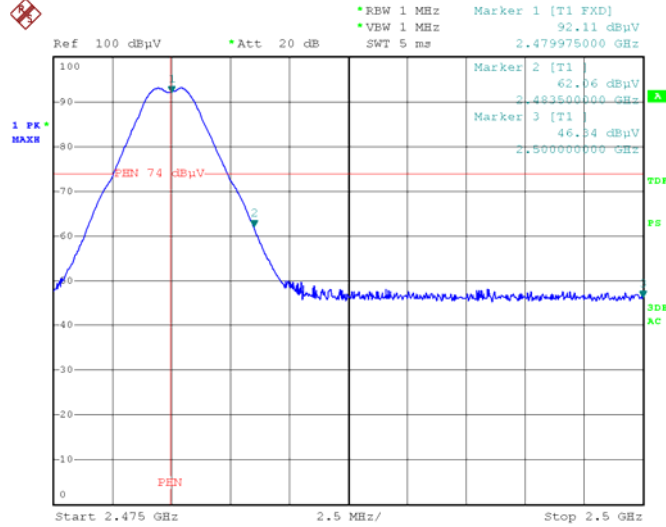
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**Band Edges(CH High)**  
**Detector mode:Peak**

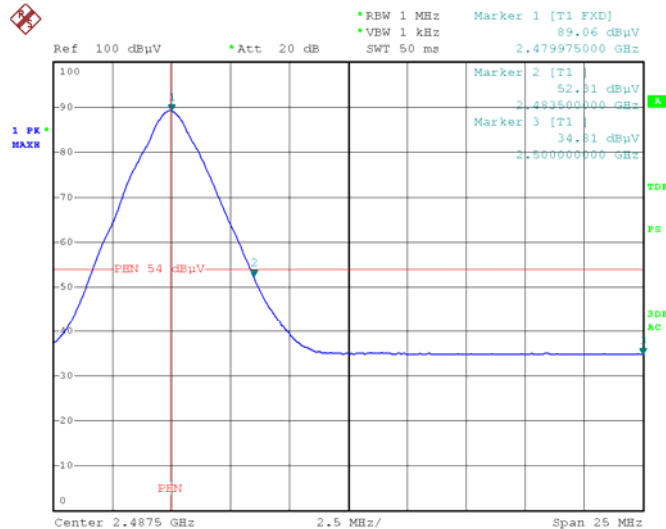
**Polarity:Vertical**



Date: 8.JUL.2013 19:44:25

**Band Edges(CH High)**  
**Detector mode:Average**

**Polarity:Vertical**



Date: 8.JUL.2013 19:48:14

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## 9. 99% bandwidth

### 9.1 Test procedure

According to RSS-210 Annex 8 and RSS-Gen 4.6.1 The Duet Transmitter output is connected to the spectrum analyzer. The resolution bandwidth shall be set to as close to 1% of the selected span as is possible without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used given that a peak or peak hold may produce a wider bandwidth than actual. The sweep time is coupled.

### 9.2. Test Equipment

Band Edge Compliance test					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Log per Antenna	ROHDE & SCHWARZ	HL050	100186	2013/03
2	Signal analyzer	ROHDE & SCHWARZ	FSIQ26	100311	2013/03

### 9.3. Test Information

EUT	DUET TRANSMITTER
Firm Name	Horizon Hobby
Operating Condition	Battery 1.5V*4
Test Condition	Ambient Temperature: 25°C Humidity: 56%
Test Date:	21 Dec. 2012~07 Jan. 2013
Operator	<b>Duke</b>
MODEL NO	HBZ5310

### 9.4. Test Results

**PASSED.**

Channel	Frequency (MHz)	Bandwidth (MHz)
Low	2405	2.61
Middle	2440	2.61
High	2480	2.61

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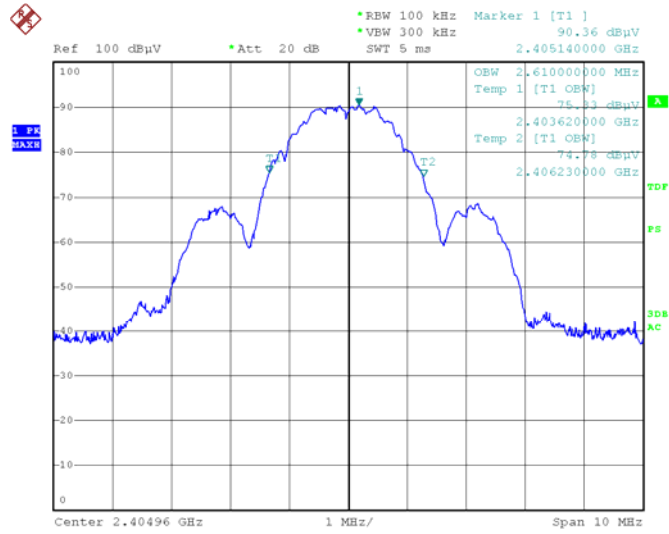
Complaint line: +86-20-85533471

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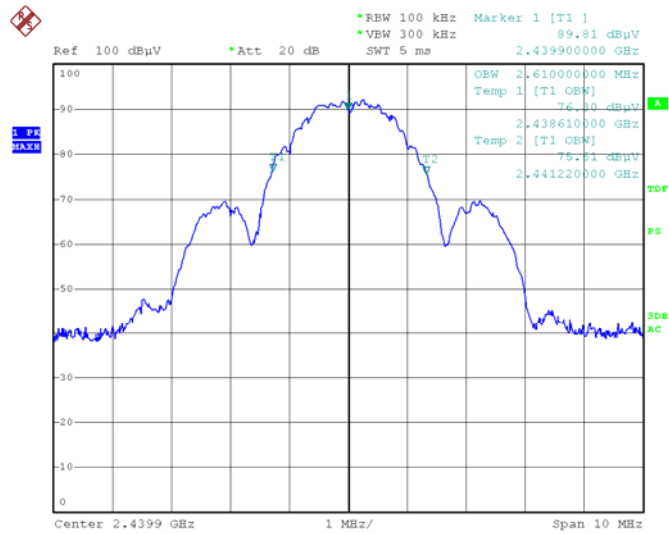


99% Bandwidth 2405MHz



Date: 8.JUL.2013 19:20:04

99% Bandwidth 2440 MHz



Date: 8.JUL.2013 19:22:27

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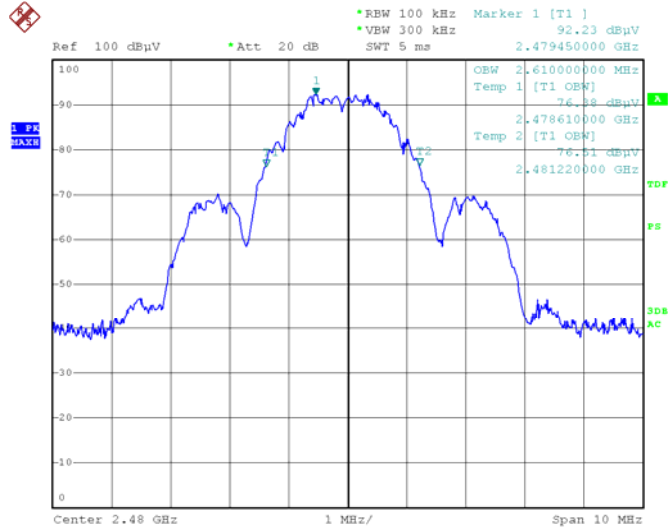
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99% Bandwidth 2480 MHz



Date: 8.JUL.2013 19:39:06

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## 10. 20 dB Bandwidth test

### 10.1. Test Equipment

20 dB Bandwidth test					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Log per Antenna	ROHDE & SCHWARZ	HL050	100186	2013/03
2	Signal analyzer	ROHDE & SCHWARZ	FSIQ26	100311	2013/03

### 10.2. Test Information

EUT	DUET TRANSMITTER
Firm Name	Horizon Hobby
Operating Condition	Battery 1.5V*4
Test Condition	Ambient Temperature: 25°C Humidity: 56%
Test Date:	21 Dec. 2012~07 Jan. 2013
Operator	<b>Duke</b>
MODEL NO	HBZ5310

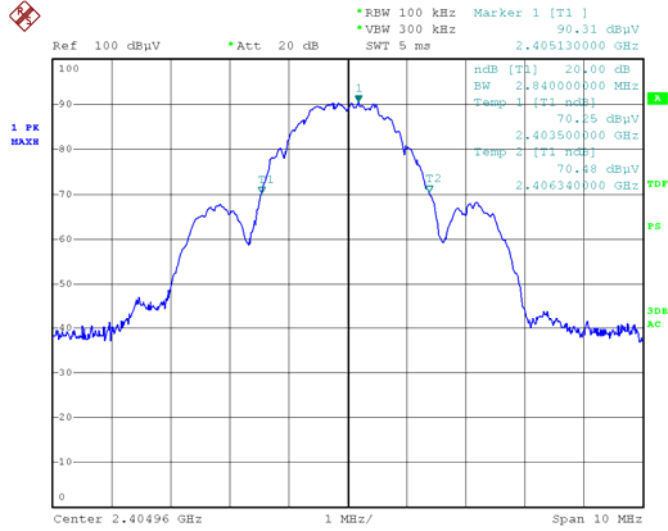
### 10.3. Test Results

**PASSED.**

The testing data was attached in the next pages.

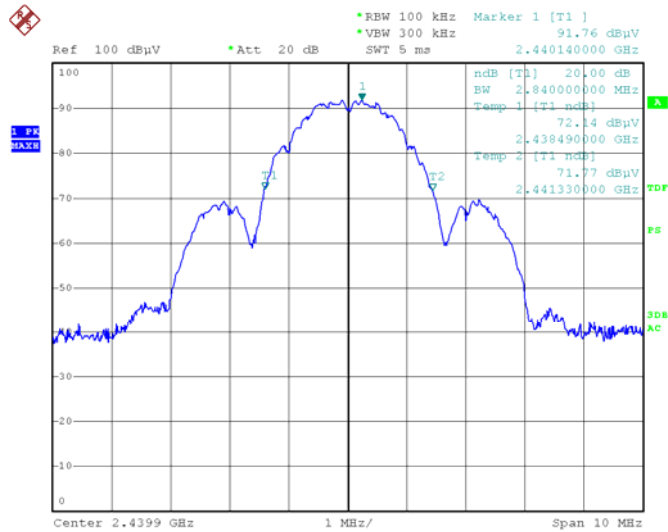
Channel	Frequency (MHz)	20dB Bandwidth (MHz)
Low	2405	2.84
Middle	2440	2.84
High	2480	2.83

### 20 dB Bandwidth (2405MHz)



Date: 8.JUL.2013 19:17:03

### 20 dB Bandwidth (2440MHz)



Date: 8.JUL.2013 19:23:29

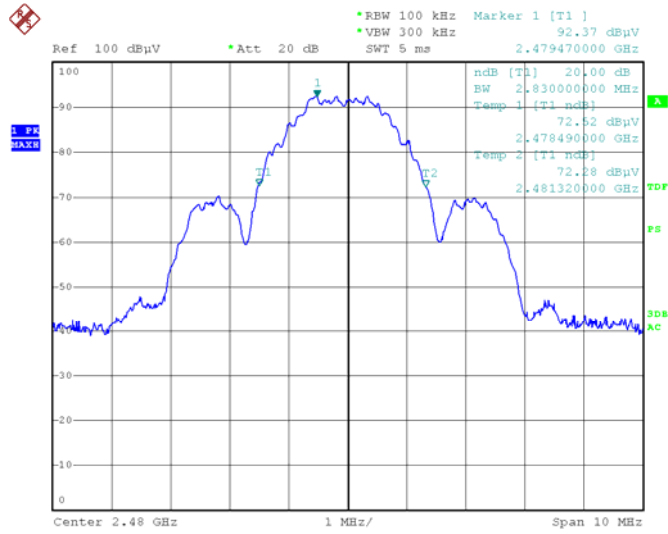
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### 20 dB Bandwidth (2480MHz)



Date: 8.JUL.2013 19:37:32

## 11.Deviation to test specifications

[ NONE ]

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