

# FCC CERTIFICATION TEST REPORT FOR

FCC ID: X5B-PL8694

Report Reference No.....: 13EAB08034 11

Date of issue.....: 2013-9-15

Testing Laboratory.....: ATT Product Service Co., Ltd.

Address.....: No. 3, ChangLianShan Industrial Park, ChangAn Town,  
DongGuan City, GuangDong, China.

Applicant's name .....: Performance Designed Products,LLC

Address.....: 14144 Ventura Blvd, Suite 200 Sherman Oaks, CA 91423  
U.S.A

Manufacturer.....: Performance Designed Products,LLC

Test specification:

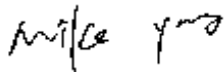
Test item description .....: Disney Infinity controller for Wii/Wii U

Trade Mark .....:

Model/Type reference .....: PL-8694  
Refer to page 5 for details.

Ratings.....: DC 3V

Responsible Engineer



(Mike Yang/ Engineer)

Approved by



(Tomy Wu /EMC Manager)

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## TEST REPORT DECLARE

<b>Applicant</b>	:	Performance Designed Products,LLC
<b>Address</b>	:	14144 Ventura Blvd, Suite 200 Sherman Oaks, CA 91423 U.S.A
<b>Equipment under Test</b>	:	Disney Infinity controller for Wii/Wii U
<b>Model No</b>	:	PL-8694
<b>Trade Mark</b>	:	
<b>Manufacturer</b>	:	Performance Designed Products,LLC
<b>Address</b>	:	14144 Ventura Blvd, Suite 200 Sherman Oaks, CA 91423 U.S.A

**Test Standard Used:** FCC Rules and Regulations Part 15 Subpart C: 2010

**Test procedure used:** ANSI C63.10:2009  
FCC Public Notice DA 00-705

**FCC ID:**X5B-PL8694

**We Declare:**

The equipment described above is tested by ATT Product Service Co., Ltd. and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and ATT Product Service Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

**After test and evaluation, our opinion is that the equipment provided for test compliance with the requirement of the above FCC standards.**

<b>Report No:</b>	13EAB08034 11		
<b>Date of Test:</b>	2013-8-13---2013-8-20	<b>Date of Report:</b>	2013-8-22

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of ATT Product Service Co., Ltd.

## 1.Summary of test Standards and results

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

Description of Test Item	Standard	Results
Maximum Peak Output Power	15.247(b)(1) ANSI C63.10 :2009	PASS
20dB Bandwidth	15. 247(a)(1) ANSI C63.10 :2009	PASS
Carrier Frequency Separation	15.247(a)(1) ANSI C63.10 :2009	PASS
Number Of Hopping Channel	15.247(a)(1)(iii) ANSI C63.10 :2009	PASS
Dwell Time	15.247(a)(1)(iii) ANSI C63.10 :2009	PASS
Radiated Emission	15.209 15.247(d) ANSI C63.10 :2009	PASS
Band Edge Compliance	15.247(d) ANSI C63.10 :2009	PASS
Power Line Conducted Emissions	15.207 ANSI C63.10 :2009	NA
Antenna requirement	15.203	PASS
RF Exposure	15.247(i) 1.1310&2.1093	PASS

## 2.General test information

### 2.1ACCRESITATIONS

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

**USA**                      **FCC**                      **Registration Number :923232**  
**Canada**                **INDUSTRY CANADA**                **Registration Number 11033A**

### 2.2Description of EUT

EUT* Name	:	Disney Infinity controller for Wii/Wii U
Model Number	:	PL-8694
Trade Mark	:	
EUT function description	:	Please reference user manual of this device
Power supply	:	DC 3V
Radio Specification	:	Bluetooth V2.0
Operation frequency	:	2402MHz -2480MHz
Modulation	:	GFSK
Data rate	:	1Mbps
Antenna Type	:	built-in "F" shape PCB antenna, maximum PK gain:2dBi
Date of Receipt	:	2013-8-13
Sample Type	:	Series production

Note: EUT is the ab. of equipment under test.

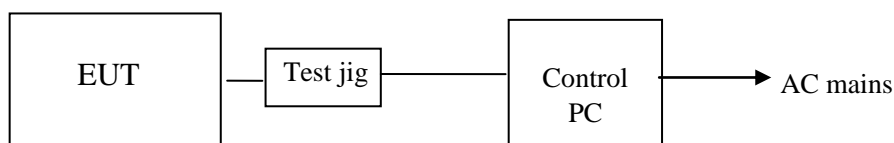
### 2.3Accessories of EUT

Description of Accessories	Manufacturer	Model number or Type	Other
/	/	/	/

### 2.4Assistant equipment used for test

Description of Assistant equipment	Manufacturer	Model number or Type	Other
PC	Lenovo	E R500	/

### 2.5Block diagram of EUT configuration for test



EUT’s Bluetooth module was connected to a special test jig provided by manufacturer which has a standard RSS-232 connector to connect to control PC, and the control PC will run a special test software

“HC\_Data\_Test.exe” provided by manufacturer to control EUT work in test mode as blow table.

Tested mode, channel, information		
Mode	Channel	Frequency (MHz)
GFSK hopping on Tx Mode	CH0 to CH78	2402 to 2480
GFSK hopping off Tx Mode	CH0	2402
	CH39	2441
	CH78	2480

Note1: Some modes not apply for all the test items.

## 2.6 Test environment conditions

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

Temperature range:	21-25°C
Humidity range:	40-75%
Pressure range:	86-106kPa

## 2.7 Measurement uncertainty

Test Item	Uncertainty
Uncertainty for Conduction emission test	2.44dB
Uncertainty for Radiation Emission test (150KHz-30MHz)	3.21dB
Uncertainty for Radiation Emission test (30MHz-1GHz)	3.14 dB (Polarize: V)
	3.16 dB (Polarize: H)
Uncertainty for Radiation Emission test (1GHz to 25GHz)	2.08dB(Polarize: V)
	2.56dB (Polarize: H)
Uncertainty for radio frequency	1×10 <sup>-9</sup>
Uncertainty for conducted RF Power	0.65dB

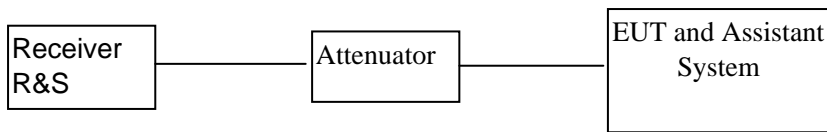
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

### 3. Maximum Peak Output Power

#### 3.1 Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	EMI Test Receiver	R&S	ESCI	101307	2012/12/27	1Y
2	Attenuator	Mini-Circuits	BW-S10W2	101109	2012/12/28	1Y
3	RF Cable	Micable	C10-01-01-1	100309	2012/12/28	1Y

#### 3.2 Block diagram of test setup



#### 3.3 Limits

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts,.

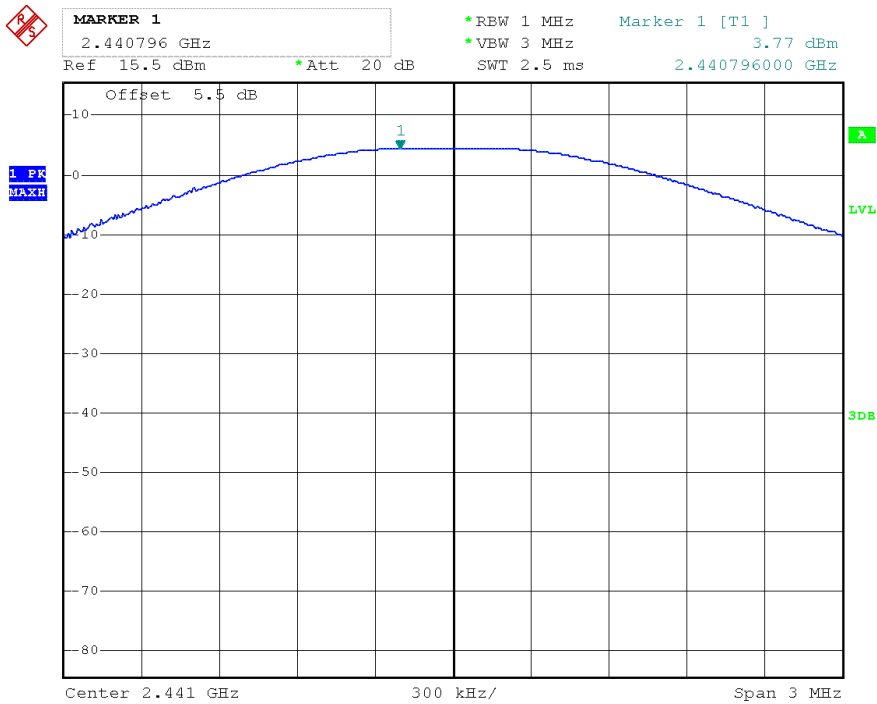
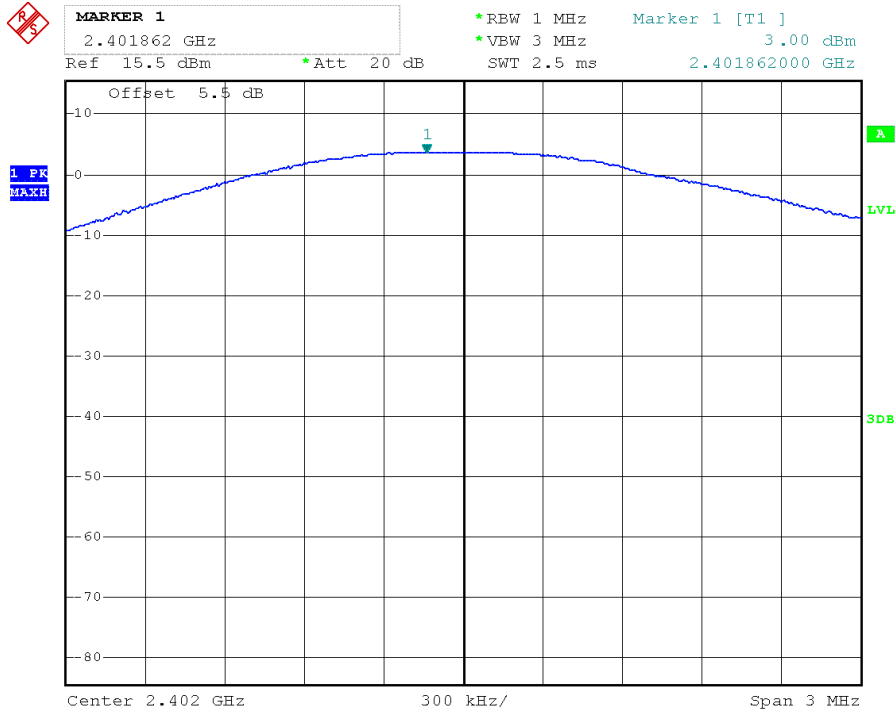
#### 3.4 Test Procedure

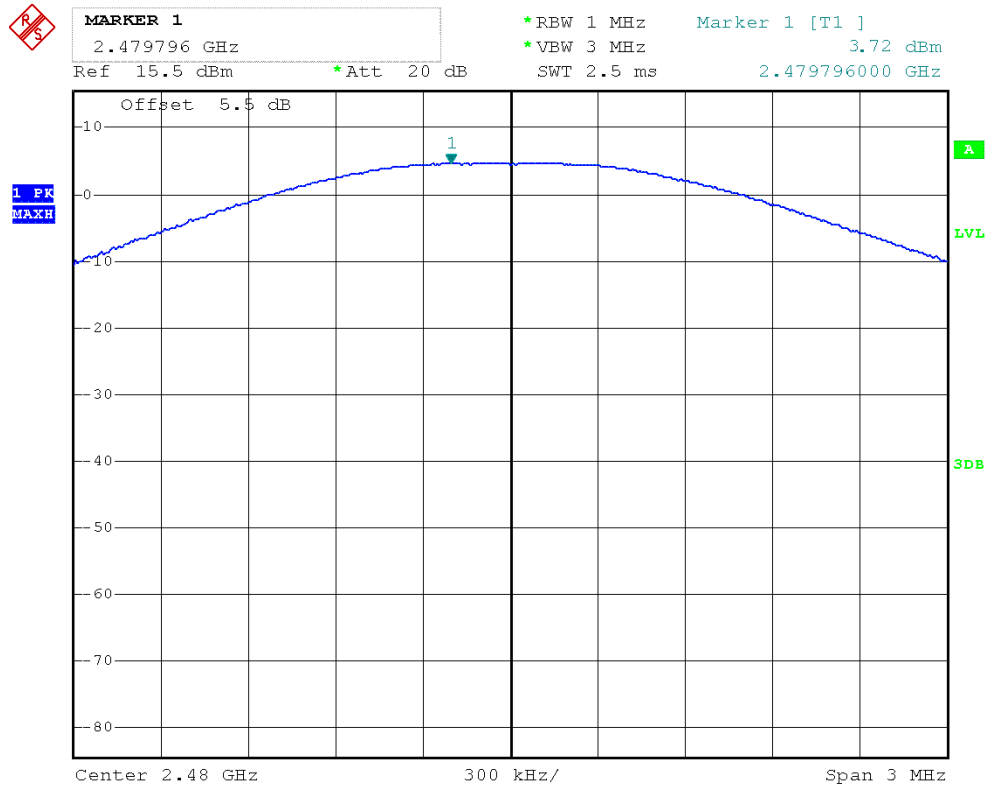
- (1) Place the EUT on a bench and set in transmitting mode.
- (2) Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to an EMI test receiver.
- (3) Add a correction factor to the display.

#### 3.5 Test Result

EUT: Disney Infinity controller for Wii/Wii U M/N: PL8694				
Mode	Freq (MHz)	Result (dBm)	Limit (dBm)	Conclusion
GFSK	2402	3.0	30	PASS
	2441	3.77	30	PASS
	2480	3.72	30	PASS
Test Date : 2013-8-27			Test Engineer : Bin Jang	





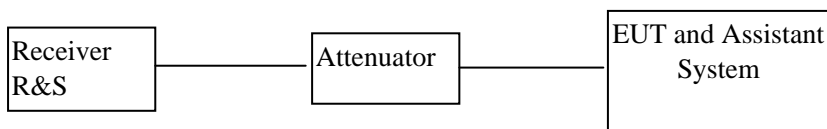


## 4. 20dB Bandwidth

### 4.1 Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	EMI Test Receiver	R&S	ESCI	101307	2012/12/27	1Y
2	Attenuator	Mini-Circuits	BW-S10W2	101109	2012/12/28	1Y
3	RF Cable	Micable	C10-01-01-1	100309	2012/12/28	1Y

### 4.2 Block diagram of test setup



### 4.3 Limits

Alternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW..

#### 4.4 Test Procedure

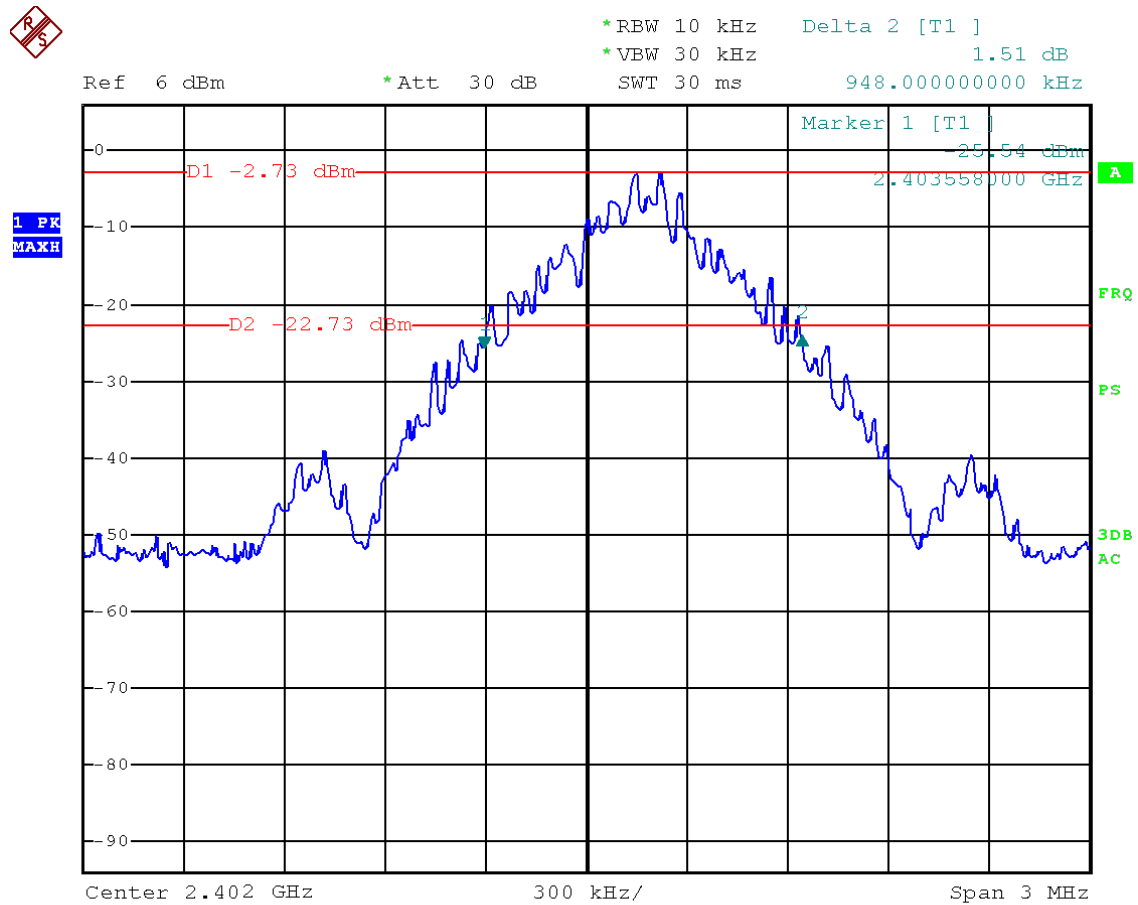
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT on the test table without connection to measurement instrument. Turn on the EUT. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete..

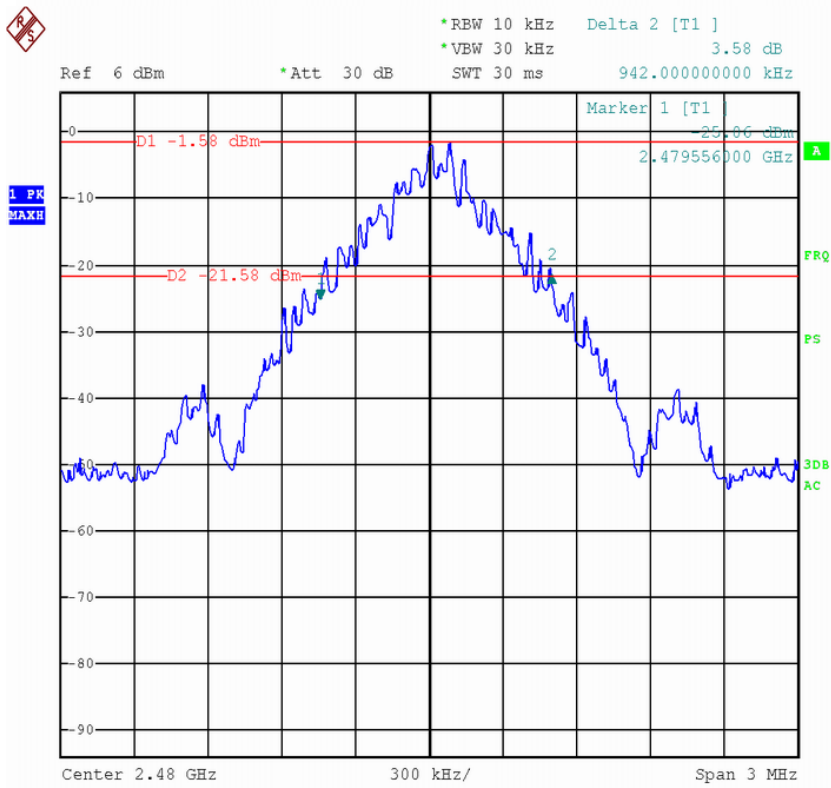
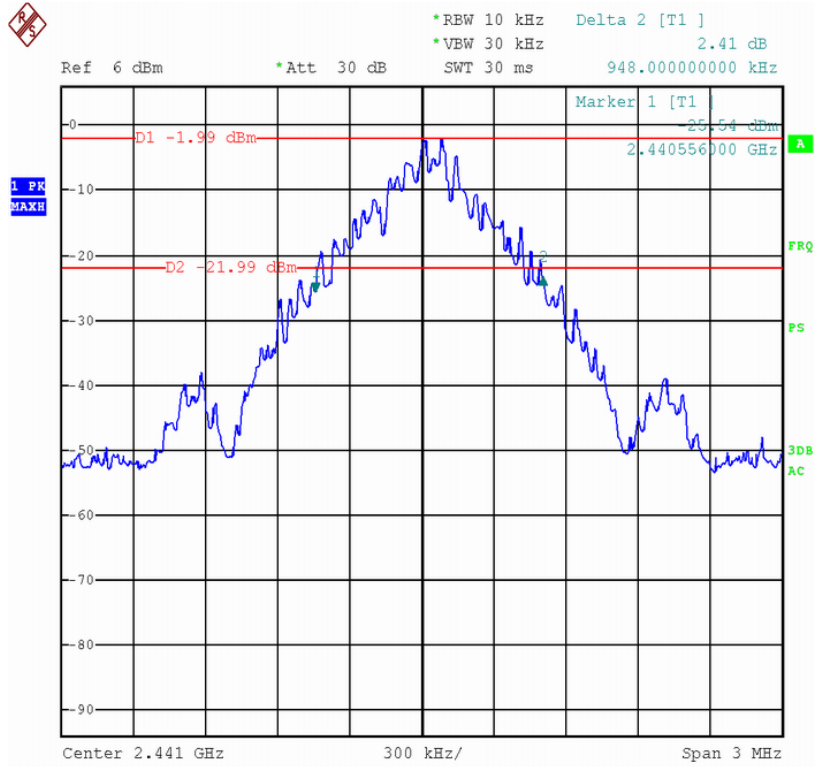
**4.5 Test Result**

EUT: Disney Infinity controller for Wii/Wii U M/N: PL-8694					
Mode	Freq (MHz)	Result (MHz)	Limit (MHz)	Margin (MHz)	Conclusion
GFSK	2402	0.948	/	/	PASS
	2441	0.948	/	/	PASS
	2480	0.942	/	/	PASS
Test Date : 2013-8-27			Test Engineer : Bin Jang		

**4.6 Original test data**

GFSK Mode



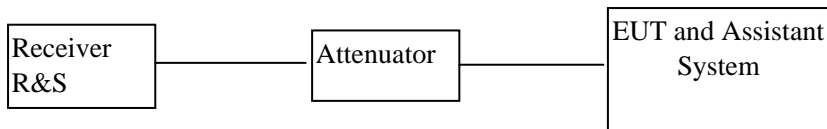


## 5. Carrier Frequency Separation

### 5.1 Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	EMI Test Receiver	R&S	ESCI	101307	2012/12/27	1Y
2	Attenuator	Mini-Circuits	BW-S10W2	101109	2012/12/28	1Y
3	RF Cable	Micable	C10-01-01-1	100309	2012/12/28	1Y

### 5.2 Block diagram of test setup



### 5.3 Limits

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

### 5.4 Test Procedure

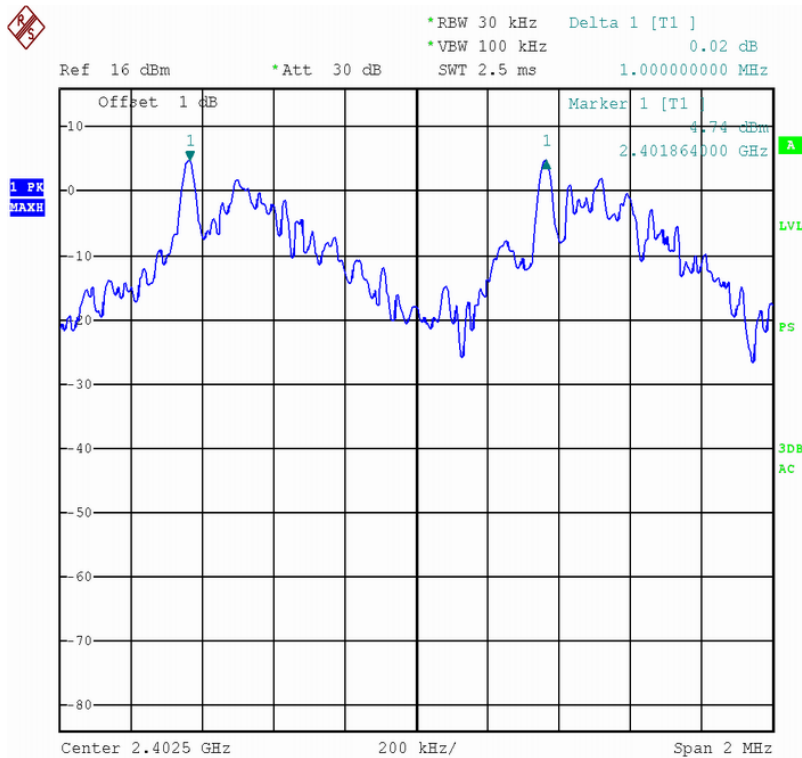
1. Set the EUT in transmitting mode, spectrum Bandwidth was set at 100 kHz, maxhold the channel.
2. Set the adjacent channel of the EUT maxhold another trace
3. Measure the channel separation.

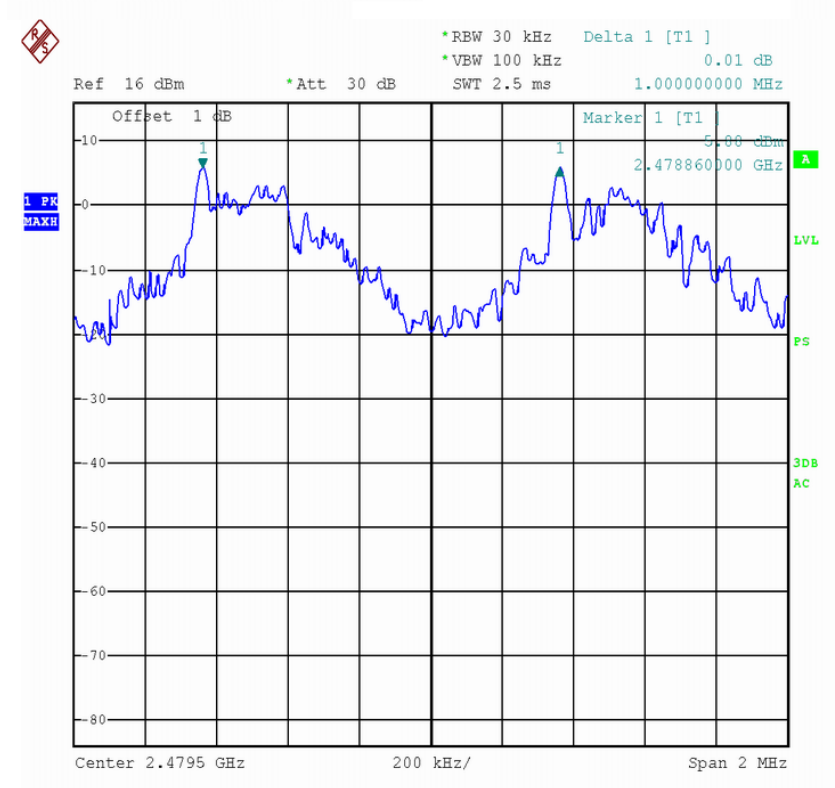
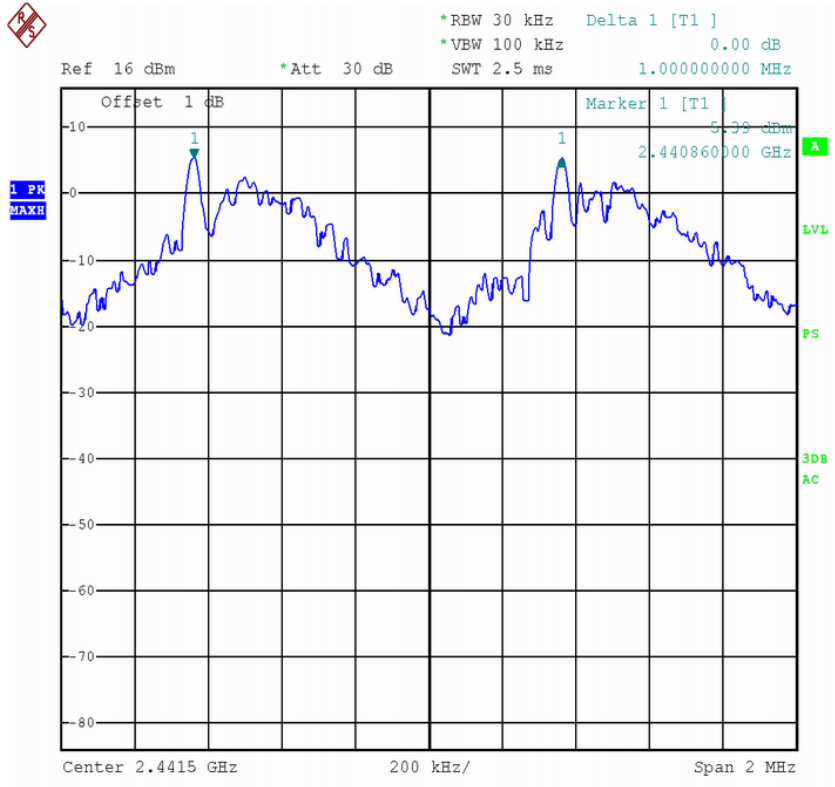
### 5.5 Test Result

EUT: Disney Infinity controller for Wii/Wii U M/N: PL-8694				
Mode	Channel separation (MHz)	20dB Bandwidth (MHz)	Limit (MHz) 2/3 of 20dB bandwidth	Conclusion
GFSK	1.0	0.948	0.632	PASS
Test Date :2013-8-27			Test Engineer : Mike Yang	

### 5.6 Original test data

#### GFSK





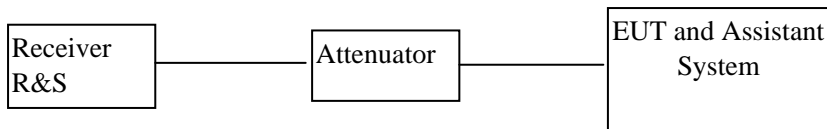


## 6. Number Of Hopping Channel

### 6.1 Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	EMI Test Receiver	R&S	ESCI	101307	2012/12/27	1Y
2	Attenuator	Mini-Circuits	BW-S10W2	101109	2012/12/28	1Y
3	RF Cable	Micable	C10-01-01-1	100309	2012/12/28	1Y

### 6.2 Block diagram of test setup



### 6.3 Limits

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

### 6.4 Test Procedure

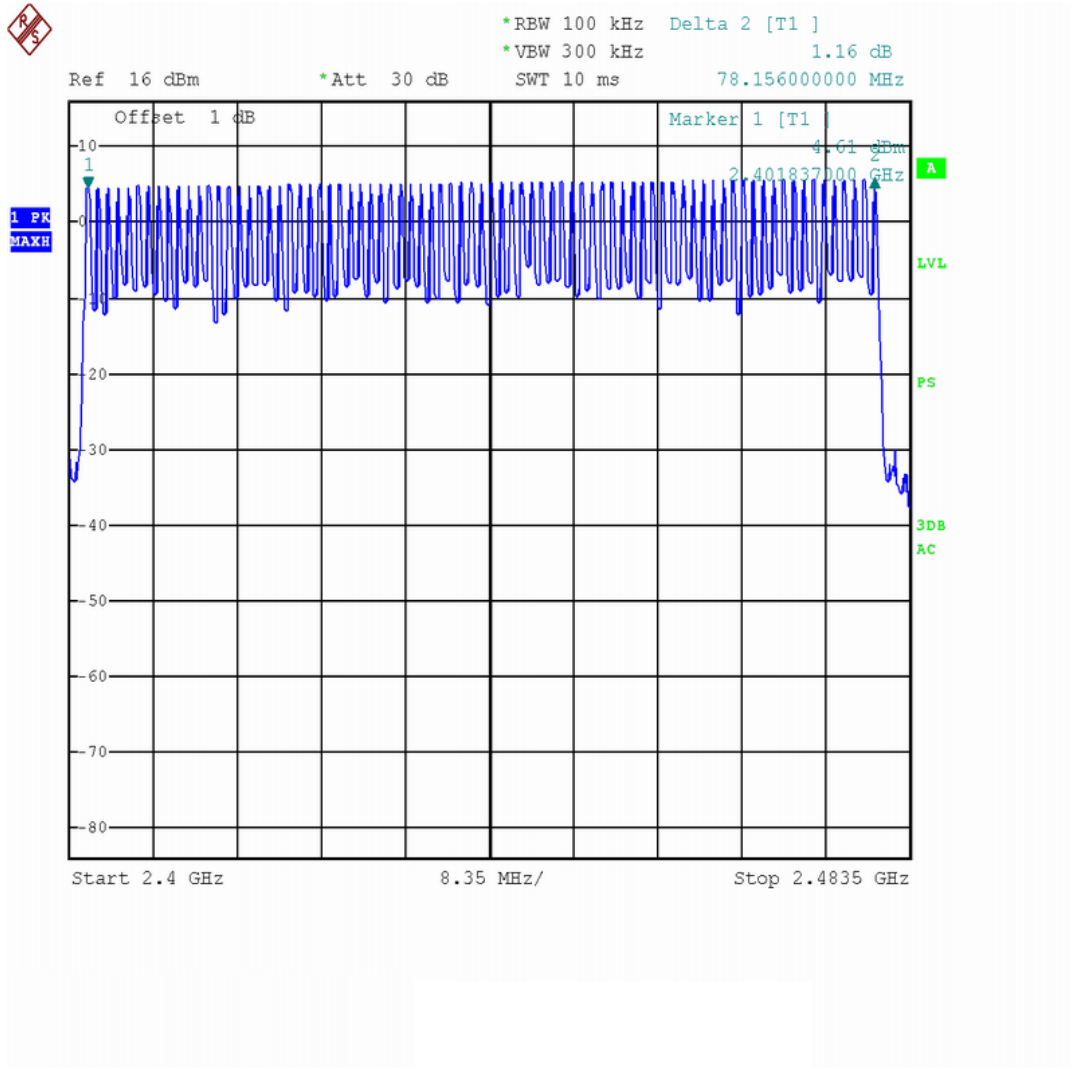
- (1) Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
- (2) Set the EUT in hopping mode from first channel to last.
- (3) By using the Max-Hold function record the Quantity of the channel.

### 6.5 Test Result

EUT: Disney Infinity controller for Wii/Wii U      M/N: PL-8694			
Mode	Number of hopping channel	Limit	Conclusion
GFSK	79	>15	PASS
Test Date : 2013-8-27		Test Engineer : Bin Jiang	

## 6.6 Original test data

GFSK:

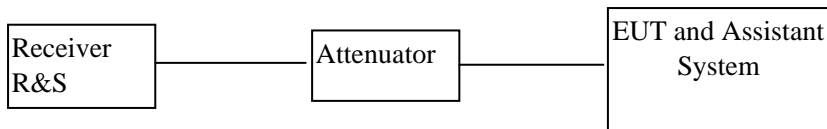


## 7. Dwell Time

### 7.1 Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	EMI Test Receiver	R&S	ESU8	100316	2012/11/26	1Y
2	Attenuator	Mini-Circuits	BW-S10W2	101109	2012/12/28	1Y
3	RF Cable	Micable	C10-01-01-1	100309	2012/12/28	1Y

### 7.2 Block diagram of test setup



### 7.3 Limits

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

### 7.4 Test Procedure

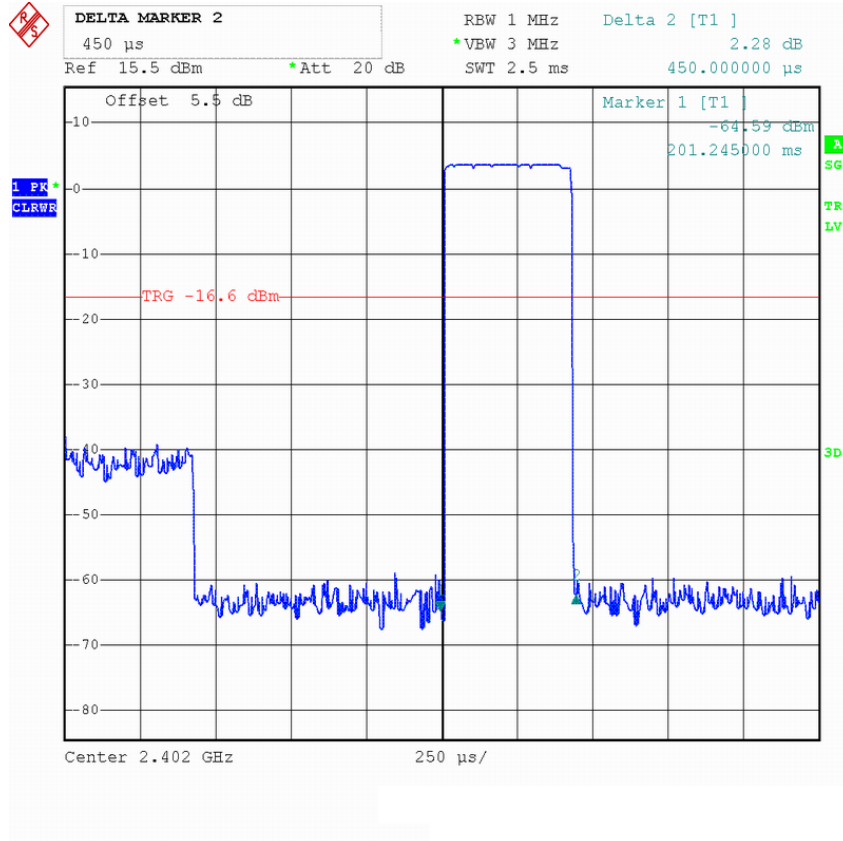
The EUT was worked in channel hopping; Spectrum SPAN was set as 0. Sweep was set as 0.4 \* channel no. (s), the quantity of pulse was get from single sweep. In addition, the time of single pulses was tested. Dwell Time= time slot length \* hope rate/ number of hopping channels \* 31.6s Hop rate=1600/s

### 7.5 Test Result

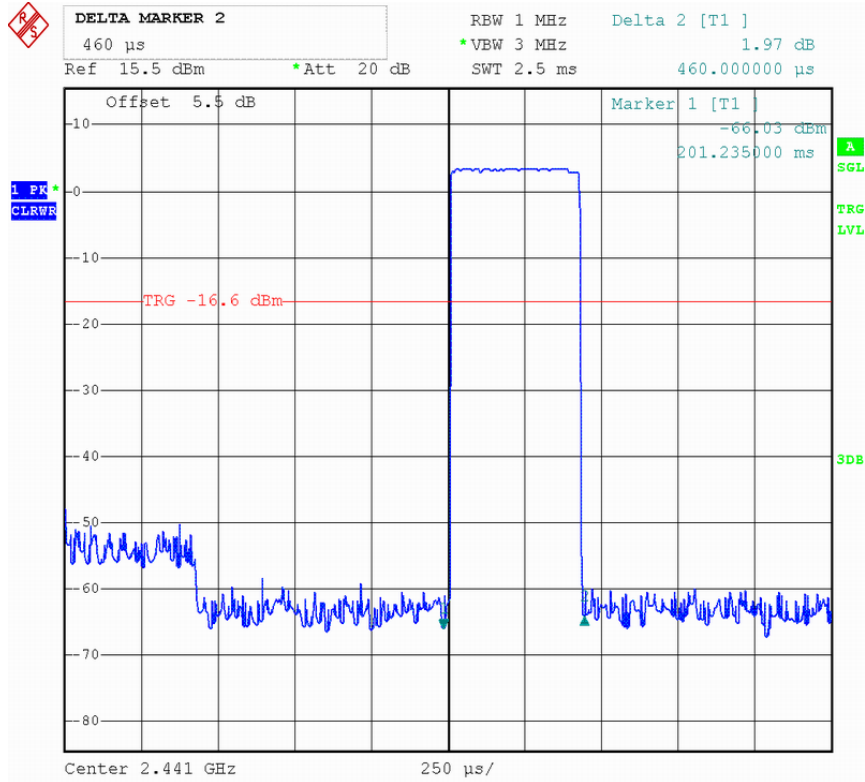
Mode	Channel	Pulse Width (ms)	Dwell Time (ms)	Limit (ms)	Result
DH1	Low	0.450	144	400	pass
	Middle	0.460	147	400	pass
	High	0.450	144	400	pass
	Note: Dwell time=Pulse time (ms) × (1600/2/79) × 31.6 s				
DH3	Low	1.770	283	400	pass
	Middle	1.740	278	400	pass
	High	1.720	275	400	pass
	Note: Dwell time=Pulse time (ms) × (1600/4/79) × 31.6 s				
DH5	Low	2.994	319	400	pass
	Middle	2.978	317	400	pass
	High	2.978	317	400	pass
	Note: Dwell time=Pulse time (ms) × (1600/6/79) × 31.6 s				

**7.6 Original test data**

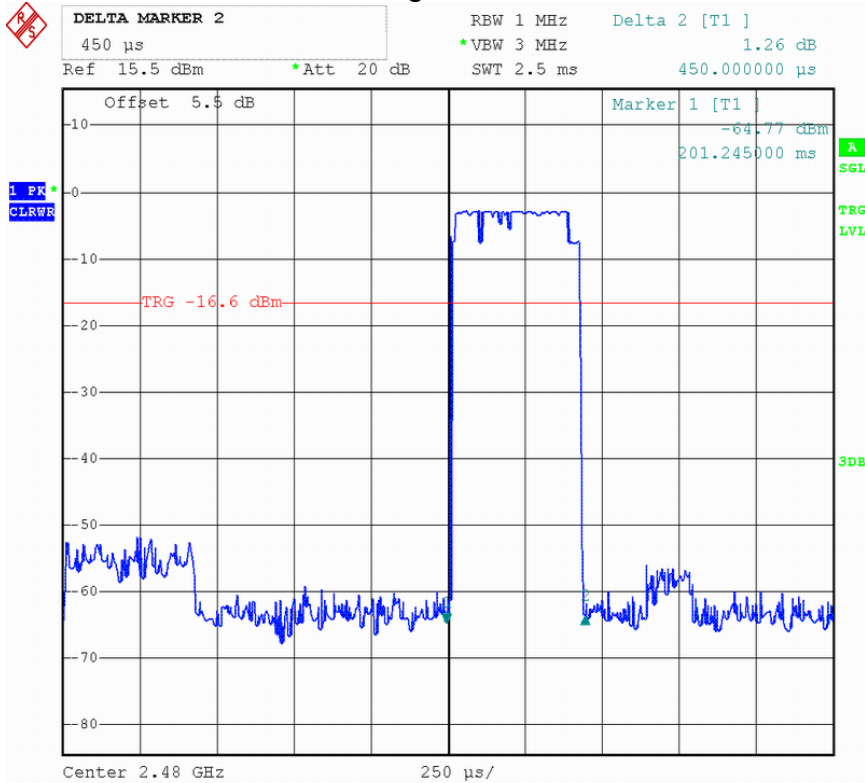
DH1 Low Channel



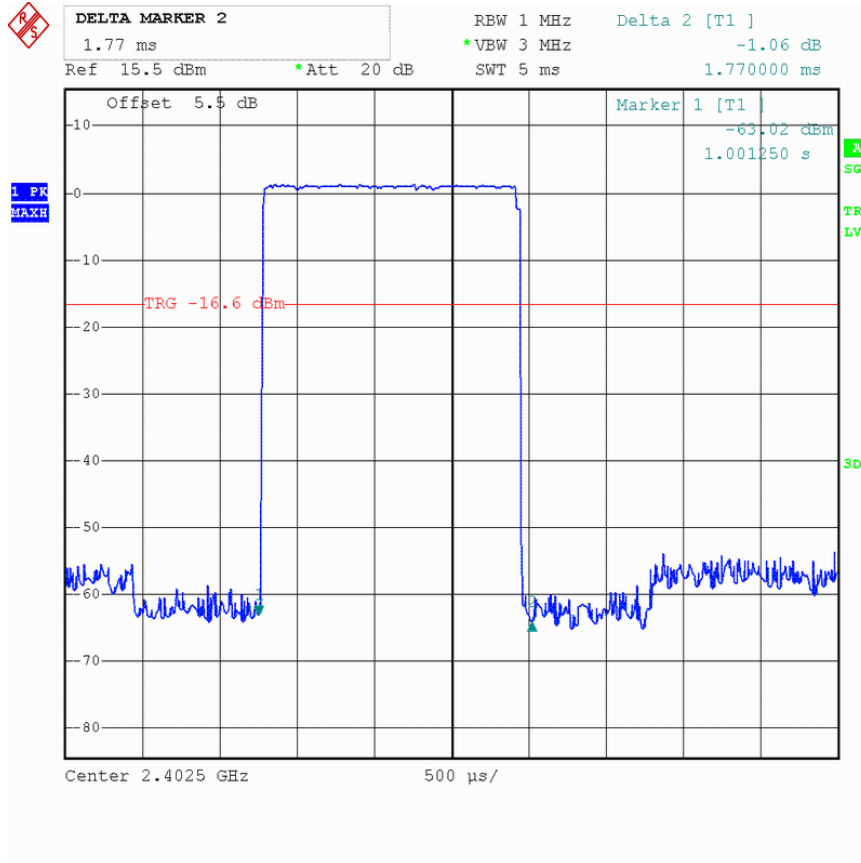
DH1 Middle Channel



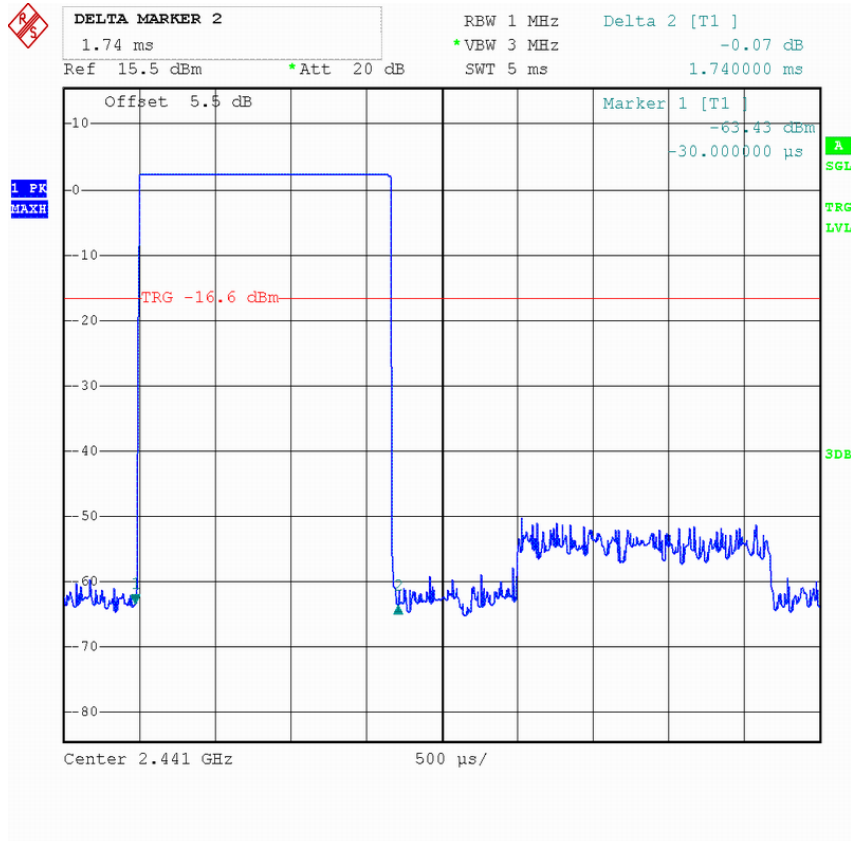
**DH1 High Channel**



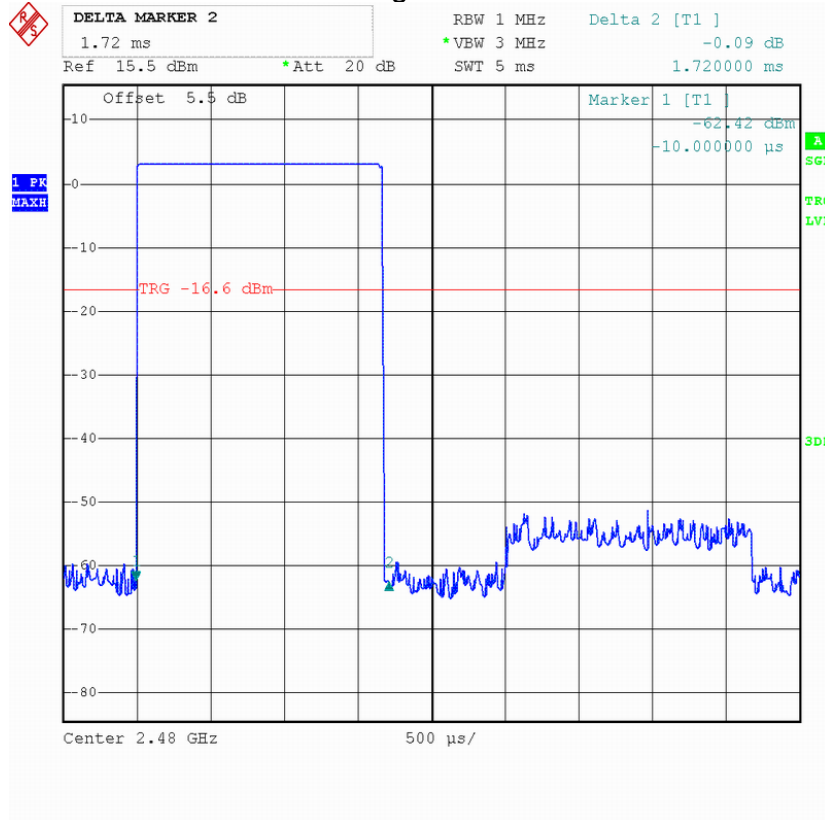
### DH3 Low Channel



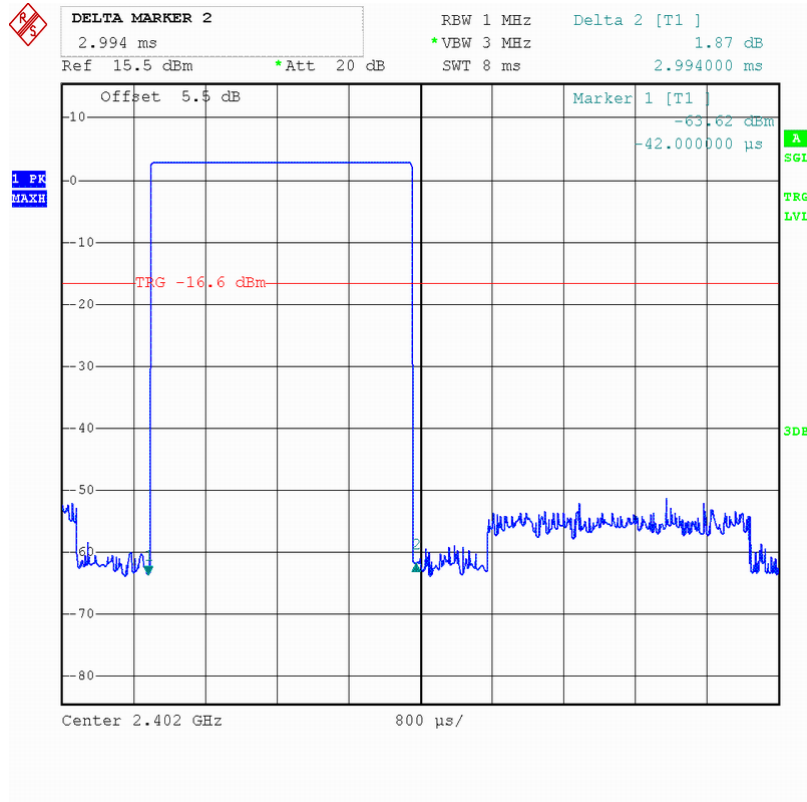
### DH3 Middle Channel



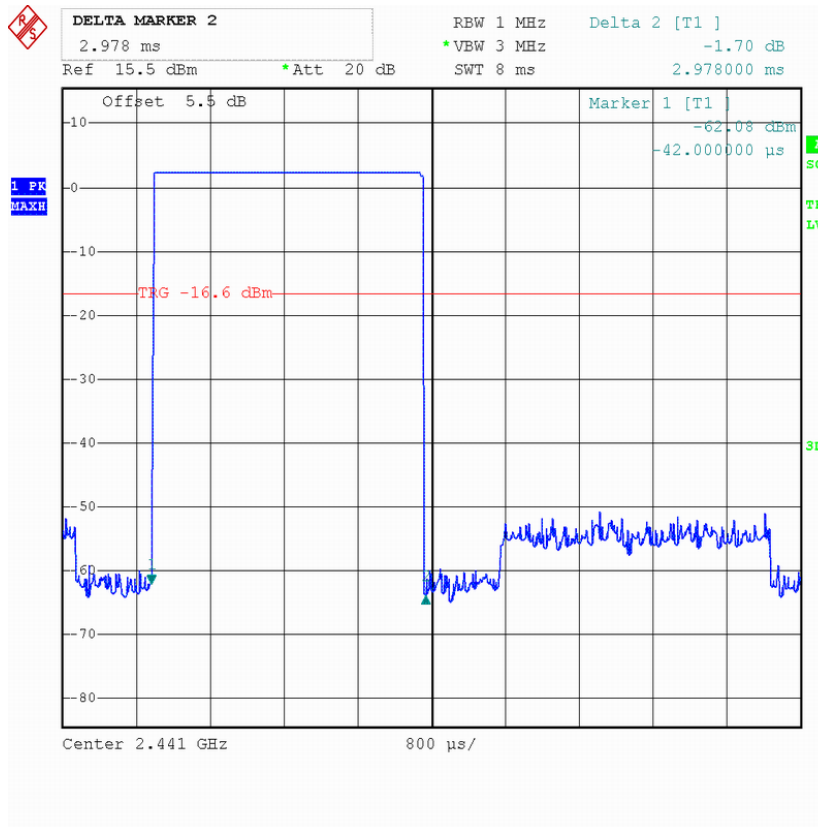
DH3 High Channel



### DH5 Low Channel

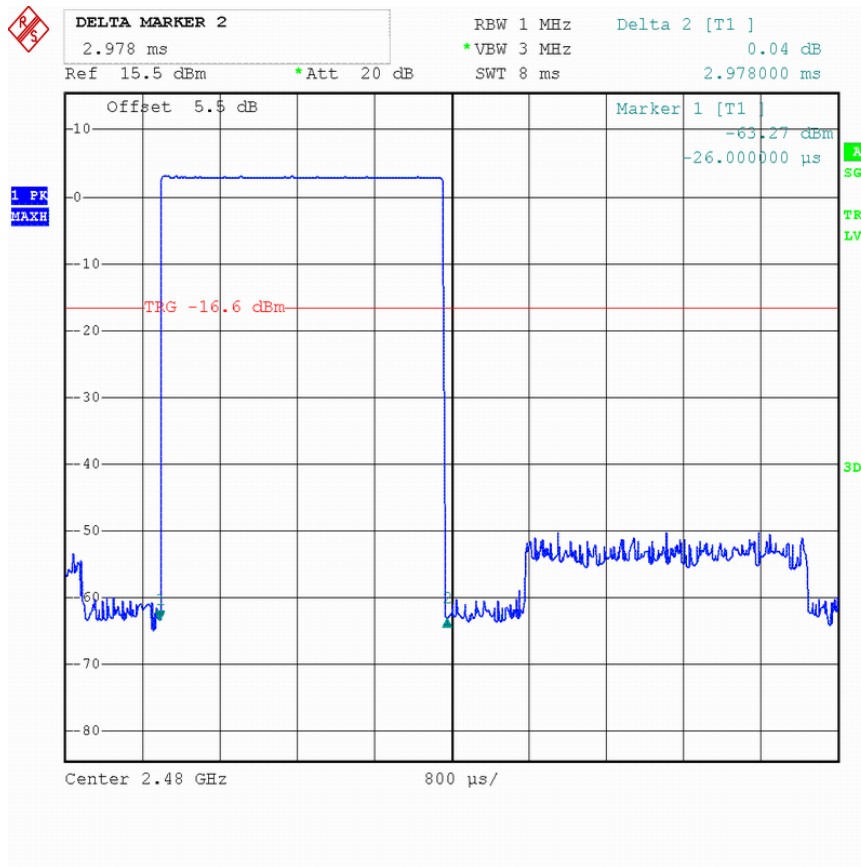


### DH5 middle Channel





DH5 High Channel



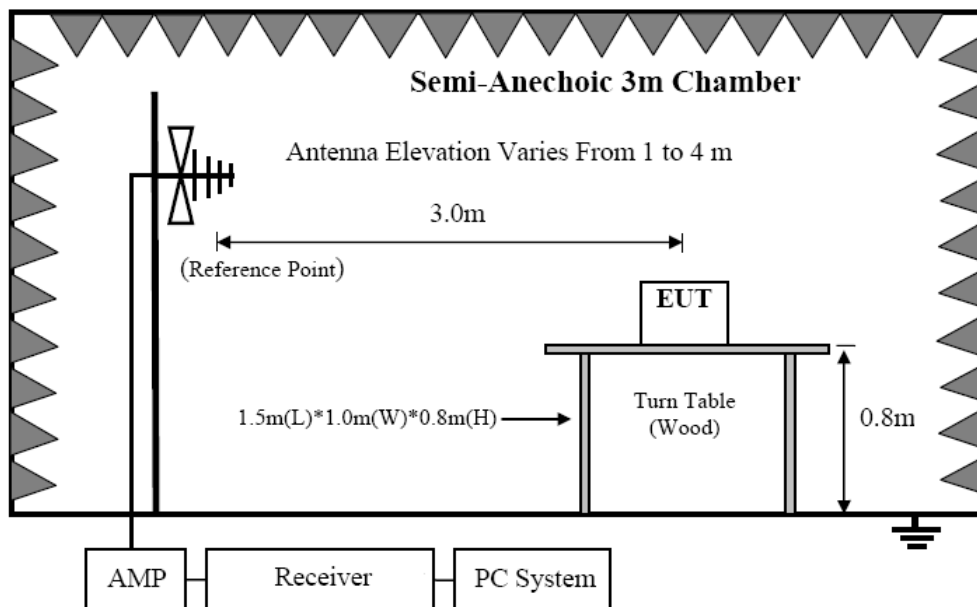
## 8. Radiated emissio

### 8.1 Test equipment

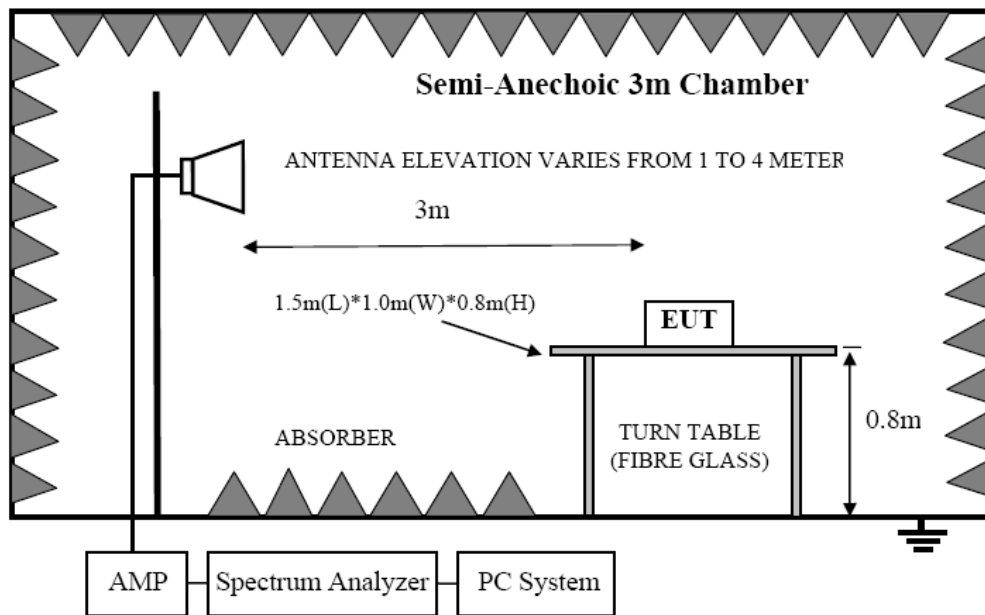
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	EMI Test Receiver	R&S	ESCI	101307	2012/12/27	1Y
2	Spectrum analyzer	Agilent	E4407B	US40240708	2012/07/18	1Y
3	Loop antenna	Chase	HLA6120	20129	2012/12/28	1Y
4	Trilog Broadband Antenna	Schwarzbeck	VULB9163	9163-462	2012/12/28	1Y
5	Double Ridged Horn Antenna	R&S	HF907	100276	2012/12/28	1Y
6	Pre-Amplifier	R&S	SCU-01	10049	2012/12/28	1Y
7	Pre-amplifier	A.H.	PAM0-0118	360	2012/12/28	1Y
8	RF Cable	R&S	R01	10403	2012/12/28	1Y
9	RF Cable	R&S	R02	10512	2012/12/28	1Y
10	Horn Antenna	EMCO	3116	9608-4877	2012/12/28	1Y

### 8.2 Block diagram of test setup

In 3m Anechoic Chamber Test Setup Diagram for below 1GHz



In 3m Anechoic Chamber Test Setup Diagram for frequency above 1GHz



Note: For harmonic emissions test a appropriate high pass filter was inserted in the input port of AMP.

### 8.3 Limit

#### 8.3.1 FCC 15.205 Restricted frequency band

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
<sup>1</sup> 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	( <sup>2</sup> )

8.3.2 FCC 15.209 Limit

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		$\mu\text{V}/\text{m}$	$\text{dB}(\mu\text{V})/\text{m}$
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	74.0 $\text{dB}(\mu\text{V})/\text{m}$ (Peak) 54.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average)	

8.3.3 Limit for this EUT

The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.4-2009. The specification used was the FCC 15.209, and FCC 15.247 limits.

## 8.4 TEST PROCEDURE

- (1) EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber.
- (2) Setup EUT and assistant system according clause 2.4 and 8.2
- (3) Test antenna was located 3m from the EUT on an adjustable mast. Below pre-scan procedure was first performed in order to find prominent radiated emissions.
  - (a) Change work frequency or channel of device if practicable.
  - (b) Change modulation type of device if practicable.
  - (c) Change power supply range from 85% to 115% of the rated supply voltage
  - (d) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions
- (4) Spectrum frequency from 9MHz to 25GHz (tenth harmonic of fundamental frequency) was investigated, and no any obvious emission were detected from 9KHz to 30MHz and 18GHz to 25GHz, so below final test was performed with frequency range from 30MHz to 18GHz.
- (5) For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.10 2009 on Radiated Emission test.
- (6) For emissions from 30MHz to 1GHz, Quasi-Peak values were measured with EMI Receiver and the bandwidth of Receiver is 120 KHz.
- (7) For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1MHz, VBW is set at 3MHz for Peak measure, Detector is at PK; RBW is set at 1MHz, VBW is set at 10Hz for Average measure, Detector is at PK..

## 8.5 Test result

### **PASS. (See below detailed test result)**

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, and section 15.205, 15.209 and 15.247, **Vertical and Horizontal mode all have been tested** , **Horizontal mode is the worse case** .with the worst margin reading of: 6.02 dB at 2483.5 MHz in the Horizontal polarization.

# Radiated Emission Test Result

**Test Mode:GFSK**

**Test Site** : 3m Chamber  
**Test Date** : 2013-8-28 **Tested By** : Mike Yang  
**EUT** : Pisney Infinity controller for Wii/Wii **Model Number** : PL-8694  
**Power Supply** : DC 3V **Test Mode** : Tx mode CH0,CH39,CH78  
**Condition** : Temp:24.5°C,Humi:55% **Antenna/Distance** : 3m

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	FCC 15.247	
	Reading (dBµV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)				Limit (dBµV/m)	Margin (dB)
Low Channel (2402)									
2402	71.17	PK	H	28	3.65	0	102.82	N/A	N/A
2402	54.62	AV	H	28	3.65	0	86.27	N/A	N/A
2402	66.51	PK	V	28	3.65	0	98.16	N/A	N/A
2402	51.28	AV	V	28	3.65	0	82.93	N/A	N/A
2390	29.38	PK	H	28.4	3.57	0	61.35	74	12.65
2390	15.42	AV	H	28.4	3.57	0	47.39	54	6.61
4804	43.21	PK	H	32.3	5.91	31.78	49.64	74	24.36
4804	26.58	AV	H	32.3	5.91	31.78	33.01	54	20.99
7206	42.15	PK	H	36.3	6.34	30.97	53.82	74	20.18
7206	26.01	AV	H	36.3	6.34	30.97	37.68	54	16.32
9608	39.64	PK	H	37.9	8.01	30.86	54.69	74	19.31
9608	24.74	AV	H	37.9	8.01	30.86	39.79	54	14.21
278.36	45.38	QP	H	12.8	2.63	27.2	33.61	46	12.39
Middle Channel (2441)									
2441	73.09	PK	H	28.7	3.74	0	105.53	N/A	N/A
2441	55.67	AV	H	28.7	3.74	0	88.11	N/A	N/A
2441	66.89	PK	V	28.7	3.74	0	99.33	N/A	N/A
2441	51.88	AV	V	28.7	3.74	0	84.32	N/A	N/A
4882	43.65	PK	H	32.6	6.15	31.78	50.62	74	23.38
4882	26.88	AV	H	32.6	6.15	31.78	33.85	54	20.15
7323	42.74	PK	H	36.7	6.22	30.97	54.69	74	19.31
7323	26.11	AV	H	36.7	6.22	30.97	38.06	54	15.94
9764	40.12	PK	H	38.2	8.11	30.86	55.57	74	18.43
9764	25.03	AV	H	38.2	8.11	30.86	40.48	54	13.52
279.45	45.66	QP	H	12.8	2.63	27.2	33.89	46	12.11
High Channel (2480)									
2480	73.27	PK	H	29.1	3.81	0	106.18	N/A	N/A
2480	54.66	AV	H	29.1	3.81	0	87.57	N/A	N/A
2480	66.71	PK	V	29.1	3.81	0	99.62	N/A	N/A
2480	51.38	AV	V	29.1	3.81	0	84.29	N/A	N/A
2483.5	30.02	PK	H	28.7	3.62	0	62.34	74	11.66
2483.5	15.66	AV	H	28.7	3.62	0	47.98	54	6.02
4960	43.51	PK	H	32.8	6.17	31.78	50.7	74	23.3
4960	26.63	AV	H	32.8	6.17	31.78	33.82	54	20.18
7440	42.36	PK	H	36.8	6.26	30.97	54.45	74	19.55
7440	26.11	AV	H	36.8	6.26	30.97	38.2	54	15.8
9920	40.02	PK	H	38.4	8.17	30.86	55.73	74	18.27
9920	25.01	AV	H	38.4	8.17	30.86	40.72	54	13.28
278.54	44.96	QP	H	12.8	2.63	27.2	33.19	46	12.81

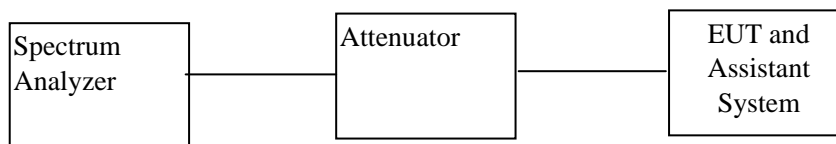
Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor  
 2. If Peak Result comply with QP limit, QP Result is deemed to comply with QP limit

## 9. Band Edge Compliance

### 9.1 Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Spectrum analyzer	Agilent	E4407B	US40240708	2012/07/31	1Y
2	RF Cable	R&S	R02	10512	2012/12/28	1Y

### 9.2 Block diagram of test setup



### 9.3 Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

### 9.4 Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Remove the antenna from the EUT and then connect to a low loss RF cable from the antenna port to a EMI test receiver, then turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.
3. Set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete..

### 9.5 Test result

PASS. (hopping on and hopping off mode all have been tested , hopping off mode is the worse case ,See below detailed test result)

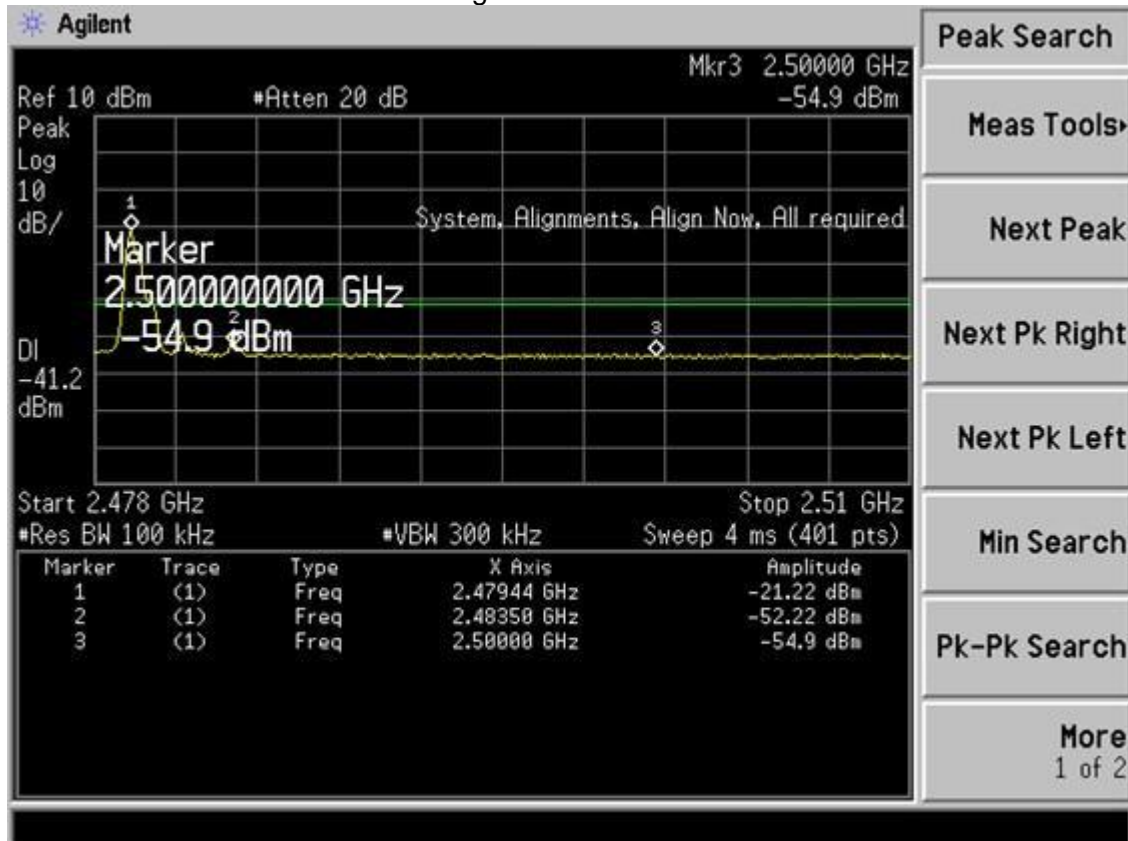
## Test Result

Low Channel





High Channel

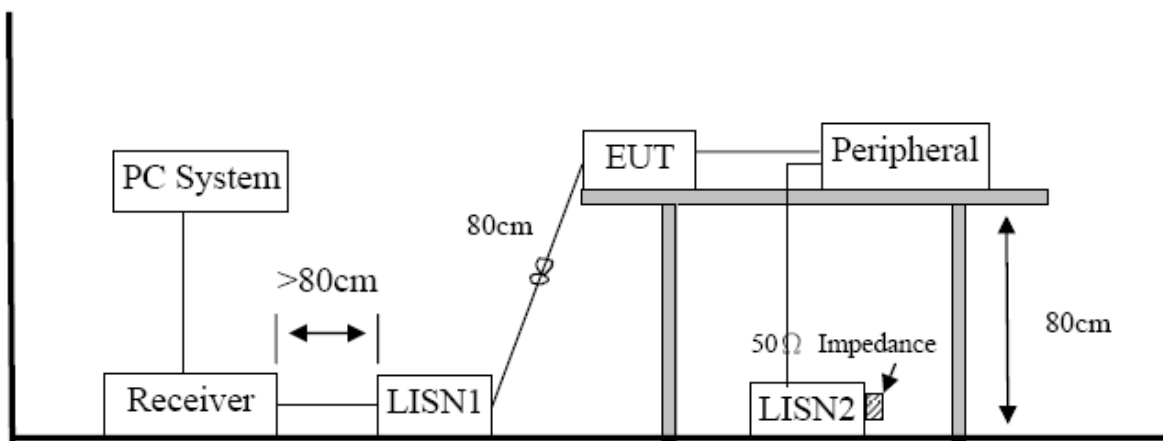


## 10. Power Line Conducted Emission

### 10.1 Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Test Receiver	R&S	ESCI	101308	2012/11/26	1 Year
2	LISN 1	AFJ	LS16	16011103219	2012/12/28	1 Year
3	LISN 2	R&S	ESH2-Z5	100309	2012/12/28	1 Year
4	Pulse Limiter	MTS-systemtechnik	MTS-IMP-136	261115-010-0024	2012/12/28	1 Year

### 10.2 Block diagram of test setup



### 10.3 Power Line Conducted Emission Limits(Class B)

Frequency	Quasi-Peak Level dB( $\mu$ V)	Average Level dB( $\mu$ V)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Note 1: \* Decreasing linearly with logarithm of frequency.

Note 2: The lower limit shall apply at the transition frequencies.

### 10.4 Test Procedure

The EUT and Support equipment, if needed, were put placed on a non-metallic table, 80cm above the ground plane.

Configuration EUT to simulate typical usage as described in clause 2.4 and test equipment as described in clause 10.2 of this report.

All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.

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All support equipment power received from a second LISN.

Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.

The Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.

During the above scans, the emissions were maximized by cable manipulation.

The test mode(s) described in clause 2.4 were scanned during the preliminary test.

After the preliminary scan, we found the test mode producing the highest emission level.

The EUT configuration and worse cable configuration of the above highest emission levels were recorded for reference of the final test.

EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test.

A scan was taken on both power lines, Neutral and Line, recording at least the six highest emissions.

Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.

The test data of the worst-case condition(s) was recorded.

The bandwidth of test receiver is set at 9 KHz.

## 10.5 Test Result

### NA. (See below detailed test result)

Note1: All emissions not reported below are too low against the prescribed limits.

Note2: "----" means average detection; "----" mans peak detection

## 11. CONDUCTED SPURIOUS EMISSIONS

### 11.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Spectrum analyzer	Agilent	E4407B	US40240708	2012/07/31	1Y
2	Attenuator	Mini-Circuits	BW-S10W2	101109	2012/12/28	1 Y
3	RF Cable	Micable	C10-01-01-1	100309	2012/12/28	1Y

### 11.2. Limit

In any 100kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.

### 11.3. Test Procedure

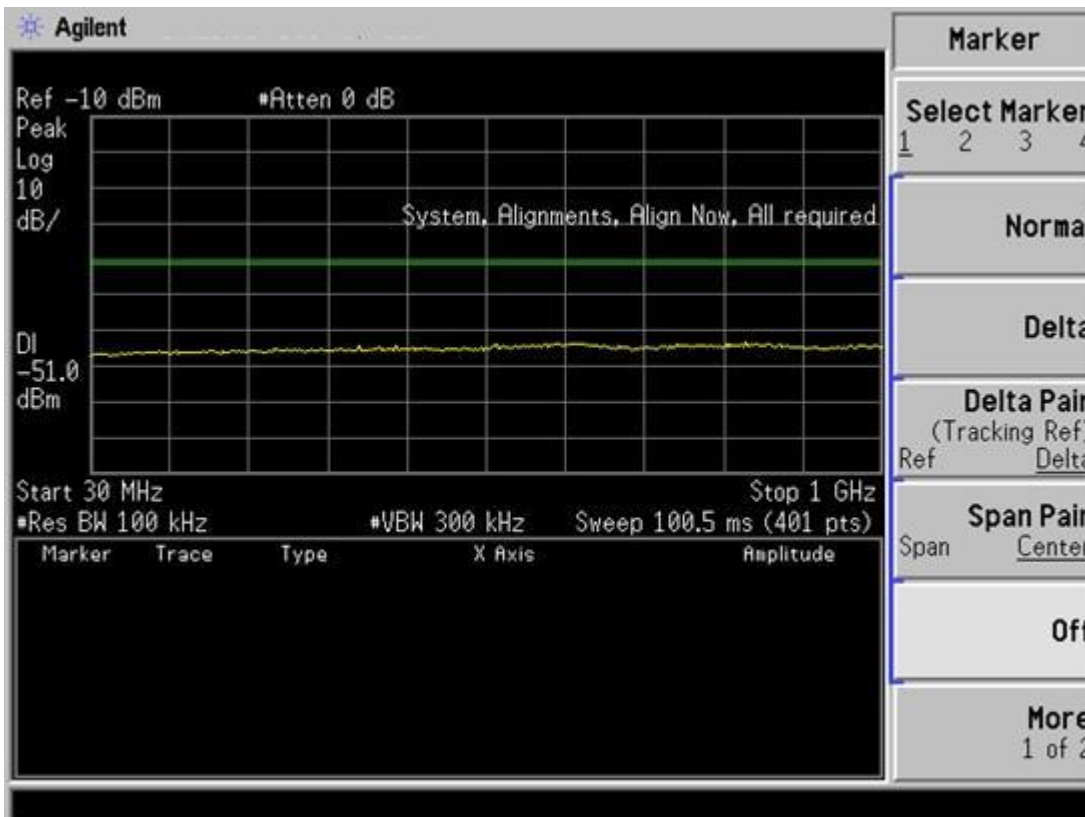
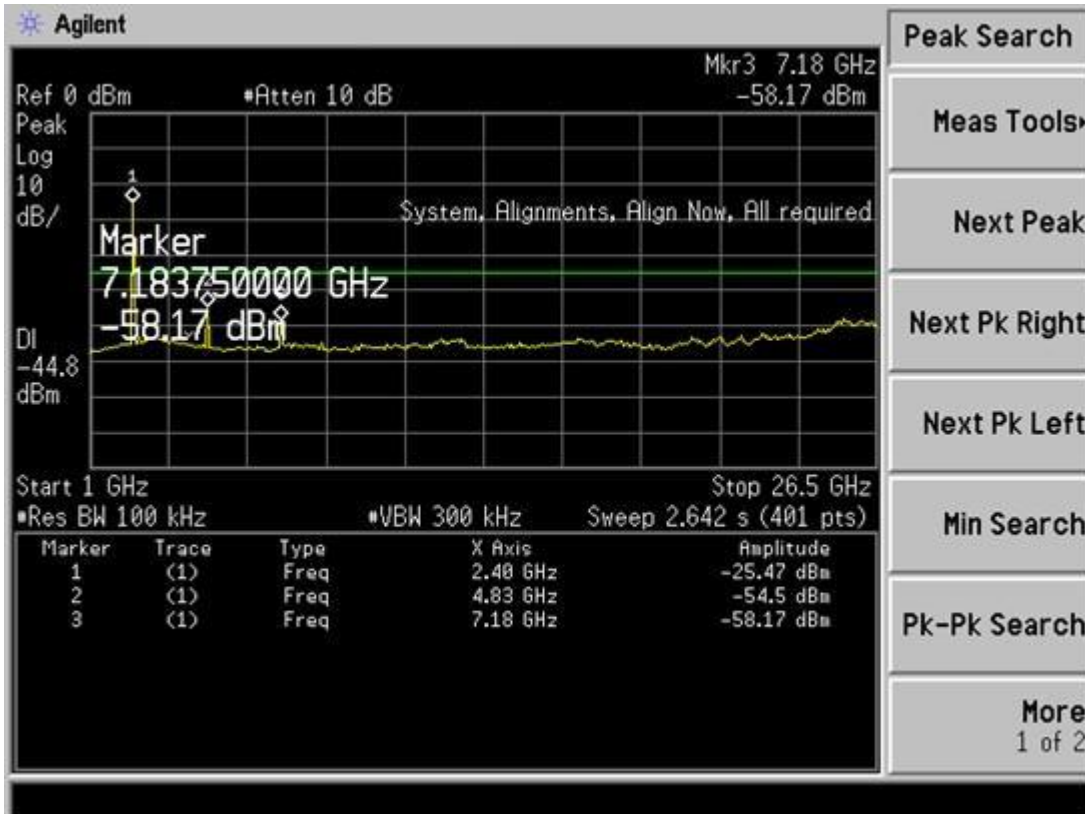
The transmitter output was connected to a spectrum analyzer, The resolution bandwidth is set to 100 kHz, The video bandwidth is set to 300 kHz and measure all the emissions detected.

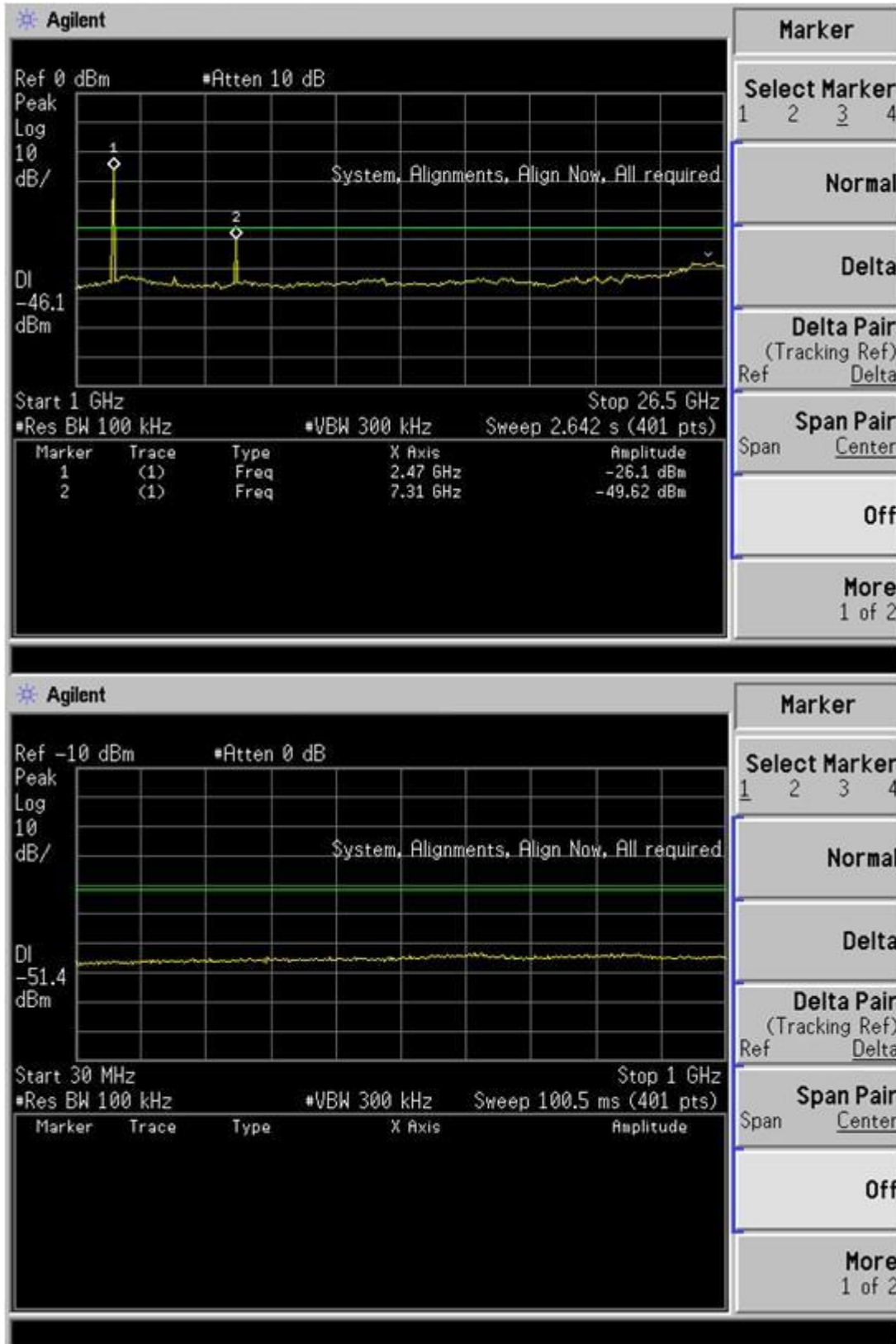
### 11.4. Test result

**PASS** (The testing data was attached in the next pages.)

**GFSK**

2402







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## **12. Antenna Requirements**

### **12.1 Limit**

For intentional device, according to FCC 47 CFR 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 according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

### **12.2 Result**

The antennas used for this product are built-in undetachable dipole antenna and that no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is only 2dBi.

**END OF REPORT**