

HANNUOWEI TOYS FACTORY

Application
For
Certification

FCC ID: 2AD4WH37

Remote Control Aircraft Series

Model: H37

Additional model: H38, H31, H801, H802, H803, H801A, H801B, H801R, H802A, H802B, H802C, H803R, H805, H806, H807, H808, H809, H810, H811, H812, H815, H816, H817, H818, H819, H820, H821, H822, H825, H826, H827, H828, H829, H830, ODY-1717

2.4GHz Wi-Fi Transceiver

Report No.: SZHH01153285-001

We hereby certify that the sample of the above item is considered to comply with the requirements of FCC Part 15, Subpart C for Intentional Radiator, mention 47 CFR [10-1-15]

Prepared and Checked by:

Approved by:

Sign on file

Terry Tang
Engineer

Kidd Yang
Senior Project Engineer
Date: June 9, 2017

- The test results reported in this test report shall refer only to the sample actually tested and shall not refer or be deemed to refer to bulk from which such a sample may be said to have been obtained.
- This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to copy or distribute this report. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results referenced from this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.
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- The evaluation data of the report will be kept for 3 years from the date of issuance.

TRF no.: FCC 15C_Tx_c

Intertek Testing Services Shenzhen Ltd. Guangzhou Branch

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LIST OF EXHIBITS

INTRODUCTION

<i>EXHIBIT 1:</i>	Summary of Tests
<i>EXHIBIT 2:</i>	General Description
<i>EXHIBIT 3:</i>	System Test Configuration
<i>EXHIBIT 4:</i>	Measurement Results
<i>EXHIBIT 5:</i>	Equipment Photographs
<i>EXHIBIT 6:</i>	Product Labeling
<i>EXHIBIT 7:</i>	Technical Specifications
<i>EXHIBIT 8:</i>	Instruction Manual
<i>EXHIBIT 9:</i>	Confidentiality Request
<i>EXHIBIT 10:</i>	Miscellaneous Information
<i>EXHIBIT 11:</i>	Test Equipment List

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MEASUREMENT/TECHNICAL REPORT

Remote Control Aircraft Series

Model: H37

Additional model: H38, H31, H801, H802, H803, H801A, H801B, H801R, H802A, H802B, H802C, H803R, H805, H806, H807, H808, H809, H810, H811, H812, H815, H816, H817, H818, H819, H820, H821, H822, H825, H826, H827, H828, H829, H830, ODY-1717

FCC ID: 2AD4WH37

This report concerns (check one) Original Grant Class II Change

Equipment Type: DTS - Part 15 Digital Transmission Systems (Wi-Fi transmitter portion)

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? Yes No

If yes, defer until : _____
date

Company Name agrees to notify the Commission by: _____
date

of the intended date of announcement of the product so that the grant can be issued on that date.

Transition Rules Request per 15.37? Yes No

If no, assumed Part 15, Subpart C for intentional radiator - the new 47 CFR [10-01-15] Edition] provision.

Report prepared by:

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Table of Contents

1.0	Summary of Test results	2
2.0	<u>General Description</u>	4
2.1	Product Description	4
2.2	Related Submittal(s) Grants	4
2.3	Test Methodology.....	4
2.4	Test Facility	4
3.0	<u>System Test Configuration</u>.....	6
3.1	Justification	6
3.2	EUT Exercising Software	6
3.3	Special Accessories	7
3.4	Measurement Uncertainty	7
3.5	Equipment Modification	7
3.6	Support Equipment List and Description	7
4.0	<u>Measurement Results</u>.....	9
4.1	Maximum Conducted Output Power at Antenna Terminals.....	9
4.2	Minimum 6 dB RF Bandwidth	10
4.3	Maximum Power Density Reading	17
4.4	Out of Band Conducted Emissions.....	24
4.5	Out of Band Radiated Emissions.....	40
4.6	Transmitter Radiated Emissions in Restricted Bands	41
4.7	Field Strength Calculation	42
4.8	Radiated Spurious Emission	43
4.9	Radiated Emissions from Digital Section of Transceiver.....	54
4.10	Transmitter Duty Cycle Calculation and Measurements	55
5.0	<u>Equipment Photographs</u>	57
6.0	<u>Product Labelling</u>.....	59
7.0	<u>Technical Specifications</u>	61
8.0	<u>Instruction Manual</u>	63
9.0	<u>Confidentiality Request</u>	65
10.0	<u>Discussion of Pulse Desensitization</u>	67
11.0	<u>Test Equipment List</u>.....	69

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List of attached file

Exhibit type	File Description	Filename
Test Report	Test Report	report.pdf
Test Setup Photo	Radiated Emission	radiated photos.pdf
External Photo	External Photo	external photos.pdf
Internal Photo	Internal Photo	internal photos.pdf
Block Diagram	Block Diagram	block.pdf
Schematics	Circuit Diagram	circuit.pdf
Operation Description	Technical Description	descri.pdf
ID Label/Location	Label Artwork and Location	label.pdf
User Manual	User Manual	manual.pdf
Cover Letter	Confidentiality Letter	request.pdf
Cover Letter	Letter of Agency	agency.pdf

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EXHIBIT 1

SUMMARY OF TEST RESULTS

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1.0 Summary of Test results

Remote Control Aircraft Series

Model: H37

FCC ID: 2AD4WH37

TEST ITEM	REFERENCE	RESULTS
Max. Output power	15.247(b)(3)	Pass
6 dB Bandwidth	15.247(a)(2)	Pass
Max. Power Density	15.247(e)	Pass
Out of Band Antenna Conducted Emission	15.247(d)	Pass
Radiated Emission in Restricted Bands	15.247(d)	Pass
Antenna Requirement	15.203	Pass (See Notes)

Notes: The EUT uses an Integral Antenna which in accordance to Section 15.203 is considered sufficient to comply with the provisions of this section.

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EXHIBIT 2

GENERAL DESCRIPTION

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2.0 General Description

2.1 Product Description

The Equipment Under Test (EUT) is a Remote Control Aircraft Series with Wi-Fi function operating at 2412-2462MHz for 802.11b/g/n(HT20MHZ), 11 channels with 5MHz channel spacing. The EUT is powered by rechargeable battery (DC 3.7V) . For more detailed features description, please refer to the user's manual.

The Models: H38, H31, H801, H802, H803, H801A, H801B, H801R, H802A, H802B, H802C, H803R, H805, H806, H807, H808, H809, H810, H811, H812, H815, H816, H817, H818, H819, H820, H821, H822, H825, H826, H827, H828, H829, H830, ODY-1717 are the same as the Model: H37 in hardware and electrical aspect. The difference in appearance and model number serves as marketing strategy

Type of Modulation: CCK, BPSK, QPSK, 16QAM, 64QAM

Antenna Type: Integral Antenna

For electronic filing, the brief circuit description is saved with filename: descri.pdf.

2.2 Related Submittal(s) Grants

This is an application for certification of:
DTS- Part 15 Digital Transmission Systems (2.4GHz Wi-Fi transmitter portion).

2.3 Test Methodology

Radiated emission measurements was performed according to the procedures in ANSI C63.10: 2013 and KDB 558074 D01 v04. Radiated emission measurement was performed in semi-anechoic chamber. For radiated emission measurement, preliminary scans were performed in the semi-anechoic chamber only to determine the worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the “**Justification Section**” of this Application. All other measurements were made in accordance with the procedures in part 2 of CFR 47.

2.4 Test Facility

The Semi-anechoic chamber used to collect the radiated data is **Intertek Testing Services Shenzhen Ltd. Guangzhou Branch** and located at Block E, No.7-2 Guang Dong Software Science Park, Caipin Road, Guangzhou Science City, GETDD Guangzhou, China. This test facility and site measurement data have been fully placed on file with the FCC (Registration Number: 549654).

EXHIBIT 3
SYSTEM TEST CONFIGURATION

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3.0 System Test Configuration

3.1 Justification

For emissions testing, the equipment under test (EUT) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, all cables were manipulated to produce worst case emissions. The EUT was powered by a fully 3.7 V rechargeable battery during the test.

On 802.11b/g/n(HT-20) mode, only one antenna is used, and all data rate were tested and only the worst case data is shown in the report.

For maximizing emissions, the EUT was rotated through 360°, the EUT was placed on the styrene turntable with 0.8m up to 1GHz and 1.5 m above 1GHz. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance.

The EUT was operated stand-alone and placed in the central of the styrene turntable.

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater for frequencies below 1000 MHz. The resolution is 1 MHz or greater for frequencies above 1000 MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

Radiated emission measurement were performed the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

3.2 EUT Exercising Software

The EUT exercise program (provided by client) used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The worst case configuration is used in all specified testing.

The parameters of test software setting:

During the test, Channel and power controlling software provided by the applicant was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the application and is going to be fixed on the firmware of the end product.

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3.3 Special Accessories

N/A.

3.4 Measurement Uncertainty

When determining of the test conclusion, the Measurement Uncertainty of test has been considered.

Uncertainty and Compliance - Unless the standard specifically states that measured values are to be extended by the measurement uncertainty in determining compliance, all compliance determinations are based on the actual measured value.

3.5 Equipment Modification

Any modifications installed previous to testing by HANNUOWEI TOYS FACTORY will be incorporated in each production model sold / leased in the United States.

No modifications were installed by Intertek Testing Services Shenzhen Ltd. Guangzhou Branch.

3.6 Support Equipment List and Description

This product was tested in the following configuration:

Refer List:

Description	Manufacturer	Model No.
iPod (Provided by Intertek)	Apple	A1421

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EXHIBIT 4

MEASUREMENT RESULTS

INTERTEK TESTING SERVICES

Applicant: HANNUOWEI TOYS FACTORY

Date of Test: May 15, 2017

Model: H37

4.0 Measurement Results

4.1 Maximum Conducted Output Power at Antenna Terminals, FCC Rules 15.247(b) (3):

The antenna power of the EUT was connected to the input of a broadband peak RF power meter. The power meter have a video bandwidth that is greater than DTS bandwidth and utilize a fast-responding diode detector. Power was read directly at the EUT antenna terminals with cable loss added.

For antennas with gains of 6 dBi or less, maximum allowed Transmitter output is 1 watt (+30 dBm).

IEEE 802.11b (Antenna Gain = 0dBi) (CCK, 1Mbps)		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2412	17.7	58.9
Middle Channel: 2437	17.7	58.9
High Channel: 2462	17.4	55.0

IEEE 802.11g (Antenna Gain = 0dBi) (16QAM, 6Mbps)		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2412	23.1	204.2
Middle Channel: 2437	22.6	182.0
High Channel: 2462	22.8	190.5

IEEE 802.11n(HT20MHZ) (Antenna Gain = 0dBi) (64QAM, 6Mbps)		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2412	22.8	190.5
Middle Channel: 2437	22.8	190.5
High Channel: 2462	22.6	182.0

Cable loss: 0.5 dB External Attenuation: 0 dB

Cable loss, external attenuation has been included in OFFSET function

EUT max. output level = 23.1dBm

For RF Exposure, the information is saved with filename: RF exposure.pdf.

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Applicant: HANNUOWEI TOYS FACTORY

Date of Test: May 15, 2017

Model: H37

4.2 Minimum 6 dB RF Bandwidth, FCC Rule 15.247(a) (2):

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RES BW was set to 100 KHz according to FCC KDB 558074 D01 v04. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A PEAK output reading was taken, a DISPLAY line was drawn 6 dB lower than PEAK level. The 6dB bandwidth was determined from where the channel output spectrum intersected the display line.

Limit: The 6 dB Bandwidth is at least 500 kHz.

IEEE 802.11b (CCK, 1Mbps)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2412	10.072
2437	10.072
2462	10.072

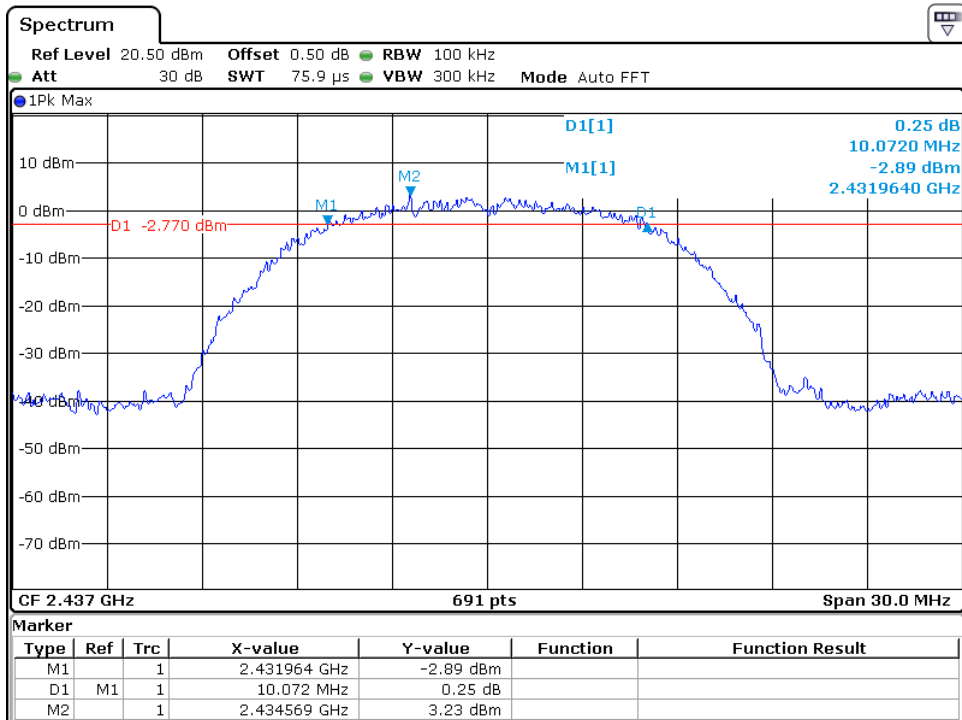
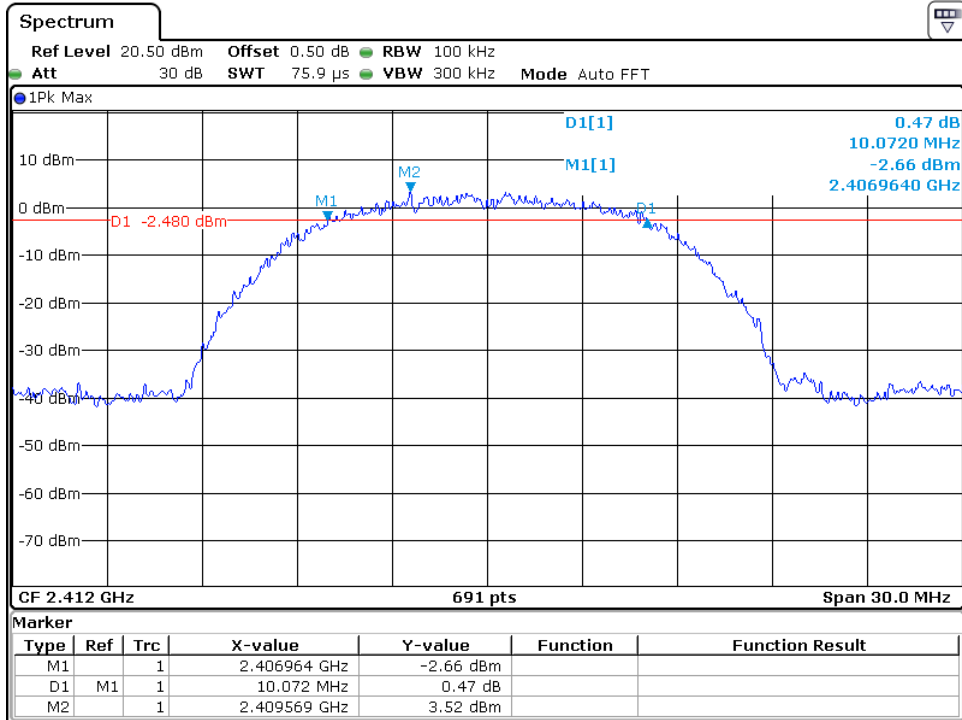
IEEE 802.11g (16QAM, 6Mbps)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2412	16.498
2437	16.498
2462	16.498

IEEE 802.11n(HT20MHZ) (64QAM, 6Mbps)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2412	17.704
2437	17.704
2462	17.704

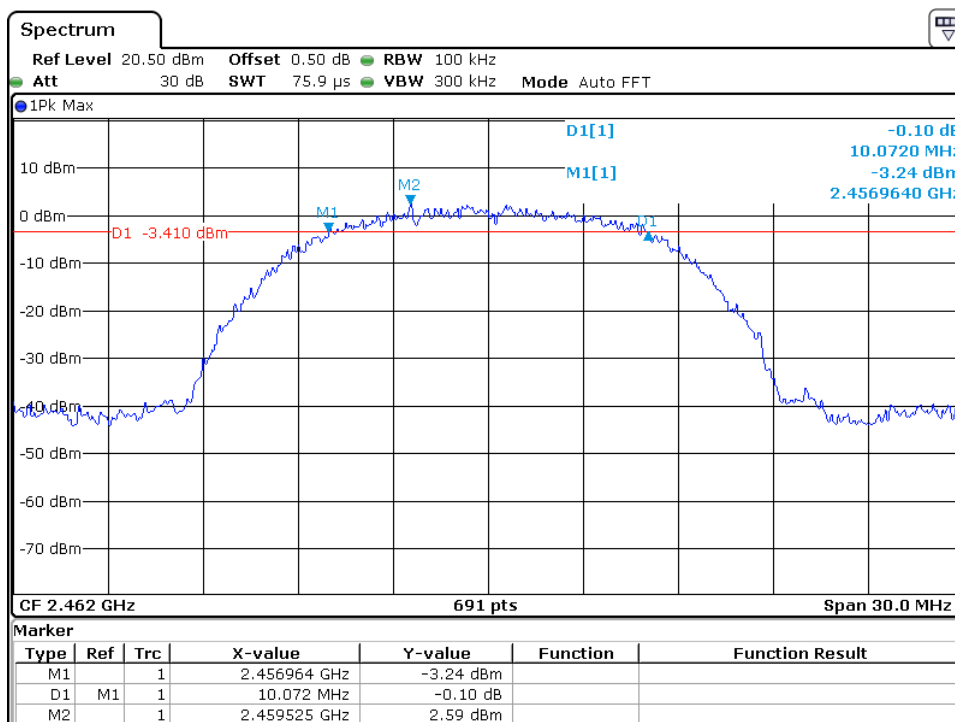
The test plots are attached as below.

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802.11b

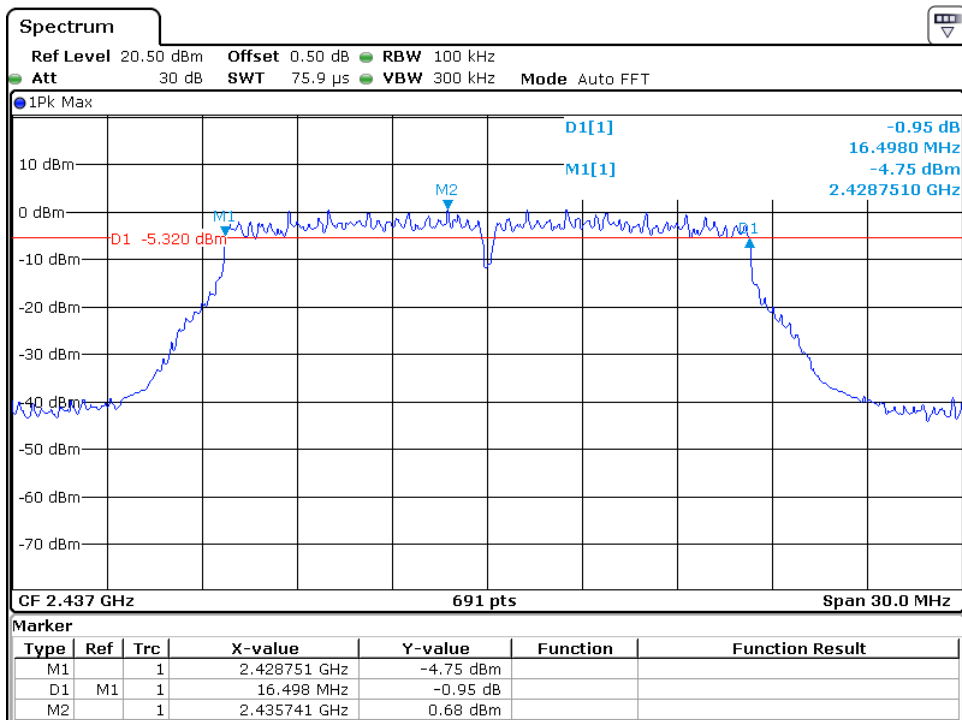
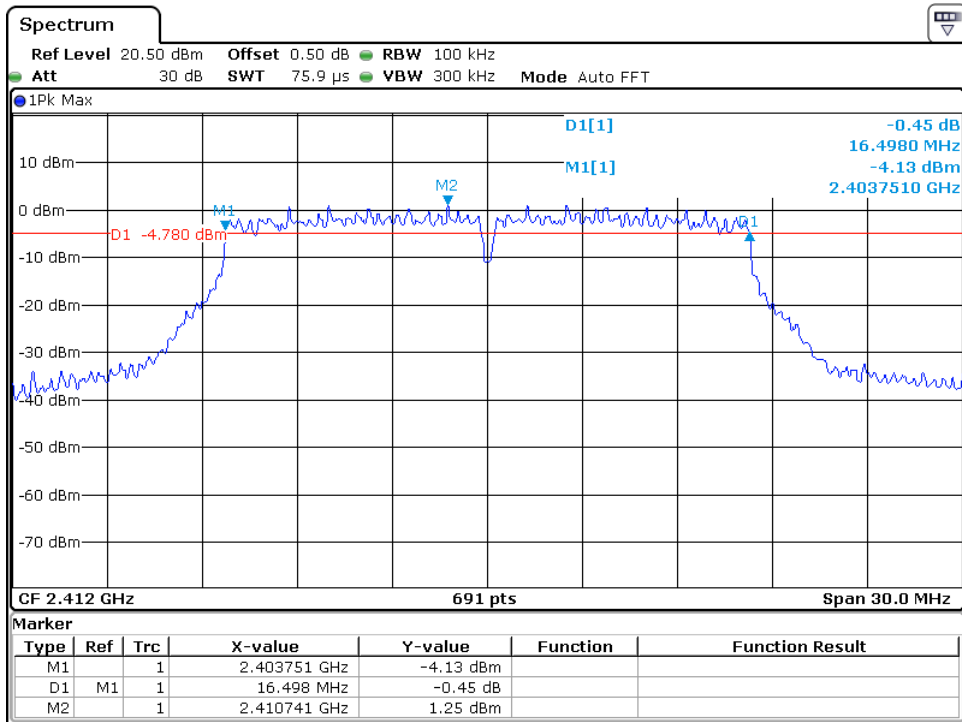


INTERTEK TESTING SERVICES

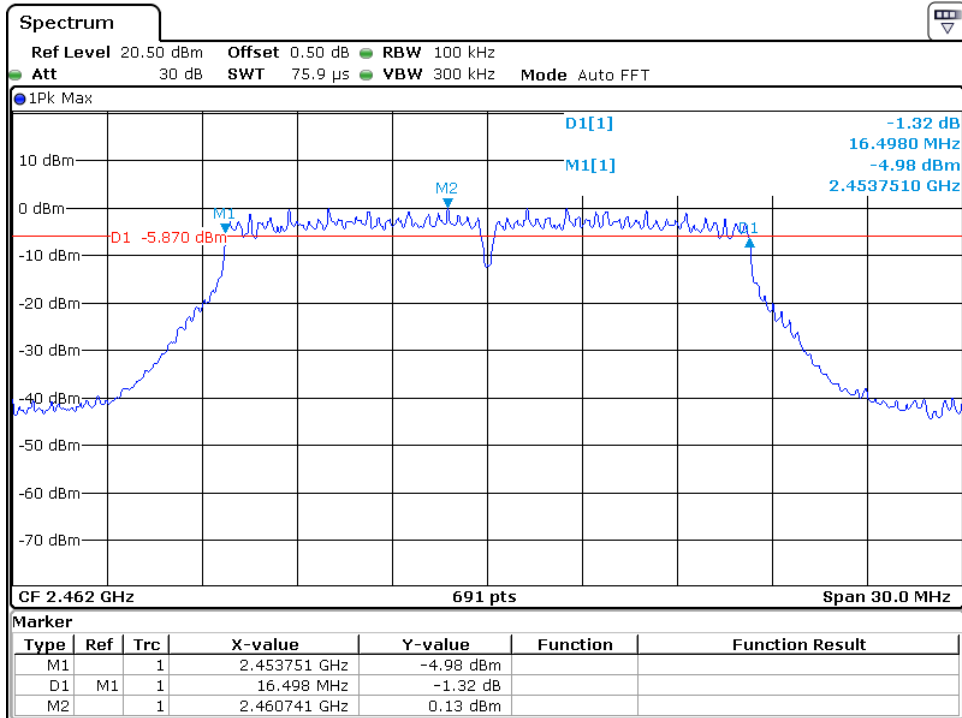


INTERTEK TESTING SERVICES

802.11g

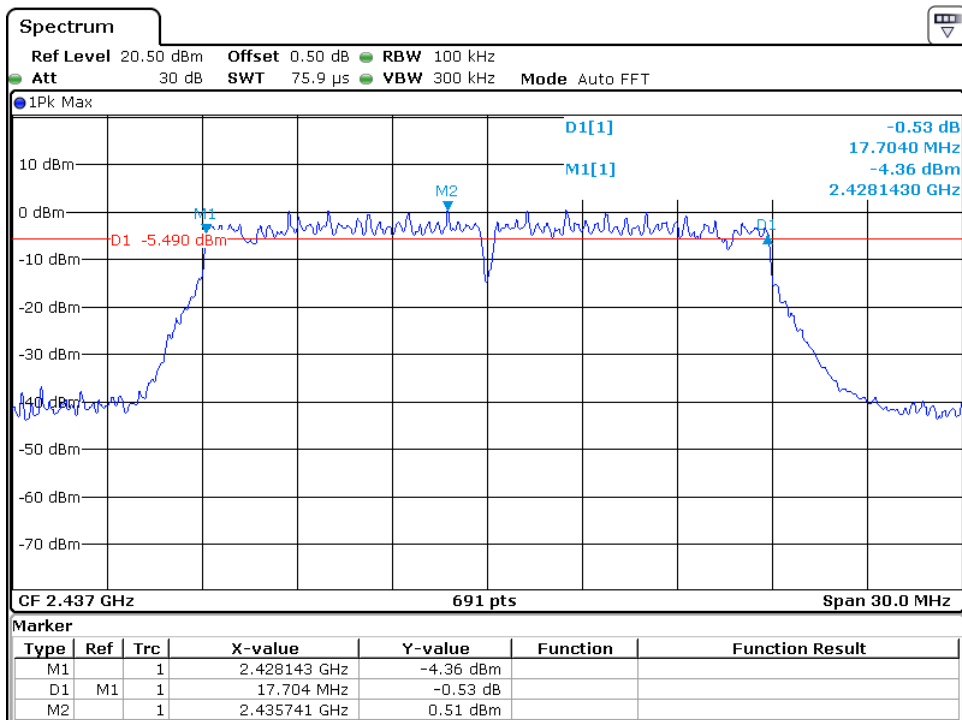
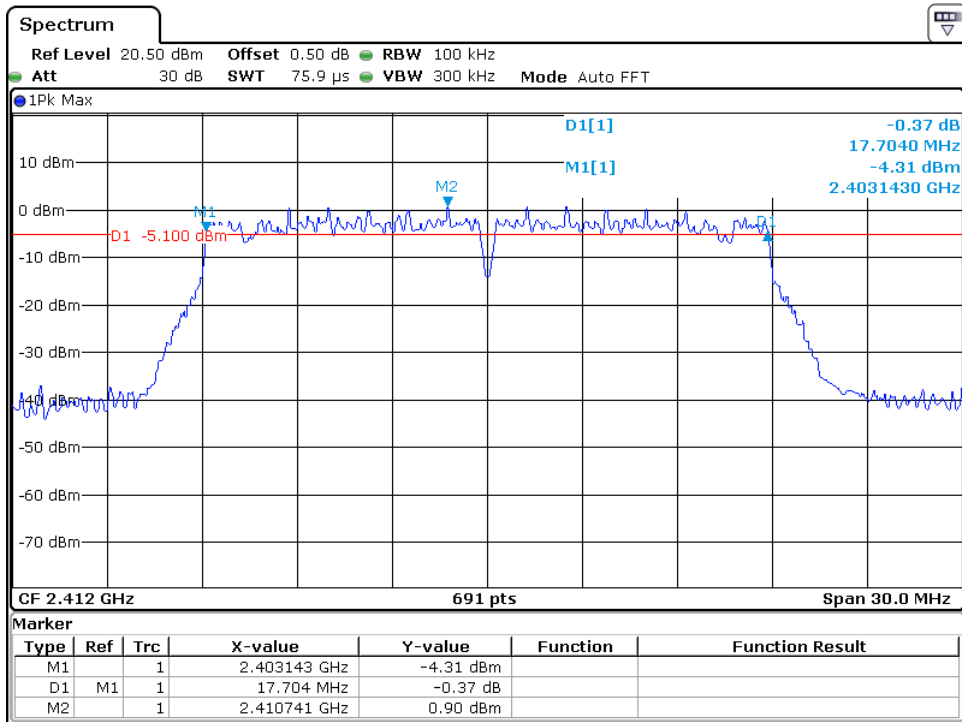


INTERTEK TESTING SERVICES

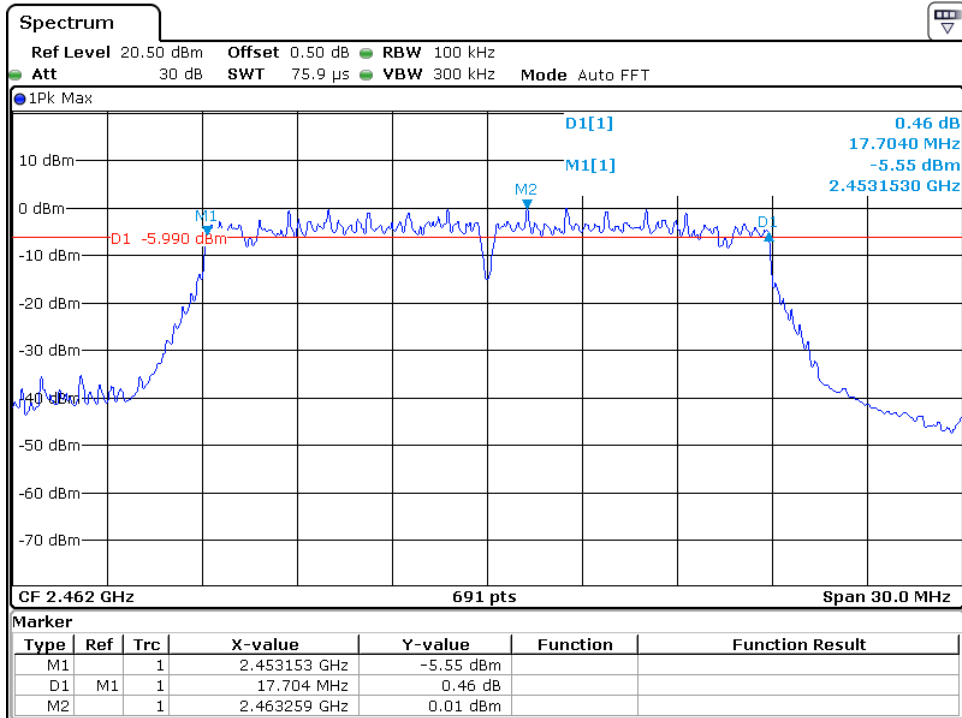


INTERTEK TESTING SERVICES

802.11n(HT20MHZ)



INTERTEK TESTING SERVICES



INTERTEK TESTING SERVICES

Applicant: HANNUOWEI TOYS FACTORY

Date of Test: May 15, 2017

Model: H37

4.3 Maximum Power Density Reading, FCC Rule 15.247(e):

The Measurement Procedure PKPSD was set according to the FCC KDB 558074 D01 v04.

Antenna output of the EUT was coupled directly to spectrum analyzer; if an external attenuator and/or cable was used, these losses are compensated for with the analyzer OFFSET function.

Limit: The Power Density does not exceed 8dBm/3 kHz.

IEEE 802.11b (CCK, 1Mbps)	
Frequency (MHz)	Power Density with RBW 100KHz
2412	3.48
2437	3.13
2462	2.90

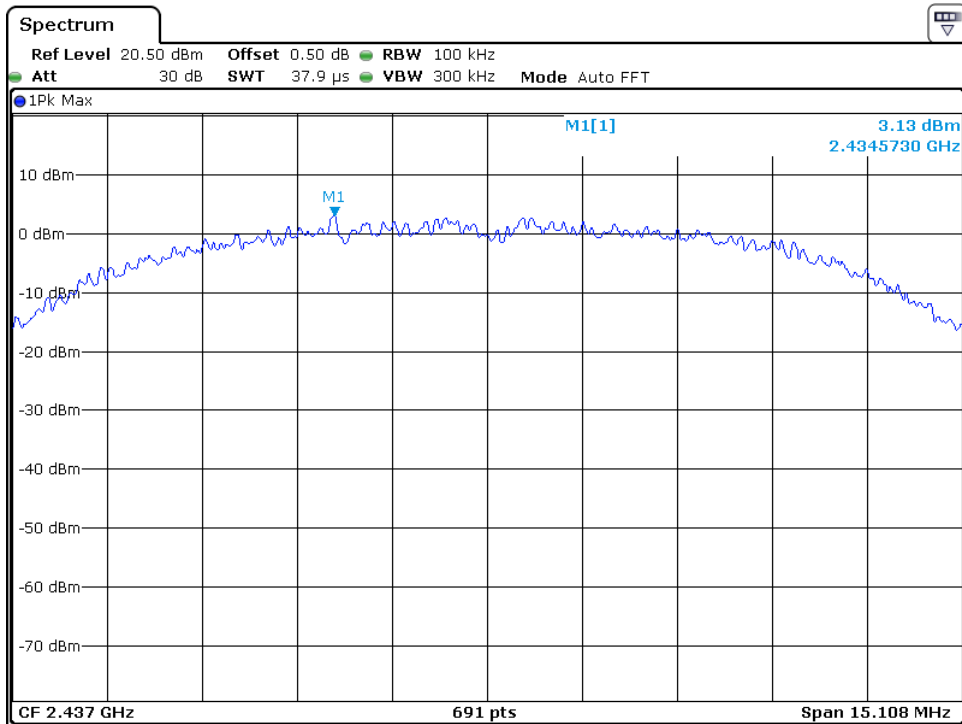
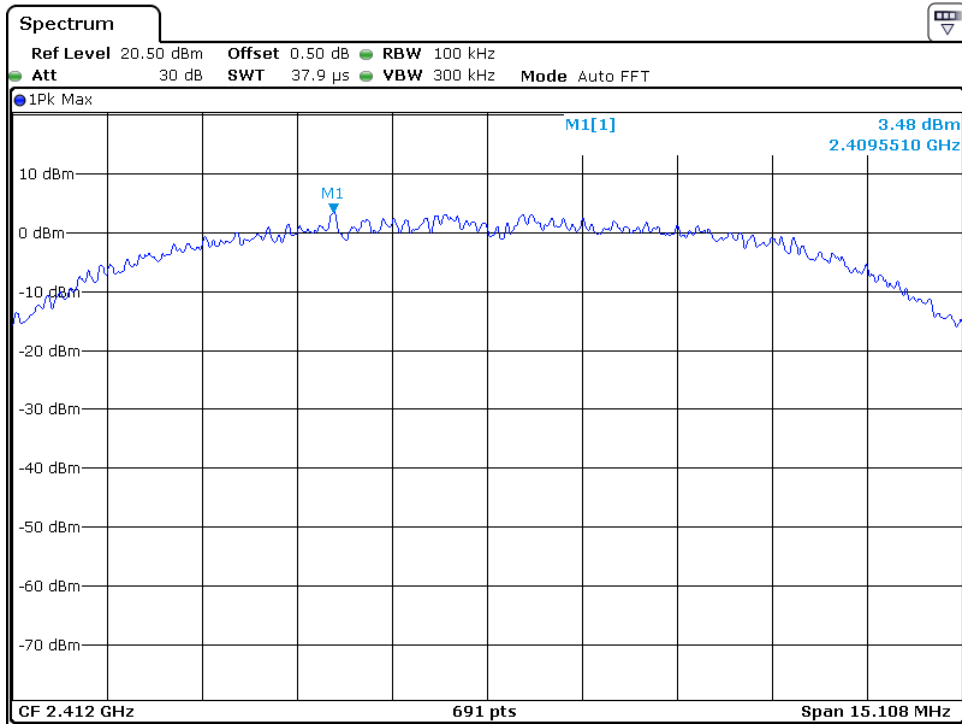
IEEE 802.11g (16QAM, 6Mbps)	
Frequency (MHz)	Power Density with RBW 100KHz
2412	0.99
2437	0.56
2462	0.03

IEEE 802.11n(HT20MHZ) (64QAM, 6Mbps)	
Frequency (MHz)	Power Density with RBW 100KHz
2412	1.01
2437	0.25
2462	-0.13

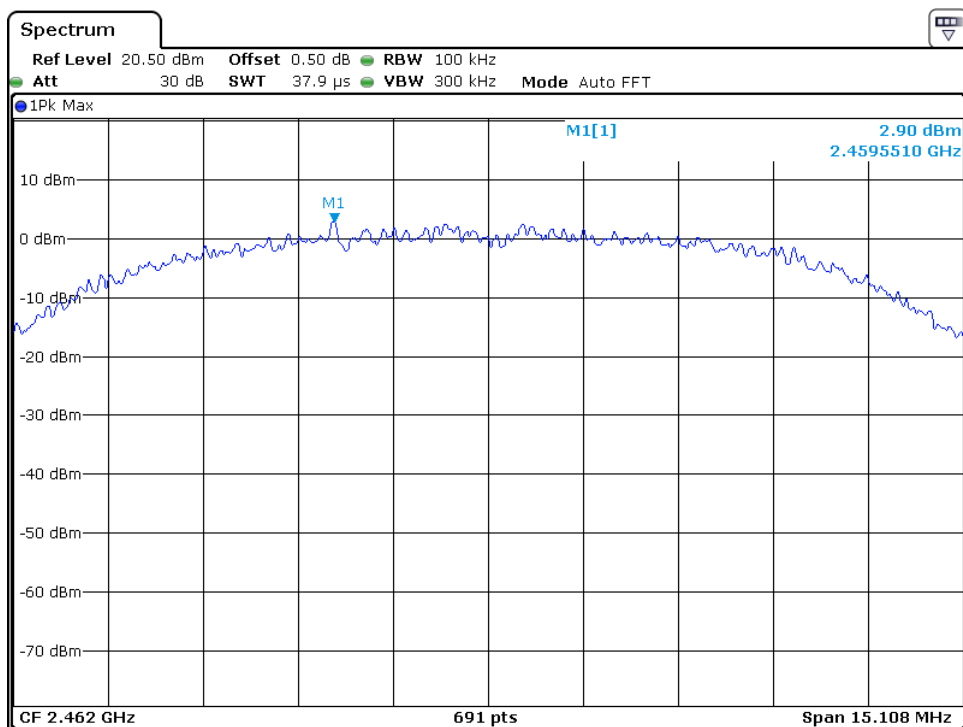
The test plots are attached as below.

INTERTEK TESTING SERVICES

802.11b

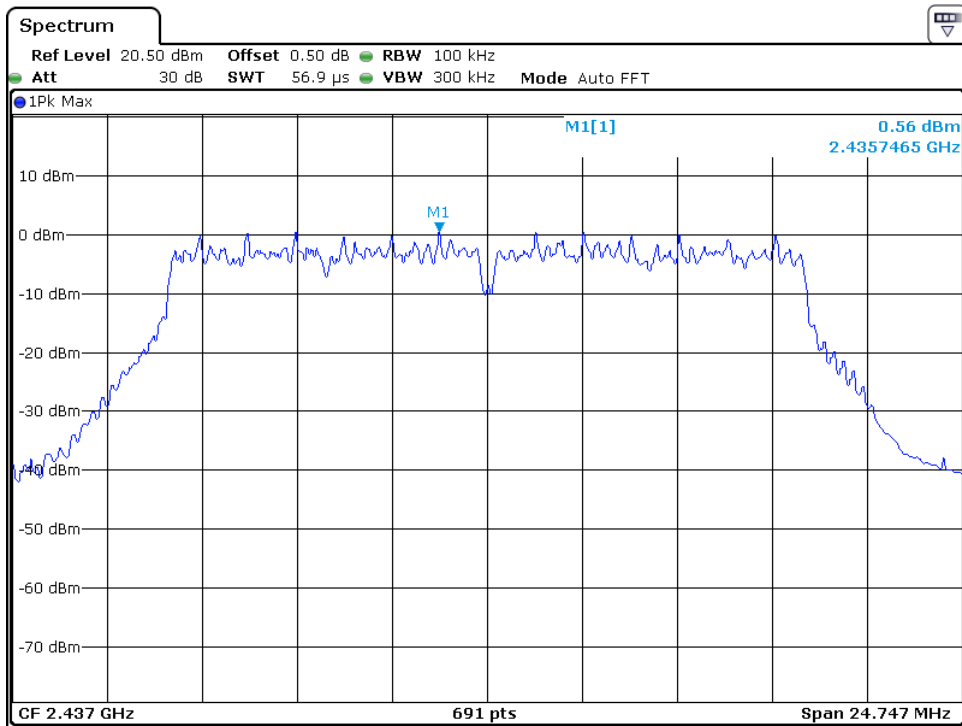
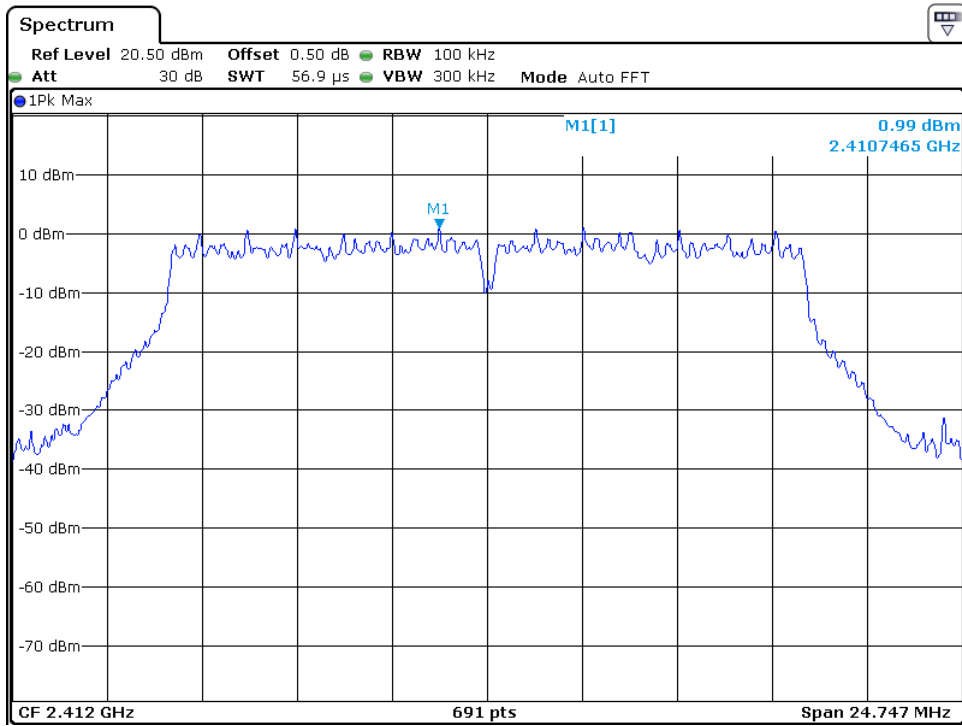


INTERTEK TESTING SERVICES

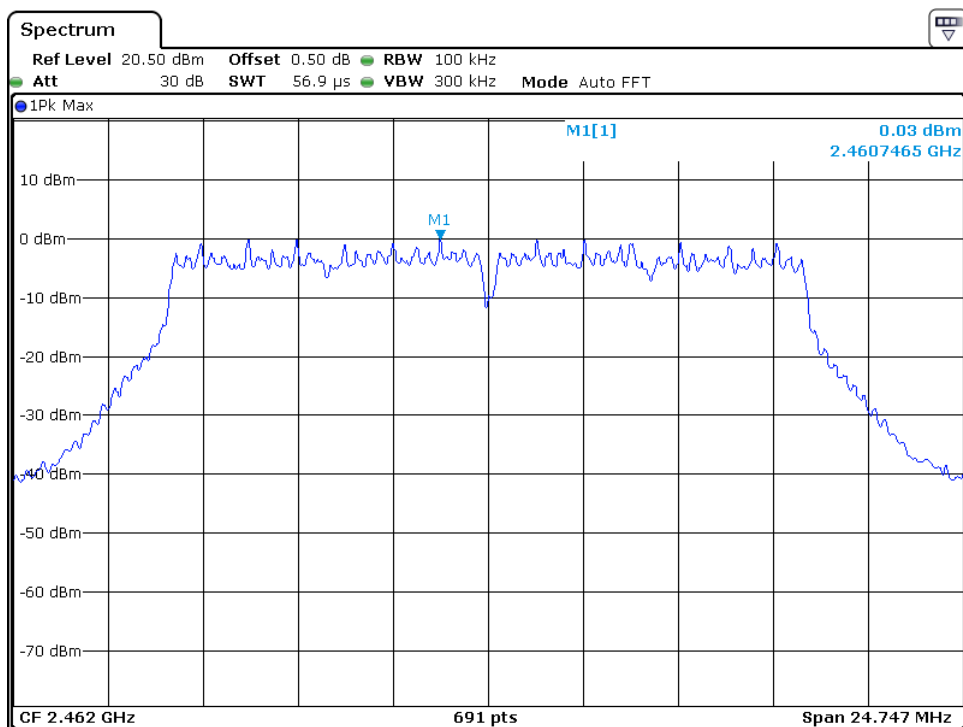


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802.11g

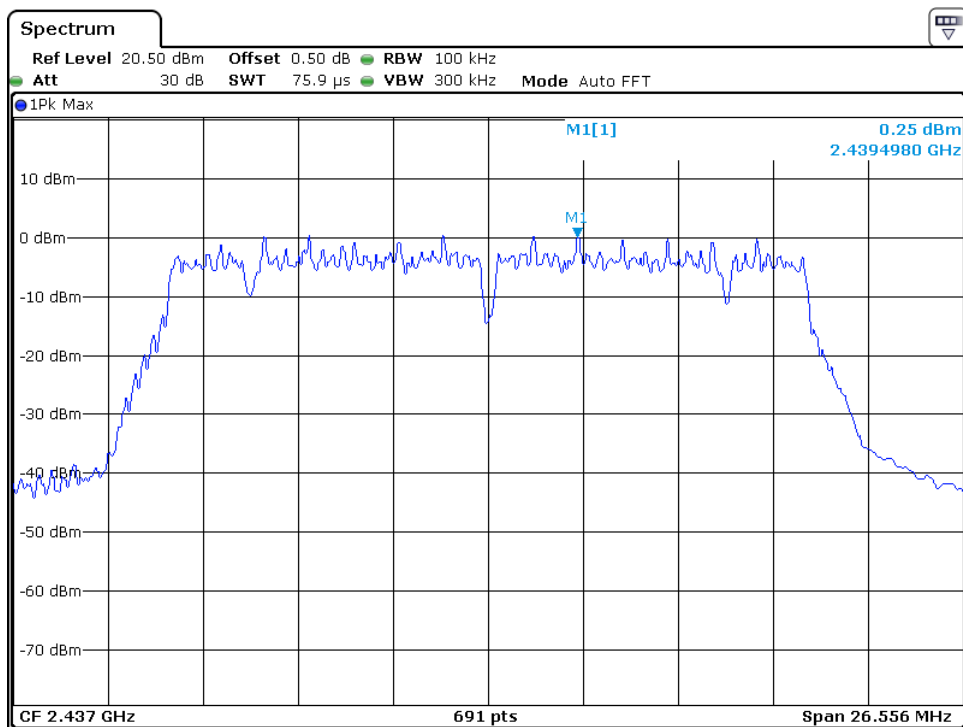
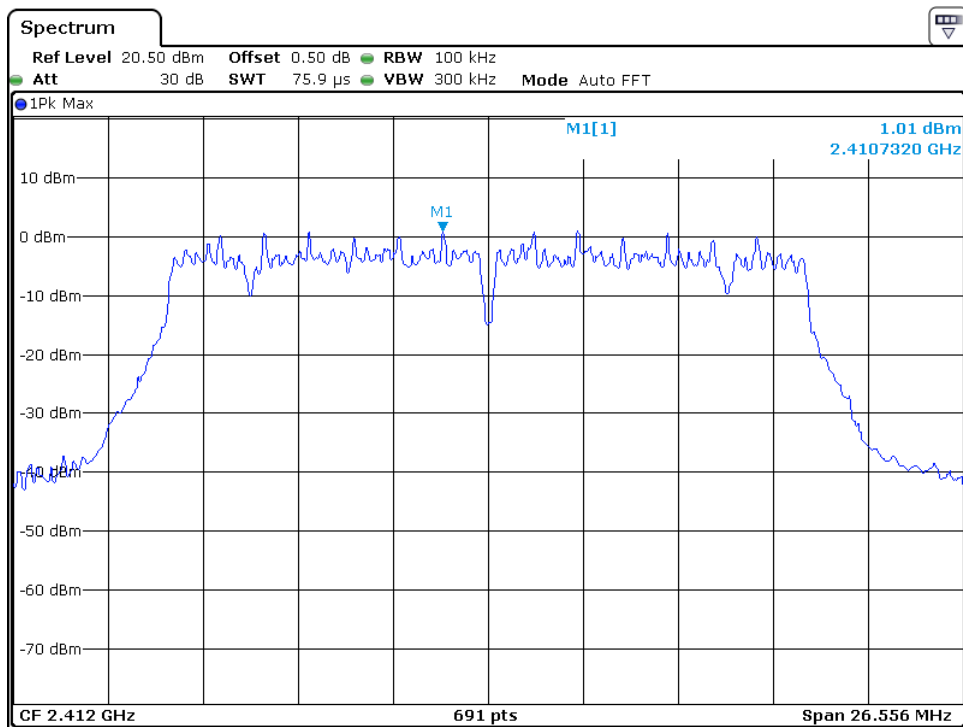


INTERTEK TESTING SERVICES

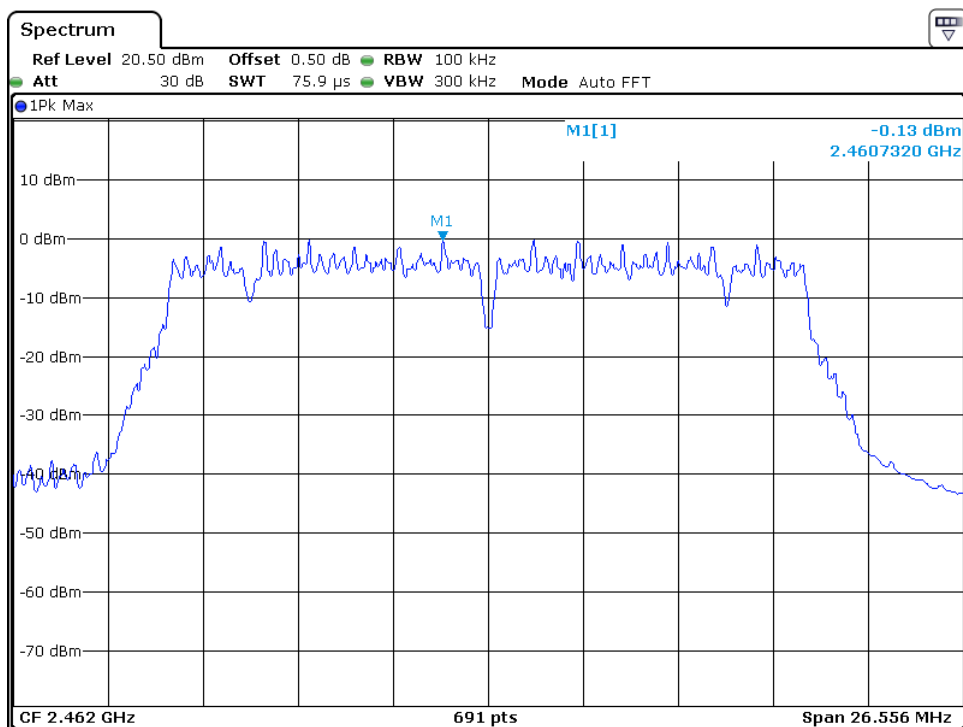


INTERTEK TESTING SERVICES

802.11n(HT20MHZ)



INTERTEK TESTING SERVICES



INTERTEK TESTING SERVICES

Applicant: HANNUOWEI TOYS FACTORY
Date of Test: May 15, 2017
Model: H37

4.4 Out of Band Conducted Emissions, FCC Rule 15.247(d)

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. The Measurement Procedure was set according to the FCC KDB 558074 D01 v04.

All other types of emissions from the EUT shall meet the general limits for radiated frequencies outside the passband.

Refer to the attached test plots for out of band conducted emissions data with rate of 1Mbps for 802.11b and 6Mbps for 802.11g and 6Mbps for 802.11n(HT20MHZ).

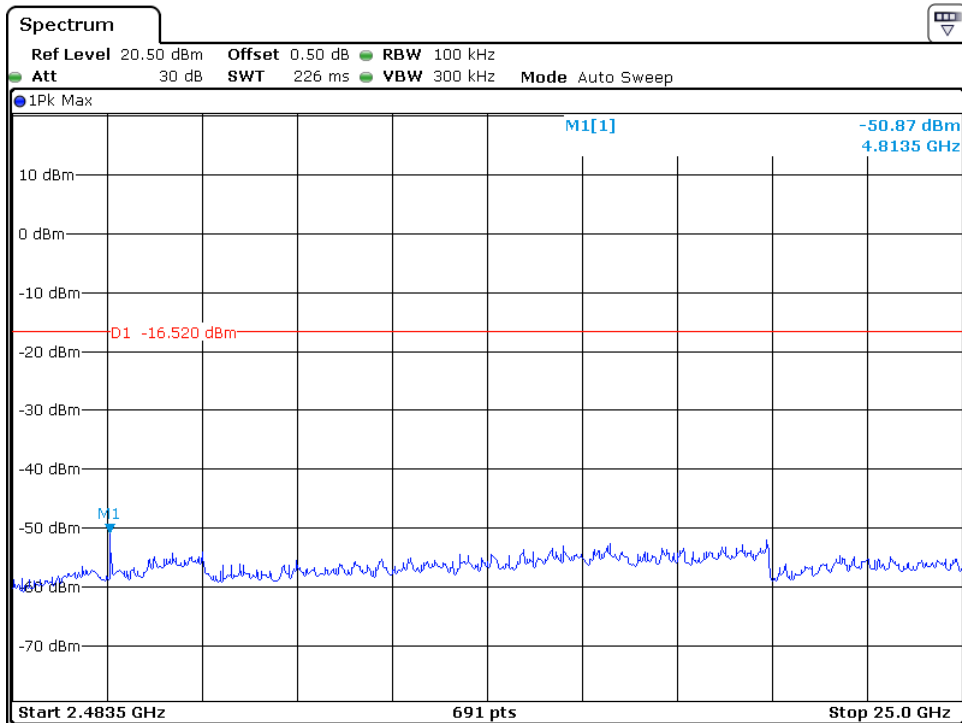
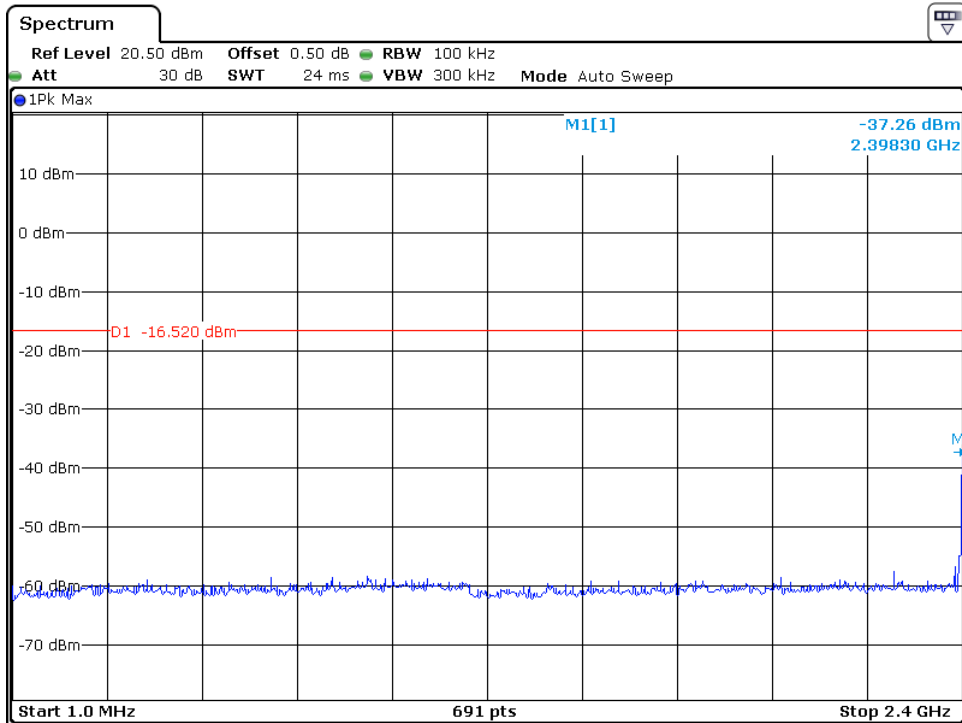
The test plots showed all spurious emission up to the tenth harmonic were measured and they were found to be at least 20 dB below the highest level of the desired power in the passband.

The test plots are attached as below.

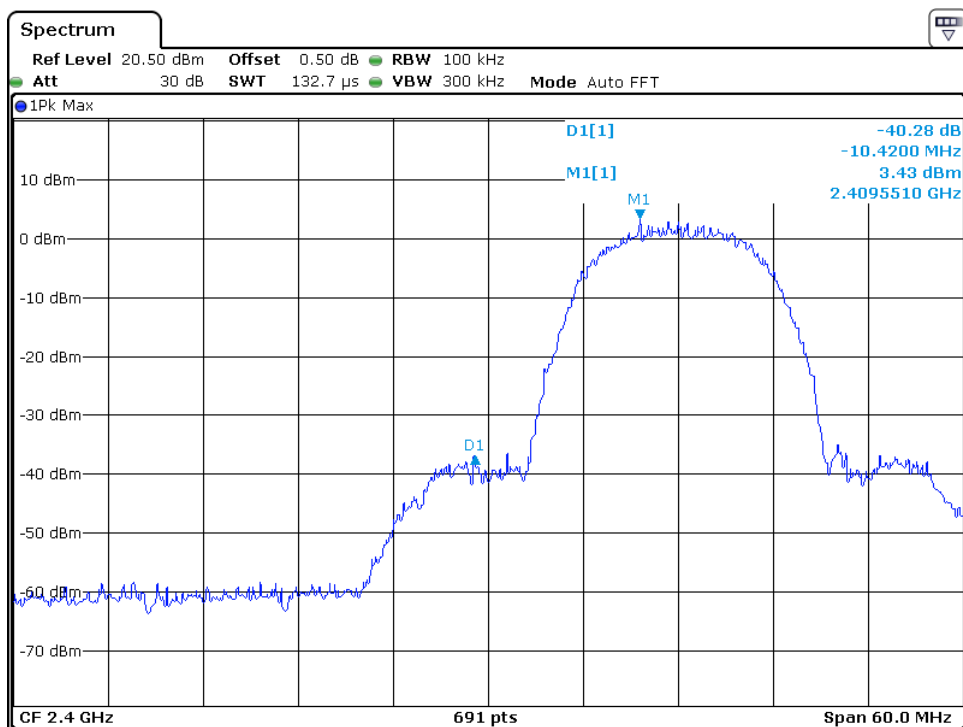
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802.11b

Channel 01 (2412MHz) Reference Level: 3.48dBm

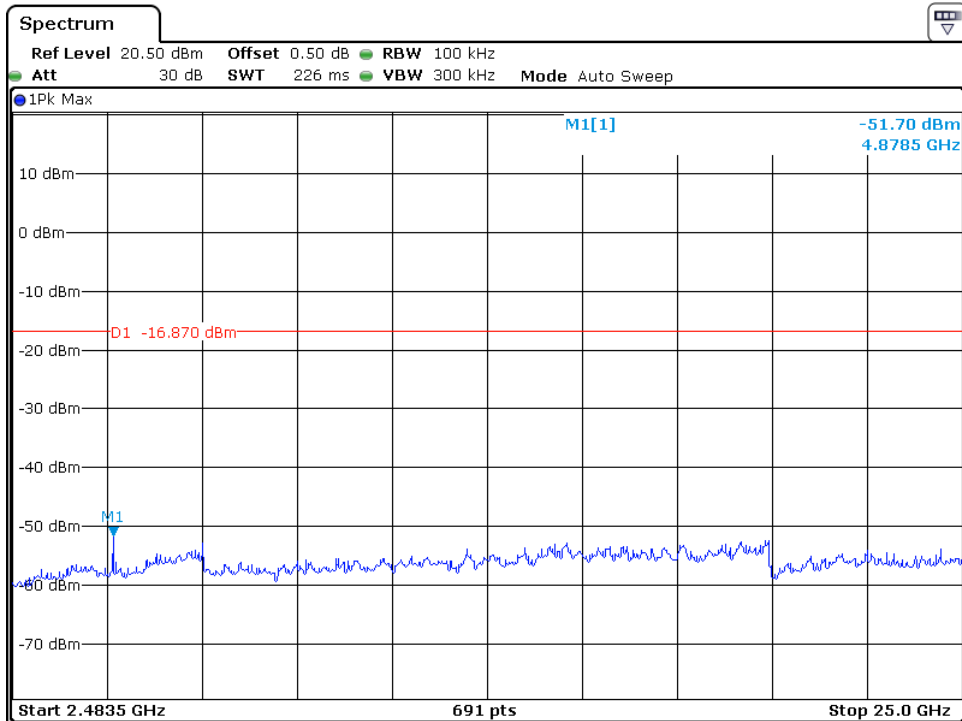
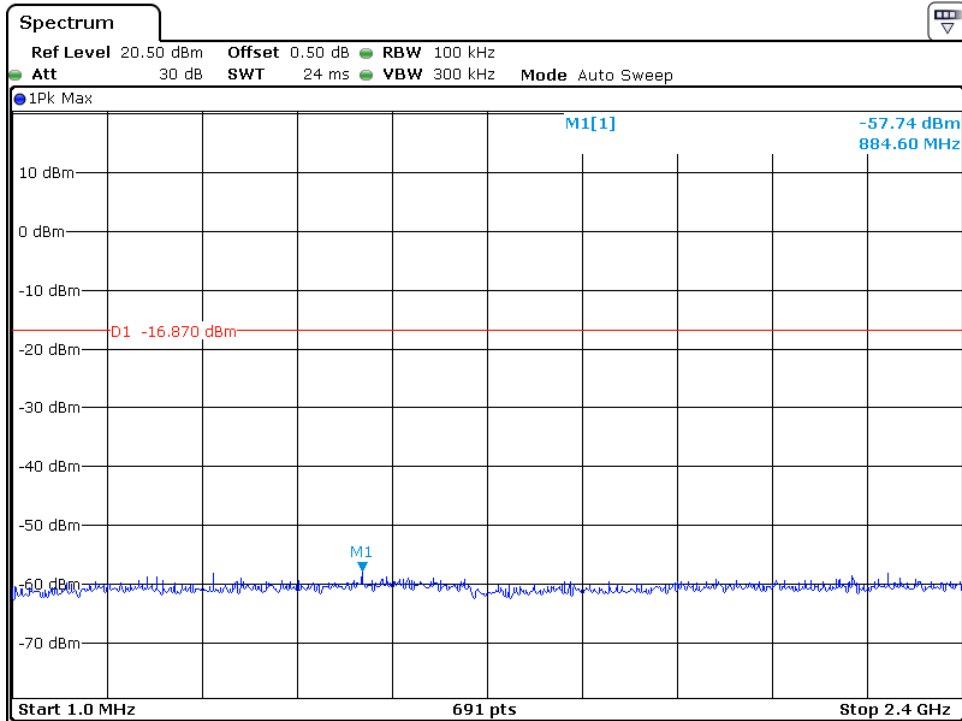


INTERTEK TESTING SERVICES



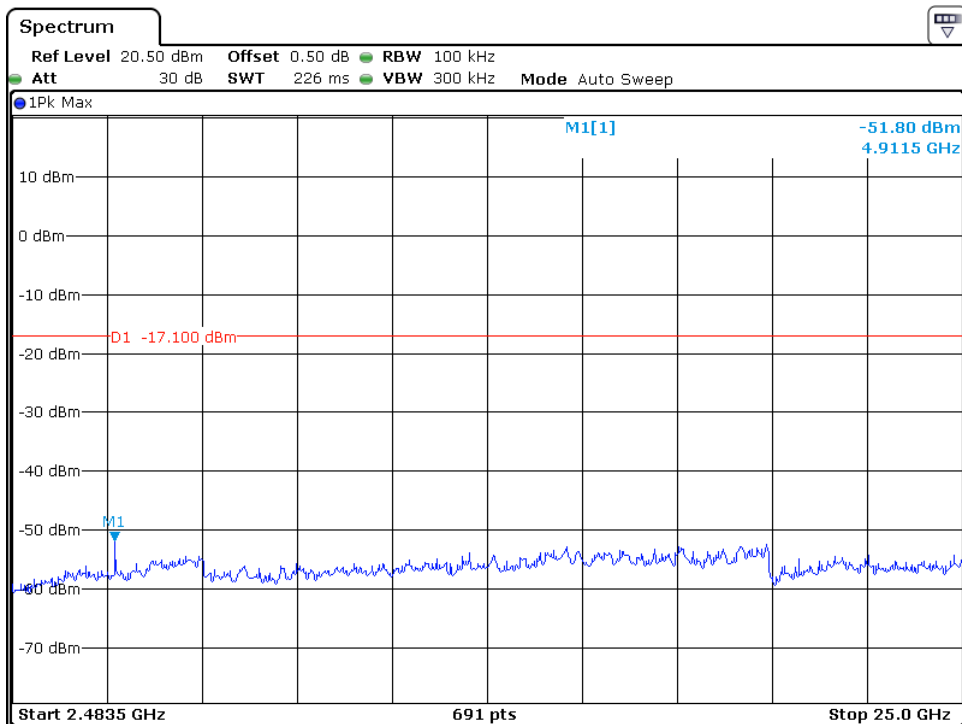
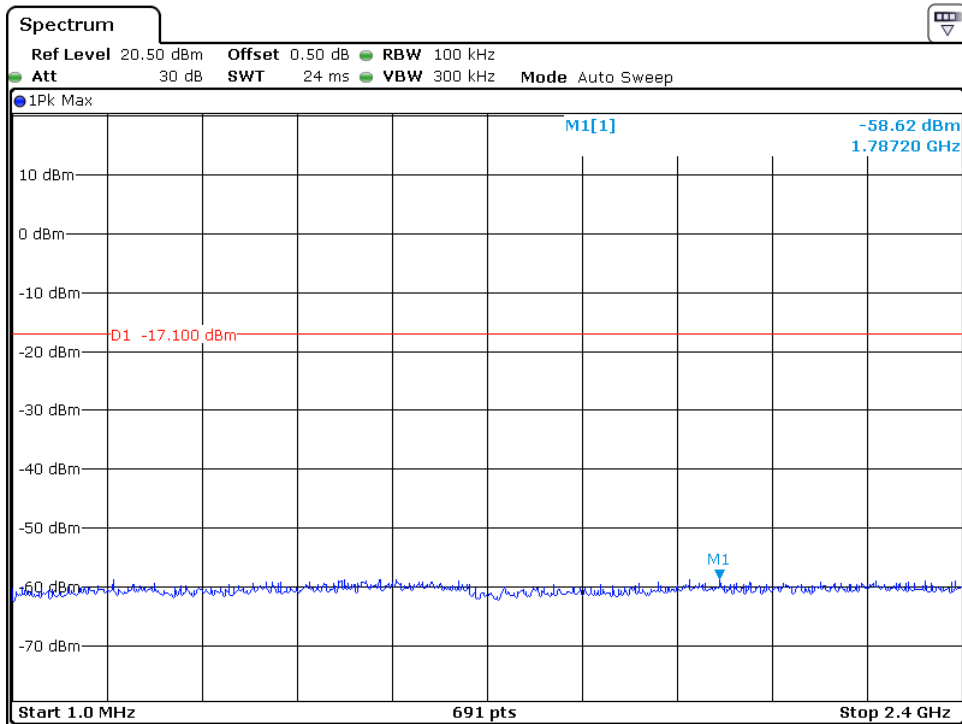
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Channel 06 (2437MHz) Reference Level: 3.13dBm

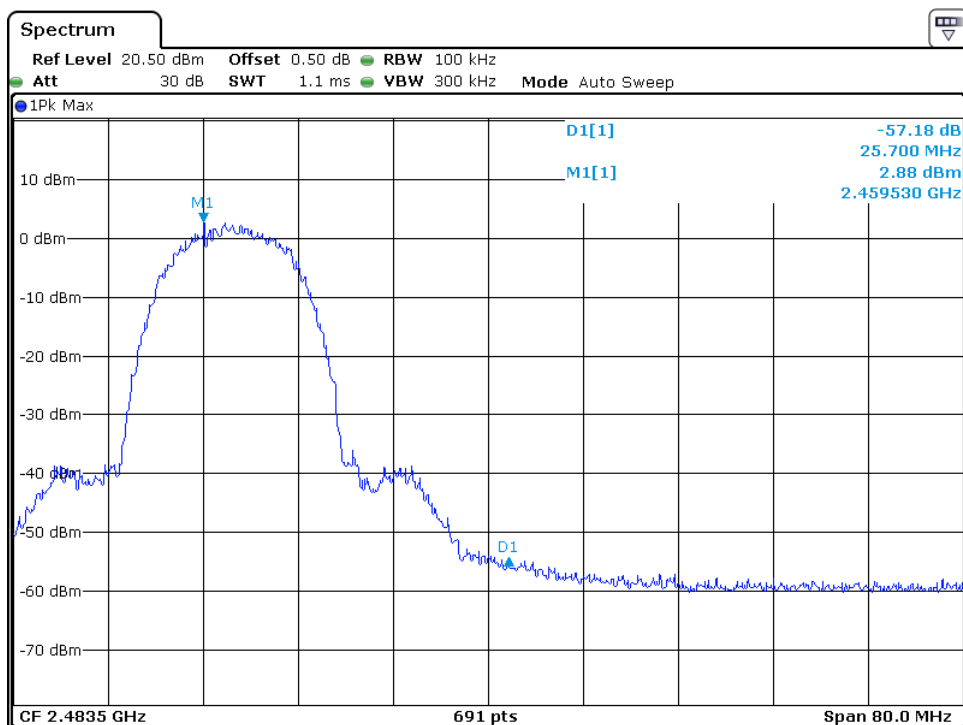


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Channel 11 (2462MHz) Reference Level: 2.90dBm



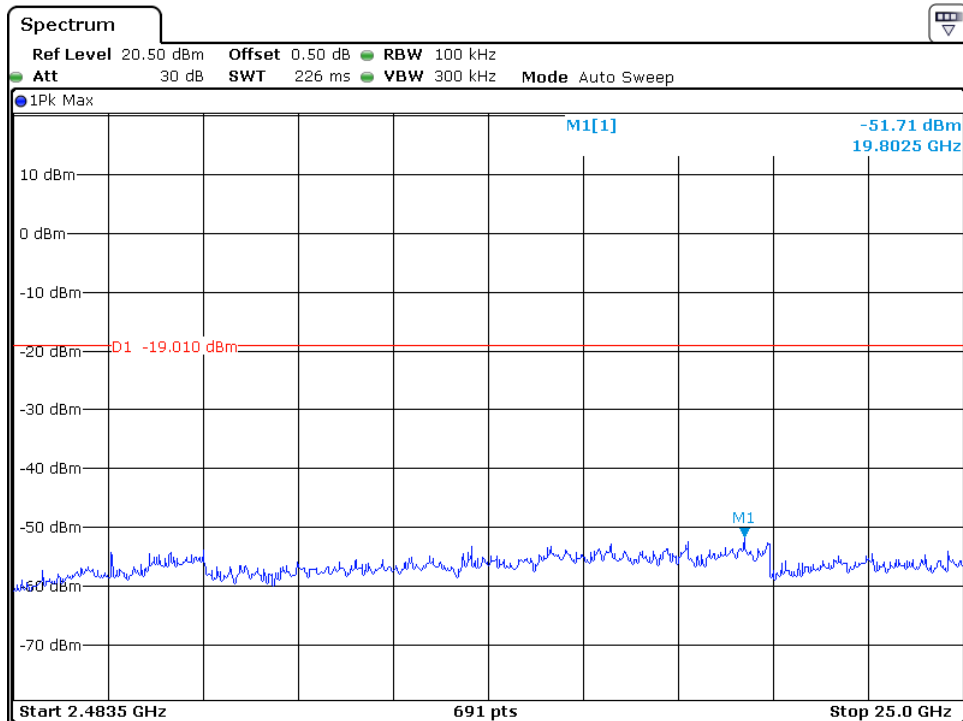
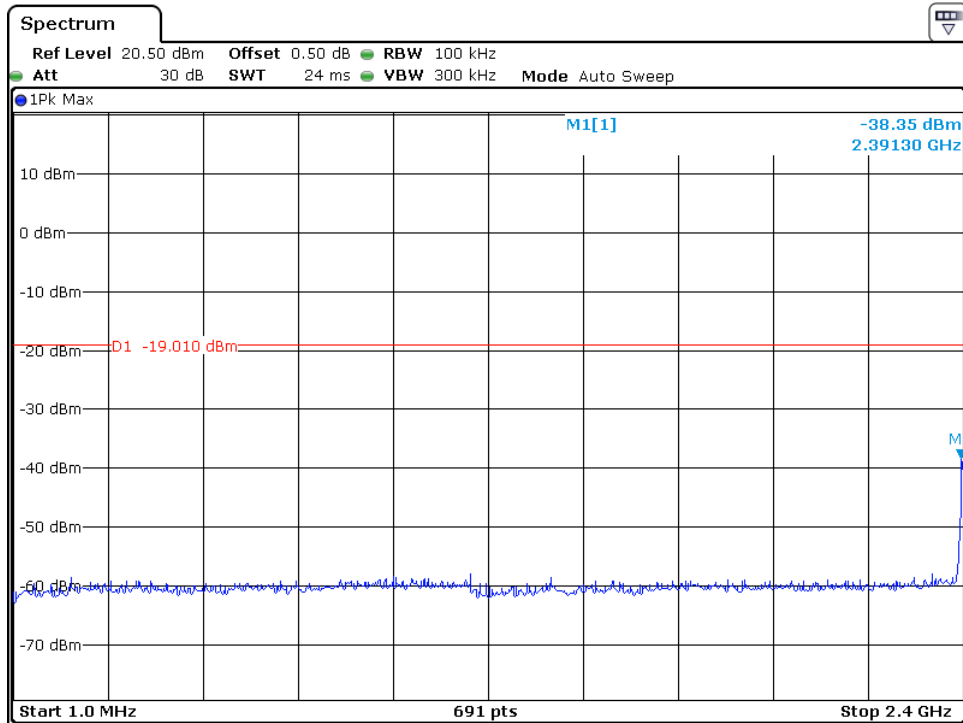
INTERTEK TESTING SERVICES



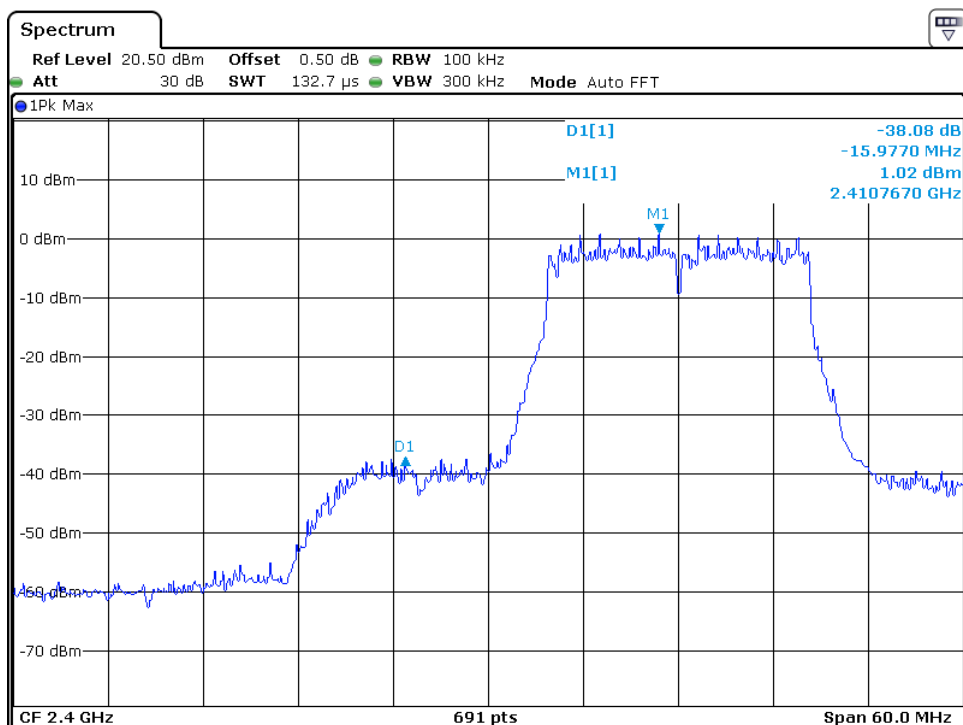
INTERTEK TESTING SERVICES

802.11g

Channel 01 (2412MHz) Reference Level: 0.99dBm

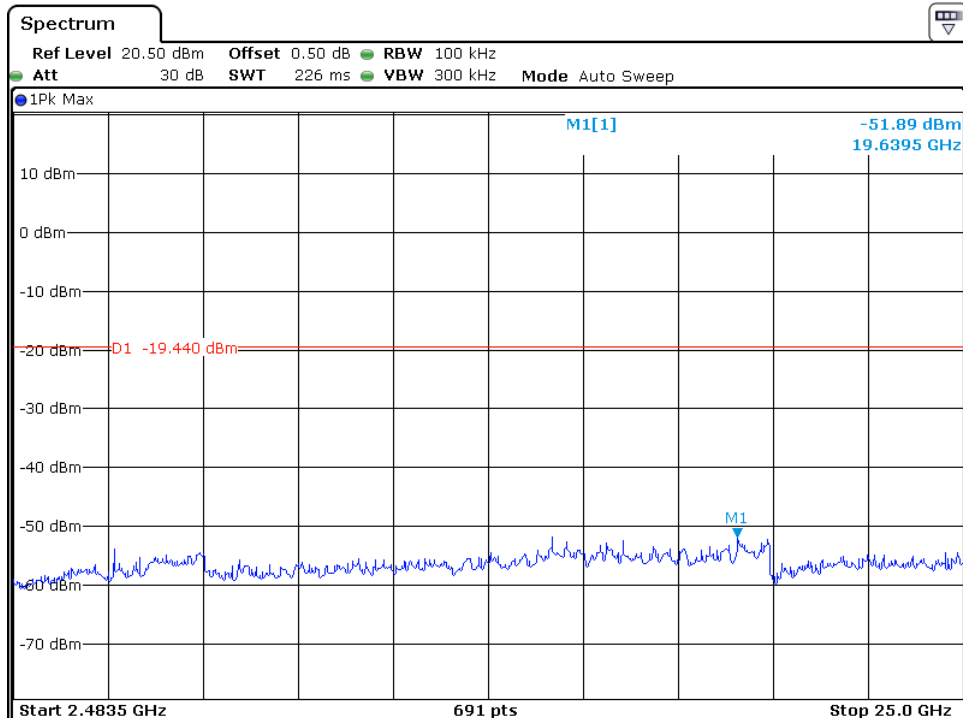
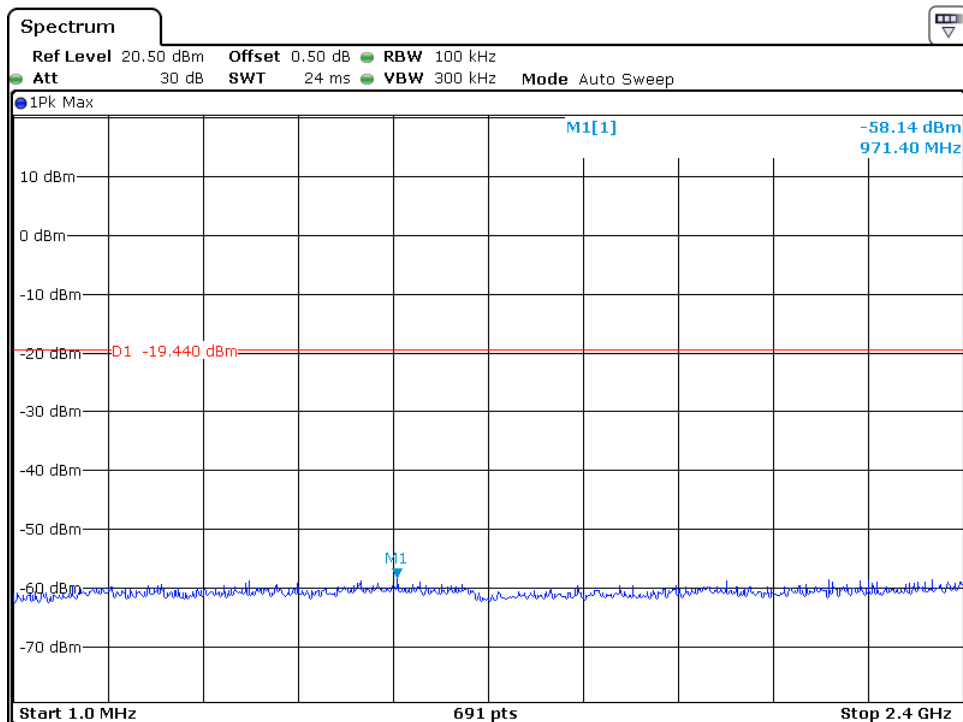


INTERTEK TESTING SERVICES



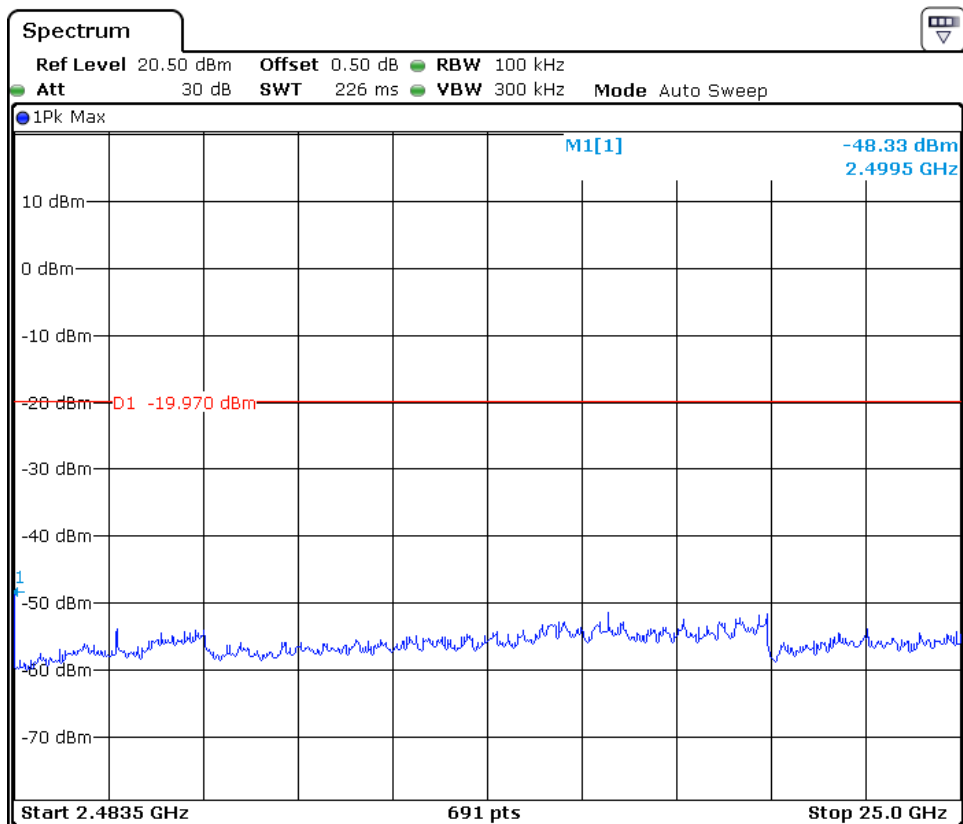
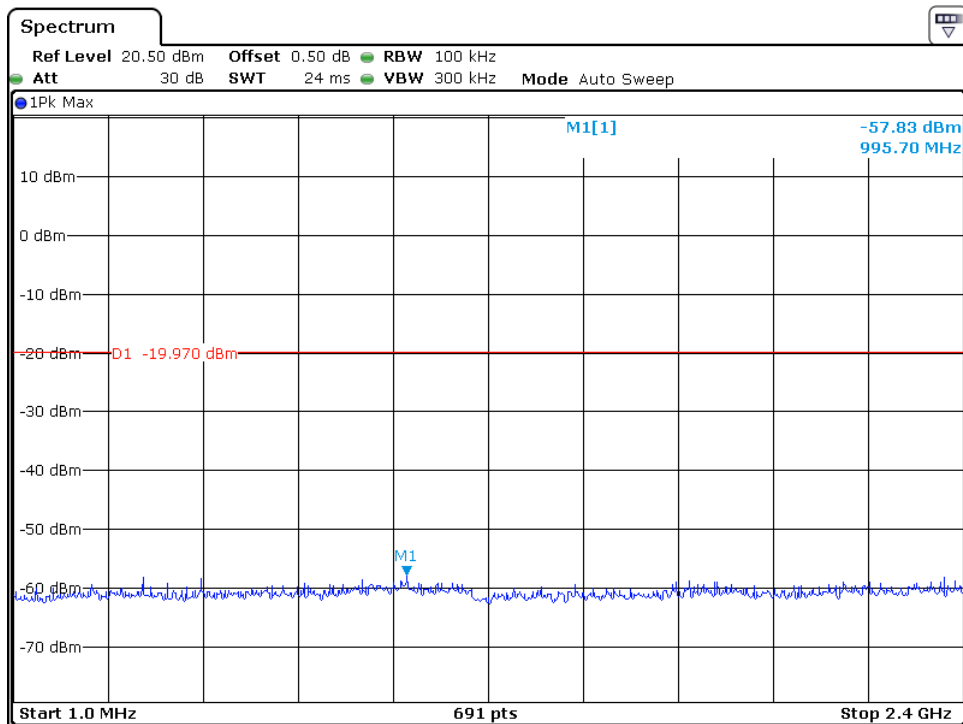
INTERTEK TESTING SERVICES

Channel 06 (2437MHz) Reference Level: 0.56dBm

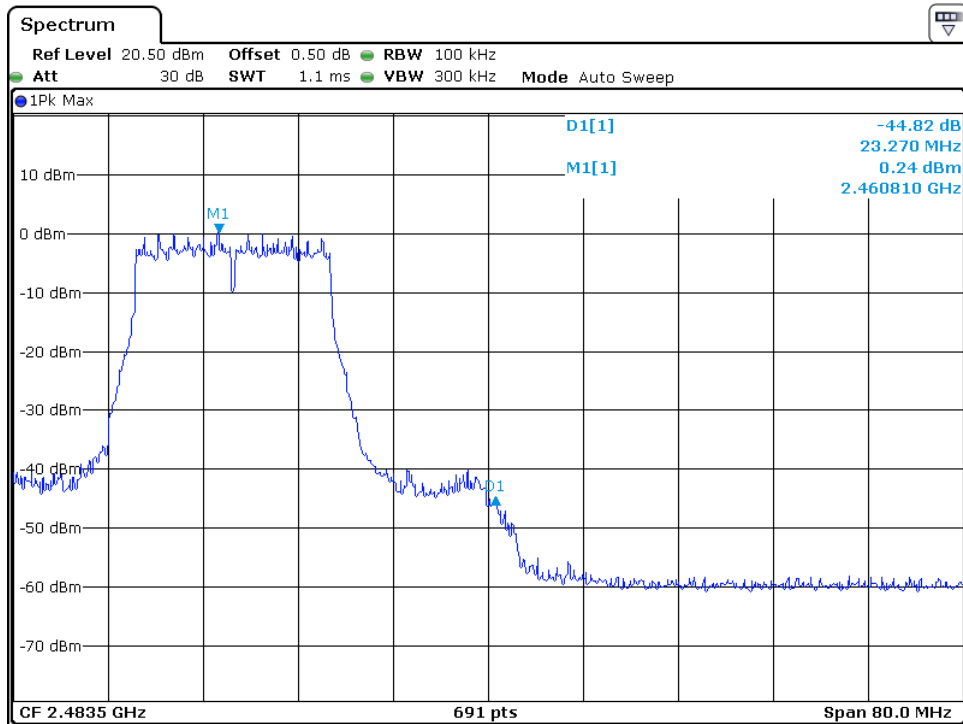


INTERTEK TESTING SERVICES

Channel 11 (2462MHz) Reference Level: 0.03dBm



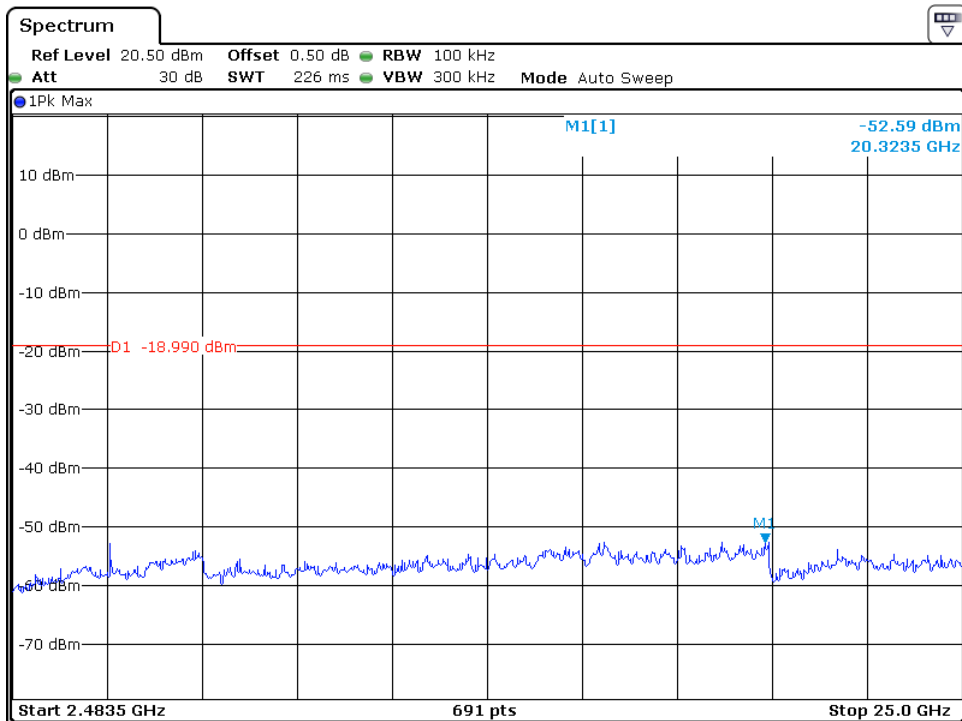
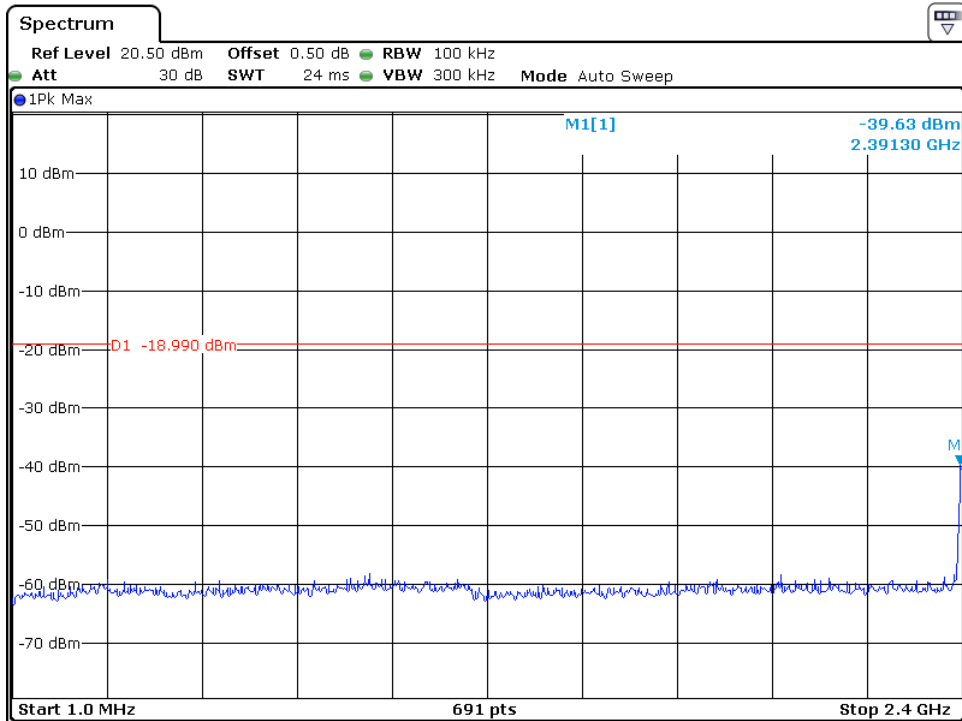
INTERTEK TESTING SERVICES



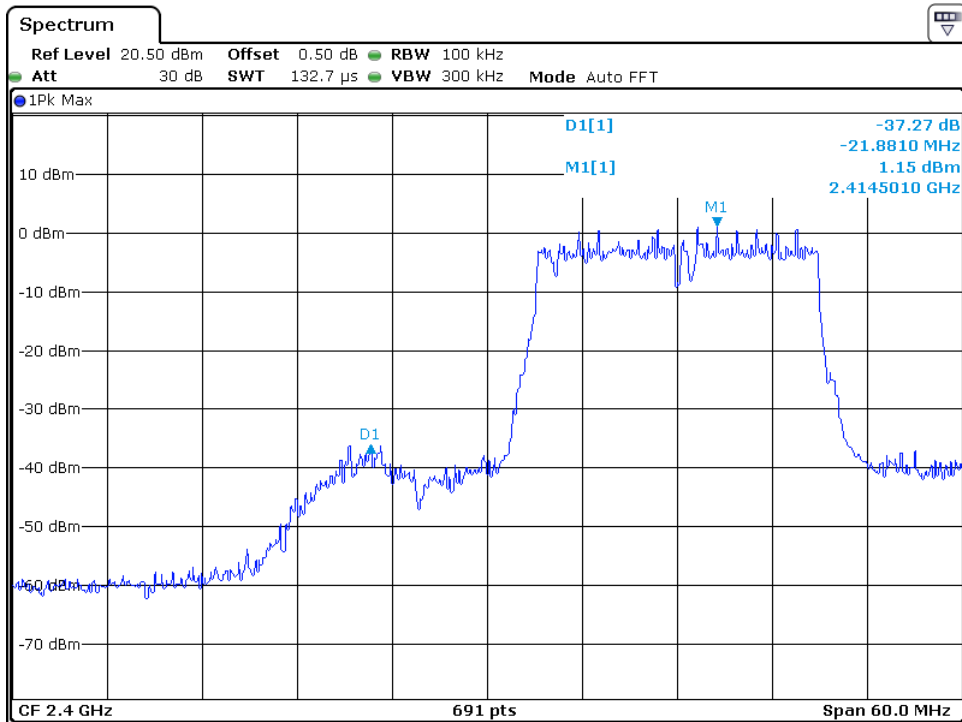
INTERTEK TESTING SERVICES

802.11n(HT20MHZ)

Channel 01 (2412MHz) Reference Level: 1.01dBm

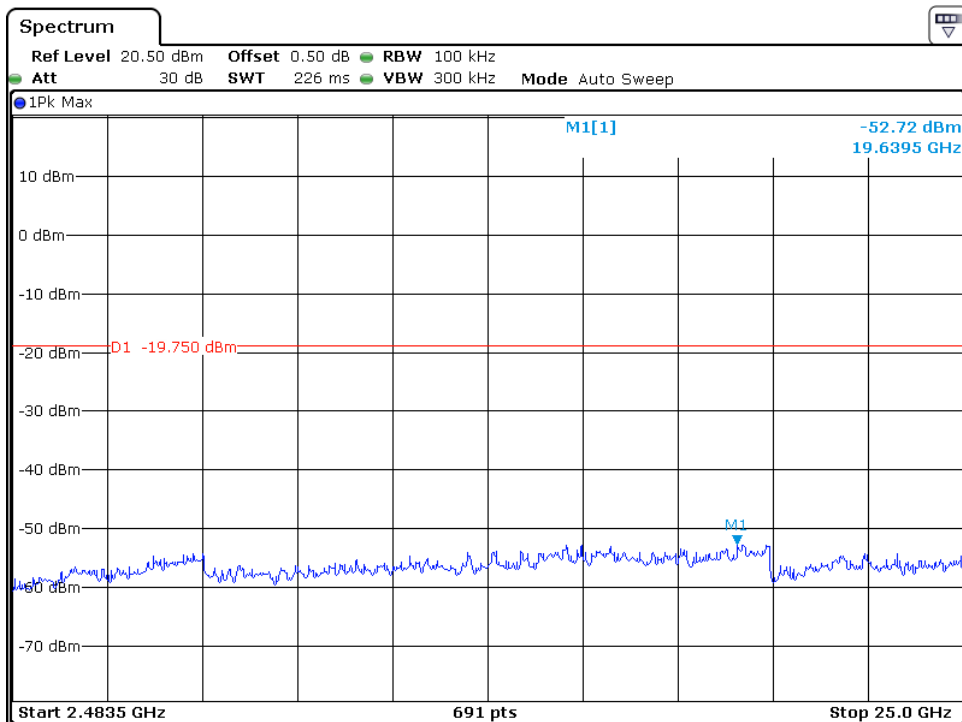
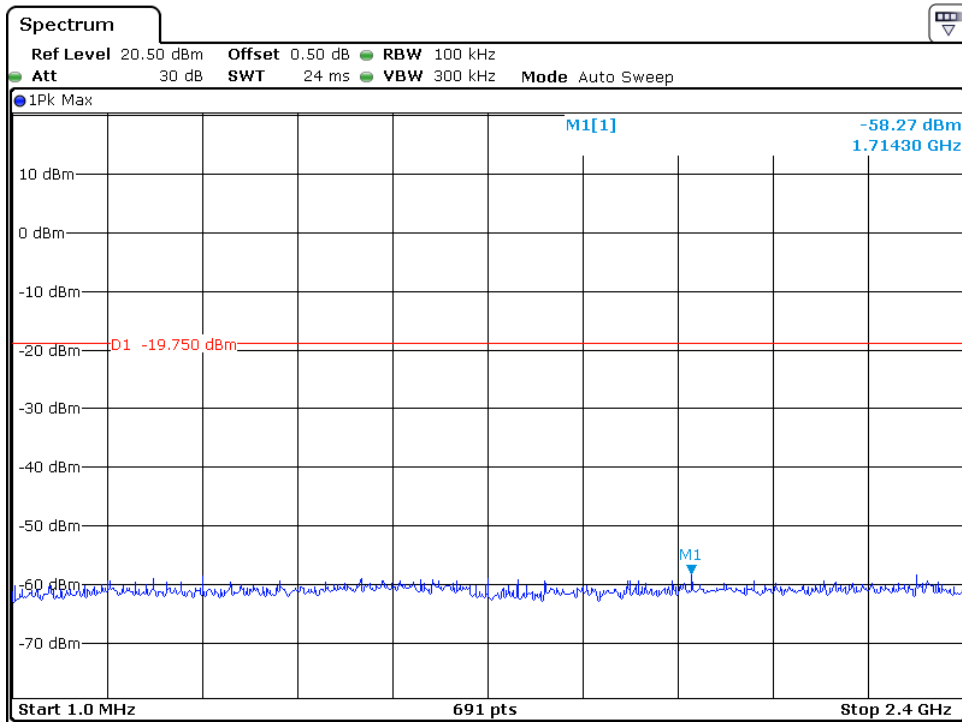


INTERTEK TESTING SERVICES



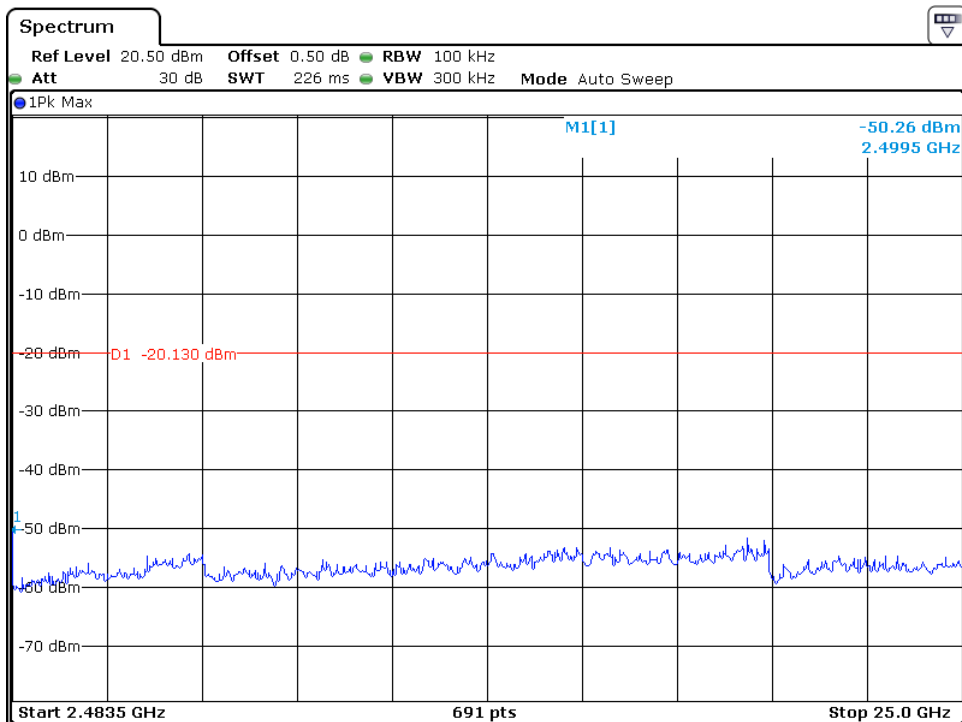
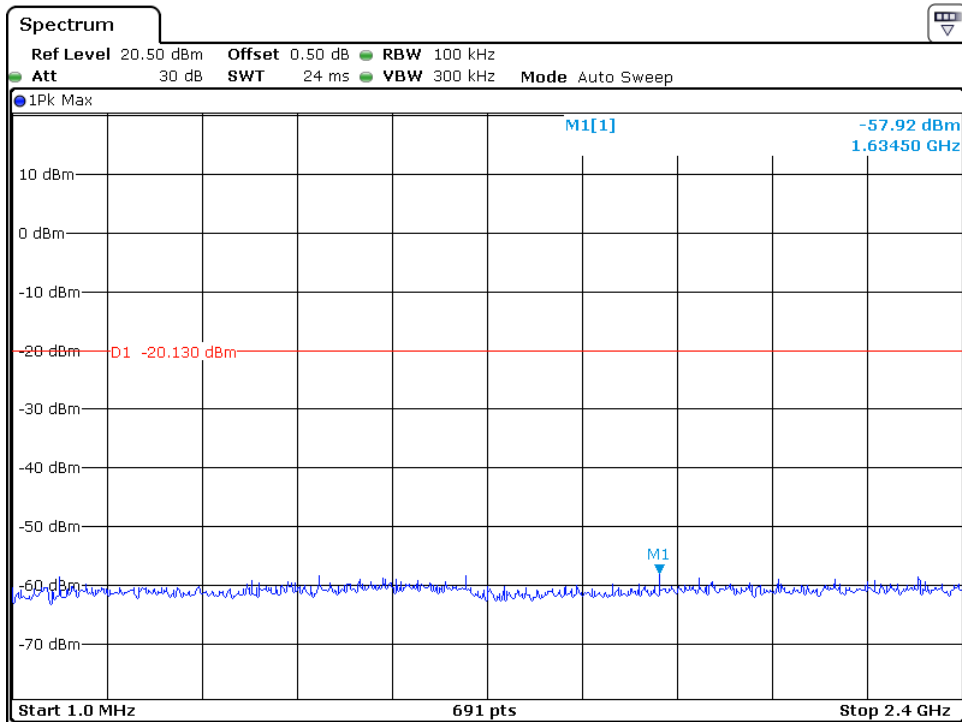
INTERTEK TESTING SERVICES

Channel 06 (2437MHz) Reference Level: 0.25dBm

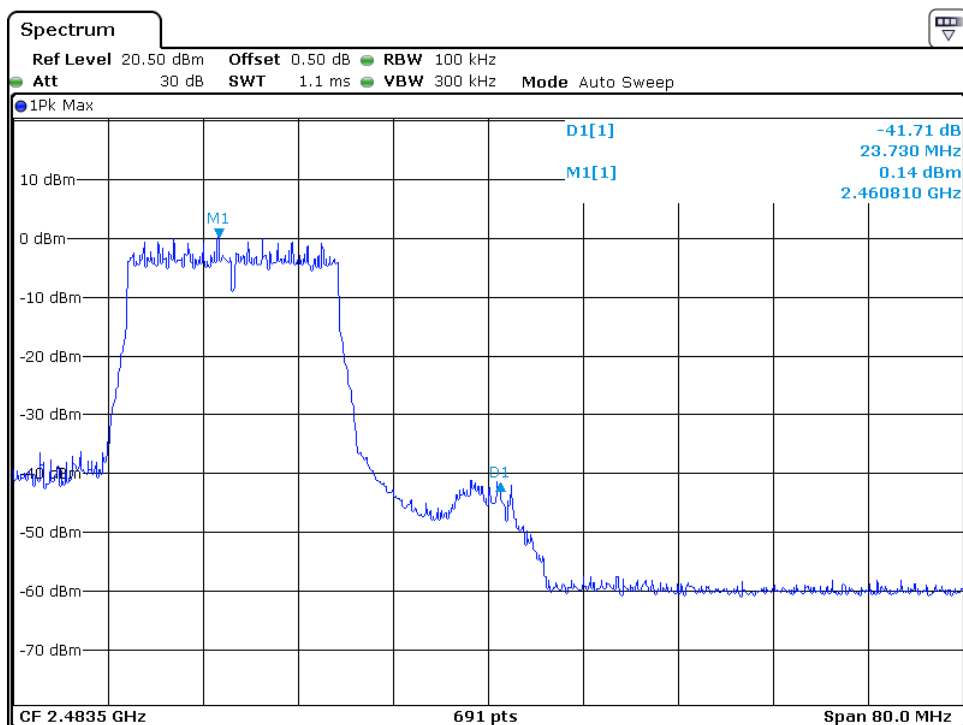


INTERTEK TESTING SERVICES

Channel 11 (2462MHz) Reference Level: -0.13dBm



INTERTEK TESTING SERVICES



INTERTEK TESTING SERVICES

Applicant: HANNUOWEI TOYS FACTORY

Date of Test: May 15, 2017

Model: H37

4.5 Out of Band Radiated Emissions (for emissions in 4.4 above that are less than 20dB below carrier), FCC Rule 15.247(d):

For out of band emissions that are close to or that exceed the 20dB attenuation requirement described in the specification, radiated measurements were performed at a 3m separation distance to determine whether these emissions complied with the general radiated emission requirement.

Not required, since all emissions are more than 20dB below fundamental

See attached data sheet

INTERTEK TESTING SERVICES

Applicant: HANNUOWEI TOYS FACTORY

Date of Test: May 15, 2017

Model: H37

4.6 Transmitter Radiated Emissions in Restricted Bands, FCC Rule 15.35(b) (c):

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included. All measurements were performed with peak detection unless otherwise specified.

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

INTERTEK TESTING SERVICES

Applicant: HANNUOWEI TOYS FACTORY

Date of Test: May 15, 2017

Model: H37

4.7 Field Strength Calculation

The field strength is calculated by adding the reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below.

$$FS = RA + AF + CF - AG + PD$$

Where

- FS = Field Strength in dB μ V/m
- RA = Receiver Amplitude (including preamplifier) in dB μ V
- CF = Cable Attenuation Factor in dB
- AF = Antenna Factor in dB
- AG = Amplifier Gain in dB
- PD = Pulse Desensitization in dB

In the radiated emission table which follows, the reading shown on the data table may reflect the preamplifier gain. An example of the calculations, where the reading does not reflect the preamplifier gain, follows:

$$FS = RA + AF + CF - AG + PD$$

Example

Assume a receiver reading of 62.0 dB μ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted. The pulse desensitization factor of the spectrum analyzer was 0 dB. The net field strength for comparison to the appropriate emission limit is 42 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

$$RA = 62.0 \text{ dB}\mu\text{V}$$

$$AF = 7.4 \text{ dB}$$

$$CF = 1.6 \text{ dB}$$

$$AG = 29.0 \text{ dB}$$

$$PD = 0 \text{ dB}$$

$$FS = 62 + 7.4 + 1.6 - 29 + 0 = 42 \text{ dB}\mu\text{V/m}$$

$$\text{Level in mV/m} = \text{Common Antilogarithm} [(42 \text{ dB}\mu\text{V/m})/20] = 125.9 \mu\text{V/m}$$

INTERTEK TESTING SERVICES

Applicant: HANNUOWEI TOYS FACTORY

Date of Test: May 15, 2017

Model: H37

4.8 Radiated Spurious Emission

Worst Case Radiated Spurious Emission (802.11b-Channel 01)

at 449.997MHz

is passed by 1.2dB margin.

For the electronic filing, the worst case radiated emission configuration photographs are saved with filename: radiated photos.pdf.

INTERTEK TESTING SERVICES

Applicant: HANNUOWEI TOYS FACTORY

Date of Test: May 15, 2017

Model: H37

Worst Case Operating Mode: Transmitting (802.11b-Channel 01)

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
Horizontal	199.980	45.1	20.0	13.3	38.4	43.5	-5.1
Horizontal	399.986	46.8	20.0	15.7	42.5	46.0	-3.5
Horizontal	449.997	45.5	20.0	19.3	44.8	46.0	-1.2
Vertical	324.900	35.3	20.0	13.5	28.8	46.0	-17.2
Vertical	299.640	34.2	20.0	15.8	30.0	46.0	-16.0
Vertical	350.100	30.6	20.0	20.3	30.9	46.0	-15.1

- NOTES:
1. Quasi-Peak detector is used for frequency below 1GHz.
 2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distances were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
 3. Negative value in the margin column shows emission below limit.

INTERTEK TESTING SERVICES

Applicant: HANNUOWEI TOYS FACTORY

Date of Test: May 15, 2017

Model: H37

Worst Case Operating Mode: Transmitting (802.11b-Channel 01)

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Peak Limit at 3m (dB μ V/m)	Margin (dB)
Vertical	*4824.000	60.6	41.3	33.5	52.8	74.0	-21.2
Vertical	*2390.00	63.5	41.4	29.1	51.2	74.0	-22.8

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Average Limit at 3m (dB μ V/m)	Margin (dB)
Vertical	*4824.000	45.6	41.3	33.5	37.8	54.0	-16.2
Vertical	*2390.000	52.7	41.4	29.1	40.4	54.0	-13.6

- NOTES: 1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz/VBW=10Hz for average value.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna used for the emission over 1000MHz.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

INTERTEK TESTING SERVICES

Applicant: HANNUOWEI TOYS FACTORY

Date of Test: May 15, 2017

Model: H37

Worst Case Operating Mode: Transmitting (802.11b-Channel 06)

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre- Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Peak Limit at 3m (dB μ V/m)	Margin (dB)
Vertical	*4874.000	60.0	41.2	33.4	52.2	74.0	-21.8
Vertical	*7311.000	61.8	40.5	35.8	57.1	74.0	-16.9

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre- Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Average Limit at 3m (dB μ V/m)	Margin (dB)
Vertical	*4874.000	45.4	41.2	33.4	37.6	54.0	-16.4
Vertical	*7311.000	46.8	40.5	35.8	42.1	54.0	-11.9

- NOTES: 1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna used for the emission over 1000MHz.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

INTERTEK TESTING SERVICES

Applicant: HANNUOWEI TOYS FACTORY

Date of Test: May 15, 2017

Model: H37

Worst Case Operating Mode: Transmitting (802.11b-Channel 11)

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Peak Limit at 3m (dB μ V/m)	Margin (dB)
Vertical	*4924.000	59.7	41.2	33.3	51.8	74.0	-22.2
Vertical	*7386.000	61.1	40.3	36.1	56.9	74.0	-17.1
Vertical	*2484.90	63.4	41.4	29.3	51.3	74.0	-22.7

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Average Limit at 3m (dB μ V/m)	Margin (dB)
Vertical	*4924.000	45.1	41.2	33.3	37.2	54.0	-16.8
Vertical	*7386.000	46.1	40.3	36.1	41.9	54.0	-12.1
Vertical	*2484.900	52.4	41.4	29.3	40.3	54.0	-13.7

- NOTES: 1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna used for the emission over 1000MHz.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

INTERTEK TESTING SERVICES

Applicant: HANNUOWEI TOYS FACTORY

Date of Test: May 15, 2017

Model: H37

Worst Case Operating Mode: Transmitting (802.11g-Channel 01)

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Peak Limit at 3m (dB μ V/m)	Margin (dB)
Vertical	*4824.000	59.5	41.3	33.5	51.7	74.0	-22.3
Vertical	*2389.350	62.7	41.4	29.1	50.4	74.0	-23.6

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Average Limit at 3m (dB μ V/m)	Margin (dB)
Vertical	*4824.000	44.8	41.3	33.5	37.0	54.0	-17.0
Vertical	*2389.350	52.8	41.4	29.1	40.5	54.0	-13.5

- NOTES: 1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna used for the emission over 1000MHz.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

INTERTEK TESTING SERVICES

Applicant: HANNUOWEI TOYS FACTORY

Date of Test: May 15, 2017

Model: H37

Worst Case Operating Mode: Transmitting (802.11g-Channel 06)

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Peak Limit at 3m (dB μ V/m)	Margin (dB)
Vertical	*4874.000	59.5	41.2	33.4	51.7	74.0	-22.3
Vertical	*7311.000	61.3	40.5	35.8	56.6	74.0	-17.4

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Average Limit at 3m (dB μ V/m)	Margin (dB)
Vertical	*4874.000	43.9	41.2	33.4	36.1	54.0	-17.9
Vertical	*7311.000	46.2	40.5	35.8	41.5	54.0	-12.5

- NOTES:
1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.
 2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
 3. Negative value in the margin column shows emission below limit.
 4. Horn antenna used for the emission over 1000MHz.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

INTERTEK TESTING SERVICES

Applicant: HANNUOWEI TOYS FACTORY

Date of Test: May 15, 2017

Model: H37

Worst Case Operating Mode: Transmitting (802.11g-Channel 11)

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Peak Limit at 3m (dB μ V/m)	Margin (dB)
Vertical	*4924.000	59.5	41.2	33.3	51.6	74.0	-22.4
Vertical	*7386.000	61.0	40.3	36.1	56.8	74.0	-17.2
Vertical	*2485.900	63.2	41.4	29.3	51.1	74.0	-22.9

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Average Limit at 3m (dB μ V/m)	Margin (dB)
Vertical	*4924.000	44.1	41.2	33.3	36.2	54.0	-17.8
Vertical	*7386.000	46.3	40.3	36.1	42.1	54.0	-11.9
Vertical	*2485.900	52.4	41.4	29.3	40.3	54.0	-13.7

- NOTES:
1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.
 2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
 3. Negative value in the margin column shows emission below limit.
 4. Horn antenna used for the emission over 1000MHz.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

INTERTEK TESTING SERVICES

Applicant: HANNUOWEI TOYS FACTORY

Date of Test: May 15, 2017

Model: H37

Worst Case Operating Mode: Transmitting (802.11n(HT20MHZ)-Channel 01)

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Peak Limit at 3m (dB μ V/m)	Margin (dB)
Vertical	*4824.000	59.2	41.3	33.5	51.4	74.0	-22.6
Vertical	*2389.190	62.6	41.4	29.1	50.3	74.0	-23.7

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Average Limit at 3m (dB μ V/m)	Margin (dB)
Vertical	*4824.000	44.3	41.3	33.5	36.5	54.0	-17.5
Vertical	*2389.190	52.9	41.4	29.1	40.6	54.0	-13.4

- NOTES:
1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.
 2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
 3. Negative value in the margin column shows emission below limit.
 4. Horn antenna used for the emission over 1000MHz.
- *
- Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

INTERTEK TESTING SERVICES

Applicant: HANNUOWEI TOYS FACTORY

Date of Test: May 15, 2017

Model: H37

Worst Case Operating Mode: Transmitting (802.11n(HT20MHZ)-Channel 06)

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Peak Limit at 3m (dB μ V/m)	Margin (dB)
Vertical	*4874.000	59.2	41.2	33.4	51.4	74.0	-22.6
Vertical	*7311.000	61.2	40.5	35.8	56.5	74.0	-17.5

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Average Limit at 3m (dB μ V/m)	Margin (dB)
Vertical	*4874.000	44.3	41.2	33.4	36.5	54.0	-17.5
Vertical	*7311.000	46.2	40.5	35.8	41.5	54.0	-12.5

- NOTES:
1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.
 2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
 3. Negative value in the margin column shows emission below limit.
 4. Horn antenna used for the emission over 1000MHz.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

INTERTEK TESTING SERVICES

Applicant: HANNUOWEI TOYS FACTORY

Date of Test: May 15, 2017

Model: H37

Worst Case Operating Mode: Transmitting (802.11n(HT20MHZ)-Channel 11)

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Peak Limit at 3m (dB μ V/m)	Margin (dB)
Vertical	*4924.000	59.3	41.2	33.3	51.4	74.0	-22.6
Vertical	*7386.000	60.9	40.3	36.1	56.7	74.0	-17.3
Vertical	*2485.500	62.4	41.4	29.3	50.3	74.0	-23.7

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Average Limit at 3m (dB μ V/m)	Margin (dB)
Vertical	*4924.000	44.5	41.2	33.3	36.6	54.0	-17.4
Vertical	*7386.000	45.9	40.3	36.1	41.7	54.0	-12.3
Vertical	*2485.500	52.8	41.4	29.3	40.7	54.0	-13.3

- NOTES:
1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.
 2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
 3. Negative value in the margin column shows emission below limit.
 4. Horn antenna used for the emission over 1000MHz.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

INTERTEK TESTING SERVICES

Applicant: HANNUOWEI TOYS FACTORY

Date of Test: May 15, 2017

Model: H37

4.9 Radiated Emissions from Digital Section of Transceiver, FCC Ref: 15.109

Not required - No digital part

Test results are attached

Included in the separated report.

INTERTEK TESTING SERVICES

Applicant: HANNUOWEI TOYS FACTORY

Date of Test: May 15, 2017

Model: H37

4.10 Transmitter Duty Cycle Calculation and Measurements, FCC Rule 15.35(b), (c)

The EUT antenna output port was connected to the input of the spectrum analyzer. The analyzer center frequency was set to EUT RF channel carrier. The SWEP function on the analyzer was set to ZERO SPAN. The Transmitter ON time was determined from the resultant time-amplitude display:

	See attached spectrum analyzer chart (s) for Transmitter timing
	See Transmitter timing diagram provided by manufacturer
x	Not applicable, duty cycle was not used.

INTERTEK TESTING SERVICES

EXHIBIT 5

EQUIPMENT PHOTOGRAPHS

INTERTEK TESTING SERVICES

5.0 Equipment Photographs

For electronic filing, the photographs are saved with filename: external photos.pdf & internal photos.pdf.

EXHIBIT 6
PRODUCT LABELLING

INTERTEK TESTING SERVICES

6.0 Product Labeling

For electronic filing, the FCC ID label artwork and location is saved with filename: label.pdf.

EXHIBIT 7
TECHNICAL SPECIFICATIONS

INTERTEK TESTING SERVICES

7.0 Technical Specifications

For electronic filing, the block diagram and circuit diagram are saved with filename: block.pdf and circuit.pdf respectively.

EXHIBIT 8
INSTRUCTION MANUAL

INTERTEK TESTING SERVICES

8.0 Instruction Manual

For electronic filing, a preliminary copy of the Instruction Manual is saved with filename: manual.pdf.

This manual will be provided to the end-user with each unit sold/leased in the United States.

INTERTEK TESTING SERVICES

EXHIBIT 9
CONFIDENTIALITY REQUEST

INTERTEK TESTING SERVICES

9.0 Confidentiality Request

For electronic filing, the confidentiality request of the tested EUT is saved with filename: request.pdf.

INTERTEK TESTING SERVICES

EXHIBIT 10

MISCELLANEOUS INFORMATION

10.0 Discussion of Pulse Desensitization

The determination of pulse desensitivity was made in accordance with Hewlett Packard Application Note 150-2, *Spectrum Analysis ... Pulsed RF*.

Pulse desensitivity is not applicable for this device since the transmitter transmits the RF signal continuously.

INTERTEK TESTING SERVICES

EXHIBIT 11

TEST EQUIPMENT LIST

INTERTEK TESTING SERVICES

11.0 Test Equipment List

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date	Calibration
				(MM-DD-YYYY)	Interval
EM030-04	3m Semi-Anechoic Chamber	9×6×6 m ³	ETS•LINDGREN	5/1/2018	1Y
EM031-02	EMI Test Receiver (9 kHz~7 GHz)	R&S ESR7	R&S	3/27/2018	1Y
EM031-03	Signal and Spectrum Analyzer (10 Hz~40 GHz)	R&S FSV40	R&S	5/8/2018	1Y
EM011-04	Loop antenna (9 kHz-30 MHz)	HFH2-Z2	R&S	5/3/2018	1Y
EM061-03	TRILOG Super Broadband test Antenna (30 MHz-1.5 GHz) (TX)	VULB 9161	SCHWARZBECK	5/3/2018	1Y
EM033-01	TRILOG Super Broadband test Antenna(30 MHz-3 GHz) (RX)	VULB 9163	SCHWARZBECK	9/8/2017	1Y
EM033-02	Bouble-Ridged Waveguide Horn Antenna (800 MHz-18 GHz)(RX)	R&S HF907	R&S	5/3/2018	1Y
EM033-03	High Frequency Antenna & preamplifier(18 GHz~26.5 GHz) (RX)	R&S SCU-26	R&S	5/4/2018	1Y
EM033-04	High Frequency Antenna & preamplifier (26 GHz-40 GHz)	R&S SCU-40	R&S	5/4/2018	1Y
EM031-02-01	Coaxial cable(9 kHz-1 GHz)	N/A	R&S	5/8/2018	1Y
EM033-02-02	Coaxial cable(1 GHz-18 GHz)	N/A	R&S	5/8/2018	1Y
EM033-04-02	Coaxial cable(18 GHz~40 GHz)	N/A	R&S	5/5/2018	1Y
EM022-03	2.45 GHz Filter	BRM50702	Micro-Tronics	5/9/2018	1Y
EM086-11	Power Meter	NRP2	R&S	1/5/2018	1Y
EM086-11-01	Power Sensor	NRP-Z91	R&S	1/5/2018	1Y