

**Sky Light Imaging Limited**

Application  
For  
Certification

**FCC ID: 2ABT4TSN48W**

**Motorized Auto-feeding Portable Scanner**

**Model: TSN48W**

**WiFi Transceiver**

Report No.: 131224017SZN-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 [10-1-13]

Prepared and Checked by:

Approved by:

Sign on file

Sunny Zhou  
Engineer

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Billy Li  
Supervisor  
Date: March 4, 2014

- 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.
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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\_b

**Intertek Testing Services Shenzhen Ltd. Kejiyuan Branch**

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# INTERTEK TESTING SERVICES

## MEASUREMENT/TECHNICAL REPORT

**Sky Light Imaging Limited**  
**MODEL: TSN48W**

**FCC ID: 2ABT4TSN48W**

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

Equipment Type: DTS - Part 15 Digital Transmission Systems (WiFi 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 [10-01-13] Edition] provision.

Report prepared by:

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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
Test Setup Photo	Conducted Emission	conducted 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
Cover Letter	Certification Agreement	agreement.pdf

# **INTERTEK TESTING SERVICES**

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## **EXHIBIT 1**

### **SUMMARY OF TEST RESULTS**

## INTERTEK TESTING SERVICES

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### 1.0 Summary of Test results

**Sky Light Imaging Limited**

**MODEL: TSN48W**

**FCC ID: 2ABT4TSN48W**

TEST	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
AC Conducted Emission	15.207	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.

**EXHIBIT 2**

**GENERAL DESCRIPTION**



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### 2.0 **General Description**

#### 2.1 Product Description

The Equipment Under Test (EUT) is a Motorized Auto-feeding Portable Scanner with WiFi function operating at 2412-2462MHz for 802.11b/g/n-HT20, 11 channels with 5MHz channel spacing and 2422-2452MHz for 802.11n-HT40, 9 channels with 5MHz channel spacing. The EUT can be powered by 3.7Vdc rechargeable battery and charged by USB port through 120V/60Hz. For more detailed features description, please refer to the user's manual.

Type of Modulation: BPSK, QPSK, 16QAM, 64QAM, CCK, DQPSK, DBPSK.  
Antenna Type: Integral Antenna.

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

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### 2.2 Related Submittal(s) Grants

This is an application for certification of:

DTS- Part 15 Digital Transmission Systems (WiFi transmitter portion)

Remaining portions are subject to the following procedures:

1. Receiver portion of WiFi: exempt from technical requirement of this Part.
2. Other Digital Function: Refer to DOC report 14010606HKG-001

### 2.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.4 (2009) and KDB 558074. Radiated emission measurement was performed in semi-anechoic chamber and conducted emission measurement was performed in shield room. 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 and shield room used to collect the radiated data and conducted data are **Intertek Testing Services Shenzhen Ltd. Kejiyuan Branch** and located at 6F, Block D, Huahan Building, Langshan Road, Nanshan District, Shenzhen, P. R. China. This test facility and site measurement data have been fully placed on file with the FCC (Registration Number: 242492).

**EXHIBIT 3**  
**SYSTEM TEST CONFIGURATION**

## INTERTEK TESTING SERVICES

### 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 3.7Vdc fully charged rechargeable battery and charged by Adapter (The Adapter was powered by AC 120V/60Hz) during the testing. Only the worst case data was reported.

The signal is maximized through rotation and placement in the three orthogonal axes. 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.

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.

#### Power Parameters of IEEE 802.11b/g/n

Test software setting of IEEE 802.11b/g/n			
Channel No.	Output Power	Data rate	Modulation type
1,6,11	6.0	802.11b: 1-11Mbps	802.11b: CCK, DQPSK, DBPSK
	6.0	802.11g: 6-54Mbps	802.11g: BPSK, QPSK, 16QAM
	6.0	802.11n-HT20: 6.5-65Mbps	802.11n: BPSK, QPSK, 16QAM,
3,6,9	6.0	802.11n-HT40: 13.5-135Mbps	802.11n: BPSK, QPSK, 16QAM, 64QAM

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## INTERTEK TESTING SERVICES

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### 3.3 Special Accessories

One shielded USB cable is used.

### 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 Sky Light Imaging Limited will be incorporated in each production model sold / leased in the United States.

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

### 3.6 Support Equipment List and Description

This product was tested in the following configuration:

Refer List:

Description	Manufacturer	Model No.
USB Cable	Smart.drive	Unshielded, Length 150cm
Mini SD Card	SanDisk	4G
Adapter	Roofer	SP-02C0551000-G

## **INTERTEK TESTING SERVICES**

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### **EXHIBIT 4**

### **MEASUREMENT RESULTS**

## INTERTEK TESTING SERVICES

Applicant: Sky Light Imaging Limited

Date of Test: January 12, 2014

Model: TSN48W

### 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 spectrum analyzer. Power was read directly and cable loss correction was added to the reading to obtain power at the EUT antenna terminals.
- ☒ The antenna port of the EUT was connected to the input of a spectrum analyzer. The analyzer was set according to the FCC KDB 558074 spectrum analyzer's integrated band power measurement function with band limits set equal to the EBW band edges and power was read directly in dBm. External attenuation and cable loss were compensated from the measured value.

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

IEEE 802.11b (Antenna Gain = 2dBi) (CCK, 1Mbps)		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2412	8.24	6.67
Middle Channel: 2437	7.39	5.48
High Channel: 2462	7.72	5.92

IEEE 802.11g (Antenna Gain = 2dBi) (16QAM, 6Mbps)		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2412	5.01	3.17
Middle Channel: 2437	5.62	3.65
High Channel: 2462	6.38	4.35

IEEE 802.11n-HT20 (Antenna Gain = 2dBi) (16QAM, 6.5Mbps)		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2412	5.88	3.87
Middle Channel: 2437	6.73	4.71

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High Channel: 2462	7.47	5.58
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IEEE 802.11n-HT40 (Antenna Gain = 2.0dBi) (64QAM, 13.5Mbps)		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2422	7.08	5.11
Middle Channel: 2437	7.31	5.38
High Channel: 2452	7.79	6.01

Cable loss: 0.5 dB    External Attenuation: 0 dB

Cable loss, external attenuation has been included in OFFSET function

EUT max. output level = 8.24dBm

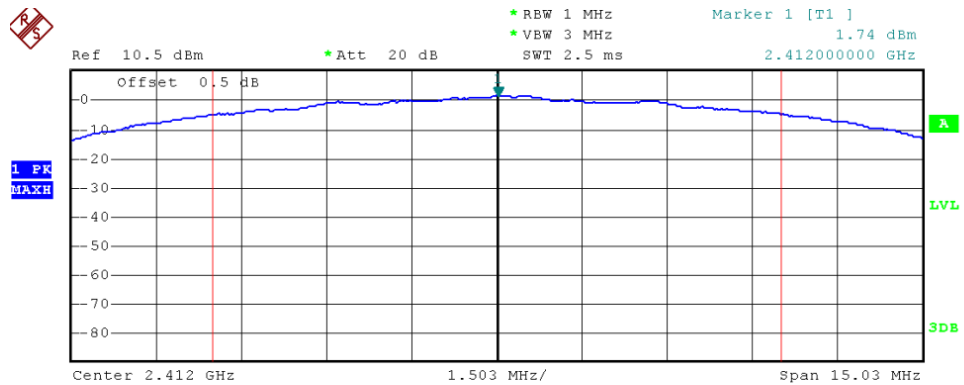
For RF Exposure, the information is saved with filename: RF exposure.pdf.

The test plots are attached as below.

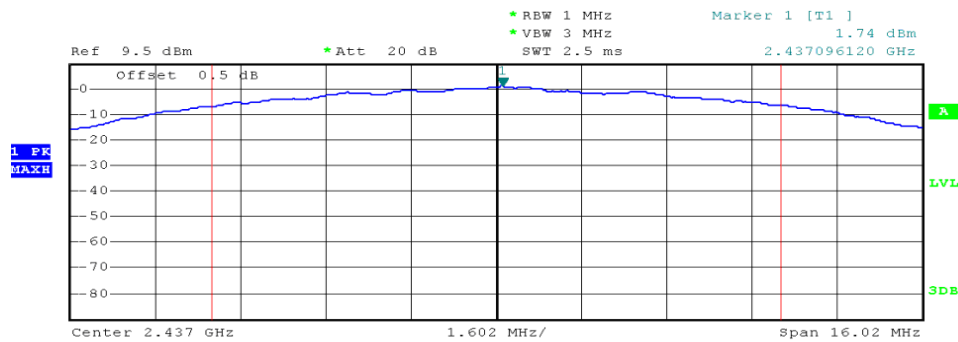


# INTERTEK TESTING SERVICES

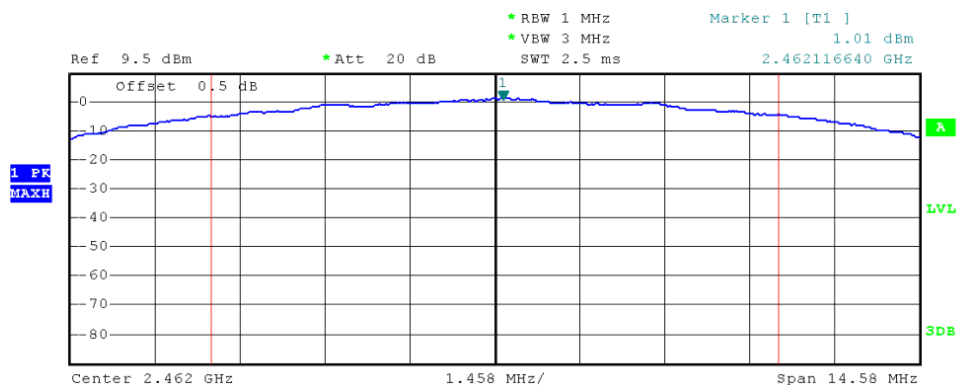
802.11b



**Tx Channel**  
Bandwidth 10.02 MHz Power 8.24 dBm



**Tx Channel**  
Bandwidth 10.68 MHz Power 7.39 dBm

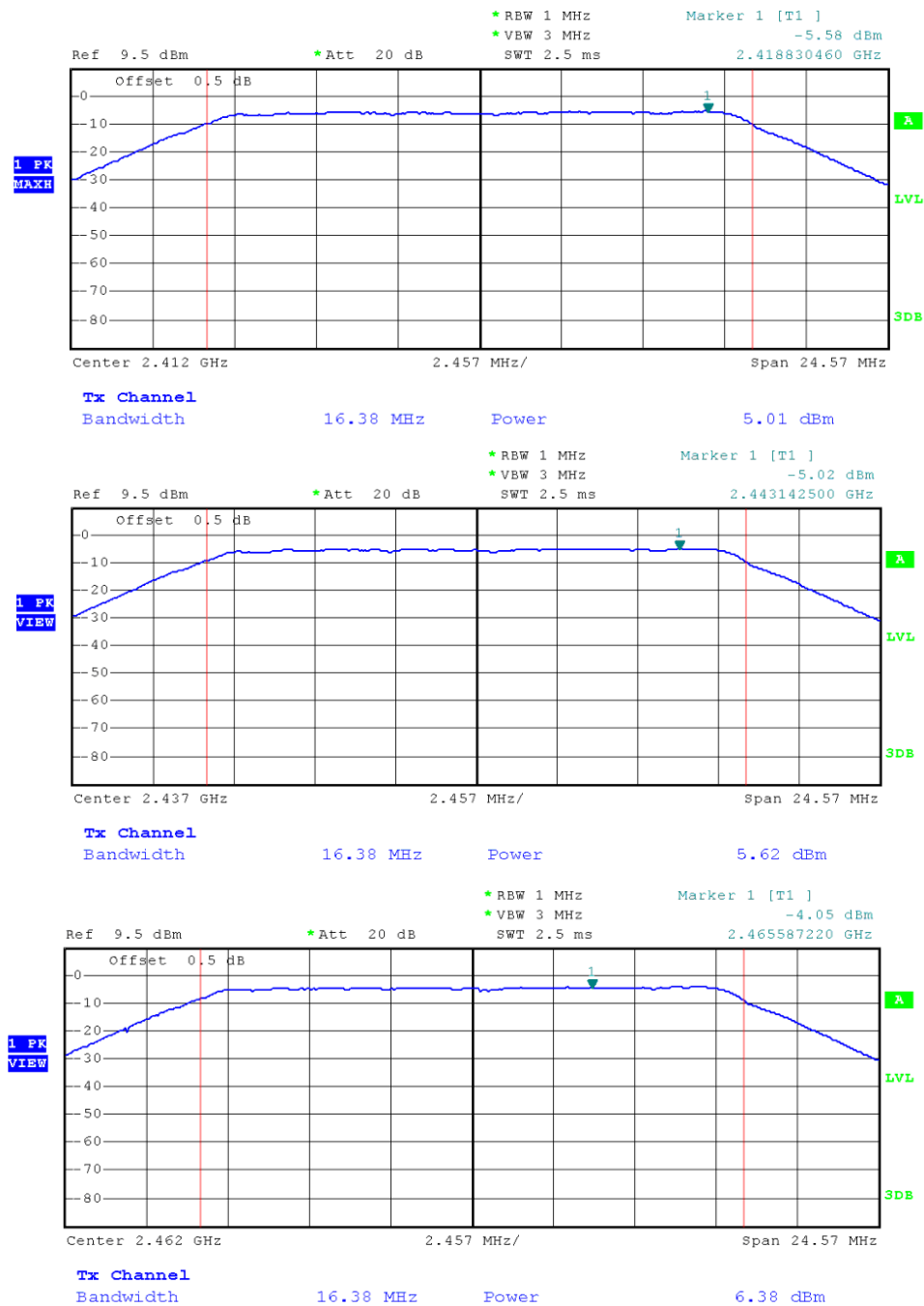


**Tx Channel**  
Bandwidth 9.72 MHz Power 7.72 dBm

TRF no.: FCC 15C\_TX\_b  
FCC ID: 2ABT4TSN48W  
Report No.: 131224017SZN-001

# INTERTEK TESTING SERVICES

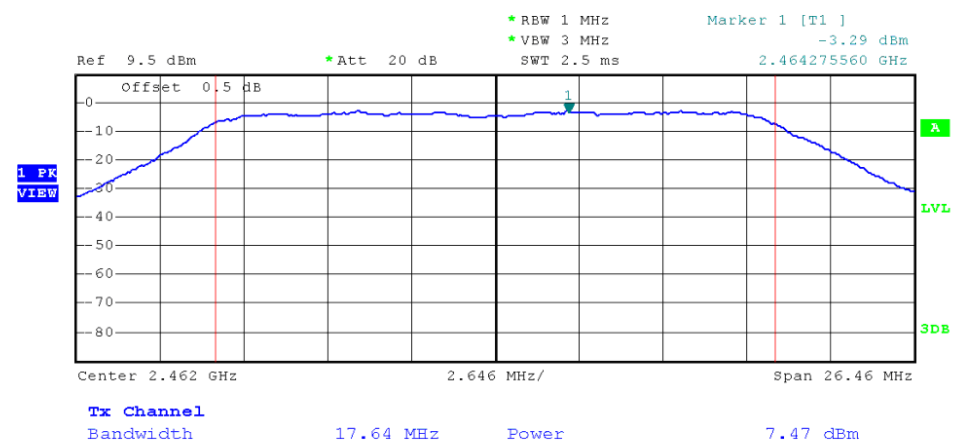
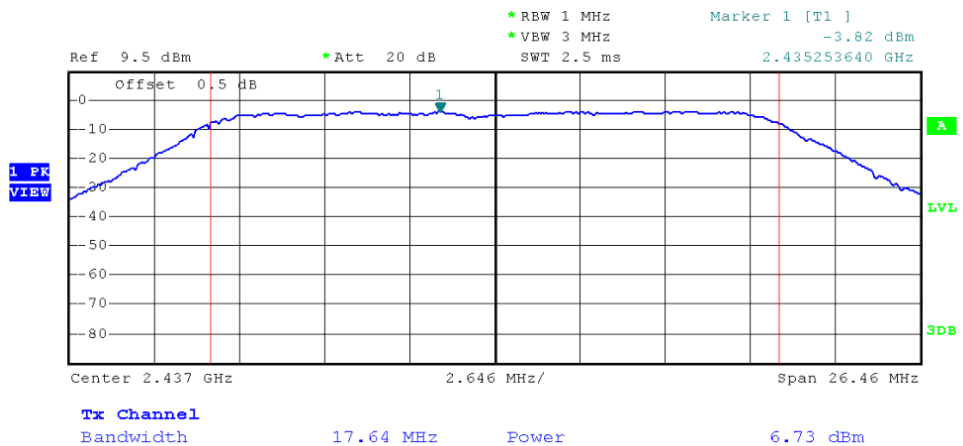
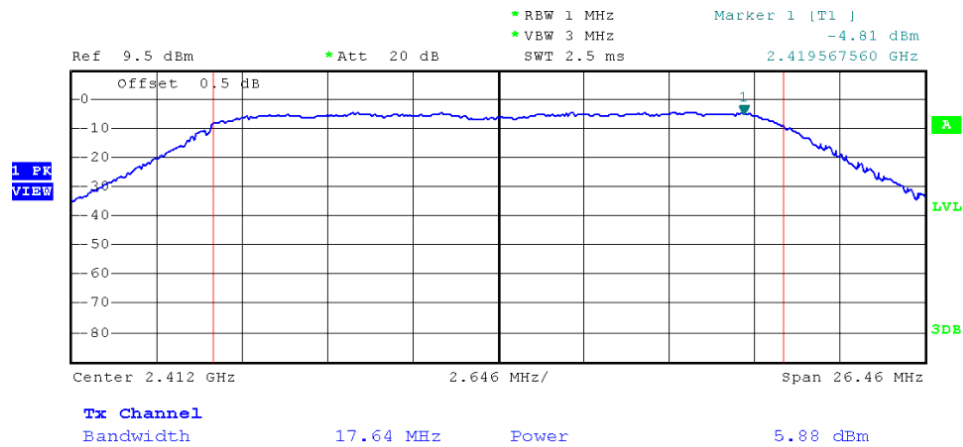
802.11g



TRF no.: FCC 15C\_TX\_b  
FCC ID: 2ABT4TSN48W  
Report No.: 131224017SZN-001

# INTERTEK TESTING SERVICES

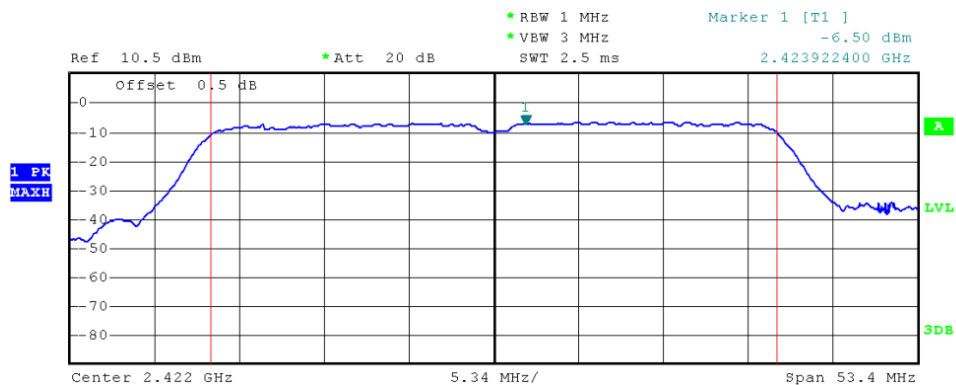
802.11 n-HT20



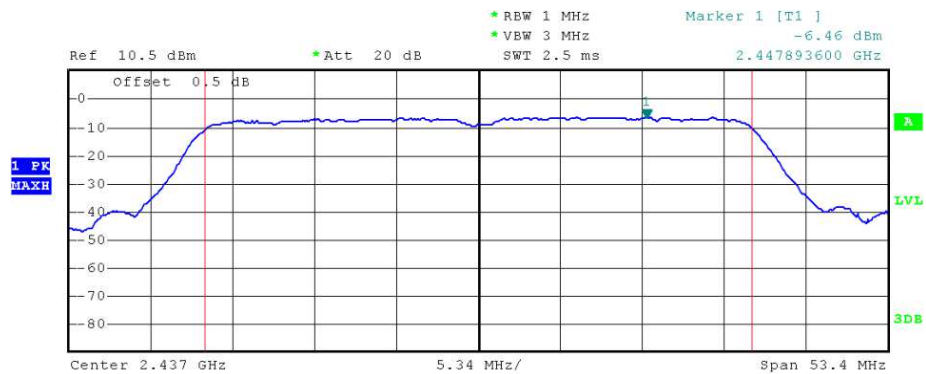
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Report No.: 131224017SZN-001

# INTERTEK TESTING SERVICES

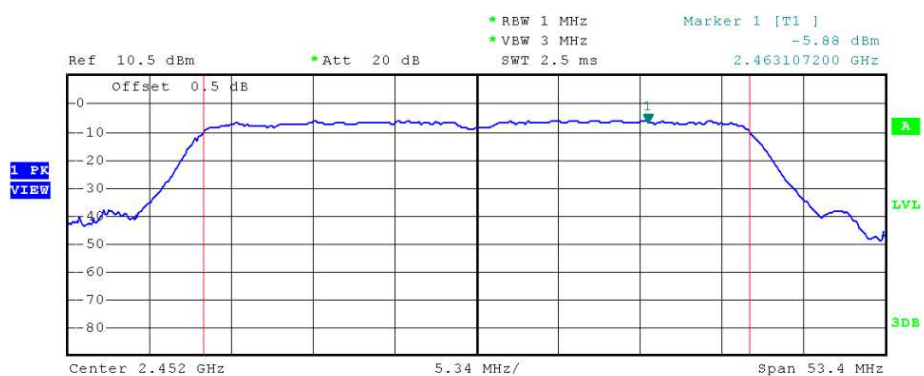
802.11 n-HT40



**Tx Channel**  
Bandwidth 35.6 MHz Power 7.08 dBm



**Tx Channel**  
Bandwidth 35.6 MHz Power 7.31 dBm



**Tx Channel**  
Bandwidth 35.6 MHz Power 7.79 dBm

TRF no.: FCC 15C\_TX\_b  
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## INTERTEK TESTING SERVICES

Applicant: Sky Light Imaging Limited

Date of Test: January 12, 2014

Model: TSN48W

### 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. 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	10.02
2437	10.68
2462	9.72

IEEE 802.11g (16QAM, 6Mbps)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2412	16.38
2437	16.38
2462	16.38

IEEE 802.11n-HT20 (16QAM, 6.5Mbps)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2412	17.64
2437	17.64
2462	17.64

TRF no.: FCC 15C\_TX\_b

FCC ID: 2ABT4TSN48W

Report No.: 131224017SZN-001

## INTERTEK TESTING SERVICES

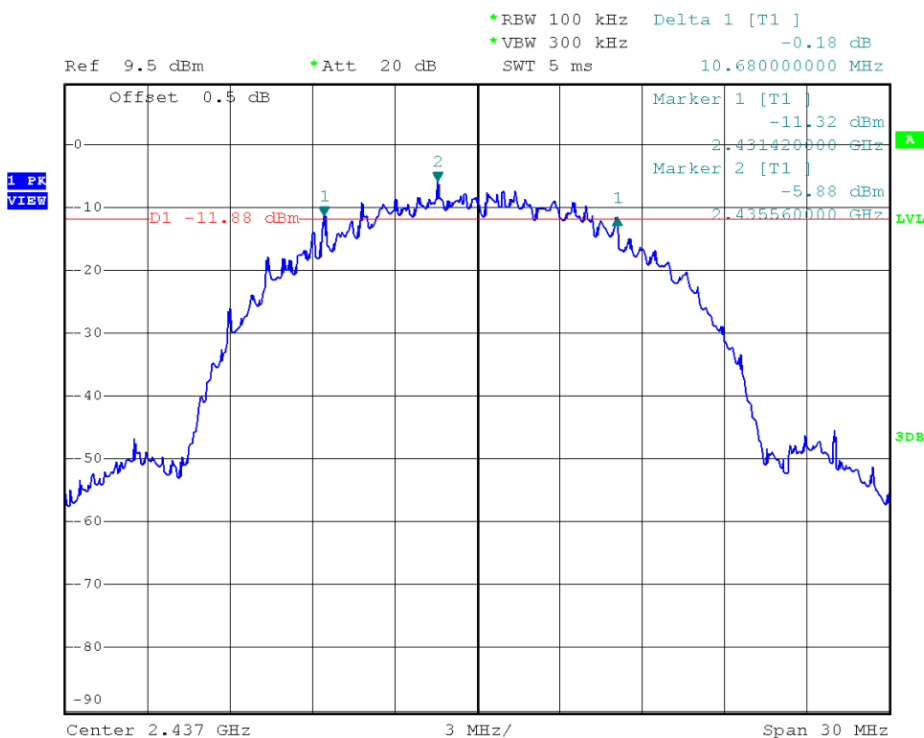
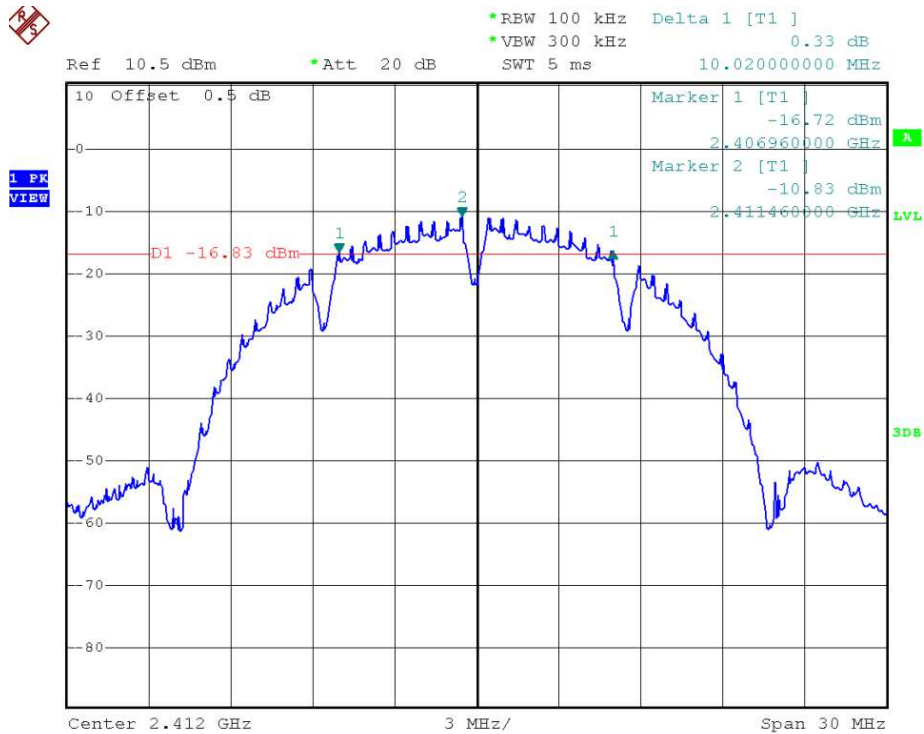
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IEEE 802.11n-HT40 (64QAM, 13.5Mbps)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2422	35.60
2437	35.60
2452	35.60

The test plots are attached as below.

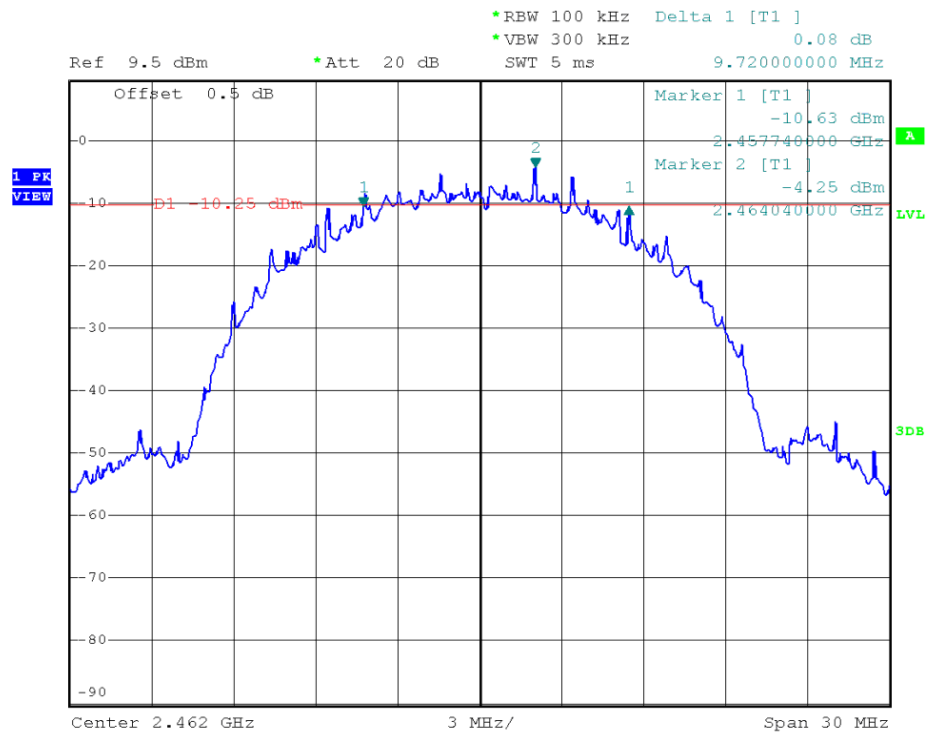
# INTERTEK TESTING SERVICES

802.11b



TRF no.: FCC 15C\_TX\_b  
FCC ID: 2ABT4TSN48W  
Report No.: 131224017SZN-001

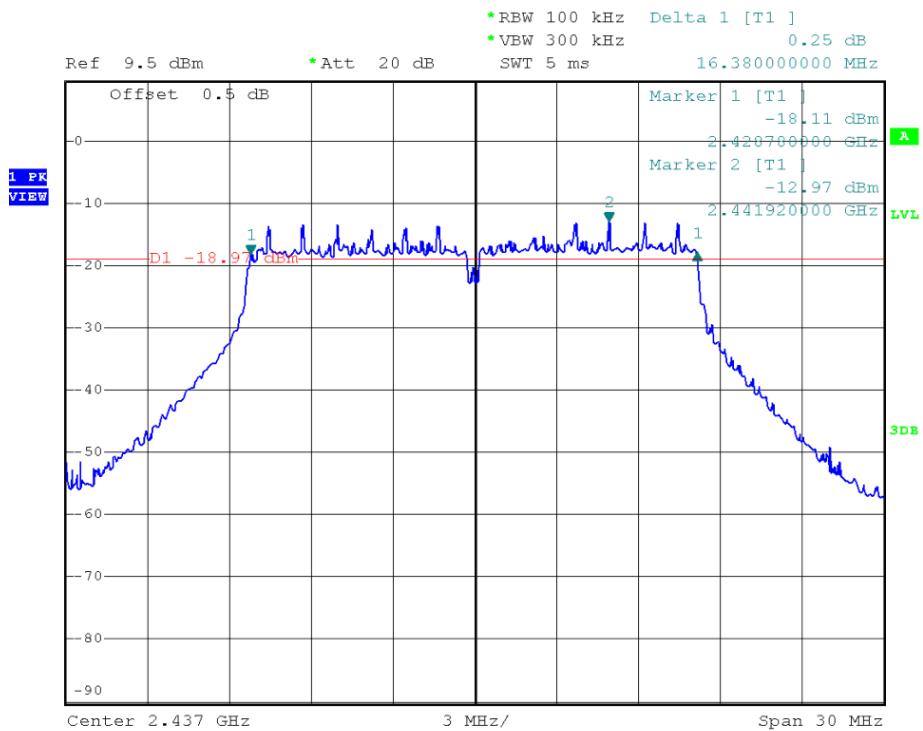
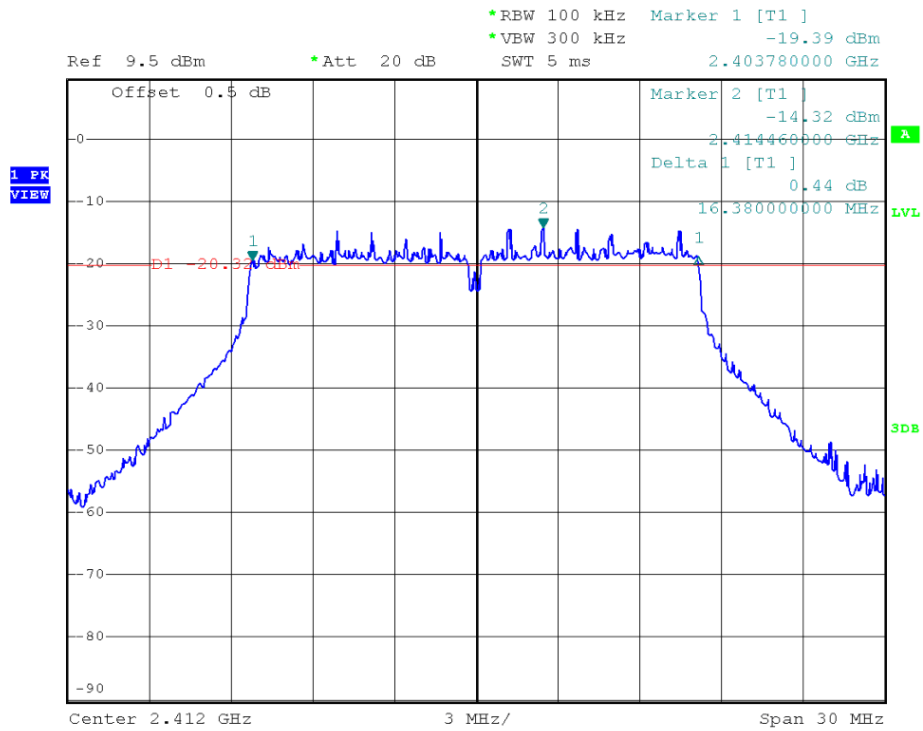
# INTERTEK TESTING SERVICES





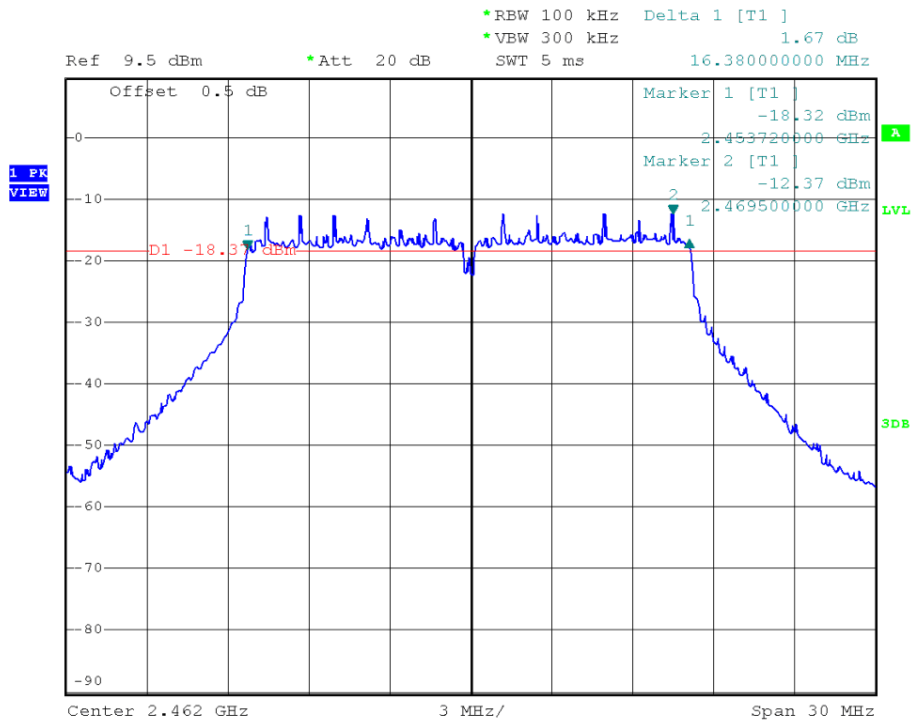
# INTERTEK TESTING SERVICES

802.11g



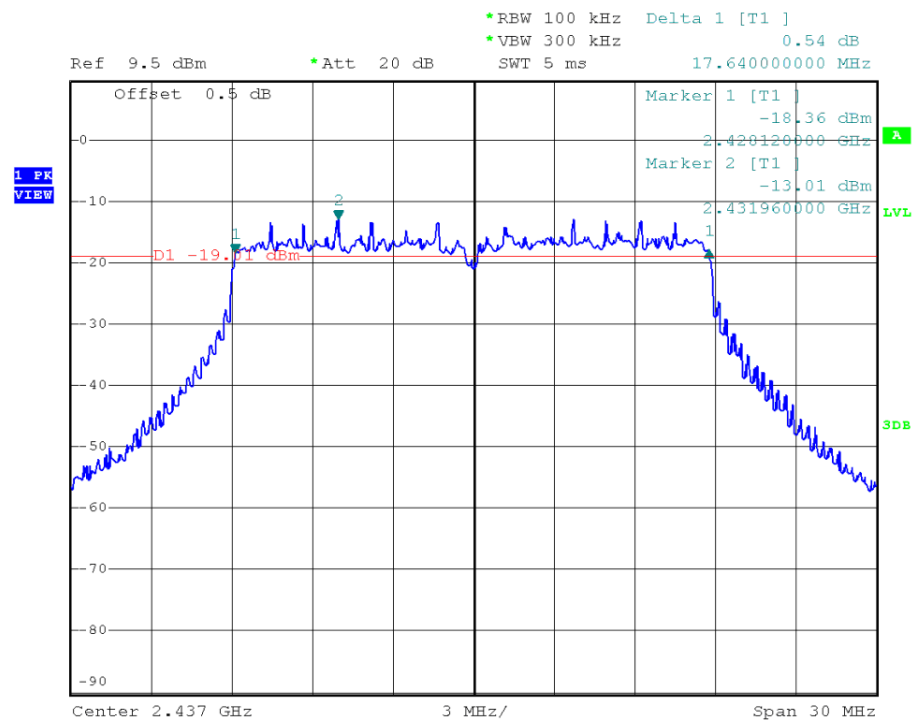
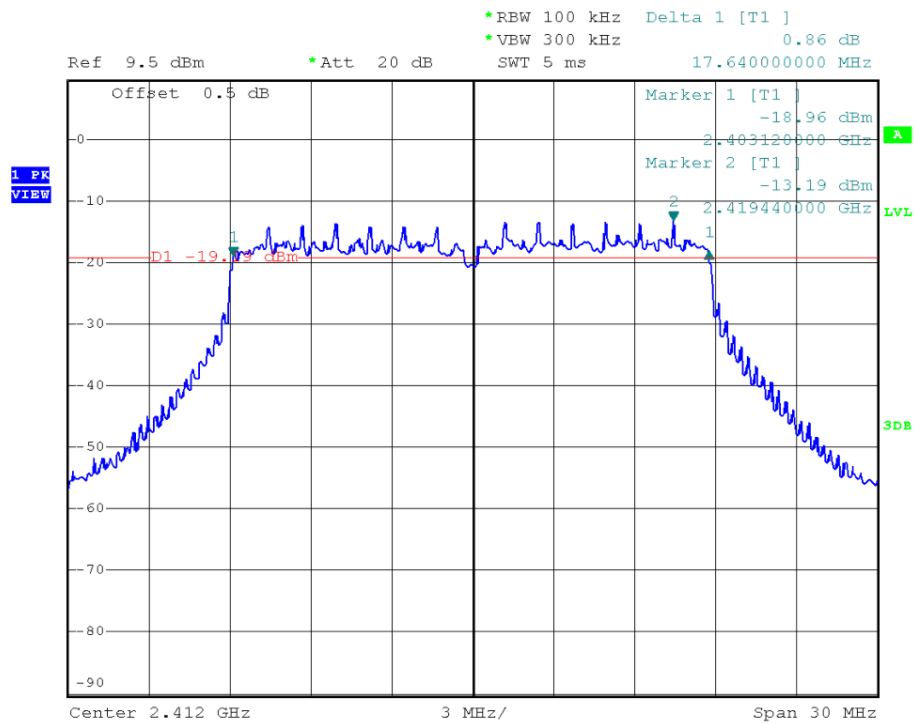
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FCC ID: 2ABT4TSN48W  
Report No.: 131224017SZN-001

# INTERTEK TESTING SERVICES



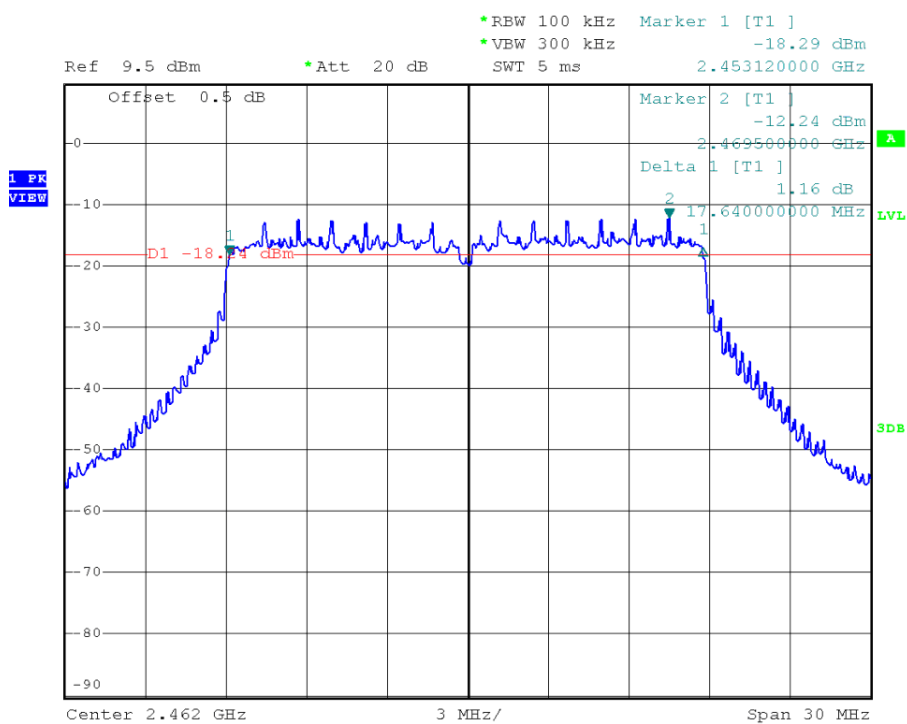
# INTERTEK TESTING SERVICES

802.11 n-HT20



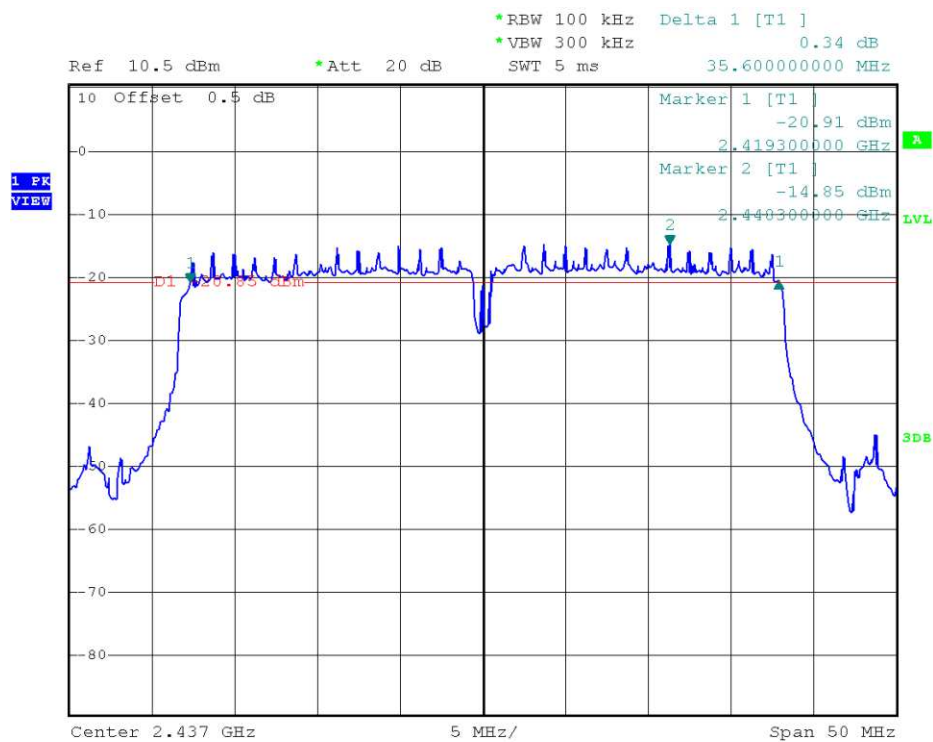
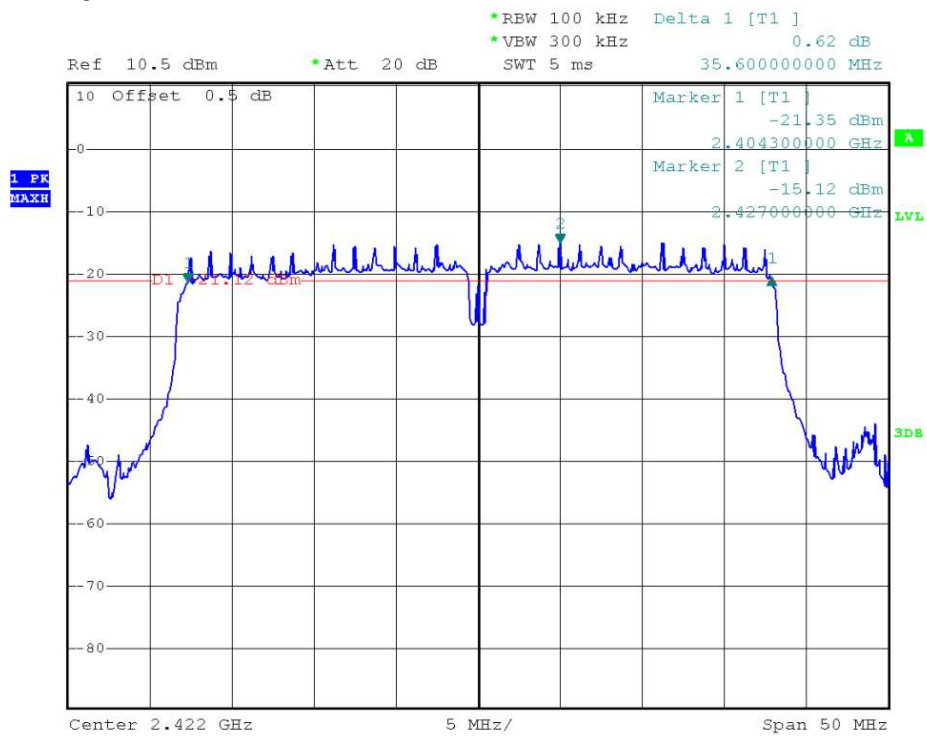
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Report No.: 131224017SZN-001

# INTERTEK TESTING SERVICES



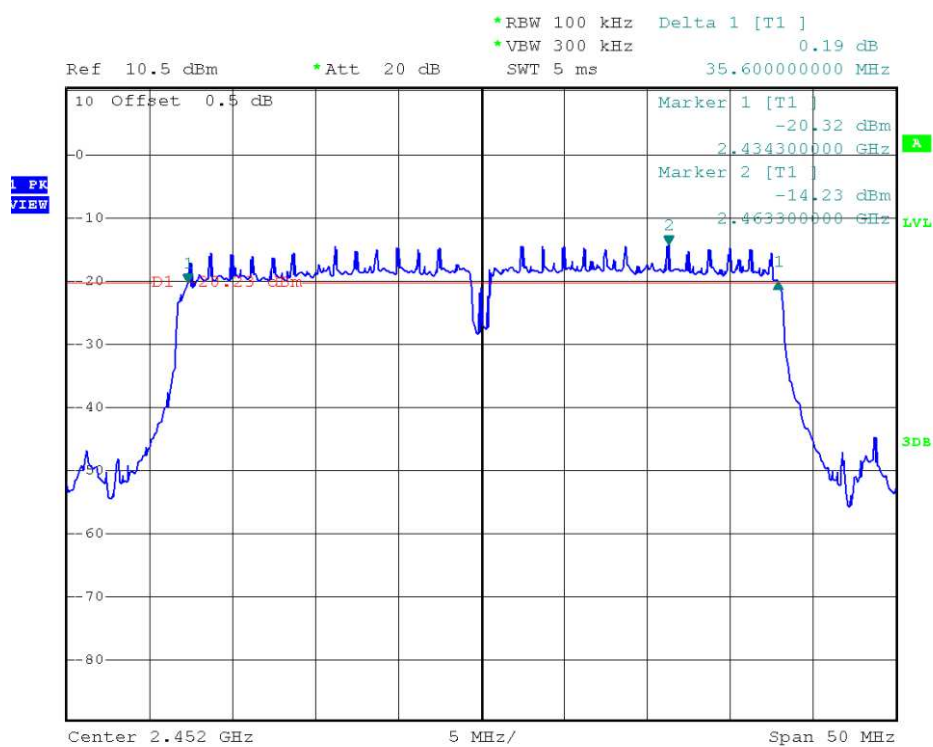
# INTERTEK TESTING SERVICES

802.11 n-HT40



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## INTERTEK TESTING SERVICES

Applicant: Sky Light Imaging Limited  
Model: TSN48W

Date of Test: January 12, 2014

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

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

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	-10.66
2437	-4.66
2462	-4.46

IEEE 802.11g (16QAM, 6Mbps)	
Frequency (MHz)	Power Density with RBW 100KHz
2412	-14.12
2437	-13.36
2462	-12.28

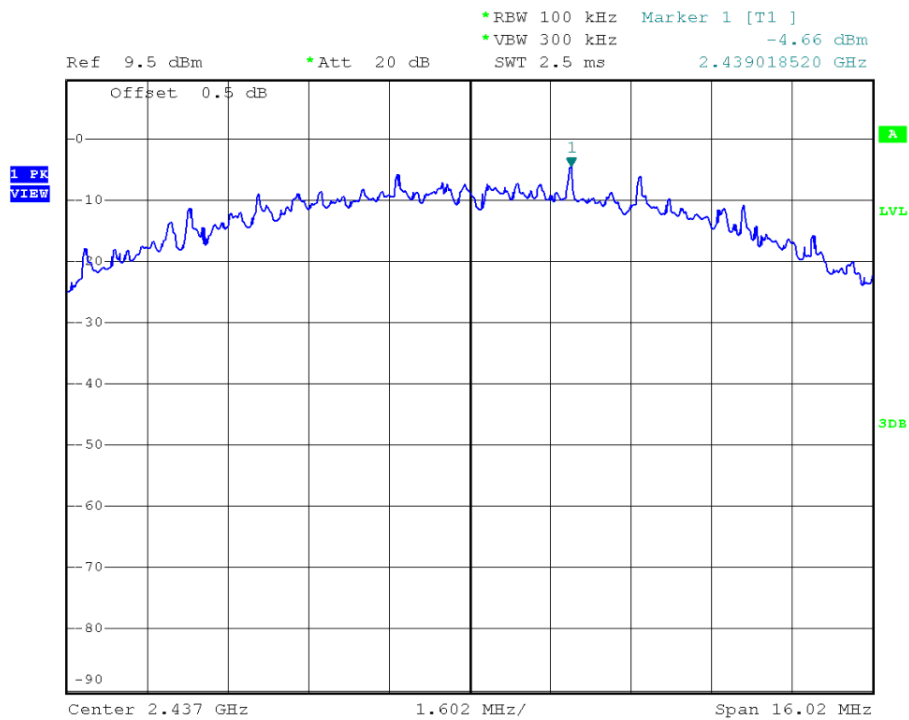
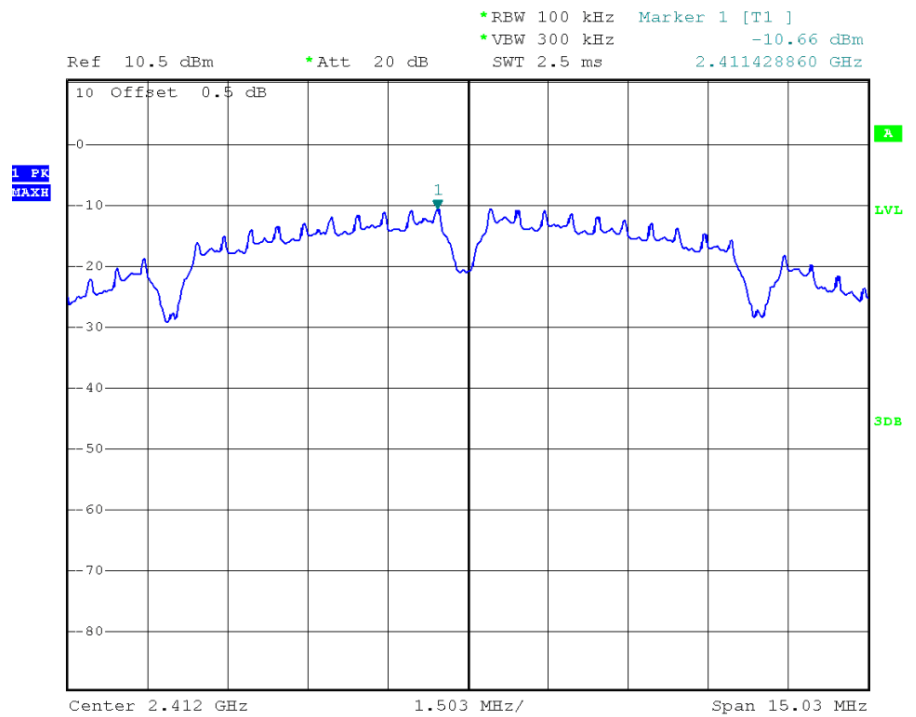
IEEE 802.11n-HT20 (16QAM, 6.5Mbps)	
Frequency (MHz)	Power Density with RBW 100KHz
2412	-13.20
2437	-12.99
2462	-12.22

IEEE 802.11n-HT40 (64QAM, 13.5Mbps)	
Frequency (MHz)	Power Density with RBW 100KHz
2422	-15.24
2437	-14.96
2452	-14.60

The test plots are attached as below.

# INTERTEK TESTING SERVICES

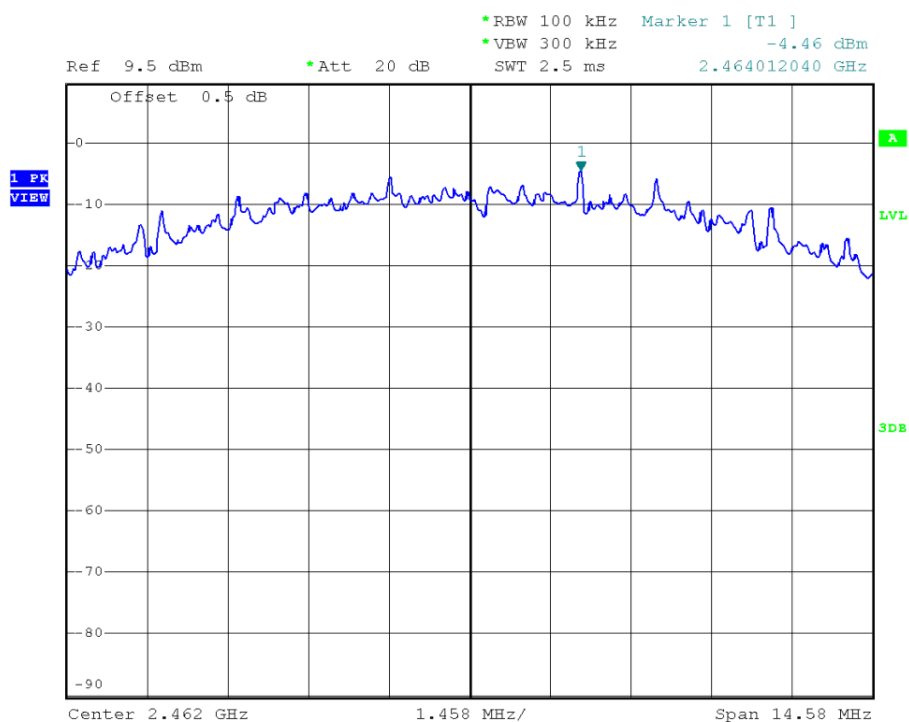
802.11b



TRF no.: FCC 15C\_TX\_b  
FCC ID: 2ABT4TSN48W  
Report No.: 131224017SZN-001

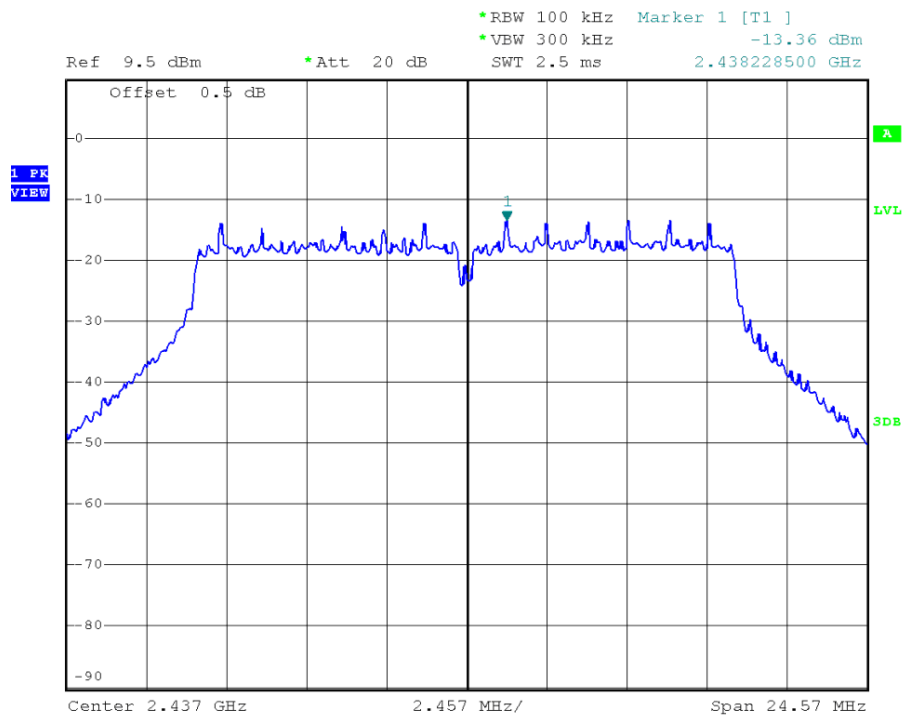
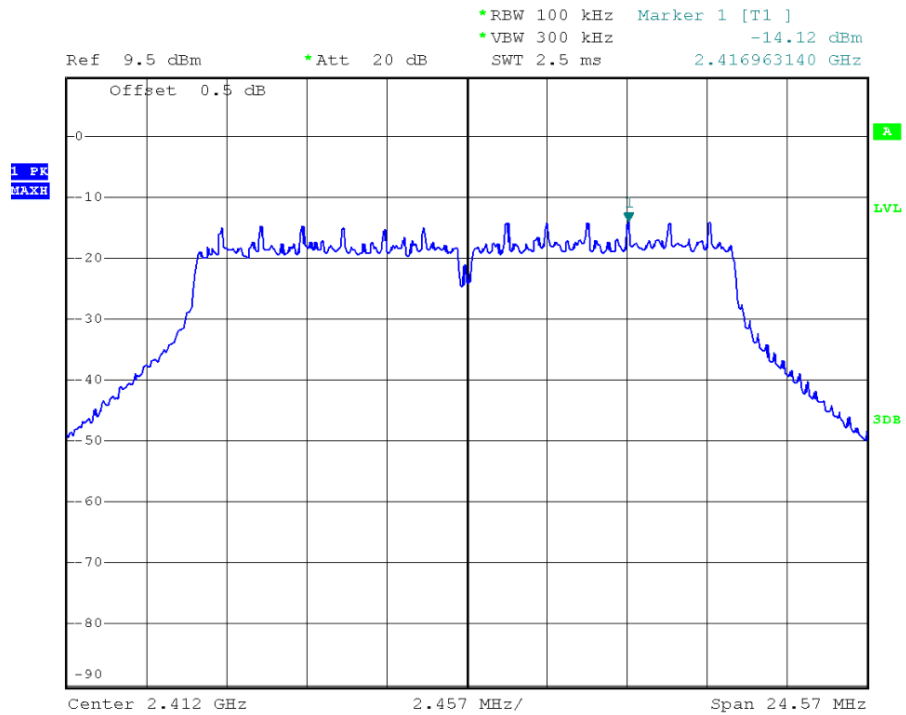


## INTERTEK TESTING SERVICES



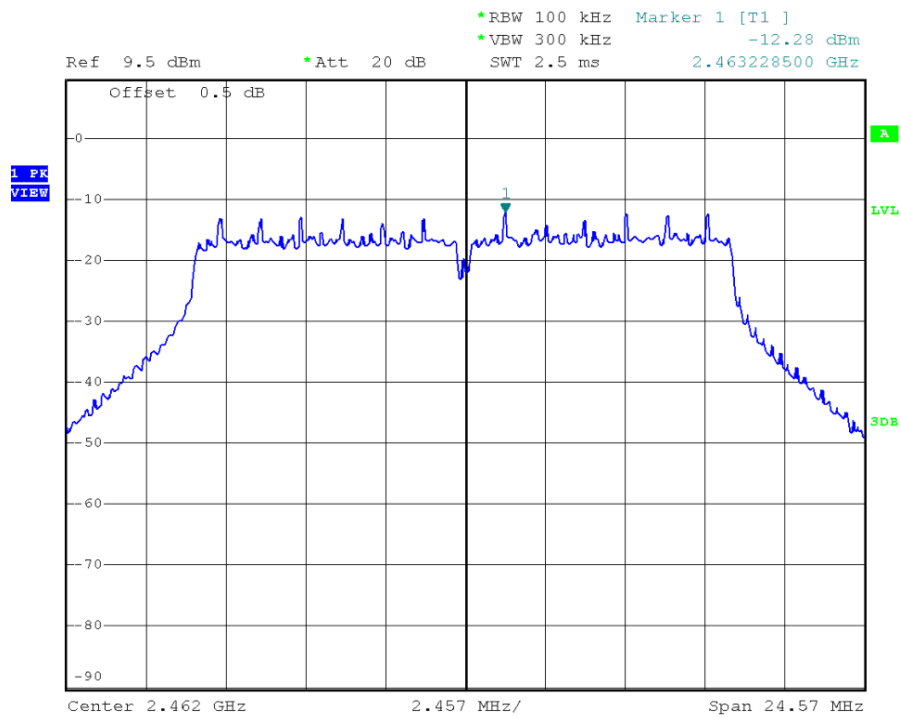
## INTERTEK TESTING SERVICES

802.11g



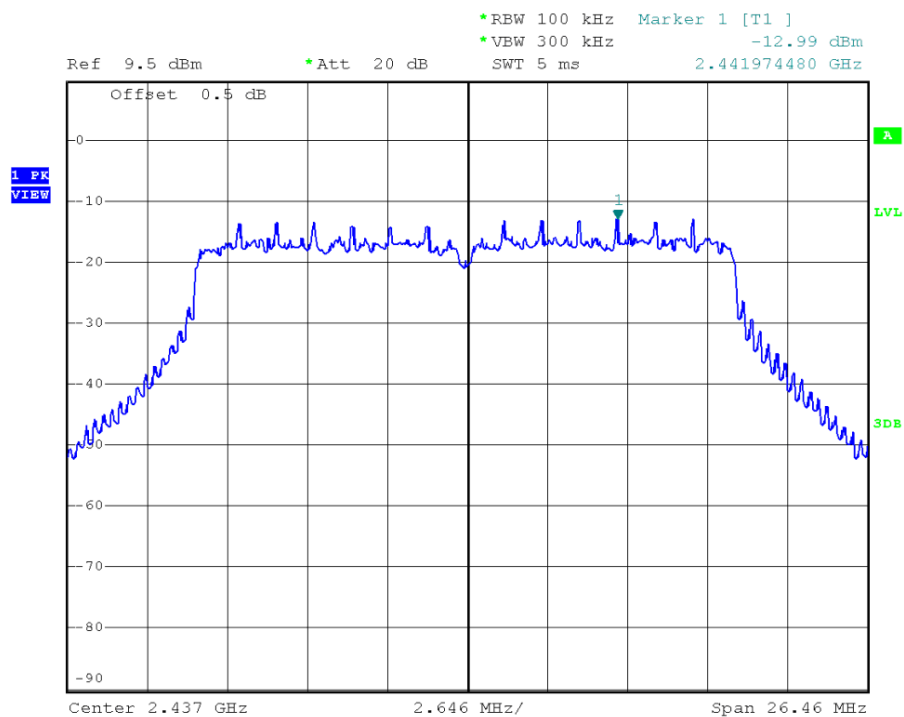
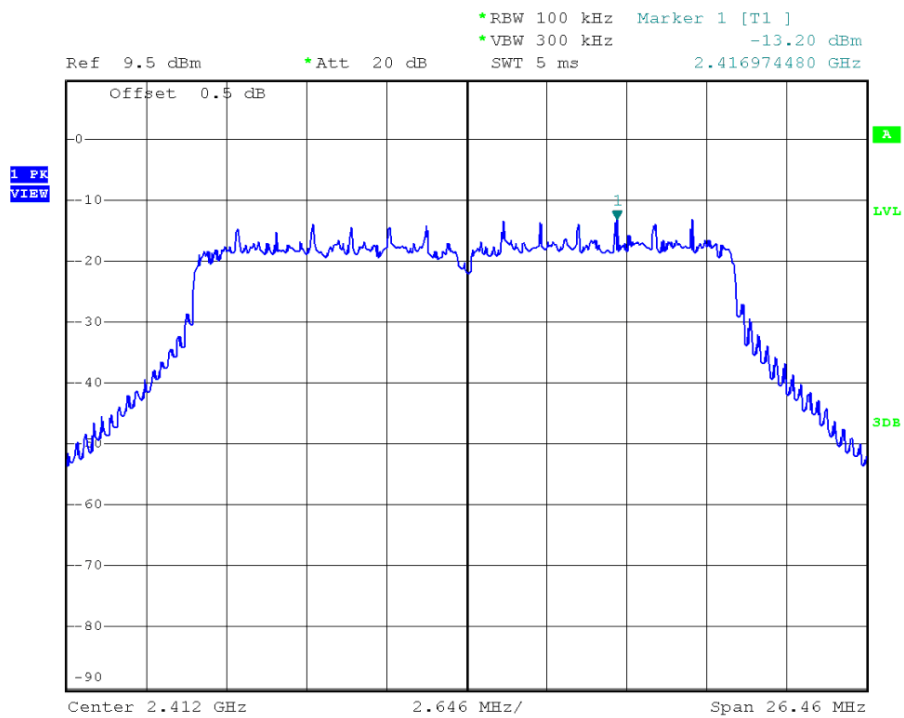
TRF no.: FCC 15C\_TX\_b  
FCC ID: 2ABT4TSN48W  
Report No.: 131224017SZN-001

## INTERTEK TESTING SERVICES



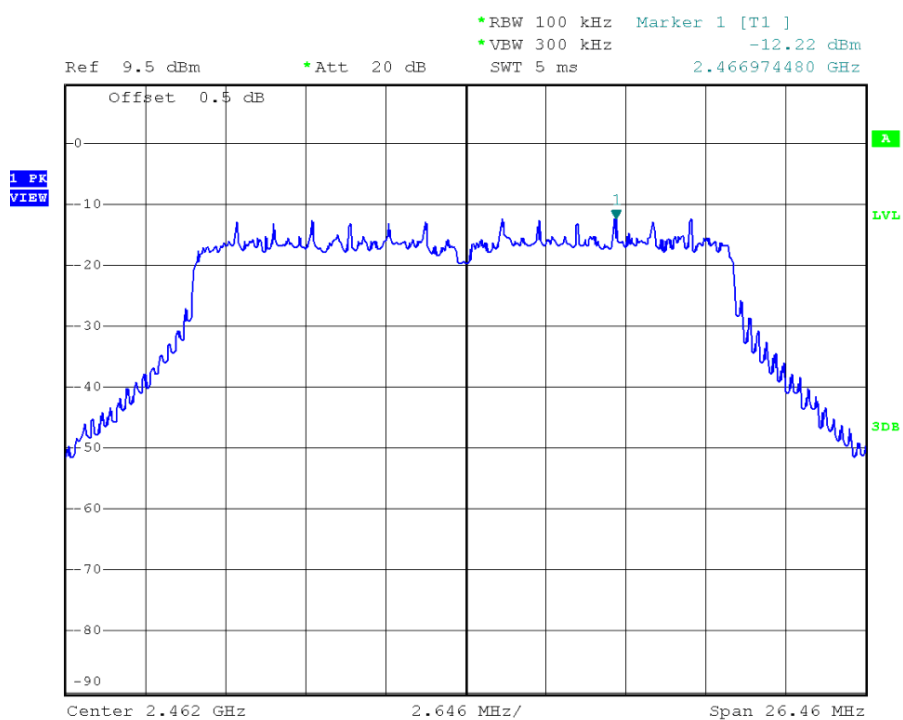
## INTERTEK TESTING SERVICES

802.11 n-HT20



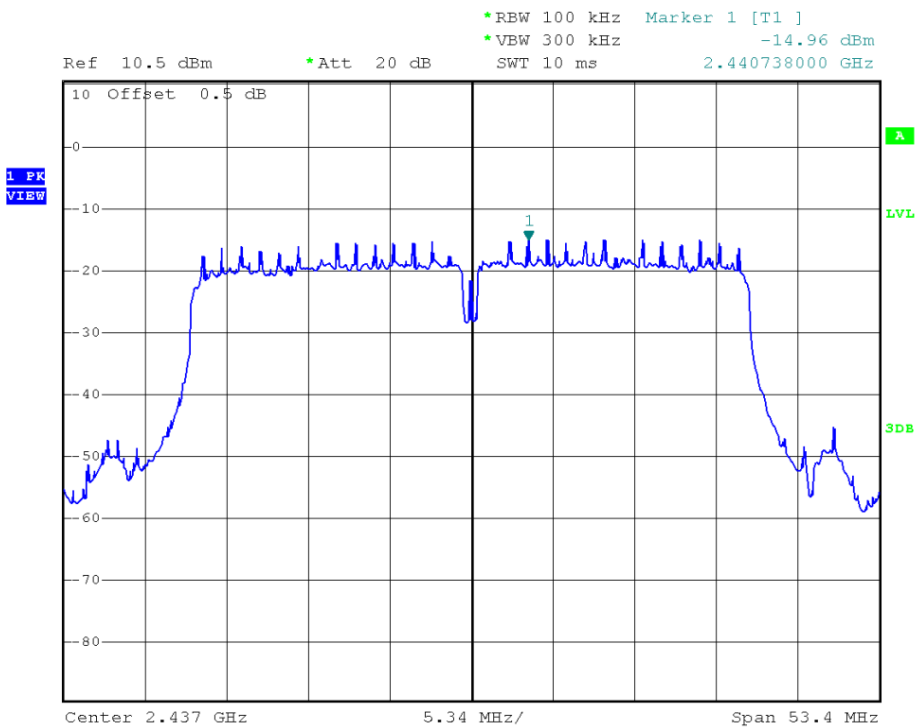
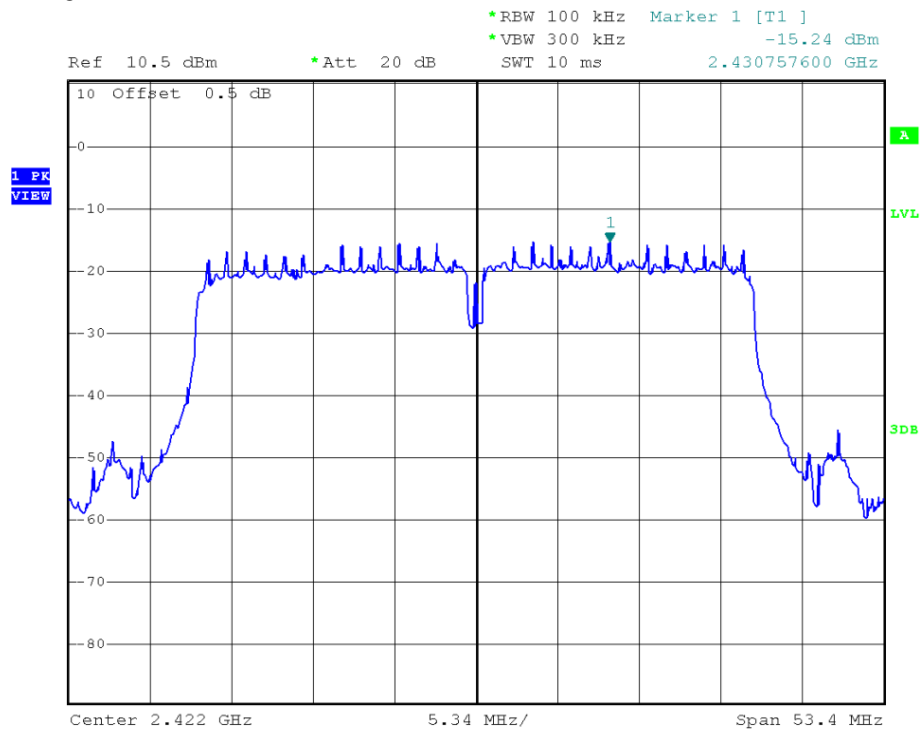
TRF no.: FCC 15C\_TX\_b  
FCC ID: 2ABT4TSN48W  
Report No.: 131224017SZN-001

## INTERTEK TESTING SERVICES



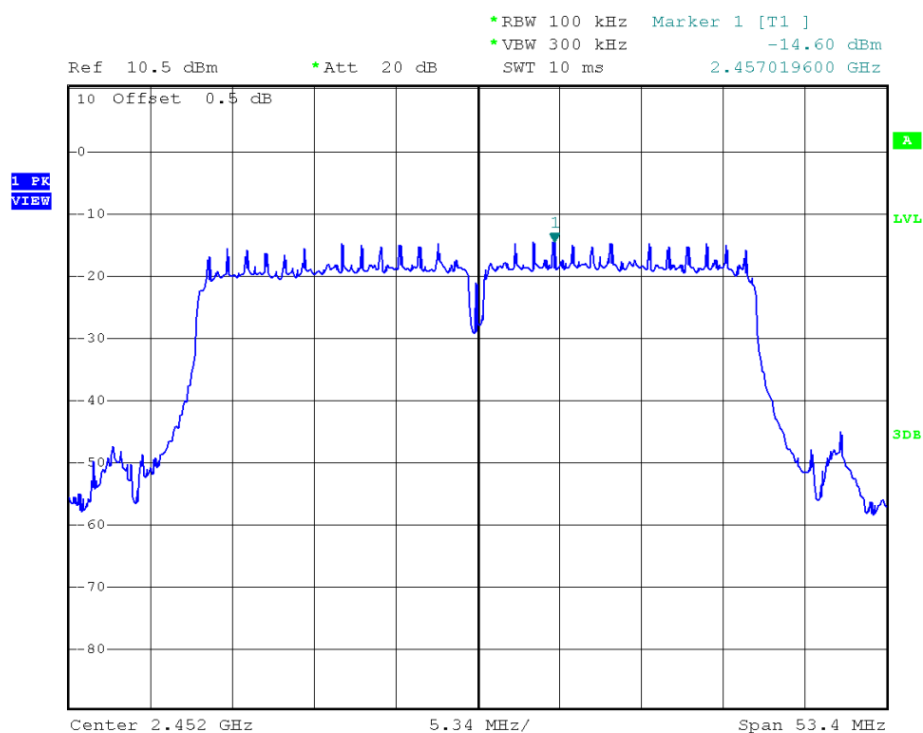
## INTERTEK TESTING SERVICES

802.11 n-HT40



TRF no.: FCC 15C\_TX\_b  
FCC ID: 2ABT4TSN48W  
Report No.: 131224017SZN-001

## INTERTEK TESTING SERVICES



## INTERTEK TESTING SERVICES

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Applicant: Sky Light Imaging Limited  
Model: TSN48W

Date of Test: January 12, 2014

### 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.

Refer to the attached test plots for out of band conducted emissions data with rate of 1Mbps for 802.11b, 6Mbps for 802.11g, 6.5Mbps for 802.11n-HT20 and 13.5Mbps for 802.11n-HT40.

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

Note: the RBW was set to 1MHz rather than 100KHz in order to increase the measurement speed, if found out fail point at 1MHz RBW, we will use reduce the RBW to 100KHz determine the final result.

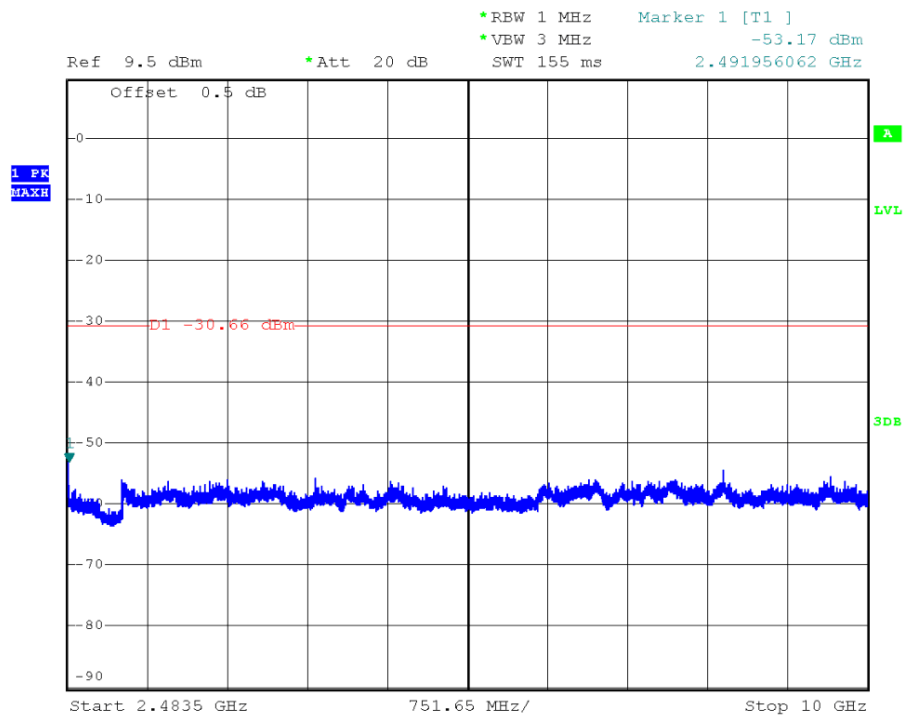
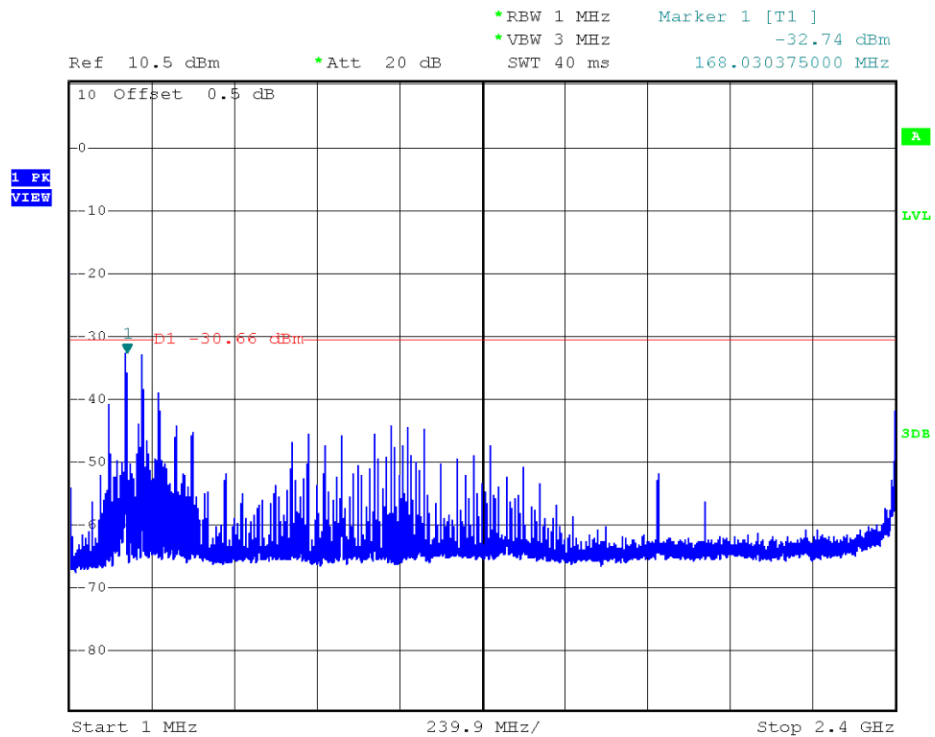
The test plots are attached as below.



## INTERTEK TESTING SERVICES

802.11b

Channel 01 (2412MHz) Reference Level: -10.66dBm

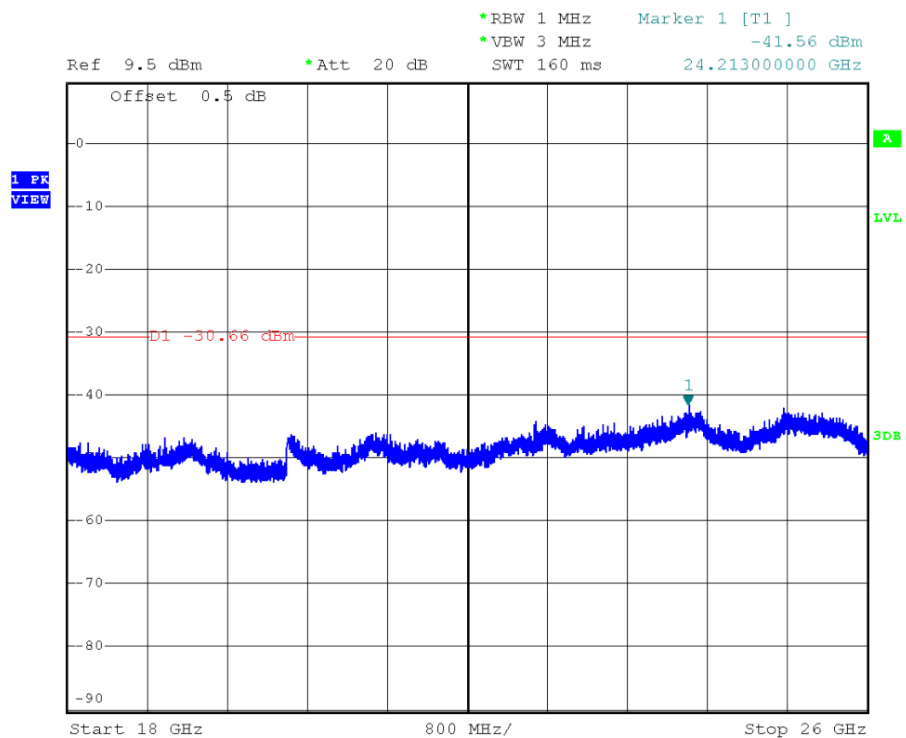
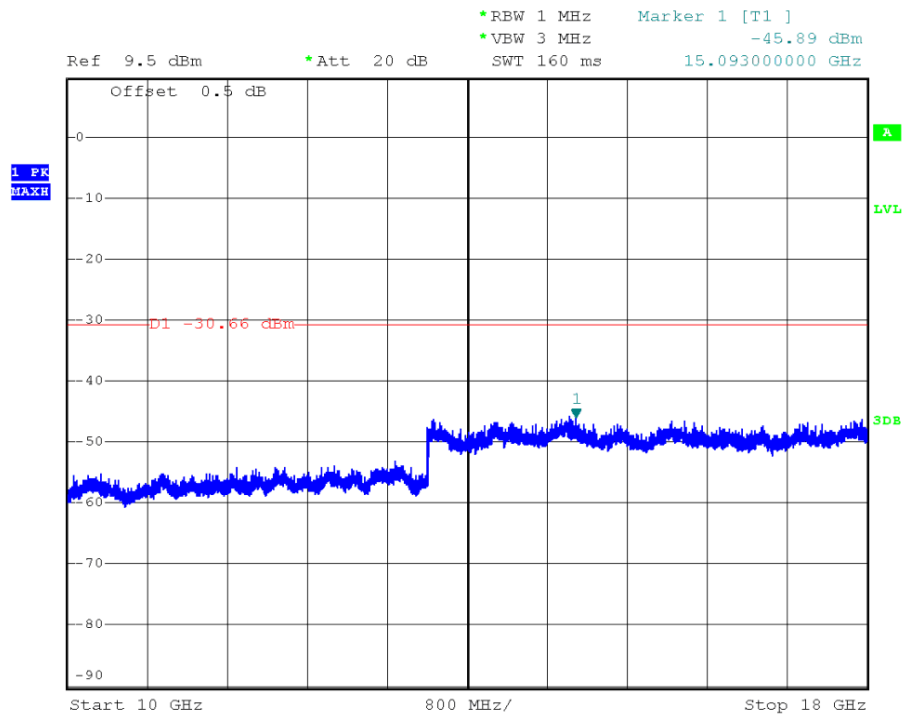


TRF no.: FCC 15C\_TX\_b

FCC ID: 2ABT4TSN48W

Report No.: 131224017SZN-001

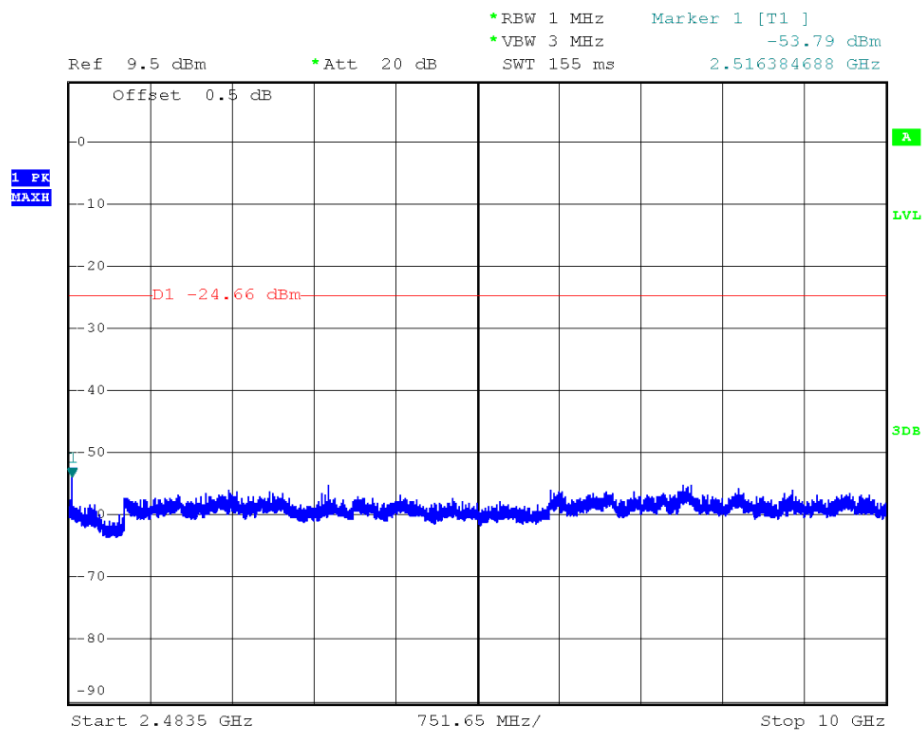
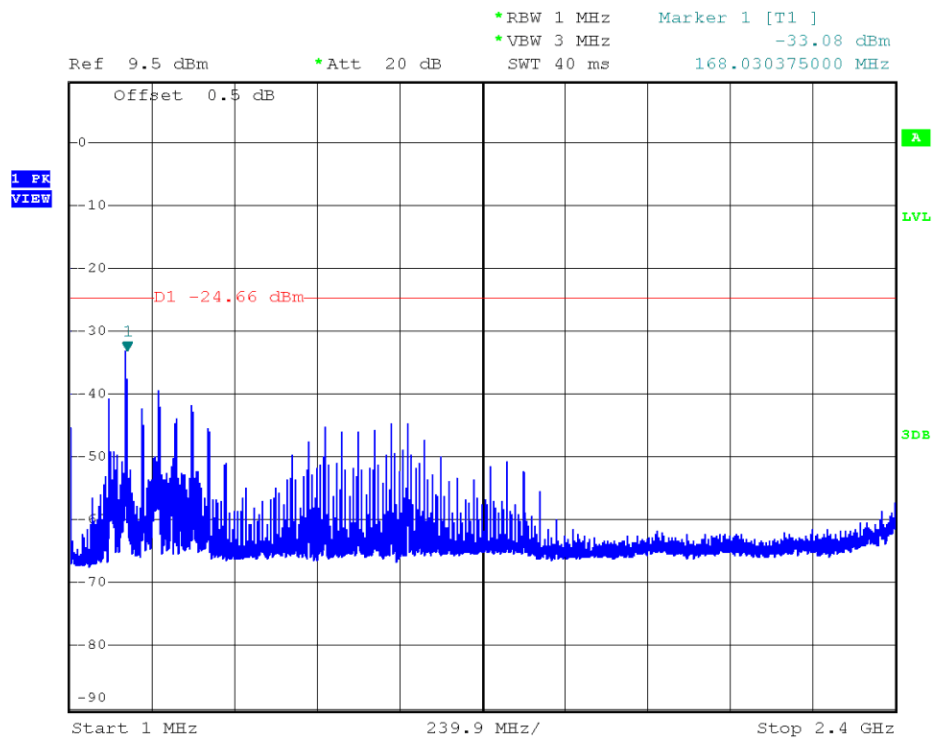
# INTERTEK TESTING SERVICES



TRF no.: FCC 15C\_TX\_b  
 FCC ID: 2ABT4TSN48W  
 Report No.: 131224017SZN-001

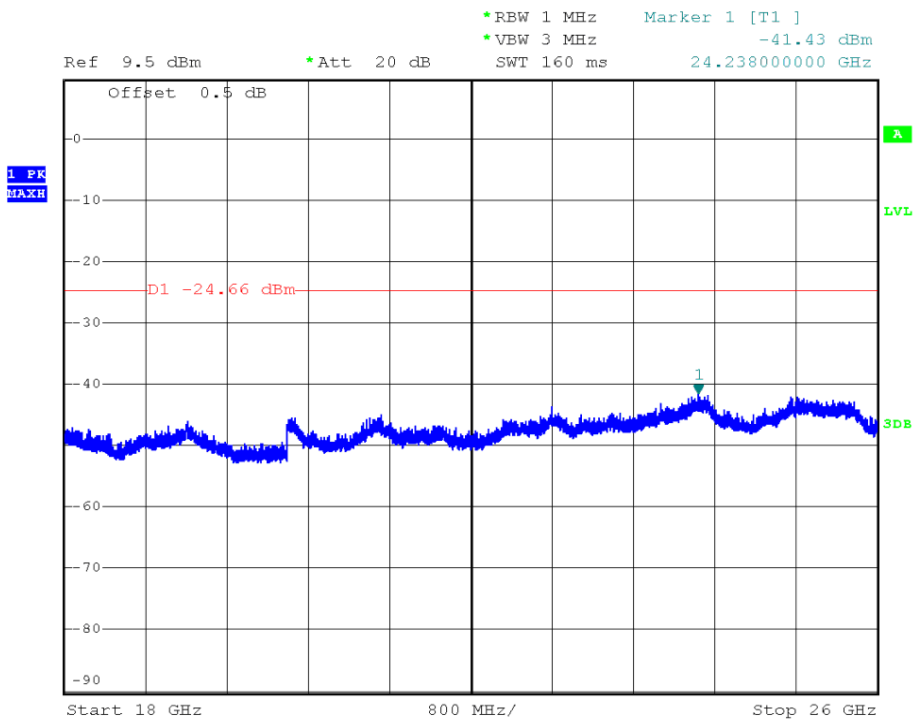
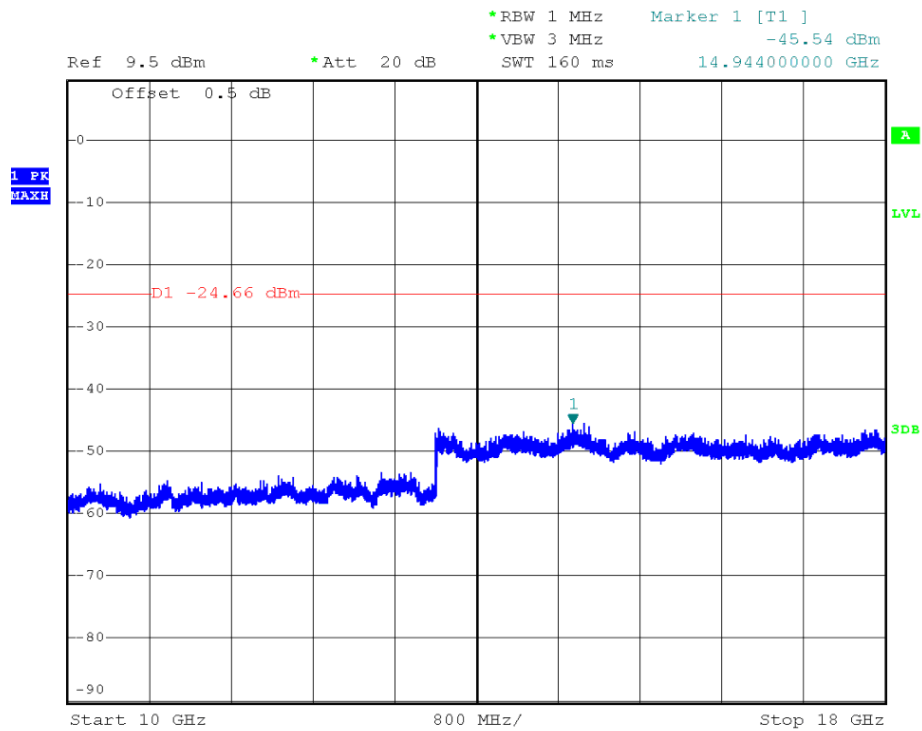
## INTERTEK TESTING SERVICES

Channel 06 (2437MHz) Reference Level: -4.66dBm



TRF no.: FCC 15C\_TX\_b  
FCC ID: 2ABT4TSN48W  
Report No.: 131224017SZN-001

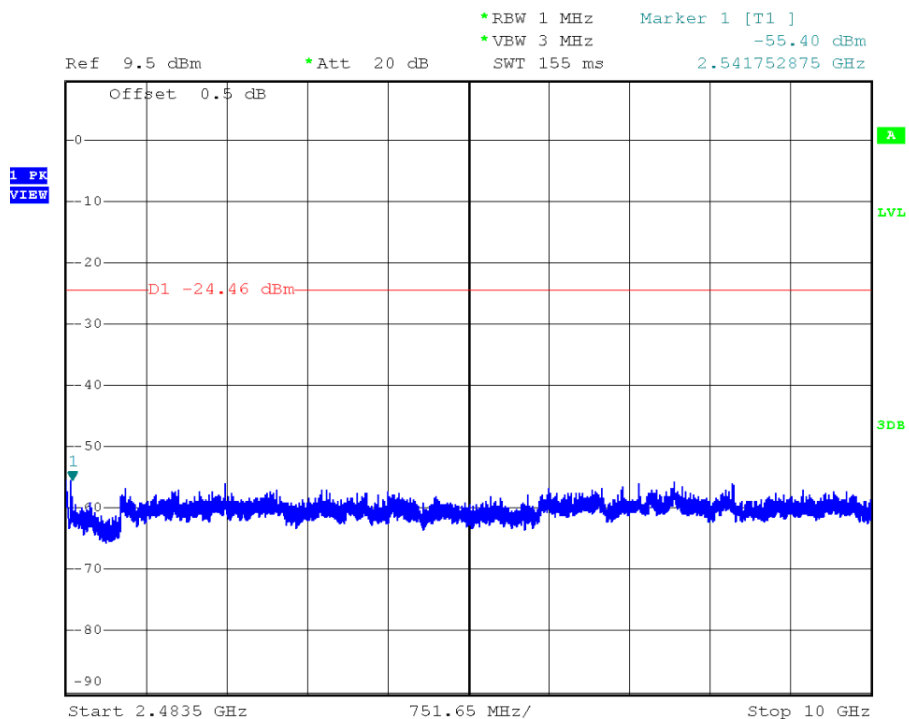
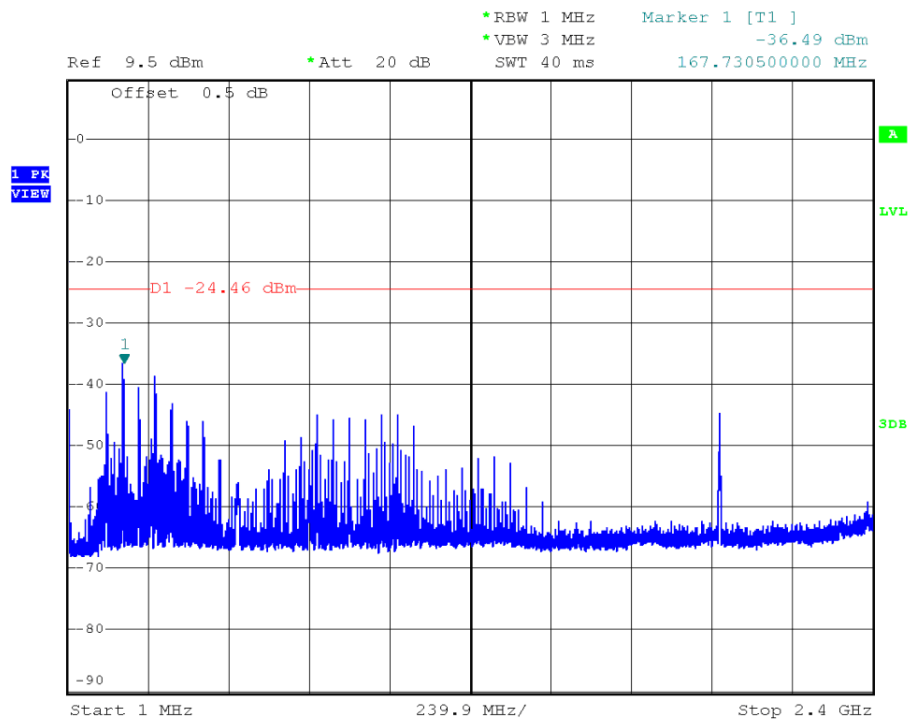
# INTERTEK TESTING SERVICES



TRF no.: FCC 15C\_TX\_b  
 FCC ID: 2ABT4TSN48W  
 Report No.: 131224017SZN-001

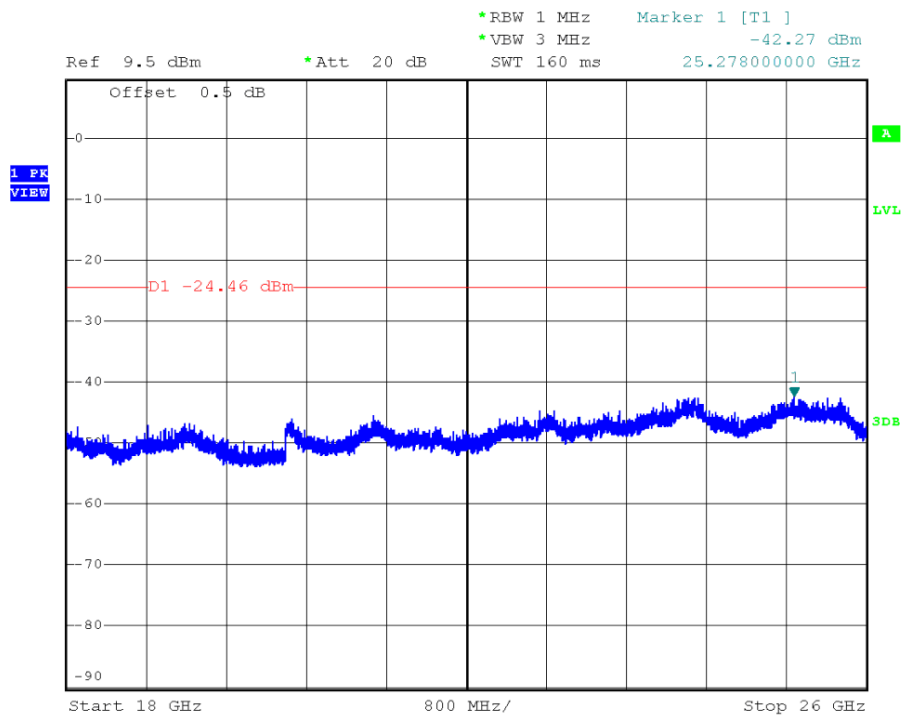
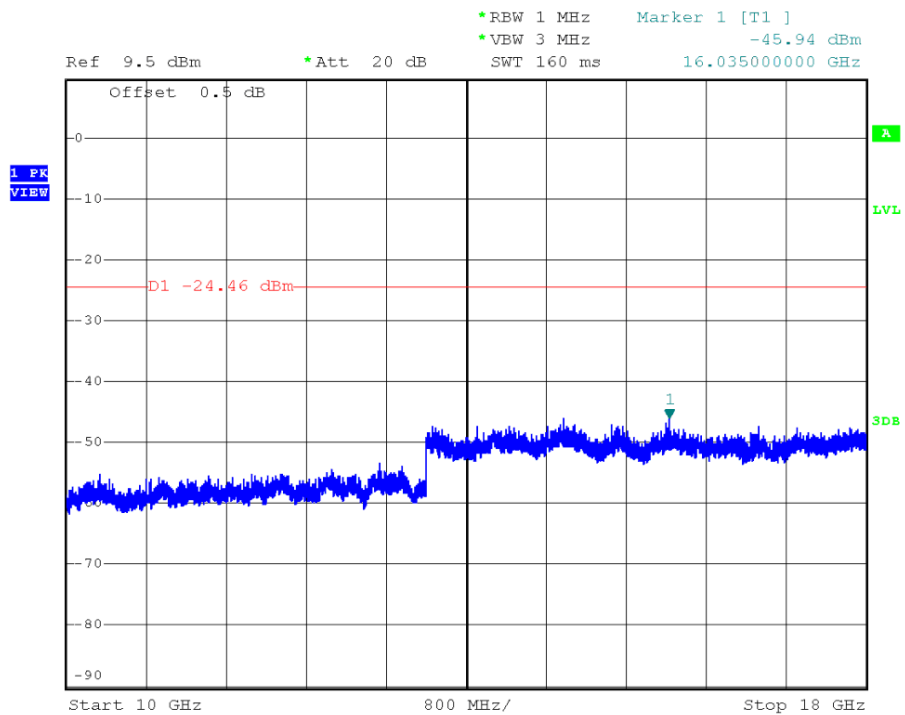
## INTERTEK TESTING SERVICES

Channel 11 (2462MHz) Reference Level: -4.46dBm



TRF no.: FCC 15C\_TX\_b  
FCC ID: 2ABT4TSN48W  
Report No.: 131224017SZN-001

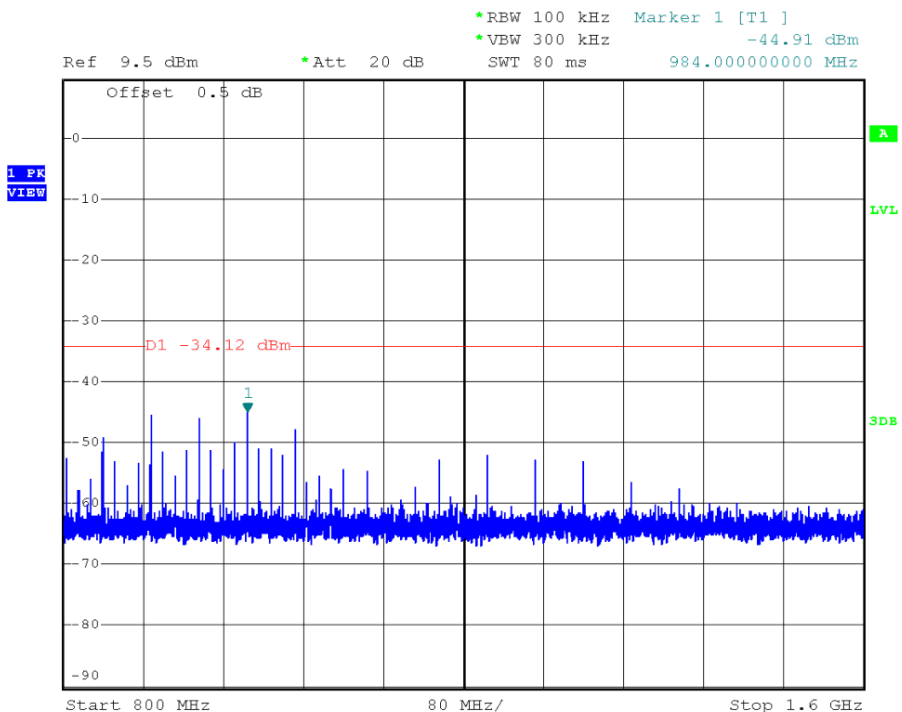
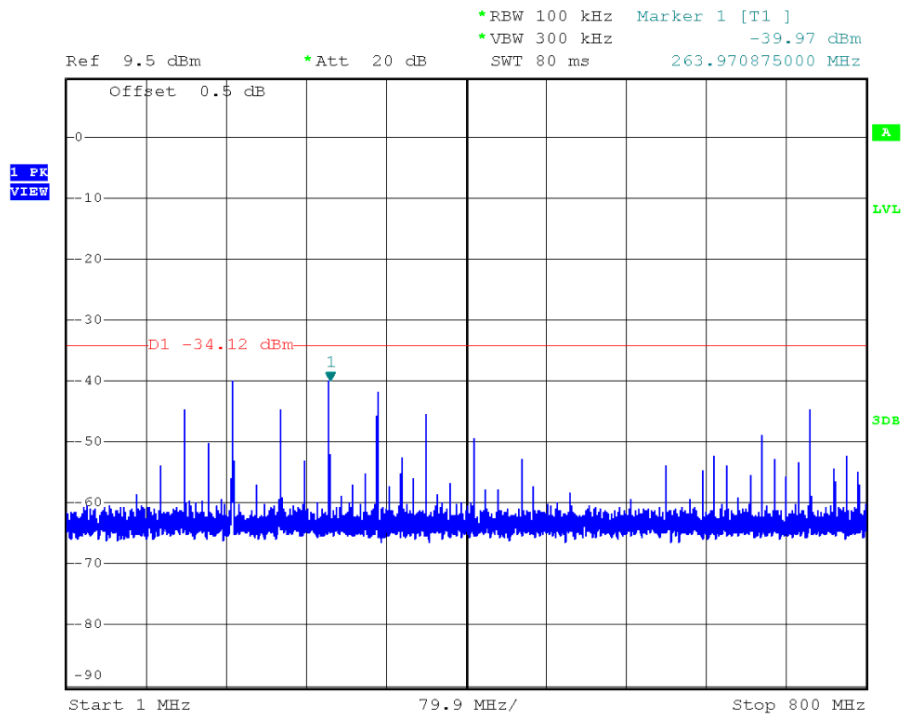
# INTERTEK TESTING SERVICES



## INTERTEK TESTING SERVICES

802.11g

Channel 01 (2412MHz) Reference Level: -14.12dBm

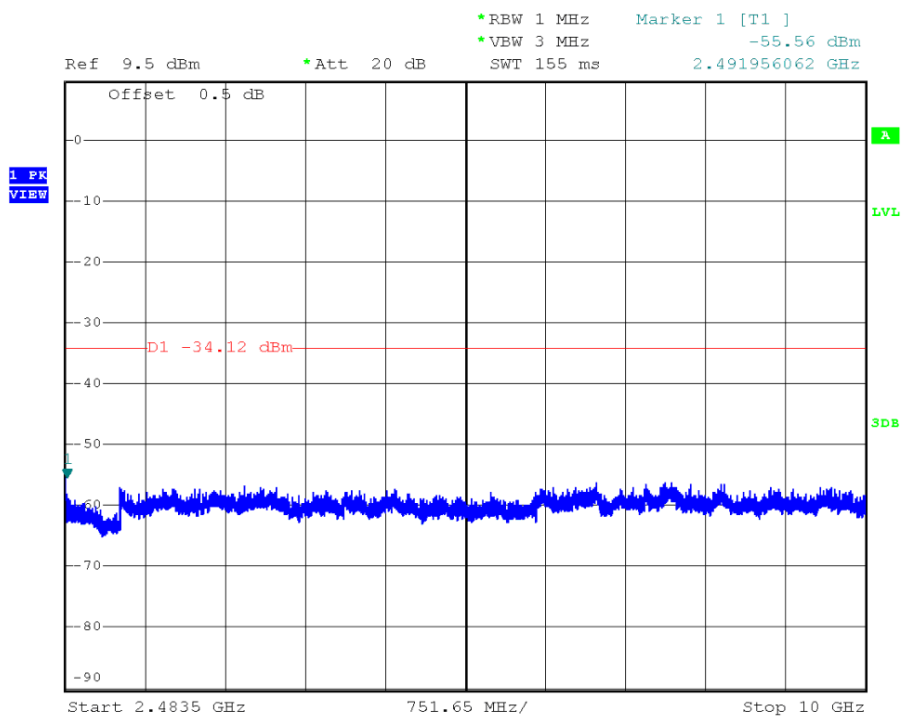
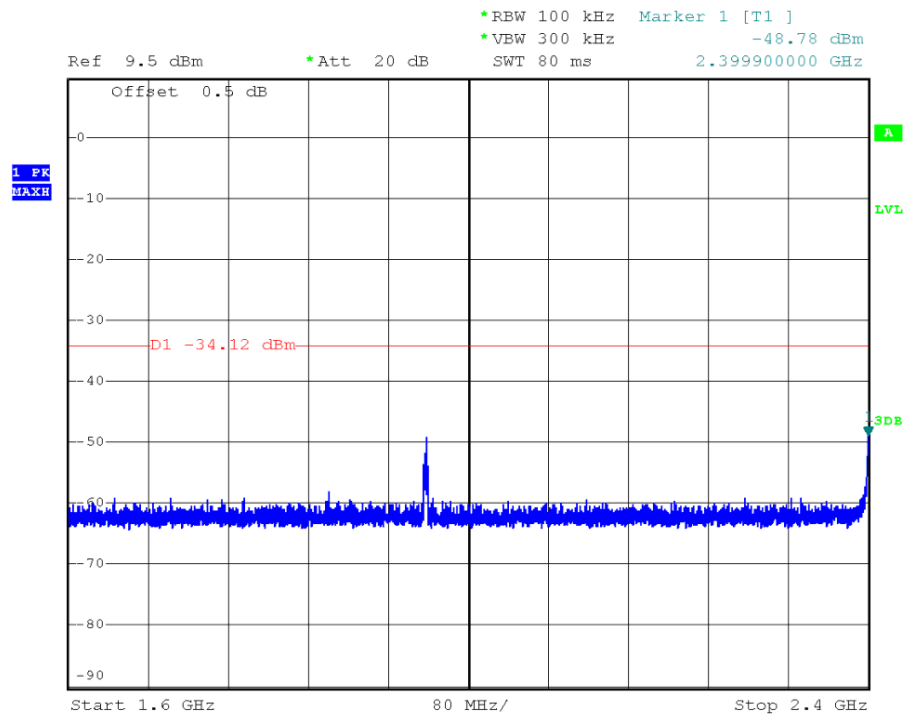


TRF no.: FCC 15C\_TX\_b

FCC ID: 2ABT4TSN48W

Report No.: 131224017SZN-001

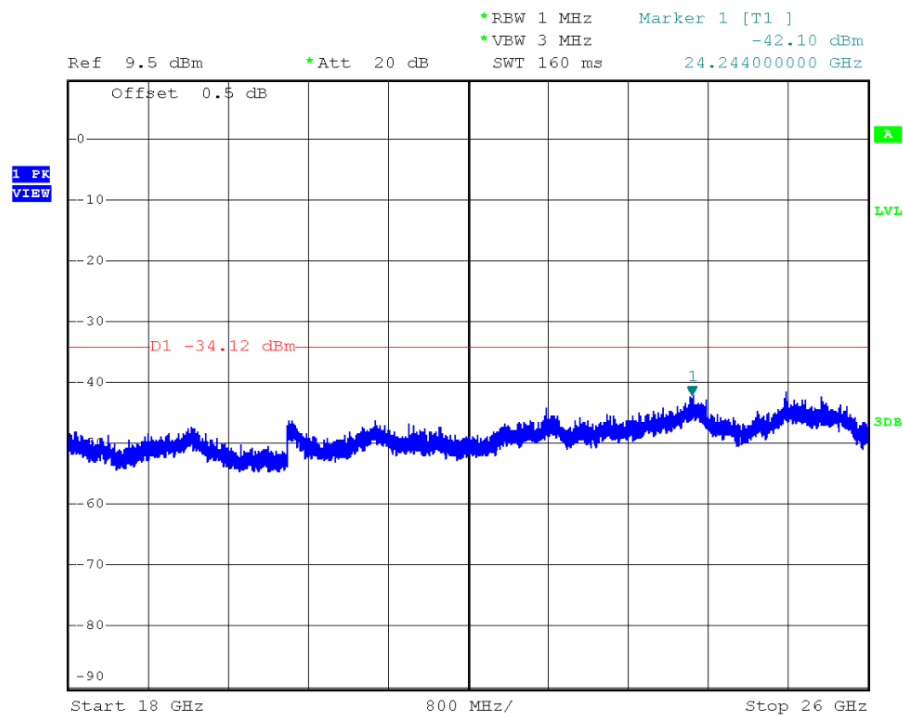
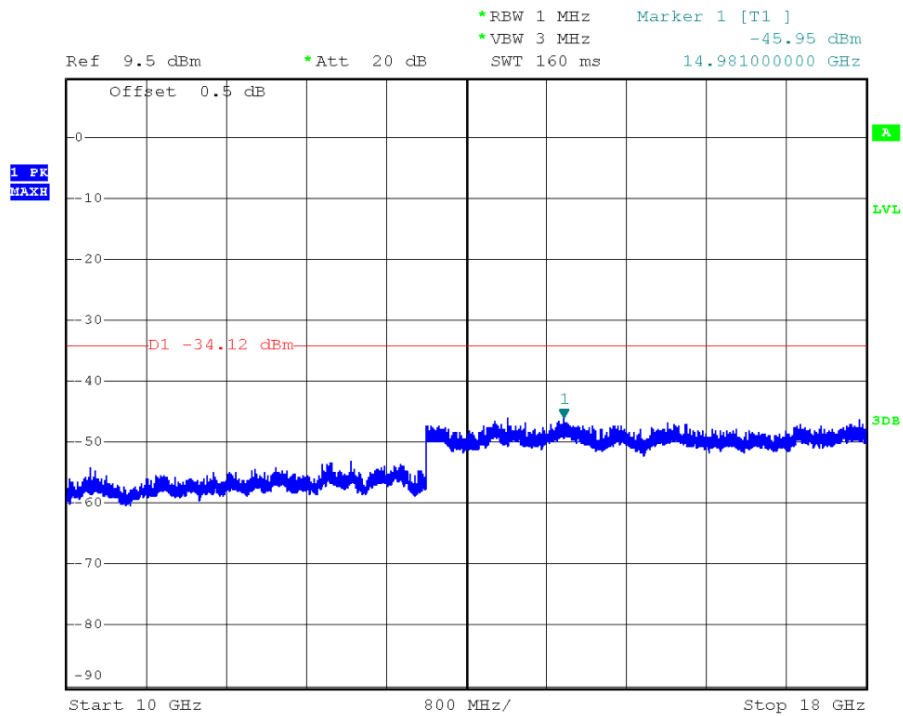
# INTERTEK TESTING SERVICES



TRF no.: FCC 15C\_TX\_b  
FCC ID: 2ABT4TSN48W  
Report No.: 131224017SZN-001

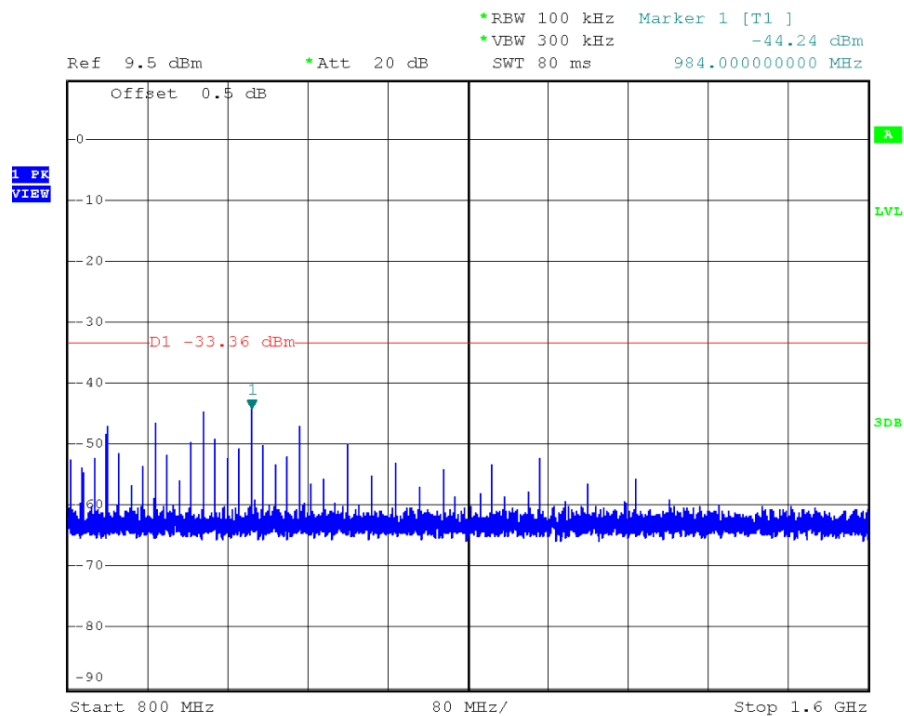
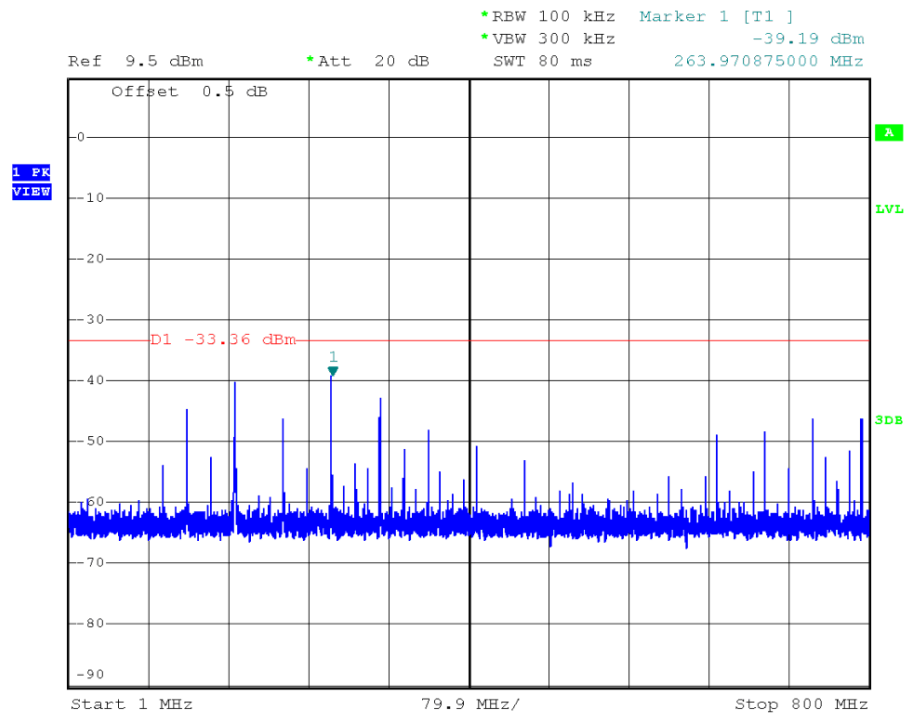


# INTERTEK TESTING SERVICES



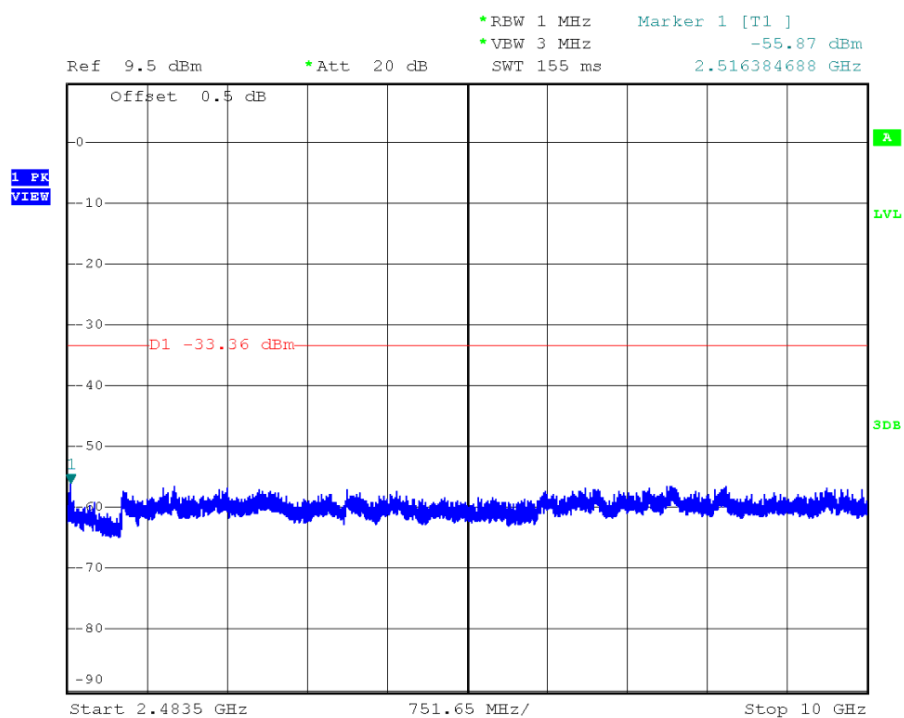
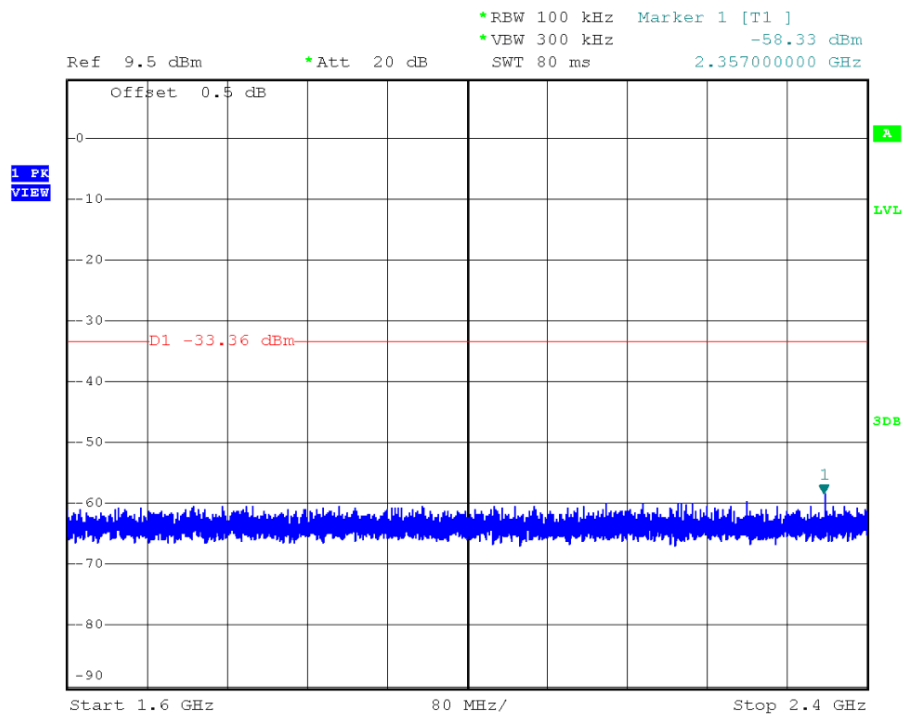
## INTERTEK TESTING SERVICES

Channel 06 (2437MHz) Reference Level: -13.36dBm

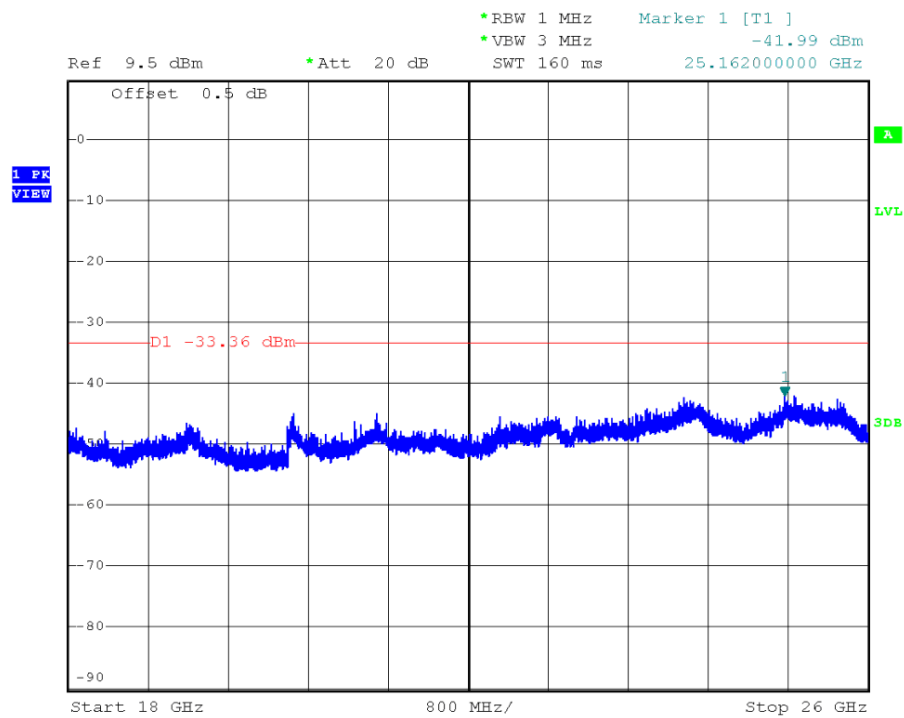
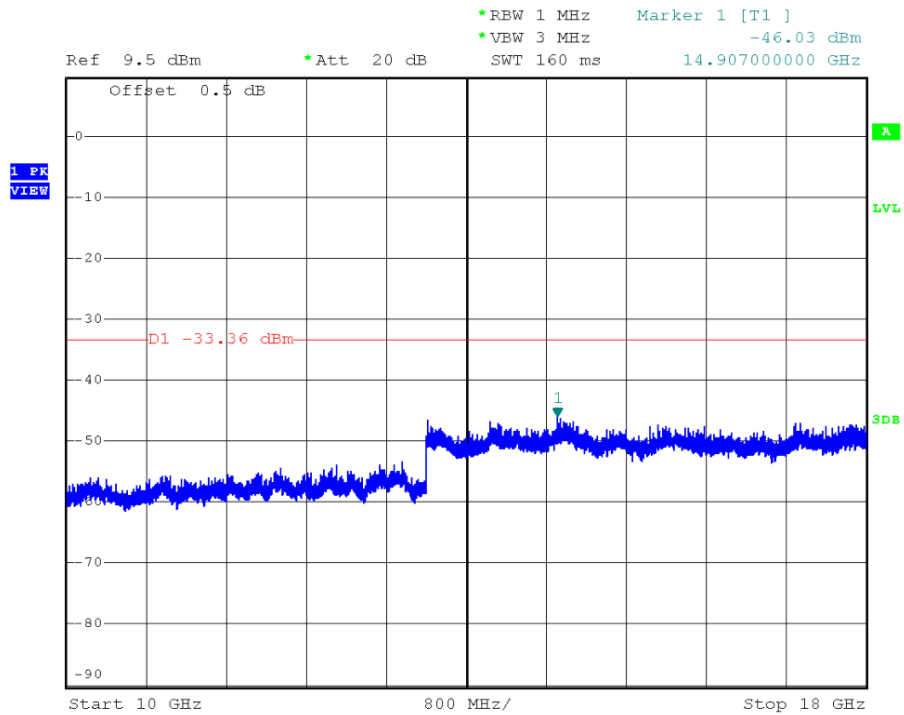


TRF no.: FCC 15C\_TX\_b  
FCC ID: 2ABT4TSN48W  
Report No.: 131224017SZN-001

# INTERTEK TESTING SERVICES

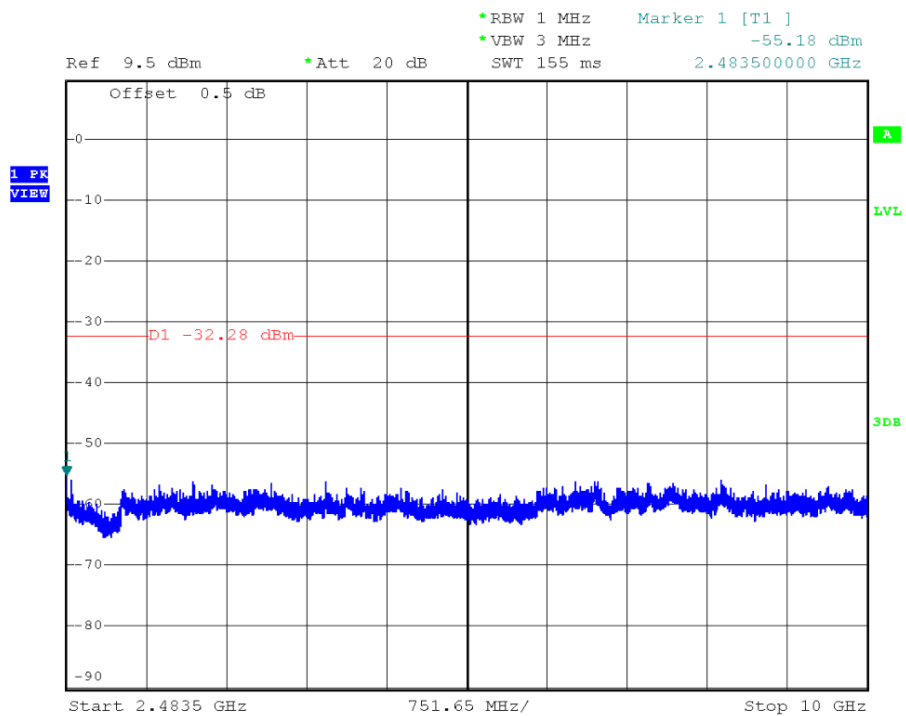
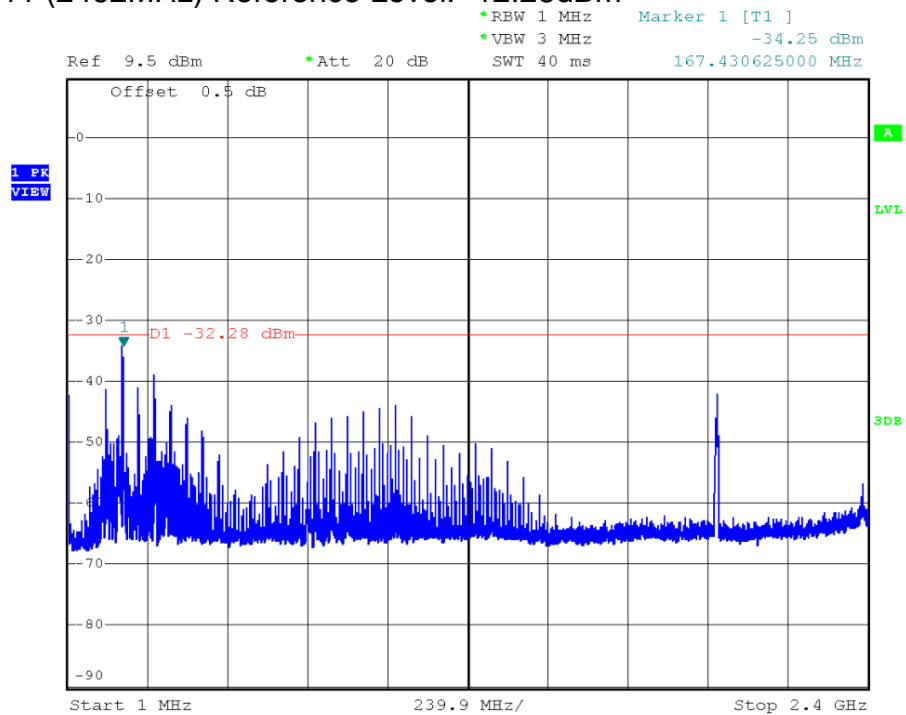


# INTERTEK TESTING SERVICES



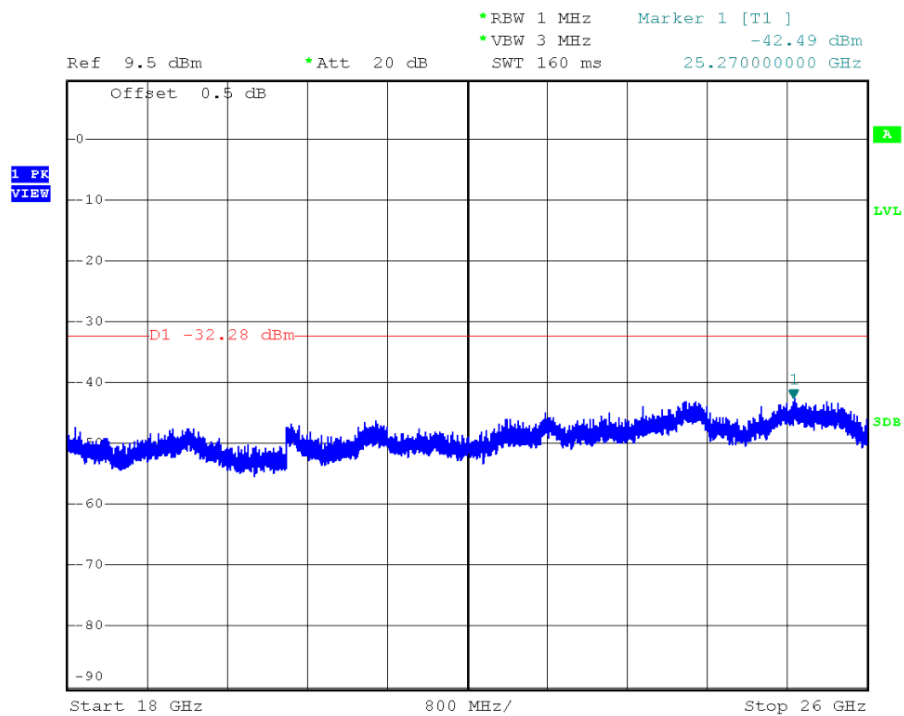
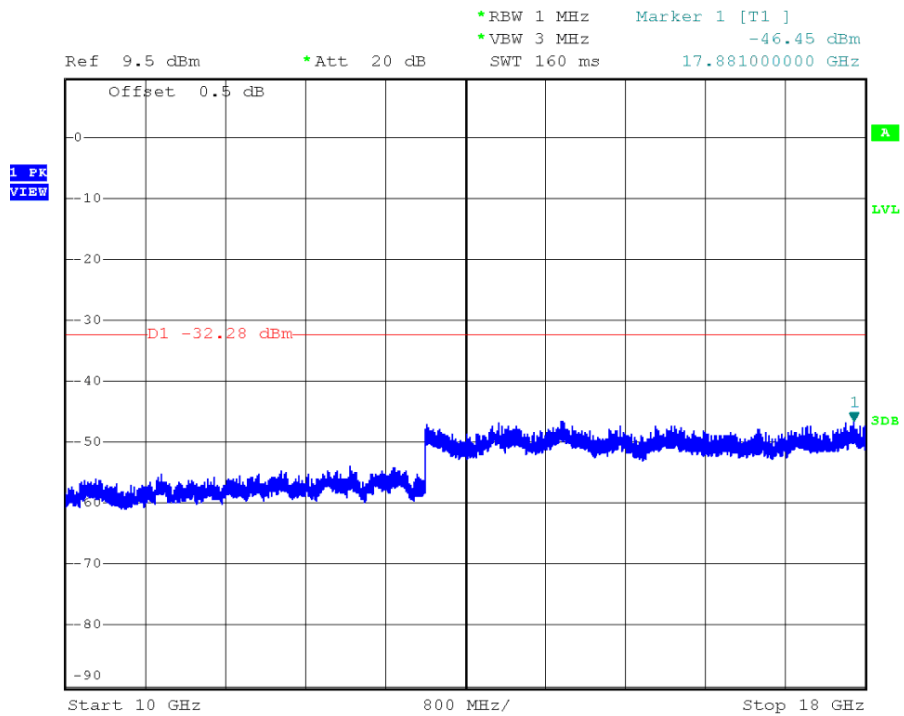
## INTERTEK TESTING SERVICES

Channel 11 (2462MHz) Reference Level: -12.28dBm



TRF no.: FCC 15C\_TX\_b  
FCC ID: 2ABT4TSN48W  
Report No.: 131224017SZN-001

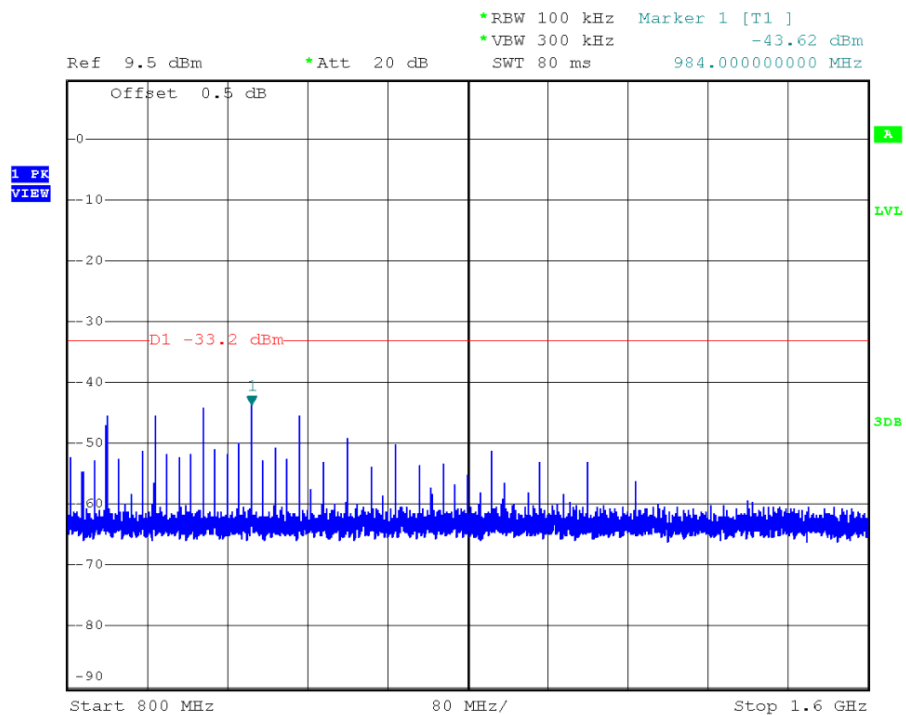
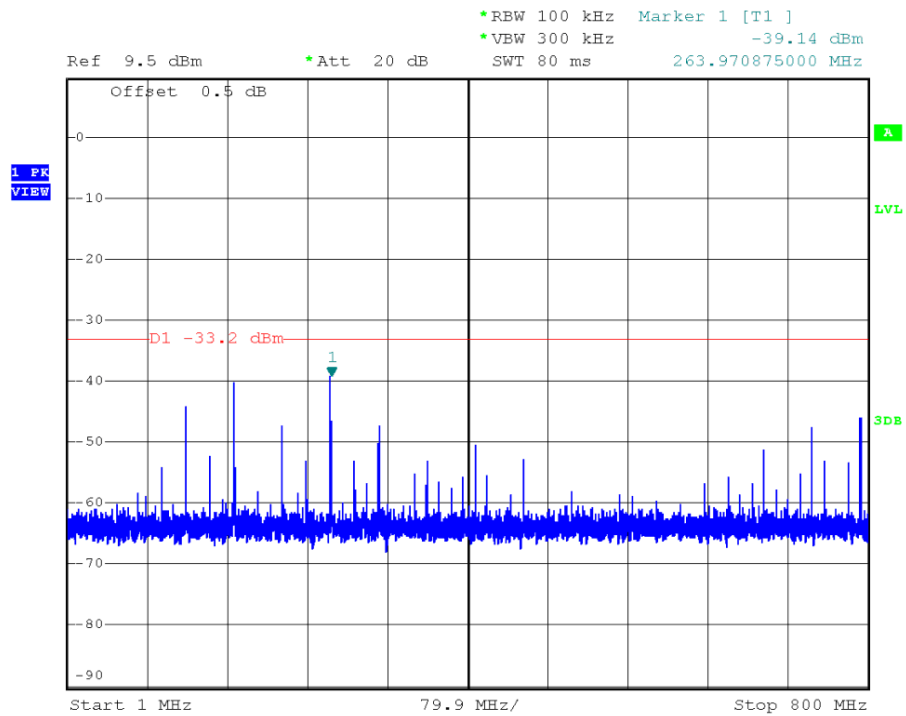
# INTERTEK TESTING SERVICES



## INTERTEK TESTING SERVICES

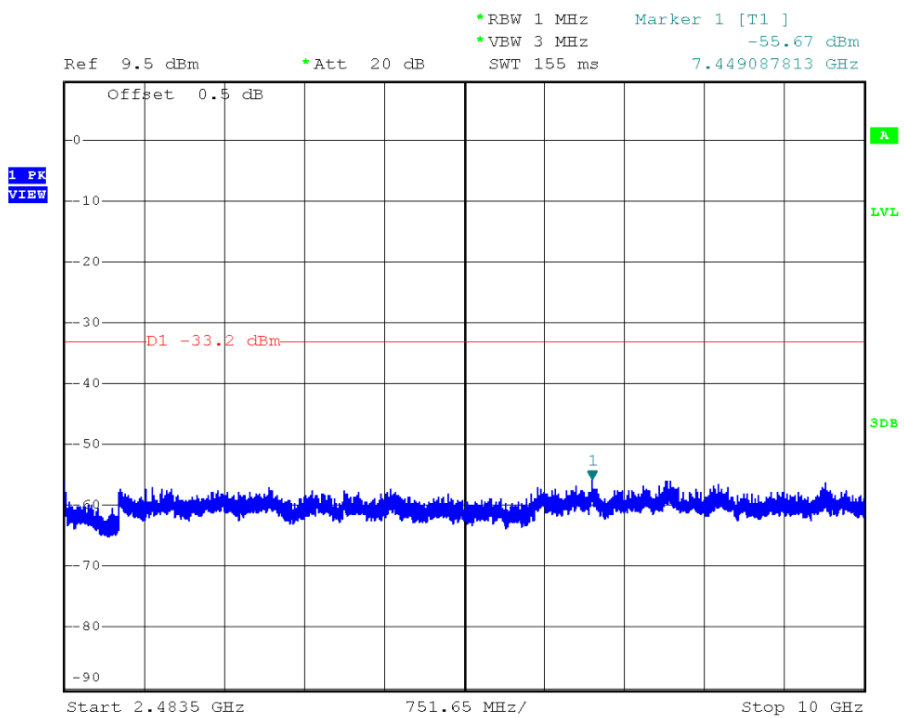
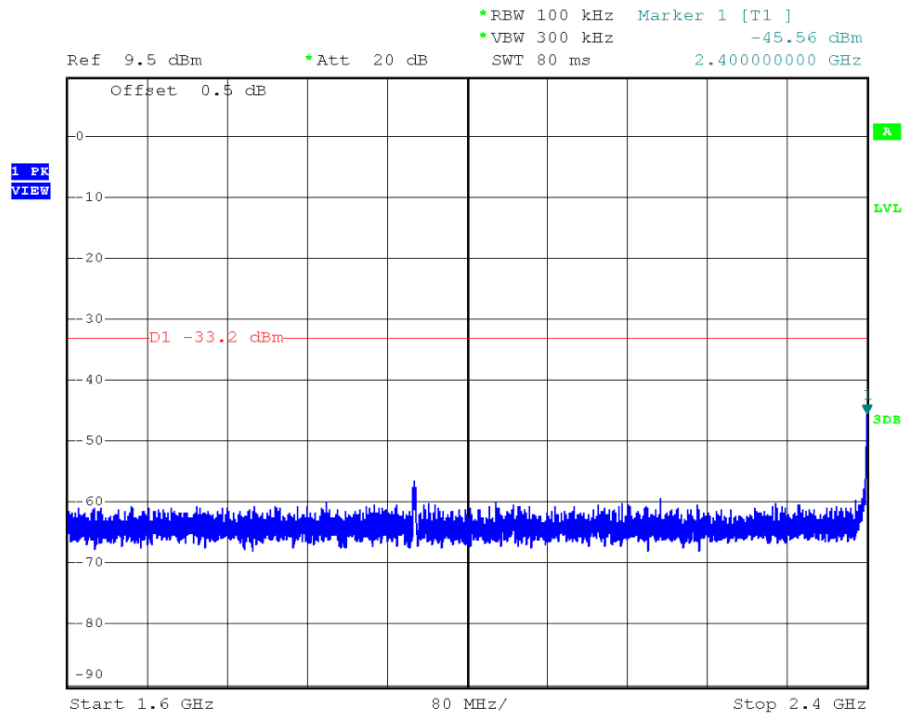
802.11 n-HT20

Channel 01 (2412MHz) Reference Level: -13.20dBm



TRF no.: FCC 15C\_TX\_b  
FCC ID: 2ABT4TSN48W  
Report No.: 131224017SZN-001

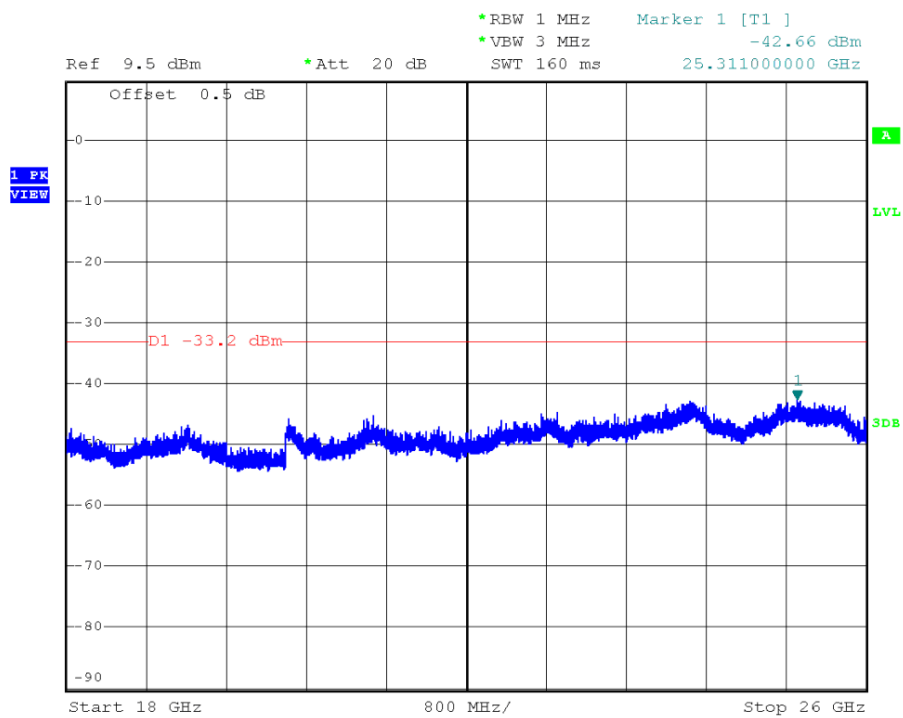
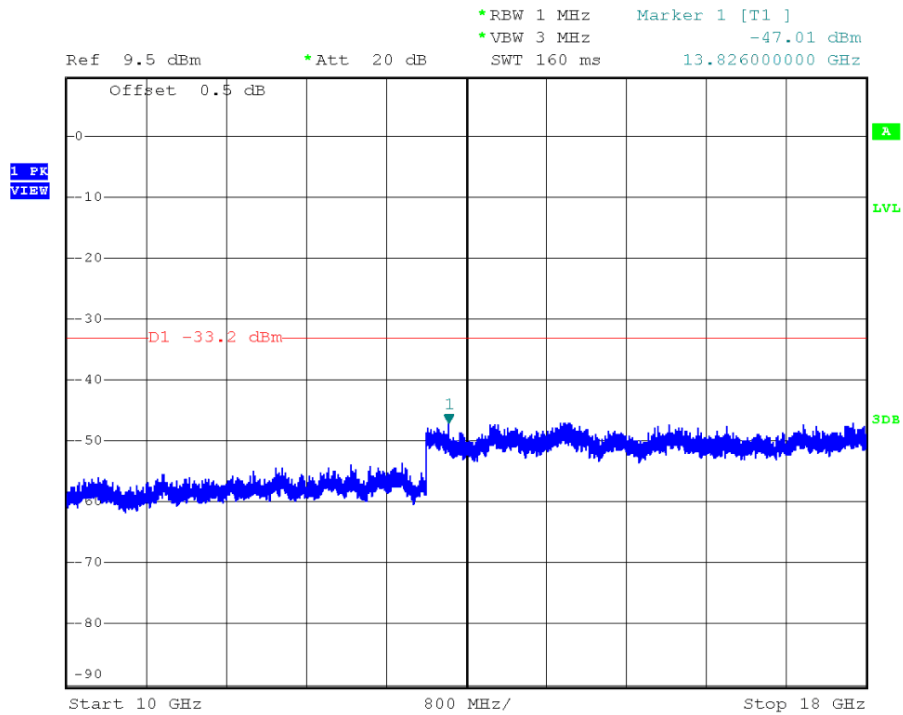
# INTERTEK TESTING SERVICES



TRF no.: FCC 15C\_TX\_b  
FCC ID: 2ABT4TSN48W  
Report No.: 131224017SZN-001

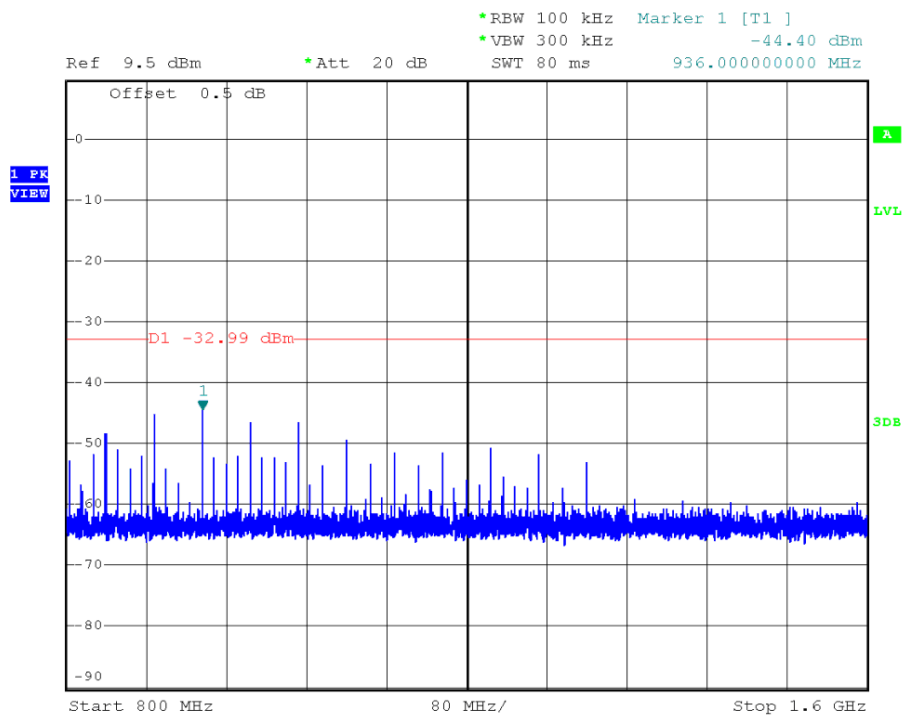
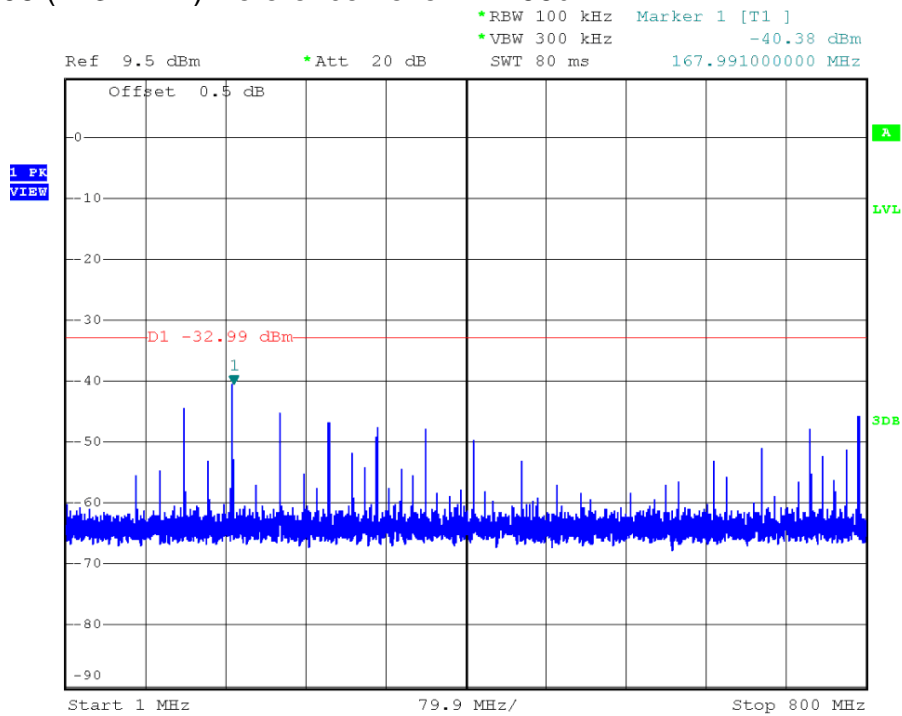


# INTERTEK TESTING SERVICES



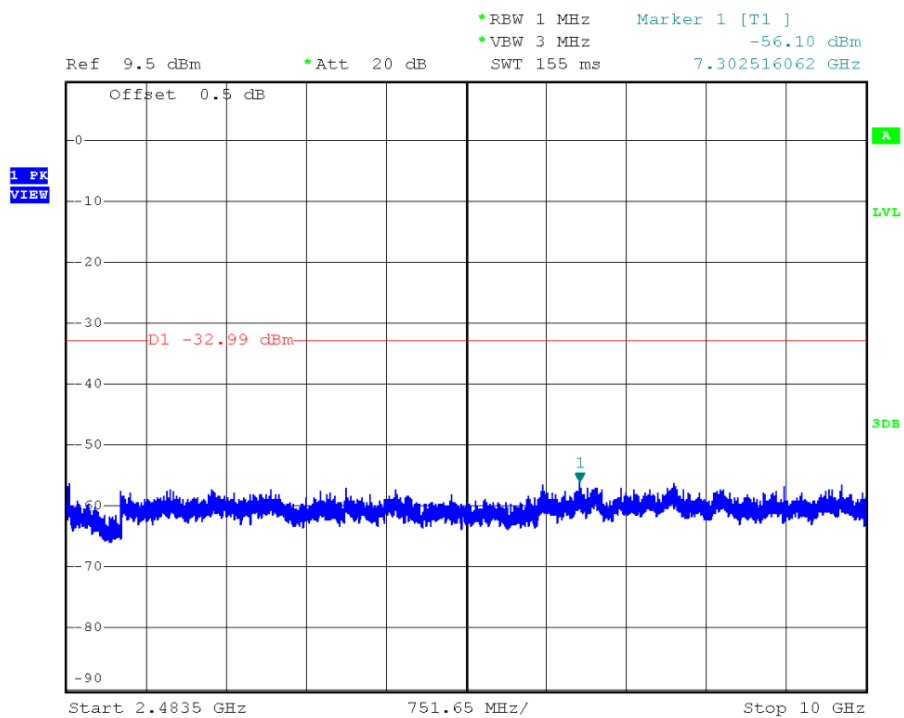
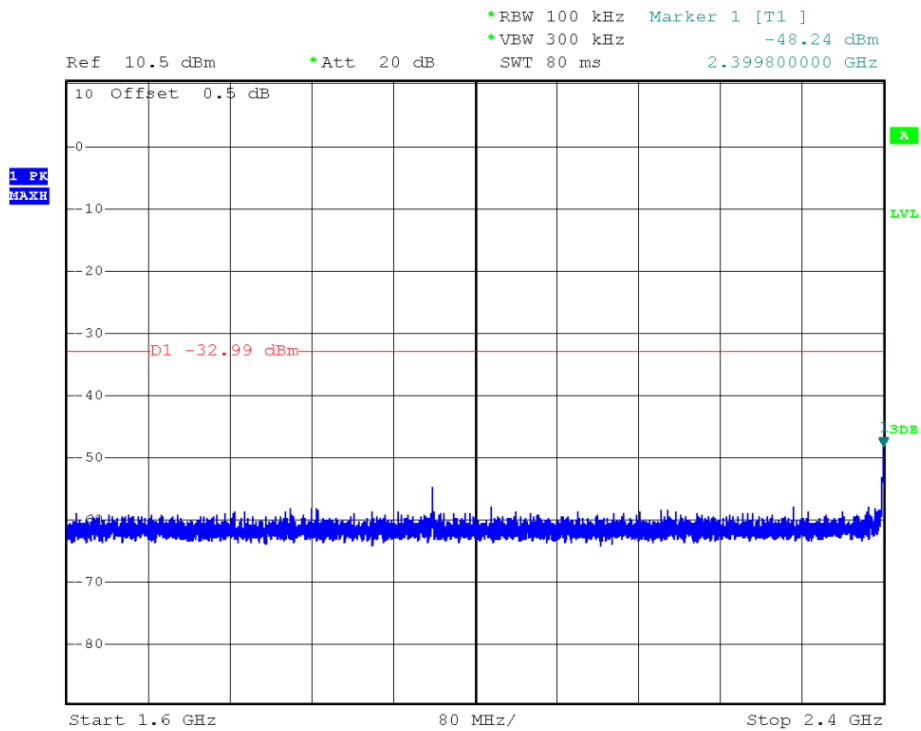
## INTERTEK TESTING SERVICES

Channel 06 (2437MHz) Reference Level: -12.99dBm

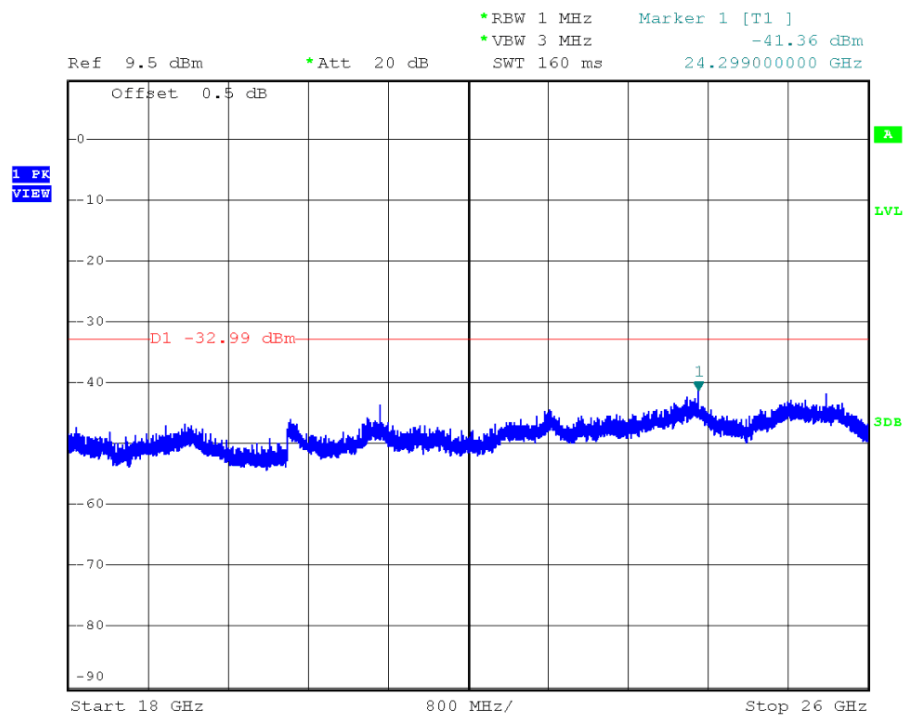
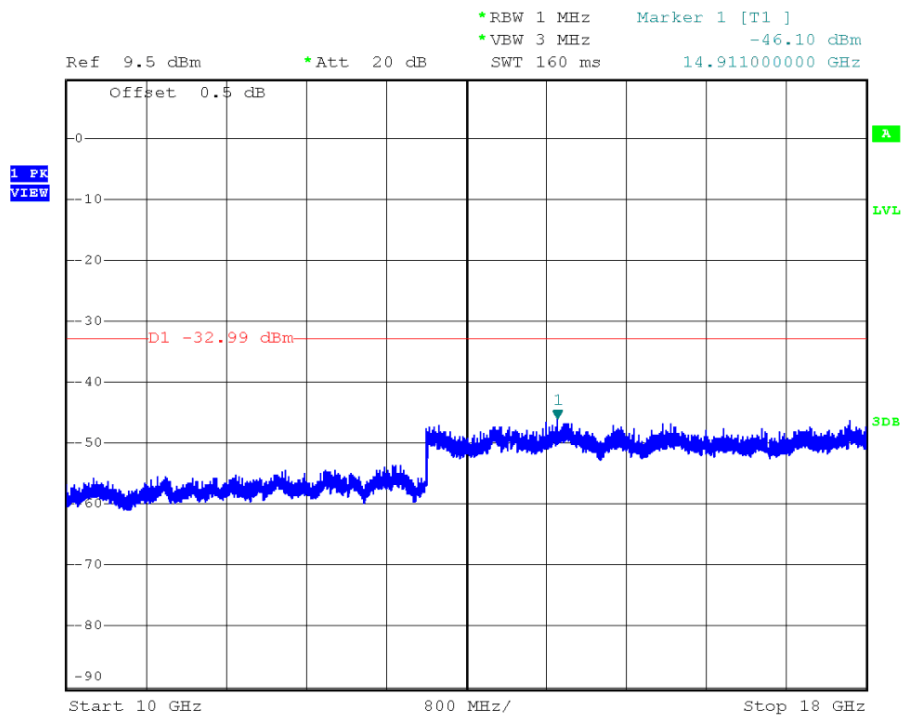


TRF no.: FCC 15C\_TX\_b  
FCC ID: 2ABT4TSN48W  
Report No.: 131224017SZN-001

# INTERTEK TESTING SERVICES



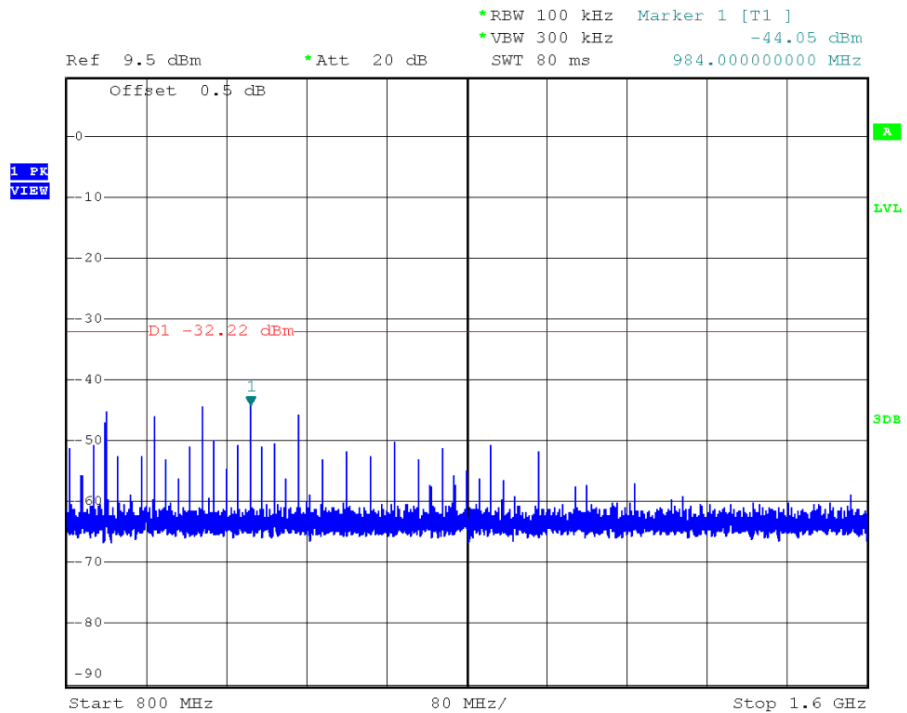
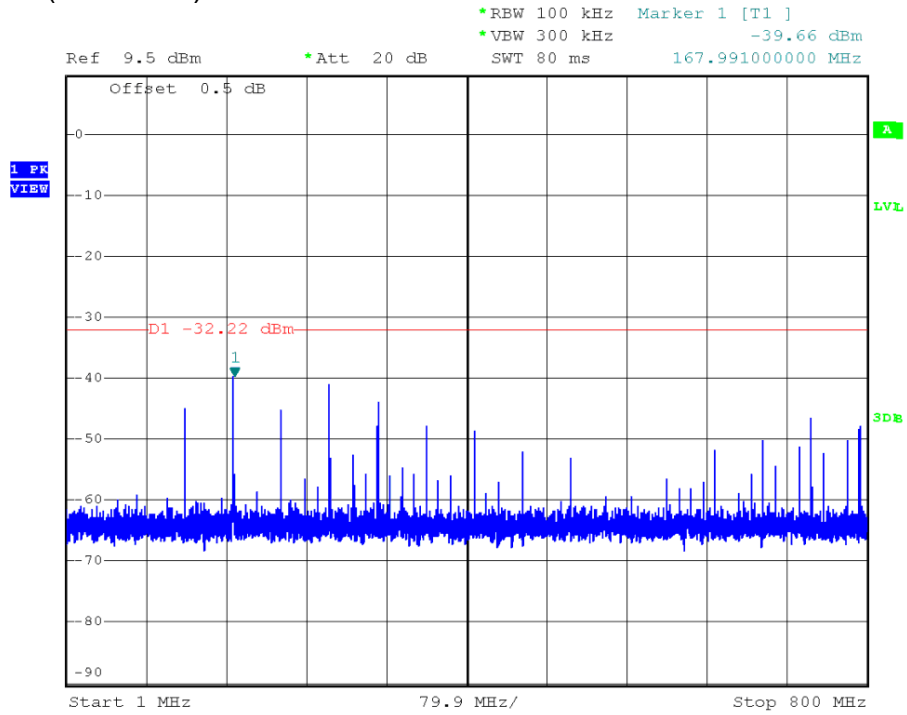
# INTERTEK TESTING SERVICES



TRF no.: FCC 15C\_TX\_b  
 FCC ID: 2ABT4TSN48W  
 Report No.: 131224017SZN-001

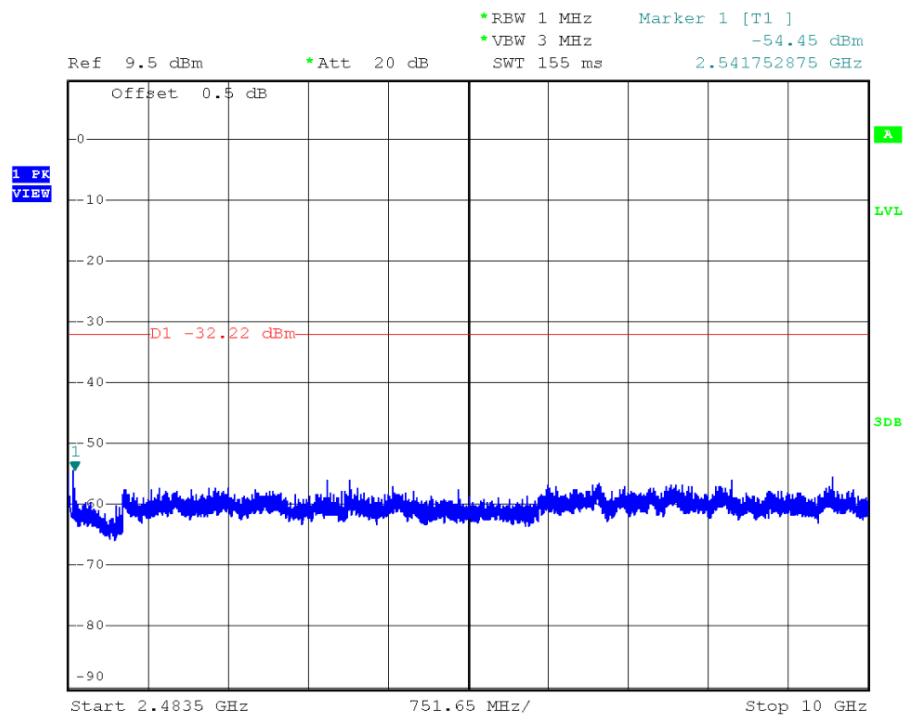
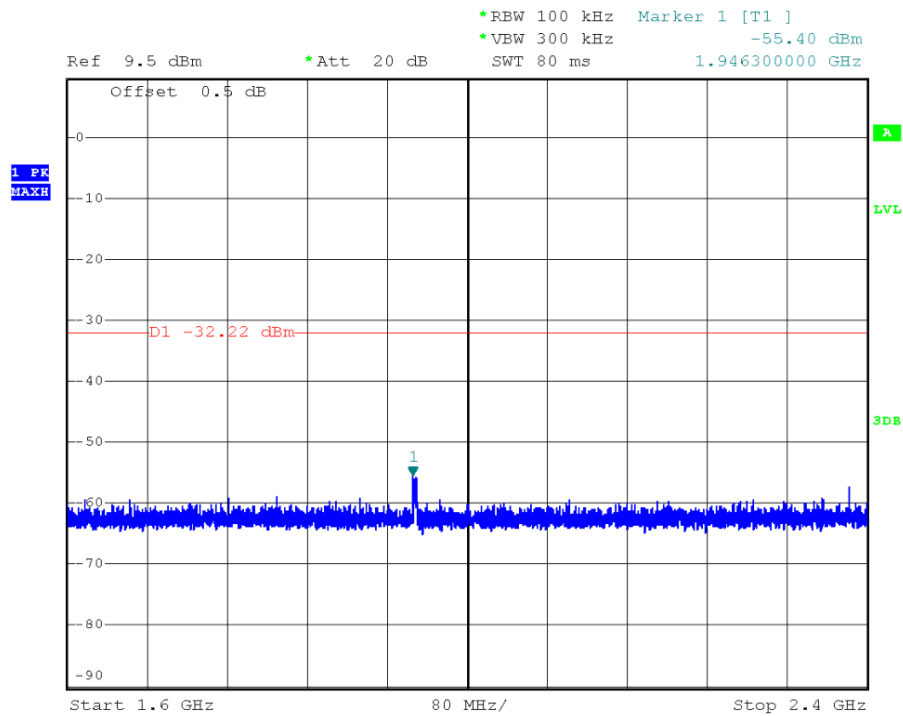
# INTERTEK TESTING SERVICES

Channel 11 (2462MHz) Reference Level: -12.22dBm

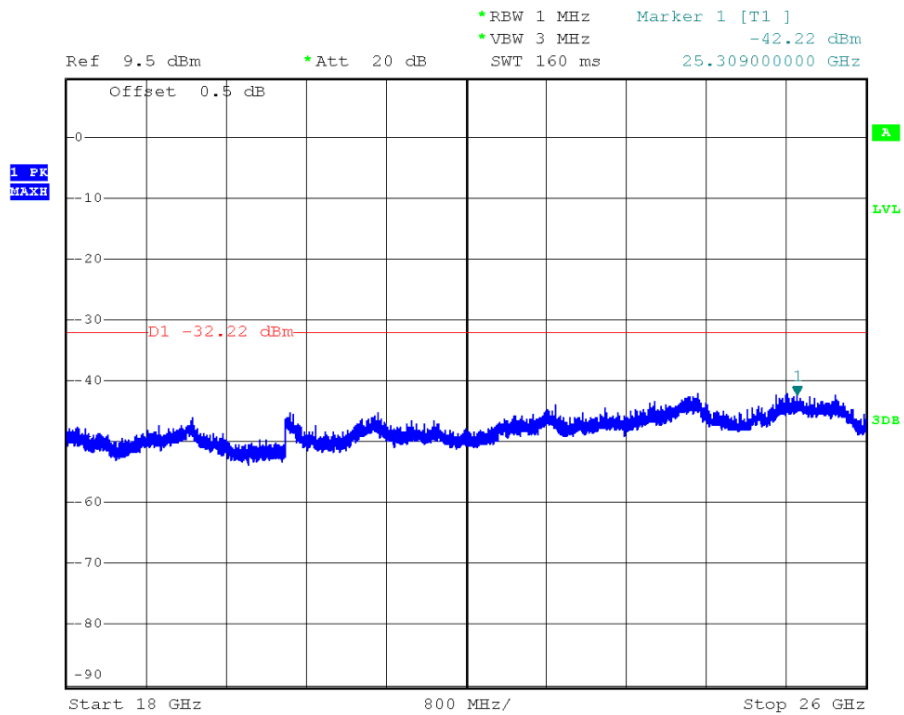
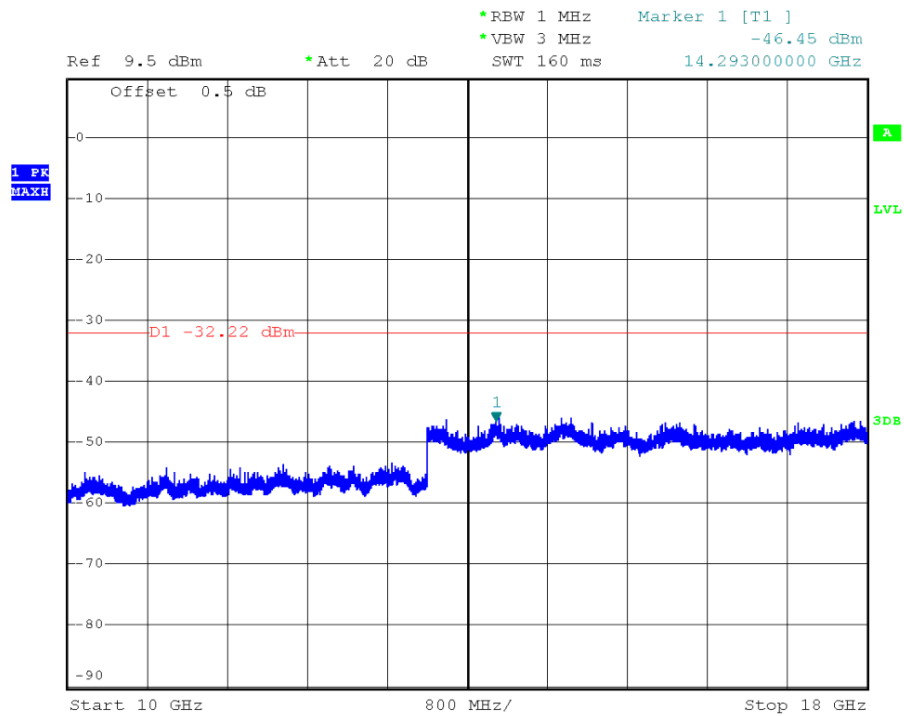


TRF no.: FCC 15C\_TX\_b  
FCC ID: 2ABT4TSN48W  
Report No.: 131224017SZN-001

# INTERTEK TESTING SERVICES



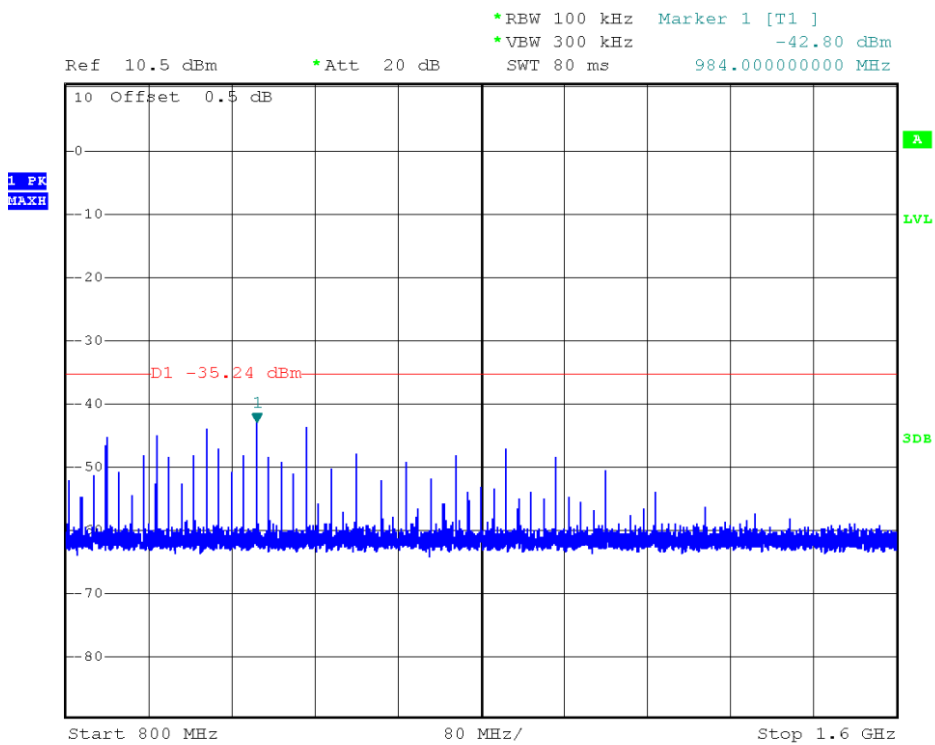
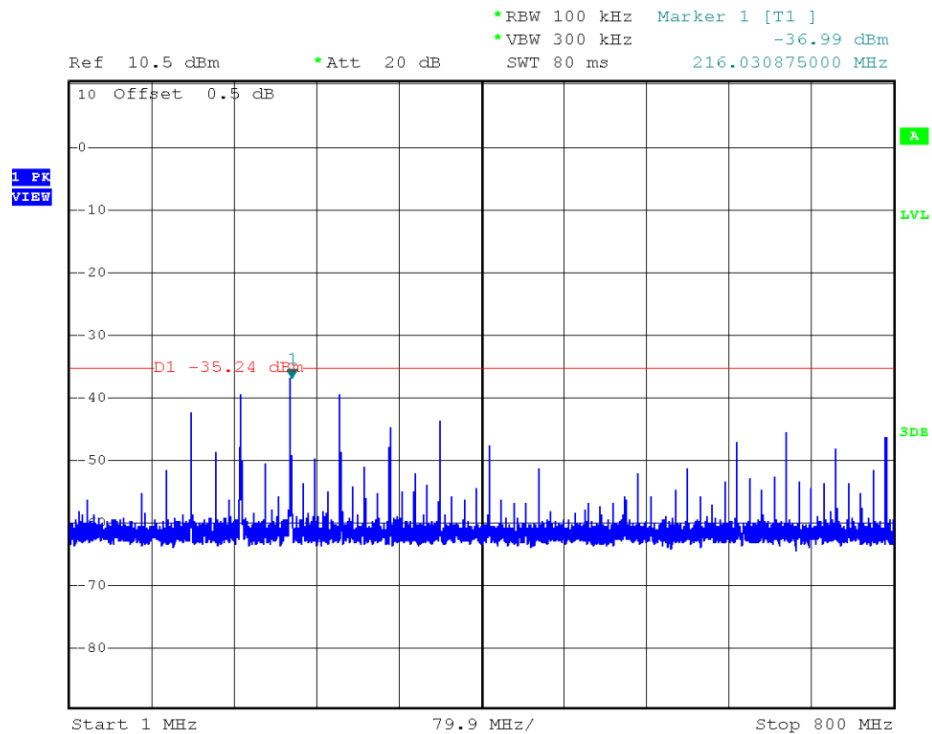
# INTERTEK TESTING SERVICES



# INTERTEK TESTING SERVICES

802.11 n-HT40

Channel 03 (2422MHz) Reference Level: -15.24dBm



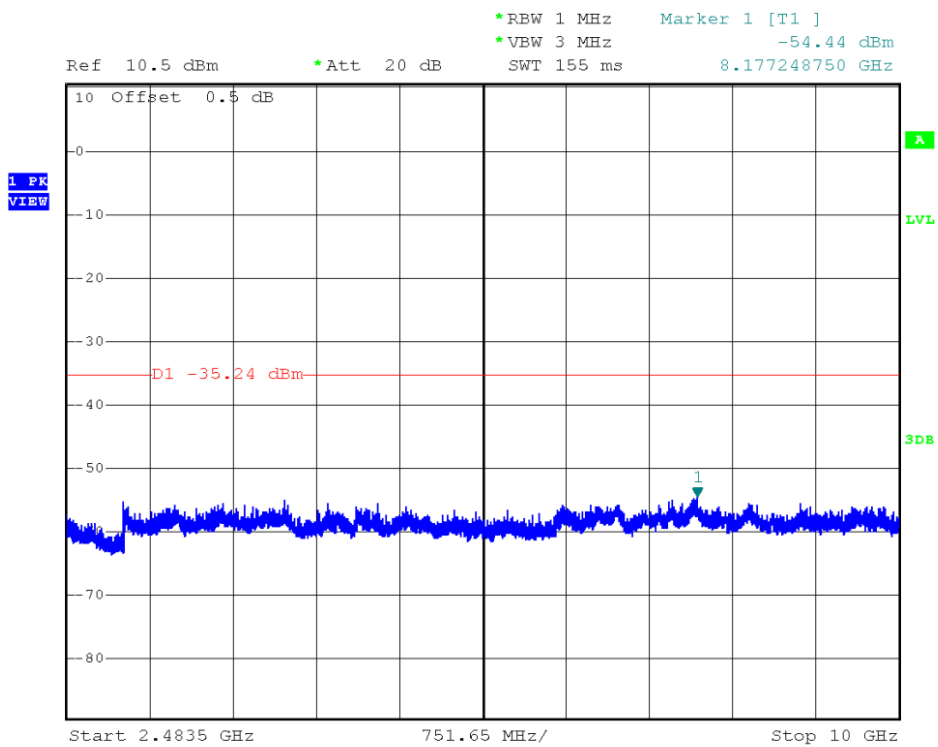
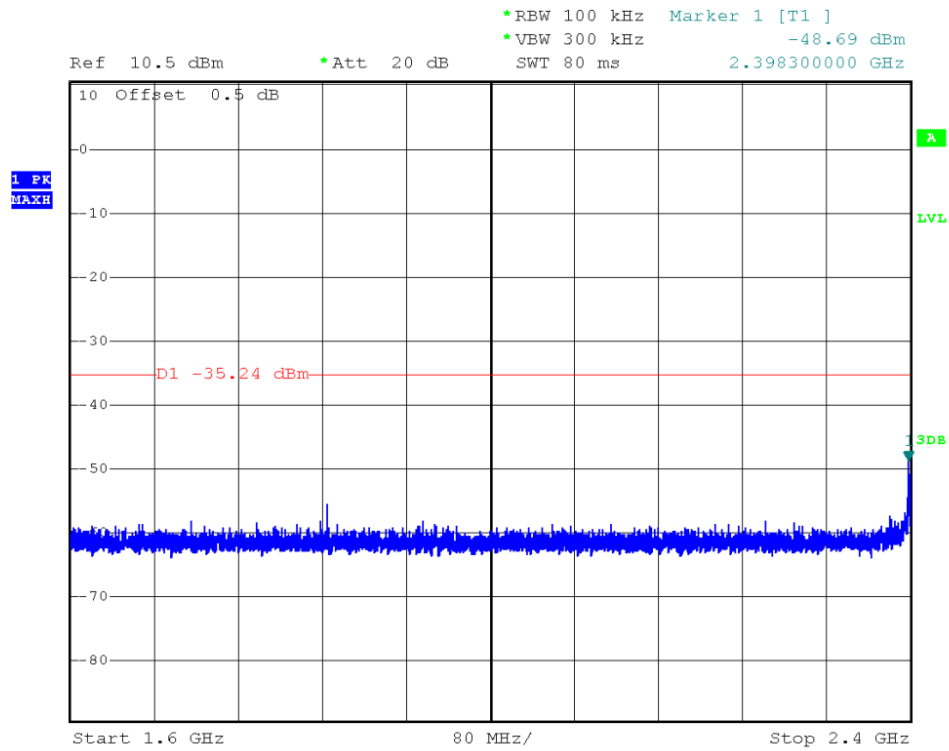
TRF no.: FCC 15C\_TX\_b

FCC ID: 2ABT4TSN48W

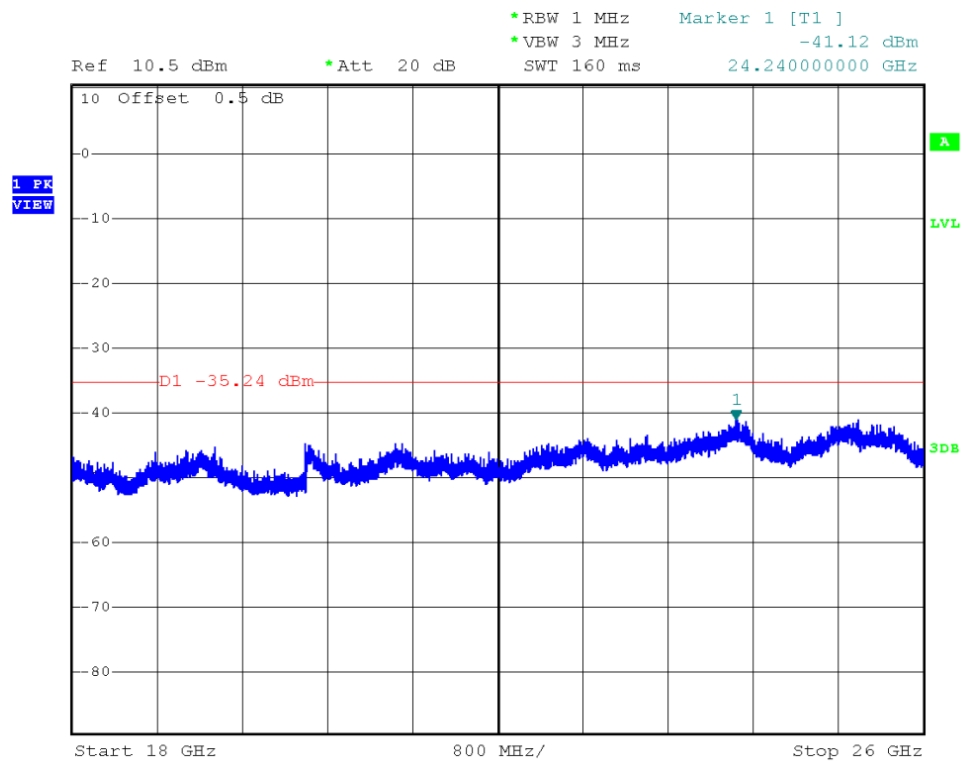
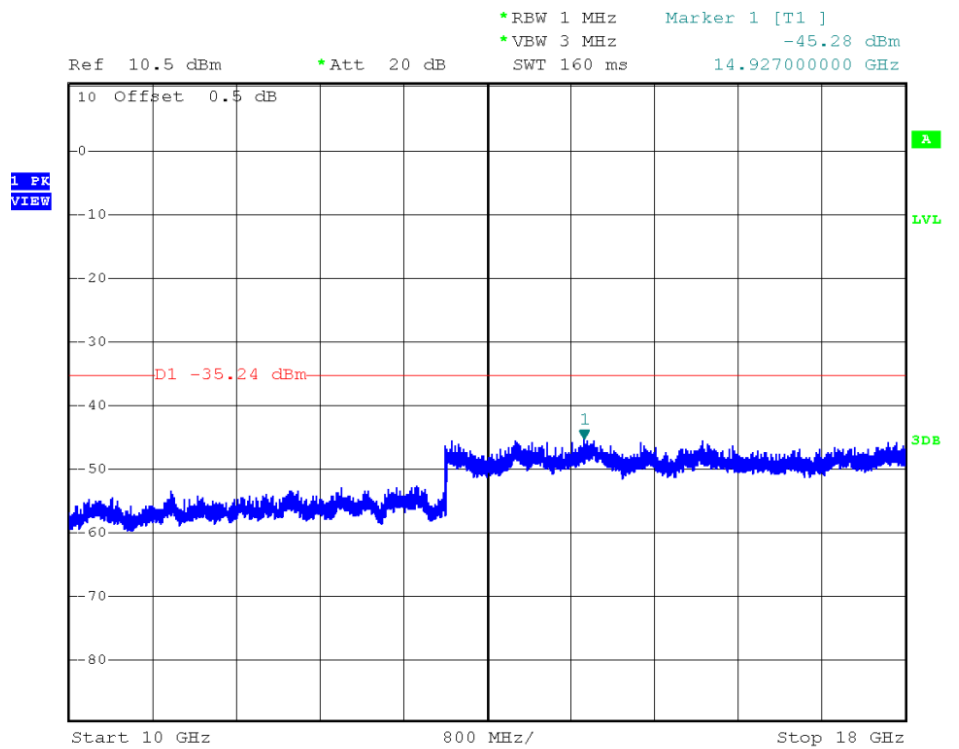
Report No.: 131224017SZN-001



# INTERTEK TESTING SERVICES

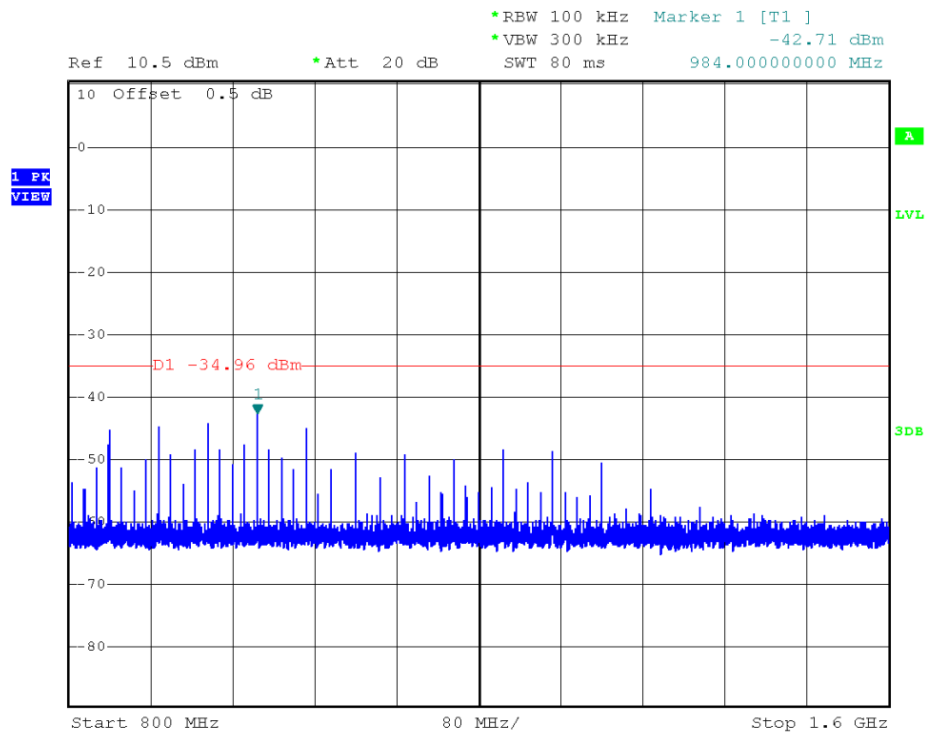
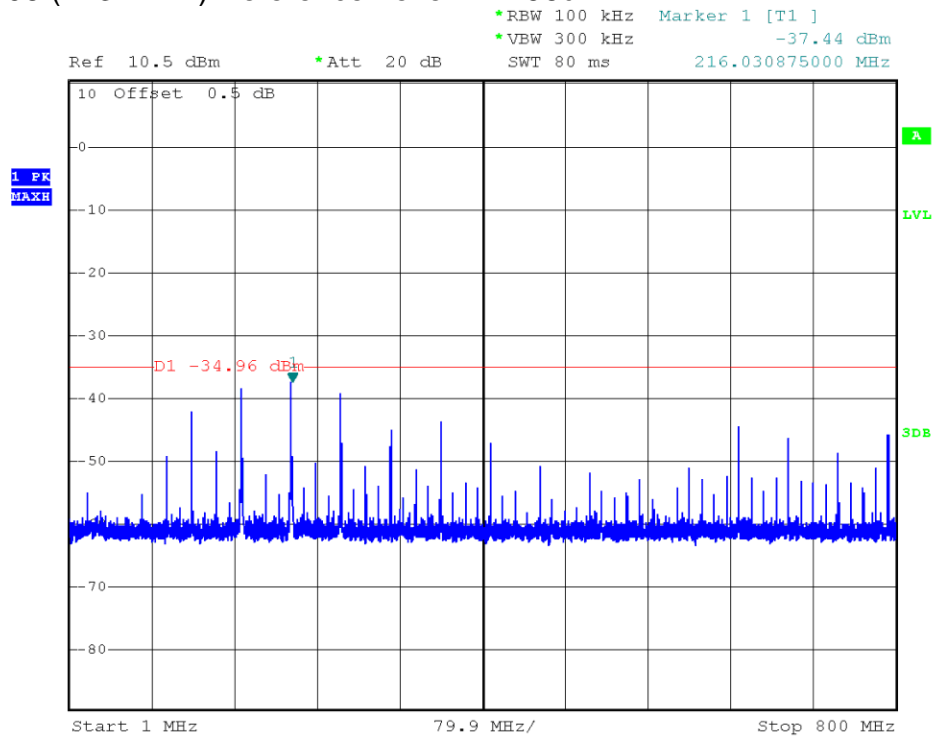


# INTERTEK TESTING SERVICES



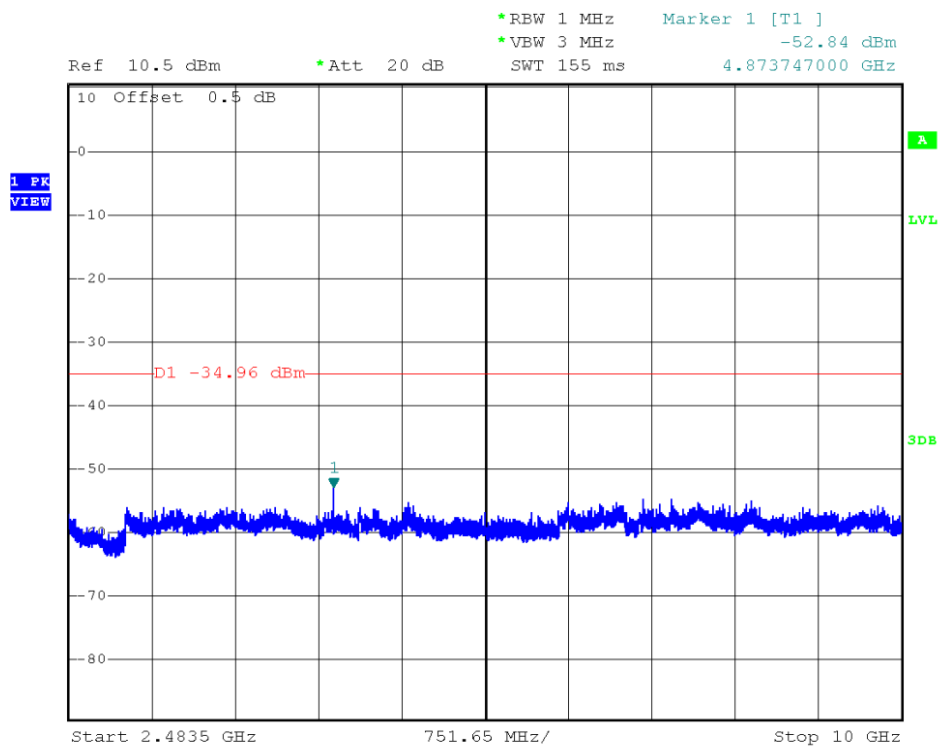
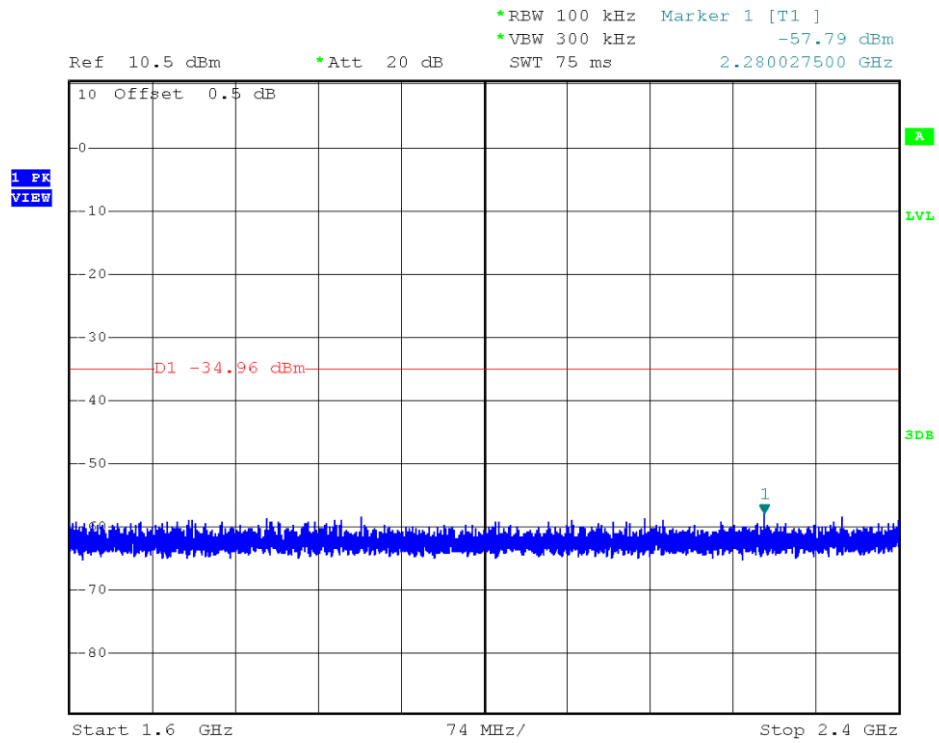
# INTERTEK TESTING SERVICES

Channel 06 (2437MHz) Reference Level: -14.96dBm



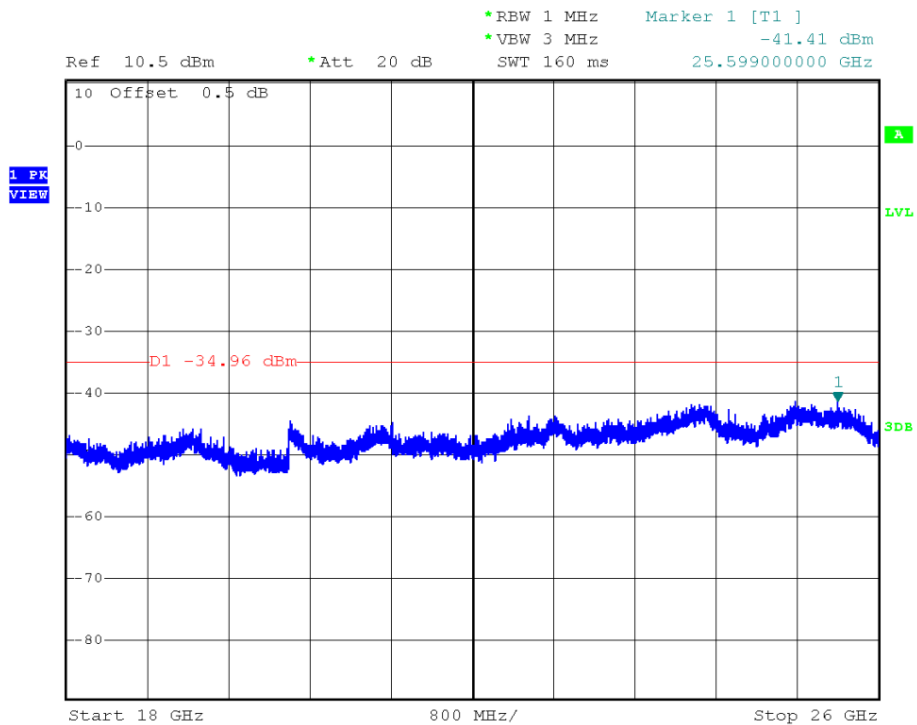
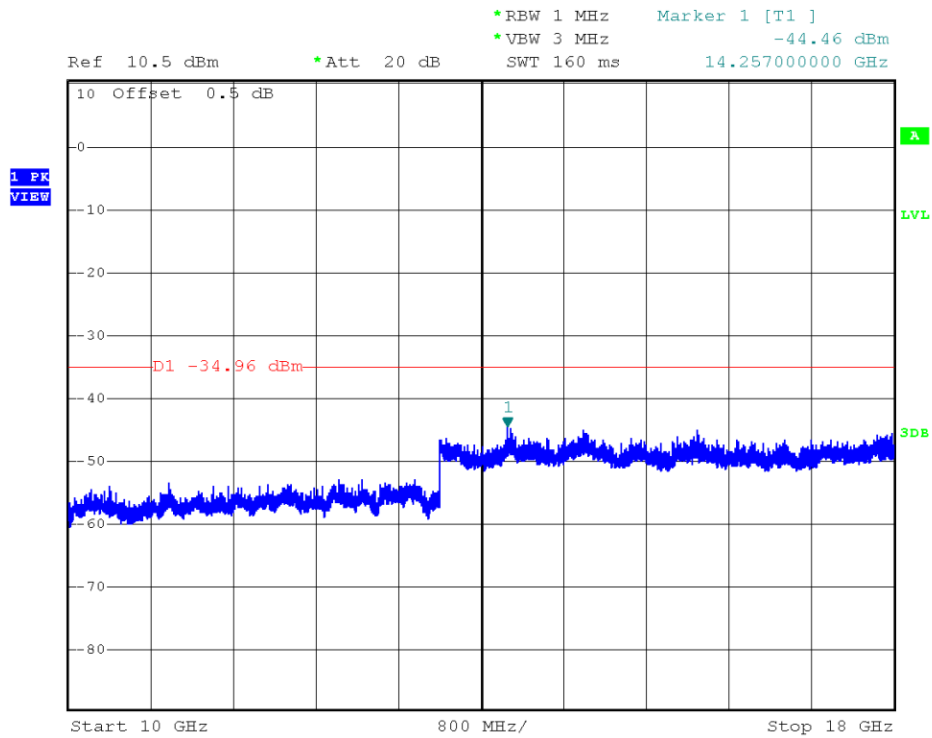
TRF no.: FCC 15C\_TX\_b  
FCC ID: 2ABT4TSN48W  
Report No.: 131224017SZN-001

# INTERTEK TESTING SERVICES



TRF no.: FCC 15C\_TX\_b  
 FCC ID: 2ABT4TSN48W  
 Report No.: 131224017SZN-001

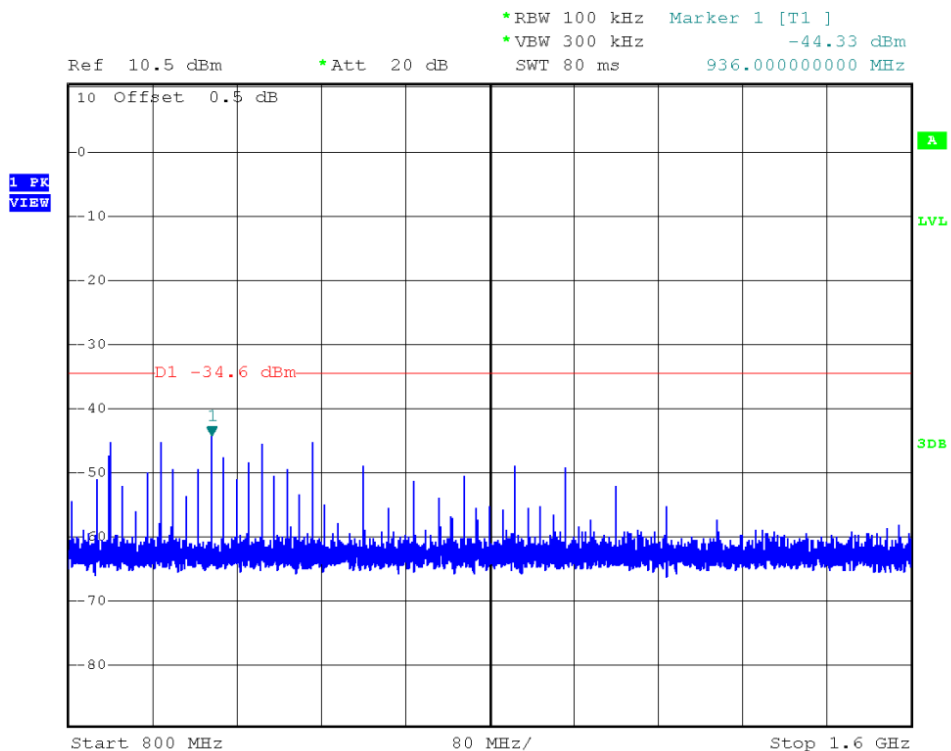
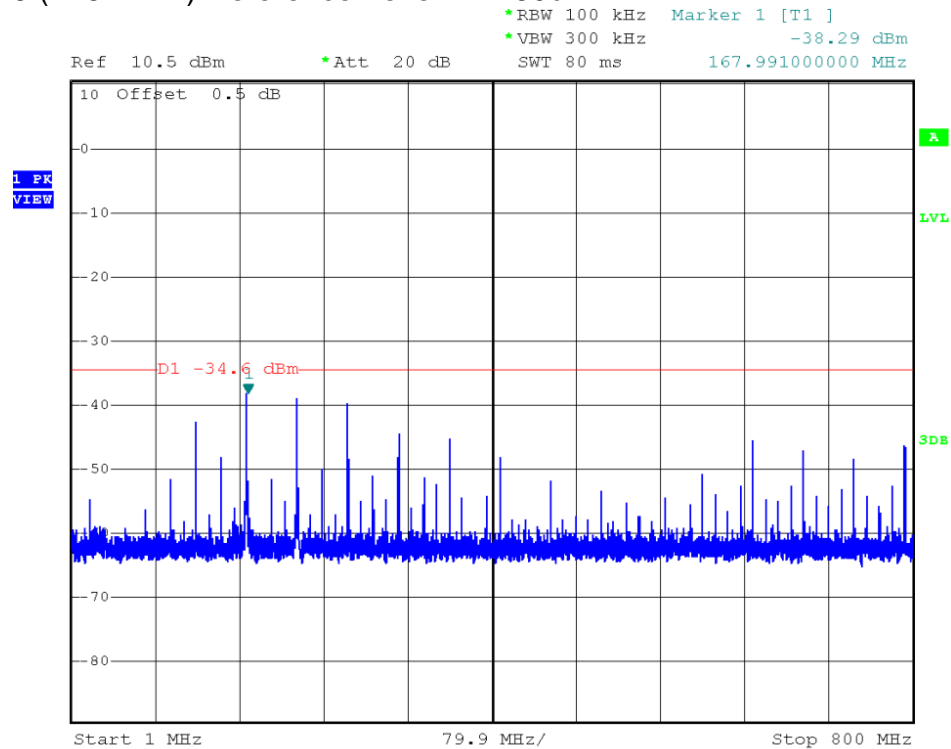
# INTERTEK TESTING SERVICES



TRF no.: FCC 15C\_TX\_b  
 FCC ID: 2ABT4TSN48W  
 Report No.: 131224017SZN-001

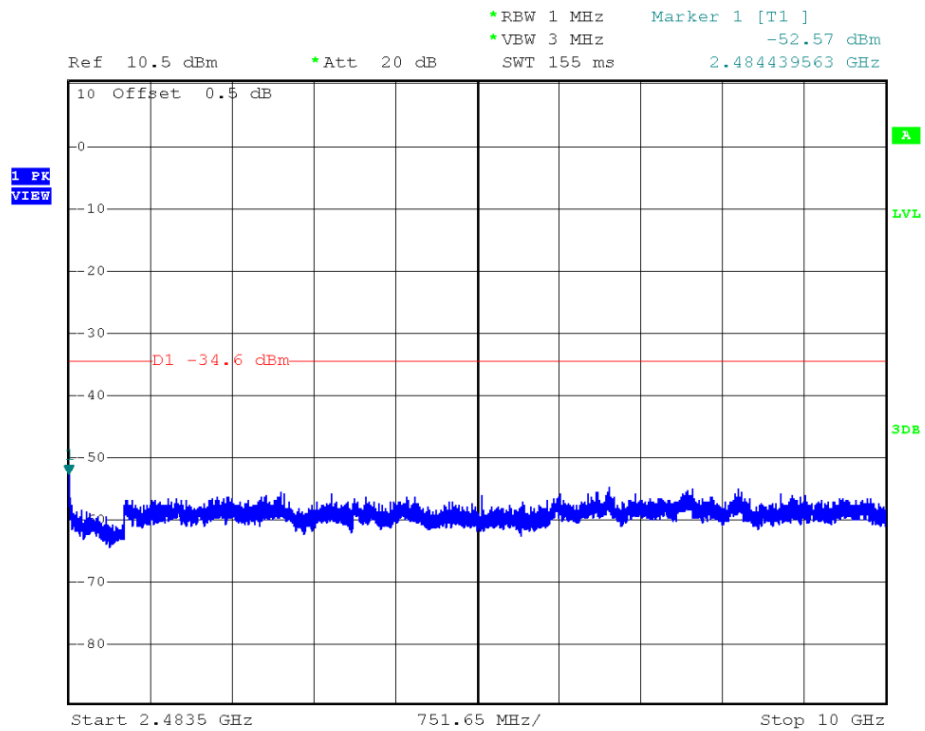
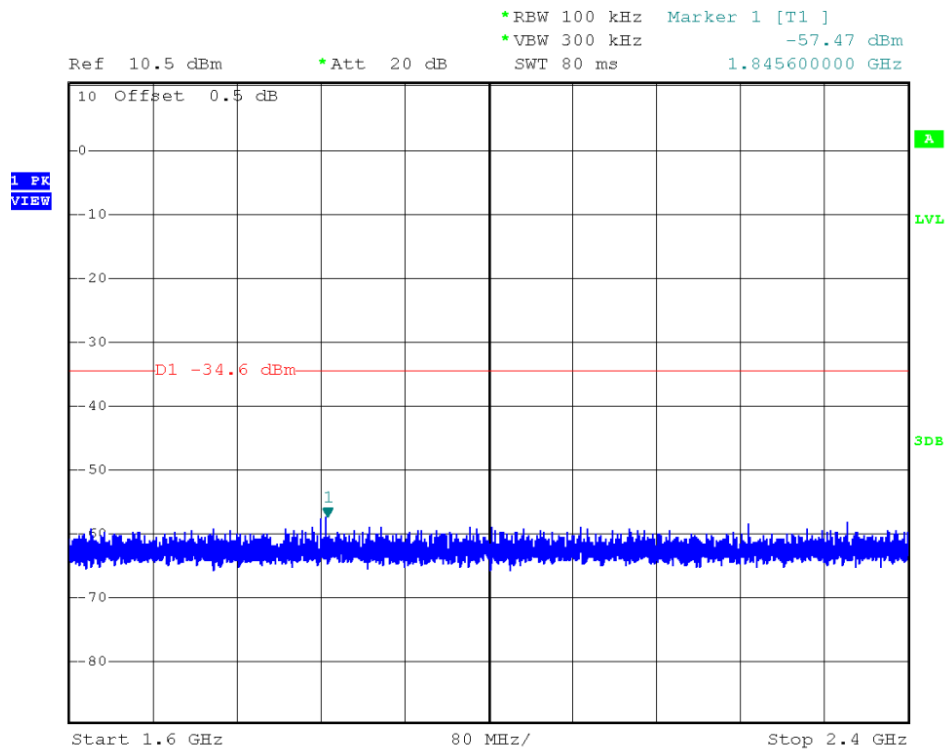
## INTERTEK TESTING SERVICES

Channel 9 (2452MHz) Reference Level: -14.60dBm

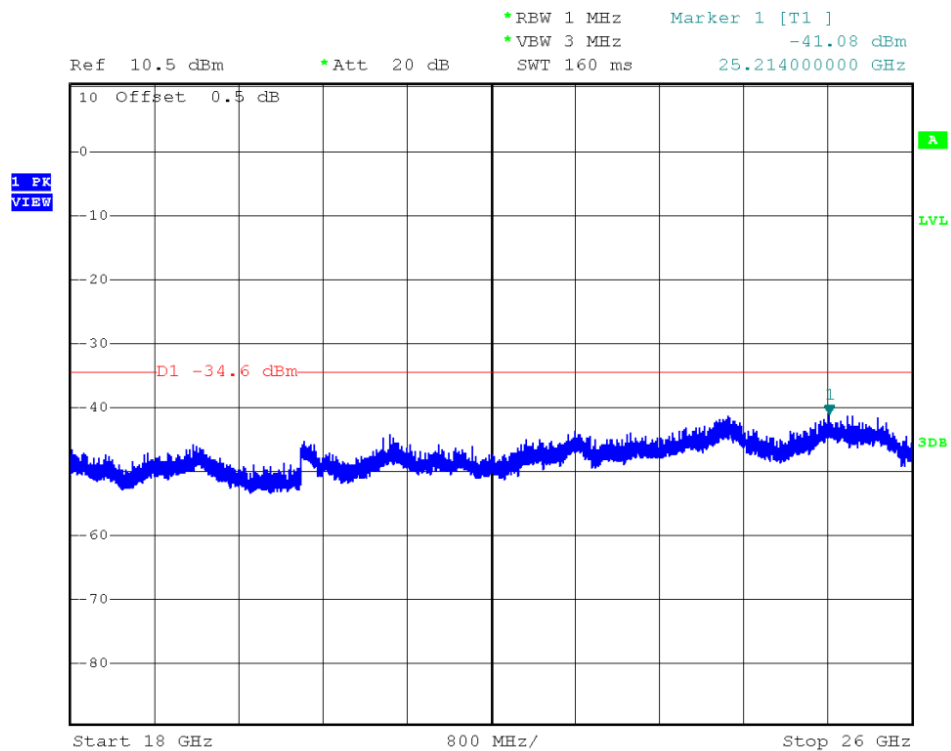
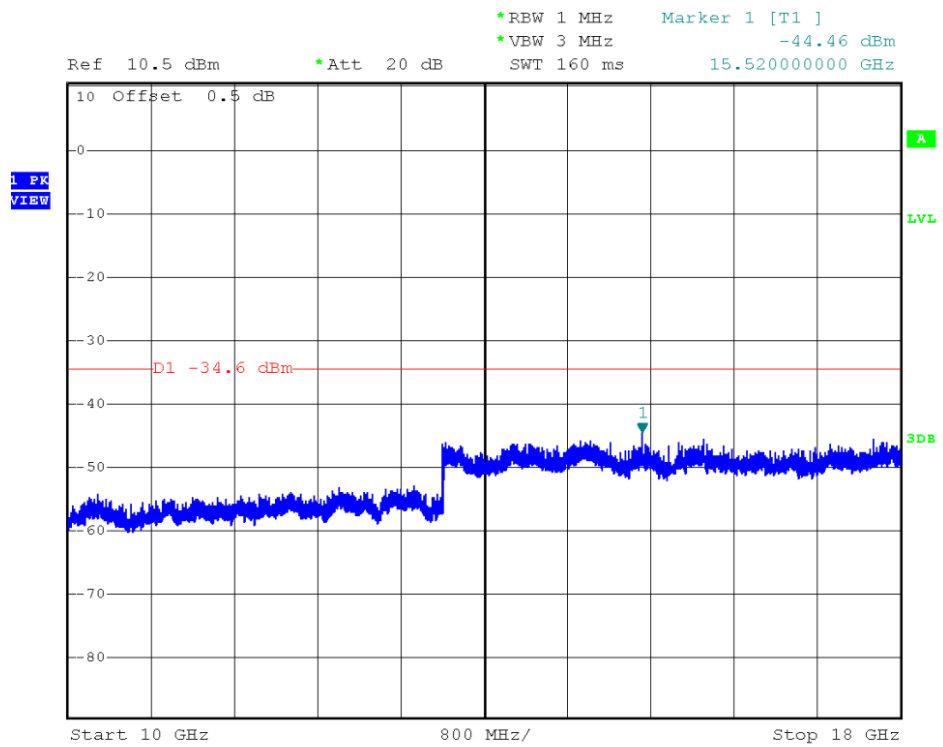


TRF no.: FCC 15C\_TX\_b  
FCC ID: 2ABT4TSN48W  
Report No.: 131224017SZN-001

# INTERTEK TESTING SERVICES



# INTERTEK TESTING SERVICES



TRF no.: FCC 15C\_TX\_b  
 FCC ID: 2ABT4TSN48W  
 Report No.: 131224017SZN-001



## INTERTEK TESTING SERVICES

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Applicant: Sky Light Imaging Limited

Date of Test: January 12, 2014

Model: TSN48W

### 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**

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Applicant: Sky Light Imaging Limited

Date of Test: January 12, 2014

Model: TSN48W

### 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

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Applicant: Sky Light Imaging Limited

Date of Test: January 12, 2014

Model: TSN48W

### 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 $\mu$ V/m
- RA = Receiver Amplitude (including preamplifier) in dB $\mu$ 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 $\mu$ 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 32 dB $\mu$ V/m. This value in dB $\mu$ V/m was converted to its corresponding level in  $\mu$ V/m.

$$\begin{aligned} RA &= 62.0 \text{ dB}\mu\text{V} \\ AF &= 7.4 \text{ dB} \\ CF &= 1.6 \text{ dB} \\ AG &= 29.0 \text{ dB} \\ PD &= 0 \text{ dB} \\ FS &= 62 + 7.4 + 1.6 - 29 + 0 = 42 \text{ dB}\mu\text{V/m} \end{aligned}$$

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

## **INTERTEK TESTING SERVICES**

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Applicant: Sky Light Imaging Limited

Date of Test: January 12, 2014

Model: TSN48W

### **4.8 Radiated Spurious Emission**

Worst Case Radiated Spurious Emission (802.11 n-HT20) at 623.994MHz is passed by 2.0 dB margin.

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

## INTERTEK TESTING SERVICES

Applicant: Sky Light Imaging Limited

Date of Test: January 12, 2014

Model: TSN48W

Worst Case Operating Mode: 802.11 n-HT20 (TX-Channel 01)

### Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	623.994	45.6	20.0	9.4	44.0	46.0	-2.0
Horizontal	815.997	45.0	20.0	17.6	39.2	46.0	-6.8
Horizontal	912.009	36.5	20.0	22.0	38.7	46.0	-7.3
Vertical	432.005	45.5	20.0	10.0	38.4	46.0	-7.6
Vertical	575.996	45.3	20.0	17.6	37.3	46.0	-8.7
Vertical	624.027	36.7	20.0	22.0	40.8	46.0	-5.2

- NOTES:
1. Quasi-Peak detector is used except for others stated.
  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.
  4. All emissions are below the QP limit.

## INTERTEK TESTING SERVICES

Applicant: Sky Light Imaging Limited  
 Date of Test: January 12, 2014  
 Model: TSN48W  
 Mode: 802.11b (TX-Channel 01)

### Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	*4824.000	51.5	36.1	34.1	49.5	74.0	-24.5
Horizontal	*2387.000	72.6	36.8	26.5	62.3	74.0	-11.7

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	*4824.000	40.4	36.1	34.1	38.4	54.0	-15.6
Horizontal	*2387.000	53.5	36.8	26.5	43.2	54.0	-10.8

- 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: Sky Light Imaging Limited  
 Date of Test: January 12, 2014  
 Model: TSN48W  
 Mode: 802.11b (TX-Channel 06)

### Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	*4874.000	50.7	36.1	34.5	49.1	74.0	-24.9
Horizontal	*7311.000	51.9	35.6	37.1	53.4	74.0	-20.6

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	*4874.000	35.8	36.1	34.5	34.2	54.0	-19.8
Horizontal	*7311.000	36.5	35.6	37.1	38.0	54.0	-16.0

- 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: Sky Light Imaging Limited  
 Date of Test: January 12, 2014  
 Model: TSN48W  
 Mode: 802.11b (TX-Channel 11)

### Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	*4924.000	49.8	36.1	34.7	48.4	74.0	-25.6
Horizontal	*2483.550	56.5	35.6	39.5	60.4	74.0	-13.6

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	*4924.000	35.3	36.1	34.7	33.9	54.0	-20.1
Horizontal	*2483.550	38.4	35.6	39.5	42.3	54.0	-11.7

- 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: Sky Light Imaging Limited  
 Date of Test: January 12, 2014  
 Model: TSN48W  
 Mode: 802.11g (TX-Channel 01)

### Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	*4824.000	52.3	36.1	34.1	50.3	74.0	-23.7
Horizontal	*2388.836	74.6	36.8	26.5	64.3	74.0	-9.7

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	*4824.000	42.2	36.1	34.1	40.2	54.0	-13.8
Horizontal	*2388.836	56.8	36.8	26.5	46.5	54.0	-7.5

- 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: Sky Light Imaging Limited  
 Date of Test: January 12, 2014  
 Model: TSN48W  
 Mode: 802.11g (TX-Channel 06)

### Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	*4874.000	52.1	36.1	34.5	50.5	74.0	-23.5
Horizontal	*7311.000	51.4	35.6	37.1	52.9	74.0	-21.1

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	*4874.000	40.3	36.1	34.5	38.7	54.0	-15.3
Horizontal	*7311.000	36.3	35.6	37.1	37.8	54.0	-16.2

- 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: Sky Light Imaging Limited  
 Date of Test: January 12, 2014  
 Model: TSN48W  
 Mode: 802.11g (TX-Channel 11)

### Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	*4924.000	50.1	36.1	34.7	48.7	74.0	-25.3
Horizontal	*2483.612	60.0	35.6	39.5	63.9	74.0	-10.1

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	*4924.000	37.5	36.1	34.7	36.1	54.0	-17.9
Horizontal	*2483.612	37.6	35.6	39.5	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: Sky Light Imaging Limited  
 Date of Test: January 12, 2014  
 Model: TSN48W  
 Mode: 802.11 n-HT20 (TX-Channel 01)

### Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB $\mu$ V/m)	Peak Limit at 3m (dB $\mu$ V/m)	Margin (dB)
Horizontal	*4824.000	51.4	36.1	34.1	49.4	74.0	-24.6
Horizontal	*2389.154	72.7	36.8	26.5	62.4	74.0	-11.6

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB $\mu$ V/m)	Average Limit at 3m (dB $\mu$ V/m)	Margin (dB)
Horizontal	*4824.000	37.9	36.1	34.1	35.9	54.0	-18.1
Horizontal	*2389.154	54.6	36.8	26.5	44.3	54.0	-9.7

- 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: Sky Light Imaging Limited  
 Date of Test: January 12, 2014  
 Model: TSN48W  
 Mode: 802.11 n-HT20 (TX-Channel 06)

### Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	*4874.000	50.4	36.1	34.5	48.8	74.0	-25.2
Horizontal	*7311.000	51.4	35.6	37.1	52.9	74.0	-21.1

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	*4874.000	37.7	36.1	34.5	36.1	54.0	-17.9
Horizontal	*7311.000	36.2	35.6	37.1	37.7	54.0	-16.3

- 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: Sky Light Imaging Limited  
 Date of Test: January 12, 2014  
 Model: TSN48W  
 Mode: 802.11 n-HT20 (TX-Channel 11)

### Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	*4924.000	50.5	36.1	34.7	49.1	74.0	-24.9
Horizontal	*2483.521	60.5	35.6	39.5	64.4	74.0	-9.6

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	*4924.000	35.8	36.1	34.7	34.4	54.0	-19.6
Horizontal	*2483.521	36.2	35.6	39.5	40.1	54.0	-13.9

- 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: Sky Light Imaging Limited  
 Date of Test: January 12, 2014  
 Model: TSN48W  
 Mode: 802.11 n-HT40 (TX-Channel 03)

### Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	*4844.000	51.7	36.1	34.1	49.7	74.0	-24.3
Horizontal	*2389.920	75.7	36.8	26.5	65.4	74.0	-8.6

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	*4844.000	40.9	36.1	34.1	38.9	54.0	-15.1
Horizontal	*2389.920	57.0	36.8	26.5	46.7	54.0	-7.3

- 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: Sky Light Imaging Limited  
 Date of Test: January 12, 2014  
 Model: TSN48W  
 Mode: 802.11 n-HT40 (TX-Channel 06)

### Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	*4874.000	52.0	36.1	34.5	50.4	74.0	-23.6
Horizontal	*7311.000	50.8	35.6	37.1	52.3	74.0	-21.7

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	*4874.000	38.3	36.1	34.5	36.7	54.0	-17.3
Horizontal	*7311.000	36.3	35.6	37.1	37.8	54.0	-16.2

- 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: Sky Light Imaging Limited  
 Date of Test: January 12, 2014  
 Model: TSN48W  
 Mode: 802.11 n-HT40 (TX-Channel 9)

### Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	*4904.000	51.5	36.1	34.7	50.1	74.0	-23.9
Horizontal	*2483.521	61.0	35.6	39.5	64.9	74.0	-9.1

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	*4904.000	36.9	36.1	34.7	35.5	54.0	-18.5
Horizontal	*2483.521	40.0	35.6	39.5	43.9	54.0	-10.1

- 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

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### 4.9 Conducted Emission

Worst Case Conducted emission at 0.742MHz is Passed by 5.3 dB margin

For electronic filing, the worst case conducted emission configuration photograph is saved with filename: conducted photos.pdf.

## INTERTEK TESTING SERVICES

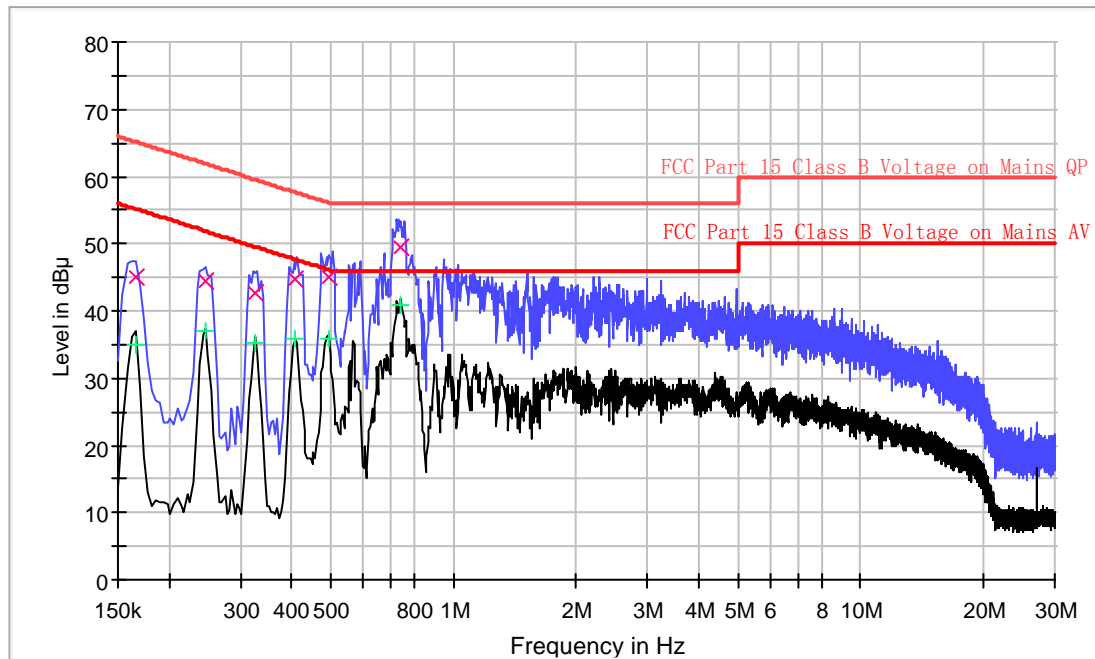
Applicant: Sky Light Imaging Limited

Date of Test: January 12, 2014

Model: TSN48W

Worst Case Operating Mode: 802.11 n-HT20 (TX-Channel 01)

### Conducted Emission Test - FCC



### Result Table QP

Frequency (MHz)	QuasiPeak (dB μV)	Line	Corr. (dB)	Margin (dB)	Limit (dB μV)
0.166000	45.1	L1	9.7	20.1	65.2
0.246000	44.3	L1	9.7	17.6	61.9
0.326000	42.6	L1	9.7	17.0	59.6
0.410000	44.7	L1	9.7	12.9	57.6
0.494000	45.2	L1	9.7	10.9	56.1
0.742000	49.4	L1	9.7	6.6	56.0

### Result Table AV

Frequency (MHz)	Average (dB μV)	Line	Corr. (dB)	Margin (dB)	Limit (dB μV)
0.166000	34.9	L1	9.7	20.3	55.2
0.246000	36.9	L1	9.7	15.0	51.9
0.326000	35.2	L1	9.7	14.4	49.6
0.410000	35.9	L1	9.7	11.7	47.6
0.494000	35.7	L1	9.7	10.4	46.1
0.742000	40.7	L1	9.7	5.3	46.0

TRF no.: FCC 15C\_TX\_b

FCC ID: 2ABT4TSN48W

Report No.: 131224017SZN-001

## INTERTEK TESTING SERVICES

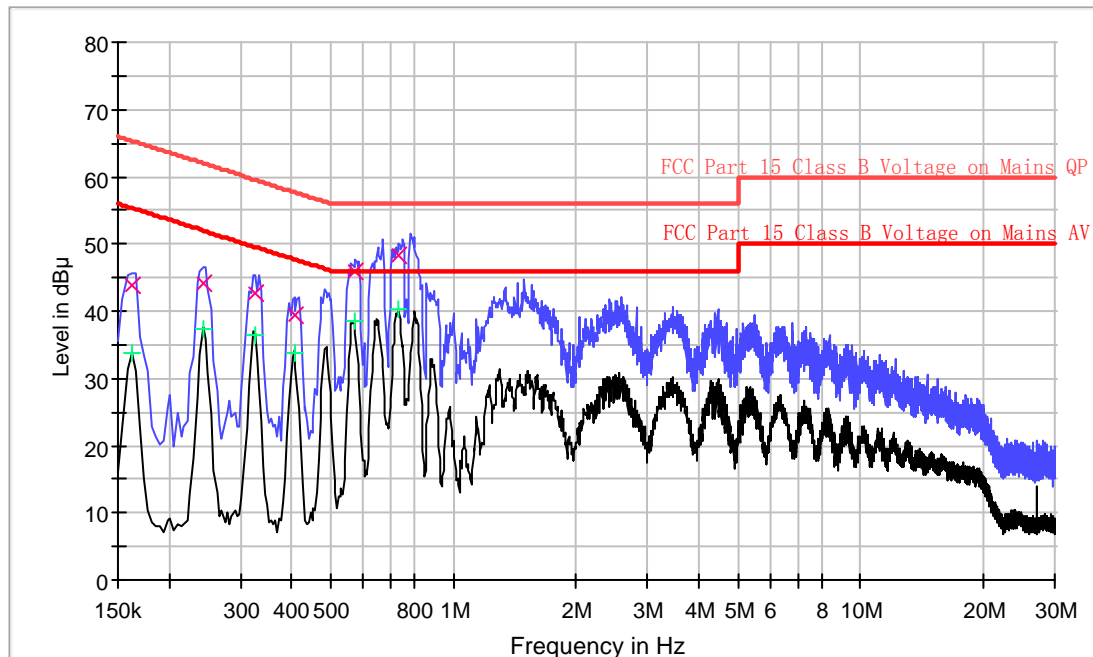
Applicant: Sky Light Imaging Limited

Date of Test: January 12, 2014

Model: TSN48W

Worst Case Operating Mode: 802.11n-HT20 (TX-Channel 01)

### Conducted Emission Test - FCC



### Result Table QP

Frequency (MHz)	QuasiPeak (dB $\mu$ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)
0.162000	44.0	N	10.1	21.4	65.4
0.242000	44.0	N	10.2	18.0	62.0
0.326000	42.6	N	10.2	17.0	59.6
0.406000	39.4	N	10.2	18.3	57.7
0.570000	45.9	N	10.2	10.1	56.0
0.734000	48.2	N	10.3	7.8	56.0

### Result Table AV

Frequency (MHz)	Average (dB $\mu$ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)
0.162000	33.8	N	10.1	21.6	55.4
0.242000	37.3	N	10.2	14.7	52.0
0.326000	36.3	N	10.2	13.3	49.6
0.406000	33.8	N	10.2	13.9	47.7
0.570000	38.5	N	10.2	7.5	46.0
0.734000	40.3	N	10.3	5.7	46.0

TRF no.: FCC 15C\_TX\_b

FCC ID: 2ABT4TSN48W

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4.10 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

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Applicant: Sky Light Imaging Limited

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### 4.11 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.

**EXHIBIT 5**  
**EQUIPMENT PHOTOGRAPHS**

## INTERTEK TESTING SERVICES

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### 5.0 Equipment Photographs

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



**EXHIBIT 6**  
**PRODUCT LABELLING**

## INTERTEK TESTING SERVICES

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### 6.0 **Product Labeling**

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

# **INTERTEK TESTING SERVICES**

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## **EXHIBIT 7**

### **TECHNICAL SPECIFICATIONS**

## INTERTEK TESTING SERVICES

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### 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

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### 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.

**EXHIBIT 9**  
**CONFIDENTIALITY REQUEST**

## INTERTEK TESTING SERVICES

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### 9.0 **Confidentiality Request**

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



## **INTERTEK TESTING SERVICES**

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### **EXHIBIT 10**

### **MISCELLANEOUS INFORMATION**

## INTERTEK TESTING SERVICES

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### 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.

**EXHIBIT 11**  
**TEST EQUIPMENT LIST**

## INTERTEK TESTING SERVICES

### 11.0 Test Equipment List

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
SZ061-03	BiConiLog Antenna	ETS	3142C	00066460	29-Jun-13	29-Jun-14
SZ185-01	EMI Receiver	R&S	ESCI	100547	12-Mar-13	12-Mar-14
SZ061-07	Pyramidal Horn Antenna	ETS	3160-09	00083067	26-Oct-13	26-Oct-14
SZ061-08	Horn Antenna	ETS	3115	00092346	13-May-13	13-May-14
SZ061-06	Active Loop Antenna	Electro-Metrics	EM-6876	217	27-Aug-13	27-Aug-14
SZ056-03	Spectrum Analyzer	R&S	FSP 30	101148	12-Mar-13	12-Mar-14
SZ181-04	Preamplifier	Agilent	8449B	3008A02474	12-Mar-13	12-Mar-14
SZ188-01	Anechoic Chamber	ETS	RFD-F/A-100	4102	2-Mar-13	2-Mar-14
SZ062-02	RF Cable	RADIAL	RG 213U	--	8-Jan-14	8-Jul-14
SZ062-06	RF Cable	RADIAL	0.04-26.5GHz	--	8-Jan-14	8-Jul-14
SZ062-12	RF Cable	RADIAL	0.04-26.5GHz	--	17-Oct-13	17-Apr-14
SZ067-04	Notch Filter	Micro-Tronics	BRM5070 2-02	--	21-May-13	21-May-14
SZ185-02	EMI Test Receiver	R&S	ESCI	100692	9-Nov-13	9-Nov-14
SZ187-01	Two-Line V-Network	R&S	ENV216	100072	9-Nov-13	9-Nov-14
SZ187-02	Two-Line V-Network	R&S	ENV216	100073	9-Nov-13	9-Nov-14
SZ188-03	Shielding Room	ETS	RFD-100	4100	23-Aug-13	23-Aug-14