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TEST REPORT

Report No.: 14030871HKG-001

Teenage Engineering AB

Application
For
Certification
(Original Grant)
(FCC ID: Z23007A)
(IC: 9915A-007A)

Transceiver

Prepared and Checked by:

Approved by:

Wong Cheuk Ho, Herbert
Lead Engineer

Wong Kwok Yeung, Kenneth
Lead Engineer
Date: June 16, 2014

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Intertek Testing Services Hong Kong Ltd.

2/F., Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.
Tel: (852) 2173 8888 Fax: (852) 2785 5487 Website: www.hk.intertek-etlsemko.com

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GENERAL INFORMATION

Grantee:	Teenage Engineering AB
Grantee Address:	Katarina bangata 71 garage, Stockholm, Sweden.
Contact Person:	David Eriksson
Tel:	+46 8 599 953 72
Fax:	+46 8 599 953 72
e-mail:	david@teenageengineering.com
Manufacturer:	Dongguan Kwan Hong Electronics Co., Ltd.
Manufacturer Address:	KwanHong Building, Xiao Bian 2nd Industrial Zone, Chang An, Dongguan, China.
Brand Name:	Teenage Engineering
Model:	OD-11
Type of EUT:	Transceiver
Description of EUT:	Wireless Speaker
Serial Number:	N/A
FCC ID / IC:	Z23007A / 9915A-007A
Date of Sample Submitted:	March 20, 2014
Date of Test:	March 20, 2014 to May 02, 2014
Report No.:	14030871HKG-001
Report Date:	June 16, 2014
Environmental Conditions:	Temperature: +10 to 40°C Humidity: 10 to 90%

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SUMMARY OF TEST RESULT

TEST SPECIFICATION	REFERENCE	RESULTS
Transmitter Power Line Conducted Emissions	15.207 / RSS-Gen 7.2.4	Pass
Radiated Emission Radiated Emission on the Bandedge	15.249 / RSS-210 A2.9	Pass
Digital Device Radiated Emissions	15.109 / RSS-210 2.5	Pass
Radiated Emission in Restricted Bands	15.205 / RSS-210 2.2	Pass

The equipment under test is found to be complying with the following standards:
FCC Part 15, October 1, 2012 Edition
RSS-210 Issue 8, December 2010
RSS-Gen Issue 3, December 2010

- Note: 1. The EUT uses a permanently attached antenna which, in accordance to section 15.203, is considered sufficient to comply with the provisions of this section.
2. Pursuant to FCC part 15 Section 15.215(c), the 20 dB bandwidth of the emission was contained within the frequency band designated (mentioned as above) which the EUT operated. The effects, if any, from frequency sweeping, frequency hopping, other modulation techniques and frequency stability over excepted variations in temperature and supply voltage were considered.

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1.0 **General Description**

1.1 Product Description

The Equipment Under Test (EUT) is a Wireless Speaker equipped with an integrated WiFi and Bluetooth transceiver module (Jorjin WG7837-BO). The EUT can accept audio signal from Airplay (WiFi) enabled device such as iphone. The Bluetooth portion is for remote control function only. The EUT can also accept line-level analog audio signal input via 3.5mm phone jack and digital audio signal via optical input (TOSLINK). The EUT is powered by 100-240VAC.

The EUT has two antennas (Antenna 1 and 2). Both can support transmitting and receiving functions.

Antenna 1 supports 2.4GHz band only: WLAN (WiFi) and Bluetooth BLE.
Antenna 2 supports 2.4GHz and 5GHz band WLAN (WiFi).

This report covered testing of 2.4GHz band only.

For 2.4GHz band operation:

Antenna 1 and 2 can be configured as MIMO when operating in 20MHz channels (802.11 b/g/n HT20).

Antenna 1 can be configured as SISO when operating in Bluetooth BLE.

Antenna 2 can be configured as SISO when operating in 40MHz channels (802.11n HT40).

During 802.11b, 802.11g and 802.11n HT 20 (20MHz bandwidth) mode, the EUT occupies 11 channels with 5MHz channel spacing (2412MHz to 2462MHz).

During 802.11n HT40 (40MHz bandwidth) mode, the EUT occupies 7 channels with 5MHz channel spacing (2422MHz to 2452MHz).

During Bluetooth BLE mode, the EUT occupies 40 channels with 2MHz channel spacing (2402MHz to 2480MHz).

Antenna Type: Internal, Integral

1.2 Related Submittal(s) Grants

This is a single application for certification of a transceiver.

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1.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.4 (2003). All radiated measurements were performed in an Open Area Test Site. Preliminary scans were performed in the Open Area Test Site only to determine 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. Average measurements were performed according to ANSI C63.10.

1.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located at Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong. This test facility and site measurement data have been placed on file with the FCC and IC.

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2.0 **System Test Configuration**

2.1 Justification

The system was configured for testing in a typical fashion (as a customer would normally use it), and in the confines as outlined in ANSI C63.4 (2003).

The device was powered by 120VAC.

For AC line conducted emission test, the EUT along with its peripherals were placed on a 1.0m(W)X1.5m(L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4meter space from a vertical ground plane. The EUT was connected to power mains through a line impedance stabilization network (LISN), which provided 50ohm coupling impedance for measuring instrument. The LISN housing, measuring instrument case, reference ground plane, and vertical ground plane were bounded together. The excess power cable between the EUT and the LISN was bundled.

For maximizing radiated emissions, the EUT was rotated through 360°, the antenna height was varied from 1 meter to 4 meters above the ground plane, and the antenna polarization was changed. This step by step procedure for maximizing emissions led to the data reported in Exhibit 3.0.

The rear of unit shall be flushed with the rear of the table.

The equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). The EUT was mounted to a plastic stand if necessary and placed on the wooden turntable, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

As the EUT has two antennas, both antennas have been checked. While conducting the test on one of antennas, another one was being disabled its transmission. Different setting of data rates of WLAN (WiFi) has been tested and worst case data is reported only.

For simultaneous transmission of WLAN (WiFi) and Bluetooth, both WLAN (WiFi) and Bluetooth portions are also switched on when taking radiated emission for determining worst-case spurious emission.

2.2 EUT Exercising Software

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use.

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2.3 Special Accessories

There are no special accessories necessary for compliance of this product.

2.4 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.

2.5 Support Equipment List and Description

1. Audio cable (3.5mm phone jack) of 1m long
(Provided by Intertek)
2. iphone (for conducted emission measurement)
(Provided by Intertek)
3. ipod (for radiated emission measurement)
(Provided by Intertek)
4. AC power cable of 1m long
(Provided by Applicant)

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3.0 Emission Results

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.

3.1 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any), Average Factor (optional) from the measured reading. The basic equation with a sample calculation is as follows:

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

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
- AV = Average Factor in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows:

$$FS = RR + LF$$

where

- FS = Field Strength in dB μ V/m
- RR = RA - AG - AV in dB μ V
- LF = CF + AF in dB

Assume a receiver reading of 52.0 dB μ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB are added. The amplifier gain of 29 dB and average factor of 5 dB are subtracted, giving a field strength of 32 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

RA = 52.0 dB μ V/m	
AF = 7.4 dB	RR = 18.0 dB μ V
CF = 1.6 dB	LF = 9.0 dB
AG = 29.0 dB	
AV = 5.0 dB	
FS = RR + LF	
FS = 18 + 9 = 27 dB μ V/m	

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(27 \text{ dB}\mu\text{V/m})/20] = 22.4 \mu\text{V/m}$$

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3.2 Radiated Emission Worse Case Configuration

The worst case in radiated emission was found at 4824.000 MHz at 802.11b DSSS 11Mbps.

3.3 Radiated Emission Data

The data on the following page lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

Judgment: Passed by 2.2 dB (Worse Case: 802.11b DSSS 11Mbps)

3.4 Conducted Emission Worse Case Configuration

The worst case in line-conducted emission was found at 0.186 MHz when both WiFi and Bluetooth are transmitting.

3.5 Conducted Emission Data

The data on the following page lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

Judgment: Pass by 11.0 dB

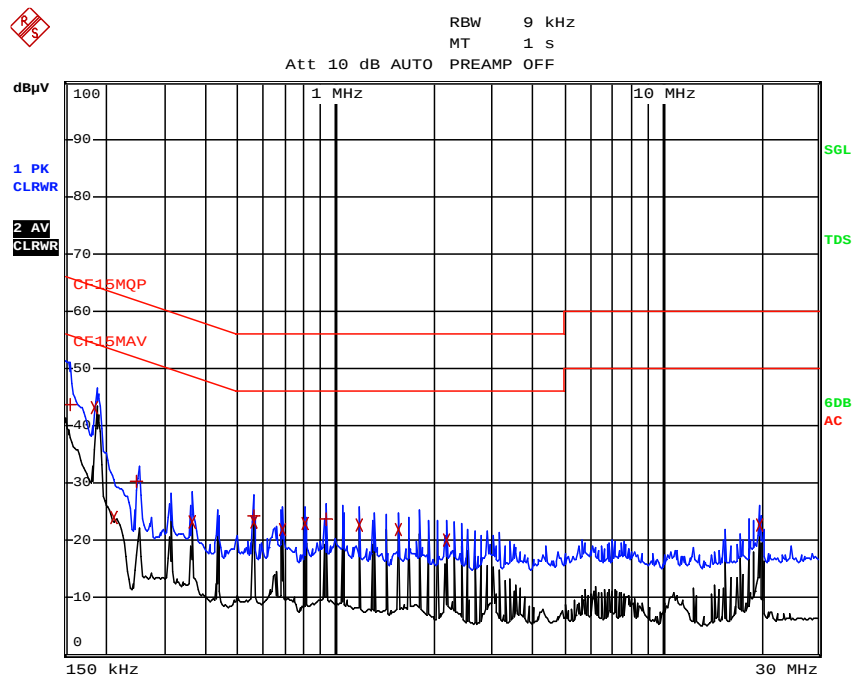
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Model: OD-11

Worst-Case Operating Mode: WiFi and Bluetooth Transmitting

Phase: Live

EDIT PEAK LIST (Final Measurement Results)				
Trace1:	CF15MQP			
Trace2:	CF15MAV			
Trace3:	---			
TRACE	FREQUENCY	LEVEL dBμV	DELTA	LIMIT dB
1 Quasi Peak	154.5 kHz	43.57 L1	-22.17	
2 CISPR Average	186 kHz	43.17 L1	-11.03	
2 CISPR Average	213 kHz	24.10 L1	-28.98	
1 Quasi Peak	249 kHz	30.43 L1	-31.35	
2 CISPR Average	361.5 kHz	23.25 L1	-25.43	
1 Quasi Peak	559.5 kHz	24.27 L1	-31.72	
2 CISPR Average	559.5 kHz	23.19 L1	-22.80	
2 CISPR Average	685.5 kHz	21.93 L1	-24.06	
2 CISPR Average	807 kHz	22.91 L1	-23.08	
1 Quasi Peak	933 kHz	23.85 L1	-32.14	
2 CISPR Average	1.1805 MHz	22.75 L1	-23.24	
2 CISPR Average	1.554 MHz	21.92 L1	-24.08	
2 CISPR Average	2.175 MHz	20.13 L1	-25.86	
2 CISPR Average	19.77 MHz	22.65 L1	-27.34	



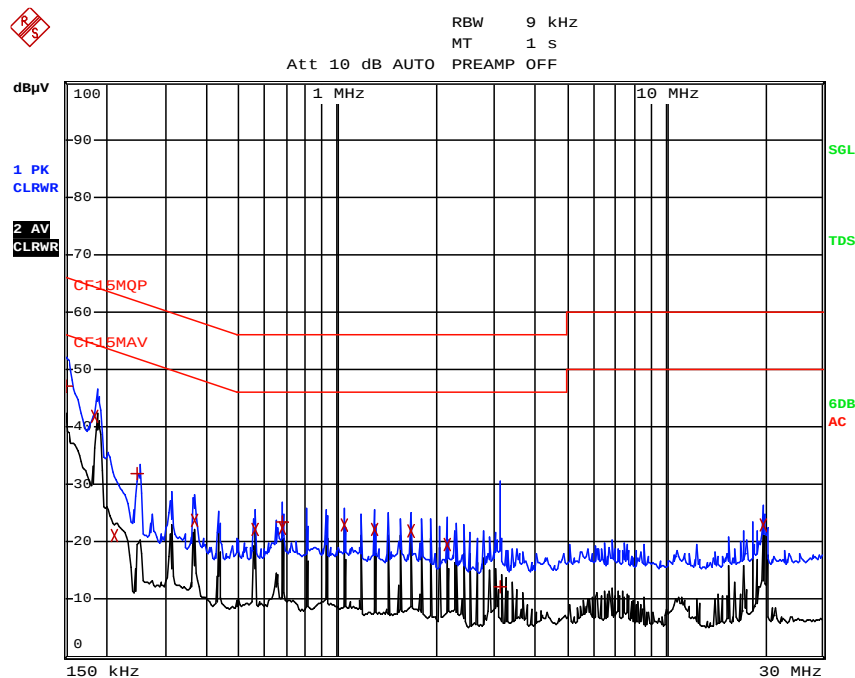
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Model: OD-11

Worst-Case Operating Mode: WiFi and Bluetooth Transmitting

Phase: Neutral

EDIT PEAK LIST (Final Measurement Results)					
Trace1:	CF15MQP				
Trace2:	CF15MAV				
Trace3:	---				
TRACE	FREQUENCY	LEVEL	dB μ V	DELTA	LIMIT dB
1 Quasi Peak	150 kHz	47.11	N	-18.88	
2 CISPR Average	186 kHz	41.86	N	-12.34	
2 CISPR Average	213 kHz	21.07	N	-32.01	
1 Quasi Peak	249 kHz	31.82	N	-29.96	
2 CISPR Average	366 kHz	23.64	N	-24.94	
2 CISPR Average	559.5 kHz	22.30	N	-23.69	
1 Quasi Peak	681 kHz	23.45	N	-32.54	
2 CISPR Average	681 kHz	22.40	N	-23.60	
2 CISPR Average	1.0545 MHz	22.92	N	-23.07	
2 CISPR Average	1.302 MHz	22.18	N	-23.81	
2 CISPR Average	1.6755 MHz	21.83	N	-24.17	
2 CISPR Average	2.1705 MHz	19.44	N	-26.56	
1 Quasi Peak	3.1425 MHz	12.09	N	-43.90	
2 CISPR Average	19.7745 MHz	22.86	N	-27.13	



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Applicant: Teenage Engineering AB
Model: OD-11

Date of Test: May 02, 2014

Worst-Case Operating Mode: Transmitting (802.11b DSSS 11Mbps) Antenna 1

Table 1
Radiated Emissions
Pursuant to FCC Part 15 Section 15.249 Requirement

Channel 01

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	2412.000	91.6	33	29.4	88.0	94.0	-6.0
H	4824.000	49.9	33	34.9	51.8	54.0	-2.2
H	7236.000	34.4	33	37.9	39.3	54.0	-14.7
H	9648.000	35.8	33	40.4	43.2	54.0	-10.8
H	12060.000	40.8	33	40.5	48.3	54.0	-5.7
H	14472.000	43.1	33	40.0	50.1	54.0	-3.9

Channel 06

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	2437.000	91.9	33	29.4	88.3	94.0	-5.7
H	4874.000	49.7	33	34.9	51.6	54.0	-2.4
H	7311.000	33.9	33	37.9	38.8	54.0	-15.2
H	9748.000	35.6	33	40.4	43.0	54.0	-11.0
H	12185.000	40.1	33	40.5	47.6	54.0	-6.4
H	14622.000	45.5	33	38.4	50.9	54.0	-3.1

Channel 11

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	2462.000	91.2	33	29.4	87.6	94.0	-6.4
H	4924.000	49.5	33	34.9	51.4	54.0	-2.6
H	7386.000	33.3	33	37.9	38.2	54.0	-15.8
H	9848.000	35.3	33	40.4	42.7	54.0	-11.3
H	12310.000	40.4	33	40.5	47.9	54.0	-6.1
H	14772.000	44.9	33	38.4	50.3	54.0	-3.7

- NOTES:
1. Average measurement method is used for emission measurement.
 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 sign in the column shows value below limit.
 4. Horn antenna is used for the emission over 1000MHz.
 5. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
 6. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.
 7. Emission within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 Section 2.2.

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Applicant: Teenage Engineering AB

Date of Test: May 02, 2014

Model: OD-11

Worst-Case Operating Mode: Transmitting (802.11b DSSS 11Mbps) Antenna 1

Table 2
Radiated Emissions
Pursuant to FCC Part 15 Section 15.249 Requirement

Channel 01

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
H	2412.000	114.1	33	29.4	110.5	114.0	-3.5
H	4824.000	55.1	33	34.9	57.0	74.0	-17.0
H	7236.000	40.9	33	37.9	45.8	74.0	-28.2
H	9648.000	40.4	33	40.4	47.8	74.0	-26.2
H	12060.000	43.3	33	40.5	50.8	74.0	-23.2
H	14472.000	46.0	33	40.0	53.0	74.0	-21.0

Channel 06

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
H	2437.000	114.6	33	29.4	111.0	114.0	-3.0
H	4874.000	54.9	33	34.9	56.8	74.0	-17.2
H	7311.000	40.5	33	37.9	45.4	74.0	-28.6
H	9748.000	40.5	33	40.4	47.9	74.0	-26.1
H	12185.000	42.9	33	40.5	50.4	74.0	-23.6
H	14622.000	47.4	33	38.4	52.8	74.0	-21.2

Channel 11

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
H	2462.000	114.4	33	29.4	110.8	114.0	-3.2
H	4924.000	54.1	33	34.9	56.0	74.0	-18.0
H	7386.000	40.2	33	37.9	45.1	74.0	-28.9
H	9848.000	40.8	33	40.4	48.2	74.0	-25.8
H	12310.000	41.6	33	40.5	49.1	74.0	-24.9
H	14772.000	46.8	33	38.4	52.2	74.0	-21.8

- NOTES:
1. Peak Detector is used for emission measurement.
 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 sign in the column shows value below limit.
 4. Horn antenna is used for the emission over 1000MHz.
 5. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
 6. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.
 7. Emission within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 Section 2.2.

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Applicant: Teenage Engineering AB

Date of Test: May 02, 2014

Model: OD-11

Worst-Case Operating Mode: Transmitting (802.11b DSSS 11Mbps) Antenna 2

Table 3
Radiated Emissions
Pursuant to FCC Part 15 Section 15.249 Requirement

Channel 01

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	2412.000	89.9	33	29.4	86.3	94.0	-7.7
H	4824.000	48.4	33	34.9	50.3	54.0	-3.7
H	7236.000	33.5	33	37.9	38.4	54.0	-15.6
H	9648.000	35.1	33	40.4	42.5	54.0	-11.5
H	12060.000	39.7	33	40.5	47.2	54.0	-6.8
H	14472.000	42.3	33	40.0	49.3	54.0	-4.7

Channel 06

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	2437.000	88.9	33	29.4	85.3	94.0	-8.7
H	4874.000	48.4	33	34.9	50.3	54.0	-3.7
H	7311.000	33.1	33	37.9	38.0	54.0	-16.0
H	9748.000	34.4	33	40.4	41.8	54.0	-12.2
H	12185.000	39.1	33	40.5	46.6	54.0	-7.4
H	14622.000	43.6	33	38.4	49.0	54.0	-5.0

Channel 11

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	2462.000	88.6	33	29.4	85.0	94.0	-9.0
H	4924.000	48.2	33	34.9	50.1	54.0	-3.9
H	7386.000	33.3	33	37.9	38.2	54.0	-15.8
H	9848.000	34.1	33	40.4	41.5	54.0	-12.5
H	12310.000	39.0	33	40.5	46.5	54.0	-7.5
H	14772.000	43.4	33	38.4	48.8	54.0	-5.2

- NOTES:
1. Average measurement method is used for emission measurement.
 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 sign in the column shows value below limit.
 4. Horn antenna is used for the emission over 1000MHz.
 5. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
 6. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.
 7. Emission within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 Section 2.2.

INTERTEK TESTING SERVICES

Applicant: Teenage Engineering AB

Date of Test: May 02, 2014

Model: OD-11

Worst-Case Operating Mode: Transmitting (802.11b DSSS 11Mbps) Antenna 2

Table 4
Radiated Emissions
Pursuant to FCC Part 15 Section 15.249 Requirement

Channel 01

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
H	2412.000	112.1	33	29.4	108.5	114.0	-5.5
H	4824.000	54.5	33	34.9	56.4	74.0	-17.6
H	7236.000	39.5	33	37.9	44.4	74.0	-29.6
H	9648.000	39.1	33	40.4	46.5	74.0	-27.5
H	12060.000	42.0	33	40.5	49.5	74.0	-24.5
H	14472.000	45.5	33	40.0	52.5	74.0	-21.5

Channel 06

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
H	2437.000	111.9	33	29.4	108.3	114.0	-5.7
H	4874.000	54.1	33	34.9	56.0	74.0	-18.0
H	7311.000	39.2	33	37.9	44.1	74.0	-29.9
H	9748.000	38.8	33	40.4	46.2	74.0	-27.8
H	12185.000	42.0	33	40.5	49.5	74.0	-24.5
H	14622.000	46.7	33	38.4	52.1	74.0	-21.9

Channel 11

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
H	2462.000	111.8	33	29.4	108.2	114.0	-5.8
H	4924.000	53.5	33	34.9	55.4	74.0	-18.6
H	7386.000	39.1	33	37.9	44.0	74.0	-30.0
H	9848.000	38.3	33	40.4	45.7	74.0	-28.3
H	12310.000	40.8	33	40.5	48.3	74.0	-25.7
H	14772.000	46.1	33	38.4	51.5	74.0	-22.5

- NOTES:
1. Peak Detector is used for emission measurement.
 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 sign in the column shows value below limit.
 4. Horn antenna is used for the emission over 1000MHz.
 5. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
 6. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.
 7. Emission within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 Section 2.2.

INTERTEK TESTING SERVICES

Applicant: Teenage Engineering AB

Date of Test: May 02, 2014

Model: OD-11

Worst-Case Operating Mode: Transmitting (802.11g OFDM 54Mbps) Antenna 1

Table 5
Radiated Emissions
Pursuant to FCC Part 15 Section 15.249 Requirement

Channel 01

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	2412.000	86.4	33	29.4	82.8	94.0	-11.2
H	4824.000	42.5	33	34.9	44.4	54.0	-9.6
H	7236.000	34.7	33	37.9	39.6	54.0	-14.4
H	9648.000	36.4	33	40.4	43.8	54.0	-10.2
H	12060.000	39.4	33	40.5	46.9	54.0	-7.1
H	14472.000	42.6	33	40.0	49.6	54.0	-4.4

Channel 06

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	2437.000	86.0	33	29.4	82.4	94.0	-11.6
H	4874.000	42.4	33	34.9	44.3	54.0	-9.7
H	7311.000	33.9	33	37.9	38.8	54.0	-15.2
H	9748.000	36.1	33	40.4	43.5	54.0	-10.5
H	12185.000	38.6	33	40.5	46.1	54.0	-7.9
H	14622.000	42.9	33	38.4	48.3	54.0	-5.7

Channel 11

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	2462.000	85.8	33	29.4	82.2	94.0	-11.8
H	4924.000	42.1	33	34.9	44.0	54.0	-10.0
H	7386.000	33.8	33	37.9	38.7	54.0	-15.3
H	9848.000	36.0	33	40.4	43.4	54.0	-10.6
H	12310.000	38.8	33	40.5	46.3	54.0	-7.7
H	14772.000	42.8	33	38.4	48.2	54.0	-5.8

- NOTES:
1. Average measurement method is used for emission measurement.
 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 sign in the column shows value below limit.
 4. Horn antenna is used for the emission over 1000MHz.
 5. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
 6. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.
 7. Emission within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 Section 2.2.

INTERTEK TESTING SERVICES

Applicant: Teenage Engineering AB

Date of Test: May 02, 2014

Model: OD-11

Worst-Case Operating Mode: Transmitting (802.11g OFDM 54Mbps) Antenna 1

Table 6
Radiated Emissions
Pursuant to FCC Part 15 Section 15.249 Requirement

Channel 01

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
H	2412.000	106.4	33	29.4	102.8	114.0	-11.2
H	4824.000	45.6	33	34.9	47.5	74.0	-26.5
H	7236.000	41.2	33	37.9	46.1	74.0	-27.9
H	9648.000	39.9	33	40.4	47.3	74.0	-26.7
H	12060.000	43.1	33	40.5	50.6	74.0	-23.4
H	14472.000	45.4	33	40.0	52.4	74.0	-21.6

Channel 06

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
H	2437.000	106.2	33	29.4	102.6	114.0	-11.4
H	4874.000	45.1	33	34.9	47.0	74.0	-27.0
H	7311.000	41.3	33	37.9	46.2	74.0	-27.8
H	9748.000	39.6	33	40.4	47.0	74.0	-27.0
H	12185.000	42.7	33	40.5	50.2	74.0	-23.8
H	14622.000	46.4	33	38.4	51.8	74.0	-22.2

Channel 11

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
H	2462.000	106.0	33	29.4	102.4	114.0	-11.6
H	4924.000	44.6	33	34.9	46.5	74.0	-27.5
H	7386.000	41.2	33	37.9	46.1	74.0	-27.9
H	9848.000	39.6	33	40.4	47.0	74.0	-27.0
H	12310.000	42.6	33	40.5	50.1	74.0	-23.9
H	14772.000	45.7	33	38.4	51.1	74.0	-22.9

- NOTES:
1. Peak Detector is used for emission measurement.
 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 sign in the column shows value below limit.
 4. Horn antenna is used for the emission over 1000MHz.
 5. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
 6. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.
 7. Emission within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 Section 2.2.

INTERTEK TESTING SERVICES

Applicant: Teenage Engineering AB

Date of Test: May 02, 2014

Model: OD-11

Worst-Case Operating Mode: Transmitting (802.11g OFDM 54Mbps) Antenna 2

Table 7
Radiated Emissions
Pursuant to FCC Part 15 Section 15.249 Requirement

Channel 01

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	2412.000	85.8	33	29.4	82.2	94.0	-11.8
H	4824.000	41.7	33	34.9	43.6	54.0	-10.4
H	7236.000	34.5	33	37.9	39.4	54.0	-14.6
H	9648.000	35.9	33	40.4	43.3	54.0	-10.7
H	12060.000	39.4	33	40.5	46.9	54.0	-7.1
H	14472.000	42.3	33	40.0	49.3	54.0	-4.7

Channel 06

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	2437.000	85.4	33	29.4	81.8	94.0	-12.2
H	4874.000	41.6	33	34.9	43.5	54.0	-10.5
H	7311.000	33.8	33	37.9	38.7	54.0	-15.3
H	9748.000	35.8	33	40.4	43.2	54.0	-10.8
H	12185.000	39.2	33	40.5	46.7	54.0	-7.3
H	14622.000	43.3	33	38.4	48.7	54.0	-5.3

Channel 11

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	2462.000	85.2	33	29.4	81.6	94.0	-12.4
H	4924.000	41.5	33	34.9	43.4	54.0	-10.6
H	7386.000	33.3	33	37.9	38.2	54.0	-15.8
H	9848.000	35.7	33	40.4	43.1	54.0	-10.9
H	12310.000	39.1	33	40.5	46.6	54.0	-7.4
H	14772.000	42.6	33	38.4	48.0	54.0	-6.0

- NOTES:
1. Average measurement method is used for emission measurement.
 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 sign in the column shows value below limit.
 4. Horn antenna is used for the emission over 1000MHz.
 5. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
 6. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.
 7. Emission within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 Section 2.2.

INTERTEK TESTING SERVICES

Applicant: Teenage Engineering AB

Date of Test: May 02, 2014

Model: OD-11

Worst-Case Operating Mode: Transmitting (802.11g OFDM 54Mbps) Antenna 2

Table 8
Radiated Emissions
Pursuant to FCC Part 15 Section 15.249 Requirement

Channel 01

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
H	2412.000	105.4	33	29.4	101.8	114.0	-12.2
H	4824.000	43.4	33	34.9	45.3	74.0	-28.7
H	7236.000	41.4	33	37.9	46.3	74.0	-27.7
H	9648.000	40.1	33	40.4	47.5	74.0	-26.5
H	12060.000	42.7	33	40.5	50.2	74.0	-23.8
H	14472.000	45.1	33	40.0	52.1	74.0	-21.9

Channel 06

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
H	2437.000	105.2	33	29.4	101.6	114.0	-12.4
H	4874.000	43.4	33	34.9	45.3	74.0	-28.7
H	7311.000	41.6	33	37.9	46.5	74.0	-27.5
H	9748.000	40.3	33	40.4	47.7	74.0	-26.3
H	12185.000	43.0	33	40.5	50.5	74.0	-23.5
H	14622.000	46.5	33	38.4	51.9	74.0	-22.1

Channel 11

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
H	2462.000	105.0	33	29.4	101.4	114.0	-12.6
H	4924.000	43.2	33	34.9	45.1	74.0	-28.9
H	7386.000	41.7	33	37.9	46.6	74.0	-27.4
H	9848.000	40.1	33	40.4	47.5	74.0	-26.5
H	12310.000	42.9	33	40.5	50.4	74.0	-23.6
H	14772.000	46.0	33	38.4	51.4	74.0	-22.6

- NOTES:
1. Peak Detector is used for emission measurement.
 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 sign in the column shows value below limit.
 4. Horn antenna is used for the emission over 1000MHz.
 5. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
 6. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.
 7. Emission within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 Section 2.2.

INTERTEK TESTING SERVICES

Applicant: Teenage Engineering AB

Date of Test: May 02, 2014

Model: OD-11

Worst-Case Operating Mode: Transmitting (802.11n HT20 mcs7 65Mbps) Antenna 1

Table 9
Radiated Emissions
Pursuant to FCC Part 15 Section 15.249 Requirement

Channel 01

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	2412.000	84.7	33	29.4	81.1	94.0	-12.9
H	4824.000	41.8	33	34.9	43.7	54.0	-10.3
H	7236.000	35.0	33	37.9	39.9	54.0	-14.1
H	9648.000	36.5	33	40.4	43.9	54.0	-10.1
H	12060.000	37.5	33	40.5	45.0	54.0	-9.0
H	14472.000	42.4	33	40.0	49.4	54.0	-4.6

Channel 06

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	2437.000	84.8	33	29.4	81.2	94.0	-12.8
H	4874.000	41.5	33	34.9	43.4	54.0	-10.6
H	7311.000	33.5	33	37.9	38.4	54.0	-15.6
H	9748.000	35.8	33	40.4	43.2	54.0	-10.8
H	12185.000	37.9	33	40.5	45.4	54.0	-8.6
H	14622.000	44.8	33	38.4	50.2	54.0	-3.8

Channel 11

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	2462.000	85.2	33	29.4	81.6	94.0	-12.4
H	4924.000	41.1	33	34.9	43.0	54.0	-11.0
H	7386.000	33.9	33	37.9	38.8	54.0	-15.2
H	9848.000	36.2	33	40.4	43.6	54.0	-10.4
H	12310.000	38.2	33	40.5	45.7	54.0	-8.3
H	14772.000	44.7	33	38.4	50.1	54.0	-3.9

- NOTES:
1. Average measurement method is used for emission measurement.
 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 sign in the column shows value below limit.
 4. Horn antenna is used for the emission over 1000MHz.
 5. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
 6. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.
 7. Emission within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 Section 2.2.

INTERTEK TESTING SERVICES

Applicant: Teenage Engineering AB

Date of Test: May 02, 2014

Model: OD-11

Worst-Case Operating Mode: Transmitting (802.11n HT20 mcs7 65Mbps) Antenna 1

Table 10
Radiated Emissions
Pursuant to FCC Part 15 Section 15.249 Requirement

Channel 01

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
H	2412.000	104.6	33	29.4	101.0	114.0	-13.0
H	4824.000	46.6	33	34.9	48.5	74.0	-25.5
H	7236.000	38.6	33	37.9	43.5	74.0	-30.5
H	9648.000	39.4	33	40.4	46.8	74.0	-27.2
H	12060.000	42.0	33	40.5	49.5	74.0	-24.5
H	14472.000	46.3	33	40.0	53.3	74.0	-20.7

Channel 06

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
H	2437.000	105.3	33	29.4	101.7	114.0	-12.3
H	4874.000	46.2	33	34.9	48.1	74.0	-25.9
H	7311.000	38.9	33	37.9	43.8	74.0	-30.2
H	9748.000	39.3	33	40.4	46.7	74.0	-27.3
H	12185.000	42.2	33	40.5	49.7	74.0	-24.3
H	14622.000	47.4	33	38.4	52.8	74.0	-21.2

Channel 11

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
H	2462.000	106.4	33	29.4	102.8	114.0	-11.2
H	4924.000	46.1	33	34.9	48.0	74.0	-26.0
H	7386.000	39.1	33	37.9	44.0	74.0	-30.0
H	9848.000	39.1	33	40.4	46.5	74.0	-27.5
H	12310.000	41.6	33	40.5	49.1	74.0	-24.9
H	14772.000	47.5	33	38.4	52.9	74.0	-21.1

- NOTES:
1. Peak Detector is used for emission measurement.
 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 sign in the column shows value below limit.
 4. Horn antenna is used for the emission over 1000MHz.
 5. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
 6. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.
 7. Emission within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 Section 2.2.

INTERTEK TESTING SERVICES

Applicant: Teenage Engineering AB

Date of Test: May 02, 2014

Model: OD-11

Worst-Case Operating Mode: Transmitting (802.11n HT20 mcs7 65Mbps) Antenna 2

Table 11
Radiated Emissions
Pursuant to FCC Part 15 Section 15.249 Requirement

Channel 01

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	2412.000	84.8	33	29.4	81.2	94.0	-12.8
H	4824.000	41.6	33	34.9	43.5	54.0	-10.5
H	7236.000	34.5	33	37.9	39.4	54.0	-14.6
H	9648.000	35.8	33	40.4	43.2	54.0	-10.8
H	12060.000	37.8	33	40.5	45.3	54.0	-8.7
H	14472.000	42.1	33	40.0	49.1	54.0	-4.9

Channel 06

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	2437.000	84.9	33	29.4	81.3	94.0	-12.7
H	4874.000	41.2	33	34.9	43.1	54.0	-10.9
H	7311.000	33.6	33	37.9	38.5	54.0	-15.5
H	9748.000	35.6	33	40.4	43.0	54.0	-11.0
H	12185.000	38.0	33	40.5	45.5	54.0	-8.5
H	14622.000	44.6	33	38.4	50.0	54.0	-4.0

Channel 11

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	2462.000	85.0	33	29.4	81.4	94.0	-12.6
H	4924.000	41.4	33	34.9	43.3	54.0	-10.7
H	7386.000	33.5	33	37.9	38.4	54.0	-15.6
H	9848.000	35.8	33	40.4	43.2	54.0	-10.8
H	12310.000	37.9	33	40.5	45.4	54.0	-8.6
H	14772.000	45.0	33	38.4	50.4	54.0	-3.6

- NOTES:
1. Average measurement method is used for emission measurement.
 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 sign in the column shows value below limit.
 4. Horn antenna is used for the emission over 1000MHz.
 5. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
 6. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.
 7. Emission within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 Section 2.2.

INTERTEK TESTING SERVICES

Applicant: Teenage Engineering AB

Date of Test: May 02, 2014

Model: OD-11

Worst-Case Operating Mode: Transmitting (802.11n HT20 mcs7 65Mbps) Antenna 2

Table 12
Radiated Emissions
Pursuant to FCC Part 15 Section 15.249 Requirement

Channel 01

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
H	2412.000	104.4	33	29.4	100.8	114.0	-13.2
H	4824.000	45.7	33	34.9	47.6	74.0	-26.4
H	7236.000	38.5	33	37.9	43.4	74.0	-30.6
H	9648.000	39.5	33	40.4	46.9	74.0	-27.1
H	12060.000	41.3	33	40.5	48.8	74.0	-25.2
H	14472.000	46.0	33	40.0	53.0	74.0	-21.0

Channel 06

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
H	2437.000	105.1	33	29.4	101.5	114.0	-12.5
H	4874.000	45.1	33	34.9	47.0	74.0	-27.0
H	7311.000	38.3	33	37.9	43.2	74.0	-30.8
H	9748.000	39.1	33	40.4	46.5	74.0	-27.5
H	12185.000	41.1	33	40.5	48.6	74.0	-25.4
H	14622.000	46.7	33	38.4	52.1	74.0	-21.9

Channel 11

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
H	2462.000	105.9	33	29.4	102.3	114.0	-11.7
H	4924.000	45.3	33	34.9	47.2	74.0	-26.8
H	7386.000	38.7	33	37.9	43.6	74.0	-30.4
H	9848.000	38.7	33	40.4	46.1	74.0	-27.9
H	12310.000	40.9	33	40.5	48.4	74.0	-25.6
H	14772.000	46.9	33	38.4	52.3	74.0	-21.7

- NOTES:
1. Peak Detector is used for emission measurement.
 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 sign in the column shows value below limit.
 4. Horn antenna is used for the emission over 1000MHz.
 5. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
 6. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.
 7. Emission within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 Section 2.2.

INTERTEK TESTING SERVICES

Applicant: Teenage Engineering AB

Date of Test: May 02, 2014

Model: OD-11

Worst-Case Operating Mode: Transmitting (802.11n HT40 mcs7 130Mbps) Antenna 2

Table 13
Radiated Emissions
Pursuant to FCC Part 15 Section 15.249 Requirement

Channel 03

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	2422.000	85.8	33	29.4	82.2	94.0	-11.8
H	4844.000	40.8	33	34.9	42.7	54.0	-11.3
H	7266.000	34.9	33	37.9	39.8	54.0	-14.2
H	9988.000	36.2	33	40.4	43.6	54.0	-10.4
H	12410.000	37.6	33	40.5	45.1	54.0	-8.9
H	14832.000	44.0	33	38.4	49.4	54.0	-4.6

Channel 06

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	2437.000	86.2	33	29.4	82.6	94.0	-11.4
H	4874.000	40.3	33	34.9	42.2	54.0	-11.8
H	7311.000	33.4	33	37.9	38.3	54.0	-15.7
H	9748.000	35.8	33	40.4	43.2	54.0	-10.8
H	12185.000	37.5	33	40.5	45.0	54.0	-9.0
H	14622.000	43.8	33	38.4	49.2	54.0	-4.8

Channel 09

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	2452.000	86.0	33	29.4	82.4	94.0	-11.6
H	4904.000	40.1	33	34.9	42.0	54.0	-12.0
H	7356.000	34.0	33	37.9	38.9	54.0	-15.1
H	9808.000	36.3	33	40.4	43.7	54.0	-10.3
H	12260.000	37.5	33	40.5	45.0	54.0	-9.0
H	14712.000	43.8	33	38.4	49.2	54.0	-4.8

- NOTES:
1. Average measurement method is used for emission measurement.
 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 sign in the column shows value below limit.
 4. Horn antenna is used for the emission over 1000MHz.
 5. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
 6. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.
 7. Emission within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 Section 2.2.

INTERTEK TESTING SERVICES

Applicant: Teenage Engineering AB

Date of Test: May 02, 2014

Model: OD-11

Worst-Case Operating Mode: Transmitting (802.11n HT40 mcs7 130Mbps) Antenna 2

Table 14
Radiated Emissions
Pursuant to FCC Part 15 Section 15.249 Requirement

Channel 03

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
H	2422.000	103.9	33	29.4	100.3	114.0	-13.7
H	4844.000	44.0	33	34.9	45.9	74.0	-28.1
H	7266.000	38.7	33	37.9	43.6	74.0	-30.4
H	9988.000	39.1	33	40.4	46.5	74.0	-27.5
H	12410.000	40.8	33	40.5	48.3	74.0	-25.7
H	14832.000	46.8	33	38.4	52.2	74.0	-21.8

Channel 06

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
H	2437.000	104.8	33	29.4	101.2	114.0	-12.8
H	4874.000	43.7	33	34.9	45.6	74.0	-28.4
H	7311.000	38.8	33	37.9	43.7	74.0	-30.3
H	9748.000	39.4	33	40.4	46.8	74.0	-27.2
H	12185.000	41.1	33	40.5	48.6	74.0	-25.4
H	14622.000	47.3	33	38.4	52.7	74.0	-21.3

Channel 09

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
H	2452.000	105.2	33	29.4	101.6	114.0	-12.4
H	4904.000	43.3	33	34.9	45.2	74.0	-28.8
H	7356.000	39.0	33	37.9	43.9	74.0	-30.1
H	9808.000	39.1	33	40.4	46.5	74.0	-27.5
H	12260.000	41.0	33	40.5	48.5	74.0	-25.5
H	14712.000	46.9	33	38.4	52.3	74.0	-21.7

- NOTES:
1. Peak Detector is used for emission measurement.
 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 sign in the column shows value below limit.
 4. Horn antenna is used for the emission over 1000MHz.
 5. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
 6. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.
 7. Emission within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 Section 2.2.

INTERTEK TESTING SERVICES

Applicant: Teenage Engineering AB

Date of Test: May 02, 2014

Model: OD-11

Worst-Case Operating Mode: Transmitting (Bluetooth BLE) Antenna 1

Table 15
Radiated Emissions
Pursuant to FCC Part 15 Section 15.249 Requirement

Channel 01

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	2402.000	84.2	33	29.4	80.6	94.0	-13.4
H	4804.000	38.8	33	34.9	40.7	54.0	-13.3
H	7206.000	35.9	33	37.9	40.8	54.0	-13.2
H	9608.000	34.2	33	40.4	41.6	54.0	-12.4
H	12010.000	36.6	33	40.5	44.1	54.0	-9.9
H	14412.000	37.4	33	40.0	44.4	54.0	-9.6

Channel 21

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	2442.000	83.8	33	29.4	80.2	94.0	-13.8
H	4884.000	38.3	33	34.9	40.2	54.0	-13.8
H	7326.000	35.4	33	37.9	40.3	54.0	-13.7
H	9768.000	33.8	33	40.4	41.2	54.0	-12.8
H	12210.000	34.5	33	40.5	42.0	54.0	-12.0
H	14652.000	38.8	33	38.4	44.2	54.0	-9.8

Channel 40

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	2480.000	84.4	33	29.4	80.8	94.0	-13.2
H	4960.000	38.1	33	34.9	40.0	54.0	-14.0
H	7440.000	36.0	33	37.9	40.9	54.0	-13.1
H	9920.000	34.3	33	40.4	41.7	54.0	-12.3
H	12400.000	33.5	33	40.5	41.0	54.0	-13.0
H	14880.000	38.8	33	38.4	44.2	54.0	-9.8

- NOTES:
1. Average measurement method is used for emission measurement.
 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 sign in the column shows value below limit.
 4. Horn antenna is used for the emission over 1000MHz.
 5. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
 6. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.
 7. Emission within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 Section 2.2.

INTERTEK TESTING SERVICES

Applicant: Teenage Engineering AB

Date of Test: May 02, 2014

Model: OD-11

Worst-Case Operating Mode: Transmitting (Bluetooth BLE) Antenna 1

Table 16
Radiated Emissions
Pursuant to FCC Part 15 Section 15.249 Requirement

Channel 01

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
H	2402.000	109.0	33	29.4	105.4	114.0	-8.6
H	4804.000	43.3	33	34.9	45.2	74.0	-28.8
H	7206.000	38.3	33	37.9	43.2	74.0	-30.8
H	9608.000	38.8	33	40.4	46.2	74.0	-27.8
H	12010.000	40.7	33	40.5	48.2	74.0	-25.8
H	14412.000	45.6	33	40.0	52.6	74.0	-21.4

Channel 21

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
H	2442.000	109.2	33	29.4	105.6	114.0	-8.4
H	4884.000	43.5	33	34.9	45.4	74.0	-28.6
H	7326.000	38.7	33	37.9	43.6	74.0	-30.4
H	9768.000	39.4	33	40.4	46.8	74.0	-27.2
H	12210.000	40.9	33	40.5	48.4	74.0	-25.6
H	14652.000	46.8	33	38.4	52.2	74.0	-21.8

Channel 40

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
H	2480.000	109.4	33	29.4	105.8	114.0	-8.2
H	4960.000	43.5	33	34.9	45.4	74.0	-28.6
H	7440.000	38.9	33	37.9	43.8	74.0	-30.2
H	9920.000	39.3	33	40.4	46.7	74.0	-27.3
H	12400.000	40.7	33	40.5	48.2	74.0	-25.8
H	14880.000	47.4	33	38.4	52.8	74.0	-21.2

- NOTES:
1. Peak Detector is used for emission measurement.
 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 sign in the column shows value below limit.
 4. Horn antenna is used for the emission over 1000MHz.
 5. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
 6. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.
 7. Emission within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 Section 2.2.

INTERTEK TESTING SERVICES

Applicant: Teenage Engineering AB

Date of Test: May 02, 2014

Model: OD-11

Worst-Case Operating Mode: WiFi and Bluetooth Transmitting (Antenna 1 and 2)

Table 19

Radiated Emissions (30MHz to 1GHz) Pursuant to FCC Part 15 Section 15.209 Requirement

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
H	90.180	40.3	16	11.0	35.3	43.5	-8.2
H	133.360	37.2	16	14.0	35.2	43.5	-8.3
H	143.445	42.5	16	14.0	40.5	43.5	-3.0
H	240.018	30.8	16	19.0	33.8	46.0	-12.2
H	248.376	31.5	16	20.0	35.5	46.0	-10.5
H	293.526	29.4	16	22.0	35.4	46.0	-10.6
H	328.004	29.2	16	24.0	37.2	46.0	-8.8
H	336.016	32.0	16	24.0	40.0	46.0	-6.0
H	384.200	32.2	16	24.0	40.2	46.0	-5.8
H	496.730	29.4	16	26.0	39.4	46.0	-6.6
H	624.027	24.4	16	29.0	37.4	46.0	-8.6
H	654.782	24.2	16	29.0	37.2	46.0	-8.8
H	699.942	27.2	16	30.0	41.2	46.0	-4.8
H	719.677	29.5	16	30.0	43.5	46.0	-2.5
H	745.096	29.6	16	30.0	43.6	46.0	-2.4
H	768.016	25.3	16	31.0	40.3	46.0	-5.7
H	790.252	24.8	16	31.0	39.8	46.0	-6.2
H	818.675	25.6	16	31.0	40.6	46.0	-5.4
H	925.720	24.6	16	33.0	41.6	46.0	-4.4

NOTES: 1. Quasi-Peak Detector Data unless otherwise 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 sign in the column shows value below limit.
4. Horn antenna is used for the emission over 1000MHz.
5. Emission within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 Section 2.2.

INTERTEK TESTING SERVICES

Applicant: Teenage Engineering AB

Date of Test: May 02, 2014

Model: OD-11

Worst-Case Operating Mode: WiFi and Bluetooth Transmitting (Antenna 1 and 2)

Table 20

Radiated Emissions (9kHz to 30MHz)
Pursuant to FCC Part 15 Section 15.209 Requirement

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Distance Factor (-dB)	Calculated at 30m (dBμV/m)	Limit at 30m (dBμV/m)	Margin (dB)
H	10.024	22.3	0	9.5	31.8	40.0	-8.2	29.5	-37.7
H	11.284	20.3	0	9.5	29.8	40.0	-10.2	29.5	-39.7
H	12.256	22.7	0	9.5	32.2	40.0	-7.8	29.5	-37.3
H	20.049	21.9	0	9.5	31.4	40.0	-8.6	29.5	-38.1
H	22.562	21.3	0	9.5	30.8	40.0	-9.2	29.5	-38.7
H	24.384	19.1	0	9.5	28.6	40.0	-11.4	29.5	-40.9

NOTES: 1. Quasi-Peak Detector Data unless otherwise 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 sign in the column shows value below limit.
4. Horn antenna is used for the emission over 1000MHz.
5. Emission within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 Section 2.2.

4.0 Equipment Photographs (External)

(External)



INTERTEK TESTING SERVICES

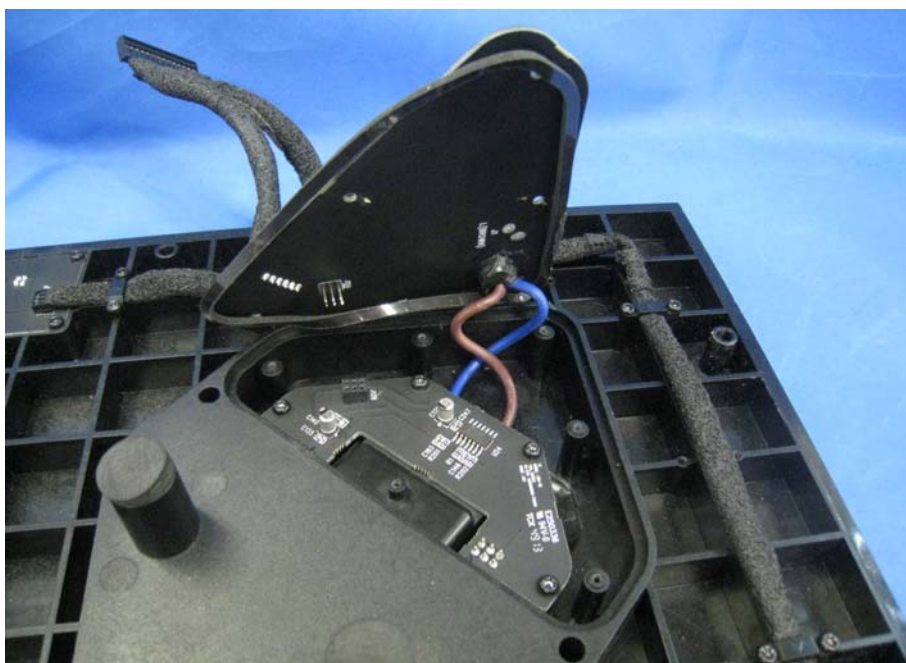
5.0 Equipment Photographs (Internal)

(Internal)



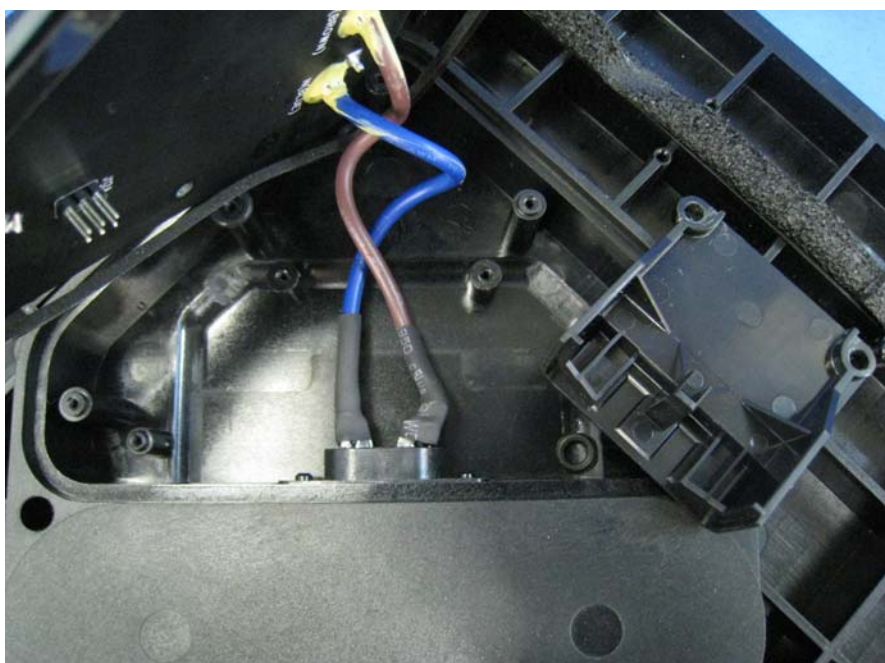
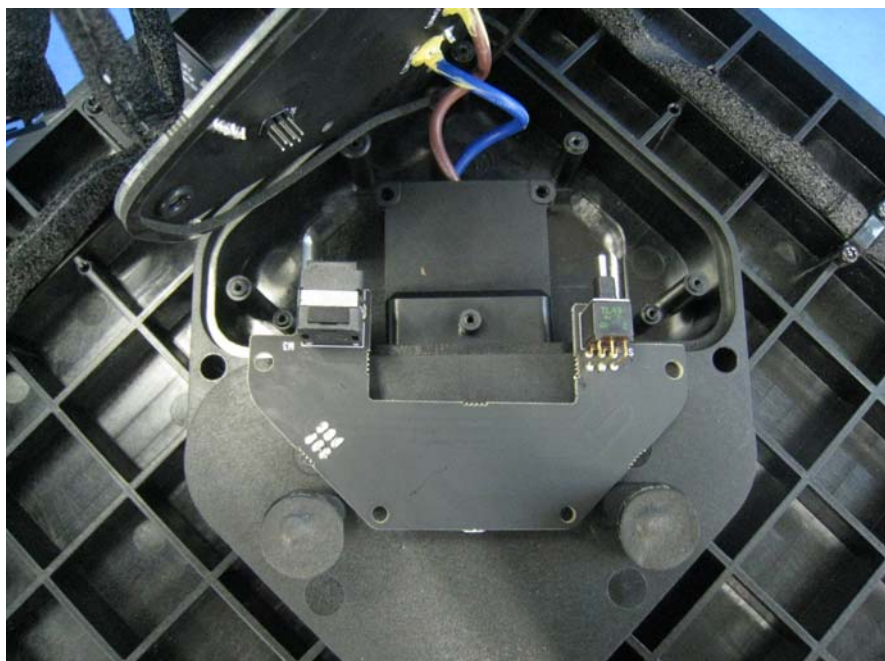
INTERTEK TESTING SERVICES

(Internal)



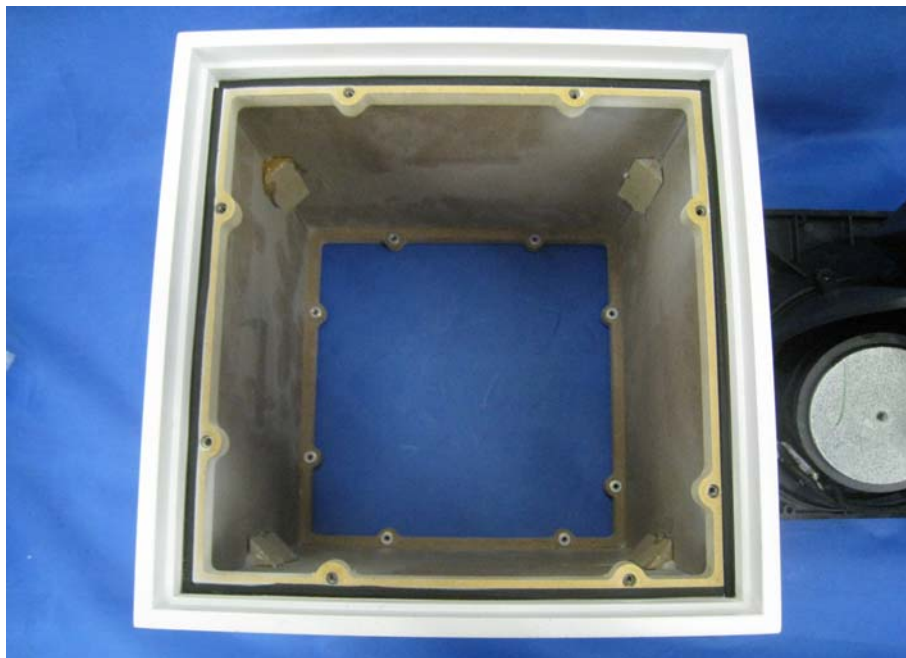
INTERTEK TESTING SERVICES

(Internal)



INTERTEK TESTING SERVICES

(Internal)



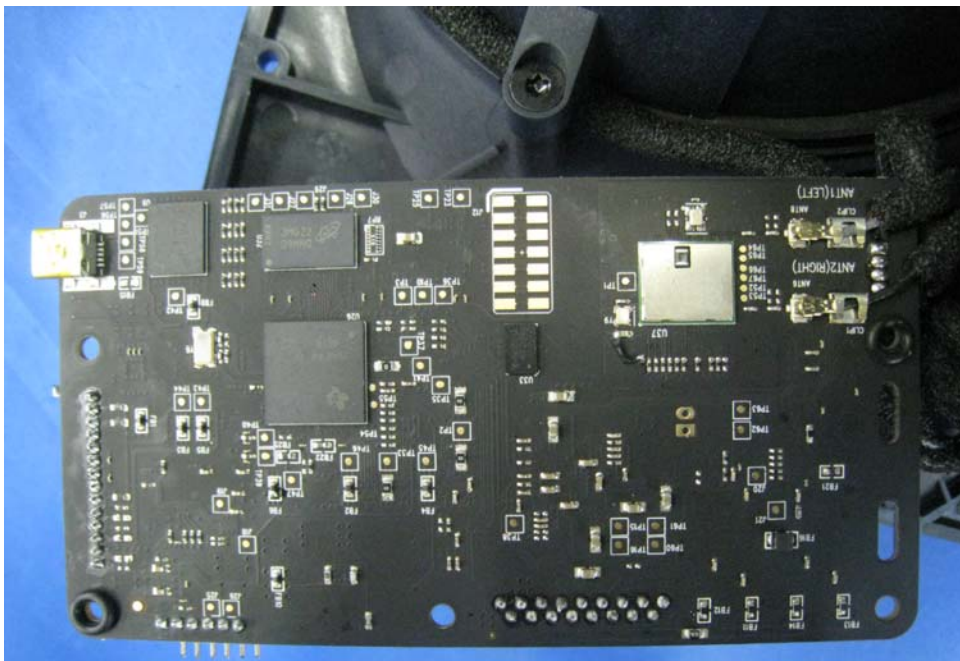
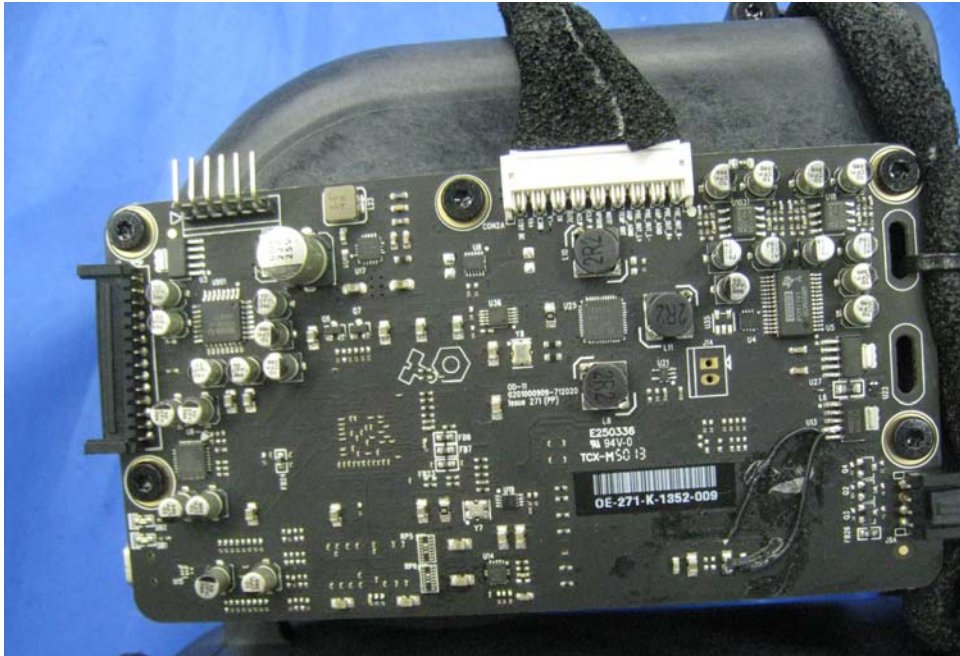
INTERTEK TESTING SERVICES

(Internal)



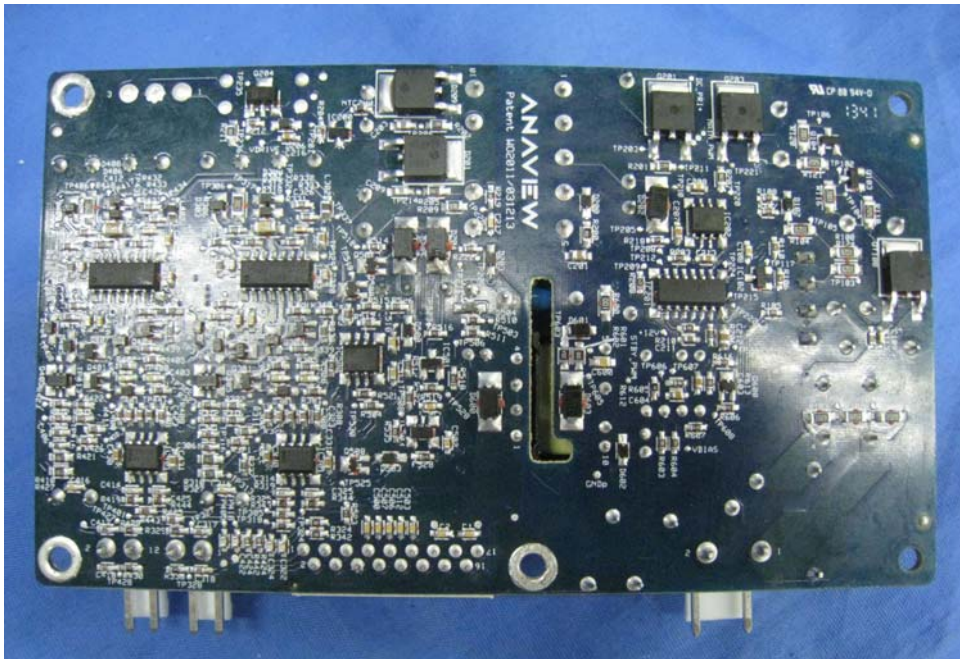
INTERTEK TESTING SERVICES

(Internal)



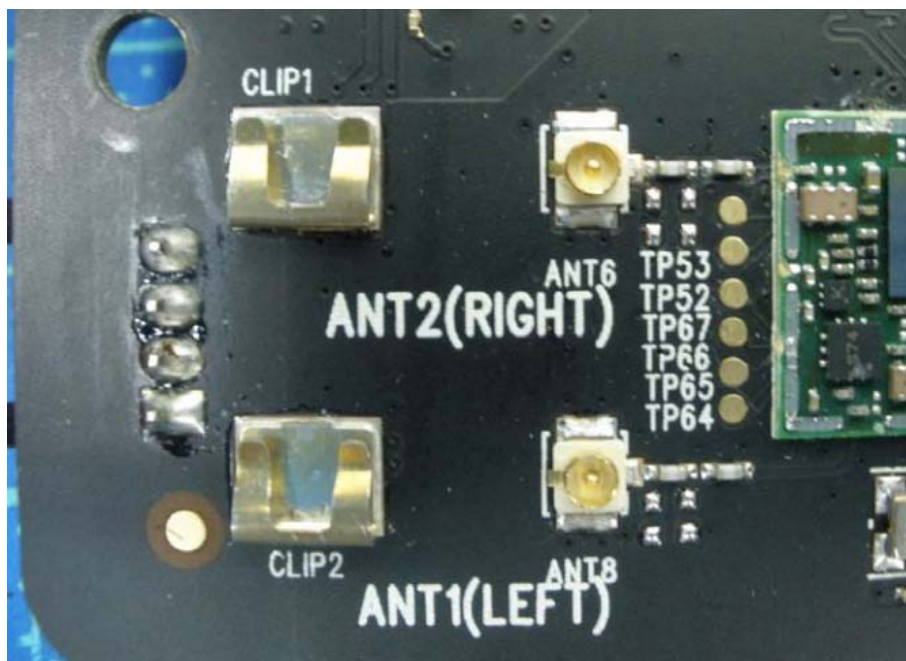
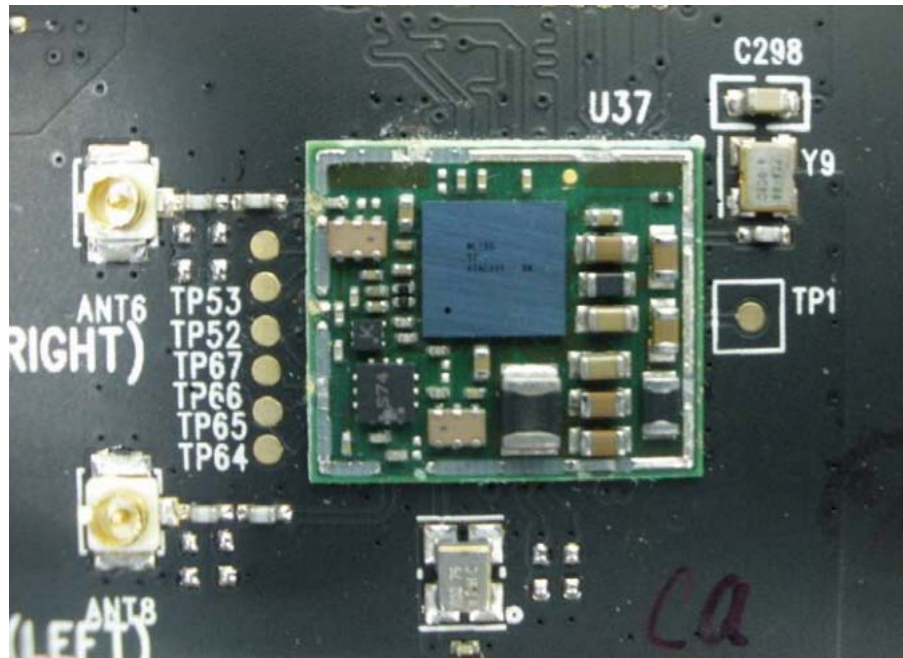
INTERTEK TESTING SERVICES

(Internal)



INTERTEK TESTING SERVICES

(Internal)



(Internal)

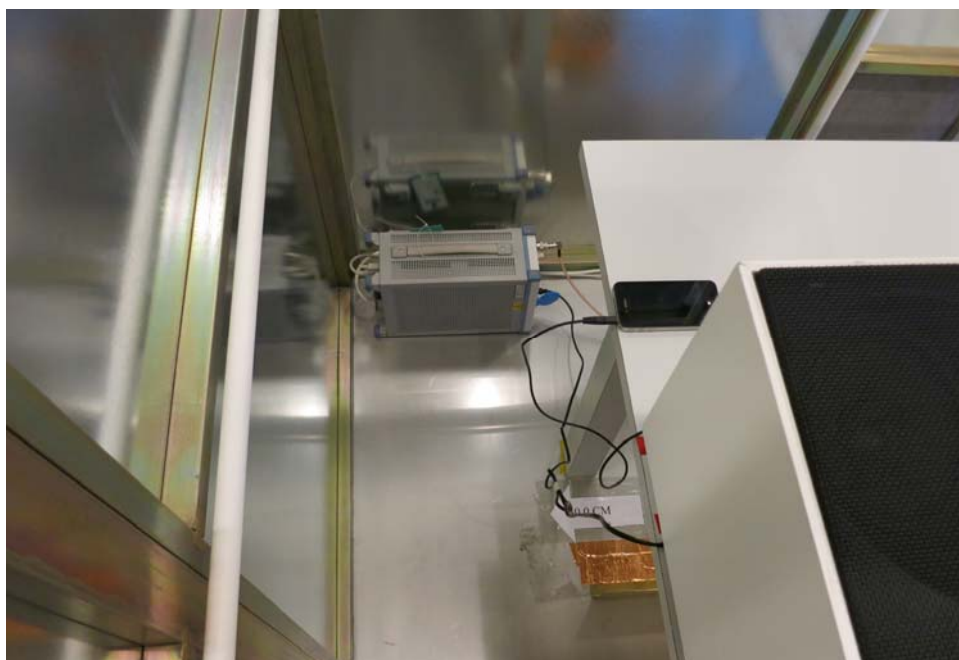
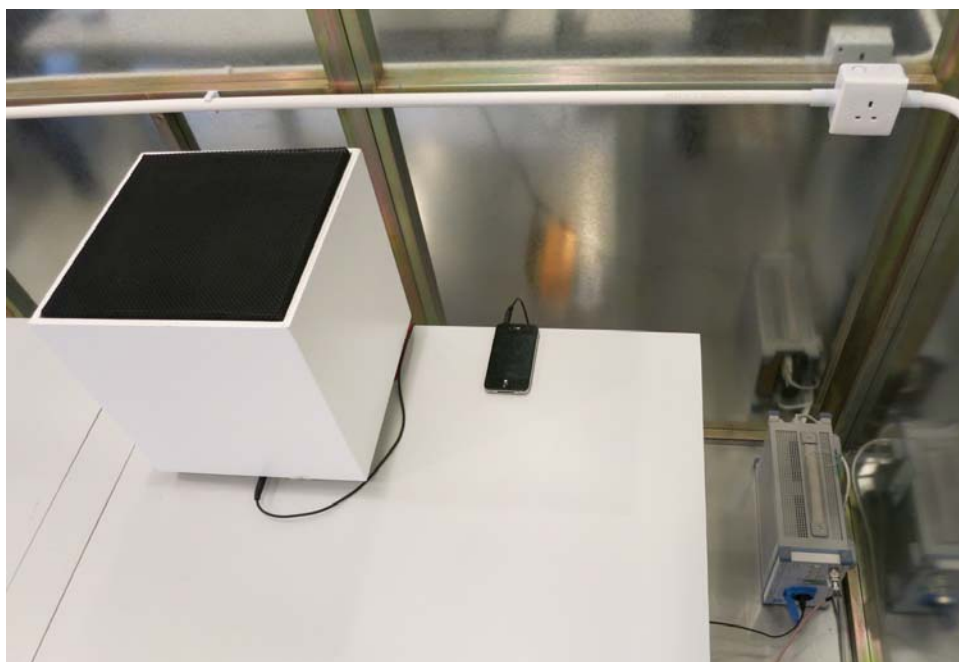


INTERTEK TESTING SERVICES

(Internal)



6.0 Conducted Emission Setup Photographs



INTERTEK TESTING SERVICES

7.0 Radiated Emission Setup Photographs



8.0 **Miscellaneous Information**

The miscellaneous information includes details of the test procedure and measured bandwidth / calculation of factor such as pulse desensitization and averaging factor.

8.1 Radiated Emission on the Bandedge

Emissions radiated outside of the specified frequency bands, except harmonics, are attenuated by 50dB below the level of the fundamental or to the general radiated emissions limits in Section 15.209 / RSS-210 2.5, whichever is the lesser attenuation, which meets the requirement of part 15.249(d) / RSS-210 A2.9.

INTERTEK TESTING SERVICES

Applicant: Teenage Engineering AB

Date of Test: May 02, 2014

Model: OD-11

Worst-Case Operating Mode: Transmitting (WiFi 802.11b)

Table 21

Radiated Emissions (Bandedge)

Pursuant to FCC Part 15 Section 15.249 Requirement

802.11b DSSS 11Mbps (Antenna 1)

Frequency (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Preamp. Gain (dB)	Antenna Factor (dB)	Reading (dBμV)	Net at 3m (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)	Restricted band (MHz)
2389.700	PK	H	33	29.4	67.8	64.2	74	-9.8	2310~2390
	AV	H	33	29.4	52.0	48.4	54	-5.6	
2412.000 Channel 1	PK	H	33	29.4	114.1	110.5	114	-3.5	-
	AV	H	33	29.4	91.6	88.0	94	-6.0	-
2462.000 Channel 11	PK	H	33	29.4	114.4	110.8	114	-3.2	-
	AV	H	33	29.4	91.2	87.6	94	-6.4	-
2484.700	PK	H	33	29.4	67.4	63.8	74	-10.2	2483.5~2500
	AV	H	33	29.4	51.8	48.2	54	-5.8	

802.11b DSSS 11Mbps (Antenna 2)

Frequency (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Preamp. Gain (dB)	Antenna Factor (dB)	Reading (dBμV)	Net at 3m (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)	Restricted band (MHz)
2389.700	PK	H	33	29.4	67.6	64.0	74	-10.0	2310~2390
	AV	H	33	29.4	51.8	48.2	54	-5.8	
2412.000 Channel 1	PK	H	33	29.4	112.1	108.5	114	-5.5	-
	AV	H	33	29.4	89.9	86.3	94	-7.7	-
2462.000 Channel 11	PK	H	33	29.4	111.8	108.2	114	-5.8	-
	AV	H	33	29.4	88.6	85.0	94	-9.0	-
2483.940	PK	H	33	29.4	67.1	63.5	74	-10.5	2483.5~2500
	AV	H	33	29.4	51.8	48.2	54	-5.8	

- NOTES:
1. Peak Detector and Average measurement method are used for emission measurement.
 2. All measurements were made at 3 meters.
 3. Negative sign in the column shows value below limit.
 4. Horn antenna is used for the emission over 1000MHz.
 5. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
 6. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.
 7. Emission within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 Section 2.2.

INTERTEK TESTING SERVICES

Applicant: Teenage Engineering AB

Date of Test: May 02, 2014

Model: OD-11

Worst-Case Operating Mode: Transmitting (WiFi 802.11g)

Table 22

Radiated Emissions (Bandedge)

Pursuant to FCC Part 15 Section 15.249 Requirement

802.11g OFDM 54Mbps (Antenna 1)

Frequency (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Preamp. Gain (dB)	Antenna Factor (dB)	Reading (dBμV)	Net at 3m (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)	Restricted band (MHz)
2389.940	PK	H	33	29.4	70.6	67.0	74	-7.0	2310~2390
	AV	H	33	29.4	51.8	48.2	54	-5.8	
2412.000 Channel 1	PK	H	33	29.4	106.4	102.8	114	-11.2	-
	AV	H	33	29.4	86.4	82.8	94	-11.2	-
2462.000 Channel 11	PK	H	33	29.4	106.0	102.4	114	-11.6	-
	AV	H	33	29.4	85.8	82.2	94	-11.8	-
2483.600	PK	H	33	29.4	71.4	67.8	74	-6.2	2483.5~2500
	AV	H	33	29.4	51.6	48.0	54	-6.0	

802.11g OFDM 54Mbps (Antenna 2)

Frequency (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Preamp. Gain (dB)	Antenna Factor (dB)	Reading (dBμV)	Net at 3m (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)	Restricted band (MHz)
2389.990	PK	H	33	29.4	70.9	67.3	74	-6.7	2310~2390
	AV	H	33	29.4	51.7	48.1	54	-5.9	
2412.000 Channel 1	PK	H	33	29.4	105.4	101.8	114	-12.2	-
	AV	H	33	29.4	85.8	82.2	94	-11.8	-
2462.000 Channel 11	PK	H	33	29.4	105.0	101.4	114	-12.6	-
	AV	H	33	29.4	85.2	81.6	94	-12.4	-
2484.140	PK	H	33	29.4	71.1	67.5	74	-6.5	2483.5~2500
	AV	H	33	29.4	51.8	48.2	54	-5.8	

- NOTES:
1. Peak Detector and Average measurement method are used for emission measurement.
 2. All measurements were made at 3 meters.
 3. Negative sign in the column shows value below limit.
 4. Horn antenna is used for the emission over 1000MHz.
 5. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
 6. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.
 7. Emission within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 Section 2.2.

INTERTEK TESTING SERVICES

Applicant: Teenage Engineering AB

Date of Test: May 02, 2014

Model: OD-11

Worst-Case Operating Mode: Transmitting (WiFi 802.11n HT20)

Table 23

Radiated Emissions (Bandedge)

Pursuant to FCC Part 15 Section 15.249 Requirement

802.11n HT20 mcs7 65Mbps (Antenna 1)

Frequency (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Preamp. Gain (dB)	Antenna Factor (dB)	Reading (dBμV)	Net at 3m (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)	Restricted band (MHz)
2389.400	PK	H	33	29.4	68.1	64.5	74	-9.5	2310~2390
	AV	H	33	29.4	51.6	48.0	54	-6.0	
2412.000 Channel 1	PK	H	33	29.4	104.6	101.0	114	-13.0	-
	AV	H	33	29.4	84.7	81.1	94	-12.9	-
2462.000 Channel 11	PK	H	33	29.4	106.4	102.8	114	-11.2	-
	AV	H	33	29.4	85.2	81.6	94	-12.4	-
2483.640	PK	H	33	29.4	69.6	66.0	74	-8.0	2483.5~2500
	AV	H	33	29.4	51.6	48.0	54	-6.0	

802.11n HT20 mcs7 65Mbps (Antenna 2)

Frequency (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Preamp. Gain (dB)	Antenna Factor (dB)	Reading (dBμV)	Net at 3m (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)	Restricted band (MHz)
2389.760	PK	H	33	29.4	67.4	63.8	74	-10.2	2310~2390
	AV	H	33	29.4	51.4	47.8	54	-6.2	
2412.000 Channel 1	PK	H	33	29.4	104.4	100.8	114	-13.2	-
	AV	H	33	29.4	84.8	81.2	94	-12.8	-
2462.000 Channel 11	PK	H	33	29.4	105.9	102.3	114	-11.7	-
	AV	H	33	29.4	85.0	81.4	94	-12.6	-
2484.240	PK	H	33	29.4	69.3	65.7	74	-8.3	2483.5~2500
	AV	H	33	29.4	51.5	47.9	54	-6.1	

- NOTES:
1. Peak Detector and Average measurement method are used for emission measurement.
 2. All measurements were made at 3 meters.
 3. Negative sign in the column shows value below limit.
 4. Horn antenna is used for the emission over 1000MHz.
 5. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
 6. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.
 7. Emission within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 Section 2.2.

INTERTEK TESTING SERVICES

Applicant: Teenage Engineering AB

Date of Test: May 02, 2014

Model: OD-11

Worst-Case Operating Mode: Transmitting (WiFi 802.11n HT40)

Table 24
Radiated Emissions (Bandedge)
Pursuant to FCC Part 15 Section 15.249 Requirement

802.11n HT40 mcs7 130Mbps (Antenna 2)

Frequency (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Preamp. Gain (dB)	Antenna Factor (dB)	Reading (dBμV)	Net at 3m (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)	Restricted band (MHz)
2389.980	PK	H	33	29.4	67.8	64.2	74	-9.8	2310~2390
	AV	H	33	29.4	51.3	47.7	54	-6.3	
2422.000 Channel 3	PK	H	33	29.4	103.9	100.3	114	-13.7	-
	AV	H	33	29.4	85.8	82.2	94	-11.8	-
2452.000 Channel 9	PK	H	33	29.4	105.2	101.6	114	-12.4	-
	AV	H	33	29.4	86.0	82.4	94	-11.6	-
2483.900	PK	H	33	29.4	67.4	63.8	74	-10.2	2483.5~2500
	AV	H	33	29.4	51.2	47.6	54	-6.4	

- NOTES:
1. Peak Detector and Average measurement method are used for emission measurement.
 2. All measurements were made at 3 meters.
 3. Negative sign in the column shows value below limit.
 4. Horn antenna is used for the emission over 1000MHz.
 5. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
 6. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.
 7. Emission within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 Section 2.2.

INTERTEK TESTING SERVICES

Applicant: Teenage Engineering AB

Date of Test: May 02, 2014

Model: OD-11

Worst-Case Operating Mode: Transmitting (Bluetooth BLE)

Table 25
Radiated Emissions (Bandedge)
Pursuant to FCC Part 15 Section 15.249 Requirement

Bluetooth BLE (Antenna 1)

Frequency (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Preamp. Gain (dB)	Antenna Factor (dB)	Reading (dBμV)	Net at 3m (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)	Restricted band (MHz)
2389.540	PK	H	33	29.4	70.8	67.2	74	-6.8	2310~2390
	AV	H	33	29.4	51.2	47.6	54	-6.4	
2402.000 Channel 1	PK	H	33	29.4	109.0	105.4	114	-8.6	-
	AV	H	33	29.4	84.2	80.6	94	-13.4	-
2480.000 Channel 40	PK	H	33	29.4	109.4	105.8	114	-8.2	-
	AV	H	33	29.4	84.4	80.8	94	-13.2	-
2483.860	PK	H	33	29.4	71.1	67.5	74	-6.5	2483.5~2500
	AV	H	33	29.4	50.4	46.8	54	-7.2	

- NOTES:
1. Peak Detector and Average measurement method are used for emission measurement.
 2. All measurements were made at 3 meters.
 3. Negative sign in the column shows value below limit.
 4. Horn antenna is used for the emission over 1000MHz.
 5. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
 6. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.
 7. Emission within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 Section 2.2.

8.2 Discussion of Pulse Desensitization

For WiFi and Bluetooth BLE: Pulse desensitivity is not applicable for this device. Since the transmitter transmits the RF signal continuously.

8.3 Calculation of Average Factor

For WiFi and Bluetooth BLE: The average factor is not applicable for this device as the transmitted signal is a continuously signal.

8.4 Emissions Test Procedures

The following is a description of the test procedure used by Intertek Testing Services Hong Kong Ltd. in the measurements of transmitter operating under the Part 15, Subpart C rules.

The transmitting equipment under test (EUT) is placed on a wooden turntable which is four feet in diameter and approximately one meter in height above the ground plane. During the radiated emissions test, the turntable is rotated and any cables leaving the EUT are manipulated to find the configuration resulting in maximum emissions. The EUT is adjusted through all three orthogonal axis to obtain maximum emission levels. The antenna height and polarization are also varied during the testing to search for maximum signal levels. The height of the antenna is varied from one to four meters.

Detector function for radiated emissions is in peak mode. Average readings, when required, are taken by measuring the duty cycle of the equipment under test and subtracting the corresponding amount in dB from the measured peak readings. A detailed description for the calculation of the average factor can be found in Exhibit 8.3.

The frequency range scanned is from 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 40 GHz, whichever is lower. For line conducted emissions, the range scanned is 150 kHz to 30 MHz.

8.4 Emissions Test Procedures (cont'd)

The EUT is warmed up for 15 minutes prior to the test.

AC power to the unit is varied from 85% to 115% nominal and variation in the fundamental emission field strength is recorded. If battery powered, a new, fully charged battery is used.

Conducted measurements were made as described in ANSI C63.4 (2003).

The IF bandwidth used for measurement of radiated signal strength was 100 kHz or greater when frequency is below 1000 MHz. Where pulsed transmissions of short enough pulse duration warrant, a greater bandwidth is selected according to the recommendations of Hewlett Packard Application Note 150-2. A discussion of whether pulse desensitivity is applicable to this unit is included in this report (See Exhibit 8.1). Above 1000 MHz, a resolution bandwidth of 1 MHz is used.

Transmitter measurements are normally conducted at a measurement distance of three meters. However, to assure low enough noise floor in the forbidden bands and above 1 GHz, signals are acquired at a distance of one meter or less. All measurements are extrapolated to three meters using inverse scaling, unless otherwise reported. Measurements taken at a closer distance are so marked.

9.0 **Confidentiality Request**

The applicant has the confidentiality request for this application.

INTERTEK TESTING SERVICES

10.0 Equipment List

1) Radiated Emissions Test

Equipment	Biconical Antenna	Log Periodic Antenna	EMI Test Receiver
Registration No.	EW-0571	EW-0446	EW-2666
Manufacturer	EMCO	EMCO	R&S
Model No.	3104C	3146	ESCI7
Calibration Date	Nov. 01, 2013	Apr. 30, 2013	Jun. 20, 2013
Calibration Due Date	May. 01, 2015	Oct. 30, 2014	Jun. 20, 2014

Equipment	14m Double Shield RF Cable	14m Double Shield RF Cable	Spectrum Analyzer
Registration No.	EW-2528	EW-2074	EW-2466
Manufacturer	RADIALL	RADIALL	R&S
Model No.	nm / br5d / sma 14m	N(m)-RG142-BNC(m) L= 14M	FSP30
Calibration Date	Oct. 26, 2013	Oct. 27, 2013	Aug. 4, 2013
Calibration Due Date	Nov. 26, 2014	Nov. 27, 2014	Aug. 4, 2014

Equipment	Double Ridged Guide Antenna	Active Loop H-Field	12m Double Shield RF Cable
Registration No.	EW-1015	EW-0191	EW-2774
Manufacturer	EMCO	EMCO	GREATBILLION
Model No.	3115	6502	SMA m-m ra 12m 40G outdoor
Calibration Date	Mar. 05, 2013	Jan 30, 2013	Sep. 02, 2013
Calibration Due Date	Sep. 05, 2014	Jul 30, 2014	Oct. 30, 2014

Equipment	Pyramidal Horn Antenna	Pre-Amplifier
Registration No.	EW-0905	EW-2354
Manufacturer	EMCO	MITEQ
Model No.	3160-09	12002600-30-10P
Calibration Date	Jan. 28, 2014	Sep. 02, 2013
Calibration Due Date	Jul. 28, 2015	Sep. 22, 2014

2) Conducted Emissions Test

Equipment	EMI Test Receiver	LISN
Registration No.	EW-2666	EW-2874
Manufacturer	R&S	R&S
Model No.	ESCI7	ENV-216
Calibration Date	Jun. 20, 2013	Oct. 17, 2013
Calibration Due Date	Jun. 20, 2014	Aug. 17, 2014

END OF TEST REPORT