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ENGINEERING TEST REPORT #: 315334-1
LSR JOB #: C-2509

Compliance Testing of:

Bluetooth LED Large Area Light with Built-in Charger

Test Date(s):


8/17/2016 8/19/2016 8/26/2016
8/18/2016 8/25/2016 8/29/2016

Prepared For:

Stanley Black and Decker
Attn: Kirwan Magdamo and Crystal Young
708 E. Joppa Road
Towson, MD 21286

This Test Report is issued under the Authority of:


John Johnston, EMC Engineer

Signature: 

Date: 8/29/16

Reviewed by:


Khairul Aidi Zainal, Engineering Manager-Test Services

Signature: 

Date: 9/19/16

Project Engineer:

John Johnston, EMC Engineer I

Signature: 

Date: 8/29/16

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Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048

LS Research, LLC in Review

As an EMC Testing Laboratory, our Accreditation and Assessments are recognized through the following:



A2LA – American Association for Laboratory Accreditation

Accreditation based on ISO/IEC 17025: 2005 with Electrical (EMC) Scope of Accreditation
A2LA Certificate Number: 1255.01



Federal Communications Commission (FCC) – USA

Listing of two 3 Meter Semi-Anechoic Chambers based on Title 47 CFR – Part 2.948
FCC Registration Number: 90756



Industry Canada

On file, 3 Meter Semi-Anechoic Chamber based on RSS-GEN – Issue 4
File Number: IC 3088A-2
On file, 3 Meter Semi-Anechoic Chamber based on RSS-GEN – Issue 4
File Number: IC 3088A-3

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Summary of Test Report

Between August 17, 2016 and August 29, 2016 the Bluetooth LED Large Area Light with Built-in Charger, provided by Stanley Black and Decker, was tested and MEETS the following requirements:

FCC and IC Paragraph	Test Requirements	Compliance (Yes/No)
FCC: 15.247 (a)(2) IC: RSS-247 sect. 5.2 (1) IC: RSS-Gen sect. 6.6	Minimum 6 dB Bandwidth / Occupied Bandwidth	Yes
FCC: 15.247 (b)(3) & 1.1310 IC: RSS-247 sect. 5.4 (4)	Maximum Output Power	Yes
FCC: 15.247 (e) IC: RSS-247 sect. 5.2 (2)	Power Spectral Density of a Digitally Modulated System	Yes
FCC: 15.247(d) IC: RSS-247 sect. 5.5	RF Conducted Spurious Emissions at the Transmitter Antenna Terminal	Yes
FCC: 15.209 & 15.205 IC: RSS-Gen sect 6.13	Transmitter Radiated Emissions	Yes
FCC: 15.109 IC: RSS-Gen sect 7.1	Receive Mode (Digital Device) Radiated Emissions	Yes
FCC: 2.1055 (d) IC: RSS Gen sect. 6.11	Frequency Stability	Yes
FCC : 15.207 and 15.107 IC : RSS Gen sect. 8.8 and ICES-003	AC Power Line Conducted Emissions	Yes

Test Facilities

All testing was performed at:

LS Research, LLC
W66 N220 Commerce Court
Cedarburg, Wisconsin, 53012 USA

LS Research, LLC is accredited by A2LA (American Association for Laboratory Accreditation) to the requirements of ISO/IEC 17025, 2005 “General Requirements for the Competence of Calibration and Testing Laboratories”.

LS Research, LLC’s scope of accreditation includes all test methods listed herein, unless otherwise noted.

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1.0 Client Information

Manufacturer Name:	Stanley Black and Decker
Address:	701 E Joppa Road, Towson, MD 21286
Contact Person:	Kirwan Magdamo and Crystal Young

1.1 Equipment Under Test (EUT) Information

The following information has been supplied by the applicant.

Product Name:	Bluetooth LED Large Area Light with Built-in Charger
Model Number:	DCL070
Serial Number:	000070; 000281; 000048

1.2 Product Information

The DCL070 Bluetooth (BLE) LED Area Light with Built-in Charger is a corded and cordless light or charger used to illuminate work areas. The unit is capable of operating on a 20 V battery or AC power. Additionally, the DCL070 may charge the 20 V battery when connected to AC power. Users can connect to and communicate with the DCL070 via the DEWALT Tool Connect App using a smartphone or tablet. The DCL070 can be programmed to turn on or off at scheduled time or intervals automatically.

1.3 Modifications Incorporated In the EUT for Compliance Purposes

None.

1.4 Deviations & Exclusions from Test Specifications

None noted at time of test.

1.5 Additional Information

The DCL070, referred to herein as the *Equipment Under Test*, or *EUT*, operates nominally when supplied 120 VAC, 60 Hz. The *EUT* was tested as a floor standing unit and operated on firmware version V048. Version V048 is a modified version of firmware version C.3, which allows RF test modes to be selected/configured. Firmware version V048 can be loaded using an Android mobile device that may subsequently read the serial/model number of the EUT.

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It should be noted that radiated emission testing was performed on serial number 000070, conducted measurements performed on serial number 000281, and conducted emission testing performed on serial number 000048.

The EUT includes an AC mains port and a convenience port. The EUT operates via 120 VAC power supplied via the AC mains port. Users can connect to the convenience port to power other electronic devices, however, the EUT is not configured to operate by providing power to the EUT via the convenience port.

Test operational modes (transmit, receive, channel selection, etc.) were instantiated by pressing a combination of buttons on the EUT. The EMC Engineers performing testing were able to quickly, and efficiently cycle through the test operational modes due to modified firmware version V048.

The radio onboard the EUT is a CC 2541 rated at 0 dBm output power. The radio includes an inverted F PCB trace antenna rated with a gain of 0 dBi.

A generic, 6 foot extension cable was used during testing when supplying the EUT with 120 VAC.

1.6 Conditions of Test

Environmental:

Temperature: 20-25° C
 Relative Humidity: 30-60%
 Atmospheric Pressure: 86-106 kPa

1.7 Test Equipment

All test equipment is calibrated by a calibration laboratory accredited by A2LA to the requirements of ISO 17025. For a complete list of test equipment and calibration dates, see Appendix A. Unless otherwise noted, resolution bandwidth of measuring instrument used during testing for given frequency range, see below.

Frequency Range	Resolution Bandwidth
9 kHz – 150 kHz	200 Hz
150 kHz – 30 MHz	9 kHz
30 MHz – 1000 MHz	120 kHz
Above 1000 MHz	1 MHz

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1.8 EUT Technical Specifications

BLE:

EUT Frequency Range (in MHz)	2402-2480 MHz
EIRP (in W)	
Maximum	0.000846
Minimum	0.0000513
Occupied Bandwidth (-6 dB)	0.700 MHz
Type of Modulation	GFSK
Emission Designator	1M05G1D
Frequency Tolerance %, Hz, ppm	Better than 100 ppm
Antenna Information	
Detachable/non-detachable	Non-detachable
Type	Inverted F PCB Trace Antenna
EUT will be operated under FCC Rule Part(s)	15.247
EUT will be operated under RSS Rule Part(s)	210/247
Modular Filing?	No
Portable or Mobile?	Portable

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2.0 Conformance Summary

When tested on the specified dates, it was determined that the EUT was compliant with the requirements of FCC Title 47, CFR Part 15.247, 15.109, 15.209, 15.107, 15.207, Industry Canada RSS-247, Issue 1 (2015), RSS-Gen Issue 4 (2014), and ICES-003 using the methods of ANSI C63.10 and ANSI C63.4.

Any modifications made to the EUT after the specified test date(s) will invalidate the data herein.

If some measurements are seen to be within the uncertainty value, as listed in Appendix C there is a possibility that this unit may not meet the required limit specification if subsequently tested.

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3.0 – RF Conducted Measurements

Manufacturer	Stanley Black and Decker
Test Location	LS Research, LLC
Rule Part	FCC Part 15.247 / RSS-247
General Measurement Procedure	FCC KDB 558074 D01 DTS Measurement Guidance v03r05 ANSI C63.10-2013
General Description of Measurement	<p>A direct measurement of the transmitted signal was performed at the antenna port of the EUT via a cable connection to a spectrum analyzer. A 10 dB attenuator was placed in series with the cable to protect the spectrum analyzer. The attenuator was added on the analyzer as gain offset settings thereby allowing direct measurements, without the need for any further corrections. The EUT was configured to run in a continuous transmit mode, while being supplied with typical data as a modulation source. Conducted measurements were performed on EUT S/N 000281, which included an SMA connector at the antenna port.</p> <p>Conducted measurements were performed with the EUT operating at the highest intensity illumination level, operating on 120 VAC, and charging a battery.</p>

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3.1 – RF Conducted – Fundamental Bandwidth

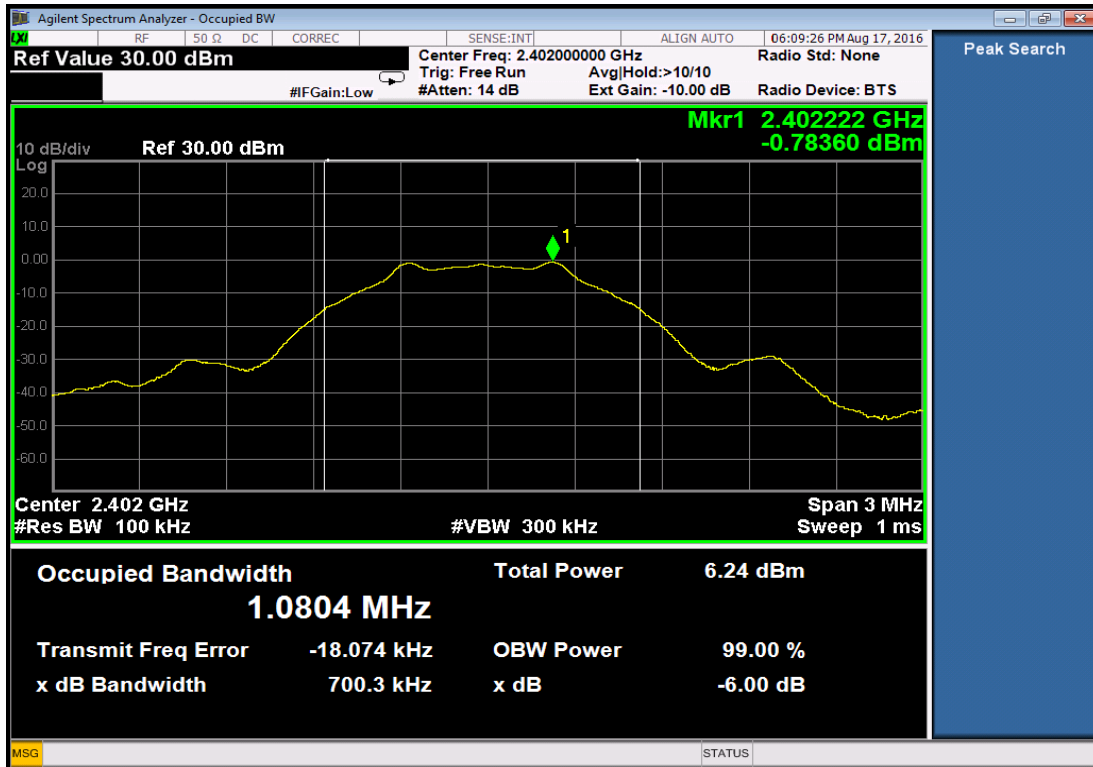
Manufacturer	Stanley Black and Decker
Date	8/17/2016
Operator	Coty Hammerer
Temp. / R.H.	20 - 25° C / 30-60% R.H.
Rule Part	FCC Part 15.247 (a)(2) / RSS-247 sect. 5.2 (1)
Specific Measurement Procedure	FCC KDB 558074 Section 8.0 DTS bandwidth ANSI C63.10 2013 RSS-GEN Section 6.6
Additional Description of Measurement	Peak detector used
Additional Notes	1. Continuous modulated transmit used for this test.

Table

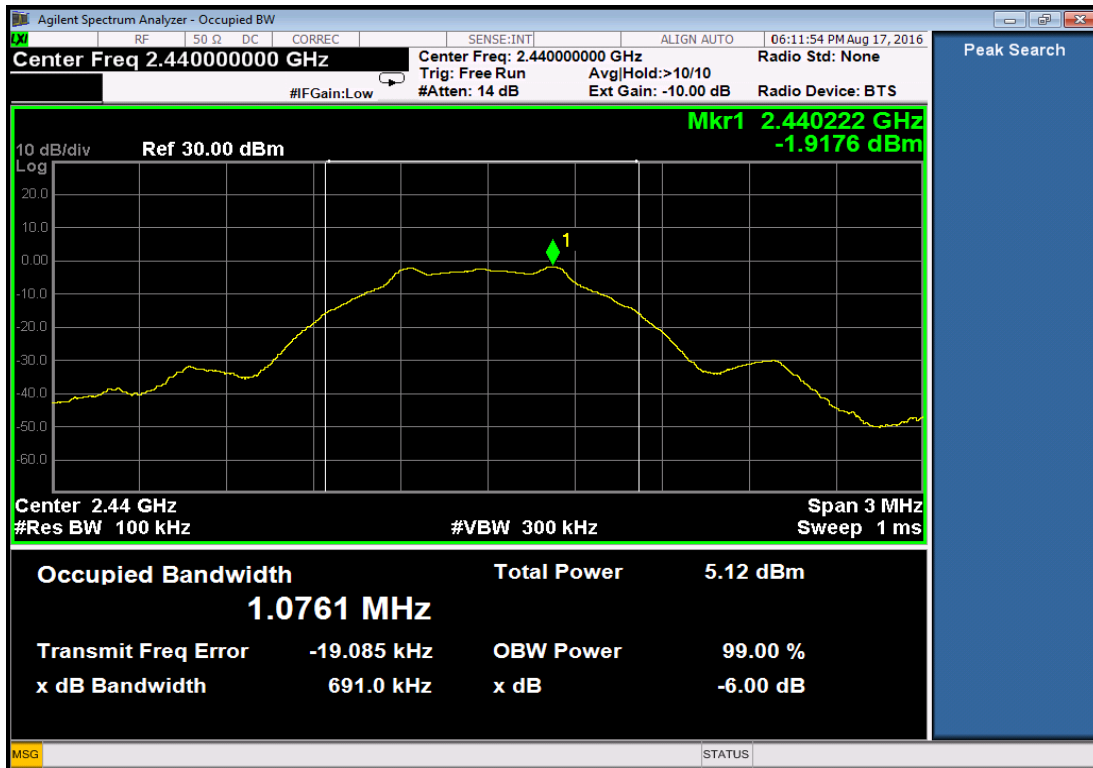
Frequency (MHz)	6 dB Bandwidth (MHz)	6 dB Bandwidth Minimum Limit (MHz)	99% OBW (MHz)
2402	0.700	0.500	1.053
2440	0.691	0.500	1.054
2480	0.694	0.500	1.054

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Plots

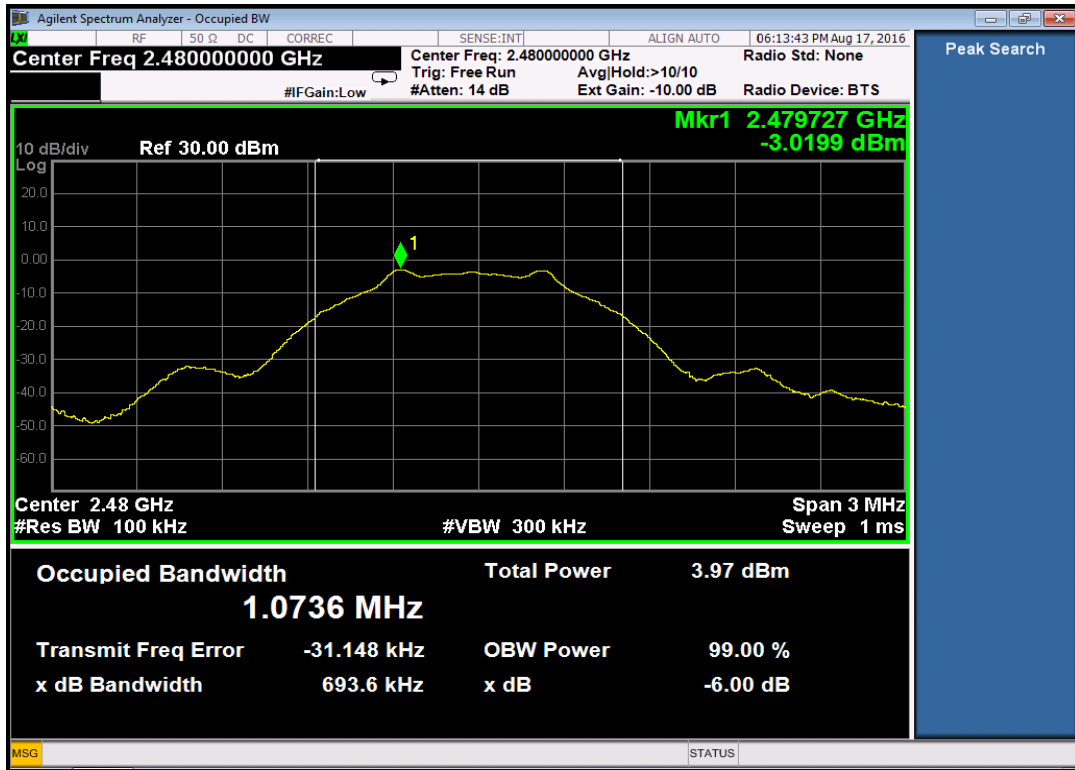


Low Channel - DTS (-6dB) BW

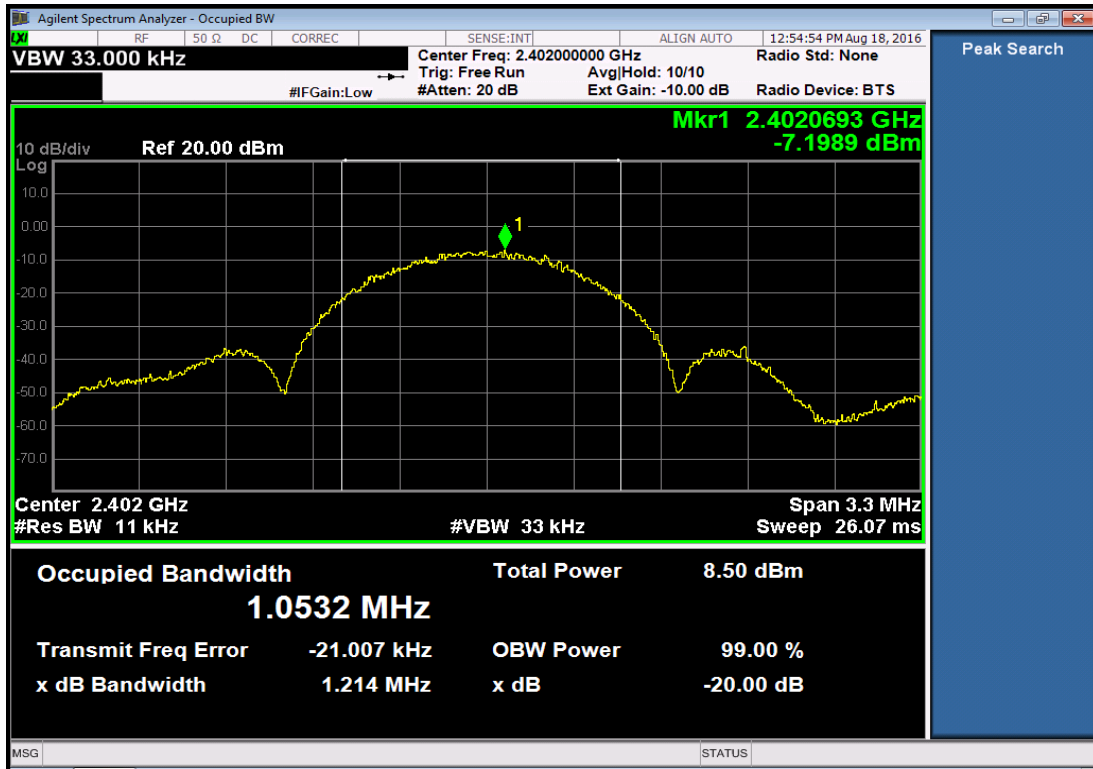


Mid Channel - DTS (-6dB) BW

Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
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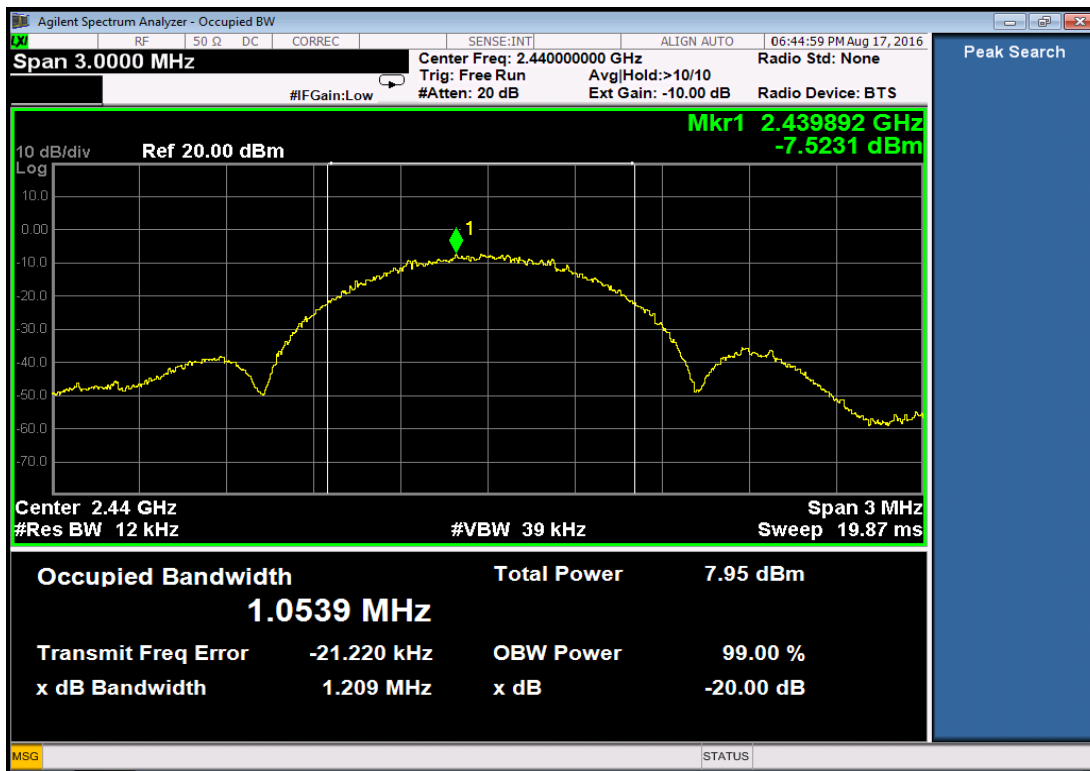


High Channel - DTS (-6dB) BW

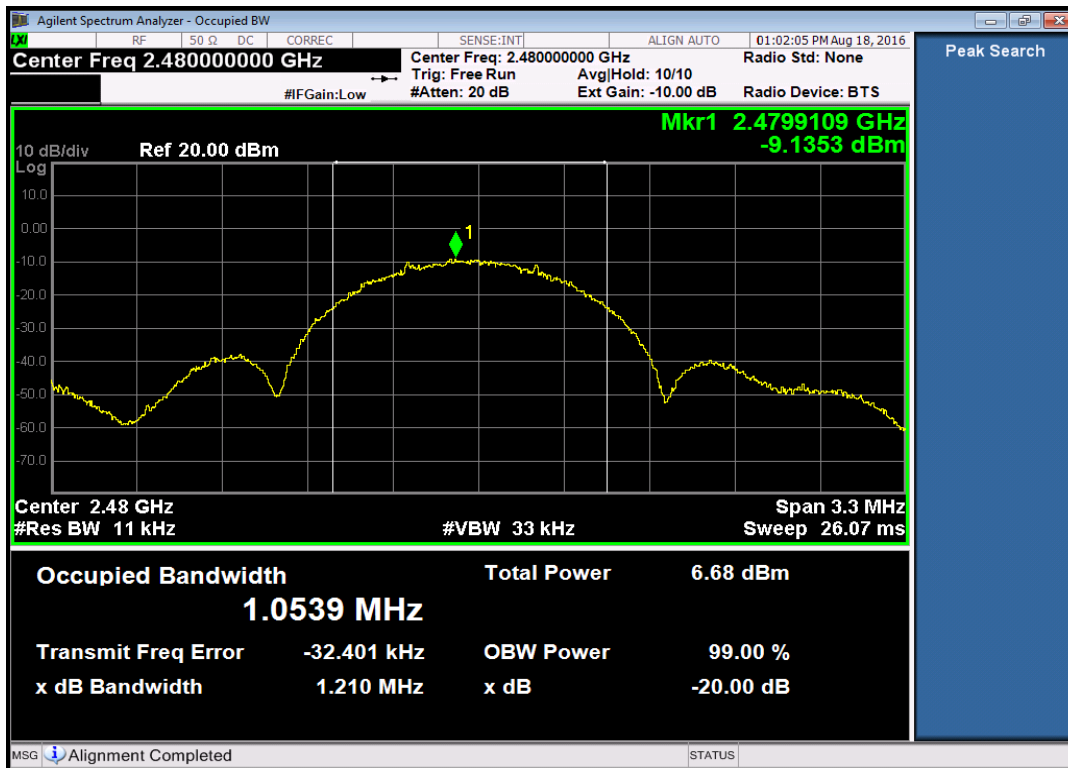


Low Channel - 99% BW

Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
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Mid Channel – 99% BW



High Channel – 99% BW

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Report: TR 315334-1	Model: DCL070
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3.2 – RF Conducted – Fundamental Power and Spectral Density

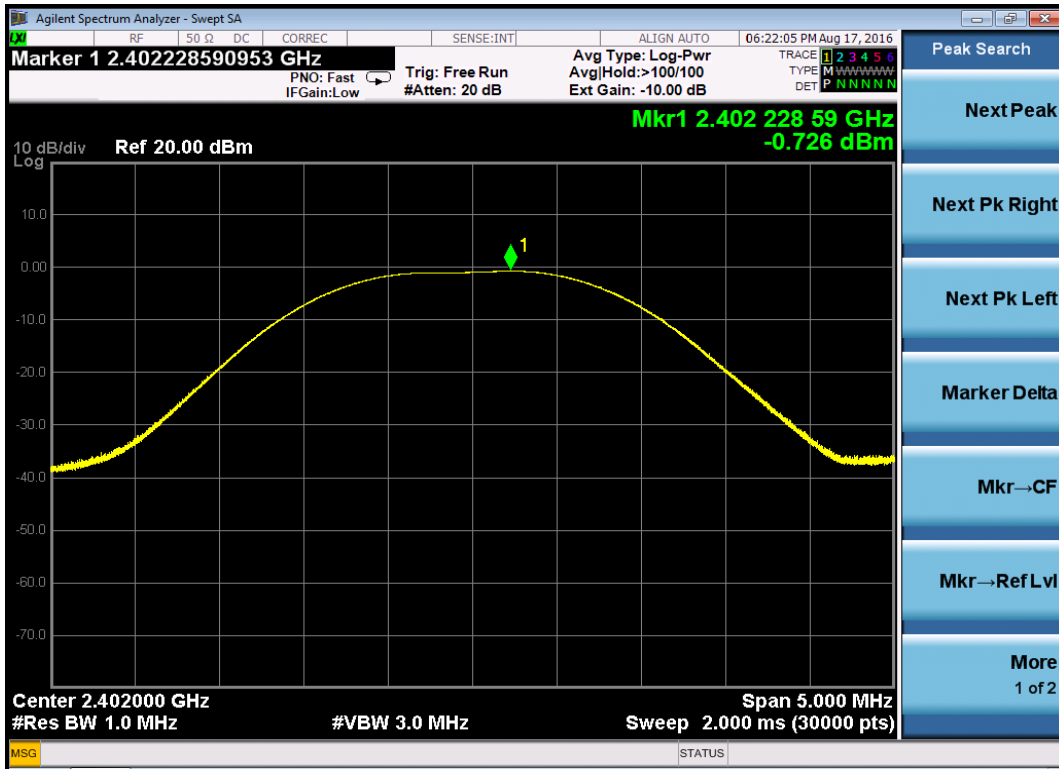
Manufacturer	Stanley Black and Decker
Date	8/17/2016 and 8/18/2016
Operator	Coty Hammerer
Temp. / R.H.	20 - 25° C / 30-60% R.H.
Rule Part	FCC 15.247(b)(3)/ FCC 15.247(e) / RSS-247 Section 5.4(3)/ RSS-247 Section 5.2(2)
Specific Measurement Procedure	FCC KDB 558074 Section 9.1.1 (Power) / 10.2 (PSD) ANSI C63.10 Section 11.9 and 11.10
Additional Description of Measurement	Peak Output Power and Peak PSD methods utilized for measurement 100 kHz resolution bandwidth used for Peak Power Spectral Density measurement
Additional Notes	1. Continuous transmit modulated used for this test. Sample Calculation: Margin (dB) = Limit – Measured Level

Table

Frequency (MHz)	Max Peak Conducted Output Power (dBm)	Power Limit (dBm)	Power Margin (dB)	Peak PSD in 100 kHz RBW (dBm)	PSD Limit in 3kHz Band Limit (dBm)	PSD Margin (dBm)
2402	-0.726	30	30.726	-0.883	8	8.883
2440	-1.701	30	31.701	-1.912	8	9.912
2480	-2.902	30	32.902	-3.236	8	11.236

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Plots

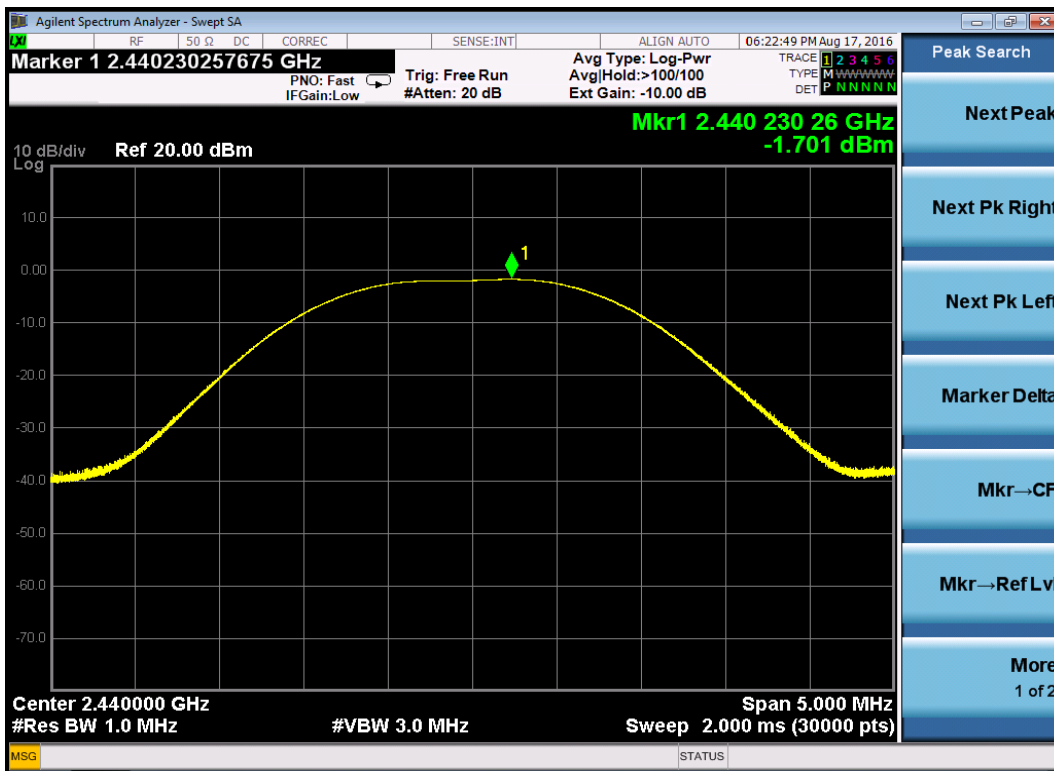


Low Channel – Peak Output Power

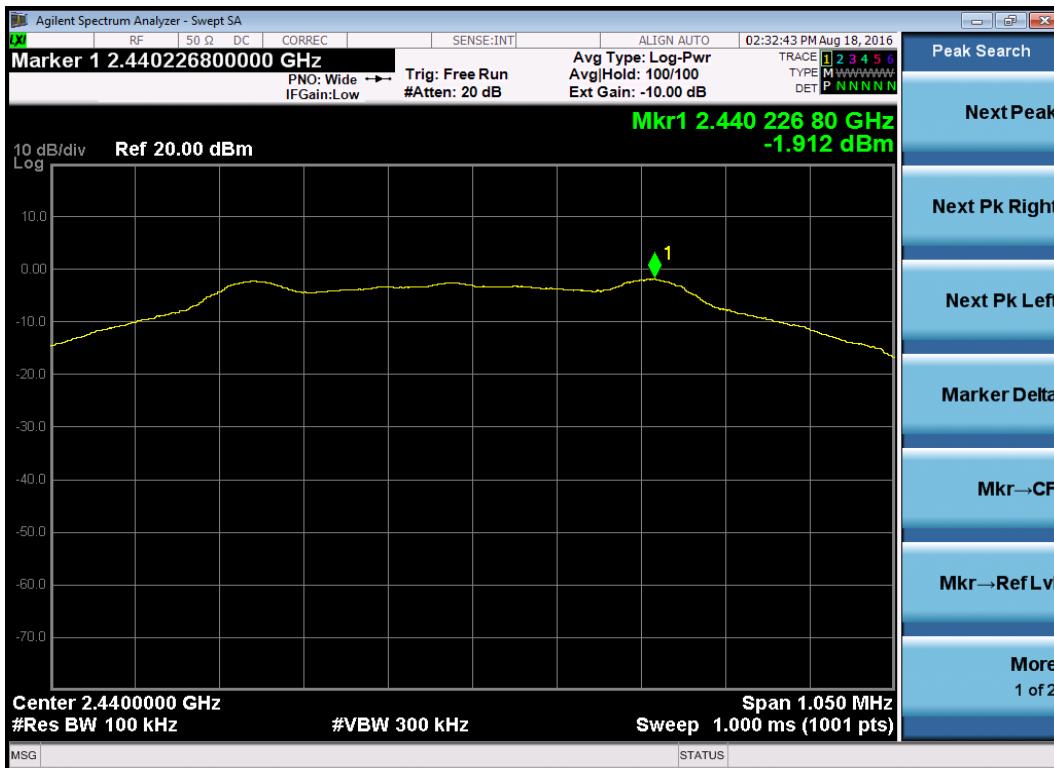


Low Channel – Peak Power Spectral Density

Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
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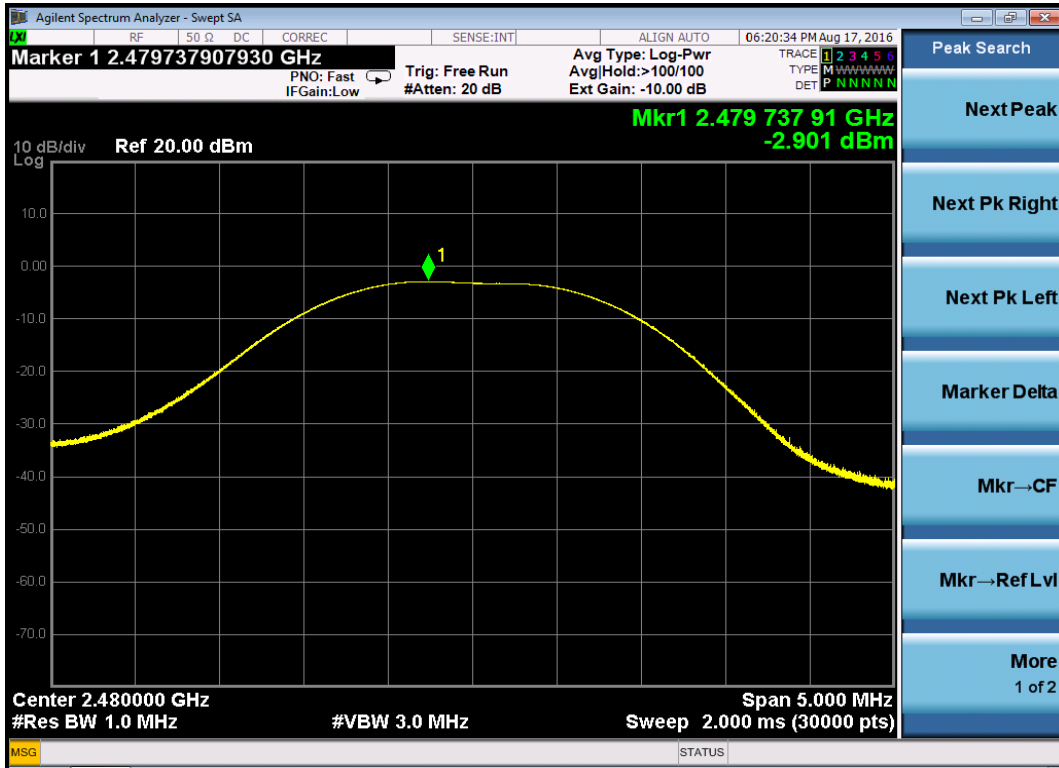


Mid Channel – Peak Output Power



Mid Channel – Peak Power Spectral Density

Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048



High Channel – Peak Output Power



High Channel – Peak Power Spectral Density

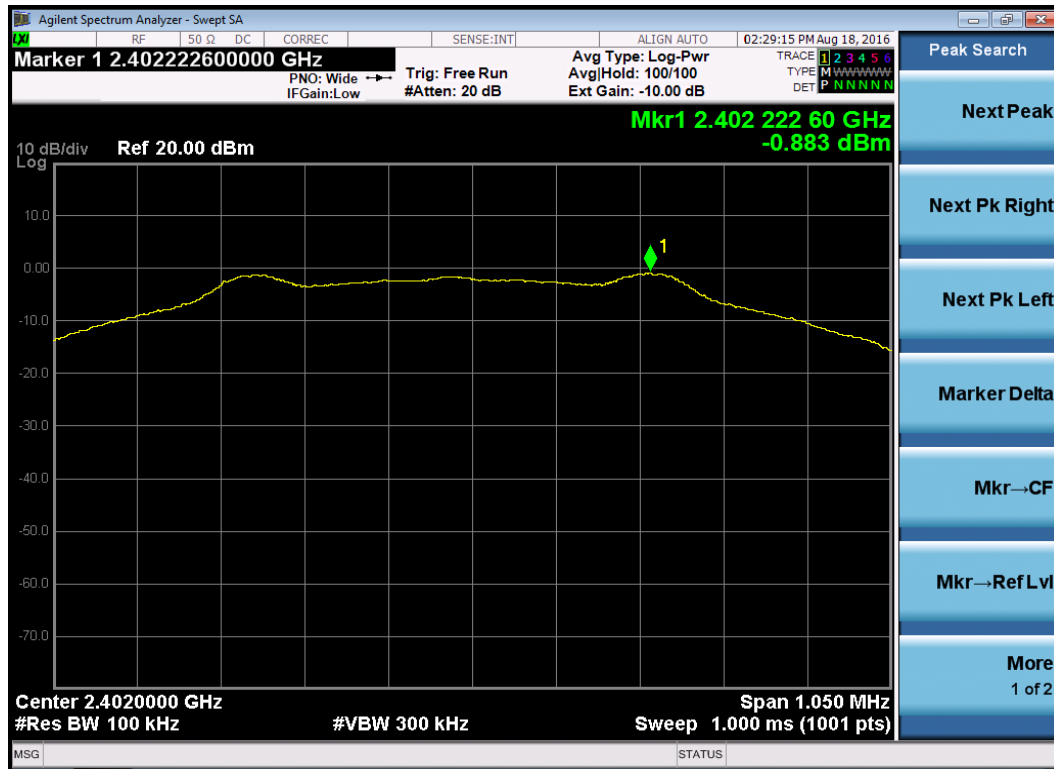
Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048

3.3 – RF Conducted – Spurious Emissions/ Band Edges

Manufacturer	Stanley Black and Decker
Date	8/18/2016
Operator	Coty Hammerer
Temp. / R.H.	20 - 25° C / 30-60% R.H.
Rule Part	FCC 15.247 (d) / RSS-247 sect. 5.5
Specific Measurement Procedure	FCC KDB 558074 Section 11.0 – Emissions in non-restricted frequency bands ANSI C63.10 Section 11.11
Additional Description of Measurement	Peak output power measured in any 100 kHz band outside the authorized frequency band shall be attenuated by at least 20 dBc.
Additional Notes	1. Continuous modulated transmission used for this test. 2. Reference Level Plots were taken at the transmitted frequency and used to determine the 20 dBc limit line.

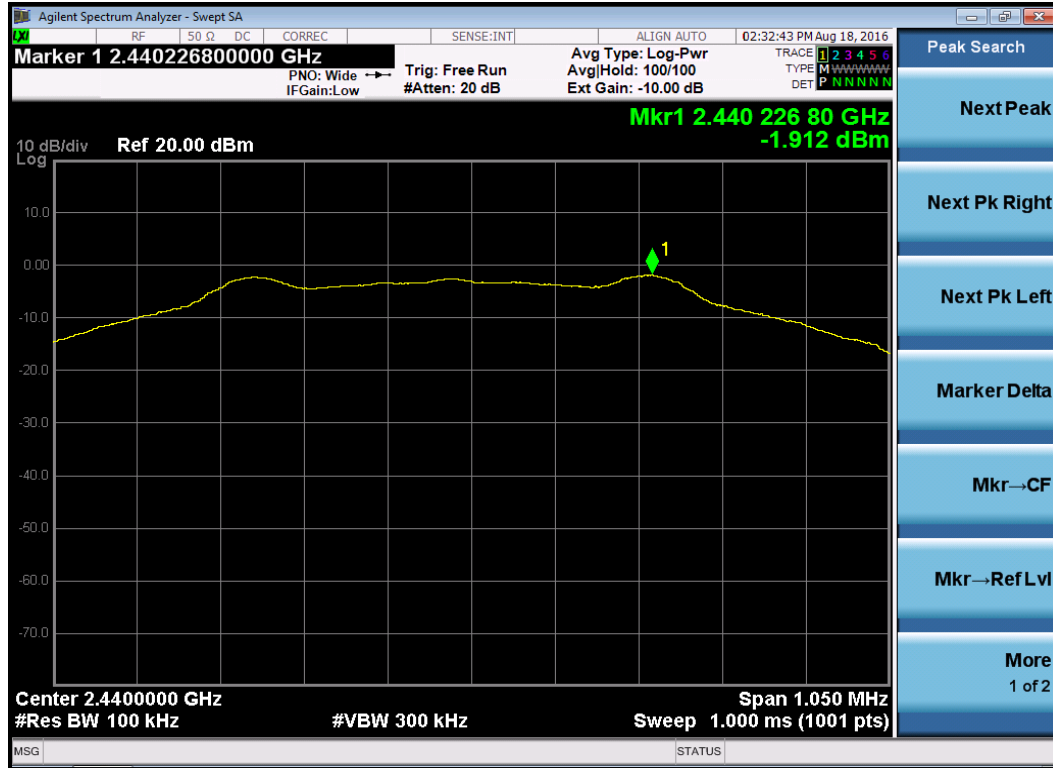
Reference Level Plots

Low Channel

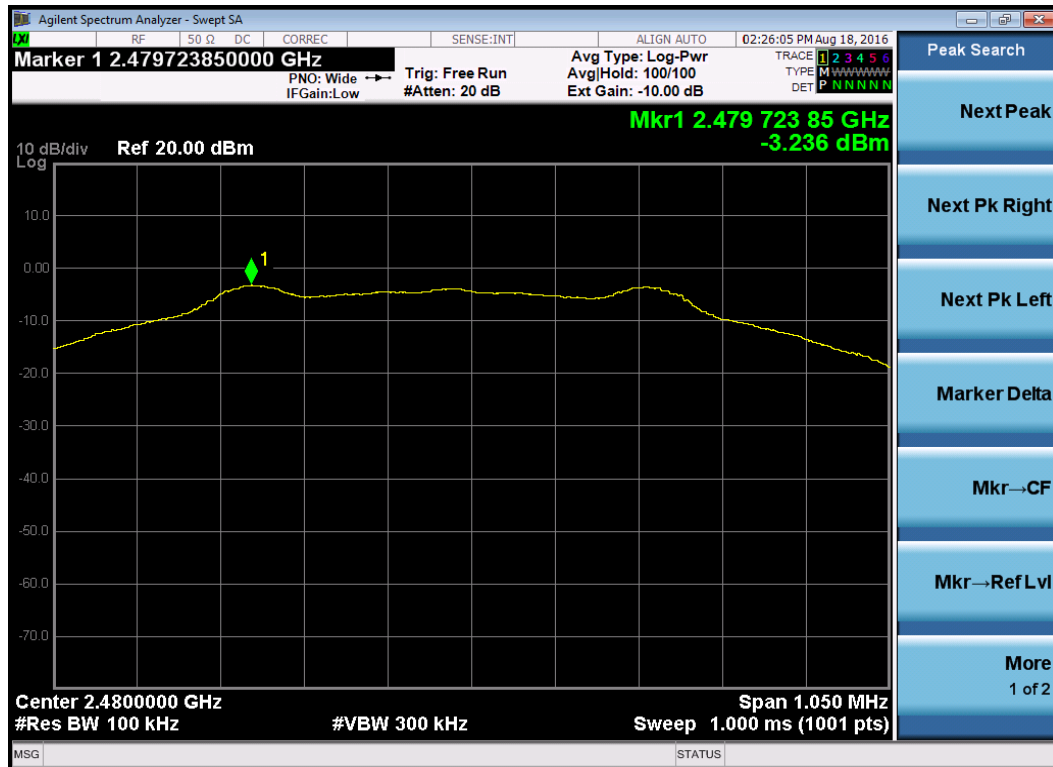


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Mid Channel



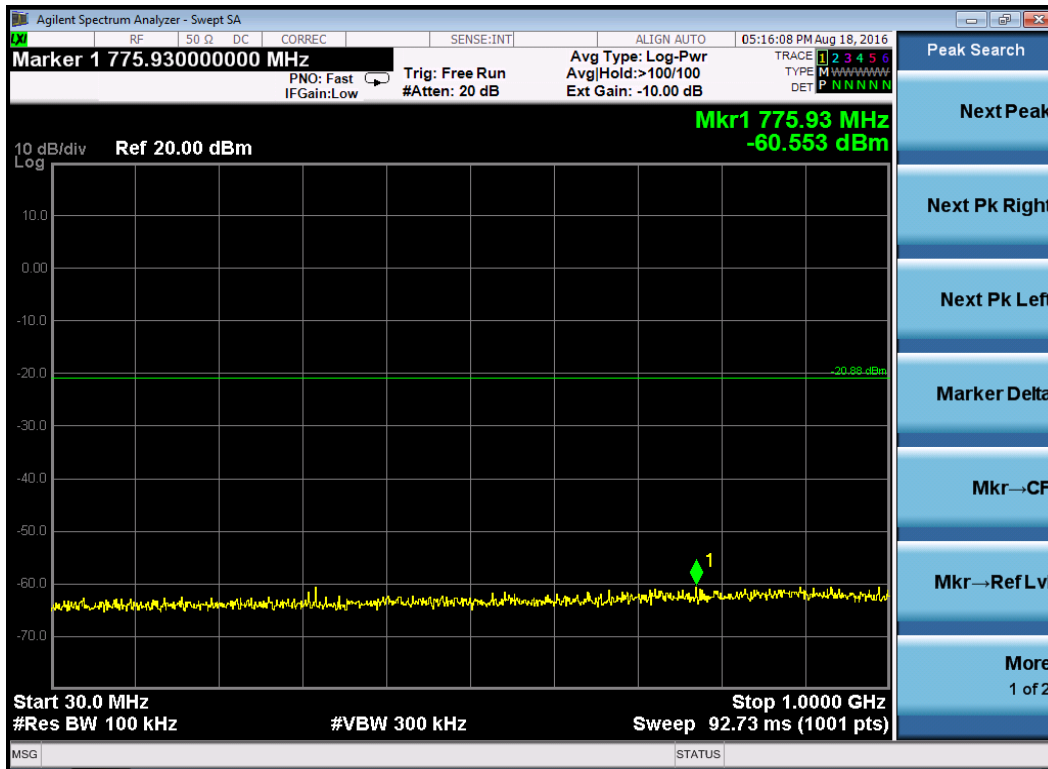
High Channel



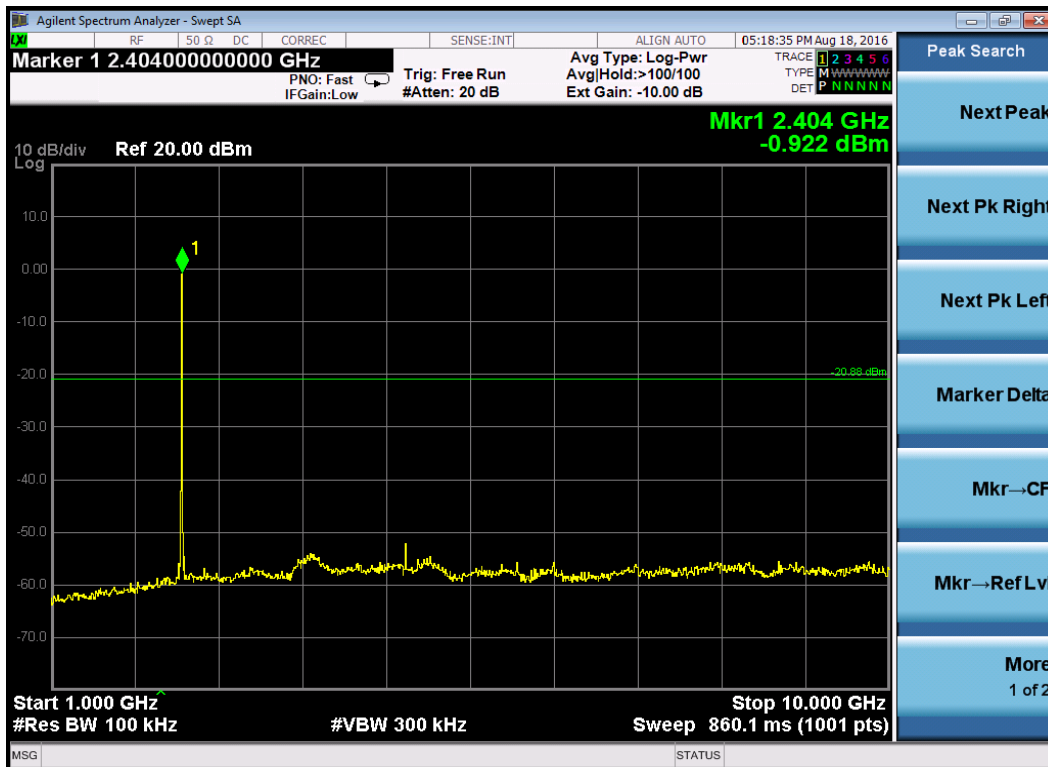
Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
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Plots

Low Channel: 30 MHz – 1 GHz

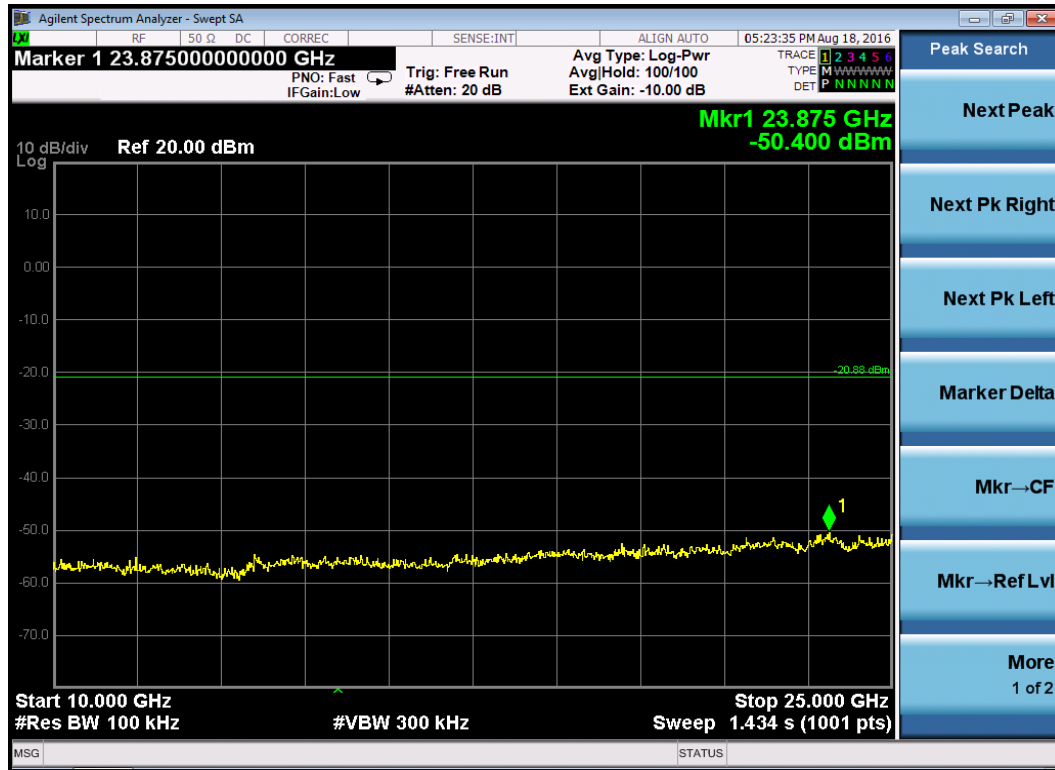


Low Channel: 1 GHz – 10 GHz

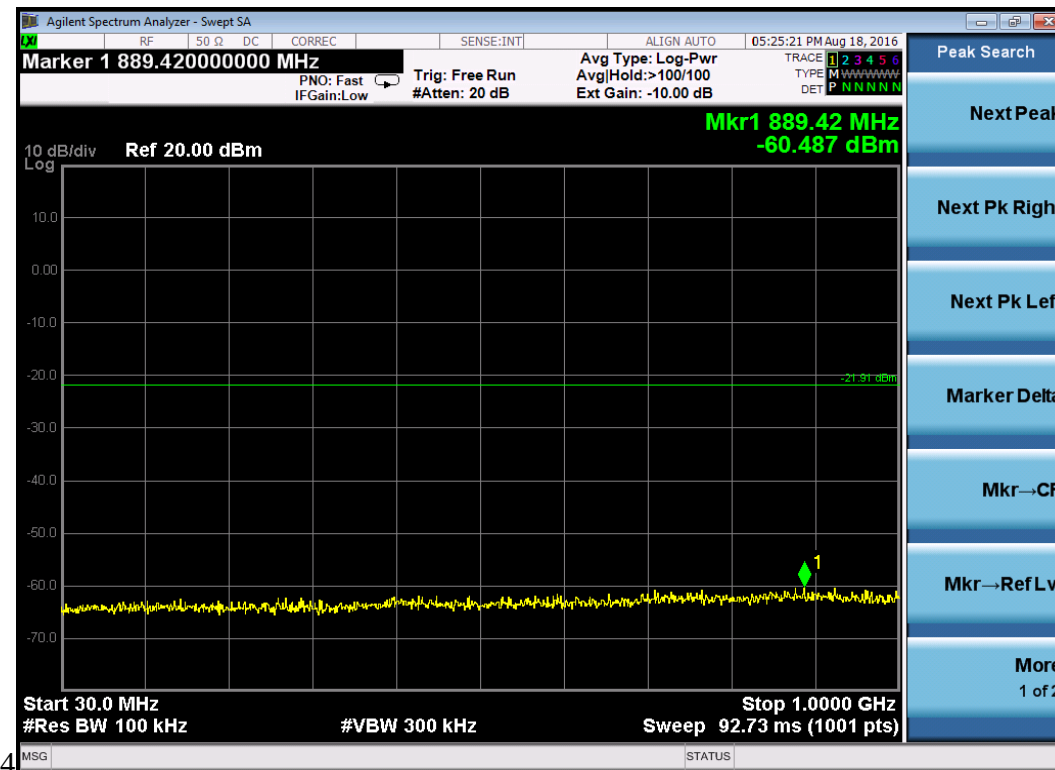


Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
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Low Channel: 10 GHz – 25 GHz

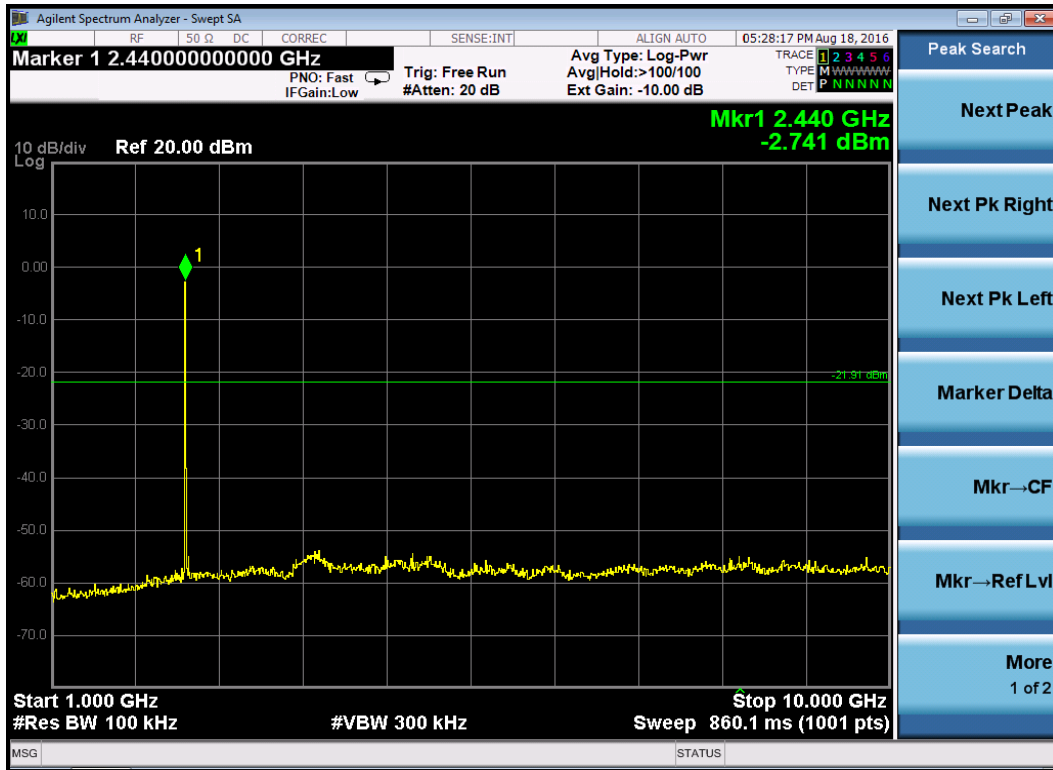


Mid Channel: 30 MHz – 1 GHz



Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
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Mid Channel: 1 GHz – 10 GHz

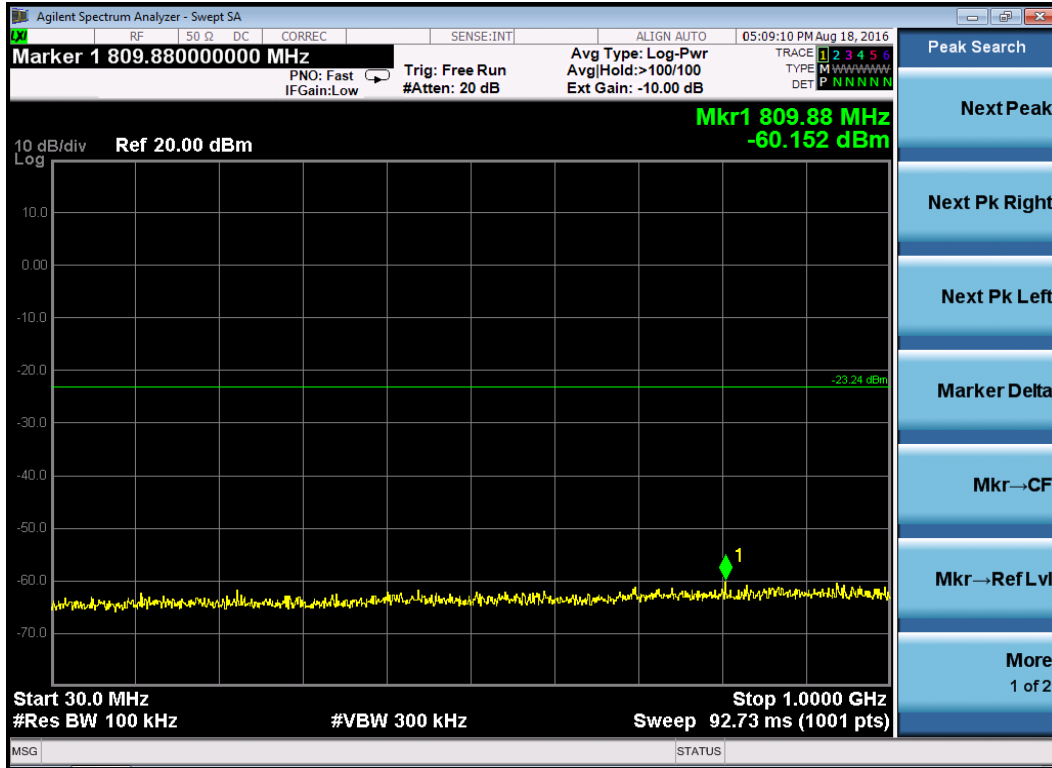


Mid Channel: 10 GHz – 25 GHz

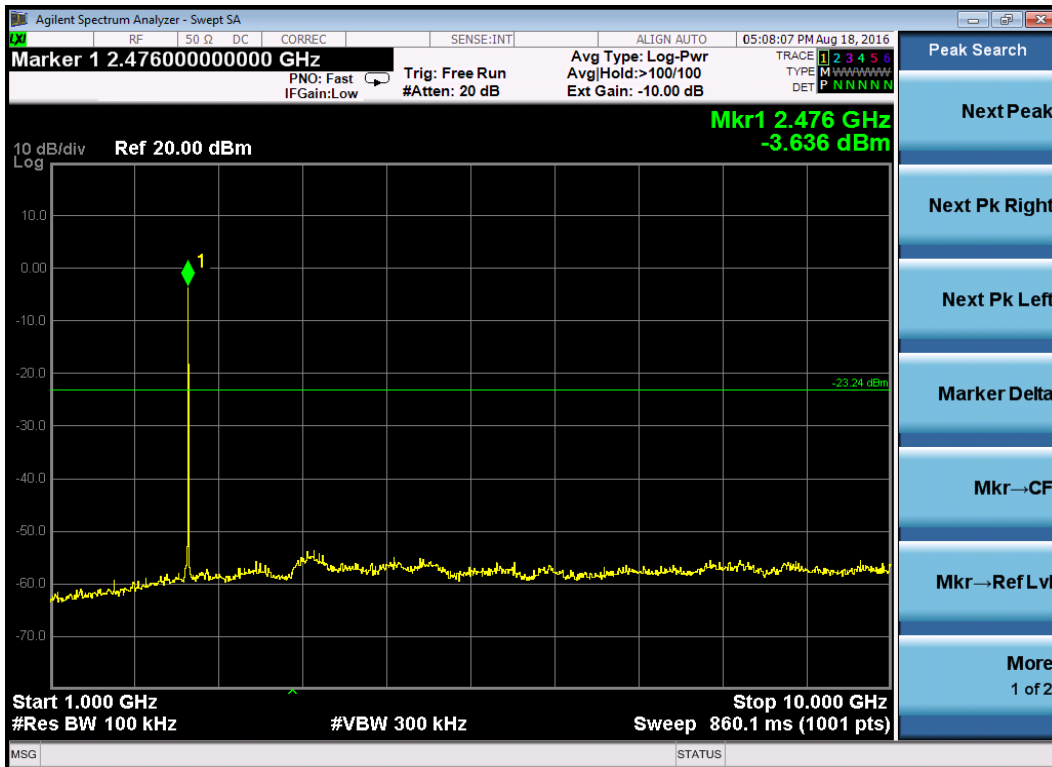


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High Channel – 30 MHz – 1 GHz



High Channel: 1 GHz – 10 GHz

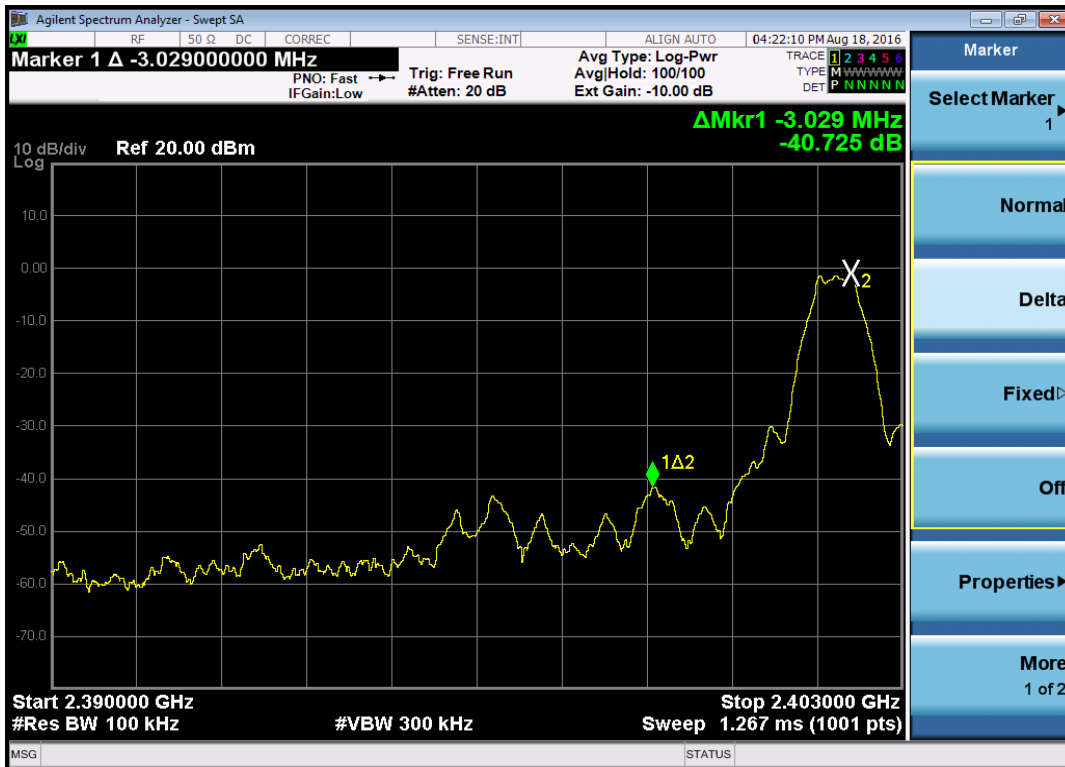


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High Channel: 10 GHz – 25 GHz



Low Channel – Lower Band Edge



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High Channel – Upper Band Edge



Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
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3.4 – RF Conducted – Frequency Stability

Manufacturer	Stanley Black and Decker
Date	8/29/2016
Operator	John Johnston
Temp. / R.H.	20 - 25° C / 30-60% R.H.
Rule Part	FCC 15.247 and 2.1055 / RSS-247
Specific Measurement Procedure	ANSI C63.10 Section 6.8 ANSI C63.10 Section 5.13(b)
Additional Description of Measurement	RF Conducted Measurement
Additional Notes	<ol style="list-style-type: none"> 1. Continuous unmodulated transmission used for this test. 2. EUT Voltage Ratings – Nominal: 120 V; Minimum: 108 V; Maximum 132 V 3. Per the manufacturer’s specification, the EUT is not operable at +/- 15% of the nominal supply voltage. Thus, the EUT was tested to the minimum and maximum allowable voltage per the manufacturer’s specification. 4. All supply voltages were provided at 60 Hz.

The equations below illustrate how the limits and margin were calculated.

$$\text{Limit (Hz)} = \text{Channel Frequency (Hz)} / 10,000$$

$$\text{Margin (Hz)} = \text{Limit (Hz)} - |(\text{Channel Frequency (Hz)} - \text{Measured Frequency (Hz)})|$$

Tables

Low Channel

Frequency Stability f = 2402 MHz				
Supply Voltage (VDC)	Frequency (Hz)	Deviation		
		Hz	Limit (Hz)	Margin (Hz)
108	2402000000	2401972751	240200	212951
120	2402000000	2401973568	240200	213768
132	2402000000	2401972189	240200	212389

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Mid Channel

Frequency Stability f = 2440 MHz				
Supply Voltage (VDC)	Frequency (Hz)	Deviation		
		Hz	Limit (Hz)	Margin (Hz)
108	2440000000	2439971860	244000	215860
120	2440000000	2439972496	244000	216496
132	2440000000	2439971966	244000	215966

High Channel

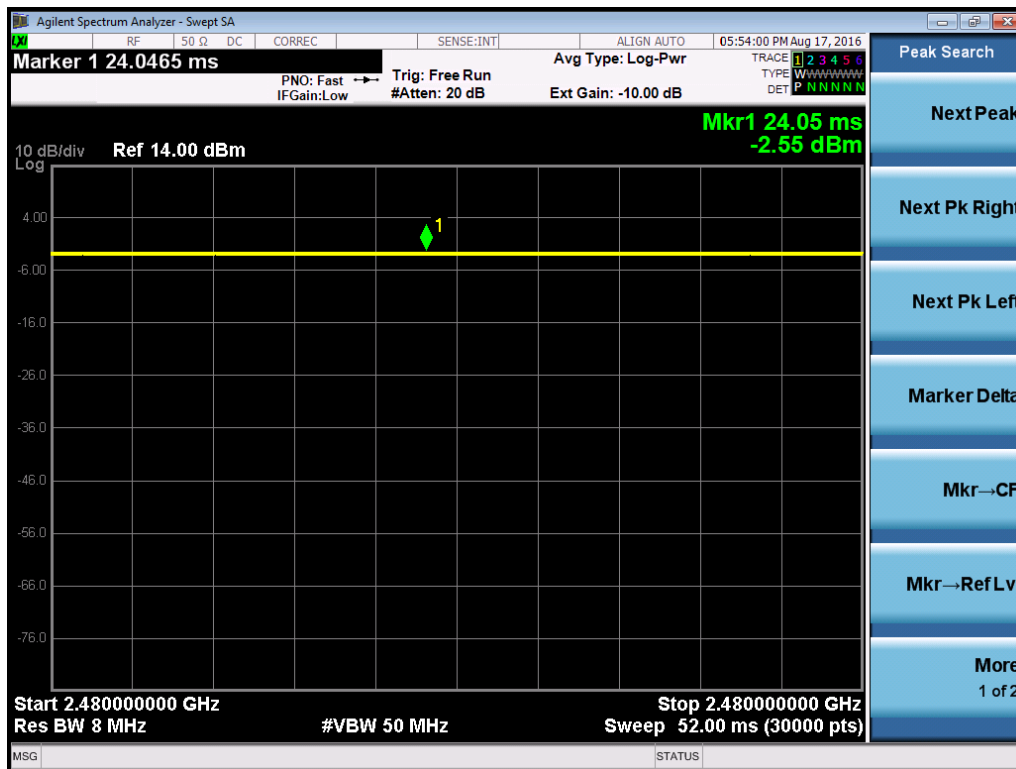
Frequency Stability f = 2480 MHz				
Supply Voltage (VDC)	Frequency (Hz)	Deviation		
		Hz	Limit (Hz)	Margin (Hz)
108	2480000000	2479971166	248000	219166
120	2480000000	2479971958	248000	219958
132	2480000000	2479971215	248000	219215

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3.5 – RF Conducted – Duty Cycle

Manufacturer	Stanley Black and Decker
Date	8/17/2016
Operator	John Johnston
Temp. / R.H.	20 - 25° C / 30-60% R.H.
Rule Part	15.247 / RSS-247
Specific Measurement Procedure	FCC KDB 558074 ANSI C63.10 Section 11.6
Additional Description of Measurement	RF Conducted Measurement
Additional Notes	<ol style="list-style-type: none"> 1. Continuous transmit modulated used for this test. 2. Measurement used to determine VBW used for average measurements for transmitter radiated measurements

Plots

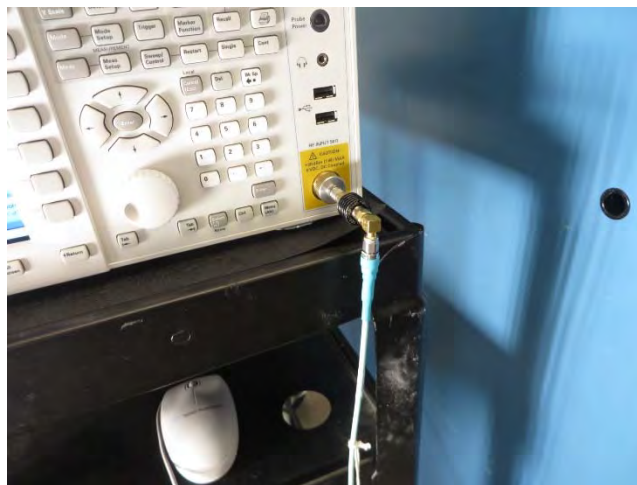


Note: The transmitter on time in the above screen capture is representative of all channels.

The transmitter never stops transmitting and, thus, the duty cycle is 100%.

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Set Up Photos



Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048

4.0 – Radiated Emissions

Rule Part(s)	FCC: 15.247 / 15.205 / 15.209 IC: RSS-247 / RSS-Gen			
Measurement Procedure	ANSI C63.10 2013 FCC KDB 558074 D01 DTS Meas Guidance v03r05			
Test Location	LS Research, LLC - FCC Listed 3 meter Semi-Anechoic Chamber			
Test Distance	3 meters			
EUT Placement	Transmitter Mode: Below 1 GHz: 80 cm height Above 1 GHz: 150 cm height			
Frequency Range of Measurement	Biconical: 30-200 MHz	Log Periodic Dipole Array: 200-1000 MHz	Double-Ridged Waveguide Horn: 1-18 GHz	Small Horn: 18-26 GHz
Measurement Detectors	30-1000MHz RBW: 120 kHz VBW: ≥ 300 kHz		1 – 25 GHz: RBW : 1MHz VBW: 3 MHz (Transmitter Peak Measurements); 10 Hz (Transmitter Average Measurements)	
Measurement Description	<p>The antenna, cable, pre-amp, and other necessary measurement system correction factors are loaded onto the EMI receiver / spectrum analyzer before the measurements are performed. Data is gathered and reported as corrected values.</p> <p>The EUT is placed on a non-conductive pedestal <u>made of expanded polyethylene foam</u> centered on a turn-table in the test location with the antenna at a 3 meter separation distance from the EUT.</p> <p>Maximum radiated RF emissions are determined by rotation of azimuth and scanning the sense antenna between 1 and 4 meters in height using both horizontal and vertical antenna polarities. Maximized levels are manually noted at degree values of azimuth and at sense antenna height.</p> <p>For measurements above 1 GHz for floor standing equipment, the intentional radiator circuitry is situated at least 80 cm above the floor and the antenna is placed 1.5 meters above the floor and tested in three different orthogonal orientations per ANSI C53.10 Section 6.3.1.</p>			
Example Calculations	Reported Measurement data = Raw receiver measurement + Antenna Correction Factor + Cable factor (dB) - amplification factor (when applicable) + Additional factor(s) (when applicable)			

Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
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FCC Part 15.209 / IC RSS-GEN sect 8.9 limits:

Frequency (MHz)	3 m Limit (μV/m)	3 m Limit (dBμV/m)	Detector Type
30-88	100	40.0	Quasi-Peak
88-216	150	43.5	Quasi-Peak
216-960	200	46.0	Quasi-Peak
Above 960	500	54.0	Quasi-Peak
Above 1 GHz	-	54.0	Average
Above 1 GHz	-	74.0	Peak

4.1 – Transmitter Band-Edge Restricted Band

Manufacturer	Stanley Black and Decker	
Date	8/18/2016	
Operator	John Johnston	
Temp. / R.H.	20 - 25° C / 30-60% R.H.	
Rule Part	FCC 15.247/ 15.205 / 15.209	
Measurement Procedure	ANSI C63.10 - 2013 Section 6.10	
Test Distance	3 meters	
EUT Placement	Antenna situated 150 cm above floor in each of three orientations	
Detectors	Peak: RBW = 1 MHz VBW ≥ 3 MHz	Average: RBW = 1 MHz VBW : 3 MHz (peak); 10 Hz (average)
Additional Notes	1) Tested in continuous transmit modulated mode with EUT rotated in three orientations. 2) EUT maximized in azimuth and antenna height with maximum results reported. 3) Video bandwidth greater than [1/(minimum transmitter on time)]. Since duty cycle is 100%, a 10 Hz video bandwidth was used for average measurements. 4) The EUT was set to the highest illumination mode and configured to operate off AC power while charging a battery during testing.	

Example Calculations:

Radiated Emissions Limits:

FCC 15.209 Average Limit @ 3 meter (dBμV/m) – Average Reading (dBμV/m) = Margin

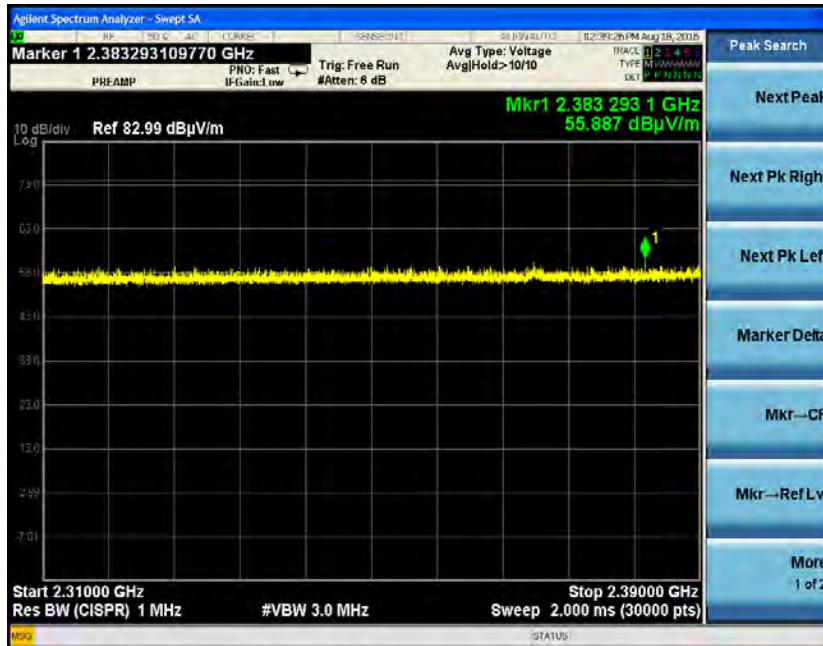
FCC 15.209 Peak Limit @ 3 meter (dBμV/m) – Peak Reading (dBμV/m) = Margin

Video Bandwidth:

1/∞ s = 0 Hz = 10 Hz default

Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048

Plots



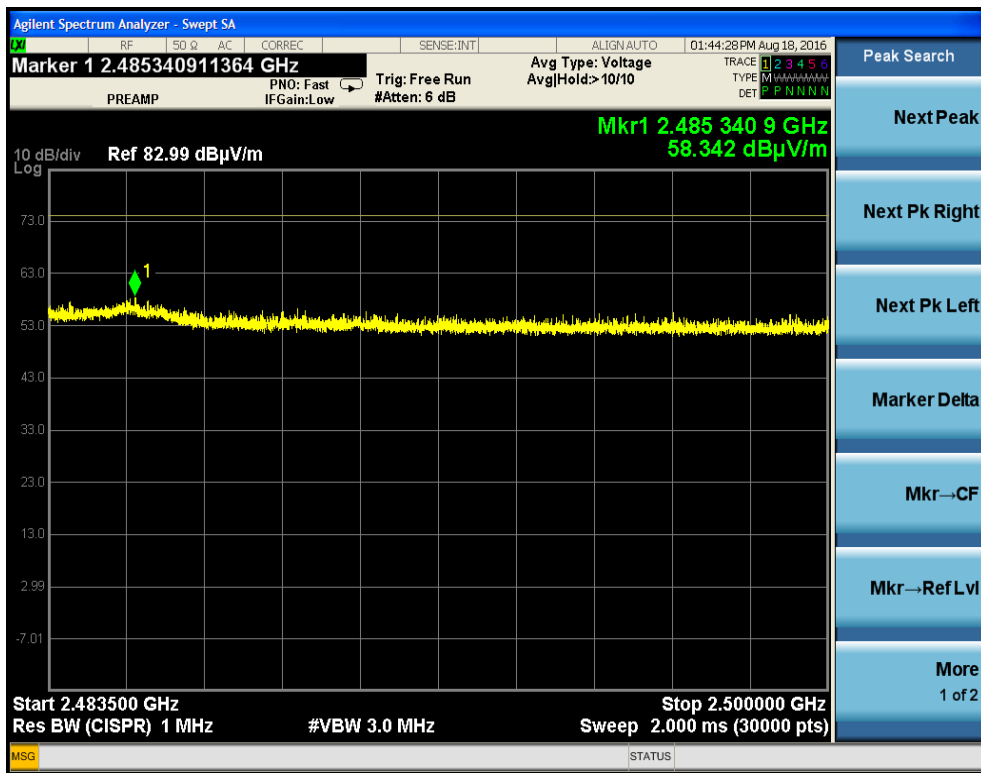
Low Channel – Band Edge Peak



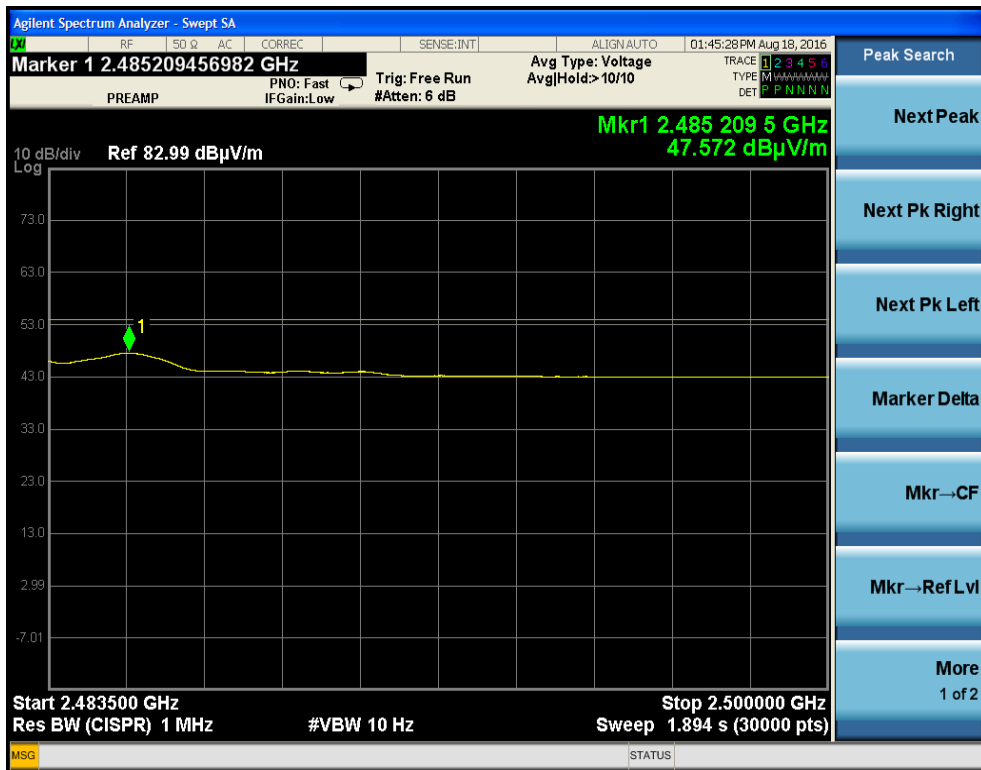
Low Channel – Band Edge Average¹

¹ Note: The peak limit (i.e., 74 dBμV/m) is shown in this average capture rather than the correct average limit (i.e., 54 dBμV/m)

Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
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High Channel – Band Edge Peak



High Channel – Band Edge Average

Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048

4.2 – Transmitter Radiated Spurious Emissions in Restricted Bands

Manufacturer	Stanley Black and Decker		
Date	8/18/2016, 8/19/2016, 8/25/2016, and 8/26/2016		
Operator	John Johnston and Khairul Aidi Zainal		
Temp. / R.H.	20 - 25° C / 30-60% R.H.		
Rule Part	15.247/ 15.205 / 15.209		
Measurement Procedure	ANSI C63.10 - 2013 Sections 6.3, 6.5, and 6.6 FCC KDB 558074 v03r05 Section 12.2.7 Radiated spurious emission test		
Test Distance	3 meters		
EUT Placement	Above and below 1 GHz: EUT situated with intentional radiator circuitry at least 80 cm above the ground plane and the antenna 150 cm above the ground plane.		
Detectors Above 1 GHz	Quasi-Peak: RBW: 120 kHz VBW: ≥ 300 kHz	Peak: RBW = 1 MHz VBW ≥ 3 MHz	Average: RBW = 1 MHz VBW = 10 Hz
Additional Notes	<ol style="list-style-type: none"> 1) Tested in continuous transmit modulated mode on three channels in three orientations. 2) EUT maximized in azimuth and antenna height with maximum results reported. 3) Video bandwidth greater than [1/(minimum transmitter on time)]. Since duty cycle is 100%, a 10 Hz video bandwidth was used for average measurements. 4) A 6 dB attenuator was used to perform measurements in the 30-200 MHz range with the biconical antenna. 5) A generic, two port power strip, provided by the manufacturer but not specific to the product, was appended to the convenience port 6) A generic (i.e., not product specific), 6 foot extension cable was used to provide the EUT with 120 VAC from the AC receptacle. 7) The EUT was set to the highest illumination mode and configured to operate off AC power while charging a battery during testing. The battery was discharged completely before testing. 		

Example Calculation:

FCC 15.209 Quasi-Peak Limit @ 3 meter (dBμV/m) – Peak Reading (dBμV/m) = Margin
 FCC 15.209 Average Limit @ 3 meter (dBμV/m) – Average Reading (dBμV/m) = Margin
 FCC 15.209 Peak Limit @ 3 meter (dBμV/m) – Peak Reading (dBμV/m) = Margin

Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048

Tables

Below 1 GHz

Frequency (MHz)	Height (m)	Azimuth (degree)	Quasi Peak Reading (dBµV/m)	Quasi Peak Limit (dBµV/m)	Q.P. Margin (dB)	Antenna Polarity	EUT orientation	Note (s)
35.97	1.00	0	37.85	40.0	2.15	V	Vertical	Tx Channel 0
56.6	1.00	0	33.58	40.0	6.42	V	Vertical	Tx Channel 0
30.0	1.00	125	36.42	40.0	3.58	V	Side	Tx Channel 0
55.9	1.00	262	34.17	40.0	5.83	V	Side	Tx Channel 0
55.9	1.00	0	34.89	40.0	5.11	V	Flat	Tx Channel 0
30.0	1.00	112	36.85	40.0	3.15	V	Flat	Tx Channel 0
30.0	1.00	140	36.87	40.0	3.13	V	Flat	Tx Channel 39
56.4	1.00	242	34.9	40.0	5.1	V	Flat	Tx Channel 39
30.2	1.00	120	36.23	40.0	3.77	V	Flat	Tx Channel 19
55.6	1.00	0	35.2	40.0	4.8	V	Flat	Tx Channel 19
166.7	1.00	0	33.86	43.5	9.64	V	Side	Tx Channel 19
55.9	1.00	280	33.94	40.0	6.06	V	Side	Tx Channel 19
30.0	1.00	146	35.73	40.0	4.27	V	Side	Tx Channel 19
251.7	1.00	170	31.34	46.0	14.66	V	Vertical	TX Channel 0

Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048

Above 1 GHz²

Frequency (MHz)	Height (m)	Azimuth (degree)	Peak Reading (dBµV/m)	Avg Reading (dBµV/m)	Avg Limit (dB)	Margin (dB)	Antenna Polarity	EUT orientation	Note (s)
4806	1	332	53.4	51.2	54	2.8	Vertical	Flat	Tx Channel 0
4882	1.86	230	52.4	50.4	54	3.6	Vertical	Flat	Tx Channel 19
4958	1	297	52.3	50.5	54	3.5	Horizontal	Vertical	Tx Channel 39
4806	1	85	50.0	47.1	54	6.9	Horizontal	Vertical	Tx Channel 0
4806	1	346	51.7	49.7	54	4.3	Vertical	Vertical	Tx Channel 0
4806	1	76	50	49.0	54	5.0	Horizontal	Side	Tx Channel 0
4806	1.2	336	51.7	49.6	54	4.4	Vertical	Side	Tx Channel 0
4806	1	180	49.8	46.6	54	7.4	Horizontal	Flat	Tx Channel 0
4882	2.97	290	51.4	49.1	54	4.9	Horizontal	Vertical	Tx Channel 19
4882	1	354	50.7	47.7	54	6.3	Vertical	Vertical	Tx Channel 19
4882	1	77	50.3	47.9	54	6.1	Horizontal	Side	Tx Channel 19
4882	1.4	318	50.3	47.7	54	6.3	Vertical	Side	Tx Channel 19
4882	1	102	50.3	47.6	54	6.4	Horizontal	Flat	Tx Channel 19
4958	1	354	50.7	47.1	54	6.9	Vertical	Vertical	Tx Channel 39
4958	1	77	49.3	46.2	54	7.8	Horizontal	Side	Tx Channel 39
4958	1	90	51.5	49.4	54	4.6	Vertical	Flat	Tx Channel 39
4958	1	79	50.5	47.9	54	6.1	Vertical	Side	Tx Channel 39
4958	1	126	49.7	46.6	54	7.4	Horizontal	Flat	Tx Channel 39

***Note: The emissions measured in the table above are not transmit harmonics of the fundamental transmission. Instead, the emissions are due to the local oscillator (LO) onboard the intentional radiator circuitry. The LO emissions were detectable with the EUT configured to operate in transmit mode and receive mode (see receive mode results below).**

² The first three rows in the table represent the highest harmonic emissions recorded at each transmitting channel across all EUT orientations and antenna polarizations.

Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048

Plots

30 MHz – 200 MHz, Vertical Polarity, Vertical Orientation³



Note: The emission spikes at 107.7 MHz are not a result of the EUT but, rather, due to static discharges emitted from raising and lowering the mast and spinning the turntable.

30 MHz – 200 MHz, Horizontal Polarity, Vertical Orientation



³ Emission traces in the 30-200 MHz range were substantially similar across all transmission channels (0, 19, and 39).

Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048

30 MHz – 200 MHz, Vertical Polarity, Side Orientation



Note: The emission spikes at 103.9 MHz are not a result of the EUT but, rather, due to static discharges emitted from raising and lowering the mast and spinning the turntable.

30 MHz – 200 MHz, Horizontal Polarity, Side Orientation



Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048

30 MHz – 200 MHz, Vertical Polarity, Flat Orientation



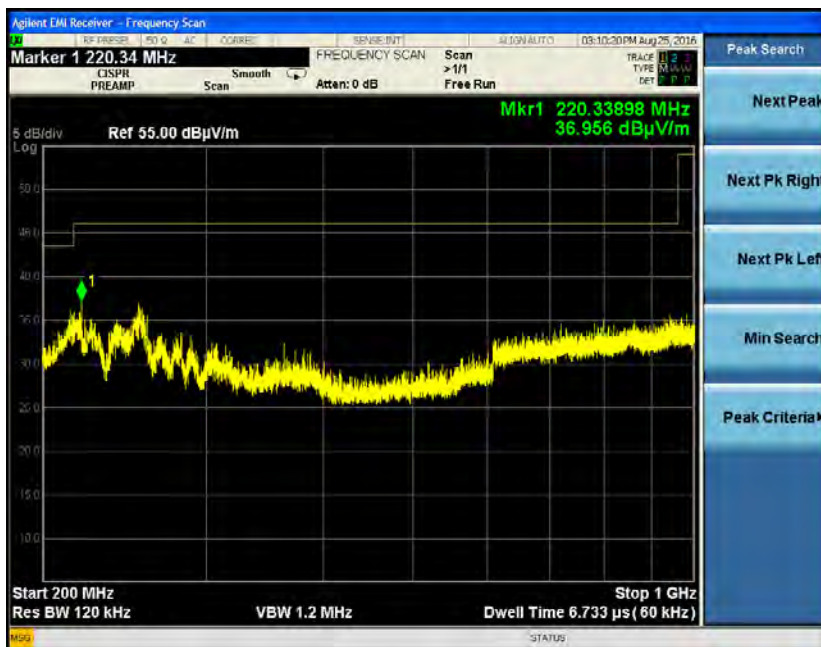
Note: The emission spikes at 103.5 MHz are not a result of the EUT but, rather, due to static discharges emitted from raising and lowering the mast and spinning the turntable.

30 MHz – 200 MHz, Horizontal Polarity, Flat Orientation



Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048

200 MHz – 1000 MHz, Horizontal Polarity⁴



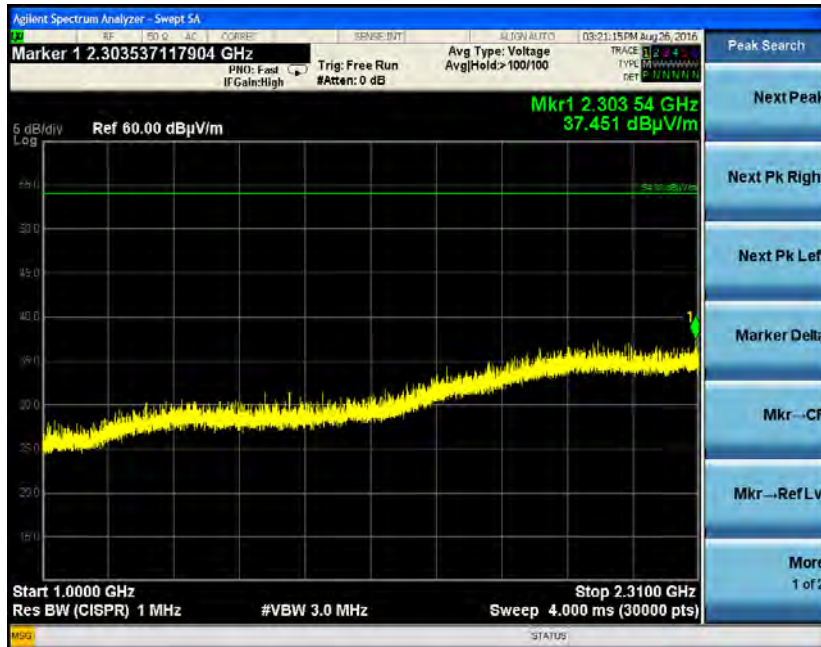
200 MHz – 1000 MHz, Vertical Polarity



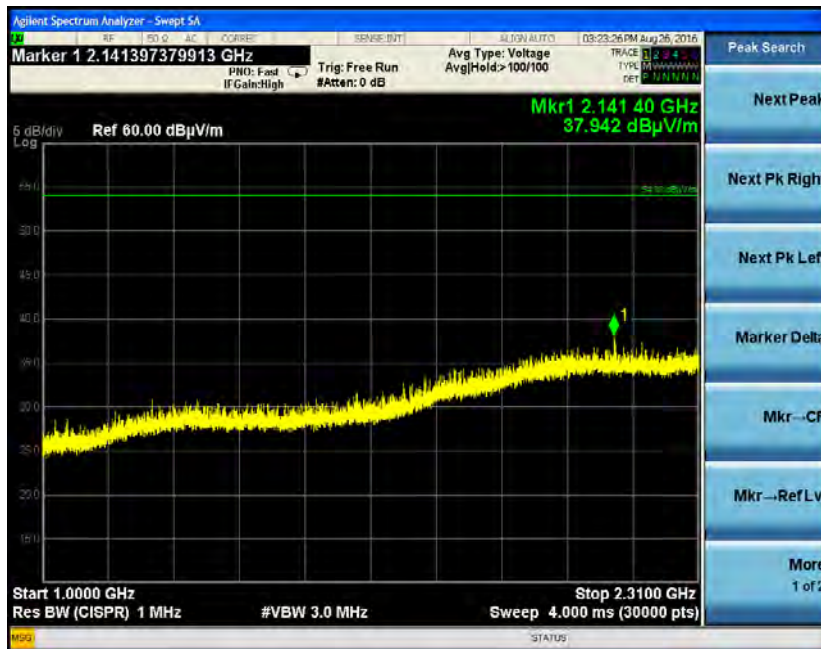
⁴ Emission traces in the 200 MHz to 1 GHz range were substantially similar across all orientations and transmission channels (0, 19, and 39)

Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
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1000 MHz – 2310 MHz, Horizontal Polarity⁵



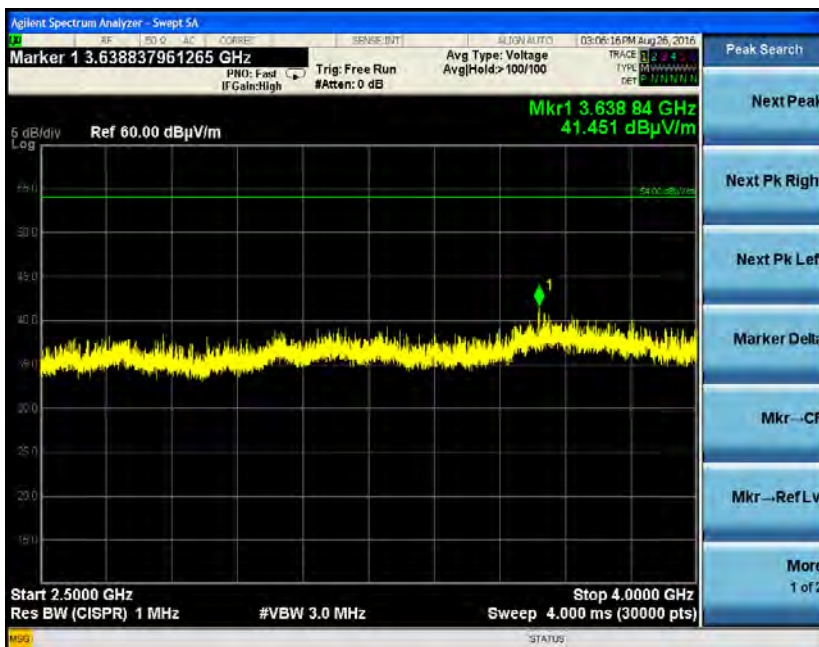
1000 MHz – 2310 MHz, Vertical Polarity



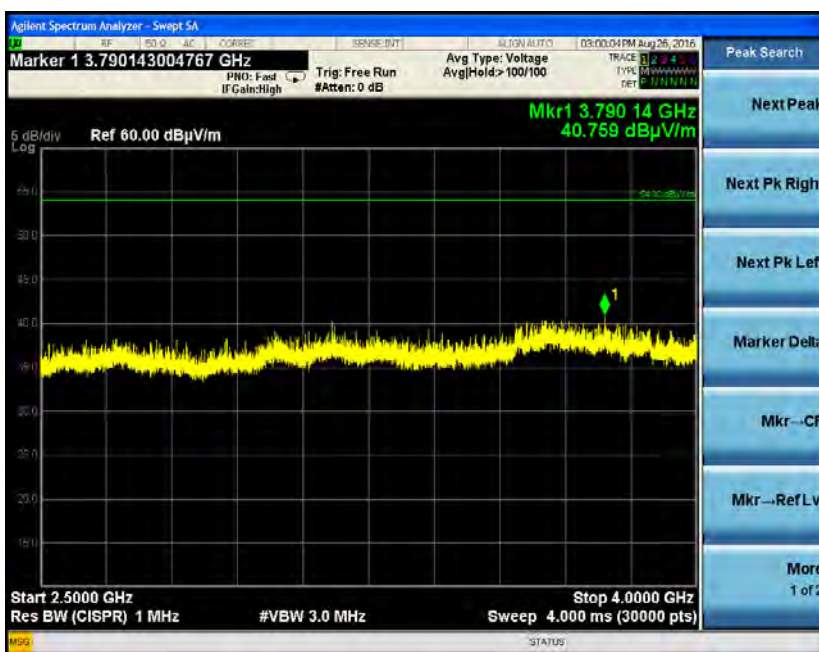
⁵ No significant emissions were detected in the 1-2.31 GHz range. The traces shown in regards to the 1-2.31 GHz range are the worst case traces for each antenna polarizations across all orientations and transmission channels (0, 19, and 39)

Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048

2500 MHz – 4000 MHz, Horizontal Polarity⁶



2500 MHz – 4000 MHz Peak, Vertical Polarity



⁶ No significant emissions were detected in the 2.5-4 GHz range. The traces shown in regards to the 2.5-4 GHz range are the worst case traces for each antenna polarizations across all orientations and transmission channels (0, 19, and 39)

Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048

4 GHz – 18 GHz, Reduced VBW, Low Channel⁷



4 GHz – 18 GHz Reduced VBW, Mid Channel



⁷ The worst-case emission traces in the 4-18 GHz range are shown across all EUT orientations and antenna polarizations

Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048

4 GHz – 18 GHz Reduced VBW, High Channel



18 GHz – 25 GHz, Reduced VBW, Horizontal Polarization⁸



⁸ No emissions were detected in the 18-25 GHz range at a reduced separation distance.

Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048

18 GHz – 25 GHz, Reduced VBW, Vertical Polarization



Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
	Model: DCL070
Report: TR 315334-1	Serial: 000070; 000281; 000048
LSR: C-2509	

4.3 – Radiated Emissions - Receive Mode

Manufacturer	Stanley Black and Decker	
Date	8/19/2016, 8/25/2016, and 8/26/2016	
Operator	John Johnston and Khairul Aidi Zainal	
Temp. / R.H.	20 - 25° C / 30-60% R.H.	
Rule Part	15.109 / RSS-Gen / ICES-003	
Measurement Procedure	ANSI C63.4 - 2014	
Test Distance	3 meters	
EUT Placement	As a floor standing EUT, the EUT was situated directly in the center of the turn table on the reference ground plane.	
Detectors	<u>30-1000 MHz</u> Quasi Peak RBW = 120 kHz VBW \geq 300 kHz	<u>1 – 25 GHz</u> RBW = 1 MHz VBW \geq 3 MHz (peak) / 10 Hz (average)
Additional Notes	1) Tested in continuous receive mode on three separate channels. 2) EUT maximized in azimuth and antenna height with maximum results reported. 3) A 6 dB attenuator was used to perform measurements in the 30-200 MHz range with the biconical antenna. 4) A generic, two port power strip, provided by the manufacturer but not specific to the product, was appended to the convenience port 5) A generic (i.e., not product specific), 6 foot extension cable was used to provide the EUT with 120 VAC from the AC receptacle. 6) The EUT was set to the highest illumination mode and configured to operate off AC power while charging a battery during testing. The battery was discharged completely before testing.	

Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048

Table

Below 1 GHz

Frequency (MHz)	Height (m)	Azimuth (degree)	Quasi Peak Reading (dB μ V/m)	Quasi Peak Limit (dB μ V/m)	Q.P. Margin (dB)	Antenna Polarity	EUT orientation	Note (s)
30.06	1.00	47.8	39.47	40.0	0.53	V	Floorstanding	Rx Channel 0
30.84	1.00	360.0	38.39	40.0	1.61	V	Floorstanding	Rx channel 0
30.18	1.00	0.0	38.17	40.0	1.83	V	Floorstanding	Rx Channel 0
30.00	1.00	0.0	36.92	40.0	3.08	V	Floorstanding	Rx Channel 19
57.01	1.00	0.0	31.52	40.0	8.48	V	Floorstanding	Rx Channel 19
251.7	1.00	170.0	31.34	46.0	14.66	V	Floorstanding	Rx Channel 19

Above 1 GHz

Frequency (MHz)	EUT Orientation	Height (m)	Angle (degree)	Peak Reading (dB μ V/m)	Peak Limit (dB μ V/m)	Margin (dB)	Average Reading (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Antenna Polarity	Notes
4806	Floorstanding	2.95	52	50.59	74.0	23.41	47.78	54.0	6.22	H	Rx Channel 0
4806	Floorstanding	1.98	335	49.72	74.0	24.28	46.83	54.0	7.17	V	Rx Channel 0
4882	Floorstanding	1	53	50.29	74.0	23.71	48.05	54.0	5.95	H	Rx Channel 19
4882	Floorstanding	1	219	49.24	74.0	24.76	46.52	54.0	7.49	V	Rx Channel 19
4958	Floorstanding	3.95	77	50.41	74.0	23.60	48.01	54.0	5.99	H	Rx Channel 39
4958	Floorstanding	1	216	49.20	74.0	24.80	46.34	54.0	7.66	V	Rx Channel 39

***Note: The emissions measured in the table above are due to the local oscillator (LO) onboard the intentional radiator circuitry. The LO emissions were detectable with the EUT configured to operate in transmit mode and receive mode (see transmit mode results above).**

Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048

Plots

30 MHz – 200 MHz, Vertical Polarity^{9,10}



30 MHz – 200 MHz, Horizontal Polarity



⁹ The worst-case traces for each antenna polarization are shown in the report.

¹⁰ The traces provided are representative of radiated emissions using a peak detector. Although the peak emissions may appear to be above the limit, the quasi-peak readings collected show that the radiated emissions are below the applicable limit.

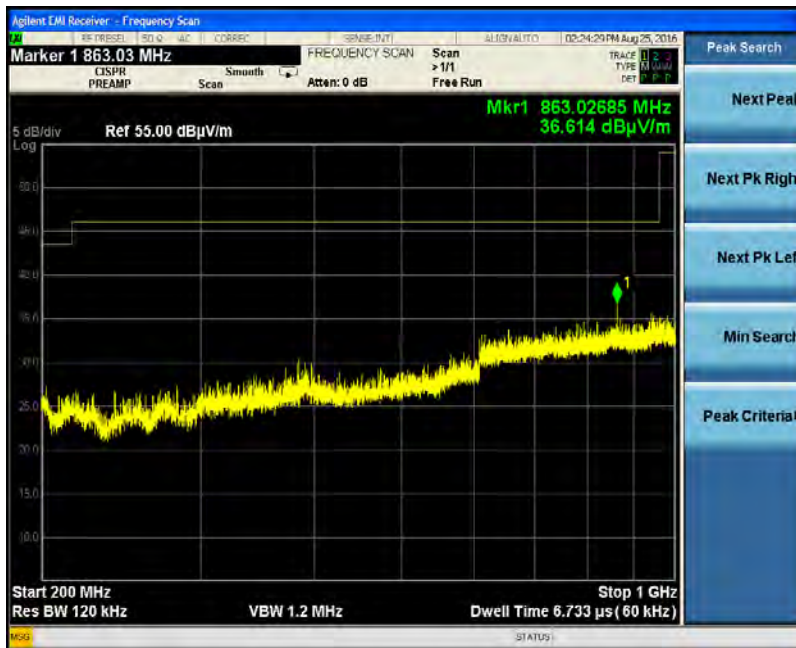
Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048

Plots

200 MHz – 1000 MHz, Vertical Polarity¹¹



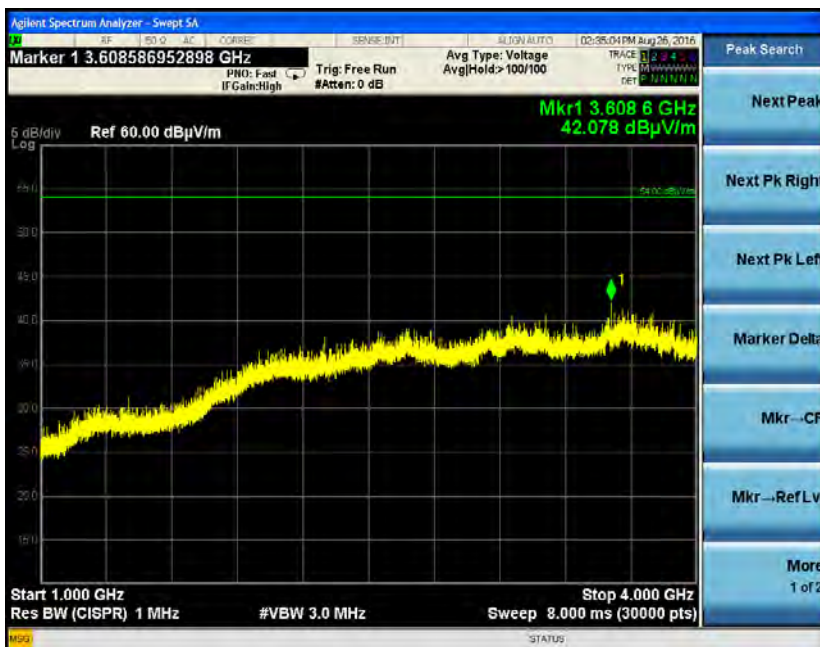
200 MHz – 1000 MHz, Horizontal Polarity



¹¹ The worst-case traces for each antenna polarization are shown in the report.

Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048

1000 MHz – 4000 MHz, Horizontal Polarity¹²



1000 MHz – 4000 MHz, Vertical Polarity



¹² No emissions were detected in the 1-4 GHz range. As such, the worst case traces for each antenna polarization are shown across all receive channels (0, 19, and 39).

Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048

Plots

4 GHz – 18 GHz, Reduced VBW, Horizontal Polarity, Receive Channel 0



4 GHz – 18 GHz, Reduced VBW, Vertical Polarity, Receive Channel 0



Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048

4 GHz – 18 GHz, Reduced VBW, Horizontal Polarity, Receive Channel 19



4 GHz – 18 GHz, Reduced VBW, Vertical Polarity, Receive Channel 19



Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048

4 GHz – 18 GHz, Reduced VBW, Horizontal Polarity, Receive Channel 39

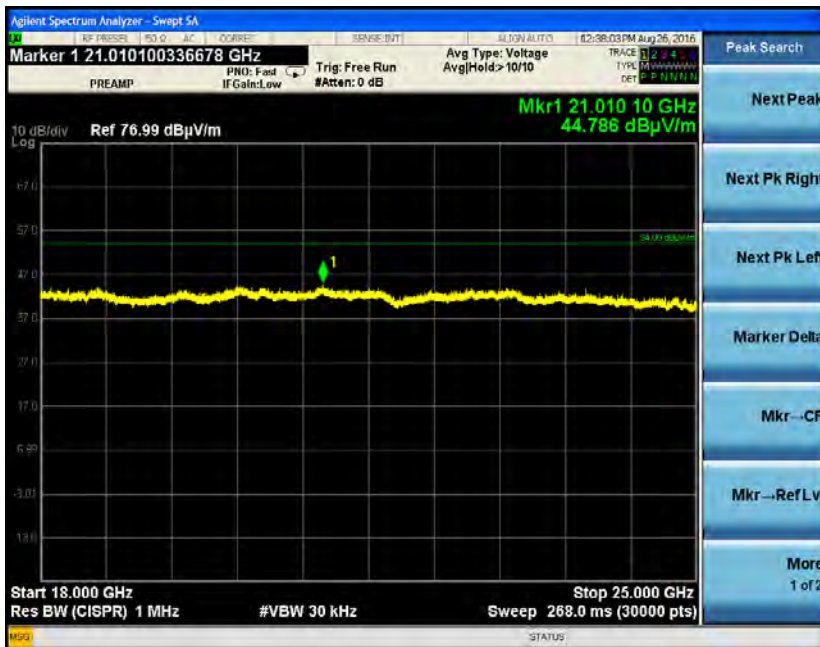


4 GHz – 18 GHz, Reduced VBW, Vertical Polarity, Receive Channel 39



Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048

18 GHz – 25 GHz, Horizontal Polarization, Reduced VBW¹³



18 GHz – 25 GHz, Vertical Polarization, Reduced VBW



¹³ No emissions were detected in the 18-25 GHz range across all receive channels (0, 19, and 39)

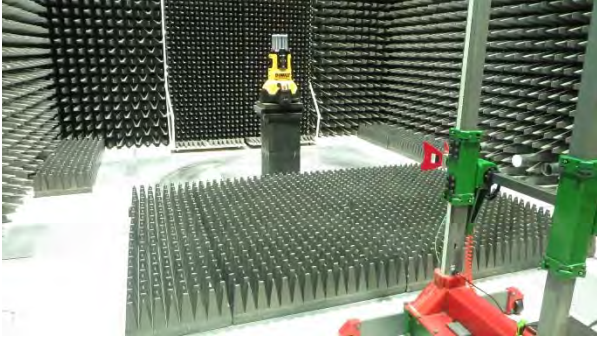
Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048

Photos

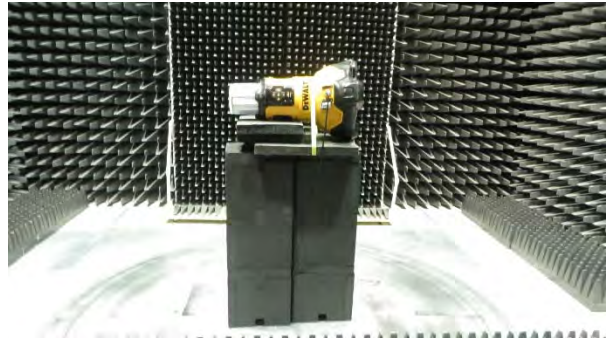
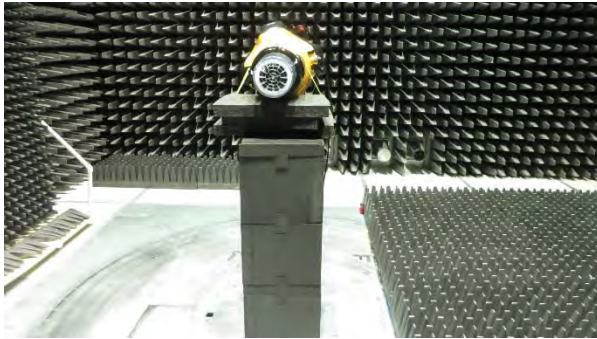
Transmit Mode Testing

Orientations

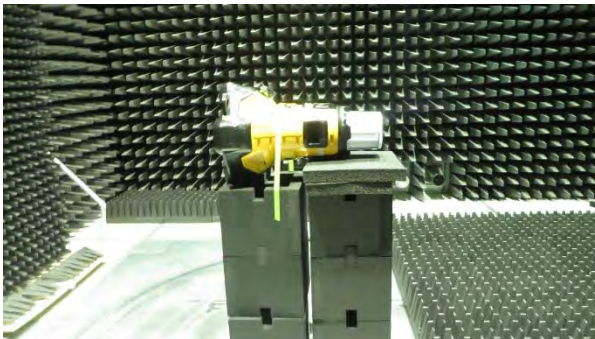
Vertical



Side

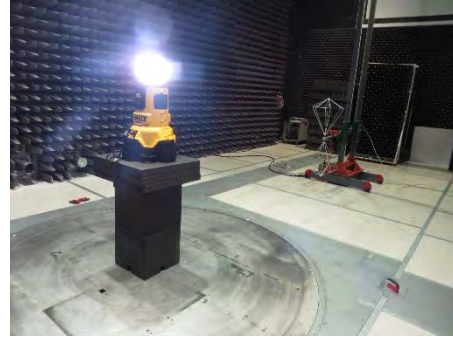
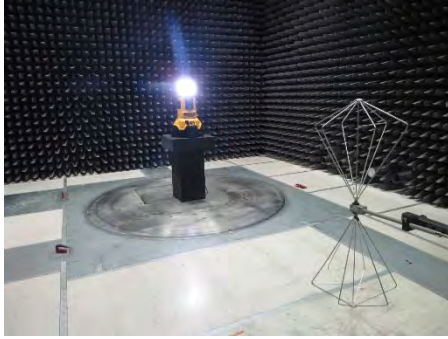


Flat



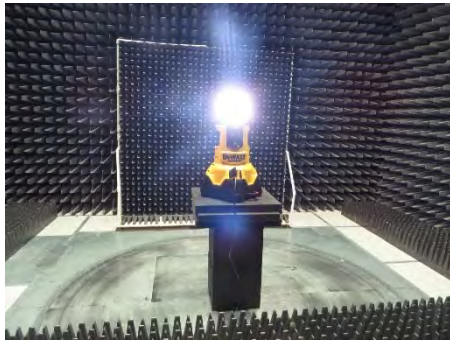
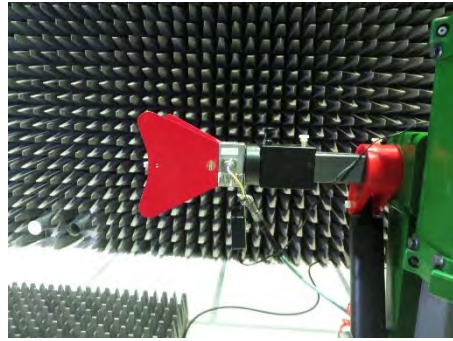
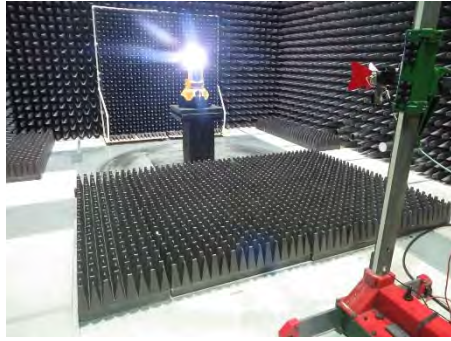
Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048

Below 1 GHz

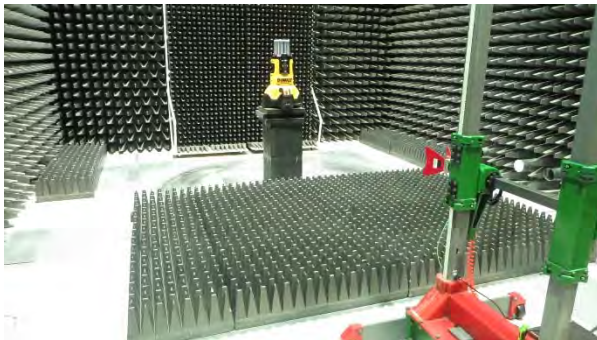


Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048

1-2.31 GHz and 2.5-4 GHz

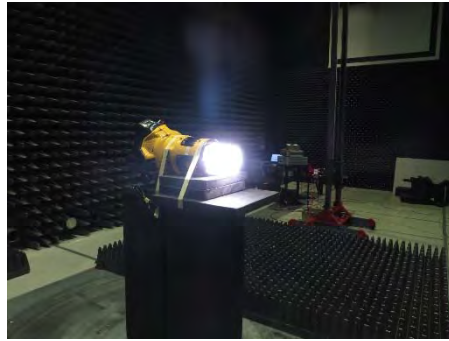
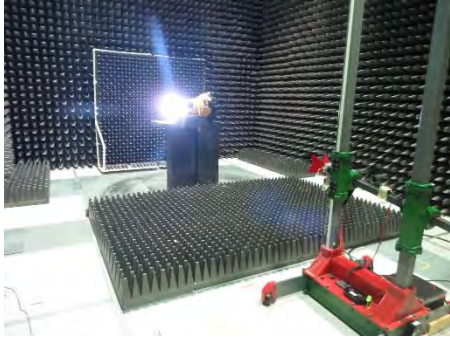


Band Edges

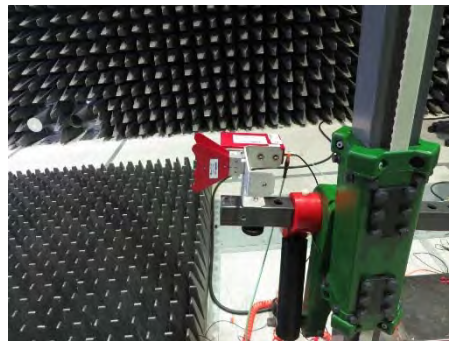
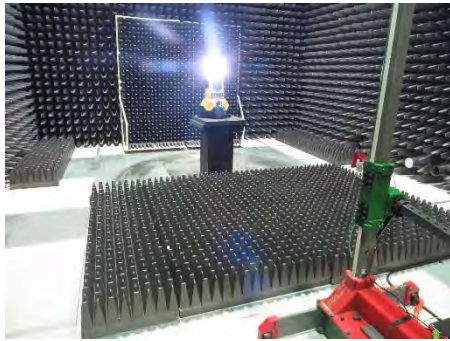


Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048

4-18 GHz



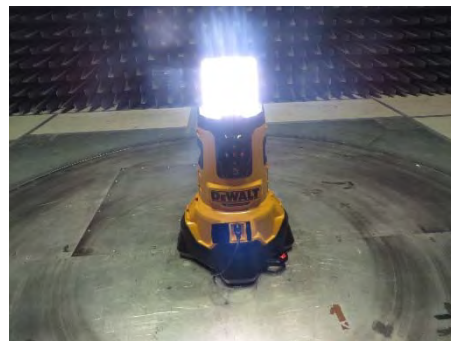
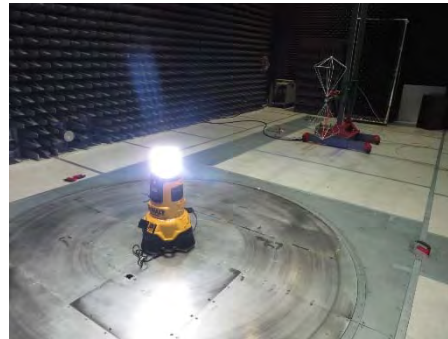
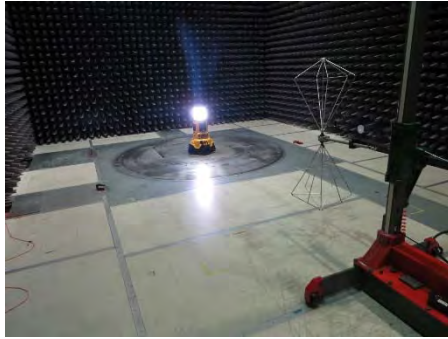
18-25 GHz



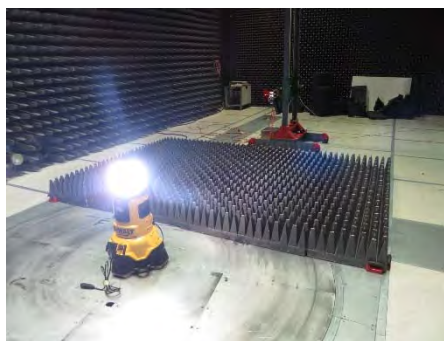
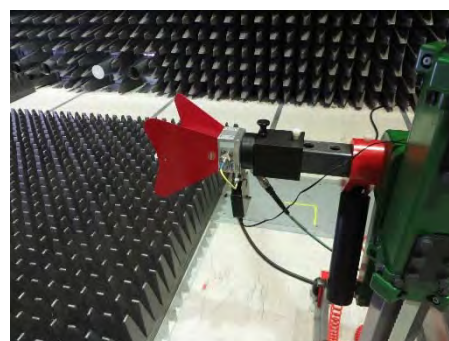
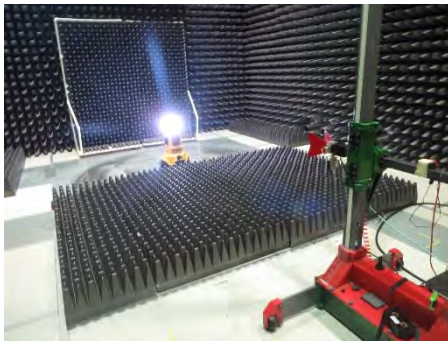
Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048

Receive Mode Testing

Below 1 GHz

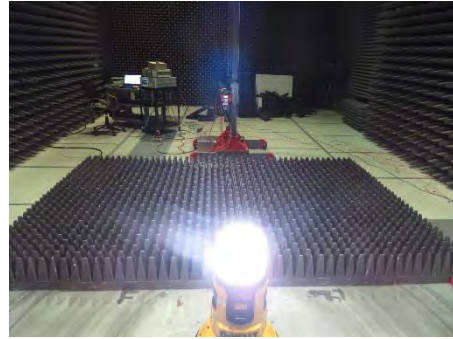
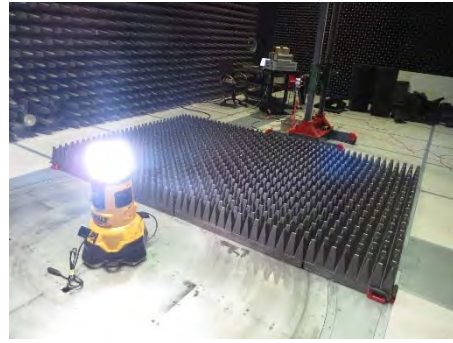
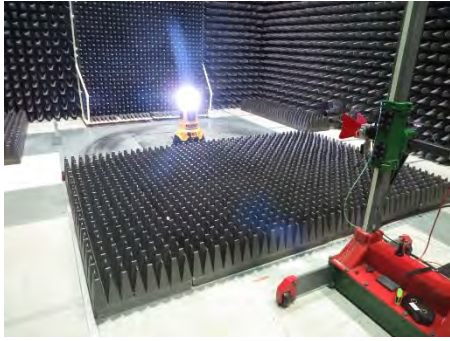


1-4 GHz

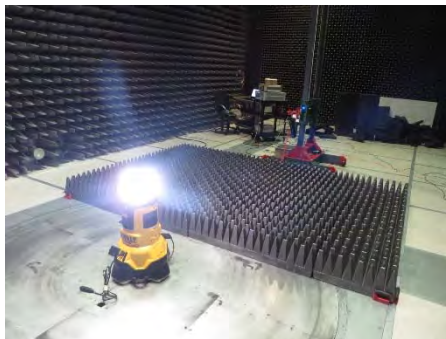
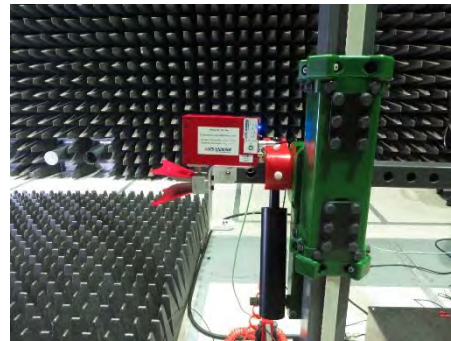
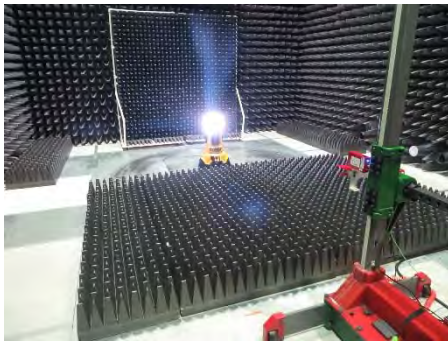


Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048

4-18 GHz



18-25 GHz



Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048

5.0 – Conducted Emissions

Manufacturer	Stanley Black and Decker
Date	8/29/2016
Operator	John Johnston
Temp./R.H.	20 - 25° C / 30-60% R.H.
Rule Part(s)	FCC: 15.207, 15.107 IC: ICES-003
Measurement Procedure	ANSI C63.4 2014 ANSI C63.10 2013
Test Location	Bench Testing
EUT Placement	80 cm height 40 cm from vertical ground plane
Frequency Range of Measurement	150 kHz to 30 MHz
Measurement Detectors	Quasi-Peak and Average Detectors
Measurement Description	<p>The necessary measurement system correction factors are loaded onto the EMI receiver before the measurements are performed. Data is gathered and reported as corrected values.</p> <p>The EUT is placed on a non-conductive pedestal <u>made of expanded polyethylene foam</u>.</p> <p>Maximum conducted RF emissions are determined on Line 1 and Line 2.</p> <p>The generic, 6 foot extension cable was bundled and provided from the EUT to the LISN. The LISN was connected to the EMI receiver.</p>
Example Calculations	Reported Measurement data = Raw receiver measurement + Cable factor (dB) - amplification factor (when applicable) + Additional factor (when applicable)

Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048

Conducted Emission Limits

The 47 CFR Part 15 Section 207, 107 Class B, and ICES-003 Class B AC conducted emission limits are provided in the table below:

Frequency of emission (MHz)	Conducted limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency

Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048

5.1 – Conducted Emissions Test Set-Up

Manufacturer	Stanley Black and Decker
Date	8/29/2016
Operator	John Johnston
Temp. / R.H.	20 - 25° C / 30-60% R.H.
Rule Part	FCC 15.207, 15.107, and ICES-003
Measurement Procedure	ANSI C63.10 (2013) Section 6.2 ANSI C63.4 (2014) Section 7
Additional Notes	<ol style="list-style-type: none"> 1) Tested in continuous transmit modulated mode and receive mode 2) A generic (i.e., not product specific), 6 foot extension cable was used to provide the EUT with 120 VAC from the AC receptacle. 3) The EUT was set to the highest illumination mode and configured to operate off AC power while charging a battery during testing. The battery was discharged completely before testing.

Receive Mode Test Results

Line	Frequency (MHz)	Quasi-Peak Measurement (dBµV)	Quasi-Peak Limit (dBµV/m)	Margin (dB)	Average Measurement (dBµV)	Average Limit (dBµV)	Margin (dB)	Notes
1	12.89	45.00	60.00	15.00	38.00	50.00	12.00	Rx Channel 0
1	13.012	44.60	60.00	15.40	37.60	50.00	12.40	Rx Channel 0
1	0.449	45.10	56.90	11.80	36.30	46.90	10.60	Rx Channel 0
1	0.557	45.10	56.00	10.90	35.80	46.00	10.20	Rx Channel 0
1	17.237	44.60	60.00	15.40	38.10	50.00	11.90	Rx Channel 0
2	0.386	51.20	58.15	6.95	45.10	48.15	3.05	Rx Channel 0
2	0.422	45.60	57.41	11.81	38.50	47.41	8.91	Rx Channel 0
2	0.534	47.00	56.00	9.00	37.50	46.00	8.50	Rx Channel 0
2	0.163	56.80	65.31	8.51	49.90	55.31	5.41	Rx Channel 19
2	0.399	53.30	57.88	4.58	46.30	47.88	1.58	Rx Channel 19
1	0.16	57.30	65.46	8.16	52.20	55.46	3.26	Rx Channel 19
1	0.4	53.10	57.86	4.76	46.00	47.86	1.86	Rx Channel 19
1	0.158	57.30	65.57	8.27	53.00	55.57	2.57	Rx Channel 39
1	0.404	53.70	57.77	4.07	46.50	47.77	1.27	Rx Channel 39
2	0.158	57.70	65.57	7.87	53.20	55.57	2.37	Rx Channel 39
2	0.399	54.40	57.88	3.48	47.00	47.88	0.88	Rx Channel 39
2	0.643	49.50	56.00	6.50	39.90	46.00	6.10	Rx Channel 39
2	0.305	53.20	60.11	6.91	45.70	50.11	4.41	Rx Channel 39

Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048

Transmitter Mode Test Results

Line	Frequency (MHz)	Quasi-Peak Measurement (dBµV)	Quasi-Peak Limit (dBµV/m)	Margin (dB)	Average Measurement (dBµV)	Average Limit (dBµV)	Margin (dB)	Notes
1	0.436	50.80	57.14	6.34	43.20	47.14	3.94	Tx Channel 0
1	0.373	52.60	58.44	5.84	47.00	48.44	1.44	Tx Channel 0
1	0.544	48.20	56.00	7.80	39.40	46.00	6.60	Tx Channel 0
2	0.377	53.00	58.35	5.35	47.90	48.35	0.45	Tx Channel 0
2	0.431	50.40	57.24	6.84	43.50	47.24	3.74	Tx Channel 0
2	0.557	49.30	56.00	6.70	41.70	46.00	4.30	Tx Channel 0
1	0.158	58.00	65.57	7.57	53.30	55.57	2.27	Tx Channel 19
1	0.395	53.80	57.96	4.16	46.90	47.96	1.06	Tx Channel 19
2	0.158	58.00	65.57	7.57	53.20	55.57	2.37	Tx Channel 19
2	0.395	54.40	57.96	3.56	47.40	47.96	0.56	Tx Channel 19
2	0.313	52.40	59.89	7.49	45.70	49.89	4.19	Tx Channel 19
1	0.158	58.00	65.57	7.57	53.80	55.57	1.77	Tx Channel 39
1	0.314	52.00	59.87	7.87	45.40	49.87	4.47	Tx Channel 39
1	0.399	54.30	57.88	3.58	47.20	47.88	0.68	Tx Channel 39
1	0.534	50.30	56.00	5.70	39.10	46.00	6.90	Tx Channel 39
2	0.4	54.90	57.86	2.96	47.70	47.86	0.16	Tx Channel 39

Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048

Screen Captures¹⁴ *Transmit Mode*

Line 1



Line 2



¹⁴ Note: The screen captures provided depict the worst-case traces on each line across all receiver and transmission channels (0, 19, and 39)

Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048

Receive Mode

Line 1



Line 2



Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048

Set-Up Photos



Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048

Appendix A – Test Equipment



Date: 29-Aug-2016 Type Test: Conducted Emissions - Rx mode Job #: C-2509

Prepared By: John Johnston Customer: Stanley Black and Decker Quote #: 315334

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	EE 960085	N9038A MXE 26.5GHz Receiver	Agilent	N9038A	MY51210148	5/12/2016	5/12/2017	Active Calibration
2	EE 960089	LISN - 15A	COM-POWER	LI-215A	191943	3/8/2016	3/8/2017	Active Calibration

Project Engineer:  Quality Assurance: 



Date: 29-Aug-2016 Type Test: Conducted Emissions - Tx mode Job #: C-2509

Prepared By: John Johnston Customer: Stanley Black and Decker Quote #: 315334

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	EE 960085	N9038A MXE 26.5GHz Receiver	Agilent	N9038A	MY51210148	5/12/2016	5/12/2017	Active Calibration
2	EE 960089	LISN - 15A	COM-POWER	LI-215A	191943	3/8/2016	3/8/2017	Active Calibration

Project Engineer:  Quality Assurance: 



Date: 8/19/2016 and 8/25/2016 Type Test: Rad Tx & Rx Emissions-30-1000MHz Job #: C-2509

Prepared By: Aidi/John Customer: Stanley Black and Decker Quote #: 315334

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	EE 960088	8GHz MXE Spectrum Analyzer	Agilent	N9038A	MY51210138	2/24/2016	2/24/2017	Active Calibration
2	AA 960005	Biconical Antenna	EMCO	93110B	9601-2280	1/14/2016	1/14/2017	Active Calibration
3	EE 960085	N9038A MXE 26.5GHz Receiver	Agilent	N9038A	MY51210148	5/12/2016	5/12/2017	Active Calibration
4	AA 960150	Biconical Antenna	ETS	3110B	0003-3346	2/1/2016	2/1/2017	Active Calibration
5	AA 960163	Log Periodic Antenna	A.H. Systems, Inc	SAS-512-2	500	3/18/2016	3/18/2017	Active Calibration

Project Engineer:  Quality Assurance: 



Date: 26-Aug-2016 Type Test: Rad Rx Mode-18-25GHz Job #: C-2509

Prepared By: John Johnston Customer: Stanley Black and Decker Quote #: 315334

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	AA 960174	Small Horn Antenna 18-40 GHz	ETS-Lindgren	3116C-PA	00206880	4/23/2016	4/23/2017	Active Calibration
2	EE 960085	N9038A MXE 26.5GHz Receiver	Agilent	N9038A	MY51210148	5/12/2016	5/12/2017	Active Calibration
3	AA 960171	Cable - low loss 1m	A.H. Systems, Inc	SAC-26G-6	386	3/31/2016	3/31/2017	Active Calibration

Project Engineer:  Quality Assurance: 

Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048



Date : 26-Aug-2016

Type Test : Rad Rx Mode-4-18GHz

Job # : C-2509

Prepared By: John Johnston

Customer : Stanley Black and Decker

Quote # : 315334

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	EE 960085	N9038A MXE 26.5GHz Receiver	Agilent	N9038A	MY51210148	5/12/2016	5/12/2017	Active Calibration
2	AA 960158	Double Ridge Horn Antenna	ETS Lindgren	3117	109300	2/4/2016	2/4/2017	Active Calibration
3	EE 960159	0.8 - 21GHz LNA	Mini-Circuits	ZVA-213X-S+	40201429	2/4/2016	2/4/2017	Active Calibration
4	AA 960171	Cable - low loss 1m	A.H. Systems, Inc	SAC-26G-6	386	3/31/2016	3/31/2017	Active Calibration

Project Engineer:

Quality Assurance:



Date : 26-Aug-2016

Type Test : Rad Tx Harmonics-18-25GHz

Job # : C-2509

Prepared By: John Johnston

Customer : Stanley Black and Decker

Quote # : 315334

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	AA 960174	Small Horn Antenna 18-40 GHz	ETS-Lindgren	316C-PA	00206880	4/23/2016	4/23/2017	Active Calibration
2	EE 960085	N9038A MXE 26.5GHz Receiver	Agilent	N9038A	MY51210148	5/12/2016	5/12/2017	Active Calibration
3	AA 960171	Cable - low loss 1m	A.H. Systems, Inc	SAC-26G-6	386	3/31/2016	3/31/2017	Active Calibration

Project Engineer:

Quality Assurance:



Date : 18-Aug-2016

Type Test : Rad Tx Harmonics-4-18GHz

Job # : C-2509

Prepared By: John Johnston

Customer : Stanley Black and Decker

Quote # : 315334

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	EE 960085	N9038A MXE 26.5GHz Receiver	Agilent	N9038A	MY51210148	5/12/2016	5/12/2017	Active Calibration
2	AA 960171	Cable - low loss 1m	A.H. Systems, Inc	SAC-26G-6	386	3/31/2016	3/31/2017	Active Calibration
3	AA 960158	Double Ridge Horn Antenna	ETS Lindgren	3117	109300	2/4/2016	2/4/2017	Active Calibration
4	EE 960159	0.8 - 21GHz LNA	Mini-Circuits	ZVA-213X-S+	40201429	2/4/2016	2/4/2017	Active Calibration
5	AA 960154	2.4GHz High Pass Filter	KWM	HPF-L-14186	7272-02	7/25/2016	7/25/2017	Active Calibration

Project Engineer:

Quality Assurance:

Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048



Date: 29-Aug-2016

Type Test: Frequency Stability

Job #: C-2509

Prepared By: John Johnston

Customer: Stanley Black and Decker

Quote #: 315334

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	EE 960087	44GHz EXA Spectrum Analyzer	Agilent	N9010A	MY53400296	12/18/2015	12/18/2016	Active Calibration
2	AA 960160	UTIFLEX Cable	Micro-Coax	UFC142A-0-0720-20C	218652-001	6/29/2016	6/29/2017	Active Verification

Project Engineer:

Quality Assurance:



Date: 18-Aug-2016

Type Test: Tx Harmonics - Conducted

Job #: C-2509

Prepared By: Coty Hammerer

Customer: Stanley Black and Decker

Quote #: 315334

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	EE 960087	44GHz EXA Spectrum Analyzer	Agilent	N9010A	MY53400296	12/18/2015	12/18/2016	Active Calibration
2	AA 960160	UTIFLEX Cable	Micro-Coax	UFC142A-0-0720-20C	218652-001	6/29/2016	6/29/2017	Active Verification

Project Engineer:

Quality Assurance:



Date: 18-Aug-2016

Type Test: Band-Edge - Conducted

Job #: C-2509

Prepared By: Coty Hammerer

Customer: Stanley Black and Decker

Quote #: 315334

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	EE 960087	44GHz EXA Spectrum Analyzer	Agilent	N9010A	MY53400296	12/18/2015	12/18/2016	Active Calibration
2	AA 960160	UTIFLEX Cable	Micro-Coax	UFC142A-0-0720-20C	218652-001	6/29/2016	6/29/2017	Active Verification

Project Engineer:

Quality Assurance:



Date: 17-Aug-2016

Type Test: PSD

Job #: C-2509

Prepared By: Coty Hammerer

Customer: Stanley Black and Decker

Quote #: 315334

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	EE 960087	44GHz EXA Spectrum Analyzer	Agilent	N9010A	MY53400296	12/18/2015	12/18/2016	Active Calibration
2	AA 960160	UTIFLEX Cable	Micro-Coax	UFC142A-0-0720-20C	218652-001	6/29/2016	6/29/2017	Active Verification

Project Engineer:

Quality Assurance:

Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048



Date: 17-Aug-2016

Type Test: Conducted Power Output

Job #: C-2509

Prepared By: Coty Hammerer

Customer: Stanley Black and Decker

Quote #: 315334

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	EE 960087	44GHz EXA Spectrum Analyzer	Agilent	N9010A	MY53400296	12/18/2015	12/18/2016	Active Calibration
2	AA 960160	UTIFLEX Cable	Micro-Coax	UFC142A-0-0720-20C	218652-001	6/29/2016	6/29/2017	Active Verification

Project Engineer:

Quality Assurance:



Date: 17-Aug-2016

Type Test: OBW (6dB and 99%)

Job #: C-2509

Prepared By: Coty Hammerer

Customer: Stanley Black and Decker

Quote #: 315334

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	EE 960087	44GHz EXA Spectrum Analyzer	Agilent	N9010A	MY53400296	12/18/2015	12/18/2016	Active Calibration
2	AA 960160	UTIFLEX Cable	Micro-Coax	UFC142A-0-0720-20C	218652-001	6/29/2016	6/29/2017	Active Verification

Project Engineer:

Quality Assurance:



Date: 17-Aug-2016

Type Test: Rx Radiated Emission -1-4GHz

Job #: C-2509

Prepared By:

Customer: Stanley Black and Decker

Quote #: 315334

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	EE 960085	N9038A MKE 26.5GHz Receiver	Agilent	N9038A	MY51210148	5/12/2016	5/12/2017	Active Calibration
2	AA 960158	Double Ridge Horn Antenna	ETS Lindgren	3117	109300	2/4/2016	2/4/2017	Active Calibration
3	EE 960159	0.8 - 21GHz LNA	Mini-Circuits	ZVA-213X-S+	40201429	2/4/2016	2/4/2017	Active Calibration

Project Engineer:

Quality Assurance:

Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048



Date: 26-Aug-2016

Type Test: Tx Rad Emiss-1-2.31GHz,2.5-4GHz

Job #: C-2509

Prepared By: John Johnston

Customer: Stanley Black and Decker

Quote #: 315334

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	EE 960085	N9038A MXE 26.5GHz Receiver	Agilent	N9038A	MY51210148	5/12/2016	5/12/2017	Active Calibration
2	AA 960158	Double Ridge Horn Antenna	ETS Lindgren	3117	109300	2/4/2016	2/4/2017	Active Calibration
3	EE 960159	0.8 - 21GHz LNA	Mini-Circuits	ZVA-213X-S+	40201429	2/4/2016	2/4/2017	Active Calibration

Project Engineer:

Quality Assurance:



Date: 18-Aug-2016

Type Test: BLE Radiated Band Edge

Job #: C-2509

Prepared By: John Johnston

Customer: Stanley Black and Decker

Quote #: 315334

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	EE 960085	N9038A MXE 26.5GHz Receiver	Agilent	N9038A	MY51210148	5/12/2016	5/12/2017	Active Calibration
2	AA 960171	Cable - low loss 1m	A.H. Systems, Inc	SAC-26G-6	386	3/31/2016	3/31/2017	Active Calibration
3	AA 960158	Double Ridge Horn Antenna	ETS Lindgren	3117	109300	2/4/2016	2/4/2017	Active Calibration

Project Engineer:

Quality Assurance:

Prepared For: Stanley Black and Decker	Name: Bluetooth LED Large Area Light with Built-in Charger
Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048

Appendix B - Uncertainty Summary

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

<i>Measurement Type</i>	<i>Particular Configuration</i>	<i>Uncertainty Values</i>
<i>Radiated Emissions</i>	<i>Biconical Antenna</i>	<i>4.82 dB</i>
<i>Radiated Emissions</i>	<i>Log Periodic Antenna</i>	<i>4.88 dB</i>
<i>Radiated Emissions</i>	<i>Horn Antenna</i>	<i>4.85 dB</i>
<i>Absolute Conducted Emissions</i>	<i>PSA Series</i>	<i>1.38 dB</i>
<i>AC Line Conducted Emissions</i>	<i>LISN</i>	<i>3.20 dB</i>
<i>Radiated Immunity</i>	<i>3 Volts/Meter</i>	<i>2.05 V/m</i>
<i>Conducted Immunity</i>	<i>3 Volts rms</i>	<i>2.33 V</i>
<i>EFT Burst, Surge, VDI</i>	<i>230 VAC</i>	<i>54.4 V</i>
<i>ESD Immunity</i>	<i>Discharge at 15kV</i>	<i>3200 V</i>
<i>Temperature/Humidity</i>	<i>Thermo-hygrometer</i>	<i>0.64° C / 2.88 % R.H.</i>

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Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048

Appendix C - References

Publication	Year	Title
FCC CFR Parts 0-15	2016	Code of Federal Regulations – Telecommunications
ANSI C63.4	2014	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
ANSI C63.10	2013	American National Standard for Testing Unlicensed Wireless Devices
RSS-247 Issue 1	2015	Digital Transmission System (DTSs), Frequency Hopping System (FHSs) and License-Exempt Local Area Network (LE-LAN) Devices
RSS-Gen Issue 4	2014	General Requirements and Information for the Certification of Radio Apparatus
FCC KDB 558074 D01 DTS Meas Guidance v03r05	2016	Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247
ICES-003	2016	Information Technology Equipment (Including Digital Apparatus) – Limits and Methods of Measurement

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Report: TR 315334-1	Model: DCL070
LSR: C-2509	Serial: 000070; 000281; 000048