



Canada

# EMC & RF Test Report

As per

**RSS-210, Issue 9:2016,**

**Annex A**

**&**

**FCC Part 15 Subpart 15.231:2016**

**Momentarily Operated Devices,  
License Exempt Radio Apparatus**

on the

**WLS922L-433**

Issued by:

**TÜV SÜD Canada Inc.**

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Testing produced for

**DSC**

*From Tyco Security Products*


See Appendix A for full client &  
EUT details.

Amir Emami,  
Project Engineer




R-4023, G-506  
C-4498, T-1246



Client	<b>Digital Security Controls</b>	
Product	<b>WLS922L-433</b>	
Standard(s)	RSS 210 Issue 9:2016, Annex A FCC Part 15 Subpart 15.231:2016	

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Client	<b>Digital Security Controls</b>	
Product	<b>WLS922L-433</b>	
Standard(s)	RSS 210 Issue 9:2016, Annex A FCC Part 15 Subpart 15.231:2016	

## Report Scope

This report addresses the Radio/EMC certification testing and test results of the **Wireless Glassbreak Detector Model: WLS922L-433**, and is herein referred to as EUT (Equipment Under Test). The EUT was tested for compliance against the following standards:


RSS-210 Issue 9, Annex A:2016

FCC Part 15 Subpart C 15.231:2016

Test procedures, results, justifications, and engineering considerations, if any, follow later in this report.

This report does not imply product endorsement by any government, accreditation agency, or TÜV SÜD Canada Inc.

Opinions or interpretations expressed in this report, if any, are outside the scope of TÜV SÜD Canada Inc. accreditations. Any opinions expressed do not necessarily reflect the opinions of TÜV SÜD Canada Inc., unless otherwise stated.


Client	<b>Digital Security Controls</b>	
Product	<b>WLS922L-433</b>	
Standard(s)	RSS 210 Issue 9:2016, Annex A FCC Part 15 Subpart 15.231:2016	

## Summary

The results contained in this report relate only to the item(s) tested.

EUT:	WLS922L-433
FCC Certification #, FCC ID:	F5317WLS922L
Industry Canada Certification #, IC:	160A-WLS922L
EUT passed all tests performed	Yes
Tests conducted by	Amir Emami


For testing dates, see "Testing Environmental Conditions and Dates".

Client	<b>Digital Security Controls</b>	
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Standard(s)	RSS 210 Issue 9:2016, Annex A FCC Part 15 Subpart 15.231:2016	

## **Test Results Summary**

<b>Standard/Method</b>	<b>Description</b>	<b>Class/Limit</b>	<b>Result</b>
FCC 15.231(a) RSS-210(A.1.1)	Periodic Operation Requirements	---	Pass
FCC 15.231(b) RSS-210(A.1.2)	Tx Radiated Emissions	---	Pass
FCC 15.231(c) RSS-210(A.1.3)	Occupied Bandwidth	---	Pass
FCC 15.231(d)	40.66-40.70 MHz Band	---	N/A
FCC 15.231(e) RSS-210(A.1.4)	Reduced Field Strength	---	N/A
FCC 15.207 RSS-GEN (Table 3)	Power Line Conducted Emissions	Class B	N/A
FCC 15.209 RSS-GEN (Table 4)	Spurious Radiated Emissions	Class B	Pass
<b>Overall Result</b>			<b>Pass</b>

If the product as tested or otherwise complies with the specification, the EUT is deemed to comply with the requirement and is deemed a 'PASS' grade. If not 'FAIL' grade will be issued. Note that 'PASS' / 'FAIL' grade is independent of any measurement uncertainties. A 'PASS' / 'FAIL' grade within measurement uncertainty is marked with a '\*'.

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Standard(s)	RSS 210 Issue 9:2016, Annex A FCC Part 15 Subpart 15.231:2016	

### ***Notes, Justifications, or Deviations***

The following notes, justifications for tests not performed or deviations from the above listed specifications apply:

For the Restricted Bands of operation, the EUT is designed to only operate at 443.92MHz. It is only used for one-way communication link with the system controller.

Power line conducted emissions was not applicable since the EUT is a battery operated device. It uses two 3V Lithium batteries.

All the tests were performed with new batteries installed.


### ***Sample Calculation(s)***

#### **Radiated Emission Test**

Margin = Limit – (Received Signal + Antenna Factor + Cable Loss – Pre-Amp Gain)


Margin = 50.5dBµV/m – (50dBµV + 10dB + 2.5dB – 20dB)

Margin = 8.0 dB (pass)

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## Applicable Standards, Specifications and Methods


- ANSI C63.4:2014    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
- CFR 47 FCC 15    Code of Federal Regulations – Radio Frequency Devices, Subpart C:2016    Intentional Radiators
- RSS-GEN Issue 4    General Requirements and Information for the Certification of 2014    Radio Apparatus
- RSS-210 Issue 9:2016    Licence-Exempt Radio Apparatus: Category I Equipment
- CISPR 32:2015    Electromagnetic Compatibility of Multimedia Equipment – Emission Requirements.
- ISO 17025:2005    General Requirements for the Competence of Testing and Calibration Laboratories

Client	<b>Digital Security Controls</b>	 Canada
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Standard(s)	RSS 210 Issue 9:2016, Annex A FCC Part 15 Subpart 15.231:2016	

## Document Revision Status

Revision 1 - June 12, 2017  
Initial Release



Client	<b>Digital Security Controls</b>	
Product	<b>WLS922L-433</b>	
Standard(s)	RSS 210 Issue 9:2016, Annex A FCC Part 15 Subpart 15.231:2016	

## Definitions and Acronyms

The following definitions and acronyms are applicable in this report.  
See also ANSI C63.14.

**AE** – Auxiliary Equipment. A digital accessory that feeds data into or receives data from another device (host) that in turn, controls its operation.

**BW** – Bandwidth. Unless otherwise stated, this refers to the 6 dB bandwidth.

**EMC** – Electro-Magnetic Compatibility. The ability of an equipment or system to function satisfactorily in its electromagnetic environment without introducing intolerable electromagnetic disturbances to anything in that environment.

**EMI** – Electro-Magnetic Immunity. The ability to maintain a specified performance when the equipment is subjected to disturbance (unwanted) signals of specified levels.


**EUT** – Equipment Under Test. A device or system being evaluated for compliance that is representative of a product to be marketed.

**ITE** – Information Technology Equipment with a primary function(s) of entry, storage, display, retrieval, transmission, processing, switching, or control, of data.

**LISN** – Line Impedance Stabilization Network

**NCR** – No Calibration Required

**RF** – Radio Frequency


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## Testing Facility

Testing for EMC on the EUT was carried out at TÜV SÜD Canada labs near Toronto, Ontario. The testing lab consists of a 3m semi-anechoic chamber calibrated to be able to allow measurements on a EUT that has a maximum width or length of up to 2m and a height of up to 3m. The chamber is equipped with a turntable that is capable of testing devices up to 3300lb in weight. This facility is capable of testing products that are rated for 120Vac and 240Vac single phase, or devices that are rated for a 208Vac 3 phase input. DC capability is also available for testing. The chamber is equipped with a mast that controls the polarization and height of the antenna. Control of the mast occurs in the control room adjoining the shielded chamber. Radiated emission measurements are performed using a BiLog antenna and a Horn antenna where applicable. Conducted emissions, unless otherwise stated, are performed using a LISN and using the Vertical Ground plane if applicable.

### **Calibrations and Accreditations**


The 3m semi-anechoic chamber is registered with Federal Communications Commission (FCC, CA6844), Industry Canada (IC, 6844A-3) and Voluntary Control Council for Interference (VCCI, R-4023, G-506, C-4498, and T-1246). This chamber was calibrated for Normalized Site Attenuation (NSA) using test procedures outlined in ANSI C63.4 "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz". The chamber is lined with ferrite tiles and absorption cones to minimize any undesired reflections. The NSA data is kept on file at TÜV SÜD Canada. For radiated susceptibility testing, a 16 point field calibration has been performed on the chamber. The field uniformity data is kept on file at TÜV SÜD Canada. TÜV SÜD Canada Inc. is accredited to ISO 17025 by A2LA with Testing Certificate #2555.01. The laboratory's current scope of accreditation listing can be found as listed on the A2LA website. All measuring equipment is calibrated on an annual or bi-annual basis as listed for each respective test.

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### ***Testing Environmental Conditions and Dates***

Following environmental conditions were recorded in the facility during time of testing

<b>Date</b>	<b>Test</b>	<b>Initials</b>	<b>Temperature (°C)</b>	<b>Humidity (%)</b>	<b>Pressure (kPa)</b>
May 29 – June 1, 2017	Radiated Emissions	AE	20 – 24	40 – 48	98.0 – 101.0

Client	<b>Digital Security Controls</b>	 Canada
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## Detailed Test Results Section

Client	<b>Digital Security Controls</b>	
Product	<b>WLS922L-433</b>	
Standard(s)	RSS 210 Issue 9:2016, Annex A FCC Part 15 Subpart 15.231:2016	

### ***Periodic Operational Requirements***

The limit is as specified in FCC 15.231(a) and RSS-210 (A.1.1).

The intentional radiator is restricted to the transmission of a control signal. Continuous transmissions, voice, video and the radio control of toys are not permitted.

#### FCC 15.231(a)(1)

A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds after being released.

Not Applicable – The EUT has no provision for manual activation

#### FCC 15.231(a)(2)

A transmitter activated automatically shall cease transmissions within 5 seconds after activation.

The maximum transmission duration is 1.0 sec.

#### FCC 15.231(a)(3)

Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour.

Not Applicable – The EUT does not transmit periodically at predetermined intervals and does not transmit polling or supervision transmissions.

#### FCC 15.231(a)(4)


Intentional radiators which are employed for radio control purposes during emergencies involving fire, security and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm condition.

Not Applicable.

#### FCC 15.231(a)(5)

Transmissions of set up information for security systems may exceed the transmission duration limits in paragraphs (1) and (2) above, provided such transmissions are under the control of a professional installer and do not exceed 10 seconds after a manually operated switch is released or a transmitter is activated automatically. Such set up information may include data.

Not Applicable.

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### Duty Cycle Measurement

The transmitted data is a fixed length, ASK modulated packet. The packet contains all of the necessary information to indicate which sensor generated the packet, the type of sensor and the status of the sensor's inputs.

The maximum ON time as defined by the manufacturer:

2.5ms header + (27 ON bits \* 0.25ms per bit)

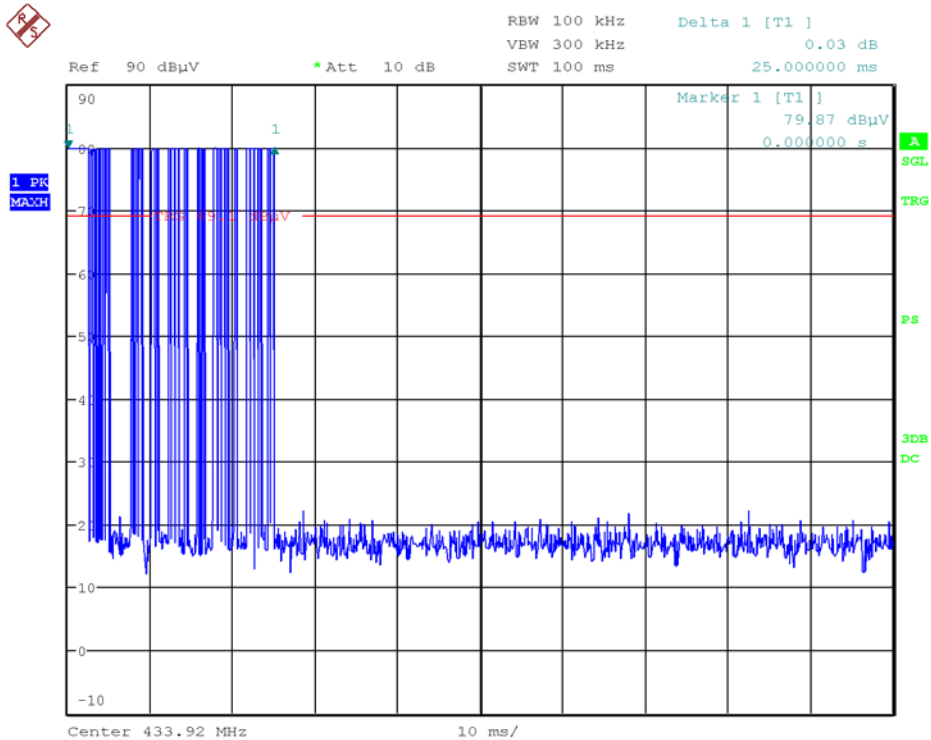
2.5ms + 6.75ms

9.25ms (Total ON time)


Duty cycle correction factor:

$$20 \log \left( \frac{9.25ms}{100ms} \right) = -20.67$$

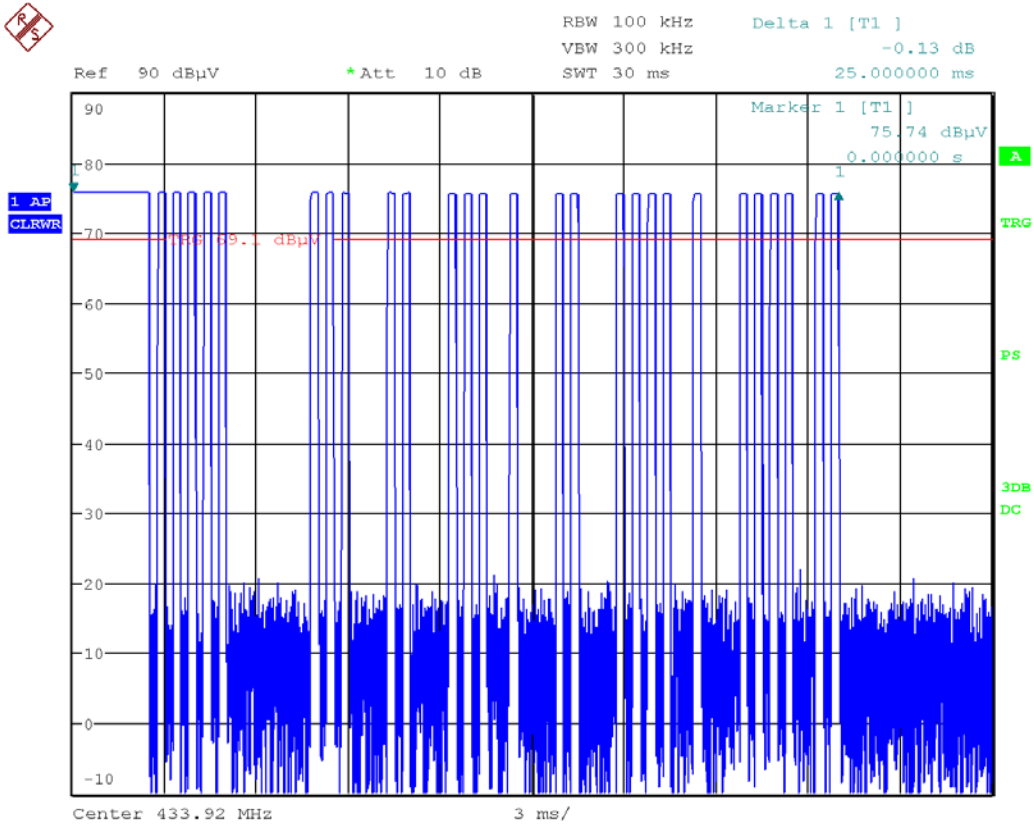
Data Transmission in 100ms




Date: 31.MAY.2017 16:29:15

Client	Digital Security Controls	
Product	WLS922L-433	
Standard(s)	RSS 210 Issue 9:2016, Annex A FCC Part 15 Subpart 15.231:2016	

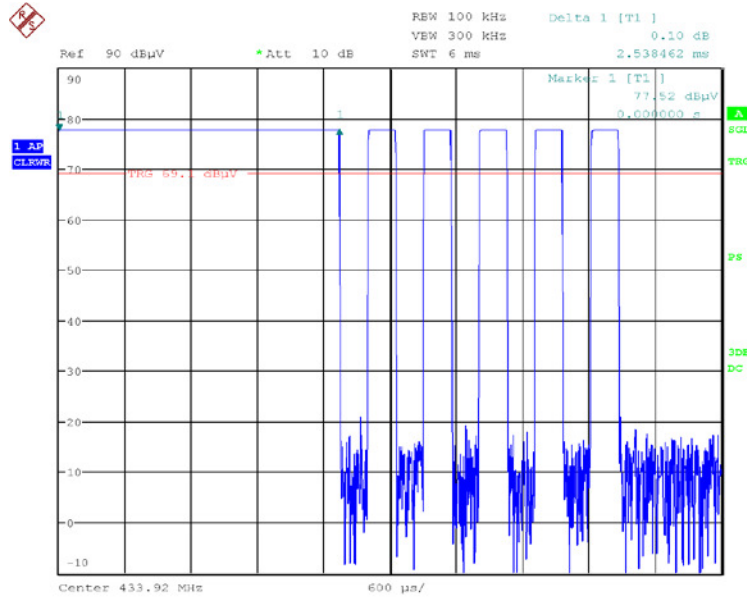
Header + Total ON Bits



Date: 31.MAY.2017 14:58:24

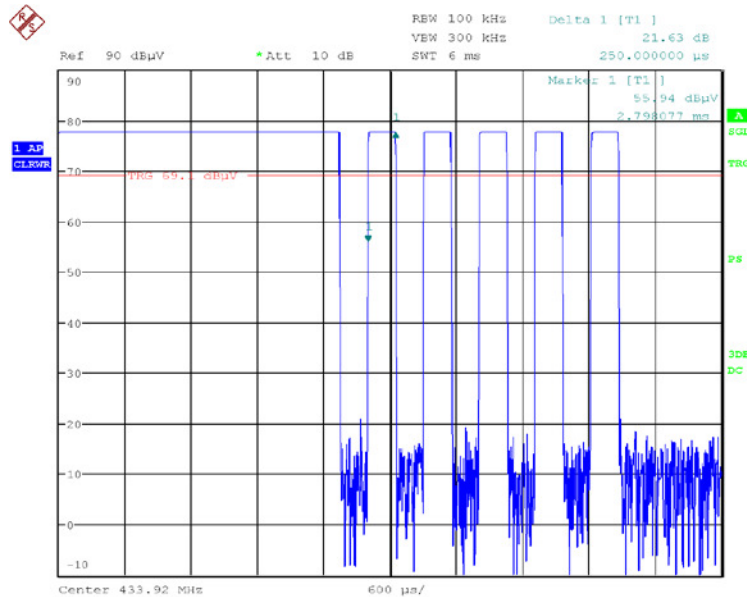
Client	Digital Security Controls	
Product	WLS922L-433	
Standard(s)	RSS 210 Issue 9:2016, Annex A FCC Part 15 Subpart 15.231:2016	

### Header Time




Date: 31.MAY.2017 15:01:48

### ON Bit Time




Date: 31.MAY.2017 15:02:36



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## Test Equipment List

Equipment	Model No.	Manufacturer	Last Calibration / Verification Date	Next Calibration / Verification Date	Asset #
Spectrum Analyzer	ESU 40	Rohde & Schwarz	Jan. 06, 2016	Jan. 06, 2018	GEMC 233
BiLog Antenna	3142-C	ETS	Oct 5, 2016	Oct 5, 2018	GEMC 8
RF Cable 10m	LMR-400-10M-50Ω-MN-MN	LexTec	Feb. 20, 2017	Feb. 20, 2018	GEMC 274
RF Cable 2m	Sucoflex 104A	Huber+Suhner	Feb. 20, 2017	Feb. 20, 2018	GEMC 272

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### ***Tx Radiated Emissions***

The field strength of emissions from momentarily operated intentional radiators shall not exceed the limits outlined in the table below based on the average value measured as per FCC 15.231(b) and RSS-210 (A.1.2).

Fundamental Frequency (MHz)	Field Strength of Fundamental ( $\mu\text{V/m}$ ) at 3m	Field Strength of Spurious Emissions ( $\mu\text{V/m}$ ) at 3m
40.66-40.70	2,250	225
70-130	1,250	125
130-174	<sup>1</sup> 1,250 to 3,750	<sup>1</sup> 125 to 375
174-260	3,750	375
260-470	<sup>1</sup> 3,750 to 12,500	<sup>1</sup> 375 to 1,250
Above 470	12,500	1,250

<sup>1</sup> Linear Interpolation


Note:

For 130 – 174MHz: FS (dB $\mu\text{V/m}$ ) = 20\*log[(56.82 x F) – 6136]

For 260 – 470MHz: FS (dB $\mu\text{V/m}$ ) = 20\*log[(41.67 x F) – 7083]

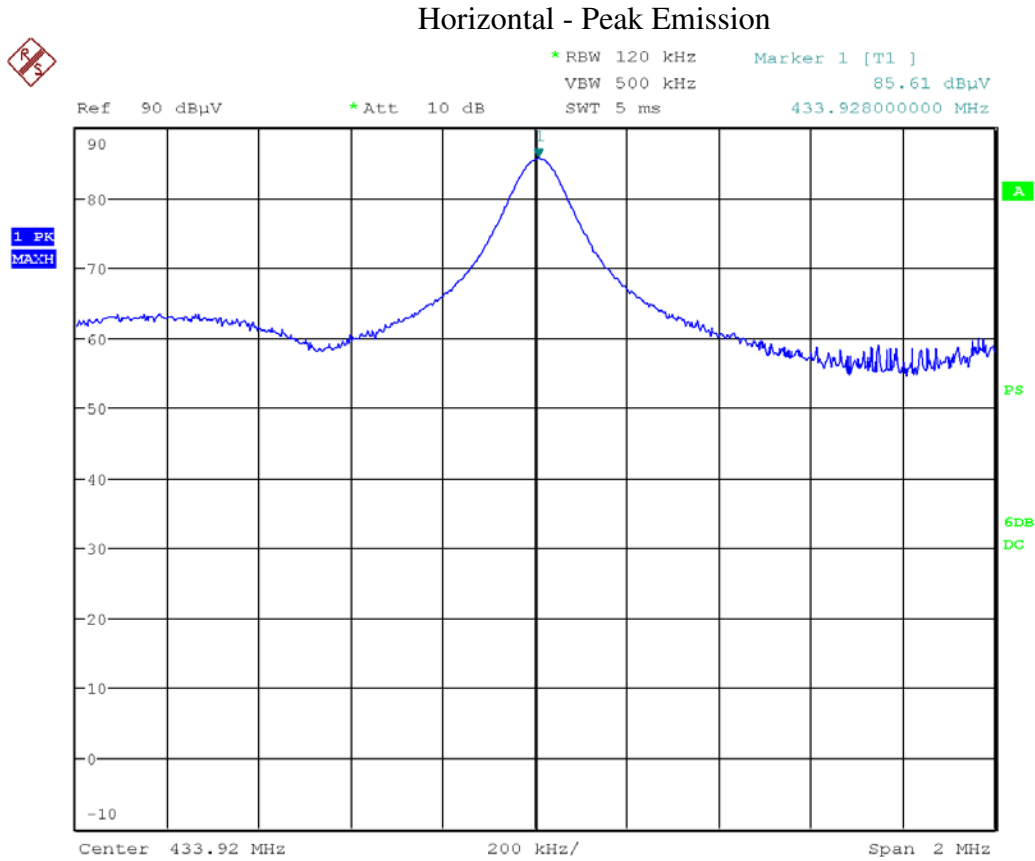
For a 433.92MHz transmitter:

Fundamental Frequency (MHz)	Field Strength of Fundamental (dB $\mu\text{V/m}$ ) at 3m	Field Strength of Spurious Emissions (dB $\mu\text{V/m}$ ) at 3m
433.92	80.8	60.8


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### Preliminary Graphs

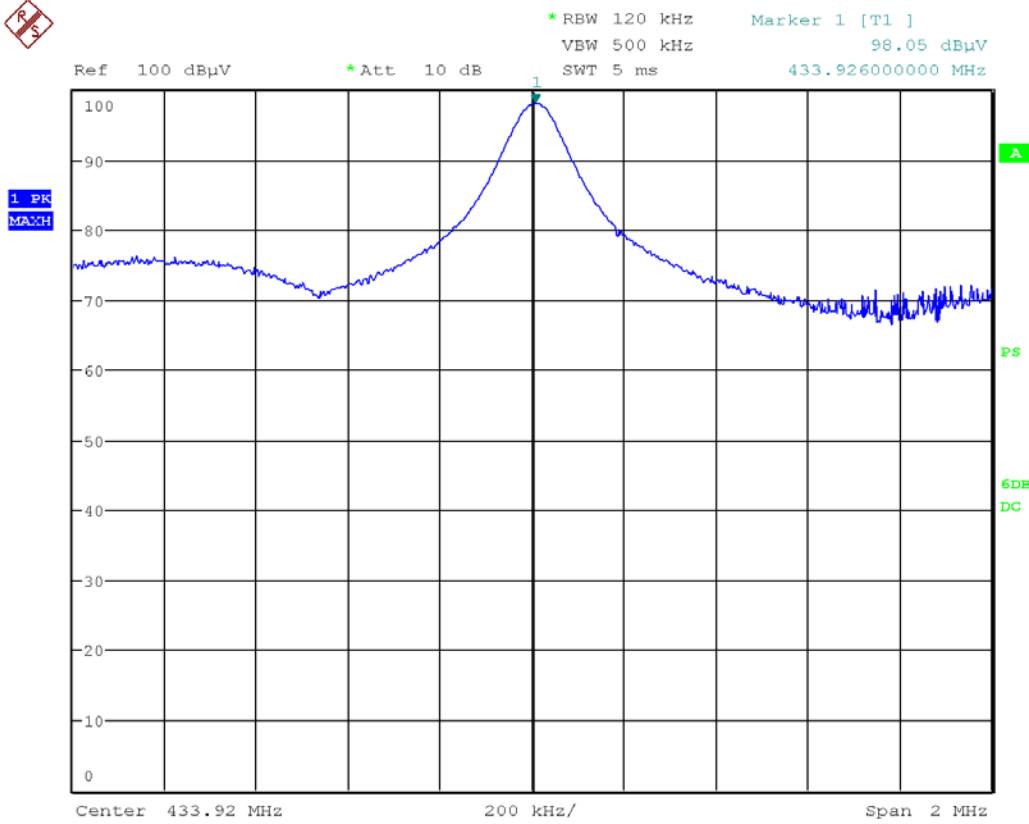
Peak plots are taken at a 3m measurement distance. The marker shows the raw value. See the Final Measurements and Results section below for corrected values.



Date: 1.JUN.2017 08:52:32


Client	Digital Security Controls	
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Vertical - Peak Emission



Date: 1.JUN.2017 08:54:17

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## Final Measurements and Results

The EUT passed. For the average radiated emission measurements, the duty cycle correction factor method was used. A duty cycle correction factor of -20.67 was applied to the peak measurement to obtain the average measurement.


The measurements were maximized by rotating the turn table over a full 0-360 rotation and the antenna height was varied from 1 m to 4 m.

Supply			Battery				
Frequency (MHz)	Peak/AVG	Received Signal (dBμV)	Correction Factors	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pass/Fail
Horizontal Antenna Polarization							
433.92	AVG	85.6	-22.2	63.4	80.8	17.4	Pass
433.92	Peak	85.6	-1.5	84.1	100.8	16.7	Pass
867.95	AVG	35.2	-14.4	20.8	60.8	40.0	Pass
867.95	Peak	35.2	6.3	41.5	80.8	39.3	Pass
1735.74	AVG	62.6	-27.9	34.8	60.8	26.0	Pass
1735.74	Peak	62.6	-7.2	55.4	80.8	25.4	Pass
2169.57	AVG	54.0	-25.3	28.7	60.8	32.1	Pass
2169.57	Peak	54.0	-4.6	49.4	80.8	31.4	Pass
Vertical Antenna Polarization							
433.92	AVG	98.1	-22.2	75.9	80.8	4.9	Pass
433.92	Peak	98.1	-1.5	96.6	100.8	4.3	Pass
867.95	AVG	46.8	-14.4	32.4	60.8	28.4	Pass
867.95	Peak	46.8	6.3	53.1	80.8	27.7	Pass
1735.70	AVG	61.7	-28.0	33.7	60.8	27.1	Pass
1735.70	Peak	61.7	-7.3	54.4	80.8	26.5	Pass
2169.92	AVG	52.5	-25.4	27.1	60.8	33.7	Pass
2169.92	Peak	52.5	-4.7	47.8	80.8	33.1	Pass

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## Test Equipment List

Equipment	Model No.	Manufacturer	Last Calibration / Verification Date	Next Calibration / Verification Date	Asset #
Spectrum Analyzer	ESU 40	Rohde & Schwarz	Jan. 06, 2016	Jan. 06, 2018	GEMC 233
Pre-Amp 1 – 26.5 GHz	HP 8449B	HP	Oct 12, 2016	Oct 12, 2018	GEMC 6351
Pre-Amp 9 kHz – 1 GHz	LNA 6901	Teseq	Feb. 2, 2017	Feb. 2, 2019	GEMC 168
Attenuator 3 dB	612-03-1	Meca Electronics, Inc	Feb. 20, 2017	Feb. 20, 2018	GEMC 222
Attenuator 6 dB	FP-50-6	Trilithic	Feb. 20, 2017	Feb. 20, 2018	GEMC 41
BiLog Antenna	3142-C	ETS	Oct 5, 2016	Oct 5, 2018	GEMC 8
Horn Antenna 1 – 18 GHz	AH-118	Com-Power Corporation	July 1, 2015	July 1, 2017	GEMC 214
RF Cable 10m	LMR-400-10M-50Ω-MN-MN	LexTec	Feb. 20, 2017	Feb. 20, 2018	GEMC 274
RF Cable 2m	Sucoflex 104A	Huber+Suhner	Feb. 20, 2017	Feb. 20, 2018	GEMC 272

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## Spurious Radiated Emissions

### Purpose

The purpose of this test is to ensure that the RF energy unintentionally emitted from the EUT does not exceed the limits listed below as defined in the applicable test standard, as measured from a receiving antenna. This helps protect broadcast radio services such as television, FM radio, pagers, cellular telephones, emergency services, and so on, from unwanted interference.

### Limits and Method

The method is as defined in ANSI C63.10 Section 6.3.

The limits for unintentional radiated emissions apply for those emissions that fall in the restricted bands, as defined in Section 15.205(a). These emissions must comply with the radiated emission limits specified in Section 15.209(a).


Frequency	Limit
0.009 MHz – 0.490 MHz	2400/F(kHz) uV/m at 30m <sup>1</sup>
0.490 MHz – 1.705 MHz	24000/F(kHz) uV/m at 30m <sup>1</sup>
1.705 MHz – 30 MHz	30 uV/m at 30m <sup>1</sup>
30 MHz – 88 MHz	100 uV/m (40.0 dBuV/m <sup>1</sup> ) at 3m
88 MHz – 216 MHz	150 uV/m (43.5 dBuV/m <sup>1</sup> ) at 3m
216 MHz – 960 MHz	200 uV/m (46.0 dBuV/m <sup>1</sup> ) at 3m
Above 960 MHz	500 uV/m (54.0 dBuV/m <sup>1</sup> ) at 3m
Above 1000 MHz	500 uV/m (54 dBuV/m <sup>2</sup> ) at 3m
Above 1000 MHz	500 uV/m (74 dBuV/m <sup>3</sup> ) at 3m

<sup>1</sup>Limit is with Quasi Peak detector with bandwidths as defined in CISPR-16-1-1

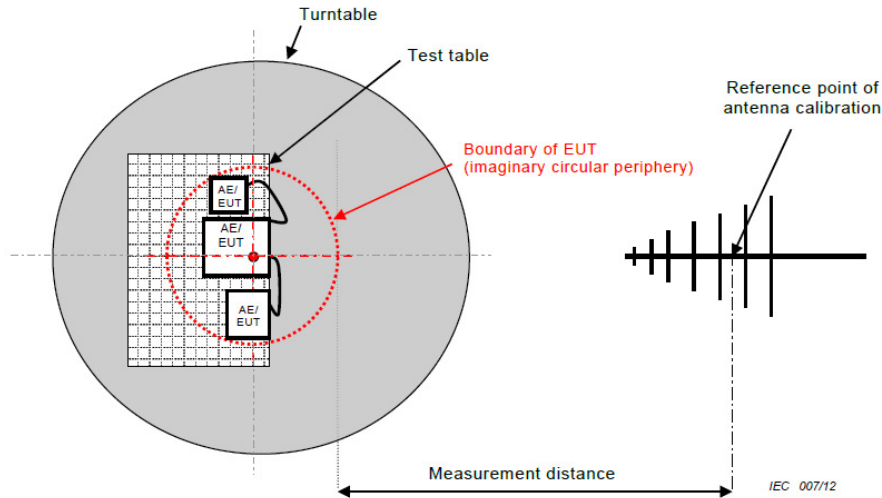
<sup>2</sup>Limit is with 1 MHz measurement bandwidth and using an Average detector

<sup>3</sup>Limit is with 1 MHz measurement bandwidth and using a Peak detector

Based on ANSI C63.4 Section 4.2, if the Peak detector measurements do not exceed the Quasi-Peak limits, where defined, then the EUT is deemed to have passed the requirements.

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### Typical Radiated Emissions Setup



### Measurement Uncertainty

The expanded measurement uncertainty is calculated in accordance with CISPR 16-4-2 and is  $\pm 4.25\text{dB}$  for 30MHz – 1GHz and  $\pm 4.93\text{dB}$  for 1GHz – 18GHz with a 'k=2' coverage factor and a 95% confidence level.


### Preliminary Graphs

The graphs shown below are maximized peak measurement graphs measured with a resolution bandwidth greater than or equal to the final required detector over a full 0-360°. This peaking process is done as a worst case measurement and enables the detection of frequencies of concern for final measurement. For final measurements with the appropriate detector, where applicable, please refer to the tables under Final Measurements.

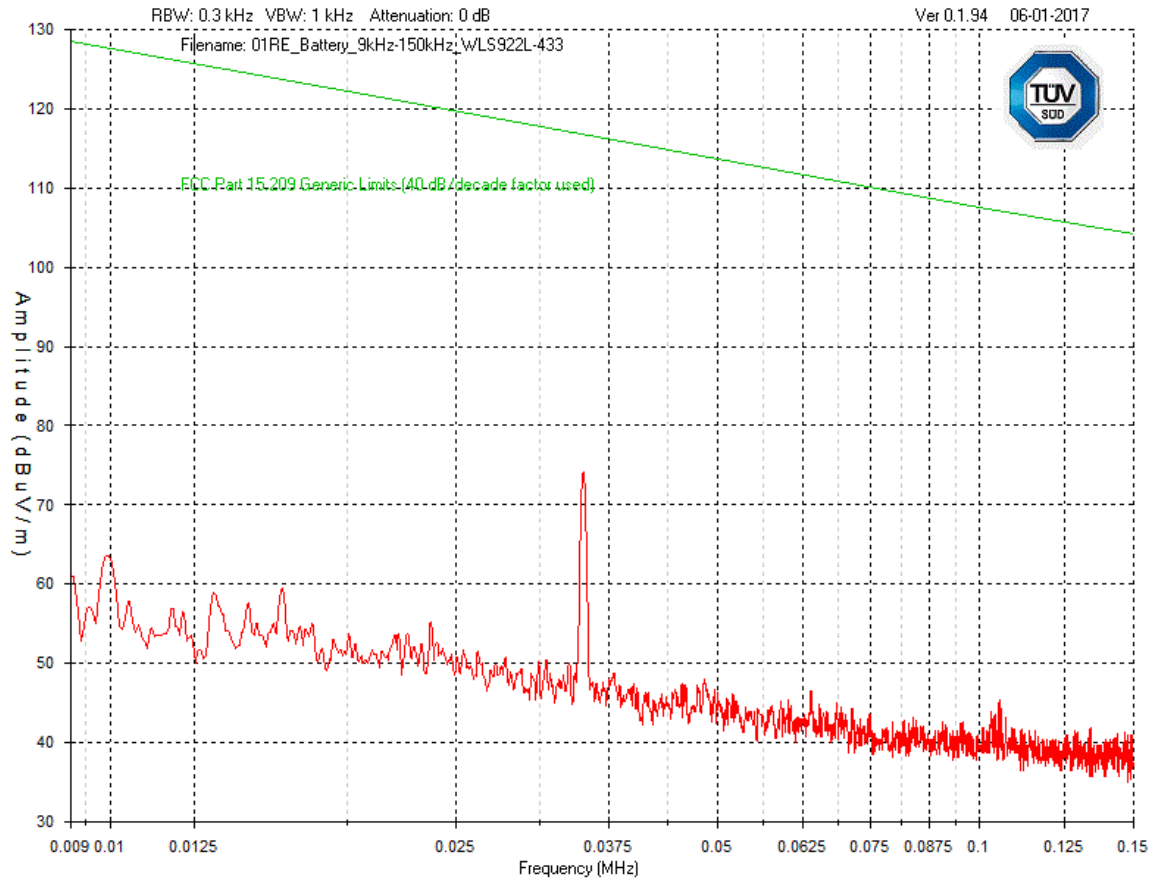
In accordance with FCC Part 15, Subpart A, Section 15.33, the device was scanned to the 10<sup>th</sup> harmonic (a minimum of 4.3392 GHz).


Devices scanned may be scanned at alternate test distances and in accordance with FCC Part 15, Subpart A, Section 15.31, an extrapolation factor of 20 dB/decade was used above 30 MHz and 40 dB/decade below 30 MHz. For example for 1 meter measurements, an extrapolation factor 9.5 dB from 20 Log (1m / 3m) is applied.



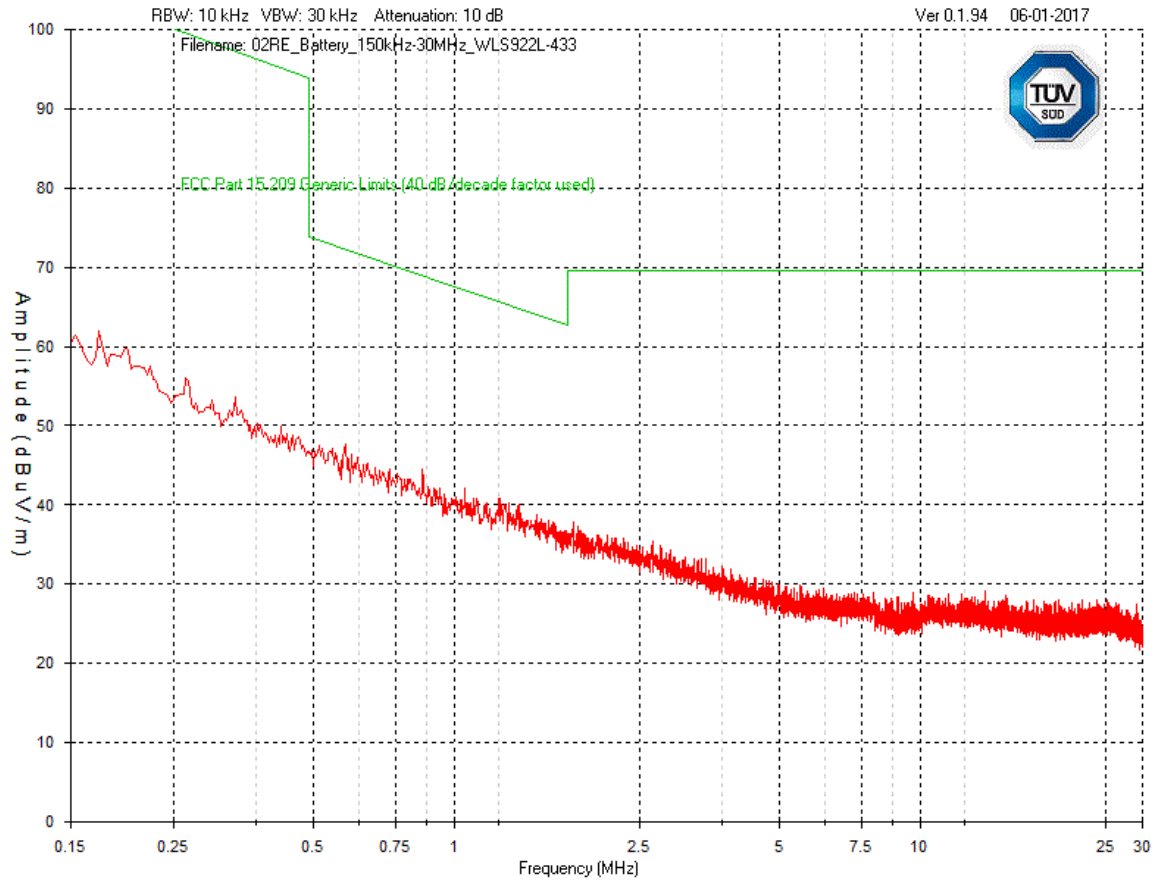
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9 kHz – 150 kHz  
Peak Emission Graph



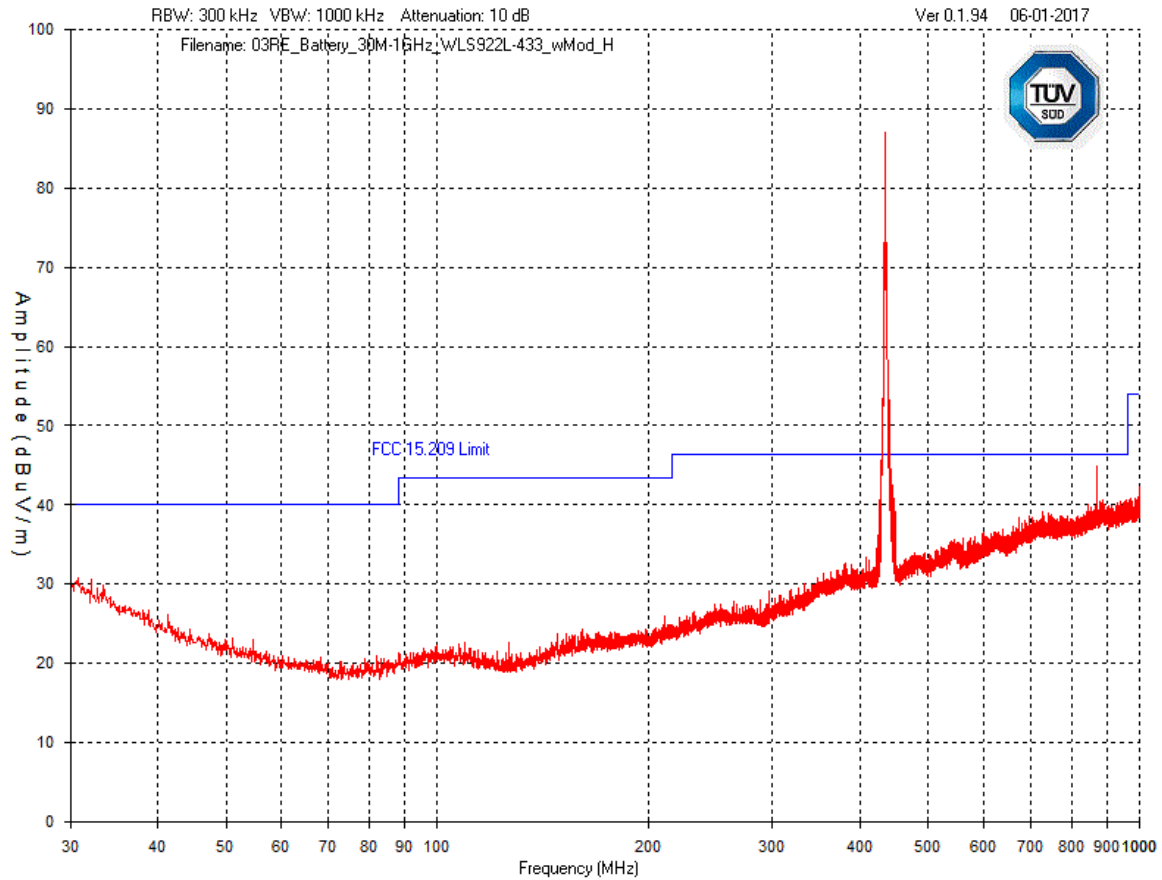
Client	Digital Security Controls	
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150 kHz – 30 MHz  
Peak Emission Graph




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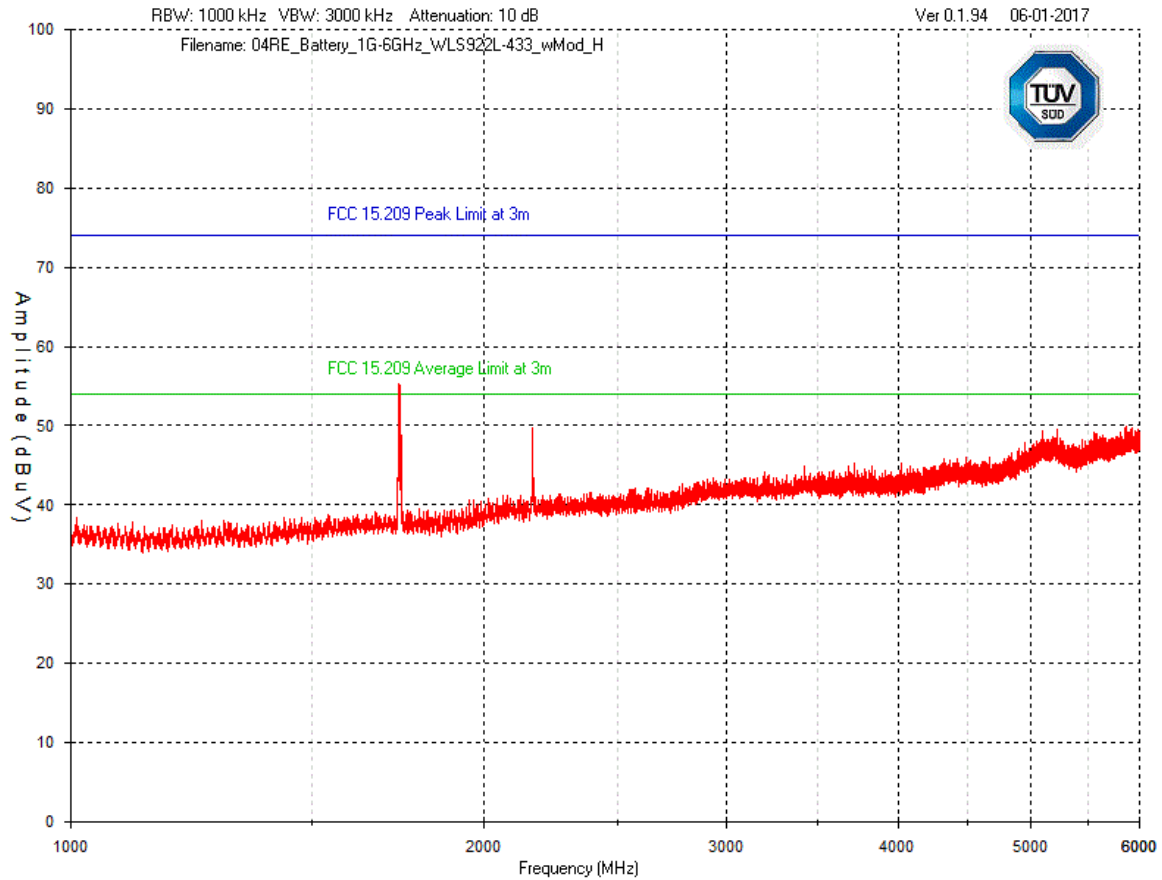
30 MHz – 1 GHz  
Horizontal - Peak Emission Graph




Note: The narrow band emissions above are the fundamental and harmonic of the intentional radiator. See the “Tx Radiated Emissions” section for the emission data.

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Product	WLS922L-433	
Standard(s)	RSS 210 Issue 9:2016, Annex A FCC Part 15 Subpart 15.231:2016	

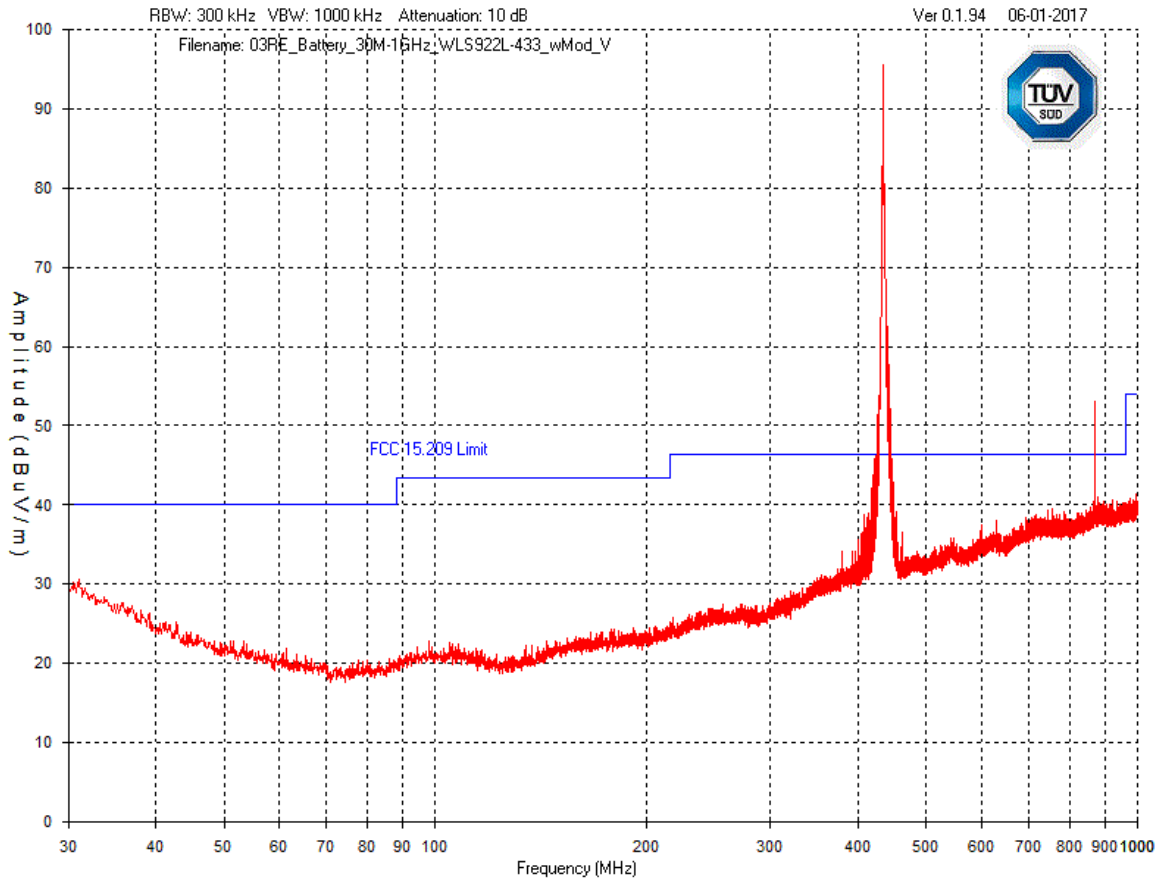
1 GHz – 6 GHz  
Horizontal - Peak Emission Graph




Note: The narrow band emissions above are the harmonics of the intentional radiator. See the “Tx Radiated Emissions” section for the emission data.

Client	Digital Security Controls	
Product	WLS922L-433	
Standard(s)	RSS 210 Issue 9:2016, Annex A FCC Part 15 Subpart 15.231:2016	

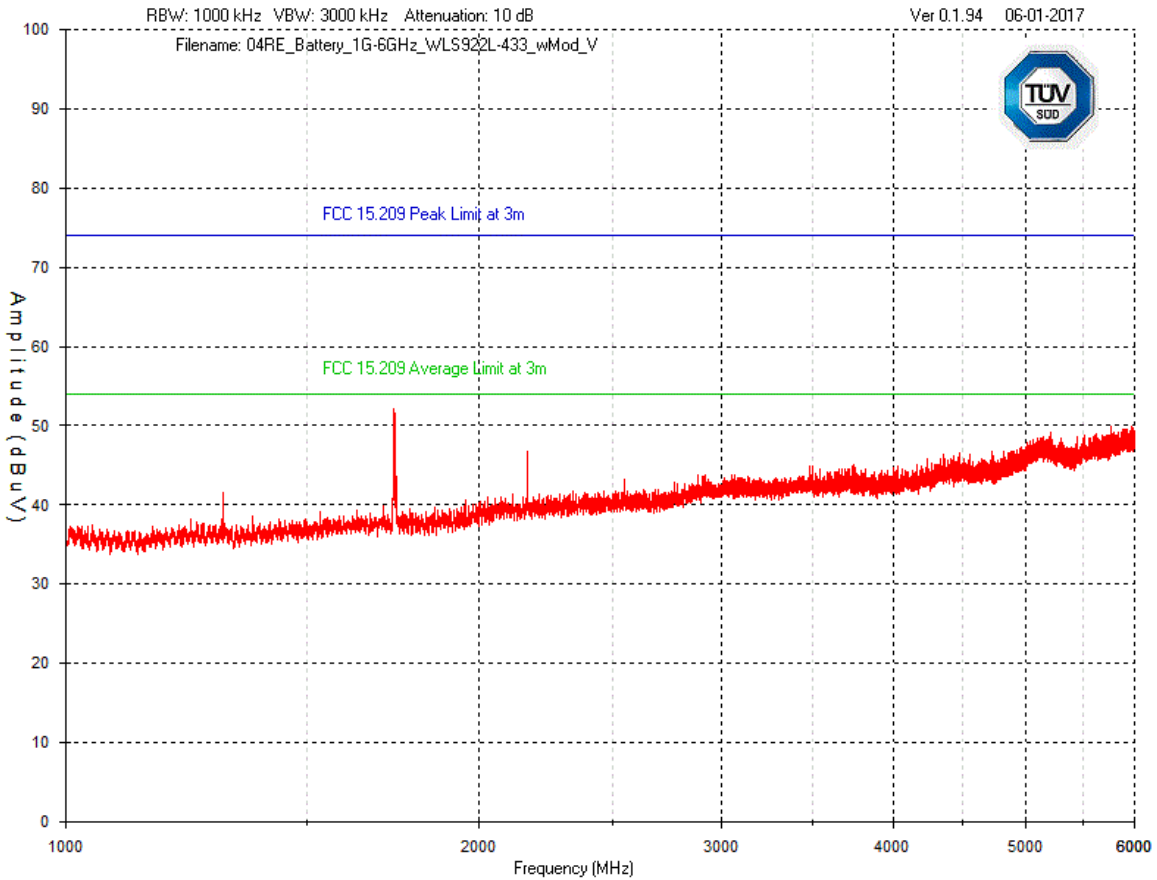
30 MHz – 1 GHz  
Vertical - Peak Emission Graph




Note: The narrow band emissions above are the fundamental and harmonic of the intentional radiator. See the “Tx Radiated Emissions” section for the emission data.

Client	Digital Security Controls	
Product	WLS922L-433	
Standard(s)	RSS 210 Issue 9:2016, Annex A FCC Part 15 Subpart 15.231:2016	

1 GHz – 6 GHz  
Vertical - Peak Emission Graph



Note: The narrow band emissions above are the harmonics of the intentional radiator. See the “Tx Radiated Emissions” section for the emission data.

Client	<b>Digital Security Controls</b>	
Product	<b>WLS922L-433</b>	
Standard(s)	RSS 210 Issue 9:2016, Annex A FCC Part 15 Subpart 15.231:2016	


## Final Measurements and Results

In accordance with 15.231(b)(2), only frequencies exceeding the 15.209 limit that occur within the bands listed in 15.205 need to be verified with a final detector. Emissions outside the restricted bands were measured for informational purposes.

The EUT passed. No emissions other than the fundamental of the intentional radiator at 433.92MHz and its harmonics were observed.

## Test Equipment List

Equipment	Model No.	Manufacturer	Last Calibration / Verification Date	Next Calibration / Verification Date	Asset #
Spectrum Analyzer	ESU 40	Rohde & Schwarz	Jan. 06, 2016	Jan. 06, 2018	GEMC 233
Pre-Amp 1 – 26.5 GHz	HP 8449B	HP	Oct 12, 2016	Oct 12, 2018	GEMC 6351
Pre-Amp 9 kHz – 1 GHz	LNA 6901	Teseq	Feb. 2, 2017	Feb. 2, 2019	GEMC 168
Attenuator 3 dB	612-03-1	Meca Electronics, Inc	Feb. 20, 2017	Feb. 20, 2018	GEMC 222
Attenuator 6 dB	FP-50-6	Trilithic	Feb. 20, 2017	Feb. 20, 2018	GEMC 41
Loop Antenna	EM 6871	Electro-Metrics	Feb 13, 2017	Feb 13, 2019	GEMC 70
Loop Antenna	EM 6872	Electro-Metrics	Feb 13, 2017	Feb 13, 2019	GEMC 71
BiLog Antenna	3142-C	ETS	Oct 5, 2016	Oct 5, 2018	GEMC 8
Horn Antenna 1 – 18 GHz	AH-118	Com-Power Corporation	July 1, 2015	July 1, 2017	GEMC 214
RF Cable 10m	LMR-400-10M-50Ω-MN-MN	LexTec	Feb. 20, 2017	Feb. 20, 2018	GEMC 274
RF Cable 2m	Sucoflex 104A	Huber+Suhner	Feb. 20, 2017	Feb. 20, 2018	GEMC 272
Emissions Software	0.1.94	Global EMC	NCR	NCR	GEMC 58

Client	Digital Security Controls	
Product	WLS922L-433	
Standard(s)	RSS 210 Issue 9:2016, Annex A FCC Part 15 Subpart 15.231:2016	

## Occupied Bandwidth

### Purpose

The purpose of this test is to ensure that the bandwidth occupied exceeds a stated minimum. This helps ensure the utilization of the frequency allocation is sufficiently wide. This also helps prevent corruption of data by ensuring adequate data separation to distinguish the reception of the intended information.

### Limits and Method

The limit is as specified in FCC Part 15.231(c) and RSS-210 (A.1.3).

The minimum 20dB bandwidth and the 99% bandwidth shall be less or equal to 0.25% of the center frequency for devices operating between 70 MHz and 900 MHz.

The method is given in ANSI C63.10 Section 6.9.2.

### Results

The EUT passed.


#### 20dB Bandwidth

Frequency (MHz)	Modulation	20dB Bandwidth (kHz)	Limit (kHz)	Result
433.92	ASK	55.0	1084.8	Pass

#### 99% Bandwidth

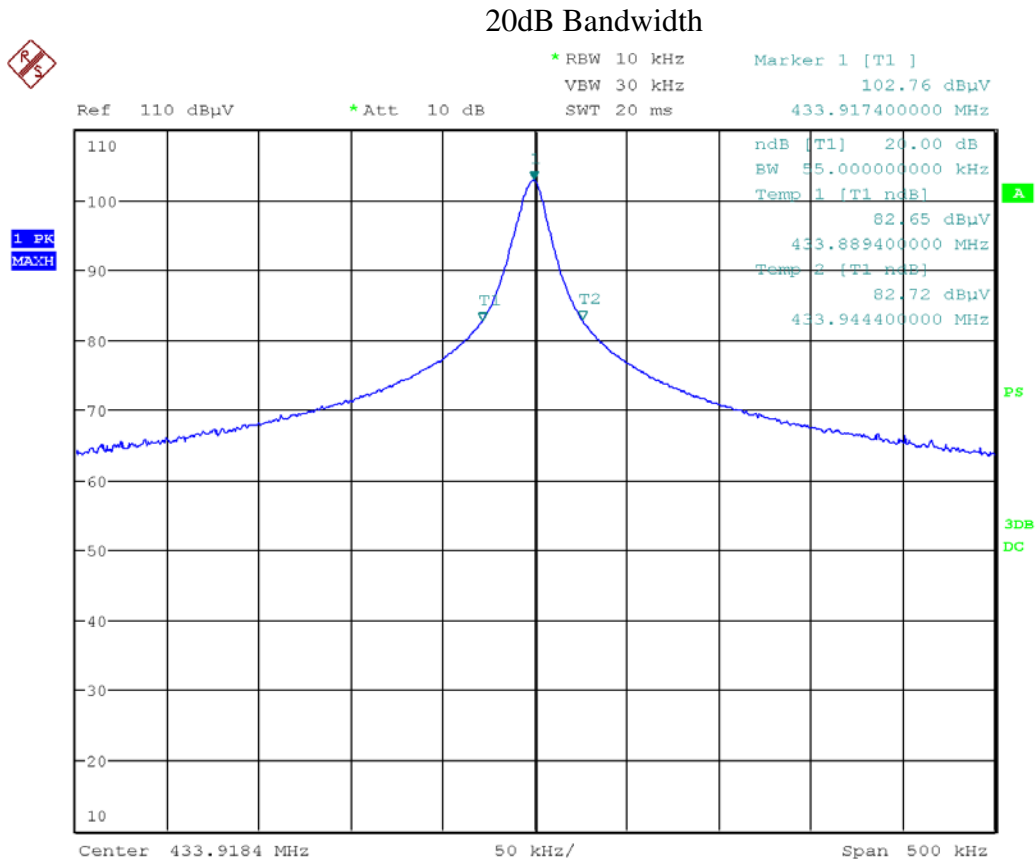
Frequency (MHz)	Modulation	99% Bandwidth (kHz)	Limit (kHz)	Result
433.92	ASK	146.5	1084.8	Pass




Client	Digital Security Controls	
Product	WLS922L-433	
Standard(s)	RSS 210 Issue 9:2016, Annex A FCC Part 15 Subpart 15.231:2016	

## Graphs

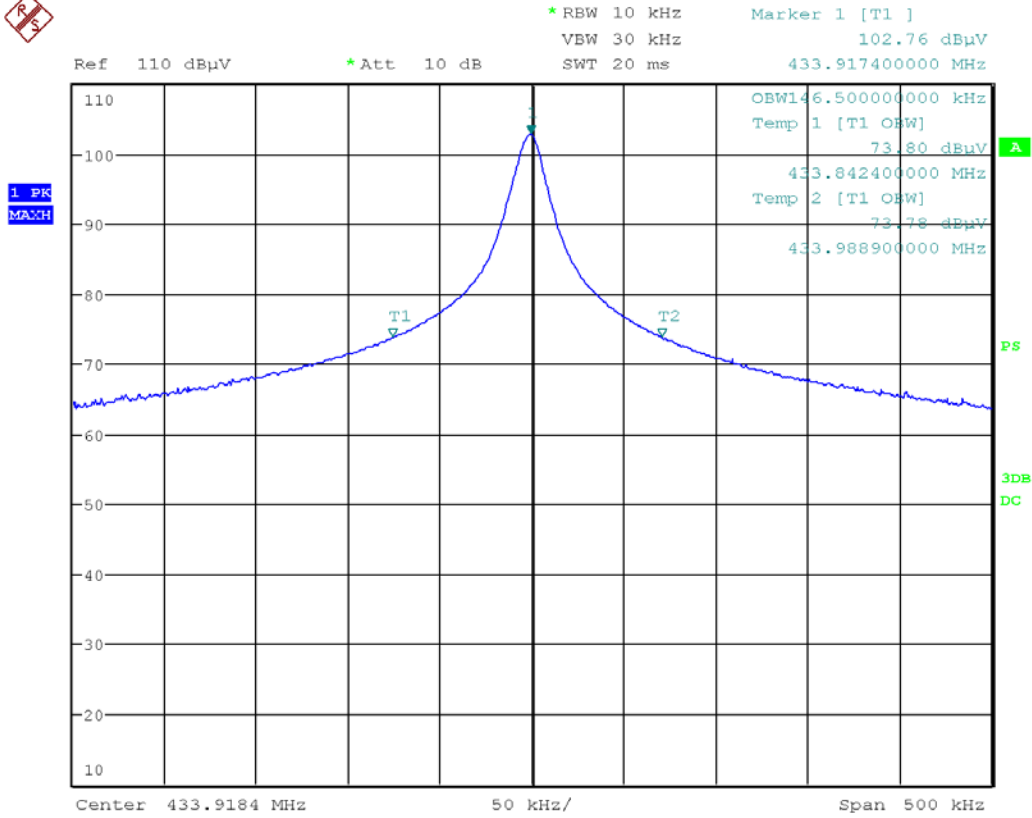
The graphs showed below show the OBW during the operation of the device. This is measured by a max hold on the spectrum analyzer and the highest resolution bandwidth that is sufficiently low to exhibit the 20 dB bandwidth of a channel during operation of the EUT. Max hold is performed for a duration of not less than 1 minute.




Date: 29.MAY.2017 19:55:48

Client	Digital Security Controls	
Product	WLS922L-433	
Standard(s)	RSS 210 Issue 9:2016, Annex A FCC Part 15 Subpart 15.231:2016	

### 99% Bandwidth




Date: 29.MAY.2017 19:54:08


Client	<b>Digital Security Controls</b>	
Product	<b>WLS922L-433</b>	
Standard(s)	RSS 210 Issue 9:2016, Annex A FCC Part 15 Subpart 15.231:2016	

## Test Equipment List

Equipment	Model No.	Manufacturer	Last Calibration / Verification Date	Next Calibration / Verification Date	Asset #
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Attenuator 6 dB	FP-50-6	Trilithic	Feb. 20, 2017	Feb. 20, 2018	GEMC 41
BiLog Antenna	3142-C	ETS	Oct 5, 2016	Oct 5, 2018	GEMC 8
RF Cable 10m	LMR-400- 10M-50Ω-MN- MN	LexTec	Feb. 20, 2017	Feb. 20, 2018	GEMC 274
RF Cable 2m	Sucoflex 104A	Huber+Suhner	Feb. 20, 2017	Feb. 20, 2018	GEMC 272

Client	<b>Digital Security Controls</b>	 TUV SUD Canada
Product	<b>WLS922L-433</b>	
Standard(s)	RSS 210 Issue 9:2016, Annex A FCC Part 15 Subpart 15.231:2016	

## Appendix A – EUT Summary


Client	<b>Digital Security Controls</b>	
Product	<b>WLS922L-433</b>	
Standard(s)	RSS 210 Issue 9:2016, Annex A FCC Part 15 Subpart 15.231:2016	

For further details for filing purposes, refer to filing package.

### General EUT Description

Client	
Organization / Address	Digital Security Controls, A division of Tyco Safety Products Canada Ltd. 3301 Langstaff Road Concord, Ontario, L4K 4L2 Canada
Contact	Dan Nita
Phone	905-760-3000
EUT Details	
EUT Name	Wireless Glassbreak Detector
EUT Model	WLS922L-433
Software Version	HW: UA261 Rev. 02 / SW Ver. 1.0
Equipment Category	Security Alarm Device
Equipment is Powered Using	Lithium Battery – 2x CR123A
Input Voltage	6V DC
Connectors available on EUT	None
Peripherals Required for Test	None
Release type	Final
Intentional Radiator Frequency	433.92MHz
Modulation	ASK
EUT Configuration	The EUT was configured to transmit continuously at 100% duty cycle with modulation

Note the EUT is considered to have been received the date of the commencement of the first test, unless otherwise stated. For a close-up picture of the EUT, see ‘Appendix B – EUT and Test Setup Photos’.

Client	<b>Digital Security Controls</b>	 TUV SUD Canada
Product	<b>WLS922L-433</b>	
Standard(s)	RSS 210 Issue 9:2016, Annex A FCC Part 15 Subpart 15.231:2016	

## Appendix B – EUT and Test Setup Photos

Refer to the files separate from this test report.