

EMC TEST REPORT



Standard(s):

FCC Subpart C, Part 15.209 and 15.247(d)
RSS-247(5.5), Issue 2, 2017

FCC ID:Y9ZMRX21AWS6 (Class II PC)

Product: 3M™ Peltor WS™ ALERT™ X Headset
Model(s): WS Alert X

Company Name:

3M Svenska AB

3M Division: PSD

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Report Number: HRE202106208-1

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1.0 Test Summary

Based on the results of our investigation, we have concluded the product tested **comply** with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested.

	Test Description	Requirement – Test	Result	Comments
4.1	FCC Part 15.207/RSS-Gen	Conducted Emissions	N/A	
4.2	FCC Parts 15.209/15.247(d)/ RSS-Gen	Radiated Emissions in restricted band	pass	See note below
Note:		Class II Permissive change verification		

1.1 Measurement Uncertainty

The measured value related to the corresponding limit will be used to decide whether the equipment meets the requirements. The measurement uncertainty figures were calculated and correspond to a coverage factor of k=2, providing a confidence level of respectively 95.45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian).

Radiated emissions 30MHz to 1000MHz	4.9 dB
Radiated emissions 1GHz to 18GHz	4.6 dB
Conducted emissions 150KHz to 30MHz (AMN)	2.7 dB
Conducted emissions 150KHz to 30MHz (AAN)	1.92 dB



2.0 Equipment Description

2.1	Equipment Under Test			
Description:	3M™ PELTOR™ headsets are intended to provide workers with protection against hazardous noise levels while allowing the user to communicate with built-in Bluetooth technology and hear the surroundings via the ambient microphones.			
Model(s):	WS Alert X			
Serial number:	N/A			
3M Division:	Personal Safety			
Modifications and Special Measures:	none			
Frequency Range:	2402.0-2480.0 MHz			
Channel No.:	39			
Modulation Type:	GFSK			
FCC Classification:	Digital Transmission System (DTS)			
Output Power EIRP:	1.5dBm (1.4mW)			
Antenna Type and Antenna Assembly Gain:	<input type="checkbox"/> External	<input checked="" type="checkbox"/> Integral PCB Antenna	<input type="checkbox"/> Dedicated	
	<input checked="" type="checkbox"/> 2.7dBi	<input checked="" type="checkbox"/> Declared by the Manufacturer	<input type="checkbox"/> Measured	
Test Deviations or Exclusions	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No		
Rated Power:	Voltage:	<input type="checkbox"/> 120VAC	<input type="checkbox"/> 230VAC	<input checked="" type="checkbox"/> 3.3VDC
	Phase:	<input type="checkbox"/> 1ph	<input type="checkbox"/> 3ph	<input checked="" type="checkbox"/> Battery
	Frequency:	<input type="checkbox"/> 50Hz	<input type="checkbox"/> 60Hz	
	Current:			
Test Dates:	09/29/2021			
Received Date:	09/10/2021			
Received Conditions:	<input type="checkbox"/> Poor	<input checked="" type="checkbox"/> Good		
	<input type="checkbox"/> Prototype	<input checked="" type="checkbox"/> Production		

**3.0 EUT Configuration****3.1 System Configuration**

No.	Product Type	Manufacturer	Model	Comments
1	Headset	3M	WS Alert X	
2	Batteries		2 x 1.5 V AA Alkaline	

3.2 Input/Output Ports of EUT

No.	Description	Type	Comments
1			

3.3 Cables

No.	Description	Type	Length	Shielding	Comments

3.4 Measurement Arrangements of EUT

	Intended Operational Arrangement(s)	Comments
<input checked="" type="checkbox"/>	Table-top only	
<input type="checkbox"/>	Floor-standing only	
<input type="checkbox"/>	Floor-standing or table-top	
<input type="checkbox"/>	Other	

3.5 Primary function(s) of EUT

No.	List of Essential Functions
1	BT Audio Communications
2	

3.6 Exercising of EUT and Interfaces

No.	Mode of Operation
1	Continuous Bluetooth transmissions at normal "paired" mode with R&S CMW270 Wireless Connectivity Tester
2	



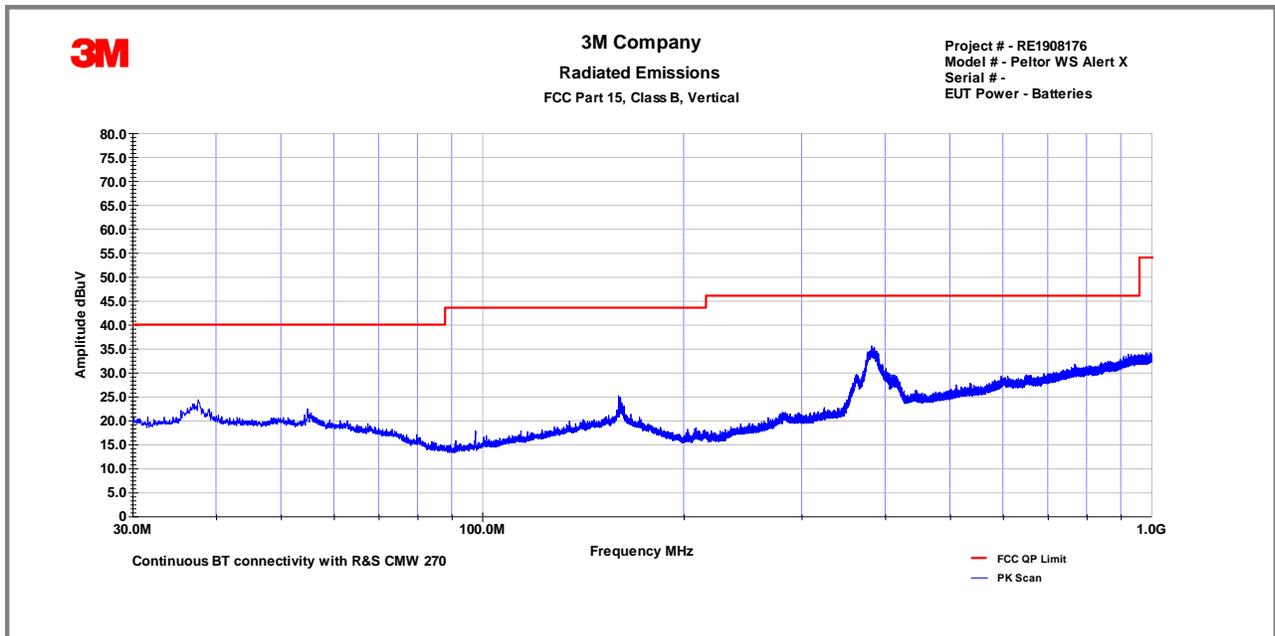
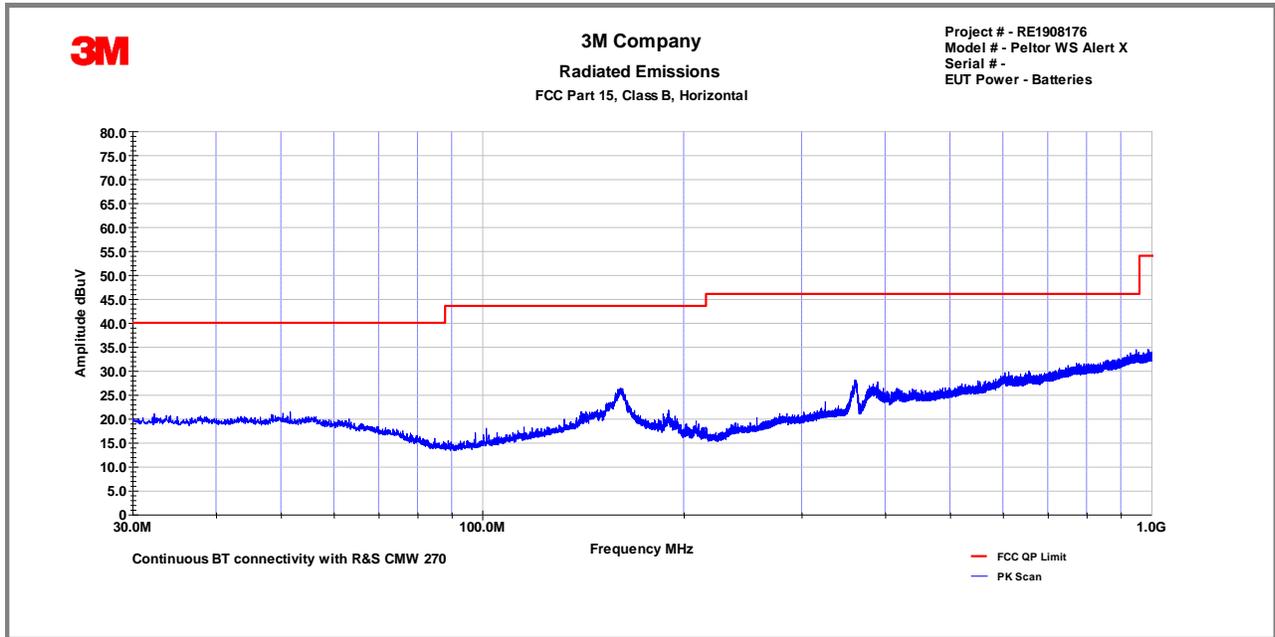
4.0 Test Conditions and Results

4.1	Conducted Emissions Data			
Method:	The AMN was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane. This distance was between the closest points of the AMN and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the AMN. All power was connected to the system through Artificial Mains Network (AMN). Conducted voltage measurements on mains lines were made at the output of the AMN.			
	All power was connected to the system through Artificial Mains Network (AMN). All tested telecommunications lines were connected to an Asymmetric Artificial Network (AAN) and conducted voltage measurements on telecommunications lines were made at the output of the ISN. Where an AAN was not appropriate or available measurements were made using a Capacitive Voltage Probe.			
Test Verification: <input type="checkbox"/>	Laboratory Ambient Temperature:			
	Relative Humidity:			
	Atmospheric Pressure:			
Reference Standard(s):	<input type="checkbox"/> FCC 15.207/RSS Gen <input type="checkbox"/> ANSI C63.4:2014 <input type="checkbox"/> ANSI C63.10:2013		Measurement Point <input checked="" type="checkbox"/> Mains <input type="checkbox"/> Telecommunication ports <input type="checkbox"/>	
	Nominal Voltage: <input type="checkbox"/> 120VAC <input type="checkbox"/> 230VAC <input type="checkbox"/>			
Test Personnel:		Date:		
Limits – Part 15.107, Class A – AC Mains				
Frequency (MHz)	Limit dB (µV)			
	Quasi-Peak	Average	Result	Comments
0.15 to 0.50	79	66	N/A	AMN
0.50 to 30	73	60	N/A	AMN
Limits – Part 15.107, Class B and Part 15.207 – AC Mains				
0.15 to 0.50	66 to 56	56 to 46	N/A	Time Domain Scan
0.50 to 5	56	46	N/A	Time Domain Scan
5 to 30	60	50	N/A	Time Domain Scan

Modifications:	
Note:	



4.2	Radiated Emissions in restricted band				
Method:	Measurements were made in a 3-meter semi-anechoic chamber that complies to CISPR 16/ANSI C63.4. EUT was rotated through three orthogonal axes to determine which attitude (orientation) and arrangement produces the highest emission relative to the limit; the attitude and device arrangement that produces the highest emission relative to the limit was used in making final radiated emission measurements. Spurious Radiated emissions measurements were performed with external preamp and a high pass filter. Final measurements were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4 m. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable.				
Test Verification: <input checked="" type="checkbox"/>	Laboratory Ambient Temperature:		23°C		
	Relative Humidity:		18%		
	Atmospheric Pressure:		836.8 mbars		
Reference Standard(s):	<input type="checkbox"/> ANSI C63.4:2014 <input checked="" type="checkbox"/> ANSI C63.10 2013 <input checked="" type="checkbox"/> KDB 996369 D04 <input type="checkbox"/>		Measurement Distance		
			<input checked="" type="checkbox"/> 3 Meters SAC <input type="checkbox"/>		
Frequency Range:	<input type="checkbox"/> 30 MHz to 1 GHz <input checked="" type="checkbox"/> 1 GHz to 26 GHz				
Nominal Voltage:	<input type="checkbox"/> 120VAC <input checked="" type="checkbox"/> 3VDC				
Test Personnel:	Keith Schwartz <i>KS</i>		Date: 09/29/2021		
Limits –15.209 and RSS Gen					
Frequency (MHz)	Limit dB (µV/m)			Distance	Results
	Quasi-Peak	Average	Peak		
0.009-0.490		2400/F(KHz)		300	N/A
0.490-1.705	24000/F(KHz)			30	N/A
1.705-30	30			30	N/A
30 to 88	40			3	pass
88 to 216	43.5			3	pass
216 to 960	46			3	pass
Above 960		54	74	3	pass
Modifications:					
Note:	<p>For emission in the restricted bands, the limit of 15.209 was used.</p> <p>The lower limit applies at the transition frequency. An inverse proportionality factor of 20 dB per decade has been used to normalize the measured data to the specified distance for determining compliance.</p> <p>No radiated spurious emissions were detected above 18GHz.</p>				

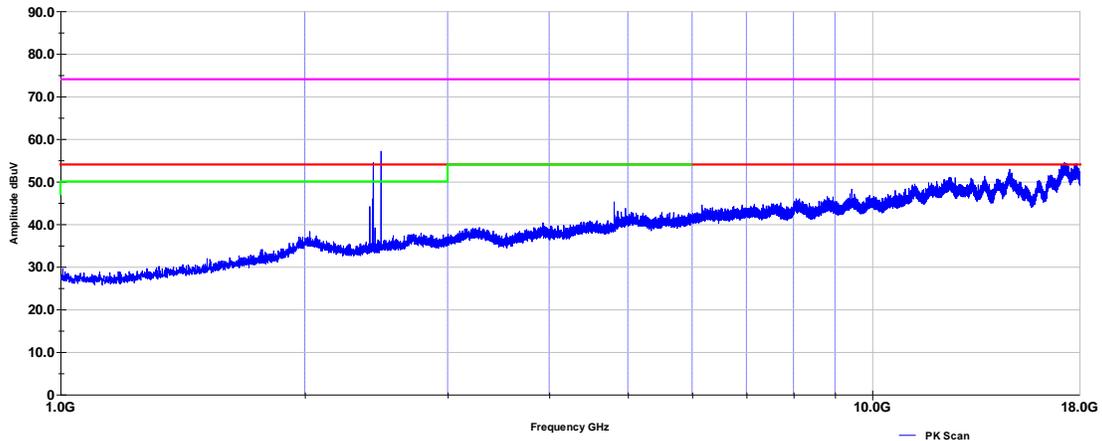


Frequency (MHz)	Pol.	QP Reading dBuV/m	Total CF dB	Net at 3 m dBuV/m	FCC Limit (dBuV/m)	Margin dB
37.94	H	5	17.1	22.1	40	-17.9
53.78	H	4	18.4	22.4	40	-17.6
161	H	4.6	18.4	23	43.5	-20.5
381.11	V	8.2	21	29.2	46	-16.8
599.87	H	5	25.7	30.7	46	-15.3
Notes:	Net Reading (dBuV) = Reading (dBuV)+Total CF(dB)					



3M Company
Radiated Emissions Prescan
FCC Part 15, 1GHz-18GHz, Vertical

Project # - RE1908176
Model # - Peltor WS Alert X
Serial # -
EUT Power - Batteries



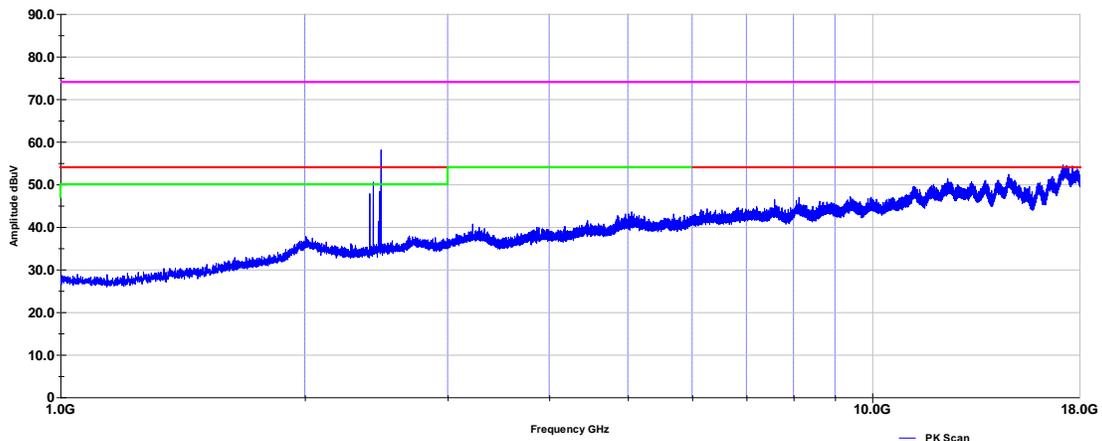
Continuous BT connectivity with R&S CMW 270

- PK Scan
- FCC PK Limit
- FCC AVG Limit
- CISPR AVG Limit



3M Company
Radiated Emissions Prescan
FCC Part 15, 1GHz-18GHz, Horizontal

Project # - RE1908176
Model # - Peltor WS Alert X
Serial # -
EUT Power - Batteries



Continuous BT connectivity with R&S CMW 270

- PK Scan
- FCC PK Limit
- FCC AVG Limit
- CISPR AVG Limit

5.0		Test Equipment			
Test Equipment Used					
Description	Manufacturer	Model	Identifier	Last Cal. Date	Check
Biconilog Antenna	Schwarzbeck	VULB 9168	9168-1070	10/20/2020	<input checked="" type="checkbox"/>
Horn Antenna	A.H. Systems	SAS 571	1010	10/20/2020	<input checked="" type="checkbox"/>
Loop Antenna	A.H. Systems	SAS-565H	1213E	10/20/2020	<input type="checkbox"/>
Loop Antenna	EMCO	ALR25M	1011	10/20/2020	<input type="checkbox"/>
Power Sensor	ETS-Lindgren	7002-004	1136	10/20/2020	<input type="checkbox"/>
Signal Analyzer	Agilent	N9000A	MY53031040	10/20/2020	<input type="checkbox"/>
EMI Receiver	Agilent	E4448A	1530975	10/20/2020	<input type="checkbox"/>
EMI Receiver	Rohde & Schwarz	ESW26	101412	10/20/2020	<input checked="" type="checkbox"/>
LISN	TESEQ	NNB51	1130	10/20/2020	<input type="checkbox"/>
EMF Meter	NARDA	ELT400	1139	10/20/2020	<input type="checkbox"/>
EMC Software	ETS-Lindgren	TILE 7		N/A	<input checked="" type="checkbox"/>
Equipment Calibration Interval:		<input checked="" type="checkbox"/> 12 months		<input type="checkbox"/> 24 months	

6.0		Report revision history		
Revision Level	Date	Report Number	Notes	
0	10/14/2021	HRE202106208-1	Original Issue	