

Philips Oral Healthcare, Inc.

TEST REPORT FOR

Rechargeable Power Toothbrush with BLE and NFC 13.56 Model: HX99

Tested To The Following Standards:

FCC Part 15 Subpart C Section(s)

15.207 & 15.225
(13.110-14.010 MHz)

Report No.: 99020-13

Date of issue: December 16, 2016



This test report bears the accreditation symbol indicating that the testing performed herein meets the test and reporting requirements of ISO/IEC 17025 under the applicable scope of EMC testing for CKC Laboratories, Inc.

We strive to create long-term, trust based relationships by providing sound, adaptive, customer first testing services. We embrace each of our customers' unique EMC challenges, not as an interruption to set processes, but rather as the reason we are in business.

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ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

Philips Oral Healthcare, Inc.
22100 Bothell-Everett Hwy
Bothell, WA 98021

REPORT PREPARED BY:

Terri Rayle
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Mariposa, CA 95338

REPRESENTATIVE: Timothy Rand
Customer Reference Number: US13-2100640728

Project Number: 99020

DATE OF EQUIPMENT RECEIPT:

October 27, 2016

DATE(S) OF TESTING:

October 27 - November 17, 2016

Report Authorization

The test data contained in this report documents the observed testing parameters pertaining to and are relevant for only the sample equipment tested in the agreed upon operational mode(s) and configuration(s) as identified herein. Compliance assessment remains the client's responsibility. This report may not be used to claim product endorsement by A2LA or any government agencies. This test report has been authorized for release under quality control from CKC Laboratories, Inc.

A handwritten signature in black ink that reads "Steve Behm". The signature is written in a cursive style and is positioned above a horizontal line.

Steve Behm
Director of Quality Assurance & Engineering Services
CKC Laboratories, Inc.

Test Facility Information



Our laboratories are configured to effectively test a wide variety of product types. CKC utilizes first class test equipment, anechoic chambers, data acquisition and information services to create accurate, repeatable and affordable test results.

TEST LOCATION(S):
CKC Laboratories, Inc.
22116 23rd Drive S.E., Suite A
Bothell, WA 98021-4413

Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.03.02

Site Registration & Accreditation Information

Location	CB #	TAIWAN	CANADA	FCC	JAPAN
Bothell	US0081	SL2-IN-E-1145R	3082C-1	US1022	A-0148

SUMMARY OF RESULTS

Standard / Specification: FCC Part 15 Subpart C - 15.225

Test Procedure	Description	Modifications	Results
15.215(c)	Occupied Bandwidth	NA	Pass
15.225(a)-(c)	Field Strength of Fundamental	NA	Pass
15.225(e)	Frequency Stability	NA	Pass
15.225(d)	Field Strength of Spurious Emissions	NA	Pass
15.207	AC Conducted Emissions	NA	Pass

NA = Not Applicable

Modifications During Testing

This list is a summary of the modifications made to the equipment during testing.

Summary of Conditions
No modifications were made during testing.

Modifications listed above must be incorporated into all production units.

Conditions During Testing

This list is a summary of the conditions noted to the equipment during testing.

Summary of Conditions
The actual testing date is stated in each section, the date/time on the plot data screen captured is incorrect.

EQUIPMENT UNDER TEST (EUT)

During testing numerous configurations may have been utilized. The configurations listed below support compliance to the standard(s) listed in the Summary of Results section.

Configuration 1

Equipment Tested:

Device	Manufacturer	Model #	S/N
Rechargeable Power Toothbrush with BLE and NFC 13.56	Philips Oral Healthcare, Inc.	HX99	NA

Support Equipment:

Device	Manufacturer	Model #	S/N
None			

Configuration 2

Equipment Tested:

Device	Manufacturer	Model #	S/N
Rechargeable Power Toothbrush with BLE and NFC 13.56	Philips Oral Healthcare, Inc.	HX99	NA

Support Equipment:

Device	Manufacturer	Model #	S/N
Inductive Charger	Philips Oral Healthcare, Inc.	CBA2001	NA

General Product Information:

Product Information	Manufacturer-Provided Details
Equipment Type:	Stand-Alone Equipment
Modulation Type(s):	ASK
Maximum Duty Cycle:	100%
Antenna Type(s) and Gain:	Loop -92.8dBi estimated
Antenna Connection Type:	Integral
Nominal Input Voltage:	3.7V LI-ION Battery
Firmware / Software used for Test:	Firmware UUID:00002A26-0000-1000-8000-00805F9B64FB

FCC Part 15 Subpart C

15.215(c) Occupied Bandwidth (20dB BW)

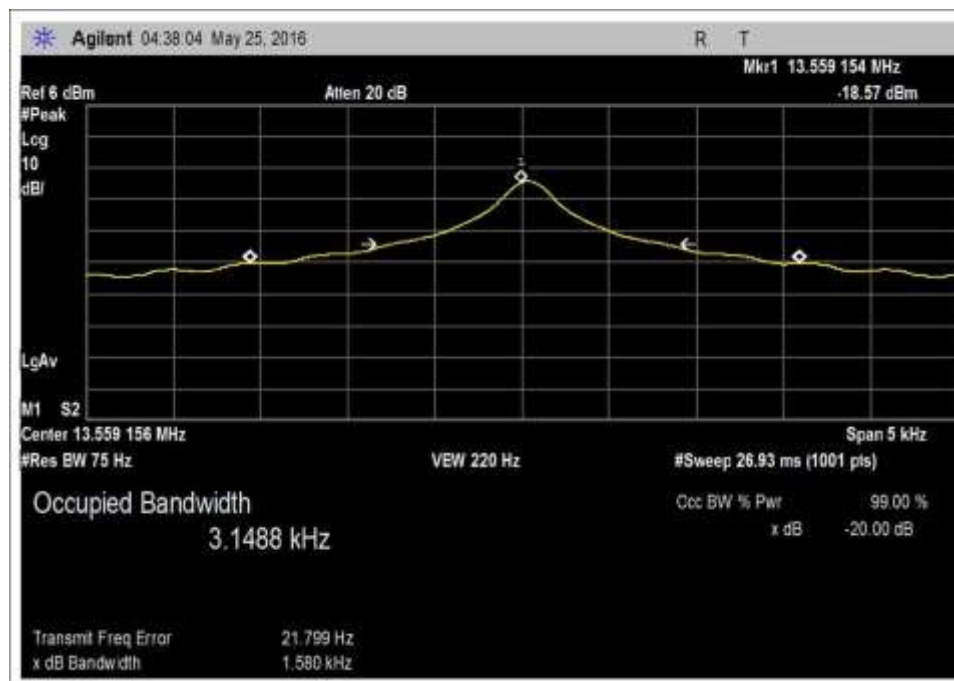
Test Setup/Conditions			
Test Location:	Bothell Lab C3	Test Engineer:	S. Pittsford
Test Method:	ANSI C63.10 (2013)	Test Date(s):	11/16/2016
Configuration:	1		
Test Setup:	<p>The EUT is placed on the Styrofoam table</p> <p>Frequency: 13.56MHz Modulation: ASK Protocol: NFC</p> <p>BLE is Disabled.</p> <p>EUT is transmitting continuously at 13.56MHz. 15.31e EUT has a fresh battery installed.</p>		

Environmental Conditions			
Temperature (°C)	22	Relative Humidity (%):	44

Test Equipment					
Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
02673	Spectrum Analyzer	Agilent	E4446A	10/12/2015	10/12/2017
P05305	Cable	Andrews	ETSI-50T	2/15/2016	2/15/2018
00052	Loop Antenna	EMCO	6502	4/8/2016	4/8/2018
P06540	Cable	Andrews	Heliac	10/29/2015	10/29/2017

Test Data Summary					
Frequency (MHz)	Antenna Port	Modulation	Measured (kHz)	Limit (kHz)	Results
13.56	integral	ASK	1.58	None	NA

Plot



Test Setup Photos



15.225(a)-(c) Field Strength of Fundamental

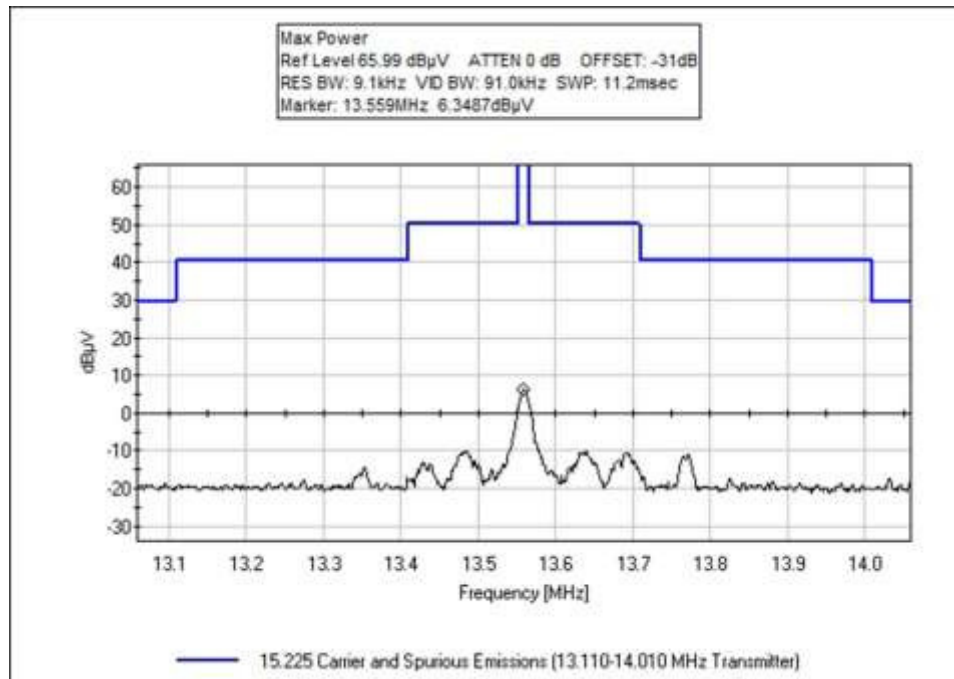
Test Data Summary - Voltage Variations

This equipment is battery powered and manufacturer declares the equipment cannot operate while charging. Power output tests were performed using a fresh battery.

Test Data Summary – Radiated Field Strength Measurement

Frequency (MHz)	Modulation	Ant. Type	Measured (dBuV/m @ 30m)	Limit (dBuV/m @ 30m)	Results
13.56	ASK	integral	6.3	≤84	Pass

Plot



Test Setup / Conditions / Data

Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA. 98021 • 1-800-500-4EMC
 Customer: **Philips Oral Healthcare, Inc.**
 Specification: **15.225 Carrier and Spurious Emissions (13.110-14.010 MHz Transmitter)**
 Work Order #: **99020** Date: 11/16/2016
 Test Type: **Maximized Emissions** Time: 11:53:29
 Tested By: Steven Pittsford Sequence#: 5
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

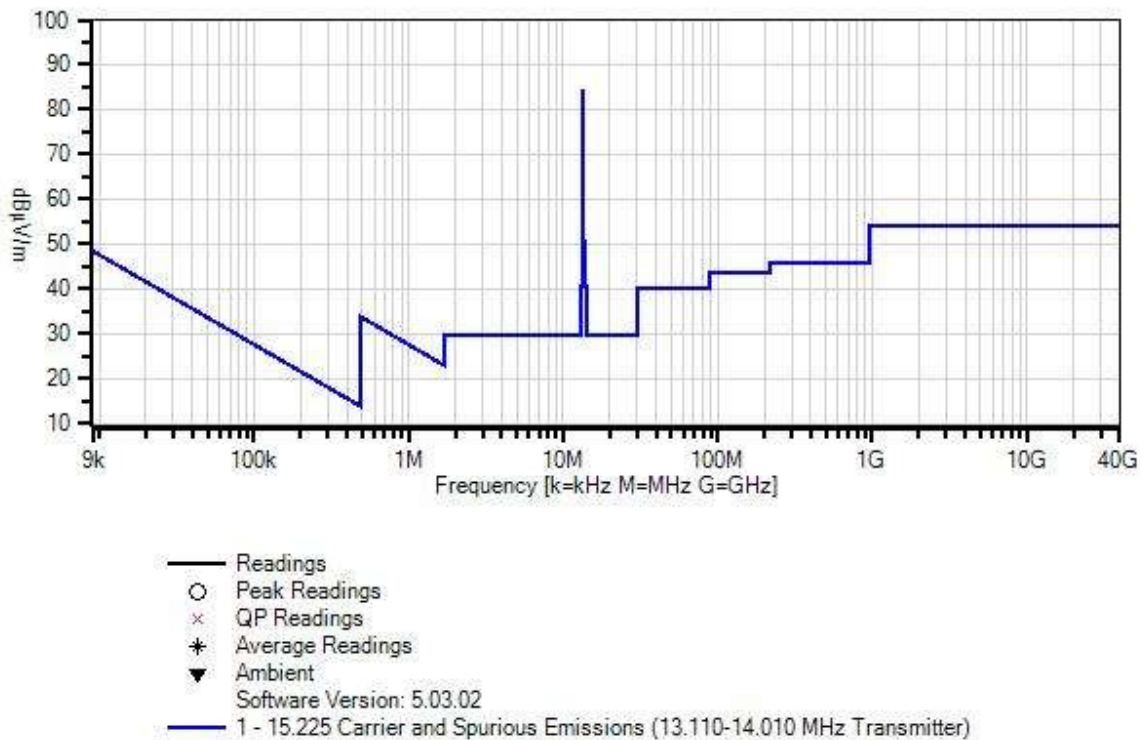
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

<p>The EUT is placed on the Styrofoam table</p> <p>Frequency: 13.56MHz Modulation: ASK Protocol: NFC</p> <p>BLE is Disabled.</p> <p>X, Y & Z axis, parallel, perpendicular polarities investigated only worst case reported.</p> <p>EUT is transmitting continuously at 13.56MHz. EUT has a fresh battery installed.</p> <p>Temperature: 22°C Relative Humidity: 44% Test Method: ANSI C63.10 (2013)</p>

Philips Oral Healthcare, Inc. WD#: 99020 Sequence#: 5 Date: 11/16/2016
15.225 Carrier and Spurious Emissions (13.110-14.010 MHz Transmitter) Test Distance: 3 Meters H+V



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP06540	Cable	Helix	10/29/2015	10/29/2017
T2	ANP05305	Cable	ETSI-50T	2/15/2016	2/15/2018
T3	AN00052	Loop Antenna	6502	4/8/2016	4/8/2018
	AN02673	Spectrum Analyzer	E4446A	10/12/2015	10/12/2017

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	T3 dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	13.559M	37.4	+0.0	+0.2	+8.7	-40.0	6.3	84.0	-77.7	Paral
X-Axis										

Test Setup Photos



Test Setup



X Axis



Y Axis



Z Axis

15.225(e) Frequency Stability

Test Setup/Conditions			
Test Location:	Bothell Lab C3	Test Engineer:	S. Pittsford
Test Method:	ANSI C63.10 (2013)	Test Date(s):	11/17/2016
Configuration:	1		
Test Setup:	<p>The EUT was placed in the temperature chamber in a test fixture where measurements were made.</p> <p>Frequency: 13.56MHz Modulation: ASK Protocol: NFC</p> <p>BLE is Disabled.</p> <p>EUT is transmitting continuously at 13.56MHz. 15.31e Fresh Battery installed.</p>		

Environmental Conditions			
Temperature (°C)	23	Relative Humidity (%):	35

Test Equipment					
Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
02673	Spectrum Analyzer	Agilent	E4446A	10/12/2015	10/12/2017
02757	Temperature Chamber	Bemco	F100/350-8	2/5/2015	2/5/2017
03029	Thermometer, Digital Infrared	Fluke	566	1/29/2015	1/29/2017

Test Data Summary					
Temperature (°C)	Voltage	Frequency (MHz)	Deviation (%)	Limit (%)	Results
-20	V _{Nominal}	13.55915	0.00627	±0.01	Pass
-10	V _{Nominal}	13.55922	0.00575	±0.01	
0	V _{Nominal}	13.55924	0.00560	±0.01	
10	V _{Nominal}	13.55924	0.00560	±0.01	
20	V _{Nominal}	13.55920	0.00590	±0.01	
30	V _{Nominal}	13.55918	0.00605	±0.01	
40	V _{Nominal}	13.55915	0.00627	±0.01	
50	V _{Nominal}	13.55913	0.00642	±0.01	
Nominal Frequency:		13.560000			

Parameter Definitions:

This equipment is battery powered and manufacturer declares the equipment cannot operate while charging. Power output tests were performed using a fresh battery.

Test Setup Photos



15.225(d) Radiated Emissions & Band Edge

Test Setup / Conditions / Data

Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA. 98021 • 1-800-500-4EMC
 Customer: **Philips Oral Healthcare, Inc.**
 Specification: **15.225 Carrier and Spurious Emissions (13.110-14.010 MHz Transmitter)**
 Work Order #: **99020** Date: 11/16/2016
 Test Type: **Maximized Emissions** Time: 14:20:22
 Tested By: Michael Atkinson Sequence#: 6
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

The EUT is placed on the Styrofoam table

 Frequency Investigated: 9kHz-1GHz

 Frequency: 13.56MHz
 Modulation: ASK
 Protocol: NFC

 BLE is Disabled.

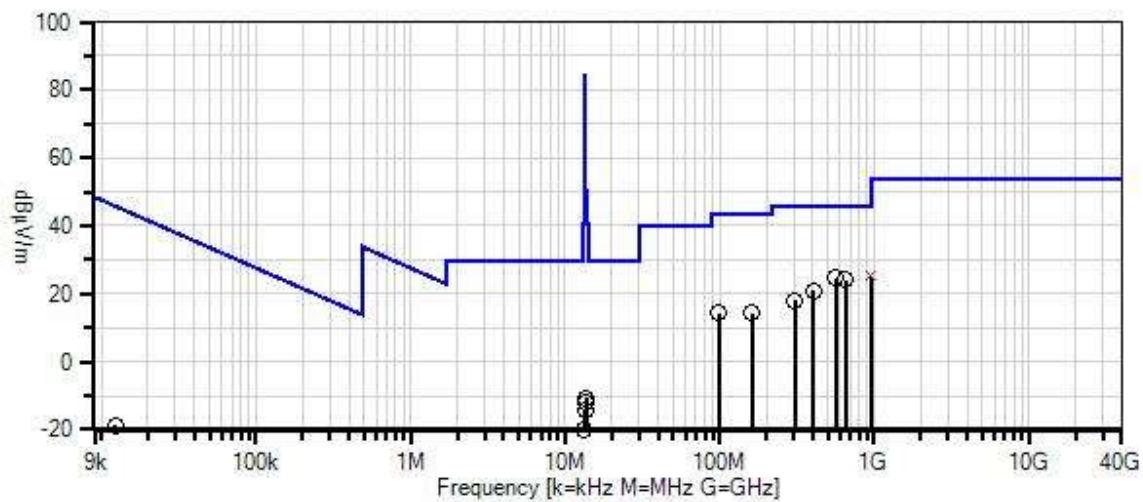
 X, Y & Z axis, parallel, perpendicular polarities investigated only worst case reported.

 EUT is transmitting continuously at 13.56MHz.
 15.31e EUT has a fresh battery installed.

 Temperature: 22°C
 Relative Humidity: 44%
 Test Method: ANSI C63.10 (2013)

No emissions within 20dB of the limit observed above 14MHz. Noise floor figures reported.

Philips Oral Healthcare, Inc. WO#: 99020 Sequence#: 6 Date: 11/16/2016
15.225 Carrier and Spurious Emissions (13.110-14.010 MHz Transmitter) Test Distance: 3 Meters Vert



- Readings
- Peak Readings
- × QP Readings
- * Average Readings
- ▼ Ambient
- Software Version: 5.03.02
- 1 - 15.225 Carrier and Spurious Emissions (13.110-14.010 MHz Transmitter)

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP06540	Cable	Helix	10/29/2015	10/29/2017
T2	ANP05963	Cable	RG-214	2/15/2016	2/15/2018
T3	ANP05360	Cable	RG214	12/1/2014	12/1/2016
T4	AN02307	Preamp	8447D	2/15/2016	2/15/2018
T5	AN01991	Biconilog Antenna	CBL6111C	3/11/2016	3/11/2018
T6	ANP05305	Cable	ETSI-50T	2/15/2016	2/15/2018
T7	AN00052	Loop Antenna	6502	4/8/2016	4/8/2018
T8	AN02673	Spectrum Analyzer	E4446A	10/12/2015	10/12/2017

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2 T6	T3 T7	T4 T8	Dist	Corr	Spec	Margin	Polar
	MHz	dBμV	dB	dB	dB	dB	Table	dBμV/m	dBμV/m	dB	Ant
1	954.490M	22.6	+0.0	+2.5	+2.1	-27.2	+0.0	25.3	46.0	-20.7	Vert
	QP		+25.3	+0.0	+0.0	+0.0					
^	954.490M	27.1	+0.0	+2.5	+2.1	-27.2	+0.0	29.8	46.0	-16.2	Vert
			+25.3	+0.0	+0.0	+0.0					
3	563.700M	29.9	+0.0	+2.0	+1.5	-28.2	+0.0	24.5	46.0	-21.5	Vert
			+19.3	+0.0	+0.0	+0.0					
4	650.700M	27.8	+0.0	+2.1	+1.7	-28.1	+0.0	24.2	46.0	-21.8	Vert
			+20.7	+0.0	+0.0	+0.0					
5	402.600M	29.4	+0.0	+1.8	+1.2	-27.6	+0.0	21.0	46.0	-25.0	Vert
			+16.2	+0.0	+0.0	+0.0					
6	306.100M	28.9	+0.0	+1.6	+1.0	-27.1	+0.0	18.0	46.0	-28.0	Vert
			+13.6	+0.0	+0.0	+0.0					
7	161.000M	29.1	+0.0	+1.4	+0.8	-27.4	+0.0	14.4	43.5	-29.1	Vert
			+10.5	+0.0	+0.0	+0.0					
8	99.200M	30.3	+0.0	+1.1	+0.6	-27.7	+0.0	14.3	43.5	-29.2	Vert
			+10.0	+0.0	+0.0	+0.0					
9	150.000k	49.3	+0.0	+0.0	+0.0	+0.0	-80.0	-21.0	24.1	-45.1	Paral
			+0.0	+0.0	+9.7	+0.0					
10	13.110M	11.2	+0.0	+0.0	+0.0	+0.0	-40.0	-19.8	29.5	-49.3	H+V
			+0.0	+0.2	+8.8	+0.0					
11	14.010M	10.0	+0.0	+0.0	+0.0	+0.0	-40.0	-21.1	29.5	-50.6	H+V
			+0.0	+0.2	+8.7	+0.0					
12	13.774M	19.2	+0.0	+0.0	+0.0	+0.0	-40.0	-11.9	40.5	-52.4	Paral
			+0.0	+0.2	+8.7	+0.0			X-Axis		
13	13.637M	20.4	+0.0	+0.0	+0.0	+0.0	-40.0	-10.7	50.5	-61.2	Paral
			+0.0	+0.2	+8.7	+0.0			X-Axis		
14	12.243k	45.1	+0.0	+0.0	+0.0	+0.0	-80.0	-18.6	45.8	-64.4	Paral
			+0.0	+0.0	+16.3	+0.0					
15	13.424M	16.9	+0.0	+0.0	+0.0	+0.0	-40.0	-14.1	50.5	-64.6	Paral
			+0.0	+0.2	+8.8	+0.0			X-Axis		

Band Edge

Band Edge Summary

Frequency (MHz)	Modulation	Ant. Type	Field Strength (dBuV/m @30m)	Limit (dBuV/m @30m)	Results
13.110	ASK	integral	-19.8	≤29.5	Pass
14.010	ASK	integral	-21.1	≤29.5	Pass

Test Setup / Conditions / Data

Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA. 98021 • 1-800-500-4EMC
 Customer: **Philips Oral Healthcare, Inc.**
 Specification: **15.225 Carrier and Spurious Emissions (13.110-14.010 MHz Transmitter)**
 Work Order #: **99020** Date: 11/16/2016
 Test Type: **Maximized Emissions** Time: 12:02:06
 Tested By: Michael Atkinson Sequence#: 5
 Software: EMITest 5.03.02

Equipment Tested:

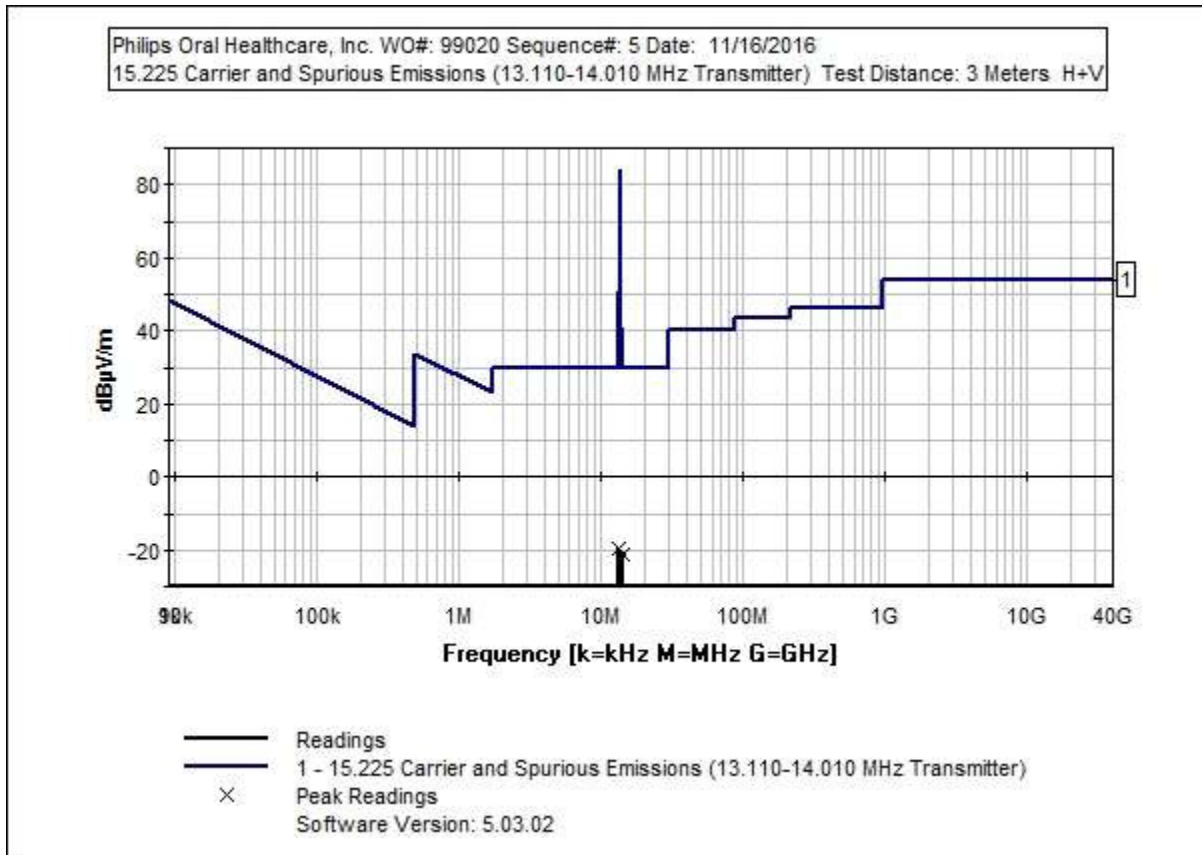
Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

<p>The EUT is placed on the Styrofoam table</p> <p>Frequency Investigated: 13.56MHz Band Edge</p> <p>Frequency: 13.56MHz</p> <p>Modulation: ASK</p> <p>Protocol: NFC</p> <p>BLE is Disabled.</p> <p>X, Y & Z axis, parallel, perpendicular polarities investigated only worst case reported.</p> <p>EUT is transmitting continuously at 13.56MHz.</p> <p>15.31e EUT has a fresh battery installed.</p>
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Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP06540	Cable	Helix	10/29/2015	10/29/2017
	ANP05963	Cable	RG-214	2/15/2016	2/15/2018
	ANP05360	Cable	RG214	12/1/2014	12/1/2016
	AN02307	Preamp	8447D	2/15/2016	2/15/2018
	AN01991	Biconilog Antenna	CBL6111C	3/11/2016	3/11/2018
T2	ANP05305	Cable	ETSI-50T	2/15/2016	2/15/2018
T3	AN00052	Loop Antenna	6502	4/8/2016	4/8/2018
	AN02673	Spectrum Analyzer	E4446A	10/12/2015	10/12/2017

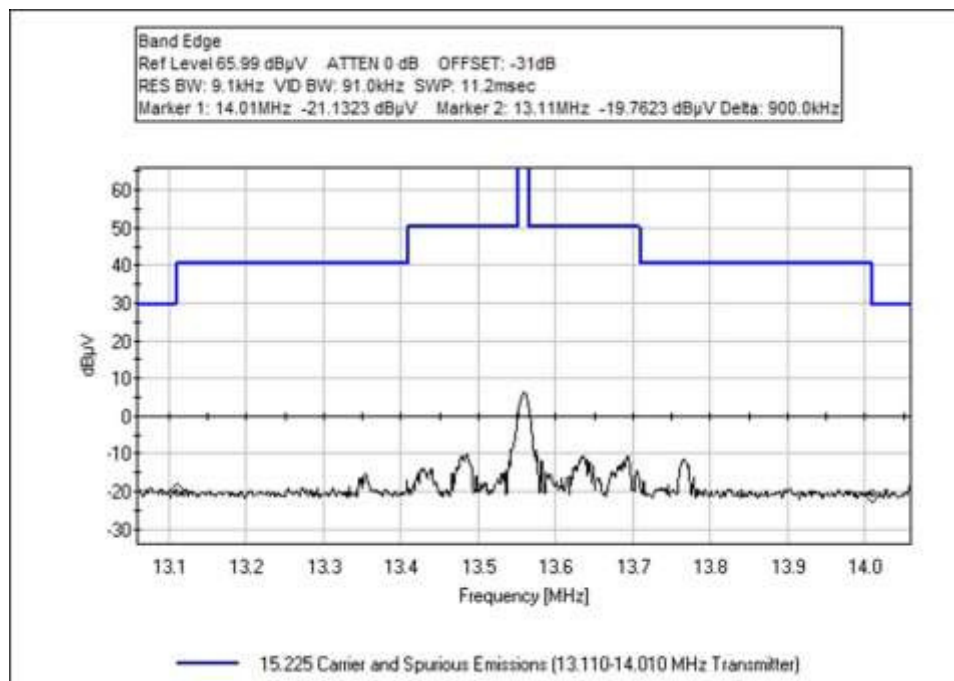
Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	Dist dB	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	13.110M	11.2	+0.0	+0.2	+8.8	-40.0	-19.8	29.5	-49.3	Paral
								X-Axis		
2	14.010M	10.0	+0.0	+0.2	+8.7	-40.0	-21.1	29.5	-50.6	H+V

Band Edge Plot



Test Setup Photos



Test Setup



X Axis



Y Axis



Z Axis

15.207 AC Conducted Emissions

Test Setup / Conditions / Data

Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA. 98021 • 1-800-500-4EMC
 Customer: **Philips Oral Healthcare, Inc.**
 Specification: **15.207 AC Mains - Average**
 Work Order #: **99020** Date: 10/27/2016
 Test Type: **Conducted Emissions** Time: 15:36:54
 Tested By: Michael Atkinson Sequence#: 1
 Software: EMITest 5.03.02 115V 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

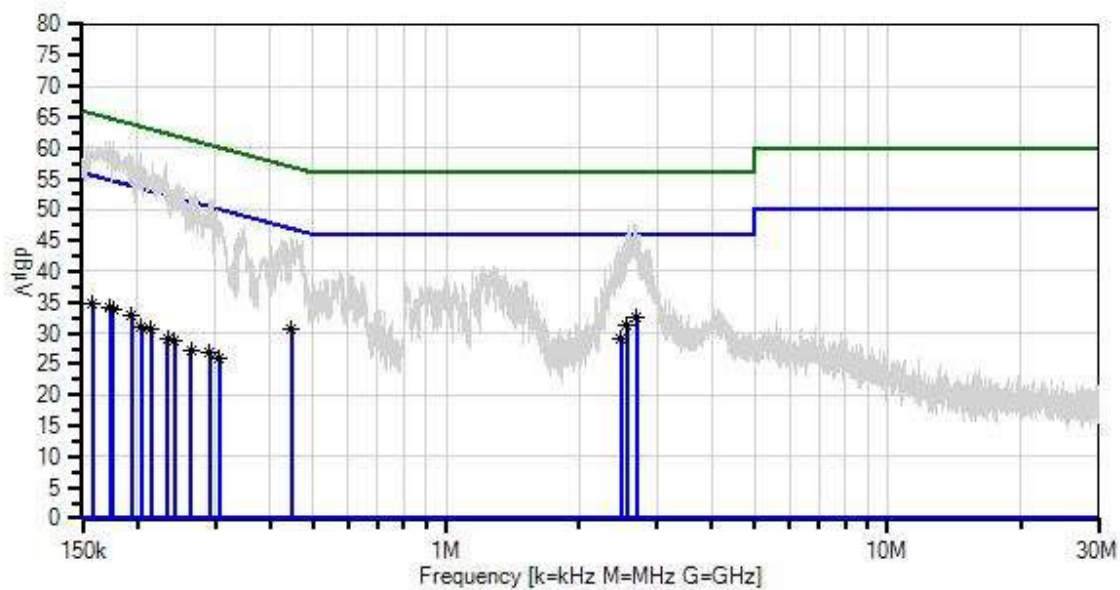
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Frequency Range: 0.15-30MHz Frequency tested: 13.56MHz Firmware power setting: Max Power Firmware UUID:00002A26-0000-1000-8000-00805F9B64FB Protocol /MCS/Modulation: ASK Antenna type: Integral Loop Antenna Gain: -92.8dBi Estimated Test Mode: EUT is on charging cradle in normal discovery mode. Test Setup: EUT is charging on charging cradle, EUT is transmitting through internal antenna. Modifications Added: None Temperature: 24°C Relative Humidity: 40% Test Method: ANSI C63.10 (2013)
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Philips Oral Healthcare, Inc. WD#: 99020 Sequence#: 1 Date: 10/27/2016
15.207 AC Mains - Average Test Lead: 115V 60Hz Line



— Sweep Data
x QP Readings
Software Version: 5.03.02
— Readings
* Average Readings
— 1 - 15.207 AC Mains - Average
○ Peak Readings
▼ Ambient
— 2 - 15.207 AC Mains - Quasi-peak

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02871	Spectrum Analyzer	E4440A	8/25/2015	8/25/2017
T1	AN02611	High Pass Filter	HE9615-150K-50-720B	2/18/2016	2/18/2018
T2	ANP06540	Cable	Heliac	10/29/2015	10/29/2017
T3	ANP05305	Cable	ETSI-50T	2/15/2016	2/15/2018
T4	ANP06219	Attenuator	768-10	4/12/2016	4/12/2018
T5	AN01492	50uH LISN-Line	3816/2NM	8/5/2015	8/5/2017
	AN01492	50uH LISN-Neutral	3816/2NM	8/5/2015	8/5/2017

Measurement Data:

Reading listed by margin.

Test Lead: Line

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dB μ V	dB	dB	dB	dB	Table	dB μ V	dB μ V	dB	Ant
1	2.696M	23.0	+0.1	+0.0	+0.1	+9.1	+0.0	32.7	46.0	-13.3	Line
Ave			+0.4								
^	2.696M	37.8	+0.1	+0.0	+0.1	+9.1	+0.0	47.5	46.0	+1.5	Line
			+0.4								
3	2.564M	21.6	+0.1	+0.0	+0.1	+9.1	+0.0	31.3	46.0	-14.7	Line
Ave			+0.4								
^	2.564M	38.2	+0.1	+0.0	+0.1	+9.1	+0.0	47.9	46.0	+1.9	Line
			+0.4								
5	446.200k	20.7	+0.2	+0.0	+0.0	+9.1	+0.0	30.6	46.9	-16.3	Line
Ave			+0.6								
^	446.200k	36.2	+0.2	+0.0	+0.0	+9.1	+0.0	46.1	46.9	-0.8	Line
			+0.6								
7	2.495M	19.4	+0.1	+0.0	+0.1	+9.1	+0.0	29.1	46.0	-16.9	Line
Ave			+0.4								
^	2.495M	35.3	+0.1	+0.0	+0.1	+9.1	+0.0	45.0	46.0	-1.0	Line
			+0.4								
9	173.684k	23.1	+0.4	+0.0	+0.0	+9.1	+0.0	34.2	54.8	-20.6	Line
Ave			+1.6								
10	158.020k	23.4	+0.6	+0.0	+0.0	+9.1	+0.0	34.9	55.6	-20.7	Line
Ave			+1.8								
^	158.020k	49.4	+0.6	+0.0	+0.0	+9.1	+0.0	60.9	55.6	+5.3	Line
			+1.8								
12	175.990k	23.0	+0.3	+0.0	+0.0	+9.1	+0.0	34.0	54.7	-20.7	Line
Ave			+1.6								
^	175.989k	50.2	+0.3	+0.0	+0.0	+9.1	+0.0	61.2	54.7	+6.5	Line
			+1.6								
^	173.684k	50.0	+0.4	+0.0	+0.0	+9.1	+0.0	61.1	54.8	+6.3	Line
			+1.6								
15	194.100k	22.4	+0.2	+0.0	+0.0	+9.1	+0.0	33.0	53.9	-20.9	Line
Ave			+1.3								
^	194.100k	47.7	+0.2	+0.0	+0.0	+9.1	+0.0	58.3	53.9	+4.4	Line
			+1.3								
17	214.960k	20.3	+0.2	+0.0	+0.0	+9.1	+0.0	30.8	53.0	-22.2	Line
Ave			+1.2								
^	214.960k	46.0	+0.2	+0.0	+0.0	+9.1	+0.0	56.5	53.0	+3.5	Line
			+1.2								

19	203.761k	20.4	+0.2 +1.3	+0.0	+0.0	+9.1	+0.0	31.0	53.5	-22.5	Line
^	203.761k	48.7	+0.2 +1.3	+0.0	+0.0	+9.1	+0.0	59.3	53.5	+5.8	Line
21	234.330k	18.6	+0.2 +1.1	+0.0	+0.0	+9.1	+0.0	29.0	52.3	-23.3	Line
^	234.330k	47.5	+0.2 +1.1	+0.0	+0.0	+9.1	+0.0	57.9	52.3	+5.6	Line
23	243.120k	18.3	+0.2 +1.0	+0.0	+0.0	+9.1	+0.0	28.6	52.0	-23.4	Line
^	243.120k	45.1	+0.2 +1.0	+0.0	+0.0	+9.1	+0.0	55.4	52.0	+3.4	Line
25	291.550k	16.7	+0.1 +0.8	+0.0	+0.0	+9.1	+0.0	26.7	50.5	-23.8	Line
^	291.550k	41.5	+0.1 +0.8	+0.0	+0.0	+9.1	+0.0	51.5	50.5	+1.0	Line
27	264.460k	17.1	+0.2 +0.9	+0.0	+0.0	+9.1	+0.0	27.3	51.3	-24.0	Line
^	264.460k	42.7	+0.2 +0.9	+0.0	+0.0	+9.1	+0.0	52.9	51.3	+1.6	Line
29	306.330k	16.0	+0.1 +0.8	+0.0	+0.0	+9.1	+0.0	26.0	50.1	-24.1	Line
^	306.330k	39.9	+0.1 +0.8	+0.0	+0.0	+9.1	+0.0	49.9	50.1	-0.2	Line



Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA. 98021 • 1-800-500-4EMC
 Customer: **Philips Oral Healthcare, Inc.**
 Specification: **15.207 AC Mains - Average**
 Work Order #: **99020** Date: 10/27/2016
 Test Type: **Conducted Emissions** Time: 15:46:04
 Tested By: Michael Atkinson Sequence#: 2
 Software: EMITest 5.03.02 115V 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

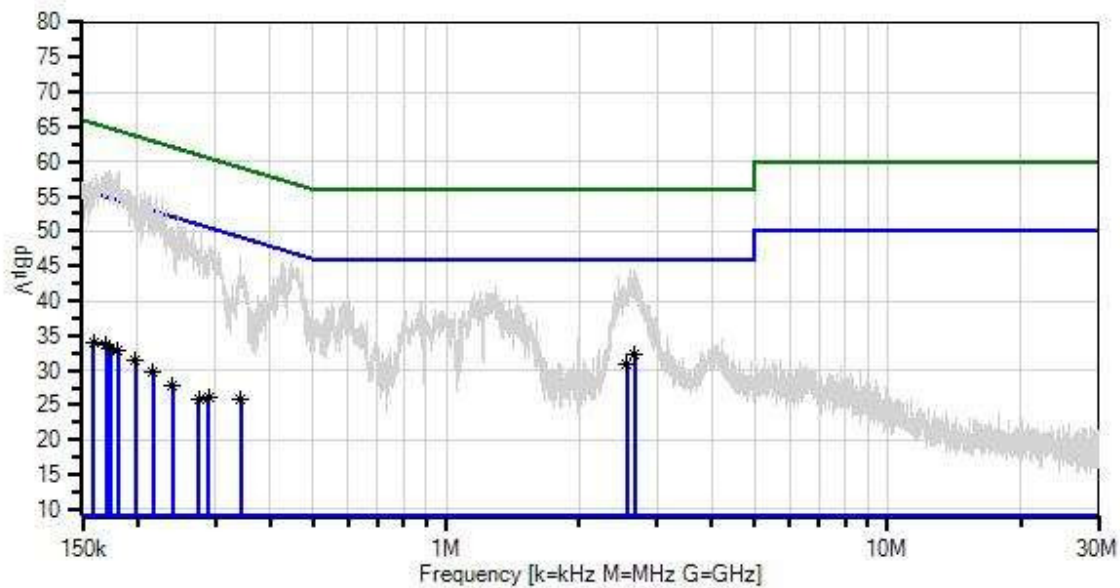
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Frequency Range: 0.15-30MHz Frequency tested: 13.56MHz Firmware power setting: Max Power Firmware UUID:00002A26-0000-1000-8000-00805F9B64FB Protocol /MCS/Modulation: ASK Antenna type: Integral Loop Antenna Gain: -92.8dBi Estimated Test Mode: EUT is on charging cradle in normal discovery mode. Test Setup: EUT is charging on charging cradle, EUT is transmitting through internal antenna. Modifications Added: None Temperature: 24°C Relative Humidity: 40% Test Method: ANSI C63.10 (2013)
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Philips Oral Healthcare, Inc. WD#: 99020 Sequence#: 2 Date: 10/27/2016
15.207 AC Mains - Average Test Lead: 115V 60Hz Return



— Sweep Data
x QP Readings
Software Version: 5.03.02
— Readings
* Average Readings
— 1 - 15.207 AC Mains - Average
○ Peak Readings
▼ Ambient
— 2 - 15.207 AC Mains - Quasi-peak

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02871	Spectrum Analyzer	E4440A	8/25/2015	8/25/2017
T1	AN02611	High Pass Filter	HE9615-150K-50-720B	2/18/2016	2/18/2018
T2	ANP06540	Cable	Heliac	10/29/2015	10/29/2017
T3	ANP05305	Cable	ETSI-50T	2/15/2016	2/15/2018
T4	ANP06219	Attenuator	768-10	4/12/2016	4/12/2018
	AN01492	50uH LISN-Line	3816/2NM	8/5/2015	8/5/2017
T5	AN01492	50uH LISN-Neutral	3816/2NM	8/5/2015	8/5/2017

Measurement Data:

Reading listed by margin.

Test Lead: Return

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dB μ V	dB	dB	dB	dB	Table	dB μ V	dB μ V	dB	Ant
1	2.669M	22.5	+0.1	+0.0	+0.1	+9.1	+0.0	32.2	46.0	-13.8	Retur
	Ave		+0.4								
^	2.669M	34.8	+0.1	+0.0	+0.1	+9.1	+0.0	44.5	46.0	-1.5	Retur
			+0.4								
3	2.567M	21.2	+0.1	+0.0	+0.1	+9.1	+0.0	30.9	46.0	-15.1	Retur
	Ave		+0.4								
^	2.567M	35.1	+0.1	+0.0	+0.1	+9.1	+0.0	44.8	46.0	-1.2	Retur
			+0.4								
5	169.492k	22.5	+0.4	+0.0	+0.0	+9.1	+0.0	33.6	55.0	-21.4	Retur
	Ave		+1.6								
6	181.020k	22.1	+0.3	+0.0	+0.0	+9.1	+0.0	33.0	54.4	-21.4	Retur
	Ave		+1.5								
^	181.020k	47.5	+0.3	+0.0	+0.0	+9.1	+0.0	58.4	54.4	+4.0	Retur
			+1.5								
8	173.580k	22.2	+0.4	+0.0	+0.0	+9.1	+0.0	33.3	54.8	-21.5	Retur
	Ave		+1.6								
^	173.579k	47.7	+0.4	+0.0	+0.0	+9.1	+0.0	58.8	54.8	+4.0	Retur
			+1.6								
^	169.492k	47.3	+0.4	+0.0	+0.0	+9.1	+0.0	58.4	55.0	+3.4	Retur
			+1.6								
11	158.700k	22.3	+0.6	+0.0	+0.0	+9.1	+0.0	33.8	55.5	-21.7	Retur
	Ave		+1.8								
^	158.700k	46.8	+0.6	+0.0	+0.0	+9.1	+0.0	58.3	55.5	+2.8	Retur
			+1.8								
13	198.020k	20.9	+0.2	+0.0	+0.0	+9.1	+0.0	31.5	53.7	-22.2	Retur
	Ave		+1.3								
^	198.020k	46.2	+0.2	+0.0	+0.0	+9.1	+0.0	56.8	53.7	+3.1	Retur
			+1.3								
15	216.410k	19.4	+0.2	+0.0	+0.0	+9.1	+0.0	29.9	53.0	-23.1	Retur
	Ave		+1.2								
^	216.410k	44.3	+0.2	+0.0	+0.0	+9.1	+0.0	54.8	53.0	+1.8	Retur
			+1.2								
17	342.220k	16.1	+0.1	+0.0	+0.0	+9.1	+0.0	26.0	49.1	-23.1	Retur
	Ave		+0.7								
^	342.220k	35.4	+0.1	+0.0	+0.0	+9.1	+0.0	45.3	49.1	-3.8	Retur
			+0.7								

19	240.440k	17.5	+0.2 +1.0	+0.0	+0.0	+9.1	+0.0	27.8	52.1	-24.3	Retur
^	240.440k	44.2	+0.2 +1.0	+0.0	+0.0	+9.1	+0.0	54.5	52.1	+2.4	Retur
21	289.810k	16.1	+0.1 +0.8	+0.0	+0.0	+9.1	+0.0	26.1	50.5	-24.4	Retur
^	289.810k	39.3	+0.1 +0.8	+0.0	+0.0	+9.1	+0.0	49.3	50.5	-1.2	Retur
23	275.010k	15.7	+0.1 +0.9	+0.0	+0.0	+9.1	+0.0	25.8	51.0	-25.2	Retur
^	275.010k	40.5	+0.1 +0.9	+0.0	+0.0	+9.1	+0.0	50.6	51.0	-0.4	Retur

Test Setup Photo



SUPPLEMENTAL INFORMATION

Measurement Uncertainty

Uncertainty Value	Parameter
4.73 dB	Radiated Emissions
3.34 dB	Mains Conducted Emissions
3.30 dB	Disturbance Power

Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of $k=2$. Compliance is deemed to occur provided measurements are below the specified limits.

Emissions Test Details

TESTING PARAMETERS

Unless otherwise indicated, the following configuration parameters are used for equipment setup: The cables were routed consistent with the typical application by varying the configuration of the test sample. Interface cables were connected to the available ports of the test unit. The effect of varying the position of the cables was investigated to find the configuration that produced maximum emissions. Cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions was selected.

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the setup photographs. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables.

The emissions data was taken with a spectrum analyzer or receiver. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in the table below. The corrected data was then compared to the applicable emission limits. Preliminary and final measurements were taken in order to ensure that all emissions from the EUT were found and maximized.

CORRECTION FACTORS

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in $\text{dB}\mu\text{V}/\text{m}$, the spectrum analyzer reading in $\text{dB}\mu\text{V}$ was corrected by using the following formula. This reading was then compared to the applicable specification limit. Individual measurements were compared with the displayed limit value in the margin column. The margin was calculated based on subtracting the limit value from the corrected measurement value; a positive margin represents a measurement exceeding the limit, while a negative margin represents a measurement less than the limit.

SAMPLE CALCULATIONS		
	Meter reading	($\text{dB}\mu\text{V}$)
+	Antenna Factor	(dB/m)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	($\text{dB}\mu\text{V}/\text{m}$)

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed were used to collect the emissions data. A spectrum analyzer or receiver was used for all measurements. Unless otherwise specified, the following table shows the measuring equipment bandwidth settings that were used in designated frequency bands. For testing emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used.

MEASURING EQUIPMENT BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	9 kHz	150 kHz	200 Hz
RADIATED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz
RADIATED EMISSIONS	1000 MHz	>1 GHz	1 MHz

SPECTRUM ANALYZER/RECEIVER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the emissions tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "positive peak" detector mode. Whenever a "quasi-peak" or "average" reading was recorded, the measurement was annotated with a "QP" or an "Ave" on the appropriate rows of the data sheets. In cases where quasi-peak or average limits were employed and data exists for multiple measurement types for the same frequency then the peak measurement was retained in the report for reference, however the numbering for the affected row was removed and an arrow or caret ("^") was placed in the far left-hand column indicating that the row above takes precedence for comparison to the limit. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data.

Peak

In this mode, the spectrum analyzer or receiver recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature called "peak hold," the measurement device had the ability to measure intermittent or low duty cycle transient emission peak levels. In this mode the measuring device made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

Quasi-peak measurements were taken using the quasi-peak detector when the true peak values exceeded or were within 2 dB of a quasi-peak specification limit. Additional QP measurements may have been taken at the discretion of the operator.

Average

Average measurements were taken using the average detector when the true peak values exceeded or were within 2 dB of an average specification limit. Additional average measurements may have been taken at the discretion of the operator. If the specification or test procedure requires trace averaging, then the averaging was performed using 100 samples or as required by the specification. All other average measurements are performed using video bandwidth averaging. To make these measurements, the test engineer reduces the video bandwidth on the measuring device until the modulation of the signal is filtered out. At this point the measuring device is set into the linear mode and the scan time is reduced.