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Northbrook, IL 60062

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Order Number:	10275688 14U17447-4
Date:	August 22, 2014
Model:	M061

Electromagnetic Compatibility Test Report

For

Qualcomm Technologies

Test Report Details

Tests Performed By:	**UL LLC** **333 Pfingsten Rd.** **Northbrook, IL 60062**
Tests Performed For:	**Qualcomm Technologies** **5775 Morehouse Drive** **San Diego, CA 92121**
Applicant Contact: E-mail:	**Andy White** **andyw@qti.qualcomm.com**
Test Report Date:	**August 22, 2014**
Product Type:	**Smart Watch**
Product standards	**FCC Part 15B, ICES-003**
Model Number:	**M061**
Sample Serial Number:	**-**
EUT Category:	**PC Peripheral**
Testing Start Date:	**August 21, 2014**
Date Testing Complete:	**August 22, 2014**
Overall Results:	**Compliant**

UL LLC reports apply only to the specific samples tested under stated test conditions. All samples tested were in good operating condition throughout the entire test program. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. UL LLC shall have no liability for any deductions, inferences or generalizations drawn by the client or others from UL LLC issued reports. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

This report may contain test results that are not covered by the NVLAP or A2LA accreditation. The scope of accreditation is limited to the specific tests that are listed on the NVLAP and/or A2LA websites referenced at the end of this report.

Report Directory

Report Revision History

Revision Date	Description	Revised By	Revision Reviewed By
None			

1.0 G E N E R A L - Product Description

1.1 Equipment Description

Equipment Under Test (EUT) is a smart watch that connects to PC via USB for data transfer

1.2 Equipment Marking Plate

See Label exhibit

1.3 Device Configuration During Test

1.3.1 Equipment Used During Test:

Use	Product Type	Manufacturer	Model	Comments
EUT	Watch	Qualcomm	M061	None
AE	Laptop	HP	8460	None
AE	Router	Dlink	-	None
Note: **EUT** - Equipment Under Test, **AE** - Auxiliary/Associated Equipment, or **SIM** - Simulator (Not Subjected to Test)				

1.3.2 Input/Output Ports:

Port #	Name	Type*	Cable Max. >3m (Y/N)	Cable Shielded (Y/N)	Comments
0	Enclosure	N/E	—	—	None
1	USB	IO	N	Y	None

Note:
AC = AC Power Port DC = DC Power Port N/E = Non-Electrical
I/O = Signal Input or Output Port (Not Involved in Process Control)
TP = Telecommunication Ports

1.3.3 EUT Internal Operating Frequencies:

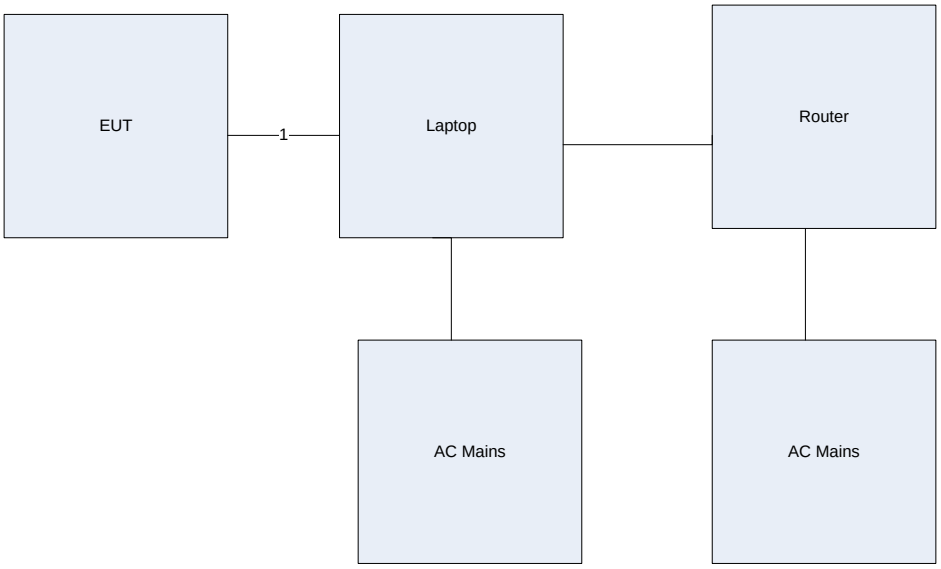
Frequency (MHz)	Description
<108	EUT Digital Ciruitry

1.3.4 Power Interface:

Mode # /Rated	Voltage (V)	Current (A)	Power (W)	Frequency (DC/AC-Hz)	Phases (#)	Comments
1	5	-	-	DC	1	via USB

1.4 Block Diagram:

The diagram below illustrates the configuration of the equipment above.



1.5 EUT Configurations

Mode #	Description
1	EUT was tested at 80cm table connected with laptop via USB. Laptop contain USB and Ethernet Connections

1.6 EUT Operation Modes

Mode #	Description
1	EUT USB connection to Laptop was active

1.7 Rational for EUT Configuration

Mode #	Description
1	The selected EUT configuration was chosen to maximize emissions

2.0 Summary

The tests listed in the Summary of Testing section of this report have been performed and the results recorded by UL LLC in accordance with the procedures stated in each test requirement and specification. The applicant determined the list of tests performed were applicable to the Equipment Under Test. As a result, the subject product has been verified to comply or not comply as noted in the Summary of Testing with each test specification. The test results relate only to the items tested.

2.1 Deviations from standard test methods

None

2.2 Device Modifications Necessary for Compliance

None

2.3 Reference Standards

Standard Number	Standard Name	Standard Date
FCC Part 15B	Radio Frequency Devices	2014
ICES-003	Information Technology Equipment (ITE) – Limits and methods of measurement	2012

2.4 Results Summary

This product is considered Class B

Requirement – Test	Result (Compliant / Non-Compliant)*
Conducted Emissions	Compliant
Radiated Emissions	Compliant

Test Engineer:

Michael Ferrer (Ext.41312)
WiSE Program Manager
Consumer Technology Division
Verification Services

Reviewer:

Bartlomiej Mucha(Ext.41216)
WiSE Staff Engineer
Consumer Technology Division
Verification Services

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL.

3.0 Calibration of Equipment Used for Measurement

All test equipment and test accessories are calibrated on a regular basis. The maximum time between calibrations is one year or the manufacturers' recommendation, whichever is less.

All test equipment calibrations are traceable to the National Institute of Standards and Technology (NIST); therefore, all test data recorded in this report is traceable to NIST.

4.0 EMISSIONS TEST RESULTS

The emissions tests were performed according to following regulations:

North America

47 CFR Part 15	Radio Frequency Devices
ICES-003	Information Technology Equipment (ITE) – Limits and methods of measurement

Unless specified otherwise in the individual Methods, the tests shall be conducted under the following ambient conditions. Confirmation of these conditions shall be verified at the time the test is conducted.

Ambient Temperature, °C	22.5 ± 2.5	Relative Humidity, %	45 ± 15	Barometric Pressure, mBar	950 ± 150

Measurement Uncertainty

Test	Range	Equipment	Uncertainty k=2
Conducted Emissions	150k-30MHz	LISN	2.29dB
Radiated Emissions	30-200MHz	Bicon 10m Horz	4.27dB
Radiated Emissions	30-200MHz	Bicon 10m Vert	4.28dB
Radiated Emissions	200-1000MHz	LogP 10m Horz	3.33dB
Radiated Emissions	200-1000MHz	LogP 10m Vert	3.39dB

Sample Calculations

Radiated Field Strength and Conducted Emissions data contained within this report is calculated on the following basis:

Field Strength (dBuV/m) = Meter Reading (dBuV) + AF (dB/m) - Gain (dB) + Cable Loss (dB)
Conducted Voltage (dBuV) = Meter Reading (dBuV) + Cable Loss (dB) + LISN IL (dB)
Conducted Current (dBuA) = Meter Reading (dBuV) + Cable Loss (dB) - Transducer Factor (dBohms)

4.1 Test Conditions and Results – MAINS TERMINAL – CONDUCTED EMISSIONS

Test Description	Measurements were made on a ground plane. 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.		
Basic Standard		FCC Part 15 Subpart B	
UL LPG		80-EM-S0026	
		Frequency range on each side of line	Measurement Point
Fully configured sample scanned over the following frequency range		150kHz to 30MHz	Mains

Limits - Class B

Frequency (MHz)	Limit (dBµV)	
	Quasi-Peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

Supplementary information: None

Table 1 Conducted Emissions EUT Configuration Settings

Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	1	1

Supplementary information: None

Table 2 Conducted Emissions Test Equipment

Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due Date
EMI Test Receiver	Rohde & Schwarz	ESCI	EMC4328	12/15/13	12/31/14
Transient Limiter	Electro-Metrics	EM7600-2	EMC4224	N/A	N/A
HighPass Filter	Solar Electronics	2803-150	885551	N/A	N/A
Attenuator	HP	8494B	2831A00838	N/A	N/A
LISN - L1	Solar	8602-50-TS-50-N	EMC4052	01/16/14	01/16/15
LISN - L2	Solar	8602-50-TS-50-N	EMC4064	01/16/14	01/16/15

Figure 1 Conducted Emissions Graph

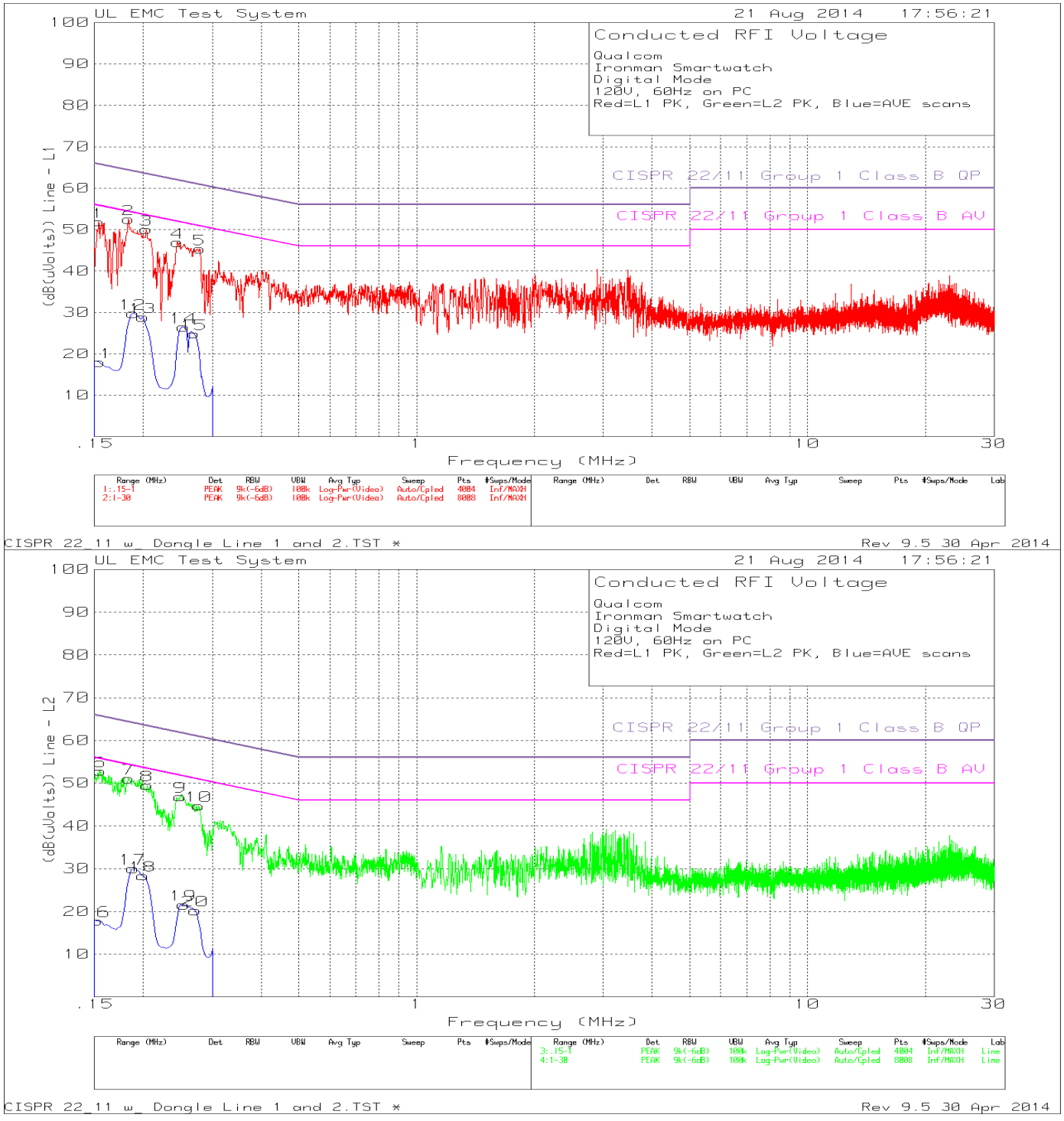


Table 3 Conducted Emissions Data Points

Qualcom
Ironman Smartwatch
Digital Mode
120V, 60Hz on PC
Red=L1 PK, Green=L2 PK, Blue=AVE scans

Trace Markers

Line - L1 .15 - 1MHz

Marker No.	Test Frequency (MHz)	Meter Reading(dBuV)	Detector	LiSN factor dB	Cable factor dB	Corrected Reading (dB(uVolts))	CISPR 22/11 Group 1 Class B QP	Margin (dB)	CISPR 22/11 Group 1 Class B AV	Margin (dB)
1	0.15382	37.5	PK	0.1	14.3	51.9	65.79	-13.89	55.79	-3.89
2	0.18328	40.54	PK	0.1	11.9	52.54	64.34	-11.8	54.34	-1.8
3	0.20364	38.46	PK	0.1	11.5	50.06	63.46	-13.4	53.46	-3.4
4	0.24455	35.51	PK	0.1	11.3	46.91	61.94	-15.03	51.94	-5.03
5	0.27868	34.2	PK	0.1	11	45.3	60.86	-15.56	50.86	-5.56
11	0.1545	3.69	Av	0.1	14.2	17.99	65.75	-47.76	55.75	-37.76
12	0.18825	18.07	Av	0.1	11.6	29.77	64.11	-34.34	54.11	-24.34
13	0.1995	17.3	Av	0.1	11.5	28.9	63.63	-34.73	53.63	-24.73
14	0.2535	15.16	Av	0.1	11.2	26.46	61.64	-35.18	51.64	-25.18
15	0.26925	13.63	Av	0.1	11.1	24.83	61.14	-36.31	51.14	-26.31

Line - L2 .15 - 1MHz

Marker No.	Test Frequency (MHz)	Meter Reading(dBuV)	Detector	LiSN factor dB	Cable factor dB	Corrected Reading (dB(uVolts))	CISPR 22/11 Group 1 Class B QP	Margin (dB)	CISPR 22/11 Group 1 Class B AV	Margin (dB)
6	0.1553	38.53	PK	0.1	14.2	52.83	65.71	-12.88	55.71	-2.88
7	0.18328	39.05	PK	0.1	11.9	51.05	64.34	-13.29	54.34	-3.29
8	0.2048	37.93	PK	0.1	11.5	49.53	63.41	-13.88	53.41	-3.88
9	0.24858	35.55	PK	0.1	11.2	46.85	61.8	-14.95	51.8	-4.95
10	0.2772	33.62	PK	0.1	11	44.72	60.9	-16.18	50.9	-6.18
16	0.15225	3.29	Av	0.1	14.4	17.79	65.88	-48.09	55.88	-38.09
17	0.18825	18.34	Av	0.1	11.6	30.04	64.11	-34.07	54.11	-24.07
18	0.1995	16.77	Av	0.1	11.5	28.37	63.63	-35.26	53.63	-25.26
19	0.2535	10.28	Av	0.1	11.2	21.58	61.64	-40.06	51.64	-30.06
20	0.2715	9.04	Av	0.1	11.1	20.24	61.07	-40.83	51.07	-30.83

PK - Peak detector
Av - CISPR average detection

4.2 Test Conditions and Results – RADIATED EMISSIONS

Test Description	Measurements were made in a 10-meter semi-anechoic chamber that complies to CISPR 16/ANSI C63.4. Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 10-meter. The EUT was rotated 360° about its azimuth with the receive antenna located at various heights in both horizontal and vertical polarities. Final measurements (quasi-peak or average as noted) were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4-meters. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable.

Basic Standard	FCC Part 15 Subpart B	
UL LPG	80-EM-S0029	
	Frequency range	Measurement Point
Fully configured sample scanned over the following frequency range	30MHz – 1GHz	(10 meter measurement distance)

Limits - Class B

Frequency (MHz)	Limit (dBµV/m)	
	Quasi-Peak	Average
30 – 88	29.6	NA
88 – 216	33.1	NA
216-960	35.6	NA
960-1000	43.53	NA

Supplementary information: The limits were extrapolated to 10 meter distance.

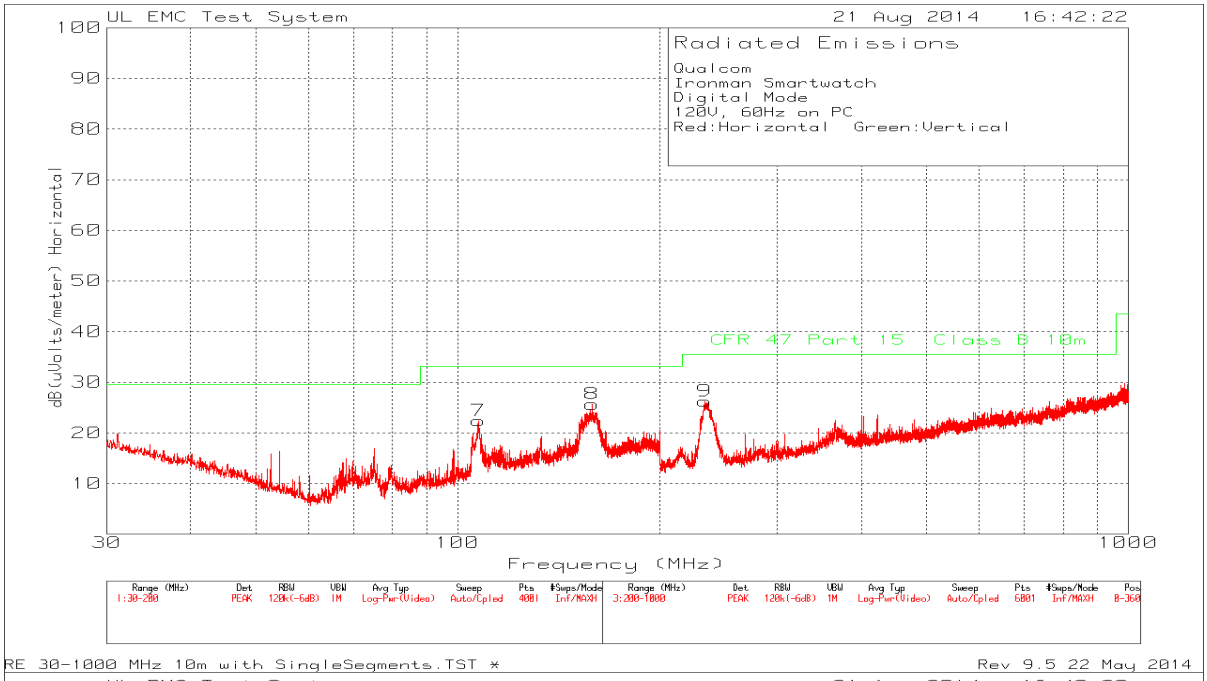
Table 4 Radiated Emissions EUT Configuration Settings

Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	1	1
Supplementary information: None		

Table 5 Radiated Emissions Test Equipment

Description	Manufacturer	Model	Identifier	Cal Date	Cal Due
EMI Test Receiver	Rohde & Schwarz	ESU	EMC4323	12/20/14	12/31/14
Bicon Antenna	Chase	VBA6106A	EMC4078	04/01/14	04/01/15
Log-P Antenna	Chase	UPA6109	EMC4258	12/11/13	12/31/14

Figure 2 Radiated Emissions Graph



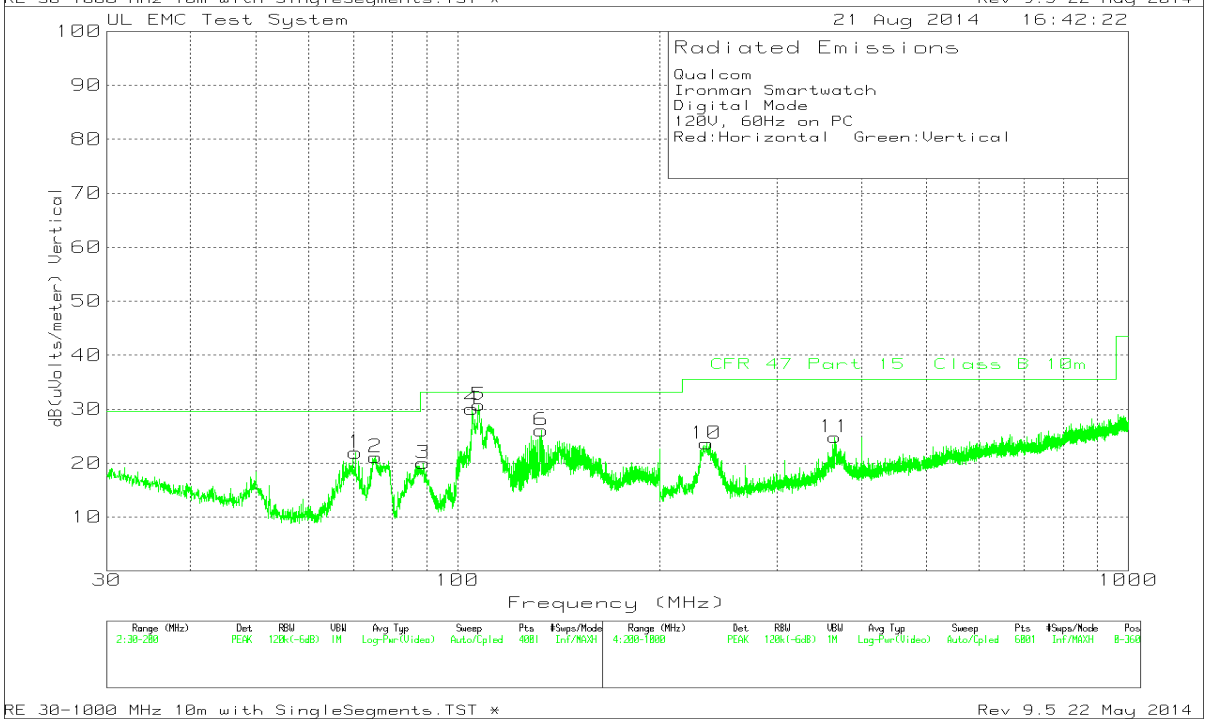


Table 6 Radiated Emissions Data Points

Trace Markers

Bicon Horizonta 30 - 200MHz											
Marker	**Frequency (MHz)**	**Meter Reading (dBuV)**	**Det**	**Antenna Factor dB/m**	**Gain Loss Factor dB**	**Corrected Reading dB(uVolts/meter)**	**CFR 47 Part 15 Class B 10m**	**Margin (dB)**	**Azimuth (Degs)**	**Height (cm)**	**Polarity**
7	107.35	40.62	PK	11.7	-29.9	22.42	33.07	-10.65	0-360	399	H
8	158.605	40.2	PK	15.1	-29.6	25.7	33.07	-7.37	0-360	399	H

PK - Peak detector

Bicon Vertical 30 - 200MHz											
Marker	**Frequency (MHz)**	**Meter Reading (dBuV)**	**Det**	**Antenna Factor dB/m**	**Gain Loss Factor dB**	**Corrected Reading dB(uVolts/meter)**	**CFR 47 Part 15 Class B 10m**	**Margin (dB)**	**Azimuth (Degs)**	**Height (cm)**	**Polarity**
1	70.46	45.62	PK	6.2	-29.9	21.92	29.55	-7.63	0-360	249	V
2	75.4325	44.71	PK	6.4	-30	21.11	29.55	-8.44	0-360	249	V
3	88.82	41.14	PK	8.8	-29.9	20.04	33.07	-13.03	0-360	249	V
4	105.0975	48.39	PK	11.5	-29.8	30.09	33.07	-2.98	0-360	99	V
5	107.5625	48.87	PK	11.8	-29.9	30.77	33.07	-2.3	0-360	249	V
6	133.275	41.57	PK	14.2	-29.7	26.07	33.07	-7	0-360	99	V

PK - Peak detector

LogP Horizontal 200 - 1000MHz											
Marker	**Frequency (MHz)**	**Meter Reading (dBuV)**	**Det**	**Antenna Factor dB/m**	**Gain Loss Factor dB**	**Corrected Reading dB(uVolts/meter)**	**CFR 47 Part 15 Class B 10m**	**Margin (dB)**	**Azimuth (Degs)**	**Height (cm)**	**Polarity**
9	233.5999	41.98	PK	10.9	-26.6	26.28	35.57	-9.29	0-360	400	H

PK - Peak detector

LogP Vertical 200 - 1000MHz											
Marker	**Frequency (MHz)**	**Meter Reading (dBuV)**	**Det**	**Antenna Factor dB/m**	**Gain Loss Factor dB**	**Corrected Reading dB(uVolts/meter)**	**CFR 47 Part 15 Class B 10m**	**Margin (dB)**	**Azimuth (Degs)**	**Height (cm)**	**Polarity**
10	235.0666	39.23	PK	11	-26.6	23.63	35.57	-11.94	0-360	299	V
11	365.0663	35.62	PK	14.9	-25.7	24.82	35.57	-10.75	0-360	99	V

PK - Peak detector

Radiated Emissions

Bicon Vertical 30 - 200MHz										
Frequency (MHz)	**Meter Reading (dBuV)**	**Det**	**Antenna Factor dB/m**	**Gain Loss Factor dB**	**Corrected Reading dB(uVolts/meter)**	**CFR 47 Part 15 Class B 10m**	**Margin (dB)**	**Azimuth (Degs)**	**Height (cm)**	**Polarity**
105.2716	45.33	QP	11.5	-29.8	27.03	33.07	-6.04	164	117	V
107.5807	46.18	QP	11.8	-29.9	28.08	33.07	-4.99	108	112	V

QP - Quasi-Peak detector

Appendix A

Accreditations and Authorizations

NVLAP Lab code: 100414-0

NVLAP: The National Institute of Standards and Technology (NIST) administers the National Voluntary Laboratory Accreditation Program (NVLAP). NVLAP is comprised of laboratory accreditation programs (LAPs) which are established on the basis of requests and demonstrated need. Each LAP includes specific calibration and/or test standards and related methods and protocols assembled to satisfy the unique needs for accreditation in a field of testing or calibration. NVLAP accredits public and private laboratories based on evaluation of their technical qualifications and competence to carry out specific calibrations or tests. Accreditation criteria are established in accordance with the U.S. Code of Federal Regulations (CFR, Title 15, Part 285), NVLAP Procedures and General Requirements, and encompass the requirements of ISO/IEC 17025. For a full scope listing see http://ts.nist.gov/standards/scopes/1004140.htm

FCC: Details of the measurement facilities used for these tests have been filed with the Federal Communications Commission's Laboratory in Columbia, Maryland (Ref. No. 91044).

Industry Canada Industrie Canada

Industry of Canada: Accredited by Industry Canada for performance of radiated measurements. Our test site complies with RSP 100, Issue 7, Section 3.3. File #: IC 2180A

VCCI: Accepted as an Associate Member to the VCCI. The measurement facilities detailed in this test report have been registered in accordance with Regulations for Voluntary Control Measures, Article 8. Registration Nos.: A0140.

ICASA: ICASA (Independent Communications Authority of South Africa) has appointed UL as a Designated Test Laboratory to test Telecommunications equipment for type approval in compliance with CISPR 22 to assist in fulfilling its mandate under section 54(1) of the Telecommunications Act, 1996 (Act 103 of 1996).

NIST/CAB: Validated by the European Commission as a U.S. Conformity Assessment Body (CAB) of the U.S.-EU Mutual Recognition Agreement (MRA) for the Electromagnetic Compatibility - Council Directive 2004/108/EC, Annex III (2-3). Also validated for the Telecommunication Equipment-Council Directive 99/5/EC, Annex III and IV, Identification Number: 0983.
NIST/CAB: Provisioned to act as a U.S. Conformity Assessment Body (CAB) under Appendix B, Phase I Procedures, of the Asia Pacific Economic Cooperation (APEC) MRA between the American Institute in Taiwan (AIT) and the United States. Our laboratory is considered qualified to test equipment subject to the applicable EMC regulations of the Chinese Taipei Bureau of Standards, Metrology and Inspection (BSMI) which require testing to CNS 13438 (CISPR 22).
NIST/CAB: Recognized by the Infocomm Development Authority of Singapore (IDA) under the Asia Pacific Economic Cooperation Mutual Recognition Agreement (APEC MRA). Our laboratory is provisionally designated to act as a Conformity Assessment Body (CAB) under Appendix B, Phase I Procedures, of the APEC MRA. Our scope of designation includes IDA TS EMC (CISPR 22), IEC 61000-4-2, -4-3, -4-4, -4-5, and -4-6