Test of Polycom Spectralink 8440 Wi-Fi handset with Bluetooth

To: FCC 47 CFR Part 15, SubPart B & ICES-003

Test Report Serial No.: POLY06-U18 Rev A

TEST REPORT

From

Test of: Polycom Spectralink 8440 Wi-Fi handset with Bluetooth

To: FCC 47 CFR Part 15, SubPart B & ICES-003

Test Report Serial No.: POLY06-U18 Rev A

This report supersedes: None

Applicant:	Polycom 4750 Willow Road Pleasanton, CA 94588-2708 USA
Product Function:	Wi-Fi handset with Bluetooth
Copy No: pdf	**Issue Date:** 14th February 2011

This Test Report is Issued Under the Authority of;

MiCOM Labs, Inc.
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Pleasanton, CA 94566 USA
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www.micomlabs.com

TESTING CERTIFICATE #2381.01

MiCOM Labs is an ISO 17025 Accredited Testing Laboratory

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1 ACCREDITATION, LISTINGS & RECOGNITION

1.1 TESTING ACCREDITATION

MiCOM Labs, Inc. is an accredited Electrical testing laboratory per the international standard EN ISO/IEC 17025. The company is accredited by the American Association for Laboratory Accreditation (A2LA) www.a2la.org test laboratory number 2381.01. MiCOM Labs test schedule is available at the following URL; http://www.a2la.org/scopepdf/2381-01.pdf

1.2 RECOGNITION

MiCOM Labs, Inc has widely recognized Electrical testing capabilities. Our international recognition includes Conformity Assessment Body designation by APEC MRA** countries. Our test reports are widely accepted for global type approvals.

Country	Recognition Body	Status	Phase	Identification No.
USA	Federal Communications Commission (FCC)	TCB	-	Listing #: 102167
Canada	Industry Canada (IC)	FCB	APEC MRA 2	Listing #: 4143A
Japan	VCCI	-	-	No. 2959
Europe	European Commission	NB	EU MRA	NB 2280
Australia	Australian Communications and Media Authority (ACMA)	CAB	APEC MRA 1	US0159
Hong Kong	Office of the Telecommunication Authority (OFTA)	CAB	APEC MRA 1	
Korea	Ministry of Information and Communication Radio Research Laboratory (RRL)	CAB	APEC MRA 1	
Singapore	Infocomm Development Authority (IDA)	CAB	APEC MRA 1	
Taiwan	National Communications Commission (NCC) Bureau of Standards, Metrology and Inspection (BSMI)	CAB	APEC MRA 1	
Vietnam	Ministry of Communication (MIC)	CAB	APEC MRA 1	

**APEC MRA – Asia Pacific Economic Community Mutual Recognition Agreement.
Is a recognition agreement under which test lab is accredited to regulatory standards of the APEC member countries.
Phase I - recognition for product testing
Phase II – recognition for both product testing and certification
N/A – Not Applicable

**EU MRA – European Union Mutual Recognition Agreement.
Is a recognition agreement under which test lab is accredited to regulatory standards of the EU member countries.

**NB – Notified Body

1.3 PRODUCT CERTIFICATION

MiCOM Labs, Inc. is an accredited Product Certification Body per the international standard EN ISO/IEC Guide 65. The company is accredited by the American Association for Laboratory Accreditation (A2LA) www.a2la.org test laboratory number 2381.02. MiCOM Labs test schedule is available at the following URL; http://www.a2la.org/scopepdf/2381-02.pdf

The American Association for Laboratory Accreditation

World Class Accreditation

Accredited Product Certification Body

A2LA has accredited

MICOM LABS

Pleasanton, CA

for technical competence as a

Product Certification Body

This product certification body is accredited in accordance with the recognized International Standard ISO/IEC Guide 65:1996 *General requirements for bodies operating product certification systems*. This accreditation demonstrates technical competence for a defined scope and the operation of a quality management system for a Telecommunications Certification Body (TCB) meeting FCC (U.S.), and IC (Canada) requirements.

Presented this 24th day of June 2010.

President & CEO
For the Accreditation Council
Certificate Number 2381.02
Valid to November 30, 2011

For the product certification schemes to which this accreditation applies, please refer to the organization's Product Certification Scope of Accreditation.

United States of America – Telecommunication Certification Body

TCB Identifier – US0159

Industry Canada – Certification Body

CAB Identifier – US0159

Europe – Notified Body

Notified Body Identifier - 2280

2 DOCUMENT HISTORY

Document History		
Revision	**Date**	**Comments**
Draft		
Rev A	14th February 2011	Initial Release

3 TEST RESULT CERTIFICATE

Applicant:	Polycom 4750 Willow Road Pleasanton California , 94588-2708, USA	Tested By:	MiCOM Labs, Inc. 440 Boulder Court Suite 200 Pleasanton California, 94566, USA
Product:	Spectralink 8400 series Wi-Fi handsets	Telephone:	+1 925 462 0304
Model No.:	Spectralink 8440 handset	Fax:	+1 925 462 0306
S/No's:	600826511		
Date(s) Tested:	Nov 19th, 2010 – Jan 3rd, 2011	Website:	www.micomlabs.com

STANDARD(S)	TEST RESULTS
FCC 47 CFR Part 15, SubPart B & ICES-003	EQUIPMENT COMPLIES

MiCOM Labs, Inc. tested the equipment mentioned in accordance with the requirements set forth in the above standards. Test results indicate that the equipment tested is capable of demonstrating compliance with the requirements as documented within this report.

Notes:

1. This document reports conditions under which testing was conducted and the results of testing performed.
2. Details of test methods used have been recorded and kept on file by the laboratory.
3. Test results apply only to the item(s) tested.

Approved & Released for MiCOM Labs, Inc. by:

ACCREDITED

TESTING CERTIFICATE #2381.01

Graeme Grieve
Quality Manager MiCOM Labs, Inc.

Gordon Hurst
President & CEO MiCOM Labs, Inc.

4 REFERENCES AND MEASUREMENT UNCERTAINTY

4.1 Normative References

Ref.	Publication	Year	Title
i.	47 CFR Part 15, SubPart B	2010	47 CFR Part 15, SubPart B; Unintentional Radiators
ii.	ICES-003	2004	Spectrum Management and Telecommunications Policy Interference-Causing Equipment Standard Digital Apparatus; Issue 4
iii.	ANSI C63.4	2009	American National Standards for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
iv.	CISPR 22/ EN 55022	2008 2006+A1:2007	Limits and Methods of Measurements of Radio Disturbance Characteristics of Information Technology Equipment
v.	M 3003	Edition 1 Dec. 1997	Expression of Uncertainty and Confidence in Measurements
vi.	LAB34	Edition 1 Aug 2002	The expression of uncertainty in EMC Testing
vii.	ETSI TR 100 028	2001	Parts 1 and 2 Electromagnetic compatibility and Radio Spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics
viii.	A2LA	9th June 2010	Reference to A2LA Accreditation Status – A2LA Advertising Policy

4.2 Test and Uncertainty Procedures

Conducted and radiated emission measurements were conducted in accordance with American National Standards Institute ANSI C63.4, listed in the Normative References section of this report.

Measurement uncertainty figures are calculated in accordance with ETSI TR 100 028 Parts 1 and 2.

Measurement uncertainties stated are based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95 % in accordance with UKAS document M 3003 listed in the Normative References section of this report.

5 TEST SUMMARY

List of Measurements: The following table represents the list of measurements required under FCC 47 CFR Part 15, SubPart B & ICES-003.

Standard Section(s)	Test Description	Condition	Result	Test Report Section
15.109	Radiated Emissions - Unintentional Radiator	Radiated	Pass	7.1
15.107	AC Mains Emissions 0.15 – 30 MHz	Conducted	Pass	7.2

Note 1: Test results reported in this document relate only to the items tested

Note 2: The required tests demonstrated compliance as per client declaration of test configuration, monitoring methodology and associated pass/fail criteria

Note 3: Section 6.7 Equipment Modifications highlights the equipment modifications that were required to bring the product into compliance with the above test matrix

6 PRODUCT DETAILS AND TEST CONFIGURATIONS

6.1 Test Program Scope

The scope of the test program was to test the Polycom Spectralink 8440 Wi-Fi handset in three different configurations as listed below for compliance against FCC 47 CFR Part 15, SubPart B & Industry Canda ICES-003.

Test Configurations

8440 Handset + AC-DC Adapter /Charger: SA106B-05 + Headset

8440 Handset + AC-DC Adapter: HK-U-120A050-CP + Charging Dock + Headset

8440 Handset + AC-DC Adapter: HK-AX-120A200-CP + Speaker Dock + Headset

APPLICANT: Polycom **PRODUCT:** Spectralink 8440 Wi-Fi handset Front

APPLICANT: Polycom **PRODUCT:** Spectralink 8440 Wi-Fi handset Back

APPLICANT: Polycom **PRODUCT:** AC-DC Adapter/ Charger for Spectralink 8400 series handsets

APPLICANT: Polycom **PRODUCT:** Charging Dock for Spectralink 8400 series handsets

APPLICANT: Polycom **PRODUCT:** AC-DC Adapter for Charging Dock

APPLICANT: Polycom **PRODUCT:** Speaker Dock for Spectralink 8400 series handsets

APPLICANT: Polycom **PRODUCT:** AC-DC Adapter for Speaker Dock

6.2 EUT Details

Detail	Description
Purpose:	Test of the Polycom Spectralink 8440 Wi-Fi handset with Bluetooth for compliance against FCC 47 CFR Part 15, SubPart B & ICES-003
Applicant:	Polycom 4750 Willow Road Pleasanton, CA 94588-2708 USA
Manufacturer:	Same as Applicant
Test Laboratory:	MiCOM Labs, Inc. 440 Boulder Court, Suite 200 Pleasanton, California 94566 USA
Test report reference number:	POLY06-U18
Date EUT received:	11/11/2010
Dates of test (from - to):	11/19/2010 - 01/03/2011
No of Units Tested:	1 – S/N: 600826511
Product Name:	Spectralink 8400 series Wi-Fi handsets
Manufacturers Trade Name:	Polycom Spectralink 8400 series Wi-Fi handsets
Model No.:	Spectralink 8440 handset
Equipment Primary Function:	Wi-Fi handset with Bluetooth
Equipment Secondary Function(s):	N/A
Type of Technology:	802.11b/g/n and Bluetooth
Installation type:	Portable
Construction/Location for Use:	Indoor/Outdoor
Software/Firmware Release:	BootROM Mink Phoenix E6 FCC Test 14.
Test Software Release:	BootROM Mink Phoenix E6 FCC Test 14.
Rated Input Voltage and Current DC:	Nominal: 3.8V; Battery: 3.5V - 4.2V, Charger (USB or Base) supply: 5V +/- 10%
Operating Temperature Range ºC:	Min: 0 °C Max: 40 °C
Equipment Dimensions:	5.75” x 2.125” x 0.9”
Weight:	8 oz
Long Term Frequency Stability:	20 p.p.m.
Transmit/Receive Operation:	Full Duplex
Output Power Type	Fixed

6.3 External A.C. / D.C. Power Adaptor

Model	Description
SA106B-05	GCI Technologies switching adaptor: Input: 100 - 240V AC; 50-60 Hz; 0.25 Amp Output: 5V DC; 1 Amp
HK-U-120A050-CP	Hon-Kwang I.T.E. Power Supply Input: 100 - 240V AC; 50/60 Hz; 0.2 Amp Output: 12V DC; 0.5 Amp
HK-AX-120A200-CP	Hon-Kwang I.T.E. Power Supply Input: 100-240V AC 50/60 Hz; 0.8 Amp Output: 12V DC; 2.0 Amp

6.4 Cabling and I/O Ports

The following is a description of the cable and input, output ports available on the EUT.

Type of I/O Ports	Description	Screened (Y/N)	Length	Qty	Tested (Y/N)
Battery terminal	Battery connections for removable battery	N	N/A	1	N
1/8th" stereo Connector	for connection to hands free headset	Y	< 3 meters	1	Y
Power Supply	Power connector - mini USB for charging using AC-DC Adapter/ Charger (model: SA106B-05)	Y	< 3 meters	1	Y
Charging terminals	Charging terminal for charging EUT with docking options	N	N/A	1	Y

6.5 EUT Configurations

EUT + AC-DC Adapter: HK-AX-120A200-CP + Speaker Dock + Headset
EUT + AC-DC Adapter: HK-U-120A050-CP + Charging Dock + Headset
EUT + AC-DC Adapter /Charger: SA106B-05 + Headset

6.6 Equipment Details

The following is a description of supporting equipment used during the test program.

Equipment	Equipment Description	Manufacturer	Model No.	Serial No (s).	Tested
Battery	Alpha SAMPLE	Polycom	ESB-RS657+002	AC10103200B7	N
Battery	Alpha SAMPLE	Polycom	ESB-RS657+002	AC1010320232	Y
Battery	Alpha SAMPLE	Polycom	ESB-RS657+002	AC101032008E	Y
Battery	Alpha SAMPLE	Polycom	ESB-RS658+002	AD101032019C	Y
Charging Dock	Alpha SAMPLE	Polycom	ESB-DCA39+001	AlphaB39174 1033	Y
AC-DC Adapter	I.T.E. Power Supply	HON-KWANG	HK-U-120A050-CP	N/A	Y
AC-DC Adapter/ Charger	Switching Adapter	GCi technologies	SA106B-05	N/A	Y
Speaker Dock	10uF @ U8 Pin4 to Ground Dock PCB Revision X4	Polycom	N/A	N/A	Y
AC-DC Adapter	I.T.E. Power Supply	HON-KWANG	HK-AX-120A200-CP	N/A	Y
Headset	Encore Headset	Plantronics	P/N: 29951-12	0E0723 K7	Y

6.7 Equipment Modifications

The following modifications were required to bring the equipment into compliance:

1. NONE

6.8 Deviations from the Test Standard

The following deviations from the test standard were required in order to complete the test program:

1. NONE

7 TEST RESULTS

7.1 Radiated Spurious Emissions – Digital Apparatus

Standard Reference

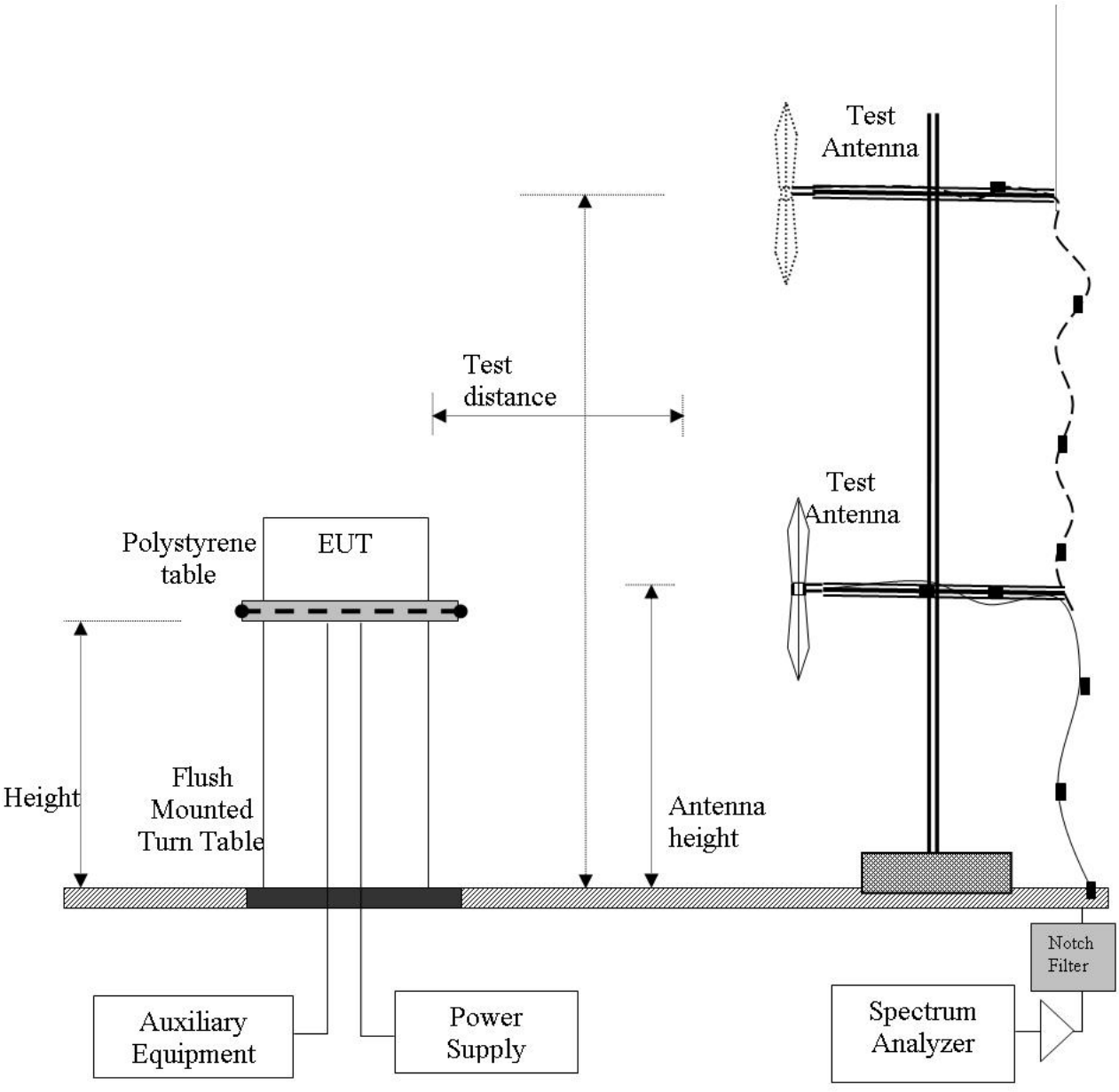
FCC, Part 15 Subpart B §15.109
Industry Canada ICES-003 §5

Test Procedure

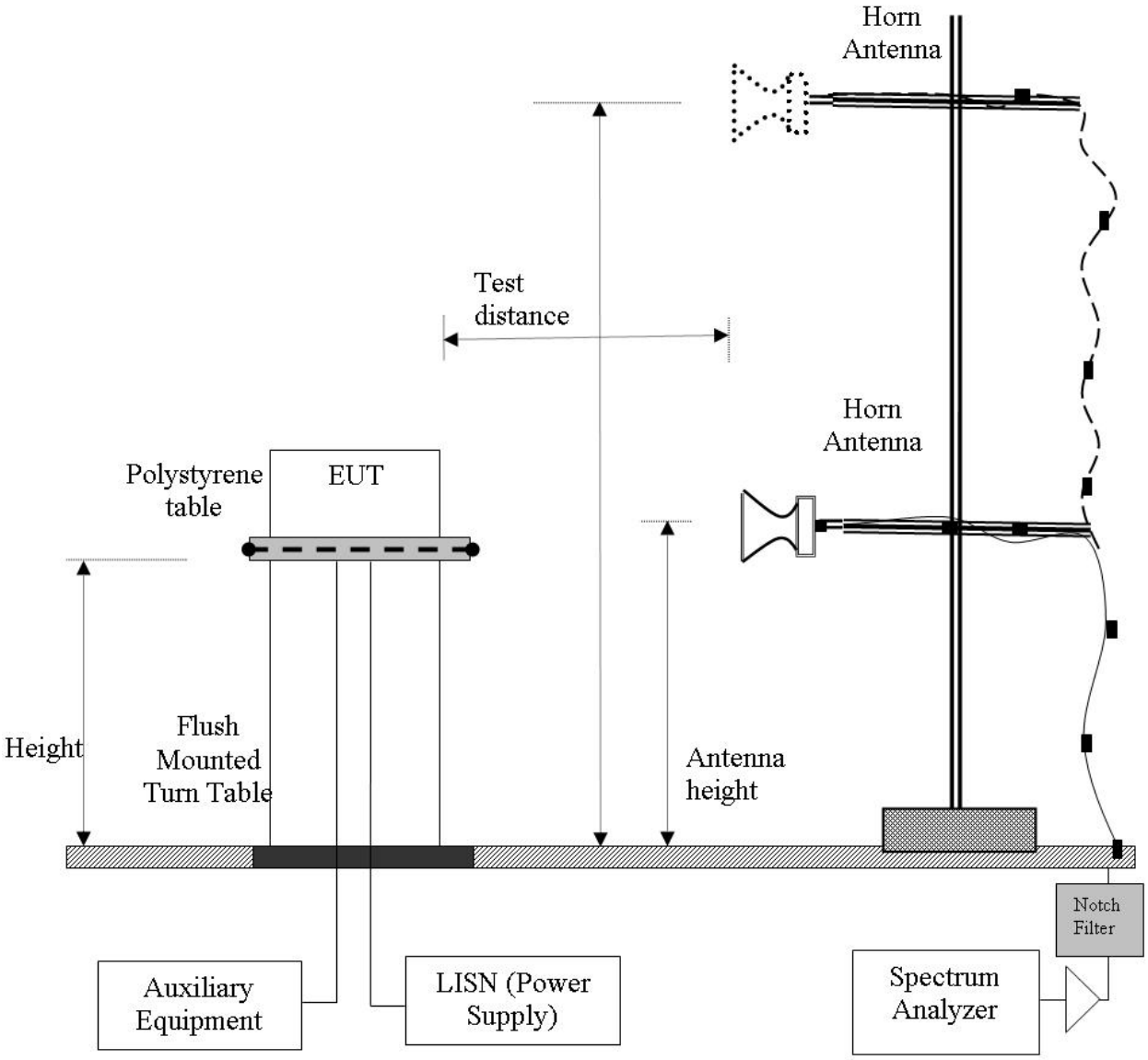
Testing was performed in a 3-meter semi-anechoic chamber. Preliminary radiated emissions were measured on every azimuth and with the receiving antenna in both horizontal and vertical polarizations. Preliminary emissions were recorded with in Spectrum Analyzer mode, using a maximum peak detector while in peak hold mode.

Emissions nearest the limits were chosen for maximization and formal measurement using a CISPR Compliant receiver. Emissions from 30 MHz – 1000 MHz are measured utilizing a CISPR compliant quasi-peak detector with a tuned receiver, using a bandwidth of 120 kHz. Emissions above 1000 MHz are measured utilizing a CISPR compliant average detector with a tuned receiver, using a bandwidth of 1 MHz. Only the highest emissions relative to the limit are listed.

Test Measurement Setup



Measurement setup for Radiated Emission Test < 1 GHz



Measurement setup for Radiated Emission Test > 1 GHz

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting Amplifier Gain from the measured reading. All factors are included in the reported data.

FS = R + AF + CORR – FO

FS = Field Strength
R = Measured Spectrum analyzer Input Amplitude
AF = Antenna Factor
FO = Distance Falloff Factor

CORR = Correction Factor = CL – AG + NFL

CL = Cable Loss
AG = Amplifier Gain
NFL = Notch Filter Loss or Waveguide Loss

Field Strength Calculation Example:

Given receiver input reading of 51.5 dBμV; Antenna Factor of 8.5 dB; Cable Loss of 1.3 dB; Falloff Factor of 0 dB, an Amplifier Gain of 26 dB and Notch Filter Loss of 1 dB. The Field Strength of the measured emission is:

FS = 51.5 + 8.5 + 1.3 - 26.0 +1 = 36.3 dBμV/m

Conversion between dBμV/m (or dBμV) and μV/m (or μV) are done as:

Level (dBμV/m) = 20 * Log (level (μV/m))

40 dBμV/m = 100 μV/m
48 dBμV/m = 250 μV/m

Specification

Radiated Spurious Emissions – Digital Apparatus

FCC, Part 15 Subpart B §15.109
A representative type or model of each digital apparatus shall be tested in accordance with the measurement methods described in FCC Part 15; Subpart A - General and FCC Subpart B – Unintentional Radiators.

Industry Canada ICES-003
A representative type or model of each digital apparatus shall be tested in accordance with the measurement method described in the publication referred to in Section 7.1 [Canadian Standards Association Standard CAN/CSA-CEI/IEC CISPR 22:02, "Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Equipment."].

FCC, Part 15 Subpart B §15.109 Spurious Emissions Limits

Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values.

Frequency (MHz)	Field Strength (µV/m) @ 3m	Measurement Distance (meters)	Field Strength (dBµV/m) @ 3m
30-88	100	3	40.0
88-216	150	3	43.5
216-960	200	3	46.0
Above 960	500	3	54.0

Field Strength of radiated emissions for a Class A digital device are as follows.

Frequency (MHz)	Field Strength (µV/m) @ 10m	Measurement Distance (meters)	Field Strength (dBµV/m) @ 3m
30-88	90	3	49.5
88-216	150	3	54.0
216-960	210	3	57.0
Above 960	300	3	60.0

ICES-003 §5 Spurious Emissions Limits

Class A Digital Device: The field intensity of radio noise emissions that are radiated from a Class A digital apparatus shall not exceed the limits specified in Table 5 of the publication referred to in Section 7.1, within the indicated frequency range.

Frequency range (MHz)	Quasi-peak limits dB(µV/m) @ 10m	Quasi-peak limits dB(µV/m) @ 3m
30 to 230	40	50.5
230 to 1000	47	57.5
Note 1	The lower limit shall apply at the transition frequency	
Note 2	Additional provisions may be required for cases where interference occurs	

Class B Digital Device: The field intensity of radio noise emissions that are radiated from a Class B digital apparatus shall not exceed the limits specified in Table 6 of the publication referred to in Section 7.1, within the indicated frequency range.

Frequency range (MHz)	Quasi-peak limits dB(µV/m) @ 10m	Quasi-peak limits dB(µV/m) @ 3m
30 to 230	30	40.5
230 to 1000	37	47.5
Note 1	The lower limit shall apply at the transition frequency.	
Note 2	Additional provisions may be required for cases where interference occurs	

Laboratory Measurement Uncertainty for Spectrum Measurement

Measurement Uncertainty	+5.6/ -4.5 dB

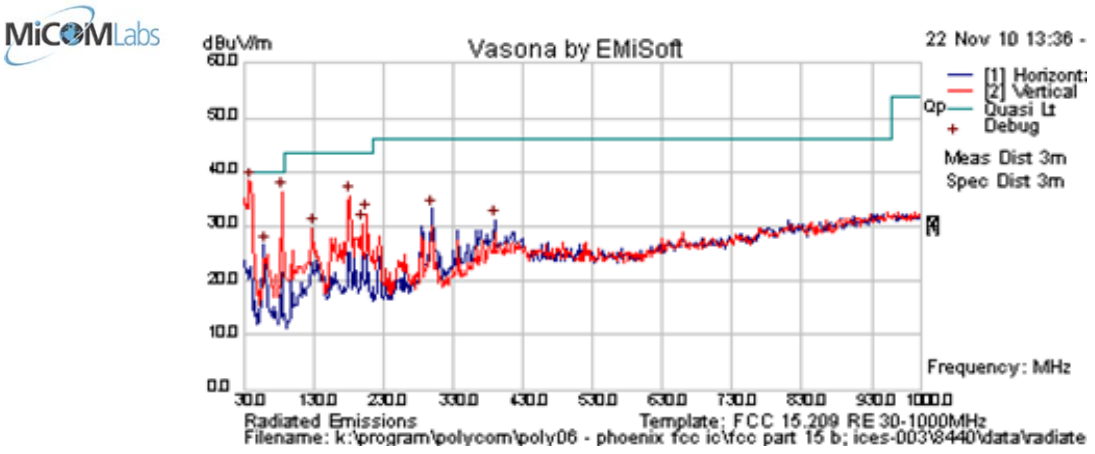
Traceability

Method	Test Equipment Used
Work instruction WI-03	0088, 0158, 0134, 0304, 0311, 0315, 0310, 0312

7.1.1 Stand Alone Charger - Measurement Results for Radiated Spurious Emissions – Digital Apparatus

EUT emissions were investigated with the EUT arranged in X, Y, and Z axis. The highest emissions orientation was chosen for the final test. Only final data is presented in this test report.

Test Freq.	N/A	**Engineer**	EVF
Variant	Digital Emissions	**Temp (°C)**	21
Freq. Range	30 MHz - 1000 MHz	**Rel. Hum. (%)**	34
Power Setting	Charger: 120VAC/ 60Hz	**Press. (mBars)**	1009
Antenna	Integral		
Test Notes 1	Handset (Model: 8440) with discharged battery (SN: AC101032008E) , headset connected, also connected to charger (Model: SA106B-05)		
Test Notes 2	Preliminary testing performed. EUT tested in vertical position/ Mode: BT Channel 39 Receive; WLAN Channel 06 Receive; WLAN=1, BT=1, BC=0, DK=1		

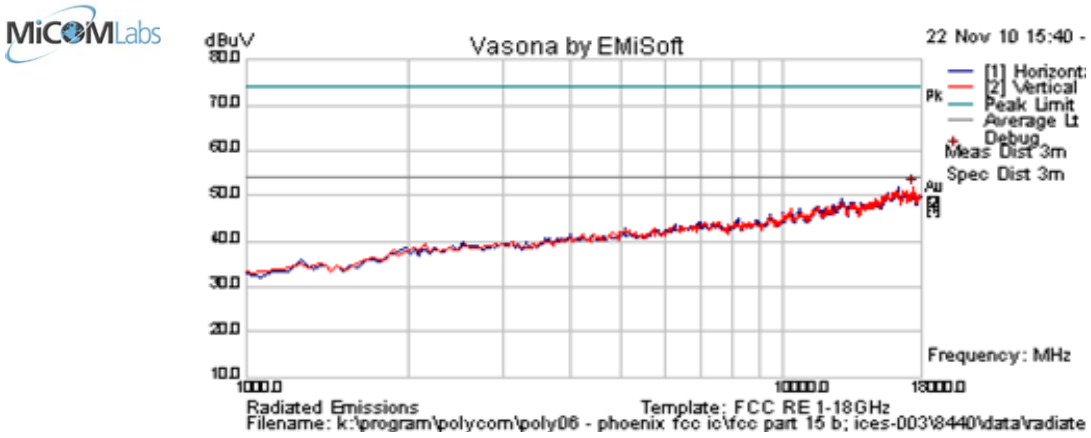


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
40.423	48.0	3.6	-17.1	34.5	Quasi Max	V	137	77	40	-5.5	Pass	DIG
85.932	47.4	4.0	-23.7	27.8	Quasi Max	V	98	246	40	-12.3	Pass	DIG
182.000	49.5	4.7	-19.6	34.5	Quasi Max	V	104	167	43.5	-9.0	Pass	DIG
207.999	46.1	4.8	-19.6	31.3	Quasi Max	V	102	171	43.5	-12.2	Pass	DIG
299.999	45.0	5.2	-16.9	33.4	Quasi Max	H	120	51	46	-12.6	Pass	DIG
200.461	45.0	4.8	-17.9	31.9	Quasi Max	V	98	0	43.5	-11.6	Pass	DIG

Legend:	DIG = Digital Device Emission; TX = Transmitter Emission; FUND = Fundamental Frequency
	NRB = Non-Restricted Band, Limit is 20 dB below Fundamental; RB = Restricted Band

Test Freq.	N/A	**Engineer**	EVF
Variant	Digital Emissions	**Temp (ºC)**	21.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum. (%)**	33
Power Setting	Charger: 120VAC/ 60Hz	**Press. (mBars)**	1007
Antenna	Integral		
Test Notes 1	Handset (Model: 8440) with discharged battery (SN: AC101032008E) , headset connected, also connected to charger (Model: SA106B-05)		
Test Notes 2	Mode: BT Channel 39 Receive; WLAN Channel 06 Receive; WLAN=1, BT=1, BC=0, DK=1		



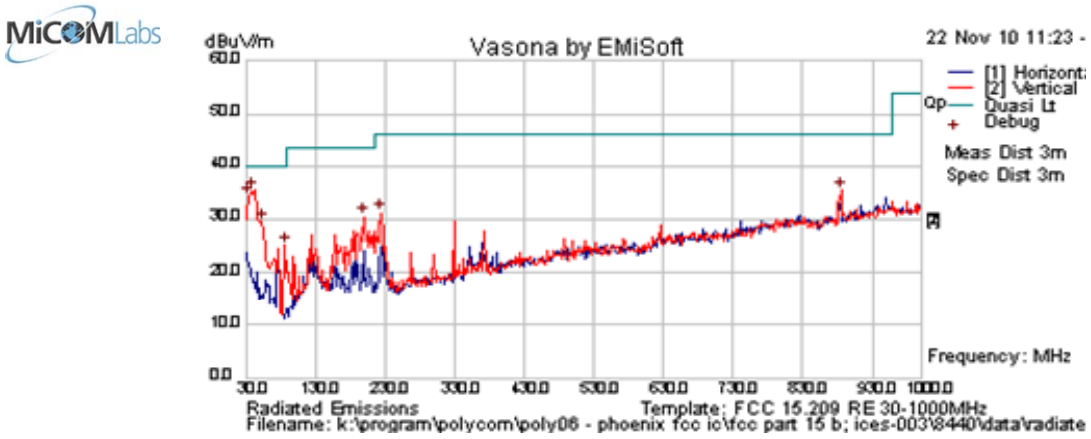
Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
No emissions above 1 GHz.												

Legend:	DIG = Digital Device Emission; TX = Transmitter Emission; FUND = Fundamental Frequency
	NRB = Non-Restricted Band, Limit is 20 dB below Fundamental; RB = Restricted Band

7.1.2 Charging Dock - Measurement Results for Radiated Spurious Emissions – Digital Apparatus

Test Freq.	N/A	**Engineer**	EVF
Variant	Digital Emissions	**Temp (ºC)**	21.5
Freq. Range	30 MHz - 1000 MHz	**Rel. Hum. (%)**	33
Power Setting	Dock: 120VAC/ 60Hz	**Press. (mBars)**	1010
Antenna	Intergal		
Test Notes 1	Handset (Model: 8440) with discharged battery (SN: AC1010320232), headset connected, charging in dock with additional battery charging (SN: AD101032019C), AC-DC Adapter (Model: HK-U-120A050-CP)		
Test Notes 2	Mode: BT Channel 39 Receive; WLAN Channel 06 Receive; WLAN=1, BT=1, BC=0, DK=1		

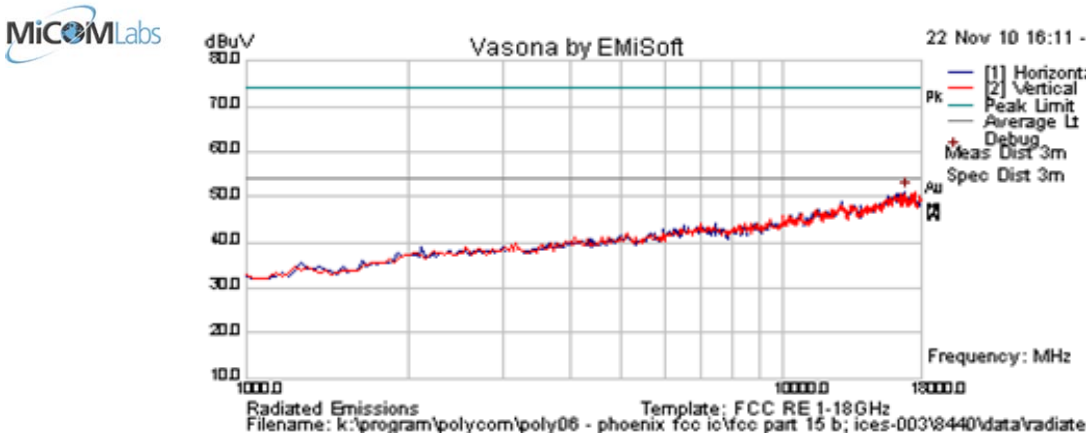


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
40.390	45.4	3.6	-17.1	31.9	Quasi Max	V	98	65	40	-8.1	Pass	
33.675	36.2	3.5	-12.1	27.6	Quasi Max	V	117	279	40	-12.4	Pass	
53.623	46.5	3.8	-23.6	26.7	Quasi Max	V	99	350	40	-13.3	Pass	
886.589	23.6	7.3	-7.3	23.6	Quasi Max	V	382	299	46	-22.4	Pass	
199.994	37.7	4.8	-17.7	24.8	Quasi Max	V	98	80	43.5	-18.8	Pass	
86.183	42.5	4.0	-23.7	22.9	Quasi Max	V	98	31	40	-17.1	Pass	
223.997	45.6	4.9	-19.4	31.1	Quasi Max	V	98	126	46	-14.9	Pass	

Legend:	DIG = Digital Device Emission; TX = Transmitter Emission; FUND = Fundamental Frequency
	NRB = Non-Restricted Band, Limit is 20 dB below Fundamental; RB = Restricted Band

Test Freq.	N/A	**Engineer**	EVF
Variant	Digital Emissions	**Temp (ºC)**	21.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum. (%)**	33
Power Setting	Dock: 120VAC/ 60Hz	**Press. (mBars)**	1007
Antenna	Intergal		
Test Notes 1	Handset (Model: 8440) with discharged battery (SN: AC1010320232), headset connected, charging in dock with additional battery charging (SN: AD101032019C), AC-DC Adapter (Model: HK-U-120A050-CP)		
Test Notes 2	Mode: BT Channel 39 Receive; WLAN Channel 06 Receive; WLAN=1, BT=1, BC=0, DK=1		



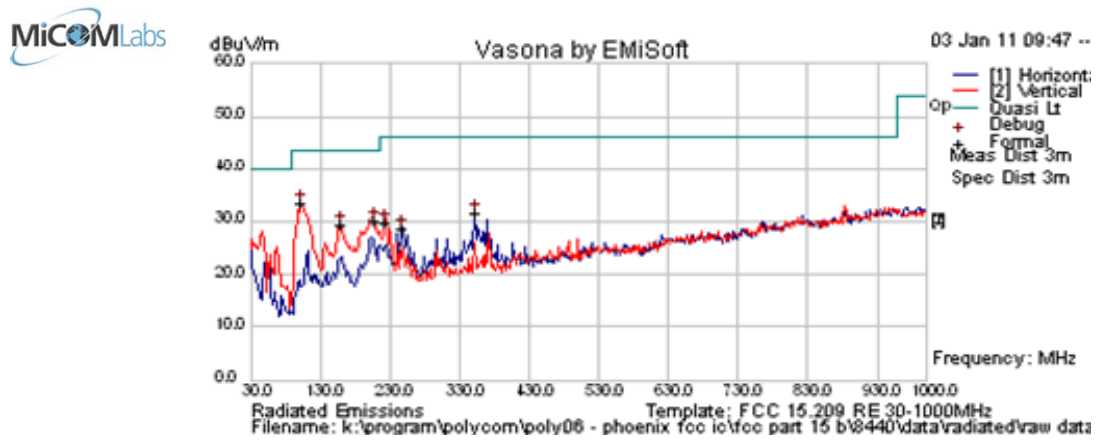
Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
No emissions above 1GHz.												

Legend:	DIG = Digital Device Emission; TX = Transmitter Emission; FUND = Fundamental Frequency
	NRB = Non-Restricted Band, Limit is 20 dB below Fundamental; RB = Restricted Band

7.1.3 Speaker Dock - Measurement Results for Radiated Spurious Emissions – Digital Apparatus

Test Freq.	N/A	**Engineer**	EVF
Variant	Digital Emissions	**Temp (ºC)**	19.5
Freq. Range	30 MHz - 1000 MHz	**Rel. Hum. (%)**	37
Power Setting	Speaker Dock: 120VAC/ 60Hz	**Press. (mBars)**	1005
Antenna	Integral		
Test Notes 1	Handset (Model: 8440) with discharged battery (SN: AC101032008E), headset connected, charging in dock with additional battery charging (SN: AD101032019C), AC-DC Adapter (Model: HK-AX-120A200-CP)		
Test Notes 2	Mode: BT Channel 39 Receive; WLAN Channel 06 Receive; WLAN=1, BT=1, BC=0, DK=1		

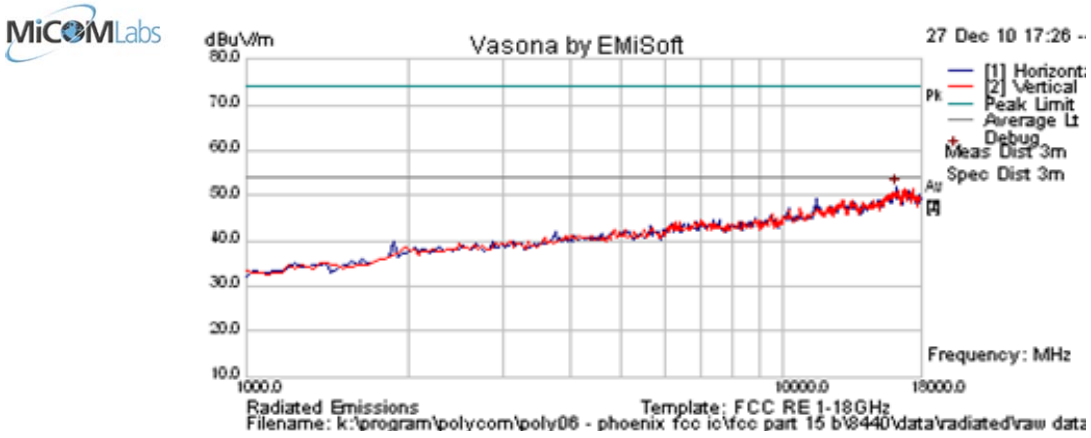


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
103.238	45.1	4.2	-20.0	29.3	Quasi Max	V	113	336	43.5	-14.2	Pass	DIG
207.372	39.9	4.8	-19.5	25.2	Quasi Max	V	98	135	43.5	-18.3	Pass	DIG
160.738	36.3	4.5	-18.3	22.5	Quasi Max	V	103	279	43.5	-21.0	Pass	DIG
351.997	41.5	5.5	-15.4	31.6	Quasi Max	H	121	360	46	-14.5	Pass	DIG
224.019	41.7	4.9	-19.4	27.2	Quasi Max	V	99	38	46	-18.8	Pass	DIG
247.999	42.6	5.0	-18.9	28.7	Quasi Max	H	157	194	46	-17.3	Pass	DIG

Legend:	DIG = Digital Device Emission; TX = Transmitter Emission; FUND = Fundamental Frequency
	NRB = Non-Restricted Band, Limit is 20 dB below Fundamental; RB = Restricted Band

Test Freq.	N/A	**Engineer**	EVF
Variant	Digital Emissions	**Temp (ºC)**	19.5
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum. (%)**	41
Power Setting	Speaker Dock: 120VAC/ 60Hz	**Press. (mBars)**	1011
Antenna	Integral		
Test Notes 1	Handset (Model: 8440) with discharged battery (SN: AC101032008E), headset connected, charging in dock with additional battery charging (SN: AD101032019C), AC-DC Adapter (Model: HK-AX-120A200-CP)		
Test Notes 2	Mode: BT Channel 39 Receive; WLAN Channel 06 Receive; WLAN=1, BT=1, BC=0, DK=1		



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
No emissions above 1 GHz.												

Legend:	DIG = Digital Device Emission; TX = Transmitter Emission; FUND = Fundamental Frequency
	NRB = Non-Restricted Band, Limit is 20 dB below Fundamental; RB = Restricted Band

7.2 Conducted Disturbance at Mains Terminal (150 kHz – 30 MHz)

Standard Reference

FCC, Part 15 Subpart C §15.107
Industry Canada ICES-003 §5.3

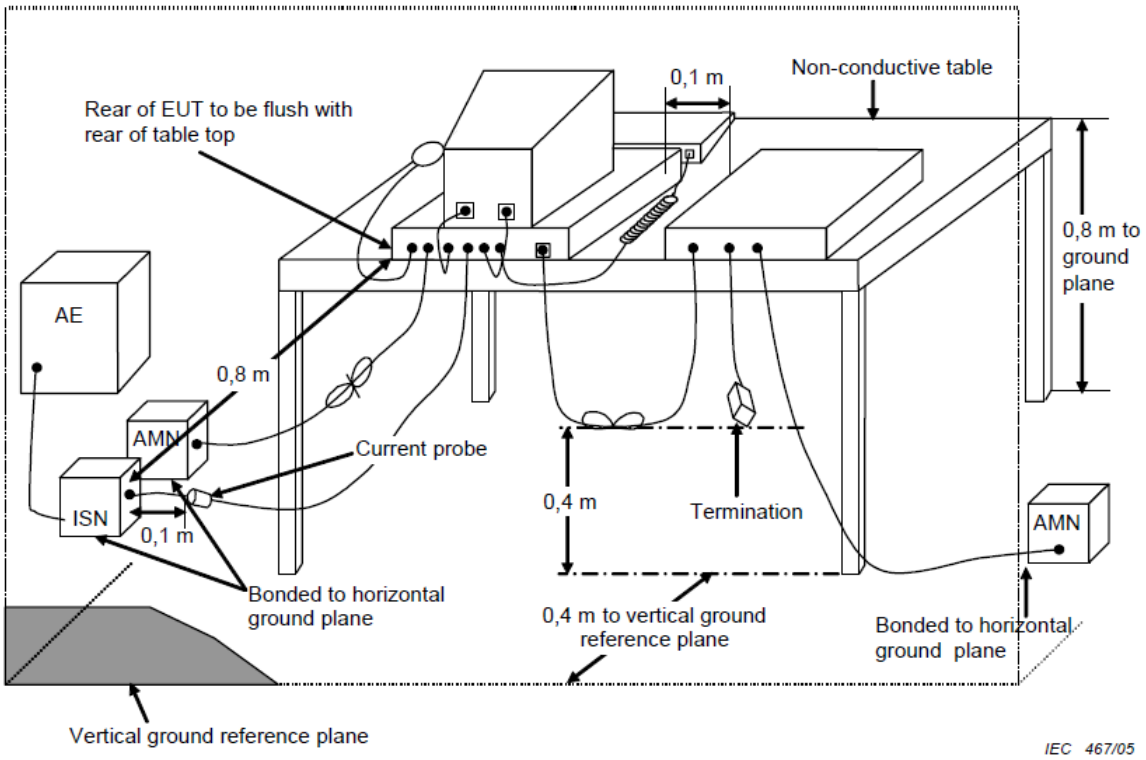
Test Procedure

The EUT is configured in accordance with ANSI C63.4. The conducted emissions are measured in a shielded room with a spectrum analyzer in peak hold in the first instance. Emissions closest to the limit are measured in the quasi-peak mode (QP) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation. The highest emissions relative to the limit are listed.

If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

If the reading of the measuring receiver shows fluctuations close to the limit, the reading shall be observed for at least 15 s at each measurement frequency; the higher reading shall be recorded with the exception of any brief isolated high reading which shall be ignored.

Test Measurement Setup



Measurement setup for Conducted Disturbance at Mains Terminals

Specification

Conducted Disturbance at Mains Terminal – Digital Apparatus

FCC, Part 15 Subpart B §15.107
(a) Except for Class A digital devices, for equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges.

(b) For a Class A digital device that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms LISN. Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Industry Canada ICES-003
The voltage of radio noise emissions that are conducted along the power supply lines of a Class A digital apparatus shall not exceed the limits specified in Table 1 of the publication referred to in Section 7.1 [Canadian Standards Association Standard CAN/CSA-CEI/IEC CISPR 22:02, "Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Equipment."], within the indicated frequency range.

The voltage of radio noise emissions that are conducted along the power supply lines of a Class B digital apparatus shall not exceed the limits specified in Table 2 of the publication referred to in Section 7.1 [Canadian Standards Association Standard CAN/CSA-CEI/IEC CISPR 22:02, "Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Equipment."], within the indicated frequency range.

FCC, Part 15 Subpart B §15.107 & Industry Canada ICES-003 Limits

Limits for conducted disturbance at the mains ports of class B ITE

Frequency of emission (MHz)	Quasi-peak (dBuV)	Average (dBuV)
0.15–0.5	66 to 56*	56 to 46*
0.5–5	56	46
5–30	60	50
Note 1	* Decreases with the logarithm of the frequency	
Note 2	* The lower limit applies at the boundary between frequency ranges	

Limits for conducted disturbance at the mains ports of class A ITE

Frequency of emission (MHz)	Quasi-peak (dBuV)	Average (dBuV)
0.15–0.5	79	66
0.5–30	73	60
Note 1	* The lower limit shall apply at the transition frequency	

Laboratory Measurement Uncertainty for Conducted Emissions

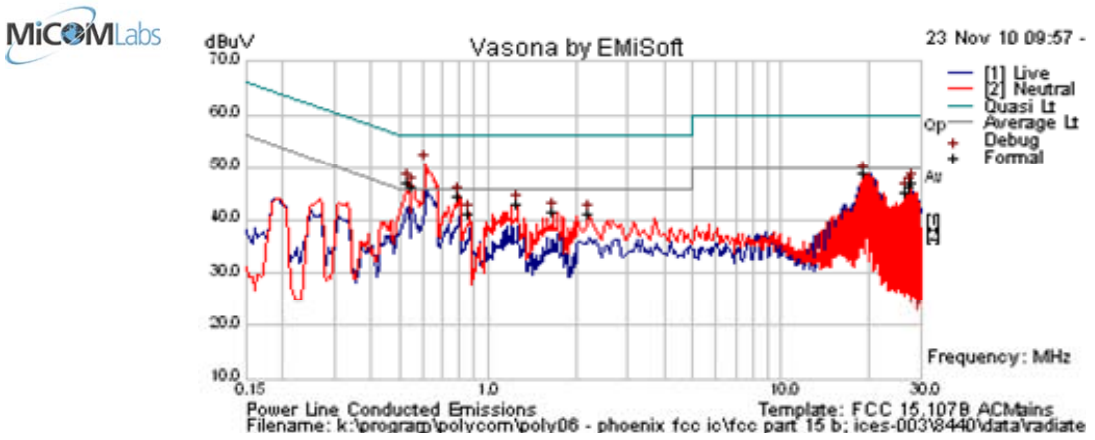
Measurement uncertainty	±2.64 dB

Traceability

Method	Test Equipment Used
Work instruction WI-EMC-01	0158, 0184, 0193, 0190, 0293, 0307

7.2.1 Stand Alone Charger - Conducted Disturbance at Mains Terminal

Test Freq.	N/A	**Engineer**	EVF
Variant	AC Line Emissions	**Temp (ºC)**	19.5
Freq. Range	0.150 MHz - 30 MHz	**Rel. Hum. (%)**	37
Power Setting	Charger: 120VAC/ 60Hz	**Press. (mBars)**	1002
Antenna	Integral		
Test Notes 1	Handset (Model: 8440) with discharged battery (SN: AC101032008E) , headset connected, also connected to charger (Model: SA106B-05)		
Test Notes 2	Mode: BT Channel 39 Receive; WLAN Channel 06 Receive; WLAN=1, BT=1, BC=0, DK=1		



Formally measured emission peaks

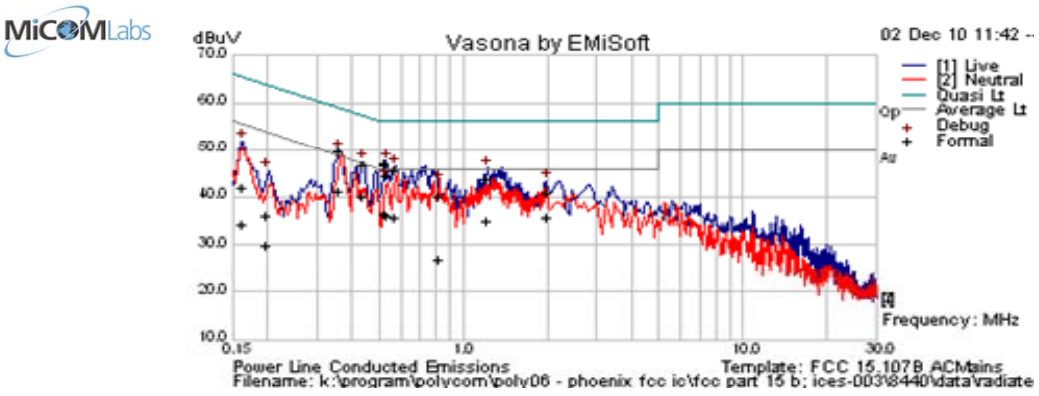
Frequency MHz	Raw dBuV	Cable Loss	Factors dB	Level dBuV	Measurement Type	Line	Limit dBuV	Margin dB	Pass /Fail	Comments
0.534	21.4	9.9	0.1	31.4	Average	Neutral	46.0	-14.6	Pass	
0.534	36.0	9.9	0.1	46.0	Quasi Peak	Neutral	56	-10.0	Pass	
0.553	22.5	9.9	0.1	32.5	Average	Neutral	46	-13.5	Pass	
0.553	35.9	9.9	0.1	45.9	Quasi Peak	Neutral	56	-10.1	Pass	
0.614	25.7	10.0	0.1	35.7	Average	Neutral	46.0	-10.3	Pass	
0.614	39.7	10.0	0.1	49.8	Quasi Peak	Neutral	56	-6.3	Pass	
0.801	22.5	10.0	0.1	32.5	Average	Neutral	46	-13.5	Pass	
0.801	33.3	10.0	0.1	43.3	Quasi Peak	Neutral	56	-12.7	Pass	
0.869	16.9	9.9	0.1	26.9	Average	Neutral	46.0	-19.1	Pass	
0.869	29.8	9.9	0.1	39.8	Quasi Peak	Neutral	56	-16.2	Pass	
1.269	20.4	10.0	0.1	30.4	Average	Neutral	46.0	-15.6	Pass	
1.269	30.2	10.0	0.1	40.3	Quasi Peak	Neutral	56	-15.7	Pass	

1.673	22.0	10.0	0.1	32.1	Average	Neutral	46.0	-13.9	Pass	
1.673	27.8	10.0	0.1	37.9	Quasi Peak	Neutral	56	-18.1	Pass	
2.206	22.0	10.1	0.1	32.2	Average	Neutral	46.0	-13.9	Pass	
2.206	28.4	10.1	0.1	38.5	Quasi Peak	Neutral	56	-17.5	Pass	
19.183	16.1	10.5	0.7	27.3	Average	Neutral	50	-22.7	Pass	
19.183	31.6	10.5	0.7	42.8	Quasi Peak	Neutral	60	-17.2	Pass	
26.837	12.2	10.7	0.9	23.8	Average	Neutral	50.0	-26.2	Pass	
26.837	27.1	10.7	0.9	38.7	Quasi Peak	Neutral	60	-21.3	Pass	
27.779	12.1	10.7	0.9	23.7	Average	Neutral	50.0	-26.3	Pass	
27.779	27.1	10.7	0.9	38.8	Quasi Peak	Neutral	60	-21.2	Pass	
28.069	11.8	10.7	0.9	23.5	Average	Neutral	50	-26.5	Pass	
28.069	27.6	10.7	0.9	39.2	Quasi Peak	Neutral	60	-20.8	Pass	

Legend:	DIG = Digital Device Emission; TX = Transmitter Emission; FUND = Fundamental Frequency
	NRB = Non-Restricted Band, Limit is 20 dB below Fundamental; RB = Restricted Band

7.2.2 Charging Dock - Conducted Disturbance at Mains Terminal

Test Freq.	N/A	**Engineer**	EVF
Variant	AC Line Emissions	**Temp (ºC)**	21.4
Freq. Range	30 MHz - 1000 MHz	**Rel. Hum.(%)**	33
Power Setting	Dock with AC-DC Adapter: 120VAC/ 60Hz	**Press. (mBars)**	1010
Antenna	Integral		
Test Notes 1	Handset (Model: 8440) with discharged battery (SN: AC101032008E), headset connected, charging in dock with additional battery charging (SN: AD101032019C), AC-DC Adapter (Model: HK-U-120A050-CP)		
Test Notes 2	Mode: BT Channel 39 Receive; WLAN Channel 06 Receive; WLAN=1, BT=1, BC=0, DK=1		



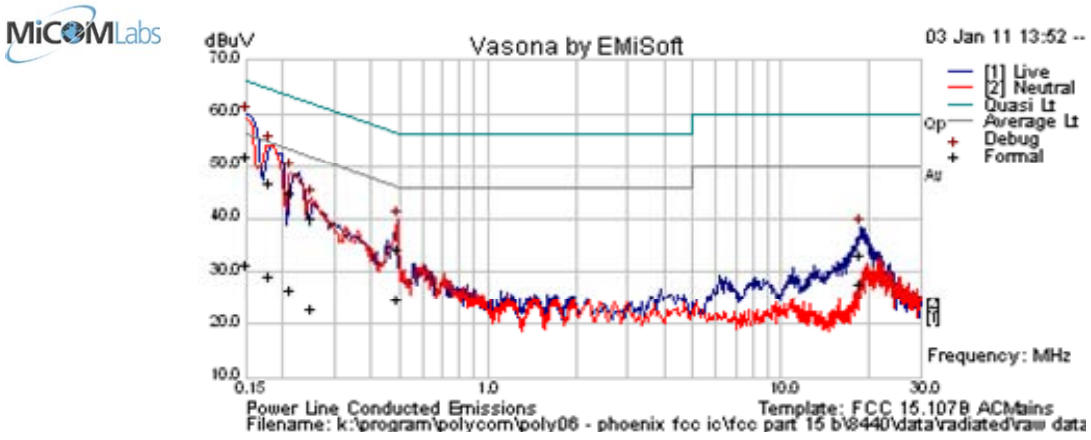
Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	Factors dB	Level dBuV	Measurement Type	Line	Limit dBuV	Margin dB	Pass /Fail	Comments
0.363	31.4	9.9	0.1	41.3	Average	Live	48.66	-7.3	Pass	
0.363	39.9	9.9	0.1	49.8	Quasi Peak	Live	58.66	-8.9	Pass	
0.442	30.2	9.9	0.1	40.1	Average	Live	47.02	-6.9	Pass	
0.442	36.9	9.9	0.1	46.9	Quasi Peak	Live	57.02	-10.2	Pass	
0.527	26.5	9.9	0.1	36.5	Average	Live	46	-9.5	Pass	
0.527	37.0	9.9	0.1	47.0	Quasi Peak	Live	56	-9.0	Pass	
0.528	26.5	9.9	0.1	36.5	Average	Live	46	-9.5	Pass	
0.528	36.9	9.9	0.1	46.9	Quasi Peak	Live	56	-9.1	Pass	
0.532	26.1	9.9	0.1	36.1	Average	Live	46	-9.9	Pass	
0.532	34.4	9.9	0.1	44.4	Quasi Peak	Live	56	-11.6	Pass	
0.570	25.9	9.9	0.1	35.9	Average	Live	46	-10.1	Pass	
0.570	35.5	9.9	0.1	45.6	Quasi Peak	Live	56	-10.4	Pass	
1.216	25.1	10.0	0.1	35.2	Average	Live	46	-10.8	Pass	
1.216	33.7	10.0	0.1	43.7	Quasi Peak	Live	56	-12.3	Pass	
2.010	25.5	10.1	0.1	35.7	Average	Live	46	-10.3	Pass	
2.010	30.9	10.1	0.1	41.1	Quasi Peak	Live	56	-15.0	Pass	

Legend:	DIG = Digital Device Emission; TX = Transmitter Emission; FUND = Fundamental Frequency
	NRB = Non-Restricted Band, Limit is 20 dB below Fundamental; RB = Restricted Band

7.2.3 Speaker Dock - Conducted Disturbance at Mains Terminal

Test Freq.	N/A	**Engineer**	EVF
Variant	AC Line Emissions	**Temp (ºC)**	19.5
Freq. Range	0.150 MHz - 30 MHz	**Rel. Hum. (%)**	36
Power Setting	Speaker Dock: 120VAC/ 60Hz	**Press. (mBars)**	1005
Antenna	Integral		
Test Notes 1	Handset (Model: 8440) with discharged battery (SN: AC101032008E), headset connected, charging in speaker dock with additional battery charging (SN: AD101032019C), AC-DC Adapter (Model: HK-AX-120A200-CP)		
Test Notes 2	Mode: BT Channel 39 Receive; WLAN Channel 06 Receive; WLAN=1, BT=1, BC=0, DK=1		



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	Factors dB	Level dBuV	Measurement Type	Line	Limit dBuV	Margin dB	Pass /Fail	Comments
0.150	21.3	9.9	0.1	31.3	Average	Live	56	-24.7	Pass	
0.150	41.8	9.9	0.1	51.8	Quasi Peak	Live	66	-14.2	Pass	
0.179	19.0	9.9	0.1	29.0	Average	Neutral	54.53	-25.6	Pass	
0.179	36.8	9.9	0.1	46.8	Quasi Peak	Neutral	64.53	-17.7	Pass	
0.213	16.6	9.9	0.1	26.6	Average	Neutral	53.09	-26.5	Pass	
0.213	34.9	9.9	0.1	44.8	Quasi Peak	Neutral	63.09	-18.3	Pass	
0.249	12.8	9.9	0.1	22.8	Average	Neutral	51.79	-29.0	Pass	
0.249	30.1	9.9	0.1	40.1	Quasi Peak	Neutral	61.79	-21.7	Pass	
0.493	14.7	9.9	0.1	24.7	Average	Neutral	46.12	-21.4	Pass	
0.493	24.2	9.9	0.1	34.2	Quasi Peak	Neutral	56.12	-21.9	Pass	
18.737	16.3	10.5	0.7	27.5	Average	Live	50	-22.5	Pass	
18.737	21.9	10.5	0.7	33.1	Quasi Peak	Live	60	-26.9	Pass	

Legend:	DIG = Digital Device Emission; TX = Transmitter Emission; FUND = Fundamental Frequency
	NRB = Non-Restricted Band, Limit is 20 dB below Fundamental; RB = Restricted Band

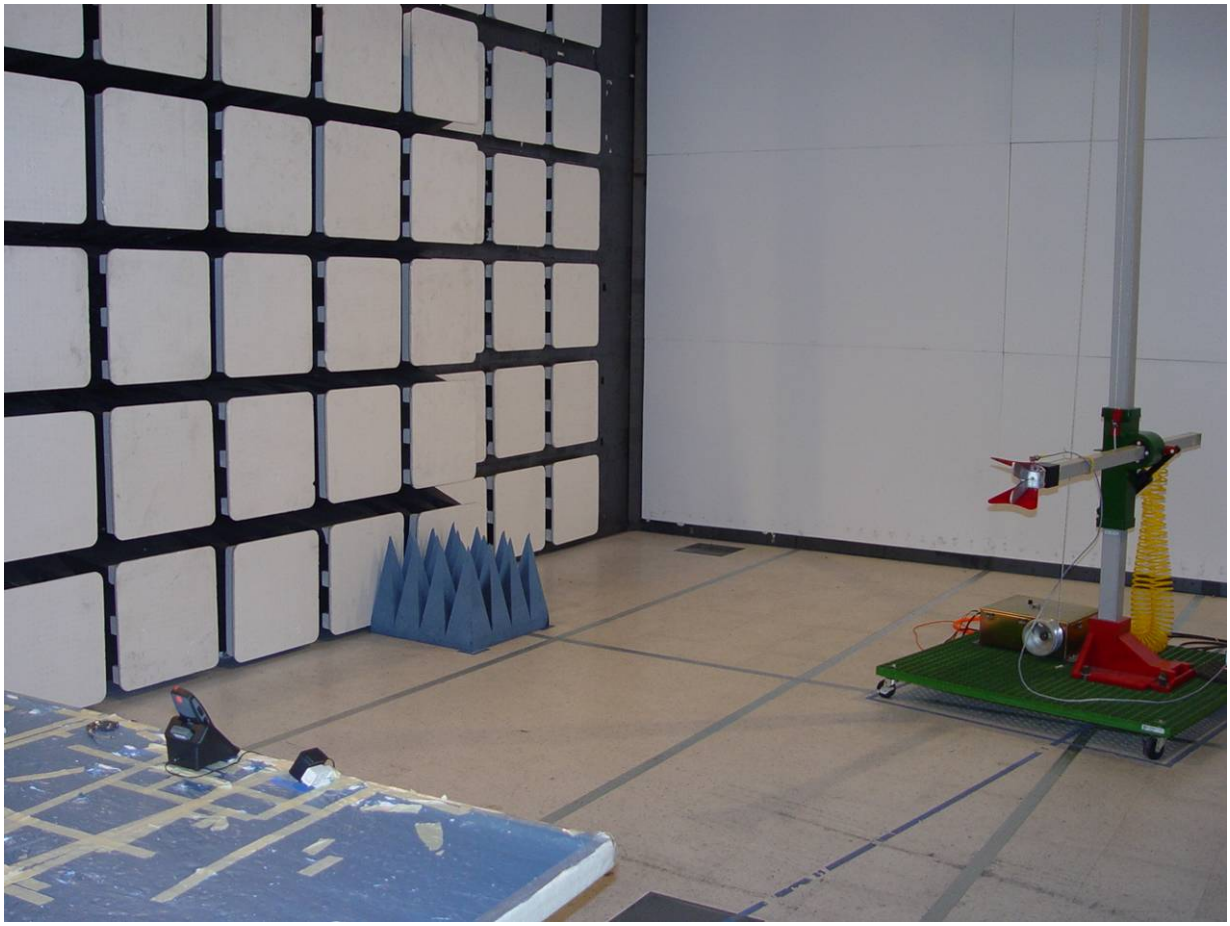
8 Photographs

8.1 Radiated Emission below 1 GHz with Stand Alone Charger

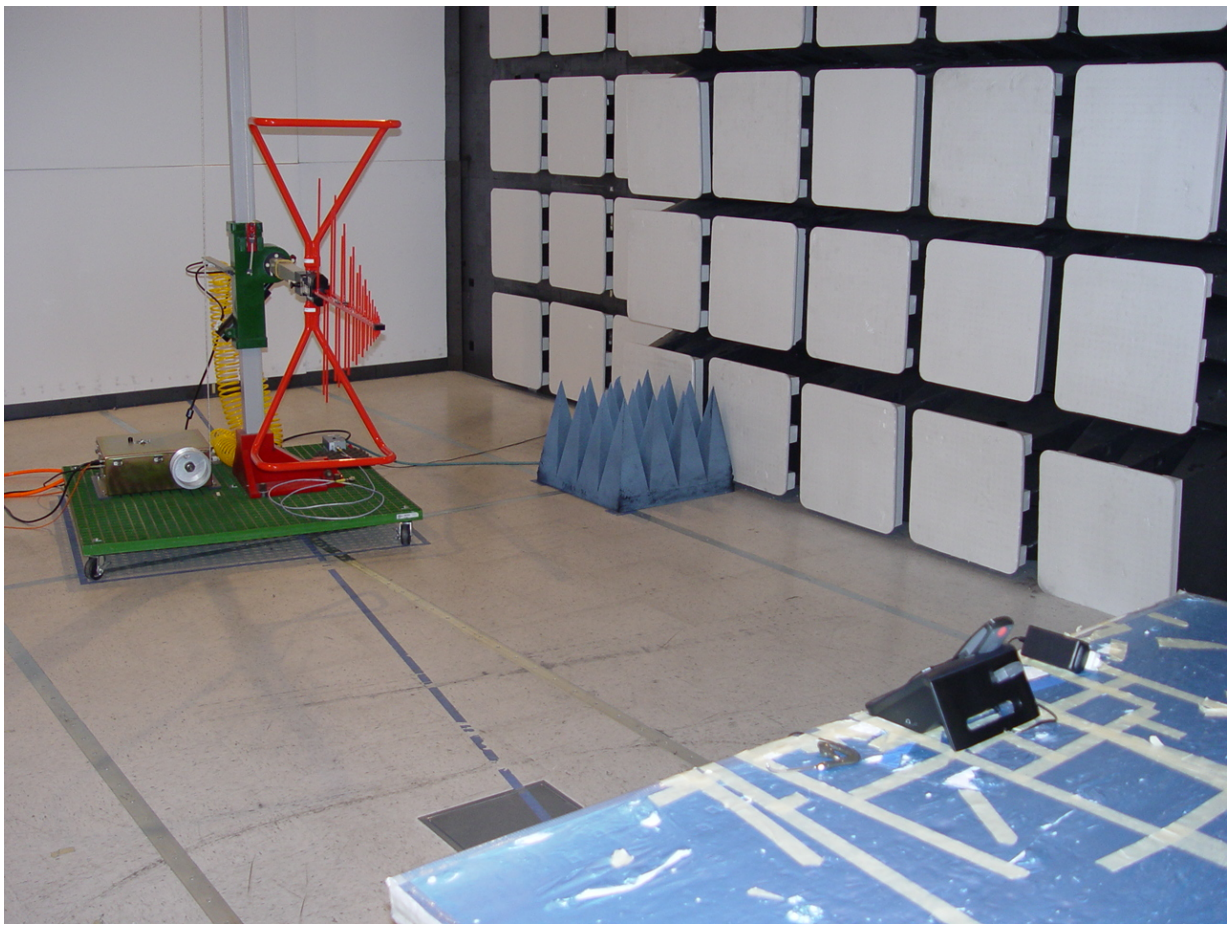
8.2 Radiated Emissions above 1 GHz with Stand Alone Charger

8.3 Radiated Emission below 1 GHz with Charging Dock

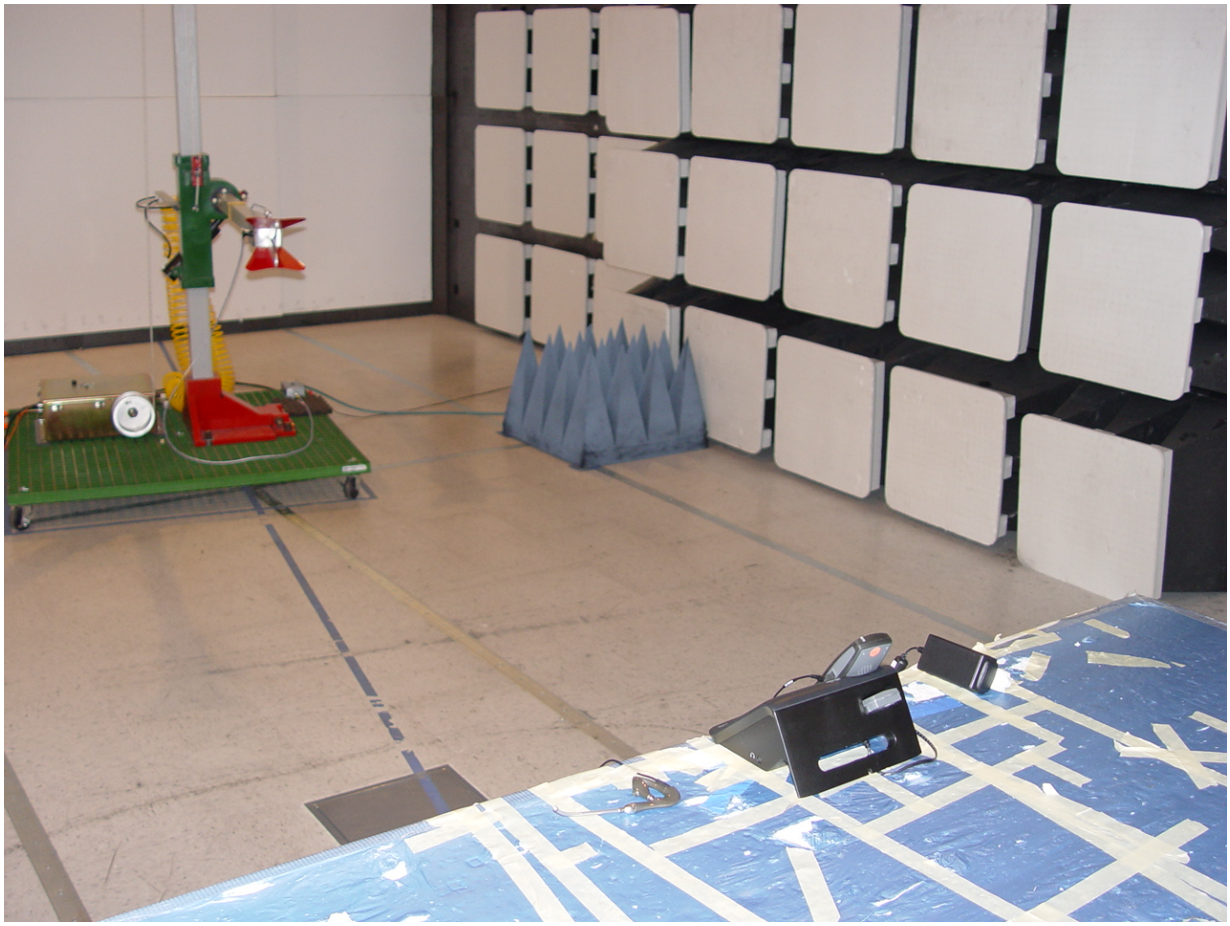
8.4 Radiated Emissions above 1 GHz with Charging Dock



8.5 Radiated Emission below 1 GHz with Speaker Dock

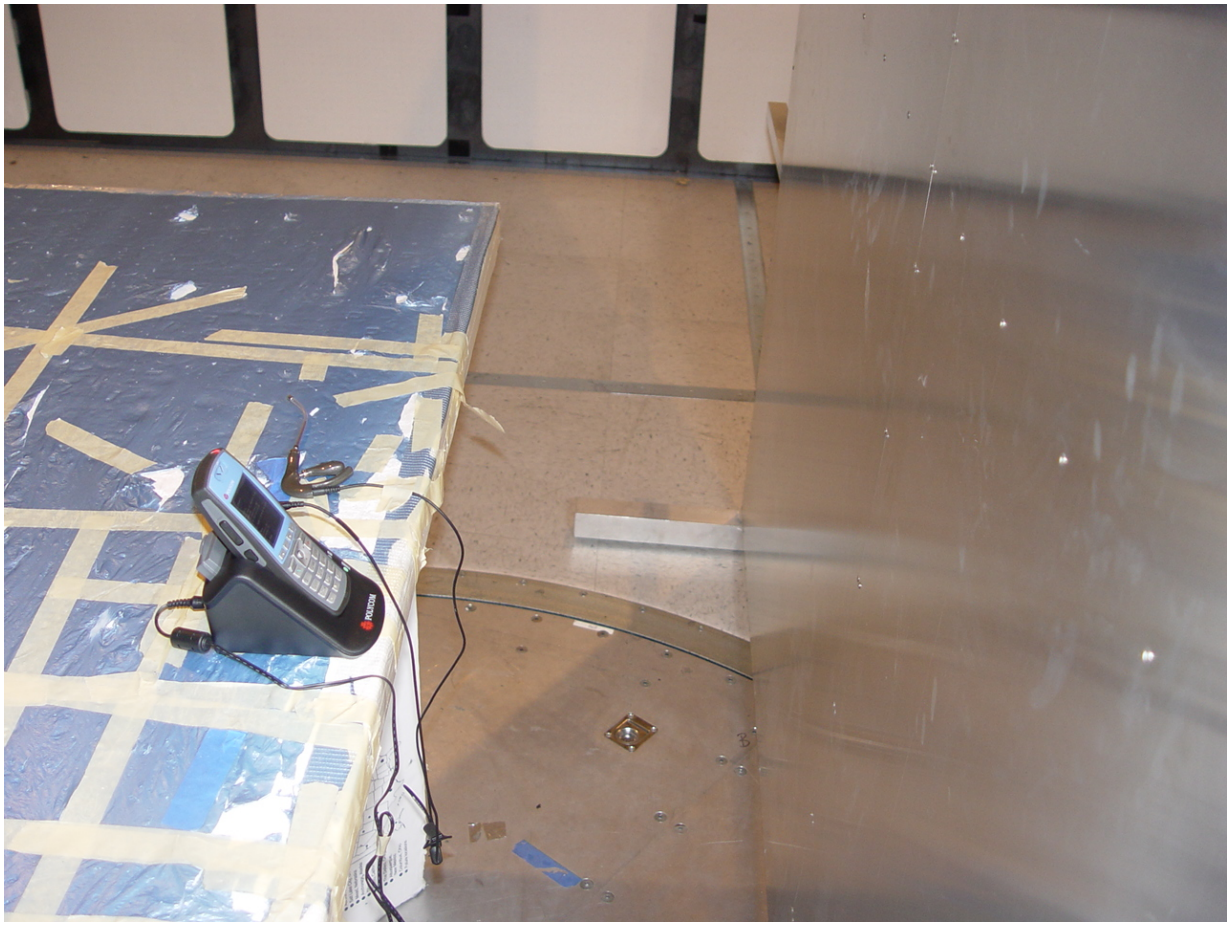


8.6 Radiated Emission above 1 GHz with Speaker Dock

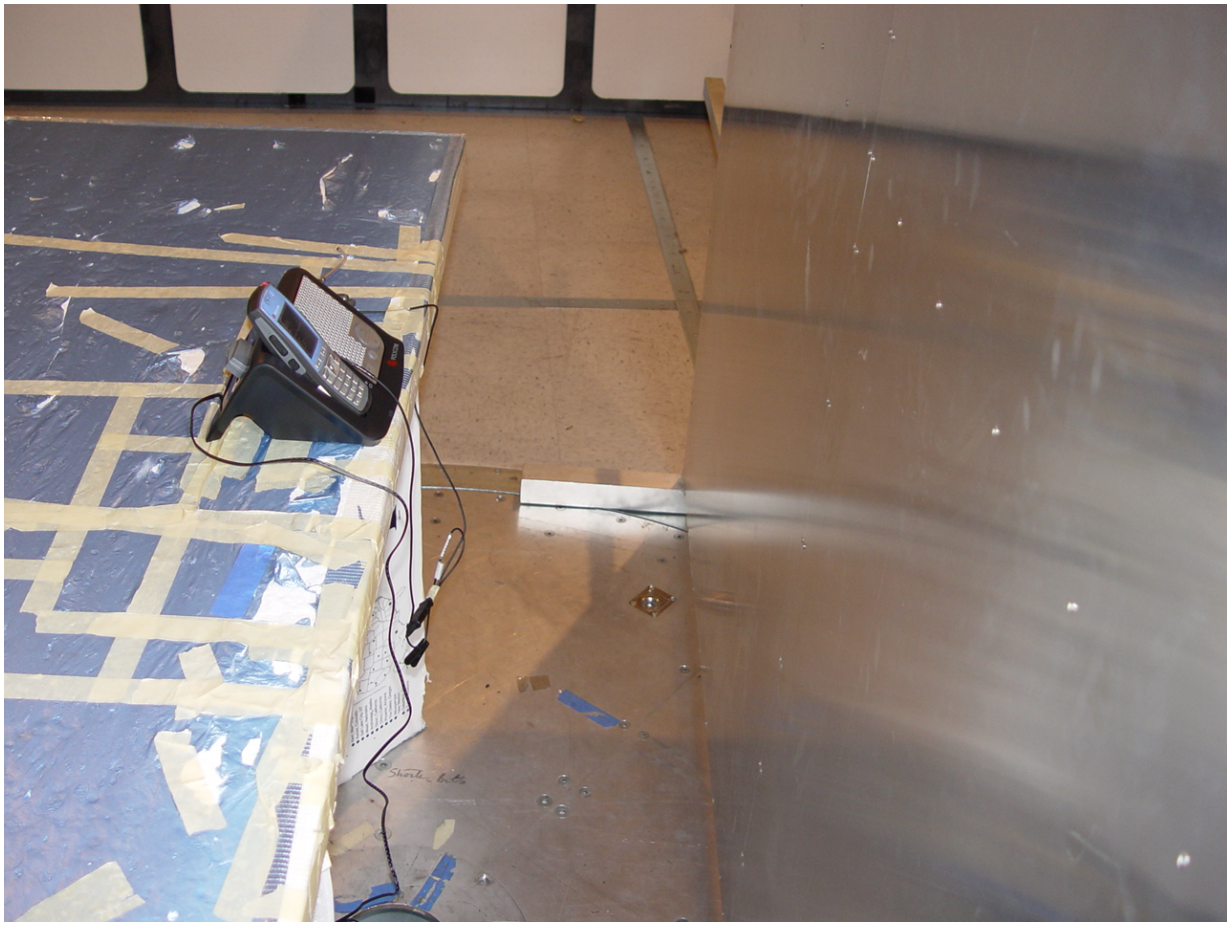


8.7 AC Mains Conducted Emissions with Stand Alone Charger

8.8 AC Mains Conducted Emissions with Charging Dock



8.9 AC Mains Conducted Emissions with Speaker Dock



9 TEST EQUIPMENT DETAILS

Asset #	Instrument	Manufacturer	Part #	Serial #
0134	Amplifier	Com Power	PA 122	181910
0158	Barometer /Thermometer	Control Co.	4196	E2846
0287	EMI Receiver	Rhode & Schwartz	ESIB 40	100201
0193	EMI Receiver	Rhode & Schwartz	ESIB 7	838496/007
0252	SMA Cable	Megaphase	Sucoflex 104	None
0310	2m SMA Cable	Micro-Coax	UFA210A-0-0787-3G03G0	209089-001
0312	3m SMA Cable	Micro-Coax	UFA210A-1-1181-3G0300	209092-001
0313	Coupler	Hewlett Packard	86205A	3140A01285
0314	30dB N-Type Attenuator	ARRA	N9444-30	1623
0070	Power Meter	Hewlett Packard	437B	3125U11552
0116	Power Sensor	Hewlett Packard	8485A	3318A19694
0117	Power Sensor	Hewlett Packard	8487D	3318A00371
0184	Pulse Limiter	Rhode & Schwartz	ESH3Z2	357.8810.52
0190	LISN	Rhode & Schwartz	ESH3Z5	836679/006
0293	BNC Cable	Megaphase	1689 1GVT4	15F50B001
0301	5.6 GHz Notch Filter	Micro-Tronics	RBC50704	001
0302	5.25 GHz Notch Filter	Micro-Tronics	BRC50703	002
0303	5.8 GHz Notch Filter	Micro-Tronics	BRC50705	003
0304	2.4GHzHz Notch Filter	Micro-Tronics	--	001
0307	BNC Cable	Megaphase	1689 1GVT4	15F50B002
0335	1-18GHz Horn Antenna	ETS- Lindgren	3117	00066580
0337	Amplifier	MiCOM Labs	--	--
0338	Antenna	Sunol Sciences	JB-3	A052907
0342	2.4 GHz Notch Filter	EWT	EWT-14-0203	H1

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