DECLARATION OF COMPLIANCE - FCC PART 80 & IC RSS-182 (Issue 4)

Test Lab Information	**Name**	**CELLTECH LABS INCORPORATED**	
	Address	21-364 Lougheed Road, Kelowna, British Columbia V1X 7R8 Canada	
Test Site Registration No.(s)	**FCC**	Accredited Site	
	IC	3874A-1	
Applicant Information	**Name**	**UNIDEN AMERICA CORPORATION**	
	Address	4700 Amon Carter Boulevard, Fort Worth, Texas 76155 United States	
Standard(s) & Procedure(s)	**FCC**	47 CFR Part 2; Part 80	
	IC	RSS-182 Issue 4; RSS-Gen Issue 3	
	ANSI	TIA/EIA-603-C-2004	
		C63.4-2003	
Device Classification(s)	**FCC**	Licensed Non-Broadcast Transmitter Held to Face (TNF)	47 CFR §80
	IC	Maritime Radio Transmitter/Receiver in the Band 156-162.5 MHz	RSS-182 Issue 4
Device Category	**FCC/IC**	Portable	
RF Exposure Category	**FCC/IC**	General Population / Uncontrolled	
Application Type	**FCC/IC**	New Certification	
Device Identifier(s)	**FCC ID:**	AMWUT638	
	IC:	513C-UT638	
Device Under Test (DUT)	Portable VHF/UHF Marine/FRS/GMRS Push-To-Talk (PTT) Radio Transceiver (VHF Marine Band)		
Date of Sample Receipt	January 12, 2011		
Date(s) of Evaluation	January 13-17, 2011		
Device Model(s)	VHF255		
Test Sample Serial No.(s)	No. 4 (Identical Prototype)		
Hardware Revision No.	EPP10		
Firmware Revision No.	Ver. 1.02		
Transmit Frequency Range(s)	156.025 - 157.425 MHz (VHF Marine Band)		
Manuf. Rated Output Power	5 Watts Conducted (+0.25W / -1W)		
Max. RF Output Power Tested	5 Watts Conducted		
Modulation Type(s)	FM		
Emission Designator(s)	16K0G3E		
Antenna Type(s) Tested	Whip (Non-detachable)		
Power Source(s) Tested	Li-Ion Battery Pack (7.4V, 1040mAh) Model: BT-1020		

This wireless device has demonstrated compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in FCC 47 CFR Rule Parts 2 and Part 80; Industry Canada RSS-182 Issue 4 and RSS-Gen Issue 3; ANSI TIA/EIA-603-C-2004 and C63.4-2003.

I attest to the accuracy of data. All measurements were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

The results and statements contained in this report pertain only to the device(s) evaluated.

This test report shall not be reproduced partially, or in full, without the prior written approval of Celltech Labs Inc.

Test Report Approved By	Sean Johnston	**Sean Johnston**	**Lab Manager**	**Celltech Labs Inc.**

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FIGURES

TEST SUMMARY

Referenced Standard(s):		FCC CFR Title 47 Parts 2, 80				
Appendix	**Description of Test**	**Procedure Reference**	**Limit Reference**	**Test Start**	**Test End**	**Result**
A	RF Output Power	ANSI/TIA/EIA-603-C	§2.1046, §80.215	13-Jan-11	13-Jan-11	Pass
B	Spurious Emissions at the antenna terminals (Conducted)	ANSI/TIA/EIA-603-C	§2.1051, 80.211	13-Jan-11	13-Jan-11	Pass
C	Modulation Limiting	ANSI/TIA/EIA-603-C	§2.1047, §80.213	14-Jan-11	14-Jan-11	Pass
D	Audio Frequency Response	ANSI/TIA/EIA-603-C	§2.1047, §80.213	14-Jan-11	14-Jan-11	Pass
E	Low-Pass Filter Response	ANSI/TIA/EIA-603-C	§2.1047, §80.213	14-Jan-11	14-Jan-11	Pass
F	Occupied Bandwidth and Emission Mask	ANSI/TIA/EIA-603-C	§2.1049, §80.211	14-Jan-11	14-Jan-11	Pass
G	Radiated TX Spurious Emissions	ANSI/TIA/EIA-603-C	§2.1053	13-Jan-11	13-Jan-11	Pass
H	Radiated RX Spurious Emissions	n/a	n/a	n/a	n/a	n/a
I	Frequency Stability	ANSI/TIA/EIA-603-C	§2.1055, §80.209	17-Jan-11	17-Jan-11	Pass
Referenced Standard(s):		**Industry Canada RSS-182 Issue 4**				
Appendix	**Description of Test**	**Procedure Reference**	**Limit Reference**	**Test Start**	**Test End**	**Result**
A	Transmitter Output power	RSS-Gen 4.8 RSS-182 4.3	RSS-182 6.2	13-Jan-11	13-Jan-11	Pass
B	Spurious Emissions at the antenna terminals (Conducted)	RSS-Gen 4.9 RSS-182 4.4	RSS-182 6.3	13-Jan-11	13-Jan-11	Pass
C	Modulation Limiting	ANSI/TIA/EIA-603-C	RSS-182	14-Jan-11	14-Jan-11	Pass
D	Audio Frequency Response	ANSI/TIA/EIA-603-C	RSS-182	14-Jan-11	14-Jan-11	Pass
E	Low-Pass Filter Response	ANSI/TIA/EIA-603-C	RSS-182	14-Jan-11	14-Jan-11	Pass
F	Occupied Bandwidth and Emission Mask	RSS-Gen 4.6.1	RSS-182	14-Jan-11	14-Jan-11	Pass
G	Radiated TX Spurious Emissions	RSS-Gen 4.9 RSS-182 4.4	RSS-182 6.3	13-Jan-11	13-Jan-11	Pass
H	Radiated RX Spurious Emissions	RSS-Gen 4.10 RSS-182 4.5	RSS-182 6.7	13-Jan-11	13-Jan-11	Pass
I	Frequency Stability	RSS-Gen 4.7 RSS-182 4.2	RSS-182 6.1	17-Jan-11	17-Jan-11	Pass

REVISION LOG

Revision	Description	Implemented By	Implementation Date
1.0	Initial Release	Jon Hughes	February 08, 2011
1.1	Corrected antenna description	Jon Hughes	February 11, 2011
1.2	Corrected power tolerance spec.	Jon Hughes	February 24, 2011
1.3	**Added Section 6.0 (page 7)**	**Jon Hughes**	**March 07, 2011**

Test Report Prepared By	Date	QA Review By	Date
Sean Johnston	February 07, 2011	Jon Hughes	February 07, 2011

1.0 SCOPE

This report outlines the measurements made and results collected during electromagnetic emissions testing of the Uniden America Corporation Model: VHF255 Portable FM VHF/UHF Marine/FRS/GMRS Push-To-Talk (PTT) Radio Transceiver (FCC ID: AMWUT052 / IC: 513C-UT052). The measurement results were applied against the applicable EMC requirements and limits outlined in the technical rules and regulations set forth in the Federal Communication's Commission Code of Federal Regulations Title 47 Part 2 and Part 80; and Industry Canada Radio Standards Specification RSS-182 Issue 4 and RSS-Gen Issue 3.

2.0 REFERENCES

2.1 Normative References

ANSI/ISO 17025:2005	General Requirements for competence of testing and calibration laboratories
IEEE/ANSI C63.4:2003	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
ANSI/TIA/EIA-603-C:2004	Land Mobile FM or PM Communication Equipment Measurement and Performance Standards
CFR Title 47 Part 2	Code of Federal Regulations Title 47: Telecommunication Part 2: Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
CFR Title 47 Part 80	Code of Federal Regulations Title 47: Telecommunication Part 80: Station in the Maritime Services
IC Spectrum Management & Telecommunications Policy	Radio Standards Specification RSS-182 Issue 4 - Maritime Radio Transmitters and Receivers in the Band 156-162.5 MHz RSS-Gen Issue 3 - General Requirements and Information for the Certification of Radiocommunication Equipment

3.0 PASS/FAIL CRITERIA

Unless otherwise noted in the Appendices, the pass/fail criteria is the limit set forth in the reference standards. The DUT is considered to have passed the requirements if the data collected during the described measurement procedure is no greater than the specified limits as defined. The pass/fail statements made in this report only apply to the unit tested.

4.0 FACILITIES AND ACCREDITATIONS

The facilities used in collecting the test results outlined in this report are located at 21-364 Lougheed Road, Kelowna, British Columbia, Canada V1X 7R8. The radiated emissions site conforms to the requirements set forth in ANSI C63.4 and is filed and listed with the FCC under Registration Number 714830 and Industry Canada under File Number IC 3874A-1.

5.0 GENERAL INFORMATION

5.1 Applicant Information

Company Name	**UNIDEN AMERICA CORPORATION**
Address	4700 Amon Carter Boulevard
	Fort Worth, Texas 76155
	United States

5.2 DUT Description

Device Type	Portable VHF/UHF Marine/FRS/GMRS Push-To-Talk Radio Transceiver (VHF Marine Band)	
Device Model(s)	VHF255	
Test Sample Serial No.(s)	No.4 (Identical Prototype)	
Device Identifier(s)	**FCC ID:**	AMWUT638
	IC:	513C-UT638
Co-located Transmitter(s)	None	
Antenna Type Tested	Whip (Non-detachable)	
Power Source Tested	Li-Ion Battery Pack (7.4V, 1040mAh) Model: BT-1020	

5.3 Rule Part(s) & Classification(s)

Rule Part(s) Applied	**FCC**	47 CFR §2; §80
	IC	RSS-182 Issue 4
Device Classification(s)	**FCC**	Licensed Non-Broadcast Transmitter Held to Face (TNF)
	IC	Maritime Radio Transmitter and Receiver in the Band 156-162.5 MHz

5.4 Mode(s) of Operation Tested

5.4.1 PTT Radio Transceiver

5.4.1.1 VHF Marine Band

Transmitter Frequency Range(s)	156.025 - 157.425 MHz
Transmitter Test Channel(s)	156.7 MHz (Channel 14)
Output Power Tested	5 Watts Conducted (High Power Setting)
Transmitter Test Mode(s)	Enter TX Test Mode (keypad entry) - Select Channel (keypad entry); Continuous Transmit with PTT constantly depressed (High power setting)
Modulation Type(s)	FM

5.5 Modification(s)

None

6.0 RANGE OF OPERATING POWER (FCC §2.1033(c)(6))

VHF255 TX Power Tolerance Spec.:

VHF 5W MODE	4.0w to 5.25w
VHF 2.5W MODE	1.8w to 3.2w
VHF 1W MODE	0.5w to 1.5w

Appendix A RF Output Power Measurement

A.1 REFERENCES	
Normative Reference Standard	FCC CFR 47 §2.1046, §80.215; IC RSS-182
Procedure Reference	The RF output power measurements were performed in accordance with TIA/EIA Standard 603.

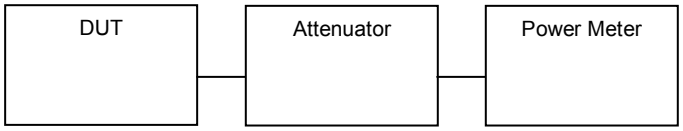
A.2 LIMITS	
FCC CFR 47 §80.215	Marine utility stations and hand-held portable transmitters: 156-162 MHz–10W
RSS-182 6.2	The output power shall be within ±1.0dB of the manufacturers rated power, hand-held portable transmitters 5W (Typical)

A.3 ENVIRONMENTAL CONDITIONS	
Temperature	25 +/- 5 ºC
Humidity	40 +/- 10 %
Barometric Pressure	101 +/- 3 kPa

ASSET NUMBER	MANUFACTURER	MODEL	DESCRIPTION	CAL DUE
00015	HP	E4408B	Spectrum Analyzer	03-May-12
00007	Gigatronics	8652A	Power Meter	04-May-12
00014	Gigatronics	80701A	Power Sensor	04-May-12

A.4 SETUP DRAWING

Figure A.4-1 - Setup Drawing – RF Output Power



A.5 TEST RESULTS

Measured Frequency	Output Power Conducted
(MHz)	(Watts)
156.7	5.0

FCC Rule Part 2.1033 (C)(8) DC Input into final amplifier

Frequency	Voltage	Current	Power
(MHz)	V	A	W
156.7	7.4	1.5	11.1

A.6 PASS/FAIL

In reference to the results outlined in A.5, the DUT passes the requirements as stated in the reference standards.

A.7 SIGN-OFF

I attest to the accuracy of the data. All measurements reported herein were performed by me and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements.

Sean Johnston
Lab Manager
Celltech Labs Inc.

Jan 13, 2011
Date

Appendix B Spurious Emissions at the Antenna Terminal

B.1 REFERENCES

Normative Reference Standard	FCC CFR 47 §2.1051, §80.211; IC RSS-182
Procedure Reference	The spurious emissions measurements at the antenna terminal were performed in accordance with TIA/EIA Standard 603.

B.2 LIMITS

FCC CFR 47 §80.211	43 + 10 Log (Po) = 43 + 10 Log (5) = 57 dB

B.3 ENVIRONMENTAL CONDITIONS

Temperature	25 +/- 5 ºC
Humidity	40 +/- 10 %
Barometric Pressure	101 +/- 3 kPa

ASSET NUMBER	MANUFACTURER	MODEL	DESCRIPTION	CAL DUE
00015	HP	E4408B	Spectrum Analyzer	03-May-12

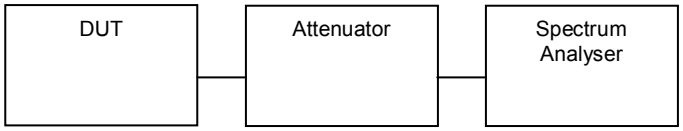
B.4 MEASUREMENT EQUIPMENT SETUP

MEASUREMENT EQUIPMENT CONNECTIONS	Carrier modulated 100%, spectrum scanned up to the 10th harmonic.
MEASUREMENT EQUIPMENT SETTINGS	For measuring the radiated field strength of the fundamental, the spectrum analyzer was set to the following settings:

Mode	Span	RBW	VBW	Detector
		MHz	MHz	
30 MHz - 1 GHz	10 MHz	100	300	Peak
> 1 GHz	50 MHz	1	3	Peak

B.5 SETUP DRAWING

Figure B.5-1 - Setup Drawing – Spurious Emissions at the Antenna Terminal



B.6 TEST RESULTS

Emission Frequency MHz	dB below Carrier (dBc)
156.7	0
313.4	65.1
470.1	59.3

B.7 PASS/FAIL

In reference to the results outlined in B.6, the DUT passes the requirements as stated in the reference standards.

B.8 SIGN-OFF

I attest to the accuracy of the data. All measurements reported herein were performed by me and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements.

Sean Johnston
Lab Manager
Celltech Labs Inc.

Jan 13, 2011
Date

Appendix C Modulation Characteristics (Modulation Limiting)

C.1 REFERENCES

Normative Reference Standard	FCC CFR 47 §2.1047, §80.213; IC RSS-182
Procedure Reference	TIA-603-C

C.2 LIMITS

§2.1047, RSS 182	*±5 KHz deviation*

C.3 ENVIRONMENTAL CONDITIONS

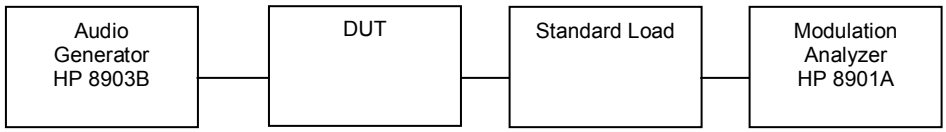
Temperature	25 +/- 5 ºC
Humidity	40 +/- 10 %
Barometric Pressure	101 +/- 3 kPa

C.4 EQUIPMENT LIST

ASSET NUMBER	MANUFACTURER	MODEL	DESCRIPTION	CAL DUE
00028	HP	8901A	Modulation Analyzer	21Jul11
00027	HP	8903B	Audio Generator/Analyzer	21Jul11

C.5 SETUP DRAWING

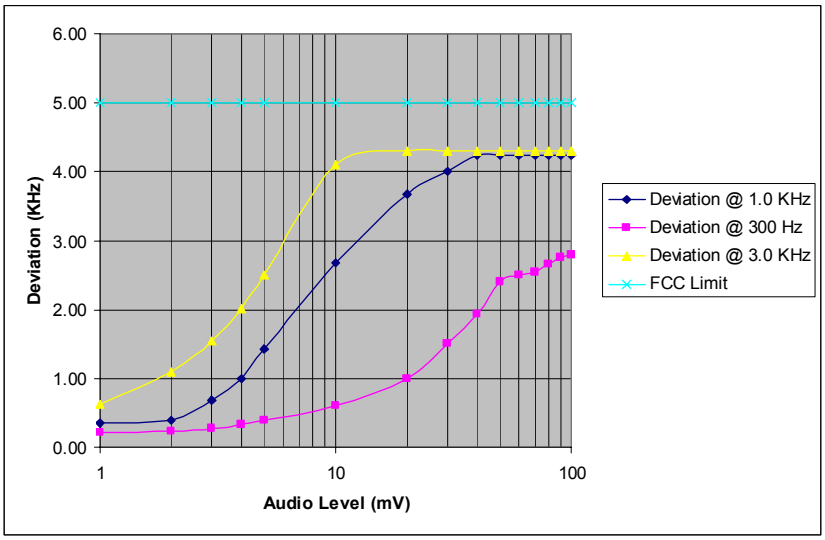
Figure C.5-1 - Setup Drawing – Modulation Characteristics



C.6 TEST RESULTS

C.6.1

Audio Level	Deviation @ 1.0 KHz	Deviation @ 300 Hz	Deviation @ 3.0 KHz	FCC Limit
mV	[KHz]	[KHz]	[KHz]	[KHz]
1	0.35	0.22	0.63	5
2	0.40	0.24	1.10	5
3	0.69	0.28	1.55	5
4	1.00	0.33	2.02	5
5	1.43	0.40	2.50	5
10	2.67	0.60	4.10	5
20	3.68	1.00	4.30	5
30	4.01	1.50	4.30	5
40	4.25	1.94	4.30	5
50	4.25	2.40	4.30	5
60	4.25	2.50	4.30	5
70	4.25	2.55	4.30	5
80	4.25	2.66	4.30	5
90	4.25	2.75	4.30	5
100	4.25	2.80	4.30	5



C.7 PASS/FAIL

In reference to the results outlined in C.6.1 the DUT passes the requirements as stated in the reference standards.

C.8 SIGN-OFF

I attest to the accuracy of the data. All measurements reported herein were performed by me and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements.

Sean Johnston
Lab Manager
Celltech Labs Inc.

Jan 14, 2011
Date

Appendix D Modulation Characteristics (Audio Frequency Response)

D.1 REFERENCES

Normative Reference Standard	FCC CFR 47 §2.1047, §80.213; IC RSS-182
Procedure Reference	TIA-603-C

D.2 LIMITS

§2.1047	a) *Voice modulated communication equipment.* A curve or equivalent data showing the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz shall be submitted. For equipment required to have an audio low-pass filter, a curve showing the frequency response of the filter or of all circuitry installed between the modulation limiter and the modulated stage shall be submitted.

D.3 ENVIRONMENTAL CONDITIONS

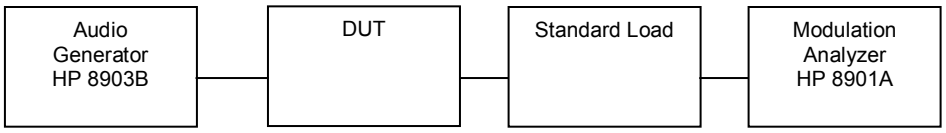
Temperature	25 +/- 5 ºC
Humidity	40 +/- 10 %
Barometric Pressure	101 +/- 3 kPa

D.4 EQUIPMENT LIST

ASSET NUMBER	MANUFACTURER	MODEL	DESCRIPTION	CAL DUE
00028	HP	8901A	Modulation Analyzer	21Jul11
00027	HP	8903B	Audio Generator/Analyzer	21Jul11

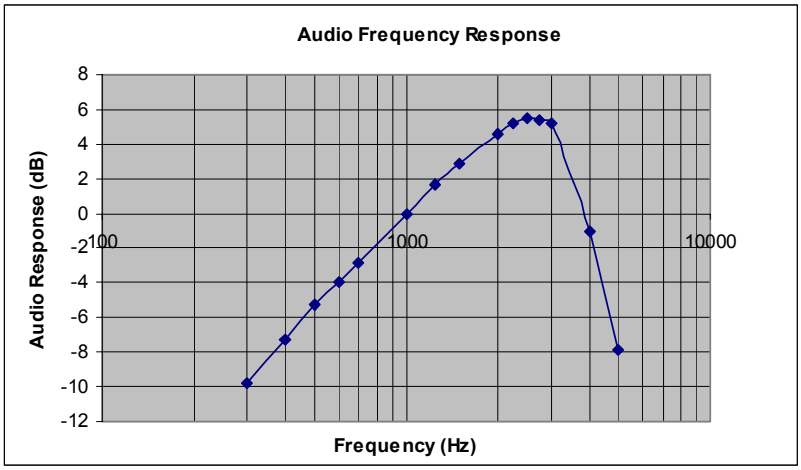
D.5 SETUP DRAWING

Figure D.5-1 - Setup Drawing – Audio Frequency Response



D.6 TEST RESULTS

Audio Frequency [Hz]	Deviation [dB]
300	-9.81
400	-7.24
500	-5.26
600	-3.93
700	-2.89
1000	0.00
1250	1.67
1500	2.88
2000	4.59
2250	5.19
2500	5.48
2750	5.43
3000	5.19
4000	-1.02
5000	-7.87
6000	-7.87



D.7 PASS/FAIL

In reference to the results outlined in D.6 the DUT passes the requirements as stated in the reference standards.

D.8 SIGN-OFF

I attest to the accuracy of the data. All measurements reported herein were performed by me and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements.

Sean Johnston
Lab Manager
Celltech Labs Inc.

Jan 14, 2011
Date

Appendix E Modulation Characteristics (Low-pass Filter Response)

E.1 REFERENCES

Normative Reference Standard	FCC CFR 47 §2.1047, §80.213; IC RSS-182
Procedure Reference	TIA-603-C

E.2 LIMITS

§80.213	e) Coast station transmitters operated in the 156–162 MHz band must be equipped with an audio low-pass filter. The filter must be installed between the modulation limiter and the modulated radio frequency stage. At frequencies between 3 kHz and 20 kHz it must have an attenuation greater than at 1 kHz by at least $60\log_{10}(f/3)$ dB where "f" is the audio frequency in kilohertz. At frequencies above 20 kHz the attenuation must be at least 50 dB greater than at 1 kHz.

E.3 ENVIRONMENTAL CONDITIONS

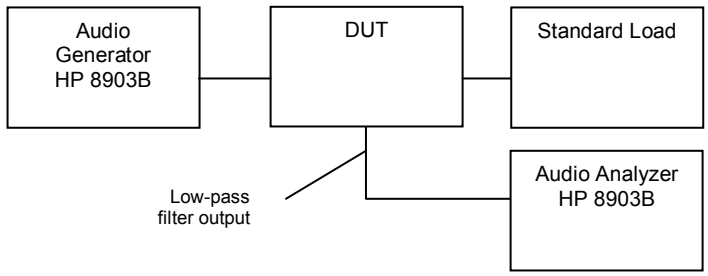
Temperature	25 +/- 5 ºC
Humidity	40 +/- 10 %
Barometric Pressure	101 +/- 3 kPa

E.4 EQUIPMENT LIST

ASSET NUMBER	MANUFACTURER	MODEL	DESCRIPTION	CAL DUE
00027	HP	8903B	Audio Generator/Analyzer	21Jul11

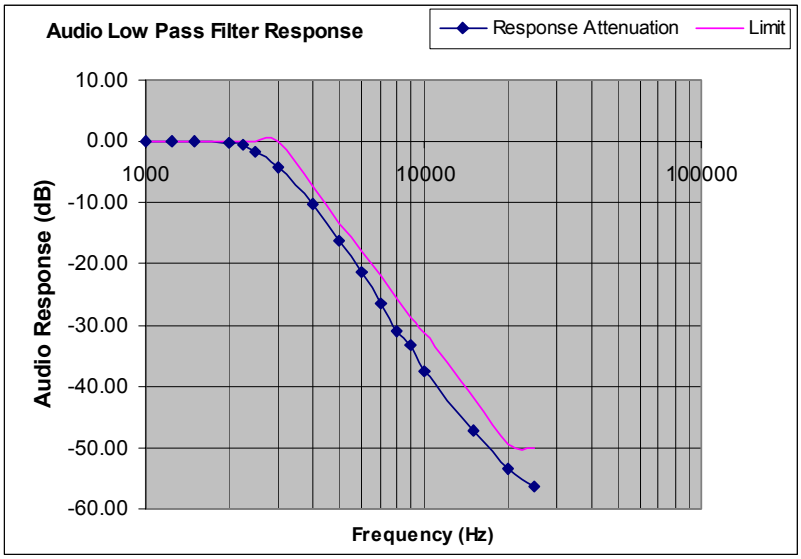
E.5 SETUP DRAWING

Figure E.5-1 - Setup Drawing – Low-pass Filter Response



E.6 TEST RESULTS

Audio Frequency [Hz]	Response Attenuation [dB]	Limit [dB]
1000	0.00	0
1250	-0.07	0
1500	-0.06	0
2000	-0.21	0
2250	-0.62	0
2500	-1.54	0
3000	-4.12	0
4000	-10.30	-7.4
5000	-16.30	-13.3
6000	-21.20	-18
7000	-26.30	-22
8000	-30.90	-25.5
9000	-33.20	-28.6
10000	-37.50	-31.3
15000	-47.30	-41.9
20000	-53.40	-49.4
25000	-56.40	-50



E.7 PASS/FAIL

In reference to the results outlined in E.6, the DUT passes the requirements as stated in the reference standards.

E.8 SIGN-OFF

I attest to the accuracy of the data. All measurements reported herein were performed by me and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements.

Sean Johnston
Lab Manager
Celltech Labs Inc.

Jan 14, 2011
Date

Appendix F Occupied Bandwidth and Emission Mask

F.1 REFERENCES

Normative Reference Standard	FCC CFR 47 §2.1049, §80.211; IC RSS-182
Procedure Reference / Description	Occupied bandwidth was performed by connecting the output of the DUT to the input of a spectrum analyzer.

F.2 LIMITS

§80.211	1) On any frequency removed from the assigned frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: At least 25 dB; (2) On any frequency removed from the assigned frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: At least 35 dB; and (3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least 43 plus $10\log_{10}$(mean power in watts) dB.
RSS-182	The nominal authorized channel bandwidth for voice is 16 kHz, for data an authorized bandwidth of 20 KHz is permitted.

F.3 ENVIRONMENTAL CONDITIONS

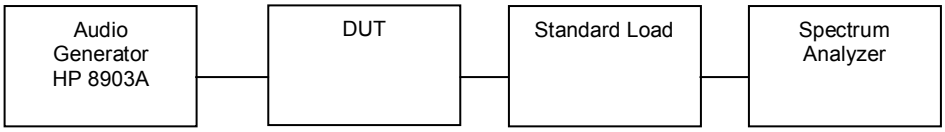
Temperature	25 +/- 5 ºC
Humidity	40 +/- 10 %
Barometric Pressure	101 +/- 3 kPa

F.4 EQUIPMENT LIST

ASSET NUMBER	MANUFACTURER	MODEL	DESCRIPTION	CAL DUE
00051	HP	8566B	Spectrum Analyzer RF Section	03-May-12
00047	HP	85685A	RF Preselector	05-May-12
00027	HP	8903B	Audio Generator/Analyzer	21-Jul-11

F.5 SETUP DRAWING

Figure F.5-1 - Setup Drawing – Occupied Bandwidth & Emission Mask



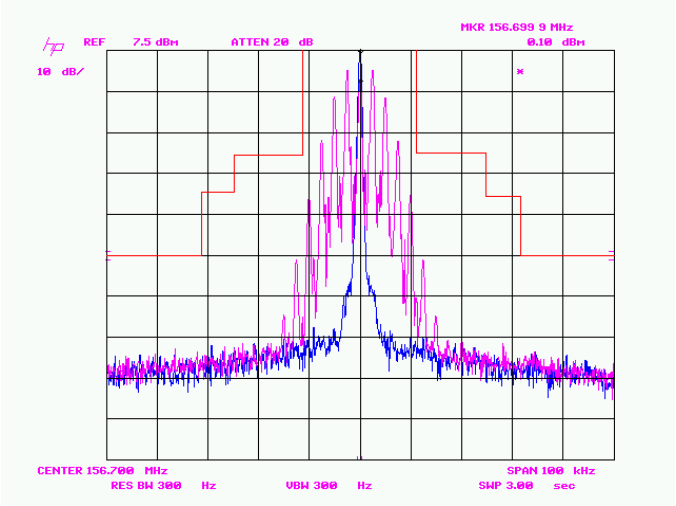
F.6 EMISSION DESIGNATOR & FREQUENCIES

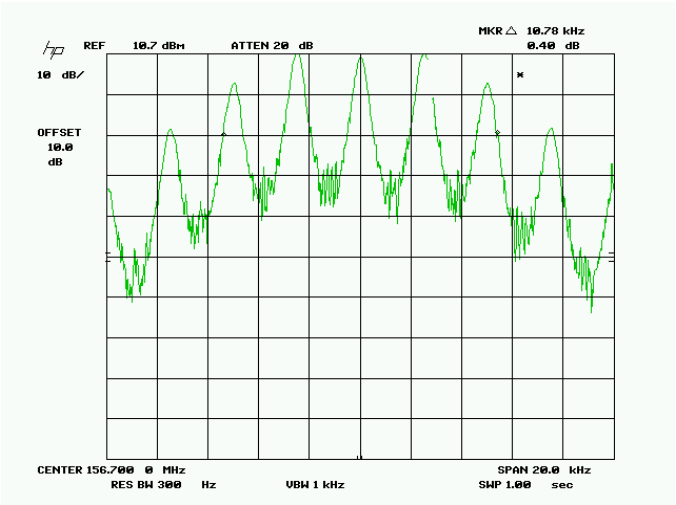
2.1033(c) (4) Type of Emission: 16K0G3E

Bn = 2M + 2DK
M = 3000
D = 4900K
Bn = 2(3000)+2(5000) = 16K

F.7 TEST RESULTS

F.7.1 Occupied Bandwidth Emission Mask





F.8 PASS/FAIL

In reference to the results outlined in F.7, the DUT passes the requirements as stated in the reference standards.

F.9 SIGN-OFF

I attest to the accuracy of the data. All measurements reported herein were performed by me and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements.

Sean Johnston
Lab Manager
Celltech Labs Inc.
Jan 14, 2011

Date

Appendix G Radiated Spurious Emissions - TX

G.1 REFERENCES

Normative Reference Standard	FCC CFR 47 §2.1053; IC RSS-182
Procedure Reference	The transmitter spurious emissions were measured in accordance with TIA/EIA Standard 603 using the substitution method on a 3-meter open area test site (OATS).

G.2 LIMITS

§2.1053 & RSS-182	Emissions must be at least 43 + 10 $\log_{10}$ (P) dB below the mean power output of the transmitter.

G.3 ENVIRONMENTAL CONDITIONS

Temperature	25 +/- 5 ºC
Humidity	40 +/- 10 %
Barometric Pressure	101 +/- 3 kPa

G.4 EQUIPMENT LIST

ASSET NUMBER	MANUFACTURER	MODEL	DESCRIPTION	CAL DUE
00072	EMCO	2075	Mini-mast	n/a
00073	EMCO	2080	Turn Table	n/a
00071	EMCO	2090	Multi-Device Controller	n/a
00015	HP	E4408B	Spectrum Analyzer	03-May-12
00050	Chase	CBL-6111A	Bilog Antenna	03-May-13
00055	EMCO	3121C	Dipole Antenna	27-Aug-10
00034	ETS	3115	Double Ridged Guide Horn	29-May-12
00035	ETS	3115	Double Ridged Guide Horn	29-May-12
00051	HP	8566B	Spectrum Analyzer RF Section	03-May-12
00049	HP	85650A	Quasi-peak Adapter	06-May-12
00047	HP	85685A	RF Preselector	05-May-12
00006	R & S	SMR 20	Signal Generator (10MHz-40GHz)	30-Apr-12
00114	Amplifier Research	DC7154	Directional Coupler (0.8-4.2 GHz)	n/a
00078	Pasternack	PE2214-20	Directional Coupler (1-18 GHz)	n/a
00106	Amplifier Research	5S1G4	Power Amplifier (5W, 800MHz-4.2GHz)	n/a
00041	Amplifier Research	10W1000C	Power Amplifier (0.5 - 1 GHz)	n/a
00007	Gigatronics	8652A	Power Meter	04-May-12
00014	Gigatronics	80701A	Power Sensor	04-May-12

G.5 MEASUREMENT EQUIPMENT SETUP

MEASUREMENT EQUIPMENT CONNECTIONS

For the field strength measurements, the measurement equipment was connected as shown in G.6. A number of antennas were used to cover the applicable frequency range tested. The ranges in which each antenna was used are as follows. For the final substitutions, the DUT was replaced with the appropriate antenna and fed from a CW signal source sufficient to replicate the received field strength of the emission being investigated.

Frequency Range	RX Antenna	TX Antenna
30 MHz - 1GHz	Bilog	Dipole
1 GHz - 18 GHz	ETS 3115 Horn	ETS 3115 Horn

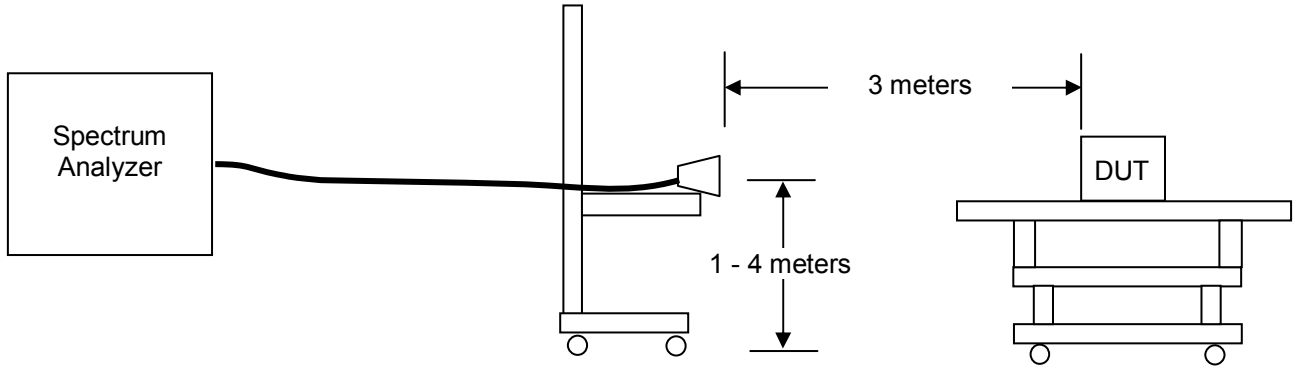
MEASUREMENT EQUIPMENT SETTINGS

For measuring the radiated field strength of the fundamental, the spectrum analyzer was set to the following settings:

RBW	VBW	Detector
MHz	MHz	
1	3	Peak

G.6 SETUP DRAWING

Figure G.6-1 - Setup Drawing – Radiated TX Spurious Emissions



G.7 TEST RESULTS

TX: 156.7 MHz
Measured Output Power: 5 W, Limit: 43+10Log(W)= 57dBc

Emissions (MHz)	Attenuation (dBc)	Limit (dBc)	Margin (dB)
156.7	-	-	-
313.4	70.3	57	13.3
470.1	66.5	57	9.5
626.8	72.4	57	15.4

Note(s):
1. DUT antenna replaced with non-radiating load.
2. Measured ERP Carrier Level (dBm) = Power Applied to Antenna (dBm) + Antenna Gain (dBd)
3. The DUT was measured in 3 orientations with respect to the receive antenna and the orientation with the highest Radiated Power results is shown (Vertical Polarization).
4. The DUT was measured with and without the optional speaker-microphone audio accessory connected to the audio jack of the DUT, and the worst-case configuration is reported (without the speaker-microphone audio accessory).

G.8 PASS/FAIL

In reference to the results outlined in G.7 the DUT passes the requirements as stated in the reference standards.

G.9 SIGN-OFF

I attest to the accuracy of the data. All measurements reported herein were performed by me and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements.

Sean Johnston
Lab Manager
Celltech Labs Inc.

Jan 13, 2011
Date

G.10 TEST SETUP PHOTOGRAPH

Appendix H Radiated Spurious Emissions - RX

H.1 REFERENCES

Normative Reference Standard	IC RSS-182
Procedure Reference(s)	The procedure used was ANSI C63.4-2003. The frequency was scanned from 30 MHz to 1.0 GHz. When an emission was found, the table was rotated to produce the maximum signal strength. The DUT was measured in three (3) orthogonal planes.
	RSS-182 4.5

H.2 LIMITS

RSS-182

Frequency (MHz)	Limits
30-88	100 uv/m measured @ 3 meters
80-216	150 uv/m measured @ 3 meters
216-960	200 uv/m measured @ 3 meters
Above 960	500 uv/m measured @ 3 meters

H.3 ENVIRONMENTAL CONDITIONS

Temperature	25 +/- 5 ºC
Humidity	40 +/- 10 %
Barometric Pressure	101 +/- 3 kPa

H.4 EQUIPMENT LIST

ASSET NUMBER	MANUFACTURER	MODEL	DESCRIPTION	CAL DUE
00072	EMCO	2075	Mini-mast	n/a
00073	EMCO	2080	Turn Table	n/a
00071	EMCO	2090	Multi-Device Controller	n/a
00015	HP	E4408B	Spectrum Analyzer	03-May-12
00050	Chase	CBL-6111A	Bilog Antenna	03-May-13
00051	HP	8566B	Spectrum Analyzer RF Section	03-May-12
00049	HP	85650A	Quasi-peak Adapter	06-May-12
00047	HP	85685A	RF Preselector	05-May-12
00006	R & S	SMR 20	Signal Generator (10MHz-40GHz)	30-Apr-12

H.5 MEASUREMENT EQUIPMENT SETUP

MEASUREMENT EQUIPMENT CONNECTIONS

For the field strength measurements, the measurement equipment was connected as shown in G.6. Various antenna types may be required to cover the applicable frequency range tested. The ranges in which each antenna was used are shown below.

Frequency Range	RX Antenna	TX Antenna
30 MHz - 1GHz	Bilog	N/a
1 GHz - 18 GHz	ETS 3115 Horn	N/a

MEASUREMENT EQUIPMENT SETTINGS

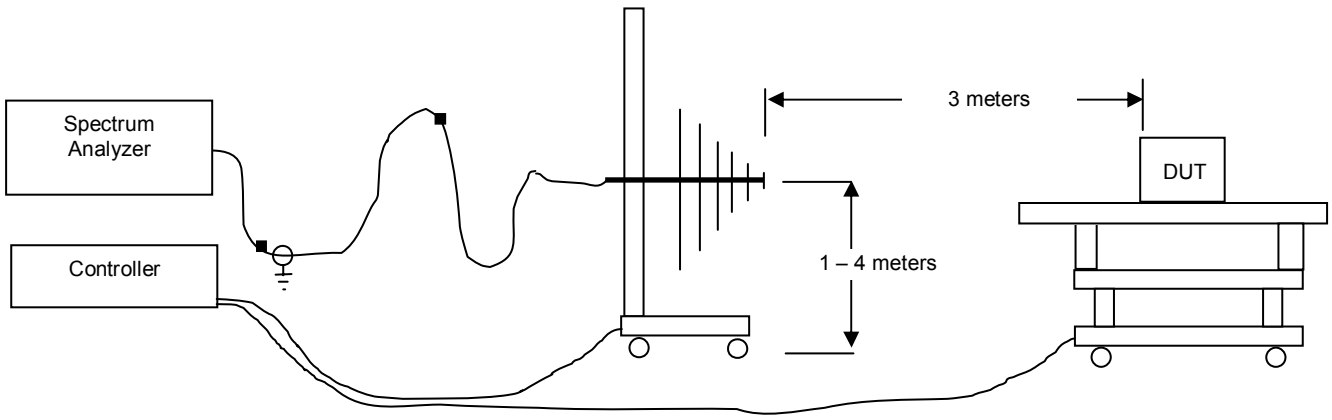
For the spurious out-of-band emissions, the spectrum analyzer was set to the following settings:

Measurement	RBW	VBW	Detector
	kHz	kHz	
< 1 GHz	100	300	Peak*
> 1 GHz	1000	3000	Peak*

* As a worst-case measurement, the QP limit was applied to measurements made with a peak detector.

H.6 SETUP DRAWING

Figure H.6-1 - Setup Drawing – Radiated RX Spurious Emissions



H.7 TEST RESULTS

Channel	Emission Frequency	Receiver	DUT	Ant Pol	Cable Loss	Correction Factor	Field Strength	Limit	Margin
	MHz	dBuv			dB	dB	dBuv/m	dBuv/m	dB
CH 14	99.8	9.1	V	V	1.8	10.3	19.4	43.5	24.1
CH 14	99.8	4.3	V	H	1.8	10.3	14.6	43.5	28.9
CH 14	282.9	9.3	V	V	2	13.7	23	46	23
CH 14	424.4	5.7	V	V	2.5	17	22.7	46	23.3

Note: The emissions reported above represent the highest emissions or noise floor measured within the frequency band of 30MHz and the 10th harmonic of the carrier. All other emissions were at the noise floor.

Formulae:
Total CF = Antenna Factor + Cable Factor + Other Factor (Amplifier Gain, filter loss, etc)
Field Strength = SA Reading + Total CF

The frequency points reported describe the highest emission measured in each of the ranges tested and are used to describe the measured spectrum as a whole. It is shown that the highest emissions measured within the spectrum pass the appropriate limits; therefore all emissions within the bands would also meet the requirements.

H.8 PASS/FAIL

In reference to the results outlined in H.7 the DUT passes the requirements as stated in the reference standards.

H.9 SIGN-OFF

I attest to the accuracy of the data. All measurements reported herein were performed by me and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements.

Sean Johnston
Lab Manager
Celltech Labs Inc.

Jan 13, 2010
Date

Appendix I Frequency Stability

I.1 REFERENCES

Normative Reference Standard	FCC CFR 47 §2.1055, §80.209; IC RSS-182
Procedure Reference / Description	§2.1055(a)(2) The frequency stability shall be measured with variation of ambient temperature as follows: (1) From -20° to +50° centigrade for equipment to be licensed for use in the Maritime Services under part 80

I.2 LIMITS

§80.209 & RSS-182	Band 156-162 MHz (ii) Ship Station = 10.0 ppm

I.3 ENVIRONMENTAL CONDITIONS

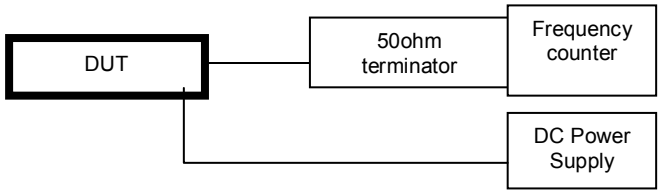
Temperature	25 +/- 5 ºC
Humidity	40 +/- 10 %
Barometric Pressure	101 +/- 3 kPa

I.4 EQUIPMENT LIST

ASSET NUMBER	MANUFACTURER	MODEL	DESCRIPTION	CAL DUE
na	ESPEC	ECT-2	Heater/Refrigerator	na
0003	HP	53181A	Frequency Counter	09-Apr-11
na	HP	E3611A	DC Power Supply	Na
00207	VWR	na	Temperature Humidity Monitor	09-Apr-11

I.5 SETUP DRAWING

Figure I.5-1 - Setup Drawing – Frequency Stability



I.6 TEST RESULTS

Temperature (degrees C)	Assigned Frequency (MHz)	Measured Frequency (MHz)	Deviation (%)	Frequency tolerance with reference to value @ 20 °C (ppm)
-20	156.70000	156.7000500	0.000032%	0.195915738
-10	156.70000	156.7000470	0.000030%	0.176770878
0	156.70000	156.7000200	0.000013%	0.004467134
10	156.70000	156.7000199	0.000013%	0.003828972
20	156.70000	156.7000193	0.000012%	0
30	156.70000	156.7000130	0.000008%	-0.040204207
40	156.70000	156.7000145	0.000009%	-0.030631777
50	156.70000	156.7000155	0.000010%	-0.024250157

Voltage (V)	Frequency (MHz)	%Deviation	PPM to reference
6.3 (Battery end point)	156.7000400	0.000026%	0.2553
8.5	156.7000185	0.000012%	0.1181

I.7 PASS/FAIL

In reference to the results outlined in I.6 the DUT passes the requirements as stated in the reference standards.

I.8 SIGN-OFF

I attest to the accuracy of the data. All measurements reported herein were performed by me and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements.

Sean Johnston
Lab Manager
Celltech Labs Inc.

Jan 17, 2011
Date

END OF DOCUMENT