



	Test Report Serial No.:	110612AMW-T1206-E80V	Test Report Issue Date:	Dec. 19, 2012
	Measurement Date(s):	2-5, Dec 2012	Test Report Revision No.:	Rev. 1.1
	Rule Part(s) Applied:	FCC 47 CFR §2, §80	Industry Canada RSS-182 Issue 4, RSS-Gen Issue 3	
	Test Site Registration(s):	FCC Accredited Site	Industry Canada Test Site Registration No. 3874A-1	

DECLARATION OF COMPLIANCE		FCC PART 80	IC RSS-182 (Issue 4)
Test Lab Information	Name	CELLTECH LABS INC.	
	Address	21-364 Lougheed Road, Kelowna, British Columbia V1X 7R8 Canada	
Test Site Registration No.(s)	FCC	Accredited Site (ISO 17025:2005 - A2LA Test Lab Certificate No. 2470.01)	
	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 5
Application Type(s)	FCC/IC	New Certification	
Device Identifier(s)	FCC ID:	AMWUT645	
	IC:	513C-UT645	
Device Under Test (DUT)	Portable Push-To-Talk (PTT) VHF Marine Radio Transceiver		
Device Model(s)	MHS235 (VHF460)		
Test Sample Serial No.(s)	None (Identical Prototype)		
Frequency Band of Operation	156-162.5 MHz		
Transmit Frequency Range(s)	156.025 - 157.425 MHz (VHF Marine Band)		
Authorized Bandwidth	20kHz (US), 16kHz (Can)		
Manuf. Rated Output Power	5.7 Watts Conducted +0.2 W / -0.0 W		
Modulation Type(s)	FM		
Emission Designator(s)	16K0G3E		
Antenna Type(s) Tested	Flexible Whip (external detachable) , -1dBi		
Power Source(s) Tested	Lithium-ion, 7.4 V		
<p>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 5 and RSS-Gen Issue 3; ANSI TIA/EIA-603-C-2004 and ANSI C63.4-2003.</p> <p>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.</p> <p>The results and statements contained in this report pertain only to the device(s) evaluated.</p> <p>This test report shall not be reproduced partially, or in full, without the prior written approval of Celltech Labs Inc.</p>			
Test Report Approved By		Glen Westwell	Lab Manager
			Celltech Labs Inc.

Applicant:	Uniden America Corporation	FCC ID:	AMWUT645	IC:	513C-UT645	
DUT Type:	Portable VHF PTT Marine Radio Transceiver	Model:	MHS235	Freq.:	156-162.5 MHz	
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<u>Appendix</u>	<u>Description of Test</u>	<u>Procedure Reference</u>	<u>Limit Reference</u>	<u>Result</u>
A	RF Output Power	ANSI/TIA/EIA-603-C	§2.1046, §80.215	Pass
B	Spurious Emissions at the antenna terminals (Conducted)	ANSI/TIA/EIA-603-C	§2.1051, 80.211	Pass
C	Modulation Limiting	ANSI/TIA/EIA-603-C	§2.1047, §80.213	Pass
D	Audio Frequency Response	ANSI/TIA/EIA-603-C	§2.1047, §80.213	Pass
E	Occupied Bandwidth and Emission Mask	ANSI/TIA/EIA-603-C	§2.1049, §80.211	Pass
F	Radiated TX Spurious Emissions	ANSI/TIA/EIA-603-C	§2.1053, §80.211	Pass
G	Frequency Stability	ANSI/TIA/EIA-603-C	§2.1055, §80.209	Pass
<u>Appendix</u>	<u>Description of Test</u>	<u>Procedure Reference</u>	<u>Limit Reference</u>	<u>Result</u>
A	Transmitter Output Power	RSS-Gen 4.8 RSS-182 5.2	RSS-182 7.5	Pass
B	Spurious Emissions at the antenna terminals (Conducted)	RSS-Gen 4.9	RSS-182 7.9	Pass
C	Modulation Limiting	ANSI/TIA/EIA-603-C	RSS-182 7.3	Pass
D	Audio Frequency Response	ANSI/TIA/EIA-603-C	RSS-182 7.3	Pass
E	Occupied Bandwidth and Emission Mask	RSS-Gen 4.6.1	RSS-182 7.9	Pass
F	Radiated TX Spurious Emissions	RSS-Gen 4.9	RSS-182 7.9	Pass
G	Frequency Stability	RSS-Gen 4.7 RSS-182 5.1	RSS-182 7.4	Pass

<b>Applicant:</b>	<b>Uniden America Corporation</b>	<b>FCC ID:</b>	<b>AMWUT645</b>	<b>IC:</b>	<b>513C-UT645</b>	
<b>DUT Type:</b>	<b>Portable VHF PTT Marine Radio Transceiver</b>	<b>Model:</b>	<b>MHS235</b>	<b>Freq.:</b>	<b>156-162.5 MHz</b>	
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### REVISION LOG

Revision	Description	Implemented By	Release Date
1.0	1st Release	Glen Westwell	13 Dec 2012
1.1	2 <sup>nd</sup> release – Added Antenna gain	Glen Westwell	20 Dec 2012

### TEST REPORT SIGN-OFF

Test Report Prepared By	Date	QA Review By	Date
Glen Westwell	Dec. 7, 2012	Mike Meaker	19 Dec 2012

Applicant:	Uniden America Corporation	FCC ID:	AMWUT645	IC:	513C-UT645	
DUT Type:	Portable VHF PTT Marine Radio Transceiver	Model:	MHS235	Freq.:	156-162.5 MHz	
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## 1.0 SCOPE

This report outlines the results collected during RF radiated and conducted measurements of the Uniden America Corporation Model: MSH235 / VHF460. The measurement results were applied against the applicable 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 5 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 5 - 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 are 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 as an accredited test facility and Industry Canada under File Number IC 3874A-1.

Applicant:	Uniden America Corporation	FCC ID:	AMWUT645	IC:	513C-UT645	
DUT Type:	Portable VHF PTT Marine Radio Transceiver	Model:	MHS235	Freq.:	156-162.5 MHz	
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## 5.0 MODE(S) OF OPERATION TESTED

### 5.1.1 PTT Radio Transceiver

#### 5.1.1.1 VHF Marine Band

<b>Transmitter Frequency Range(s)</b>	156.025 - 157.425 MHz
<b>Transmitter Test Channel(s)</b>	156.7 MHz (USA Ch.14), 156.050 (Can Ch. 01A), 157.425 (USA Ch.88)
<b>Output Power Tested</b>	5.7 Watts Conducted (High Power Setting)
<b>Antenna Gain</b>	-1dBi
<b>Channel Spacing</b>	25 kHz
<b>Authorized Bandwidth</b>	20 kHz (US), 16kHz (Can)
<b>Modulation Type(s)</b>	FM


#### Range of operating Power

Max. = 5.9W

Min. = 0.8W

## 5.2 **Modification(s)**

Test software was provided for continuous transmit.

<b>Applicant:</b>	Uniden America Corporation	<b>FCC ID:</b>	AMWUT645	<b>IC:</b>	513C-UT645	
<b>DUT Type:</b>	Portable VHF PTT Marine Radio Transceiver	<b>Model:</b>	MHS235	<b>Freq.:</b>	156-162.5 MHz	
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## Appendix A RF Output Power Measurement

### A.1 REFERENCES

<b>Normative Reference Standard</b>	FCC CFR 47 §2.1046, §80.215; IC RSS-182, 7.5
<b>Procedure Reference</b>	The RF output power measurements were performed in accordance with ANSI 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 7.5	The output power shall be within $\pm 1.0$ dB of the manufacturers rated power, hand-held portable transmitters 5W (Typical)

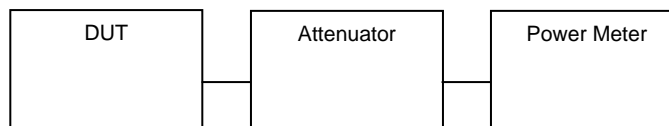
### A.3 ENVIRONMENTAL CONDITIONS


<b>Temperature</b>	25 +/- 5 °C
<b>Humidity</b>	40 +/- 10 %
<b>Barometric Pressure</b>	101 +/- 3 kPa

ASSET NUMBER	MANUFACTURER	MODEL	DESCRIPTION	CAL DUE
00007	Gigatronics	8652A	Power Meter	03-May-14
00014	Gigatronics	80701A	Power Sensor	03-May-14

### A.4 SETUP DRAWING

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



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#### A.5 TEST RESULTS

Measured Frequency	Conducted Output Power	Conducted Output Power
(MHz)	(dBm)	(Watts)
156.7 (Ch. 14)	37.4	5.5
157.425 (Ch. 88)	37.4	5.5
156.050 (Ch. 01A)	37.5	5.6

#### A.6 PASS/FAIL

In reference to the results outlined in A.5, the DUT meets 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.



Glen Westwell  
Lab Manager  
Celltech Labs Inc.

7 Dec 2012

Date

Applicant:	Uniden America Corporation	FCC ID:	AMWUT645	IC:	513C-UT645	
DUT Type:	Portable VHF PTT Marine Radio Transceiver	Model:	MHS235	Freq.:	156-162.5 MHz	
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## Appendix B Spurious Emissions at the Antenna Terminal

### B.1 REFERENCES

<b>Normative Reference Standard</b>	FCC CFR 47 §2.1051, §80.211; IC RSS-182
<b>Procedure Reference</b>	<p>The spurious emissions measurements at the antenna terminal were performed in accordance with ANSI TIA/EIA Standard 603.</p> <p>The emission search was performed across all required ranges. The worst case performance has been presented.</p>

### B.2 LIMITS

FCC CFR 47 §80.211	$43 + 10 \log(P_o) = 43 + 10 \log$
RSS182, Para. 7.9, 7.11	$43 + 10 \log(P_o) = 43 + 10 \log, R_X = 2nW$ .

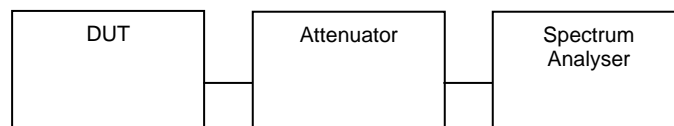
### B.3 ENVIRONMENTAL CONDITIONS

<b>Temperature</b>	25 +/- 5 °C
<b>Humidity</b>	40 +/- 10 %
<b>Barometric Pressure</b>	101 +/- 3 kPa

ASSET NUMBER	MANUFACTURER	MODEL	DESCRIPTION	CAL DUE
00051	HP	8566B	Spectrum Analyzer RF Section	10-May-2014
00047	HP	85685A	RF Preselector	10-May-2014
N/A	R&S	FSU 26.5	Spectrum Analyzer	05-Nov-2013

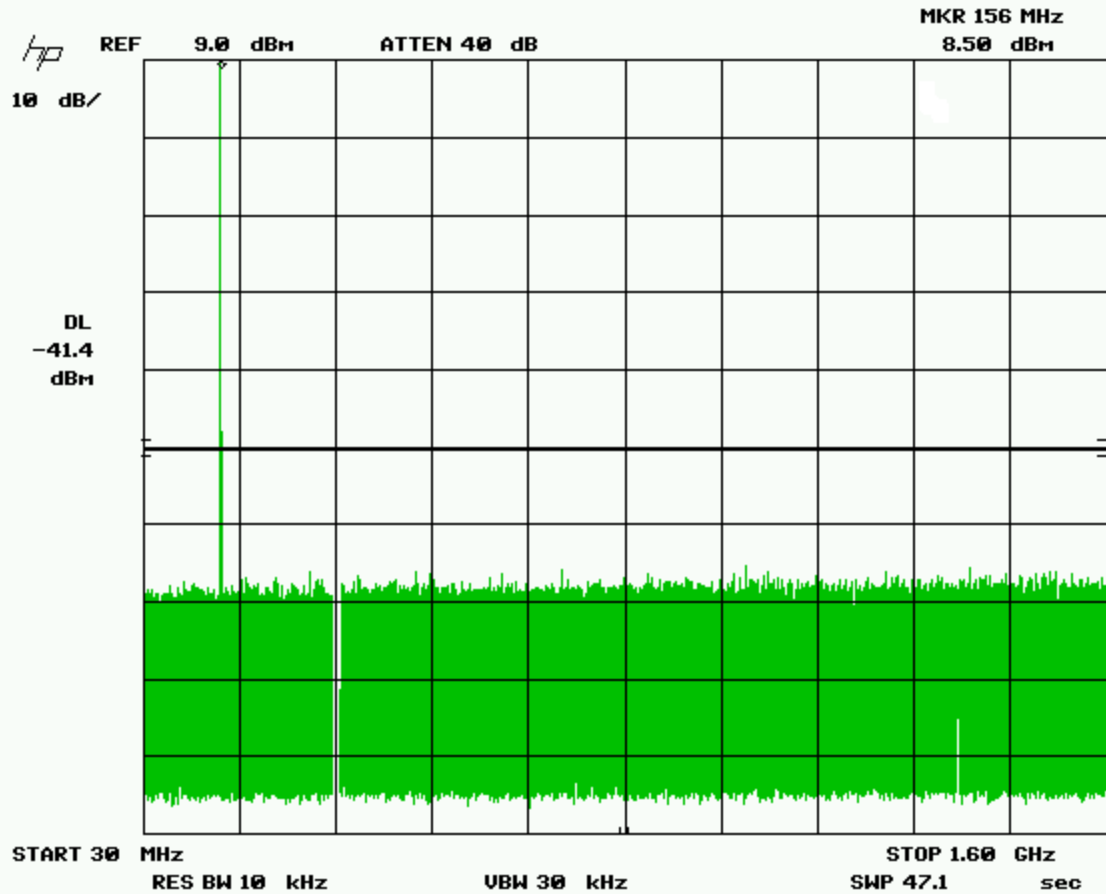
### B.4 SETUP DRAWING


Figure B.4-1 - Setup Drawing – Spurious Emissions at the Antenna Terminal



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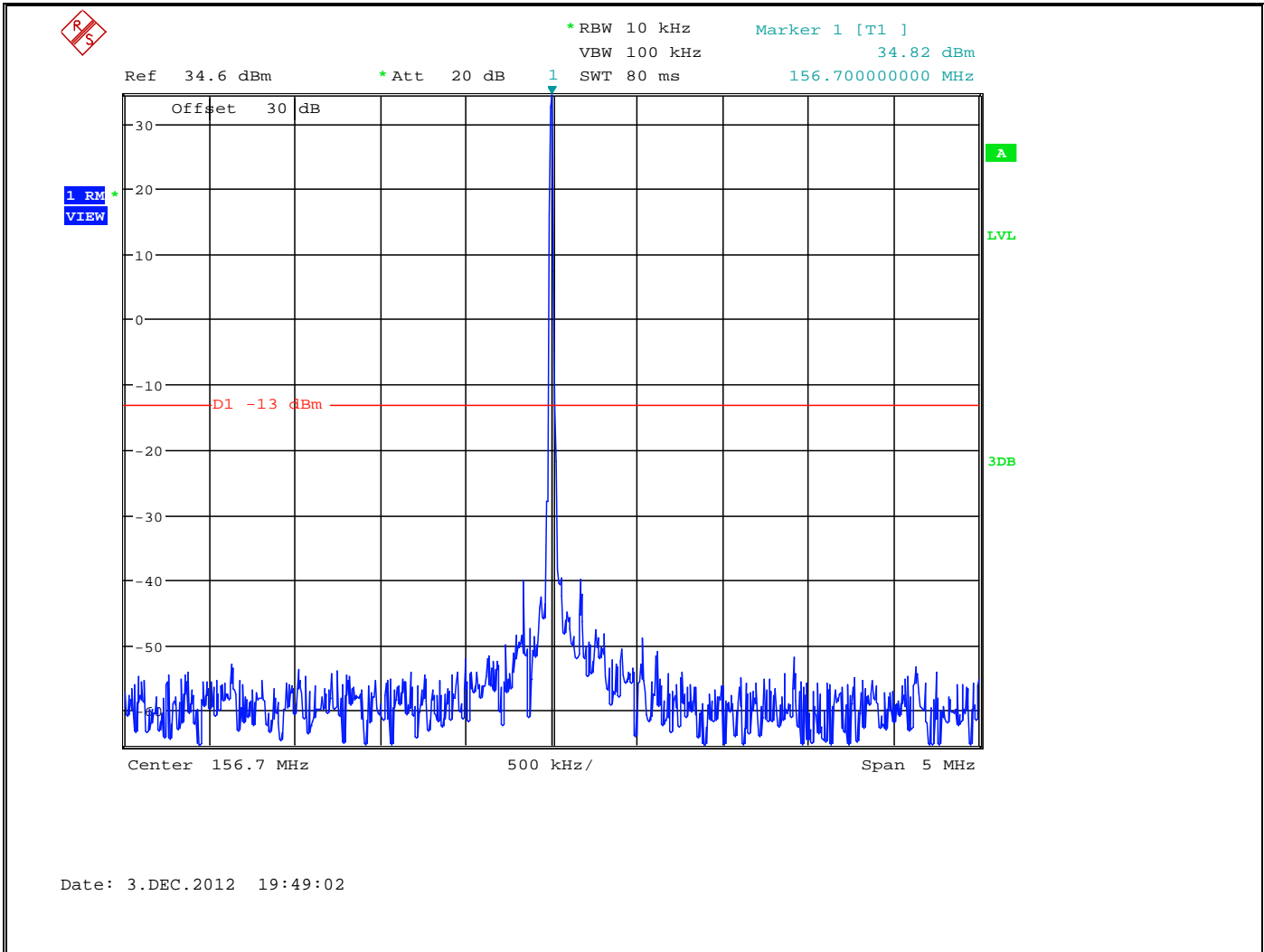
## B.5 TEST RESULTS




Applicant:	Uniden America Corporation	FCC ID:	AMWUT645	IC:	513C-UT645	
DUT Type:	Portable VHF PTT Marine Radio Transceiver	Model:	MHS235	Freq.:	156-162.5 MHz	
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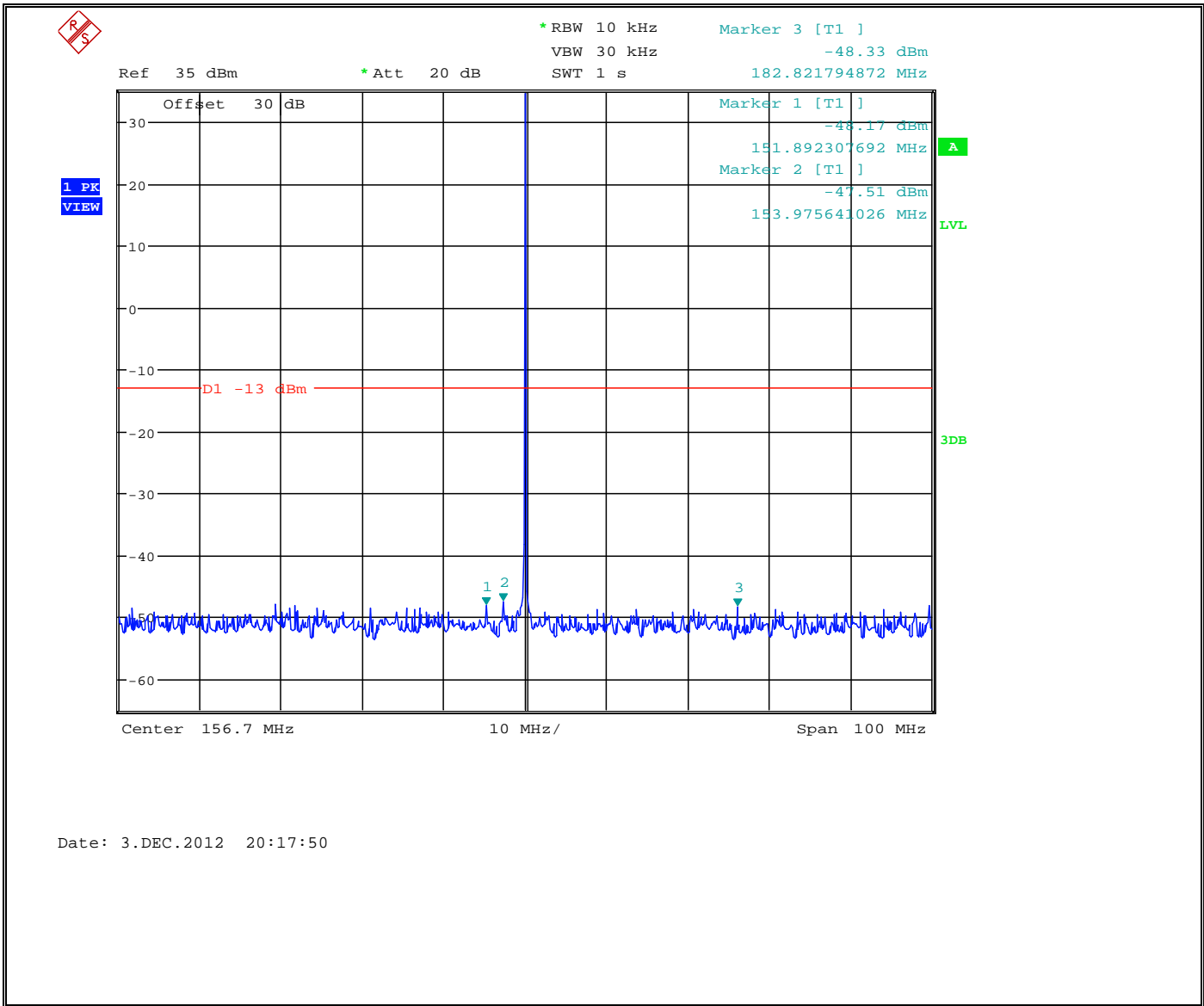
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## B.6 TEST RESULTS



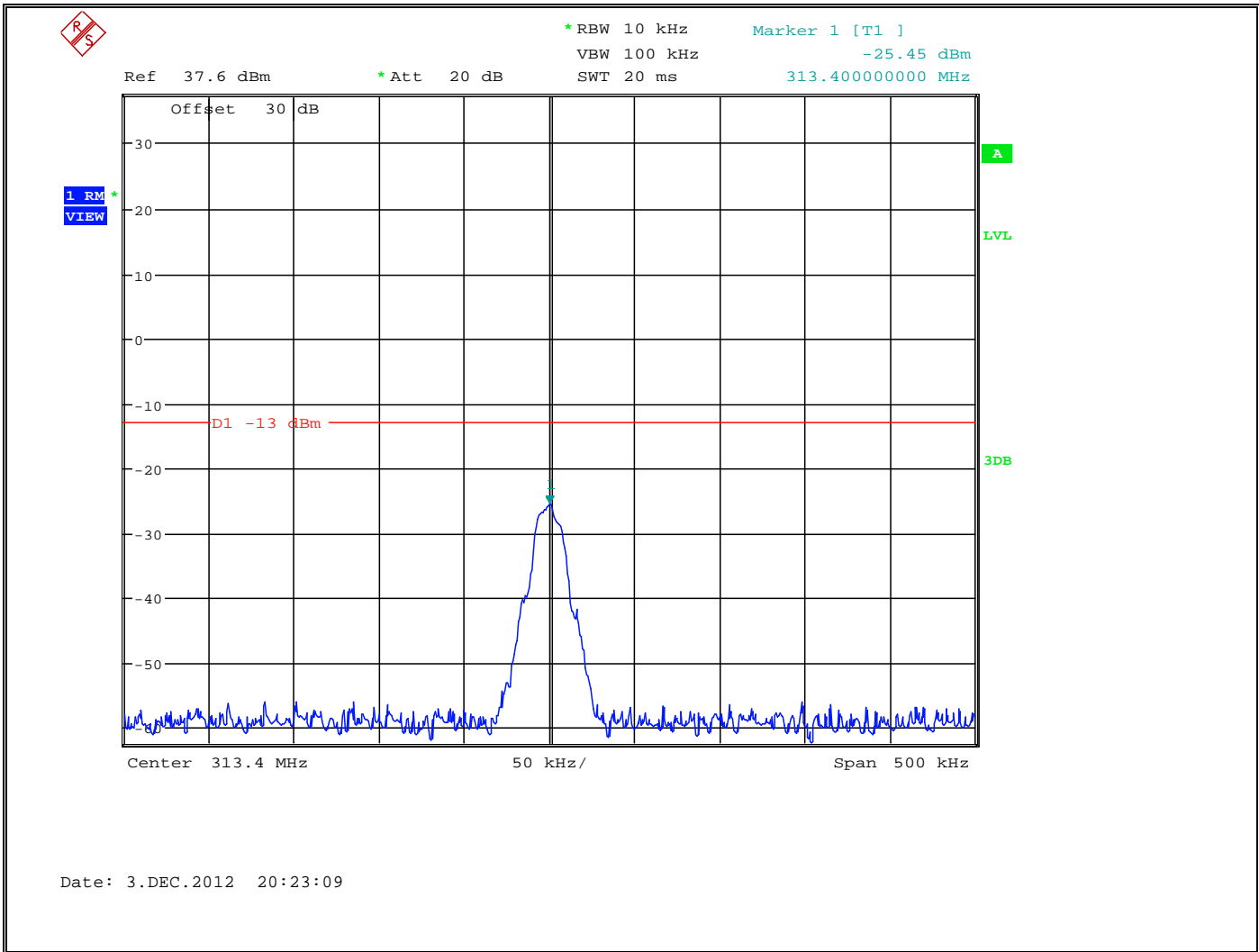
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DUT Type:	Portable VHF PTT Marine Radio Transceiver	Model:	MHS235	Freq.:	156-162.5 MHz	
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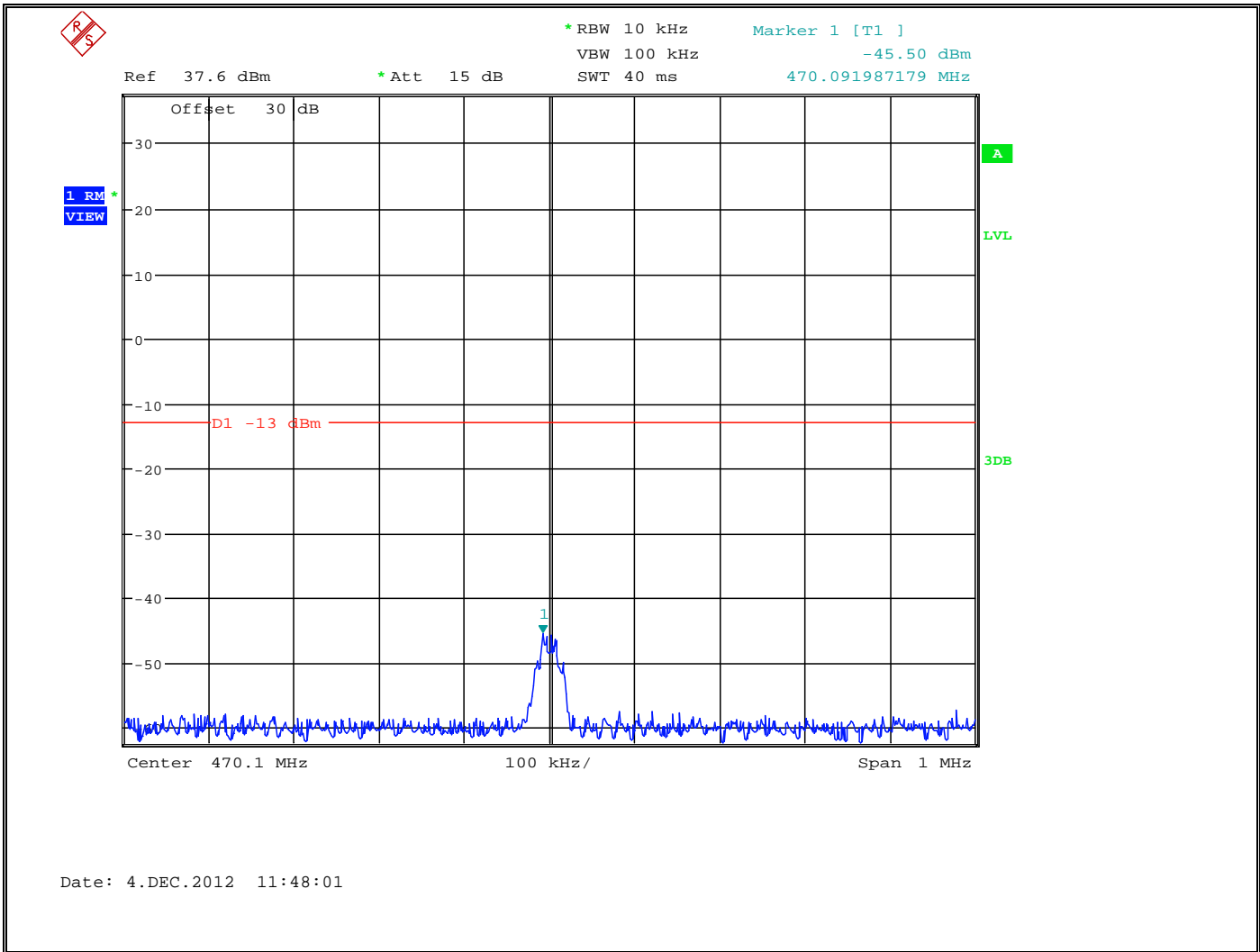
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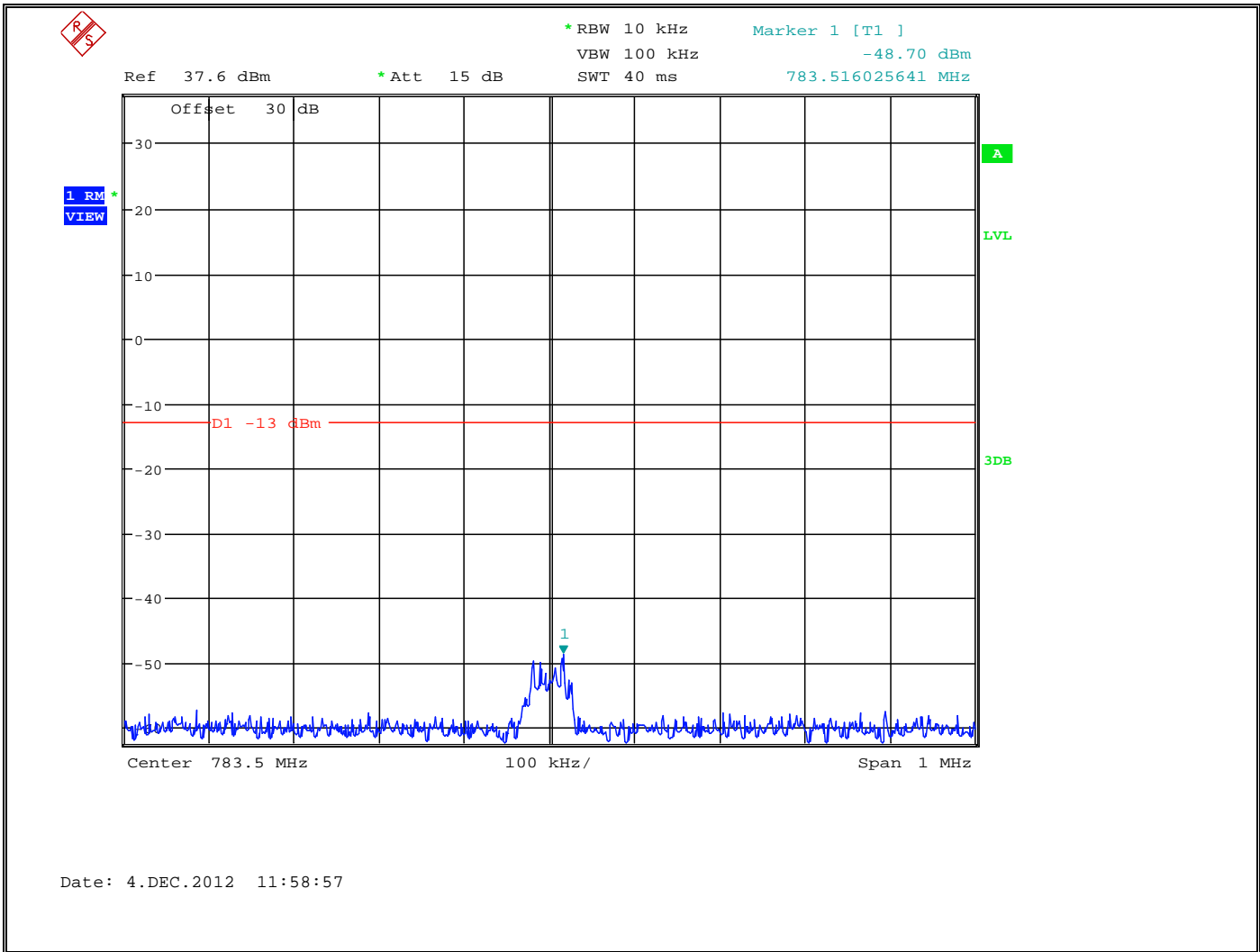
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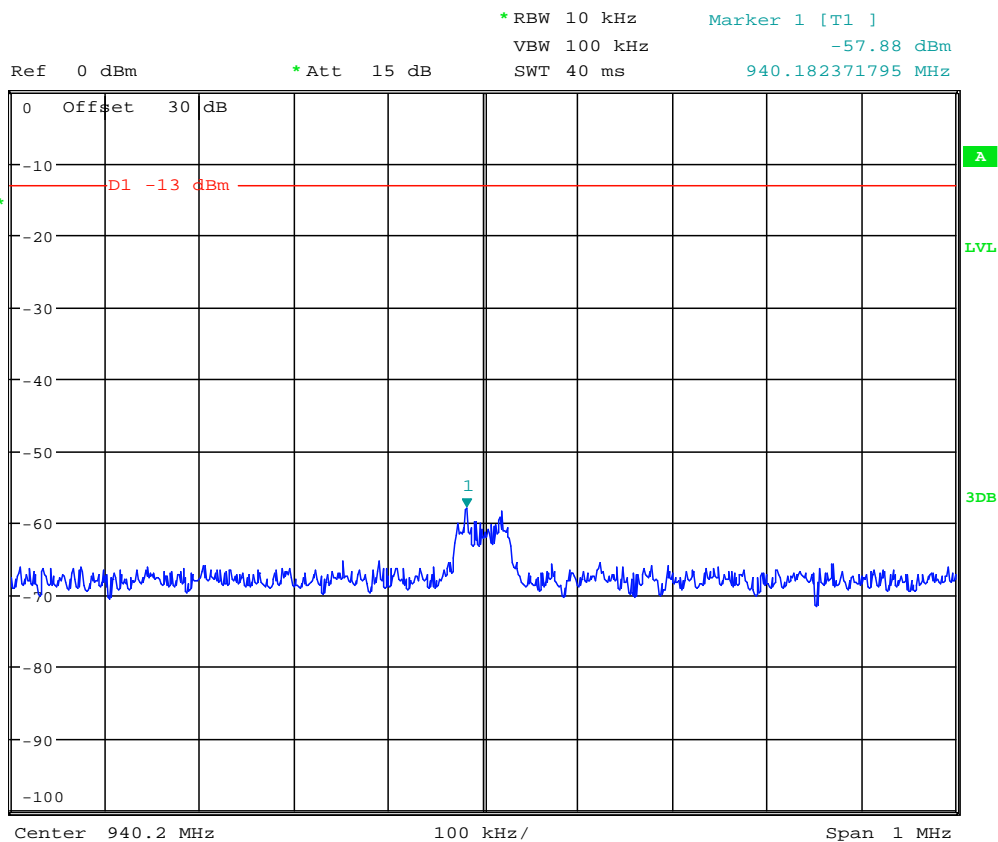


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1 RM  
VIEW



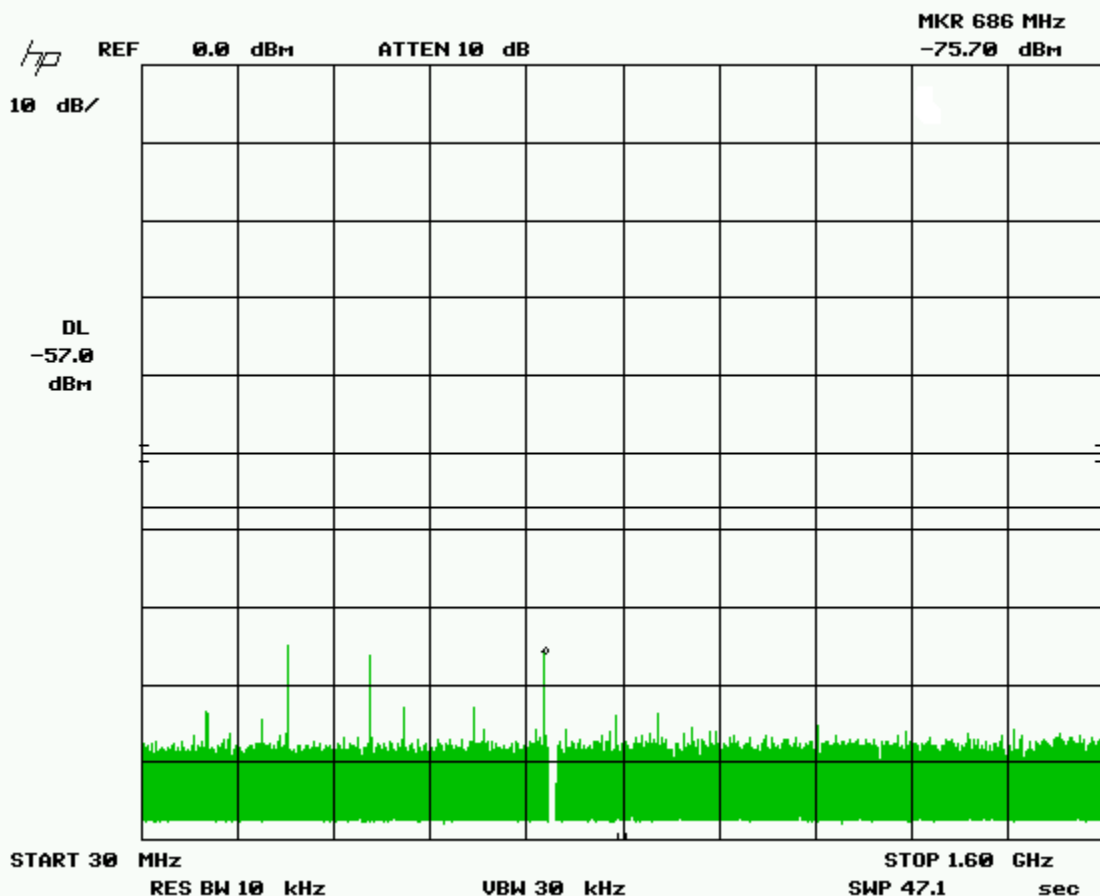
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Receiver (RX) conducted Spurious Emissions (worst case).

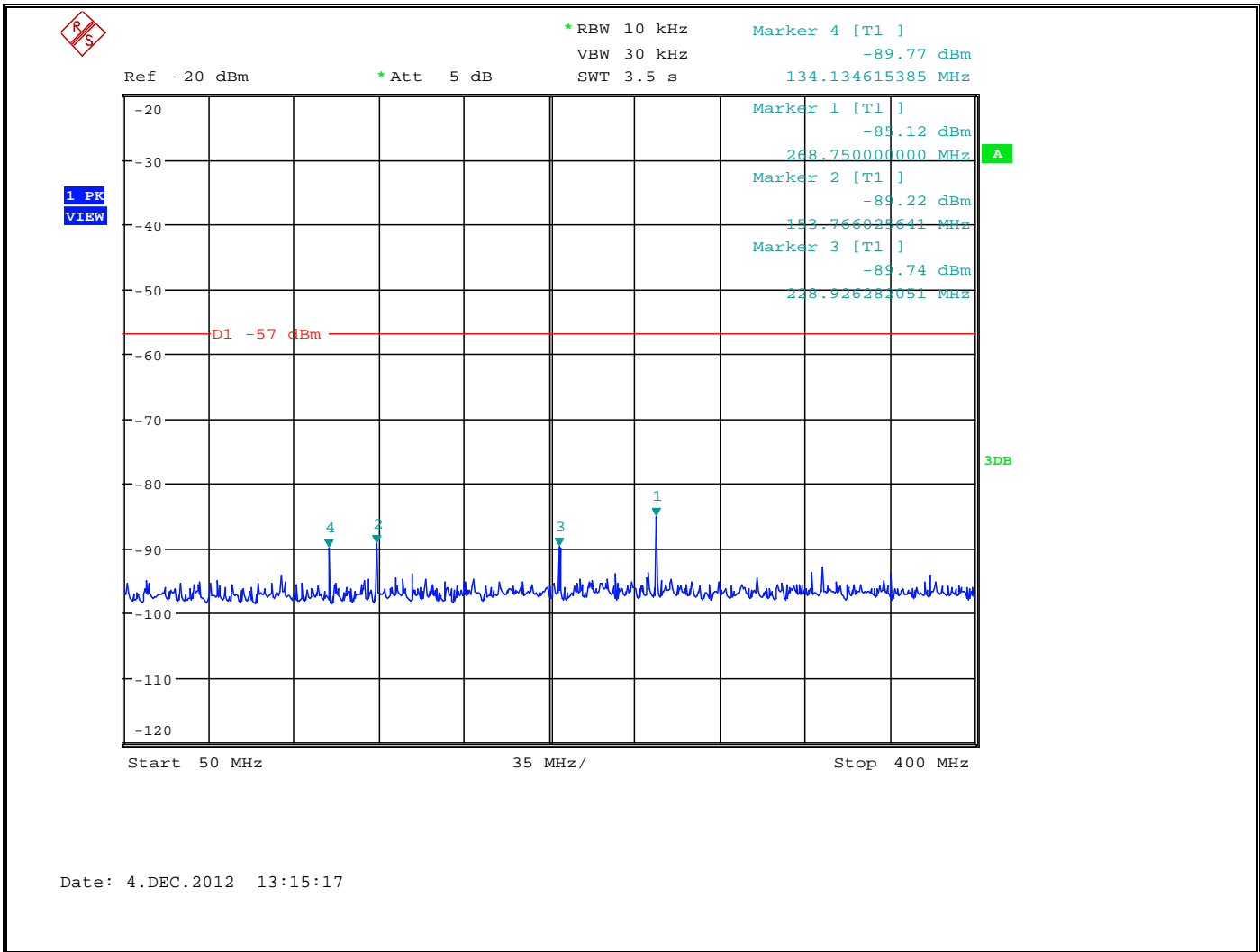
Applicant:	Uniden America Corporation	FCC ID:	AMWUT645	IC:	513C-UT645	
DUT Type:	Portable VHF PTT Marine Radio Transceiver	Model:	MHS235	Freq.:	156-162.5 MHz	
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Test Site Registration(s):	FCC Accredited Site	Industry Canada Test Site Registration No. 3874A-1	



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	Measurement Date(s):	2-5, Dec 2012	Test Report Revision No.:	Rev. 1.1
	Rule Part(s) Applied:	FCC 47 CFR §2, §80	Industry Canada RSS-182 Issue 4, RSS-Gen Issue 3	
	Test Site Registration(s):	FCC Accredited Site	Industry Canada Test Site Registration No. 3874A-1	



Applicant:	Uniden America Corporation	FCC ID:	AMWUT645	IC:	513C-UT645	
DUT Type:	Portable VHF PTT Marine Radio Transceiver	Model:	MHS235	Freq.:	156-162.5 MHz	
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	Test Report Serial No.:	110612AMW-T1206-E80V	Test Report Issue Date:	Dec. 19, 2012
	Measurement Date(s):	2-5, Dec 2012	Test Report Revision No.:	Rev. 1.1
	Rule Part(s) Applied:	FCC 47 CFR §2, §80	Industry Canada RSS-182 Issue 4, RSS-Gen Issue 3	
	Test Site Registration(s):	FCC Accredited Site	Industry Canada Test Site Registration No. 3874A-1	

#### B.7 PASS/FAIL

In reference to the results outlined in B.5, the DUT meets 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.



Glen Westwell.  
Lab Manager  
Celltech Labs Inc.

Dec. 10, 2012

Date

Applicant:	Uniden America Corporation	FCC ID:	AMWUT645	IC:	513C-UT645	
DUT Type:	Portable VHF PTT Marine Radio Transceiver	Model:	MHS235	Freq.:	156-162.5 MHz	
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	Test Report Serial No.:	110612AMW-T1206-E80V	Test Report Issue Date:	Dec. 19, 2012
	Measurement Date(s):	2-5, Dec 2012	Test Report Revision No.:	Rev. 1.1
	Rule Part(s) Applied:	FCC 47 CFR §2, §80	Industry Canada RSS-182 Issue 4, RSS-Gen Issue 3	
	Test Site Registration(s):	FCC Accredited Site	Industry Canada Test Site Registration No. 3874A-1	

### Appendix C Modulation Characteristics (Modulation Limiting)

#### C.1 REFERENCES

<b>Normative Reference Standard</b>	FCC CFR 47 §2.1047, §80.213; IC RSS-182
<b>Procedure Reference</b>	ANSI TIA-603-C

#### C.2 LIMITS

§2.1047(b), 80.213(a)(2), RSS 182, 7.7	±5 KHz deviation
---	------------------

#### C.3 ENVIRONMENTAL CONDITIONS

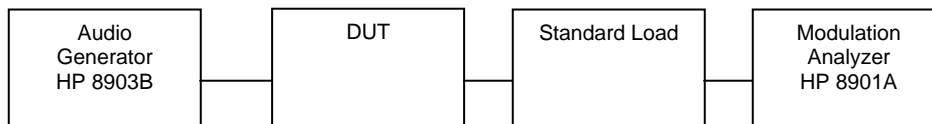
<b>Temperature</b>	25 +/- 5 °C
<b>Humidity</b>	40 +/- 10 %
<b>Barometric Pressure</b>	101 +/- 3 kPa

#### C.4 EQUIPMENT LIST

ASSET NUMBER	MANUFACTURER	MODEL	DESCRIPTION	CAL DUE
00028	HP	8901A	Modulation Analyzer	21Jul13
00027	HP	8903B	Audio Generator/Analyzer	21Jul13

#### C.5 SETUP DRAWING

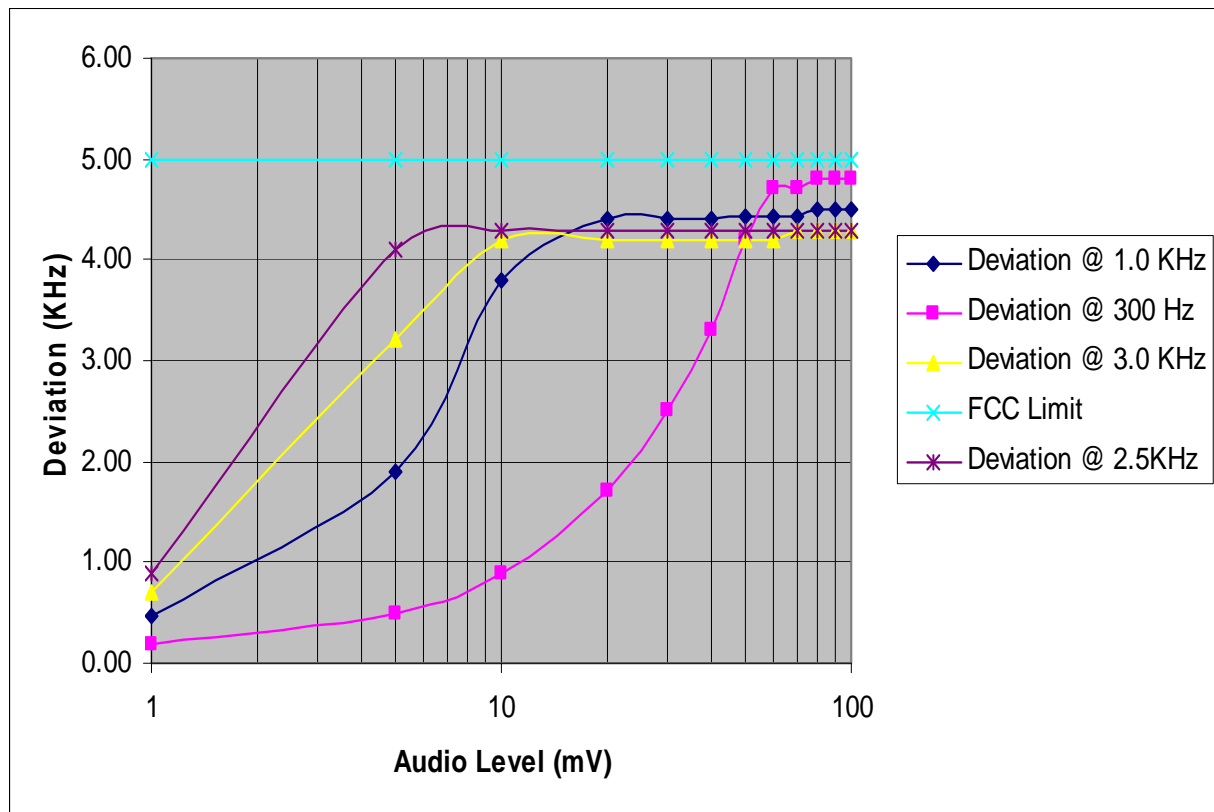
Figure C.5-1 - Setup Drawing – Modulation Characteristics



	Test Report Serial No.:	110612AMW-T1206-E80V	Test Report Issue Date:	Dec. 19, 2012
	Measurement Date(s):	2-5, Dec 2012	Test Report Revision No.:	Rev. 1.1
	Rule Part(s) Applied:	FCC 47 CFR §2, §80	Industry Canada RSS-182 Issue 4, RSS-Gen Issue 3	
	Test Site Registration(s):	FCC Accredited Site	Industry Canada Test Site Registration No. 3874A-1	


## C.6 TEST RESULTS

### C.6.1



## C.7 PASS/FAIL

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

Applicant:	Uniden America Corporation	FCC ID:	AMWUT645	IC:	513C-UT645	
DUT Type:	Portable VHF PTT Marine Radio Transceiver	Model:	MHS235	Freq.:	156-162.5 MHz	
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	Measurement Date(s):	2-5, Dec 2012	Test Report Revision No.:	Rev. 1.1
	Rule Part(s) Applied:	FCC 47 CFR §2, §80	Industry Canada RSS-182 Issue 4, RSS-Gen Issue 3	
	Test Site Registration(s):	FCC Accredited Site	Industry Canada Test Site Registration No. 3874A-1	

### 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.



\_\_\_\_\_  
Glen Westwell  
Lab Manager  
Celltech Labs Inc.

\_\_\_\_\_  
Dec 7, 2012

\_\_\_\_\_  
Date

Applicant:	Uniden America Corporation	FCC ID:	AMWUT645	IC:	513C-UT645	
DUT Type:	Portable VHF PTT Marine Radio Transceiver	Model:	MHS235	Freq.:	156-162.5 MHz	
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	Test Report Serial No.:	110612AMW-T1206-E80V	Test Report Issue Date:	Dec. 19, 2012
	Measurement Date(s):	2-5, Dec 2012	Test Report Revision No.:	Rev. 1.1
	Rule Part(s) Applied:	FCC 47 CFR §2, §80	Industry Canada RSS-182 Issue 4, RSS-Gen Issue 3	
	Test Site Registration(s):	FCC Accredited Site	Industry Canada Test Site Registration No. 3874A-1	

## Appendix D Modulation Characteristics (Audio Frequency Response)

### D.1 REFERENCES

<b>Normative Reference Standard</b>	FCC CFR 47 §2.1047, §80.213; IC RSS-182, 7.8
<b>Procedure Reference</b>	ANSI TIA-603-C

### D.2 LIMITS

§2.1047(a) 80.213(a)(2), (a)(3)(d)	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.
---------------------------------------	--

### D.3 ENVIRONMENTAL CONDITIONS

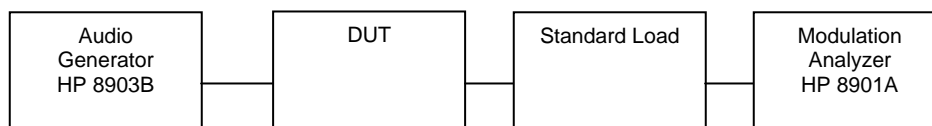
<b>Temperature</b>	25 +/- 5 °C
<b>Humidity</b>	40 +/- 10 %
<b>Barometric Pressure</b>	101 +/- 3 kPa

### D.4 EQUIPMENT LIST

ASSET NUMBER	MANUFACTURER	MODEL	DESCRIPTION	CAL DUE
00028	HP	8901A	Modulation Analyzer	21Jul13
00027	HP	8903B	Audio Generator/Analyzer	21Jul13

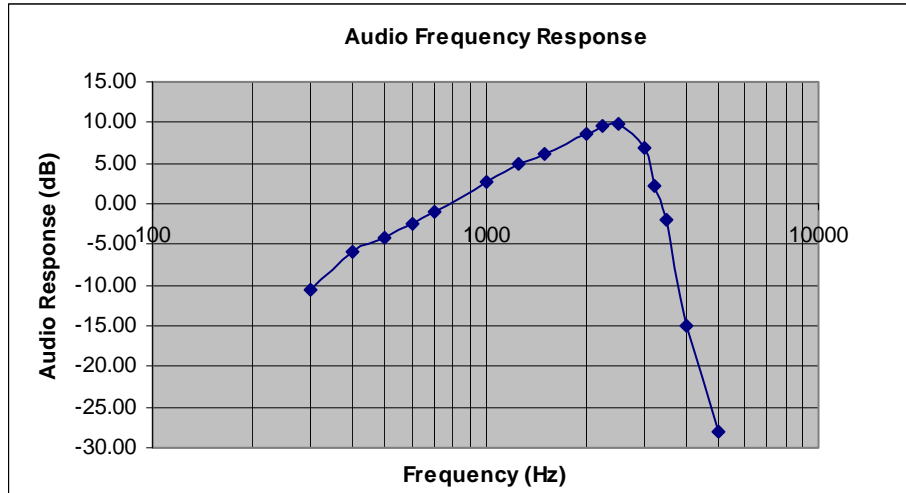
### D.5 SETUP DRAWING

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



	Test Report Serial No.:	110612AMW-T1206-E80V	Test Report Issue Date:	Dec. 19, 2012
	Measurement Date(s):	2-5, Dec 2012	Test Report Revision No.:	Rev. 1.1
	Rule Part(s) Applied:	FCC 47 CFR §2, §80	Industry Canada RSS-182 Issue 4, RSS-Gen Issue 3	
	Test Site Registration(s):	FCC Accredited Site	Industry Canada Test Site Registration No. 3874A-1	

## D.6 TEST RESULTS



## D.7 PASS/FAIL

In reference to the results outlined in D.6 the DUT meets 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.



Glen Westwell  
Lab Manager  
Celltech Labs Inc.

Dec 7 2012

Date

Applicant:	Uniden America Corporation	FCC ID:	AMWUT645	IC:	513C-UT645	
DUT Type:	Portable VHF PTT Marine Radio Transceiver	Model:	MHS235	Freq.:	156-162.5 MHz	
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	Test Report Serial No.:	110612AMW-T1206-E80V	Test Report Issue Date:	Dec. 19, 2012
	Measurement Date(s):	2-5, Dec 2012	Test Report Revision No.:	Rev. 1.1
	Rule Part(s) Applied:	FCC 47 CFR §2, §80	Industry Canada RSS-182 Issue 4, RSS-Gen Issue 3	
	Test Site Registration(s):	FCC Accredited Site	Industry Canada Test Site Registration No. 3874A-1	

## Appendix E Occupied Bandwidth and Emission Mask

### E.1 REFERENCES

<b>Normative Reference Standard</b>	FCC CFR 47 §2.1049, §80.211; IC RSS-182, 7.9
<b>Procedure Reference / Description</b>	Occupied bandwidth was performed by connecting the output of the DUT to the input of a spectrum analyzer.

### E.2 LIMITS

§80.211	<p>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;</p> <p>(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</p> <p>(3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least 43 plus 10 log<sub>10</sub>P (mean power in watts) dB.</p> <p>ABW = 20 kHz (80.205 - G3E)</p>
RSS-182	The nominal authorized channel bandwidth for voice is 16 kHz, for data an authorized bandwidth of 20 KHz is permitted.

### E.3 ENVIRONMENTAL CONDITIONS

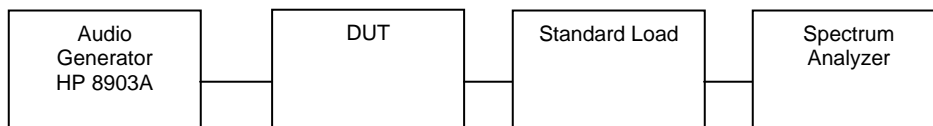
<b>Temperature</b>	25 +/- 5 °C
<b>Humidity</b>	40 +/- 10 %
<b>Barometric Pressure</b>	101 +/- 3 kPa


### E.4 EQUIPMENT LIST

ASSET NUMBER	MANUFACTURER	MODEL	DESCRIPTION	CAL DUE
N/A	R&S	FSU 26.5	Spectrum Analyzer RF Section	05-Nov-2013
00051	HP	8566B	Spectrum Analyzer RF Section	10-May-2014
00047	HP	85685A	RF Preselector	10-May-2014
00027	HP	8903B	Audio Generator/Analyzer	21-Jul-2013

### E.5 SETUP DRAWING

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



<b>Applicant:</b>	Uniden America Corporation	<b>FCC ID:</b>	AMWUT645	<b>IC:</b>	513C-UT645	
<b>DUT Type:</b>	Portable VHF PTT Marine Radio Transceiver	<b>Model:</b>	MHS235	<b>Freq.:</b>	156-162.5 MHz	
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	Test Report Serial No.:	110612AMW-T1206-E80V	Test Report Issue Date:	Dec. 19, 2012
	Measurement Date(s):	2-5, Dec 2012	Test Report Revision No.:	Rev. 1.1
	Rule Part(s) Applied:	FCC 47 CFR §2, §80	Industry Canada RSS-182 Issue 4, RSS-Gen Issue 3	
	Test Site Registration(s):	FCC Accredited Site	Industry Canada Test Site Registration No. 3874A-1	

## E.6 TEST RESULTS

### E.6.1 Occupied Bandwidth & Emission Mask

#### Ch.14



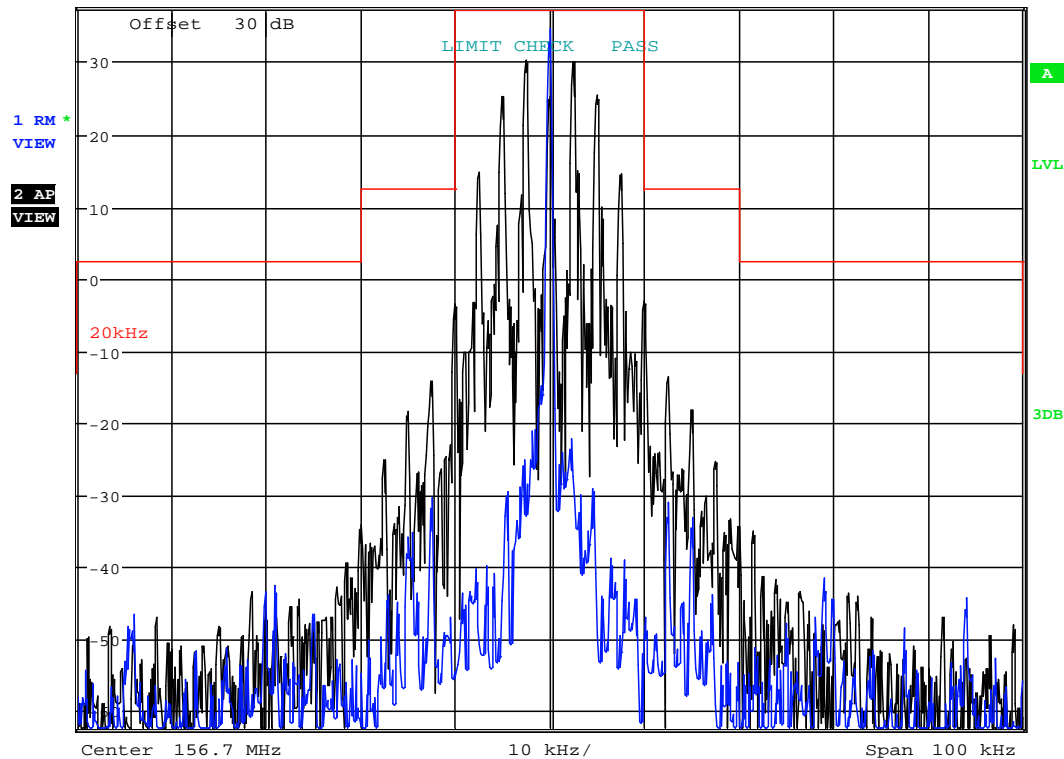
\* RBW 300 Hz

\* VBW 1 kHz


Ref 37.6 dBm

\* Att 25 dB

SWT 1.15 s



Date: 3.DEC.2012 19:10:28

Applicant:	Uniden America Corporation	FCC ID:	AMWUT645	IC:	513C-UT645	
DUT Type:	Portable VHF PTT Marine Radio Transceiver	Model:	MHS235	Freq.:	156-162.5 MHz	
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	Test Report Serial No.:	110612AMW-T1206-E80V	Test Report Issue Date:	Dec. 19, 2012
	Measurement Date(s):	2-5, Dec 2012	Test Report Revision No.:	Rev. 1.1
	Rule Part(s) Applied:	FCC 47 CFR §2, §80	Industry Canada RSS-182 Issue 4, RSS-Gen Issue 3	
	Test Site Registration(s):	FCC Accredited Site	Industry Canada Test Site Registration No. 3874A-1	

## E.7 TEST RESULTS

### E.7.1 Occupied Bandwidth & Emission Mask

#### Ch.14



\* RBW 300 Hz

VBW 3 kHz

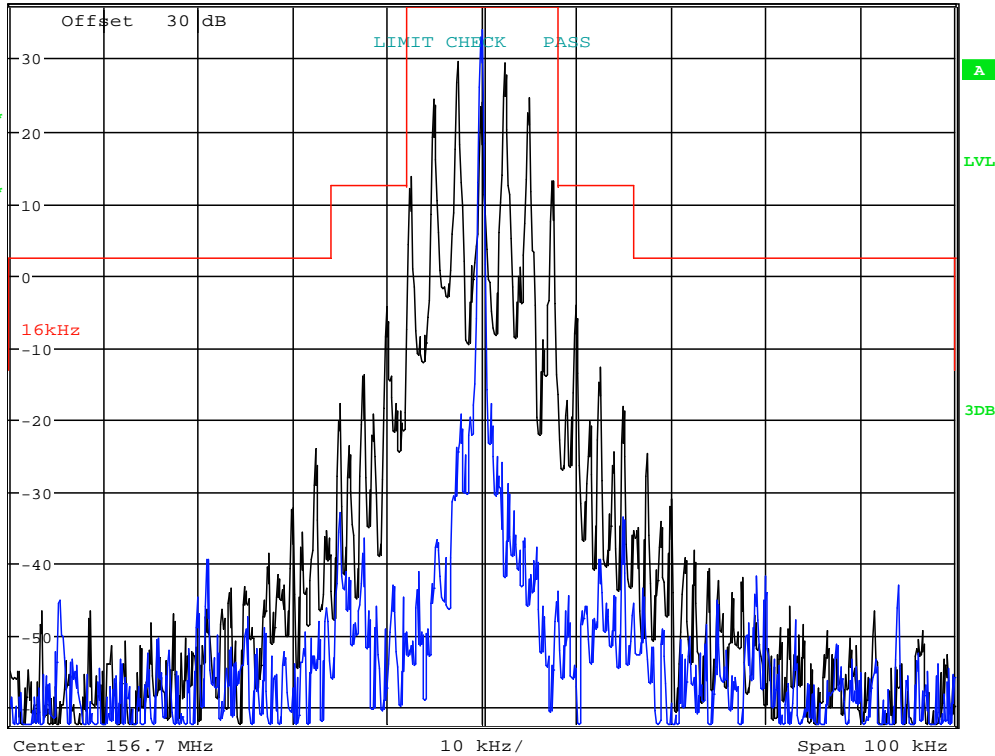
SWT 1.15 s

Ref 37.6 dBm


Att 35 dB

1 RM  
VIEW

2 RM  
VIEW

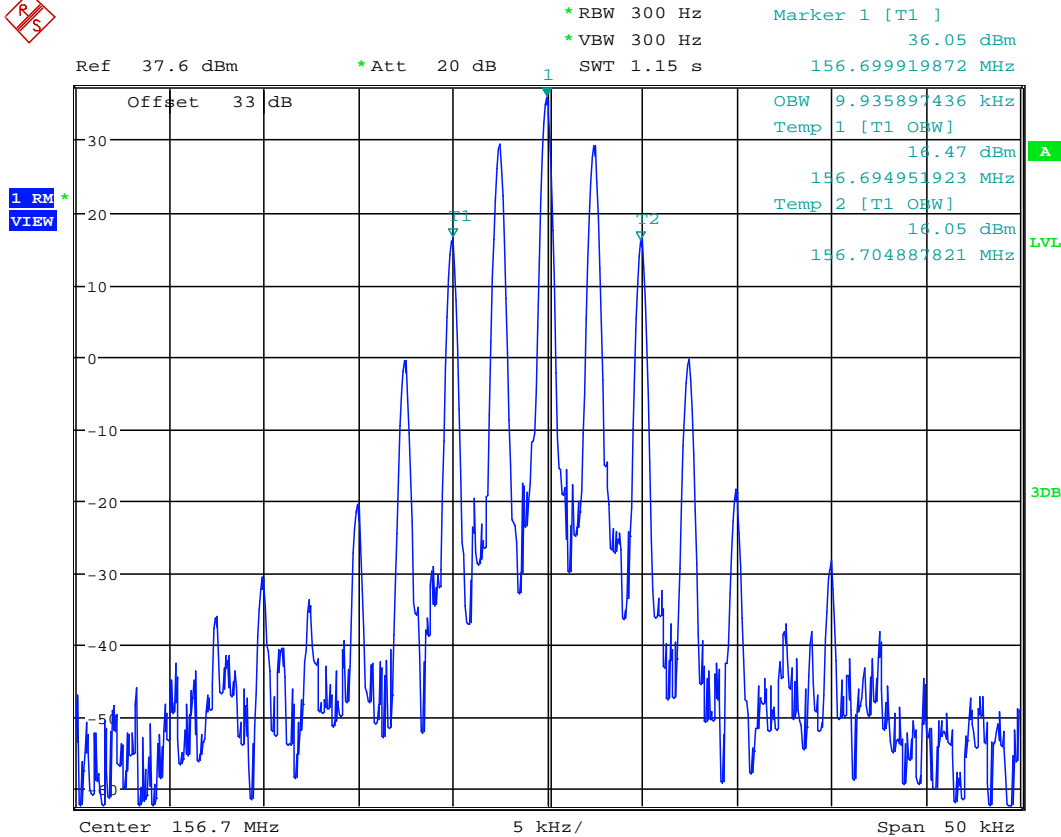


Date: 7.DEC.2012 18:43:53

Applicant:	Uniden America Corporation	FCC ID:	AMWUT645	IC:	513C-UT645	
DUT Type:	Portable VHF PTT Marine Radio Transceiver	Model:	MHS235	Freq.:	156-162.5 MHz	
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	Test Report Serial No.:	110612AMW-T1206-E80V	Test Report Issue Date:	Dec. 19, 2012
	Measurement Date(s):	2-5, Dec 2012	Test Report Revision No.:	Rev. 1.1
	Rule Part(s) Applied:	FCC 47 CFR §2, §80	Industry Canada RSS-182 Issue 4, RSS-Gen Issue 3	
	Test Site Registration(s):	FCC Accredited Site	Industry Canada Test Site Registration No. 3874A-1	

### Ch.14 - 99% Occ. BW. = 9.9 kHz




Date: 2.DEC.2012 14:14:56

### E.8 PASS/FAIL

In reference to the results outlined in F.6 the DUT meets the requirements as stated in the reference standards.

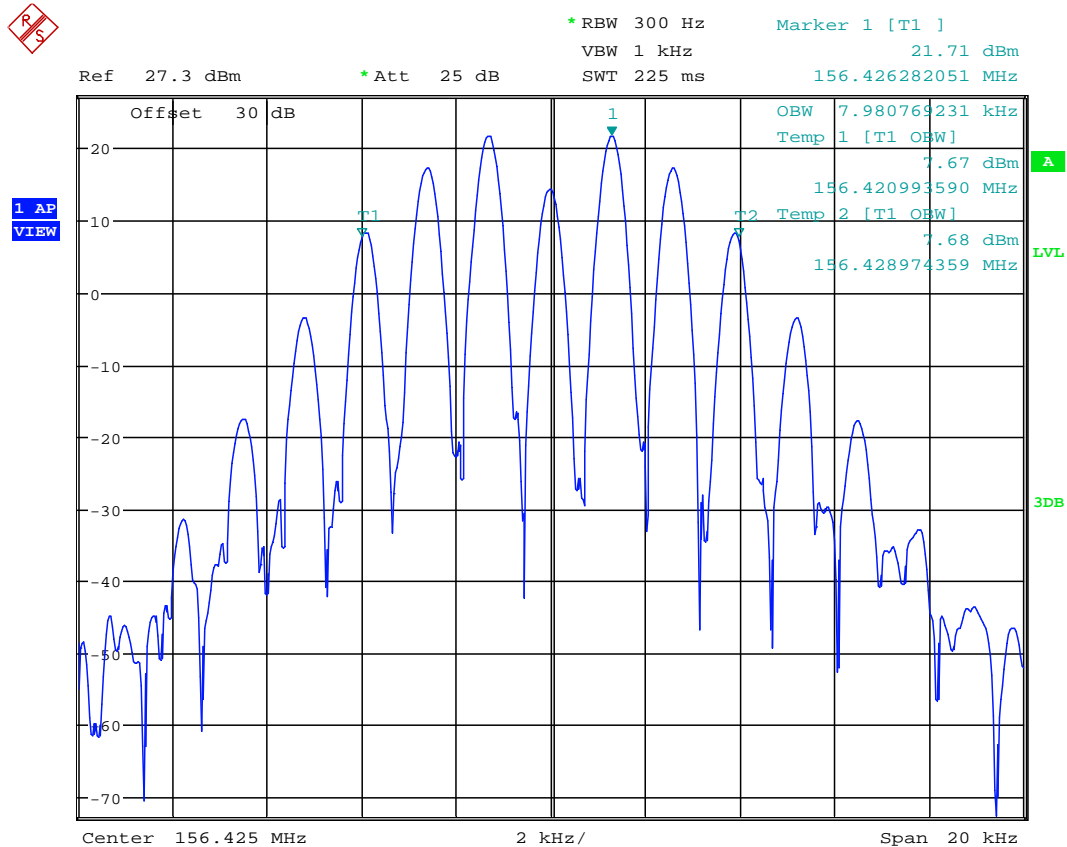
### E.9 SIGN-OFF

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.

Applicant:	Uniden America Corporation	FCC ID:	AMWUT645	IC:	513C-UT645	
DUT Type:	Portable VHF PTT Marine Radio Transceiver	Model:	MHS235	Freq.:	156-162.5 MHz	
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	Test Report Serial No.:	110612AMW-T1206-E80V	Test Report Issue Date:	Dec. 19, 2012
	Measurement Date(s):	2-5, Dec 2012	Test Report Revision No.:	Rev. 1.1
	Rule Part(s) Applied:	FCC 47 CFR §2, §80	Industry Canada RSS-182 Issue 4, RSS-Gen Issue 3	
	Test Site Registration(s):	FCC Accredited Site	Industry Canada Test Site Registration No. 3874A-1	


### DSC 1.3 – 99% OBW = 8.0 kHz



Date: 3.DEC.2012 16:58:50

### E.10 PASS/FAIL

In reference to the results outlined in F.6 the DUT meets the requirements as stated in the reference standards.

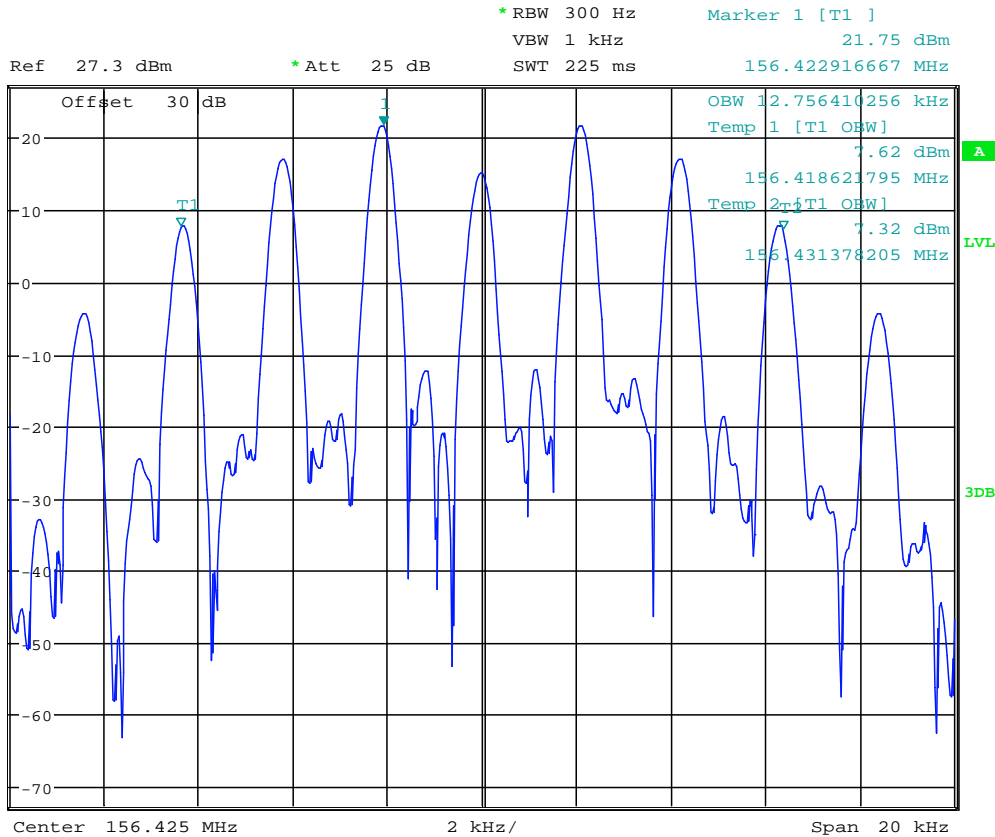
Applicant:	Uniden America Corporation	FCC ID:	AMWUT645	IC:	513C-UT645	
DUT Type:	Portable VHF PTT Marine Radio Transceiver	Model:	MHS235	Freq.:	156-162.5 MHz	
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	Test Report Serial No.:	110612AMW-T1206-E80V	Test Report Issue Date:	Dec. 19, 2012
	Measurement Date(s):	2-5, Dec 2012	Test Report Revision No.:	Rev. 1.1
	Rule Part(s) Applied:	FCC 47 CFR §2, §80	Industry Canada RSS-182 Issue 4, RSS-Gen Issue 3	
	Test Site Registration(s):	FCC Accredited Site	Industry Canada Test Site Registration No. 3874A-1	

### DSC 2.1 – 99% OBW = 12.8 kHz




1 AP  
VIEW



Date: 3.DEC.2012 16:52:13

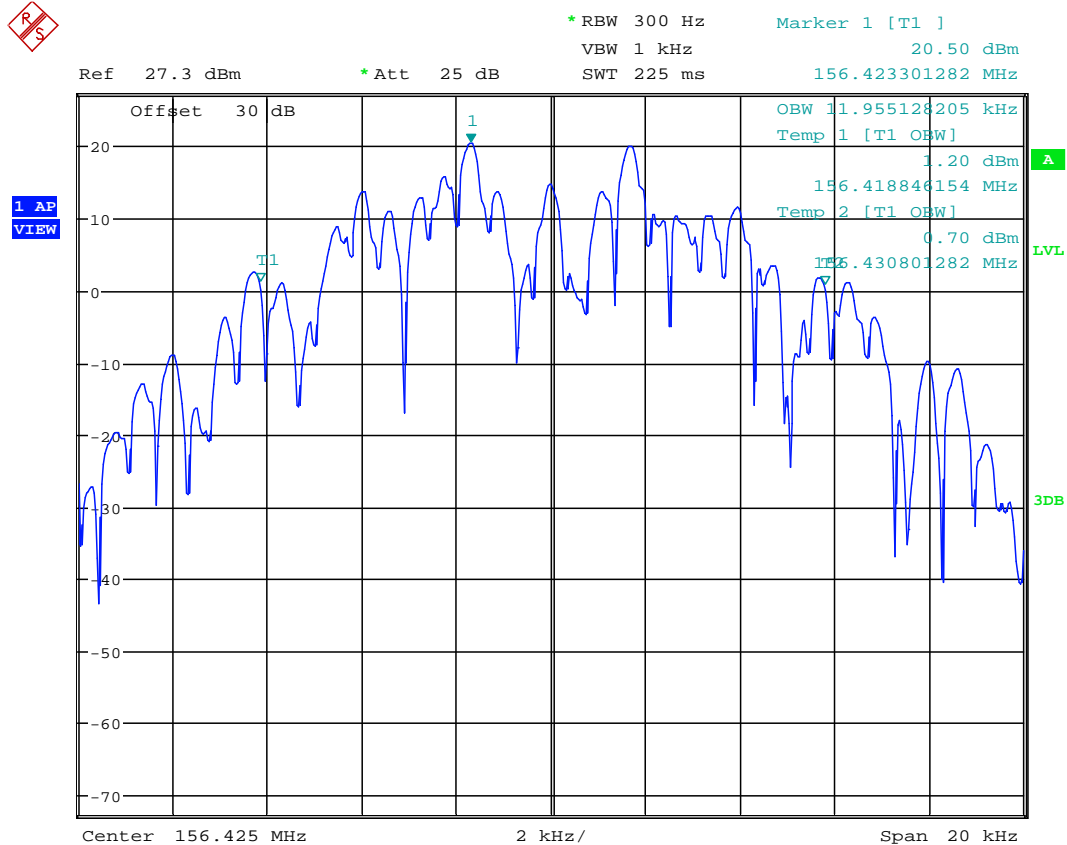
### E.11 PASS/FAIL

In reference to the results outlined in F.6 the DUT meets the requirements as stated in the reference standards.

Applicant:	Uniden America Corporation	FCC ID:	AMWUT645	IC:	513C-UT645	
DUT Type:	Portable VHF PTT Marine Radio Transceiver	Model:	MHS235	Freq.:	156-162.5 MHz	
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	Test Report Serial No.:	110612AMW-T1206-E80V	Test Report Issue Date:	Dec. 19, 2012
	Measurement Date(s):	2-5, Dec 2012	Test Report Revision No.:	Rev. 1.1
	Rule Part(s) Applied:	FCC 47 CFR §2, §80	Industry Canada RSS-182 Issue 4, RSS-Gen Issue 3	
	Test Site Registration(s):	FCC Accredited Site	Industry Canada Test Site Registration No. 3874A-1	

### DSC Pulse – 99% OBW = 12.0 kHz



Date: 3.DEC.2012 16:55:10

### E.12 PASS/FAIL


In reference to the results outlined in F.6 the DUT meets the requirements as stated in the reference standards.

*Glen Westwell*

Glen Westwell  
Lab Manager  
Celltech Labs Inc.

Dec 7, 2012

Date

Applicant:	Uniden America Corporation	FCC ID:	AMWUT645	IC:	513C-UT645	
DUT Type:	Portable VHF PTT Marine Radio Transceiver	Model:	MHS235	Freq.:	156-162.5 MHz	
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	Test Report Serial No.:	110612AMW-T1206-E80V	Test Report Issue Date:	Dec. 19, 2012
	Measurement Date(s):	2-5, Dec 2012	Test Report Revision No.:	Rev. 1.1
	Rule Part(s) Applied:	FCC 47 CFR §2, §80	Industry Canada RSS-182 Issue 4, RSS-Gen Issue 3	
	Test Site Registration(s):	FCC Accredited Site	Industry Canada Test Site Registration No. 3874A-1	

## Appendix F Radiated Spurious Emissions - TX

### F.1 REFERENCES

<b>Normative Reference Standard</b>	FCC CFR 47 §2.1053; IC RSS-182
<b>Procedure Reference</b>	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).

### F.2 LIMITS

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

### F.3 ENVIRONMENTAL CONDITIONS

<b>Temperature</b>	25 +/- 5 °C
<b>Humidity</b>	40 +/- 10 %
<b>Barometric Pressure</b>	101 +/- 3 kPa

### F.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
N/A	R&S	FSU 26	Spectrum Analyzer	05-Nov-13
00050	Chase	CBL-6111A	Bilog Antenna	07-May-14
00055	EMCO	3121C	Dipole Antenna	07-May-14
00051	HP	8566B	Spectrum Analyzer RF Section	10-May-14
00049	HP	85650A	Quasi-peak Adapter	10-May-14
00047	HP	85685A	RF Preselector	10-May-14
00006	R & S	SMR 20	Signal Generator (10MHz-40GHz)	1-May-14
00007	Gigatronics	8652A	Power Meter	03-May-14
00014	Gigatronics	80701A	Power Sensor	03-May-14



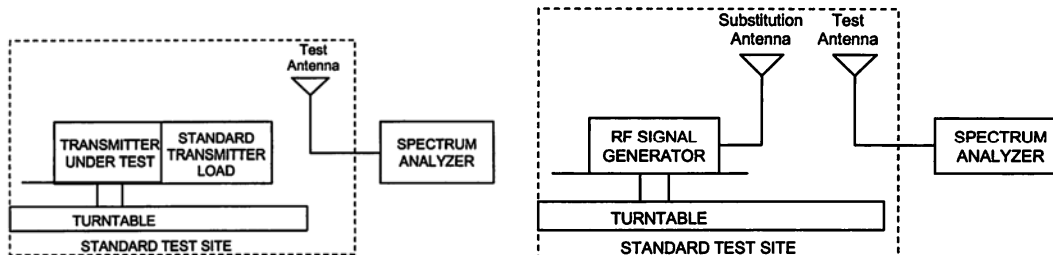
	Test Report Serial No.:	110612AMW-T1206-E80V	Test Report Issue Date:	Dec. 19, 2012
	Measurement Date(s):	2-5, Dec 2012	Test Report Revision No.:	Rev. 1.1
	Rule Part(s) Applied:	FCC 47 CFR §2, §80	Industry Canada RSS-182 Issue 4, RSS-Gen Issue 3	
	Test Site Registration(s):	FCC Accredited Site	Industry Canada Test Site Registration No. 3874A-1	


## F.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. Worst case performance is presented.		
	Frequency Range	RX Antenna	TX Antenna
	30 MHz - 1GHz	Bilog	Dipole
	1 GHz - 18 GHz	ETS 3115 Horn	ETS 3115 Horn
MEASUREMENT EQUIPMENT SETTINGS	Measurement Settings.		
	RBW	VBW	Detector
	MHz	MHz	
	10 kHz < 1GHz 1 MHz >1 GHz	300 kHz < 1 GHz 3 MHz > 1 GHz	Peak

## F.6 SETUP DRAWING

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



Applicant:	Uniden America Corporation	FCC ID:	AMWUT645	IC:	513C-UT645	
DUT Type:	Portable VHF PTT Marine Radio Transceiver	Model:	MHS235	Freq.:	156-162.5 MHz	
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	Test Report Serial No.:	110612AMW-T1206-E80V	Test Report Issue Date:	Dec. 19, 2012
	Measurement Date(s):	2-5, Dec 2012	Test Report Revision No.:	Rev. 1.1
	Rule Part(s) Applied:	FCC 47 CFR §2, §80	Industry Canada RSS-182 Issue 4, RSS-Gen Issue 3	
	Test Site Registration(s):	FCC Accredited Site	Industry Canada Test Site Registration No. 3874A-1	

## F.7 TEST RESULTS

### TX: 156.7 MHz

Emissions (MHz)	Emission Level (dB)	Substitution Level (dB)	Cable Loss (dB)	Antenna Gain (dBd)	Corrected Level (dBm)	Limit (dBm)	Margin (dB)
313.4	-62.8	-31.4	-3.6	-0.95	-35.95	-13	-22.95
470.1	-62.6	-28.9	-4.6	-1.15	-34.65	-13	-21.65
783.5	-72.8	-29.3	-6.2	-0.15	-35.65	-13	-22.65
940.2	-77.7	-32.2	-6.9	-0.65	-39.75	-13	-26.75

#### Note(s):

1. DUT antenna replaced with non-radiating load.
2. 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).
3. Worst case data is presented.

## F.8 PASS/FAIL

In reference to the results outlined in G.7 the DUT meets 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.



Glen Westwell  
Lab Manager  
Celltech Labs Inc.

Dec. 7<sup>th</sup> 2012


Date

Applicant:	Uniden America Corporation	FCC ID:	AMWUT645	IC:	513C-UT645	
DUT Type:	Portable VHF PTT Marine Radio Transceiver	Model:	MHS235	Freq.:	156-162.5 MHz	
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	Test Report Serial No.:	110612AMW-T1206-E80V	Test Report Issue Date:	Dec. 19, 2012
	Measurement Date(s):	2-5, Dec 2012	Test Report Revision No.:	Rev. 1.1
	Rule Part(s) Applied:	FCC 47 CFR §2, §80	Industry Canada RSS-182 Issue 4, RSS-Gen Issue 3	
	Test Site Registration(s):	FCC Accredited Site	Industry Canada Test Site Registration No. 3874A-1	

#### F.10 TEST SETUP PHOTOGRAPH



Applicant:	Uniden America Corporation	FCC ID:	AMWUT645	IC:	513C-UT645	
DUT Type:	Portable VHF PTT Marine Radio Transceiver	Model:	MHS235	Freq.:	156-162.5 MHz	
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	Test Report Serial No.:	110612AMW-T1206-E80V	Test Report Issue Date:	Dec. 19, 2012
	Measurement Date(s):	2-5, Dec 2012	Test Report Revision No.:	Rev. 1.1
	Rule Part(s) Applied:	FCC 47 CFR §2, §80	Industry Canada RSS-182 Issue 4, RSS-Gen Issue 3	
	Test Site Registration(s):	FCC Accredited Site	Industry Canada Test Site Registration No. 3874A-1	

## Appendix G Frequency Stability

### G.1 REFERENCES

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

### G.2 LIMITS

§80.209 & RSS-182	Band 156-162 MHz (ii) Ship Station = 10.0 ppm
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### G.3 ENVIRONMENTAL CONDITIONS

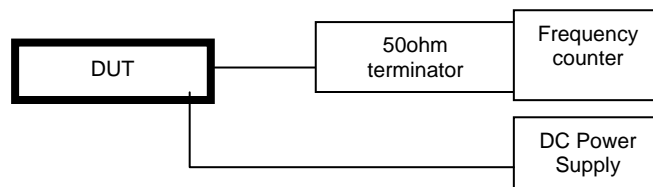
<b>Temperature</b>	25 +/- 5 °C
<b>Humidity</b>	40 +/- 10 %
<b>Barometric Pressure</b>	101 +/- 3 kPa


### G.4 EQUIPMENT LIST

ASSET NUMBER	MANUFACTURER	MODEL	DESCRIPTION	CAL DUE
na	ESPEC	ECT-2	Heater/Refrigerator	na
0003	HP	53181A	Frequency Counter	02-May-14
na	HP	E3611A	DC Power Supply	na
00207	VWR	na	Temperature Humidity Monitor	20-July-14

### G.5 SETUP DRAWING

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



<b>Applicant:</b>	Uniden America Corporation	<b>FCC ID:</b>	AMWUT645	<b>IC:</b>	513C-UT645	
<b>DUT Type:</b>	Portable VHF PTT Marine Radio Transceiver	<b>Model:</b>	MHS235	<b>Freq.:</b>	156-162.5 MHz	
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	Test Report Serial No.:	110612AMW-T1206-E80V	Test Report Issue Date:	Dec. 19, 2012
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	Test Site Registration(s):	FCC Accredited Site	Industry Canada Test Site Registration No. 3874A-1	

## G.6 TEST RESULTS

Temperature (degrees C)	Assigned Frequency (MHz)	Measured Frequency (MHz)	Deviation (Hz)	Frequency tolerance (ppm)
-20	156.70000	156.699835	-165	-1.05
-10	156.70000	156.699824	-176	-1.12
0	156.70000	156.699830	-170	-1.08
10	156.70000	156.699842	-158	-1.01
20	156.70000	156.699835	-165	-1.05
30	156.70000	156.699913	-87	-0.56
40	156.70000	156.699840	-160	-1.02
50	156.70000	156.699835	-165	-1.05
20 +end point	156.70000	156.699835	-165	-1.05
20 -end point	156.70000	156.699835	-165	-1.05

## G.7 PASS/FAIL

In reference to the results outlined in H.6 the DUT meets the requirements as stated in the reference standards.

## G.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.



Glen Westwell  
Lab Manager  
Celltech Labs Inc.


Dec. 7, 2012

Date

Applicant:	Uniden America Corporation	FCC ID:	AMWUT645	IC:	513C-UT645	
DUT Type:	Portable VHF PTT Marine Radio Transceiver	Model:	MHS235	Freq.:	156-162.5 MHz	
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	Test Report Serial No.:	110612AMW-T1206-E80V	Test Report Issue Date:	Dec. 19, 2012
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	Test Site Registration(s):	FCC Accredited Site	Industry Canada Test Site Registration No. 3874A-1	

END OF DOCUMENT

Applicant:	Uniden America Corporation	FCC ID:	AMWUT645	IC:	513C-UT645	
DUT Type:	Portable VHF PTT Marine Radio Transceiver	Model:	MHS235	Freq.:	156-162.5 MHz	
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