Report on the FCC and IC Testing of:

ACR Electronics Inc
PLB-425 Personal Locating Beacon

In accordance with FCC 47 CFR Part 95, FCC 47 CFR Part 2, Industry Canada RSS-287 and Industry Canada RSS-GEN

Prepared for: ACR Electronics Inc.
5757 Ravenswood Road
Ft. Lauderdale
Florida

FCC ID: B66ACRPLB-400-425
IC: 1322A-ACRPLB400425

Product Service

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Document Number: 75943184-09 | Issue: 01

SIGNATURE			
NAME	**JOB TITLE**	**RESPONSIBLE FOR**	**ISSUE DATE**
Simon Bennett	Chief Engineer	Authorised Signatory	11 March 2019

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD Product Service document control rules.

ENGINEERING STATEMENT
The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC 47 CFR Part 95, FCC 47 CFR Part 2, Industry Canada RSS-287 and Industry Canada RSS-GEN. The sample tested was found to comply with the requirements defined in the applied rules.

SIGNATURE			
NAME	**JOB TITLE**	**RESPONSIBLE FOR**	**ISSUE DATE**
Matthew Russell	RF Team Leader	Testing	11 March 2019

FCC Accreditation
90987 Octagon House, Fareham Test Laboratory

Industry Canada Accreditation
IC2932B-1 Octagon House, Fareham Test Laboratory

EXECUTIVE SUMMARY
A sample of this product was tested and found to be compliant with FCC 47 CFR Part 95: 2017, FCC 47 CFR Part 2: 2017, Industry Canada RSS-287: Issue 2 (03-2014) and Industry Canada RSS-GEN: Issue 5 (04-2018).

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Product Service

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Product Service

1 Report Summary

1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Issue	Description of Change	Date of Issue
1	First Issue	11 March 2019

Table 1

1.2 Introduction

Applicant	ACR Electronics Inc
Manufacturer	ACR Electronics Inc
Model Number(s)	ResQlink (PLB 425)
Serial Number(s)	PLB-425, S/N: #3 (TSR04) PLB-425, S/N: #10 (TSR20)
Hardware Version(s)	PLB-425: A3-06-3138- Rev T2
Software Version(s)	K3-01-0145 Rev C
Number of Samples Tested	2
Test Specification/Issue/Date	FCC 47 CFR Part 95: 2017 FCC 47 CFR Part 2: 2017 Industry Canada RSS-287: Issue 2 (03-2014) Industry Canada RSS-GEN: Issue 5 (04-2018)
Order Number Date	45752 21-June-2018
Date of Receipt of EUT	16-November-2018 and 28-November-2018
Start of Test	16-November-2018
Finish of Test	28-November-2018
Name of Engineer(s)	Matthew Russell
Related Document(s)	ANSI C63.26: 2015 RTCM 11010.2

Product Service

1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 95, FCC 47 CFR Part 2, Industry Canada RSS-287 and Industry Canada RSS-GEN is shown below.

Section	Specification Clause				Test Description	Result	Comments/Base Standard
	Part 95	Part 2	RSS-287	RSS-GEN			
Configuration and Mode: Battery Powered - 121.5 MHz Homer							
2.1	RTCM 1010.2 A.16.1	2.1055	7.4.2	6.11	Transmitter Frequency Stability	Pass	
2.2	RTCM 1010.2 A.16.2	2.1047	7.4.1	-	Modulation Characteristics	Pass	
2.3	RTCM 1010.2 Clause A.16.3	2.1046	7.4.3	6.12	Peak Equivalent Isotropic Radiated Power	Pass	
2.4	-	2.1051	7.4.4	6.13	Spurious Emissions at Antenna Terminals	Pass	
2.5	-	2.1049	-	6.7	Occupied Bandwidth	Pass	
2.6	RTCM 1010.2 A.16.2(e)	-	7.4.5	-	Spectrum Characteristics	Pass	

Table 2

Product Service

1.4 Application Form

G.1 Beacon Manufacturer and Beacon Model

Beacon Manufacturer	ACR Electronics, Inc.
Beacon Model	PLB-400 and PLB-425
Other Model Names	For PLB-400: ResQLink For PLB-425: ResQLink View

Beacon Type and Operational Configurations

Beacon Type	**Beacon used while:**	**Tick where appropriate**
EPIRB Float Free	Floating in water or on deck or in a safety raft	☐
EPIRB Non-Float Free (automatic and manual activation)	Floating in water or on deck or in a safety raft	☐
EPIRB Non-Float Free (manual activation only)	Floating in water or on deck or in a safety raft	☐
EPIRB Float Free with VDR	Floating in water or on deck or in a safety raft	☐
PLB	On ground and above ground	☒
	On ground and above ground and floating in water	☐
ELT Survival	On ground and above ground	☐
	On ground and above ground and floating in water	☐
ELT Auto Fixed	Fixed ELT with aircraft external antenna	☐
ELT (DT)	Distress tracking ELT with aircraft external antenna	☐
ELT Auto Portable	In aircraft with an external antenna	☐
	On ground, above ground, or in a safety raft with an integrated antenna	☐
ELT Auto Deployable	Deployable ELT with attached antenna	☐
Other (specify)		☐

Product Service

Beacon Characteristics

Characteristic	Specification
Operating frequency (406 MHz operating channel = 406.xxx)	406.031 MHz
Operating temperature range (T_{min}, T_{max})	Tmin = -20°C Tmax = +55°C
Temperature, at which minimum duration of continuous operation is expected (Submit C/S T.007 Section 5, part s, if applicable)	-20°C
Operating lifetime	24 hours
Beacon power supply type (internal non -rechargeable, internal re-chargeable, external, combined, other)	Internal non -rechargeable
External power supply parameters (AC/DC and nominal voltage)	N/A
Is external power supply needed to energise the beacon or its ancillary devices in any of operation modes (N/A or Yes of No)	No
Battery cell chemistry	$LiMnO_2$
Battery cell model name, size and number of cells in a battery pack, and details of the battery pack electrical configuration	CR123A, 2/3A, 3 cells in series
Battery cell manufacturer	Panasonic
Battery pack manufacturer and part number	ACR Electronics, Inc. A3-06-2703
Beacon manufacturers declared maximum allowed cell shelf-life (from date of cell manufacture to date of battery pack installation in the beacon) (years)	1.0 years
Declared beacon battery replacement period (from date of installation in the beacon to expiry date marked on the beacon) (years)	5 years
Oscillator type (e.g. OCXO, MCXO, TCXO)	TCXO
Oscillator manufacturer	RAKON (Made in New Zealand)
Oscillator part name / part number	RAKON P/N E6907LF, ACR P/N A1-11-1169
Oscillator satisfies long-term frequency stability requirements (Yes or No)	Yes
Antenna type: Integral or Other (e.g. External, Detachable – specify type)	Integral
Antenna manufacturer	ACR Electronics Inc.
Antenna part name and part number (OEM, if applicable, and beacon manufacturer's)	A3-06-3136
Antenna cable assembly min / max RF- loses at 406 MHz, if applicable	N/A

Product Service

Characteristic	Specification
Navigation device type (Internal, External or None)	Internal
Features in beacon that prevent degradation to 406 MHz signal or beacon lifetime resulting from a failure of navigation device or failure to acquire position data (Yes, No, or N/A)	Yes
Features in beacon that ensures erroneous position data is not encoded into the beacon message (Yes, No or N/A)	Yes
Navigation device capable of supporting global coverage (Yes, No or N/A)	Yes
Encoded position update capability (Yes, No, N/A)	Yes
Encoded position update interval value (range) (min)	>5 min, <60 min
For Internal Navigation Devices	
- Geodetic reference system (WGS 84 or GTRF)	WGS 84
- GNSS receiver cold start forced at every beacon activation (Yes or No)	Yes
- Navigation device manufacturer	uBlox
- Navigation device model name and part Number	SAM-M8Q GPS module, P/N SAM-M8Q
- Internal navigation device antenna type (integrated, internal, external, passive / active), manufacturer and model	Integral Ceramic to SAM-M8Q
- GNSS system supported (e.g. GPS, GLONASS, Galileo)	GPS
For External Navigation Devices	
- Data protocol for GNSS receiver to beacon interface	N/A
- Physical interface for beacon to navigation device	N/A
- Electrical interface for beacon to navigation device	N/A
- Part number of the external navigation interface device (if applicable)	N/A
- Navigation device model and manufacturer (if beacon designed to use specific devices)	N/A

Product Service

Self-Test Mode Characteristics	Self-Test Mode	Optional GNSS Self-Test Mode
- Activated by a separate switch / separate switch positions (Yes / No)	Yes	Yes
- Self-test / GNSS self-test mode switch automatically returns to normal position when released (Yes or No)	Yes	Yes
- Self-test / GNSS activation can cause an operational mode transmission (Yes or No)	No	No
- Results in transmission of a single self-test burst only, regardless of how long the self-test activation mechanism is applied (Yes or No)	Yes	Yes
- Results of self-test / GNSS self-test indicated by (provide details, e.g Pass / Fail indicator l, strobe light, etc.)	Yes, Red Green LEDs. Additionally displayed on PLB-425	Yes, Red Green LEDs. Additionally displayed on PLB-425
- The content of the encoded position data fields of the self-test message has default values	Yes	N/A
- Performs an internal check and indicates that RF power emitted at 406 MHz and 121.5 MHz, if beacon includes a 121.5 MHz homer (Yes or No)	Yes	Yes
- Self-test results in transmission of a signal other than at 406 MHz (Yes & details or No)	Yes, 121.5 MHz	No
- Self-test can be activated directly at beacon (Yes or No)	Yes	Yes
- List of Items checked by self-test	Battery, 406 Pwr/PLL lock, 121 Pwr, Non-volatile memory Battery Witness Battery Voltage GPS Com Check	Battery, GPS ACQ, 406 Burst
- Self-test / GNSS self-test 406 MHz burst duration (440 or 520 ms)	440 ms	520 ms
- Self-test message length format flag in bit 25,bit (“0” or “1”)	1	1
- Maximum duration of a self-test mode, sec	13 Secs	110 Secs
- Maximum recommended number of self-tests / GNSS self-tests during battery pack replacement period (as applicable)	60	20
- Distinct indication of self-test start (Yes or No)	Yes	Yes
- Indication of self-test results (Yes or No)	Yes	Yes
- Distinct indication of insufficient battery capacity (Yes or No)	Yes	Yes
- Automatic termination of self-test mode immediately after completion of the self-test cycle (Yes or No)	Yes	Yes
- GNSS Self-test results in transmission of a single burst, irrespectively of the test result (Yes or No)	N/A	Yes
- Self-test / GNSS self-test can be activated from beacon remote activation points (Yes & details or No)	No	No
- List all methods of Self-test mode and GNSS Self-test modes activation. Provide details on a separate sheet to describe	Press Self-Test button 2 Sec to 5 Sec	Press Self-Test button for 5 Sec to 10 Sec

Product Service

Characteristic	Specification	
Message Coding Protocols:	(x) Tick the boxes below against the intended protocol options	
User Protocol (tick where appropriate)	☐	Maritime with MMSI
	☐	Maritime with Radio Call Sign
	☐	EPIRB Float Free with Serial Number
	☐	EPIRB Non Float Free with Serial Number
	☐	Radio Call Sign
	☐	Aviation
	☐	ELT with Serial Number
	☐	ELT with Aircraft Operator and Serial Number
	☐	ELT with Aircraft 24-bit Address
	☐	PLB with Serial Number
	☐	National (Short Message Format)
	☐	National (Long Message Format)
Standard Location Protocol (tick where appropriate)	☒	EPIRB with MMSI
	☒	EPIRB with Serial Number
	☒	ELT with 24-bit Address
	☒	ELT with Aircraft Operator Designator
	☒	ELT with Serial Number
	☒	PLB with Serial Number
National Location Protocol (tick where appropriate)	☒	National Location: EPIRB
	☒	National Location: ELT
	☒	National Location: PLB
ELT (DT) Location Protocol (tick where appropriate)	☐	ELT with Serial Number
	☐	ELT with Aircraft Operator and Serial Number
	☐	ELT with Aircraft 24-bit Address
RLS Location Protocol (tick where appropriate)	☐	EPIRB
	☐	ELT
	☐	PLB
User Location Protocol (tick where appropriate)	☐	Maritime with MMSI
	☐	Maritime with Radio Call Sign
	☐	EPIRB Float Free with Serial Number
	☐	EPIRB Non Float Free with Serial Number
	☐	Radio Call Sign
	☐	Aviation
	☐	ELT with Serial Number
	☐	ELT with Aircraft Operator and Serial Number
	☐	ELT with Aircraft 24-bit Address
	☐	PLB with Serial Number

Product Service

Characteristic	Specification
Beacon includes a homer transmitter(s) (Yes or No)	Yes
-Homer transmitter(s) frequency (Yes or No)	121.5 MHz
- 121.5 MHz transmit power (dBm)	17 dBm
- 243 MHz transmit power (dBm)	N/A
- AIS transmit power (dBm)	N/A
- Other	N/A
-Homer transmitter(s) duty cycle (%)	95%
-Duty cycle of homer swept tone (%)	33%
Beacon includes a high intensity flashing light (e.g. Strobe) (Yes or No)	Yes
-light intensity (cd)	36.75 cd white light
-flash rate (flashes per minute)	6 per minute
Beacon transmission repetition period satisfies C/S T.001 requirement that two beacon's repetition periods are not synchronised closer than a few seconds over 5 minute period, and the time intervals between transmissions are randomly distributed on the interval 47.5 to 52.5 seconds (Yes or No)	Yes
Other ancillary devices (e.g. voice transceiver, remote control, external audio and light indicators, external activation device). List details on a separate sheet if insufficient space to describe	N/A
Beacon includes automatic activation mechanism (Yes or No). Specify type of automatic beacon activation mechanism	No
Beacon includes a voice-transceiver (Yes or No)	No
-Provide prevention against continuous operation of voice transmitter (Yes or No), and if Yes specify:	N/A
-maximum continuous voice transmission duration (limit), minutes	N/A
-Manufacturer-specified total duration of voice-transmitter operation during the declared rated lifetime ("On time"), (hrs)	N/A
Beacon includes features and functions not listed above, related or non-related to 406 MHz (Yes or No) List features and use a separate sheet if insufficient space	No

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Characteristic	Specification
Beacon model hardware part number (P/N) and version	PLB-400: A3-06-3138-1 Rev T2 PLB-425: A3-06-3138- Rev T2
Beacon model software/firmware P/N, version, date of issue / releases	K3-01-0145 Rev C
Beacon model printed circuit board P/N and version	A3-07-0469 Rev C
Known non-compliances with C/S T.001 requirements (Yes or No) If Yes, provide details (or use a separate sheet if insufficient space)	No
Beacon Manufacturer Point of Contact (POC) for this Type Approval application:	Name and Job Title: Dan Stankovic, Director of Certification and Test Phone: 954-862-2175 E-mail: Dan.stankovic@acrartex.com

Dated: 05/29/2018..... Signed:..... .....
Dan Stankovic, Director of Certification and Test

Product Service

1.5 Product Information

1.5.1 Technical Description

PLB is a hand held unit to be activated in case of emergency when no other means of rescue are possible. Activation of the PLB sets in motion rescue services.

1.6 Deviations from the Standard

No deviations from the applicable test standard were made during testing.

1.7 EUT Modification Record

The table below details modifications made to the EUT during the test programme.
The modifications incorporated during each test are recorded on the appropriate test pages.

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
0	As supplied by manufacturer.	N/A	N/A
1	Update to correct Frame Sync for GNSS ST (FS incorrect when EUT transmits without GPS data for GNSS ST).	Manufacturer	25/09/2018
2	Software fix to correct GPS encoded position update interval.	Manufacturer	16/10/2018
3	121.5 MHz conducted output port repair (TSR#20 only)	Manufacturer	10/12/2018

Table 3

Product Service

1.8 Test Location

TÜV SÜD Product Service conducted the following tests at our Fareham Test Laboratory.

Test Name	Name of Engineer(s)	Accreditation
Configuration and Mode: Battery Powered - 121.5 MHz Homer		
Transmitter Frequency Stability	Matthew Russell	UKAS
Modulation Characteristics	Matthew Russell	UKAS
Spurious Emissions at Antenna Terminals	Matthew Russell	UKAS
Occupied Bandwidth	Matthew Russell	UKAS
Spectrum Characteristics	Matthew Russell	UKAS

Table 4

Office Address:

Octagon House
Concorde Way
Segensworth North
Fareham
Hampshire
PO15 5RL
United Kingdom

TÜV SÜD Product Service conducted the following tests at EMC Hursley by a TUV SUD Product Service Engineer.

Test Name	Name of Engineer(s)	Accreditation
Configuration and Mode: Battery Powered - 121.5 MHz Homer		
Peak Equivalent Isotropic Radiated Power	Theano Papakosta Nic Forsyth	Not UKAS

Table 5

Office Address:

Trafalgar House
Trafalgar Cl
Chandler's Ford
Eastleigh
SO53 4BW
United Kingdom

Product Service

2 Test Details

2.1 Transmitter Frequency Stability

2.1.1 Specification Reference

FCC 47 CFR Part 95, Clause RTCM 11010.2, Clause A.16.1
FCC 47 CFR Part 2, Clause 2.1055
Industry Canada RSS-287, Clause 7.4.2
Industry Canada RSS-GEN, Clause 6.11

2.1.2 Equipment Under Test and Modification State

PLB-425, S/N: #3 (TSR04) - Modification State 2
PLB-425, S/N: #10 (TSR20) - Modification State 2

2.1.3 Date of Test

22-November-2018 to 28-November-2018

2.1.4 Test Method

This test was performed in accordance with ANSI C63.26 clause 5.6 and Industry Canada RSS-287 clause 6.1.

2.1.5 Environmental Conditions

Ambient Temperature	21.5 °C
Relative Humidity	36.5 %

2.1.6 Test Results

Battery Powered - 121.5 MHz Homer

Temperature	Measured Frequency (MHz)	Frequency Error (ppm)
+ 55.0 °C	121.49791	-17.20
+50.0 °C	121.49791	-17.20
+40.0 °C	121.49809	-15.72
+30.0 °C	121.49841	-13.09
+20.0 °C	121.49786	-17.61
+10 °C	121.49904	-7.90
0 °C	121.49917	-6.83
-10.0 °C	121.49913	-7.16
-20.0 °C	121.49882	-9.71

Table 6 - Frequency Stability Under Temperature Variations

RTCM 11010.3, Limit Clause A.16.1

The carrier frequency, measured at the minimum and maximum operating temperatures, shall be 121.5 MHz ± 50 parts/million.

Industry Canada RSS-287, Limit Clause 7.4.2

The carrier frequency shall not depart by more than 0.005% (±50 ppm) from that measured at 20°C and the rated supply voltage.

2.1.7 Test Location and Test Equipment Used

This test was carried out in RF Laboratory 1.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Climatic Chamber	Votsch	VT4002	161	-	O/P Mon
Digital Temperature Indicator	Fluke	51	2267	12	12-Jul-2019
Power Splitter	Weinschel	1870A	3204	12	12-Apr-2019
Hygrometer	Rotronic	I-1000	3220	12	30-Aug-2018
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	02-Oct-2018
Oscilloscope	Agilent Technologies	DSO9104A	4142	12	29-Jun-2018
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	06-Mar-2019
Frequency Standard	Spectracom	SecureSync 1200-0408-0601	4393	6	20-Oct-2018
1 metre K-Type Cable	Florida Labs	KMS-180SP-39.4-KMS	4520	12	13-Feb-2019
EXA	Keysight Technologies	N9010B	4968	12	21-Dec-2018

Table 7

O/P Mon – Output Monitored using calibrated equipment

2.2 Modulation Characteristics

2.2.1 Specification Reference

FCC 47 CFR Part 95, Clause RTCM 11010.2, Clause A.16.2
FCC 47 CFR Part 2, Clause 2.1047
Industry Canada RSS-287, Clause 7.4.1

2.2.2 Equipment Under Test and Modification State

S/N: PLB-425, S/N: #3 (TSR04) - Modification State 2
S/N: PLB-425, S/N: #10 (TSR20)- Modification State 2

2.2.3 Date of Test

16-November-2018 to 28-November-2018

2.2.4 Test Method

This test was performed in accordance with RTCM 11010.3, clause A.16.2 and Industry Canada RSS-287 clause 6.4.

2.2.5 Environmental Conditions

Ambient Temperature	21.5 - 22.0 °C
Relative Humidity	29.1 - 30.6 %

2.2.6 Test Results

Battery Powered - 121.5 MHz Homer

Requirement	Result	Unit
The carrier is not interrupted (except for two seconds encompassing the transmission of the 406 MHz pulse plus the additional time required for the Morse "P" transmission).	True	-
Lower Audio Frequency	377.69	Hz
Upper Audio Frequency	1112.63	Hz
Range of Audio Frequency	734.94	Hz
Sweep Direction	Downwards	-
Sweep Repetition Rate	3.68	Hz
Modulation Duty Cycle (near start)	33.2	%
Modulation Duty Cycle (near midpoint)	36.5	%
Modulation Duty Cycle (near end)	34.6	%
Modulation Factor	96.92	%
Morse Code P - Dot Length	113.76	ms
Morse Code P - Dash Length	345.83	ms
Morse Code P - Gap Length	115.88	ms
Morse Code P - Modulating Frequency	1002.30	Hz
Frequency Coherence (Percentage of power contained within 60 Hz)	55.85	%

Table 8 - Modulation Characteristics

RTCM 11010.3, Limit Clause A.16.2 and Industry Canada RSS-287, Limit Clause 7.4.1

Requirement	Limit
The carrier is not interrupted (except for two seconds encompassing the transmission of the 406 MHz pulse plus the additional time required for the Morse “P” transmission).	True
Lower Audio Frequency	> 300 Hz
Upper Audio Frequency	< 1600 Hz
Audio Frequency Range	> 700 Hz
Sweep Repetition Rate	Between 2 Hz and 4 Hz
Modulation Duty Cycle	Between 33% and 55%
Modulation Factor	Between 85% and 100%
Morse Letter P: Dot Length Dash Length Gap Length Modulating Frequency	 115 ms ± 5% 345 ms ± 5% 115 ms ± 5% 1000 Hz ± 50 Hz

Table 9 - Modulation Characteristic Limits

2.2.7 Test Location and Test Equipment Used

This test was carried out in RF Laboratory 1.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Attenuator (10dB)	Weinschel	47-10-34	481	12	18-Jul-2019
Termination (50ohm, 1W)	Suhner	50ohm 1W	3080	12	18-Jul-2019
Hygrometer	Rotronic	I-1000	3220	12	13-Sep-2019
Oscilloscope	Agilent Technologies	DSO9104A	4142	12	19-Jul-2019
EXA	Keysight Technologies	N9010B	4969	12	21-Dec-2018
Cable (18GHz)	Rosenberger	LU7-036-1000	5030	-	O/P Mon

Table 10

O/P Mon – Output Monitored using calibrated equipment

2.3 Peak Equivalent Isotropic Radiated Power

2.3.1 Specification Reference

FCC 47 CFR Part 95, Clause RTCM 11010.2, Clause A.16.3 and A.16.4
FCC 47 CFR Part 2, Clause 2.1046
Industry Canada RSS-287, Clause 7.4.3
Industry Canada RSS-GEN, Clause 6.12

2.3.2 Equipment Under Test and Modification State

PLB-425, S/N: #10 (TSR20) - Modification State 1

2.3.3 Date of Test

13-November-2018

2.3.4 Test Method

This test was performed in accordance with RTCM 11010.3, clause A.16.3 and A.16.4 and Industry Canada RSS-287, clause 6.2.

2.3.5 Environmental Conditions

Ambient Temperature	21.5 °C
Relative Humidity	30.6 %

2.3.6 Test Results

Battery Powered - 121.5 MHz Homer

Azimuth (º)	PEIRP (mW)
	Elevation (6.5º)
0	53.0
30	54.2
60	51.8
90	51.8
120	50.6
150	49.4
180	47.2
210	47.2
240	48.3
270	51.8
300	51.8
330	51.8
Median PEIRP (mW)	51.8
Maximum to Minimum Ratio (dB)	0.6

Table 11 - On Ground Plane, Peak EIRP

Azimuth (°)	PEIRP (mW)
	Elevation (5°)
0	5.0
90	8.9
180	3.7
270	5.8
Minimum PEIRP	3.7

Table 12 - Off Ground Plane, Peak EIRP

RTCM 11010.3, Limit Clause A.16.3 and A.16.4

On Ground Plane: The median PEIRP shall be between 25 and 100 mW. The ratio of maximum to minimum of the 11 highest values of PEIRP shall not exceed 4 to 1 (6 dB).

Above Ground Plane: The minimum value of PEIRP measured at each of the 4 azimuth angle increments shall be at least 2 mW.

Industry Canada RSS-287, Limit Clause 7.4.3

≥ 25 mW

2.3.7 Test Location and Test Equipment Used

This test was carried out in OATS (EMC Hursley).

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Antenna, (Tuned Dipole Set)	Roberts Antenna	A-100	569	-	TU
Spectrum Analyser	Agilent Technologies	E7405A	1410	12	13-Sep-2019
Hygrometer	Rotronic	A1	2677	12	20-Feb-2019

Table 13

TU – Traceability Unscheduled

Product Service

2.4 Spurious Emissions at Antenna Terminals

2.4.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1051
Industry Canada RSS-287, Clause 7.4.4
Industry Canada RSS-GEN, Clause 6.13

2.4.2 Equipment Under Test and Modification State

S/N: PLB-425, S/N: #10 (TSR20)- Modification State 2

2.4.3 Date of Test

20-November-2018

2.4.4 Test Method

This test was performed in accordance with ANSI C63.26, clause 5.7.

2.4.5 Environmental Conditions

Ambient Temperature	21.5 °C
Relative Humidity	30.6 %

2.4.6 Test Results

Battery Powered - 121.5 MHz Homer

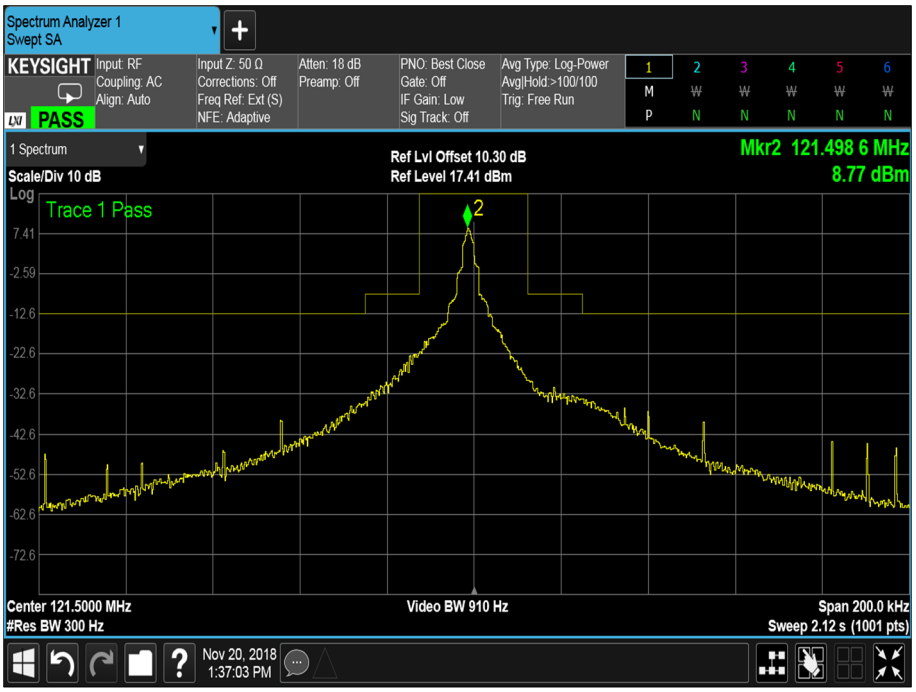

Figure 1 - Transmitter Mask (RSS-287 clause 7.4.4)

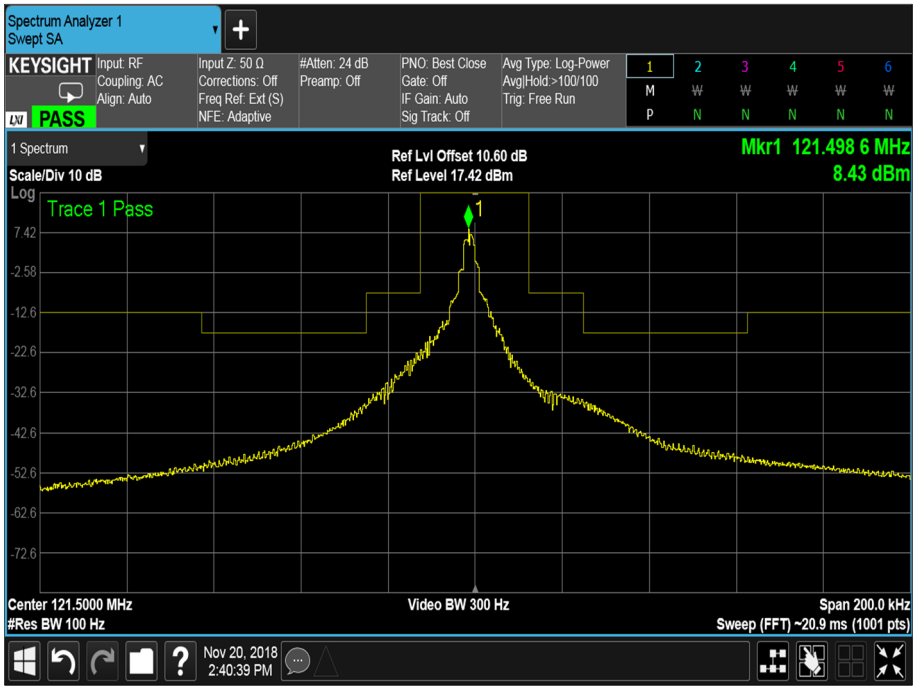

Figure 2 - Transmitter Mask (RTCM 11010.2 clause 4.3.4)

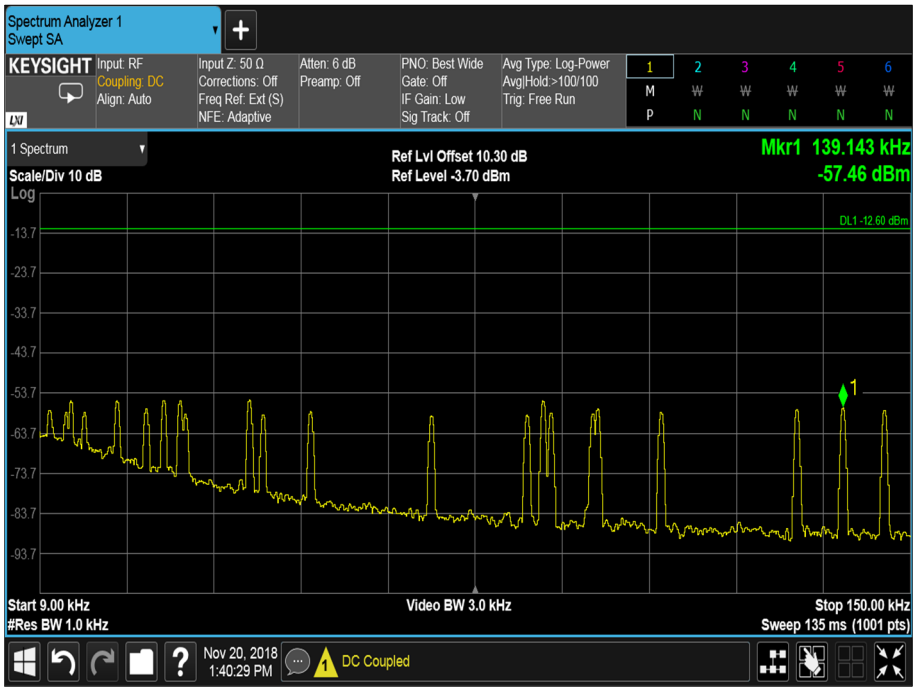

Figure 3 - 9 kHz to 150 kHz

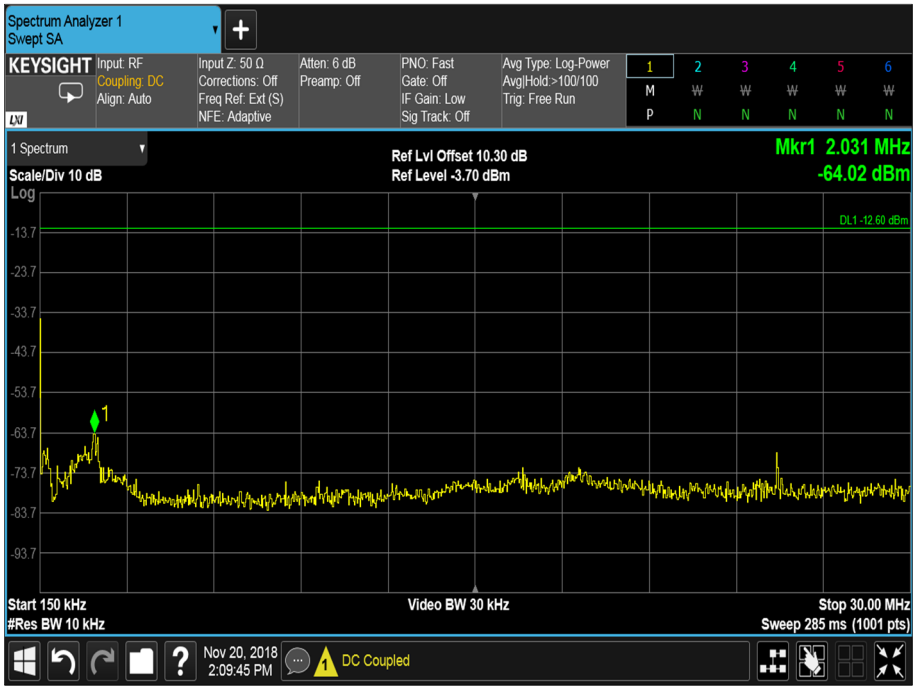

Figure 4 - 150 kHz to 30 MHz

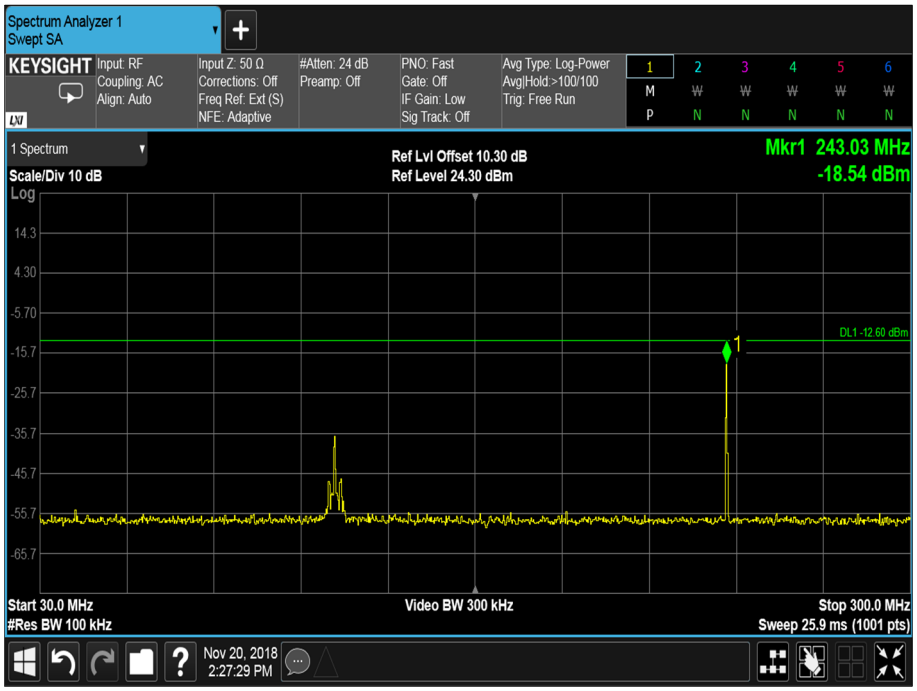

Figure 5 - 30 MHz to 300 MHz

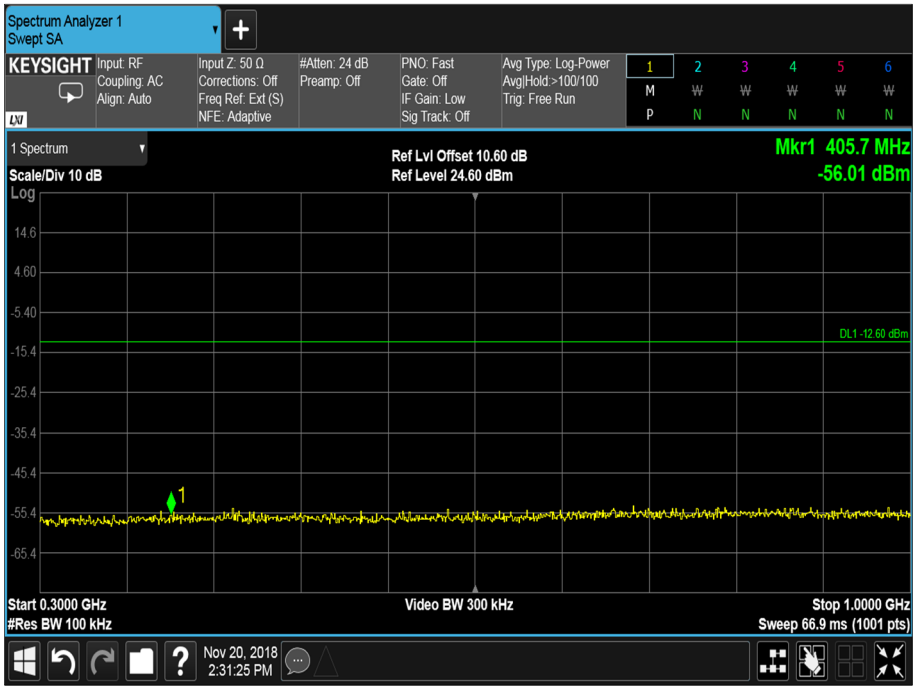

Figure 6 - 300 MHz to 1 GHz

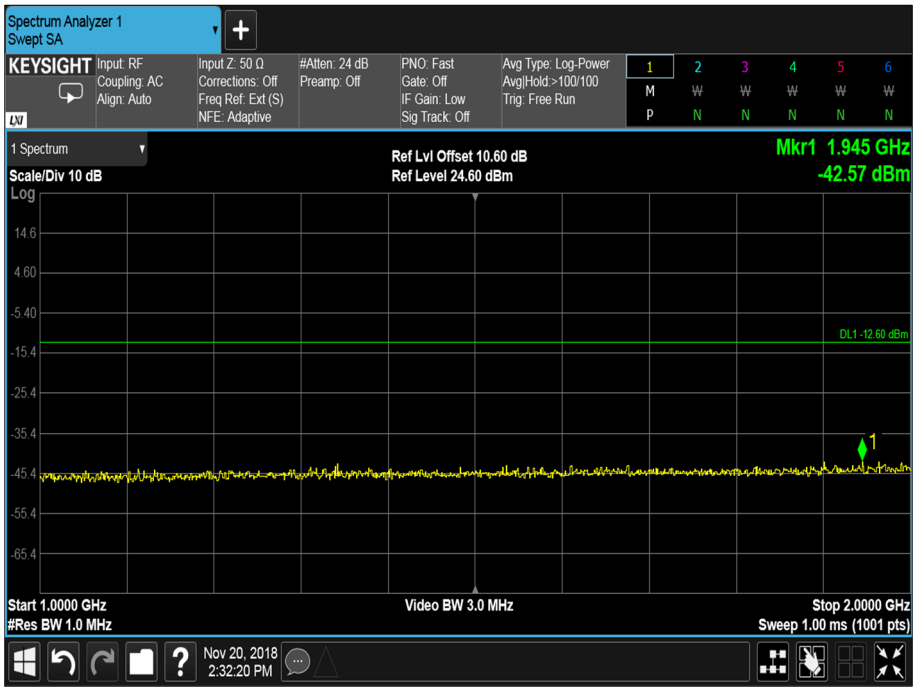

Figure 7 - 1 GHz to 2 GHz

RTCM 11010.3, Limit Clause 4.2.4

The transmitter power output spectrum shall remain within th limits of the emission mask shown in the figure below.

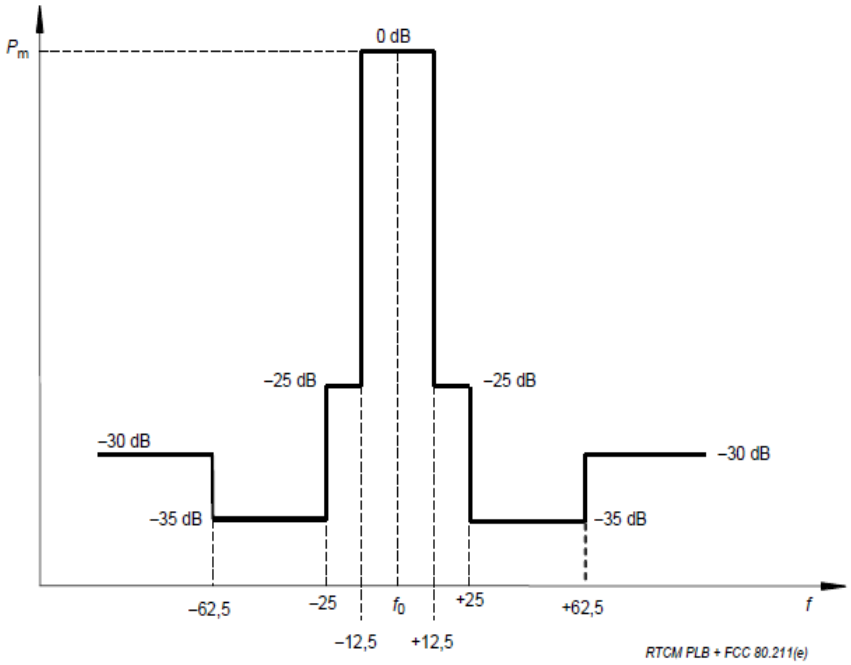

Figure 8 - Emission Mask for 121.5 MHz Signal

Industry Canada RSS-287, Limit Clause 7.4.4

The average power of unwanted emissions in a 300 Hz resolution bandwidth shall be attenuated below the level of the average transmitter power P (dBW) by:

(a) at least 25 dB on any frequency removed from the centre of the authorized bandwidth by more than 50%, up to and including 100% of the authorized bandwidth; and

(b) at least 30 dB on any frequency removed from the centre of the authorized bandwidth by more than 100%

where the authorized bandwidth is set at 25 kHz with the transmit frequency at the centre of the bandwidth.

Product Service

2.4.7 Test Location and Test Equipment Used

This test was carried out in RF Laboratory 1.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Attenuator (10dB)	Weinschel	47-10-34	481	12	18-Jul-2019
High Pass Filter	Mini-Circuits	NHP-300	1640	12	23-Oct-2019
Termination (50ohm, 1W)	Suhner	50ohm 1W	3080	12	18-Jul-2019
Hygrometer	Rotronic	I-1000	3220	12	13-Sep-2019
Tunable Notch Filter	Wainwright	WRCD 100.0/130.0-0.05/50-5EEK	3426	-	O/P Mon
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	17-Oct-2019
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	22-Oct-2019
EXA	Keysight Technologies	N9010B	4969	12	21-Dec-2018
Cable (18GHz)	Rosenberger	LU7-036-1000	5030	-	O/P Mon

Table 14

O/P Mon – Output Monitored using calibrated equipment

Product Service

2.5 Occupied Bandwidth

2.5.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1049
Industry Canada RSS-GEN, Clause 6.7

2.5.2 Equipment Under Test and Modification State

PLB-425, S/N: #10 (TSR20)- Modification State 2

2.5.3 Date of Test

19-November-2018

2.5.4 Test Method

This test was performed in accordance with ANSI C63.26, clause 5.4.4 and Industry Canada RSS-GEN clause 6.7.

2.5.5 Environmental Conditions

Ambient Temperature	21.4 °C
Relative Humidity	31.2 %

2.5.6 Test Results

Battery Powered - 121.5 MHz Homer

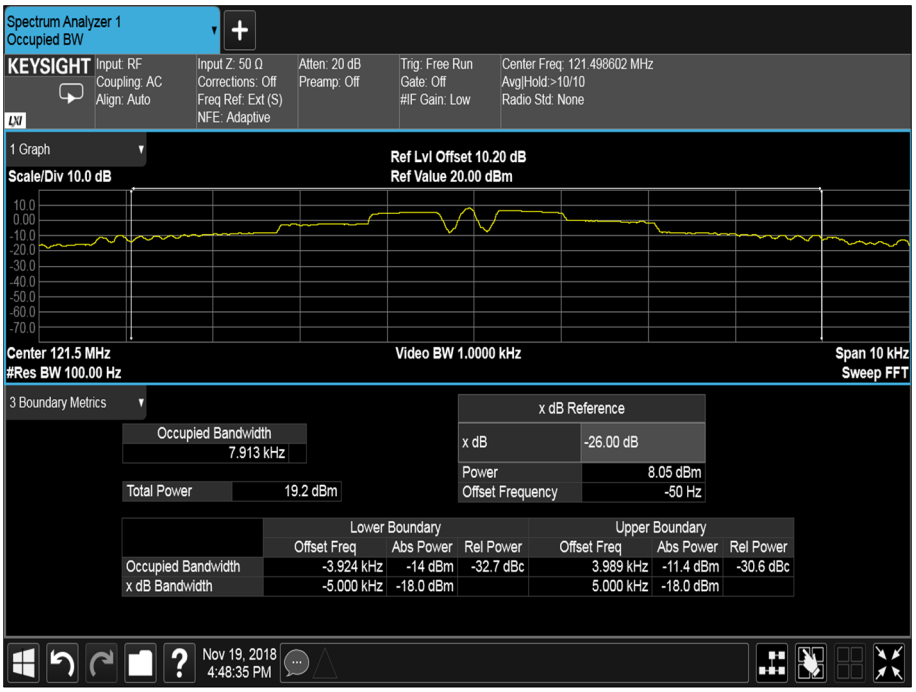

Figure 9 - 99% Occupied Bandwidth

FCC Part 95 and Industry Canada RSS-287 Limit Clause

None Specified

Product Service

2.5.7 Test Location and Test Equipment Used

This test was carried out in RF Laboratory 1.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Attenuator (10dB)	Weinschel	47-10-34	481	12	18-Jul-2019
Termination (50ohm, 1W)	Suhner	50ohm 1W	3080	12	18-Jul-2019
EXA	Keysight Technologies	N9010B	4969	12	21-Dec-2018
Cable (18GHz)	Rosenberger	LU7-036-1000	5030	-	O/P Mon

Table 15

O/P Mon – Output Monitored using calibrated equipment

Product Service

2.6 Spectrum Characteristics

2.6.1 Specification Reference

FCC 47 CFR Part 95, Clause RTCM 11010.2, A.16.2(e)
Industry Canada RSS-287, Clause 7.4.5

2.6.2 Equipment Under Test and Modification State

PLB-425, S/N: #10 (TSR20)- Modification State 2

2.6.3 Date of Test

19-November-2018

2.6.4 Test Method

This test was performed in accordance with Industry Canada RSS-287, clause 6.5.

2.6.5 Environmental Conditions

Ambient Temperature	21.2 °C
Relative Humidity	31.3 %

2.6.6 Test Results

Battery Powered - 121.5 MHz Homer

Parameter	Result
Total (Wideband) Power (dBm)	17.41
Power within ±30 Hz (dBm)	13.96
Difference (dB)	3.45

Table 16 - Spectrum Characteristics

Remarks

The 121.5 MHz Homer transmission is interrupted for a period of approximately 2 seconds whilst the 406 MHz is transmitting. When the 121.5 MHz Homer resumed transmission it was noted that the frequency was within ±30 Hz of the nominal frequency.

RTCM 11010.2, Limit Clause A.16.2(e)

Measurements must be made to show that at least 30% of the total power emitted during any transmission cycle with or without modulation shall be contained within ± 30 Hz of the carrier frequency. Additionally, if the emission is interrupted by the transmission of the 406 MHz burst, the carrier frequency must not shift more than ± 30 Hz.

Industry Canada RSS-287 Limit Clause 7.4.5

The total power in the resolution bandwidth shall not drop by more than 5 dB below the transmitter mean output power that is measured by a wideband meter, indicating that at least 30% of the power resides within the band fc ±30 Hz (at 121.5 MHz) and within the band fc ±60 Hz (at 243 MHz).

Product Service

2.6.7 Test Location and Test Equipment Used

This test was carried out in RF Laboratory 1.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Attenuator (10dB)	Weinschel	47-10-34	481	12	18-Jul-2019
Termination (50ohm, 1W)	Suhner	50ohm 1W	3080	12	18-Jul-2019
Hygrometer	Rotronic	I-1000	3220	12	13-Sep-2019
EXA	Keysight Technologies	N9010B	4969	12	21-Dec-2018
Cable (18GHz)	Rosenberger	LU7-036-1000	5030	-	O/P Mon

Table 17

O/P Mon – Output Monitored using calibrated equipment

3 Photographs

3.1 Test Setup Photographs

Figure 10 - Front View

Product Service

4 Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

Test Name	Measurement Uncertainty
Transmitter Frequency Stability	± 11 Hz
Modulation Characteristics	Minimum Audio Frequency: ± 22.4 Hz Maximum Audio Frequency: ± 121.56 Hz Audio Frequency Range: ± 123.6 Hz Sweep Repetition Rate: ± 5 % Modulation Factor: ± 5% Modulation Duty Cycle: ± 5% 30% Occupied Bandwidth: ± 5%
Peak Equivalent Isotropic Radiated Power	± 5.2 dB
Spurious Emissions at Antenna Terminals	± 3.45 dB
Occupied Bandwidth	± 102.2 Hz
Spectrum Characteristics	± 1.8 dB

Table 18