Report on the FCC and IC Testing of:

Orolia Limited
PLB (Conducted)Model: Fastfind 220

In accordance with FCC 47 CFR Part 95, FCC 47 CFR Part 2, Industry Canada RSS-287 and Industry Canada RSS-GEN Issue 5

Prepared for: Orolia Limited
Silver Point, Airport Service Road
Hilsea, Portsmouth, PO3 5PB
United Kingdom

FCC ID: KLS-Z423 IC: 6913A-Z423PL

Product Service

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Document Number: 75942209-10 | Issue: 01

SIGNATURE			
NAME	**JOB TITLE**	**RESPONSIBLE FOR**	**ISSUE DATE**
Matthew Russell	Senior Engineer	Authorised Signatory	19 December 2018

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 Issue 5. The sample tested was found to comply with the requirements defined in the applied rules.

SIGNATURE			
NAME	**JOB TITLE**	**RESPONSIBLE FOR**	**ISSUE DATE**
Mehadi Choudhury	Engineer	Testing	19 December 2018
Nicolas Salguero Camarena	Engineer	Testing	19 December 2018

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: 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	19 December 2018

Table 1

1.2 Introduction

Applicant	Orolia Limited
Manufacturer	Orolia Limited
Model Number(s)	Fastfind 220
Serial Number(s)	#07
Hardware Version(s)	1001488 Issue A
Software Version(s)	1001767 Issue A
Number of Samples Tested	1
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: Issue 5 (04-2018)
Order Number Date	20805 20-March-2018
Date of Receipt of EUT	22-March-2018
Start of Test	22-June-2018
Finish of Test	18-December-2018
Name of Engineer(s)	Mehadi Choudhury and Nicolas Salguero Camarena
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-GENIssue 5 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	6.2	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 Declaration of Build Status

MAIN EUT			
MANUFACTURING DESCRIPTION	FastFind 220 PLB		
MANUFACTURER	OROLIA LTD		
MODEL NAME/NUMBER	Z423		
PART NUMBER	Z423		
SERIAL NUMBER			
HARDWARE VERSION	1001488 Issue A		
SOFTWARE VERSION	1001767 Issue A		
PSU VOLTAGE/FREQUENCY/CURRENT	Lithium 12 Volts nominal (2 Battery pack in series)		
HIGHEST INTERNALLY GENERATED / USED FREQUENCY	GEN : 406.031 Mhz / USED :1575.42 MHz (GNSS)		
FCC ID (if applicable)	KLS		
INDUSTRY CANADA ID (if applicable)	6319A		
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	Personal Locator Beacon (PLB) device with buikt-in 406 Mhz Cospas-Sarsat transmitter and 121.5MHz Homer. It is used to assist in the locating and recovery of people that are in imminent danger.		
COUNTRY OF ORIGIN	N/A		
RF CHARACTERISTICS (if applicable)			
TRANSMITTER FREQUENCY OPERATING RANGE (MHz)	406.031 MHz / 121.5 MHz		
RECEIVER FREQUENCY OPERATING RANGE (MHz)	1575.42 MHz (GNSS)		
INTERMEDIATE FREQUENCIES	N/A		
EMISSION DESIGNATOR(S): (i.e. G1D, GXW)	16K0G1D (406.031 MHz) / 3K20A3X (121.5MHz)		
MODULATION TYPES: (i.e. GMSK, QPSK)	Phase Mod (406.031 MHz) / Swept tone AM (121.5MHz)		
OUTPUT POWER (W or dBm)	37dBm (406.031 MHz) / 19dBm (121.5MHz)		
SEPARATE BATTERY/POWER SUPPLY (if applicable)			
MANUFACTURING DESCRIPTION	Lithium battery Pack		
MANUFACTURER	OROLIA LTD (Made with CR123 GP cells)		
TYPE	Lithium Manganese Dioxide		
PART NUMBER	1001802		
PSU VOLTAGE/FREQUENCY/CURRENT	6V		
COUNTRY OF ORIGIN	N/A		
MODULES (if applicable)			
MANUFACTURING DESCRIPTION			
MANUFACTURER			
TYPE			
POWER			
FCC ID			
INDUSTRY CANADA ID			
EMISSION DESIGNATOR			
DHSS/FHSS/COMBINED OR OTHER			
COUNTRY OF ORIGIN			
ANCILLARIES (if applicable)			
MANUFACTURING DESCRIPTION			
MANUFACTURER			
TYPE			
PART NUMBER			
SERIAL NUMBER			
COUNTRY OF ORIGIN			

I hereby declare that the information supplied is correct and complete.

Name: Erwan THOMAS Position held: Hardware and Certification engineer

Date: 14/08/2018

Product Service

1.5 Product Information

1.5.1 Technical Description

Personal Locator Beacon (PLB) device with built-in 406 MHz Cospas-Sarsat transmitter and 121.5 MHz Homer. It is used to assist in the locating and recovery of people that are in imminent danger.

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
Serial Number: #07			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 3

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	Mehadi Choudhury	UKAS
Modulation Characteristics	Mehadi Choudhury and Nicolas Salguero Camarena	UKAS
Peak Equivalent Isotropic Radiated Power	Bidhan Bhandari	UKAS
Spurious Emissions at Antenna Terminals	Nicolas Salguero Camarena and Mehadi Choudhury	UKAS
Occupied Bandwidth	Nicolas Salguero Camarena	UKAS
Spectrum Characteristics	Nicolas Salguero Camarena	UKAS

Table 4

Office Address:

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

Product Service

2 Test Details

2.1 Transmitter Frequency Stability

2.1.1 Specification Reference

FCC 47 CFR Part 95, Clause RTCM 1010.2 A.16.1
FCC 47 CFR Part 2, Clause 2.1055
Industry Canada RSS-287, Clause 7.4.2
Industry Canada RSS-GEN Issue 5, Clause 6.11

2.1.2 Equipment Under Test and Modification State

Fastfind 220, S/N: #07 - Modification State 0

2.1.3 Date of Test

28-June-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	23.8 °C
Relative Humidity	45.6 %

2.1.6 Test Results

Battery Powered - 121.5 MHz Homer

Temperature	Measured Frequency (MHz)	Frequency Error (ppm)
+55.0 °C	121649988.000	-0.099
+50.0 °C	121649985.192	-0.122
+40.0 °C	121649991.350	-0.071
+30.0 °C	121650001.977	0.016
+20.0 °C	121649985.826	-0.117
+10.0 °C	121650003.420	0.028
0 °C	121650004.273	0.035
-10.0 °C	121650007.706	0.016
-20.0 °C	121650009.278	0.076

Table 5 - Frequency Stability Under Temperature Variations

Remarks

The EUT was intentionally offset to 121.65 MHz.

RTCM 11010.2, 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	05-Jul-2018
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 6

O/P Mon – Output Monitored using calibrated equipment

Product Service

2.2 Modulation Characteristics

2.2.1 Specification Reference

FCC 47 CFR Part 95, Clause RTCM 1010.2 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

Fastfind 220, S/N: #07 - Modification State 0

2.2.3 Date of Test

22-June-2018 to 21-August-2018

2.2.4 Test Method

This test was performed in accordance with RTCM 11010.2, clause A.16.2 and Industry Canada RSS-287 clause 6.4.

2.2.5 Environmental Conditions

Ambient Temperature	22.8 - 23.9 °C
Relative Humidity	41.2 - 71.8 %

Product Service

2.2.6 Test Results

Battery Powered - 121.5 MHz Homer

Requirement	Result			Unit
	22.8 °C	-20.0 °C	+55.0 °C	
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	764.119	761.272	763.785	Hz
Upper Audio Frequency	1500.63	1500.130	1500.327	Hz
Range of Audio Frequency	736.517	738.858	736.542	Hz
Sweep Repetition Rate	2.67	2.67	2.67	Hz
Modulation Duty Cycle*	34.7-35.1	33.7-34.8	35.6-35.8	%
Modulation Factor	92.683	90.393	95.039	%
Morse Code P - Dot Length	114.43	114.79	114.53	ms
Morse Code P - Dash Length	345.88	346.15	346.81	ms
Morse Code P - Gap Length	115.91	115.92	115.53	ms
Morse Code P - Modulating Frequency	1.0004938	1.0000150	1.0004556	kHz

Table 7 - Modulation Characteristics

*measurements were taken near the start/middle/end of the swept tone.

RTCM 11010.2, 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 8 - Modulation Characteristic Limits

Product Service

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
Climatic Chamber	Votsch	VT4002	161	-	O/P Mon
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	20-Oct-2018
Digital Temperature Indicator	Fluke	51	1385	12	02-Jan-2019
Digital Temperature Indicator	Fluke	51	2267	12	05-Jul-2018
Climatic Chamber	TAS	Micro 225	2892	-	O/P Mon
Attenuator (30dB/50W)	Aeroflex / Weinschel	47-30-34	3164	12	31-Aug-2018
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
'N' - 'N' RF Cable (1m)	Rhophase	NPS-1803-1000-NPS	3700	12	31-Jan-2019
Oscilloscope	Agilent Technologies	DSO9104A	4142	12	29-Jun-2018
Oscilloscope	Agilent Technologies	DSO9104A	4142	12	19-Jul-2019
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
Cable (18GHz	Rosenberger	LU7-036-1000	5031	-	O/P Mon

Table 9

O/P Mon – Output Monitored using calibrated equipment

Product Service

2.3 Peak Equivalent Isotropic Radiated Power

2.3.1 Specification Reference

FCC 47 CFR Part 95, Clause RTCM 1010.2 A.16.3 and A.16.4
FCC 47 CFR Part 2, Clause 2.1046
Industry Canada RSS-287, Clause 7.4.3 and 6.2.
Industry Canada RSS-GENIssue 5, Clause 6.12.

2.3.2 Equipment Under Test and Modification State

Z423 FastFind 220, S/N: #08 - Modification State 1

2.3.3 Date of Test

02-November-2018

2.3.4 Test Method

This test was performed in accordance with RTCM 11010.2 clause A.16.3 and A.16.4 and RSS-287 clause 6.2.

2.3.5 Environmental Conditions

Ambient Temperature	30.0 °C
Relative Humidity	41.6 %

2.3.6 Test Results

Battery Powered - 121.5 MHz Homer

RTCM 1010.2 A16.3 PEIRP

Azimuth (º)	PEIRP (mW)
	Elevation with highest antenna gain = 6.9 º
0	26.32
30	25.96
60	25.37
90	25.25
120	24.74
150	24.12
180	23.46
210	23.46
240	24.01
270	25.14
300	25.72
330	25.78
Median PEIRP (mW)	25.20
Maximum to Minimum Ratio (dB)	0.5

Table 10 - On Ground Plane, Peak EIRP

RTCM 1010.2 A16.4 Off Ground Plant Radiated Power Test

Azimuth (º)	PEIRP (mW)
	Elevation with highest antenna gain = 5 º
0	16.92
90	16.46
180	14.30
270	15.18
Minimum PEIRP (mW)	14.30

Table 11 - Above Ground Plane, Peak EIRP

RTCM 11010.2 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, Clause 7.4.3

Azimuth (º)	Average PEIRP (mW)
	Elevation with highest antenna gain = 6.9 º
0	26.92

Industry Canada RSS-287, Limit Clause 7.4.3

Main beam average power ≥ 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
Power Sensor	Hewlett Packard	8481A	1338	12	31-Oct-2018
Spectrum Analyser	Agilent Technologies	E7405A	1410	12	23-Aug-2018
Beacon Tester	WS Technologies	BT100S	3263	-	TU

Table 12

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 Issue 5, Clause 6.13

2.4.2 Equipment Under Test and Modification State

Fastfind 220, S/N: #07 - Modification State 0

2.4.3 Date of Test

22-August-2018 to 18-December-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	22.3 °C
Relative Humidity	65.3 %

2.4.6 Test Results

Battery Powered - 121.5 MHz Homer

Emission Mask for 121.5 MHz Signal (4.2.4)

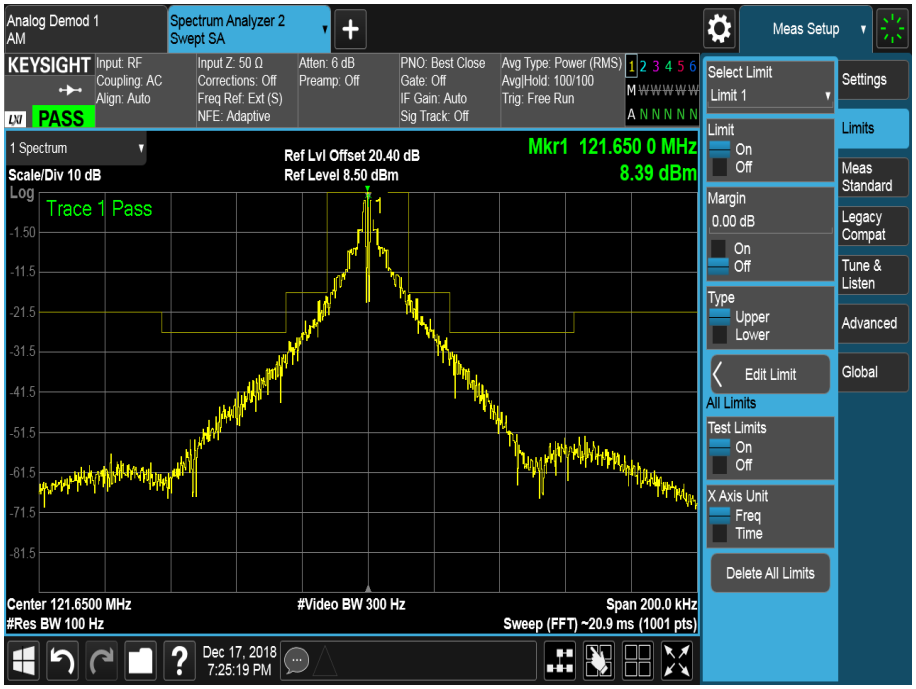

Figure 1 – Emission Mask (RTCM 1010.2 Fig4) – Ambient Temperature

Product Service

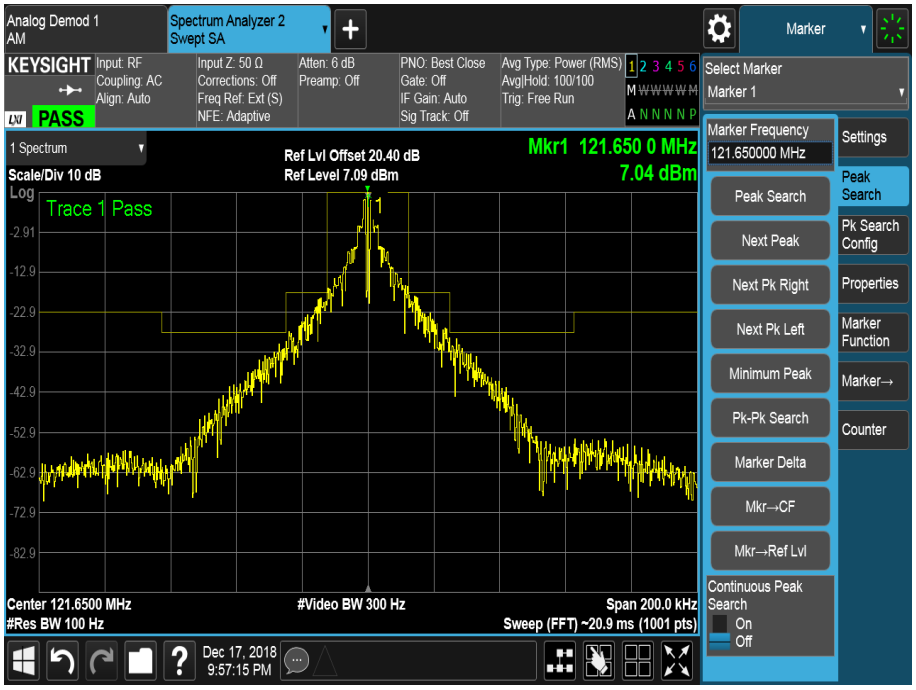

Figure 2 – Emission Mask (RTCM 1010.2 Fig4) – Low Temperature

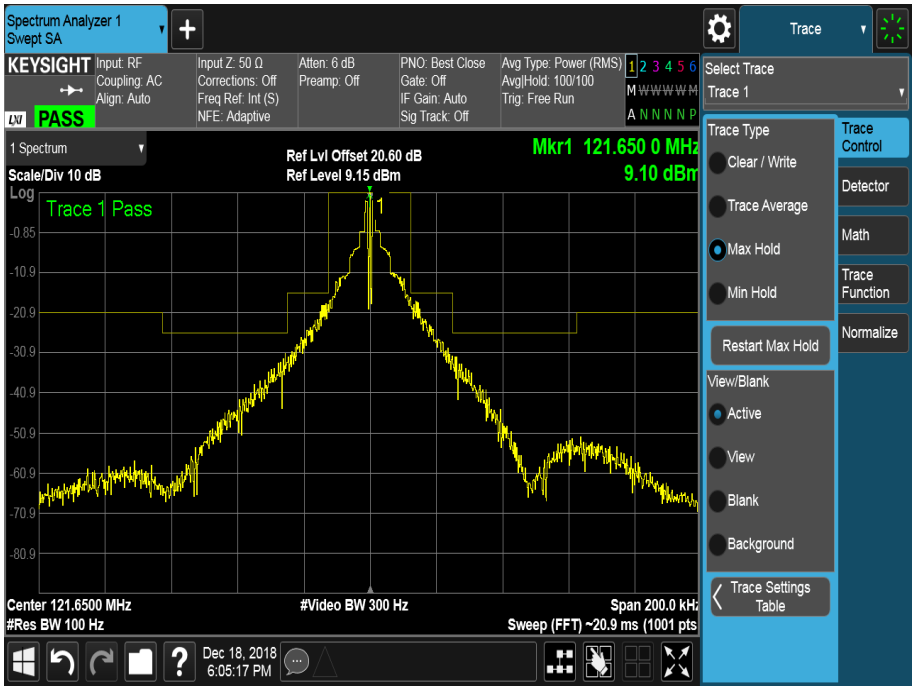

Figure 3 – Emission Mask (RTCM 1010.2 Fig4 – High Temperature

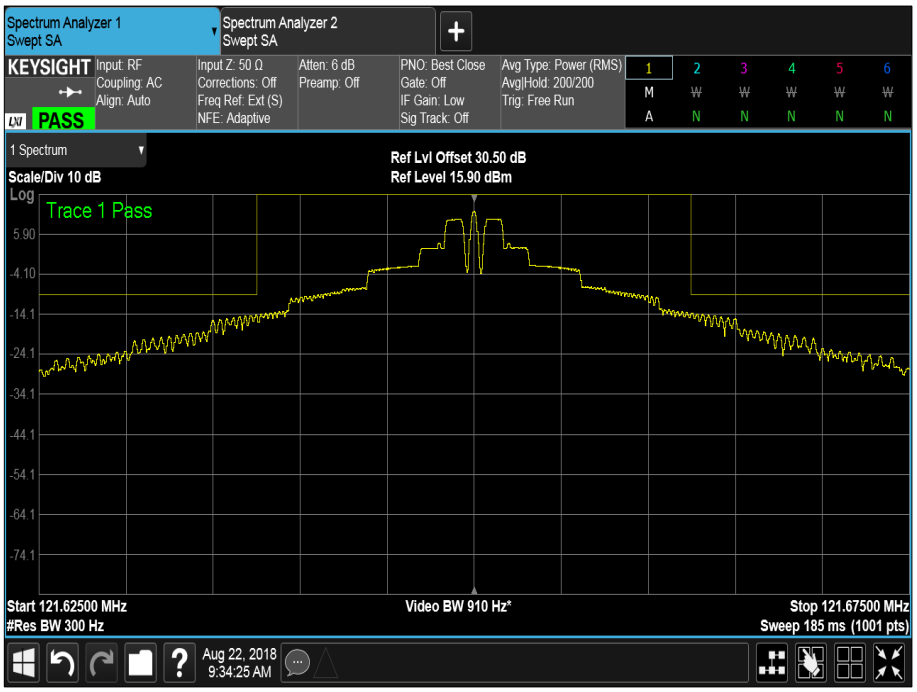

Figure 4 - Transmitter Mask (RSS-287)

Figure 5 - 9 kHz to 150 kHz

Product Service

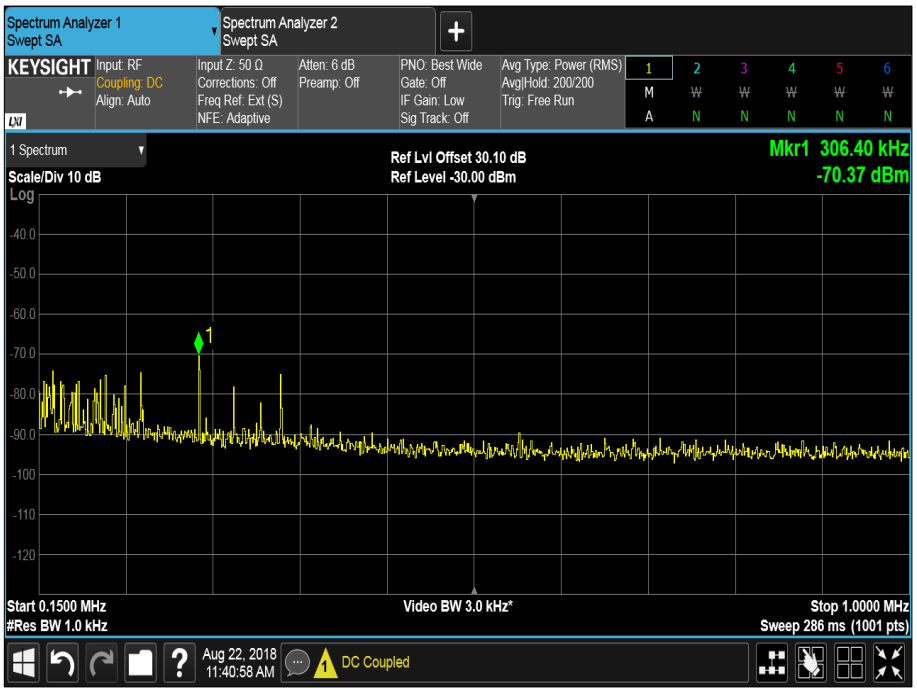

Figure 6 - 150 kHz to 1 MHz

Figure 7 - 1 MHz to 10 MHz

Product Service

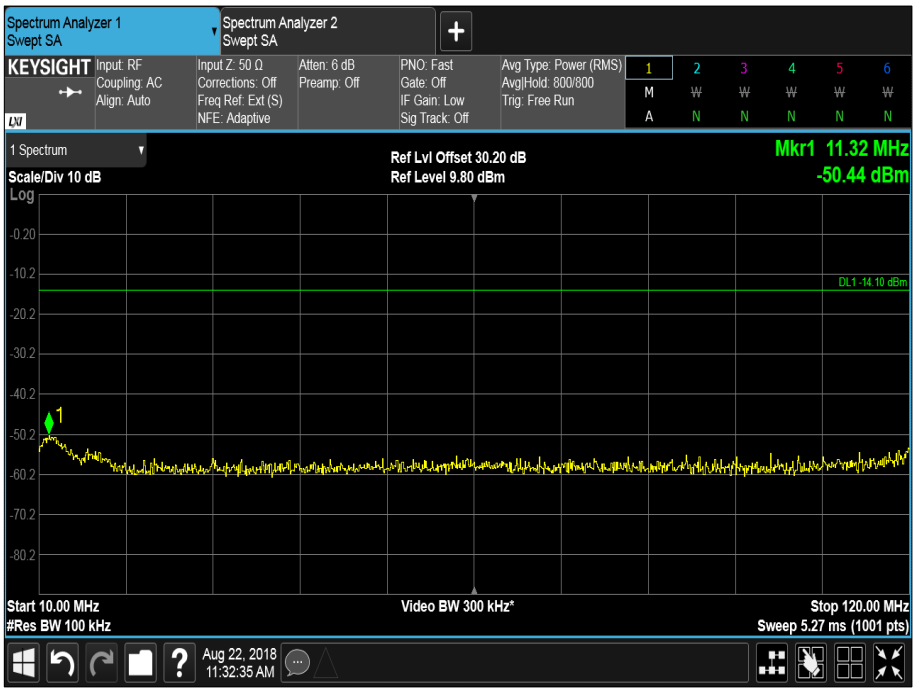

Figure 8 - 10 MHz to 120 MHz

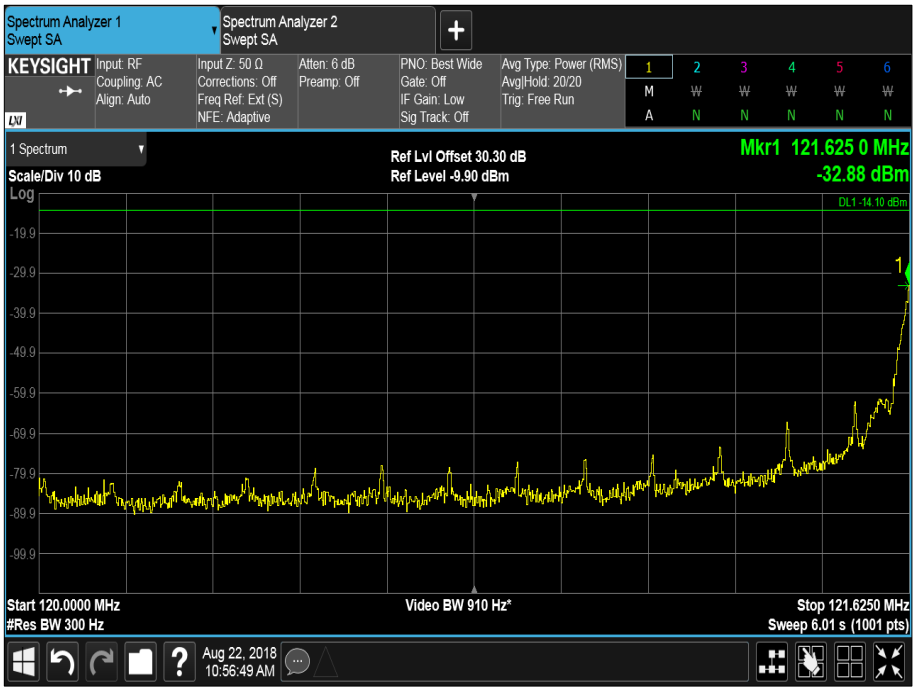

Figure 9 - 120 MHz to 121.625 MHz

Product Service

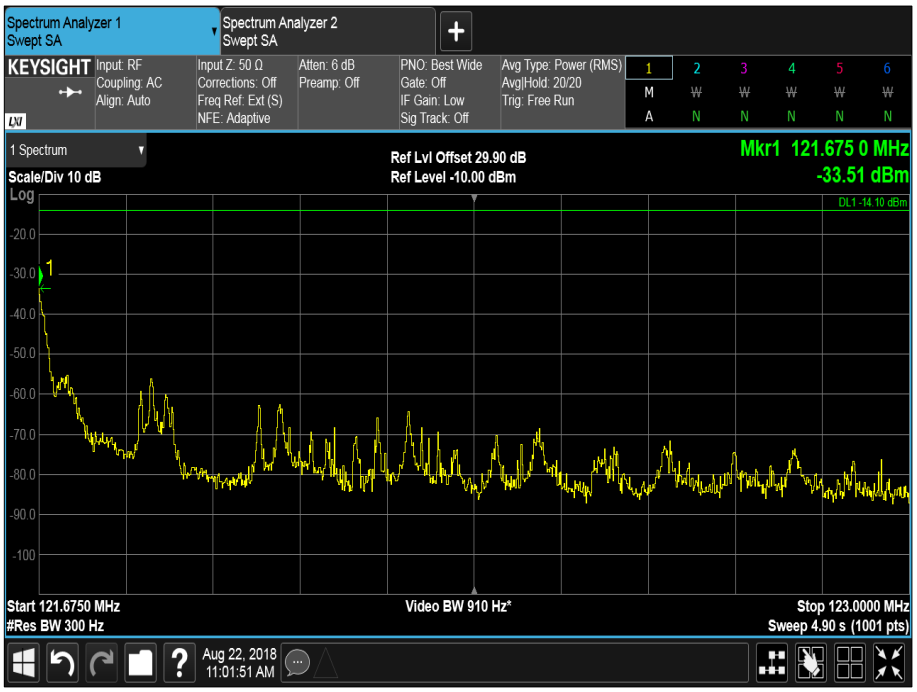

Figure 10 - 121.675 MHz to 123 MHz

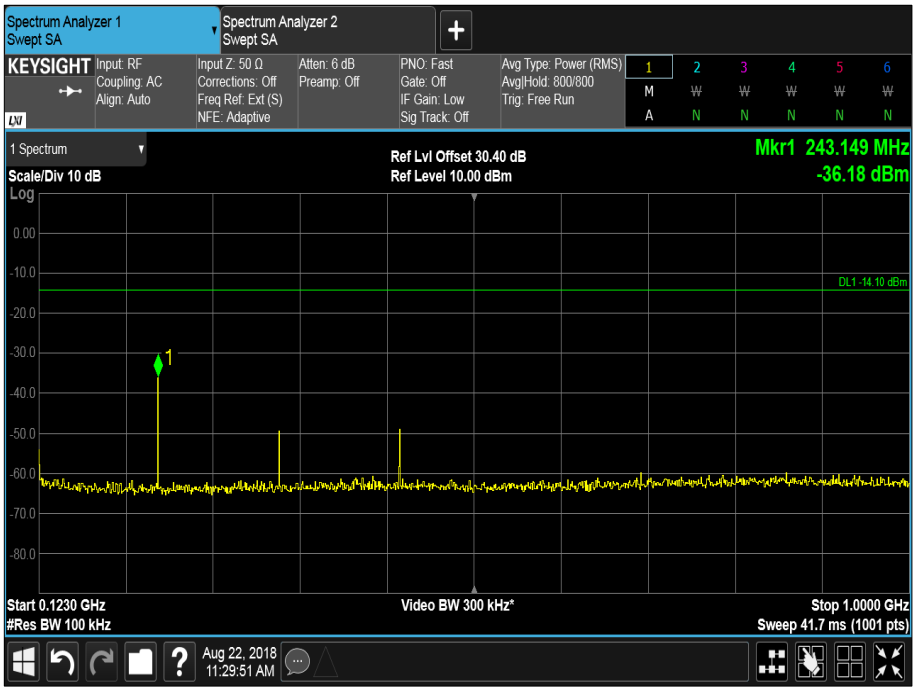

Figure 11 - 123 MHz to 1 GHz

Product Service

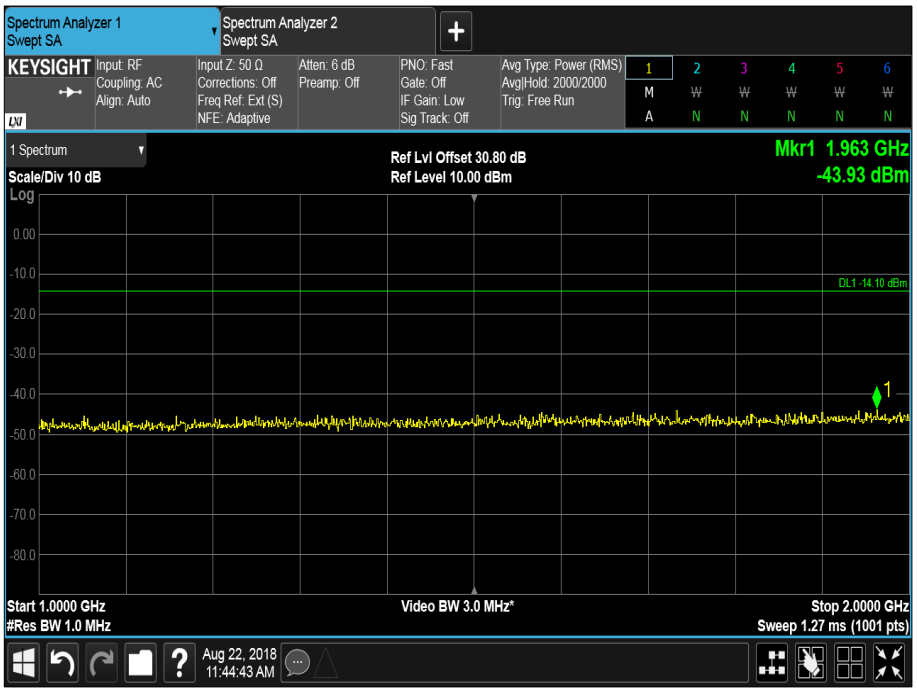

Figure 12 - 1 GHz to 2 GHz

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.

RTCM1010.2, Limit Clause 4.2.4

The transmitter power output spectrum shall remain within the limits of the emission mask shown in Figure 4 of the specification.

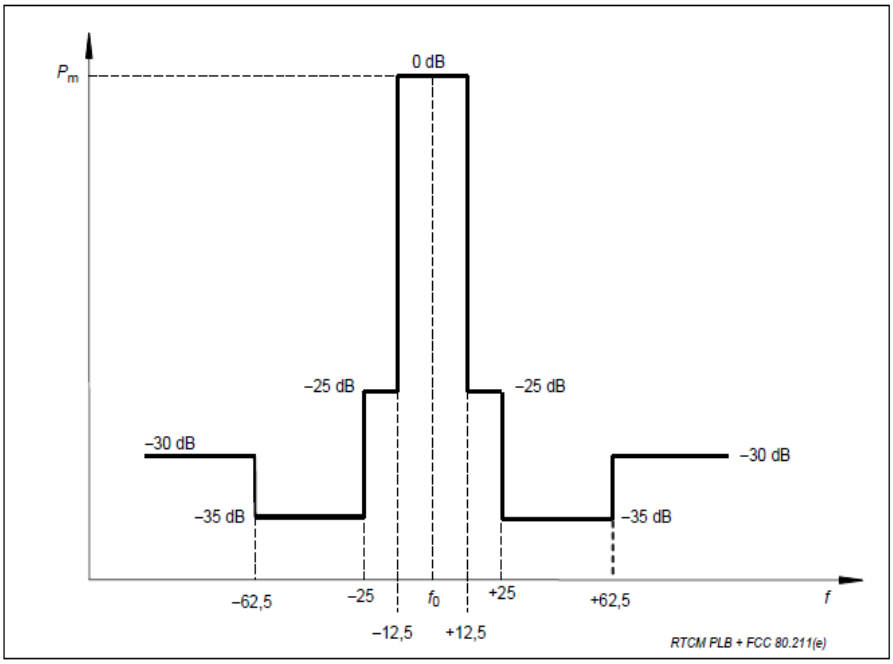

Figure 13 – Emission Mask Limit for 121.5 MHz Signal

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
Climatic Chamber	Votsch	VT4002	161	-	O/P Mon
Attenuator (20dB/ 2W)	Pasternack	PE7004-20	489	12	24-Oct-2019
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	20-Oct-2018
Digital Temperature Indicator	Fluke	51	1385	12	02-Jan-2019
Attenuator (30dB/50W)	Aeroflex / Weinschel	47-30-34	3164	12	31-Aug-2018
Hygrometer	Rotronic	I-1000	3220	12	13-Sep-2019
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	02-Oct-2018
'N' - 'N' RF Cable (1m)	Rhophase	NPS-1803-1000-NPS	3700	12	31-Jan-2019
P-Series Power Meter	Agilent Technologies	N1911A	3980	12	28-Sep-2018
50 MHz-18 GHz Wideband Power Sensor	Agilent Technologies	N1921A	3982	12	28-Sep-2018
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	06-Mar-2019
Frequency Standard	Spectracom	SecureSync 1200-0408-0601	4393	6	16-Apr-2019
Climatic Chamber	Aralab	FitoTerm 300E45	4823	-	O/P Mon
EXA	Keysight Technologies	N9010B	4968	12	21-Dec-2018
EXA	Keysight Technologies	N9010B	4969	12	21-Dec-2018
Cable (18GHz	Rosenberger	LU7-036-1000	5031	-	O/P Mon

Table 13

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 Issue 5, Clause 6.7

2.5.2 Equipment Under Test and Modification State

Fastfind 220, S/N: #07 - Modification State 0

2.5.3 Date of Test

21-August-2018 to 22-August-2018

2.5.4 Test Method

This test was performed in accordance with ANSI C63.26, clause 5.4.3.

2.5.5 Environmental Conditions

Ambient Temperature	22.3 - 23.1 °C
Relative Humidity	58.6 - 65.3 %

2.5.6 Test Results

Battery Powered - 121.5 MHz Homer

Figure 14 - 99% Occupied Bandwidth

Figure 15 - 30% Occupied Bandwidth

FCC Part 95 and Industry Canada RSS-GEN Limit Clause

None Specified

Product Service

2.5.7 Test Location and Test Equipment Used

This test was carried out in RF Laboratory 1 and RF Laboratory 3.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	20-Oct-2018
Attenuator (30dB/50W)	Aeroflex / Weinschel	47-30-34	3164	12	31-Aug-2018
Hygrometer	Rotronic	I-1000	3220	12	30-Aug-2018
'N' - 'N' RF Cable (1m)	Rhophase	NPS-1803-1000-NPS	3700	12	31-Jan-2019
Frequency Standard	Spectracom	SecureSync 1200-0408-0601	4393	6	20-Oct-2018
EXA	Keysight Technologies	N9010B	4969	12	21-Dec-2018
Cable (18GHz	Rosenberger	LU7-036-1000	5031	-	O/P Mon

Table 14

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 1010.2 A.16.2(e)
Industry Canada RSS-287, Clause 7.4.5

2.6.2 Equipment Under Test and Modification State

Fastfind 220, S/N: #07 - Modification State 0

2.6.3 Date of Test

20-August-2018 to 21-August-2018

2.6.4 Test Method

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

2.6.5 Environmental Conditions

Ambient Temperature	24.3 °C
Relative Humidity	60.0 %

2.6.6 Test Results

Battery Powered - 121.5 MHz Homer

Parameter	Result
Ambient Total (Wideband) Power (dBm)	16.10 dBm
Ambient Power within the resolution bandwidth (dBm)	11.74 dBm
Ambient Difference (dB)	4.36 dB
-20C Total (Wideband) Power (dBm)	15.16 dBm
-20 C Power within the resolution bandwidth (dBm)	10.53 dBm
-20C Difference (dB)	4.63 dB
55C Total (Wideband) Power (dBm)	17.09 dBm
55C Power within the resolution bandwidth (dBm)	12.90 dBm
55C Difference (dB)	4.19 dB

Table 15 - Spectrum Characteristics

RTCM 1010.2, 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).

2.6.7 Test Location and Test Equipment Used

This test was carried out in RF Laboratory 3.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Power Splitter	Weinschel	1506A	606	12	12-Apr-2019
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	20-Oct-2018
Digital Temperature Indicator	Fluke	51	1385	12	02-Jan-2019
Climatic Chamber	TAS	Micro 225	2892	-	O/P Mon
Attenuator (30dB/50W)	Aeroflex / Weinschel	47-30-34	3164	12	31-Aug-2018
Hygrometer	Rotronic	I-1000	3220	12	30-Aug-2018
'N' - 'N' RF Cable (1m)	Rhophase	NPS-1803-1000-NPS	3700	12	31-Jan-2019
P-Series Power Meter	Agilent Technologies	N1911A	3980	12	28-Sep-2018
50 MHz-18 GHz Wideband Power Sensor	Agilent Technologies	N1921A	3982	12	28-Sep-2018
Frequency Standard	Spectracom	SecureSync 1200-0408-0601	4393	6	20-Oct-2018
EXA	Keysight Technologies	N9010B	4969	12	21-Dec-2018
Cable (18GHz	Rosenberger	LU7-036-1000	5031	-	O/P Mon

Table 16

O/P Mon – Output Monitored using calibrated equipment

Product Service

3 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	± 44.13 Hz
Spectrum Characteristics	± 1.8 dB

Table 17