

# FCC and ISCED Test Report

Park Air Systems Ltd

Ground to air transceiver, Model: T6-TRV

In accordance with FCC 47 CFR Part 87,  
FCC 47 CFR Part 2, Industry Canada RSS-141  
and ISCED RSS-GEN

Prepared for: Park Air Systems Ltd  
Northfields  
Market Deeping  
Peterborough  
PE6 8UE  
United Kingdom



Add value.  
Inspire trust.

FCC ID: C8LT6-TRV

IC: 2137A-T6TRV

## COMMERCIAL-IN-CONFIDENCE

Document 75952109-01 Issue 04

### SIGNATURE

NAME	JOB TITLE	RESPONSIBLE FOR	ISSUE DATE
Matthew Russell	Chief Engineer (RF)	Authorised Signatory	09 November 2022

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD 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 87, FCC 47 CFR Part 2, Industry Canada RSS-141 and ISCED RSS-GEN. The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Neil Rousell	09 November 2022	

FCC Accreditation

90987 Octagon House, Fareham Test Laboratory

ISCED Accreditation

12669A Octagon House, Fareham Test Laboratory

### EXECUTIVE SUMMARY

A sample of this product was tested and found to be compliant with FCC 47 CFR Part 87: 2019, FCC 47 CFR Part 2: 2019, Industry Canada RSS-141: Issue 2 (06-2010) and ISCED RSS-GEN: Issue 5 (04-2018) + A2 (02-2021) for the tests detailed in section 1.3.



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### ACCREDITATION

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# 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	20 July 2021
2	FCC and IC ID numbers added to cover the T6-TV product. Also a correction to the limit for A9W in Section 2.2.	25 November 2021
3	To update the ITU Emission Designator for the ACARS in section 1.5	28 September 2022
4	To remove the FCC/IC ID for the T6-TV model	09 November 2022

**Table 1**

## 1.2 Introduction

Applicant	Park Air Systems Ltd
Manufacturer	Park Air Systems Ltd
Model Number(s)	T6-TRV
Serial Number(s)	313303
Hardware Version(s)	2
Software Version(s)	10.10.0-rc3
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 87: 2019 FCC 47 CFR Part 2: 2019 Industry Canada RSS-141: Issue 2 (06-2010) ISED RSS-GEN: Issue 5 (04-2018) + A2 (02-2021)
Order Number	72566
Date	29-April-2021
Date of Receipt of EUT	11-June-2021
Start of Test	21-June-2021
Finish of Test	14-July-2021
Name of Engineer(s)	Neil Rousell
Related Document(s)	ANSI C63.26 (2015)



### 1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 87, FCC 47 CFR Part 2, Industry Canada RSS-141 and ISED RSS-GEN is shown below.

Section	Specification Clause				Test Description	Result	Comments/Base Standard
	Part 87	Part 2	RSS-141	RSS-GEN			
Configuration and Mode: ACARS							
2.1	87.131	2.1046	5.1	6.12	Power and Emissions	Pass	Tested to the A3E requirements as requested by the applicant.
2.2	87.135	2.1049	5.1	6.7	Bandwidth of Emission	Pass	
2.3	87.139	2.1051	5.2	6.13	Spurious Emissions at Antenna Terminals	Pass	
Configuration and Mode: VDL M2							
2.1	87.131	2.1046	5.1	6.12	Power and Emissions	Pass	25 W setting used for FCC. 20 W setting used for ISED.
2.2	87.135	2.1049	5.1	6.7	Bandwidth of Emission	Pass	
2.3	87.139	2.1051	5.2	6.13	Spurious Emissions at Antenna Terminals	Pass	

**Table 2**

NOTE: Tests were limited to the specific test cases stated above as requested by the applicant.



## 1.4 Application Form

### Equipment Description

Technical Description: (Please provide a brief description of the intended use of the equipment including the technologies the product supports)	Ground to air transceiver for use in the VHF aeronautical band using AM voice, VDLM2, and ACARS with 25/8.33 kHz channel spacing	
Manufacturer:	Park Air Systems Ltd	
Model:	T6-TRV	
Part Number:	24-05655031/2	
Hardware Version:	2	
Software Version:	10.10.0-rc3	
FCC ID of the product under test – <a href="#">see guidance here</a>	C8LT6-TRV	
IC ID of the product under test – <a href="#">see guidance here</a>	2137A-T6TRV	

### Intentional Radiators

Technology	AM Voice	AM Voice	ACARS	VDLM2		
Frequency Range (MHz to MHz)	118.000 to 136.975	118.000 to 136.975	118.000 to 136.975	118.000 to 136.975		
Conducted Declared Output Power (dBm)	47	47	44	44		
Antenna Gain (dBi)	N/A	N/A	N/A	N/A		
Supported Bandwidth(s) (MHz) (e.g 1 MHz, 20 MHz, 40 MHz)	25 kHz	8.33 kHz	25 kHz	25 kHz		
Modulation Scheme(s) (e.g GFSK, QPSK etc)	AM-DSB	AM-DSB	AM-MSK	D8PSK		
ITU Emission Designator ( <a href="#">see guidance here</a> ) (not mandatory for Part 15 devices)	6K80A3EJN	5K00A3EJN	13K0A9W	14K0G1D		
Bottom Frequency (MHz)	118.000	118.000	118.000	118.000		
Middle Frequency (MHz)	127.500	127.500	127.500	127.500		
Top Frequency (MHz)	136.975	136.975	136.975	136.975		

### Un-intentional Radiators

Highest frequency generated or used in the device or on which the device operates or tunes	206.975 MHz
Lowest frequency generated or used in the device or on which the device operates or tunes	20 MHz
Class A Digital Device (Use in commercial, industrial or business environment) <input checked="" type="checkbox"/>	
Class B Digital Device (Use in residential environment only) <input type="checkbox"/>	

### AC Power Source

AC supply frequency:	47 - 63	Hz
Voltage	110 - 240	V
Max current:	3	A
Single Phase <input checked="" type="checkbox"/> Three Phase <input type="checkbox"/>		



#### DC Power Source

Nominal voltage:	24	V
Extreme upper voltage:	32	V
Extreme lower voltage:	21	V
Max current:	15	A

#### Battery Power Source

Voltage:		V
End-point voltage:		V (Point at which the battery will terminate)
Alkaline <input type="checkbox"/> Leclanche <input type="checkbox"/> Lithium <input type="checkbox"/> Nickel Cadmium <input type="checkbox"/> Lead Acid* <input type="checkbox"/> *(Vehicle regulated)		
Other <input type="checkbox"/>	Please detail:	

#### Charging

Can the EUT transmit whilst being charged	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
---	---

#### Temperature

Minimum temperature:	-20	°C
Maximum temperature:	+55	°C

#### Cable Loss

Adapter Cable Loss (Conducted sample)	-	dB
--	---	----

#### Antenna Characteristics

Antenna connector <input checked="" type="checkbox"/>	State impedance	50	Ohm
Temporary antenna connector <input type="checkbox"/>	State impedance		Ohm
Integral antenna <input type="checkbox"/>	Type:		Gain
External antenna <input type="checkbox"/>	Type:		Gain
For external antenna only: Standard Antenna Jack <input type="checkbox"/> If yes, describe how user is prohibited from changing antenna (if not professional installed): Equipment is only ever professionally installed <input type="checkbox"/> Non-standard Antenna Jack <input type="checkbox"/>			

#### Ancillaries (if applicable)

Manufacturer:	-	Part Number:	-
Model:	-	Country of Origin:	-

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

Name: Adam Brookes  
Position held: Test & Acceptance Engineer  
Date: 09 July 2021



## 1.5 Product Information

### 1.5.1 Technical Description

Ground to air transceiver for use in the VHF aeronautical band using AM voice, VDLM2, and ACARS with 25/8.33 kHz channel spacing.

### 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
Model: T6-TRV, Serial Number: 313303			
0	As supplied by the customer	Not Applicable	Not Applicable
1	Power setting reduced from 25 W to 20 W via the front panel control. The manufacturer declares that in the power for VDLM2 will be limited to 20 W in Canada in order to satisfy the 50 W peak power requirement.	Neil Rousell	14-Jul-2021

**Table 3**

### 1.8 Test Location

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

Test Name	Name of Engineer(s)	Accreditation
Configuration and Mode: ACARS		
Power and Emissions	Neil Rousell	UKAS
Bandwidth of Emission	Neil Rousell	UKAS
Spurious Emissions at Antenna Terminals	Neil Rousell	UKAS
Configuration and Mode: VDLM2		
Power and Emissions	Neil Rousell	UKAS
Bandwidth of Emission	Neil Rousell	UKAS
Spurious Emissions at Antenna Terminals	Neil Rousell	UKAS

**Table 4**

Office Address:

TÜV SÜD  
Octagon House  
Concorde Way  
Fareham  
Hampshire  
PO15 5RL  
United Kingdom



## 2 Test Details

### 2.1 Power and Emissions

#### 2.1.1 Specification Reference

FCC 47 CFR Part 87, Clause 87.131  
FCC 47 CFR Part 2, Clause 2.1046  
Industry Canada RSS-141, Clause 5.1  
ISED RSS-GEN, Clause 6.12

#### 2.1.2 Equipment Under Test and Modification State

T6-TRV, S/N: 313303 - Modification State 0 (ACARS)  
T6-TRV, S/N: 313303 – Modification State 1 (VDLM2)

#### 2.1.3 Date of Test

21-June-2021 to 14-July-2021

#### 2.1.4 Test Method

This test was performed in accordance with ANSI C63.26, clause 5.2.4.2 and Industry Canada RSS-141, clause 4.1

#### 2.1.5 Environmental Conditions

Ambient Temperature 23.2 -23.8 °C  
Relative Humidity 57.4 – 58.8 %

#### 2.1.6 Test Results

##### ACARS

Method	118.000 MHz		127.500 MHz		136.975 MHz	
	Maximum Power (dBm)	Maximum Power (W)	Maximum Power (dBm)	Maximum Power (W)	Maximum Power (dBm)	Maximum Power (W)
Mean	45.9	38.9	45.9	38.9	45.9	38.9

**Table 5 - Transmitter Output Power**

##### VDLM2

Method	118.000 MHz		127.500 MHz		136.975 MHz	
	Maximum Power (dBm)	Maximum Power (W)	Maximum Power (dBm)	Maximum Power (W)	Maximum Power (dBm)	Maximum Power (W)
Peak (FCC); 25 W	47.1	51.3	46.9	49.0	47.0	49.9
Peak (ISED); 20 W	46.1	40.7	46.0	39.8	46.0	39.8

**Table 6 - Transmitter Output Power**





FCC 47 CFR Part 87, Limit Clause 87.131

<200 W

Industry Canada RSS-141, Limit Clause 5.1

Ground Equipment:

50 W for fixed equipment with A9W, G1D or G7D emissions

300 W for fixed equipment with A3E emissions

20 W for mobile, portable and transportable equipment with A3E emissions

Airborne Equipment:

55 W

**2.1.7 Test Location and Test Equipment Used**

This test was carried out in RF Laboratory 2.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Programmable Power Supply	California Inst	2001RP	1898	-	TU
Multimeter	Fluke	79 Series II	3057	12	21-Aug-2021
Attenuator (10dB, 150W)	Narda	769-10	3368	12	23-Jul-2021
Attenuator (30dB, 150W)	Narda	769-30	3369	12	23-Jul-2021
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	29-Jan-2022
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	30-Dec-2021
RadiPower USB RF power sensor	DARE!! Instruments	RPR3006W	4437	12	13-Nov-2021
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB-40	5475	12	06-Apr-2022

**Table 7**

TU - Traceability Unscheduled



## **2.2 Bandwidth of Emission**

### **2.2.1 Specification Reference**

FCC 47 CFR Part 87, Clause 87.135  
FCC 47 CFR Part 2, Clause 2.1049  
Industry Canada RSS-141, Clause 5.1  
ISED RSS-GEN, Clause 6.7

### **2.2.2 Equipment Under Test and Modification State**

T6-TRV, S/N: 313303 - Modification State 0

### **2.2.3 Date of Test**

21-June-2021

### **2.2.4 Test Method**

This test was performed in accordance with ANSI C63.26, clause 5.4.4

### **2.2.5 Environmental Conditions**

Ambient Temperature 23.2 °C  
Relative Humidity 57.4 %

### **2.2.6 Test Results**

ACARS

99% Occupied Bandwidth (kHz)		
118.000 MHz	127.500 MHz	136.975 MHz
5.828	5.823	5.886

**Table 8 - Occupied Bandwidth Results**

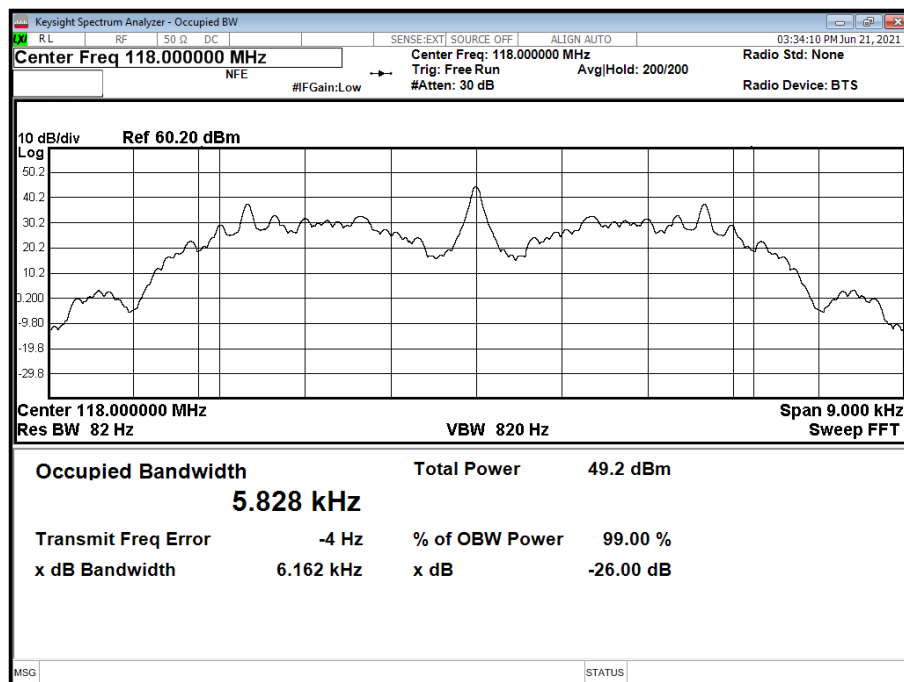


Figure 1 - Occupied Bandwidth - 118.000 MHz

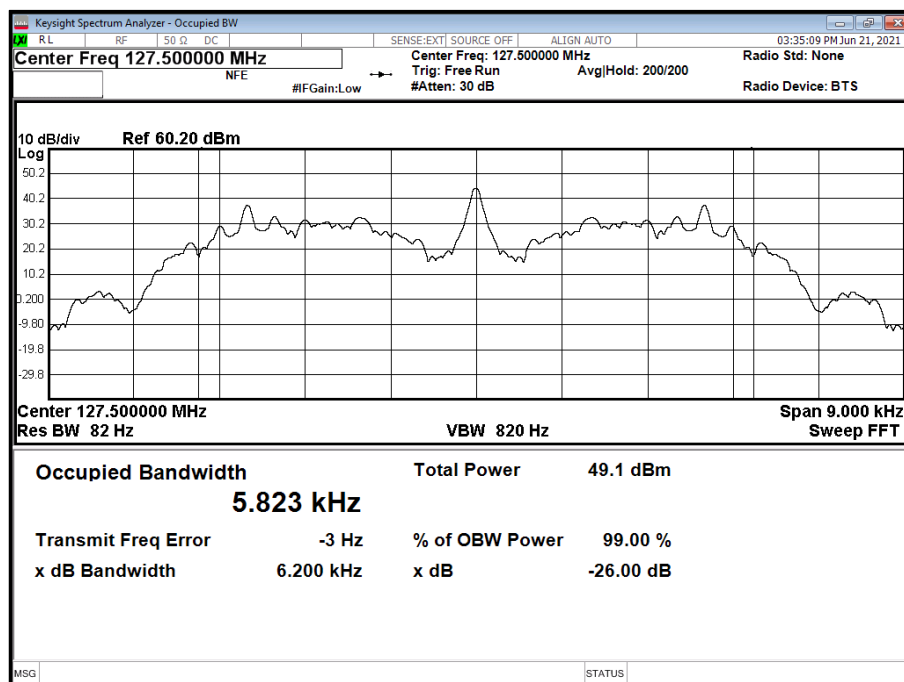


Figure 2 - Occupied Bandwidth - 127.500 MHz

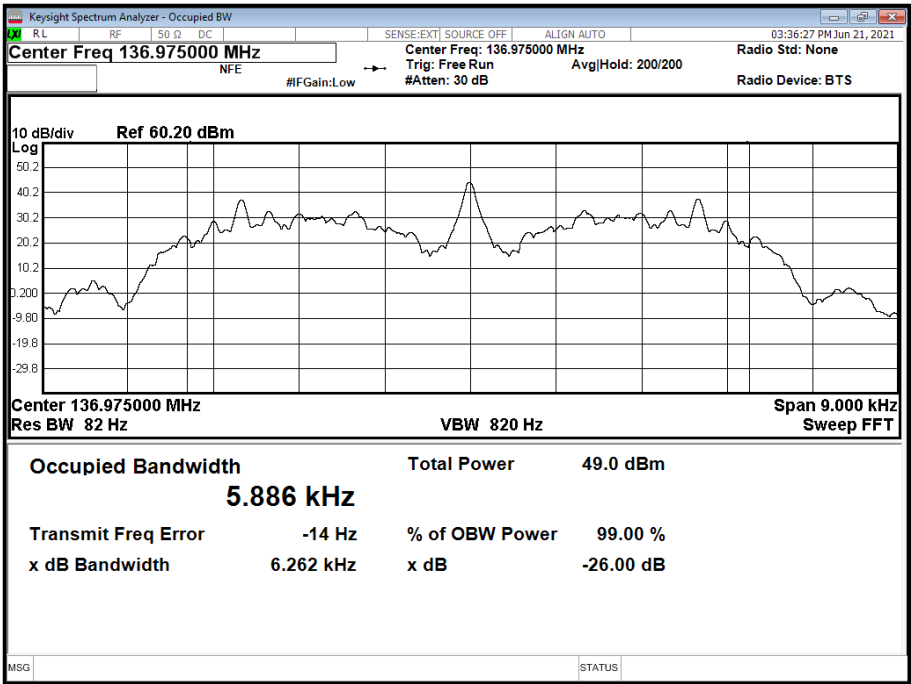


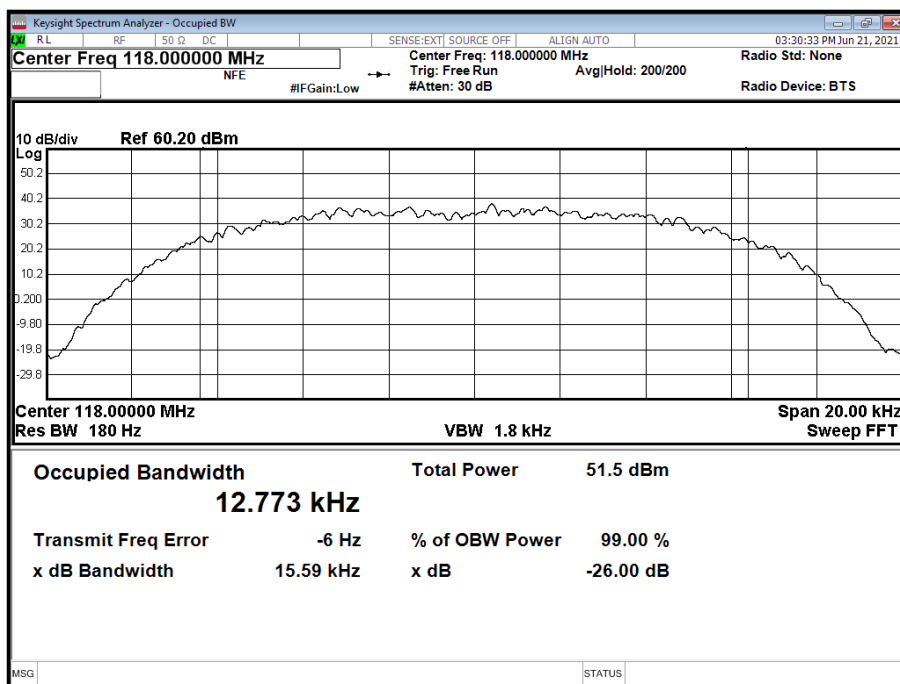
Figure 3 - Occupied Bandwidth - 136.975 MHz



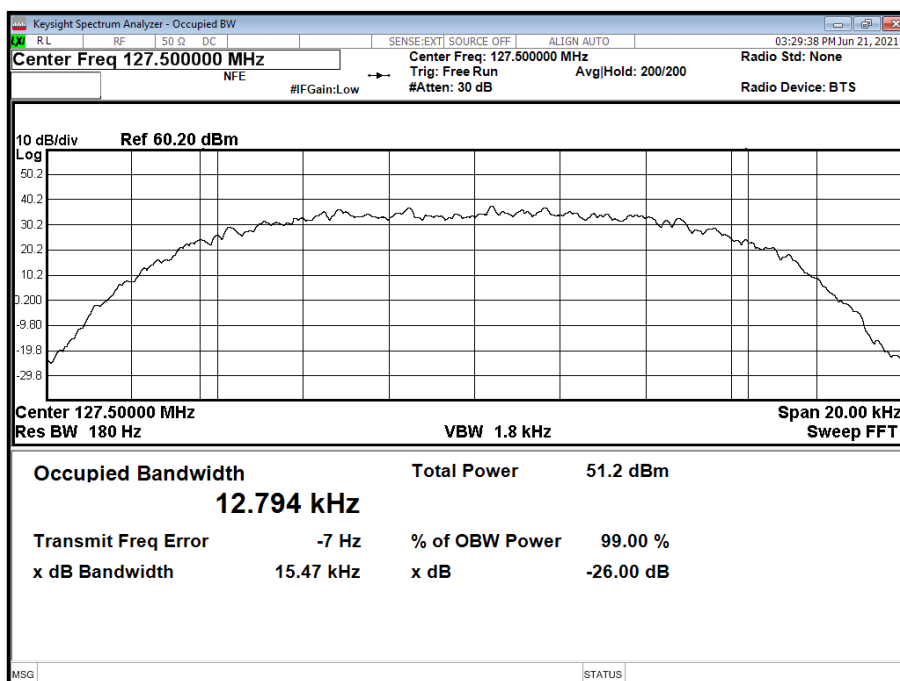
## VDLM2

99% Occupied Bandwidth (kHz)		
118.000 MHz	127.500 MHz	136.975 MHz
12.773	12.794	12.665

**Table 9 - Occupied Bandwidth Results**



**Figure 4 - Occupied Bandwidth - 118.000 MHz**



**Figure 5 - Occupied Bandwidth - 127.500 MHz**

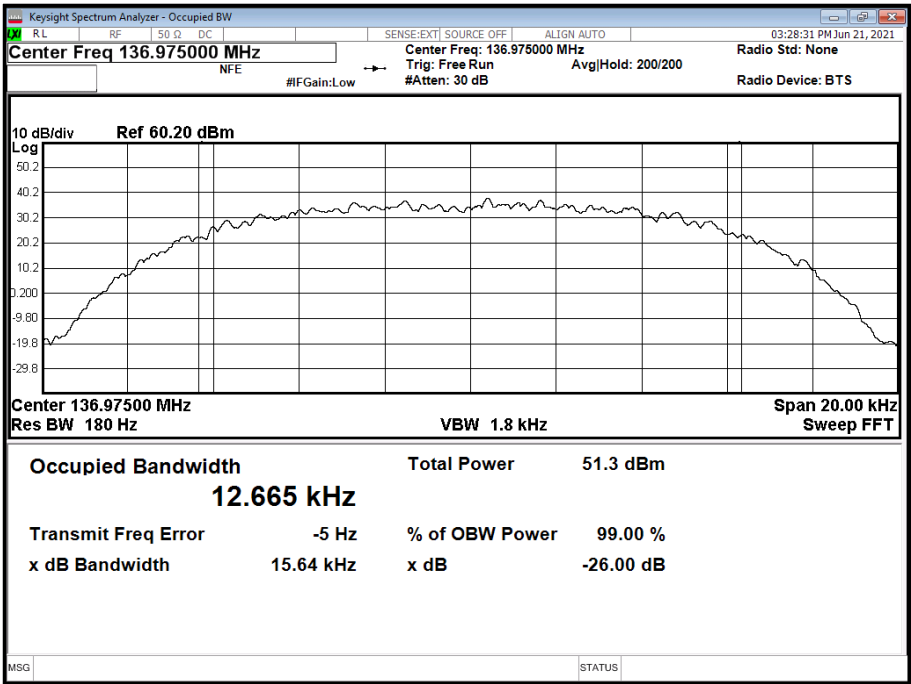


Figure 6 - Occupied Bandwidth - 136.975 MHz

FCC 47 CFR Part 87, Limit Clause 87.135(a) and 87.137(a)

The authorized bandwidth is the maximum occupied bandwidth authorized to be used by a station.

The authorized bandwidth declared by the manufacturer is: A9W: 25 kHz, G1D: 25 kHz

Industry Canada RSS-141, Limit Clause 5.1

Channel Bandwidth:

25 kHz

Necessary Bandwidth

- 6 kHz for A3E emissions
- 13 kHz for A9W emissions
- 14 kHz for G1D and G7D emissions



## 2.2.7 Test Location and Test Equipment Used

This test was carried out in RF Laboratory 2.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	03-Dec-2021
Programmable Power Supply	California Inst	2001RP	1898	-	TU
Multimeter	Fluke	79 Series II	3057	12	21-Aug-2021
Attenuator (10dB, 150W)	Narda	769-10	3368	12	23-Jul-2021
Attenuator (30dB, 150W)	Narda	769-30	3369	12	23-Jul-2021
Frequency Standard	Spectracom	SecureSync 1200-0408-0601	4393	6	03-Dec-2021
PXA Signal Analyser	Keysight Technologies	N9030A	4654	12	06-Nov-2021
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB-40	5475	12	06-Apr-2022

**Table 10**

TU - Traceability Unscheduled

## 2.3 Spurious Emissions at Antenna Terminals

### 2.3.1 Specification Reference

FCC 47 CFR Part 87, Clause 87.139  
FCC 47 CFR Part 2, Clause 2.1051  
Industry Canada RSS-141, Clause 5.2  
ISED RSS-GEN, Clause 6.13

### 2.3.2 Equipment Under Test and Modification State

T6-TRV, S/N: 313303 - Modification State 0

### 2.3.3 Date of Test

21-June-2021 to 22-June-2021

### 2.3.4 Test Method

This test was performed in accordance with ANSI C63.26, clause 5.7 and Industry Canada RSS-141, clause 4.2

### 2.3.5 Environmental Conditions

Ambient Temperature 21.9 - 23.3 °C  
Relative Humidity 48.2 - 57.4 %

### 2.3.6 Test Results

#### ACARS

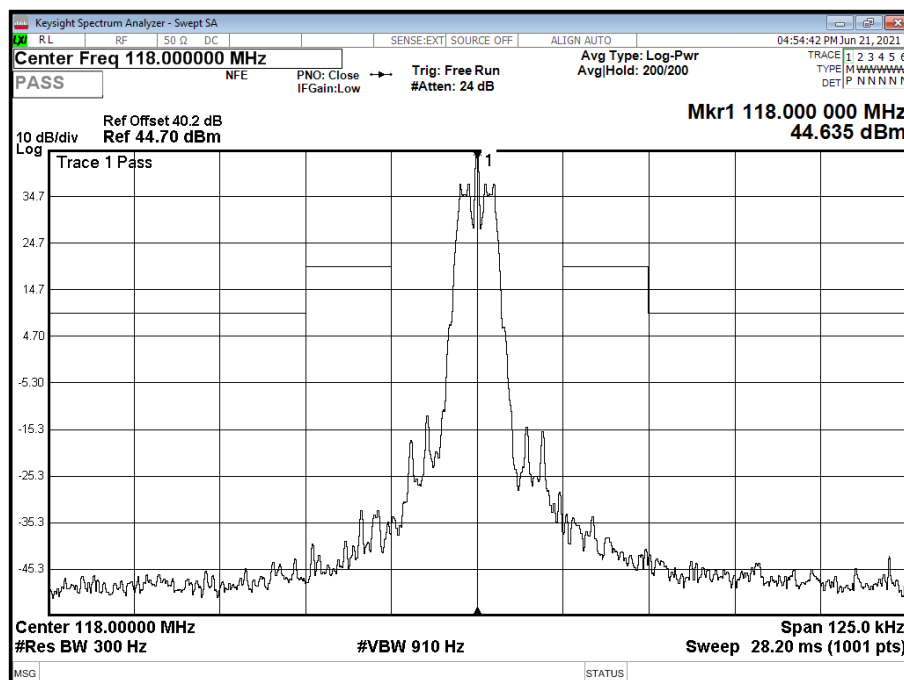


Figure 7 - 118.000 MHz - Transmitter Spectrum Mask



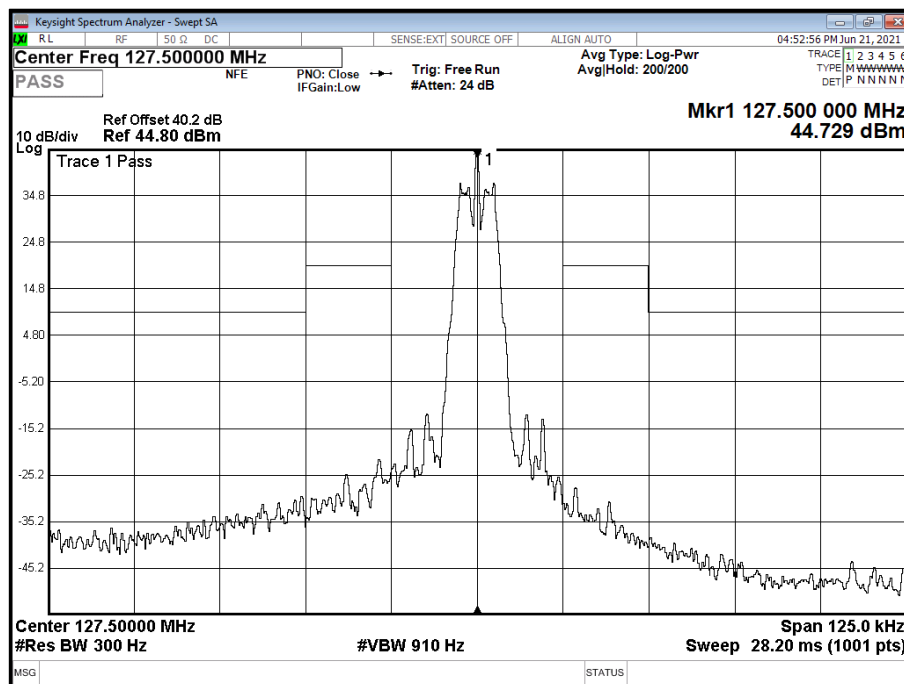


Figure 8 - 127.500 MHz - Transmitter Spectrum Mask

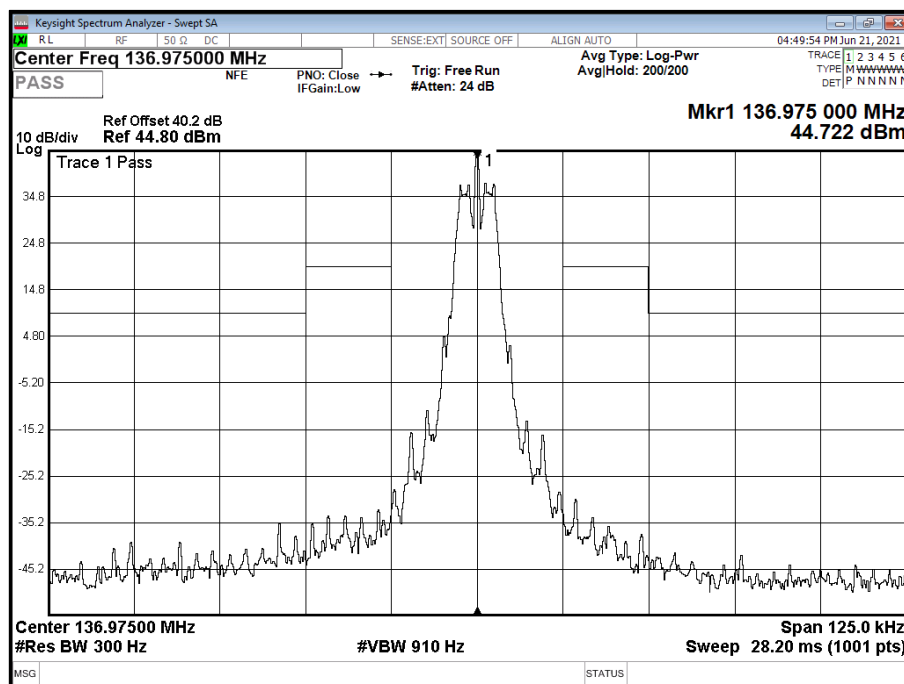


Figure 9 - 136.975 MHz - Transmitter Spectrum Mask

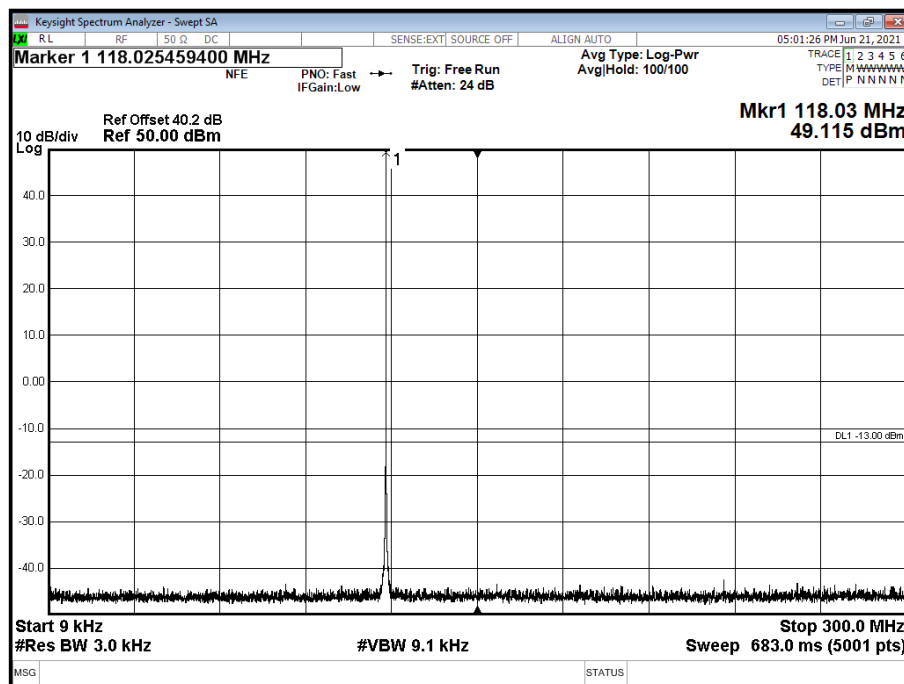


Figure 10 - 118.000 MHz - 9 kHz to 300 MHz

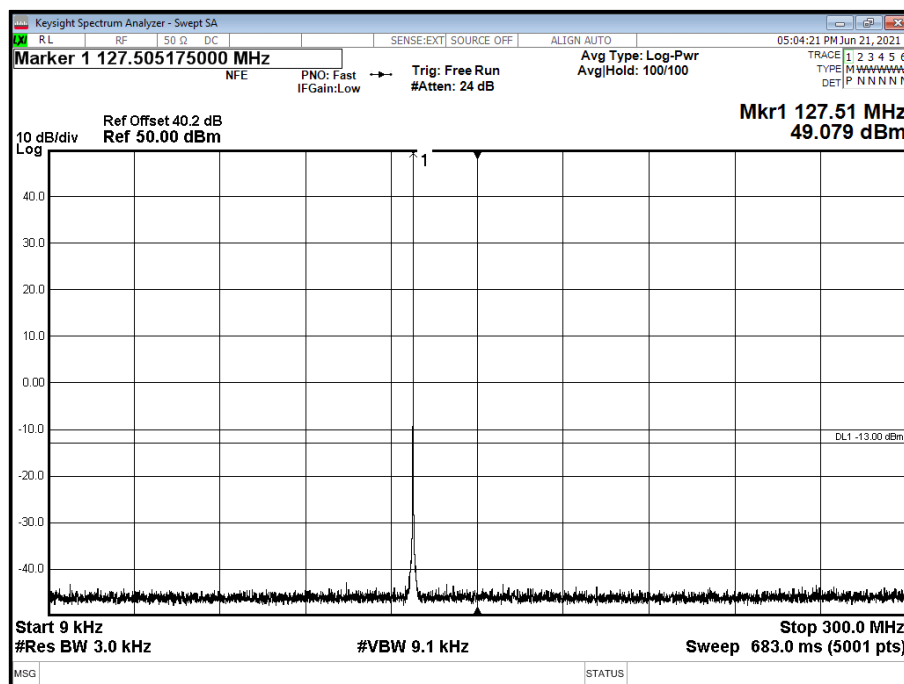


Figure 11 - 127.500 MHz - 9 kHz to 300 MHz

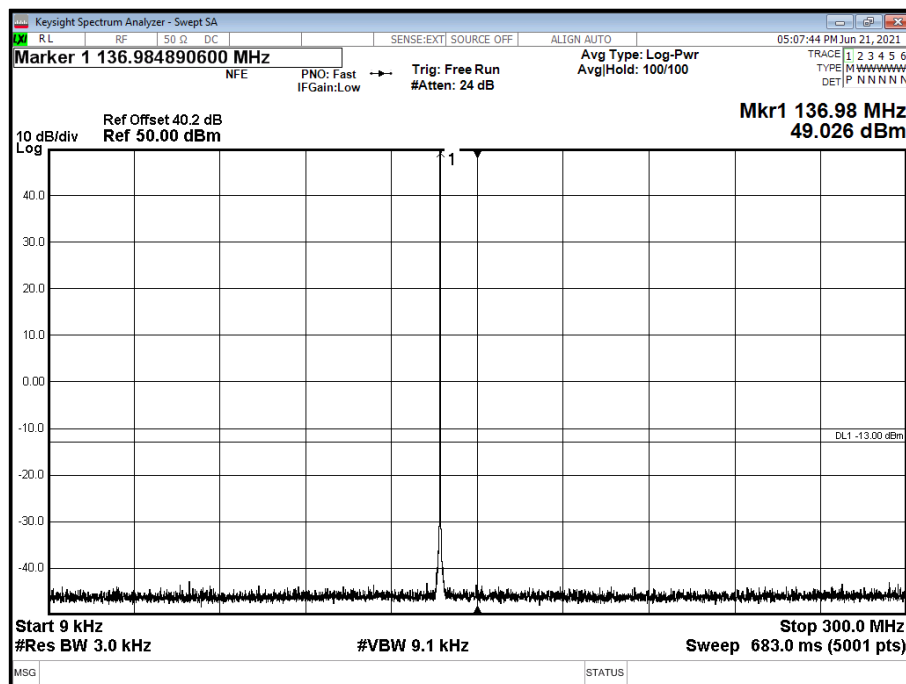


Figure 12 - 136.975 MHz - 9 kHz to 300 MHz

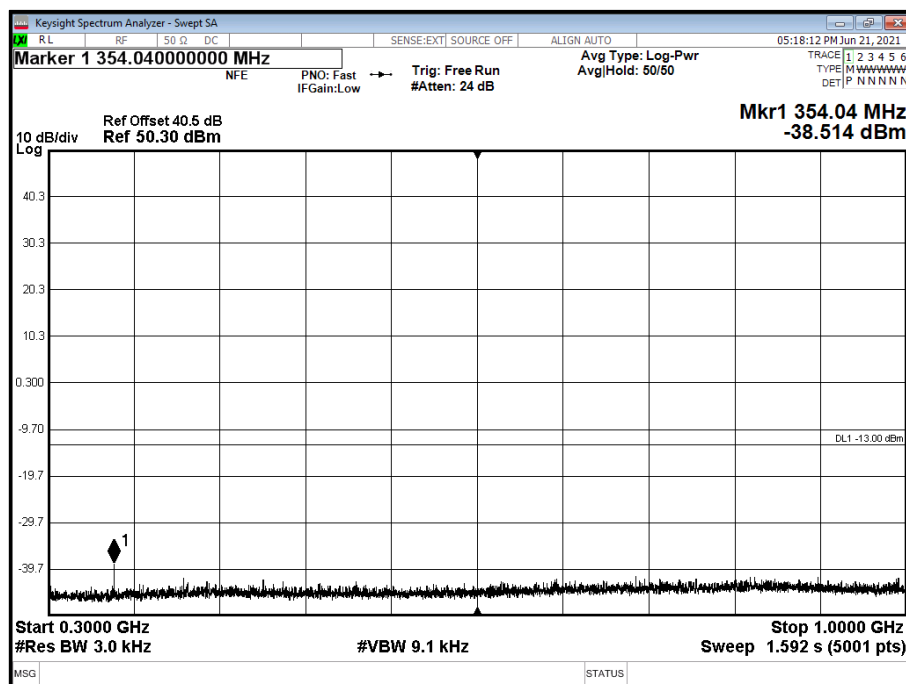


Figure 13 - 118.000 MHz - 300 MHz to 1 GHz

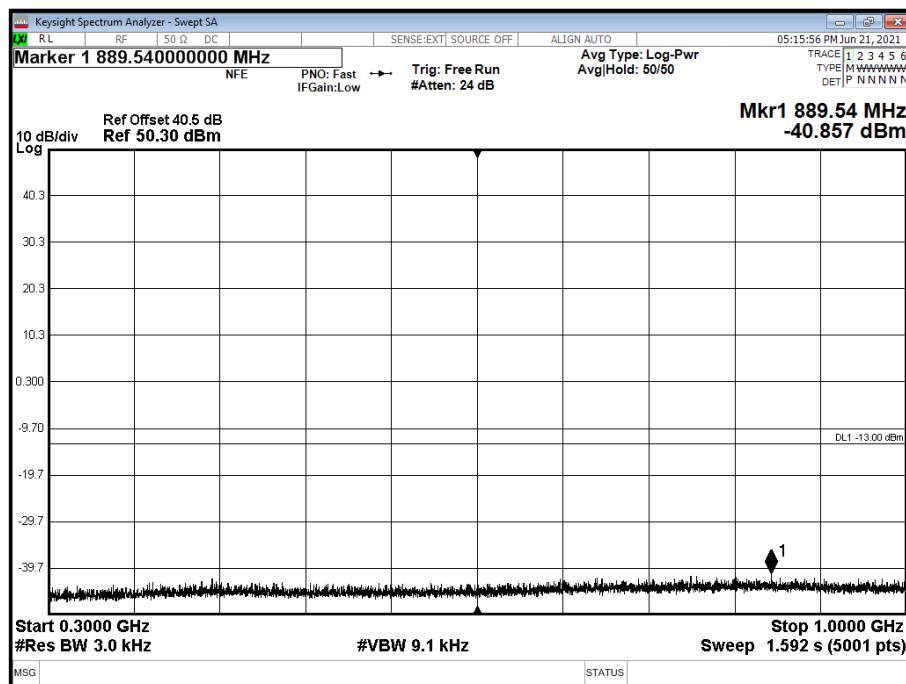


Figure 14 - 127.500 MHz - 300 MHz to 1 GHz

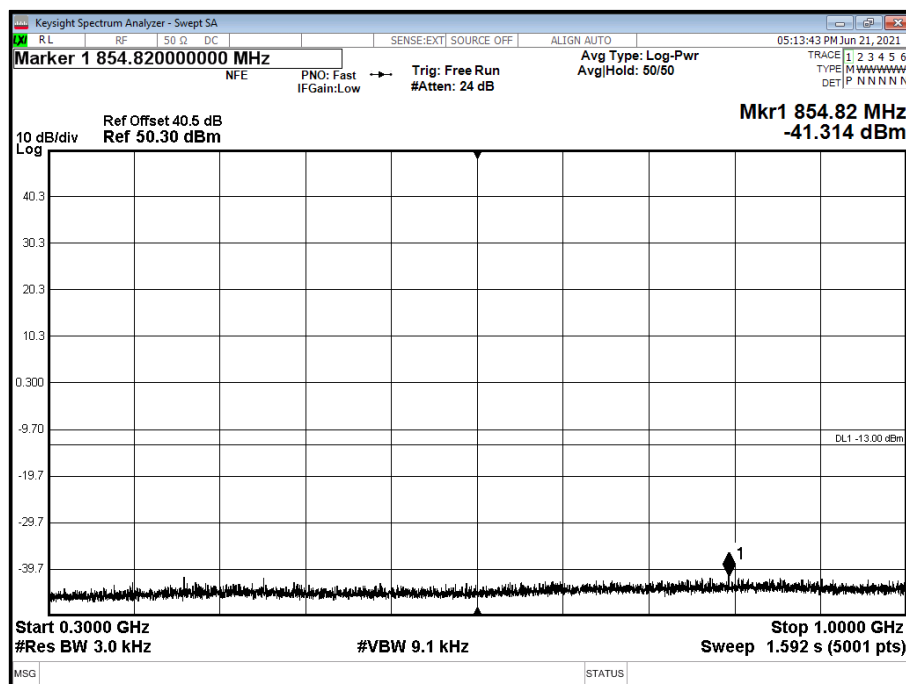


Figure 15 - 136.975 MHz - 300 MHz to 1 GHz

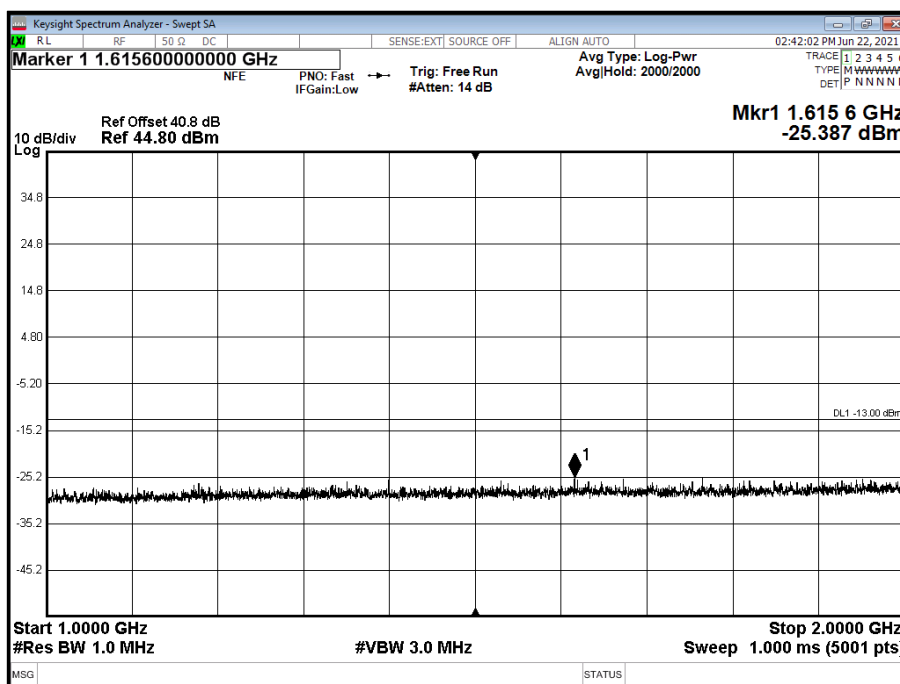


Figure 16 - 118.000 MHz - 1 GHz to 2 GHz

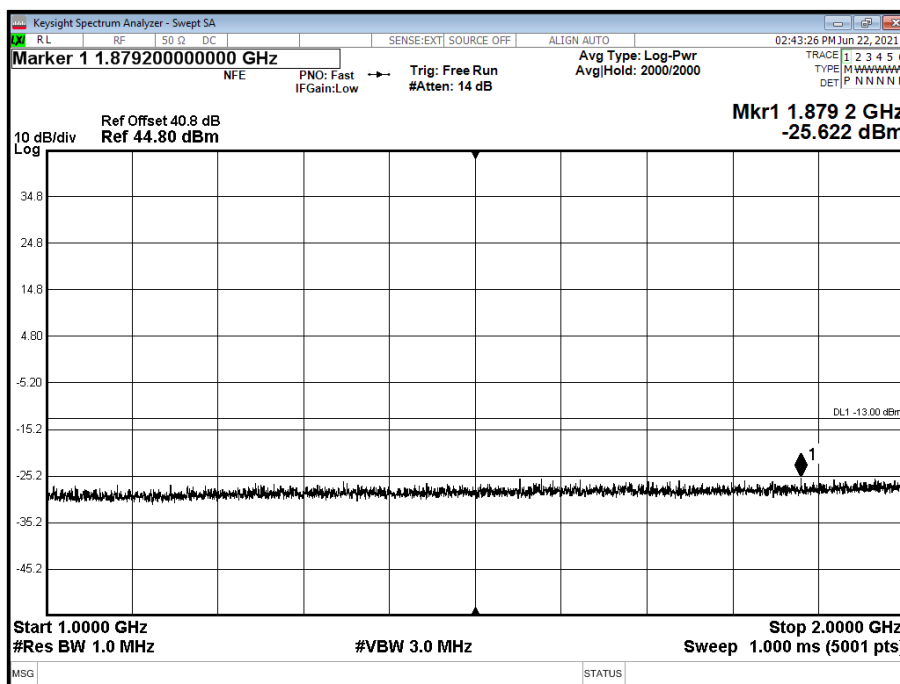


Figure 17 - 127.500 MHz - 1 GHz to 2 GHz

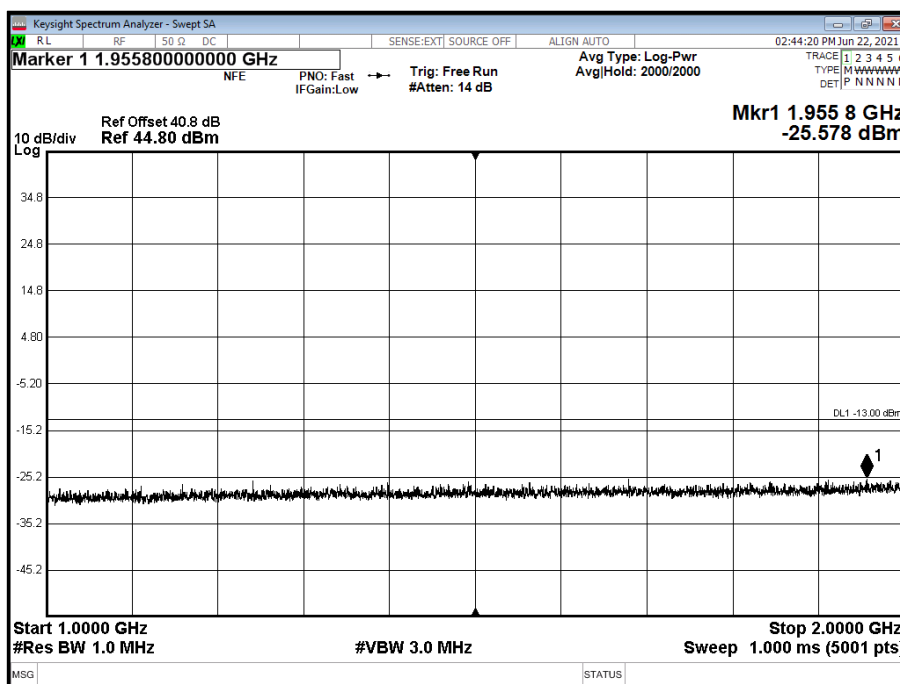


Figure 18 - 136.975 MHz - 1 GHz to 2 GHz

FCC 47 CFR Part 87, Limit Clause 87.139 (a)

Except for ELTs and when using single sideband (R3E, H3E, J3E), or frequency modulation (F9) or digital modulation (F9Y) for telemetry or telecommand in the 1435-1525 MHz, 2345-2395 MHz, or 5091–5150 MHz band or digital modulation (G7D) for differential GPS, the mean power of any emissions must be attenuated below the mean power of the transmitter (pY) as follows:

- (1) When the frequency is removed from the assigned frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth the attenuation must be at least 25 dB;
- (2) When the frequency is removed from the assigned frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth the attenuation must be at least 35 dB.
- (3) When the frequency is removed from the assigned frequency by more than 250 percent of the authorized bandwidth the attenuation for aircraft station transmitters must be at least 40 dB; and the attenuation for aeronautical station transmitters must be at least  $43 + 10 \log_{10} pY$  dB.

Industry Canada RSS-141, Limit Clause 5.2

For transmitters with A3E or A9W emissions, the mean power of any emissions shall be attenuated below the mean power of the transmitter, P as follows:

- (a) When the frequency is removed from the equipment's channel centre frequency by more than 50% up to and including 100% of the channel bandwidth, the attenuation shall be at least 25 dB, measured with a bandwidth of 300 Hz;
- (b) When the frequency is removed from the equipment's channel centre frequency by more than 100% up to and including 250% of the channel bandwidth, the attenuation shall be at least 35 dB, measured with a bandwidth of 300 Hz;
- (c) When the frequency is removed from the equipment's channel centre frequency by more than 250% of the channel bandwidth, the attenuation for on-board aircraft transmitters shall be at least 40 dB; and the attenuation for ground transmitters shall be at least  $43 + 10 \log_{10} P$  (in watts) dB, measured with a bandwidth of 3 kHz.

## VDLM2

Adjacent Channel	118.000 MHz		127.500 MHz		136.975 MHz	
	Lower Result (dBm)	Upper Result (dBm)	Lower Result (dBm)	Upper Result (dBm)	Lower Result (dBm)	Upper Result (dBm)
First	-23.18	-21.57	-24.29	-24.56	-23.43	-24.15

Table 11 - Adjacent Channel Power Results

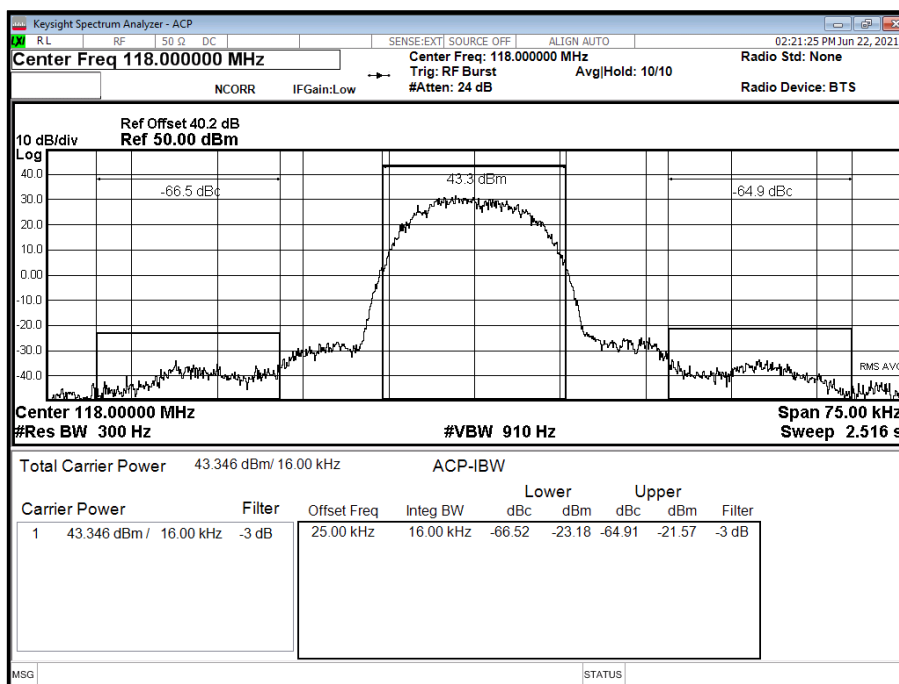


Figure 19 - 118.000 MHz

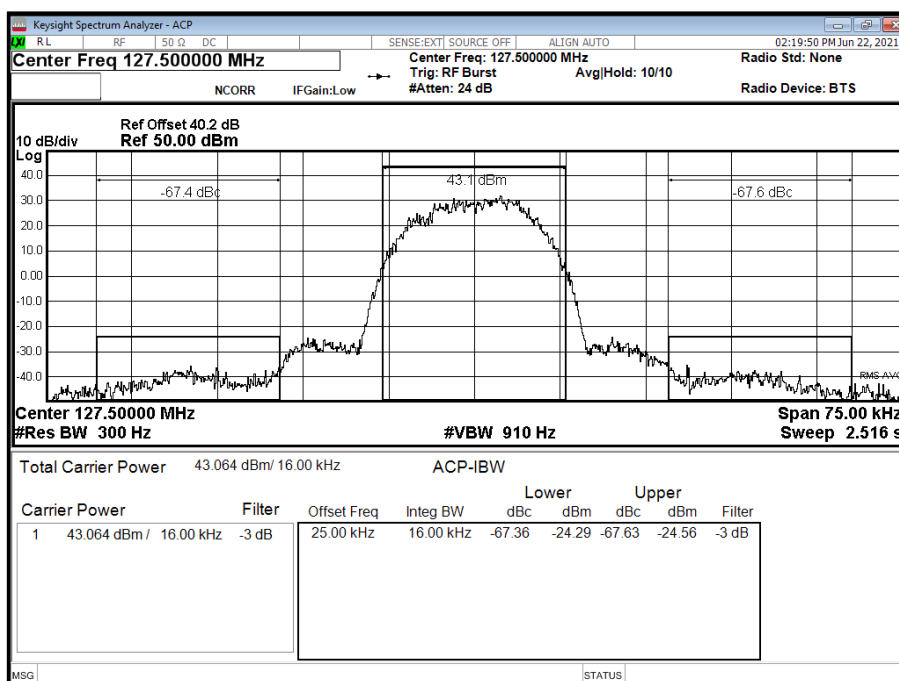
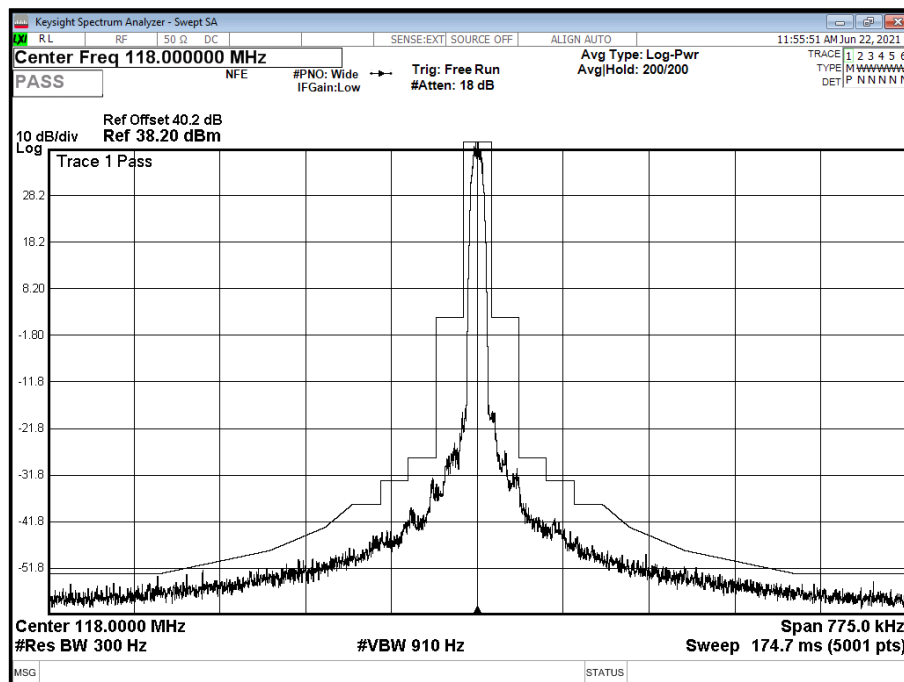
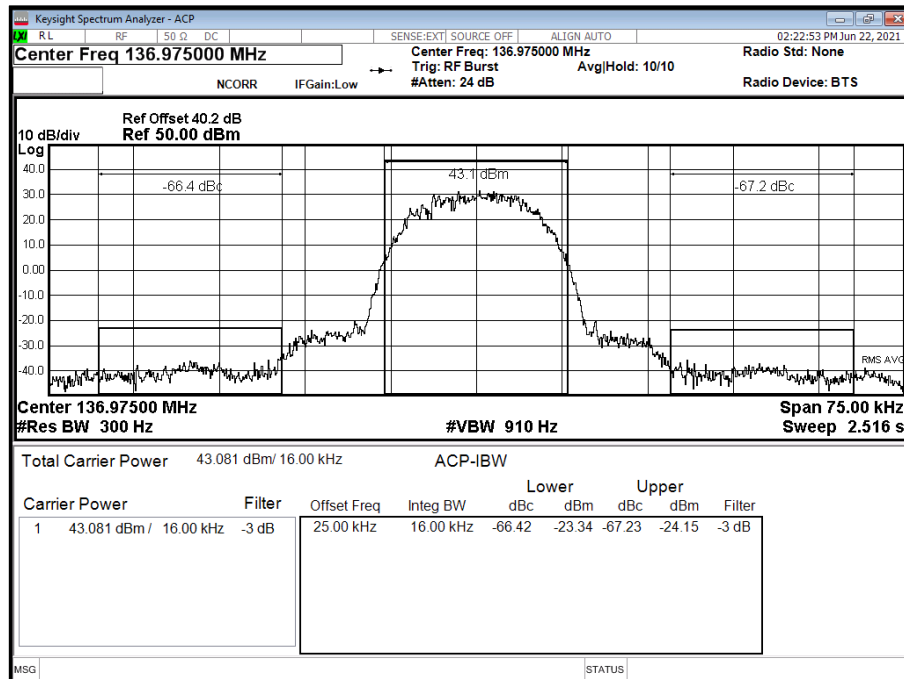


Figure 20 - 127.500 MHz





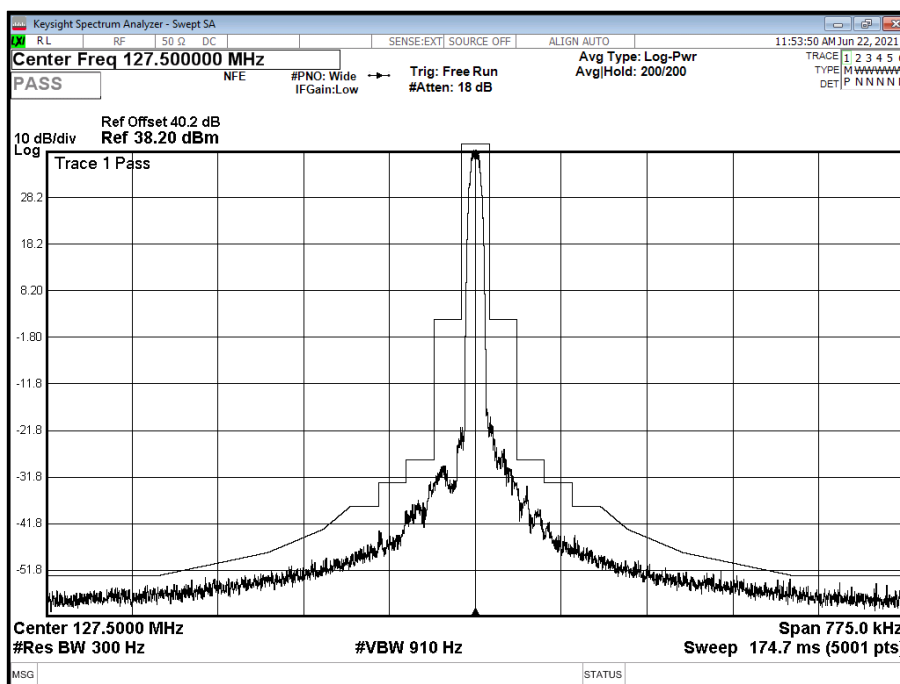


Figure 23 - 127.500 MHz, Emission Mask (within first four adjacent channels)

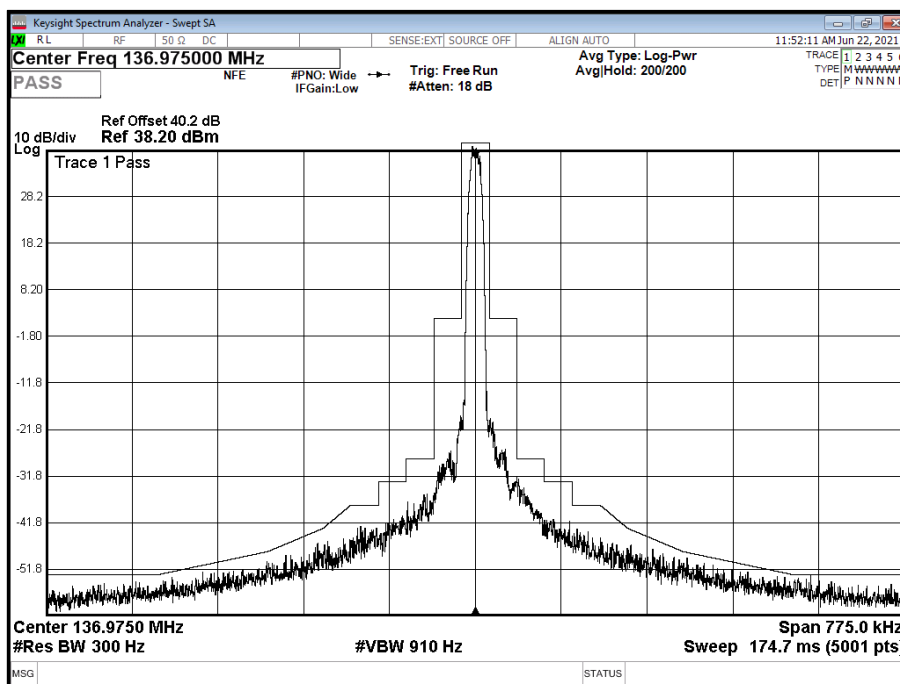


Figure 24 - 136.975 MHz, Emission Mask (within first four adjacent channels)

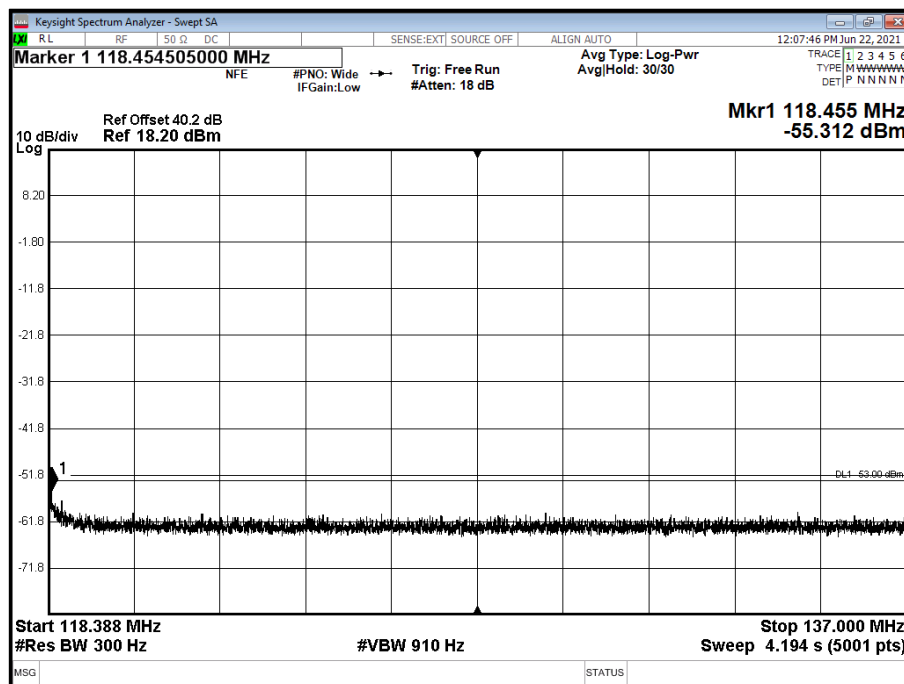


Figure 25 - 118.000 MHz, In-band emission requirement (> four adjacent channels)

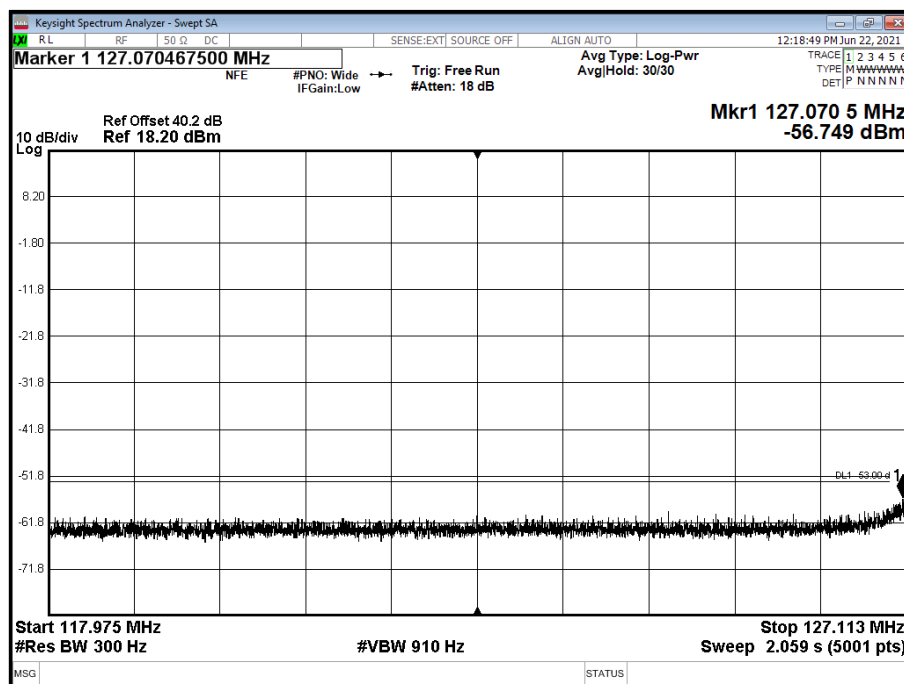


Figure 26 - 127.500 MHz, In-band emission requirement (> four adjacent channels)

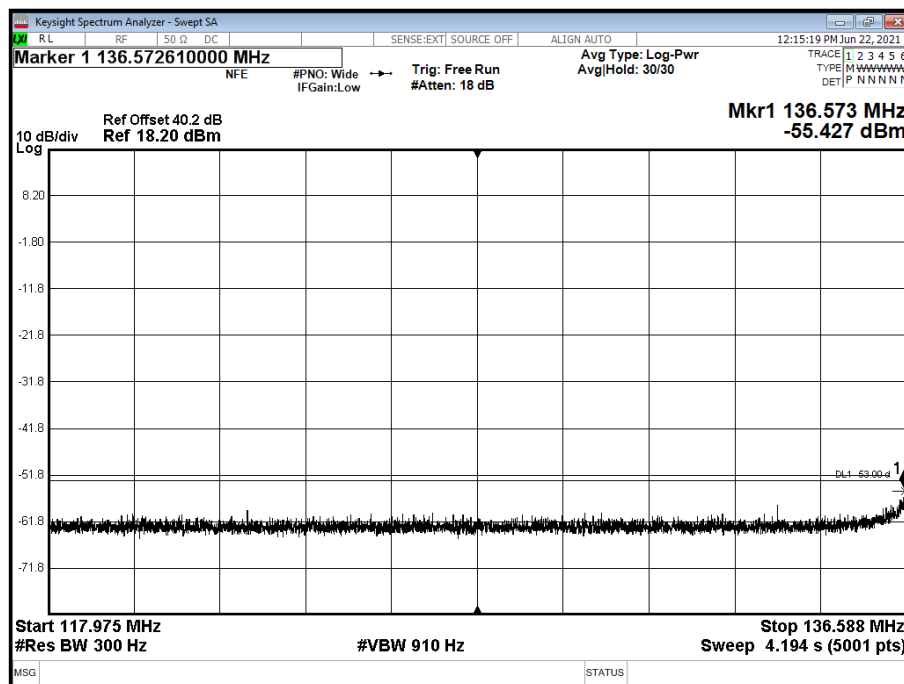


Figure 27 - 136.975 MHz, In-band emission requirement (> four adjacent channels)

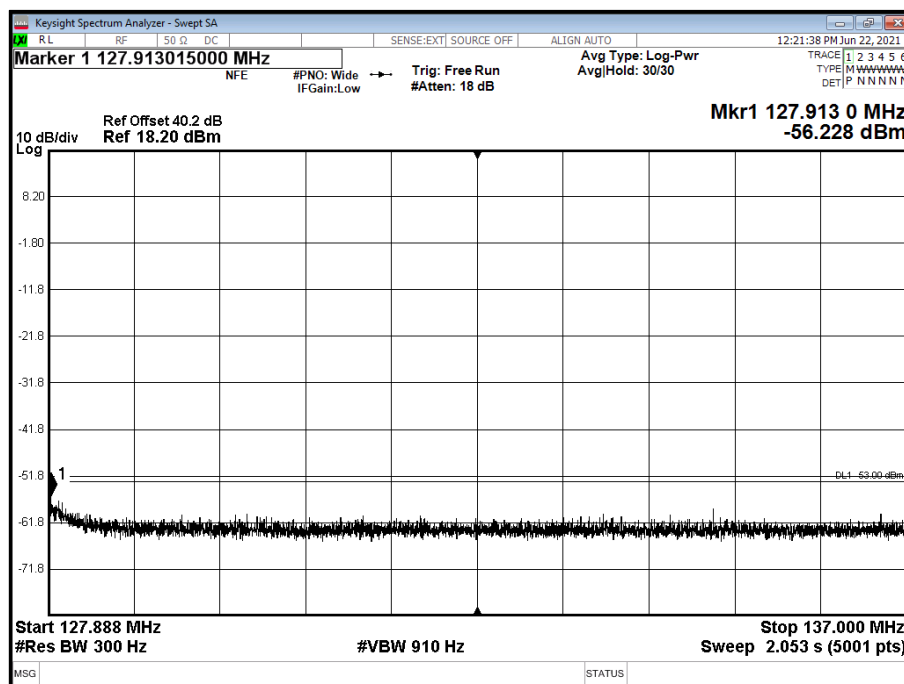


Figure 28 - 127.500 MHz, In-band emission requirement (> four adjacent channels)



FCC 47 CFR Part 87, Limit Clause 87.139(k)

For VHF aeronautical stations and aircraft stations operating with G1D or G7D emissions:

The amount of power measured across either first adjacent 25 kHz channel shall not exceed 2 dBm.

The amount of power measured across either second adjacent 25 kHz channel shall be less than -28 dBm;

The amount of power measured across either fourth adjacent 25 kHz channel shall be less than -38 dBm; and

From thereon the power measured in any other adjacent 25 kHz channel shall monotonically decrease at a rate of at least 5 dB per octave to a maximum value of -53 dBm.

The amount of power measured over a 16 kHz channel bandwidth centered on the first adjacent 25 kHz channel shall not exceed -18 dBm.

ISED RSS-141, Limit Clause 5.2

Transmitters with G1D or G7D emissions shall comply with the following:

the amount of transmitted peak power when measured over either of the first-adjacent 25 kHz channels shall not exceed 2 dBm;

the amount of transmitted peak power when measured across either of the second-adjacent 25 kHz channels shall not exceed -28 dBm;

the amount of transmitted peak power when measured across either of the third-adjacent 25 kHz channels shall not exceed -33 dBm; and

the amount of transmitted peak power measured across either of the fourth-adjacent 25 kHz channels shall not exceed -38 dBm; and from thereon the amount of power measured in any other adjacent channel shall monotonically decrease at a rate of at least 5 dB/octave, to a maximum value of -53 dBm.



### 2.3.7 Test Location and Test Equipment Used

This test was carried out in RF Laboratory 2.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Expires
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	03-Dec-2021
Programmable Power Supply	California Inst	2001RP	1898	-	TU
Multimeter	Fluke	79 Series II	3057	12	21-Aug-2021
Attenuator (10dB, 150W)	Narda	769-10	3368	12	23-Jul-2021
Attenuator (30dB, 150W)	Narda	769-30	3369	12	23-Jul-2021
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	29-Jan-2022
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	30-Dec-2021
Frequency Standard	Spectracom	SecureSync 1200-0408-0601	4393	6	03-Dec-2021
PXA Signal Analyser	Keysight Technologies	N9030A	4654	12	06-Nov-2021
Thermo-Hygro-Barometer	PCE Instruments	PCE-THB-40	5475	12	06-Apr-2022

**Table 12**

TU - Traceability Unscheduled



### 3 Measurement Uncertainty

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

Test Name	Measurement Uncertainty
Power and Emissions	$\pm 3.2$ dB
Bandwidth of Emission	$\pm 90.81$ Hz
Spurious Emissions at Antenna Terminals	$\pm 3.45$ dB

**Table 13**

#### Measurement Uncertainty Decision Rule

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115: 2007, clause 4.4.3 and 4.5.1.