Amber Helm Development L.C.
92723 Michigan Hwy-152
Sister Lakes, Michigan 49047 USA
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VASTRM-2024TX
Issued: **December 22, 2020**

EMC Test Report

regarding

USA:	**CFR Title 47, Part 15.247**	(Emissions)
Canada:	**ISED RSS-247v2/GENv5**	(Emissions)

for

73006

Category: BLE Remote Control

Judgments:
15.247/RSS-247v2 Compliant Device
Testing Completed: December 15, 2020

TESTING
NVLAP LAB CODE 200129-0

Prepared for:

Air Lift Company

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Data Recorded by:	Dr. Joseph Brunett, EMC-002790-NE	Reviewed by:	Gordon Helm, EMC-002401-NE
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Revision History

Rev. No.	Date	Details	Revised By
r0	December 22, 2020	Initial Release.	J. Brunett
r1	January 18, 2021	Missing photo, minor typos.	J. Brunett

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1 Test Report Scope and Limitations

1.1 Laboratory Authorization

Test Facility description and attenuation characteristics are on file with the FCC Laboratory, Columbia, Maryland (FCC Reg. No: US5348 and US5356) and with ISED Canada, Ottawa, ON (File Ref. No: 3161A and 24249). Amber Helm Development L.C. holds accreditation under NVLAP Lab Code 200129-0.

1.2 Report Retention

For equipment verified to comply with the regulations herein, the manufacturer is obliged to retain this report with the product records for the life of the product, and no less than ten years. A copy of this Report will remain on file with this laboratory until January 2031.

1.3 Subcontracted Testing

This report does not contain data produced under subcontract.

1.4 Test Data

This test report contains data included within the laboratories scope of accreditation.

1.5 Limitation of Results

The test results contained in this report relate only to the item(s) tested. Any electrical or mechanical modification made to the test item subsequent to the test date shall invalidate the data presented in this report. Any electrical or mechanical modification made to the test item subsequent to this test date shall require reevaluation.

1.6 Copyright

This report shall not be reproduced, except in full, without the written approval of Amber Helm Development L.C.

1.7 Endorsements

This report shall not be used to claim product endorsement by any accrediting, regulatory, or governmental agency.

1.8 Test Location

The EUT was fully tested by **Amber Helm Development L.C.**, headquartered at 92723 Michigan Hwy-152, Sister Lakes, Michigan 49047 USA. Table 1 lists all sites employed herein. Specific test sites utilized are also listed in the test results sections of this report where needed.

Table 1: Test Site List.

Description	**Location**	**Quality Num.**
OATS (3 meter)	3615 E Grand River Rd., Williamston, Michigan 48895	OATSC

1.9 Traceability and Equipment Used

Pertinent test equipment used for measurements at this facility is listed in Table 2. The quality system employed at Amber Helm Development L.C. has been established to ensure all equipment has a clearly identifiable classification, calibration expiry date, and that all calibrations are traceable to the SI through NIST, other recognized national laboratories, accepted fundamental or natural physical constants, ratio type of calibration, or by comparison to consensus standards.

Table 2: Equipment List.

Description	**Manufacturer/Model**	**SN**	**Quality Num.**	**Cal/Ver By / Date Due**
Spectrum Analyzer	R & S / FSV30	101660	RSFSV30001	RS / Apr-2021
Spectrum Analyzer	R & S / FPC1500	101692	RSFPC15001	RS / Mar-2021
Biconical	EMCO / 93110B	9802-3039	BICEMCO01	Keysight / Aug-2021
Log Periodic Antenna	EMCO / 3146	9305-3614	LOGEMCO01	Keysight / Aug-2021
BNC-BNC Coax	WRTL / RG58/U	001	CAB001-BLACK	AHD / Apr-2021
3.5-3.5MM Coax	PhaseFlex / PhaseFlex	001	CAB015-PURP	AHD / Jan-2021
Quad Ridge Horn	Singer / A6100	C35200	HQR1TO18S01	Keysight / Aug-2021
K-Band Horn	JEF / NRL Std.	001	HRNK01	AHD / Jul-2021
LISN	Solar / 8012-50-R-24-BNC	970917	LISNB	AHD / March-2021

2 Test Specifications and Procedures

2.1 Test Specification and General Procedures

The goal of Air Lift Company is to demonstrate that the Equipment Under Test (EUT) complies with the Rules and/or Directives below. Detailed in this report are the results of testing the Air Lift Company 73006 for compliance to:

Country/Region	Rules or Directive	Referenced Section(s)
United States	Code of Federal Regulations	CFR Title 47, Part 15.247
Canada	ISED Canada	ISED RSS-247v2/GENv5

It has been determined that the equipment under test is subject to the rules and directives above at the date of this testing. In conjunction with these rules and directives, the following specifications and procedures are followed herein to demonstrate compliance (in whole or in part) with these regulations.

ANSI C63.4:2014	"Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz"
ANSI C63.10:2013	"American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices"
KDB 558074 D01 v05r02	"GUIDANCE FOR COMPLIANCE MEASUREMENTS ON DIGITAL TRANSMISSION SYSTEM, FREQUENCY HOPPING SPREAD SPECTRUM SYSTEM, AND HYBRID SYSTEM DEVICES OPERATING UNDER SECTION 15.247 OF THE FCC RULES "
TP0102RA	"AHD Internal Document TP0102 - Radiated Emissions Test Procedure"
ISED Canada	"The Measurement of Occupied Bandwidth"
ICES-003; Issue 7 (2020)	"Information Technology Equipment (ITE) - Limits and methods of measurement"

3 Configuration and Identification of the Equipment Under Test

3.1 Description and Declarations

The EUT is a remote control for an electronic suspension module. The EUT is approximately 14 x 7 x 2 cm in dimension, and is depicted in Figure 1. It is powered by 5 VDC via a power adapter or 3 VDC alkaline battery. The EUT is used to control vehicle suspension. Table 3 outlines provider declared EUT specifications.

Figure 1: Photos of EUT.

Table 3: EUT Declarations.

General Declarations	
Equipment Type:	BLE Remote Control
Country of Origin:	USA
Nominal Supply:	5 VDC via a power adapter or 3 VDC
Oper. Temp Range:	Not Declared
Frequency Range:	2402 – 2480 MHz
Antenna Dimension:	Not Declared
Antenna Type:	SMT Coil
Antenna Gain:	Not Declared
Number of Channels:	40
Channel Spacing:	Not Declared
Alignment Range:	Not Declared
Type of Modulation:	GFSK

United States	
FCC ID Number:	2ANLC-EBK83016
Classification:	DTS

Canada	
IC Number:	23130-EBK83016
Classification:	Spread Spectrum Device, Remote Control Device

3.1.1 EUT Configuration

The EUT is configured for testing as depicted in Figure 2.

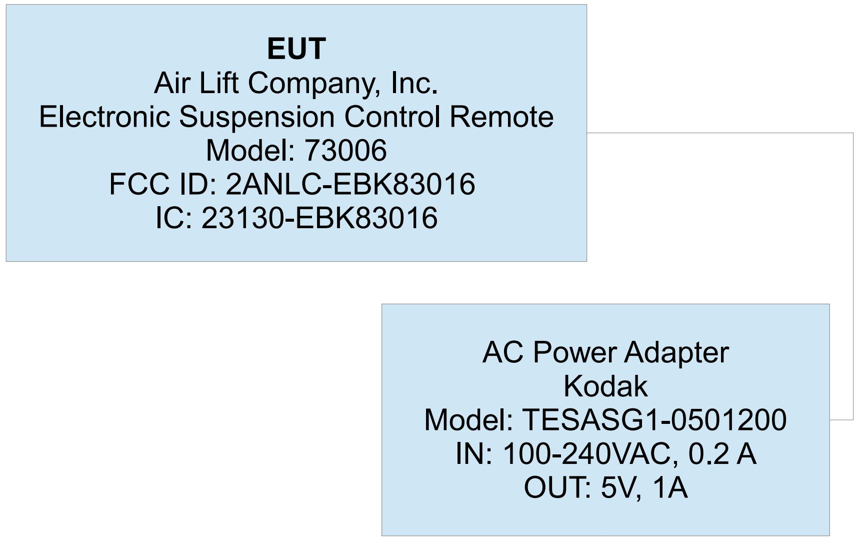


Figure 2: EUT Test Configuration Diagram.

3.1.2 Modes of Operation

The EUT is capable of 1MBps GFSK modulation as tested herein.

3.1.3 Variants

There is only a single variant of the EUT, as tested.

3.1.4 Test Samples

Three samples in total were provided. Two samples were programmed with custom test software enabling CW and modulated transmissions on Low, Middle, and High channels, while the third sample was normal operating and used for photographs and digital spurious emissions validation. A representative DC power cable and AC power adapter were also supplied for testing.

3.1.5 Functional Exerciser

Normal operating EUT functionality was verified by observation of transmitted signal.

3.1.6 Modifications Made

There were no modifications made to the EUT by this laboratory, however the manufacturer did reduce eut power after pretesting to bring the EUT into compliance with the regulatory limits. Manufacturer retains details of the power setting.

3.1.7 Production Intent

The EUT appears to be a production ready sample.

3.1.8 Declared Exemptions and Additional Product Notes

The EUT may be powered via a 5 VDC usb style power cable. Manufacturer declares the EUT does not exchange data over this cable (i.e. the EUT is not a PC peripheral.) Worst case emissions are measured both with and without the dc power cable attached to the EUT, as it was determined that inclusion of this cable had minor influence on the worst case emissions observed.

4 Emissions

4.1 General Test Procedures

4.1.1 Radiated Test Setup and Procedures

Radiated electromagnetic emissions from the EUT are first pre-scanned in our screen room. Spectrum and modulation characteristics of all emissions are recorded. Instrumentation, including spectrum analyzers and other test equipment as detailed in Section 1.8 are employed. After pre-scan, emission measurements are made on the test site of record. If the EUT connects to auxiliary equipment and is table or floor standing, the configurations prescribed in relevant test standards are followed. Alternatively, a layout closest to normal use (as declared by the provider) is employed if the resulting emissions appear to be worst-case in such a configuration. See Figure 3. All intentionally radiating elements that are not fixed-mounted in use are placed on the test table lying flat, on their side, and on their end (3-axes) and the resulting worst case emissions are recorded. If the EUT is fixed-mounted in use, measurements are made with the device oriented in the manner consistent with installation and then emissions are recorded. If the EUT exhibits spurious emissions due to internal receiver circuitry, such emissions are measured with an appropriate carrier signal applied.

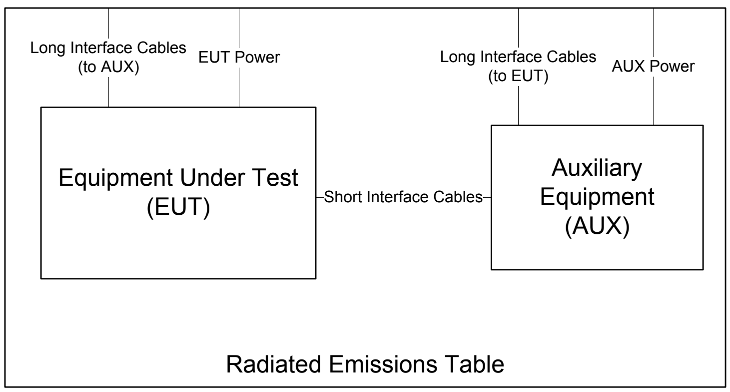


Figure 3: Radiated Emissions Diagram of the EUT.

For devices with intentional emissions below 30 MHz, a shielded loop antenna and/or E-field and H-Field broadband probes are used depending on the regulations. Shielded loops are placed at a 1 meter receive height at the desired measurement distance. For exposure in this band, the broadband probes employed are 10cm diameter single-axis shielded transducers and measurements are repeated and summed over three axes.

Emissions between 30 MHz and 1 GHz are measured using calibrated broadband antennas. For both horizontal and vertical polarizations, the test antenna is raised and lowered from 1 to 4 m in height until a maximum emission level is detected. The EUT is then rotated through 360^o in azimuth until the highest emission is detected. The test antenna is then raised and lowered one last time from 1 to 4 m and the worst case value is recorded. Emissions above 1 GHz are characterized using standard gain or broadband ridge-horn antennas on our OATS with a 4×5 m rectangle of ECCOSORB absorber covering the OATS ground screen and a 1.5m table height. Care is taken to ensure that test receiver resolution and video bandwidths meet the regulatory requirements, and that the emission bandwidth of the EUT is not reduced. Photographs of the test setup employed are depicted in Figure 4.

Where regulations allow for direct measurement of field strength, power values (dBm) measured on the test receiver / analyzer are converted to dBμV/m at the regulatory distance, using

$$E_{dist} = 107 + P_R + K_A - K_G + K_E - C_F$$

where P_R is the power recorded on spectrum analyzer, in dBm, K_A is the test antenna factor in dB/m, K_G is the combined pre-amplifier gain and cable loss in dB, K_E is duty correction factor (when applicable) in dB, and C_F is a distance conversion (employed only if limits are specified at alternate distance) in dB. This field strength value is then compared with the regulatory limit. If effective isotropic radiated power (EIRP) is computed, it is computed as

$$EIRP(dBm) = E_{3m}(dB\mu V/m) - 95.2.$$

When presenting data at each frequency, the highest measured emission under all possible EUT orientations (3-axes) is reported.

Figure 4: Radiated Emissions Test Setup Photograph(s).

4.1.2 Conducted Emissions Test Setup and Procedures

Transmit Antenna Port Conducted Emissions At least one sample EUT supplied for testing was provided with a 50Ω antenna port. Conducted transmit chain emissions measurements (where applicable) are made by connecting the EUT antenna port directly to the test receiver port. Photographs of the test setup employed are depicted in Figure 5.

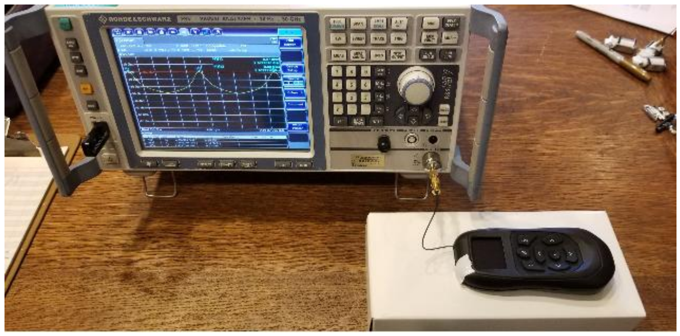


Figure 5: Conducted RF Test Setup Photograph(s).

AC Port Conducted Spurious For this device, AC power line conducted emissions are measured in our screen room. If the EUT connects to auxiliary equipment and is table or floor standing, the configurations prescribed in ANSI C63.4 / CISPR 22 are employed. Alternatively, an on-table layout more representative of actual use may be employed if the resulting emissions appear to be worst-case in such a configuration. See Figure 6.

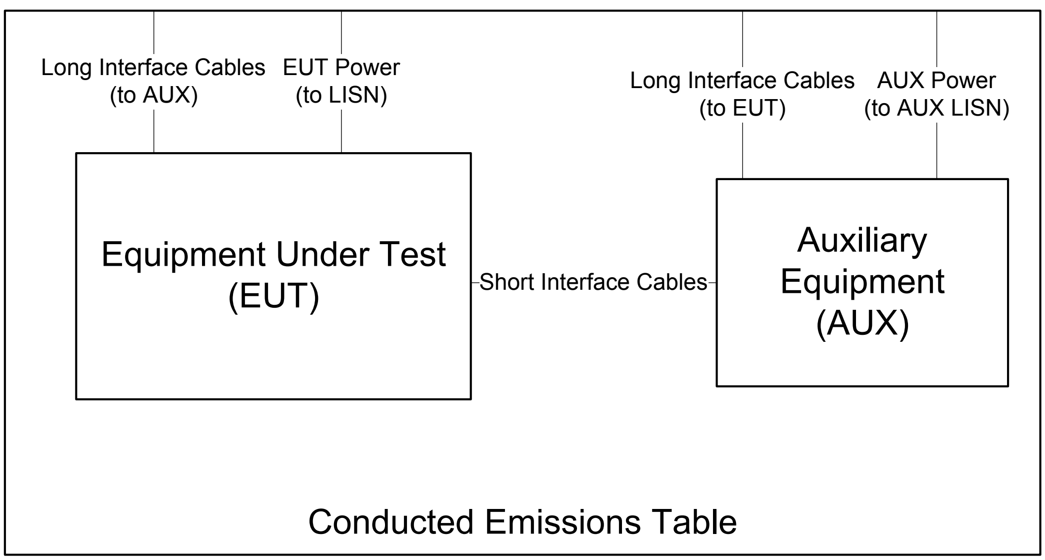


Figure 6: Conducted Emissions Setup Diagram of the EUT.

Conducted emissions are measured and recorded for each AC mains power source over the spectrum 0.15 MHz to 30 MHz for both the ungrounded (HI/PHASE) and grounded (LO/GND) conductors with the EUT placed in its highest current draw operating mode(s). The test receiver is set to peak-hold mode in order to record the peak emissions throughout the course of functional operation. Only if an emission exceeds or is near the limit are quasi-peak and average detection applied. Photographs of the test setup employed are depicted in Figure 7.

Figure 7: Conducted Emissions Test Setup Photograph(s).

4.1.3 Power Supply Variation

Tests at extreme supply voltages are made if required by the procedures specified in the test standard, and results of this testing are detailed in this report.

In the case of this EUT, measurements of the worst-case radiated emissions are performed with the supply voltage varied by no less than 85% and 115% of the nominal rated value for devices connecting to AC power mains.

4.2 Intentional Emissions

4.2.1 Duty and Transmission Cycle, Pulsed Operation

The details and results of testing the EUT for pulsed operation are summarized in Table 4. Plots showing the measurements made to obtain these values are provided in Figure 8.

Table 4: Pulsed Emission Characteristics (Duty Cycle).

Frequency Range	Det	IFBW	VBW		
f > 1 000 MHz	Pk	3 MHz	10 MHz	**Test Date:**	13-Dec-20
				Test Engineer:	Joseph Brunett
				EUT	Air Lift 73006
				Meas. Distance:	Conducted

Pulsed Operation / Duty Cycle								
Transmit Mode	Symbol Rate (Msym/s)	Data Rate (Mbps)	Voltage (V)	Oper. Freq (MHz)	Tx Cycle Time* (ms)	On-Time* (ms)	Duty Cycle (%)	Power Duty Correction (dB)
GFSK	1.000	GFSK (1 Mbps)	13.4	2440.0	0.625	0.385	61.6	2.1

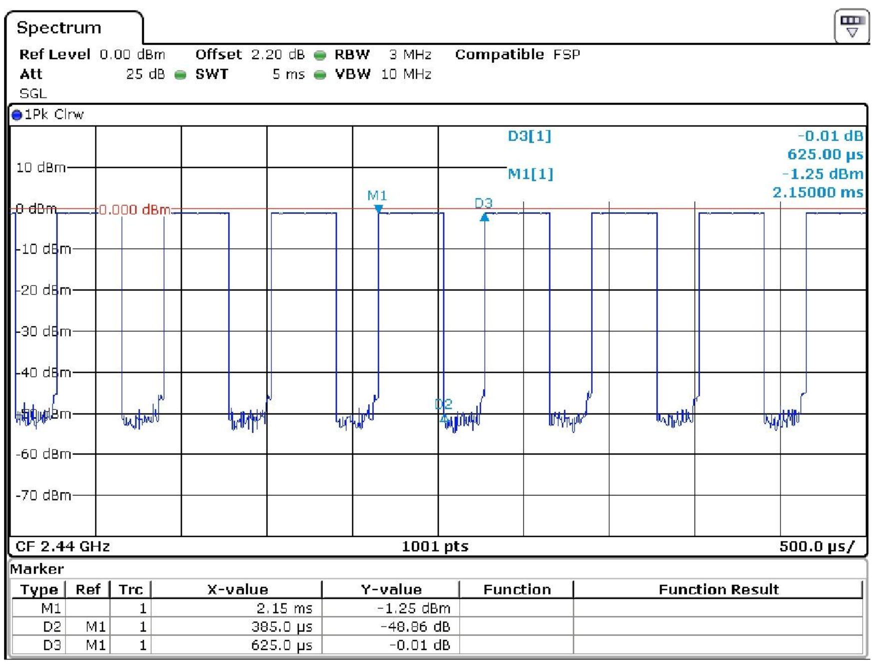


Figure 8: Pulsed Emission Characteristics (Duty Cycle).

4.2.2 Fundamental Emission Bandwidth

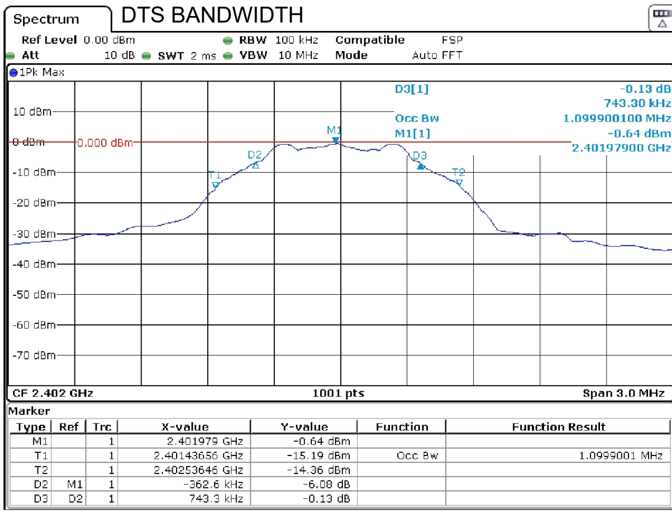
Emission bandwidth (EBW) of the EUT is measured with the device placed in the test mode(s) with the shortest available packet length and minimum packet spacing. Radiated emissions are recorded following the test procedures listed in Section 2.1. The 6 dB bandwidth is measured for the lowest, middle, and highest channels available. The 99% emission bandwidth per IC test procedures is also reported. The results of this testing are summarized in Table 5. Plots showing measurements employed obtain the emission bandwidths reported are provided in Figure 9.

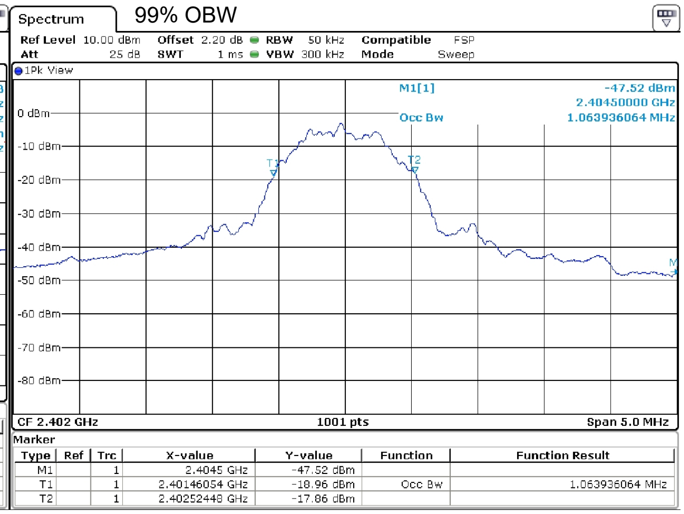
Table 5: Intentional Emission Bandwidth.

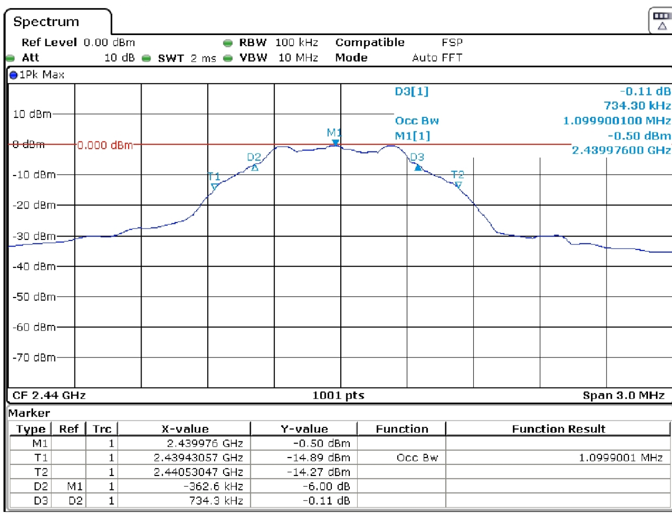
Type	Det	IFBW	VBW
DTS OBW	Pk	100 kHz	> 3 x IFBW
99% OBW	Pk	50 kHz	> 3 x IFBW

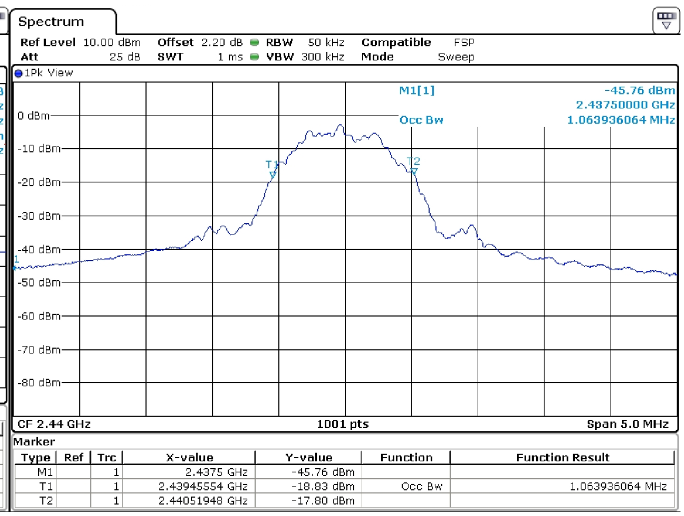
Test Date:	10/14/20
Test Engineer:	Joseph Brunett
EUT	Air Lift 73006
Meas. Distance:	Cond.

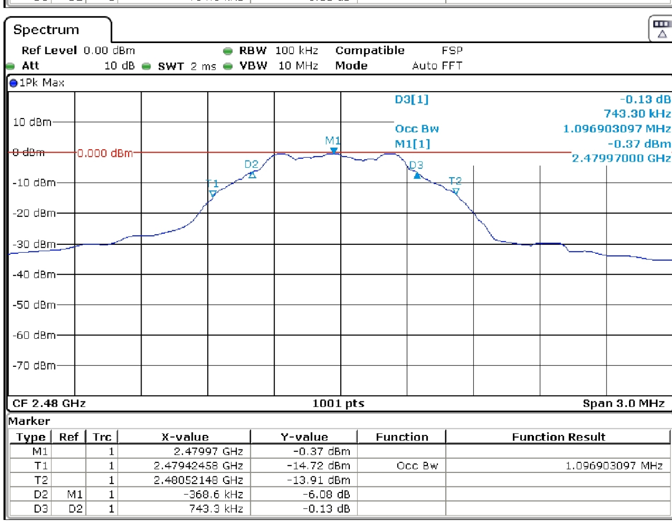
Occupied Bandwidth								
Transmit Mode	Symbol Rate (Msym/s)	Data Rate* (Mbps)	Voltage (V)	Oper. Freq (MHz)	6 dB BW (MHz)	6 dB BW Limit (MHz)	99% OBW (MHz)	Pass/Fail
GFSK	-	1.0	13.4	2402.0	0.743	-	1.064	Pass
				2440.0	0.734	-	1.064	Pass
				2480.0	0.743	-	1.064	Pass











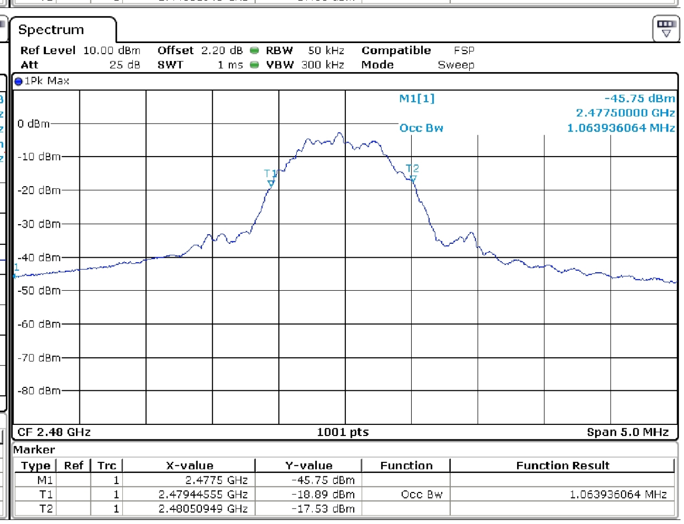


Figure 9: Intentional Emission Bandwidth.

4.2.3 Effective Isotropic Radiated Power

The EUT's radiated power is computed from antenna port conducted power measurements and the gain of the EUT antenna(s). Where the EUT is not sold with an antenna connector, a modified product has been provided including such. Peak conducted output power was measured directly from the EUT at the port where the antenna attaches. The test receiver bandwidth was set to be greater than the measured emission bandwidth of the EUT to capture the true peak. Antenna gain is either provided directly by the antenna manufacturer or measured by comparison between calculated EIRP and conducted output power. Table 6 details the results of these measurements. Plots showing conducted measurements made are depicted in Figure 10.

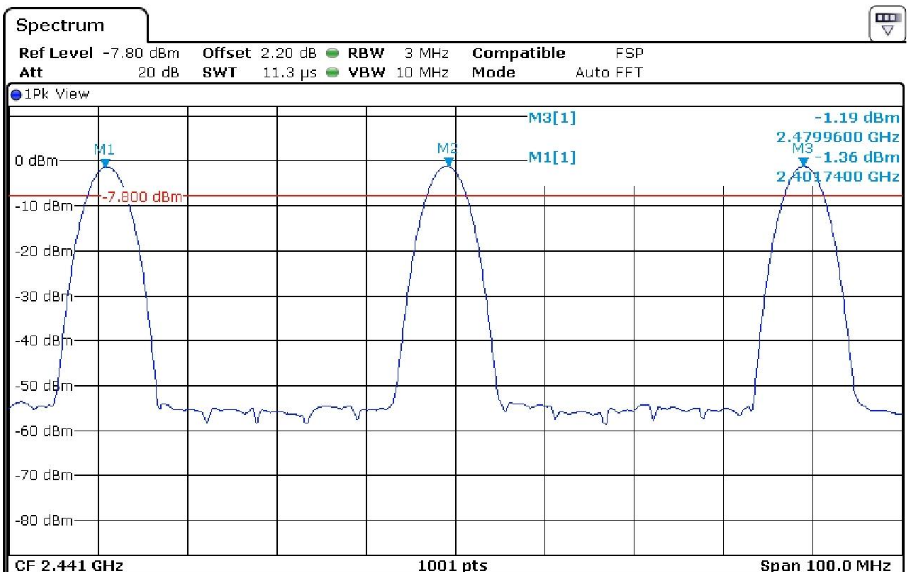
Table 6: Radiated Power Results.

Frequency Range	**Det**	**IF Bandwidth**	**Video Bandwidth**		
25 MHz ≤ f ≤ 1 000 MHz	Pk/QPk	120 kHz	300 kHz	**Test Date:**	13-Dec-20
f > 1 000 MHz	Pk/Avg	3 MHz	3 MHz	**Test Engineer:**	J. Brunett
				EUT:	Air Lift 73006
				Meas. Distance:	3m

															FCC/IC
#	Mode	Channel	Freq. MHz	Ant. Used	Ant. Pol.	Table Azim. deg	Ant Height m	Ka (dB/m)	Kg (dB)	Efield @ 3m (dBuV/m)	EIRP (Pk) dBm	Pout* (Pk) dBm	Ant Gain dBi	Po Cond (Avg) Limit dBm	Pass dB
1	GFSK (Battery)	L	2402.0	HQR1TO18S01	H/V	300.0	1.5	30.5	-0.3	95.3	.1	-1.4	1.5	30.0	**31.4**
2		M	2440.0	HQR1TO18S01	H/V	300.0	1.5	30.7	-0.3	92.8	-2.4	-1.2	-1.2	30.0	31.2
3		H	2480.0	HQR1TO18S01	H/V	300.0	1.5	30.8	-0.3	90.3	-4.9	-1.2	-3.7	30.0	31.2
4	GFSK (DC Cable Pwr)	L	2402.0	HQR1TO18S01	H/V	180.0	1.5	30.5	-0.3	92.8	-2.4	-1.4	-1.0	30.0	**31.4**
5		M	2440.0	HQR1TO18S01	H/V	180.0	1.5	30.7	-0.3	92.2	-3.0	-1.2	-1.8	30.0	31.2
6		H	2480.0	HQR1TO18S01	H/V	180.0	1.5	30.8	-0.3	90.4	-4.8	-1.2	-3.6	30.0	31.2
7															
#	Mode	Channel	Freq. MHz	Supply Voltage	Ant. Pol.	Table Azim. deg	Ant Height m	Ka dB/m	Kg dB	E3(Pk) dBμV/m					
8	GFSK	L	2440.0	3.3	H/V	300.0	1.5	30.7	-0.3	92.8					
9			2440.0	3.0	H/V	300.0	1.5	30.7	-0.3	92.8					
10			2440.0	2.6	H/V	300.0	1.5	30.7	-0.3	92.8					

* Measured conducted out of modified sample.

** Measured radiated at 3 meter distance. Peak power measured with IFBW > OBW



Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.40174 GHz	-1.36 dBm		
M2		1	2.4402 GHz	-1.19 dBm		
M3		1	2.47996 GHz	-1.19 dBm		

Figure 10: Conducted RF Power Plots

4.2.4 Power Spectral Density

For this test, the EUT was attached directly to the test receiver. Following FCC DTS measurement procedures, the emission spectrum is first scanned for maximum spectral peaks, the span and receiver bandwidth are then reduced until the power spectral density is measured in the prescribed receiver bandwidth. The results of this testing are summarized in Table 7. Plots showing how these measurements were made are depicted in Figure 11.

Table 7: Power Spectral Density Results.

Frequency Range	Detector	IF Bandwidth	Video Bandwidth		
2400-2483.5	Pk	3 kHz	10 kHz	**Test Date:**	13-Dec-20
				Test Engineer:	Joseph Brunett
				EUT:	Air Lift 73006
				Meas. Distance:	Conducted

						FCC/IC
Mode	Channel	Frequency (MHz)	Ant. Used	PSDcond (meas)* (dBm/3kHz)	PSD Limit (dBm/3kHz)	Pass By (dB)
CM	L	2402.0	Cond.	-16.0	8.00	24.0
	M	2440.0	Cond.	-15.7	8.00	23.7
	H	2480.0	Cond.	-15.7	8.00	23.7

* PSD measured conducted out the EUT antenna port following FCC DTS PKPSD procedure.

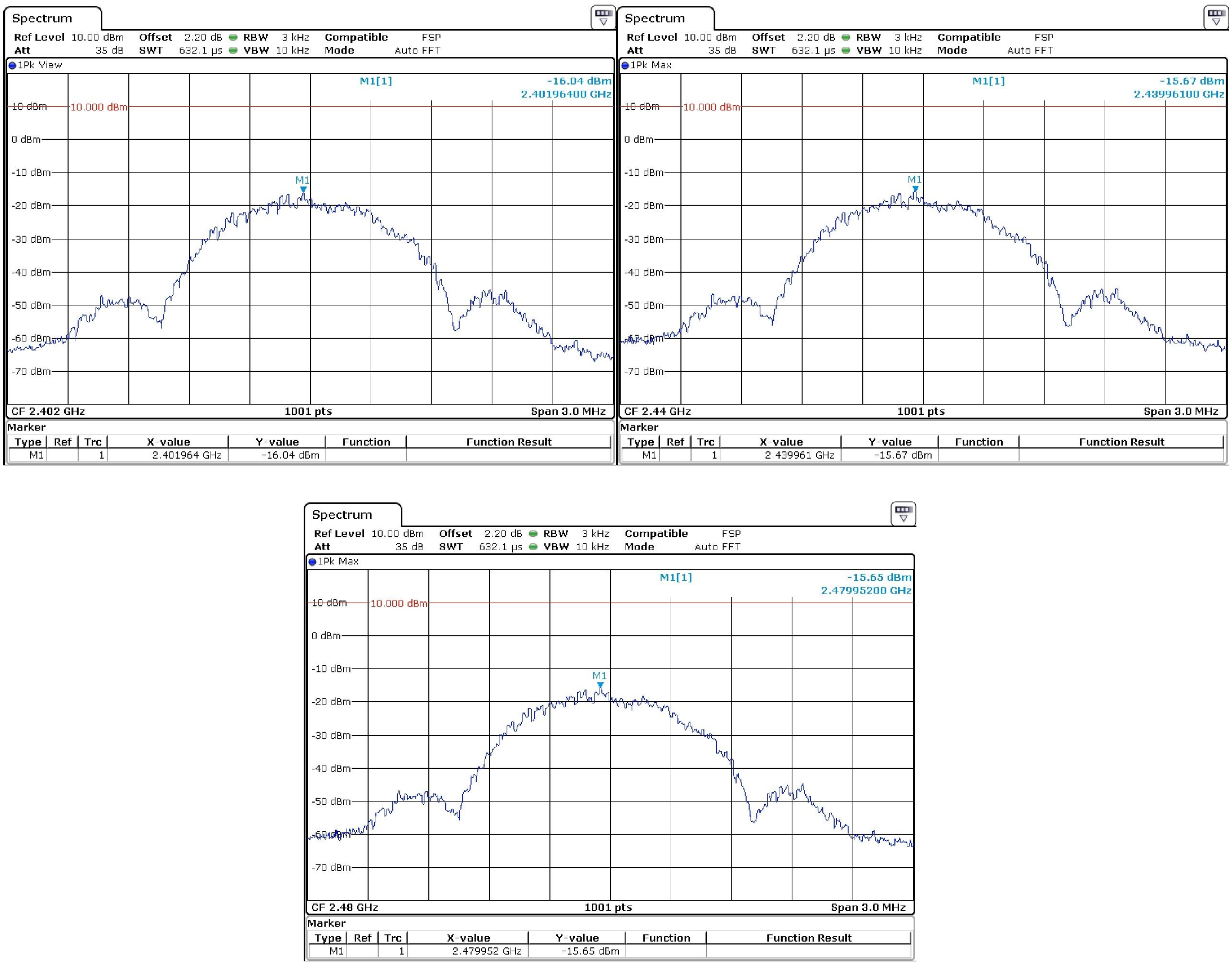


Figure 11: Power Spectral Density Plots.

4.3 Unintentional Emissions

4.3.1 Transmit Chain Radiated Spurious Emissions

The results for the measurement of transmit chain spurious emissions at the nominal voltage and temperature are provided in Table 8. Measurements are performed to 10 times the highest fundamental operating frequency.

Table 8: Transmit Chain Spurious Emissions.

Frequency Range	Det	IF Bandwidth	Video Bandwidth		
25 MHz ≤ f ≤ 1 000 MHz	Pk/QPk	120 kHz	300 kHz	**Test Date:**	13-Dec-20
f > 1 000 MHz	Pk/Avg	1 MHz	3 MHz	**Test Engineer:**	J. Brunett
				EUT:	Air Lift 73006
				Mode:	Cont. Modulated
				Meas. Distance:	3m

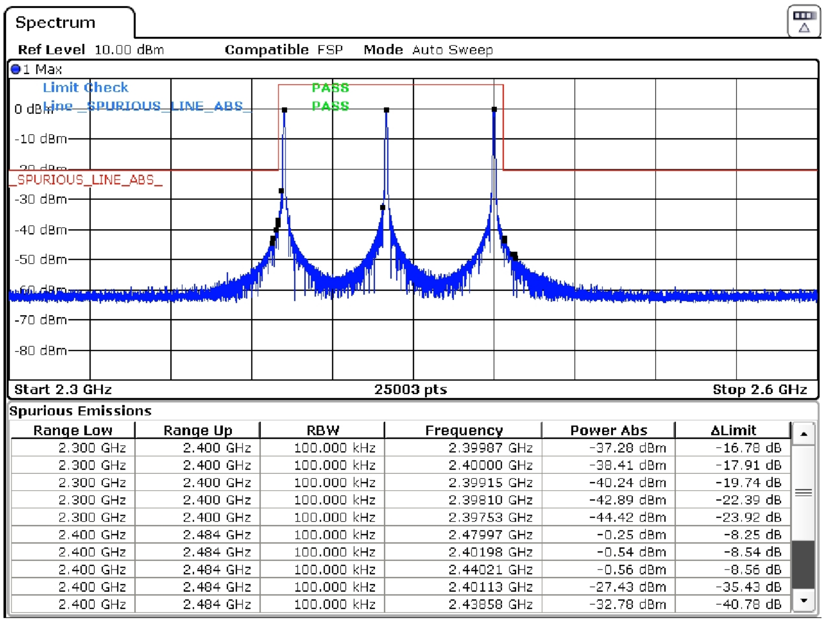
#	Freq. Start MHz	Freq. Stop MHz	Ant. Used	Ant. Pol.	Table Azim. deg	Ant Height m	Ka dB/m	Kg dB	E3(Pk) dBμV/m	E3(Avg)* dBμV/m	E3 Avg Lim dBμV/m	Pass dB	Comments (FCC/IC)
1	Fundamental Restricted Band Edge (Low Side)												
2	2390.0	2390.0	HQR1TO18S01	H/V	270	1.5	30.5	-0.3	58.4	40.2	54.0	13.8	all channels, Battery Pwr
3	2390.0	2390.0	HQR1TO18S01	H/V	270	1.5	30.5	-0.3	56.1	37.9	54.0	16.1	all channels, DC Pwr
4	Fundamental Restricted Band Edge (High Side)												
5	2483.5	2483.5	HQR1TO18S01	H/V	270	1.5	30.8	-0.3	64.4	45.0	54.0	9.0	all channels, Battery Pwr
6	2483.5	2483.5	HQR1TO18S01	H/V	270	1.5	30.8	-0.3	62.1	44.1	54.0	9.9	all channels, DC Pwr
7	Harmonic / Spurious Emissions												
8	4804.0	4804.0	HQR1TO18S01	H/V	90	1.5	32.3	-0.5	52.2	51.0	54.0	3.0	
9	4882.0	4805.0	HQR1TO18S01	H/V	90	1.5	32.3	-0.5	52.3	52.1	54.0	1.9	
10	4960.0	4806.0	HQR1TO18S01	H/V	90	1.5	32.3	-0.5	55.3	52.8	54.0	**1.2**	
11	4000.0	6000.0	HQR1TO18S01	H/V	all	all	32.6	-0.6	55.3	52.8	54.0	1.2	all channels; max all
12	7206.0	7206.0	HQR1TO18S01	H/V	90	1.5	33.2	-0.7	40.1		54.0	13.9	
13	7323.0	7323.0	HQR1TO18S01	H/V	90	1.5	33.3	-0.7	39.8		54.0	14.2	
14	7440.0	7440.0	HQR1TO18S01	H/V	90	1.5	33.4	-0.7	40.2		54.0	13.8	
15	6000.0	8400.0	HQR1TO18S01	H/V	all	all	34.3	-0.8	40.2		54.0	13.8	
16	8400.0	12500.0	HQR1TO18S01	H/V	all	all	35.6	-1.1	42.9		54.0	11.1	all channels; max all; noise
17	12500.0	18000.0	HQR1TO18S01	H/V	all	all	34.2	-1.6	40.1		54.0	13.9	all channels; max all; noise
18	18000.0	26000.0	HRNK01	H/V	all	all	32.0	0.0	42.3		54.0	11.7	all channels; max all; noise
19													
20	NOTE: No other Radio Chain emissions were observed within 20 dB of the spurious emissions limit over the range of 30MHz – 26 GHz												
21													

*Restricted Band measurements made employing RMS detector with Duty Cycle added back following ANSI C63.10 11.12.2.5.2

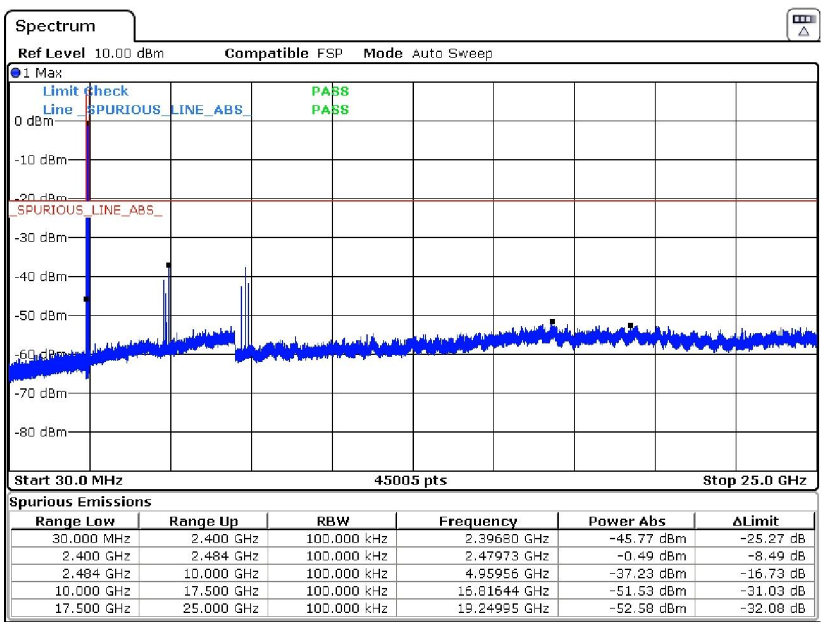
*Band Edge Avg measurements made following ANSI C63.10 11.13.3.5

4.3.2 Relative Transmit Chain Spurious Emissions

The results for the measurement of transmit chain spurious emissions relative to the fundamental in a 100 kHz receiver bandwidth (at the nominal voltage and temperature) are provided in Figure 12 below.



Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.300 GHz	2.400 GHz	100.000 kHz	2.39987 GHz	-37.28 dBm	-16.78 dB
2.300 GHz	2.400 GHz	100.000 kHz	2.40000 GHz	-38.41 dBm	-17.91 dB
2.300 GHz	2.400 GHz	100.000 kHz	2.39915 GHz	-40.24 dBm	-19.74 dB
2.300 GHz	2.400 GHz	100.000 kHz	2.39810 GHz	-42.89 dBm	-22.39 dB
2.300 GHz	2.400 GHz	100.000 kHz	2.39753 GHz	-44.42 dBm	-23.92 dB
2.400 GHz	2.484 GHz	100.000 kHz	2.47997 GHz	-0.25 dBm	-8.25 dB
2.400 GHz	2.484 GHz	100.000 kHz	2.40198 GHz	-0.54 dBm	-8.54 dB
2.400 GHz	2.484 GHz	100.000 kHz	2.44021 GHz	-0.56 dBm	-8.56 dB
2.400 GHz	2.484 GHz	100.000 kHz	2.40113 GHz	-27.43 dBm	-35.43 dB
2.400 GHz	2.484 GHz	100.000 kHz	2.43858 GHz	-32.78 dBm	-40.78 dB



Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	2.400 GHz	100.000 kHz	2.39680 GHz	-45.77 dBm	-25.27 dB
2.400 GHz	2.484 GHz	100.000 kHz	2.47973 GHz	-0.49 dBm	-8.49 dB
2.484 GHz	10.000 GHz	100.000 kHz	4.95956 GHz	-37.23 dBm	-16.73 dB
10.000 GHz	17.500 GHz	100.000 kHz	16.81644 GHz	-51.53 dBm	-31.03 dB
17.500 GHz	25.000 GHz	100.000 kHz	19.24995 GHz	-52.58 dBm	-32.08 dB

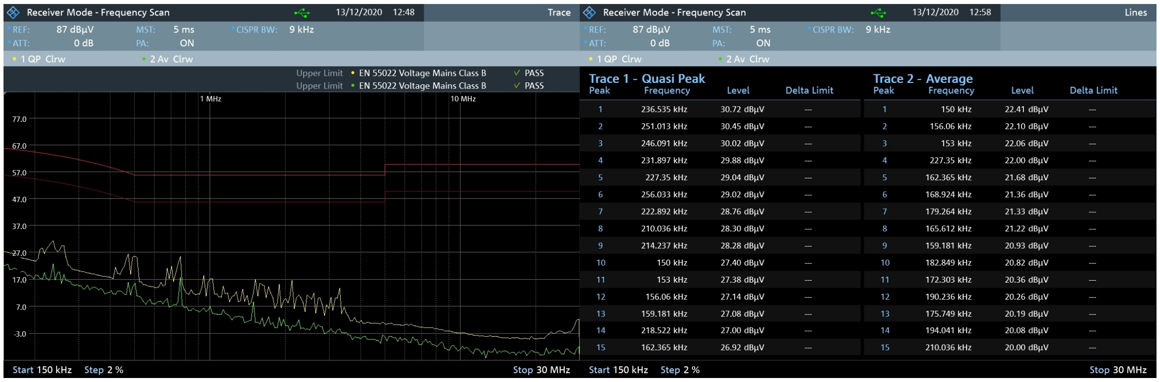
Figure 12: Conducted Transmitter Emissions Measured.

4.3.3 Conducted Emissions Test Results - AC Power Port(s)

The results of emissions from the EUT's AC mains power port(s) are reported in Table 9.

Table 9: AC Mains Power Conducted Emissions Results.

AC COND EMISSIONS - L1



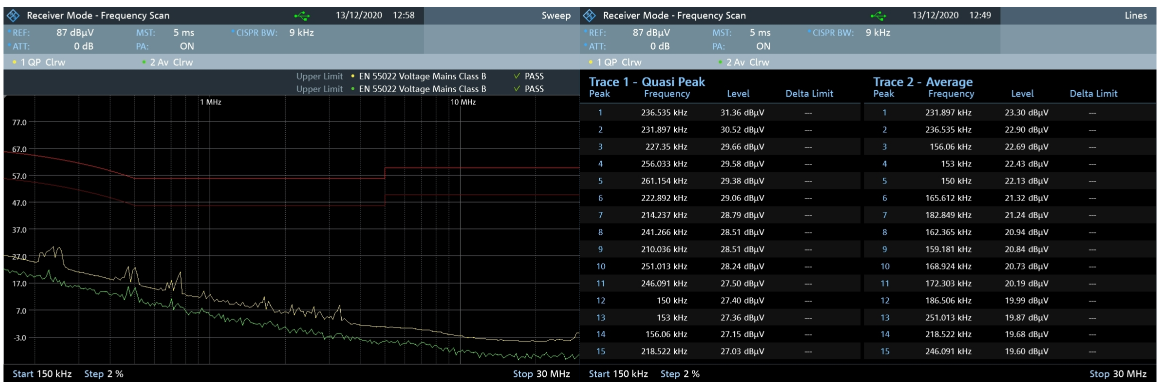
Trace 1 - Quasi Peak

Peak	Frequency	Level	Delta Limit
1	236.535 kHz	30.72 dBµV	---
2	251.013 kHz	30.45 dBµV	---
3	246.091 kHz	30.02 dBµV	---
4	231.897 kHz	29.88 dBµV	---
5	227.35 kHz	29.04 dBµV	---
6	256.033 kHz	29.02 dBµV	---
7	222.892 kHz	28.76 dBµV	---
8	210.036 kHz	28.30 dBµV	---
9	214.237 kHz	28.28 dBµV	---
10	150 kHz	27.40 dBµV	---
11	153 kHz	27.38 dBµV	---
12	156.06 kHz	27.14 dBµV	---
13	159.181 kHz	27.08 dBµV	---
14	218.522 kHz	27.00 dBµV	---
15	162.365 kHz	26.92 dBµV	---

Trace 2 - Average

Peak	Frequency	Level	Delta Limit
1	150 kHz	22.41 dBµV	---
2	156.06 kHz	22.10 dBµV	---
3	153 kHz	22.06 dBµV	---
4	227.35 kHz	22.00 dBµV	---
5	162.365 kHz	21.68 dBµV	---
6	168.924 kHz	21.36 dBµV	---
7	179.264 kHz	21.33 dBµV	---
8	165.612 kHz	21.22 dBµV	---
9	159.181 kHz	20.93 dBµV	---
10	182.849 kHz	20.82 dBµV	---
11	172.303 kHz	20.36 dBµV	---
12	190.236 kHz	20.26 dBµV	---
13	175.749 kHz	20.19 dBµV	---
14	194.041 kHz	20.08 dBµV	---
15	210.036 kHz	20.00 dBµV	---

AC COND EMISSIONS - L2



Trace 1 - Quasi Peak

Peak	Frequency	Level	Delta Limit
1	236.535 kHz	31.36 dBµV	---
2	231.897 kHz	30.52 dBµV	---
3	227.35 kHz	29.66 dBµV	---
4	256.033 kHz	29.58 dBµV	---
5	261.154 kHz	29.38 dBµV	---
6	222.892 kHz	29.06 dBµV	---
7	214.237 kHz	28.79 dBµV	---
8	241.266 kHz	28.51 dBµV	---
9	210.036 kHz	28.51 dBµV	---
10	251.013 kHz	28.24 dBµV	---
11	246.091 kHz	27.50 dBµV	---
12	150 kHz	27.40 dBµV	---
13	153 kHz	27.36 dBµV	---
14	156.06 kHz	27.15 dBµV	---
15	218.522 kHz	27.03 dBµV	---

Trace 2 - Average

Peak	Frequency	Level	Delta Limit
1	231.897 kHz	23.30 dBµV	---
2	236.535 kHz	22.90 dBµV	---
3	156.06 kHz	22.69 dBµV	---
4	153 kHz	22.43 dBµV	---
5	150 kHz	22.13 dBµV	---
6	165.612 kHz	21.32 dBµV	---
7	182.849 kHz	21.24 dBµV	---
8	162.365 kHz	20.94 dBµV	---
9	159.181 kHz	20.84 dBµV	---
10	168.924 kHz	20.73 dBµV	---
11	172.303 kHz	20.19 dBµV	---
12	186.506 kHz	19.99 dBµV	---
13	251.013 kHz	19.87 dBµV	---
14	218.522 kHz	19.68 dBµV	---
15	246.091 kHz	19.60 dBµV	---

5 Measurement Uncertainty and Accreditation Documents

The maximum values of measurement uncertainty for the laboratory test equipment and facilities associated with each test are given in the table below. This uncertainty is computed for a 95.45% confidence level based on a coverage factor of $k = 2$.

Table 10: Measurement Uncertainty.

Measured Parameter	Measurement Uncertainty†
Radio Frequency	$\pm(f_{Mkr}/10^7 + RBW/10 + (SPN/(PTS-1))/2 + 1\,\text{Hz})$
Conducted Emm. Amplitude	$\pm 1.9\,\text{dB}$
Radiated Emm. Amplitude ($f < 30\,\text{MHz}$)	$\pm 3.1\,\text{dB}$
Radiated Emm. Amplitude ($30 - 200\,\text{MHz}$)	$\pm 4.0\,\text{dB}$
Radiated Emm. Amplitude ($200 - 1000\,\text{MHz}$)	$\pm 5.2\,\text{dB}$
Radiated Emm. Amplitude ($f > 1000\,\text{MHz}$)	$\pm 3.7\,\text{dB}$

†Ref: CISPR 16-4-2:2011+A1:2014


United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

Certificate of Accreditation to ISO/IEC 17025:2017

NVLAP LAB CODE: 200129-0

AHD (Amber Helm Development, L.C.)
Sister Lakes, MI

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

Electromagnetic Compatibility & Telecommunications

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).

2020-06-23 through 2021-06-30
Effective Dates

For the National Voluntary Laboratory Accreditation Program

Figure 13: Accreditation Documents