Test Report No.: *Prüfbericht-Nr.:*	**US21UPY0.003 Rev.:03 Part 1**	**Order No.:** *Auftrags-Nr.:*	P00230106 234174290	Page 1 of 38 *Seite 1 von 38*
Client Reference No.: *Kunden-Referenz-Nr.:*	2229228	**Order date:** *Auftragsdatum:*	6/14/2021	
Client: *Auftraggeber:*	Satellite Tracking of People, LLC 5353 W Sam Houston Parkway N, Suite 190 Houston, Texas, 77041			
Test item: *Prüfgegenstand:*	BLUbase			
Identification/ Type No.: *Bezeichnung / Typ-Nr.*	BLUbase V1			
Order content: *Auftrags-Inhalt:*	Radio Compliance Test Report			
Test specification: *Prüfgrundlage:*	FCC 47 CFR Part 15.247:2021, RSS-247:2020			
Date of sample receipt: *Wareneingangsdatum:*	7/11/2021	See Test Setup Exhibit for Photos		
Test sample No: *Prüfmuster-Nr.:*	24-010668, 24-010669			
Testing period: *Prüfzeitraum:*	7/14/2021- 8/5/2021			
Testing laboratory: *Prüflaboratorium:*	TUV Rheinland of North America 710 Resende Road, Building 199 Webster, NY 14580			
Test result*: *Prüfergebnis*:*	Pass			

tested by: Alexander Sowinski
geprüft von:

Date: 7/28/2022
Datum:

Position / Stellung: Expert

authorized by: Richard Decker
genehmigt von:

Issue Date: 7/28/2022
Ausstellungsdatum:

Position / Stellung: Expert

Others /
Sonstiges:

Condition of the test item at delivery:
Zustand des Prüfgegenstandes bei Anlieferung: Test sample complete and undamaged

* Legend:	P(ass) = passed a.m. test specification(s)	F(ail) = failed a.m. test specification(s)	N/A = not applicable	N/T = not tested
* *Legende:*	*P(ass) = entspricht o.g. Prüfgrundlage(n)*	*F(ail) = entspricht nicht o.g. Prüfgrundlage(n)*	*N/A = nicht anwendbar*	*N/T = nicht getestet*

Test report no.: US21UPY0.003 Rev.:03 Part 1
Prüfbericht-Nr.:

Remarks
Anmerkungen

1	The equipment used during the specified testing period was calibrated according to our test laboratory calibration program. The equipment fulfils the requirements included in the relevant standards. The traceability of the test equipment used is ensured by compliance with the regulations of our management system. Detailed information regarding test conditions, equipment and measurement uncertainty is available in the test laboratory and could be provided on request. *Alle eingesetzten Prüfmittel waren zum angegebenen Prüfzeitraum gemäß eines festgelegten Kalibierungsprogramms unseres Prüfhauses kalibriert. Sie entsprechen den in den Prüfprogrammen hinterlegten Anforderungen. Die Rückverfolgbarkeit der eingesetzten Prüfmittel ist durch die Einhaltung der Regelungen unseres Managementsystems gegeben.* *Detaillierte Informationen bezüglich Prüfkonditionen, Prüfequipment und Messunsicherheiten sind im Prüflabor vorhanden und können auf Wunsch bereitgestellt werden.*
2	As contractually agreed, this document has been signed digitally only. TUV Rheinland has not verified and unable to verify which legal or other pertaining requirements are applicable for this document. Such verification is within the responsibility of the user of this document. Upon request by its client, TUV Rheinland can confirm the validity of the digital signature by a separate document. Such request shall be addressed to our Sales department. An environmental fee for such additional service will be charged. *Wie vertraglich vereinbart, wurde dieses Dokument nur digital unterzeichnet. Der TÜV Rheinland hat nicht überprüft, welche rechtlichen oder sonstigen diesbezüglichen Anforderungen für dieses Dokument gelten. Diese Überprüfung liegt in der Verantwortung des Benutzers dieses Dokuments. Auf Verlangen des Kunden kann der TÜV Rheinland die Gültigkeit der digitalen Signatur durch ein gesondertes Dokument bestätigen. Diese Anfrage ist an unseren Vertrieb zu richten. Eine Umweltgebühr für einen solchen zusätzlichen Service wird erhoben.*
3	Test clauses with remark of * are subcontracted to qualified subcontractors and descripted under the respective test clause in the report. Deviations of testing specification(s) or customer requirements are listed in specific test clause in the report. *Prüfklausel mit der Note * wurden an qualifizierte Unterauftragnehmer vergeben und sind unter der jeweiligen Prüfklausel des Berichts beschrieben.* *Abweichungen von Prüfspezifikation(en) oder Kundenanforderungen sind in der jeweiligen Prüfklausel im Bericht aufgeführt.*
4	The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TÜV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA.
5	Radio Compliance Test Report. The above product was found to be Compliant to the above test standard(s).

Test report no .: US21UPY0.003 Rev.:03 Part 1
Prüfbericht-Nr.:

Product description
Produktbeschreibung

1	**Product details:** *Produktdetails:*	BLUbase is our small, lightweight (RF) transceiver. Working in tandem with BLUband, BLUbase receives, enters, and leaves records from BLUband.
2	**Dimensions / Weight:** *Maße / Gewicht:*	11 cm x 11 cm x 3 cm / 0.16 kg
3	**Operating elements:** *Bedienelemente:*	AC Mains 100-240 VAC, 50/60Hz. Transmit bands 903-927 MHz.
4	**Equipment / Accessories:** *Ausstattung / Zubehör:*	None.
5	**Used materials:** *Verwendete Materialien:*	None.
6	**Other:** *Sonstiges:*	Test sample(s), as well sample information, description, product details and intended usage was provided by customer.
7	**Test sample obtaining:** *Prüfmusterbereitstellung:*	☒ Sending by customer ☐ Sampling by TÜV Rheinland Group ☐ others:

Revisions

Date mm/dd/yy	Name	Page Number of Change	Describe Change
08/12/2021	Rev.:01	N/A	Original Document
12/09/2021	Rev.:02	All	Updated FCC ID, Operating Bands
07/28/2022	Rev.:03	All	Updated Operating Band

TABLE OF CONTENTS

1 General Information

1.1 Scope

This report is intended to document the status of conformance based on the results of testing performed on the BLUbase, Model Number: BLUbase V1, manufactured by Satellite Tracking of People, LLC. This report only applies to the specific samples tested under the stated test conditions. It is the responsibility of the manufacturer to assure that additional production units of this model are manufactured with identical or EMI equivalent electrical and mechanical components.

1.2 Purpose

Testing was performed to evaluate the Radio performance of the EUT (Equipment Under Test) in accordance with the applicable requirements, procedures, and criteria defined in the application of regulations and application of standards listed in this report.

1.3 *Summary of Test Results*

Applicant:	Satellite Tracking of People, LLC 5353 W Sam Houston Parkway N, Suite 190 Houston, Texas, 77041	**Tel:**	713-354-9393	**Contact:**	Mark Kirincic
		Fax:	--	**e-mail:**	mkirincic@securustechnologies.com

Description:	BLUbase	**Test Voltage/Freq.:**	120VAC 60Hz
Model Number:	BLUbase V1		
Serial Number:	24-010668, 24-010669	**Test Engineer:**	Alexander Sowinski

Standards	Description	Severity Level or Limit	Criteria	Test Result
FCC 47 CFR Part 15.247:2021, RSS-247:2020 Radio Standard	Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.	See Basic Sections Below	See Below	**Complies**
FCC 47 CFR Part 15.203, RSS-Gen (6.8)	Antenna Requirements	Per Standards	Report	**Complies**
FCC 47 CFR Part 15.247 (b.3), RSS-247 (5.4)	Transmitter Output Power	EIRP < 1 Watt (30 dBm)	Limit	**Complies**
FCC 47 CFR Part 15.247 (a.2), RSS-247 (5.2)	Occupied Bandwidth	6dB OBW > 500 kHz	Limit	**Complies**
FCC 47 CFR Part 15.247 (e), RSS-247 (5.2)	Power Spectral Density	PSD < 8dBm / 3kHz band	Limit	**Complies**
FCC 47 CFR Part 15.247 (d), RSS-247 (5.5)	Out of Band Emissions	< 20 dBr / 100kHz band	Limit	**Complies**
FCC CFR 15.209, RSS-Gen (8.9)	Transmitter Spurious Emissions	Class B, 30 - 1000 MHz Class B, 1000 - 18000 MHz	Limit	**Complies**
FCC CFR 15.207, RSS-Gen (8.8)	AC Line Conducted Emissions	Class B, 150 kHz – 30 MHz	Limit	**Complies**

2 Laboratory Information

2.1 Accreditations & Endorsements

TUV Rheinland of North America located at, 710 Resende Road Webster, NY 14580 is accredited by the commission for performing testing services for the general public on a fee basis. This laboratory test facilities have been fully described in reports submitted to and accepted by the FCC (Registration No 5253). The laboratory scope of accreditation includes: Title 47 CFR Part 15, and 18. The accreditation is updated every 3 years.

2.1.1 ILAC/A2LA

This is a program which is administered under the auspices of A2LA accredited. The laboratory has been assessed and accredited in accordance with ISO Standard 17025:2017 (Certificate Number: 3331.08). The scope of laboratory accreditation includes emission and immunity testing. The accreditation is updated annually.

2.1.2 VCCI

VCCI Accredited test lab. Registration numbers A-0365.

2.1.3 Industry Canada

(Registration No.: 482B-1) The 10 meter Semi-Anechoic chamber has been accepted by Industry Canada to perform testing to 3 and to 10m, based on the test procedures described in ANSI C63.4-2014.

2.1.4 BSMI

Registration No.: SL2-IN-E-1159R. The BSMI accreditation was obtained by NIST MRA with the BSMI.

2.1.5 Korea

(Designation No.: US0192). Recognized by National Radio Research Agency (RRA) as an accredited Conformity Assessment Body (CAB) under the terms for Korea Phase I of the APEC TEL.

2.2 Test Software

1) CIGUI 32 Version 1.4 for California Instruments AC power source
2) TILE version 4.1.B
3) TILE 7 version 7.1.3.24
4) Voltech PM 6000 Firmware 1.22.07RC6, Software IEC61000-3 for PM6000 Release 1.24.12
5) California Instruments AC power source MXHCL
6) Rohde & Schwarz EMI Measurement software EMC32 version 8.54.0
7) TEMA 3000 version 4.1.2
8) TILE version 3.4.k.28

2.3 Measurement Uncertainty

Two types of measurement uncertainty are expressed in this report, per *ISO Guide To The Expression Of Uncertainty In Measurement*, 1st Edition, 1995.

The Combined Standard Uncertainty is the standard uncertainty of the result of a measurement when that result is obtained from the values of a number of other quantities, equal to the positive square root of a sum of terms, the terms being the variances or co-variances of these other quantities weighted according to how the measurement result varies with changes in these quantities. The term standard uncertainty is the result of a measurement expressed as a standard deviation.

The Expanded Uncertainty defines an interval about the result of a measurement that may be expected to encompass a large fraction of the distribution of values that could reasonably be attributed to the measurand. The fraction may be viewed as the coverage probability or level of confidence of the interval.

2.3.1 Sample Calculation – radiated & conducted emissions

The field strength is calculated by subtracting the Amplifier Gain and adding the Cable Loss and Antenna Correction Factor to the measured reading. The basic equation is as follows:

Field Strength (dBμV/m) = RAW - AMP + CBL + ACF

Where: RAW = Measured level before correction (dBμV)

AMP = Amplifier Gain (dB)

CBL = Cable Loss (dB)

ACF = Antenna Correction Factor (dB/m)

$$\mu V/m = 10^{\frac{dB\mu V/m}{20}}$$

Sample radiated emissions calculation @ 30 MHz

Measurement +Antenna Factor–Amplifier Gain+Cable loss=Radiated Emissions (dBuV/m)

25 dBuV/m + 17.5 dB – 20 dB + 1.0 dB = 23.5 dBuV/m

2.3.2 Measurement Uncertainty Emissions

Per CISPR 16-4-2	**Ulab**	**Ucispr**
Radiated Disturbance @ 10m		
30 MHz – 1,000 MHz	4.57 dB	5.2 dB
Radiated Disturbance @ 3m		
1.0 GHz – 6.0 GHz	5.18 dB	5.2 dB
6.0 GHz – 18.0 GHz	5.48 dB	5.5 dB
18.0 GHz – 26.5 GHz	5.21 dB	
26.5 GHz – 40.0 GHz	4.99 dB	
Conducted Disturbance @ Mains Terminals		
150 kHz – 30 MHz	2.62 dB	3.6 dB
Disturbance Power		
30 MHz – 300 MHz	3.88 dB	4.5 dB

Measurement Uncertainty Emissions

The estimated combined standard uncertainty for radiated emissions measurements is ± 4.57 dB	Per CISPR16-4-2 Method
The estimated combined standard uncertainty for radiated emissions measurements from 1 GHz to 6 GHz is ± 5.18dB	Per CISPR16-4-2 Method
The estimated combined standard uncertainty for radiated emissions measurements from 6 GHz to 18 GHz is ± 5.48dB	Per CISPR16-4-2 Method
The estimated combined standard uncertainty for conducted emissions measurements is ± 2.62dB.	Per CISPR16-4-2 Method

Expanded measurement uncertainty numbers are shown in the tables above. Compliance criteria are not based on measurement uncertainty.

2.4 Calibration Traceability

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST). Measurement method complies with ANSI/NCSL Z540-1-1994 and ISO Standard ISO IEC 17025:2017. Equipment calibration records are kept on file at the test facility.

2.5 Measurement Equipment Identification

Page 1 of 1

Equip.	Description	Model	Manufacturer	Last Date MM/DD/YYYY	Due Date MM/DD/YYYY
G1701077	SunAR JB6 Antenna	JB6	SunAR	04/30/2020	04/30/2022
G1701081	Fluke Multimeter 87 V 39760226	87 V	Fluke	04/09/2021	04/09/2022
G1701082	Temperature/Humidity/Barometer	68000-49	Control Company	02/12/2021	06/12/2023
G1701089	R&S EMI Receiver ESW44 101880	ESW44	Rohde & Schwarz	04/02/2021	04/02/2022
G1701233	EMCO Horn Antenna 3115 9812-5635	3115	EMCO	02/28/2020	03/28/2022
G1701365	EMCO Horn 3160-10 1180	3160-10	EMCO	08/11/2020	08/11/2022
G1701367	EMCO Horn 3160-09 6707	3160-09	EMCO	08/11/2020	08/11/2022
G1701385	R&S EMI Receiver ESU40 100274	ESU40	Rohde & Schwarz	02/09/2021	02/09/2022
G1701452	RF Path 30-1000MHz	RF Cable Path		05/12/2021	02/12/2023
G1701526	Tunable Notch Filter	240NFNM	EAGLE	No Cal	No Cal

3 Product Information

3.1 Test Plan

The EUT product information, test configuration, mode of operation, test types, test procedures, test levels, pass/failure criteria, in this report were carried out per the product test plan located in appendix A of this report.

4 Transmitter Requirements

4.1 Antenna Requirements

Per the requirements of FCC 47 CFR 15.203: 2021, the antenna of an intentional transmitter shall:
… be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

The BLUbase contains a stamp metal embedded SMT antenna with a maximum gain of +1.0 dBi (LoRa/FSK). The antenna is contained fully within the BLUbase and is not accessible to the end user.

4.2 Transmitter Output Power

This test measures conducted output power of the transmitter

4.2.1 Over View of Test

Results	**Complies** (as tested per this report)					**Date**	07/29/2021
Standard	FCC 47 CFR Part 15.247 (b.3), RSS-247 (5.4)						
Product Model	BLUbase V1			**Serial#**	24-010668		
Configuration	See test plan for details.						
Test Set-up	Tested in shielded room, EUT placed on table. See test plans for details.						
EUT Powered By	120V60Hz	**Temp**	22ºC	**Humidity**	56%	**Pressure**	986 mbar
Channel Frequencies	Low Channel: 903 MHz Mid Channel: 915 MHz High Channel: 927 MHz			**Power Setting @ Channel**	14 dBm		
Perf. Criteria	ERP < 1 Watt (30 dBm)			**Perf. Verification**	Readings Under Limit		
Mod. to EUT	None			**Test Performed By**	Alexander Sowinski		

4.2.2 Test Procedure

Antenna port conducted emission tests were performed using the procedures of FCC 47 CFR Part 15.247 (b.3), RSS-247 (5.4) and/or ANSI C63.10 including methods for signal maximizations and EUT configuration. The EUT was placed in the test chamber and connected directly to the spectrum analyzer via temporary SMA connection. Peak measurements were taken with RBW = 1 MHz on each of the low, mid, and high channels utilizing both the LoRa and FSK transmission schemes of the EUT.

4.2.3 Deviations

There were no deviations from the test methodology listed in the test plan for the conducted emission test.

4.2.4 Final Test

All final conducted emissions measurements were below (in compliance) the limits.

4.2.5 Final Data

Table 1: Output Power, EUT power setting @ 14 dBm

Type	Frequency	Conducted Power	Limit	Margin
	MHz	dBm	dBm	dB
LoRa	903.00	14.98	30.0	-15.02
LoRa	915.00	14.86	30.0	-15.14
LoRa	927.00	14.70	30.0	-15.30
FSK	903.00	14.83	30.0	-15.17
FSK	915.00	14.74	30.0	-15.26
FSK	927.00	14.65	30.0	-15.35

4.2.6 Final Plots

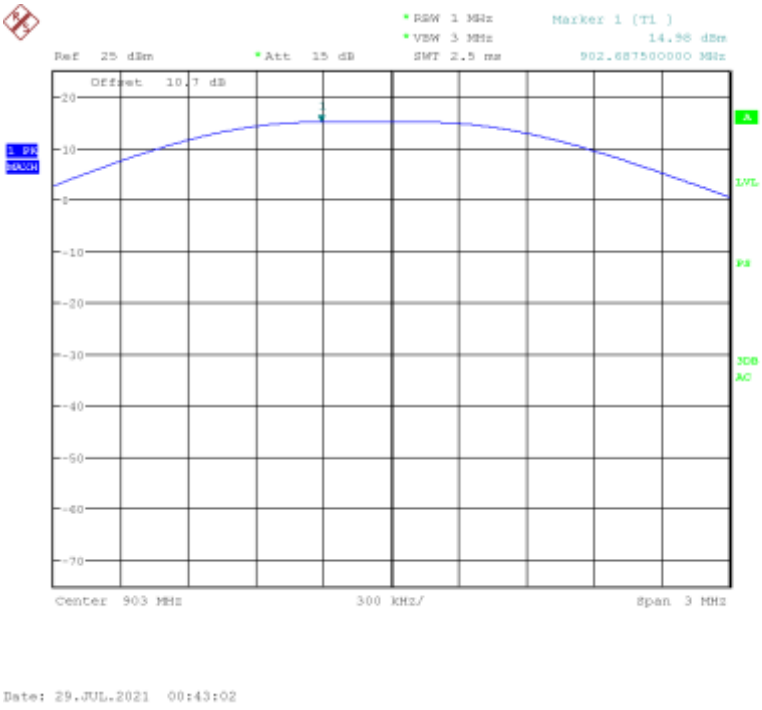

Figure 1 – Low Channel Output Power (LoRa)

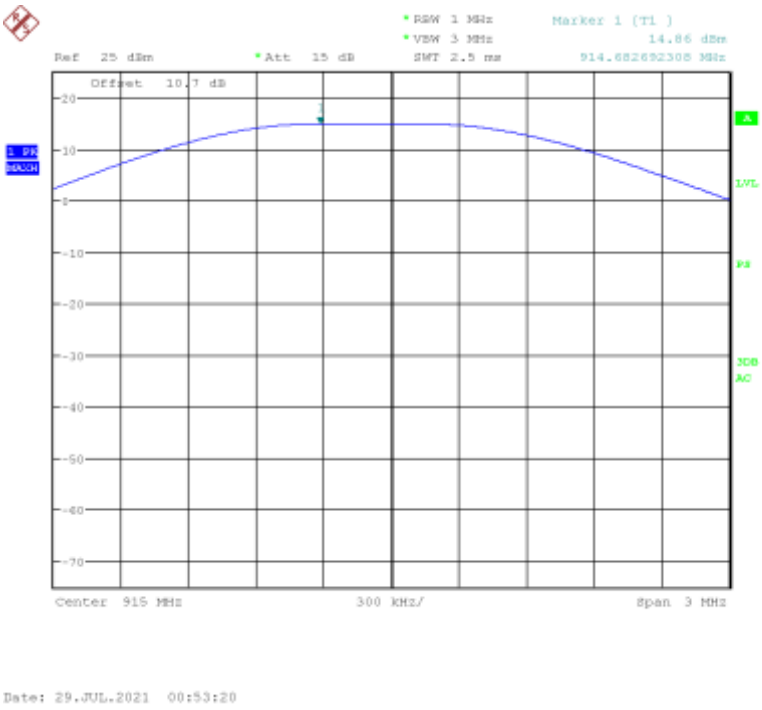

Figure 2 – Mid Channel Output Power (LoRa)

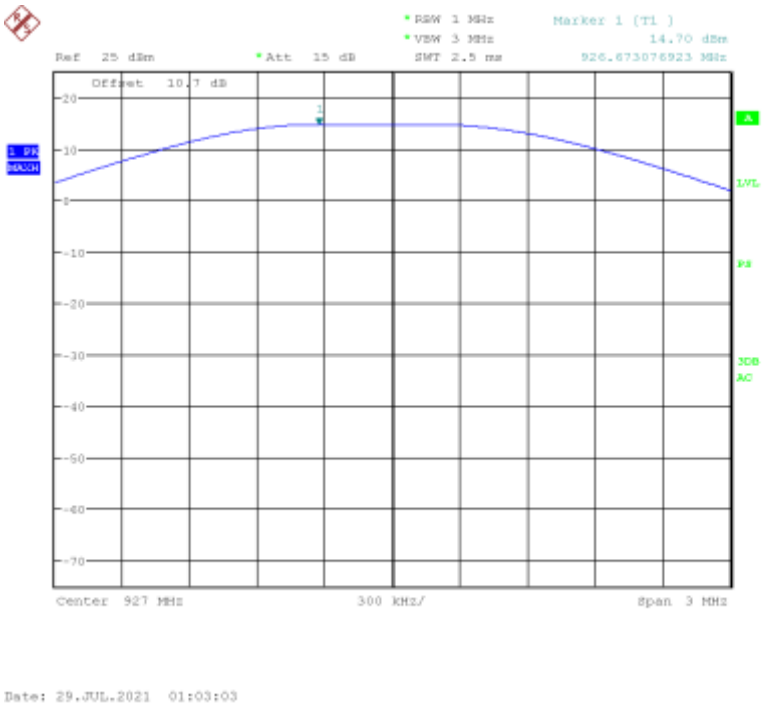

Figure 3 – High Channel Output Power (LoRa)

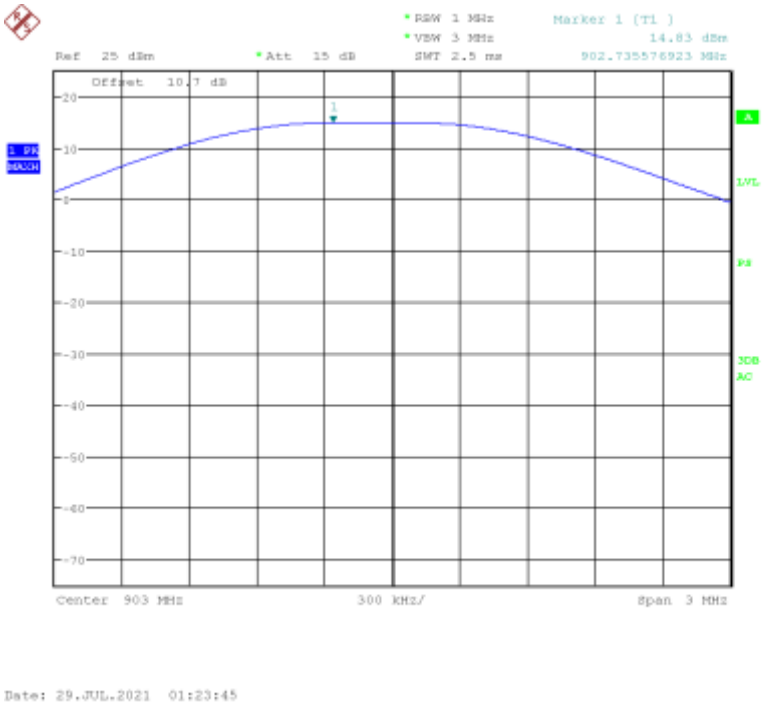

Figure 4 – Low Channel Output Power (FSK)

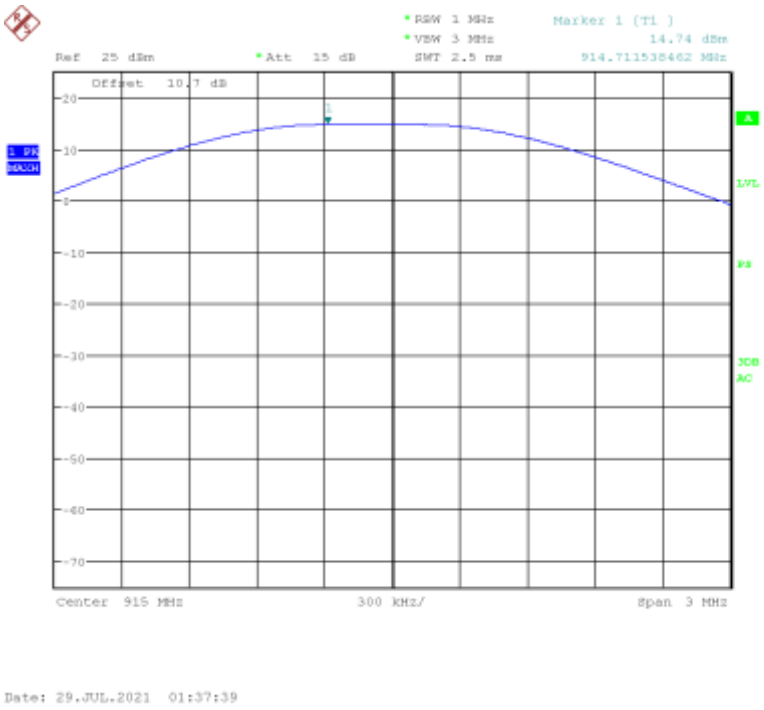

Figure 5 – Mid Channel Output Power (FSK)

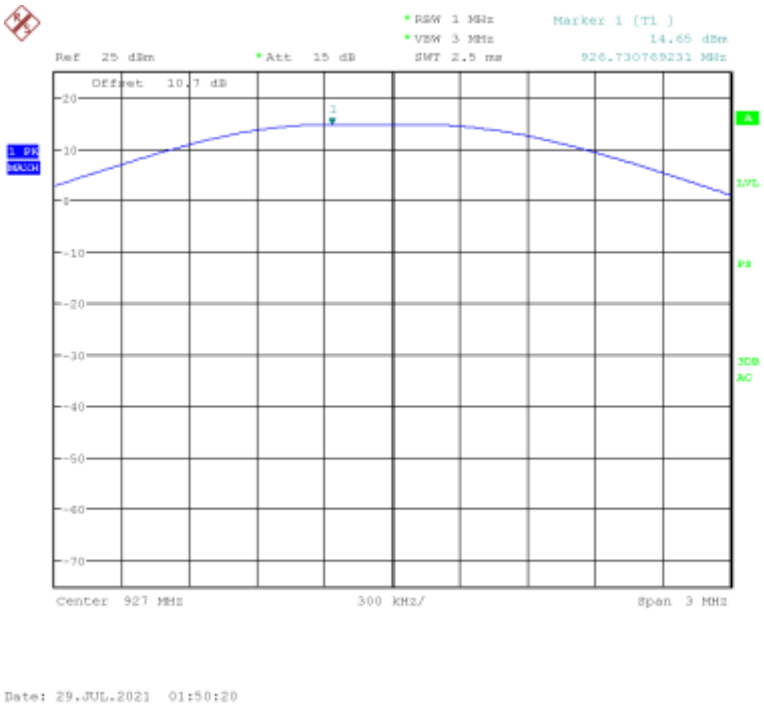

Figure 6 – High Channel Output Power (FSK)

4.3 Occupied Bandwidth

This test measures the 6 dB and 99% bandwidth of the EUT.

4.3.1 Test Over View

Results	**Complies** (as tested per this report)				**Date**	07/29/2021	
Standard	FCC 47 CFR Part 15.247 (a.2), RSS-247 (5.2)						
Product Model	BLUbase V1			**Serial#**	24-010668		
Configuration	See test plan for details.						
Test Set-up	Tested in shielded room, EUT placed on table. See test plan for details.						
EUT Powered By	120V60Hz	**Temp**	22ºC	**Humidity**	56%	**Pressure**	986 mbar
Channel Frequencies	Low Channel: 903 MHz Mid Channel: 915 MHz High Channel: 927 MHz			**Power Setting @ Channel**	14 dBm		
Perf. Criteria	6 dB OBW > 500 kHz			**Perf. Verification**	Readings above Minimum		
Mod to EUT	None			**Test Performed By**	Alexander Sowinski		

4.3.2 Test Procedure

Antenna port conducted emission tests were performed using the procedures of FCC 47 CFR Part 15.247 (a.2), RSS-247 (5.2) and/or ANSI C63.10 including methods for signal maximizations and EUT configuration. The EUT was placed in the test chamber and connected directly to the spectrum analyzer via temporary SMA connection. Peak measurements were taken with RBW = 100 kHz on each of the low, mid, and high channels utilizing both the LoRa and FSK transmission schemes of the EUT.

4.3.3 Deviations

There were no deviations from the test methodology listed in the test plan for the occupied bandwidth test.

4.3.4 Final Test

The occupied bandwidth of the EUT were above the minimum levels specified by the standard

4.3.5 Final Data

Table 2: Occupied Bandwidth, EUT power setting @ 14 dBm

Type	Frequency	Flow	Fhigh	6dB OBW	99% OBW	6dB OBW Minimum	Result
	MHz	MHz	MHz	kHz	kHz	kHz	
LoRa	903.00	902.60577	903.24039	634.61600	687.50000	500.00000	PASS
LoRa	915.00	914.61058	915.23558	625.00000	677.88462	500.00000	PASS
LoRa	927.00	926.61539	927.23558	620.19200	1014.42310	500.00000	PASS
FSK	903.00	902.64904	903.19231	543.27000	610.57692	500.00000	PASS
FSK	915.00	914.64904	915.18750	538.46200	610.57692	500.00000	PASS
FSK	927.00	926.65385	927.18269	528.84600	649.03846	500.00000	PASS

4.3.6 Final Plots

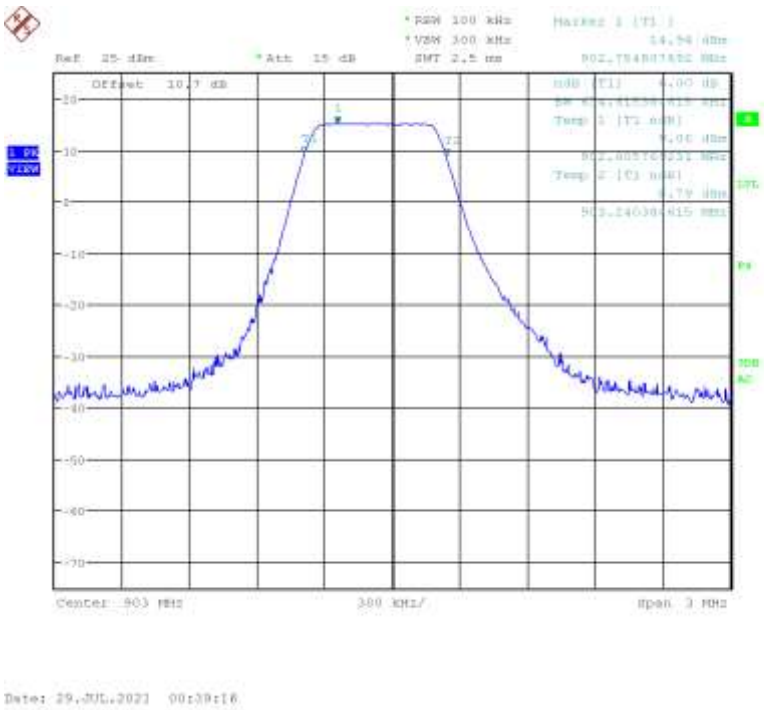

Figure 7 – Low Channel 6 dB Occupied Bandwidth (LoRa)

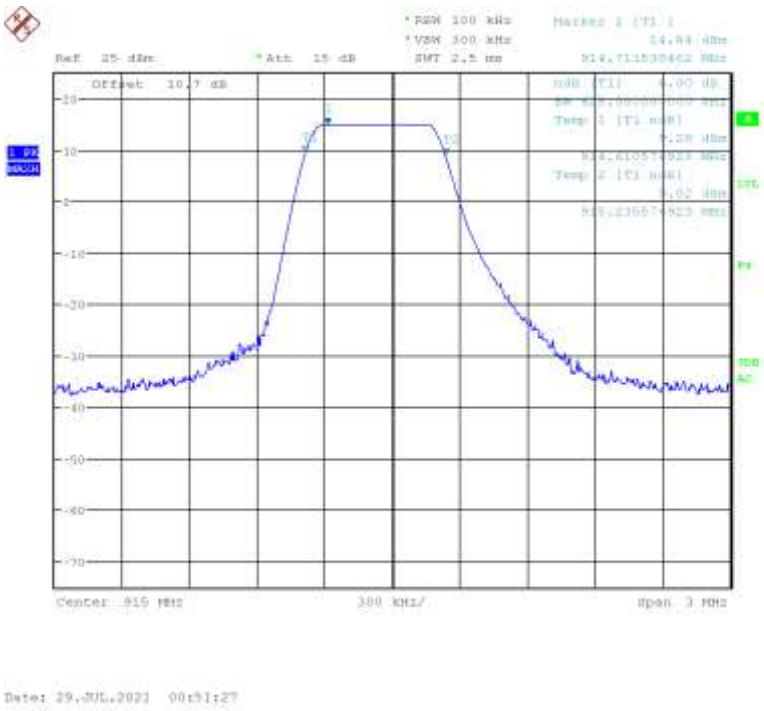

Figure 8 – Mid Channel 6 dB Occupied Bandwidth (LoRa)

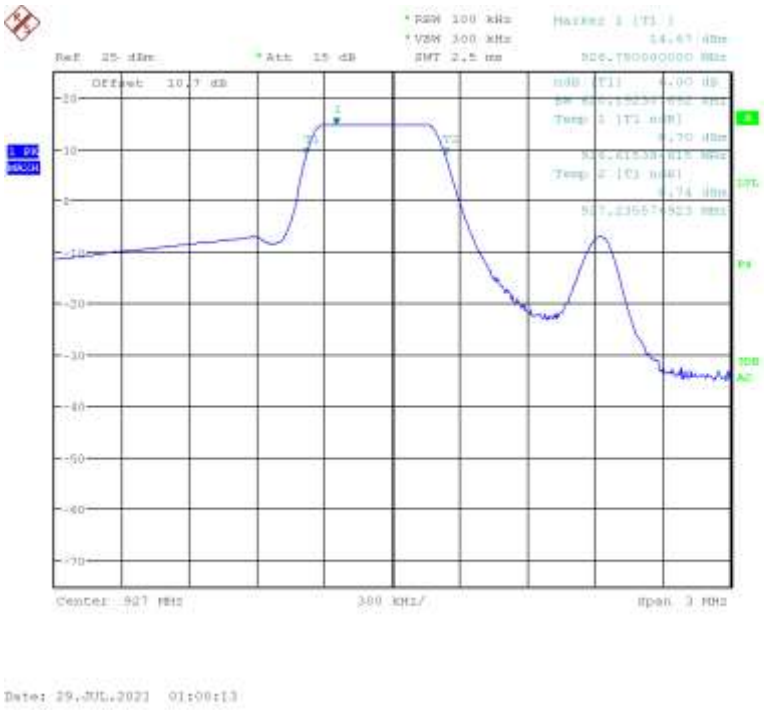

Figure 9 – High Channel 6 dB Occupied Bandwidth (LoRa)

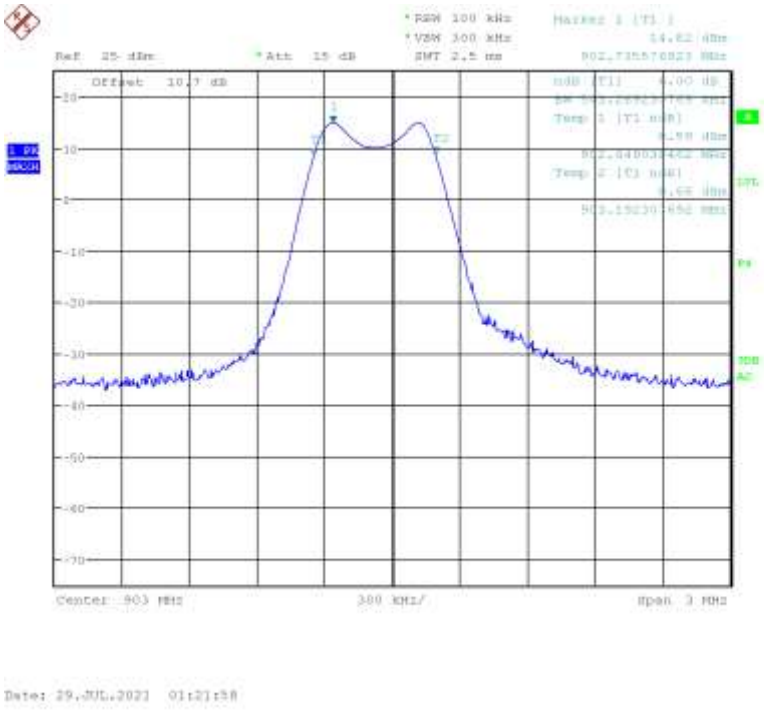

Figure 10 – Low Channel 6 dB Occupied Bandwidth (FSK)

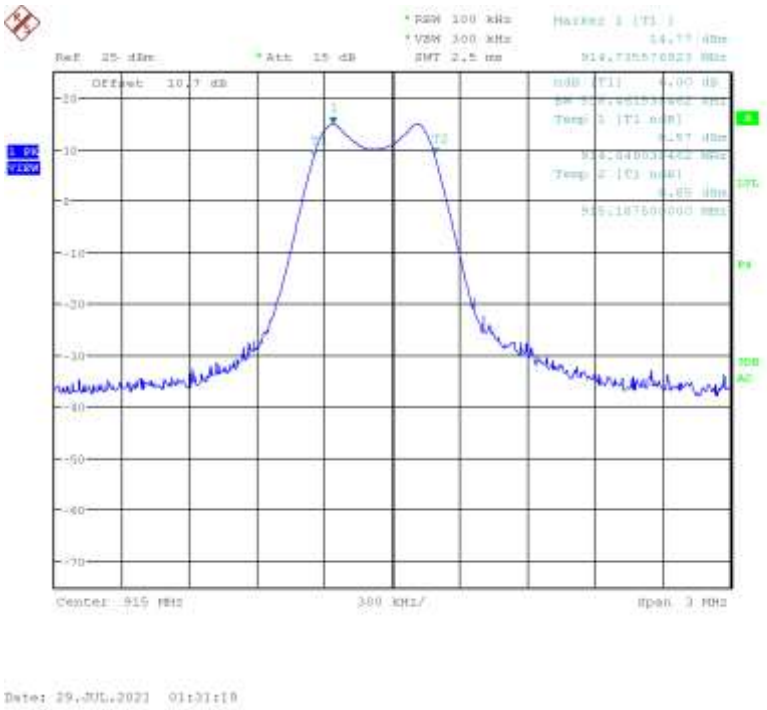

Figure 11 – Mid Channel 6 dB Occupied Bandwidth (FSK)

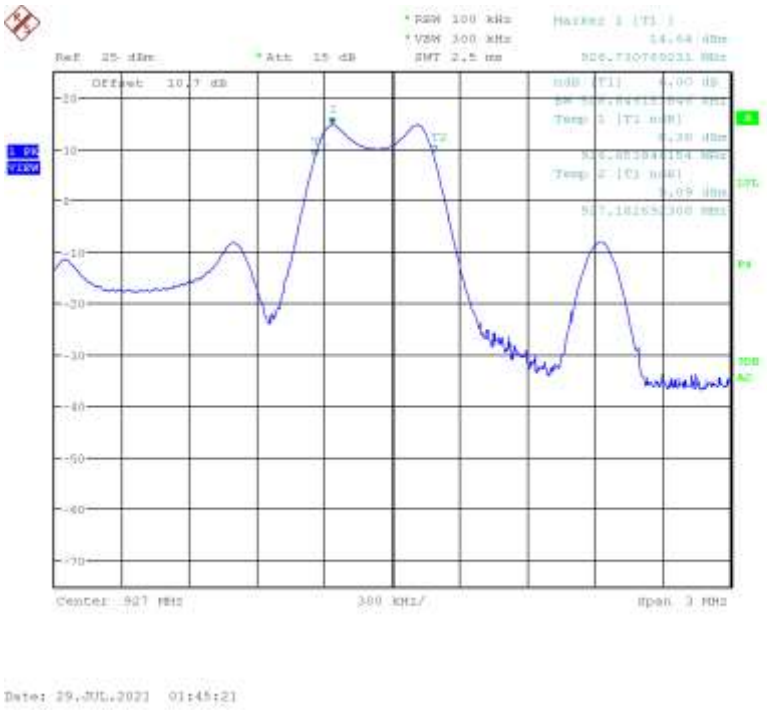

Figure 12 – High Channel 6 dB Occupied Bandwidth (FSK)

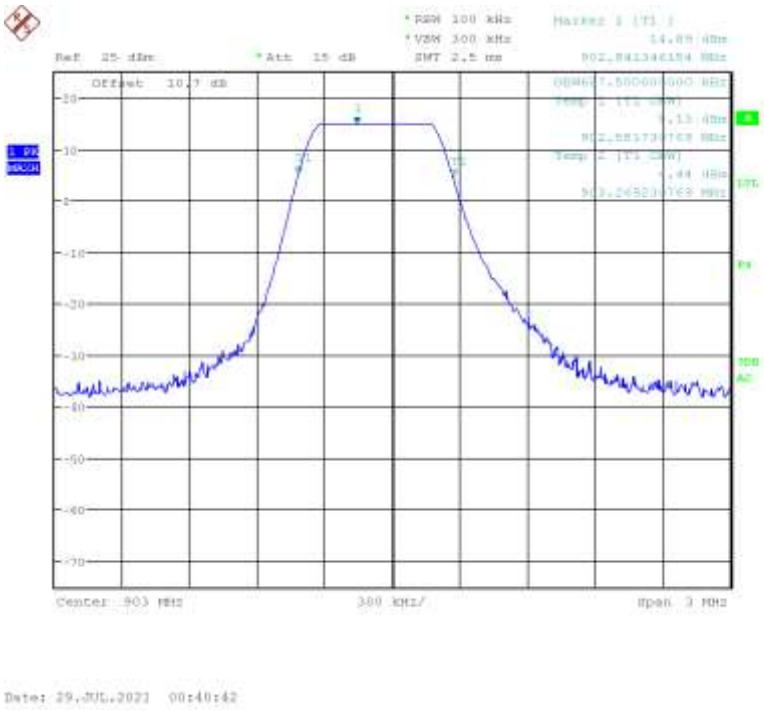

Figure 13 – Low Channel 99% Occupied Bandwidth (LoRa)

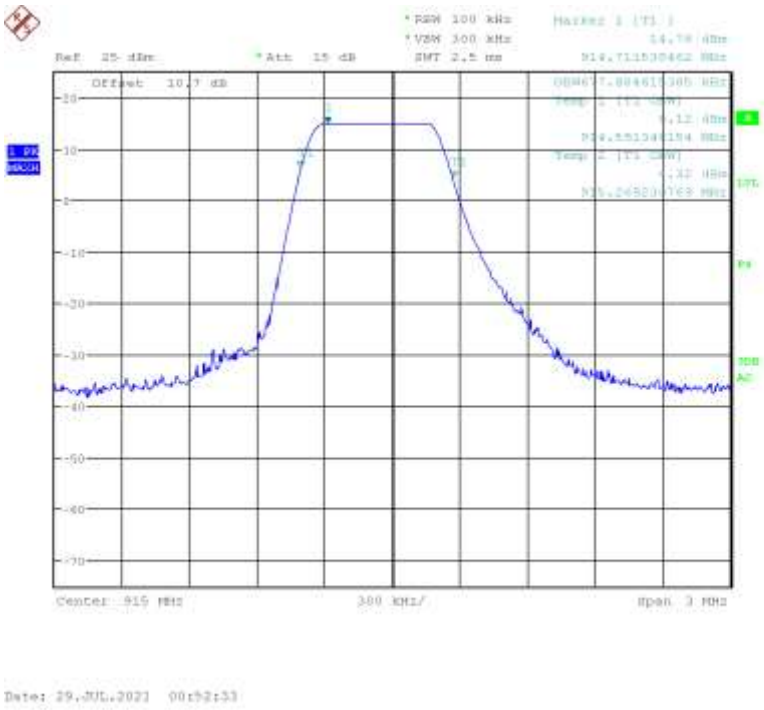

Figure 14 – Mid Channel 99% Occupied Bandwidth (LoRa)

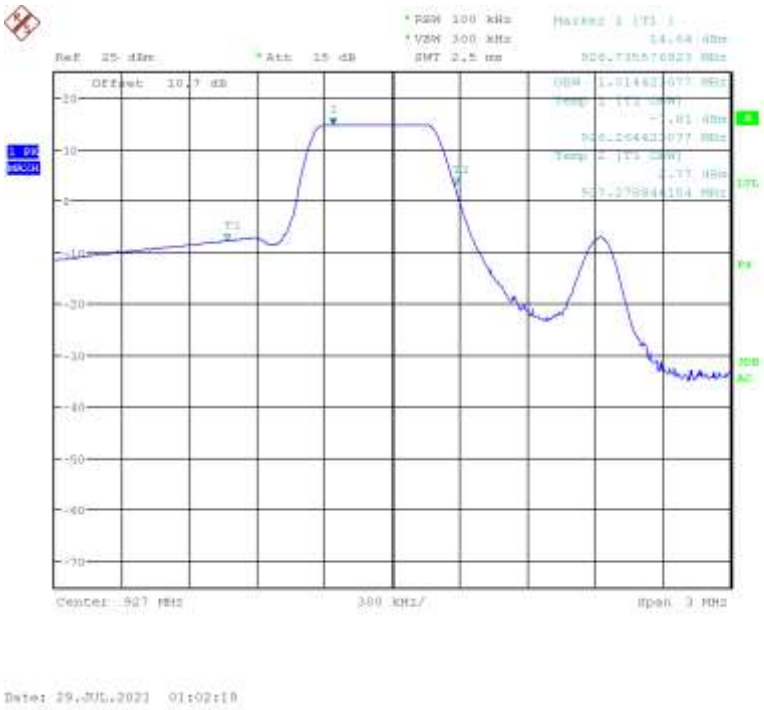

Figure 15 – High Channel 99% Occupied Bandwidth (LoRa)

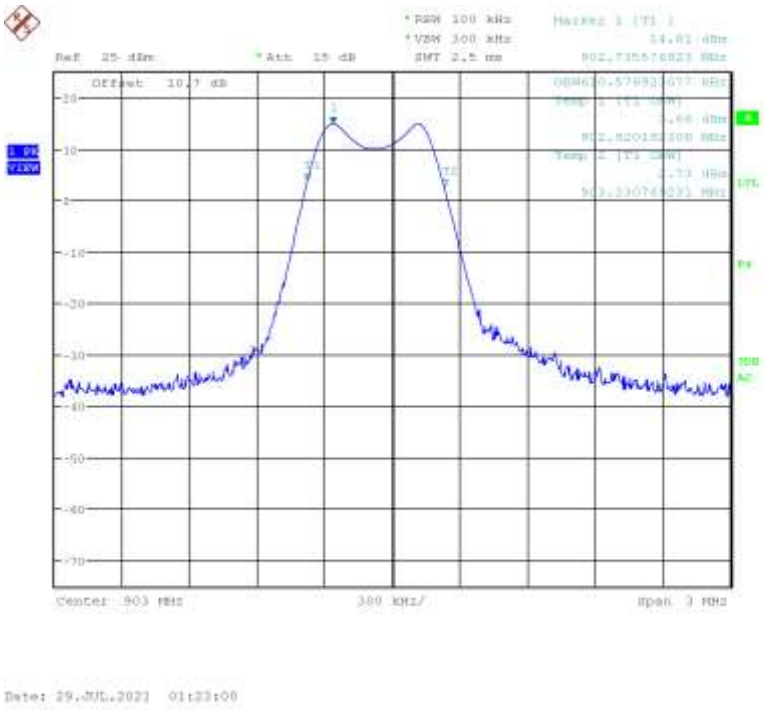

Figure 16 – Low Channel 99% Occupied Bandwidth (FSK)

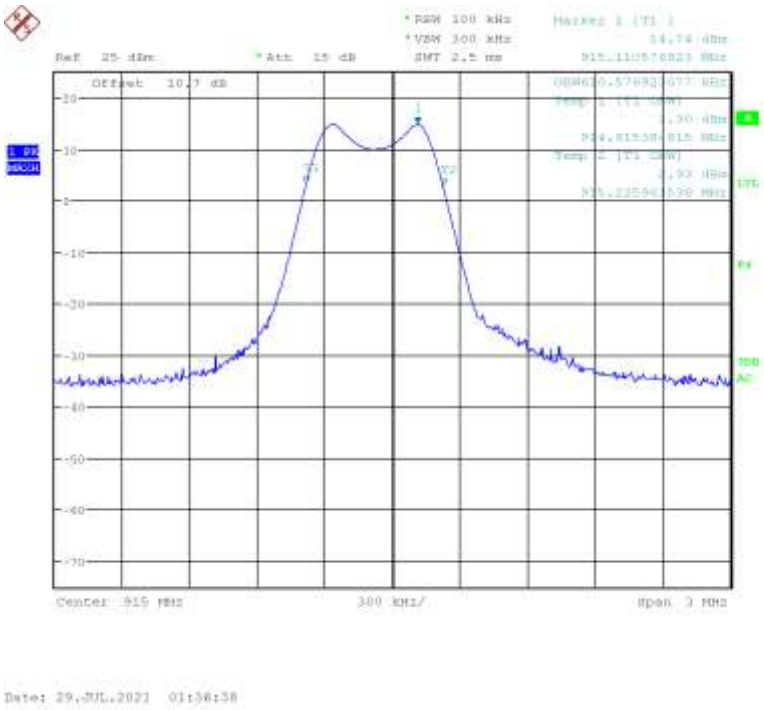

Figure 17 – Mid Channel 99% Occupied Bandwidth (FSK)

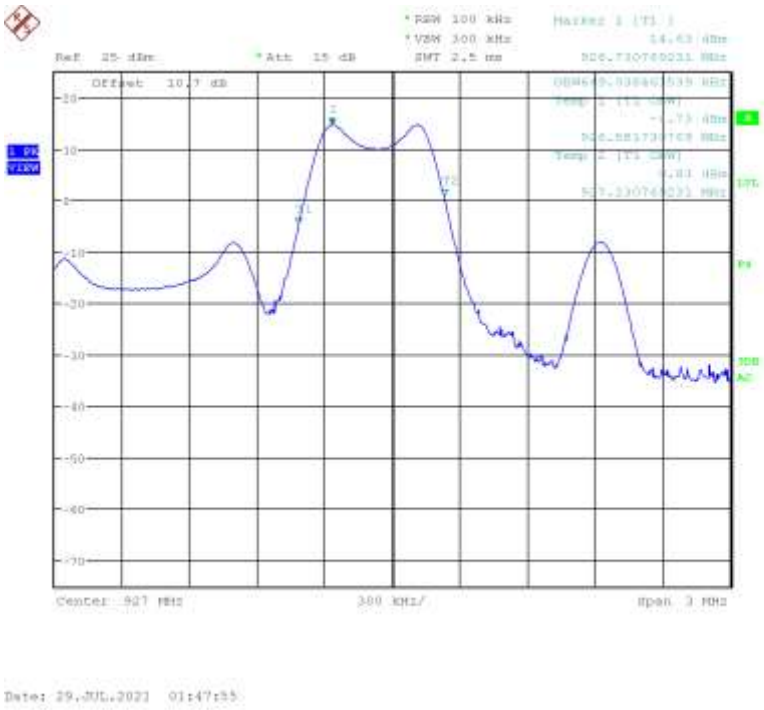

Figure 18 – High Channel 99% Occupied Bandwidth (FSK)

4.4 Power Spectral Density

This test measures the power spectral density of the EUT.

4.4.1 Test Over View

Results	**Complies** (as tested per this report)				**Date**	07/29/2021	
Standard	FCC 47 CFR Part 15.247 (e), RSS-247 (5.2)						
Product Model	BLUbase V1			**Serial#**	24-010668		
Configuration	See test plan for details.						
Test Set-up	Tested in shielded room, EUT placed on table. See test plan for details						
EUT Powered By	120V60Hz	**Temp**	22ºC	**Humidity**	56%	**Pressure**	986 mbar
Channel Frequencies	Low Channel: 903 MHz Mid Channel: 915 MHz High Channel: 927 MHz			**Power Setting @ Channel**	14 dBm		
Perf. Criteria	PSD < 8dBm / 3kHz			**Perf. Verification**	Readings under Limit		
Mod to EUT	None			**Test Performed By**	Alexander Sowinski		

4.4.2 Test Procedure

Antenna port conducted emission tests were performed using the procedures of FCC 47 CFR Part 15.247 (e), RSS-247 (5.2) and/or ANSI C63.10 including methods for signal maximizations and EUT configuration. The EUT was placed in the test chamber and connected directly to the spectrum analyzer via temporary SMA connection. Peak measurements were taken with RBW = 3 kHz on each of the low, mid, and high channels utilizing both the LoRa and FSK transmission schemes of the EUT.

4.4.3 Deviations

There were no deviations from the test methodology listed in the test plan for the power spectral density test.

4.4.4 Final Test

The power spectral density measurements were below the limits specified by the standard

4.4.5 Final Data

Table 3: Power Spectral Density, EUT power setting @ 14 dBm.

Type	Frequency	PSD	Limit	Margin
	MHz	dBm/3kHz	dBm	dB
LoRa	903.00	-3.04	8.0	-11.04
LoRa	915.00	-2.97	8.0	-10.97
LoRa	927.00	-2.66	8.0	-10.66
FSK	903.00	7.76	8.0	-0.24
FSK	915.00	7.69	8.0	-0.31
FSK	927.00	7.44	8.0	-0.56

4.4.6 Final Plots

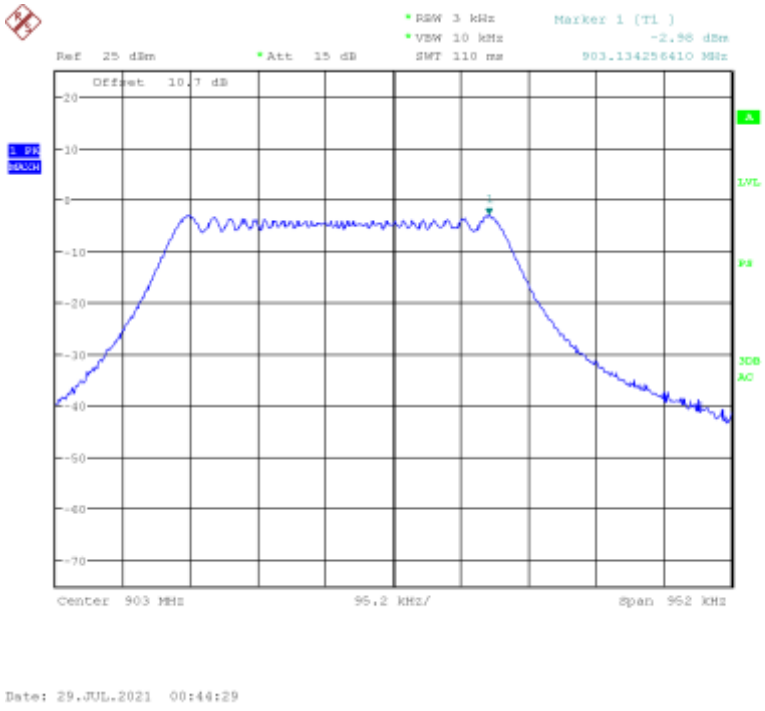

Figure 19 – Low Channel Power Spectral Density (LoRa)

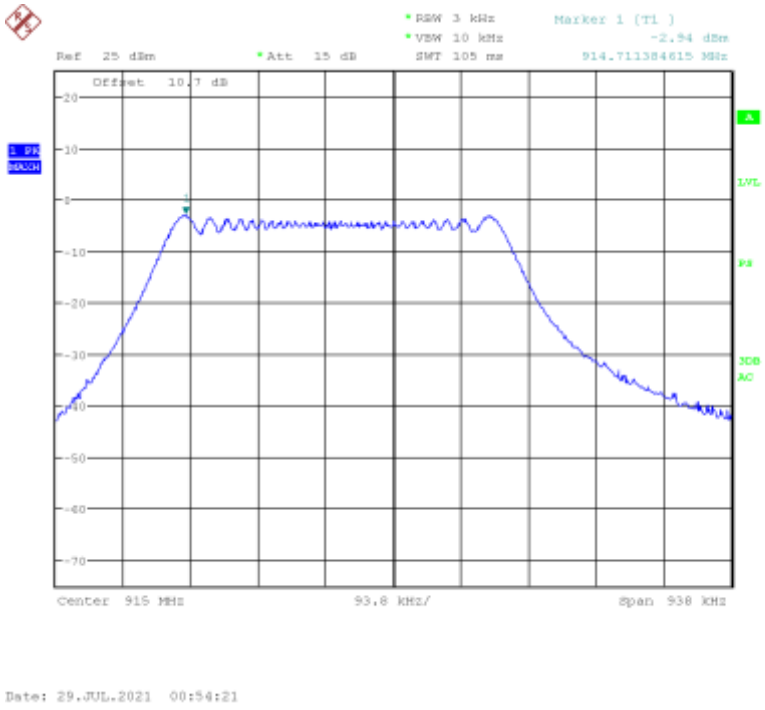

Figure 20 – Mid Channel Power Spectral Density (LoRa)

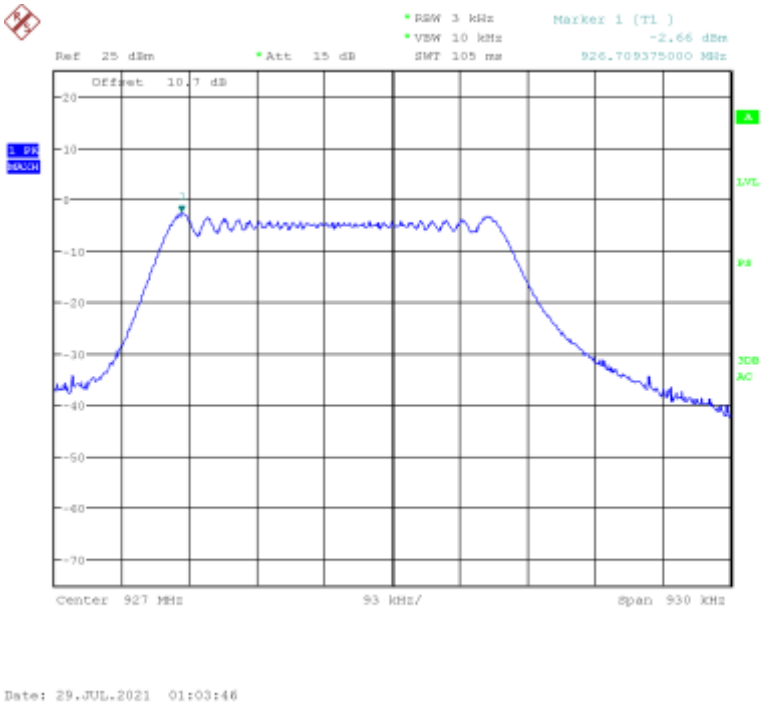

Figure 21 – High Channel Power Spectral Density (LoRa)

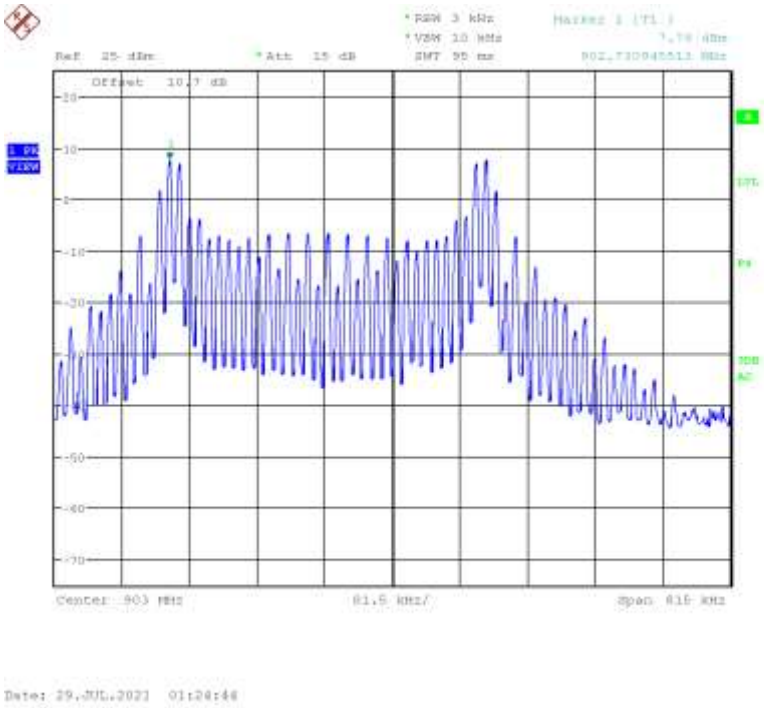

Figure 22 – Low Channel Power Spectral Density (FSK)

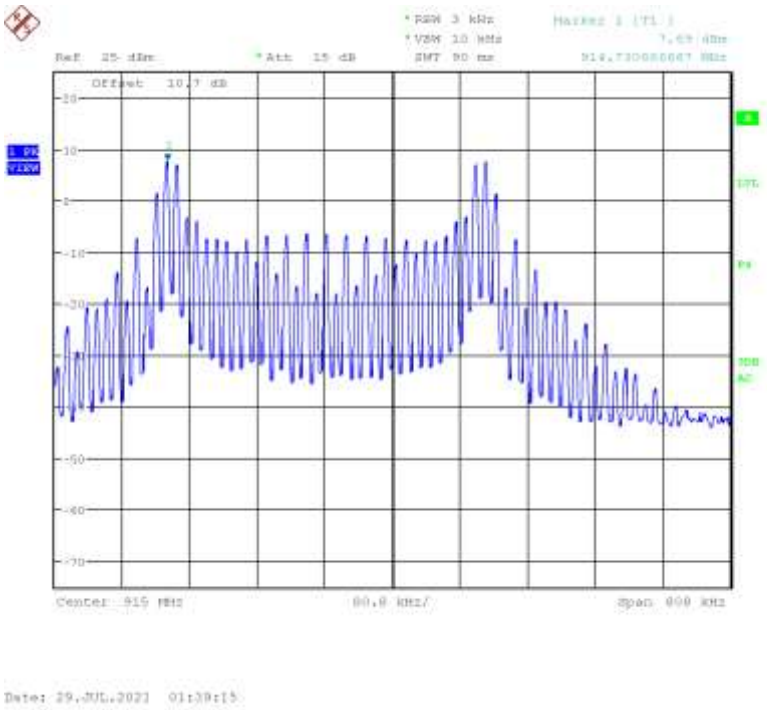

Figure 23 – Mid Channel Power Spectral Density (FSK)

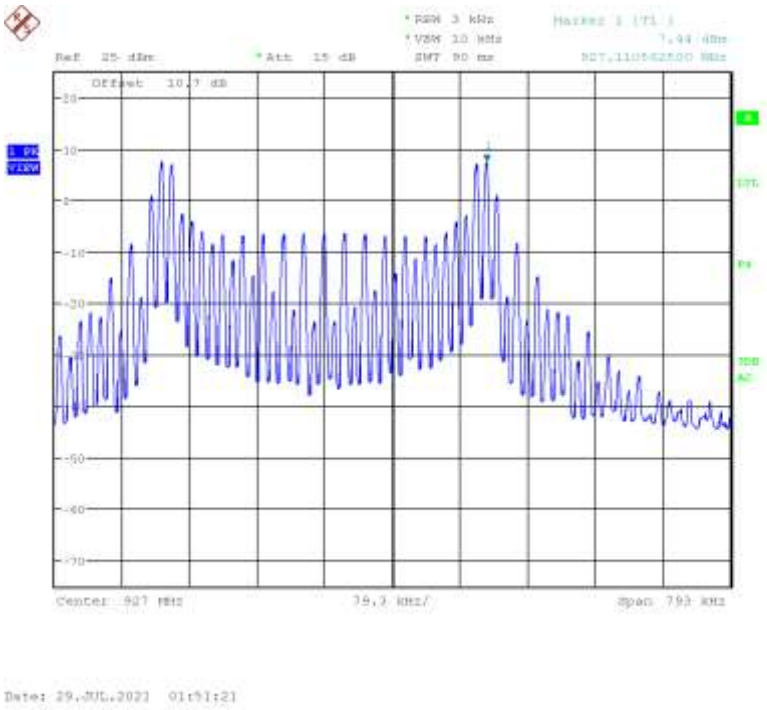

Figure 24 – High Channel Power Spectral Density (FSK)

4.5 Out of Band Emissions

This test checks for any spurious emissions outside of the transmit band.

4.5.1 Test Over View

Results	**Complies** (as tested per this report)				**Date**	07/29/2021	
Standard	FCC 47 CFR Part 15.247 (d), RSS-247 (5.5)						
Product Model	BLUbase V1			**Serial#**	24-010668		
Configuration	See test plan for details.						
Test Set-up	Tested in shielded room, EUT placed on table. See test plan for details						
EUT Powered By	120V60Hz	**Temp**	22ºC	**Humidity**	56%	**Pressure**	986 mbar
Channel Frequencies	Low Channel: 903 MHz Mid Channel: 915 MHz High Channel: 927 MHz			**Power Setting @ Channel**	14 dBm		
Perf. Criteria	< 20 dBr / 100 kHz band			**Perf. Verification**	Readings Below Limit		
Mod to EUT	None			**Test Performed By**	Alexander Sowinski		

4.5.2 Test Procedure

Antenna port conducted emission tests were performed using the procedures of FCC 47 CFR Part 15.247 (d), RSS-247 (5.5) and/or ANSI C63.10 including methods for signal maximizations and EUT configuration. The EUT was placed in the test chamber and connected directly to the spectrum analyzer via temporary SMA connection. Peak measurements were taken with RBW = 100 kHz on each of the low, mid, and high channels utilizing both the LoRa and FSK transmission schemes of the EUT.

4.5.3 Deviations

There were no deviations from the test methodology listed in the test plan for the out of band emissions test.

4.5.4 Final Test

The reading from the EUT were below the limits specified by the relevant standard.

4.5.5 Final Data

Table 4: Conducted Out of Band Emissions – EUT power setting @ 14 dBm

Type	Freq	Level	Limit	Margin
	MHz	dBm	dBm	dB
LoRa	903.00	15.28	N/A	N/A
	2708.221	-47.81	-4.72	-43.09
	3600.962	-46.02	-4.72	-41.30
	5415.24	-35.66	-4.72	-30.94
LoRa	915.00	15.20	N/A	N/A
	2737.019	-49.52	-4.80	-44.72
	5472.837	-33.16	-4.80	-28.36
LoRa	927.00	14.98	N/A	N/A
	5559.231	-33.10	-5.02	-28.08

Type	Freq	Level	Limit	Margin
	MHz	dBm	dBm	dB
FSK	903.00	15.12	N/A	N/A
	2708.221	-48.81	-4.88	-43.93
	3600.962	-46.40	-4.88	-41.52
	5415.24	-36.25	-4.88	-31.37
FSK	915.00	15.04	N/A	N/A
	5472.837	-33.59	-4.96	-28.63
FSK	927.00	14.92	N/A	N/A
	5559.231	-33.65	-5.08	-28.57

4.5.6 Final Plots

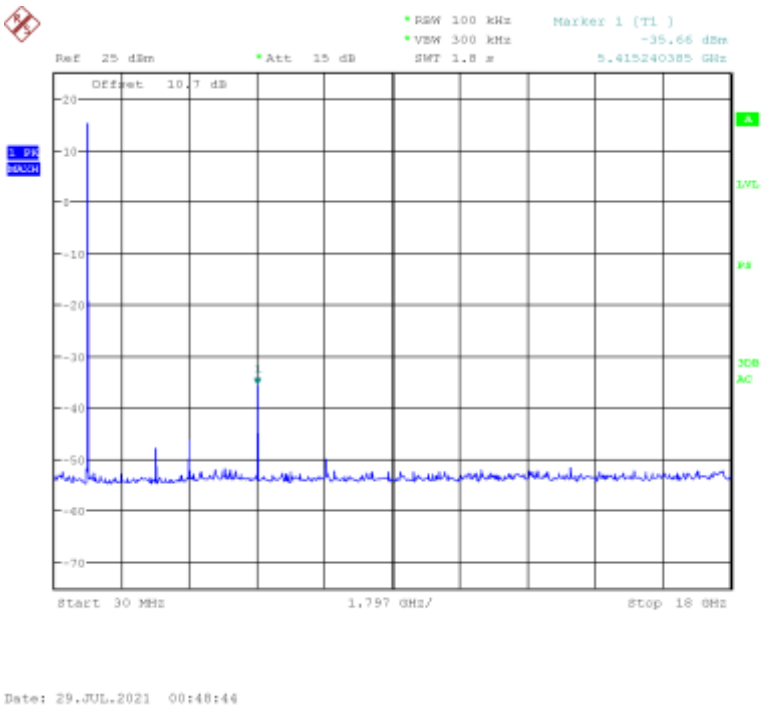

Figure 25 – Low Channel Conducted Spurious Emissions (LoRa)

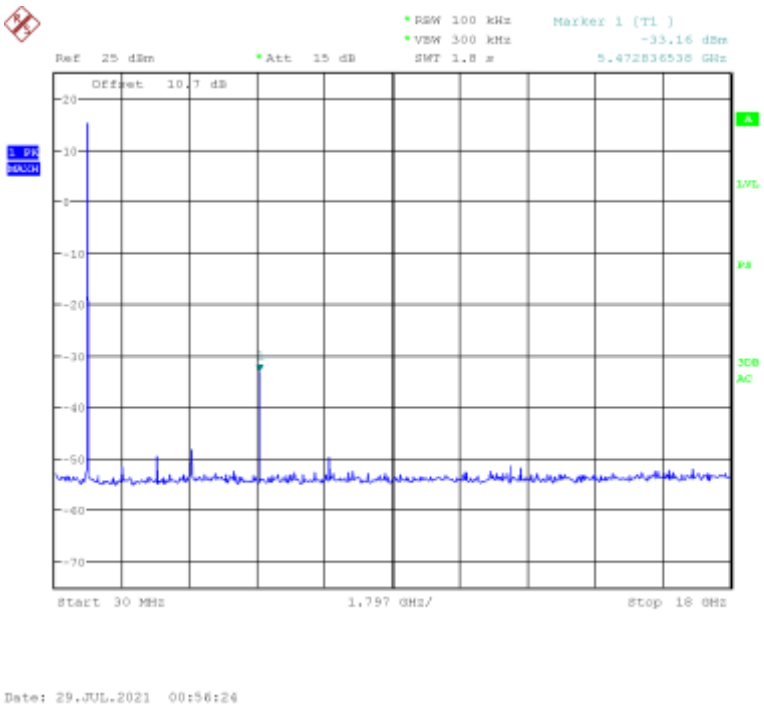

Figure 26 – Mid Channel Conducted Spurious Emissions (LoRa)

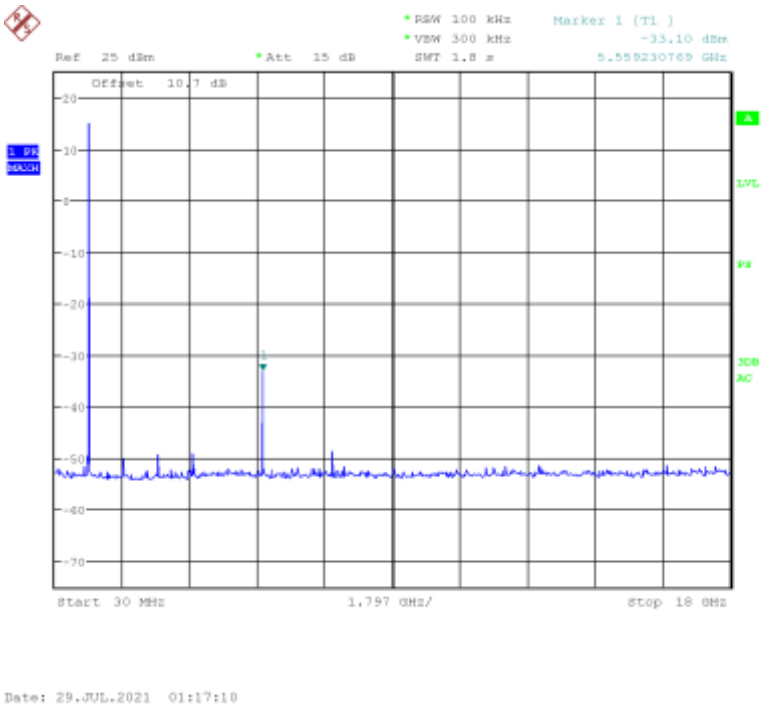

Figure 27 – High Channel Conducted Spurious Emissions (LoRa)

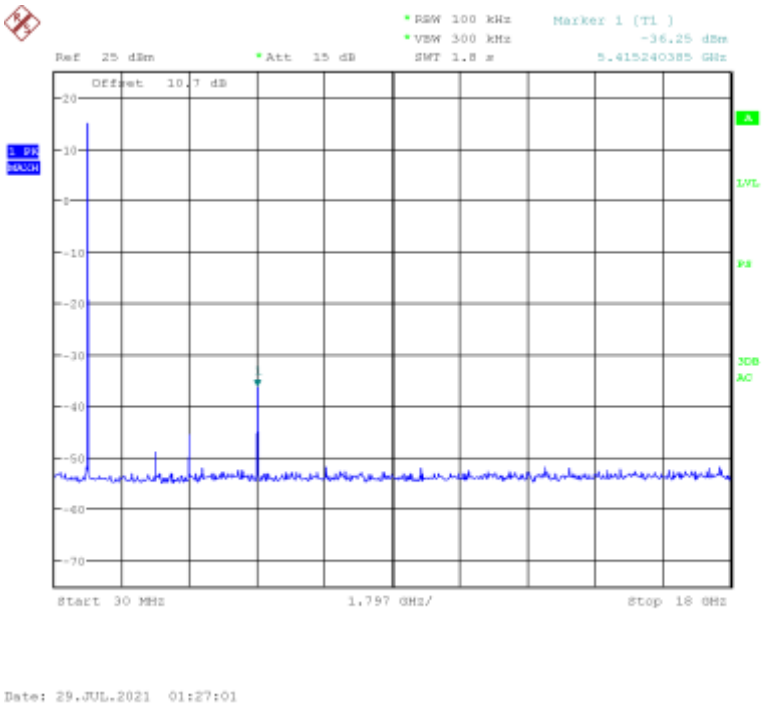

Figure 28 – Low Channel Conducted Spurious Emissions (FSK)

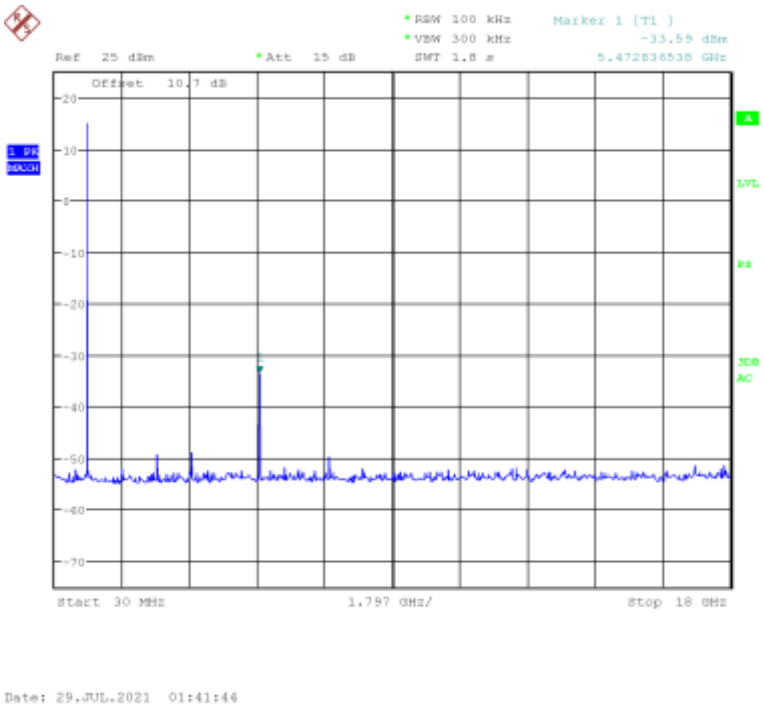

Figure 29 – Mid Channel Conducted Spurious Emissions (FSK)

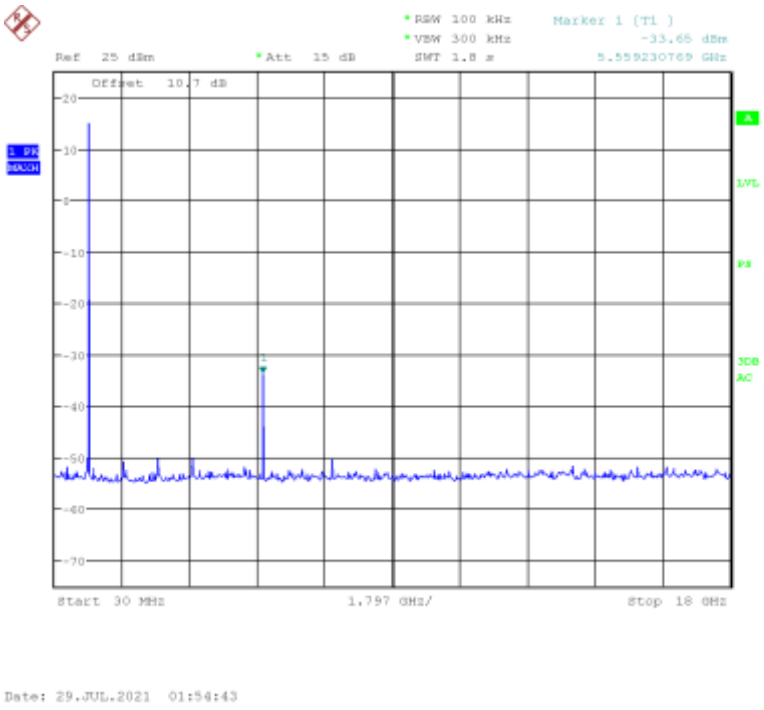

Figure 30 – High Channel Conducted Spurious Emissions (FSK)

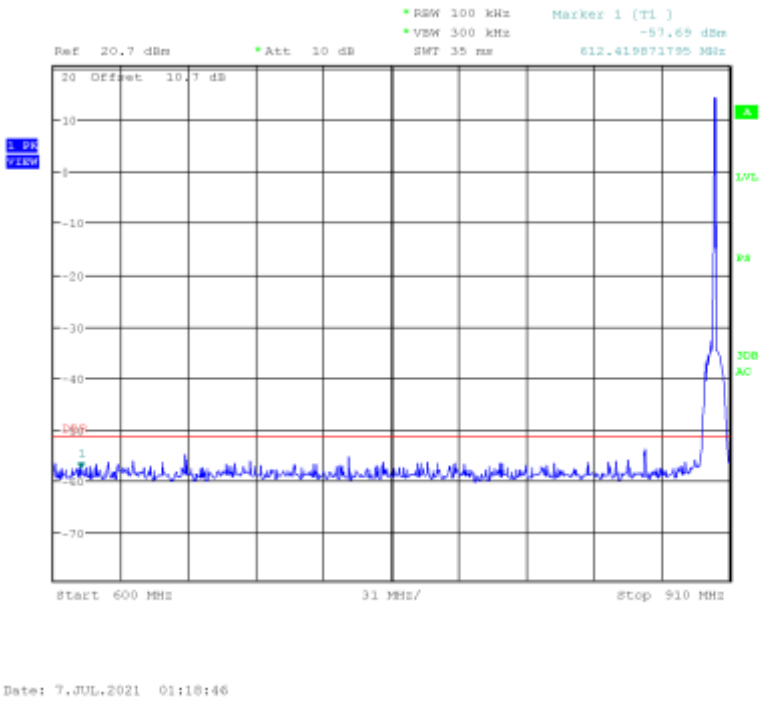

Figure 31 – Low Channel Conducted Band Edge (LoRa)

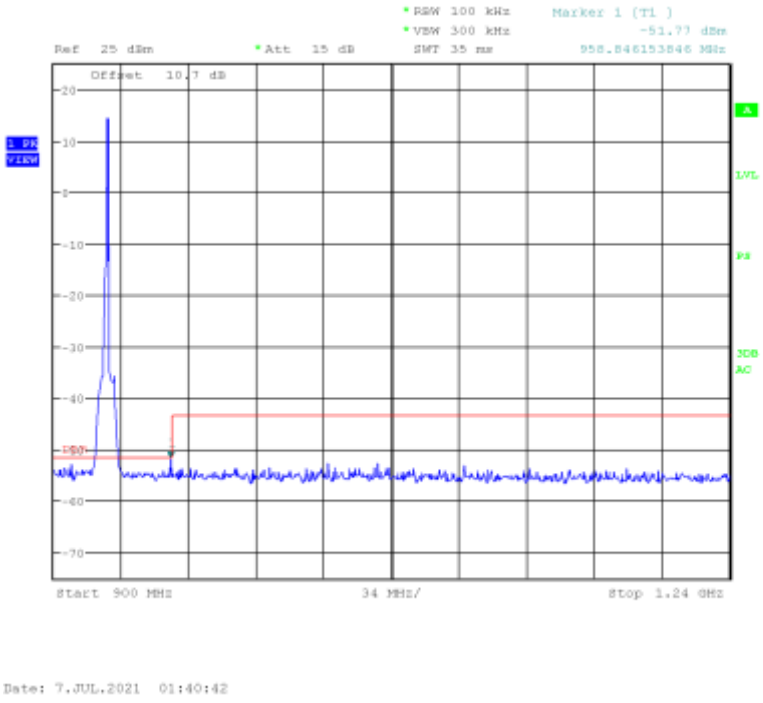

Figure 32 – High Channel Conducted Band Edge (LoRa)

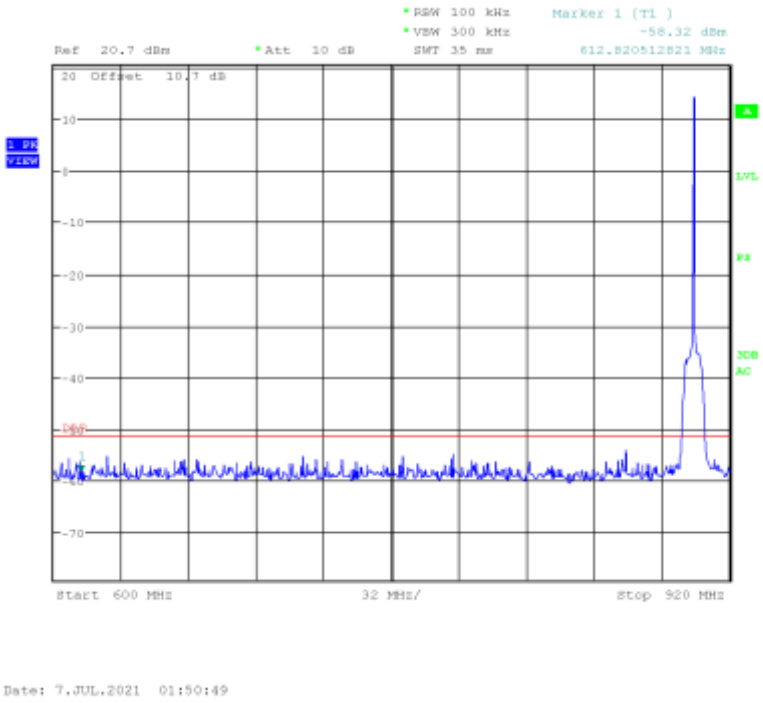

Figure 33 – Low Channel Conducted Band Edge (FSK)

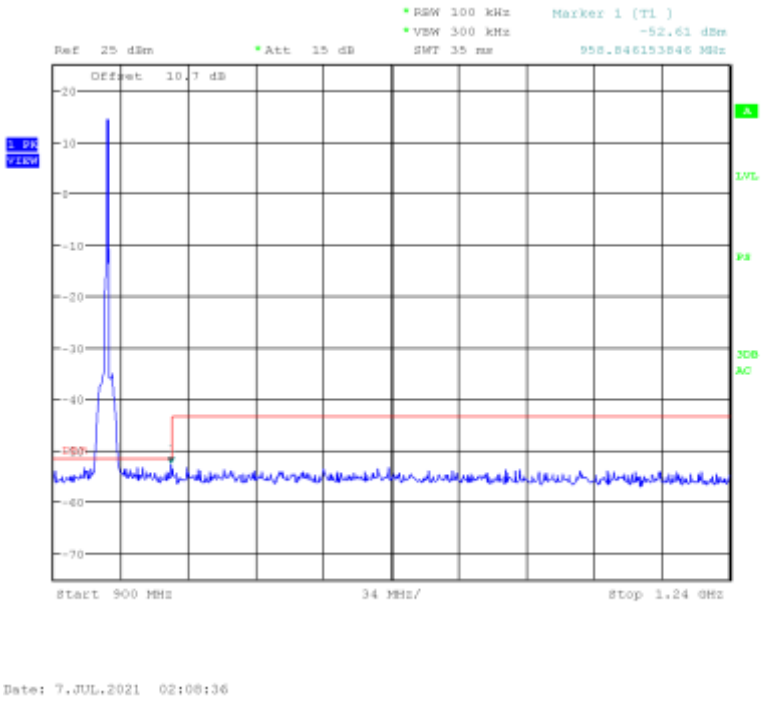

Figure 34 – High Channel Conducted Band Edge (FSK)