TIMCO ENGINEERING, Inc.

An IIA Company

Test Report - FCC Part 101 FM STL & LPAS
Applicant: SVP Broadcast Microwave S.L.

Approved for Release By:

Signature: Bruno Clavier

Name & Title: Bruno Clavier, General Manager

Date of Signature 12/21/2023

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1. Applicant Information

Applicant: SVP Broadcast Microwave S.L.
Address: Calle Arriluzea 3
Durango, Bizkaia 48200 Spain

1.1 Part 101 Test Result Summary

The following test procedure and guidance were used for measuring 47 CFR FCC PART 2, Sub-part J and 47 CFR FCC PART 101 Subpart C; ANSI C63.26-2015. Full test results are available in this report.

Clauses	Description of the Requirements	Result (Pass, Fail or N/A)
2.1047, 101.141	Modulation Characteristics	N/A
2.1046, 101.113	Transmitter Power	Pass
2.1049, 101.109	Occupied Bandwidth	Pass
101.111	Spectrum Emission Mask	Pass
2.1051, 101.111	Conducted Out of Band Emission	Pass
2.1053, 101.111	Radiated Out of Band Emissions	Pass
2.1055, 101.107	Frequency Stability	N/A

No additions to the test methods were needed. There were no deviations, or exclusions from the test methods. No test results are from external providers or from the customer. The test results relate only to the items tested. Timco does not offer opinions and interpretations, only a pass/fail statement.

2. Location of Testing

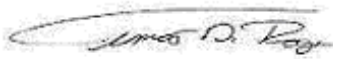
2.1 Test Laboratory

Timco Engineering Inc. is a subsidiary of Industrial Inspection & Analysis, Inc. ("IIA").
Testing was performed at Timco's permanent laboratory located at 849 NW State Road 45, Newberry, Florida 32669

FCC test firm # 578780
FCC Designation # US1070
FCC site registration is under A2LA certificate # 0955.01
ISED Canada test site registration # 2056A
EU Notified Body # 1177
For all designations see A2LA scope # 0955.01

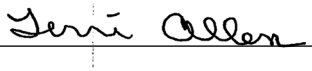
2.2 Testing was performed, reviewed by

Dates of Testing: 8-14-2023 – 9-01-2023

Signature:  Sr. EMC Engineer EMC-003838-NE

Name & Title: Tim Royer, EMC Engineer

Date of Signature 12/21/2023

Signature: 

Name & Title: Terri Allen, Project Specialist

Date of Signature 12/21/2023

3. Test Sample(s) (EUT/DUT)

The test sample was received: 7/27/2023

3.1 Description of the EUT

A description as well as unambiguous identification of the EUT(s) tested. Where more than one sample is required for technical reasons (such as the use of connected units for the purpose of conducted output power testing where the product units will have integral antennas), each specific test shall identify which unit was tested.

Identification	
FCC ID:	2BCB7-HDT-04
Brief Description	High Power Airborne Transmitter
Model(s) #	HDT-04
Firmware version	N/A
Software version	N/A
Serial Number	N/A

Technical Characteristics	
Frequency Range	2180 MHZ
RF O/P Power (Max.)	15 W
Modulation	FM
Bandwidth	4.779 MHz
Emission Class	8M00D7W
Duty Cycle	100 %
Antenna Type	UFL
Voltage Rating (AC or Batt.)	28 VDC

Antenna Characteristics			
Antenna	Frequency Range	Mode / BW	Antenna Gain
1	n/a	n/a	4.5 dBi

- Note: Information such as antenna gain, firmware/software numbers are provided by manufacturer and cannot be validated by the test lab.

3.2 Configuration of EUT

Mode (#)	Test Frequencies (MHz)	BW (nominal) (MHz)	Emission Designator
3	2180 MHz	4.757	4M76D7W

Operating conditions during Testing:

The device was operated without the provided antenna(s).

No other modifications of the device under test (including firmware, specific software settings, and input/output signal levels to the EUT) were made.

Peripherals used during Testing:

No peripherals used.

3.3 Test Setup of EUT

Equipment, antenna, and cable arrangement. The setup of the equipment and cable or wire placement on the test site that produces the highest radiated and the highest ac power line conducted emissions shall be shown clearly and described. Information on the orientation of portable equipment during testing shall be included. Drawings or photographs may be used for this purpose.

Test Setups are included in the test report.

4. Test methods & Applicable Regulatory Limits

4.1 Test methods/Standards/Guidance:

Test procedures and guidance for measuring Licensed CFR 47 Part 2 / FCC CFR 47 Part 101 Subpart C Licensed device:

1) ANSI C63.26-2015

4.2 Applied Limits and Regulatory Limits:

1) FCC CFR 47 Part 2 / FCC CFR 47 Part 101 Subpart C

5. Measurement Uncertainty

Parameter	Uncertainty (dB)
Conducted Emissions	± 3.14 dB
Radiated Emissions (9kHz – 30 MHz)	± 3.08 dB
Radiated Emissions (30 – 200 MHz)	± 2.16 dB
Radiated Emissions (200 – 1000 MHz)	± 2.15 dB
Radiated Emissions (1 GHz – 18 GHz)	± 2.14 dB
Radiated Emissions (18 GHz – 40 GHz)	± 2.31 dB
Note: The uncertainties provided in this table represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of K=2.	

6. Environmental Conditions

6.1 Temperature & Humidity

Measurements performed at the test site did not exceed the following:

Parameter	Measurement
Temperature	23 C +/- 5%
Humidity	55% +/- 5%
Barometric Pressure	30.05 in Hg
Note: Specific environmental conditions that are applicable to a specific test are available in the test result section.	

7. List of Test Equipment and Test Facility

The test equipment used identified by type, manufacturer, serial number, or other identification and the date on which the next calibration or service check is due.

Description of the firmware or software used to operate EUT for testing purposes.

A complete list of all test equipment used shall be included with the test report. The manufacturer's model and serial numbers, and date of last calibration, and calibration interval shall be included. Measurement cable loss, measuring instrument bandwidth and detector function, video bandwidth, if appropriate, and antenna factors shall also be included where applicable.

7.1 List of Test Equipment

Test Equipment						
Type	Device	Manufacturer	Model	SN#	Current Cal	Cal Due
Antenna	Biconical 1057	Eaton	94455-1	1057	10/16/20	10/16/2023
Antenna, NSA	Log-Periodic 1243	Eaton	96005	1243	5/4/21	5/3/2024
Antenna	Double-Ridged Horn/ETS Horn 1	ETS-Lindgren	3117	00035923	2/25/20	10/14/2023
Receiver	EMI Test Receiver R&S ESU 40	Rohde & Schwarz	ESU 40	100320	5/27/21	5/26/2024
CHAMBER	CHAMBER	Panashield	3M	N/A	03/12/19	12/21/2023
Pre-amp	Pre-amp	RF-LAMBDA	RLNA00M45GA	NA	02/27/19	07/26/2025

Software			
Software	Author	Version	Validation on
ESU Firmware	Rohde & Schwarz	4.43 SP3; BIOS v5.1-24-3	2018
RSCommander	Rohde & Schwarz	1.6.4	2014
ScopeExplorer	LeCroy	v2.25.0.0	2009
Field Strength	Timco	v4.10.7.0	2016

8. Test Results

The results of the test are usually indicated in the form of tables, spectrum analyzer plots, charts, sample calculations, as appropriate for each test procedure.

A description and/or a block diagram of the test setup is usually provided.

The measurement results, along with the appropriate limits for comparison, may be presented in tabular or graphical form. In addition, any variation in the measurement environment may be reported if applicable (e.g., a significant change of temperature that could affect the cable loss and amplifier response).

Unless noted otherwise in the referenced standard, the measurements of **ac power-line conducted emissions and conducted power output** will be reported in units of dBµV. Unless noted otherwise in the referenced standard, the measurements of **radiated emissions** will be reported in units of decibels, referenced to one microvolt per meter (dBµV/m) for electric fields, or to one ampere per meter (dBA/m) for magnetic fields, at the distance specified in the appropriate standards or requirements. The measurements of antenna-conducted power for receivers may be reported in units of dBµV if the impedance of the measuring instrument is also reported. Otherwise, antenna-conducted power will be reported in units of decibels referenced to one milliwatt (dBm). All formulas for data conversions and conversion factors, if used, will be included in this measurement report.

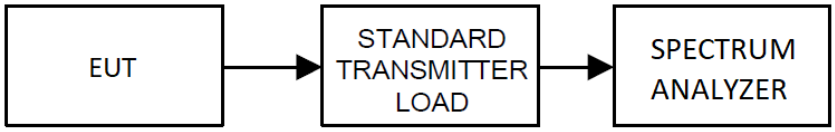
Example:

Freq (MHz)	Meter Reading	+ ACF	+CL	= FS
33	20 dBµV	+ 10.36 dB/m	+0.40 dB	=30.36 dBµV/m @ 3m

EIRP = Pcond (dBm) + dBi

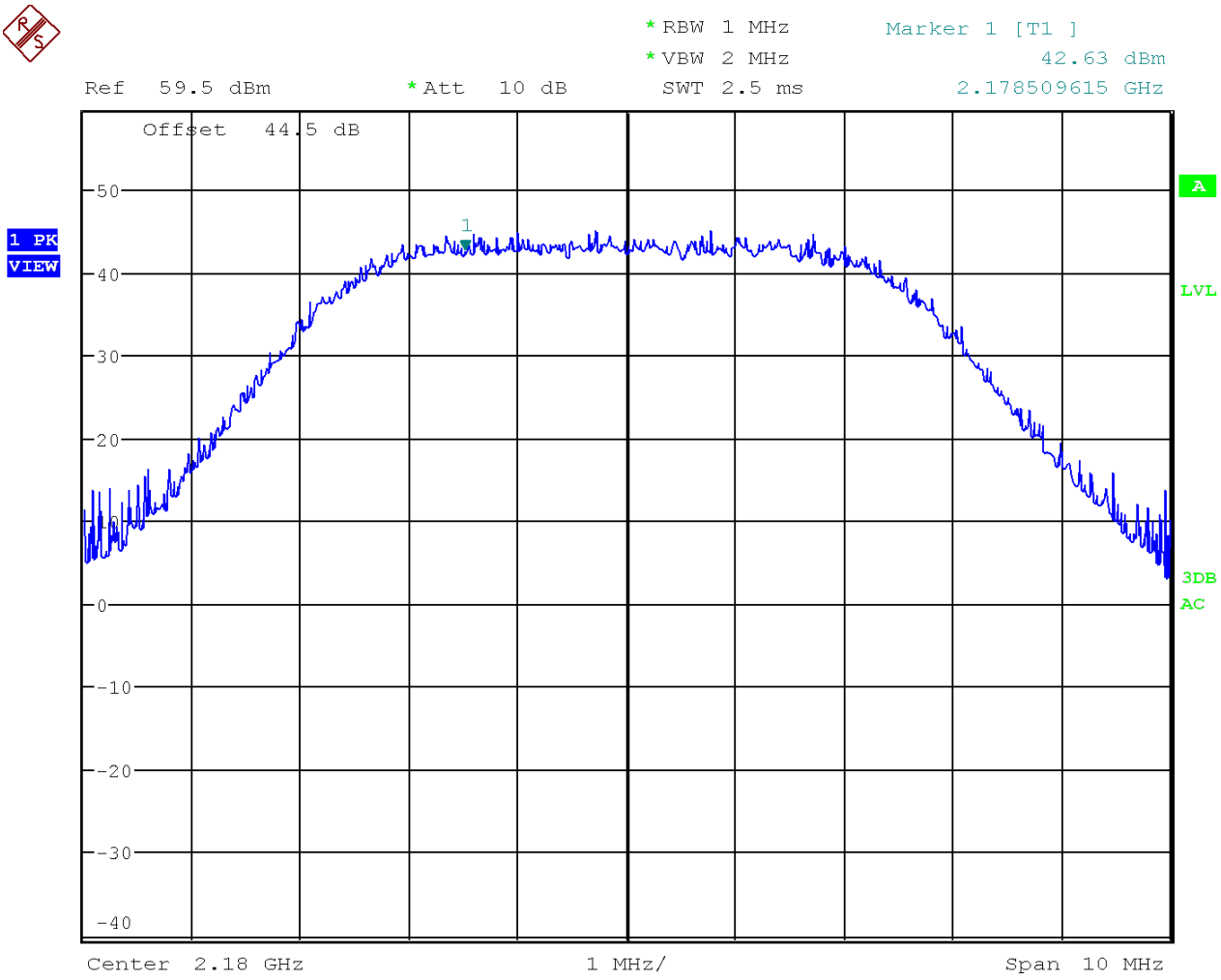
8.1 RF Output Power

Limits from FCC Parts 2.1046(a), 101.113; and test procedure from ANSI C63.26-2015.

Test Setup


Test Results, Mode 1			
Mode	Tuned Frequency (MHz)	Power Output (dBm)	Power Output (W)
1	2180	42.63	18.32

8.1.1 RF Output Power Plot, 2180 MHz



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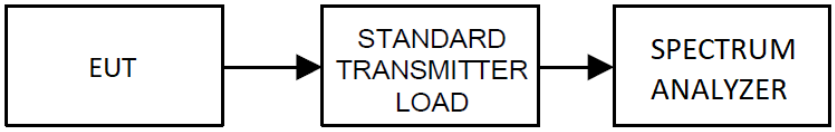
8.2 Bandwidth & Emission

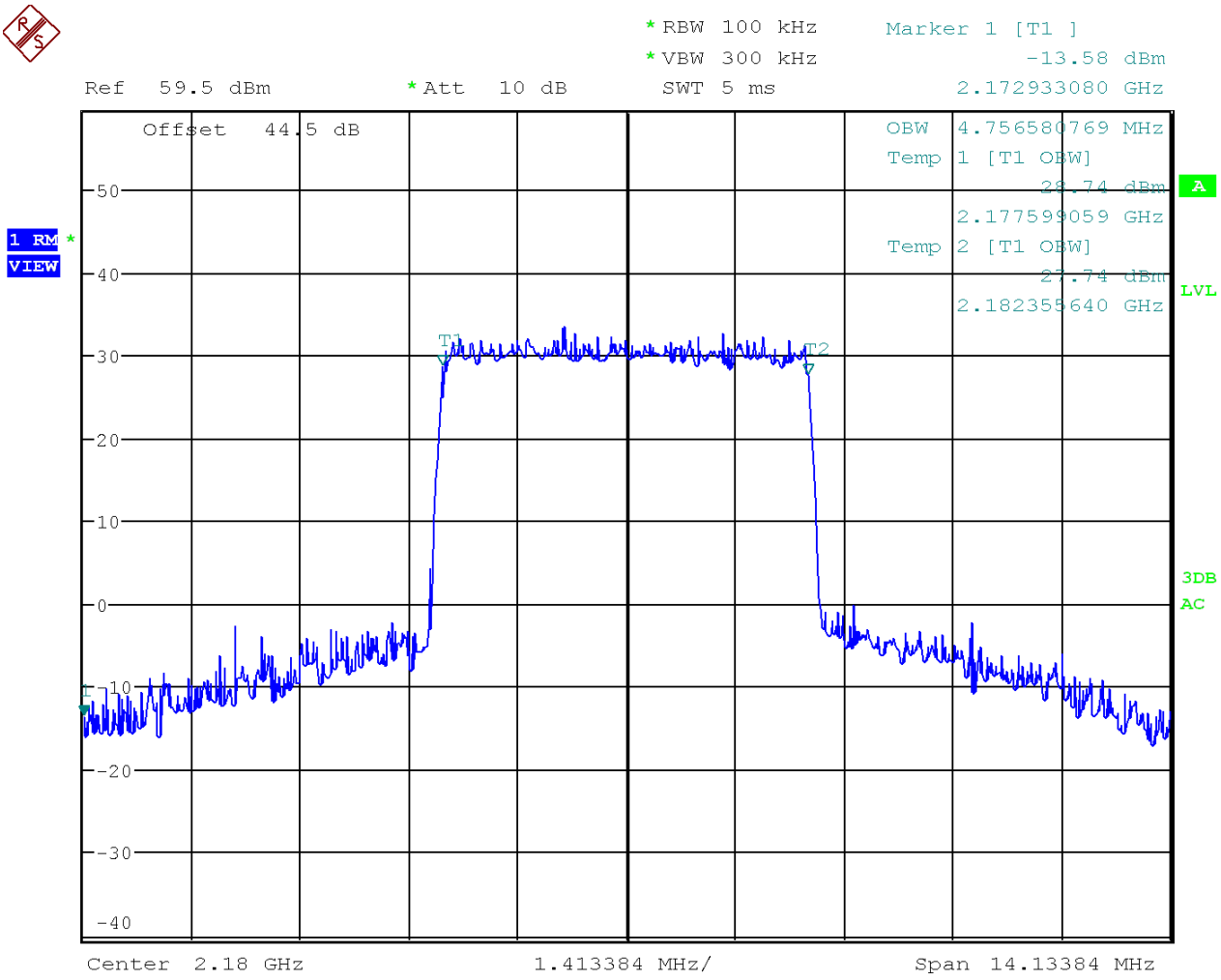
Limits from FCC Parts 2.1049 and 101.109 test procedure from ANSI C63.26-2015.

Test Setup


Test Results, Occupied Bandwidth		
Tuned Frequency (MHz)	Occupied Bandwidth (MHz)	Bandwidth Type
2180	4.757	99%

Occupied Bandwidth, Spectrum Plots

8.2.1 99% Bandwidth Plot, 2180 MHz



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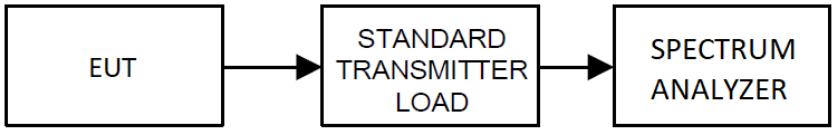
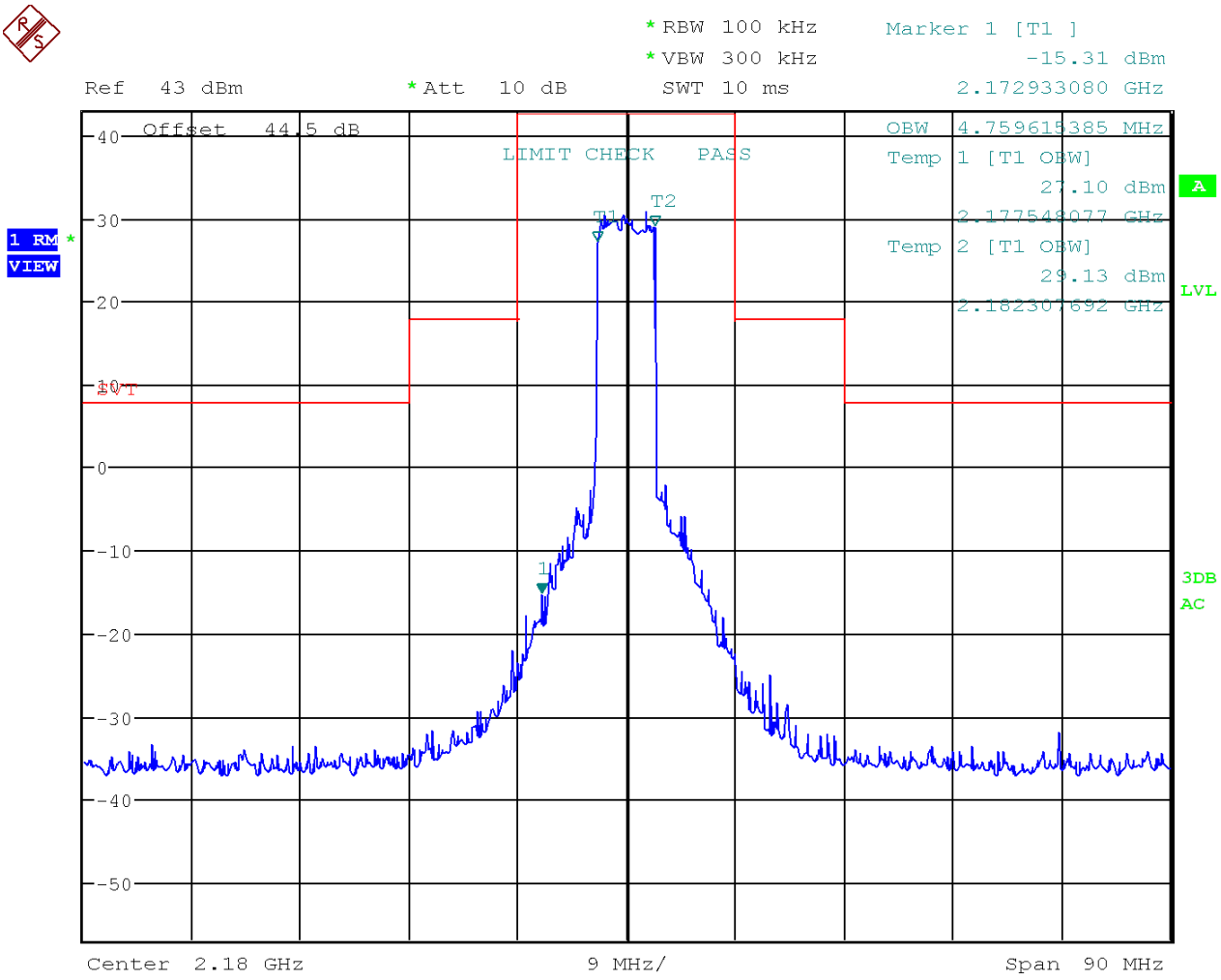
8.3 Emission Limitations, In-Band

Limits from FCC Part 101.111; and test procedure from ANSI C63.26-2015.

Conducted Test Setup


Conducted Emissions Mask, Spectrum Plots

8.3.1 Emission Mask, 2180 MHz



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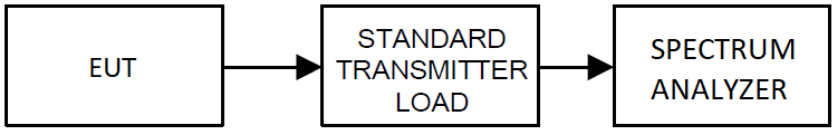
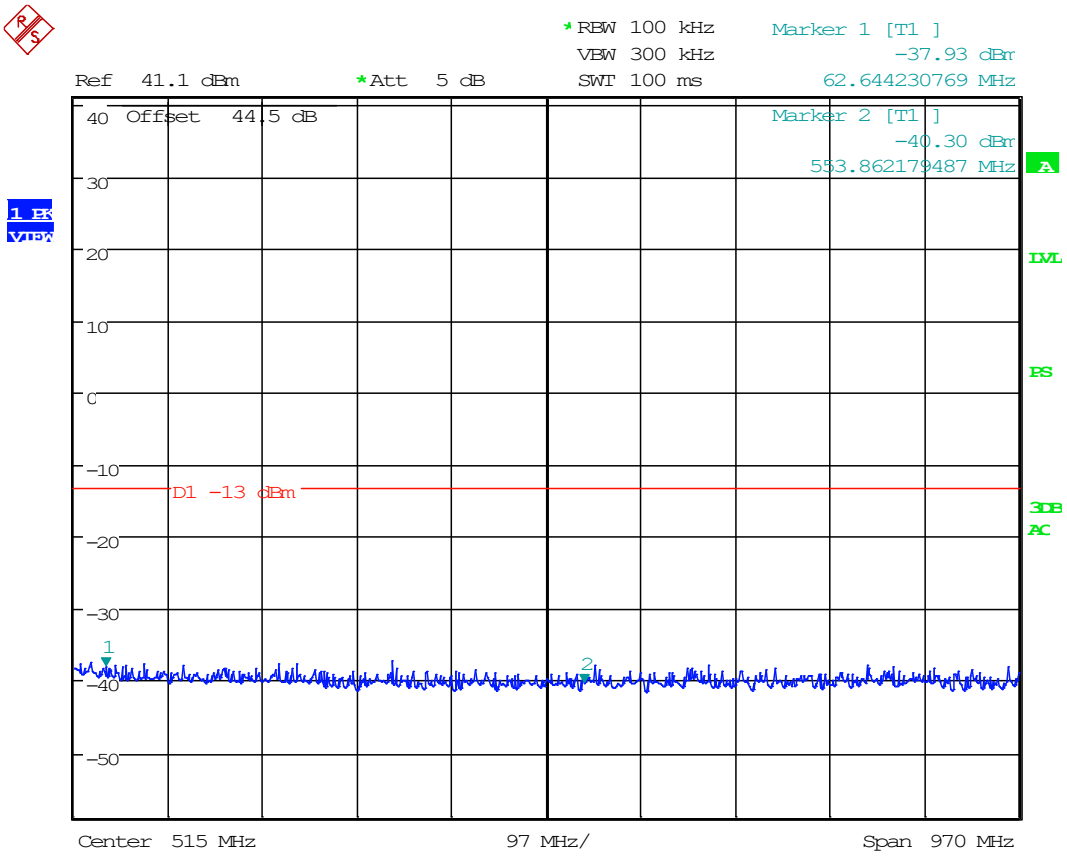
8.4 Emission Limitations, Out-of-Band

Limits from FCC Parts 2.1051, and 101.111 and test procedure from ANSI C63.26-2015.

Conducted Test Setup


Conducted Emissions Spectrum Plots

8.4.1 Conducted Emissions, Below 1G, 2180 MHz



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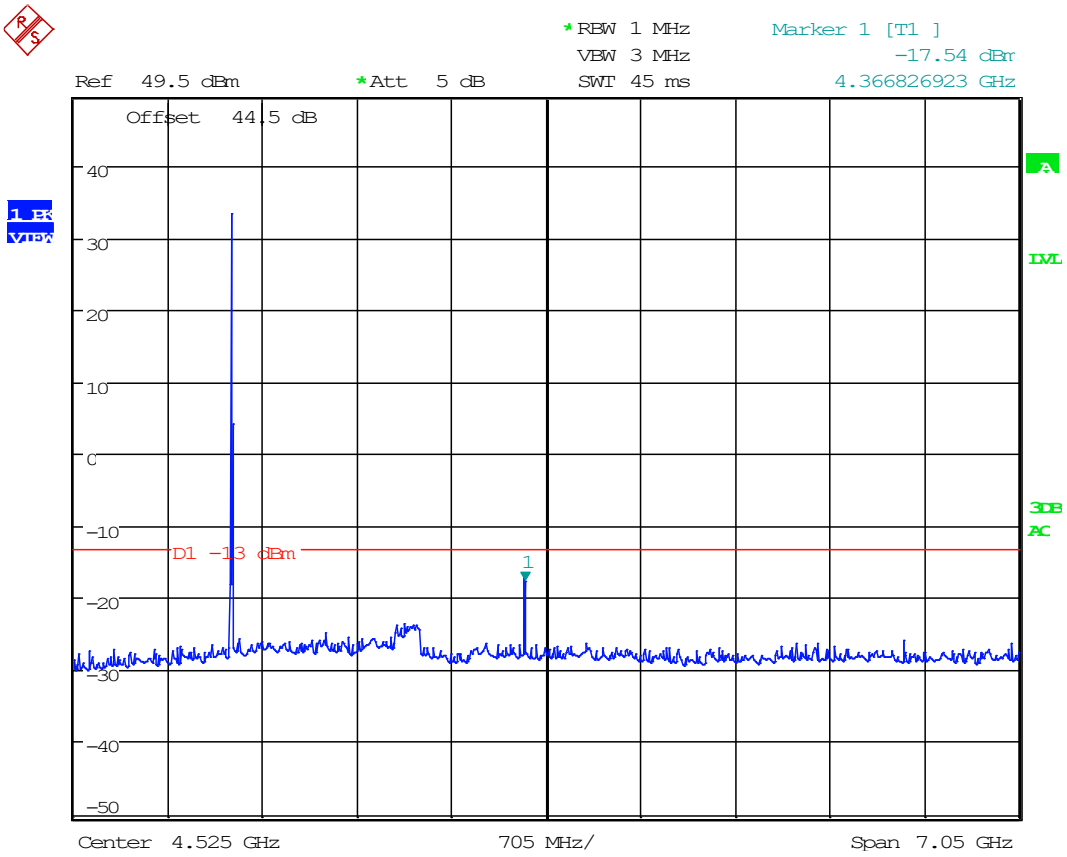
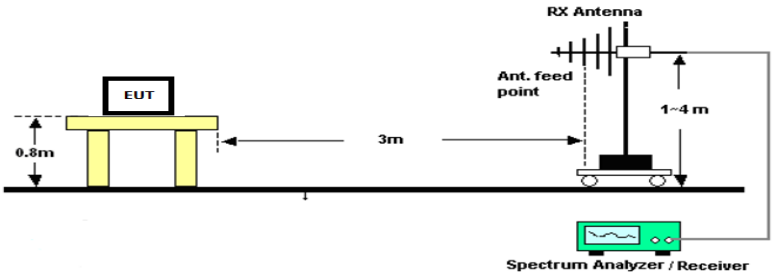
8.4.2 Conducted Emissions, Above 1G, 2180 MHz



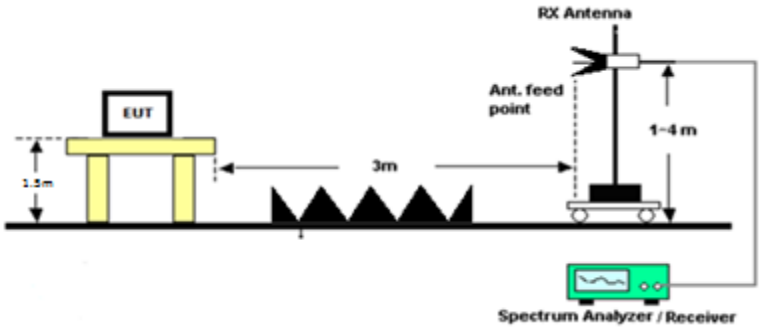
8.5 Radiated Emissions

Limits from FCC Parts 2.1053 and 101.111 and test procedure from ANSI C63.26-2015.

Radiated Test Setup, 30 – 1000 MHz



Radiated Test Setup, Above 1000 MHz



Radiated Emissions, Tabular Data

8.5.1 Radiated Emissions, 2180 MHz

Tuned Frequency (MHz)	Emission Frequency (MHz)	Detector	Meter Reading (dBuV)	Antenna Polarity	Coax Loss (dB)	Antenna Correction Factor (dB/m)	Distance (m)	Field Strength (dBµV/m)	ERP (dBm)	Spurious Limit (dBm)	Margin (dB)
2180.00	4360.00	PK	24.50	H	-7.90	12.81	3.00	29.41	-67.97	-13.00	54.97
2180.00	4360.00	PK	23.30	V	-7.90	12.81	3.00	28.21	-69.17	-13.00	56.17
2180.00	6540.00	PK	23.70	H	-9.74	14.85	3.00	28.81	-68.56	-13.00	55.56
2180.00	6540.00	PK	24.10	V	-9.74	14.85	3.00	29.21	-68.16	-13.00	55.16
2180.00	8720.00	PK	25.10	H	-11.20	14.92	3.00	28.82	-68.55	-13.00	55.55
2180.00	8720.00	PK	24.90	V	-11.20	14.92	3.00	28.62	-68.75	-13.00	55.75
2180.00	10900.00	PK	24.90	H	-12.54	15.90	3.00	28.26	-69.12	-13.00	56.12
2180.00	10900.00	PK	25.10	V	-12.54	15.90	3.00	28.46	-68.92	-13.00	55.92
2180.00	13080.00	PK	25.50	H	-13.91	16.49	3.00	28.07	-69.31	-13.00	56.31
2180.00	13080.00	PK	25.20	V	-13.91	16.49	3.00	27.77	-69.61	-13.00	56.61
2180.00	15260.00	PK	25.70	H	-14.93	17.46	3.00	28.23	-69.15	-13.00	56.15
2180.00	15260.00	PK	25.80	V	-14.93	17.46	3.00	28.33	-69.05	-13.00	56.05
2180.00	17440.00	PK	25.10	H	-16.26	17.97	3.00	26.81	-70.56	-13.00	57.56
2180.00	17440.00	PK	25.50	V	-16.26	17.97	3.00	27.21	-70.16	-13.00	57.16
2180.00	19620.00	PK	25.90	H	-16.97	27.74	3.00	36.67	-60.71	-13.00	47.71
2180.00	19620.00	PK	26.00	V	-16.97	27.74	3.00	36.77	-60.61	-13.00	47.61
2180.00	21800.00	PK	27.20	H	-17.99	27.73	3.00	36.94	-60.44	-13.00	47.44
2180.00	21800.00	PK	26.20	V	-17.99	27.73	3.00	35.94	-61.44	-13.00	48.44

9. ANNEX-A - Photographs of the EUT

Photographs of the EUT and any manufacturer supplied accessories to be used with the EUT are in separate supplementary documents labelled EXTERNAL PHOTOS and INTERNAL PHOTOS.

10. ANNEX-B – Test Setup Photographs

Test setup photographs are located in a separate supplementary ANNEX-B document.

11. History of Test Report Changes

Test Report #	Revision #	Description	Date of Issue
TR_9248-23_FCC 101_	1	Initial release	9/18/2023
	2	Corrected Emission Class pg.6	9/27/2023
		2025 & 2100	

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END OF TEST REPORT