



Test Report - FCC Part 90 Booster Class A (B9A)

Applicant: Eviden

Signature:

A handwritten signature in black ink, appearing to read 'Tim Royer', written over a horizontal line.

Sr. EMC Engineer
EMC-003838-NE



Name & Title:

Tim Royer, EMC Engineer

Date of Signature 1/24/2024

Signature:

A handwritten signature in black ink, appearing to read 'Kristoffer Costa', written over a horizontal line.

Name & Title:

Kristoffer Costa, EMC Technician

Date of Signature 1/24/2024

This test report relates only to the items tested as identified and is not valid for any subsequent changes or modifications made to the equipment under test.

Table of Contents

1.	APPLICANT INFORMATION.....	4
1.1	TEST RESULT SUMMARY	4
2.	LOCATION OF TESTING	7
2.1	TEST LABORATORY.....	7
3.	TEST SAMPLE(S) (EUT/DUT).....	8
3.1	DEFINITIONS	8
3.2	DESCRIPTION OF THE EUT	9
3.3	CONFIGURATION OF EUT	10
3.4	TEST SETUP OF EUT	10
4.	TEST METHODS & APPLICABLE REGULATORY LIMITS.....	11
4.1	TEST METHODS/STANDARDS/GUIDANCE:.....	11
4.2	APPLIED LIMITS AND REGULATORY LIMITS:.....	11
5.	MEASUREMENT UNCERTAINTY.....	11
6.	ENVIRONMENTAL CONDITIONS	11
6.1	TEMPERATURE & HUMIDITY	11
7.	LIST OF TEST EQUIPMENT AND TEST FACILITY.....	13
7.1	LIST OF TEST EQUIPMENT	13
8.	TEST RESULTS	15
8.1	POWER AT THE FINAL AMPLIFIER.....	16
8.2	RF OUTPUT POWER & GAIN.....	17
8.3	OUT-OF-BAND REJECTION.....	19
8.3.1	Uplink, Class A	20
8.3.2	Downlink, Class A	21
8.4	BANDWIDTH & EMISSION	22
8.5	INPUT VS OUTPUT SIGNAL COMPARISON	23
8.5.1	Tetra, Input Signal.....	25
8.5.2	Tetra, UL Mask C, AGC, 456 MHz.....	26
8.5.3	Tetra, UL Mask C, AGC +3, 456 MHz.....	27
8.5.4	Tetra, UL Mask C, AGC, 457.575 MHz	28
8.5.5	Tetra, UL Mask C, AGC+3, 457.575 MHz	29
8.5.6	Tetra, DL Mask C, AGC, 450.9 MHz.....	30
8.5.7	Tetra, DL Mask C, AGC+3, 450.9 MHz.....	31
8.5.8	Tetra, DL Mask C, AGC, 452.575 MHz	32
8.5.9	Tetra, DL Mask C, AGC+3, 452.575 MHz	33
8.6	NOISE FIGURE.....	34
8.7	OUT-OF-BAND/OUT-OF-BLOCK EMISSIONS (INTERMODULATION PRODUCTS)	35
8.7.1	Tetra, Uplink, AGC, 456 MHz.....	36
8.7.2	Tetra, Uplink, AGC+3dB, 456 MHz	37
8.7.3	Tetra, Uplink, AGC, 457.575 MHz	38

8.7.4	<i>Tetra, Uplink, AGC+3dB, 457.575 MHz</i>	39
8.7.5	<i>Tetra, Downlink, AGC, 450.9 MHz</i>	40
8.7.6	<i>Tetra, Downlink, AGC+3dB, 450.9 MHz</i>	41
8.7.7	<i>Tetra, Downlink, AGC, 452.575 MHz</i>	42
8.7.8	<i>Tetra, Downlink, AGC+3dB, 452.575 MHz</i>	43
8.8	EMISSION MASK, OUT-OF-BAND.....	44
8.8.1	<i>30 MHz to 1 GHz, 456 MHz</i>	45
8.8.2	<i>1 GHz to 10th Harmonic, 456 MHz</i>	46
8.8.3	<i>30 MHz to 1 GHz, 457.575 MHz</i>	47
8.8.4	<i>1 GHz to 10th Harmonic, 457.575 MHz</i>	48
8.8.5	<i>30 MHz to 1 GHz, 450.9 MHz</i>	49
8.8.6	<i>1 GHz to 10th Harmonic, 450.9 MHz</i>	50
8.8.7	<i>30 MHz to 1 GHz, 452.575 MHz</i>	51
8.8.8	<i>1 GHz to 10th Harmonic, 452.575 MHz</i>	52
8.9	SPURIOUS RADIATED EMISSIONS.....	53
8.9.1	<i>Uplink, 456 MHz</i>	54
8.9.2	<i>Uplink, 457.575 MHz</i>	55
8.9.3	<i>Downlink, 450.9 MHz</i>	56
8.9.4	<i>Downlink, 452.575 MHz</i>	57
9.	ANNEX-B – TEST SETUP PHOTOGRAPHS.....	58
10.	HISTORY OF TEST REPORT CHANGES.....	58

1. Applicant Information

Applicant: Eviden Austria Gmbh
Address: C/O Eviden Austria Gmbh
Wagramer Strasse 19/Stock 16,
Vienna, Austria 1220.

1.1 Test Result Summary

The following test procedure and guidance were used for measuring FCC PART 90 (PRIVATE LAND MOBILE RADIO SERVICES) known as Licensed Land Mobile; ANSI C63.26-2015 and FCC KDB 935210 D05 v01r04 Industrial Signal Boosters. Full test results are available in this report.

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.

Applicable Clauses from Part 2		
FCC Part 2 Clauses	Description of the requirements	Result: (Pass, Fail, N/A)
2.202	Bandwidth & Emission	Pass
2.1033 (c)(8)	Power at the Final Amplifier	Pass
2.1046 (a)	RF Output Power	Pass
2.1047	Modulation characteristics	n/a
2.1049	Occupied Bandwidth	Pass
2.1051	Spurious emissions at antenna terminals	Pass
2.1053	Field strength of spurious radiation	Pass
2.1055	Frequency stability	n/a

Applicable Clauses from Part 90 Subpart I		
FCC Part 90 Clauses	Description of the requirements	Result: (Pass, Fail, N/A)
90.205	Transmitter Power	Pass
90.207	Types of Emissions	Pass
90.209	Bandwidth limitations	Pass
90.210	Emission masks, In-band	Pass
90.210	Emission masks, Out-of-band	Pass
90.213	Frequency stability	n/a
90.214	Transient Frequency Behavior	n/a
90.219 (d)(6)(i)	ERP of intermodulation products	n/a ¹
90.219 (d)(6)(ii)	ERP of noise within the passband	n/a ¹
90.219 (d)(6)(iii)	ERP of noise on spectrum < 1 MHz outside of the passband	n/a ¹
90.219 (d)(3)(i), (e)(1)	ERP of Radiated Power	n/a ¹
90.219 (e)(2)	Noise figure	Pass
90.219 (e)(3)	Spurious emissions	Pass
90.219 (e)(4)(i)(ii)(iii)	Retransmitted Signals	Pass
90.221	Adjacent channel power limits	Pass

Note 1: Requirements in Part 90.219 (d) apply at deployment of this EUT, therefore are not applicable at certification.

KDB 935210 D05 v01r04		
FCC KDB 935210 D05 Clauses	Description of the requirements	Result: (Pass, Fail, N/A)
4.1	Test Signals for PLMRS (Input Signals)	Pass
4.2	AGC Threshold	Reported
4.3	Out-of-Band Rejection	Reported
4.4	Input-versus-Output Signal Comparison	Pass
4.5	Output Power	Pass
4.5	Amplifier/Booster Gain (optional)	Reported
4.6	Noise Figure	Pass

4.7.2	Out-of-band/Out-of-block Conducted Emissions (Intermodulation Products)	Pass
4.7.3	EUT Spurious Conducted Emissions	Pass
4.8	Frequency Stability	n/a
4.9	Spurious Radiated Emissions	Pass

KDB 484596 D01 v01		
FCC KDB 935210 D05 Clauses	Description of the requirements	Result: (Pass, Fail, N/A)
3 a	Introduction	Reported
3 b	Explain the Differences	Reported
3 c	Spot-check Verification Data	Pass
3 d	Reference Section	Reported

2. Location of Testing

2.1 Test Laboratory

Timco Engineering Inc. is a subsidiary of Industrial Inspection & Analysis, Inc. ("IIA"). Testing was performed at IIA's permanent laboratory located at 13146 NW 86th Drive, Suite 400, Alachua, Florida 32615.

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

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

The test sample was received: 11/9/2023

3.1 Definitions

Signal booster: A device or system that automatically receives, amplifies, and retransmits signals from wireless stations into and out of building interiors, tunnels, shielded outdoor areas and other locations where these signals would otherwise be too weak for reliable communications. Signal booster systems may contain both Class A and Class B signal boosters as components.

Class A signal booster: A signal booster designed to retransmit signals on one or more specific channels. A signal booster is deemed to be a Class A signal booster if none of its passbands exceed 75 kHz.

Class B signal booster: A signal booster designed to retransmit any signals within a wide frequency band. A signal booster is deemed to be a Class B signal booster if it has a passband that exceeds 75 kHz.

3.2 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:	2A289BRTM36
Brief Description	400 MHz Digital TETRA Repeater
Model(s) #	BRTM36
Firmware version	N/A
Software version	V1.1.0.669
Serial Number	N/A

Technical Characteristics	
Frequency Range	Uplink: 456- 457.575 Downlink: 450.9- 452.575
RF O/P Power (Max.)	24 dBm
Modulation	FM
Bandwidth & Emission Class	D7W
Number of Channels	N/A
Duty Cycle	100%
Antenna Connector	N Type
Voltage Rating (AC or Batt.)	100- 240 VAC

Antenna Characteristics			
Antenna	Frequency Range	Mode / BW	Antenna Gain
1	n/a	n/a	0 dBi

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

3.3 Configuration of EUT

Test Modes		
Band (MHz)	Link Direction	Test Frequencies (MHz)
456- 457.575 MHz	Uplink	456 MHz
		457.575 MHz
450.9- 452.575 MHz	Downlink	450.9 MHz
		452.575 MHz

Operating conditions during Testing:

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:

A laptop was used to program the EUT.

3.4 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 Part 90 Licensed device:

- 1) ANSI C63.26-2015
- 2) FCC KDB 935210 D05 v01r04 Industrial Signal Boosters

4.2 Applied Limits and Regulatory Limits:

- 1) FCC CFR 47 Part 90 Subpart I, 90.219

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.	



13146 NW 86th Drive, Suite 400, Alachua, Florida 32615
(352) 472-5500 / testing@industrial-ia.com

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
Receiver	EMI Test Receiver R&S ESW44	Rohde & Schwarz	ESW44	103049	10/13/21	10/12/2024
Signal Generator	Signal Generator HP 8648C	HP	8648C	35537A01 679	3/29/19	8/03/2025
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	5/31/23	5/30/2026
CHAMBER	CHAMBER	Panashiel d	3M	N/A	3/12/19	12/21/2023
Pre-amp	Pre-amp	RF- LAMBDA	RLNA00M45GA	NA	2/27/19	7/26/2025

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



13146 NW 86th Drive, Suite 400, Alachua, Florida 32615
(352) 472-5500 / testing@industrial-ia.com

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 dB μ V. 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 (dB μ V/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 dB μ V 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 dB μ V	+ 10.36 dB/m	+0.40 dB	=30.36 dB μ V/m @ 3m

$EIRP = P_{cond} \text{ (dBm)} + dBi$

8.1 Power at the Final Amplifier

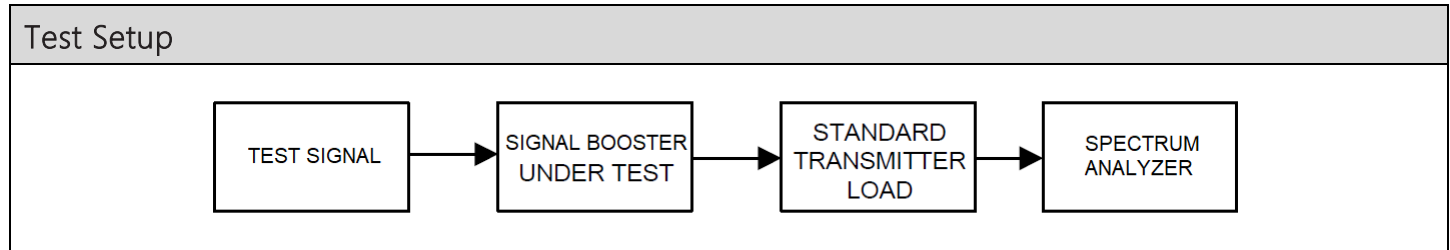
Limits from FCC Part 2.1033 (c)(8).

No method of measurement is specified. The result has been calculated based on all available information.

Test Results		
EUT Operating Voltage (V)	EUT Current (A)	Power at the Final Amplifier (W)
110	0.63	70

8.2 RF Output Power & Gain

Limits from FCC Parts 2.1046(a), and 90.205 and test procedure from ANSI C63.26-2015 and FCC KDB 935210 D05 v01r04 Industrial Signal Boosters.



Test Results, Power Output		
Link Direction	Max Power Output (dBm)	Max Power Output (W)
Uplink	26.52	0.448
Downlink	26.32	0.428

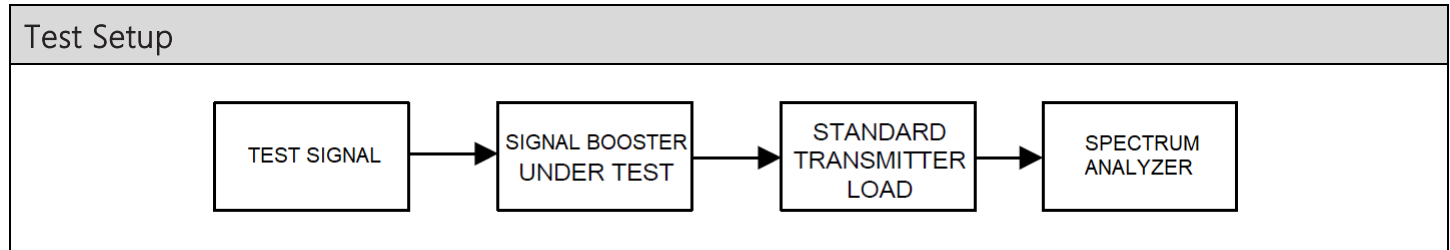
Gain

Test Results, Gain					
Link Direction	Tuned Frequency (MHz)	Input Level	Power Input (dBm)	Power Output (dBm)	Gain (dB)
Uplink	456	AGC	-34	26.08	60.08
		AGC+3	-31	26.10	67.10
	457.575	AGC	-33	26.50	59.5
		AGC+3	-30	26.52	56.52
Downlink	450.9	AGC	-35	26.12	61.12
		AGC+3	-32	26.32	58.32
	452.575	AGC	-35	25.75	60.75
		AGC+3	-32	25.77	57.77

6dB adjustment from splitter included in calculation

8.3 Out-of-band Rejection

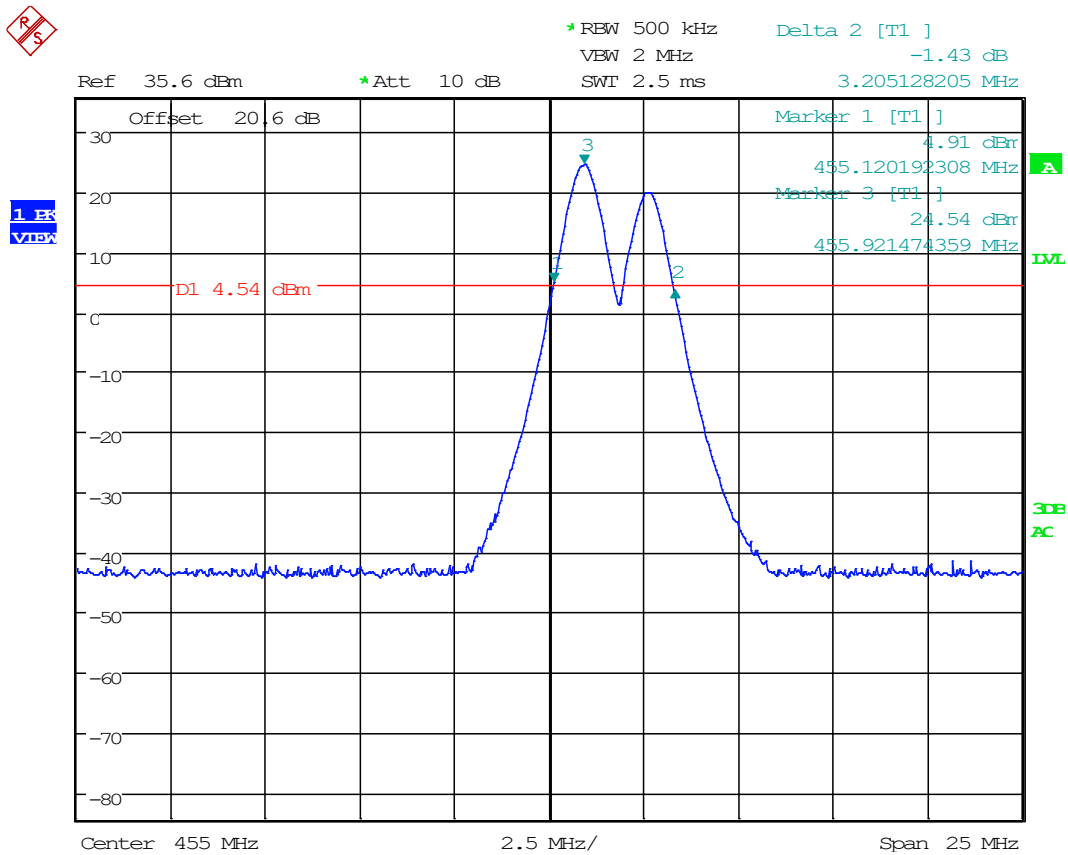
Limits and test method from FCC KDB 935210 D05 v01r04 Industrial Signal Boosters.



Test Results, Out-of-band Rejection and Class of Operation			
Operating Band (MHz)	Link Direction	Passband (kHz)	Class of Operation
456- 457.575 MHz	Uplink	< 75 kHz	Class A
450.9- 452.575 MHz	Downlink	< 75 kHz	Class A

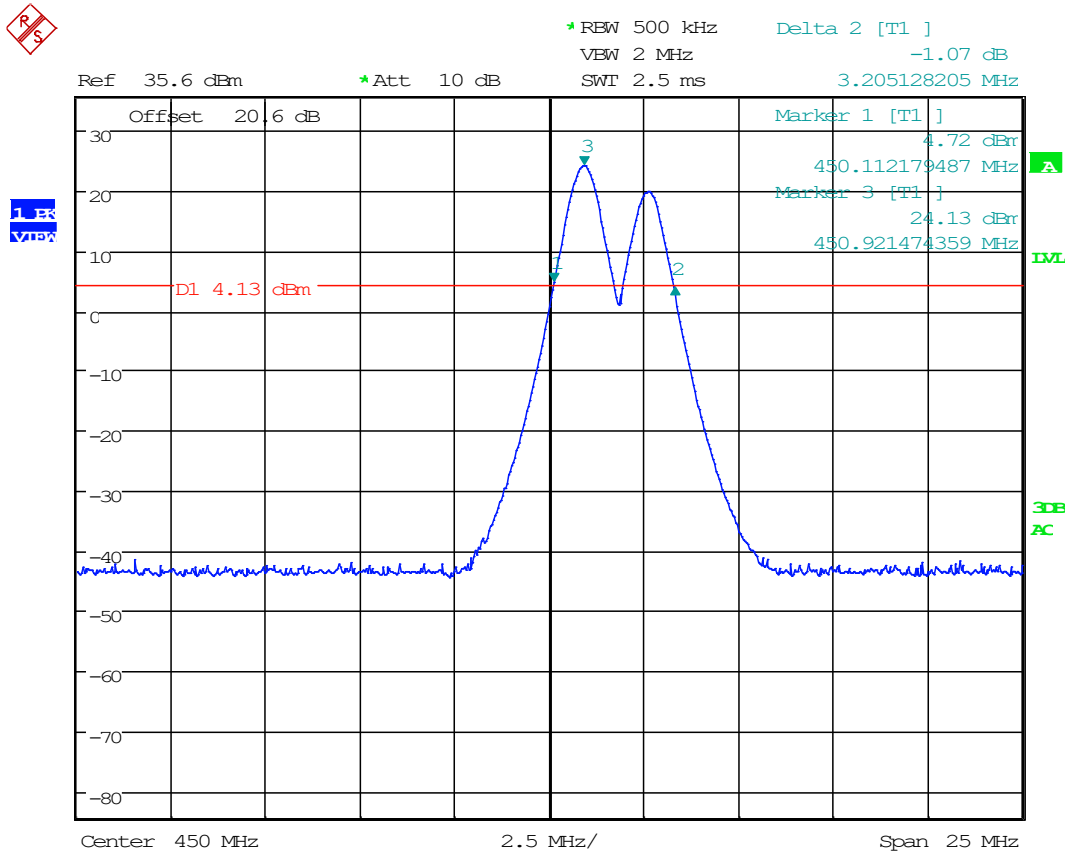
Out-of-band Rejection, Spectrum Plots

8.3.1 Uplink, Class A



Date: 14.DEC.2023 10:55:31

8.3.2 Downlink, Class A



Date: 14.DEC.2023 11:00:20

8.4 Bandwidth & Emission

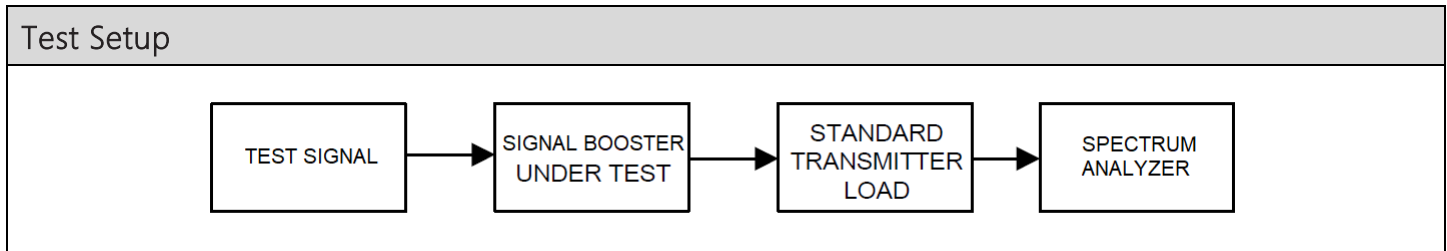
Limits from FCC Parts 90.209 and FCC KDB 935210 D05 v01r04 Industrial Signal Boosters.

Authorized Bandwidth		
Rule Part	Operating Range (MHz)	Authorized Bandwidth (kHz)
Part 90	456- 457.575 MHz	20
Part 90	450.9- 452.575 MHz	20

Applicable Input Signals		
Signal	Occupied Bandwidth (kHz)	Representative Emission Designator(s)
Tetra	20.971	D7W

8.5 Input VS Output Signal Comparison

Limits from FCC Parts 90.210 and test procedure from ANSI C63.26-2015 and FCC KDB 935210 D05 v01r04 Industrial Signal Boosters.



Input VS Output Comparison

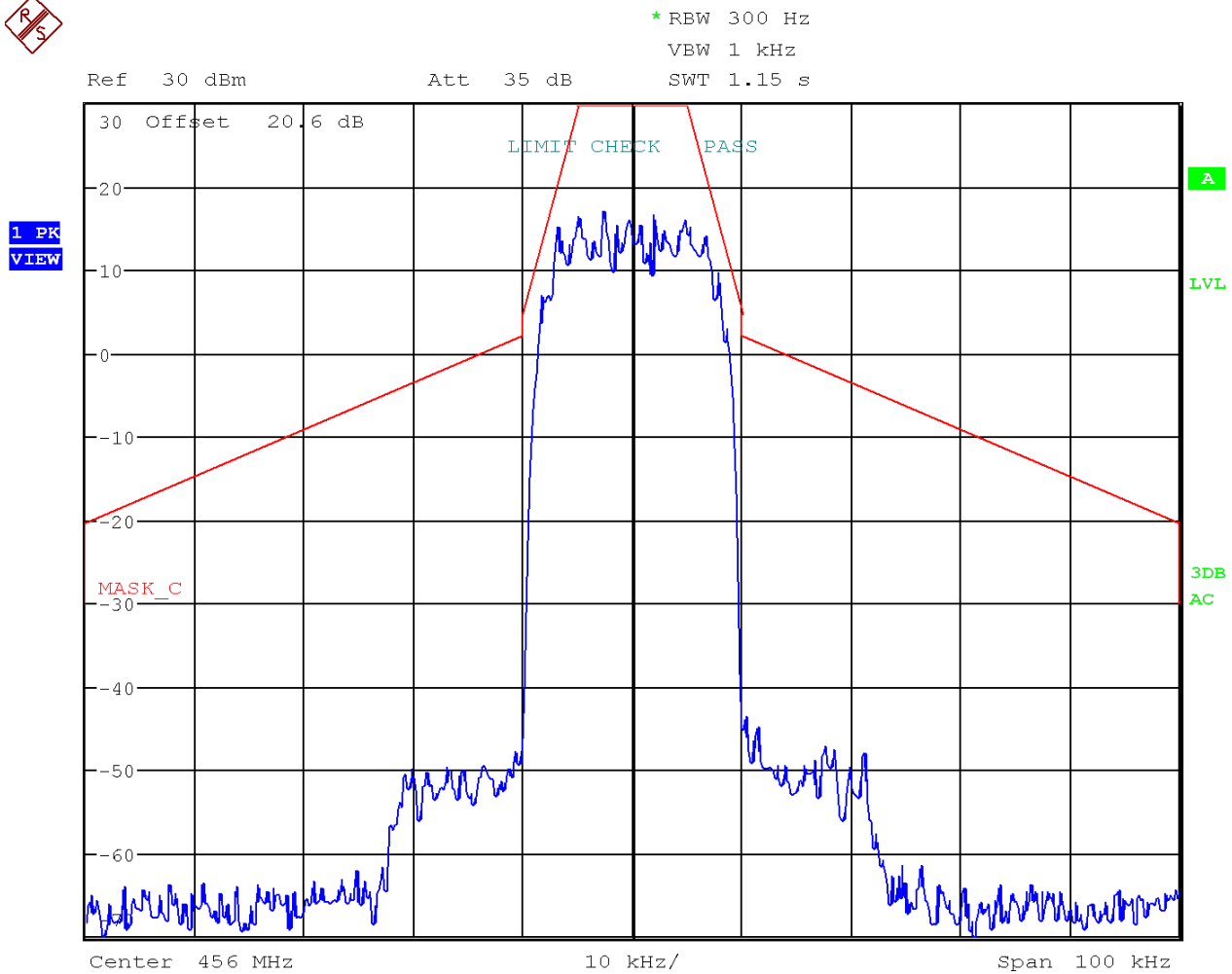
Test Results, Input VS Output Comparison						
Link Direction	Tuned Frequency (MHz)	Input Signal	AGC Level	99% OBW of Input (kHz)	99% OBW of Output (kHz)	Change (%)
Uplink	456	Tetra	@ AGC	16.288	20.879	4.591
Downlink	452.575	Tetra	@ AGC	16.288	20.971	4.683

Input VS Output, Input Spectrum Plots

8.5.1 Tetra, Input Signal

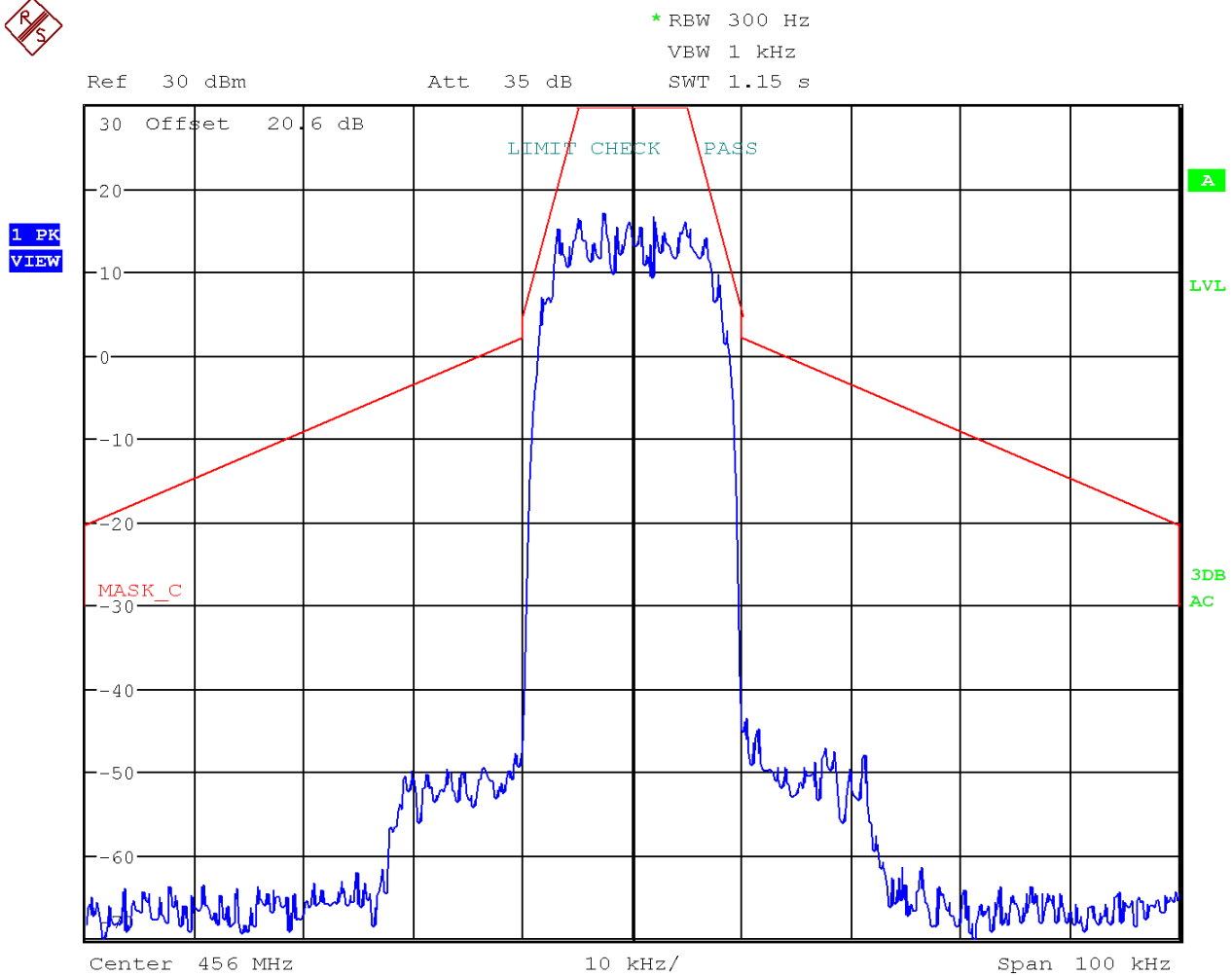


8.5.2 Tetra, UL Mask C, AGC, 456 MHz



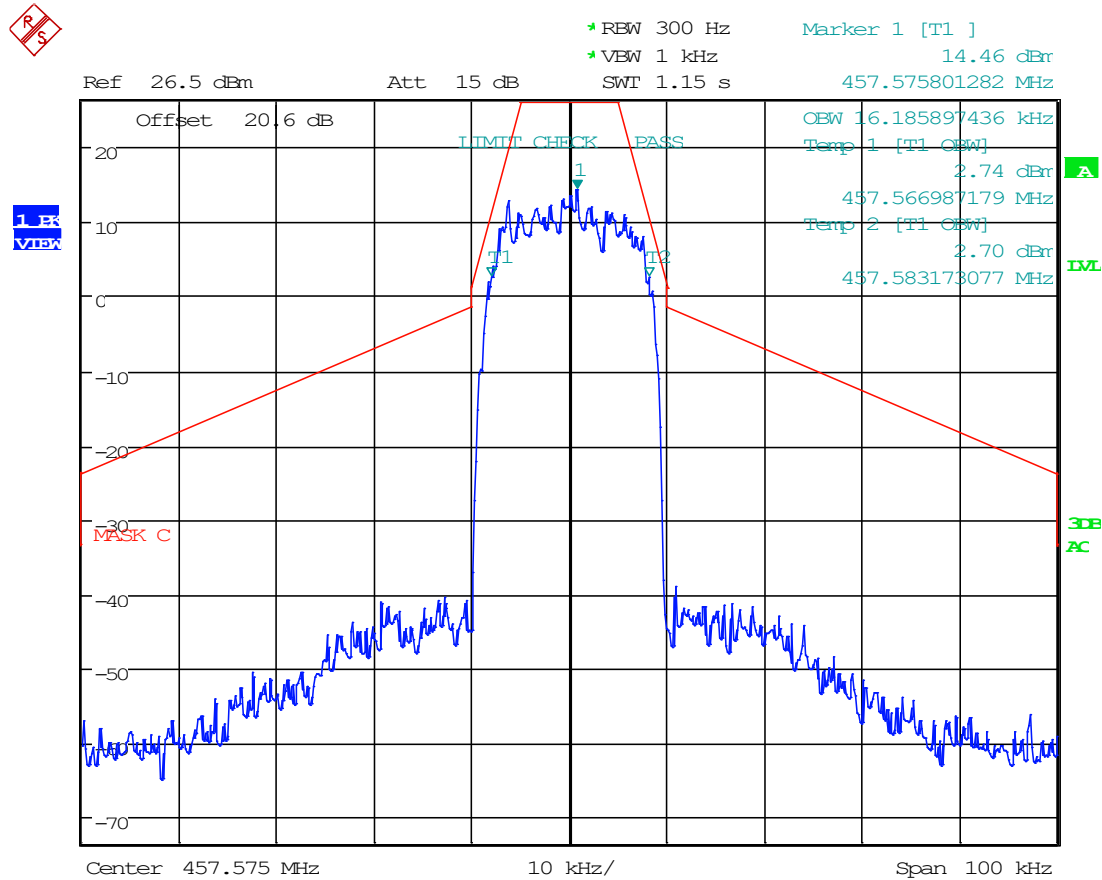
Date: 22.JAN.2024 15:37:00

8.5.3 Tetra, UL Mask C, AGC +3, 456 MHz



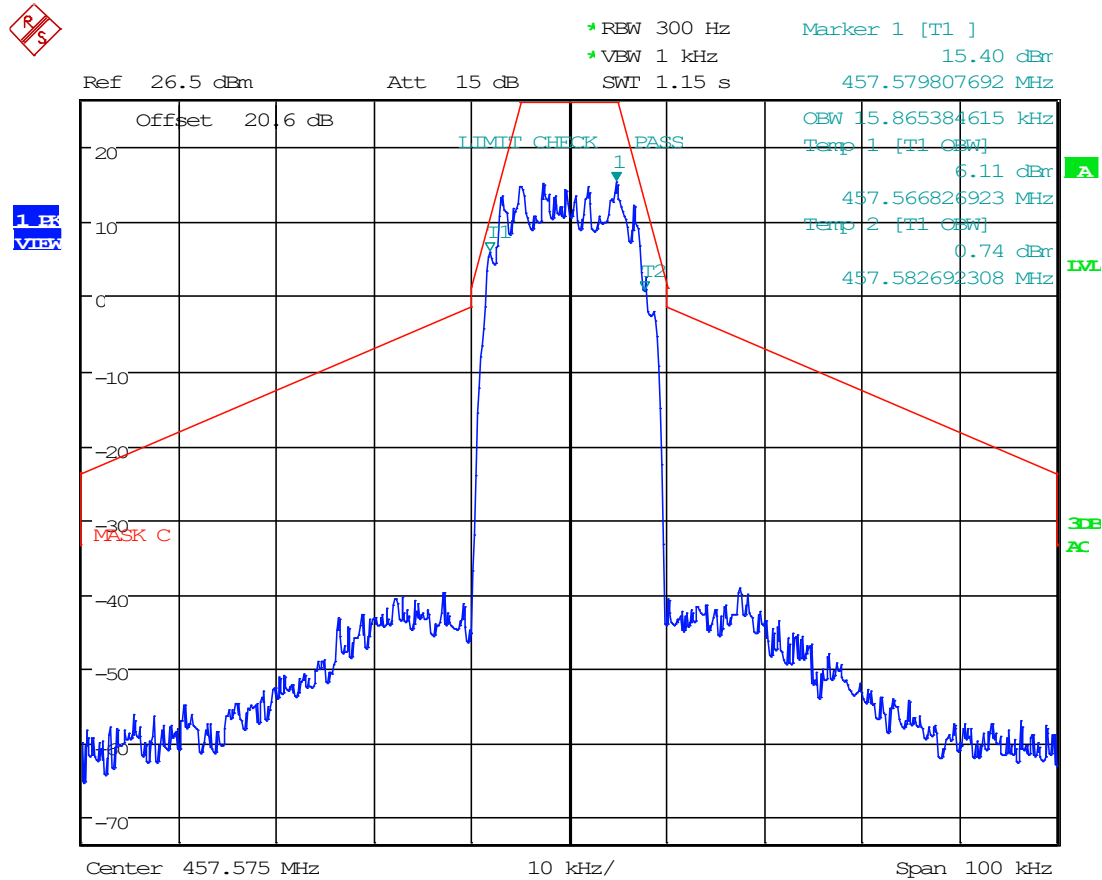
Date: 22.JAN.2024 15:37:24

8.5.4 Tetra, UL Mask C, AGC, 457.575 MHz



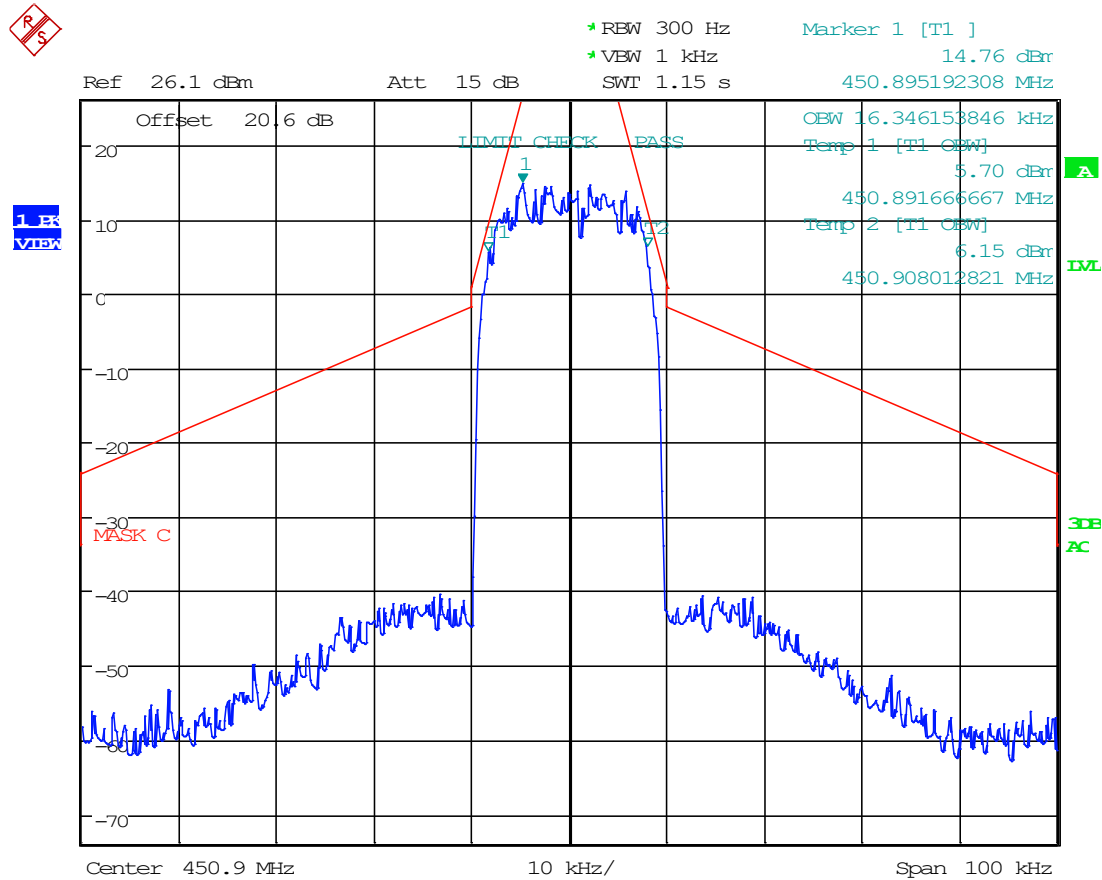
Date: 13.DEC.2023 16:31:00

8.5.5 Tetra, UL Mask C, AGC+3, 457.575 MHz



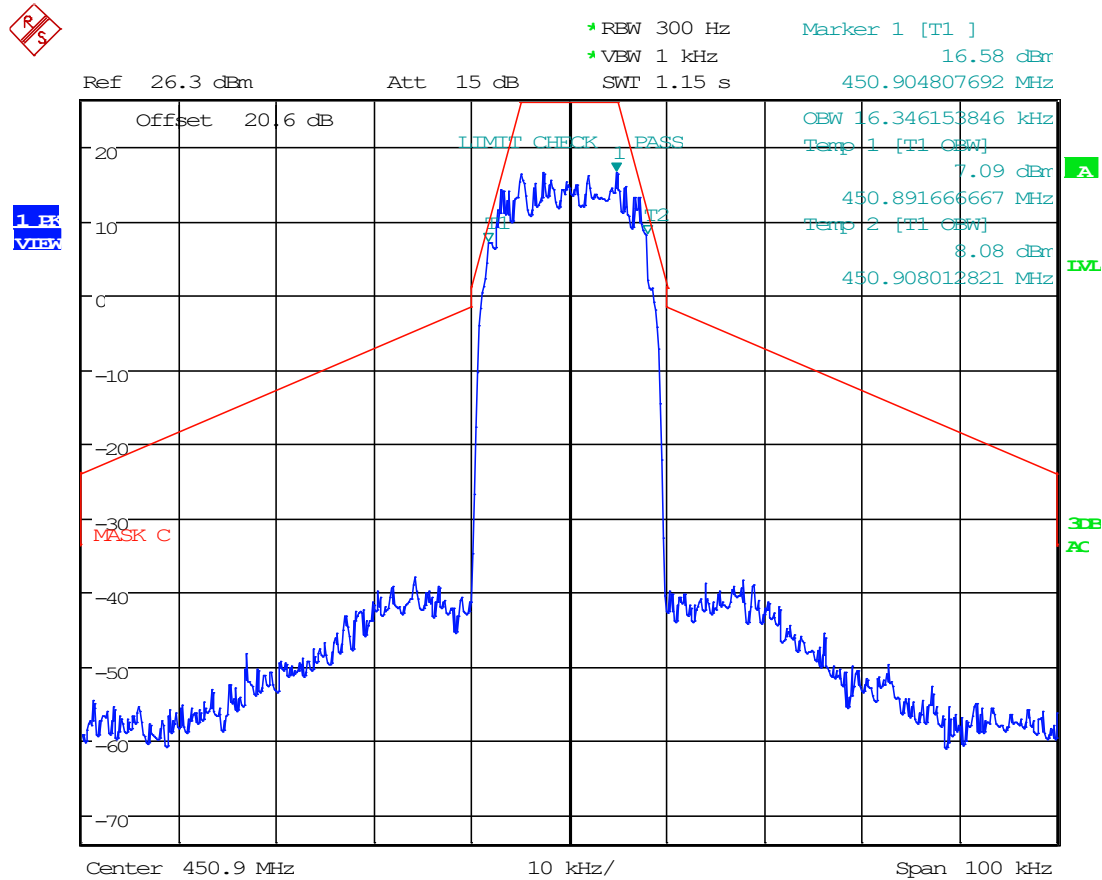
Date: 13.DEC.2023 16:31:51

8.5.6 Tetra, DL Mask C, AGC, 450.9 MHz



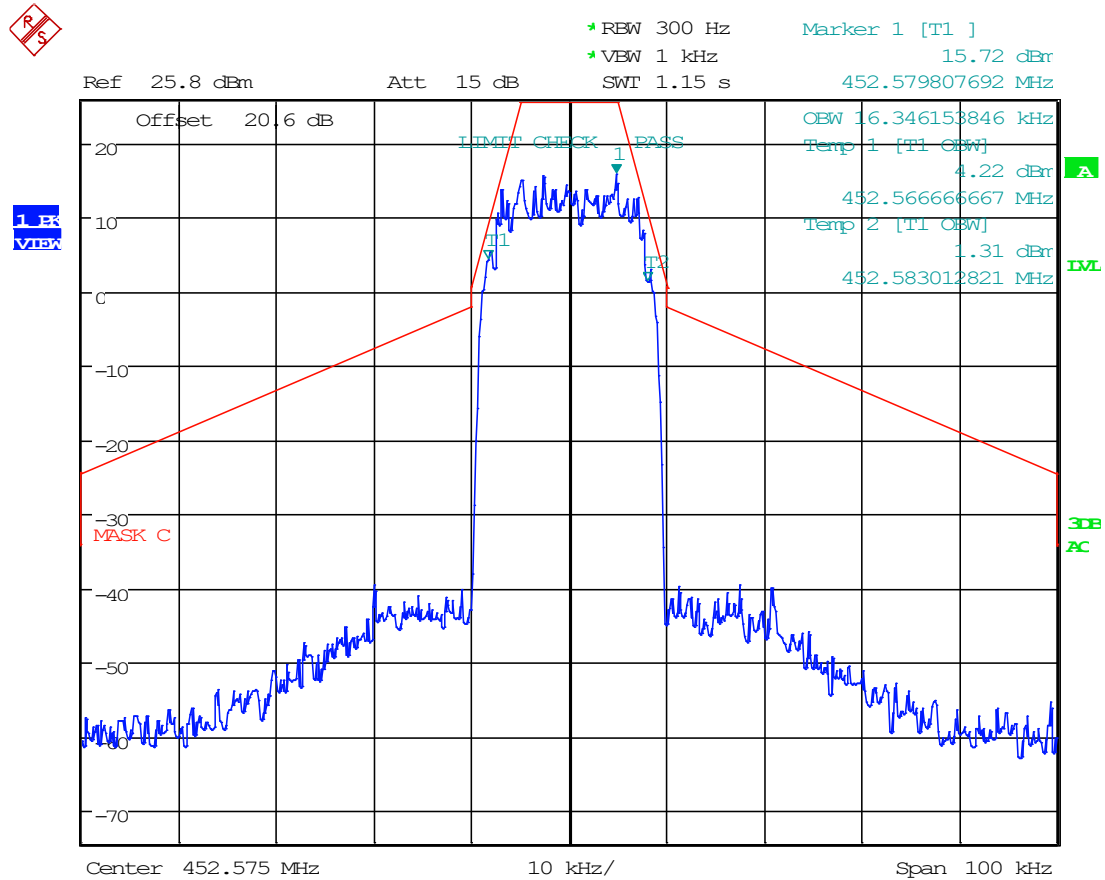
Date: 13.DEC.2023 16:33:33

8.5.7 Tetra, DL Mask C, AGC+3, 450.9 MHz



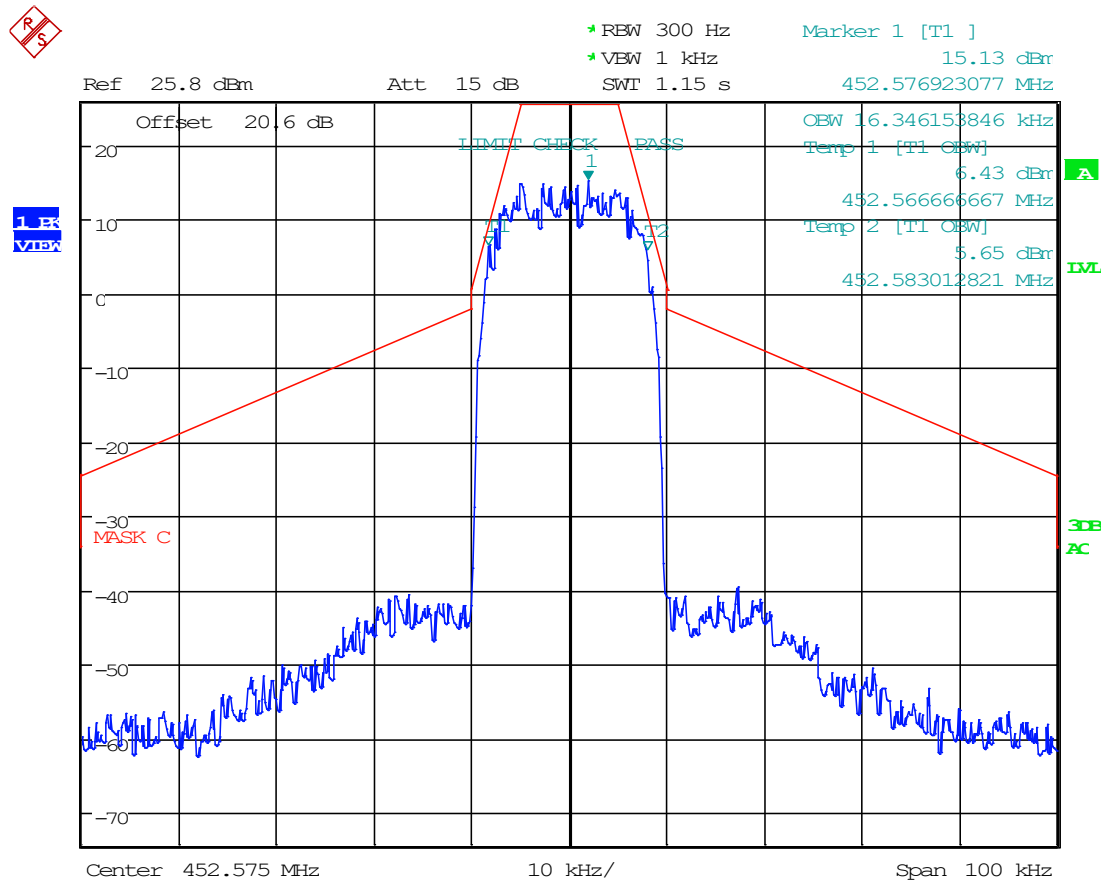
Date: 13.DEC.2023 16:34:25

8.5.8 Tetra, DL Mask C, AGC, 452.575 MHz



Date: 13.DEC.2023 16:36:04

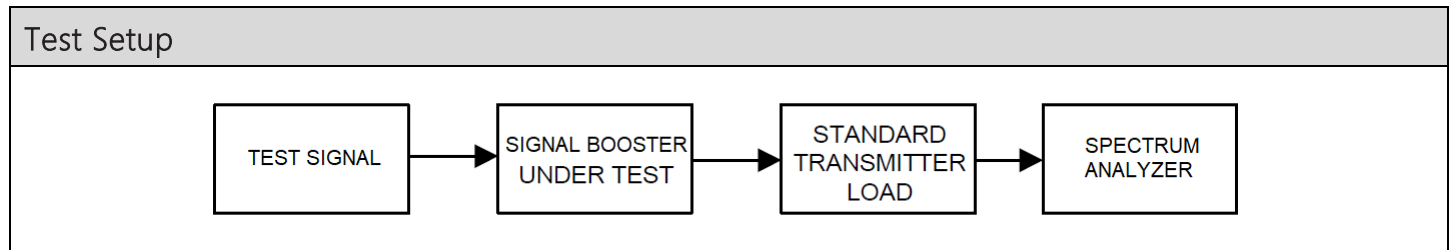
8.5.9 Tetra, DL Mask C, AGC+3, 452.575 MHz



Date: 13.DEC.2023 16:37:00

8.6 Noise Figure

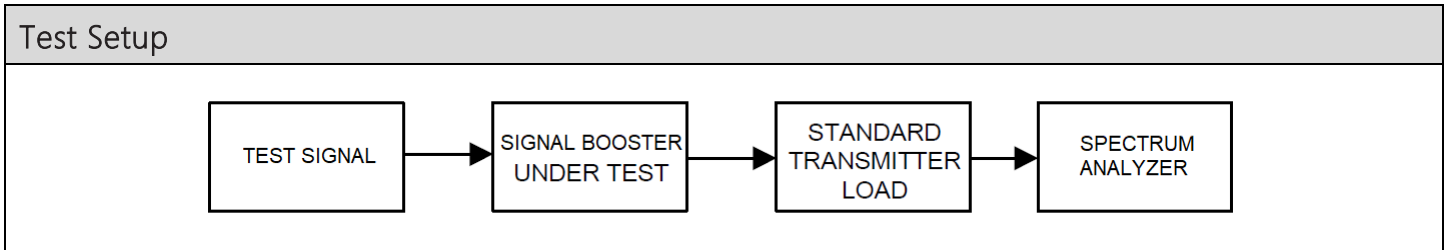
Limits from FCC 90.219 (e)(2) and KDB 935210 D05 v01r04 Industrial Signal Boosters. Test method from "Noise Figure Measurement Accuracy: The Y-Factor Method" by Keysight Technologies.



Test Results, Out-of-band Rejection and Class of Operation			
Operating Band (MHz)	Link Direction	Noise Figure (dB)	Limit (dB)
456- 457.575 MHz	Uplink	0.68	< 9 dB
450.9- 452.575 MHz	Downlink	2.16	< 9 dB

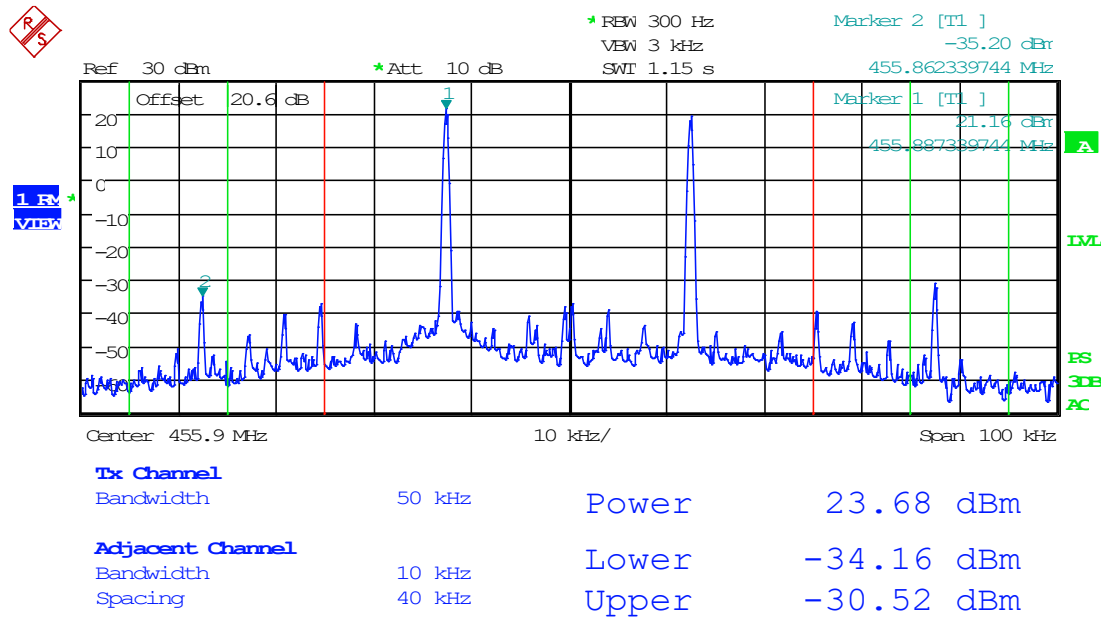
8.7 Out-of-Band/Out-of-Block Emissions (Intermodulation Products)

Limits from FCC Parts 2.1051, FCC Pt. 90.219(d)(6) and test procedure from ANSI C63.26-2015 and FCC KDB 935210 D05 v01r04 Industrial Signal Boosters.



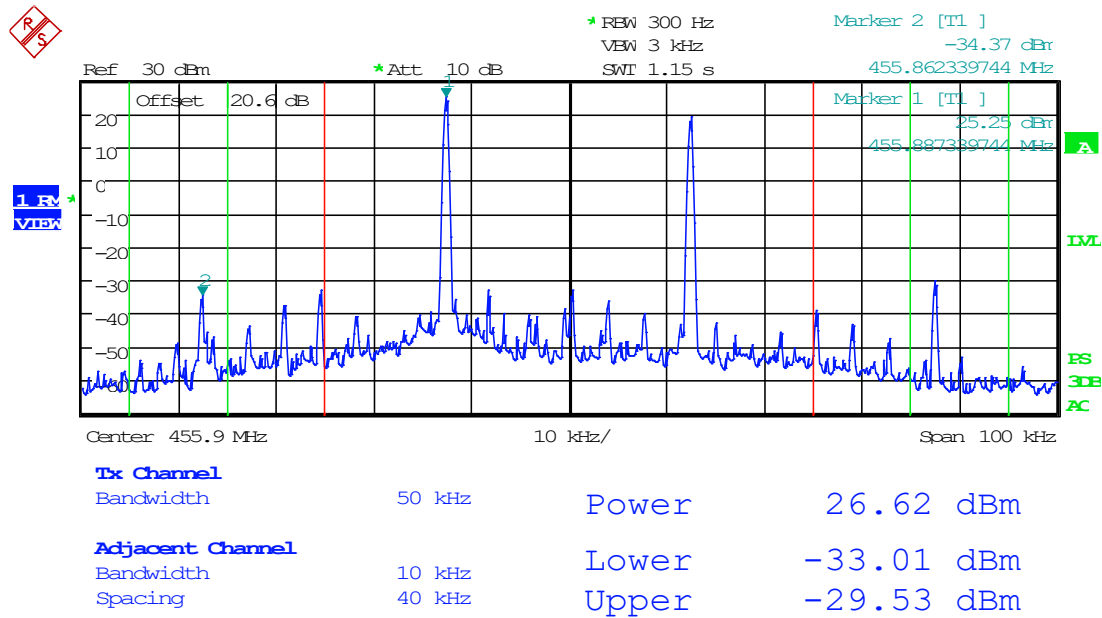
Intermodulation Products Spectrum Plots

8.7.1 Tetra, Uplink, AGC, 456 MHz



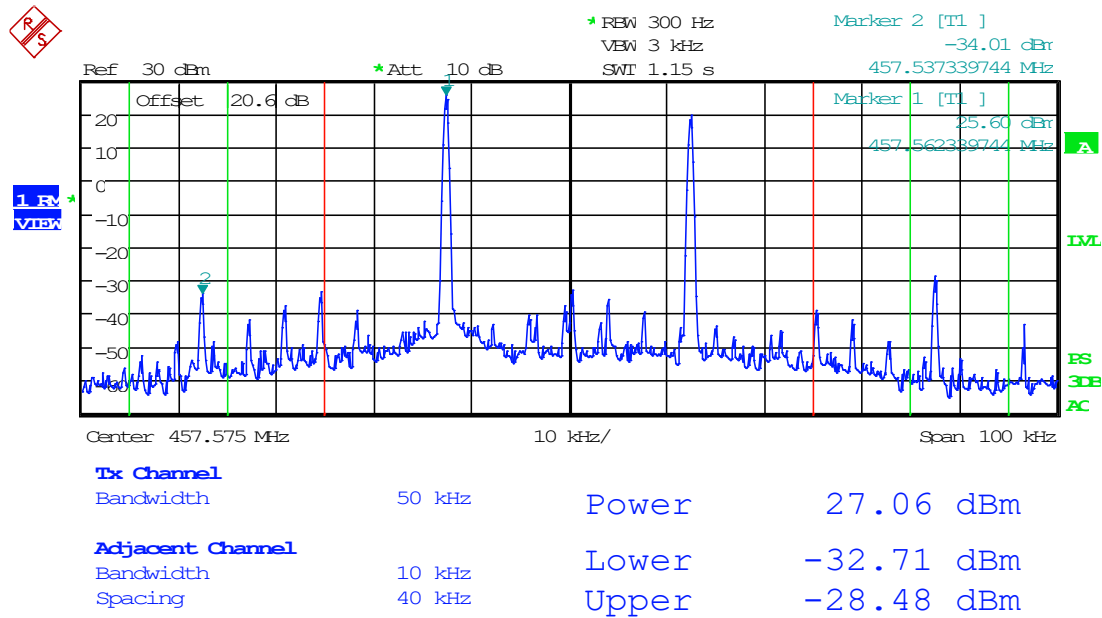
Date: 13.DEC.2023 17:08:56

8.7.2 Tetra, Uplink, AGC+3dB, 456 MHz



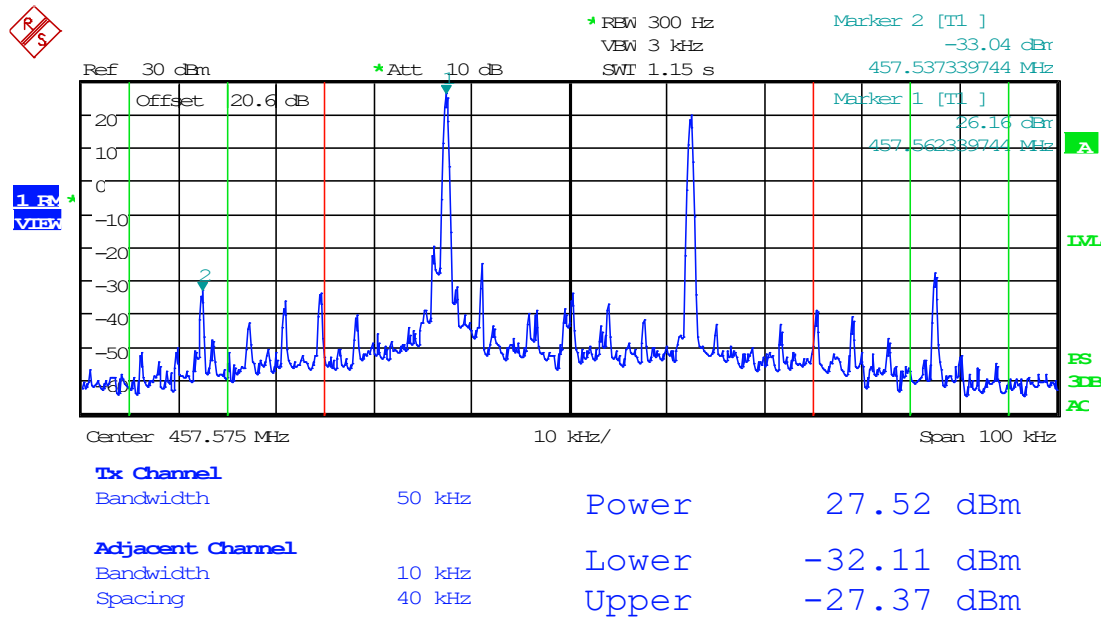
Date: 13.DEC.2023 17:09:44

8.7.3 Tetra, Uplink, AGC, 457.575 MHz



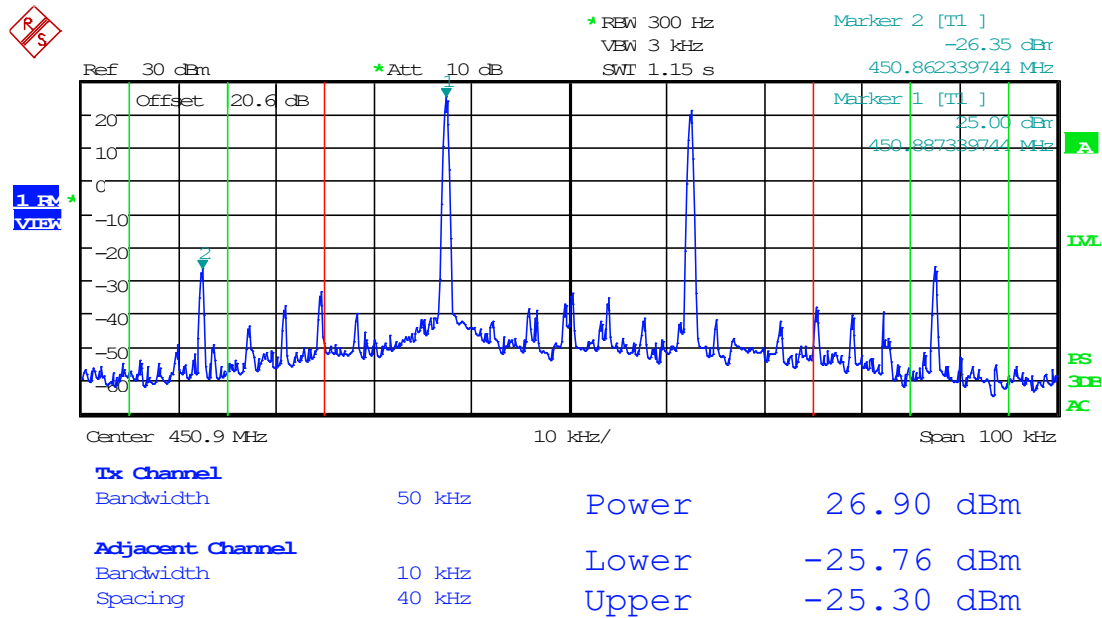
Date: 13.DEC.2023 17:12:42

8.7.4 Tetra, Uplink, AGC+3dB, 457.575 MHz



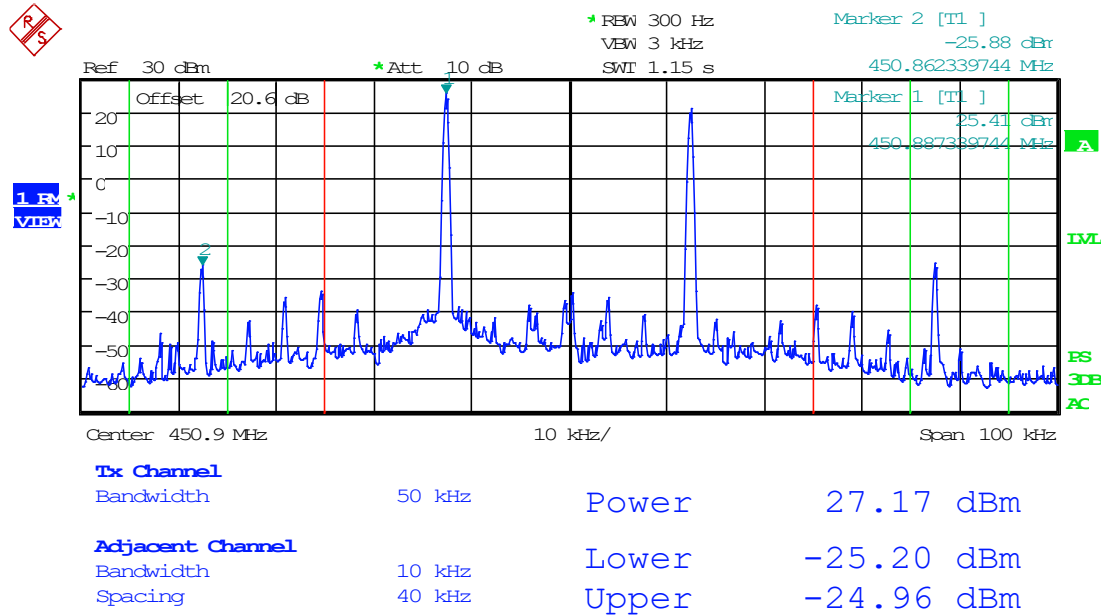
Date: 13.DEC.2023 17:13:28

8.7.5 Tetra, Downlink, AGC, 450.9 MHz



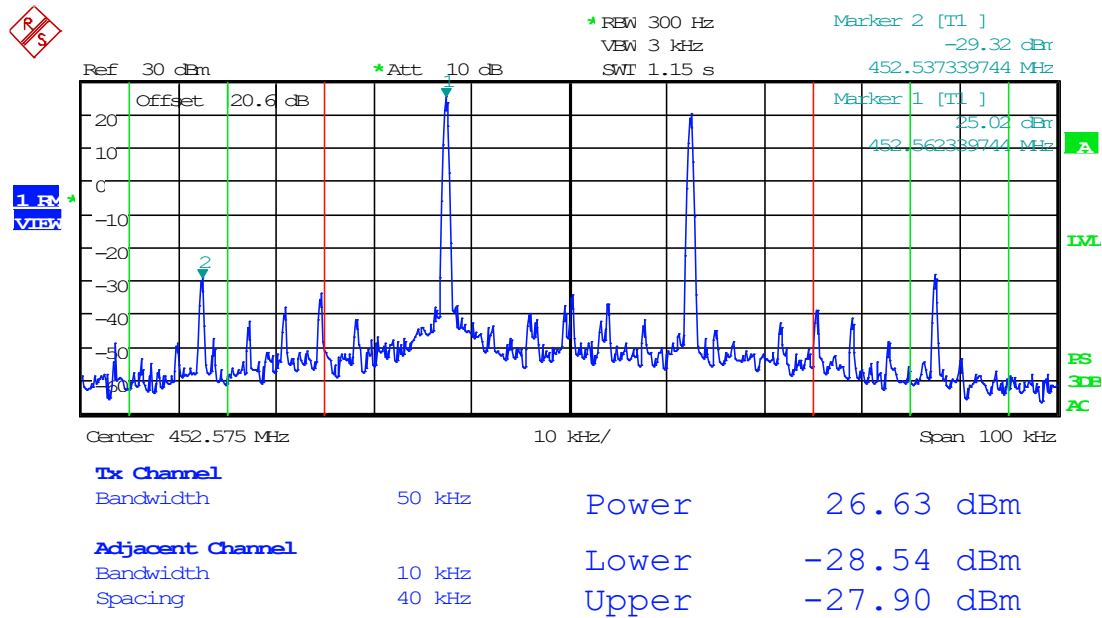
Date: 13.DEC.2023 17:16:40

8.7.6 Tetra, Downlink, AGC+3dB, 450.9 MHz



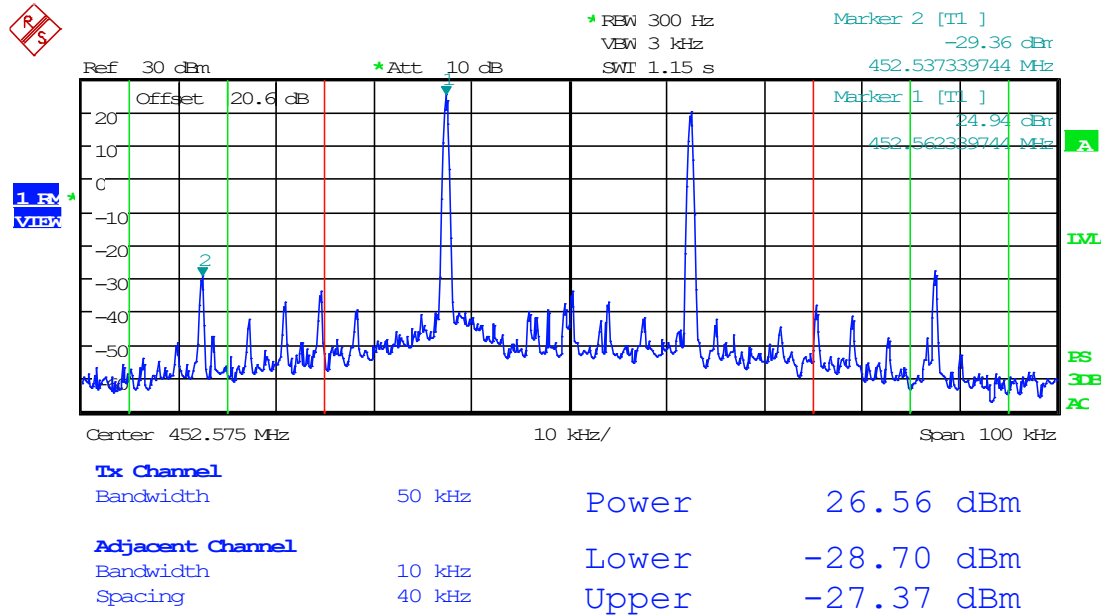
Date: 13.DEC.2023 17:17:27

8.7.7 Tetra, Downlink, AGC, 452.575 MHz



Date: 13.DEC.2023 17:19:11

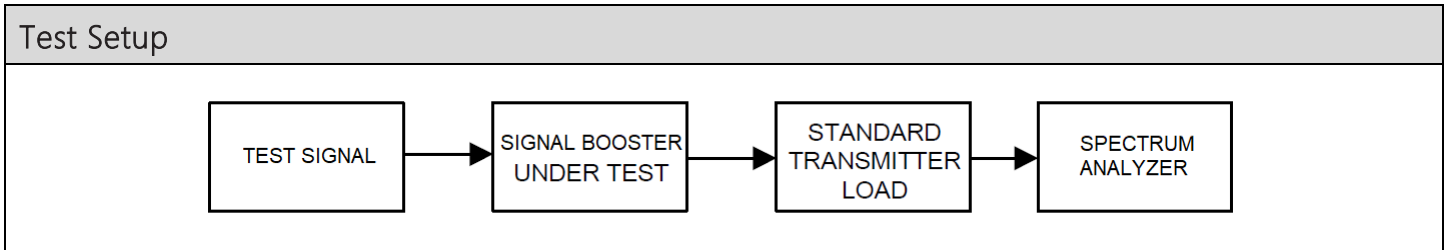
8.7.8 Tetra, Downlink, AGC+3dB, 452.575 MHz



Date: 13.DEC.2023 17:19:51

8.8 Emission Mask, Out-of-Band

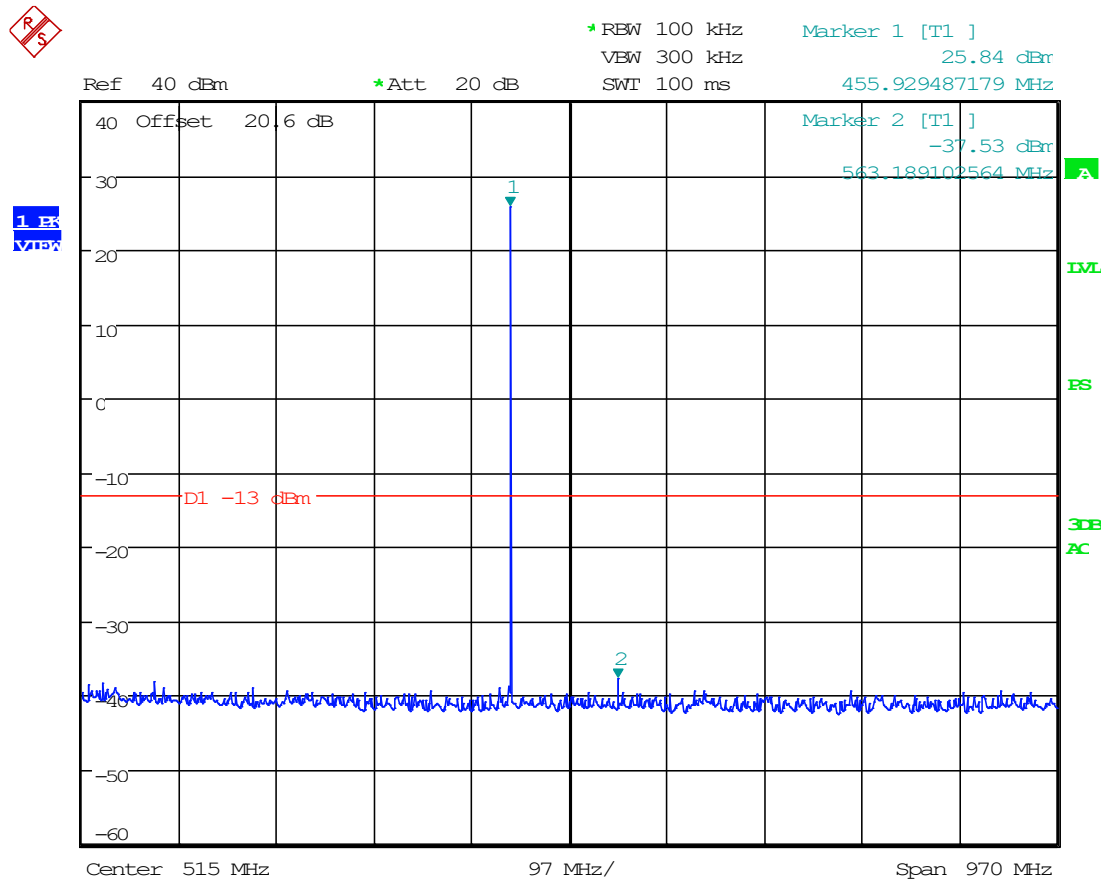
Limits from FCC Parts 2.1051, FCC Pt. 90.219(e)(3) and test procedure from ANSI C63.26-2015 and FCC KDB 935210 D05 v01r04 Industrial Signal Boosters.



Note: Testing was done simultaneously on all combinations of Uplinks and Downlinks to address co-location of signals.

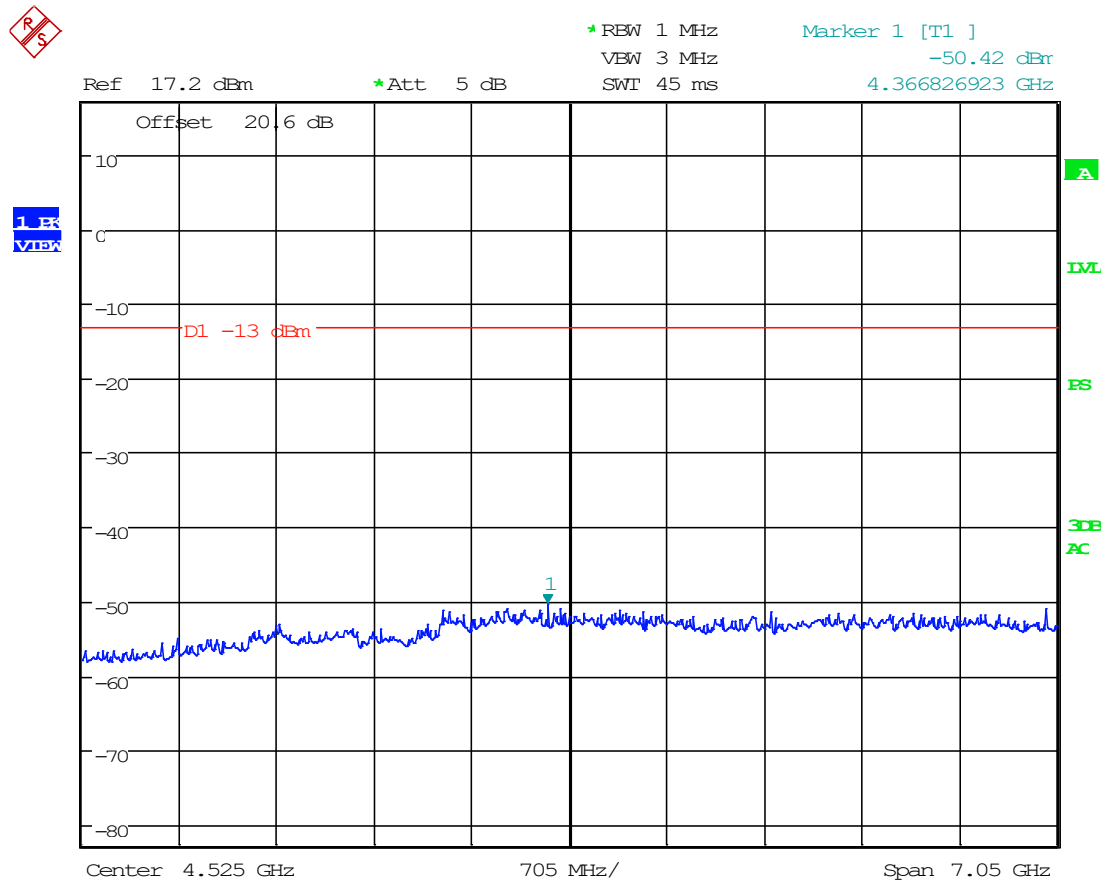
Conducted Emissions Spectrum Plots

8.8.1 30 MHz to 1 GHz, 456 MHz



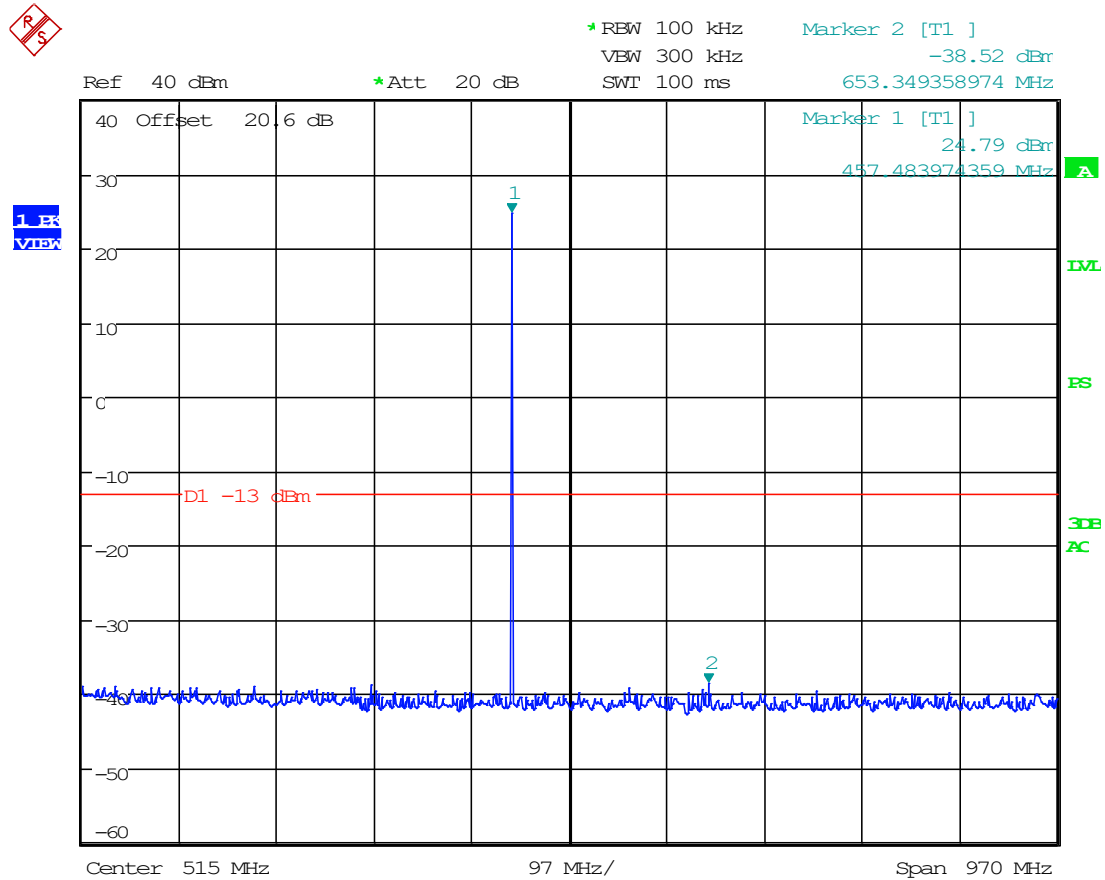
Date: 13.DEC.2023 16:48:35

8.8.2 1 GHz to 10th Harmonic, 456 MHz



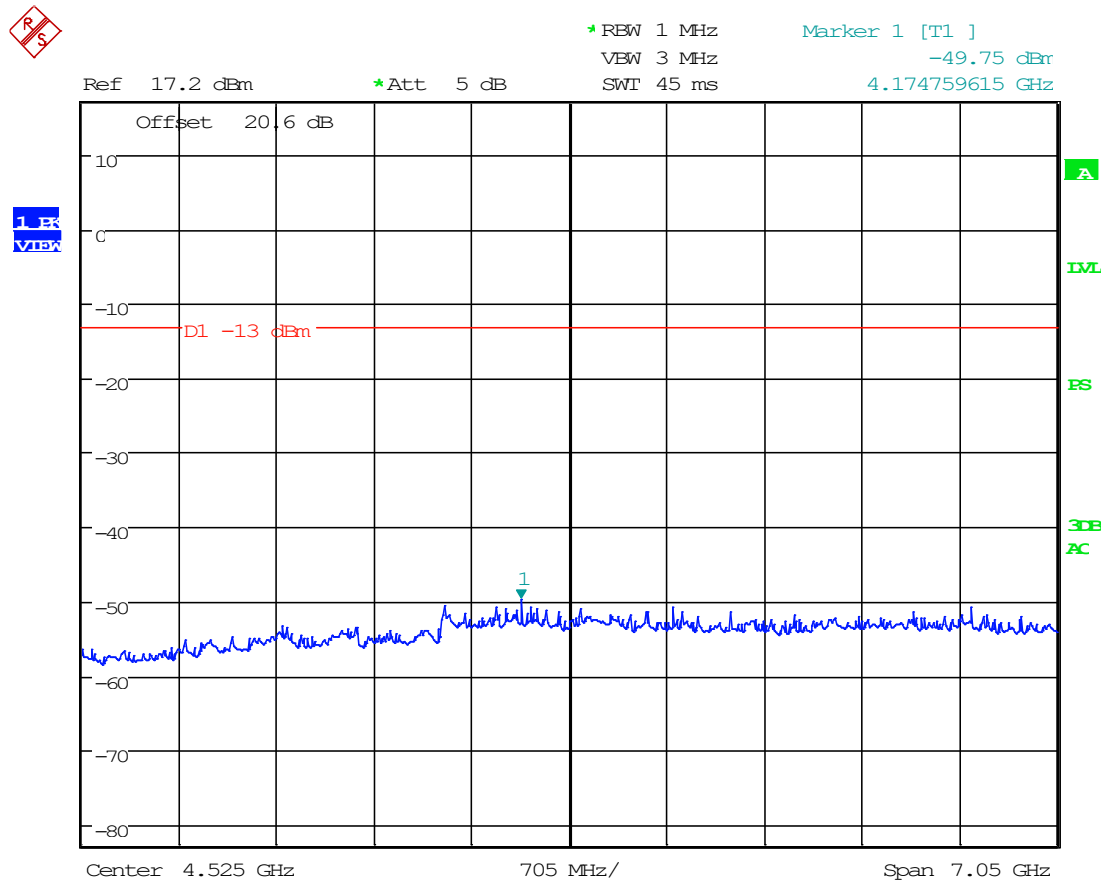
Date: 13.DEC.2023 16:53:15

8.8.3 30 MHz to 1 GHz, 457.575 MHz



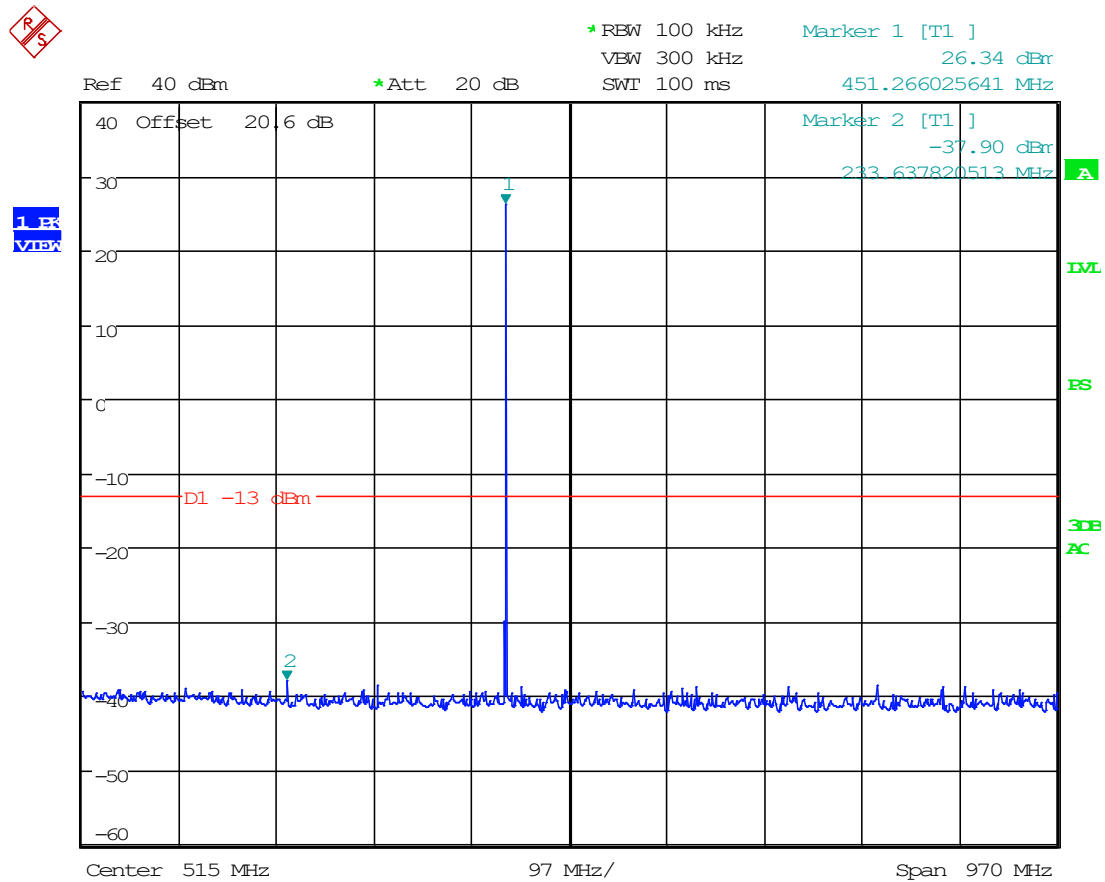
Date: 13.DEC.2023 16:47:36

8.8.4 1 GHz to 10th Harmonic, 457.575 MHz



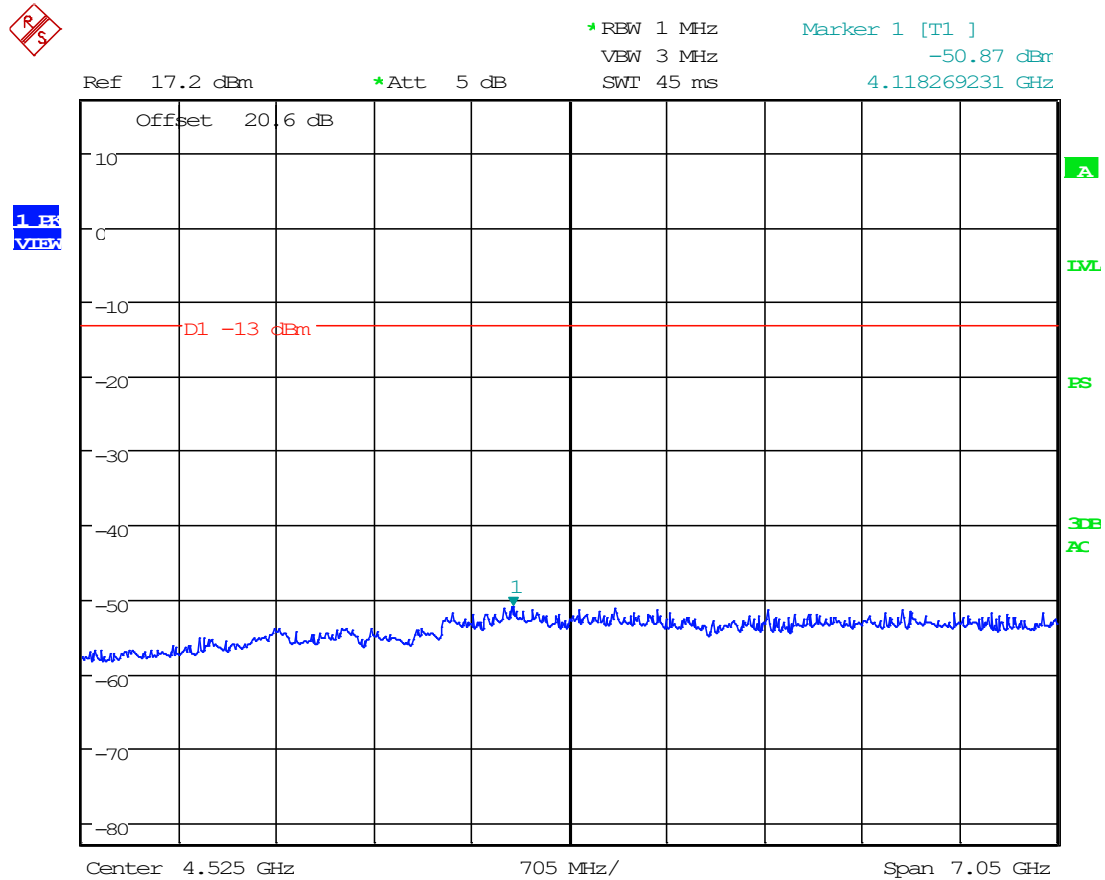
Date: 13.DEC.2023 16:54:13

8.8.5 30 MHz to 1 GHz, 450.9 MHz



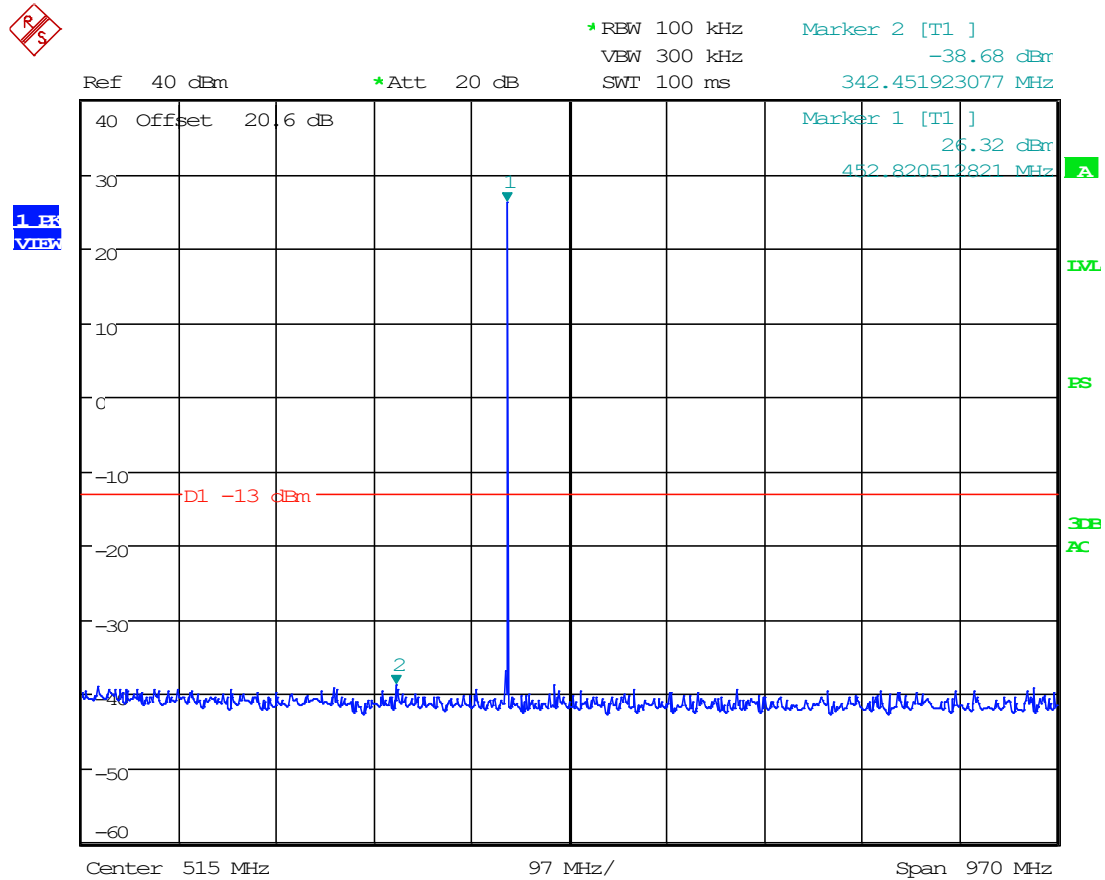
Date: 13.DEC.2023 16:46:34

8.8.6 1 GHz to 10th Harmonic, 450.9 MHz



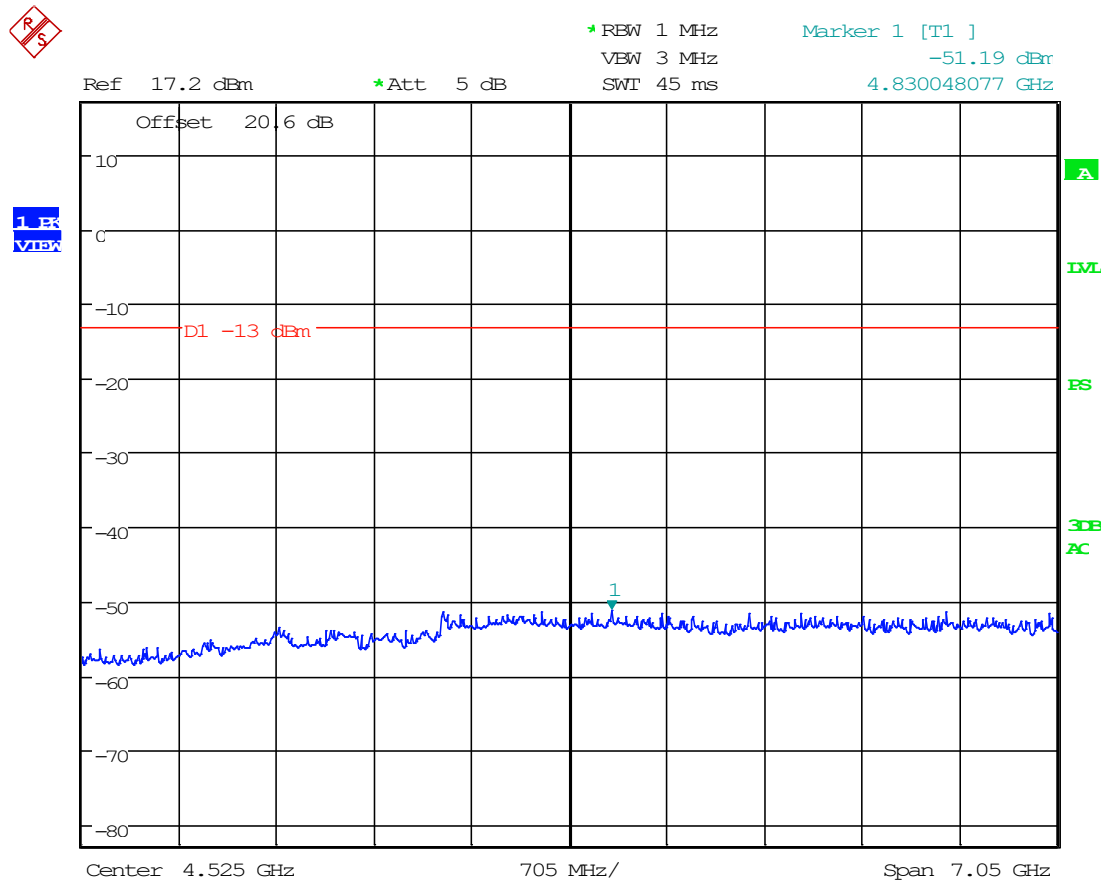
Date: 13.DEC.2023 16:55:22

8.8.7 30 MHz to 1 GHz, 452.575 MHz



Date: 13.DEC.2023 16:44:53

8.8.8 1 GHz to 10th Harmonic, 452.575 MHz

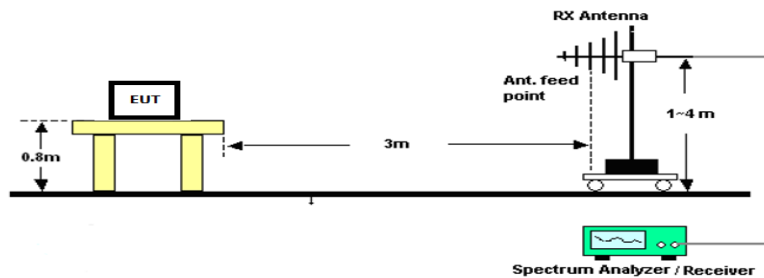


Date: 13.DEC.2023 16:56:06

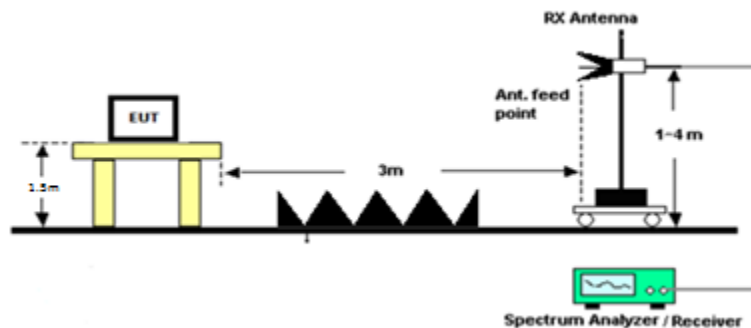
8.9 Spurious Radiated Emissions

Limits from FCC Parts 2.1053, 90.210 and test procedure from ANSI C63.26-2015 and FCC KDB 935210 D05 v01r04 Industrial Signal Boosters.

Radiated Test Setup, 30 – 1000 MHz



Radiated Test Setup, Above 1000 MHz



Radiated Emissions, Tabular Data

8.9.1 Uplink, 456 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 (dBuV/m)	ERP (dBm)	Spurious Limit (dBm)	Margin (dB)
460.000	920.00	PK	12.00	H	-3.58	12.17	3.00	20.59	-76.78	-13.00	63.78
460.000	920.00	PK	10.60	V	-3.58	12.17	3.00	19.19	-78.18	-13.00	65.18
460.000	1380.00	PK	14.80	H	-4.34	12.18	3.00	22.64	-74.74	-13.00	61.74
460.000	1380.00	PK	10.70	V	-4.34	12.18	3.00	18.54	-78.84	-13.00	65.84
460.000	1840.00	PK	10.80	H	-5.11	12.19	3.00	17.88	-79.50	-13.00	66.50
460.000	1840.00	PK	11.30	V	-5.11	12.19	3.00	18.38	-79.00	-13.00	66.00
460.000	2300.00	PK	11.90	H	-5.74	12.19	3.00	18.35	-79.02	-13.00	66.02
460.000	2300.00	PK	11.80	V	-5.74	12.19	3.00	18.25	-79.12	-13.00	66.12
460.000	2760.00	PK	11.70	H	-6.26	12.20	3.00	17.64	-79.74	-13.00	66.74
460.000	2760.00	PK	11.90	V	-6.26	12.20	3.00	17.84	-79.54	-13.00	66.54
460.000	3220.00	PK	13.80	H	-6.79	12.21	3.00	19.22	-78.16	-13.00	65.16
460.000	3220.00	PK	13.50	V	-6.79	12.21	3.00	18.92	-78.46	-13.00	65.46
460.000	3680.00	PK	13.70	H	-7.20	12.34	3.00	18.84	-78.54	-13.00	65.54
460.000	3680.00	PK	13.20	V	-7.20	12.34	3.00	18.34	-79.04	-13.00	66.04
460.000	4140.00	PK	13.60	H	-7.69	12.61	3.00	18.53	-78.85	-13.00	65.85
460.000	4140.00	PK	13.40	V	-7.69	12.61	3.00	18.33	-79.05	-13.00	66.05
460.000	4600.00	PK	14.10	H	-8.12	13.04	3.00	19.02	-78.36	-13.00	65.36
460.000	4600.00	PK	14.00	V	-8.12	13.04	3.00	18.92	-78.46	-13.00	65.46

8.9.2 Uplink, 457.575 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 (dBuV/m)	ERP (dBm)	Spurious Limit (dBm)	Margin (dB)
457.575	915.150	PK	14.80	H	-3.57	12.17	3.00	23.41	-73.97	-13.00	60.97
457.575	915.150	PK	12.50	V	-3.57	12.17	3.00	21.11	-76.27	-13.00	63.27
457.575	1372.725	PK	10.40	H	-4.34	12.18	3.00	18.24	-79.13	-13.00	66.13
457.575	1372.725	PK	10.60	V	-4.34	12.18	3.00	18.44	-78.93	-13.00	65.93
457.575	1830.300	PK	10.70	H	-5.11	12.19	3.00	17.78	-79.60	-13.00	66.60
457.575	1830.300	PK	10.90	V	-5.11	12.19	3.00	17.98	-79.40	-13.00	66.40
457.575	2287.875	PK	11.70	H	-5.73	12.19	3.00	18.17	-79.21	-13.00	66.21
457.575	2287.875	PK	11.00	V	-5.73	12.19	3.00	17.47	-79.91	-13.00	66.91
457.575	2745.450	PK	11.70	H	-6.24	12.20	3.00	17.66	-79.72	-13.00	66.72
457.575	2745.450	PK	12.40	V	-6.24	12.20	3.00	18.36	-79.02	-13.00	66.02
457.575	3203.025	PK	13.60	H	-6.78	12.21	3.00	19.03	-78.35	-13.00	65.35
457.575	3203.025	PK	13.70	V	-6.78	12.21	3.00	19.13	-78.25	-13.00	65.25
457.575	3660.600	PK	13.30	H	-7.19	12.33	3.00	18.45	-78.93	-13.00	65.93
457.575	3660.600	PK	13.70	V	-7.19	12.33	3.00	18.85	-78.53	-13.00	65.53
457.575	4118.175	PK	13.10	H	-7.67	12.59	3.00	18.03	-79.35	-13.00	66.35
457.575	4118.175	PK	13.20	V	-7.67	12.59	3.00	18.13	-79.25	-13.00	66.25
457.575	4575.750	PK	13.90	H	-8.10	13.01	3.00	18.81	-78.57	-13.00	65.57
457.575	4575.750	PK	14.20	V	-8.10	13.01	3.00	19.11	-78.27	-13.00	65.27

8.9.3 Downlink, 450.9 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 (dBuV/m)	ERP (dBm)	Spurious Limit (dBm)	Margin (dB)
450.900	901.80	PK	13.20	H	-3.54	12.17	3.00	21.83	-75.55	-13.00	62.55
450.900	901.80	PK	13.50	V	-3.54	12.17	3.00	22.13	-75.25	-13.00	62.25
450.900	1352.70	PK	9.90	H	-4.32	12.18	3.00	17.76	-79.62	-13.00	66.62
450.900	1352.70	PK	10.30	V	-4.32	12.18	3.00	18.16	-79.22	-13.00	66.22
450.900	1803.60	PK	10.70	H	-5.11	12.19	3.00	17.78	-79.60	-13.00	66.60
450.900	1803.60	PK	10.40	V	-5.11	12.19	3.00	17.48	-79.90	-13.00	66.90
450.900	2254.50	PK	11.80	H	-5.69	12.19	3.00	18.30	-79.07	-13.00	66.07
450.900	2254.50	PK	11.60	V	-5.69	12.19	3.00	18.10	-79.27	-13.00	66.27
450.900	2705.40	PK	11.70	H	-6.20	12.20	3.00	17.70	-79.67	-13.00	66.67
450.900	2705.40	PK	11.70	V	-6.20	12.20	3.00	17.70	-79.67	-13.00	66.67
450.900	3156.30	PK	12.90	H	-6.72	12.21	3.00	18.38	-78.99	-13.00	65.99
450.900	3156.30	PK	13.30	V	-6.72	12.21	3.00	18.78	-78.59	-13.00	65.59
450.900	3607.20	PK	13.10	H	-7.15	12.32	3.00	18.27	-79.11	-13.00	66.11
450.900	3607.20	PK	13.20	V	-7.15	12.32	3.00	18.37	-79.01	-13.00	66.01
450.900	4058.10	PK	13.40	H	-7.61	12.54	3.00	18.33	-79.05	-13.00	66.05
450.900	4058.10	PK	13.80	V	-7.61	12.54	3.00	18.73	-78.65	-13.00	65.65
450.900	4509.00	PK	13.70	H	-8.06	12.95	3.00	18.59	-78.79	-13.00	65.79
450.900	4509.00	PK	13.80	V	-8.06	12.95	3.00	18.69	-78.69	-13.00	65.69

8.9.4 Downlink, 452.575 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 (dBuV/m)	ERP (dBm)	Spurious Limit (dBm)	Margin (dB)
452.575	905.150	PK	14.70	H	-3.55	12.17	3.00	23.32	-74.05	-13.00	61.05
452.575	905.150	PK	17.90	V	-3.55	12.17	3.00	26.52	-70.85	-13.00	57.85
452.575	1357.725	PK	11.00	H	-4.33	12.18	3.00	18.85	-78.52	-13.00	65.52
452.575	1357.725	PK	11.20	V	-4.33	12.18	3.00	19.05	-78.32	-13.00	65.32
452.575	1810.300	PK	10.70	H	-5.11	12.19	3.00	17.78	-79.60	-13.00	66.60
452.575	1810.300	PK	10.70	V	-5.11	12.19	3.00	17.78	-79.60	-13.00	66.60
452.575	2262.875	PK	12.10	H	-5.70	12.19	3.00	18.59	-78.78	-13.00	65.78
452.575	2262.875	PK	11.90	V	-5.70	12.19	3.00	18.39	-78.98	-13.00	65.98
452.575	2715.450	PK	12.10	H	-6.21	12.20	3.00	18.09	-79.29	-13.00	66.29
452.575	2715.450	PK	11.60	V	-6.21	12.20	3.00	17.59	-79.79	-13.00	66.79
452.575	3168.025	PK	13.10	H	-6.74	12.21	3.00	18.57	-78.81	-13.00	65.81
452.575	3168.025	PK	13.20	V	-6.74	12.21	3.00	18.67	-78.71	-13.00	65.71
452.575	3620.600	PK	13.10	H	-7.16	12.32	3.00	18.26	-79.11	-13.00	66.11
452.575	3620.600	PK	13.70	V	-7.16	12.32	3.00	18.86	-78.51	-13.00	65.51
452.575	4073.175	PK	13.70	H	-7.63	12.55	3.00	18.63	-78.75	-13.00	65.75
452.575	4073.175	PK	13.70	V	-7.63	12.55	3.00	18.63	-78.75	-13.00	65.75
452.575	4525.750	PK	13.50	H	-8.07	12.96	3.00	18.39	-78.98	-13.00	65.98
452.575	4525.750	PK	13.80	V	-8.07	12.96	3.00	18.69	-78.68	-13.00	65.68

9. ANNEX-B – Test Setup Photographs

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

10. History of Test Report Changes

Test Report #	Revision #	Description	Date of Issue
TR_10906-23_FCC 90_Booster Class A_	1	Initial release	1/22/2023
	2	Change in Page 1 and 4	04/30/2025

END OF TEST REPORT
