ACCREDITED
CERT #0955.01

INDUSTRIAL®
INSPECTION & ANALYSIS

Test Report - FCC PART 90 Booster Class B (B9B)
Applicant: Fiplex Communications Inc.

Signature: Sr. EMC Engineer EMC-003838-NE

Name & Title: Tim Royer, EMC Engineer

Date of Signature 12/20/2024

Signature:

Name & Title: Kristoffer Costa, EMC Technician

Date of Signature 12/20/2024

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.

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1. Applicant Information

Applicant: Fiplex Communications Inc.
Address: 2101 NW 79th Avenue
Miami, Florida, 33122, United States

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

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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

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4.8	Frequency Stability	n/a
4.9	Spurious Radiated Emissions	Pass

Applicable Clauses from Part 22			
FCC Pt. 2 General Requirements	FCC Part 22 Clauses	Description of the requirements	Result: (Pass, Fail, N/A)
2.1033(c)(4)	22.357	Modulation Characteristics	Pass
2.1046	22.535 22.565 22.727 22.759 22.867	RF Power Output	Pass
2.1047		Audio Frequency Response	n/a
2.1047		Audio Low Pass Filter Response	n/a
2.1047		Modulation Limiting	n/a
2.1049		Occupied Bandwidth (99%)	n/a
2.1051	22.359	Conducted Spurious Emissions at Antenna Terminals	Pass
2.1053	22.359	Radiated Field Strength of Spurious Emissions	Pass
2.1055	22.355 22.863	Frequency Stability	Pass

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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: 10/28/2024

Dates of Testing: 10/30/2024 – 11/12/2024

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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.

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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:	P3THRHU-B
Brief Description	VHF: 136 - 174MHz UHF Low Band: 406.1 - 430MHz UHF: 450 – 512MHz PS800: 806 - 824 / 851 – 869MHz Remote unit with 5 bands, Connected to a master unit with FO and antennas with RF communication.
Model(s) #	HRHU1L24S33
Firmware version	N/A
Software version	N/A
Serial Number	24044597FU

Technical Characteristics	
Frequency Range	450 MHz- 512 MHz (Pt. 90) 454.5 MHz (Pt. 22)
RF O/P Power (Max.)	32.05dBm/ 1.60W
Modulation	FM
Bandwidth & Emission Class	F3E, F1D, F1E, F1W, F1D, F1E, D7W
Number of Channels	N/A
Duty Cycle	100%
Antenna Connector	N Type
Voltage Rating (AC or Batt.)	110 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.

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3.3 Configuration of EUT

Test Modes		
Band (MHz)	Link Direction	Test Frequencies (MHz)
450 MHz- 512 MHz	Downlink	450 MHz
		454.5 MHz
		479 MHz
		510 MHz
450 MHz- 512 MHz	Uplink	450 MHz
		454.5 MHz
		479 MHz
		510 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.

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4. Test methods & Applicable Regulatory Limits

4.1 Test methods/Standards/Guidance:

Test procedures and guidance for measuring Licensed Part 90 and Part 22 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 (2018)
2) FCC CFR 47 Part 22

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.	

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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, NSA	Log-Periodic 1243	Eaton	96005	1243	5/4/21	12/18/2024
Antenna	Double-Ridged Horn/ETS Horn 1	ETS-Lindgren	3117	00035923	5/31/23	12/18/2024
CHAMBER	CHAMBER	Panashield	3M	N/A	12/29/23	12/18/2025
Pre-amp	Pre-amp	RF-LAMBDA	RLNA00M45GA	NA	7/27/22	7/26/2025
Receiver	EMI Test Receiver R&S ESU 40	Rohde & Schwarz	ESU 40	100320	9/18/24	9/18/2027
Receiver	EMI Test Receiver R&S ESW44	Rohde & Schwarz	ESW44	103049	10/13/21	12/12/2024
Function Generator	Function Generator	Standford	DS340	25200	2/22/24	2/21/2027

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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

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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

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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	0.010364	1.14

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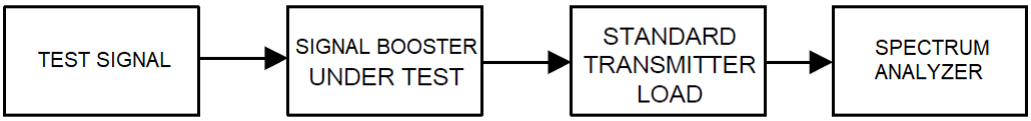
8.2 RF Output Power & Gain

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 Setup



Test Results, Power Output		
Link Direction	Max Power Output (dBm)	Max Power Output (W)
Downlink	32.05	1.60
Uplink	-7.34	0.000185

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Gain

Test Results, Gain					
Link Direction	Tuned Frequency (MHz)	Input Level	Power Input (dBm)	Power Output (dBm)	Gain (dB)
Downlink	450	AGC	-53.3	30.01	83.31
		AGC+3	-50.3	29.95	80.25
	454.5	AGC	-53.3	32.04	85.34
		AGC+3	-50.3	32.05	82.35
	479	AGC	-52.4	31.69	84.09
		AGC+3	-49.4	31.63	81.03
	510	AGC	-52.4	31.34	83.74
		AGC+3	-49.4	31.39	80.79
Uplink	450	AGC	-53.3	-11.11	64.41
		AGC+3	-50.3	-11.06	61.36
	454.5	AGC	-53.3	-7.34	57.64
		AGC+3	-50.3	-7.37	57.67
	479	AGC	-52.4	-10.28	62.68
		AGC+3	-49.4	-10.35	59.75
	510	AGC	-52.4	-11.10	63.5
		AGC+3	-49.4	-11.24	60.64

6dB adjustment from splitter included in calculation

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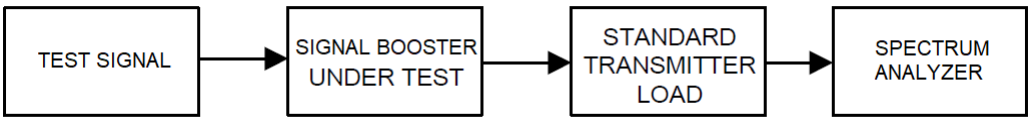
8.3 Out-of-band Rejection

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

Test Setup


Test Results, Out-of-band Rejection and Class of Operation			
Operating Band (MHz)	Link Direction	Passband (kHz)	Class of Operation
450 MHz- 512 MHz	Downlink	> 75 kHz	Class B
450 MHz- 512 MHz	Uplink	> 75 kHz	Class B

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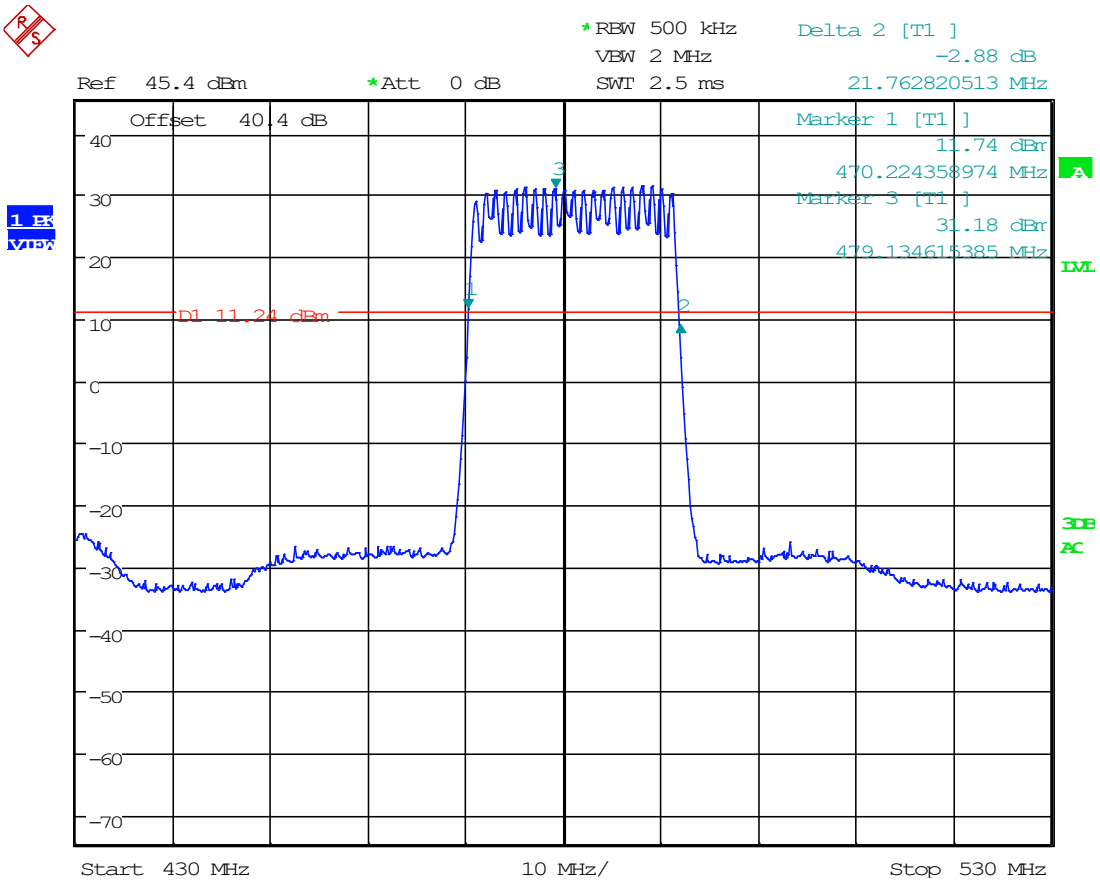
Out-of-band Rejection, Spectrum Plots

8.3.1 Downlink, Class B



Date: 31.OCT.2024 07:43:47

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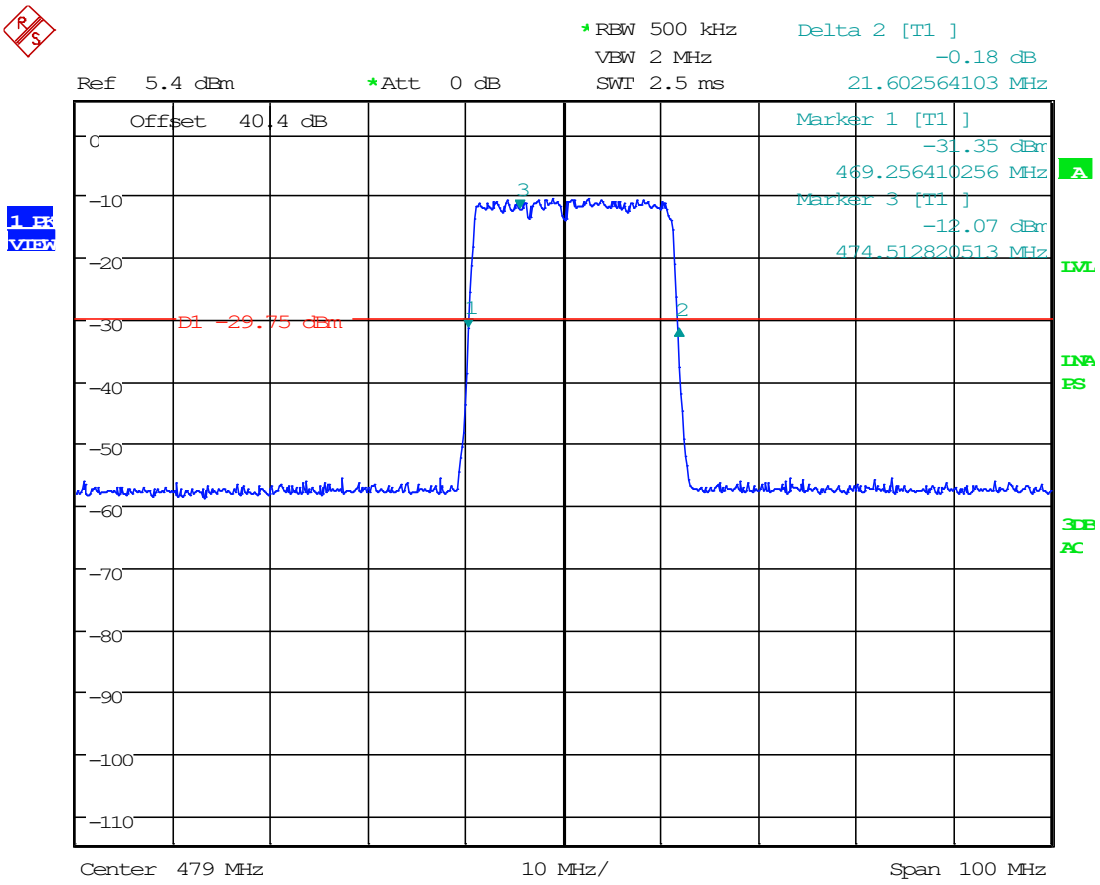
8.3.2 Uplink, Class B



Date: 4.NOV.2024 13:58:58

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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	Authorized Bandwidth (kHz)
Part 90	450 MHz- 512 MHz	6.25/12.5/25
Part 22	454 MHz- 455 MHz	6.25/12.5/25

Applicable Input Signals		
Signal	Occupied Bandwidth (kHz)	Representative Emission Designator(s)
CW	N/A	N/A
6.25 kHz FM	4.05	4K05F3E
12.5 kHz FM	7.93	7K93F3E
25 kHz FM	10.42	10K4F3E
C4FM (P25 Phase I)	8.13	8K13F1D, 8K13F1E
HCPM (P25 Phase II SU)	8.05	8K05F1W
HDQPSK (P25 Phase II BS)	9.86	9K86F1D, 9K86F1E, 9K86D7W

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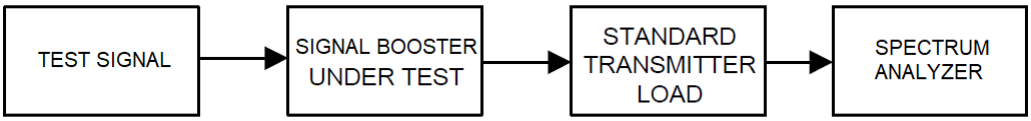
8.5 Input VS Output Signal Comparison

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

Test Setup


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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 (%)
Downlink	450	6.25 kHz FM	@ AGC	4.046	4.06	0.014
		12.5 kHz FM	@ AGC	7.932	7.90	0.032
		25 kHz FM	@ AGC	12.319	12.34	0.021
		C4FM	@ AGC	8.133	7.89	0.243
		HCPM	@ AGC	8.213	8.05	0.163
		HDQPSK	@ AGC	9.895	9.82	0.075
Downlink	454.5	6.25 kHz FM	@ AGC	4.046	4.04	0.014
		12.5 kHz FM	@ AGC	7.932	7.89	0.042
		25 kHz FM	@ AGC	12.319	10.42	1.719
		C4FM	@ AGC	8.133	8.13	0.003
		HCPM	@ AGC	8.213	7.93	0.283
		HDQPSK	@ AGC	9.895	9.86	0.035
Downlink	479	6.25 kHz FM	@ AGC	4.046	4.04	0.006
		12.5 kHz FM	@ AGC	7.932	7.93	0.002
		25 kHz FM	@ AGC	12.319	12.34	0.021
		C4FM	@ AGC	8.133	7.89	0.243
		HCPM	@ AGC	8.213	8.21	0.003
		HDQPSK	@ AGC	9.895	9.82	0.075
Downlink	510	6.25 kHz FM	@ AGC	4.046	4.05	0.004
		12.5 kHz FM	@ AGC	7.932	6.09	1.842
		25 kHz FM	@ AGC	12.319	12.34	0.021
		C4FM	@ AGC	8.133	7.97	0.163
		HCPM	@ AGC	8.213	8.05	0.163
		HDQPSK	@ AGC	9.895	9.77	0.125

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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	450	6.25 kHz FM	@ AGC	4.046	4.05	0.004
		12.5 kHz FM	@ AGC	7.932	7.93	0.002
		25 kHz FM	@ AGC	12.319	10.41	1.909
		C4FM	@ AGC	8.133	7.89	0.243
		HCPM	@ AGC	8.213	8.05	0.163
		HDQPSK	@ AGC	9.895	9.82	0.075
Uplink	454.5	6.25 kHz FM	@ AGC	4.046	4.04	0.006
		12.5 kHz FM	@ AGC	7.932	7.89	0.042
		25 kHz FM	@ AGC	12.319	10.25	2.069
		C4FM	@ AGC	8.133	7.97	0.163
		HCPM	@ AGC	8.213	8.01	0.203
		HDQPSK	@ AGC	9.895	9.86	0.035
Uplink	479	6.25 kHz FM	@ AGC	4.046	4.04	0.006
		12.5 kHz FM	@ AGC	7.932	7.93	0.002
		25 kHz FM	@ AGC	12.319	10.42	1.899
		C4FM	@ AGC	8.133	7.89	0.243
		HCPM	@ AGC	8.213	8.21	0.003
		HDQPSK	@ AGC	9.895	9.82	0.075
Uplink	510	6.25 kHz FM	@ AGC	4.046	4.04	0.006
		12.5 kHz FM	@ AGC	7.932	7.89	0.042
		25 kHz FM	@ AGC	12.319	10.42	1.899
		C4FM	@ AGC	8.133	7.82	0.313
		HCPM	@ AGC	8.213	8.17	0.043
		HDQPSK	@ AGC	9.895	9.70	0.195

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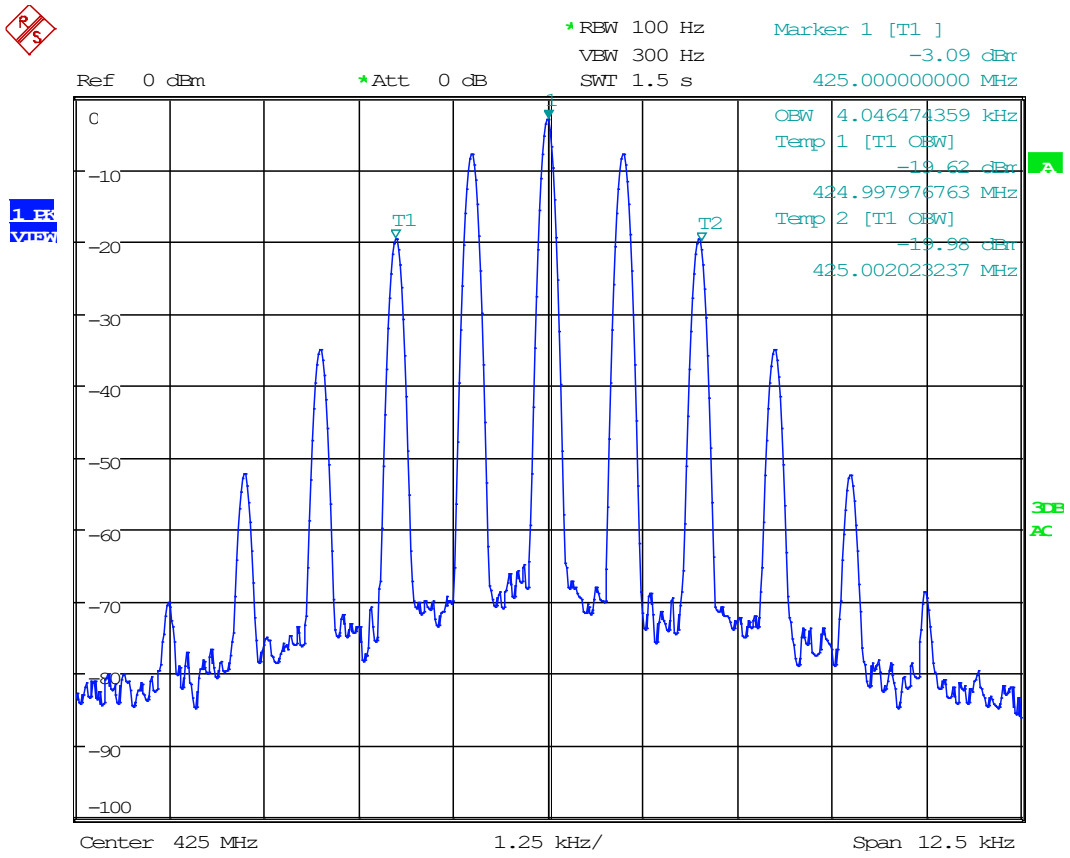
8.5.1 6.25 kHz FM, Input Signal



Date: 4.JAN.2021 11:51:31

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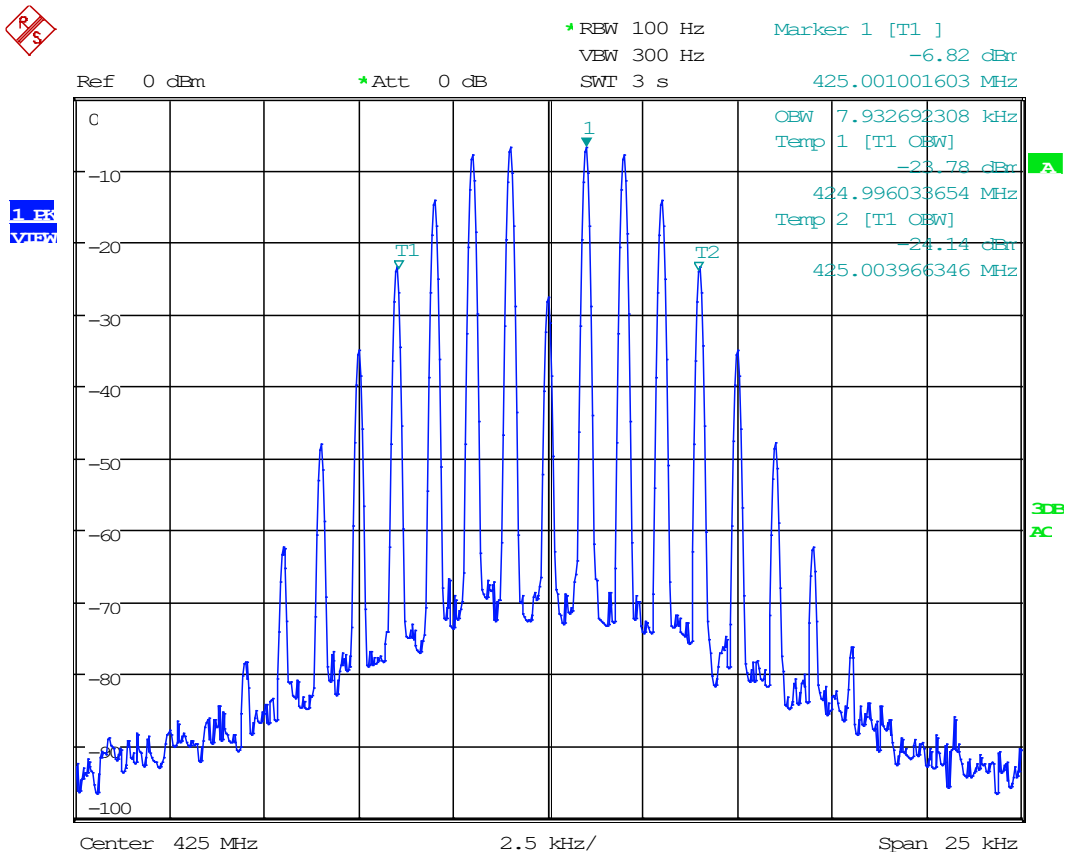
8.5.2 12.5 kHz FM, Input Signal



Date: 4.JAN.2021 11:49:22

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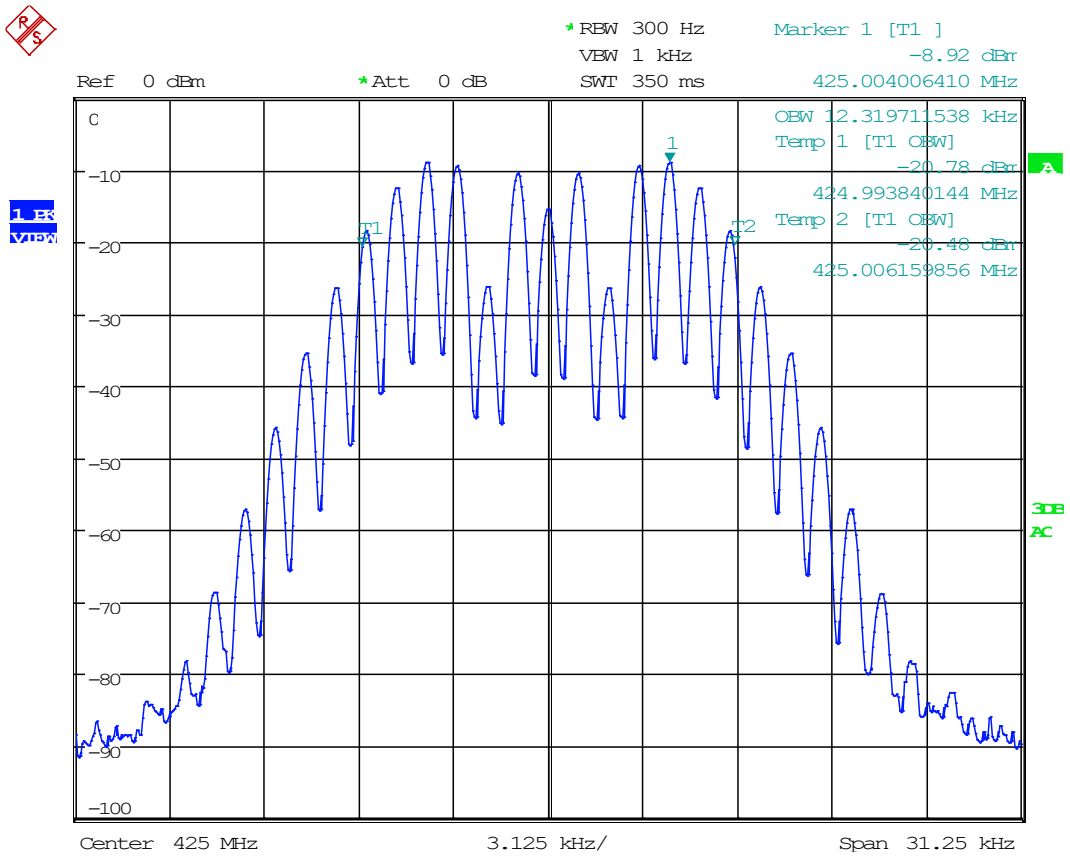
8.5.3 25 kHz FM, Input Signal



Date: 4.JAN.2021 11:50:26

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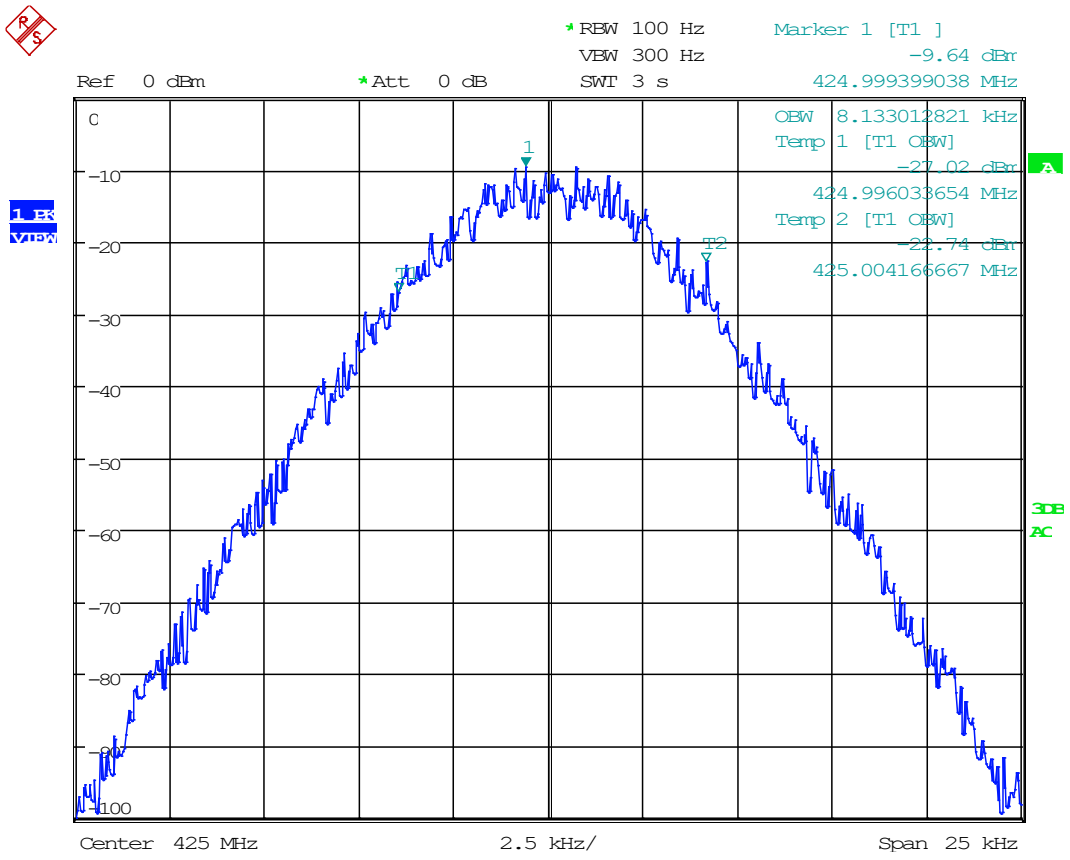
8.5.4 C4FM, Input Signal



Date: 4.JAN.2021 11:42:36

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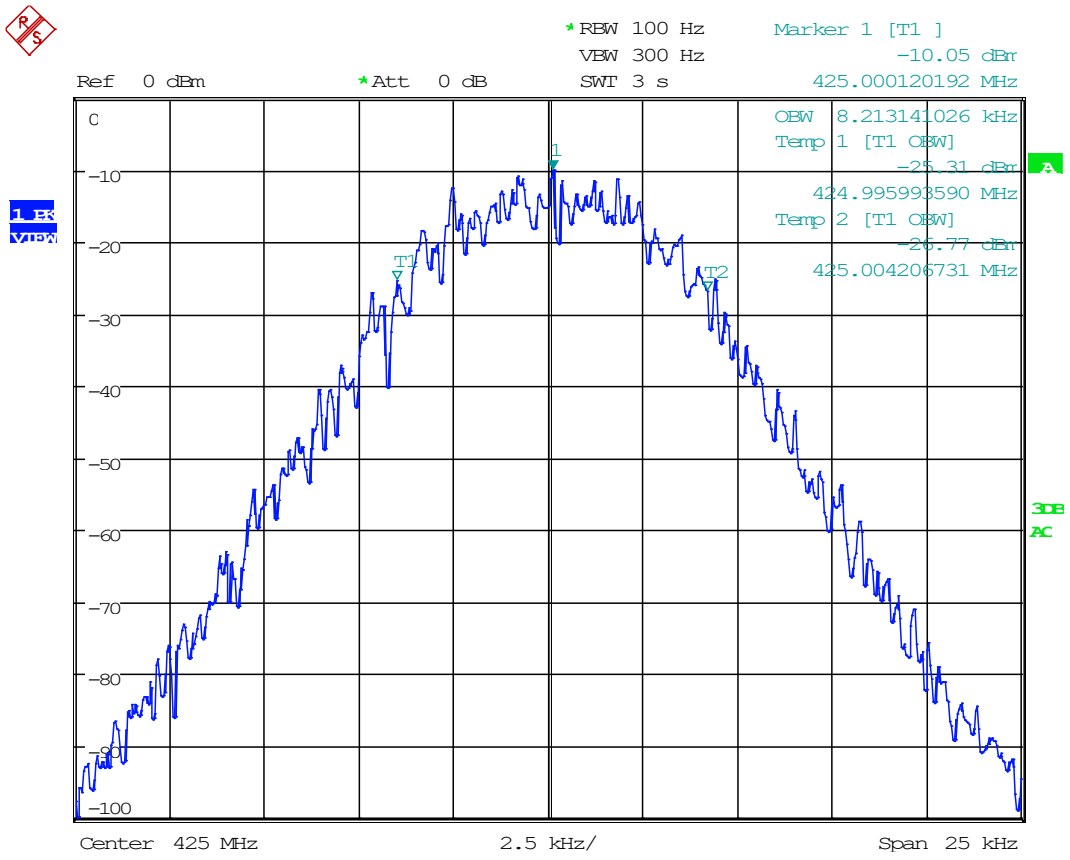
8.5.5 H-CPM, Input Signal



Date: 4.JAN.2021 11:43:53

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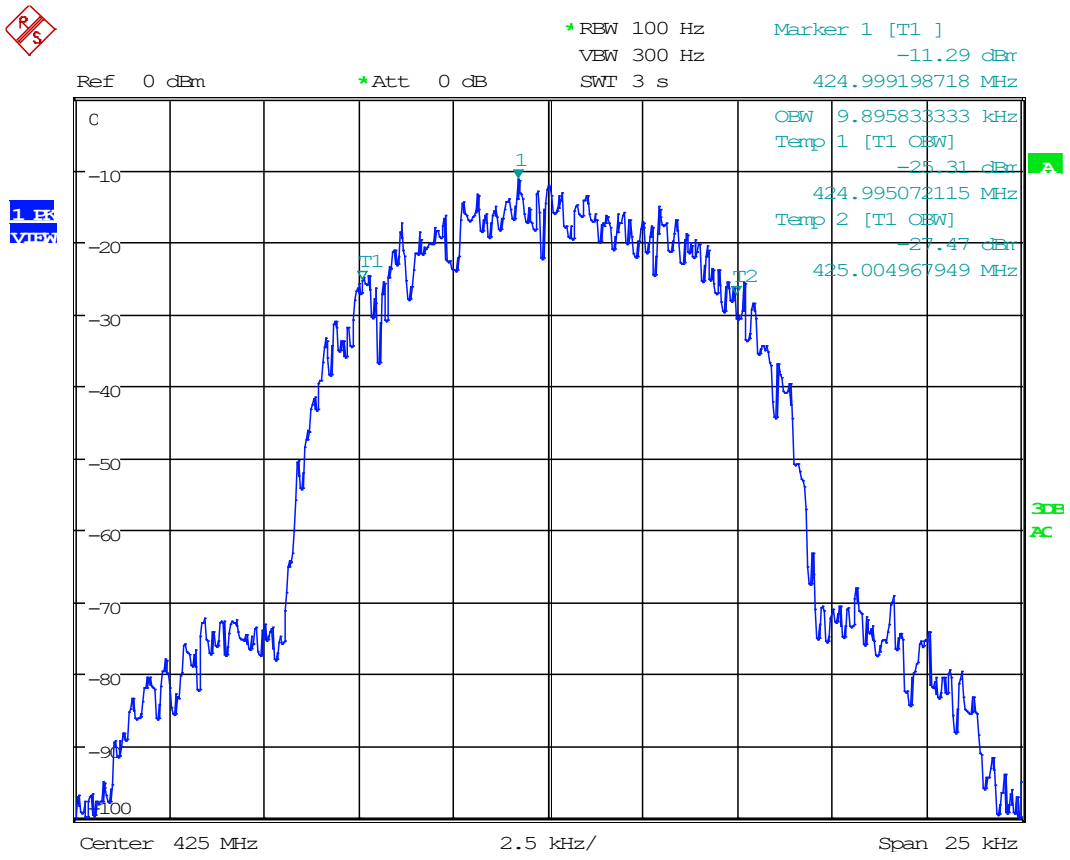
8.5.6 H-DQPSK, Input Signal



Date: 4.JAN.2021 11:45:31

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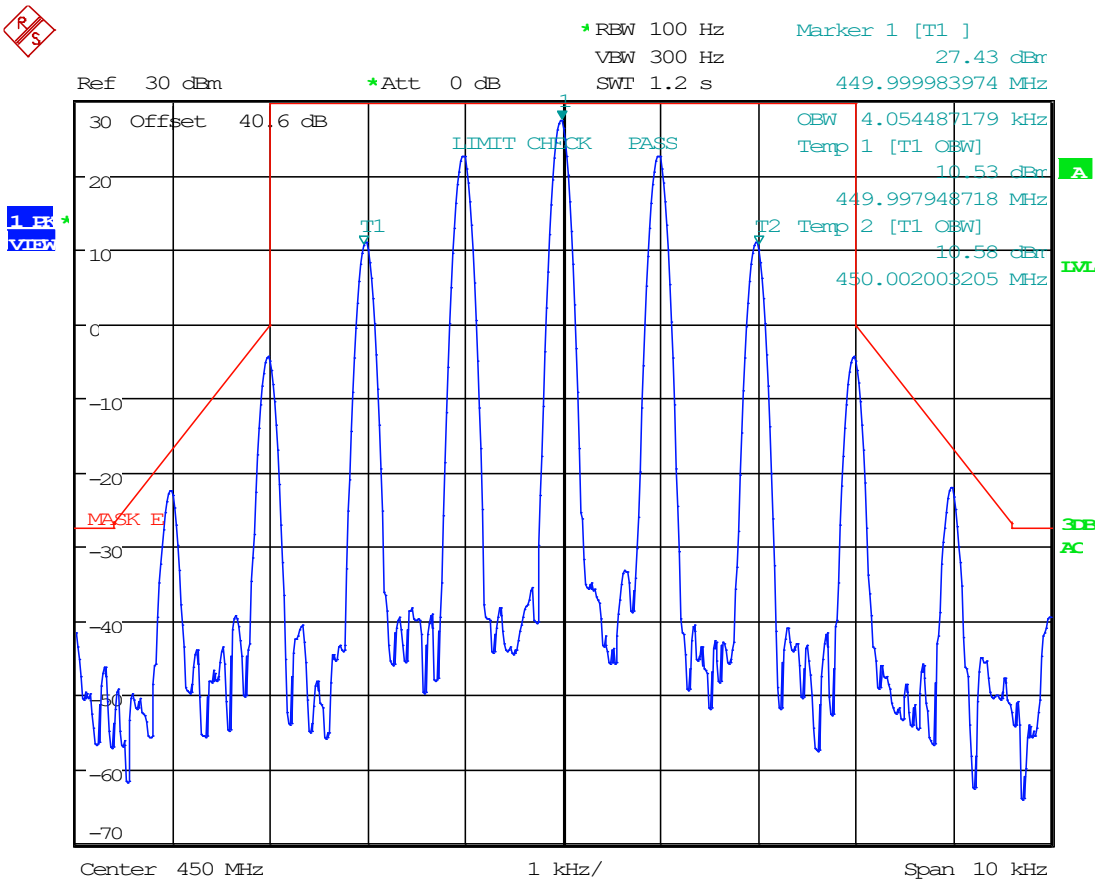
8.5.7 6.25 kHz, FM, DL Mask E, AGC, 450 MHz



Date: 29.OCT.2024 12:43:25

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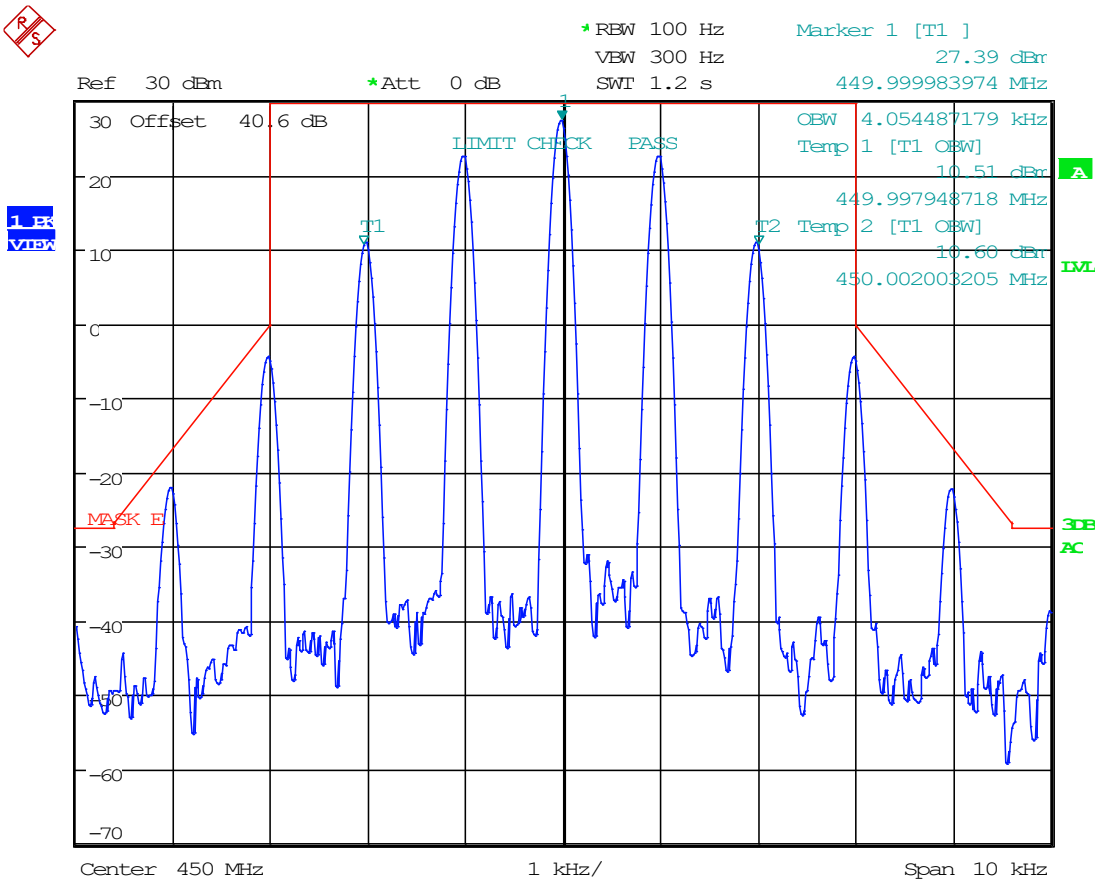
8.5.8 6.25 kHz, FM, DL Mask E, AGC +3, 450 MHz



Date: 29.OCT.2024 12:45:21

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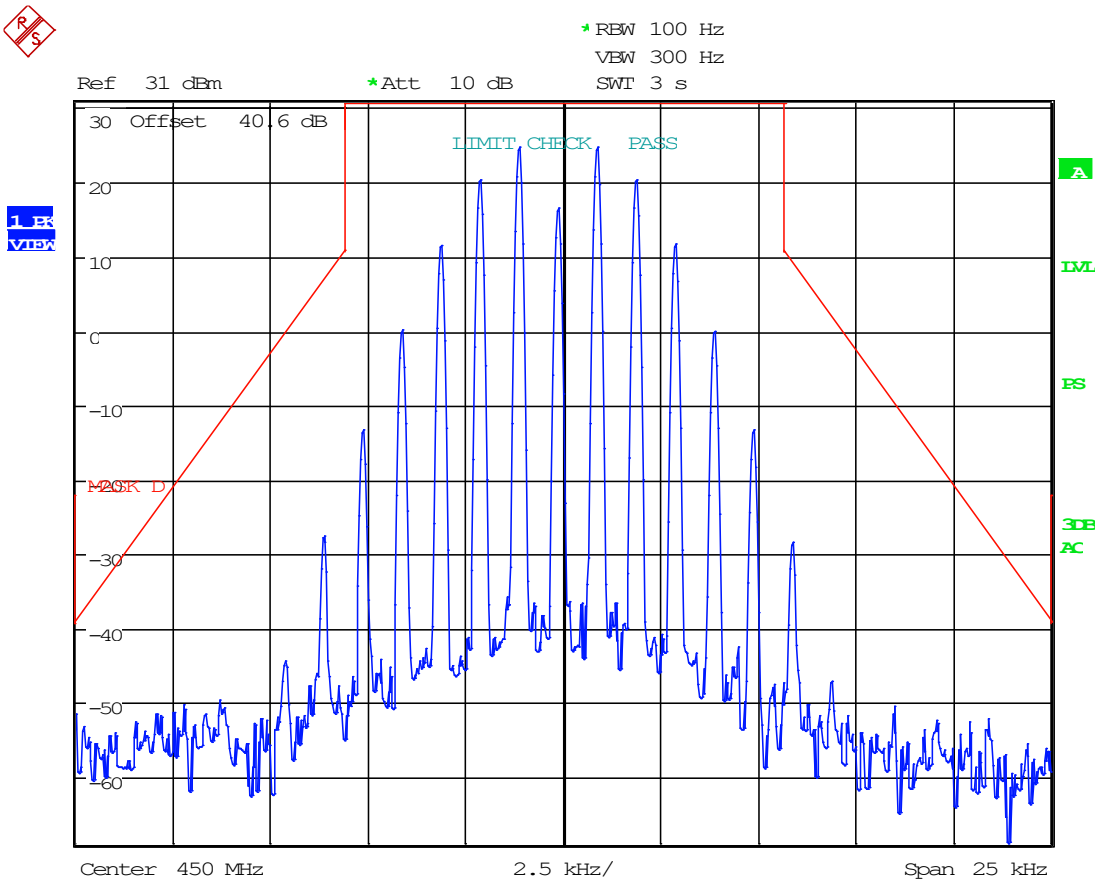
8.5.9 12.5 kHz, FM, DL Mask D, AGC, 450 MHz



Date: 29.OCT.2024 13:05:41

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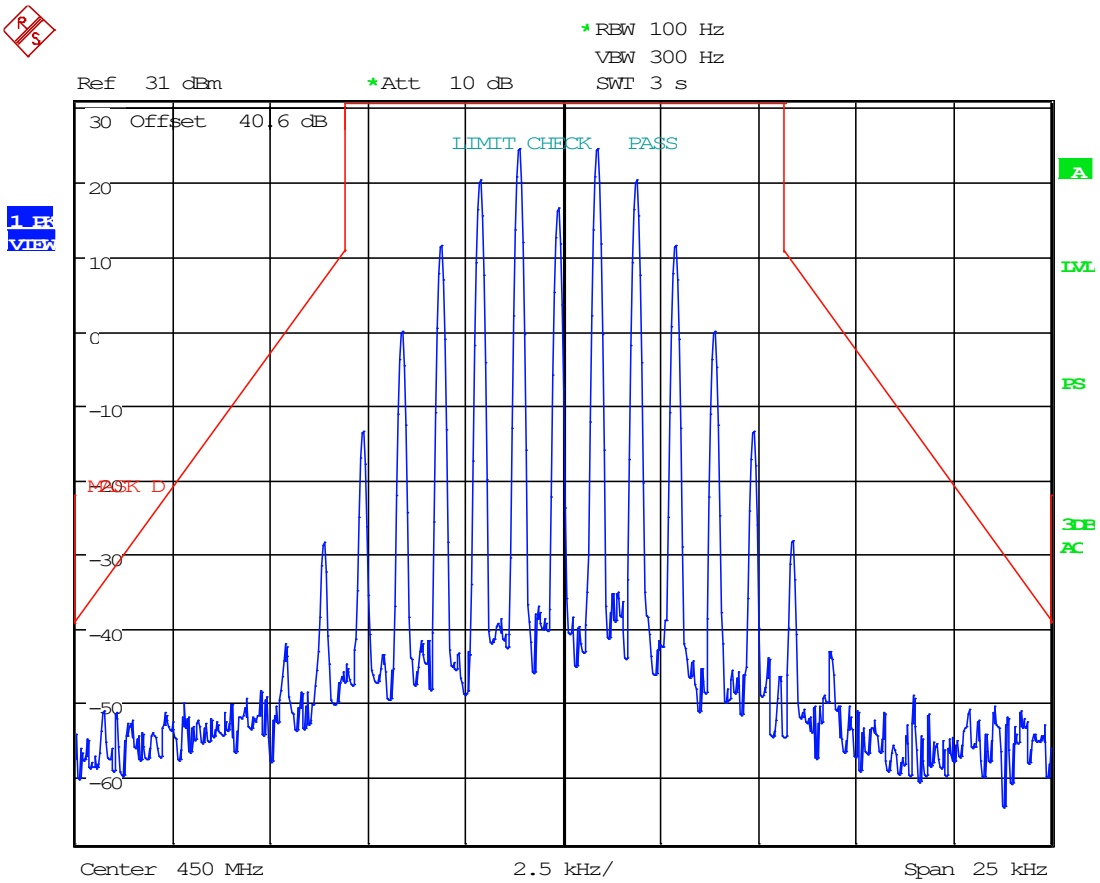
8.5.10 12.5 kHz, FM, DL Mask D, AGC+3, 450 MHz



Date: 29.OCT.2024 13:04:58

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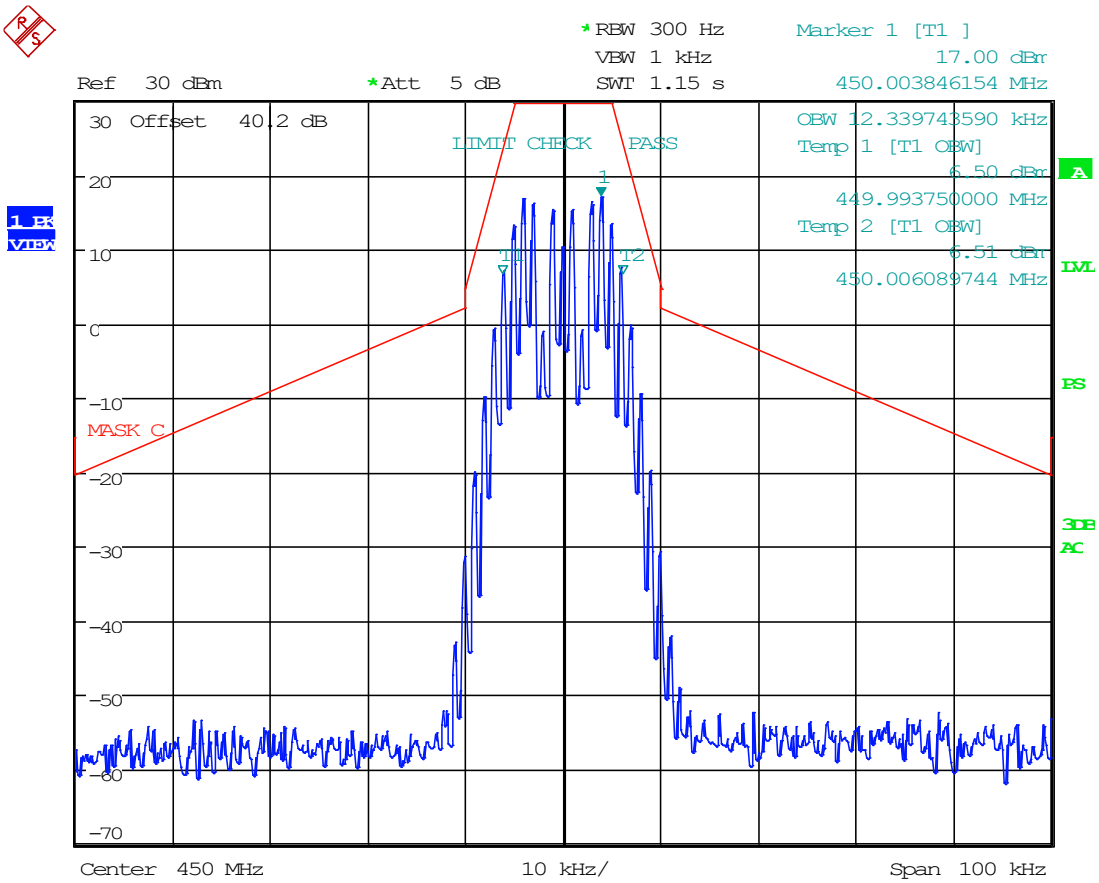
8.5.11 25 kHz FM, DL Mask C, AGC, 450 MHz



Date: 2.JAN.2025 14:41:59

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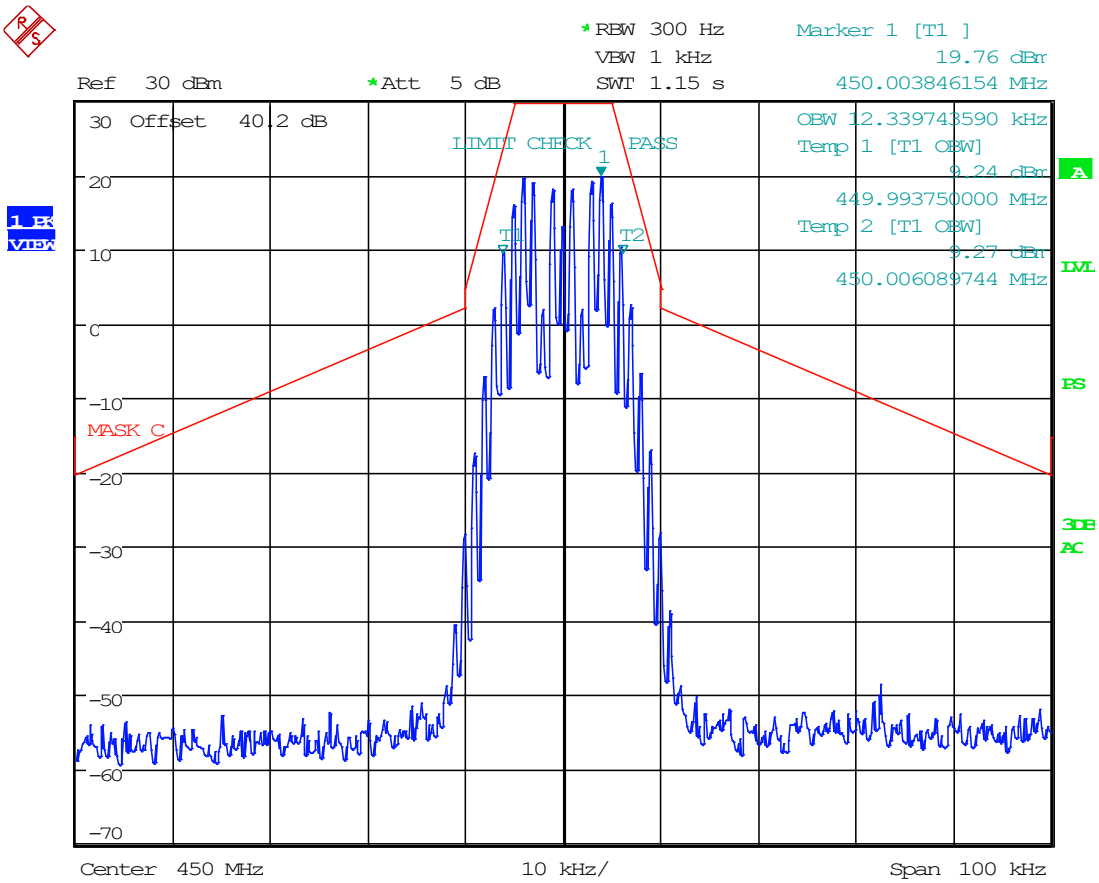
8.5.12 25 kHz FM, DL Mask C, AGC+3, 450 MHz



Date: 2.JAN.2025 14:43:09

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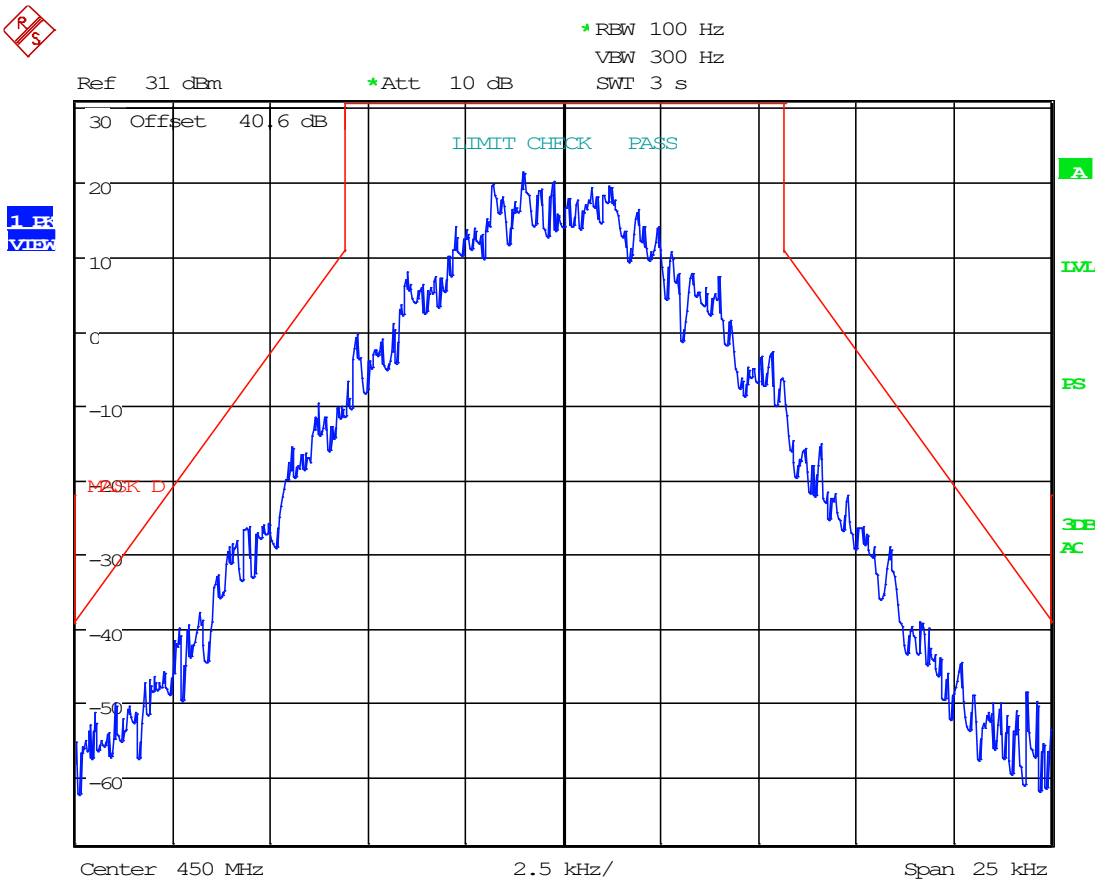
8.5.13 C4FM, DL Mask D, AGC, 450 MHz



Date: 29.OCT.2024 13:06:16

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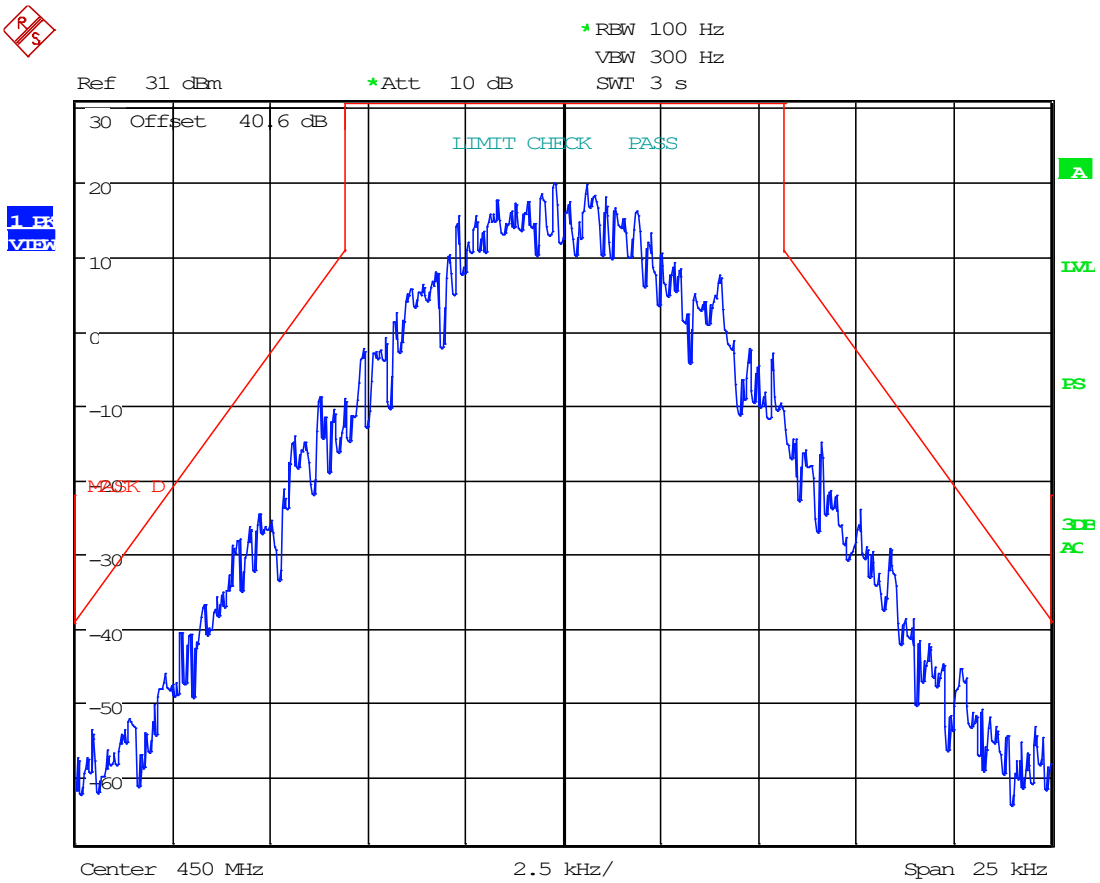
8.5.14 C4FM, DL Mask D, AGC+3, 450 MHz



Date: 29.OCT.2024 13:06:46

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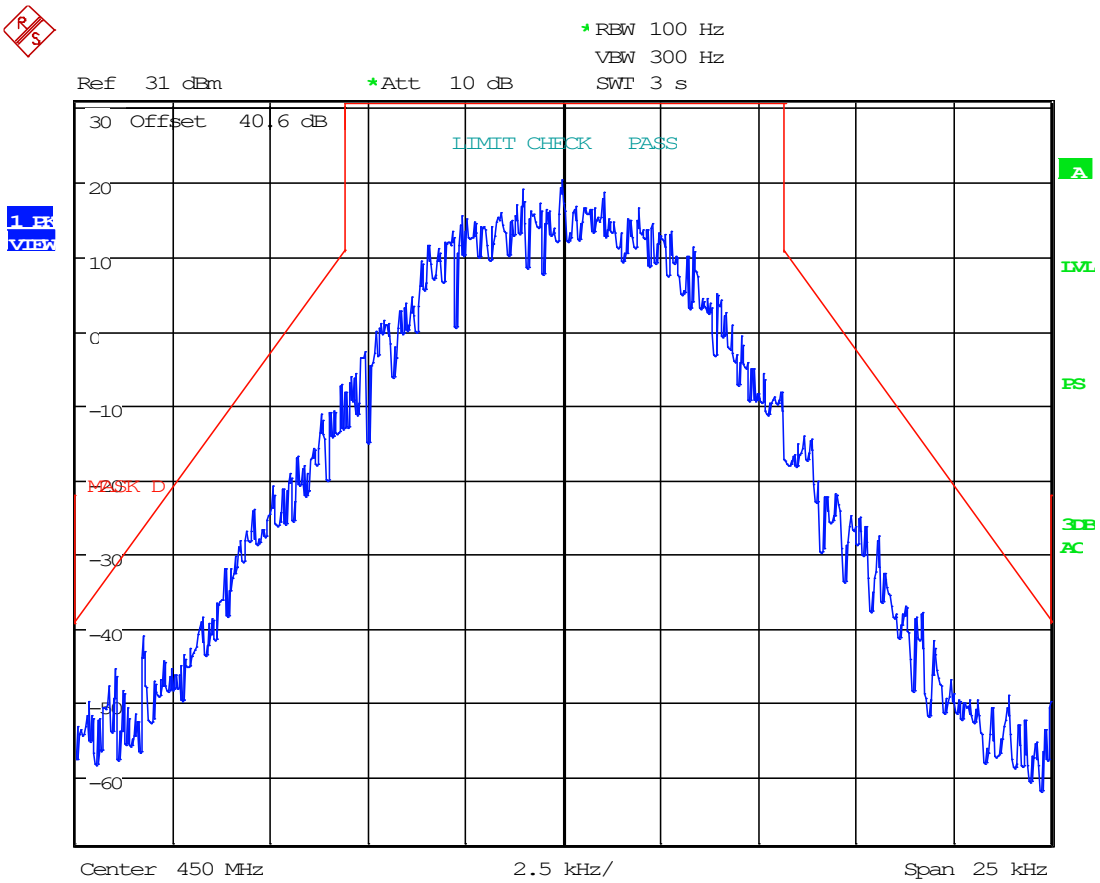
8.5.15 H-CPM, DL Mask D, AGC, 450 MHz



Date: 29.OCT.2024 13:07:47

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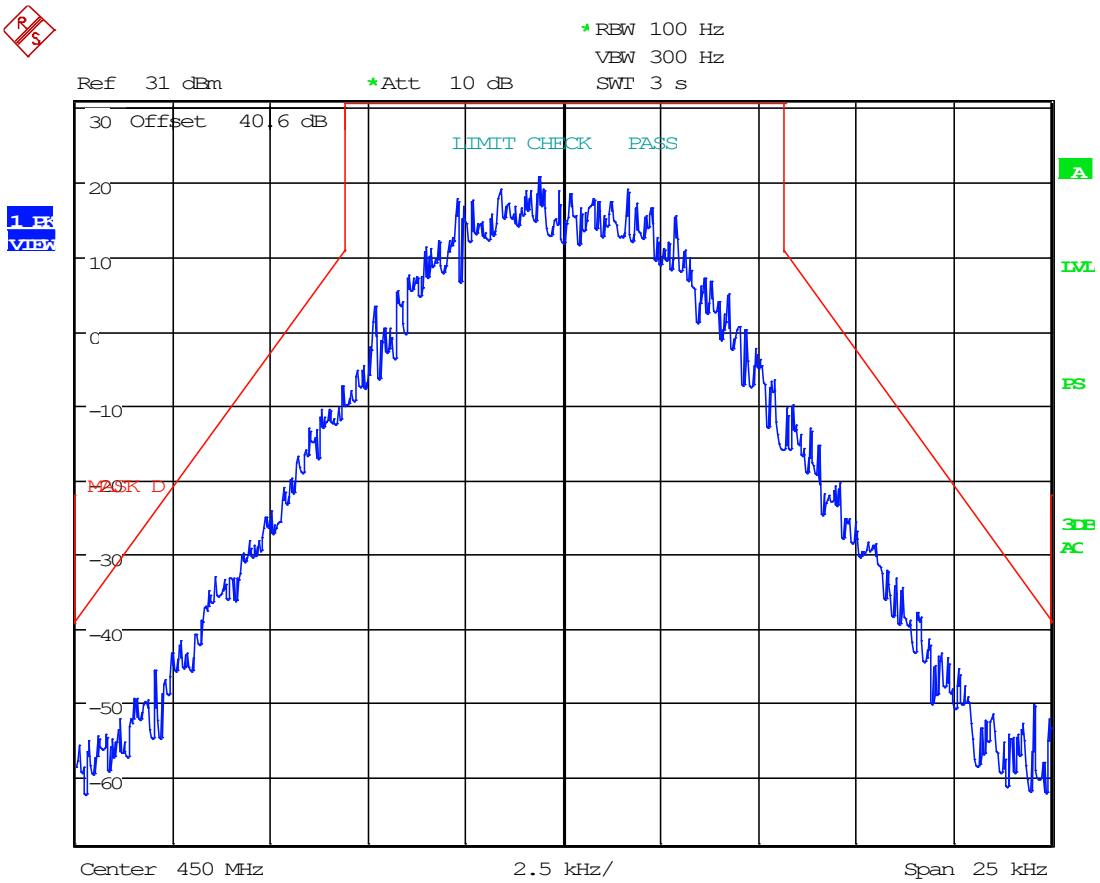
8.5.16 H-CPM, DL Mask D, AGC+3, 450 MHz



Date: 29.OCT.2024 13:07:21

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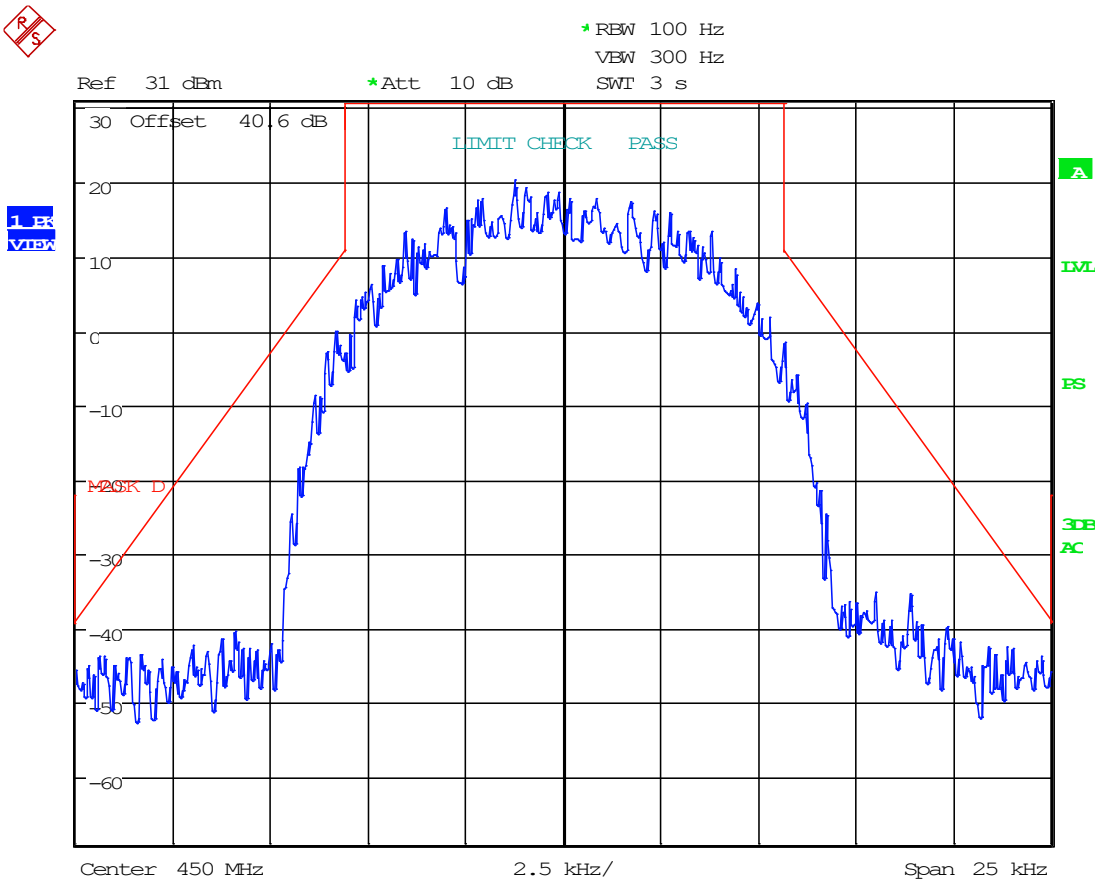
8.5.17 H-DQPSK, DL Mask D, AGC, 450 MHz



Date: 29.OCT.2024 13:08:55

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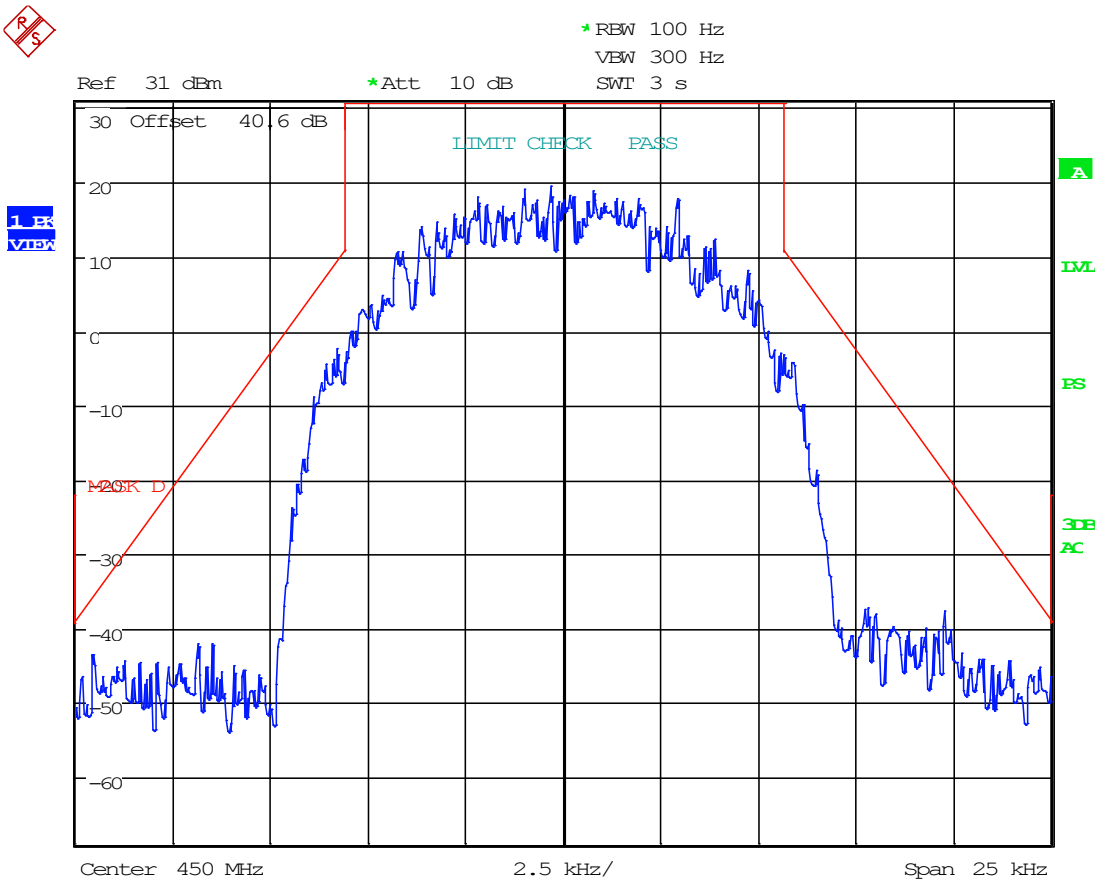
8.5.18 H-DQPSK, DL Mask D, AGC+3, 450 MHz



Date: 29.OCT.2024 13:09:23

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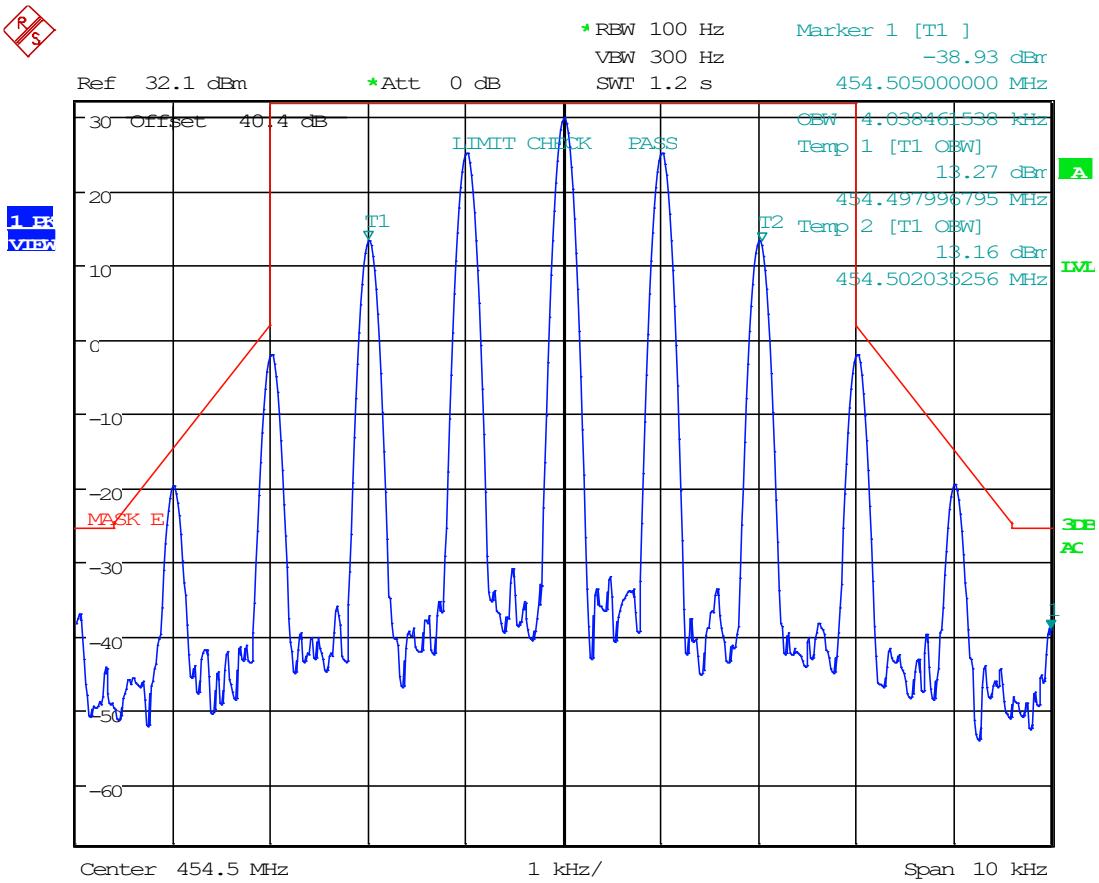
8.5.19 6.25 kHz, FM, DL Mask E, AGC, 454.5 MHz



Date: 8.NOV.2024 11:26:04

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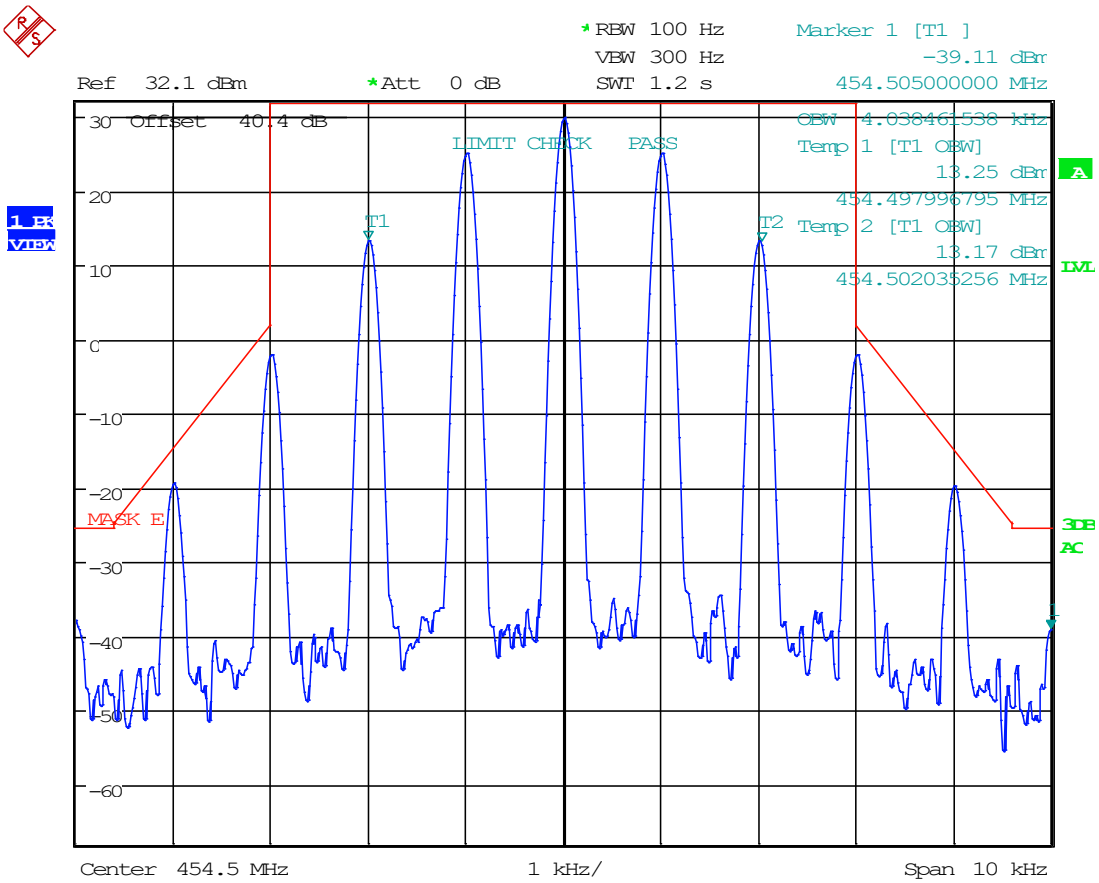
8.5.20 6.25 kHz, FM, DL Mask E, AGC+3, 454.5 MHz



Date: 8.NOV.2024 11:26:22

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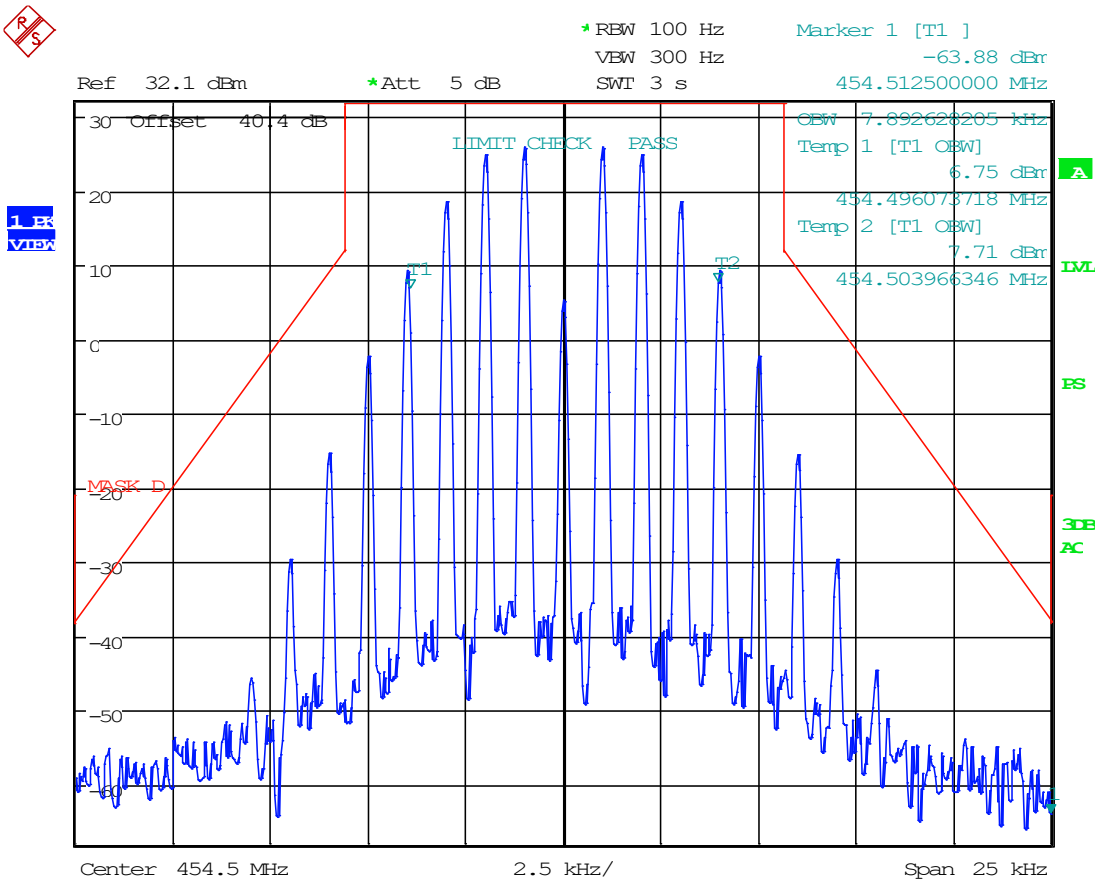
8.5.21 12.5 kHz, FM, DL Mask D, AGC, 454.5 MHz



Date: 8.NOV.2024 11:29:07

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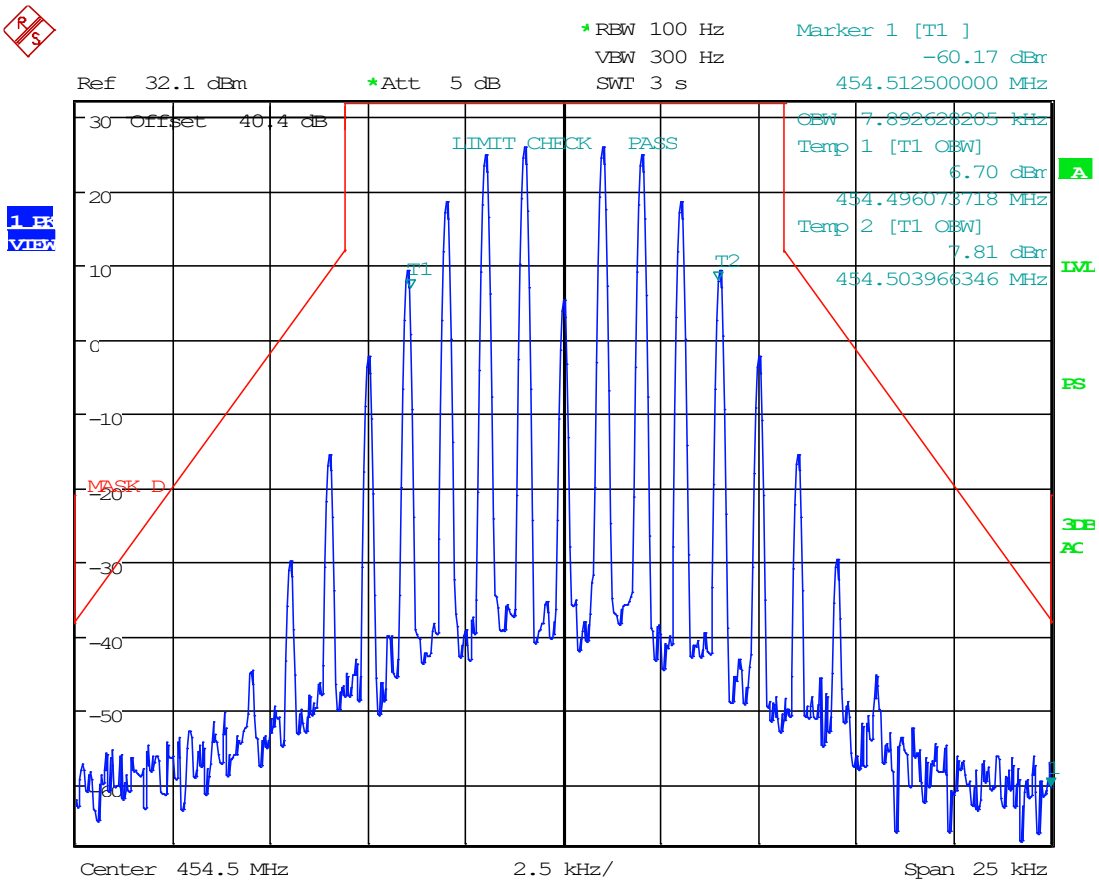
8.5.22 12.5 kHz, FM, DL Mask D, AGC+3, 454.5 MHz



Date: 8.NOV.2024 11:28:46

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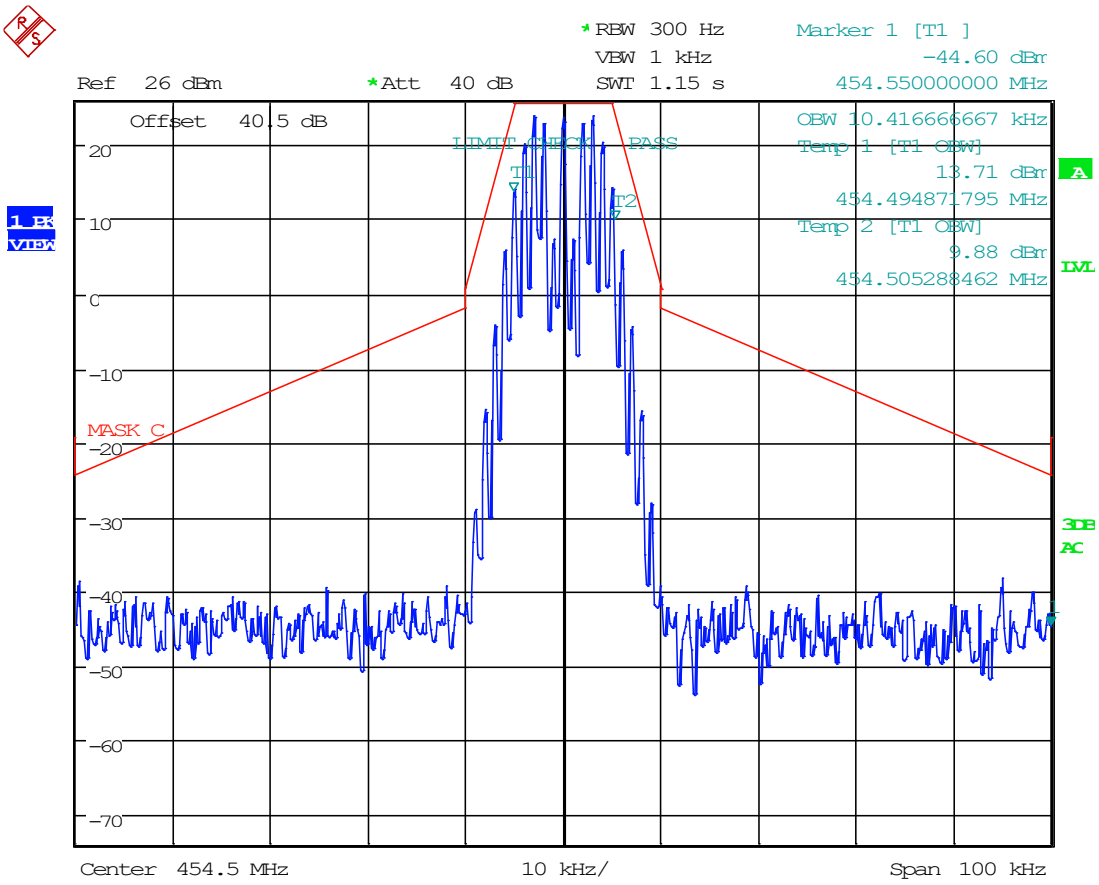
8.5.23 25 kHz FM, DL Mask C, AGC, 454.5 MHz



Date: 8.NOV.2024 11:40:15

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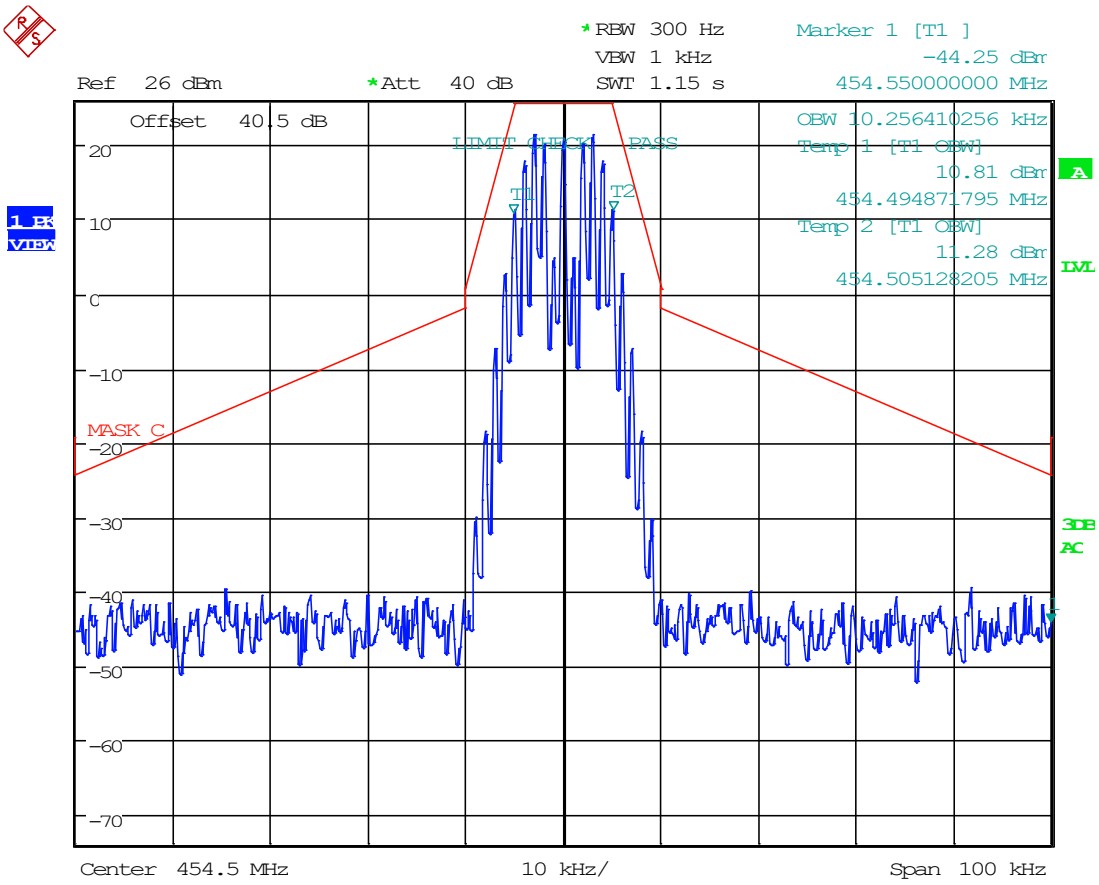
8.5.24 25 kHz FM, DL Mask C, AGC+3, 454.5 MHz



Date: 8.NOV.2024 11:40:42

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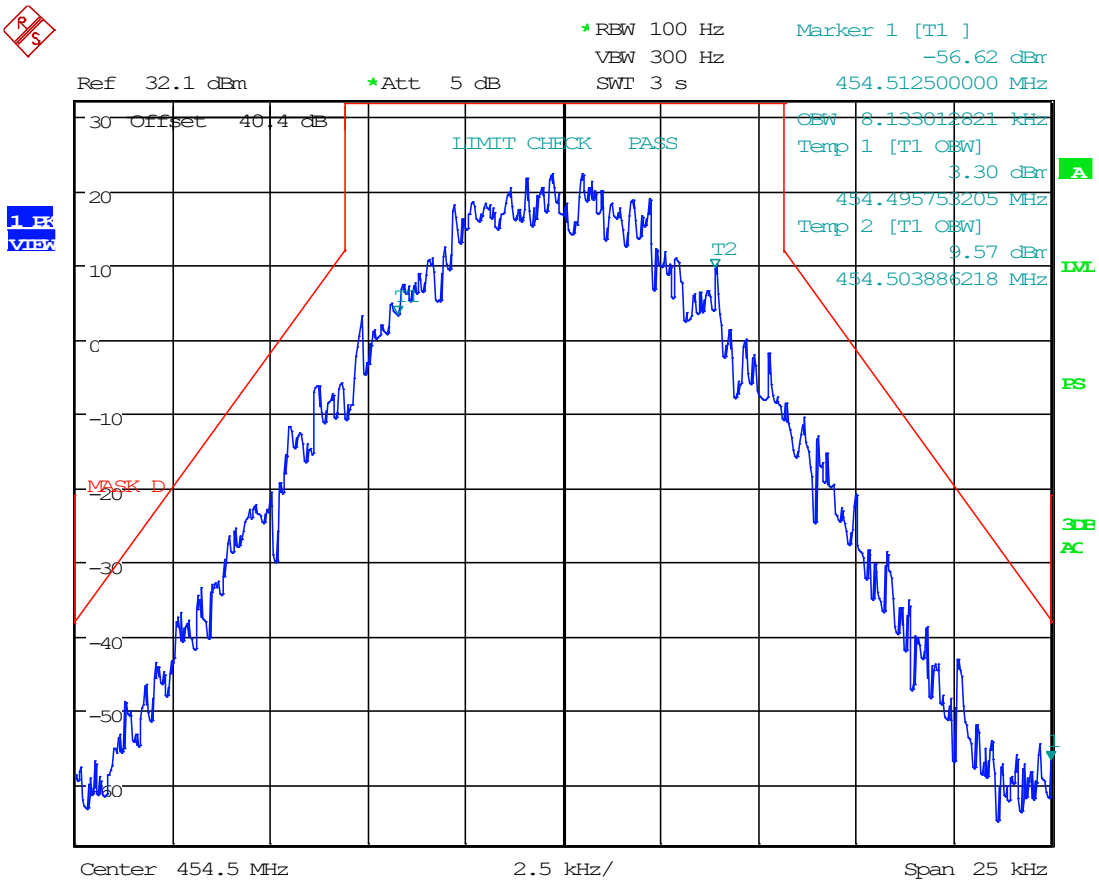
8.5.25 C4FM, DL Mask D, AGC, 454.5 MHz



Date: 8.NOV.2024 11:30:18

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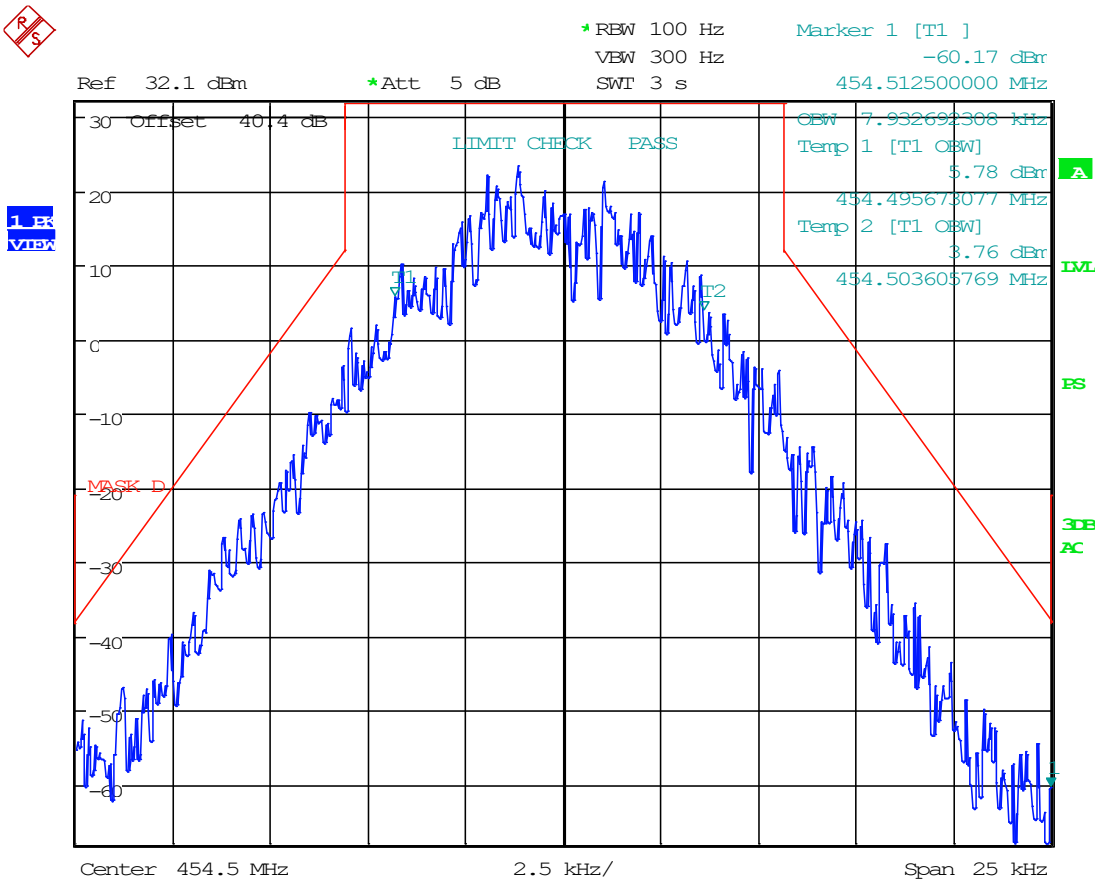
8.5.26 C4FM, DL Mask D, AGC+3, 454.5 MHz



Date: 8.NOV.2024 11:30:35

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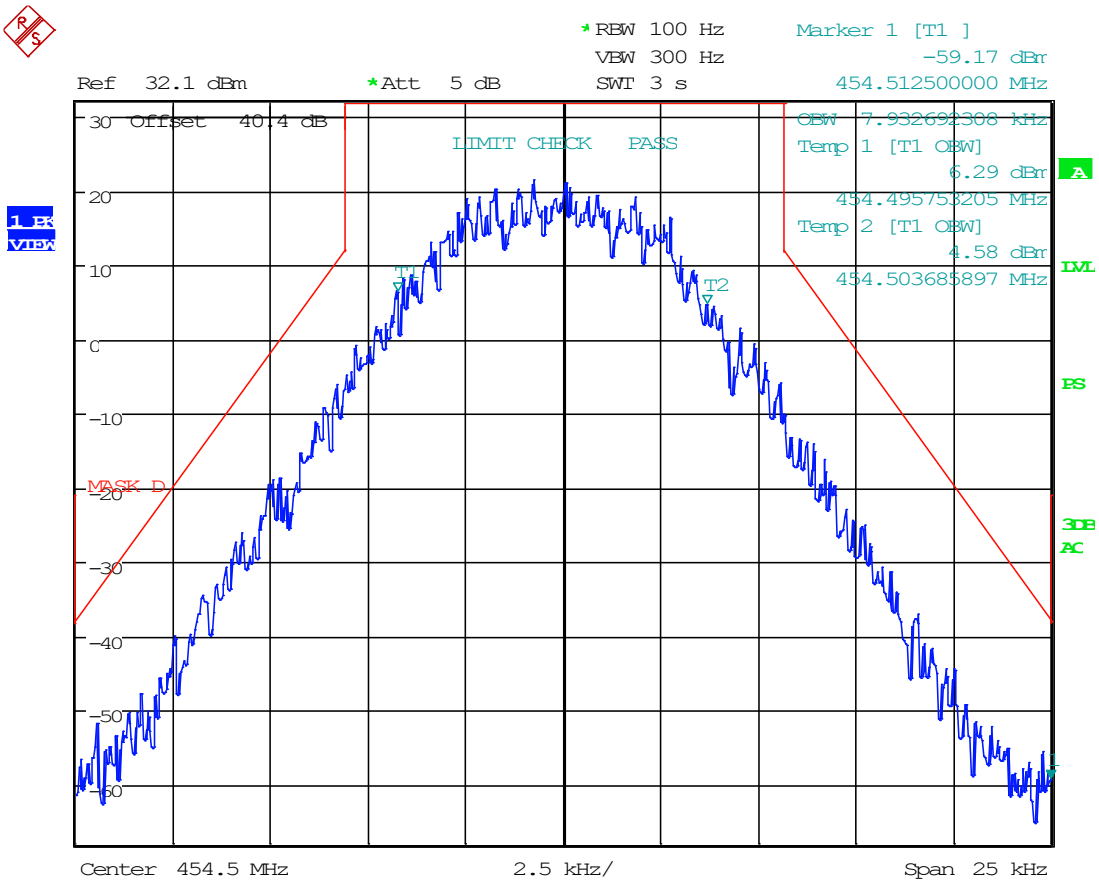
8.5.27 H-CPM, DL Mask D, AGC, 454.5 MHz



Date: 8.NOV.2024 11:32:13

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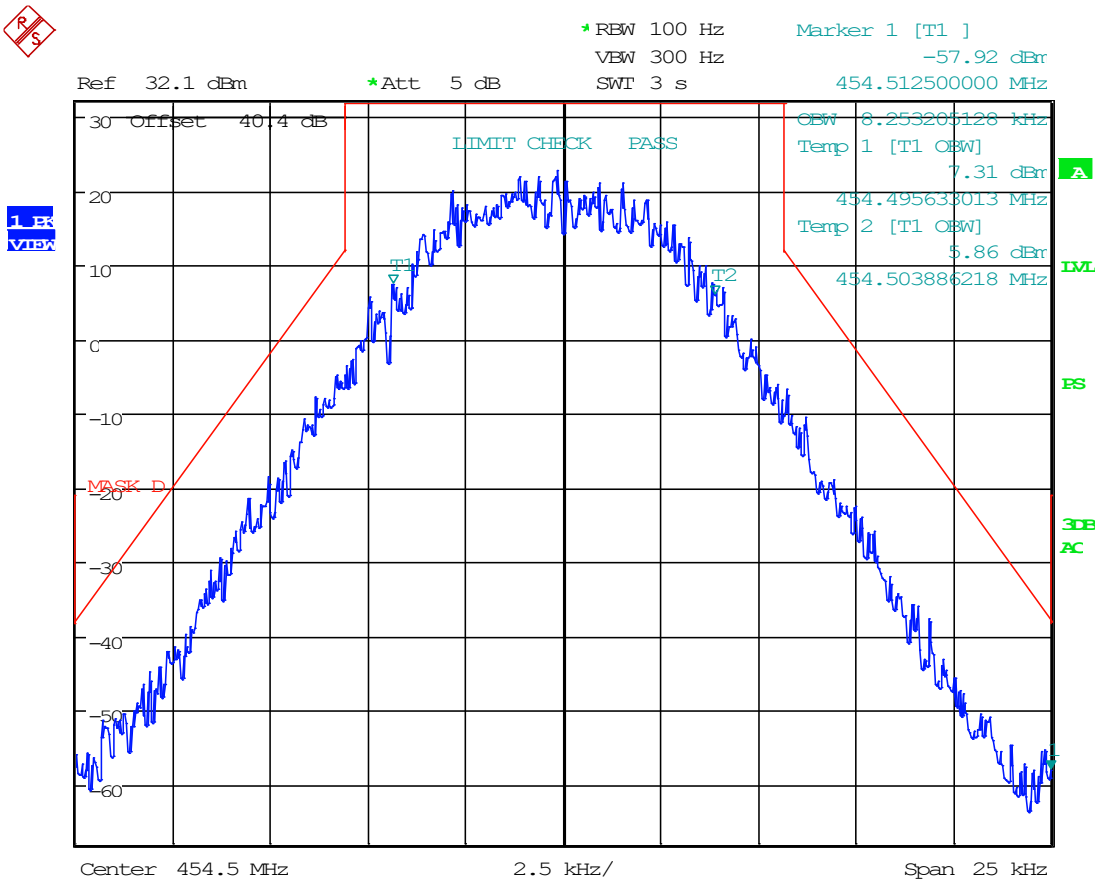
8.5.28 H-CPM, DL Mask D, AGC+3, 454.5 MHz



Date: 8.NOV.2024 11:31:51

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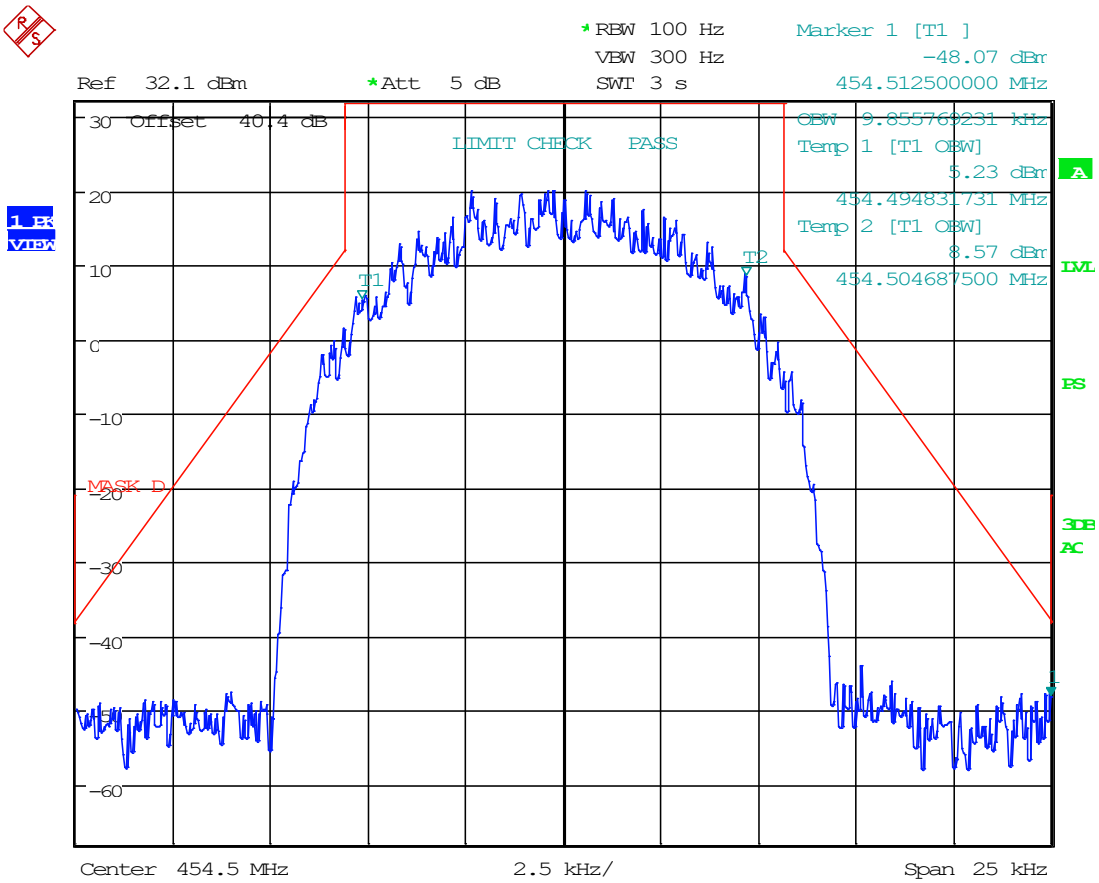
8.5.29 H-DQPSK, DL Mask D, AGC, 454.5 MHz



Date: 8.NOV.2024 11:33:16

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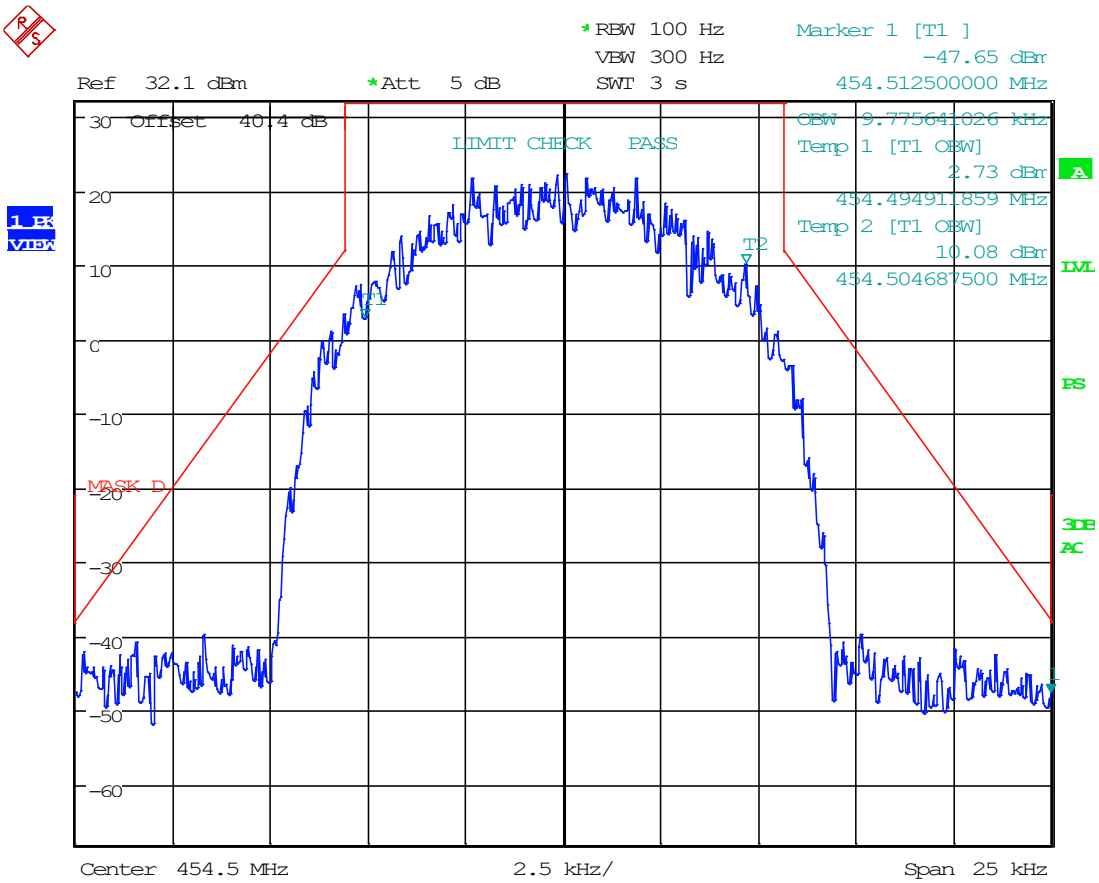
8.5.30 H-DQPSK, DL Mask D, AGC+3, 454.5 MHz



Date: 8.NOV.2024 11:33:44

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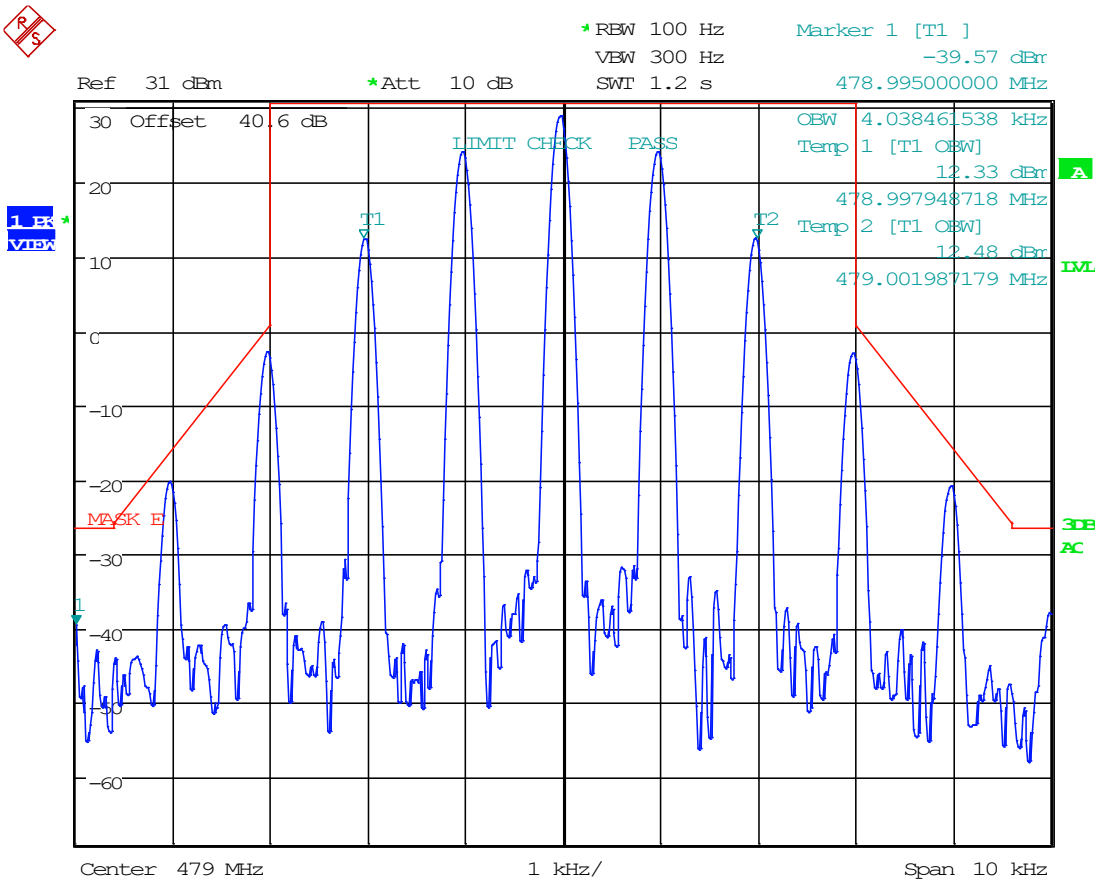
8.5.31 6.25 kHz, FM, DL Mask E, AGC, 479 MHz



Date: 29.OCT.2024 12:46:44

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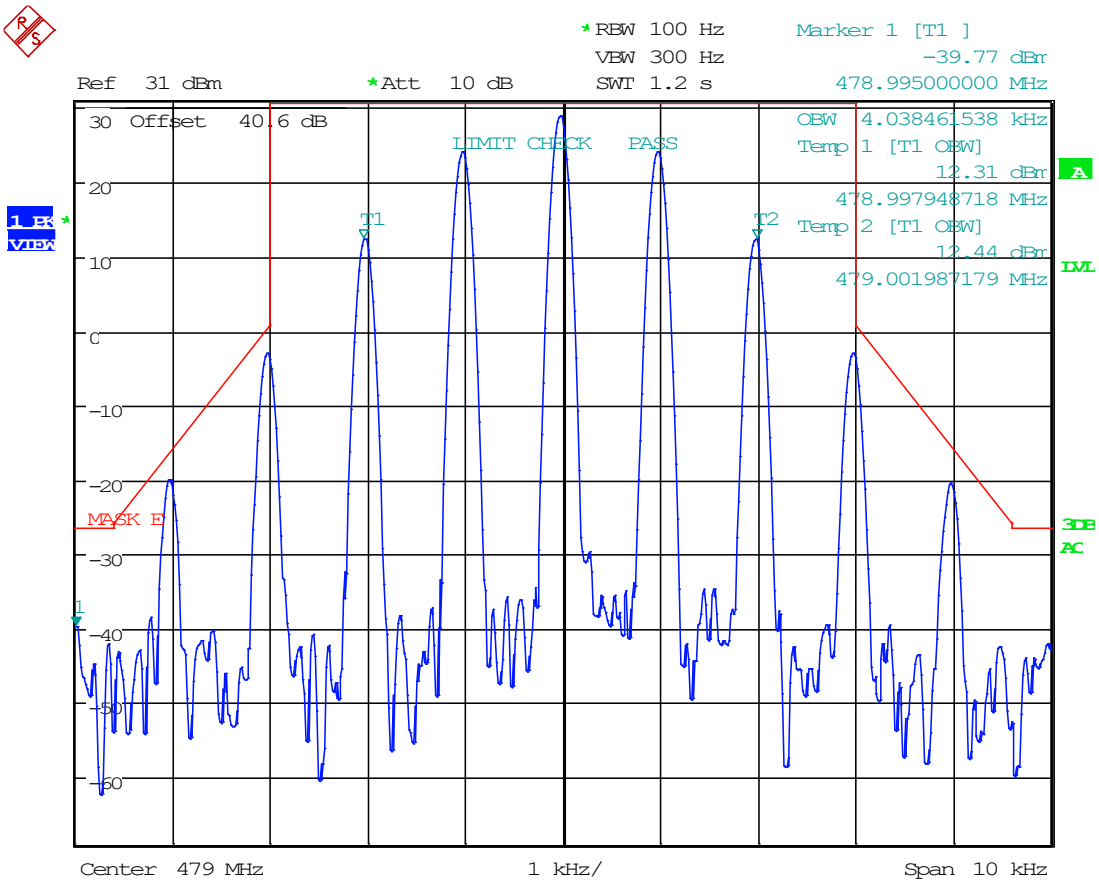
8.5.32 6.25 kHz, FM, DL Mask E, AGC+3, 479 MHz



Date: 29.OCT.2024 12:46:28

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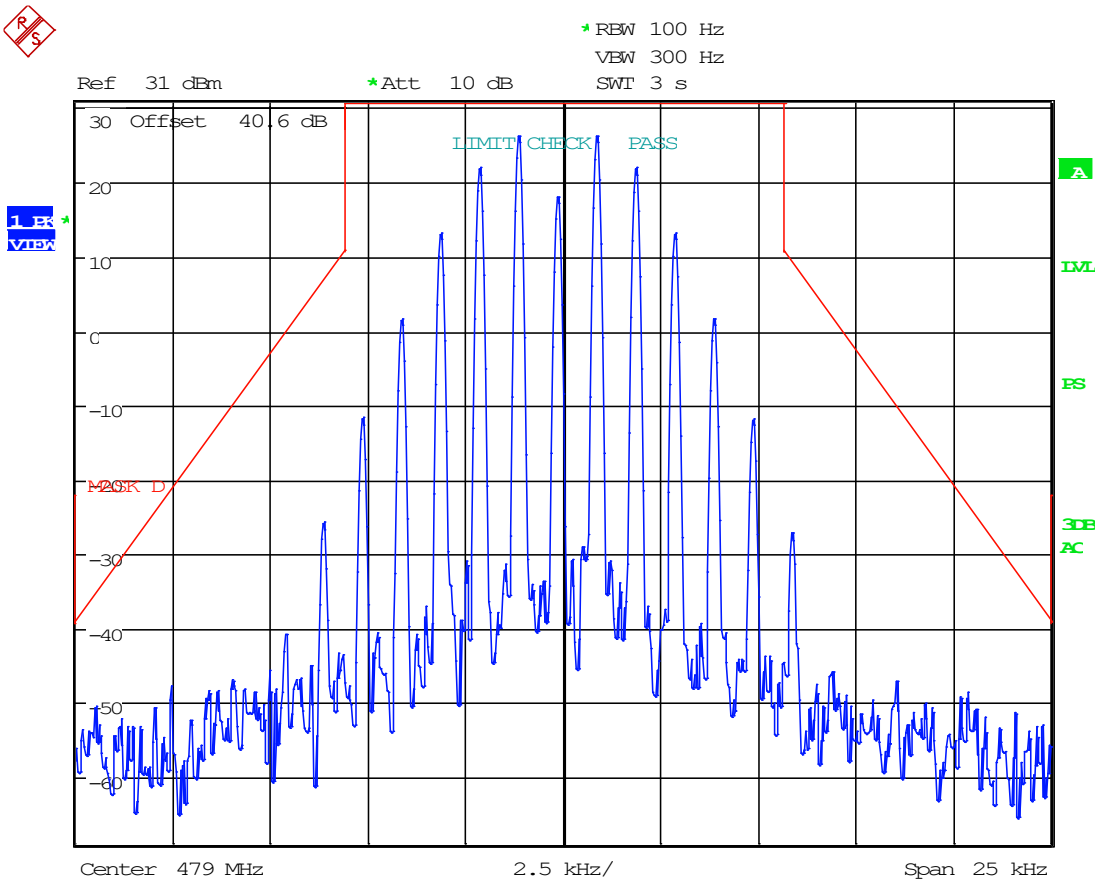
8.5.33 12.5 kHz, FM, DL Mask D, AGC, 479 MHz



Date: 29.OCT.2024 13:03:58

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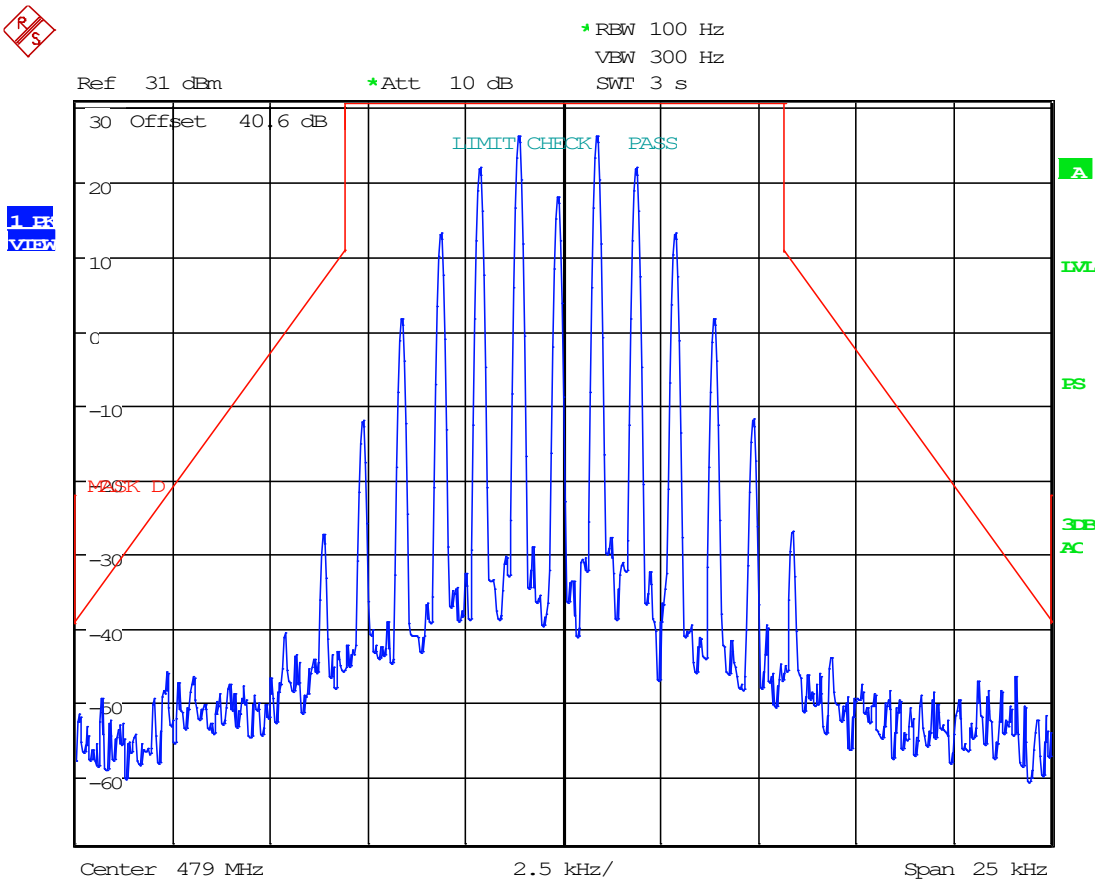
8.5.34 12.5 kHz, FM, DL Mask D, AGC+3, 479 MHz



Date: 29.OCT.2024 13:04:26

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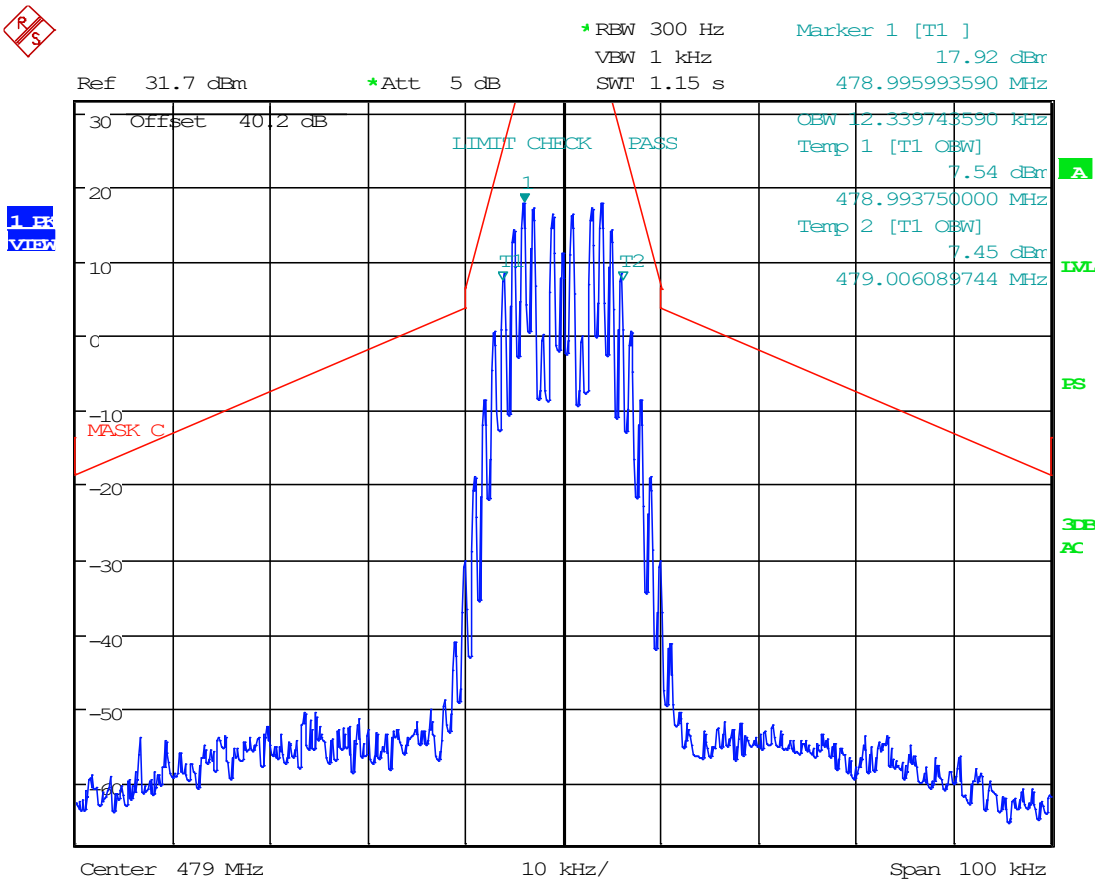
8.5.35 25 kHz FM, DL Mask C, AGC, 479 MHz



Date: 2.JAN.2025 14:49:37

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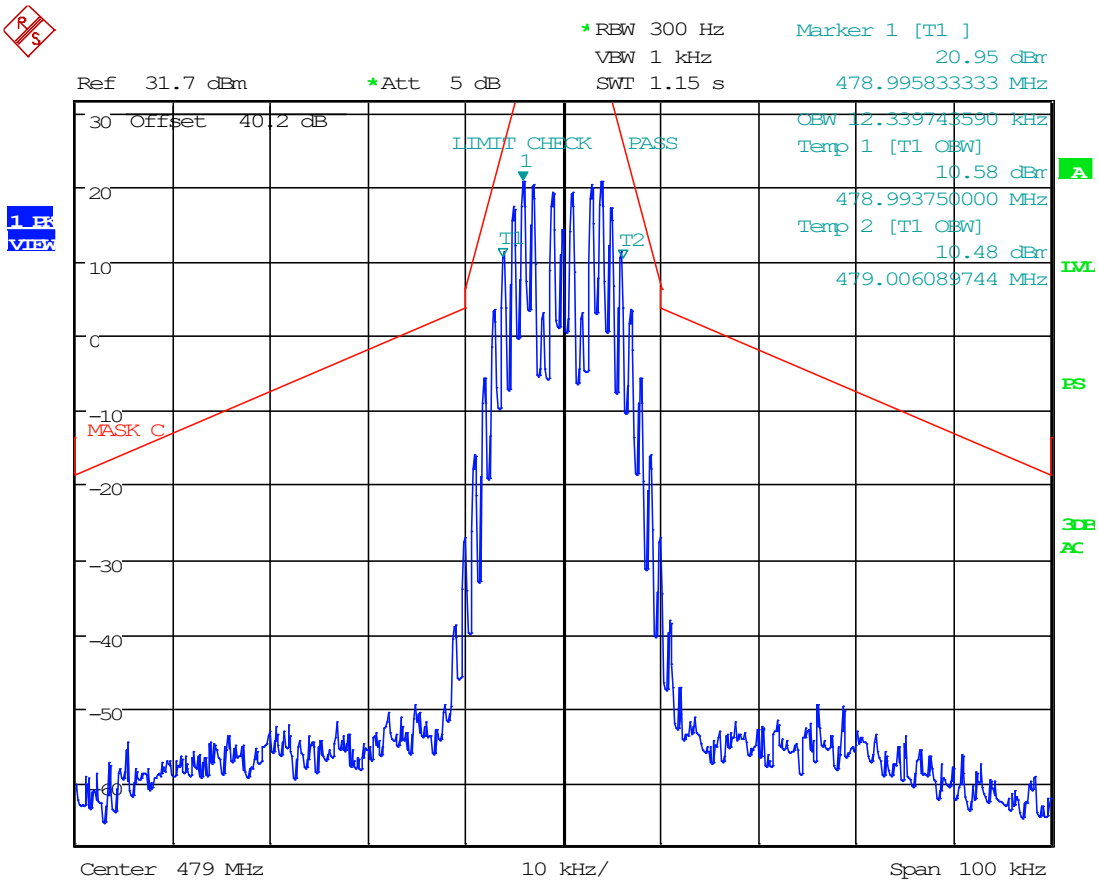
8.5.36 25 kHz FM, DL Mask C, AGC+3, 479 MHz



Date: 2.JAN.2025 14:50:19

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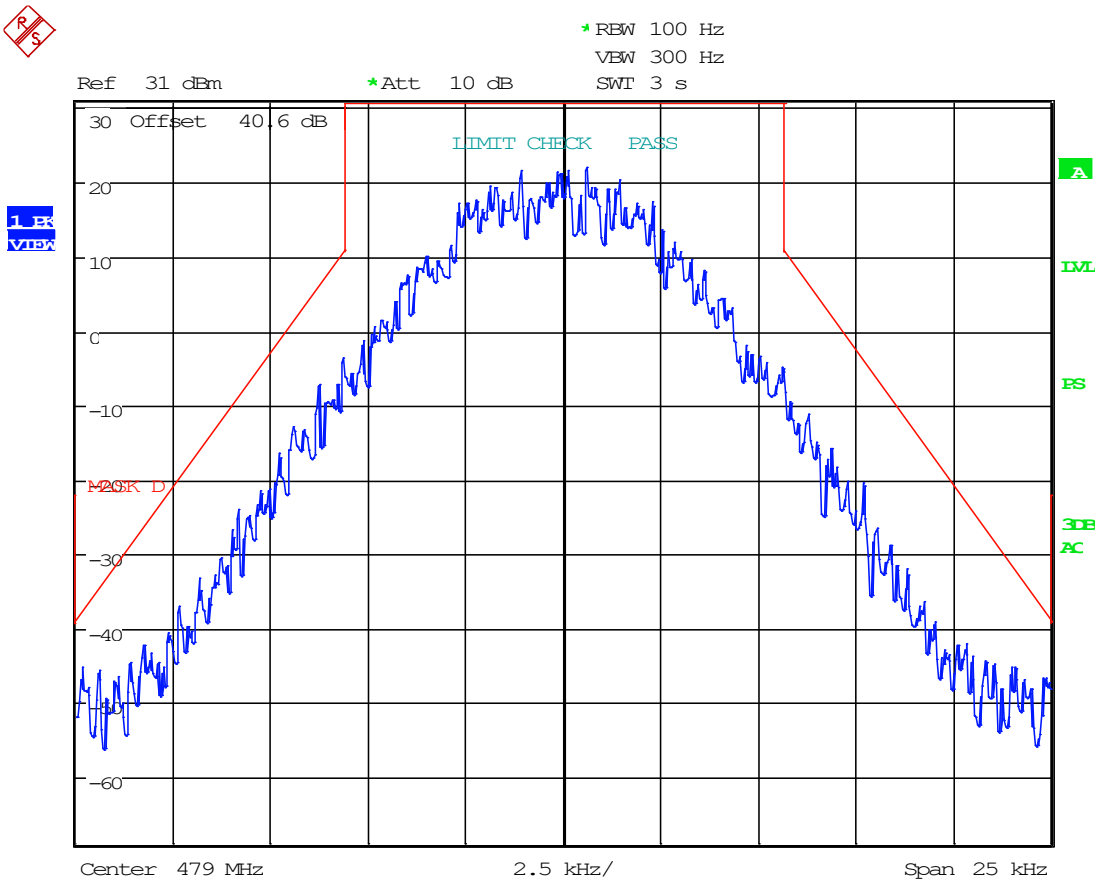
8.5.37 C4FM, DL Mask D, AGC, 479 MHz



Date: 29.OCT.2024 13:03:19

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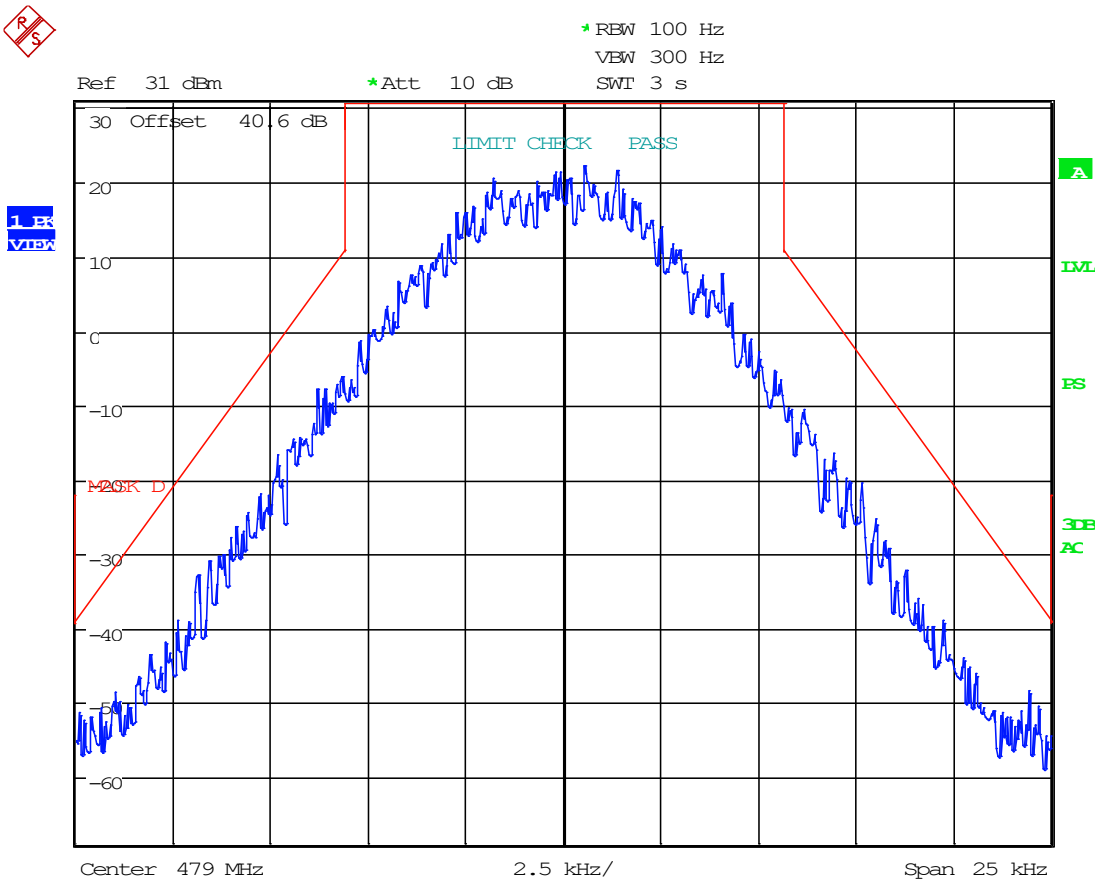
8.5.38 C4FM, DL Mask D, AGC+3, 479 MHz



Date: 29.OCT.2024 13:02:53

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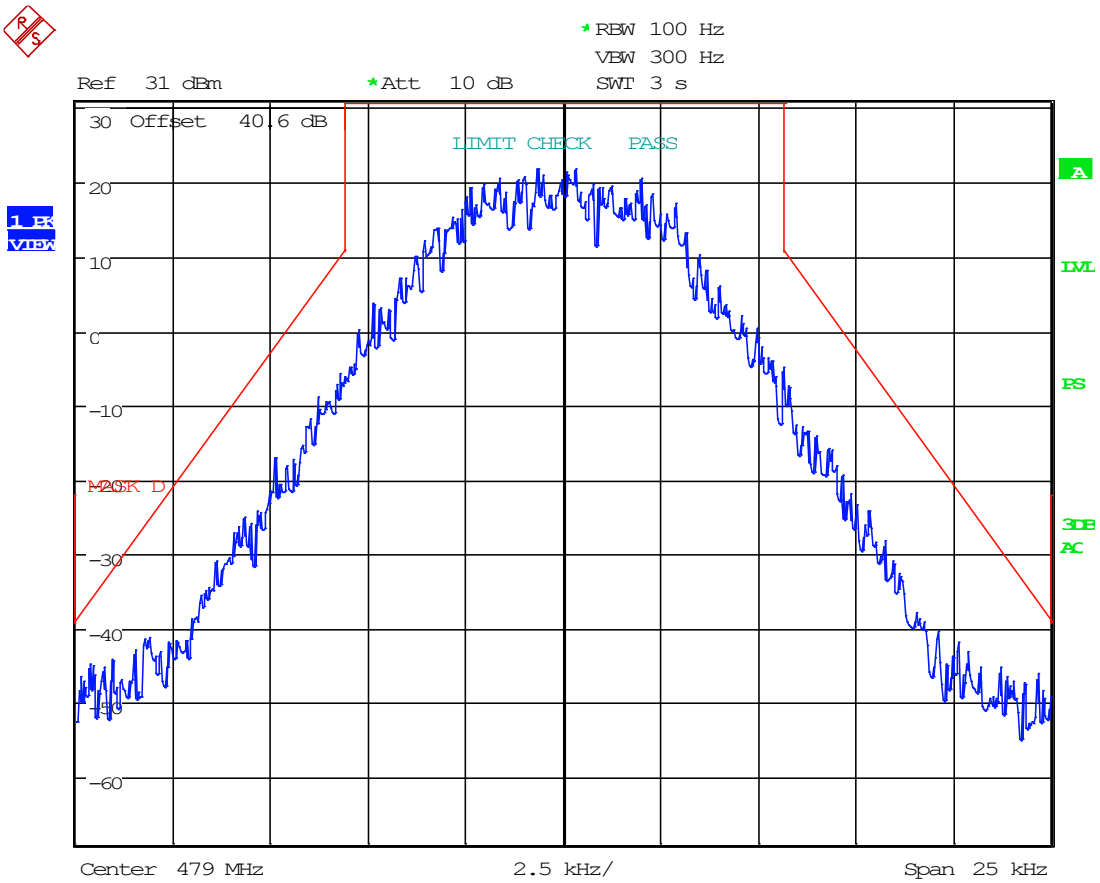
8.5.39 H-CPM, DL Mask D, AGC, 479 MHz



Date: 29.OCT.2024 12:59:27

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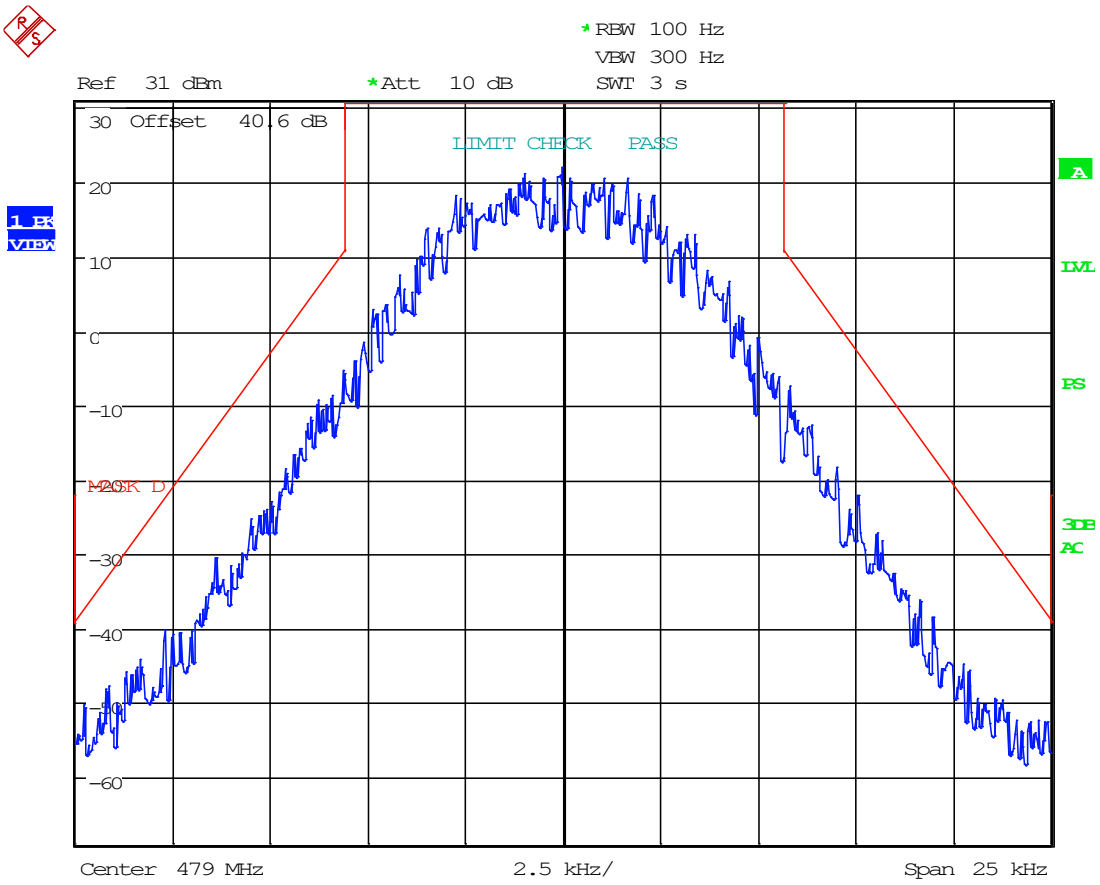
8.5.40 H-CPM, DL Mask D, AGC+3, 479 MHz



Date: 29.OCT.2024 13:02:01

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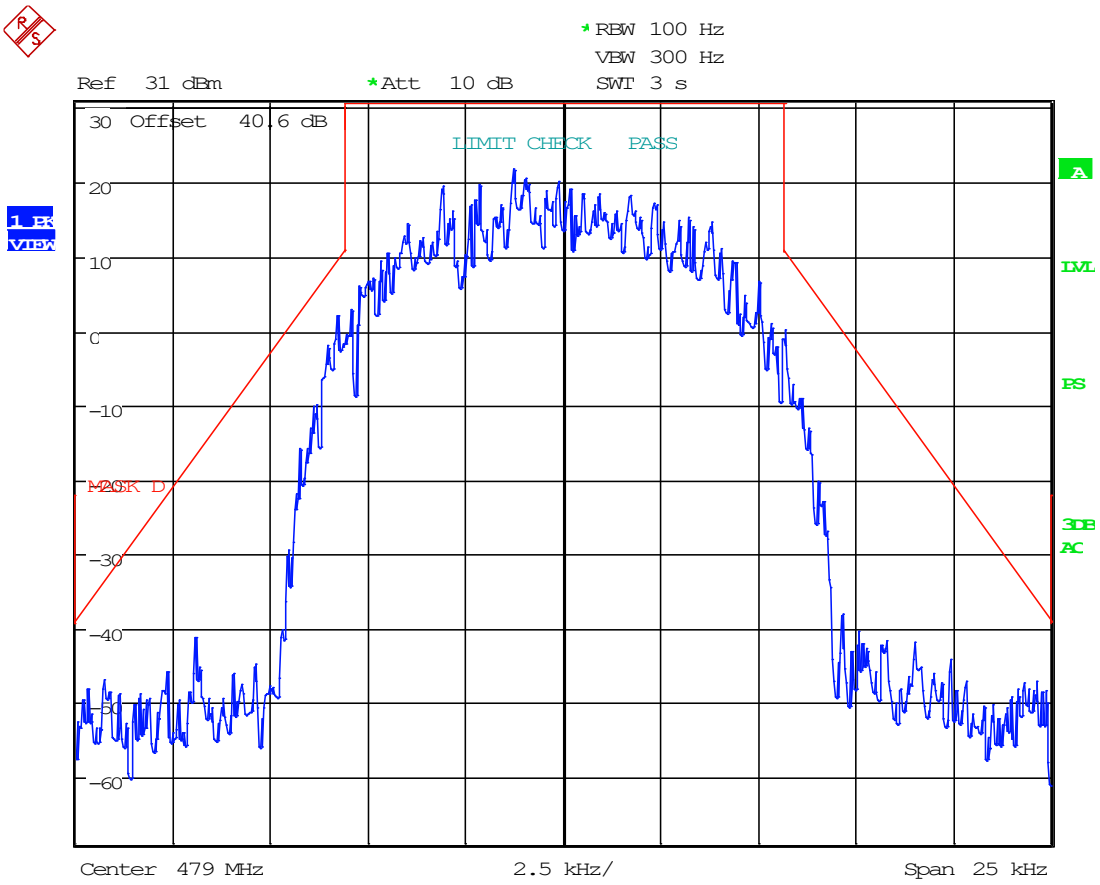
8.5.41 H-DQPSK, DL Mask D, AGC, 479 MHz



Date: 29.OCT.2024 12:58:27

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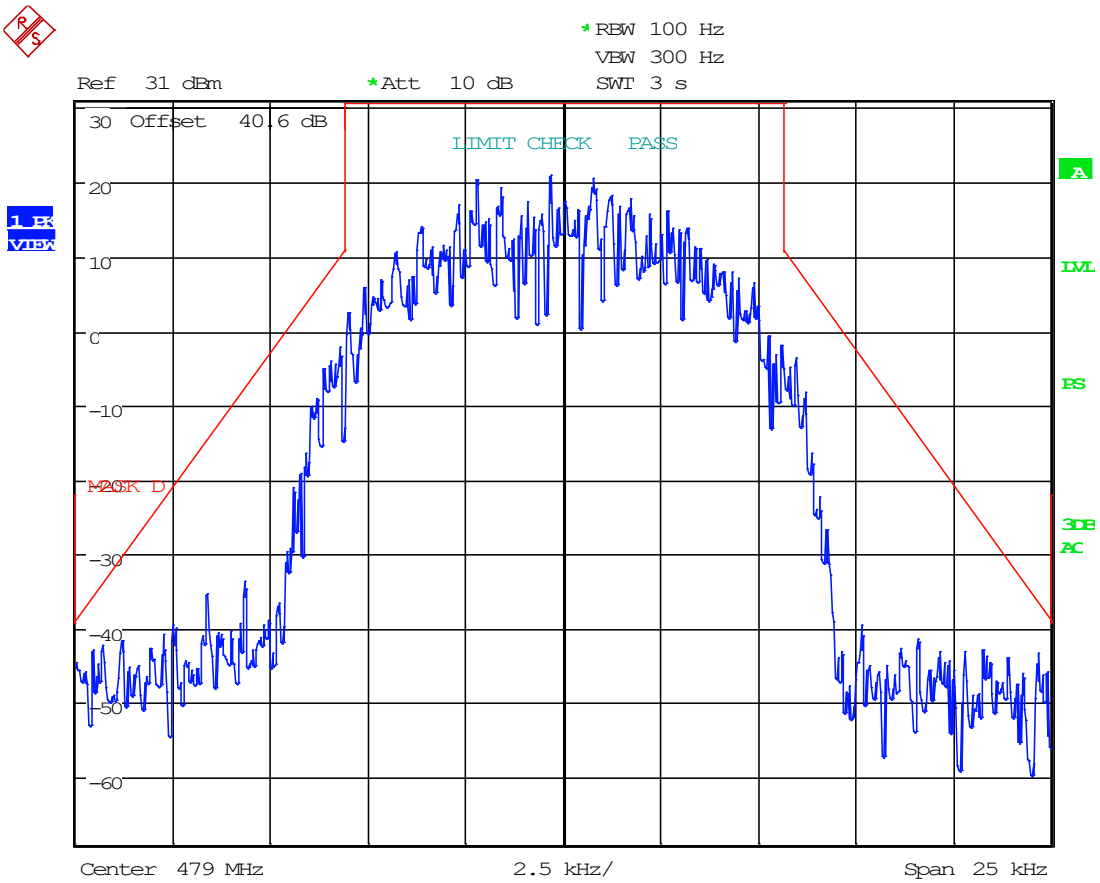
8.5.42 H-DQPSK, DL Mask D, AGC+3, 479 MHz



Date: 29.OCT.2024 12:58:01

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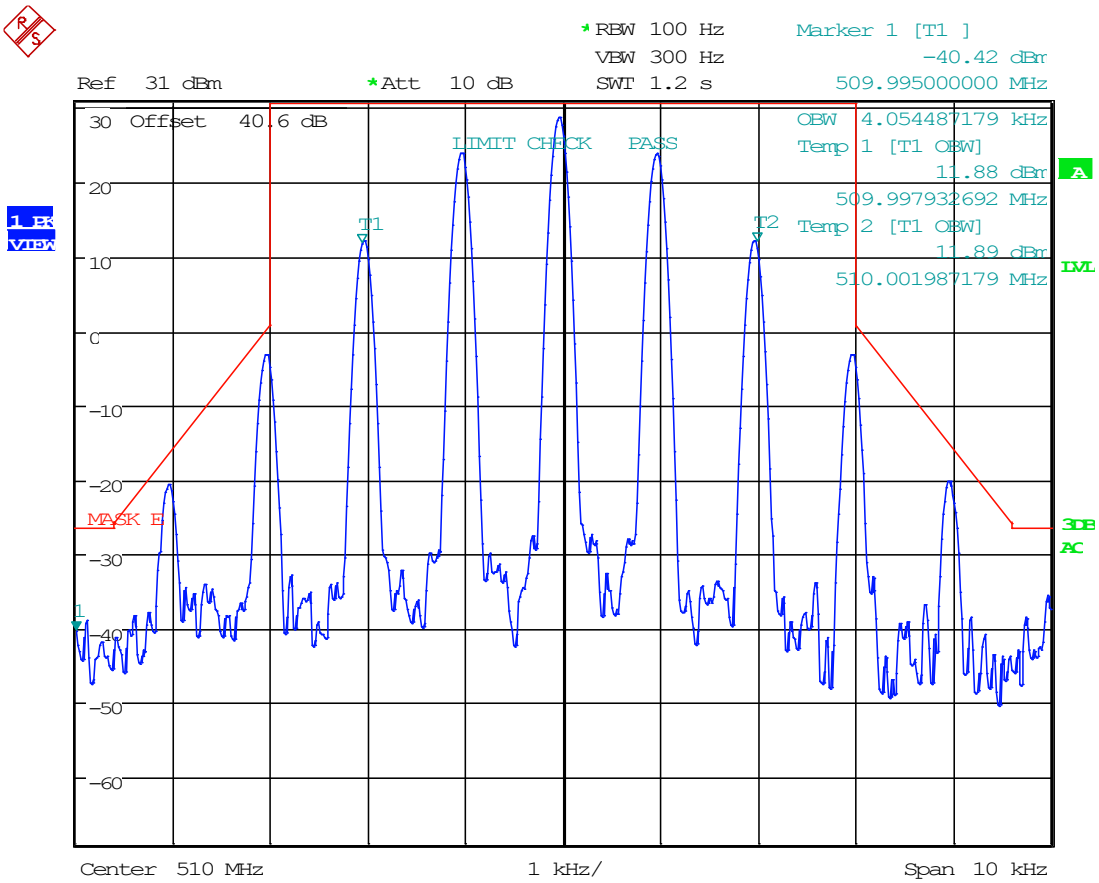
8.5.43 6.25 kHz, FM, DL Mask E, AGC, 510 MHz



Date: 29.OCT.2024 12:47:34

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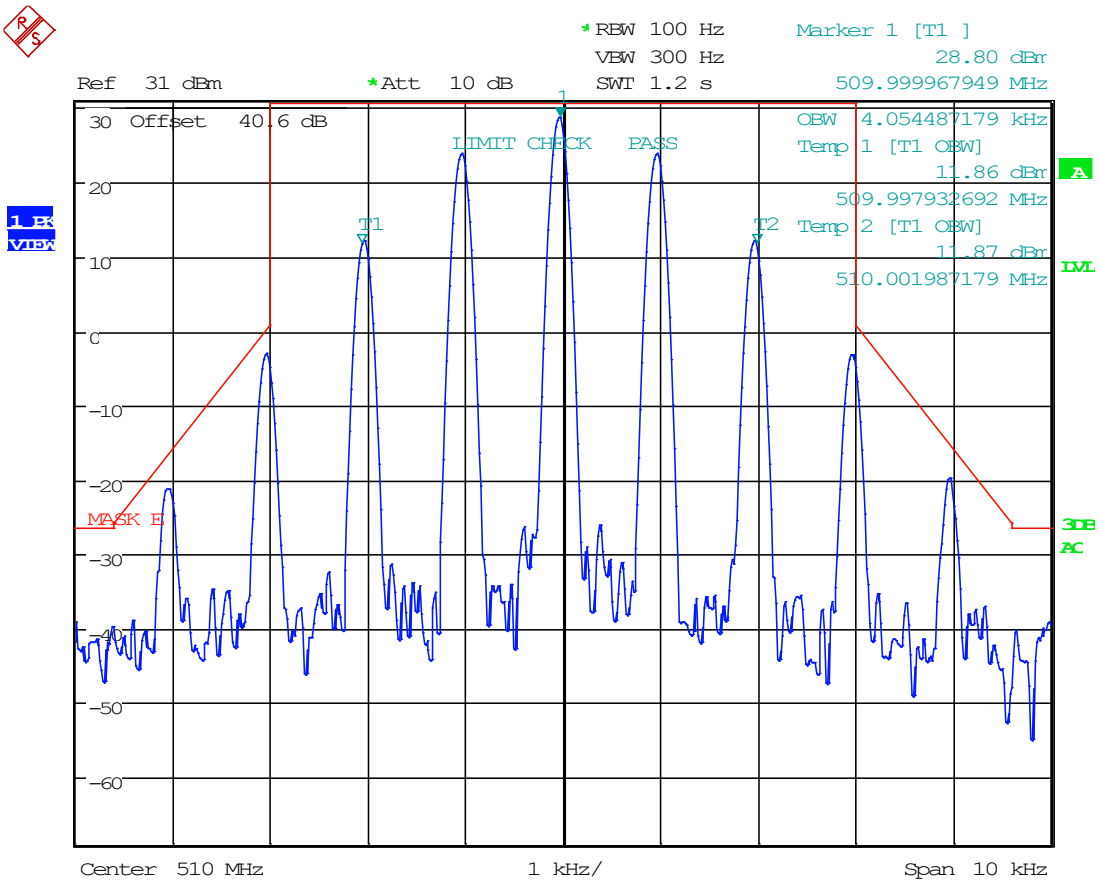
8.5.44 6.25 kHz, FM, DL Mask E, AGC+3, 510 MHz



Date: 29.OCT.2024 12:47:56

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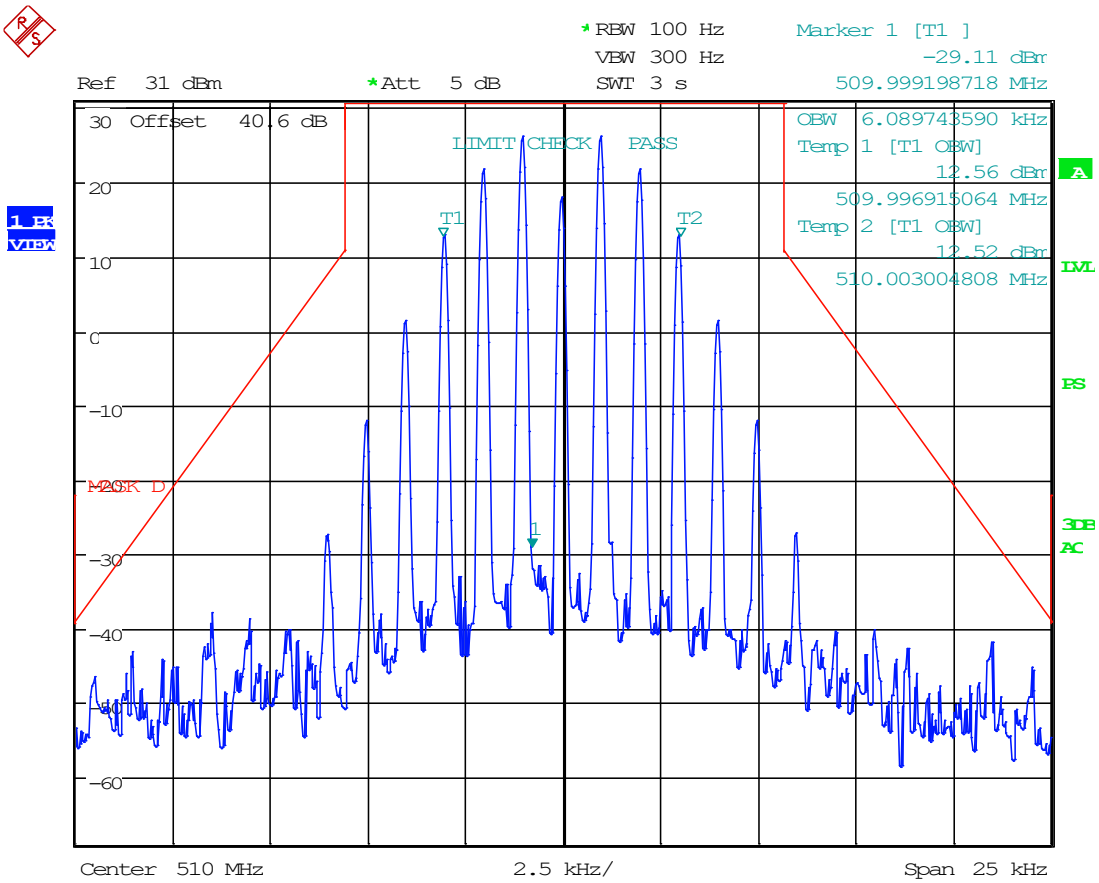
8.5.45 12.5 kHz, FM, DL Mask D, AGC, 510 MHz



Date: 29.OCT.2024 12:53:00

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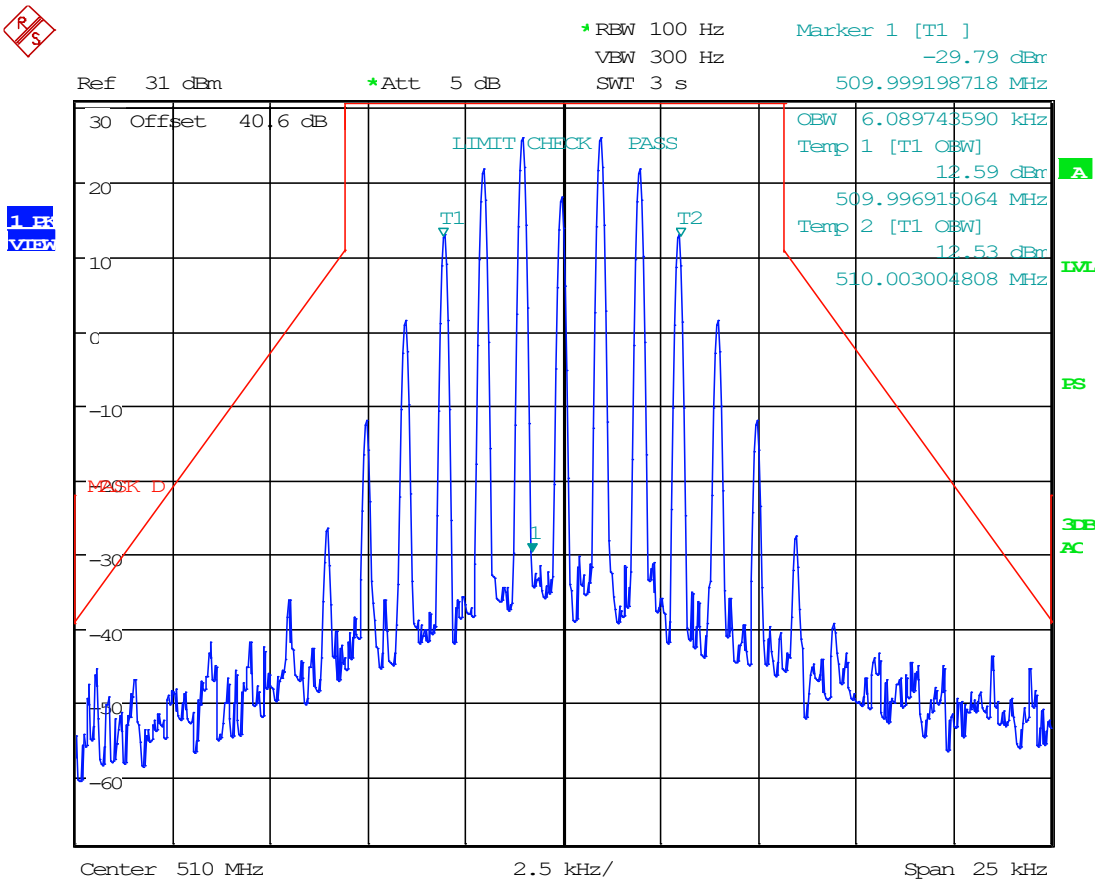
8.5.46 12.5 kHz, FM, DL Mask D, AGC+3, 510 MHz



Date: 29.OCT.2024 12:52:38

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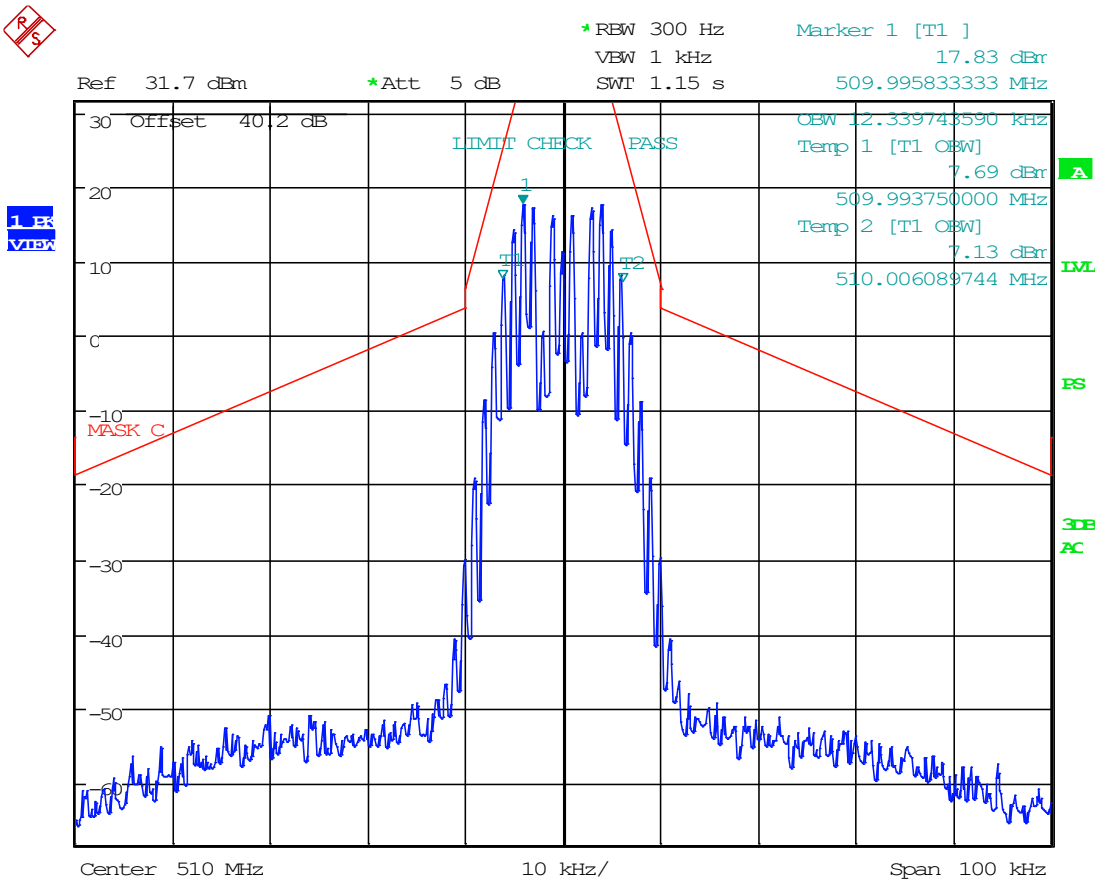
8.5.47 25 kHz FM, DL Mask C, AGC, 510 MHz



Date: 2.JAN.2025 14:51:46

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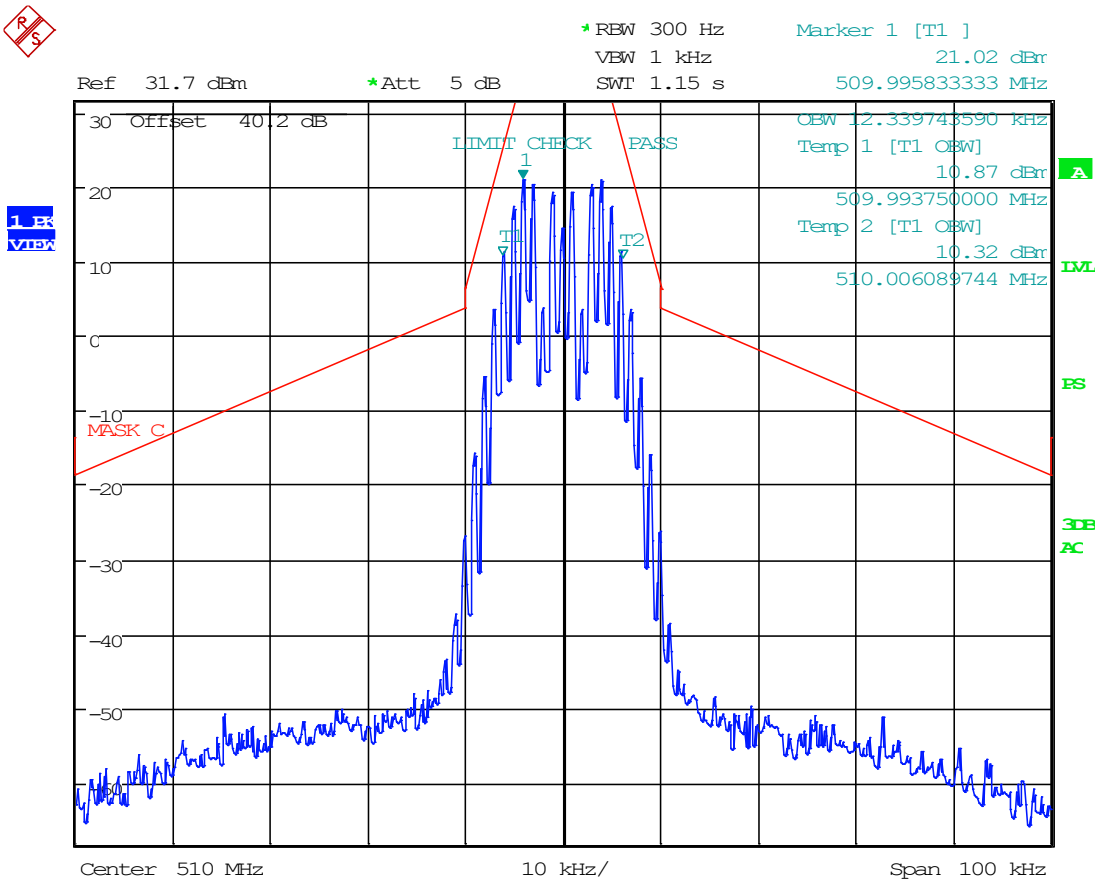
8.5.48 25 kHz FM, DL Mask C, AGC+3, 510 MHz



Date: 2.JAN.2025 14:52:32

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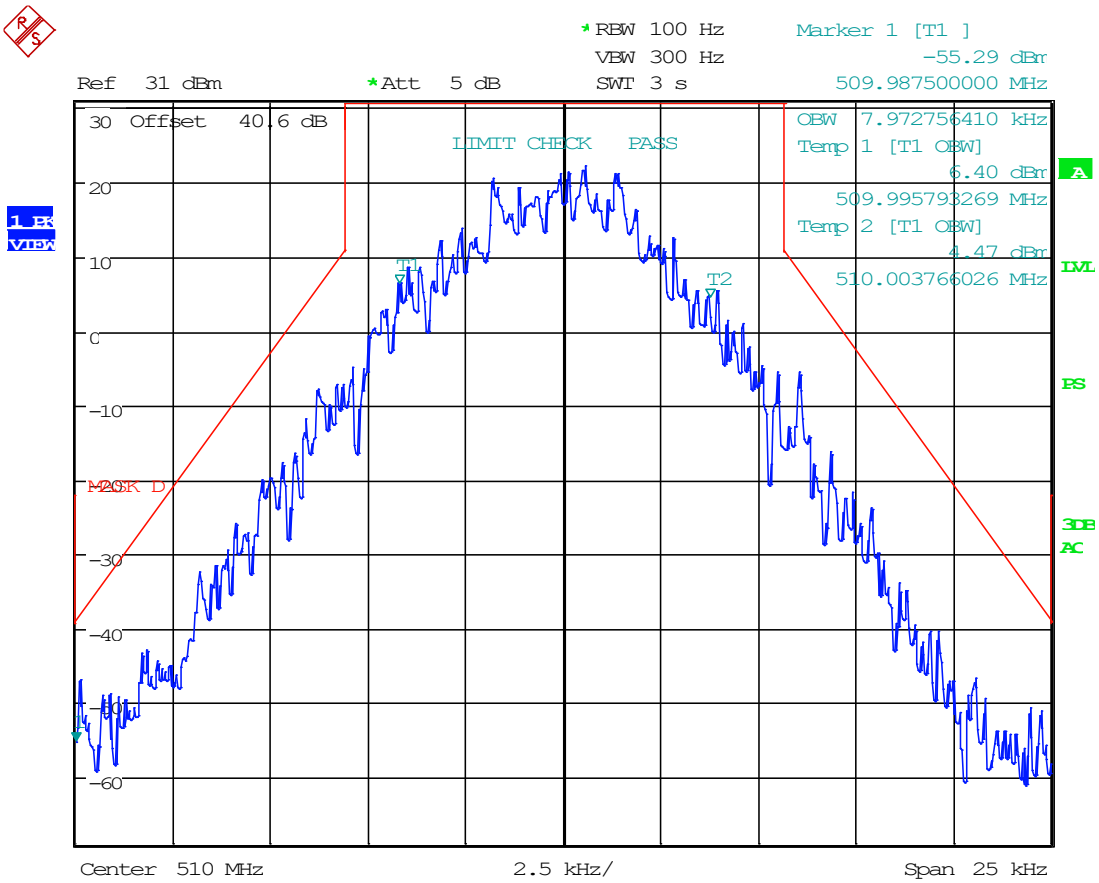
8.5.49 C4FM, DL Mask D, AGC, 510 MHz



Date: 29.OCT.2024 12:49:35

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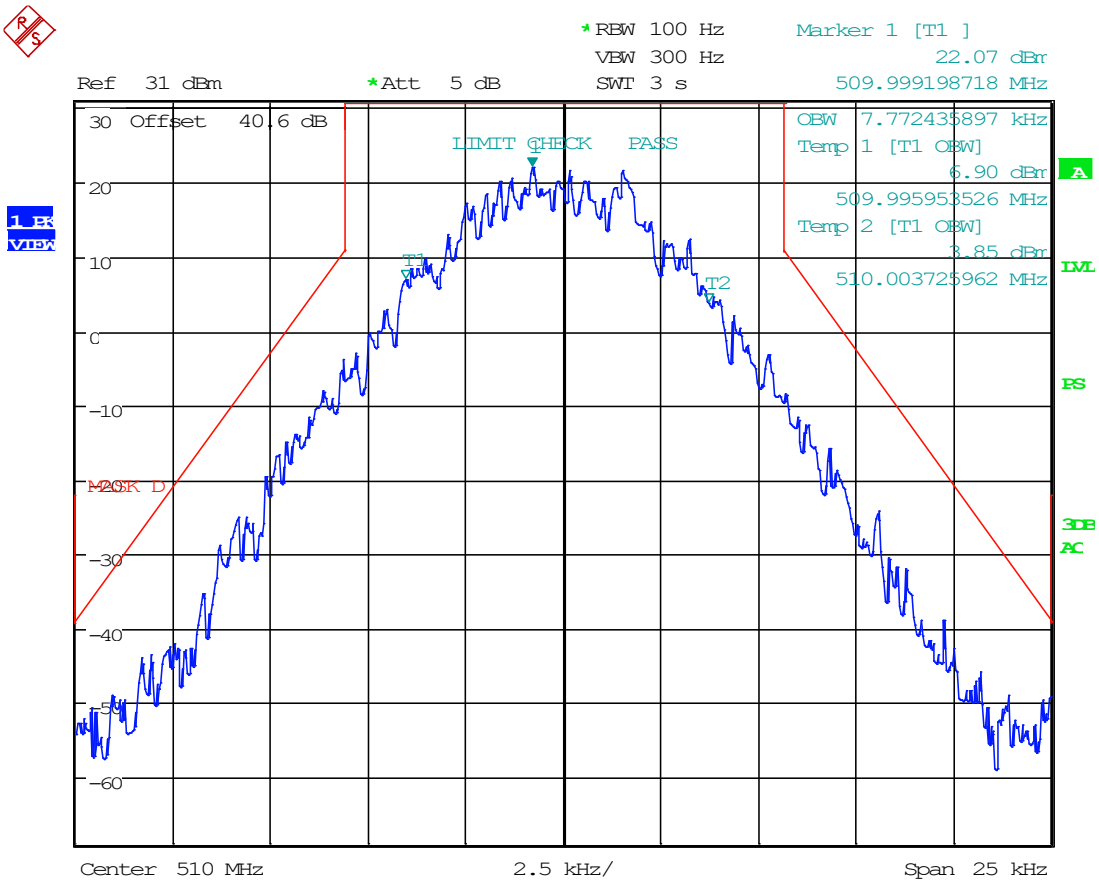
8.5.50 C4FM, DL Mask D, AGC+3, 510 MHz



Date: 29.OCT.2024 12:50:16

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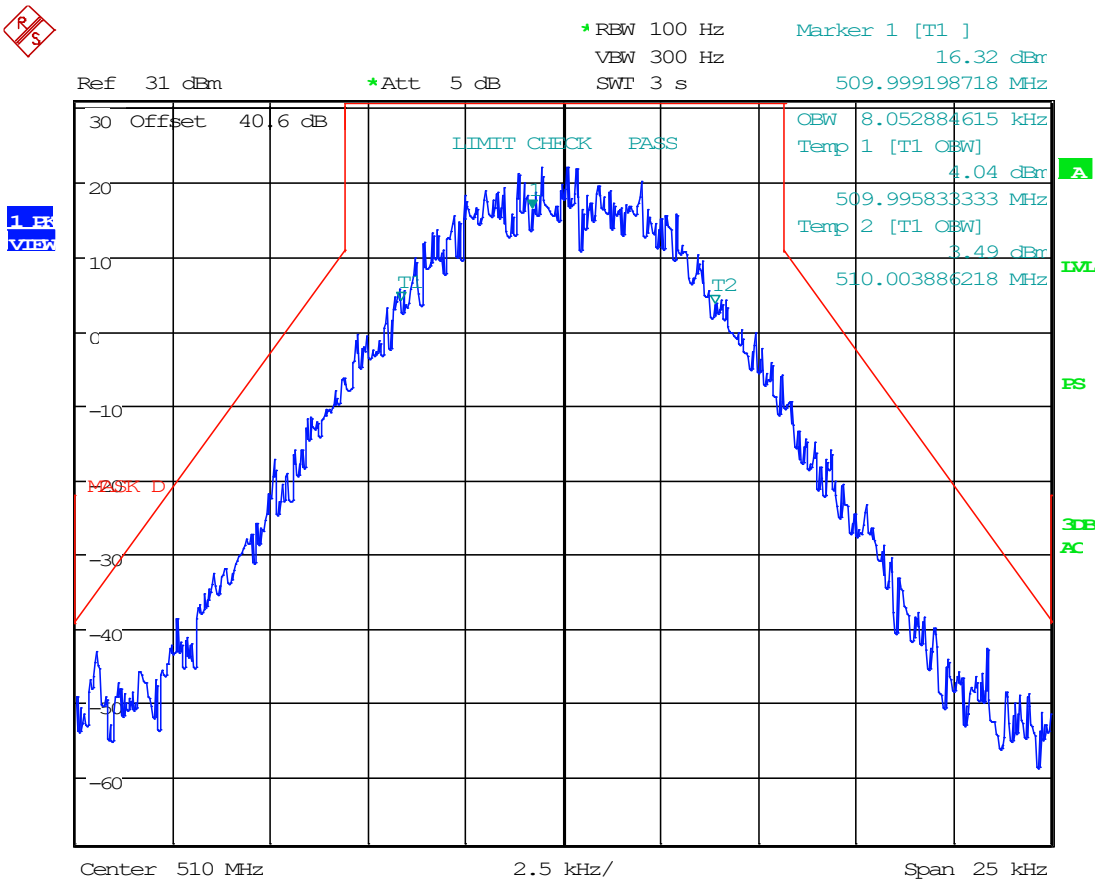
8.5.51 H-CPM, DL Mask D, AGC, 510 MHz



Date: 29.OCT.2024 12:51:31

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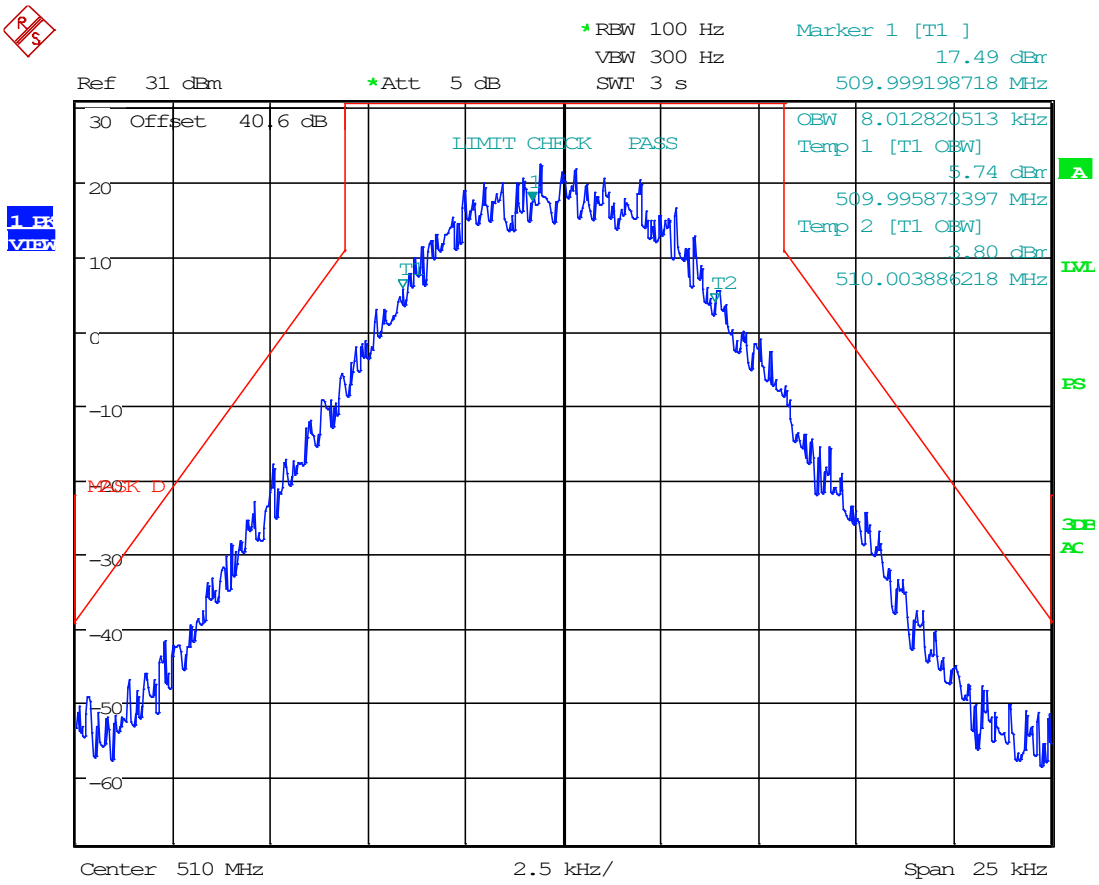
8.5.52 H-CPM, DL Mask D, AGC+3, 510 MHz



Date: 29.OCT.2024 12:51:07

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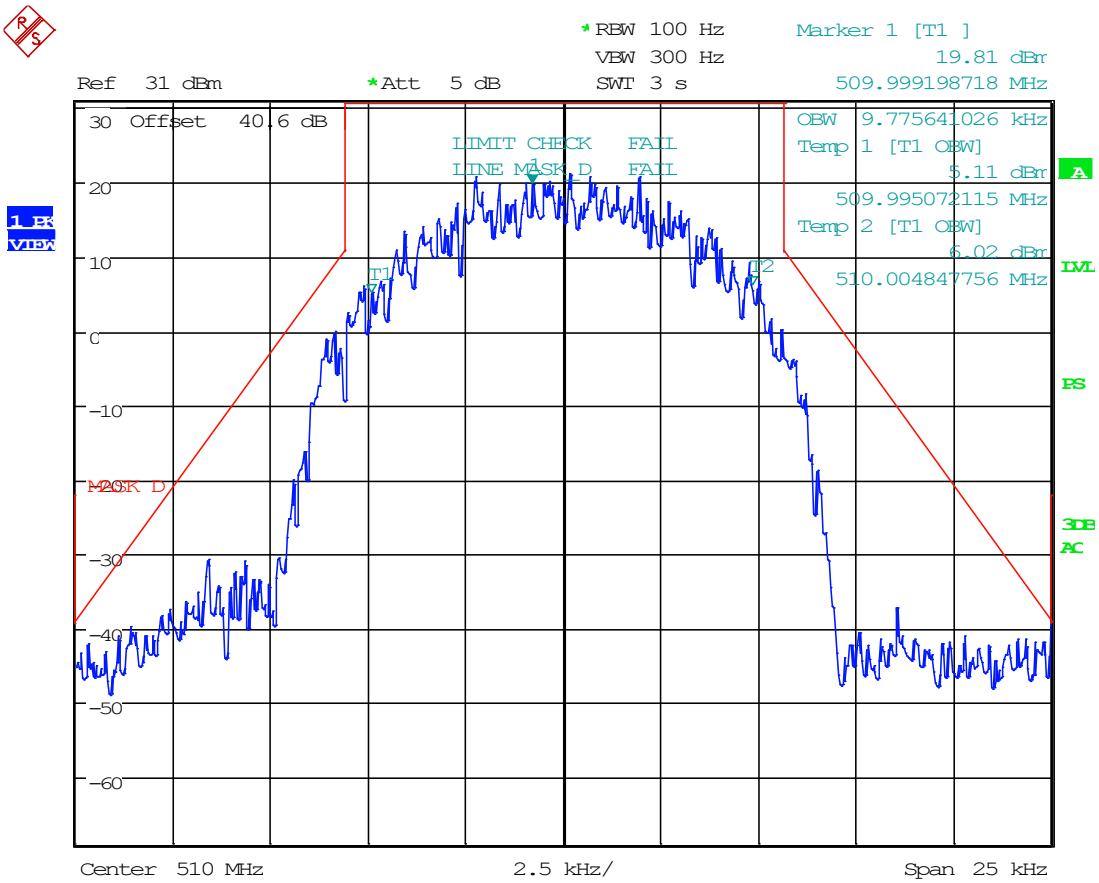
8.5.53 H-DQPSK, DL Mask D, AGC, 510 MHz



Date: 29.OCT.2024 12:54:05

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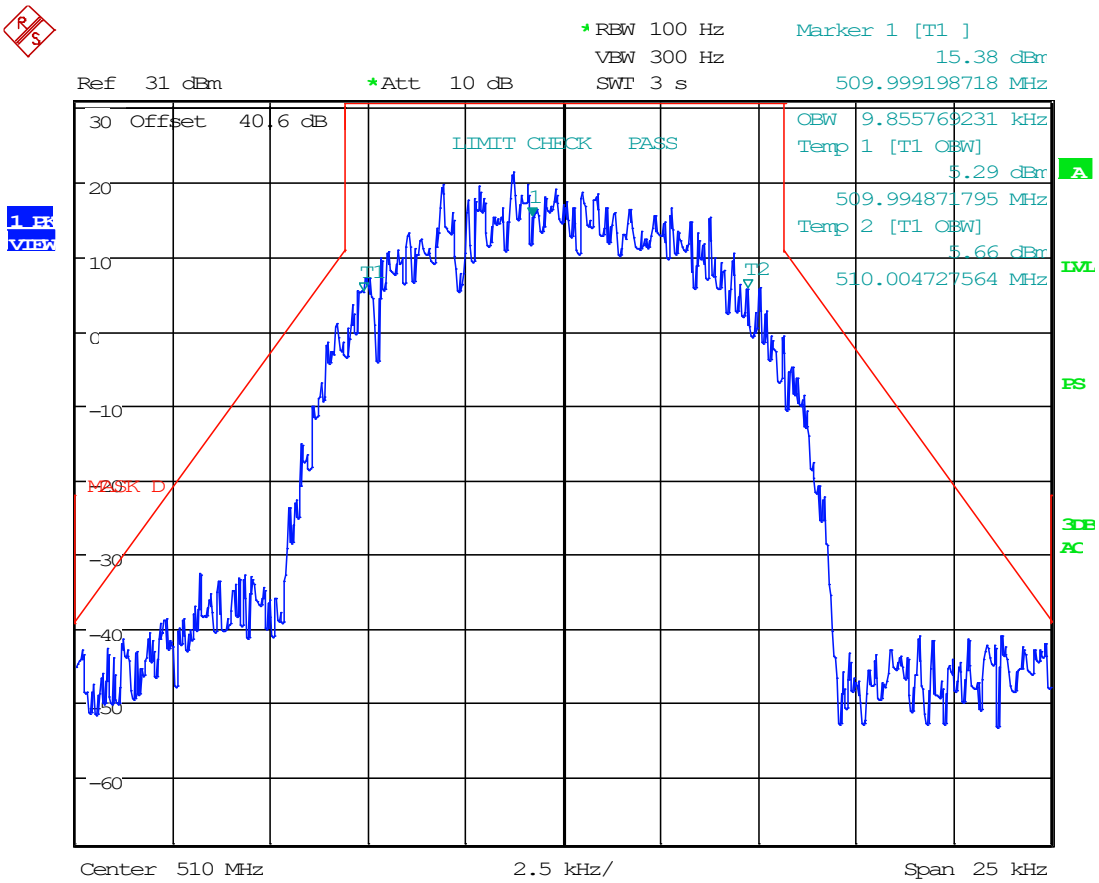
8.5.54 H-DQPSK, DL Mask D, AGC+3, 510 MHz



Date: 29.OCT.2024 12:55:13

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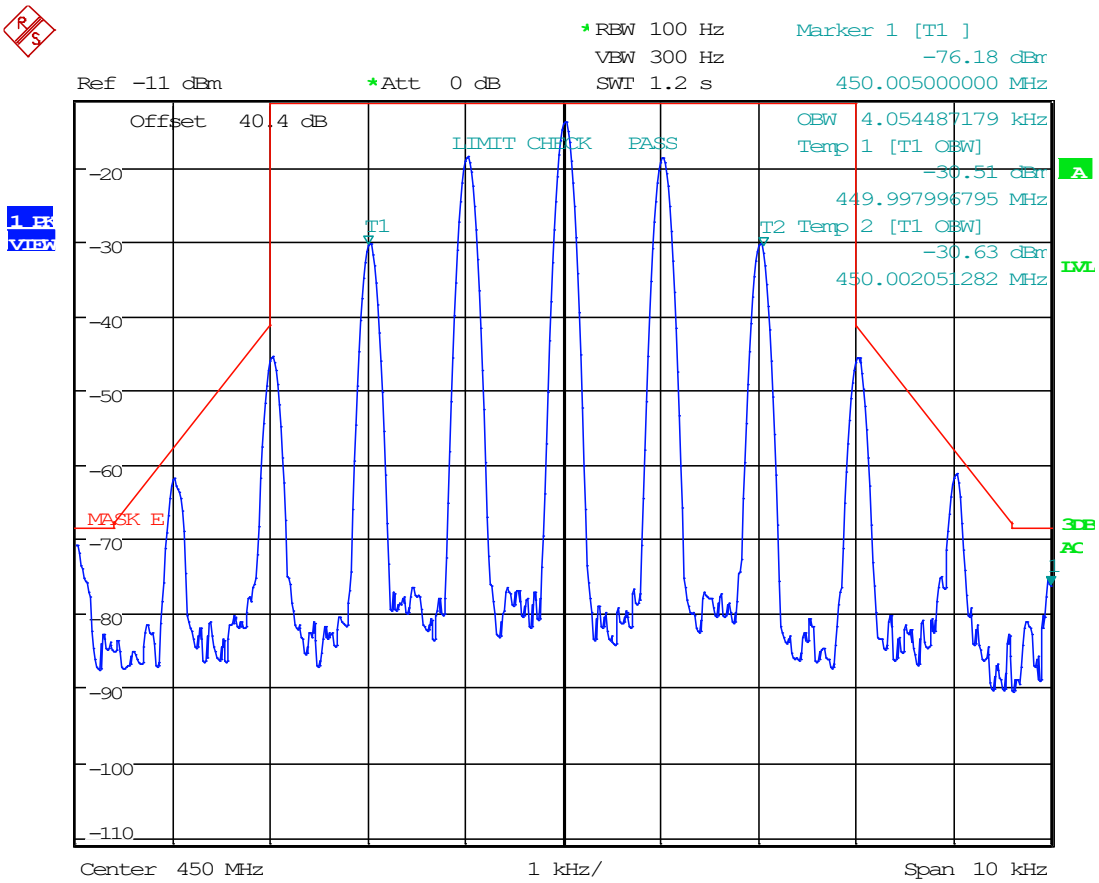
8.5.55 6.25 kHz, FM, UL Mask E, AGC, 450 MHz



Date: 1.NOV.2024 07:10:59

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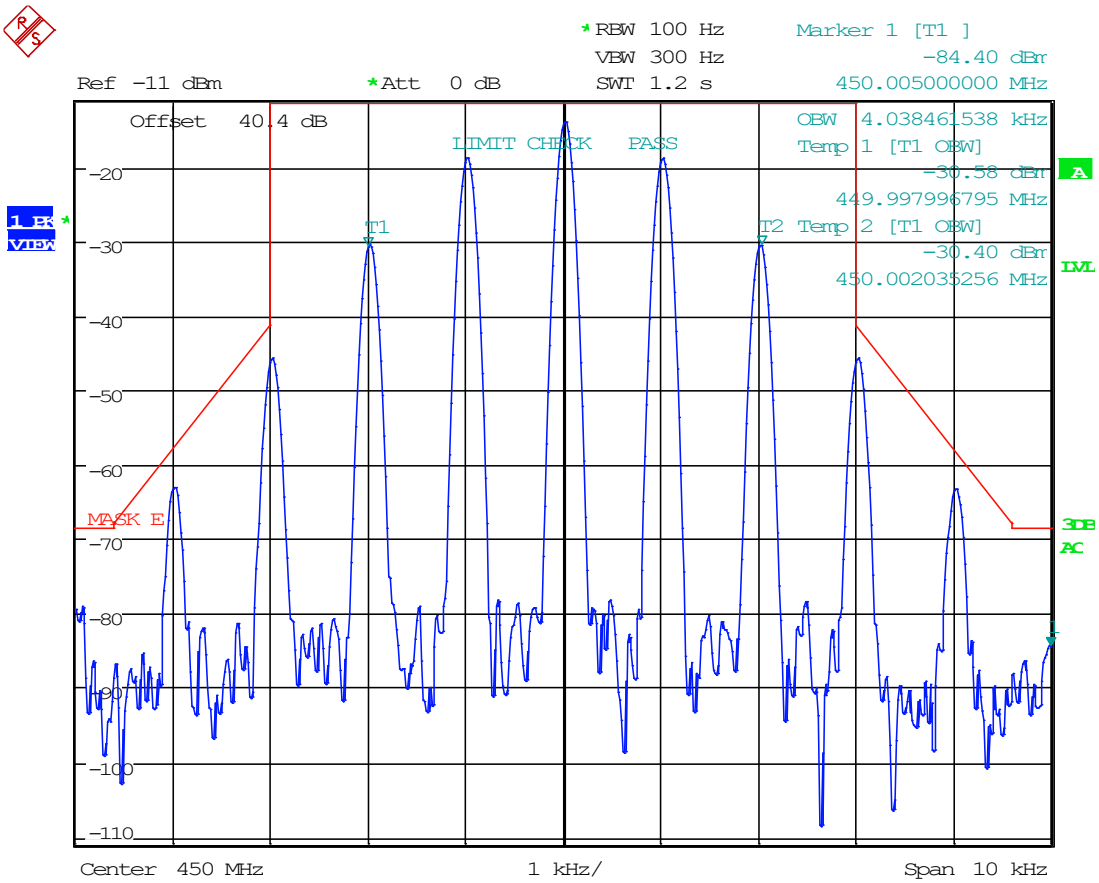
8.5.56 6.25 kHz, FM, UL Mask E, AGC+3, 450 MHz



Date: 1.NOV.2024 07:11:22

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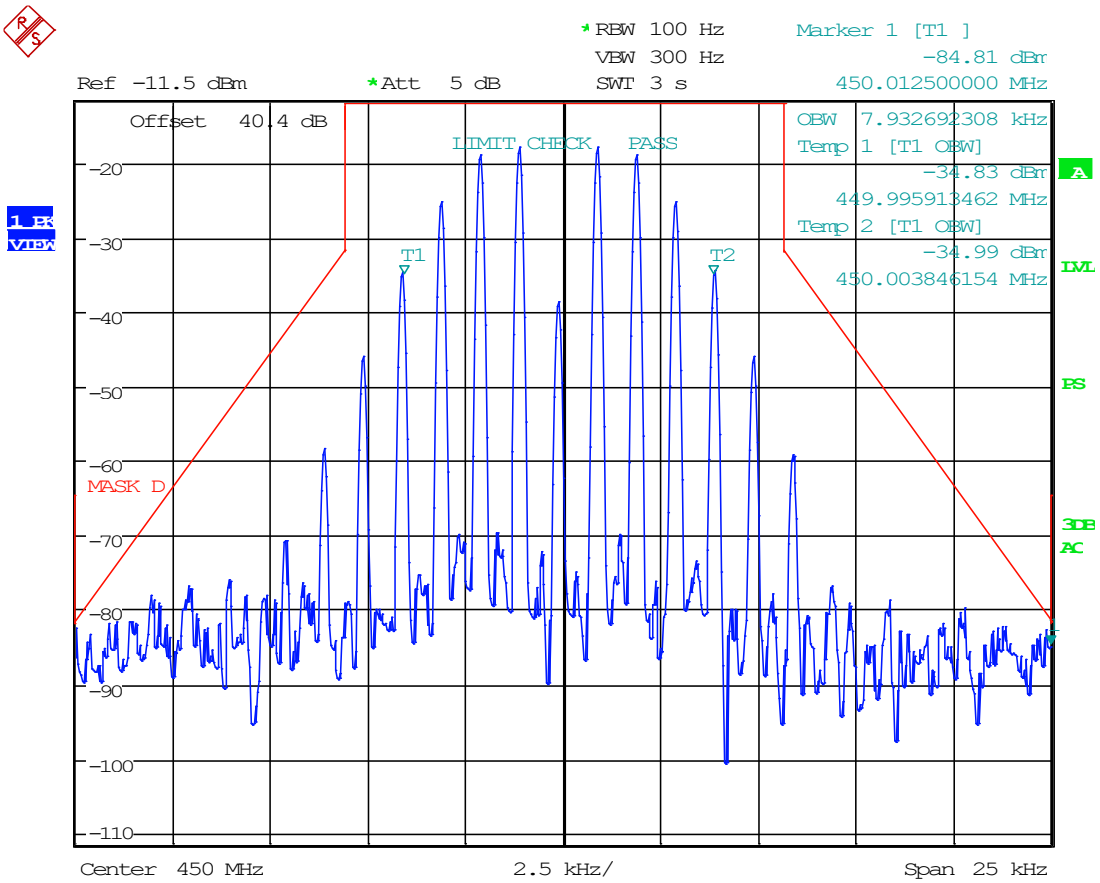
8.5.57 12.5 kHz, FM, UL Mask D, AGC, 450 MHz



Date: 1.NOV.2024 07:19:47

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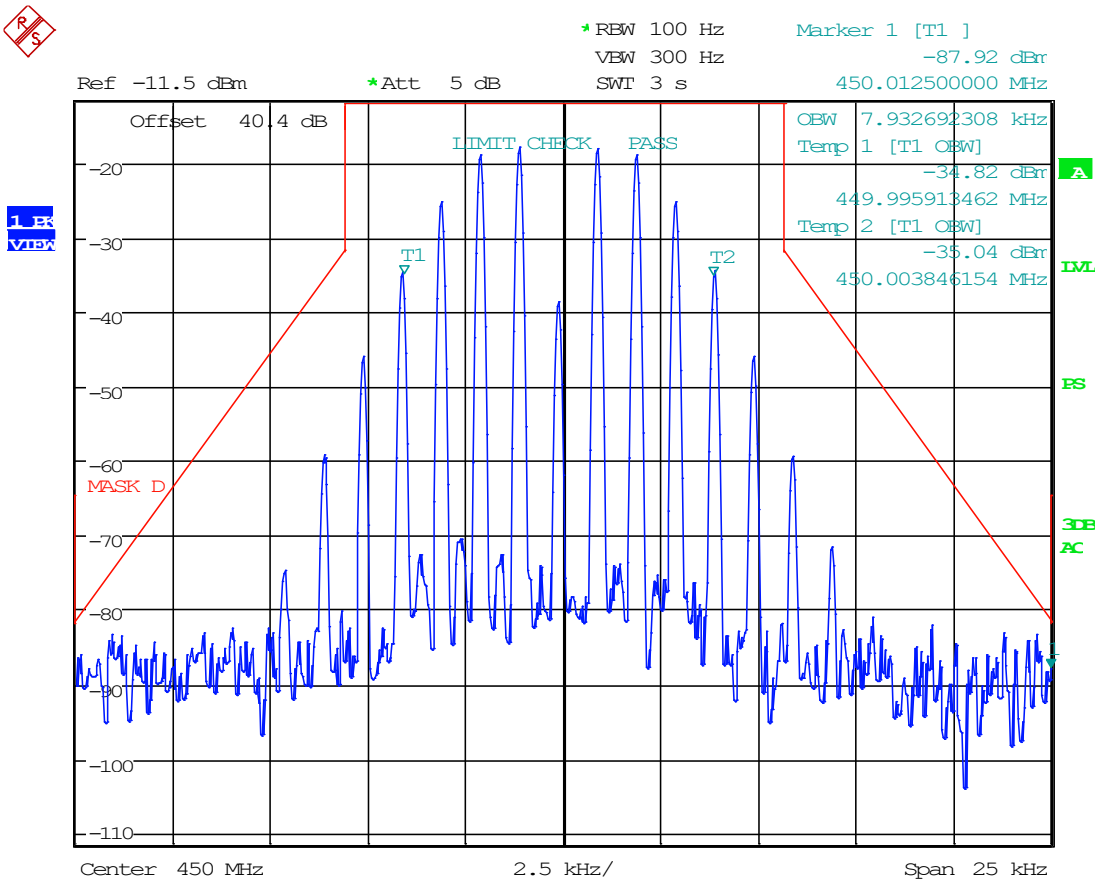
8.5.58 12.5 kHz, FM, UL Mask D, AGC+3, 450 MHz



Date: 1.NOV.2024 07:20:09

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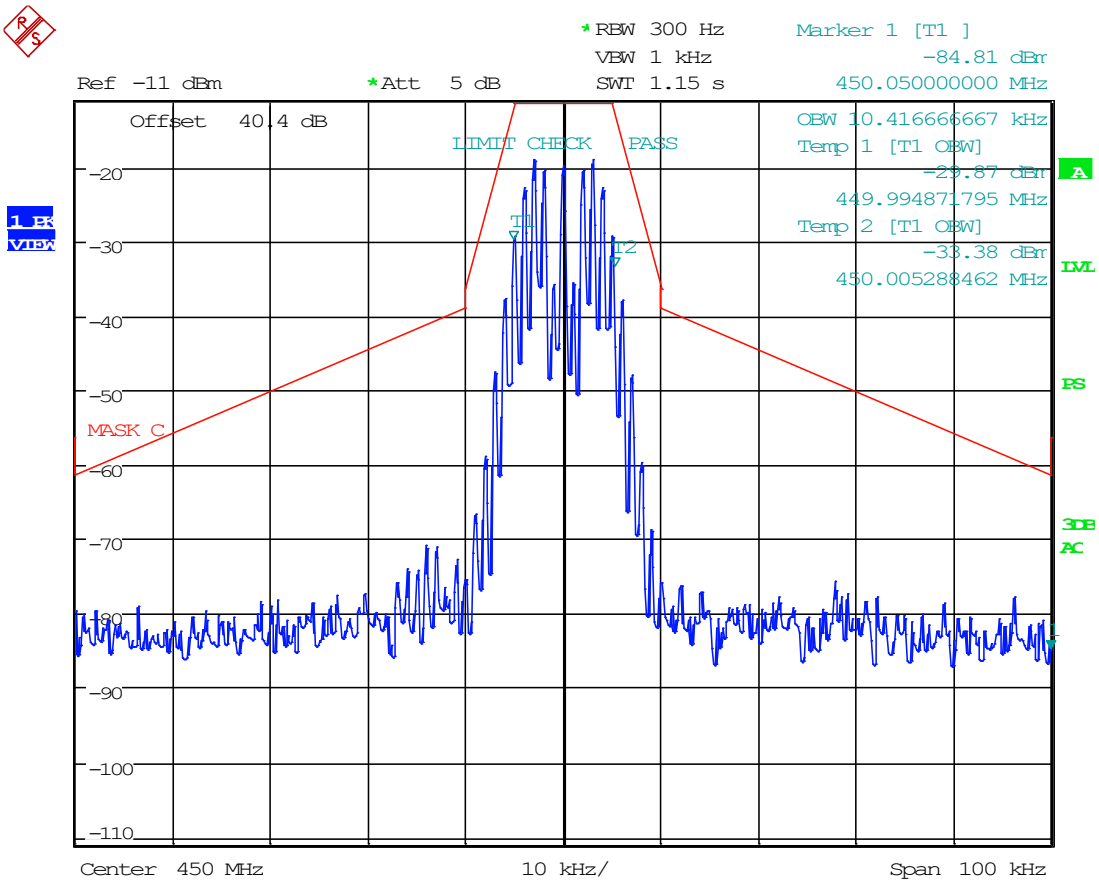
8.5.59 25 kHz FM, UL Mask C, AGC, 450 MHz



Date: 1.NOV.2024 07:13:12

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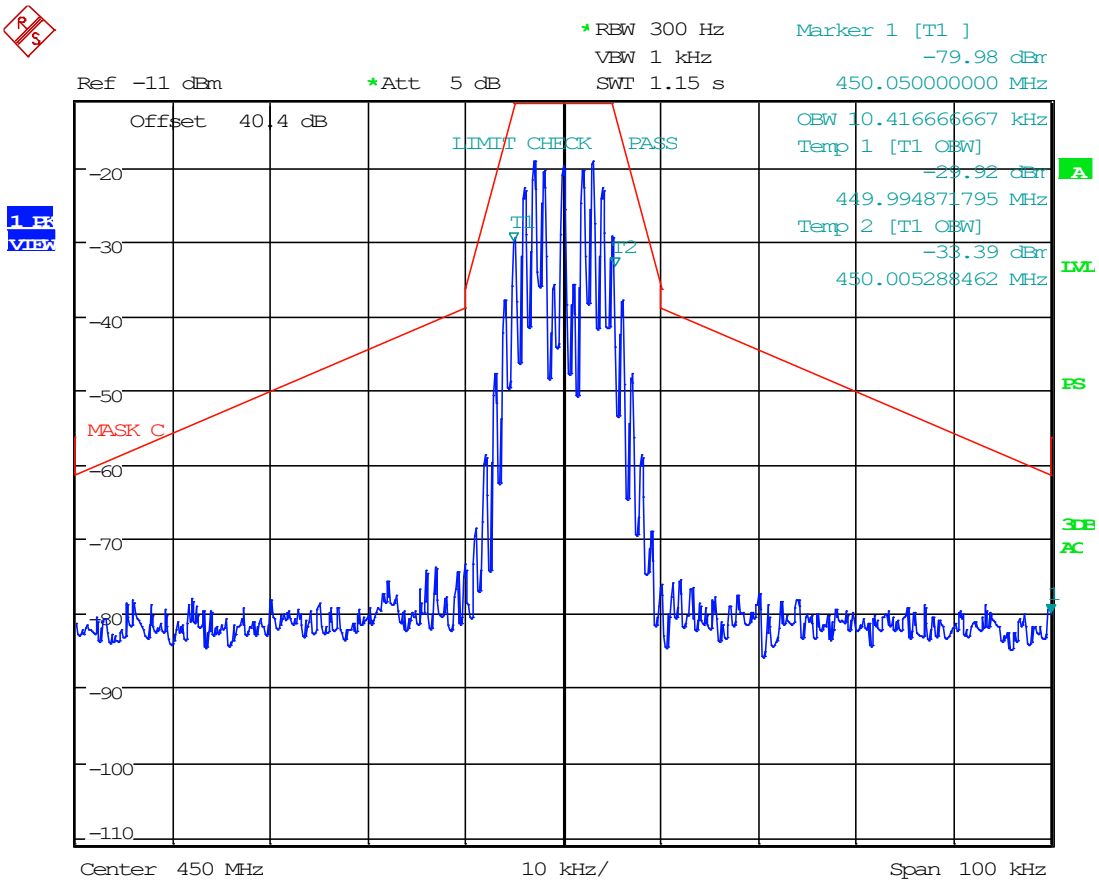
8.5.60 25 kHz FM, UL Mask C, AGC+3, 450 MHz



Date: 1.NOV.2024 07:12:54

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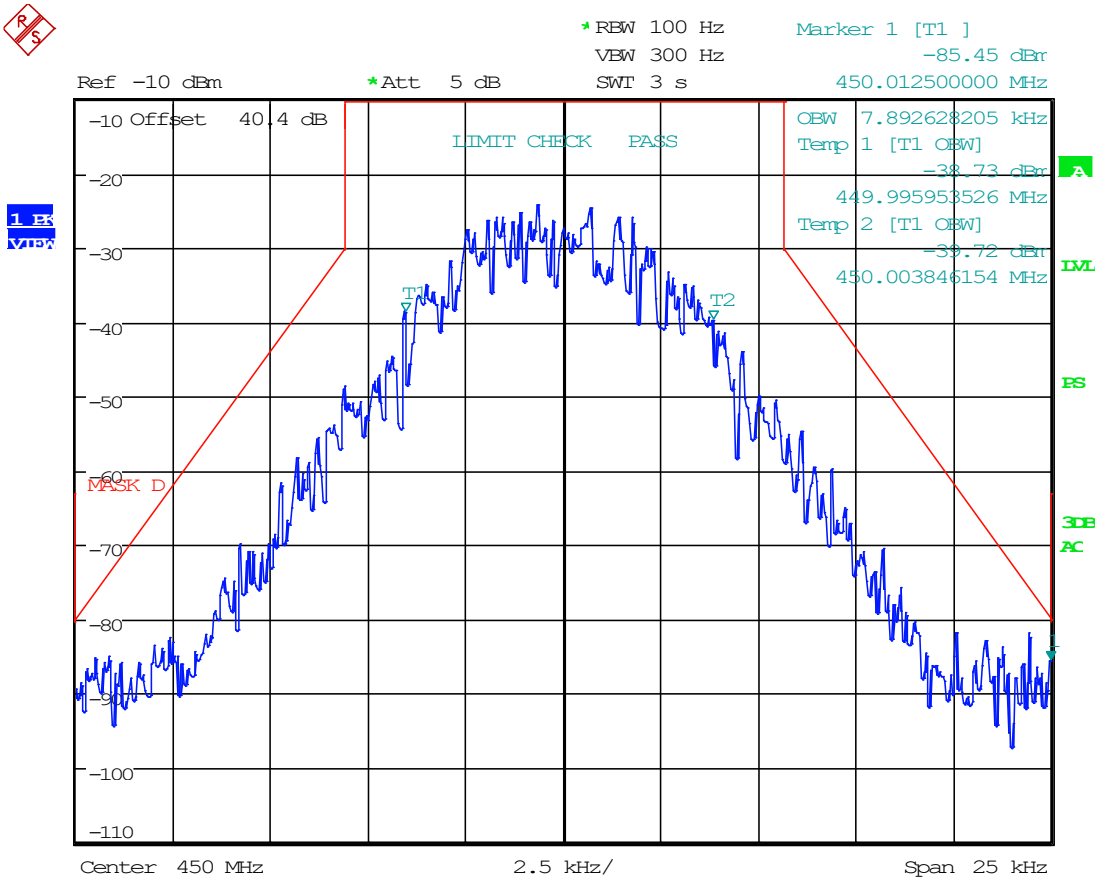
8.5.61 C4FM, UL Mask D, AGC, 450 MHz



Date: 1.NOV.2024 14:26:17

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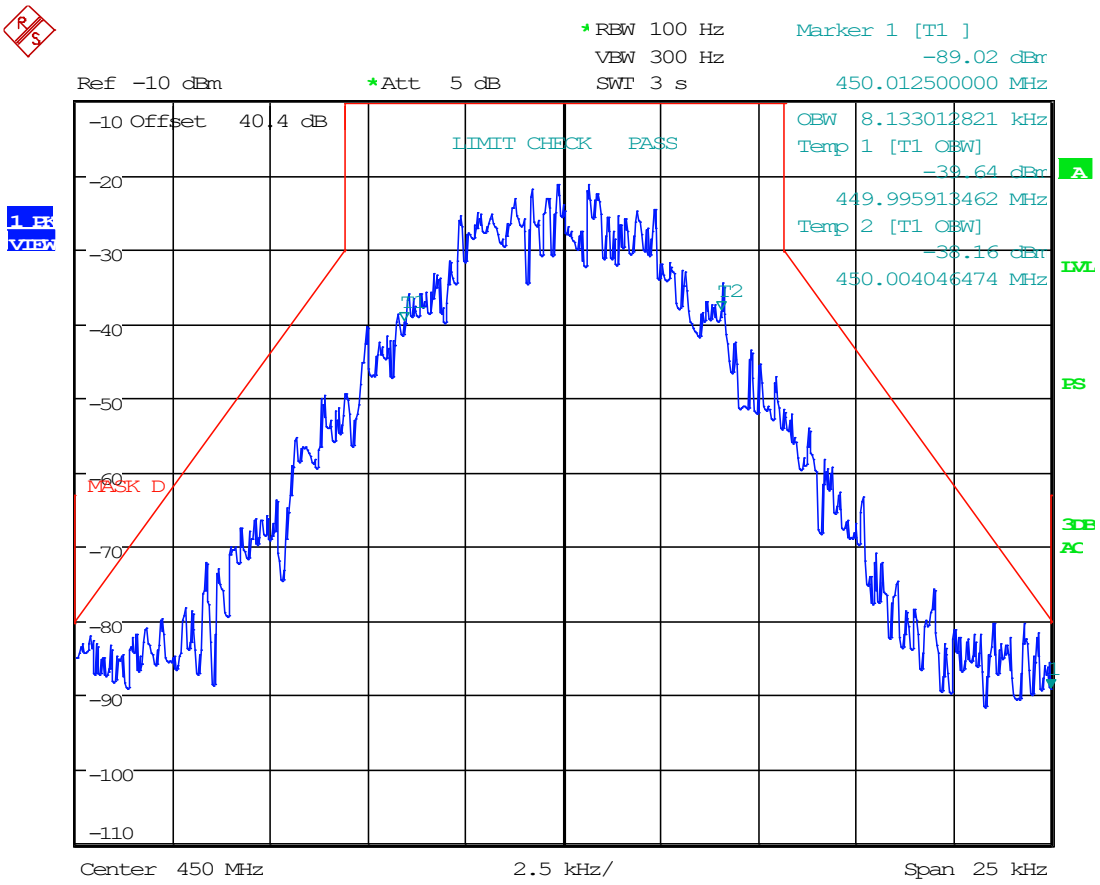
8.5.62 C4FM, UL Mask D, AGC+3, 450 MHz



Date: 1.NOV.2024 14:26:57

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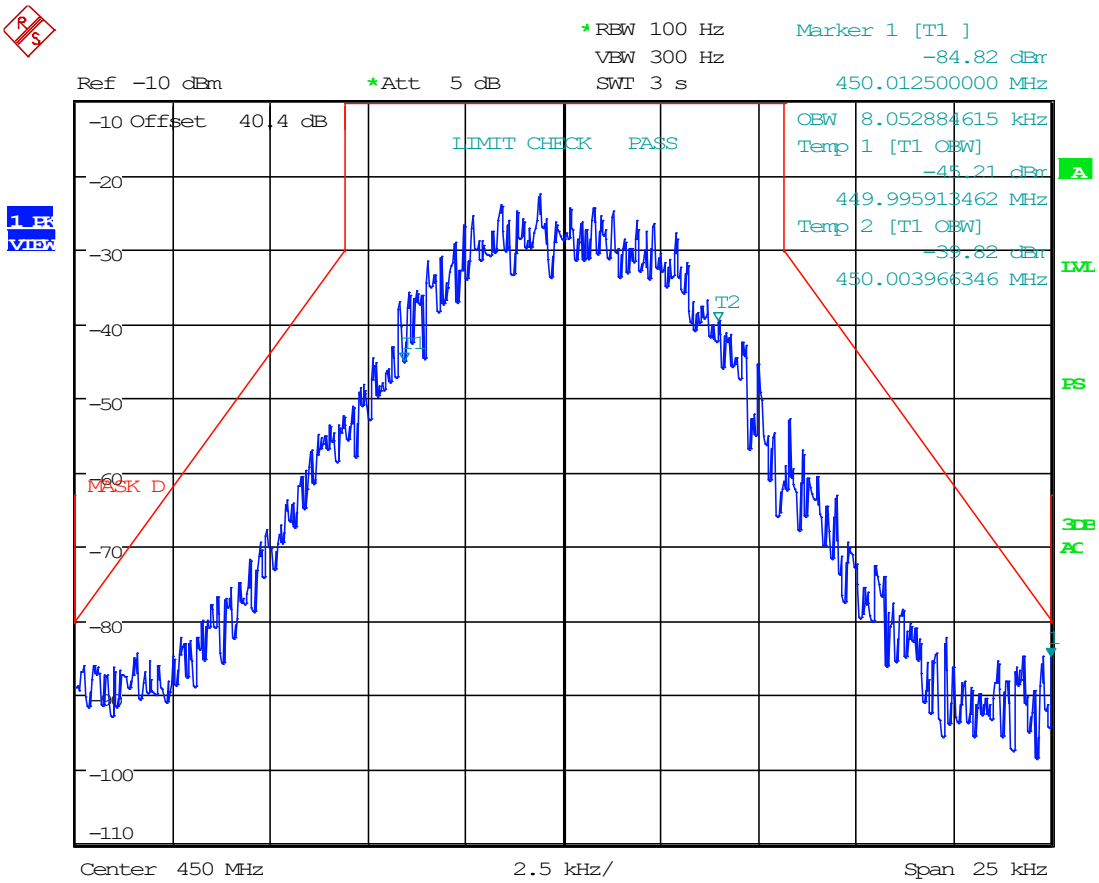
8.5.63 H-CPM, UL Mask D, AGC, 450 MHz



Date: 1.NOV.2024 14:25:37

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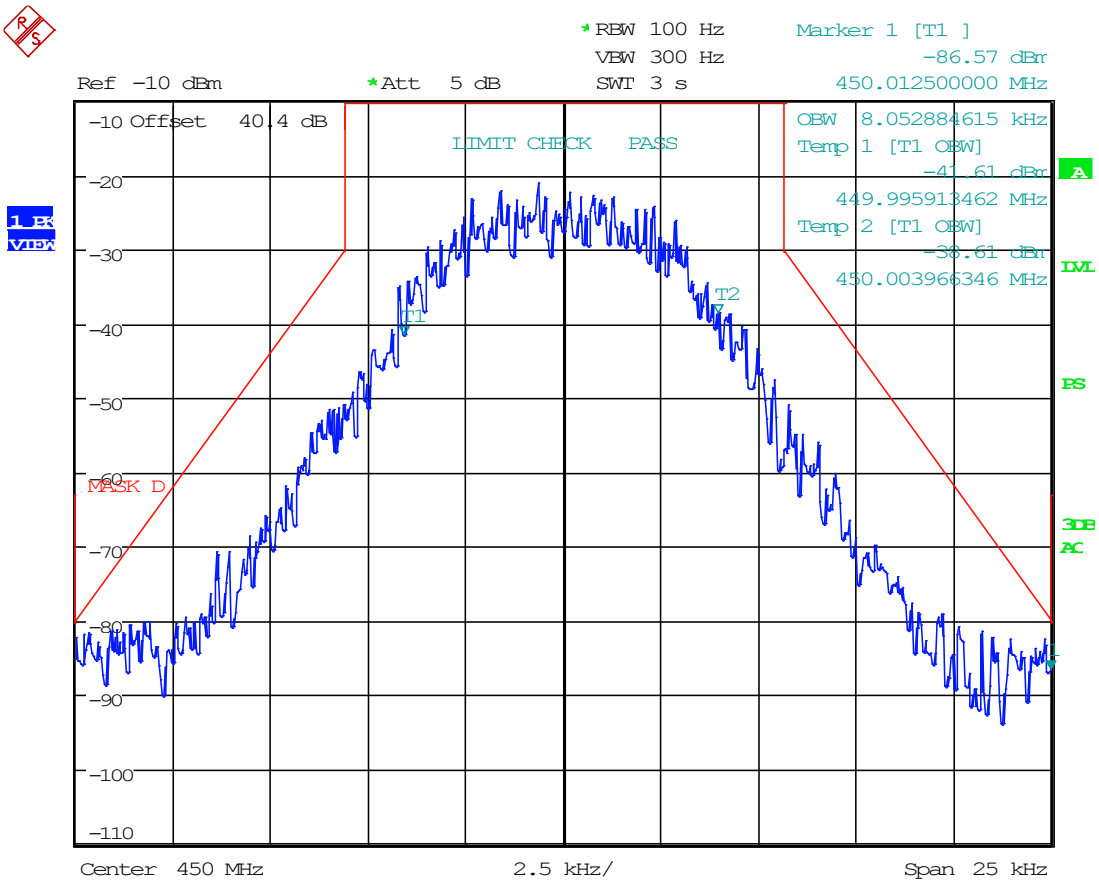
8.5.64 H-CPM, UL Mask D, AGC+3, 450 MHz



Date: 1.NOV.2024 14:25:15

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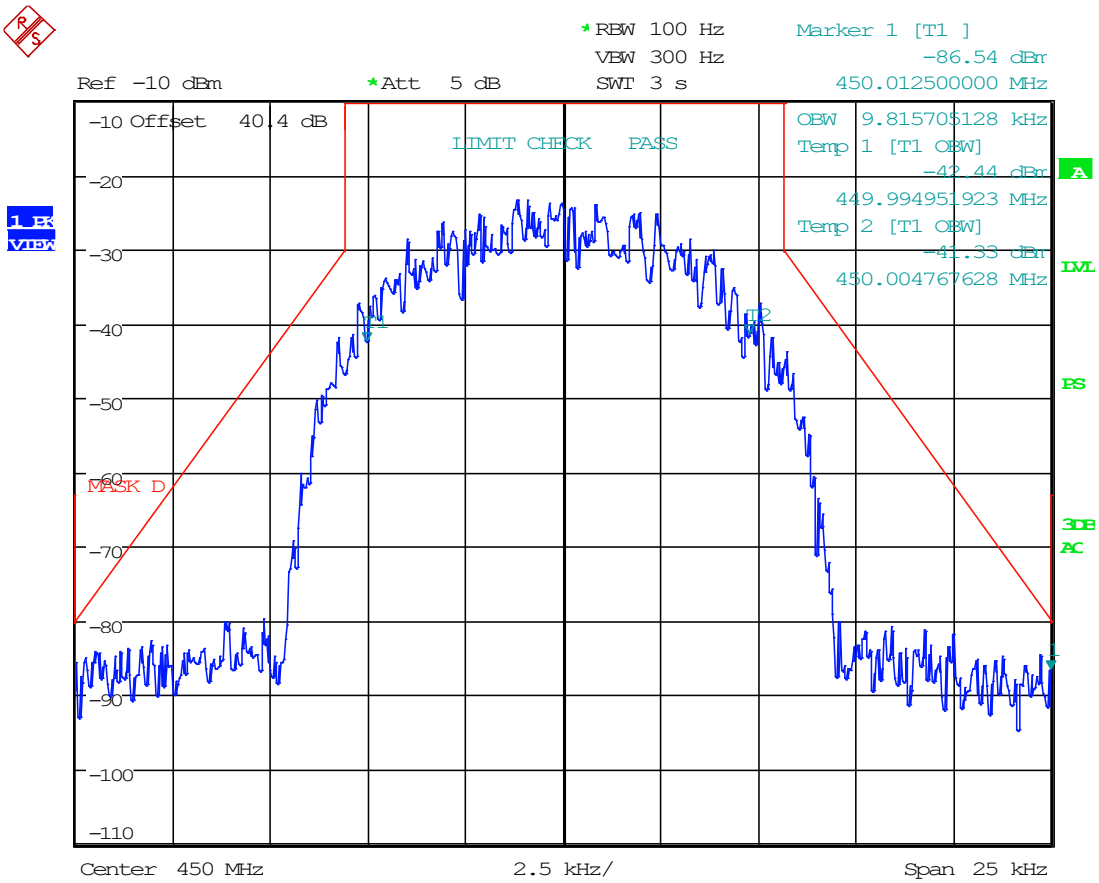
8.5.65 H-DQPSK, UL Mask D, AGC, 450 MHz



Date: 1.NOV.2024 14:24:30

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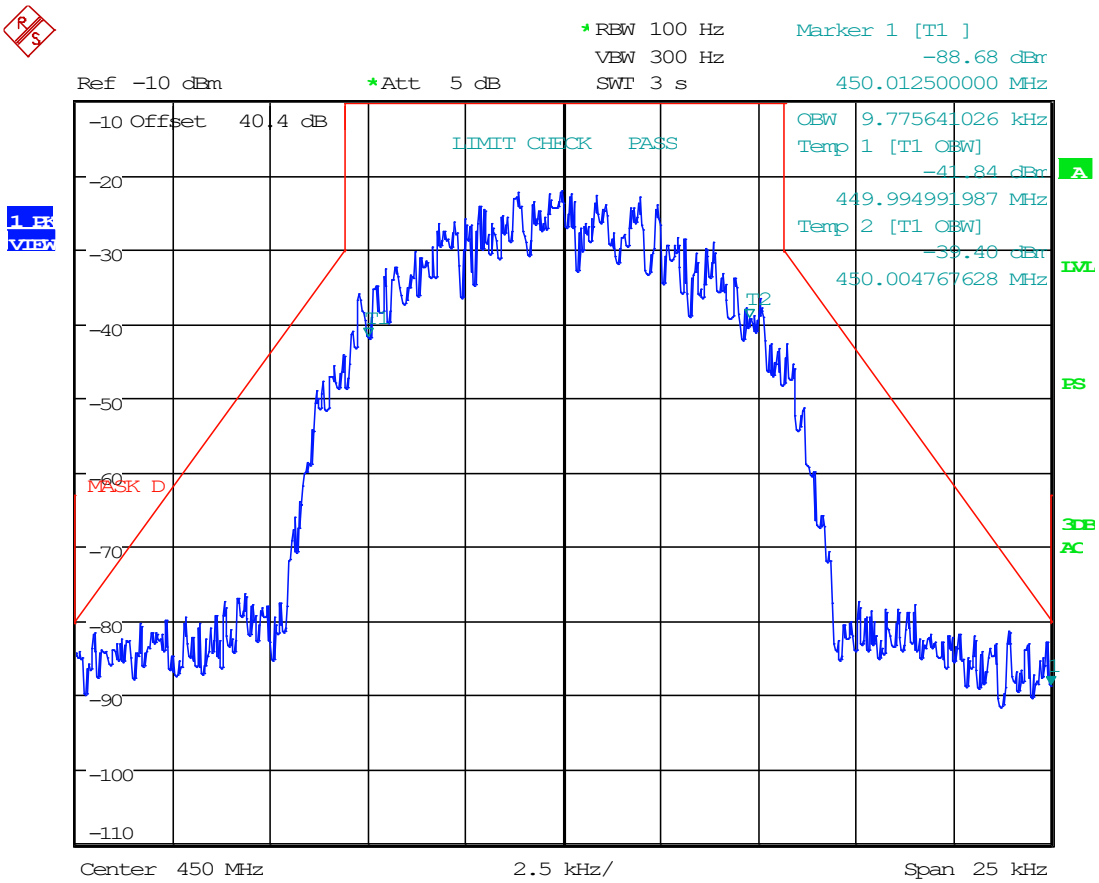
8.5.66 H-DQPSK, UL Mask D, AGC+3, 450 MHz



Date: 1.NOV.2024 14:24:52

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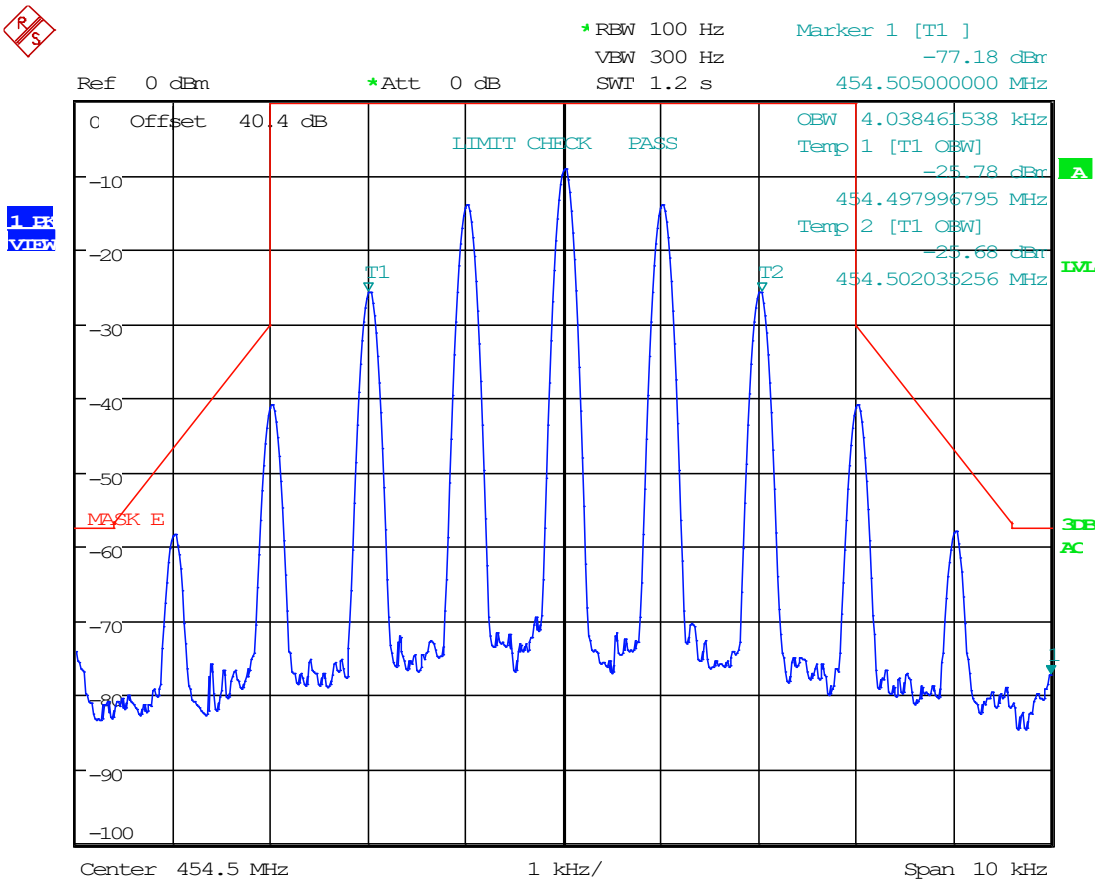
8.5.67 6.25 kHz, FM, UL Mask E, AGC, 454.5 MHz



Date: 8.NOV.2024 14:59:54

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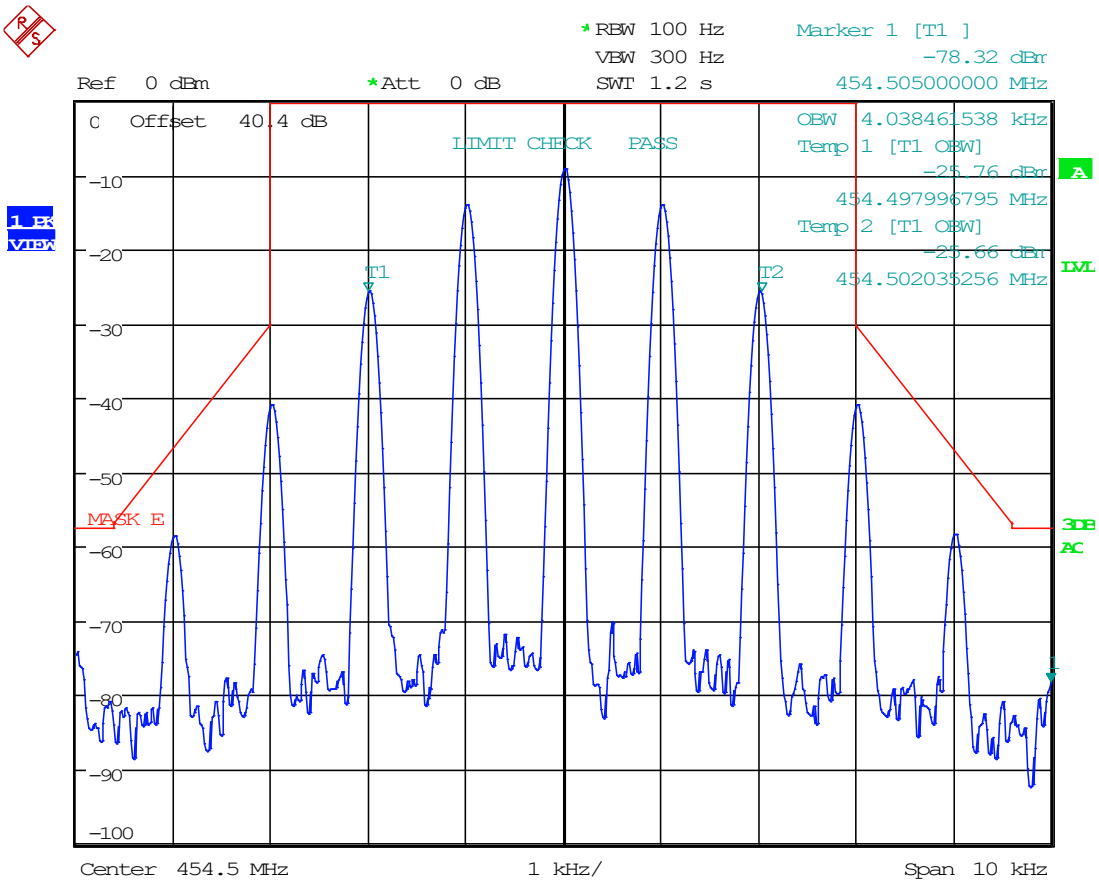
8.5.68 6.25 kHz, FM, UL Mask E, AGC+3, 454.5 MHz



Date: 8.NOV.2024 14:59:23

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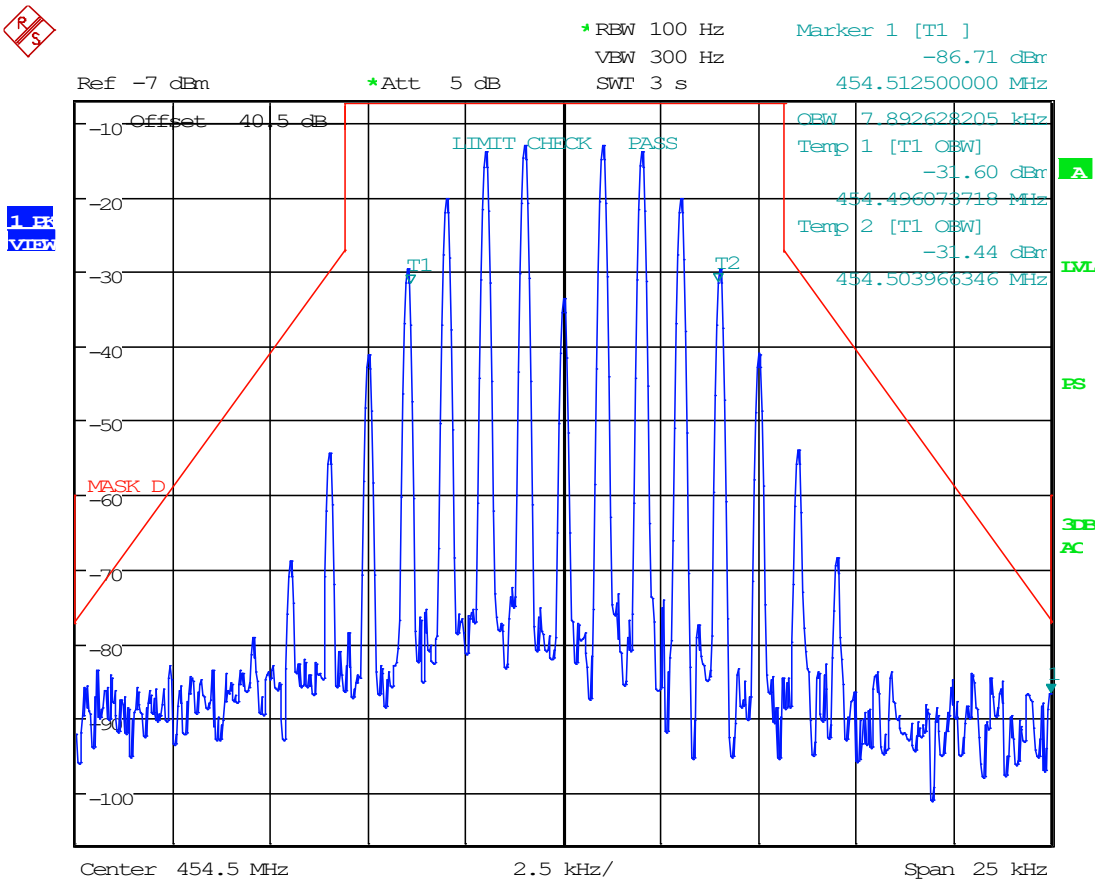
8.5.69 12.5 kHz, FM, UL Mask D, AGC, 454.5 MHz



Date: 8.NOV.2024 15:01:06

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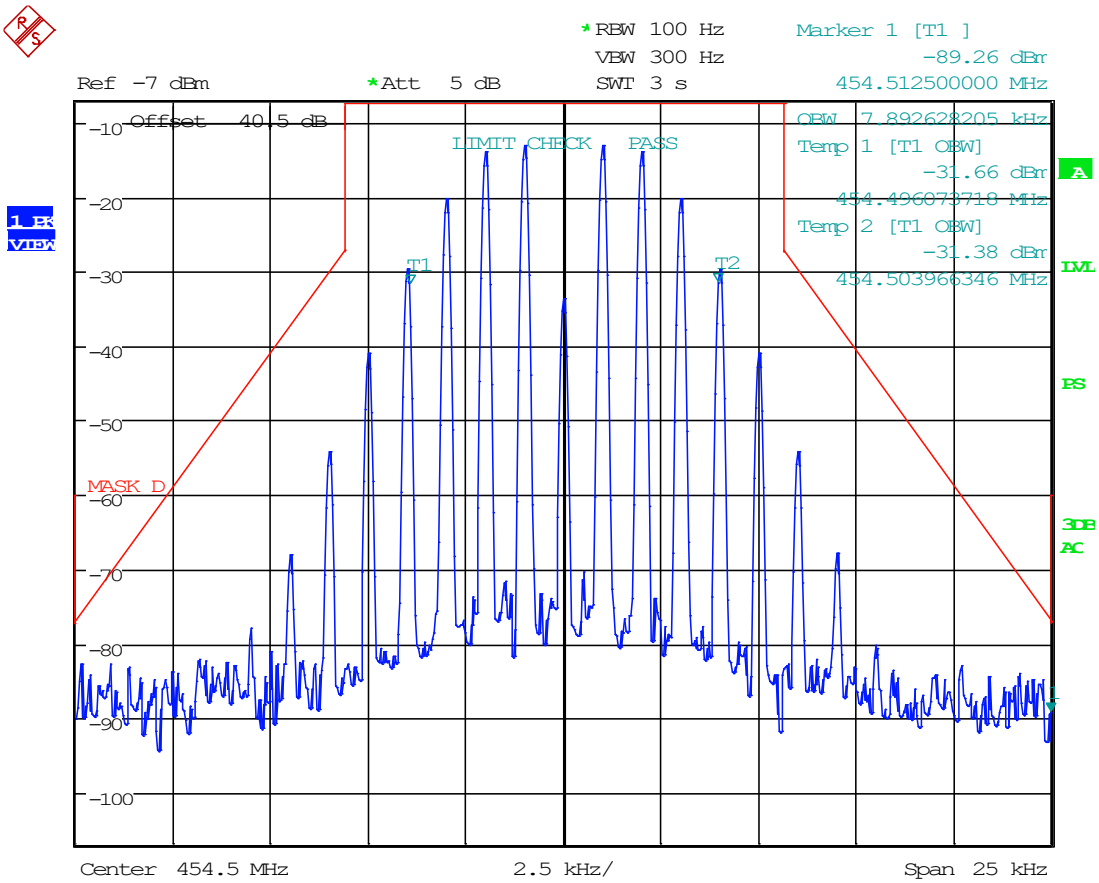
8.5.70 12.5 kHz, FM, UL Mask D, AGC+3, 454.5 MHz



Date: 8.NOV.2024 15:01:32

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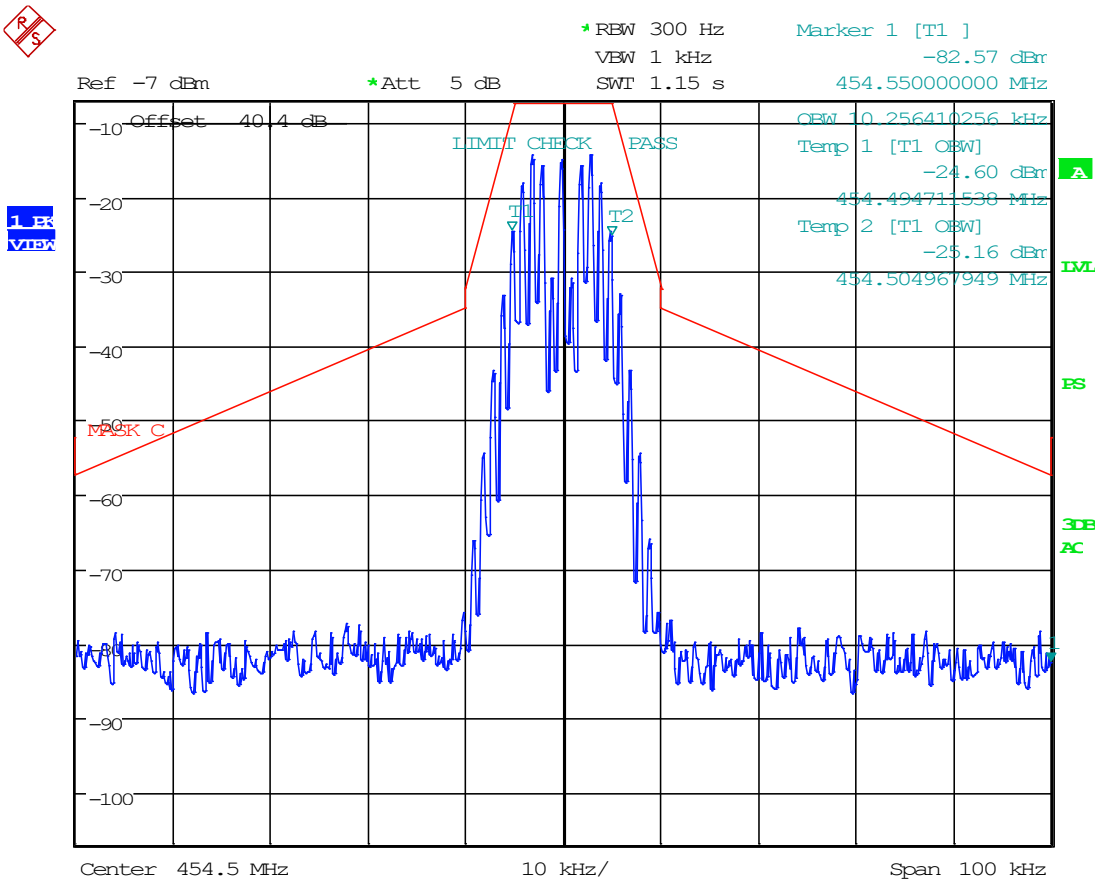
8.5.71 25 kHz FM, UL Mask C, AGC, 454.5 MHz



Date: 8.NOV.2024 14:57:19

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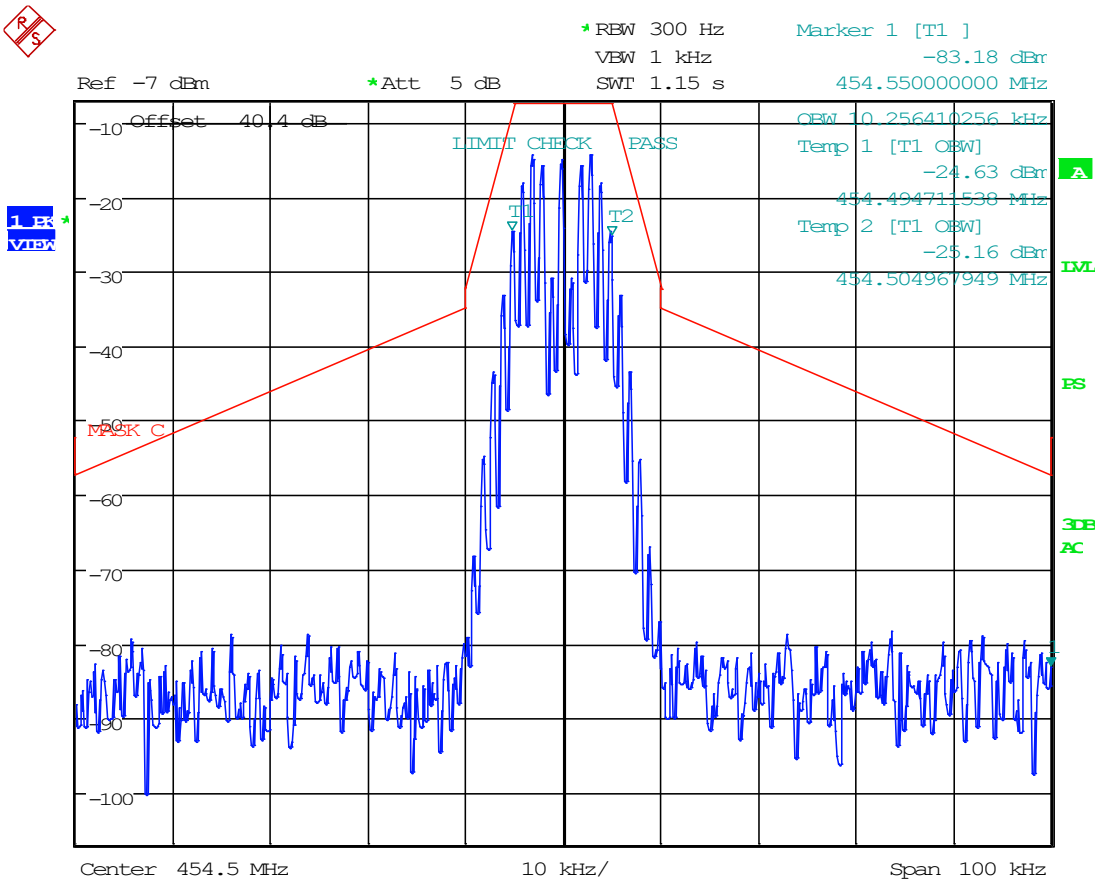
8.5.72 25 kHz FM, UL Mask C, AGC+3, 454.5 MHz



Date: 8.NOV.2024 14:57:54

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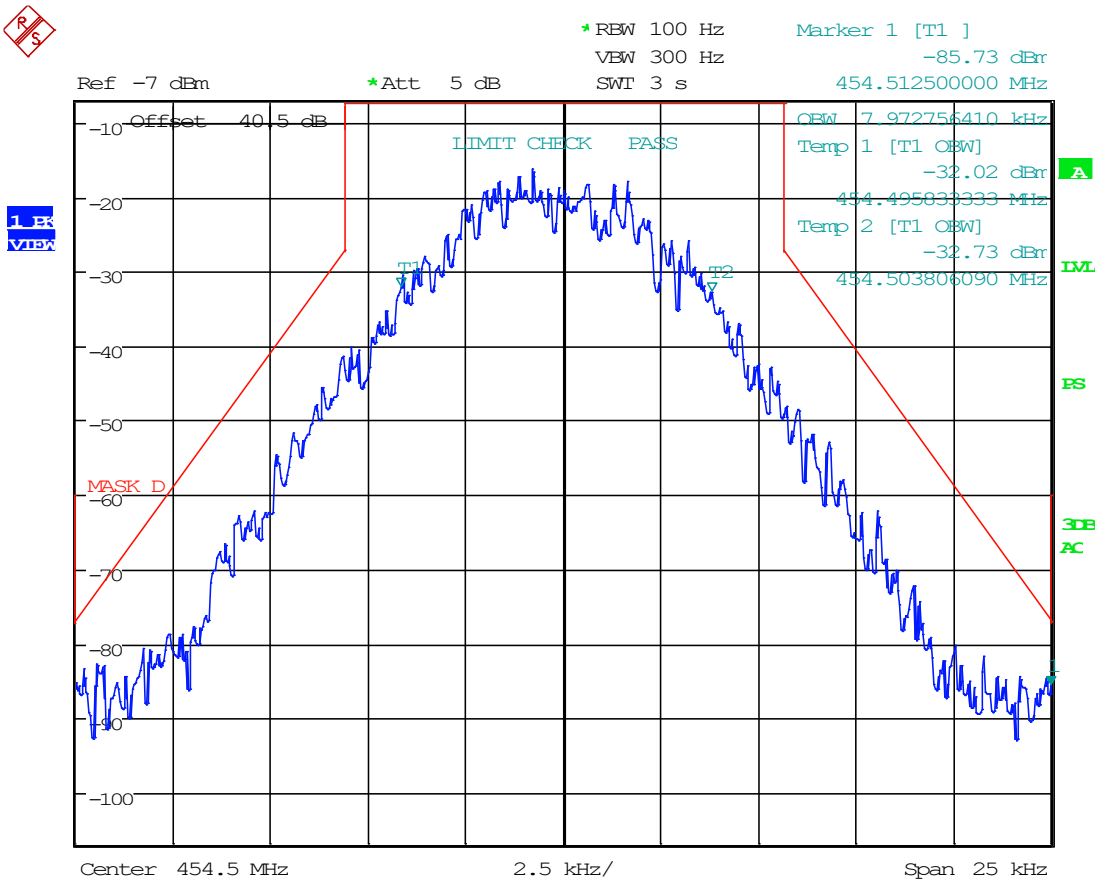
8.5.73 C4FM, UL Mask D, AGC, 454.5 MHz



Date: 8.NOV.2024 15:05:05

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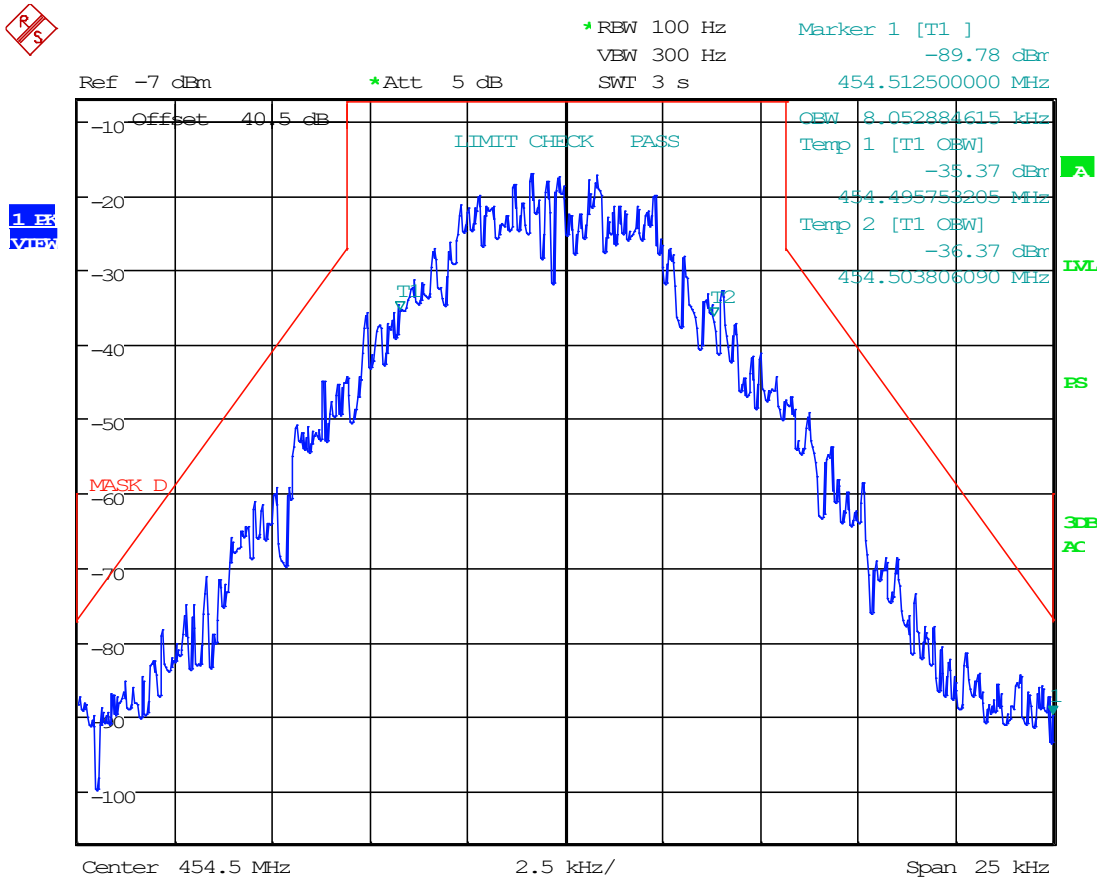
8.5.74 C4FM, UL Mask D, AGC+3, 454.5 MHz



Date: 8.NOV.2024 15:05:23

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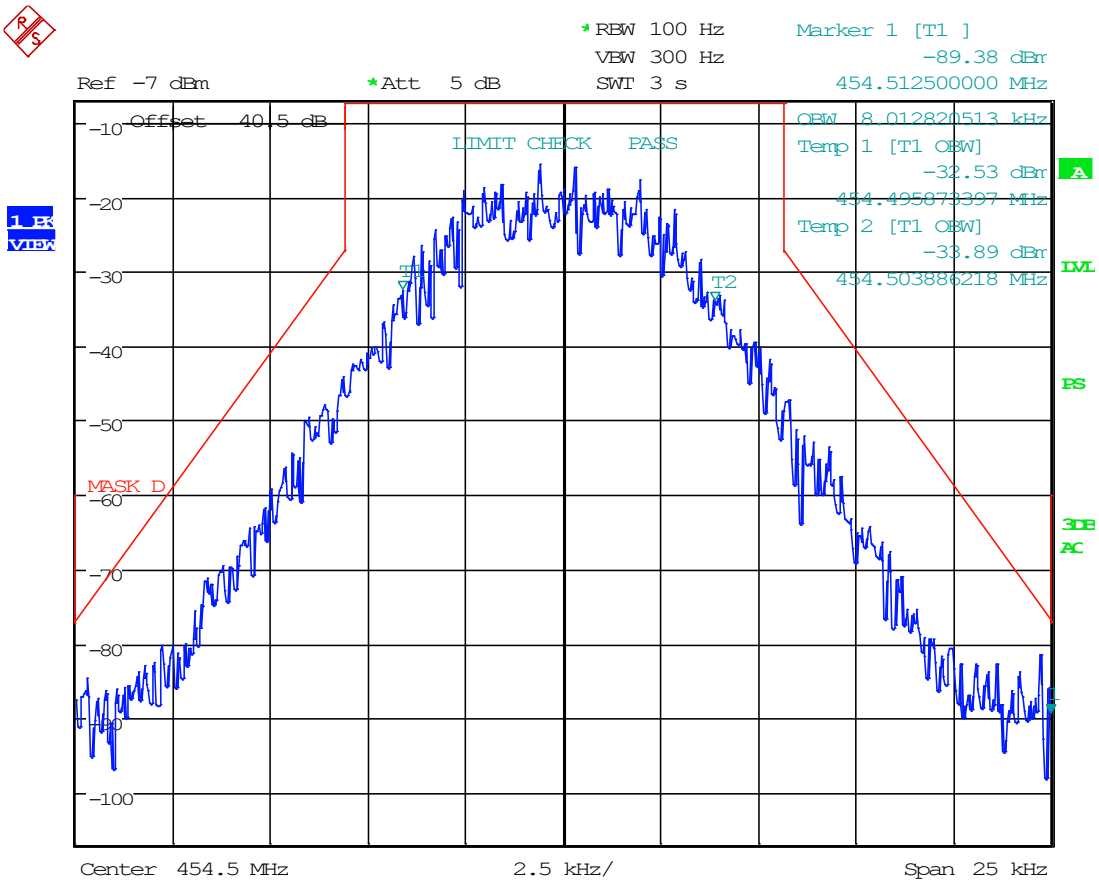
8.5.75 H-CPM, UL Mask D, AGC, 454.5 MHz



Date: 8.NOV.2024 15:06:11

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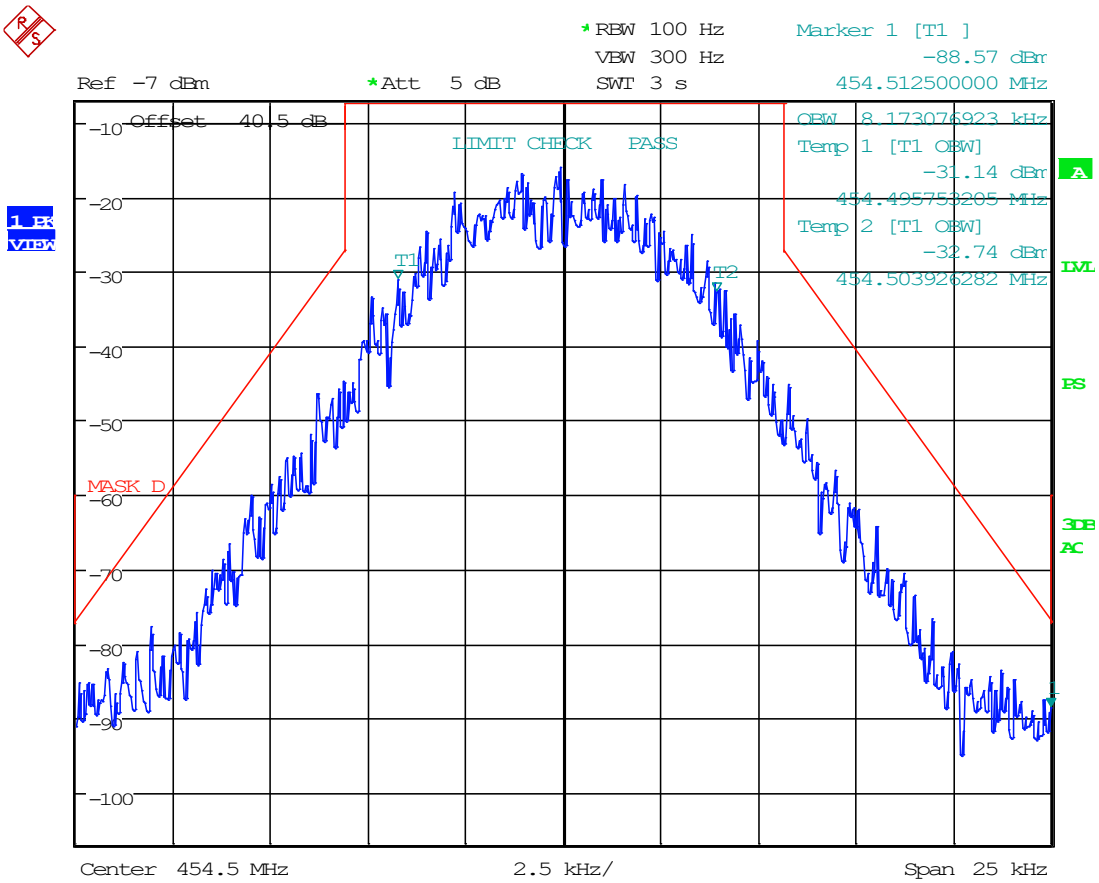
8.5.76 H-CPM, UL Mask D, AGC+3, 454.5 MHz



Date: 8.NOV.2024 15:05:52

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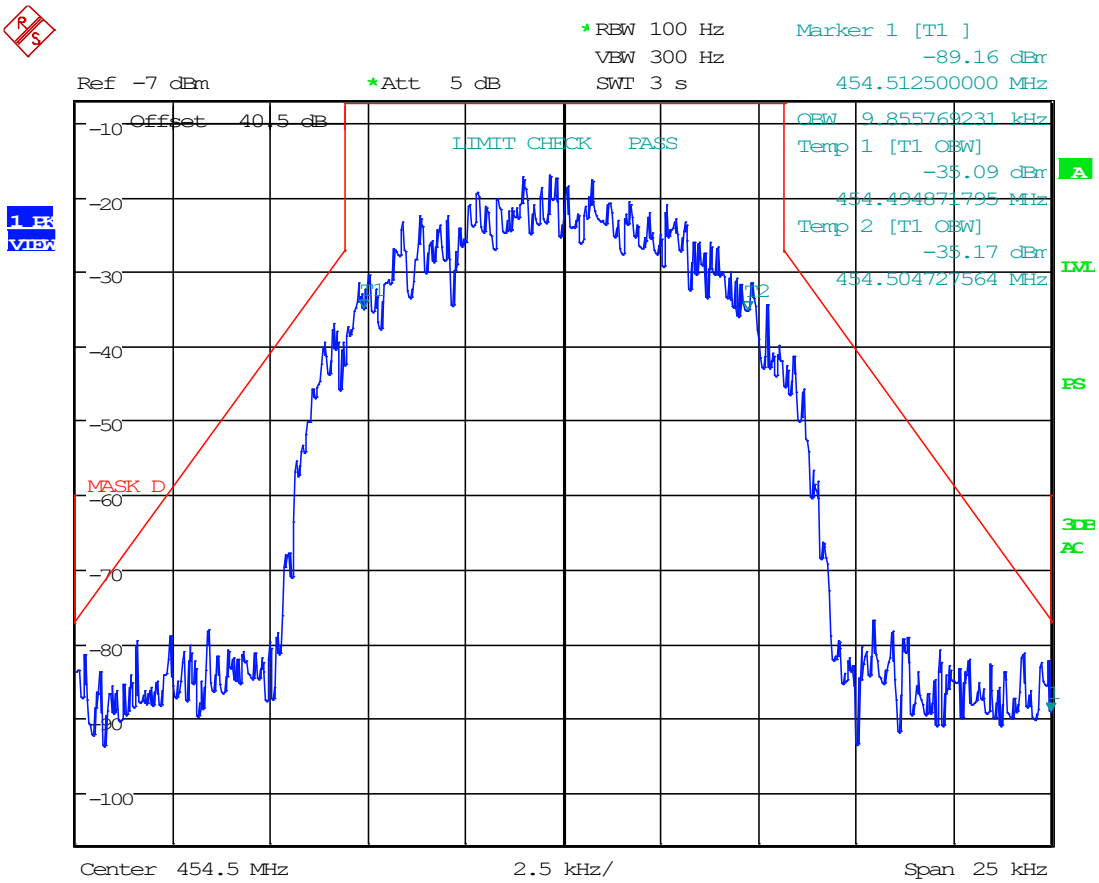
8.5.77 H-DQPSK, UL Mask D, AGC, 454.5 MHz



Date: 8.NOV.2024 15:06:42

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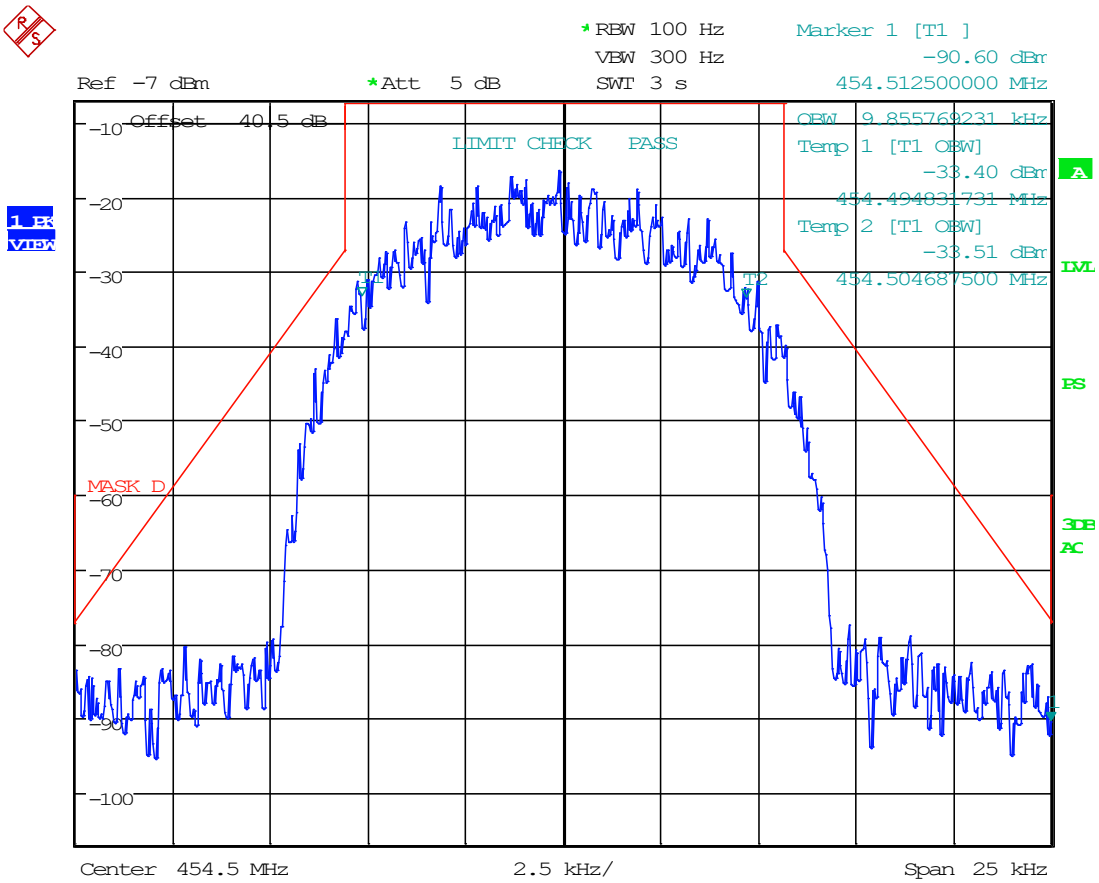
8.5.78 H-DQPSK, UL Mask D, AGC+3, 454.5 MHz



Date: 8.NOV.2024 15:07:02

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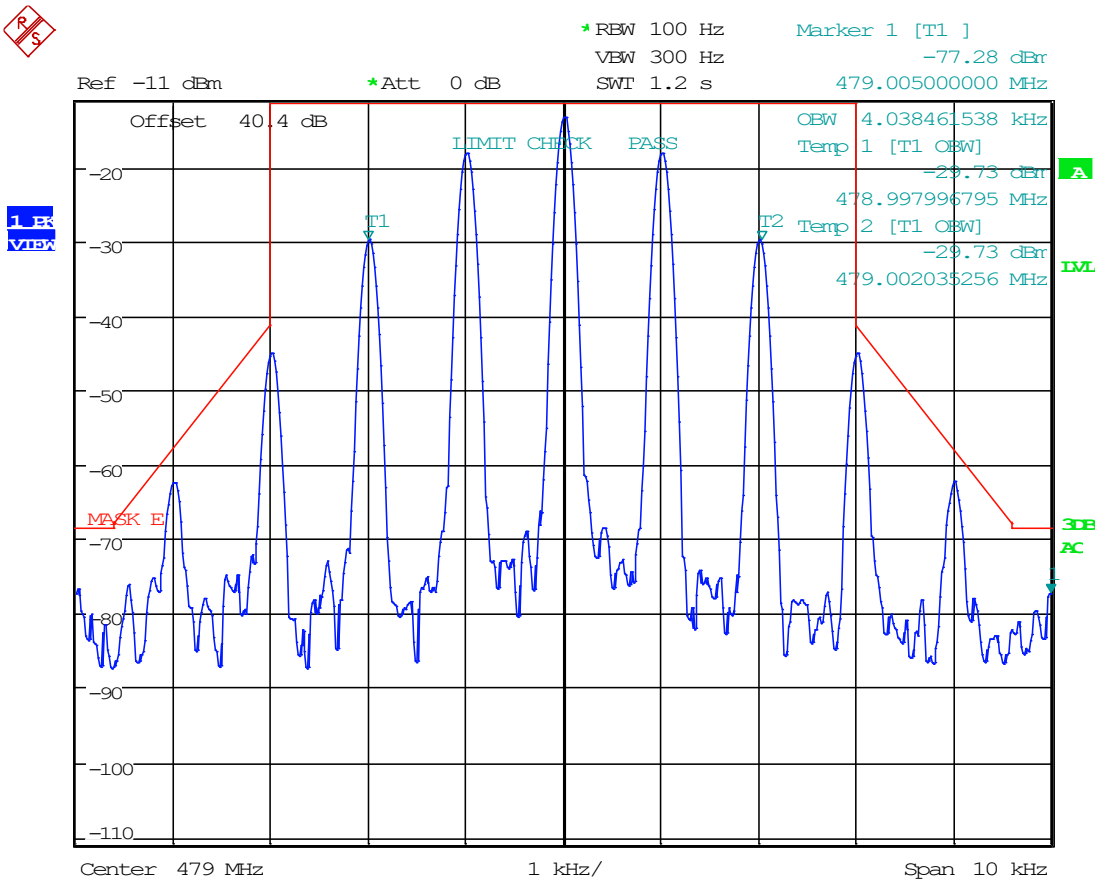
8.5.79 6.25 kHz, FM, UL Mask E, AGC, 479 MHz



Date: 1.NOV.2024 07:10:24

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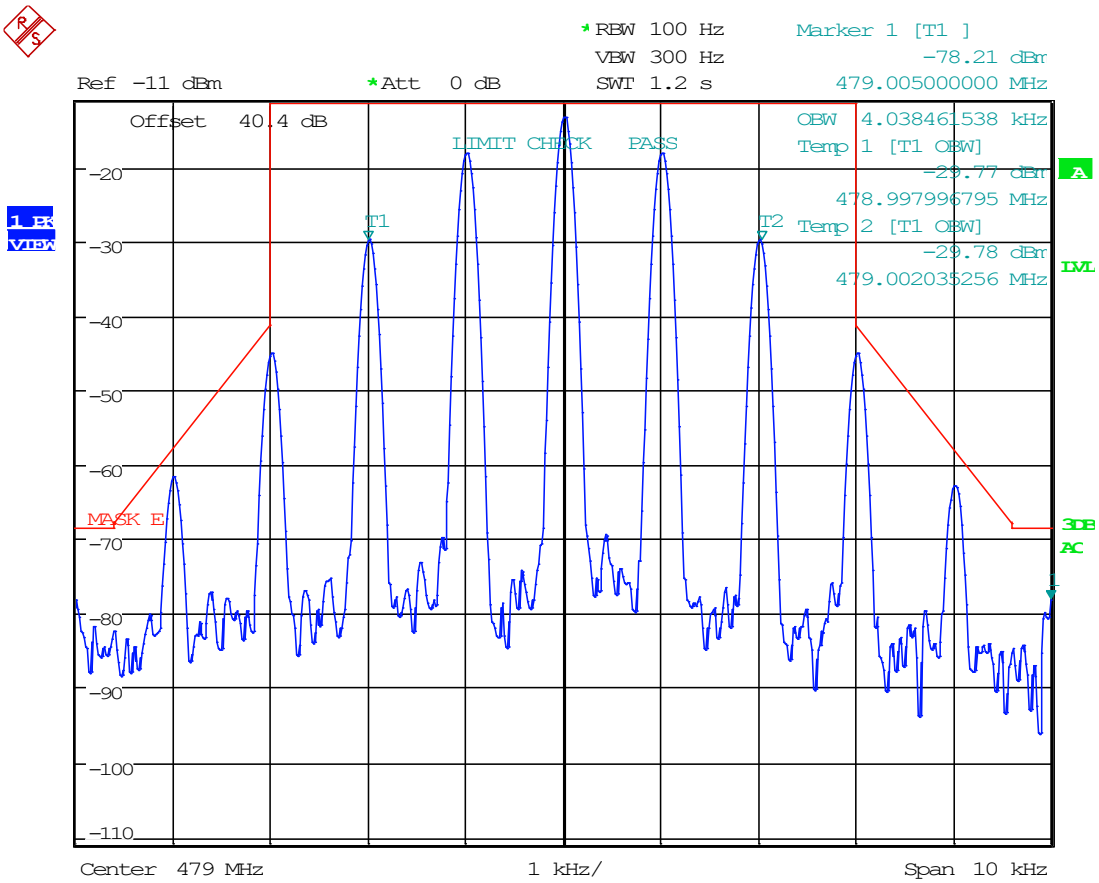
8.5.80 6.25 kHz, FM, UL Mask E, AGC+3, 479 MHz



Date: 1.NOV.2024 07:10:05

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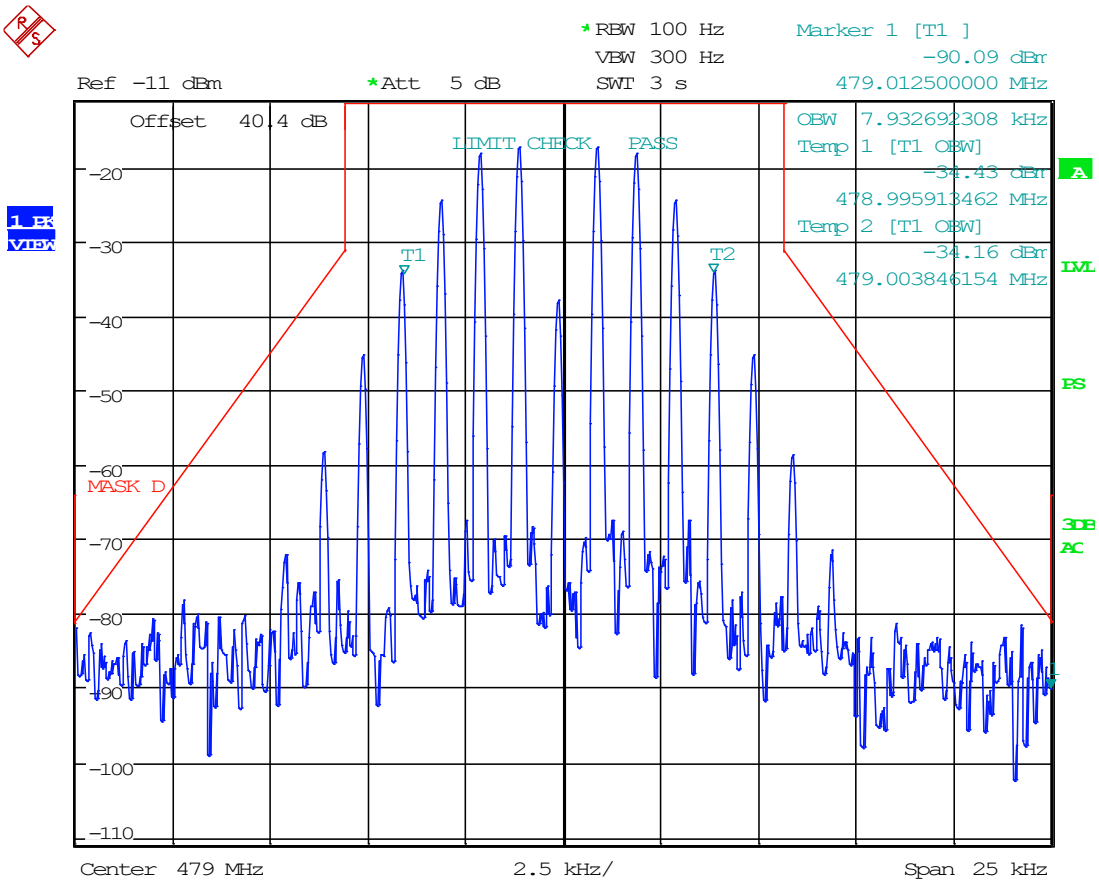
8.5.81 12.5 kHz, FM, UL Mask D, AGC, 479 MHz



Date: 1.NOV.2024 07:19:01

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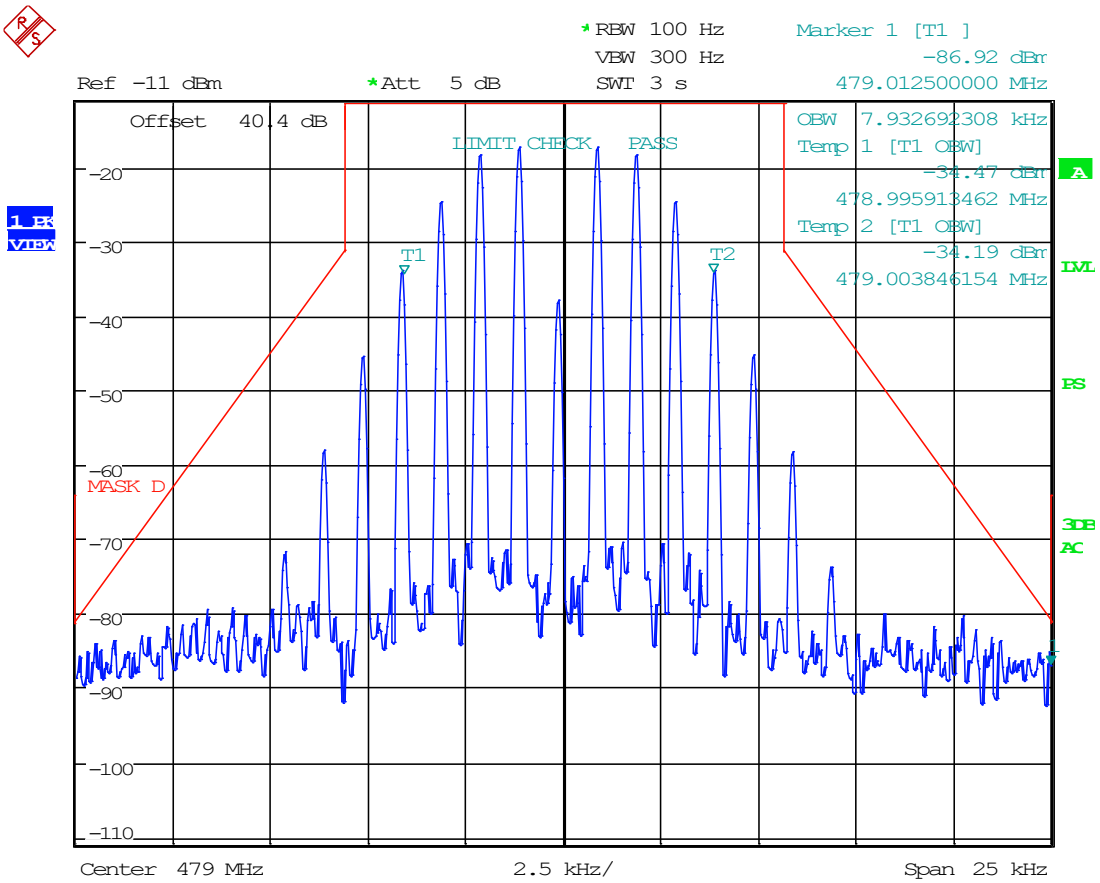
8.5.82 12.5 kHz, FM, UL Mask D, AGC+3, 479 MHz



Date: 1.NOV.2024 07:18:33

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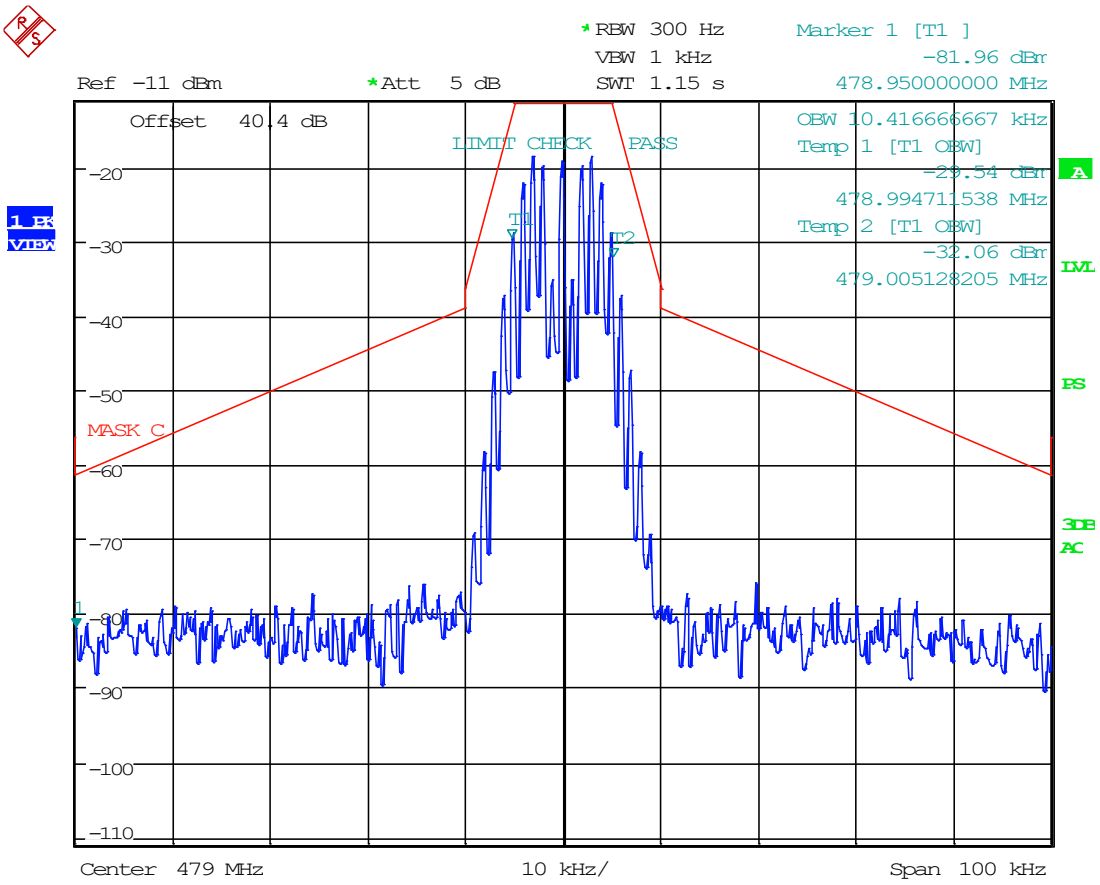
8.5.83 25 kHz FM, UL Mask C, AGC, 479 MHz



Date: 1.NOV.2024 07:13:35

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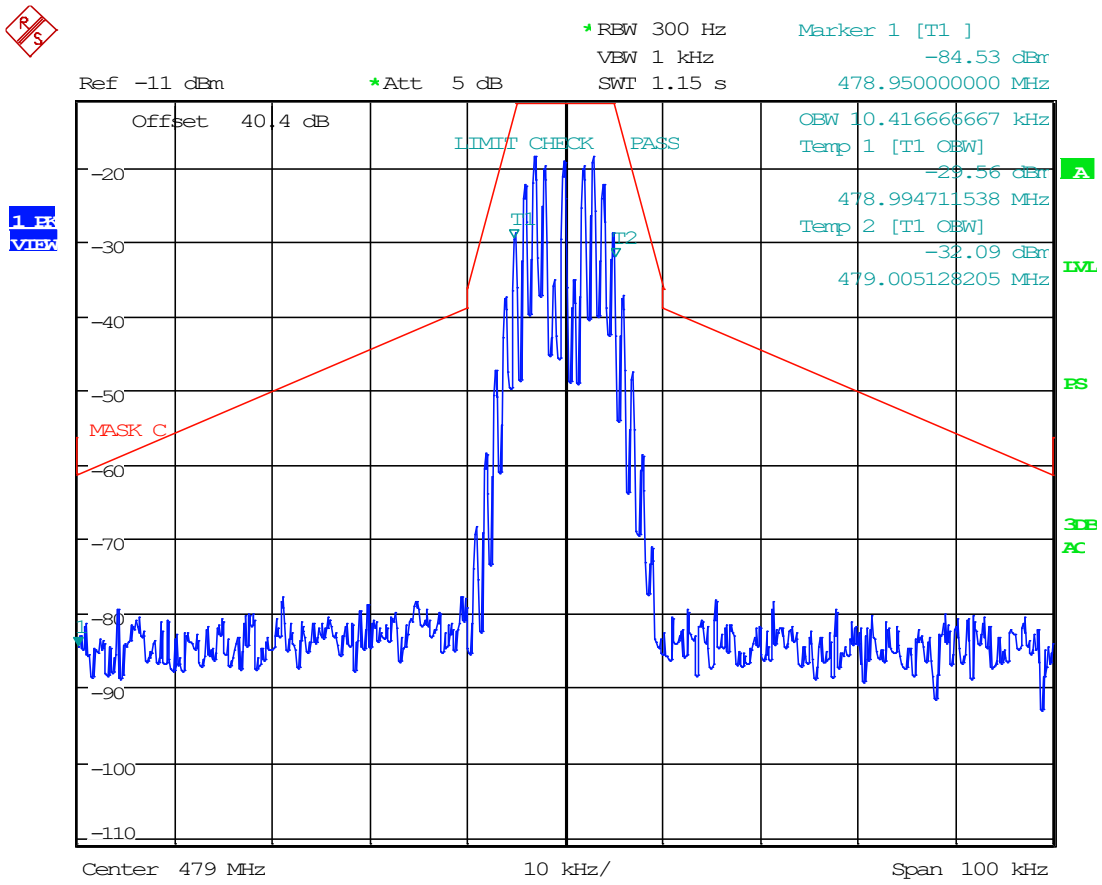
8.5.84 25 kHz FM, UL Mask C, AGC+3, 479 MHz



Date: 1.NOV.2024 07:14:00

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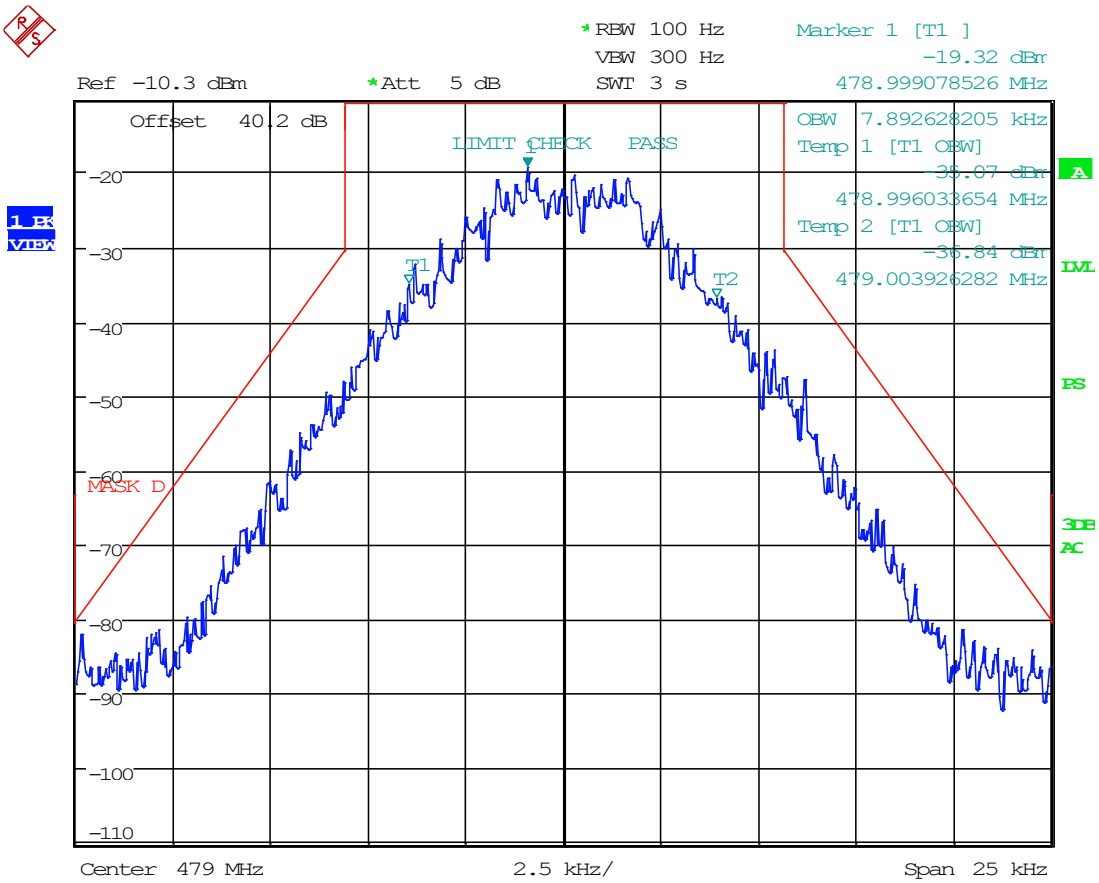
8.5.85 C4FM, UL Mask D, AGC, 479 MHz



Date: 3.JAN.2025 08:40:02

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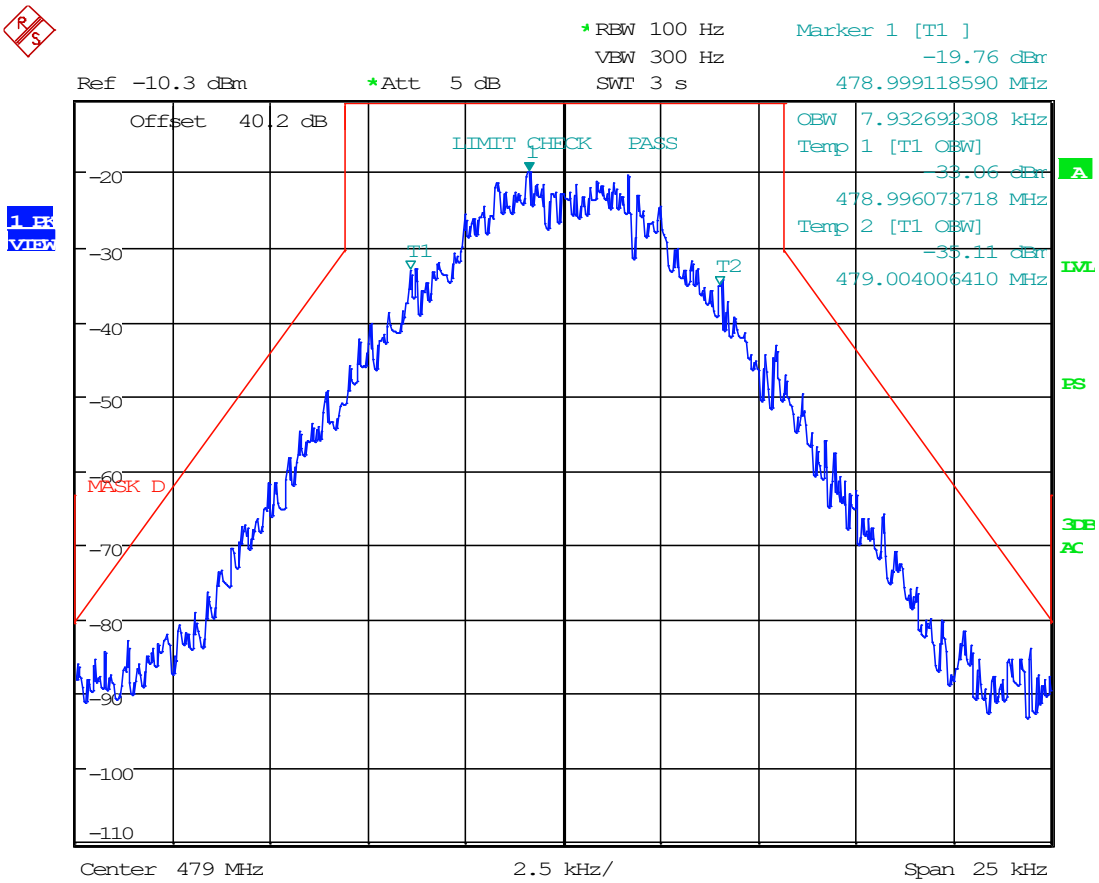
8.5.86 C4FM, UL Mask D, AGC+3, 479 MHz



Date: 3.JAN.2025 08:40:39

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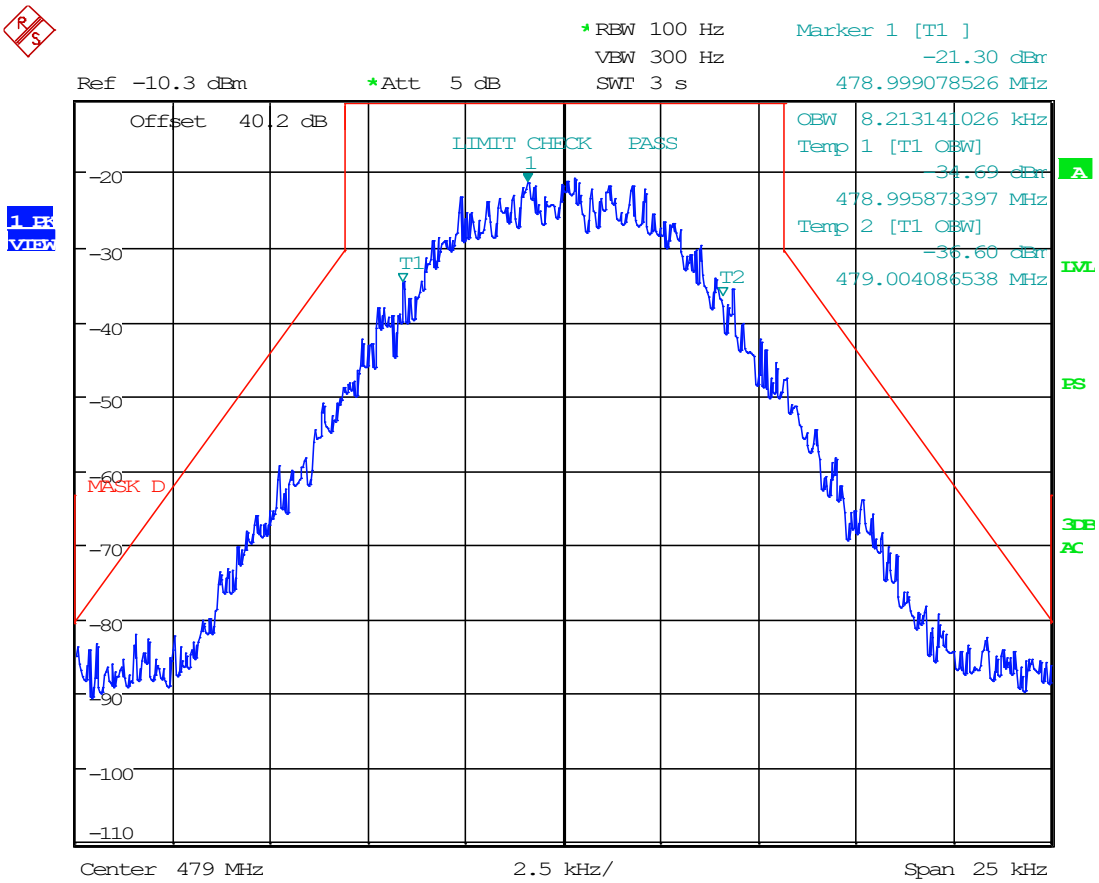
8.5.87 H-CPM, UL Mask D, AGC, 479 MHz



Date: 3.JAN.2025 09:16:01

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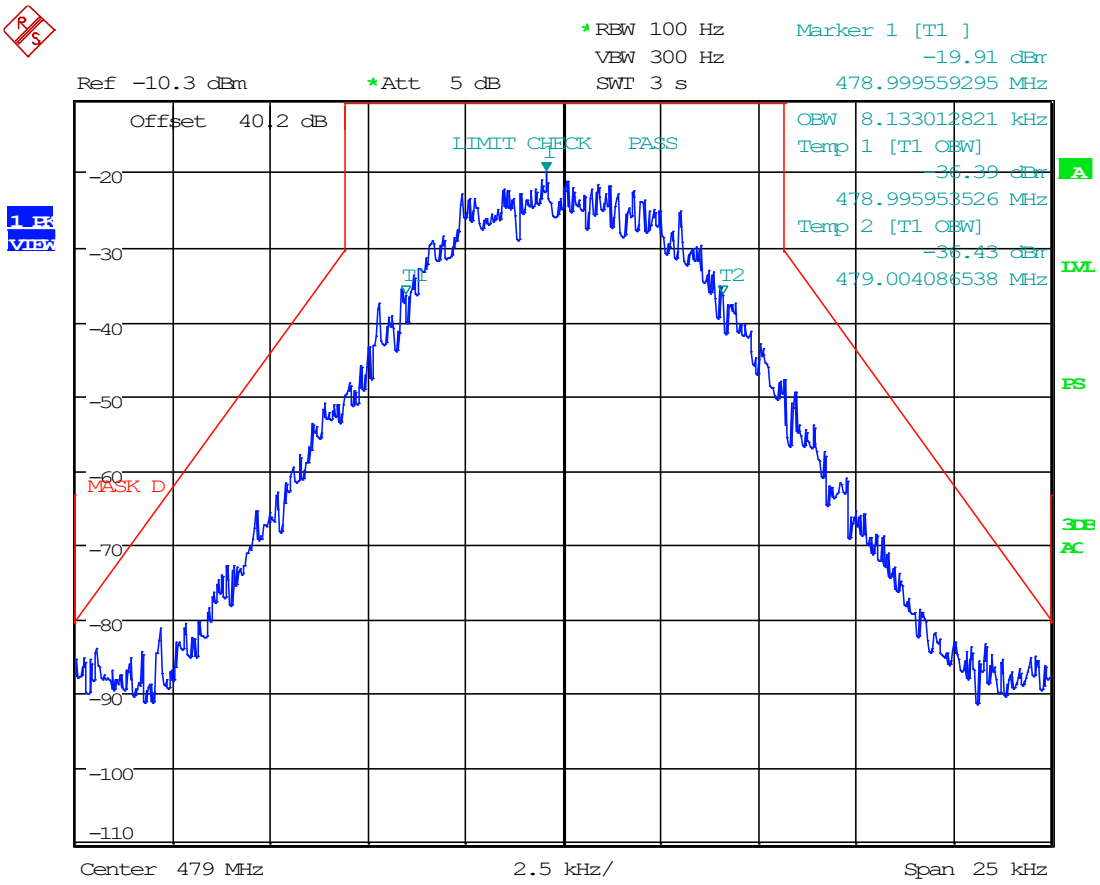
8.5.88 H-CPM, UL Mask D, AGC+3, 479 MHz



Date: 3.JAN.2025 09:16:40

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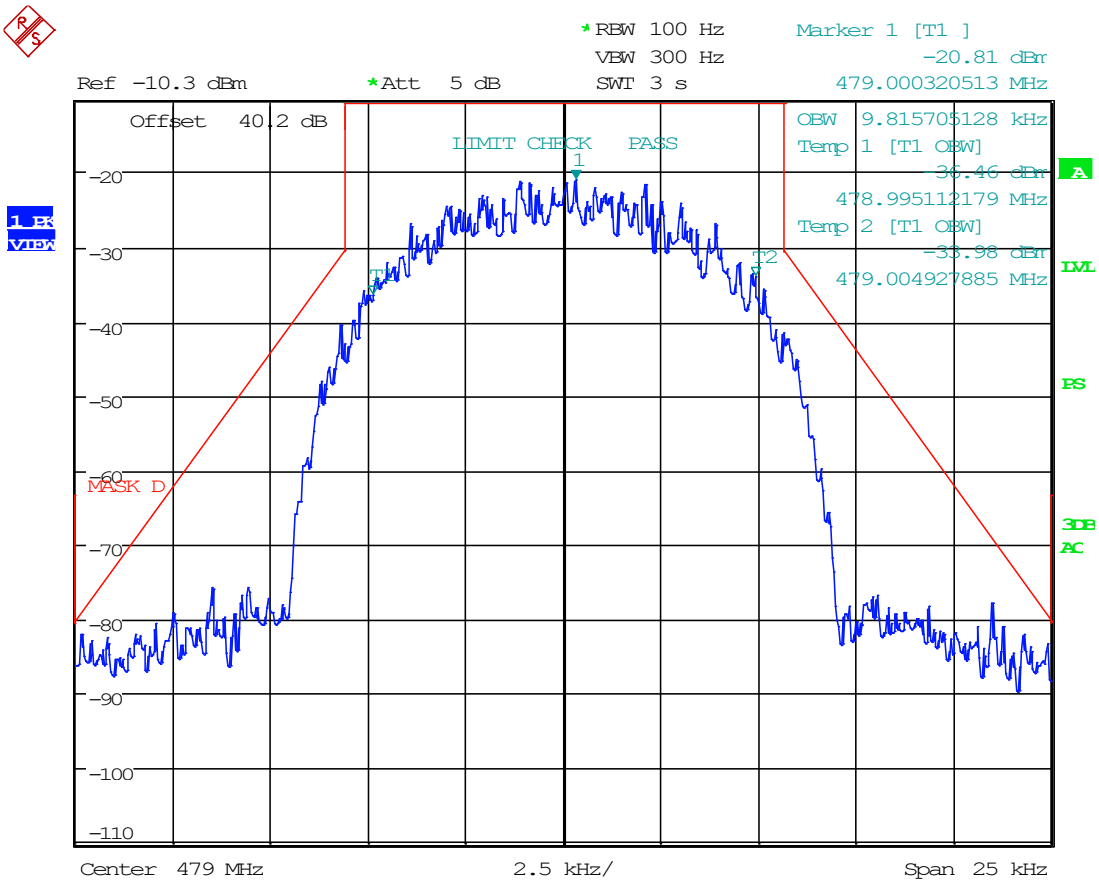
8.5.89 H-DQPSK, UL Mask D, AGC, 479 MHz



Date: 3.JAN.2025 09:21:20

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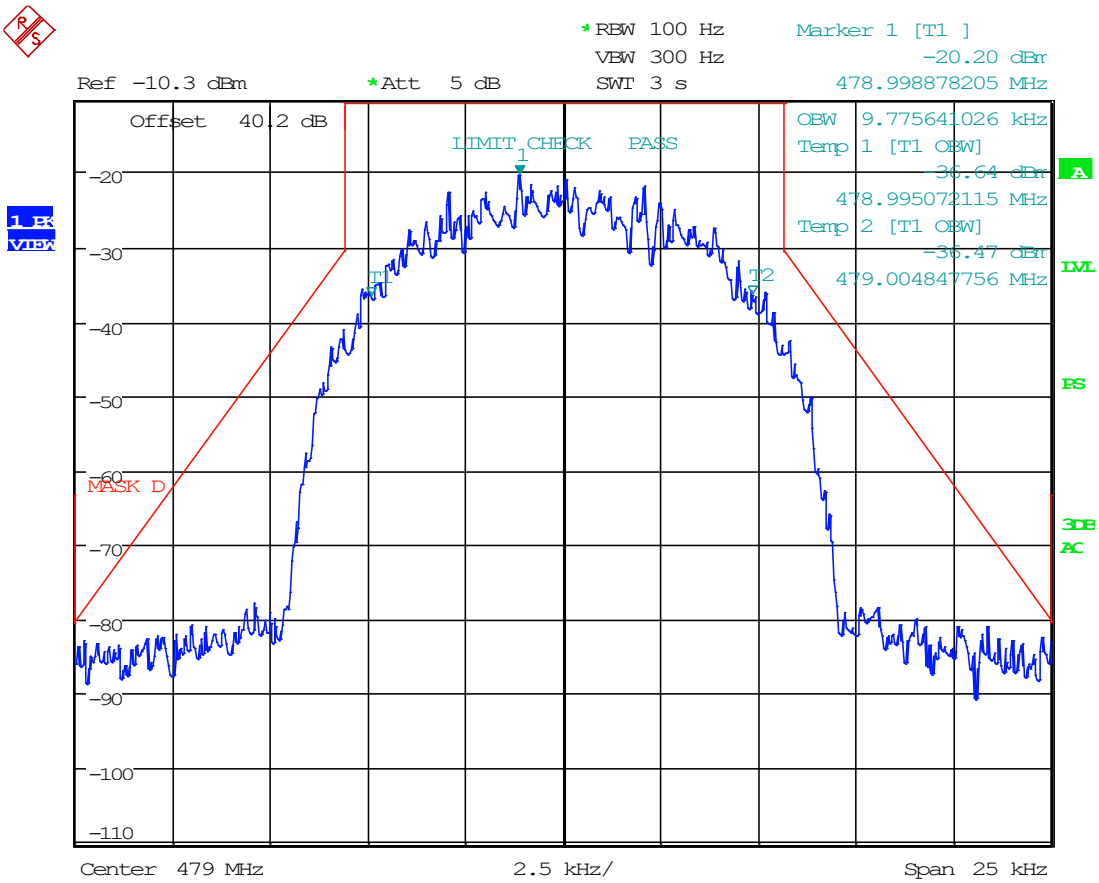
8.5.90 H-DQPSK, UL Mask D, AGC+3, 479 MHz



Date: 3.JAN.2025 09:22:12

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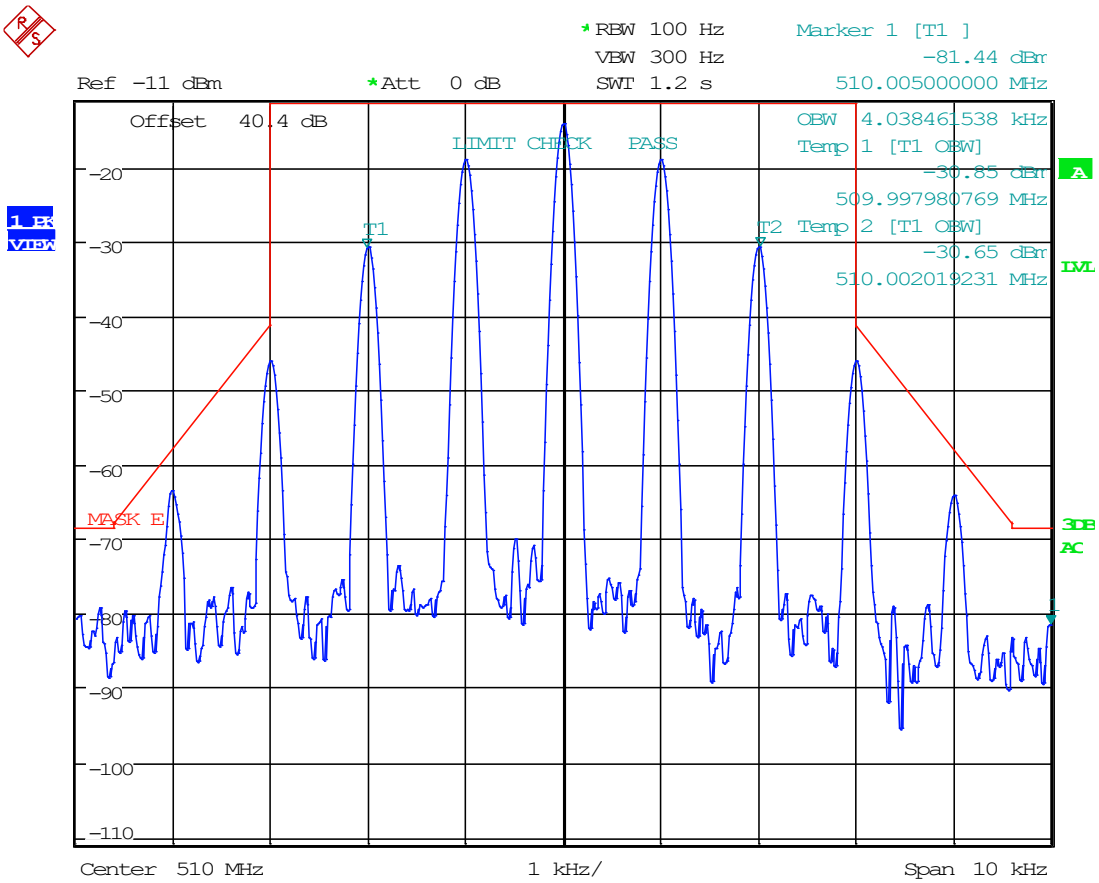
8.5.91 6.25 kHz, FM, UL Mask E, AGC, 510 MHz



Date: 1.NOV.2024 07:08:55

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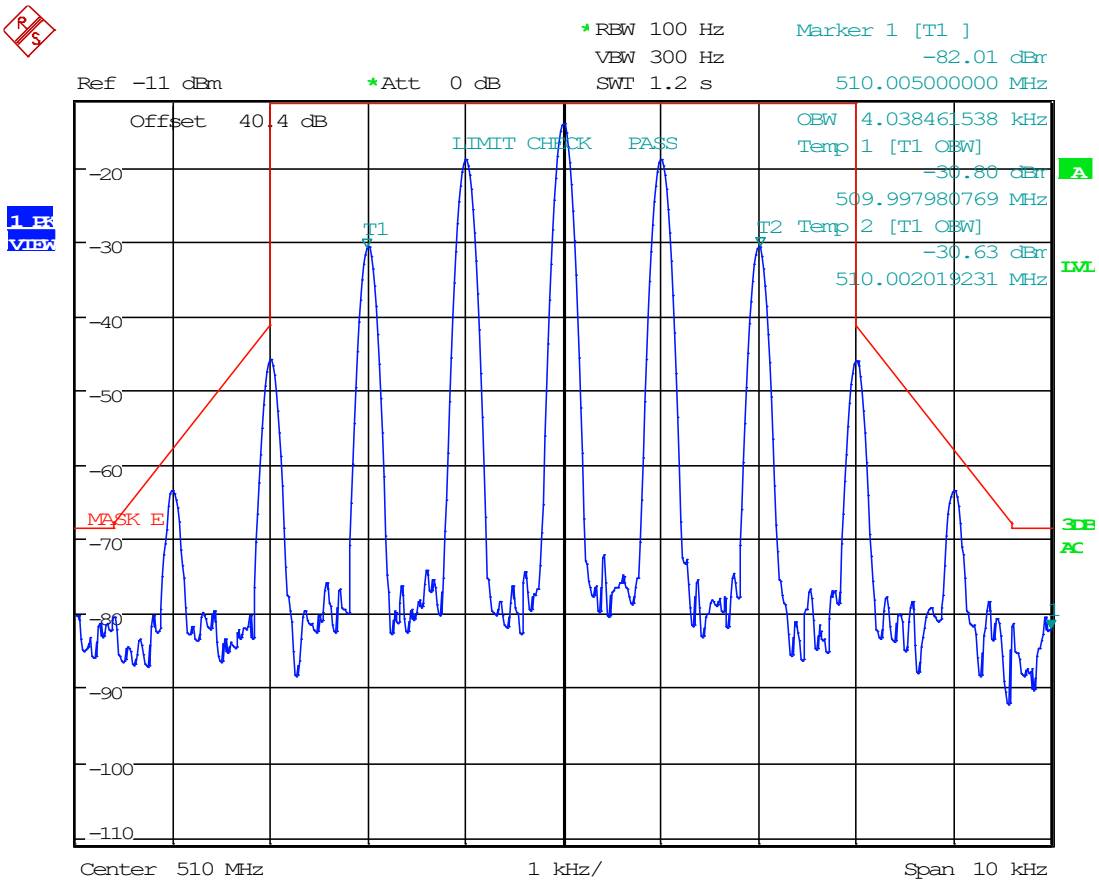
8.5.92 6.25 kHz, FM, UL Mask E, AGC+3, 510 MHz



Date: 1.NOV.2024 07:09:18

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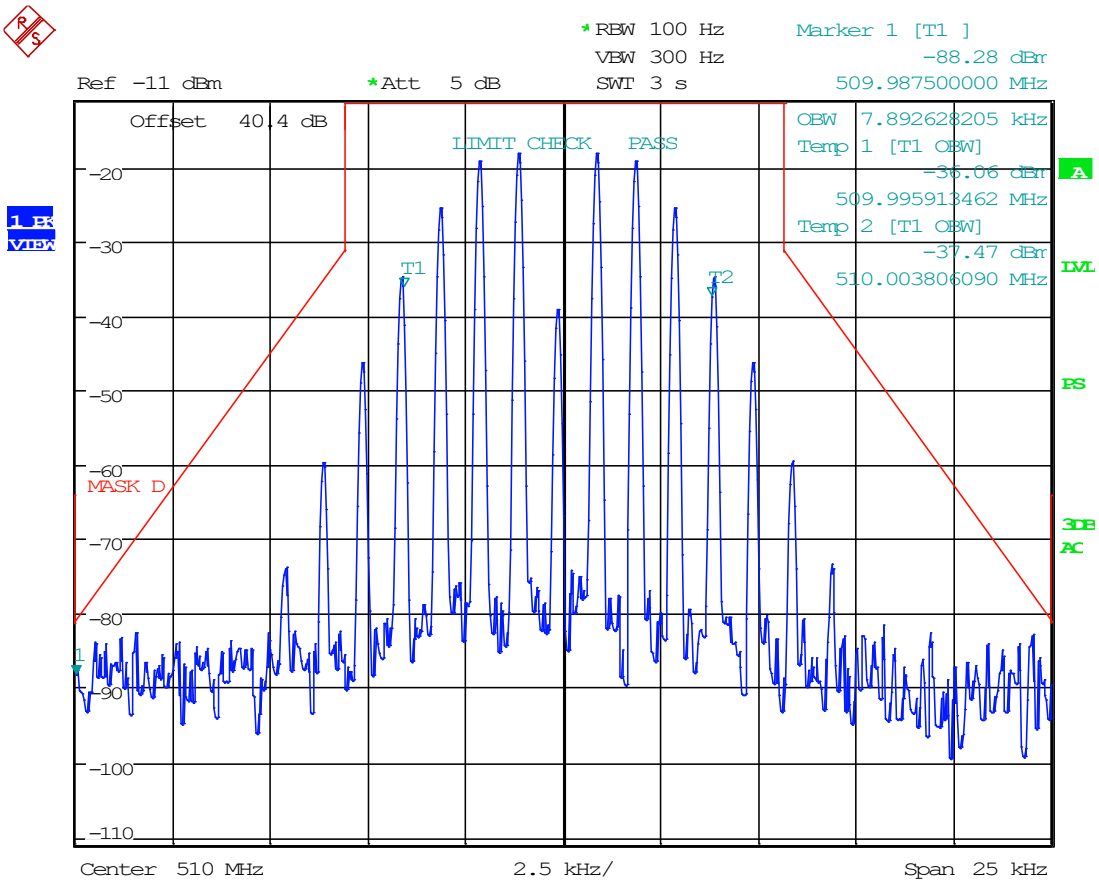
8.5.93 12.5 kHz, FM, UL Mask D, AGC, 510 MHz



Date: 1.NOV.2024 07:16:13

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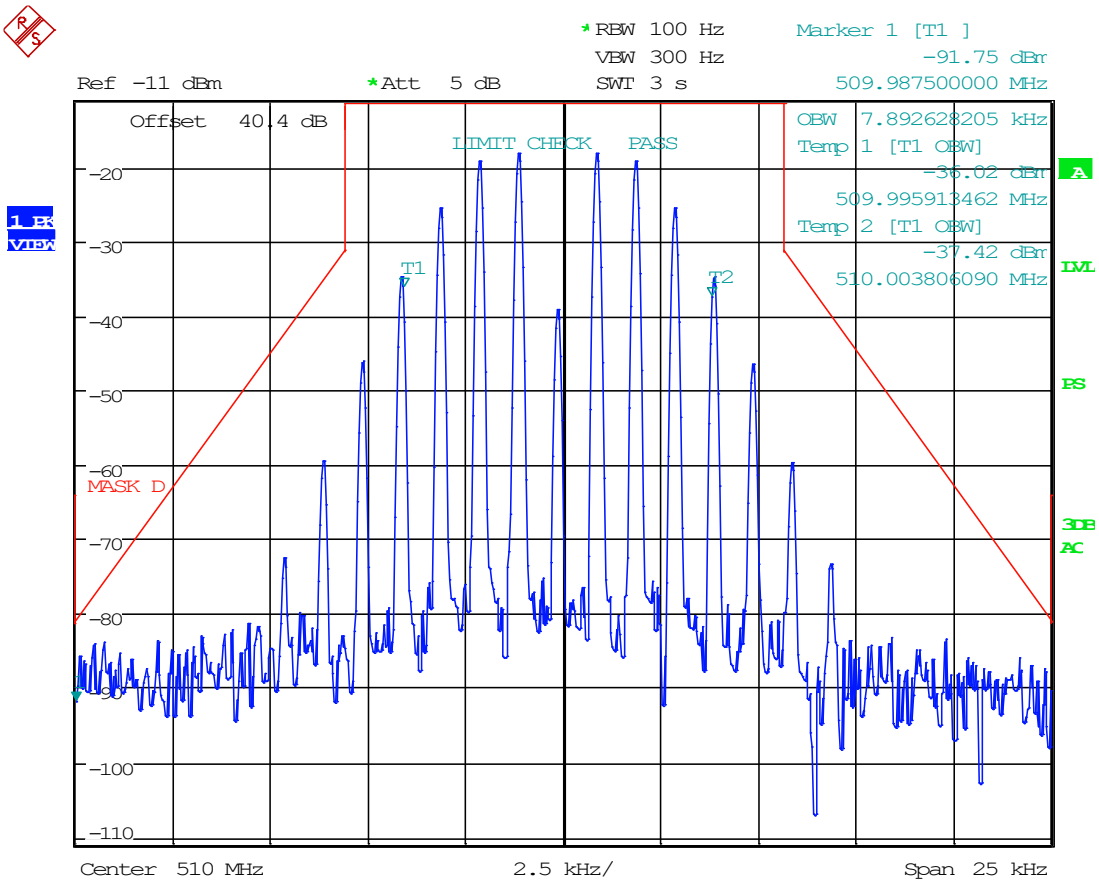
8.5.94 12.5 kHz, FM, UL Mask D, AGC+3, 510 MHz



Date: 1.NOV.2024 07:16:38

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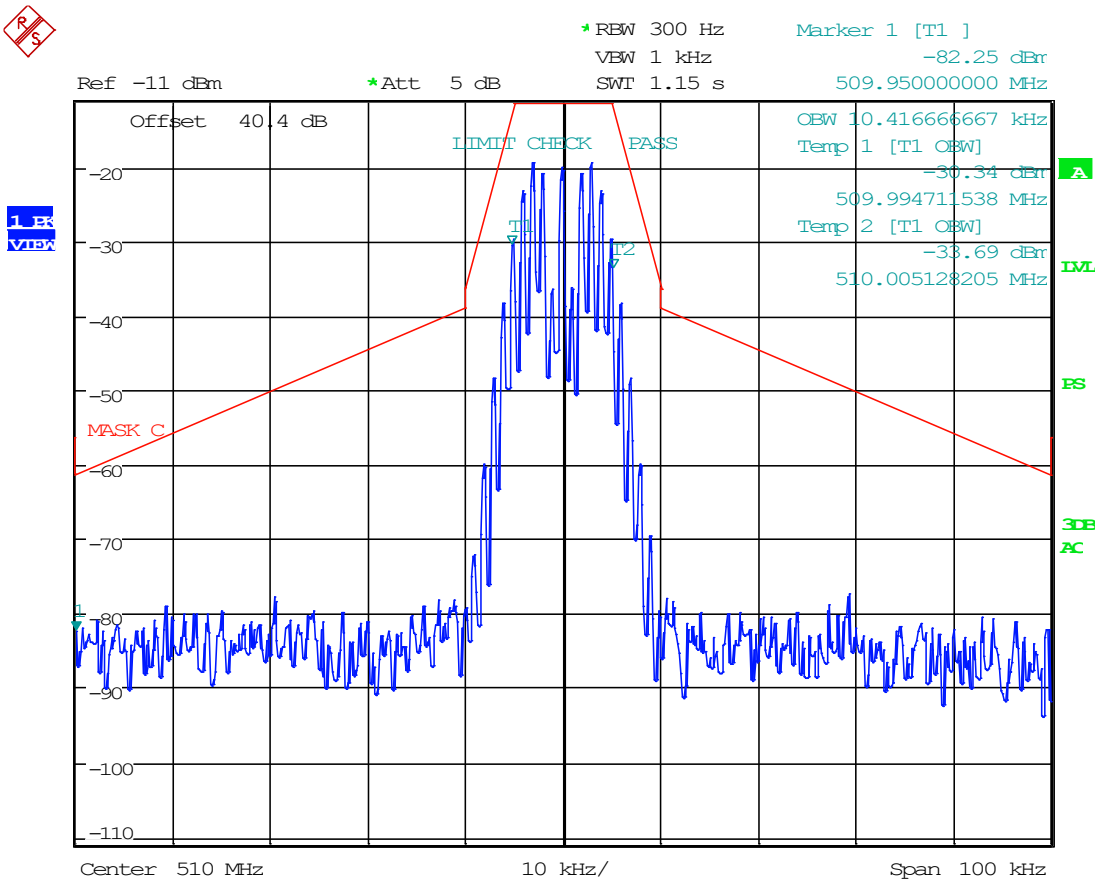
8.5.95 25 kHz FM, UL Mask C, AGC, 510 MHz



Date: 1.NOV.2024 07:14:46

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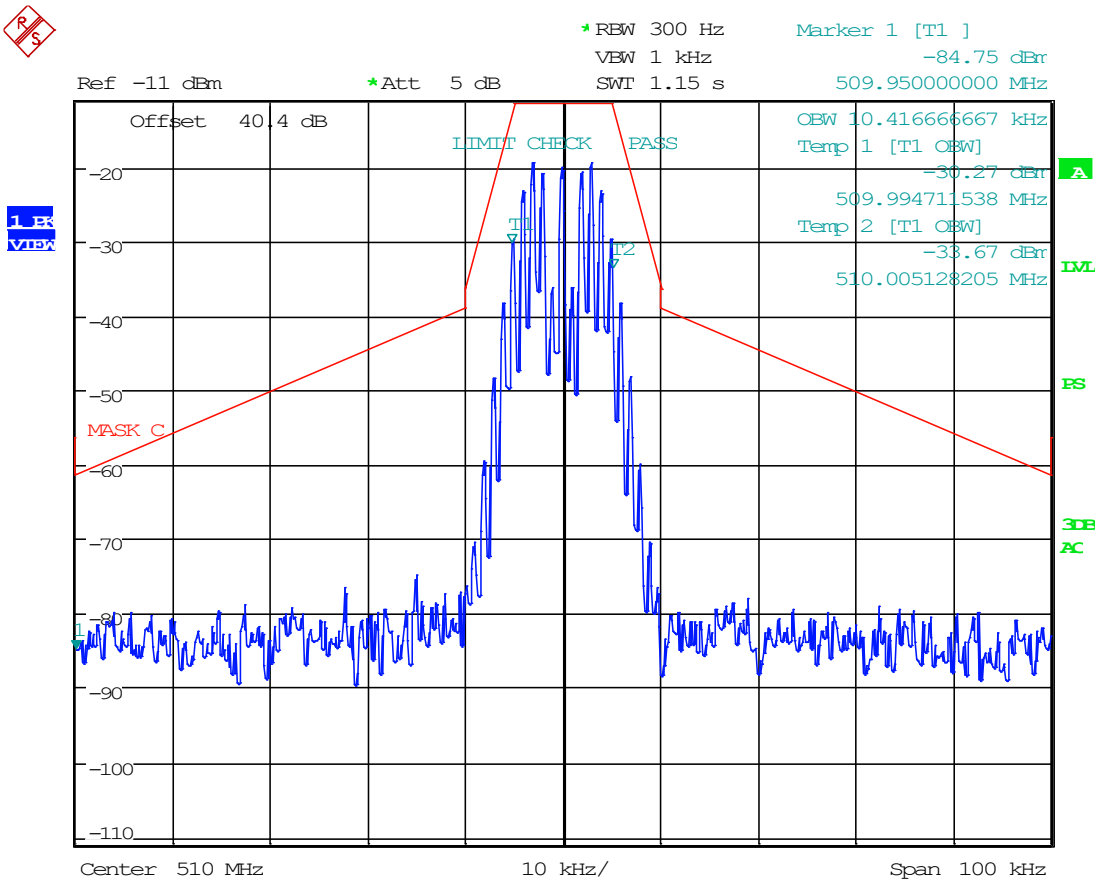
8.5.96 25 kHz FM, UL Mask C, AGC+3, 510 MHz



Date: 1.NOV.2024 07:14:28

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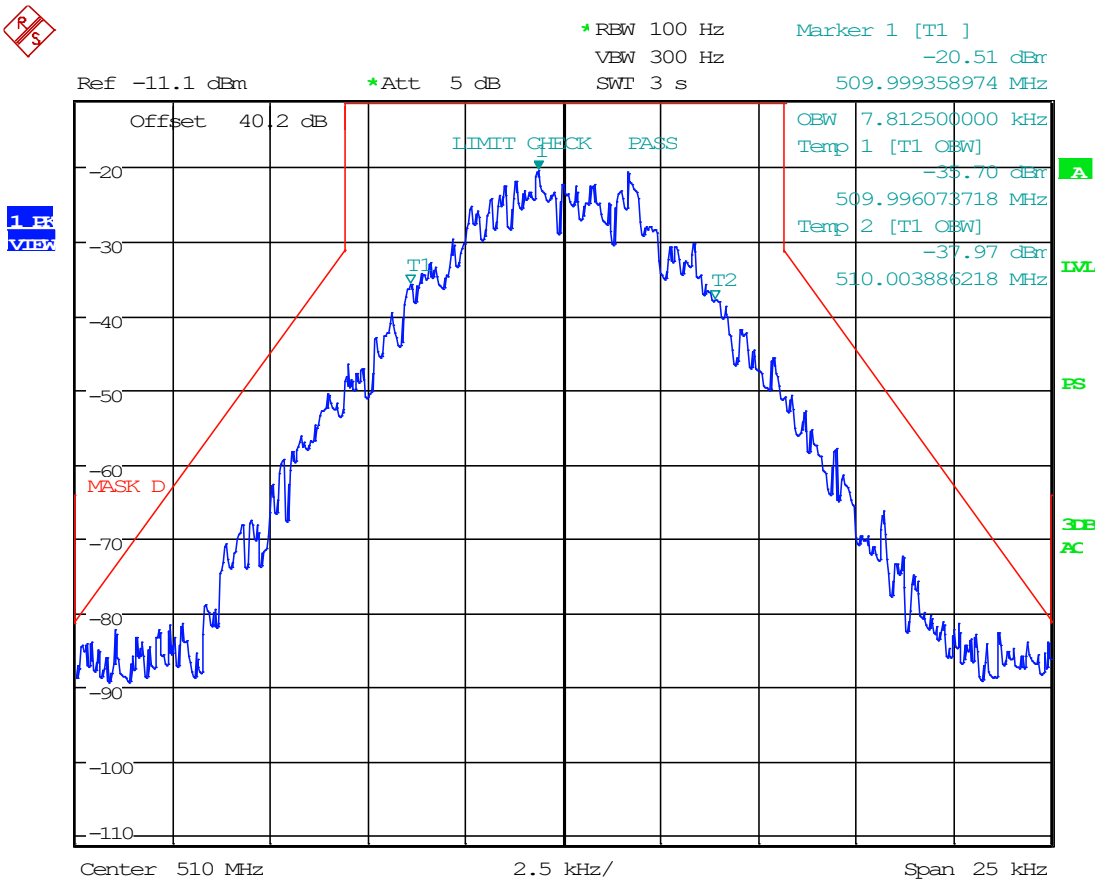
8.5.97 C4FM, UL Mask D, AGC, 510 MHz



Date: 3.JAN.2025 08:42:15

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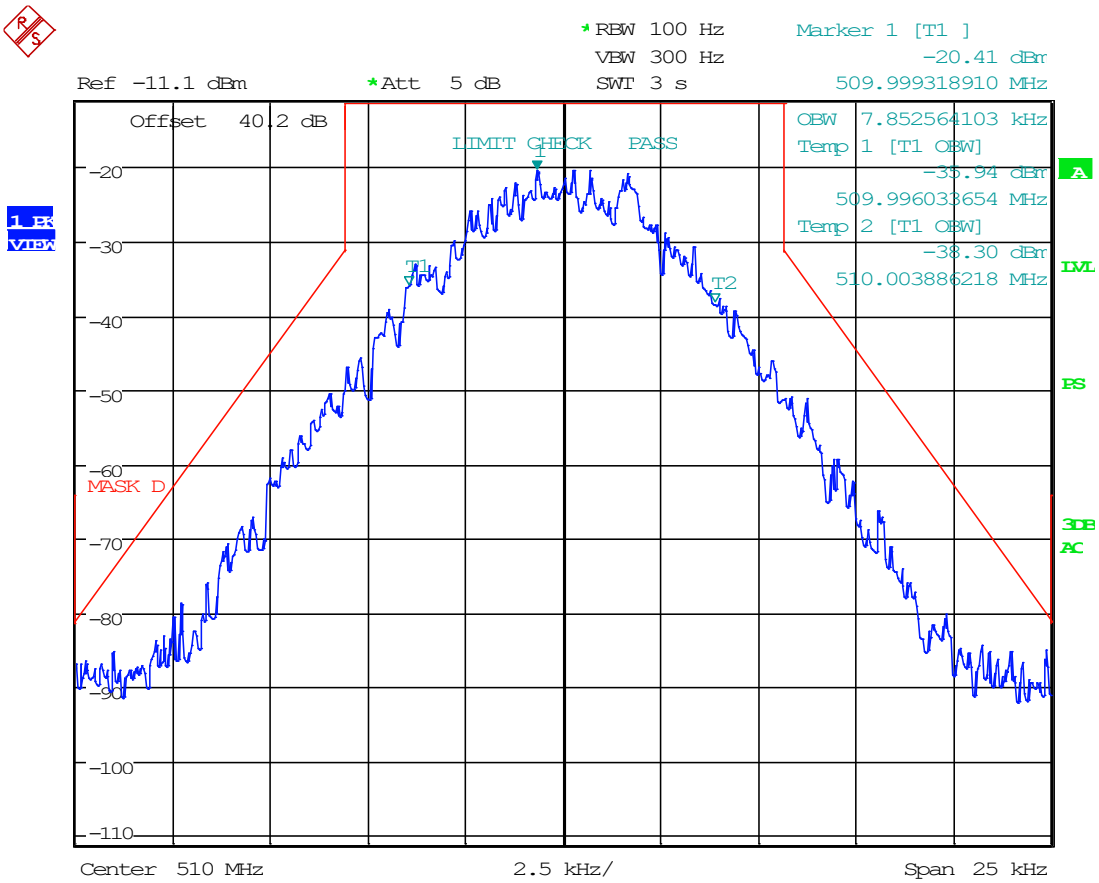
8.5.98 C4FM, UL Mask D, AGC+3, 510 MHz



Date: 3.JAN.2025 08:43:25

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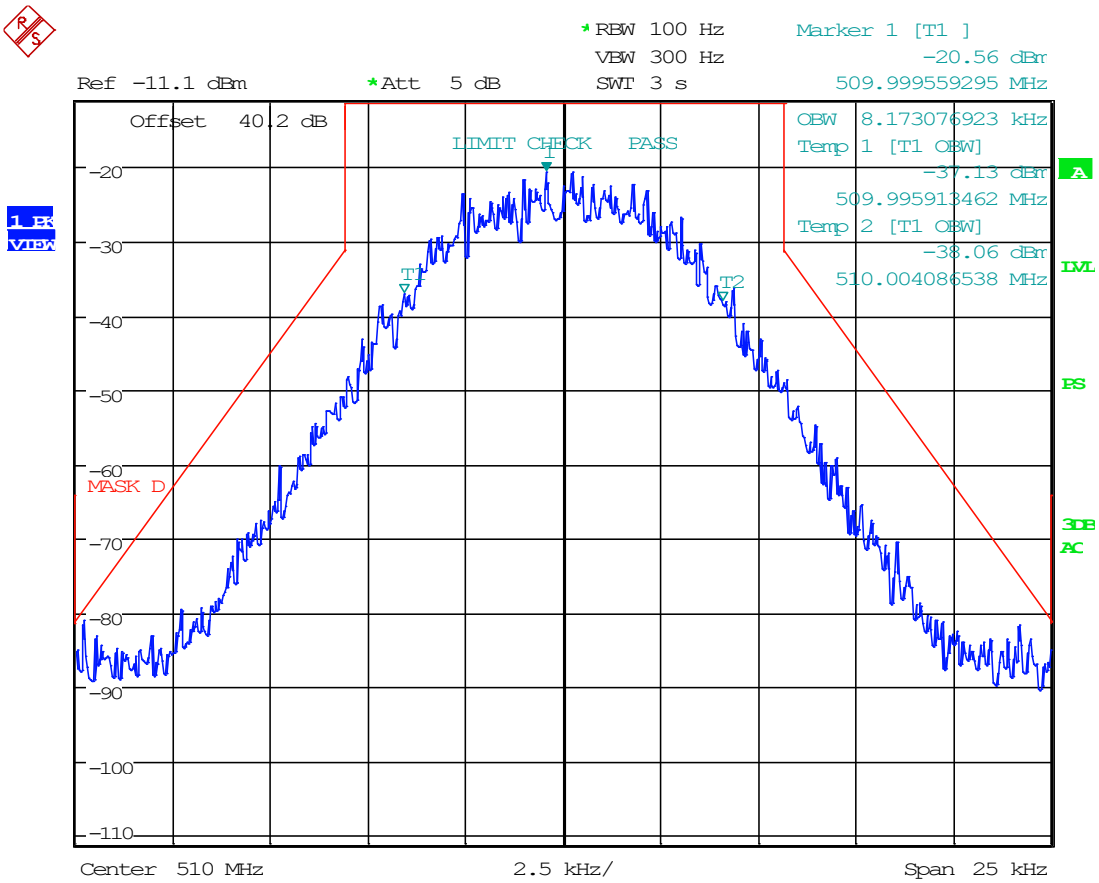
8.5.99 H-CPM, UL Mask D, AGC, 510 MHz



Date: 3.JAN.2025 09:17:37

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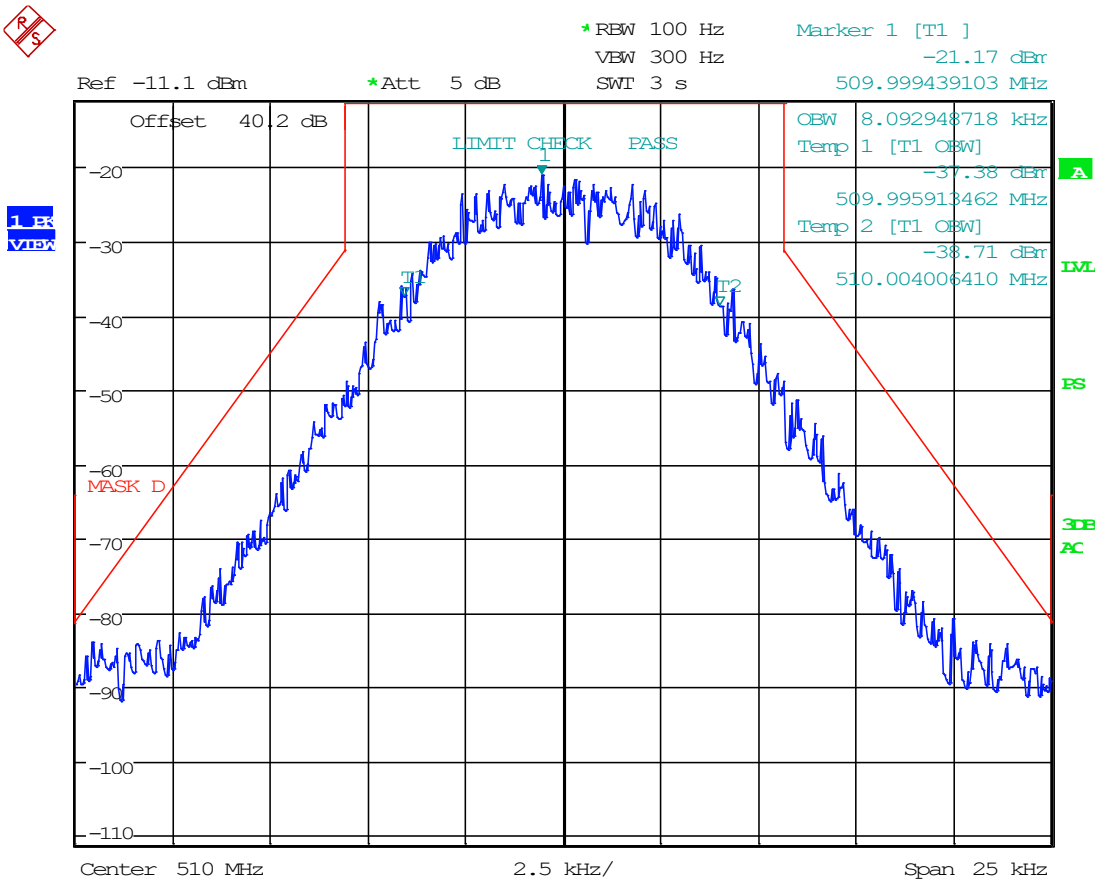
8.5.100 H-CPM, UL Mask D, AGC+3, 510 MHz



Date: 3.JAN.2025 09:18:16

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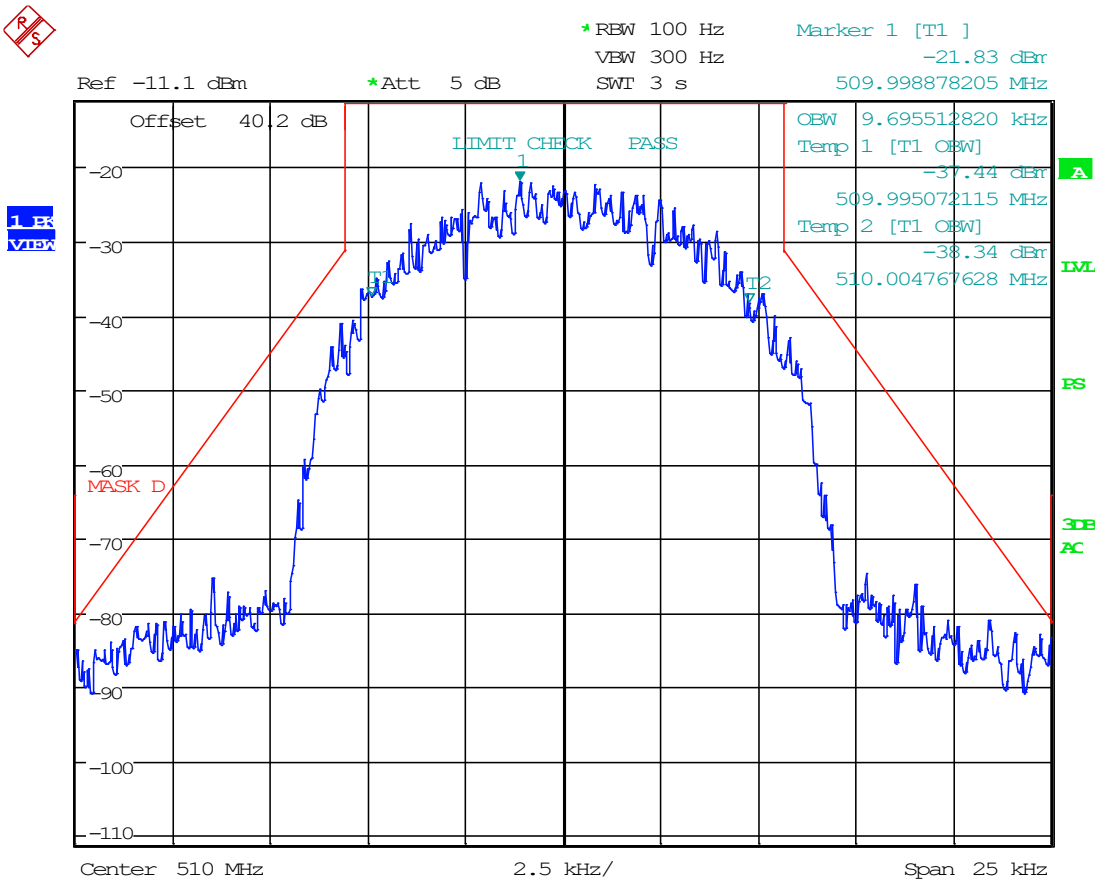
8.5.101H-DQPSK, UL Mask D, AGC, 510 MHz



Date: 3.JAN.2025 09:23:16

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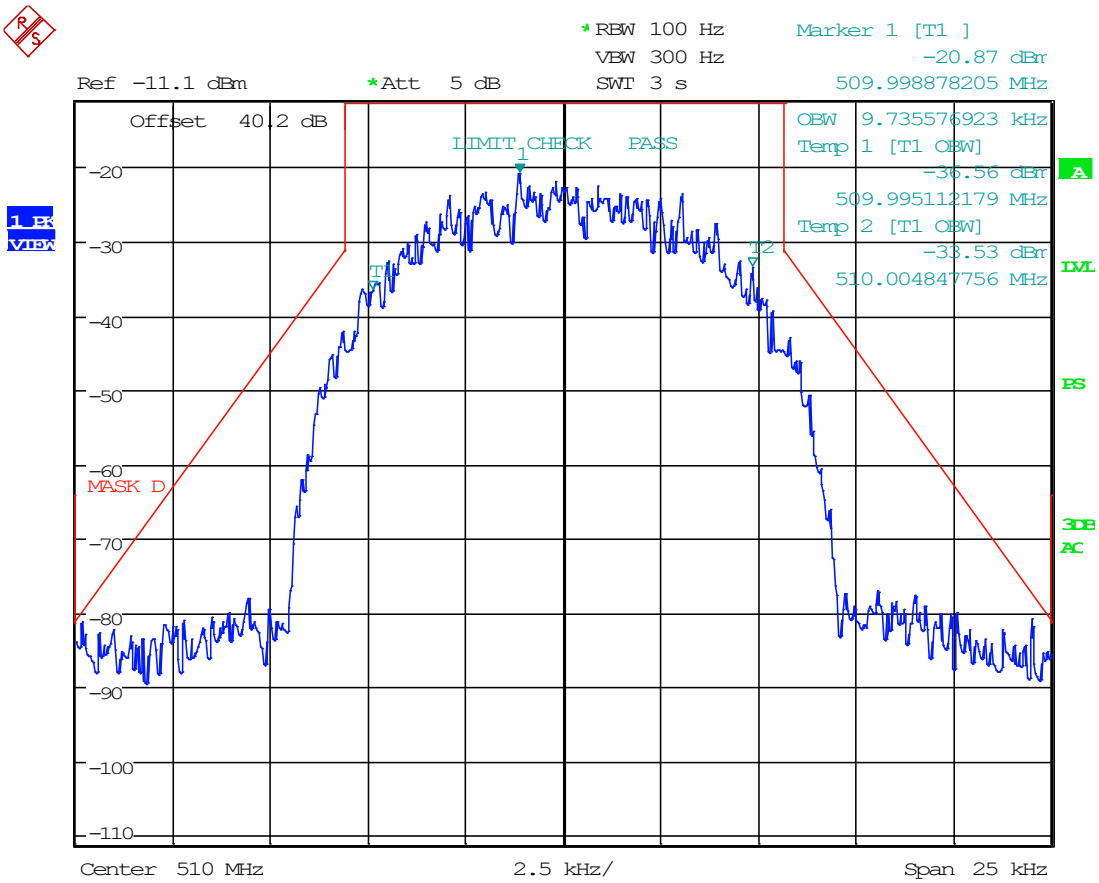
8.5.102 H-DQPSK, UL Mask D, AGC+3, 510 MHz



Date: 3.JAN.2025 09:23:55

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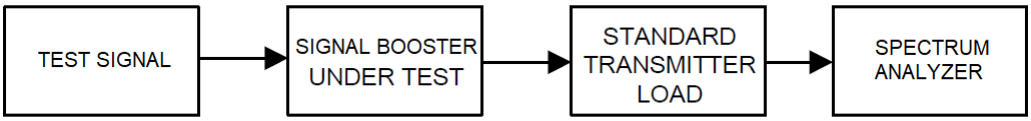
8.6 Noise Figure

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 Setup


Test Results, Out-of-band Rejection and Class of Operation			
Operating Band (MHz)	Link Direction	Noise Figure (dB)	Limit (dB)
450 MHz- 512 MHz	Downlink	6.21	< 9 dB
450 MHz- 512 MHz	Uplink	2.40	< 9 dB

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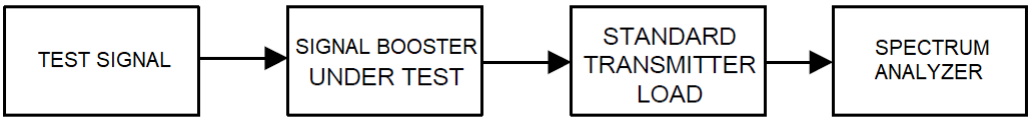
8.7 Out-of-Band/Out-of-Block Emissions (Intermodulation Products)

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

Test Setup


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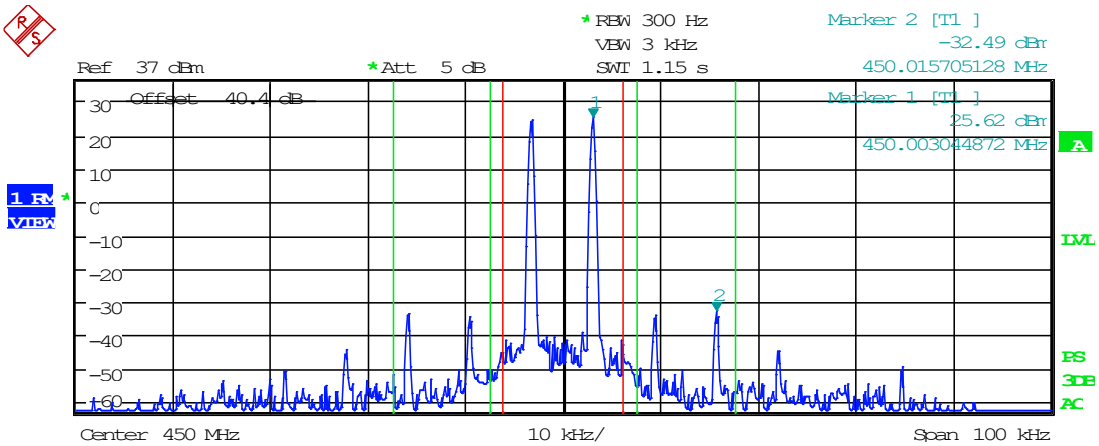
8.7.1 6.25 kHz Signal, Downlink, AGC, 450 MHz



Tx Channel			
Bandwidth	12.5 kHz	Power	28.73 dBm
Adjacent Channel		Lower	-29.96 dBm
Bandwidth	10 kHz		
Spacing	12.5 kHz	Upper	-29.54 dBm

Date: 31.OCT.2024 07:12:30

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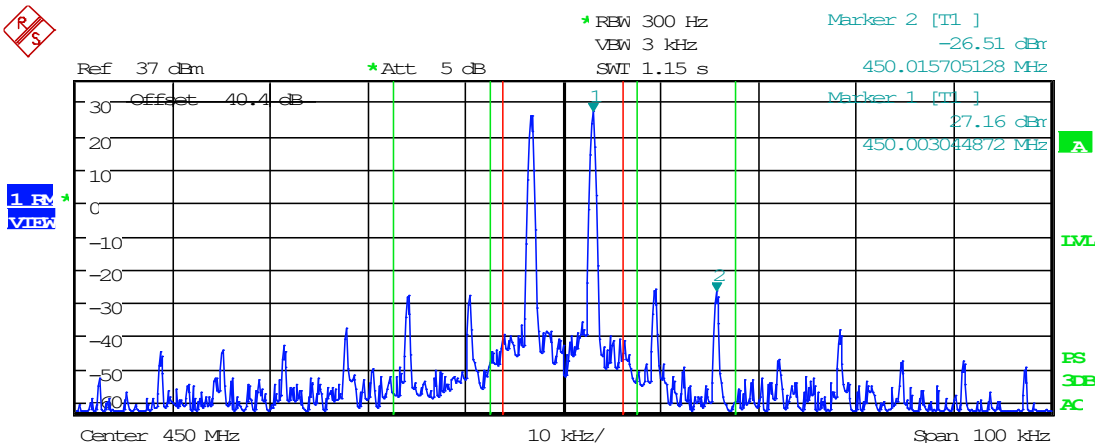
8.7.2 6.25 kHz Signal, Downlink, AGC+3dB, 450 MHz



Tx Channel
Bandwidth 12.5 kHz

Power 30.29 dBm

Adjacent Channel
Bandwidth 10 kHz
Spacing 12.5 kHz

Lower -24.20 dBm
Upper -22.68 dBm

Date: 31.OCT.2024 07:12:49

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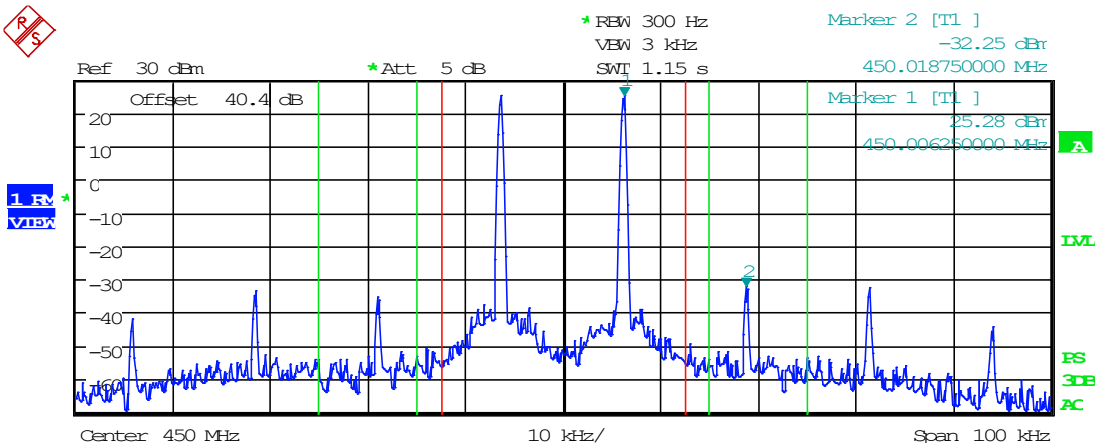
8.7.3 12.5 kHz Signal, Downlink, AGC, 450 MHz



Tx Channel			
Bandwidth	25 kHz	Power	28.69 dBm
Adjacent Channel		Lower	-34.10 dBm
Bandwidth	10 kHz		
Spacing	20 kHz	Upper	-31.01 dBm

Date: 31.OCT.2024 07:20:10

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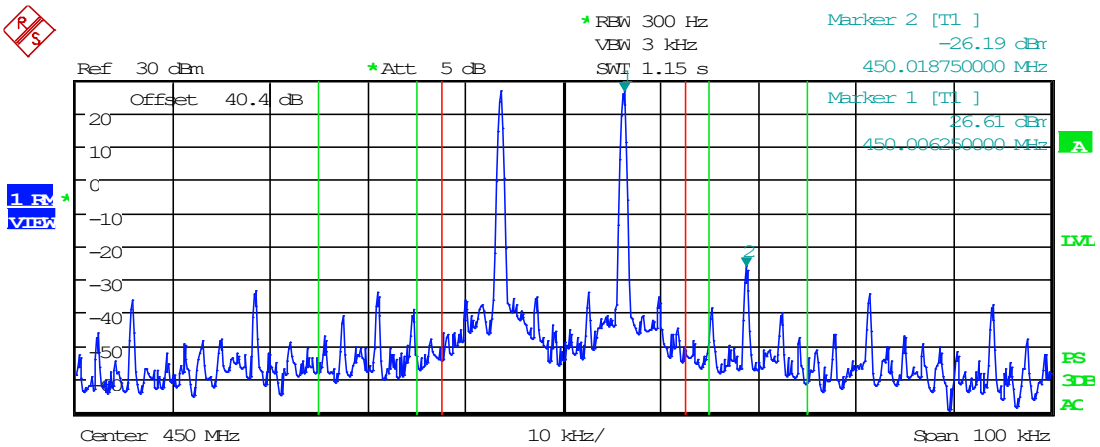
8.7.4 12.5 kHz Signal, Downlink, AGC+3dB, 450 MHz



Tx Channel
Bandwidth 25 kHz

Power 30.03 dBm

Adjacent Channel
Bandwidth 10 kHz
Spacing 20 kHz

Lower -31.15 dBm
Upper -25.11 dBm

Date: 31.OCT.2024 07:19:52

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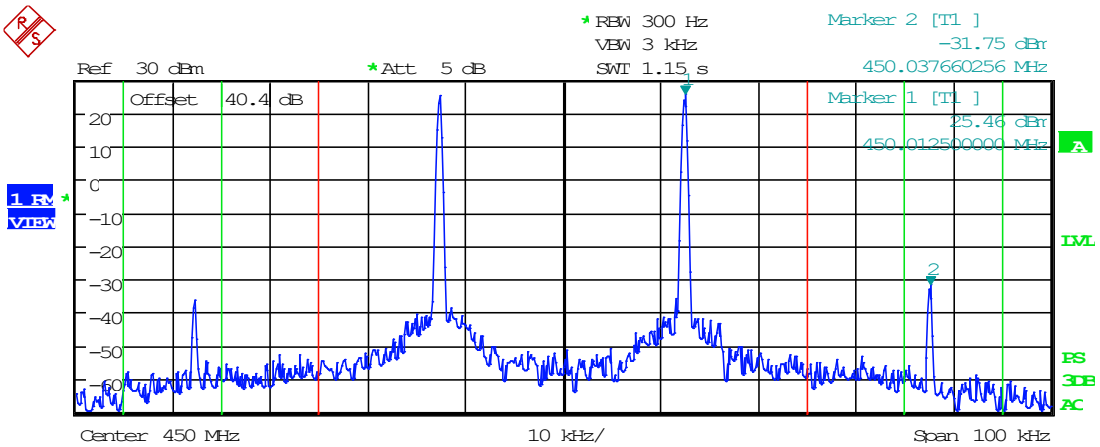
8.7.5 25 kHz Signal, Downlink, AGC, 450 MHz



Tx Channel

Bandwidth	50 kHz	Power	28.72 dBm

Adjacent Channel

Bandwidth	10 kHz	Lower	-35.53 dBm
Spacing	40 kHz	Upper	-31.12 dBm

Date: 31.OCT.2024 07:21:28

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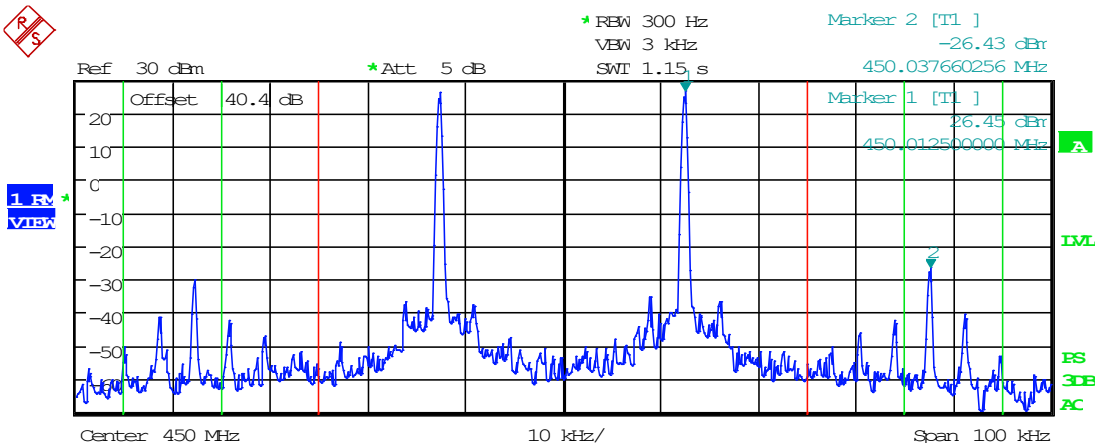
8.7.6 25 kHz Signal, Downlink, AGC+3dB, 450 MHz



Tx Channel

Bandwidth	50 kHz	Power	29.70 dBm

Adjacent Channel

Bandwidth	10 kHz	Lower	-29.32 dBm
Spacing	40 kHz	Upper	-25.73 dBm

Date: 31.OCT.2024 07:21:50

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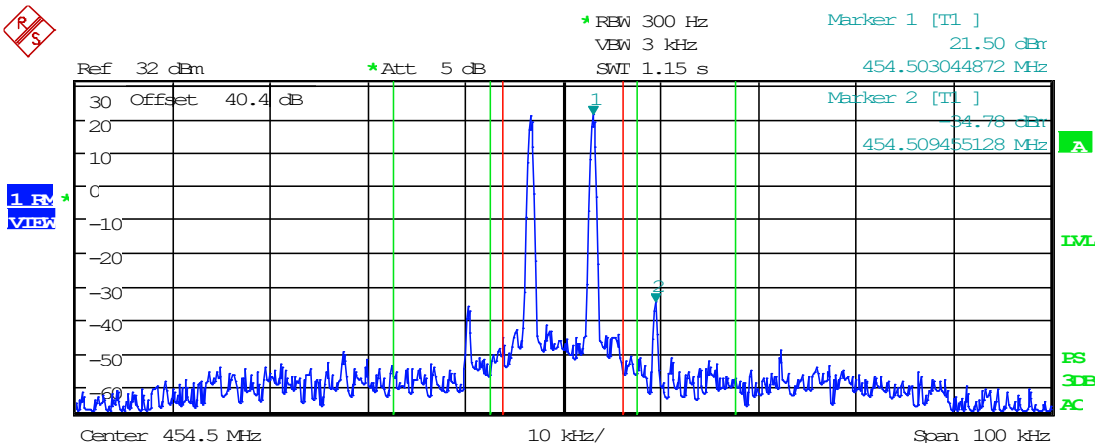
8.7.7 6.25 kHz Signal, Downlink, AGC, 454.5 MHz



Tx Channel
Bandwidth 12.5 kHz

Power 24.63 dBm

Adjacent Channel
Bandwidth 10 kHz
Spacing 12.5 kHz

Lower -34.66 dBm
Upper -33.58 dBm

Date: 8.NOV.2024 14:01:55

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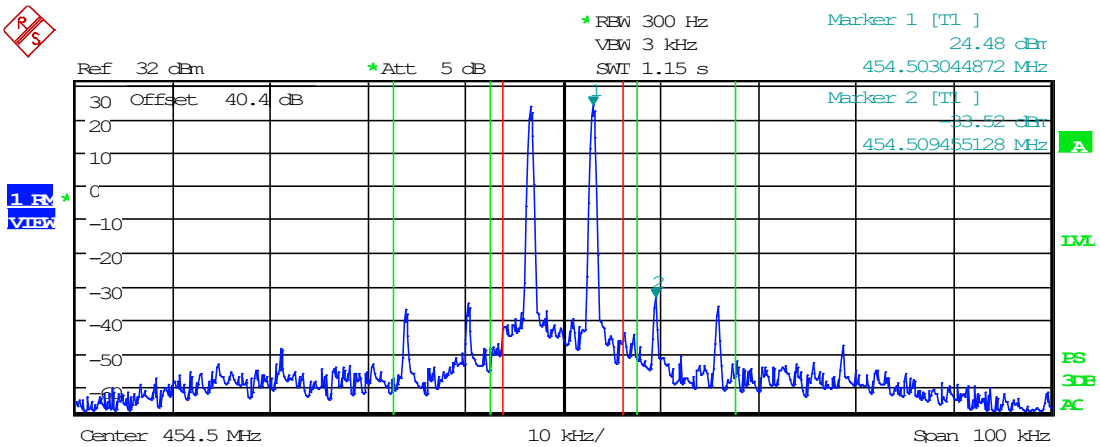
8.7.8 6.25 kHz Signal, Downlink, AGC+3dB, 454.5 MHz



Tx Channel
Bandwidth 12.5 kHz

Power 27.63 dBm

Adjacent Channel
Bandwidth 10 kHz
Spacing 12.5 kHz

Lower -31.78 dBm
Upper -30.86 dBm

Date: 8.NOV.2024 14:01:32

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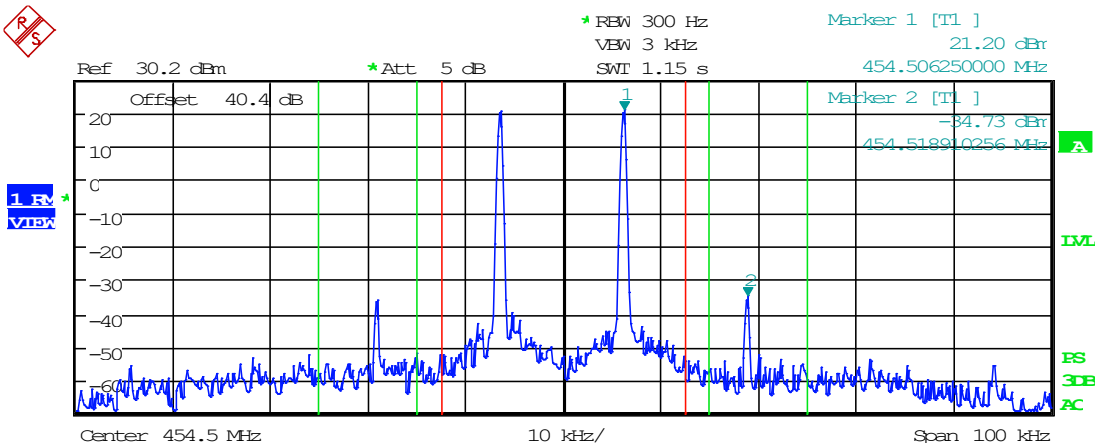
8.7.9 12.5 kHz Signal, Downlink, AGC, 454.5 MHz



Tx Channel
Bandwidth 25 kHz

Power 24.59 dBm

Adjacent Channel
Bandwidth 10 kHz
Spacing 20 kHz

Lower -34.64 dBm
Upper -33.76 dBm

Date: 8.NOV.2024 14:02:41

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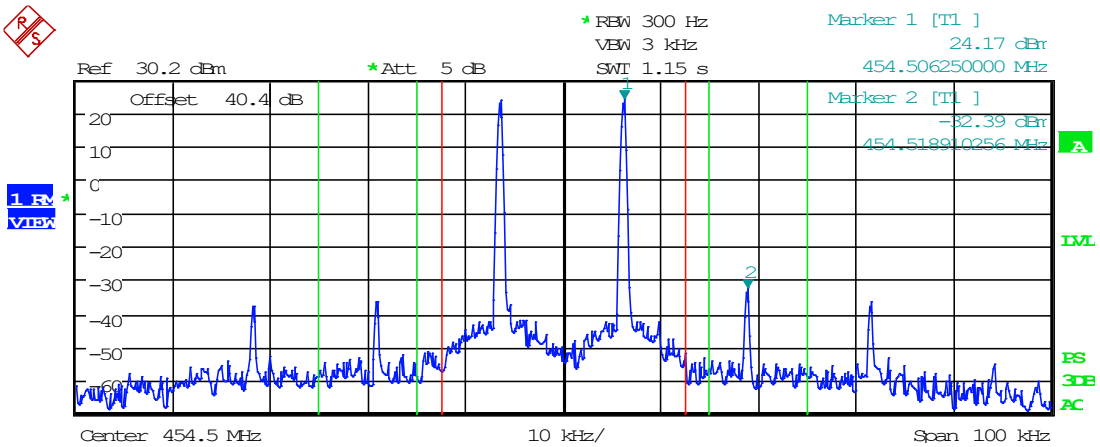
8.7.10 12.5 kHz Signal, Downlink, AGC+3dB, 454.5 MHz



Tx Channel			
Bandwidth	25 kHz	Power	27.57 dBm
Adjacent Channel			
Bandwidth	10 kHz	Lower	-34.77 dBm
Spacing	20 kHz	Upper	-31.55 dBm

Date: 8.NOV.2024 14:03:03

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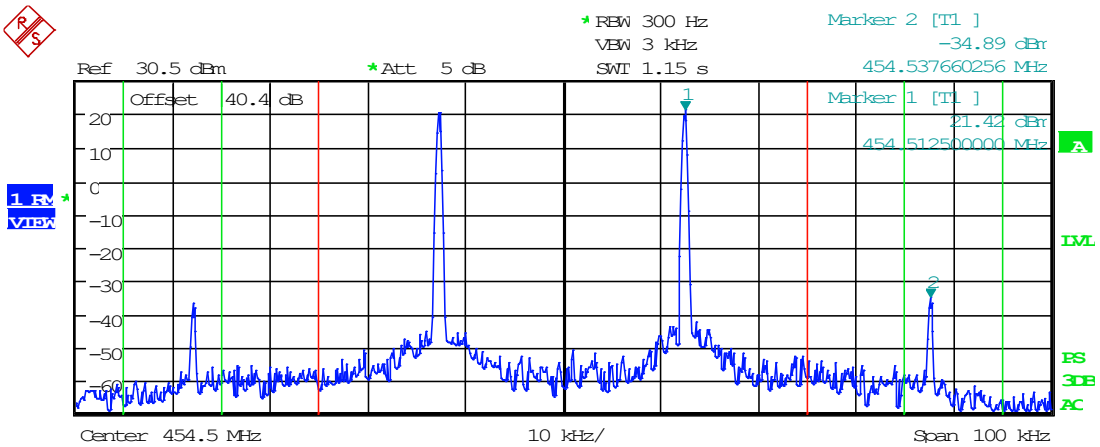
8.7.11 25 kHz Signal, Downlink, AGC, 454.5 MHz



Tx Channel
Bandwidth 50 kHz

Power 24.63 dBm

Adjacent Channel
Bandwidth 10 kHz
Spacing 40 kHz

Lower -35.94 dBm
Upper -34.26 dBm

Date: 8.NOV.2024 14:04:12

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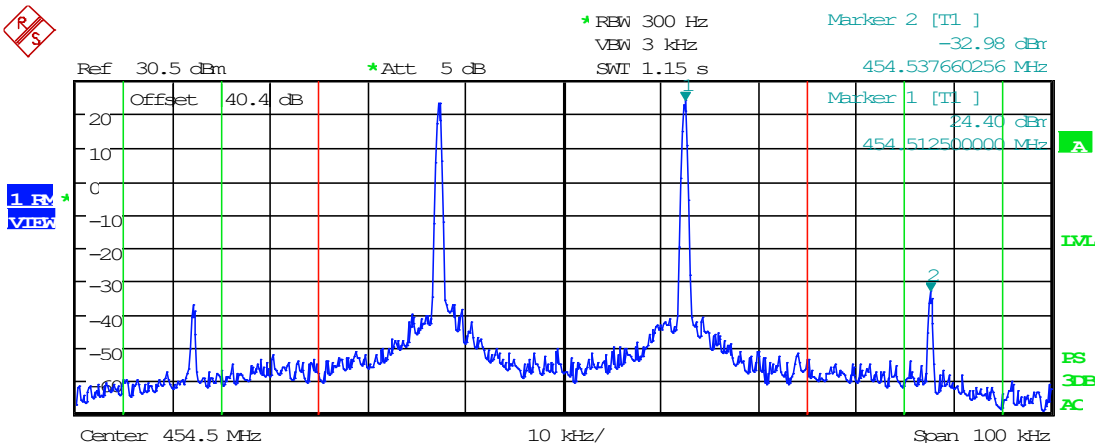
8.7.12 25 kHz Signal, Downlink, AGC+3dB, 454.5 MHz



Tx Channel
Bandwidth 50 kHz

Power 27.62 dBm

Adjacent Channel
Bandwidth 10 kHz
Spacing 40 kHz

Lower -36.21 dBm
Upper -32.45 dBm

Date: 8.NOV.2024 14:03:52

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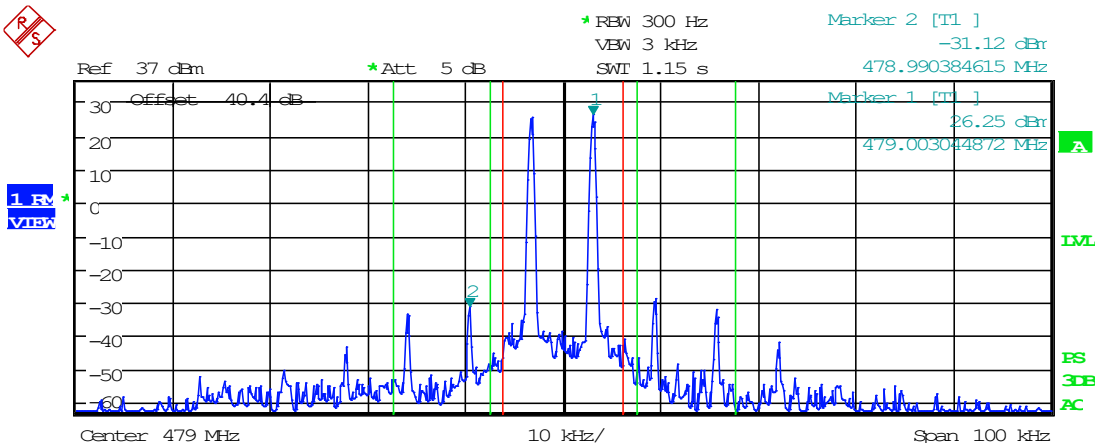
8.7.13 6.25 kHz Signal, Downlink, AGC, 479 MHz



Tx Channel			
Bandwidth	12.5 kHz	Power	29.49 dBm
Adjacent Channel			
Bandwidth	10 kHz	Lower	-28.51 dBm
Spacing	12.5 kHz	Upper	-26.43 dBm

Date: 31.OCT.2024 07:14:09

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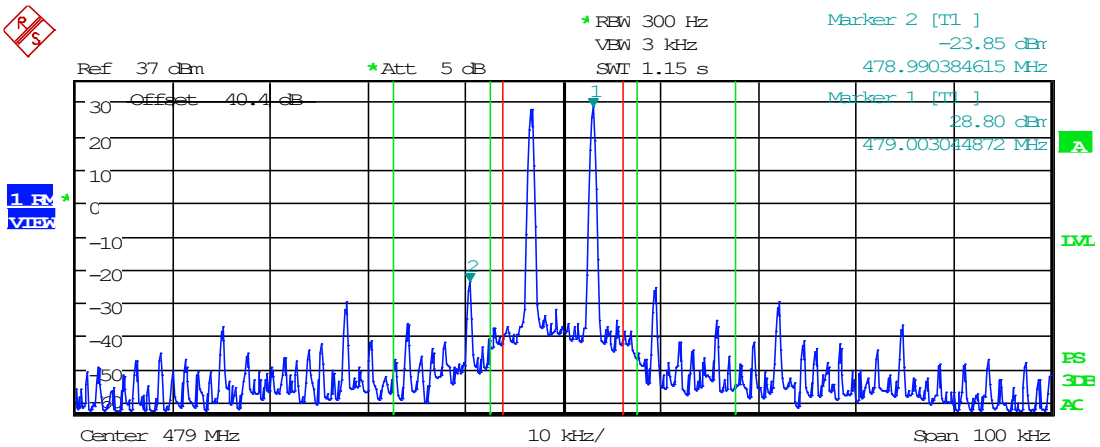
8.7.14 6.25 kHz Signal, Downlink, AGC+3dB, 479 MHz



Tx Channel
Bandwidth 12.5 kHz

Power 32.05 dBm

Adjacent Channel
Bandwidth 10 kHz
Spacing 12.5 kHz

Lower -22.86 dBm
Upper -24.30 dBm

Date: 31.OCT.2024 07:13:45

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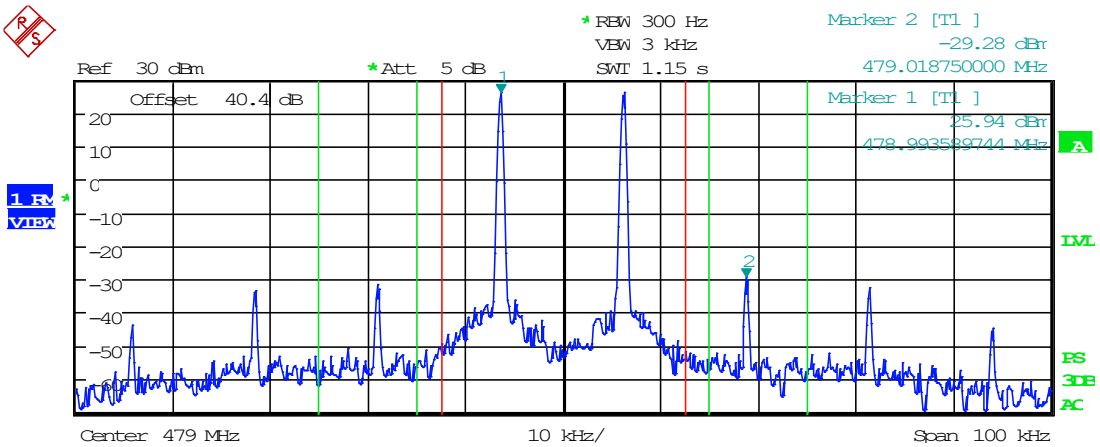
8.7.15 12.5 kHz Signal, Downlink, AGC, 479 MHz



Tx Channel
Bandwidth 25 kHz

Power 29.42 dBm

Adjacent Channel
Bandwidth 10 kHz
Spacing 20 kHz

Lower -30.68 dBm
Upper -28.45 dBm

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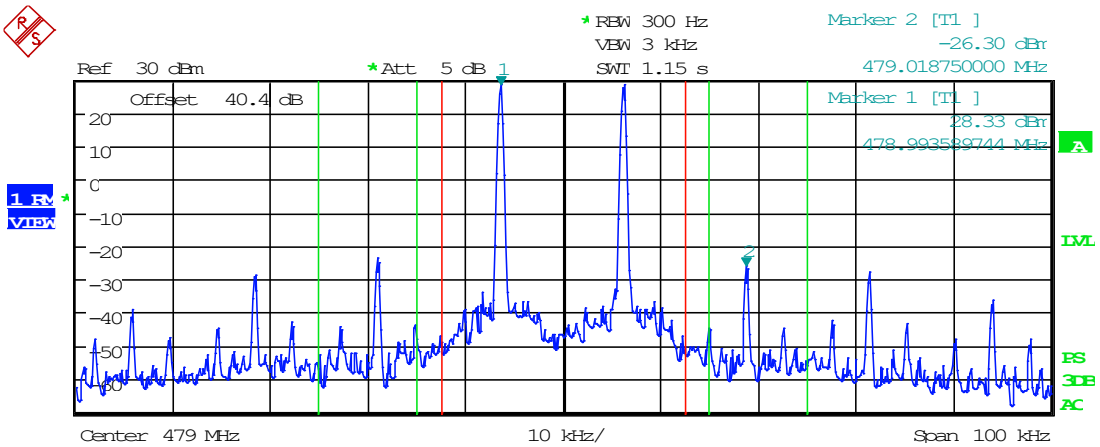
8.7.16 12.5 kHz Signal, Downlink, AGC+3dB, 479 MHz



Tx Channel
Bandwidth 25 kHz

Power 31.79 dBm

Adjacent Channel
Bandwidth 10 kHz
Spacing 20 kHz

Lower -23.02 dBm
Upper -25.32 dBm

Date: 31.OCT.2024 07:19:09

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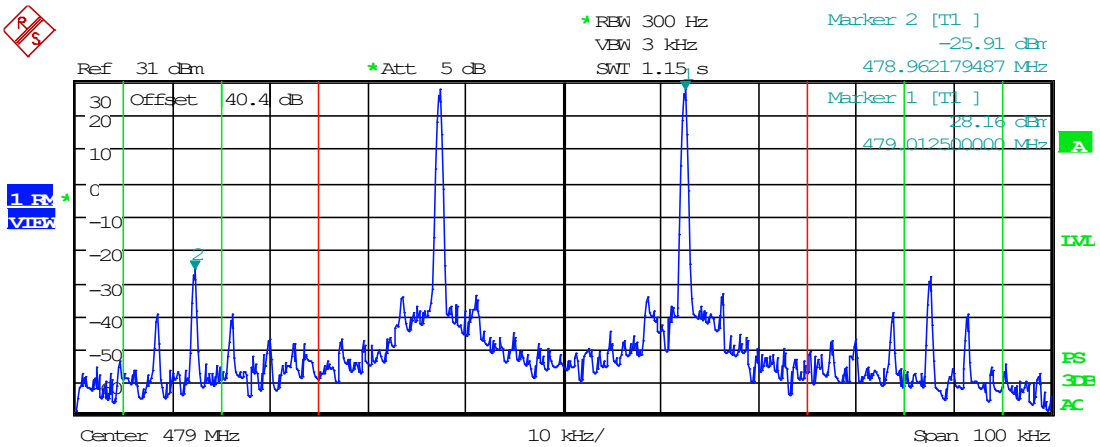
8.7.17 25 kHz Signal, Downlink, AGC, 479 MHz



Tx Channel
Bandwidth 50 kHz

Power 31.48 dBm

Adjacent Channel
Bandwidth 10 kHz
Spacing 40 kHz

Lower -25.31 dBm
Upper -27.55 dBm

Date: 31.OCT.2024 07:22:42

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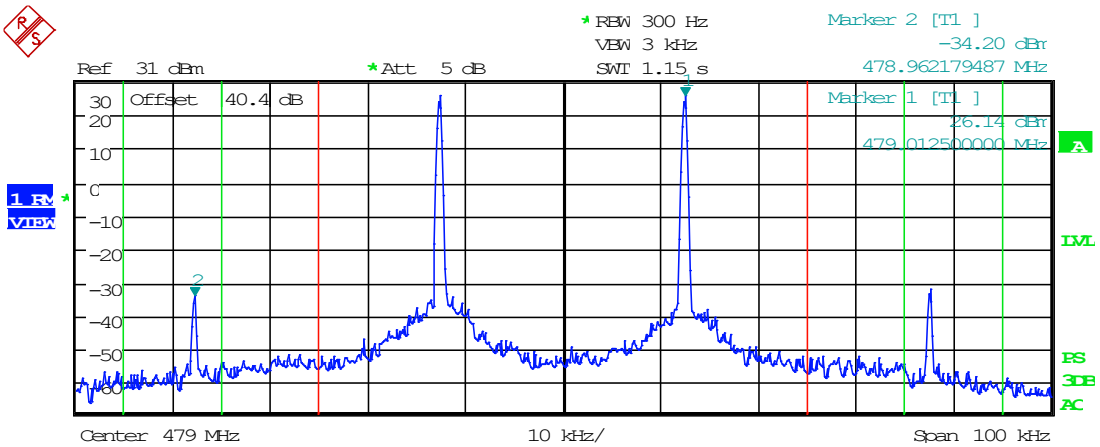
8.7.18 25 kHz Signal, Downlink, AGC+3dB, 479 MHz



Tx Channel

Bandwidth	50 kHz	Power	29.46 dBm

Adjacent Channel

Bandwidth	10 kHz	Lower	-33.35 dBm
Spacing	40 kHz	Upper	-31.36 dBm

Date: 31.OCT.2024 07:23:25

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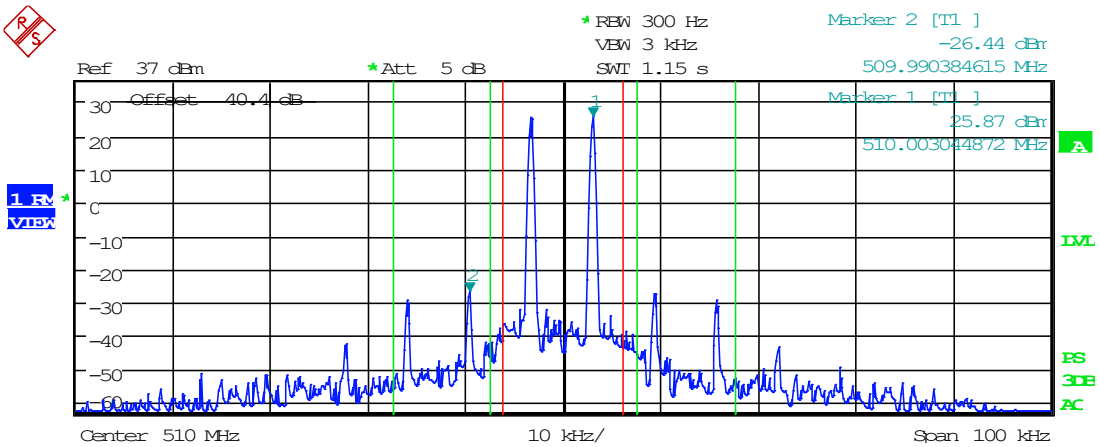
8.7.19 6.25 kHz Signal, Downlink, AGC, 510 MHz



Tx Channel
Bandwidth 12.5 kHz

Power 29.33 dBm

Adjacent Channel
Bandwidth 10 kHz
Spacing 12.5 kHz

Lower -23.81 dBm
Upper -24.08 dBm

Date: 31.OCT.2024 07:14:55

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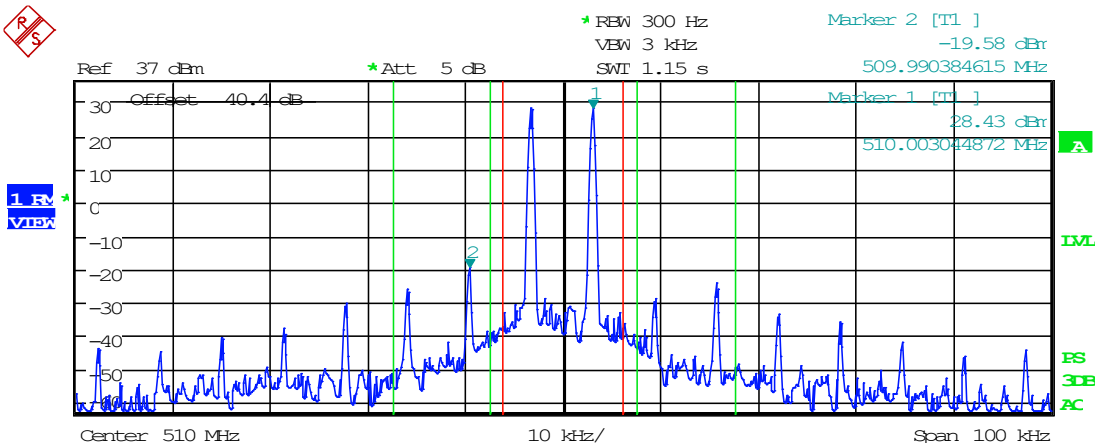
8.7.20 6.25 kHz Signal, Downlink, AGC+3dB, 510 MHz



Tx Channel
Bandwidth 12.5 kHz

Power 31.89 dBm

Adjacent Channel
Bandwidth 10 kHz
Spacing 12.5 kHz

Lower -18.14 dBm
Upper -22.19 dBm

Date: 31.OCT.2024 07:15:14

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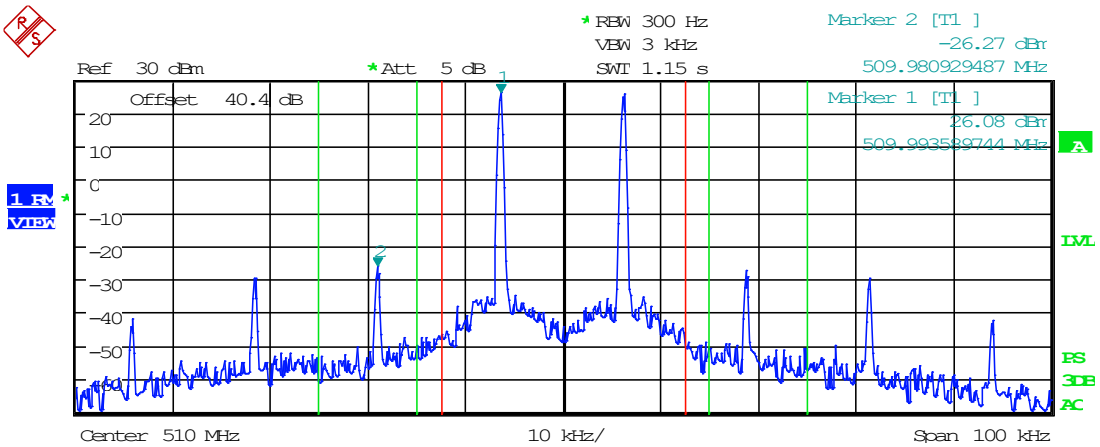
8.7.21 12.5 kHz Signal, Downlink, AGC, 510 MHz



Tx Channel
Bandwidth 25 kHz

Power 29.31 dBm

Adjacent Channel
Bandwidth 10 kHz
Spacing 20 kHz

Lower -25.59 dBm
Upper -26.97 dBm

Date: 31.OCT.2024 07:17:53

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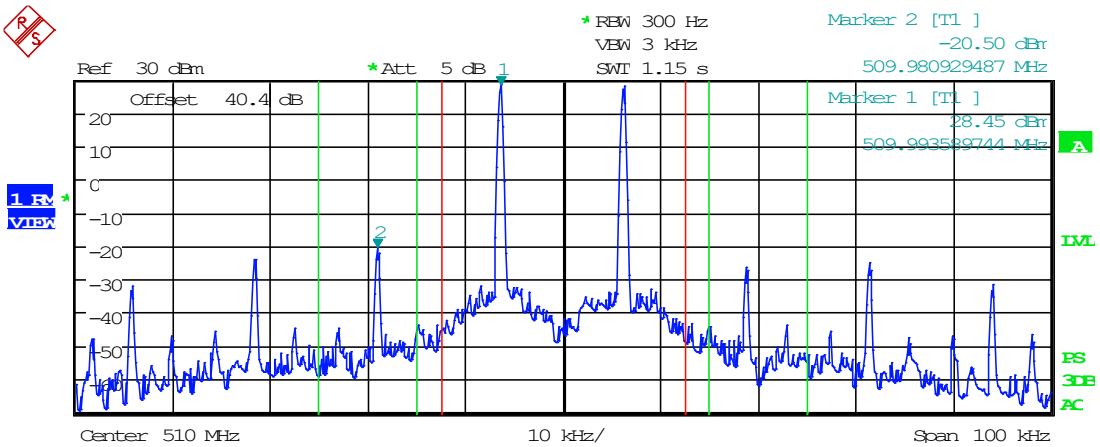
8.7.22 12.5 kHz Signal, Downlink, AGC+3dB, 510 MHz



Tx Channel
Bandwidth 25 kHz

Power 31.68 dBm

Adjacent Channel
Bandwidth 10 kHz
Spacing 20 kHz

Lower -19.94 dBm
Upper -25.57 dBm

Date: 31.OCT.2024 07:17:32

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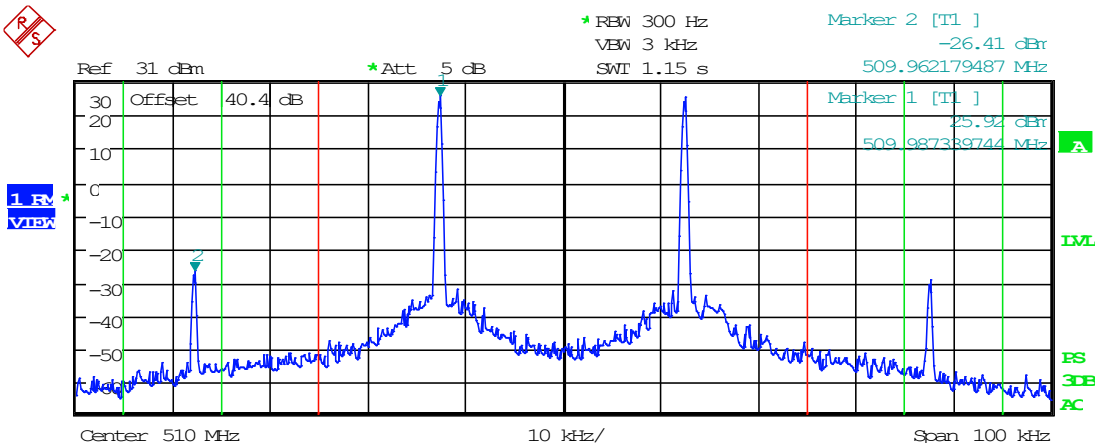
8.7.23 25 kHz Signal, Downlink, AGC, 510 MHz



Tx Channel
Bandwidth 50 kHz

Power 29.28 dBm

Adjacent Channel
Bandwidth 10 kHz
Spacing 40 kHz

Lower -25.85 dBm
Upper -28.54 dBm

Date: 31.OCT.2024 07:24:12

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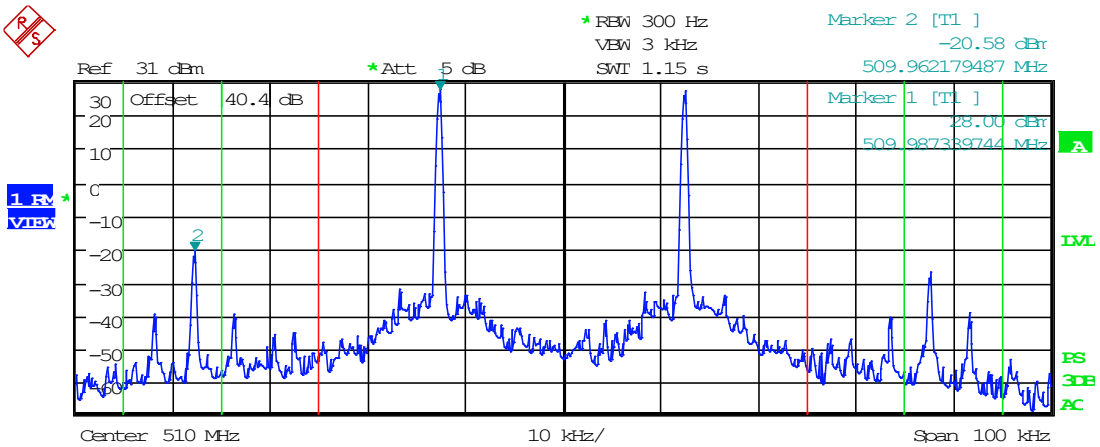
8.7.24 25 kHz Signal, Downlink, AGC+3dB, 510 MHz



Tx Channel
Bandwidth 50 kHz

Power 31.36 dBm

Adjacent Channel
Bandwidth 10 kHz
Spacing 40 kHz

Lower -20.06 dBm
Upper -26.17 dBm

Date: 31.OCT.2024 07:24:36

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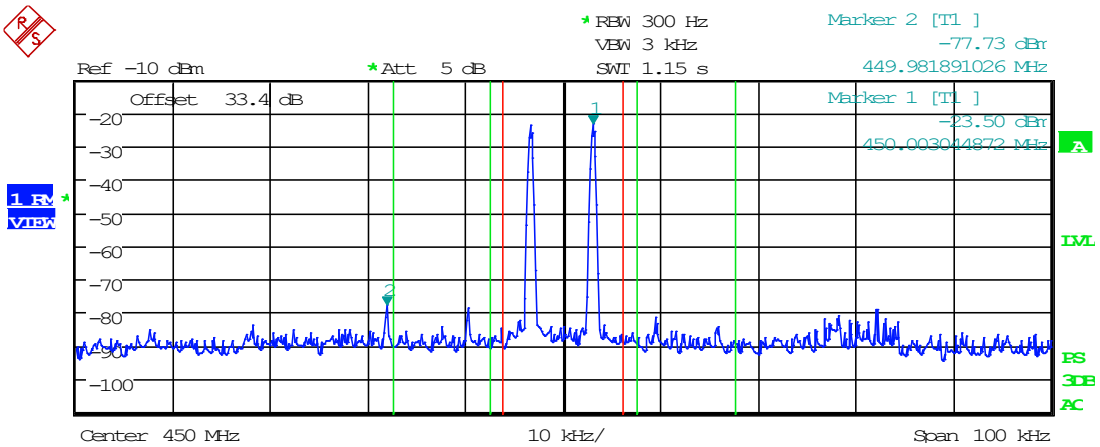
8.7.25 6.25 kHz Signal, Uplink, AGC, 450 MHz



Tx Channel
Bandwidth 12.5 kHz

Power -20.33 dBm

Adjacent Channel
Bandwidth 10 kHz
Spacing 12.5 kHz

Lower -72.67 dBm
Upper -73.16 dBm

Date: 4.NOV.2024 10:51:01

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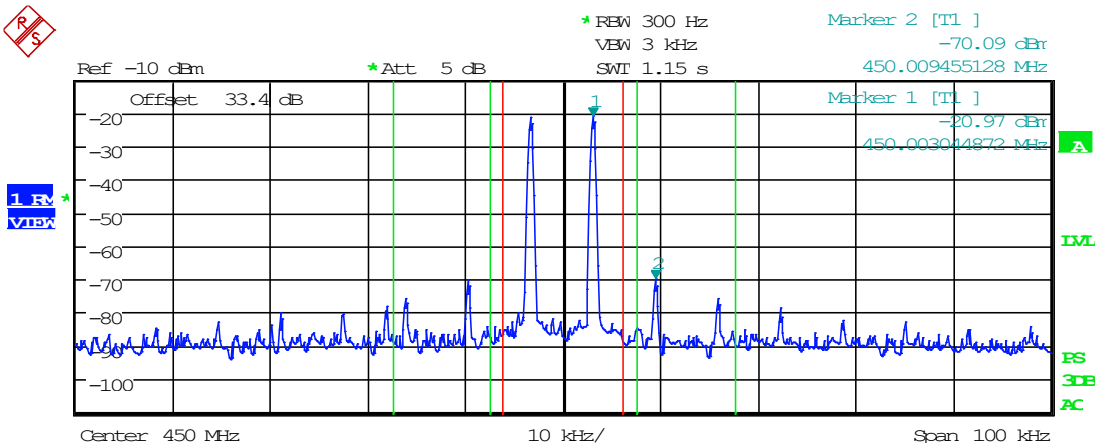
8.7.26 6.25 kHz Signal, Uplink, AGC+3dB, 450 MHz



Tx Channel
Bandwidth 12.5 kHz

Power -17.80 dBm

Adjacent Channel
Bandwidth 10 kHz
Spacing 12.5 kHz

Lower -67.52 dBm
Upper -67.49 dBm

Date: 4.NOV.2024 10:51:30

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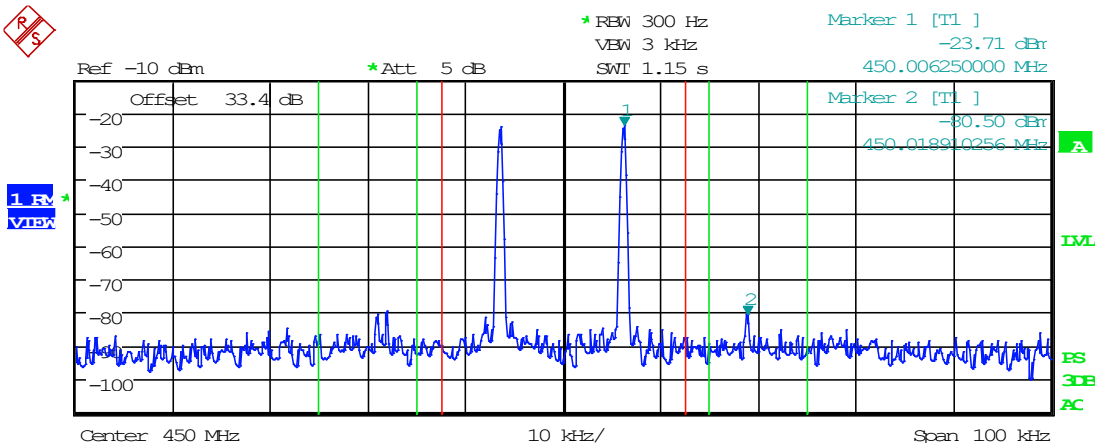
8.7.27 12.5 kHz Signal, Uplink, AGC, 450 MHz



Tx Channel
Bandwidth 25 kHz

Power -20.39 dBm

Adjacent Channel
Bandwidth 10 kHz
Spacing 20 kHz

Lower -72.92 dBm
Upper -73.90 dBm

Date: 4.NOV.2024 10:58:02

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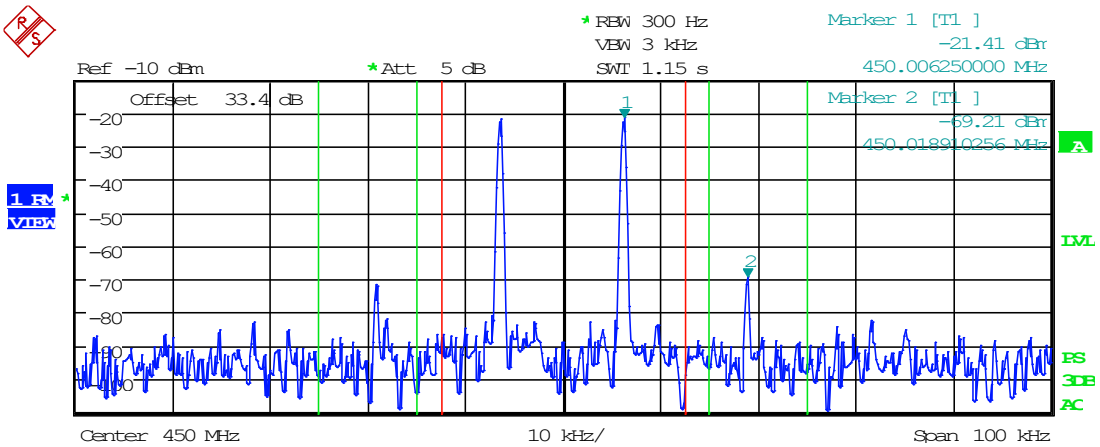
8.7.28 12.5 kHz Signal, Uplink, AGC+3dB, 450 MHz



Tx Channel
Bandwidth 25 kHz

Power -18.10 dBm

Adjacent Channel
Bandwidth 10 kHz
Spacing 20 kHz

Lower -69.72 dBm
Upper -68.51 dBm

Date: 4.NOV.2024 10:57:42

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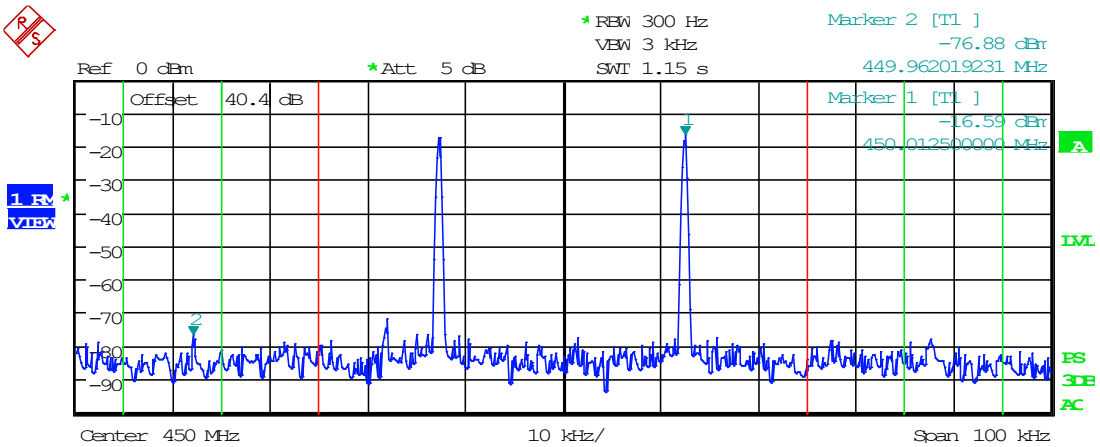
8.7.29 25 kHz Signal, Uplink, AGC, 450 MHz



Tx Channel
Bandwidth 50 kHz

Power -13.39 dBm

Adjacent Channel
Bandwidth 10 kHz
Spacing 40 kHz

Lower -69.48 dBm
Upper -68.89 dBm

Date: 4.NOV.2024 10:59:18

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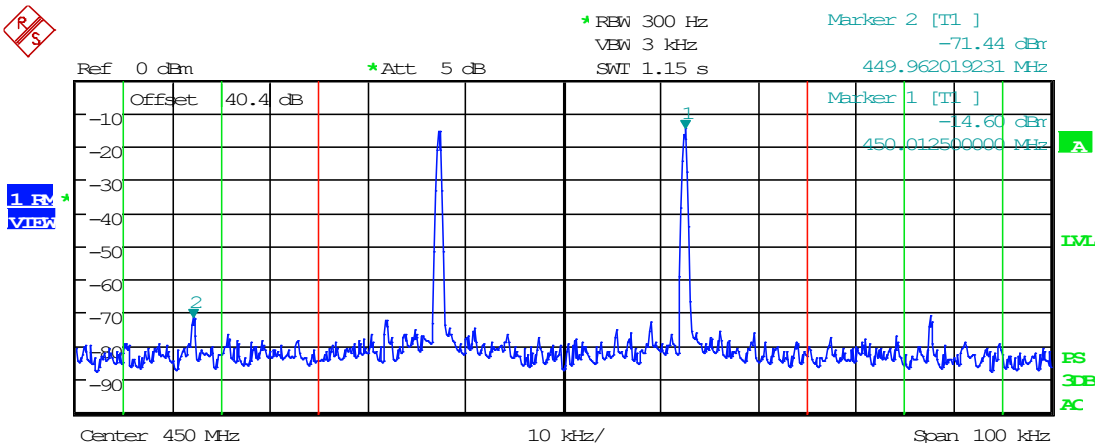
8.7.30 25 kHz Signal, Uplink, AGC+3dB, 450 MHz



Tx Channel
Bandwidth 50 kHz

Power -11.39 dBm

Adjacent Channel
Bandwidth 10 kHz
Spacing 40 kHz

Lower -65.78 dBm
Upper -66.16 dBm

Date: 4.NOV.2024 11:00:05

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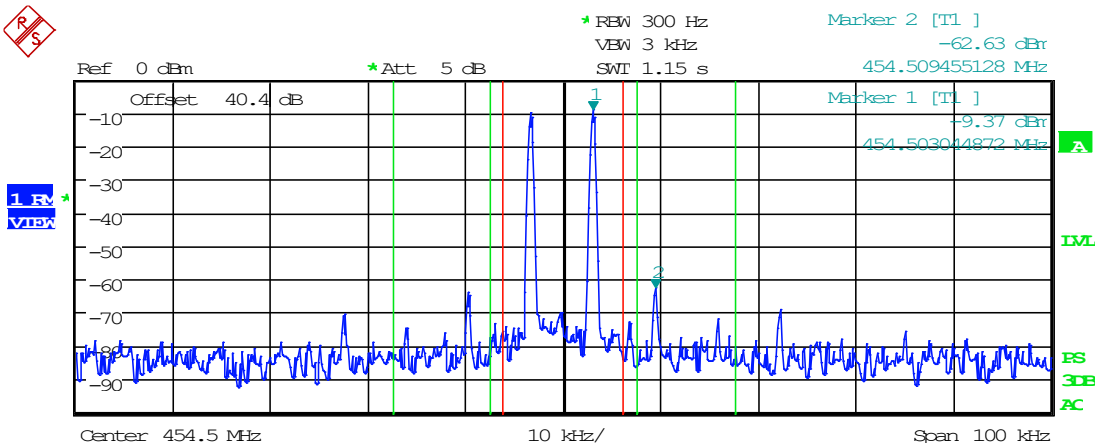
8.7.31 6.25 kHz Signal, Uplink, AGC, 454.5 MHz



Tx Channel
Bandwidth 12.5 kHz

Power -6.26 dBm

Adjacent Channel
Bandwidth 10 kHz
Spacing 12.5 kHz

Lower -61.81 dBm
Upper -60.53 dBm

Date: 8.NOV.2024 14:16:23

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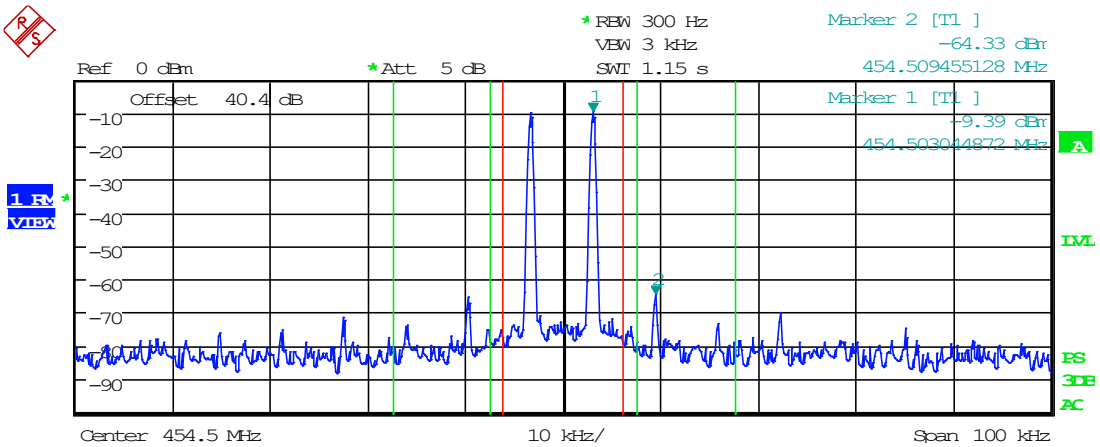
8.7.32 6.25 kHz Signal, Uplink, AGC+3dB, 454.5 MHz



Tx Channel
Bandwidth 12.5 kHz

Power -6.26 dBm

Adjacent Channel
Bandwidth 10 kHz
Spacing 12.5 kHz

Lower -62.23 dBm
Upper -61.78 dBm

Date: 8.NOV.2024 14:16:04

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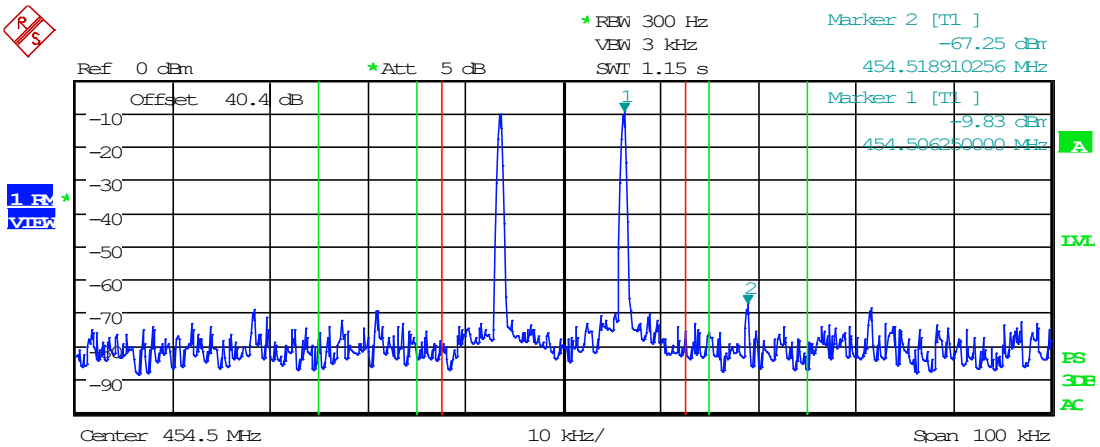
8.7.33 12.5 kHz Signal, Uplink, AGC, 454.5 MHz



Tx Channel
Bandwidth 25 kHz

Power -6.45 dBm

Adjacent Channel
Bandwidth 10 kHz
Spacing 20 kHz

Lower -62.88 dBm
Upper -63.13 dBm

Date: 8.NOV.2024 14:17:39

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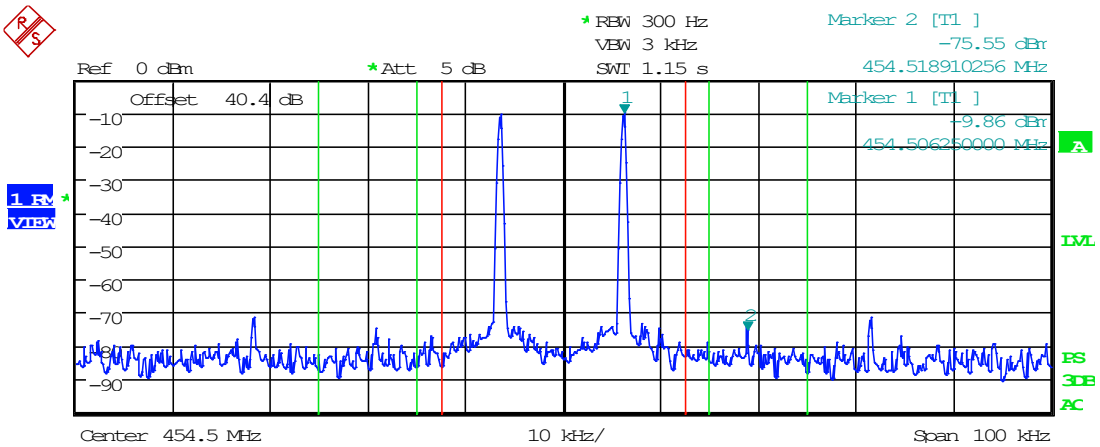
8.7.34 12.5 kHz Signal, Uplink, AGC+3dB, 454.5 MHz



Tx Channel
Bandwidth 25 kHz

Power -6.47 dBm

Adjacent Channel
Bandwidth 10 kHz
Spacing 20 kHz

Lower -67.87 dBm
Upper -67.42 dBm

Date: 8.NOV.2024 14:18:02

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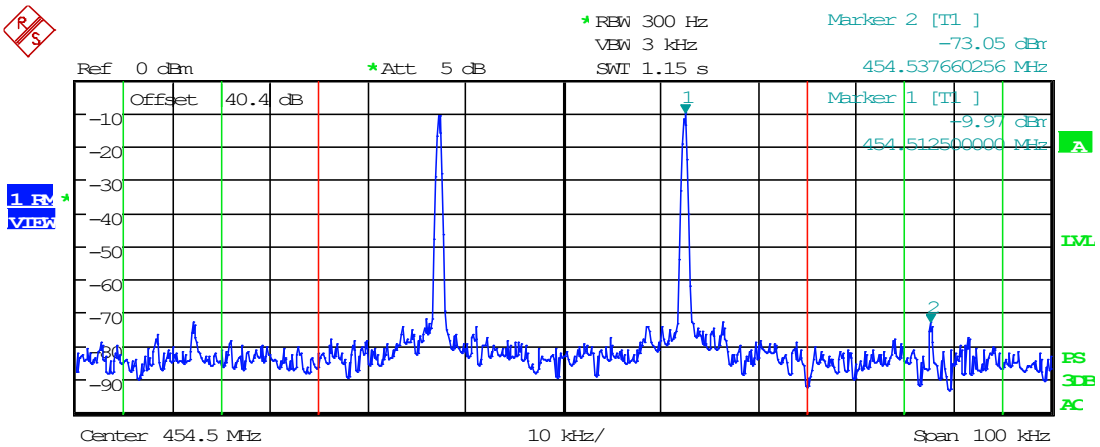
8.7.35 25 kHz Signal, Uplink, AGC, 454.5 MHz



Tx Channel
Bandwidth 50 kHz

Power -6.79 dBm

Adjacent Channel
Bandwidth 10 kHz
Spacing 40 kHz

Lower -66.92 dBm
Upper -67.15 dBm

Date: 8.NOV.2024 14:15:05

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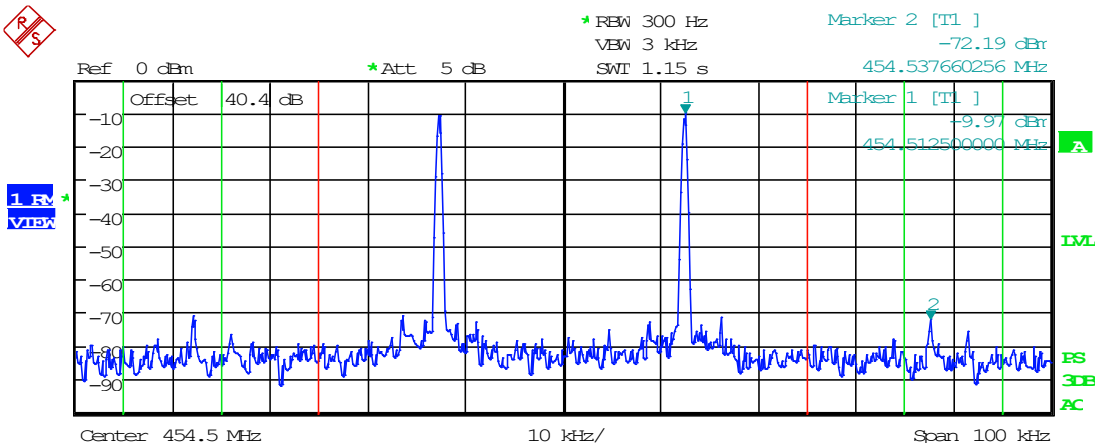
8.7.36 25 kHz Signal, Uplink, AGC+3dB, 454.5 MHz



Tx Channel
Bandwidth 50 kHz

Power -6.78 dBm

Adjacent Channel
Bandwidth 10 kHz
Spacing 40 kHz

Lower -66.54 dBm
Upper -66.98 dBm

Date: 8.NOV.2024 14:14:45

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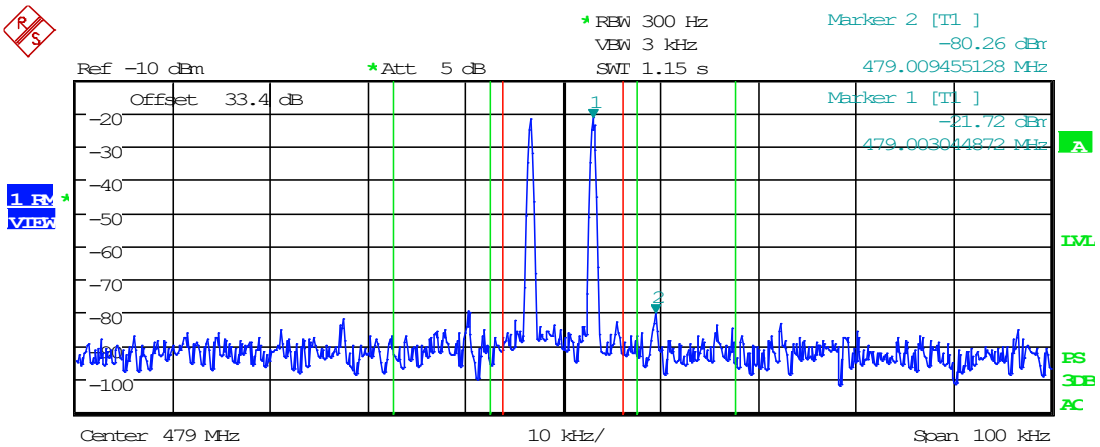
8.7.37 6.25 kHz Signal, Uplink, AGC, 479 MHz



Tx Channel
Bandwidth 12.5 kHz

Power -18.44 dBm

Adjacent Channel
Bandwidth 10 kHz
Spacing 12.5 kHz

Lower -73.62 dBm
Upper -74.19 dBm

Date: 4.NOV.2024 10:52:22

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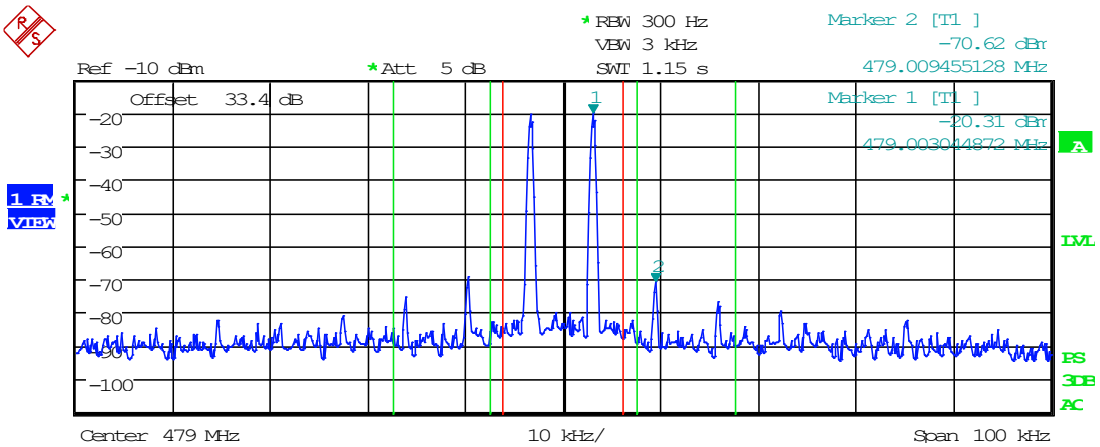
8.7.38 6.25 kHz Signal, Uplink, AGC+3dB, 479 MHz



Tx Channel
Bandwidth 12.5 kHz

Power -17.03 dBm

Adjacent Channel
Bandwidth 10 kHz
Spacing 12.5 kHz

Lower -67.07 dBm
Upper -68.09 dBm

Date: 4.NOV.2024 10:52:03

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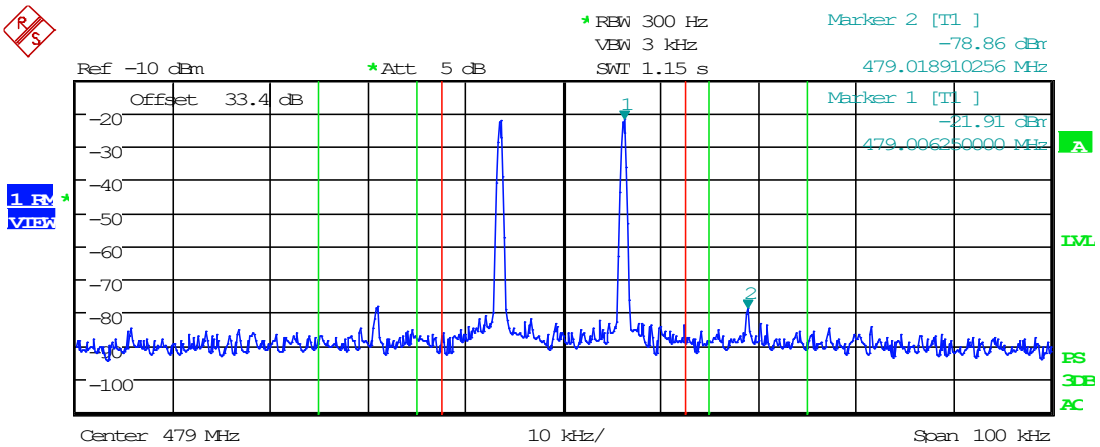
8.7.39 12.5 kHz Signal, Uplink, AGC, 479 MHz



Tx Channel
Bandwidth 25 kHz

Power -18.45 dBm

Adjacent Channel
Bandwidth 10 kHz
Spacing 20 kHz

Lower -71.90 dBm
Upper -72.25 dBm

Date: 4.NOV.2024 10:56:45

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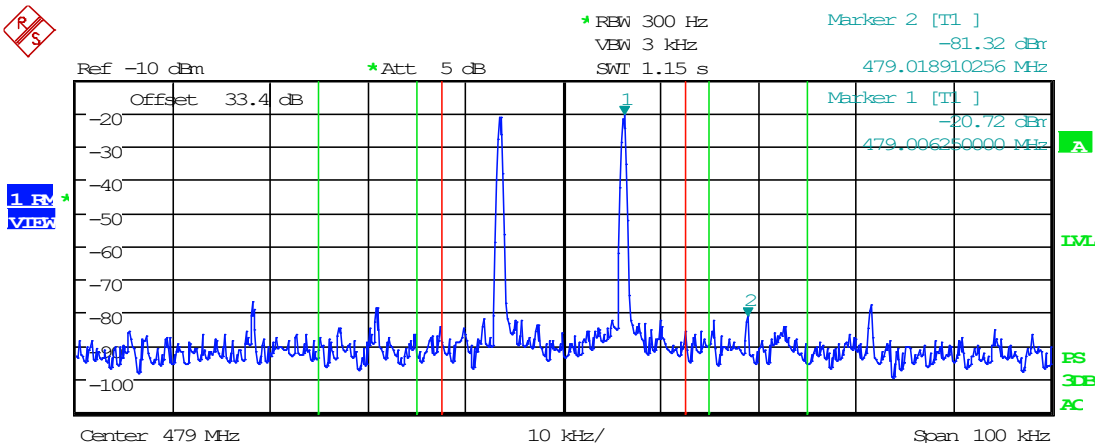
8.7.40 12.5 kHz Signal, Uplink, AGC+3dB, 479 MHz



Tx Channel
Bandwidth 25 kHz

Power -17.30 dBm

Adjacent Channel
Bandwidth 10 kHz
Spacing 20 kHz

Lower -73.33 dBm
Upper -73.59 dBm

Date: 4.NOV.2024 10:57:05

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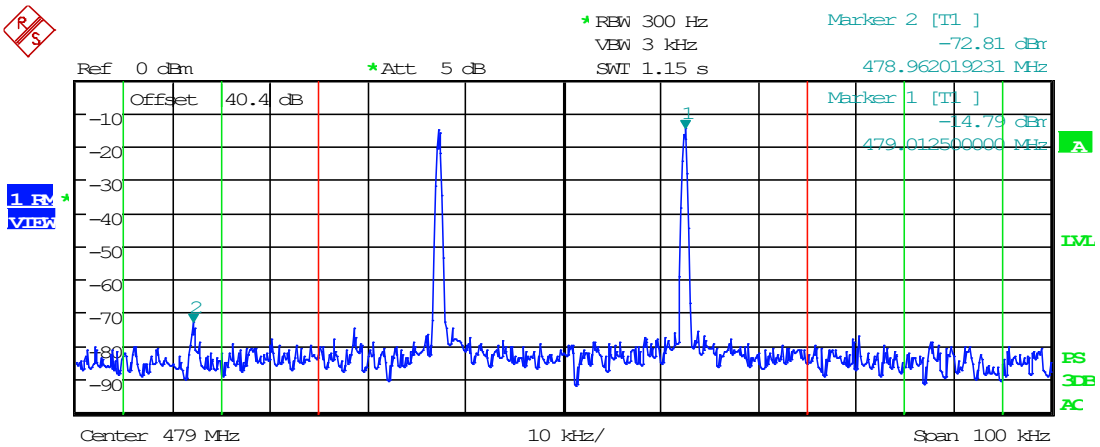
8.7.41 25 kHz Signal, Uplink, AGC, 479 MHz



Tx Channel

Bandwidth	50 kHz	Power	-11.50 dBm

Adjacent Channel

Bandwidth	10 kHz	Lower	-67.76 dBm
Spacing	40 kHz	Upper	-69.00 dBm

Date: 4.NOV.2024 11:01:10

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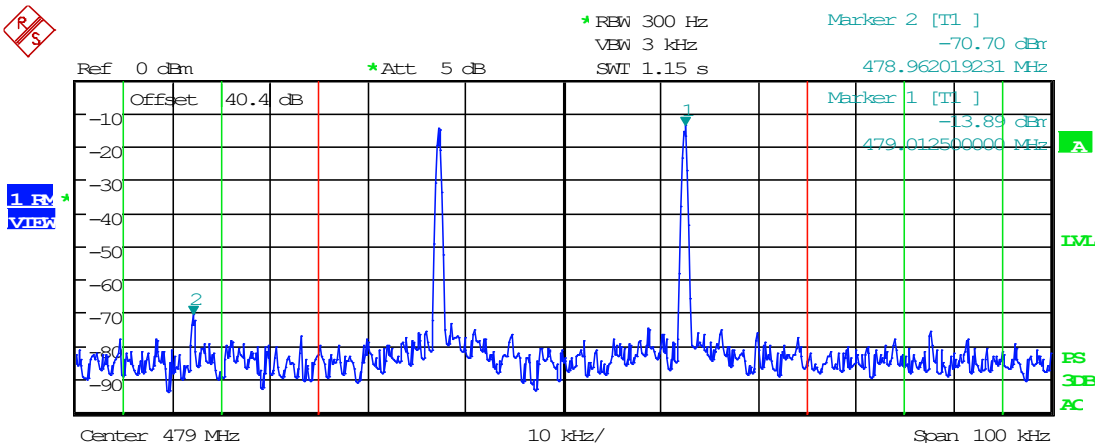
8.7.42 25 kHz Signal, Uplink, AGC+3dB, 479 MHz



Tx Channel
Bandwidth 50 kHz

Power -10.62 dBm

Adjacent Channel
Bandwidth 10 kHz
Spacing 40 kHz

Lower -66.59 dBm
Upper -68.13 dBm

Date: 4.NOV.2024 11:00:53

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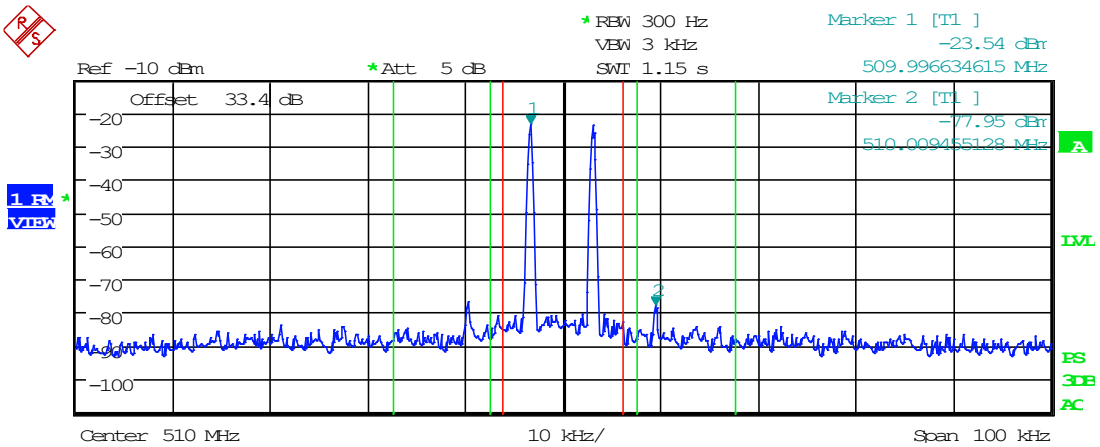
8.7.43 6.25 kHz Signal, Uplink, AGC, 510 MHz



Tx Channel
Bandwidth 12.5 kHz

Power -20.38 dBm

Adjacent Channel
Bandwidth 10 kHz
Spacing 12.5 kHz

Lower -71.01 dBm
Upper -71.29 dBm

Date: 4.NOV.2024 10:53:10

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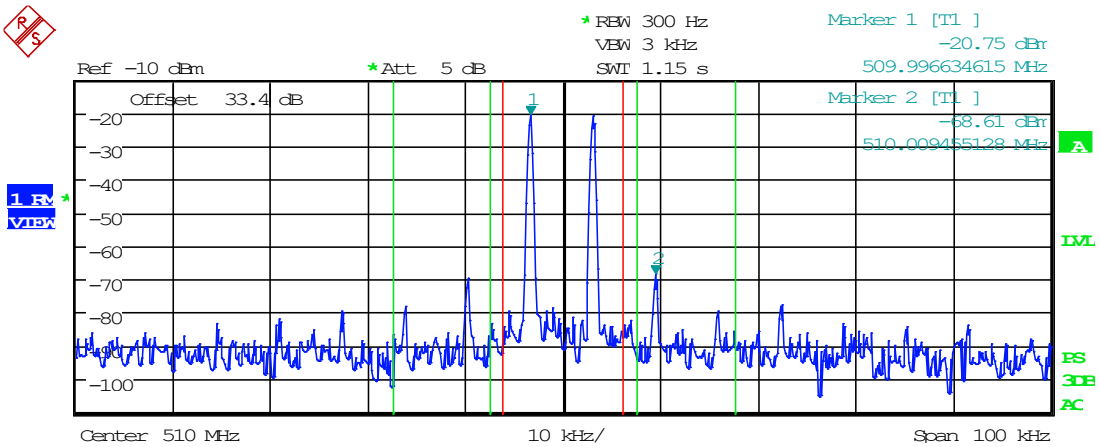
8.7.44 6.25 kHz Signal, Uplink, AGC+3dB, 510 MHz



Tx Channel
Bandwidth 12.5 kHz

Power -17.62 dBm

Adjacent Channel
Bandwidth 10 kHz
Spacing 12.5 kHz

Lower -68.19 dBm
Upper -67.17 dBm

Date: 4.NOV.2024 10:53:39

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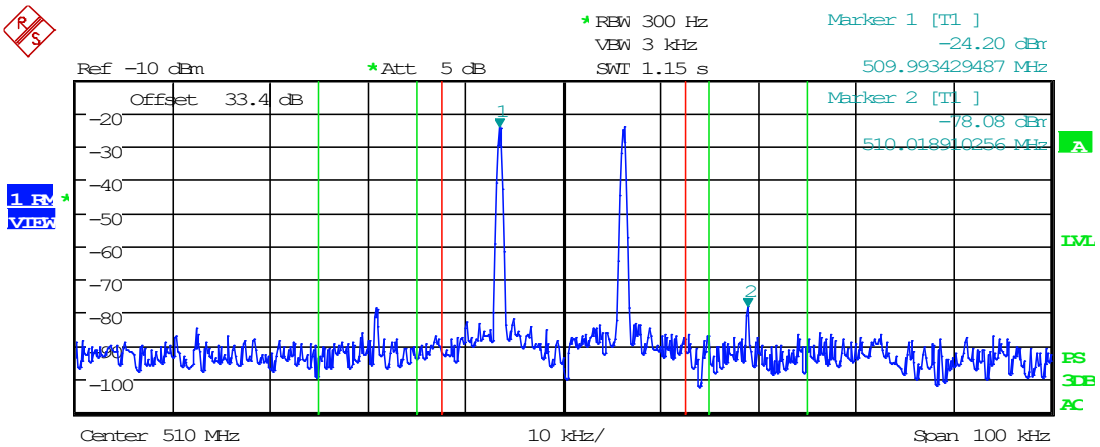
8.7.45 12.5 kHz Signal, Uplink, AGC, 510 MHz



Tx Channel
Bandwidth 25 kHz

Power -20.51 dBm

Adjacent Channel
Bandwidth 10 kHz
Spacing 20 kHz

Lower -74.04 dBm
Upper -74.54 dBm

Date: 4.NOV.2024 10:56:10

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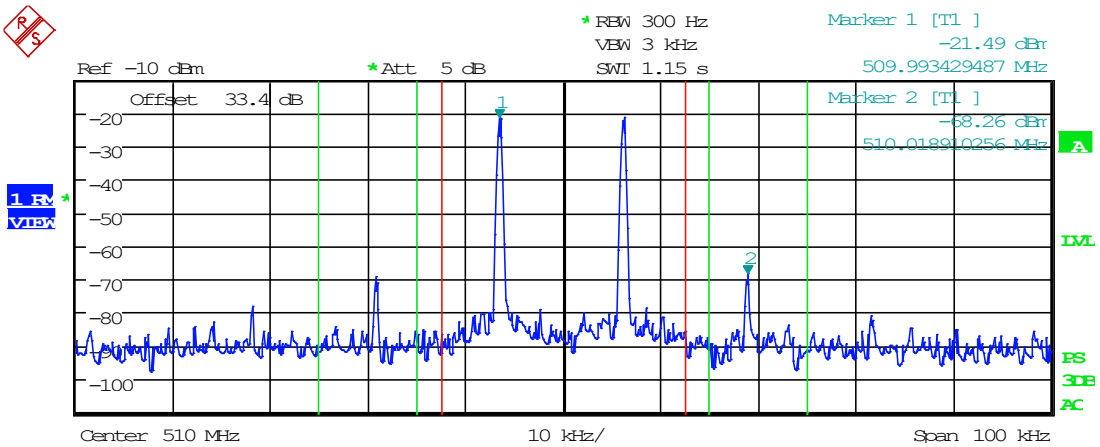
8.7.46 12.5 kHz Signal, Uplink, AGC+3dB, 510 MHz



Tx Channel
Bandwidth 25 kHz

Power -17.82 dBm

Adjacent Channel
Bandwidth 10 kHz
Spacing 20 kHz

Lower -68.07 dBm
Upper -66.91 dBm

Date: 4.NOV.2024 10:54:48

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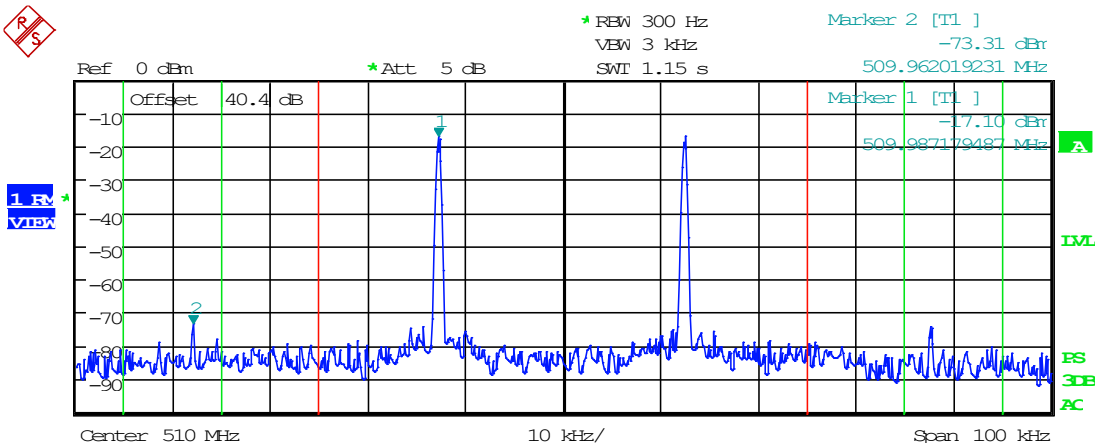
8.7.47 25 kHz Signal, Uplink, AGC, 510 MHz



Tx Channel
Bandwidth 50 kHz

Power -13.64 dBm

Adjacent Channel
Bandwidth 10 kHz
Spacing 40 kHz

Lower -67.74 dBm
Upper -68.50 dBm

Date: 4.NOV.2024 11:03:54

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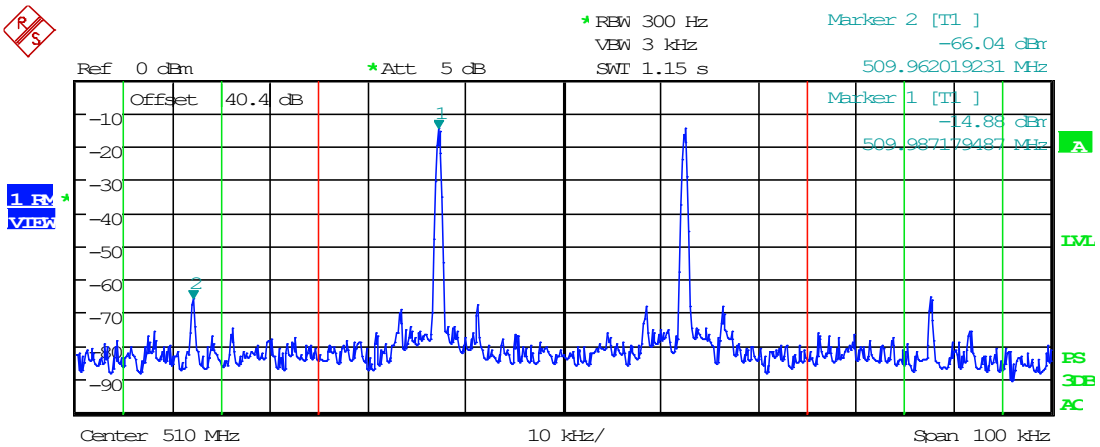
8.7.48 25 kHz Signal, Uplink, AGC+3dB, 510 MHz



Tx Channel
Bandwidth 50 kHz

Power -11.38 dBm

Adjacent Channel
Bandwidth 10 kHz
Spacing 40 kHz

Lower -63.16 dBm
Upper -63.00 dBm

Date: 4.NOV.2024 11:04:16

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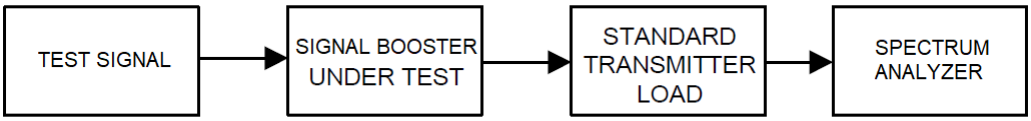
8.8 Emission Mask, Out-of-Band

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.

Test Setup


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

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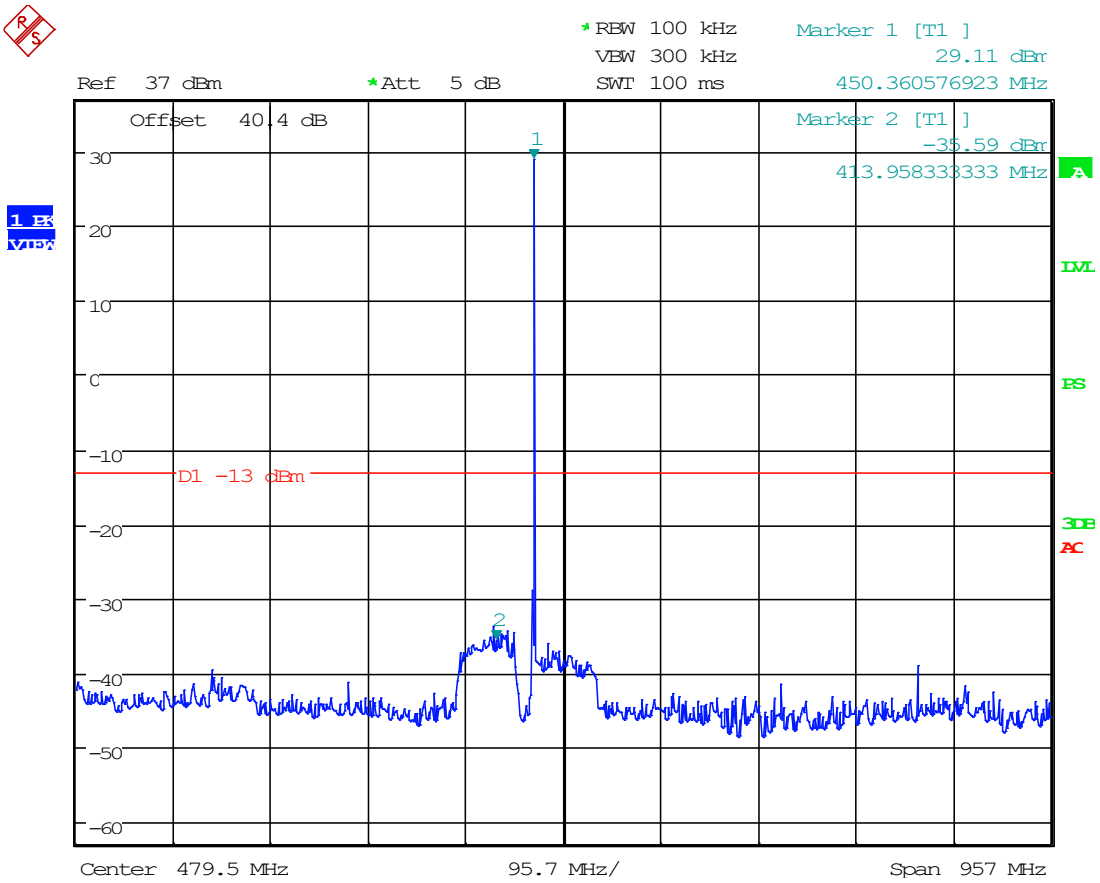
8.8.1 30 MHz to 1 GHz, Downlink, 450 MHz



Date: 31.OCT.2024 07:31:46

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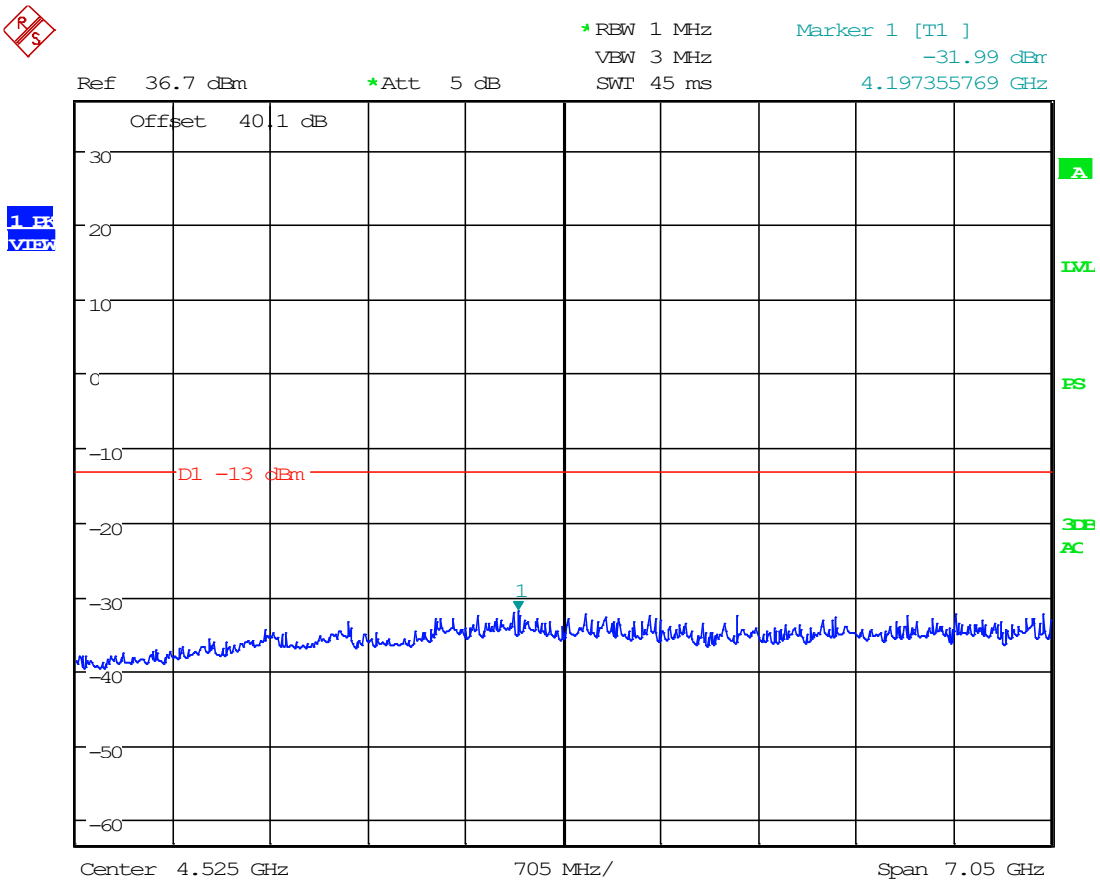
8.8.2 1 GHz to 10th Harmonic, Downlink, 450 MHz



Date: 31.OCT.2024 07:32:30

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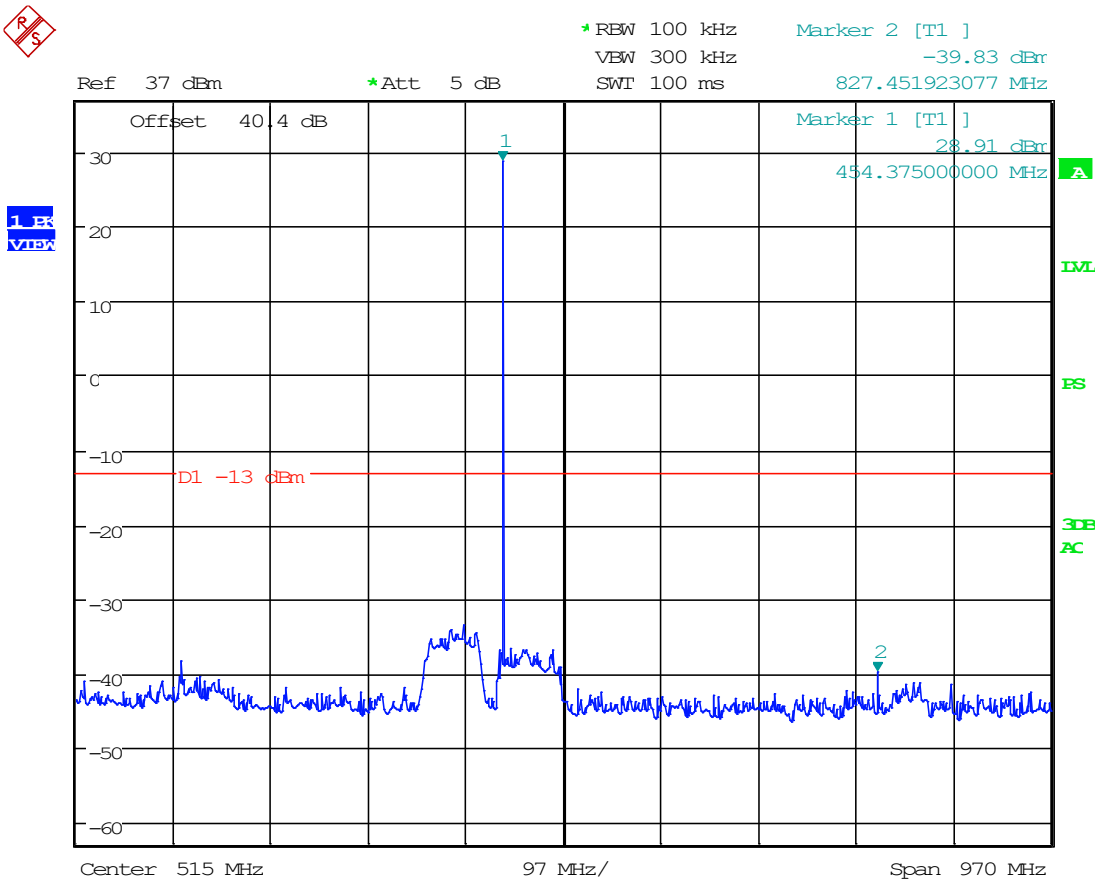
8.8.3 30 MHz to 1 GHz, Downlink, 454.5 MHz



Date: 8.NOV.2024 11:43:04

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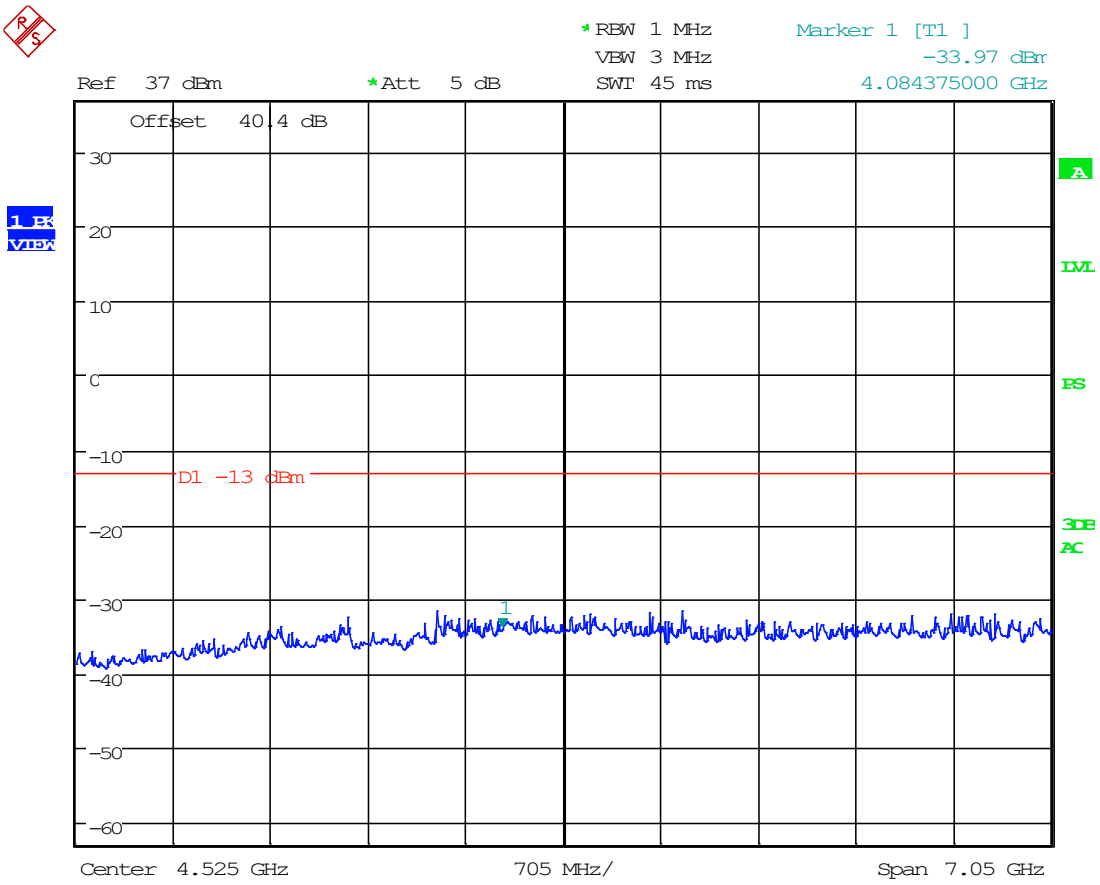
8.8.4 1 GHz to 10th Harmonic, Downlink, 454.5 MHz



Date: 8.NOV.2024 11:44:23

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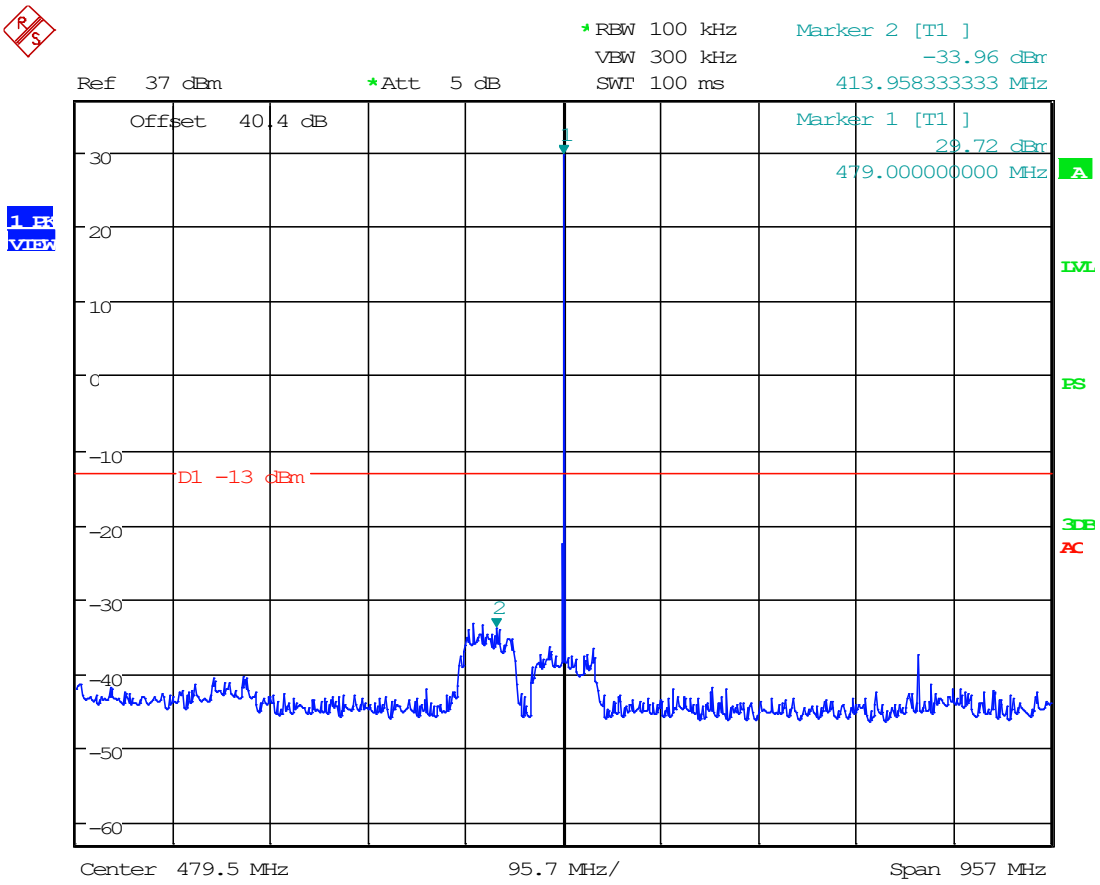
8.8.5 30 MHz to 1 GHz, Downlink, 479 MHz



Date: 31.OCT.2024 07:31:20

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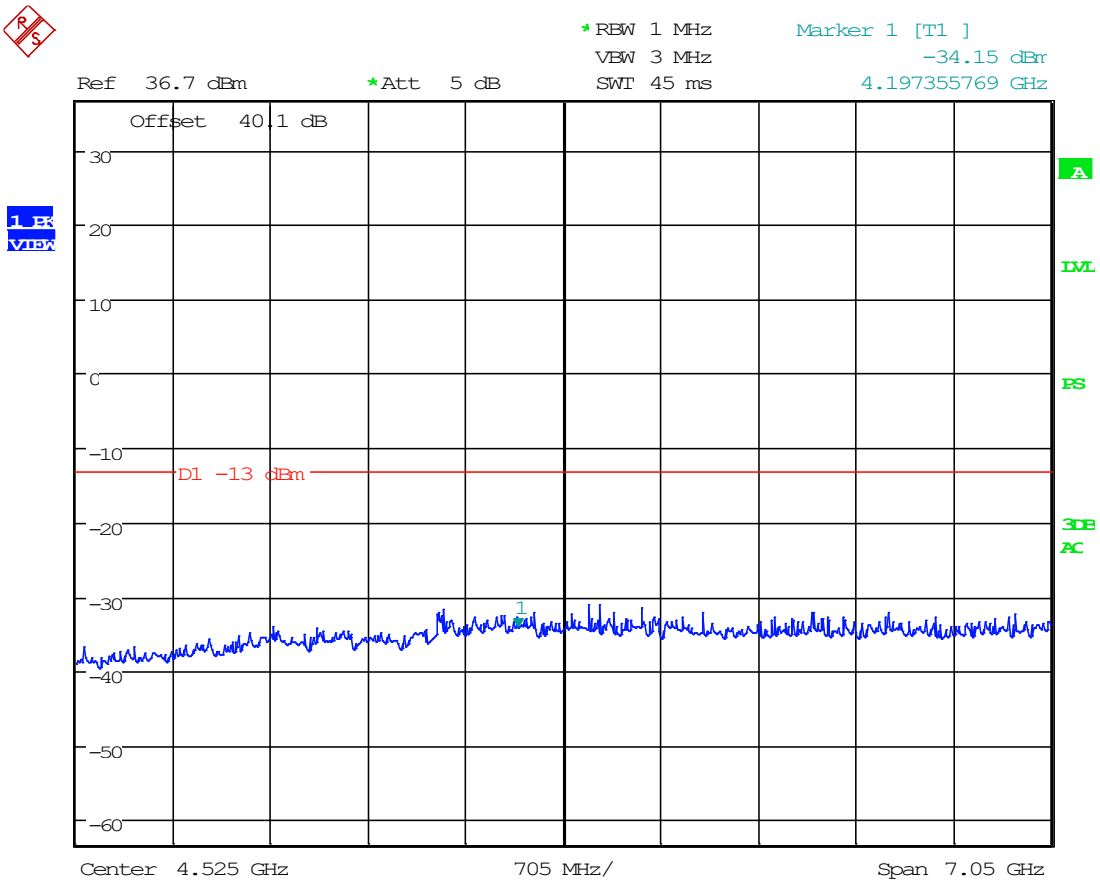
8.8.6 1 GHz to 10th Harmonic, Downlink, 479 MHz



Date: 31.OCT.2024 07:32:50

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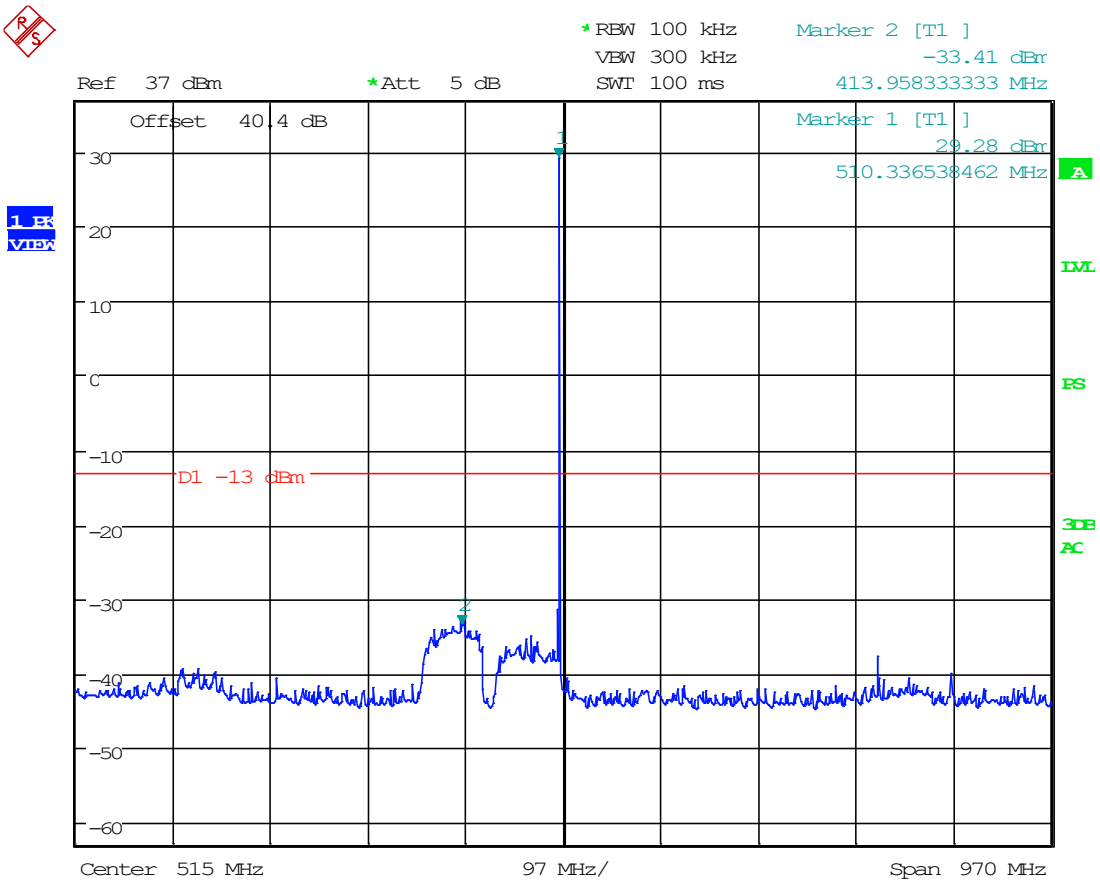
8.8.7 30 MHz to 1 GHz, Downlink, 510 MHz



Date: 31.OCT.2024 07:29:42

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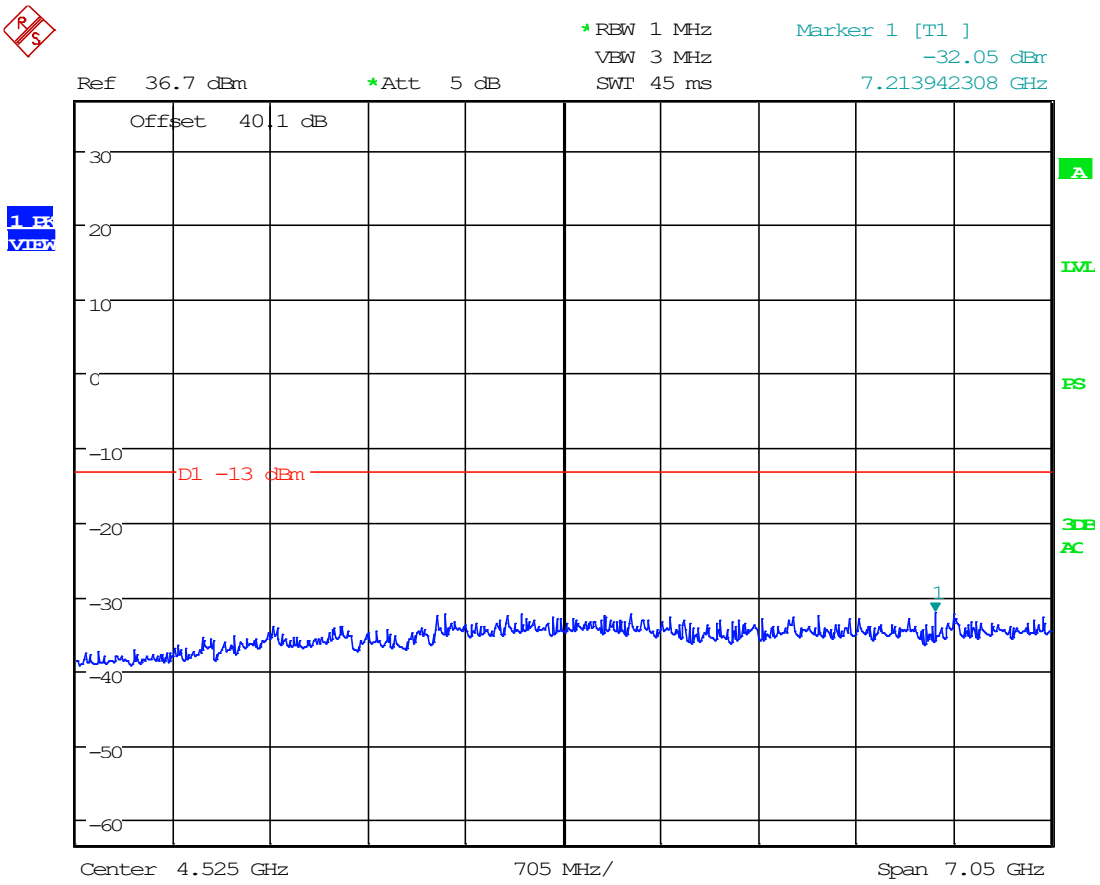
8.8.8 1 GHz to 10th Harmonic, Downlink, 510 MHz



Date: 31.OCT.2024 07:33:14

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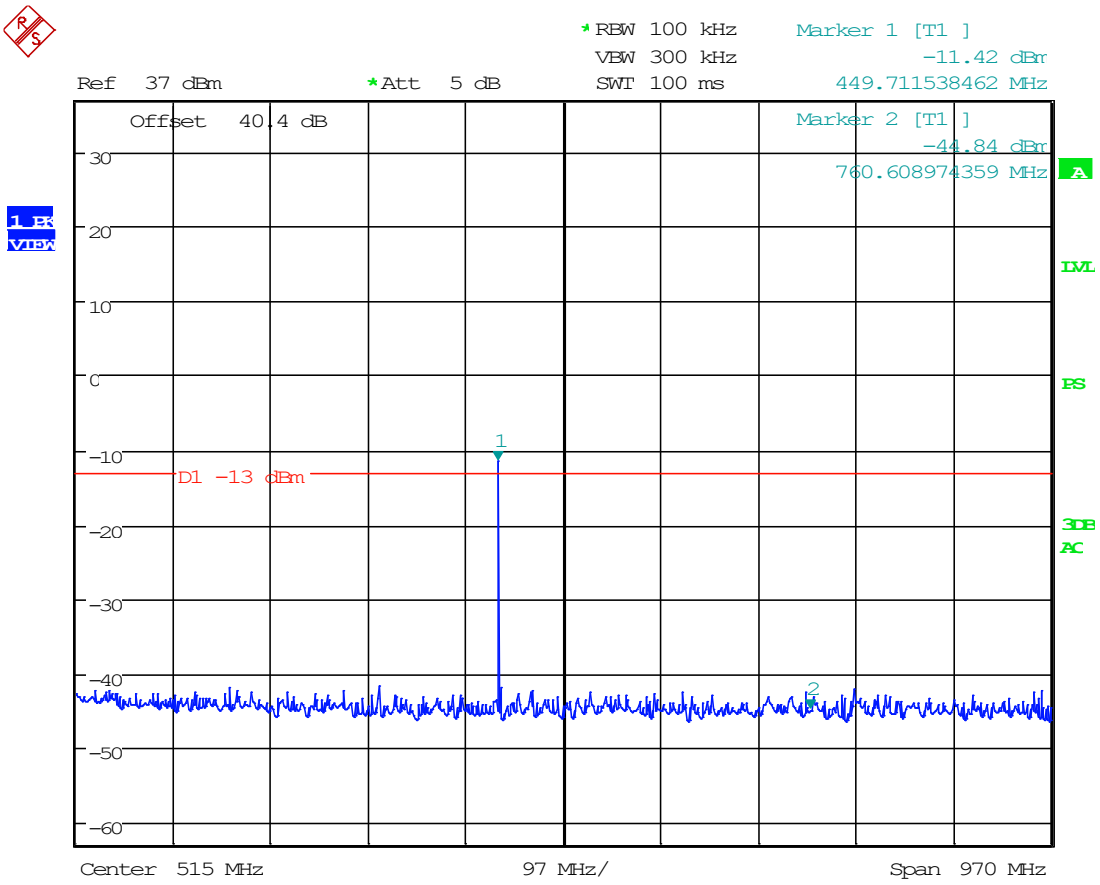
8.8.9 30 MHz to 1 GHz, Uplink, 450 MHz



Date: 1.NOV.2024 07:04:50

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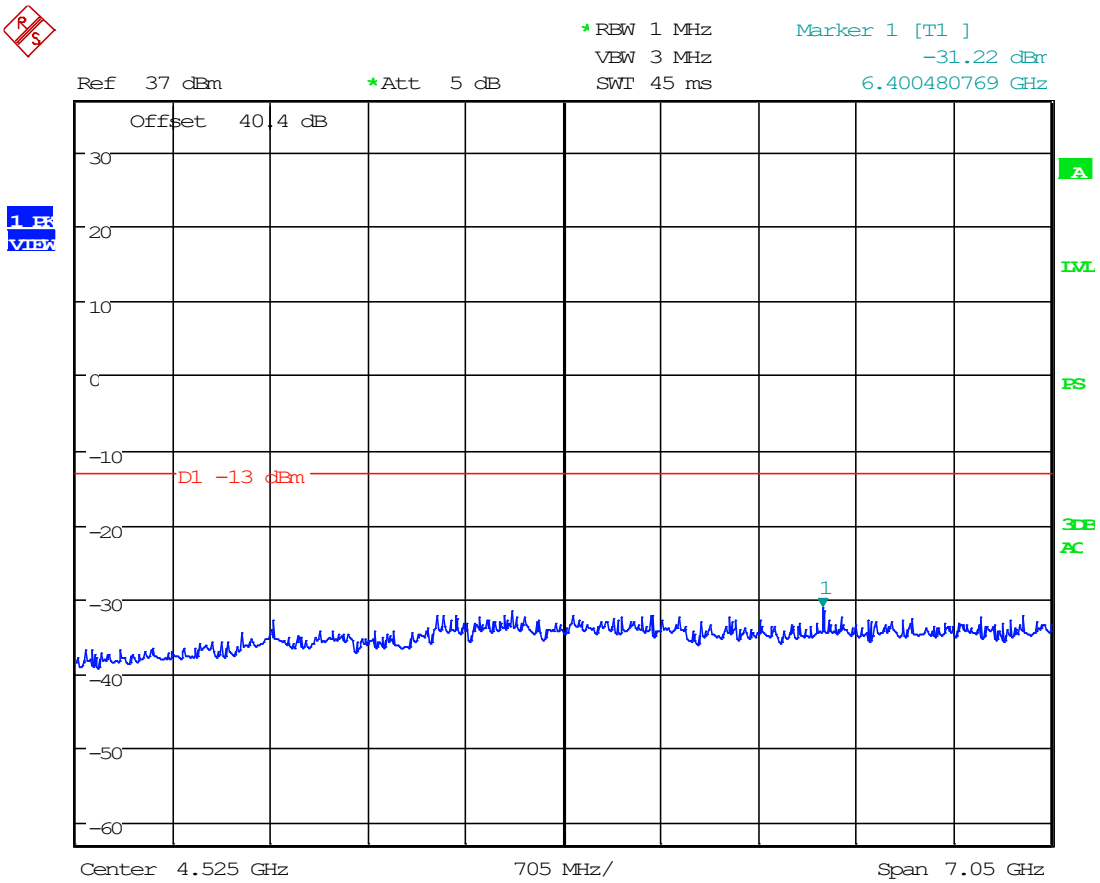
8.8.10 1 GHz to 10th Harmonic, Uplink, 450 MHz



Date: 1.NOV.2024 07:05:26

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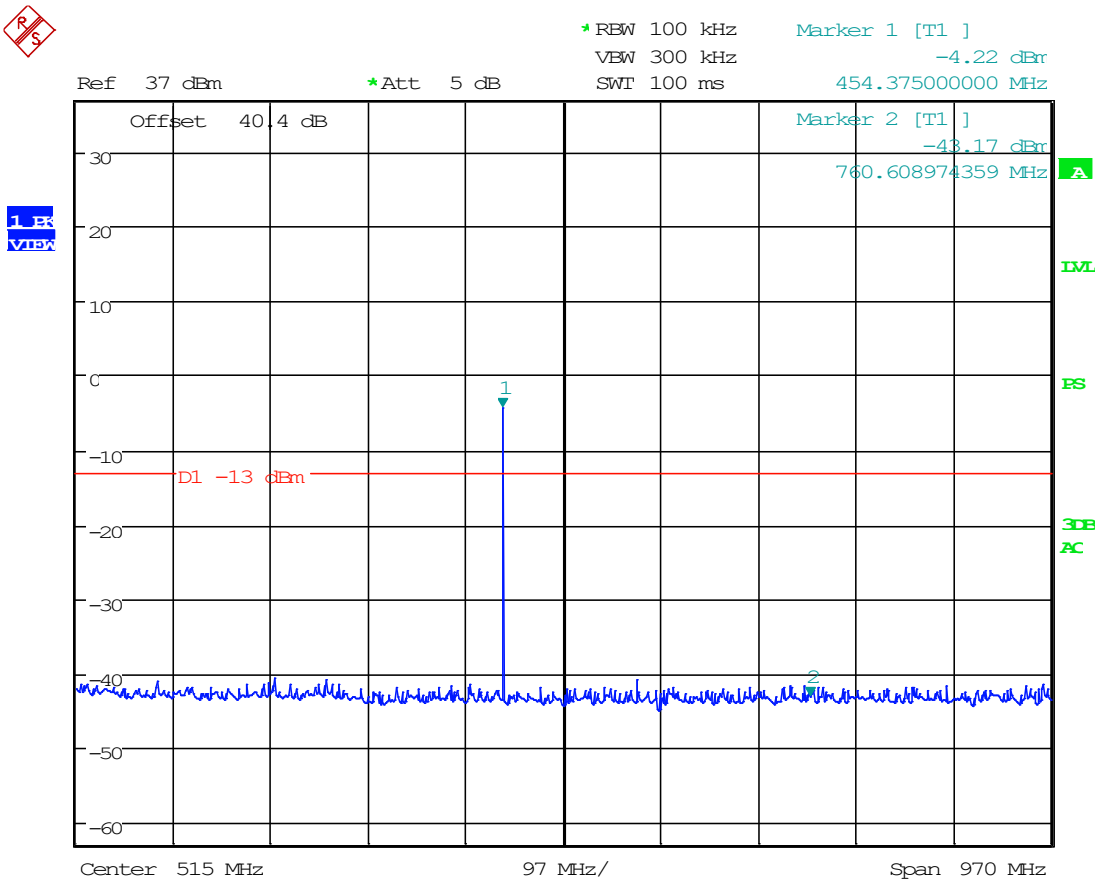
8.8.11 30 MHz to 1 GHz, Uplink, 454.5 MHz



Date: 8.NOV.2024 15:15:20

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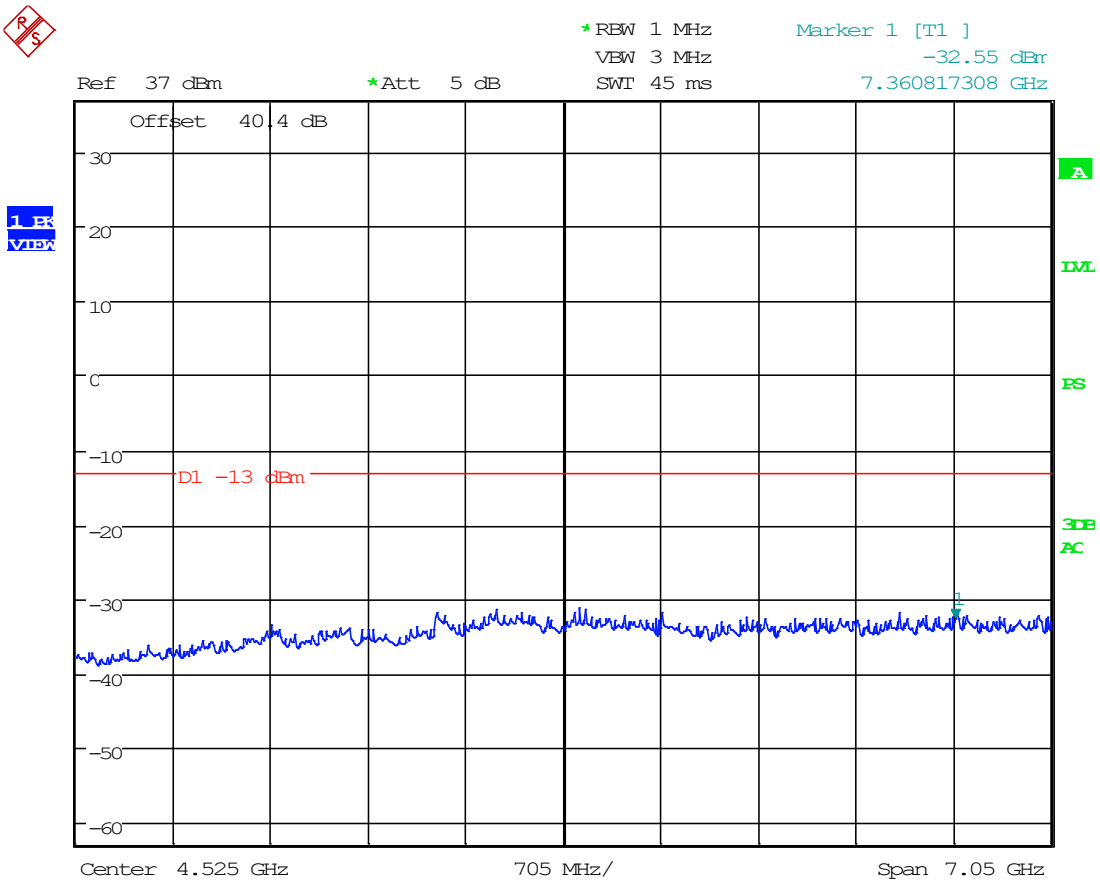
8.8.12 1 GHz to 10th Harmonic, Uplink, 454.5 MHz



Date: 8.NOV.2024 15:16:13

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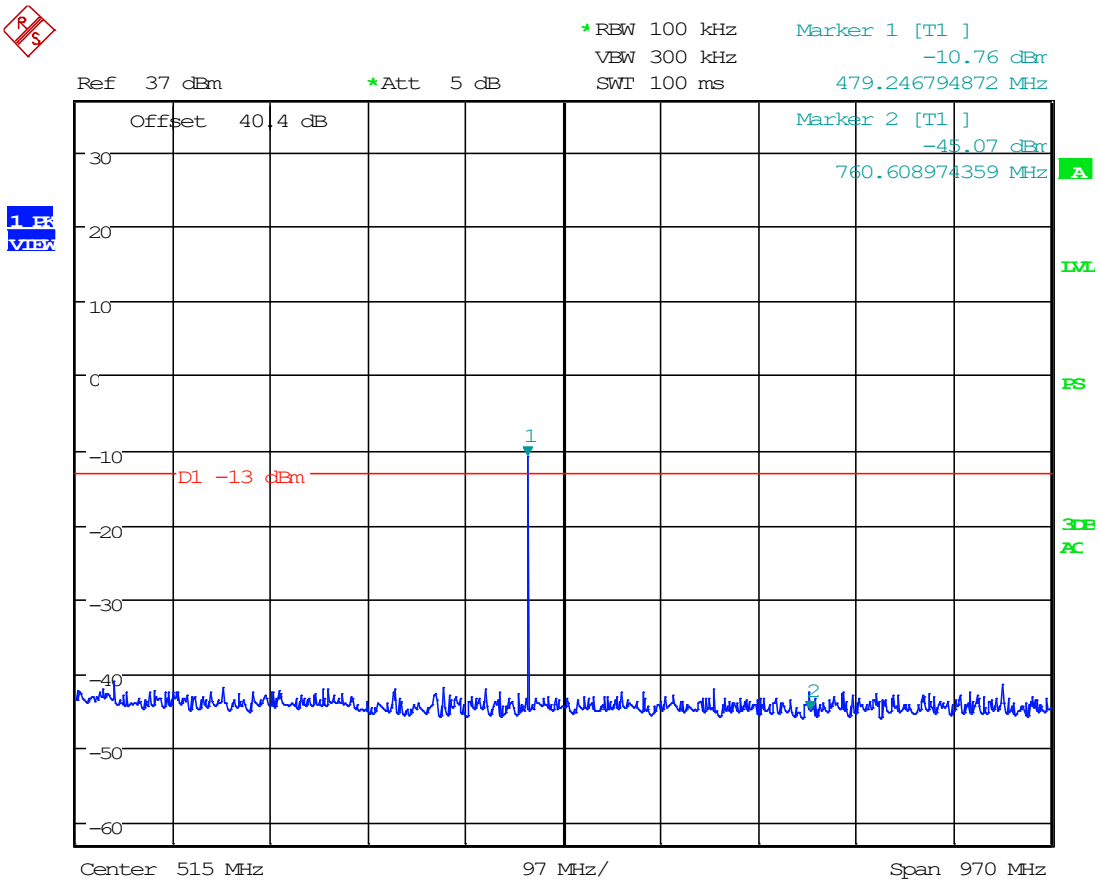
8.8.13 30 MHz to 1 GHz, Uplink, 479 MHz



Date: 1.NOV.2024 07:04:31

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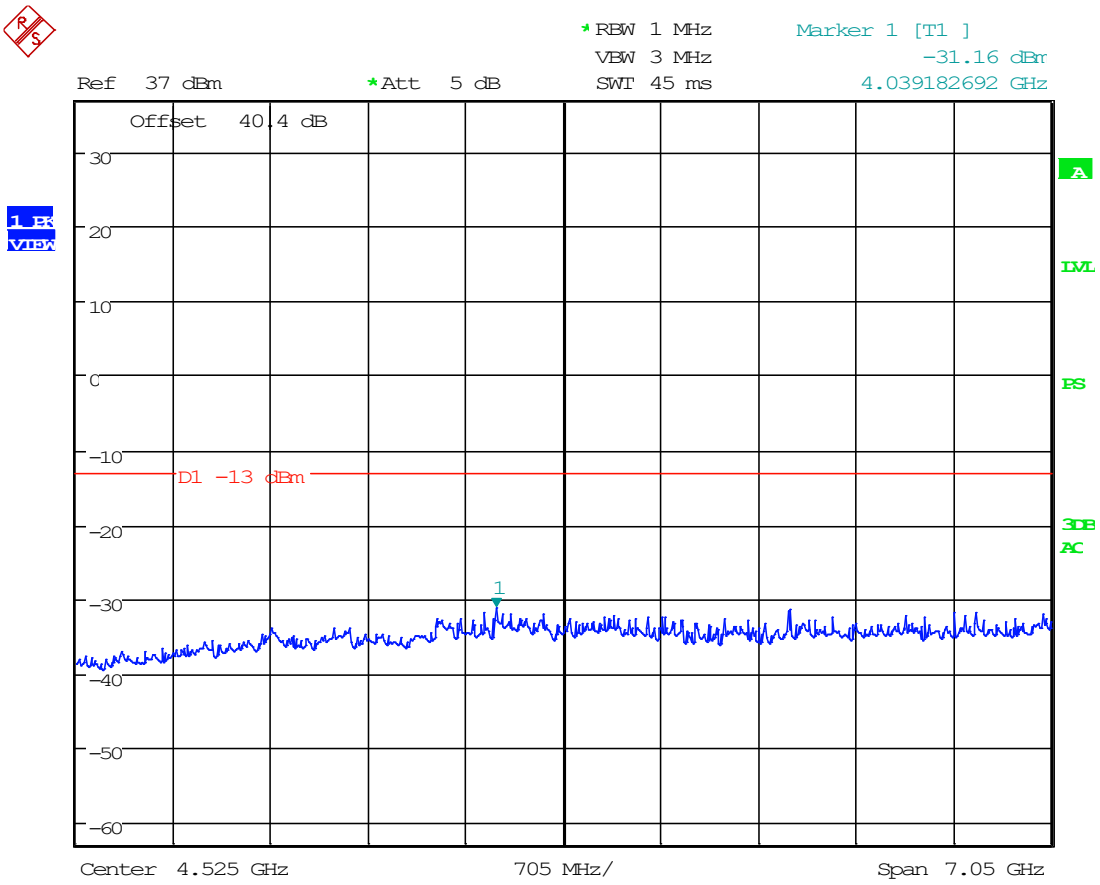
8.8.14 1 GHz to 10th Harmonic, Uplink, 479 MHz



Date: 1.NOV.2024 07:06:28

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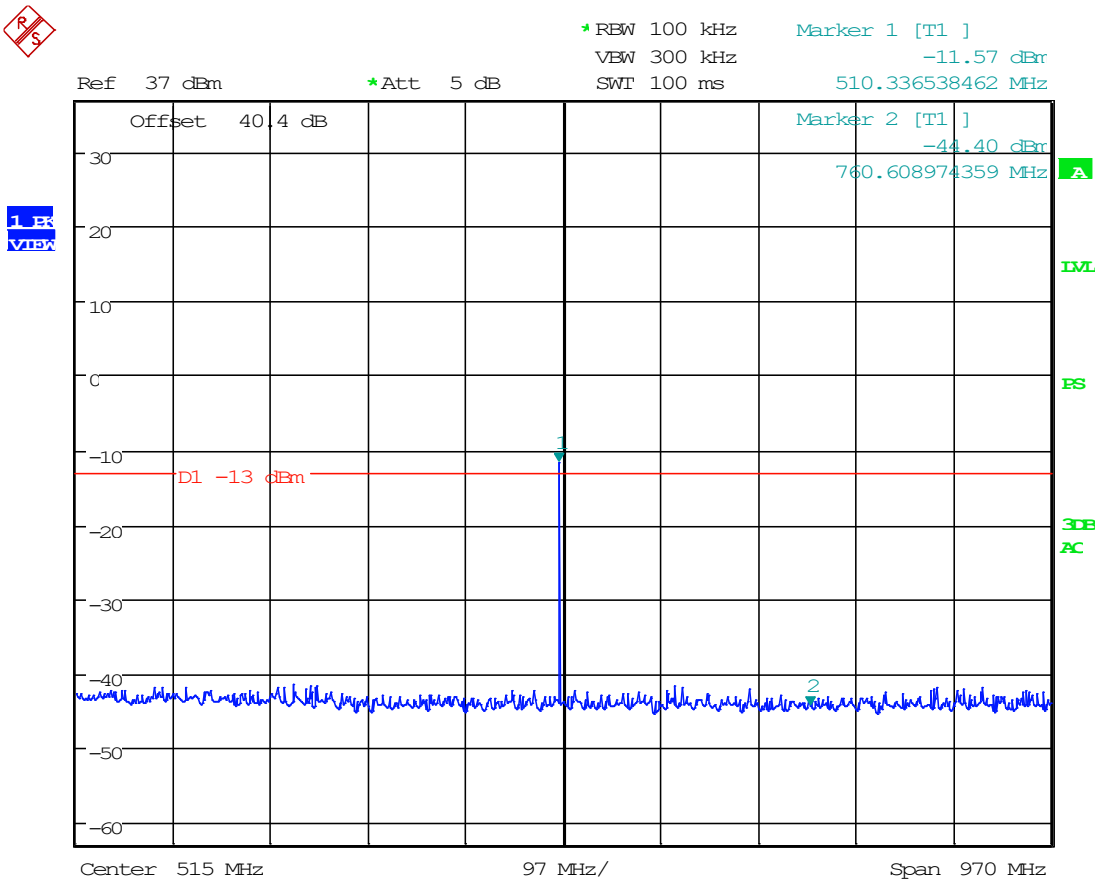
8.8.15 30 MHz to 1 GHz, Uplink, 510 MHz



Date: 1.NOV.2024 07:04:01

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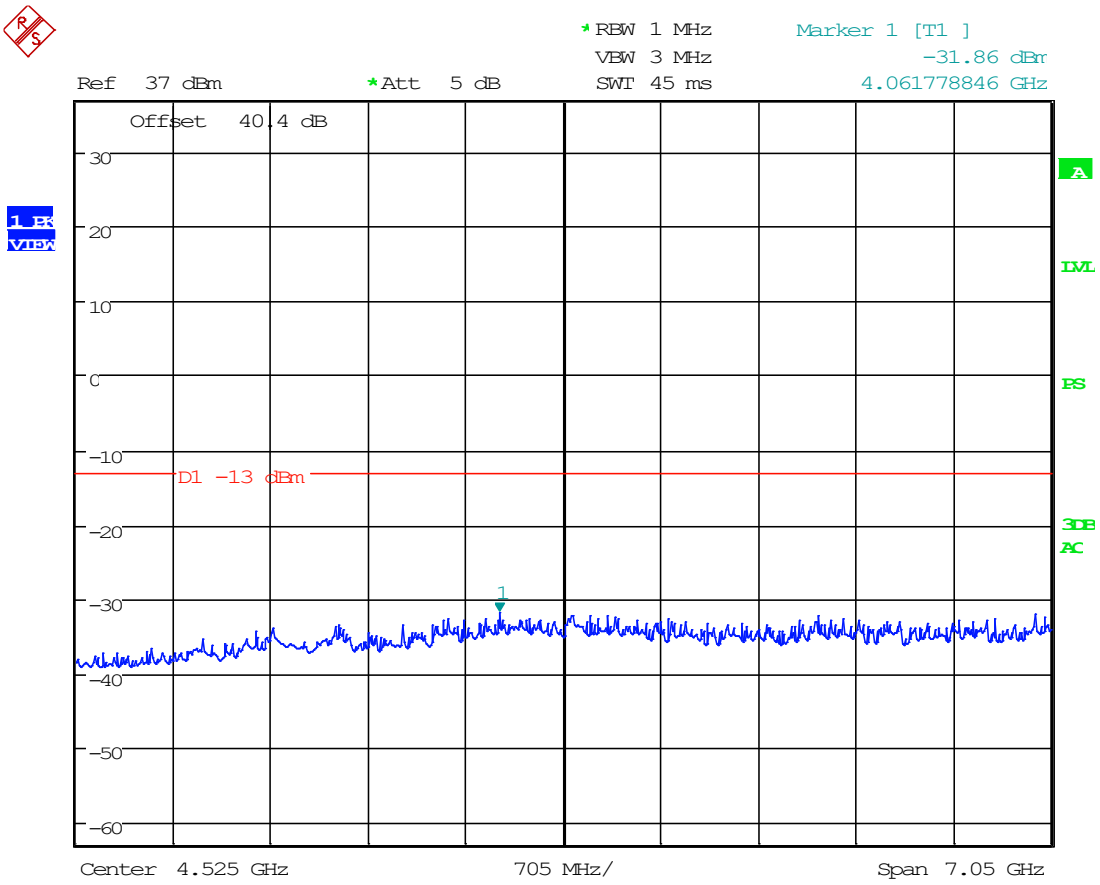
8.8.16 1 GHz to 10th Harmonic, Uplink, 510 MHz



Date: 1.NOV.2024 07:06:50

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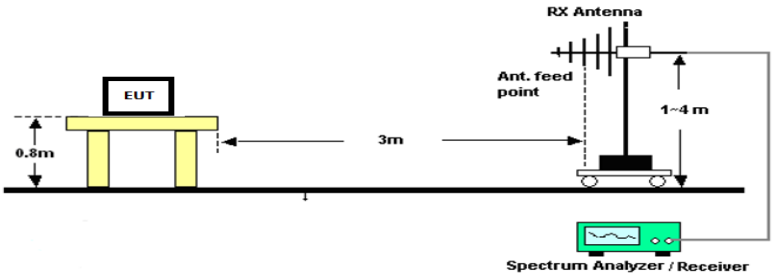
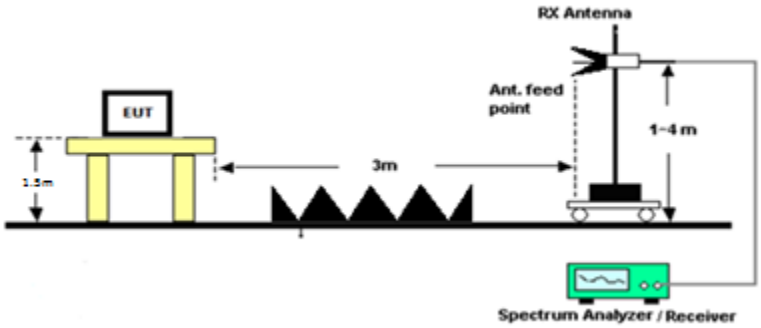
8.9 Spurious Radiated Emissions

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


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8.9.1 Downlink, 450 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)
450.00	900.00	PK	23.30	H	-3.54	22.67	3.00	42.43	-54.95	-13.00	41.95
450.00	900.00	PK	22.10	V	-3.54	22.67	3.00	41.23	-56.15	-13.00	43.15
450.00	1350.00	PK	22.30	H	-4.32	28.77	3.00	46.75	-50.63	-13.00	37.63
450.00	1350.00	PK	22.50	V	-4.32	28.77	3.00	46.95	-50.43	-13.00	37.43
450.00	1800.00	PK	20.90	H	-5.11	30.45	3.00	46.24	-51.13	-13.00	38.13
450.00	1800.00	PK	20.90	V	-5.11	30.45	3.00	46.24	-51.13	-13.00	38.13
450.00	2250.00	PK	21.20	H	-5.69	31.88	3.00	47.39	-49.98	-13.00	36.98
450.00	2250.00	PK	21.50	V	-5.69	31.88	3.00	47.69	-49.68	-13.00	36.68
450.00	2700.00	PK	23.00	H	-6.19	32.47	3.00	49.28	-48.10	-13.00	35.10
450.00	2700.00	PK	23.50	V	-6.19	32.47	3.00	49.78	-47.60	-13.00	34.60
450.00	3150.00	PK	22.30	H	-6.72	32.85	3.00	48.44	-48.94	-13.00	35.94
450.00	3150.00	PK	22.40	V	-6.72	32.85	3.00	48.54	-48.84	-13.00	35.84
450.00	3600.00	PK	22.10	H	-7.14	33.08	3.00	48.04	-49.34	-13.00	36.34
450.00	3600.00	PK	22.30	V	-7.14	33.08	3.00	48.24	-49.14	-13.00	36.14
450.00	4050.00	PK	20.60	H	-7.61	33.38	3.00	46.37	-51.01	-13.00	38.01
450.00	4050.00	PK	20.60	V	-7.61	33.38	3.00	46.37	-51.01	-13.00	38.01
450.00	4500.00	PK	22.70	H	-8.05	33.87	3.00	48.52	-48.86	-13.00	35.86
450.00	4500.00	PK	22.10	V	-8.05	33.87	3.00	47.92	-49.46	-13.00	36.46

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8.9.2 Uplink, 450 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)
450.00	900.00	PK	23.10	H	-3.54	22.67	3.00	42.23	-55.15	-13.00	42.15
450.00	900.00	PK	22.60	V	-3.54	22.67	3.00	41.73	-55.65	-13.00	42.65
450.00	1350.00	PK	22.10	H	-4.32	28.77	3.00	46.55	-50.83	-13.00	37.83
450.00	1350.00	PK	22.10	V	-4.32	28.77	3.00	46.55	-50.83	-13.00	37.83
450.00	1800.00	PK	21.80	H	-5.11	30.45	3.00	47.14	-50.23	-13.00	37.23
450.00	1800.00	PK	21.10	V	-5.11	30.45	3.00	46.44	-50.93	-13.00	37.93
450.00	2250.00	PK	21.20	H	-5.69	31.88	3.00	47.39	-49.98	-13.00	36.98
450.00	2250.00	PK	21.30	V	-5.69	31.88	3.00	47.49	-49.88	-13.00	36.88
450.00	2700.00	PK	23.70	H	-6.19	32.47	3.00	49.98	-47.40	-13.00	34.40
450.00	2700.00	PK	23.80	V	-6.19	32.47	3.00	50.08	-47.30	-13.00	34.30
450.00	3150.00	PK	23.30	H	-6.72	32.85	3.00	49.44	-47.94	-13.00	34.94
450.00	3150.00	PK	22.60	V	-6.72	32.85	3.00	48.74	-48.64	-13.00	35.64
450.00	3600.00	PK	22.80	H	-7.14	33.08	3.00	48.74	-48.64	-13.00	35.64
450.00	3600.00	PK	22.60	V	-7.14	33.08	3.00	48.54	-48.84	-13.00	35.84
450.00	4050.00	PK	20.60	H	-7.61	33.38	3.00	46.37	-51.01	-13.00	38.01
450.00	4050.00	PK	20.50	V	-7.61	33.38	3.00	46.27	-51.11	-13.00	38.11
450.00	4500.00	PK	22.00	H	-8.05	33.87	3.00	47.82	-49.56	-13.00	36.56
450.00	4500.00	PK	21.90	V	-8.05	33.87	3.00	47.72	-49.66	-13.00	36.66

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8.9.3 Downlink, 454.5 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)
454.50	909.00	PK	22.30	H	-3.55	22.69	3.00	41.45	-55.93	-13.00	42.93
454.50	909.00	PK	21.40	V	-3.55	22.69	3.00	40.55	-56.83	-13.00	43.83
454.50	1363.50	PK	22.10	H	-4.33	28.54	3.00	46.31	-51.07	-13.00	38.07
454.50	1363.50	PK	22.20	V	-4.33	28.54	3.00	46.41	-50.97	-13.00	37.97
454.50	1818.00	PK	20.30	H	-5.11	30.67	3.00	45.86	-51.52	-13.00	38.52
454.50	1818.00	PK	20.50	V	-5.11	30.67	3.00	46.06	-51.32	-13.00	38.32
454.50	2272.50	PK	21.50	H	-5.71	31.92	3.00	47.71	-49.66	-13.00	36.66
454.50	2272.50	PK	21.40	V	-5.71	31.92	3.00	47.61	-49.76	-13.00	36.76
454.50	2727.00	PK	24.00	H	-6.22	32.48	3.00	50.26	-47.12	-13.00	34.12
454.50	2727.00	PK	23.70	V	-6.22	32.48	3.00	49.96	-47.42	-13.00	34.42
454.50	3181.50	PK	23.00	H	-6.76	32.76	3.00	49.01	-48.37	-13.00	35.37
454.50	3181.50	PK	22.30	V	-6.76	32.76	3.00	48.31	-49.07	-13.00	36.07
454.50	3636.00	PK	22.90	H	-7.17	33.18	3.00	48.91	-48.47	-13.00	35.47
454.50	3636.00	PK	22.30	V	-7.17	33.18	3.00	48.31	-49.07	-13.00	36.07
454.50	4090.50	PK	20.70	H	-7.64	33.53	3.00	46.59	-50.79	-13.00	37.79
454.50	4090.50	PK	20.30	V	-7.64	33.53	3.00	46.19	-51.19	-13.00	38.19
454.50	4545.00	PK	22.10	H	-8.08	33.97	3.00	47.99	-49.39	-13.00	36.39
454.50	4545.00	PK	21.80	V	-8.08	33.97	3.00	47.69	-49.69	-13.00	36.69

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8.9.4 Uplink, 454.5 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)
454.50	909.00	PK	21.70	H	-3.55	22.69	3.00	40.85	-56.53	-13.00	43.53
454.50	909.00	PK	21.50	V	-3.55	22.69	3.00	40.65	-56.73	-13.00	43.73
454.50	1363.50	PK	22.30	H	-4.33	28.54	3.00	46.51	-50.87	-13.00	37.87
454.50	1363.50	PK	21.90	V	-4.33	28.54	3.00	46.11	-51.27	-13.00	38.27
454.50	1818.00	PK	20.90	H	-5.11	30.67	3.00	46.46	-50.92	-13.00	37.92
454.50	1818.00	PK	21.40	V	-5.11	30.67	3.00	46.96	-50.42	-13.00	37.42
454.50	2272.50	PK	21.40	H	-5.71	31.92	3.00	47.61	-49.76	-13.00	36.76
454.50	2272.50	PK	21.70	V	-5.71	31.92	3.00	47.91	-49.46	-13.00	36.46
454.50	2727.00	PK	24.20	H	-6.22	32.48	3.00	50.46	-46.92	-13.00	33.92
454.50	2727.00	PK	24.90	V	-6.22	32.48	3.00	51.16	-46.22	-13.00	33.22
454.50	3181.50	PK	23.20	H	-6.76	32.76	3.00	49.21	-48.17	-13.00	35.17
454.50	3181.50	PK	22.60	V	-6.76	32.76	3.00	48.61	-48.77	-13.00	35.77
454.50	3636.00	PK	22.60	H	-7.17	33.18	3.00	48.61	-48.77	-13.00	35.77
454.50	3636.00	PK	22.40	V	-7.17	33.18	3.00	48.41	-48.97	-13.00	35.97
454.50	4090.50	PK	21.50	H	-7.64	33.53	3.00	47.39	-49.99	-13.00	36.99
454.50	4090.50	PK	21.00	V	-7.64	33.53	3.00	46.89	-50.49	-13.00	37.49
454.50	4545.00	PK	22.50	H	-8.08	33.97	3.00	48.39	-48.99	-13.00	35.99
454.50	4545.00	PK	22.00	V	-8.08	33.97	3.00	47.89	-49.49	-13.00	36.49

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8.9.5 Downlink, 479 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)
479.00	958.00	PK	22.30	H	-3.63	23.26	3.00	41.93	-55.45	-13.00	42.45
479.00	958.00	PK	21.80	V	-3.63	23.26	3.00	41.43	-55.95	-13.00	42.95
479.00	1437.00	PK	21.00	H	-4.42	27.96	3.00	44.54	-52.84	-13.00	39.84
479.00	1437.00	PK	21.70	V	-4.42	27.96	3.00	45.24	-52.14	-13.00	39.14
479.00	1916.00	PK	20.90	H	-5.16	31.39	3.00	47.13	-50.25	-13.00	37.25
479.00	1916.00	PK	20.80	V	-5.16	31.39	3.00	47.03	-50.35	-13.00	37.35
479.00	2395.00	PK	21.00	H	-5.86	32.12	3.00	47.26	-50.12	-13.00	37.12
479.00	2395.00	PK	20.80	V	-5.86	32.12	3.00	47.06	-50.32	-13.00	37.32
479.00	2874.00	PK	23.90	H	-6.39	32.30	3.00	49.81	-47.57	-13.00	34.57
479.00	2874.00	PK	24.70	V	-6.39	32.30	3.00	50.61	-46.77	-13.00	33.77
479.00	3353.00	PK	22.50	H	-6.90	32.66	3.00	48.26	-49.11	-13.00	36.11
479.00	3353.00	PK	22.30	V	-6.90	32.66	3.00	48.06	-49.31	-13.00	36.31
479.00	3832.00	PK	21.80	H	-7.38	33.45	3.00	47.86	-49.52	-13.00	36.52
479.00	3832.00	PK	21.50	V	-7.38	33.45	3.00	47.56	-49.82	-13.00	36.82
479.00	4311.00	PK	22.30	H	-7.84	33.55	3.00	48.01	-49.37	-13.00	36.37
479.00	4311.00	PK	22.30	V	-7.84	33.55	3.00	48.01	-49.37	-13.00	36.37
479.00	4790.00	PK	21.70	H	-8.25	34.16	3.00	47.61	-49.77	-13.00	36.77
479.00	4790.00	PK	22.00	V	-8.25	34.16	3.00	47.91	-49.47	-13.00	36.47

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8.9.6 Uplink, 479 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)
479.00	958.00	PK	22.10	H	-3.63	23.26	3.00	41.73	-55.65	-13.00	42.65
479.00	958.00	PK	22.30	V	-3.63	23.26	3.00	41.93	-55.45	-13.00	42.45
479.00	1437.00	PK	21.00	H	-4.42	27.96	3.00	44.54	-52.84	-13.00	39.84
479.00	1437.00	PK	21.40	V	-4.42	27.96	3.00	44.94	-52.44	-13.00	39.44
479.00	1916.00	PK	21.20	H	-5.16	31.39	3.00	47.43	-49.95	-13.00	36.95
479.00	1916.00	PK	20.80	V	-5.16	31.39	3.00	47.03	-50.35	-13.00	37.35
479.00	2395.00	PK	22.20	H	-5.86	32.12	3.00	48.46	-48.92	-13.00	35.92
479.00	2395.00	PK	22.80	V	-5.86	32.12	3.00	49.06	-48.32	-13.00	35.32
479.00	2874.00	PK	24.60	H	-6.39	32.30	3.00	50.51	-46.87	-13.00	33.87
479.00	2874.00	PK	24.80	V	-6.39	32.30	3.00	50.71	-46.67	-13.00	33.67
479.00	3353.00	PK	22.80	H	-6.90	32.66	3.00	48.56	-48.81	-13.00	35.81
479.00	3353.00	PK	23.20	V	-6.90	32.66	3.00	48.96	-48.41	-13.00	35.41
479.00	3832.00	PK	21.80	H	-7.38	33.45	3.00	47.86	-49.52	-13.00	36.52
479.00	3832.00	PK	21.90	V	-7.38	33.45	3.00	47.96	-49.42	-13.00	36.42
479.00	4311.00	PK	22.10	H	-7.84	33.55	3.00	47.81	-49.57	-13.00	36.57
479.00	4311.00	PK	21.80	V	-7.84	33.55	3.00	47.51	-49.87	-13.00	36.87
479.00	4790.00	PK	21.40	H	-8.25	34.16	3.00	47.31	-50.07	-13.00	37.07
479.00	4790.00	PK	22.20	V	-8.25	34.16	3.00	48.11	-49.27	-13.00	36.27

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8.9.7 Downlink, 510 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)
510.00	1020.00	PK	27.00	H	-3.79	26.71	3.00	49.92	-47.46	-13.00	34.46
510.00	1020.00	PK	27.50	V	-3.79	26.71	3.00	50.42	-46.96	-13.00	33.96
510.00	1530.00	PK	22.00	H	-4.59	27.67	3.00	45.08	-52.30	-13.00	39.30
510.00	1530.00	PK	21.60	V	-4.59	27.67	3.00	44.68	-52.70	-13.00	39.70
510.00	2040.00	PK	21.50	H	-5.45	31.53	3.00	47.58	-49.80	-13.00	36.80
510.00	2040.00	PK	21.10	V	-5.45	31.53	3.00	47.18	-50.20	-13.00	37.20
510.00	2550.00	PK	24.50	H	-6.03	32.57	3.00	51.04	-46.34	-13.00	33.34
510.00	2550.00	PK	23.20	V	-6.03	32.57	3.00	49.74	-47.64	-13.00	34.64
510.00	3060.00	PK	21.40	H	-6.60	32.90	3.00	47.70	-49.68	-13.00	36.68
510.00	3060.00	PK	21.30	V	-6.60	32.90	3.00	47.60	-49.78	-13.00	36.78
510.00	3570.00	PK	22.50	H	-7.11	33.07	3.00	48.45	-48.92	-13.00	35.92
510.00	3570.00	PK	22.30	V	-7.11	33.07	3.00	48.25	-49.12	-13.00	36.12
510.00	4080.00	PK	20.60	H	-7.63	33.49	3.00	46.46	-50.92	-13.00	37.92
510.00	4080.00	PK	20.70	V	-7.63	33.49	3.00	46.56	-50.82	-13.00	37.82
510.00	4590.00	PK	21.30	H	-8.11	34.07	3.00	47.26	-50.12	-13.00	37.12
510.00	4590.00	PK	21.60	V	-8.11	34.07	3.00	47.56	-49.82	-13.00	36.82
510.00	5100.00	PK	22.70	H	-8.55	34.21	3.00	48.36	-49.02	-13.00	36.02
510.00	5100.00	PK	21.90	V	-8.55	34.21	3.00	47.56	-49.82	-13.00	36.82

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8.9.8 Uplink, 510 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)
510.00	1020.00	PK	20.10	H	-3.79	26.71	3.00	43.02	-54.36	-13.00	41.36
510.00	1020.00	PK	20.90	V	-3.79	26.71	3.00	43.82	-53.56	-13.00	40.56
510.00	1530.00	PK	22.40	H	-4.59	27.67	3.00	45.48	-51.90	-13.00	38.90
510.00	1530.00	PK	22.20	V	-4.59	27.67	3.00	45.28	-52.10	-13.00	39.10
510.00	2040.00	PK	20.80	H	-5.45	31.53	3.00	46.88	-50.50	-13.00	37.50
510.00	2040.00	PK	21.40	V	-5.45	31.53	3.00	47.48	-49.90	-13.00	36.90
510.00	2550.00	PK	24.00	H	-6.03	32.57	3.00	50.54	-46.84	-13.00	33.84
510.00	2550.00	PK	24.60	V	-6.03	32.57	3.00	51.14	-46.24	-13.00	33.24
510.00	3060.00	PK	21.70	H	-6.60	32.90	3.00	48.00	-49.38	-13.00	36.38
510.00	3060.00	PK	21.30	V	-6.60	32.90	3.00	47.60	-49.78	-13.00	36.78
510.00	3570.00	PK	22.80	H	-7.11	33.07	3.00	48.75	-48.62	-13.00	35.62
510.00	3570.00	PK	22.20	V	-7.11	33.07	3.00	48.15	-49.22	-13.00	36.22
510.00	4080.00	PK	21.40	H	-7.63	33.49	3.00	47.26	-50.12	-13.00	37.12
510.00	4080.00	PK	20.80	V	-7.63	33.49	3.00	46.66	-50.72	-13.00	37.72
510.00	4590.00	PK	22.40	H	-8.11	34.07	3.00	48.36	-49.02	-13.00	36.02
510.00	4590.00	PK	21.70	V	-8.11	34.07	3.00	47.66	-49.72	-13.00	36.72
510.00	5100.00	PK	22.00	H	-8.55	34.21	3.00	47.66	-49.72	-13.00	36.72
510.00	5100.00	PK	21.90	V	-8.55	34.21	3.00	47.56	-49.82	-13.00	36.82

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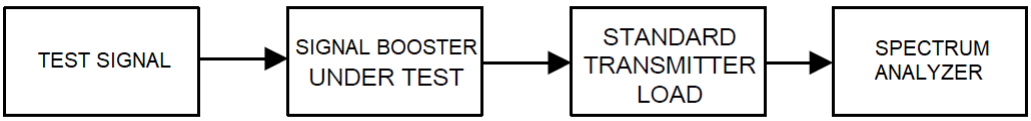
8.10 Adjacent channel power limits

Limits from FCC Part 90.221, and test procedure from ANSI C63.26-2015.

Test Setup


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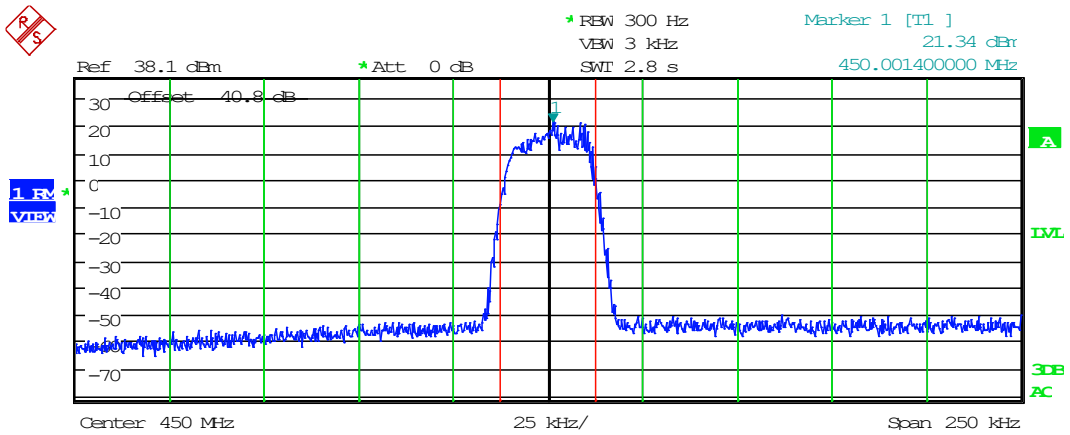
8.10.1 Downlink, 25k, AGC, 450 MHz



Tx Channel			
Bandwidth	25 kHz	Power	33.79 dBm
Adjacent Channel			
Bandwidth	25 kHz	Lower	-70.83 dB
Spacing	37.5 kHz	Upper	-69.20 dB
Alternate Channel			
Bandwidth	25 kHz	Lower	-72.60 dB
Spacing	62.5 kHz	Upper	-69.55 dB
2nd Alternate Channel			
Bandwidth	25 kHz	Lower	-74.56 dB
Spacing	87.5 kHz	Upper	-69.43 dB

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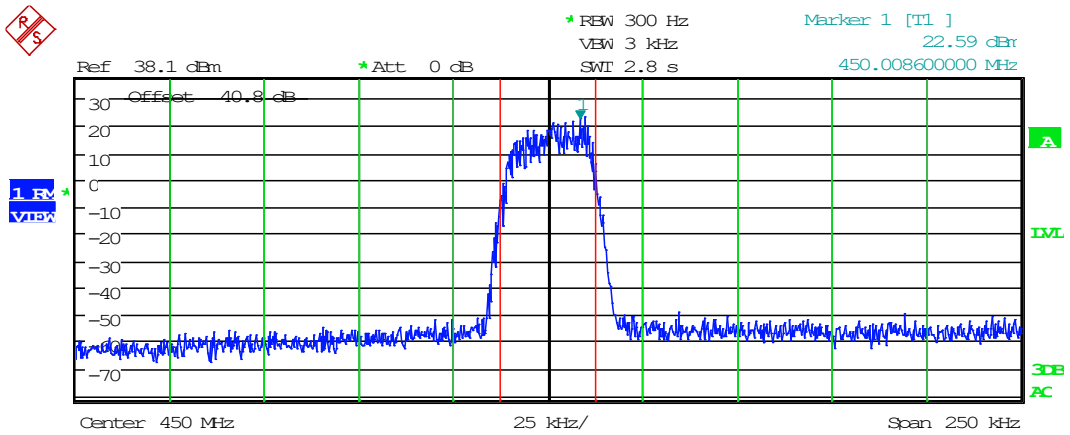
8.10.2 Downlink, 25k, AGC+3, 450 MHz



Tx Channel
Bandwidth 25 kHz

Power 34.13 dBm

Adjacent Channel
Bandwidth 25 kHz
Spacing 37.5 kHz

Lower -73.14 dB
Upper -70.94 dB

Alternate Channel
Bandwidth 25 kHz
Spacing 62.5 kHz

Lower -74.93 dB
Upper -71.29 dB

2nd Alternate Channel
Bandwidth 25 kHz
Spacing 87.5 kHz

Lower -76.31 dB
Upper -71.64 dB

Date: 2.JAN.2025 12:00:59

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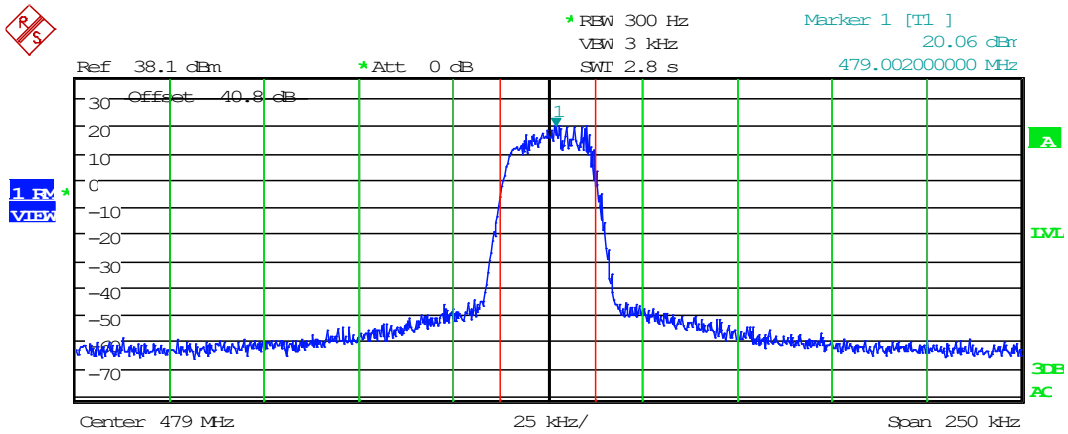
8.10.3 Downlink, 25k, AGC, 479 MHz



Tx Channel			
Bandwidth	25 kHz	Power	33.58 dBm
Adjacent Channel			
Bandwidth	25 kHz	Lower	-68.68 dB
Spacing	37.5 kHz	Upper	-68.06 dB
Alternate Channel			
Bandwidth	25 kHz	Lower	-75.10 dB
Spacing	62.5 kHz	Upper	-74.49 dB
2nd Alternate Channel			
Bandwidth	25 kHz	Lower	-77.36 dB
Spacing	87.5 kHz	Upper	-77.46 dB

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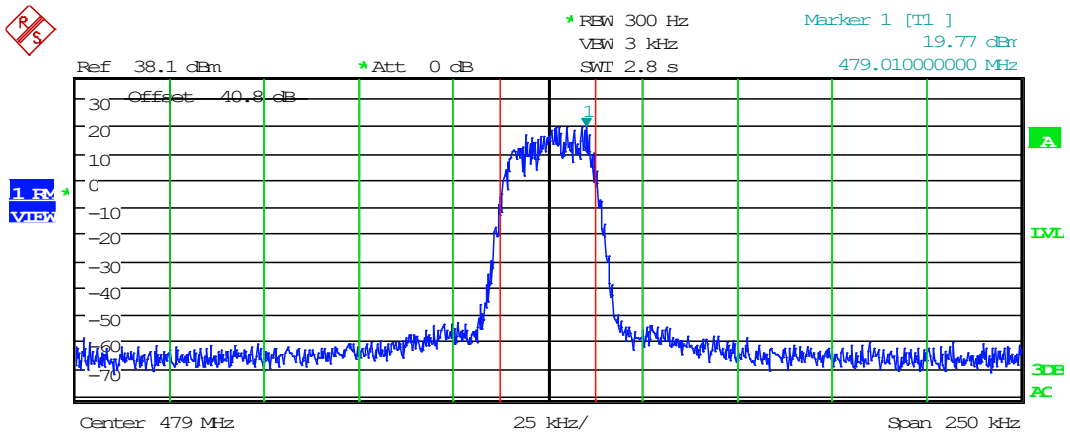
8.10.4 Downlink, 25k, AGC+3, 479 MHz



Tx Channel
Bandwidth 25 kHz
Power 32.18 dBm

Adjacent Channel
Bandwidth 25 kHz
Spacing 37.5 kHz
Lower -73.43 dB
Upper -73.51 dB

Alternate Channel
Bandwidth 25 kHz
Spacing 62.5 kHz
Lower -78.10 dB
Upper -78.27 dB

2nd Alternate Channel
Bandwidth 25 kHz
Spacing 87.5 kHz
Lower -79.09 dB
Upper -79.34 dB

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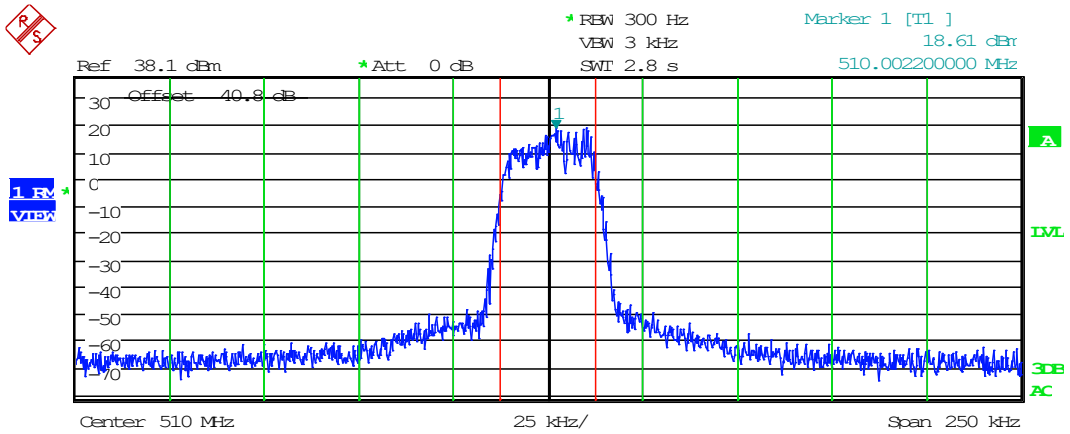
8.10.5 Downlink, 25k, AGC, 510 MHz



Tx Channel			
Bandwidth	25 kHz	Power	31.03 dBm
Adjacent Channel			
Bandwidth	25 kHz	Lower	-70.12 dB
Spacing	37.5 kHz	Upper	-70.24 dB
Alternate Channel			
Bandwidth	25 kHz	Lower	-77.58 dB
Spacing	62.5 kHz	Upper	-77.31 dB
2nd Alternate Channel			
Bandwidth	25 kHz	Lower	-79.27 dB
Spacing	87.5 kHz	Upper	-79.32 dB

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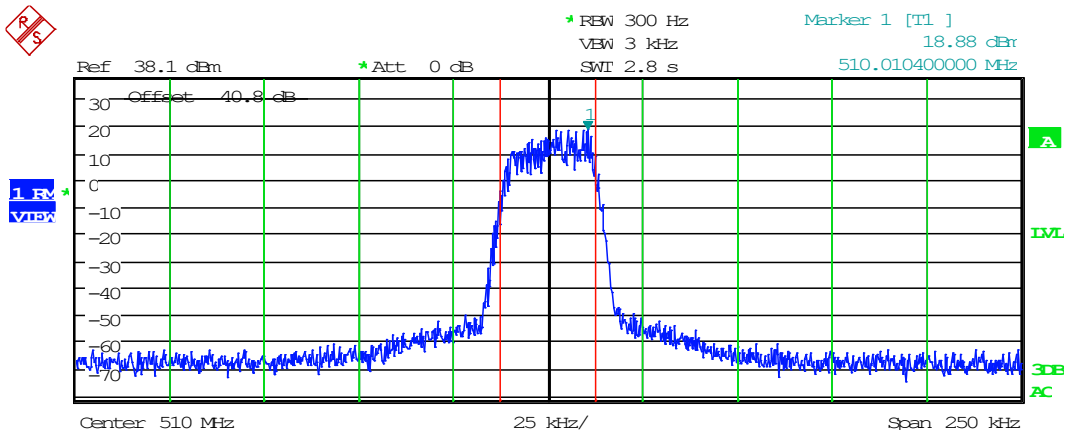
8.10.6 Downlink, 25k, AGC+3, 510 MHz



Tx Channel			
Bandwidth	25 kHz	Power	30.74 dBm
Adjacent Channel			
Bandwidth	25 kHz	Lower	-71.85 dB
Spacing	37.5 kHz	Upper	-71.21 dB
Alternate Channel			
Bandwidth	25 kHz	Lower	-78.19 dB
Spacing	62.5 kHz	Upper	-78.48 dB
2nd Alternate Channel			
Bandwidth	25 kHz	Lower	-79.39 dB
Spacing	87.5 kHz	Upper	-79.56 dB

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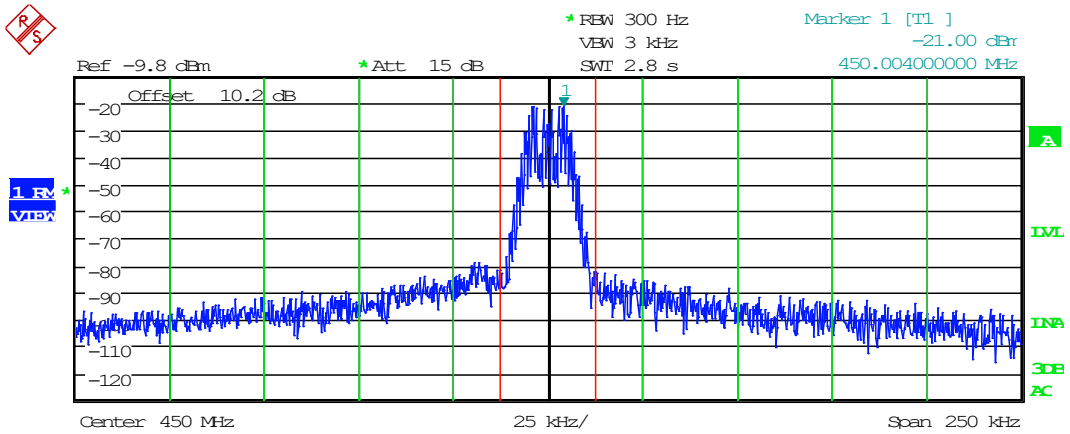
8.10.7 Uplink, 25k, AGC, 450 MHz



Tx Channel			
Bandwidth	25 kHz	Power	-11.71 dBm
Adjacent Channel			
Bandwidth	25 kHz	Lower	-60.11 dB
Spacing	37.5 kHz	Upper	-62.31 dB
Alternate Channel			
Bandwidth	25 kHz	Lower	-65.19 dB
Spacing	62.5 kHz	Upper	-67.19 dB
2nd Alternate Channel			
Bandwidth	25 kHz	Lower	-67.81 dB
Spacing	87.5 kHz	Upper	-69.15 dB

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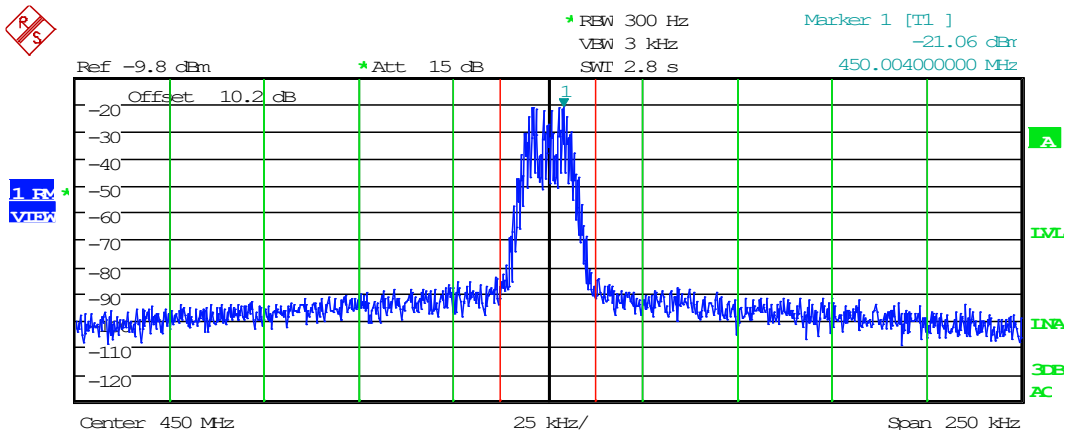
8.10.8 Uplink, 25k, AGC+3, 450 MHz



Tx Channel
Bandwidth 25 kHz
Power -11.72 dBm

Adjacent Channel
Bandwidth 25 kHz
Spacing 37.5 kHz
Lower -62.21 dB
Upper -62.83 dB

Alternate Channel
Bandwidth 25 kHz
Spacing 62.5 kHz
Lower -65.07 dB
Upper -65.92 dB

2nd Alternate Channel
Bandwidth 25 kHz
Spacing 87.5 kHz
Lower -67.16 dB
Upper -68.17 dB

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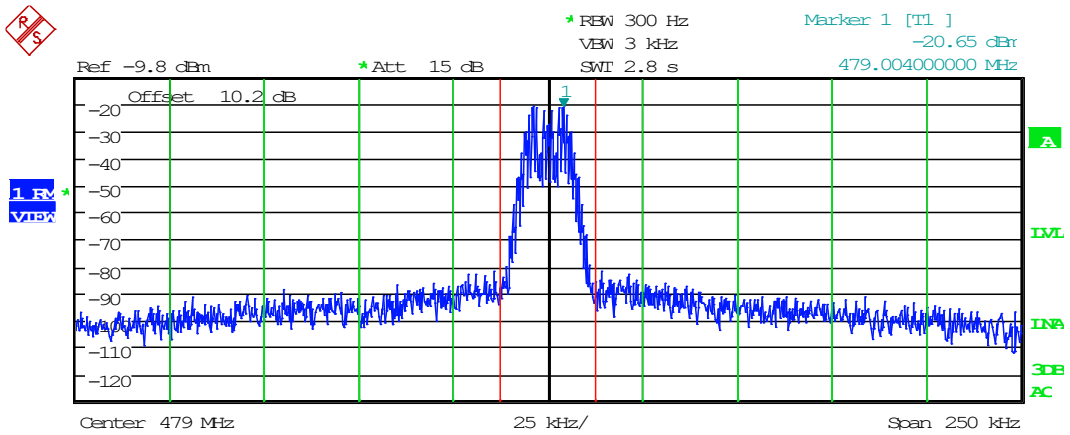
8.10.9 Uplink, 25k, AGC, 479 MHz



Tx Channel			
Bandwidth	25 kHz	Power	-11.31 dBm
Adjacent Channel			
Bandwidth	25 kHz	Lower	-62.70 dB
Spacing	37.5 kHz	Upper	-62.22 dB
Alternate Channel			
Bandwidth	25 kHz	Lower	-65.17 dB
Spacing	62.5 kHz	Upper	-66.00 dB
2nd Alternate Channel			
Bandwidth	25 kHz	Lower	-67.48 dB
Spacing	87.5 kHz	Upper	-68.32 dB

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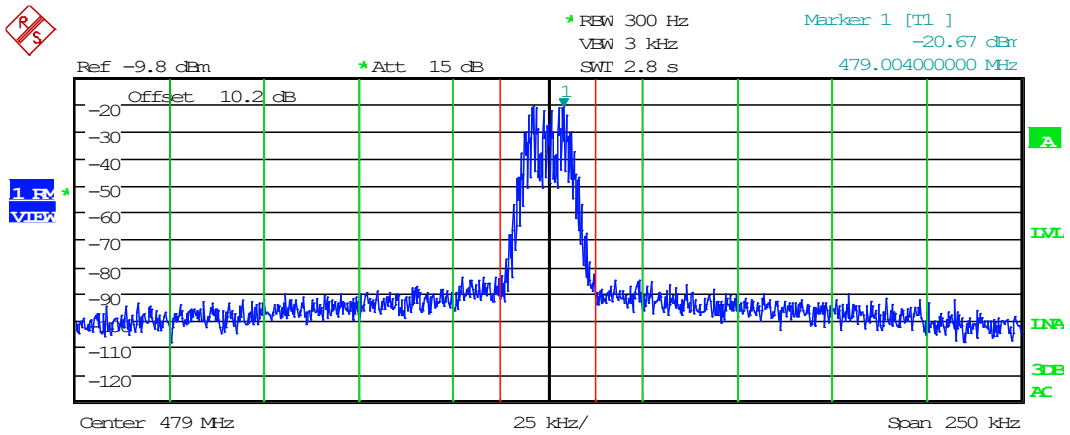
8.10.10 Uplink, 25k, AGC+3, 479 MHz



Tx Channel			
Bandwidth	25 kHz	Power	-11.33 dBm
Adjacent Channel			
Bandwidth	25 kHz	Lower	-62.50 dB
Spacing	37.5 kHz	Upper	-62.61 dB
Alternate Channel			
Bandwidth	25 kHz	Lower	-65.13 dB
Spacing	62.5 kHz	Upper	-65.65 dB
2nd Alternate Channel			
Bandwidth	25 kHz	Lower	-67.73 dB
Spacing	87.5 kHz	Upper	-67.16 dB

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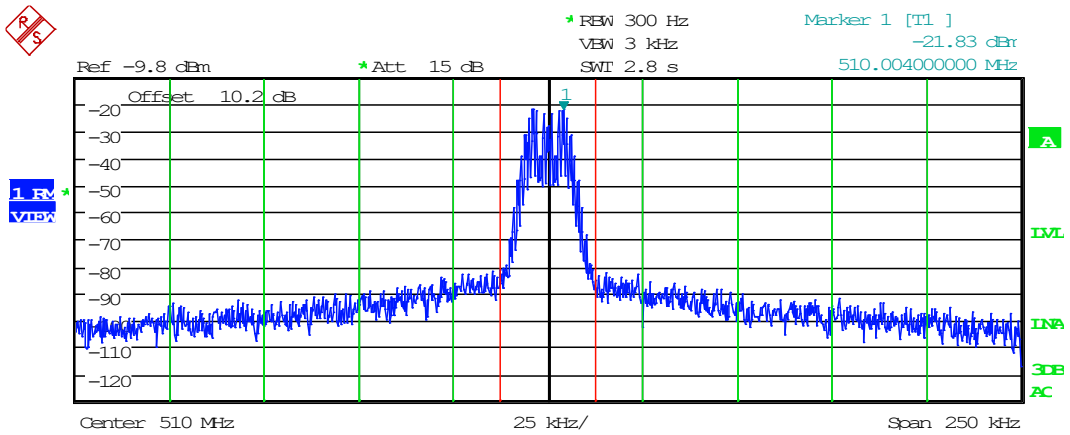
8.10.11 Uplink, 25k, AGC, 510 MHz



Tx Channel			
Bandwidth	25 kHz	Power	-12.31 dBm
Adjacent Channel			
Bandwidth	25 kHz	Lower	-60.23 dB
Spacing	37.5 kHz	Upper	-61.17 dB
Alternate Channel			
Bandwidth	25 kHz	Lower	-65.19 dB
Spacing	62.5 kHz	Upper	-65.75 dB
2nd Alternate Channel			
Bandwidth	25 kHz	Lower	-67.86 dB
Spacing	87.5 kHz	Upper	-67.99 dB

Date: 2.JAN.2025 15:35:37

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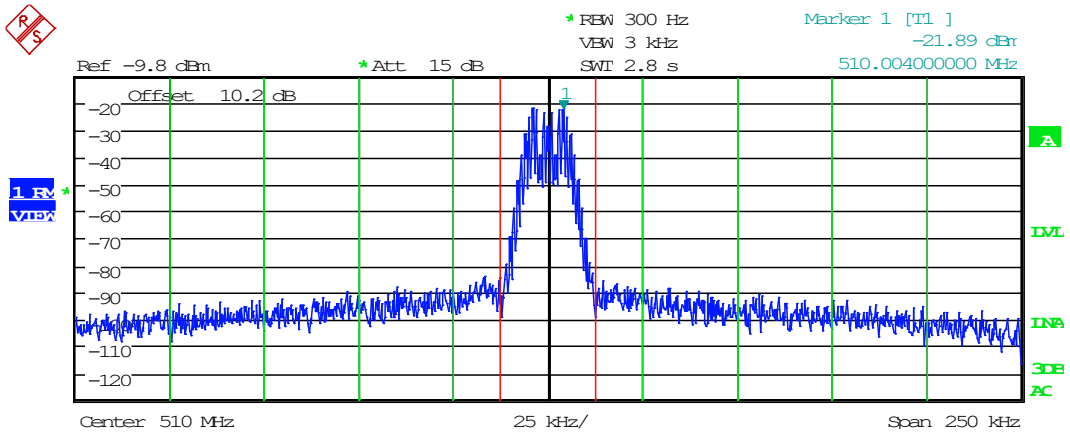
8.10.12 Uplink, 25k, AGC+3, 510 MHz



Tx Channel
Bandwidth 25 kHz — Power -12.33 dBm

Adjacent Channel
Bandwidth 25 kHz
Spacing 37.5 kHz
Lower -62.56 dB
Upper -63.58 dB

Alternate Channel
Bandwidth 25 kHz
Spacing 62.5 kHz
Lower -65.39 dB
Upper -65.97 dB

2nd Alternate Channel
Bandwidth 25 kHz
Spacing 87.5 kHz
Lower -67.88 dB
Upper -68.35 dB

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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_19228-25_FCC 90_UHF HB_Booster Class B_	1	Initial release	12/20/2024
	2	3.2 Updated	2/27/2025
	3	Updated pages 1, 12	4/1/2025
	4	Updated brief description	05/22/2025

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END OF TEST REPORT

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