



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

Signature:

A handwritten signature in black ink, appearing to read 'Tim Royer'.

Sr. EMC Engineer
EMC-003838-NE



Name & Title: Tim Royer, EMC Engineer

Date of Signature 12/23/2024

Signature:

A handwritten signature in black ink, appearing to read 'Kristoffer Costa'.

Name & Title: Kristoffer Costa, EMC Technician

Date of Signature 12/23/2024

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

Table of Contents

1.	APPLICANT INFORMATION.....	7
1.1	TEST RESULT SUMMARY	7
2.	LOCATION OF TESTING.....	10
2.1	TEST LABORATORY.....	10
3.	TEST SAMPLE(S) (EUT/DUT).....	10
3.1	DEFINITIONS	11
3.2	DESCRIPTION OF THE EUT	12
3.3	CONFIGURATION OF EUT	13
3.4	TEST SETUP OF EUT	13
4.	TEST METHODS & APPLICABLE REGULATORY LIMITS.....	14
4.1	TEST METHODS/STANDARDS/GUIDANCE:.....	14
4.2	APPLIED LIMITS AND REGULATORY LIMITS:.....	14
5.	MEASUREMENT UNCERTAINTY.....	14
6.	ENVIRONMENTAL CONDITIONS	14
6.1	TEMPERATURE & HUMIDITY	14
7.	LIST OF TEST EQUIPMENT AND TEST FACILITY.....	15
7.1	LIST OF TEST EQUIPMENT	15
8.	TEST RESULTS	17
8.1	POWER AT THE FINAL AMPLIFIER.....	18
8.2	RF OUTPUT POWER & GAIN.....	19
8.3	OUT-OF-BAND REJECTION.....	21
8.3.1	<i>Downlink, Class B</i>	22
8.3.2	<i>Uplink, Class B</i>	23
8.4	BANDWIDTH & EMISSION	24
8.5	INPUT VS OUTPUT SIGNAL COMPARISON	25
8.5.1	<i>6.25 kHz FM, Input Signal</i>	28
8.5.2	<i>12.5 kHz FM, Input Signal</i>	29
8.5.3	<i>25 kHz FM, Input Signal</i>	30
8.5.4	<i>C4FM, Input Signal</i>	31
8.5.5	<i>H-CPM, Input Signal</i>	32
8.5.6	<i>H-DQPSK, Input Signal</i>	33
8.5.7	<i>6.25 kHz, FM, DL Mask D, AGC, 854 MHz</i>	34
8.5.8	<i>6.25 kHz, FM, DL Mask D, AGC +3, 854 MHz</i>	35
8.5.9	<i>12.5 kHz, FM, DL Mask D, AGC, 854 MHz</i>	36
8.5.10	<i>12.5 kHz, FM, DL Mask D, AGC+3, 854 MHz</i>	37
8.5.11	<i>25 kHz FM, DL Mask G, AGC, 854 MHz</i>	38
8.5.12	<i>25 kHz FM, DL Mask G, AGC+3, 854 MHz</i>	39
8.5.13	<i>C4FM, DL Mask D, AGC, 854 MHz</i>	40
8.5.14	<i>C4FM, DL Mask D, AGC+3, 854 MHz</i>	41
8.5.15	<i>H-CPM, DL Mask D, AGC, 854 MHz</i>	42
8.5.16	<i>H-CPM, DL Mask D, AGC+3, 854 MHz</i>	43

8.5.17	H-DQPSK, DL Mask D, AGC, 854 MHz.....	44
8.5.18	H-DQPSK, DL Mask D, AGC+3, 854 MHz.....	45
8.5.19	6.25 kHz, FM, DL Mask D, AGC, 860 MHz.....	46
8.5.20	6.25 kHz, FM, DL Mask D, AGC+3, 860 MHz.....	47
8.5.21	12.5 kHz, FM, DL Mask D, AGC, 860 MHz.....	48
8.5.22	12.5 kHz, FM, DL Mask D, AGC+3, 860 MHz.....	49
8.5.23	25 kHz FM, DL Mask G, AGC, 860 MHz.....	50
8.5.24	25 kHz FM, DL Mask G, AGC+3, 860 MHz.....	51
8.5.25	C4FM, DL Mask D, AGC, 860 MHz.....	52
8.5.26	C4FM, DL Mask D, AGC+3, 860 MHz.....	53
8.5.27	H-CPM, DL Mask D, AGC, 860 MHz.....	54
8.5.28	H-CPM, DL Mask D, AGC+3, 860 MHz.....	55
8.5.29	H-DQPSK, DL Mask D, AGC, 860 MHz.....	56
8.5.30	H-DQPSK, DL Mask D, AGC+3, 860 MHz.....	57
8.5.31	6.25 kHz, FM, DL Mask D, AGC, 868 MHz.....	58
8.5.32	6.25 kHz, FM, DL Mask D, AGC+3, 868 MHz.....	59
8.5.33	12.5 kHz, FM, DL Mask D, AGC, 868 MHz.....	60
8.5.34	12.5 kHz, FM, DL Mask D, AGC+3, 868 MHz.....	61
8.5.35	25 kHz FM, DL Mask G, AGC, 868 MHz.....	62
8.5.36	25 kHz FM, DL Mask G, AGC+3, 868 MHz.....	63
8.5.37	C4FM, DL Mask D, AGC, 868 MHz.....	64
8.5.38	C4FM, DL Mask D, AGC+3, 868 MHz.....	65
8.5.39	H-CPM, DL Mask D, AGC, 868 MHz.....	66
8.5.40	H-CPM, DL Mask D, AGC+3, 868 MHz.....	67
8.5.41	H-DQPSK, DL Mask D, AGC, 868 MHz.....	68
8.5.42	H-DQPSK, DL Mask D, AGC+3, 868 MHz.....	69
8.5.43	6.25 kHz, FM, UL Mask D, AGC, 809 MHz.....	70
8.5.44	6.25 kHz, FM, UL Mask D, AGC+3, 809 MHz.....	71
8.5.45	12.5 kHz, FM, UL Mask D, AGC, 809 MHz.....	72
8.5.46	12.5 kHz, FM, UL Mask D, AGC+3, 809 MHz.....	73
8.5.47	25 kHz FM, UL Mask G, AGC, 809 MHz.....	74
8.5.48	25 kHz FM, UL Mask G, AGC+3, 809 MHz.....	75
8.5.49	C4FM, UL Mask D, AGC, 809 MHz.....	76
8.5.50	C4FM, UL Mask D, AGC+3, 809 MHz.....	77
8.5.51	H-CPM, UL Mask D, AGC, 809 MHz.....	78
8.5.52	H-CPM, UL Mask D, AGC+3, 809 MHz.....	79
8.5.53	H-DQPSK, UL Mask D, AGC, 809 MHz.....	80
8.5.54	H-DQPSK, UL Mask D, AGC+3, 809 MHz.....	81
8.5.55	6.25 kHz, FM, UL Mask D, AGC, 815 MHz.....	82
8.5.56	6.25 kHz, FM, UL Mask D, AGC+3, 815 MHz.....	83
8.5.57	12.5 kHz, FM, UL Mask D, AGC, 815 MHz.....	84
8.5.58	12.5 kHz, FM, UL Mask D, AGC+3, 815 MHz.....	85
8.5.59	25 kHz FM, UL Mask G, AGC, 815 MHz.....	86
8.5.60	25 kHz FM, UL Mask G, AGC+3, 815 MHz.....	87
8.5.61	C4FM, UL Mask D, AGC, 815 MHz.....	88
8.5.62	C4FM, UL Mask D, AGC+3, 815 MHz.....	89
8.5.63	H-CPM, UL Mask D, AGC, 815 MHz.....	90
8.5.64	H-CPM, UL Mask D, AGC+3, 815 MHz.....	91
8.5.65	H-DQPSK, UL Mask D, AGC, 815 MHz.....	92

8.5.66	H-DQPSK, UL Mask D, AGC+3, 815 MHz	93
8.5.67	6.25 kHz, FM, UL Mask D, AGC, 823 MHz	94
8.5.68	6.25 kHz, FM, UL Mask D, AGC+3, 823 MHz	95
8.5.69	12.5 kHz, FM, UL Mask D, AGC, 823 MHz	96
8.5.70	12.5 kHz, FM, UL Mask D, AGC+3, 823 MHz	97
8.5.71	25 kHz FM, UL Mask G, AGC, 823 MHz	98
8.5.72	25 kHz FM, UL Mask G, AGC+3, 823 MHz	99
8.5.73	C4FM, UL Mask D, AGC, 823 MHz	100
8.5.74	C4FM, UL Mask D, AGC+3, 823 MHz	101
8.5.75	H-CPM, UL Mask D, AGC, 823 MHz	102
8.5.76	H-CPM, UL Mask D, AGC+3, 823 MHz	103
8.5.77	H-DQPSK, UL Mask D, AGC, 823 MHz	104
8.5.78	H-DQPSK, UL Mask D, AGC+3, 823 MHz	105
8.6	NOISE FIGURE	106
8.7	OUT-OF-BAND/OUT-OF-BLOCK EMISSIONS (INTERMODULATION PRODUCTS)	107
8.7.1	6.25 kHz Signal, Downlink, AGC, 854 MHz	108
8.7.2	6.25 kHz Signal, Downlink, AGC+3dB, 854 MHz	109
8.7.3	12.5 kHz Signal, Downlink, AGC, 854 MHz	110
8.7.4	12.5 kHz Signal, Downlink, AGC+3dB, 854 MHz	111
8.7.5	25 kHz Signal, Downlink, AGC, 854 MHz	112
8.7.6	25 kHz Signal, Downlink, AGC+3dB, 854 MHz	113
8.7.7	6.25 kHz Signal, Downlink, AGC, 860 MHz	114
8.7.8	6.25 kHz Signal, Downlink, AGC+3dB, 860 MHz	115
8.7.9	12.5 kHz Signal, Downlink, AGC, 860 MHz	116
8.7.10	12.5 kHz Signal, Downlink, AGC+3dB, 860 MHz	117
8.7.11	25 kHz Signal, Downlink, AGC, 860 MHz	118
8.7.12	25 kHz Signal, Downlink, AGC+3dB, 860 MHz	119
8.7.13	6.25 kHz Signal, Downlink, AGC, 868 MHz	120
8.7.14	6.25 kHz Signal, Downlink, AGC+3dB, 868 MHz	121
8.7.15	12.5 kHz Signal, Downlink, AGC, 868 MHz	122
8.7.16	12.5 kHz Signal, Downlink, AGC+3dB, 868 MHz	123
8.7.17	25 kHz Signal, Downlink, AGC, 868 MHz	124
8.7.18	25 kHz Signal, Downlink, AGC+3dB, 868 MHz	125
8.7.19	6.25 kHz Signal, Uplink, AGC, 809 MHz	126
8.7.20	6.25 kHz Signal, Uplink, AGC+3dB, 809 MHz	127
8.7.21	12.5 kHz Signal, Uplink, AGC, 809 MHz	128
8.7.22	12.5 kHz Signal, Uplink, AGC+3dB, 809 MHz	129
8.7.23	25 kHz Signal, Uplink, AGC, 809 MHz	130
8.7.24	25 kHz Signal, Uplink, AGC+3dB, 809 MHz	131
8.7.25	6.25 kHz Signal, Uplink, AGC, 815 MHz	132
8.7.26	6.25 kHz Signal, Uplink, AGC+3dB, 815 MHz	133
8.7.27	12.5 kHz Signal, Uplink, AGC, 815 MHz	134
8.7.28	12.5 kHz Signal, Uplink, AGC+3dB, 815 MHz	135
8.7.29	25 kHz Signal, Uplink, AGC, 815 MHz	136
8.7.30	25 kHz Signal, Uplink, AGC+3dB, 815 MHz	137
8.7.31	6.25 kHz Signal, Uplink, AGC, 823 MHz	138
8.7.32	6.25 kHz Signal, Uplink, AGC+3dB, 823 MHz	139
8.7.33	12.5 kHz Signal, Uplink, AGC, 823 MHz	140
8.7.34	12.5 kHz Signal, Uplink, AGC+3dB, 823 MHz	141

8.7.35	25 kHz Signal, Uplink, AGC, 823 MHz	142
8.7.36	25 kHz Signal, Uplink, AGC+3dB, 823 MHz.....	143
8.8	EMISSION MASK, OUT-OF-BAND.....	144
8.8.1	30 MHz to 1 GHz, Downlink, 854 MHz.....	145
8.8.2	1 GHz to 10 th Harmonic, Downlink, 854 MHz.....	146
8.8.3	30 MHz to 1 GHz, Downlink, 860 MHz	147
8.8.4	1 GHz to 10 th Harmonic, Downlink, 860 MHz	148
8.8.5	30 MHz to 1 GHz, Downlink, 868 MHz	149
8.8.6	1 GHz to 10 th Harmonic, Downlink, 868 MHz	150
8.8.7	30 MHz to 1 GHz, Uplink, 809 MHz	151
8.8.8	1 GHz to 10 th Harmonic, Uplink, 809 MHz.....	152
8.8.9	30 MHz to 1 GHz, Uplink, 815 MHz	153
8.8.10	1 GHz to 10 th Harmonic, Uplink, 815 MHz	154
8.8.11	30 MHz to 1 GHz, Uplink, 823 MHz.....	155
8.8.12	1 GHz to 10 th Harmonic, Uplink, 823 MHz.....	156
8.9	SPURIOUS RADIATED EMISSIONS.....	157
8.9.1	Downlink, 854 MHz	158
8.9.2	Downlink, 860 MHz	159
8.9.3	Downlink, 868 MHz	160
8.9.4	Uplink, 809 MHz	161
8.9.5	Uplink, 815 MHz.....	162
8.9.6	Uplink, 823 MHz	163
8.10	ADJACENT CHANNEL POWER LIMITS.....	164
8.10.1	Downlink, 25k, AGC, 854 MHz	165
8.10.2	Downlink, 25k, AGC+3, 854 MHz	166
8.10.3	Downlink, 25k, AGC, 860 MHz.....	167
8.10.4	Downlink, 25k, AGC+3, 860 MHz.....	168
8.10.5	Downlink, 25k, AGC, 868 MHz.....	169
8.10.6	Downlink, 25k, AGC+3, 868 MHz.....	170
8.10.7	Uplink, 25k, AGC, 809 MHz.....	171
8.10.8	Uplink, 25k, AGC+3, 809 MHz.....	172
8.10.9	Uplink, 25k, AGC, 815 MHz.....	173
8.10.10	Uplink, 25k, AGC+3, 815 MHz	174
8.10.11	Uplink, 25k, AGC, 823 MHz.....	175
8.10.12	Uplink, 25k, AGC+3, 823 MHz	176
9.	ANNEX-B – TEST SETUP PHOTOGRAPHS.....	177
10.	HISTORY OF TEST REPORT CHANGES.....	177

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

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

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

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

4.8	Frequency Stability	n/a
4.9	Spurious Radiated Emissions	Pass

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

3.1 Definitions

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

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

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

3.2 Description of the EUT

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

Identification	
FCC ID:	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	24064662FU

Technical Characteristics	
Frequency Range	DL: 851 MHz- 869 MHz UL: 806 MHz- 824 MHz
RF O/P Power (Max.)	31.12dBm/ 1.294W
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.

3.3 Configuration of EUT

Test Modes		
Band (MHz)	Link Direction	Test Frequencies (MHz)
851 MHz- 869 MHz	Downlink	854 MHz
		860 MHz
		868 MHz
806 MHz- 824 MHz	Uplink	809 MHz
		815 MHz
		823 MHz

Operating conditions during Testing:

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

Peripherals used during Testing:

A laptop was used to program the EUT.

3.4 Test Setup of EUT

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

Test Setups are included in the test report.

4. Test methods & Applicable Regulatory Limits

4.1 Test methods/Standards/Guidance:

Test procedures and guidance for measuring Licensed Part 90 Licensed device:

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

4.2 Applied Limits and Regulatory Limits:

- 1) FCC CFR 47 Part 90 (2018)

5. Measurement Uncertainty

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

6. Environmental Conditions

6.1 Temperature & Humidity

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

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

7. List of Test Equipment and Test Facility

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

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

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

7.1 List of Test Equipment

Test Equipment						
Type	Device	Manufacturer	Model	SN#	Current Cal	Cal Due
Antenna, 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	RLNA00M45 GA	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

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

8. Test Results

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

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

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

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

Example:

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

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

8.1 Power at the Final Amplifier

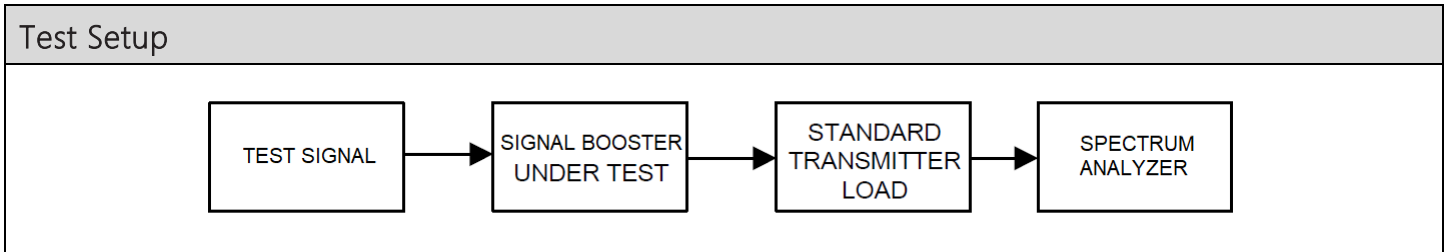
Limits from FCC Part 2.1033 (c)(8).

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

Test Results		
EUT Operating Voltage (V)	EUT Current (A)	Power at the Final Amplifier (W)
110	0.010364	1.14

8.2 RF Output Power & Gain

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



Test Results, Power Output		
Link Direction	Max Power Output (dBm)	Max Power Output (W)
Downlink	31.12	1.294
Uplink	-10.89	0.000081

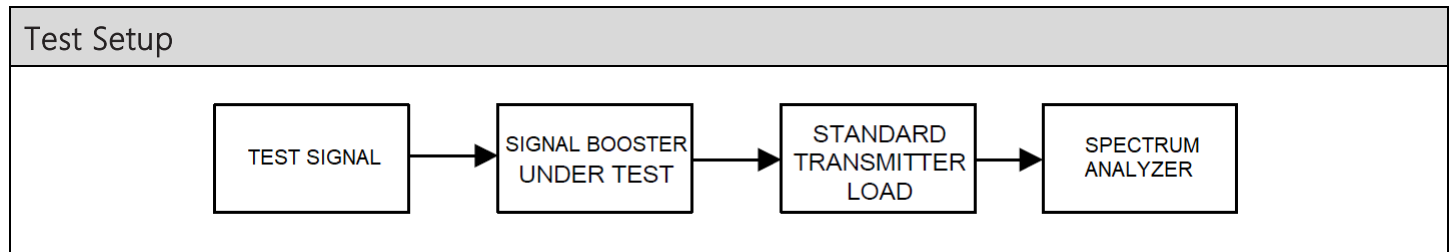
Gain

Test Results, Gain					
Link Direction	Tuned Frequency (MHz)	Input Level	Power Input (dBm)	Power Output (dBm)	Gain (dB)
Downlink	854	AGC	-54	29.65	83.65
		AGC+3	-51	30.15	83.43
	860	AGC	-53.3	30.13	83.43
		AGC+3	-50.3	30.12	80.42
	868	AGC	-53.8	31.12	84.92
		AGC+3	-50.8	31.08	81.88
Uplink	809	AGC	-54	-11.35	65.35
		AGC+3	-51	-11.40	62.12
	815	AGC	-53.3	-11.12	64.42
		AGC+3	-50.3	-11.19	61.49
	823	AGC	-53.8	-10.89	64.69
		AGC+3	-50.8	-10.99	61.79

6dB adjustment from splitter included in calculation

8.3 Out-of-band Rejection

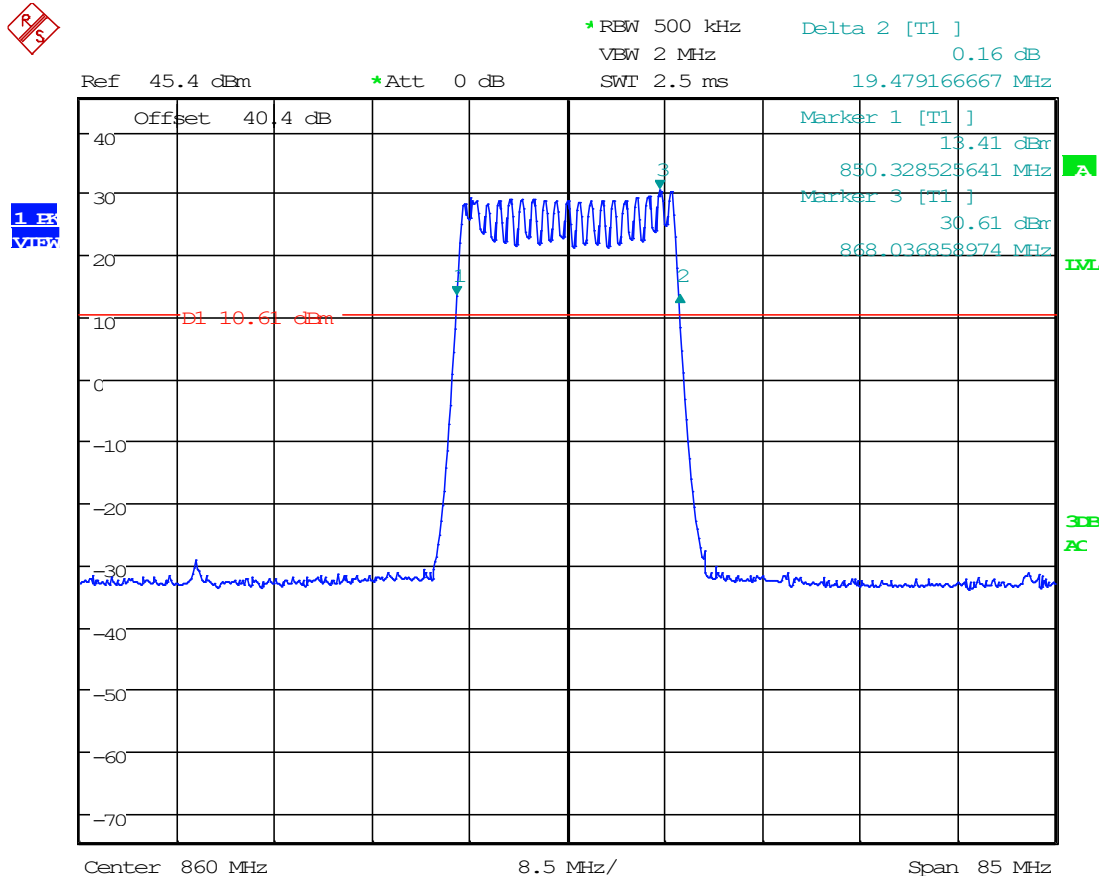
Limits and test method from FCC KDB 935210 D05 v01r04 Industrial Signal Boosters.



Test Results, Out-of-band Rejection and Class of Operation			
Operating Band (MHz)	Link Direction	Passband (kHz)	Class of Operation
851 MHz- 869 MHz	Downlink	> 75 kHz	Class B
806 MHz- 824 MHz	Uplink	> 75 kHz	Class B

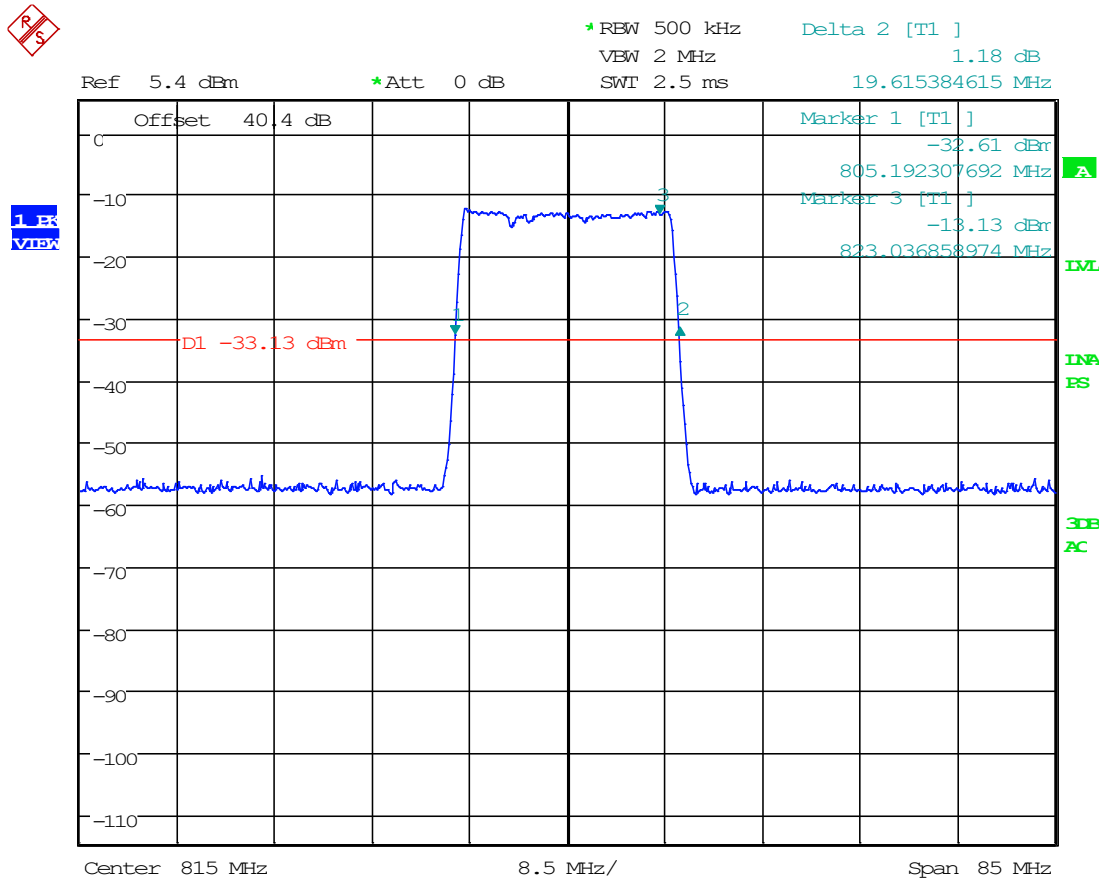
Out-of-band Rejection, Spectrum Plots

8.3.1 Downlink, Class B



Date: 30.OCT.2024 15:09:43

8.3.2 Uplink, Class B



Date: 4.NOV.2024 16:22:46

8.4 Bandwidth & Emission

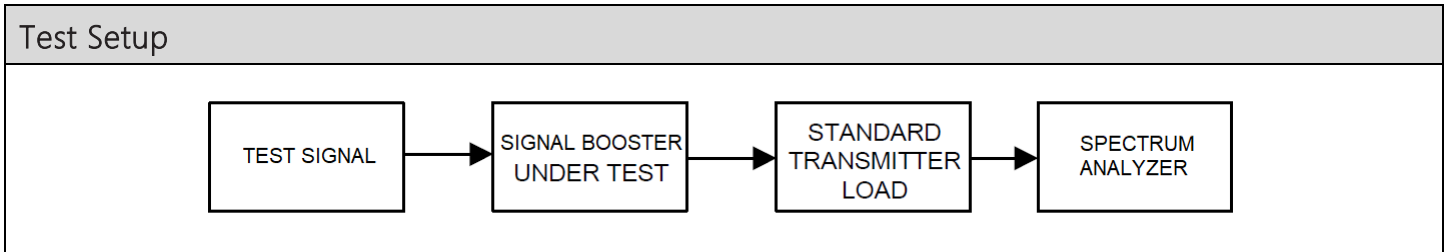
Limits from FCC Parts 90.209 and FCC KDB 935210 D05 v01r04 Industrial Signal Boosters.

Authorized Bandwidth		
Rule Part	Operating Range	Authorized Bandwidth (kHz)
Part 90	851 MHz- 869 MHz	6.25/12.5/25
Part 90	806 MHz- 824 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	4.038	4K04F3E
12.5 kHz FM	7.933	7K93F3E
25 kHz FM	10.337	10K3F3E
C4FM (P25 Phase I)	8.173	8K17F1D, 8K17F1E
HCPM (P25 Phase II SU)	8.333	8K33F1W
HDQPSK (P25 Phase II BS)	9.976	9K98F1D, 9K98F1E, 9K98D7W

8.5 Input VS Output Signal Comparison

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



Input VS Output Comparison

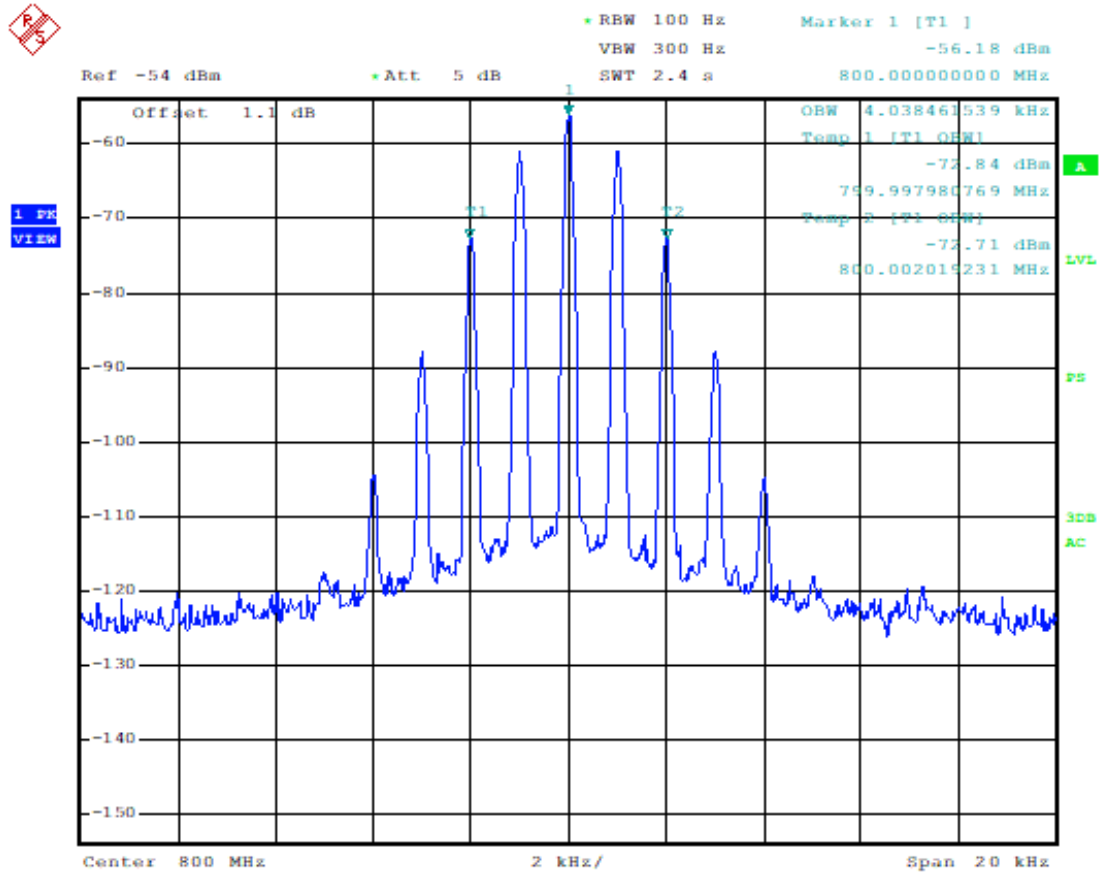
Test Results, Input VS Output Comparison						
Link Direction	Tuned Frequency (MHz)	Input Signal	AGC Level	99% OBW of Input (kHz)	99% OBW of Output (kHz)	Change (%)
Downlink	854	6.25 kHz FM	@ AGC	4.038	4.038	0
		12.5 kHz FM	@ AGC	6.21	6.071	0.139
		25 kHz FM	@ AGC	10.22	10.331	0.111
		C4FM	@ AGC	7.71	8.075	0.365
		HCPM	@ AGC	7.71	8.104	0.394
		HDQPSK	@ AGC	9.92	9.777	0.143
Downlink	860	6.25 kHz FM	@ AGC	4.038	4.037	0.001
		12.5 kHz FM	@ AGC	6.21	6.071	0.139
		25 kHz FM	@ AGC	10.22	10.331	0.111
		C4FM	@ AGC	7.71	8.044	0.334
		HCPM	@ AGC	7.71	8.163	0.453
		HDQPSK	@ AGC	9.92	9.777	0.143
Downlink	868	6.25 kHz FM	@ AGC	4.038	4.037	0.001
		12.5 kHz FM	@ AGC	6.21	6.071	0.139
		25 kHz FM	@ AGC	10.22	10.330	0.11
		C4FM	@ AGC	7.71	7.985	0.275
		HCPM	@ AGC	7.71	8.150	0.44
		HDQPSK	@ AGC	9.92	9.777	0.143

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	809	6.25 kHz FM	@ AGC	4.038	4.038	0
		12.5 kHz FM	@ AGC	6.21	7.933	1.723
		25 kHz FM	@ AGC	10.22	10.337	0.117
		C4FM	@ AGC	7.71	8.173	0.623
		HCPM	@ AGC	7.71	8.333	0.623
		HDQPSK	@ AGC	9.92	9.856	0.064
Uplink	815	6.25 kHz FM	@ AGC	4.038	4.038	0
		12.5 kHz FM	@ AGC	6.21	7.933	1.723
		25 kHz FM	@ AGC	10.22	10.337	0.117
		C4FM	@ AGC	7.71	7.933	0.223
		HCPM	@ AGC	7.71	8.253	0.543
		HDQPSK	@ AGC	9.92	9.976	0.056
Uplink	823	6.25 kHz FM	@ AGC	4.038	4.038	0
		12.5 kHz FM	@ AGC	6.21	7.933	1.723
		25 kHz FM	@ AGC	10.22	10.337	0.117
		C4FM	@ AGC	7.71	8.013	0.303
		HCPM	@ AGC	7.71	7.813	0.103
		HDQPSK	@ AGC	9.92	9.776	0.144

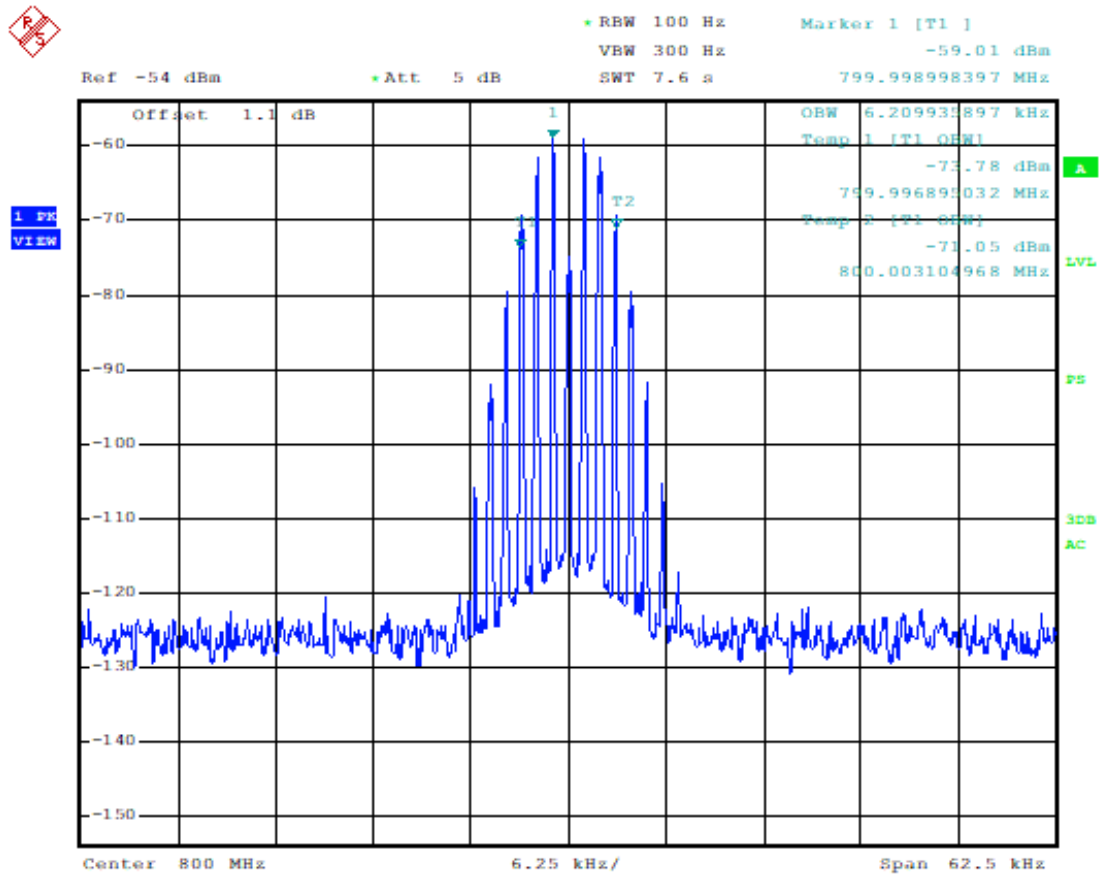
Input VS Output, Input Spectrum Plots

8.5.1 6.25 kHz FM, Input Signal



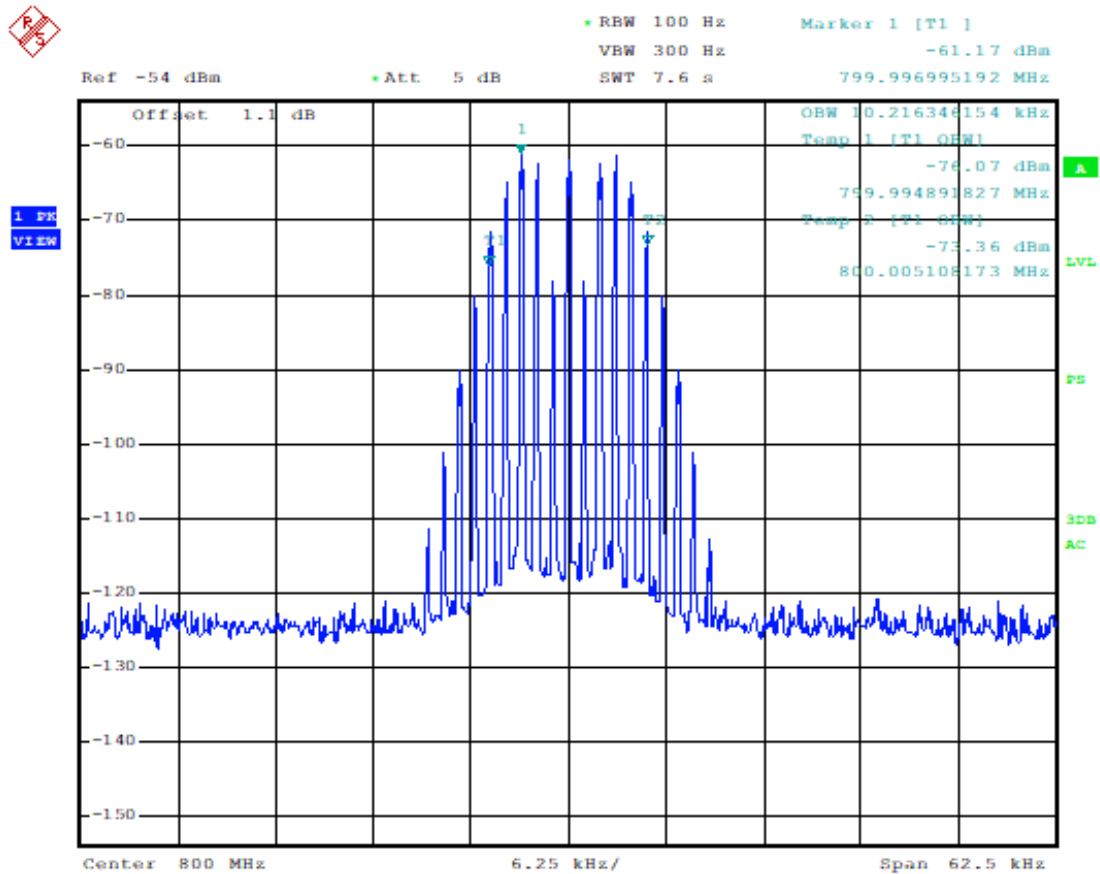
Date: 30.JAN.2019 13:10:11

8.5.2 12.5 kHz FM, Input Signal



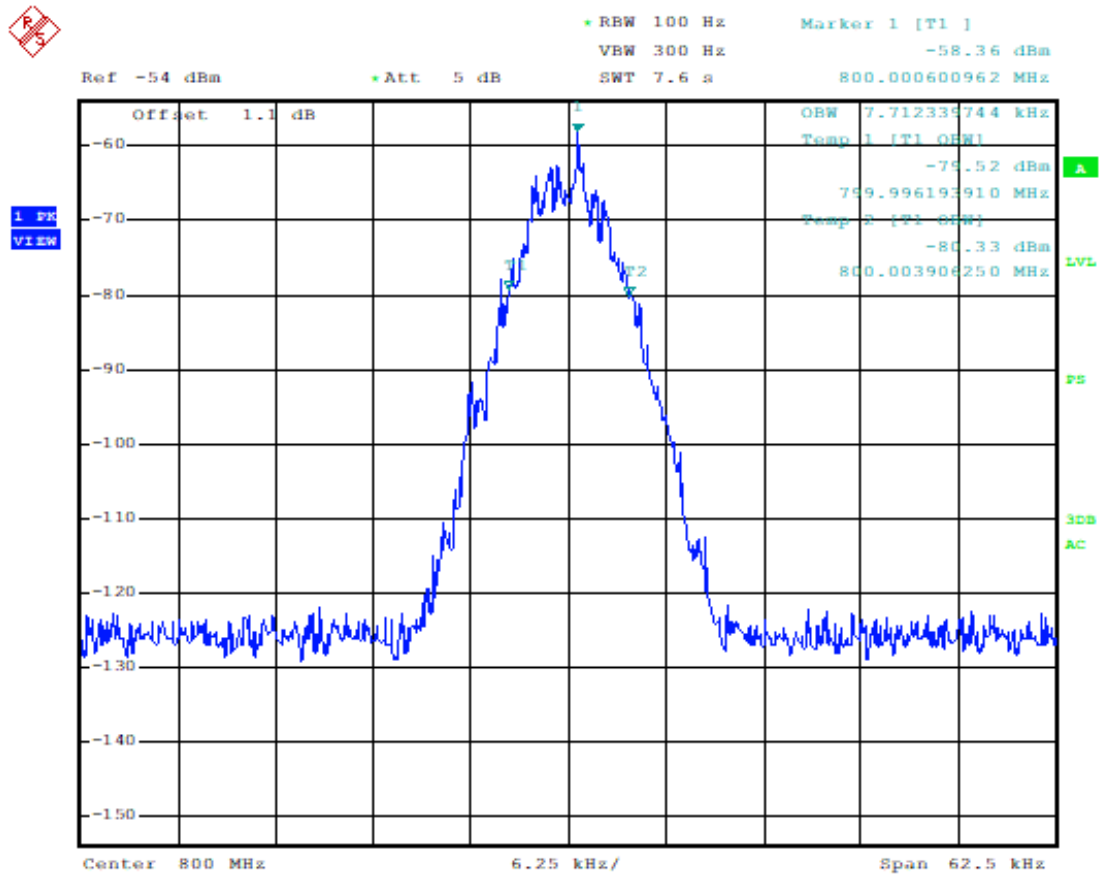
Date: 30.JAN.2019 14:19:45

8.5.3 25 kHz FM, Input Signal



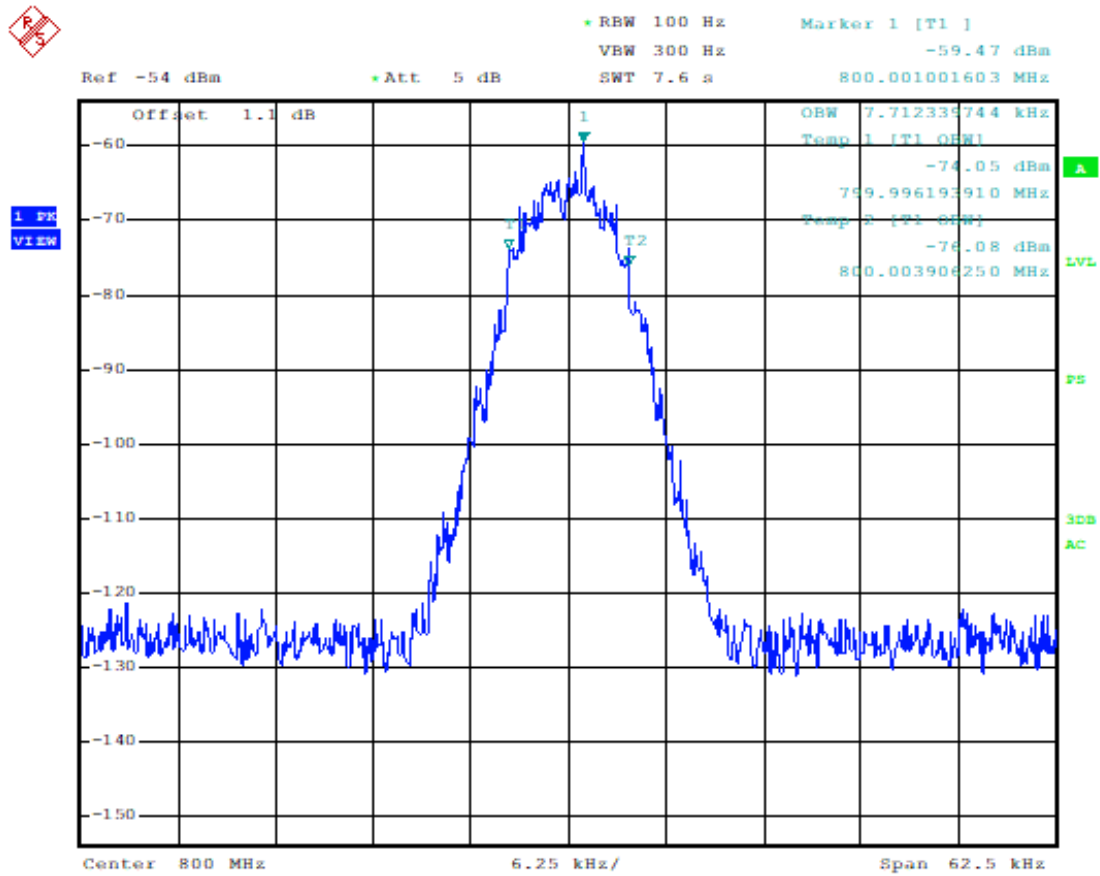
Date: 30.JAN.2019 14:23:14

8.5.4 C4FM, Input Signal



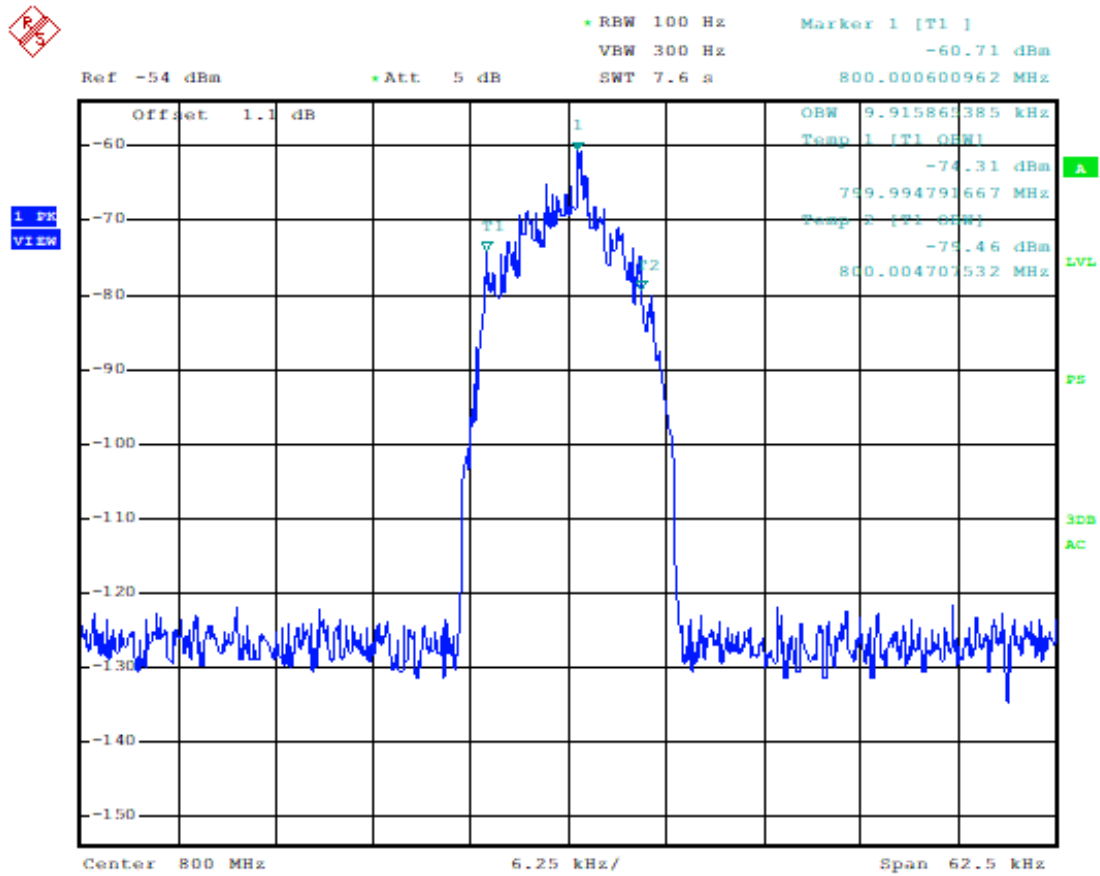
Date: 30.JAN.2019 14:28:58

8.5.5 H-CPM, Input Signal



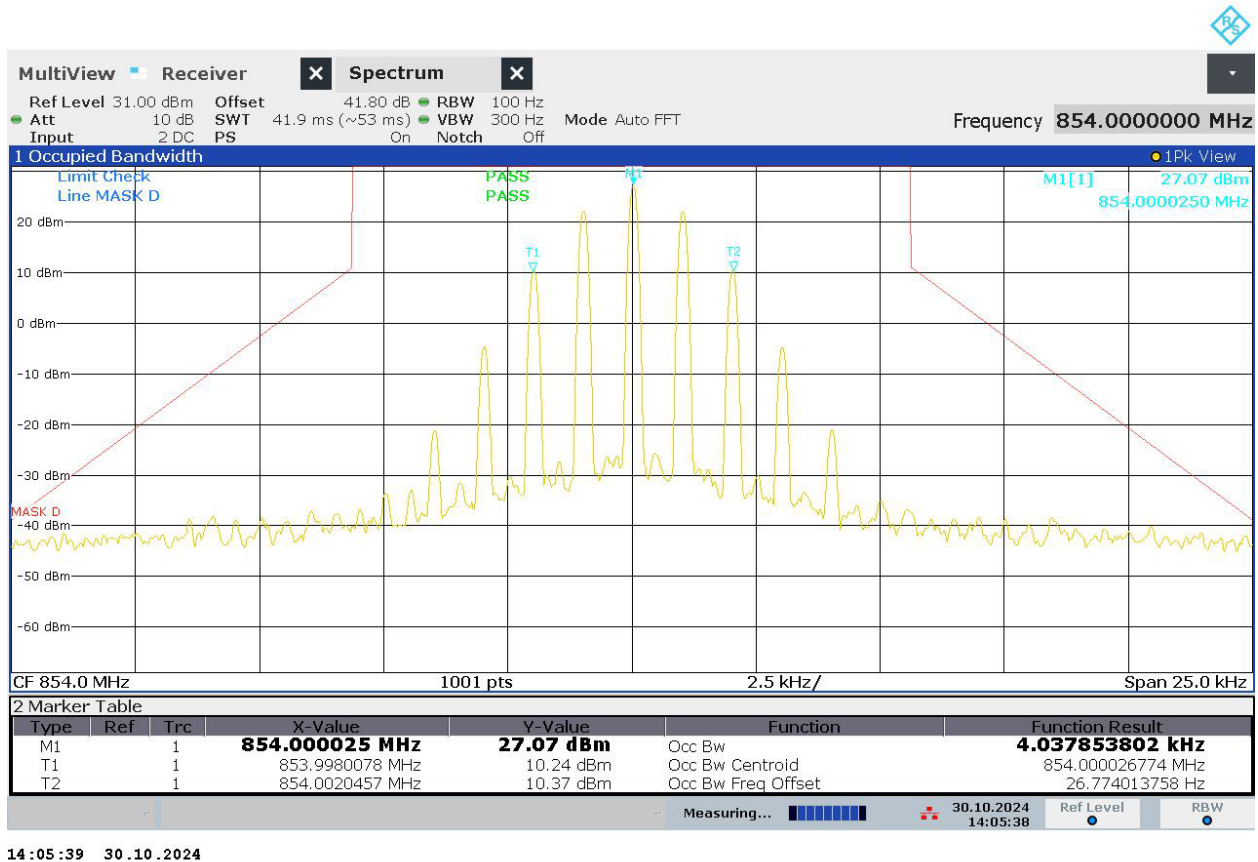
Date: 30.JAN.2019 14:30:47

8.5.6 H-DQPSK, Input Signal

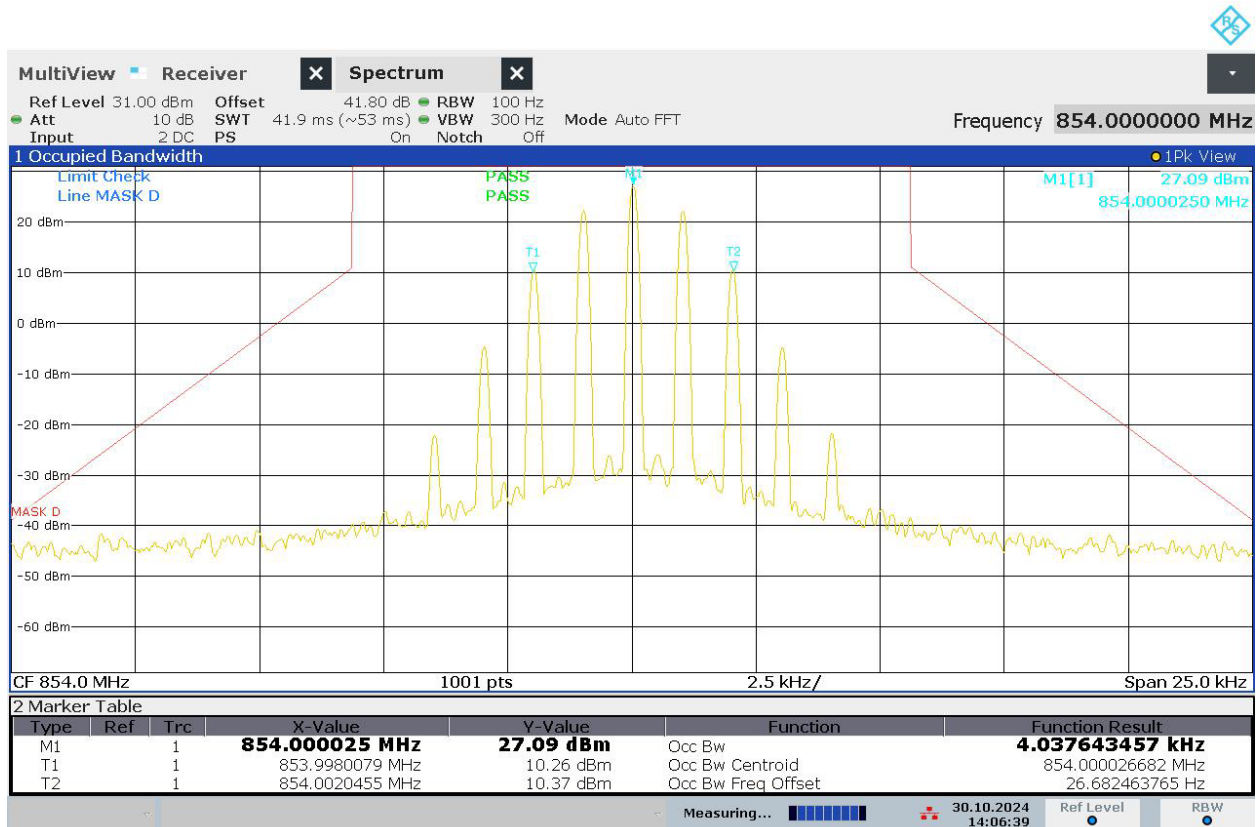


Date: 30.JAN.2019 14:32:35

8.5.7 6.25 kHz, FM, DL Mask D, AGC, 854 MHz

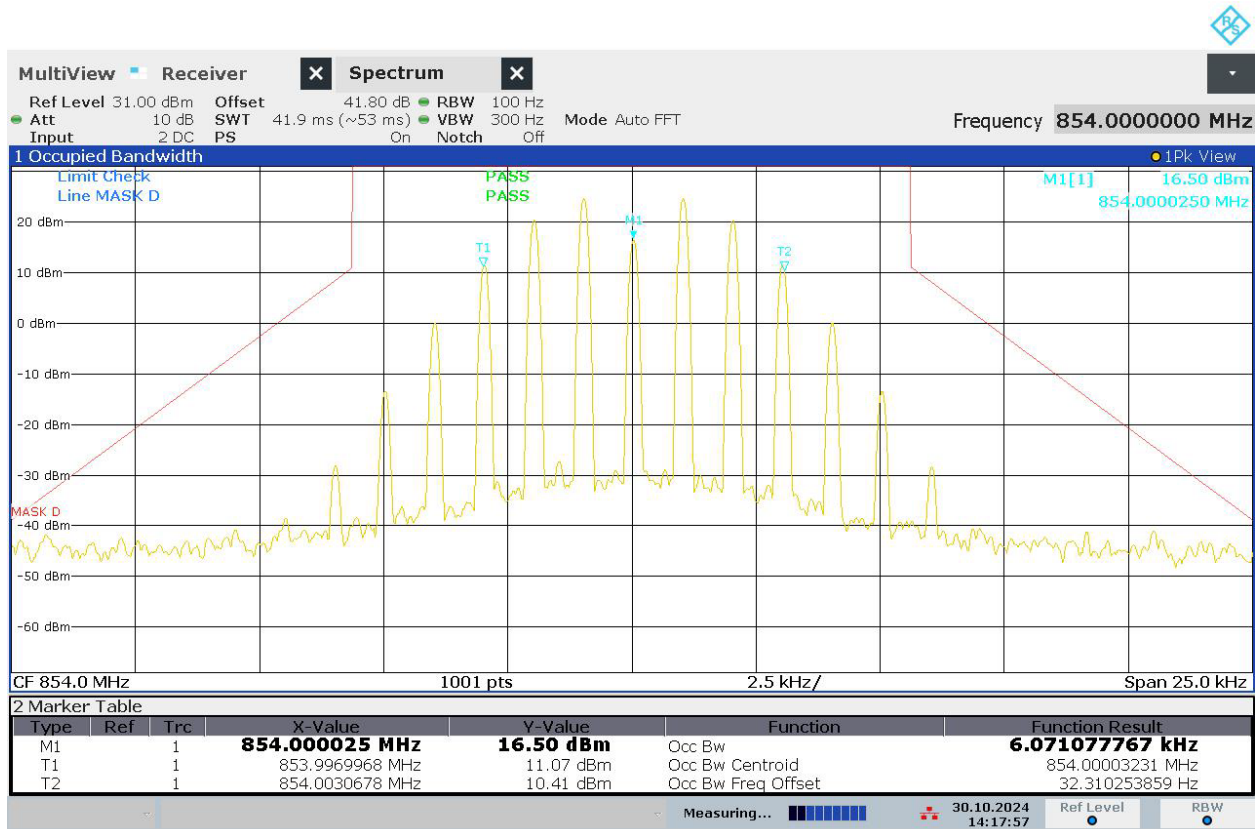


8.5.8 6.25 kHz, FM, DL Mask D, AGC +3, 854 MHz



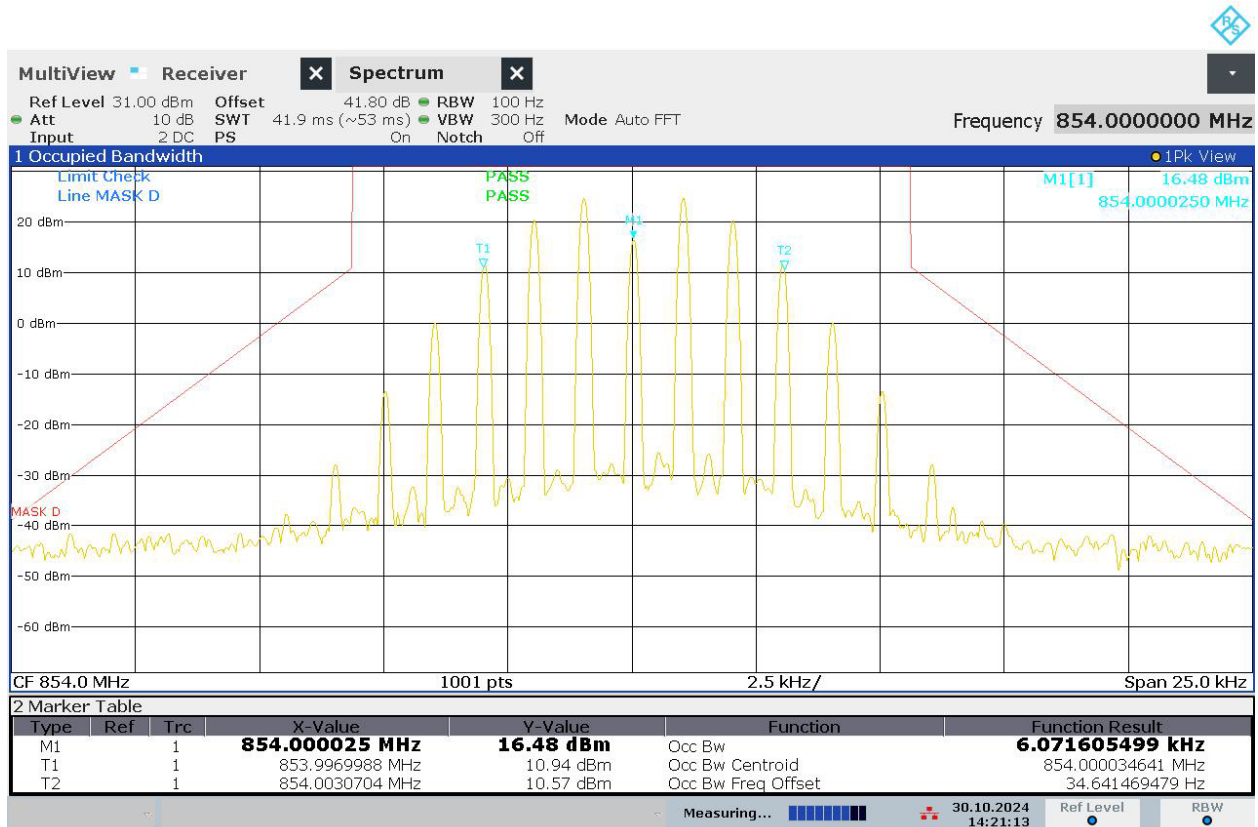
14:06:39 30.10.2024

8.5.9 12.5 kHz, FM, DL Mask D, AGC, 854 MHz



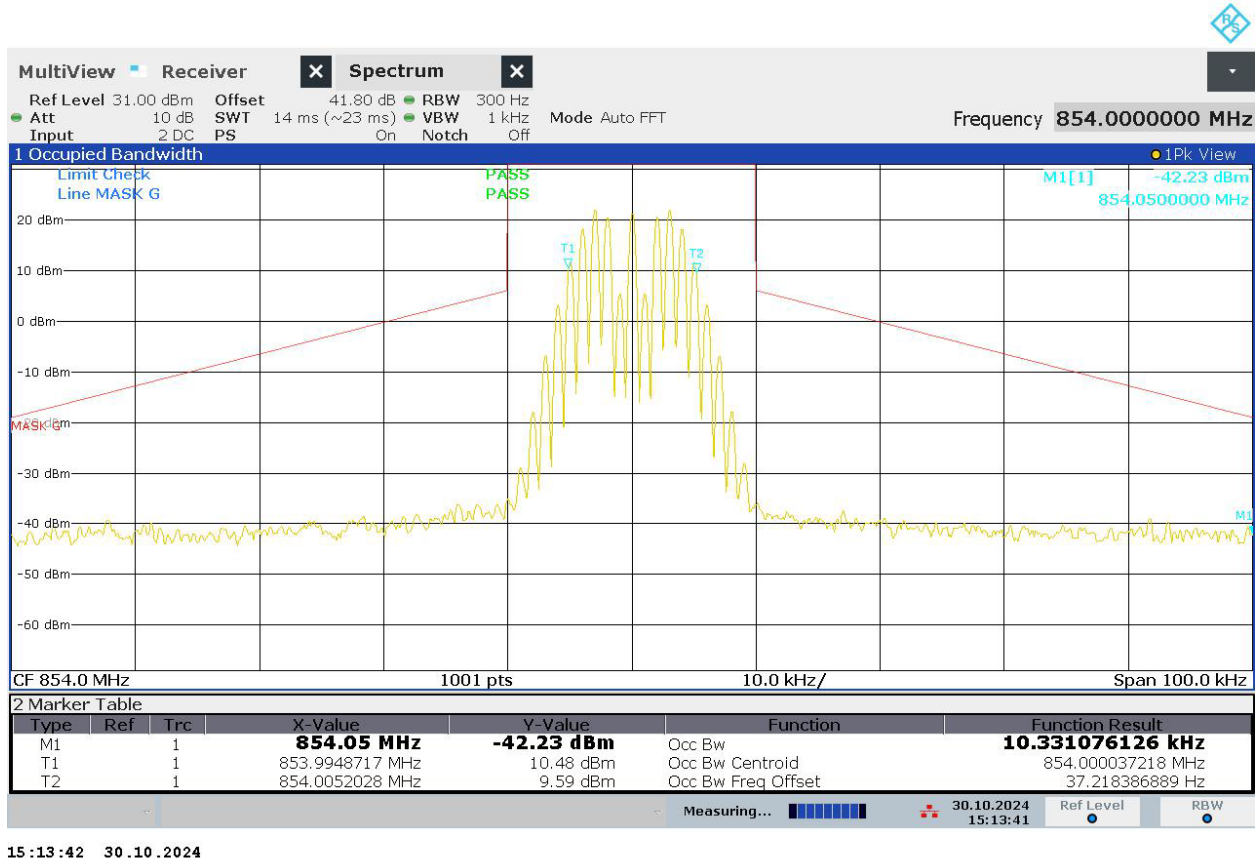
14:17:57 30.10.2024

8.5.10 12.5 kHz, FM, DL Mask D, AGC+3, 854 MHz

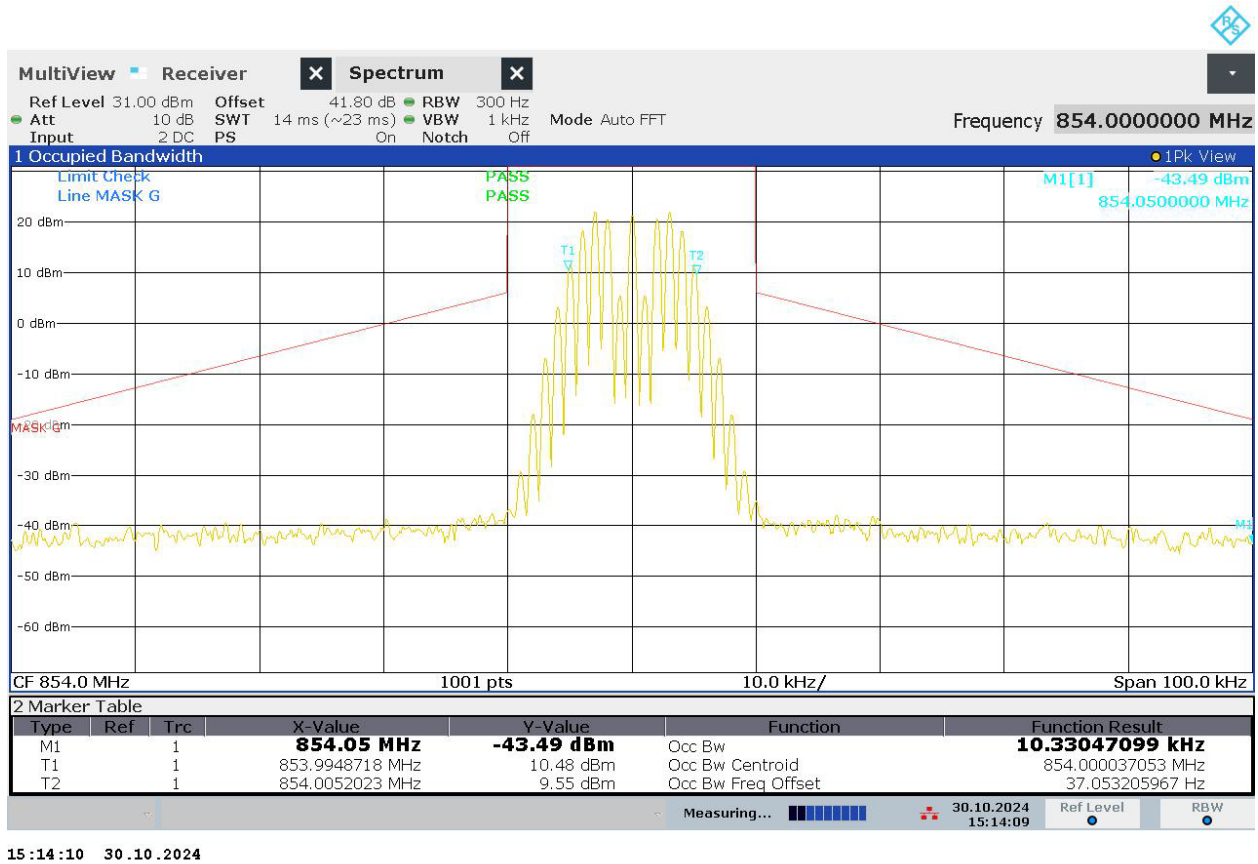


14:21:14 30.10.2024

8.5.11 25 kHz FM, DL Mask G, AGC, 854 MHz



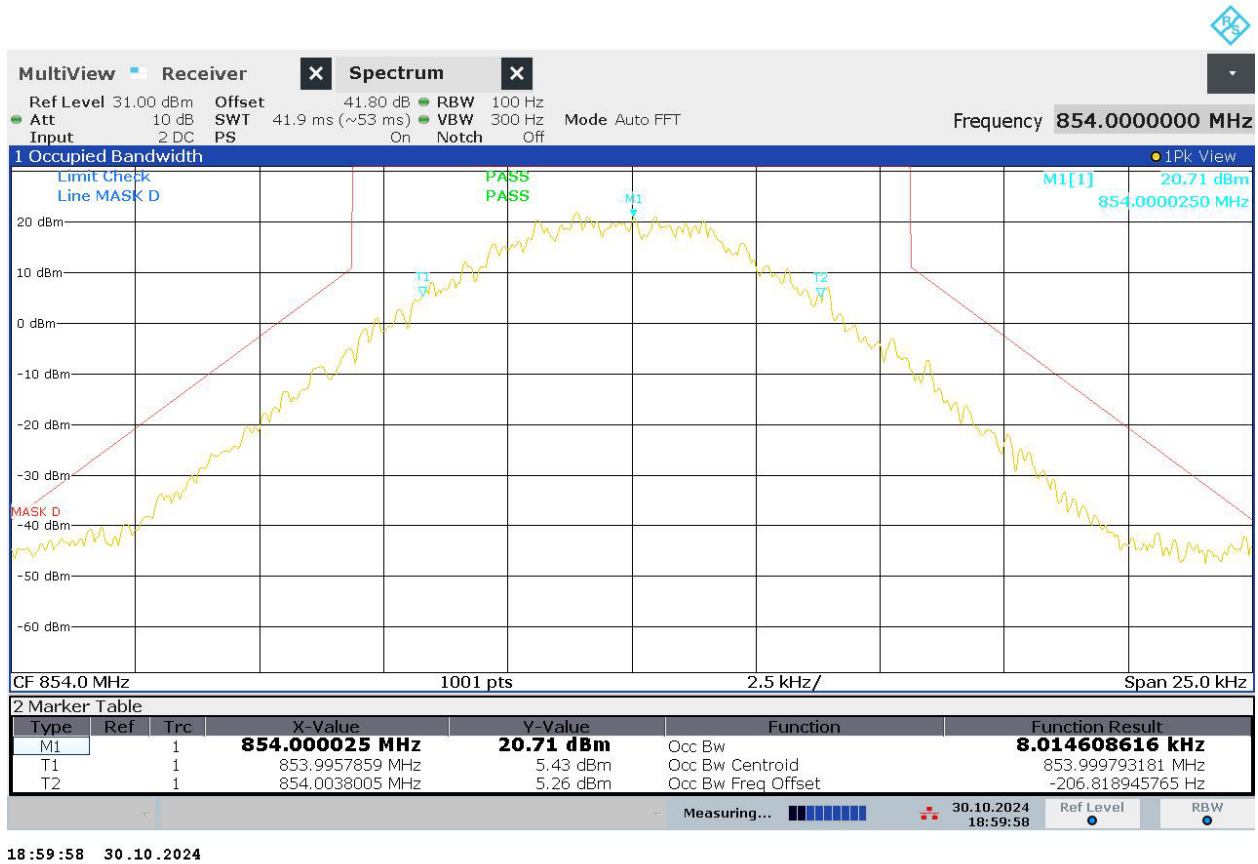
8.5.12 25 kHz FM, DL Mask G, AGC+3, 854 MHz



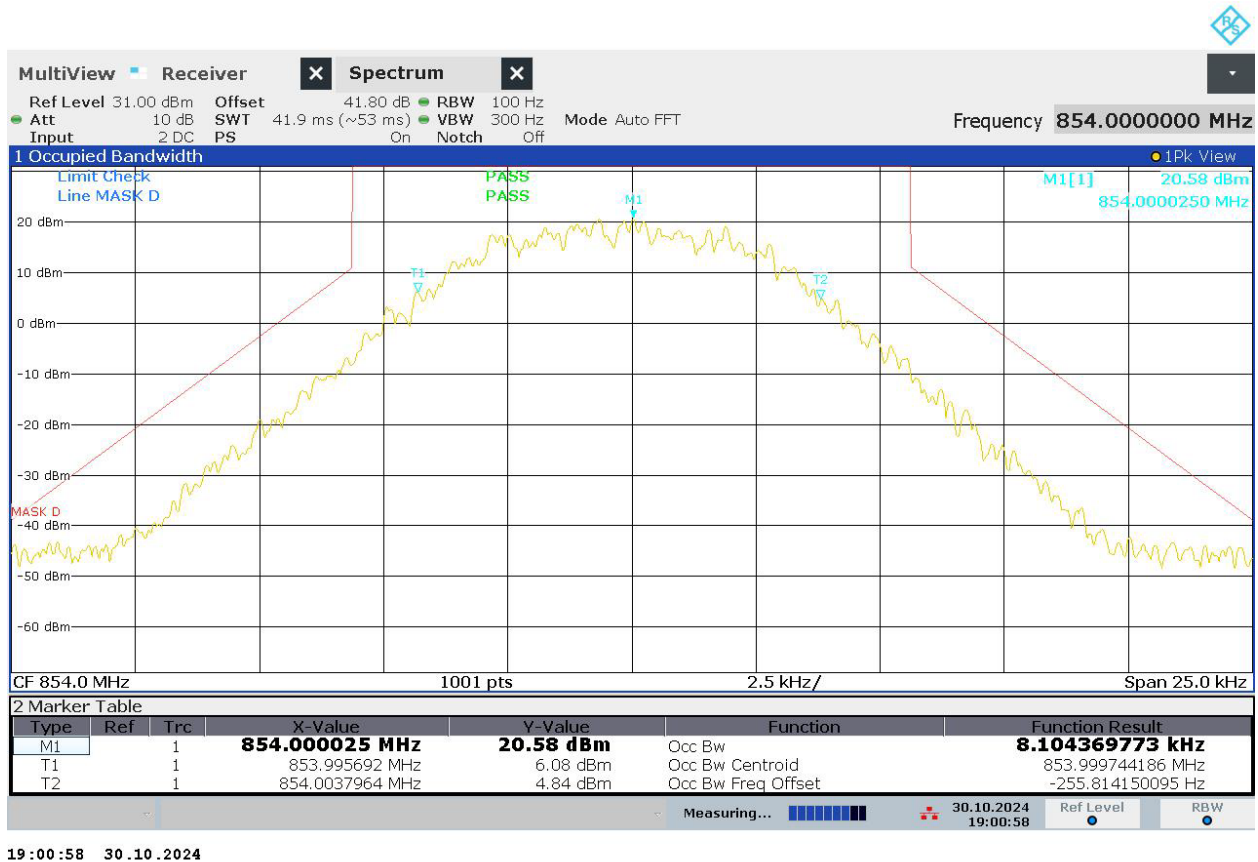
8.5.13 C4FM, DL Mask D, AGC, 854 MHz



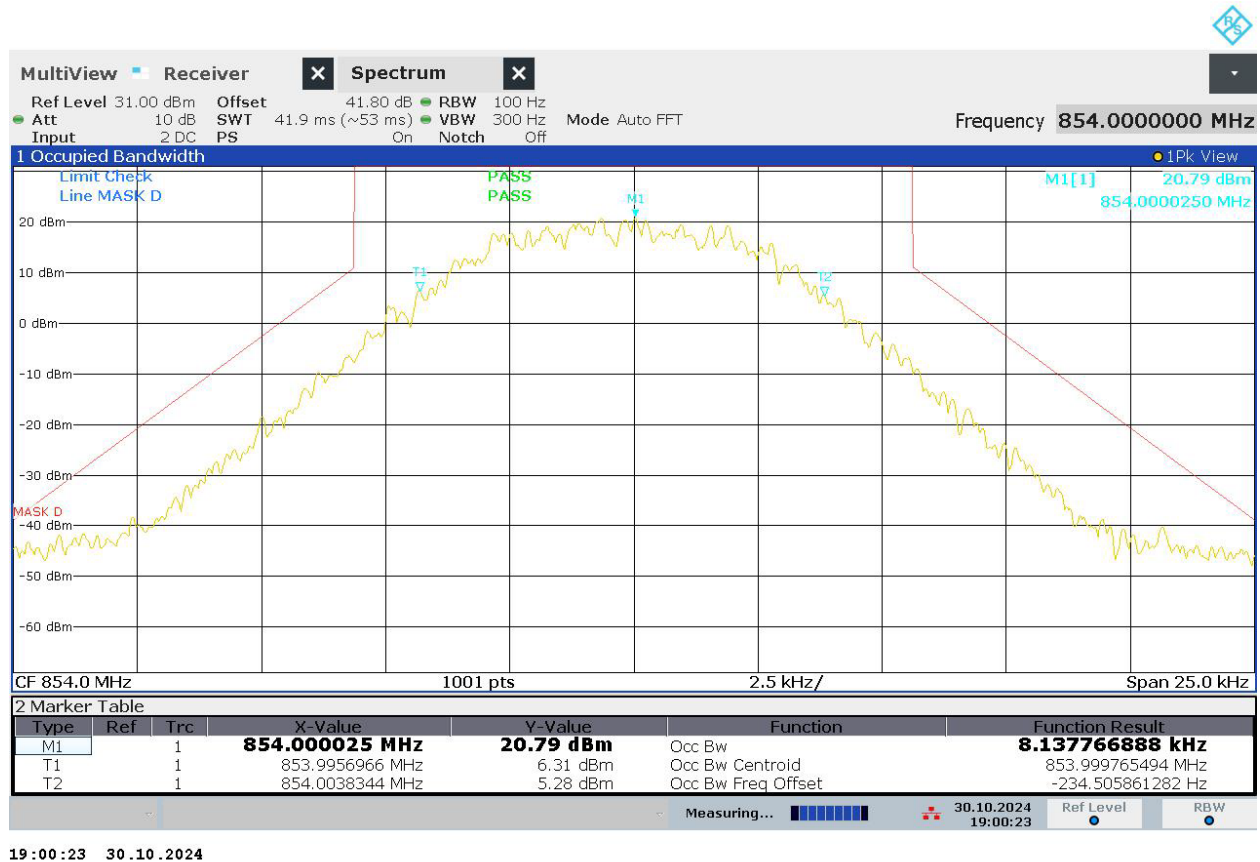
8.5.14 C4FM, DL Mask D, AGC+3, 854 MHz



8.5.15 H-CPM, DL Mask D, AGC, 854 MHz



8.5.16 H-CPM, DL Mask D, AGC+3, 854 MHz



8.5.17 H-DQPSK, DL Mask D, AGC, 854 MHz

