ENGINEERING TEST REPORT

UHF P25 Transceiver
Model No.: IC-F7540
FCC ID: AFJ399110

Applicant:

ICOM Incorporated
1-1-32, Kamiminami, Hirano-ku
Osaka, Japan, 547-0003

Tested in Accordance With

Federal Communications Commission (FCC)
47 CFR, Parts 2, 22 and 90 (Subpart R, S)

UltraTech's File No.: 23ICOM615_FCC90

This Test report is Issued under the Authority of Tri M. Luu, BASc, Vice President of Engineering UltraTech Group of Labs Date: September 1, 2023	
Report Prepared by: Santhosh Fernandez Issued Date: September 1, 2023	Tested by: Nimisha Desai Test Dates: August 9-28, 2023

- *The results in this Test Report apply only to the sample(s) tested, and the sample tested is randomly selected.*
- *This report must not be used by the client to claim product endorsement by any agency of the US Government.*
- *This test report shall not be reproduced, except in full, without a written approval from UltraTech.*

UltraTech

3000 Bristol Circle, Oakville, Ontario, Canada, L6H 6G4
Tel.: (905) 829-1570 Fax.: (905) 829-8050
Website: www.ultratech-labs.com, Email: vic@ultratech-labs.com, Email: tri@ultratech-labs.com

APEC TEL CA0001 | 1309 | 46390-2049 | AT-1945 | SL2-IN-E-1119R | Korea KCC-RRA CA0001

TABLE OF CONTENTS

EXHIBIT 1. INTRODUCTION

1.1. SCOPE

Reference:	FCC Parts 2, 22, 74, 80 and 90 (Subpart I)
Title:	Code of Federal Regulations (CFR), Title 47 Telecommunication – Parts 2, 22, 74, 80 and 90 (Subpart I)
Purpose of Test:	To obtain Certification Authorization for Radio operating in the Frequency Band 769-775 MHz, 799-805 MHz & 806-824 MHz and 851-869 MHz
Test Procedures:	Both conducted and radiated emissions measurements were conducted in accordance with TIA/EIA Standard TIA/EIA-603-E – Land Mobile FM or PM Communications Equipment Measurement and performance Standards.

1.2. REVISION HISTORY

Document	Issue Date	Description
23ICOM615_FCC90	September , 2023	Original Report

1.3. RELATED SUBMITTAL(S)/GRANT(S)

None

1.4. NORMATIVE REFERENCES

Publication	Year	Title
FCC CFR Parts 0-19, 80-End	2023	Code of Federal Regulations – Telecommunication
ANSI C63.4	2014	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
ANSI/TIA-603-E	2016	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
ANSI C63.26	2015	American National Standard for Compliance Testing of Transmitters used in Licensed Radio Services
RSS-119, Issue 12	2015	Land Mobile and Fixed Radio Transmitters and Receivers Operating in the Frequency Range 27.41-960 MHz
RSS-Gen, Issue 5	2018	General Requirements for Compliance of Radio Apparatus
RSS-310, Issue 4	2015	Licence-exempt Radio Apparatus (All Frequency Bands): Category II Equipment
ICES-003, Issue 7	2020	Digital Apparatus

EXHIBIT 2. PERFORMANCE ASSESSMENT

2.1. CLIENT INFORMATION

APPLICANT	
Name:	Icom Incorporated
Address:	1-1-32, Kamiminami Hirano-ku, Osaka Japan, 547-0003
Contact Person:	Mr. Atsushi Tomiyama Phone #: +81 6 6793 5302 Fax #: +81 6 6793 0013 Email Address: world_support@icom.co.jp

MANUFACTURER	
Name:	Icom Incorporated
Address:	1-1-32, Kamiminami Hirano-ku, Osaka Japan, 547-0003
Contact Person:	Mr. Atsushi Tomiyama Phone #: +81 6 6793 5302 Fax #: +81 6 6793 0013 Email Address: world_support@icom.co.jp

2.2. EQUIPMENT UNDER TEST (EUT) INFORMATION

The applicant has supplied the following information (with the exception of the Date of Receipt).

Brand Name:	ICOM Incorporated
Product Name:	UHF P25 Transceiver
Model Name or Number:	IC-F7540
Serial Number:	13000001
Type of Equipment:	Licensed Non-Broadcast Station Transmitter
Power Supply Requirement:	13.6 VDC nominal
Transmitting/Receiving Antenna Type:	Non-integral
Primary User Functions of EUT:	2-Way Wireless Voice & Data Communication

2.3. EUT'S TECHNICAL SPECIFICATIONS

TRANSMITTER	
Equipment Type:	Mobile
Intended Operating Environment:	Restricted to Occupational Use only
Power Supply Requirement:	13.6 VDC Nominal
RF Output Power Rating: 769-775 MHz, 799-805 MHz: 806-824 MHz and 851-869 MHz:	 30 Watts(High) / 2 Watts (Low) 35 Watts(High) / 2 Watts (Low)
Operating Frequency Range:	769-775 MHz, 799-805 MHz & 806-824 MHz and 851-869 MHz
RF Output Impedance:	50 Ω
Channel Spacing:	25 kHz, 20 kHz, 12.5 kHz
Occupied Bandwidth (99%):	15.96 kHz (25 kHz Analog) F3E 10.72 kHz (20 kHz Analog) F3E 11.05 kHz (12.5 kHz Analog) F3E 8.09 kHz (12.5 kHz Digital) F1D/F1E 8.09 kHz (12.5 kHz Digital) F1W
Emission Designation*:	Analog: 16K0F3E**, 14K0F3E, 11K0F3E, Digital: 8K10F1E, 8K10F1D, 8K10F1W

* For an average case of commercial telephony, the Necessary Bandwidth is calculated as follows:
For FM Voice Modulation:
Channel Spacing = 25 KHz, D = 5 KHz max, K = 1, M = 3 KHz
B_n = 2M + 2DK = 2(3) + 2(5)(1) = **16 KHz**
Emission designation: 16K0F3E

Channel Spacing = 20 KHz, D = 4 KHz max, K = 1, M = 3 KHz
B_n = 2M + 2DK = 2(3) + 2(4)(1) = **14 KHz**
Emission designation: 14K0F3E

Channel Spacing = 12.5 KHz, D = 2.5 KHz max, K = 1, M = 3 KHz
B_n = 2M + 2DK = 2(3) + 2(2.5)(1) = **11 KHz**
Emission designation: 11K0F3E
****Note:** The emission designation 16K0F3E with 25 KHz Channel bandwidth is only applied to the device operated in FCC Rules Part 22, 74 & 80 frequencies. The operation of 16K0F3E emission will be disabled in the firmware by the manufacturer for device that operates in FCC Rules Part 90 frequencies (Private Land Mobile) as declared by the applicant.

2.4. LIST OF EUT'S PORTS

Port Number	EUT's Port Description	Number of Identical Ports	Connector Type	Terminated with
1	Microphone Connector	1	8 Pin-connector Jack	Microphone
2	Antenna Connector	1	N	50 Ohm Load
3.	Micro USB	1	Micro- USB connector	Micro USB Cable
4.	DC POWER	1	2 wire	DC supply
5.	Ignition	1	1 Wire	Open cable
6.	D-Sub	1	25 Pin	Open cable
7	GPS Antenna	1	SMA	GPS Antenna UX-241
8.	EXT. Speaker	1	1/8" Jack	Speaker

2.5. ANCILLARY EQUIPMENT

The EUT was tested while connected to the following representative configuration of ancillary equipment necessary to exercise the ports during tests:

Ancillary Equipment # 1	
Description:	Microphone
Brand name:	ICOM
Model Name or Number:	HM218
Connected to EUT's Port:	Microphone Connector

Ancillary Equipment # 2	
Description:	External Speaker
Brand name:	ICOM
Model Name or Number:	SP-35
Connected to EUT's Port:	EXT Speaker

EXHIBIT 3. EUT OPERATING CONDITIONS AND CONFIGURATIONS DURING TESTS

3.1. CLIMATE TEST CONDITIONS

The climate conditions of the test environment are as follows:

Temperature:	21°C - 24°C
Humidity:	45% to 58%
Pressure:	102 kPa
Power Input Source:	13.6 VDC Nominal

3.2. OPERATIONAL TEST CONDITIONS & ARRANGEMENT FOR TEST SIGNALS

Operating Modes:	The transmitter was operated in a continuous transmission mode with the carrier modulated as specified in the Test Data.
Special Test Software:	N/A
Special Hardware Used:	N/A
Transmitter Test Antenna:	The EUT is tested with the antenna port terminated to a 50 Ohm RF Load.

Transmitter Test Signals	
Frequency Band(s):	769-775 MHz, 799-805 MHz & 806-824 MHz and 851-869 MHz
Test Frequencies: (Near lowest, near middle & near highest frequencies in the frequency range of operation of applicable band)	769.1 MHz, 774.9 MHz, 799.1 MHz, 804.9 MHz, 806.1 MHz, 808.9 MHz, 815.1 MHz, 823.9 MHz, 851.1 MHz,853.9 MHz, 860.1 MHz, 868.9 MHz
Transmitter Wanted Output Test Signals: Transmitter Power (measured maximum output power): Normal Test Modulation: Modulating signal source:	 769-775 MHz& 799-805 MHz band: 27.80 W 806-824 MHz and 851-869 MHz band:34.12W FM Voice/Digital External

EXHIBIT 4. SUMMARY OF TEST RESULTS

4.1. LOCATION OF TESTS

All of the measurements described in this report were performed at Ultratech Group of Labs located in the city of Oakville, Province of Ontario, Canada.

Radiated Emissions were performed at the Ultratech's 3-10 TDK Semi-Anechoic Chamber situated in the Town of Oakville, province of Ontario. This test site been calibrated in accordance with ANSI C63.4, and found to be in compliance with the requirements of Sec. 2.948 of the FCC Rules. The descriptions and site measurement data of the Oakville 3-10 TDK Semi-Anechoic Chamber has been filed with ANAB File No.: AT-1945.

4.2. APPLICABILITY & SUMMARY OF EMISSION TEST RESULTS

FCC Section(s)	Test Requirements	Applicability (Yes/No)
1.1307, 1.1310, 2.1091 & 2.1093	RF Exposure Limit	Yes
2.1046, 22.565, 90.205, 90.541 (d)	RF Power Output	Yes
90.543(f)	GNSS (EIRP)	Not Wideband or Discrete emission <700 Hz
2.1047(a), & 90.242(b)(8)	Audio Frequency Response	Not applicable to new standard. However, tests are conducted under FCC's recommendation.
2.1047(b) & 90.210	Modulation Limiting	Yes
2.1049 90.209, 90.210, 90.691	Emission Limitation & Emission Mask	Yes
2.1051, 2.1057, 90.210, 90.543	Emission Limits - Spurious Emissions at Antenna Terminal	Yes
2.1053, 2.1057, 22.359, 90.210, 90.543	Emission Limits - Field Strength of Spurious Emissions	Yes
90.543	Adjacent Channel Power	Yes for 769-805MHz Band
2.1055, 22.355, 90.213 & 90.539	Frequency Stability	Yes
90.214	Transient Frequency Behavior	N/A
UHF P25 Transceiver, Model No.: IC-F7540, by ICOM Incorporated has also been tested and found to comply with FCC Part 15, Subpart B - Radio Receivers and Digital Devices. The engineering test report has been documented and kept on file and is available upon request.		

4.3. MODIFICATIONS INCORPORATED IN THE EUT FOR COMPLIANCE PURPOSES

None

4.3.1. DEVIATION OF STANDARD TEST PROCEDURES

None

EXHIBIT 5. MEASUREMENTS, EXAMINATIONS & TEST DATA FOR EMC EMISSIONS

5.1. TEST PROCEDURES

This section contains test results only. Details of test methods and procedures can be found in EXHIBIT 8 of this report.

5.2. MEASUREMENT UNCERTAINTIES

The measurement uncertainties stated were calculated in accordance with the requirements of CISPR 16-4-2 @ IEC:2003 and JCGM 100:2008 (GUM 1995) – Guide to the Expression of Uncertainty in Measurement.
Refer to Exhibit 7 for Measurement Uncertainties.

5.3. MEASUREMENT EQUIPMENT USED

The measurement equipment used complied with the requirements of the Standards referenced in the Methods & Procedures ANSI C63.4 and CISPR 16-1-1.

5.4. ESSENTIAL/PRIMARY FUNCTIONS AS DECLARED BY THE MANUFACTURER

The essential function of the EUT is to communicate to and from radios over RF link.

5.5. RF POWER OUTPUT [§§ 2.1046, 90.205, 90.541& 90.543]

5.5.1. Limits

Please refer to FCC 47 CFR 90.205, 90.541, 90.543 for specification details.

5.5.2. Method of Measurements

Refer to Section 8.1 (Conducted) and 8.2 (Radiated) of this report for measurement details

5.5.3. Test Data

769-805 MHz band Conducted power

Frequencies MHz	Power Rating Watts	Power Rating dBm	Measured Power dBm	Measured Power Watts
769.100	30.0	44.77	44.44	27.80
774.900	30.0	44.77	44.42	27.67
799.100	30.0	44.77	44.36	27.29
804.900	30.0	44.77	44.37	27.35
769.100	2.0	33.01	33.21	2.09
774.900	2.0	33.01	33.18	2.08
799.100	2.0	33.01	33.13	2.06
804.900	2.0	33.01	33.14	2.06
769.100	15.0	41.76	41.79	15.10
774.900	15.0	41.76	41.77	15.03
799.100	15.0	41.76	41.71	14.83
804.900	15.0	41.76	41.72	14.86

806-869MHz Band Conducted power

Frequencies MHz	Power Rating Watts	Power Rating dBm	Measured Power dBm	Measured Power Watts
806.100	35.0	45.44	45.27	33.65
808.900	35.0	45.44	45.06	32.06
815.100	35.0	45.44	45.24	33.42
823.900	35.0	45.44	45.02	31.77
851.100	35.0	45.44	45.15	32.73
853.900	35.0	45.44	45.19	33.04
860.100	35.0	45.44	45.24	33.42
868.900	35.0	45.44	45.33	34.12
806.100	2.0	33.01	32.89	1.95
808.900	2.0	33.01	32.92	1.96
815.100	2.0	33.01	32.86	1.93
823.900	2.0	33.01	32.87	1.94
851.100	2.0	33.01	32.94	1.97
853.900	2.0	33.01	33.00	2.00
860.100	2.0	33.01	33.05	2.02
868.900	2.0	33.01	33.16	2.07
806.100	15.0	41.76	41.47	14.03
808.900	15.0	41.76	41.52	14.19
815.100	15.0	41.76	41.55	14.29
823.900	15.0	41.76	41.64	14.59
851.100	15.0	41.76	41.73	14.89
853.900	15.0	41.76	41.79	15.10
860.100	15.0	41.76	41.84	15.28
868.900	15.0	41.76	41.94	15.63

5.6. AUDIO FREQUENCY RESPONSE [§ 2.1047(a) & 90.242(b)(8)]

5.6.1. Limits

§ **2.1047(a):** Voice modulated communication equipment. A curve or equivalent data showing the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz shall be submitted. For equipment required to have an audio low-pass filter, a curve showing the frequency response of the filter or of all circuitry installed between the modulation limiter and the modulated stage shall be submitted.

§ **90.242(b)(8):** Recommended audio filter attenuation characteristics are given below:

Audio band	Minimum Attenuation Rel. to 1 kHz Attenuation
3 –20 KHz	60 $\log_{10}$(f/3) dB where f is in kHz
20 – 30 KHz	50dB

5.6.2. Method of Measurements

The rated audio input signal was applied to the input of the audio low pass filter(or of all modulation stages) using an output of Bode network analyzer. This input signal level and it's corresponding output signal were then measured and recorded using the Bode Network Analyzer. Tests were repeated at different audio signal frequencies from 0 to 50 KHz.

Refer to Section 6 for Test Set up block diagram and equipment used.

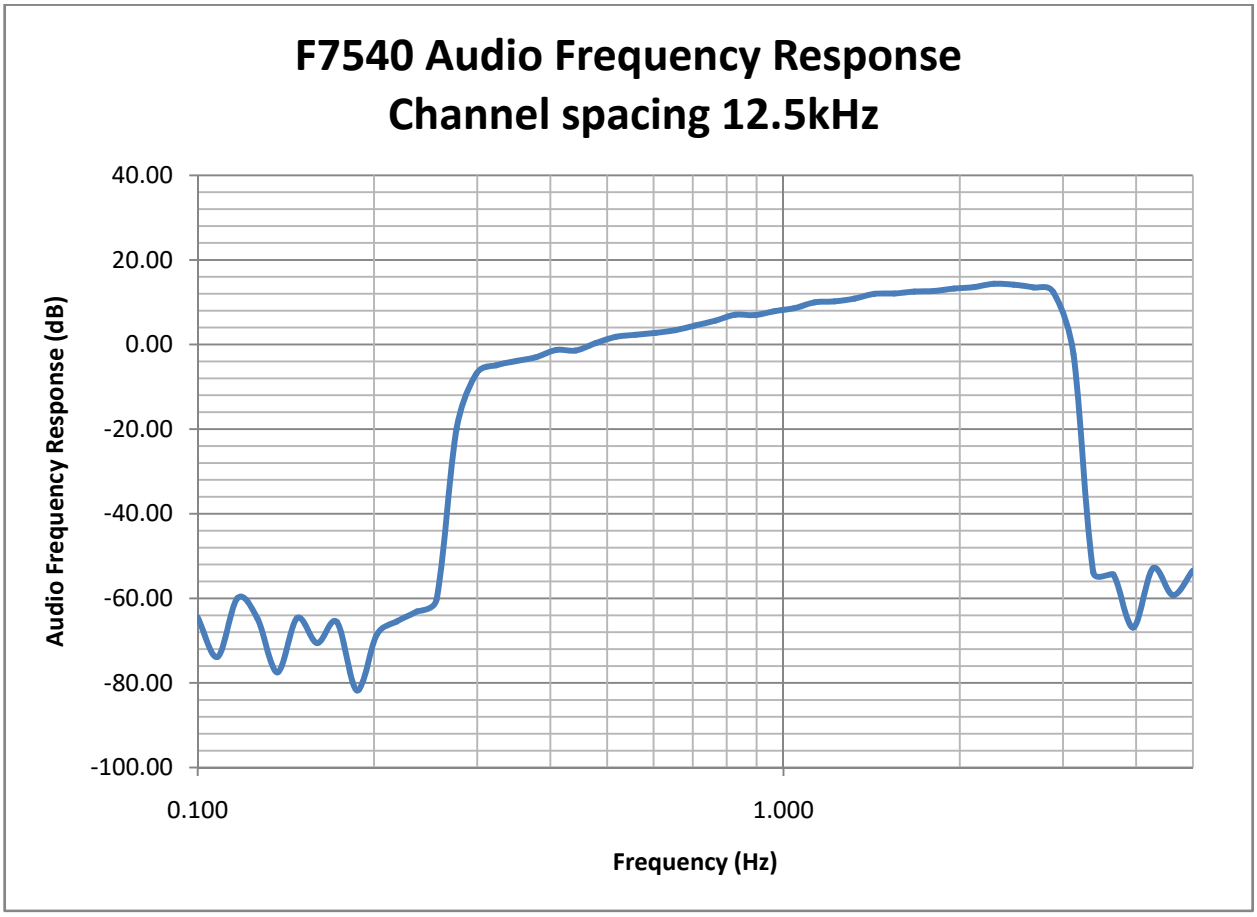
5.6.3. Test Data

Note: Audio Freq Response and Modulation limiting tests were performed only for 12.5 , 20 & 25 kHz channel spacing.

5.6.3.1. 12.5 KHz Channel Spacing, F3E, Frequency of All Modulation States (769-775 MHz band)

5.6.3.1.1. Audio frequency response

Frequency (KHz)	Trace 1: Gain: Magnitude (dB)	**Frequency (KHz)**	Trace 1: Gain: Magnitude (dB)
0.100	-64.50	**0.765**	5.63
0.108	-73.82	**0.827**	7.01
0.117	-59.95	**0.894**	6.96
0.126	-64.79	**0.967**	7.91
0.137	-77.50	**1.046**	8.60
0.148	-64.66	**1.131**	9.99
0.160	-70.58	**1.223**	10.21
0.173	-65.62	**1.322**	10.86
0.187	-81.76	**1.430**	11.97
0.202	-68.57	**1.546**	12.06
0.219	-65.46	**1.672**	12.52
0.236	-63.13	**1.808**	12.64
0.256	-60.29	**1.955**	13.22
0.277	-19.98	**2.114**	13.56
0.299	-6.93	**2.287**	14.36
0.323	-4.91	**2.473**	14.13
0.350	-3.90	**2.674**	13.50
0.378	-3.01	**2.891**	12.33
0.409	-1.29	**3.127**	-2.26
0.442	-1.40	**3.381**	-53.87
0.478	0.33	**3.656**	-54.36
0.517	1.80	**3.954**	-66.90
0.559	2.30	**4.276**	-52.89
0.605	2.74	**4.624**	-59.24
0.654	3.40	**5.000**	-53.44
0.707	4.48		

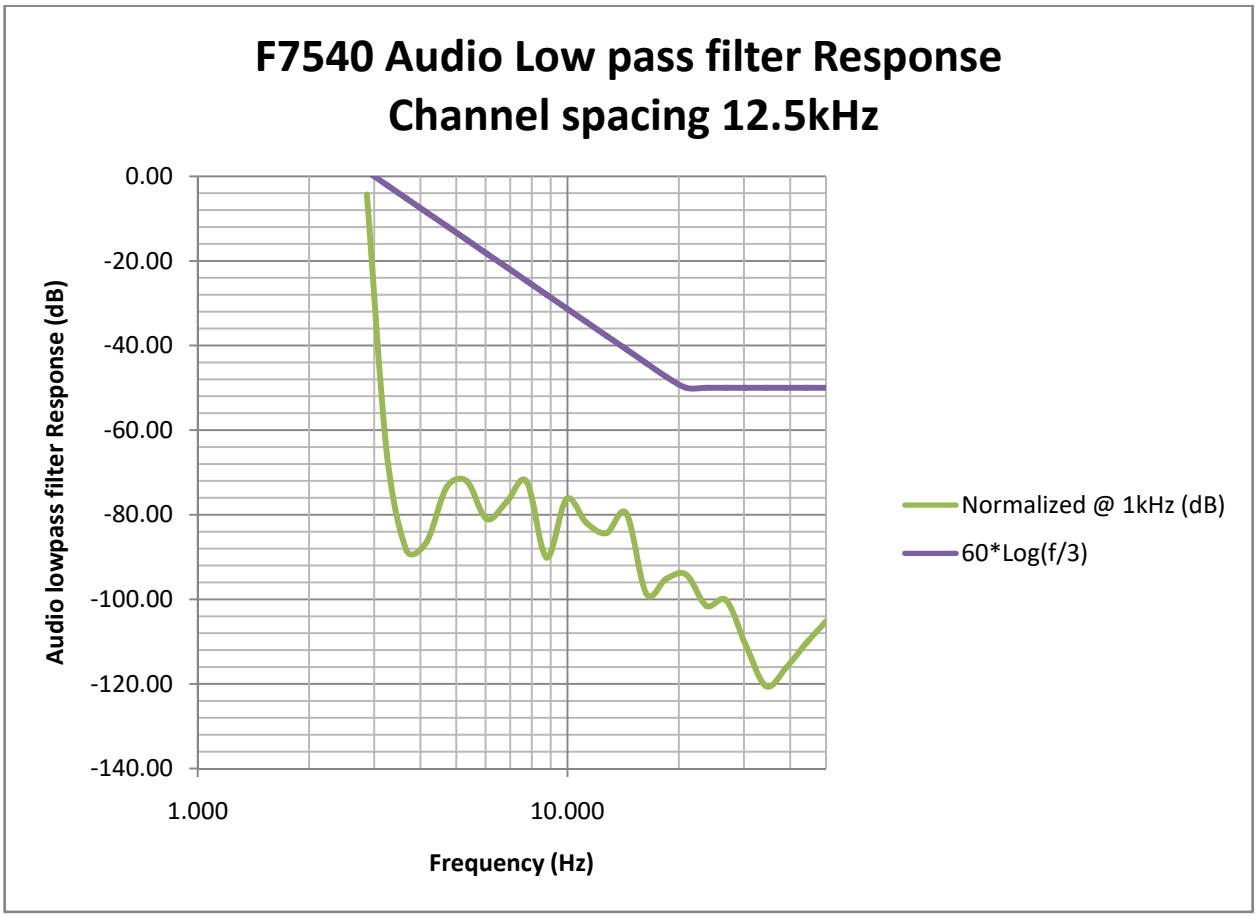


All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

5.6.3.1.2. Audio Low pass filter Response

Frequency (KHz)	Trace 1: Gain: Magnitude (dB)	Normalized @ 1kHz (dB)	60*Log(f/3)
0.100	-49.71	-63.68	
0.113	-44.21	-58.18	
0.128	-43.50	-57.47	
0.145	-48.96	-62.93	
0.164	-57.07	-71.04	
0.186	-47.37	-61.34	
0.211	-56.25	-70.22	
0.239	-52.28	-66.25	
0.270	-10.94	-24.91	
0.306	9.52	-4.45	
0.347	9.95	-4.02	
0.392	10.54	-3.43	
0.444	11.47	-2.50	
0.503	12.35	-1.62	
0.570	13.61	-0.36	
0.645	12.86	-1.11	
0.731	14.45	0.48	
0.827	14.78	0.81	
0.937	14.85	0.88	
1.061	13.97	0.00	
1.201	14.38	0.41	
1.360	14.10	0.13	
1.540	15.04	1.07	
1.744	14.66	0.69	
1.975	14.56	0.59	
2.236	13.85	-0.12	
2.532	12.49	-1.48	
2.867	9.64	-4.33	1.18
3.247	-51.77	-65.75	-2.06
3.676	-74.55	-88.52	-5.30
4.163	-72.40	-86.37	-8.54
4.714	-59.48	-73.45	-11.78
5.338	-58.07	-72.04	-15.02
6.044	-67.04	-81.01	-18.25
6.844	-63.02	-76.99	-21.49
7.750	-58.18	-72.15	-24.73
8.775	-76.15	-90.12	-27.97
9.937	-62.33	-76.30	-31.21

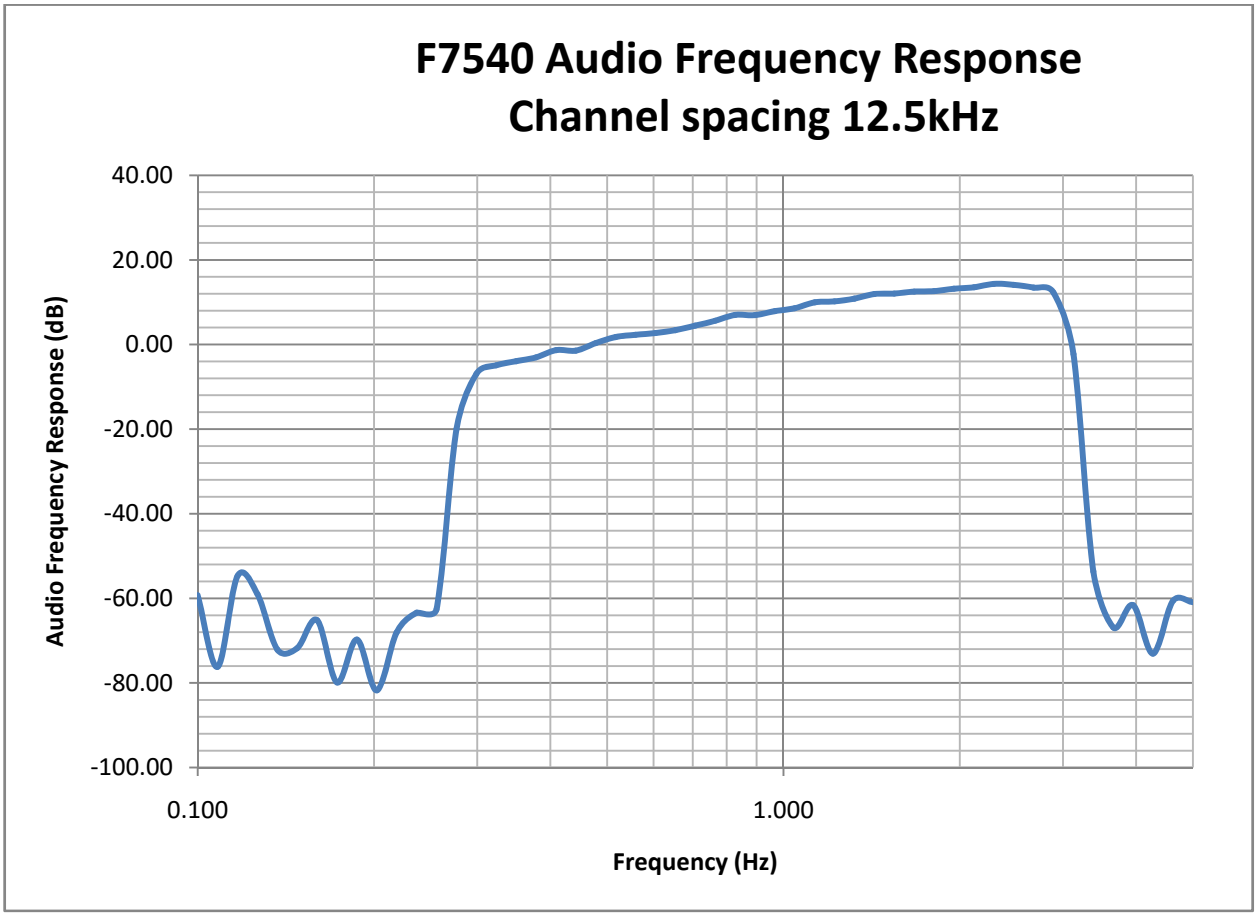
11.252	-67.94	-81.91	-34.45
12.741	-70.37	-84.34	-37.68
14.427	-65.76	-79.73	-40.92
16.336	-84.71	-98.68	-44.16
18.498	-81.20	-95.17	-47.40
20.947	-80.20	-94.17	-50.00
23.719	-87.54	-101.51	-50.00
26.858	-86.28	-100.25	-50.00
30.413	-97.08	-111.05	-50.00
34.438	-106.56	-120.53	-50.00
38.995	-102.21	-116.18	-50.00
44.156	-96.42	-110.39	-50.00
50.000	-91.25	-105.22	-50.00



5.6.3.2. 12.5 KHz Channel Spacing, F3E, Frequency of All Modulation States (799-805 MHz band)

5.6.3.2.1. Audio frequency response

Frequency (KHz)	Trace 1: Gain: Magnitude (dB)	**Frequency (KHz)**	Trace 1: Gain: Magnitude (dB)
0.100	-59.23	0.765	5.62
0.108	-76.17	0.827	6.99
0.117	-54.75	0.894	6.94
0.126	-59.00	0.967	7.89
0.137	-72.09	1.046	8.58
0.148	-71.77	1.131	9.97
0.160	-65.17	1.223	10.19
0.173	-79.88	1.322	10.84
0.187	-69.74	1.430	11.95
0.202	-81.74	1.546	12.04
0.219	-68.04	1.672	12.50
0.236	-63.40	1.808	12.61
0.256	-62.61	1.955	13.19
0.277	-19.98	2.114	13.53
0.299	-6.96	2.287	14.33
0.323	-4.93	2.473	14.09
0.350	-3.93	2.674	13.46
0.378	-3.05	2.891	12.30
0.409	-1.32	3.127	-2.28
0.442	-1.43	3.381	-53.62
0.478	0.32	3.656	-66.88
0.517	1.78	3.954	-61.63
0.559	2.28	4.276	-73.06
0.605	2.71	4.624	-60.59
0.654	3.39	5.000	-60.89
0.707	4.45		

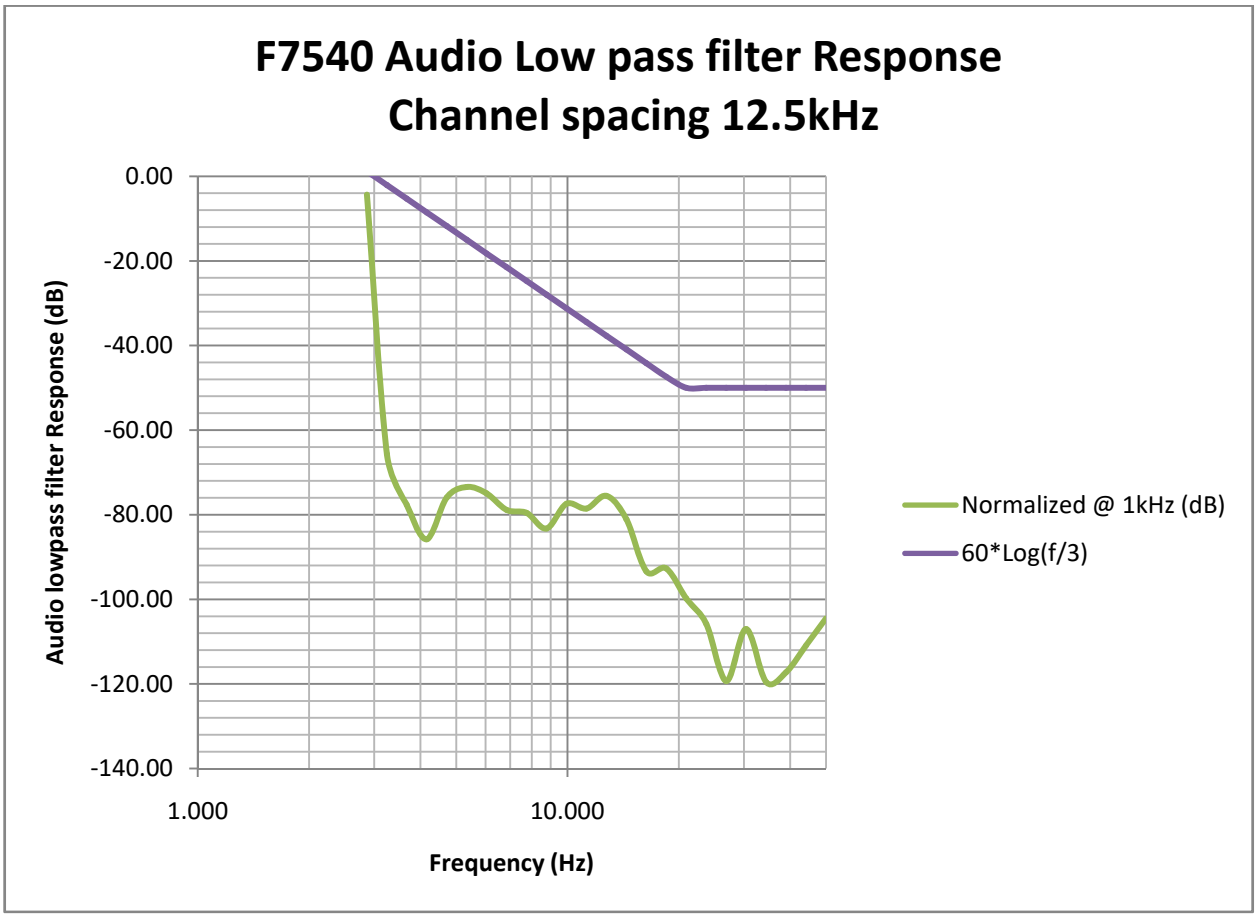


All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

5.6.3.2.2. Audio Low pass filter Response

Frequency (KHz)	Trace 1: Gain: Magnitude (dB)	Normalized @ 1kHz (dB)	60*Log(f/3)
0.100	-50.72	-64.67	
0.113	-44.30	-58.25	
0.128	-40.39	-54.34	
0.145	-56.87	-70.81	
0.164	-49.27	-63.22	
0.186	-54.06	-68.01	
0.211	-59.01	-72.96	
0.239	-48.51	-62.46	
0.270	-11.07	-25.02	
0.306	9.53	-4.42	
0.347	9.93	-4.01	
0.392	10.52	-3.42	
0.444	11.45	-2.50	
0.503	12.33	-1.62	
0.570	13.60	-0.35	
0.645	12.84	-1.11	
0.731	14.43	0.48	
0.827	14.76	0.81	
0.937	14.83	0.88	
1.061	13.95	0.00	
1.201	14.36	0.42	
1.360	14.08	0.13	
1.540	15.02	1.07	
1.744	14.63	0.68	
1.975	14.53	0.58	
2.236	13.82	-0.13	
2.532	12.45	-1.50	
2.867	9.61	-4.34	1.18
3.247	-51.71	-65.66	-2.06
3.676	-63.73	-77.68	-5.30
4.163	-71.84	-85.79	-8.54
4.714	-62.00	-75.95	-11.78
5.338	-59.48	-73.43	-15.02
6.044	-60.99	-74.94	-18.25
6.844	-64.91	-78.86	-21.49
7.750	-65.60	-79.55	-24.73
8.775	-69.30	-83.25	-27.97
9.937	-63.48	-77.43	-31.21

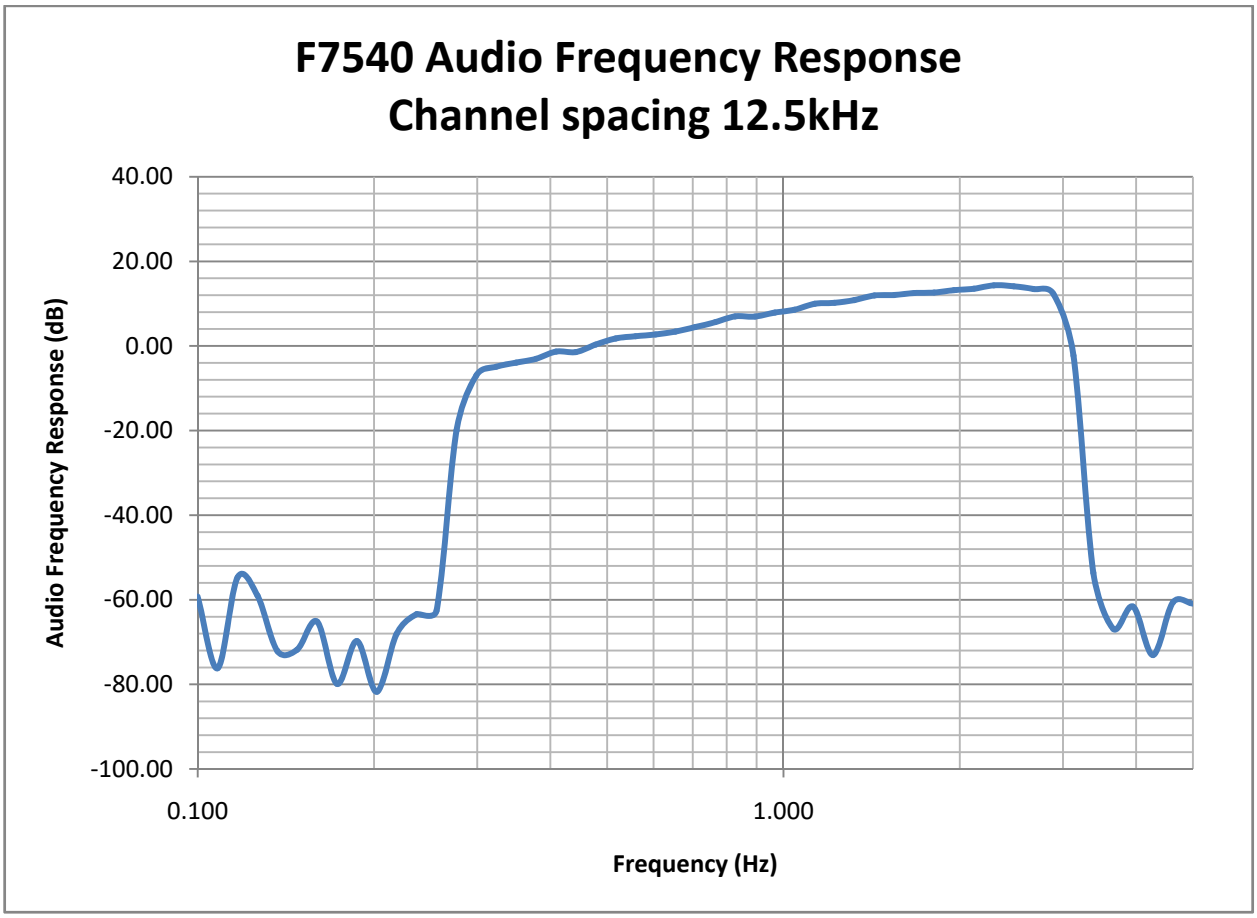
11.252	-64.60	-78.54	-34.45
12.741	-61.58	-75.53	-37.68
14.427	-67.15	-81.10	-40.92
16.336	-79.42	-93.37	-44.16
18.498	-78.74	-92.69	-47.40
20.947	-85.85	-99.80	-50.00
23.719	-91.86	-105.81	-50.00
26.858	-105.36	-119.31	-50.00
30.413	-93.07	-107.02	-50.00
34.438	-105.60	-119.55	-50.00
38.995	-103.30	-117.25	-50.00
44.156	-96.92	-110.87	-50.00
50.000	-90.57	-104.52	-50.00



5.6.3.3. 12.5 KHz Channel Spacing, F3E, Frequency of All Modulation States (806-824 MHz band)

5.6.3.3.1. Audio frequency response

Frequency (KHz)	Trace 1: Gain: Magnitude (dB)	**Frequency (KHz)**	Trace 1: Gain: Magnitude (dB)
0.100	-59.23	0.765	5.62
0.108	-76.17	0.827	6.99
0.117	-54.75	0.894	6.94
0.126	-59.00	0.967	7.89
0.137	-72.09	1.046	8.58
0.148	-71.77	1.131	9.97
0.160	-65.17	1.223	10.19
0.173	-79.88	1.322	10.84
0.187	-69.74	1.430	11.95
0.202	-81.74	1.546	12.04
0.219	-68.04	1.672	12.50
0.236	-63.40	1.808	12.61
0.256	-62.61	1.955	13.19
0.277	-19.98	2.114	13.53
0.299	-6.96	2.287	14.33
0.323	-4.93	2.473	14.09
0.350	-3.93	2.674	13.46
0.378	-3.05	2.891	12.30
0.409	-1.32	3.127	-2.28
0.442	-1.43	3.381	-53.62
0.478	0.32	3.656	-66.88
0.517	1.78	3.954	-61.63
0.559	2.28	4.276	-73.06
0.605	2.71	4.624	-60.59
0.654	3.39	5.000	-60.89
0.707	4.45		

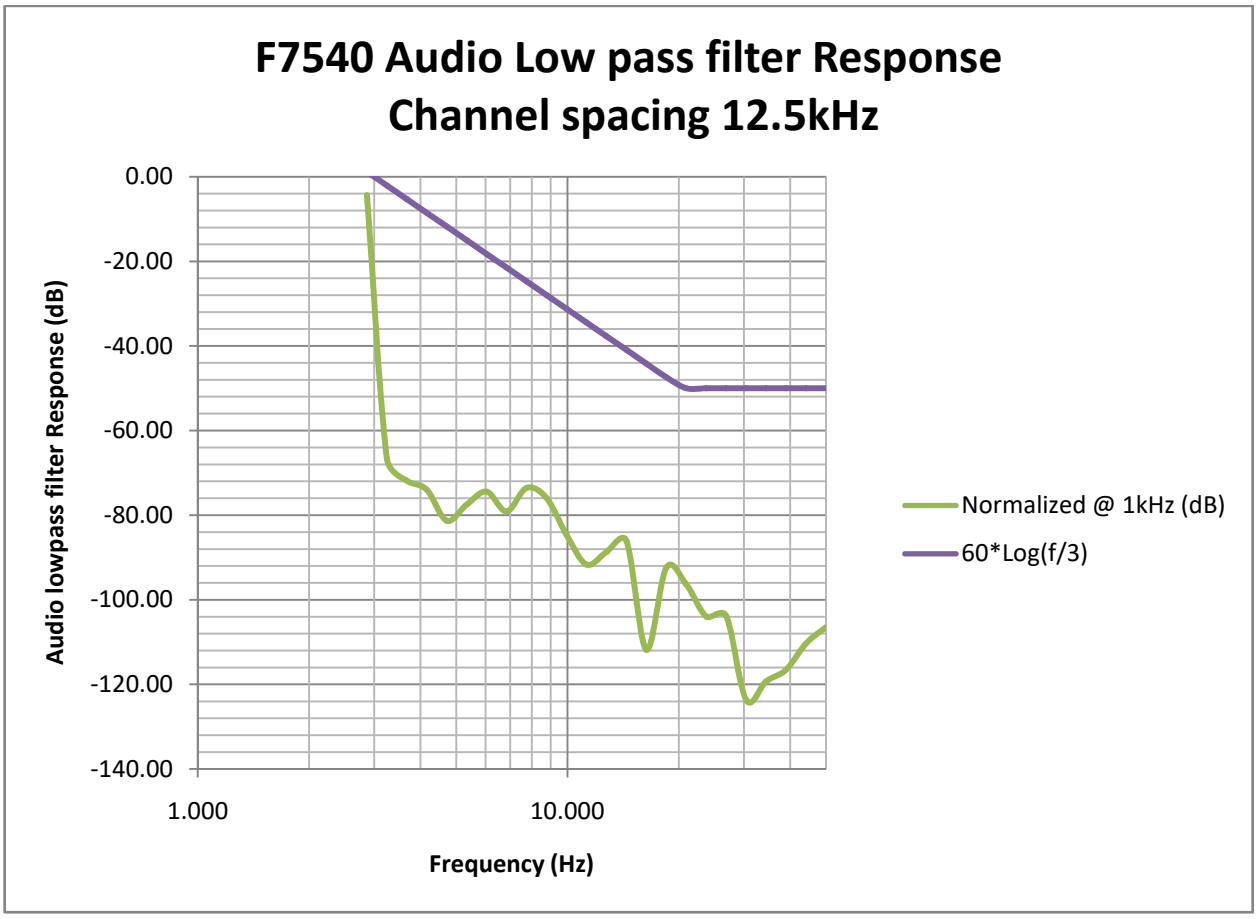


All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

5.6.3.3.2. Audio Low pass filter Response

Frequency (KHz)	Trace 1: Gain: Magnitude (dB)	Normalized @ 1kHz (dB)	60*Log(f/3)
0.100	-35.10	-48.92	
0.113	-42.46	-56.28	
0.128	-37.50	-51.33	
0.145	-45.43	-59.26	
0.164	-60.02	-73.85	
0.186	-51.84	-65.67	
0.211	-52.41	-66.24	
0.239	-59.46	-73.28	
0.270	-11.22	-25.05	
0.306	9.39	-4.43	
0.347	9.82	-4.00	
0.392	10.40	-3.42	
0.444	11.32	-2.50	
0.503	12.21	-1.62	
0.570	13.47	-0.36	
0.645	12.72	-1.10	
0.731	14.31	0.49	
0.827	14.64	0.81	
0.937	14.71	0.88	
1.061	13.82	0.00	
1.201	14.24	0.41	
1.360	13.95	0.13	
1.540	14.89	1.07	
1.744	14.50	0.68	
1.975	14.40	0.57	
2.236	13.69	-0.14	
2.532	12.32	-1.51	
2.867	9.48	-4.35	1.18
3.247	-52.86	-66.69	-2.06
3.676	-57.98	-71.80	-5.30
4.163	-60.15	-73.97	-8.54
4.714	-67.49	-81.31	-11.78
5.338	-63.66	-77.49	-15.02
6.044	-60.59	-74.42	-18.25
6.844	-65.28	-79.11	-21.49
7.750	-59.72	-73.54	-24.73
8.775	-62.11	-75.93	-27.97
9.937	-70.76	-84.58	-31.21

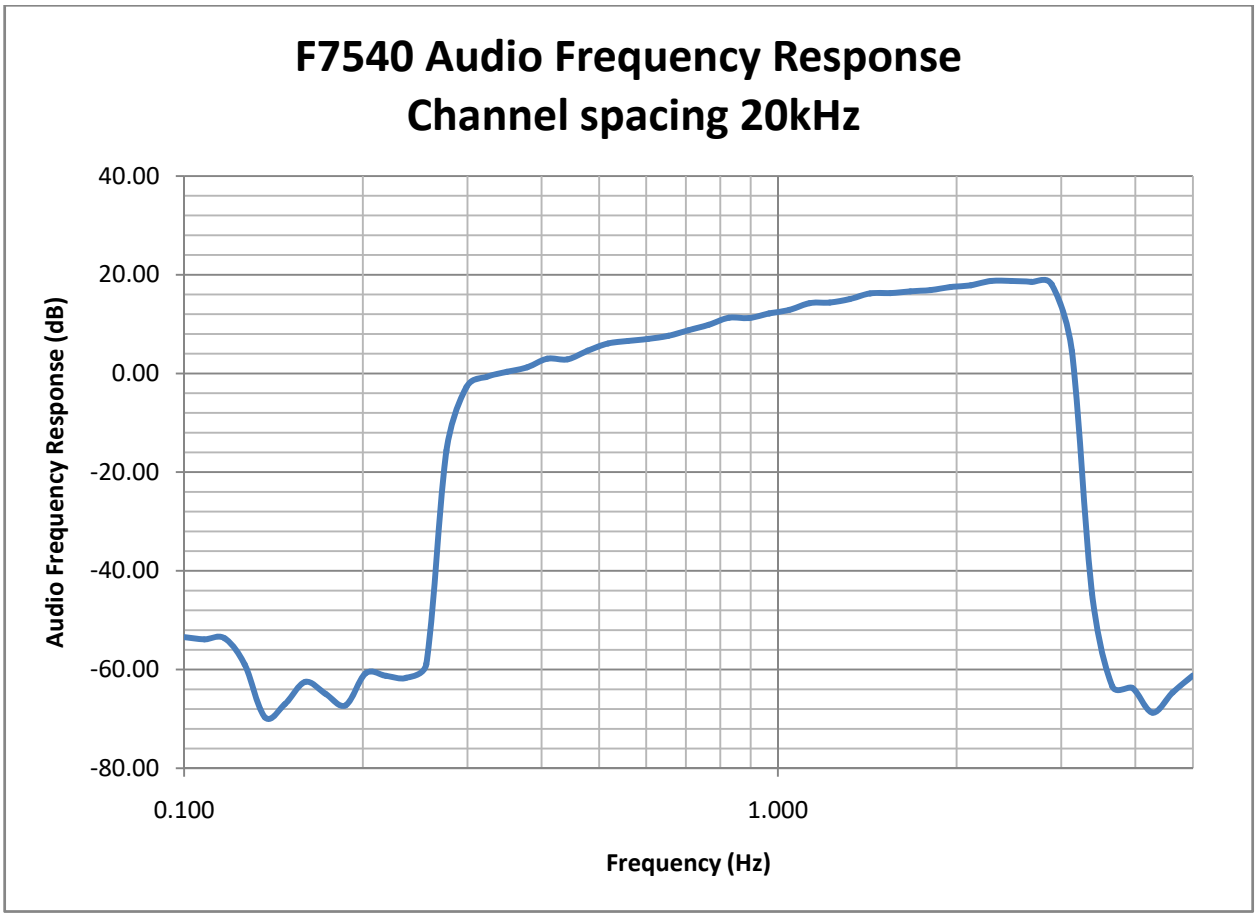
11.252	-77.83	-91.65	-34.45
12.741	-74.90	-88.72	-37.68
14.427	-72.26	-86.08	-40.92
16.336	-98.01	-111.84	-44.16
18.498	-78.60	-92.43	-47.40
20.947	-82.53	-96.36	-50.00
23.719	-90.15	-103.97	-50.00
26.858	-90.03	-103.85	-50.00
30.413	-109.83	-123.65	-50.00
34.438	-105.44	-119.27	-50.00
38.995	-102.68	-116.51	-50.00
44.156	-96.49	-110.31	-50.00
50.000	-92.64	-106.46	-50.00



5.6.3.4. 20 KHz Channel Spacing, F3E, Frequency of All Modulation States (806-824 MHz band)

5.6.3.4.1. Audio frequency response

Frequency (KHz)	Trace 1: Gain: Magnitude (dB)	**Frequency (KHz)**	Trace 1: Gain: Magnitude (dB)
0.100	-53.42	0.765	9.84
0.108	-53.86	0.827	11.29
0.117	-53.64	0.894	11.23
0.126	-58.98	0.967	12.15
0.137	-69.67	1.046	12.87
0.148	-66.98	1.131	14.23
0.160	-62.50	1.223	14.35
0.173	-64.88	1.322	15.06
0.187	-67.24	1.430	16.21
0.202	-60.73	1.546	16.27
0.219	-61.26	1.672	16.62
0.236	-61.67	1.808	16.89
0.256	-58.90	1.955	17.52
0.277	-15.61	2.114	17.85
0.299	-2.72	2.287	18.73
0.323	-0.68	2.473	18.72
0.350	0.34	2.674	18.56
0.378	1.24	2.891	18.02
0.409	2.97	3.127	4.56
0.442	2.85	3.381	-44.60
0.478	4.59	3.656	-63.35
0.517	6.06	3.954	-63.72
0.559	6.58	4.276	-68.72
0.605	6.99	4.624	-64.64
0.654	7.62	5.000	-61.21
0.707	8.75		

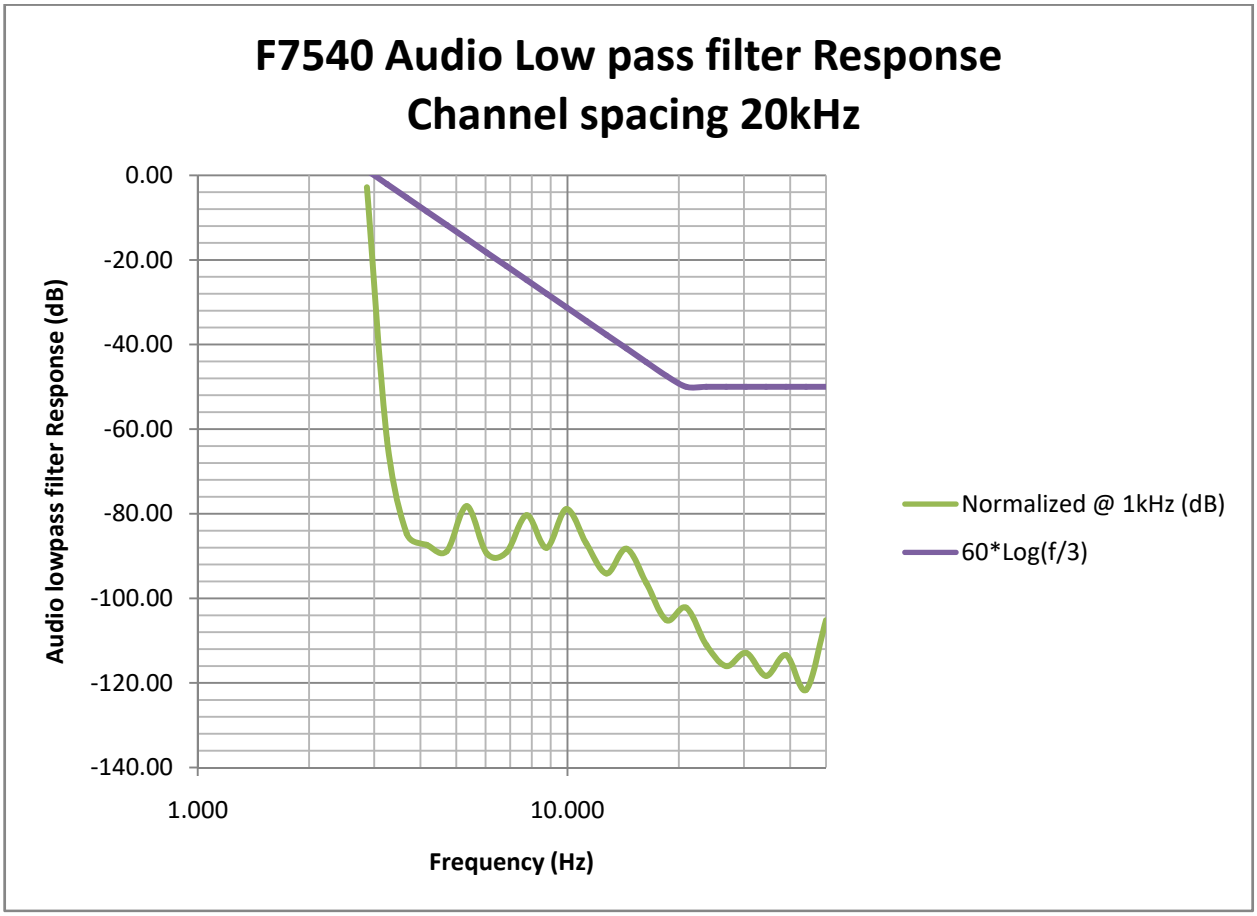


All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

5.6.3.4.2. Audio Low pass filter Response

Frequency (KHz)	Trace 1: Gain: Magnitude (dB)	Normalized @ 1kHz (dB)	60*Log(f/3)
0.100	-34.93	-53.01	
0.113	-37.94	-56.03	
0.128	-46.50	-64.58	
0.145	-51.40	-69.48	
0.164	-43.91	-61.99	
0.186	-50.58	-68.66	
0.211	-71.42	-89.50	
0.239	-40.92	-59.00	
0.270	-6.68	-24.76	
0.306	13.76	-4.32	
0.347	14.16	-3.93	
0.392	14.77	-3.32	
0.444	15.81	-2.28	
0.503	16.55	-1.53	
0.570	17.77	-0.31	
0.645	17.02	-1.06	
0.731	18.67	0.59	
0.827	18.98	0.90	
0.937	19.11	1.02	
1.061	18.08	0.00	
1.201	18.60	0.52	
1.360	18.20	0.11	
1.540	19.21	1.13	
1.744	18.75	0.67	
1.975	18.74	0.65	
2.236	18.13	0.05	
2.532	17.14	-0.94	
2.867	15.23	-2.85	1.18
3.247	-44.24	-62.32	-2.06
3.676	-66.67	-84.75	-5.30
4.163	-69.29	-87.37	-8.54
4.714	-70.77	-88.85	-11.78
5.338	-60.14	-78.22	-15.02
6.044	-71.26	-89.34	-18.25
6.844	-71.02	-89.10	-21.49
7.750	-62.27	-80.35	-24.73
8.775	-69.98	-88.06	-27.97
9.937	-60.80	-78.89	-31.21

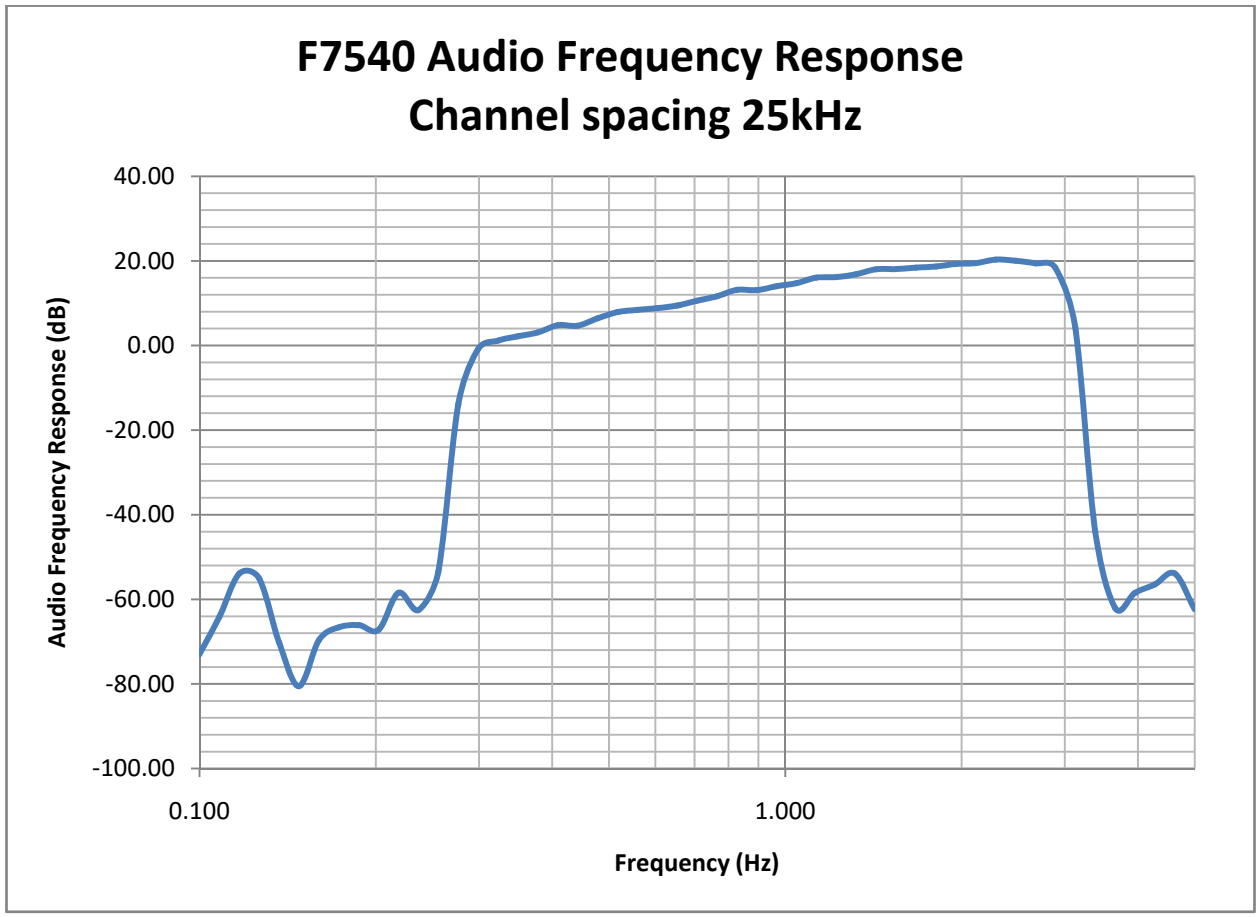
11.252	-69.01	-87.09	-34.45
12.741	-76.02	-94.10	-37.68
14.427	-70.19	-88.27	-40.92
16.336	-78.29	-96.38	-44.16
18.498	-87.04	-105.13	-47.40
20.947	-84.14	-102.22	-50.00
23.719	-92.93	-111.01	-50.00
26.858	-97.93	-116.01	-50.00
30.413	-94.80	-112.88	-50.00
34.438	-100.25	-118.33	-50.00
38.995	-95.33	-113.41	-50.00
44.156	-103.53	-121.61	-50.00
50.000	-87.10	-105.18	-50.00



5.6.3.5. 25 KHz Channel Spacing, F3E, Frequency of All Modulation States (806-824 MHz band)

5.6.3.5.1. Audio frequency response

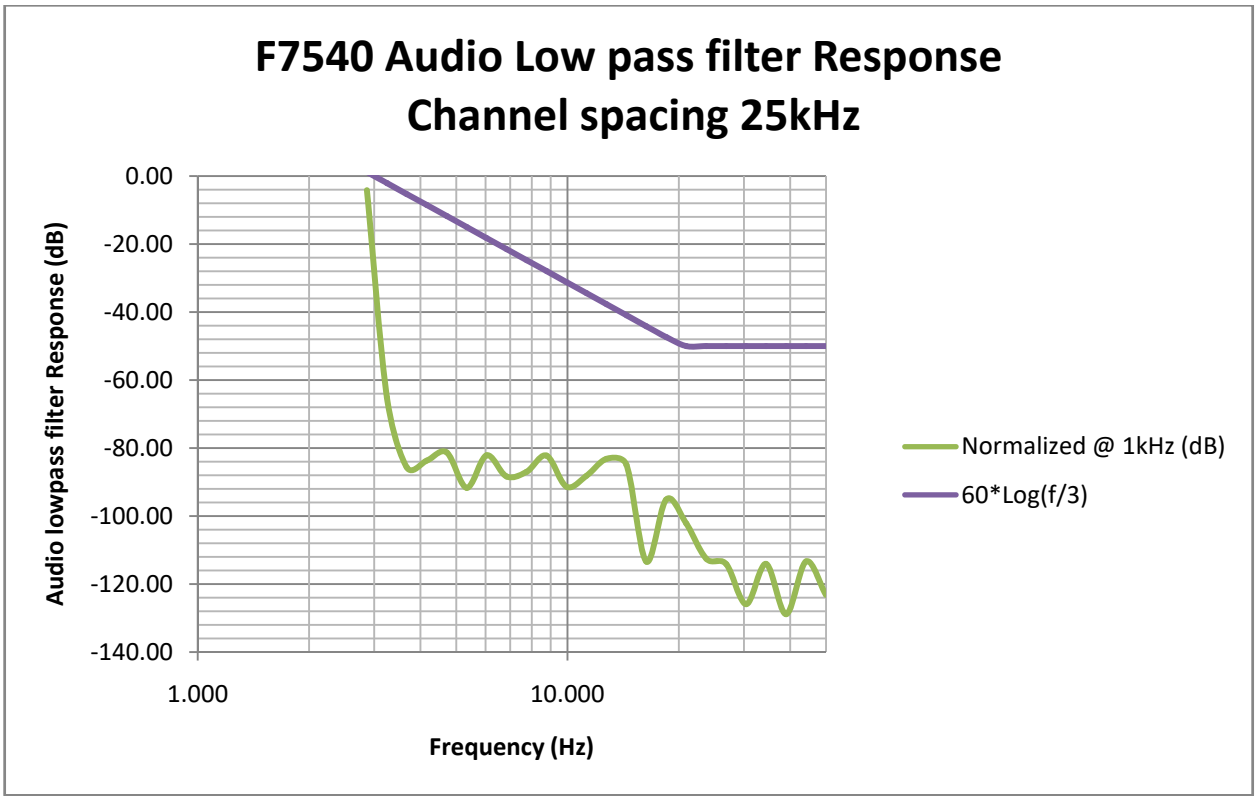
Frequency (KHz)	Trace 1: Gain: Magnitude (dB)	**Frequency (KHz)**	Trace 1: Gain: Magnitude (dB)
0.100	-72.99	0.765	11.64
0.108	-64.10	0.827	13.14
0.117	-53.91	0.894	13.09
0.126	-55.11	0.967	14.00
0.137	-70.20	1.046	14.73
0.148	-80.53	1.131	16.06
0.160	-69.62	1.223	16.17
0.173	-66.61	1.322	16.86
0.187	-66.09	1.430	18.04
0.202	-67.20	1.546	18.06
0.219	-58.45	1.672	18.40
0.236	-62.55	1.808	18.66
0.256	-53.50	1.955	19.26
0.277	-13.86	2.114	19.45
0.299	-0.84	2.287	20.29
0.323	1.14	2.473	20.04
0.350	2.17	2.674	19.43
0.378	3.08	2.891	18.37
0.409	4.80	3.127	4.25
0.442	4.69	3.381	-43.86
0.478	6.42	3.656	-62.04
0.517	7.90	3.954	-58.47
0.559	8.42	4.276	-56.49
0.605	8.82	4.624	-53.91
0.654	9.43	5.000	-62.35
0.707	10.59		



5.6.3.5.2. Audio Low pass filter Response

Frequency (KHz)	Trace 1: Gain: Magnitude (dB)	Normalized @ 1kHz (dB)	60*Log(f/3)
0.100	-35.58	-55.43	
0.113	-39.51	-59.37	
0.128	-39.30	-59.16	
0.145	-52.04	-71.89	
0.164	-41.50	-61.35	
0.186	-44.35	-64.20	
0.211	-58.57	-78.43	
0.239	-42.72	-62.58	
0.270	-4.86	-24.71	
0.306	15.56	-4.30	
0.347	15.94	-3.91	
0.392	16.59	-3.26	
0.444	17.68	-2.18	
0.503	18.37	-1.49	
0.570	19.53	-0.32	
0.645	18.79	-1.07	
0.731	20.51	0.66	
0.827	20.75	0.90	
0.937	20.91	1.05	
1.061	19.86	0.00	
1.201	20.38	0.53	
1.360	19.97	0.11	
1.540	20.97	1.11	
1.744	20.58	0.72	
1.975	20.53	0.68	
2.236	19.76	-0.10	
2.532	18.35	-1.51	
2.867	15.66	-4.20	1.18
3.247	-45.27	-65.13	-2.06
3.676	-65.81	-85.66	-5.30
4.163	-63.86	-83.72	-8.54
4.714	-61.44	-81.29	-11.78
5.338	-71.85	-91.71	-15.02
6.044	-62.30	-82.16	-18.25
6.844	-68.49	-88.35	-21.49
7.750	-67.13	-86.99	-24.73
8.775	-62.39	-82.25	-27.97
9.937	-71.51	-91.37	-31.21

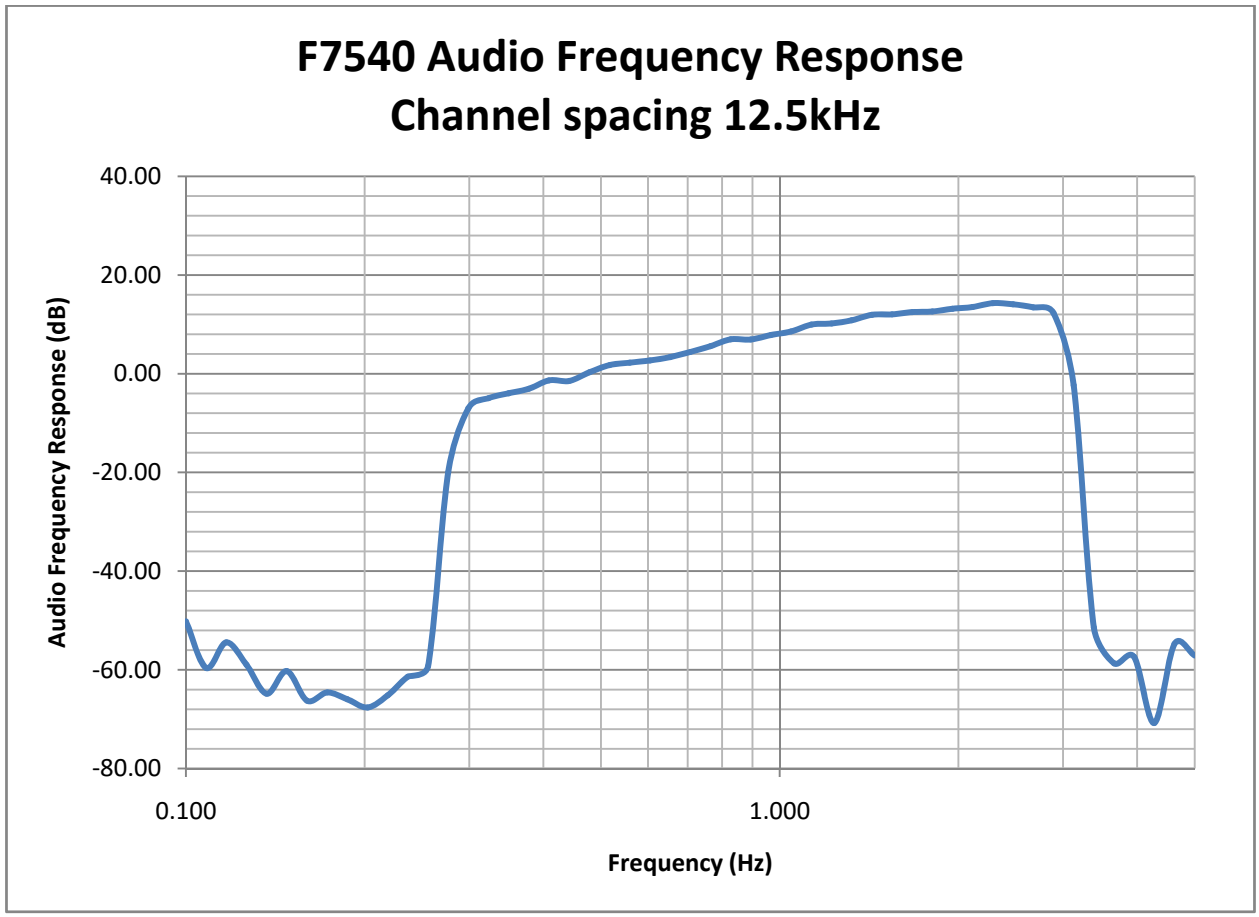
11.252	-68.32	-88.18	-34.45
12.741	-63.34	-83.19	-37.68
14.427	-65.08	-84.94	-40.92
16.336	-93.53	-113.39	-44.16
18.498	-75.29	-95.14	-47.40
20.947	-82.37	-102.23	-50.00
23.719	-92.70	-112.56	-50.00
26.858	-94.31	-114.16	-50.00
30.413	-106.07	-125.93	-50.00
34.438	-94.25	-114.11	-50.00
38.995	-109.02	-128.87	-50.00
44.156	-93.52	-113.38	-50.00
50.000	-103.33	-123.18	-50.00



5.6.3.6. 12.5 KHz Channel Spacing, F3E, Frequency of All Modulation States (851-869 MHz band)

5.6.3.6.1. Audio frequency response

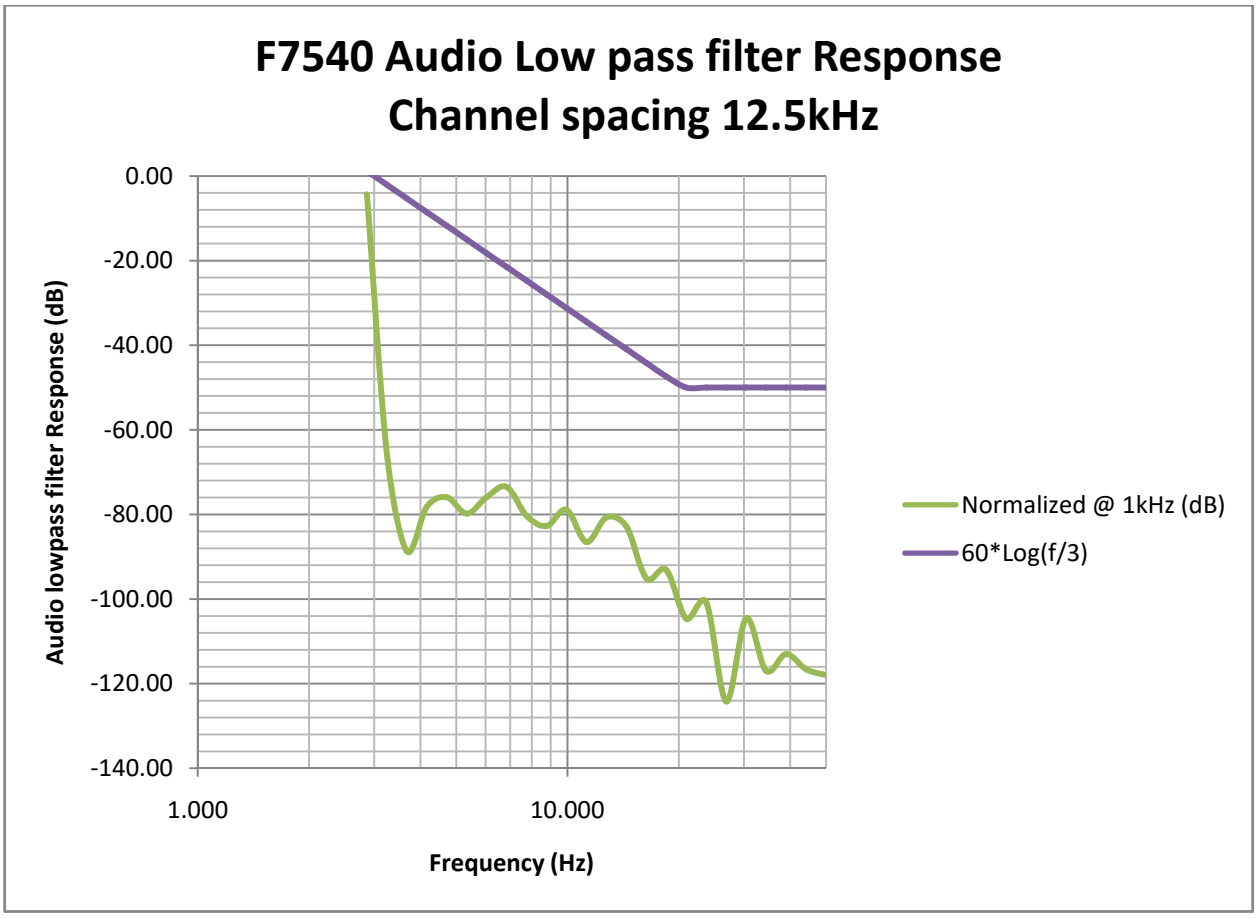
Frequency (KHz)	Trace 1: Gain: Magnitude (dB)	**Frequency (KHz)**	Trace 1: Gain: Magnitude (dB)
0.100	-50.18	0.765	5.59
0.108	-59.62	0.827	6.97
0.117	-54.43	0.894	6.93
0.126	-58.96	0.967	7.86
0.137	-64.85	1.046	8.56
0.148	-60.25	1.131	9.94
0.160	-66.24	1.223	10.17
0.173	-64.58	1.322	10.82
0.187	-65.97	1.430	11.93
0.202	-67.63	1.546	12.01
0.219	-65.17	1.672	12.48
0.236	-61.37	1.808	12.60
0.256	-59.27	1.955	13.17
0.277	-19.94	2.114	13.51
0.299	-7.01	2.287	14.30
0.323	-4.95	2.473	14.07
0.350	-3.96	2.674	13.44
0.378	-3.06	2.891	12.27
0.409	-1.35	3.127	-2.32
0.442	-1.46	3.381	-51.41
0.478	0.29	3.656	-58.68
0.517	1.75	3.954	-57.39
0.559	2.25	4.276	-70.78
0.605	2.68	4.624	-54.74
0.654	3.36	5.000	-57.10
0.707	4.42		



5.6.3.6.2. Audio Low pass filter Response

Frequency (KHz)	Trace 1: Gain: Magnitude (dB)	Normalized @ 1kHz (dB)	60*Log(f/3)
0.100	-44.13	-58.06	
0.113	-39.15	-53.07	
0.128	-44.26	-58.18	
0.145	-41.47	-55.39	
0.164	-57.65	-71.57	
0.186	-52.16	-66.08	
0.211	-58.76	-72.68	
0.239	-51.71	-65.63	
0.270	-11.12	-25.05	
0.306	9.47	-4.45	
0.347	9.90	-4.02	
0.392	10.48	-3.44	
0.444	11.41	-2.52	
0.503	12.29	-1.63	
0.570	13.56	-0.36	
0.645	12.80	-1.13	
0.731	14.40	0.48	
0.827	14.73	0.80	
0.937	14.80	0.88	
1.061	13.92	0.00	
1.201	14.34	0.42	
1.360	14.05	0.13	
1.540	14.99	1.07	
1.744	14.61	0.68	
1.975	14.51	0.58	
2.236	13.79	-0.13	
2.532	12.43	-1.50	
2.867	9.58	-4.34	1.18
3.247	-51.86	-65.78	-2.06
3.676	-74.74	-88.67	-5.30
4.163	-64.27	-78.19	-8.54
4.714	-62.02	-75.94	-11.78
5.338	-65.89	-79.81	-15.02
6.044	-62.02	-75.94	-18.25
6.844	-59.55	-73.47	-21.49
7.750	-66.41	-80.34	-24.73
8.775	-68.81	-82.73	-27.97
9.937	-64.97	-78.89	-31.21

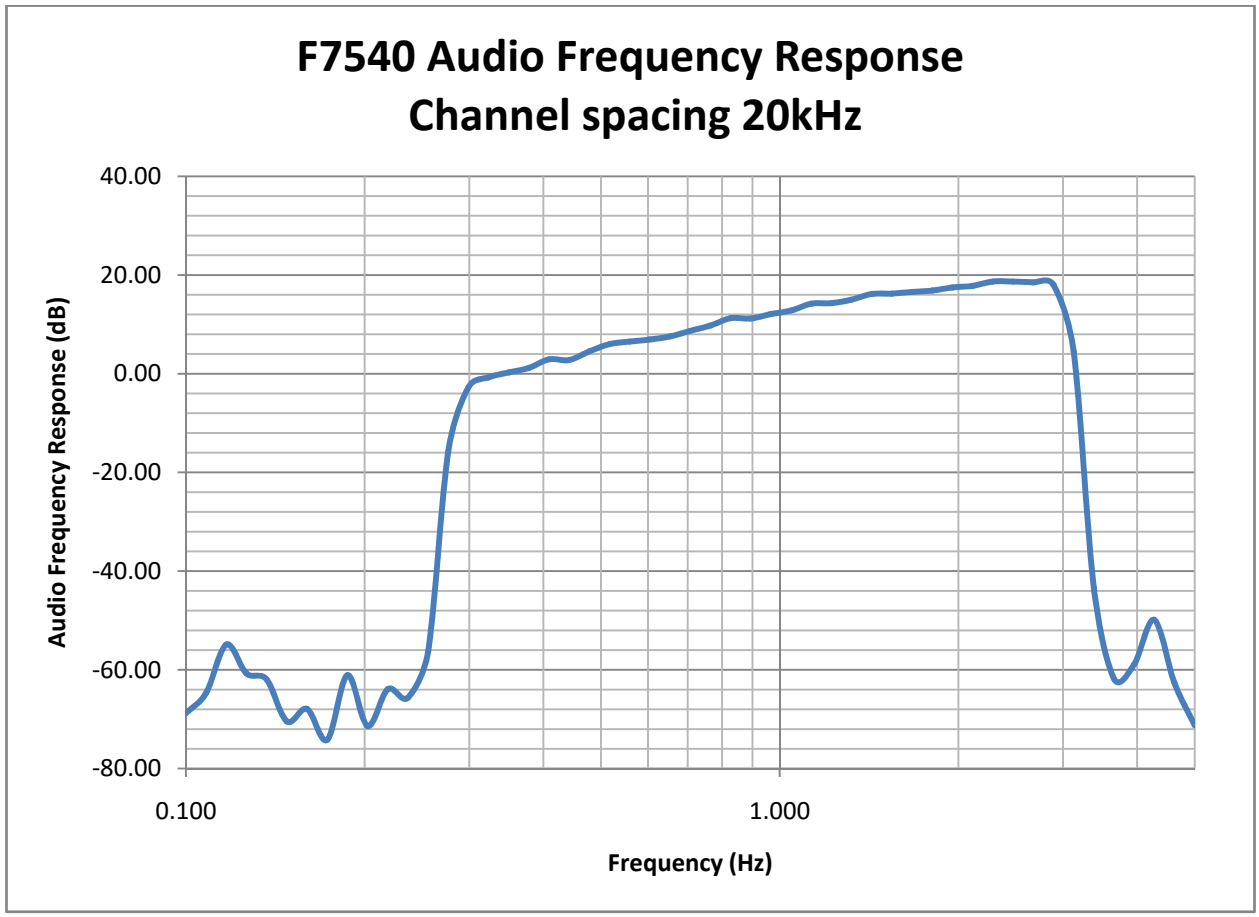
11.252	-72.60	-86.52	-34.45
12.741	-66.76	-80.69	-37.68
14.427	-68.92	-82.85	-40.92
16.336	-81.20	-95.12	-44.16
18.498	-79.18	-93.10	-47.40
20.947	-90.73	-104.66	-50.00
23.719	-86.84	-100.76	-50.00
26.858	-110.27	-124.19	-50.00
30.413	-90.65	-104.57	-50.00
34.438	-103.05	-116.97	-50.00
38.995	-99.08	-113.00	-50.00
44.156	-102.66	-116.58	-50.00
50.000	-104.07	-118.00	-50.00



5.6.3.7. 20 KHz Channel Spacing, F3E, Frequency of All Modulation States (851-869 MHz band)

5.6.3.7.1. Audio frequency response

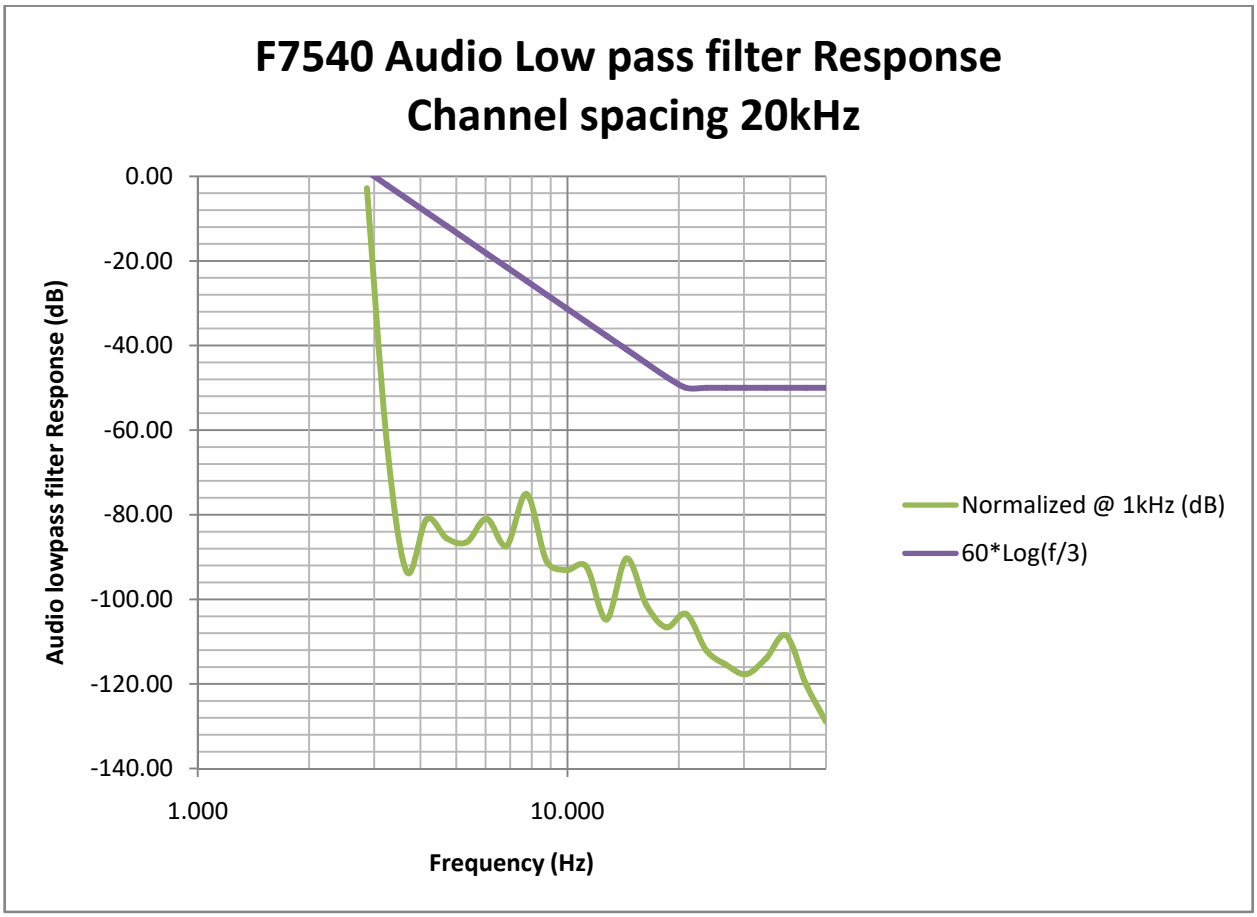
Frequency (KHz)	Trace 1: Gain: Magnitude (dB)	**Frequency (KHz)**	Trace 1: Gain: Magnitude (dB)
0.100	-68.77	0.100	-68.77
0.108	-64.67	0.108	-64.67
0.117	-54.86	0.117	-54.86
0.126	-60.74	0.126	-60.74
0.137	-61.95	0.137	-61.95
0.148	-70.45	0.148	-70.45
0.160	-67.91	0.160	-67.91
0.173	-74.16	0.173	-74.16
0.187	-61.07	0.187	-61.07
0.202	-71.41	0.202	-71.41
0.219	-63.91	0.219	-63.91
0.236	-65.65	0.236	-65.65
0.256	-56.37	0.256	-56.37
0.277	-15.77	0.277	-15.77
0.299	-2.76	0.299	-2.76
0.323	-0.75	0.323	-0.75
0.350	0.26	0.350	0.26
0.378	1.18	0.378	1.18
0.409	2.91	0.409	2.91
0.442	2.78	0.442	2.78
0.478	4.53	0.478	4.53
0.517	6.00	0.517	6.00
0.559	6.51	0.559	6.51
0.605	6.93	0.605	6.93
0.654	7.55	0.654	7.55
0.707	8.68		



5.6.3.7.2. Audio Low pass filter Response

Frequency (KHz)	Trace 1: Gain: Magnitude (dB)	Normalized @ 1kHz (dB)	60*Log(f/3)
0.100	-36.67	-54.71	
0.113	-38.20	-56.23	
0.128	-41.84	-59.87	
0.145	-46.24	-64.27	
0.164	-46.49	-64.52	
0.186	-52.60	-70.64	
0.211	-53.58	-71.62	
0.239	-40.86	-58.89	
0.270	-6.83	-24.86	
0.306	13.69	-4.34	
0.347	14.05	-3.99	
0.392	14.70	-3.33	
0.444	15.73	-2.30	
0.503	16.48	-1.55	
0.570	17.71	-0.33	
0.645	16.96	-1.07	
0.731	18.61	0.57	
0.827	18.92	0.89	
0.937	19.05	1.02	
1.061	18.03	0.00	
1.201	18.55	0.51	
1.360	18.15	0.12	
1.540	19.16	1.13	
1.744	18.71	0.67	
1.975	18.69	0.66	
2.236	18.09	0.06	
2.532	17.10	-0.94	
2.867	15.19	-2.85	1.18
3.247	-45.09	-63.13	-2.06
3.676	-75.42	-93.45	-5.30
4.163	-63.00	-81.03	-8.54
4.714	-67.54	-85.58	-11.78
5.338	-68.45	-86.49	-15.02
6.044	-62.88	-80.91	-18.25
6.844	-69.30	-87.34	-21.49
7.750	-57.06	-75.09	-24.73
8.775	-72.95	-90.98	-27.97
9.937	-75.07	-93.10	-31.21

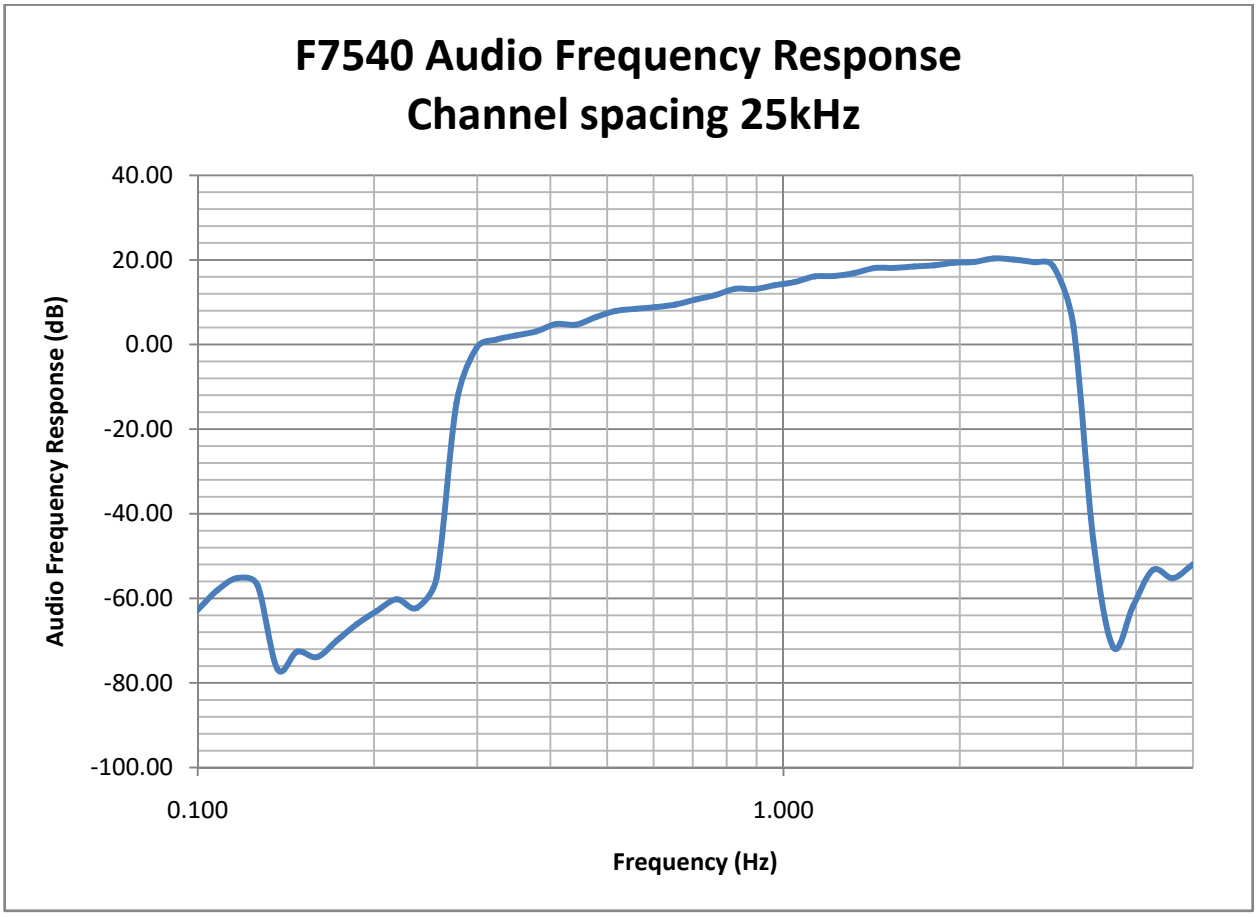
11.252	-74.23	-92.26	-34.45
12.741	-86.73	-104.76	-37.68
14.427	-72.31	-90.35	-40.92
16.336	-83.27	-101.30	-44.16
18.498	-88.56	-106.59	-47.40
20.947	-85.43	-103.46	-50.00
23.719	-94.01	-112.05	-50.00
26.858	-97.46	-115.50	-50.00
30.413	-99.66	-117.69	-50.00
34.438	-95.91	-113.95	-50.00
38.995	-90.49	-108.52	-50.00
44.156	-102.09	-120.13	-50.00
50.000	-110.89	-128.92	-50.00



5.6.3.8. 25 KHz Channel Spacing, F3E, Frequency of All Modulation States (851-869 MHz band)

5.6.3.8.1. Audio frequency response

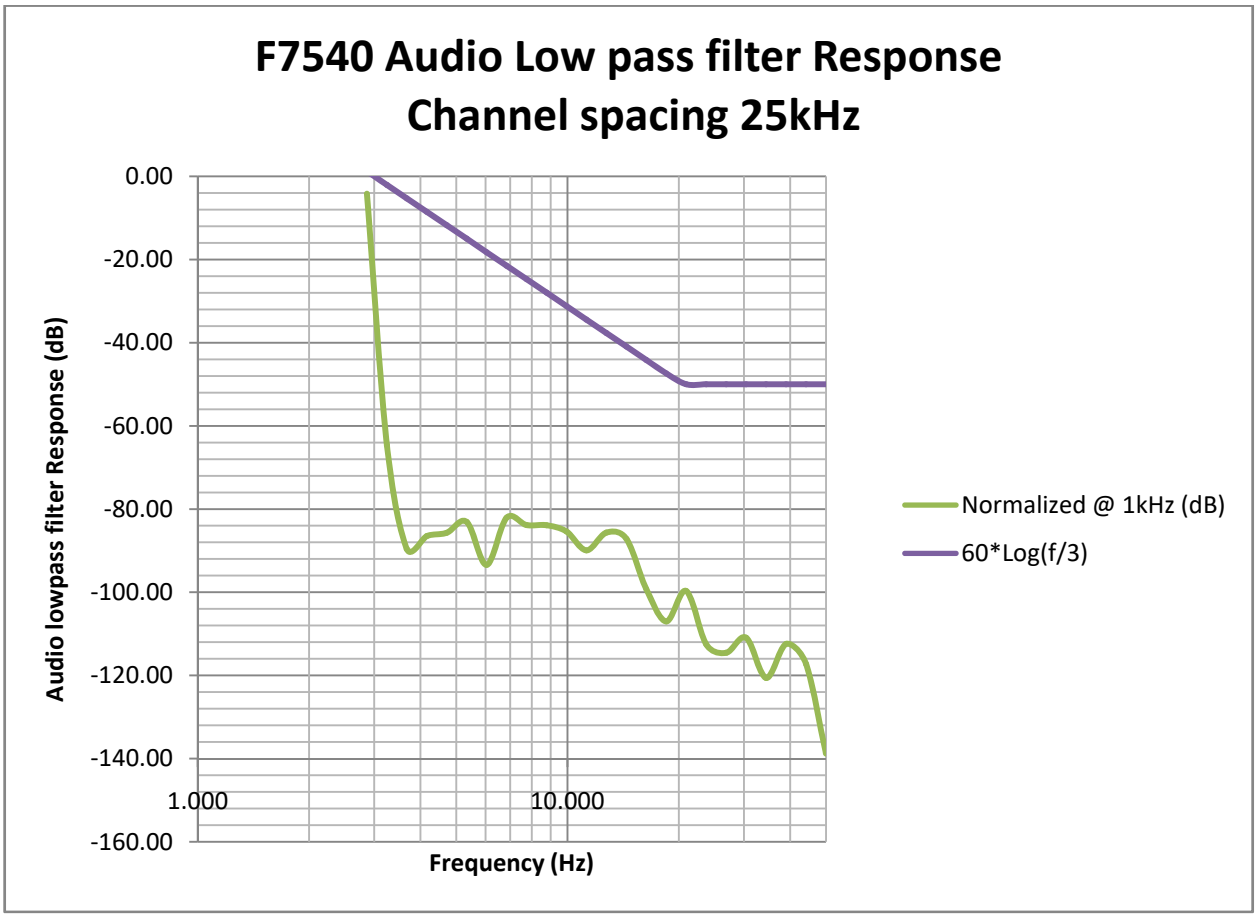
Frequency (KHz)	Trace 1: Gain: Magnitude (dB)	**Frequency (KHz)**	Trace 1: Gain: Magnitude (dB)
0.100	-62.74	0.765	11.66
0.108	-58.02	0.827	13.17
0.117	-55.18	0.894	13.12
0.126	-56.88	0.967	14.03
0.137	-76.68	1.046	14.77
0.148	-72.59	1.131	16.10
0.160	-73.87	1.223	16.20
0.173	-69.95	1.322	16.89
0.187	-66.10	1.430	18.08
0.202	-62.99	1.546	18.10
0.219	-60.21	1.672	18.43
0.236	-62.27	1.808	18.70
0.256	-55.27	1.955	19.31
0.277	-13.83	2.114	19.49
0.299	-0.87	2.287	20.34
0.323	1.14	2.473	20.09
0.350	2.16	2.674	19.47
0.378	3.08	2.891	18.41
0.409	4.82	3.127	4.28
0.442	4.69	3.381	-46.29
0.478	6.45	3.656	-71.56
0.517	7.91	3.954	-61.76
0.559	8.44	4.276	-53.27
0.605	8.84	4.624	-55.22
0.654	9.44	5.000	-51.96
0.707	10.62		



5.6.3.8.2. Audio Low pass filter Response

Frequency (KHz)	Trace 1: Gain: Magnitude (dB)	Normalized @ 1kHz (dB)	60*Log(f/3)
0.100	-30.99	-50.88	
0.113	-31.89	-51.77	
0.128	-45.45	-65.33	
0.145	-55.02	-74.91	
0.164	-46.09	-65.97	
0.186	-42.35	-62.23	
0.211	-57.18	-77.07	
0.239	-45.89	-65.77	
0.270	-4.86	-24.74	
0.306	15.58	-4.31	
0.347	15.95	-3.93	
0.392	16.61	-3.28	
0.444	17.69	-2.20	
0.503	18.38	-1.50	
0.570	19.55	-0.33	
0.645	18.81	-1.07	
0.731	20.53	0.65	
0.827	20.78	0.89	
0.937	20.93	1.05	
1.061	19.89	0.00	
1.201	20.41	0.53	
1.360	20.00	0.12	
1.540	21.00	1.12	
1.744	20.62	0.73	
1.975	20.57	0.69	
2.236	19.80	-0.09	
2.532	18.38	-1.50	
2.867	15.69	-4.19	1.18
3.247	-44.76	-64.65	-2.06
3.676	-69.70	-89.58	-5.30
4.163	-66.62	-86.50	-8.54
4.714	-65.82	-85.71	-11.78
5.338	-63.21	-83.09	-15.02
6.044	-73.53	-93.42	-18.25
6.844	-62.20	-82.08	-21.49
7.750	-63.97	-83.85	-24.73
8.775	-64.00	-83.89	-27.97
9.937	-65.49	-85.38	-31.21

11.252	-70.03	-89.92	-34.45
12.741	-65.76	-85.65	-37.68
14.427	-67.29	-87.17	-40.92
16.336	-79.35	-99.24	-44.16
18.498	-87.12	-107.01	-47.40
20.947	-79.79	-99.68	-50.00
23.719	-92.64	-112.53	-50.00
26.858	-94.66	-114.54	-50.00
30.413	-91.05	-110.94	-50.00
34.438	-100.71	-120.60	-50.00
38.995	-92.53	-112.42	-50.00
44.156	-97.39	-117.27	-50.00
50.000	-118.88	-138.77	-50.00



5.7. MODULATION LIMITING [§§ 2.1047 (b), 74.463, 80.213 & 90.210]

5.7.1. Limits

§ **2.1047(b):** Equipment which employs modulation limiting. A curve or family of curves showing the percentage of modulation versus the modulation input voltage shall be supplied. The information submitted shall be sufficient to show modulation limiting capability throughout the range of modulating frequencies and input modulating signal levels employed.

Recommended frequency deviation characteristics are given below:

- 1.25 kHz for 6.25 kHz Channel Spacing System
- 2.5 KHz for 12.5 kHz Channel Spacing System

5.7.2. Method of Measurements

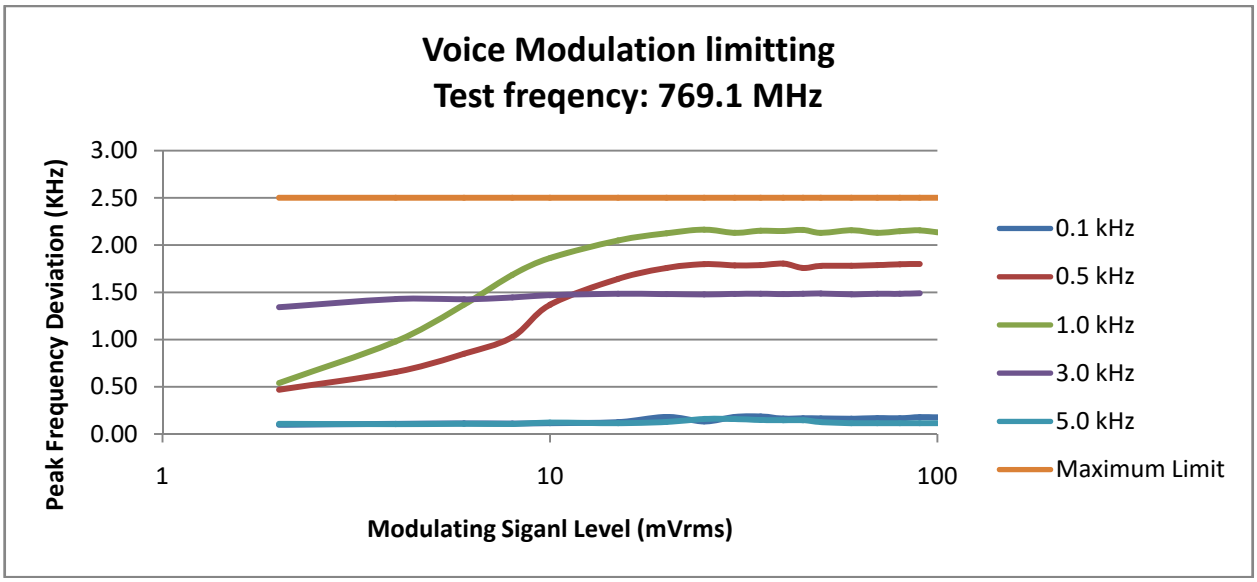
For Audio Transmitter: The carrier frequency deviation was measured with the tone input signal level varied from 0 Vp to audio input rating level plus 16 dB at frequencies 0.1, 0.5, 1.0, 3.0 and 5.0 kHz. The maximum deviation was recorded at each test condition.

For Data Transmitter with Maximum Frequency Deviation set by Factory: The EUT was set at maximum frequency deviation, and its peak frequency deviation was then measured using EUT's internal random data source.

5.7.3. Test Data

5.7.3.1. Voice Modulation Limiting for 12.5 KHz Channel Spacing Operation (769-775 MHz band)

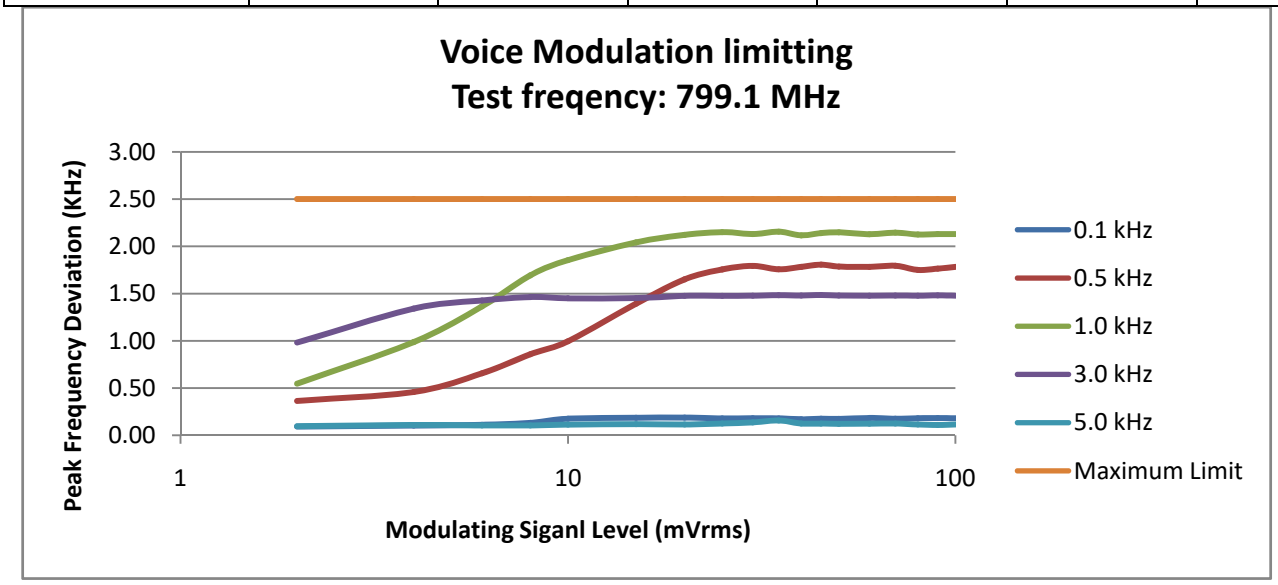
Modulating Signal Level	Peak Frequency Deviation (kHz)					Maximum Limit
(mVrms)	0.1 kHz	0.5 kHz	1.0 kHz	3.0 kHz	5.0 kHz	(kHz)
1	0.10	0.18	0.31	0.56	0.10	2.5
2	0.10	0.29	0.54	0.98	0.11	2.5
4	0.11	0.47	0.98	1.34	0.11	2.5
6	0.11	0.66	1.37	1.43	0.11	2.5
8	0.11	0.85	1.68	1.43	0.11	2.5
10	0.12	1.03	1.86	1.45	0.12	2.5
15	0.13	1.37	2.05	1.47	0.11	2.5
20	0.18	1.64	2.12	1.48	0.13	2.5
25	0.13	1.76	2.16	1.48	0.16	2.5
30	0.18	1.80	2.13	1.48	0.16	2.5
35	0.19	1.79	2.15	1.48	0.15	2.5
40	0.16	1.79	2.15	1.48	0.15	2.5
45	0.17	1.80	2.16	1.48	0.15	2.5
50	0.17	1.76	2.13	1.48	0.13	2.5
60	0.16	1.78	2.16	1.49	0.12	2.5
70	0.17	1.78	2.13	1.48	0.12	2.5
80	0.17	1.79	2.15	1.48	0.12	2.5
90	0.18	1.80	2.16	1.48	0.12	2.5
100	0.18	1.80	2.14	1.49	0.12	2.5



Voice Signal Input Level	= STD MOD Level + 16 dB = 7 mV+ 16 dB = 32.90 dB(mVrms) = 44.17 mVrms	
Modulation Frequency (kHz)	**Peak Deviation (kHz)**	**Maximum Limit (kHz)**
0.1	0.12	2.5
0.2	0.17	2.5
0.4	1.72	2.5
0.6	1.85	2.5
0.8	2.08	2.5
1.0	2.16	2.5
1.2	2.17	2.5
1.4	2.17	2.5
1.6	2.19	2.5
1.8	2.21	2.5
2.0	2.23	2.5
2.5	2.08	2.5
3.0	1.49	2.5
3.5	0.10	2.5
4.0	0.11	2.5
4.5	0.11	2.5
5.0	0.10	2.5
6.0	0.11	2.5
7.0	0.11	2.5
8.0	0.10	2.5
9.0	0.10	2.5
10.0	0.10	2.5

5.7.3.2. Voice Modulation Limiting for 12.5 KHz Channel Spacing Operation (799-805 MHz band)

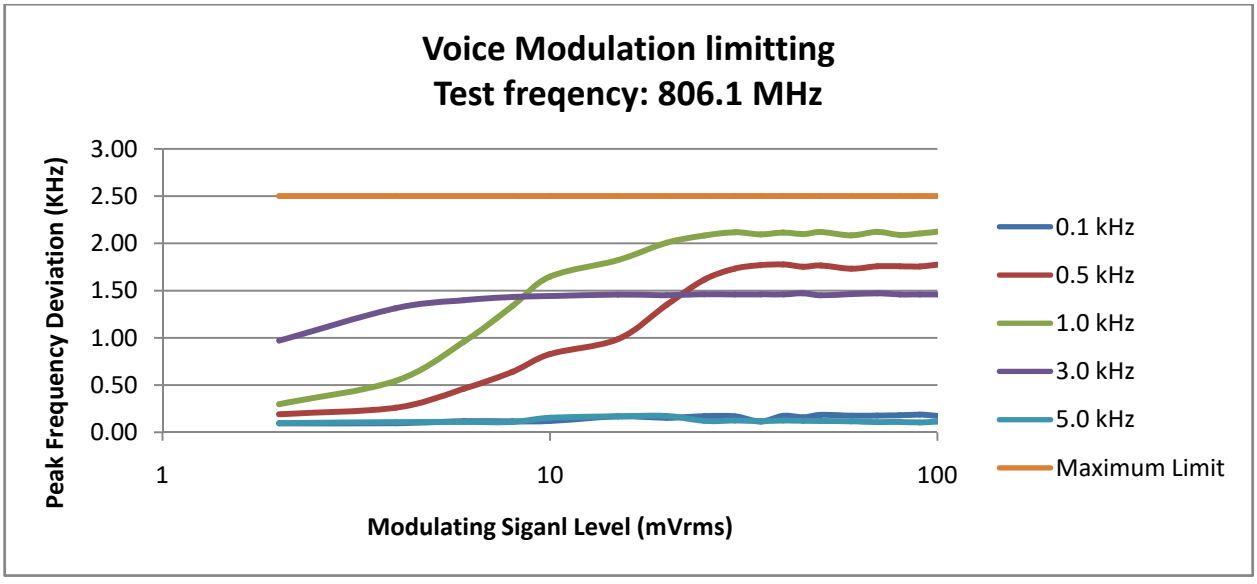
Modulating Signal Level	Peak Frequency Deviation (kHz)					Maximum Limit
(mVrms)	0.1 kHz	0.5 kHz	1.0 kHz	3.0 kHz	5.0 kHz	(kHz)
1	0.09	0.25	0.30	0.55	0.09	2.5
2	0.09	0.36	0.55	0.98	0.10	2.5
4	0.10	0.46	0.99	1.34	0.11	2.5
6	0.11	0.66	1.36	1.43	0.11	2.5
8	0.13	0.86	1.69	1.46	0.11	2.5
10	0.18	1.00	1.85	1.45	0.11	2.5
15	0.19	1.39	2.04	1.45	0.12	2.5
20	0.19	1.65	2.12	1.48	0.11	2.5
25	0.18	1.76	2.15	1.48	0.13	2.5
30	0.18	1.79	2.13	1.48	0.14	2.5
35	0.18	1.76	2.16	1.48	0.16	2.5
40	0.17	1.78	2.12	1.48	0.13	2.5
45	0.18	1.81	2.14	1.48	0.12	2.5
50	0.17	1.79	2.15	1.48	0.12	2.5
60	0.18	1.78	2.13	1.48	0.12	2.5
70	0.18	1.80	2.15	1.48	0.13	2.5
80	0.18	1.75	2.13	1.48	0.11	2.5
90	0.18	1.76	2.13	1.48	0.11	2.5
100	0.18	1.78	2.13	1.48	0.11	2.5



Voice Signal Input Level	= STD MOD Level + 16 dB = 7 mV+ 16 dB = 32.90 dB(mVrms) = 44.17 mVrms	
Modulation Frequency (kHz)	**Peak Deviation (kHz)**	**Maximum Limit (kHz)**
0.1	0.10	2.5
0.2	0.11	2.5
0.4	1.73	2.5
0.6	1.86	2.5
0.8	2.06	2.5
1.0	2.17	2.5
1.2	2.15	2.5
1.4	2.15	2.5
1.6	2.20	2.5
1.8	2.21	2.5
2.0	2.22	2.5
2.5	2.07	2.5
3.0	1.48	2.5
3.5	0.09	2.5
4.0	0.09	2.5
4.5	0.08	2.5
5.0	0.10	2.5
6.0	0.10	2.5
7.0	0.10	2.5
8.0	0.11	2.5
9.0	0.10	2.5
10.0	0.11	2.5

5.7.3.3. Voice Modulation Limiting for 12.5 KHz Channel Spacing Operation (806-824 MHz band)

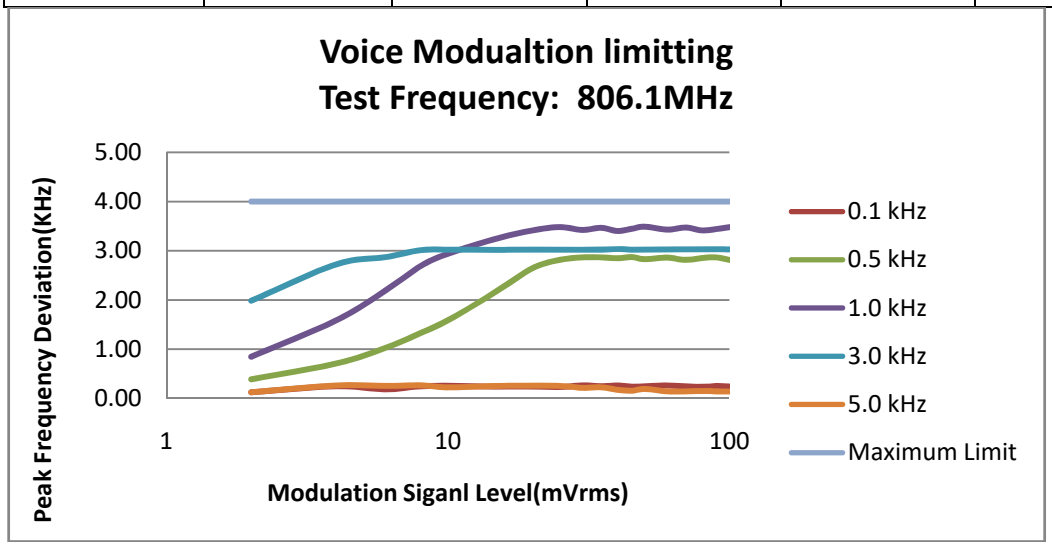
Modulating Signal Level	Peak Frequency Deviation (kHz)					Maximum Limit
(mVrms)	0.1 kHz	0.5 kHz	1.0 kHz	3.0 kHz	5.0 kHz	(kHz)
1	0.09	0.19	0.30	0.539	0.09	2.5
2	0.10	0.26	0.55	0.97	0.10	2.5
4	0.12	0.46	0.96	1.31	0.11	2.5
6	0.12	0.64	1.34	1.40	0.11	2.5
8	0.12	0.83	1.65	1.43	0.11	2.5
10	0.17	0.99	1.82	1.44	0.15	2.5
15	0.15	1.35	2.01	1.46	0.17	2.5
20	0.17	1.62	2.08	1.45	0.17	2.5
25	0.17	1.73	2.12	1.46	0.12	2.5
30	0.11	1.77	2.09	1.46	0.12	2.5
35	0.17	1.78	2.11	1.46	0.12	2.5
40	0.16	1.75	2.10	1.46	0.12	2.5
45	0.18	1.77	2.12	1.47	0.12	2.5
50	0.18	1.73	2.09	1.45	0.12	2.5
60	0.18	1.76	2.12	1.46	0.12	2.5
70	0.18	1.76	2.09	1.47	0.11	2.5
80	0.19	1.76	2.10	1.46	0.11	2.5
90	0.17	1.77	2.12	1.46	0.11	2.5
100	0.19	1.74	2.099	1.46	0.11	2.5



Voice Signal Input Level	= STD MOD Level + 16 dB = 7 mV+ 16 dB = 32.90 dB(mVrms) = 44.17 mVrms	
Modulation Frequency (kHz)	**Peak Deviation (kHz)**	**Maximum Limit (kHz)**
0.1	0.09	2.5
0.2	0.15	2.5
0.4	1.71	2.5
0.6	1.82	2.5
0.8	2.04	2.5
1.0	2.13	2.5
1.2	2.12	2.5
1.4	2.12	2.5
1.6	2.15	2.5
1.8	2.16	2.5
2.0	2.18	2.5
2.5	2.05	2.5
3.0	1.46	2.5
3.5	0.09	2.5
4.0	0.09	2.5
4.5	0.09	2.5
5.0	0.12	2.5
6.0	0.12	2.5
7.0	0.08	2.5
8.0	0.10	2.5
9.0	0.10	2.5
10.0	0.10	2.5

5.7.3.4. Voice Modulation Limiting for 20 KHz Channel Spacing Operation (806-824 MHz band)

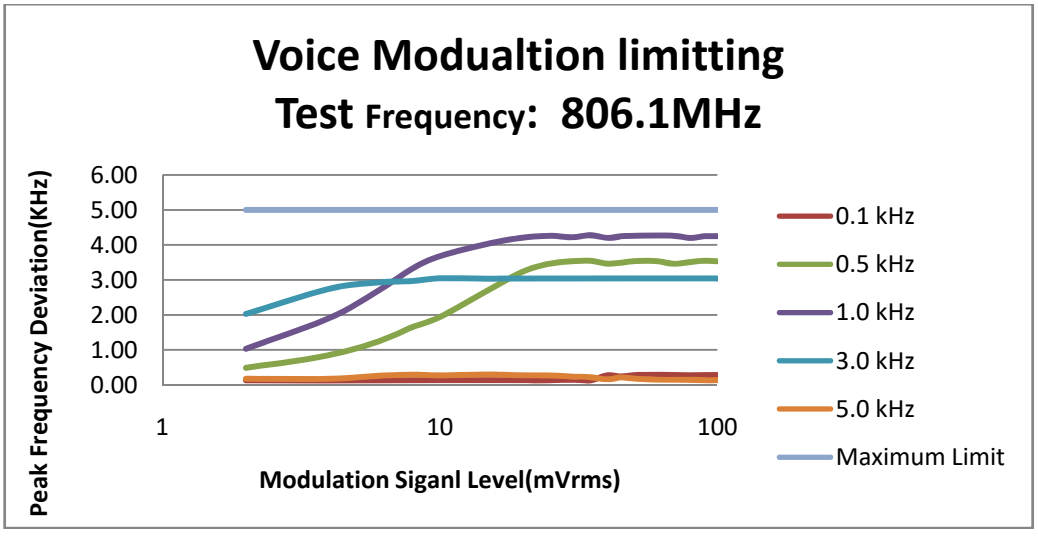
Modulating Signal Level	Peak Frequency Deviation (kHz) at the following modulating frequency:					Maximum Limit
(mVrms)	0.1 kHz	0.5 kHz	1.0 kHz	3.0 kHz	5.0 kHz	(kHz)
1	0.10	0.24	0.46	1.09	0.11	4.0
2	0.13	0.39	0.85	1.98	0.13	4.0
4	0.25	0.71	1.58	2.72	0.26	4.0
6	0.18	1.03	2.19	2.87	0.25	4.0
8	0.25	1.33	2.69	3.01	0.27	4.0
10	0.25	1.59	2.94	3.02	0.22	4.0
15	0.24	2.19	3.25	3.02	0.25	4.0
20	0.24	2.65	3.41	3.02	0.26	4.0
25	0.23	2.82	3.48	3.02	0.26	4.0
30	0.26	2.87	3.42	3.02	0.21	4.0
35	0.25	2.87	3.47	3.02	0.23	4.0
40	0.26	2.85	3.40	3.04	0.18	4.0
45	0.24	2.87	3.45	3.02	0.16	4.0
50	0.25	2.83	3.49	3.02	0.19	4.0
60	0.26	2.86	3.43	3.03	0.14	4.0
70	0.24	2.81	3.47	3.03	0.14	4.0
80	0.23	2.85	3.41	3.03	0.15	4.0
90	0.25	2.86	3.44	3.03	0.14	4.0
100	0.24	2.81	3.48	3.03	0.14	4.0



Voice Signal Input Level	= STD MOD Level + 16 dB = 6.8 mV+ 16 dB = 32.65 dB(mVrms) = 42.91 mVrms	
Modulation Frequency (KHz)	**Peak Deviation (KHz)**	**Maximum Limit (KHz)**
0.1	0.11	4.0
0.2	0.26	4.0
0.4	2.75	4.0
0.6	2.94	4.0
0.8	3.27	4.0
1.0	3.50	4.0
1.2	3.53	4.0
1.4	3.51	4.0
1.6	3.50	4.0
1.8	3.55	4.0
2.0	3.58	4.0
2.5	3.58	4.0
3.0	3.02	4.0
3.5	0.16	4.0
4.0	0.13	4.0
4.5	0.15	4.0
5.0	0.13	4.0
6.0	0.14	4.0
7.0	0.13	4.0
8.0	0.13	4.0
9.0	0.15	4.0
10.0	0.13	4.0

5.7.3.5. Voice Modulation Limiting for 25 KHz Channel Spacing Operation (806-824 MHz band)

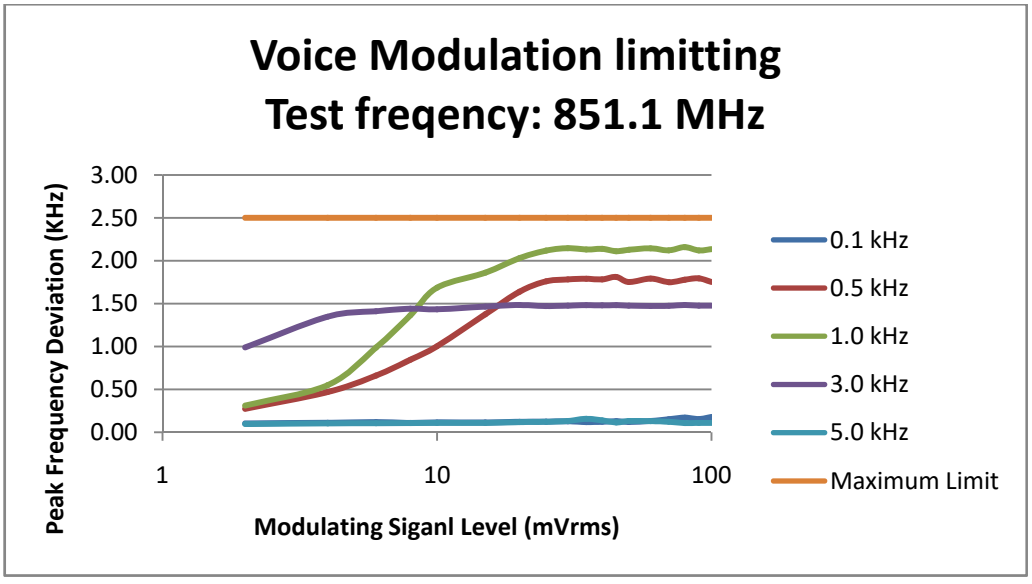
Modulating Signal Level	Peak Frequency Deviation (kHz) at the following modulating frequency:					Maximum Limit
(mVrms)	0.1 kHz	0.5 kHz	1.0 kHz	3.0 kHz	5.0 kHz	(kHz)
1	0.11	0.26	0.56	1.09	0.11	5.0
2	0.13	0.49	1.03	2.03	0.18	5.0
4	0.13	0.85	1.91	2.75	0.18	5.0
6	0.13	1.25	2.70	2.93	0.26	5.0
8	0.14	1.66	3.33	2.97	0.29	5.0
10	0.14	1.94	3.68	3.05	0.27	5.0
15	0.13	2.71	4.04	3.04	0.30	5.0
20	0.14	3.24	4.21	3.04	0.27	5.0
25	0.13	3.47	4.26	3.04	0.27	5.0
30	0.15	3.53	4.22	3.04	0.24	5.0
35	0.14	3.54	4.28	3.05	0.22	5.0
40	0.28	3.46	4.20	3.04	0.16	5.0
45	0.24	3.49	4.25	3.03	0.22	5.0
50	0.28	3.53	4.26	3.04	0.18	5.0
60	0.29	3.54	4.27	3.04	0.15	5.0
70	0.28	3.46	4.26	3.04	0.14	5.0
80	0.28	3.51	4.20	3.04	0.15	5.0
90	0.28	3.54	4.25	3.04	0.14	5.0
100	0.28	3.53	4.25	3.04	0.14	5.0



Voice Signal Input Level	= STD MOD Level + 16 dB = 7 mV+ 16 dB = 32.90 dB(mVrms) = 44.17 mVrms	
Modulation Frequency (KHz)	**Peak Deviation (KHz)**	**Maximum Limit (KHz)**
0.1	0.10	5.0
0.2	0.13	5.0
0.4	3.42	5.0
0.6	3.64	5.0
0.8	4.10	5.0
1.0	4.28	5.0
1.2	4.28	5.0
1.4	4.29	5.0
1.6	4.32	5.0
1.8	4.39	5.0
2.0	4.40	5.0
2.5	4.20	5.0
3.0	3.04	5.0
3.5	0.12	5.0
4.0	0.16	5.0
4.5	0.17	5.0
5.0	0.14	5.0
6.0	0.11	5.0
7.0	0.12	5.0
8.0	0.18	5.0
9.0	0.18	5.0
10.0	0.17	5.0

5.7.3.7. Voice Modulation Limiting for 12.5 KHz Channel Spacing Operation (851-869 MHz band)

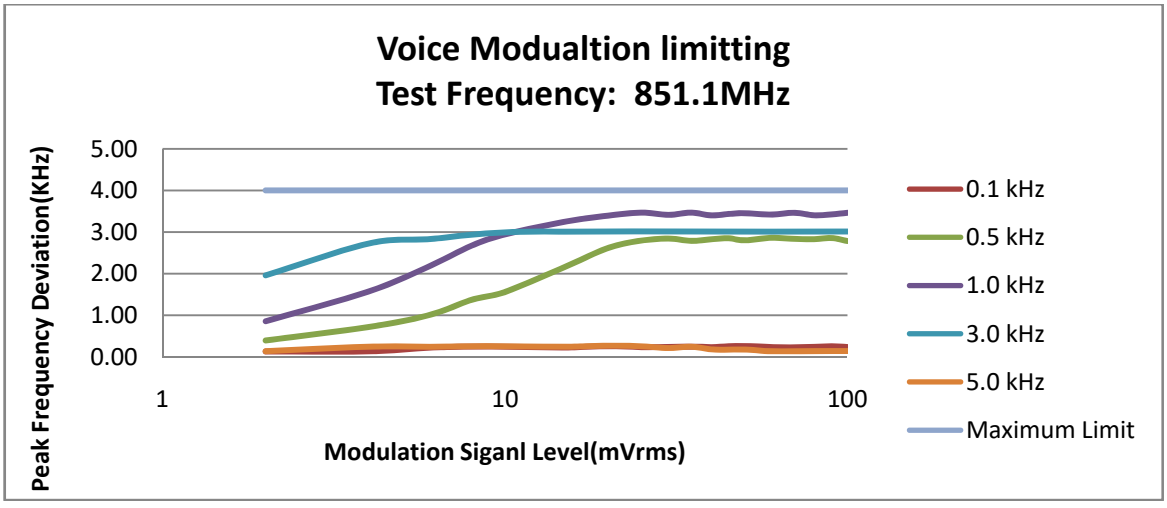
Modulating Signal Level	Peak Frequency Deviation (kHz)					Maximum Limit
(mVrms)	0.1 kHz	0.5 kHz	1.0 kHz	3.0 kHz	5.0 kHz	(kHz)
1	0.10	0.18	0.31	0.57	0.10	2.5
2	0.10	0.27	0.55	0.99	0.10	2.5
4	0.11	0.47	0.99	1.35	0.10	2.5
6	0.12	0.66	1.37	1.41	0.11	2.5
8	0.11	0.85	1.69	1.44	0.11	2.5
10	0.12	1.00	1.86	1.43	0.11	2.5
15	0.11	1.38	2.03	1.47	0.11	2.5
20	0.12	1.64	2.12	1.48	0.12	2.5
25	0.12	1.76	2.15	1.47	0.12	2.5
30	0.13	1.78	2.13	1.48	0.13	2.5
35	0.12	1.79	2.14	1.48	0.16	2.5
40	0.12	1.78	2.11	1.48	0.14	2.5
45	0.13	1.81	2.13	1.48	0.12	2.5
50	0.12	1.75	2.14	1.48	0.13	2.5
60	0.13	1.79	2.12	1.47	0.13	2.5
70	0.15	1.75	2.16	1.47	0.12	2.5
80	0.17	1.78	2.12	1.48	0.11	2.5
90	0.15	1.79	2.14	1.48	0.11	2.5
100	0.18	1.75	2.15	1.48	0.11	2.5



Voice Signal Input Level	= STD MOD Level + 16 dB = 7 mV+ 16 dB = 32.90 dB(mVrms) = 44.17 mVrms	
Modulation Frequency (kHz)	**Peak Deviation (kHz)**	**Maximum Limit (kHz)**
0.1	0.10	2.5
0.2	0.11	2.5
0.4	1.72	2.5
0.6	1.86	2.5
0.8	2.05	2.5
1.0	2.15	2.5
1.2	2.15	2.5
1.4	2.16	2.5
1.6	2.17	2.5
1.8	2.20	2.5
2.0	2.22	2.5
2.5	2.07	2.5
3.0	1.47	2.5
3.5	0.10	2.5
4.0	0.10	2.5
4.5	0.09	2.5
5.0	0.10	2.5
6.0	0.12	2.5
7.0	0.10	2.5
8.0	0.10	2.5
9.0	0.12	2.5
10.0	0.11	2.5

5.7.3.8. Voice Modulation Limiting for 20 KHz Channel Spacing Operation (851-869 MHz band)

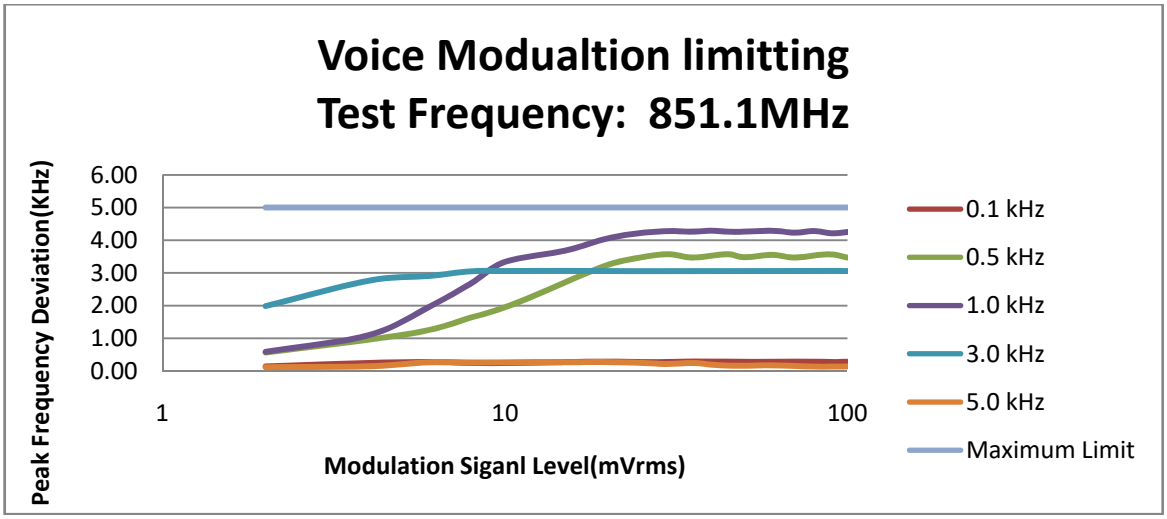
Modulating Signal Level	Peak Frequency Deviation (kHz) at the following modulating frequency:					Maximum Limit
(mVrms)	0.1 kHz	0.5 kHz	1.0 kHz	3.0 kHz	5.0 kHz	(kHz)
1	0.11	0.24	0.46	1.08	0.10	4.0
2	0.13	0.40	0.86	1.96	0.14	4.0
4	0.13	0.72	1.57	2.72	0.25	4.0
6	0.22	1.01	2.18	2.83	0.25	4.0
8	0.25	1.38	2.68	2.93	0.26	4.0
10	0.25	1.56	2.94	3.00	0.26	4.0
15	0.23	2.17	3.25	3.01	0.25	4.0
20	0.26	2.62	3.40	3.01	0.27	4.0
25	0.24	2.80	3.47	3.02	0.26	4.0
30	0.24	2.85	3.41	3.01	0.21	4.0
35	0.25	2.79	3.47	3.01	0.25	4.0
40	0.24	2.83	3.40	3.01	0.18	4.0
45	0.26	2.85	3.44	3.01	0.17	4.0
50	0.26	2.80	3.45	3.01	0.18	4.0
60	0.24	2.86	3.42	3.01	0.13	4.0
70	0.23	2.84	3.46	3.01	0.14	4.0
80	0.24	2.83	3.40	3.01	0.13	4.0
90	0.26	2.86	3.43	3.01	0.14	4.0
100	0.24	2.79	3.46	3.01	0.14	4.0



Voice Signal Input Level	= STD MOD Level + 16 dB = 6.9 mV+ 16 dB = 32.78 dB(mVrms) = 43.54 mVrms	
Modulation Frequency (KHz)	**Peak Deviation (KHz)**	**Maximum Limit (KHz)**
0.1	0.10	4.0
0.2	0.22	4.0
0.4	2.75	4.0
0.6	2.91	4.0
0.8	3.27	4.0
1.0	3.48	4.0
1.2	3.52	4.0
1.4	3.49	4.0
1.6	3.52	4.0
1.8	3.53	4.0
2.0	3.57	4.0
2.5	3.57	4.0
3.0	3.01	4.0
3.5	0.15	4.0
4.0	0.15	4.0
4.5	0.17	4.0
5.0	0.18	4.0
6.0	0.16	4.0
7.0	0.16	4.0
8.0	0.17	4.0
9.0	0.16	4.0
10.0	0.16	4.0

5.7.3.9. Voice Modulation Limiting for 25 KHz Channel Spacing Operation (851-869 MHz band)

Modulating Signal Level	Peak Frequency Deviation (kHz) at the following modulating frequency:					Maximum Limit
(mVrms)	0.1 kHz	0.5 kHz	1.0 kHz	3.0 kHz	5.0 kHz	(kHz)
1	0.12	0.29	0.58	1.08	0.11	5.0
2	0.14	0.57	1.09	1.99	0.11	5.0
4	0.25	0.96	1.96	2.76	0.14	5.0
6	0.27	1.25	2.69	2.91	0.27	5.0
8	0.25	1.64	3.33	3.05	0.25	5.0
10	0.24	1.94	3.68	3.06	0.27	5.0
15	0.27	2.71	4.06	3.06	0.27	5.0
20	0.29	3.25	4.22	3.05	0.27	5.0
25	0.27	3.48	4.28	3.06	0.25	5.0
30	0.28	3.57	4.26	3.05	0.21	5.0
35	0.29	3.47	4.29	3.06	0.25	5.0
40	0.29	3.52	4.26	3.06	0.19	5.0
45	0.28	3.57	4.26	3.06	0.16	5.0
50	0.28	3.48	4.29	3.05	0.16	5.0
60	0.28	3.55	4.23	3.06	0.17	5.0
70	0.28	3.47	4.28	3.05	0.15	5.0
80	0.29	3.53	4.21	3.06	0.13	5.0
90	0.27	3.57	4.25	3.07	0.13	5.0
100	0.28	3.47	4.29	3.06	0.14	5.0



Voice Signal Input Level	= STD MOD Level + 16 dB = 7 mV+ 16 dB = 32.90 dB(mVrms) = 44.17 mVrms	
Modulation Frequency (KHz)	**Peak Deviation (KHz)**	**Maximum Limit (KHz)**
0.1	0.11	5.0
0.2	0.25	5.0
0.4	3.40	5.0
0.6	3.66	5.0
0.8	4.12	5.0
1.0	4.31	5.0
1.2	4.28	5.0
1.4	4.29	5.0
1.6	4.39	5.0
1.8	4.43	5.0
2.0	4.38	5.0
2.5	4.22	5.0
3.0	3.06	5.0
3.5	0.16	5.0
4.0	0.16	5.0
4.5	0.16	5.0
5.0	0.16	5.0
6.0	0.15	5.0
7.0	0.15	5.0
8.0	0.16	5.0
9.0	0.16	5.0
10.0	0.15	5.0

5.8. OCCUPIED BANDWIDTH & EMISSION MASK [§§ 2.1049, 90.209, 90.210, 90.210 & 90.691] [RSS-119 § 5.5 & 5.8]

5.8.1. Limits

Frequency band (MHz)	Channel Spacing (kHz)	Authorized bandwidth (kHz)
150-174	7.5	20/11.25/6
406-512	6.25	20/11.25/6
806-809/851-854	12.5	20
809-817/854-862	12.5	*20/11.25
817-824/862-869	25	*20
896-901/935-940	12.5	13.6

*Operations using equipment designed to operate with a 25 kilohertz channel bandwidth may be authorized up to a 20 kilohertz bandwidth unless the equipment meets the Adjacent Channel Power limits of § 90.221 in which case operations may be authorized up to a 22 kilohertz bandwidth. Operations using equipment designed to operate with a 12.5 kilohertz channel bandwidth may be authorized up to an 11.25 kilohertz bandwidth.

Emissions shall be attenuated below the mean output power of the transmitter as follows:
Emission Mask Requirement- FCC Reference: 90.210 and90.691

Frequency band (MHz)	Mask for equipment with audio low pass filter	Mask for equipment without audio low pass filter
150-174 [2]	B, D, or E	C, D or E
421-512 [2 5]	B, D, or E	C, D, or E
806-809/851-854 [6]	B	H
809-824/854-869 [35]	B, D	D, G.

1 Equipment using single sideband J3E emission must meet the requirements of Emission Mask A. Equipment using other emissions must meet the requirements of Emission Mask B or C, as applicable.
2 Equipment designed to operate with a 25 kHz channel bandwidth must meet the requirements of Emission Mask B or C, as applicable. Equipment designed to operate with a 12.5 kHz channel bandwidth must meet the requirements of Emission Mask D, and equipment designed to operate with a 6.25 kHz channel bandwidth must meet the requirements of Emission Mask E.
3 Equipment used in this licensed to EA or non-EA systems shall comply with the emission mask provisions of § 90.691 of this chapter.
4 DSRCS Roadside Units equipment in the 5850-5925 MHz band is governed under subpart M of this part.
5 Equipment designed to operate on 25 kilohertz bandwidth channels must meet the requirements of either Emission Mask B or G, whichever is applicable, while equipment designed to operate on 12.5 kilohertz bandwidth channels must meet the requirements of Emission Mask D. Equipment designed to operate on 25 kilohertz bandwidth channels may alternatively meet the Adjacent Channel Power limits of § 90.221.
6 Transmitters utilizing analog emissions that are equipped with an audio low-pass filter must meet Emission Mask B. All transmitters utilizing digital emissions and those transmitters using analog emissions without an audio low-pass filter must meet Emission Mask H.

§ 90.691 Emission mask requirements for EA-based systems

(a) Out-of-band emission requirement shall apply only to the “outer” channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:
(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 116 Log10(f/6.1) decibels or 50 + 10 Log10(P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.
(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 43 + 10Log10(P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.
(b) When an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in this section.

RSS-119: The maximum permissible occupied bandwidth shall not exceed the authorized bandwidth specified in Table 3 for the equipment’s frequency band.

Table 3 - Channel Spacing, Authorized Bandwidths and Applicable Spectrum Masks

Frequency Band (MHz)	Related SRSP for Channelling Plan and e.r.p.	Channel Spacing (kHz)	Authorized Bandwidth (kHz)	Spectrum Masks with Audio Filter	Spectrum Masks Without Audio Filter
764-776 and 794-806	SRSP-511	6.25 , 12.5	Note 2	Section 5.8.9	Section 5.8.9
806-821-/851-866 and 821-824/866-869	SRSP-502	25	20	B	G
		12.5	11.25	D	D

Note 1: Paging transmitters in the bands 406.1-430 MHz or 450-470 MHz are to use Mask G.

Note 2: Provided that the ACP requirements in Section 5.8.9.1 are met, any authorized bandwidth that does not exceed the channel bandwidth can be used.

Note 3: Mask G applies if two 12.5 kHz channels are aggregated. Alternatively, a mask may be used which does not produce more adjacent channel interference than narrowband (12.5 kHz) channel equipment.

5.8.2. Method of Measurements

Refer to Section 8.4 of this report for measurement details.

Masks selected
Channel Bandwidth 12.5KHz, 20KHz & 25KHz

Frequency		Analog	Digital
806-809	851-854	B	H
809-824	854-869	B,D	G

Frequency	**Analog**	**Mask**
806.1	12.5, 20 & 25kHz	B
808.9	20KHz	B
815.1	12.5 & 25kHz	B,D, 90.691
823.9	12.5 & 25kHz	B, D,90.691
851.1	12.5, 20 & 25kHz	B
853.9	20KHz	B
860.1	12.5 & 25kHz	B,D, 90.691
868.9	12.5 & 25kHz	B, D,90.691

Frequency	**Digital**	**Mask**
806.1	Phase 1&2	H
815.1	Phase 1&2	D, 90.691
823.9	Phase 1&2	D, 90.691
851.1	Phase 1&2	H
860.1	Phase 1&2	D, 90.691
868.9	Phase 1&2	D, 90.691

5.8.3. Test Data- OCCUPIED BANDWIDTH

5.8.3.1. 99% Occupied Bandwidth

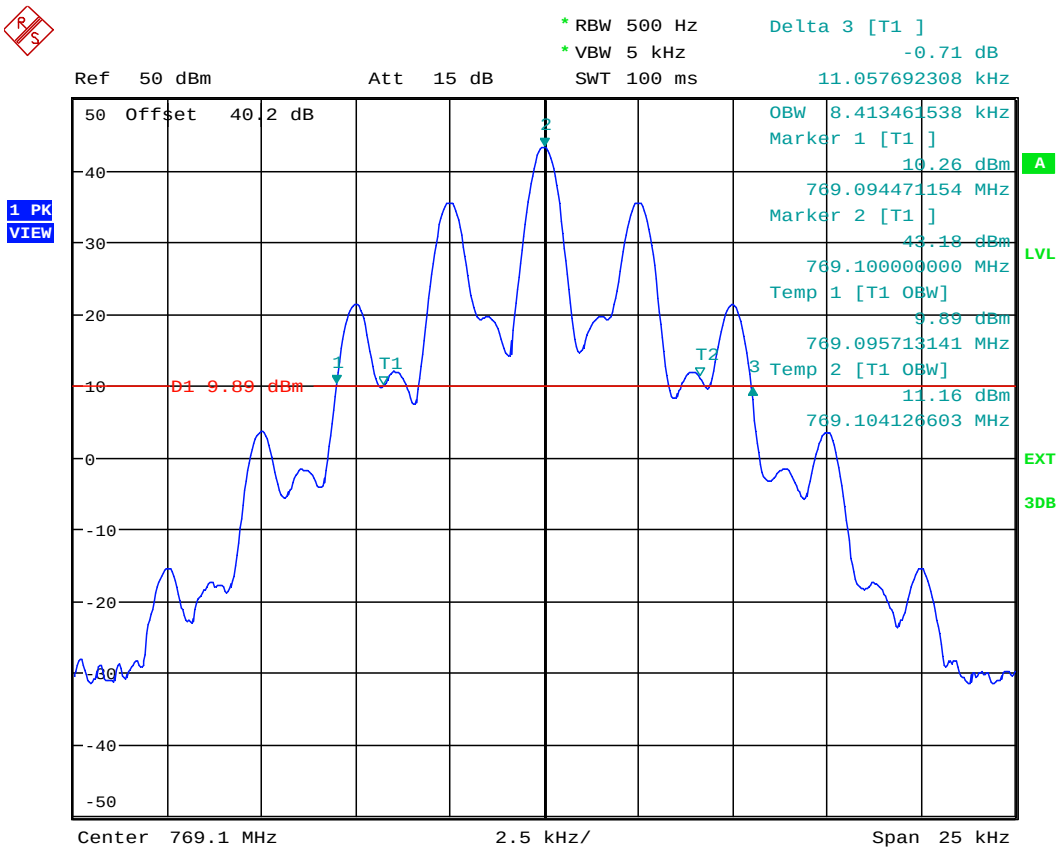
Frequency (MHz)	Channel Spacing (kHz)	Analog FM with 2.5 KHz sine wave signal	Digital F1D/F1E	Digital F1W	Maximum Authorized Bandwidth (kHz)
769.1	12.5	11.05	8.09	8.05	11.25
774.9	12.5	11.02	8.09	7.93	11.25
799.1	12.5	10.98	8.05	7.97	11.25
804.9	12.5	11.02	8.01	7.85	11.25
806.1	12.5	10.98	8.01	7.97	11.25
815.1	12.5	10.98	8.01	7.93	11.25
823.9	12.5	11.05	8.09	8.05	11.25
806.1	20	10.72	N/A	N/A	20
808.9	20	10.72	N/A	N/A	20
806.1	25	15.82	N/A	N/A	20
815.1	25	15.96	N/A	N/A	20
823.9	25	15.86	N/A	N/A	20
851.1	12.5	10.94	7.93	8.01	11.25
860.1	12.5	10.98	8.09	8.09	11.25
868.9	12.5	10.94	7.93	7.93	11.25
851.1	20	10.72	N/A	N/A	20
853.9	20	10.72	N/A	N/A	20
851.1	25	15.77	N/A	N/A	20
860.1	25	15.86	N/A	N/A	20
868.9	25	15.77	N/A	N/A	20

Note: 99% Occupied Bandwidth measurements were done using the built-in auto function of the analyzer.

5.8.4. Test Data- OBW

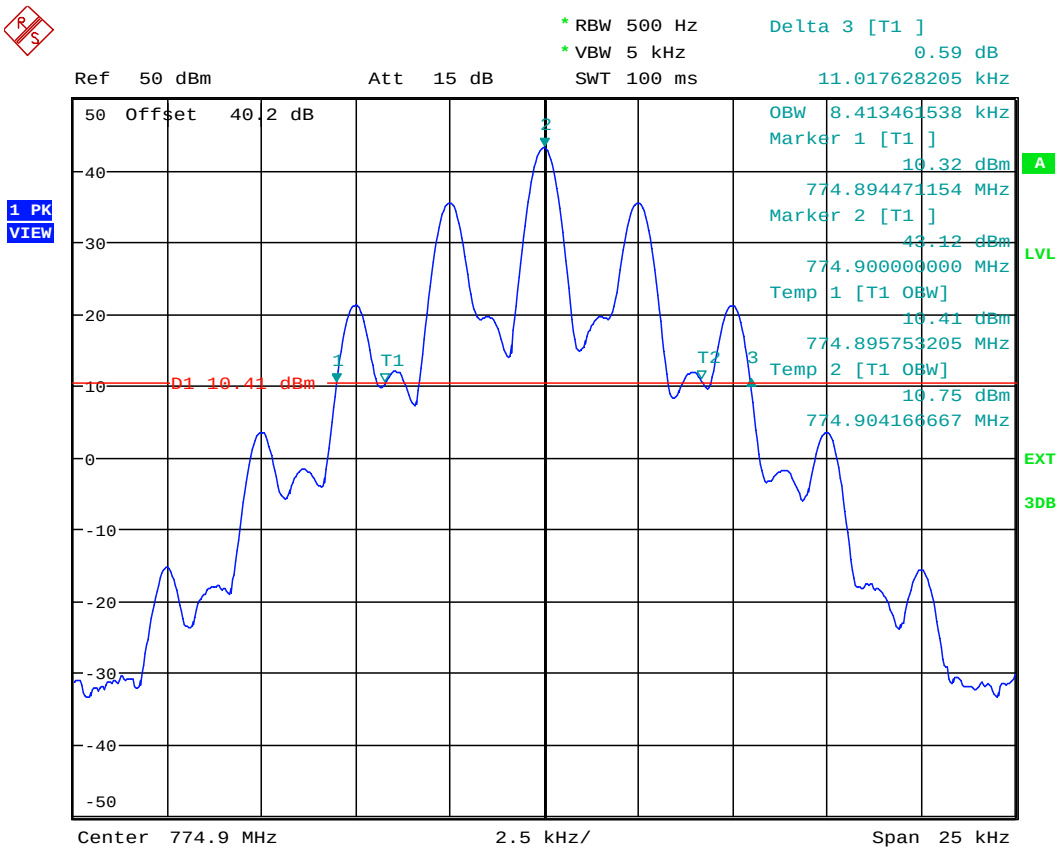
5.8.4.1. Configuration: 99% OBW, Band 1: 769-775MHz, 769.1MHz, 12.5 KHz, Analog, High power

OBW: 11.05 KHz



5.8.4.2. Configuration: 99% OBW, Band 1: 769-775MHz, 774.9MHz, 12.5 KHz, Analog, High power

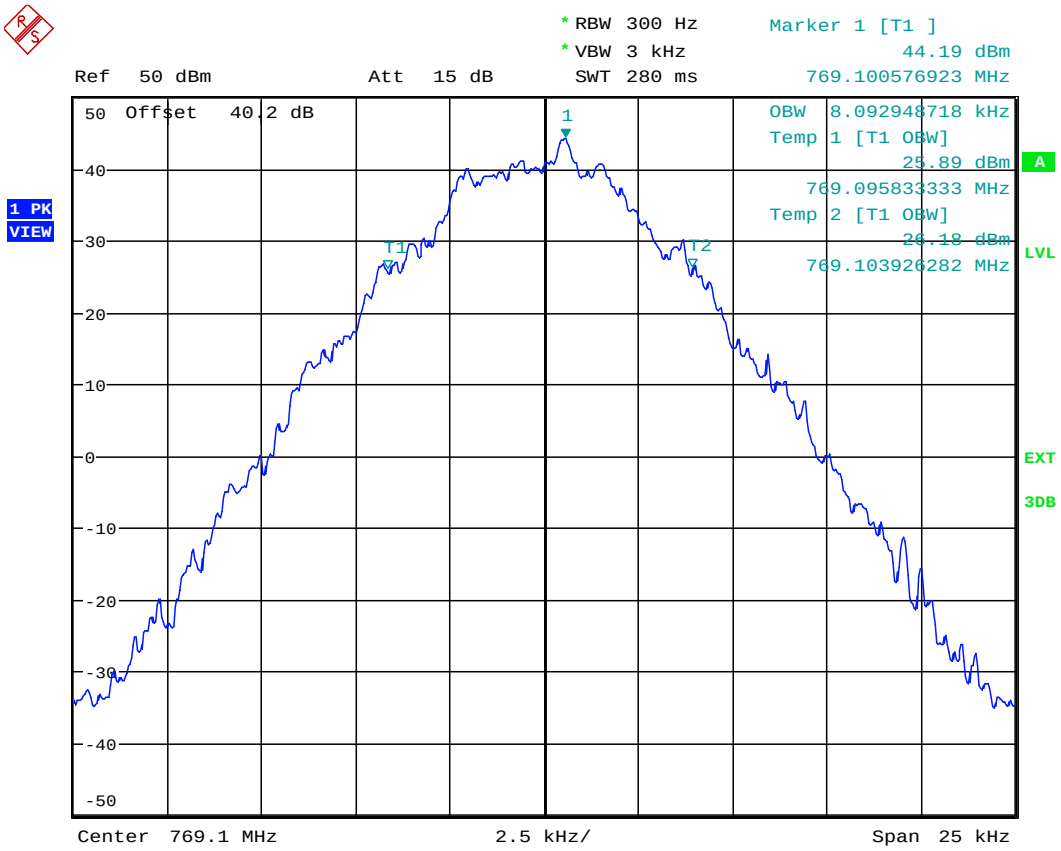
OBW: 11.017 KHz



Date: 14.AUG.2023 11:49:09

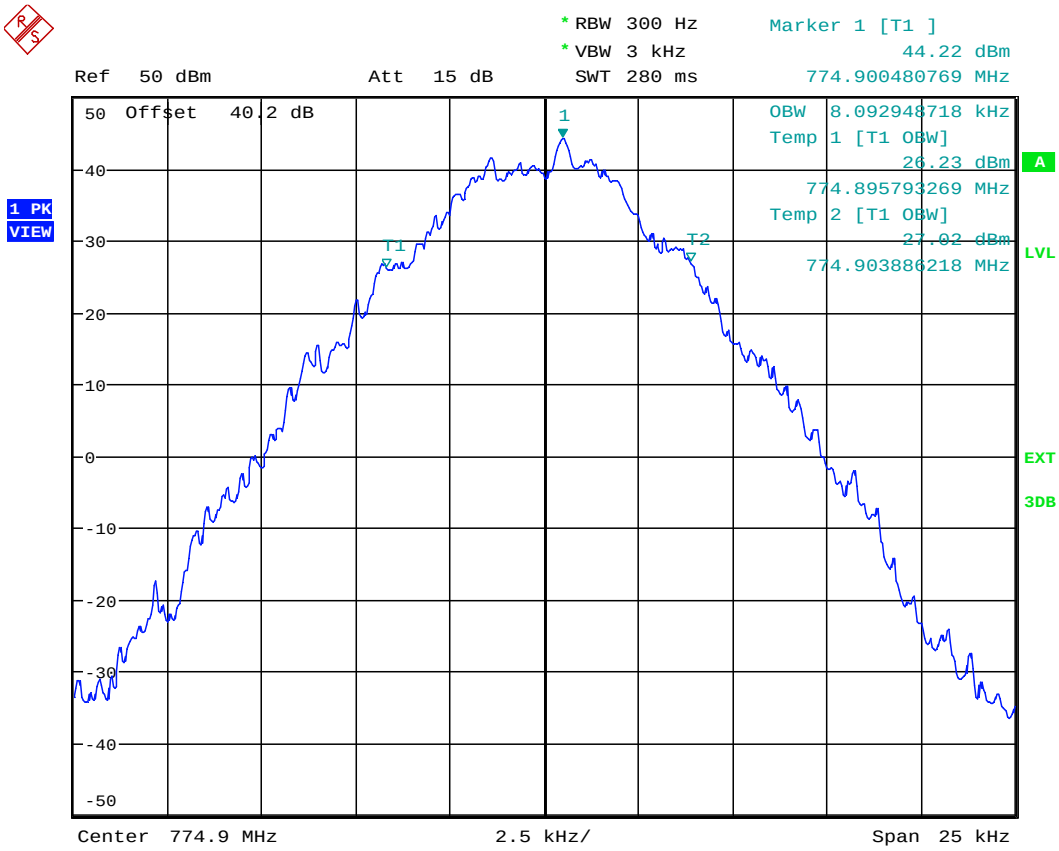
5.8.4.3. Configuration: 99% OBW, Band 1: 769-775MHz, 769.1MHz, Digital, F1E& F1D, High power

OBW: 8.09 KHz



5.8.4.4. Configuration: 99% OBW, Band 1: 769-775MHz, 774.9MHz, Digital, F1E& F1D, High power

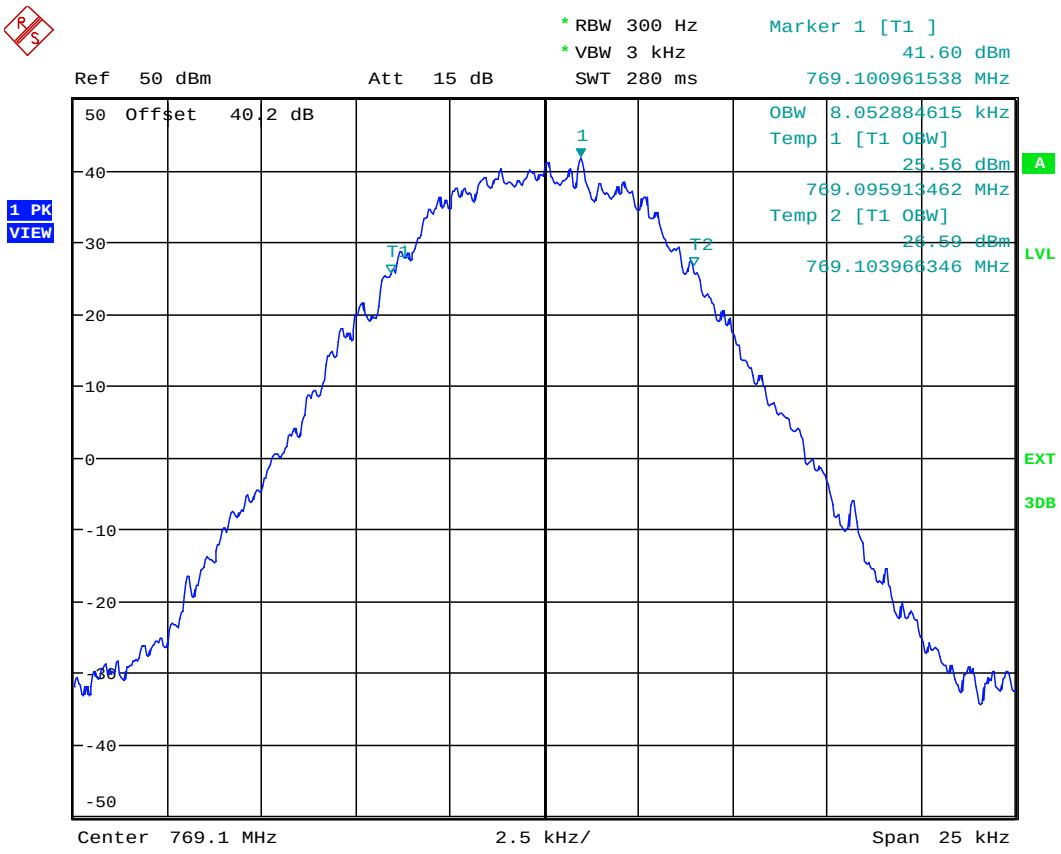
OBW: 8.09 KHz



Date: 14.AUG.2023 12:26:39

5.8.4.5. Configuration: 99% OBW, Band 1: 769-775MHz, 769.1MHz, Digital, F1W, High power

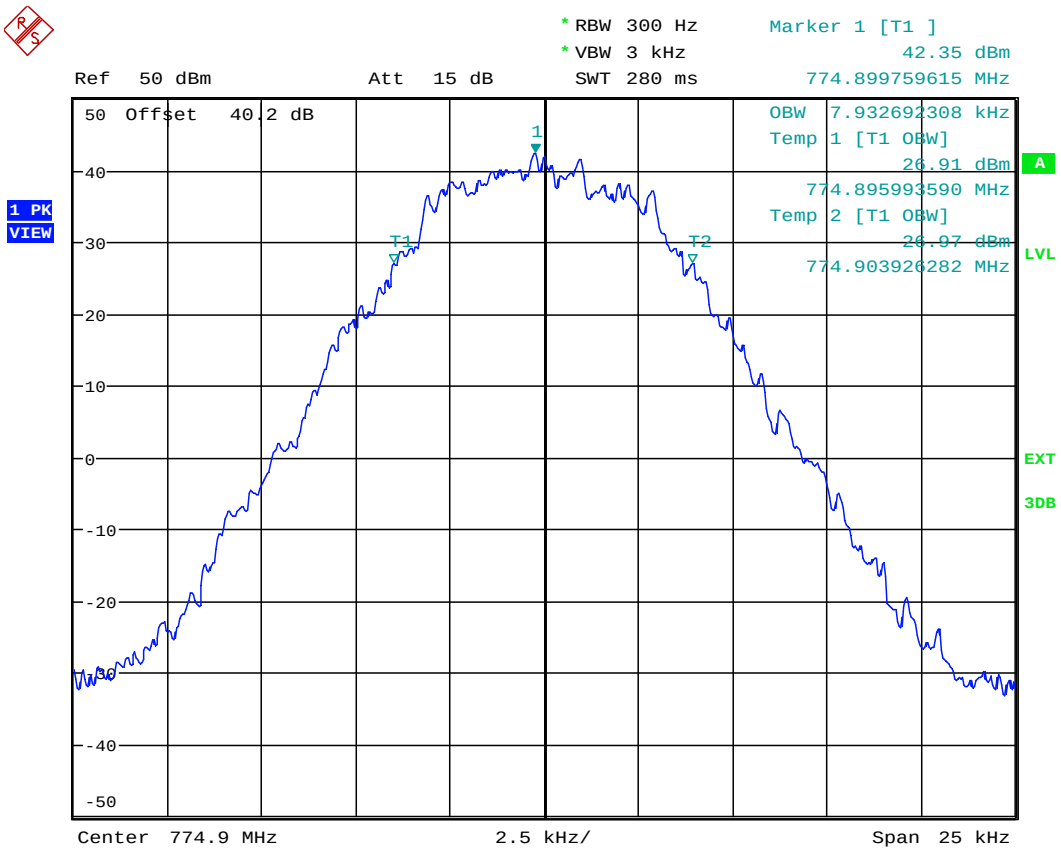
OBW: 8.05 KHz



Date: 14.AUG.2023 13:00:21

5.8.4.6. Configuration: 99% OBW, Band 1: 769-775MHz, 774.9MHz, Digital, F1W, High power

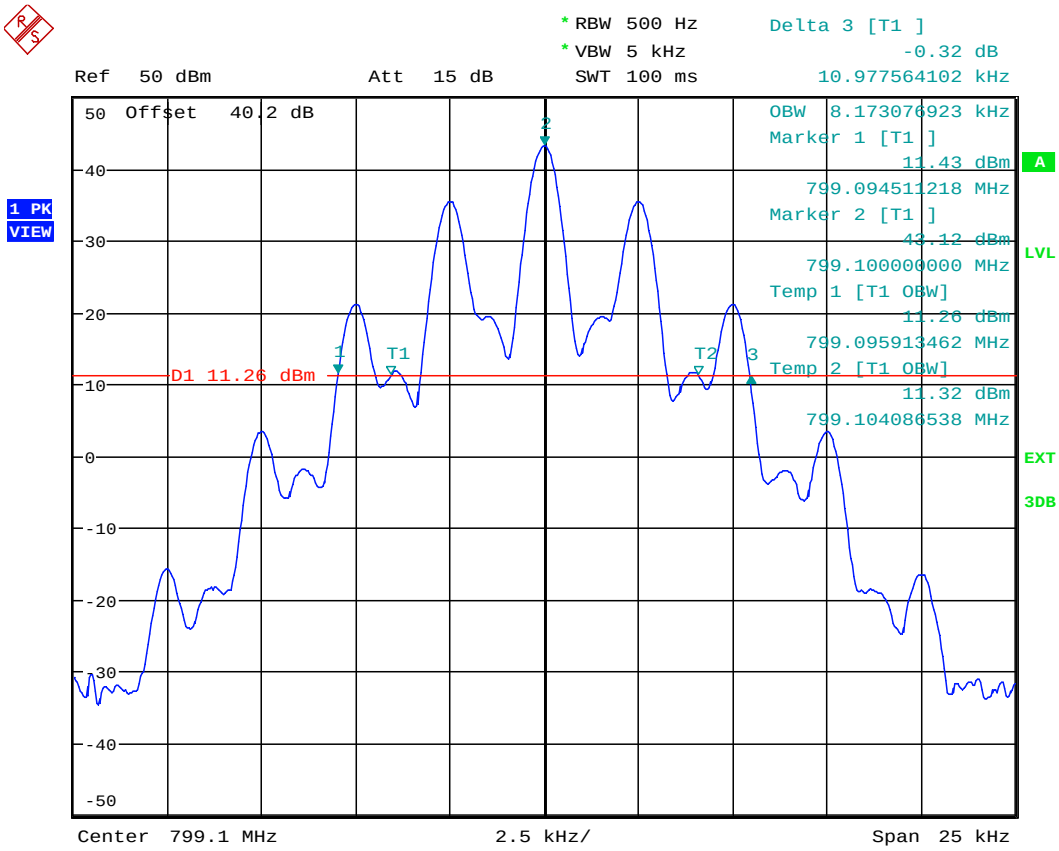
OBW: 7.93 KHz



Date: 14.AUG.2023 13:02:30

5.8.4.7. Configuration: 99% OBW, Band 2: 799-805MHz, 799.1MHz, 12.5 KHz, Analog, High power

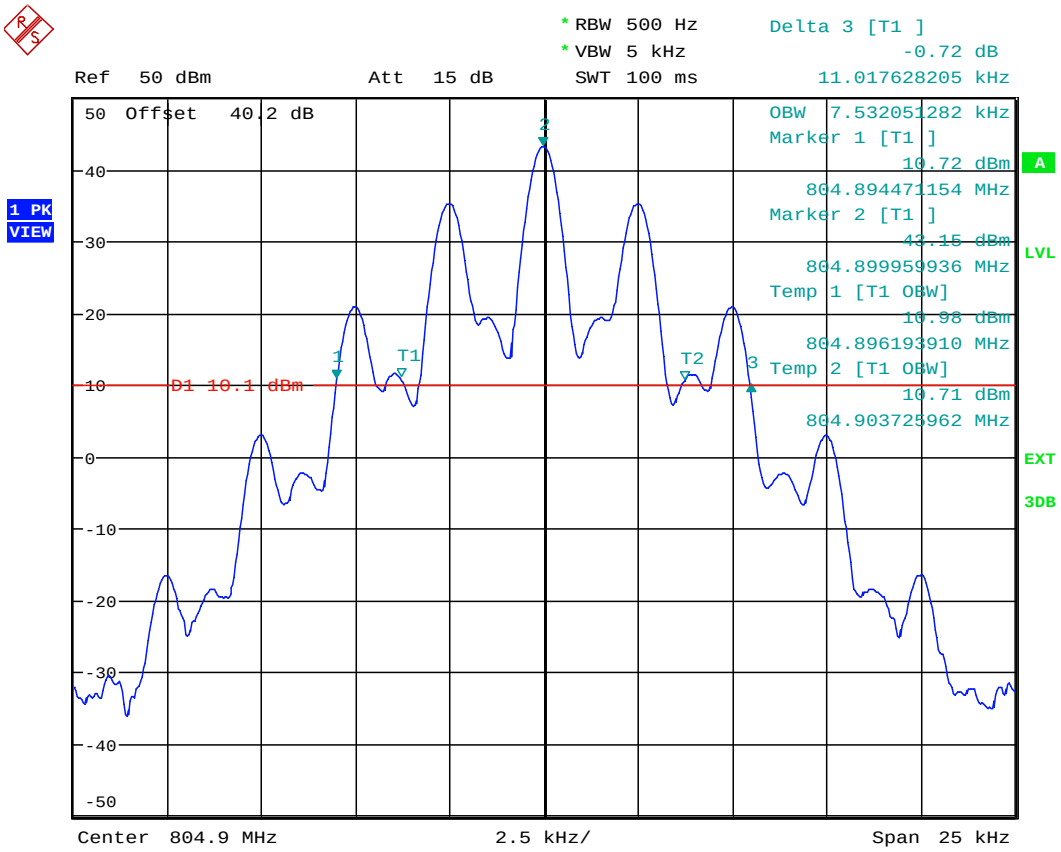
OBW: 10.98 KHz



Date: 14.AUG.2023 11:44:53

5.8.4.8. Configuration: 99% OBW, Band 2: 799-805MHz, 804.9MHz, 12.5 KHz, Analog, High power

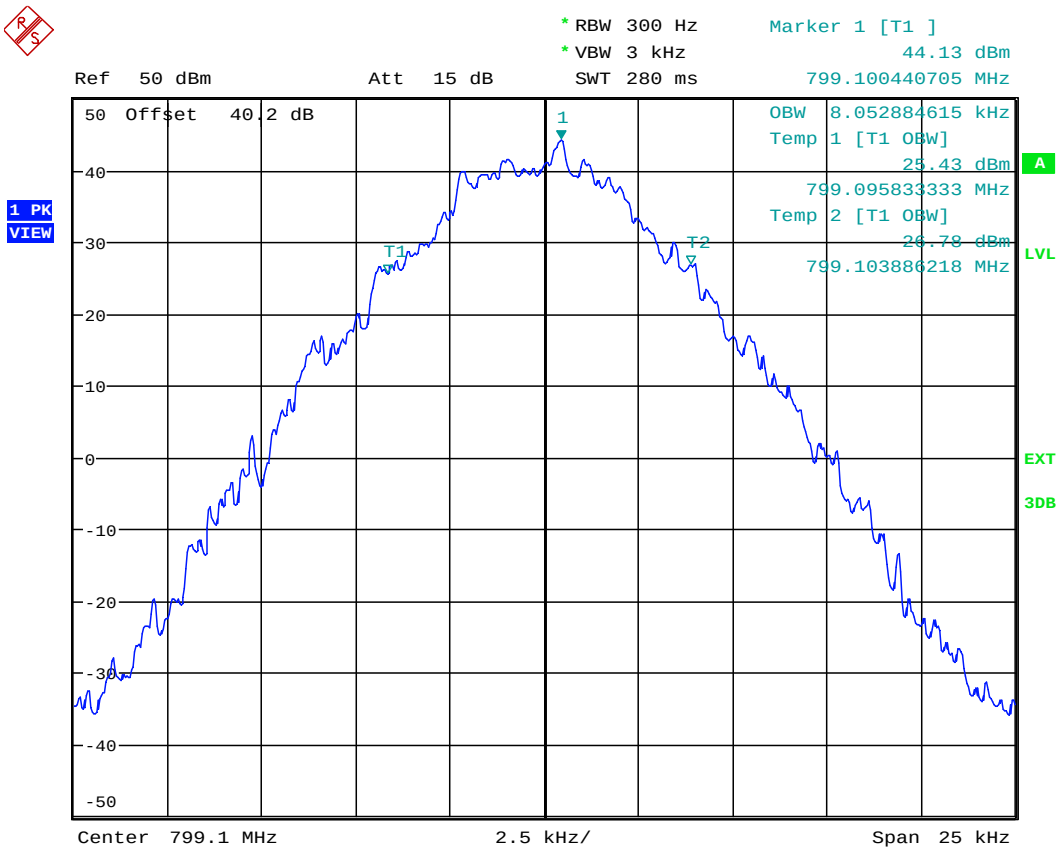
OBW: 11.02 KHz



Date: 14.AUG.2023 11:46:07

5.8.4.9. Configuration: 99% OBW, Band 2: 799-805MHz, 799.1MHz, Digital, F1E& F1D, High power

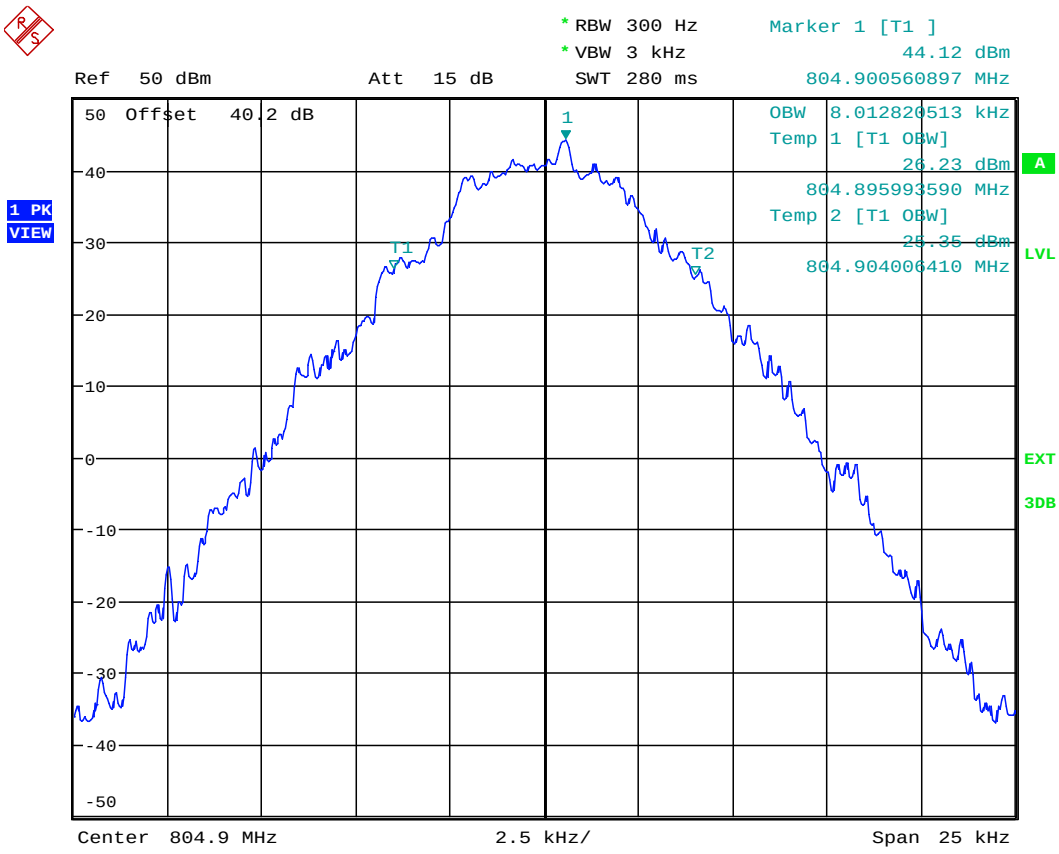
OBW: 8.05 KHz



Date: 14.AUG.2023 12:29:25

5.8.4.10. Configuration: 99% OBW, Band 2: 799-805MHz, 804.9MHz, Digital, F1E& F1D, High power

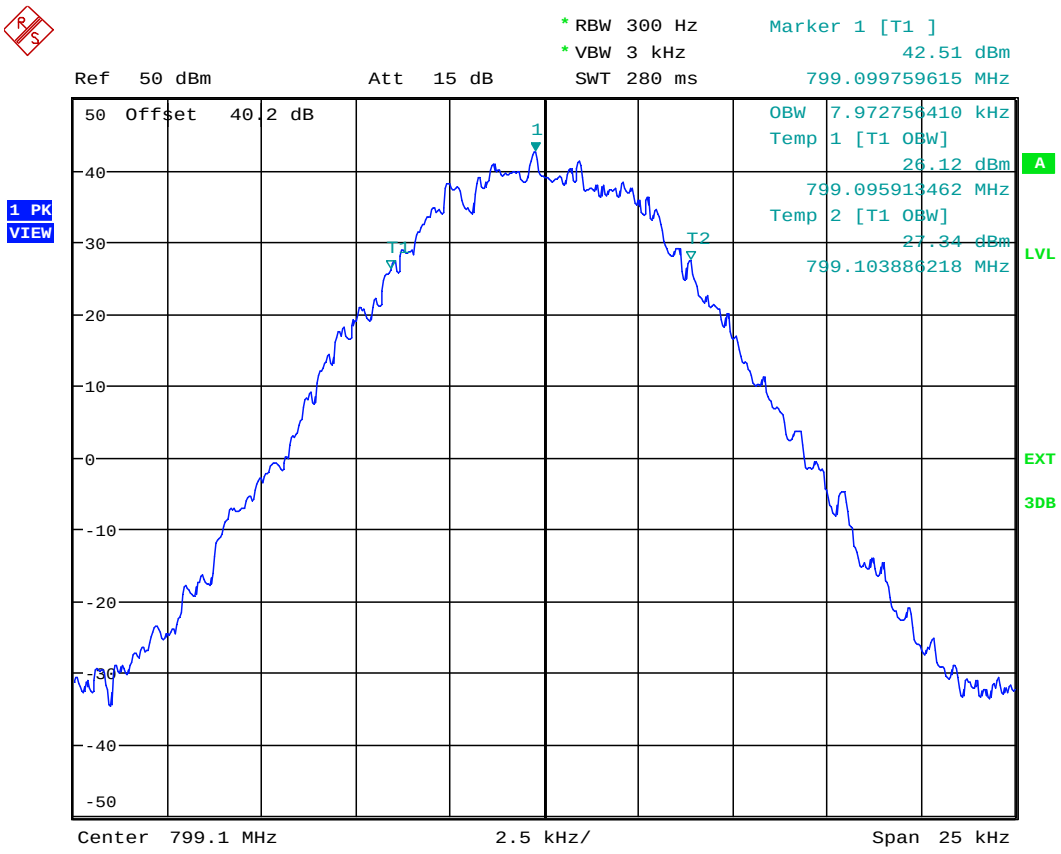
OBW: 8.01 KHz



Date: 14.AUG.2023 12:37:38

5.8.4.11. Configuration: 99% OBW, Band 2: 799-805MHz, 799.1MHz, Digital, F1W, High power

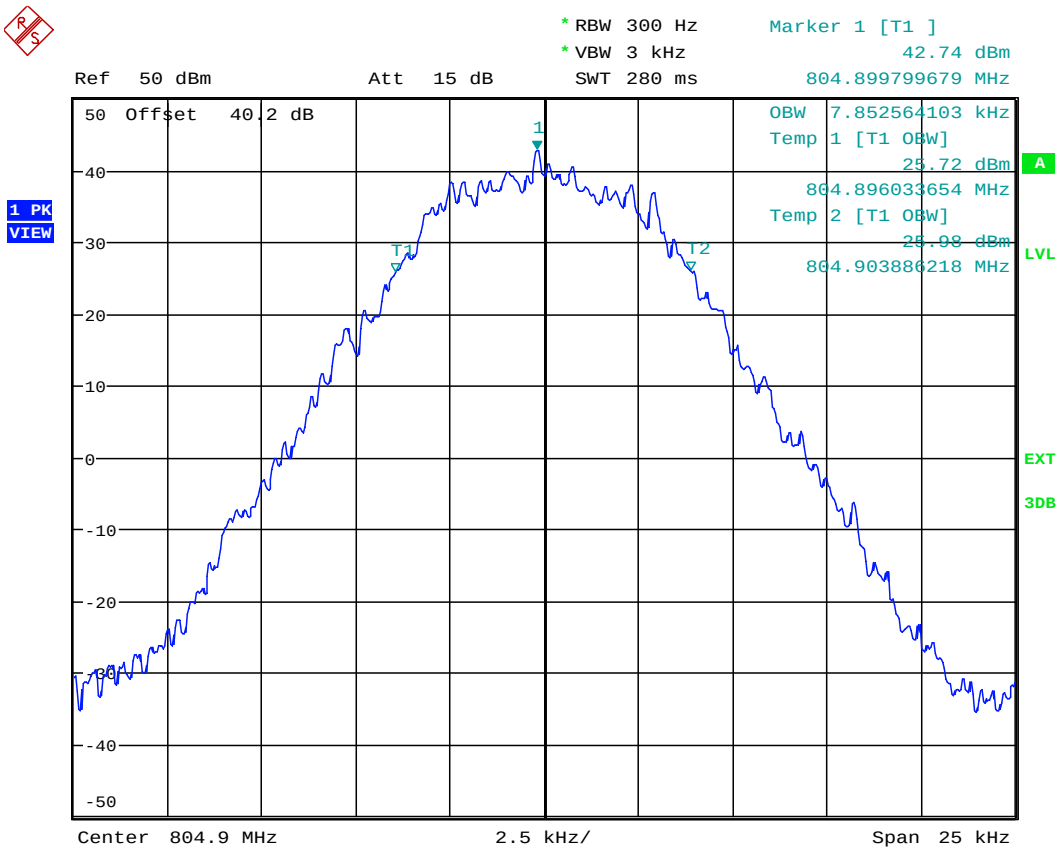
OBW: 7.97 KHz



Date: 14.AUG.2023 13:04:29

5.8.4.12. Configuration: 99% OBW, Band 2: 799-805MHz, 804.9MHz, Digital, F1W, High power

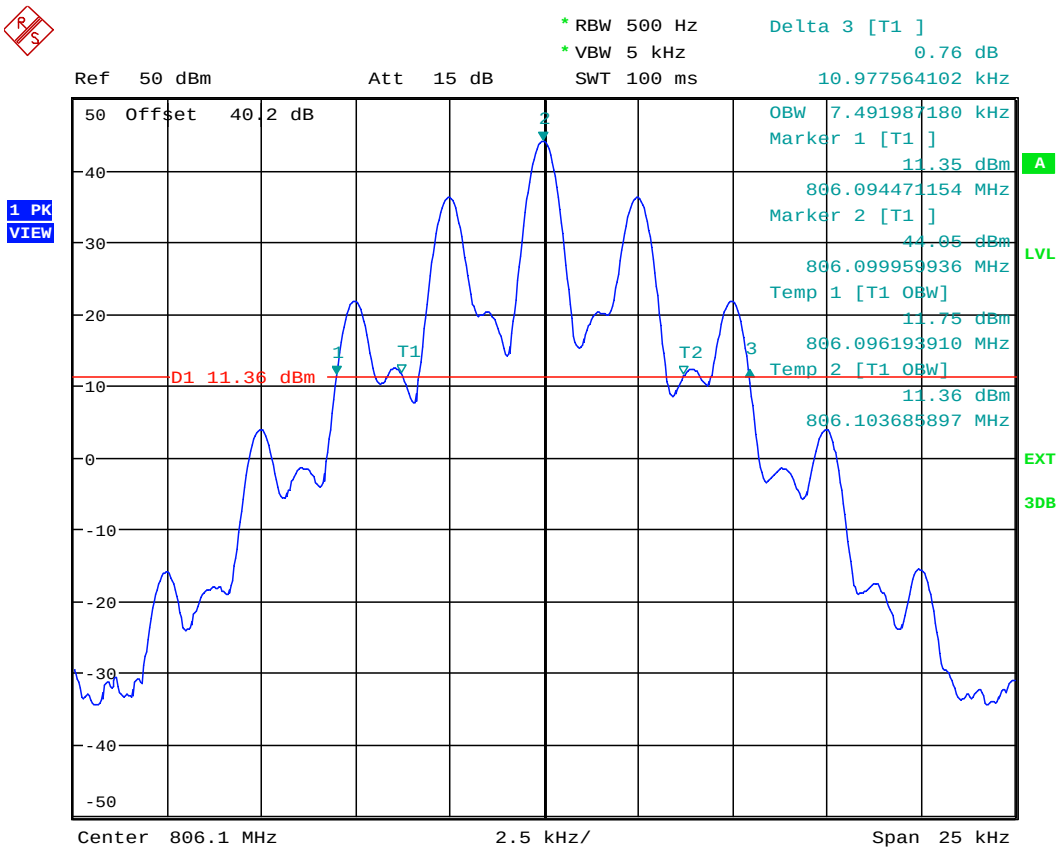
OBW: 7.85 KHz



Date: 14.AUG.2023 13:05:49

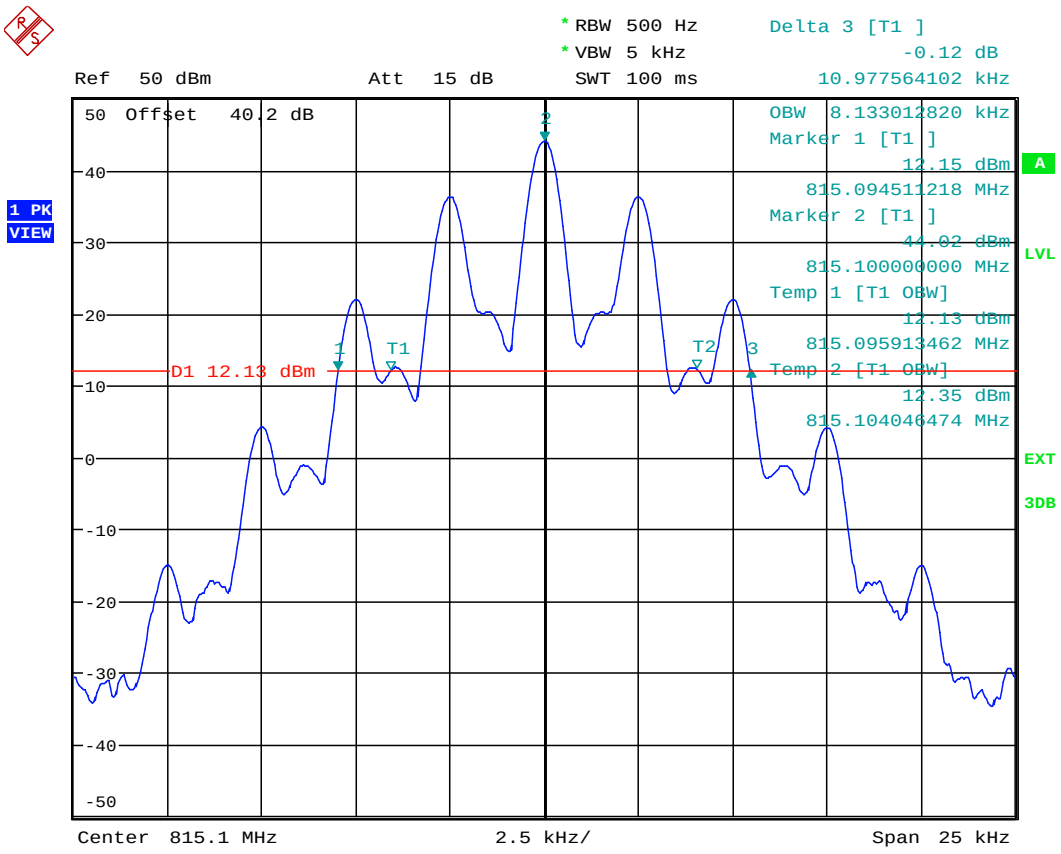
5.8.4.13. Configuration: 99% OBW, Band 3: 806-824MHz, 806.1MHz, 12.5 KHz, Analog, High power

OBW: 10.98 KHz



5.8.4.14. Configuration: 99% OBW, Band 3: 806-824MHz MHz, 815.1MHz, 12.5 KHz, Analog, High power

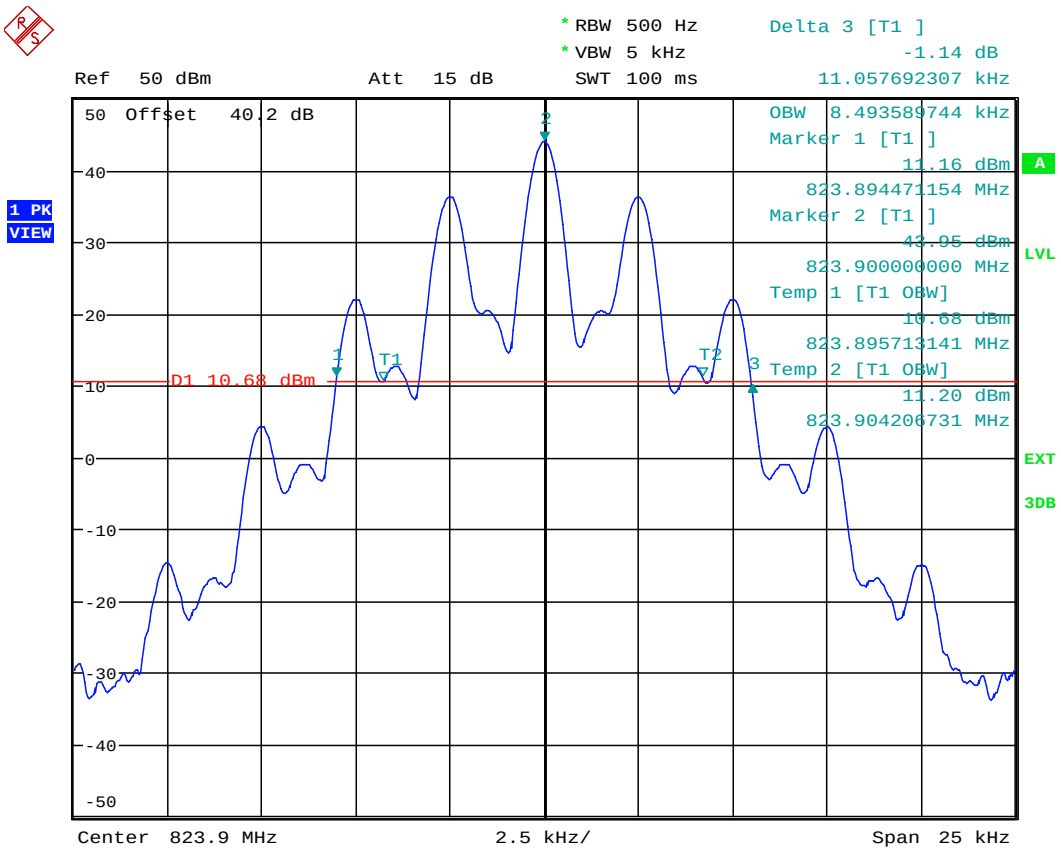
OBW: 10.98 KHz



Date: 14.AUG.2023 11:39:57

5.8.4.15. Configuration: 99% OBW, Band 3: 806-824MHz MHz, 823.9MHz, 12.5 KHz, Analog, High power

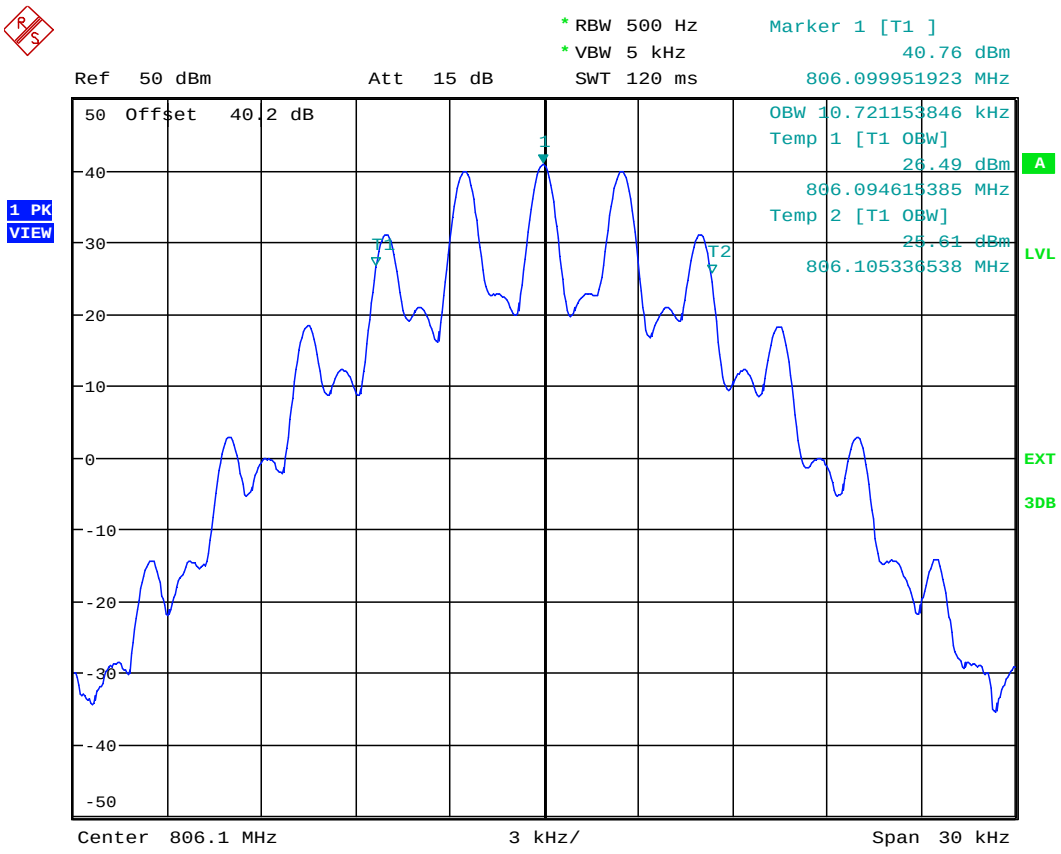
OBW: 11.05 KHz



Date: 14.AUG.2023 11:42:19

5.8.4.16. Configuration: 99% OBW, Band 3: 806-809MHz, 806.1MHz, 20 KHz, Analog, High power

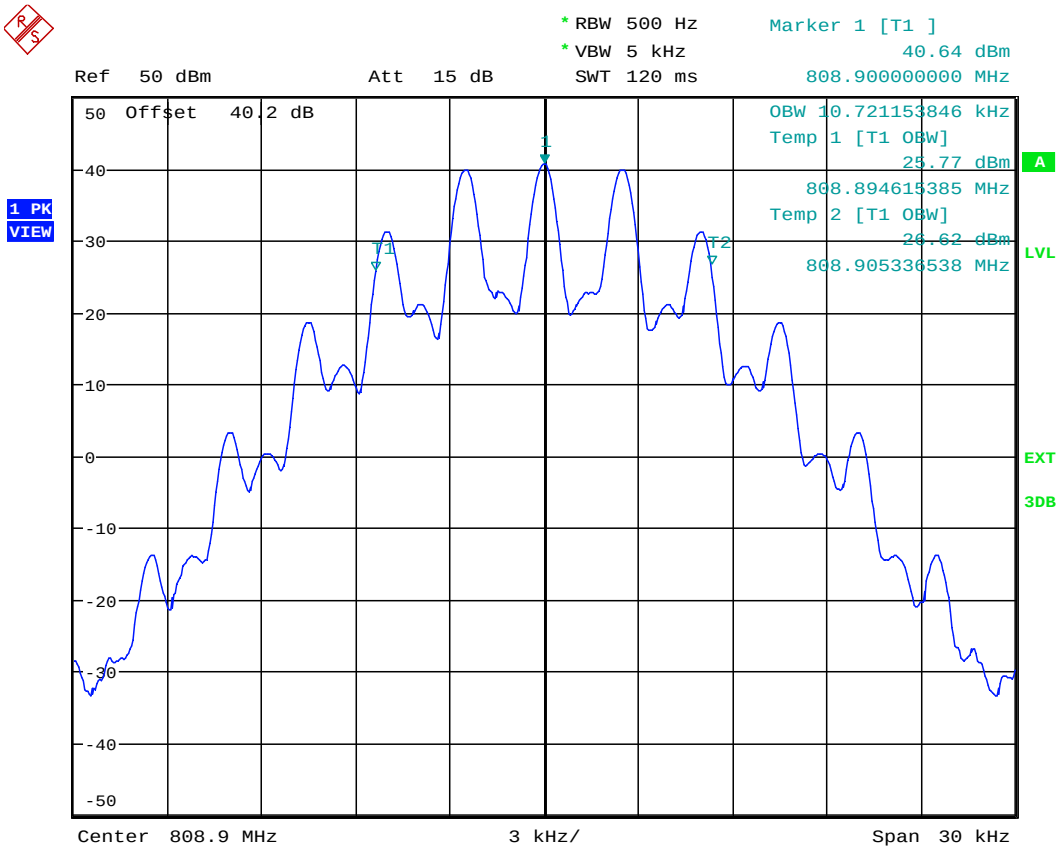
OBW: 10.72 KHz



Date: 14.AUG.2023 12:01:47

5.8.4.17. Configuration: 99% OBW, Band 3: 806-809MHz MHz, 808.9MHz, 20 KHz, Analog, High power

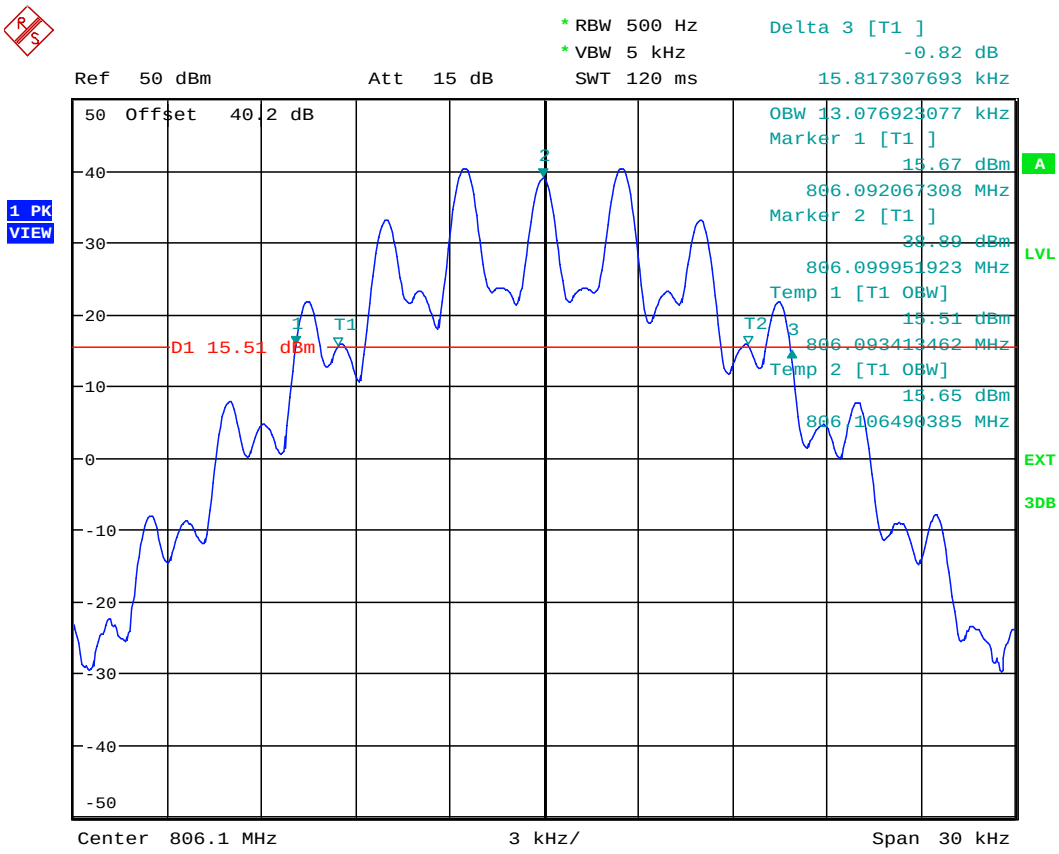
OBW: 10.72 KHz



Date: 14.AUG.2023 12:02:55

5.8.4.18. Configuration: 99% OBW, Band 3: 806-824MHz, 806.1MHz, 25 KHz, Analog, High power

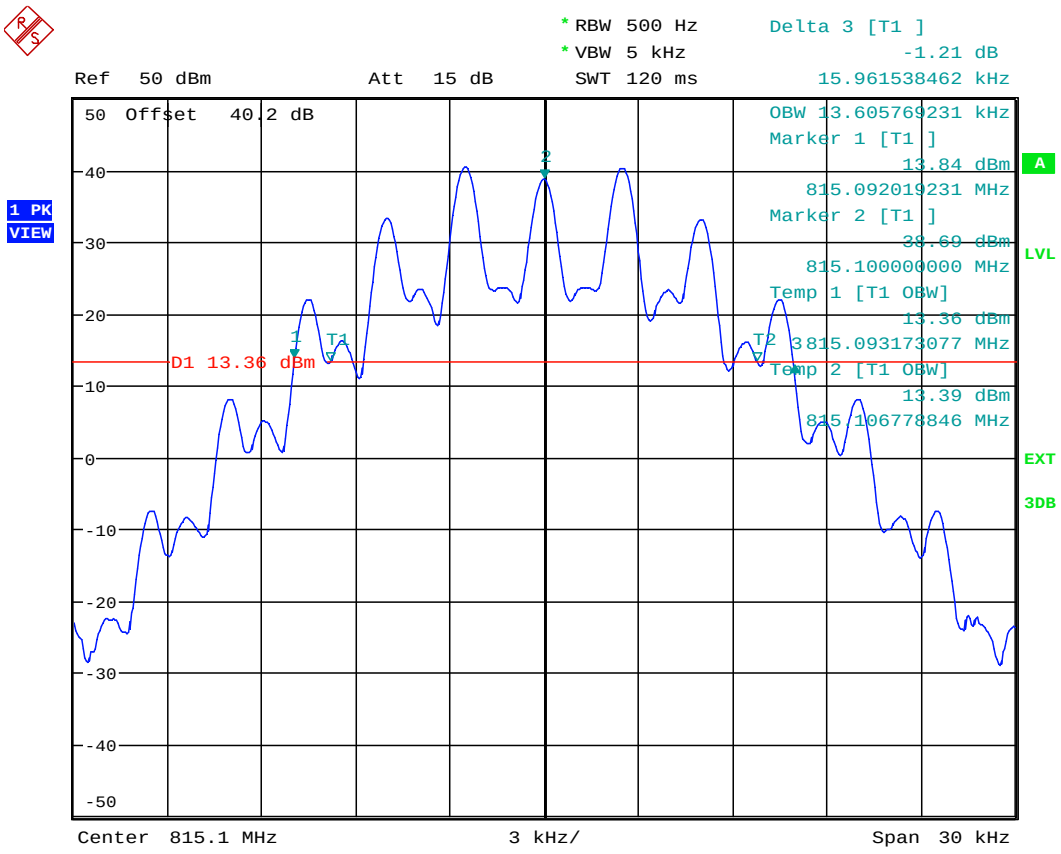
OBW: 15.82 KHz



Date: 14.AUG.2023 12:09:56

5.8.4.19. Configuration: 99% OBW, Band 3: 806-824MHz MHz, 815.1MHz, 25 KHz, Analog, High power

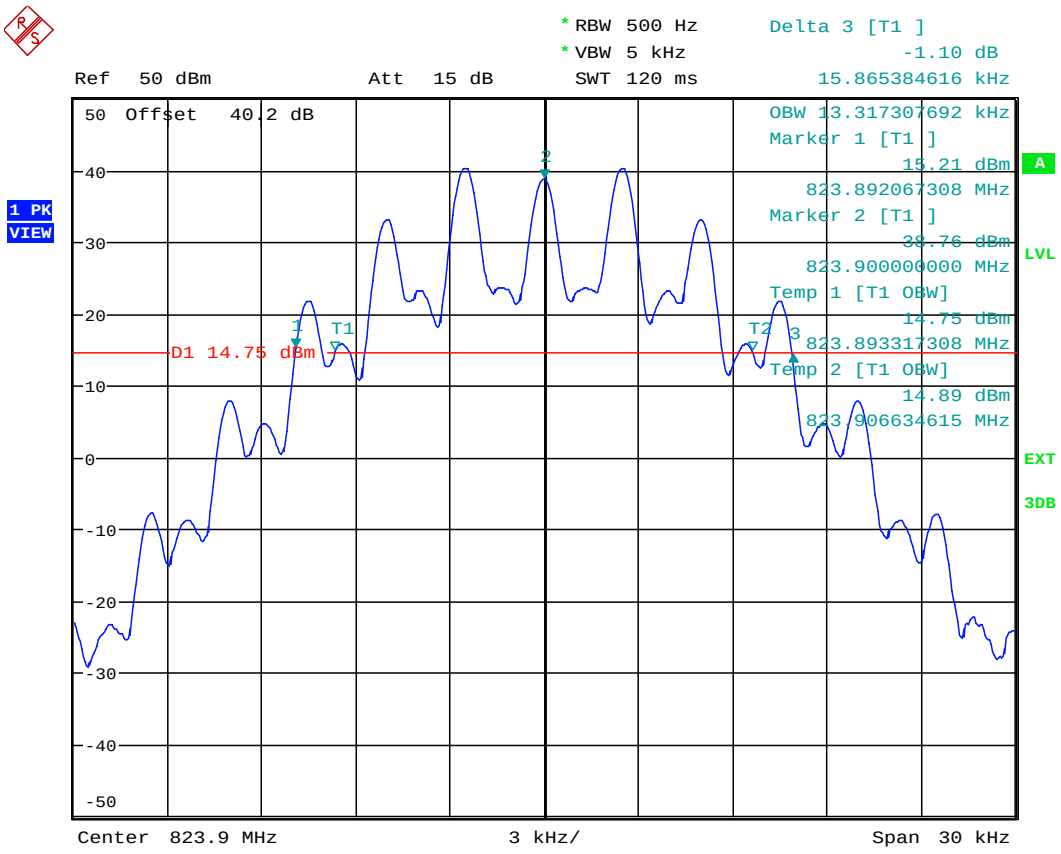
OBW: 15.96 KHz



Date: 14.AUG.2023 12:11:38

5.8.4.20. Configuration: 99% OBW, Band 3: 806-824MHz MHz, 823.9MHz, 25 KHz, Analog, High power

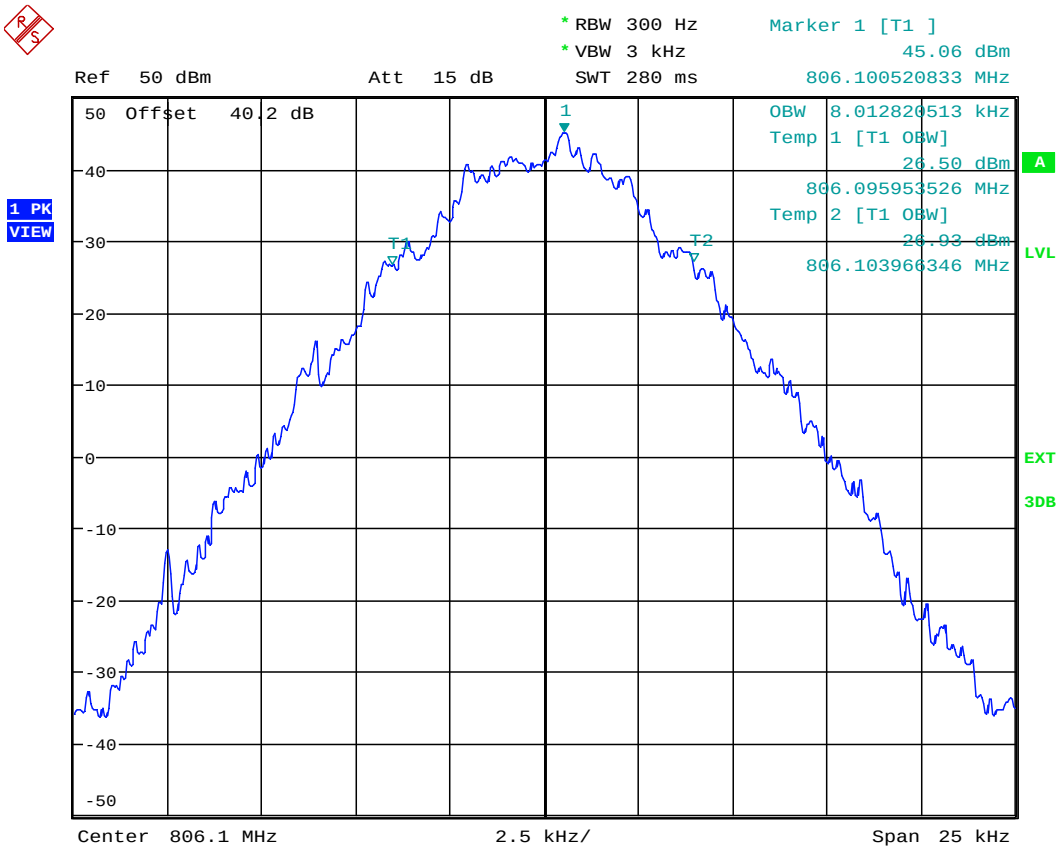
OBW: 15.86 KHz



Date: 14.AUG.2023 12:12:55

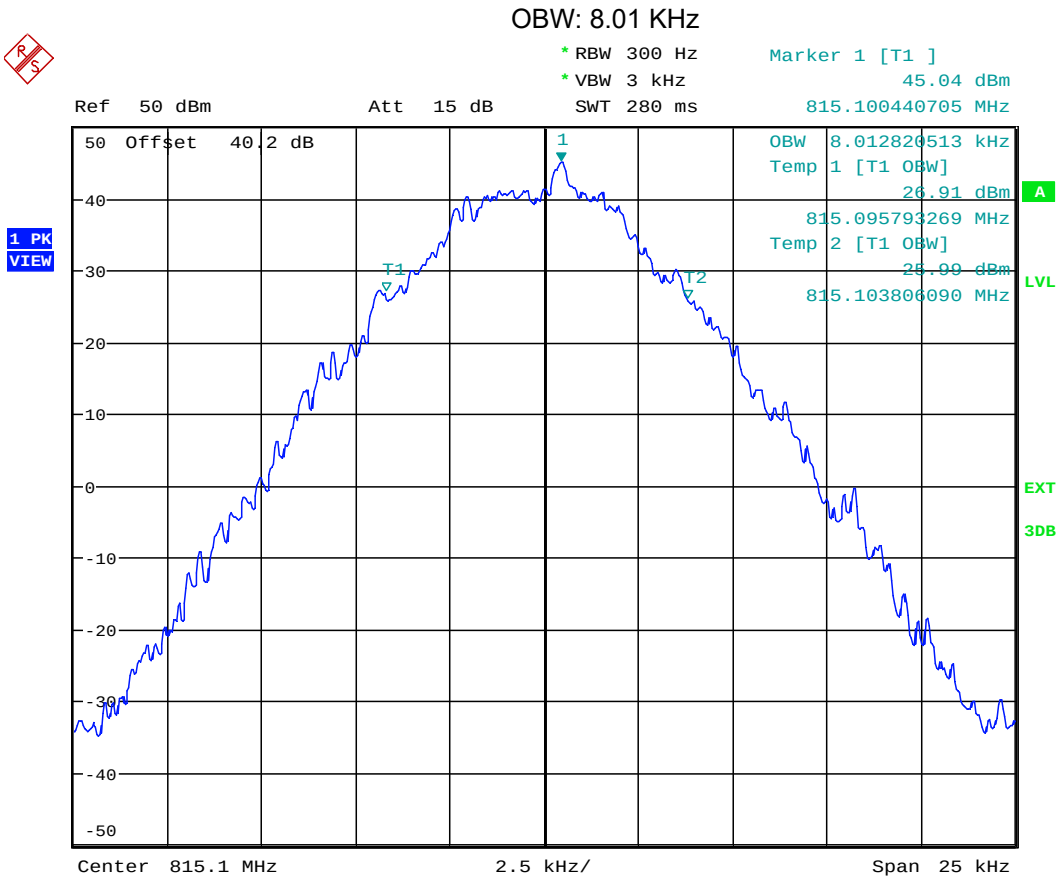
5.8.4.21. Configuration: 99% OBW, Band 3: 806-824MHz MHz, 806.1MHz, Digital, F1E& F1D, High power

OBW: 8.01 KHz



Date: 14.AUG.2023 12:43:13

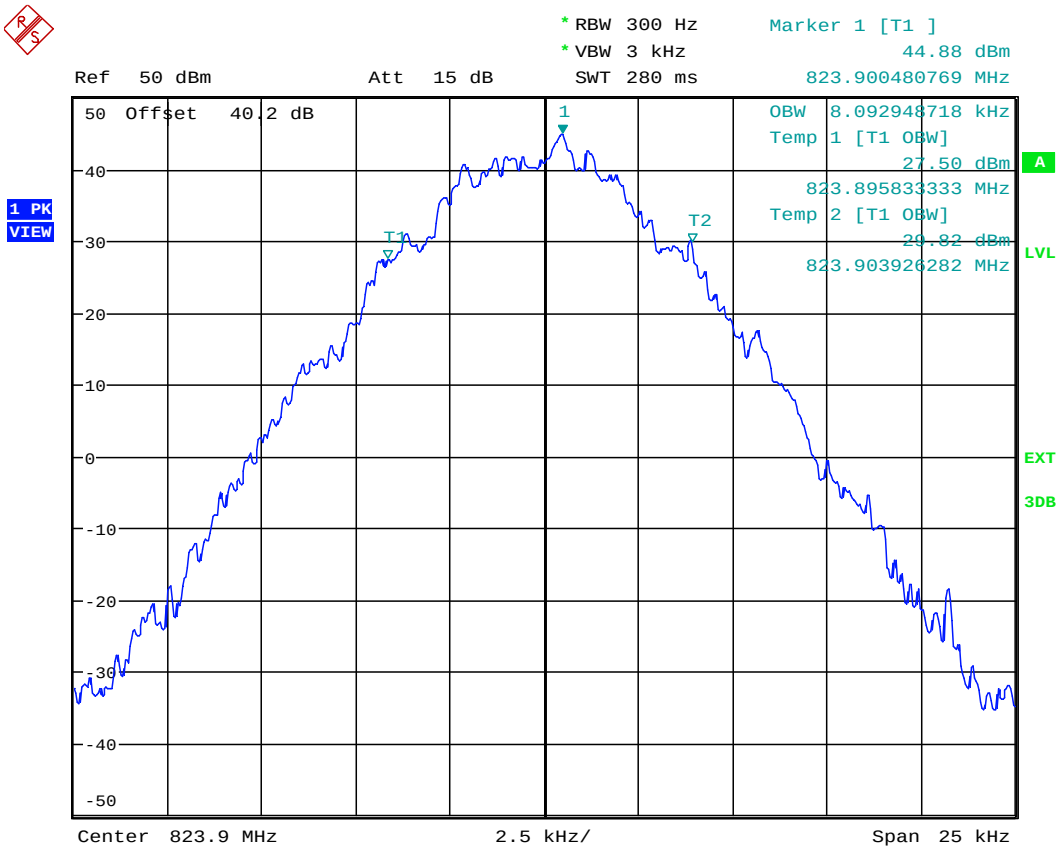
5.8.4.22. Configuration: 99% OBW, Band 3: 806-824MHz MHz, 815.1MHz, Digital, F1E& F1D, High power



Date: 14.AUG.2023 12:44:32

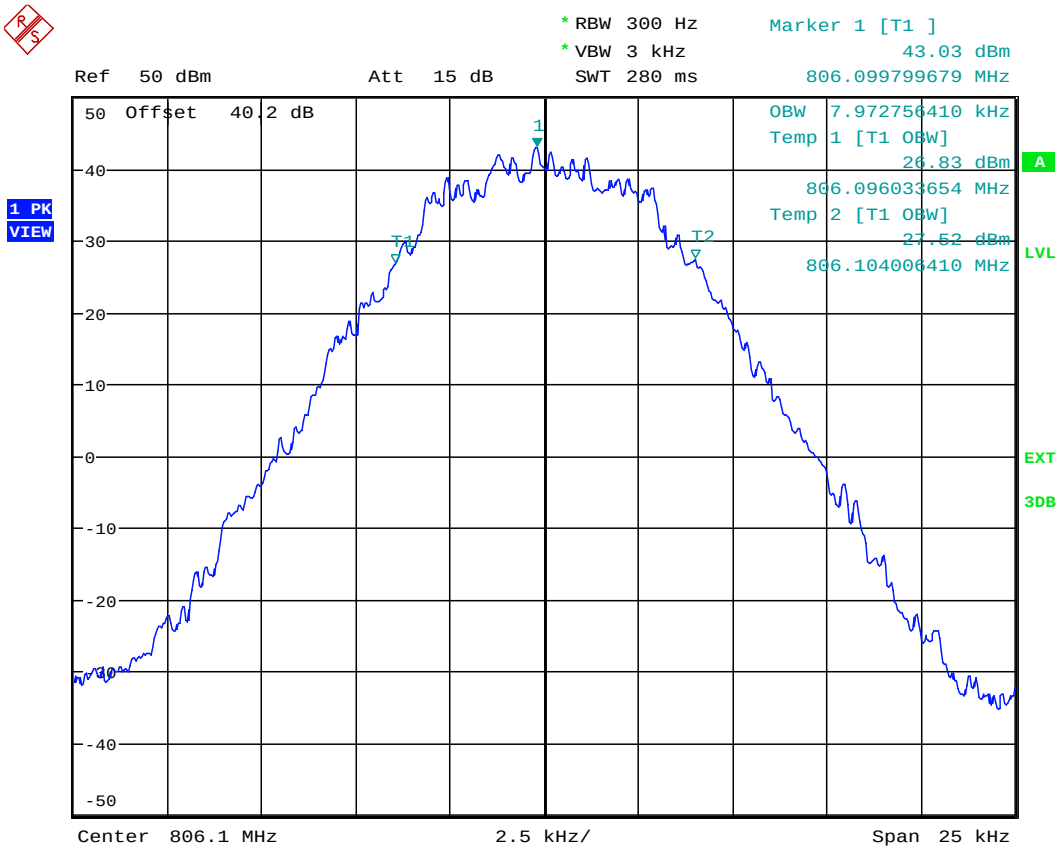
5.8.4.23. Configuration: 99% OBW, Band 3: 806-824MHz MHz, 823.9MHz, Digital, F1E& F1D, High power

OBW: 8.09 KHz



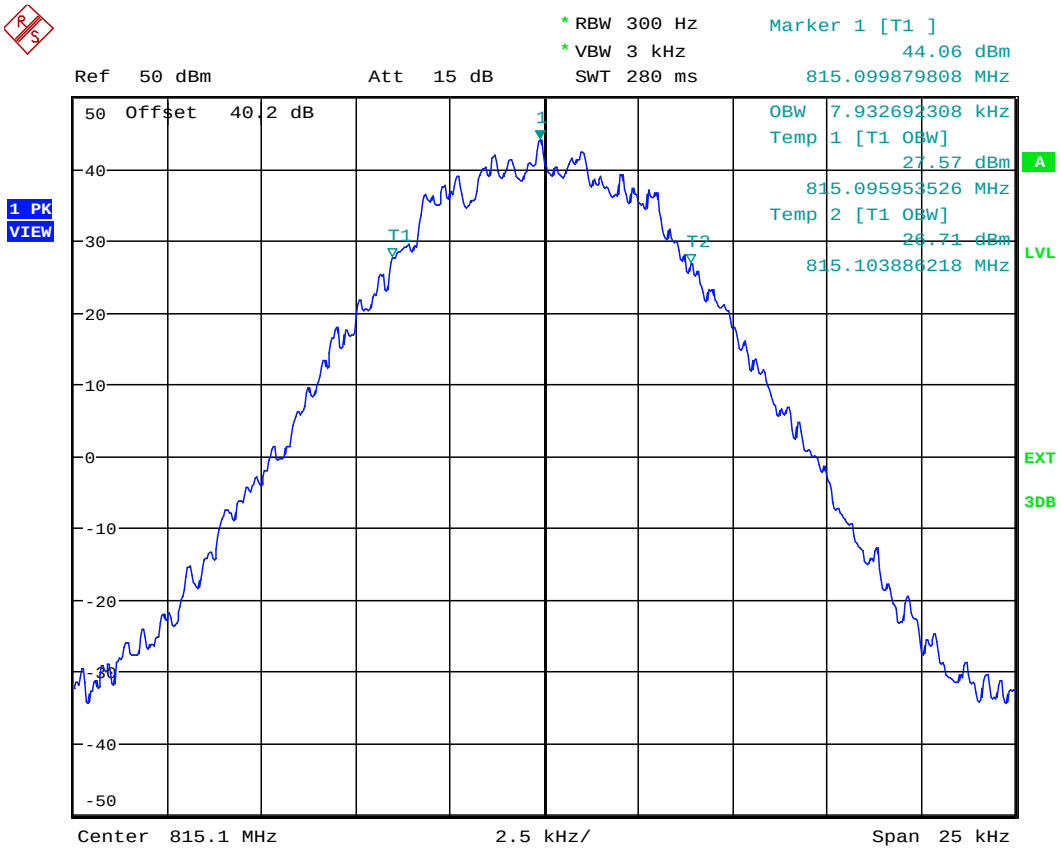
5.8.4.24. Configuration: 99% OBW, Band 3: 806-824MHz MHz, 806.1MHz, Digital, F1W, High power

OBW: 7.97 KHz



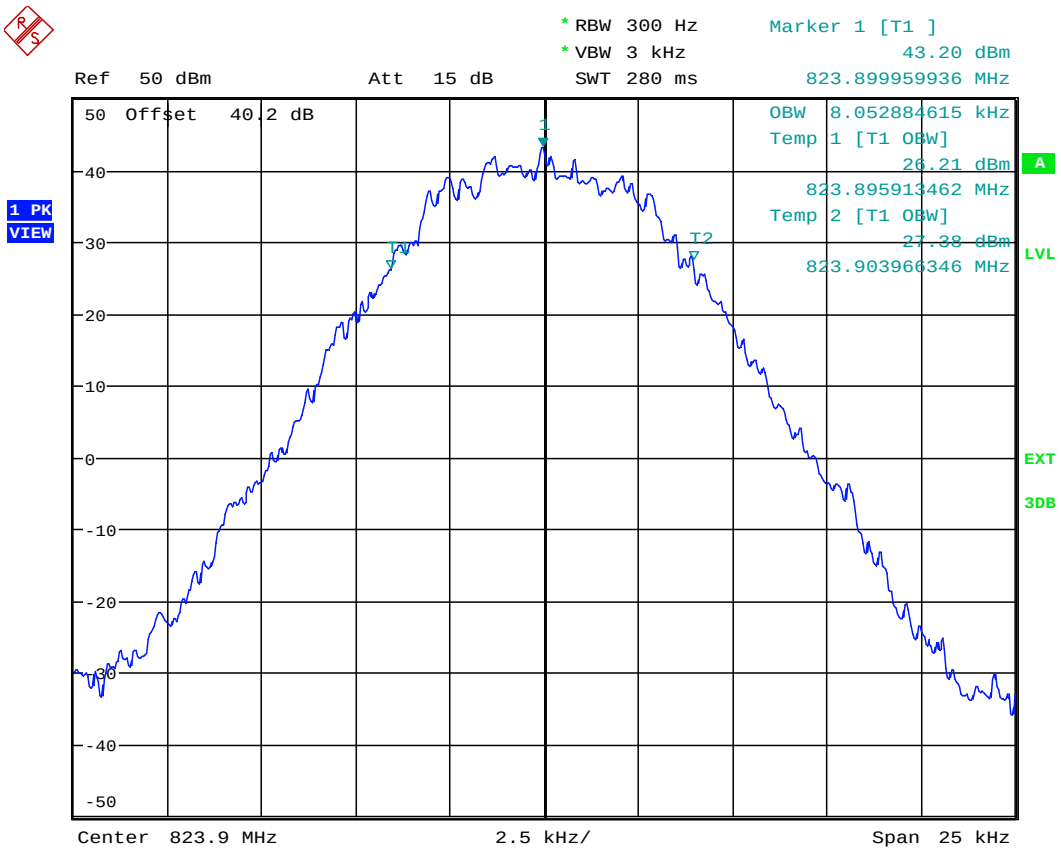
5.8.4.25. Configuration: 99% OBW, Band 3: 806-824MHz MHz, 815.1MHz, Digital, F1W, High power

OBW: 7.93



5.8.4.26. Configuration: 99% OBW, Band 3: 806-824MHz MHz, 823.9MHz, Digital, F1W, High power

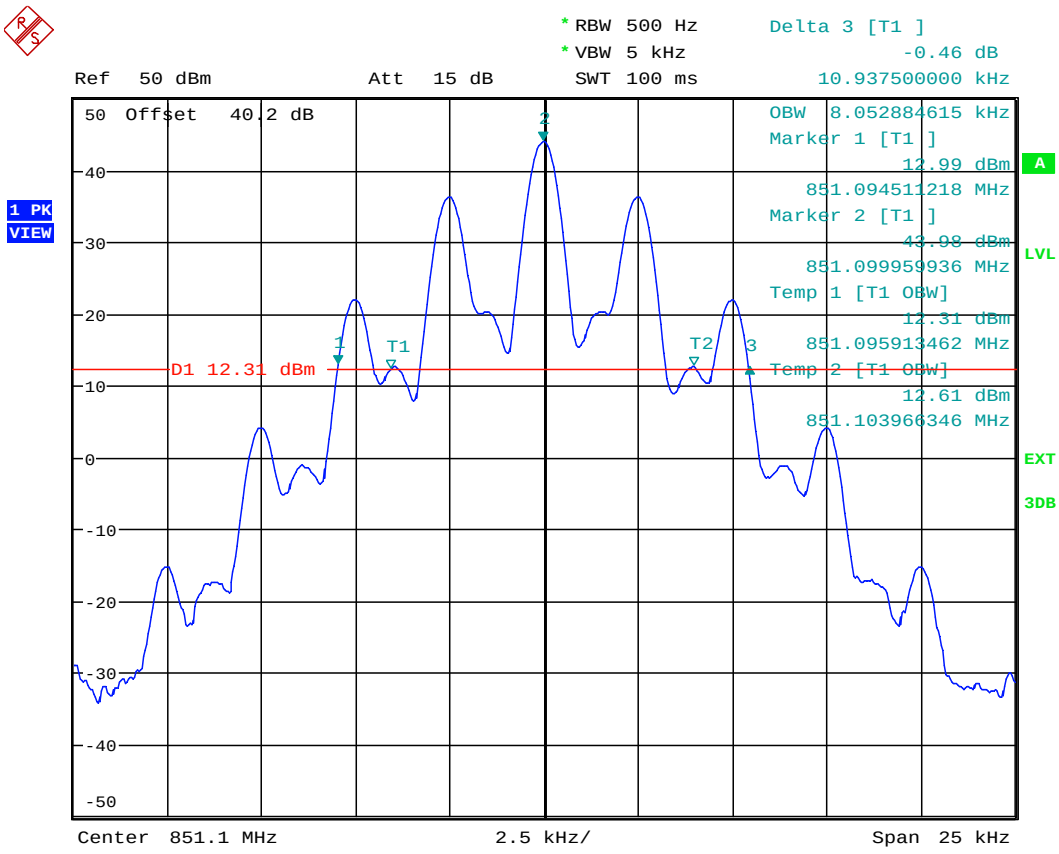
OBW: 8.05 KHz



Date: 14.AUG.2023 13:09:43

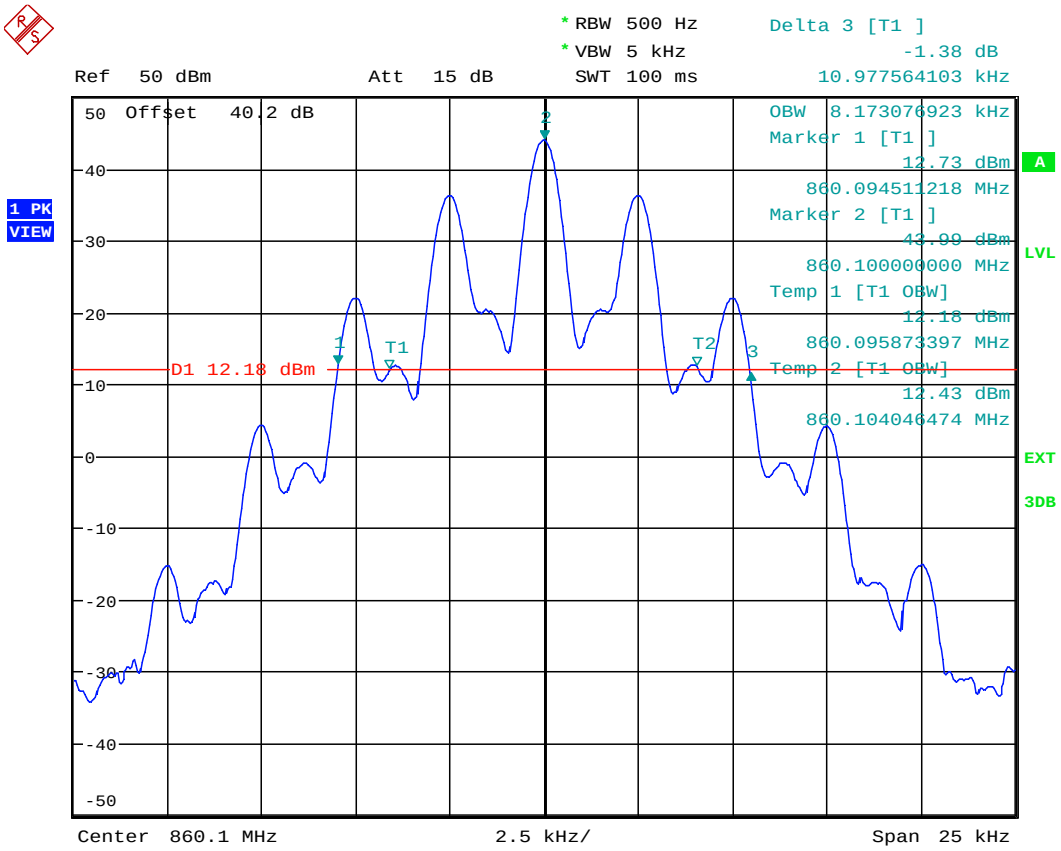
5.8.4.27. Configuration: 99% OBW, Band 4: 851-869MHz, 851.1MHz, 12.5 KHz, Analog, High power

OBW: 10.94 KHz



5.8.4.28. Configuration: 99% OBW, Band 4: 851-869MHz, 860.1MHz, 12.5 KHz, Analog, High power

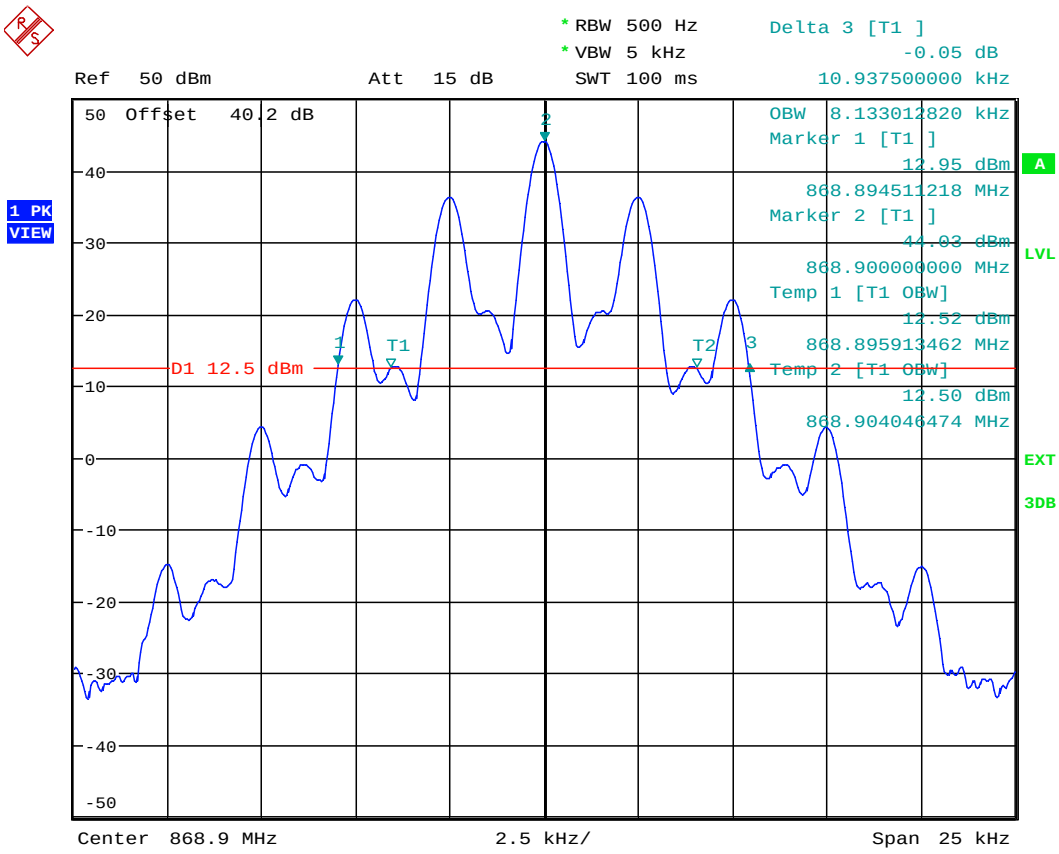
OBW: 10.98 KHz



Date: 14.AUG.2023 11:55:11

5.8.4.29. Configuration: 99% OBW, Band 4: 851-869MHz, 868.9MHz, 12.5 KHz, Analog, High power

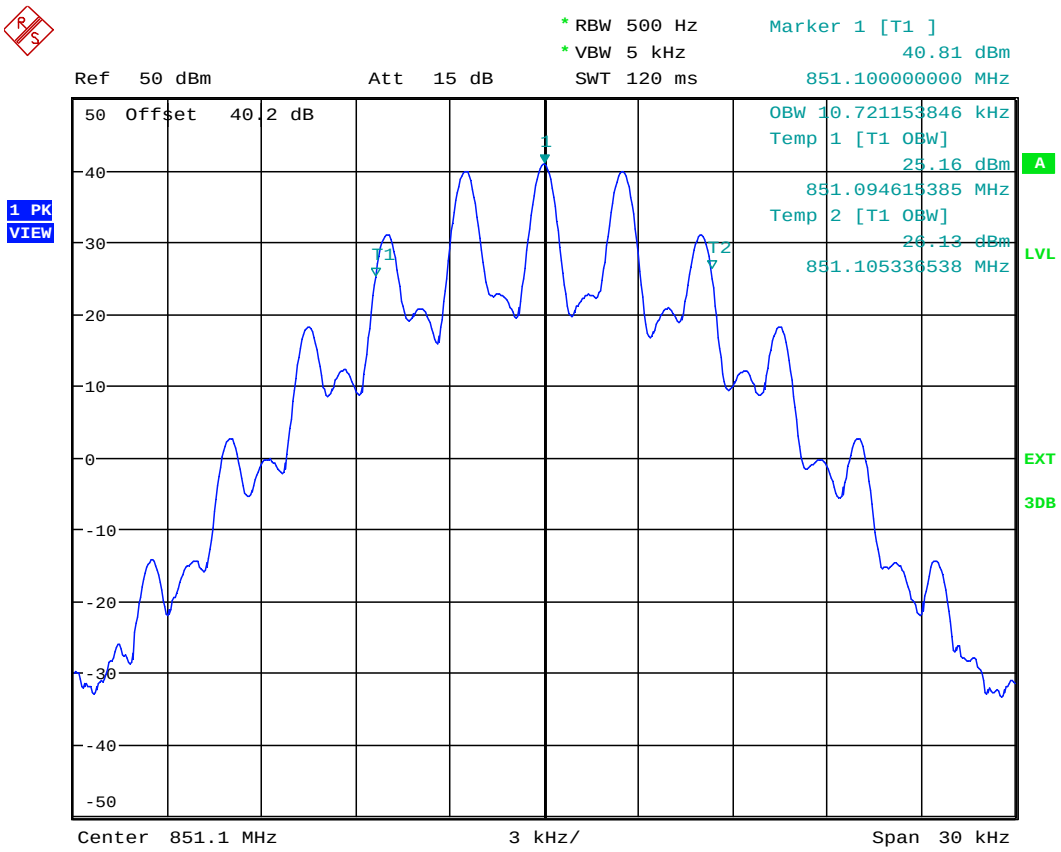
OBW: 10.94 KHz



Date: 14.AUG.2023 11:57:09

5.8.4.30. Configuration: 99% OBW, Band 4: 851-854MHz, 851.1MHz, 20 KHz, Analog, High power

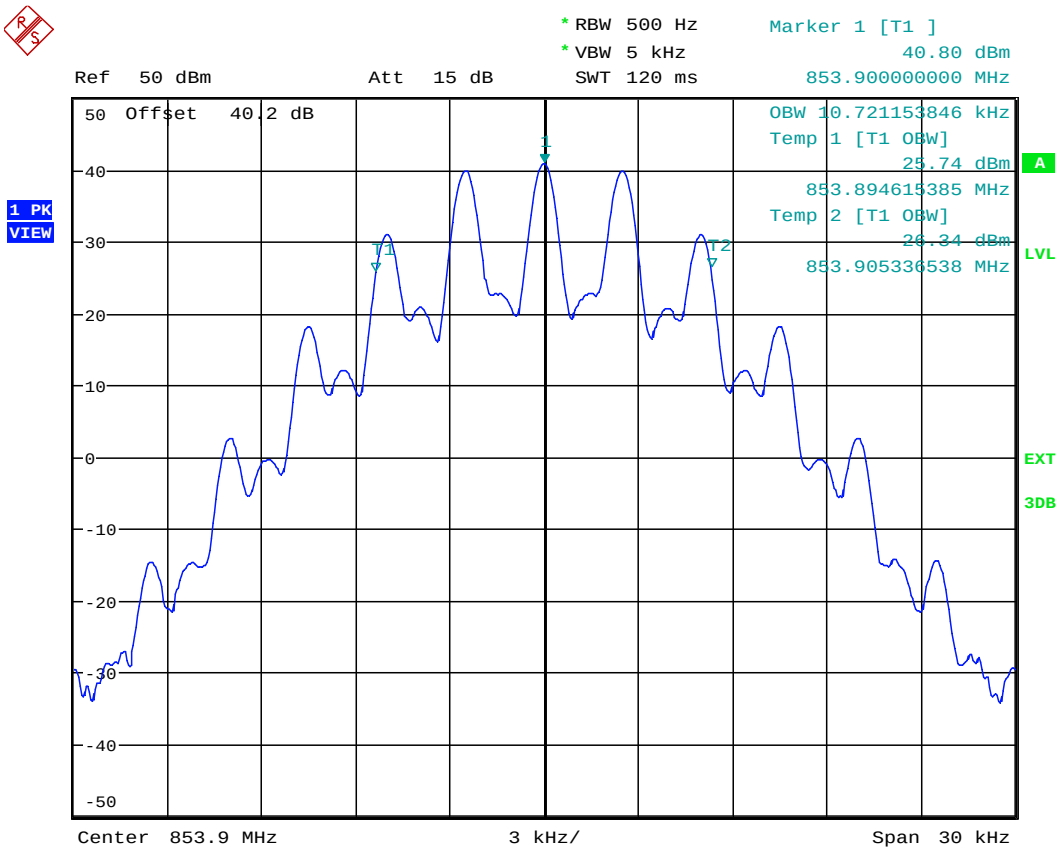
OBW: 10.72 KHz



Date: 14.AUG.2023 12:06:36

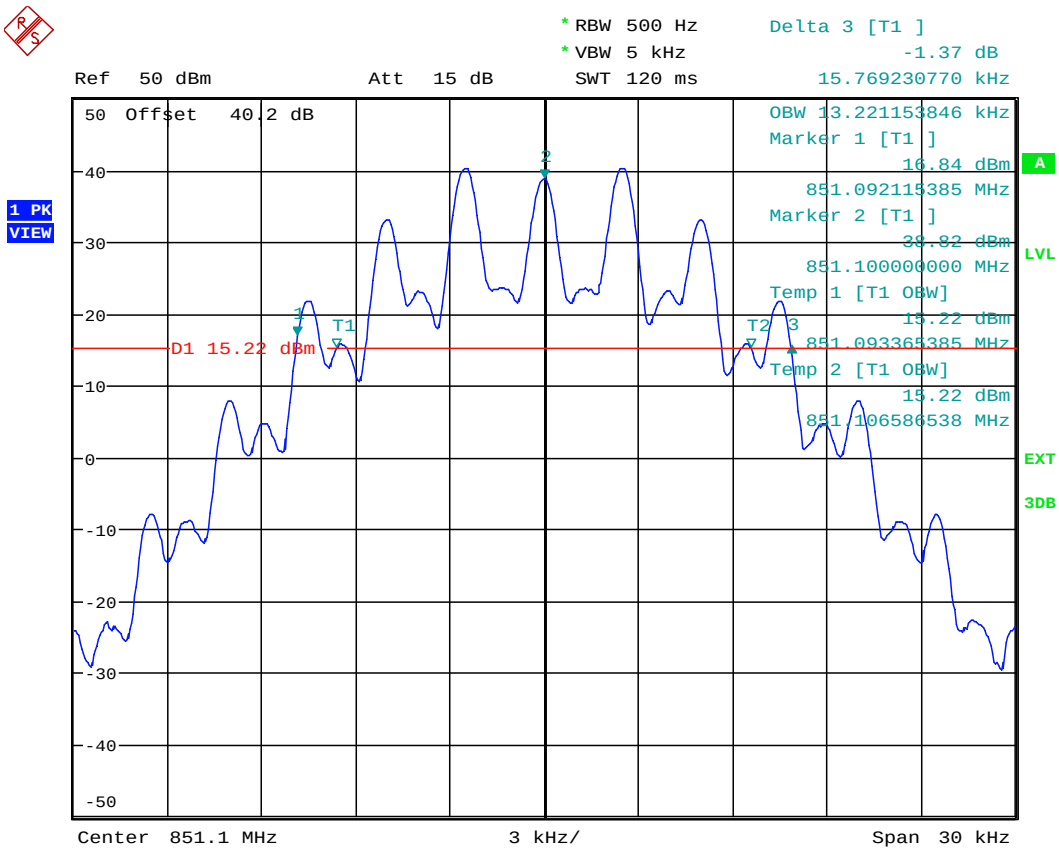
5.8.4.31. Configuration: 99% OBW, Band 4: 851-854MHz, 853.9MHz, 20 KHz, Analog, High power

OBW: 10.72 KHz



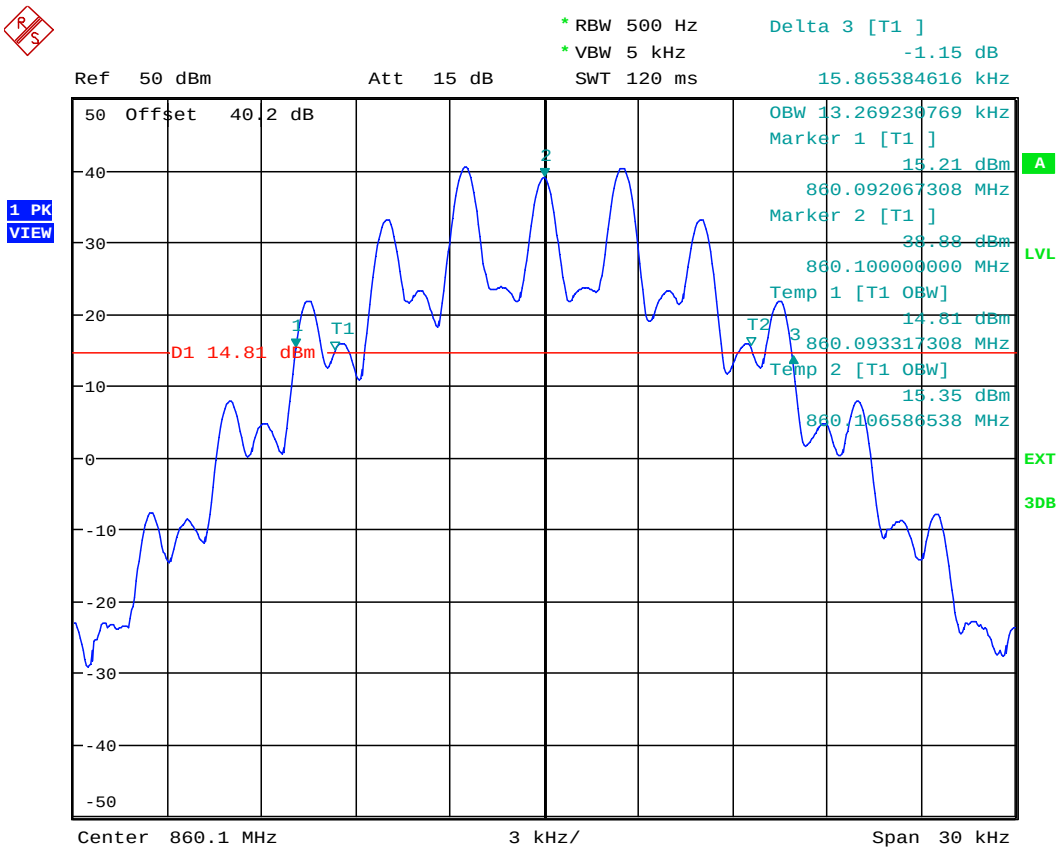
5.8.4.32. Configuration: 99% OBW, Band 4: 851-869MHz, 851.1MHz, 25 KHz, Analog, High power

OBW: 15.77 KHz



5.8.4.33. Configuration: 99% OBW, Band 4: 851-869MHz, 860.1MHz, 25 KHz, Analog, High power

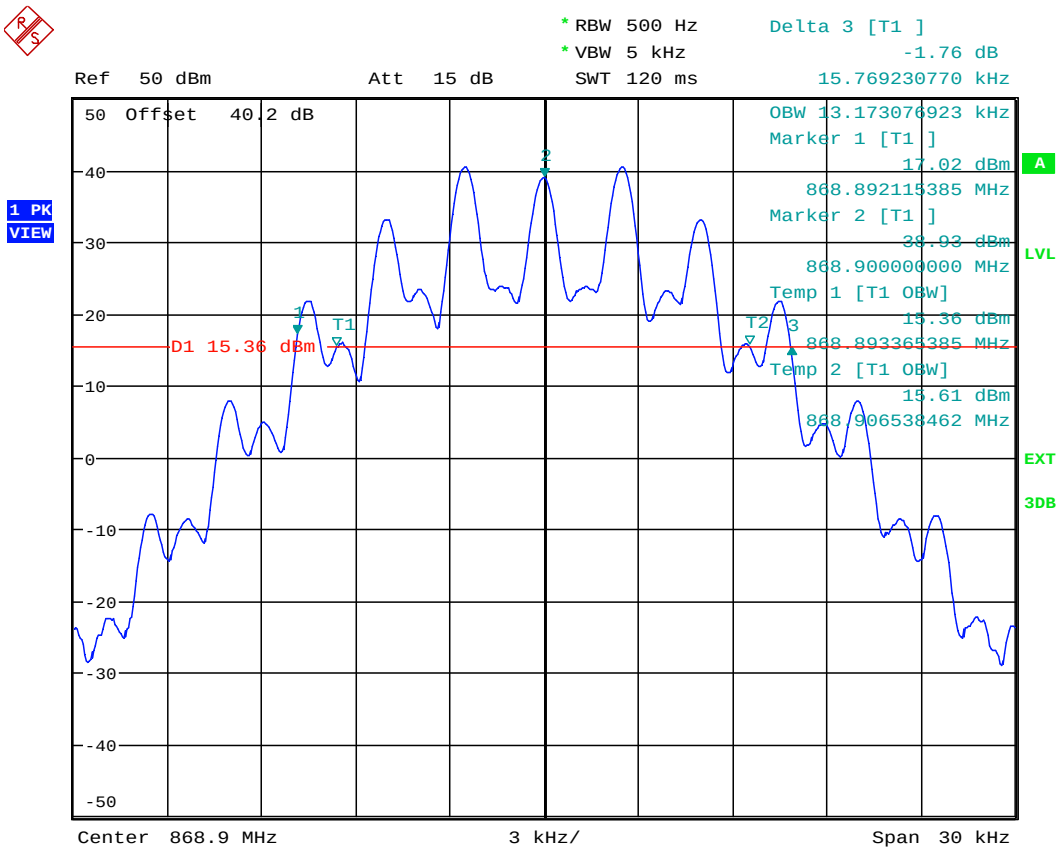
OBW: 15.86 KHz



Date: 14.AUG.2023 12:18:00

5.8.4.34. Configuration: 99% OBW, Band 4: 851-869MHz, 868.9MHz, 25 KHz, Analog, High power

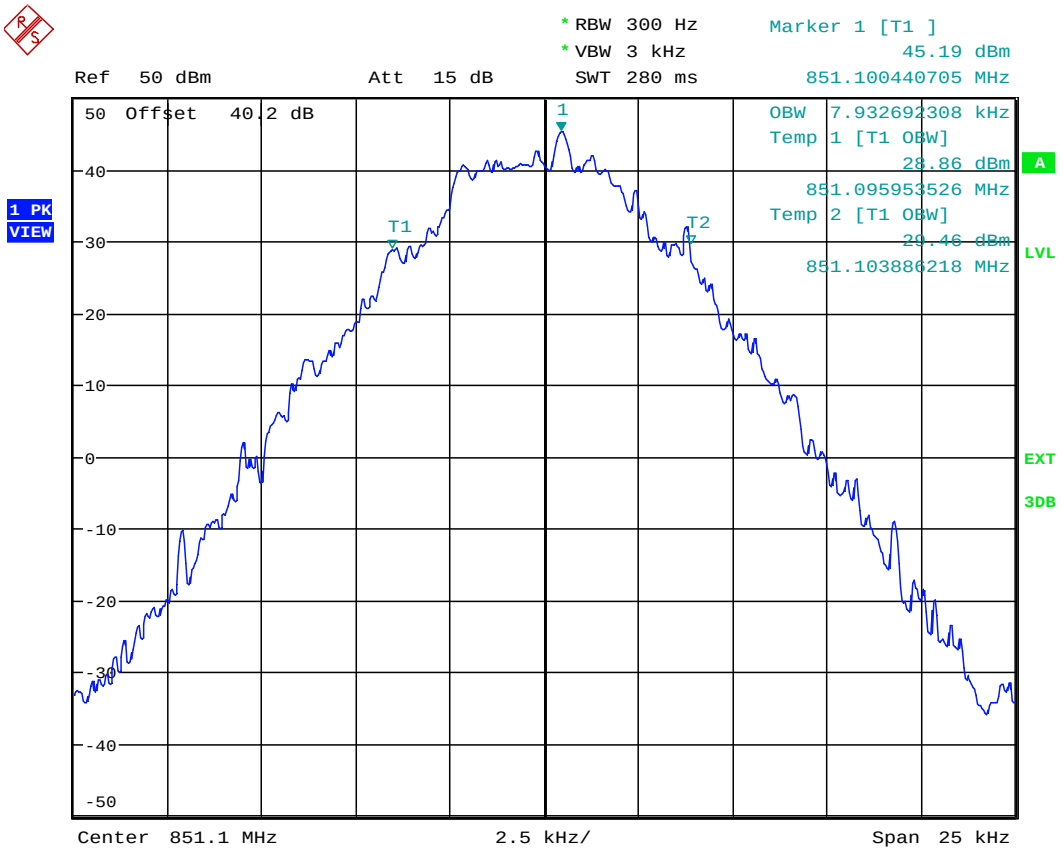
OBW: 15.77 KHz



Date: 14.AUG.2023 12:19:15

5.8.4.35. Configuration: 99% OBW, Band 4: 851-869MHz, 851.1MHz, Digital, F1E& F1D, High power

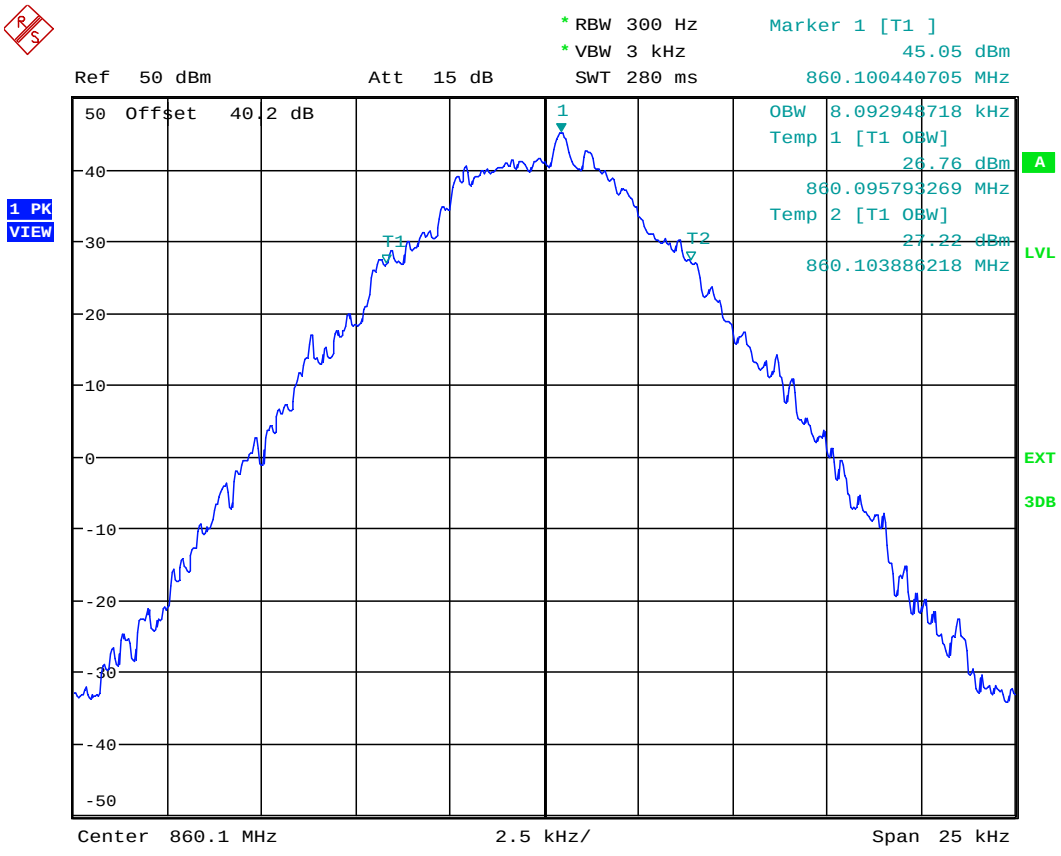
OBW: 7.93 KHz



Date: 14.AUG.2023 12:48:43

5.8.4.36. Configuration: 99% OBW, Band 4: 851-869MHz, 860.1MHz, Digital, F1E& F1D, High power

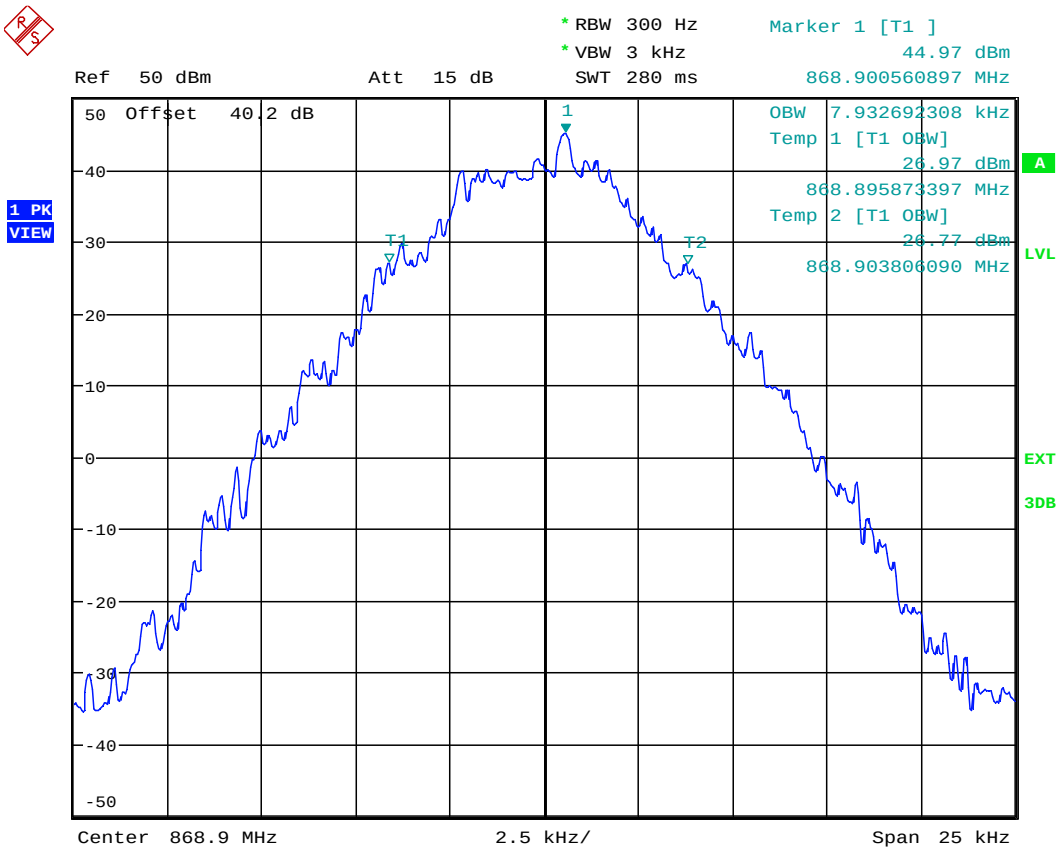
OBW: 8.09 KHz



Date: 14.AUG.2023 12:50:15

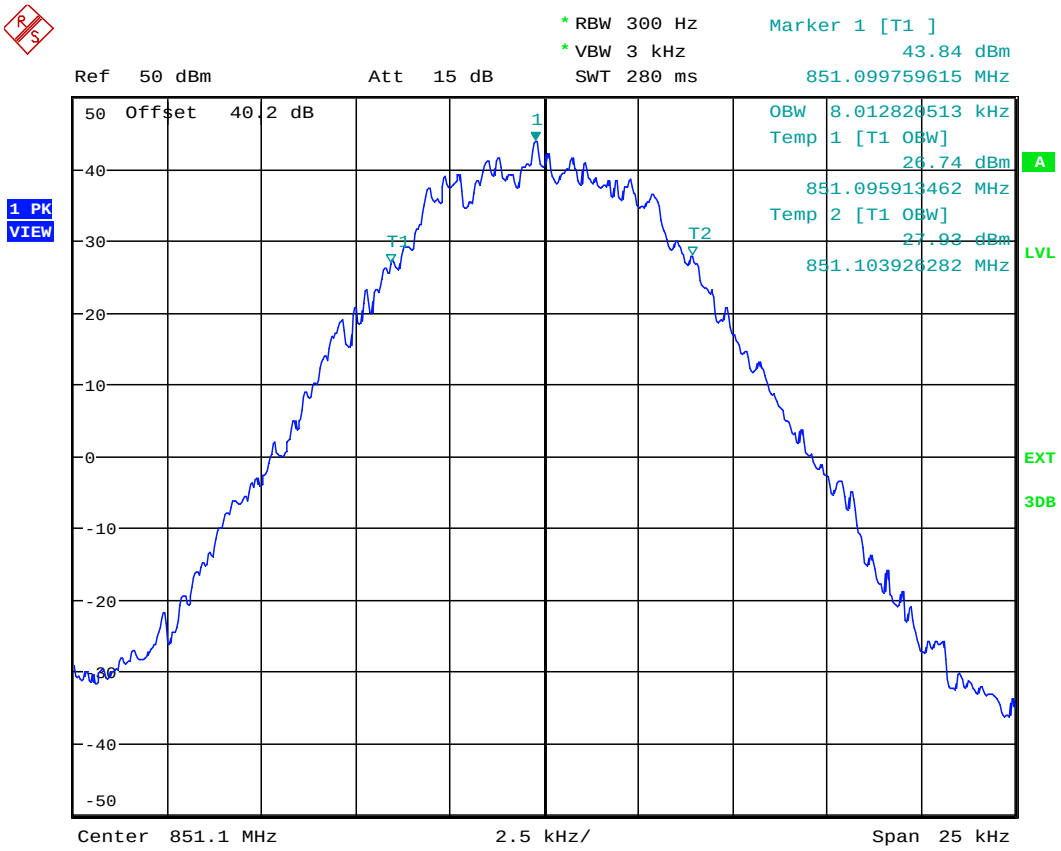
5.8.4.37. Configuration: 99% OBW, Band 4: 851-869MHz, 868.9MHz, Digital, F1E& F1D, High power

OBW: 7.93 KHz



5.8.4.38. Configuration: 99% OBW, Band 4: 851-869MHz, 851.1MHz, Digital, F1W, High power

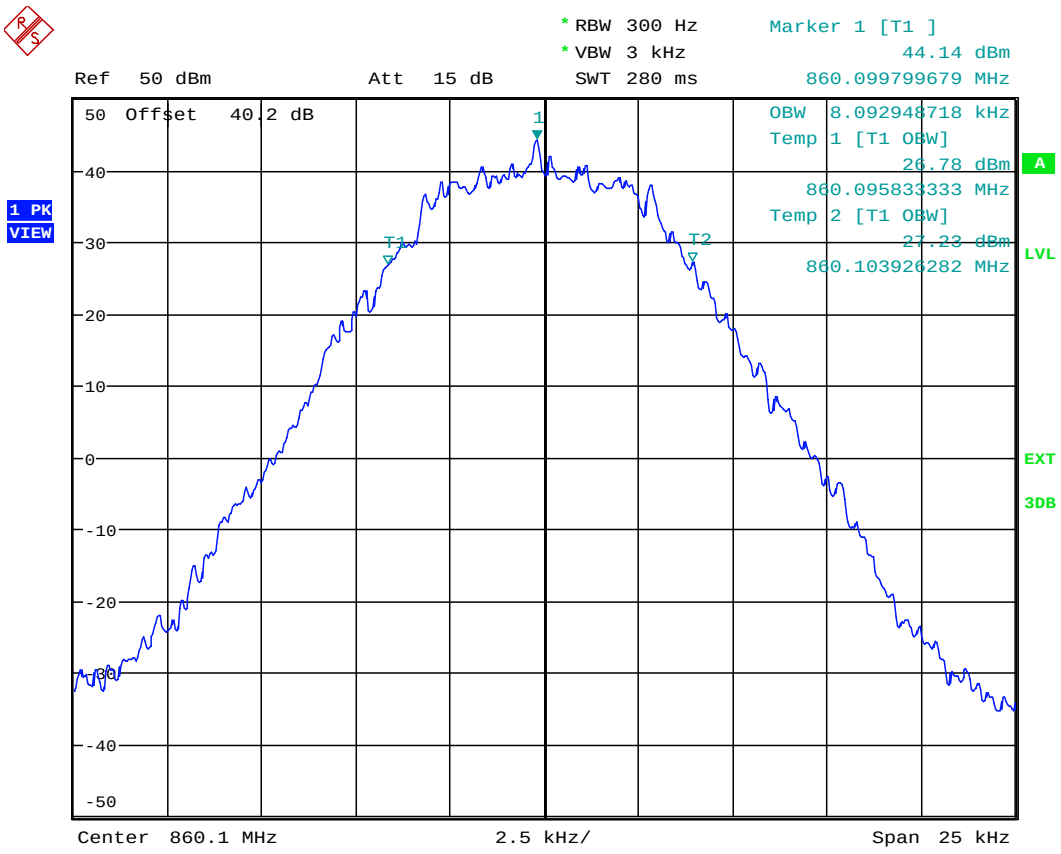
OBW: 8.01 KHz



Date: 14.AUG.2023 13:10:56

5.8.4.39. Configuration: 99% OBW, Band 4: 851-869MHz, 860.1MHz, Digital, F1W, High power

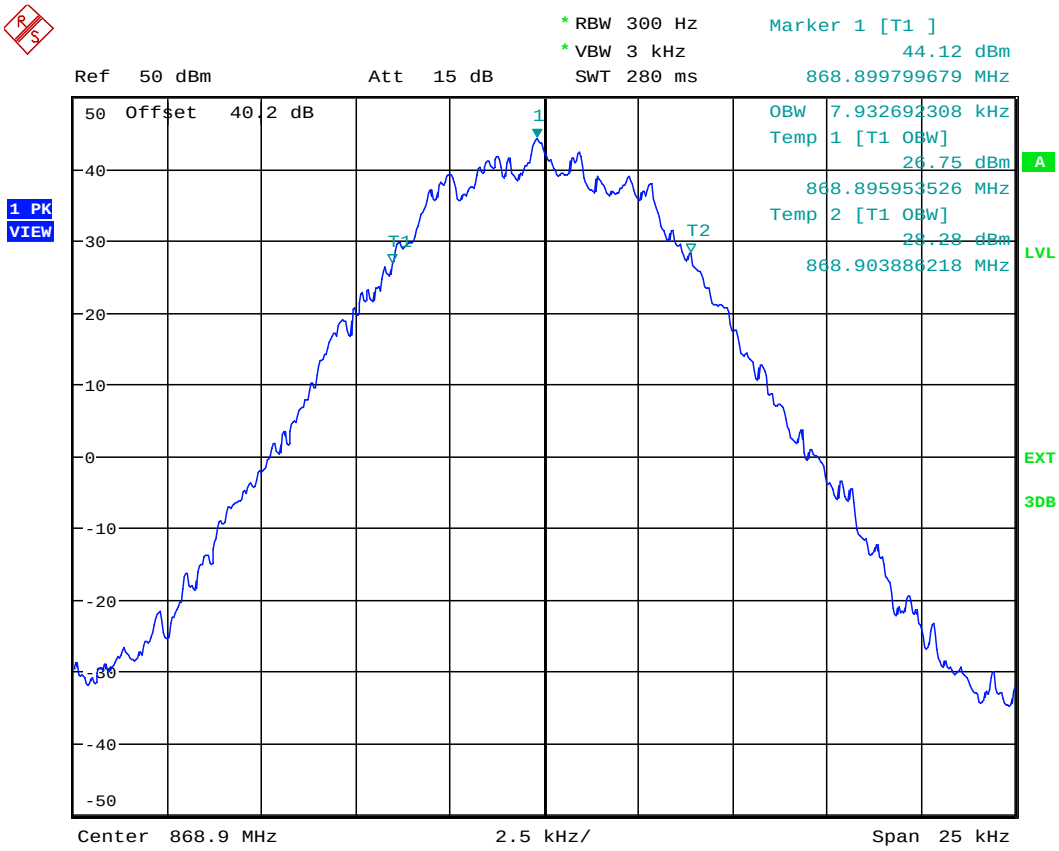
OBW: 8.09 KHz



Date: 14.AUG.2023 13:12:05

5.8.4.40. Configuration: 99% OBW, Band 4: 851-869MHz, 868.9MHz, Digital, F1W, High power

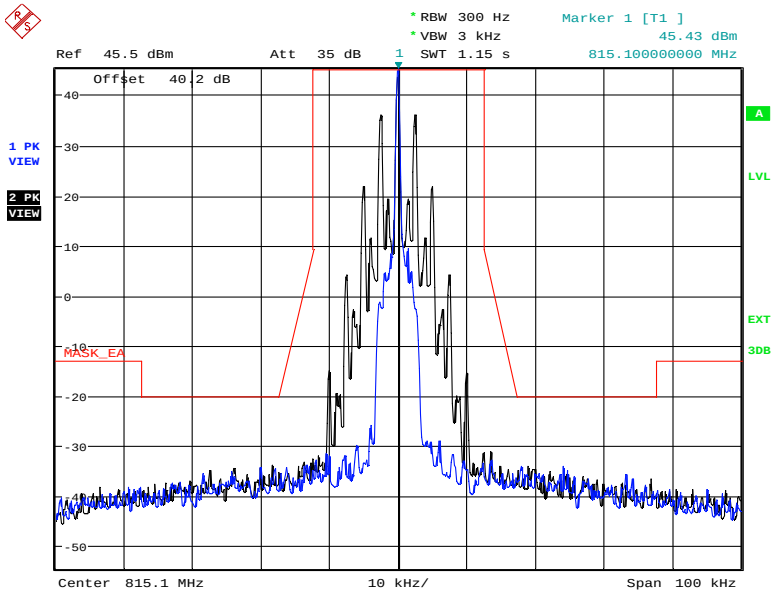
OBW: 7.93 KHz



Date: 14.AUG.2023 13:13:40

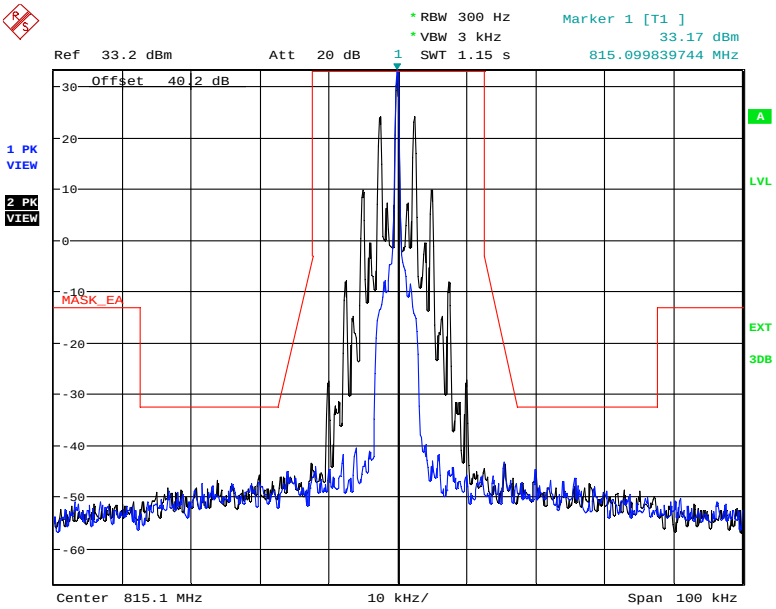
5.8.5. Test Data- EMISSION MASKS- MASK 90.691

5.8.5.1. Configuration: Mask 90.691, Sub Band 3: 809-824MHz, 815.1MHz, 12.5 KHz, Analog, High power



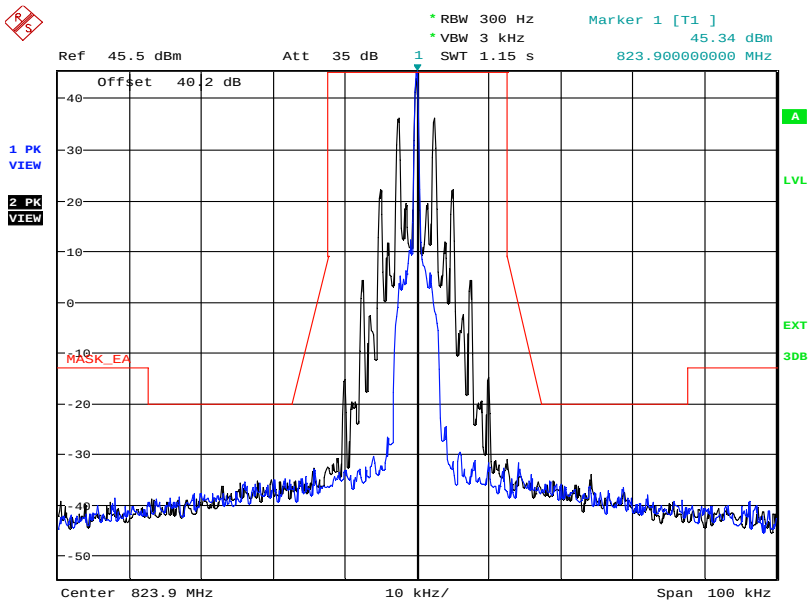
Date: 14.AUG.2023 15:59:33

5.8.5.2. Configuration: Mask 90.691, Sub Band 3: 809-824MHz, 815.1MHz, 12.5 KHz, Analog, Low power



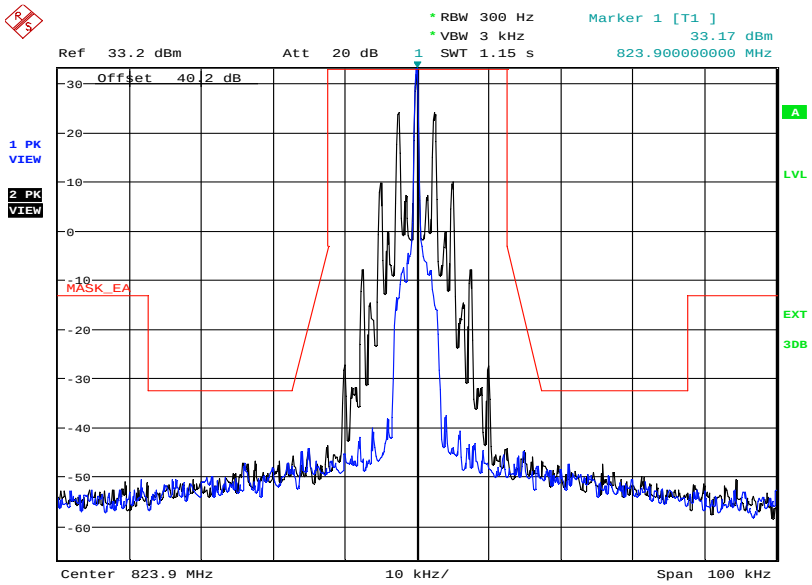
Date: 14.AUG.2023 16:39:15

5.8.5.3. Configuration: Mask 90.691, Sub Band 3: 809-824MHz, 823.9MHz, 12.5 KHz, Analog, High power



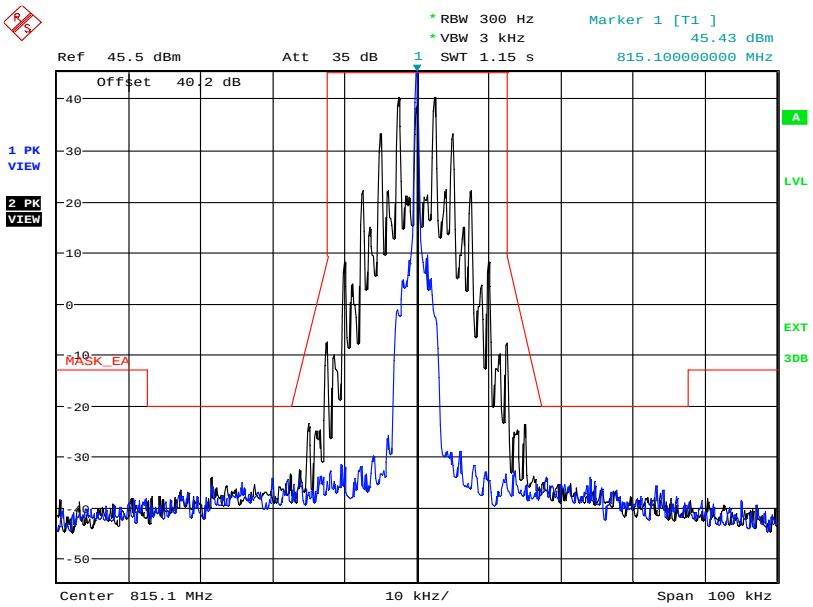
Date: 14.AUG.2023 16:08:44

5.8.5.4. Configuration: Mask 90.691, Sub Band 3: 809-824MHz, 823.9MHz, 12.5 KHz, Analog, Low power



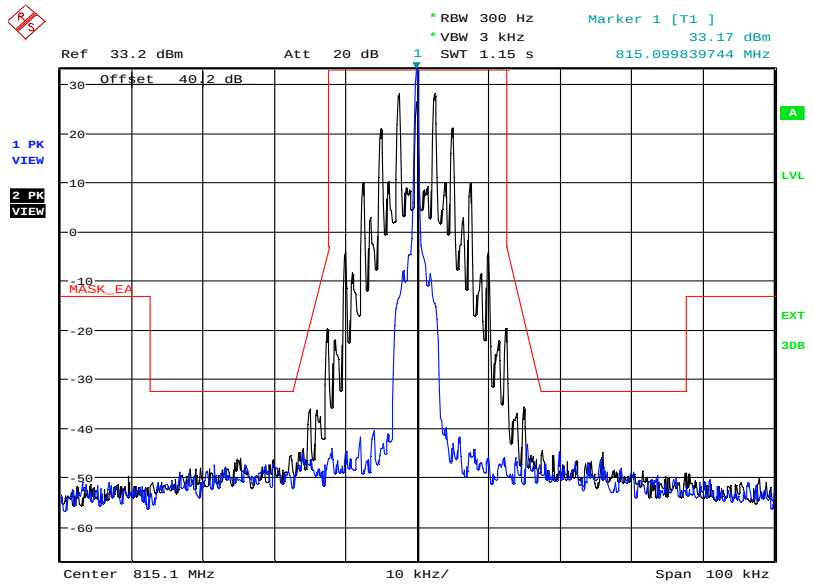
Date: 14.AUG.2023 16:50:03

5.8.5.5. Configuration: Mask 90.691, Sub Band 3: 809-824MHz, 815.1MHz, 25 KHz, Analog, High power



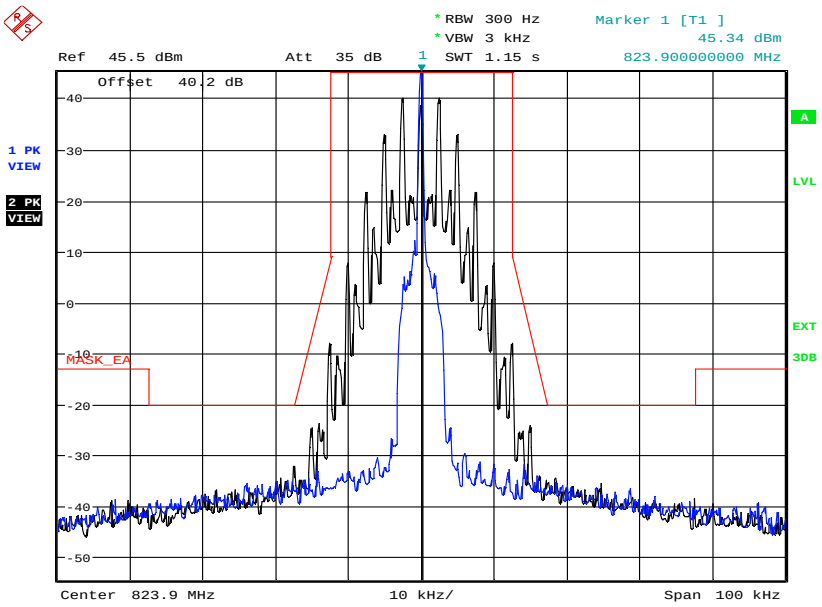
Date: 14.AUG.2023 16:00:33

5.8.5.6. Configuration: Mask 90.691, Sub Band 3: 809-824MHz, 815.1MHz, 25 KHz, Analog, Low power



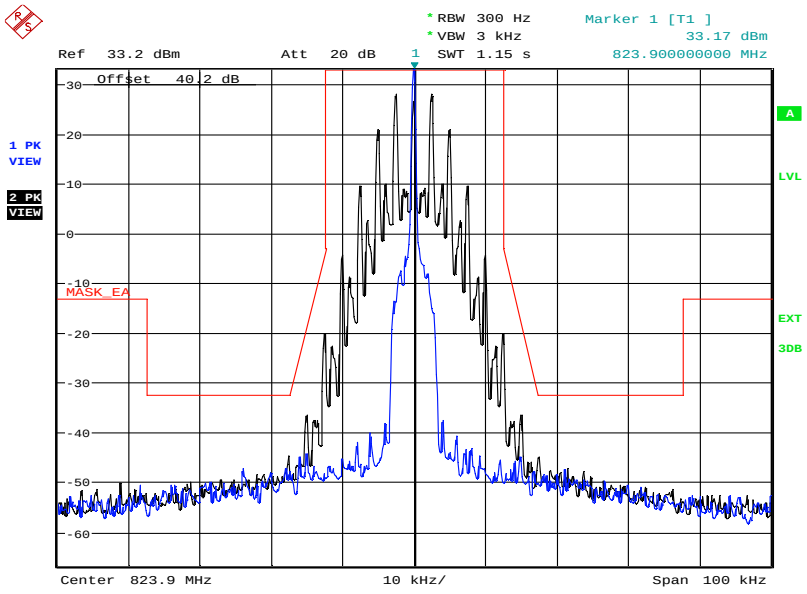
Date: 14.AUG.2023 16:41:21

5.8.5.7. Configuration: Mask 90.691, Sub Band 3: 809-824MHz, 823.9MHz, 25 KHz, Analog, High power



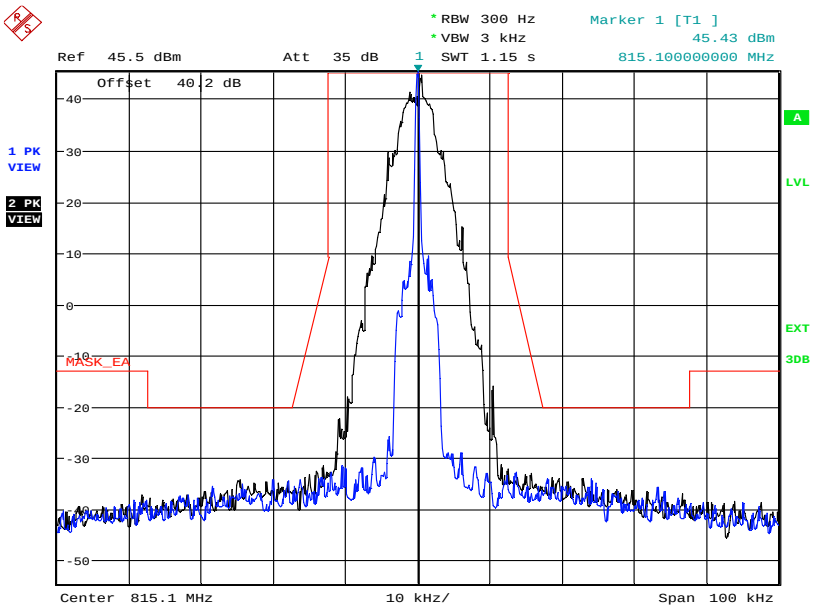
Date: 14.AUG.2023 16:10:03

5.8.5.8. Configuration: Mask 90.691, Sub Band 3: 809-824MHz, 823.9MHz, 25 KHz, Analog, Low power



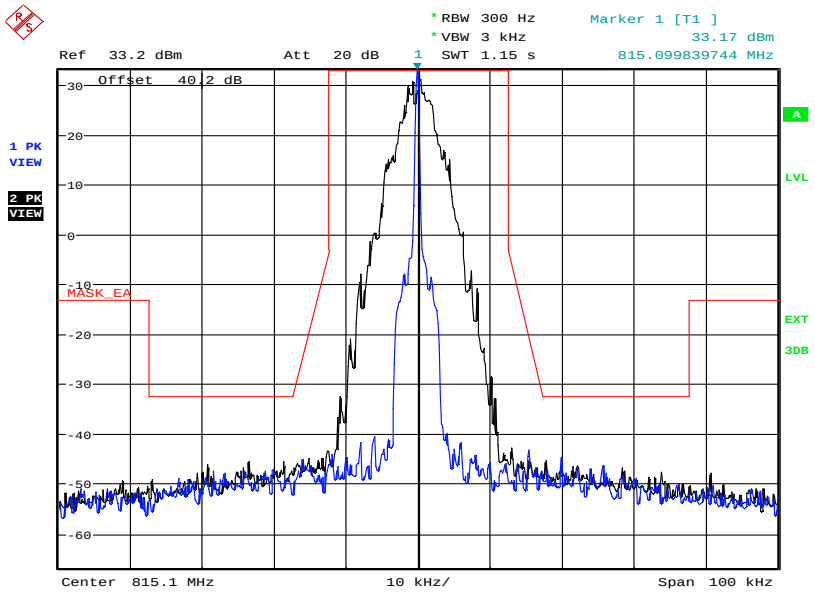
Date: 14.AUG.2023 16:51:08

5.8.5.9. Configuration: Mask 90.691, Sub Band 3: 809-824MHz, 815.1MHz, F1E&F1D, Digital, High power



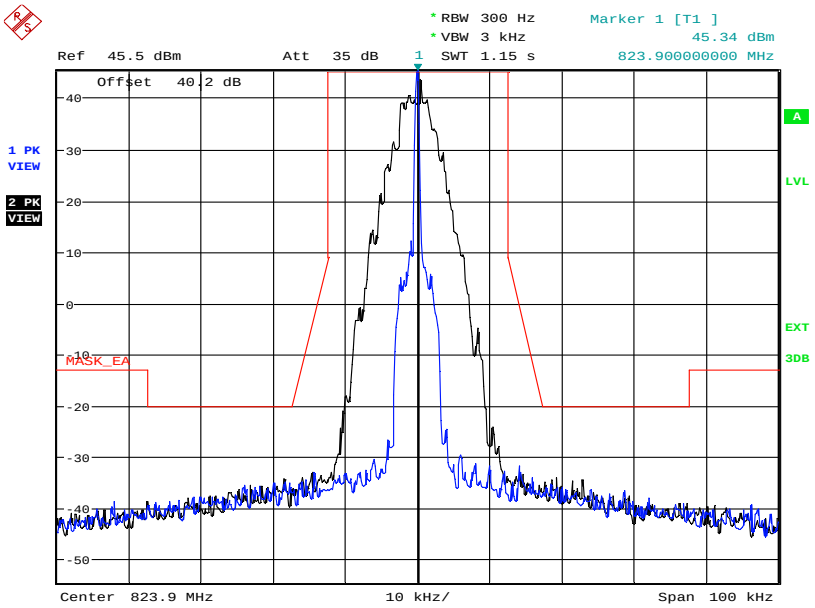
Date: 14.AUG.2023 16:02:11

5.8.5.10. Configuration: Mask 90.691, Sub Band 3: 809-824MHz, 815.1MHz, F1E&F1D, Digital, Low power



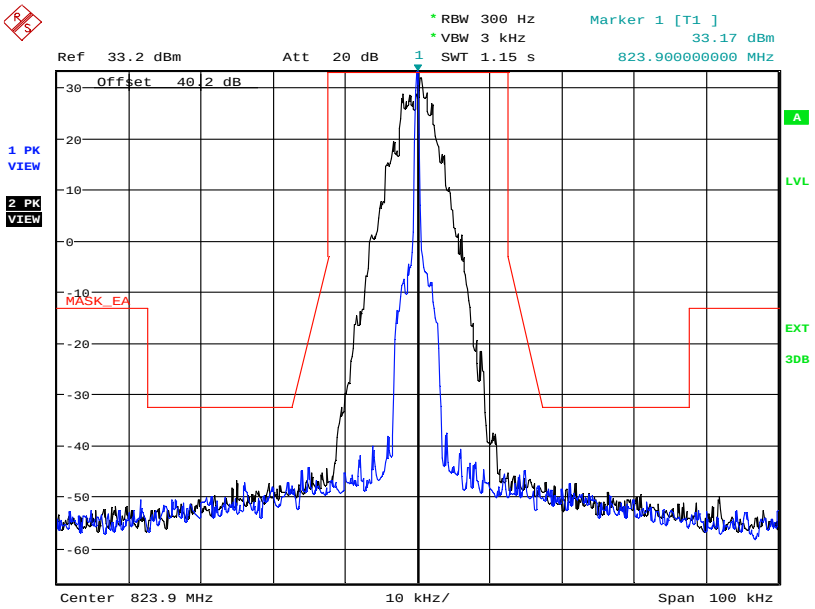
Date: 14.AUG.2023 16:43:00

5.8.5.11. Configuration: Mask 90.691, Sub Band 3: 809-824MHz, 823.9MHz, F1E&F1D, Digital, High power



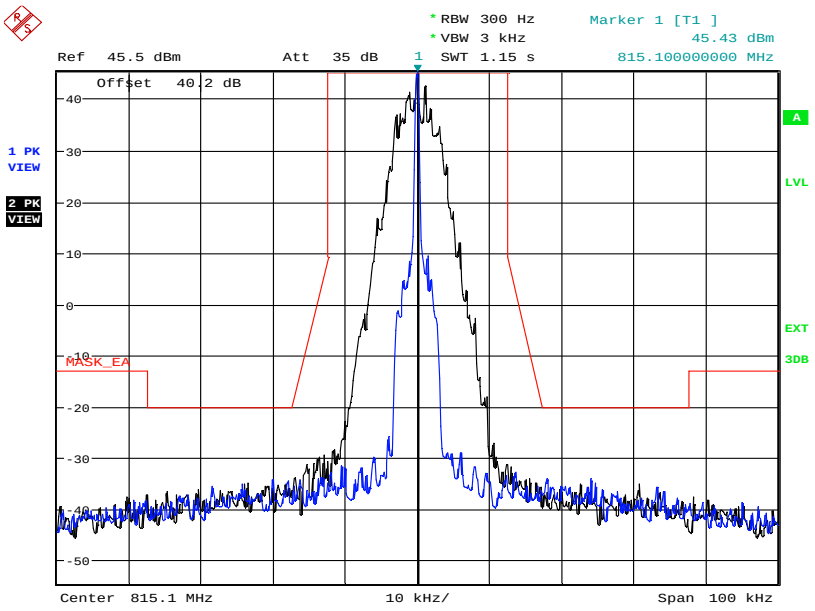
Date: 14.AUG.2023 16:11:26

5.8.5.12. Configuration: Mask 90.691, Sub Band 3: 809-824MHz, 823.9MHz, F1E&F1D, Digital, Low power



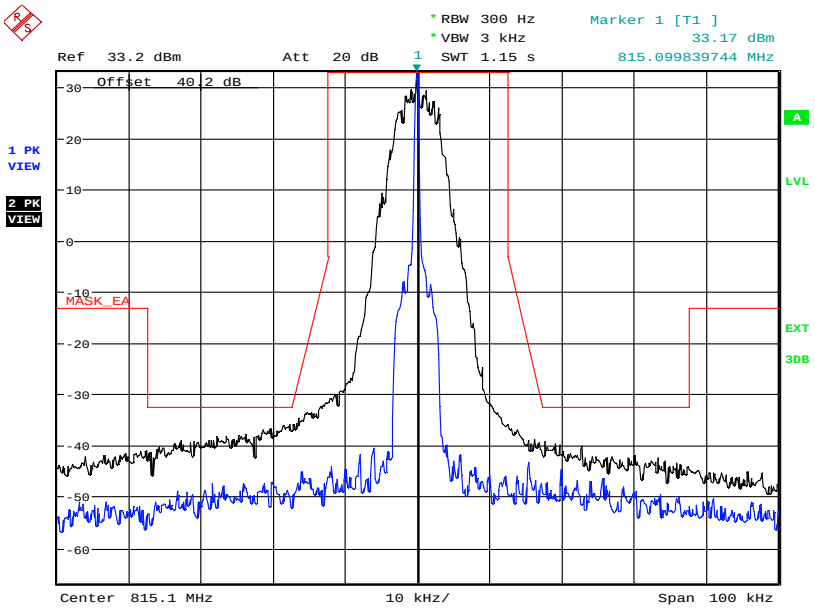
Date: 14.AUG.2023 16:52:19

5.8.5.13. Configuration: Mask 90.691, Sub Band 3: 809-824MHz, 815.1MHz, F1W, Digital, High power



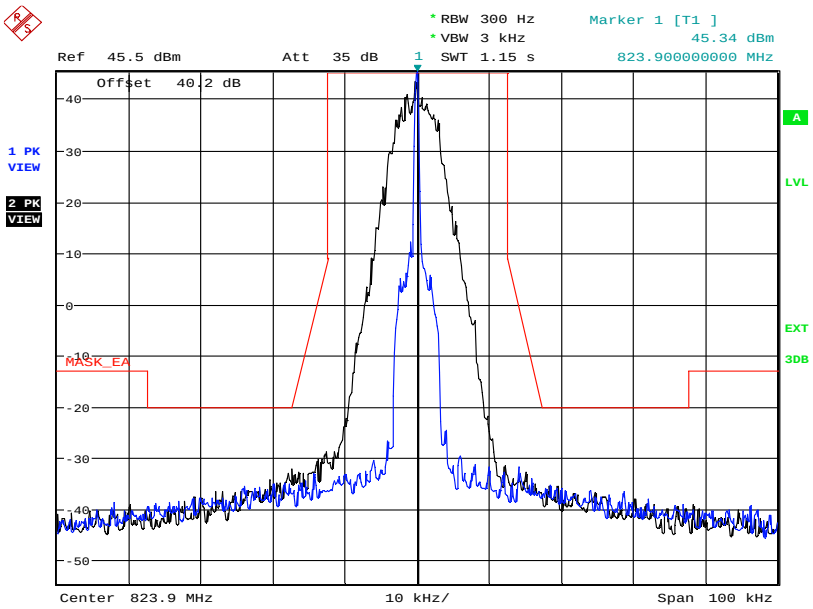
Date: 14.AUG.2023 16:03:48

5.8.5.14. Configuration: Mask 90.691, Sub Band 3: 809-824MHz, 815.1MHz, F1W, Digital, Low power



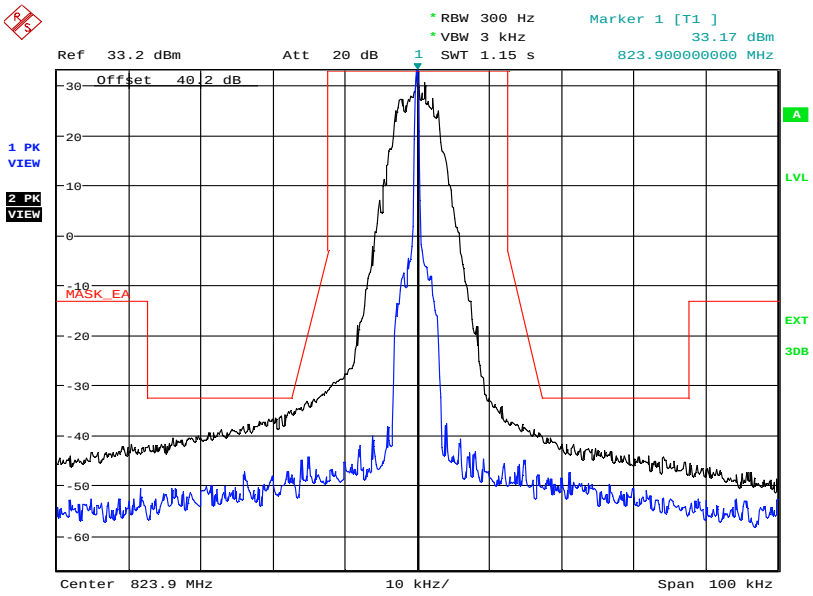
Date: 14.AUG.2023 16:47:52

5.8.5.15. Configuration: Mask 90.691, Sub Band 3: 809-824MHz, 823.9MHz, F1W, Digital, High power



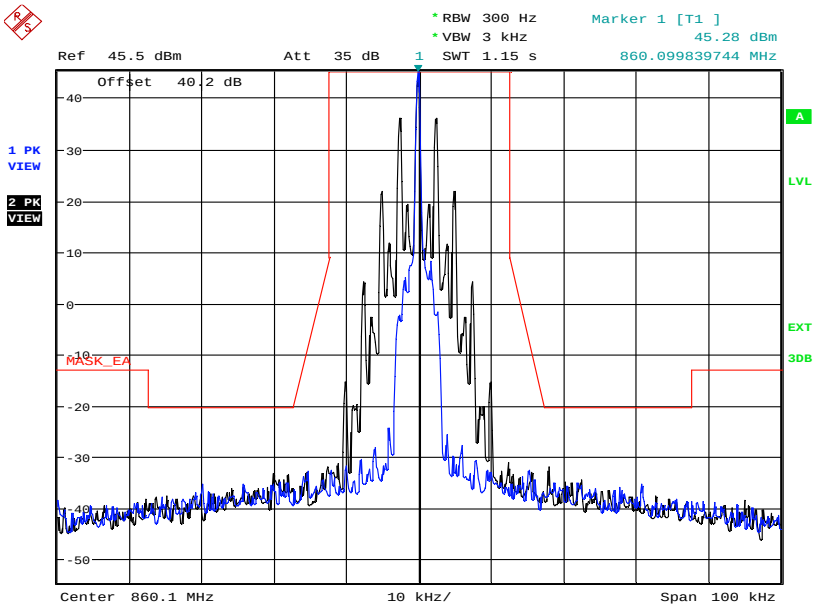
Date: 14.AUG.2023 16:12:45

5.8.5.16. Configuration: Mask 90.691, Sub Band 3: 809-824MHz, 823.9MHz, F1W, Digital, Low power



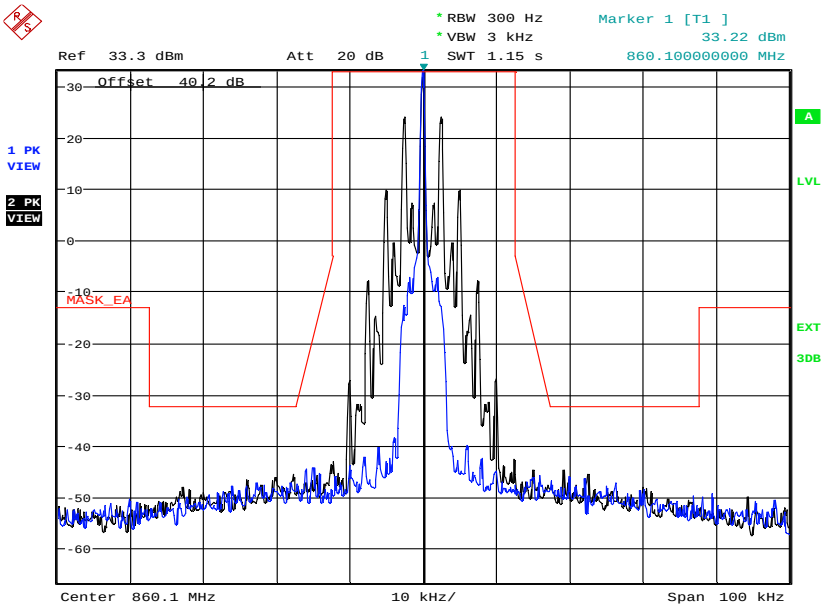
Date: 14.AUG.2023 16:53:58

5.8.5.17. Configuration: Mask 90.691, Sub Band 4: 854-869MHz, 860.1MHz, 12.5 KHz, Analog, High power



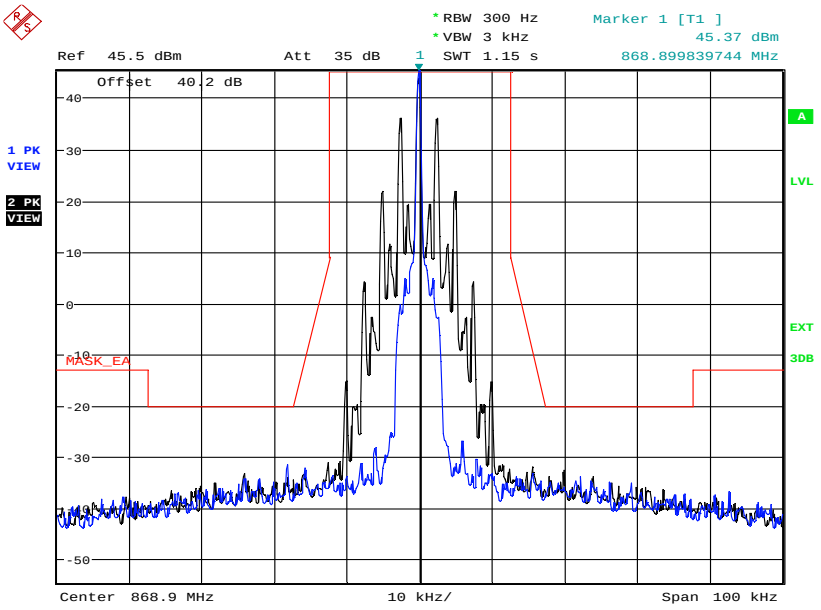
Date: 14.AUG.2023 16:15:59

5.8.5.18. Configuration: Mask 90.691, Sub Band 4: 854-869MHz, 860.1MHz, 12.5 KHz, Analog, Low power



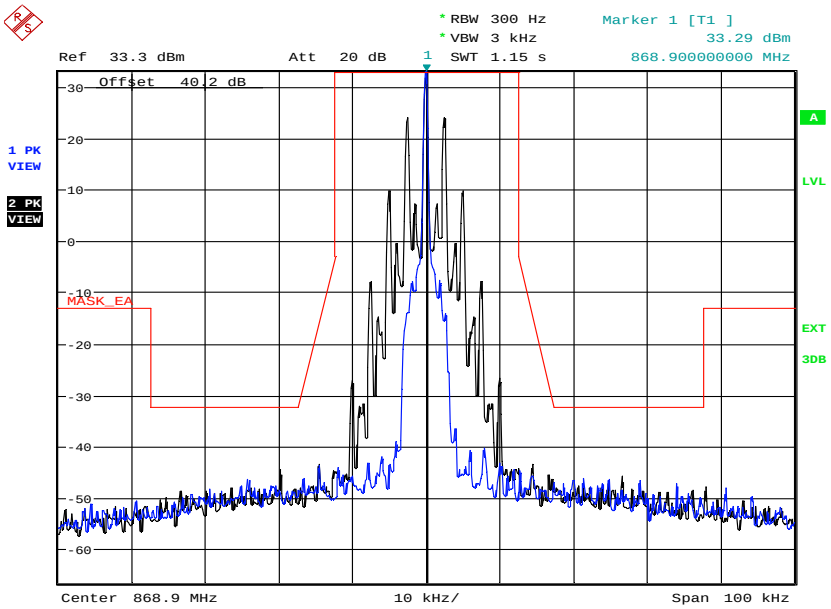
Date: 14.AUG.2023 16:57:10

5.8.5.19. Configuration: Mask 90.691, Sub Band 4: 854-869MHz, 868.9MHz, 12.5 KHz, Analog, High power



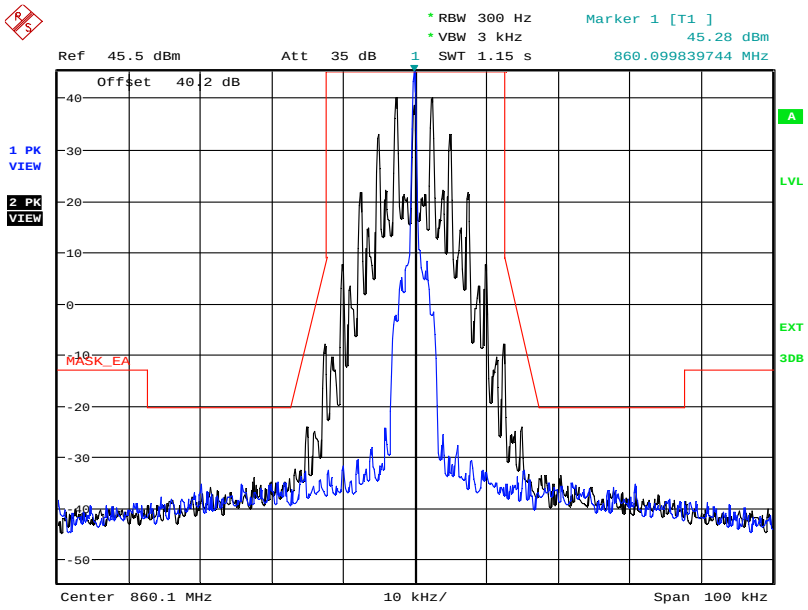
Date: 14.AUG.2023 16:26:50

5.8.5.20. Configuration: Mask 90.691, Sub Band 4: 854-869MHz, 868.9MHz, 12.5 KHz, Analog, Low power



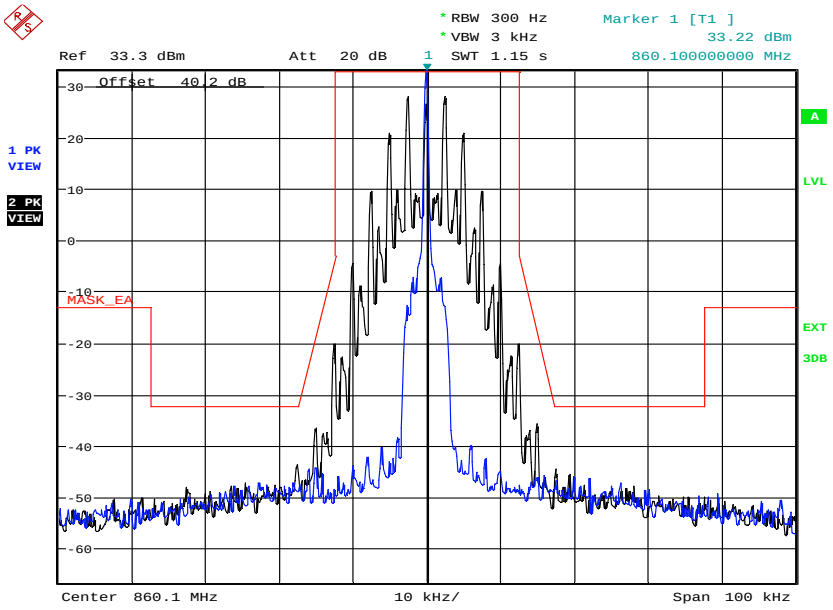
Date: 14.AUG.2023 17:11:14

5.8.5.21. Configuration: Mask 90.691, Sub Band 4: 854-869MHz, 860.1MHz, 25 KHz, Analog, High power



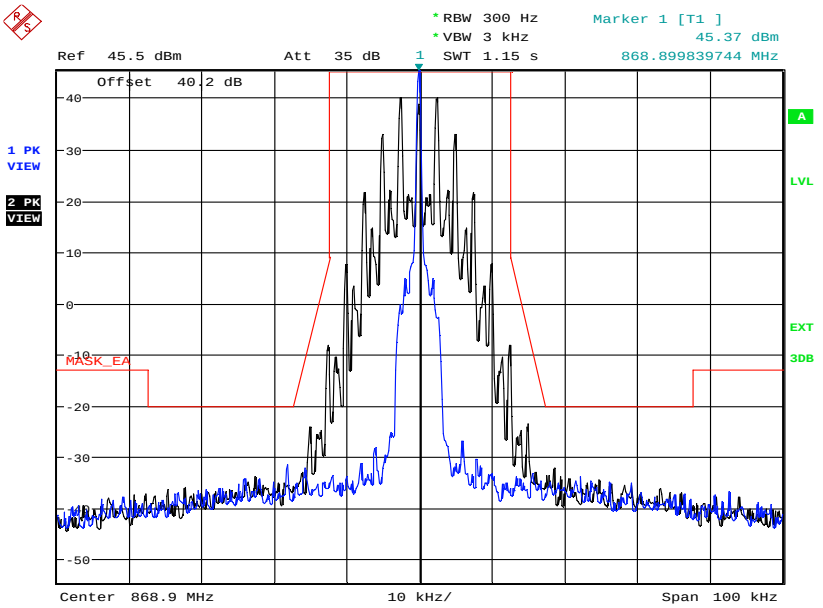
Date: 14.AUG.2023 16:17:03

5.8.5.22. Configuration: Mask 90.691, Sub Band 4: 854-869MHz, 860.1MHz, 25 KHz, Analog, Low power



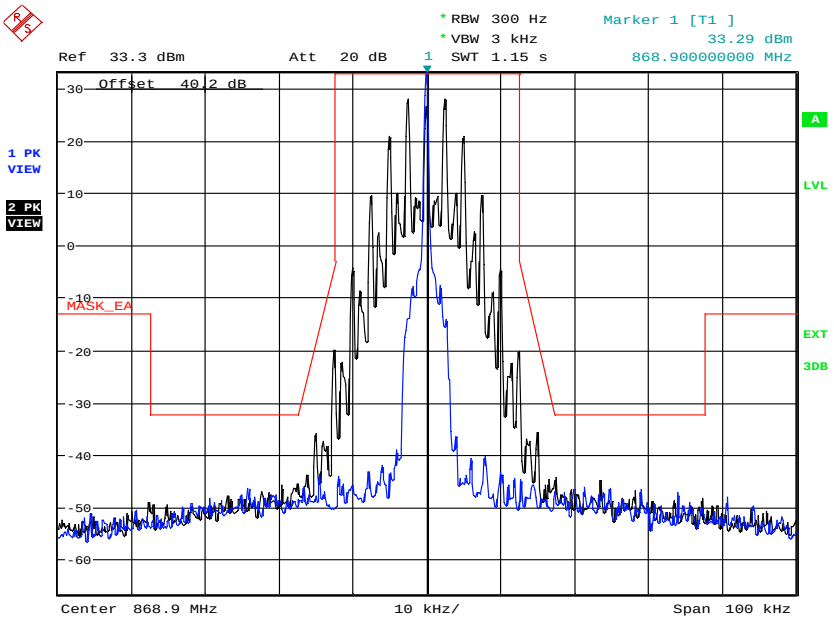
Date: 14.AUG.2023 16:59:06

5.8.5.23. Configuration: Mask 90.691, Sub Band 4: 854-869MHz, 868.9MHz, 25 KHz, Analog, High power



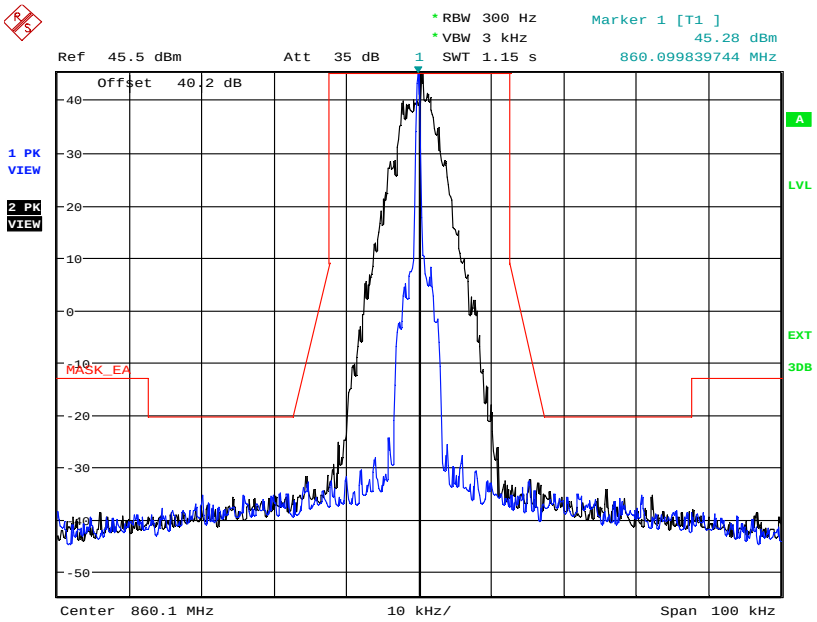
Date: 14.AUG.2023 16:27:59

5.8.5.24. Configuration: Mask 90.691, Sub Band 4: 854-869MHz, 868.9MHz, 25 KHz, Analog, Low power



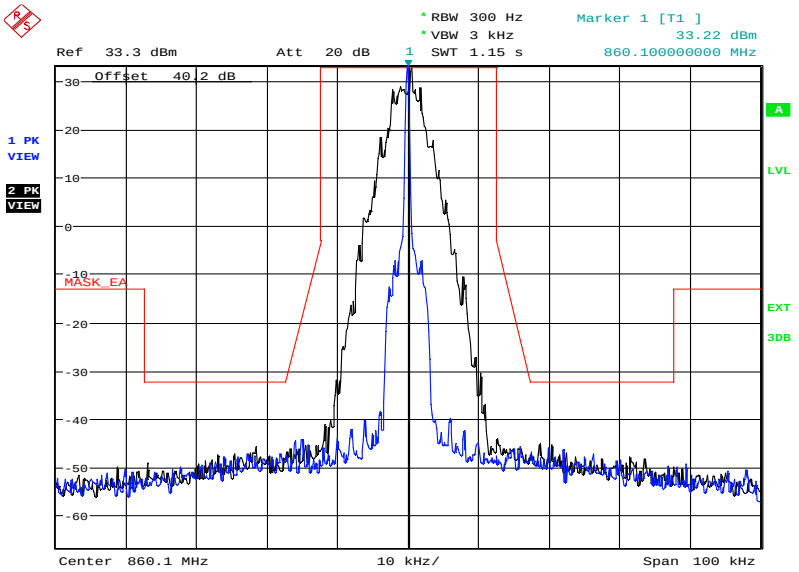
Date: 14.AUG.2023 17:12:16

5.8.5.25. Configuration: Mask 90.691, Sub Band 4: 854-869MHz, 860.1MHz, F1E&F1D, Digital, High power



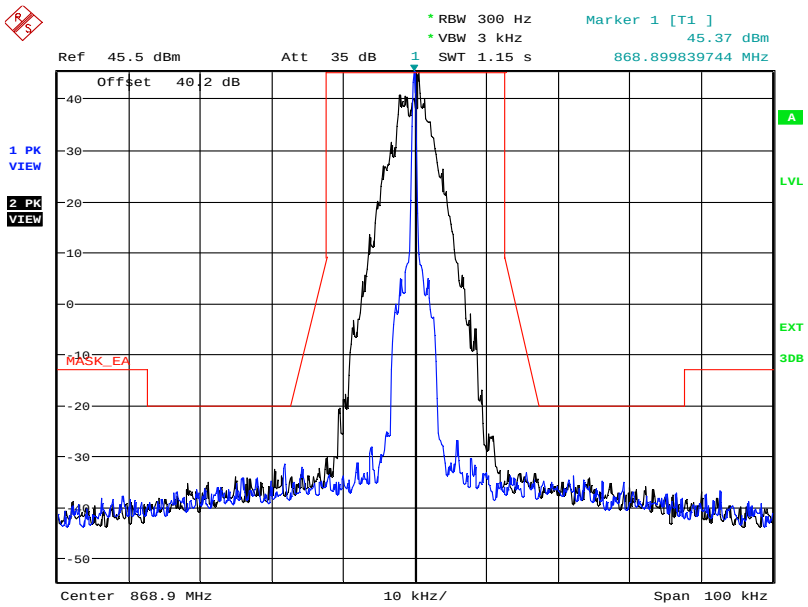
Date: 14.AUG.2023 16:18:15

5.8.5.26. Configuration: Mask 90.691, Sub Band 4: 854-869MHz, 860.1MHz, F1E&F1D, Digital, Low power



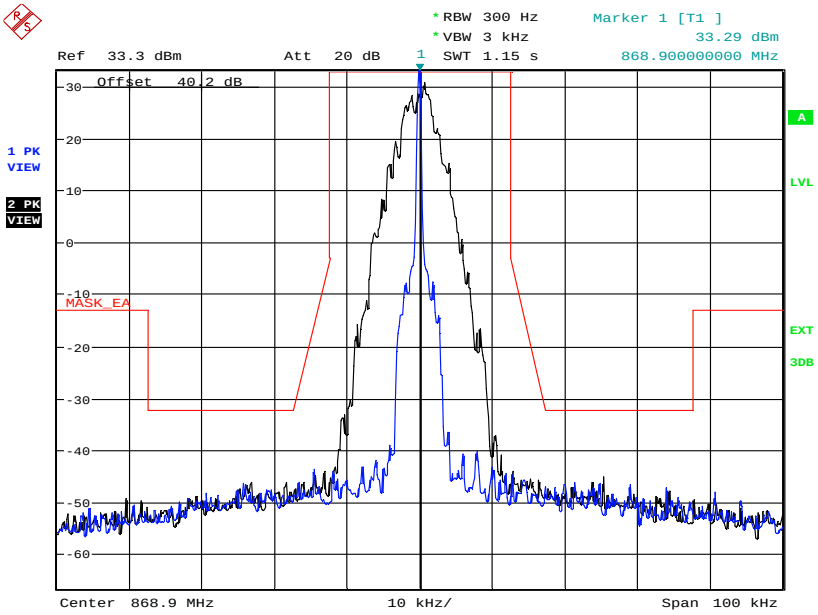
Date: 14.AUG.2023 17:00:28

5.8.5.27. Configuration: Mask 90.691, Sub Band 4: 854-869MHz, 868.9MHz, F1E&F1D, Digital, High power



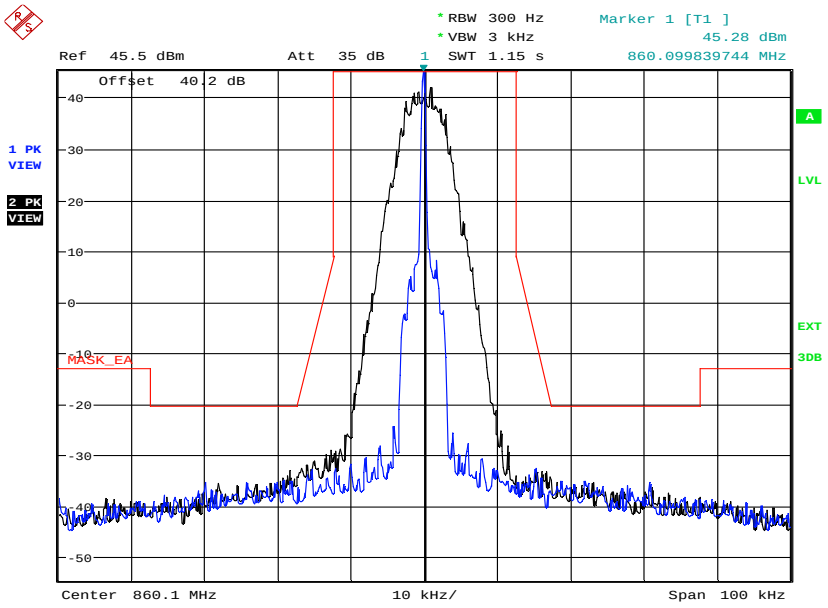
Date: 14.AUG.2023 16:29:17

5.8.5.28. Configuration: Mask 90.691, Sub Band 4: 854-869MHz, 868.9MHz, F1E&F1D, Digital, Low power



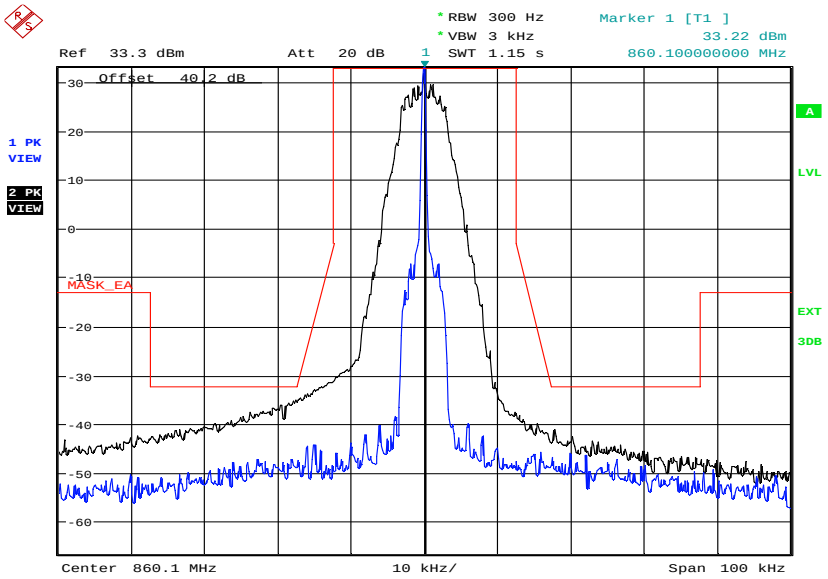
Date: 14.AUG.2023 17:13:31

5.8.5.29. Configuration: Mask 90.691, Sub Band 4: 854-869MHz, 860.1MHz, F1W, Digital, High power



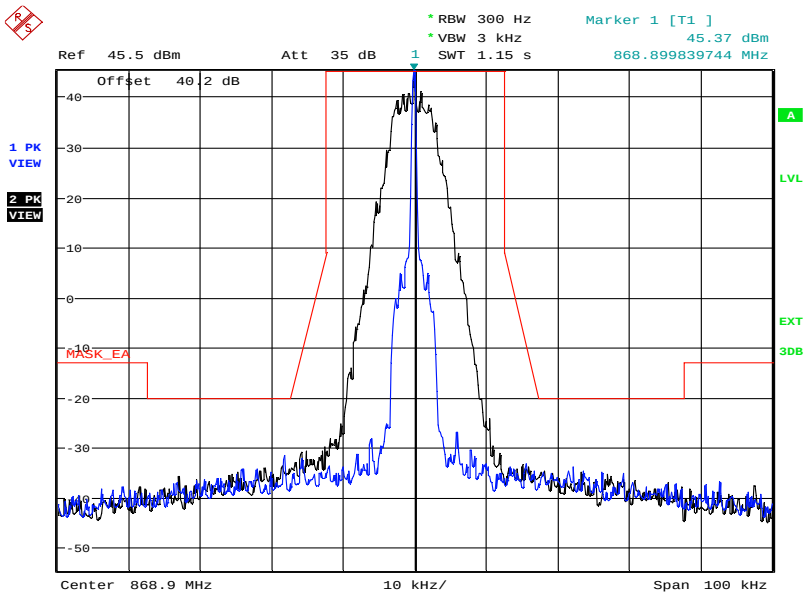
Date: 14.AUG.2023 16:19:54

5.8.5.30. Configuration: Mask 90.691, Sub Band 4: 854-869MHz, 860.1MHz, F1W, Digital, Low power



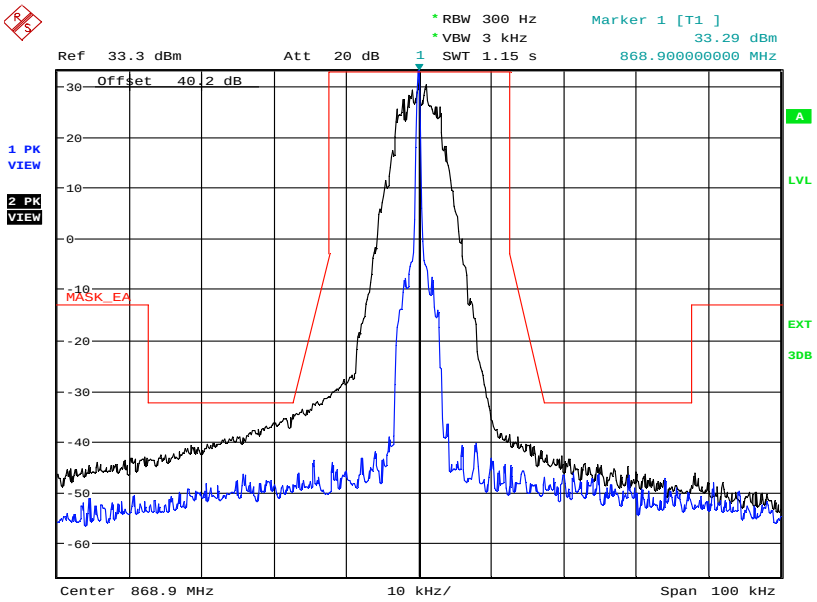
Date: 14.AUG.2023 17:03:08

5.8.5.31. Configuration: Mask 90.691, Sub Band 4: 854-869MHz, 868.9MHz, F1W, Digital, High power



Date: 14.AUG.2023 16:30:39

5.8.5.32. Configuration: Mask 90.691, Sub Band 4: 854-869MHz, 868.9MHz, F1W, Digital, Low power

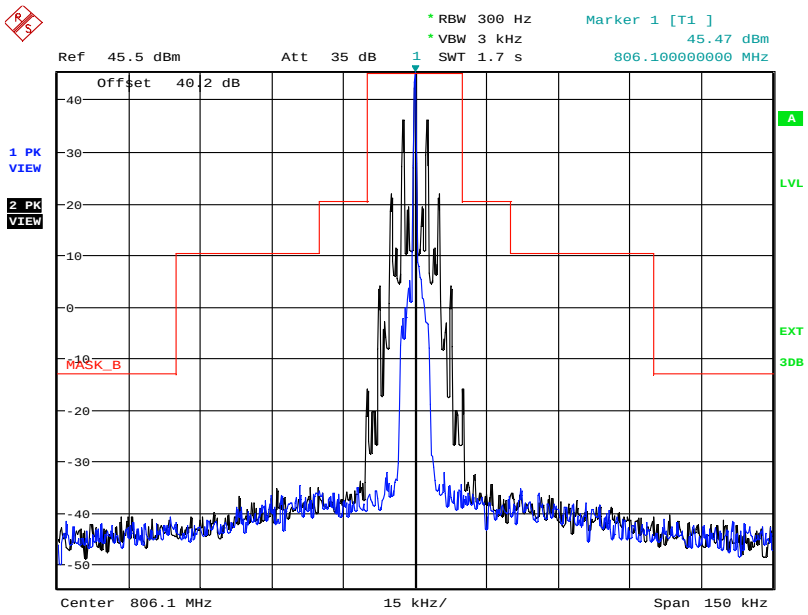


Date: 14.AUG.2023 17:17:19

5.8.5.33.

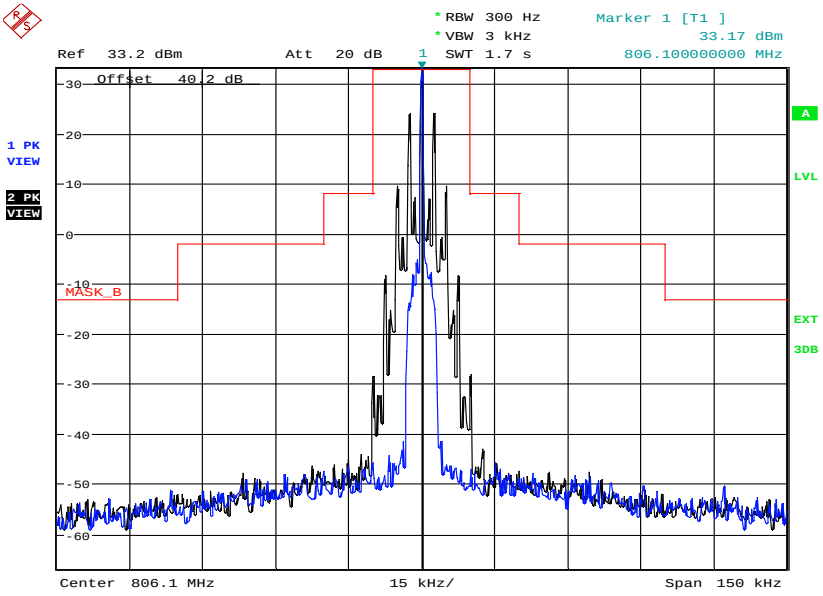
5.8.6. Test Data- EMISSION MASKS- MASK B

5.8.6.1. Configuration: Mask B, Band 3: 806-824MHz, 806.1MHz, 12.5 KHz, Analog, High power



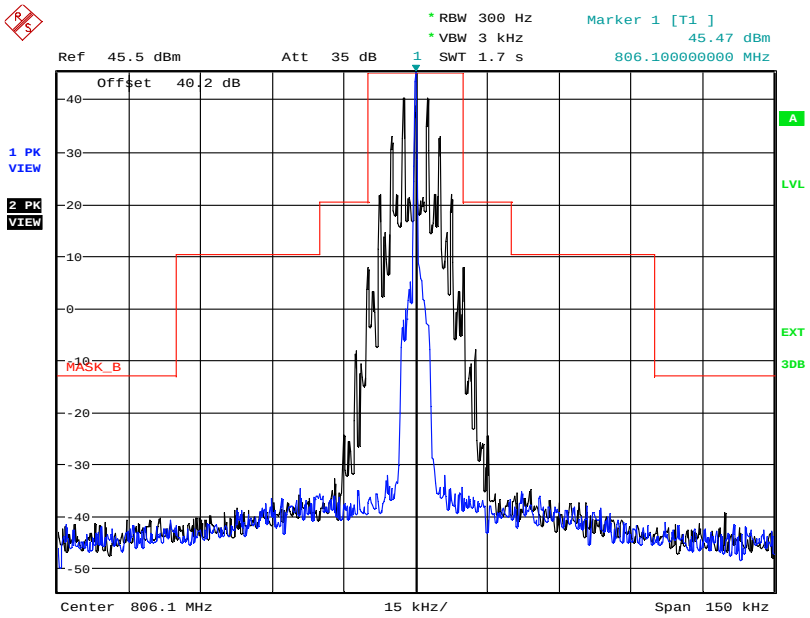
Date: 14.AUG.2023 14:17:48

5.8.6.2. Configuration: Mask B, Band 3: 806-824MHz, 806.1MHz, 12.5 KHz, Analog, Low power



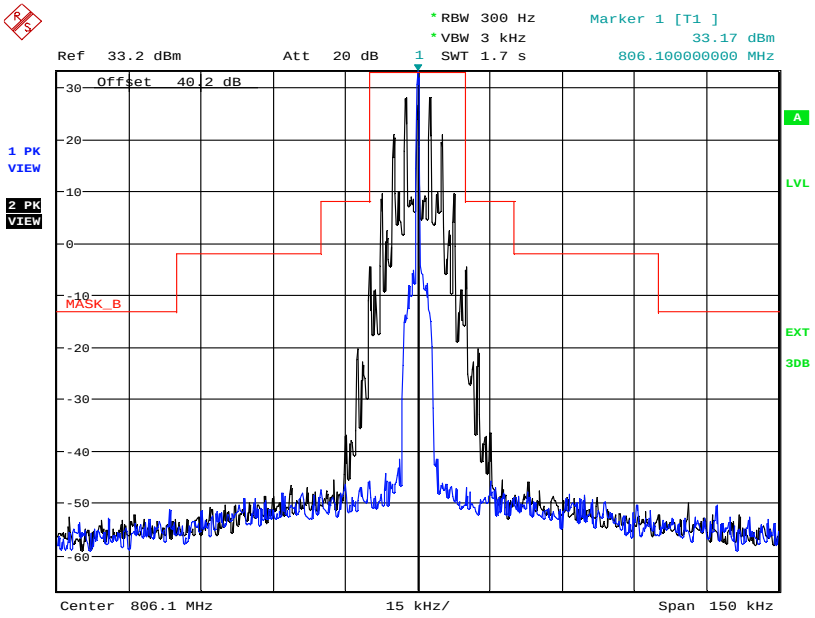
Date: 14.AUG.2023 15:07:02

5.8.6.3. Configuration: Mask B, Band 3: 806-824MHz, 806.1MHz, 25 KHz, Analog, High power



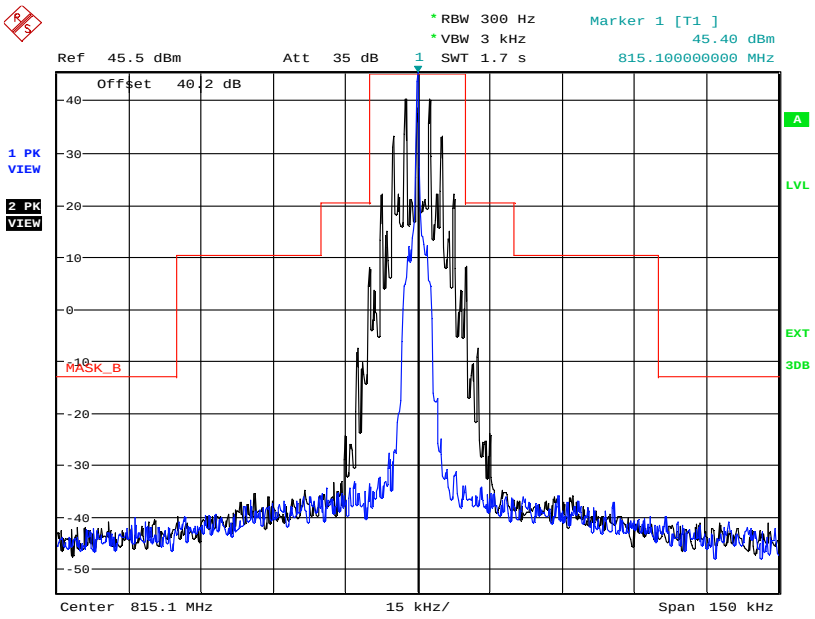
Date: 14.AUG.2023 14:22:02

5.8.6.4. Configuration: Mask B, Band 3: 806-824MHz, 806.1MHz, 25 KHz, Analog, Low power



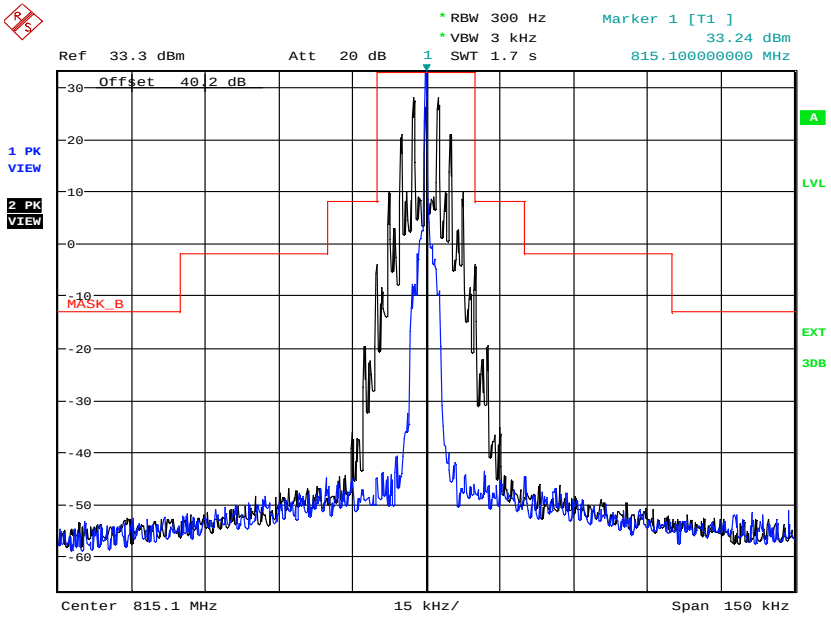
Date: 14.AUG.2023 15:09:12

5.8.6.5. Configuration: Mask B, Band 3: 806-824MHz, 815.1MHz, 25 KHz, Analog, High power



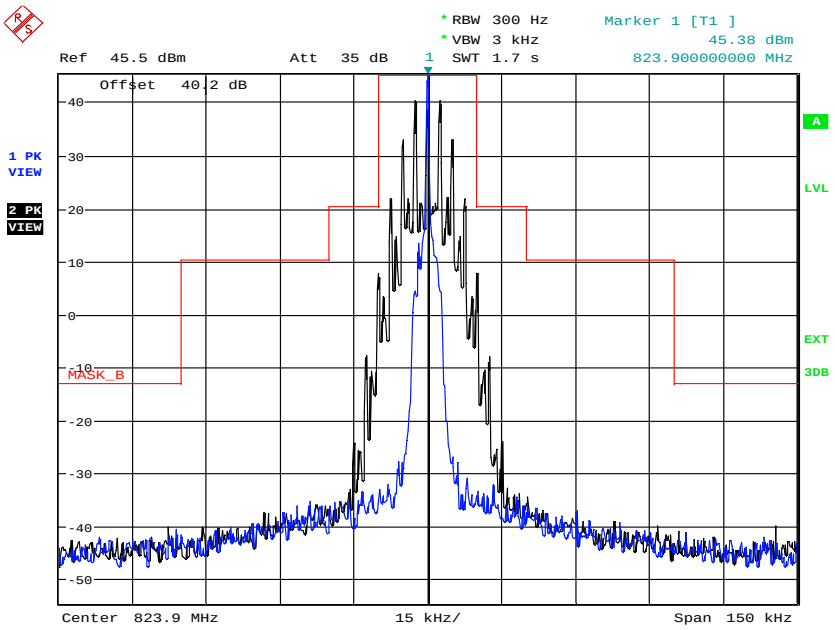
Date: 14.AUG.2023 14:38:35

5.8.6.6. Configuration: Mask B, Band 3: 806-824MHz, 815.1MHz, 25 KHz, Analog, Low power



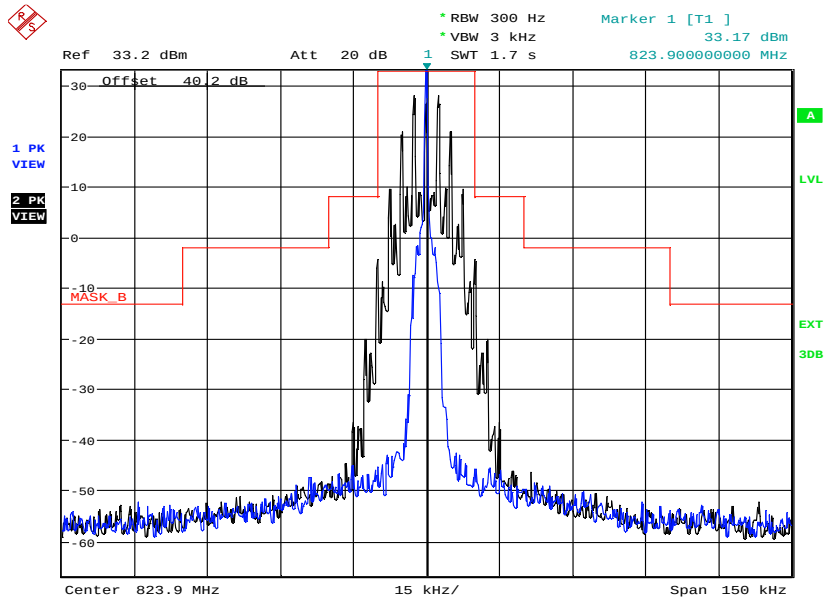
Date: 14.AUG.2023 15:13:46

5.8.6.7. Configuration: Mask B, Band 3: 806-824MHz, 823.9MHz, 25 KHz, Analog, High power



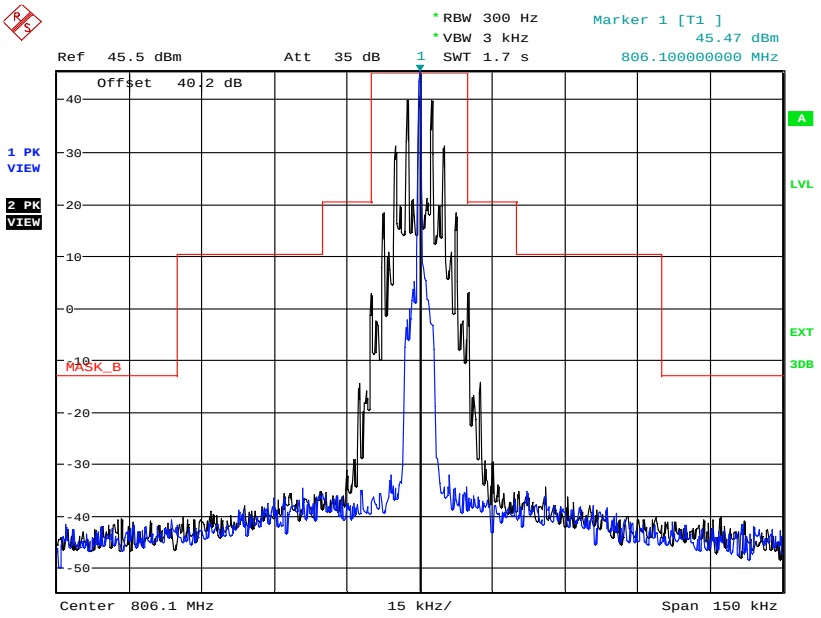
Date: 14.AUG.2023 14:45:02

5.8.6.8. Configuration: Mask B, Band 3: 806-824MHz, 823.9MHz, 25 KHz, Analog, Low power



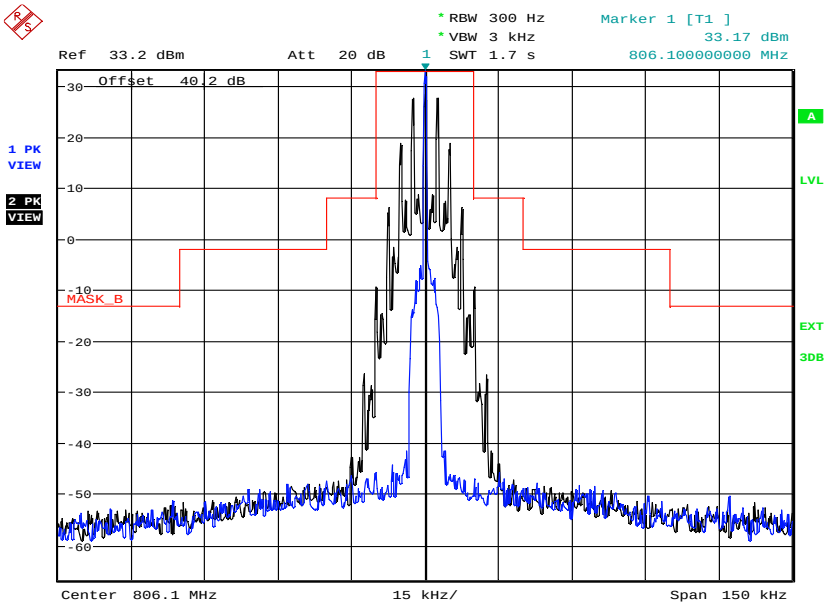
Date: 14.AUG.2023 15:16:00

5.8.6.9. Configuration: Mask B, Sub Band 3: 806-809MHz, 806.1MHz, 20 KHz, Analog, High power



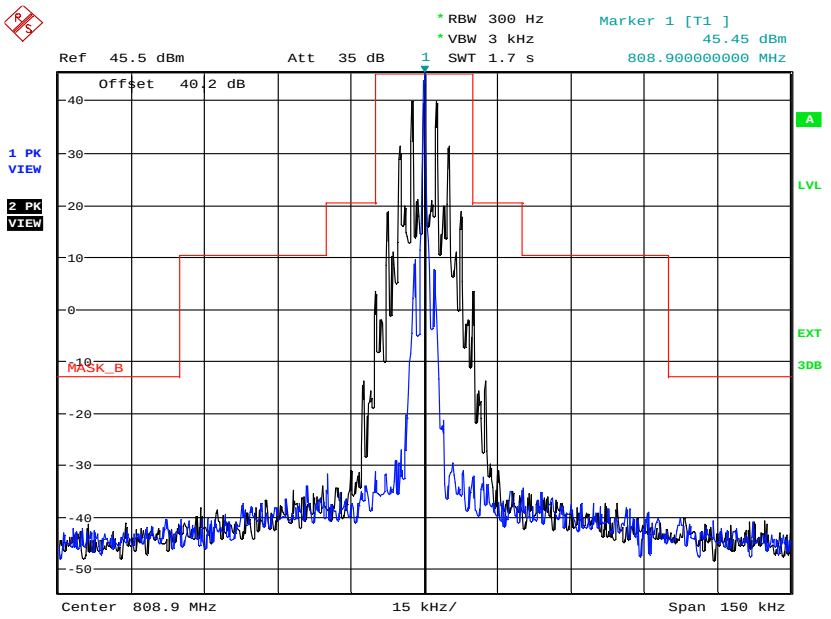
Date: 14.AUG.2023 14:23:55

5.8.6.10. Configuration: Mask B, Sub Band 3: 806-809MHz, 806.1MHz, 20 KHz, Analog, Low power



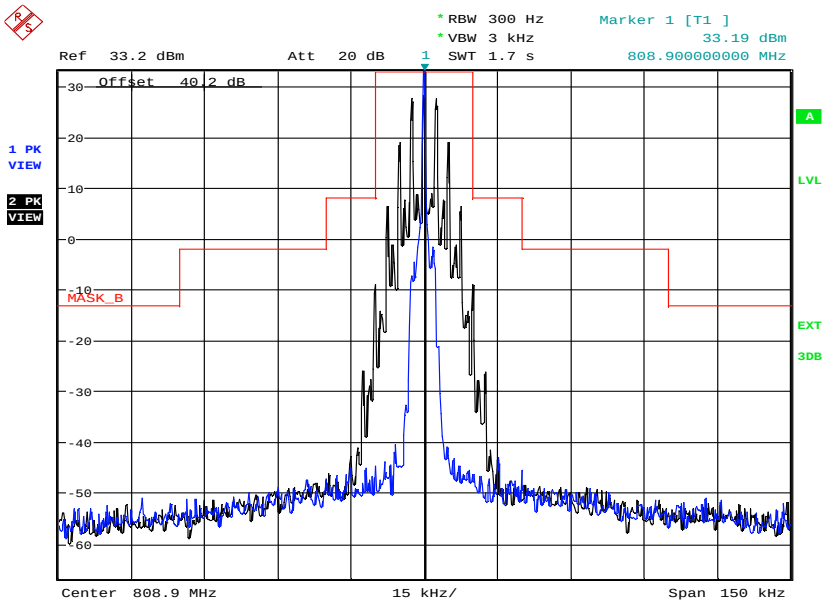
Date: 14.AUG.2023 15:08:09

5.8.6.11. Configuration: Mask B, Sub Band 3: 806-809MHz, 808.9MHz, 20 KHz, Analog, High power



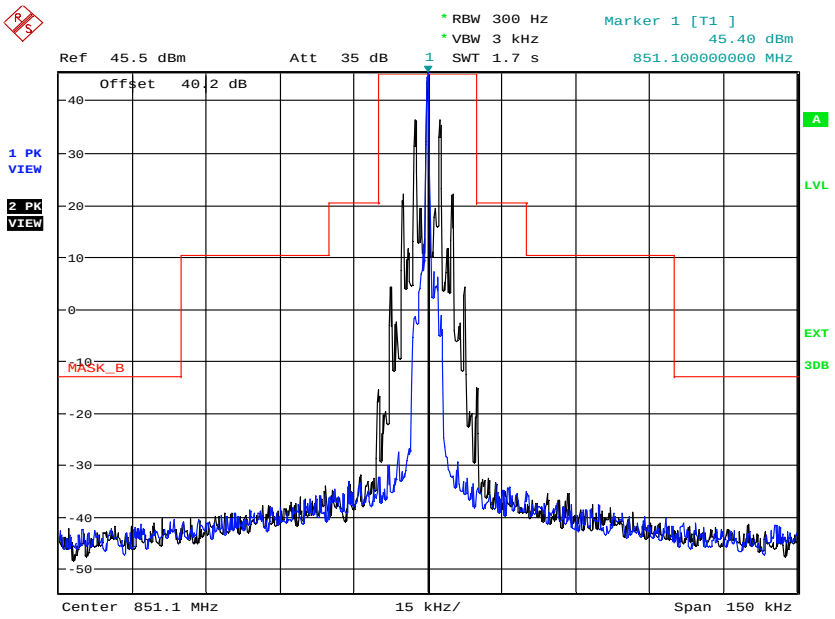
Date: 14.AUG.2023 14:32:23

5.8.6.12. Configuration: Mask B, Sub Band 3: 806-809MHz, 808.9MHz, 20 KHz, Analog, Low power



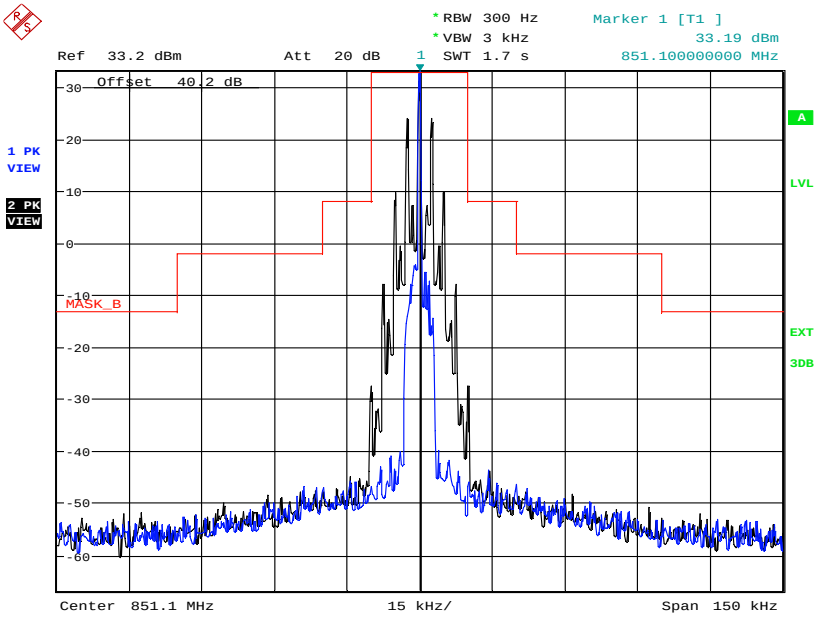
Date: 14.AUG.2023 15:11:16

5.8.6.13. Configuration: Mask B, Band 4: 851-869MHz, 851.1MHz, 12.5 KHz, Analog, High power



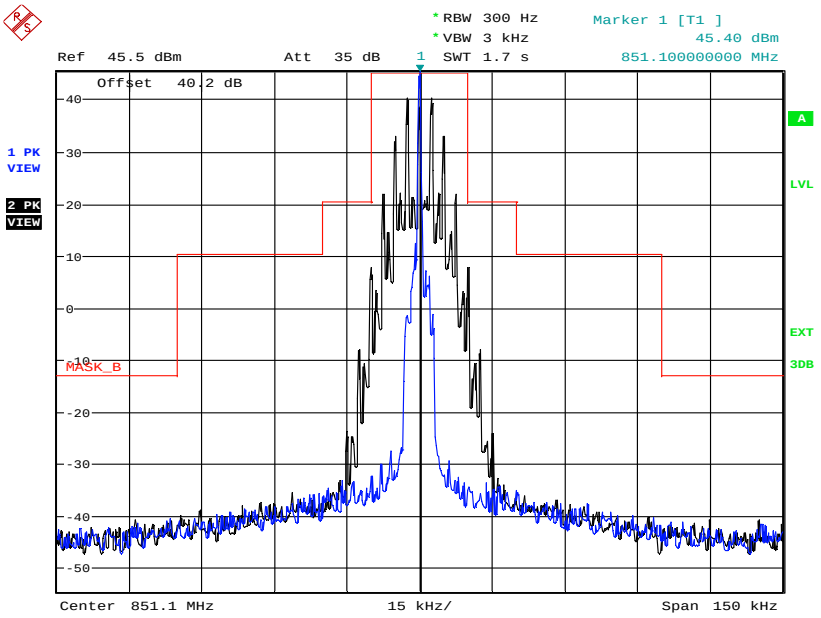
Date: 14.AUG.2023 14:49:25

5.8.6.14. Configuration: Mask B, Band 4: 851-869MHz, 851.1MHz, 12.5 KHz, Analog, Lowpower



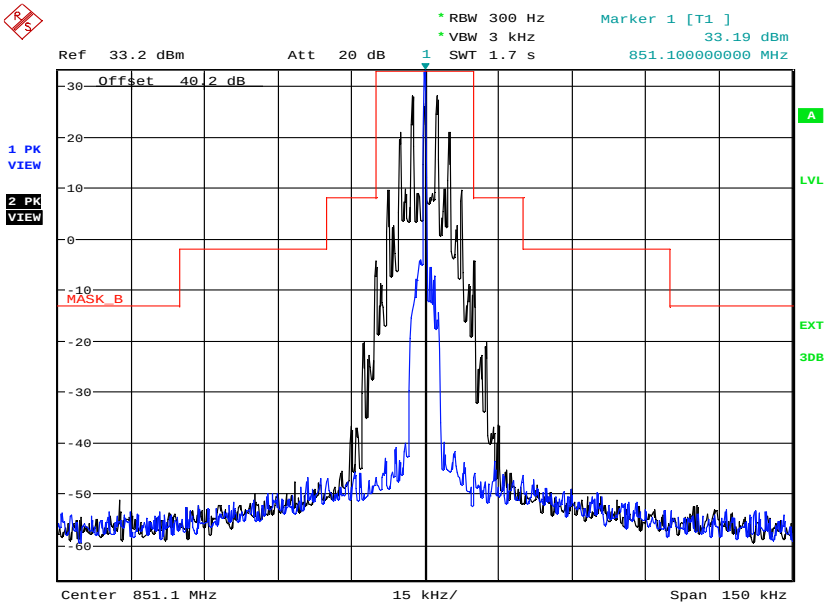
Date: 14.AUG.2023 15:26:05

5.8.6.15. Configuration: Mask B, Band 4: 851-869MHz, 851.1MHz, 25 KHz, Analog, High power



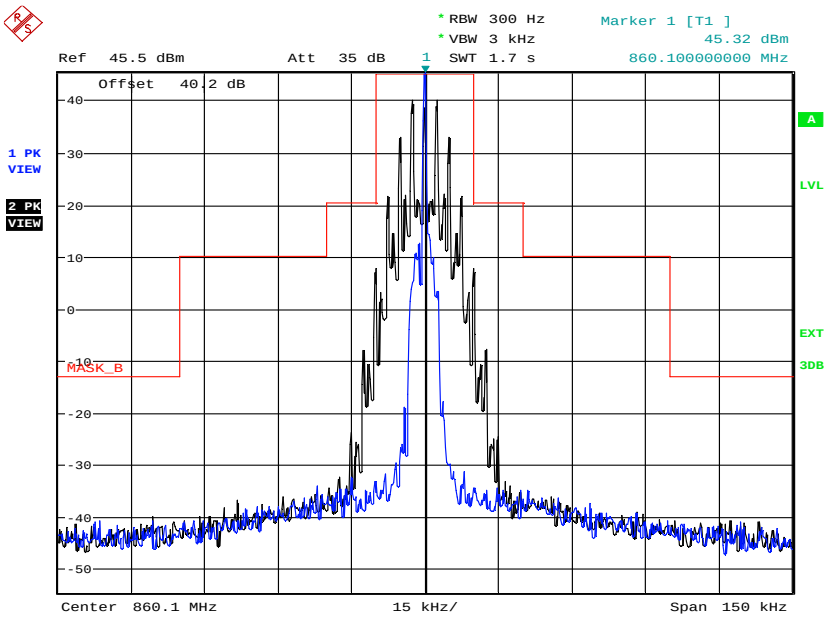
Date: 14.AUG.2023 14:53:02

5.8.6.16. Configuration: Mask B, Band 4: 851-869MHz, 851.1MHz, 25 KHz, Analog, Low power



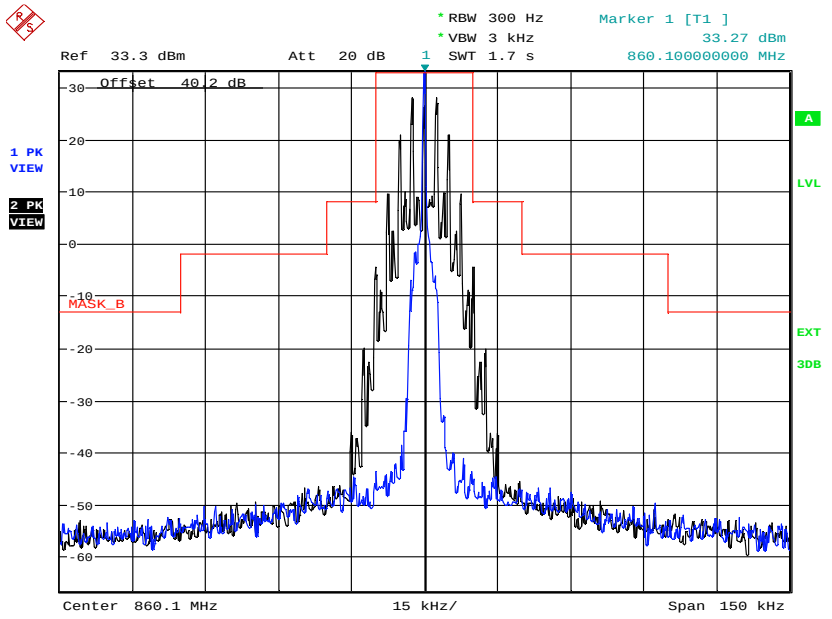
Date: 14.AUG.2023 15:28:18

5.8.6.17. Configuration: Mask B, Band 4: 851-869MHz, 860.1MHz, 25 KHz, Analog, High power



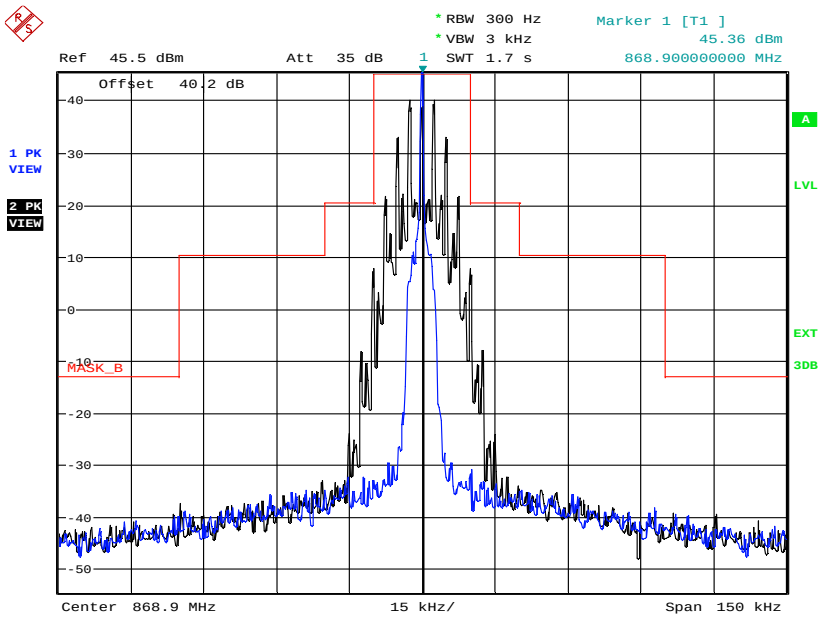
Date: 14.AUG.2023 14:58:26

5.8.6.18. Configuration: Mask B, Band 4: 851-869MHz, 860.1MHz, 25 KHz, Analog, Low power



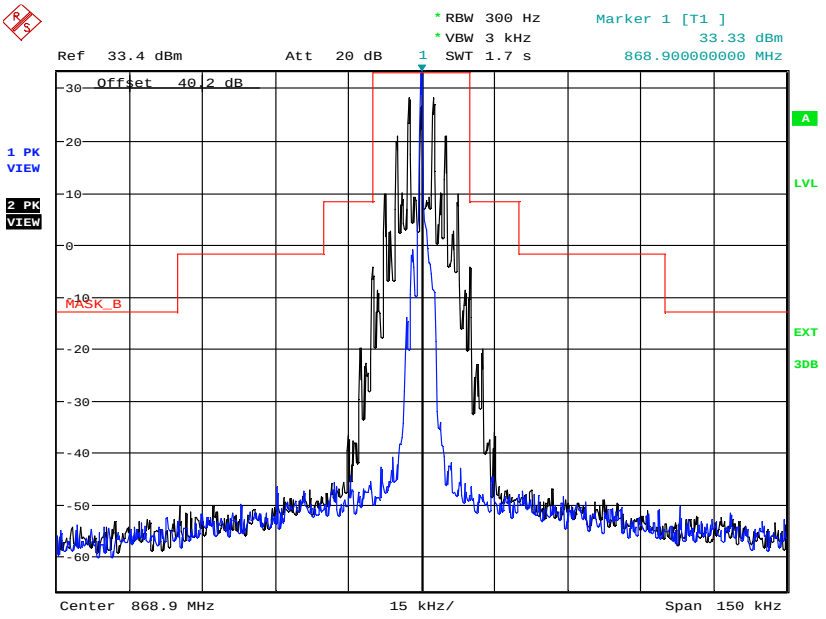
Date: 14.AUG.2023 15:32:29

5.8.6.19. Configuration: Mask B, Band 4: 851-869MHz, 868.9MHz, 25 KHz, Analog, High power



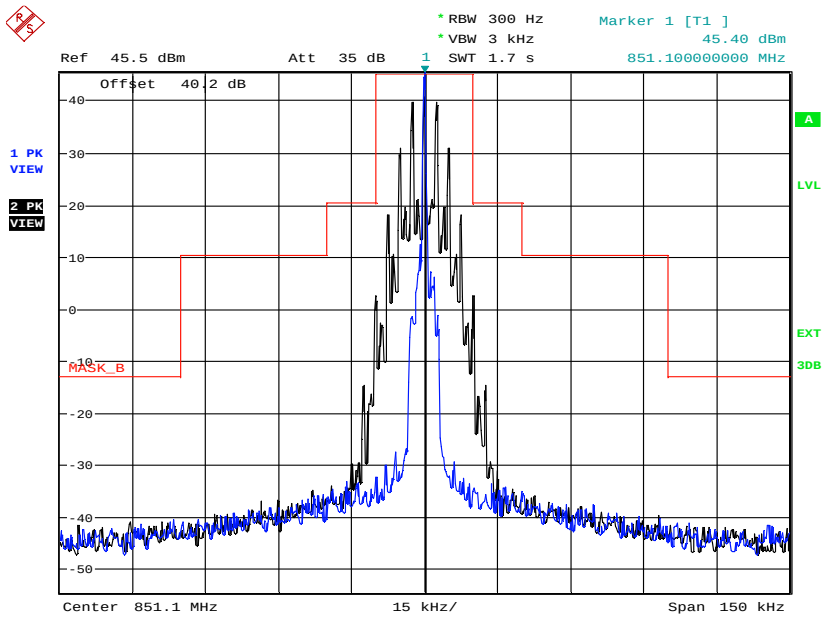
Date: 14.AUG.2023 15:01:10

5.8.6.20. Configuration: Mask B, Band 4: 851-869MHz, 868.9MHz, 25 KHz, Analog, Low power



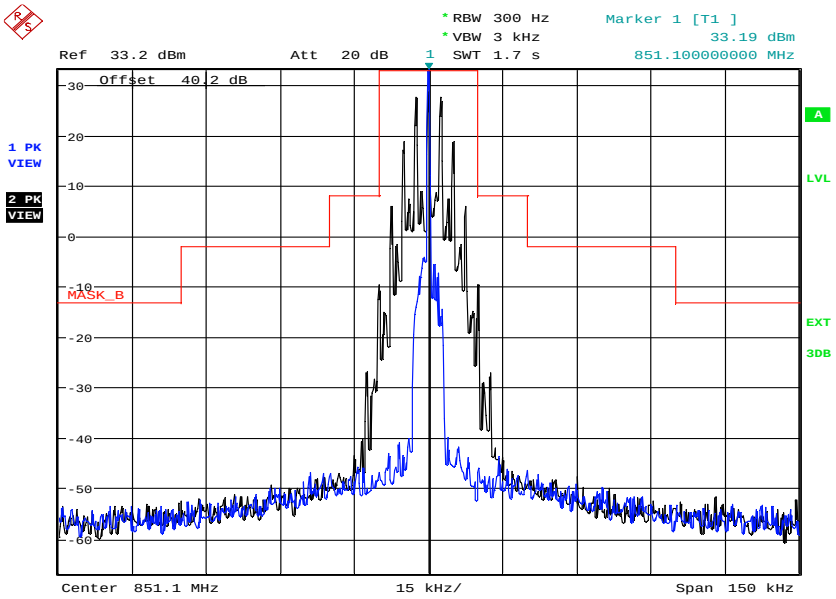
Date: 14.AUG.2023 15:34:52

5.8.6.21. Configuration: Mask B, Sub Band 4: 851-854MHz, 851.1MHz, 20 KHz, Analog, High power



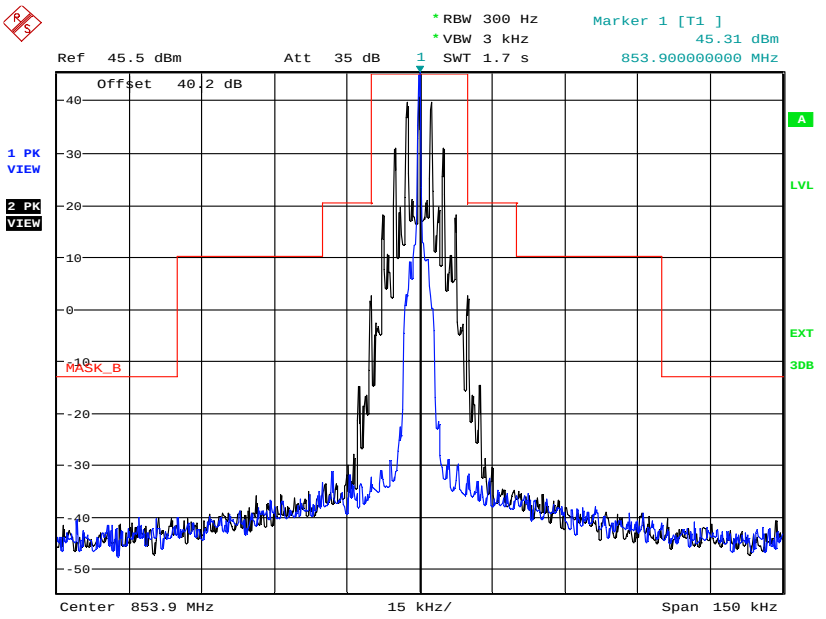
Date: 14.AUG.2023 14:52:00

5.8.6.22. Configuration: Mask B, Sub Band 4: 851-854MHz, 851.1MHz, 20 KHz, Analog, Low power



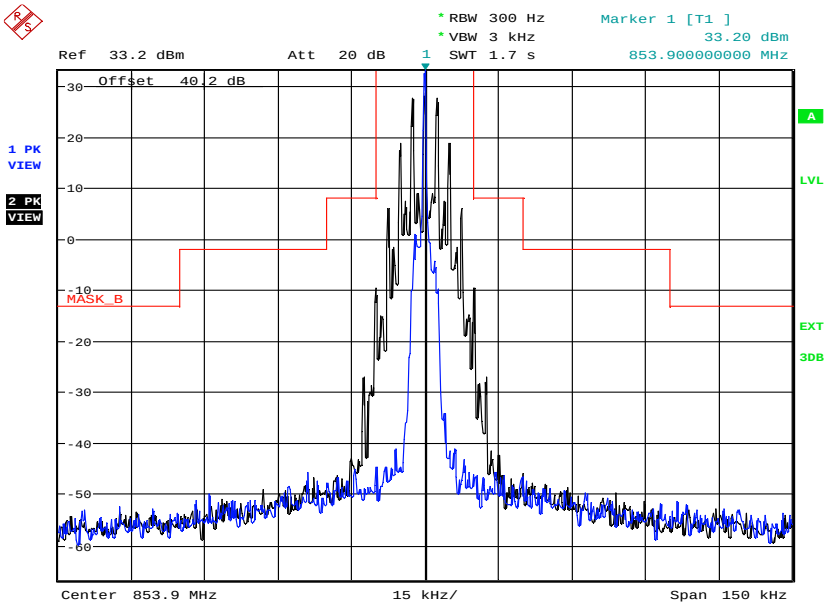
Date: 14.AUG.2023 15:27:13

5.8.6.23. Configuration: Mask B, Sub Band 4: 851-854MHz, 853. 9MHz, 20 KHz, Analog, High power



Date: 14.AUG.2023 14:55:34

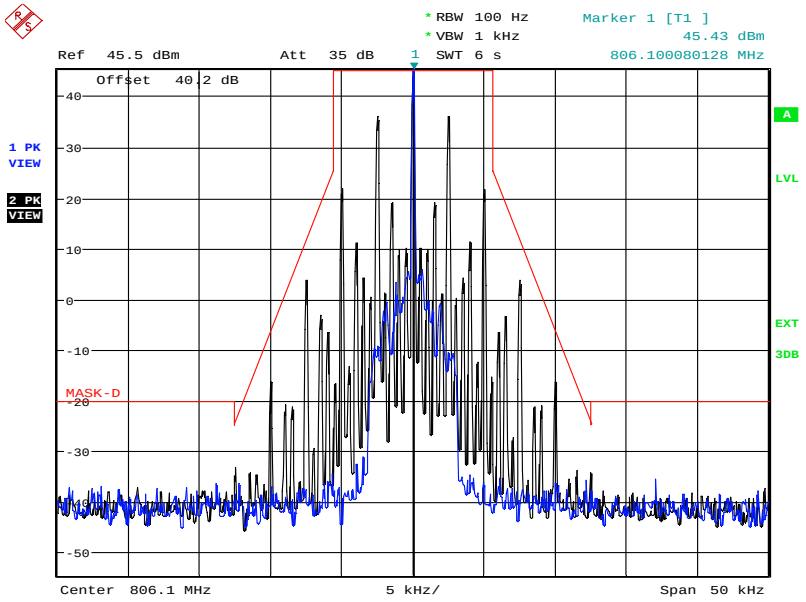
5.8.6.24. Configuration: Mask B, Sub Band 4: 851-854MHz, 853.9MHz, 20 KHz, Analog, Low power



Date: 14.AUG.2023 15:30:12

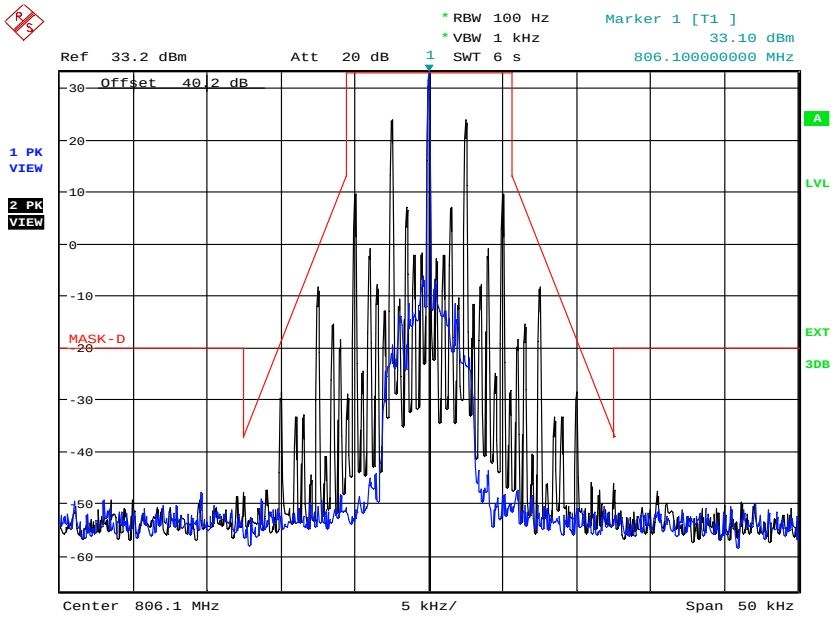
5.8.7. Test Data- EMISSION MASKS- MASK D

5.8.7.1. Configuration: Mask D, Band 3:, 806.1MHz, 12.5 KHz, Analog, High power, Rule Part: IC



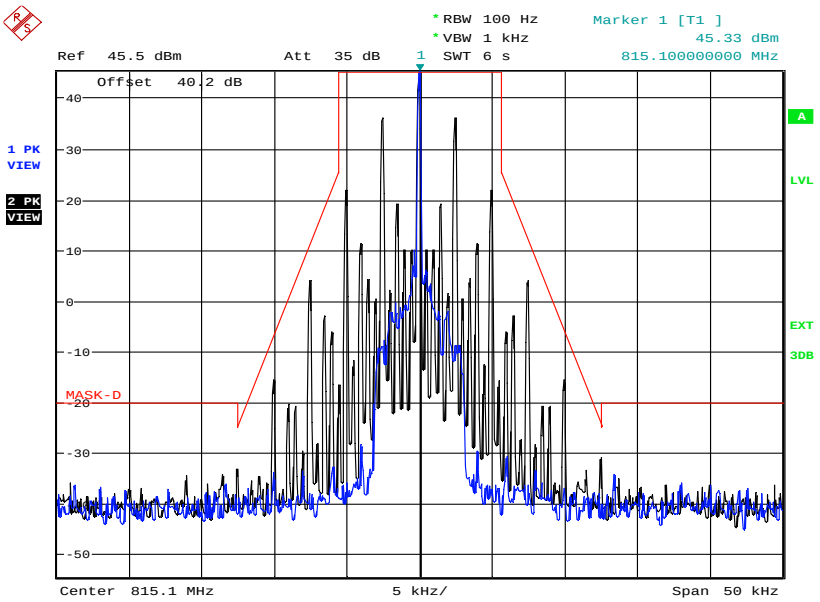
Date: 15.AUG.2023 10:20:34

5.8.7.2. Configuration: Mask D, Band 3:, 806.1MHz, 12.5 KHz, Analog, Low power, Rule Part: IC



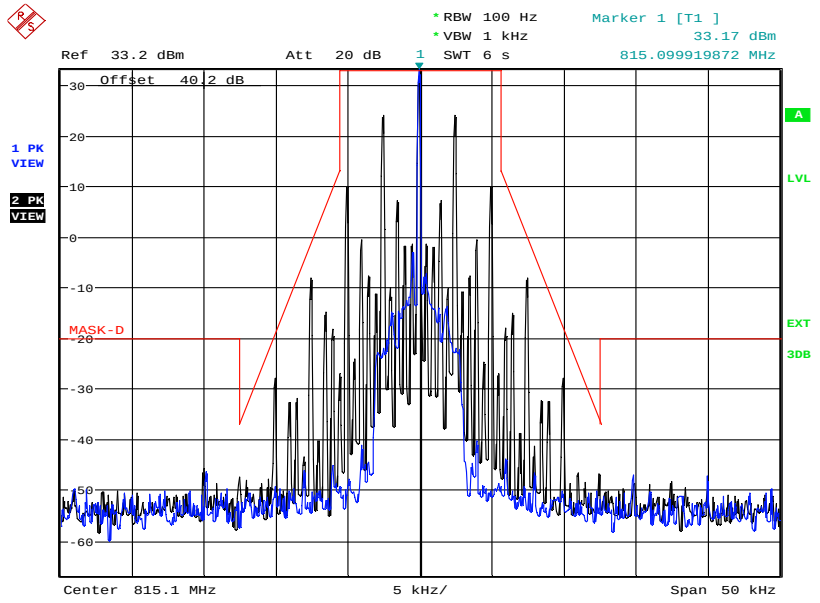
Date: 15.AUG.2023 11:37:50

5.8.7.3. Configuration: Mask D, Band 3: 815.1MHz, 12.5 KHz, Analog, High power, Part: FCC 90.210 & IC



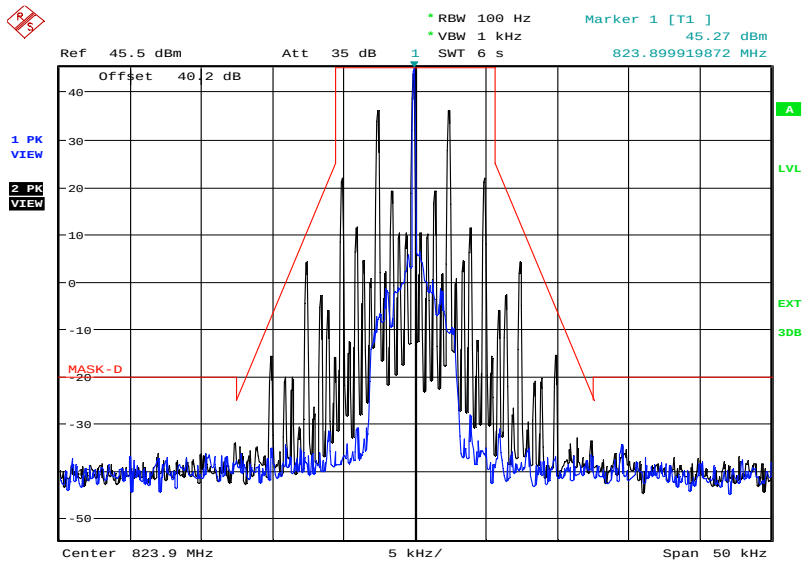
Date: 15.AUG.2023 10:29:33

5.8.7.4. Configuration: Mask D, Band 3: 815.1MHz, 12.5 KHz, Analog, Low power, Part: FCC 90.210 & IC



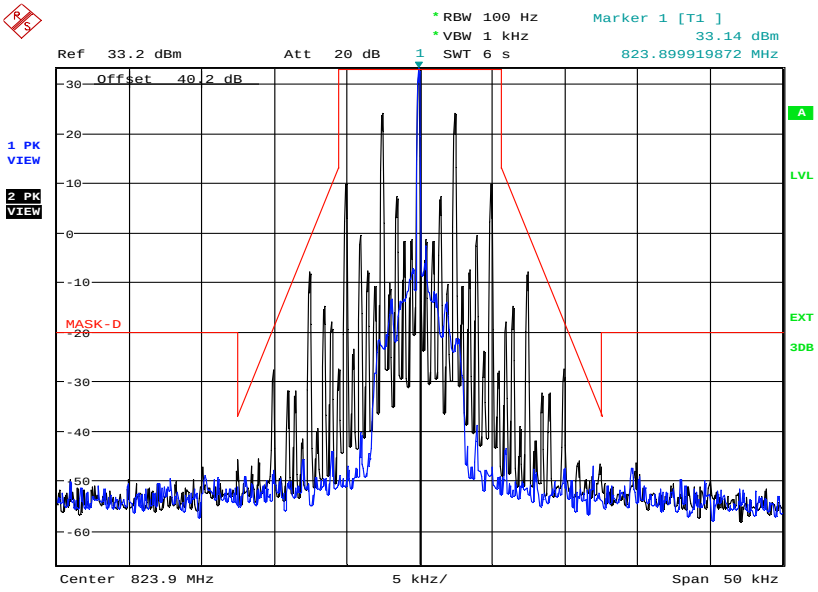
Date: 15.AUG.2023 11:49:01

5.8.7.5. Configuration: Mask D, Band 3: 823.9MHz, 12.5 KHz, Analog, High power Part: FCC 90.210 & IC



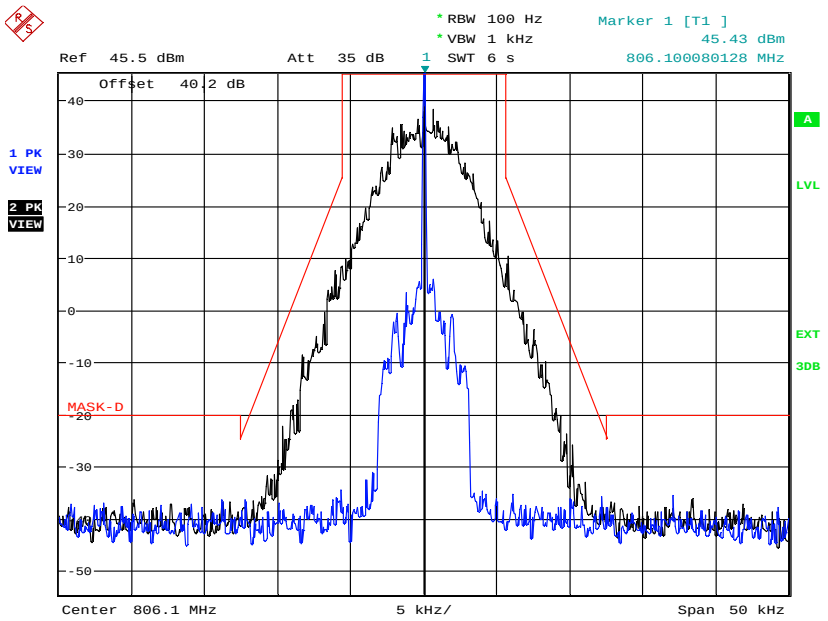
Date: 15.AUG.2023 10:39:39

5.8.7.6. Configuration: Mask D, Band 3: 823.9MHz, 12.5 KHz, Analog, Low power Part: FCC 90.210 & IC



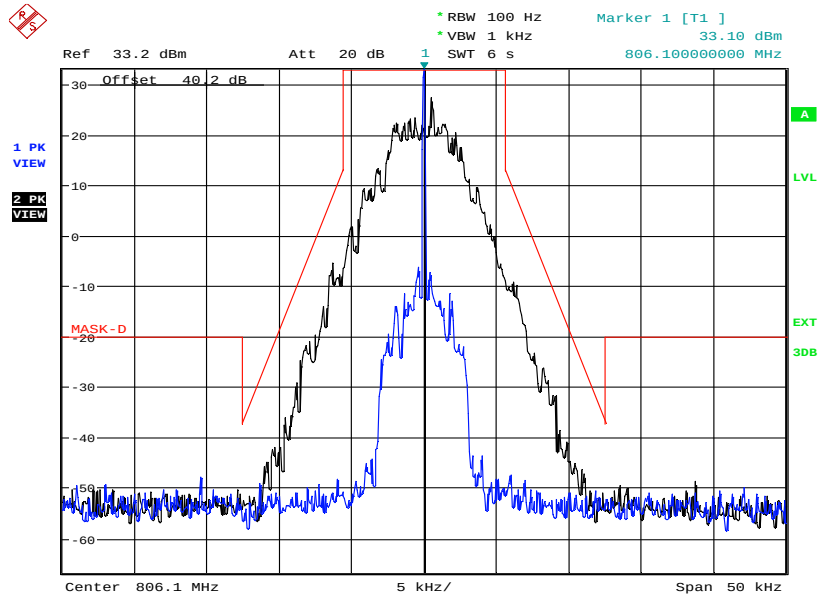
Date: 15.AUG.2023 11:58:48

5.8.7.7. Configuration: Mask D, Band 3: 806.1MHz, F1E&F1D, Digital, High power Rule Part: IC



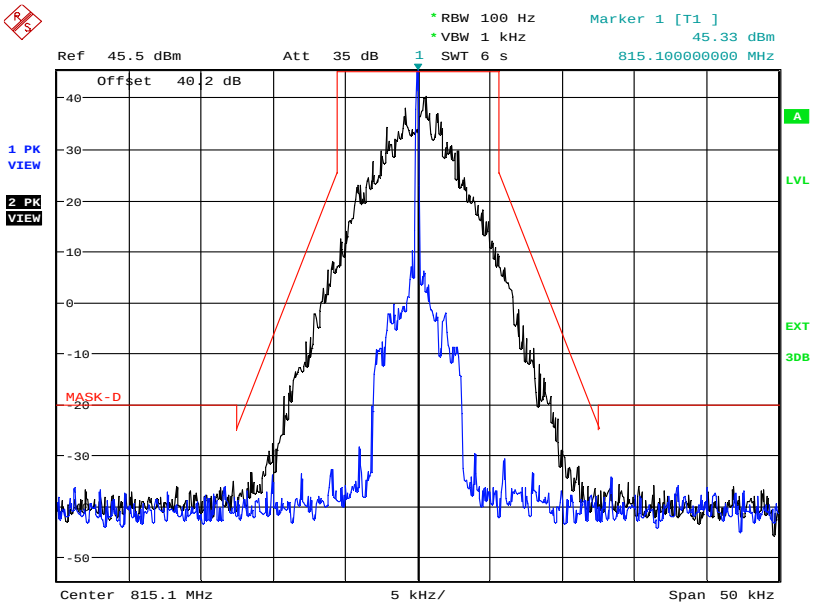
Date: 15.AUG.2023 10:22:47

5.8.7.8. Configuration: Mask D, Band 3: 806.1MHz, F1E&F1D, Digital, Low power Rule Part: IC



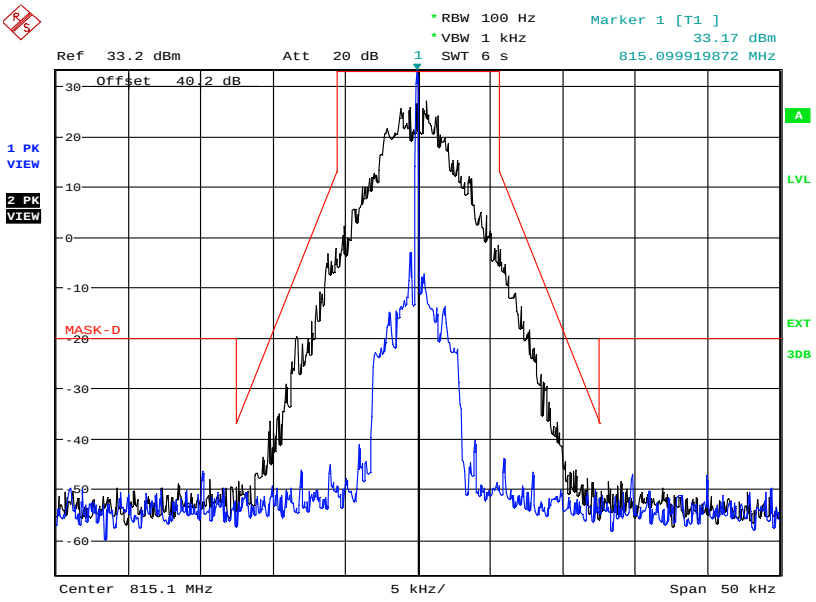
Date: 15.AUG.2023 11:39:26

5.8.7.9. Configuration: Mask D, Band 3: 815.1MHz, F1E&F1D, Digital, High power FCC 90.210 & IC



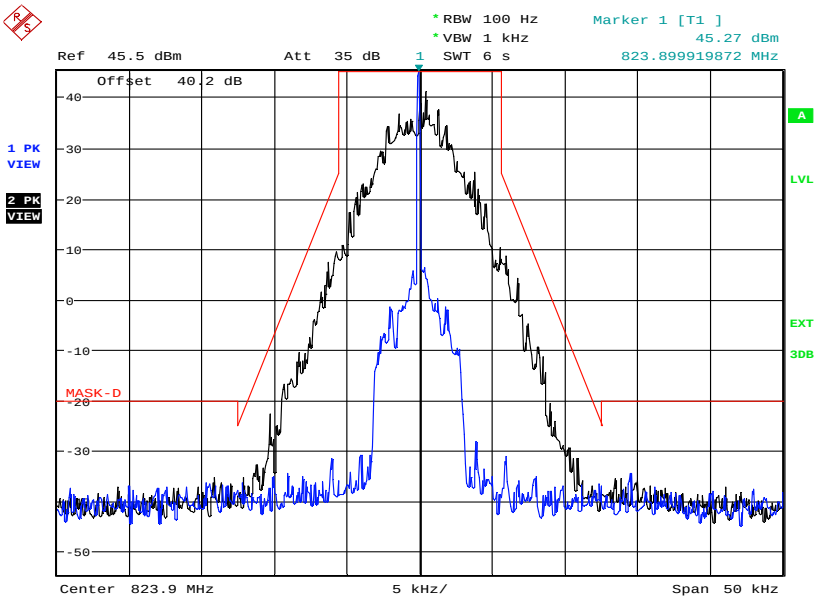
Date: 15.AUG.2023 10:31:17

5.8.7.10. Configuration: Mask D, Band 3: 815.1MHz, F1E&F1D, Digital, Lowh power FCC 90.210 & IC



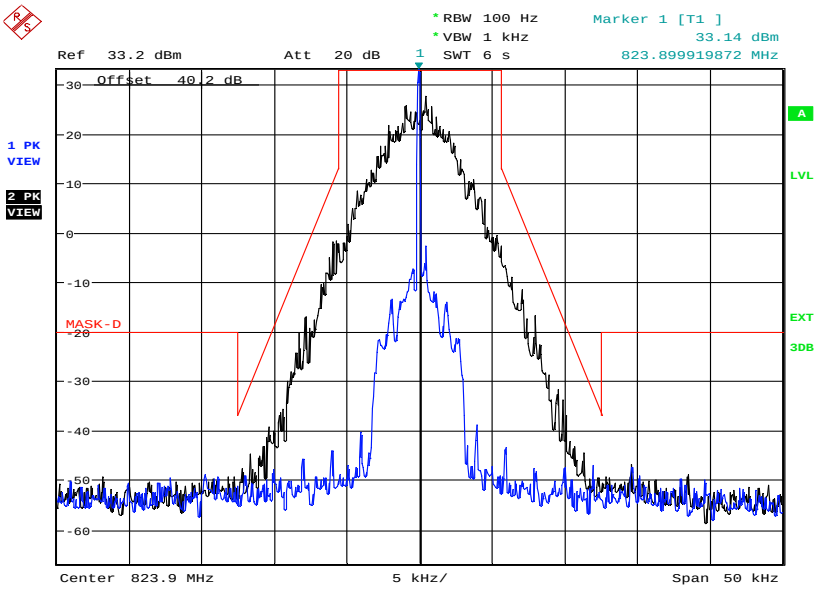
Date: 15.AUG.2023 11:50:42

5.8.7.11. Configuration: Mask D, Band 3: 823.9MHz, F1E&F1D, Digital, High power FCC 90.210 & IC



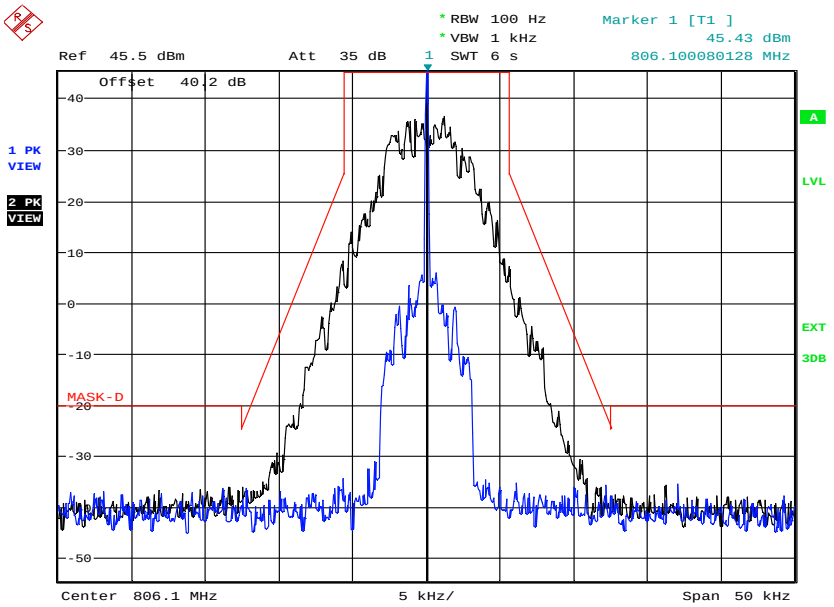
Date: 15.AUG.2023 10:41:07

5.8.7.12. Configuration: Mask D, Band 3: 823.9MHz, F1E&F1D, Digital,Low power FCC 90.210 & IC



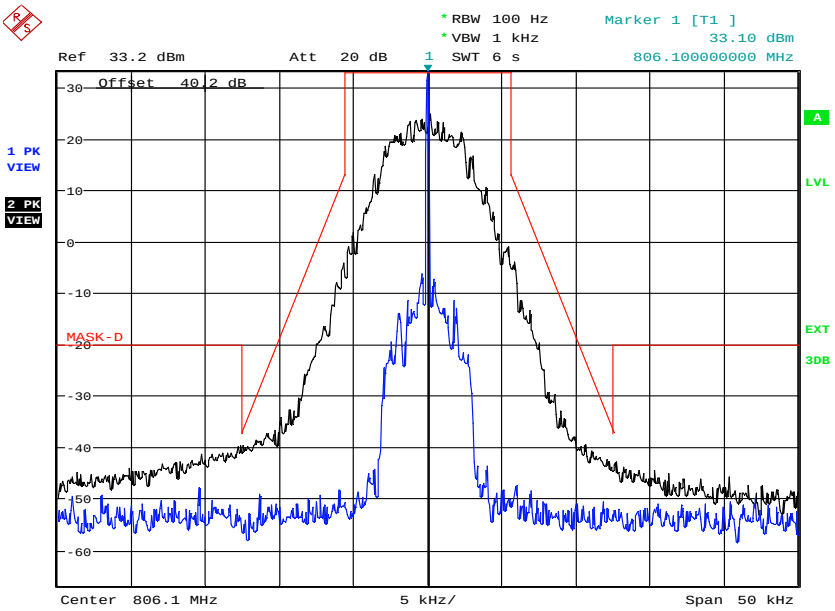
Date: 15.AUG.2023 12:00:09

5.8.7.13. Configuration: Mask D, Band 3: 806.1MHz, F1W, Digital, High power Rule Part: IC



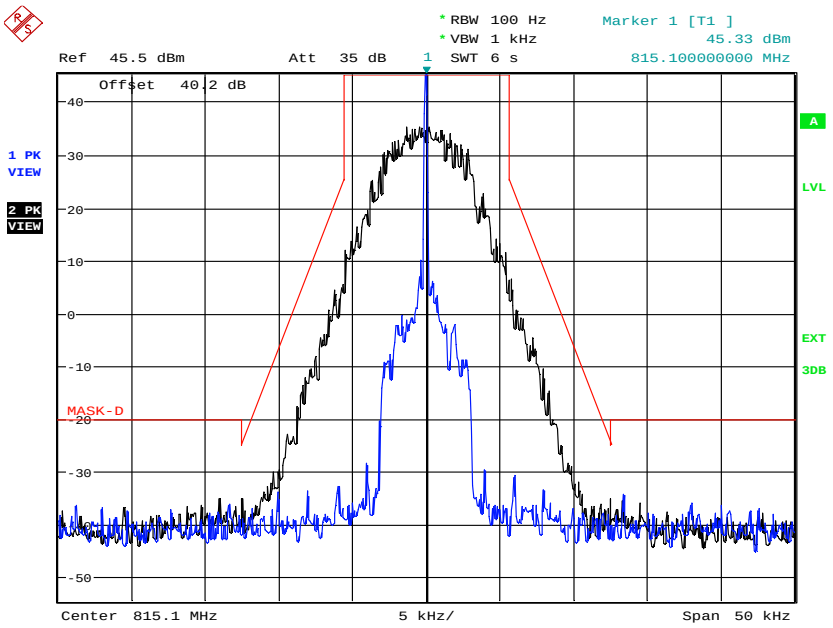
Date: 15.AUG.2023 10:25:20

5.8.7.14. Configuration: Mask D, Band 3: 806.1MHz, F1W, Digital, Low power Rule Part: IC



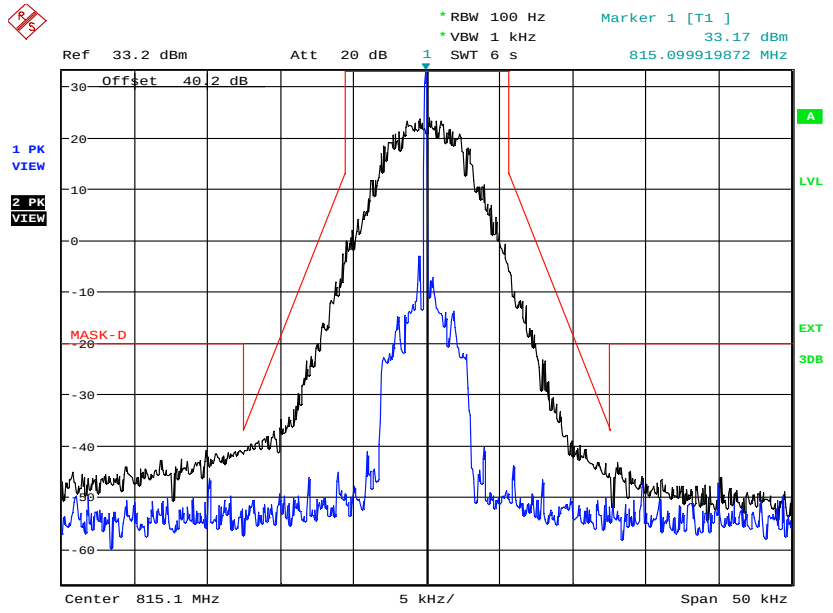
Date: 15.AUG.2023 11:42:07

5.8.7.15. Configuration: Mask D, Band 3: 815.1MHz, F1W, Digital, High power FCC 90.210 & IC



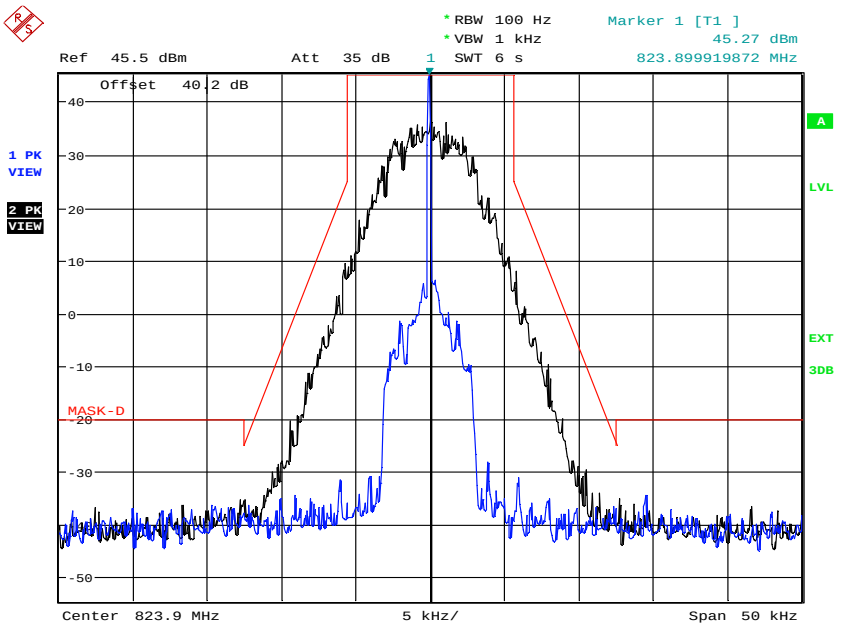
Date: 15.AUG.2023 10:32:52

5.8.7.16. Configuration: Mask D, Band 3: 815.1MHz, F1W, Digital, Low power FCC 90.210 & IC



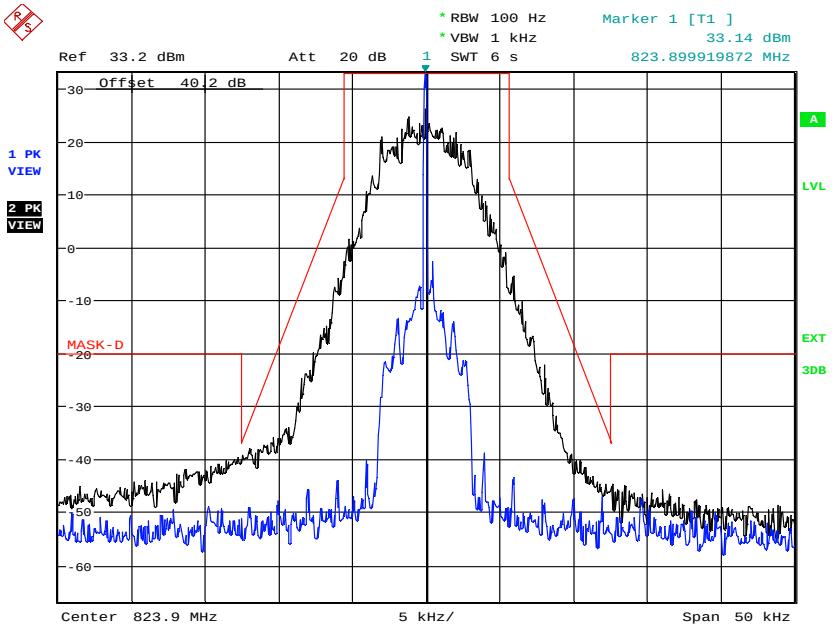
Date: 15.AUG.2023 11:55:14

5.8.7.17. Configuration: Mask D, Band 3: 823.9MHz, F1W, Digital, High power FCC 90.210 & IC



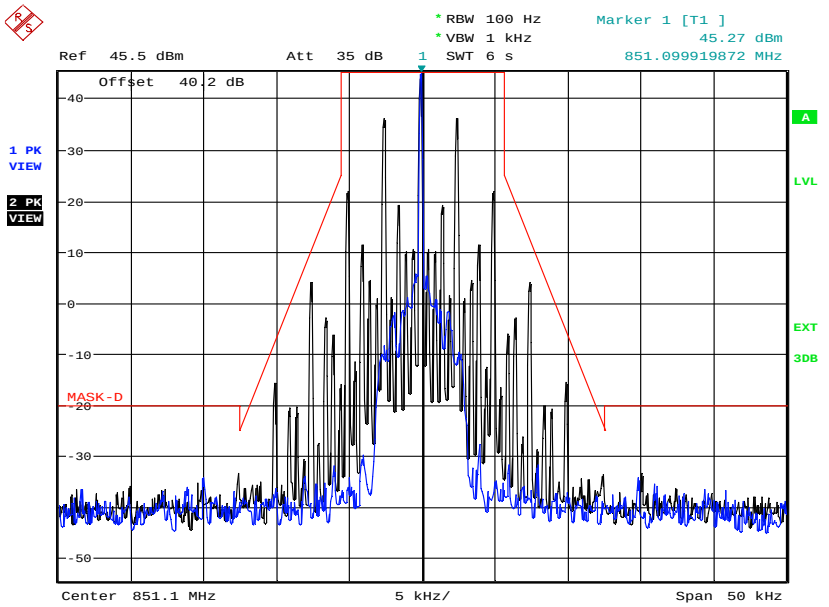
Date: 15.AUG.2023 10:42:56

5.8.7.18. Configuration: Mask D, Band 3: 823.9MHz, F1W, Digital, Low power FCC 90.210 & IC



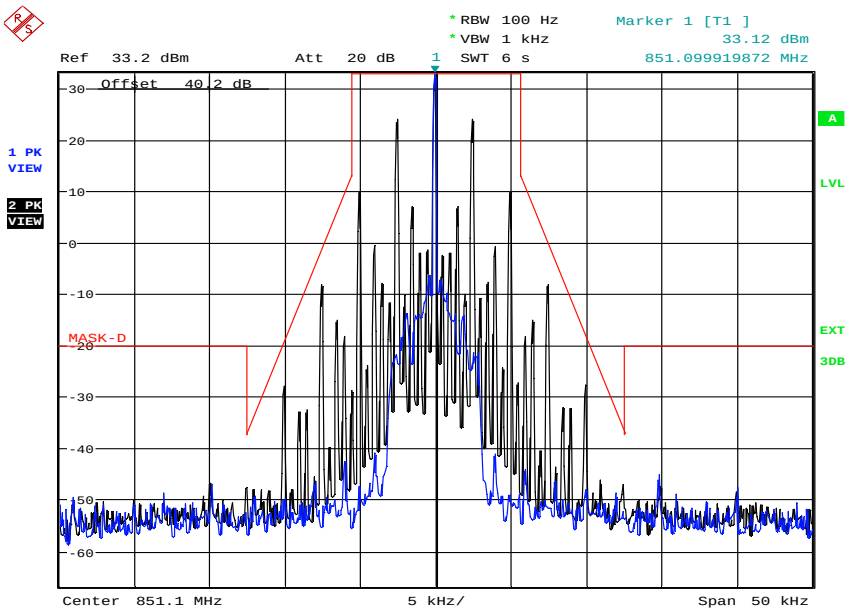
Date: 15.AUG.2023 12:02:01

5.8.7.19. Configuration: Mask D, Band 4: 851.1MHz, 12.5 KHz, Analog, High power Rule Part: IC



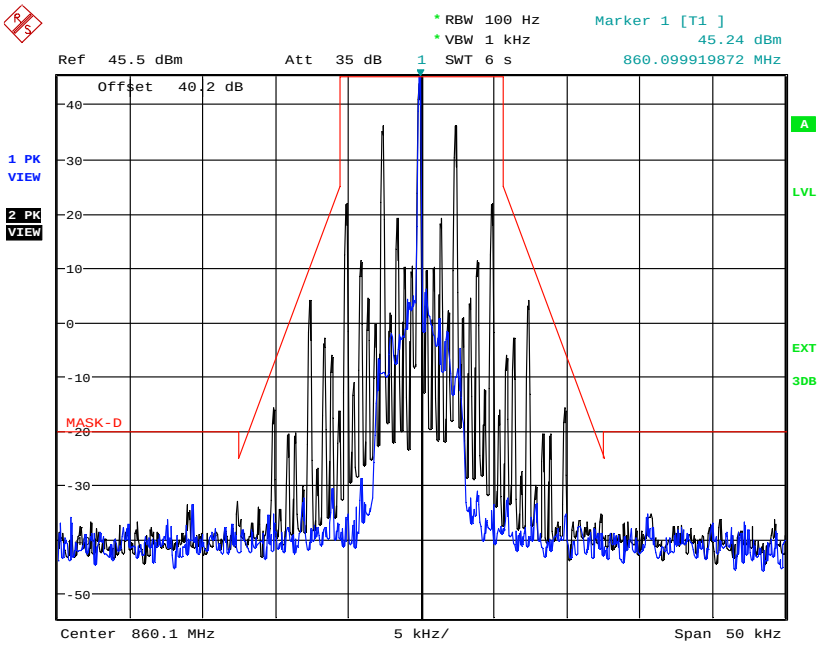
Date: 15.AUG.2023 10:53:03

5.8.7.20. Configuration: Mask D, Band 4: 851.1MHz, 12.5 KHz, Analog, Low power FCC 90.210 & IC



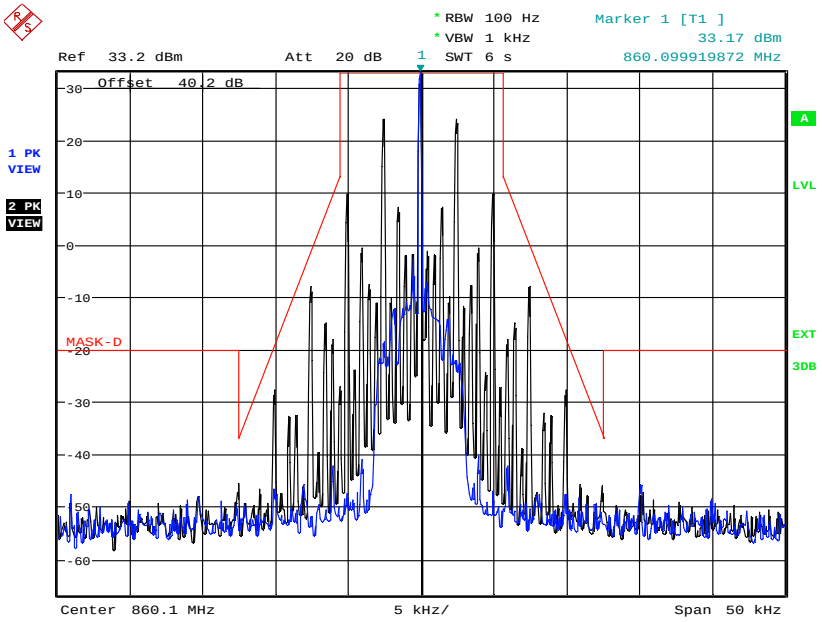
Date: 15.AUG.2023 12:06:28

5.8.7.21. Configuration: Mask D, Band 4: 860.1MHz, 12.5 KHz, Analog, High power FCC 90.210 & IC



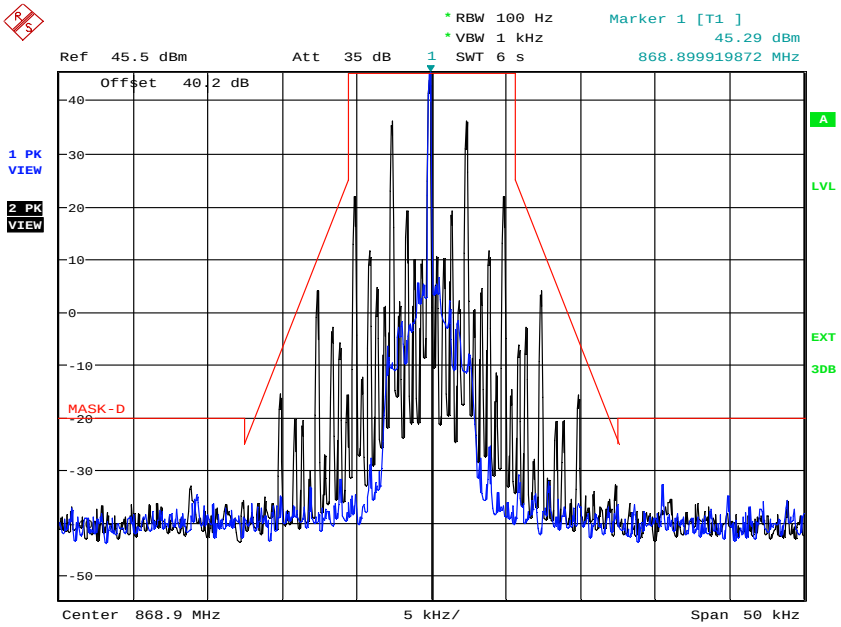
Date: 15.AUG.2023 11:12:01

5.8.7.22. Configuration: Mask D, Band 4: 860.1MHz, 12.5 KHz, Analog, Low power FCC 90.210 & IC



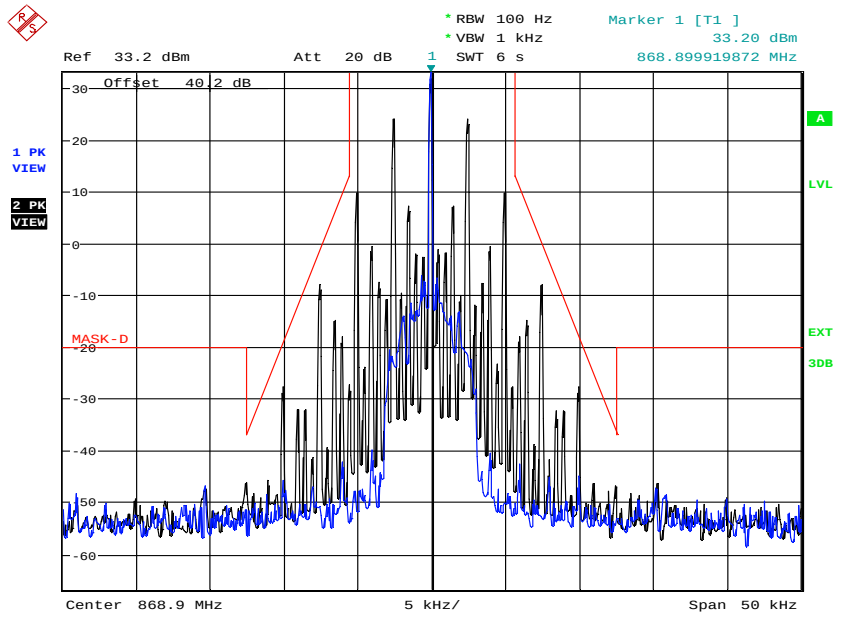
Date: 15.AUG.2023 12:15:55

5.8.7.23. Configuration: Mask D, Band 4: 868.9MHz, 12.5 KHz, Analog, High power FCC 90.210 & IC



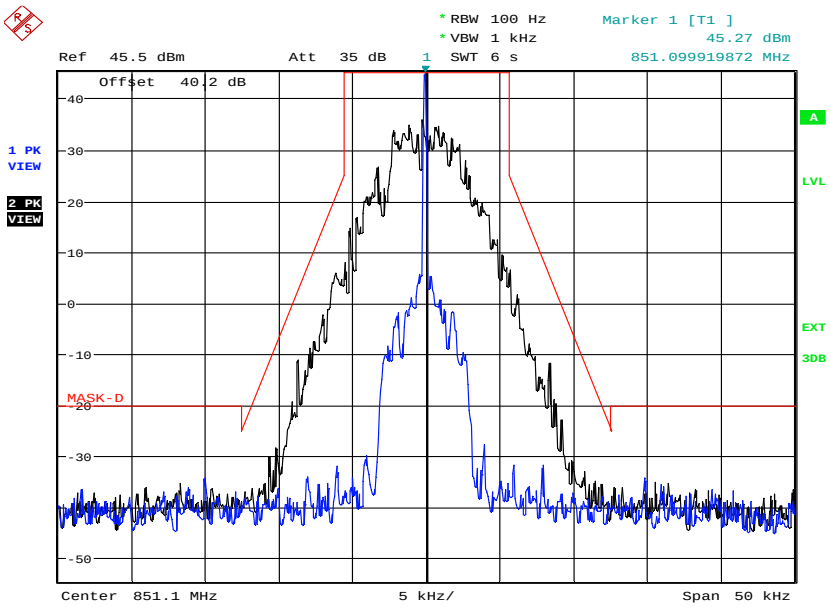
Date: 15.AUG.2023 11:23:25

5.8.7.24. Configuration: Mask D, Band 4: 868.9MHz, 12.5 KHz, Analog, Low power FCC 90.210 & IC



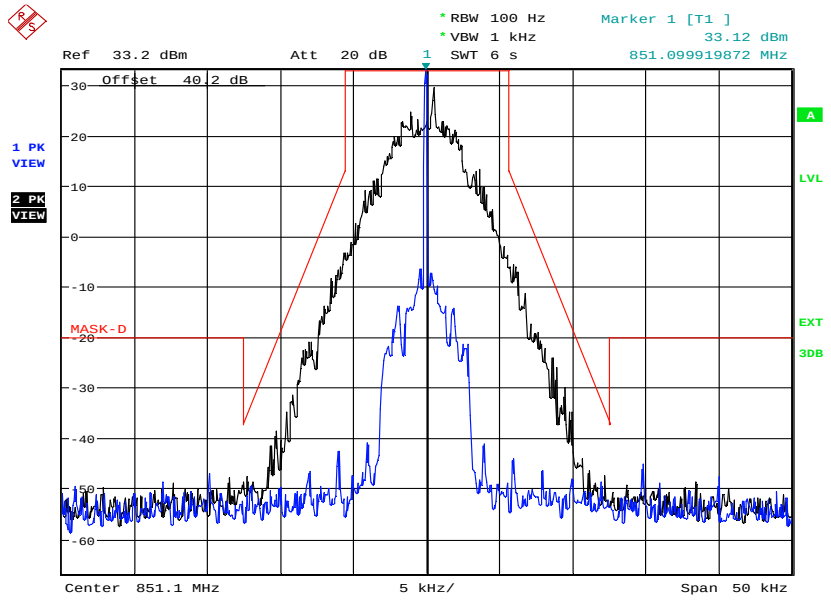
Date: 15.AUG.2023 12:22:12

5.8.7.25. Configuration: Mask D, Band 4: 851.1MHz, F1E&F1D, Digital, High power Rule Part: IC



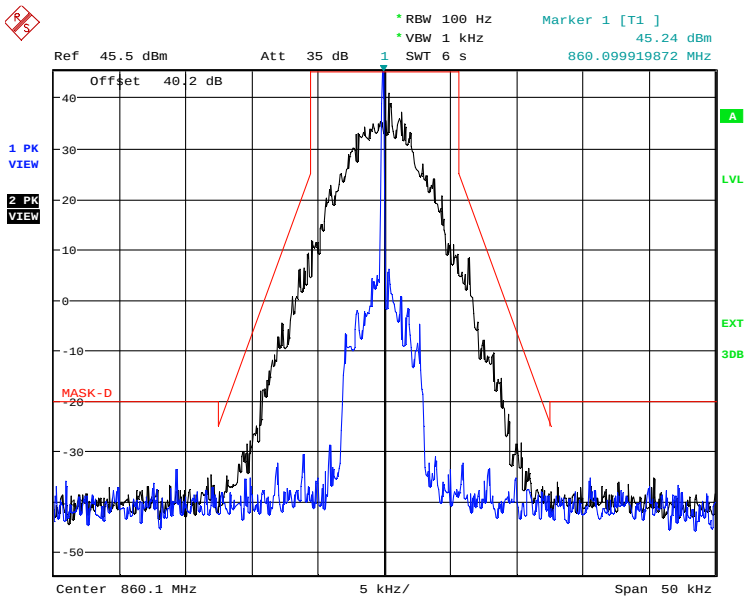
Date: 15.AUG.2023 10:54:33

5.8.7.26. Configuration: Mask D, Band 4: 851.1MHz, F1E&F1D, Digital, Low power FCC 90.210 & IC



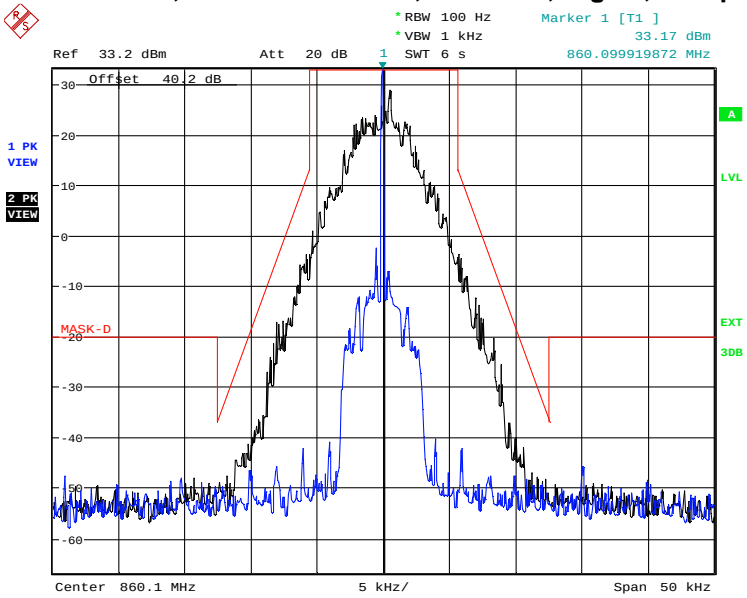
Date: 15.AUG.2023 12:07:55

5.8.7.27. Configuration: Mask D, Band 4: 860.1MHz, F1E&F1D, Digital, High power FCC 90.210 & IC



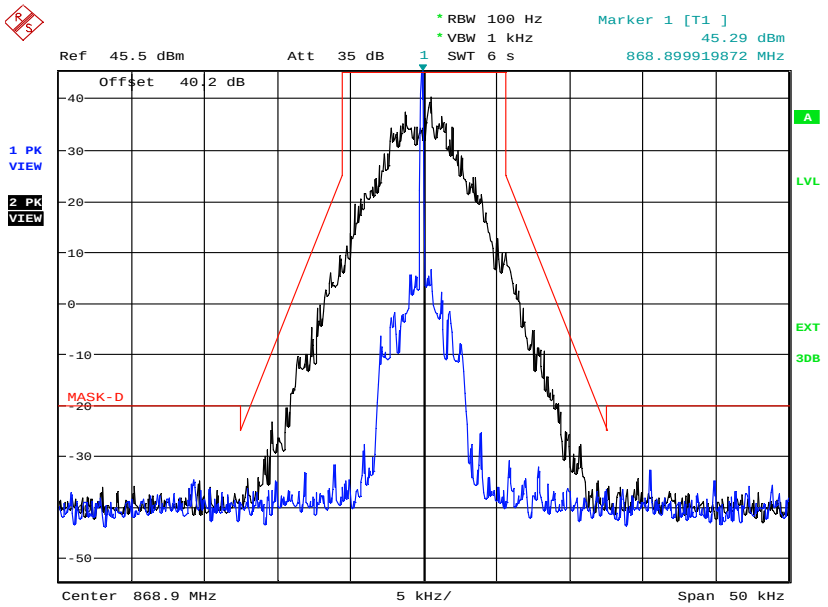
Date: 15.AUG.2023 11:13:30

5.8.7.28. Configuration: Mask D, Band 4: 860.1MHz, F1E&F1D, Digital, Low power FCC 90.210 & IC



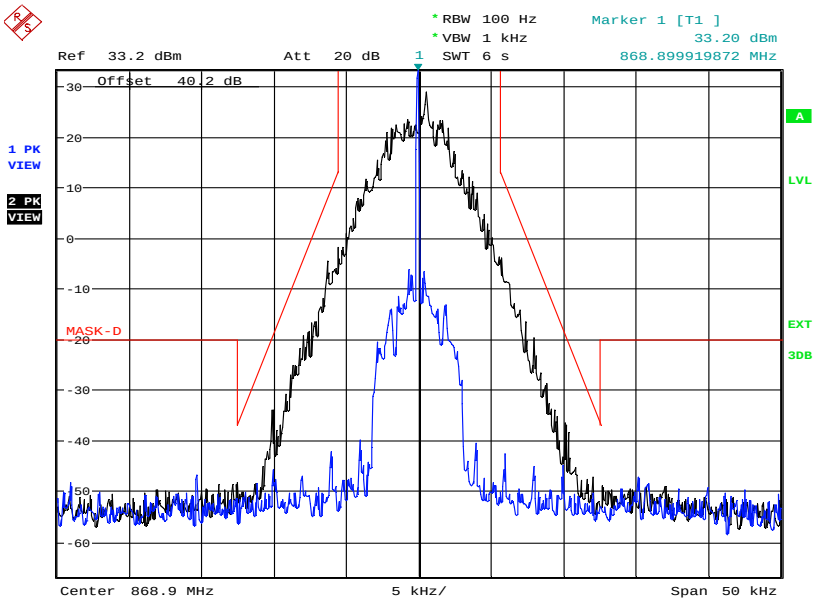
Date: 15.AUG.2023 12:17:21

5.8.7.29. Configuration: Mask D, Band 4: 868.9MHz, F1E&F1D, Digital, High power FCC 90.210 & IC



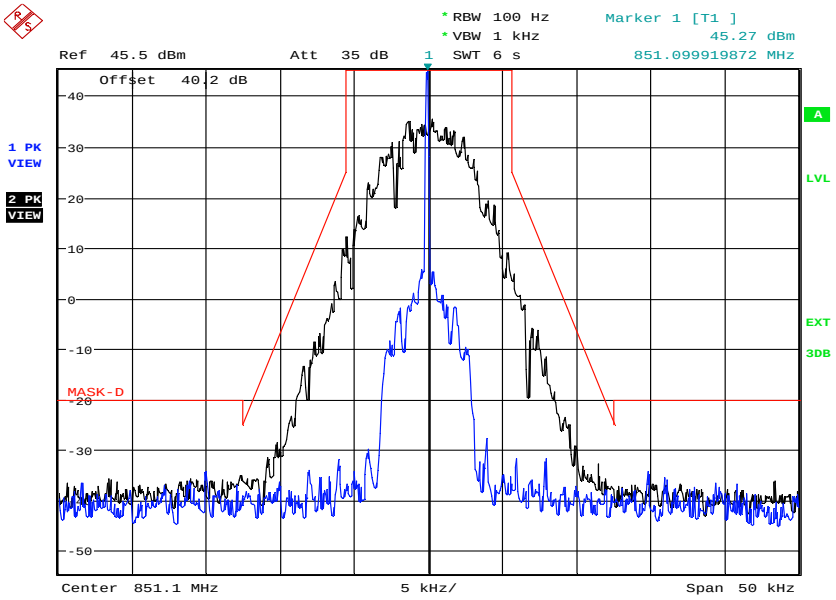
Date: 15.AUG.2023 11:25:35

5.8.7.30. Configuration: Mask D, Band 4: 868.9MHz, F1E&F1D, Digital, Digital, Low power FCC 90.210 & IC



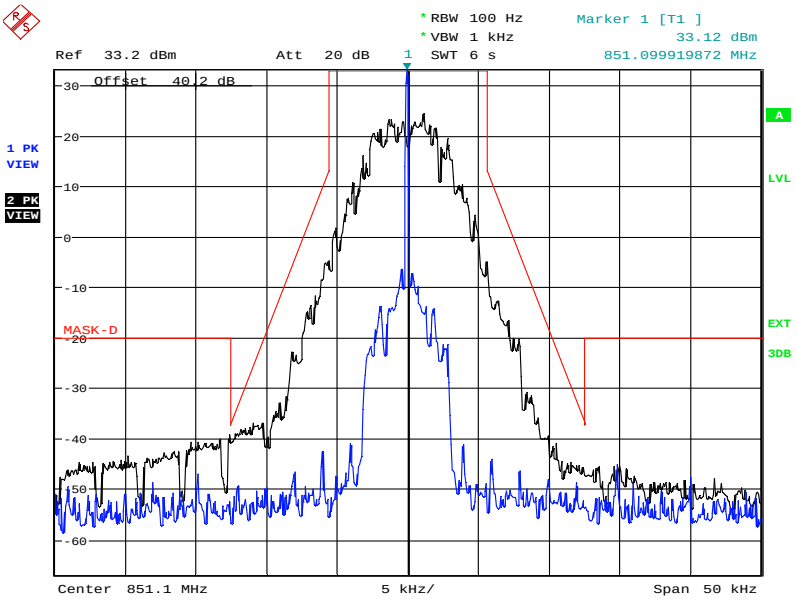
Date: 15.AUG.2023 12:23:32

5.8.7.31. Configuration: Mask D, Band 4: 851.1MHz, F1W, Digital, High power Rule Part: IC



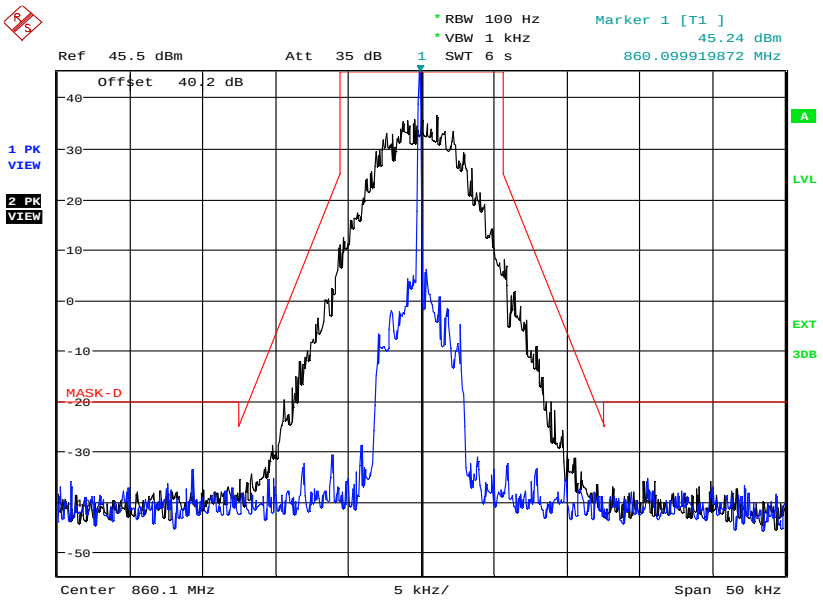
Date: 15.AUG.2023 11:04:18

5.8.7.32. Configuration: Mask D, Band 4: 851.1MHz, F1W, Digital, Digital, Low power FCC 90.210 & IC



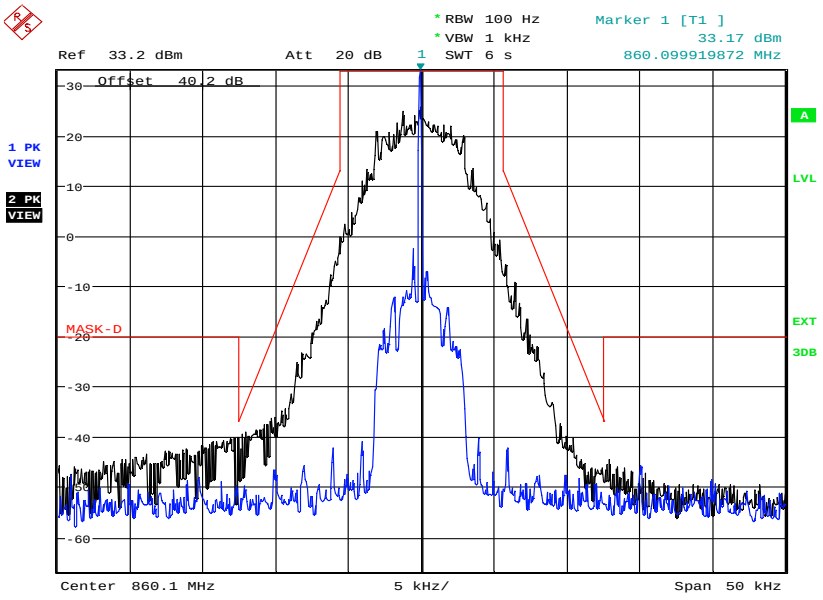
Date: 15.AUG.2023 12:12:42

5.8.7.33. Configuration: Mask D, Band 4: 860.1MHz, F1W, Digital, High power FCC 90.210 & IC



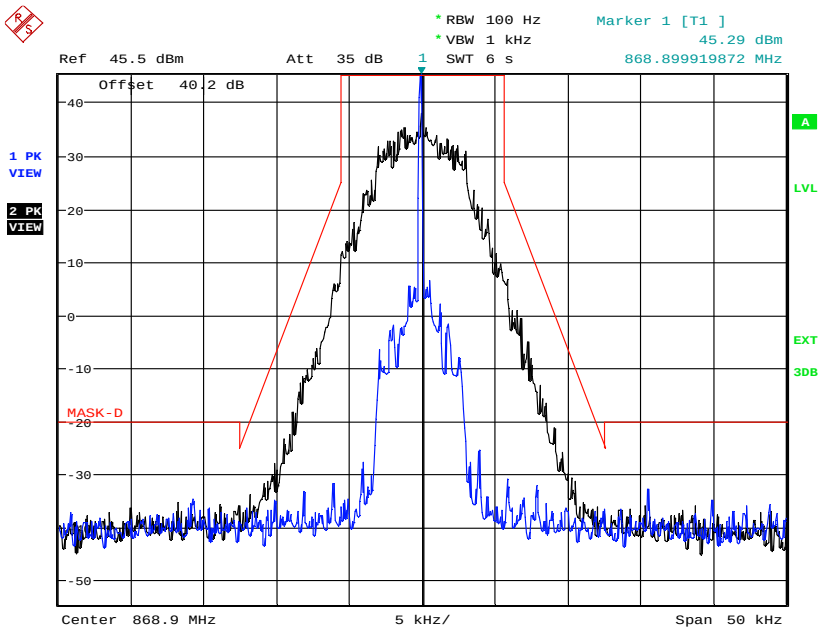
Date: 15.AUG.2023 11:16:56

5.8.7.34. Configuration: Mask D, Band 4: 860.1MHz, F1W, Digital, Digital, Low power FCC 90.210 & IC



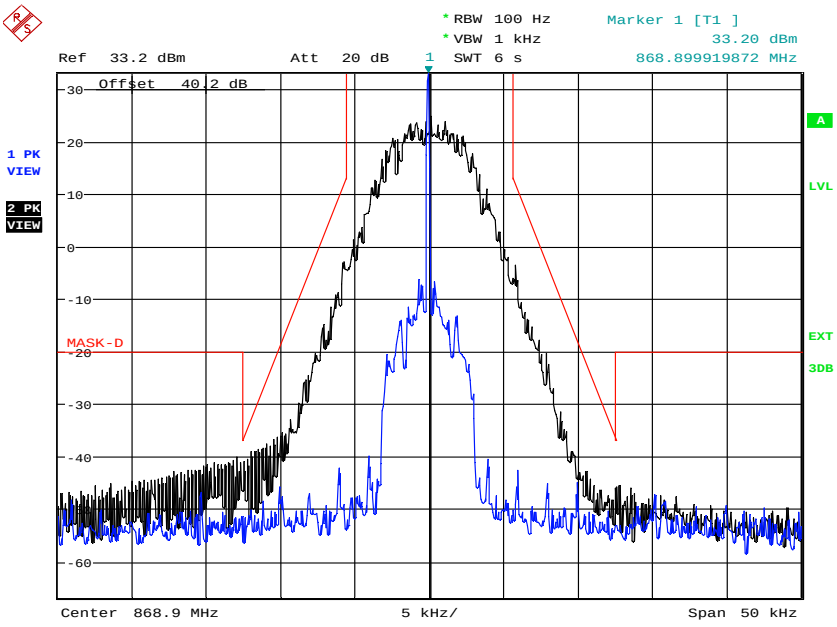
Date: 15.AUG.2023 12:19:21

5.8.7.35. Configuration: Mask D, Band 4: 868.9MHz, F1W, Digital, High power FCC 90.210 & IC



Date: 15.AUG.2023 11:28:04

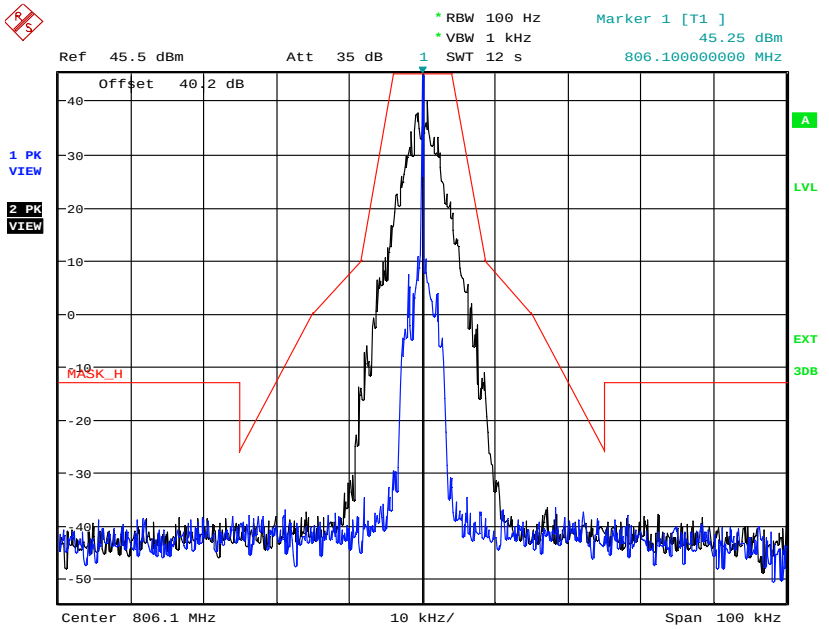
5.8.7.36. Configuration: Mask D, Band 4: 868.9MHz, F1W, Digital, Digital, Low power FCC 90.210 & IC



Date: 15.AUG.2023 12:25:25

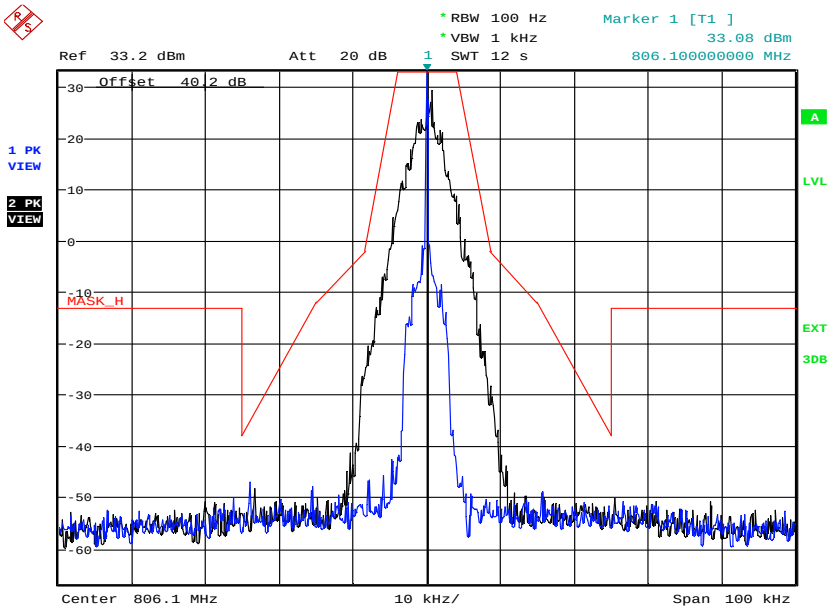
5.8.8. Test Data- EMISSION MASKS- MASK H

5.8.8.1. Configuration: Mask H, Sub Band 3: 806-809MHz, 806.1MHz, F1E&F1D, Digital, High power



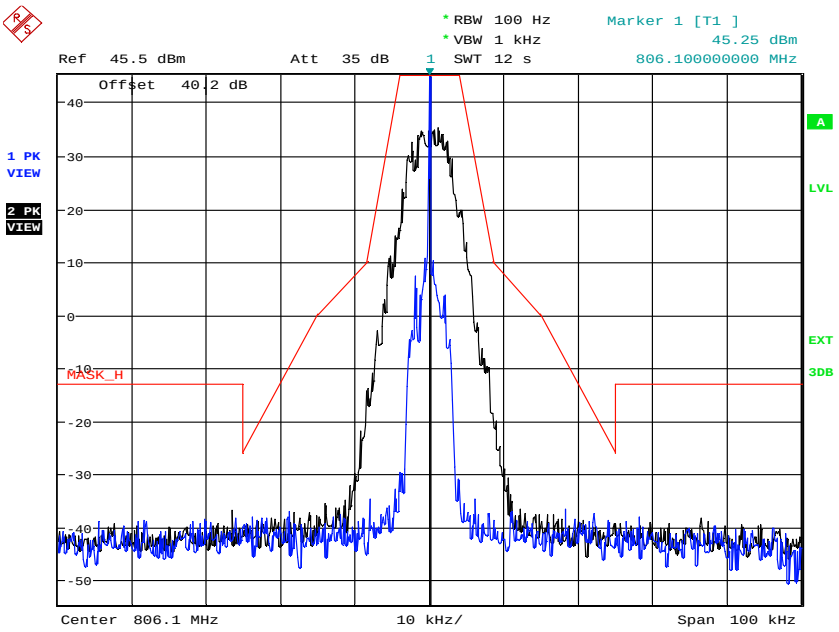
Date: 15.AUG.2023 12:33:25

5.8.8.2. Configuration: Mask H, Sub Band 3: 806-809MHz, 806.1MHz, F1E&F1D, Digital, Low power



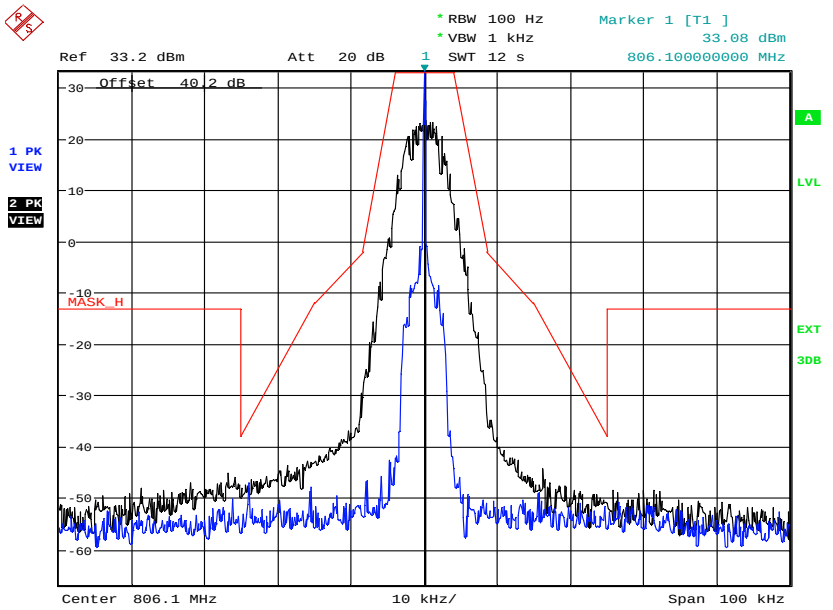
Date: 15.AUG.2023 12:52:08

5.8.8.3. Configuration: Mask H, Sub Band 3: 806-809MHz, 806.1MHz, F1W, Digital, High power



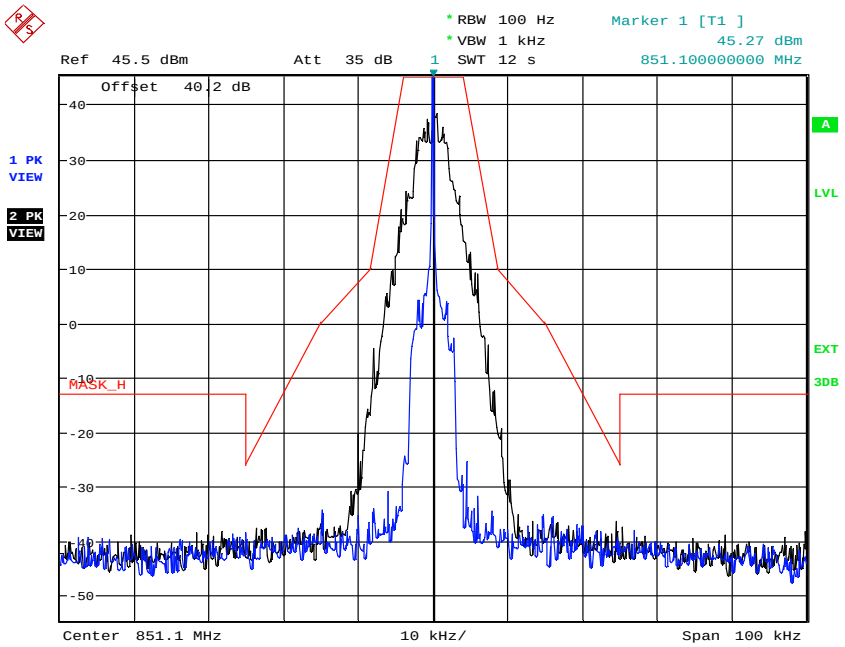
Date: 15.AUG.2023 12:35:49

5.8.8.4. Configuration: Mask H, Sub Band 3: 806-809MHz, 806.1MHz, F1W, Digital, Low power



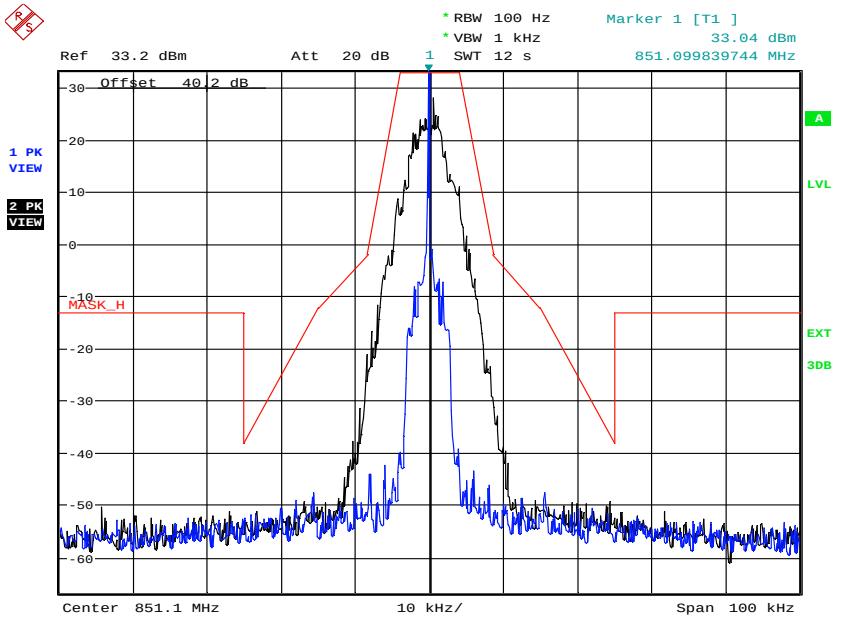
Date: 15.AUG.2023 12:54:11

5.8.8.5. Configuration: Mask H, Sub Band 4: 851-854MHz, 851.1MHz, F1E&F1D, Digital, High power



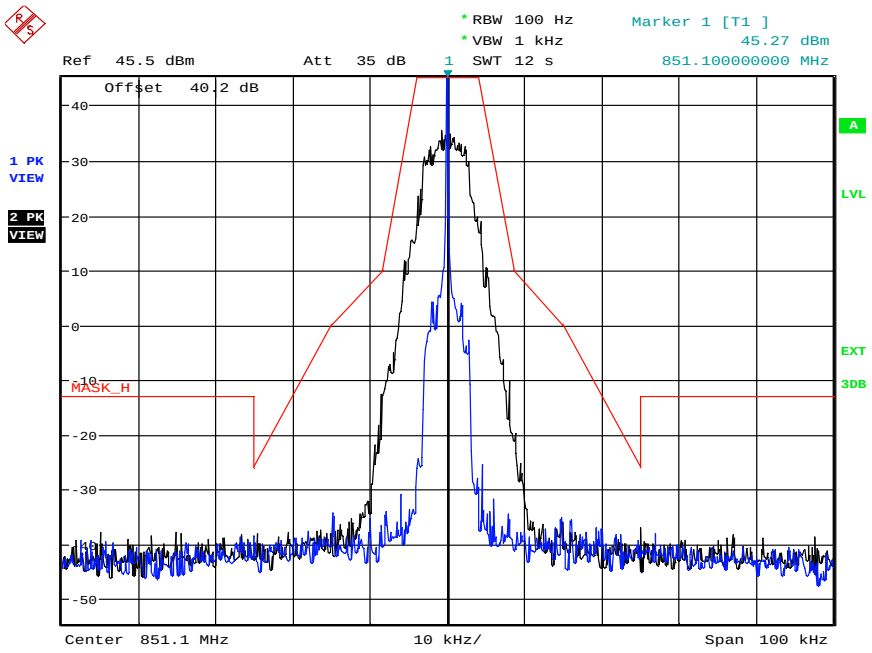
Date: 15.AUG.2023 12:44:15

5.8.8.6. Configuration: Mask H, Sub Band 4: 851-854MHz, 851.1MHz, F1E&F1D, Digital, Low power



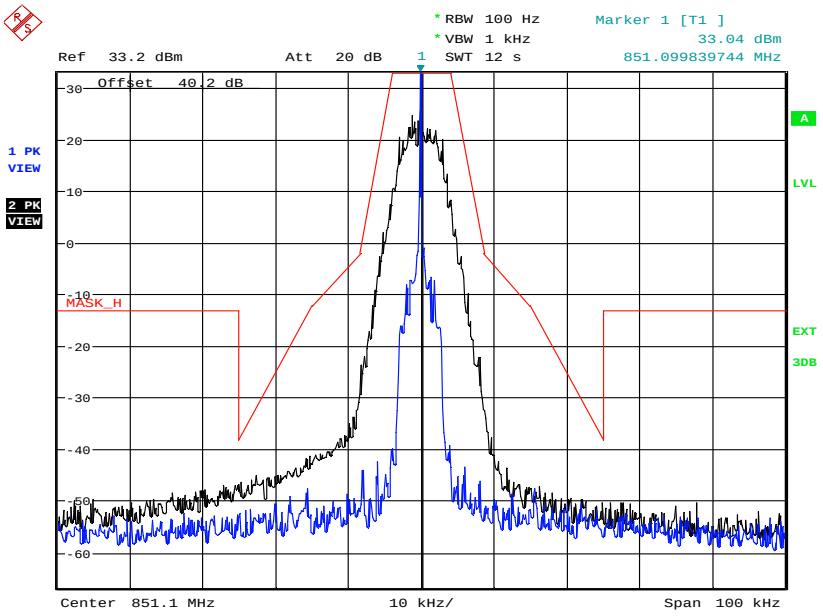
Date: 15.AUG.2023 12:57:33

5.8.8.7. Configuration: Mask H, Sub Band 4: 851-854MHz, 851.1MHz, F1W, Digital, High power



Date: 15.AUG.2023 12:46:03

5.8.8.8. Configuration: Mask H, Sub Band 4: 851-854MHz, 851.1MHz, F1W, Digital, Low power



Date: 15.AUG.2023 12:59:57

5.9. TRANSMITTER ANTENNA POWER SPURIOUS/HARMONIC CONDUCTED EMISSIONS [§ 2.1051, 2.1057, 22.359, & 90.210] [RSS-119, § 5.5 & 5.8]

5.9.1. Limits

Emissions shall be attenuated below the mean output power of the transmitter as follows:

FCC Rules	Attenuation Limit (dBc)
§ 90.210(b)	At least 43 + 10 log (P) dB.
§ 90.210(d)	At least 50 + 10 log (P) dB or 70 dB, whichever is the lesser attenuation.
§ 90.543(b)	At least 43 + 10 log (P) dB

RSS-119: Emissions shall be attenuated below the mean output power of the transmitter as follows:

RSS-119, Issue 12 Tables 6 & 7	Frequency Range	Attenuation Limit (dBc)
Mask D	30 MHz or lowest radio frequency signal generated in the device to the tenth harmonic of the highest fundamental frequency.	At least 50 + 10 log (P) dB or 70 dB, whichever is the lesser attenuation.
Mask E	30 MHz or lowest radio frequency signal generated in the device to the tenth harmonic of the highest fundamental frequency.	At least 55 + 10 log (P) or 65 dB, whichever is the lesser attenuation.
Mask B	30 MHz or lowest radio frequency signal generated in the device to the tenth harmonic of the highest fundamental frequency.	At least 43 + 10 log (P).

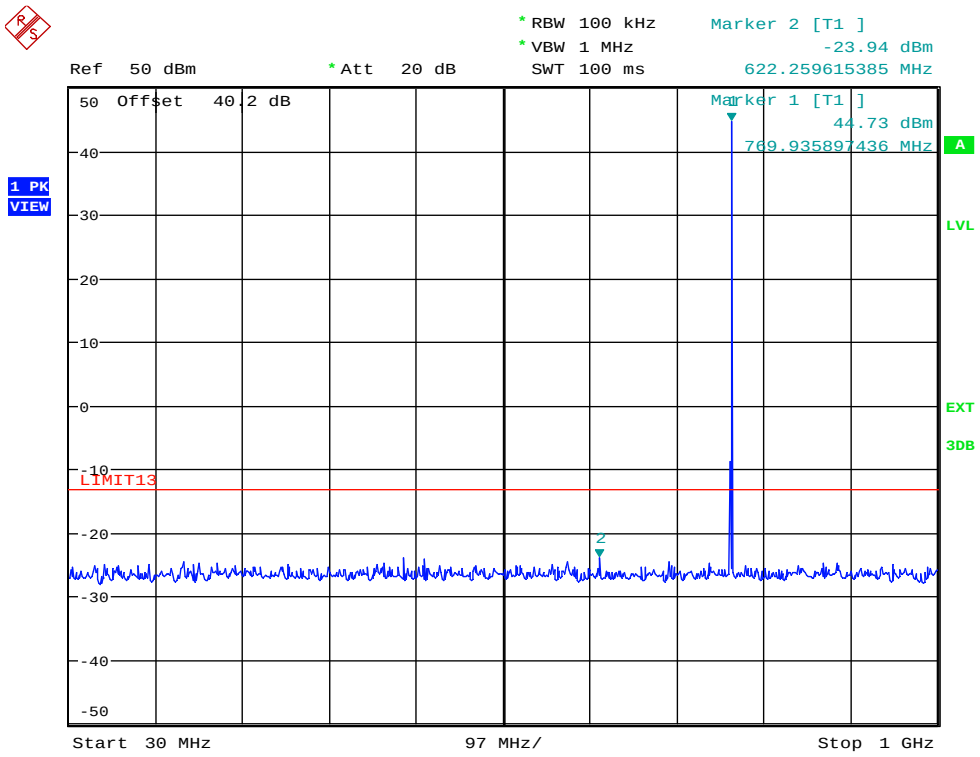
5.9.2. Method of Measurements

Refer to Section 8.5 of this report for measurement details

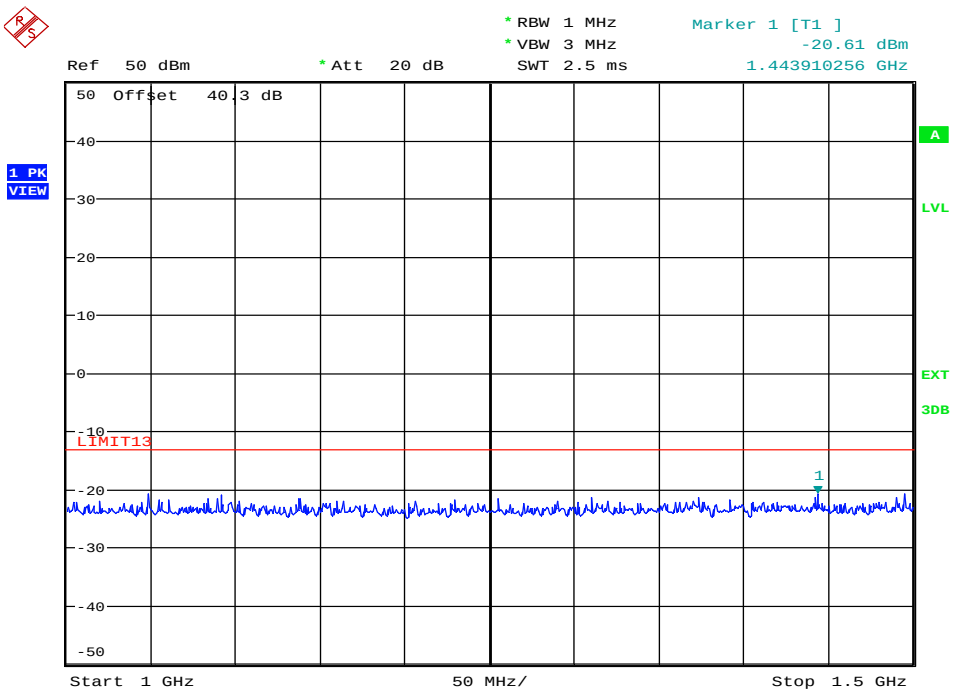
5.9.3. Test Data

Note: There was no difference in spurious/harmonic emissions on the pre-scans for different channel spacing and modulation types. Therefore, the rf spurious/harmonic emissions in this section would be performed for Digital modulation with 12.5 kHz channel spacing F1W Digital. The frequencies were investigated from 30 MHz- 9 GHz.

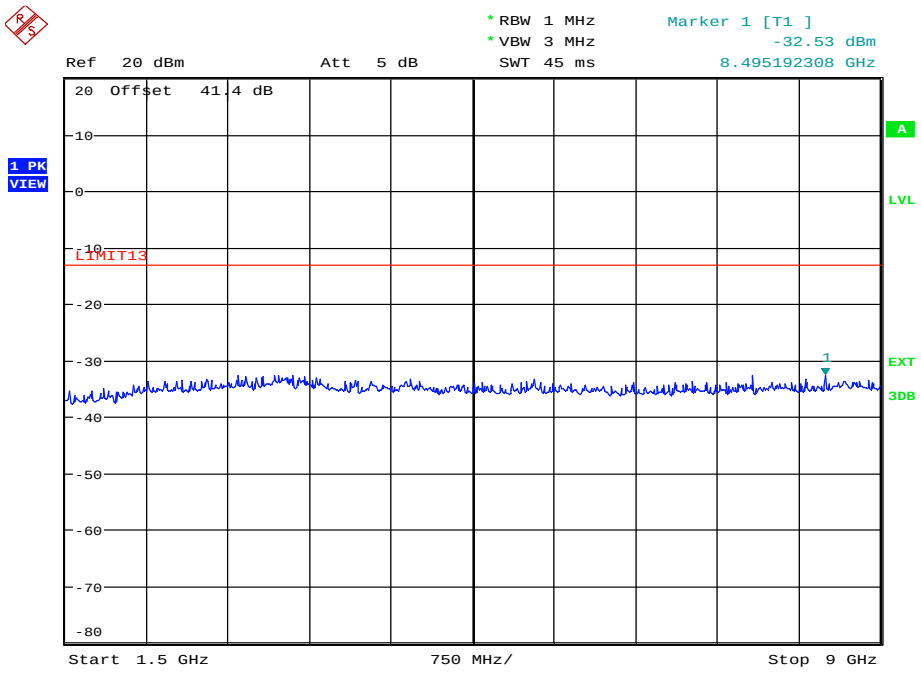
5.9.3.1. Configuration: Tx Conducted Emission, Band 1: 769-775MHz, 769.1MHz, F1W, Digital, High power



Date: 15.AUG.2023 14:17:45

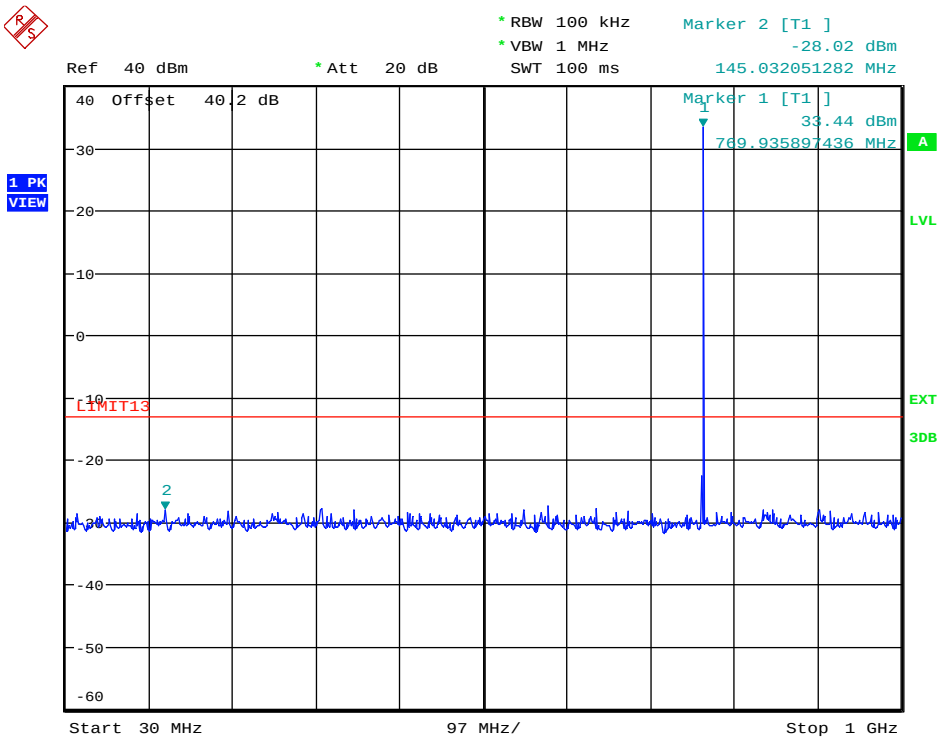


Date: 15.AUG.2023 14:42:05

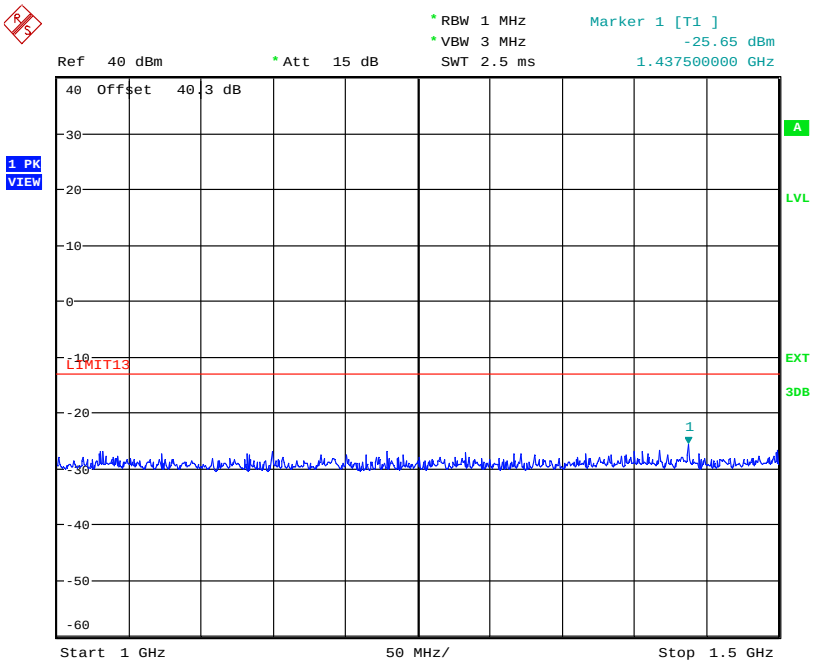


Date: 15.AUG.2023 14:49:13

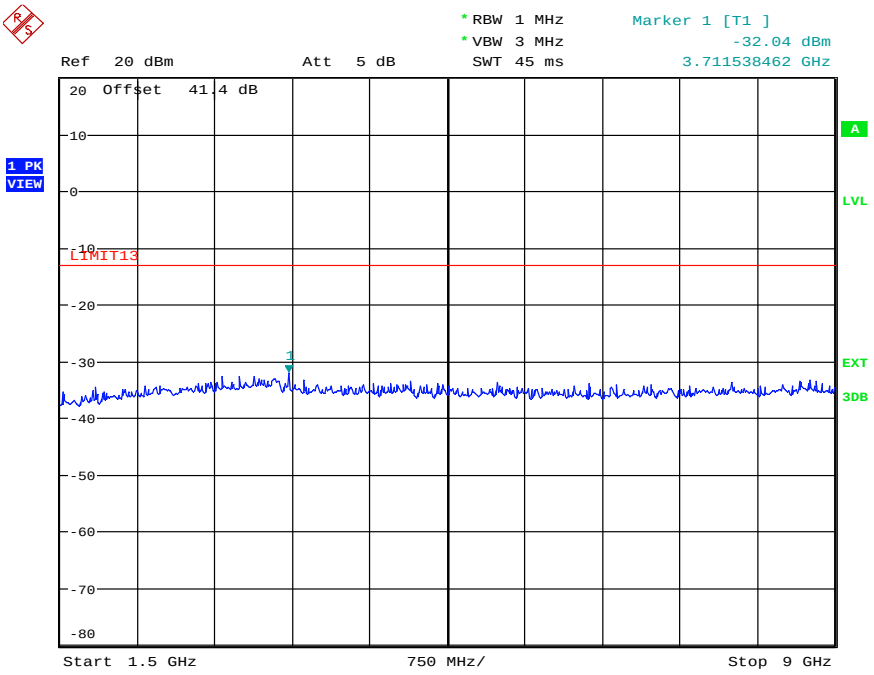
5.9.3.2. Configuration: Tx Conducted Emission, Band 1: 769-775MHz, 769.1MHz, F1W, Digital, Low power



Date: 15.AUG.2023 15:55:55

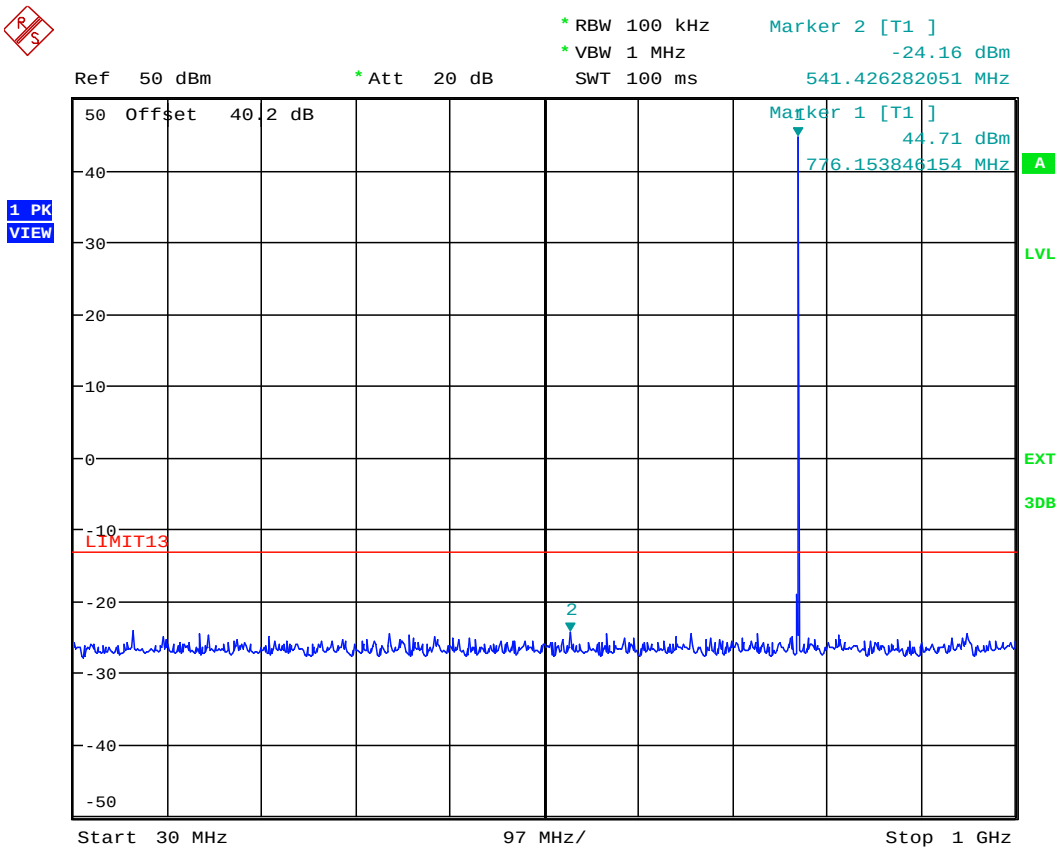


Date: 15.AUG.2023 15:38:47

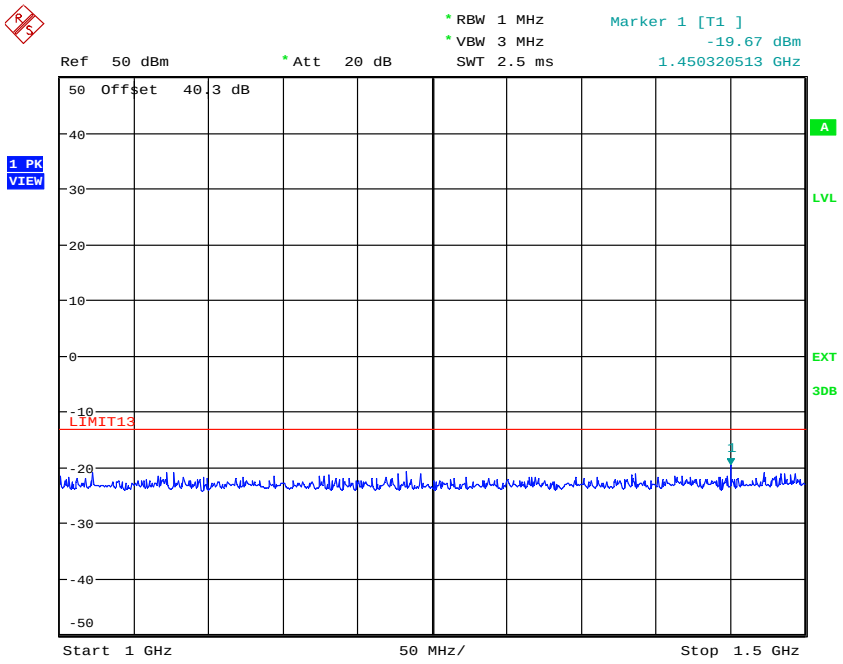


Date: 15.AUG.2023 15:31:50

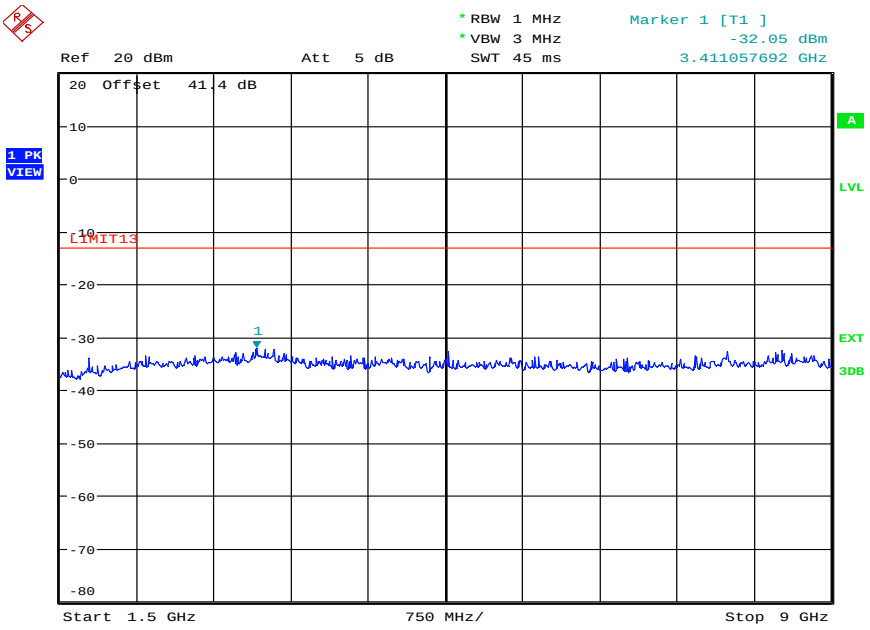
5.9.3.3. Configuration: Tx Conducted Emission, Band 1: 769-775MHz, 774.9MHz, F1W, Digital, High power



Date: 15.AUG.2023 14:16:55

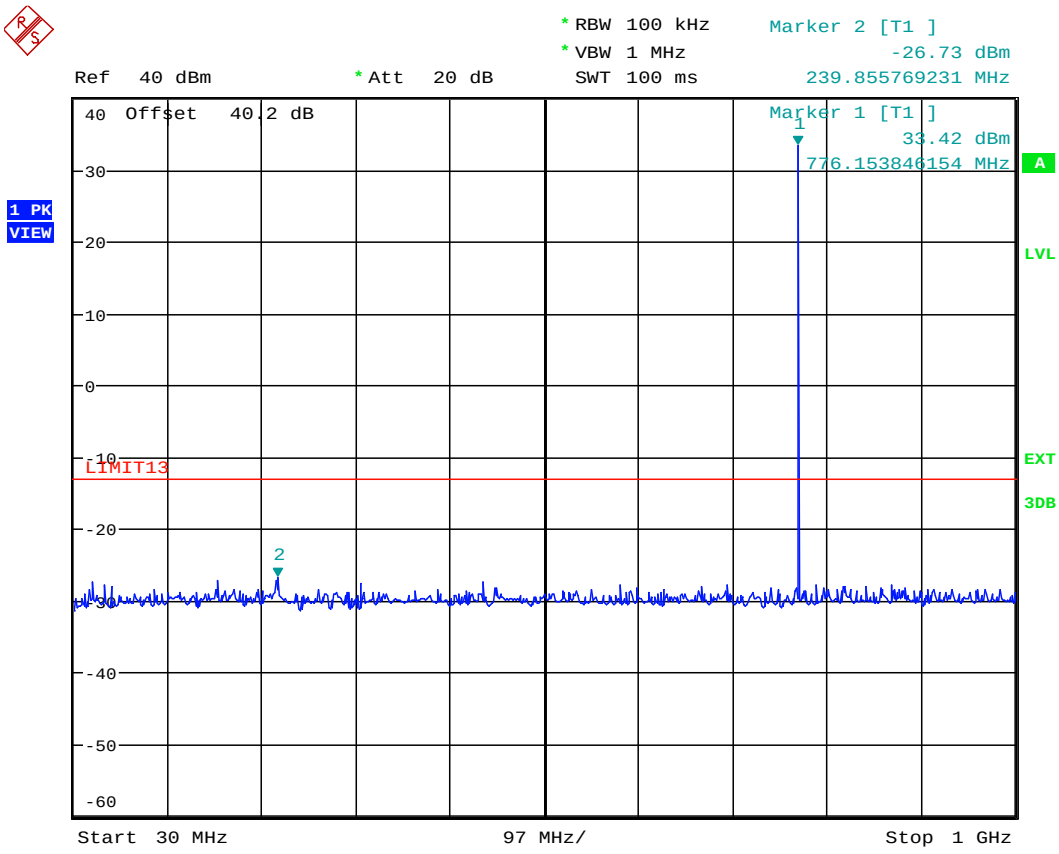


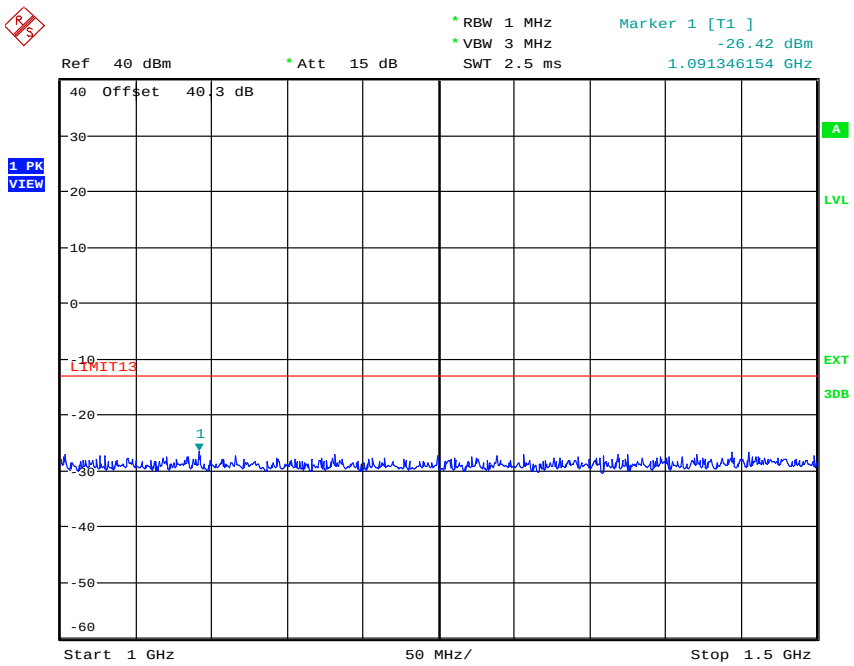
Date: 15.AUG.2023 14:42:45



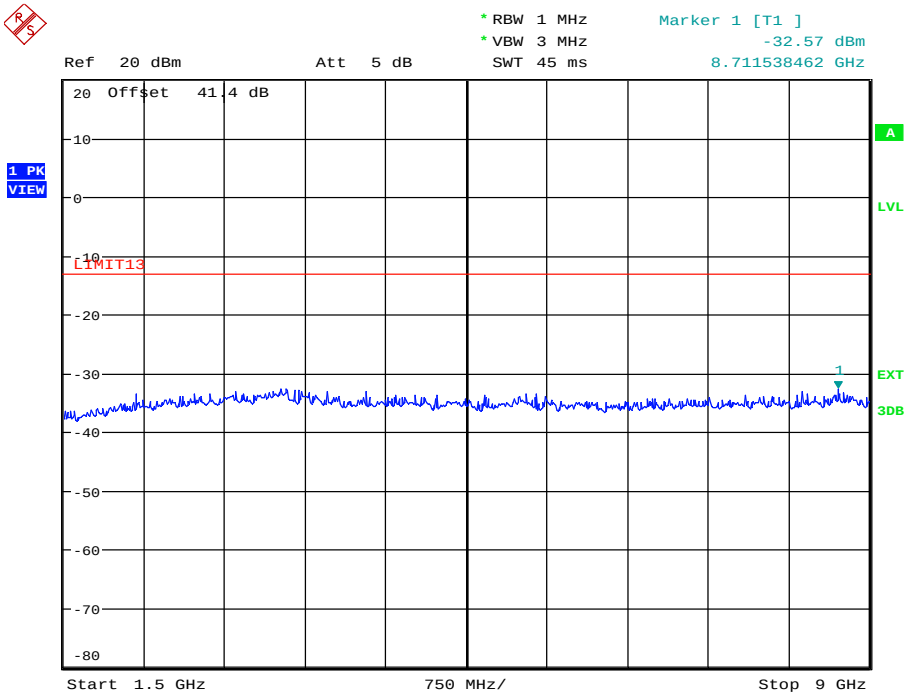
Date: 15.AUG.2023 14:50:27

5.9.3.4. Configuration: Tx Conducted Emission, Band 1: 769-775MHz, 774.9MHz, F1W, Digital, Low power



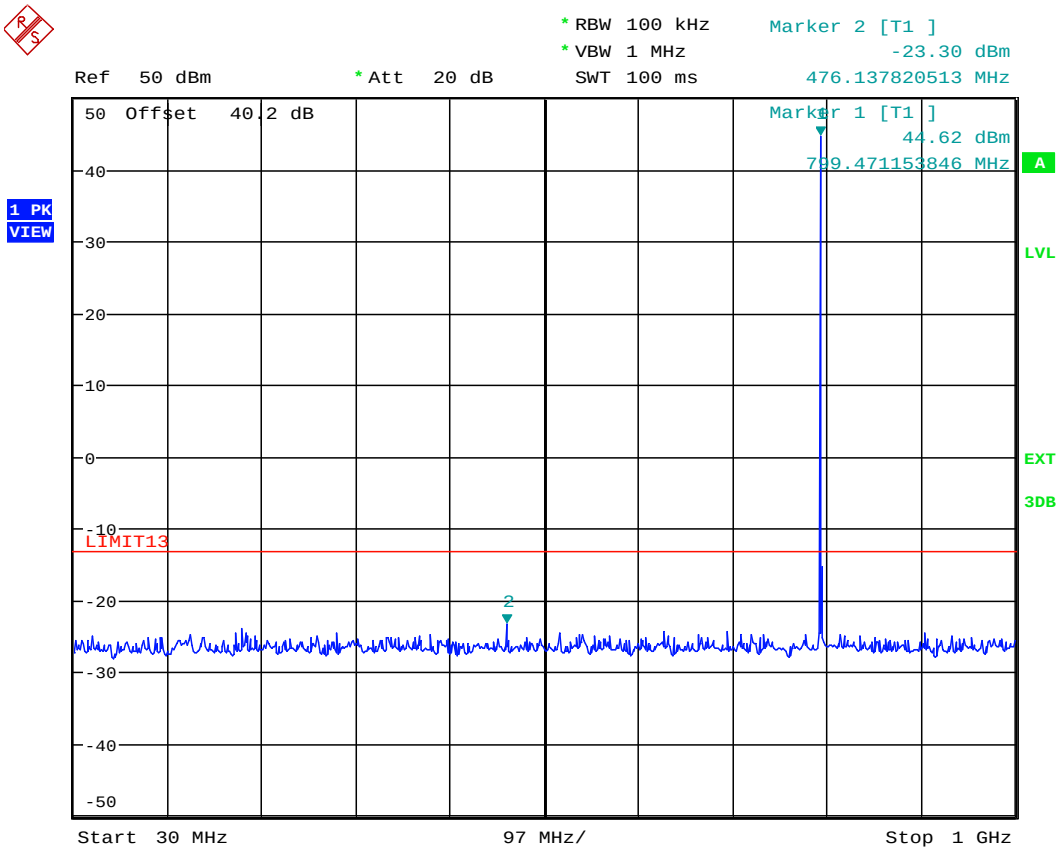


Date: 15.AUG.2023 15:39:54

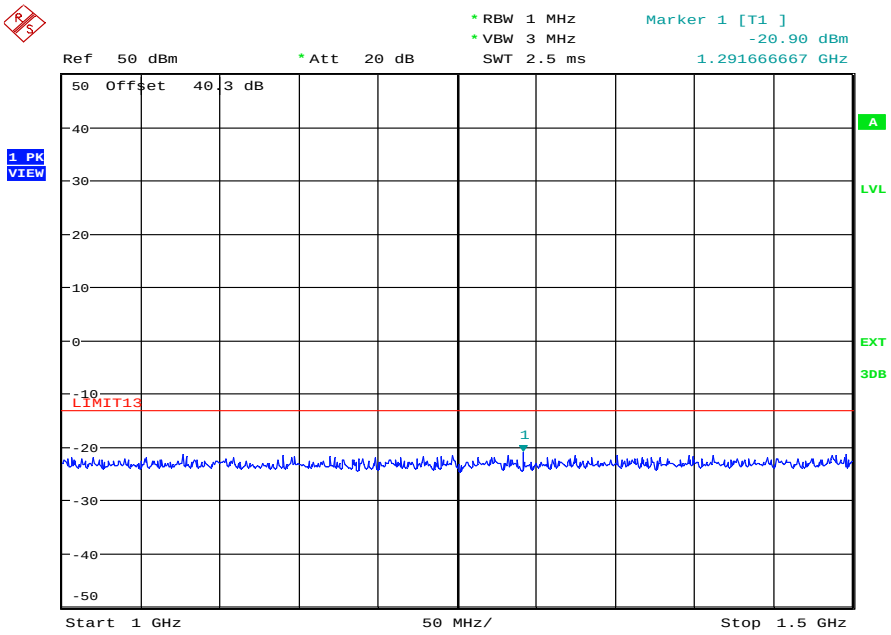


Date: 15.AUG.2023 15:32:28

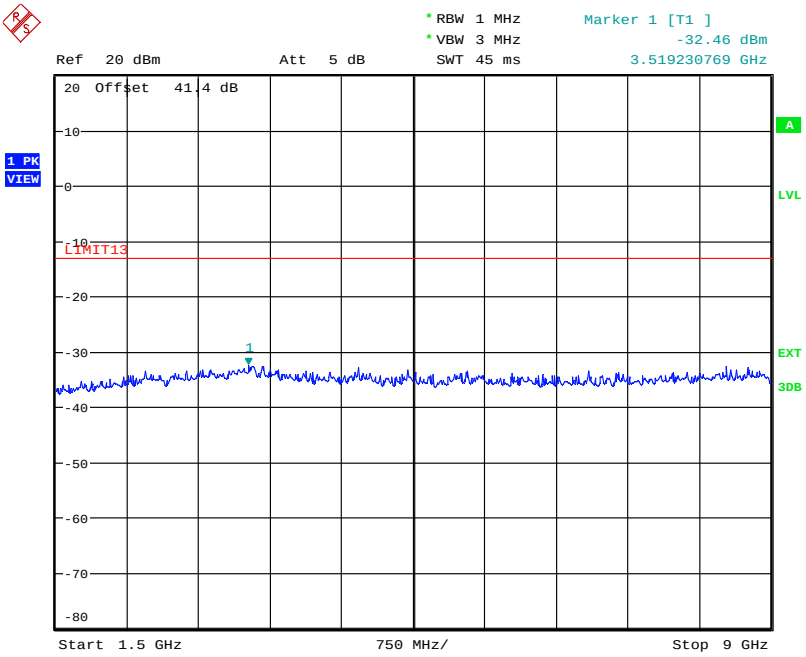
5.9.3.5. Configuration: Tx Conducted Emission, Band 2: 799-805MHz, 799.1MHz, F1W, Digital, High power



Date: 15.AUG.2023 14:19:21

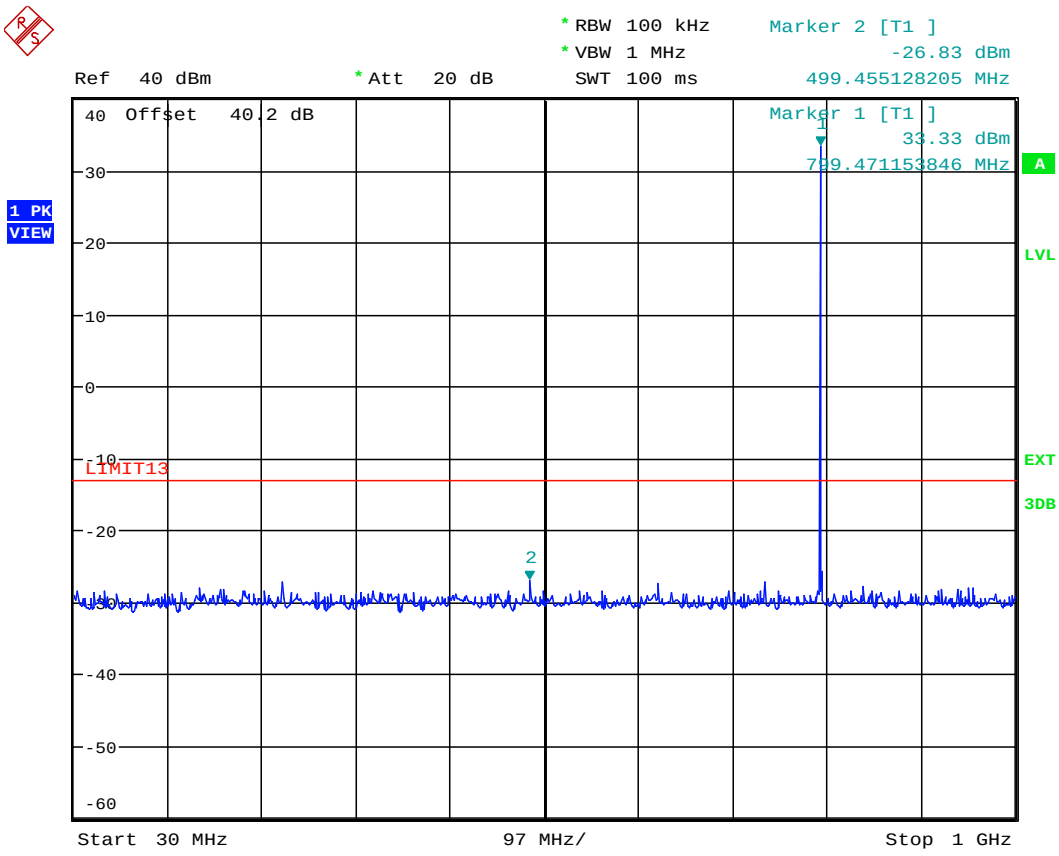


Date: 15.AUG.2023 14:43:28

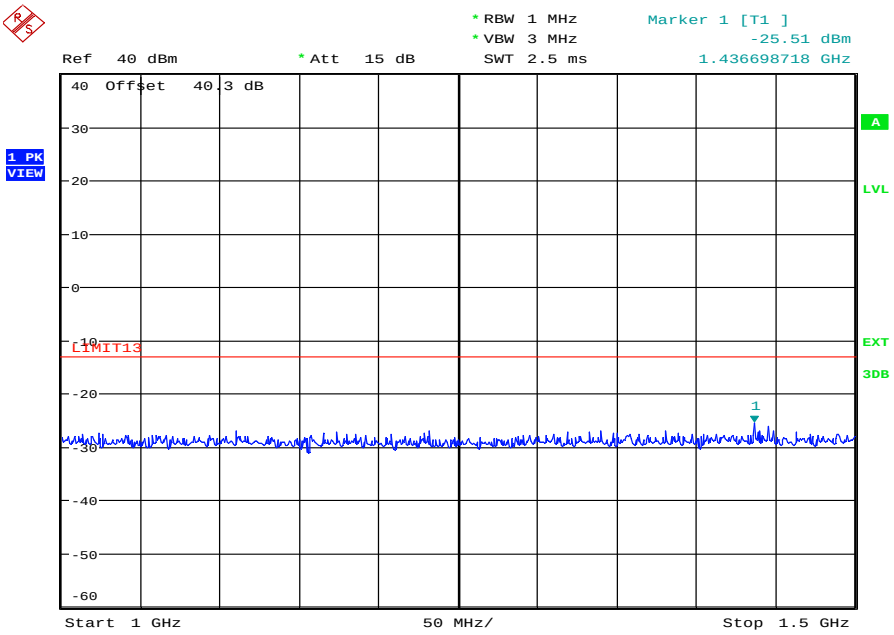


Date: 15.AUG.2023 14:52:00

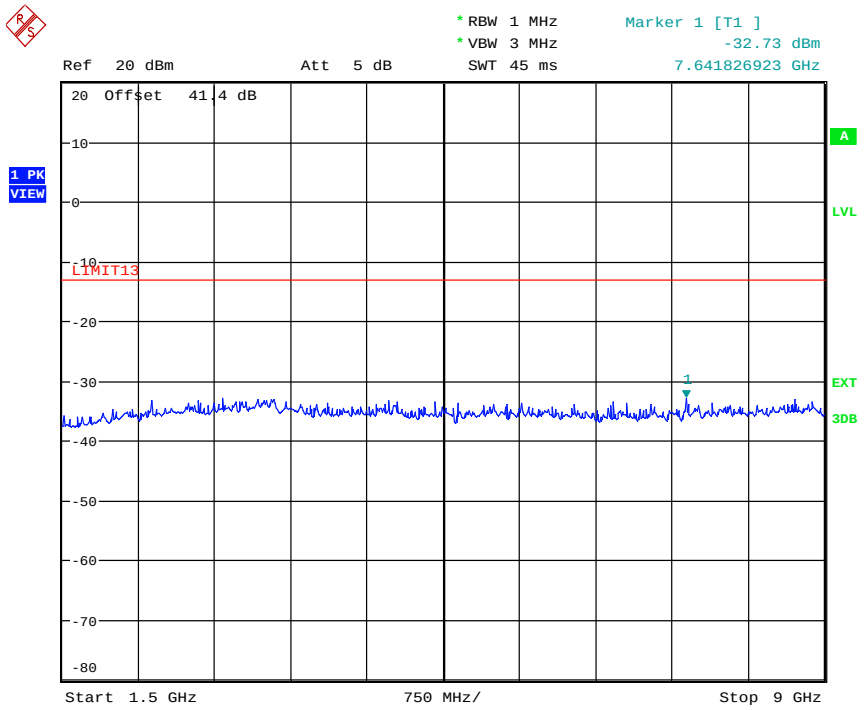
5.9.3.6. Configuration: Tx Conducted Emission, Band 2: 799-805MHz, 799.1MHz, F1W, Digital, Low power



Date: 15.AUG.2023 15:57:51

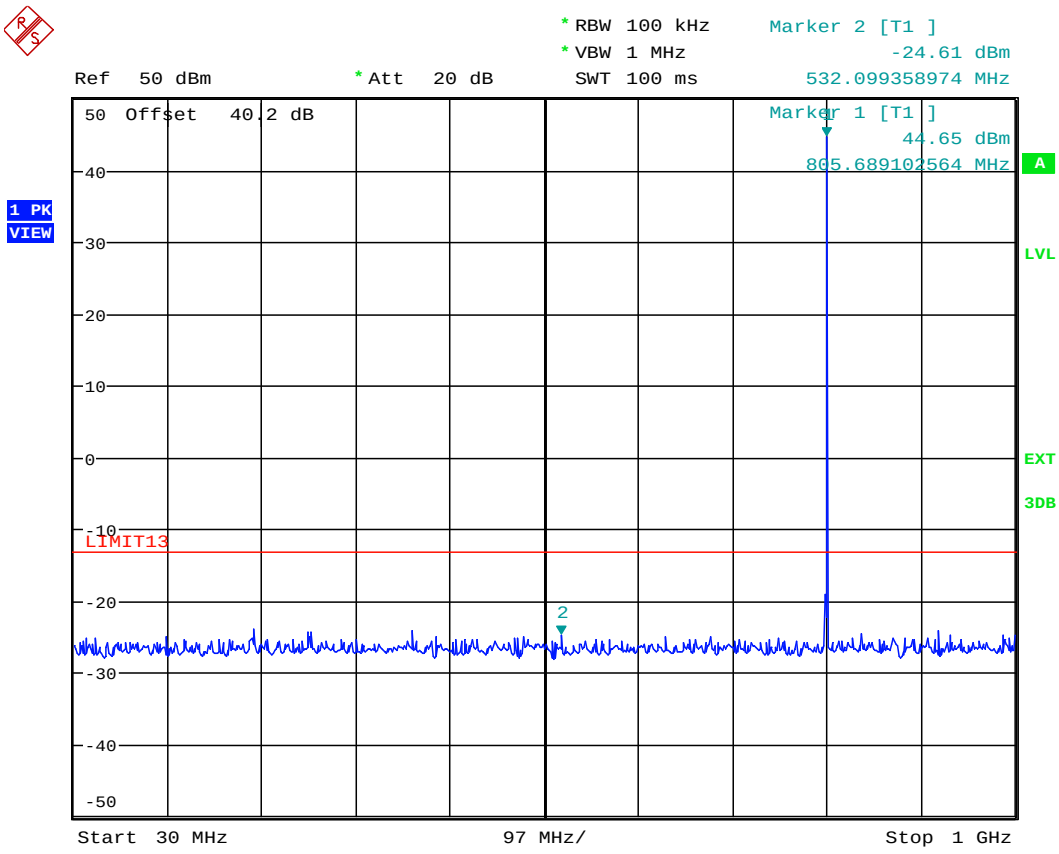


Date: 15.AUG.2023 15:40:43

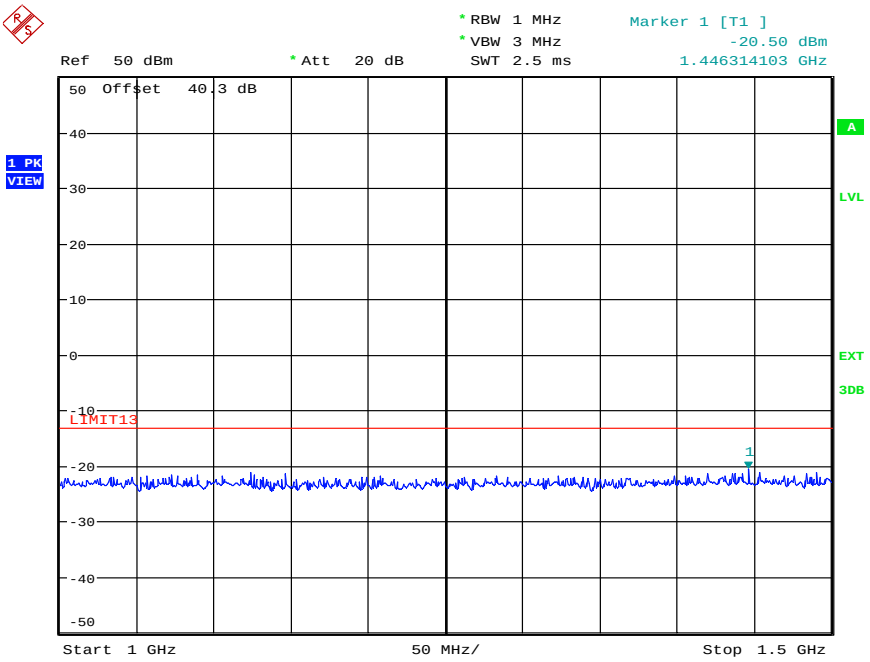


Date: 15.AUG.2023 15:33:13

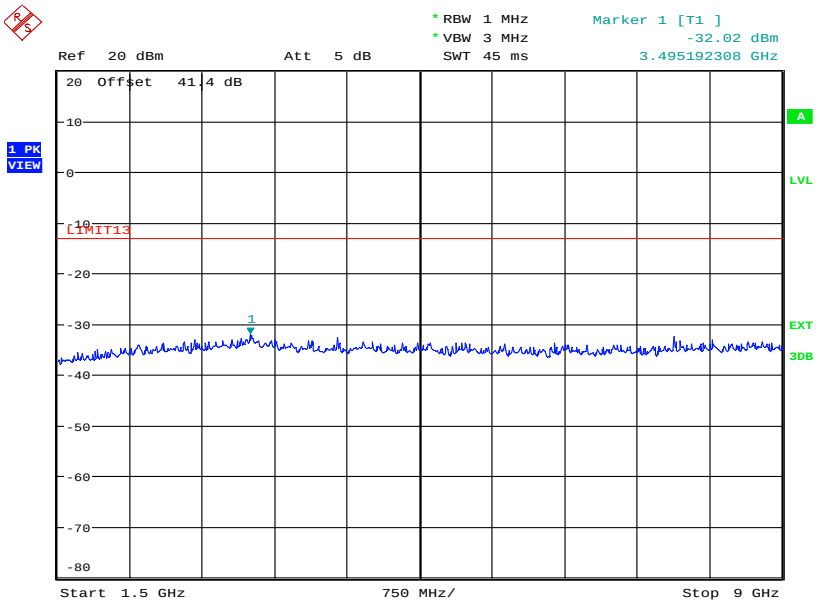
5.9.3.7. Configuration: Tx Conducted Emission, Band 2: 799-805MHz, 804.9MHz, F1W, Digital, High power



Date: 15.AUG.2023 14:22:21

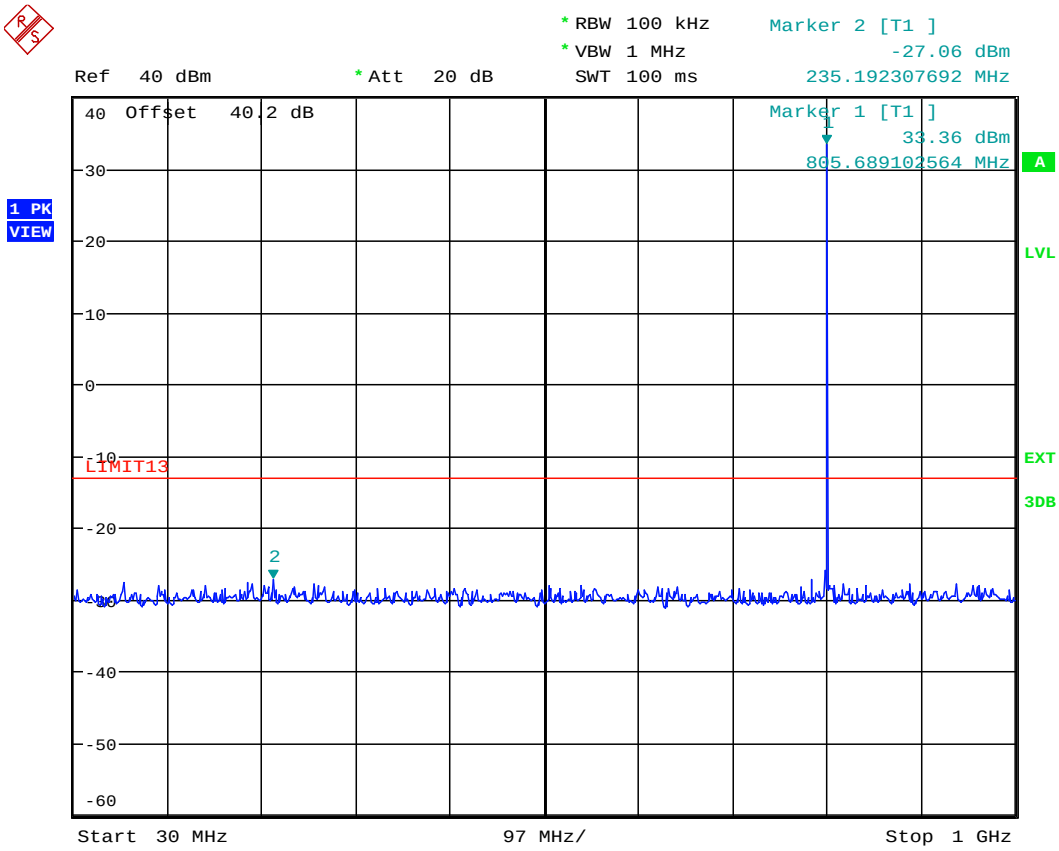


Date: 15.AUG.2023 14:44:13

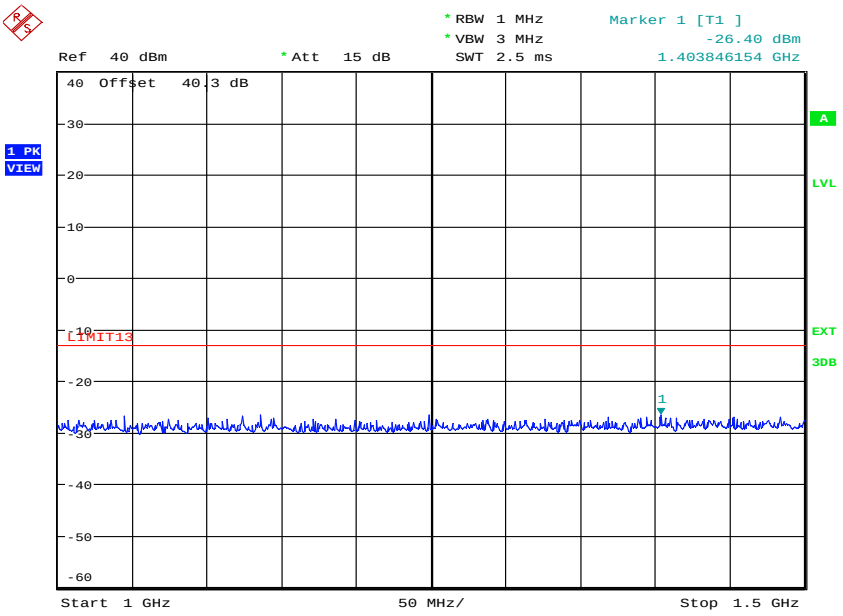


Date: 15.AUG.2023 14:53:42

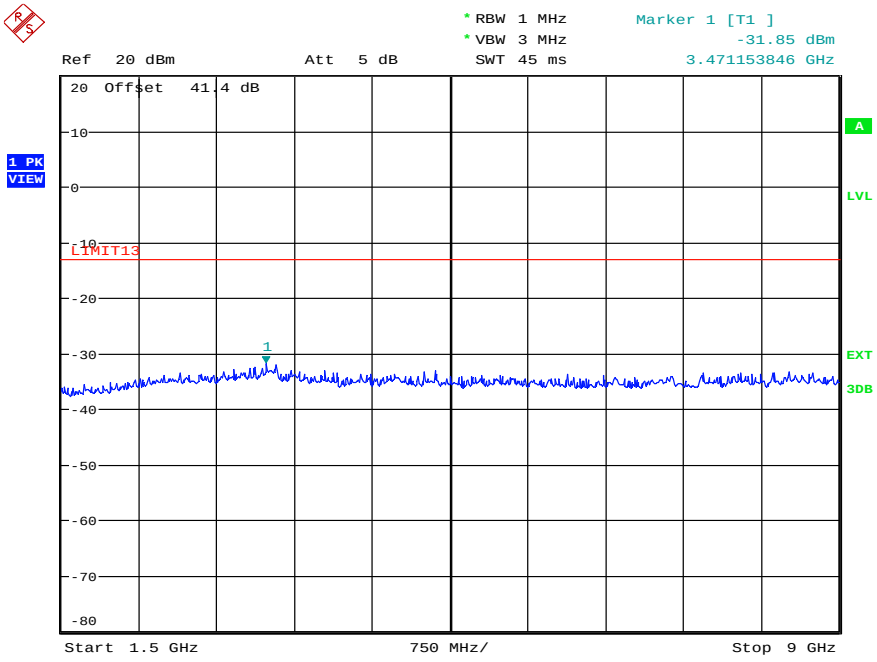
5.9.3.8. Configuration: Tx Conducted Emission, Band 2: 799-805MHz, 804.9MHz, F1W, Digital, Low power



Date: 15.AUG.2023 15:58:35

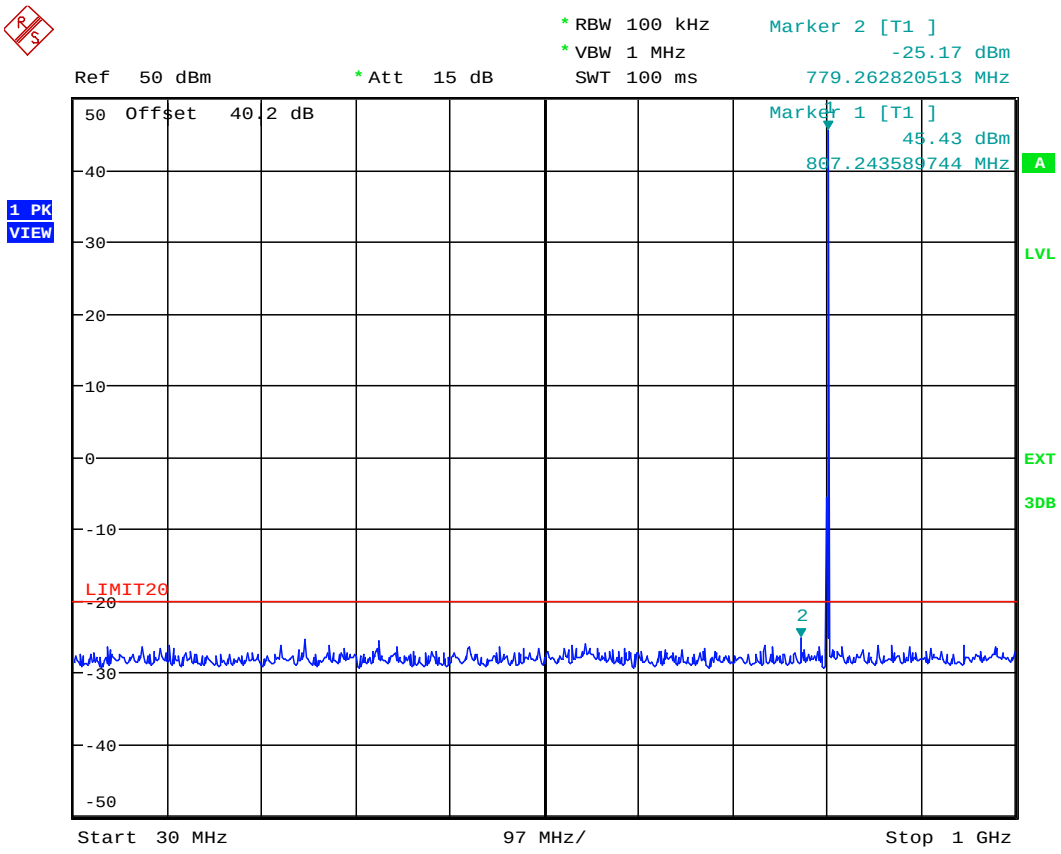


Date: 15.AUG.2023 15:41:23

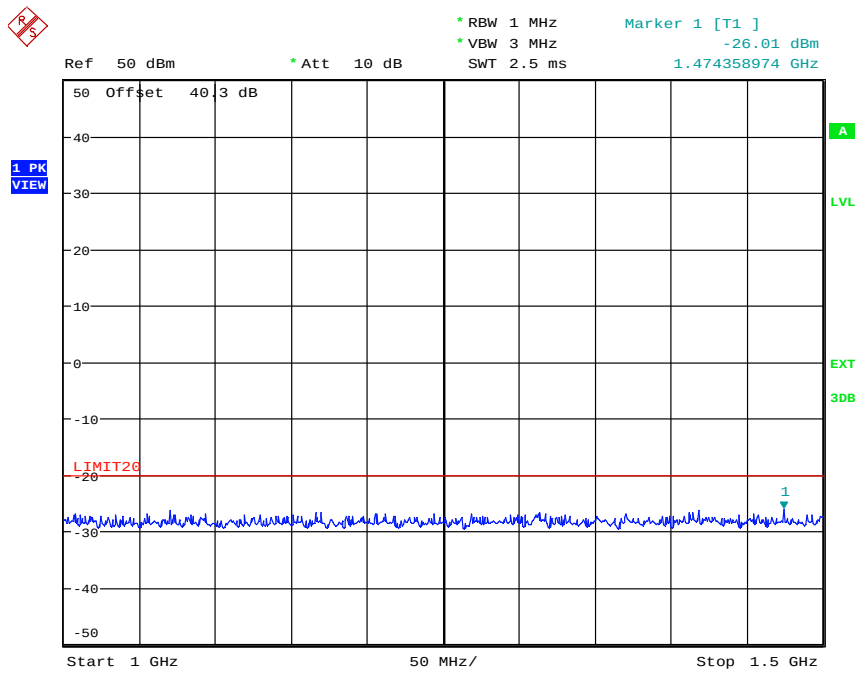


Date: 15.AUG.2023 15:33:55

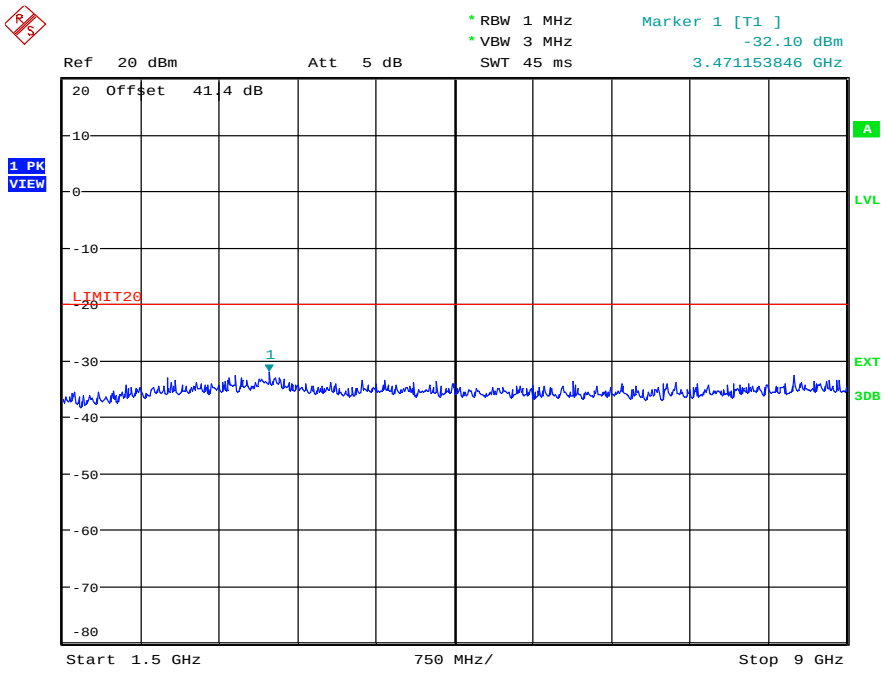
5.9.3.9. Configuration: Tx Conducted Emission, Band 3: 806-824MHz, 806.1MHz, F1W, Digital, High power



Date: 15.AUG.2023 15:03:22

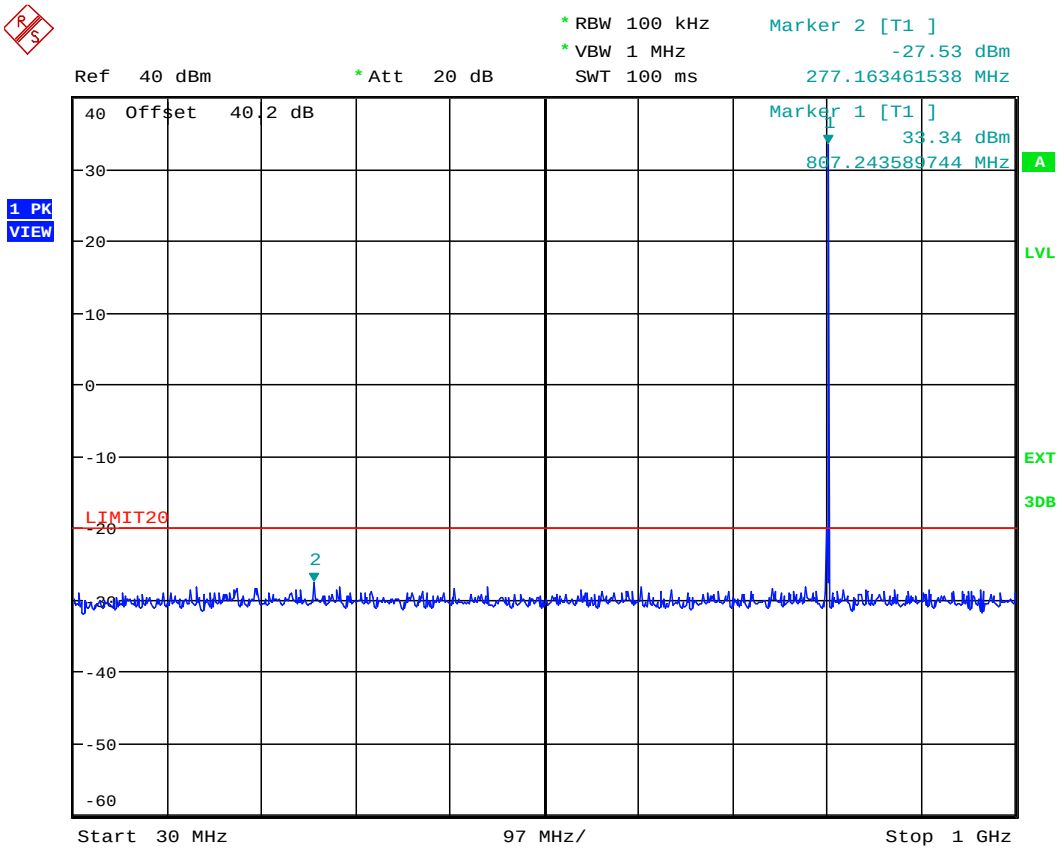


Date: 15.AUG.2023 15:11:39

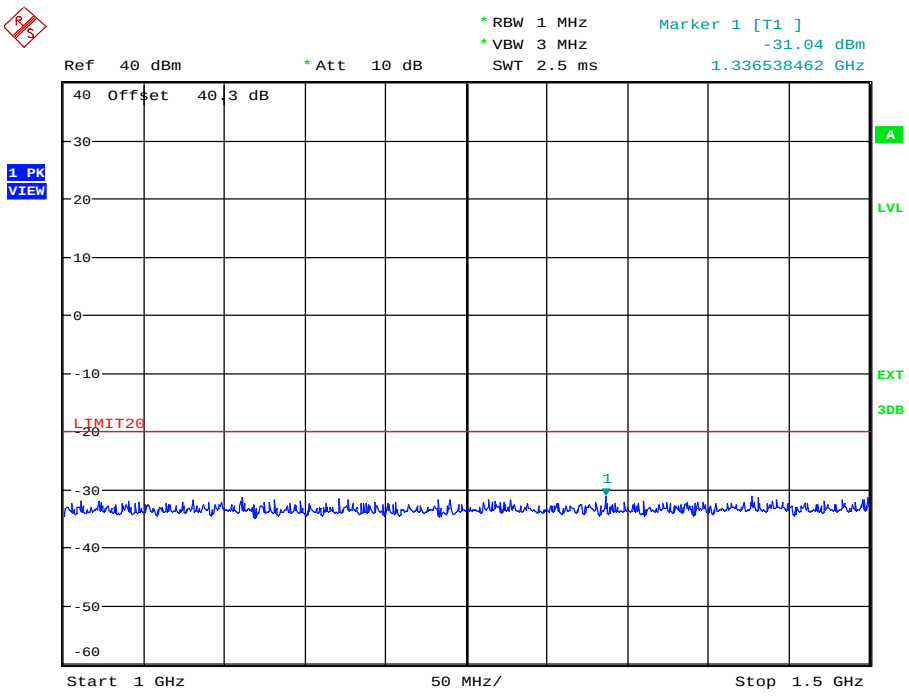


Date: 15.AUG.2023 15:18:36

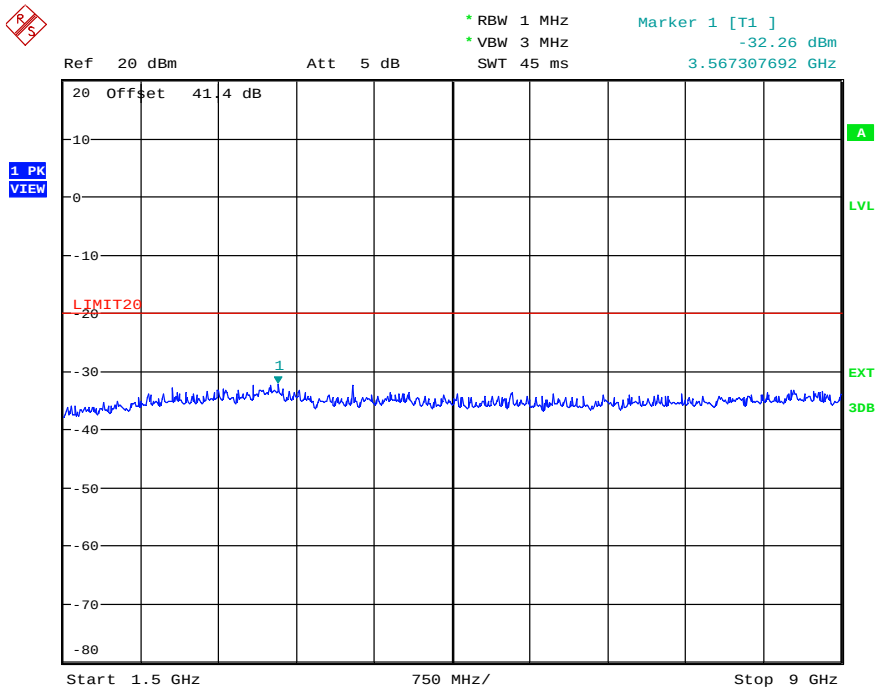
5.9.3.10. Configuration: Tx Conducted, Band 3: 806-824MHz, 806.1MHz, F1W, Digital, Low power



Date: 15.AUG.2023 15:49:05

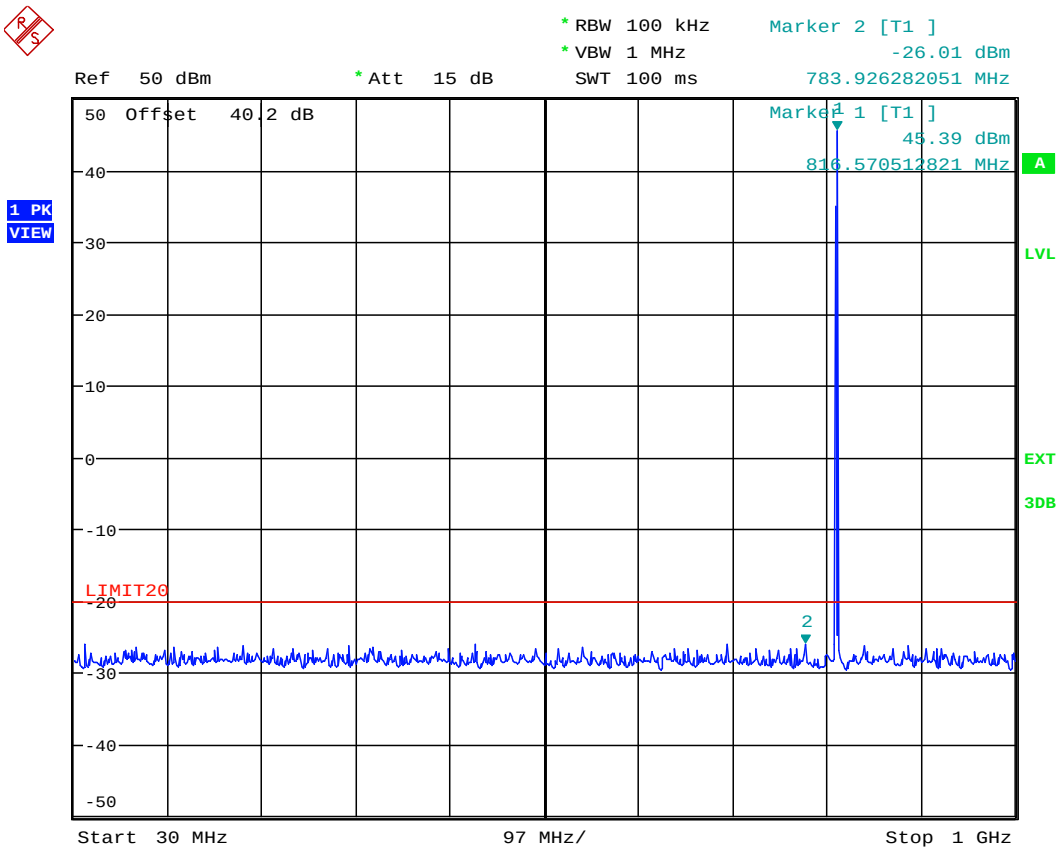


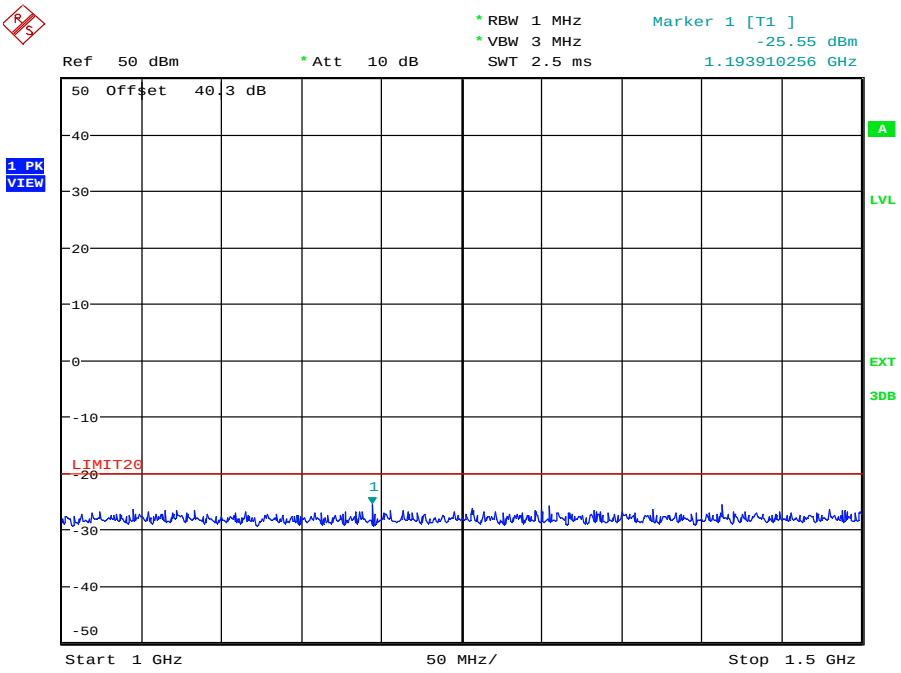
Date: 15.AUG.2023 15:42:56



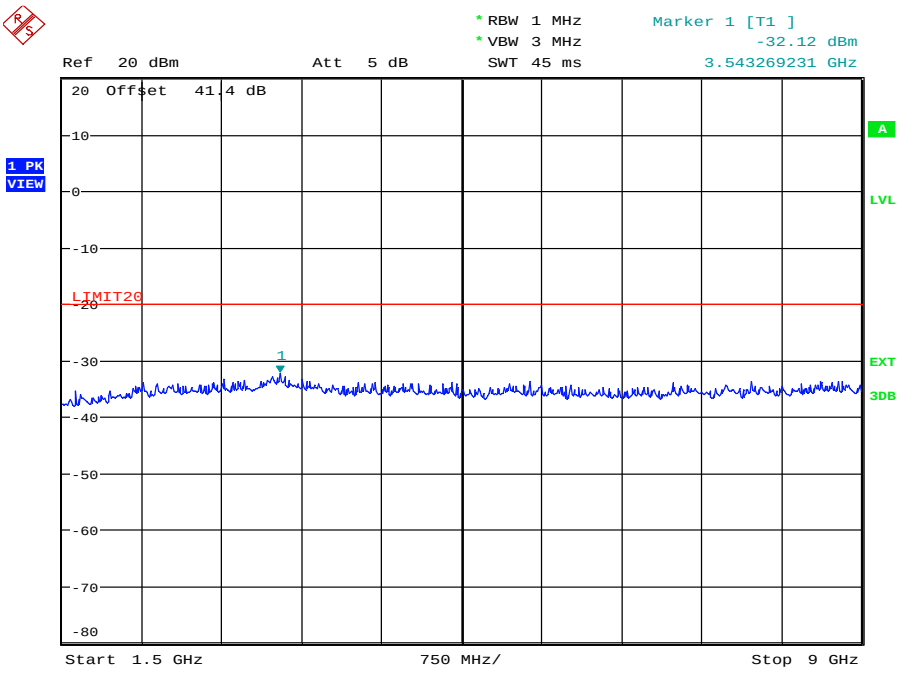
Date: 15.AUG.2023 15:26:59

5.9.3.11. Configuration: Tx Conducted, Band 3: 806-824MHz, 815.1MHz, F1W, Digital, High power



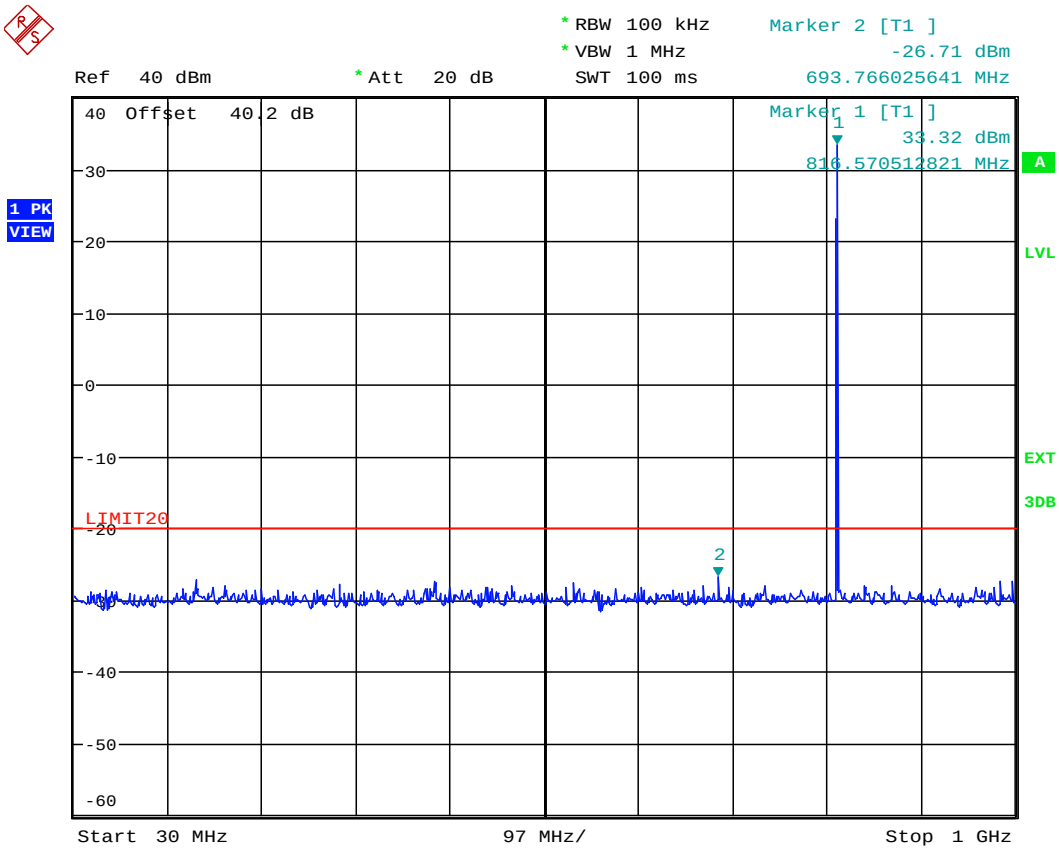


Date: 15.AUG.2023 15:12:22

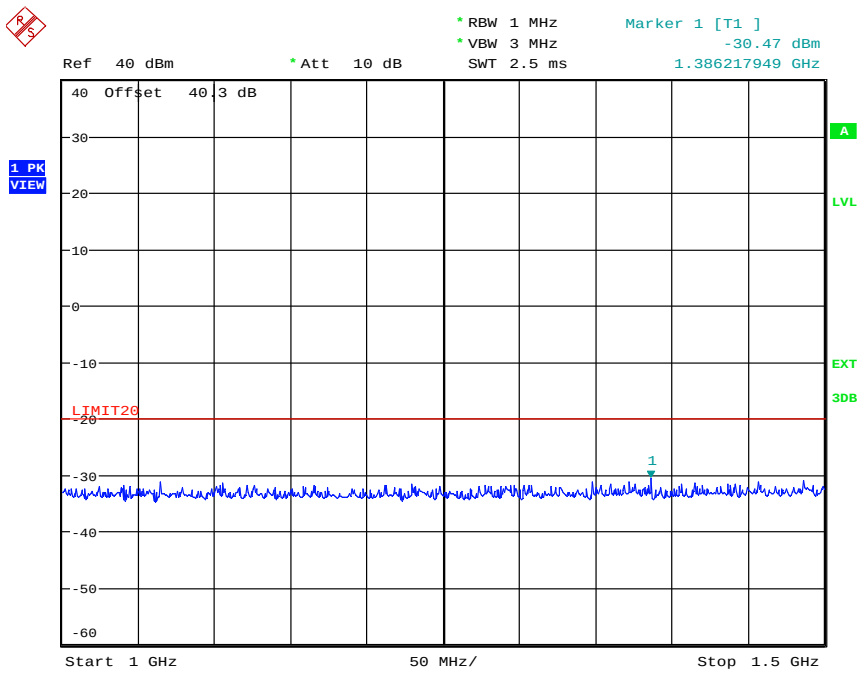


Date: 15.AUG.2023 15:19:12

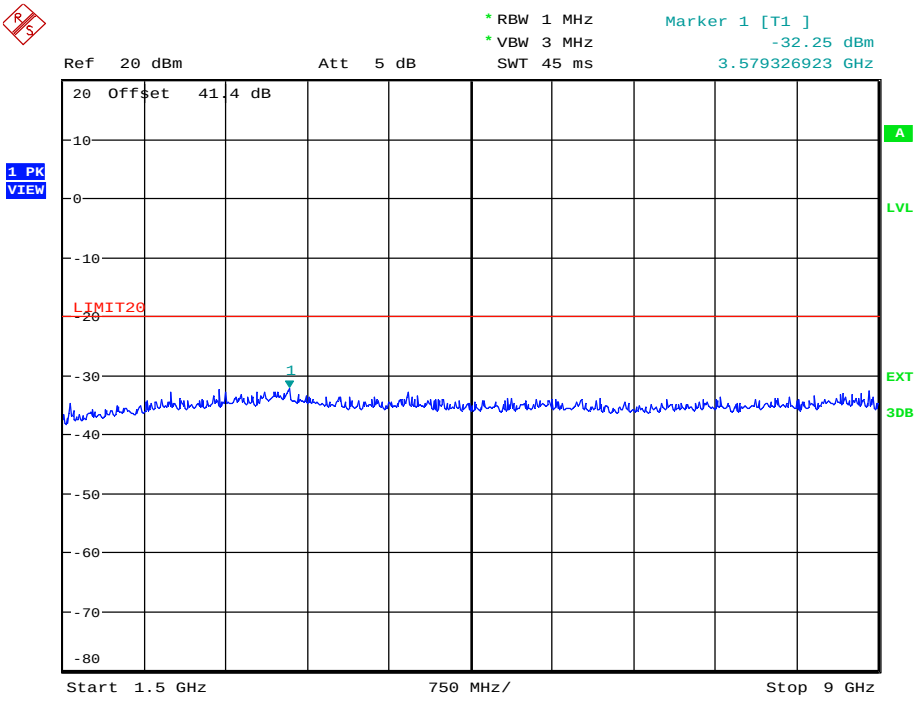
5.9.3.12. Configuration: Tx Conducted, Band 3: 806-824MHz, 815.1MHz, F1W, Digital, Low power



Date: 15.AUG.2023 15:50:14

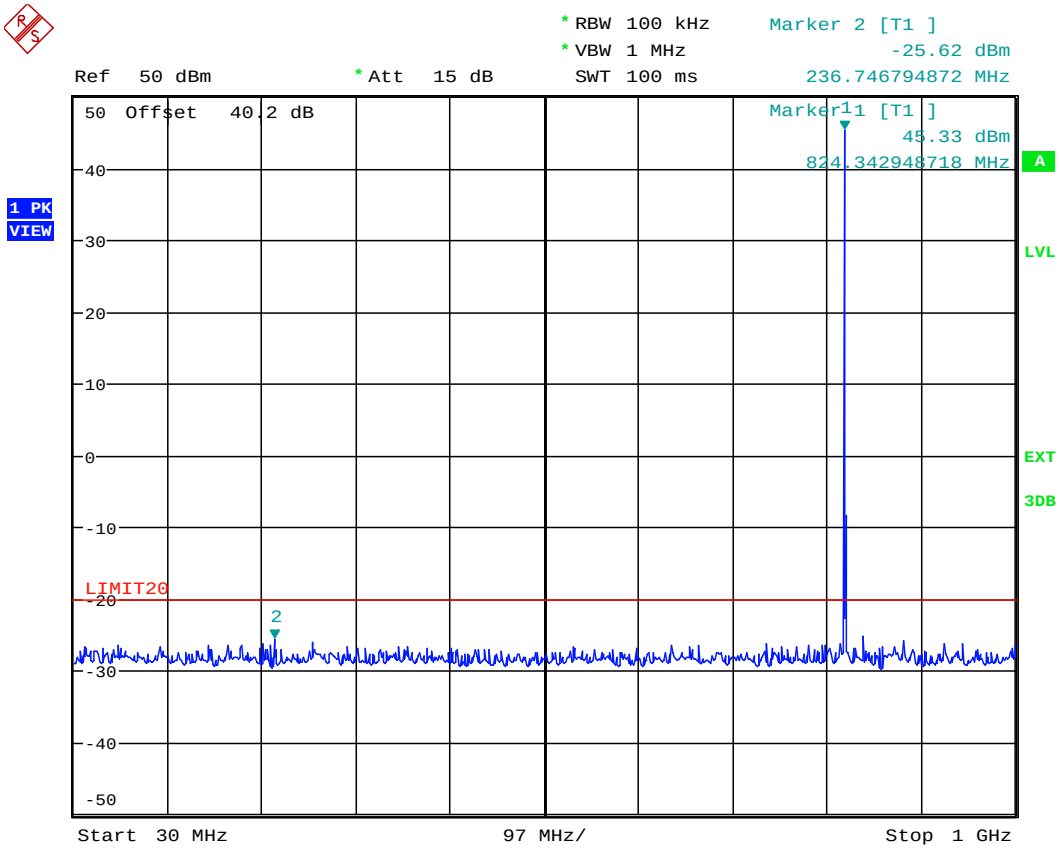


Date: 15.AUG.2023 15:43:41

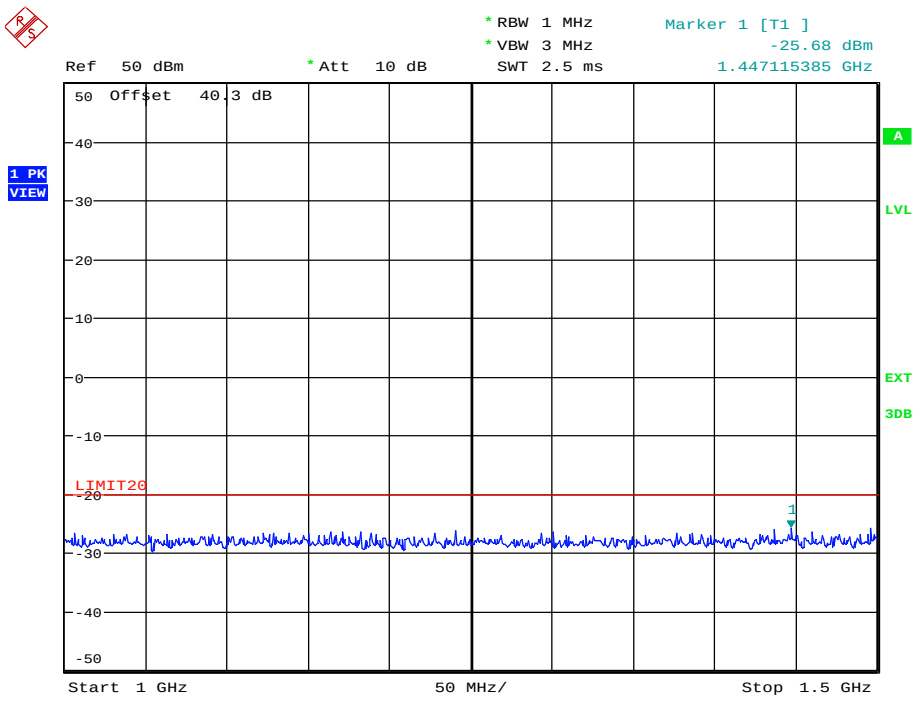


Date: 15.AUG.2023 15:27:51

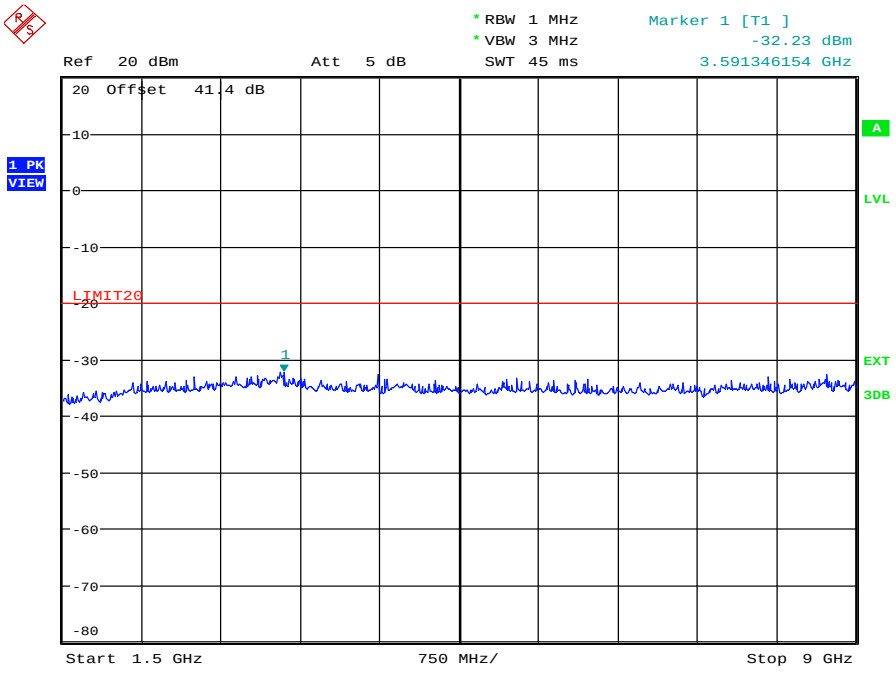
5.9.3.13. Configuration: Tx Conducted, Band 3: 806-824MHz, 823.9MHz, F1W, Digital, High power



Date: 15.AUG.2023 15:05:14

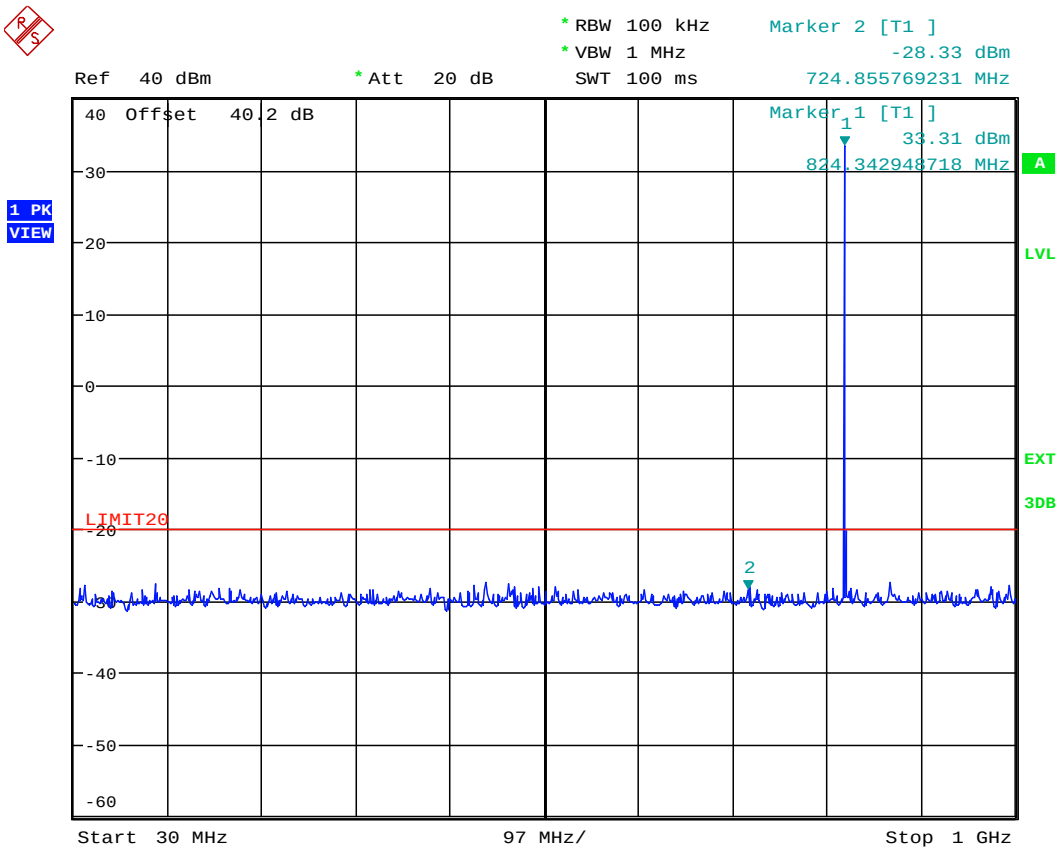


Date: 15.AUG.2023 15:12:59

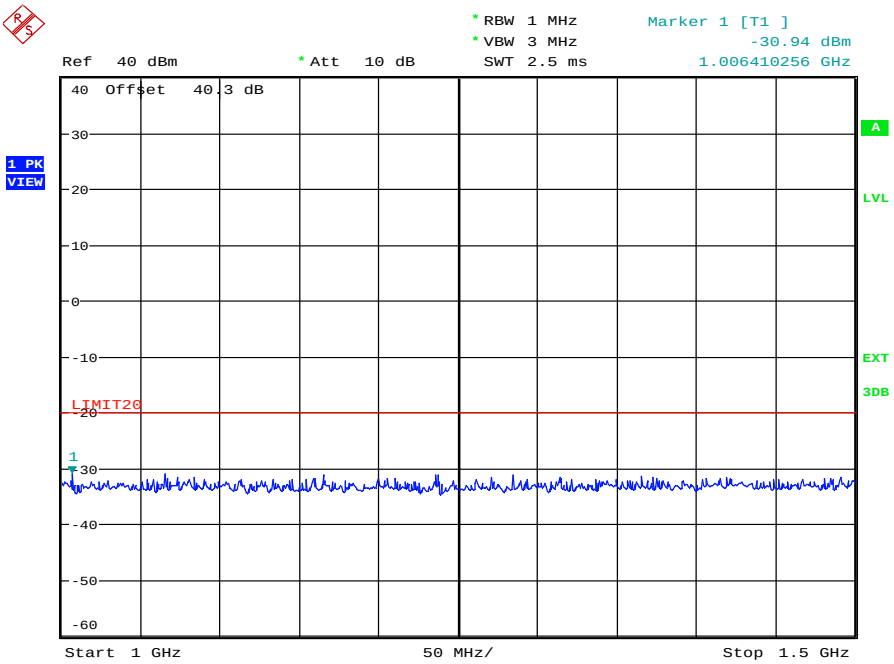


Date: 15.AUG.2023 15:19:55

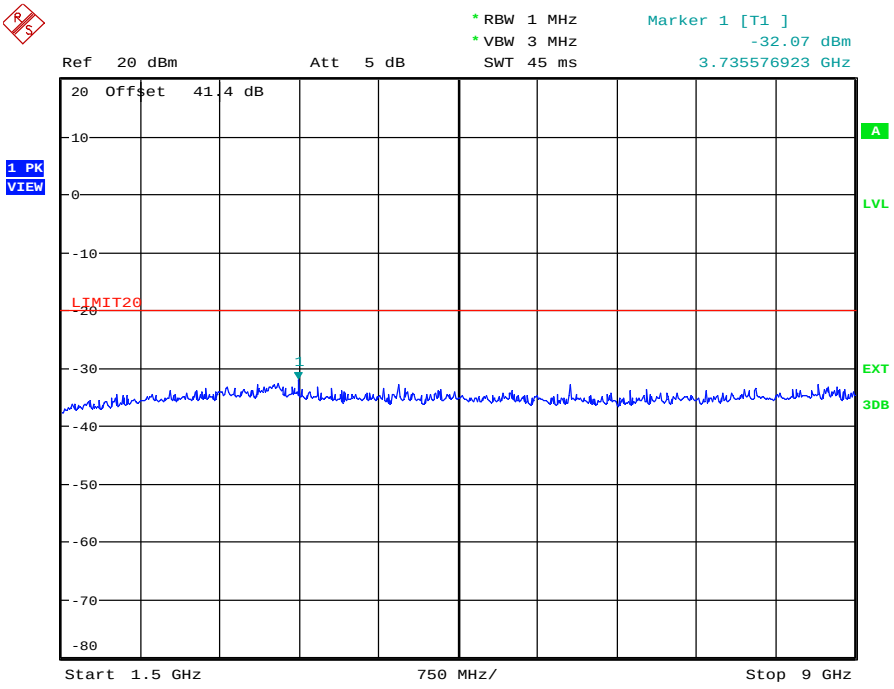
5.9.3.14. Configuration: Tx Conducted, Band 3: 806-824MHz, 823.9MHz, F1W, Digital, Low power



Date: 15.AUG.2023 15:51:26

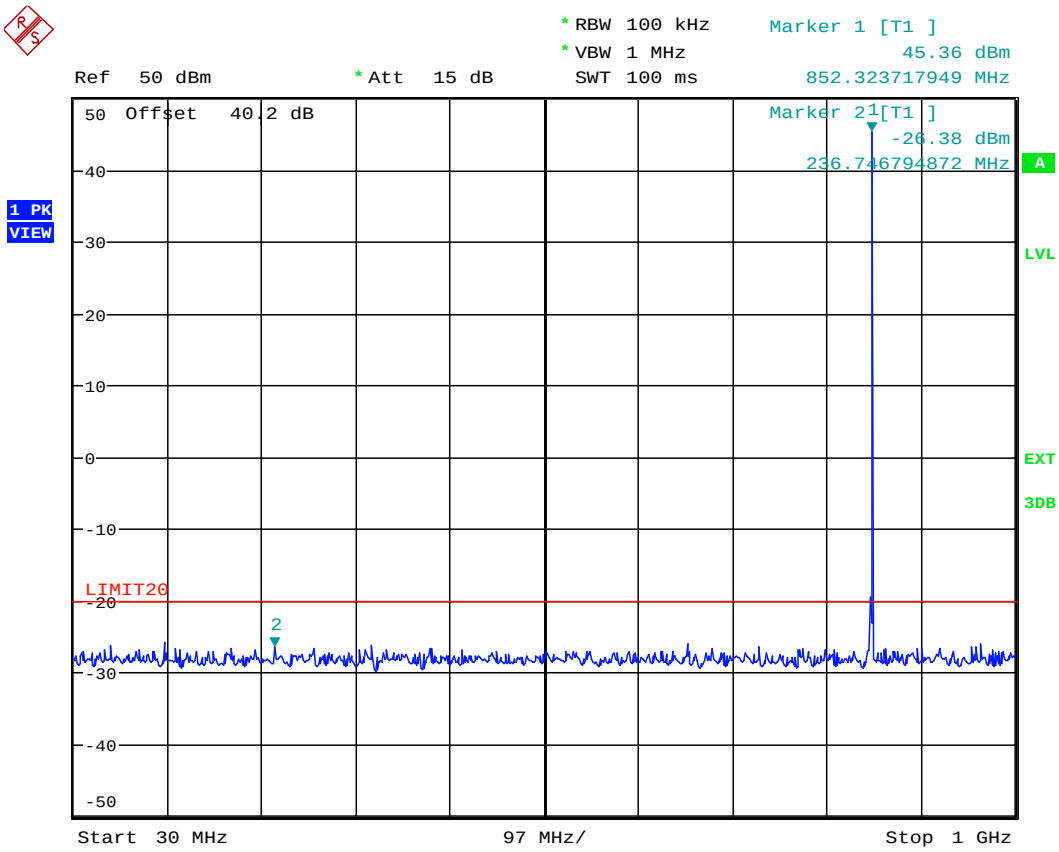


Date: 15.AUG.2023 15:44:19

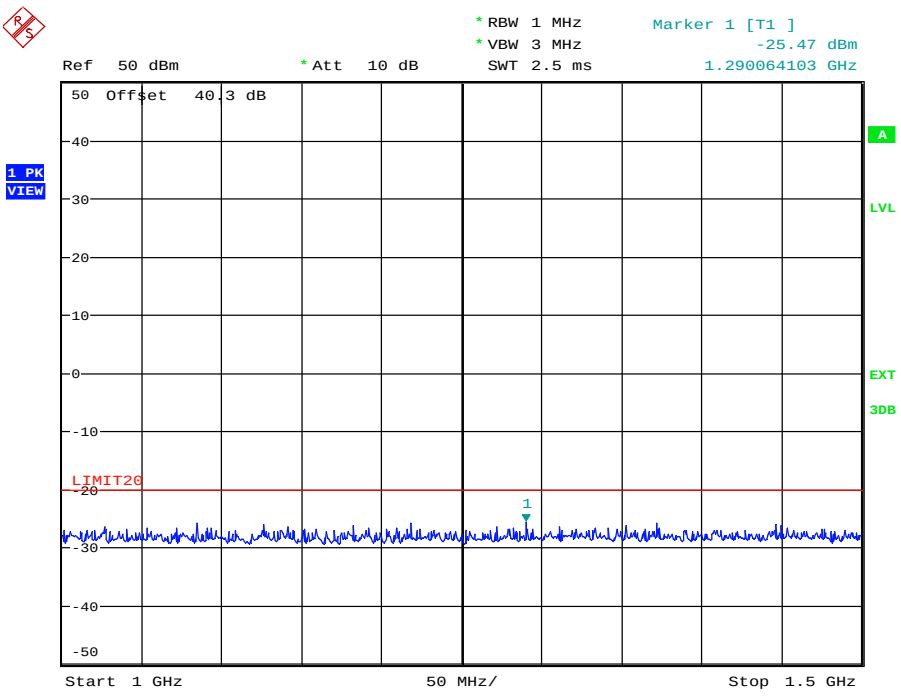


Date: 15.AUG.2023 15:28:31

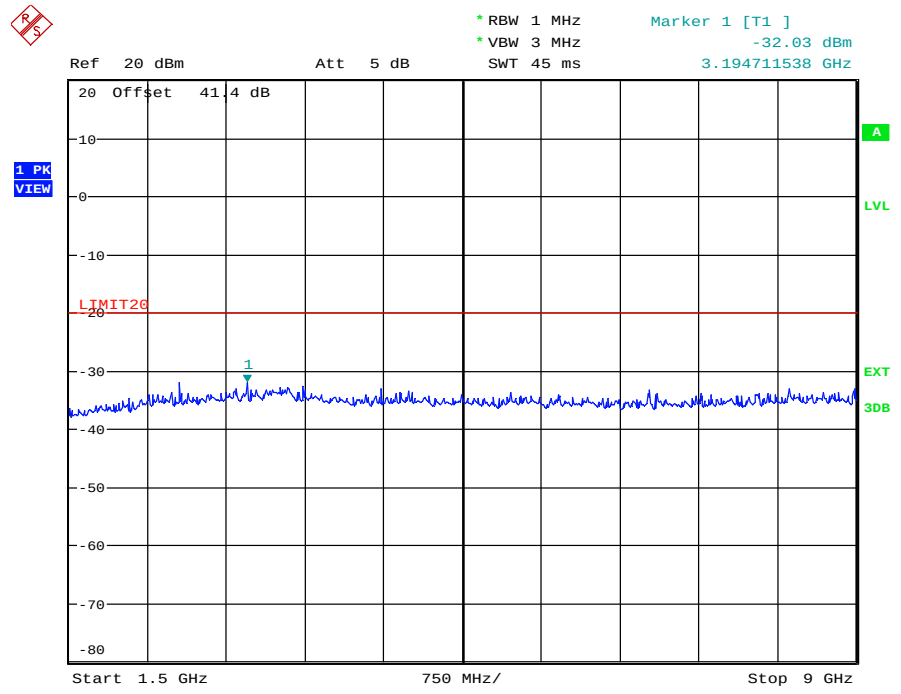
5.9.3.15. Configuration: Tx Conducted , Band 4: 851-869MHz, 851.1MHz, F1W, Digital, High power



Date: 15.AUG.2023 15:06:13

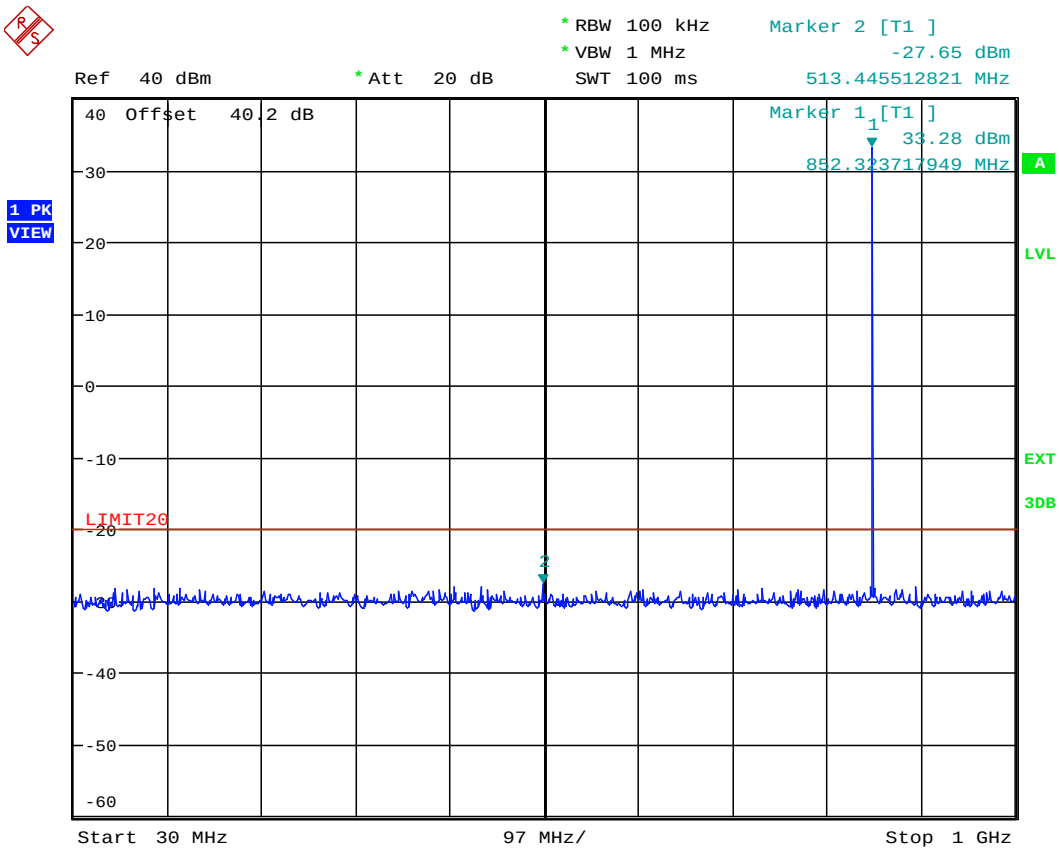


Date: 15.AUG.2023 15:13:52

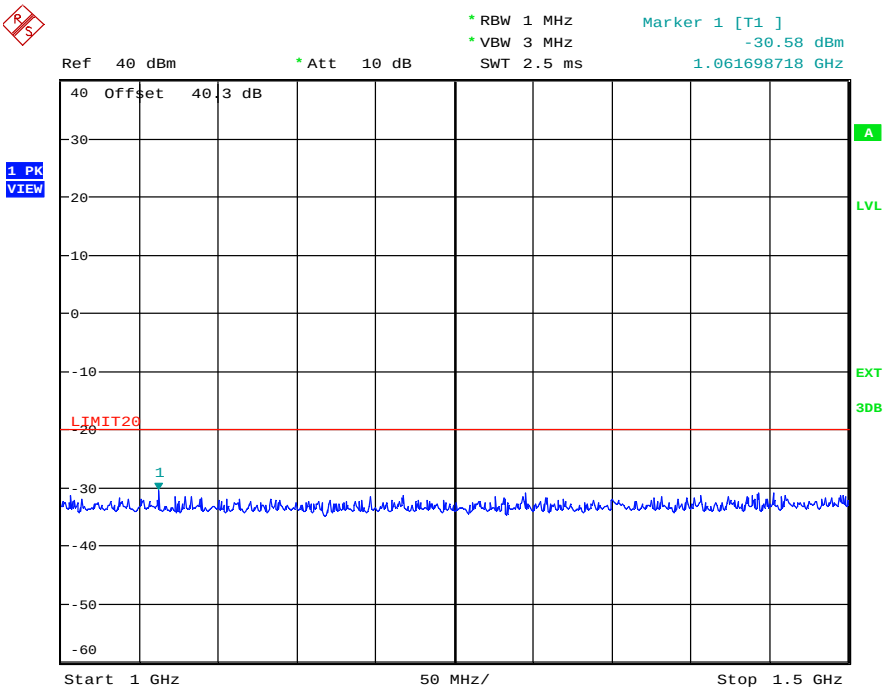


Date: 15.AUG.2023 15:20:49

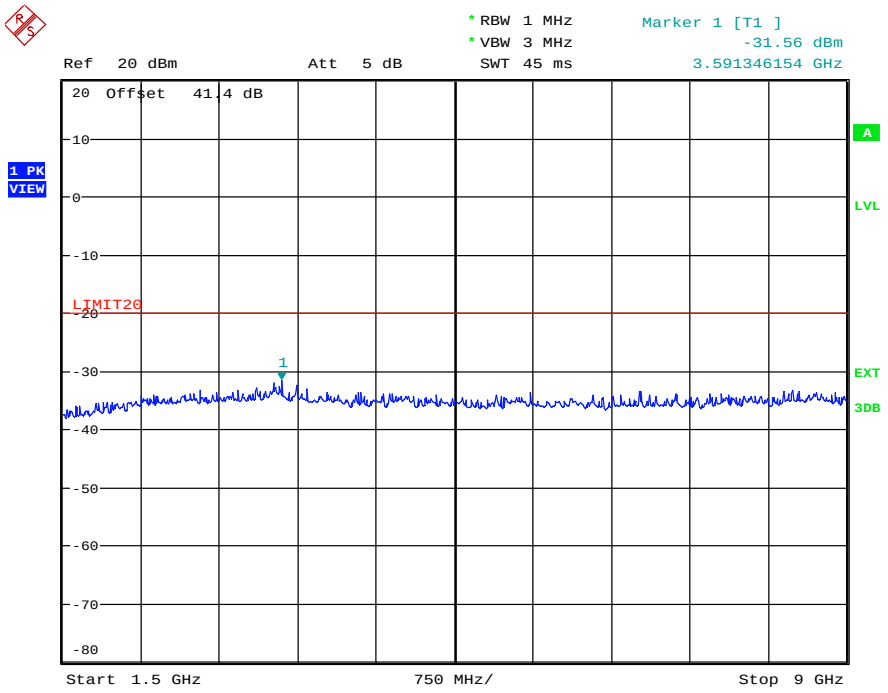
5.9.3.16. Configuration: Tx Conducted , Band 4: 851-869MHz, 851.1MHz, F1W, Digital,Low power



Date: 15.AUG.2023 15:52:19

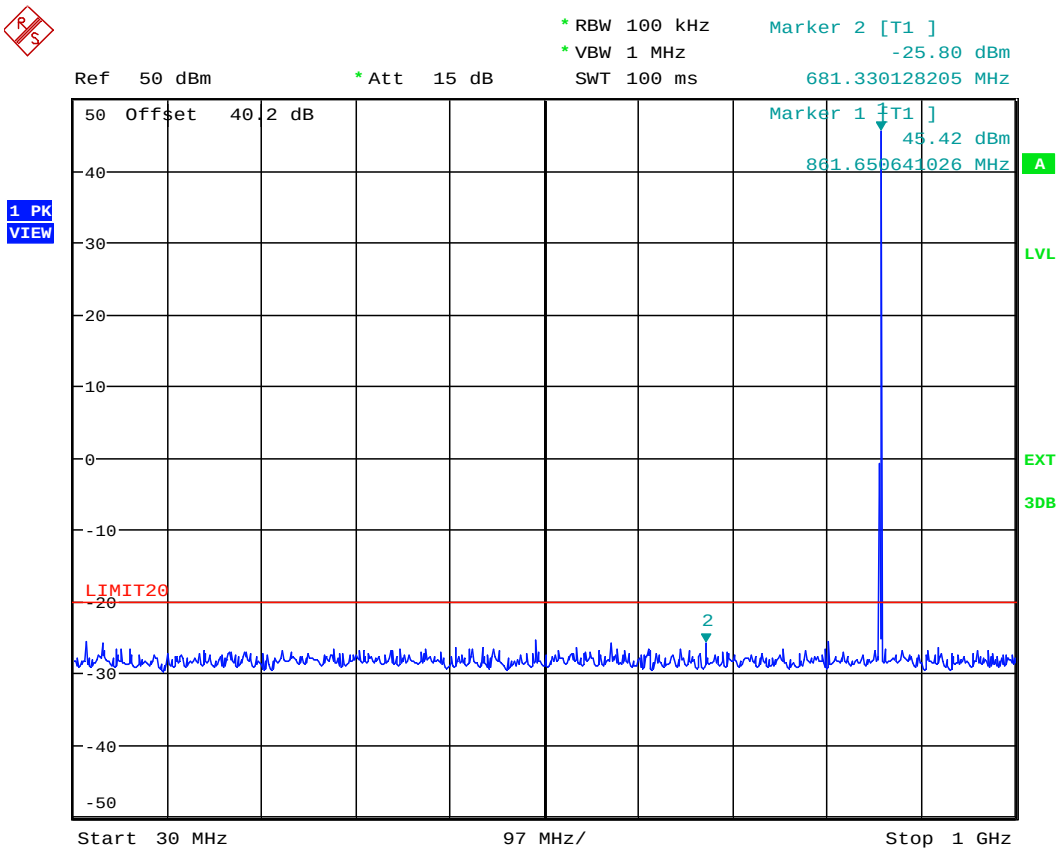


Date: 15.AUG.2023 15:45:06

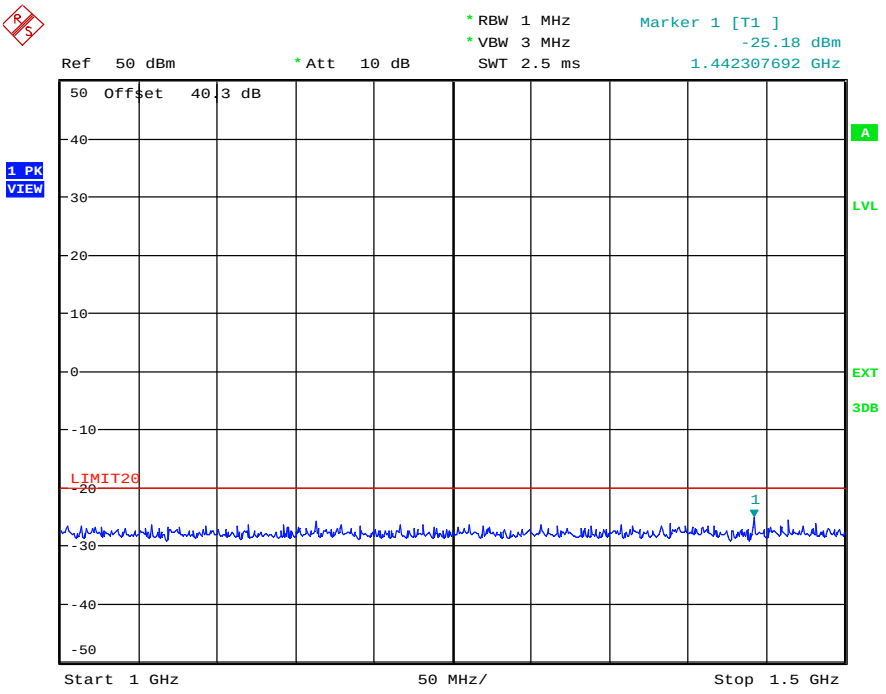


Date: 15.AUG.2023 15:29:12

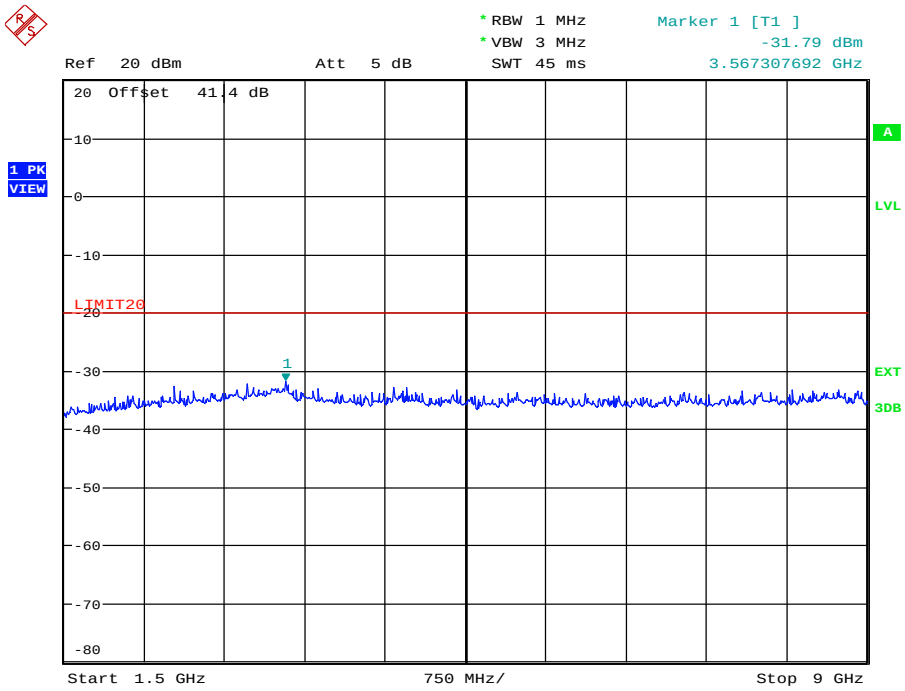
5.9.3.17. Configuration: Tx Conducted , Band 4: 851-869MHz, 860.1MHz, F1W, Digital, High power



Date: 15.AUG.2023 15:07:00

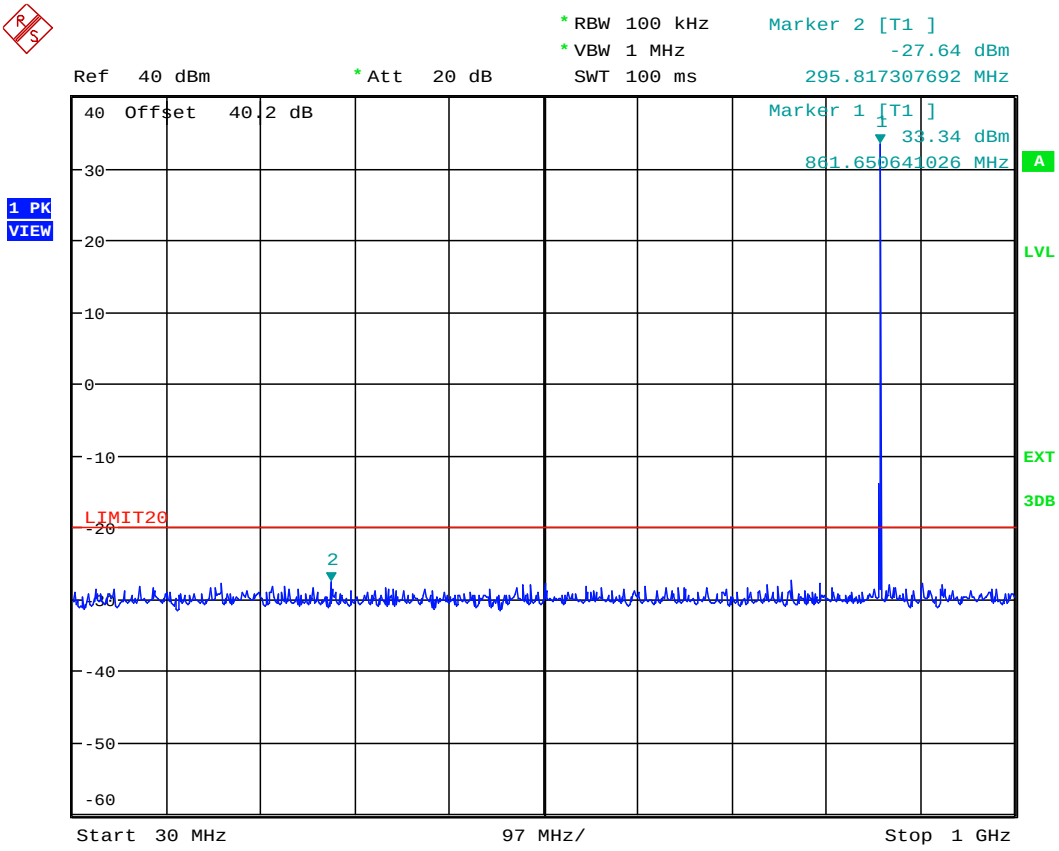


Date: 15.AUG.2023 15:14:33

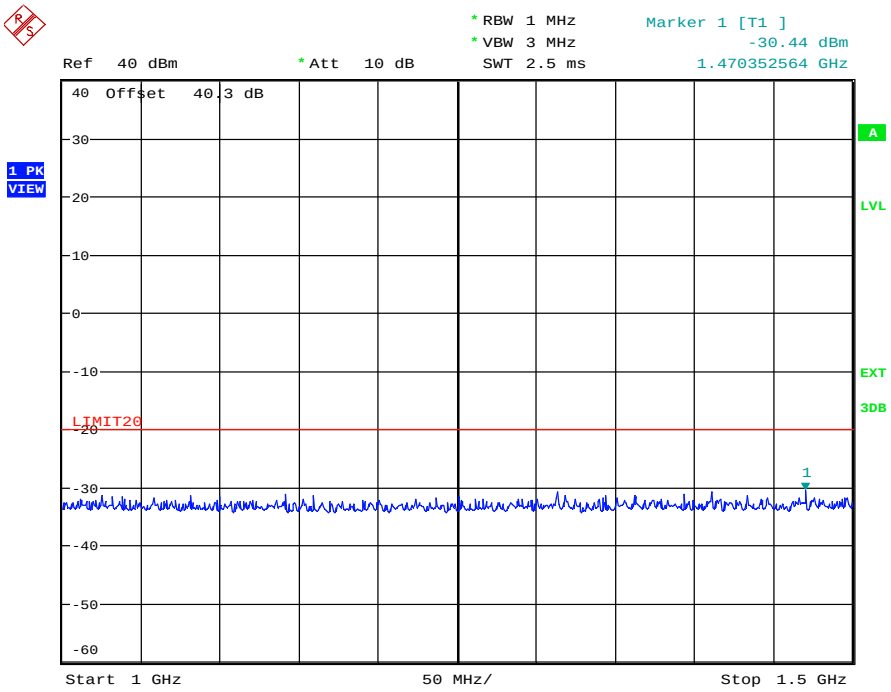


Date: 15.AUG.2023 15:21:29

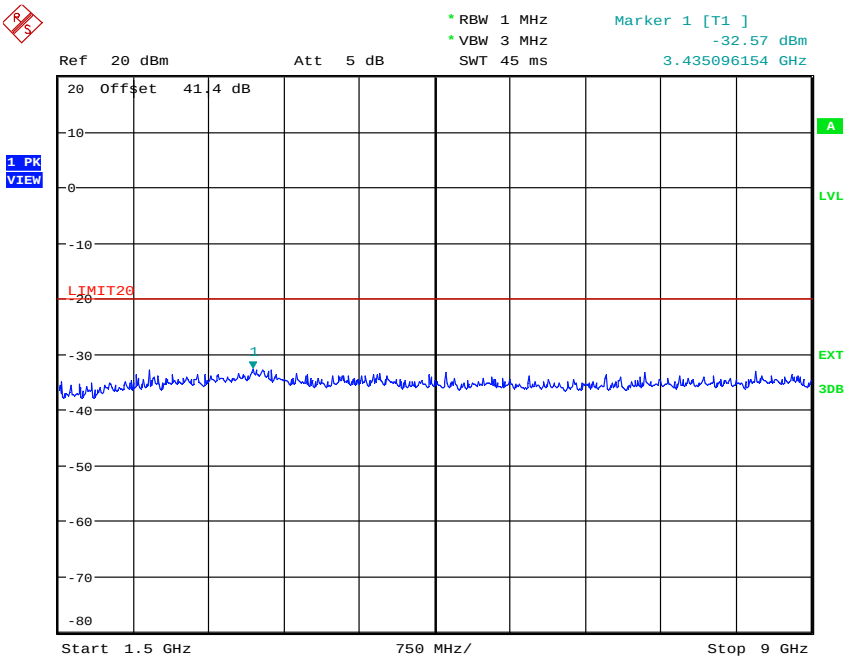
5.9.3.18. Configuration: Tx Conducted , Band 4: 851-869MHz, 860.1MHz, F1W, Digital, Low power



Date: 15.AUG.2023 15:53:01

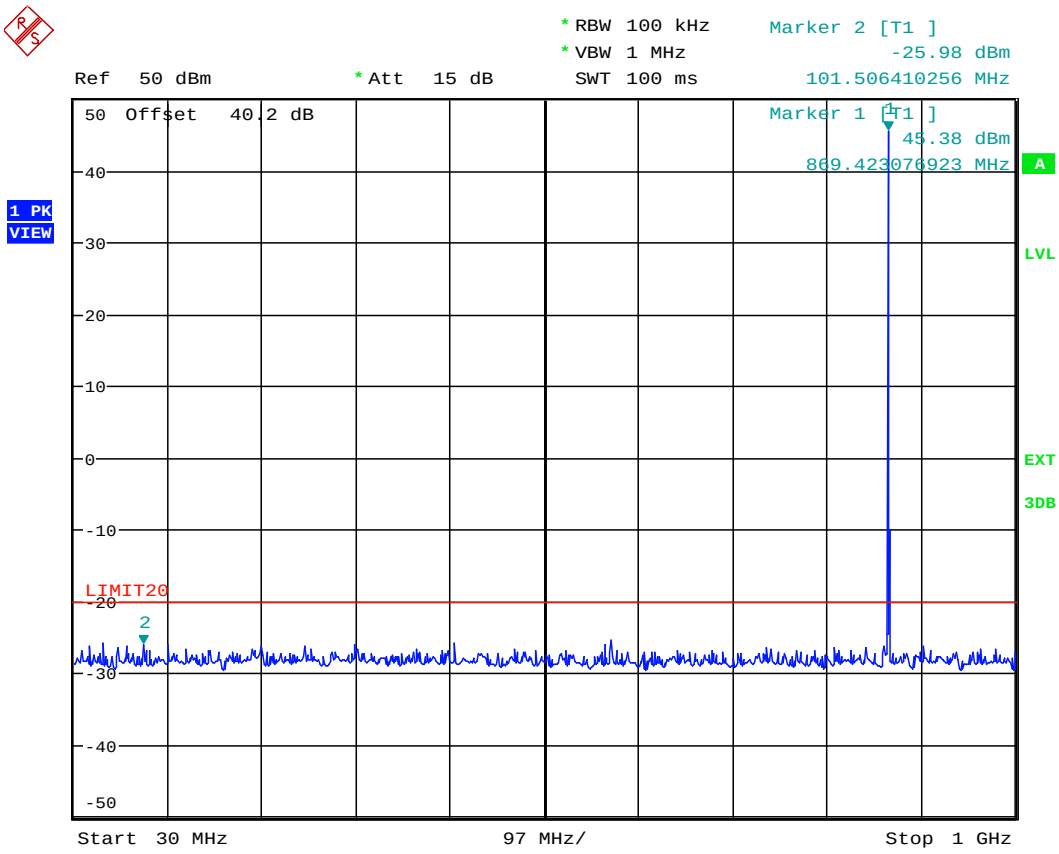


Date: 15.AUG.2023 15:45:43

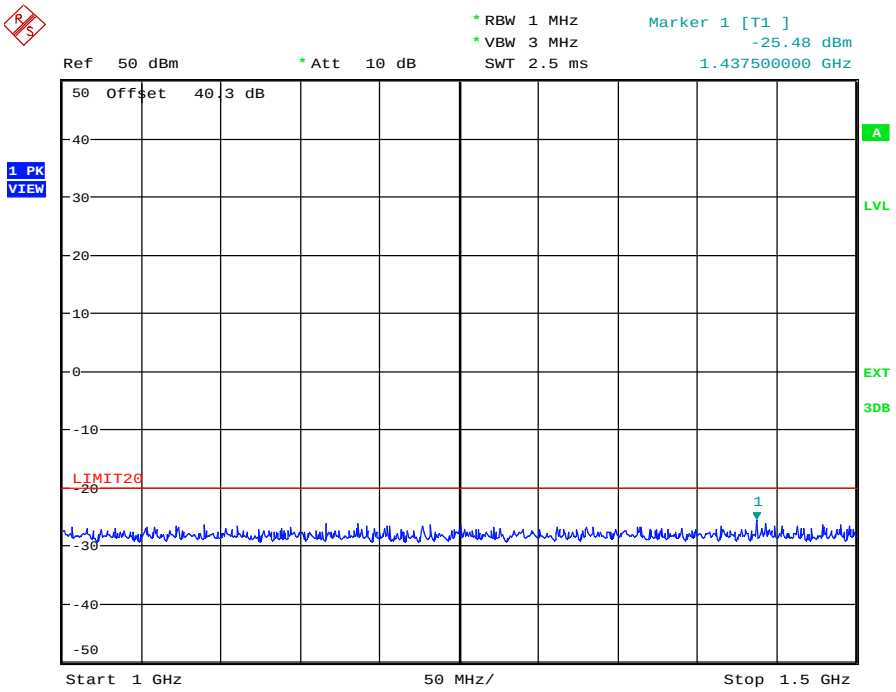


Date: 15.AUG.2023 15:29:55

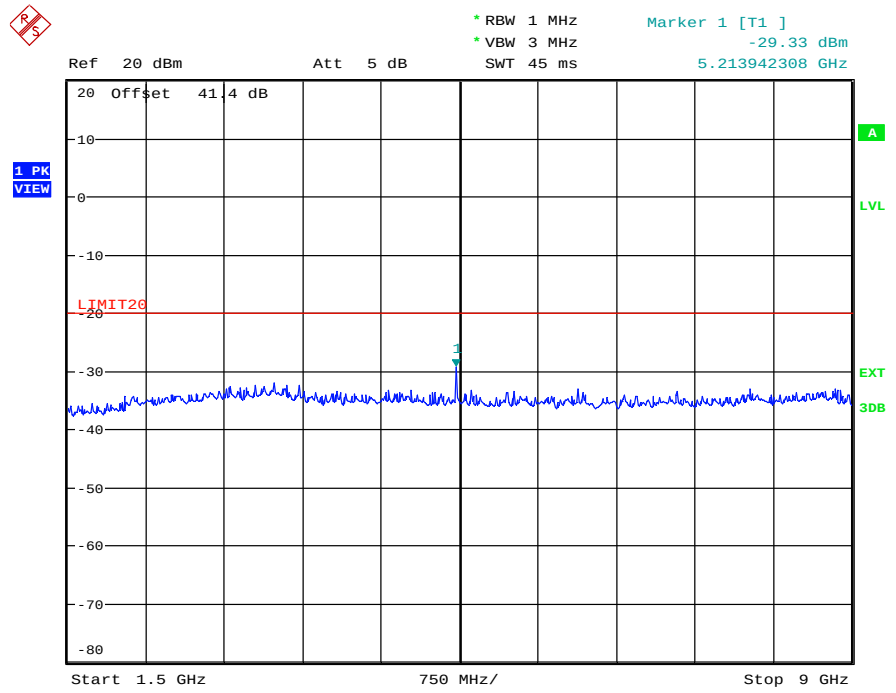
5.9.3.19. Configuration: Tx Conducted , Band 4: 851-869MHz, 868.9MHz, F1W, Digital, High power



Date: 15.AUG.2023 15:08:41

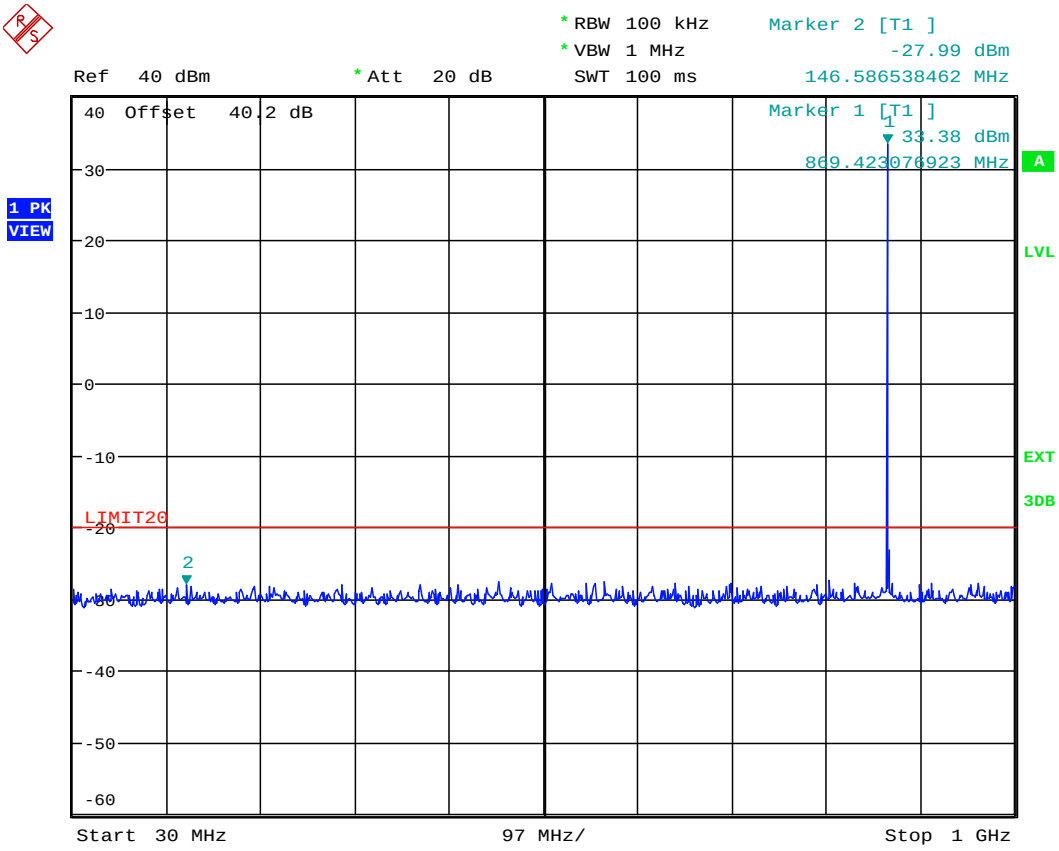


Date: 15.AUG.2023 15:15:33

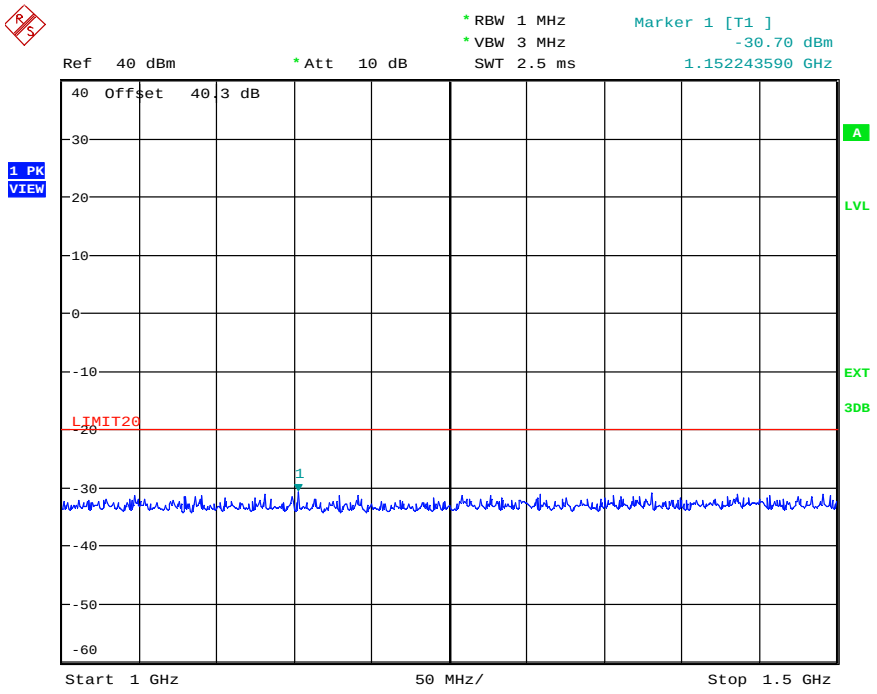


Date: 15.AUG.2023 15:22:46

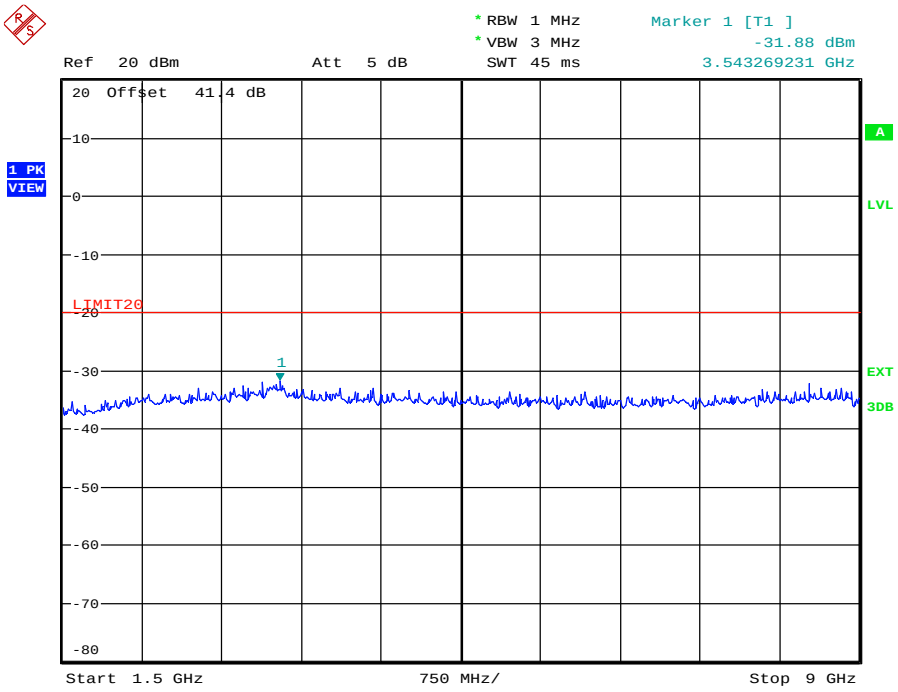
5.9.3.20. Configuration: Tx Conducted , Band 4: 851-869MHz, 868.9MHz, F1W, Digital, Low power



Date: 15.AUG.2023 15:53:46



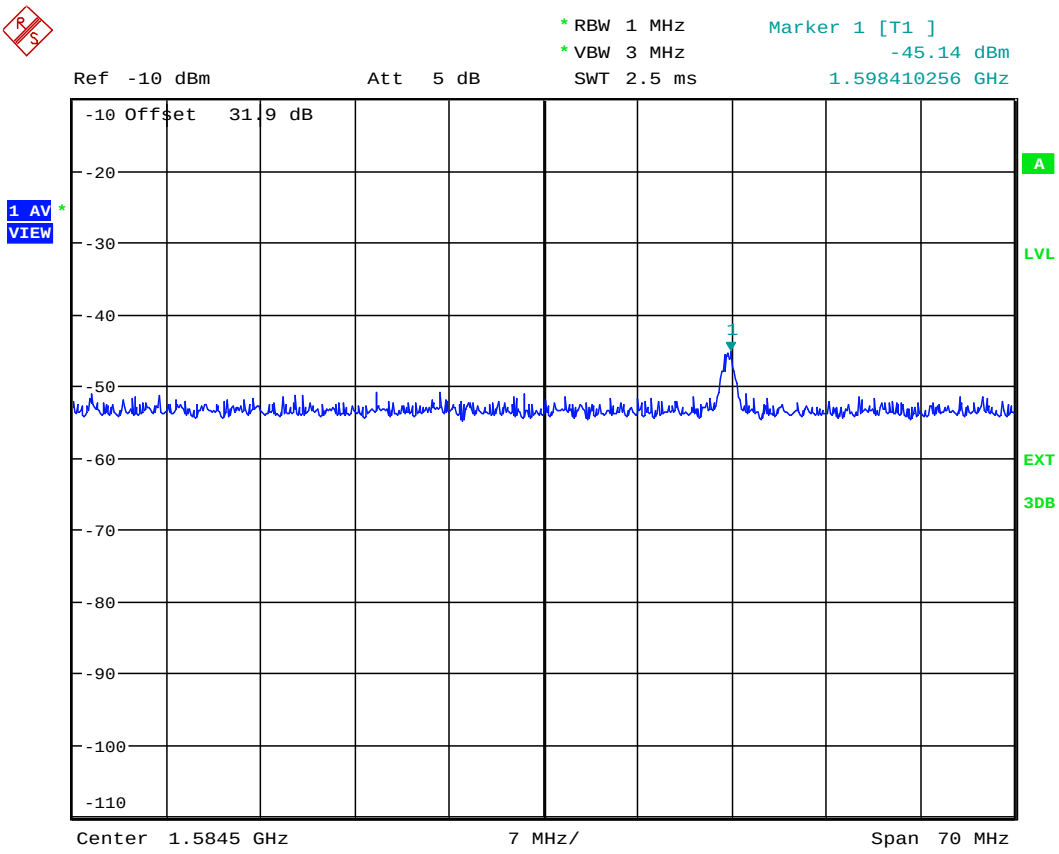
Date: 15.AUG.2023 15:46:23



Date: 15.AUG.2023 15:30:35

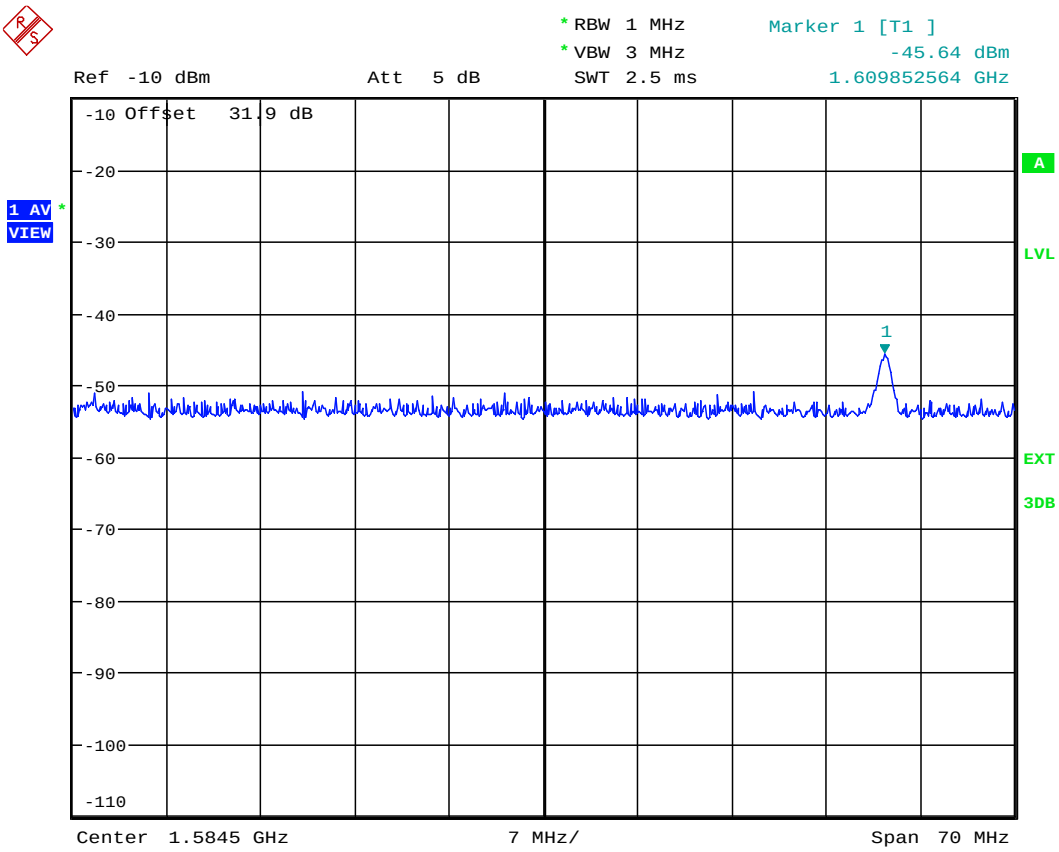
5.9.4. EIRP Levels in the band (1.559-1.610 GHz) 90.543(f), RSS-119 5.8.9.2

5.9.4.1. 799.1MHz, Digital F1W, High Power



Date: 15.AUG.2023 16:57:04

5.9.4.2. 804.9MHz, Digital F1W, High Power



Date: 15.AUG.2023 16:58:23

5.9.4.3. Evaluation of signals

Antenna Gain of the device =0dBi

Tx Frequency (MHz)	Measured Frequency (MHz)	Corrected Level (dBm)	PSD (dBW/MHz)	EIRP= (PSD+0dBi) (dBW/MHz)	EIRP Limit (dBW/MHz)	Margin (dB)
799.1	1598.4	-45.64	-75.64	-75.64	-70	-5.64
804.9	1609.8	-46.14	-76.14	-76.14	-70	-6.14

PSD(dBm/Hz)= Power(dBm)-10log(RBW)
RBW used in MHz

5.10. ADJACENT CHANNEL POWER [§ 90.543] [RSS-119 –Section 5.8.9]

5.10.1. Limits

§ 90.543 (a) The adjacent channel power (ACP) requirements for transmitters designed for various channel sizes are shown in the following tables. Mobile station requirements apply to handheld, car mounted and control station units. The tables specify a value for the ACP as a function of the displacement from the channel center frequency and measurement bandwidth. In the following tables, "(s)" indicates a swept measurement may be used.

12.5 kHz Mobile Transmitter ACP Requirements

Offset from center frequency (kHz)	Measurement bandwidth (kHz)	Maximum ACP relative (dBc)
9.375	6.25	−40
15.625	6.25	−60
21.875	6.25	−60
37.50	25.00	−60
62.50	25.00	−65
87.50	25.00	−65
150.00	100	−65
250.00	100	−65
350.00	100	−65
>400 to 12 MHz	30 (s)	−75
12 MHz to paired receive band	30 (s)	−75
In the paired receive band	30 (s)	−100

25 kHz Mobile Transmitter ACP Requirements

Offset from center frequency (kHz)	Measurement bandwidth (kHz)	Maximum ACP relative (dBc)
15.625	6.25	−40
21.875	6.25	−60
37.50	25	−60
62.50	25	−65
87.50	25	−65
150.00	100	−65
250.00	100	−65
350.00	100	−65
>400 kHz to 12 MHz	30 (s)	−75
12 MHz to paired receive band	30 (s)	−75
In the paired receive band	30 (s)	−100

5.10.2. Method of Measurements

TIA-603-E and § 90.543

5.10.3. Test Data

5.10.3.1. Analog 12.5 kHz @ 769.1 MHZ

Mode		Analog		
Frequency(MHz)		769.1		
Channel Spacing(KHz)		12.5		
Offset (KHz)	Measurement BW (KHz)	Lower ACP (dBc)	Upper ACP (dBc)	Maximum ACP Relative (dBc)
9.375	6.25	-48.54	-49.30	-40
15.625	6.25	-73.63	-73.27	-60
21.875	6.25	-74.66	-74.87	-60
37.5	25	-72.62	-72.99	-60
62.5	25	-77.05	-77.56	-65
87.5	25	-79.02	-79.97	-65
150	100	-76.18	-77.84	-65
250	100	-77.86	-79.72	-65
350	100	-81.38	-82.01	-65
400	30	-88.27	-88.49	-75
12M	30	-92.58	-92.84	-75

5.10.3.2. Analog 12.5 kHz @ 774.9 MHZ

Mode		Analog		
Frequency(MHz)		774.9		
Channel Spacing(KHz)		12.5		
Offset (KHz)	Measurement BW (KHz)	Lower ACP (dBc)	Upper ACP (dBc)	Maximum ACP Relative (dBc)
9.375	6.25	-48.47	-49.33	-40
15.625	6.25	-75.52	-74.99	-60
21.875	6.25	-75.47	-76.16	-60
37.5	25	-74.75	-74.87	-60
62.5	25	-77.78	-78.28	-65
87.5	25	-80.54	-81.16	-65
150	100	-77.32	-78.56	-65
250	100	-80.27	-80.51	-65
350	100	-81.30	-81.96	-65
400	30	-87.00	-87.85	-75
12M	30	-93.15	-93.69	-75

5.10.3.3. Analog 12.5 kHz @ 799.1 MHZ

Mode		Analog		
Frequency(MHz)		799.1		
Channel Spacing(KHz)		12.5		
Offset (KHz)	Measurement BW (KHz)	Lower ACP (dBc)	Upper ACP (dBc)	Maximum ACP Relative (dBc)
9.375	6.25	-48.67	-49.67	-40
15.625	6.25	-74.03	-74.36	-60
21.875	6.25	-75.19	-75.54	-60
37.5	25	-73.12	-74.22	-60
62.5	25	-77.77	-78.94	-65
87.5	25	-80.19	-80.24	-65
150	100	-77.01	-77.29	-65
250	100	-78.91	-79.41	-65
350	100	-80.73	-81.02	-65
400	30	-87.05	-87.07	-75
12M	30	-92.63	-93.22	-75
In paired receive band	30(swept)	-106.67	-107.81	-100

5.10.3.4. Analog 12.5 kHz @ 804.9 MHZ

Mode		Analog		
Frequency(MHz)		804.9		
Channel Spacing(KHz)		12.5		
Offset (KHz)	Measurement BW (KHz)	Lower ACP (dBc)	Upper ACP (dBc)	Maximum ACP Relative (dBc)
9.375	6.25	-50.51	-49.13	-40
15.625	6.25	-75.13	-74.95	-60
21.875	6.25	-76.97	-76.43	-60
37.5	25	-72.91	-74.09	-60
62.5	25	-77.60	-78.12	-65
87.5	25	-79.89	-80.38	-65
150	100	-76.84	-76.87	-65
250	100	-77.74	-78.30	-65
350	100	-80.85	-81.22	-65
400	30	-87.16	-87.39	-75
12M	30	-93.42	-93.25	-75
In paired receive band	30(Swept)	-107.05	-107.61	-100

5.10.3.5. Digital F1E&F1D 12.5 kHz @ 769.1 MHZ

Mode		Digital F1E&F1D		
Frequency(MHz)		769.1		
Channel Spacing(KHz)		12.5		
Offset (KHz)	Measurement BW (KHz)	Lower ACP (dBc)	Upper ACP (dBc)	Maximum ACP Relative (dBc)
9.375	6.25	-41.78	-42.30	-40
15.625	6.25	-71.65	-71.74	-60
21.875	6.25	-72.75	-72.77	-60
37.5	25	-71.77	-71.16	-65
62.5	25	-75.79	-75.92	-65
87.5	25	-77.36	-77.58	-65
150	100	-72.87	-74.51	-65
250	100	-75.46	-76.86	-65
350	100	-78.11	-78.07	-65
400	30	-85.81	-85.82	-75
12M	30	-93.39	-92.95	-75

5.10.3.6. Digital F1E&F1D 12.5 kHz @ 774.9 MHZ

Mode		Digital F1E&F1D		
Frequency(MHz)		774.9		
Channel Spacing(KHz)		12.5		
Offset (KHz)	Measurement BW (KHz)	Lower ACP (dBc)	Upper ACP (dBc)	Maximum ACP Relative (dBc)
9.375	6.25	-40.78	-42.68	-40
15.625	6.25	-73.94	-75.03	-60
21.875	6.25	-74.74	-75.86	-60
37.5	25	-72.34	-72.26	-65
62.5	25	-76.98	-76.92	-65
87.5	25	-78.80	-78.68	-65
150	100	-74.06	-74.24	-65
250	100	-76.45	-76.17	-65
350	100	-77.48	-77.46	-65
400	30	-84.89	-85.82	-75
12M	30	-93.18	-93.17	-75

5.10.3.7. Digital F1E&F1D 12.5 kHz @ 799.1 MHZ

Mode		Digital F1E&F1D		
Frequency(MHz)		799.1		
Channel Spacing(KHz)		12.5		
Offset (KHz)	Measurement BW (KHz)	Lower ACP (dBc)	Upper ACP (dBc)	Maximum ACP Relative (dBc)
9.375	6.25	-41.25	-42.24	-40
15.625	6.25	-74.35	-74.75	-60
21.875	6.25	-74.77	-75.78	-60
37.5	25	-71.19	-72.01	-65
62.5	25	-76.09	-76.75	-65
87.5	25	-78.25	-78.18	-65
150	100	-73.05	-73.55	-65
250	100	-74.97	-74.94	-65
350	100	-77.53	-77.34	-65
400	30	-84.47	-85.41	-75
12M	30	-93.41	-93.01	-75
In receive band	30(Swept)	-106.65	-106.91	-100

5.10.3.8. Digital F1E&F1D 12.5 kHz @ 804.9 MHZ

Mode		Digital F1E&F1D		
Frequency(MHz)		804.9		
Channel Spacing(KHz)		12.5		
Offset (KHz)	Measurement BW (KHz)	Lower ACP (dBc)	Upper ACP (dBc)	Maximum ACP Relative (dBc)
9.375	6.25	-40.50	-42.89	-40
15.625	6.25	-73.85	-74.69	-60
21.875	6.25	-75.34	-74.87	-60
37.5	25	-72.24	-71.72	-65
62.5	25	-76.37	-75.86	-65
87.5	25	-78.84	-78.57	-65
150	100	-73.67	-73.81	-65
250	100	-74.90	-74.89	-65
350	100	-77.33	-77.65	-65
400	30	-84.92	-85.37	-75
12M	30	-92.45	-93.90	-75
In receive band	30(Swept)	-106.69	-107.23	-100

5.10.3.9. Digital F1W 12.5 kHz @ 769.1 MHZ

Mode		Digital F1W		
Frequency(MHz)		769.1		
Channel Spacing(KHz)		12.5		
Offset (KHz)	Measurement BW (KHz)	Lower ACP (dBc)	Upper ACP (dBc)	Maximum ACP Relative (dBc)
9.375	6.25	-41.66	-43.96	-40
15.625	6.25	-72.48	-73.07	-60
21.875	6.25	-73.89	-75.52	-60
37.5	25	-72.14	-72.49	-65
62.5	25	-77.58	-77.01	-65
87.5	25	-79.24	-80.14	-65
150	100	-73.55	-74.83	-65
250	100	-76.85	-78.09	-65
350	100	-78.57	-79.73	-65
400	30	-86.33	-86.71	-75
12M	30	-93.60	-93.06	-75

5.10.3.10. Digital F1W 12.5 kHz @ 774.9 MHZ

Frequency(MHz)		774.9		
Channel Spacing(KHz)		12.5		
Offset (KHz)	Measurement BW (KHz)	Lower ACP (dBc)	Upper ACP (dBc)	Maximum ACP Relative (dBc)
9.375	6.25	-41.62	-41.96	-40
15.625	6.25	-72.11	-73.19	-60
21.875	6.25	-74.70	-75.30	-60
37.5	25	-73.04	-73.75	-65
62.5	25	-77.43	-78.33	-65
87.5	25	-78.92	-80.17	-65
150	100	-75.75	-76.09	-65
250	100	-77.79	-77.44	-65
350	100	-78.88	-79.60	-65
400	30	-85.98	-86.43	-75
12M	30	-92.76	-93.34	-75

5.10.3.11. Digital F1W 12.5 kHz @ 799.1 MHZ

Mode		Digital F1W		
Frequency(MHz)		799.1		
Channel Spacing(KHz)		12.5		
Offset (KHz)	Measurement BW (KHz)	Lower ACP (dBc)	Upper ACP (dBc)	Maximum ACP Relative (dBc)
9.375	6.25	-42.21	-42.71	-40
15.625	6.25	-73.10	-73.34	-60
21.875	6.25	-75.26	-75.40	-60
37.5	25	-72.43	-72.28	-65
62.5	25	-77.72	-77.34	-65
87.5	25	-78.86	-79.31	-65
150	100	-74.01	-74.21	-65
250	100	-75.26	-76.04	-65
350	100	-78.65	-78.14	-65
400	30	-85.34	-84.80	-75
12M	30	-94.00	-94.00	-75
In receive band	30(Swept)	-106.18	-107.20	-100

5.10.3.12. Digital F1W 12.5 kHz @ 804.9 MHZ

Mode		Digital F1W		
Frequency(MHz)		804.9		
Channel Spacing(KHz)		12.5		
Offset (KHz)	Measurement BW (KHz)	Lower ACP (dBc)	Upper ACP (dBc)	Maximum ACP Relative (dBc)
9.375	6.25	-43.13	-41.96	-40
15.625	6.25	-72.47	-73.78	-60
21.875	6.25	-74.28	-74.92	-60
37.5	25	-72.56	-72.18	-65
62.5	25	-77.10	-77.24	-65
87.5	25	-79.52	-78.97	-65
150	100	-74.27	-73.95	-65
250	100	-75.40	-75.72	-65
350	100	-78.06	-78.66	-65
400	30	-85.19	-86.10	-75
12M	30	-92.90	-93.17	-75
In receive band	30(Swept)	-106.75	-106.96	-100

5.11. TRANSMITTER SPURIOUS/HARMONIC RADIATED EMISSIONS [§§ 2.1053, 2.1057, 22.359, 80.211(f)(3) & 90.210] [RSS-119, § 5.5 & 5.8]

5.11.1. Limits

Emissions shall be attenuated below the mean output power of the transmitter as follows:

FCC Rules	Attenuation Limit (dBc)
§ 90.210(b)	At least 43 + 10 log (P) dB.
§ 90.210(d)	At least 50 + 10 log (P) dB or 70 dB, whichever is the lesser attenuation.
§ 90.543(b)	At least 43 + 10 log (P) dB

RSS-119
Emissions shall be attenuated below the mean output power of the transmitter as follows:

RSS-119, Issue 12 Tables 6 & 7	Frequency Range	Attenuation Limit (dBc)
Mask D	30 MHz or lowest radio frequency signal generated in the device to the tenth harmonic of the highest fundamental frequency.	At least 50 + 10 log (P) dB or 70 dB, whichever is the lesser attenuation.
Mask E	30 MHz or lowest radio frequency signal generated in the device to the tenth harmonic of the highest fundamental frequency.	At least 55 + 10 log (P) or 65 dB, whichever is the lesser attenuation.
Mask B	30 MHz or lowest radio frequency signal generated in the device to the tenth harmonic of the highest fundamental frequency.	At least 43 + 10 log (P).

5.11.2. Method of Measurements

The spurious/harmonic ERP measurements are using substitution method specified in Section 8.2 of this report.

5.11.3. Test Data

Remarks:

- The RF spurious/harmonic emission characteristics for different channel spacing are indistinguishable. Therefore, the following radiated emissions were performed at 12.5 kHz channel spacing Digital F1W operation,
- The radiated emissions were performed with high power setting at 3 m distance to represents the worst-case test configuration.
- The emissions were scanned from 30 MHz to 10th harmonics; all spurious emissions that are in excess of 20dB below the specified limit shall be recorded.

5.11.3.1. Near Lowest Frequency (769.1MHz) –Band 1

Test Frequency (MHz):		769.1				
Power Setting:		HIGH				
Limit (dBm):		-13.0				
Frequency (MHz)	E-Field (dBµV/m)	EMI Detector (Peak/QP)	Antenna Polarization (H/V)	ERP Measured (dBm)	Limit (dBm)	Margin (dB)
All emissions are more than 20 dB below the limit line.						

5.11.3.2. Near Highest Frequency (774.9MHz) –Band 1

Test Frequency (MHz):		774.9				
Power Setting:		HIGH				
Limit (dBm):		-13.0				
Frequency (MHz)	E-Field (dBµV/m)	EMI Detector (Peak/QP)	Antenna Polarization (H/V)	ERP Measured (dBm)	Limit (dBm)	Margin (dB)
All emissions are more than 20 dB below the limit line.						

5.11.3.3. Near Lowest Frequency (799.1 MHz) –Band 2

Test Frequency (MHz):		799.1				
Power Setting:		HIGH				
Limit (dBm):		-13.0				
Frequency (MHz)	E-Field (dBµV/m)	EMI Detector (Peak/QP)	Antenna Polarization (H/V)	ERP Measured (dBm)	Limit (dBm)	Margin (dB)
All emissions are more than 20 dB below the limit line. Note: For band 1559-1610 MHz as per ANSI 63.26 (6.5.2.7) conducted method is to be used and this evaluation is shown in the conducted data for this band						

5.11.3.4. Near Highest Frequency (804.9MHz) –Band 2

Test Frequency (MHz):		804.9				
Power Setting:		HIGH				
Limit (dBm):		-13.0				
Frequency (MHz)	E-Field (dBµV/m)	EMI Detector (Peak/QP)	Antenna Polarization (H/V)	ERP Measured (dBm)	Limit (dBm)	Margin (dB)
All emissions are more than 20 dB below the limit line. Note: For band 1559-1610 MHz as per ANSI 63.26 (6.5.2.7) conducted method is to be used and this evaluation is shown in the conducted data for this band						

5.11.3.5. Near Lowest Frequency (806.1MHz) –Band 3

Test Frequency (MHz):	806.1					
Power Setting:	HIGH					
Limit (dBm):	-20.0					
Frequency (MHz)	**E-Field (dBµV/m)**	**EMI Detector (Peak/QP)**	**Antenna Polarization (H/V)**	**ERP Measured (dBm)**	**Limit (dBm)**	**Margin (dB)**
1612.2	75.58	PEAK	V	-24.40	-20	-4.40
1612.2	73.70	PEAK	H	-26.70	-20	-6.70
2418.30	58.90	PEAK	V	-38.55	-20	-18.55
2418.30	58.56	PEAK	H	-39.95	-20	-19.95
All other emissions are more than 20 dB below the limit line.						

5.11.3.6. Near Middle Frequency (815.1 MHz) –Band 3

Test Frequency (MHz):	815.1					
Power Setting:	HIGH					
Limit (dBm):	-20.0					
Frequency (MHz)	**E-Field (dBµV/m)**	**EMI Detector (Peak/QP)**	**Antenna Polarization (H/V)**	**ERP Measured (dBm)**	**Limit (dBm)**	**Margin (dB)**
1630.2	77.21	PEAK	V	-21.69	-20	-1.69
1630.2	75.44	PEAK	H	-24.59	-20	-4.59
2445.30	59.16	PEAK	V	-38.96	-20	-18.96
2445.30	57.26	PEAK	H	-39.66	-20	-19.66
4890.60	64.77	PEAK	H	-35.58	-20	-15.58
All other emissions are more than 20 dB below the limit line.						

5.11.3.7. Near Highest Frequency (823.9MHz) –Band 3

Test Frequency (MHz):	823.9					
Power Setting:	HIGH					
Limit (dBm):	-20.0					
Frequency (MHz)	**E-Field (dBµV/m)**	**EMI Detector (Peak/QP)**	**Antenna Polarization (H/V)**	**ERP Measured (dBm)**	**Limit (dBm)**	**Margin (dB)**
1647.8	75.07	PEAK	V	-23.51	-20	-3.51
1647.8	71.48	PEAK	H	27.61	-20	-7.61
2471.70	59.86	PEAK	V	-39.48	-20	-19.48
4943.40	67.11	PEAK	V	-32.22	-20	-12.22
4943.40	64.55	PEAK	H	-34.52	-20	-14.52
All other emissions are more than 20 dB below the limit line.						

5.11.3.8. Near Lowest Frequency (851.1MHz) –Band 4

Test Frequency (MHz):		851.1				
Power Setting:		HIGH				
Limit (dBm):		-20.0				
Frequency (MHz)	E-Field (dBµV/m)	EMI Detector (Peak/QP)	Antenna Polarization (H/V)	ERP Measured (dBm)	Limit (dBm)	Margin (dB)
1702.2	65.61	PEAK	V	-33.28	-20.0	-13.28
1702.2	69.55	PEAK	H	-29.18	-20.0	-9.18
2553.30	61.71	PEAK	V	-36.40	-20.0	-16.40
2553.30	60.06	PEAK	H	-37.20	-20.0	-17.20
5106.60	72.72	PEAK	V	-27.14	-20.0	-7.14
5106.60	71.68	PEAK	H	-28.24	-20.0	-8.24
8511.00	62.61	PEAK	V	-38.11	-20.0	-18.11
All other emissions are more than 20 dB below the limit line.						

5.11.3.9. Near Middle Frequency (860.1 MHz) –Band 4

Test Frequency (MHz):		860.1				
Power Setting:		HIGH				
Limit (dBm):		-20.0				
Frequency (MHz)	E-Field (dBµV/m)	EMI Detector (Peak/QP)	Antenna Polarization (H/V)	ERP Measured (dBm)	Limit (dBm)	Margin (dB)
1720.20	63.42	PEAK	V	-35.25	-20.0	-15.25
1720.20	69.55	PEAK	H	-32.85	-20.0	-12.85
2580.30	59.67	PEAK	V	-38.52	-20.0	-18.52
5160.60	68.05	PEAK	V	-32.00	-20.0	-12.00
5160.60	66.63	PEAK	H	-33.30	-20.0	-13.30
6020.70	63.02	PEAK	V	-36.91	-20.0	-16.91
6880.80	60.81	PEAK	V	-38.82	-20.0	-18.82
All other emissions are more than 20 dB below the limit line.						

5.11.3.10. Near Highest Frequency (868.9 MHz) –Band 4

Test Frequency (MHz):		**868.9**				
Power Setting:		HIGH				
Limit (dBm):		-20.0				
Frequency (MHz)	**E-Field (dBµV/m)**	**EMI Detector (Peak/QP)**	**Antenna Polarization (H/V)**	**ERP Measured (dBm)**	**Limit (dBm)**	**Margin (dB)**
1737.80	63.26	PEAK	V	-34.94	-20.0	-14.94
1737.80	61.57	PEAK	H	-37.44	-20.0	-17.44
5213.40	65.33	PEAK	V	-35.29	-20.0	-15.29
5213.40	65.58	PEAK	H	-35.99	-20.0	-15.99
8689.00	63.40	PEAK	H	-37.29	-20.0	-17.29
All other emissions are more than 20 dB below the limit line.						

5.12. FREQUENCY STABILITY [§§ 2.1055, 22.355, 90.213& 90.539] [RSS-119 § 5.3]

5.12.1. Limits

§ 90.213 Transmitters used must have minimum frequency stability as specified in the following table.

Frequency Range (MHz)	Channel Bandwidth (KHz)	Frequency Tolerance (ppm)		
		Fixed and Base Stations	Mobile Stations	
			> 2 W	≤ 2 W
150-174 MHz	6.25 12.5 25	1.0 2.5 5.0	2.0 5.0 5.0	2.0 5.0 50.0*
421-512 MHz	6.25 12.5 25	0.5 1.5 2.5	1.0 2.5 5.0	1.0 2.5 5.0

- Stations operating in the 154.45 to 154.49 MHz or the 173.2 to 173.4 MHz bands must have a frequency stability of 5 ppm.
- Paging transmitters operating on paging-only frequencies must operate with frequency stability of 5 ppm in the 150-174 MHz band and 2.5 ppm in the 421-512 MHz band.

§ 22.355 Transmitters used must have minimum frequency stability as specified in the following table.

TABLE C–1—FREQUENCY TOLERANCE FOR TRANSMITTERS IN THE PUBLIC MOBILE SERVICES

Frequency range (MHz)	Base, fixed (ppm)	Mobile ≤3 watts (ppm)	Mobile ≤3 watts (ppm)
25 to 50	20.0	20.0	50.0
50 to 450	5.0	5.0	50.0
450 to 512	2.5	5.0	5.0
821 to 896	1.5	2.5	2.5
928 to 929	5.0	n/a	n/a
929 to 960	1.5	n/a	n/a
2110 to 2220	10.0	n/a	n/a

§ 90.539 Transmitters designed to operate in 769–775 MHz and 799–805 MHz frequency bands must meet the frequency stability requirements in this section.
(a) Mobile, portable and control transmitters must normally use automatic frequency control (AFC) to lock on to the base station signal.
(b) The frequency stability of base transmitters operating in the narrowband segment must be 100 parts per billion or better.
(c) The frequency stability of mobile, portable, and control transmitters operating in the narrowband segment must be 400 parts per billion or better when AFC is locked to the base station. When AFC is not locked to the base station, the frequency stability must be at least 1.0 ppm for 6.25 kHz, 1.5 ppm for 12.5 kHz (2 channel aggregate), and 2.5 ppm for 25 kHz (4 channel aggregate).
(d) The frequency stability of base transmitters operating in the wideband segment must be 1 part per million or better.
(e) The frequency stability of mobile, portable and control transmitters operating in the wideband segment must be 1.25 parts per million or better when AFC is locked to a base station, and 5 parts per million or better when AFC is not locked.

Note: For 90.539 band the EUT was tested while AFC was not locked and hence the limit is 1.5ppm. For this unit a limit of 1 ppm is specified by manufacturer.

RSS-119
The carrier frequency shall not depart from the reference frequency in excess of the values given in Table 1.

Table 1 - Transmitter Frequency Stability

Frequency Band (MHz)	Authorized Bandwidth (kHz)	Frequency Stability (ppm)		
		Base/Fixed	Mobile Station	
			>2 watts	≤ 2 watts
764-776 and 794-806 (Note 3)	6.25 12.5 25	0.1	0.4 (Note 4)	0.4 (Note 4)
	50	1	1.25 (Note 5)	1.25 (Note 5)
806-821/851-866 and 821-824/866-869 (Note 5)	25 (Note 2)	0.1	0.1	0.1
	25	1.5	2.5	2.5
	12.5	1	1.5	1.5
896-901/935-940 (Note 6)	12.5	0.1	1.5	1.5
929-930/931-932	25	1.5	N/A	N/A
928-929/952-953 and 932-932.5/941-941.5	25	1.5	N/A	N/A
	12.5	1	3 for remote station	N/A
932.5-935/941.5-944	25	2.5	N/A	N/A
	12.5	2.5	N/A	N/A

Note 1: Mobile units may utilize synchronizing signals from associated base stations to achieve the specified carrier stability.
Note 2: This provision is for digital equipment with a channel spacing of 25 kHz and an occupied bandwidth greater than 20kHz.
Note 2: Mobile, portable and control transmitters operating in the 764-776 MHz and 794-806 MHz must normally use automatic frequency control (AFC) to lock onto the base station signal. The mobile station's frequency stability values given in Table 1 are for mobile stations operating under this condition.
Note 3: Mobile, portable and control transmitters operating in the bands 768-776 MHz and 798-806 MHz must normally use AFC to lock onto the base station signal. The mobile station's frequency stability values given in Table 1 are for mobile stations operating under this condition.
Note 4: When the mobile, portable and control transmitters are operating in the 764-776 MHz narrowband segment and the AFC is not locked to the base station, the frequency stability must be at least 1.0 ppm for 6.25 kHz, 1.5 ppm for 12.5 kHz (2-channel aggregate), and 2.5 ppm for 25 kHz (4-channel aggregate).
Note 5 When the mobile, portable and control transmitters are operating with channel bandwidths equal to 50 kHz in the band 768-776 MHz and the AFC is not locked onto the base station signal, the frequency stability must be equal to or better than 5 ppm.
Note 6: Control stations may operate with the frequency tolerance specified for associated mobile frequencies.

Note: For 764-776 and 794-806 band the EUT was tested while AFC was not locked and hence the limit is 1.5ppm. For this unit a limit of 1 ppm is specified by manufacturer.

5.12.2. Method of Measurements

Refer to Section 8.3 of this report for measurement details

5.12.3. Test Data

Test Frequency:	**769.1 MHz**
Full Power Level:	27.8W
Frequency Tolerance Limit:	± 1.0 ppm or ± 769.1 Hz
Max. Frequency Tolerance Measured:	320 Hz or 0.42 ppm
Input Voltage Rating:	13.6VDC (nominal)

Ambient Temperature (°C)	**Frequency Drift (Hz)**		
	Supply Voltage (Nominal) 13.6 VDC	**Supply Voltage(-15%) 11.56 Vdc**	**Supply Voltage(+15%) 15.64 Vdc**
-30	320	--	--
-20	94	--	--
-10	95	--	--
0	-118	--	--
10	-97	--	--
20	-125	-134	-127
30	-124	--	--
40	-132	--	--
50	-142	--	--
60	137	--	--

Test Frequency:	**799.1 MHz**
Full Power Level:	27.29W
Frequency Tolerance Limit:	± 1.0 ppm or ± 799.1 Hz
Max. Frequency Tolerance Measured:	370 Hz or 0.46 ppm
Input Voltage Rating:	13.6VDC (nominal)

Ambient Temperature (°C)	**Frequency Drift (Hz)**		
	Supply Voltage (Nominal) 13.6 VDC	**Supply Voltage(-15%) 11.56 Vdc**	**Supply Voltage(+15%) 15.64 Vdc**
-30	370	--	--
-20	111	--	--
-10	109	--	--
0	-119	--	--
10	-101	--	--
20	-138	-123	-136
30	-140	--	--
40	-156	--	--
50	-125	--	--
60	137	--	--

Test Frequency:	**806.1 MHz**
Full Power Level:	33.65 W
Frequency Tolerance Limit:	± 1.0 ppm or ± 806.1 Hz
Max. Frequency Tolerance Measured:	299 Hz or 0.37 ppm
Input Voltage Rating:	13.6 VDC (nominal)

Ambient Temperature (°C)	**Frequency Drift (Hz)**		
	Supply Voltage (Nominal) 13.6 VDC	**Supply Voltage(-15%) 11.56 Vdc**	**Supply Voltage(+15%) 15.64 Vdc**
-30	299	--	--
-20	277	--	--
-10	251	--	--
0	170	--	--
10	139	--	--
20	148	132	120
30	110	--	--
40	-101	--	--
50	-186	--	--
60	-174	--	--

Test Frequency:	**851.1 MHz**
Full Power Level:	32.73 W
Frequency Tolerance Limit:	± 1.0 ppm or ± 851.1 Hz
Max. Frequency Tolerance Measured:	265 Hz or 0.31 ppm
Input Voltage Rating:	13.6 VDC (nominal)

Ambient Temperature (°C)	**Frequency Drift (Hz)**		
	Supply Voltage (Nominal) 13.6 VDC	**Supply Voltage(-15%) 11.56 Vdc**	**Supply Voltage(+15%) 15.64 Vdc**
-30	265	--	--
-20	106	--	--
-10	134	--	--
0	101	--	--
10	-152	--	--
20	-153	-150	-165
30	-163	--	--
40	-175	--	--
50	-140	--	--
60	148	--	--

5.13. RF EXPOSURE REQUIREMENTS [§§ 1.1310 & 2.1091][RSS-102]

5.13.1. Limits

§ **1.1310:** The criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in 1.1307(b).

Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*($900/f^2$)	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500			f/1500	30
1500-100,000			1.0	30

f = frequency in MHz
* = Plane-wave equivalent power density

RSS-102.:The criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in RSS-102.

Table 4: RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m^2)	Reference Period (minutes)
300-6000	$3.142\ f^{0.3417}$	$0.008335\ f^{0.3417}$	$0.02619 f^{0.6834}$	6
Note: f is frequency in MHz.				

Table 6: RF Field Strength Limits for Controlled Use Devices (Controlled Environment)

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m^2)	Reference Period (minutes)
100-6000	$15.60\ f^{0.25}$	$0.04138\ f^{0.25}$	$0.6455 f^{0.5}$	6
Note: f is frequency in MHz.				

Note 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

Note 2: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

5.13.2. Method of Measurements

Calculation Method of RF Safety Distance:

$$S = \frac{PG}{4\pi \cdot r^2} = \frac{EIRP}{4\pi \cdot r^2}$$

Where, P: power input to the antenna in mW
EIRP: Equivalent (effective) isotropic radiated power.
S: power density mW/cm^2
G: numeric gain of antenna relative to isotropic radiator
r: distance to centre of radiation in cm

$$r = \sqrt{\frac{PG}{4\pi \cdot S}} = \sqrt{\frac{EIRP}{4\pi \cdot S}}$$

FCC radio frequency exposure limits may be exceeded at distances closer than r cm from the antenna of this device.

5.13.3. Evaluation of RF Exposure Compliance Requirements

. This mobile radio also contains a **Bluetooth Module** which may transmit simultaneously with Tx output power of 0.00204 Watts which is very low and category excluded for mobile application where minimum 20cm user separation distance from the radio is always maintained

5.13.3.1. FCC Evaluation

Maximum RF Power conducted, $\mathbf{P_{conducted}[W]}$:	35.0
Maximum Antenna Gain, **G[dBi]**:	0
Maximum EIRP, $\mathbf{P_{EIRP}[W]}$:	35.0
User-based time-average for PTT	50%
MPE Limit for Occupational/Controlled Exposure, $\mathbf{S_{controlled}[mW/cm^2]}$:	2.56
MPE Limit for General Population/Uncontrolled Exposure, $\mathbf{S_{uncontrolled}[mW/cm^2]}$	0.512
Min Calculated RF Safety Distance for Occupational/Controlled Exposure, $\mathbf{r_{safety\_controlled}[cm]}$:	**24**
Min Calculated RF Safety Distance for General Population/Uncontrolled Exposure, $\mathbf{r_{safety\_uncontrolled}[cm]}$	**53**

5.13.3.2. ISED Evaluation

Maximum RF Power conducted, $\mathbf{P_{conducted}[W]}$:	35
Maximum Antenna Gain, **G[dBi]**:	0
Maximum EIRP, $\mathbf{P_{EIRP}[W]}$:	35
User-based time-average for PTT	50 %

MPE Environment	Power Density limit , S (mW/m^2)	Minimum Distance (Cm)	Distance In user's manual (Cm)	Power Density at user's manual distance, S (mW/m^2)	Power Density at user's manual distance, S (W/m^2)
Occupational/Controlled Exposure	**1.79**	**28**	**31 (0.31m)**	**1.44**	**14.4**
General Population/Uncontrolled Exposure	**0.24**	**77**	**82 (0.82m)**	**0.21**	**2.1**

5.14. RECEIVER ANTENNA POWER SPURIOUS/HARMONIC CONDUCTED EMISSIONS [RSS-Gen § 7.2.3 & RSS-119 § 5.11]

5.14.1. Limits

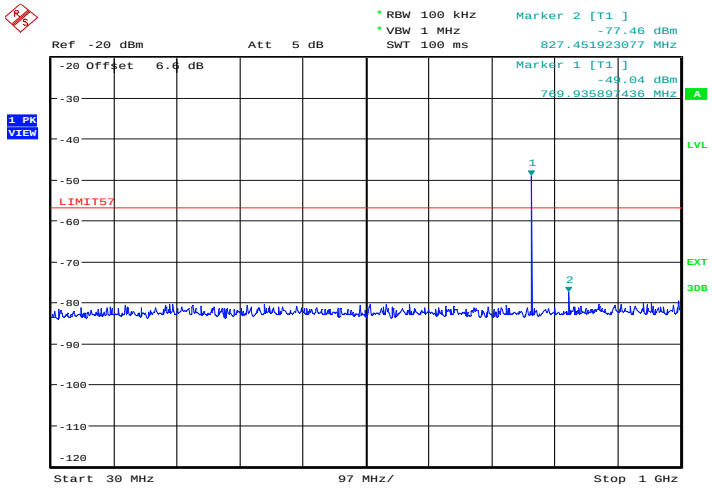
No spurious output signals appearing at the antenna terminals shall exceed 2 nanowatts per any 4 kHz spurious frequency in the band 30-1000 MHz, or 5 nanowatts above 1 GHz.

5.14.2. Method of Measurements

Refer to RSS-Gen and TIA-603-E.

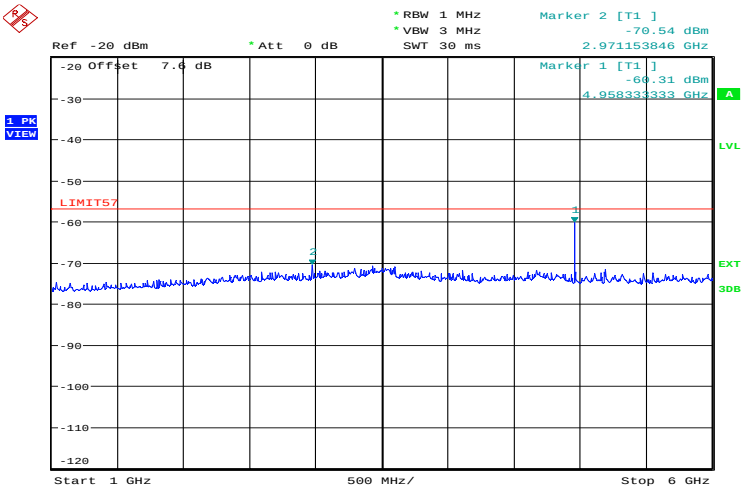
5.14.3. Test Data

5.14.3.1. Configuration: Rx Conducted Emission, Band 1: 769-775MHz, 769.1MHz



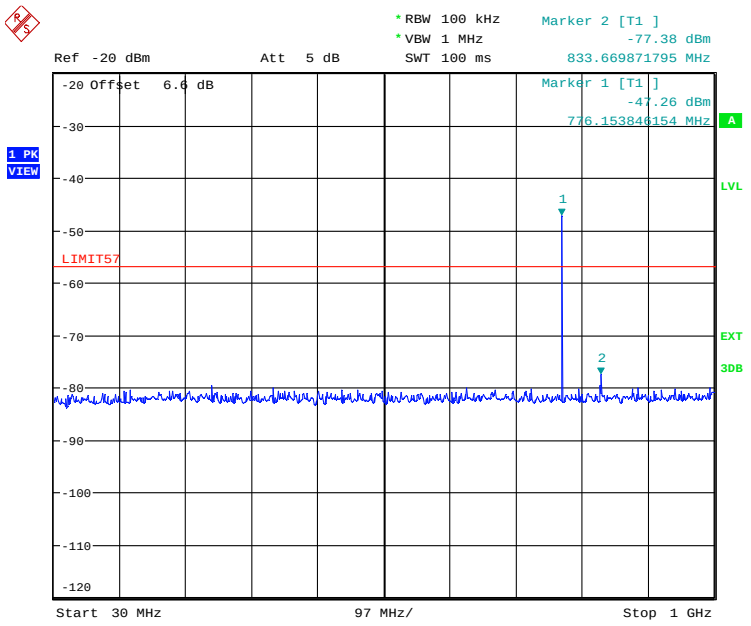
Date: 16.AUG.2023 10:23:44

Highest peak is Rx Signal input (1mV rms)



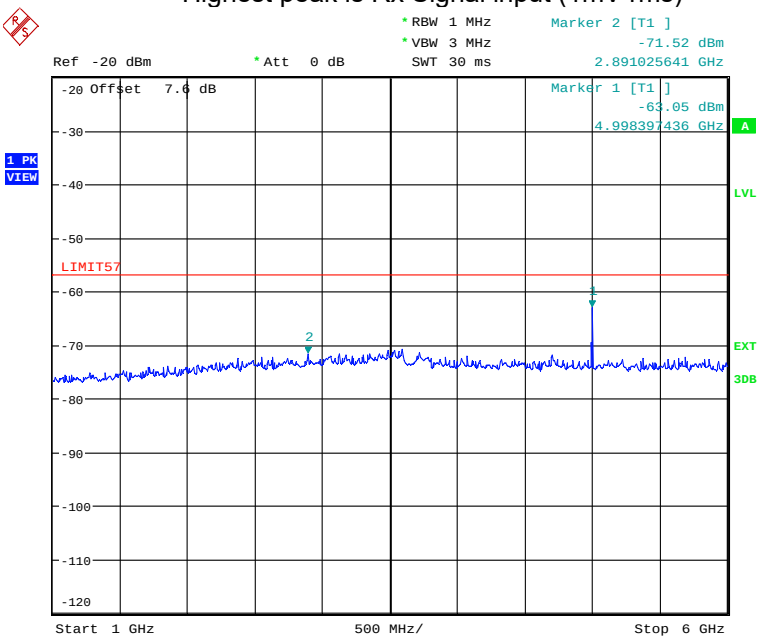
Date: 16.AUG.2023 10:35:42

5.14.3.2. Configuration: Rx Conducted Emission, Band 1: 769-775MHz, 774.9MHz



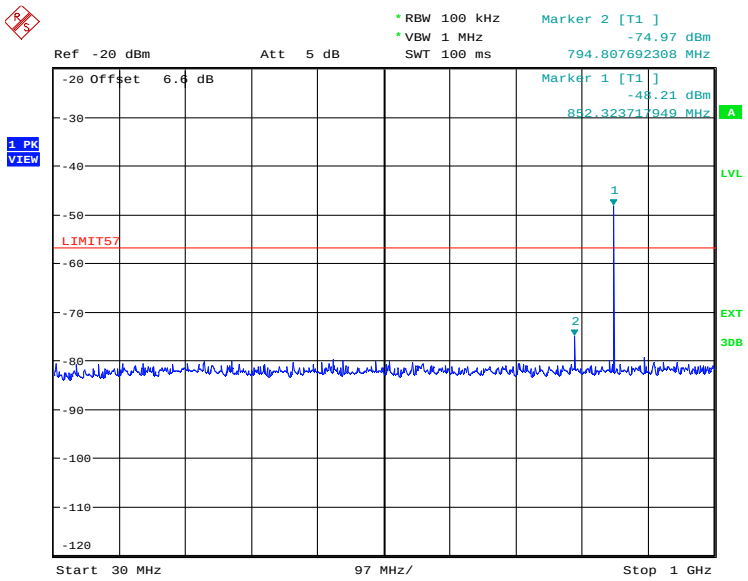
Date: 16.AUG.2023 10:26:47

Highest peak is Rx Signal input (1mV rms)



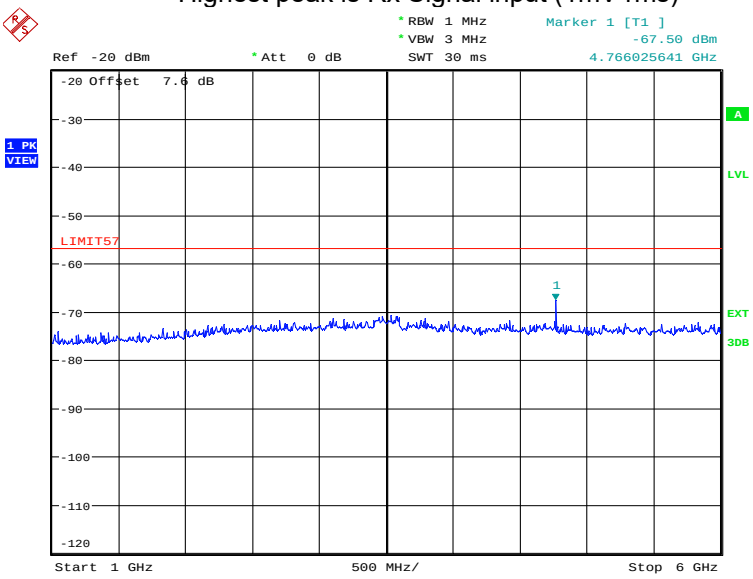
Date: 16.AUG.2023 10:36:59

5.14.3.3. Configuration: Rx Conducted Emission, Band 4: 851-869MHz, 851.1MHz



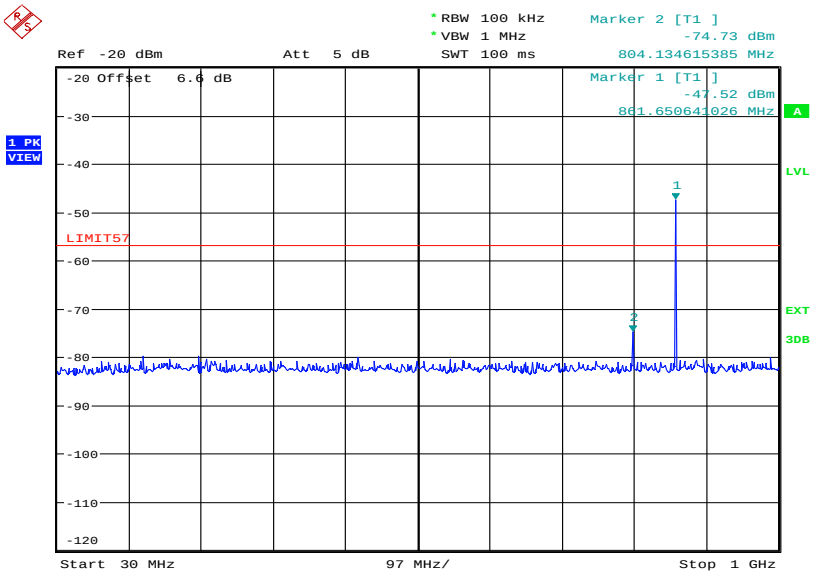
Date: 16.AUG.2023 10:28:45

Highest peak is Rx Signal input (1mV rms)



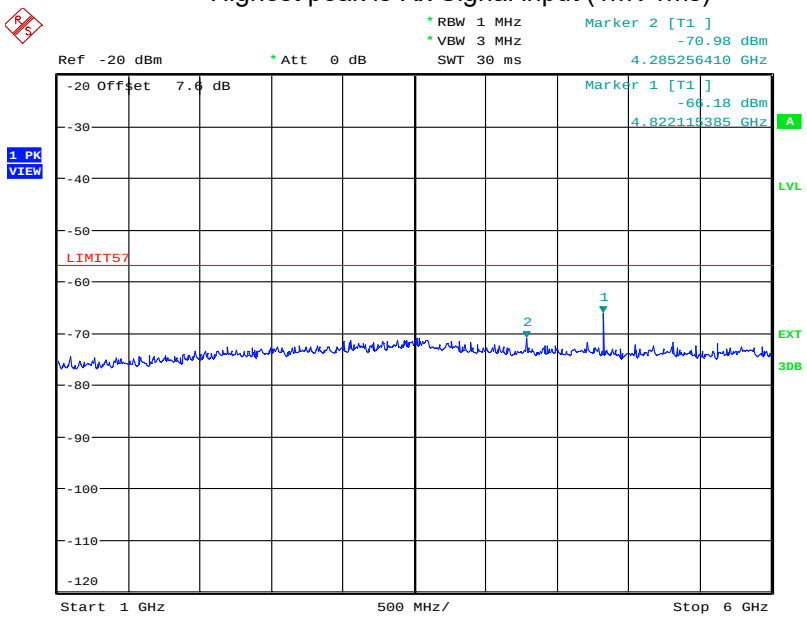
Date: 16.AUG.2023 10:38:23

5.14.3.4. Configuration: Rx Conducted Emission, Band 4: 851-869MHz, 860.1MHz



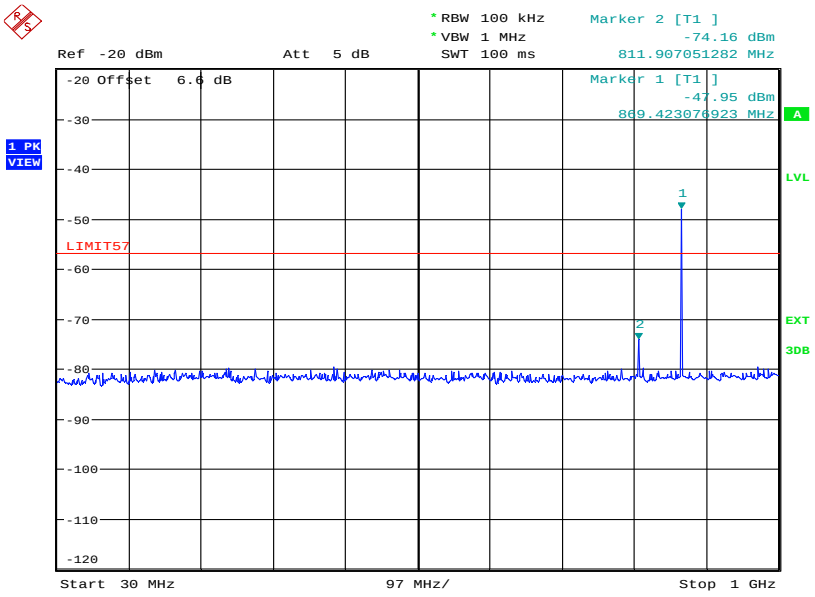
Date: 16.AUG.2023 10:31:20

Highest peak is Rx Signal input (1mV rms)



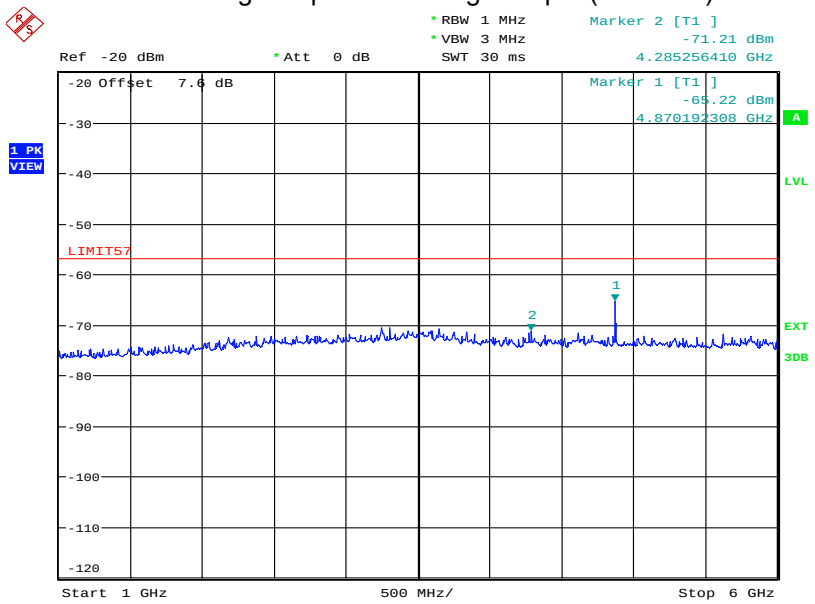
Date: 16.AUG.2023 10:39:36

5.14.3.5. Configuration: Rx Conducted Emission, Band 4: 851-869MHz, 868.9MHz



Date: 16.AUG.2023 10:32:36

Highest peak is Rx Signal input (1mV rms)



Date: 16.AUG.2023 10:40:59

5.15. RECEIVER SPURIOUS EMISSIONS (RADIATED) [RSS-Gen § 7.2.3 & RSS-119 § 5.11]

5.15.1. Limits

The equipment shall meet the limits of the following table:

Spurious Frequency (MHz)	Field Strength at 3 meters	
	(μV/m)	(dBμV/m)
30 – 88	100	40.0
88 – 216	150	43.5
216 – 960	200	46.0
Above 960	500	54.0

5.15.2. Method of Measurements

RSS-Gen and ANSI C63.4

5.15.3. Test data

- The measuring receiver shall be tuned over the frequency range 30 MHz to 6 GHz.
- All spurious emissions that are in excess of 20 dB below the specified limit shall be recorded.
- IF:57.15 MHz

Test Frequency (MHz)	Frequency (MHz)	RF Peak Measurement (dBuV/m)		RF QP/Avg Measurement (dBuV/m)		Limit (dBuV/m)	Margin (dB)	
		Vertical	Horizontal	Vertical	Horizontal		Vertical	Horizontal
769.100	4957.500	55.99	51.65	53.32	47.81	54	-0.68	-6.19
774.900	4992.300	55.09	52.36	52.35	49.03	54	-1.65	-4.97
851.100	793.950	38.20	37.90			46.02	-7.82	-8.12
	3175.800	44.26	43.55	37.95	34.57	54	-16.05	-19.43
	4763.700	49.13	48.96	43.69	42.30	54	-10.31	-11.70
	5557.650	49.30	47.87	40.64	37.72	54	-13.36	-16.28
860.100	802.950	36.40	37.70	--	--	46.02	-9.62	-8.32
	3211.800	44.74	43.53	38.05	35.19	54	-15.95	-18.81
	4817.700	51.89	50.34	47.98	45.68	54	-6.02	-8.32
	5620.650	50.06	47.40	41.87	37.73	54	-12.13	-16.27
868.900	811.750	36.83	39.84	--	--	46.02	-9.19	-6.18
	3247.000	43.20	43.21	35.77	33.64	54	-18.23	-20.36
	4870.500	53.68	51.21	50.78	44.26	54	-3.22	-9.74
	5682.250	50.48	48.76	41.15	37.36	54	-12.85	-16.64

5.16. RADIATED EMISSIONS FROM UNINTENTIONAL RADIATORS (DIGITAL DEVICES) [RSS-Gen § 7.3 & ICES-003, ISSUE 6]

5.16.1. Limits

The equipment shall meet the limits of the following table:

Frequency of emission (MHz)	Class B Limits	
	(dBµV/m at 3 m)	(dBµV/m at 10 m)
30 – 88	40.0	29.5
88 – 216	43.5	33.0
216 – 960	46.0	35.5
Above 960	54.0	43.5

5.16.2. Method of Measurements

Refer to Ultratech Test Procedures ULTR-P001-2004 & ANSI C63.4 for method of measurements.

5.16.3. Test Data

- The measuring receiver shall be tuned over the frequency range 30 MHz to 12.5 GHz.
- All spurious emissions that are in excess of 20 dB below the specified limit shall be recorded.

Frequency (MHz)	Measured Field Strength @ 3 m (dBµV/m)	Detector Used (Peak/QP)	Antenna Plane (H/V)	Field Strength Limits (dBµV/m)	Margin (dB)
43.99	31.4	PEAK	V	40	-8.6
43.99	25.2	PEAK	H	40	-14.8
107.72	28.4	PEAK	V	40	-11.6
107.72	26.1	PEAK	H	43.5	-17.4
176.12	30.6	QP	V	43.5	-12.9
264.72	27.2	PEAK	V	46	-18.8
264.72	28.8	PEAK	H	46	-17.2
272.5	27.75	PEAK	V	46	-18.25
283.38	27.53	PEAK	V	46	-18.47
337.78	29.78	PEAK	H	46	-16.22
441.93	29.62	PEAK	V	46	-16.38
441.93	31.85	PEAK	H	46	-14.15
566.29	32.11	PEAK	H	46	-13.89
794.8	35.8	PEAK	V	46	-10.2
794.8	38.59	PEAK	H	46	-7.41
4957	56.0	PEAK	V	74	-18.01
4957	53.3	AVG	V	54	-0.7
4957	51.7	PEAK	H	74	-22.3
4957	47.8	AVG	H	54	-6.19

5.17. POWER LINE CONDUCTED EMISSIONS FROM UNINTENTIONAL RADIATORS (DIGITAL DEVICES) [RSS-Gen § 7.2 & ICES-003, ISSUE 6]

5.17.1. Limits

The equipment shall meet the limits of the following table:

Frequency (MHz)	Conducted limit (dBµV)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56[Note 1]	56 to 46[Note 1]
0.5 – 5	56	46
5 – 30	60	50

Note 1: The level decreases linearly with the logarithm of the frequency.

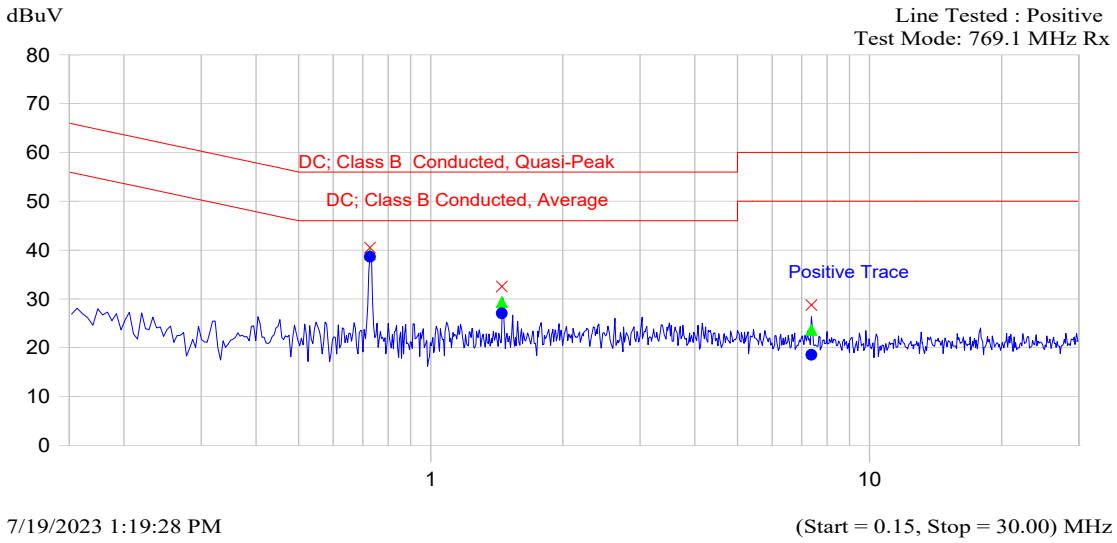
5.17.2. Method of Measurements

Refer to Ultratech Test Procedures ULTR-P001-2004 & ANSI C63.4 for method of measurements.

5.17.3. Test Data

Description: Line Voltage: 13.6 Vdc
Setup Name: DC; Conducted
Customer Name: ICOM
Project Number: ICOM-615Q
Operator Name: Nimisha
EUT Name: P25 Mobile Transceiver
Date Created: 7/19/2023 1:13:04 PM
Date Modified: 7/19/2023 1:23:44 PM

Current Graph

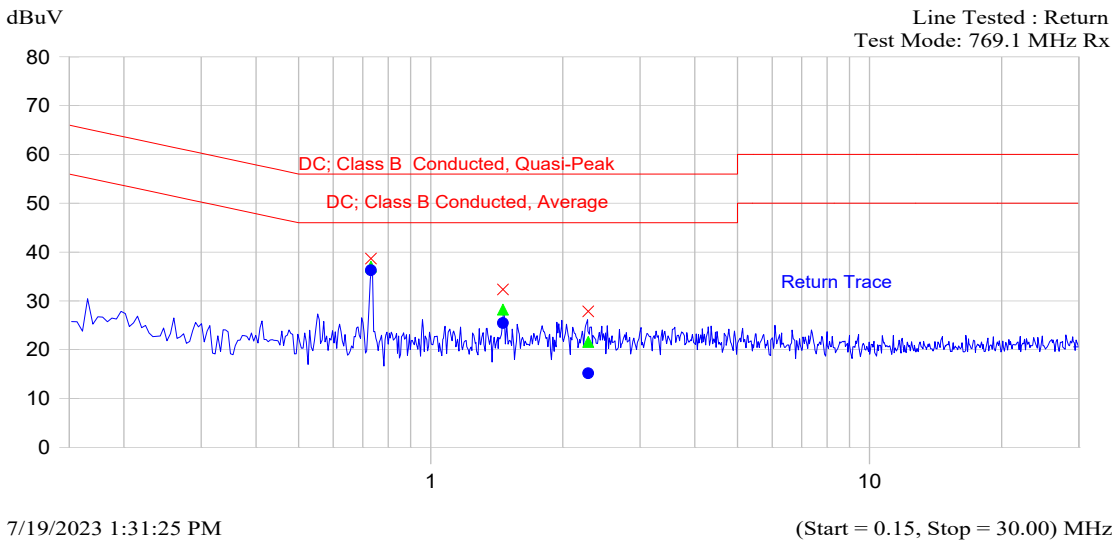


Current List

Frequency MHz	Peak dBuV	QP dBuV	Qp-Qp Limit dB	Avg dBuV	Avg-Avg Limit dB	Trace Name
0.727	40.5	39.1	-16.9	38.6	-7.4	Positive Trace
1.452	32.5	29.3	-26.7	27.0	-19.0	Positive Trace
7.369	28.7	23.7	-36.3	18.5	-31.5	Positive Trace

Description: Line Voltage: 13.6 Vdc
Setup Name: DC; Conducted
Customer Name: ICOM
Project Number: ICOM-615Q
Operator Name: Nimisha
EUT Name: P25 Mobile Transceiver
Date Created: 7/19/2023 1:13:04 PM
Date Modified: 7/19/2023 1:34:44 PM

Current Graph

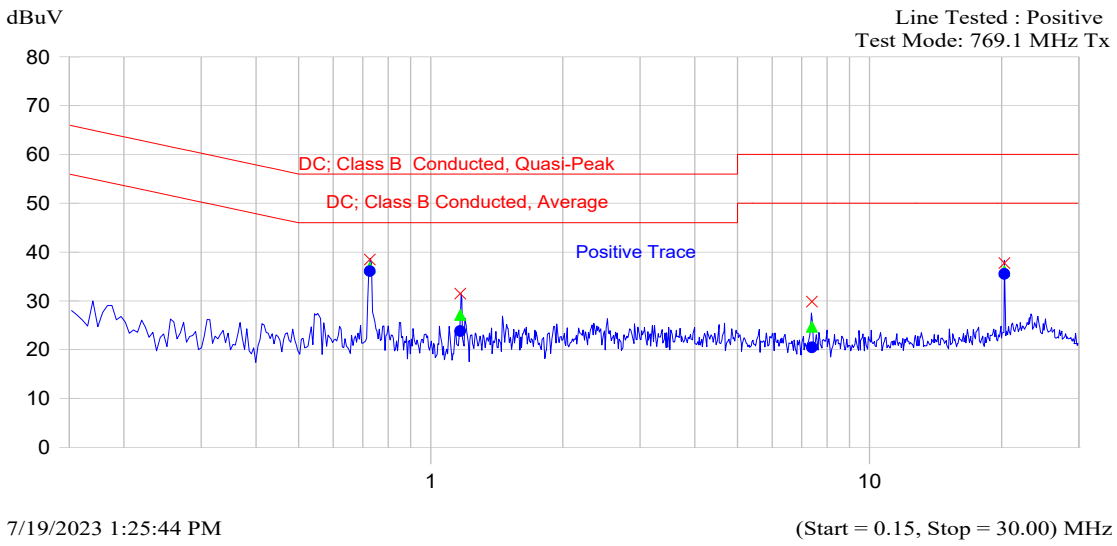


Current List

Frequency MHz	Peak dBuV	QP dBuV	Qp-Qp Limit dB	Avg dBuV	Avg-Avg Limit dB	Trace Name
0.730	38.7	37.0	-19.0	36.3	-9.7	Return Trace
1.461	32.3	28.2	-27.8	25.4	-20.6	Return Trace
2.286	27.8	21.6	-34.4	15.2	-30.8	Return Trace

Description: Line Voltage: 13.6 Vdc
Setup Name: DC; Conducted
Customer Name: ICOM
Project Number: ICOM-615Q
Operator Name: Nimisha
EUT Name: P25 Mobile Transceiver
Date Created: 7/19/2023 1:13:04 PM
Date Modified: 7/19/2023 1:30:05 PM

Current Graph

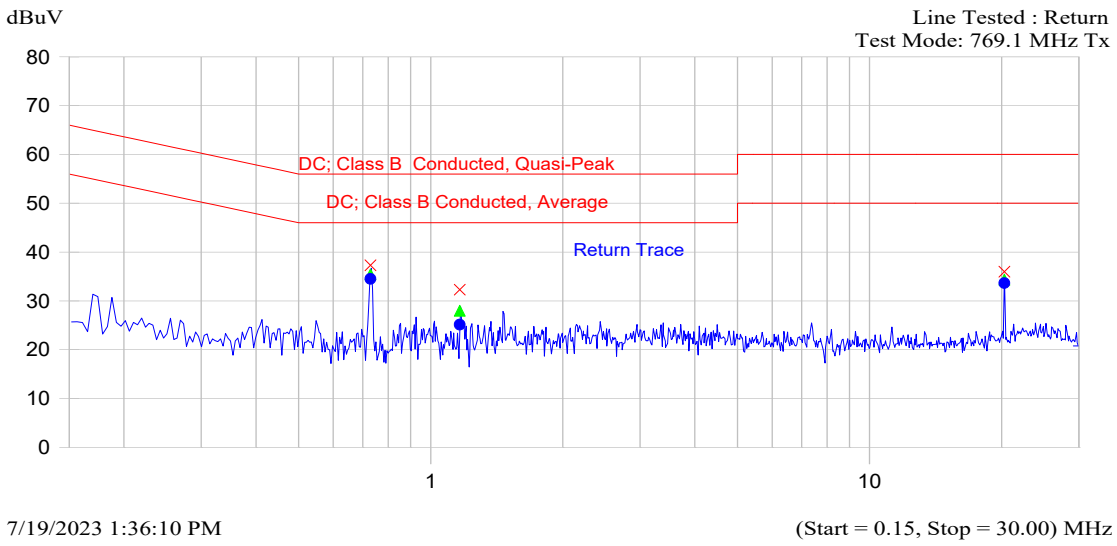


Current List

Frequency MHz	Peak dBuV	QP dBuV	Qp-Qp Limit dB	Avg dBuV	Avg-Avg Limit dB	Trace Name
0.726	38.5	36.8	-19.2	36.1	-9.9	Positive Trace
1.168	31.5	27.1	-28.9	23.8	-22.2	Positive Trace
7.384	29.9	24.7	-35.3	20.5	-29.5	Positive Trace
20.301	37.8	36.1	-23.9	35.5	-14.5	Positive Trace

Description: Line Voltage: 13.6 Vdc
Setup Name: DC; Conducted
Customer Name: ICOM
Project Number: ICOM-615Q
Operator Name: Nimisha
EUT Name: P25 Mobile Transceiver
Date Created: 7/19/2023 1:13:04 PM
Date Modified: 7/19/2023 1:40:19 PM

Current Graph

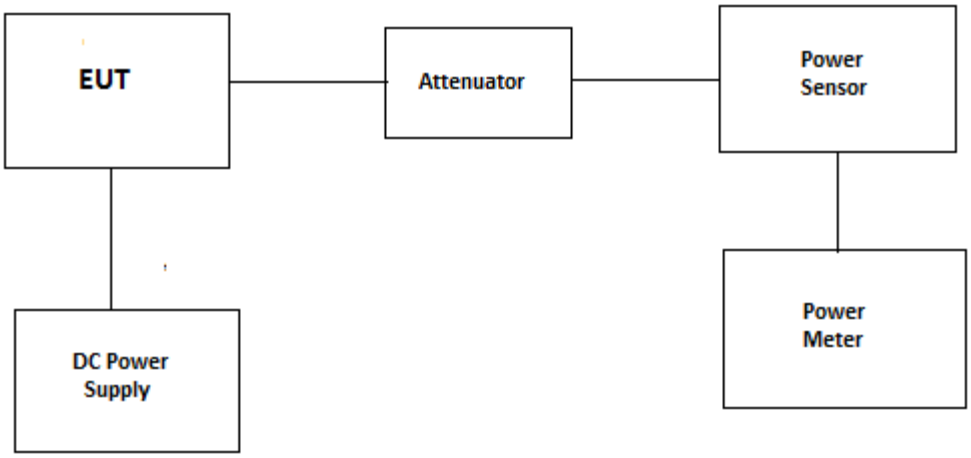


Current List

Frequency MHz	Peak dBuV	QP dBuV	Qp-Qp Limit dB	Avg dBuV	Avg-Avg Limit dB	Trace Name
0.729	37.3	35.4	-20.6	34.5	-11.5	Return Trace
1.165	32.3	28.0	-28.0	25.1	-20.9	Return Trace
20.300	36.0	34.3	-25.7	33.6	-16.4	Return Trace

EXHIBIT 6. Block Diagram & Test Equipment List

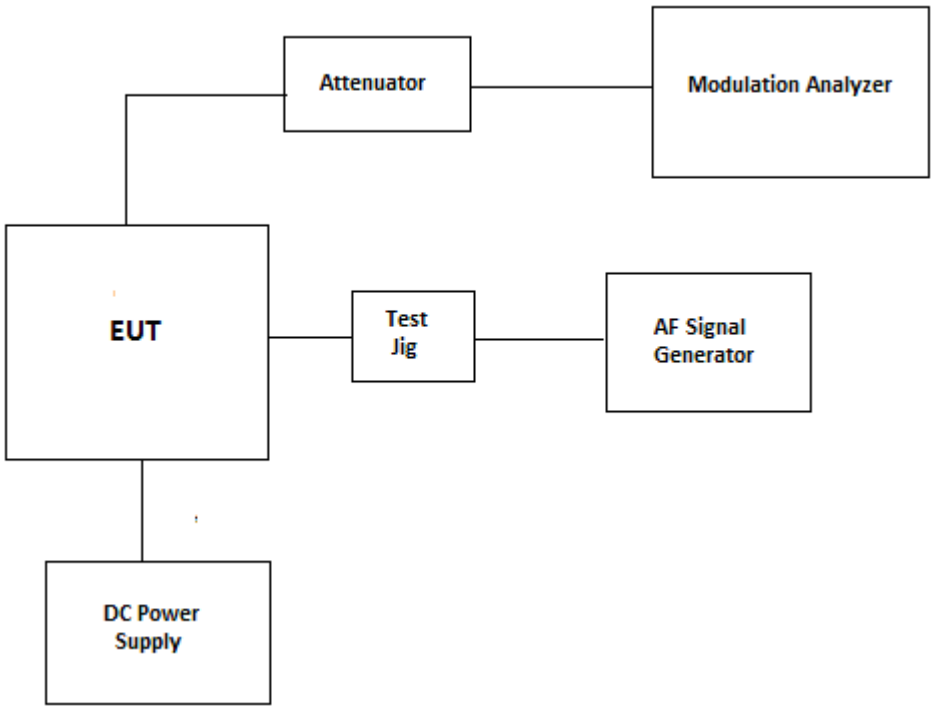
6.1. Conducted Power



Test Date: Aug 09, 2023

Test Instrument	Manufacturer	Model No	Serial No	Frequency Range	Cal Due date
Power Meter	HP	436A	210A11242	100KHz-sensor dependant	30 Aug 2024
Power Sensor	HP	8482A	MY44175182	0.1MHz-4.2GHz	07 Feb 2024
Attenuator(30dB)	Aeroflex/Weinschel	49-30-34-LIM	RA725	DC-8.5GHz	Cal before use
Attenuator(10dB)	Aeroflex/Weinschel	46-10-34	BS4336	DC-18GHz	Cal before use
Power supply	Pyramid	PS-36KX	--	12-15 Vdc, 35A	--
Multimeter	Fluke	8842A	4142058	---	26 Oct 2024

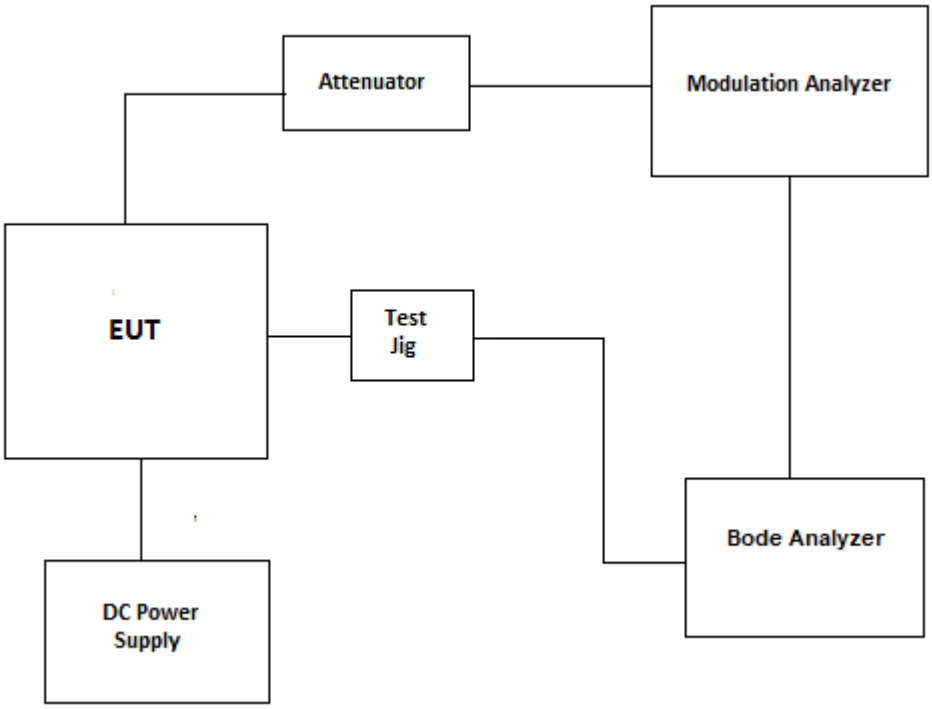
6.2. Modulation Limit



Test date: Aug 10& 11, 2023

Test Instrument	Manufacturer	Model No	Serial No	Frequency Range	Cal Due date
Modulation Analyzer	HP	HP-8901B	3226A04606	150KHz-1300MHz	29 Mar 2024
AF Signal Generator	HP	HP-8920B	US39064699	30MHz-1GHz	29 Mar 2024
Digital Voltmeter	HP	3456A	2015A04523	--	08 Feb 2024
Attenuator(30dB)	Aeroflex/Weinschel	49-30-34-LIM	RA725	DC-8.5GHz	Cal before use
Attenuator(10dB)	Aeroflex/Weinschel	46-10-34	BS4336	DC-18GHz	Cal before use
Power supply	Pyramid	PS-36KX	--	12-15 Vdc, 35A	--
Multimeter	Fluke	8842A	4142058	---	26 Oct 2024

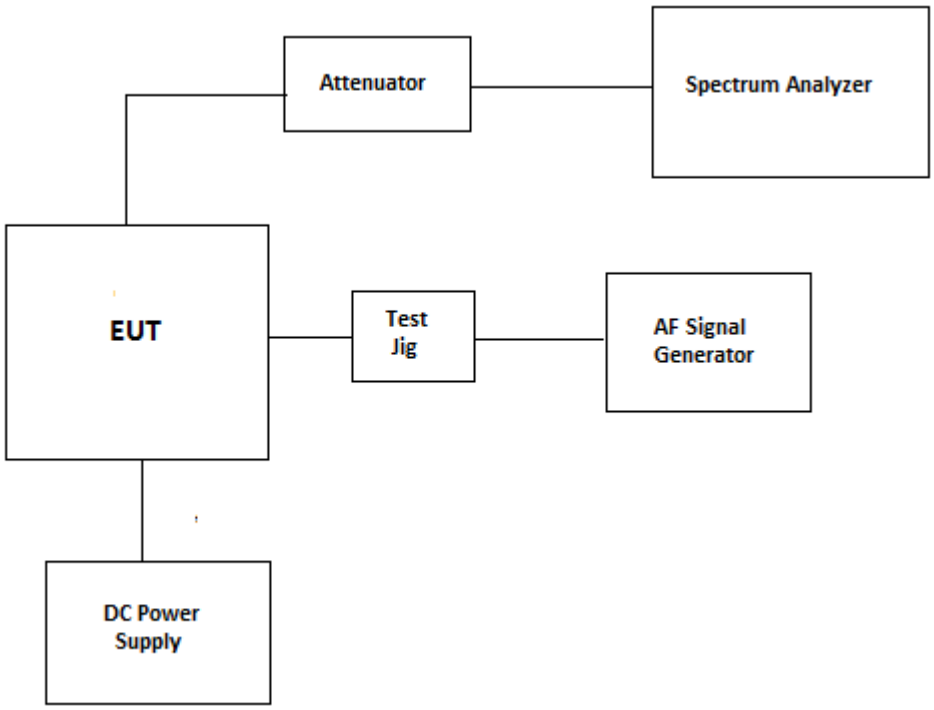
6.3. Audio Frequency Response/ Audio Low pass filter Response



Test Date: Aug 11, 2023

Test Instrument	Manufacturer	Model No	Serial No	Frequency Range	Cal Due date
Modulation Analyzer	HP	HP-8901B	3226A04606	150KHz-1300MHz	29 Mar 2024
Network Analyzer	Omicron Labs	Bode 100	PM453H	1Hz-50MHz	8 Feb 2024
Attenuator(30dB)	Aeroflex/Weinschel	49-30-34-LIM	RA725	DC-8.5GHz	Cal before use
Attenuator(10dB)	Aeroflex/Weinschel	46-10-34	BS4336	DC-18GHz	Cal before use
Power supply	Pyramid	PS-36KX	--	12-15 Vdc, 35A	--
Multimeter	Fluke	8842A	4142058	---	26 Oct 2024

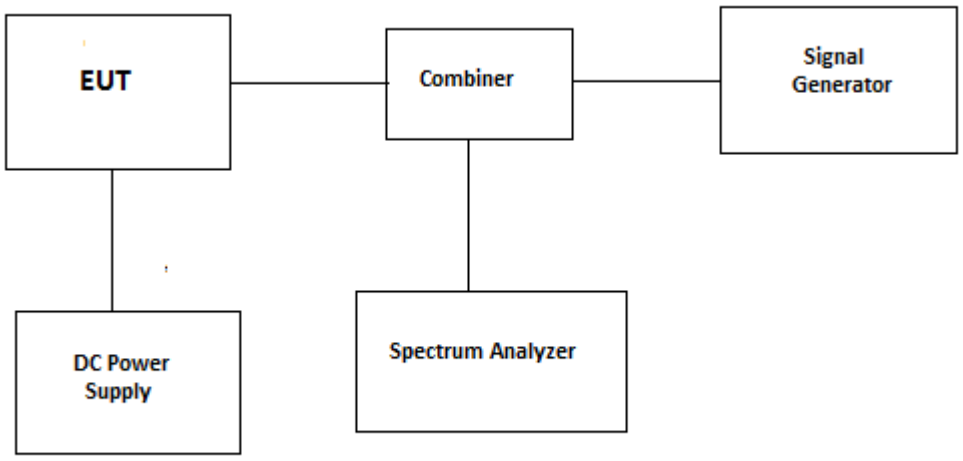
6.4. 99% OBW and Mask



Test Date: Aug 14, 2023

Test Instrument	Manufacturer	Model No	Serial No	Frequency Range	Cal Due date
Spectrum Analyzer	Rohde & Schwarz	FSU	100398	20Hz-26.5GHz	20 Sep 2023
AF Signal Generator	HP	HP-8920B	US39064699	30MHz-1GHz	29 Mar 2024
Digital Voltmeter	HP	3456A	2015A04523	--	08 Feb 2024
Attenuator(30dB)	Aeroflex/Weinschel	49-30-34-LIM	RA725	DC-8.5GHz	Cal before use
Attenuator(10dB)	Aeroflex/Weinschel	46-10-34	BS4336	DC-18GHz	Cal before use
Power supply	Pyramid	PS-36KX	--	12-15 Vdc, 35A	--
Multimeter	Fluke	8842A	4142058	---	26 Oct 2024

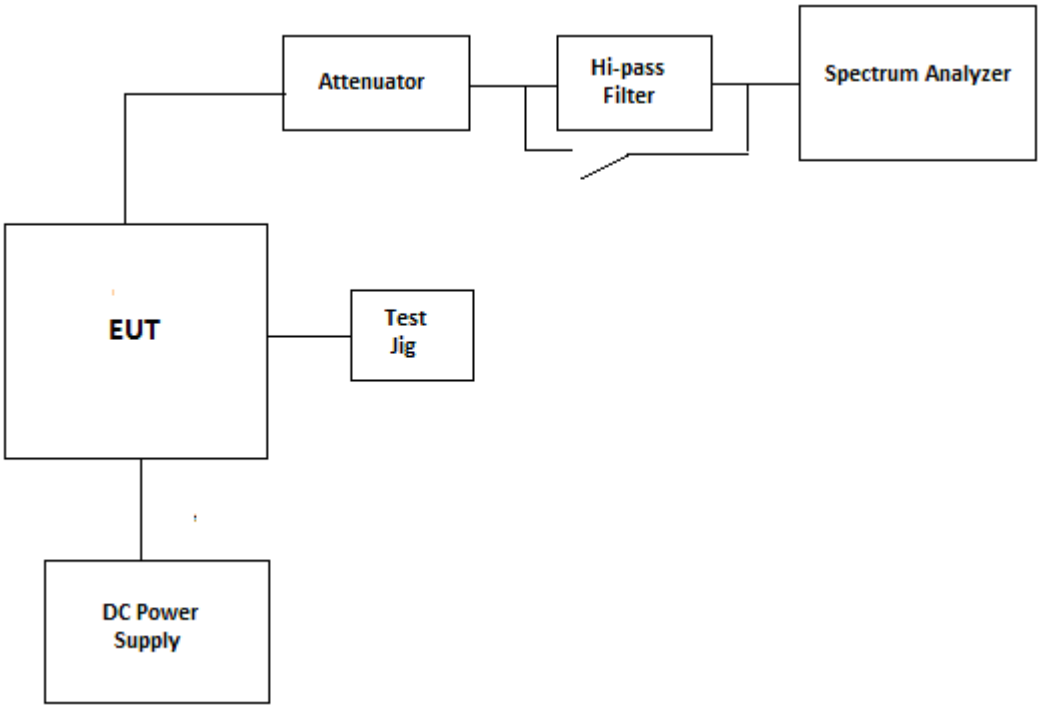
6.5. Rx Conducted Emission



Test Date: Aug 16, 2023

Test Instrument	Manufacturer	Model No	Serial No	Frequency Range	Cal Due date
Spectrum Analyzer	Rohde & Schwarz	FSU	100398	20Hz-26.5GHz	20 Sep 2023
Signal Generator	Marconi	2024	112255164	9KHz-2.5GHz	22 Oct 2023
Combiner	Weinschel 93458	1515	PS119	DC-18GHz	Cal before use
Power supply	Pyramid	PS-36KX	--	12-15 Vdc, 35A	--
Multimeter	Fluke	8842A	4142058	---	26 Oct 2024

6.6. Tx Conducted Emission

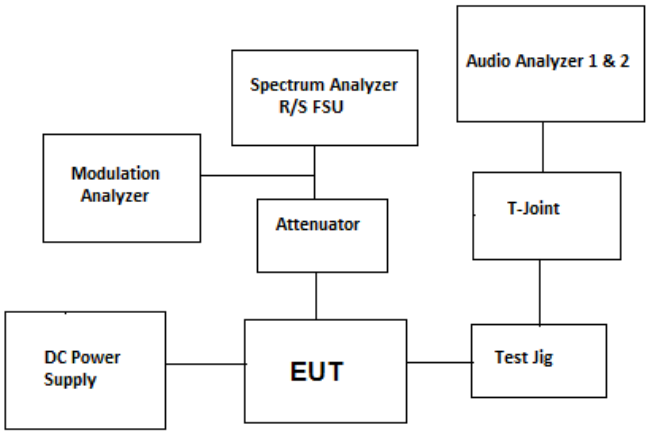


Test Date: Aug 15, 2023

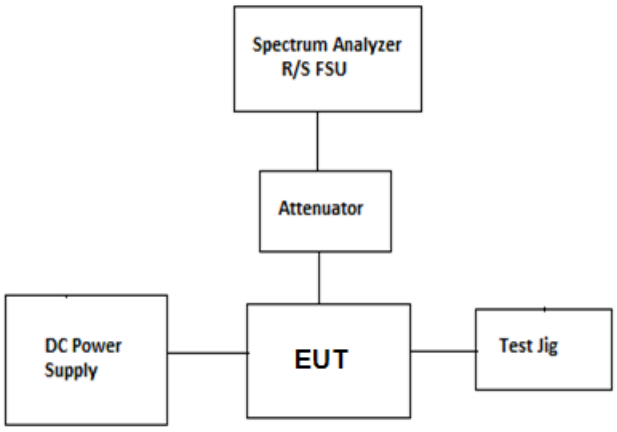
Test Instrument	Manufacturer	Model No	Serial No	Frequency Range	Cal Due date
Spectrum Analyzer	Rohde & Schwarz	FSU	100398	20Hz-26.5GHz	20 Sep 2023
Hi-pass filter	K&L	11SH10-1500/T8000-0/0	2	Cut off 1500MHz	Cal before use
Attenuator(30dB)	Aeroflex/Weinschel	49-30-34-LIM	RA725	DC-8.5GHz	Cal before use
Attenuator(10dB)	Aeroflex/Weinschel	46-10-34	BS4336	DC-18GHz	Cal before use
Power supply	Pyramid	PS-36KX	--	12-15 Vdc, 35A	--
Multimeter	Fluke	8842A	4142058	---	26 Oct 2024

6.7. Emission Limitations (ACP)

Test Setup (Analog)



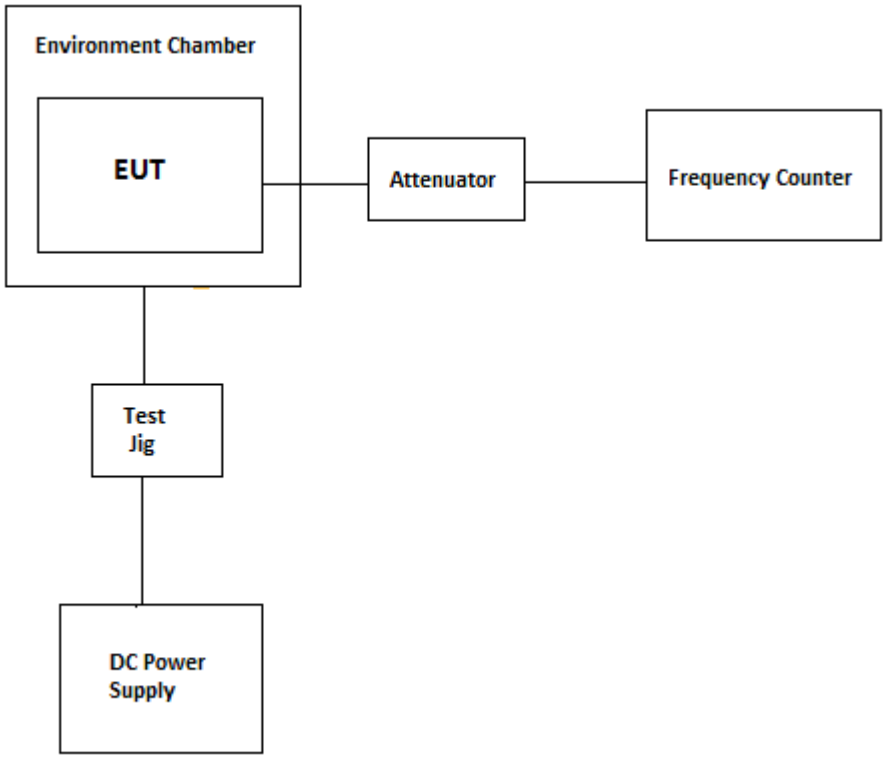
Test Setup (Digital)



Test Date: Aug 16 & 17, 2023

Test Instrument	Manufacturer	Model No	Serial No	Frequency Range	Cal Due date
Spectrum Analyzer	Rohde & Schwarz	FSU	100398	20Hz-26.5GHz	20 Sep 2023
AF Signal Generator	Kuman	FY6600-60M	170966000106	DC-60M	07 Feb 2025
Digital Voltmeter	HP	3456A	2015A04523	--	08 Feb 2024
Attenuator(30dB)	Aeroflex/Weinschel	49-30-34-LIM	RA725	DC-8.5GHz	Cal before use
Attenuator(10dB)	Aeroflex/Weinschel	46-10-34	BS4336	DC-18GHz	Cal before use
Power supply	Pyramid	PS-36KX	--	12-15 Vdc, 35A	--
Multimeter	Fluke	8842A	4142058	---	26 Oct 2024

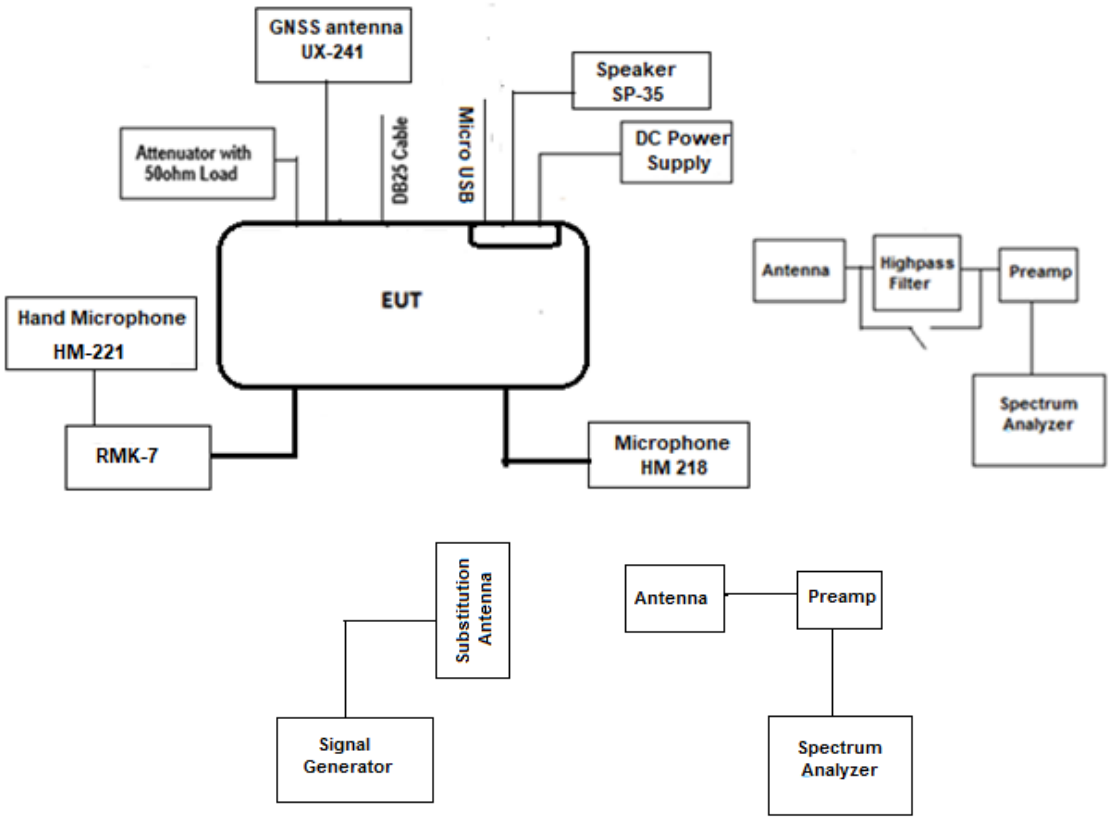
6.8. Frequency Stability



Test Date: Aug 24, 25&28, 2023

Test Instrument	Manufacturer	Model No	Serial No	Frequency Range	Cal Due date
Environmental Chamber	Envirotronics	SSH32C	11994847-S-11059	-60 to 177° C	30 Aug 2023
Frequency Counter	HP	5352B	3049A04423	10Hz-40GHz	15 Sep 2024
Attenuator(20dB)	Aeroflex\Weinschel	34-20-34	BP6023	DC-18GHz	Cal before use
Attenuator(20dB)	Narda	26298	A577	DC-1GHz	Cal before use
Power Supply	XANTREX	XKW 60-50	--	1-60V, DC 50A	----
Multimeter	Fluke	8842A	5021295	---	10 Mar 2025

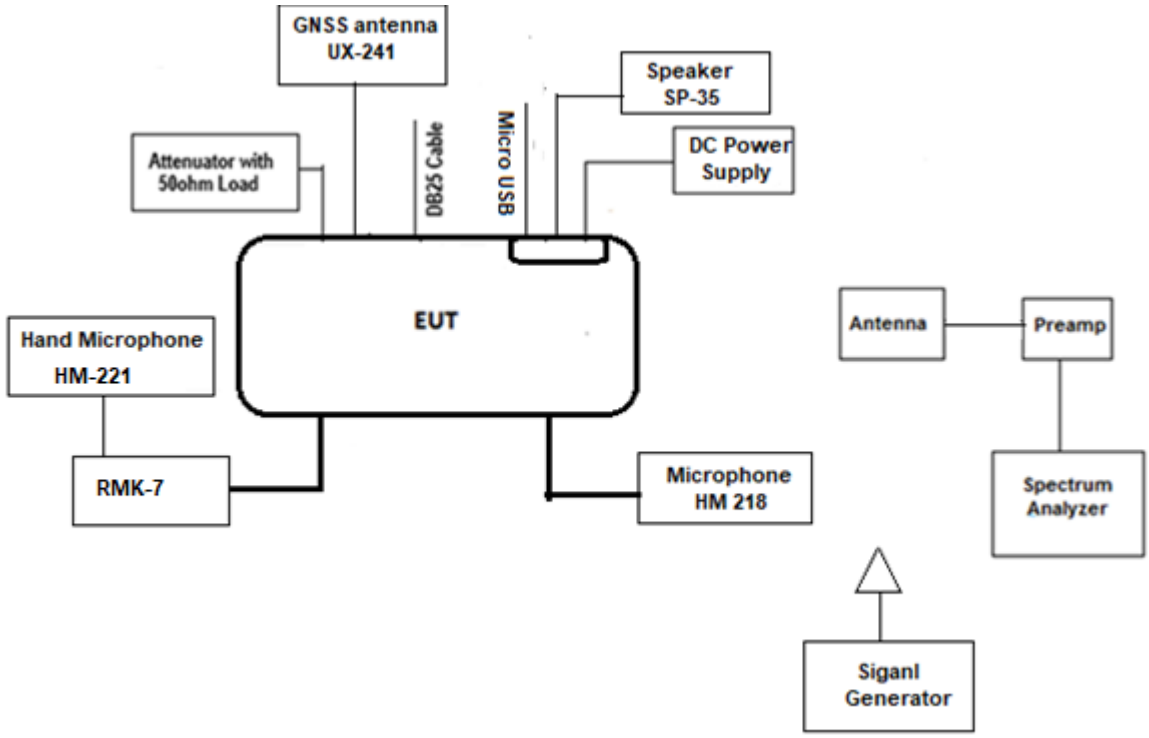
6.9. Tx Radiated



Test Date: Aug 18,21&22 2023

Test Instrument	Manufacturer	Model No	Serial No	Frequency Range	Cal Due date
Spectrum Analyzer	Rohde & Schwarz	FSU	100398	20Hz-26.5GHz	20 Sep 2023
EMI Receiver	Rohde & Schwarz	ESU40	100037	20Hz-40GHz	26 Sep 2023
Biconilog Antenna	EMCO	3142C	00026873	26-2000MHz	16 Dec 2023
Log Periodic Antenna	ETS	3148	00023845	200-2000MHz	15 May 2025
Horn Antenna	ETS	3117	00119425	1-18GHz	20 Jan 2024
Horn Antenna	ETS	3115	9701-5061	1-18GHz	15 Aug 2024
Preamplifier	Com-Power	PAM-118A	551016	500MHz-18GHz	01 Mar 2024
Preamplifier	Com-Power	PAM-103	18020181	1MHz-1000MHz	01 Mar 2024
Signal Generator	Marconi	2024	112255164	9KHz-2.5GHz	22 Oct 2023
Hi-pass filter	K&L	11SH10-1500/T8000-0/0	2	Cut off 1500MHz	Cal before use
Attenuator(30dB)	Aeroflex/Weinschel	49-30-34-LIM	RA725	DC-8.5GHz	Cal before use
Attenuator(10dB)	Aeroflex/Weinschel	46-10-34	BS4336	DC-18GHz	Cal before use
Load(50ohm)	Narda	377 BNM	--	DC-18GHz	Cal before use
Power supply	Pyramid	PS-36KX	--	12-15 Vdc, 35A	--
Multimeter	Fluke	8842A	4142058	---	26 Oct 2024

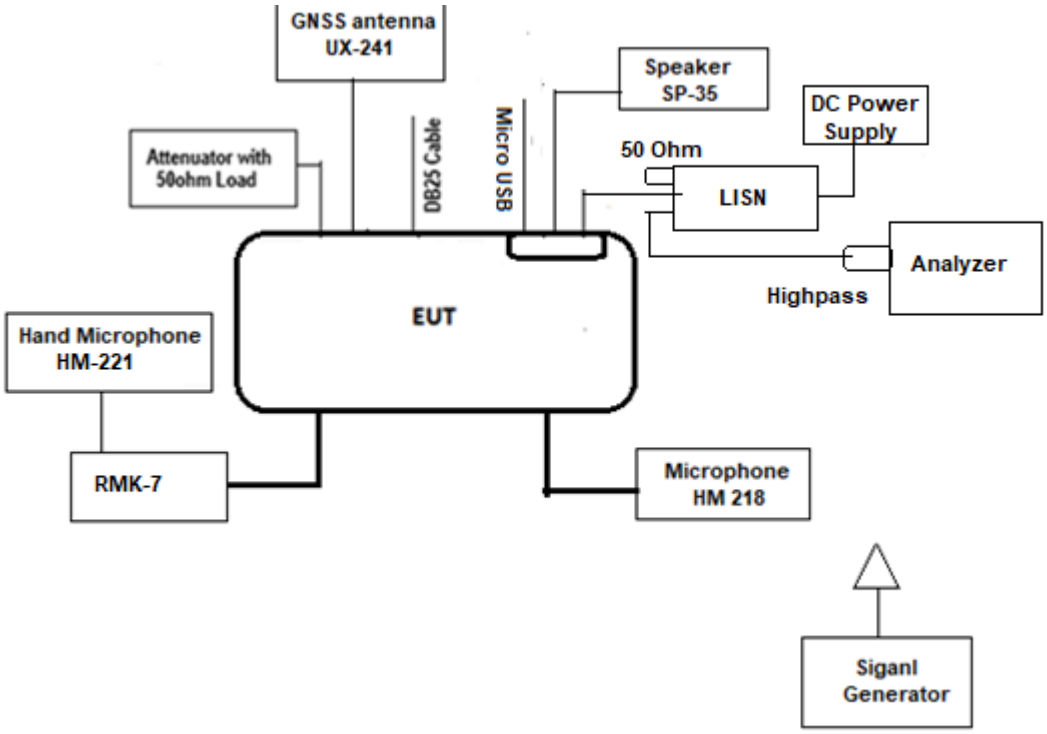
6.10. Rx Radiated



Test Date: Aug 21&22, 2023, Unintentional Radiated: Jul 17, 2023

Test Instrument	Manufacturer	Model No	Serial No	Frequency Range	Cal Due date
Spectrum Analyzer	Rohde & Schwarz	FSU	100398	20Hz-26.5GHz	20 Sep 2023
EMI Receiver	Rohde & Schwarz	ESU40	100037	20Hz-40GHz	26 Sep 2023
Biconilog Antenna	EMCO	3142C	00026873	26-2000MHz	16 Dec 2023
Log Periodic Antenna	ETS	3148	00023845	200-2000MHz	15 May 2025
Horn Antenna	ETS	3117	00119425	1-18GHz	20 Jan 2024
Horn Antenna	ETS	3115	9701-5061	1-18GHz	15 Aug 2024
Preamplifier	Com-Power	PAM-118A	551016	500MHz-18GHz	01 Mar 2024
Preamplifier	Com-Power	PAM-103	18020181	1MHz-1000MHz	01 Mar 2024
Signal Generator	Marconi	2024	112255164	9KHz-2.5GHz	22 Oct 2023
Attenuator(30dB)	Aeroflex/Weinschel	49-30-34-LIM	RA725	DC-8.5GHz	Cal before use
Attenuator(10dB)	Aeroflex/Weinschel	46-10-34	BS4336	DC-18GHz	Cal before use
Load(50ohm)	Narda	377 BNM	--	DC-18GHz	Cal before use
Power supply	Pyramid	PS-36KX	--	12-15 Vdc, 35A	--
Multimeter	Fluke	8842A	4142058	---	26 Oct 2024

6.11. Power Line Conducted Emission



Test Date: Jul 19, 2023

Test Instrument	Manufacturer	Model No	Serial No	Frequency Range	Cal Due date
Analyzer	HP	8593EM	3710A00223	9KHz-26.5GHz	14 Feb 2024
High pass filter	Rhode&Schwarz	EZ-25	830164/600	150KHz-30MHz	19 Oct 2023
LISN	Schwarzbeck	NDTV8160	9443	150KHz-30MHz	03 Mar 2024
Signal Generator	Marconi	2024	112255164	9KHz-2.5GHz	22 Oct 2023
Power supply	Pyramid	PS-36KX	--	12-15 Vdc, 35A	--
Multimeter	Fluke	8842A	4142058	---	26 Oct 2024

EXHIBIT 7. MEASUREMENT UNCERTAINTY

The measurement uncertainties stated were calculated in accordance with the requirements of CISPR 16-4-2 @ IEC:2003 and JCGM 100:2008 (GUM 1995) – Guide to the Expression of Uncertainty in Measurement.

7.1. RADIATED EMISSION MEASUREMENT UNCERTAINTY

	Radiated Emission Measurement Uncertainty @ 3m, Horizontal (30-1000 MHz):	**Measured**	**Limit**
u_c	**Combined standard uncertainty:** $u_c(y) = \sqrt{\sum_{i=1}^{m} u_i^2(y)}$	**± 2.15**	**± 2.6**
U	**Expanded uncertainty U:** $U = 2u_c(y)$	**± 4.30**	**± 5.2**

	Radiated Emission Measurement Uncertainty @ 3m, Vertical (30-1000 MHz):	**Measured**	**Limit**
u_c	**Combined standard uncertainty:** $u_c(y) = \sqrt{\sum_{i=1}^{m} u_i^2(y)}$	**± 2.14**	**± 2.6**
U	**Expanded uncertainty U:** $U = 2u_c(y)$	**± 4.29**	**± 5.2**

	Radiated Emission Measurement Uncertainty @ 3 m, Horizontal & Vertical (1 – 18 GHz):	**Measured**	**Limit**
u_c	**Combined standard uncertainty:** $u_c(y) = \sqrt{\sum_{i=1}^{m} u_i^2(y)}$	**± 1.52**	**Under consideration**
U	**Expanded uncertainty U:** $U = 2u_c(y)$	**± 3.04**	**Under consideration**

EXHIBIT 8. MEASUREMENT METHODS

8.1. CONDUCTED POWER MEASUREMENTS

- The following shall be applied to the combination(s) of the radio device and its intended antenna(e).
- I f the RF level is user adjustable, all measurements shall be made with the highest power level available to the user for that combination.
- The following method of measurement shall apply to both conducted and radiated measurements.
- The radiated measurements are performed at the Ultratech Calibrated Open Field Test Site.
- The measurement shall be performed using normal operation of the equipment with modulation.

Test procedure shall be as follows:

Step 1: Duty Cycle measurements if the transmitter's transmission is transient

- Using a EMI Receiver with the frequency span set to 0 Hz and the sweep time set at a suitable value to capture the envelope peaks and the duty cycle of the transmitter output signal;
- The duty cycle of the transmitter, x = Tx on / (Tx on + Tx off) with 0<x<1, is measure and recorded in the test report. For the purpose of testing, the equipment shall be operated with a duty cycle that is equal or more than 0.1.

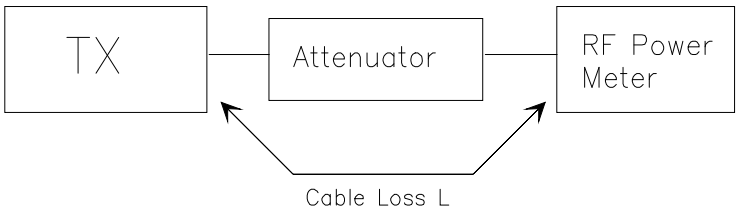
Step 2: Calculation of Average EIRP. See Figure 1

- The average output power of the transmitter shall be determined using a wideband, calibrated RF average power meter with the power sensor with an integration period that exceeds the repetition period of the transmitter by a factor 5 or more. The observed value shall be recorded as "A" (in dBm);
- The e.i.r.p. shall be calculated from the above measured power output "A", the observed duty cycle x, and the applicable antenna assembly gain "G" in dBi, according to the formula:

EIRP = A + G + 10log(1/x)

{X = 1 for continuous transmission => 10log(1/x) = 0 dB}

Figure 1.



8.2. RADIATED POWER MEASUREMENTS (ERP & EIRP) USING SUBSTITUTION METHOD

8.2.1. MAXIMIZING RF EMISSION LEVEL (E-FIELD)

(a) The measurements were performed with full rf output power and modulation.
(b) Test was performed at listed 3m open area test site (listed with FCC, IC, ITI, NVLAP, ACA & VCCI).
(c) The transmitter under test was placed at the specified height on a non-conducting turntable (80 cm height)
(d) The BICONILOG antenna (20 MHz to 1 GHz) or HORN antenna (1 GHz to 18 GHz) was used for measuring.
(e) Load an appropriate correction factors file in EMI Receiver for correcting the field strength reading level

Total Correction Factor recorded in the EMI Receiver = Cable Loss + Antenna Factor
E (dBμV/m) = Reading (dBμV) + Total Correction Factor (dB/m)

(f) Set the EMI Receiver and #2 as follows:

Center Frequency:	test frequency
Resolution BW:	100 KHz
Video BW:	same
Detector Mode:	positive
Average:	off
Span:	3 x the signal bandwidth

(g) The test antenna was lowered or raised from 1 to 4 meters until the maximum signal level was detected.
(h) The transmitter was rotated through 360^{o} about a vertical axis until a higher maximum signal was received.
(i) The test antenna was lowered or raised again from 1 to 4 meters until a maximum was obtained. This level was recorded.
(j) The recorded reading was corrected to the true field strength level by adding the antenna factor, cable loss and subtracting the pre-amplifier gain.
(k) The above steps were repeated with both transmitters' antenna and test receiving antenna placed in vertical and horizontal polarization. Both readings with the antennas placed in vertical and horizontal polarization shall be recorded.
(l) Repeat for all different test signal frequencies.

8.2.2. Measuring the EIRP of Spurious/Harmonic Emissions using Substitution Method

(a) Set the EMI Receiver (for measuring E-Field) and Receiver #2 (for measuring EIRP) as follows:

Center Frequency:	equal to the signal source
Resolution BW:	100 KHz
Video BW:	VBW > RBW
Detector Mode:	positive
Average:	off
Span:	3 x the signal bandwidth

(b) Load an appropriate correction factors file in EMI Receiver for correcting the field strength reading level

Total Correction Factor recorded in the EMI Receiver = Cable Loss + Antenna Factor
E (dBuV/m) = Reading (dBuV) + Total Correction Factor (dB/m)

(c) Select the frequency and E-field levels obtained in the Section 8.2.1 for ERP/EIRP measurements.
(d) Substitute the EUT by a signal generator and one of the following transmitting antenna (substitution antenna):
- DIPOLE antenna for frequency from 30-1000 MHz or
- HORN antenna for frequency above 1 GHz }.

(e) Mount the transmitting antenna at 1.5 meter high from the ground plane.
(f) Use one of the following antenna as a receiving antenna:
- DIPOLE antenna for frequency from 30-1000 MHz or
- HORN antenna for frequency above 1 GHz }.

(g) If the DIPOLE antenna is used, tune it's elements to the frequency as specified in the calibration manual.
(h) Adjust both transmitting and receiving antenna in a VERTICAL polarization.
(i) Tune the EMI Receivers to the test frequency.
(j) Lower or raise the test antenna from 1 to 4 meters until the maximum signal level was detected.
(k) The transmitter was rotated through 360^{o} about a vertical axis until a higher maximum signal was received.
(l) Lower or raise the test antenna from 1 to 4 meters until the maximum signal level was detected.
(m) Adjust input signal to the substitution antenna until an equal or a known related level to that detected from the transmitter was obtained in the test receiver.
(n) Record the power level read from the Average Power Meter and calculate the ERP/EIRP as follows:

P = P1 - L1 = (P2 + L2) – L1 = P3 + A + L2 - L1
EIRP = P + G1 = P3 + L2 - L1 + A + G1
ERP = EIRP – 2.15 dB
Total Correction factor in EMI Receiver # 2 = L2 – L1 + G1

Where:	P:	Actual RF Power fed into the substitution antenna port after corrected.
	P1:	Power output from the signal generator
	P2:	Power measured at attenuator A input
	P3:	Power reading on the Average Power Meter
	EIRP:	EIRP after correction
	ERP:	ERP after correction

(o) Adjust both transmitting and receiving antenna in a HORIZONTAL polarization, then repeat step (k) to (o)
(p) Repeat step (d) to (o) for different test frequency
(q) Repeat steps (c) to (j) with the substitution antenna oriented in horizontal polarization.
(r) Actual gain of the EUT's antenna is the difference of the measured EIRP and measured RF power at the RF port. Correct the antenna gain if necessary.

Figure 2

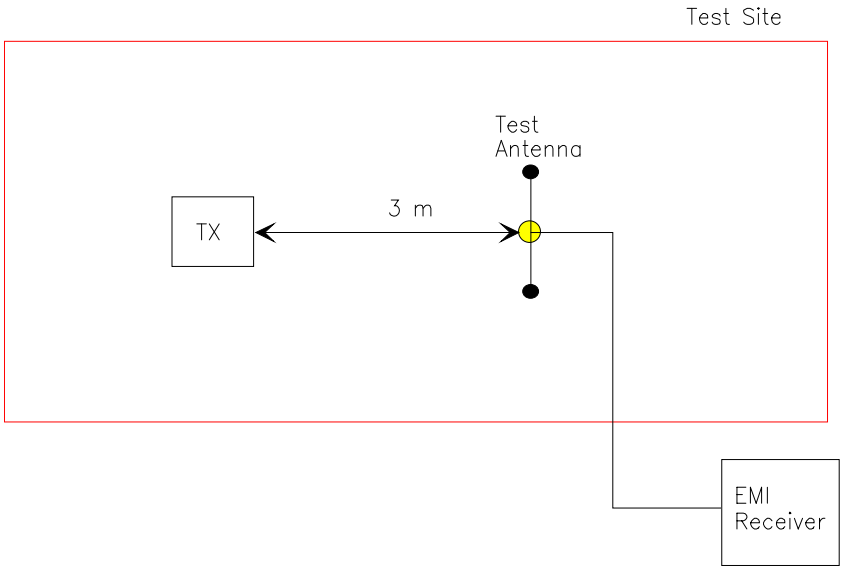
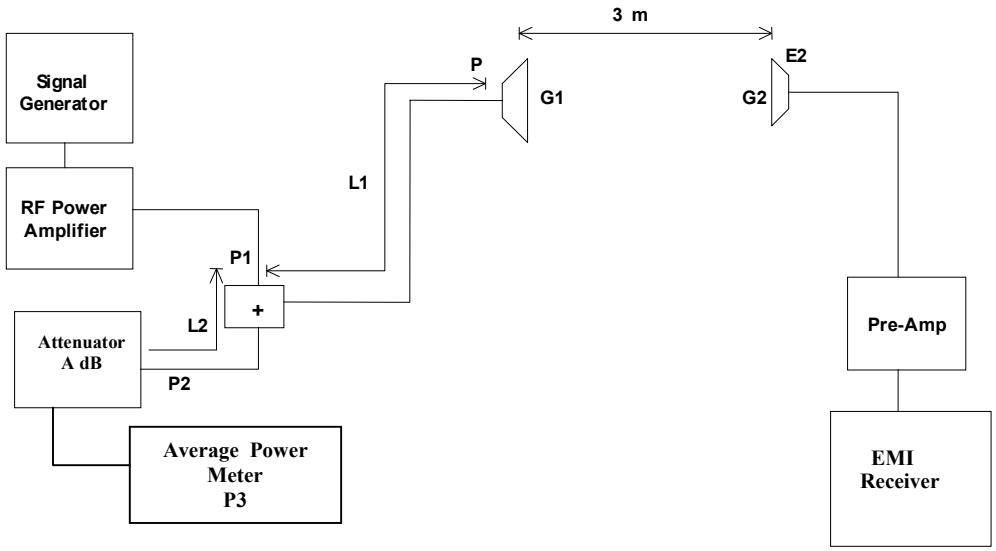


Figure 3



8.3. FREQUENCY STABILITY

Refer to FCC @ 2.1055.

(a) The frequency stability shall be measured with variation of ambient temperature as follows: From -30 to +50 centigrade except that specified in subparagraph (2) & (3) of this paragraph.

(b) Frequency measurements shall be made at extremes of the specified temperature range and at intervals of not more than 10 centigrade through the range. A period of time sufficient to stabilize all of the components of the oscillator circuit at each temperature level shall be allowed prior to frequency measurement. The short-term transient effects on the frequency of the transmitter due to keying (except for broadcast transmitters) and any heating element cycling normally occurring at each ambient temperature level also shall be shown. Only the portion or portions of the transmitter containing the frequency determining and stability circuitry need be subjected to the temperature variation test.

(d) The frequency stability supply shall be measured with variation of primary supply voltage as follows:

(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

(2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.

(3) The supply voltage shall be measured at the input to the cable normally provide with the equipment, or at the power supply terminals if cables are not normally provided. Effects on frequency of transmitter keying (except for broadcast transmitters) and any heating element cycling at the nominal supply voltage and at each extreme also shall be shown.

(e) When deemed necessary, the Commission may require tests of frequency stability under conditions in addition to those specifically set out in paragraphs (a), (b), (c) and (d) of this section. (For example, measurements showing the effect of proximity to large metal objects, or of various types of antennas, may be required for portable equipment).

8.4. EMISSION MASK

Voice or Digital Modulation Through a Voice Input Port @ 2.1049(c)(i):- The transmitter was modulated by a 2.5 KHz tone signal at an input level 16 dB greater than that required to produce 50% modulation (e.g.: ±2.5 KHz peak deviation at 1 KHz modulating frequency). The input level was established at the frequency of maximum response of the audio modulating circuit.

Digital Modulation Through a Data Input Port @ 2.1049(h):- Transmitters employing digital modulation techniques - when modulated by an input signal such that its amplitude and symbol rate represent the maximum rated conditions under which the equipment will be operated. The signal shall be applied through any filter networks, pseudo-random generators or other devices required in normal service. Additionally, the Emission Masks shall be shown for operation with any devices used for modifying the spectrum when such devices are operational at the discretion of the user.

The following EMI Receiver bandwidth shall be used for measurement of Emission Mask/Out-of-Band Emission Measurements:

(1) For 25 KHz Channel Spacing: RBW = 300 Hz
(2) For 12.5 KHz or 6.25 KHz Channel Spacings: RBW = 100 Hz

The all cases the Video Bandwidth shall be equal or greater than the measuring bandwidth.

8.5. SPURIOUS EMISSIONS (CONDUCTED)

With transmitter modulation characteristics described in Out-of-Band Emissions measurements @ 2.1049, the transmitter spurious and harmonic emissions were scanned. The spurious and harmonic emissions were measured with the EMI Receiver controls set as RBW = 30 KHz minimum , VBW ≥ RBW and SWEEP TIME = AUTO). The transmitter was operated at a full rated power output, and modulated as follows:

FCC 47 CFR 2.1057 - Frequency spectrum to be investigated: The spectrum was investigated from the lowest radio generated in the equipment up to at least the 10^{th} harmonic of the carrier frequency or to the highest frequency practicable in the present state of the art of measuring techniques, whichever is lower. Particular attention should be paid to harmonics and subharmonics of the carrier frequency. Radiation at the frequencies of multiplier stages should be checked. The
amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be reported.

FCC 47 CFR 2.1051 - Spurious Emissions at Antenna Terminal: The radio frequency voltage or powers generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of the harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in 2.1049 as appropriate. The magnitude of spurious emissions, which are attenuated more than 20 dB below the permissible value, need not be specified.

***END OF REPORT**