

ENGINEERING TEST REPORT



UHF P25 Transceiver
Model No.: IC-F7040T/S
FCC ID: AFJ399000

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 I)

UltraTech's File No.: 18ICOM485_FCC90

This Test report is Issued under the Authority of
Tri M. Luu, BASc,
Vice President of Engineering
UltraTech Group of Labs

Date: June 26, 2018

Report Prepared by: Santhosh Fernandez

Tested by: Nimisha Desai

Issued Date: June 26, 2018

Test Dates: May 24-June 26, 2018

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EXHIBIT 1. INTRODUCTION

1.1. SCOPE

Reference:	FCC Parts 2, 22, 74, and 90 (Subpart I)
Title:	Code of Federal Regulations (CFR), Title 47 Telecommunication – Parts 2, 22, and 90 (Subpart I)
Purpose of Test:	To obtain FCC Certification Authorization for Radio operating in the Frequency Band 400-406 & 406.1-470 MHz (25 kHz, 12.5 kHz Channel Spacing).
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
18ICOM485_FCC90	June 26, 2018	Original Report

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

None

1.4. NORMATIVE REFERENCES

Publication	Year	Title
FCC CFR Parts 0-19, 80-End	2017	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
CISPR 22	2008-09 Ed 6	Information Technology Equipment - Radio Disturbance Characteristics - Limits and Methods of Measurement
CISPR 16-1-1 +A1 +A2	2006 2006 2007	Specification for radio disturbance and immunity measuring apparatus and methods. Part 1-1: Measuring Apparatus
CISPR 16-1-2 +A1 +A2	2003 2004 2006	Specification for radio disturbance and immunity measuring apparatus and methods. Part 1-2: Conducted disturbances

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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-F7040T
Serial Number:	00000309
Type of Equipment:	Licensed Non-Broadcast Station Transmitter
Power Supply Requirement:	7.5 VDC nominal
Transmitting/Receiving Antenna Type:	Non-integral
Primary User Functions of EUT:	2-Way Wireless Voice & Data Communication

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2.3. EUT'S TECHNICAL SPECIFICATIONS

TRANSMITTER	
Equipment Type:	Portable
Intended Operating Environment:	Restricted to Occupational Use only
Power Supply Requirement:	7.5 VDC Nominal
RF Output Power Rating:	3 Watts(High) / 1 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%):	15.82 kHz (25 kHz Analog) F3E 10.385 kHz (20 kHz Analog) F3E 5.689 kHz (12.5 kHz Analog) F3E 7.93 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 $B_n = 2M + 2DK = 2(3) + 2(5)(1) = \underline{16 \text{ KHz}}$ Emission designation: 16K0F3E Channel Spacing = 20 KHz, D = 4 KHz max, K = 1, M = 3 KHz $B_n = 2M + 2DK = 2(3) + 2(4)(1) = \underline{14 \text{ KHz}}$ Emission designation: 14K0F3E Channel Spacing = 12.5 KHz, D = 2.5 KHz max, K = 1, M = 3 KHz $B_n = 2M + 2DK = 2(3) + 2(2.5)(1) = \underline{11 \text{ KHz}}$ 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	Speaker-Microphone Connector	1	ICOM Multi-connector Jack	Speaker-Microphone
2	Antenna Connector	1	Special type	50 Ohm Load/Antenna
3.	USB	1	Micro USB connector	Micro USB Cable

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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:	Speaker Microphone
Brand name:	ICOM
Model Name or Number:	HM-222
Connected to EUT's Port:	Speaker-Microphone Connector

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:	7.5 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:	 3.10 W High 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, Refer to SAR Report
2.1046, 22.565, 90.205, 90.541 (d)	RF Power Output	Yes
90.543(f)	GNSS (EIRP)	Yes for 769-805MHz Band
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-F7040T, by ICOM Incorporated has also been tested and found to comply with FCC Part 15, Subpart B - Radio Receivers and Class B 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

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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, 22.565, 90.205, 90.541& 90.543]

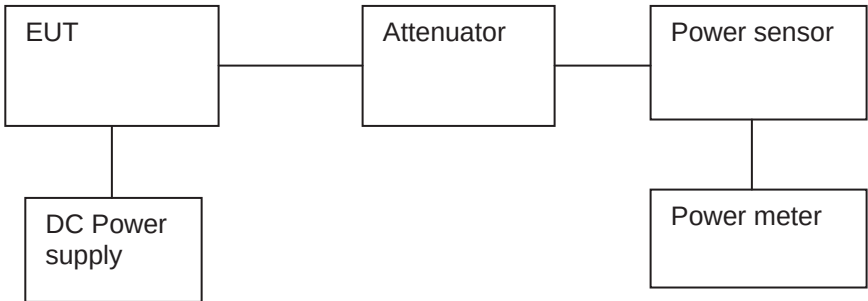
5.5.1. Limits

Please refer to FCC 47 CFR 90.205, 90.541, 90.543 & 22.565 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 Arrangement

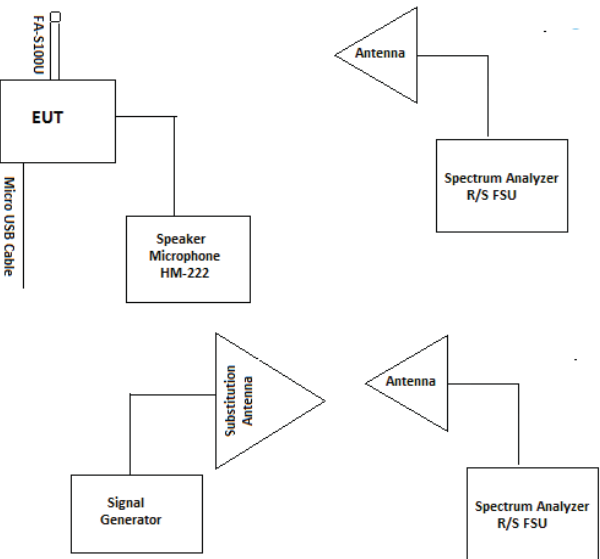


5.5.4. Test Data

769-805 MHz band Conducted power

Frequencies	Power Rating	Power Rating	Power	Actual Power
MHz	Watts	dBm	dBm	Watts
769.100	3.0	34.77	34.51	2.82
774.900	3.0	34.77	34.51	2.82
799.100	3.0	34.77	34.52	2.83
804.900	3.0	34.77	34.52	2.83
769.100	1.0	30.00	30.83	1.21
774.900	1.0	30.00	30.83	1.21
799.100	1.0	30.00	30.82	1.21
804.900	1.0	30.00	30.81	1.21

769-805 MHz band Radiated power ERP with Antenna @ 90.541(d)



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Frequency (MHz)	Antenna Polarization	Measured (dBuV)	ERP (dBm)	ERP Limit (dBm)	Margin
769.1	V	133.94	34.20	34.77	-0.6
769.1	H	120.16	19.84	34.77	-14.9
774.9	V	131.24	33.59	34.77	-1.2
774.9	H	121.65	21.50	34.77	-13.3
799.1	V	131.4	33.15	34.77	-1.6
799.1	H	119.48	19.95	34.77	-14.8
804.9	V	130.15	32.59	34.77	-2.2
804.9	H	122.13	22.61	34.77	-12.2

806-869MHz Band Conducted power

Frequencies	Power Rating	Power Rating	Actual Power	Actual Power
MHz	Watts	dBm	dBm	Watts
806.100	3.0	34.77	34.91	3.10
808.900	3.0	34.77	34.83	3.04
815.100	3.0	34.77	34.91	3.10
823.900	3.0	34.77	34.90	3.09
851.100	3.0	34.77	34.87	3.07
853.900	3.0	34.77	34.81	3.03
860.100	3.0	34.77	34.88	3.08
868.900	3.0	34.77	34.87	3.07
806.100	1.0	30.00	30.76	1.19
808.900	1.0	30.00	30.65	1.16
815.100	1.0	30.00	30.78	1.20
823.900	1.0	30.00	30.79	1.20
851.100	1.0	30.00	30.79	1.20
853.900	1.0	30.00	30.71	1.18
860.100	1.0	30.00	30.80	1.20
868.900	1.0	30.00	30.81	1.21

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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.

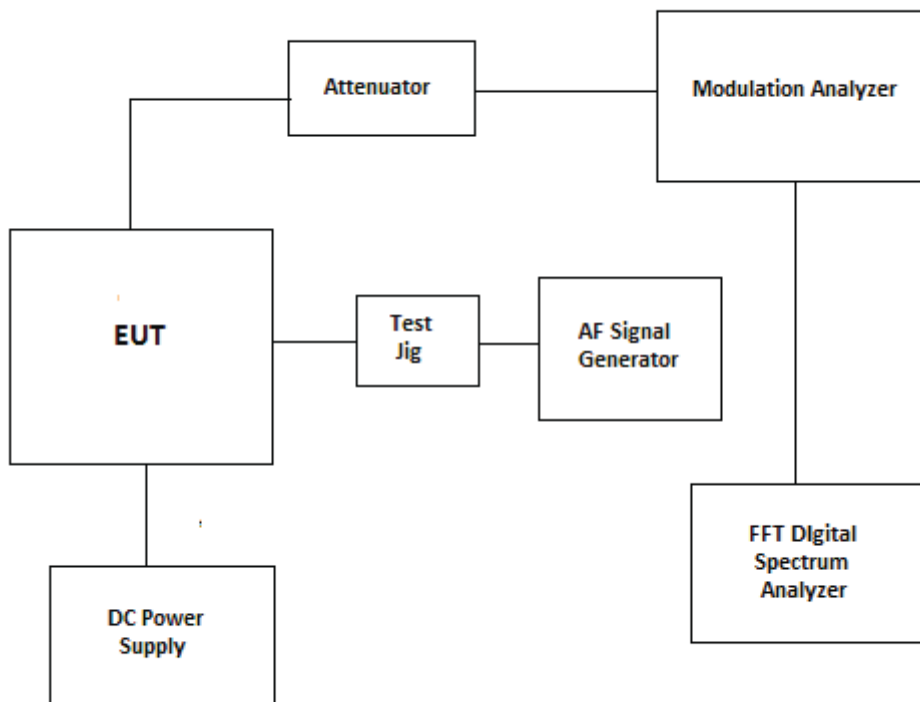
§ 90.242(b)(8): Recommended audio filter attenuation characteristics are given below:

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 audio oscillator, this input signal level and its corresponding output signal were then measured and recorded using the FFT Digital Spectrum Analyzer. Tests were repeated at different audio signal frequencies from 0 to 50 KHz.

5.6.3. Test Arrangement



5.6.4. Test Data

Note: Audio Freq Response and Modulation limiting tests were performed only for 12.5 , 20 & 25 kHz channel spacing. These tests were not performed for 6.25 kHz ch spacing as there is no FM voice capability for this device.

5.6.4.1. 12.5 KHz Channel Spacing, F3E, Frequency of All Modulation States (769-775 MHz band)

Remark: Due to the difficulty of measuring the Frequency Response of the internal low-pass filter, the Frequency Response of All Modulation States is performed to show the roll-off at 3 kHz in comparison with the recommended audio filter attenuation.

Frequency (KHz)	Audio In (dBV)	Audio Out (dBV)	Attenuation (Out - In) (dB)	Attenuation Rel. to 1 KHz (dB)	Recommended Attenuation (dB)
0.1	-38.42	-60.00	-21.6	-58.7	--
0.3	-38.42	-17.60	20.8	-16.3	--
0.4	-38.42	-12.57	25.9	-11.2	--
0.6	-38.42	-7.22	31.2	-5.9	--
0.8	-38.42	-3.78	34.6	-2.4	--
1.0	-38.42	-1.35	37.1	0.0	--
1.5	-38.42	2.04	40.5	3.4	--
2.0	-38.42	2.58	41.0	3.9	--
2.5	-38.42	1.78	40.2	3.1	--
3.0	-38.42	-1.12	37.3	0.2	0
3.5	-38.42	-60.00	-21.6	-58.7	-4
4.0	-38.42	-70.00	-31.6	-68.7	-7
4.5	-38.42	-70.00	-31.6	-68.7	-11
5.0	-38.42	-70.00	-31.6	-68.7	-13
6.0	-38.42	-70.00	-31.6	-68.7	-18
7.0	-38.42	-70.00	-31.6	-68.7	-22
8.0	-38.42	-70.00	-31.6	-68.7	-26
9.0	-38.42	-70.00	-31.6	-68.7	-29
10.0	-38.42	-70.00	-31.6	-68.7	-31
12.0	-38.42	-70.00	-31.6	-68.7	-36
14.0	-38.42	-70.00	-31.6	-68.7	-40
16.0	-38.42	-70.00	-31.6	-68.7	-44
18.0	-38.42	-70.00	-31.6	-68.7	-47
20.0	-38.42	-70.00	-31.6	-68.7	-50
25.0	-38.42	-70.00	-31.6	-68.7	-50
30.0	-38.42	-70.00	-31.6	-68.7	-50
35.0	-38.42	-70.00	-31.6	-68.7	-50
40.0	-38.42	-70.00	-31.6	-68.7	-50
45.0	-38.42	-70.00	-31.6	-68.7	-50
50.0	-38.42	-70.00	-31.6	-68.7	-50

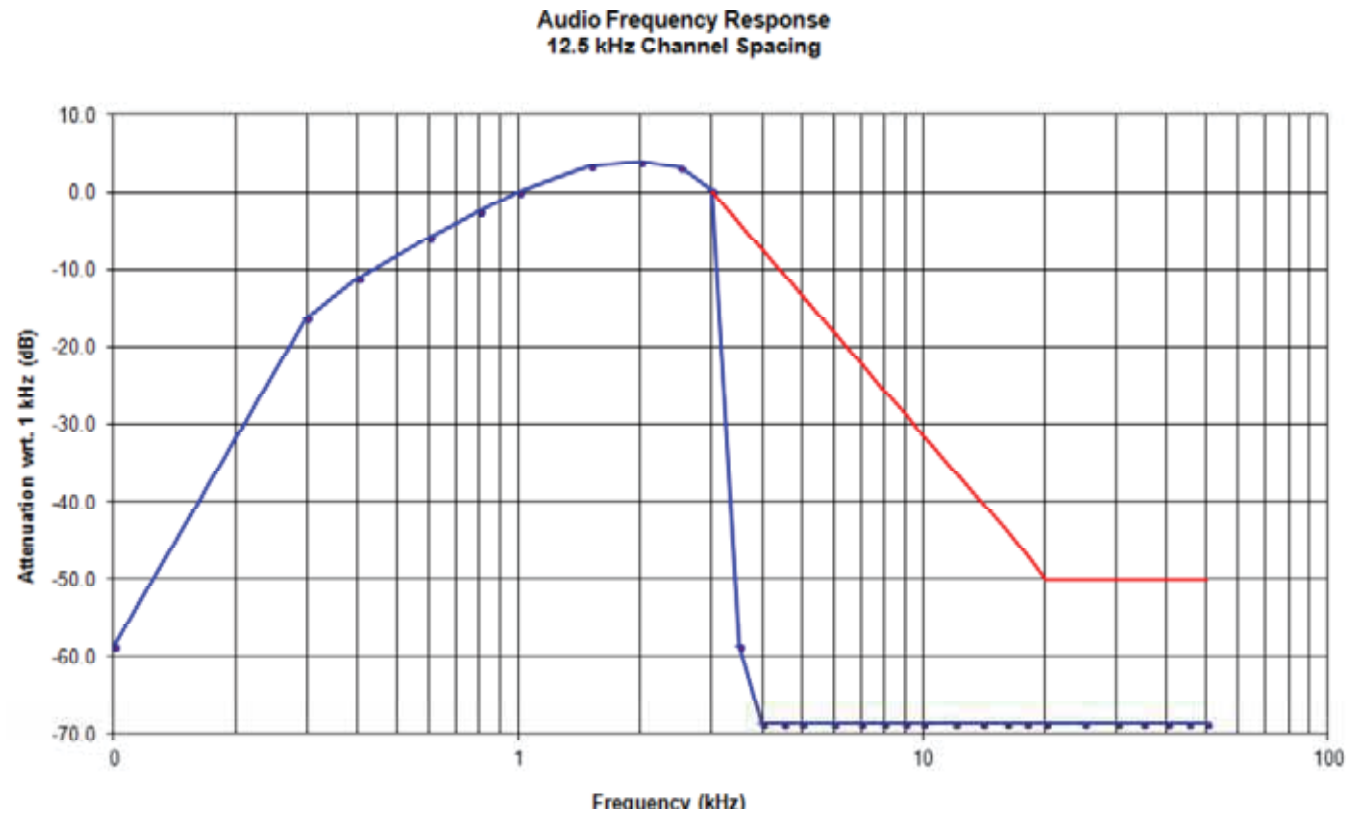
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5.6.4.2. 12.5 KHz Channel Spacing, F3E, Frequency of All Modulation States (799-805 MHz band)

Remark: Due to the difficulty of measuring the Frequency Response of the internal low-pass filter, the Frequency Response of All Modulation States is performed to show the roll-off at 3 kHz in comparison with the recommended audio filter attenuation.

Frequency (KHz)	Audio In (dBV)	Audio Out (dBV)	Attenuation (Out - In) (dB)	Attenuation Rel. to 1 KHz (dB)	Recommended Attenuation (dB)
0.1	-38.42	-60.00	-21.6	-58.7	--
0.3	-38.42	-17.74	20.7	-16.4	--
0.4	-38.42	-12.71	25.7	-11.4	--
0.6	-38.42	-7.33	31.1	-6.0	--
0.8	-38.42	-3.90	34.5	-2.6	--
1.0	-38.42	-1.32	37.1	0.0	--
1.5	-38.42	2.01	40.4	3.3	--
2.0	-38.42	2.56	41.0	3.9	--
2.5	-38.42	1.77	40.2	3.1	--
3.0	-38.42	-1.28	37.1	0.0	0
3.5	-38.42	-60.00	-21.6	-58.7	-4
4.0	-38.42	-70.00	-31.6	-68.7	-7
4.5	-38.42	-70.00	-31.6	-68.7	-11
5.0	-38.42	-70.00	-31.6	-68.7	-13
6.0	-38.42	-70.00	-31.6	-68.7	-18
7.0	-38.42	-70.00	-31.6	-68.7	-22
8.0	-38.42	-70.00	-31.6	-68.7	-26
9.0	-38.42	-70.00	-31.6	-68.7	-29
10.0	-38.42	-70.00	-31.6	-68.7	-31
12.0	-38.42	-70.00	-31.6	-68.7	-36
14.0	-38.42	-70.00	-31.6	-68.7	-40
16.0	-38.42	-70.00	-31.6	-68.7	-44
18.0	-38.42	-70.00	-31.6	-68.7	-47
20.0	-38.42	-70.00	-31.6	-68.7	-50
25.0	-38.42	-70.00	-31.6	-68.7	-50
30.0	-38.42	-70.00	-31.6	-68.7	-50
35.0	-38.42	-70.00	-31.6	-68.7	-50
40.0	-38.42	-70.00	-31.6	-68.7	-50
45.0	-38.42	-70.00	-31.6	-68.7	-50
50.0	-38.42	-70.00	-31.6	-68.7	-50

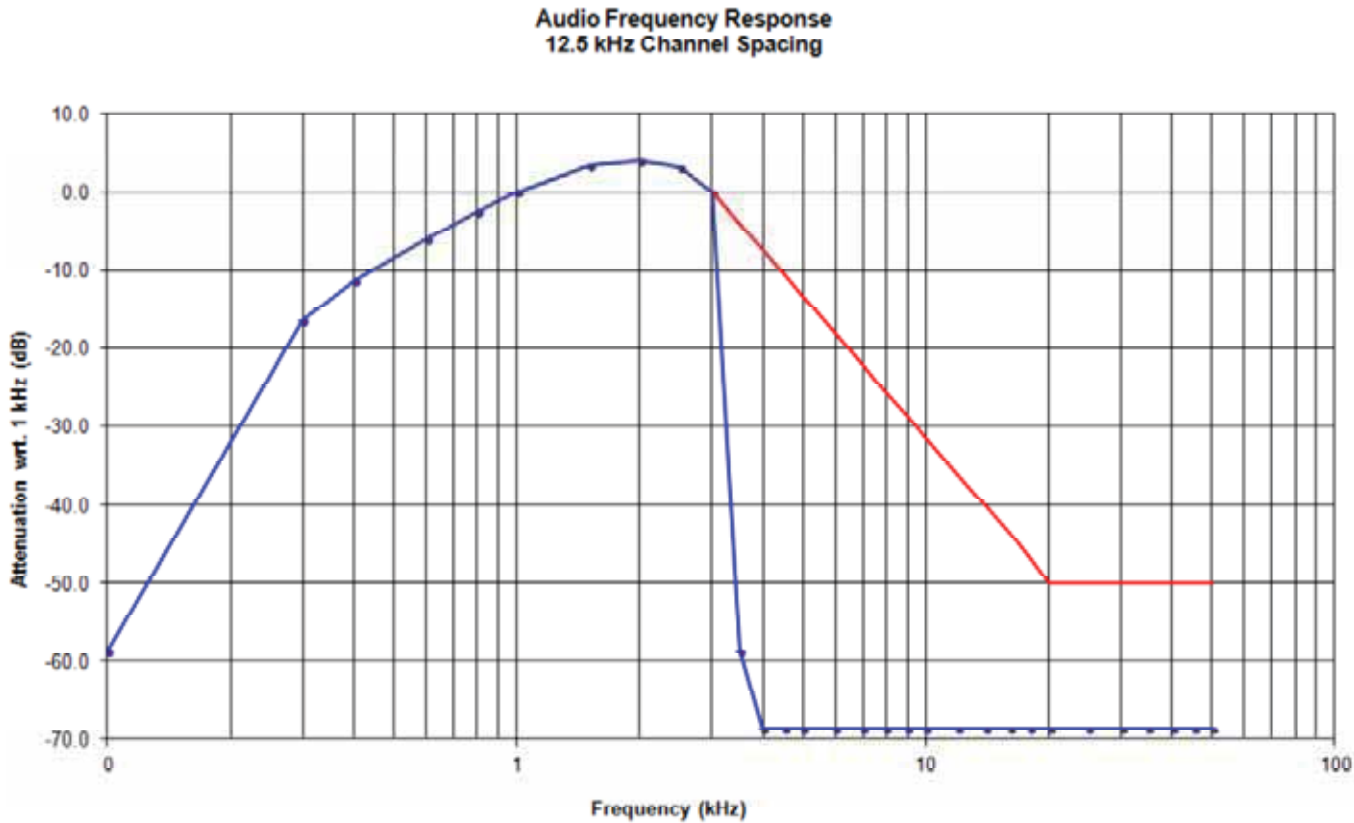
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5.6.4.3. 12.5 KHz Channel Spacing, F3E, Frequency of All Modulation States (806-824 MHz band)

Remark: Due to the difficulty of measuring the Frequency Response of the internal low-pass filter, the Frequency Response of All Modulation States is performed to show the roll-off at 3 kHz in comparison with the recommended audio filter attenuation.

Frequency (KHz)	Audio In (dBV)	Audio Out (dBV)	Attenuation (Out - In) (dB)	Attenuation Rel. to 1 KHz (dB)	Recommended Attenuation (dB)
0.1	-38.42	-60.00	-21.6	-58.5	--
0.3	-38.42	-17.88	20.5	-16.4	--
0.4	-38.42	-12.79	25.6	-11.3	--
0.6	-38.42	-7.40	31.0	-5.9	--
0.8	-38.42	-3.96	34.5	-2.5	--
1.0	-38.42	-1.50	36.9	0.0	--
1.5	-38.42	1.99	40.4	3.5	--
2.0	-38.42	2.55	41.0	4.1	--
2.5	-38.42	1.76	40.2	3.3	--
3.0	-38.42	-1.29	37.1	0.2	0
3.5	-38.42	-60.00	-21.6	-58.5	-4
4.0	-38.42	-70.00	-31.6	-68.5	-7
4.5	-38.42	-70.00	-31.6	-68.5	-11
5.0	-38.42	-70.00	-31.6	-68.5	-13
6.0	-38.42	-70.00	-31.6	-68.5	-18
7.0	-38.42	-70.00	-31.6	-68.5	-22
8.0	-38.42	-70.00	-31.6	-68.5	-26
9.0	-38.42	-70.00	-31.6	-68.5	-29
10.0	-38.42	-70.00	-31.6	-68.5	-31
12.0	-38.42	-70.00	-31.6	-68.5	-36
14.0	-38.42	-70.00	-31.6	-68.5	-40
16.0	-38.42	-70.00	-31.6	-68.5	-44
18.0	-38.42	-70.00	-31.6	-68.5	-47
20.0	-38.42	-70.00	-31.6	-68.5	-50
25.0	-38.42	-70.00	-31.6	-68.5	-50
30.0	-38.42	-70.00	-31.6	-68.5	-50
35.0	-38.42	-70.00	-31.6	-68.5	-50
40.0	-38.42	-70.00	-31.6	-68.5	-50
45.0	-38.42	-70.00	-31.6	-68.5	-50
50.0	-38.42	-70.00	-31.6	-68.5	-50

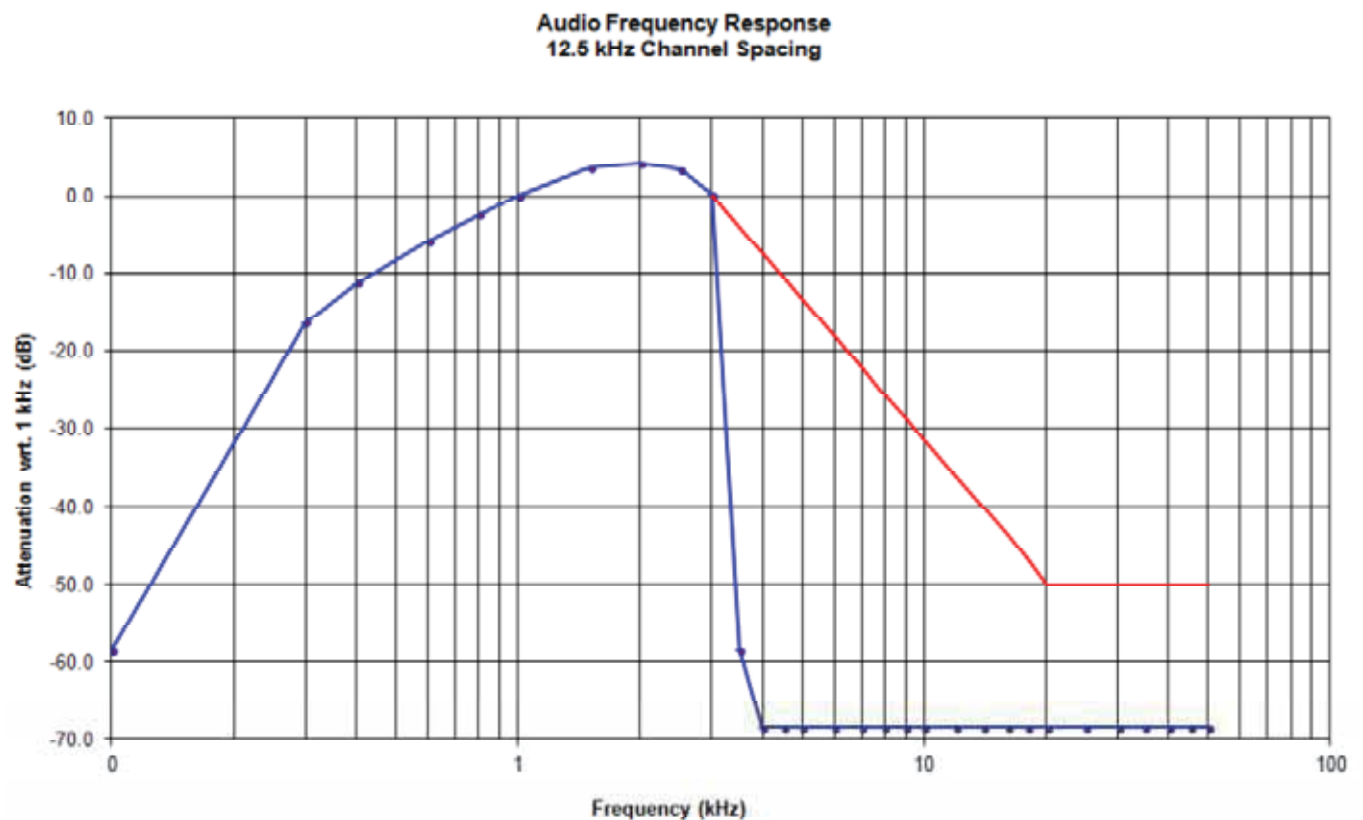
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5.6.4.4. 20 KHz Channel Spacing, F3E, Frequency of All Modulation States (806-824 MHz band)

Remark: Due to the difficulty of measuring the Frequency Response of the internal low-pass filter, the Frequency Response of All Modulation States is performed to show the roll-off at 3 kHz in comparison with the recommended audio filter attenuation.

Frequency (KHz)	Audio In (dBV)	Audio Out (dBV)	Attenuation (Out - In) (dB)	Attenuation Rel. to 1 KHz (dB)	Recommended Attenuation (dB)
0.1	-38.06	-60.00	-21.9	-62.9	--
0.3	-38.06	-13.41	24.7	-16.3	--
0.4	-38.06	-8.18	29.9	-11.1	--
0.6	-38.06	-2.96	35.1	-5.8	--
0.8	-38.06	0.36	38.4	-2.5	--
1.0	-38.06	2.87	40.9	0.0	--
1.5	-38.06	6.28	44.3	3.4	--
2.0	-38.06	6.89	45.0	4.0	--
2.5	-38.06	6.70	44.8	3.8	--
3.0	-38.06	5.08	43.1	2.2	0
3.5	-38.06	-56.70	-18.6	-59.6	-4
4.0	-38.06	-70.00	-31.9	-72.9	-7
4.5	-38.06	-70.00	-31.9	-72.9	-11
5.0	-38.06	-70.00	-31.9	-72.9	-13
6.0	-38.06	-70.00	-31.9	-72.9	-18
7.0	-38.06	-70.00	-31.9	-72.9	-22
8.0	-38.06	-70.00	-31.9	-72.9	-26
9.0	-38.06	-70.00	-31.9	-72.9	-29
10.0	-38.06	-70.00	-31.9	-72.9	-31
12.0	-38.06	-70.00	-31.9	-72.9	-36
14.0	-38.06	-70.00	-31.9	-72.9	-40
16.0	-38.06	-70.00	-31.9	-72.9	-44
18.0	-38.06	-70.00	-31.9	-72.9	-47
20.0	-38.06	-70.00	-31.9	-72.9	-50
25.0	-38.06	-70.00	-31.9	-72.9	-50
30.0	-38.06	-70.00	-31.9	-72.9	-50
35.0	-38.06	-70.00	-31.9	-72.9	-50
40.0	-38.06	-70.00	-31.9	-72.9	-50
45.0	-38.06	-70.00	-31.9	-72.9	-50
50.0	-38.06	-70.00	-31.9	-72.9	-50

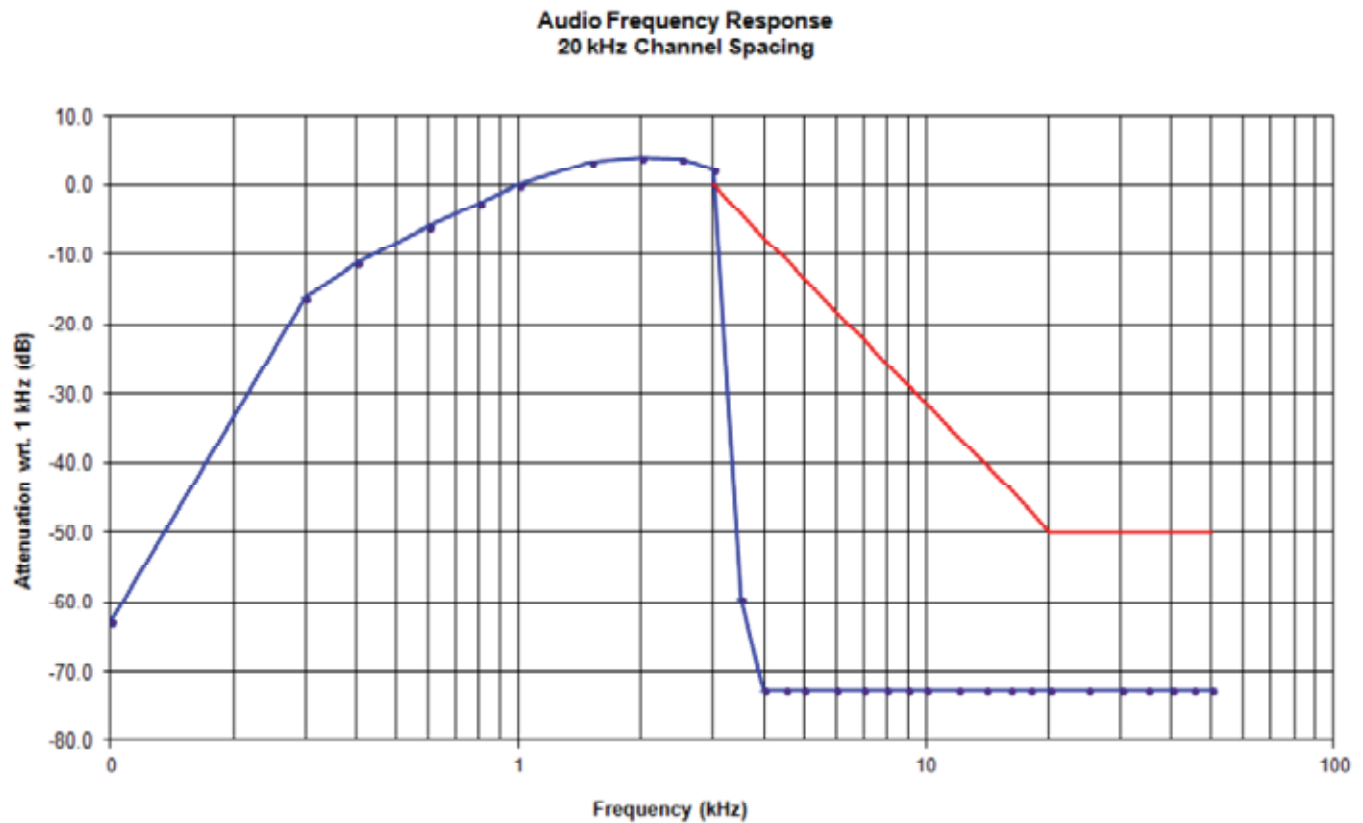
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5.6.4.5. 25 KHz Channel Spacing, F3E, Frequency of All Modulation States (806-824 MHz band)

Remark: Due to the difficulty of measuring the Frequency Response of the internal low-pass filter, the Frequency Response of All Modulation States is performed to show the roll-off at 3 kHz in comparison with the recommended audio filter attenuation.

Frequency (KHz)	Audio In (dBV)	Audio Out (dBV)	Attenuation (Out - In) (dB)	Attenuation Rel. to 1 KHz (dB)	Recommended Attenuation (dB)
0.1	-38.06	-60.00	-21.9	-64.8	--
0.3	-38.06	-11.36	26.7	-16.2	--
0.4	-38.06	-6.29	31.8	-11.1	--
0.6	-38.06	-1.18	36.9	-6.0	--
0.8	-38.06	2.27	40.3	-2.6	--
1.0	-38.06	4.82	42.9	0.0	--
1.5	-38.06	8.21	46.3	3.4	--
2.0	-38.06	8.83	46.9	4.0	--
2.5	-38.06	8.64	46.7	3.8	--
3.0	-38.06	7.01	45.1	2.2	0
3.5	-38.06	-54.70	-16.6	-59.5	-4
4.0	-38.06	-70.00	-31.9	-74.8	-7
4.5	-38.06	-70.00	-31.9	-74.8	-11
5.0	-38.06	-70.00	-31.9	-74.8	-13
6.0	-38.06	-70.00	-31.9	-74.8	-18
7.0	-38.06	-70.00	-31.9	-74.8	-22
8.0	-38.06	-70.00	-31.9	-74.8	-26
9.0	-38.06	-70.00	-31.9	-74.8	-29
10.0	-38.06	-70.00	-31.9	-74.8	-31
12.0	-38.06	-70.00	-31.9	-74.8	-36
14.0	-38.06	-70.00	-31.9	-74.8	-40
16.0	-38.06	-70.00	-31.9	-74.8	-44
18.0	-38.06	-70.00	-31.9	-74.8	-47
20.0	-38.06	-70.00	-31.9	-74.8	-50
25.0	-38.06	-70.00	-31.9	-74.8	-50
30.0	-38.06	-70.00	-31.9	-74.8	-50
35.0	-38.06	-70.00	-31.9	-74.8	-50
40.0	-38.06	-70.00	-31.9	-74.8	-50
45.0	-38.06	-70.00	-31.9	-74.8	-50
50.0	-38.06	-70.00	-31.9	-74.8	-50

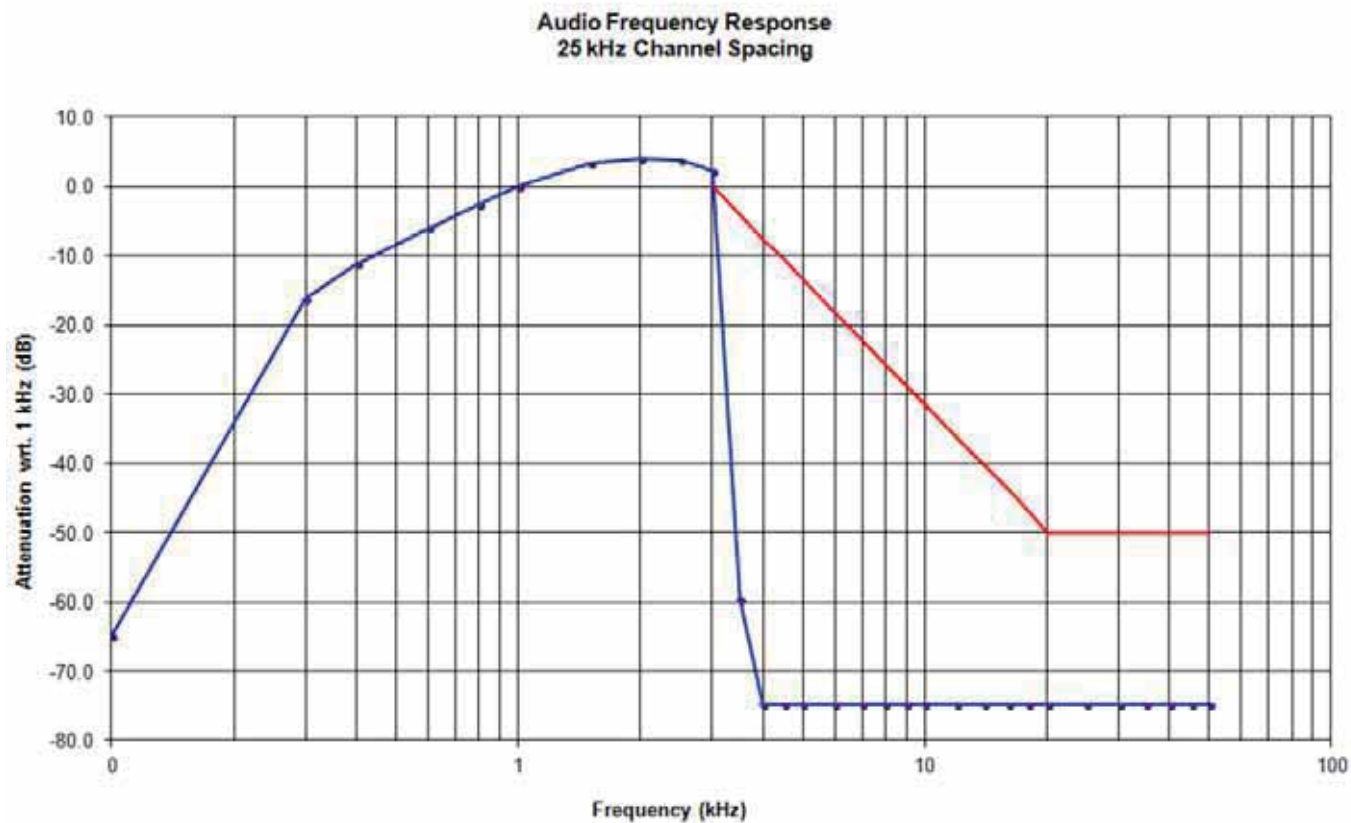
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5.6.4.6. 12.5 KHz Channel Spacing, F3E, Frequency of All Modulation States (851-869 MHz band)

Remark: Due to the difficulty of measuring the Frequency Response of the internal low-pass filter, the Frequency Response of All Modulation States is performed to show the roll-off at 3 kHz in comparison with the recommended audio filter attenuation.

Frequency (KHz)	Audio In (dBV)	Audio Out (dBV)	Attenuation (Out - In) (dB)	Attenuation Rel. to 1 KHz (dB)	Recommended Attenuation (dB)
0.1	-38.42	-60.00	-21.6	-58.6	--
0.3	-38.42	-17.92	20.5	-16.5	--
0.4	-38.42	-12.83	25.6	-11.4	--
0.6	-38.42	-7.42	31.0	-6.0	--
0.8	-38.42	-3.97	34.4	-2.6	--
1.0	-38.42	-1.39	37.0	0.0	--
1.5	-38.42	1.98	40.4	3.4	--
2.0	-38.42	2.54	41.0	3.9	--
2.5	-38.42	1.76	40.2	3.1	--
3.0	-38.42	-1.29	37.1	0.1	0
3.5	-38.42	-60.00	-21.6	-58.6	-4
4.0	-38.42	-70.00	-31.6	-68.6	-7
4.5	-38.42	-70.00	-31.6	-68.6	-11
5.0	-38.42	-70.00	-31.6	-68.6	-13
6.0	-38.42	-70.00	-31.6	-68.6	-18
7.0	-38.42	-70.00	-31.6	-68.6	-22
8.0	-38.42	-70.00	-31.6	-68.6	-26
9.0	-38.42	-70.00	-31.6	-68.6	-29
10.0	-38.42	-70.00	-31.6	-68.6	-31
12.0	-38.42	-70.00	-31.6	-68.6	-36
14.0	-38.42	-70.00	-31.6	-68.6	-40
16.0	-38.42	-70.00	-31.6	-68.6	-44
18.0	-38.42	-70.00	-31.6	-68.6	-47
20.0	-38.42	-70.00	-31.6	-68.6	-50
25.0	-38.42	-70.00	-31.6	-68.6	-50
30.0	-38.42	-70.00	-31.6	-68.6	-50
35.0	-38.42	-70.00	-31.6	-68.6	-50
40.0	-38.42	-70.00	-31.6	-68.6	-50
45.0	-38.42	-70.00	-31.6	-68.6	-50
50.0	-38.42	-70.00	-31.6	-68.6	-50

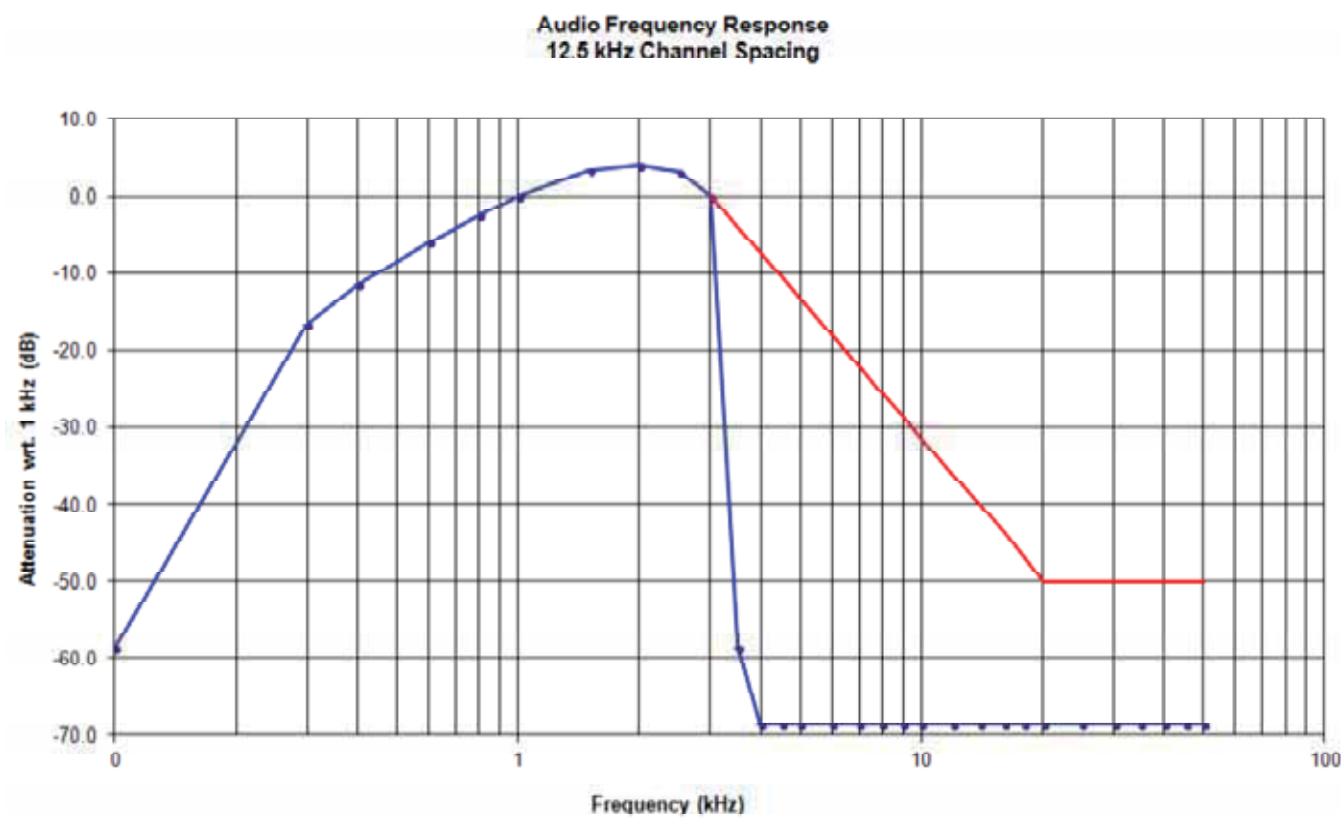
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5.6.4.7. 20 KHz Channel Spacing, F3E, Frequency of All Modulation States (851-869 MHz band)

Remark: Due to the difficulty of measuring the Frequency Response of the internal low-pass filter, the Frequency Response of All Modulation States is performed to show the roll-off at 3 kHz in comparison with the recommended audio filter attenuation.

Frequency (KHz)	Audio In (dBV)	Audio Out (dBV)	Attenuation (Out - In) (dB)	Attenuation Rel. to 1 KHz (dB)	Recommended Attenuation (dB)
0.1	-38.06	-60.00	-21.9	-62.9	--
0.3	-38.06	-13.41	24.7	-16.3	--
0.4	-38.06	-8.18	29.9	-11.1	--
0.6	-38.06	-2.96	35.1	-5.8	--
0.8	-38.06	0.36	38.4	-2.5	--
1.0	-38.06	2.87	40.9	0.0	--
1.5	-38.06	6.28	44.3	3.4	--
2.0	-38.06	6.89	45.0	4.0	--
2.5	-38.06	6.70	44.8	3.8	--
3.0	-38.06	5.08	43.1	2.2	0
3.5	-38.06	-56.70	-18.6	-59.6	-4
4.0	-38.06	-70.00	-31.9	-72.9	-7
4.5	-38.06	-70.00	-31.9	-72.9	-11
5.0	-38.06	-70.00	-31.9	-72.9	-13
6.0	-38.06	-70.00	-31.9	-72.9	-18
7.0	-38.06	-70.00	-31.9	-72.9	-22
8.0	-38.06	-70.00	-31.9	-72.9	-26
9.0	-38.06	-70.00	-31.9	-72.9	-29
10.0	-38.06	-70.00	-31.9	-72.9	-31
12.0	-38.06	-70.00	-31.9	-72.9	-36
14.0	-38.06	-70.00	-31.9	-72.9	-40
16.0	-38.06	-70.00	-31.9	-72.9	-44
18.0	-38.06	-70.00	-31.9	-72.9	-47
20.0	-38.06	-70.00	-31.9	-72.9	-50
25.0	-38.06	-70.00	-31.9	-72.9	-50
30.0	-38.06	-70.00	-31.9	-72.9	-50
35.0	-38.06	-70.00	-31.9	-72.9	-50
40.0	-38.06	-70.00	-31.9	-72.9	-50
45.0	-38.06	-70.00	-31.9	-72.9	-50
50.0	-38.06	-70.00	-31.9	-72.9	-50

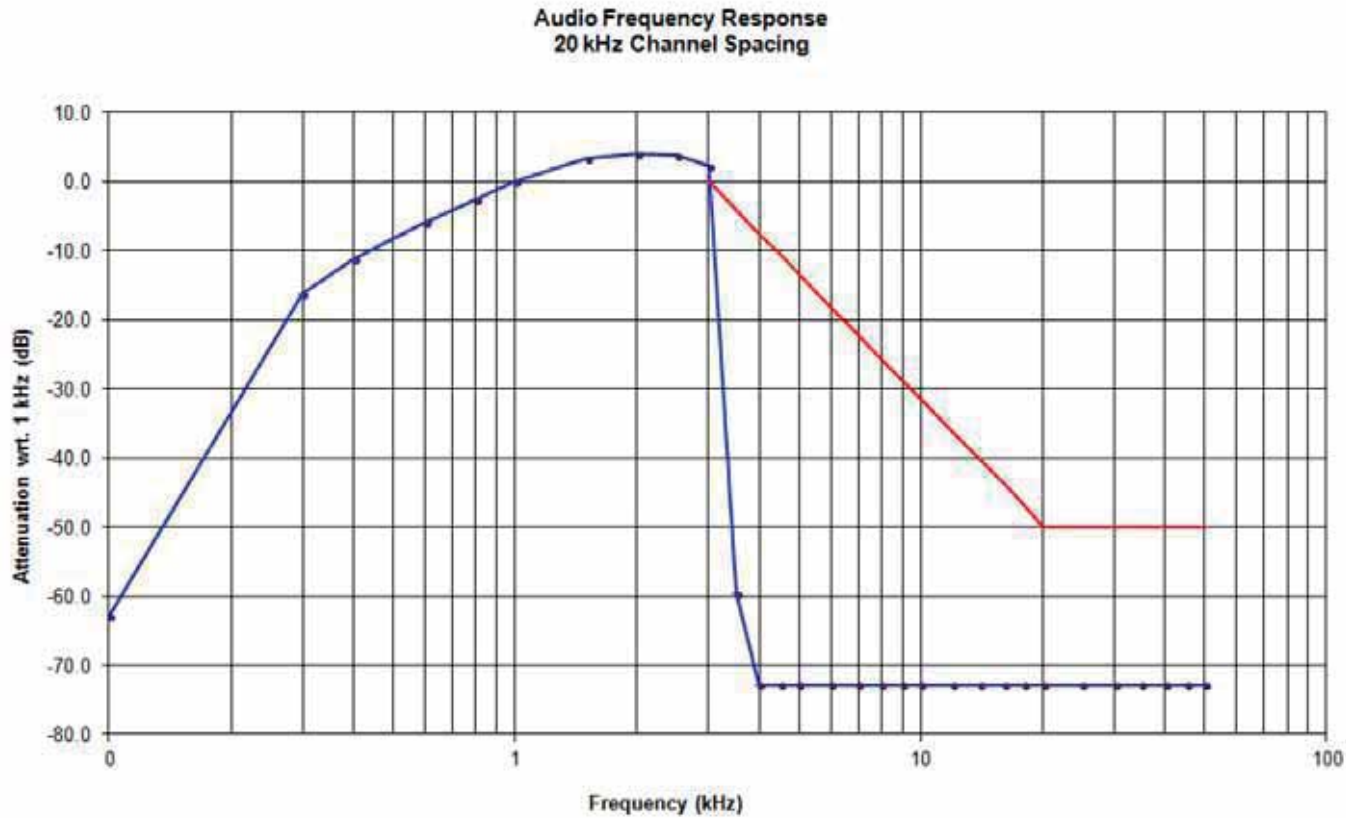
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5.6.4.8. 25 KHz Channel Spacing, F3E, Frequency of All Modulation States (851-869 MHz band)

Remark: Due to the difficulty of measuring the Frequency Response of the internal low-pass filter, the Frequency Response of All Modulation States is performed to show the roll-off at 3 kHz in comparison with the recommended audio filter attenuation.

Frequency (KHz)	Audio In (dBV)	Audio Out (dBV)	Attenuation (Out - In) (dB)	Attenuation Rel. to 1 KHz (dB)	Recommended Attenuation (dB)
0.1	-38.06	-60.00	-21.9	-64.8	--
0.3	-38.06	-11.35	26.7	-16.2	--
0.4	-38.06	-6.28	31.8	-11.1	--
0.6	-38.06	-1.18	36.9	-6.0	--
0.8	-38.06	2.28	40.3	-2.5	--
1.0	-38.06	4.82	42.9	0.0	--
1.5	-38.06	8.22	46.3	3.4	--
2.0	-38.06	8.82	46.9	4.0	--
2.5	-38.06	8.64	46.7	3.8	--
3.0	-38.06	7.07	45.1	2.2	0
3.5	-38.06	-56.30	-18.2	-61.1	-4
4.0	-38.06	-70.00	-31.9	-74.8	-7
4.5	-38.06	-70.00	-31.9	-74.8	-11
5.0	-38.06	-70.00	-31.9	-74.8	-13
6.0	-38.06	-70.00	-31.9	-74.8	-18
7.0	-38.06	-70.00	-31.9	-74.8	-22
8.0	-38.06	-70.00	-31.9	-74.8	-26
9.0	-38.06	-70.00	-31.9	-74.8	-29
10.0	-38.06	-70.00	-31.9	-74.8	-31
12.0	-38.06	-70.00	-31.9	-74.8	-36
14.0	-38.06	-70.00	-31.9	-74.8	-40
16.0	-38.06	-70.00	-31.9	-74.8	-44
18.0	-38.06	-70.00	-31.9	-74.8	-47
20.0	-38.06	-70.00	-31.9	-74.8	-50
25.0	-38.06	-70.00	-31.9	-74.8	-50
30.0	-38.06	-70.00	-31.9	-74.8	-50
35.0	-38.06	-70.00	-31.9	-74.8	-50
40.0	-38.06	-70.00	-31.9	-74.8	-50
45.0	-38.06	-70.00	-31.9	-74.8	-50
50.0	-38.06	-70.00	-31.9	-74.8	-50

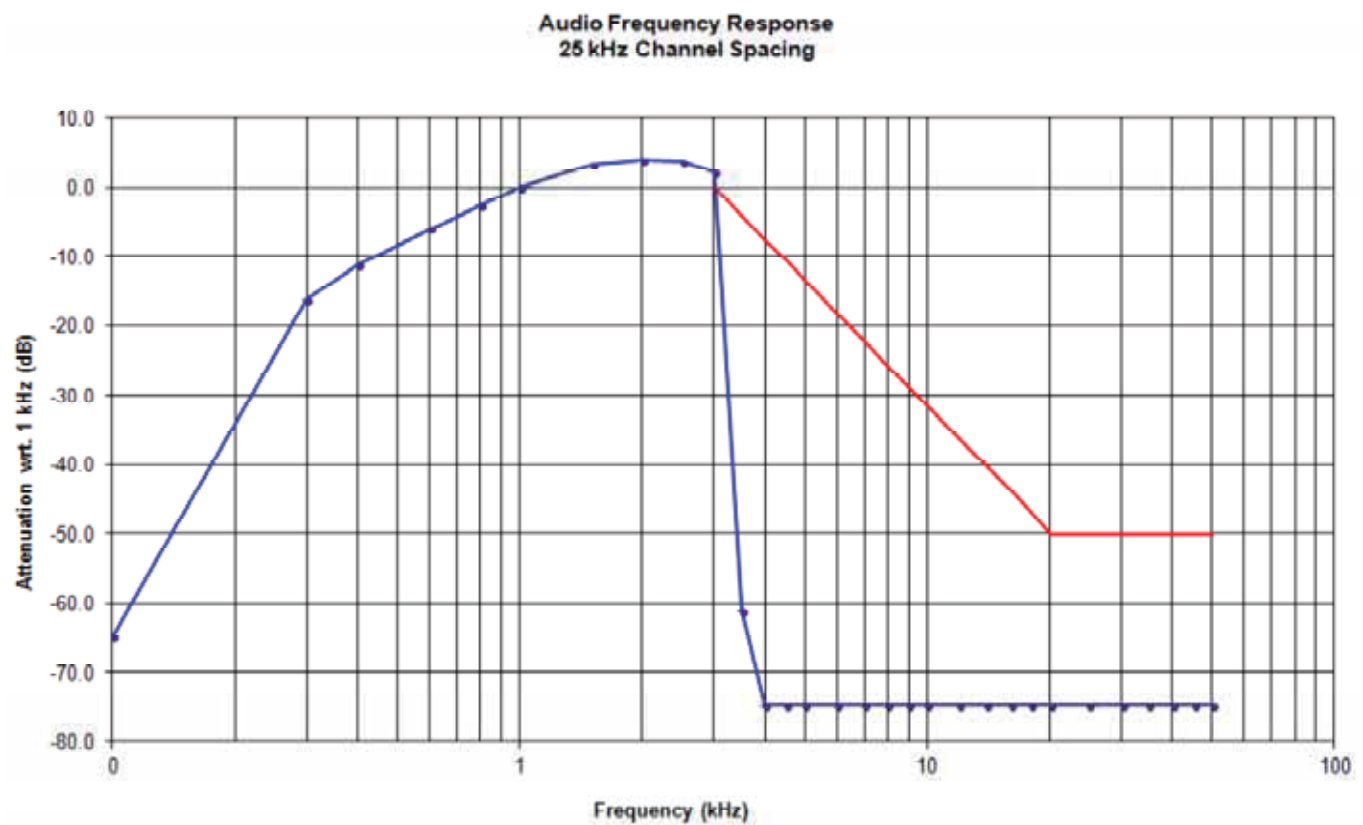
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5.7. MODULATION LIMITING [§§ 2.1047 (b) & 90.210]

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:

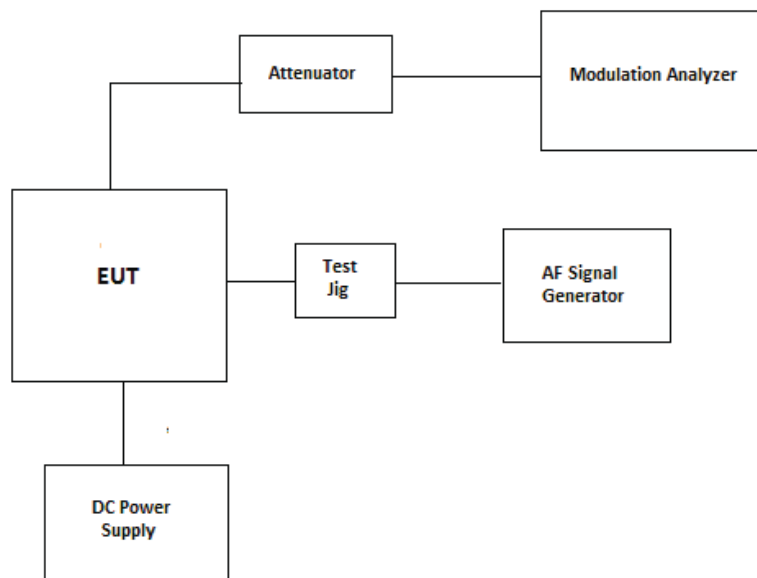
- 1.25 kHz for 6.25 kHz Channel Spacing System
- 2.5 KHz for 12.5 kHz Channel Spacing System

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 Arrangement



5.7.4. Test Data

5.7.4.1. 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)
2	0.089	0.15	0.28	0.60	0.093	2.5
4	0.096	0.22	0.51	1.02	0.099	2.5
6	0.098	0.31	0.70	1.23	0.095	2.5
8	0.099	0.39	0.93	1.30	0.097	2.5
10	0.097	0.46	1.09	1.34	0.096	2.5
15	0.096	0.63	1.48	1.39	0.096	2.5
20	0.087	0.83	1.76	1.40	0.103	2.5
25	0.106	0.99	1.87	1.40	0.101	2.5
30	0.092	1.16	1.93	1.40	0.101	2.5
35	0.093	1.30	1.97	1.40	0.105	2.5
40	0.102	1.42	2.00	1.40	0.118	2.5
45	0.101	1.53	2.02	1.39	0.107	2.5
50	0.097	1.61	2.03	1.40	0.103	2.5
60	0.096	1.70	2.01	1.40	0.103	2.5
70	0.096	1.73	2.03	1.40	0.103	2.5
80	0.096	1.69	2.03	1.40	0.102	2.5
90	0.096	1.70	2.03	1.40	0.103	2.5
100	0.096	1.72	2.03	1.40	0.103	2.5

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Voice Signal Input Level = STD MOD Level + 16 dB = 12 mV+ 16 dB = 37.58 dB(mVrms) = 75.71 mVrms		
Modulation Frequency (kHz)	Peak Deviation (kHz)	Maximum Limit (kHz)
0.1	0.10	2.5
0.2	0.09	2.5
0.3	1.13	2.5
0.4	1.65	2.5
0.6	1.78	2.5
0.8	1.98	2.5
1.0	2.01	2.5
1.2	2.04	2.5
1.4	2.05	2.5
1.6	2.10	2.5
1.8	2.09	2.5
2.0	2.10	2.5
2.5	1.97	2.5
3.0	1.39	2.5
3.5	0.09	2.5
4.0	0.10	2.5
4.5	0.10	2.5
5.0	0.10	2.5
6.0	0.10	2.5
7.0	0.10	2.5
8.0	0.10	2.5
9.0	0.10	2.5
10.0	0.10	2.5

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

Modulating Signal Level (mVrms)	Peak Frequency Deviation (kHz)					Maximum Limit (kHz)
	0.1 kHz	0.5 kHz	1.0 kHz	3.0 kHz	5.0 kHz	
2	0.090	0.16	0.29	0.59	0.091	2.5
4	0.089	0.23	0.49	1.02	0.093	2.5
6	0.086	0.30	0.70	1.23	0.092	2.5
8	0.096	0.38	0.91	1.30	0.093	2.5
10	0.096	0.45	1.06	1.32	0.093	2.5
15	0.088	0.63	1.46	1.34	0.094	2.5
20	0.086	0.81	1.74	1.36	0.099	2.5
25	0.087	0.99	1.87	1.39	0.098	2.5
30	0.097	1.13	1.93	1.39	0.095	2.5
35	0.095	1.28	1.97	1.40	0.095	2.5
40	0.094	1.41	2.00	1.39	0.096	2.5
45	0.094	1.50	2.03	1.39	0.098	2.5
50	0.094	1.59	2.03	1.40	0.099	2.5
60	0.094	1.70	2.02	1.40	0.098	2.5
70	0.094	1.73	2.04	1.40	0.098	2.5
80	0.094	1.73	2.04	1.40	0.098	2.5
90	0.094	1.73	2.04	1.40	0.098	2.5
100	0.094	1.73	2.04	1.40	0.098	2.5

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Voice Signal Input Level = STD MOD Level + 16 dB = 12 mV+ 16 dB = 37.58 dB(mVrms) = 75.71 mVrms		
Modulation Frequency (kHz)	Peak Deviation (kHz)	Maximum Limit (kHz)
0.1	0.09	2.5
0.2	0.10	2.5
0.3	1.64	2.5
0.4	1.77	2.5
0.6	1.94	2.5
0.8	2.05	2.5
1.0	2.06	2.5
1.2	2.05	2.5
1.4	2.09	2.5
1.6	2.09	2.5
1.8	2.10	2.5
2.0	1.96	2.5
2.5	1.40	2.5
3.0	0.10	2.5
3.5	0.10	2.5
4.0	0.09	2.5
4.5	0.10	2.5
5.0	0.09	2.5
6.0	0.09	2.5
7.0	0.09	2.5
8.0	0.09	2.5
9.0	0.09	2.5
10.0	0.09	2.5

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

Modulating Signal Level (mVrms)	Peak Frequency Deviation (kHz)					Maximum Limit (kHz)
	0.1 kHz	0.5 kHz	1.0 kHz	3.0 kHz	5.0 kHz	
2	0.096	0.14	0.29	0.59	0.094	2.5
4	0.090	0.23	0.49	1.01	0.094	2.5
6	0.098	0.30	0.69	1.24	0.097	2.5
8	0.094	0.38	0.91	1.30	0.097	2.5
10	0.089	0.45	1.06	1.33	0.095	2.5
15	0.095	0.63	1.46	1.38	0.097	2.5
20	0.094	0.82	1.75	1.39	0.098	2.5
25	0.094	0.97	1.86	1.39	0.095	2.5
30	0.091	1.14	1.92	1.40	0.095	2.5
35	0.092	1.28	1.96	1.39	0.099	2.5
40	0.092	1.41	2.00	1.39	0.099	2.5
45	0.093	1.51	2.02	1.39	0.099	2.5
50	0.094	1.59	2.03	1.39	0.095	2.5
60	0.096	1.69	2.03	1.40	0.095	2.5
70	0.094	1.72	2.04	1.39	0.095	2.5
80	0.094	1.72	2.03	1.40	0.095	2.5
90	0.094	1.72	2.04	1.39	0.095	2.5
100	0.094	1.70	2.01	1.40	0.095	2.5

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Voice Signal Input Level = STD MOD Level + 16 dB = 12 mV+ 16 dB = 37.58 dB(mVrms) = 75.71 mVrms		
Modulation Frequency (kHz)	Peak Deviation (kHz)	Maximum Limit (kHz)
0.1	0.09	2.5
0.2	0.10	2.5
0.3	1.63	2.5
0.4	1.77	2.5
0.6	1.93	2.5
0.8	2.04	2.5
1.0	2.06	2.5
1.2	2.05	2.5
1.4	2.07	2.5
1.6	2.08	2.5
1.8	2.10	2.5
2.0	1.96	2.5
2.5	1.40	2.5
3.0	0.10	2.5
3.5	0.09	2.5
4.0	0.09	2.5
4.5	0.10	2.5
5.0	0.09	2.5
6.0	0.09	2.5
7.0	0.10	2.5
8.0	0.10	2.5
9.0	0.10	2.5
10.0	0.10	2.5

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

Modulating Signal Level (mVrms)	Peak Frequency Deviation (kHz) at the following modulating frequency:					Maximum Limit (kHz)
	0.1 kHz	0.5 kHz	1.0 kHz	3.0 kHz	5.0 kHz	
2	0.107	0.21	0.41	1.18	0.103	4.0
4	0.108	0.31	0.76	2.04	0.101	4.0
6	0.097	0.44	1.08	2.49	0.104	4.0
8	0.098	0.57	1.42	2.62	0.097	4.0
10	0.097	0.67	1.69	2.71	0.099	4.0
15	0.098	0.98	2.31	2.83	0.095	4.0
20	0.095	1.28	2.75	2.83	0.102	4.0
25	0.097	1.56	2.93	2.83	0.104	4.0
30	0.102	1.79	3.05	2.83	0.104	4.0
35	0.102	2.03	3.13	2.83	0.118	4.0
40	0.101	2.23	3.17	2.83	0.121	4.0
45	0.098	2.41	3.23	2.83	0.114	4.0
50	0.096	2.55	3.25	2.83	0.114	4.0
60	0.098	2.71	3.21	2.83	0.121	4.0
70	0.098	2.74	3.25	2.83	0.124	4.0
80	0.095	2.72	3.25	2.83	0.124	4.0
90	0.094	2.75	3.26	2.83	0.124	4.0
100	0.094	2.70	3.18	2.83	0.122	4.0

Voice Signal Input Level = STD MOD Level + 16 dB = 12.5 mV+ 16 dB = 37.94 dB(mVrms) = 78.87 mVrms		
Modulation Frequency (KHz)	Peak Deviation (KHz)	Maximum Limit (KHz)
0.1	0.11	4.0
0.2	0.10	4.0
0.3	1.84	4.0
0.4	2.64	4.0
0.6	2.82	4.0
0.8	3.06	4.0
1.0	3.28	4.0
1.2	3.31	4.0
1.4	3.30	4.0
1.6	3.33	4.0
1.8	3.35	4.0
2.0	3.39	4.0
2.5	3.36	4.0
3.0	2.83	4.0
3.5	0.10	4.0
4.0	0.09	4.0
4.5	0.09	4.0
5.0	0.10	4.0
6.0	0.10	4.0
7.0	0.10	4.0
8.0	0.10	4.0
9.0	0.10	4.0
10.0	0.10	4.0

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5.7.4.5. 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)
2	0.092	0.24	0.52	1.45	0.105	5.0
4	0.094	0.39	0.95	2.54	0.101	5.0
6	0.098	0.55	1.37	3.11	0.100	5.0
8	0.097	0.73	1.79	3.27	0.101	5.0
10	0.098	0.85	2.13	3.38	0.109	5.0
15	0.097	1.23	2.91	3.48	0.110	5.0
20	0.105	1.61	3.45	3.52	0.102	5.0
25	0.101	1.96	3.66	3.52	0.111	5.0
30	0.110	2.27	3.80	3.52	0.113	5.0
35	0.108	2.57	3.90	3.52	0.124	5.0
40	0.101	2.82	3.98	3.52	0.130	5.0
45	0.113	3.02	4.02	3.53	0.136	5.0
50	0.109	3.18	4.06	3.53	0.120	5.0
60	0.102	3.37	3.98	3.52	0.136	5.0
70	0.102	3.41	4.05	3.52	0.132	5.0
80	0.102	3.35	4.03	3.52	0.131	5.0
90	0.102	3.38	4.07	3.52	0.130	5.0
100	0.102	3.41	4.01	3.52	0.127	5.0

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Voice Signal Input Level = STD MOD Level + 16 dB = 12.5 mV+ 16 dB = 37.94 dB(mVrms) = 78.87 mVrms		
Modulation Frequency (KHz)	Peak Deviation (KHz)	Maximum Limit (KHz)
0.1	0.11	5.0
0.2	0.11	5.0
0.3	3.31	5.0
0.4	3.82	5.0
0.6	4.08	5.0
0.8	4.09	5.0
1.0	4.09	5.0
1.2	4.13	5.0
1.4	4.18	5.0
1.6	4.22	5.0
1.8	4.21	5.0
2.0	3.53	5.0
2.5	0.10	5.0
3.0	0.10	5.0
3.5	0.10	5.0
4.0	0.12	5.0
4.5	0.11	5.0
5.0	0.10	5.0
6.0	0.10	5.0
7.0	0.10	5.0
8.0	0.10	5.0
9.0	0.10	5.0

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5.7.4.6. 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)
2	0.095	0.16	0.29	0.59	0.098	2.5
4	0.089	0.23	0.50	1.02	0.094	2.5
6	0.096	0.31	0.70	1.24	0.097	2.5
8	0.094	0.39	0.92	1.30	0.094	2.5
10	0.096	0.44	1.07	1.37	0.097	2.5
15	0.098	0.63	1.46	1.38	0.096	2.5
20	0.099	0.82	1.75	1.39	0.093	2.5
25	0.093	0.98	1.87	1.39	0.098	2.5
30	0.093	1.14	1.93	1.40	0.099	2.5
35	0.097	1.29	1.97	1.40	0.099	2.5
40	0.096	1.40	2.00	1.39	0.099	2.5
45	0.098	1.52	2.02	1.40	0.099	2.5
50	0.097	1.59	2.04	1.41	0.098	2.5
60	0.097	1.70	2.01	1.40	0.098	2.5
70	0.098	1.75	2.04	1.40	0.098	2.5
80	0.098	1.73	2.03	1.40	0.098	2.5
90	0.098	1.73	2.04	1.40	0.098	2.5
100	0.098	1.73	2.00	1.40	0.098	2.5

Voice Signal Input Level = STD MOD Level + 16 dB = 12 mV+ 16 dB = 37.58 dB(mVrms) = 75.71 mVrms		
Modulation Frequency (kHz)	Peak Deviation (kHz)	Maximum Limit (kHz)
0.1	0.10	2.5
0.2	0.10	2.5
0.3	1.12	2.5
0.4	1.64	2.5
0.6	1.78	2.5
0.8	1.93	2.5
1.0	2.03	2.5
1.2	2.04	2.5
1.4	2.06	2.5
1.6	2.08	2.5
1.8	2.10	2.5
2.0	2.11	2.5
2.5	1.97	2.5
3.0	1.40	2.5
3.5	0.09	2.5
4.0	0.10	2.5
4.5	0.10	2.5
5.0	0.09	2.5
6.0	0.10	2.5
7.0	0.09	2.5
8.0	0.09	2.5
9.0	0.09	2.5
10.0	0.09	2.5

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

Modulating Signal Level (mVrms)	Peak Frequency Deviation (kHz) at the following modulating frequency:					Maximum Limit (kHz)
	0.1 kHz	0.5 kHz	1.0 kHz	3.0 kHz	5.0 kHz	
2	0.107	0.20	0.42	1.17	0.105	4.0
4	0.101	0.33	0.76	2.04	0.099	4.0
6	0.100	0.45	1.09	2.50	0.097	4.0
8	0.098	0.57	1.43	2.62	0.107	4.0
10	0.096	0.68	1.69	2.70	0.101	4.0
15	0.096	0.98	2.31	2.83	0.104	4.0
20	0.098	1.27	2.75	2.84	0.105	4.0
25	0.096	1.55	2.93	2.84	0.108	4.0
30	0.103	1.81	3.04	2.83	0.110	4.0
35	0.100	2.03	3.13	2.84	0.121	4.0
40	0.102	2.24	3.19	2.84	0.125	4.0
45	0.106	2.42	3.23	2.84	0.129	4.0
50	0.102	2.54	3.26	2.84	0.126	4.0
60	0.103	2.71	3.26	2.83	0.127	4.0
70	0.100	2.74	3.26	2.83	0.126	4.0
80	0.101	2.77	3.25	2.83	0.125	4.0
90	0.103	2.75	3.25	2.83	0.127	4.0
100	0.103	2.74	3.18	2.83	0.129	4.0

Voice Signal Input Level = STD MOD Level + 16 dB = 12.5 mV+ 16 dB = 37.94 dB(mVrms) = 78.87 mVrms		
Modulation Frequency (KHz)	Peak Deviation (KHz)	Maximum Limit (KHz)
0.1	0.10	4.0
0.2	0.11	4.0
0.3	1.84	4.0
0.4	2.65	4.0
0.6	2.77	4.0
0.8	3.06	4.0
1.0	3.28	4.0
1.2	3.31	4.0
1.4	3.31	4.0
1.6	3.32	4.0
1.8	3.34	4.0
2.0	3.35	4.0
2.5	3.37	4.0
3.0	2.84	4.0
3.5	0.10	4.0
4.0	0.10	4.0
4.5	0.12	4.0
5.0	0.10	4.0
6.0	0.10	4.0
7.0	0.10	4.0
8.0	0.10	4.0
9.0	0.10	4.0
10.0	0.10	4.0

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5.7.4.8. 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)
2	0.108	0.25	0.52	1.45	0.098	5.0
4	0.106	0.40	0.93	2.53	0.100	5.0
6	0.105	0.55	1.34	3.10	0.098	5.0
8	0.102	0.71	1.76	3.27	0.109	5.0
10	0.110	0.84	2.10	3.35	0.108	5.0
15	0.112	1.21	2.89	3.49	0.107	5.0
20	0.102	1.59	3.42	3.51	0.121	5.0
25	0.105	1.93	3.66	3.52	0.115	5.0
30	0.109	2.24	3.80	3.52	0.122	5.0
35	0.110	2.52	3.89	3.53	0.125	5.0
40	0.107	2.79	3.96	3.53	0.131	5.0
45	0.103	3.00	4.01	3.53	0.148	5.0
50	0.106	3.16	4.06	3.52	0.136	5.0
60	0.107	3.38	4.02	3.52	0.132	5.0
70	0.106	3.41	4.06	3.53	0.138	5.0
80	0.103	3.42	4.05	3.52	0.132	5.0
90	0.103	3.43	4.05	3.52	0.124	5.0
100	0.103	3.41	3.97	3.52	0.124	5.0

Voice Signal Input Level = STD MOD Level + 16 dB = 12.5 mV+ 16 dB = 37.94 dB(mVrms) = 78.87 mVrms		
Modulation Frequency (KHz)	Peak Deviation (KHz)	Maximum Limit (KHz)
0.1	0.10	5.0
0.2	0.11	5.0
0.3	2.29	5.0
0.4	3.30	5.0
0.6	3.51	5.0
0.8	3.82	5.0
1.0	4.10	5.0
1.2	4.13	5.0
1.4	4.12	5.0
1.6	4.14	5.0
1.8	4.19	5.0
2.0	4.23	5.0
2.5	4.20	5.0
3.0	3.54	5.0
3.5	0.10	5.0
4.0	0.11	5.0
4.5	0.11	5.0
5.0	0.12	5.0
6.0	0.11	5.0
7.0	0.10	5.0
8.0	0.10	5.0
9.0	0.10	5.0

5.7.4.9. Digital Modulation

Max Deviation measured for 6.25 KHz Channel Spacing Digital Mod = 1.56 kHz

Phase 1(Digital)	Channel 21	769.1 MHz	+2.83 kHz
Phase 1(Digital)	Channel 24	799.1 MHz	+2.86 kHz
Phase 1(Digital)	Channel 27	806.1 MHz	+2.87 kHz
Phase 1(Digital)	Channel 30	851.1 MHz	+2.88 kHz

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5.8. OCCUPIED BANDWIDTH & EMISSION MASK [§§ 2.1049, 90.209, 90.210, 90.210 & 90.691]

5.8.1. Limits

STANDARD CHANNEL SPACING/BANDWIDTH

Frequency band (MHz)	Channel spacing (kHz)	Authorized bandwidth (kHz)
Below 25 ² .		
25–50	20	20
72–76	20	20
150–174	17.5	1,3 20/11.25/6
216–220 ³	6.25	20/11.25/6
220–222	5	4
406–512 ²	16.25	1,3 20/11.25/6
806–809/851–854	12.5	20
809–824/854–869	25	20
896–901/935–940	12.5	13.6
902–928 ⁴		
929–930	25	20
1427–1432 ³	12.5	12.5
³ 2450–2483.5 ²		
Above 2500 ²		

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

Emission Mask Requirement- FCC

Reference: 90.210 and 90.691

APPLICABLE EMISSION MASKS

Frequency band (MHz)	Mask for equipment with Audio low pass filter	Mask for equipment without audio low pass filter
Below 25 ¹	A or B	A or C
25–50	B	C
72–76	B	C
150–174 ²	B, D, or E	C, D, or E
150 Paging-only	B	C
220–222	F	F
421–512 ²	B, D, or E	C, D, or E
450 Paging-only	B	G
806–809/851–854	B	H
809–824/854–869 ³	B	G
896–901/935–940	I	J
902–928	K	K
929–930	B	G
4940–4990 MHz	L or M	L or M.
5850–5925 ⁴		
All other bands	B	C

¹ Equipment using single sideband J3E emission must 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.

⁴ DSRCs Roadside Units equipment in the 5850–5925 MHz band is governed under subpart M of this part.

§ 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 $116 \log_{10}(f/6.1)$ decibels or $50 + 10 \log_{10}(P)$ 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 $43 + 10 \log_{10}(P)$ 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.

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

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

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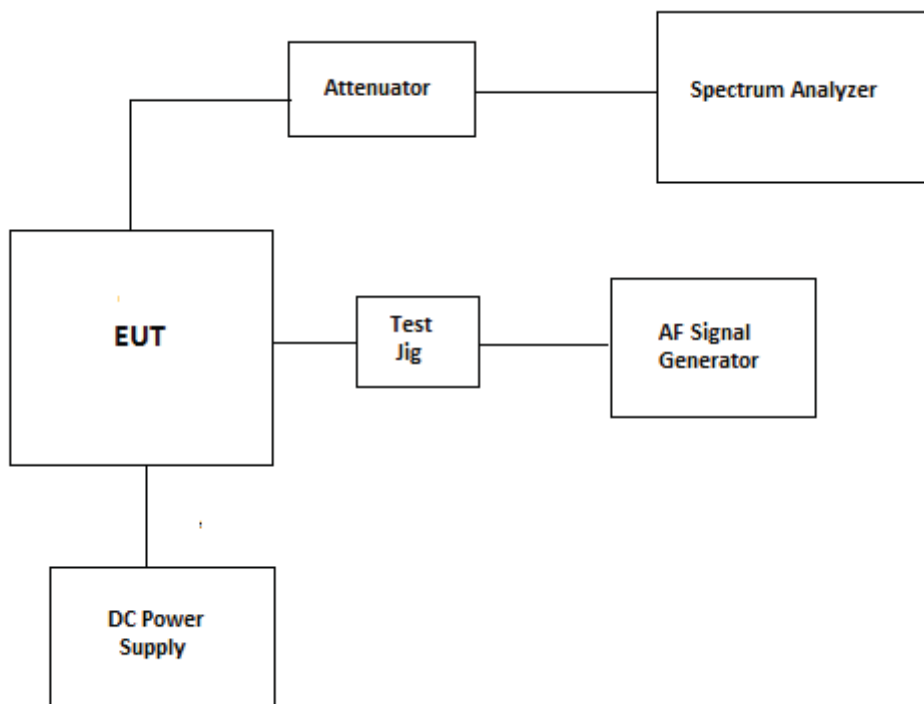
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5.8.3. Test Arrangement



5.8.4. Test Data- OCCUPIED BANDWIDTH

5.8.4.1. 99% Occupied Bandwidth (kHz)

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	5.689	7.93	8.05	11.25
774.9	12.5	5.689	7.93	7.89	11.25
799.1	12.5	5.689	8.01	8.05	11.25
804.9	12.5	5.689	7.89	8.05	11.25
806.1	12.5	5.689	7.89	8.05	20
815.1	12.5	5.689	7.81	8.09	20
823.9	12.5	5.689	7.81	8.05	20
806.1	20	10.336	N/A	N/A	20
808.9	20	10.385	N/A	N/A	20
806.1	25	15.65	N/A	N/A	20
815.1	25	15.82	N/A	N/A	20
823.9	25	15.705	N/A	N/A	20
851.1	12.5	5.689	7.81	8.05	20
860.1	12.5	5.689	7.93	8.01	20
868.9	12.5	5.689	7.97	7.85	20
851.1	20	10.385	N/A	N/A	20
853.9	20	10.385	N/A	N/A	20
851.1	25	15.705	N/A	N/A	20
860.1	25	15.761	N/A	N/A	20
868.9	25	15.705	N/A	N/A	20

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

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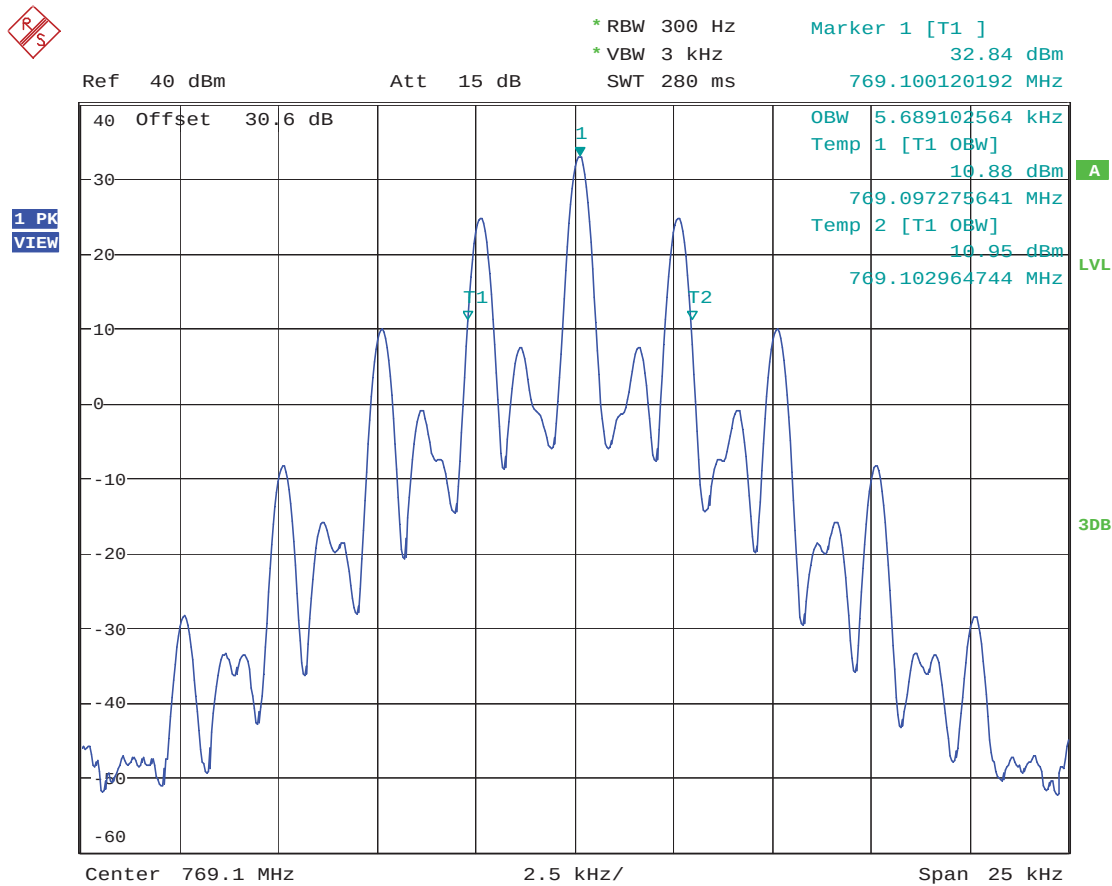
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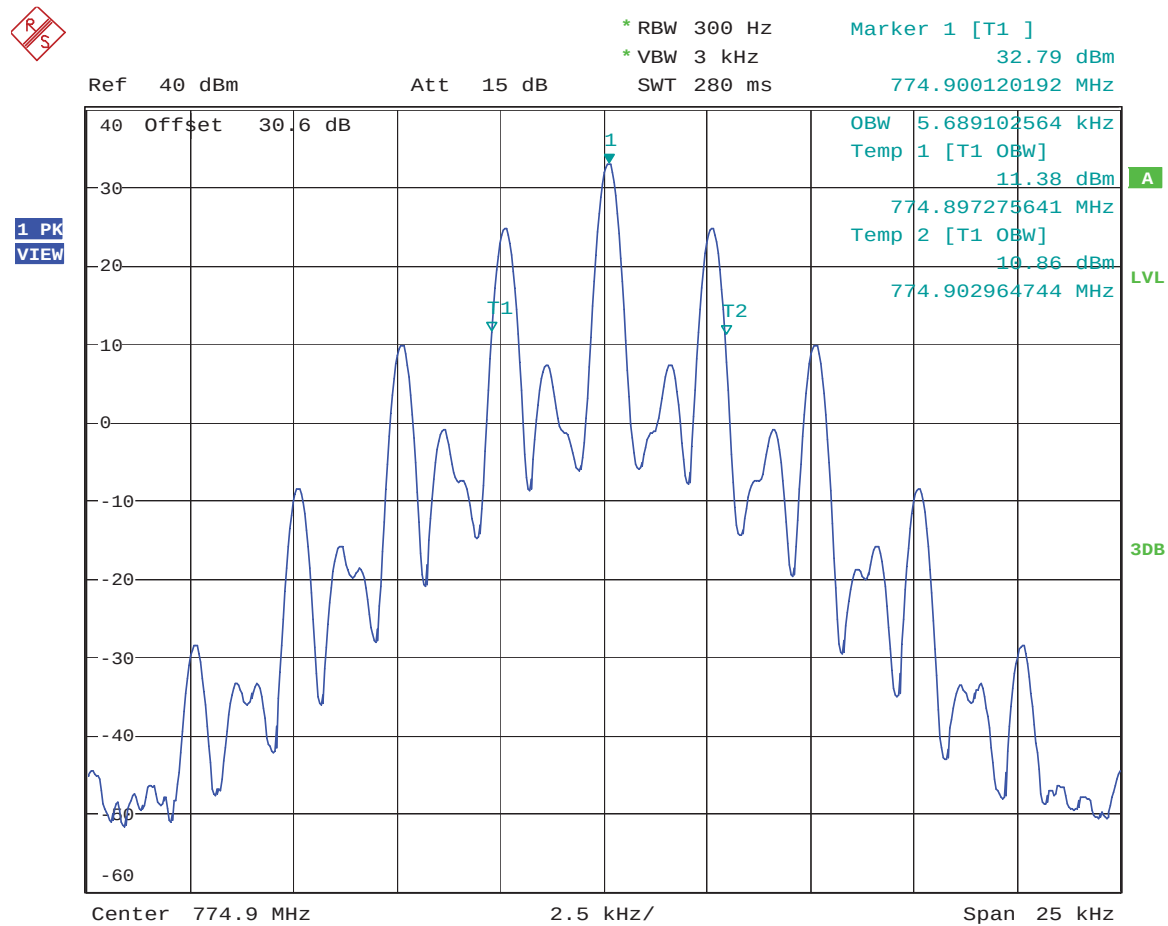
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5.8.4.2. Configuration: 99% OBW, Band 1: 769-775MHz, 769.1MHz, 12.5 KHz, Analog, High power
OBW: 5.689 KHz



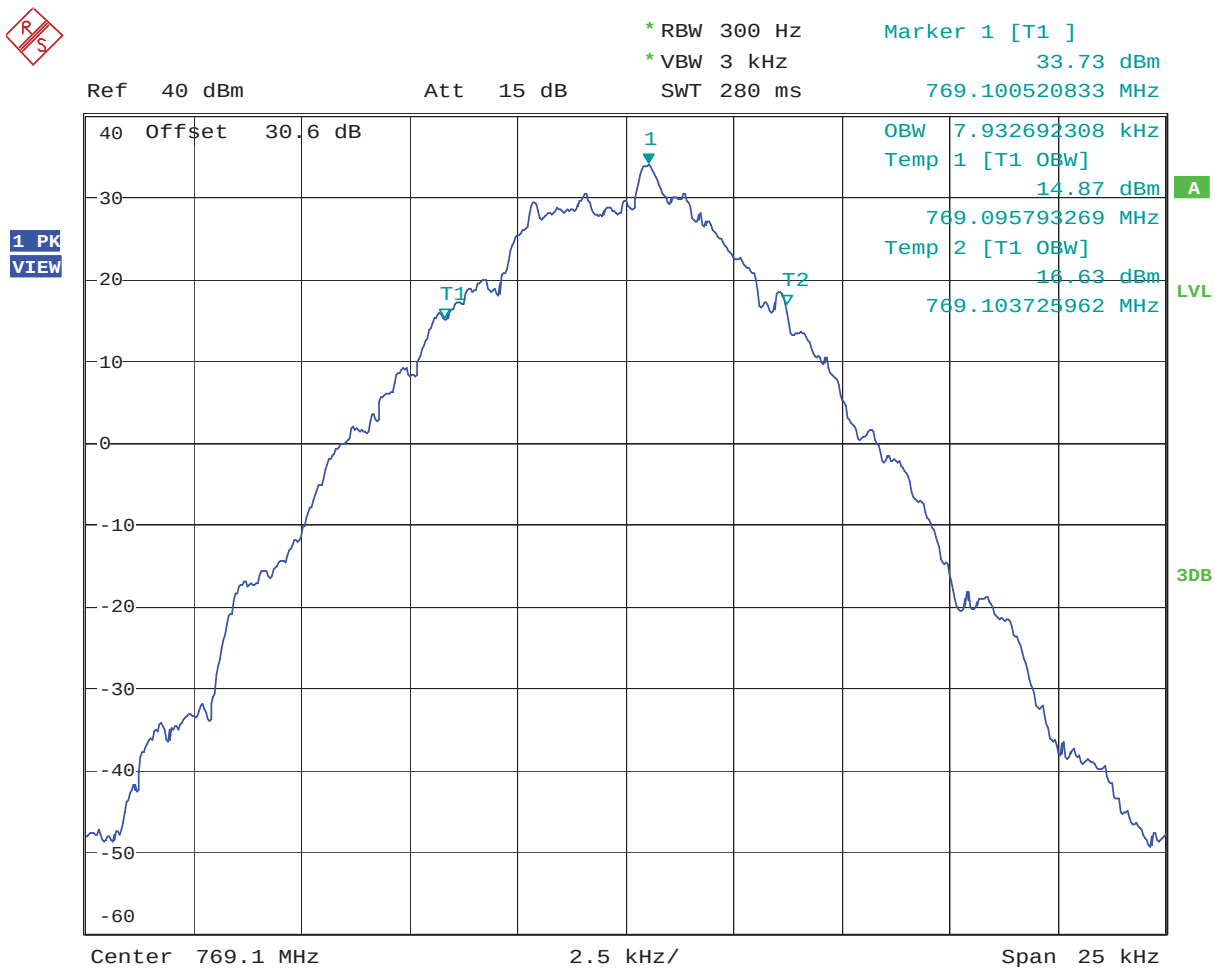
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5.8.4.3. Configuration: 99% OBW, Band 1: 769-775MHz, 774.9MHz, 12.5 KHz, Analog, High power
OBW: 5.689 KHz



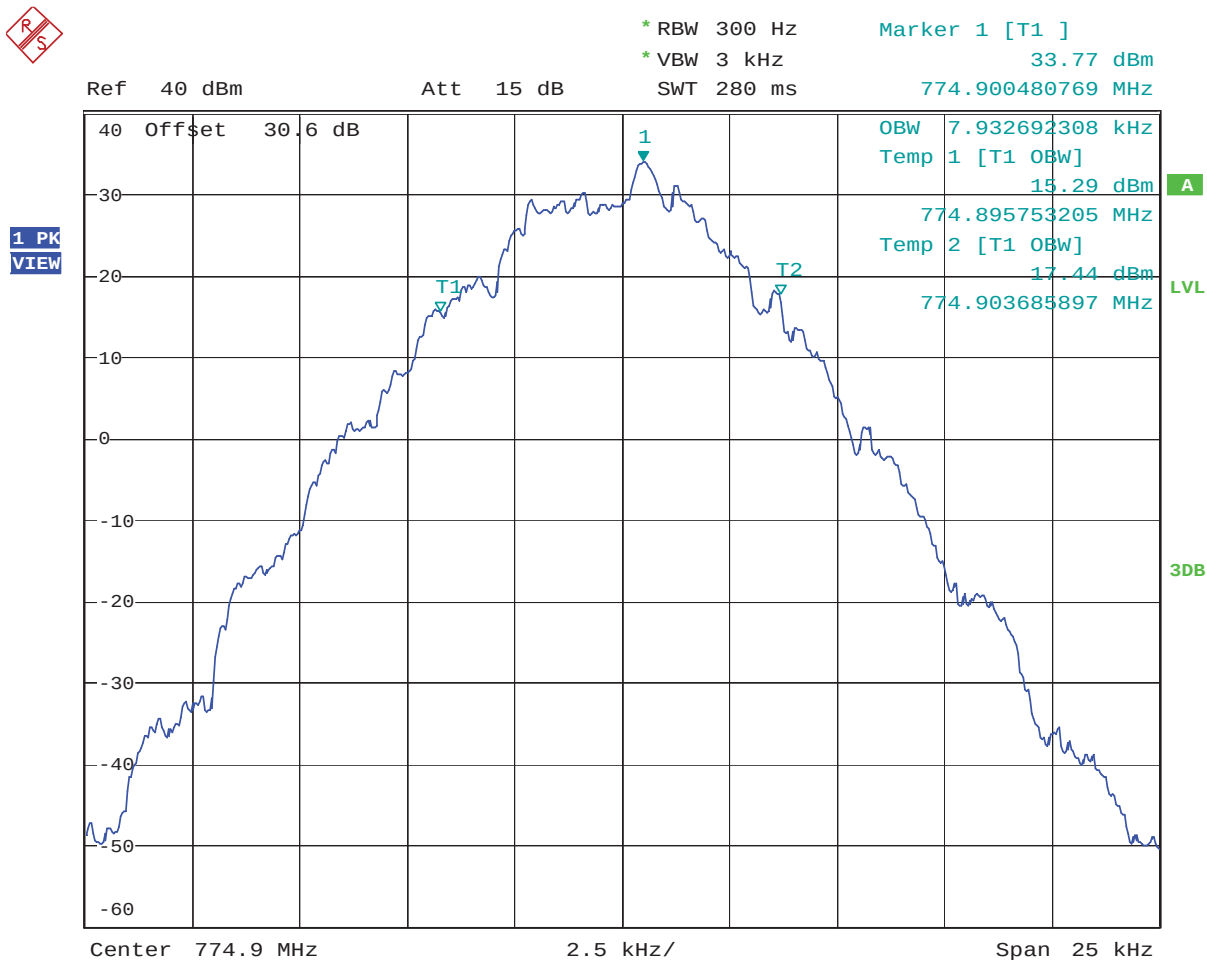
Date: 29.MAY.2018 10:11:23

5.8.4.4. Configuration: 99% OBW, Band 1: 769-775MHz, 769.1MHz, 12.5 KHz, Digital, F1E& F1D, High power
OBW: 7.93 KHz



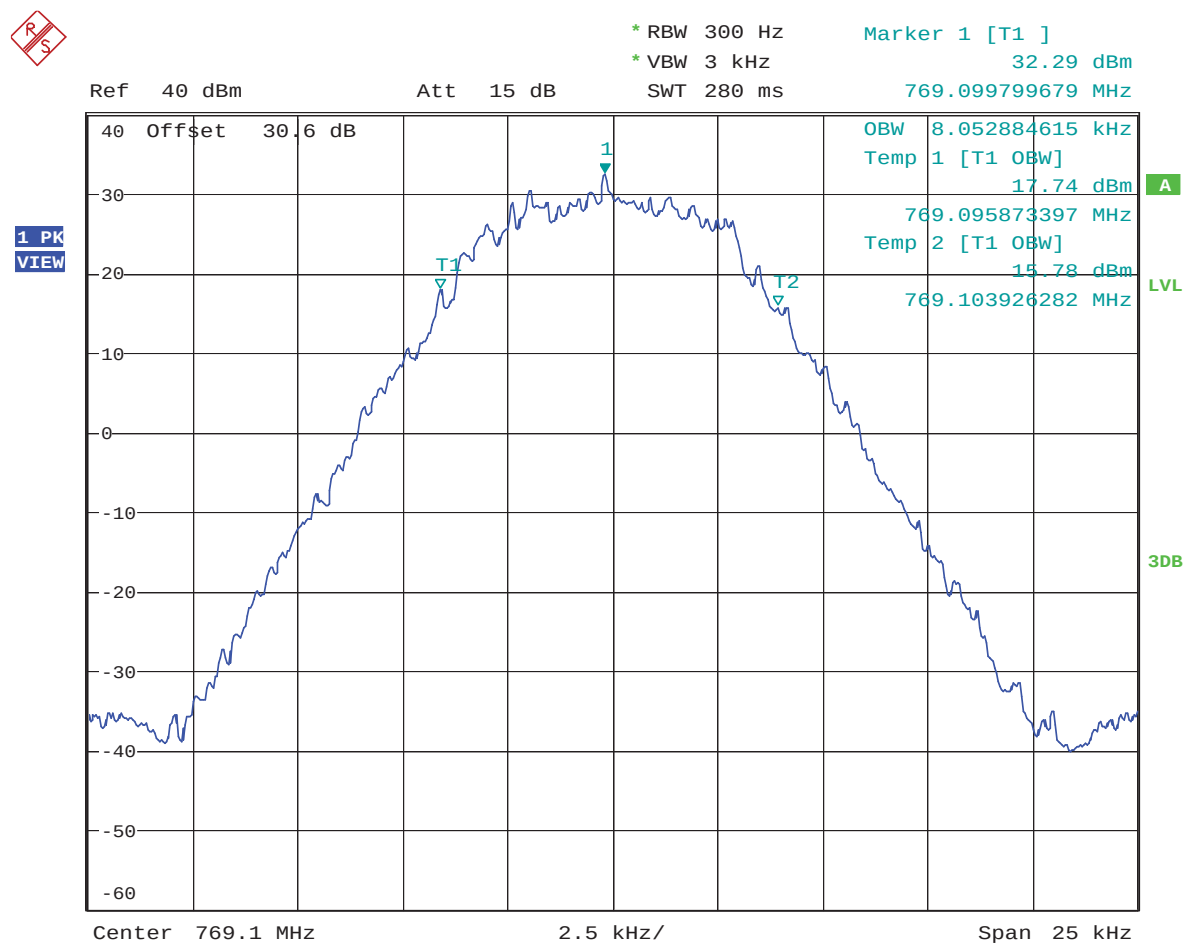
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5.8.4.5. Configuration: 99% OBW, Band 1: 769-775MHz, 774.9MHz, 12.5 KHz, Digital, F1E& F1D, High power
OBW: 7.93 KHz



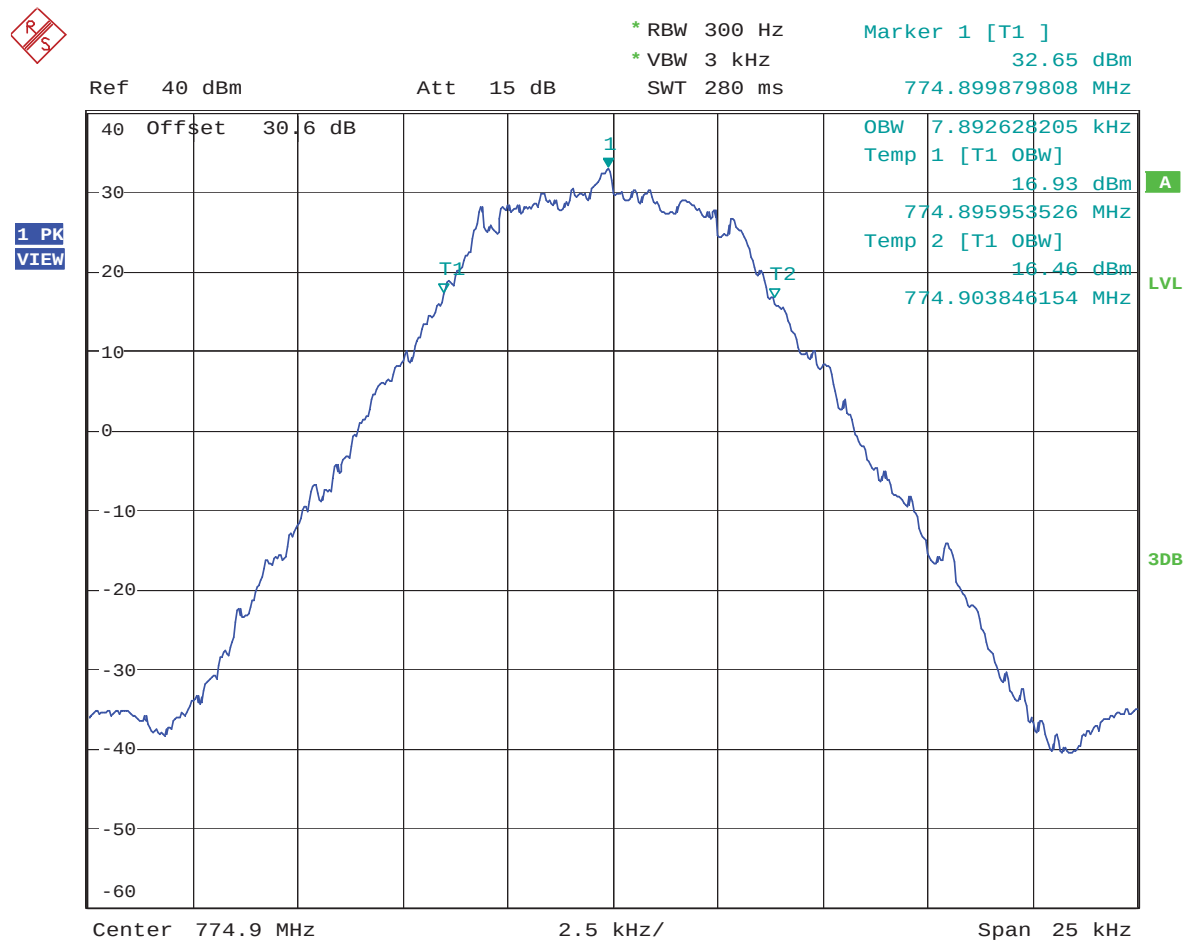
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5.8.4.6. Configuration: 99% OBW, Band 1: 769-775MHz, 769.1MHz, 12.5 KHz, Digital, F1W, High power
OBW: 8.05 KHz



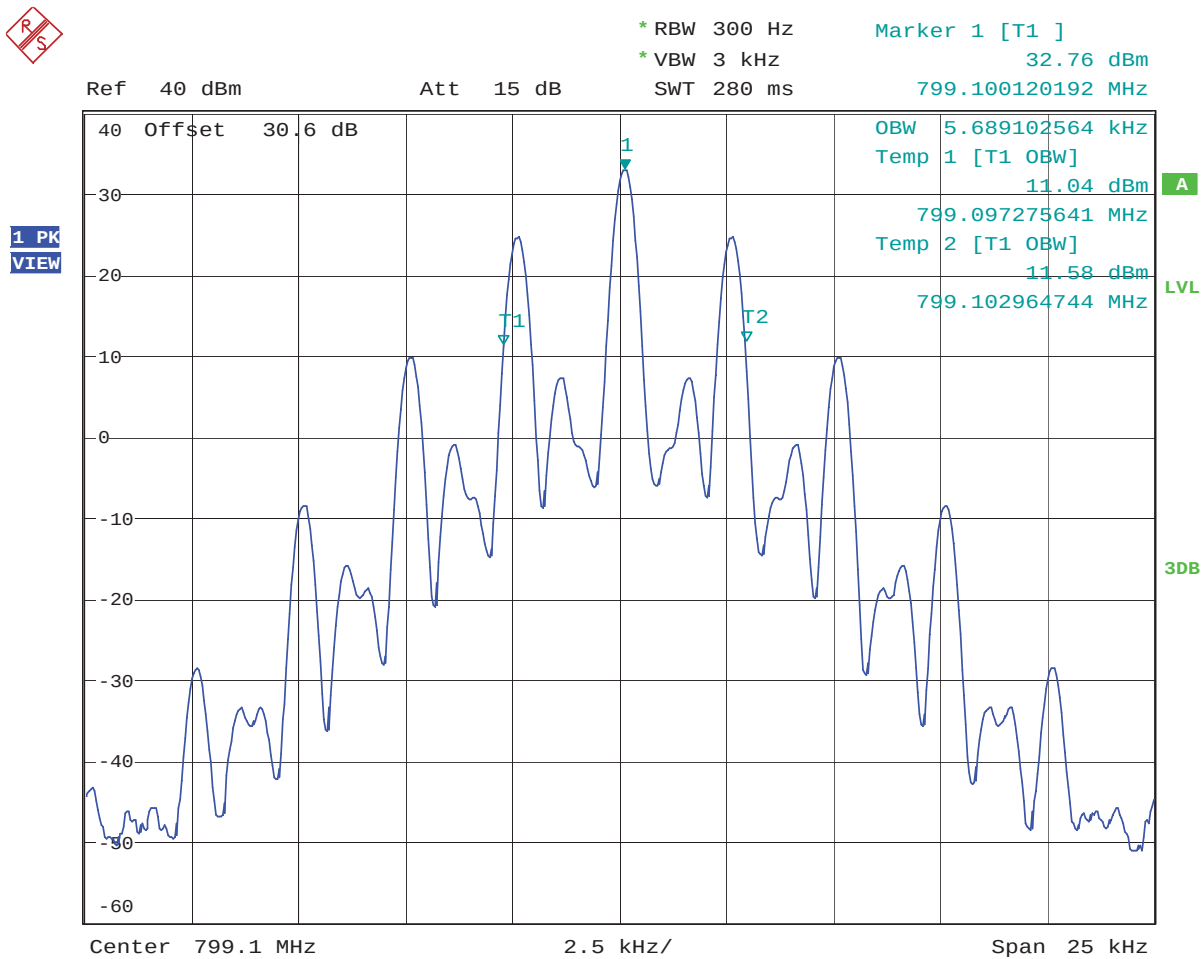
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5.8.4.7. Configuration: 99% OBW, Band 1: 769-775MHz, 774.9MHz, 12.5 KHz, Digital, F1W, High power
OBW: 7.89 KHz



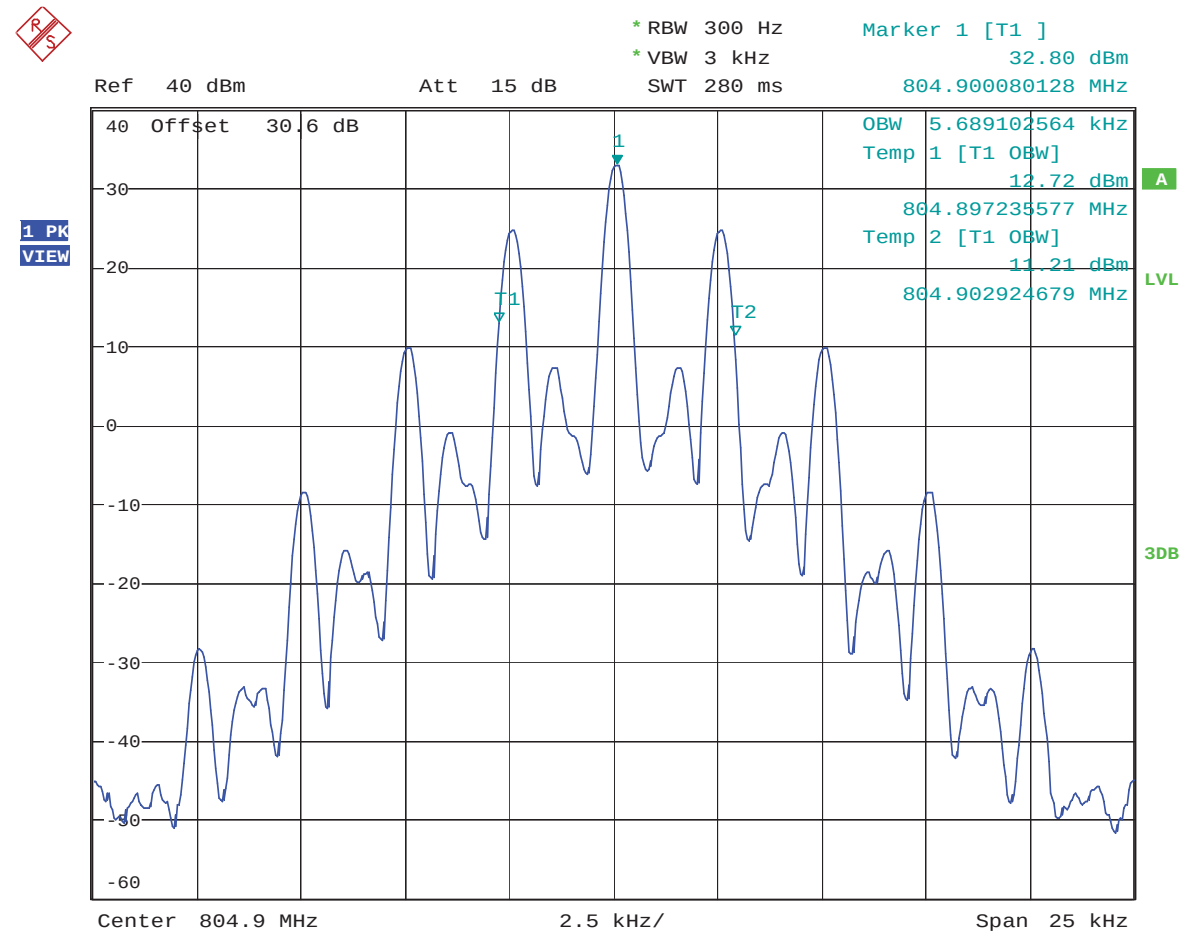
Date: 29.MAY.2018 11:22:30

5.8.4.8. Configuration: 99% OBW, Band 2: 799-805MHz, 799.1MHz, 12.5 KHz, Analog, High power
OBW: 5.689 KHz



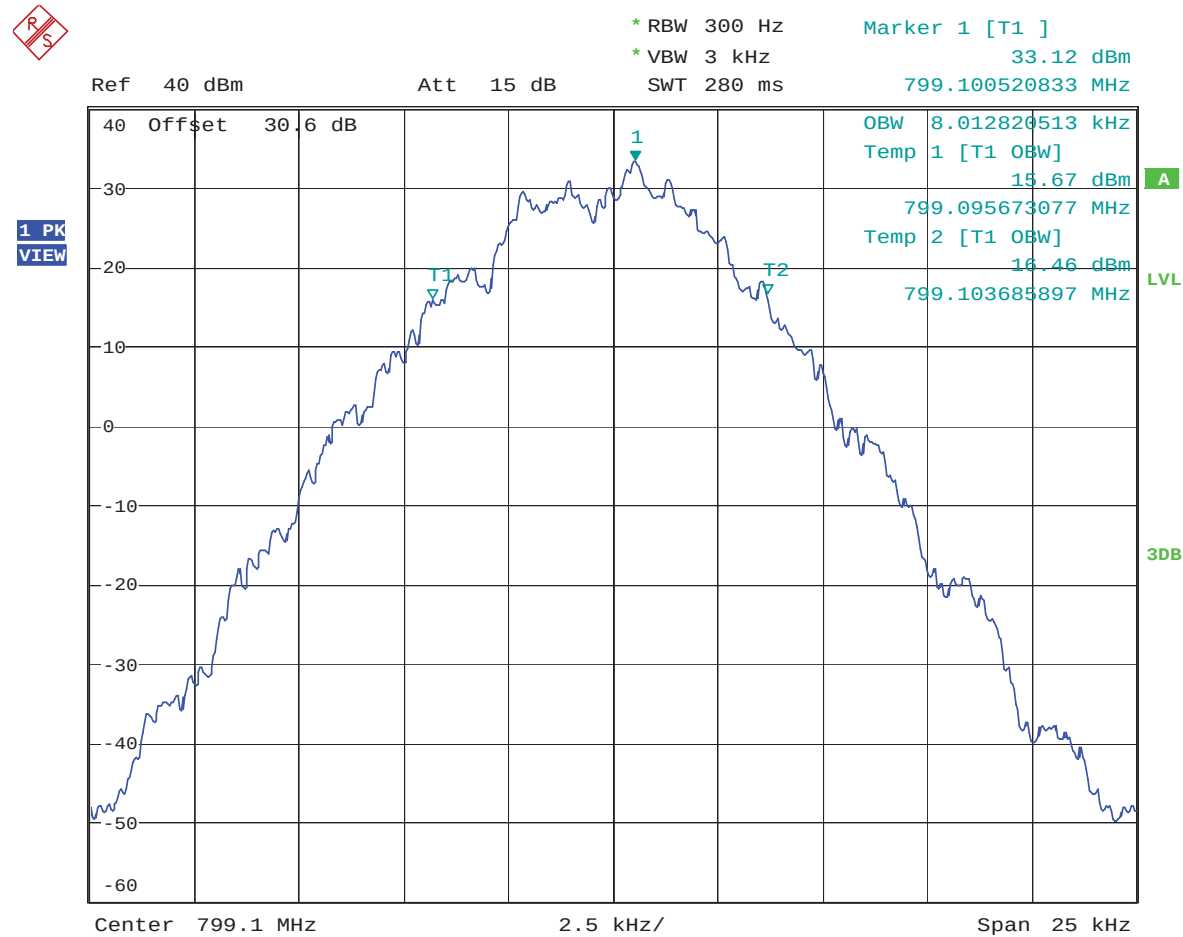
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5.8.4.9. Configuration: 99% OBW, Band 2: 799-805MHz, 804.9MHz, 12.5 KHz, Analog, High power
OBW: 5.689 KHz



Date: 29.MAY.2018 10:20:18

5.8.4.10. Configuration: 99% OBW, Band 2: 799-805MHz, 799.1MHz, 12.5 KHz, Digital, F1E& F1D, High power
OBW: 8.01 KHz



Date: 29.MAY.2018 11:03:19

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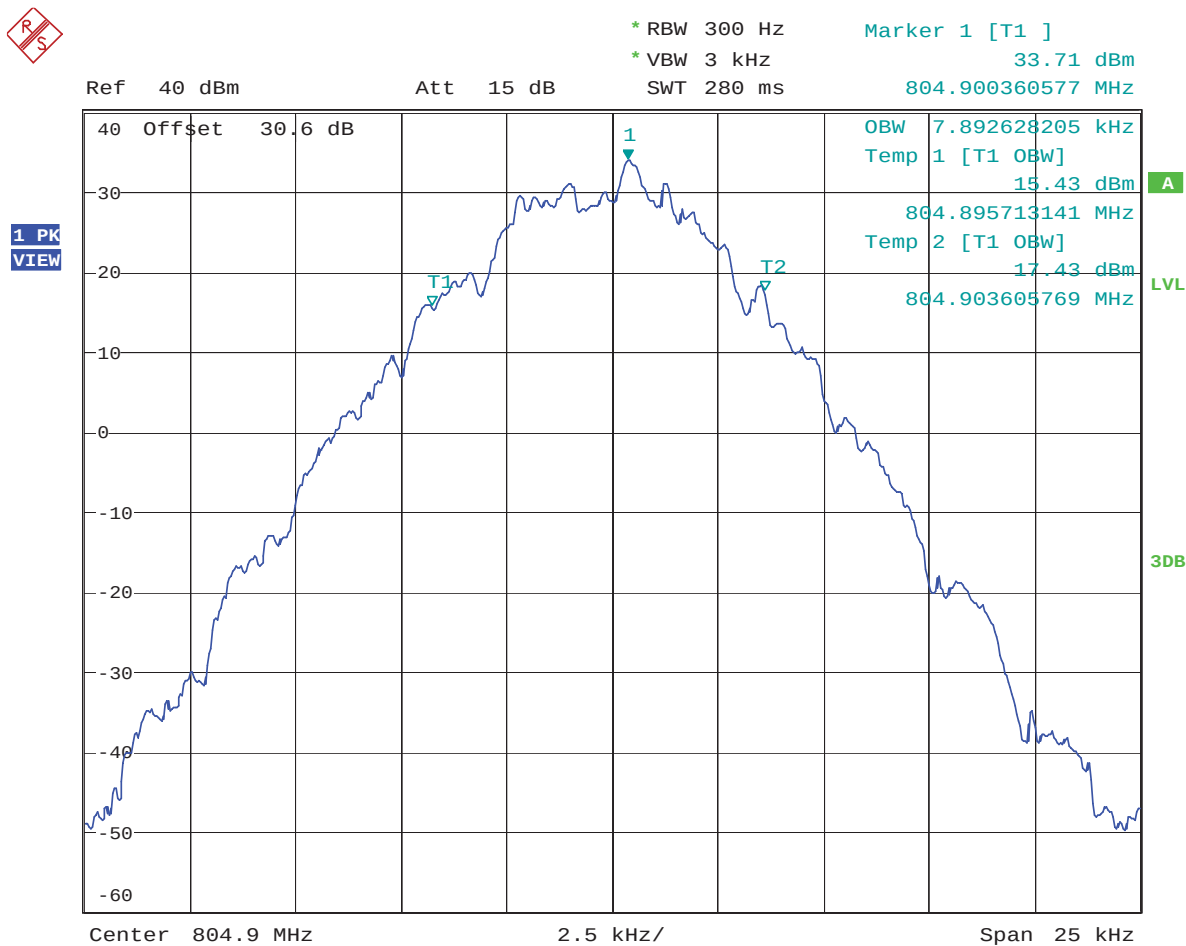
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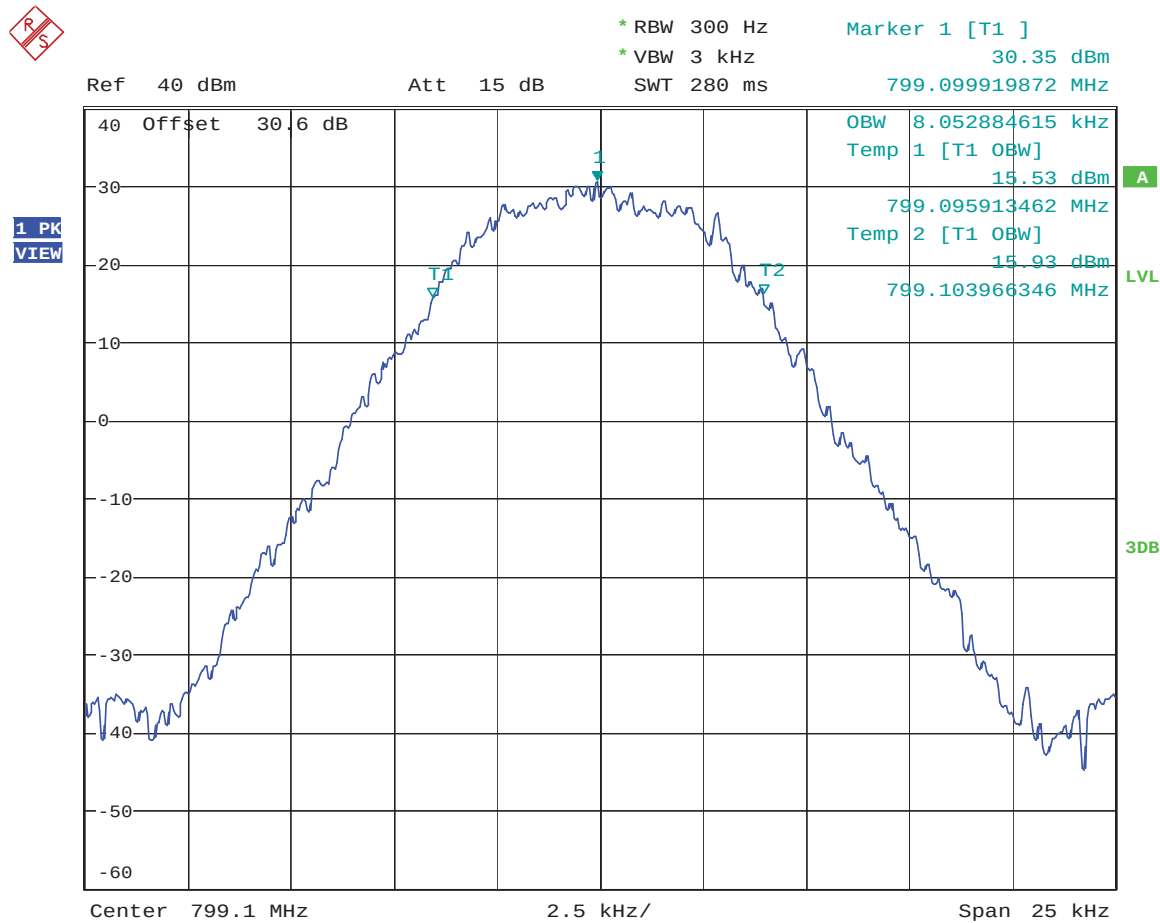
5.8.4.11. Configuration: 99% OBW, Band 2: 799-805MHz, 804.9MHz, 12.5 KHz, Digital, F1E& F1D, High power

OBW: 7.89 KHz



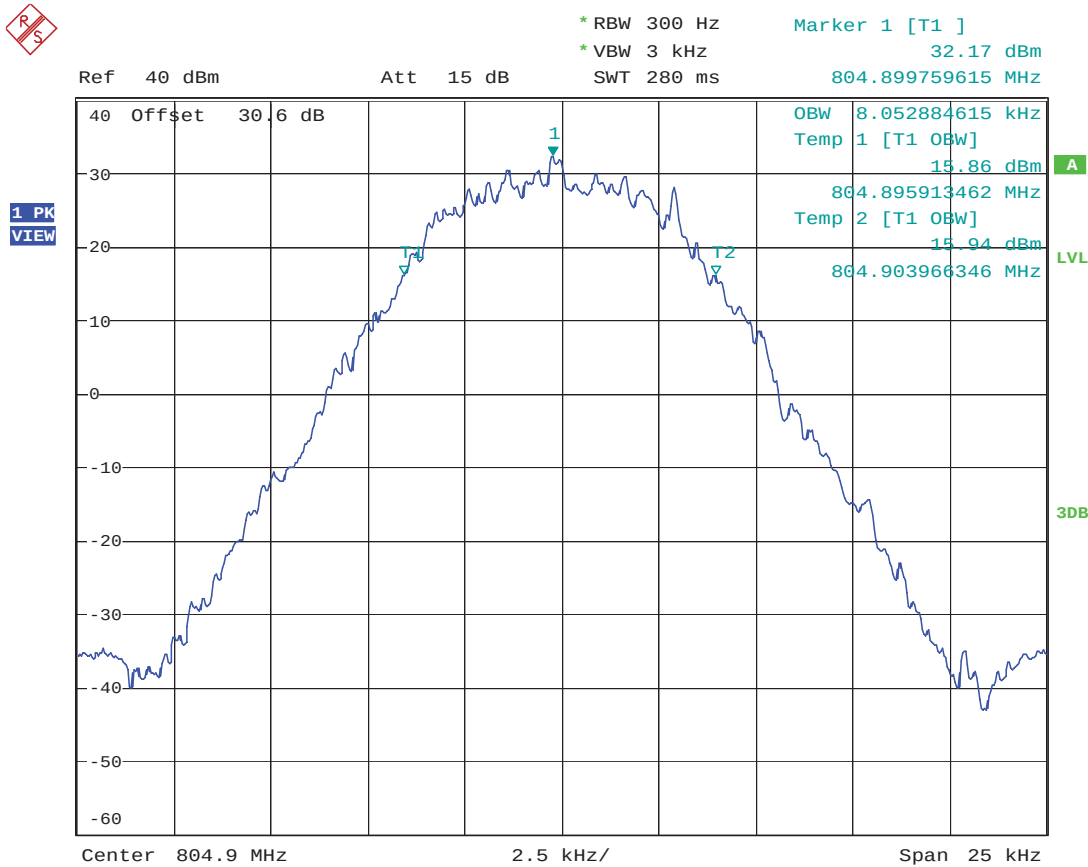
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5.8.4.12. Configuration: 99% OBW, Band 2: 799-805MHz, 799.1MHz, 12.5 KHz, Digital, F1W, High power
OBW: 8.05 KHz



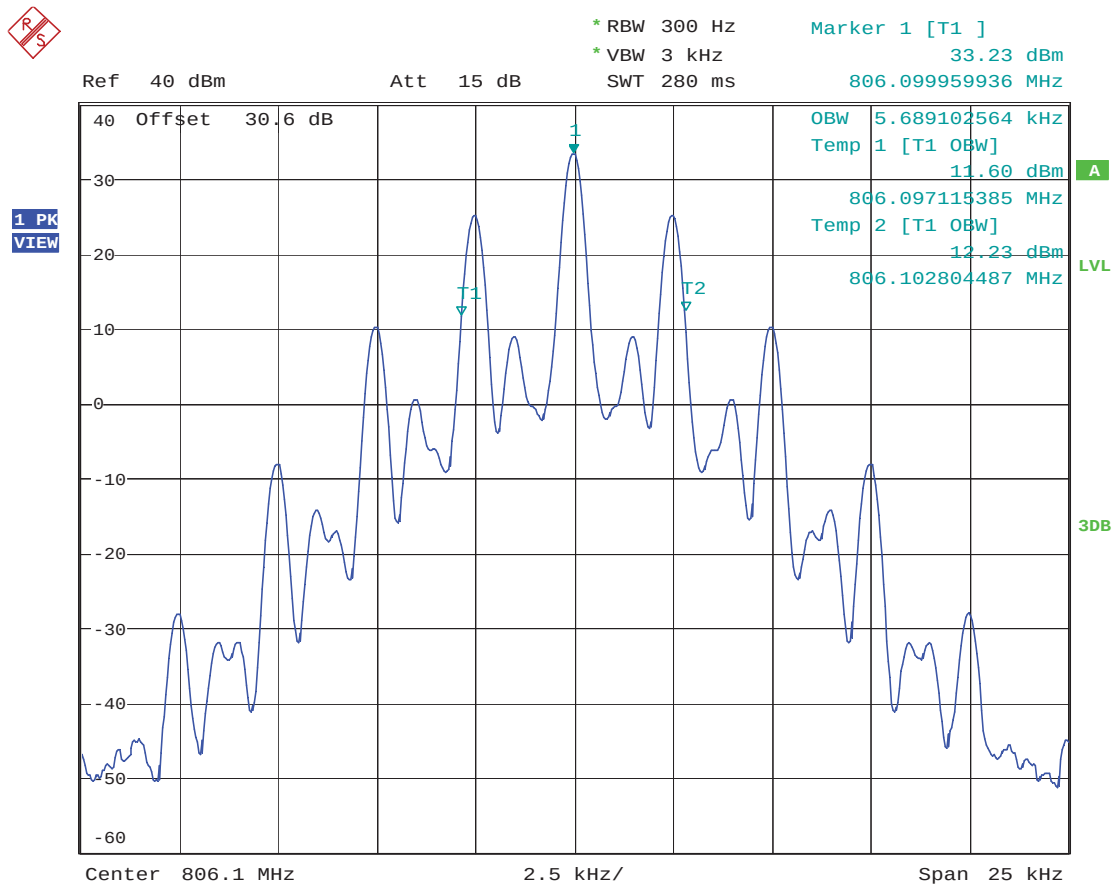
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5.8.4.13. Configuration: 99% OBW, Band 2: 799-805MHz, 804.9MHz, 12.5 KHz, Digital, F1W, High power
OBW: 8.05 KHz



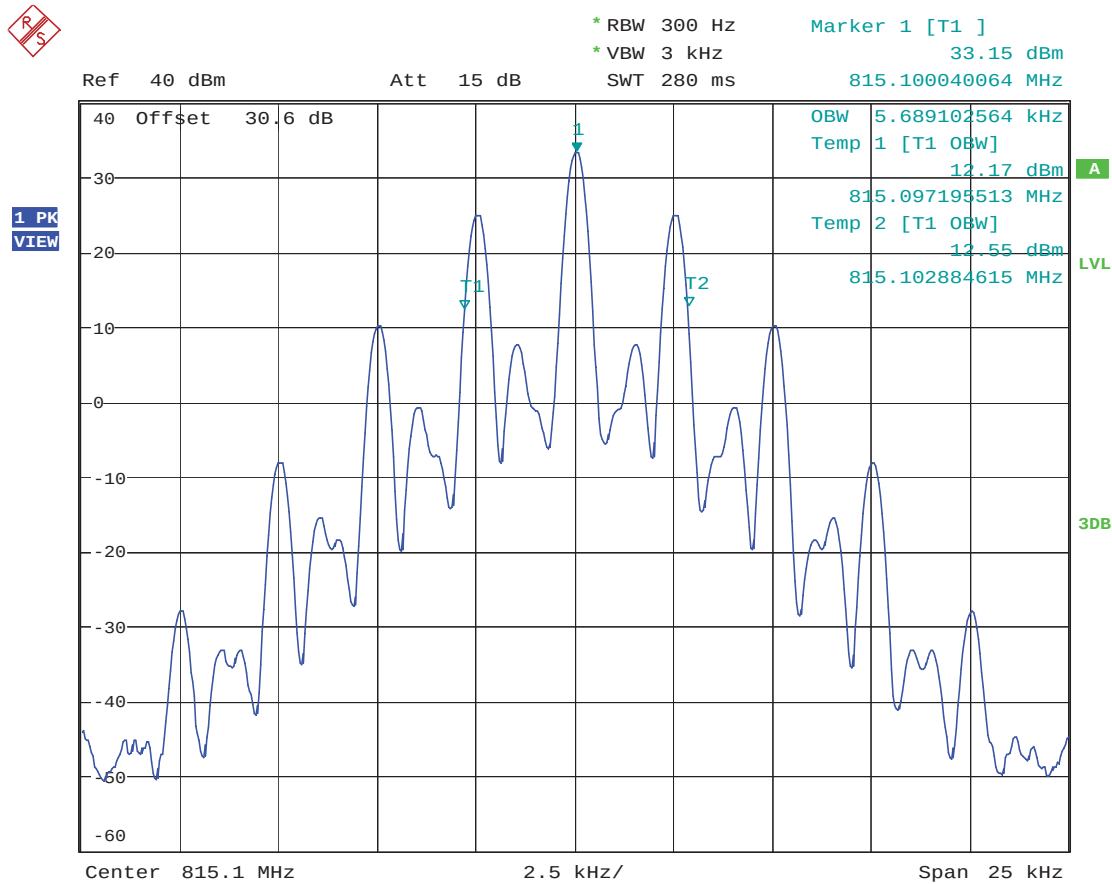
Date: 29.MAY.2018 11:25:57

5.8.4.14. Configuration: 99% OBW, Band 3: 806-824MHz, 806.1MHz, 12.5 KHz, Analog, High power
OBW: 5.689 KHz



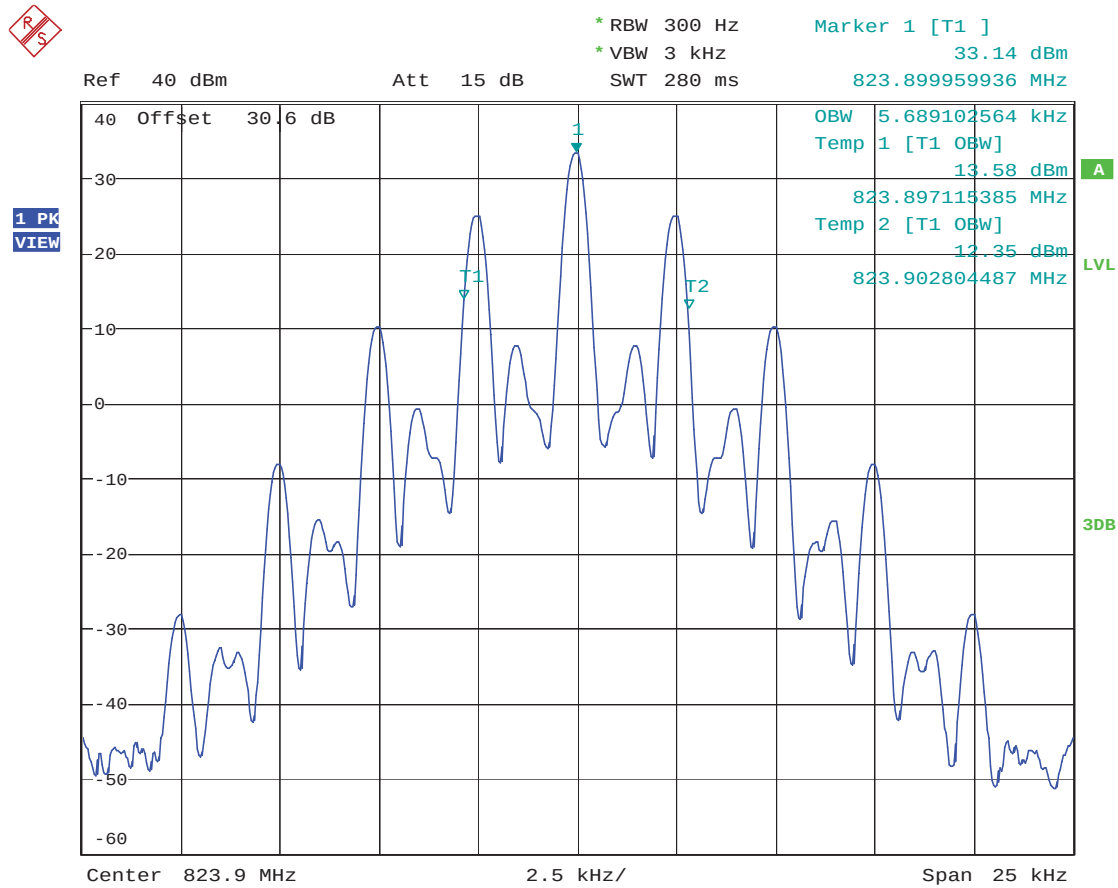
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5.8.4.15. Configuration: 99% OBW, Band 3: 806-824MHz MHz, 815.1MHz, 12.5 KHz, Analog, High power
OBW: 5.689 KHz



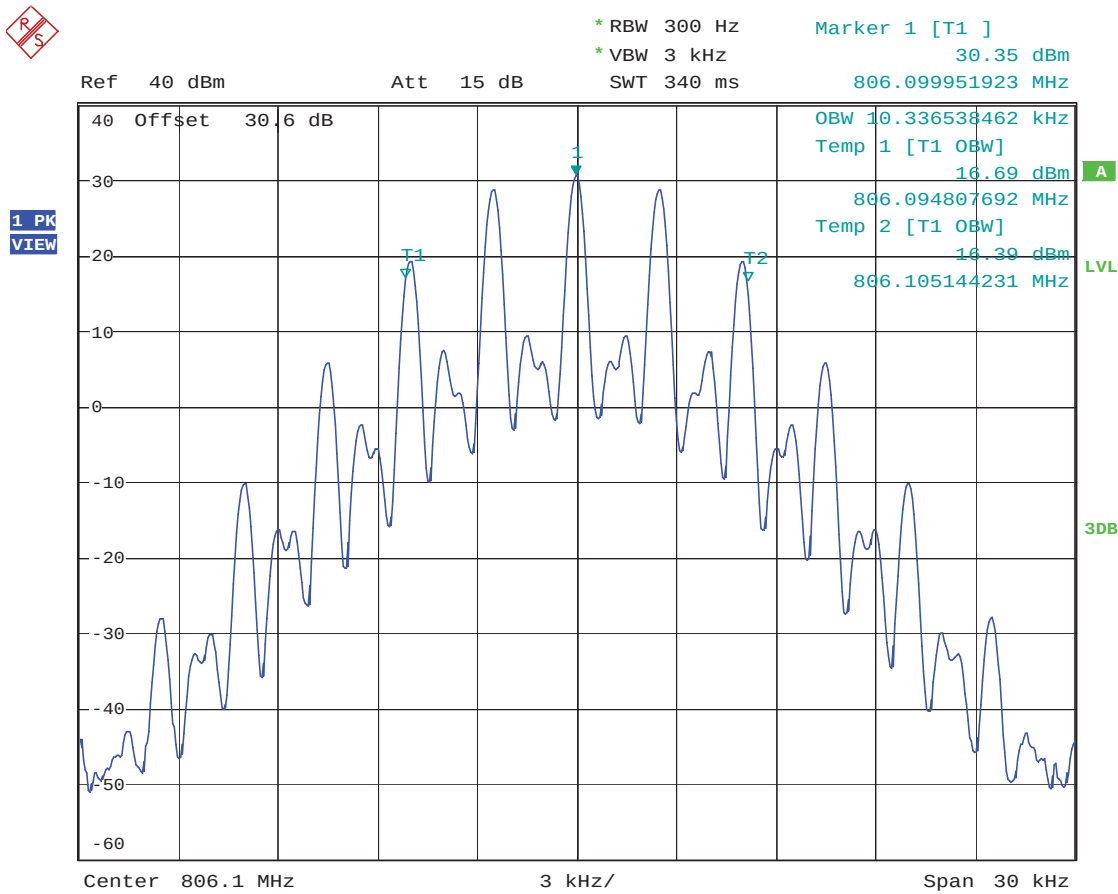
Date: 29.MAY.2018 10:23:53

5.8.4.16. Configuration: 99% OBW, Band 3: 806-824MHz MHz, 823.9MHz, 12.5 KHz, Analog, High power
OBW: 5.689 KHz



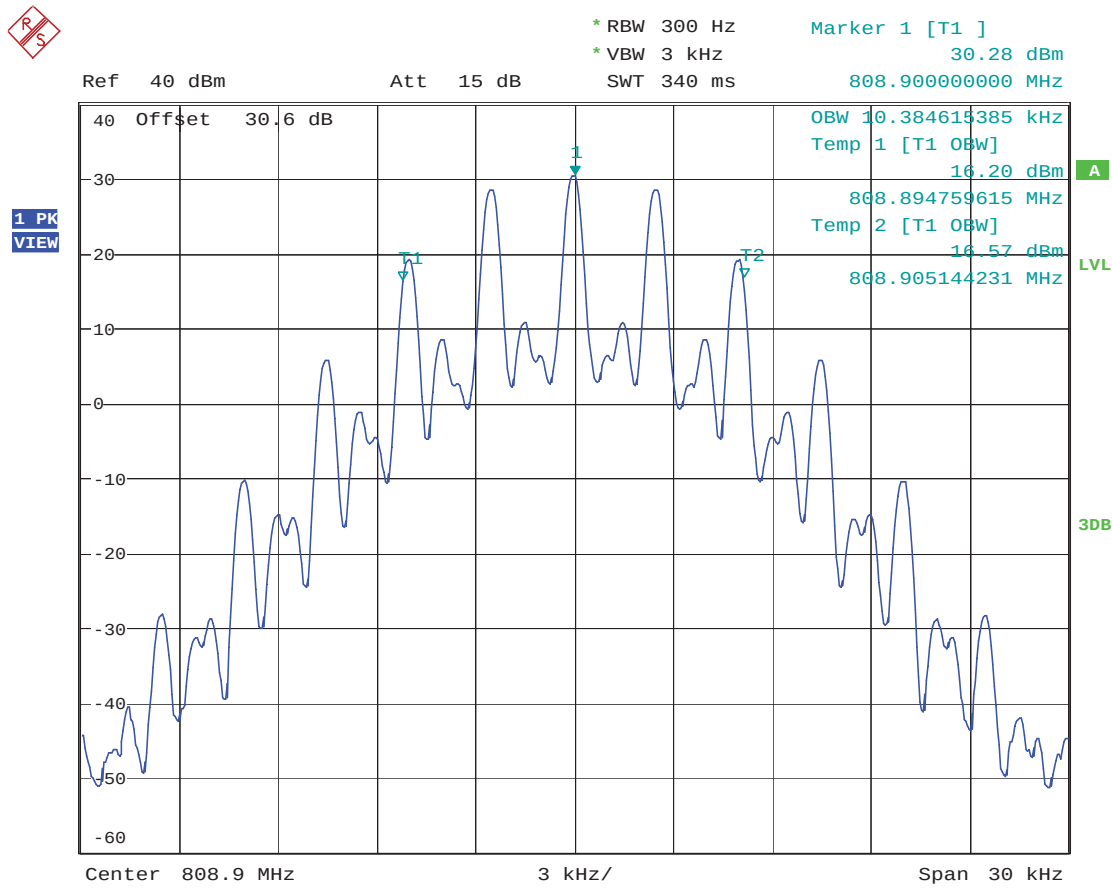
Date: 29.MAY.2018 11:51:52

5.8.4.17. Configuration: 99% OBW, Band 3: 806-809MHz, 806.1MHz, 20 KHz, Analog, High power
OBW: 10.336 KHz



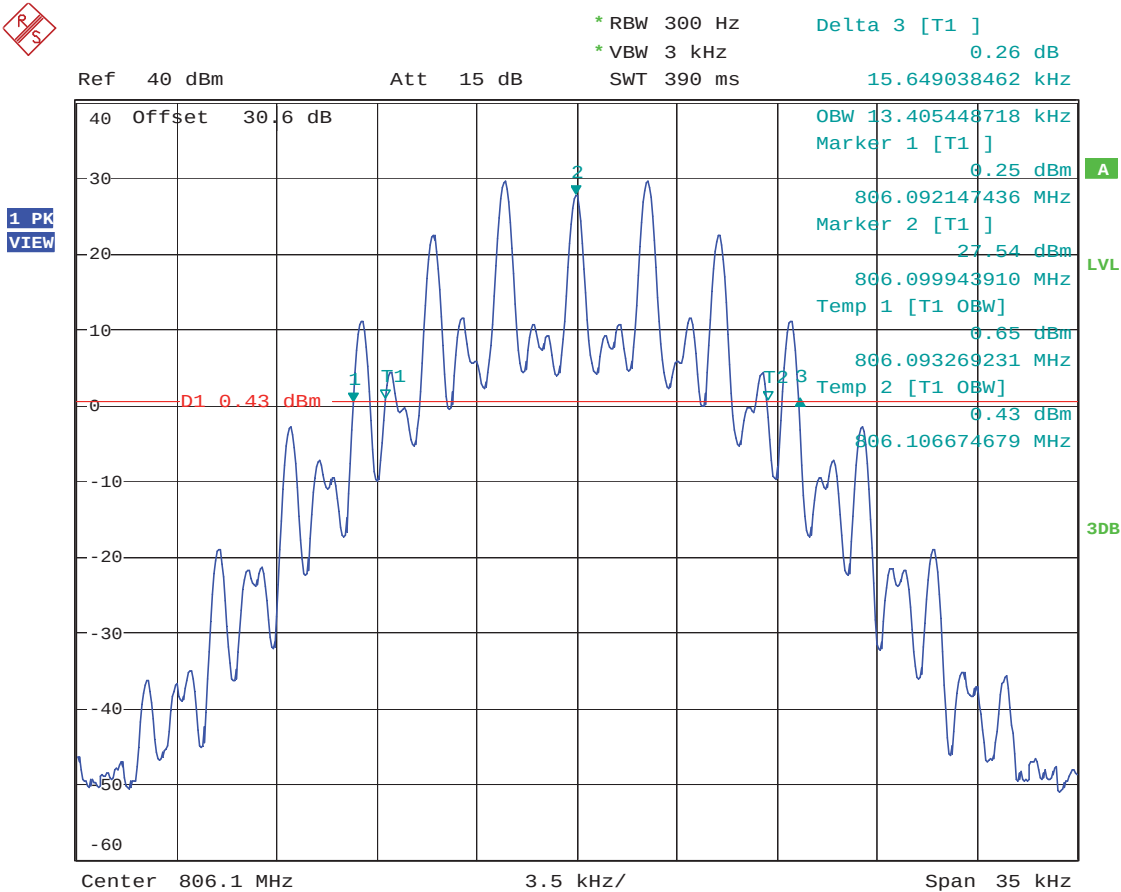
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5.8.4.18. Configuration: 99% OBW, Band 3: 806-809MHz MHz, 808.9MHz, 20 KHz, Analog, High power
OBW: 10.385 KHz



Date: 29.MAY.2018 10:36:22

5.8.4.19. Configuration: 99% OBW, Band 3: 806-824MHz, 806.1MHz, 25 KHz, Analog, High power
OBW: 15.65 KHz



Date: 29.MAY.2018 10:42:18

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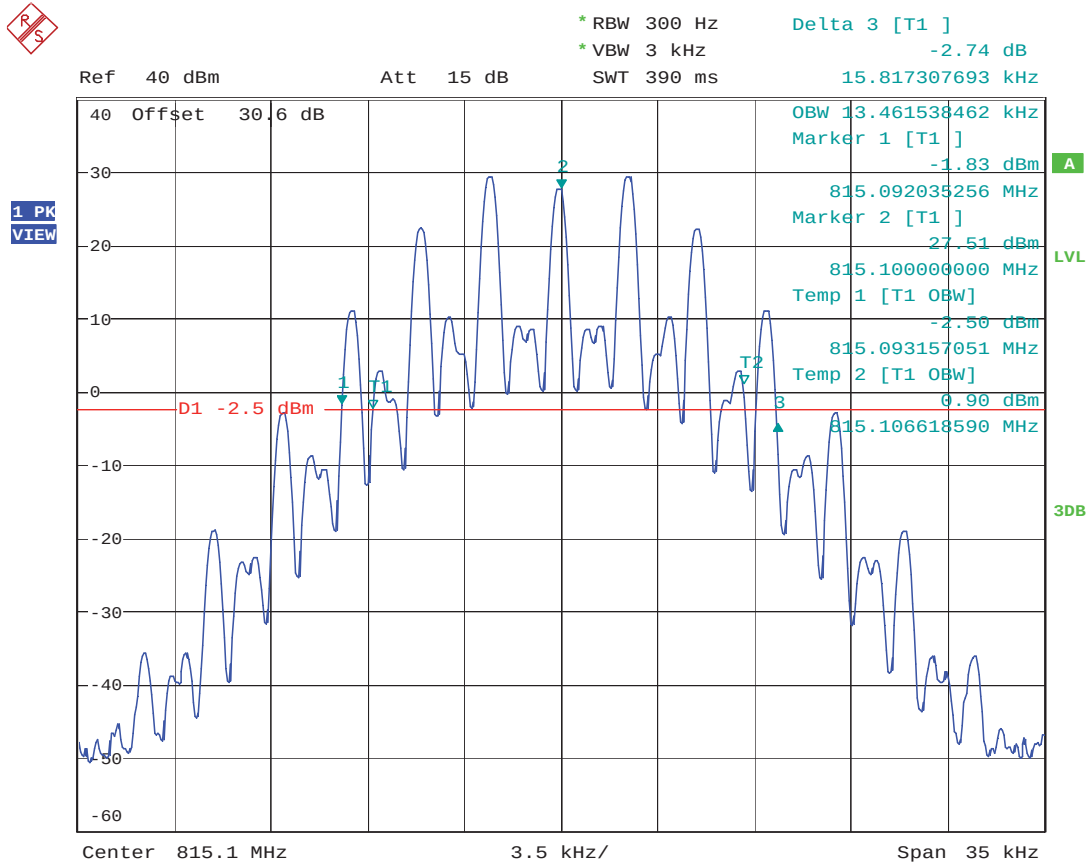
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5.8.4.20. Configuration: 99% OBW, Band 3: 806-824MHz MHz, 815.1MHz, 25 KHz, Analog, High power
OBW: 15.82 KHz



Date: 29.MAY.2018 10:46:12

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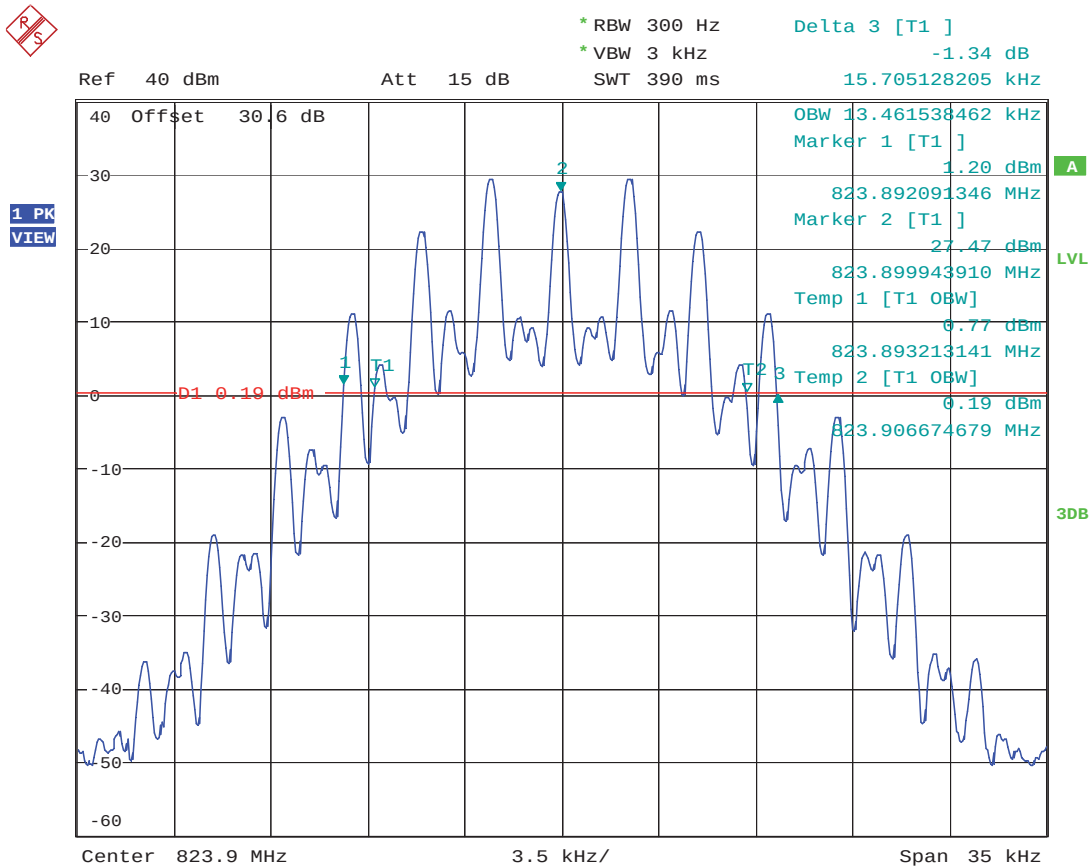
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Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

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June 26, 2018

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5.8.4.21. Configuration: 99% OBW, Band 3: 806-824MHz MHz, 823.9MHz, 25 KHz, Analog, High power
OBW: 15.705 KHz



Date: 29.MAY.2018 10:48:35

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Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

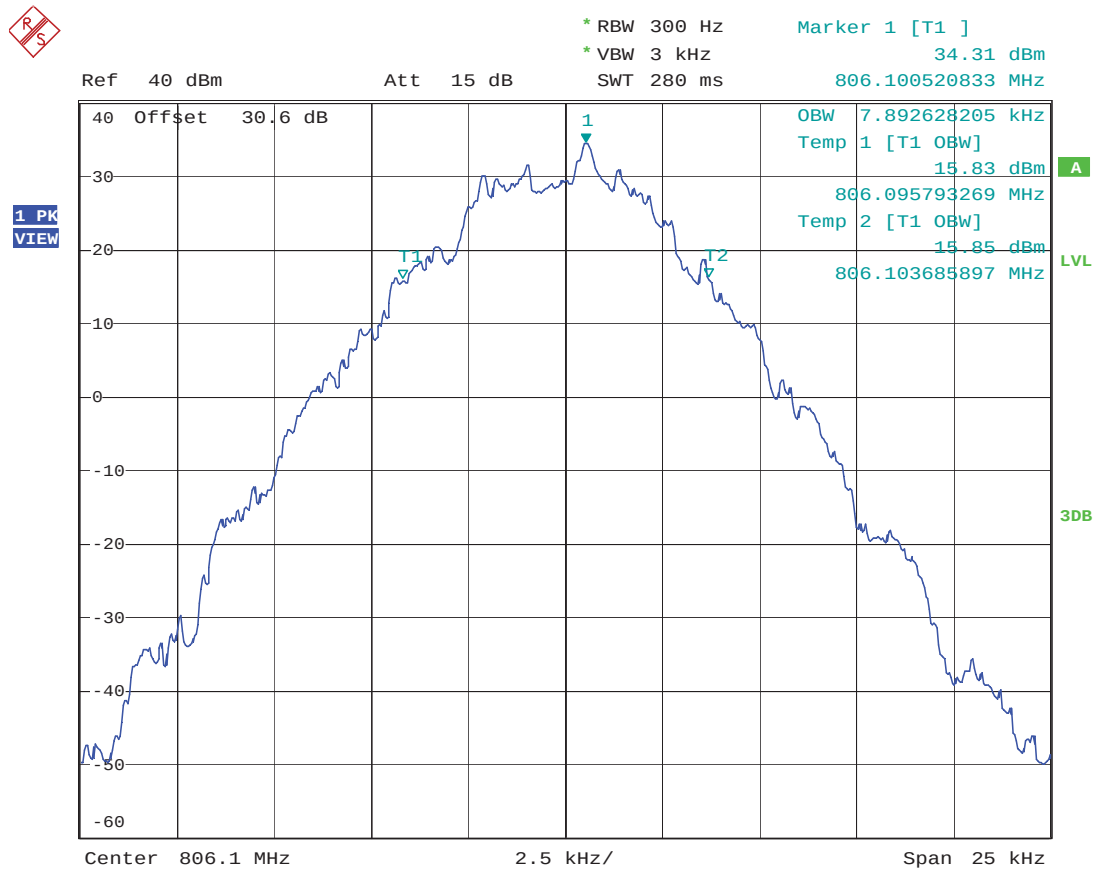
File #: 18ICOM485_FCC90

June 26, 2018

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

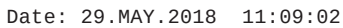
5.8.4.22. Configuration: 99% OBW, Band 3: 806-824MHz MHz, 806.1MHz, 12.5 KHz, Digital, F1E& F1D, High power

OBW: 7.89 KHz



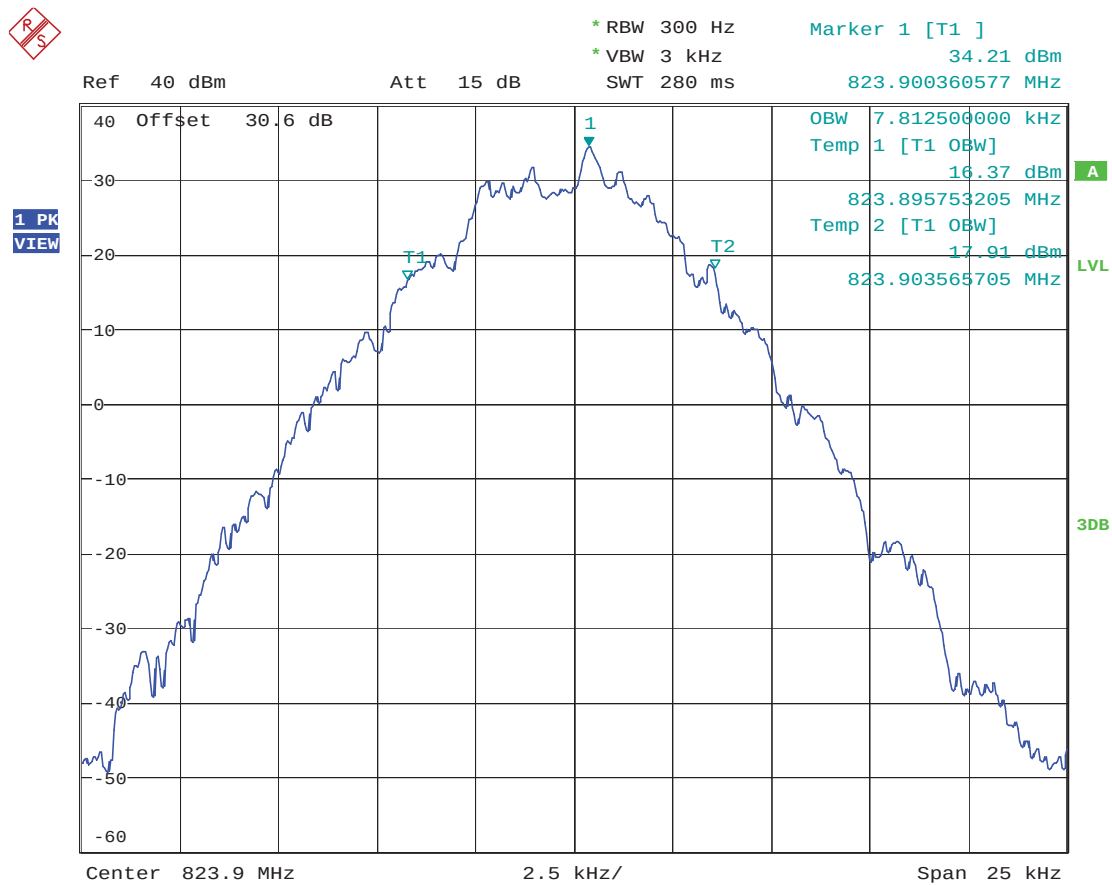
Date: 29.MAY.2018 11:07:24

OBW: 7.81 KHz



5.8.4.24. Configuration: 99% OBW, Band 3: 806-824MHz MHz, 823.9MHz, 12.5 KHz, Digital, F1E& F1D, High power

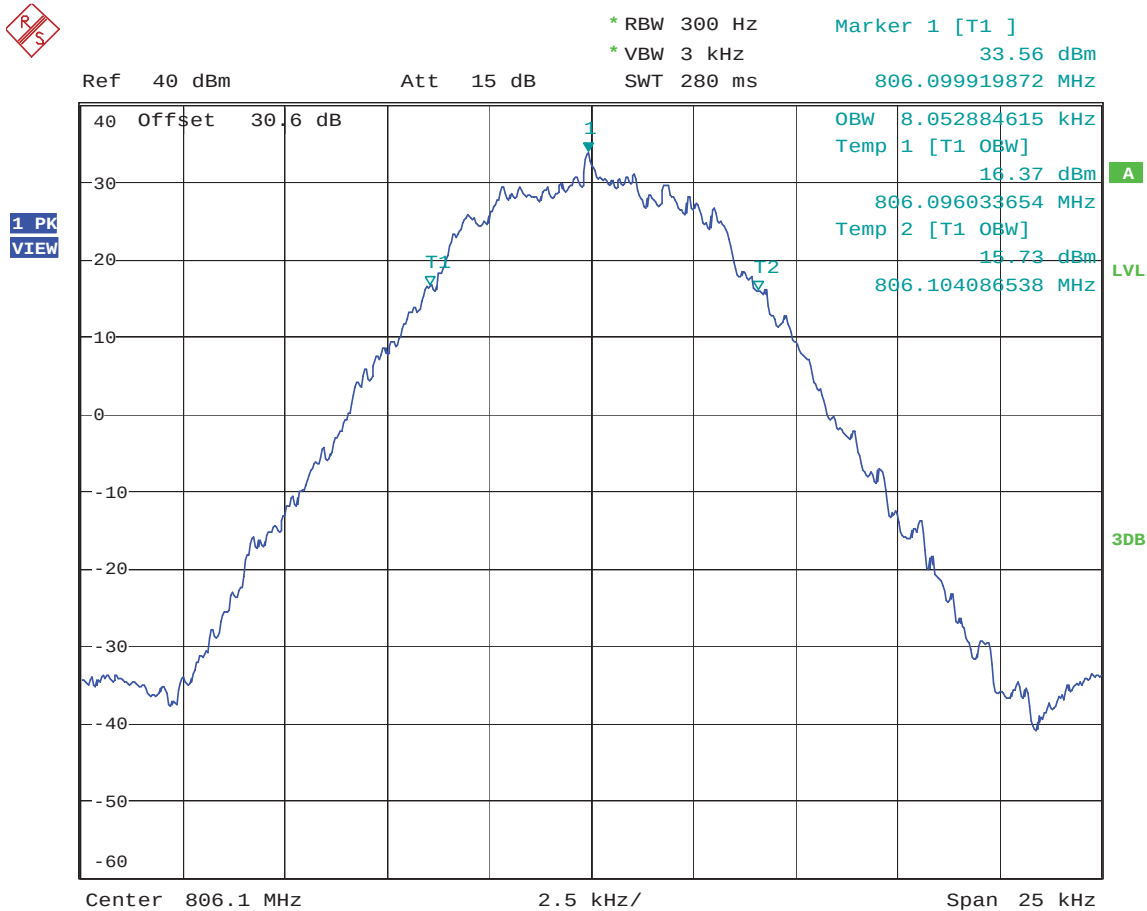
OBW: 7.81 KHz



Date: 29.MAY.2018 11:10:30

5.8.4.25. Configuration: 99% OBW, Band 3: 806-824MHz MHz, 806.1MHz, 12.5 KHz, Digital, F1W, High power

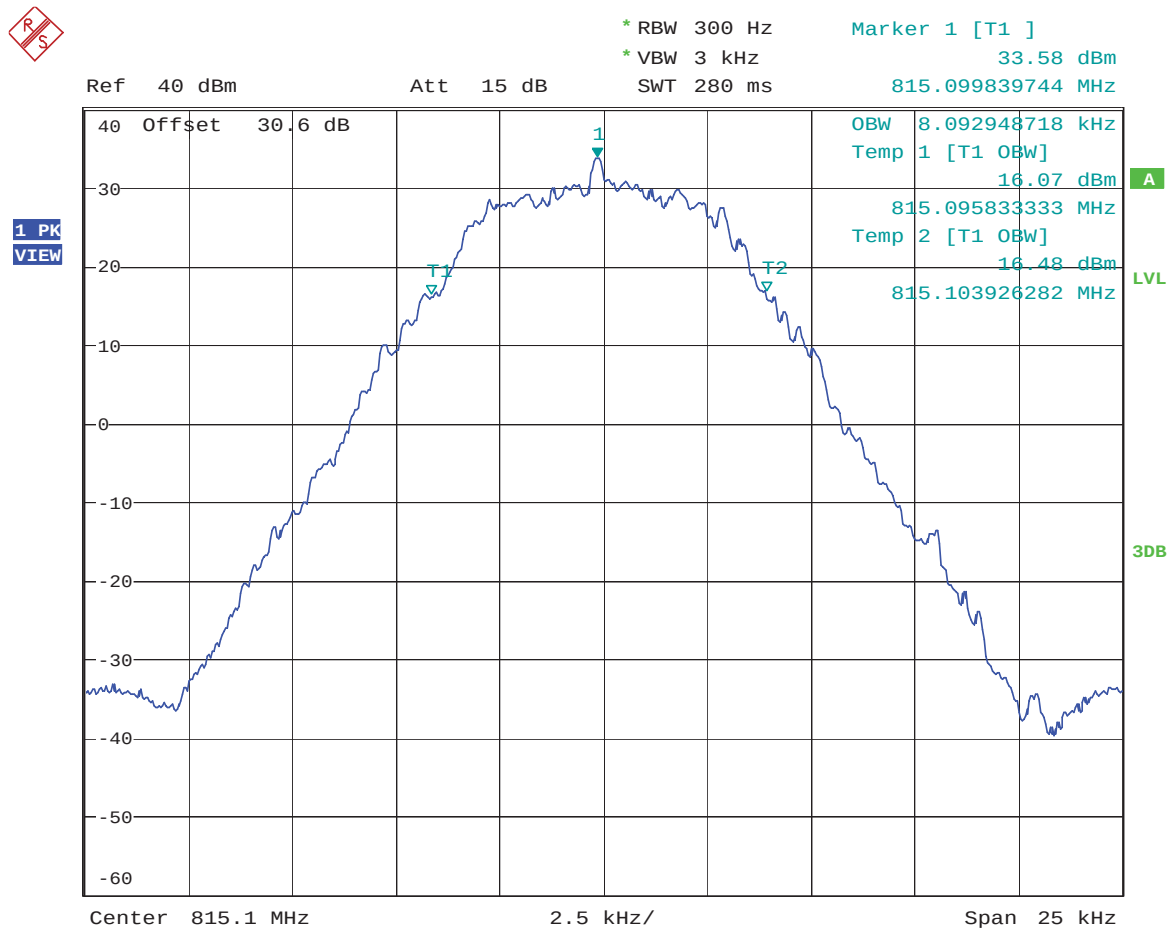
OBW: 8.05 KHz



Date: 29.MAY.2018 11:28:05

5.8.4.26. Configuration: 99% OBW, Band 3: 806-824MHz MHz, 815.1MHz, 12.5 KHz, Digital, F1W, High power

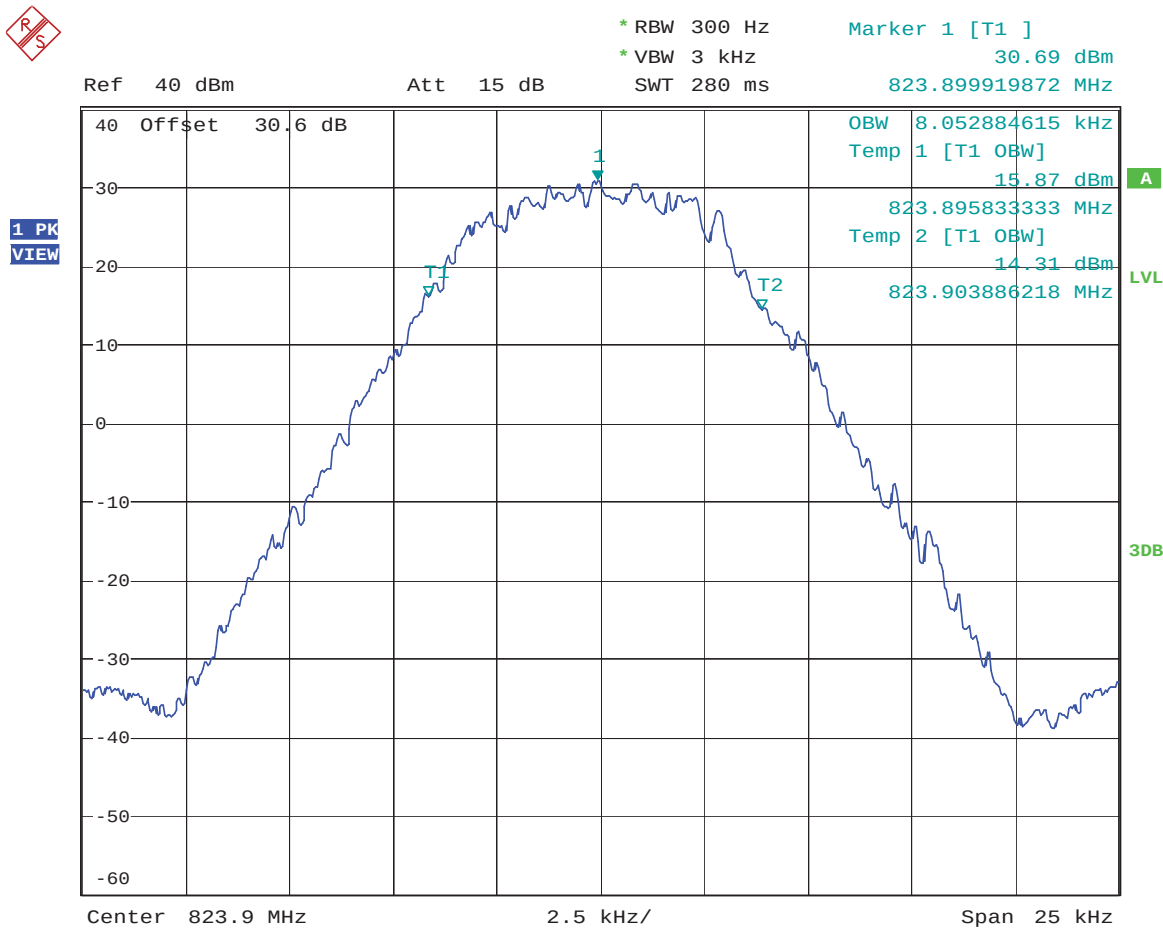
OBW: 8.09



Date: 29.MAY.2018 11:32:41

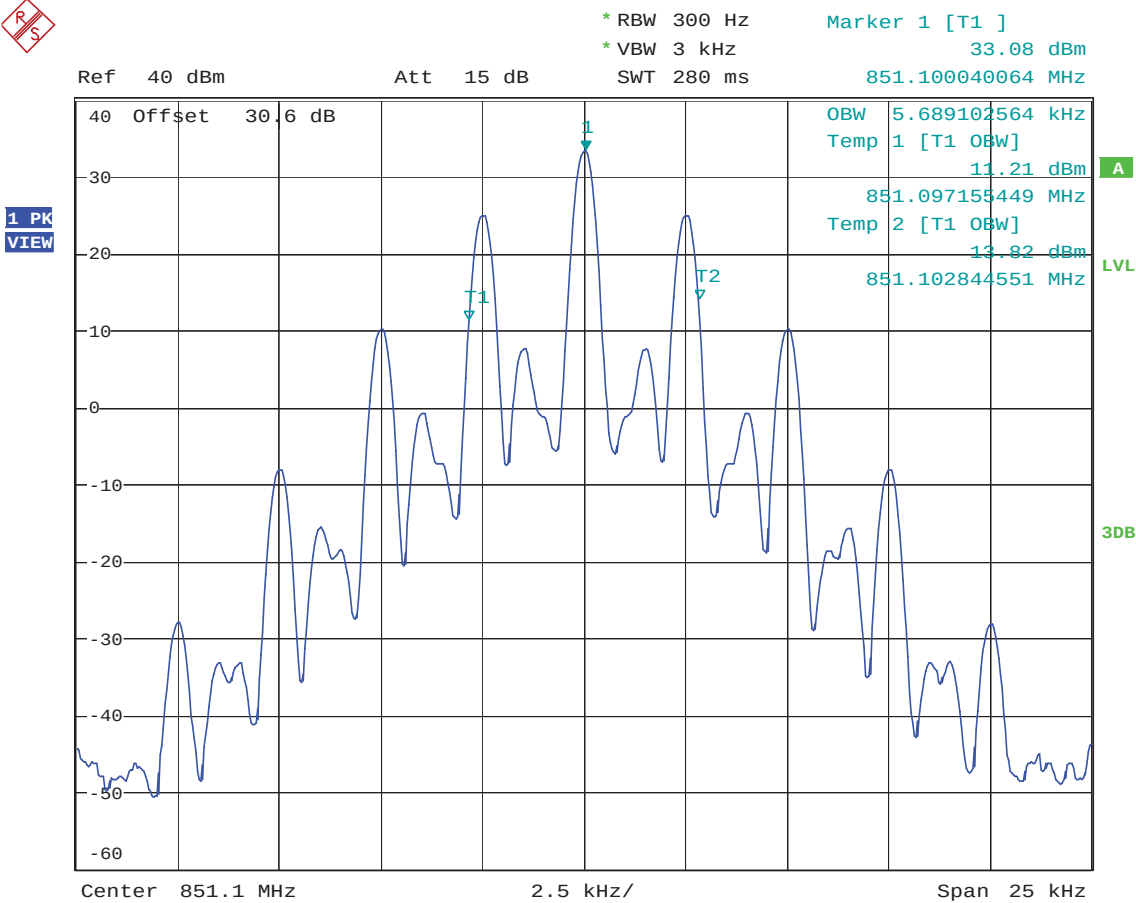
5.8.4.27. Configuration: 99% OBW, Band 3: 806-824MHz MHz, 823.9MHz, 12.5 KHz, Digital, F1W, High power

OBW: 8.05 KHz



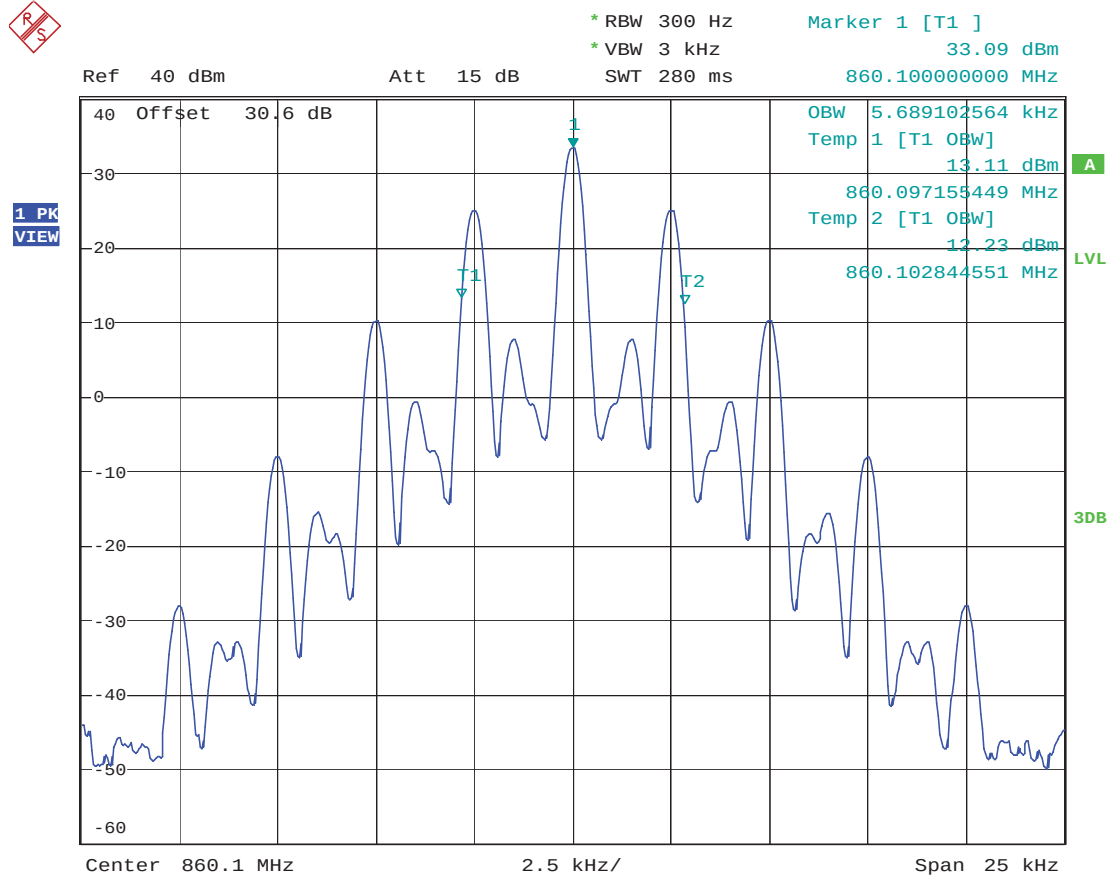
Date: 29.MAY.2018 11:34:13

5.8.4.28. Configuration: 99% OBW, Band 4: 851-869MHz, 851.1MHz, 12.5 KHz, Analog, High power
OBW: 5.689 KHz



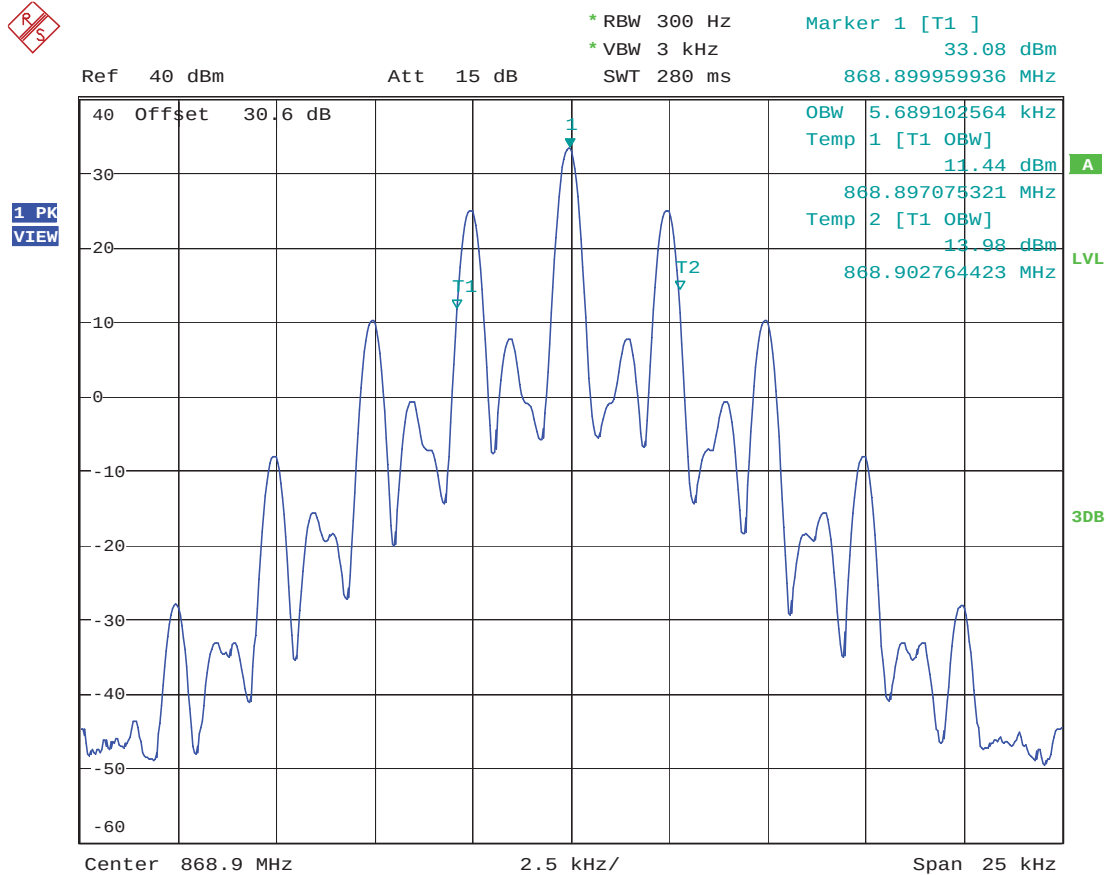
Date: 29.MAY.2018 10:26:53

5.8.4.29. Configuration: 99% OBW, Band 4: 851-869MHz, 860.1MHz, 12.5 KHz, Analog, High power
OBW: 5.689 KHz



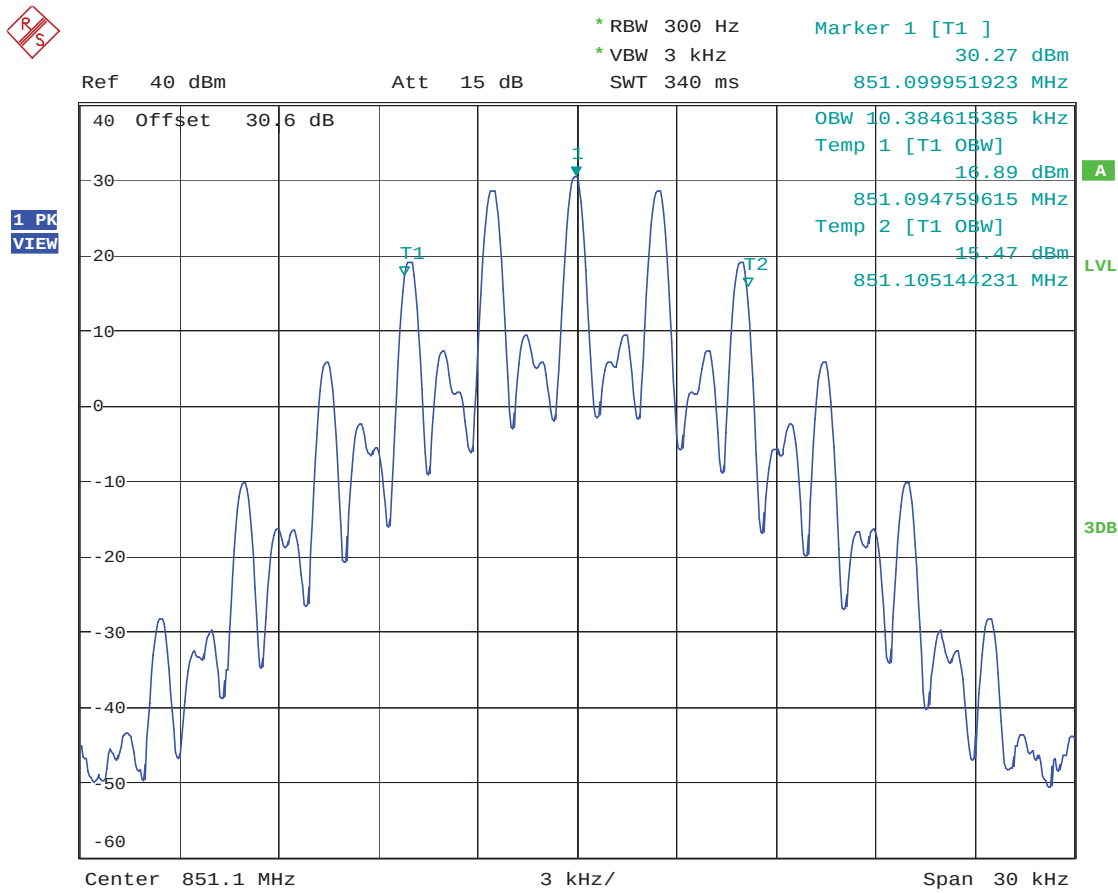
Date: 29.MAY.2018 10:28:12

5.8.4.30. Configuration: 99% OBW, Band 4: 851-869MHz, 868.9MHz, 12.5 KHz, Analog, High power
OBW: 5.689 KHz



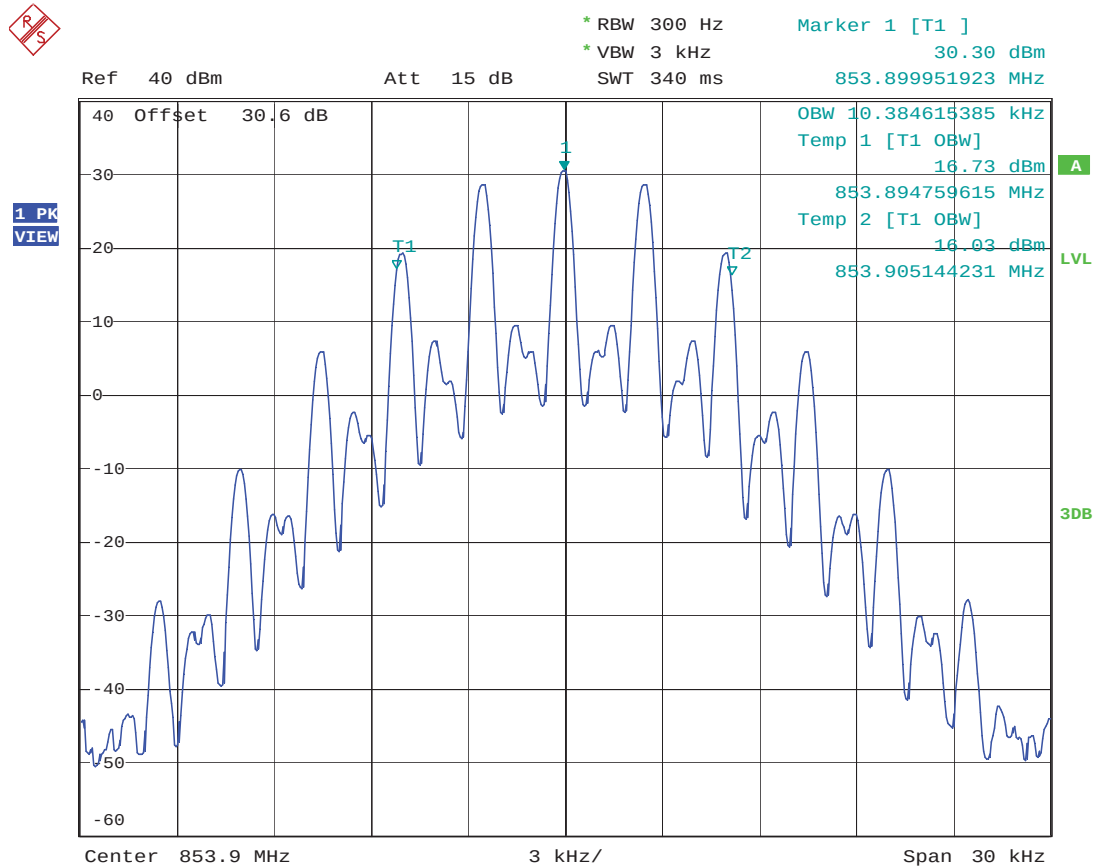
Date: 29.MAY.2018 10:30:01

5.8.4.31. Configuration: 99% OBW, Band 4: 851-854MHz, 851.1MHz, 20 KHz, Analog, High power
OBW: 10.385 KHz



Date: 29.MAY.2018 10:33:49

5.8.4.32. Configuration: 99% OBW, Band 4: 851-854MHz, 853.9MHz, 20 KHz, Analog, High power
OBW: 10.385 KHz



Date: 29.MAY.2018 10:37:51

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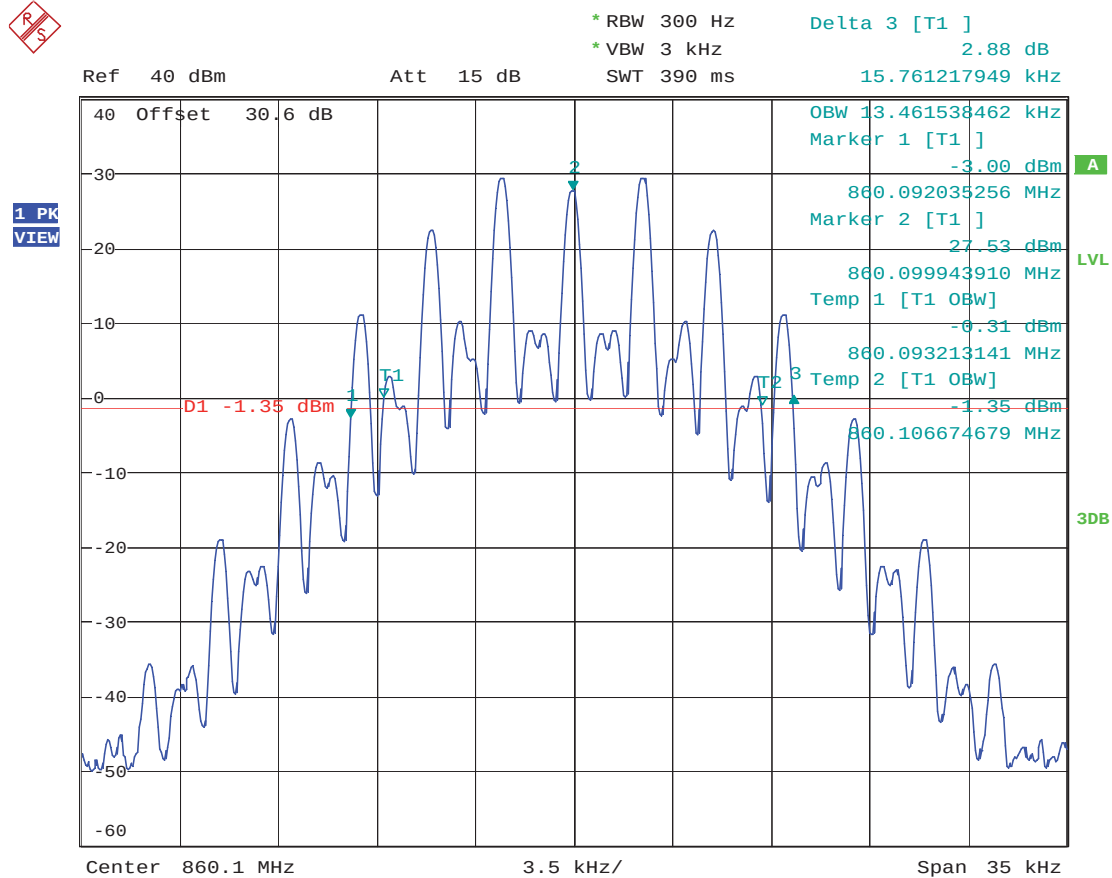
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

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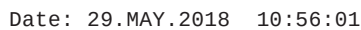
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

5.8.4.34. Configuration: 99% OBW, Band 4: 851-869MHz, 860.1MHz, 25 KHz, Analog, High power
OBW: 15.76 KHz



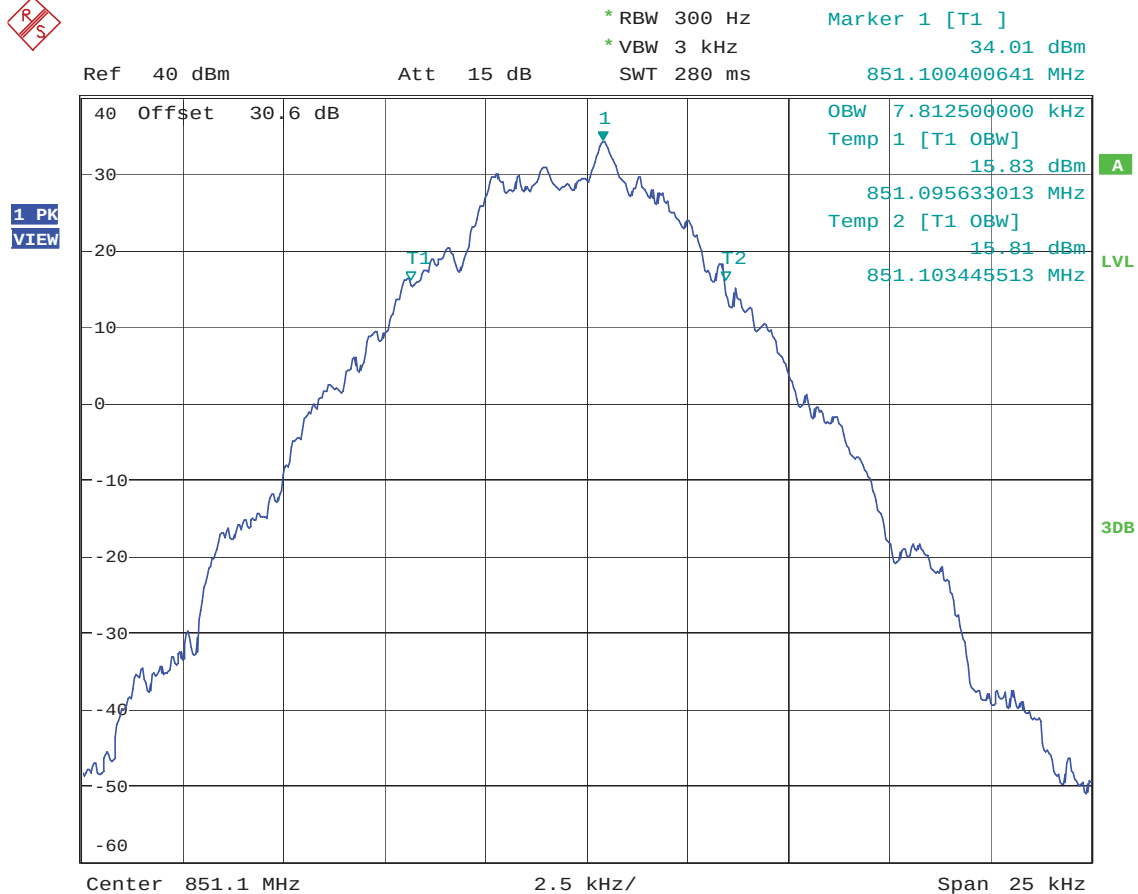
Date: 29.MAY.2018 10:53:36

OBW: 15.705 KHz



5.8.4.36. Configuration: 99% OBW, Band 4: 851-869MHz, 851.1MHz, 12.5 KHz, Digital, F1E& F1D, High power

OBW: 7.81 KHz



Date: 29.MAY.2018 11:12:10

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Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

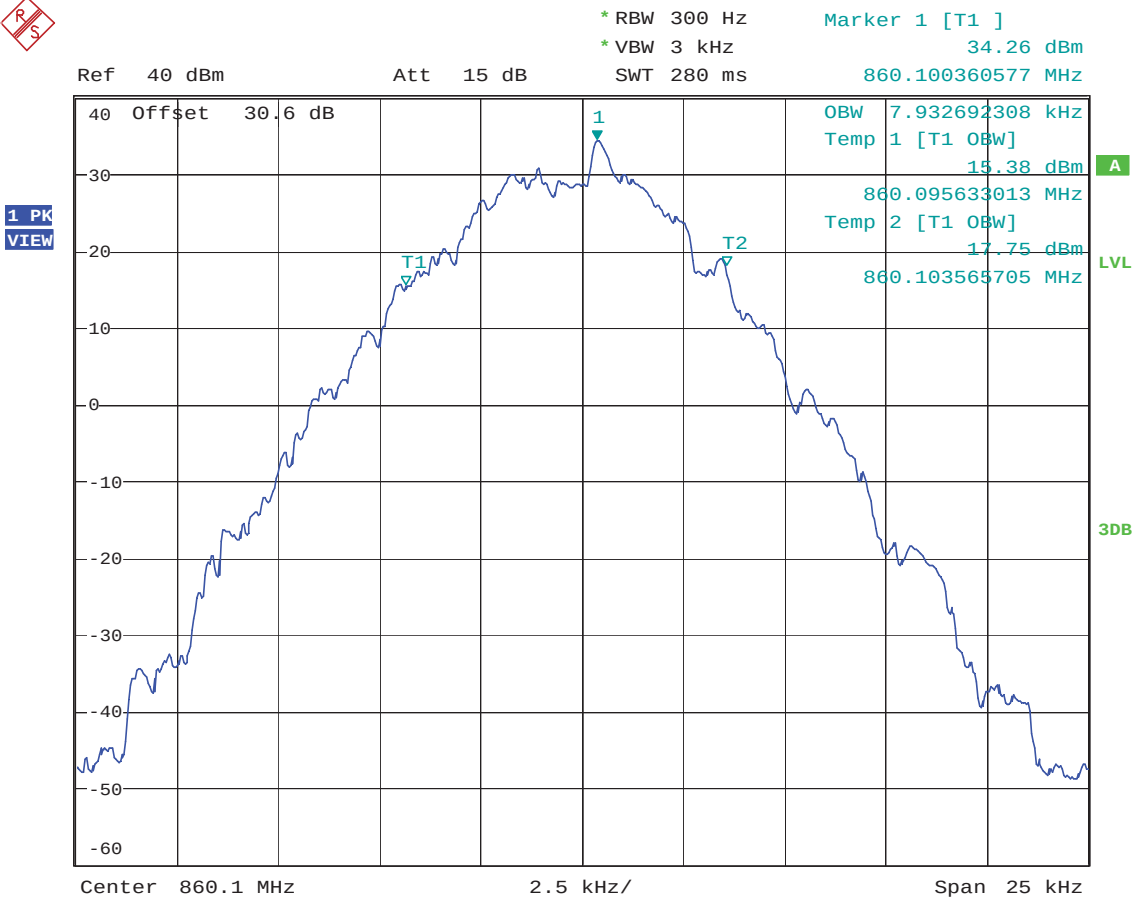
File #: 18ICOM485_FCC90

June 26, 2018

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

5.8.4.37. Configuration: 99% OBW, Band 4: 851-869MHz, 860.1MHz, 12.5 KHz, Digital, F1E& F1D, High power

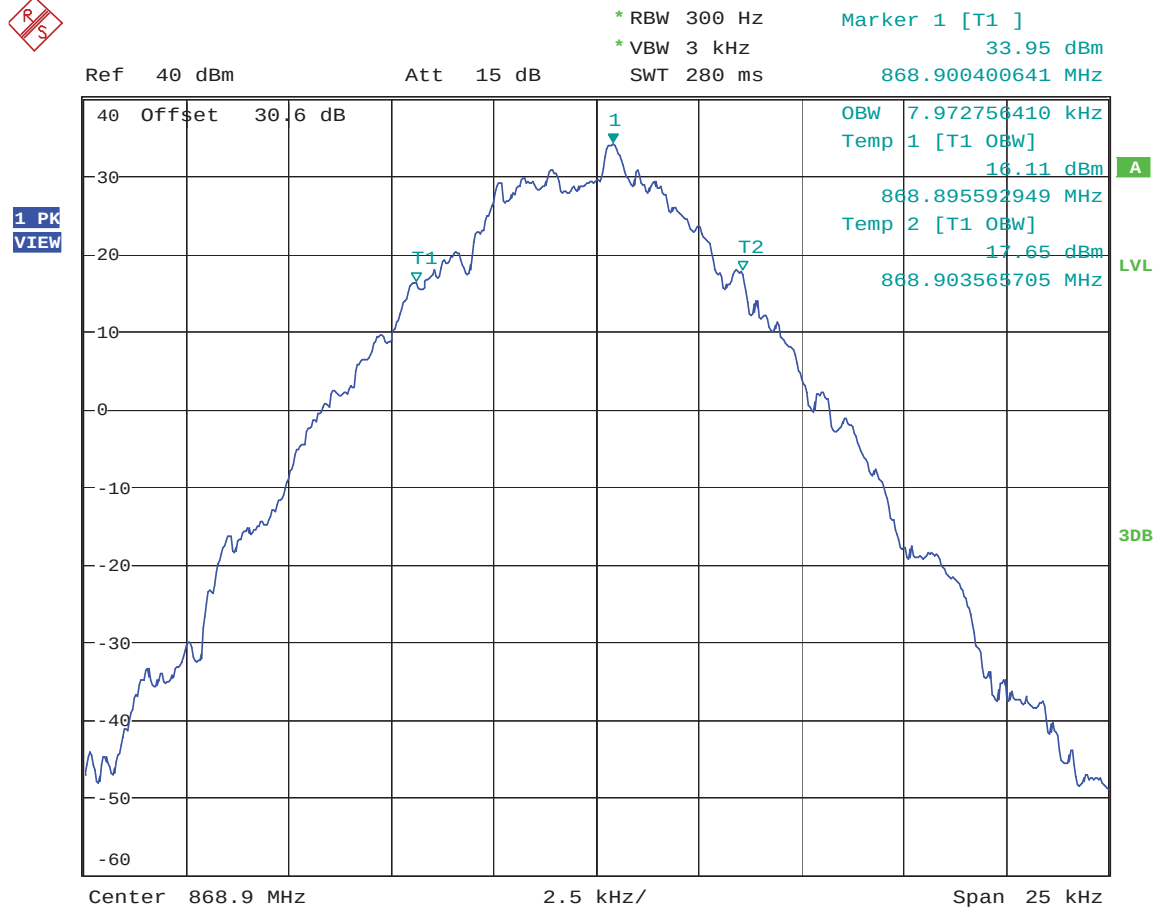
OBW: 7.93 KHz



Date: 29.MAY.2018 11:13:36

5.8.4.38. Configuration: 99% OBW, Band 4: 851-869MHz, 868.9MHz, 12.5 KHz, Digital, F1E& F1D, High power

OBW: 7.97 KHz



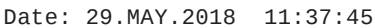
Date: 29.MAY.2018 11:15:21

ULTRATECH GROUP OF LABS

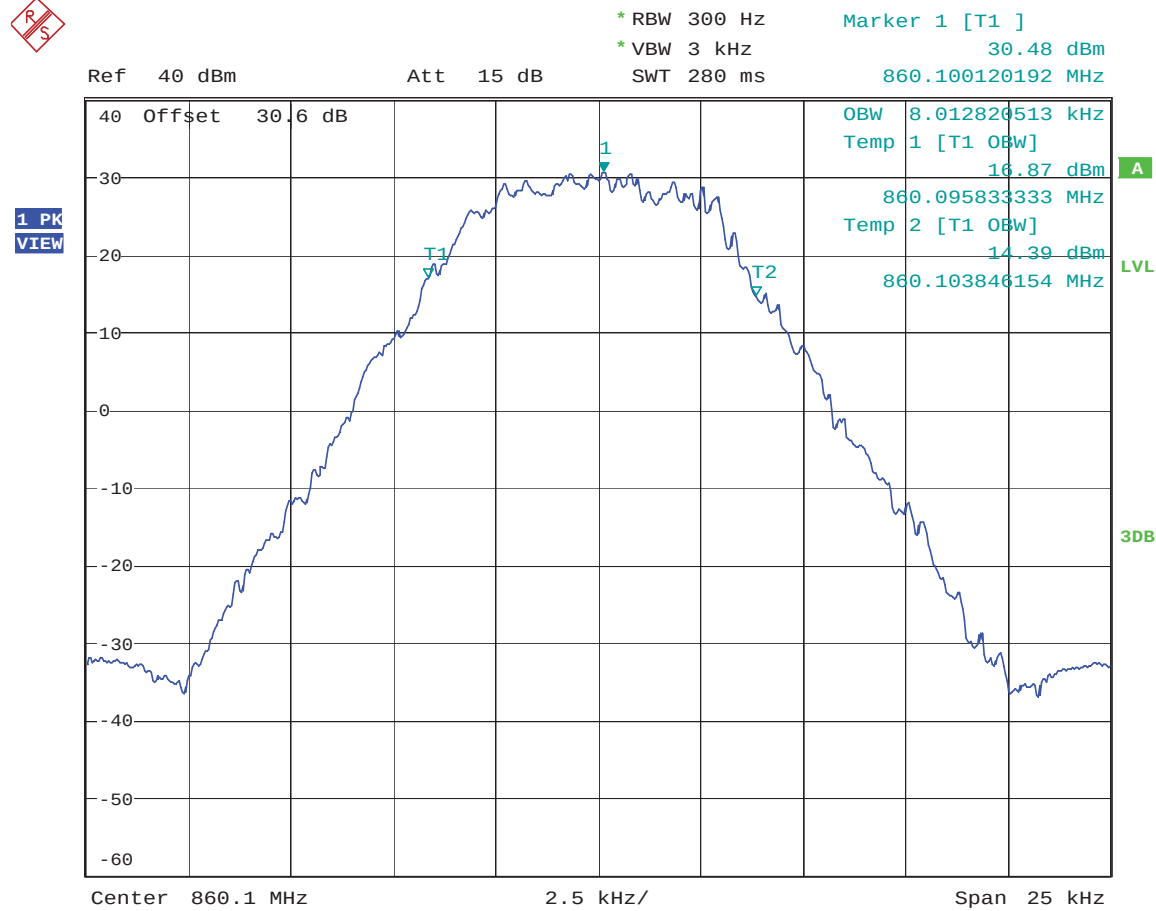
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90
June 26, 2018

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

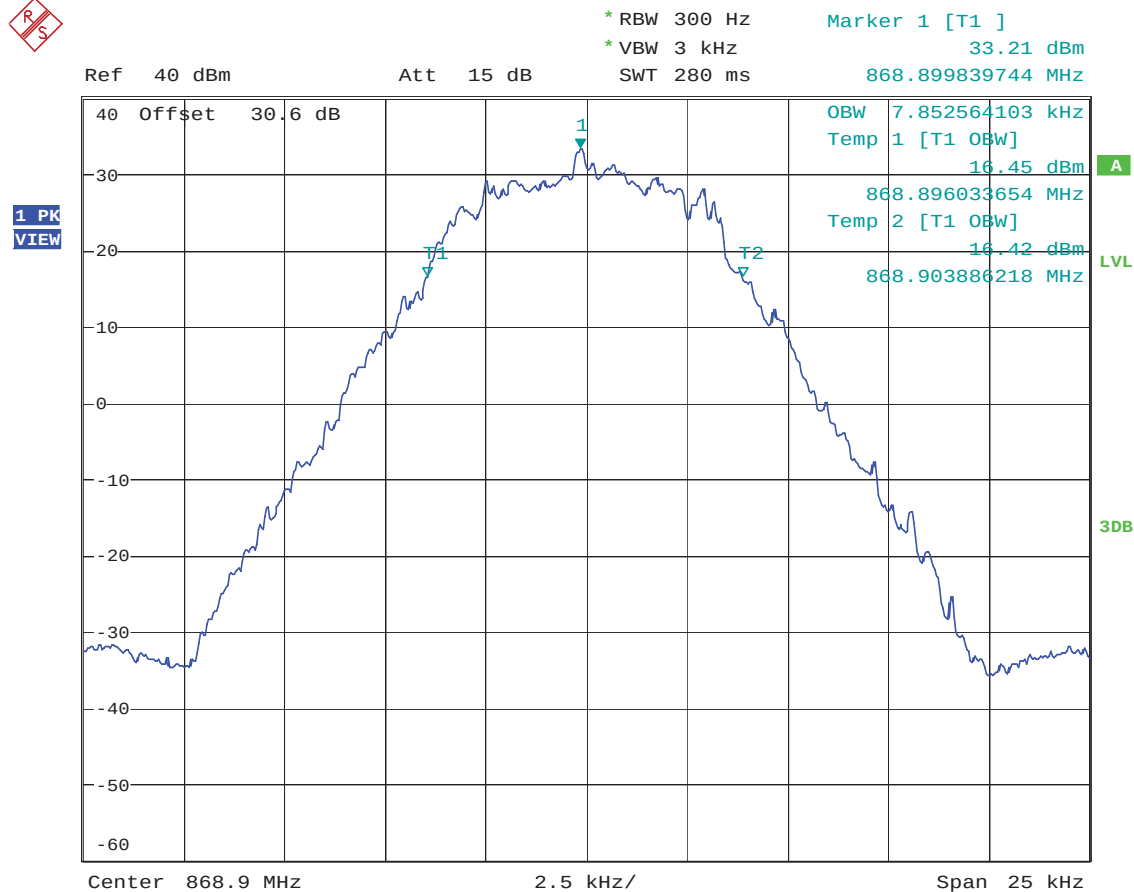


5.8.4.40. Configuration: 99% OBW, Band 4: 851-869MHz, 860.1MHz, 12.5 KHz, Digital, F1W, High power
OBW: 8.01 KHz



Date: 29.MAY.2018 11:39:54

5.8.4.41. Configuration: 99% OBW, Band 4: 851-869MHz, 868.9MHz, 12.5 KHz, Digital, F1W, High power
OBW: 7.85 KHz

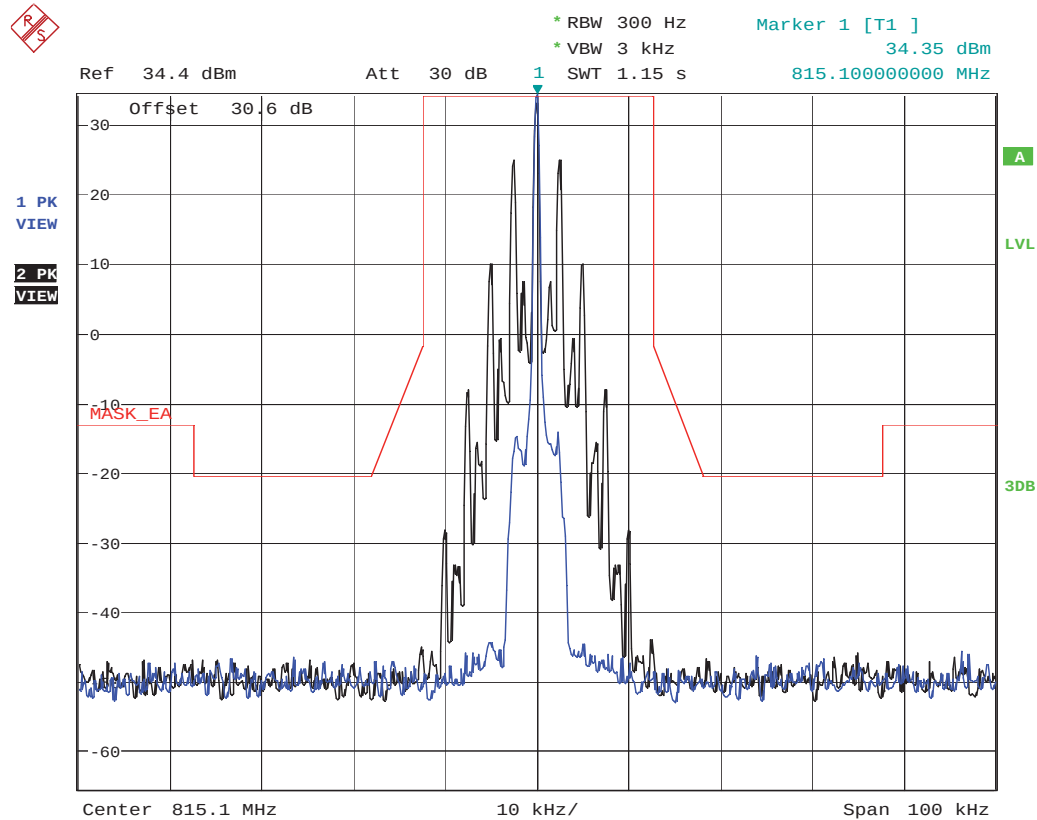


Date: 29.MAY.2018 11:42:01

5.8.5. Test Data- EMISSION MASKS- MASK 90.691

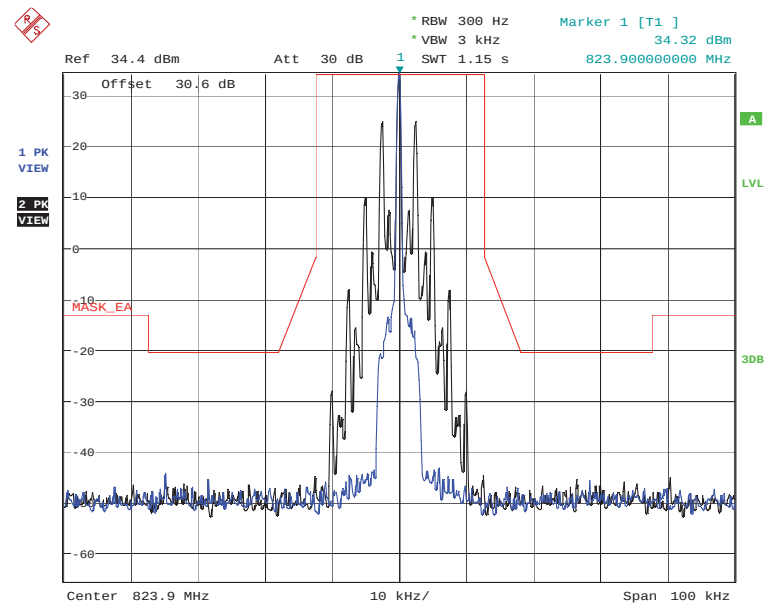
High Power Analog

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



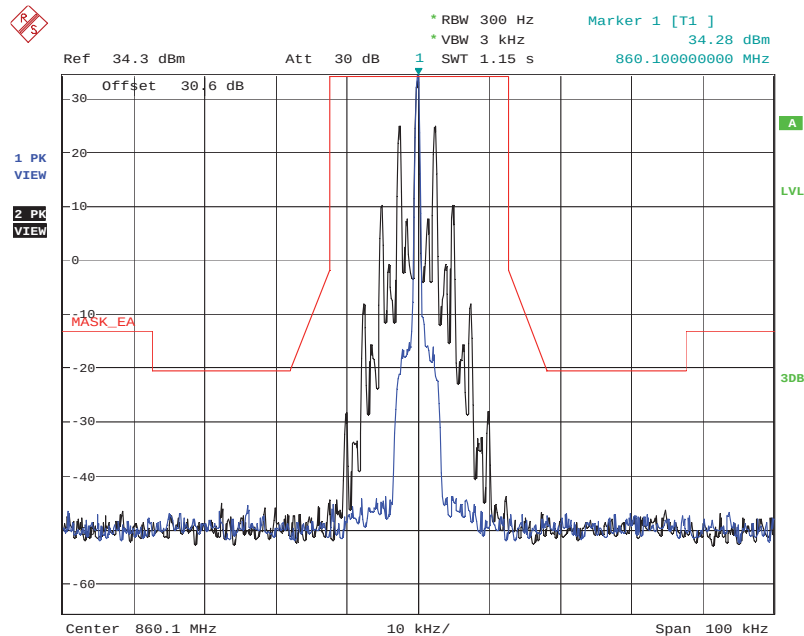
Date: 1.JUN.2018 10:39:33

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



Date: 1.JUN.2018 10:49:58

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



Date: 1.JUN.2018 10:57:03

ULTRATECH GROUP OF LABS

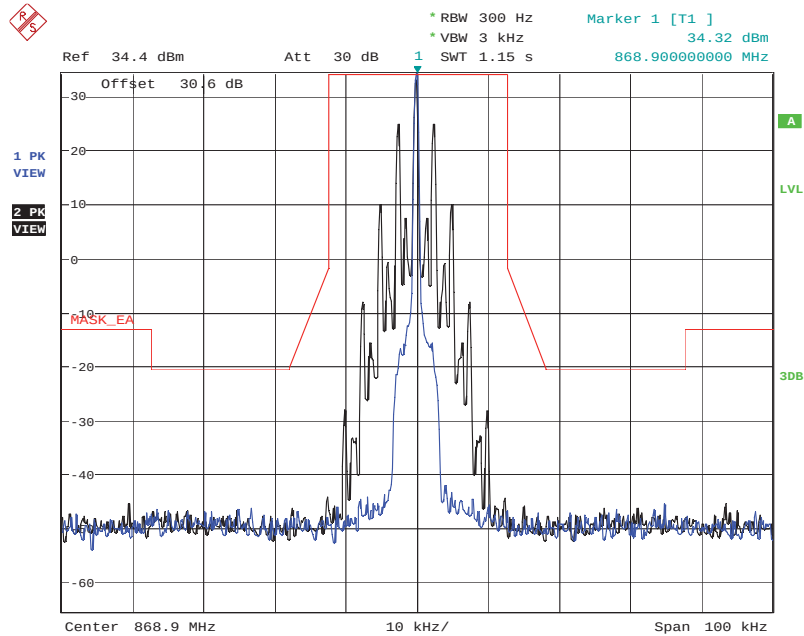
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

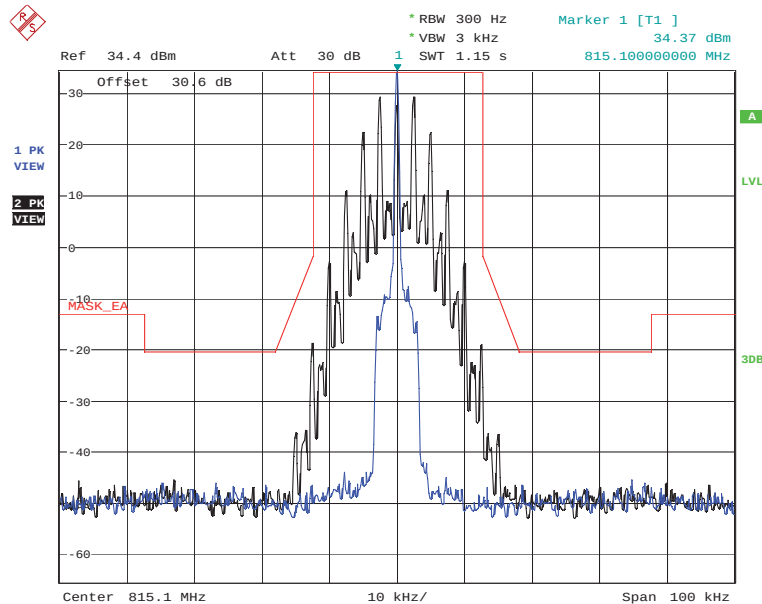
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

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



Date: 1.JUN.2018 11:05:46

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



Date: 1.JUN.2018 10:46:50

ULTRATECH GROUP OF LABS

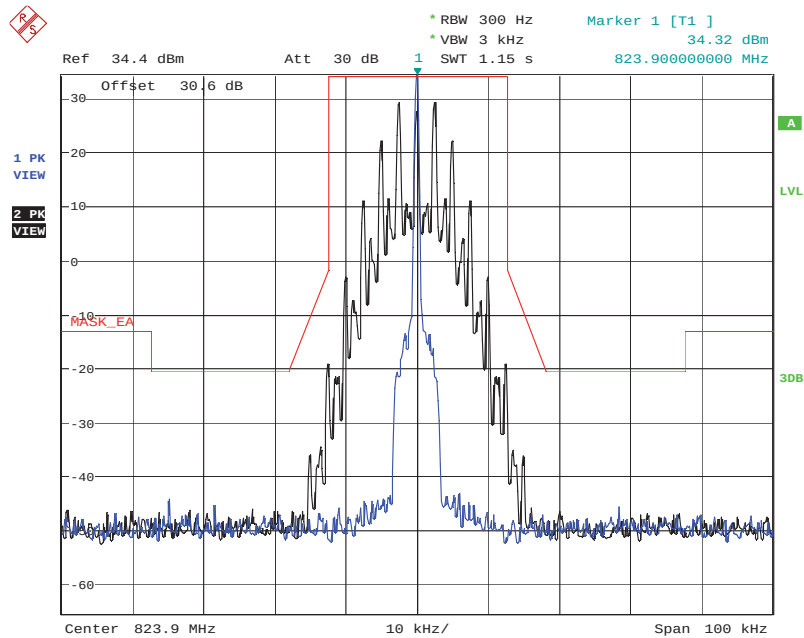
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

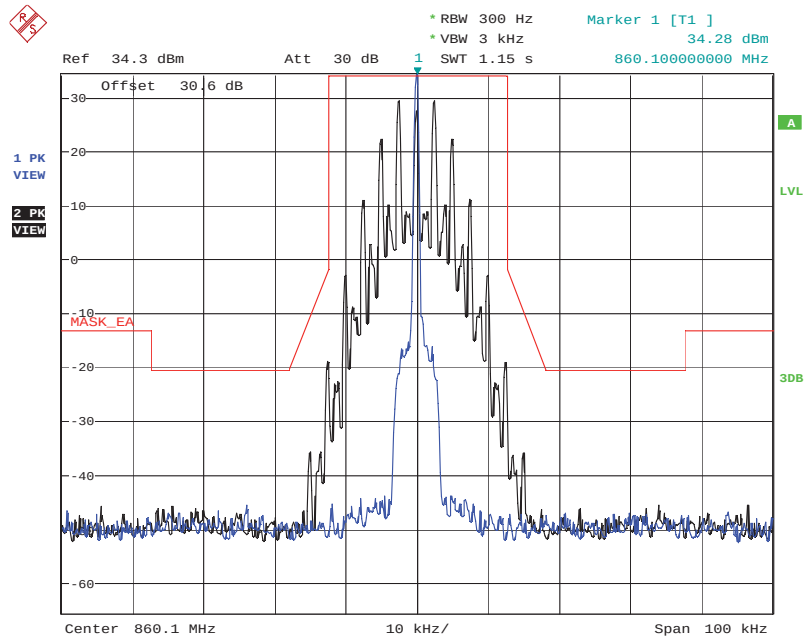
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

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



Date: 1.JUN.2018 10:51:11

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



Date: 1.JUN.2018 10:58:19

ULTRATECH GROUP OF LABS

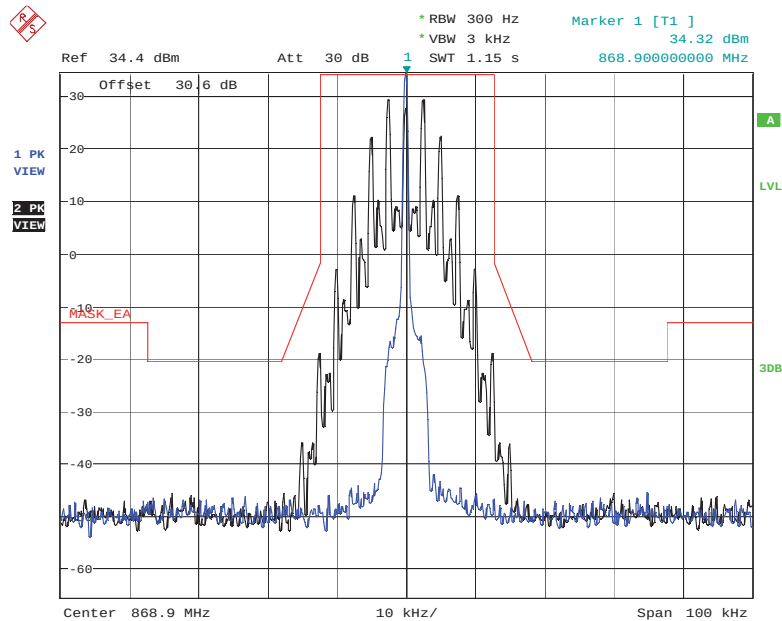
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

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

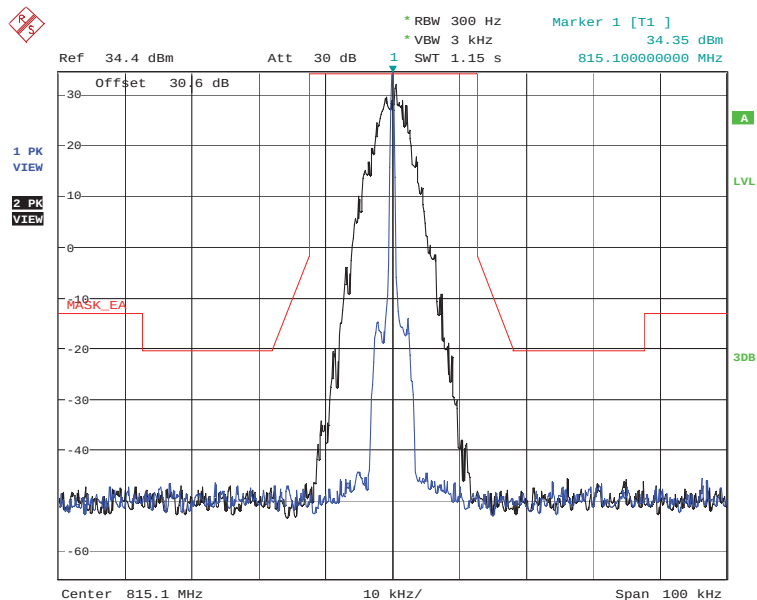
5.8.5.8. Configuration: Mask 90.691, Sub Band 4: 854-869MHz, 868.9MHz, 25 KHz, Analog, High power



Date: 1.JUN.2018 11:06:57

High Power Digital

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



Date: 1.JUN.2018 10:41:28

ULTRATECH GROUP OF LABS

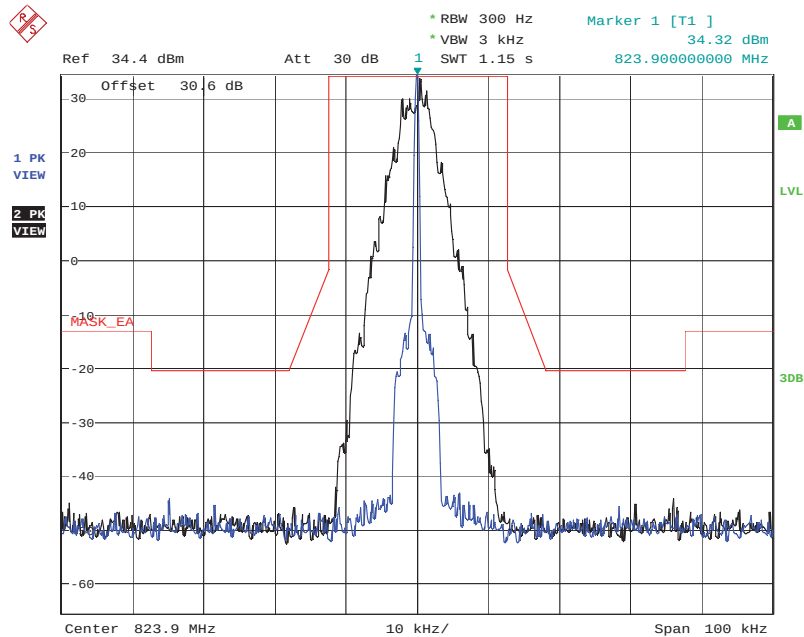
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

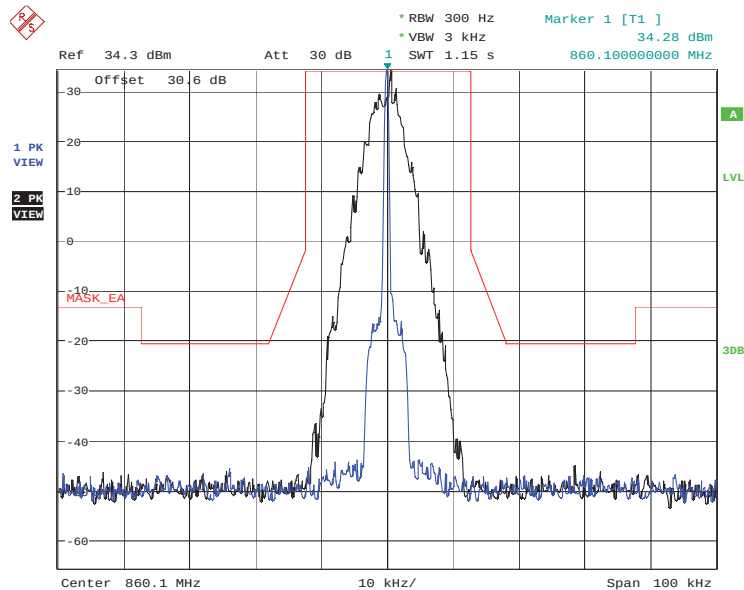
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

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



Date: 1.JUN.2018 10:52:24

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



Date: 1.JUN.2018 10:59:33

ULTRATECH GROUP OF LABS

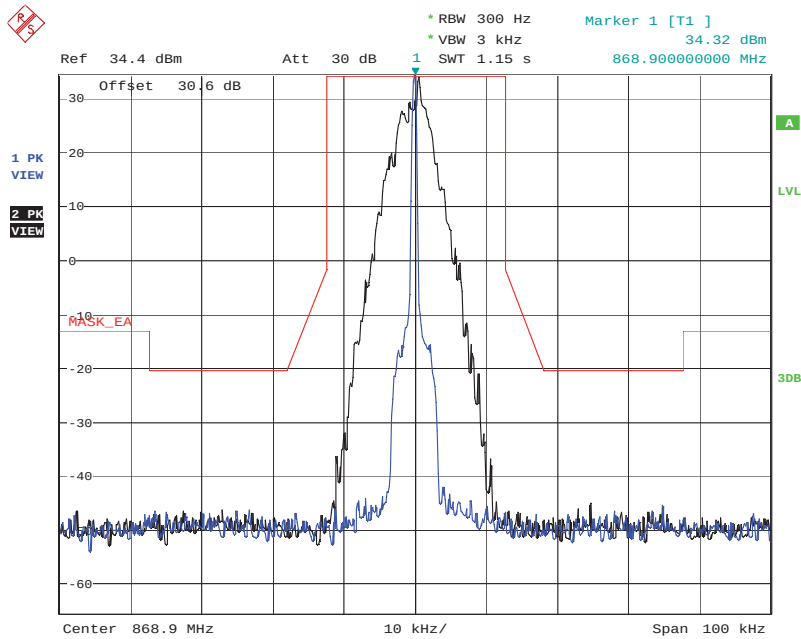
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

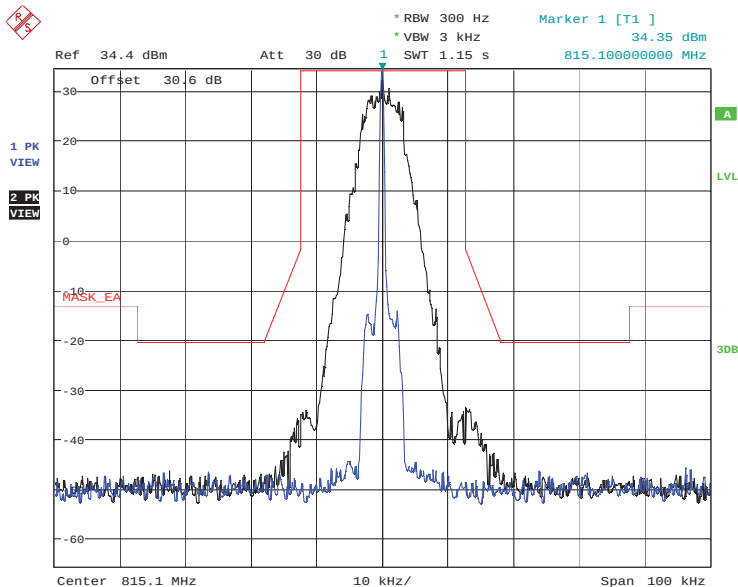
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

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



Date: 1.JUN.2018 11:09:08

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



Date: 1.JUN.2018 10:43:13

ULTRATECH GROUP OF LABS

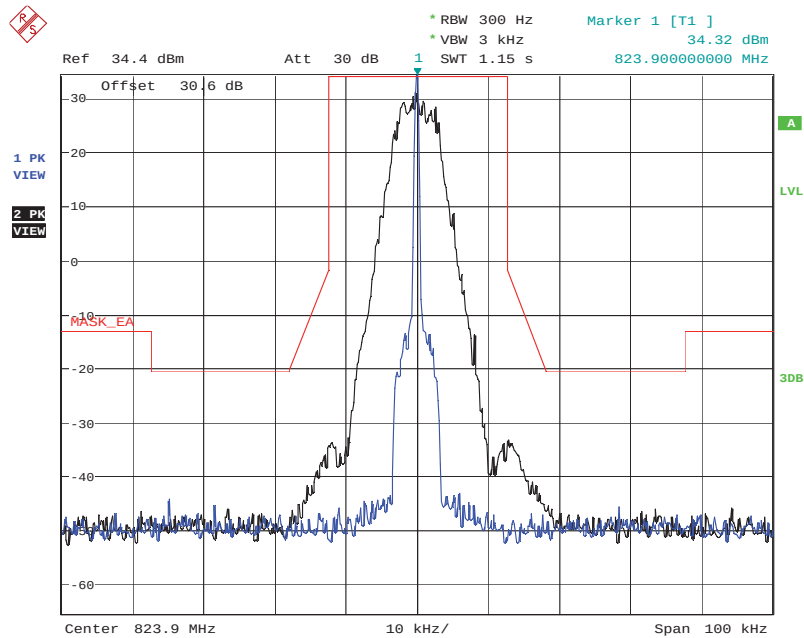
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

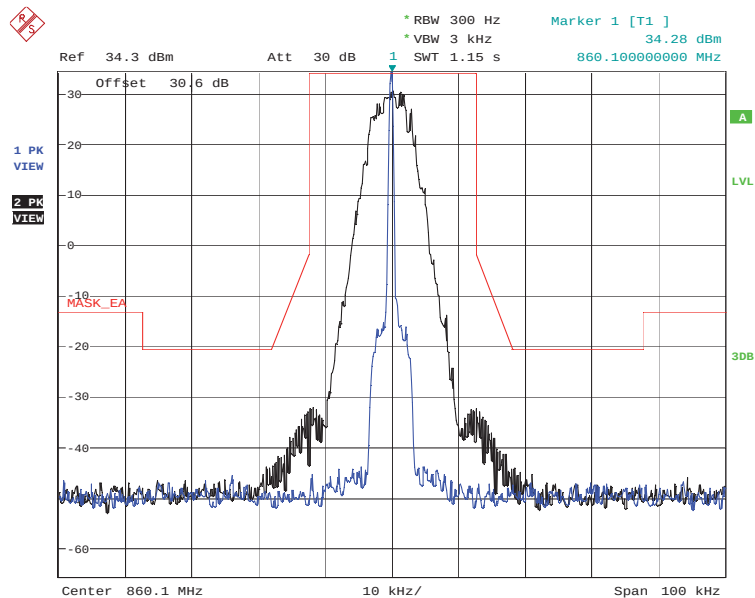
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

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



Date: 1.JUN.2018 10:53:57

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



Date: 1.JUN.2018 11:01:16

ULTRATECH GROUP OF LABS

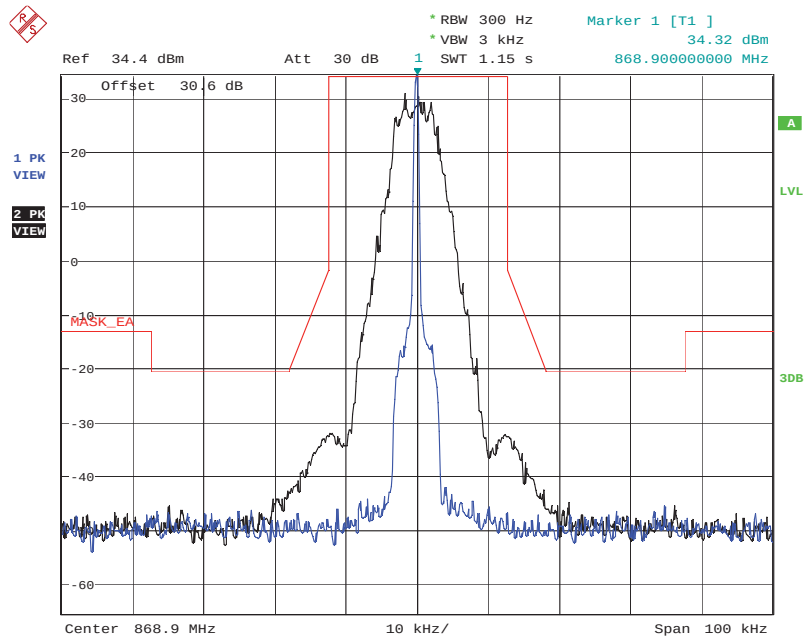
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

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

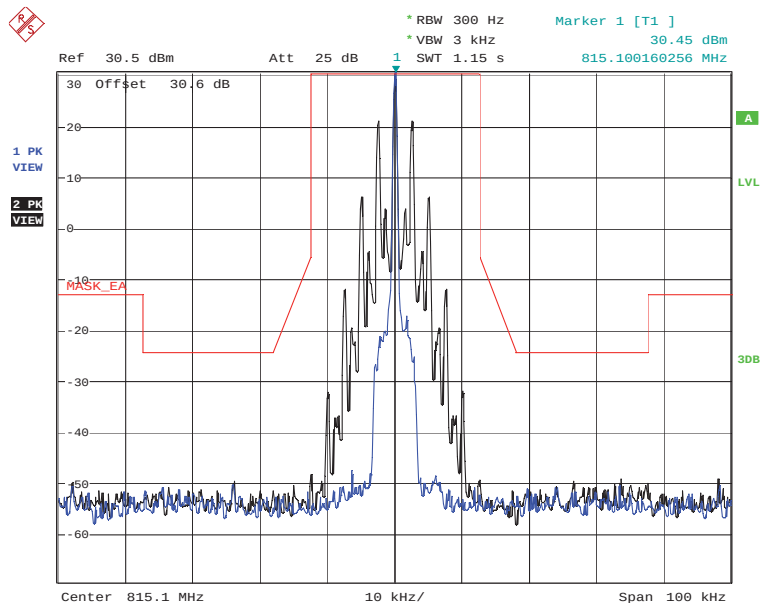
5.8.5.16. Configuration: Mask 90.691, Sub Band 4: 854-869MHz, 868.9MHz, F1W, Digital, High power



Date: 1.JUN.2018 11:10:37

Low Power Analog

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



Date: 1.JUN.2018 12:23:00

ULTRATECH GROUP OF LABS

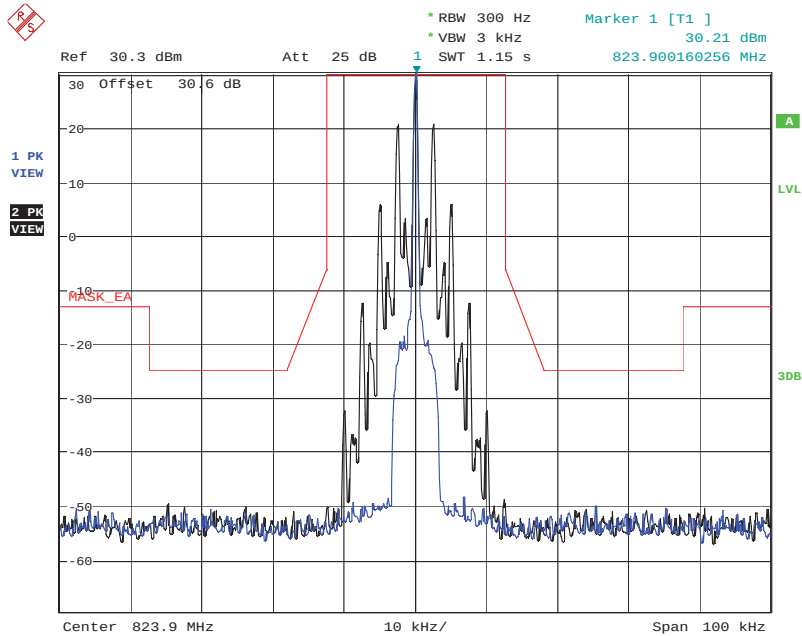
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

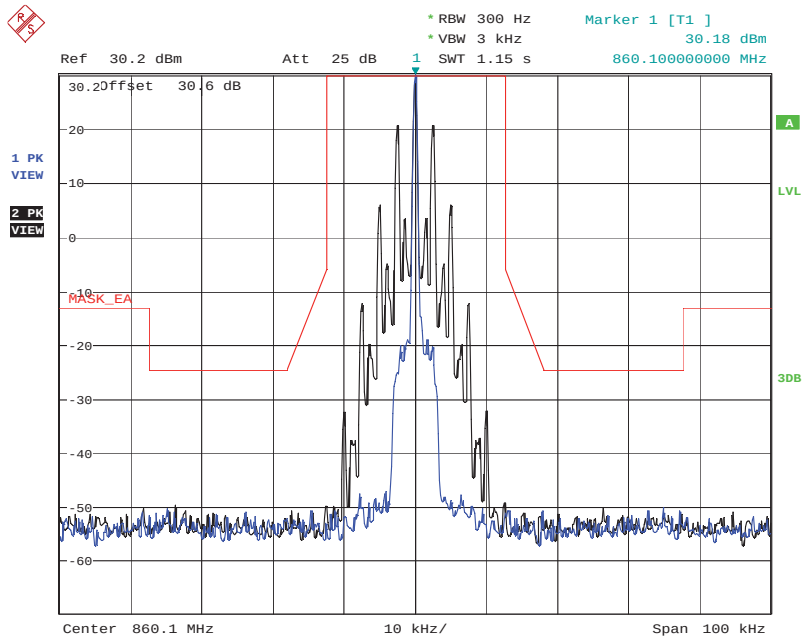
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

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



Date: 1.JUN.2018 12:30:59

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



Date: 1.JUN.2018 12:38:31

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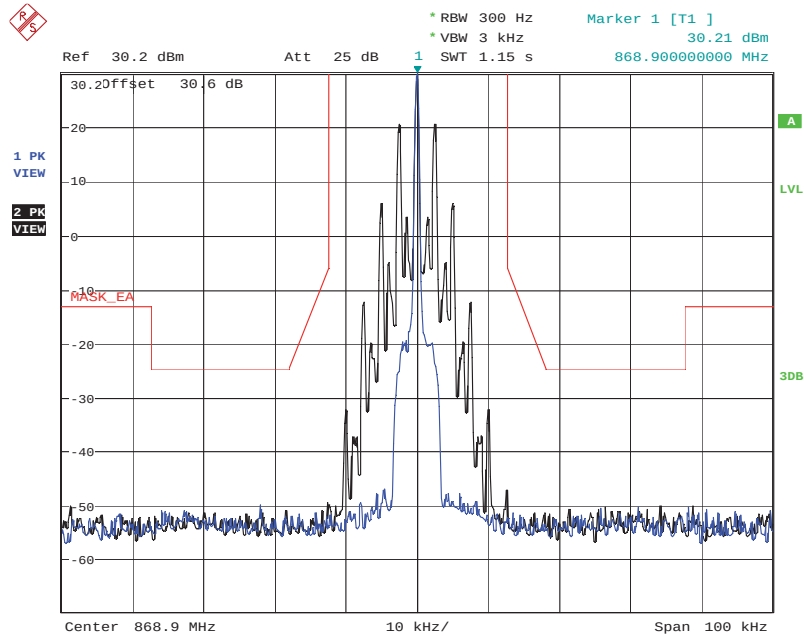
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

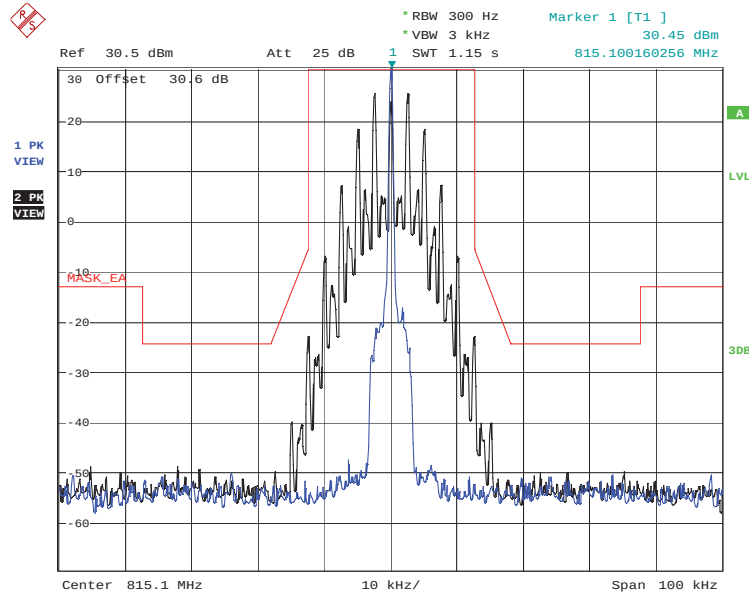
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

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



Date: 1.JUN.2018 12:50:24

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



Date: 1.JUN.2018 12:24:24

ULTRATECH GROUP OF LABS

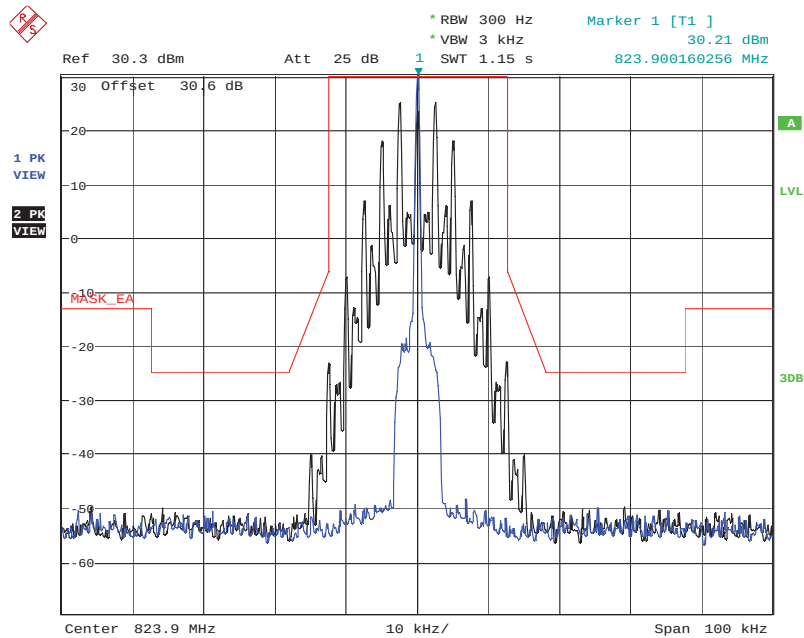
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vjc@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

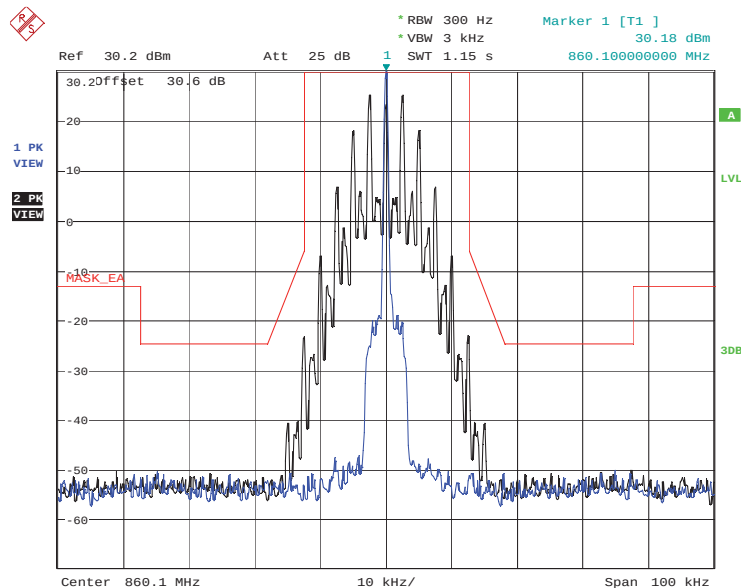
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

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



Date: 1.JUN.2018 12:32:15

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



Date: 1.JUN.2018 12:39:53

ULTRATECH GROUP OF LABS

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Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

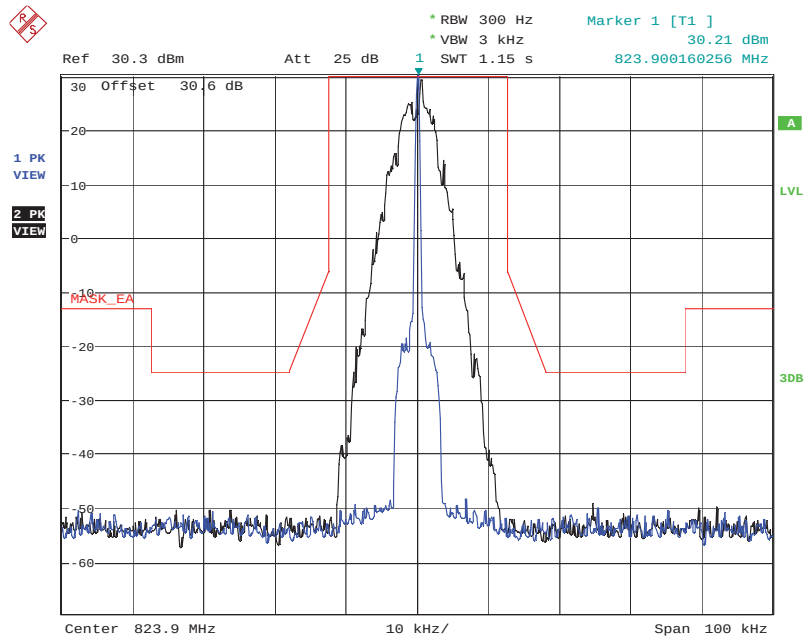
June 26, 2018

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

Date: 1.JUN.2018 12:51:41

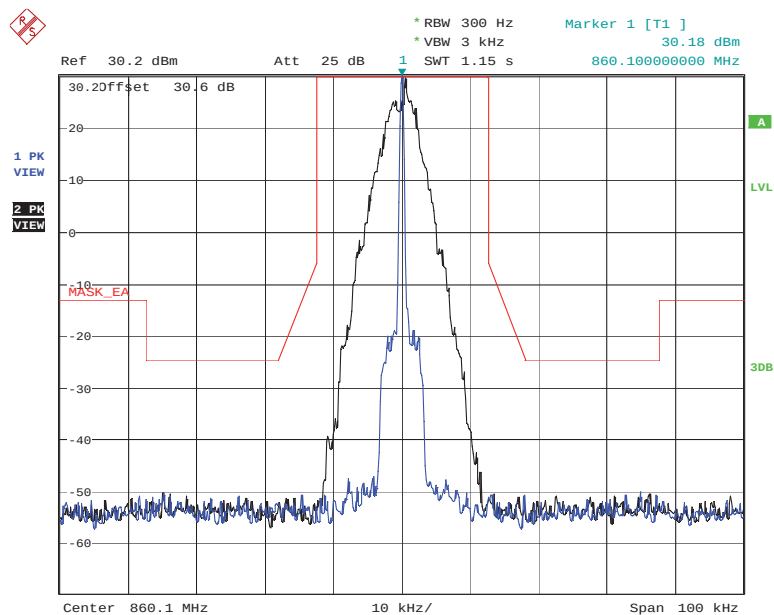
Date: 1.JUN.2018 12:25:41

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



Date: 1.JUN.2018 12:33:23

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



Date: 1.JUN.2018 12:41:18

ULTRATECH GROUP OF LABS

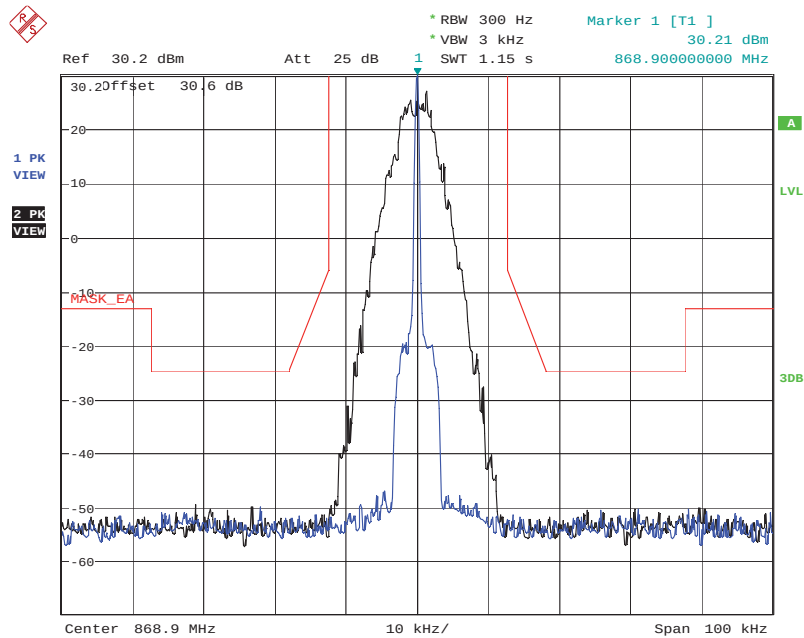
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

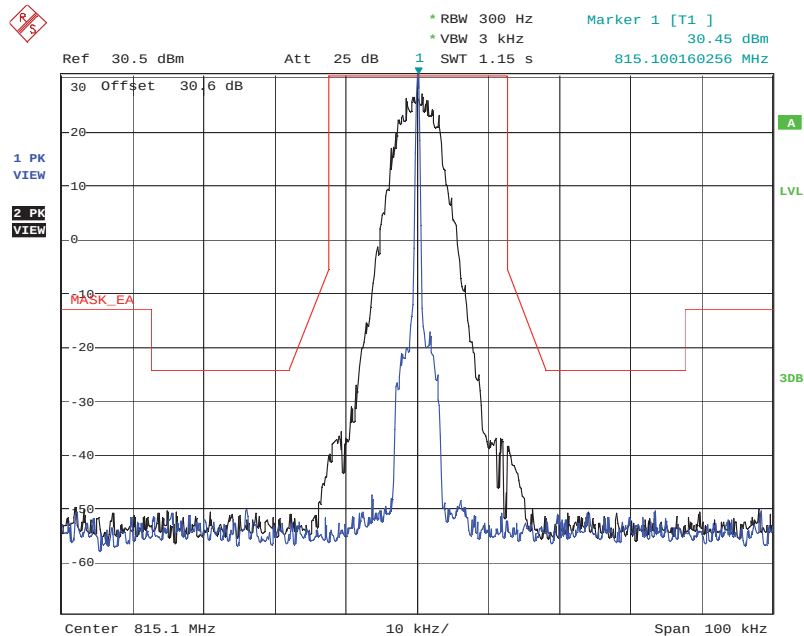
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

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



Date: 1.JUN.2018 12:52:55

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



Date: 1.JUN.2018 12:27:38

ULTRATECH GROUP OF LABS

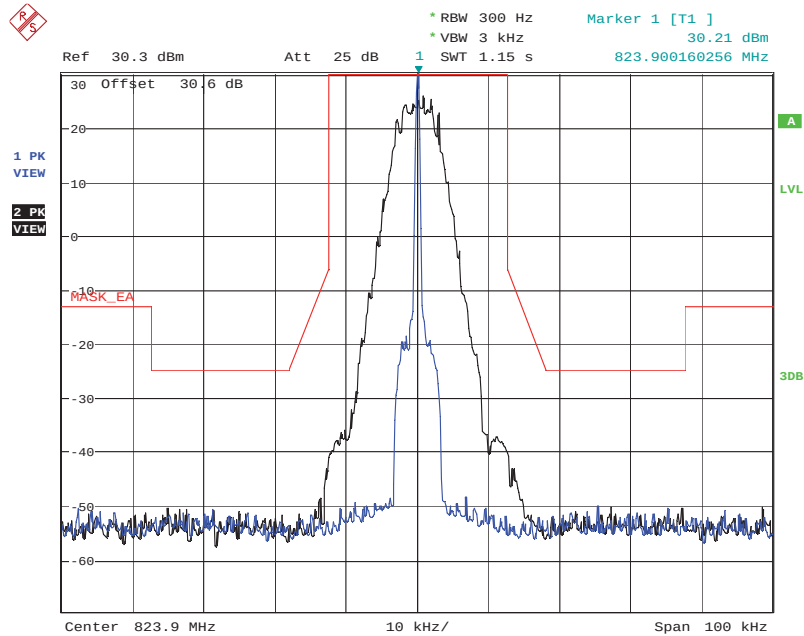
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

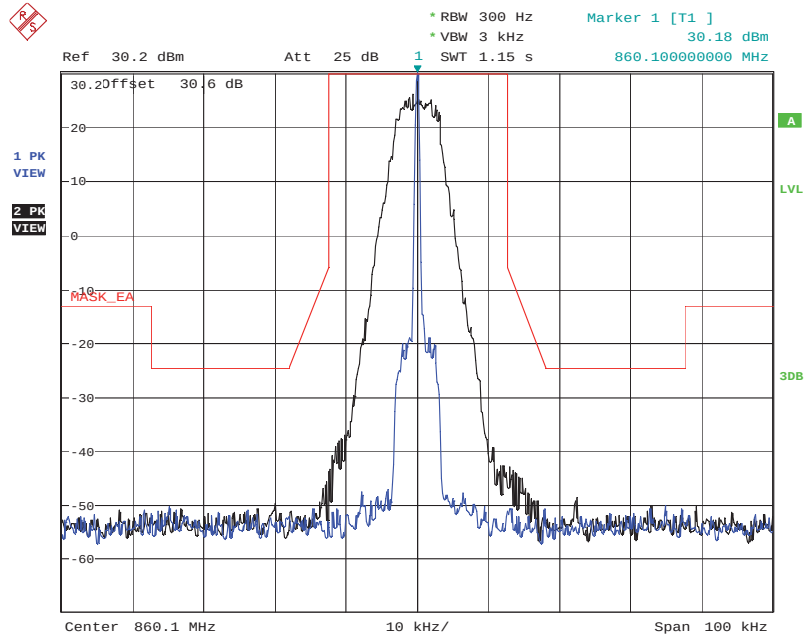
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

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



Date: 1.JUN.2018 12:34:52

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



Date: 1.JUN.2018 12:42:57

ULTRATECH GROUP OF LABS

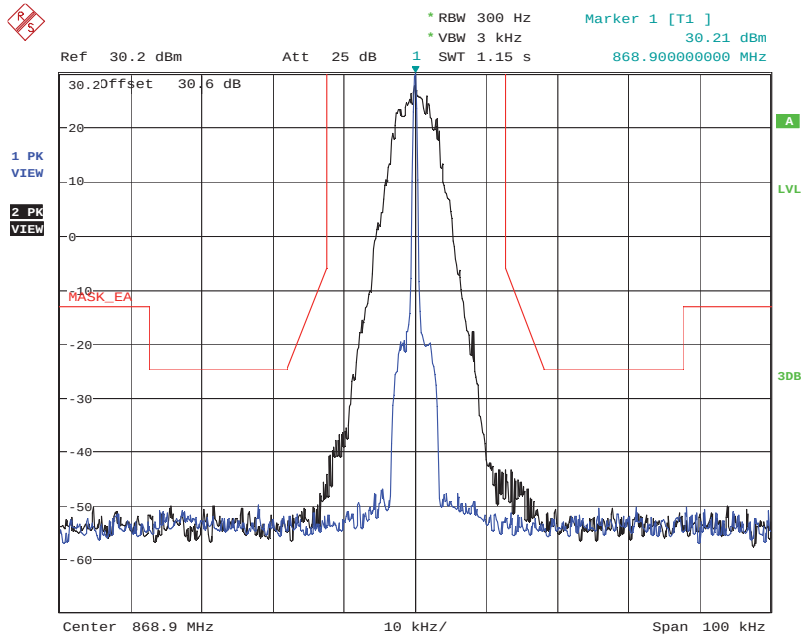
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

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

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



Date: 1.JUN.2018 12:54:41

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Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

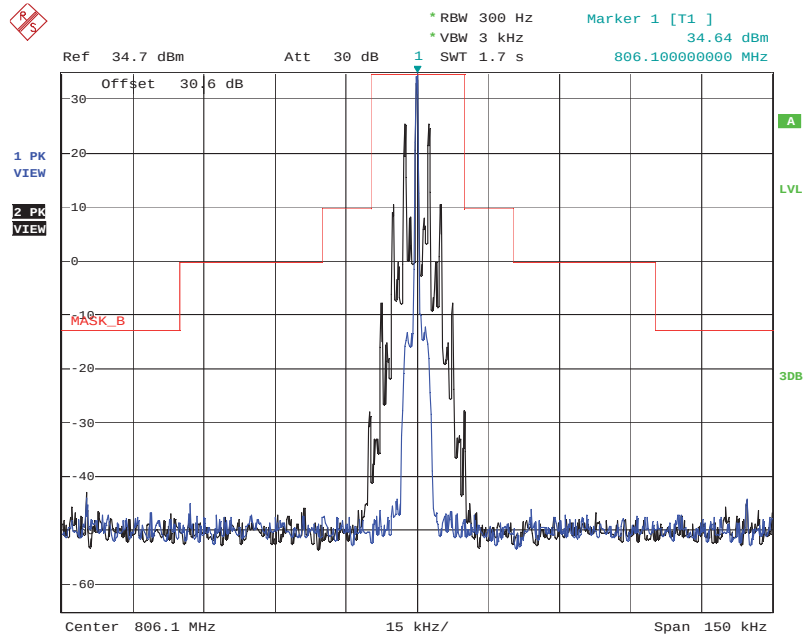
June 26, 2018

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

5.8.6. Test Data- EMISSION MASKS- MASK B

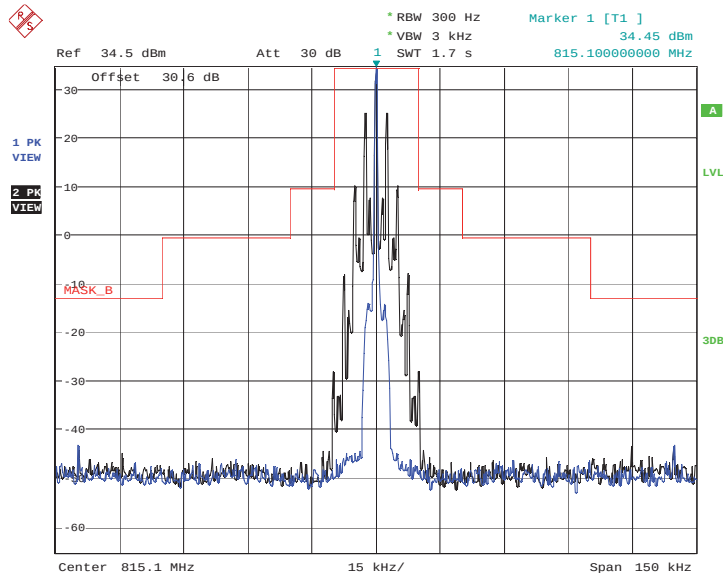
High Power

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



Date: 1.JUN.2018 08:35:19

5.8.6.2. Configuration: Mask B, Band 3: 806-824MHz, 815.1MHz, 12.5 KHz, Analog, High power



Date: 1.JUN.2018 08:43:02

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3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

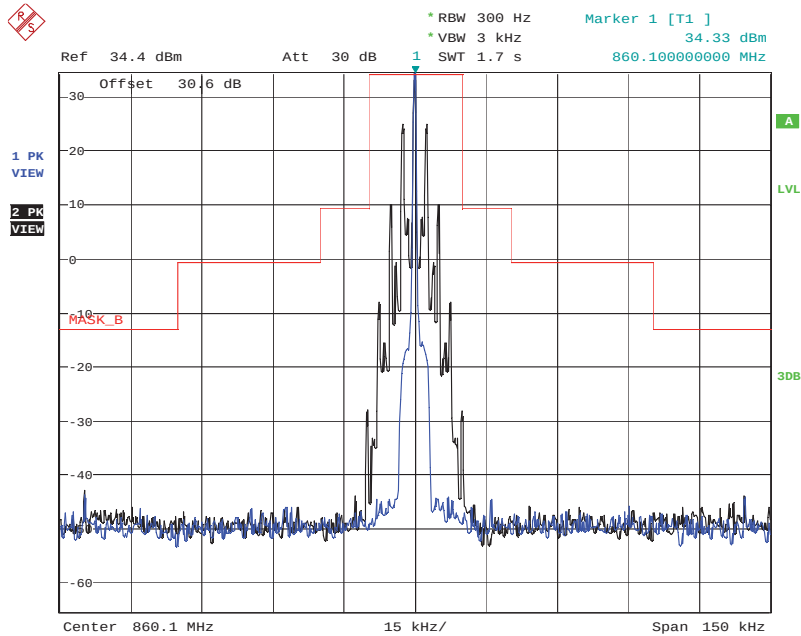
June 26, 2018

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

Date: 1.JUN.2018 08:48:43

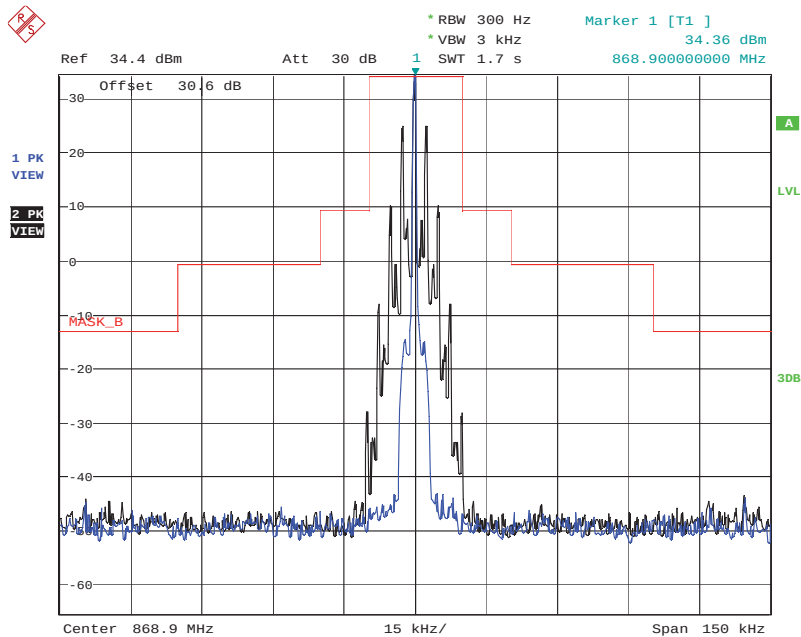
Date: 1.JUN.2018 08:53:37

5.8.6.5. Configuration: Mask B, Band 4: 851-869MHz, 860.1MHz, 12.5 KHz, Analog, High power



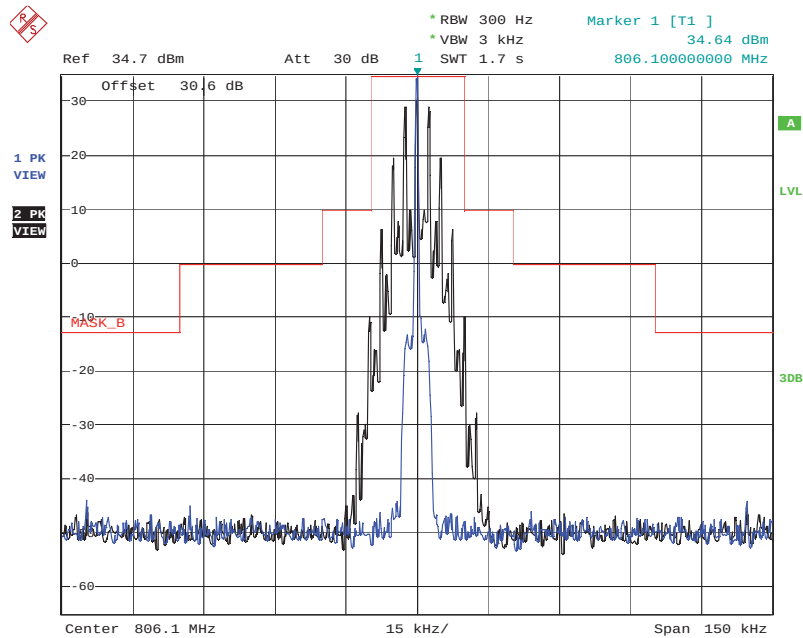
Date: 1.JUN.2018 09:01:26

5.8.6.6. Configuration: Mask B, Band 4: 851-869MHz, 868.9MHz, 12.5 KHz, Analog, High power



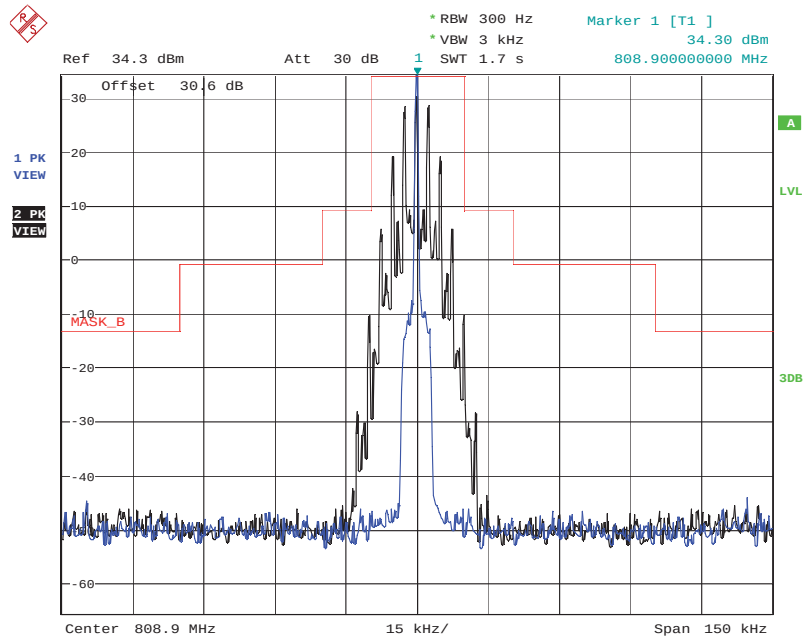
Date: 1.JUN.2018 09:06:47

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



Date: 1.JUN.2018 08:37:31

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



Date: 1.JUN.2018 09:16:24

ULTRATECH GROUP OF LABS

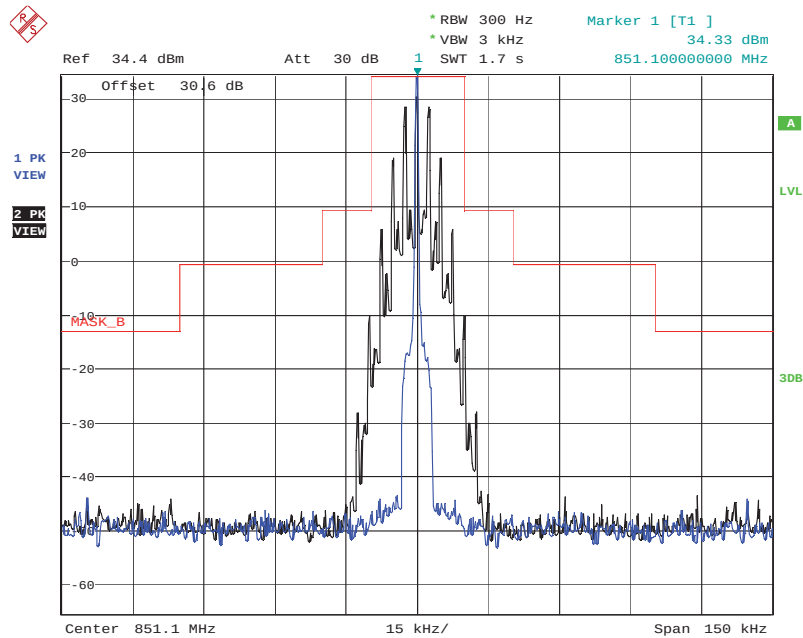
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

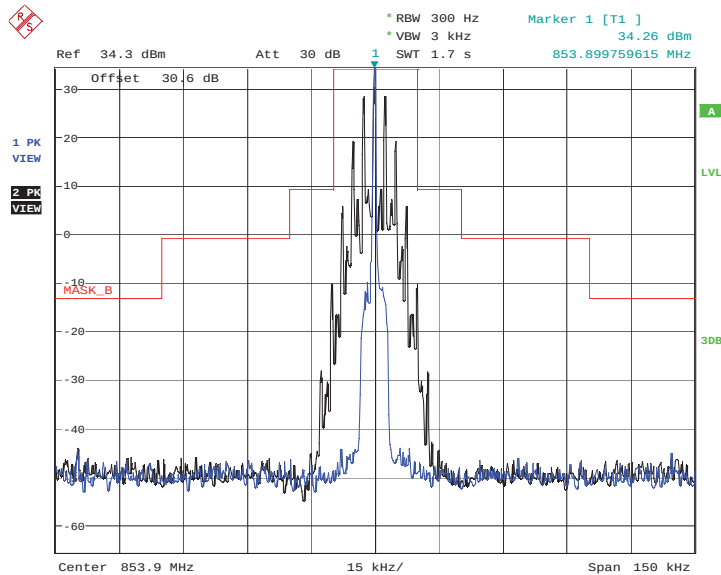
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

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



Date: 1.JUN.2018 08:55:20

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



Date: 1.JUN.2018 09:18:53

ULTRATECH GROUP OF LABS

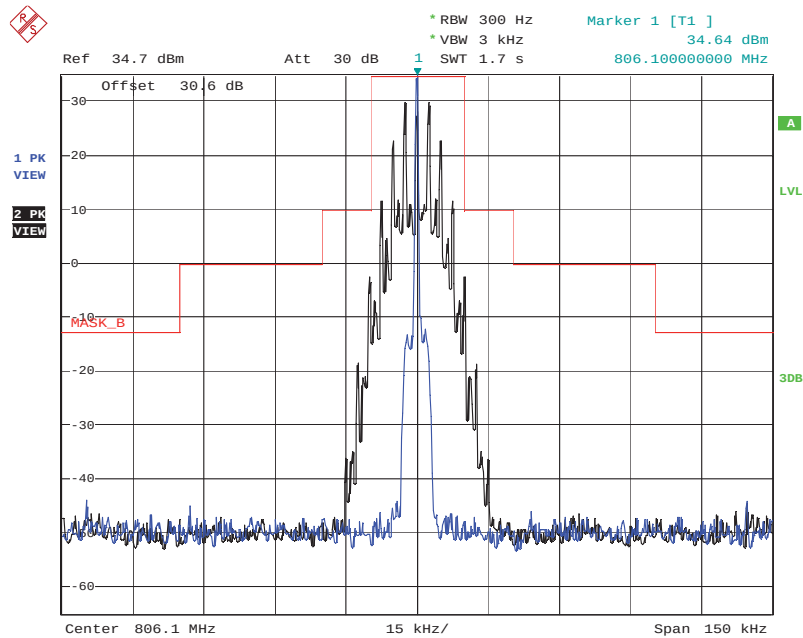
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

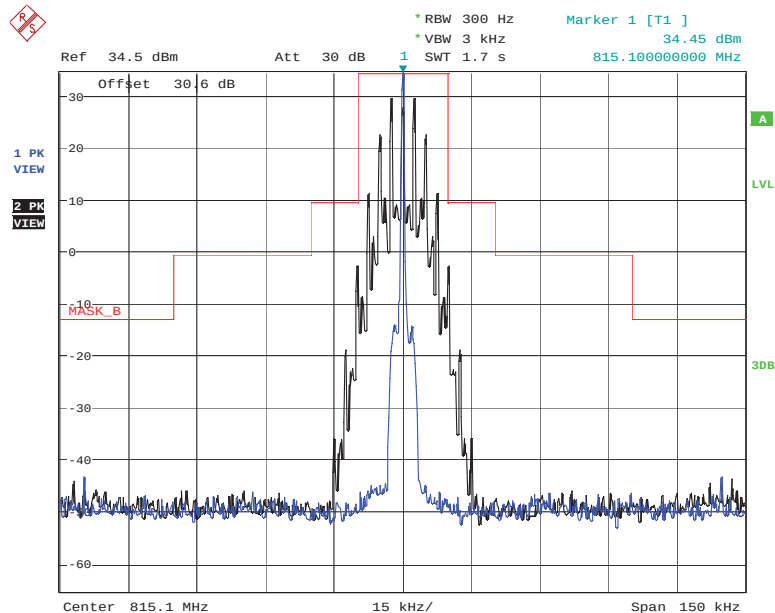
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

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



Date: 1.JUN.2018 08:39:20

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



Date: 1.JUN.2018 08:44:51

ULTRATECH GROUP OF LABS

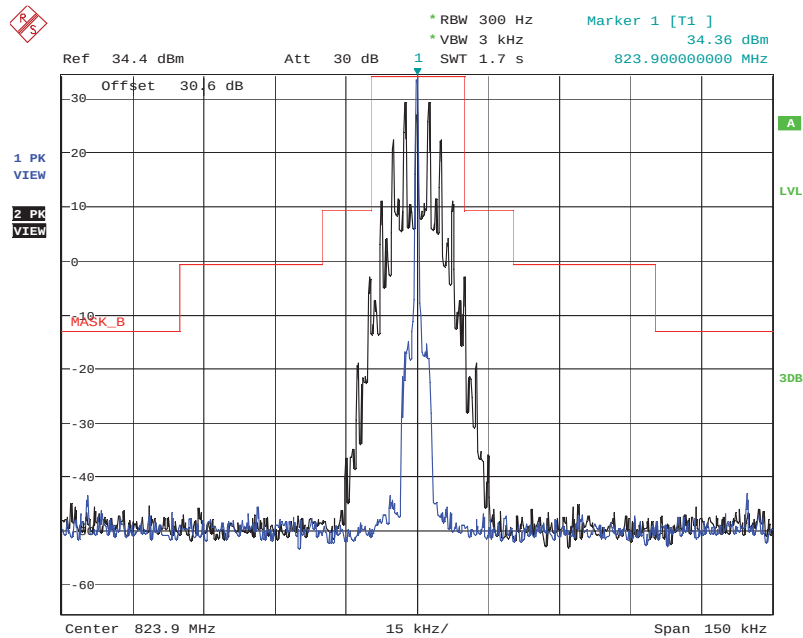
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

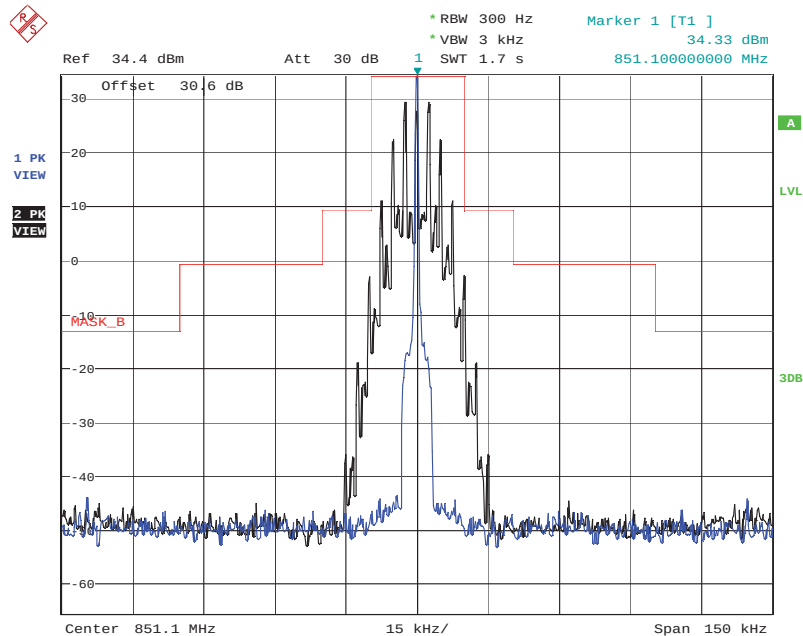
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

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



Date: 1.JUN.2018 08:50:15

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



Date: 1.JUN.2018 08:57:15

ULTRATECH GROUP OF LABS

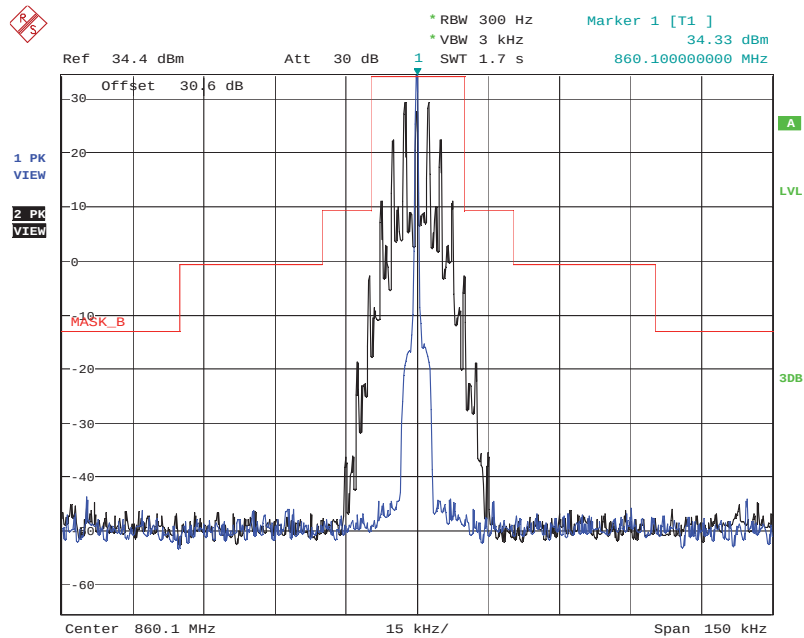
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

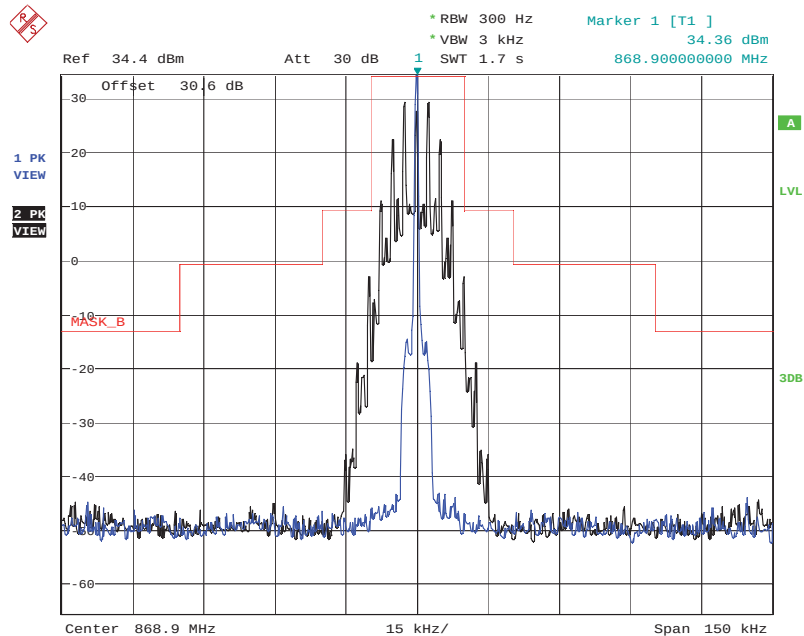
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

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



Date: 1.JUN.2018 09:03:18

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



Date: 1.JUN.2018 09:08:31

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3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

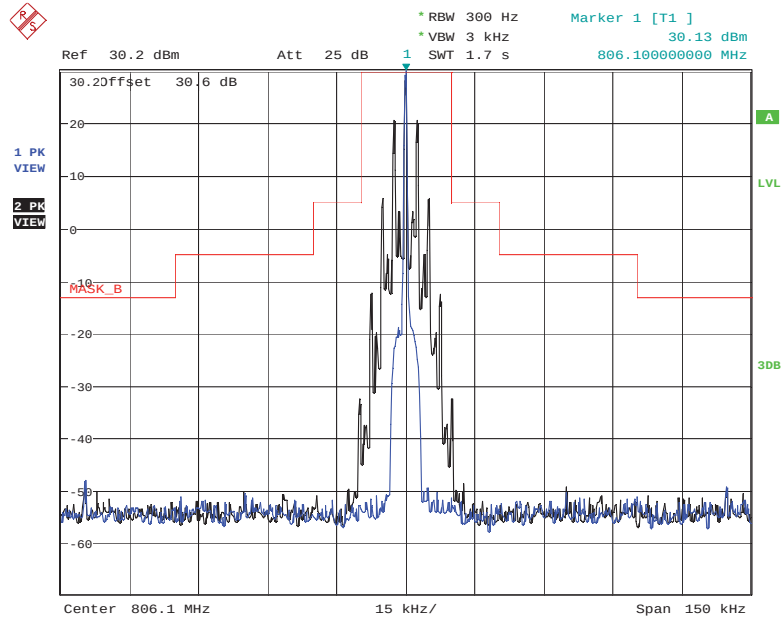
File #: 18ICOM485_FCC90

June 26, 2018

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

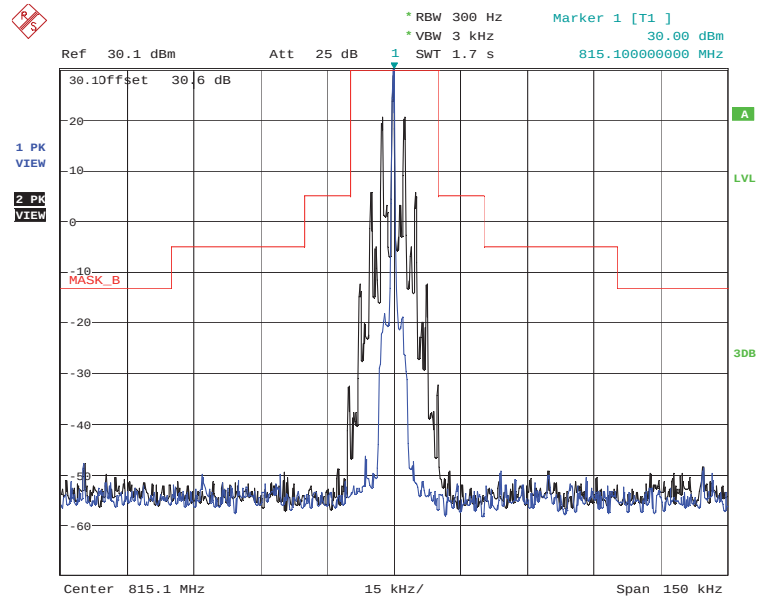
Low Power

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



Date: 1.JUN.2018 09:27:46

5.8.6.18. Configuration: Mask B, Band 3: 806-824MHz, 815.1MHz, 12.5 KHz, Analog, Low power



Date: 1.JUN.2018 09:34:32

ULTRATECH GROUP OF LABS

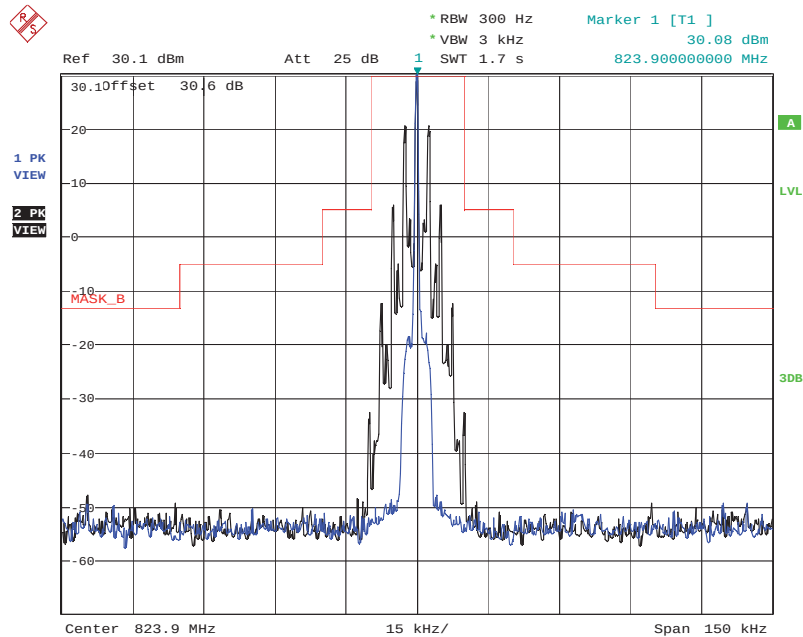
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

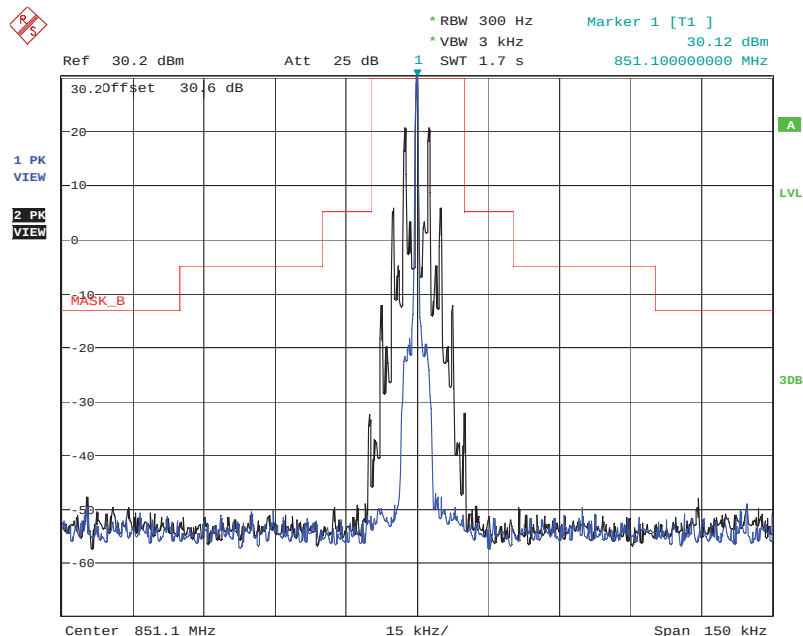
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

5.8.6.19. Configuration: Mask B, Band 3: 806-824MHz, 823.9MHz, 12.5 KHz, Analog, Low power



Date: 1.JUN.2018 09:43:58

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



Date: 1.JUN.2018 09:48:57

ULTRATECH GROUP OF LABS

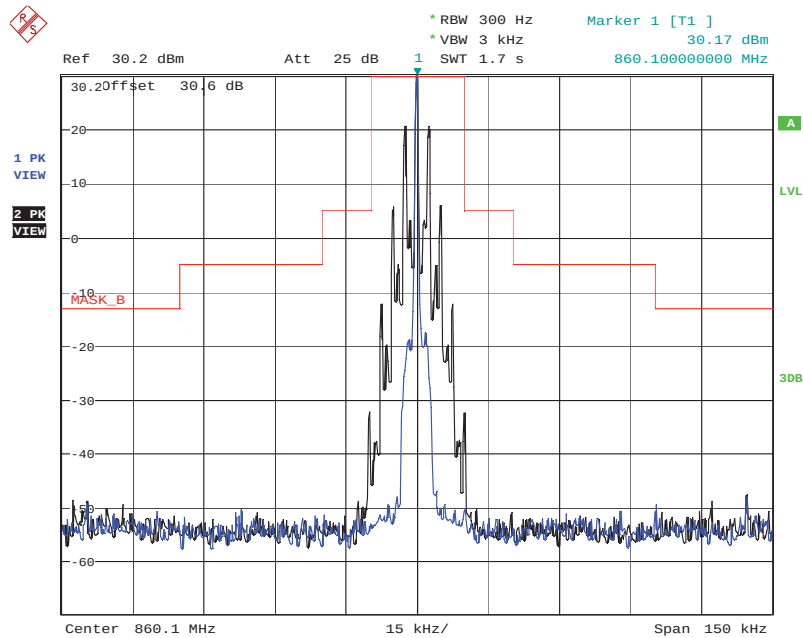
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

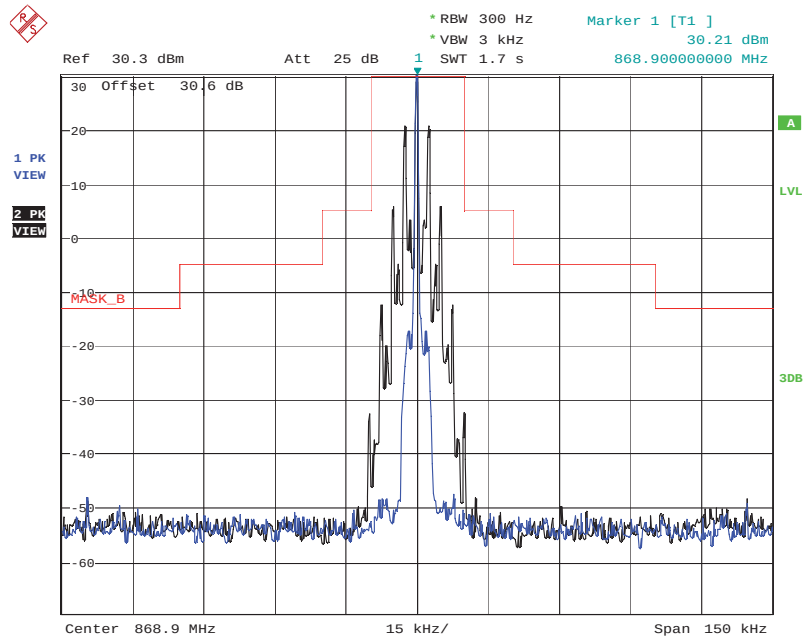
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

5.8.6.21. Configuration: Mask B, Band 4: 851-869MHz, 860.1MHz, 12.5 KHz, Analog, Low power



Date: 1.JUN.2018 09:54:48

5.8.6.22. Configuration: Mask B, Band 4: 851-869MHz, 868.9MHz, 12.5 KHz, Analog, Low power



Date: 1.JUN.2018 09:58:46

ULTRATECH GROUP OF LABS

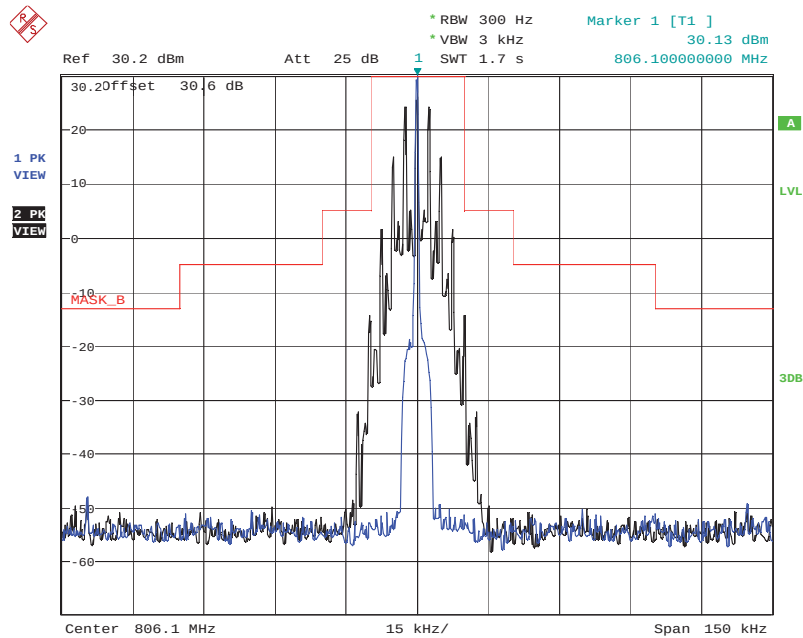
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

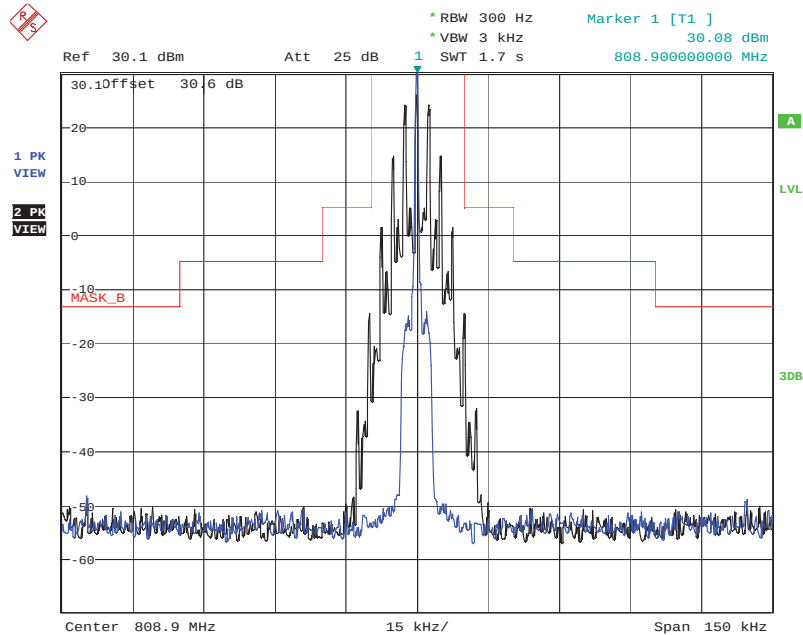
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

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



Date: 1.JUN.2018 09:29:15

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



Date: 1.JUN.2018 10:03:06

ULTRATECH GROUP OF LABS

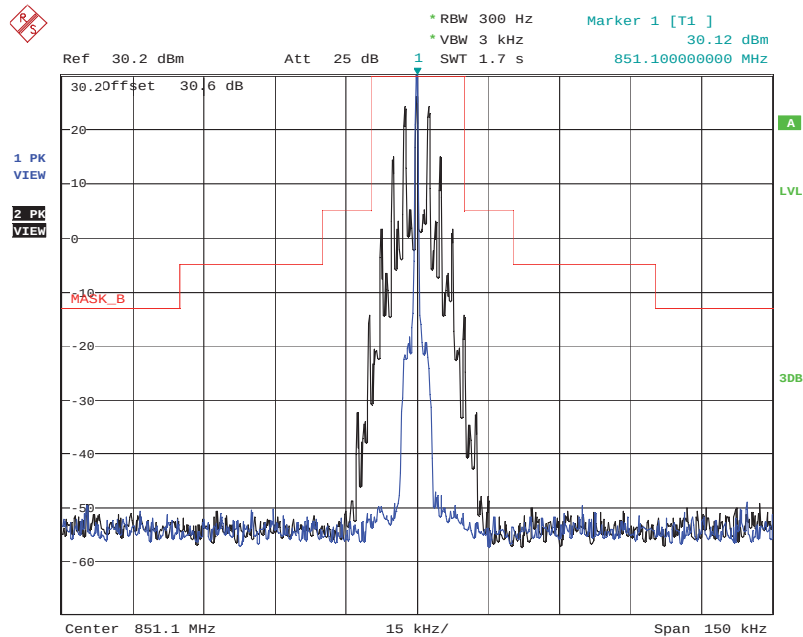
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

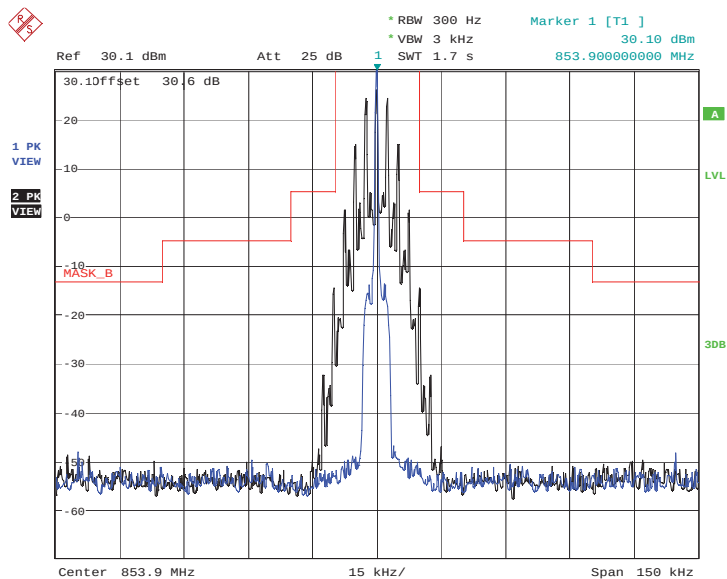
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

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



Date: 1.JUN.2018 09:50:03

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



Date: 1.JUN.2018 10:05:28

ULTRATECH GROUP OF LABS

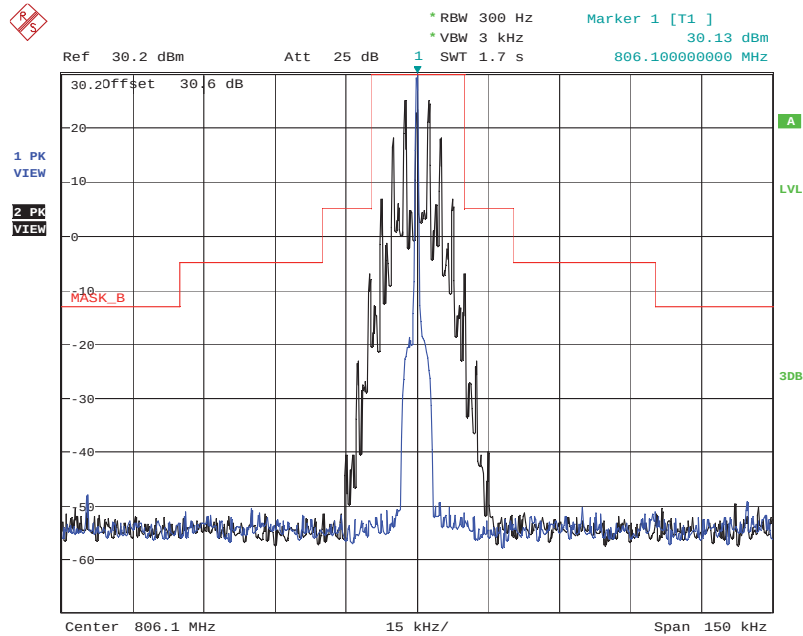
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

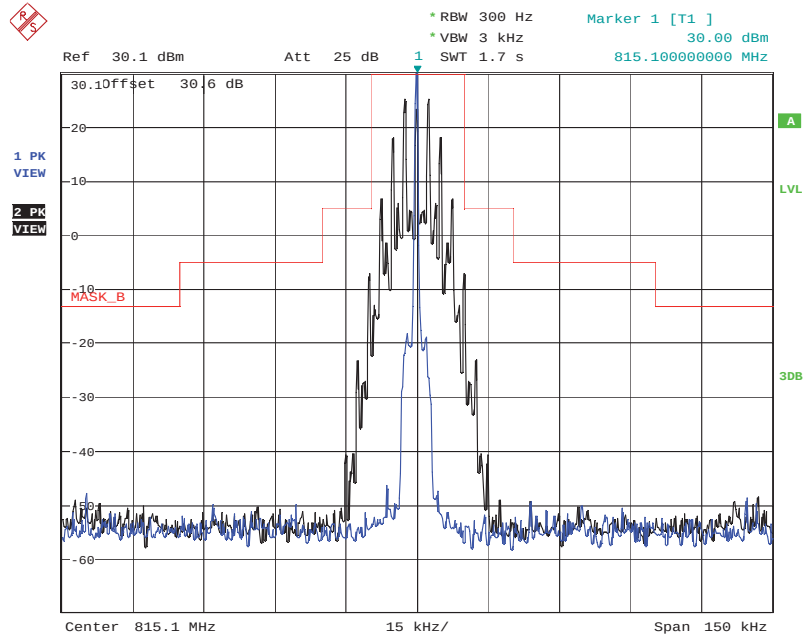
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

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



Date: 1.JUN.2018 09:30:30

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



Date: 1.JUN.2018 09:35:49

ULTRATECH GROUP OF LABS

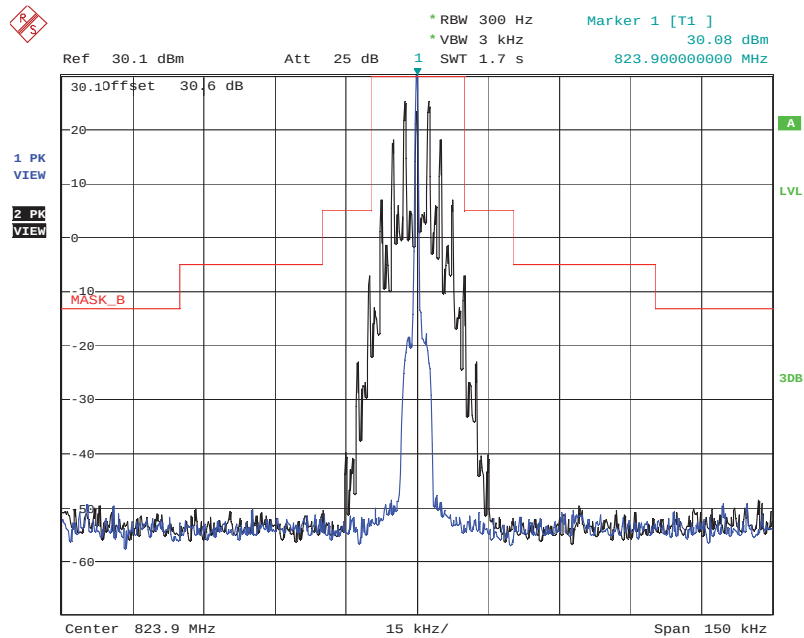
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

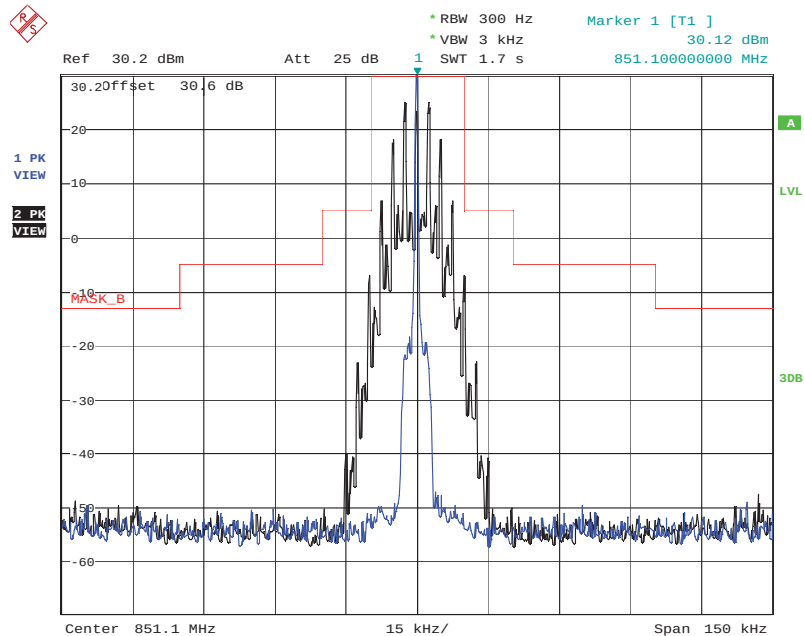
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

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



Date: 1.JUN.2018 09:45:22

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



Date: 1.JUN.2018 09:51:41

ULTRATECH GROUP OF LABS

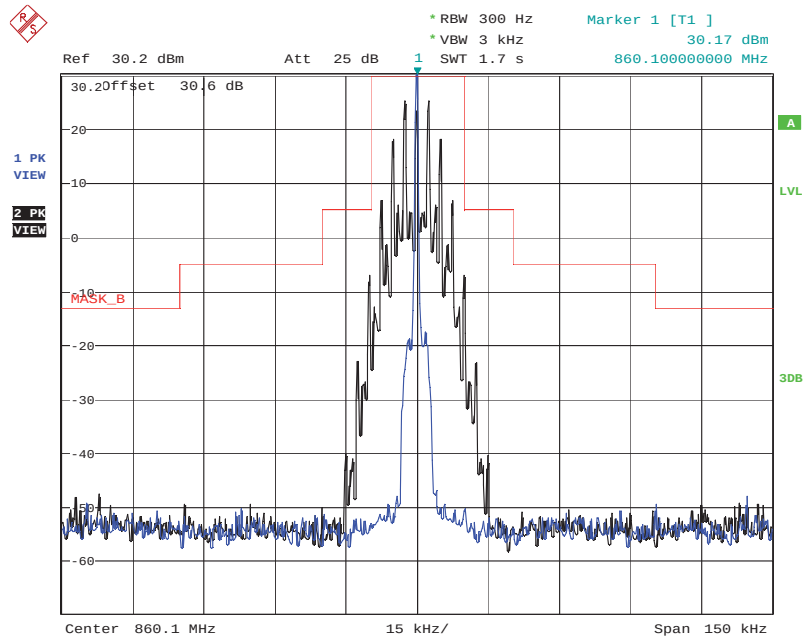
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

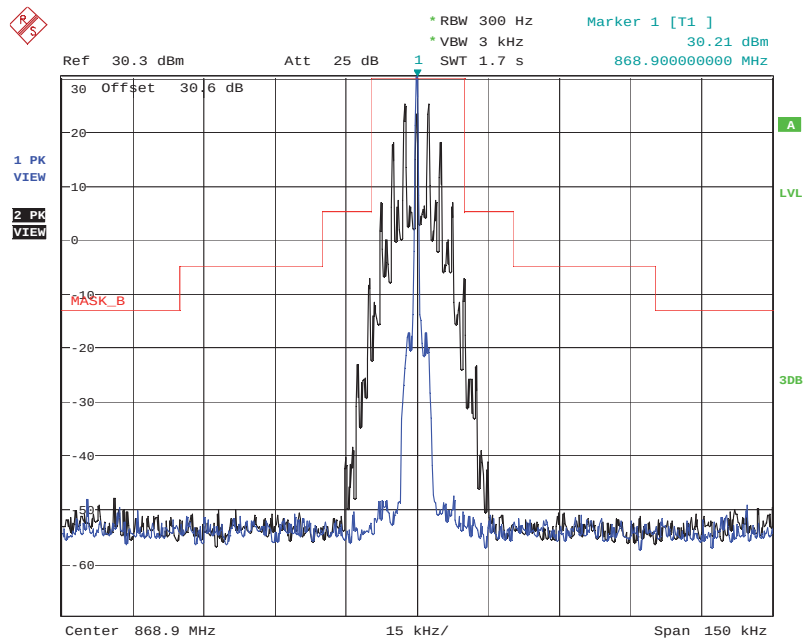
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

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



Date: 1.JUN.2018 09:56:04

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



Date: 1.JUN.2018 10:00:13

ULTRATECH GROUP OF LABS

3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

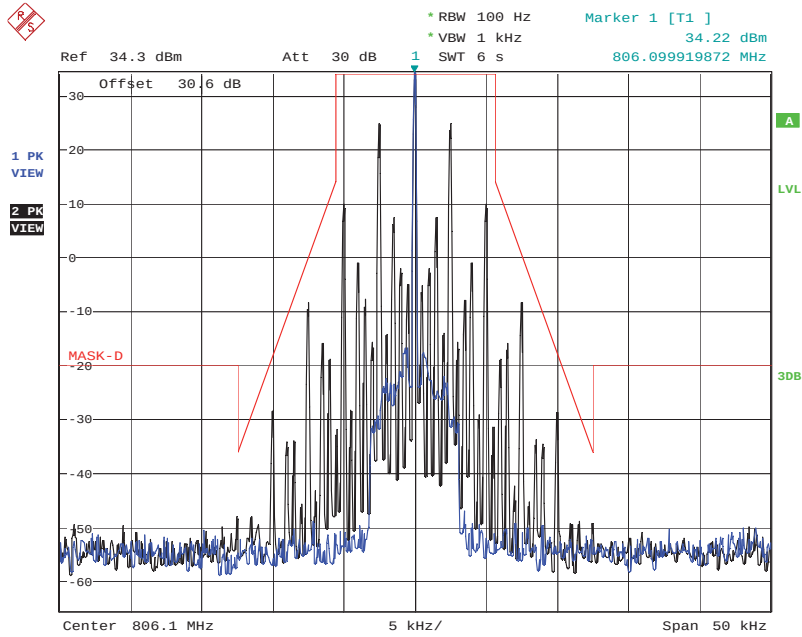
File #: 18ICOM485_FCC90

June 26, 2018

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

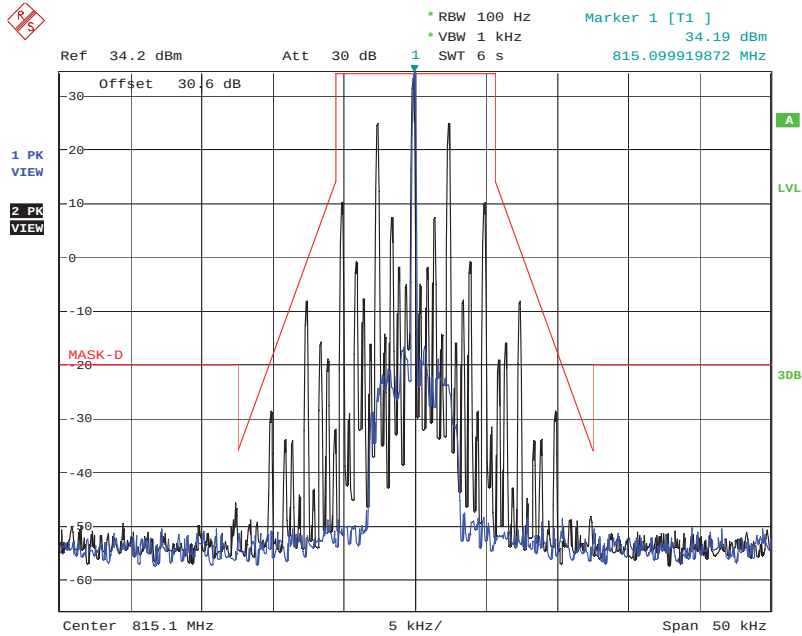
5.8.7. Test Data- EMISSION MASKS- MASK D (Not required for FCC)

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



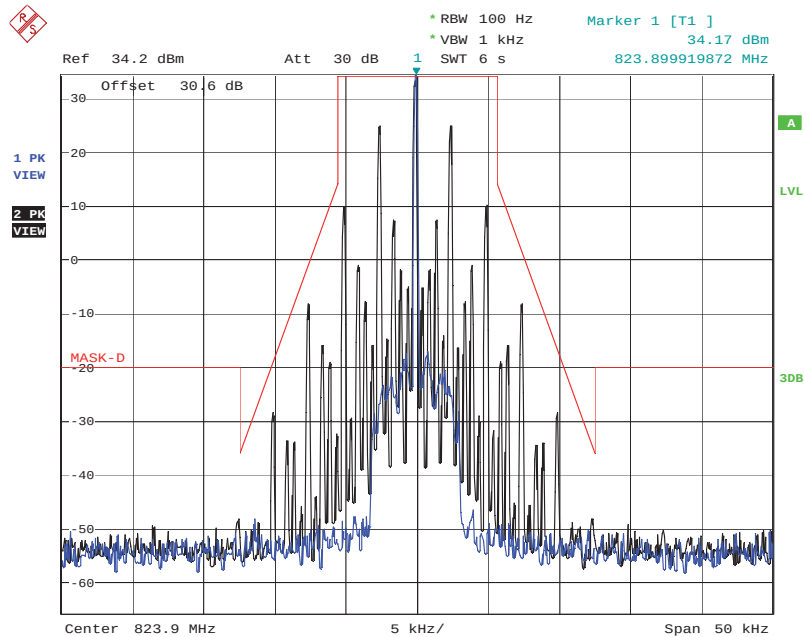
Date: 1.JUN.2018 15:20:24

5.8.7.2. Configuration: Mask D, Band 3: 806-824MHz, 815.1MHz, 12.5 KHz, Analog, High power



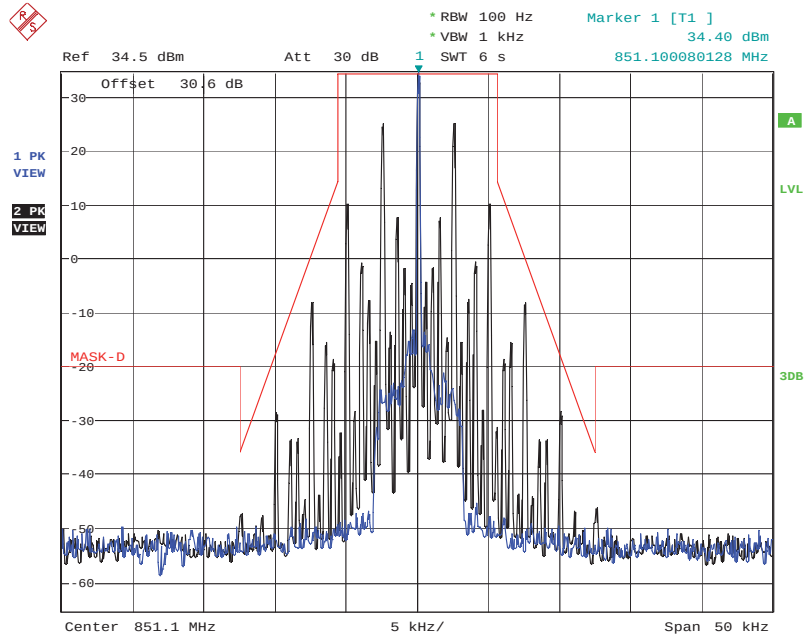
Date: 1.JUN.2018 15:32:29

5.8.7.3. Configuration: Mask D, Band 3: 806-824MHz, 823.9MHz, 12.5 KHz, Analog, High power



Date: 1.JUN.2018 15:40:12

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



Date: 4.JUN.2018 14:37:04

ULTRATECH GROUP OF LABS

3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

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

[illegible]

Ref 34 dBm Att 30 dB 1 RBW 100 Hz VBW 1 kHz SWT 6 s Marker 1 [T1] 33.97 dBm 868.899919872 MHz

Offset 30.6 dB

1 PK VIEW

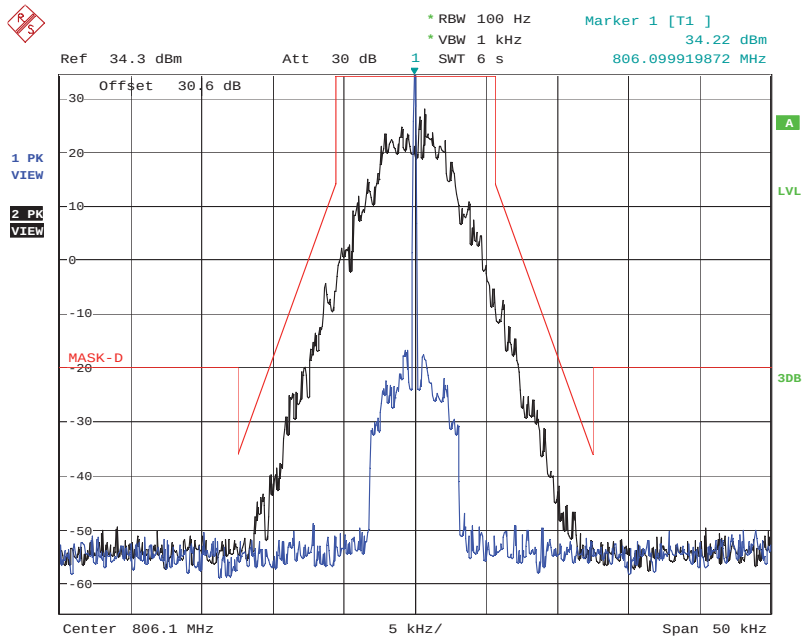
2 PK VIEW

MASK-D

Center 868.9 MHz 5 kHz/ Span 50 kHz

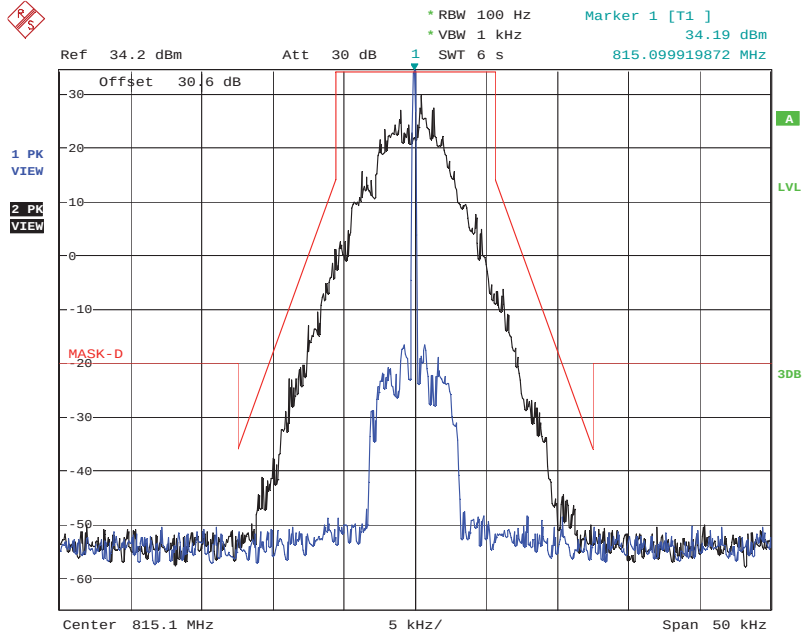
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

5.8.7.7. Configuration: Mask D, Band 3: 806-824MHz, 806.1MHz, F1E&F1D, Digital, High power



Date: 1.JUN.2018 15:22:24

5.8.7.8. Configuration: Mask D, Band 3: 806-824MHz, 815.1MHz, F1E&F1D, Digital, High power



Date: 1.JUN.2018 15:34:20

ULTRATECH GROUP OF LABS

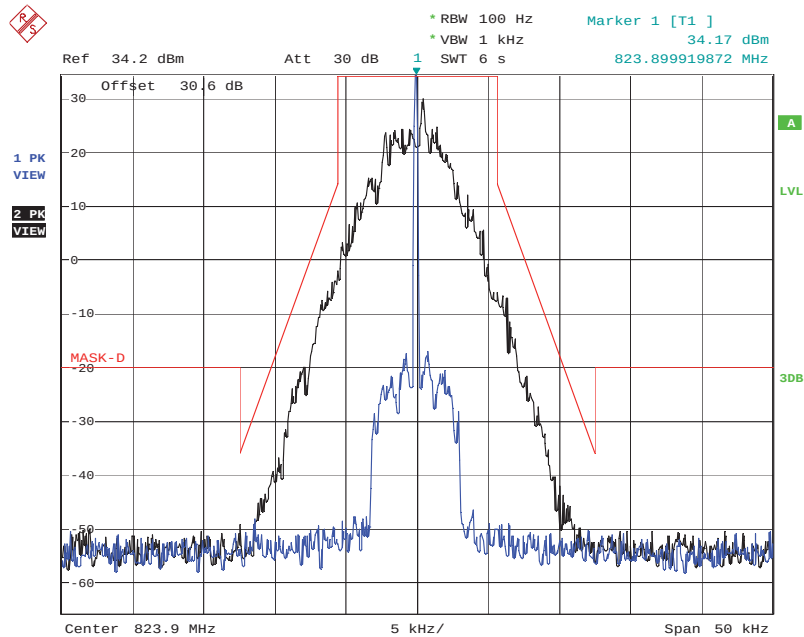
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

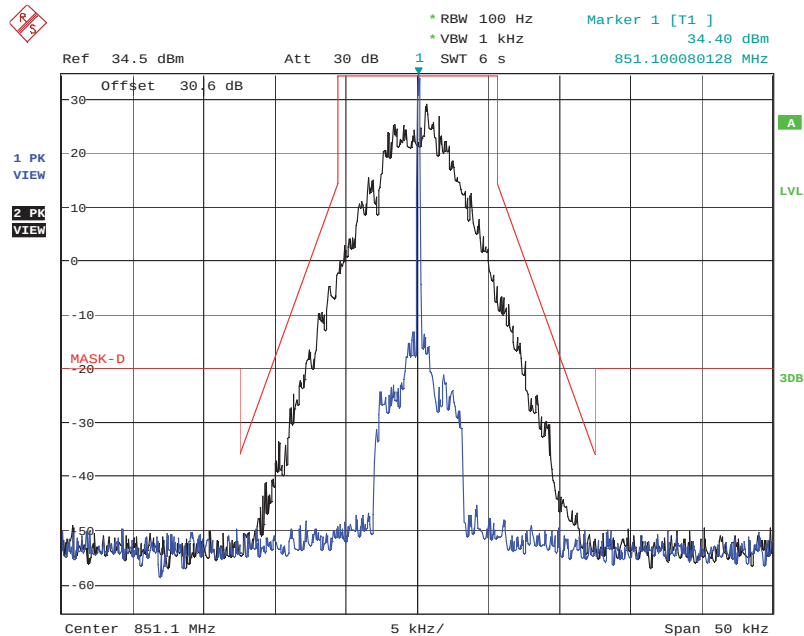
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

5.8.7.9. Configuration: Mask D, Band 3: 806-824MHz, 823.9MHz, F1E&F1D, Digital, High power



Date: 1.JUN.2018 15:41:39

5.8.7.10. Configuration: Mask D, Band 4: 851-869MHz, 851.1MHz, F1E&F1D, Digital, High power



Date: 4.JUN.2018 14:39:48

ULTRATECH GROUP OF LABS

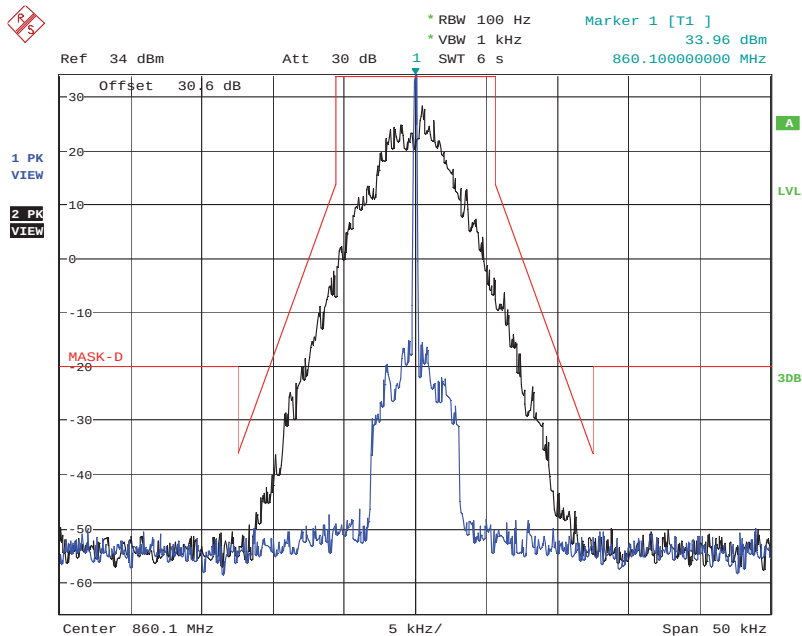
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

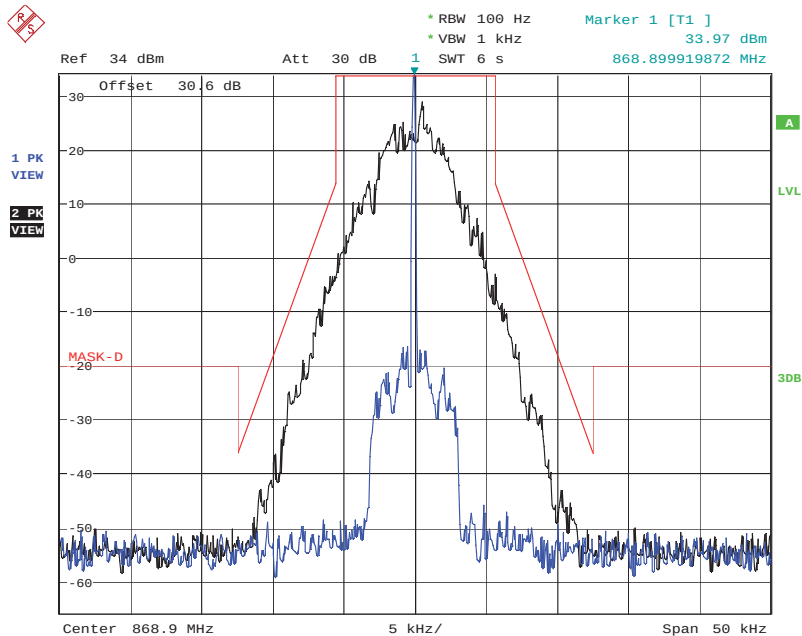
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

5.8.7.11. Configuration: Mask D, Band 4: 851-869MHz, 860.1MHz, F1E&F1D, Digital, High power



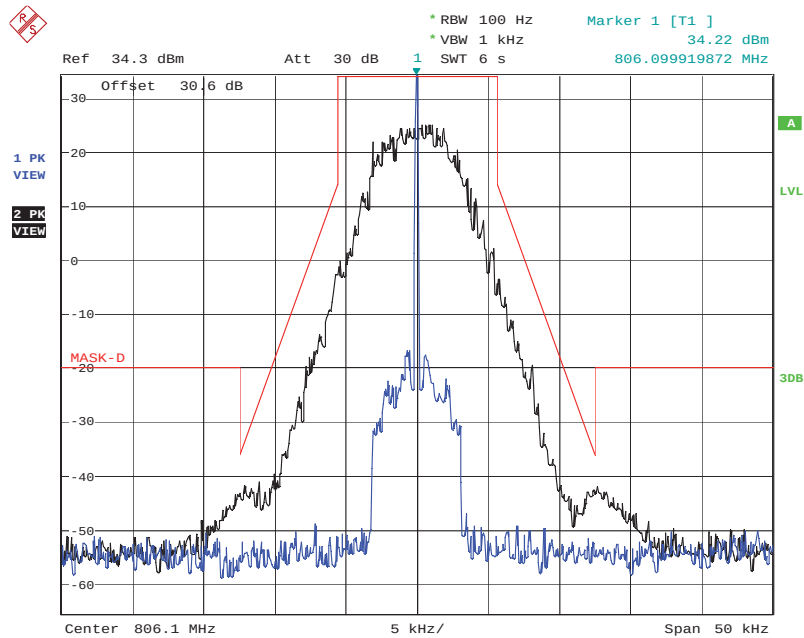
Date: 4.JUN.2018 14:54:07

5.8.7.12. Configuration: Mask D, Band 4: 851-869MHz, 868.9MHz, F1E&F1D, Digital, High power



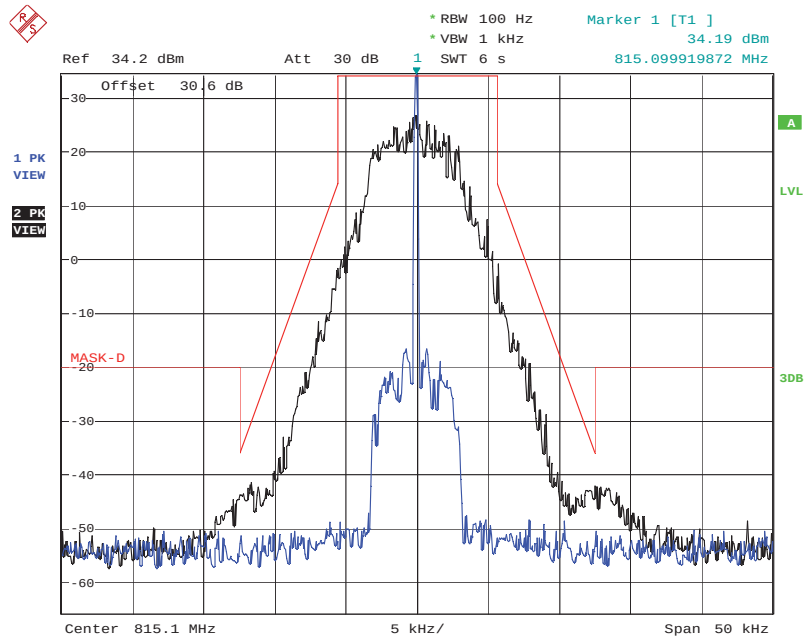
Date: 4.JUN.2018 15:00:58

5.8.7.13. Configuration: Mask D, Band 3: 806-824MHz, 806.1MHz, F1W, Digital, High power



Date: 1.JUN.2018 15:27:49

5.8.7.14. Configuration: Mask D, Band 3: 806-824MHz, 815.1MHz, F1W, Digital, High power



Date: 1.JUN.2018 15:36:42

ULTRATECH GROUP OF LABS

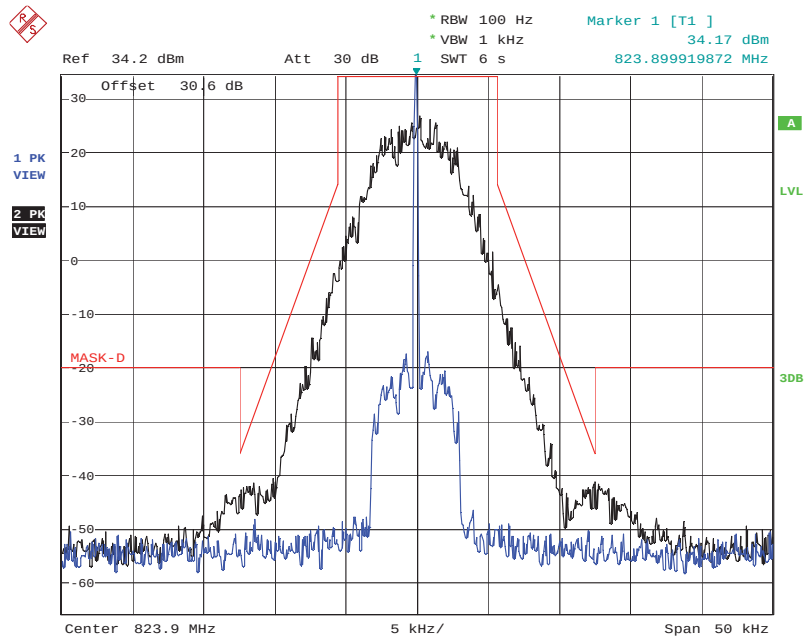
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

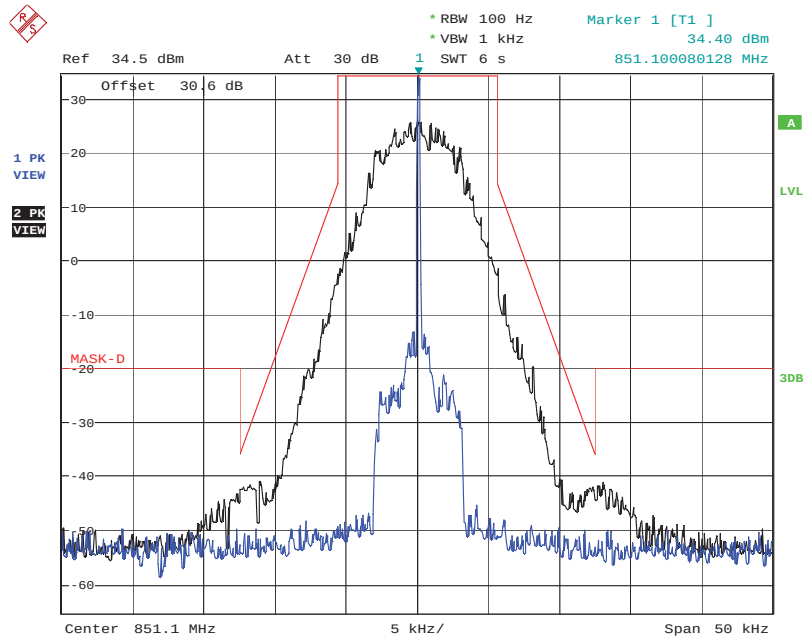
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

5.8.7.15. Configuration: Mask D, Band 3: 806-824MHz, 823.9MHz, F1W, Digital, High power



Date: 1.JUN.2018 15:43:39

5.8.7.16. Configuration: Mask D, Band 4: 851-869MHz, 851.1MHz, F1W, Digital, High power



Date: 4.JUN.2018 14:43:13

ULTRATECH GROUP OF LABS

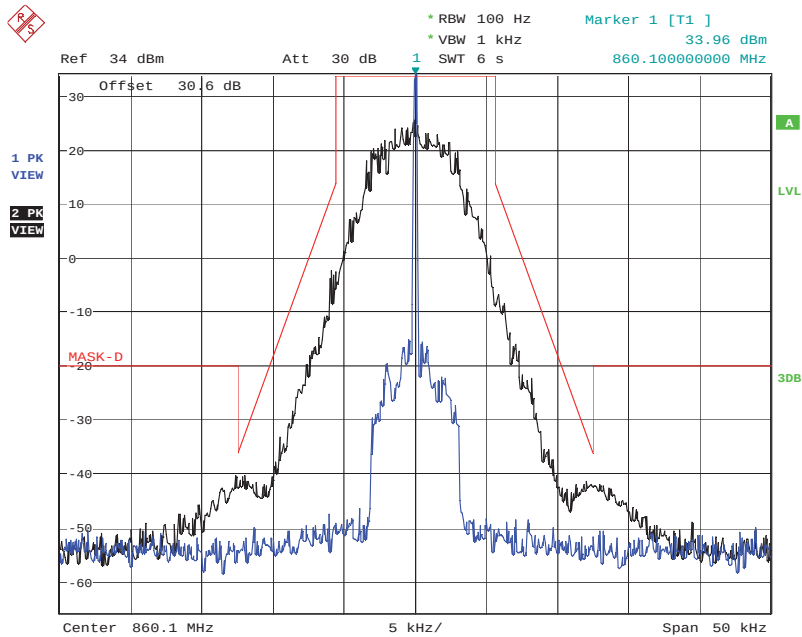
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

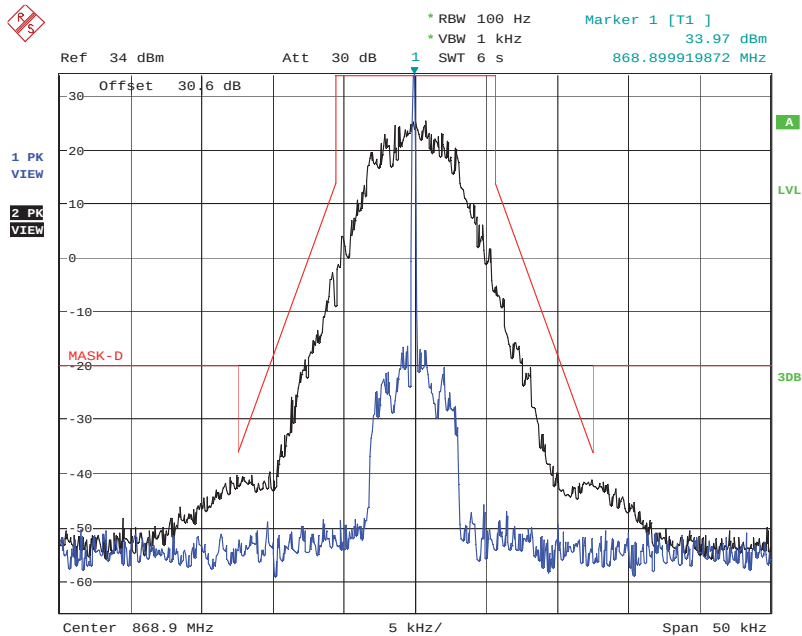
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

5.8.7.17. Configuration: Mask D, Band 4: 851-869MHz, 860.1MHz, F1W, Digital, High power



Date: 4.JUN.2018 14:55:53

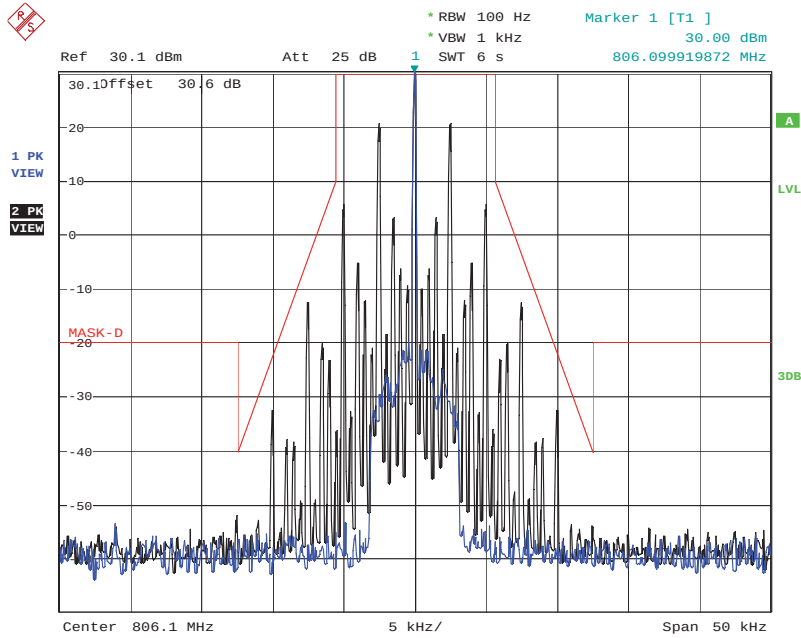
5.8.7.18. Configuration: Mask D, Band 4: 851-869MHz, 868.9MHz, F1W, Digital, High power



Date: 4.JUN.2018 15:03:02

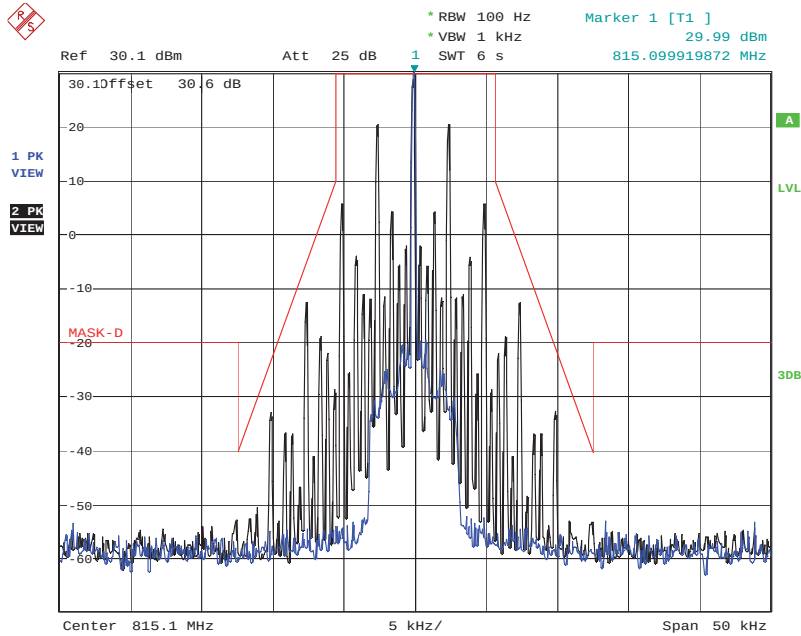
Low Power

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



Date: 4.JUN.2018 15:10:11

5.8.7.20. Configuration: Mask D, Band 3: 806-824MHz, 815.1MHz, 12.5 KHz, Analog, Low power



Date: 4.JUN.2018 15:17:11

ULTRATECH GROUP OF LABS

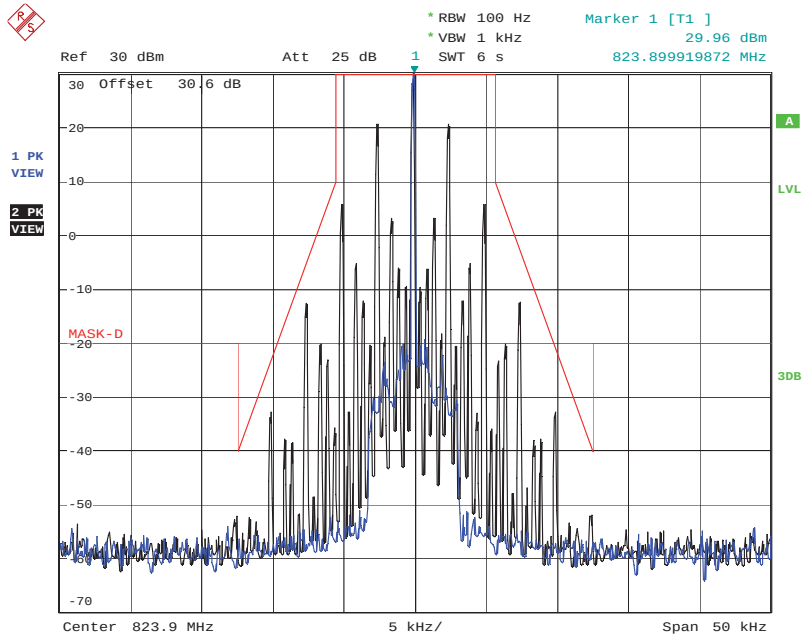
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

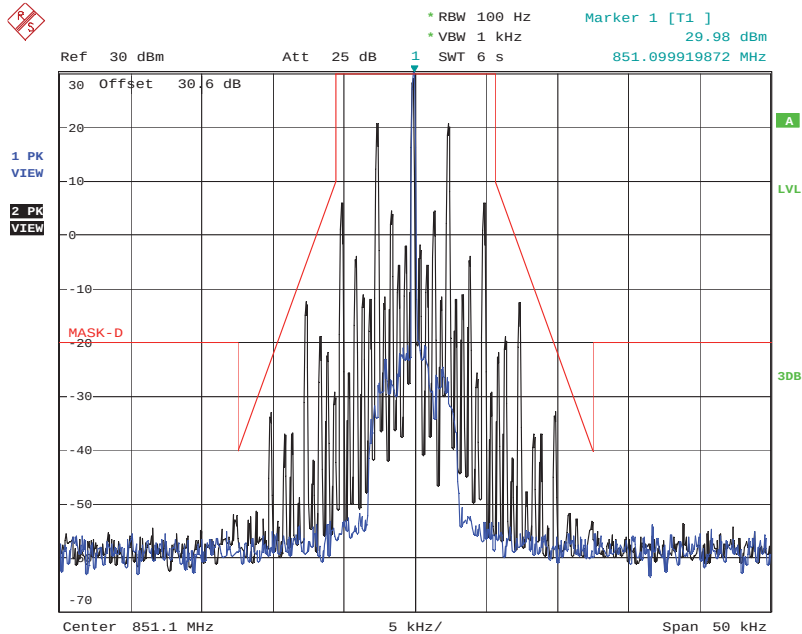
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

5.8.7.21. Configuration: Mask D, Band 3: 806-824MHz, 823.9MHz, 12.5 KHz, Analog, Low power



Date: 4.JUN.2018 15:22:36

5.8.7.22. Configuration: Mask D, Band 4: 851-869MHz, 851.1MHz, 12.5 KHz, Analog, Low power



Date: 4.JUN.2018 15:28:09

ULTRATECH GROUP OF LABS

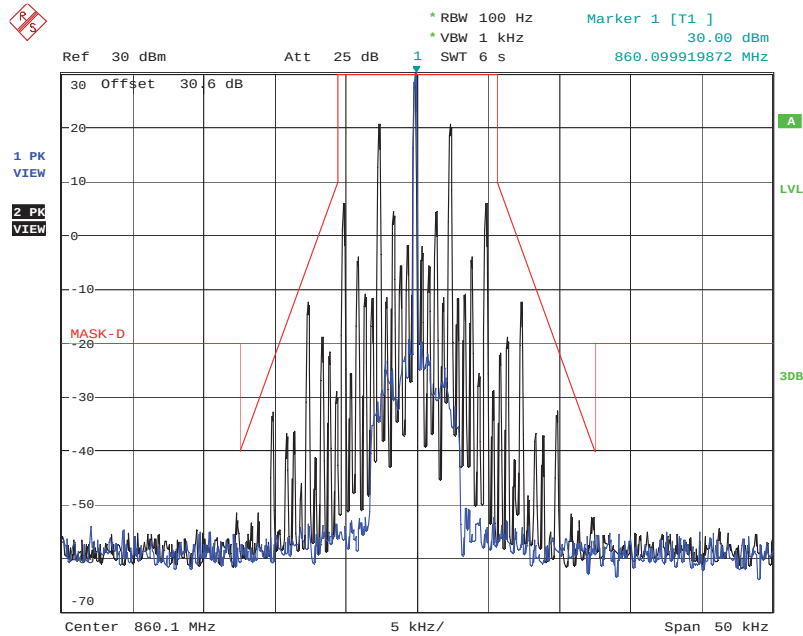
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

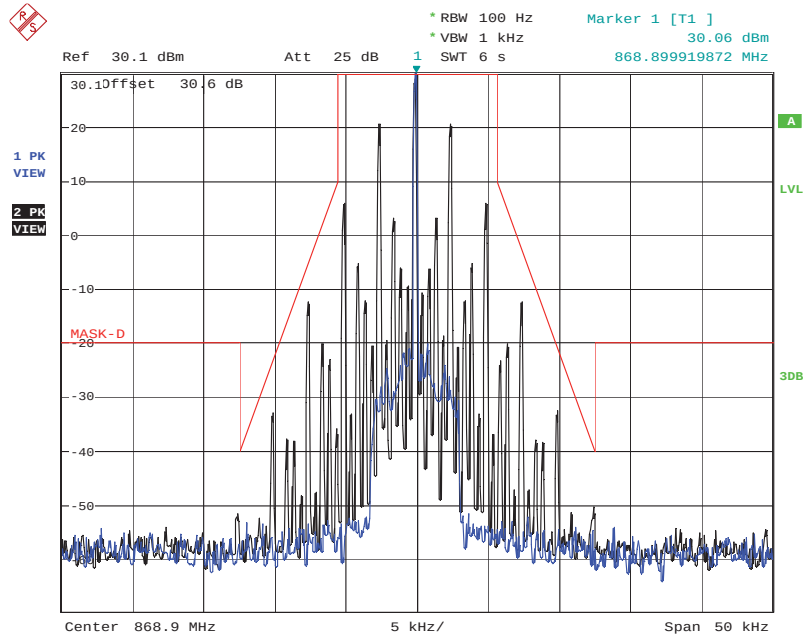
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

5.8.7.23. Configuration: Mask D, Band 4: 851-869MHz, 860.1MHz, 12.5 KHz, Analog, Low power



Date: 4.JUN.2018 15:34:20

5.8.7.24. Configuration: Mask D, Band 4: 851-869MHz, 868.9MHz, 12.5 KHz, Analog, Low power



Date: 4.JUN.2018 15:40:29

ULTRATECH GROUP OF LABS

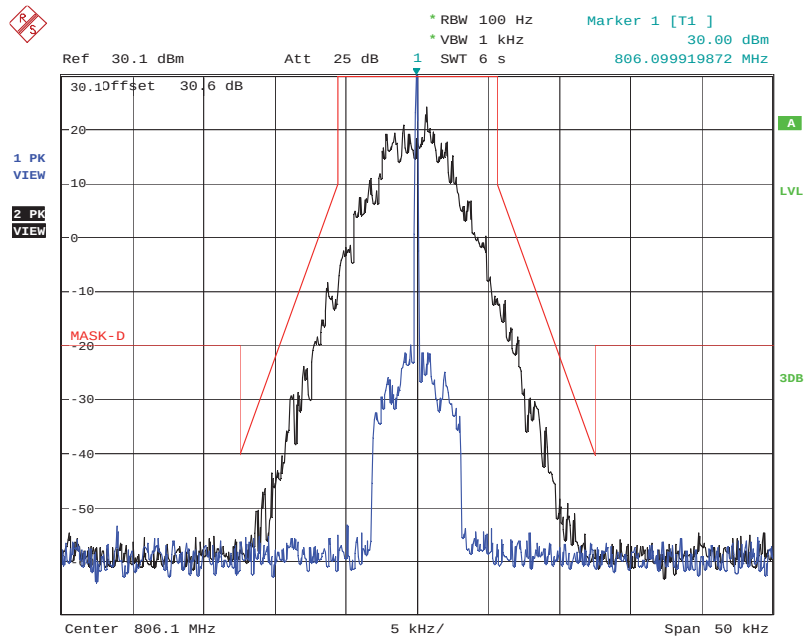
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

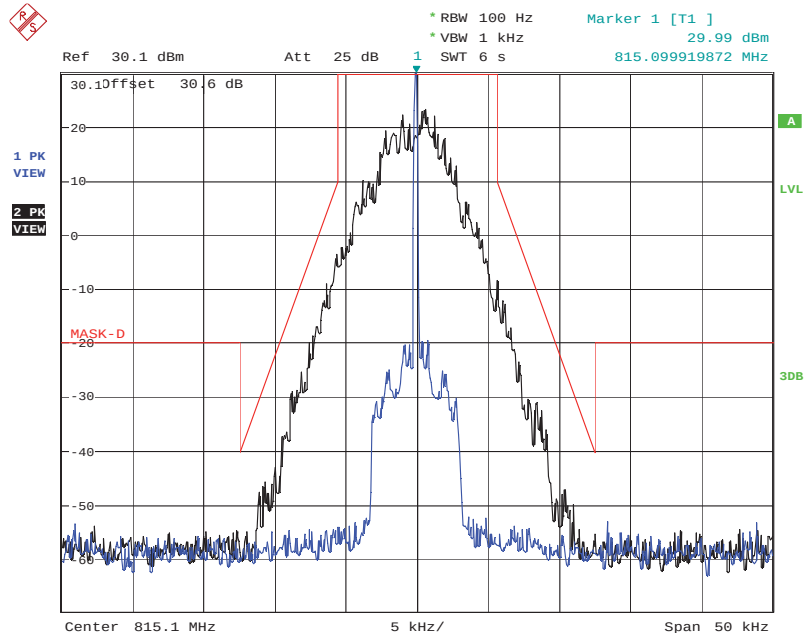
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

5.8.7.25. Configuration: Mask D, Band 3: 806-824MHz, 806.1MHz, F1E&F1D, Digital, Low power



Date: 4.JUN.2018 15:12:10

5.8.7.26. Configuration: Mask D, Band 3: 806-824MHz, 815.1MHz, F1E&F1D, Digital, Low power



Date: 4.JUN.2018 15:18:28

ULTRATECH GROUP OF LABS

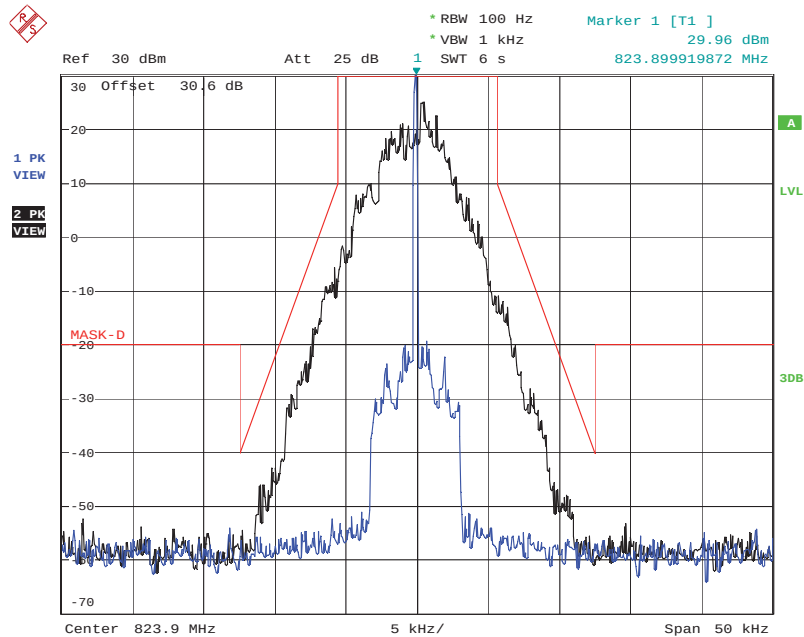
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

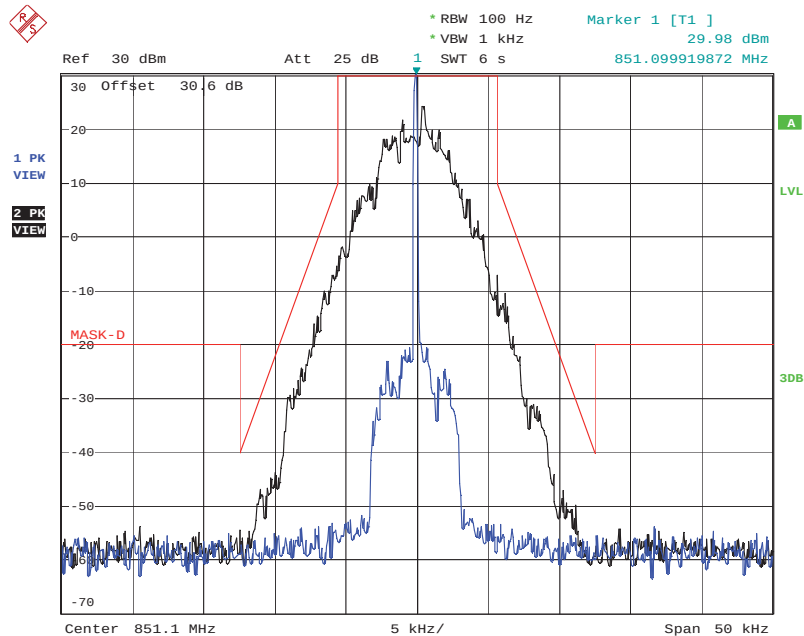
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

5.8.7.27. Configuration: Mask D, Band 3: 806-824MHz, 823.9MHz, F1E&F1D, Digital, Low power



Date: 4.JUN.2018 15:24:04

5.8.7.28. Configuration: Mask D, Band 4: 851-869MHz, 851.1MHz, F1E&F1D, Digital, Low power



Date: 4.JUN.2018 15:29:39

ULTRATECH GROUP OF LABS

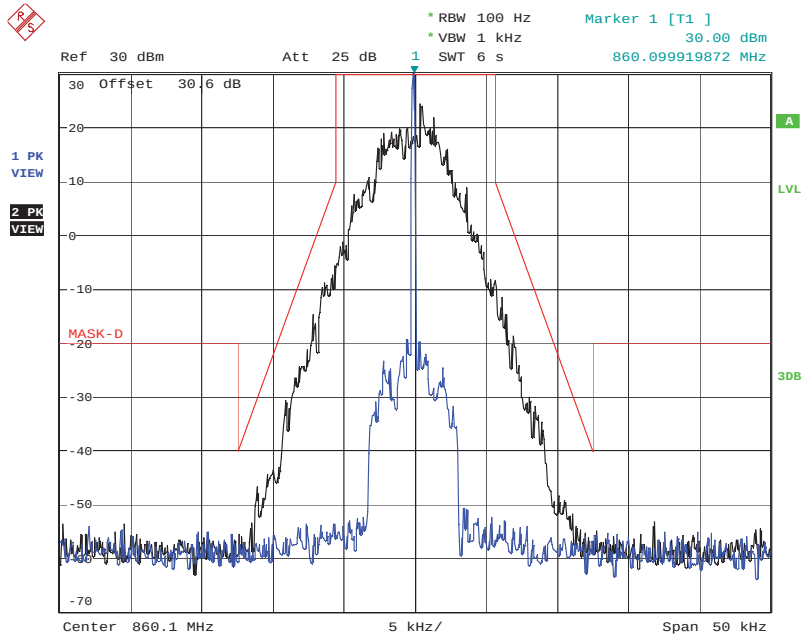
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

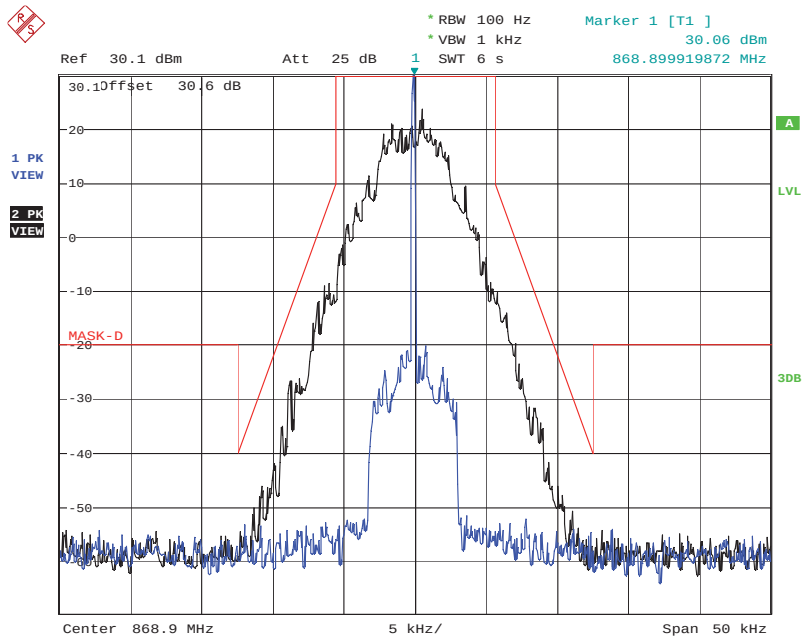
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

5.8.7.29. Configuration: Mask D, Band 4: 851-869MHz, 860.1MHz, F1E&F1D, Digital, Low power



Date: 4.JUN.2018 15:35:31

5.8.7.30. Configuration: Mask D, Band 4: 851-869MHz, 868.9MHz, F1E&F1D, Digital, Low power



Date: 4.JUN.2018 15:41:44

ULTRATECH GROUP OF LABS

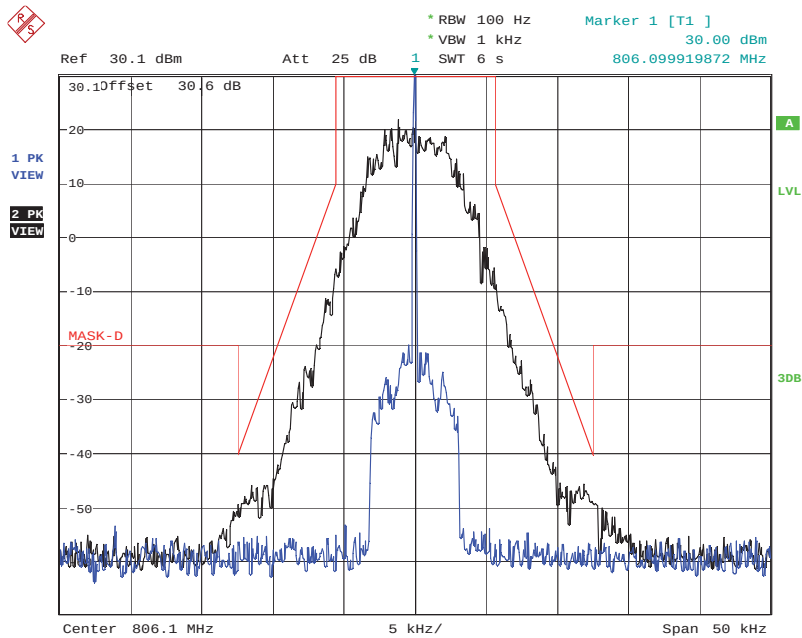
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

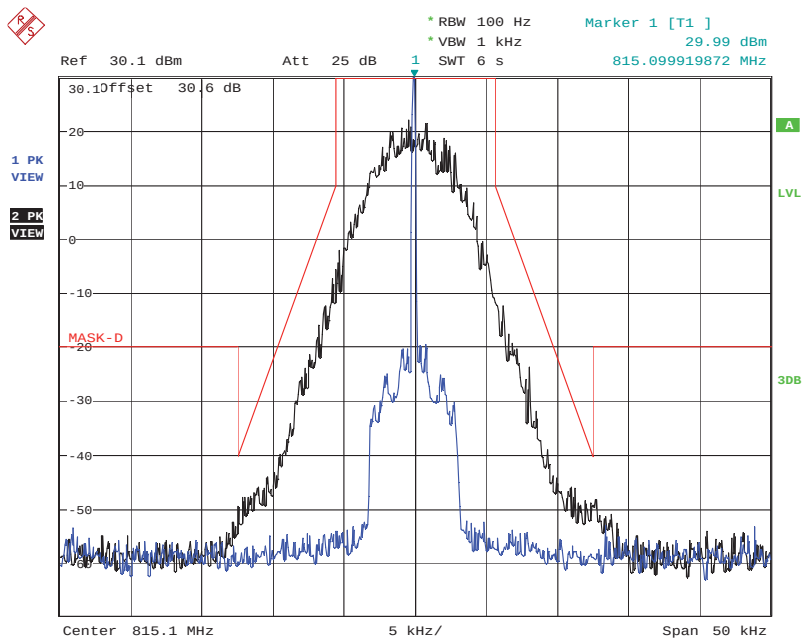
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

5.8.7.31. Configuration: Mask D, Band 3: 806-824MHz, 806.1MHz, F1W, Digital, Low power



Date: 4.JUN.2018 15:14:07

5.8.7.32. Configuration: Mask D, Band 3: 806-824MHz, 815.1MHz, F1W, Digital, Low power



Date: 4.JUN.2018 15:19:45

ULTRATECH GROUP OF LABS

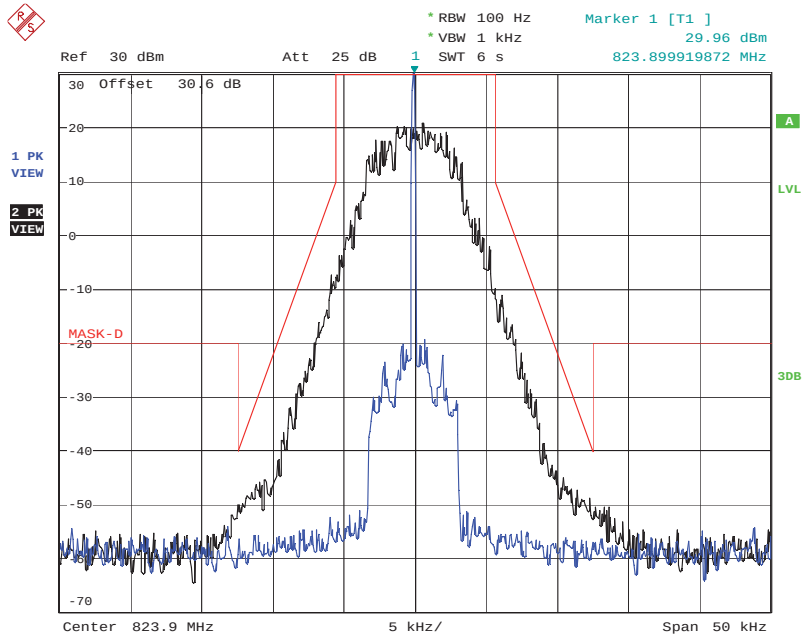
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

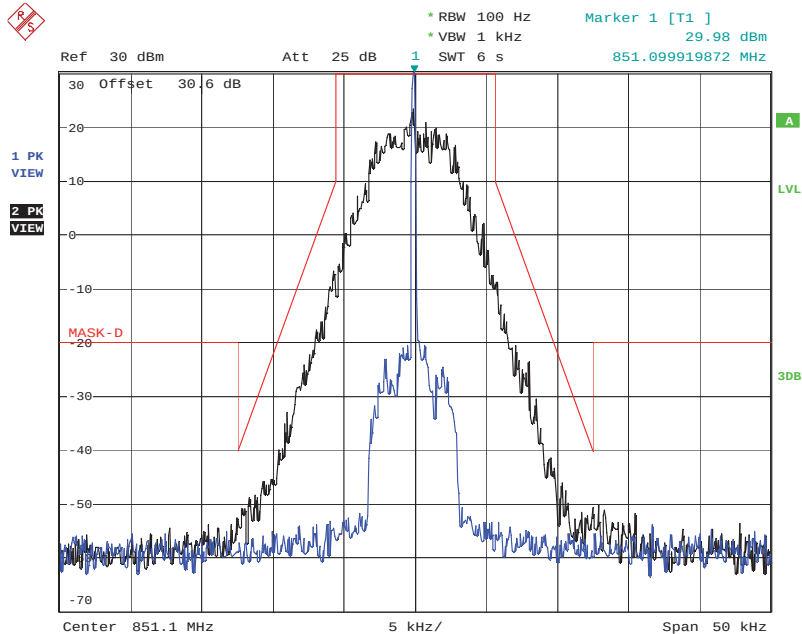
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

5.8.7.33. Configuration: Mask D, Band 3: 806-824MHz, 823.9MHz, F1W, Digital, Low power



Date: 4.JUN.2018 15:25:26

5.8.7.34. Configuration: Mask D, Band 4: 851-869MHz, 851.1MHz, F1W, Digital, Low power



Date: 4.JUN.2018 15:31:09

ULTRATECH GROUP OF LABS

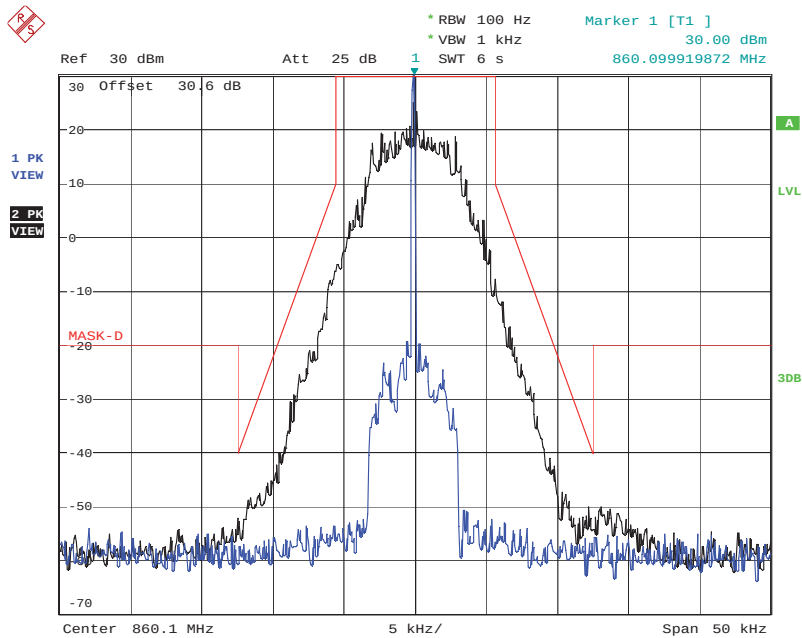
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

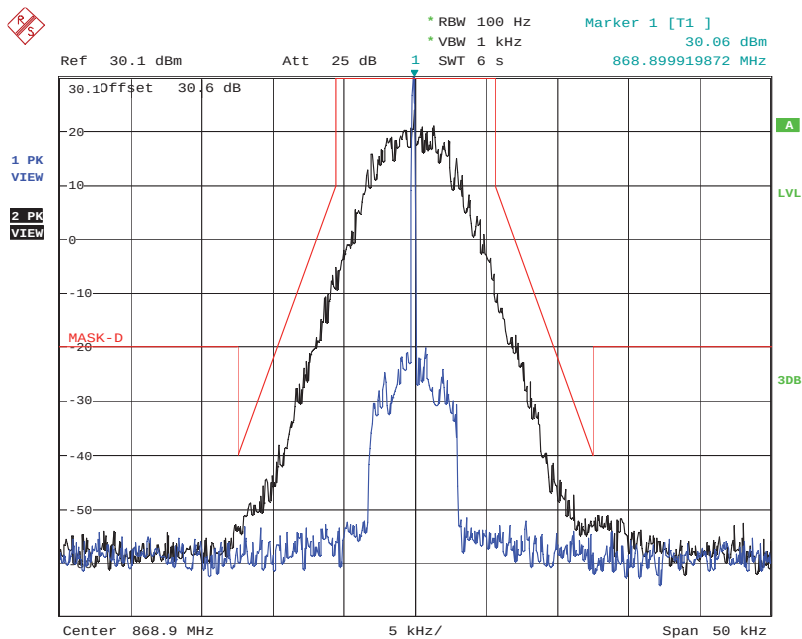
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

5.8.7.35. Configuration: Mask D, Band 4: 851-869MHz, 860.1MHz, F1W, Digital, Low power



Date: 4.JUN.2018 15:37:22

5.8.7.36. Configuration: Mask D, Band 4: 851-869MHz, 868.9MHz, F1W, Digital, Low power

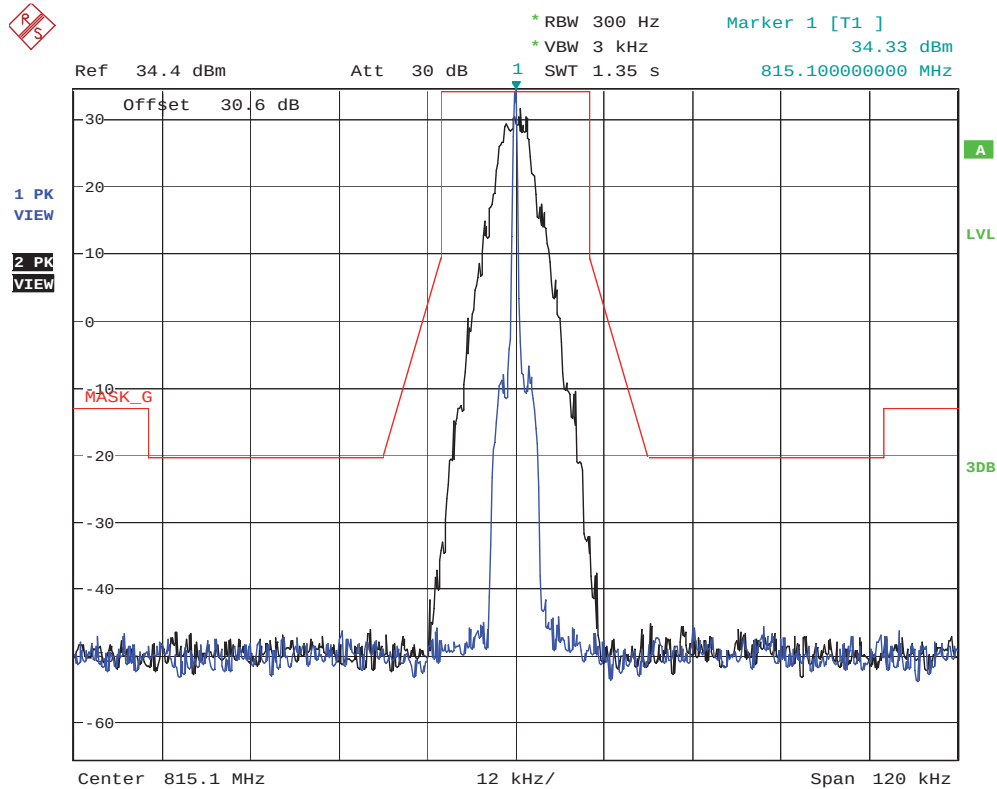


Date: 4.JUN.2018 15:43:32

5.8.8. Test Data- EMISSION MASKS- MASK G

High Power

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



Date: 1.JUN.2018 13:30:33

ULTRATECH GROUP OF LABS

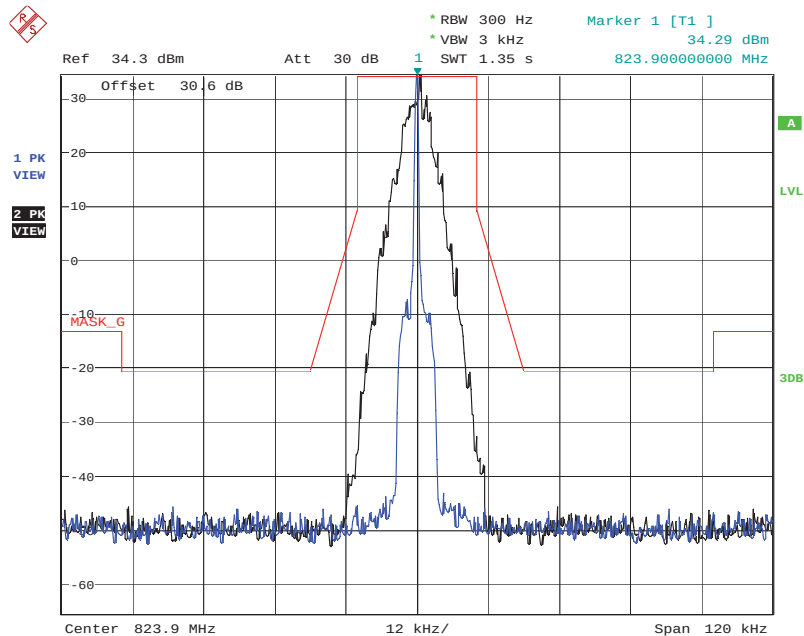
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

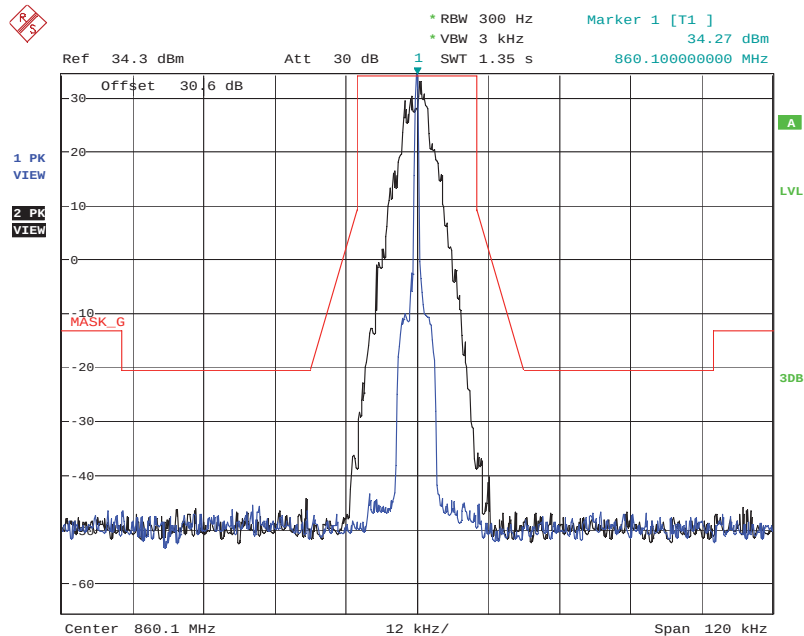
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

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



Date: 1.JUN.2018 13:35:27

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



Date: 1.JUN.2018 13:39:29

ULTRATECH GROUP OF LABS

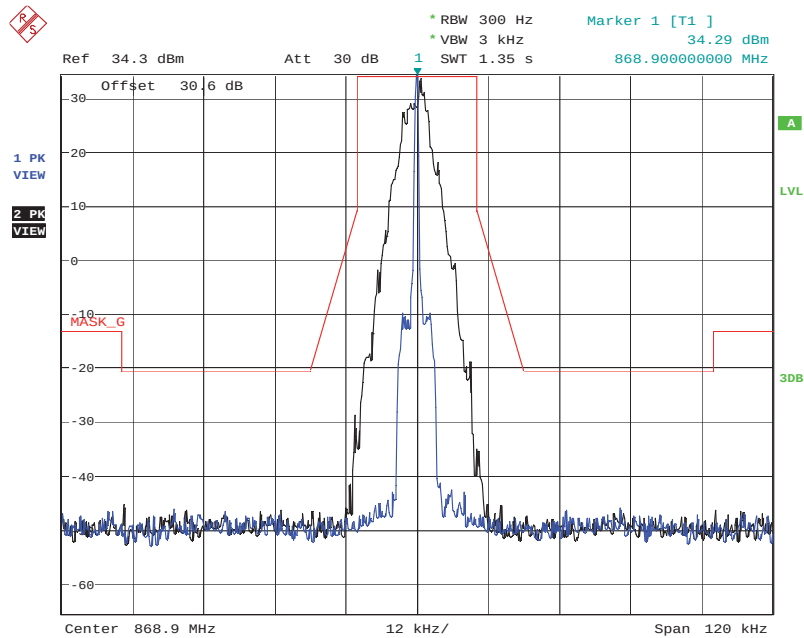
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

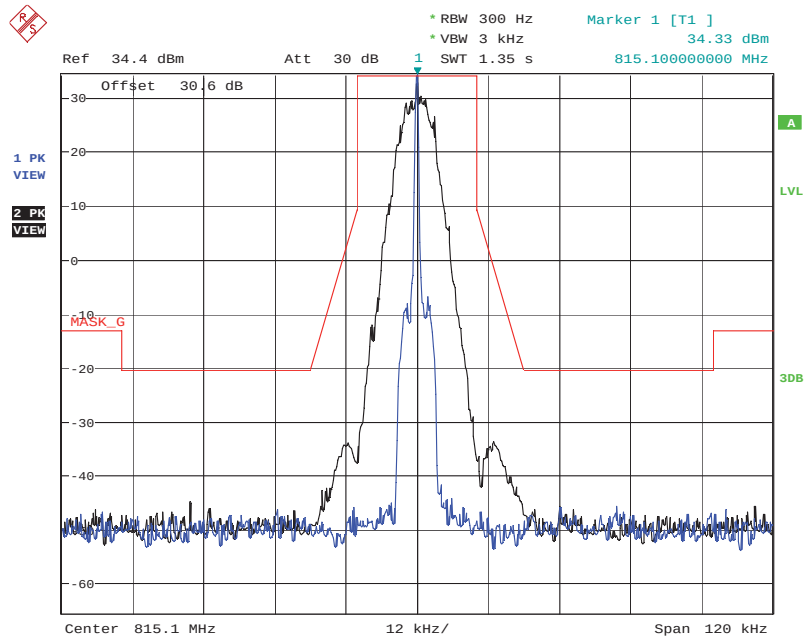
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

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



Date: 1.JUN.2018 13:43:31

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



Date: 1.JUN.2018 13:32:30

ULTRATECH GROUP OF LABS

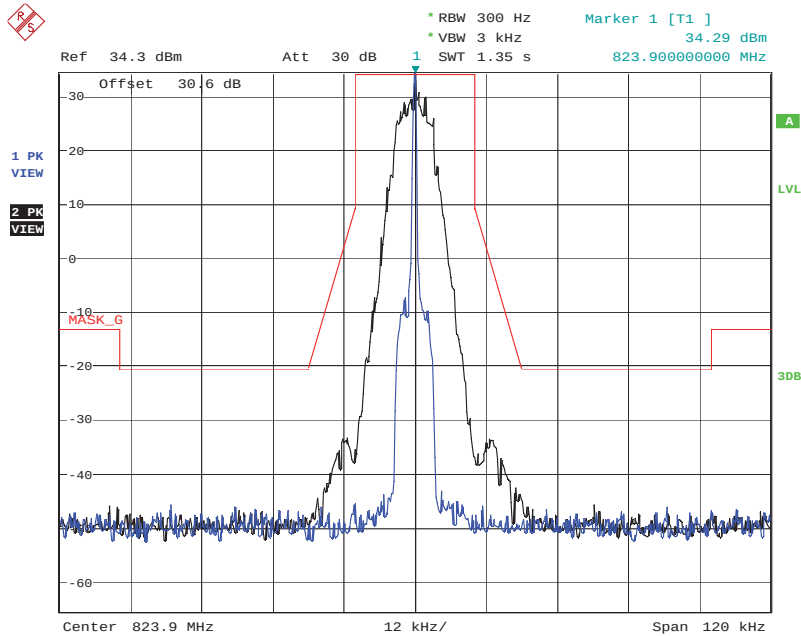
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

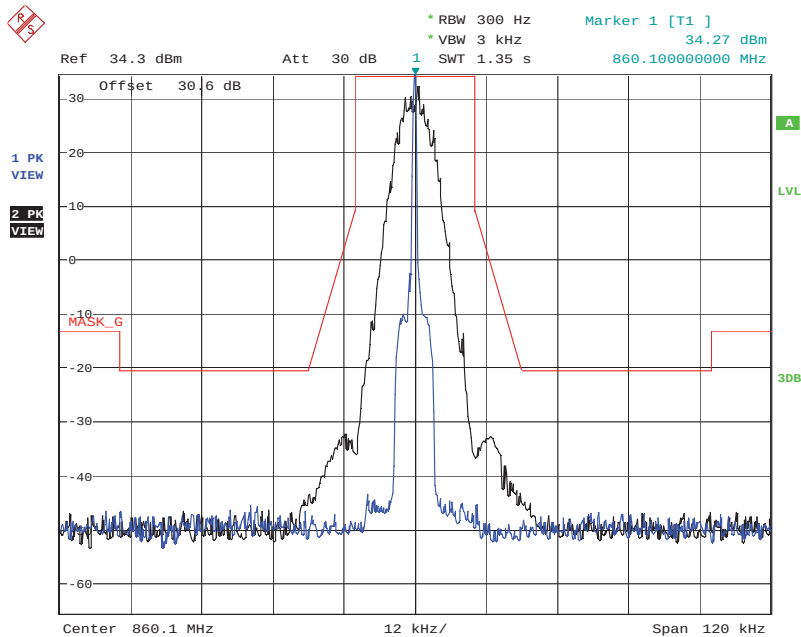
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

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



Date: 1.JUN.2018 13:37:03

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



Date: 1.JUN.2018 13:40:50

ULTRATECH GROUP OF LABS

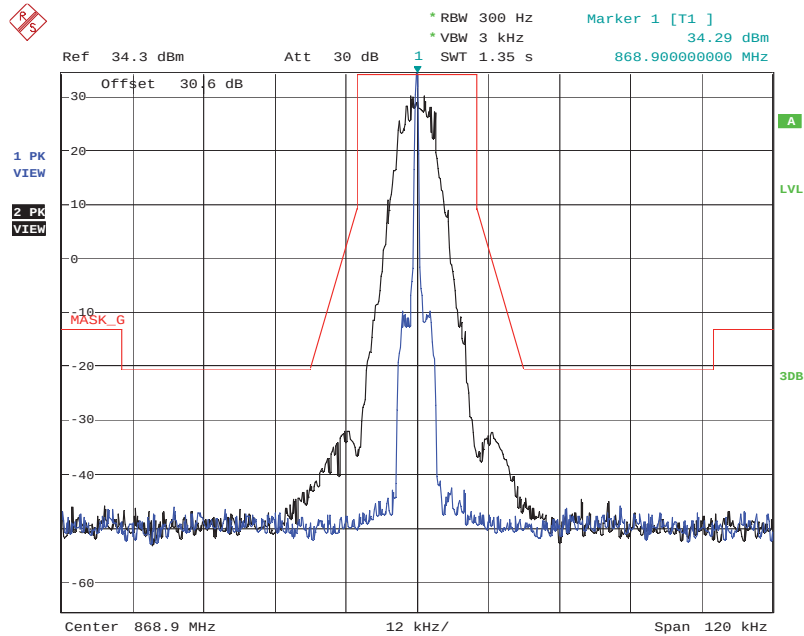
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

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

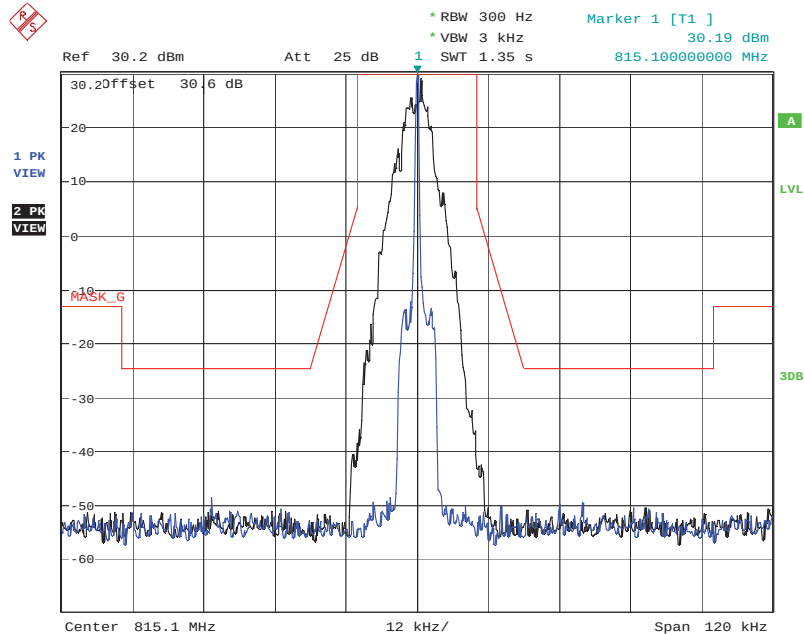
5.8.8.8. Configuration: Mask G, Sub Band 4: 854-869MHz, 868.9MHz, F1W, Digital, High power



Date: 1.JUN.2018 13:45:38

Low Power

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



Date: 1.JUN.2018 13:09:48

ULTRATECH GROUP OF LABS

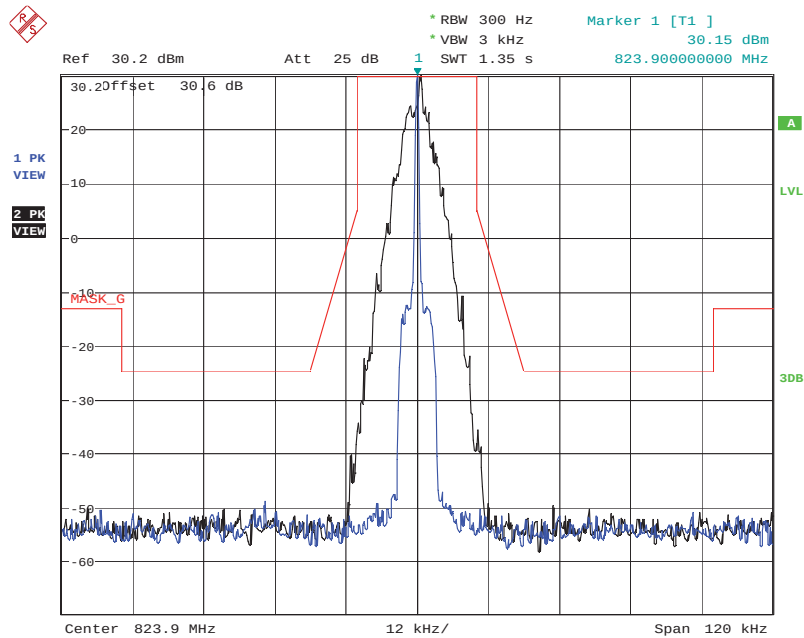
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

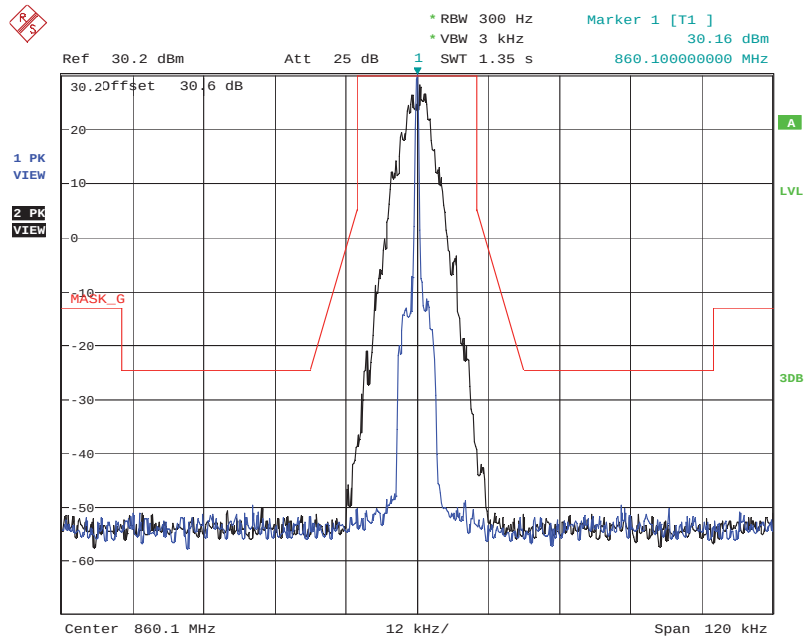
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

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



Date: 1.JUN.2018 13:14:25

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



Date: 1.JUN.2018 13:19:05

ULTRATECH GROUP OF LABS

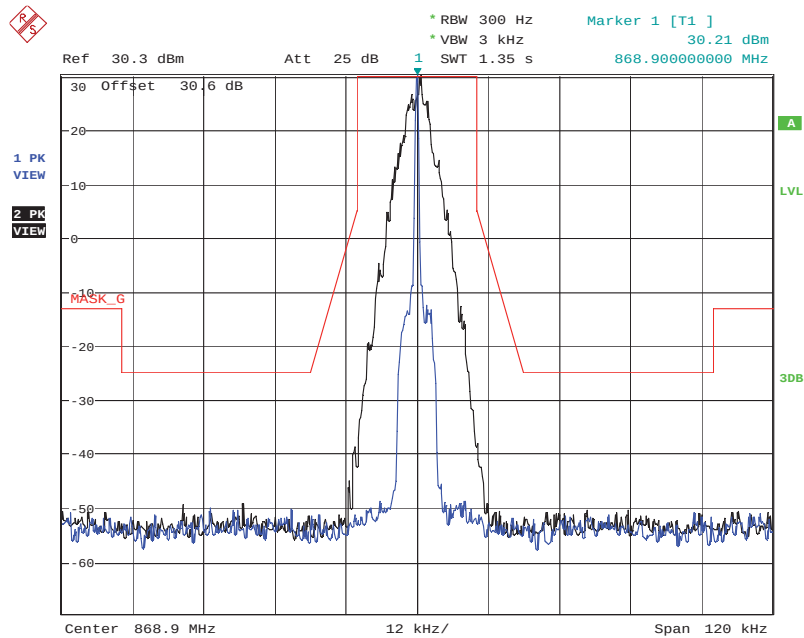
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

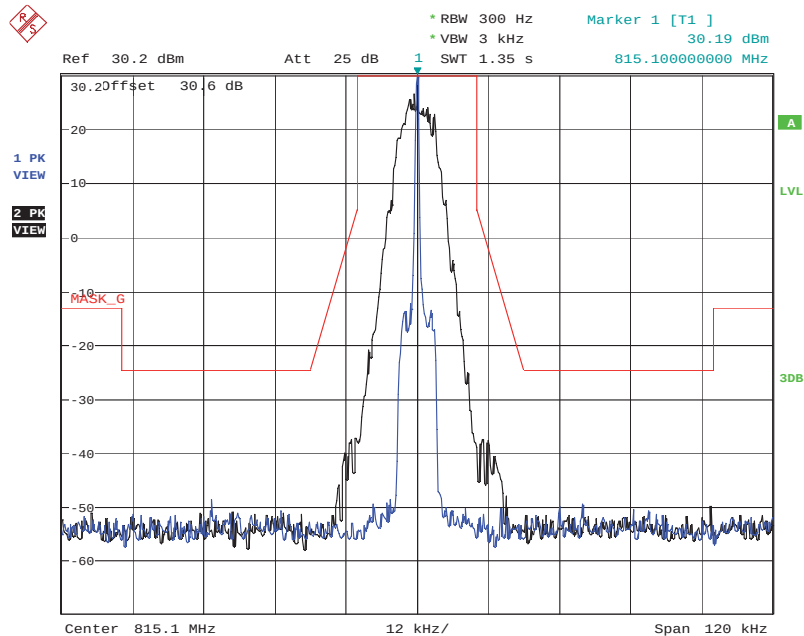
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

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



Date: 1.JUN.2018 13:24:27

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



Date: 1.JUN.2018 13:11:33

ULTRATECH GROUP OF LABS

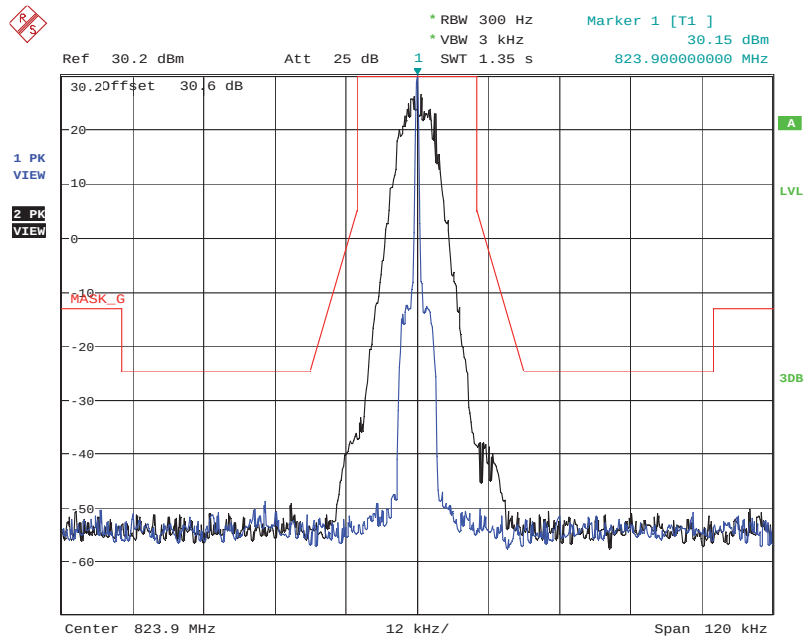
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

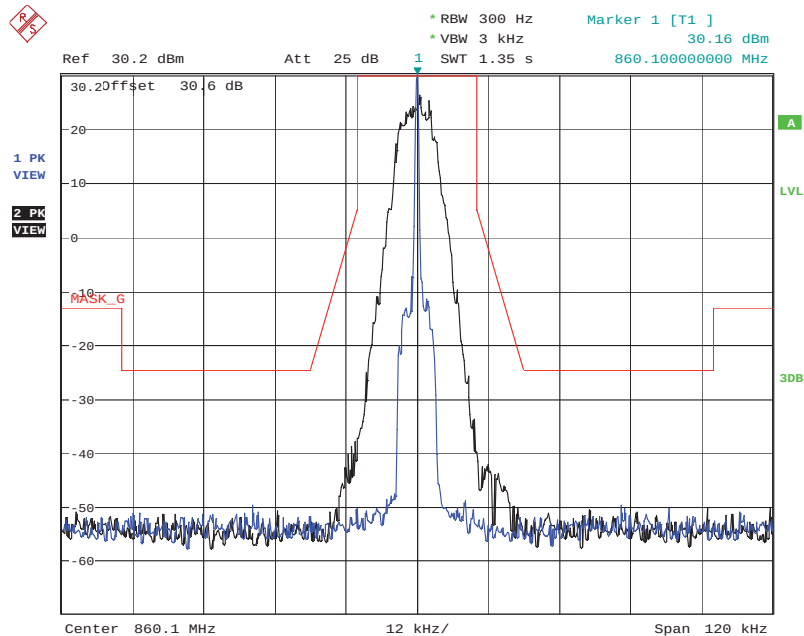
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

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



Date: 1.JUN.2018 13:15:50

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



Date: 1.JUN.2018 13:20:24

ULTRATECH GROUP OF LABS

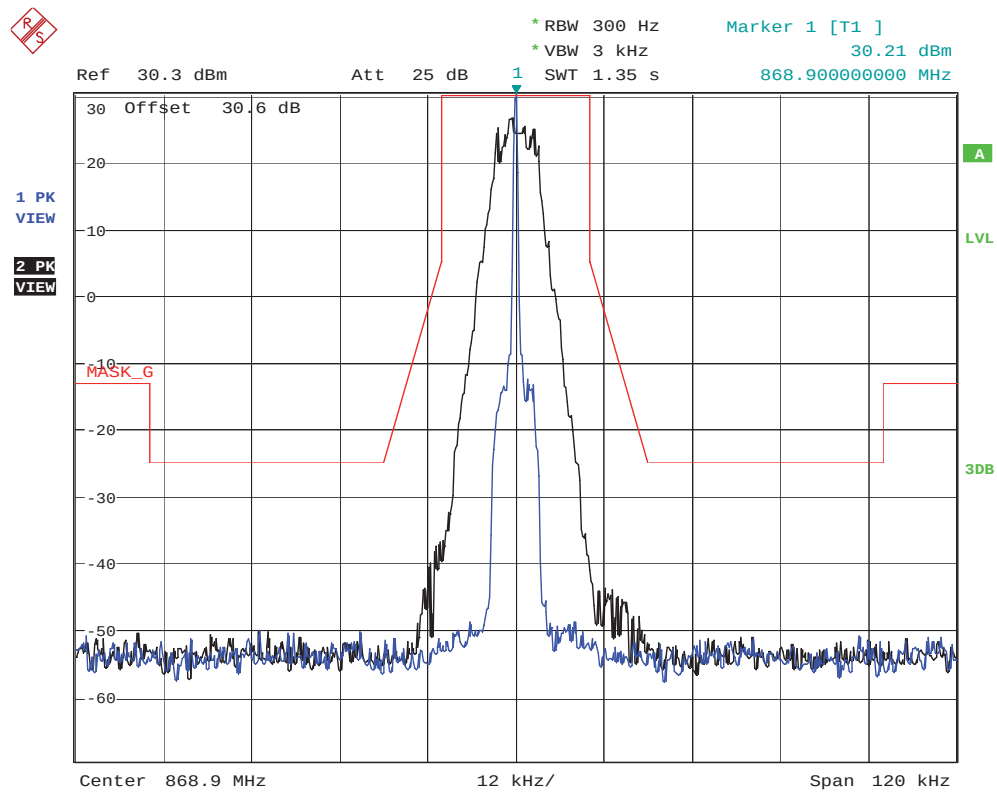
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

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

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



Date: 1. JUN. 2018 13:26:16

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3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

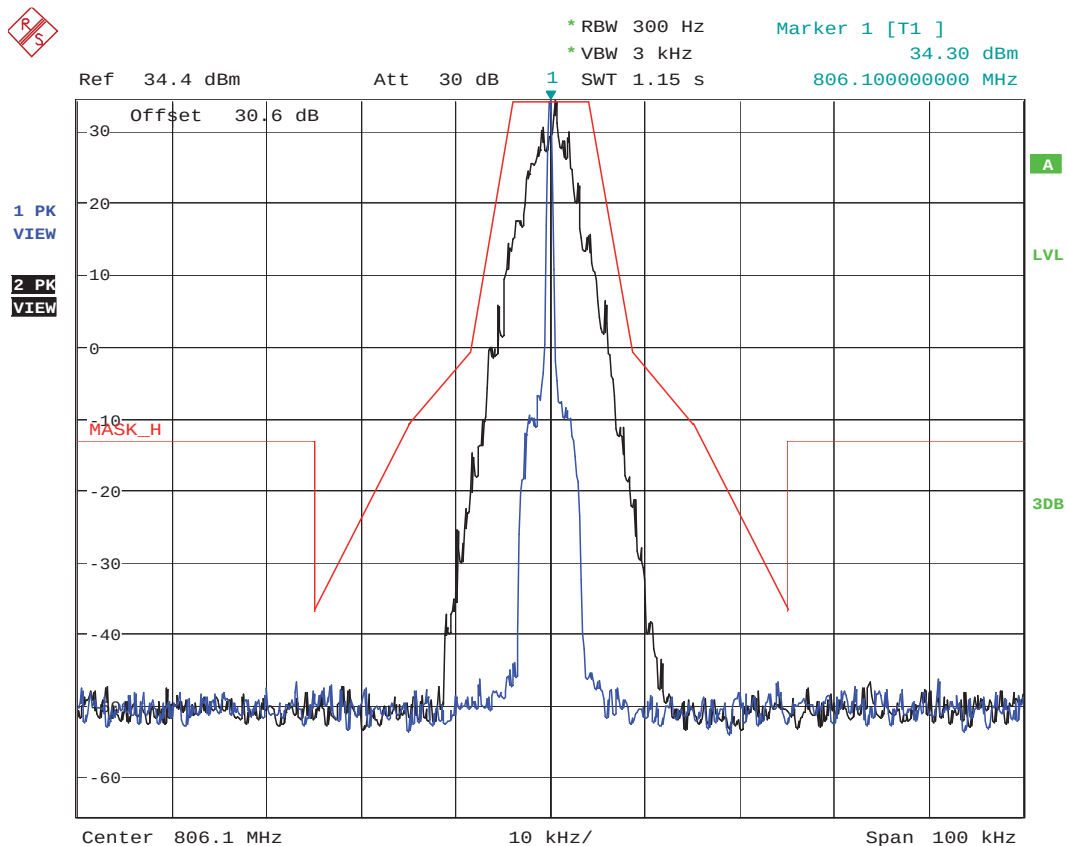
June 26, 2018

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

5.8.9. Test Data- EMISSION MASKS- MASK H

High Power

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



Date: 1.JUN.2018 14:32:36

ULTRATECH GROUP OF LABS

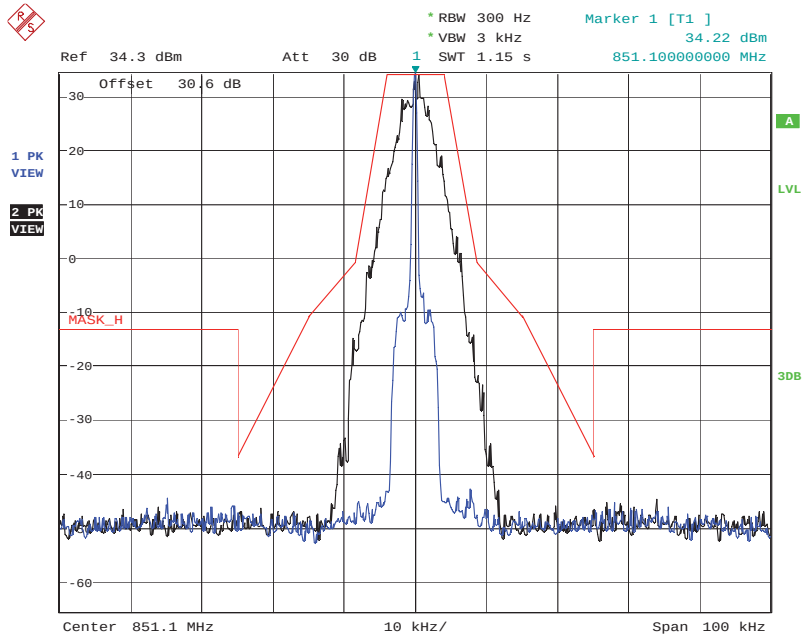
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

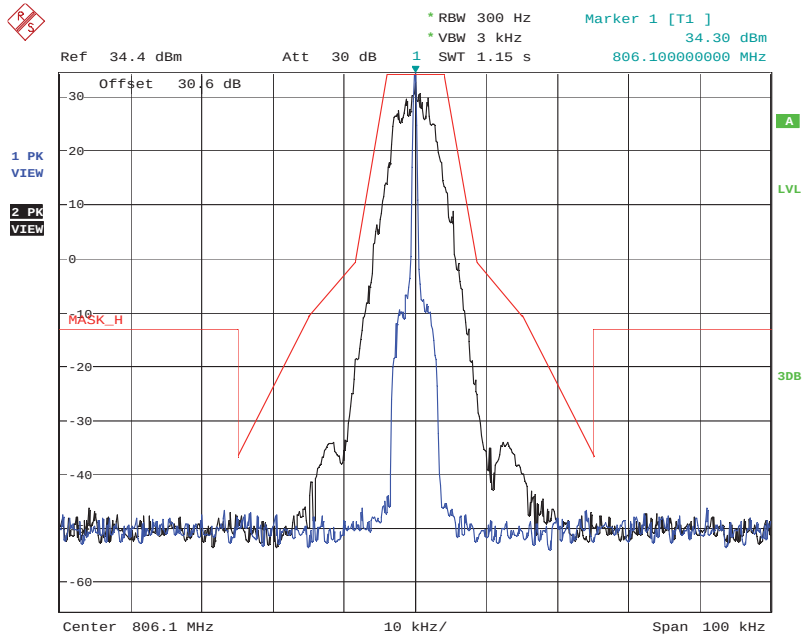
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

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



Date: 1.JUN.2018 14:40:19

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



Date: 1.JUN.2018 14:35:15

ULTRATECH GROUP OF LABS

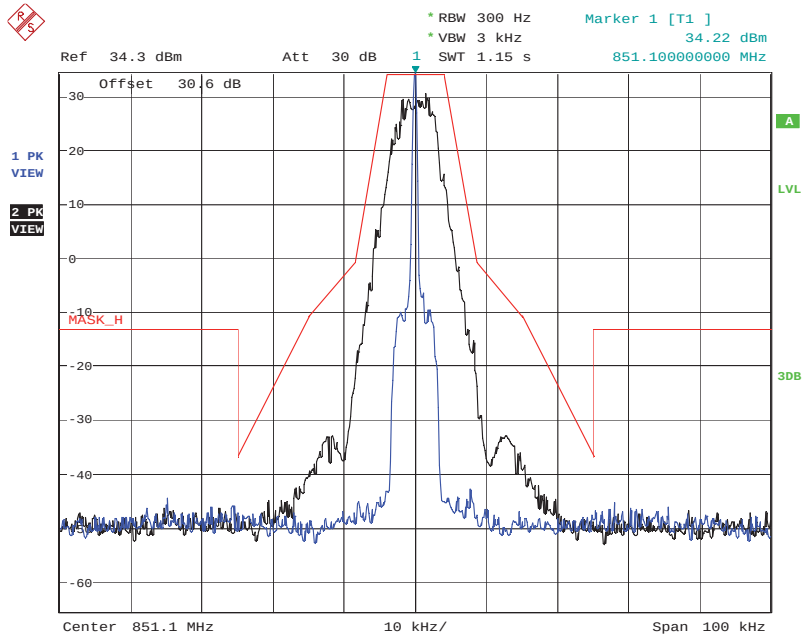
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

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

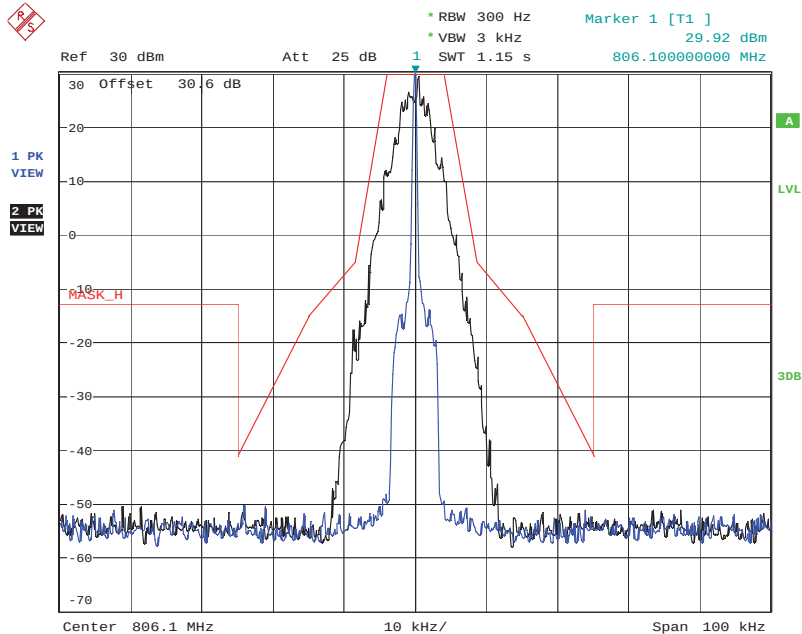
5.8.9.4. Configuration: Mask H, Sub Band 4: 851-854MHz, 851.1MHz, F1W, Digital, High power



Date: 1.JUN.2018 14:41:58

Low Power

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



Date: 1.JUN.2018 14:45:53

ULTRATECH GROUP OF LABS

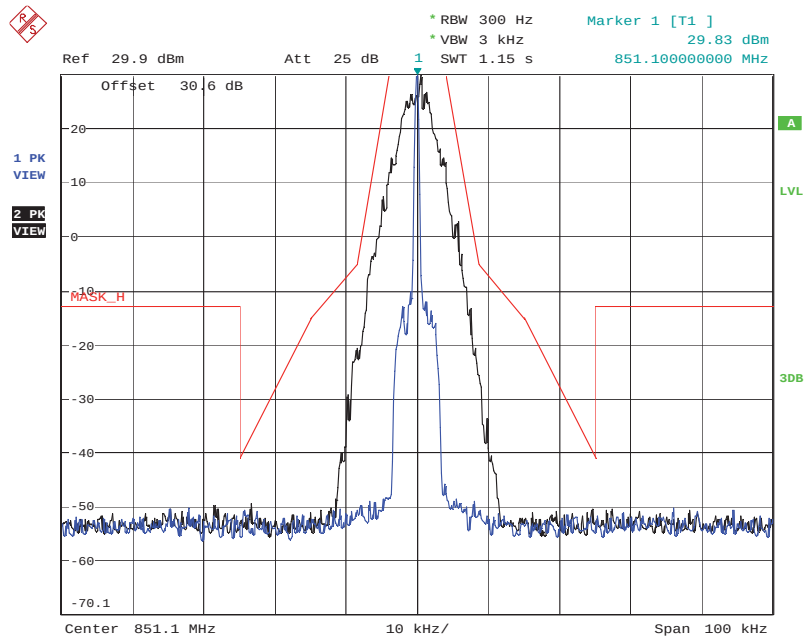
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

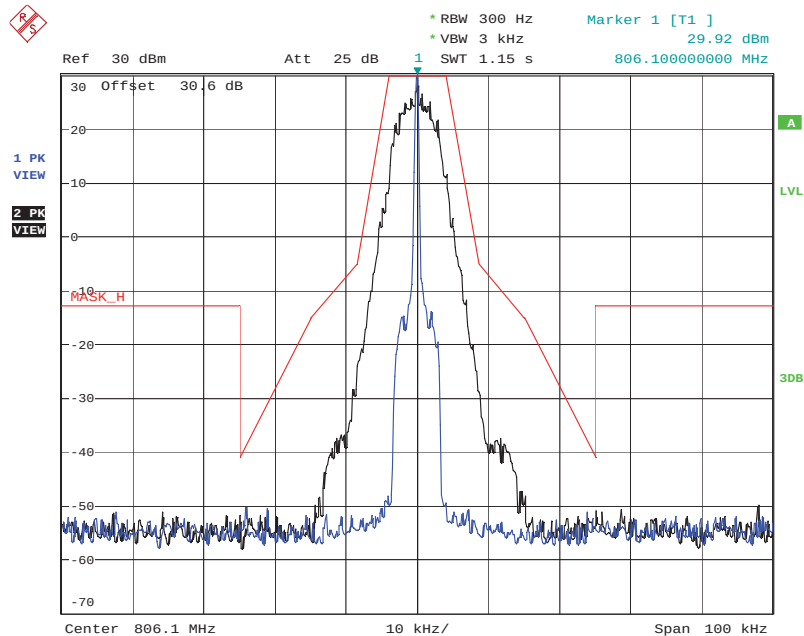
All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

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



Date: 1.JUN.2018 14:54:35

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



Date: 1.JUN.2018 14:47:51

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3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 18ICOM485_FCC90

June 26, 2018

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

