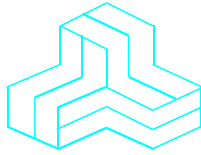


ENGINEERING TEST REPORT



2.4/5.8GHz High Speed 1W Module
Model: nMIMO2458
FCC ID: NS915NM2458

Applicant:

Microhard Systems Inc.
150 Country Hills Landing NW
Calgary, Alberta
Canada T3K 5P3

In Accordance With

Federal Communications Commission (FCC)
Part 15, Subpart E, Section 15.407
Unlicensed National Information Infrastructure (U-NII) Device
Operating in the 5.725-5.85 GHz Band

UltraTech's File No.: 15MCRS079_FCC15E407

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

Date: November 16, 2015

Report Prepared by: Dan Huynh

Tested by: Hung Trinh

Issued Date: November 16, 2015

Test Dates: June 18 - August 2, 2015

- *The results in this Test Report apply only to the sample(s) tested, and the sample tested is randomly selected.*
- *This report must not be used by the client to claim product endorsement by NVLAP or any agency of the US Government.*

UltraTech

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NVLAP LAB
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AT-1945



SL2-IN-E-
1119R



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CA2049



TL363_B



TPTDP
DA1300

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EXHIBIT 1. INTRODUCTION

1.1. SCOPE

Reference:	FCC Part 15, Subpart E, Section 15.407
Title:	Code of Federal Regulations (CFR), Title 47 – Telecommunication, Part 15 – Radio Frequency Devices
Purpose of Test:	Equipment Certification for Unlicensed National Information Infrastructure (U-NII) Device Operating in the 5.725-5.85 GHz Band
Test Procedures:	- ANSI C63.4 - ANSI C63.10 - FCC KDB Publication No. 789033 D02 General UNII Test Procedures New Rules v01 - FCC, KDB Publication No. 662911 D01 Multiple Transmitter Output v02r01
Environmental Classification:	☒ Commercial, industrial or business environment ☒ Residential environment

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

None.

1.3. NORMATIVE REFERENCES

Publication	Year	Title
47 CFR Parts 0-19	2015	Code of Federal Regulations (CFR), Title 47 – Telecommunication
ANSI C63.4	2009	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 C63.10	2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
FCC, KDB Publication No. 789033 D02 General UNII Test Procedures New Rules v01	2014	GUIDELINES FOR COMPLIANCE TESTING OF UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE (U-NII) DEVICES PART 15, SUBPART E
FCC, KDB Publication No. 662911 D01 Multiple Transmitter Output v02r01	2013	Emissions Testing of Transmitters with Multiple Outputs in the Same Band

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November 16, 2015

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EXHIBIT 2. PERFORMANCE ASSESSMENT

2.1. CLIENT INFORMATION

APPLICANT	
Name:	Microhard Systems Inc.
Address:	150 Country Hills Landing NW Calgary, Alberta Canada T3K 5P3
Contact Person:	Mr. Hany Shenouda Phone #: 403 248-0028 Fax #: 403 248 2762 Email Address: shenouda@microhardcorp.com

MANUFACTURER	
Name:	Microhard Systems Inc.
Address:	150 Country Hills Landing NW Calgary, Alberta Canada T3K 5P3
Contact Person:	Mr. Hany Shenouda Phone #: 403 248-0028 Fax #: 403 248-2762 Email Address: shenouda@microhardcorp.com

2.2. EQUIPMENT UNDER TEST (EUT) INFORMATION

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

Brand Name:	Microhard Systems Inc.
Product Name:	2.4/5.8GHz High Speed 1W Module
Model Name or Number:	nMIMO2458
Serial Number:	Test Sample
Type of Equipment:	Unlicensed National Information Infrastructure TX
Input Power Supply Type:	External DC Power Supply
Primary User Functions of EUT:	802.11abng 2x2 module

2.3. EUT'S TECHNICAL SPECIFICATIONS

Transmitter	
Equipment Type:	• Mobile • Base Station (fixed use)
Intended Operating Environment:	▪ Commercial, industrial or business environment ▪ Residential environment
Power Supply Requirement:	3.3 VDC
RF Output Power Rating:	24.33 dBm (271.02 mW) max. combined conducted output power
*Software Output Power Setting:	0 to 31.5
Operating Frequency Range:	5745 - 5825MHz 5755 - 5795MHz
RF Output Impedance:	50 Ω
Duty Cycle:	Continuous
Modulation Type:	802.11abng 2x2 module
Antenna Connector Types:	U.FL

*Software output power setting is a factory tune-up parameter, not available to end users.

2.4. ASSOCIATED ANTENNA DESCRIPTIONS

Antenna Type	Maximum Gain (dBi)
Rubber Ducky	3
Note: a minimum cable loss of 1.02 dBi shall be used with the listed antenna	

2.5. LIST OF EUT'S PORTS

Port Number	EUT's Port Description	Number of Identical Ports	Connector Type	Cable Type (Shielded/Non-shielded)
1	RF port	2	U.FL	Shielded cable
2	DC supply and I/O port	1	Pin header	Direct connection (no cable)

2.6. 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:	Test Jig
Brand name:	Microhard Systems Inc.
Model Name or Number:	N/A
Connected to EUT's Port:	I/O Port

Ancillary Equipment # 2	
Description:	AC/DC Adapter
Brand name:	BI Switching Power Supply
Model Name or Number:	BI30-120200-AdU
Connected to EUT's Port:	Test Jig of the EUT

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 to 23 °C
Humidity:	45 to 58%
Pressure:	102 kPa
Power Input Source:	3.3 VDC

3.2. OPERATIONAL TEST CONDITIONS & ARRANGEMENT FOR TESTS

Operating Modes:	The transmitter was operated in a continuous transmission mode with the carrier modulated as specified in the Test Data.
Special Test Software:	Special software provided by the Applicant to operate the EUT at each channel frequency continuously and in the range of typical modes of operation.
Special Hardware Used:	Test Jig
Transmitter Test Antenna:	The EUT is tested with the antenna fitted in a manner typical of normal intended use as non-integral antenna equipment as described with the test results.

Transmitter Test Signals	
Frequency Band(s):	5745 - 5825MHz 5755 - 5795MHz
Frequency(ies) Tested:	5745MHz, 5785MHz, 5825MHz 5755 MHz, 5795 MHz
RF Power Output: (measured maximum output power at antenna terminals)	24.33 dBm (271.02 mW)
Normal Test Modulation:	*Data Rate 1 – 12
Modulating Signal Source:	Internal

* See detailed operational description exhibit for details.

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.

- AC Power Line Conducted Emissions were performed in UltraTech's shielded room, 24'(L) by 16'(W) by 8'(H).
- 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 FCC office (FCC File No.: 91038) and Industry Canada office (Industry Canada File No.: 2049A-3). Expiry Date: 2017-04-02.

4.2. APPLICABILITY & SUMMARY OF EMC EMISSION TEST RESULTS

FCC Section(s)	Test Requirements	Compliance (Yes/No)
15.203	Antenna Requirements	Yes
15.207(a)	AC Power Line Conducted Emissions	Yes
15.407(a)	Output Power	Yes
15.407(a)	Power Spectral Density	Yes
15.407(b)	Undesirable Emission	Yes
15.407(c)	Transmission Requirements	Yes ¹
15.407(e)	6 dB Bandwidth	Yes
15.407(f)	RF Exposure	Yes
15.407(g)	Frequency Stability	Yes
15.407(h)	Transmit Power Control (TPC) and Dynamic Frequency Selection (DFS).	N/A

¹ Refer to operational description exhibit.

4.3. MODIFICATIONS INCORPORATED IN THE EUT FOR COMPLIANCE PURPOSES

None.

EXHIBIT 5. TEST DATA

5.1. POWER LINE CONDUCTED EMISSIONS [§15.207(a)]

5.1.1. Limit(s)

The equipment shall meet the limits of the following table:

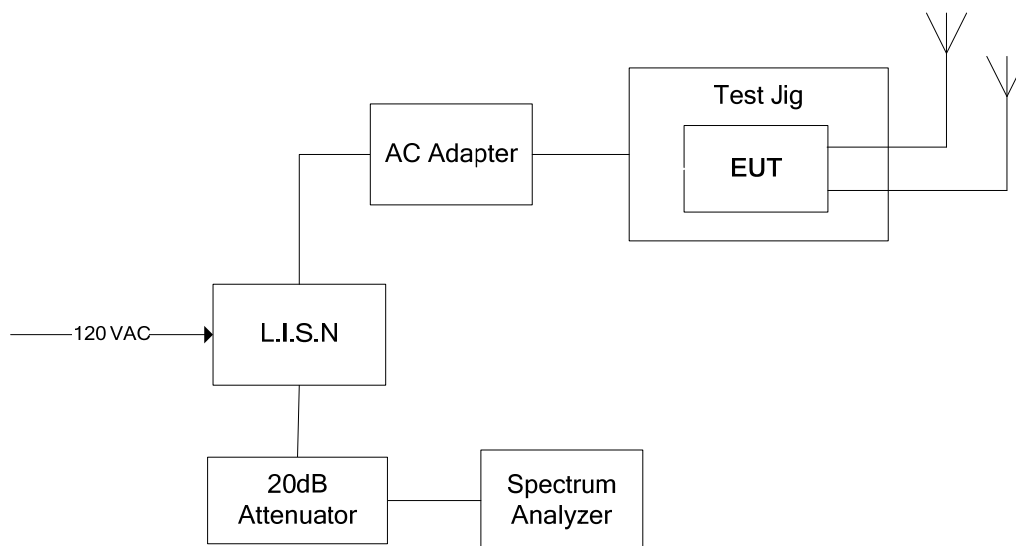
Frequency of emission (MHz)	Conducted Limits (dB μ V)	
	Quasi-peak	Average
0.15–0.5	66 to 56*	56 to 46*
0.5–5	56	46
5–30	60	50

*Decreases linearly with the logarithm of the frequency

5.1.2. Method of Measurements

ANSI C63.4-2009

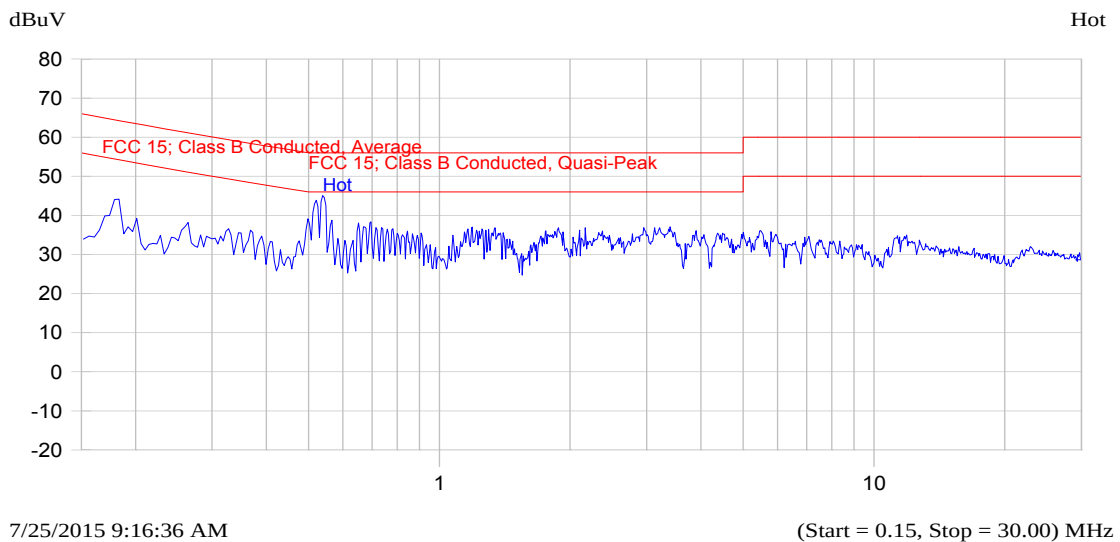
5.1.3. Test Arrangement



5.1.4. Test Data

Plot 5.1.4.1. Power Line Conducted Emissions; Line Voltage: 120 VAC; Line Tested: Hot

Current Graph

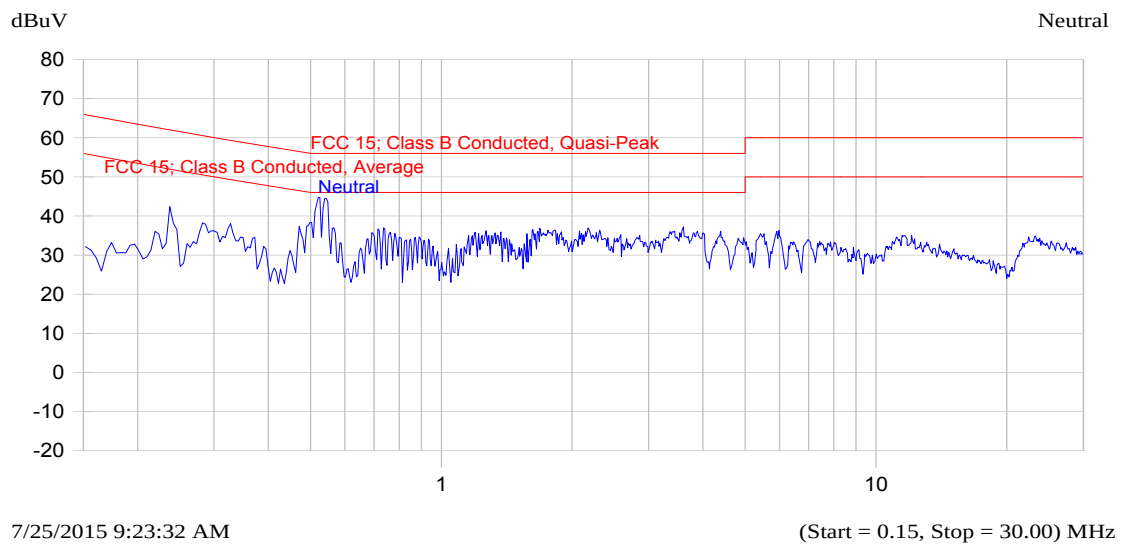


Current List

Frequency MHz	Peak dBuV	QP dBuV	Delta QP-QP Limit dB	Avg dBuV	Delta Avg-Avg Limit dB	Trace Name
0.182	47.6	38.3	-26.1	28.1	-26.3	Hot
0.537	46.6	43.7	-12.3	41.5	-4.5	Hot
3.402	39.4	34.8	-21.2	29.0	-17.0	Hot

Plot 5.1.4.2. Power Line Conducted Emissions; Line Voltage 120 VAC; Line Tested: Neutral

Current Graph



Current List

Frequency MHz	Peak dBuV	QP dBuV	Delta dB	QP-QP Limit dB	Avg dBuV	Delta Avg-Avg Limit dB	Trace Name
0.247	44.5	35.4	-26.5		27.4	-24.5	Neutral
0.521	46.8	44.8	-11.2		42.7	-3.3	Neutral
0.538	46.4	43.6	-12.4		41.5	-4.5	Neutral
3.603	39.1	32.8	-23.2		26.5	-19.5	Neutral

5.2. DUTY CYCLE [§ 15.3(c)]

5.2.1. Requirements

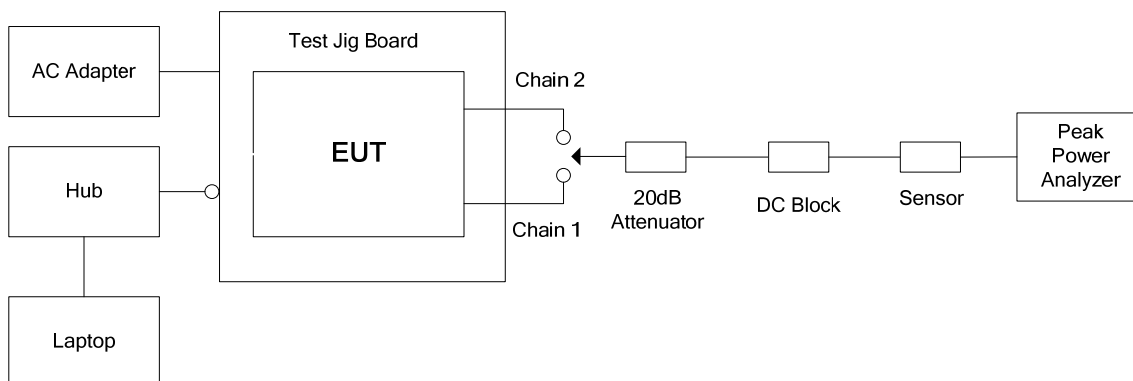
§ 15.35(c) Unless otherwise specified, e.g., § 15.255(b), when the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. The exact method of calculating the average field strength shall be submitted with any application for certification or shall be retained in the measurement data file for equipment subject to notification or verification.

789033 D02 General UNII Test Procedures New Rules v01, Section II.B.1.: All measurements are to be performed with the EUT transmitting at 100 percent duty cycle at its maximum power control level; however, if 100 percent duty cycle cannot be achieved, measurements of duty cycle, x , and maximum-power transmission duration, T , are required for each tested mode of operation

5.2.2. Method of Measurements

FCC KDB 789033 D02 General UNII Test Procedures New Rules v01, Section II.B.2.b

5.2.3. Test Arrangement

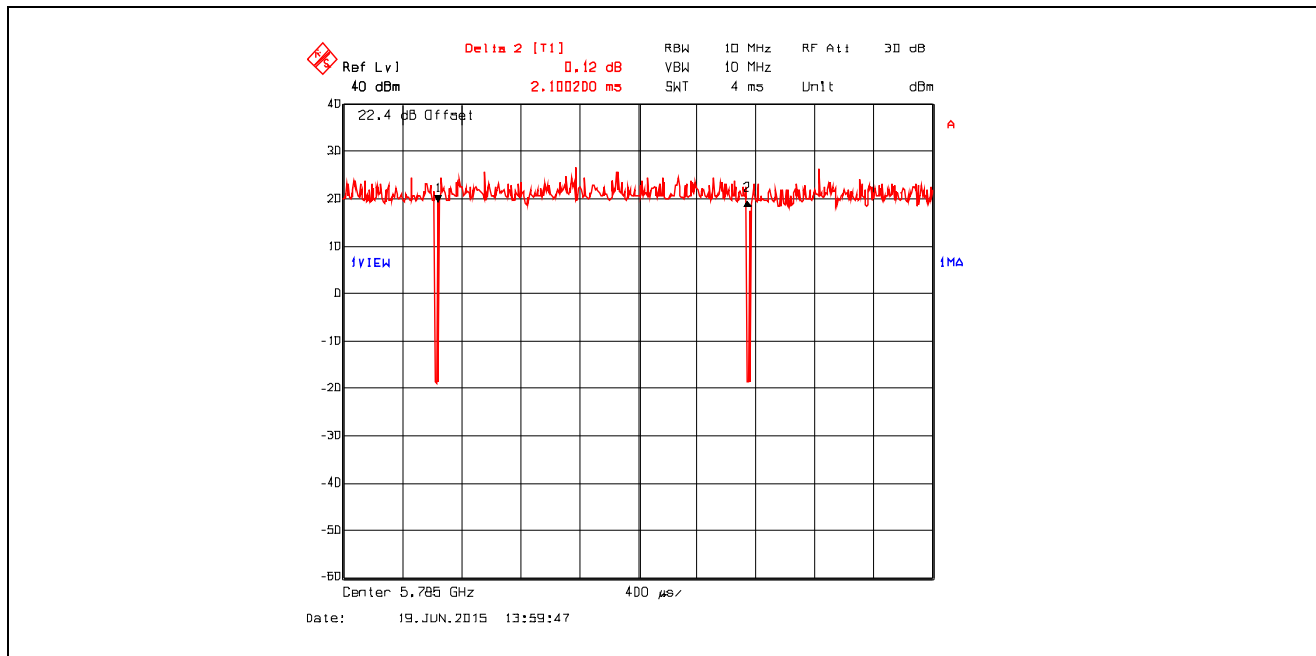


5.2.4. Test Data

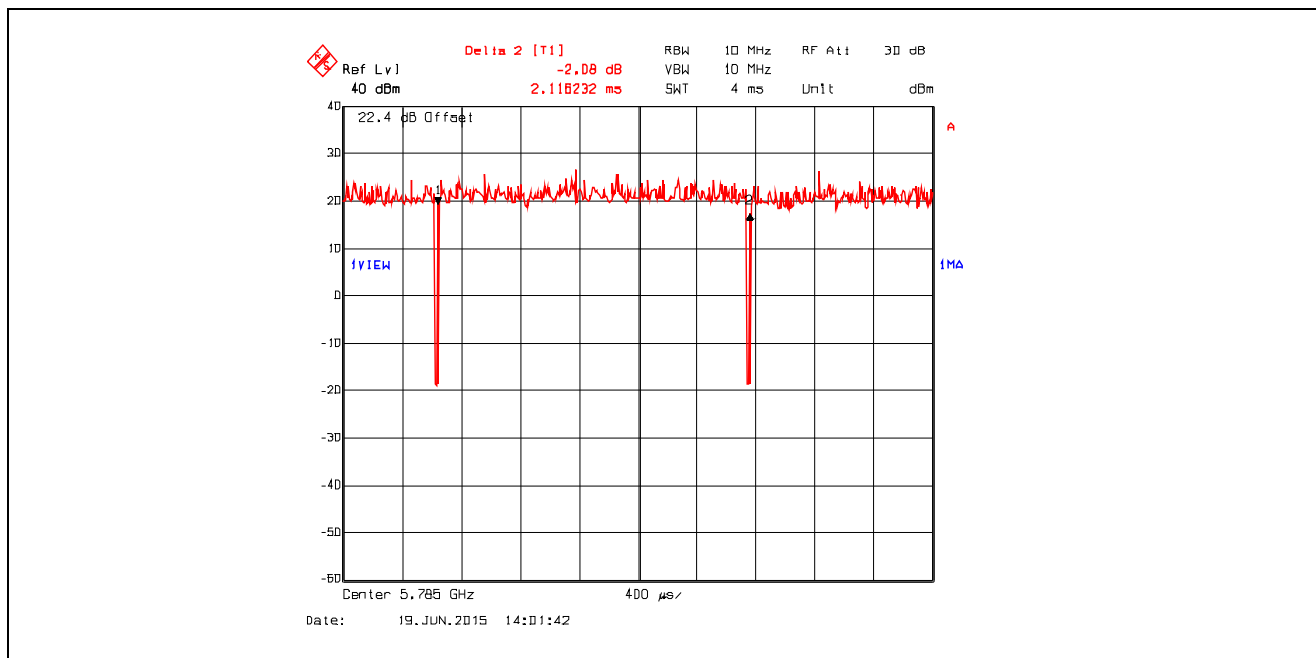
Data Rate	Channel Number	Frequency (MHz)	Duty Cycle (dB)
1	157	5785	0.033
2	157	5785	0.049
3	157	5785	0.127
4	157	5785	0.178
5	157	5785	0.029
6	157	5785	0.052
7	157	5785	0.116
8	157	5785	0.184
9	151	5755	0.053
10	151	5755	0.137
11	151	5755	0.228
12	151	5755	0.343

Refer to the following plots for details.

Plot 5.2.4.1. Duty Cycle, Data Rate 1, Ch 157, Pulse Width



Plot 5.2.4.2. Duty Cycle, Data Rate 1, Ch 157, Pulse Train



$$\text{Duty Cycle Correction Factor} = 10 \cdot \log \left[1 / (2.1002 / 2.1162) \right] = 0.033 \text{ dB}$$

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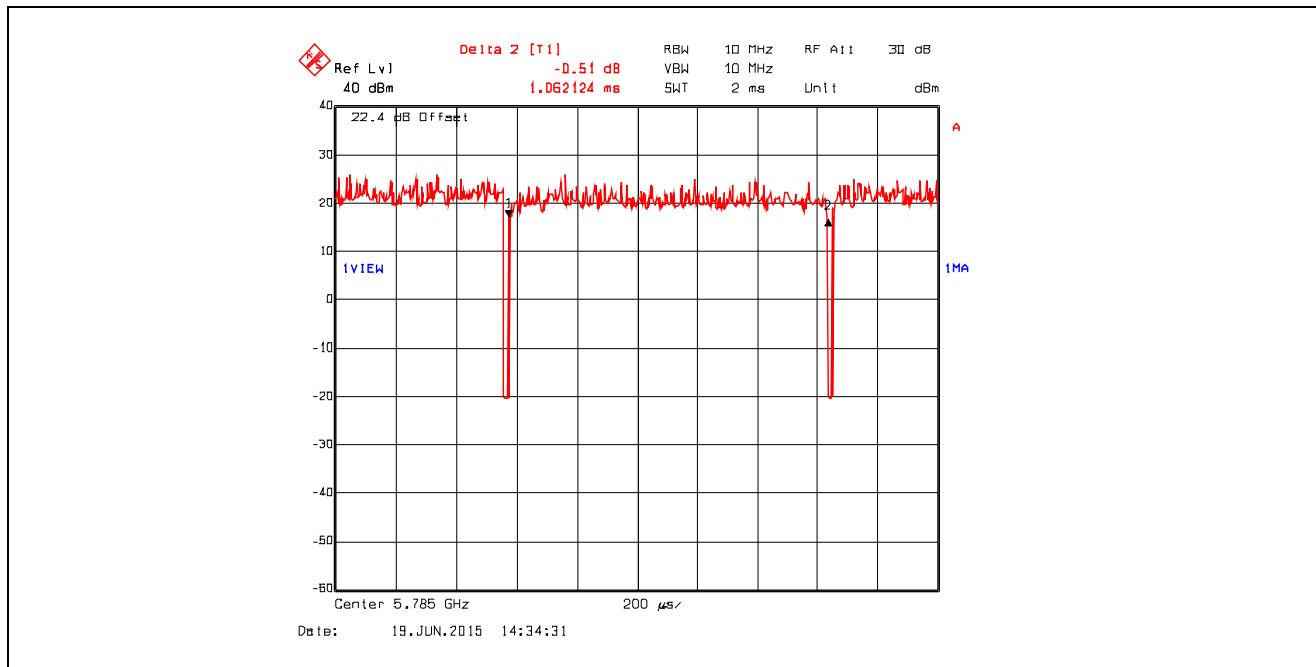
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 15MCRS079_FCC15E407

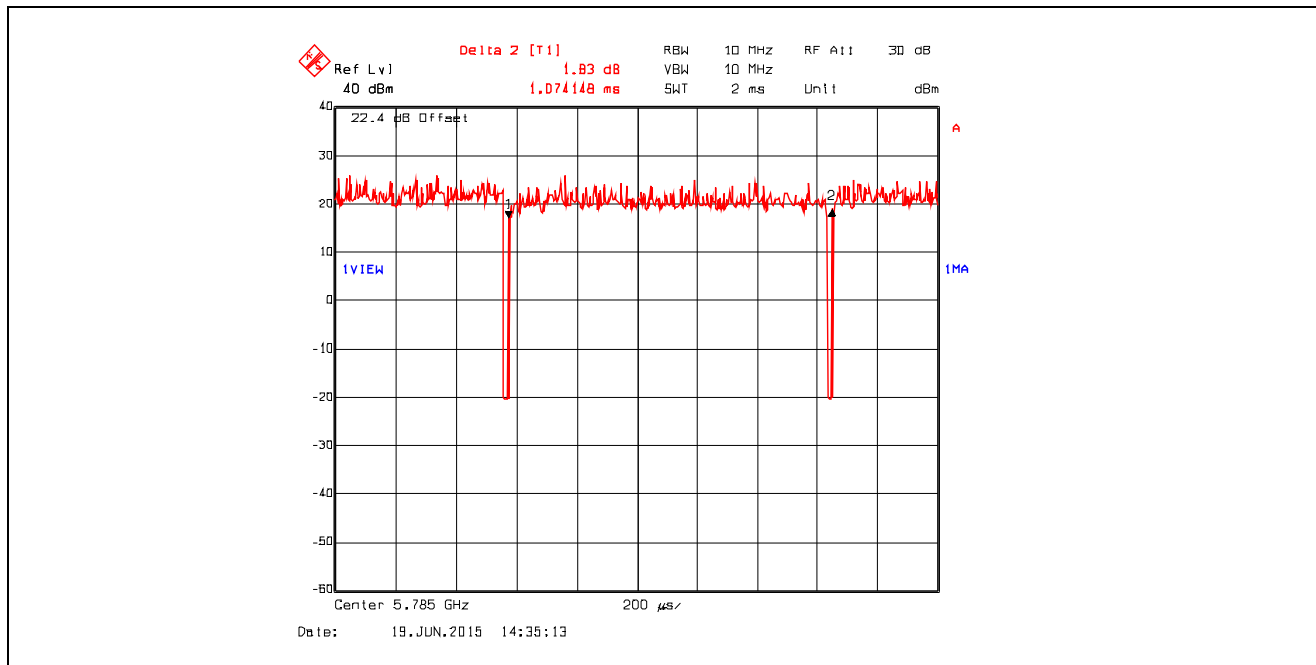
November 16, 2015

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

Plot 5.2.4.3. Duty Cycle, Data Rate 2, Ch 157, Pulse Width



Plot 5.2.4.4. Duty Cycle, Data Rate 2, Ch 157, Pulse Train



Duty Cycle Correction Factor = $10 \cdot \log [1 / (1.0621 / 1.0741)] = 0.049 \text{ dB}$

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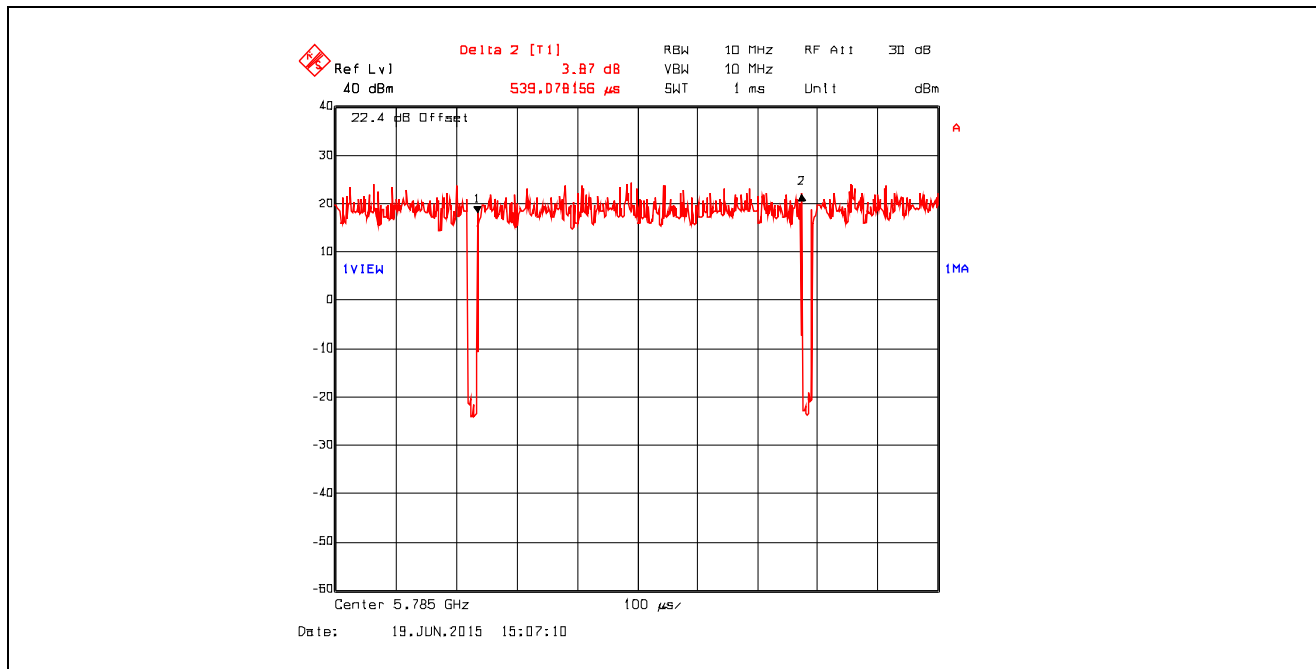
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 15MCRS079_FCC15E407

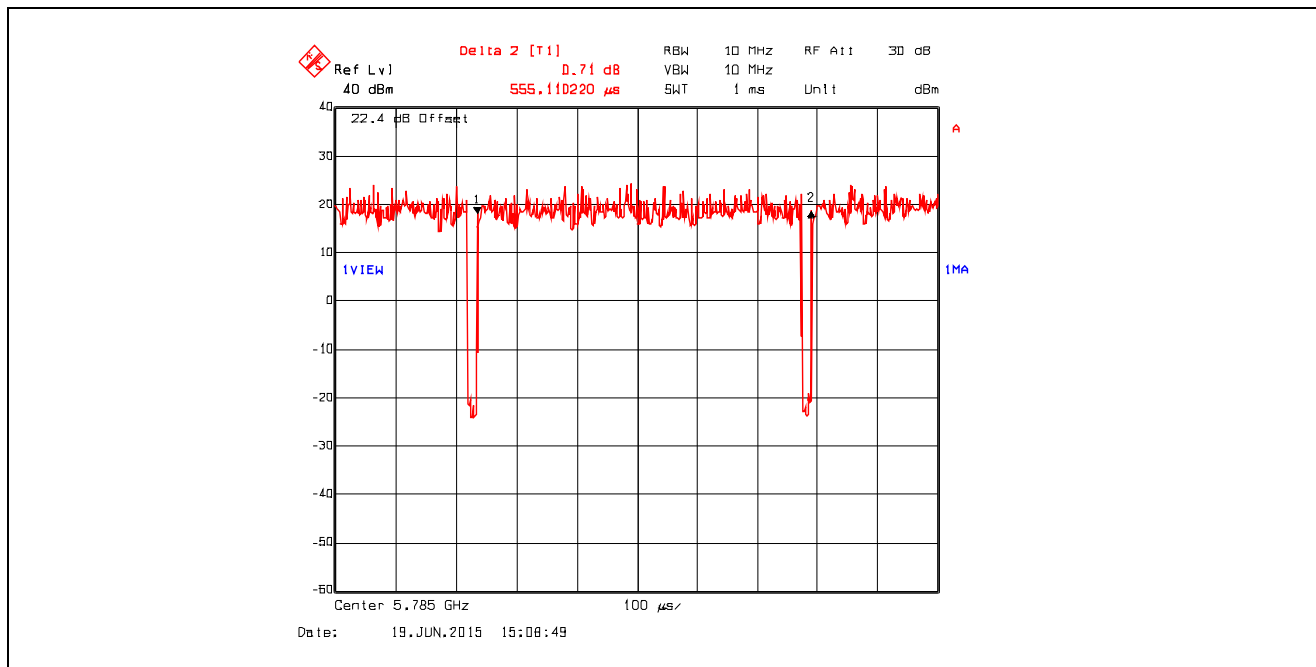
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Plot 5.2.4.5. Duty Cycle, Data Rate 3, Ch 157, Pulse Width



Plot 5.2.4.6. Duty Cycle, Data Rate 3, Ch 157, Pulse Train



Duty Cycle Correction Factor = $10 \cdot \log [1 / (539.0782 / 555.1102)] = 0.127 \text{ dB}$

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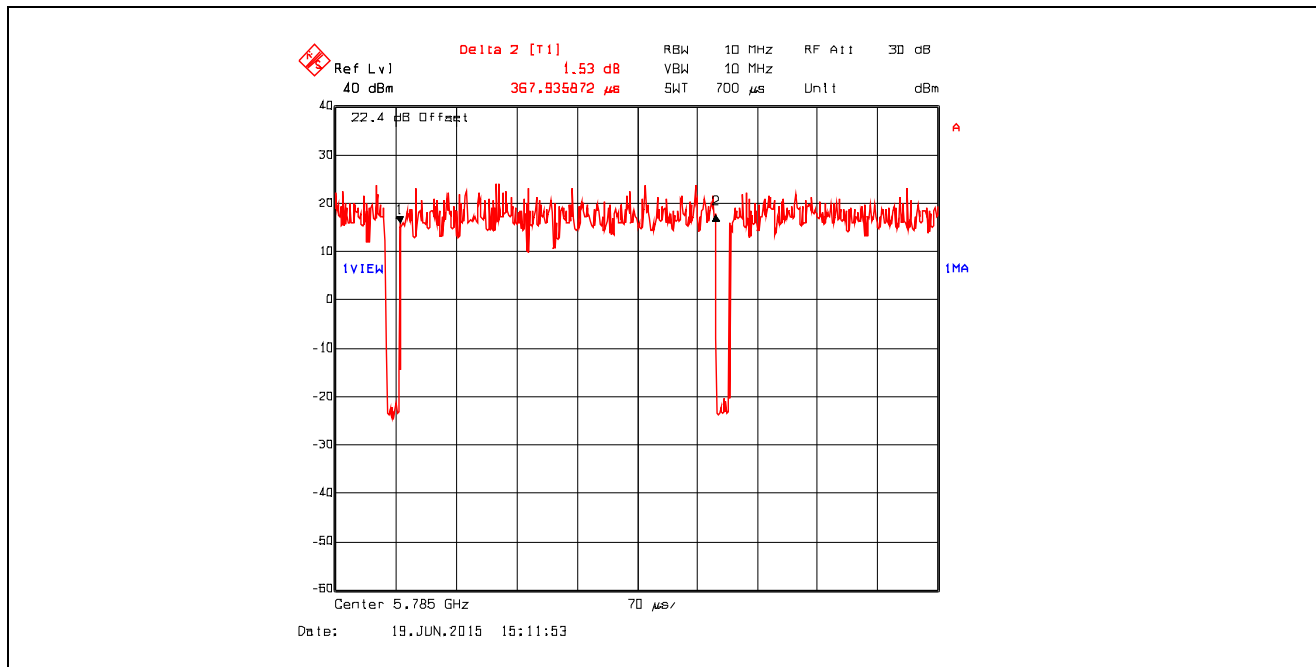
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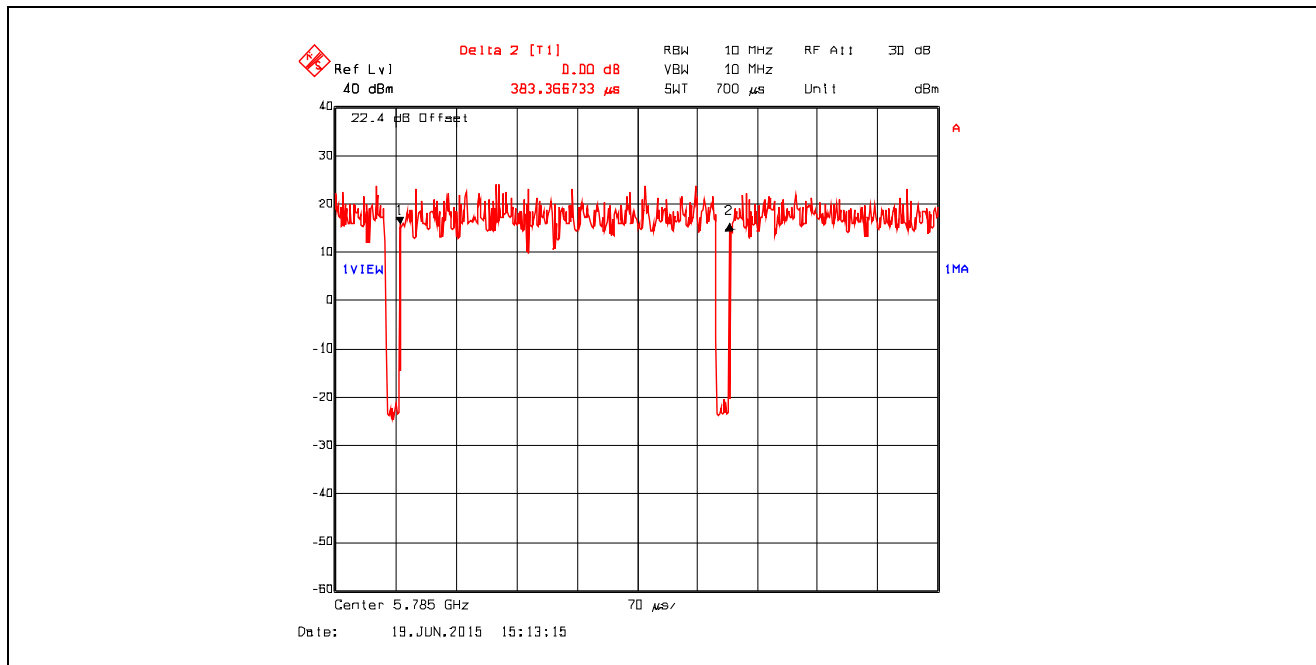
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All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

Plot 5.2.4.7. Duty Cycle, Data Rate 4, Ch 157, Pulse Width



Plot 5.2.4.8. Duty Cycle, Data Rate 4, Ch 157, Pulse Train



$$\text{Duty Cycle Correction Factor} = 10 \cdot \log \left[1 / (367.9359 / 383.3667) \right] = 0.178 \text{ dB}$$

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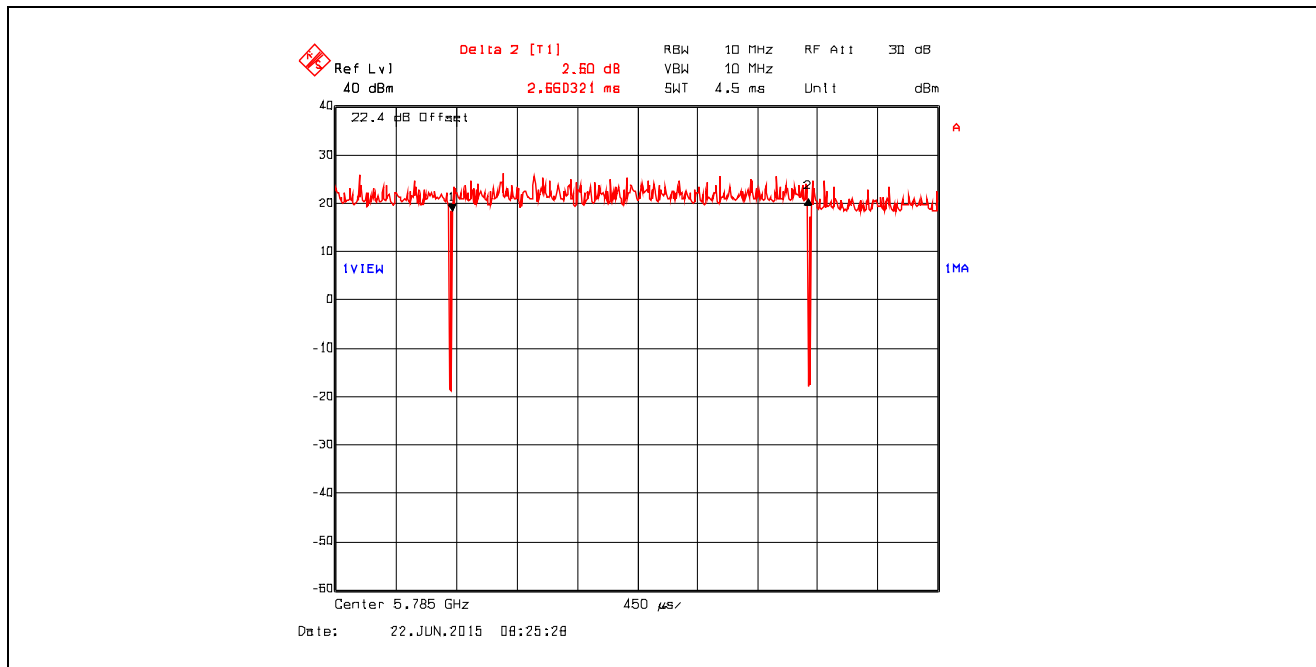
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

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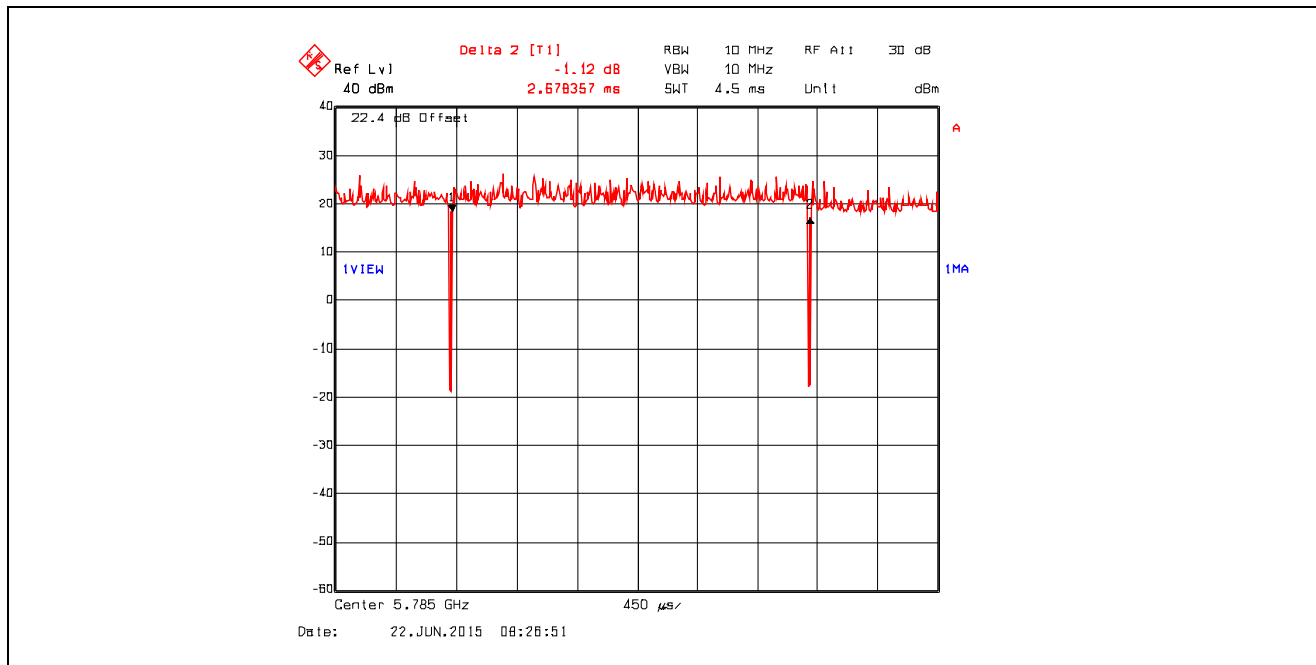
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Plot 5.2.4.9. Duty Cycle, Data Rate 5, Ch 157, Pulse Width

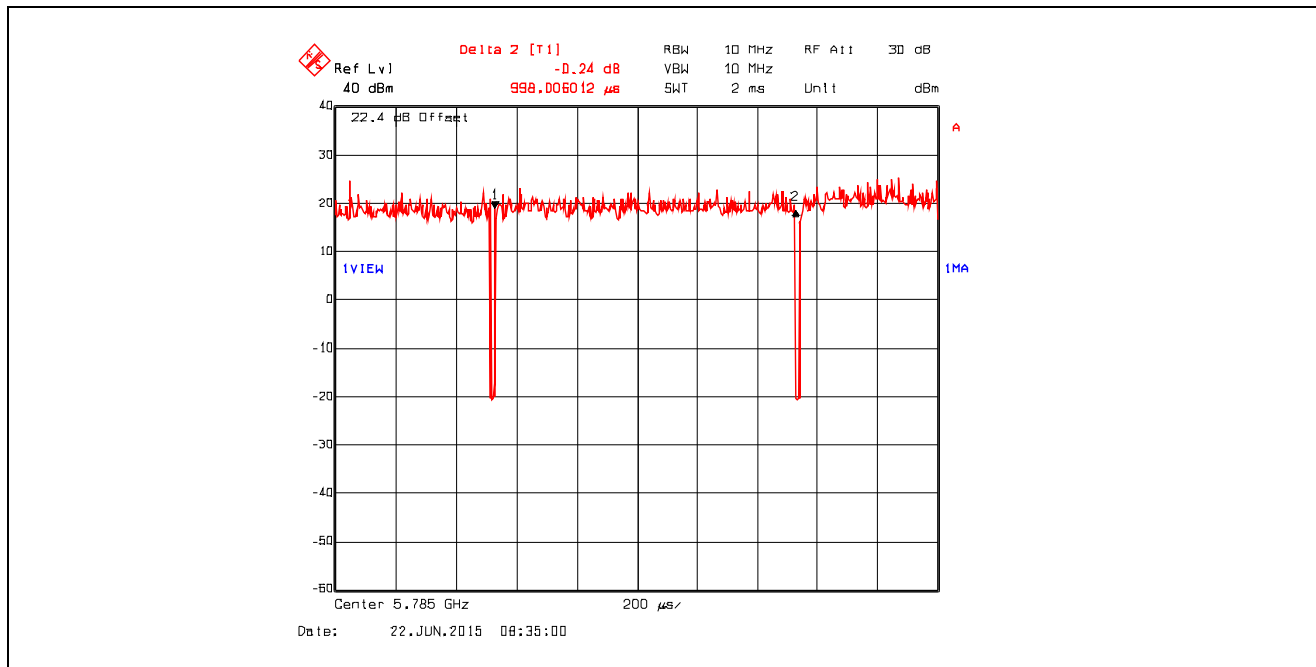


Plot 5.2.4.10. Duty Cycle, Data Rate 5, Ch 157, Pulse Train

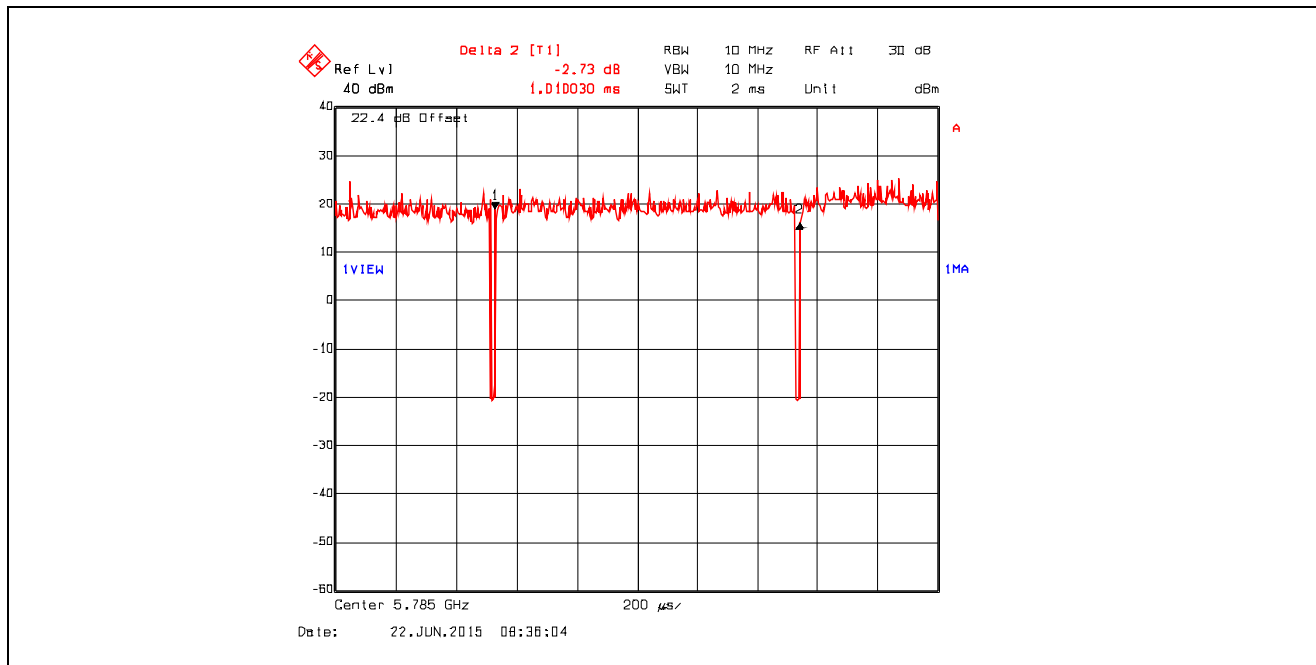


Duty Cycle Correction Factor = $10 \cdot \log [1 / (2.6603 / 2.6784)] = 0.029 \text{ dB}$

Plot 5.2.4.11. Duty Cycle, Data Rate 6, Ch 157, Pulse Width



Plot 5.2.4.12. Duty Cycle, Data Rate 6, Ch 157, Pulse Train



Duty Cycle Correction Factor = $10 \cdot \log [1 / (998.0060 / 1010.0300)] = 0.052 \text{ dB}$

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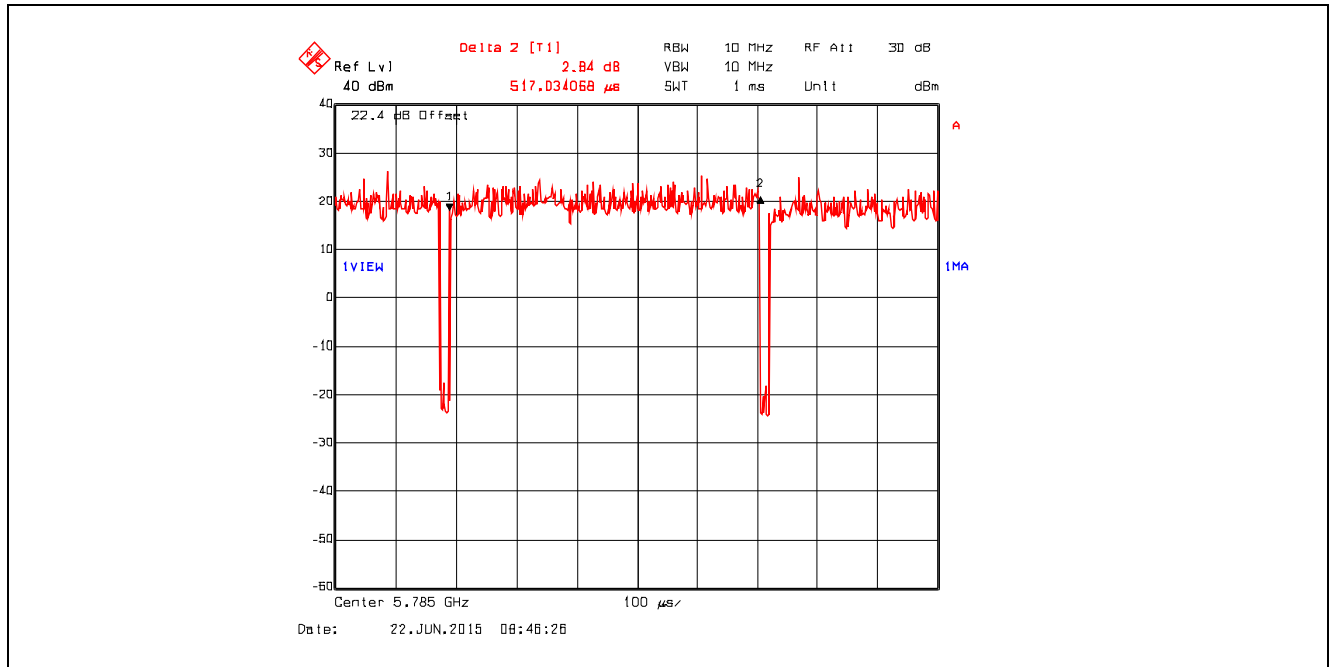
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 15MCRS079_FCC15E407

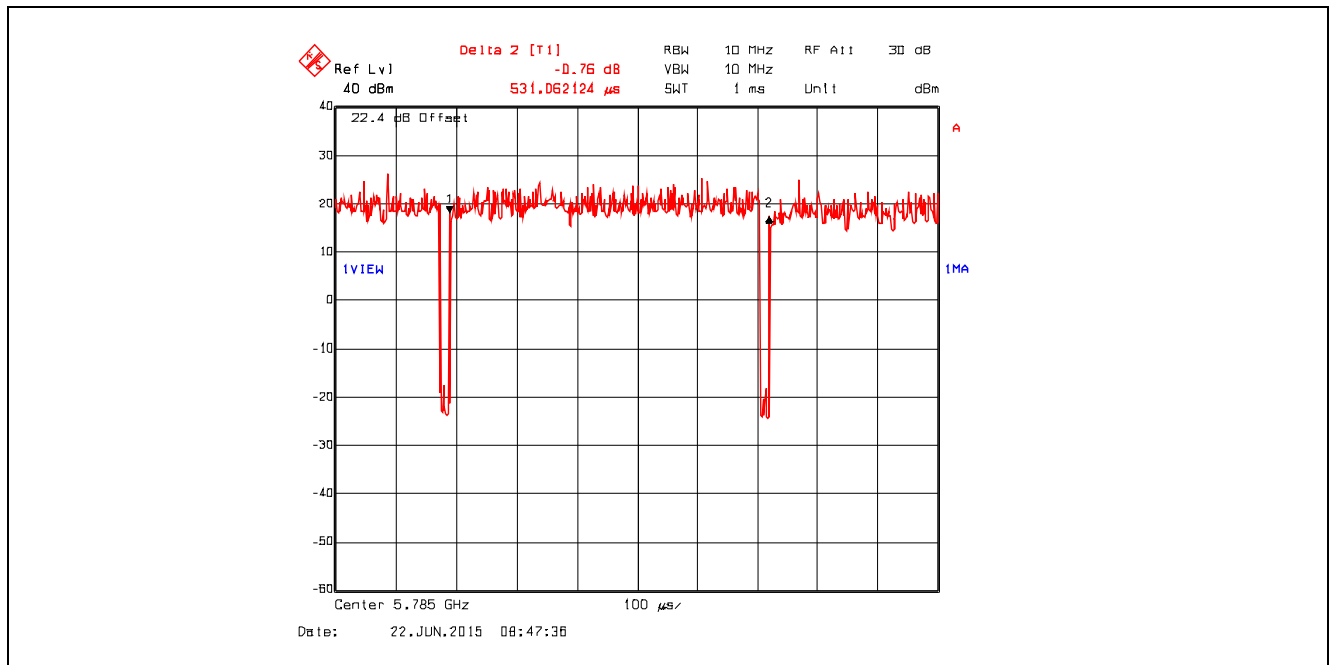
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All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

Plot 5.2.4.13. Duty Cycle, Data Rate 7, Ch 157, Pulse Width



Plot 5.2.4.14. Duty Cycle, Data Rate 7, Ch 157, Pulse Train



Duty Cycle Correction Factor = $10 \cdot \log [1 / (517.0341 / 531.0621)] = 0.116 \text{ dB}$

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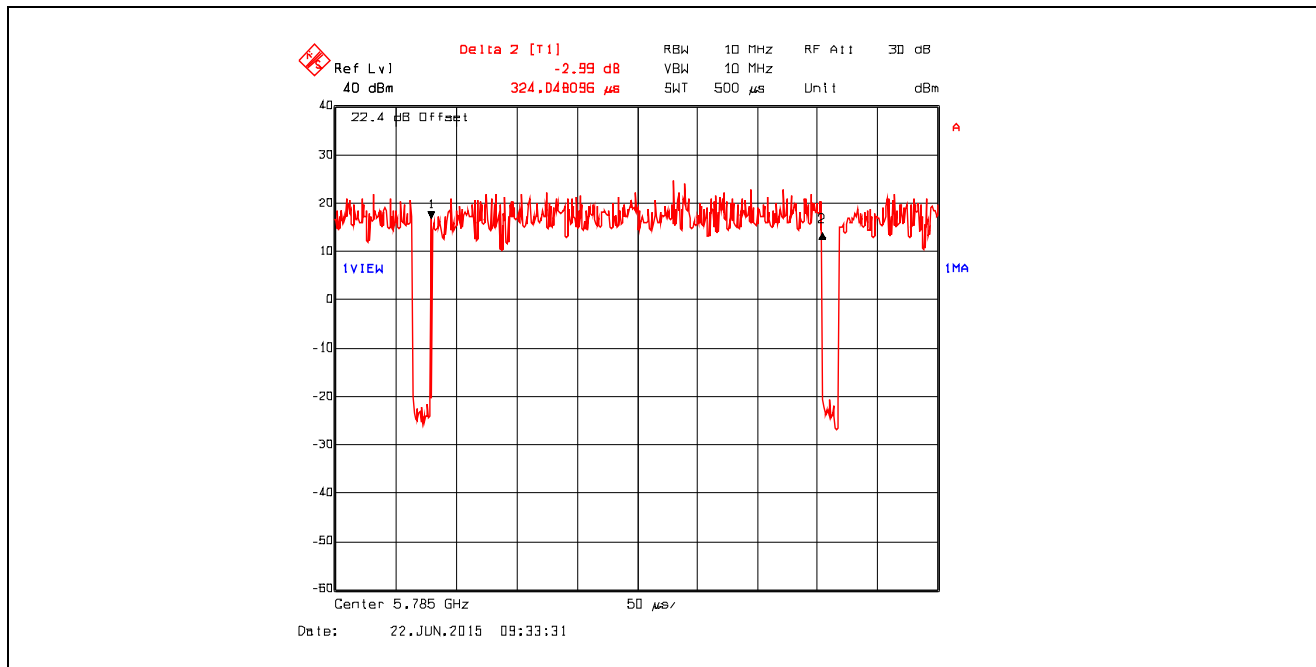
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File #: 15MCRS079_FCC15E407

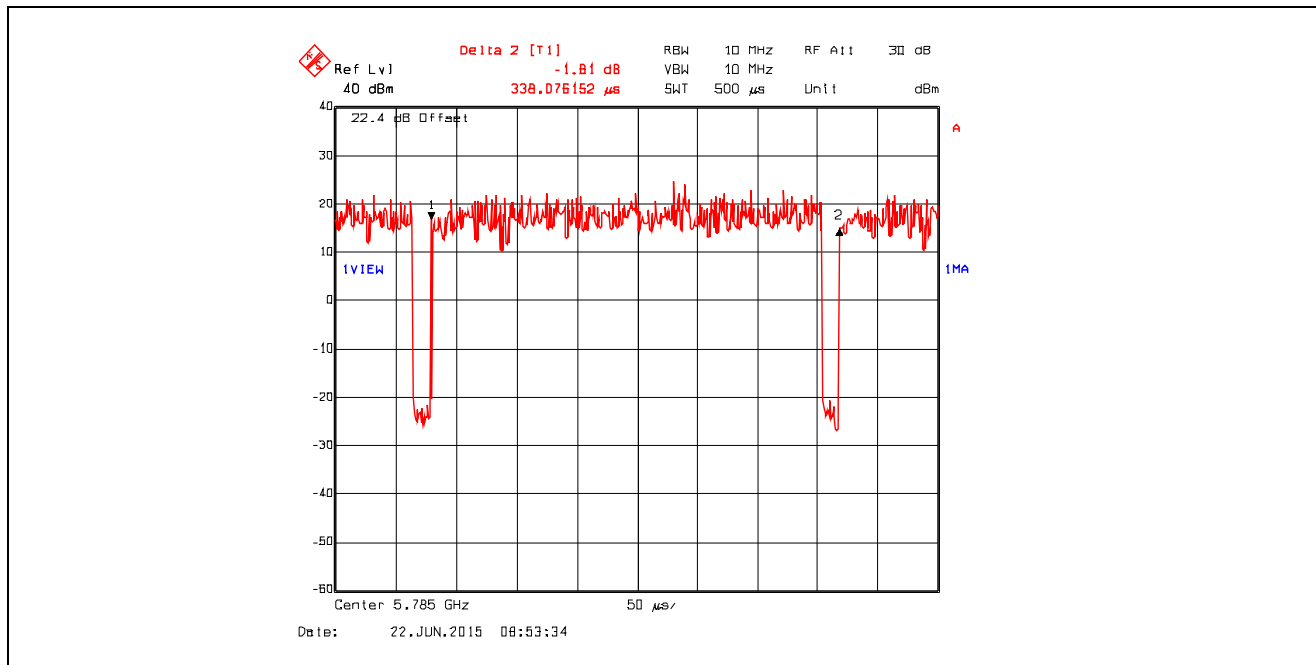
November 16, 2015

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

Plot 5.2.4.15. Duty Cycle, Data Rate 8, Ch 157, Pulse Width



Plot 5.2.4.16. Duty Cycle, Data Rate 8, Ch 157, Pulse Train



$$\text{Duty Cycle Correction Factor} = 10 \cdot \log \left[1 / \left(324.0481 / 338.0762 \right) \right] = 0.184 \text{ dB}$$

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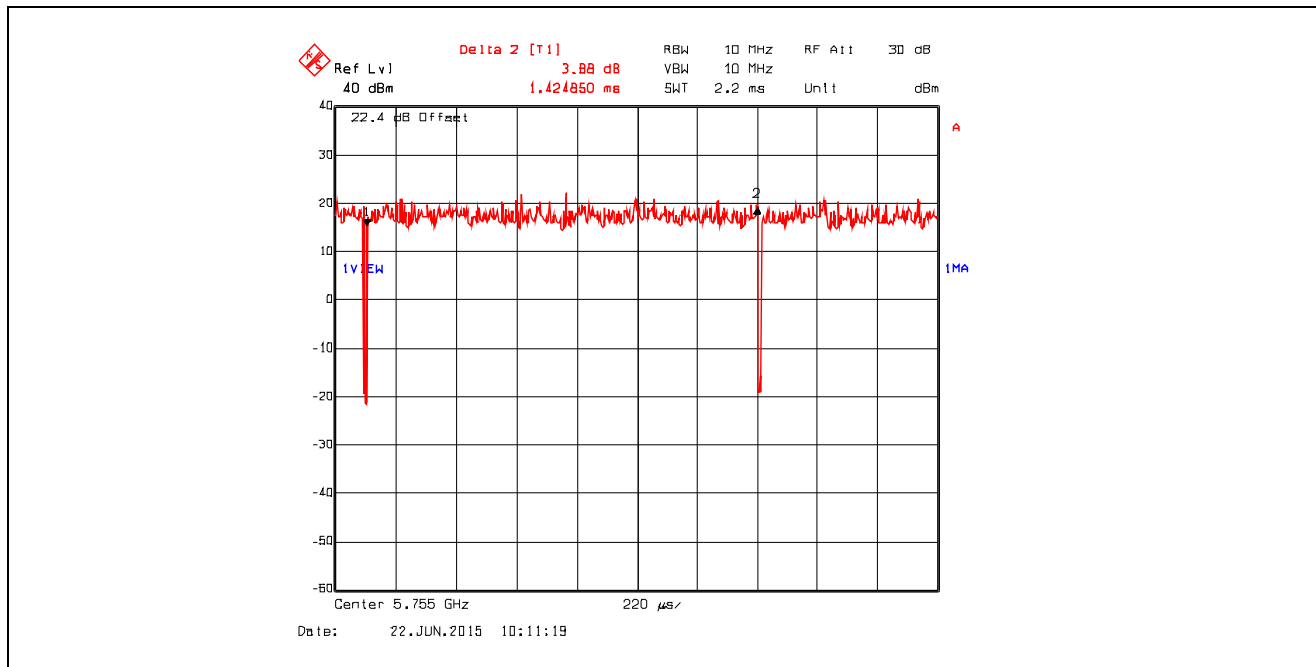
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 15MCRS079_FCC15E407

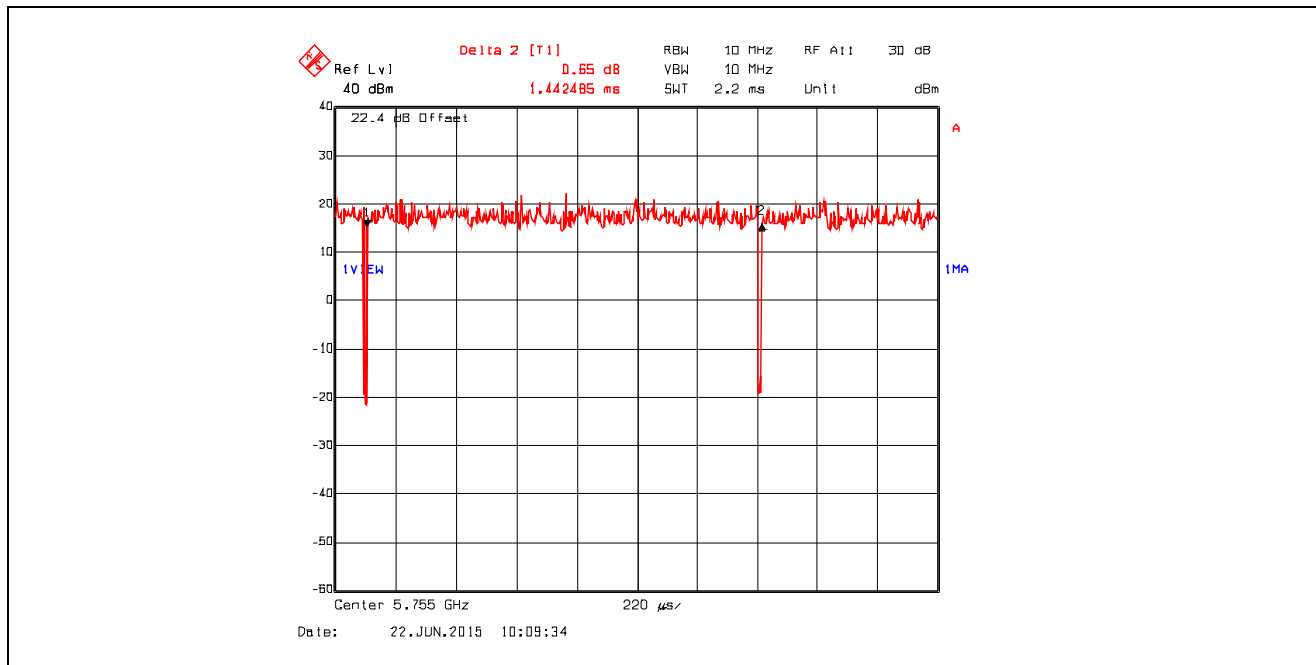
November 16, 2015

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

Plot 5.2.4.17. Duty Cycle, Data Rate 9, Ch 151, Pulse Width



Plot 5.2.4.18. Duty Cycle, Data Rate 9, Ch 151, Pulse Train



Duty Cycle Correction Factor = $10 \cdot \log [1 / (1.4249 / 1.4425)] = 0.053 \text{ dB}$

ULTRATECH GROUP OF LABS

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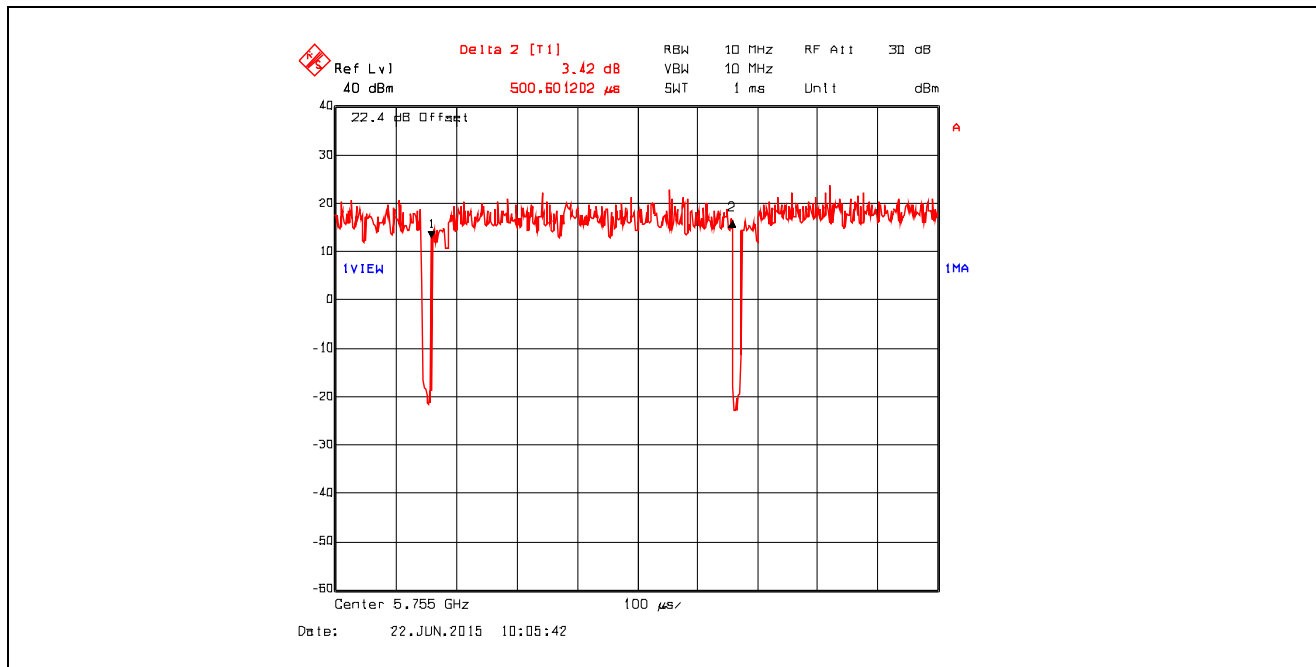
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 15MCRS079_FCC15E407

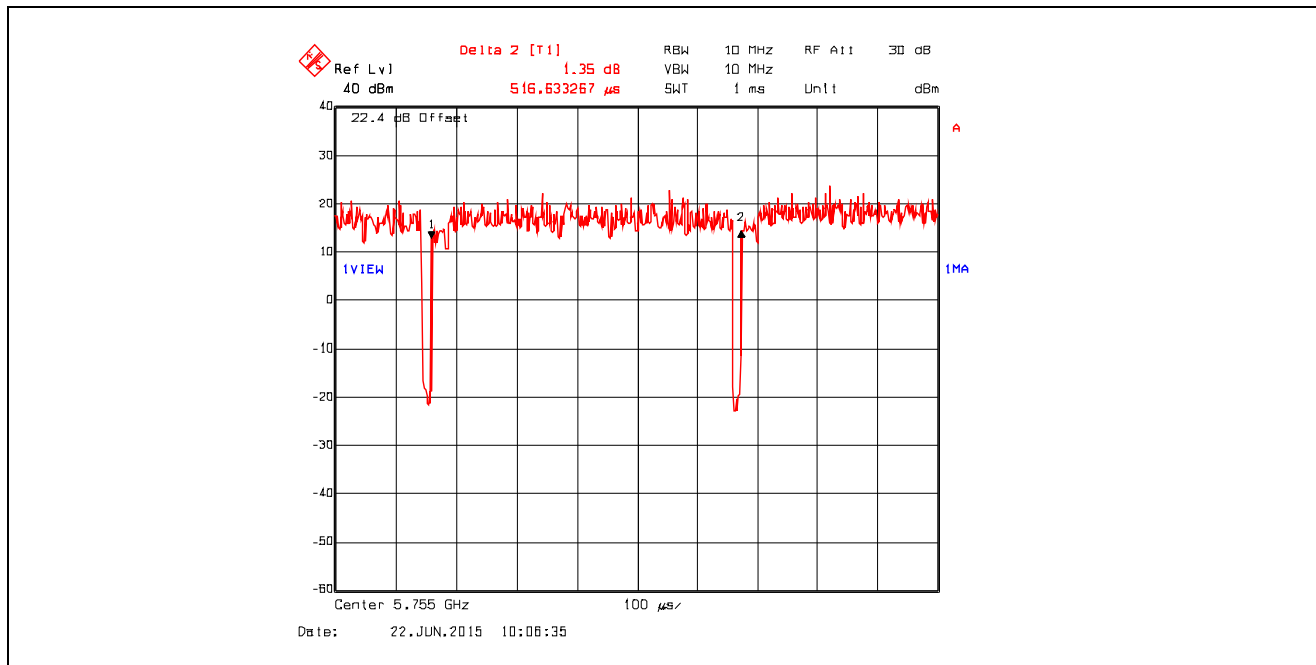
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Plot 5.2.4.19. Duty Cycle, Data Rate 10, Ch 151, Pulse Width



Plot 5.2.4.20. Duty Cycle, Data Rate 10, Ch 151, Pulse Train



$$\text{Duty Cycle Correction Factor} = 10 \cdot \log [1 / (500.6012 / 516.6333)] = 0.137 \text{ dB}$$

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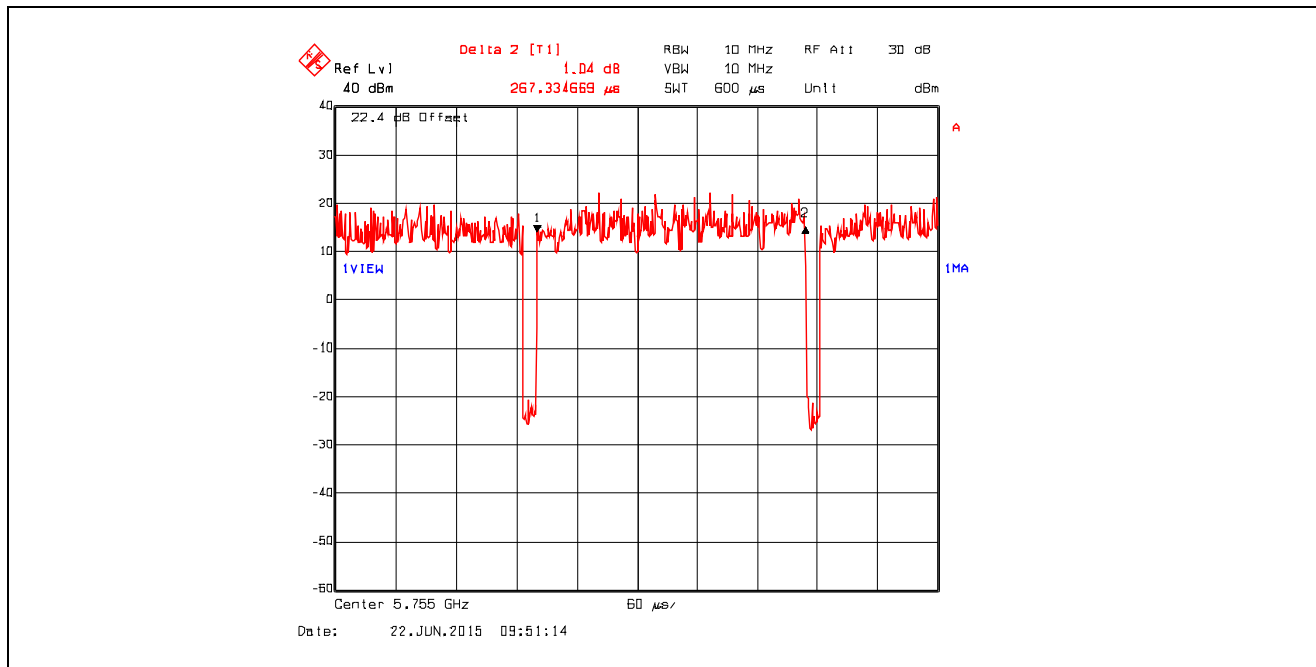
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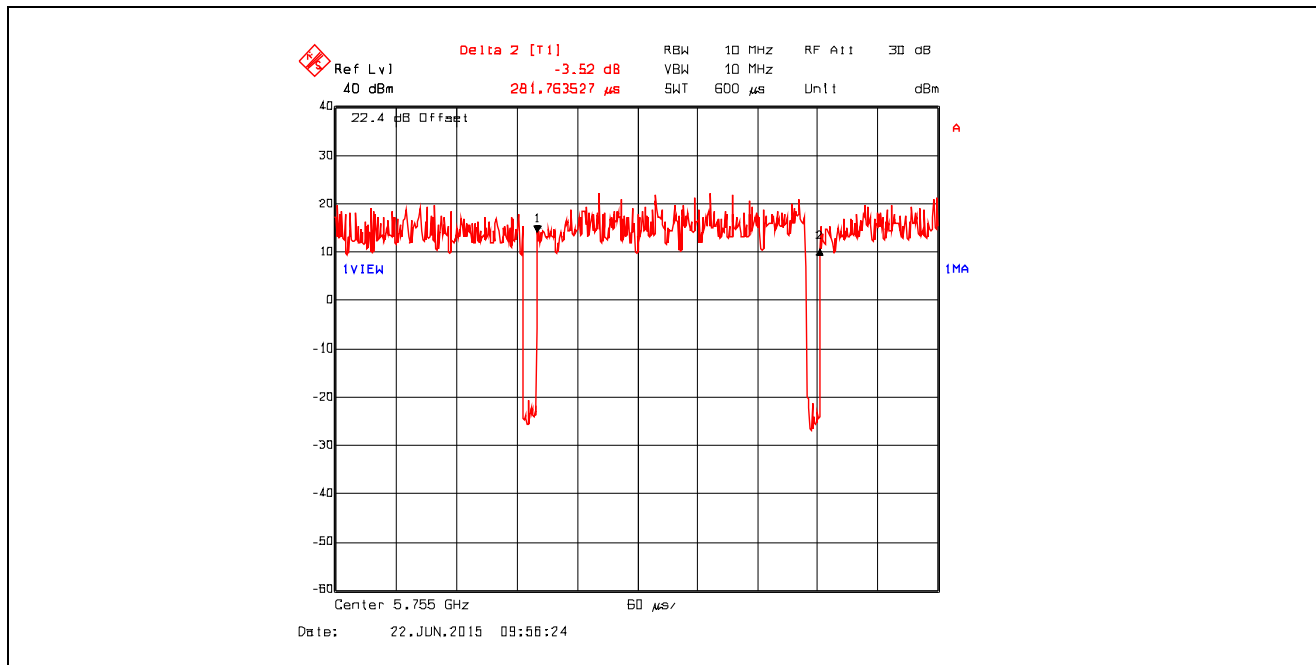
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Plot 5.2.4.21. Duty Cycle, Data Rate 11, Ch 151, Pulse Width



Plot 5.2.4.22. Duty Cycle, Data Rate 11, Ch 151, Pulse Train



Duty Cycle Correction Factor = $10 \cdot \log [1 / (267.3347 / 281.7635)] = 0.228 \text{ dB}$

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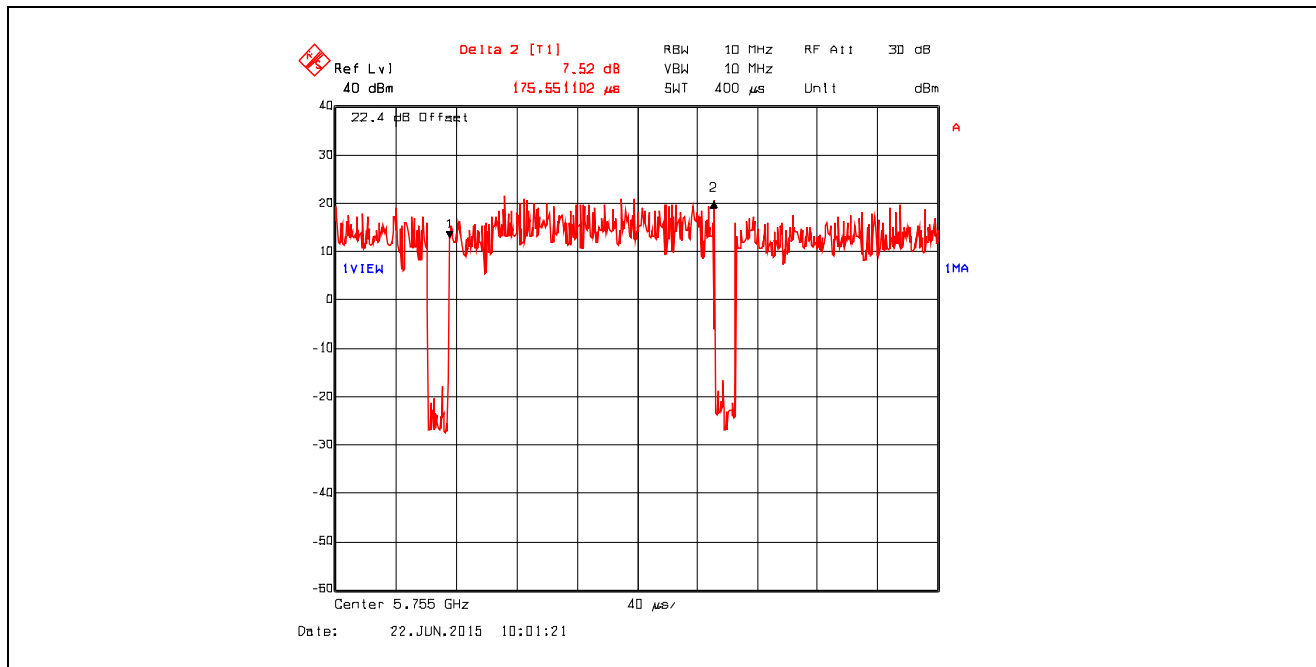
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 15MCRS079_FCC15E407

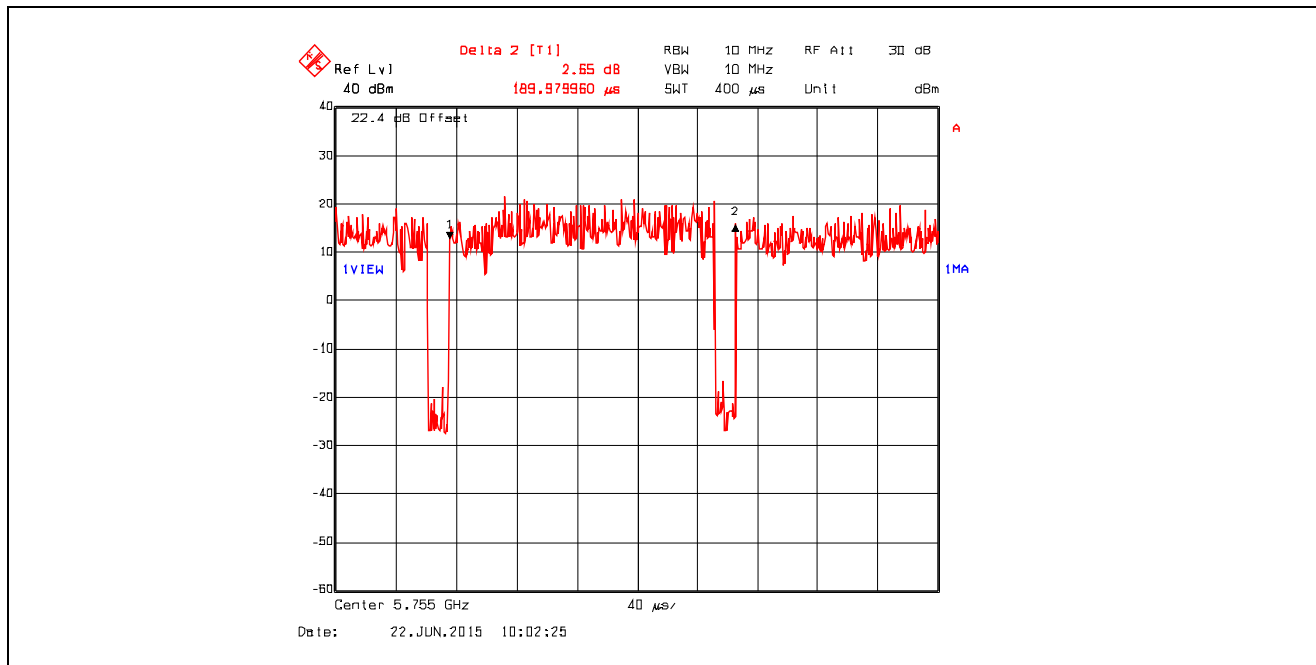
November 16, 2015

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

Plot 5.2.4.23. Duty Cycle, Data Rate 12, Ch 151, Pulse Width



Plot 5.2.4.24. Duty Cycle, Data Rate 12, Ch 151, Pulse Train



$$\text{Duty Cycle Correction Factor} = 10 \cdot \log [1 / (175.5511 / 189.9800)] = 0.343 \text{ dB}$$

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5.3. MAXIMUM CONDUCTED OUTPUT POWER [§ 15.407(a)]

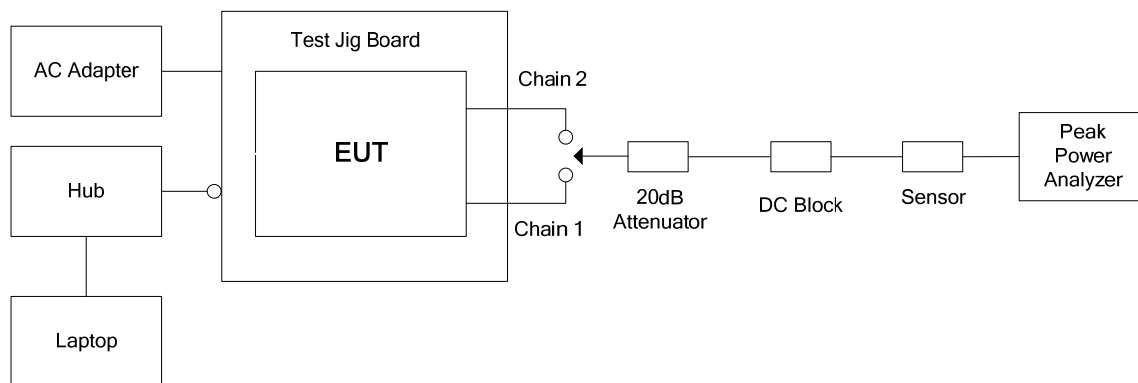
5.3.1. Limit(s)

§ 15.407(a)(3) For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

5.3.2. Method of Measurements

FCC KDB 789033 D02 General UNII Test Procedures New Rules v01, Section II.E.3.a
FCC KDB 662911 D01 Multiple Transmitter Output v02r01, Section E.1

5.3.3. Test Arrangement



5.3.4. Test Data

Data Rate	Output Power Setting	Channel	Frequency (MHz)	Average Power (dBm)		Duty Cycle Correction Factor (dB)	*Total Average Power		**EIRP (dBm)
				Chain # 1	Chain # 2		(dBm)	(mW)	
1	13	149	5745	15.29	14.56	0.033	17.98	62.81	19.96
	19	157	5785	19.72	19.37	0.033	22.59	181.55	24.57
	18	165	5825	18.26	18.65	0.033	21.50	141.25	23.48
2	13	149	5745	16.34	16.25	0.049	19.35	86.10	21.33
	19	157	5785	19.39	20.15	0.049	22.85	192.75	24.83
	18	165	5825	18.07	19.45	0.049	21.87	153.82	23.85
3	13	149	5745	15.21	16.25	0.127	18.90	77.62	20.88
	19	157	5785	20.49	18.76	0.127	22.85	192.75	24.83
	18	165	5825	18.37	18.36	0.127	21.50	141.25	23.48
4	13	149	5745	17.15	16.32	0.178	19.94	98.63	21.92
	19	157	5785	20.35	18.85	0.178	22.85	192.75	24.83
	18	165	5825	19.35	17.90	0.178	21.87	153.82	23.85
5	13	149	5745	16.83	16.35	0.029	19.64	92.04	21.62
	19	157	5785	19.12	20.13	0.029	22.69	185.78	24.67
	18	165	5825	18.98	19.23	0.029	22.15	164.06	24.13
6	13	149	5745	16.22	16.24	0.052	19.29	84.92	21.27
	19	157	5785	19.87	20.07	0.052	23.03	200.91	25.01
	18	165	5825	18.97	19.15	0.052	22.12	162.93	24.10
7	13	149	5745	16.13	17.62	0.116	20.06	101.39	22.04
	19	157	5785	19.59	20.35	0.116	23.11	204.64	25.09
	18	165	5825	19.38	19.62	0.116	22.63	183.23	24.61
8	13	149	5745	17.58	17.64	0.184	20.80	120.23	22.78
	19	157	5785	19.75	21.23	0.184	23.75	237.14	25.73
	18	165	5825	19.55	19.61	0.184	22.77	189.23	24.75
9	7	151	5755	9.25	10.54	0.053	13.01	20.00	14.99
	18	159	5795	20.60	20.68	0.053	23.70	234.42	25.68
10	7	151	5755	9.33	10.83	0.137	13.29	21.33	15.27
	18	159	5795	20.77	20.92	0.137	23.99	250.61	25.97
11	7	151	5755	10.26	10.85	0.228	13.80	23.99	15.78
	18	159	5795	20.75	20.87	0.228	24.05	254.10	26.03
12	7	151	5755	10.39	11.07	0.343	14.10	25.70	16.08
	18	159	5795	20.95	21.00	0.343	24.33	271.02	26.31
*Total Average Power = (Average Power of Chan #1 + Average Power of Chan #2) + Duty Cycle Correction Factor ** EIRP = Total Average Power (dBm) + Antenna Assembly Gain (1.98 dBi)									

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5.4. POWER SPECTRAL DENSITY [§ 15.407(a)]

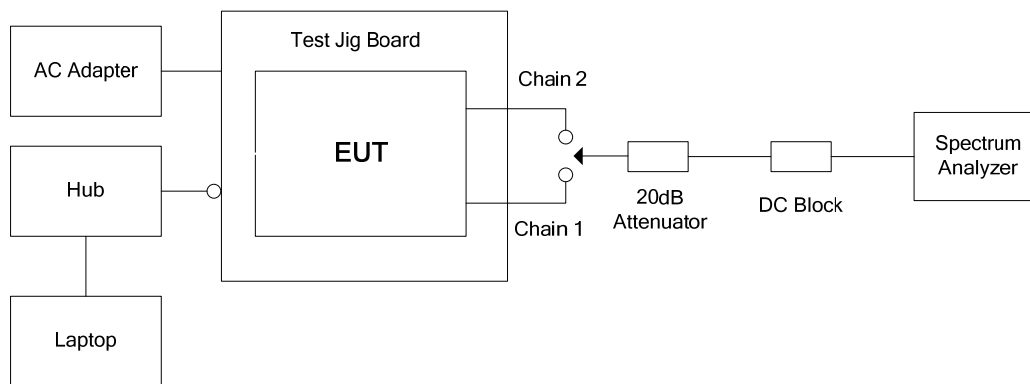
5.4.1. Limit(s)

§ 15.407(a)(3) The maximum power spectral density shall not exceed 30 dBm in any 500 kHz band.

5.4.2. Method of Measurements

FCC KDB 789033 D02 General UNII Test Procedures New Rules v01, Section II F, SA-2 Test Method.
FCC KDB 662911 D01 Multiple Transmitter Output v02r01, Section E.2.b.

5.4.3. Test Arrangement



5.4.4. Test Data

Operating Mode	Software Output Power Setting	Channel Number	Frequency (MHz)	Average Power (dBm)		Duty Cycle (dB)	Max. PSD (dBm)	Limit (dBm/500 kHz)	Margin (dBm)
				Chain # 1	Chain # 2				
Data Rate 1	13	149	5745	-1.39	-2.35	0.037	1.20	30.00	-28.80
	19	157	5785	1.69	4.07	0.037	6.08	30.00	-23.92
	18	165	5825	-0.90	3.18	0.037	4.64	30.00	-25.36
Data Rate 2	13	149	5745	-1.71	-2.26	0.049	1.08	30.00	-28.92
	19	157	5785	1.77	3.65	0.049	5.87	30.00	-24.13
	18	165	5825	-1.19	3.11	0.049	4.53	30.00	-25.47
Data Rate 3	13	149	5745	-1.84	-2.16	0.127	1.14	30.00	-28.86
	19	157	5785	1.51	3.55	0.127	5.79	30.00	-24.21
	18	165	5825	-1.29	2.88	0.127	4.42	30.00	-25.58
Data Rate 4	13	149	5745	-1.76	-2.61	0.178	1.03	30.00	-28.97
	19	157	5785	1.34	3.33	0.178	5.64	30.00	-24.36
	18	165	5825	-1.63	3.03	0.178	4.49	30.00	-25.51
Data Rate 5	13	149	5745	-2.11	-2.42	0.029	0.78	30.00	-29.22
	19	157	5785	1.59	3.64	0.029	5.78	30.00	-24.22
	18	165	5825	-1.30	2.86	0.029	4.30	30.00	-25.70
Data Rate 6	13	149	5745	-2.09	-2.32	0.052	0.86	30.00	-29.14
	19	157	5785	1.44	3.62	0.052	5.73	30.00	-24.27
	18	165	5825	-1.38	2.82	0.052	4.27	30.00	-25.73
Data Rate 7	13	149	5745	-2.00	-2.50	0.116	0.89	30.00	-29.11
	19	157	5785	1.19	3.74	0.116	5.78	30.00	-24.22
	18	165	5825	-1.60	2.68	0.116	4.18	30.00	-25.82
Data Rate 8	13	149	5745	-2.12	-2.68	0.184	0.80	30.00	-29.20
	19	157	5785	1.20	3.68	0.184	5.80	30.00	-24.20
	18	165	5825	-1.67	3.03	0.184	4.48	30.00	-25.52

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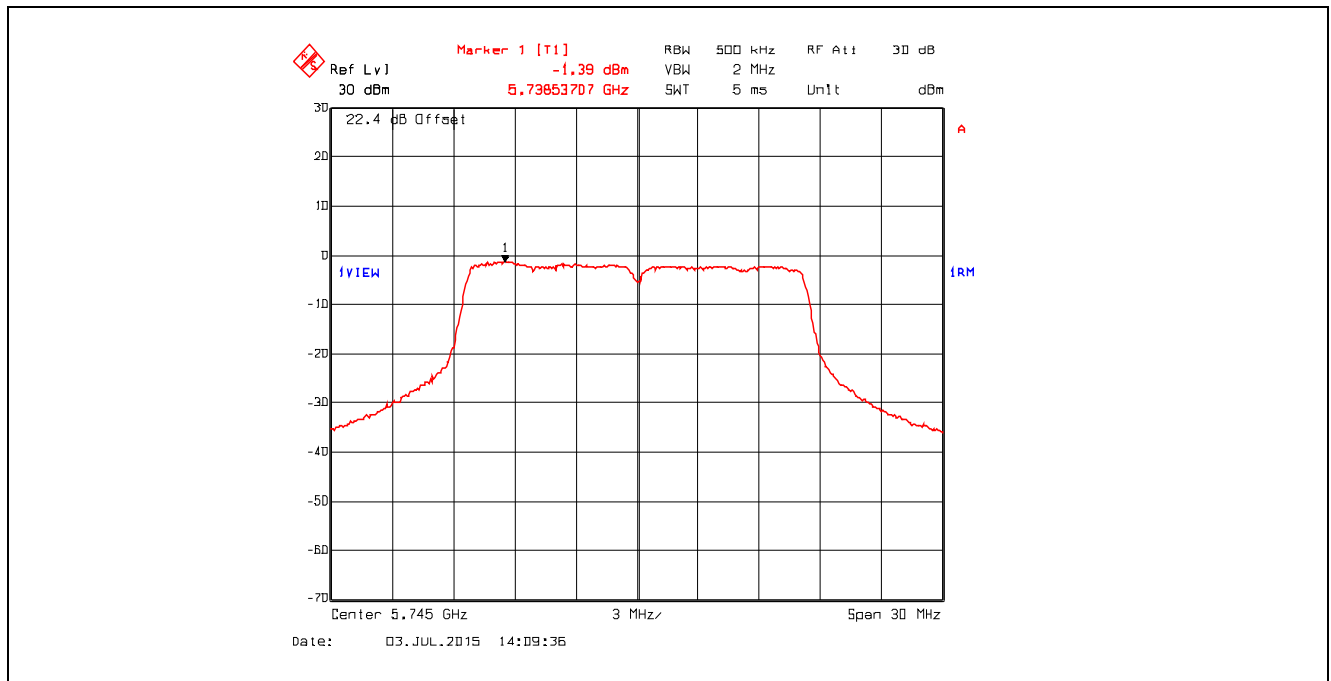
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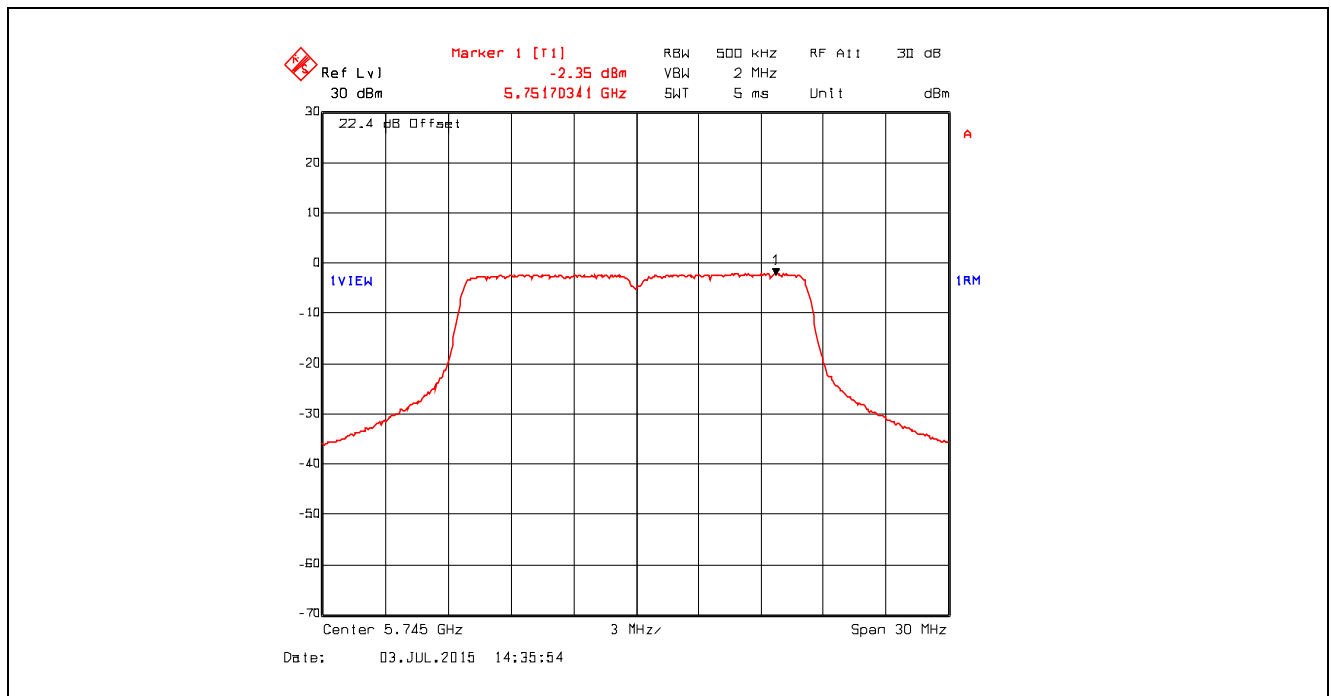
Operating Mode	Software Output Power Setting	Channel Number	Frequency (MHz)	Peak Power (dBm)		Duty Cycle (dB)	Max. PSD (dBm)	Limit (dBm/500 kHz)	Margin (dBm)
				Chain # 1	Chain # 2				
Data Rate 9	7	151	5755	-10.36	-9.54	0.053	-6.87	30.00	-36.87
	18	159	5795	-2.30	0.23	0.053	2.21	30.00	-27.79
Data Rate 10	7	151	5755	-10.34	-9.74	0.137	-6.88	30.00	-36.88
	18	159	5795	-2.42	0.11	0.137	2.18	30.00	-27.82
Data Rate 11	7	151	5755	-10.44	-9.69	0.228	-6.81	30.00	-36.81
	18	159	5795	-2.60	0.06	0.228	2.17	30.00	-27.83
Data Rate 12	7	151	5755	-10.56	-10.13	0.343	-6.99	30.00	-36.99
	18	159	5795	-2.54	-0.41	0.343	2.00	30.00	-28.00

See the following plots for detailed measurements.

Plot 5.4.4.1. Power Spectral Density, Data Rate 1, Chain # 1, Ch 149, 5745 MHz, Software Output Power Setting 13



Plot 5.4.4.2. Power Spectral Density, Data Rate 1, Chain # 2, Ch 149, 5745 MHz, Software Output Power Setting 13



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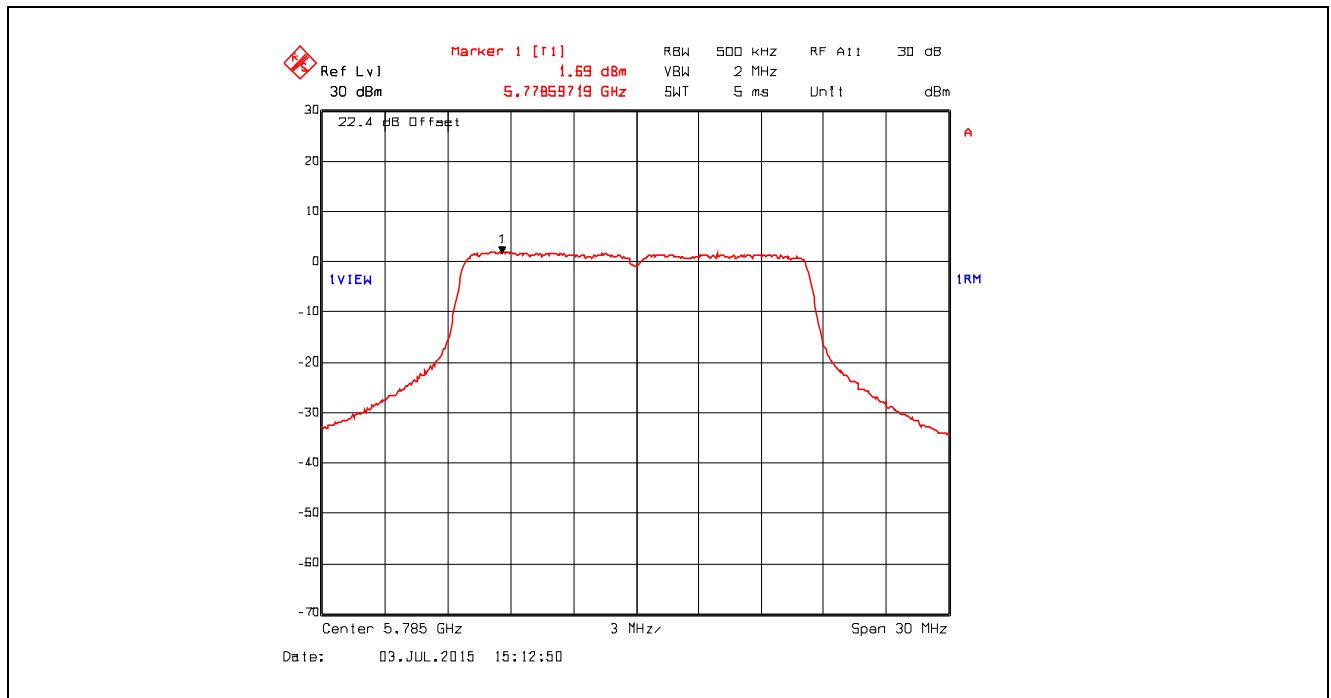
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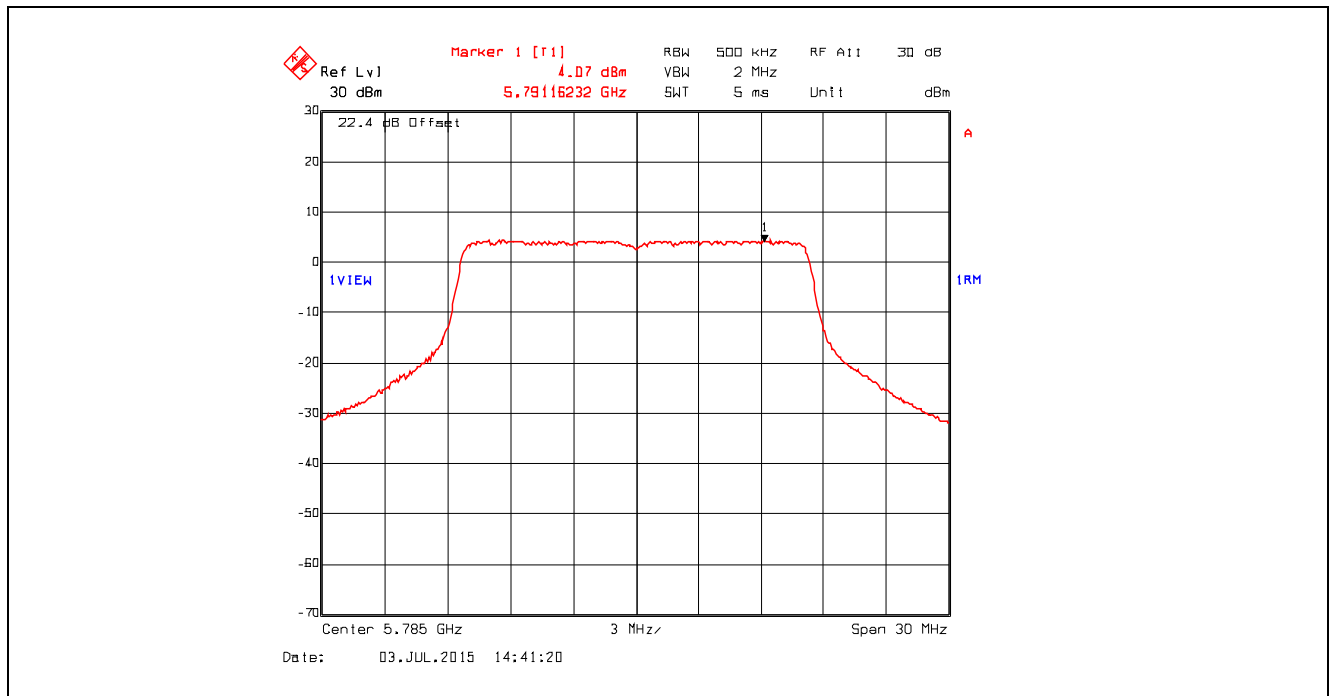
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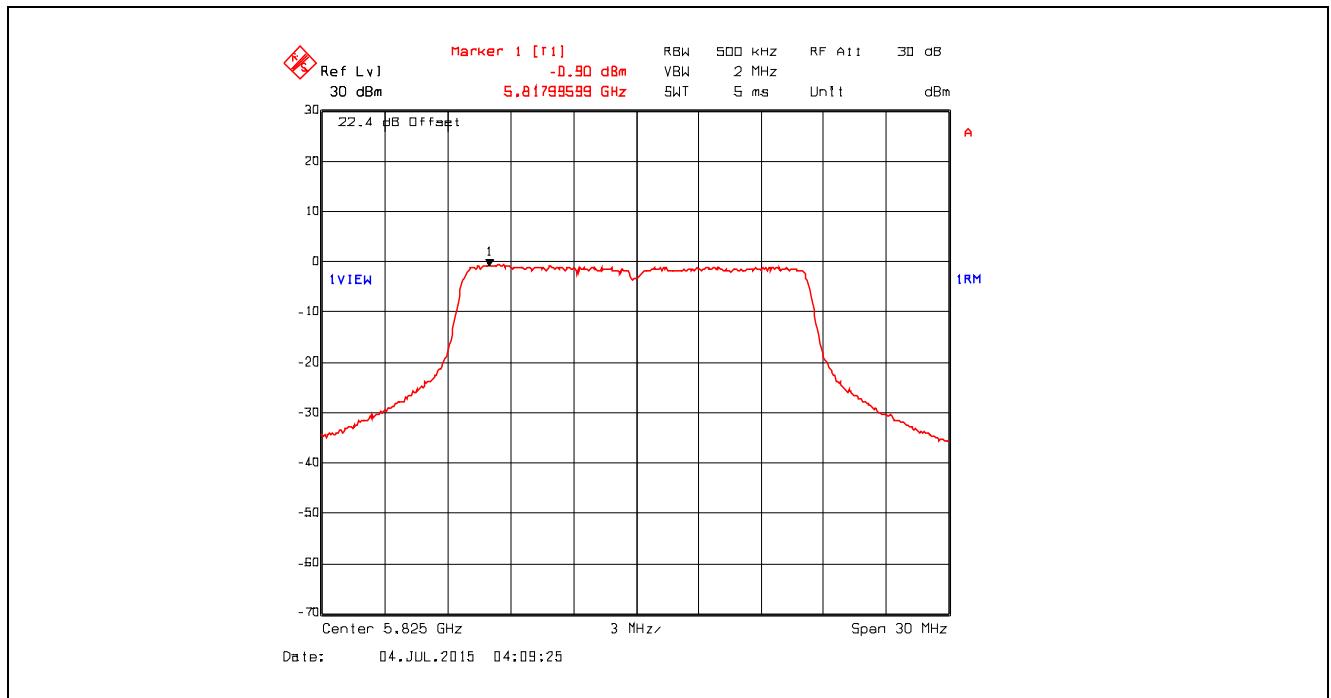
Plot 5.4.4.3. Power Spectral Density, Data Rate 1, Chain # 1, Ch 157, 5785 MHz, Software Output Power Setting 19



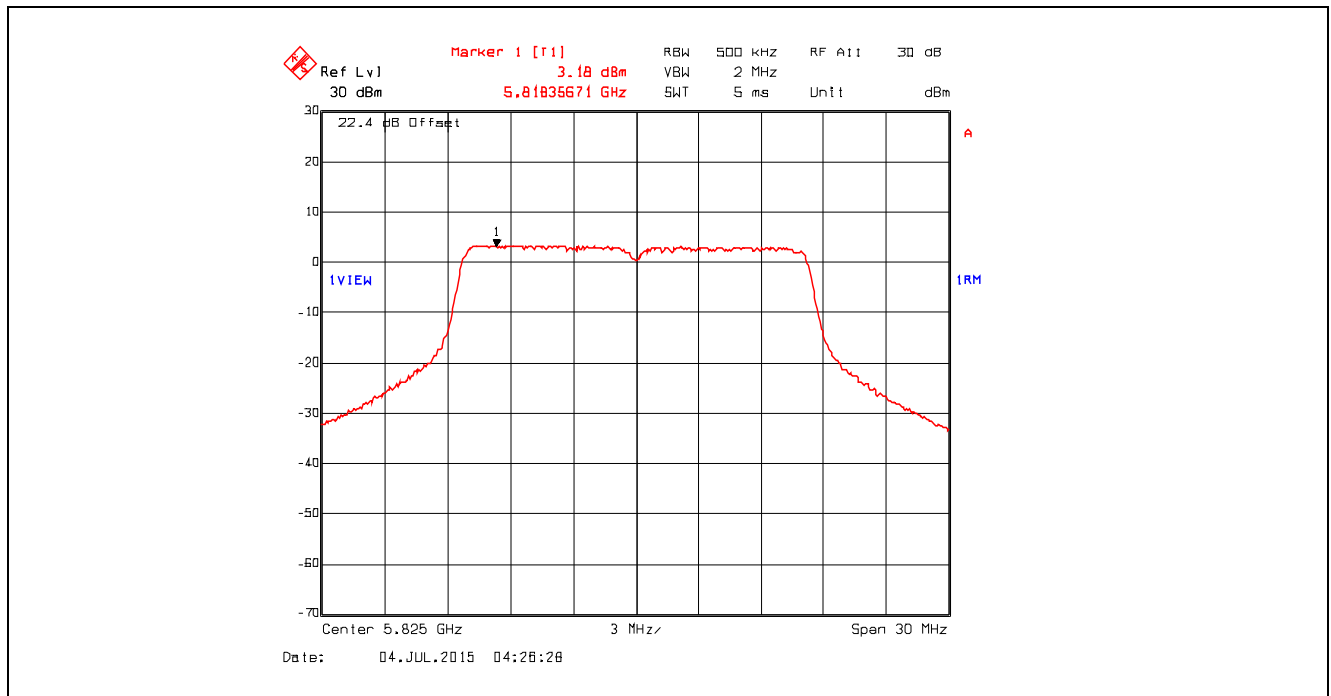
Plot 5.4.4.4. Power Spectral Density, Data Rate 1, Chain # 2, Ch 157, 5785 MHz, Software Output Power Setting 19



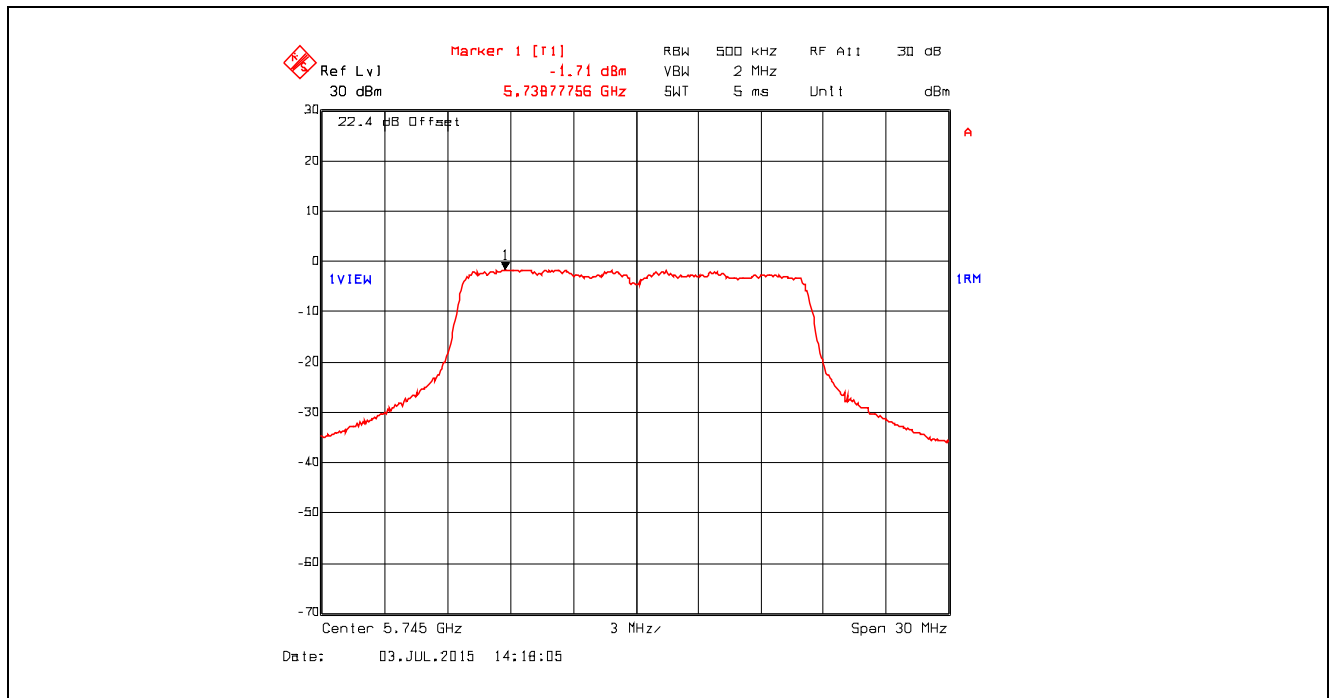
Plot 5.4.4.5. Power Spectral Density, Data Rate 1, Chain # 1, Ch 165, 5825 MHz, Software Output Power Setting 18



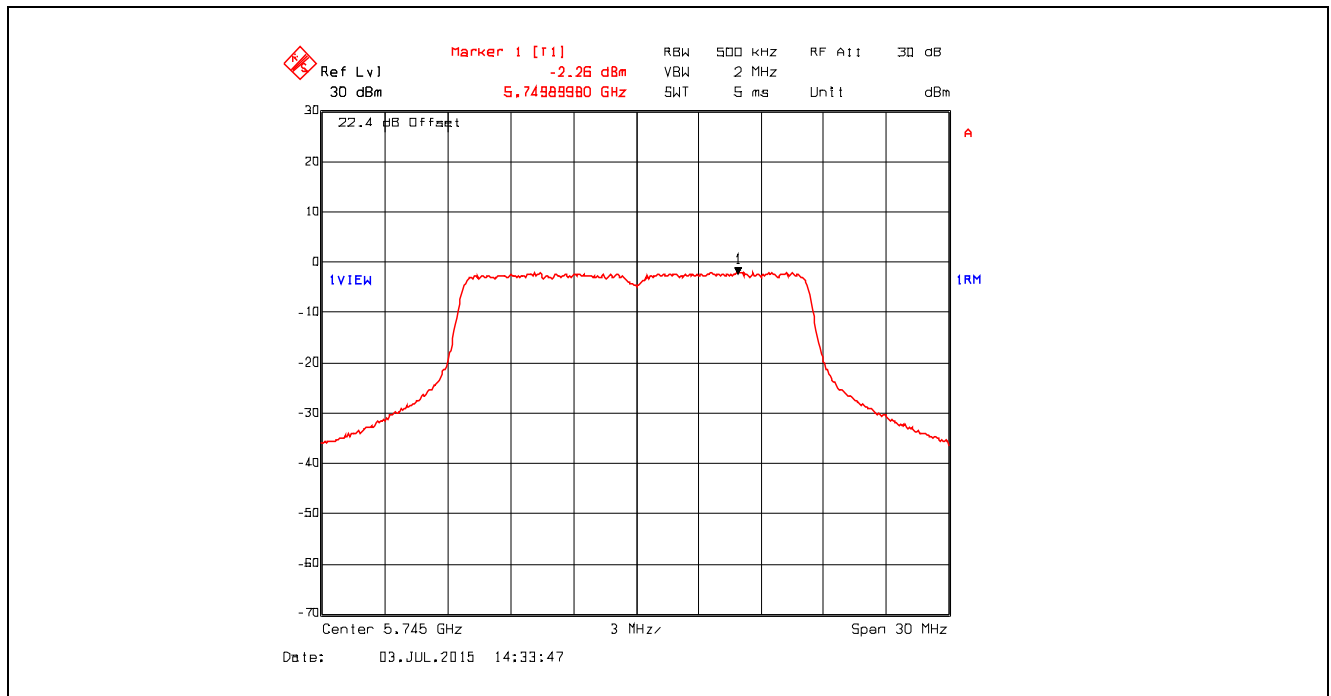
Plot 5.4.4.6. Power Spectral Density, Data Rate 1, Chain # 2, Ch 165, 5825 MHz, Software Output Power Setting 18



Plot 5.4.4.7. Power Spectral Density, Data Rate 2, Chain # 1, Ch 149, 5745 MHz, Software Output Power Setting 13



Plot 5.4.4.8. Power Spectral Density, Data Rate 2, Chain # 2, Ch 149, 5745 MHz, Software Output Power Setting 13



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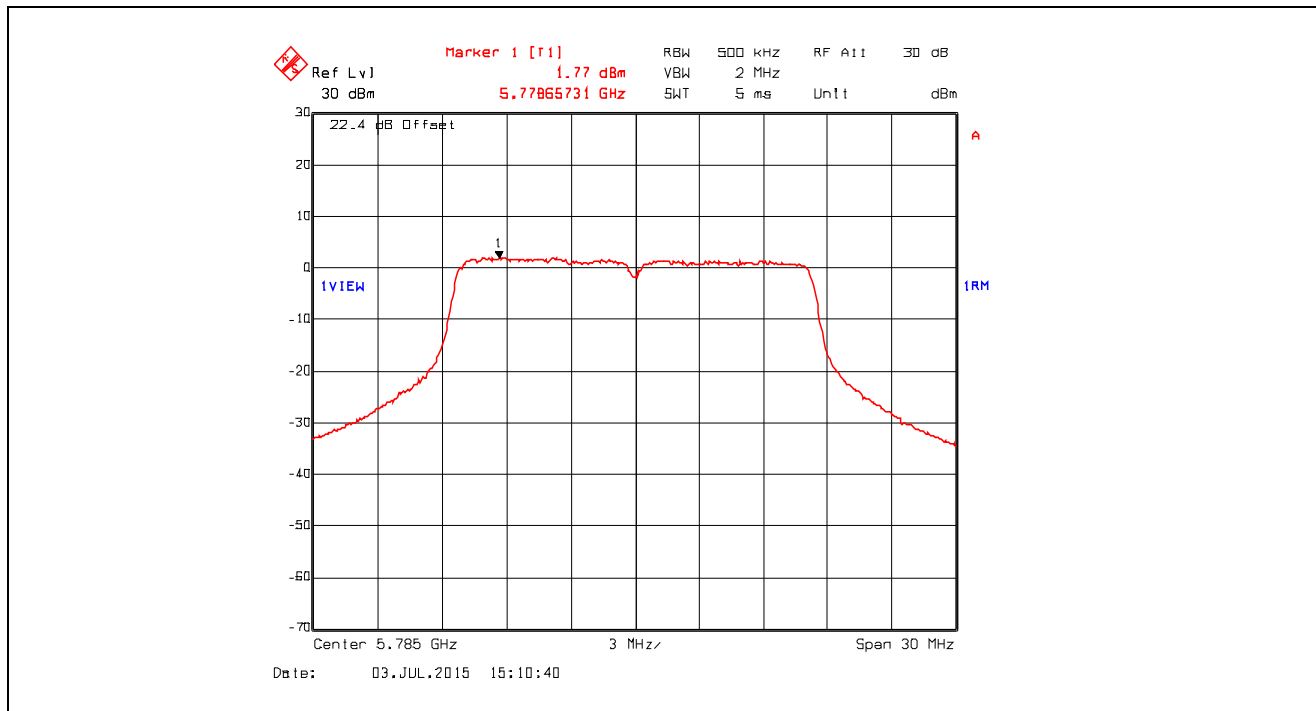
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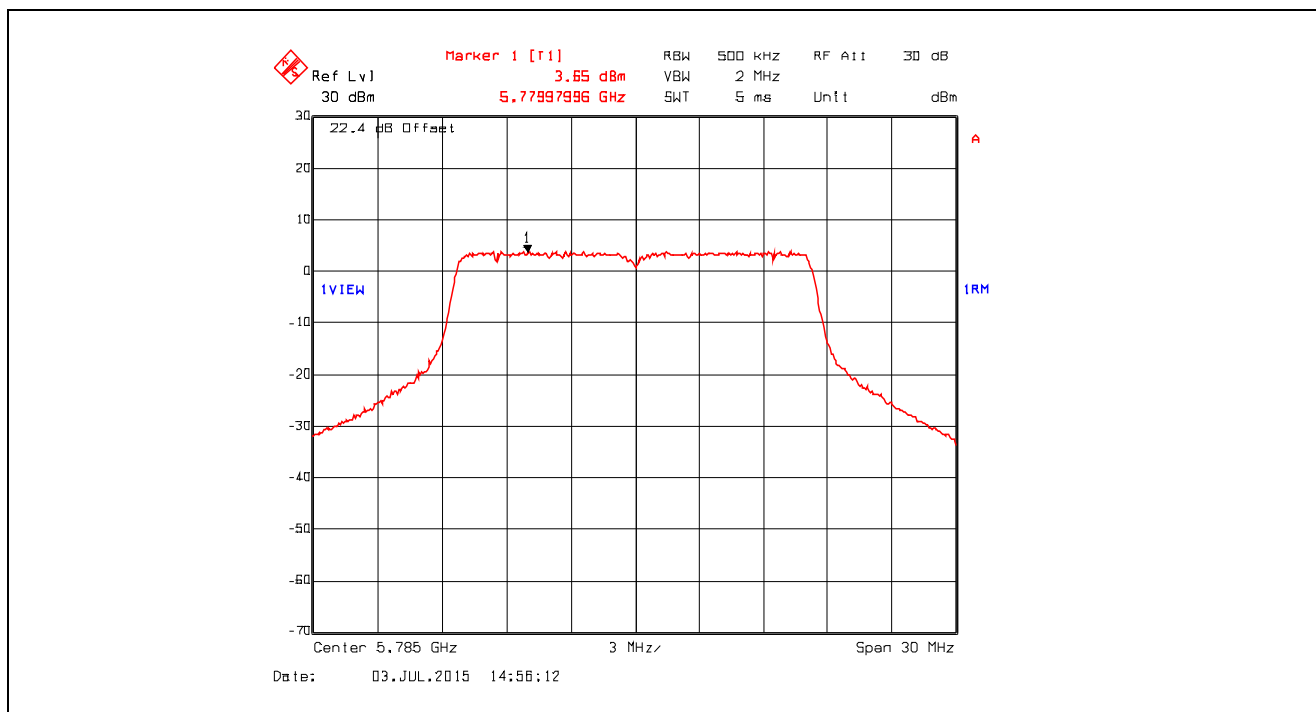
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Plot 5.4.4.9. Power Spectral Density, Data Rate 2, Chain # 1, Ch 157, 5785 MHz, Software Output Power Setting 19



Plot 5.4.4.10. Power Spectral Density, Data Rate 2, Chain # 2, Ch 157, 5785 MHz, Software Output Power Setting 19



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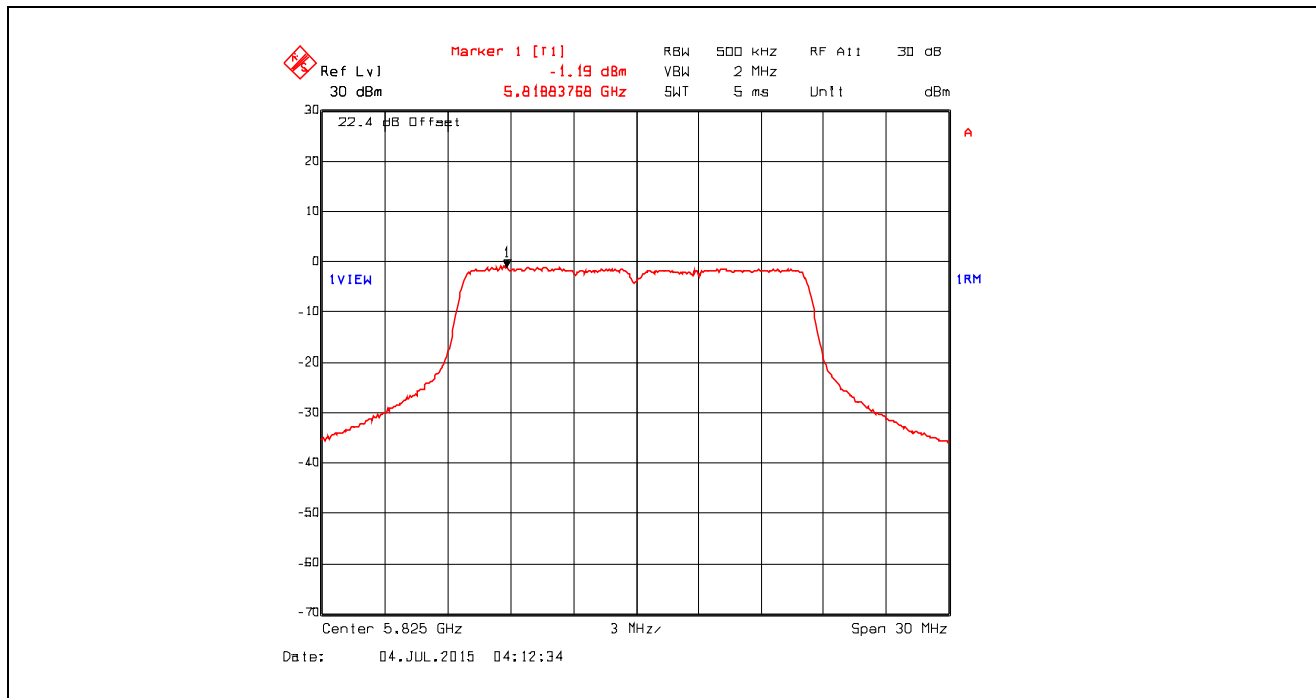
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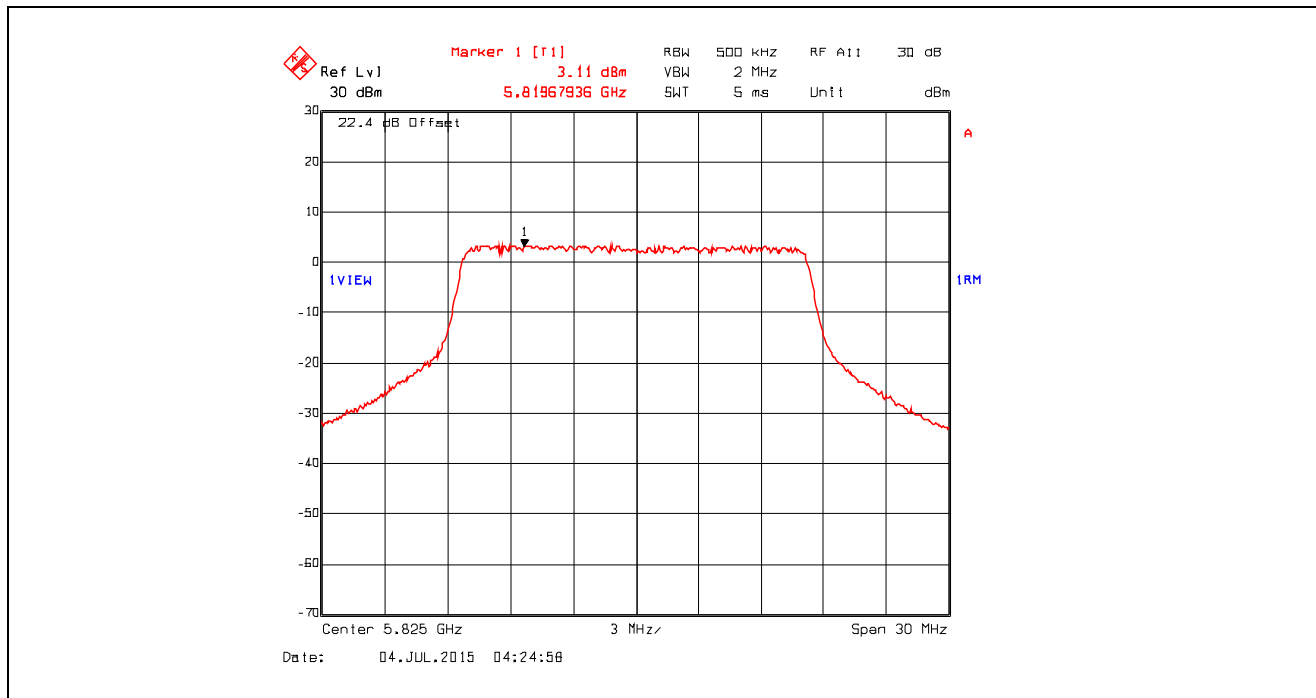
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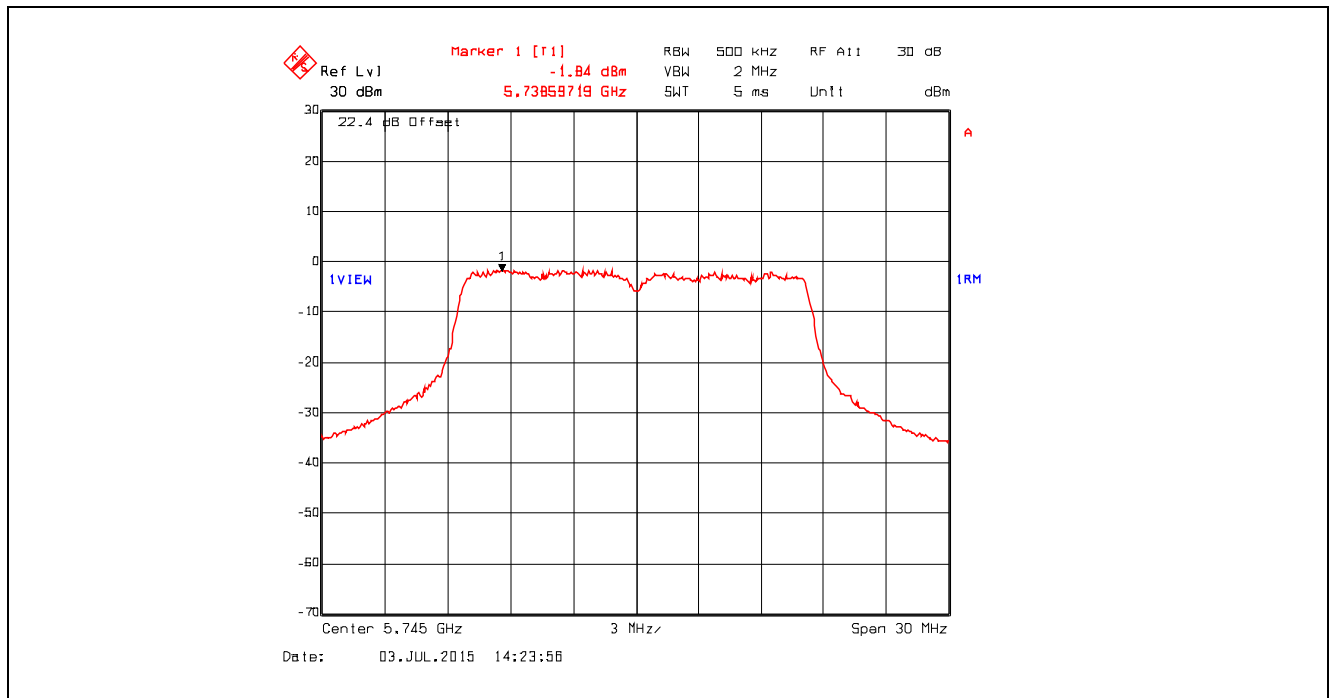
Plot 5.4.4.11. Power Spectral Density, Data Rate 2, Chain # 1, Ch 165, 5825 MHz, Software Output Power Setting 18



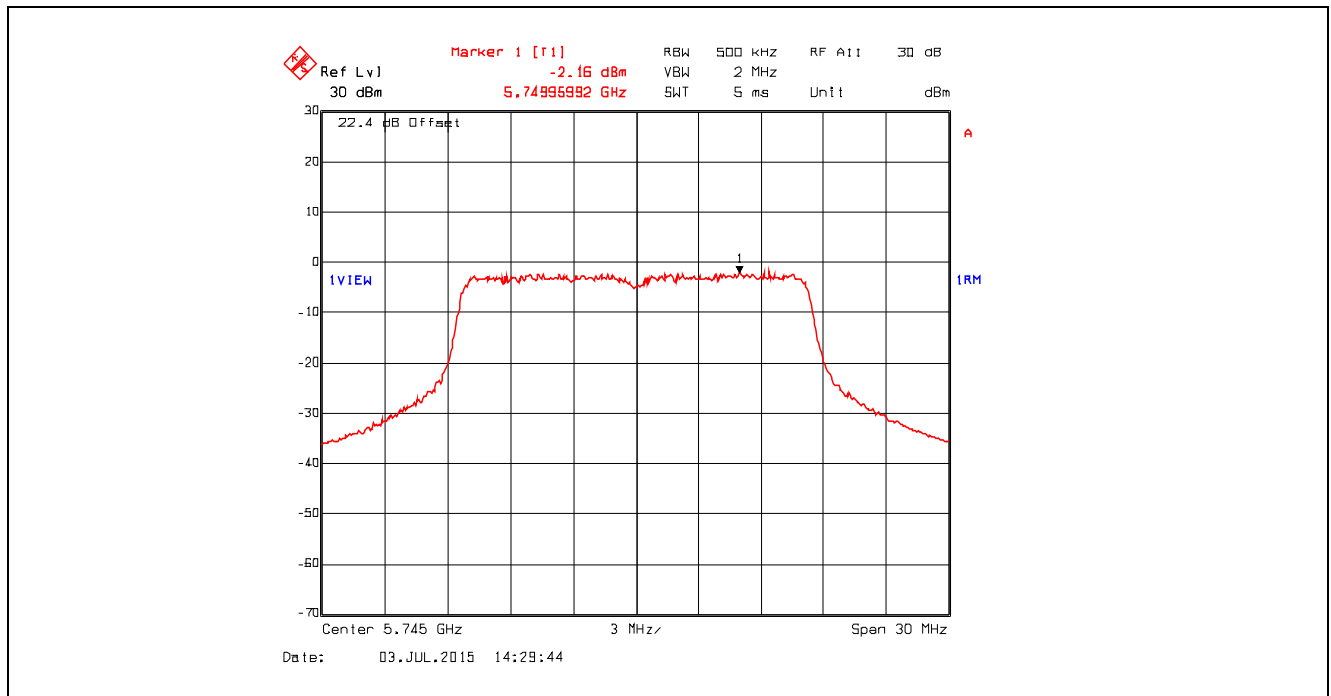
Plot 5.4.4.12. Power Spectral Density, Data Rate 2, Chain # 2, Ch 165, 5825 MHz, Software Output Power Setting 18



Plot 5.4.4.13. Power Spectral Density, Data Rate 3, Chain # 1, Ch 149, 5745 MHz, Software Output Power Setting 13



Plot 5.4.4.14. Power Spectral Density, Data Rate 3, Chain # 2, Ch 149, 5745 MHz, Software Output Power Setting 13



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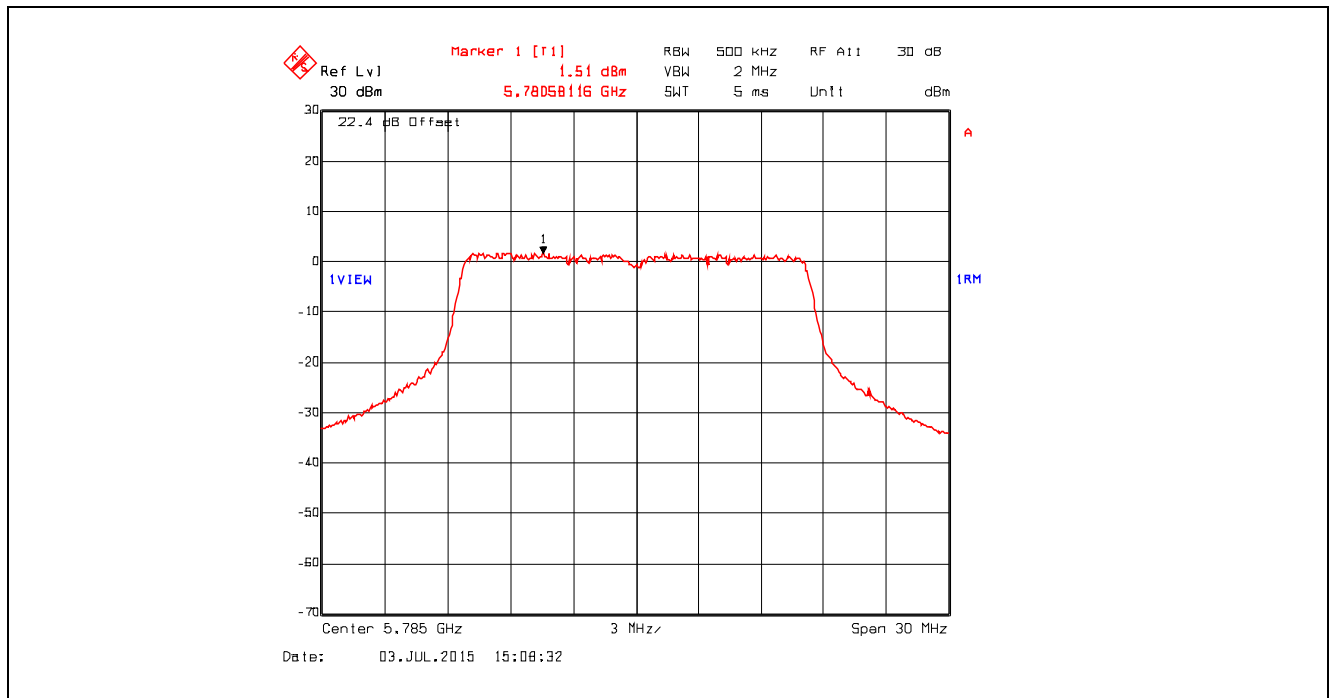
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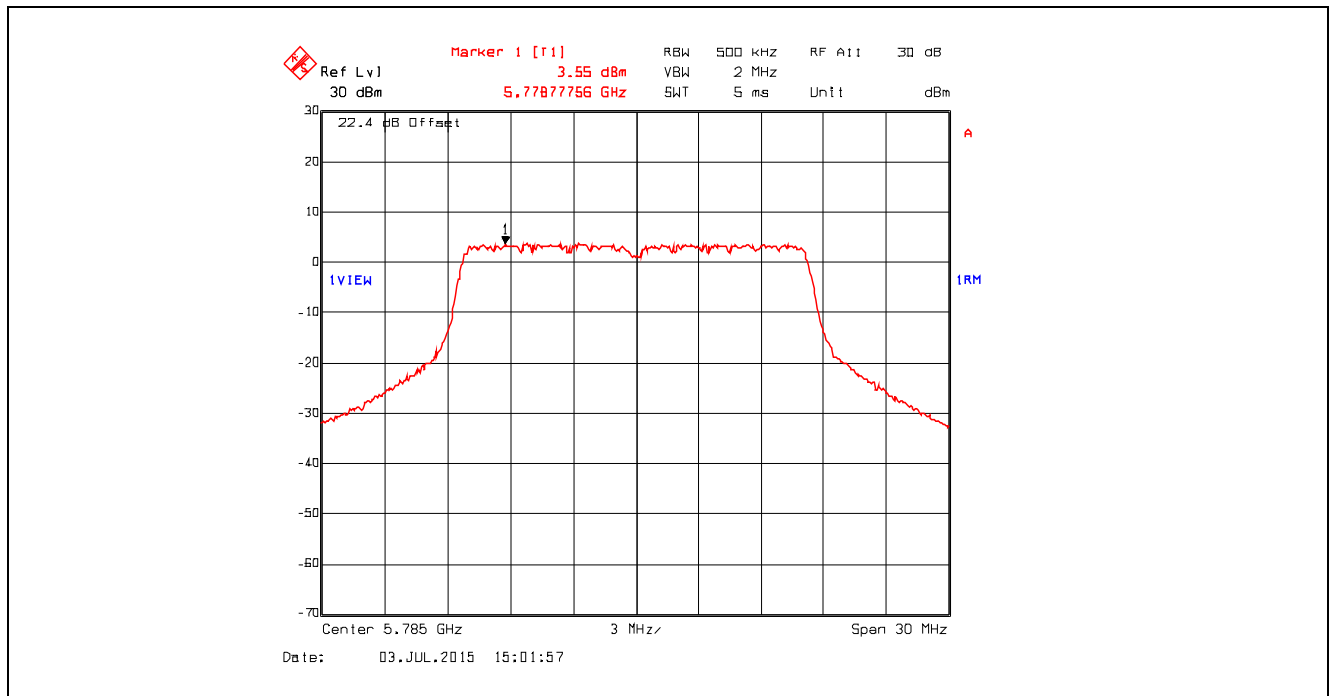
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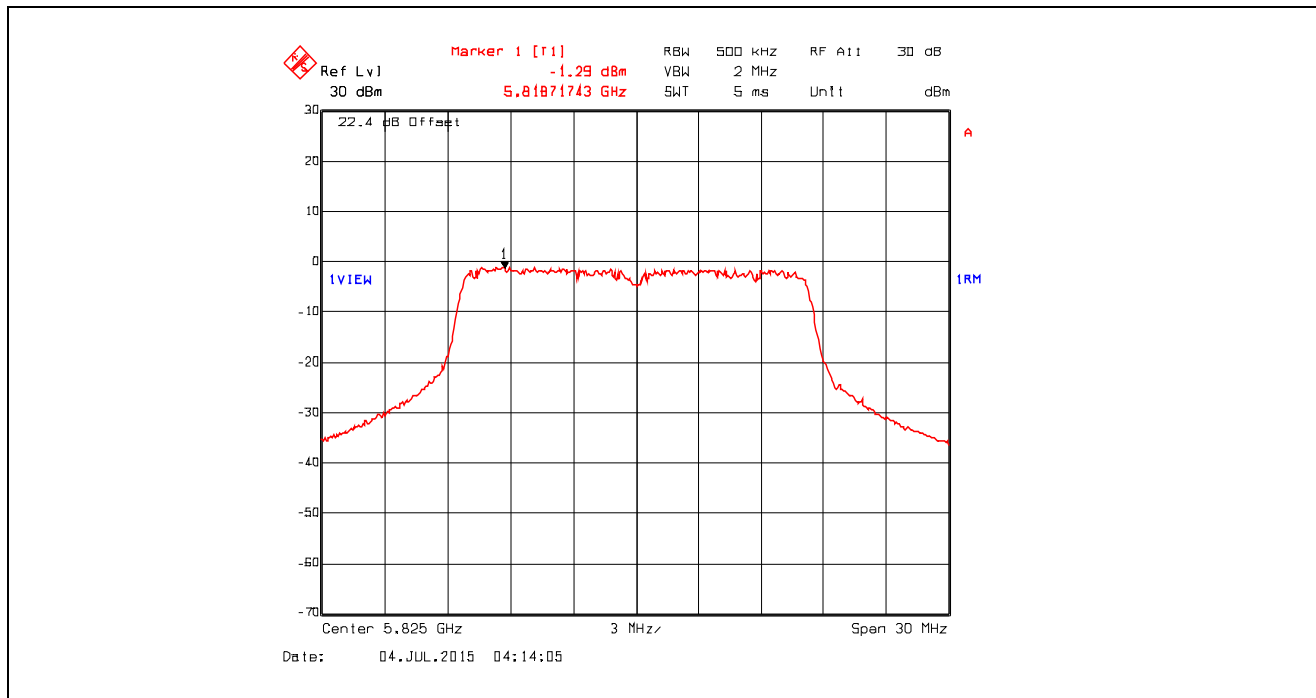
Plot 5.4.4.15. Power Spectral Density, Data Rate 3, Chain # 1, Ch 157, 5785 MHz, Software Output Power Setting 19



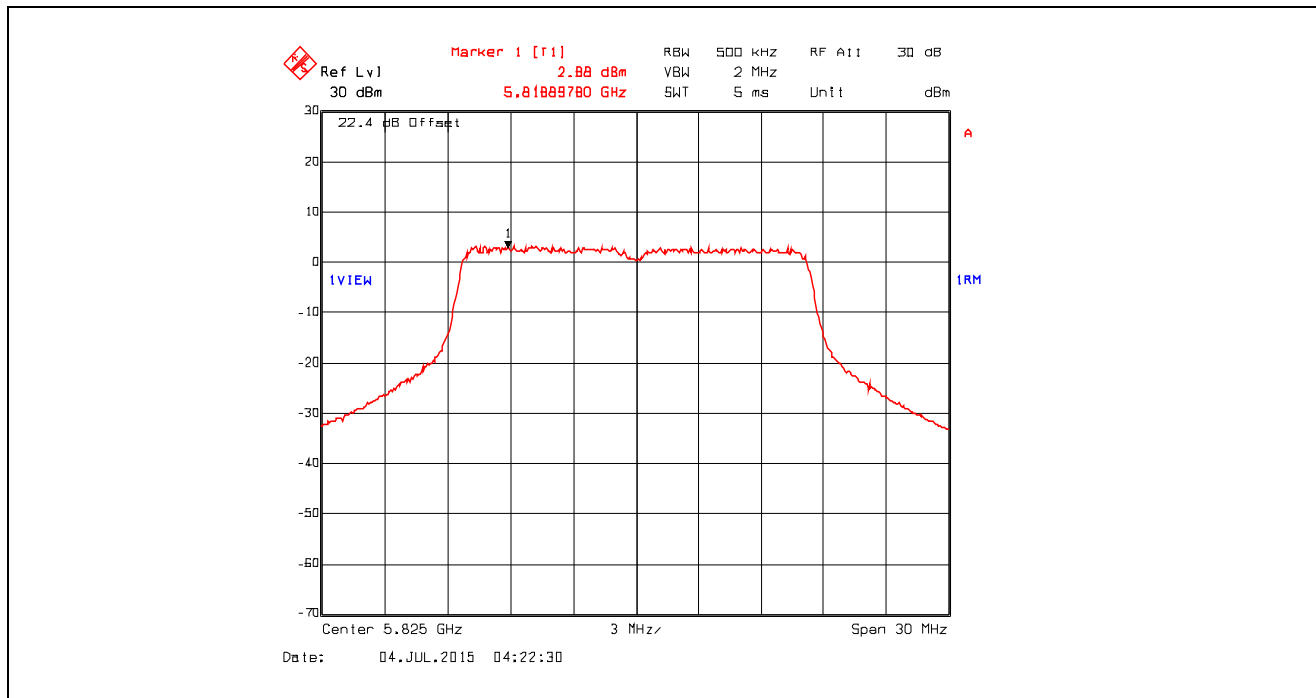
Plot 5.4.4.16. Power Spectral Density, Data Rate 3, Chain # 2, Ch 157, 5785 MHz, Software Output Power Setting 19



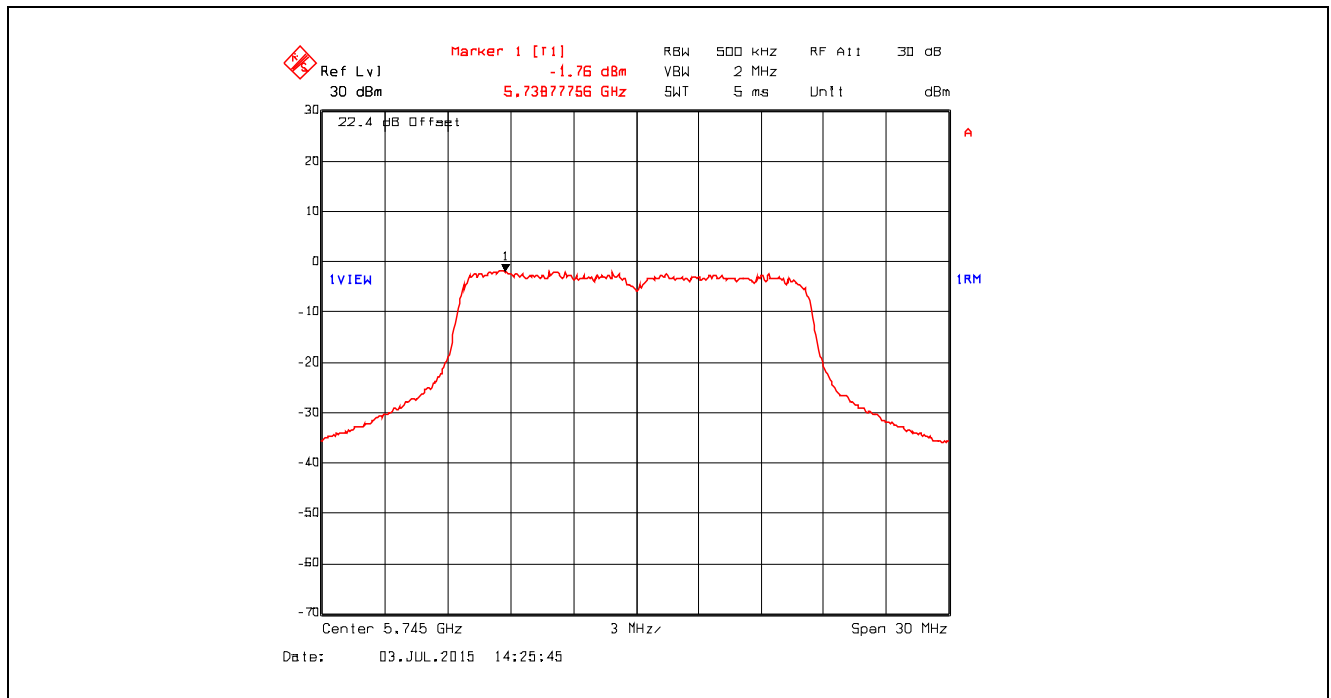
Plot 5.4.4.17. Power Spectral Density, Data Rate 3, Chain # 1, Ch 165, 5825 MHz, Software Output Power Setting 18



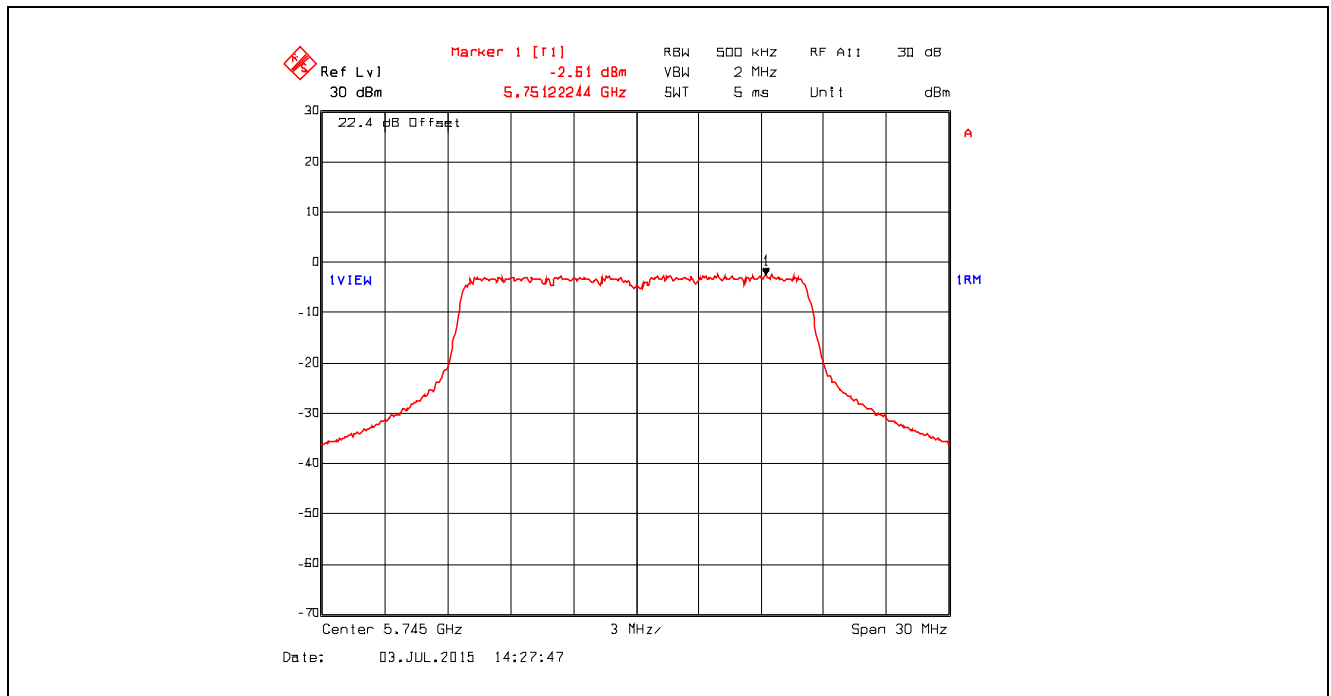
Plot 5.4.4.18. Power Spectral Density, Data Rate 3, Chain # 2, Ch 165, 5825 MHz, Software Output Power Setting 18



Plot 5.4.4.19. Power Spectral Density, Data Rate 4, Chain # 1, Ch 149, 5745 MHz, Software Output Power Setting 13



Plot 5.4.4.20. Power Spectral Density, Data Rate 4, Chain # 2, Ch 149, 5745 MHz, Software Output Power Setting 13



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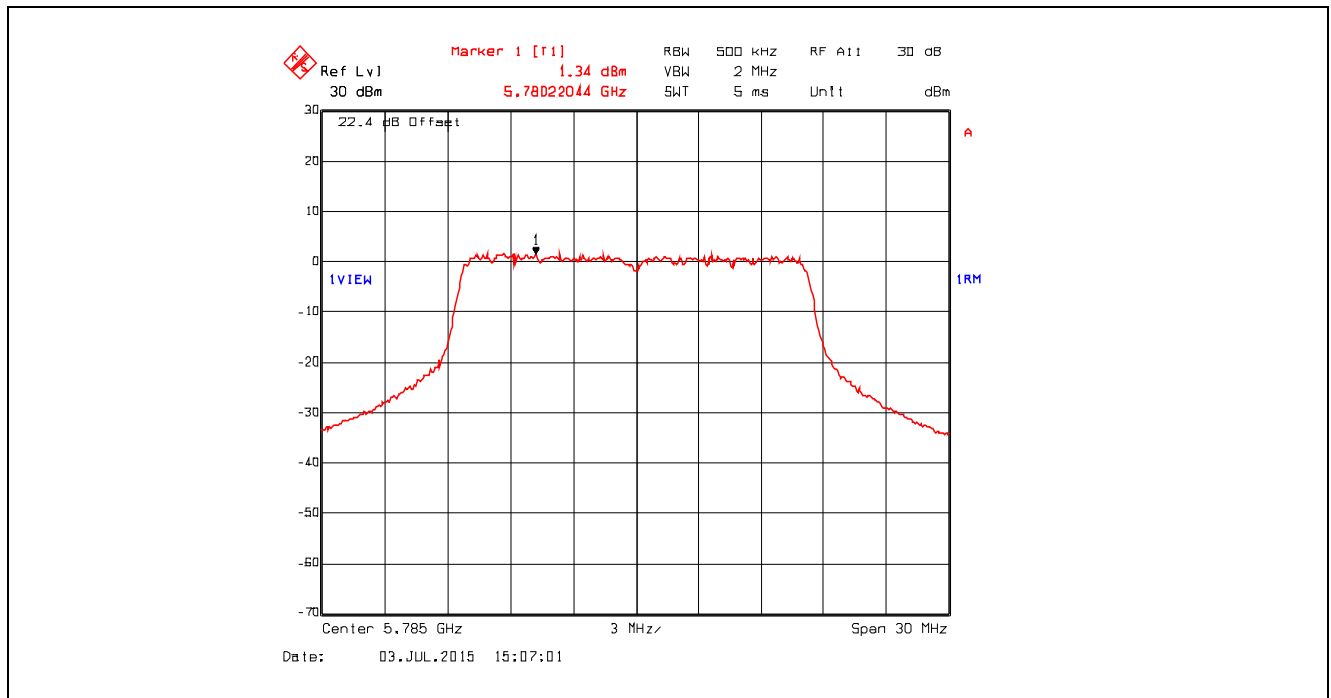
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

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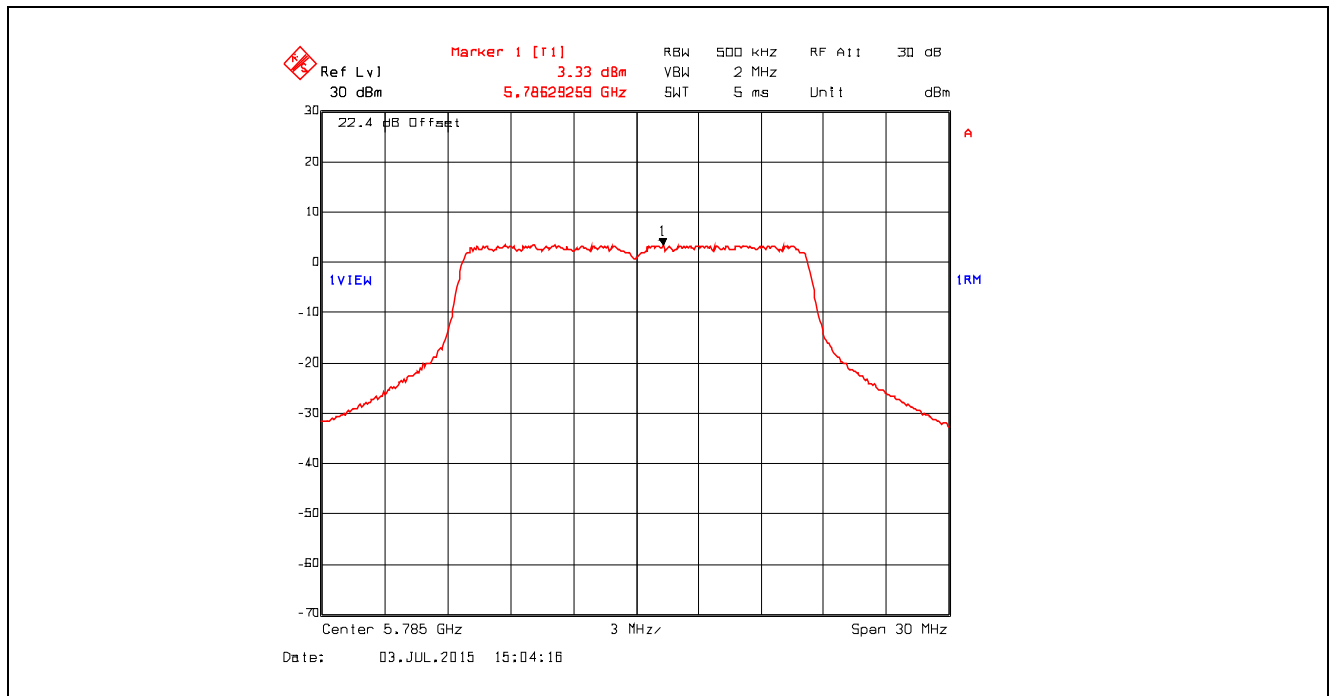
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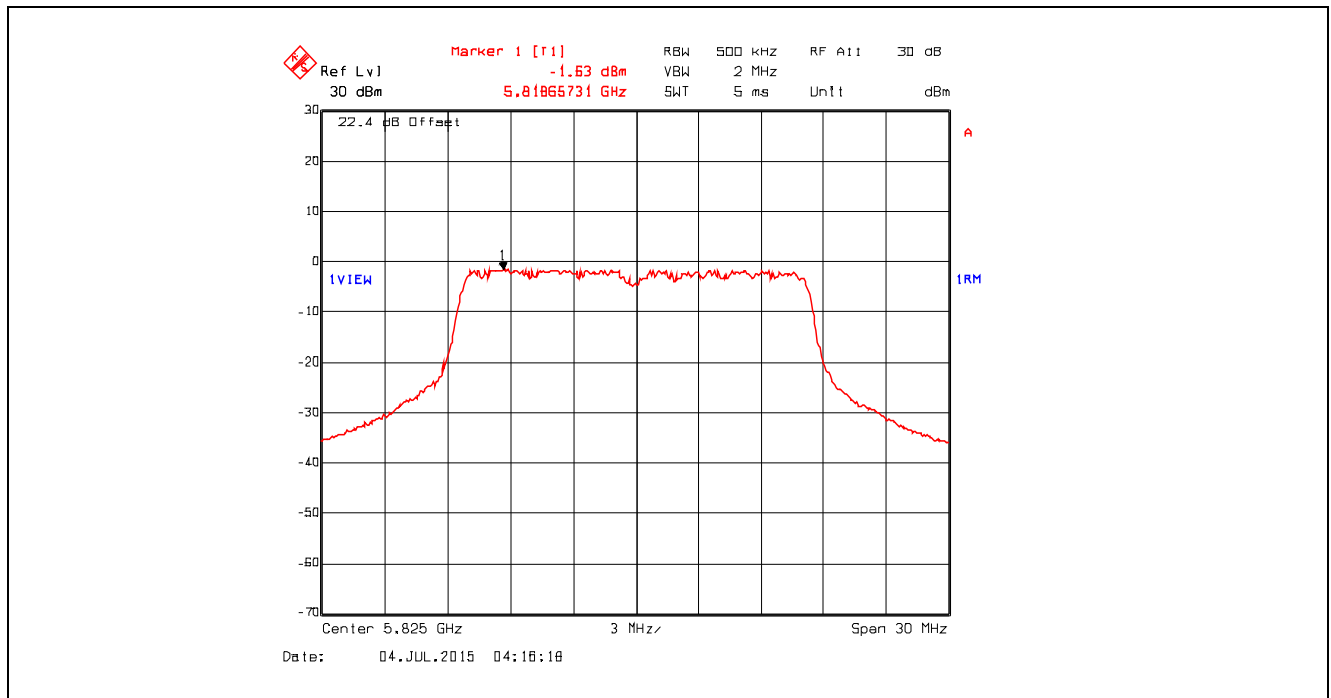
Plot 5.4.4.21. Power Spectral Density, Data Rate 4, Chain # 1, Ch 157, 5785 MHz, Software Output Power Setting 19



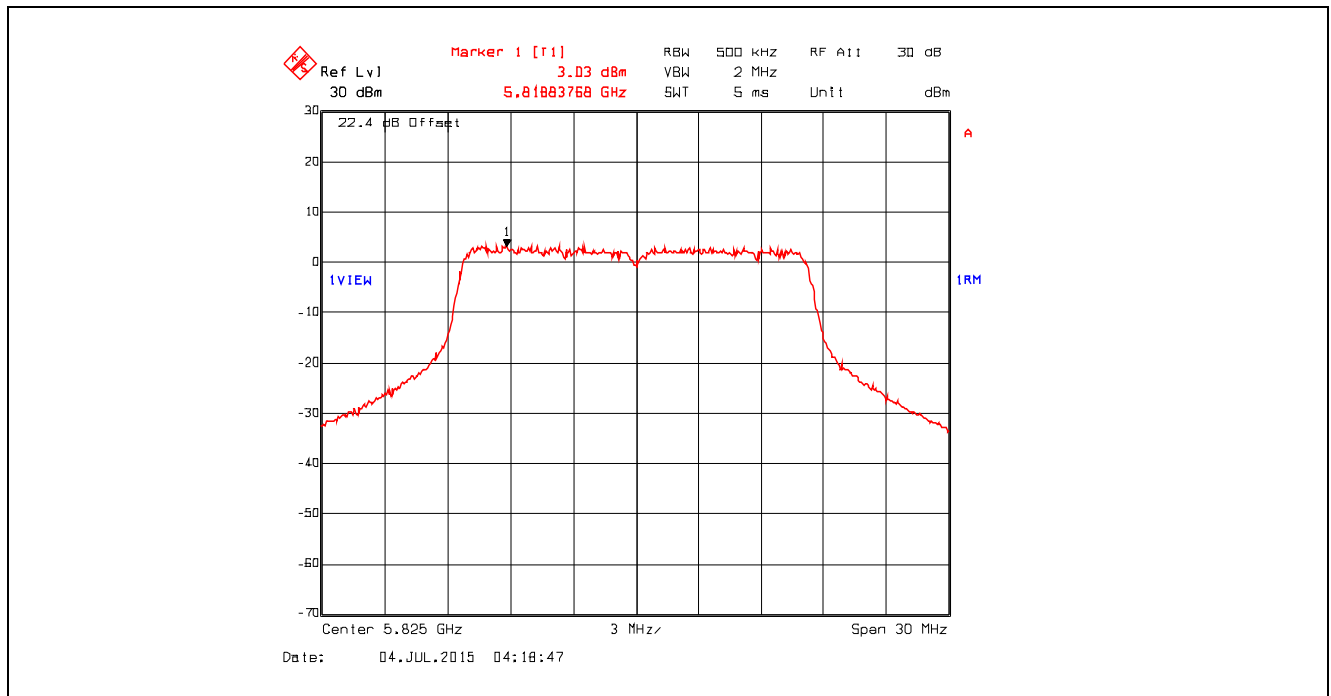
Plot 5.4.4.22. Power Spectral Density, Data Rate 4, Chain # 2, Ch 157, 5785 MHz, Software Output Power Setting 19



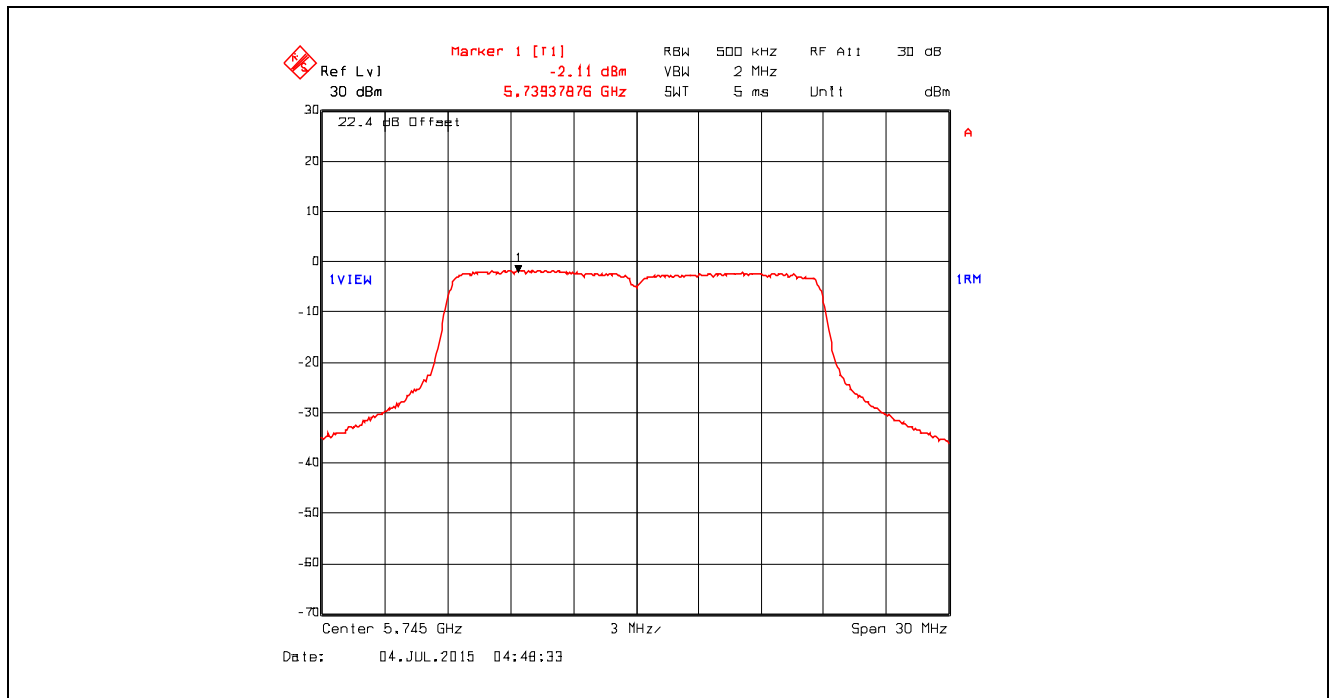
Plot 5.4.4.23. Power Spectral Density, Data Rate 4, Chain # 1, Ch 165, 5825 MHz, Software Output Power Setting 18



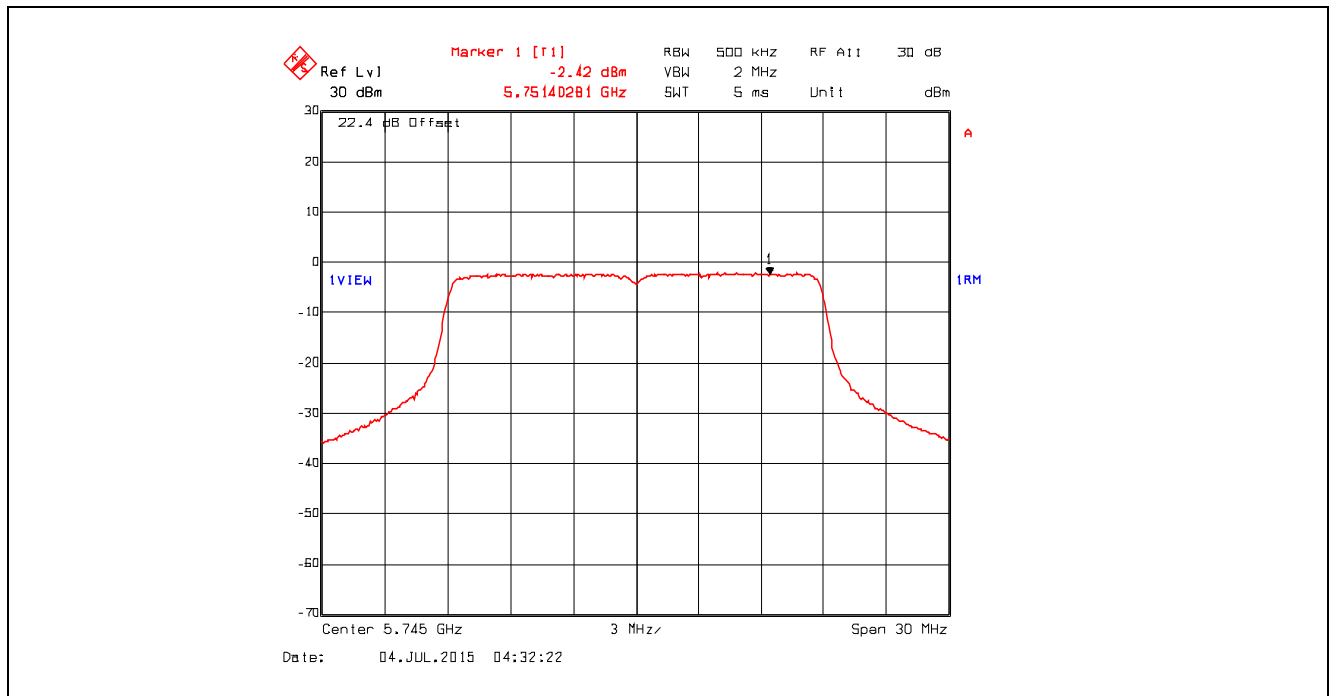
Plot 5.4.4.24. Power Spectral Density, Data Rate 4, Chain # 2, Ch 165, 5825 MHz, Software Output Power Setting 18



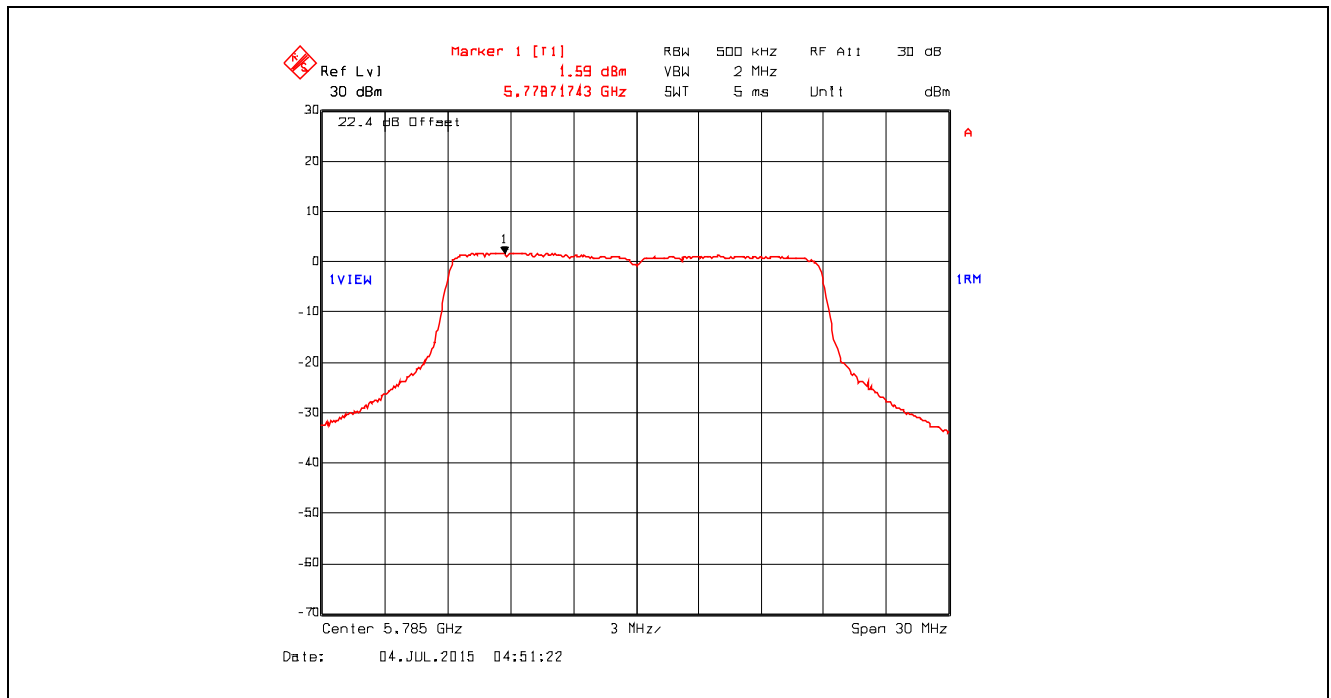
Plot 5.4.4.25. Power Spectral Density, Data Rate 5, Chain # 1, Ch 149, 5745 MHz, Software Output Power Setting 13



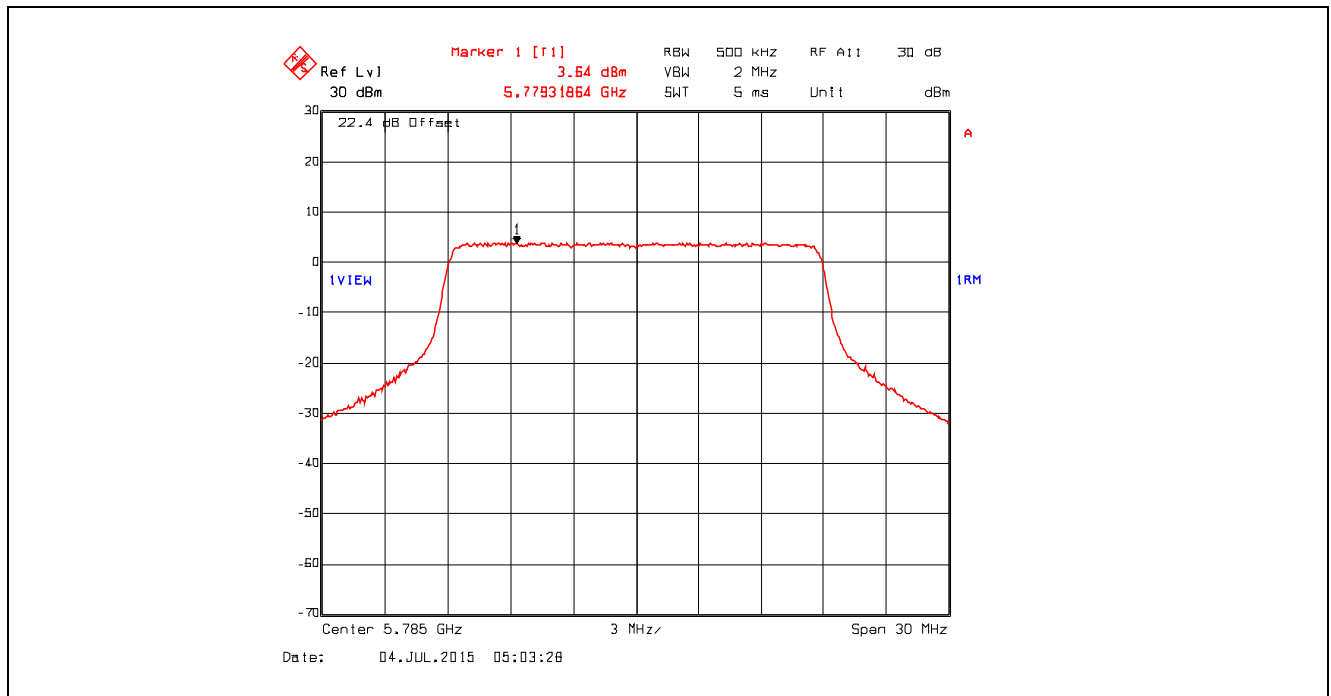
Plot 5.4.4.26. Power Spectral Density, Data Rate 5, Chain # 2, Ch 149, 5745 MHz, Software Output Power Setting 13



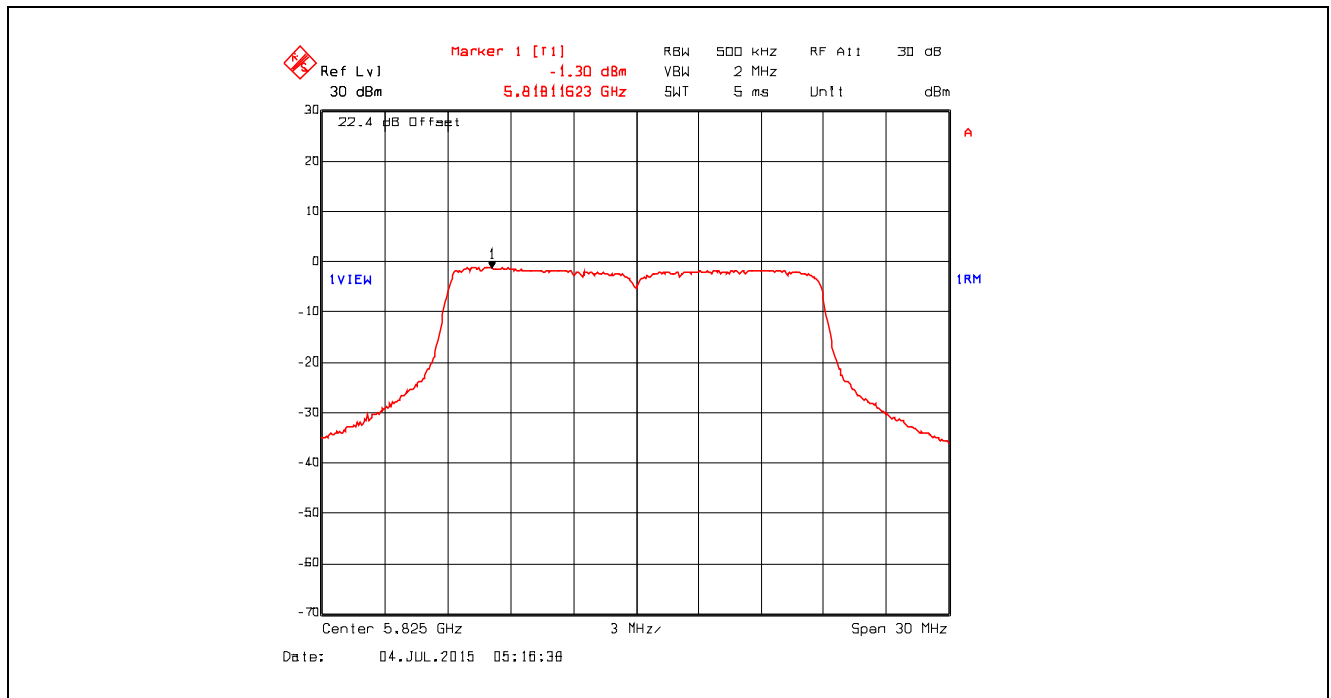
Plot 5.4.4.27. Power Spectral Density, Data Rate 5, Chain # 1, Ch 157, 5785 MHz, Software Output Power Setting 19



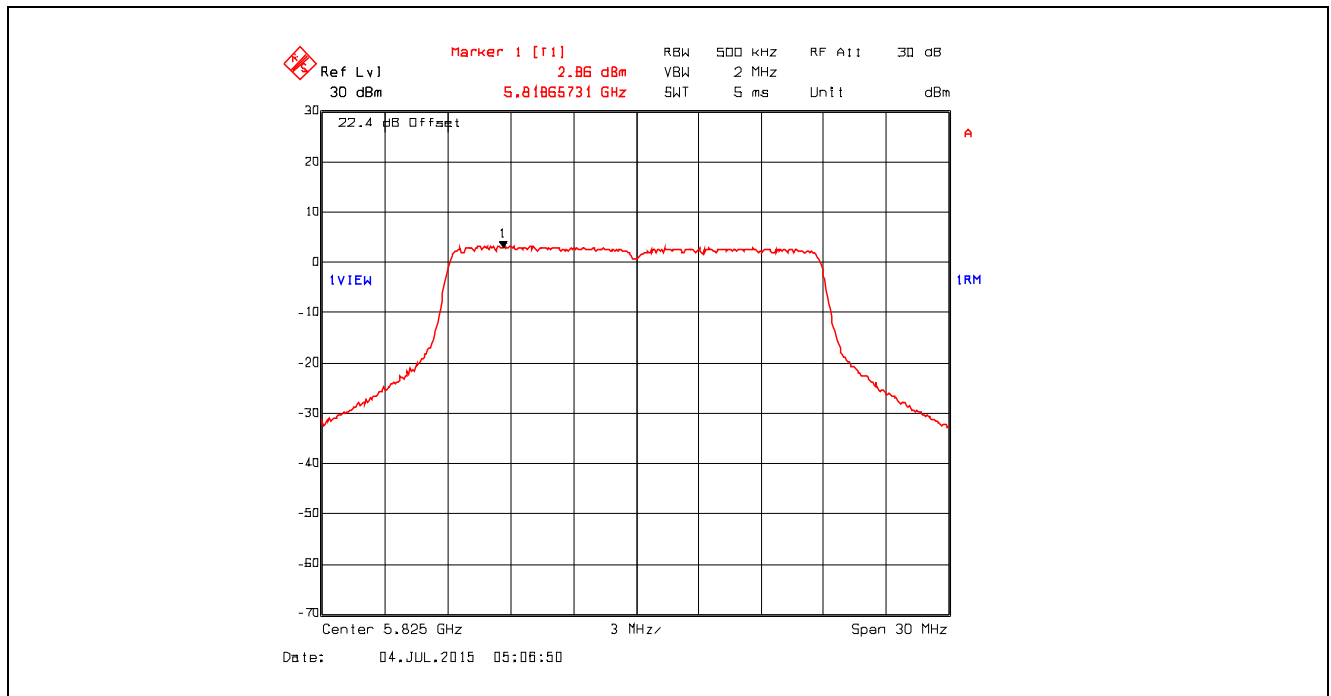
Plot 5.4.4.28. Power Spectral Density, Data Rate 5, Chain # 2, Ch 157, 5785 MHz, Software Output Power Setting 19



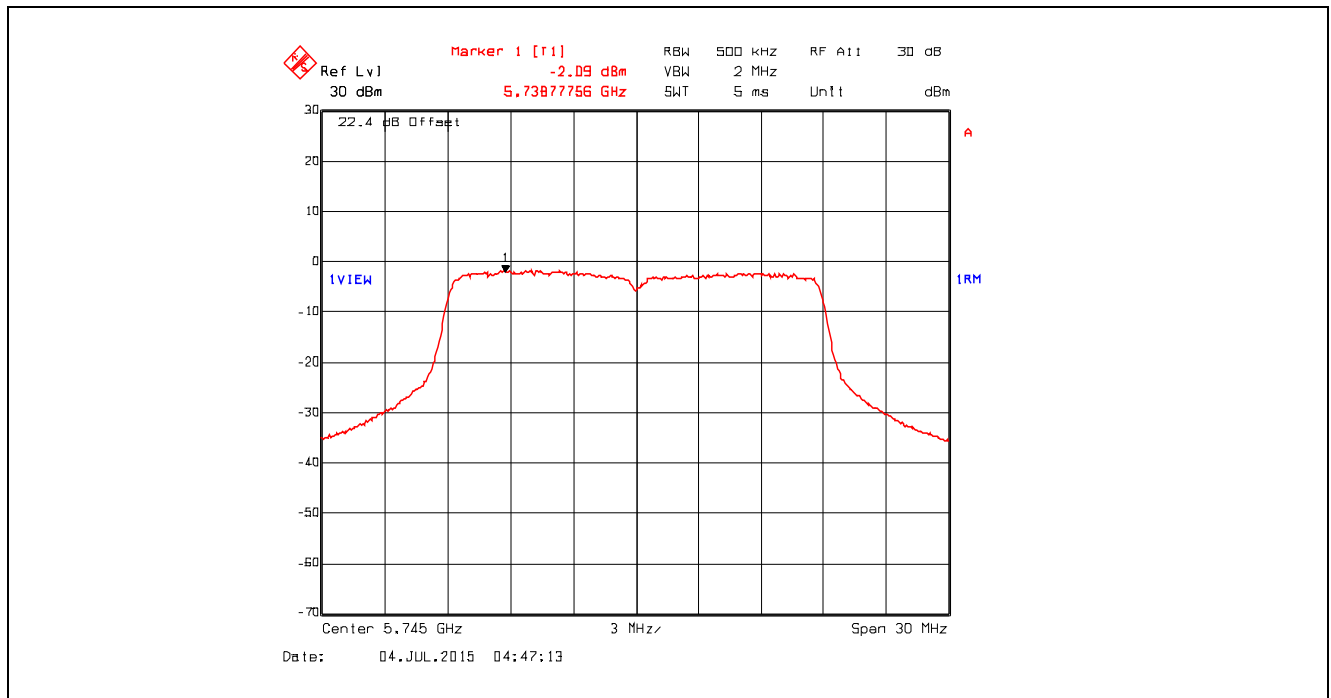
Plot 5.4.4.29. Power Spectral Density, Data Rate 5, Chain # 1, Ch 165, 5825 MHz, Software Output Power Setting 18



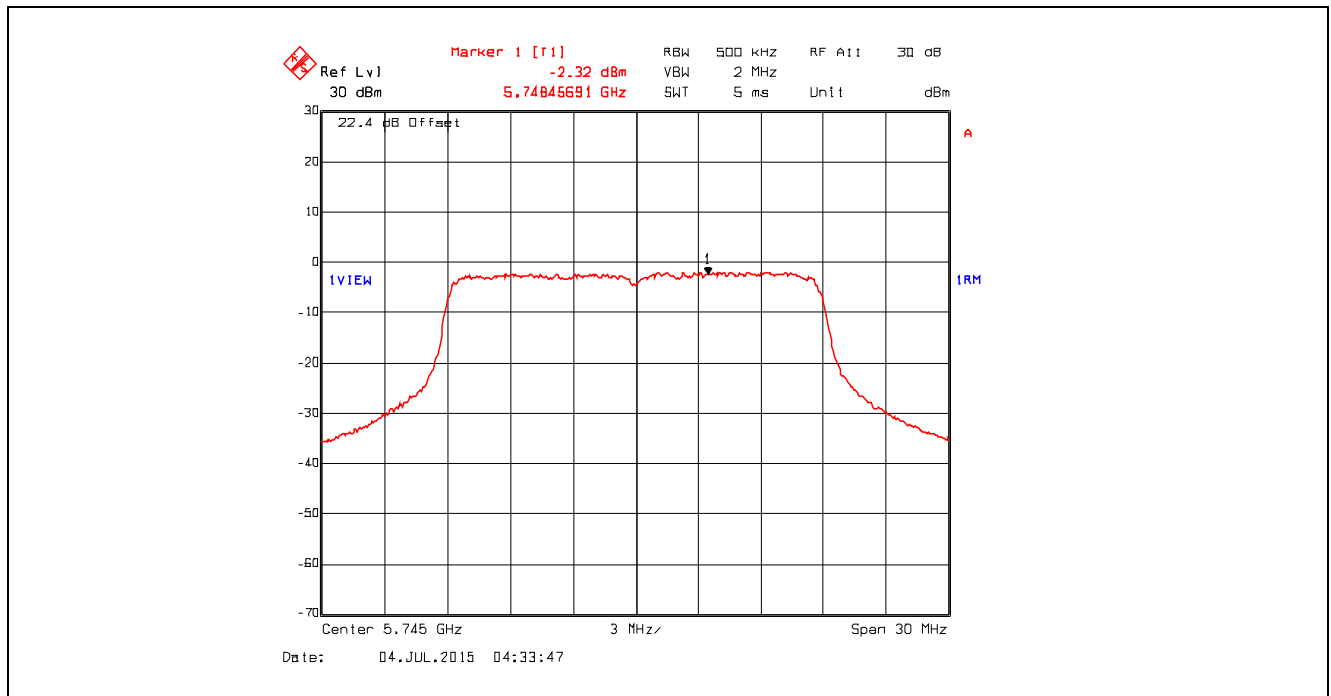
Plot 5.4.4.30. Power Spectral Density, Data Rate 5, Chain # 2, Ch 165, 5825 MHz, Software Output Power Setting 18



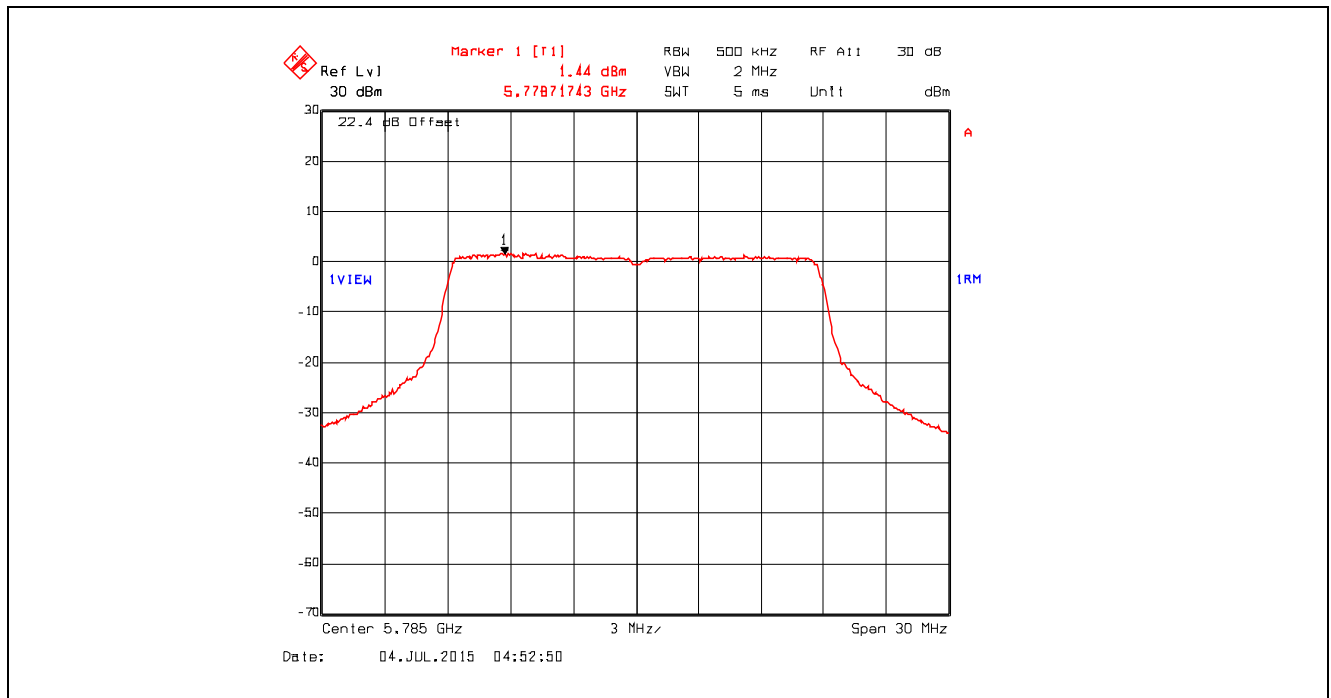
Plot 5.4.4.31. Power Spectral Density, Data Rate 6, Chain # 1, Ch 149, 5745 MHz, Software Output Power Setting 13



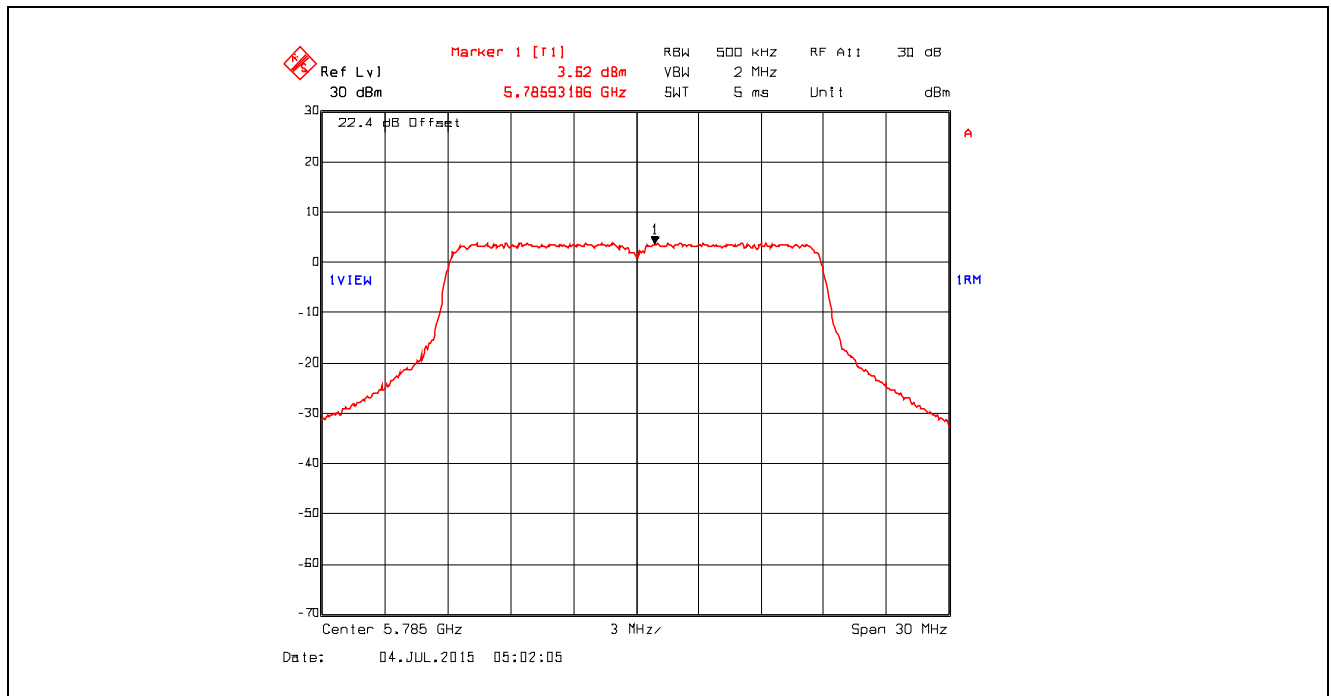
Plot 5.4.4.32. Power Spectral Density, Data Rate 6, Chain # 2, Ch 149, 5745 MHz, Software Output Power Setting 13



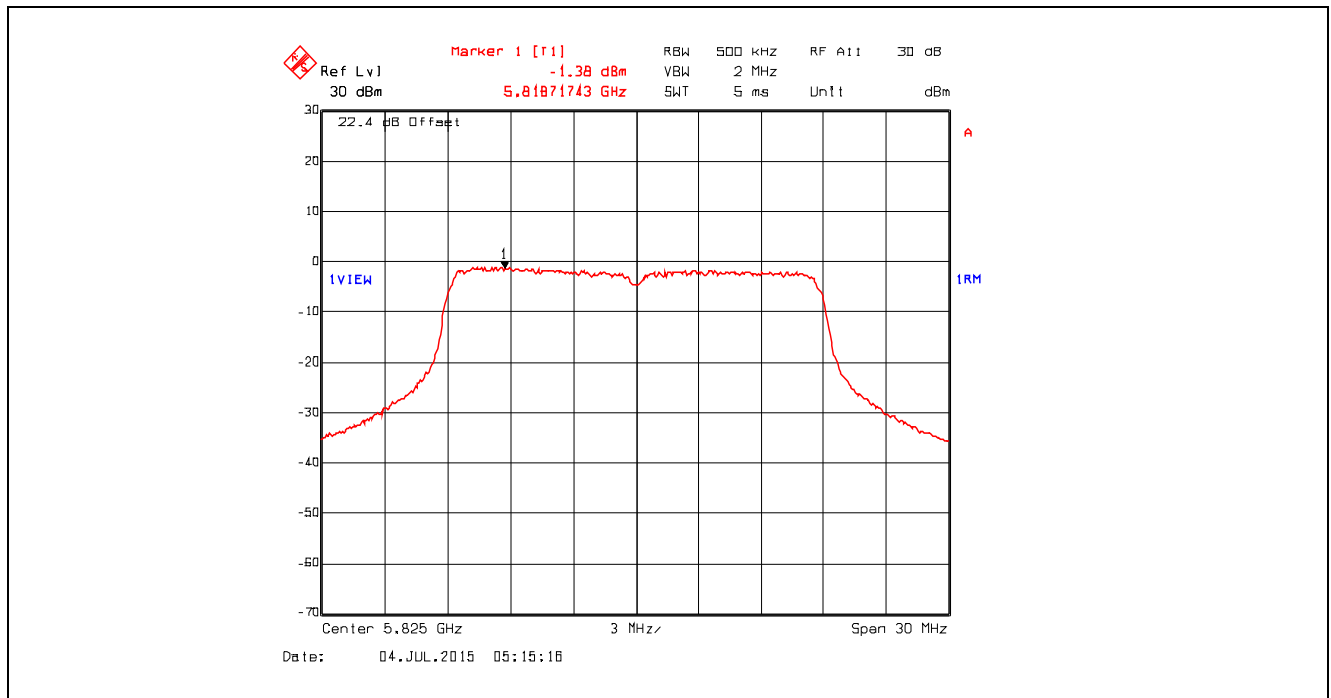
Plot 5.4.4.33. Power Spectral Density, Data Rate 6, Chain # 1, Ch 157, 5785 MHz, Software Output Power Setting 19



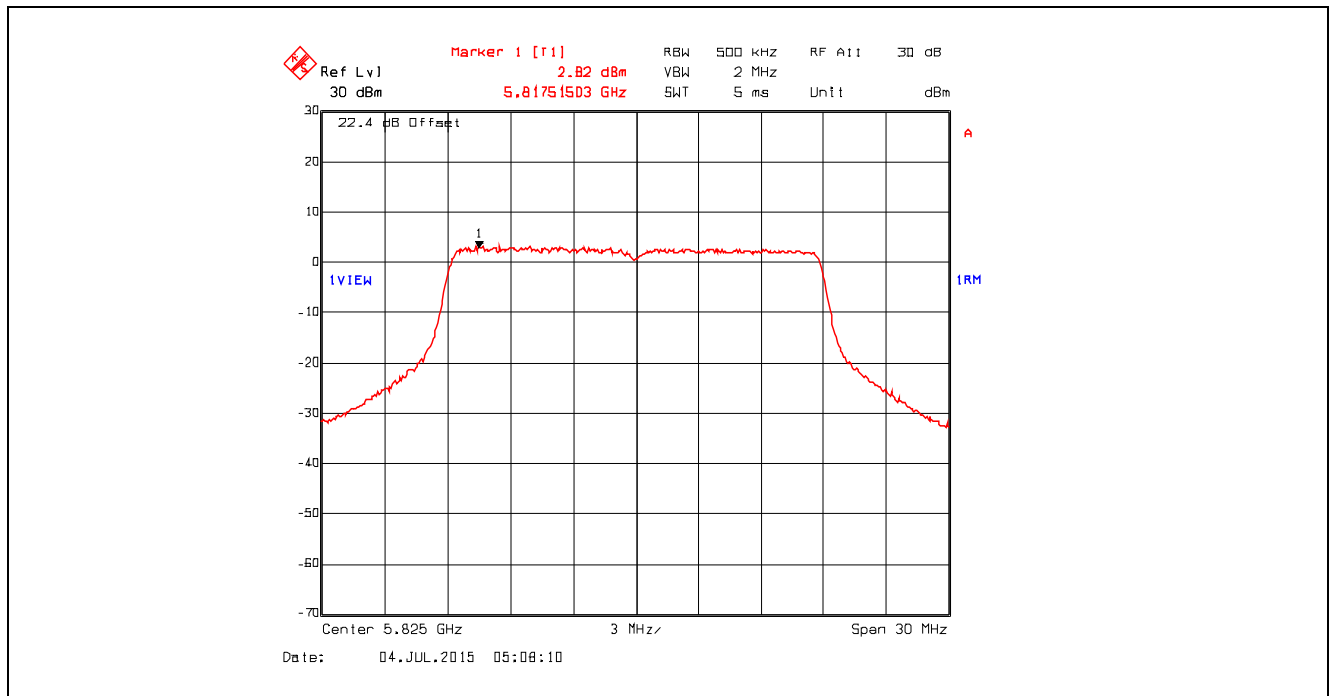
Plot 5.4.4.34. Power Spectral Density, Data Rate 6, Chain # 2, Ch 157, 5785 MHz, Software Output Power Setting 19



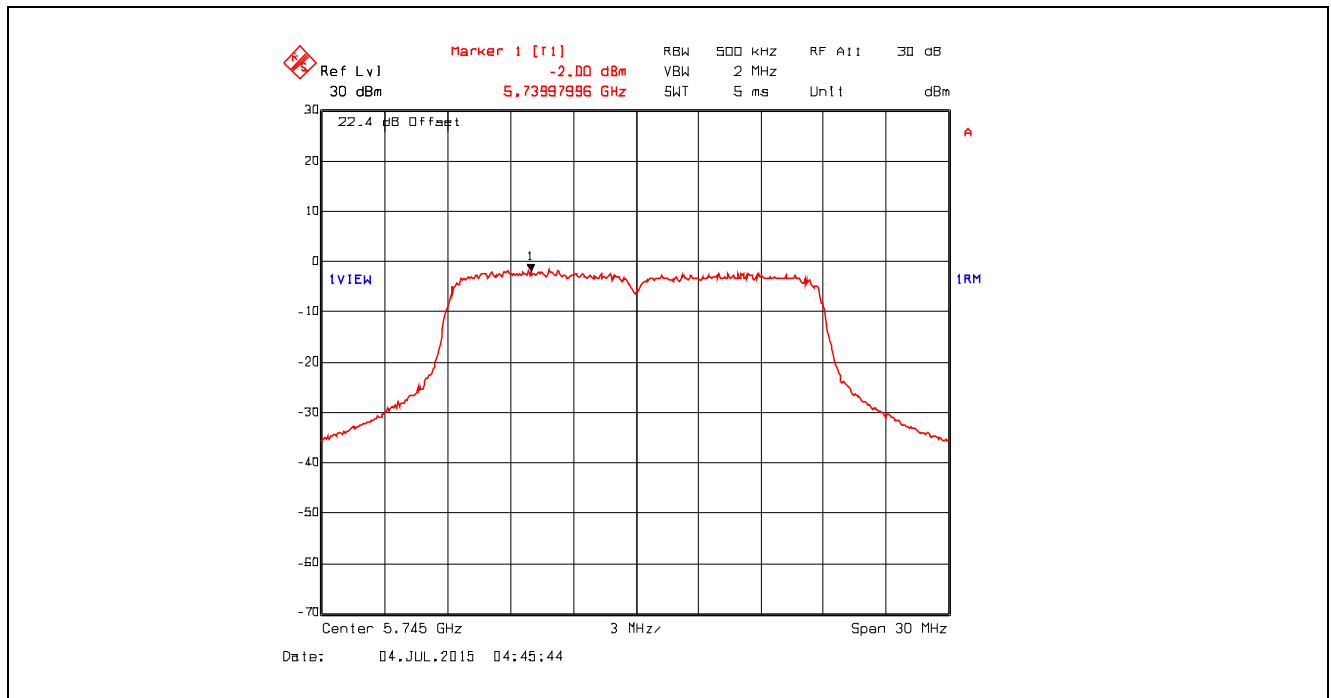
Plot 5.4.4.35. Power Spectral Density, Data Rate 6, Chain # 1, Ch 165, 5825 MHz, Software Output Power Setting 18



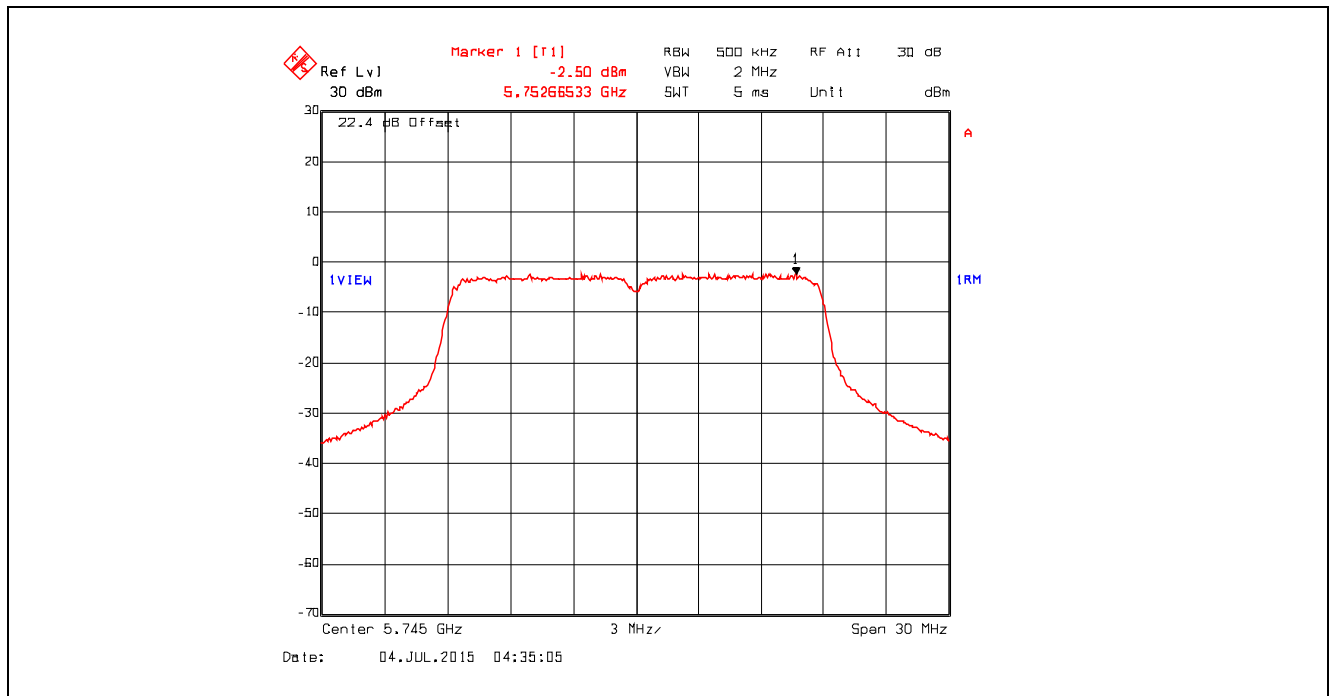
Plot 5.4.4.36. Power Spectral Density, Data Rate 6, Chain # 2, Ch 165, 5825 MHz, Software Output Power Setting 18



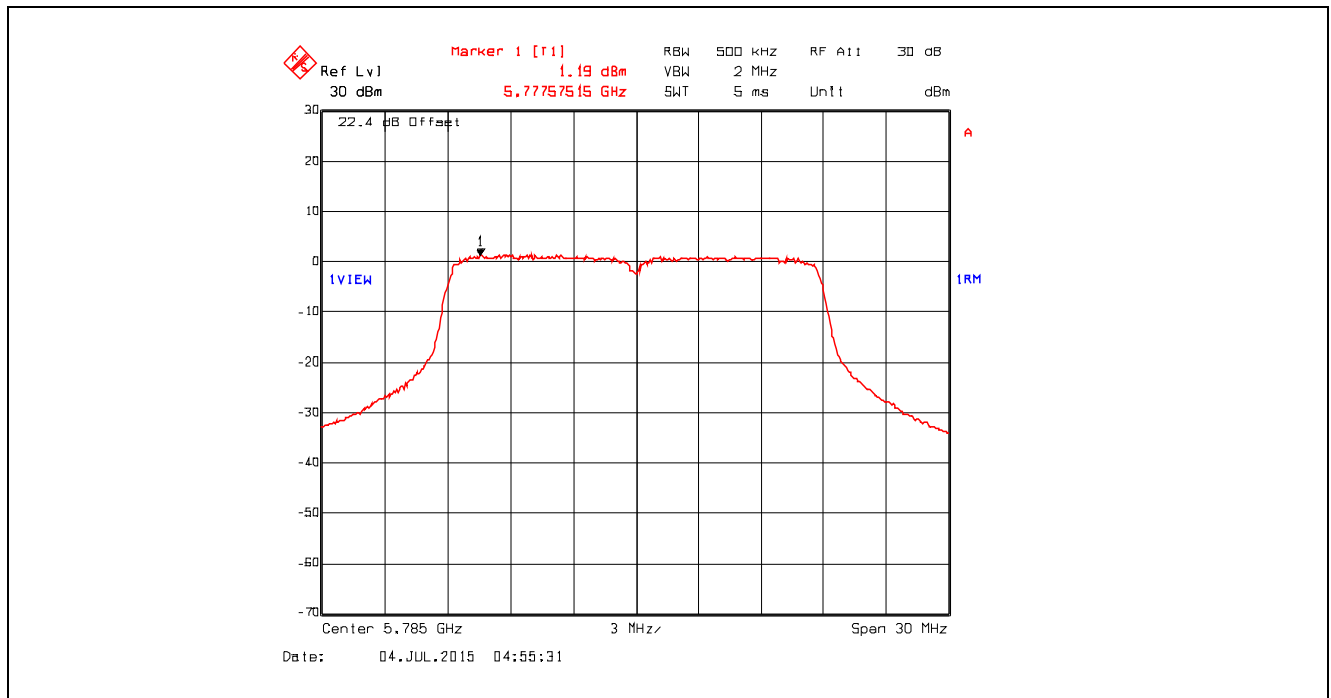
Plot 5.4.4.37. Power Spectral Density, Data Rate 7, Chain # 1, Ch 149, 5745 MHz, Software Output Power Setting 13



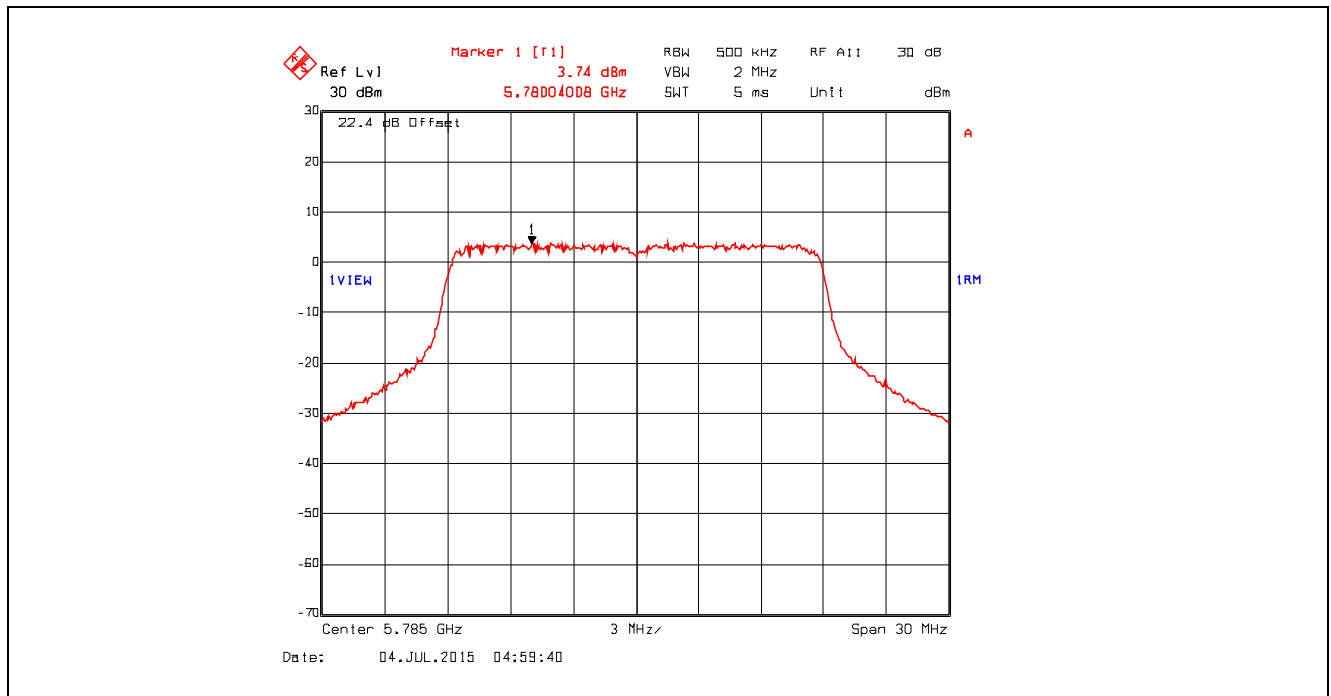
Plot 5.4.4.38. Power Spectral Density, Data Rate 7, Chain # 2, Ch 149, 5745 MHz, Software Output Power Setting 13



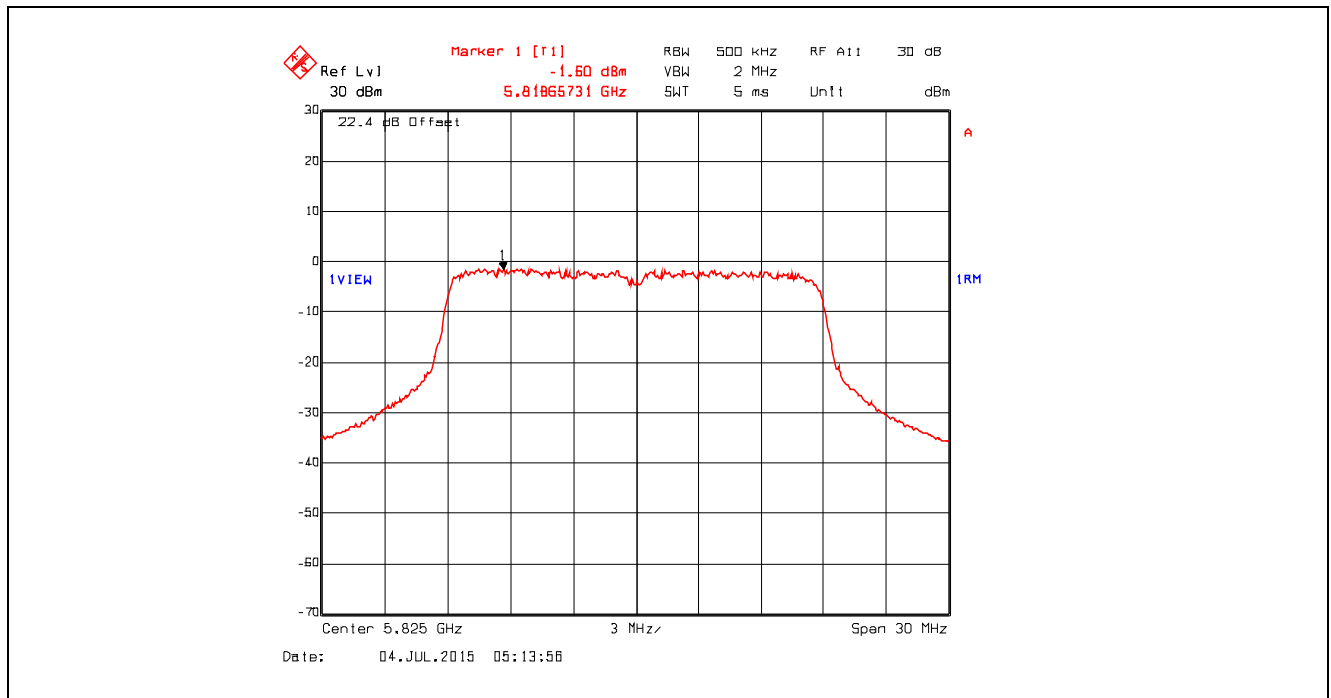
Plot 5.4.4.39. Power Spectral Density, Data Rate 7, Chain # 1, Ch 157, 5785 MHz, Software Output Power Setting 19



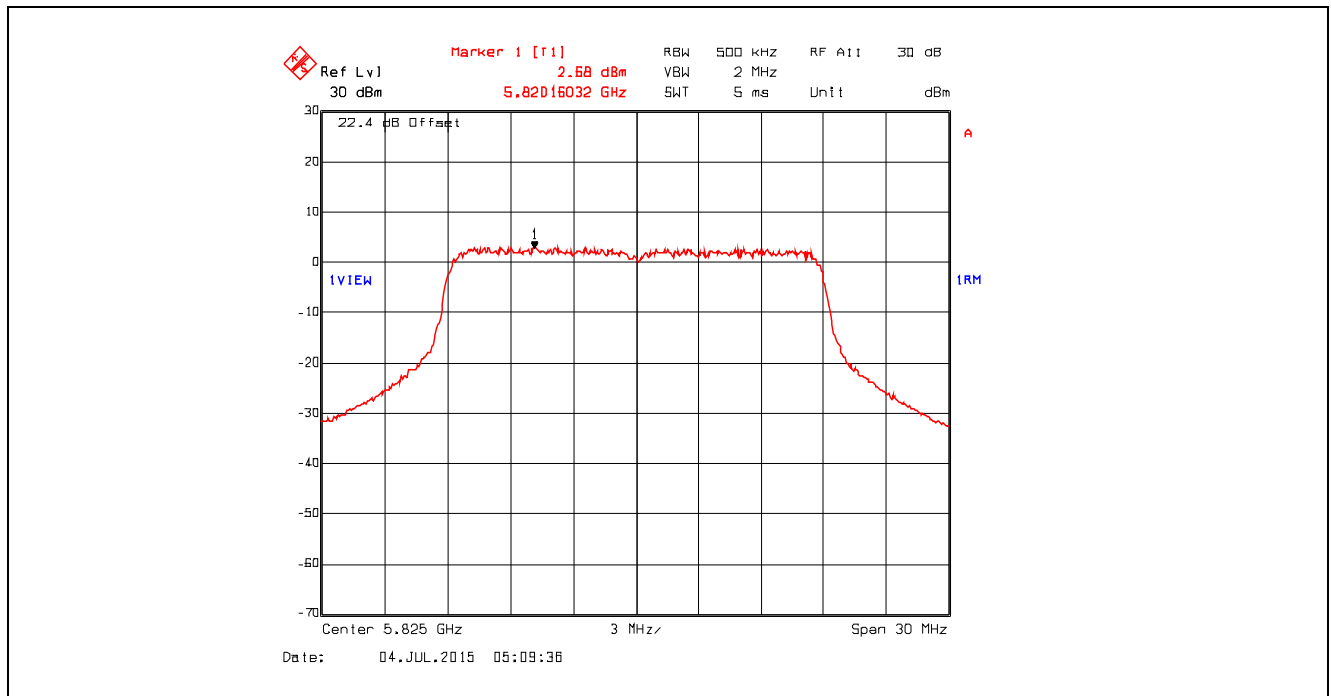
Plot 5.4.4.40. Power Spectral Density, Data Rate 7, Chain # 2, Ch 157, 5785 MHz, Software Output Power Setting 19



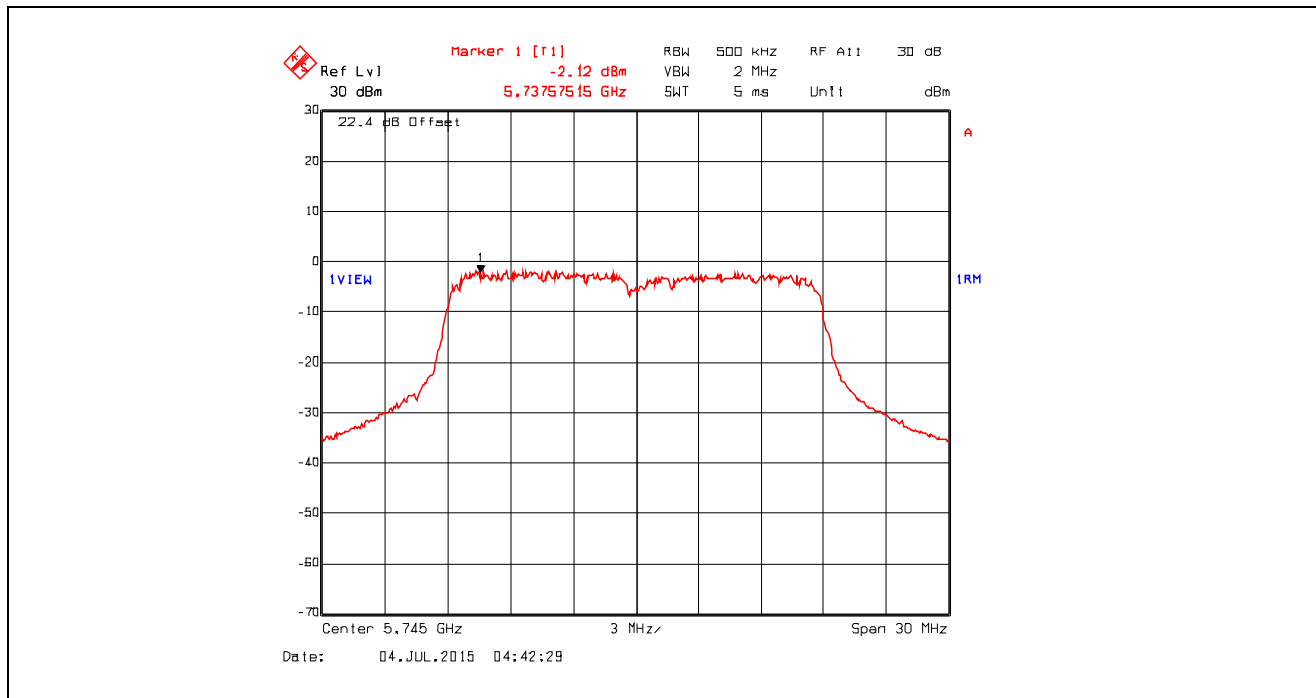
Plot 5.4.4.41. Power Spectral Density, Data Rate 7, Chain # 1, Ch 165, 5825 MHz, Software Output Power Setting 18



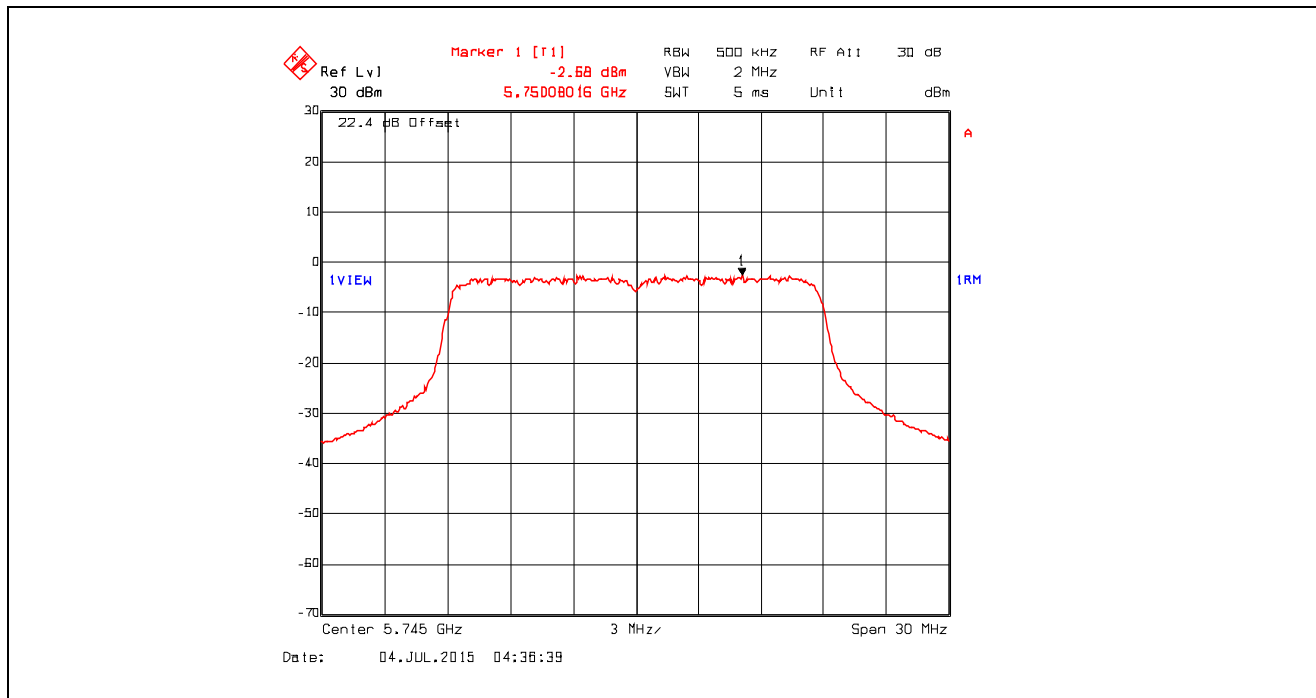
Plot 5.4.4.42. Power Spectral Density, Data Rate 7, Chain # 2, Ch 165, 5825 MHz, Software Output Power Setting 18



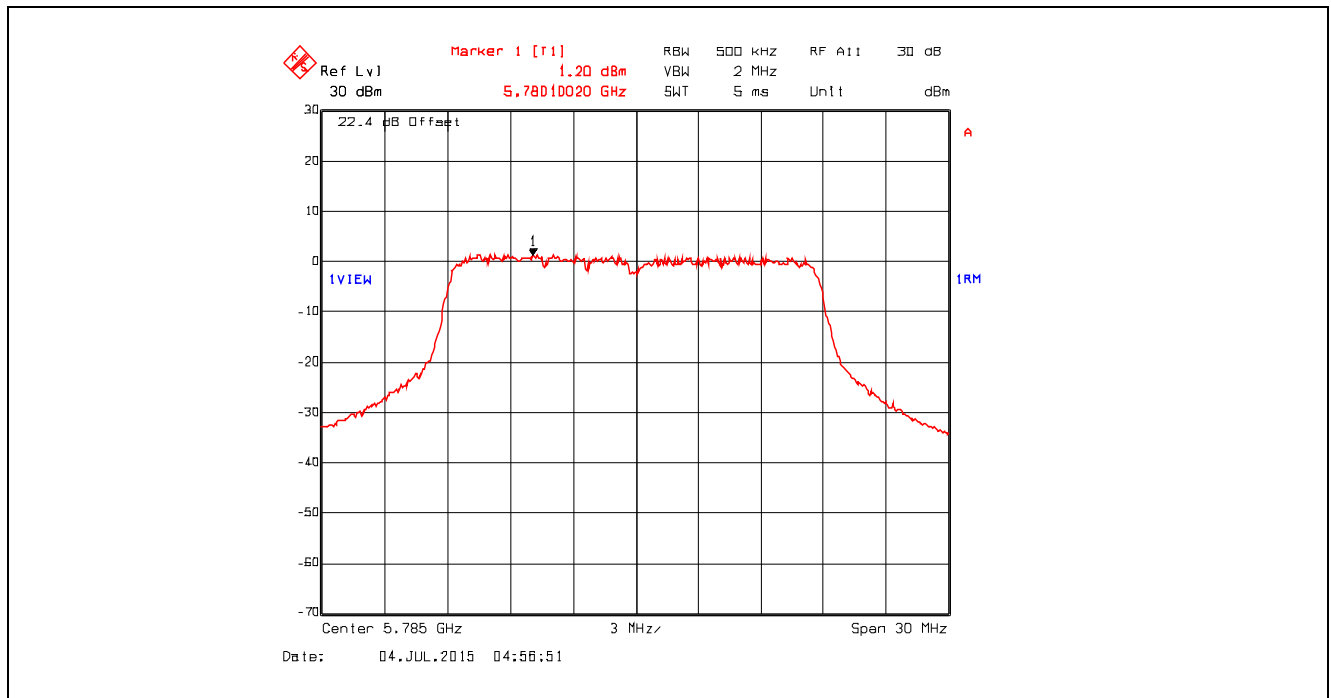
Plot 5.4.4.43. Power Spectral Density, Data Rate 8, Chain # 1, Ch 149, 5745 MHz, Software Output Power Setting 13



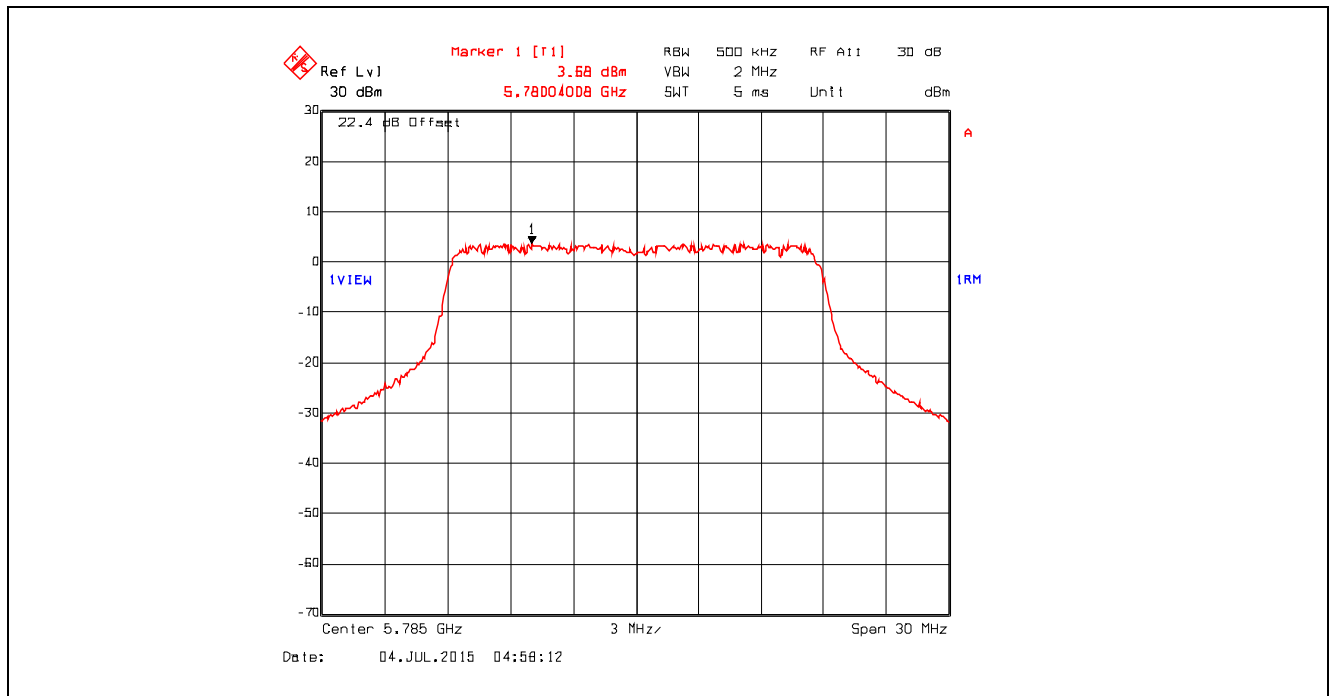
Plot 5.4.4.44. Power Spectral Density, Data Rate 8, Chain # 2, Ch 149, 5745 MHz, Software Output Power Setting 13



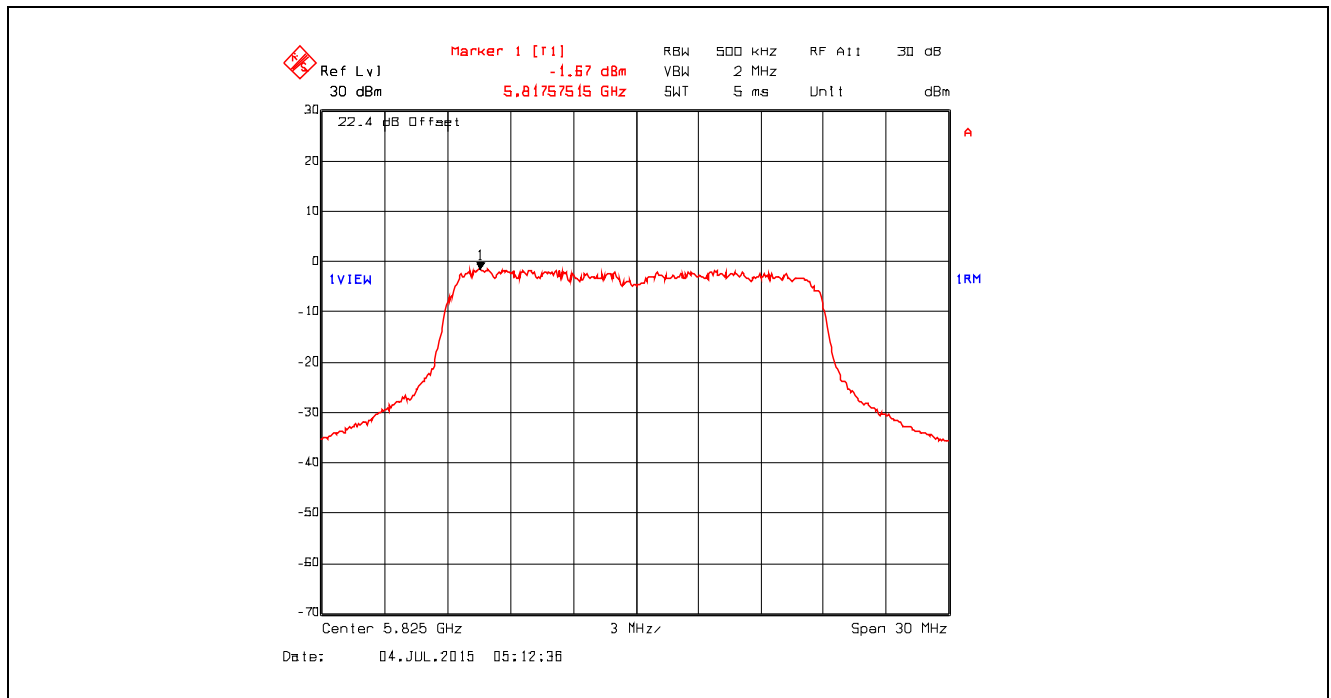
Plot 5.4.4.45. Power Spectral Density, Data Rate 8, Chain # 1, Ch 157, 5785 MHz, Software Output Power Setting 19



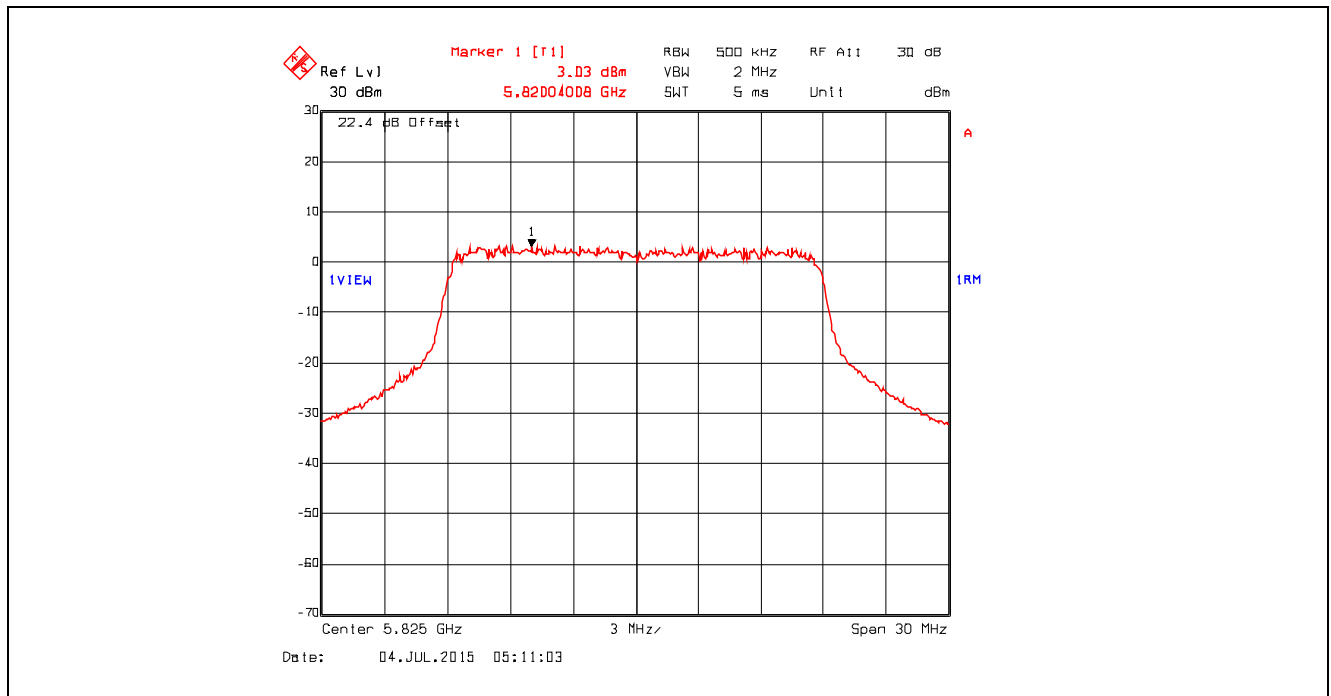
Plot 5.4.4.46. Power Spectral Density, Data Rate 8, Chain # 2, Ch 157, 5785 MHz, Software Output Power Setting 19



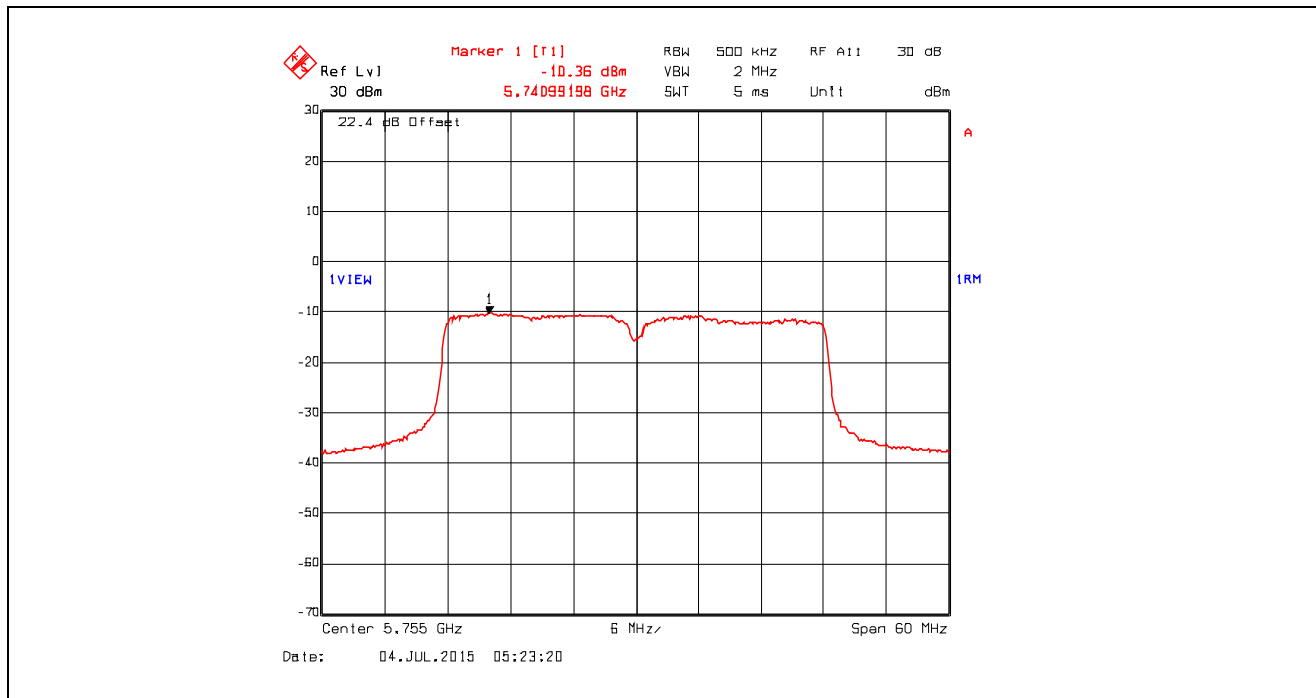
Plot 5.4.4.47. Power Spectral Density, Data Rate 8, Chain # 1, Ch 165, 5825 MHz, Software Output Power Setting 18



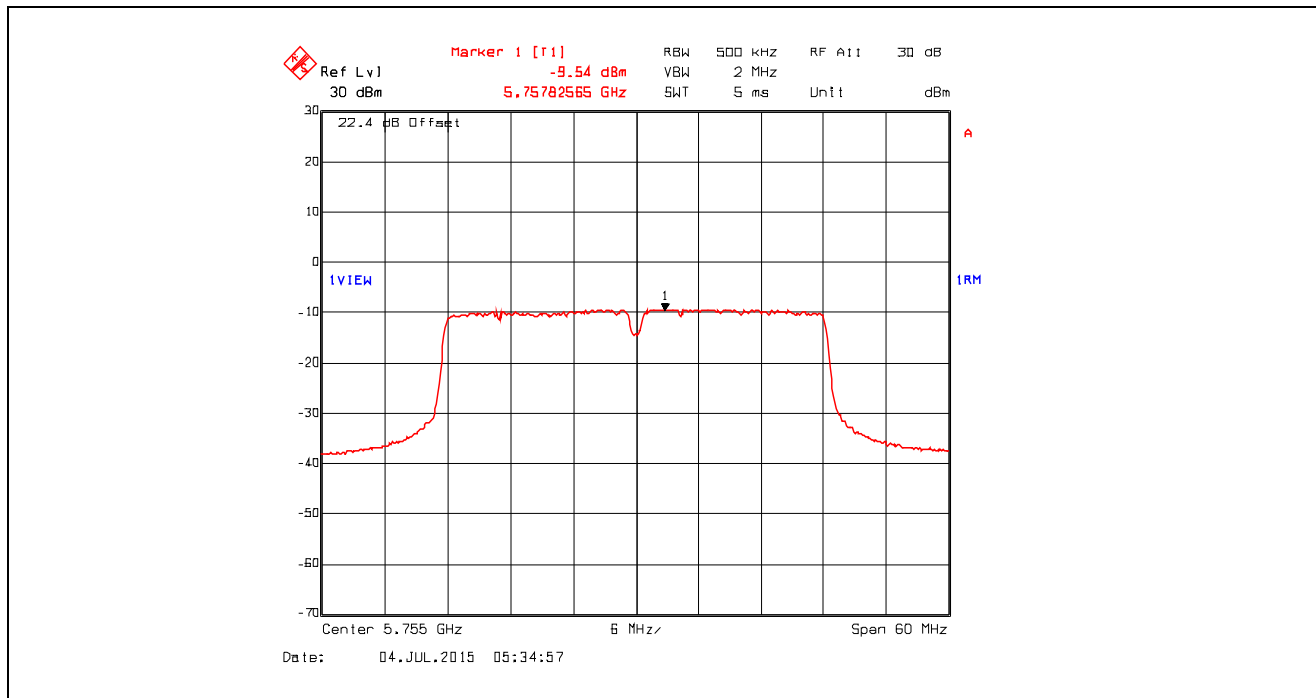
Plot 5.4.4.48. Power Spectral Density, Data Rate 8, Chain # 2, Ch 165, 5825 MHz, Software Output Power Setting 18



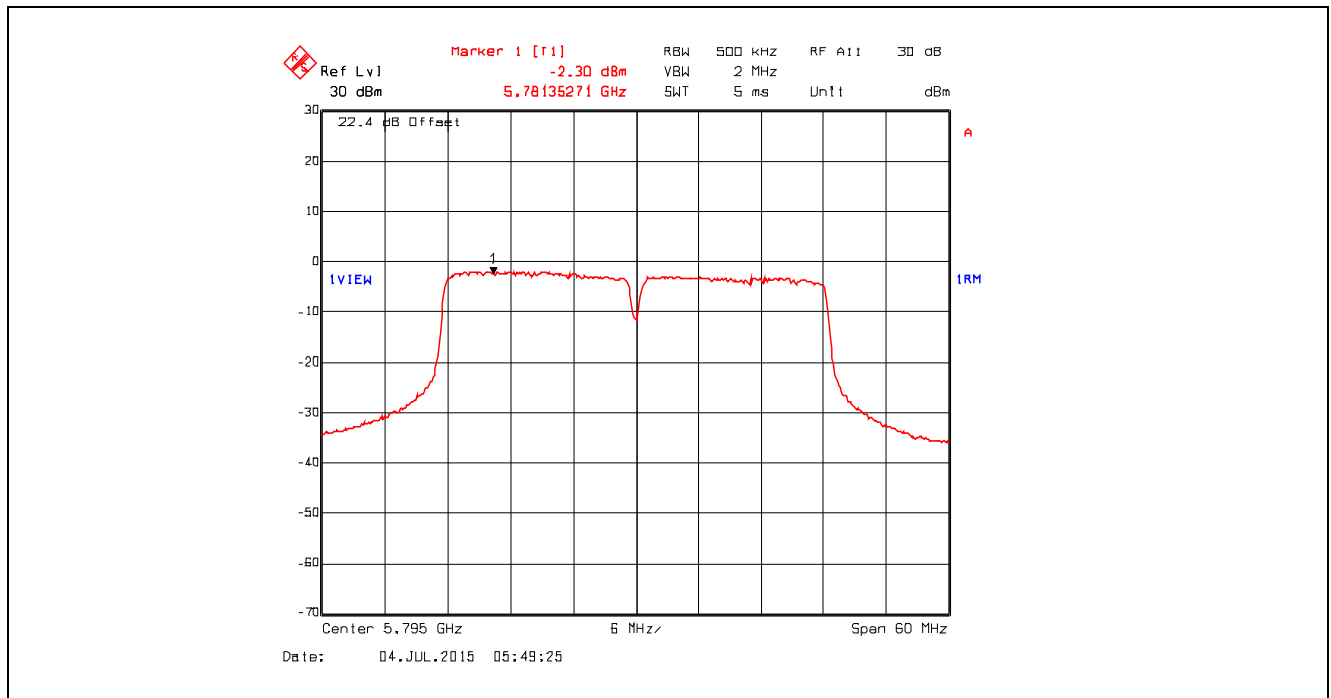
Plot 5.4.4.49. Power Spectral Density, Data Rate 9, Chain # 1, Ch 151, 5755 MHz, Software Output Power Setting 7



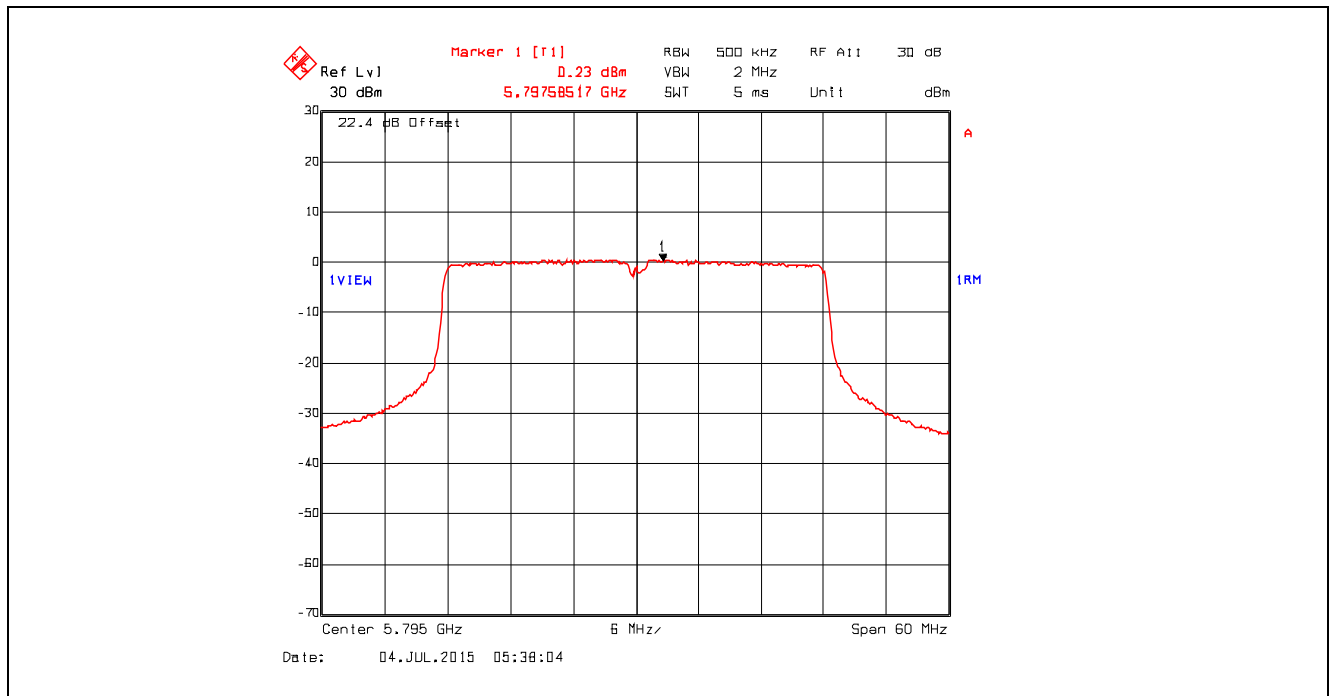
Plot 5.4.4.50. Power Spectral Density, Data Rate 9, Chain # 2, Ch 151, 5755 MHz, Software Output Power Setting 7



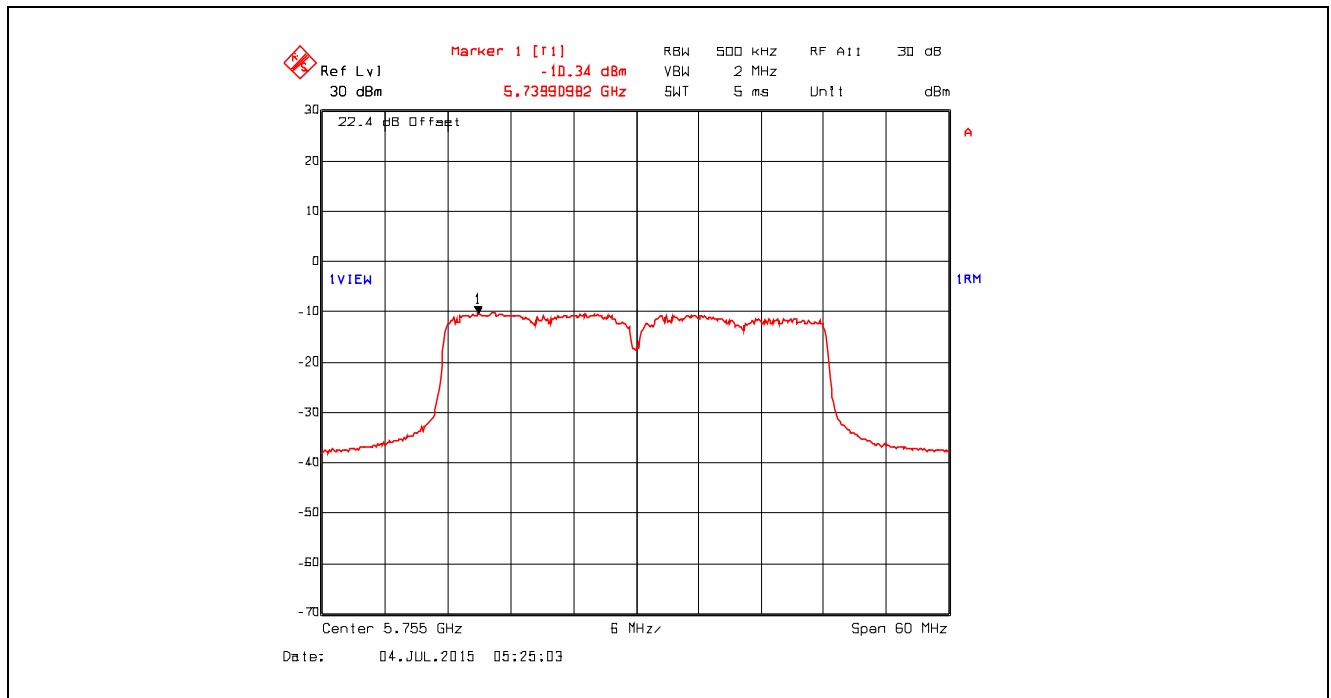
Plot 5.4.4.51. Power Spectral Density, Data Rate 9, Chain # 1, Ch 159, 5795 MHz, Software Output Power Setting 18



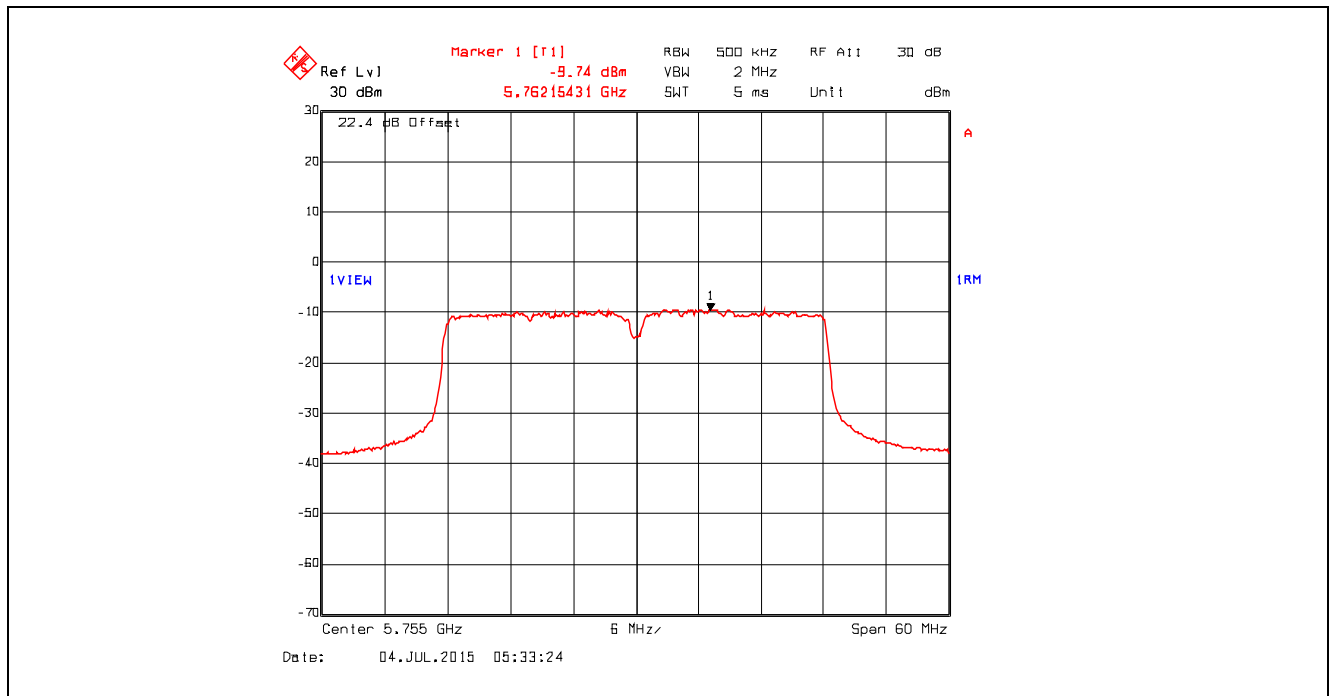
Plot 5.4.4.52. Power Spectral Density, Data Rate 9, Chain # 2, Ch 159, 5795 MHz, Software Output Power Setting 18



Plot 5.4.4.53. Power Spectral Density, Data Rate 10, Chain # 1, Ch 151, 5755 MHz, Software Output Power Setting 7



Plot 5.4.4.54. Power Spectral Density, Data Rate 10, Chain # 2, Ch 151, 5755 MHz, Software Output Power Setting 7



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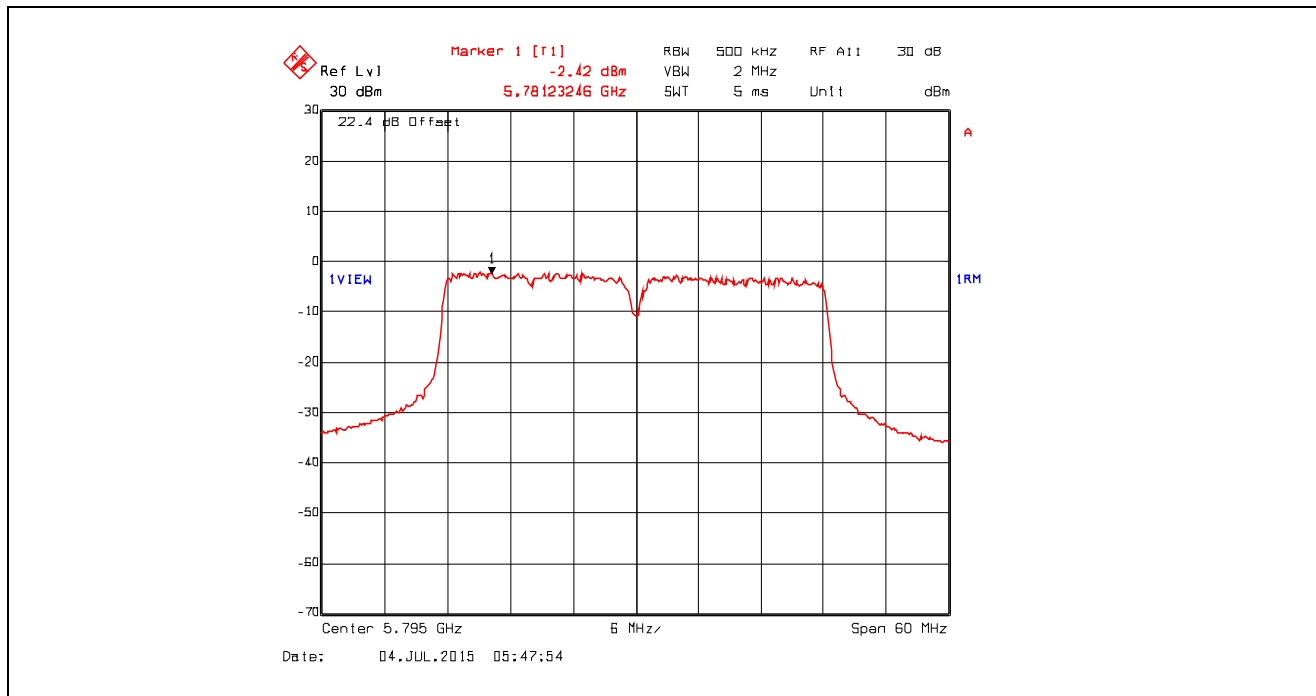
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 15MCRS079_FCC15E407

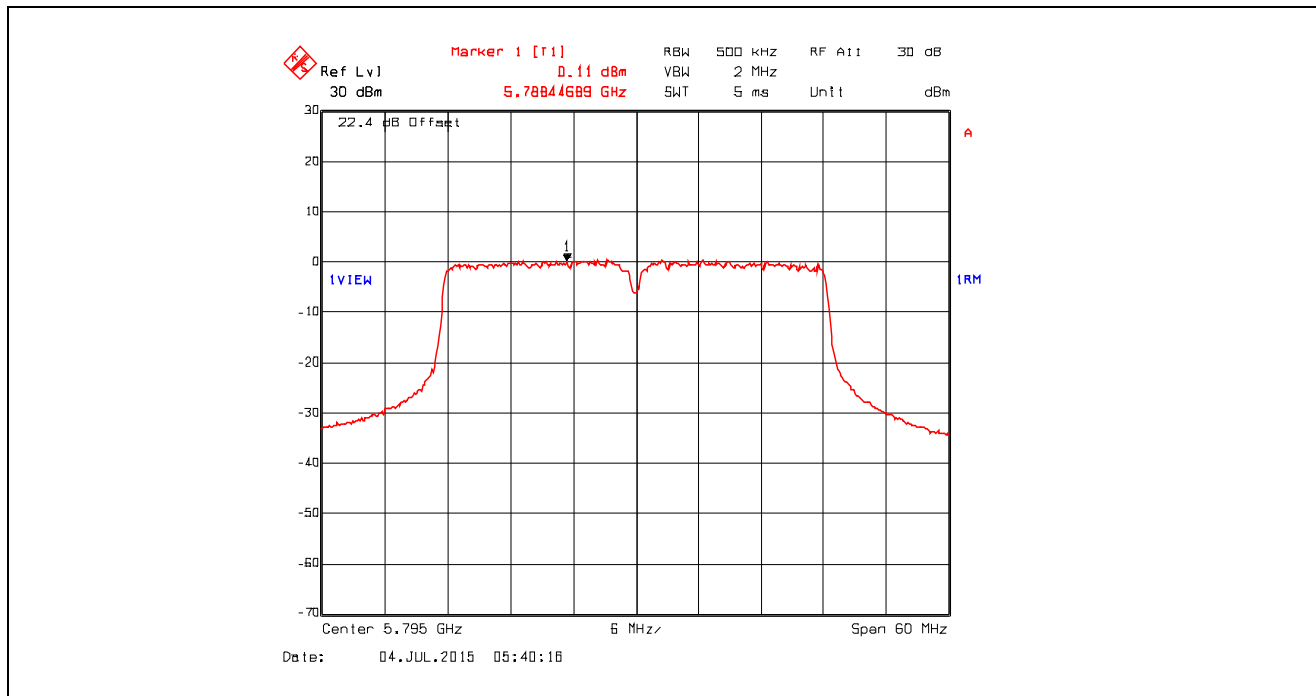
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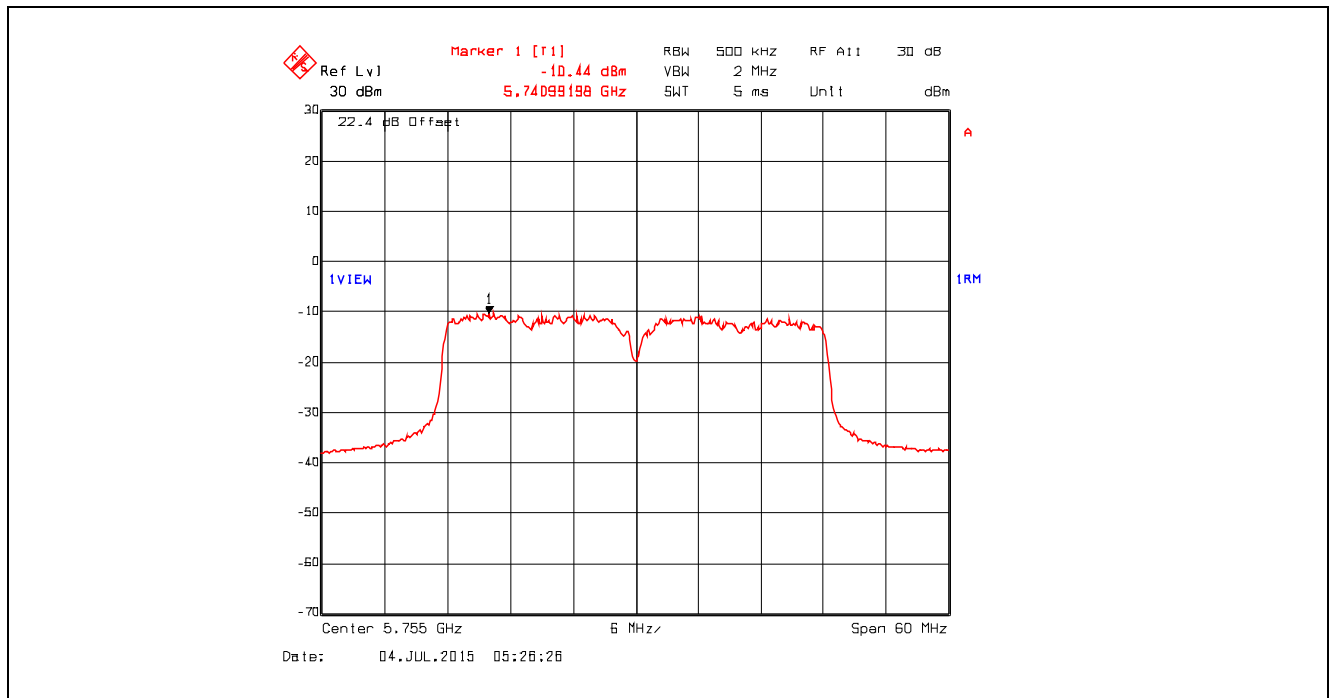
Plot 5.4.4.55. Power Spectral Density, Data Rate 10, Chain # 1, Ch 159, 5795 MHz, Software Output Power Setting 18



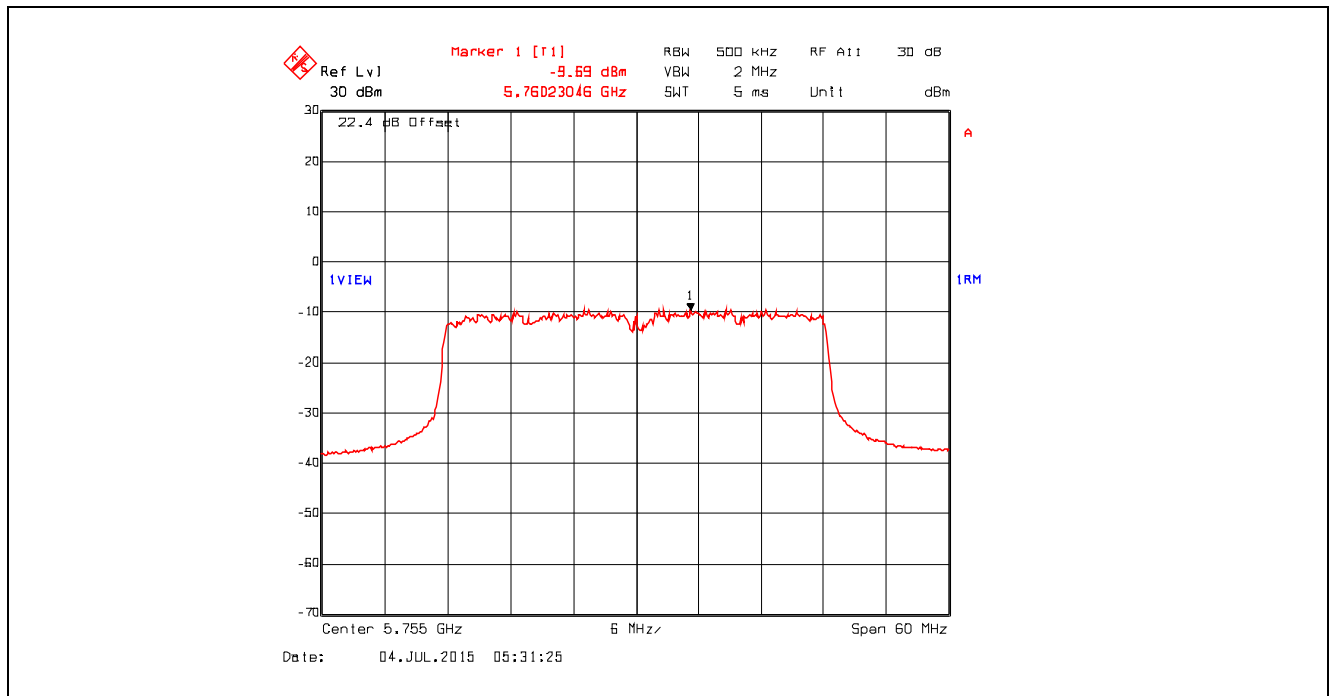
Plot 5.4.4.56. Power Spectral Density, Data Rate 10, Chain # 2, Ch 159, 5795 MHz, Software Output Power Setting 18



Plot 5.4.4.57. Power Spectral Density, Data Rate 11, Chain # 1, Ch 151, 5755 MHz, Software Output Power Setting 7



Plot 5.4.4.58. Power Spectral Density, Data Rate 11, Chain # 2, Ch 151, 5755 MHz, Software Output Power Setting 7



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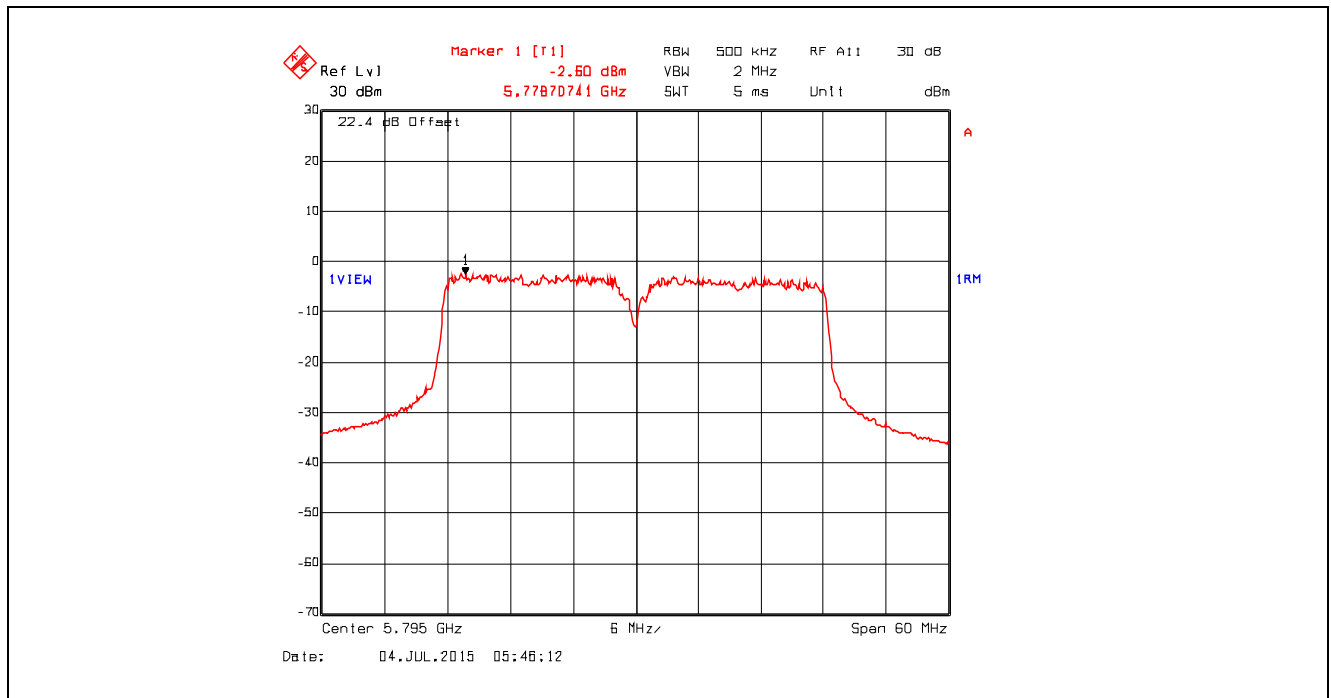
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 15MCRS079_FCC15E407

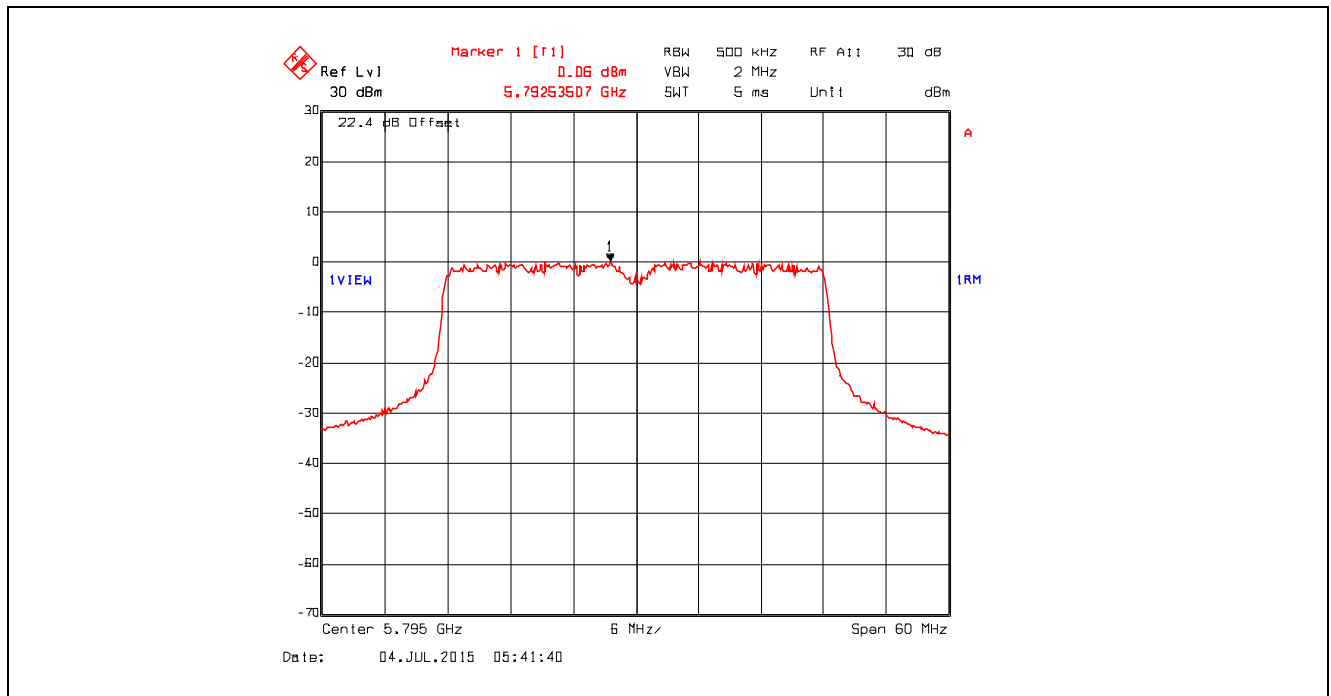
November 16, 2015

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

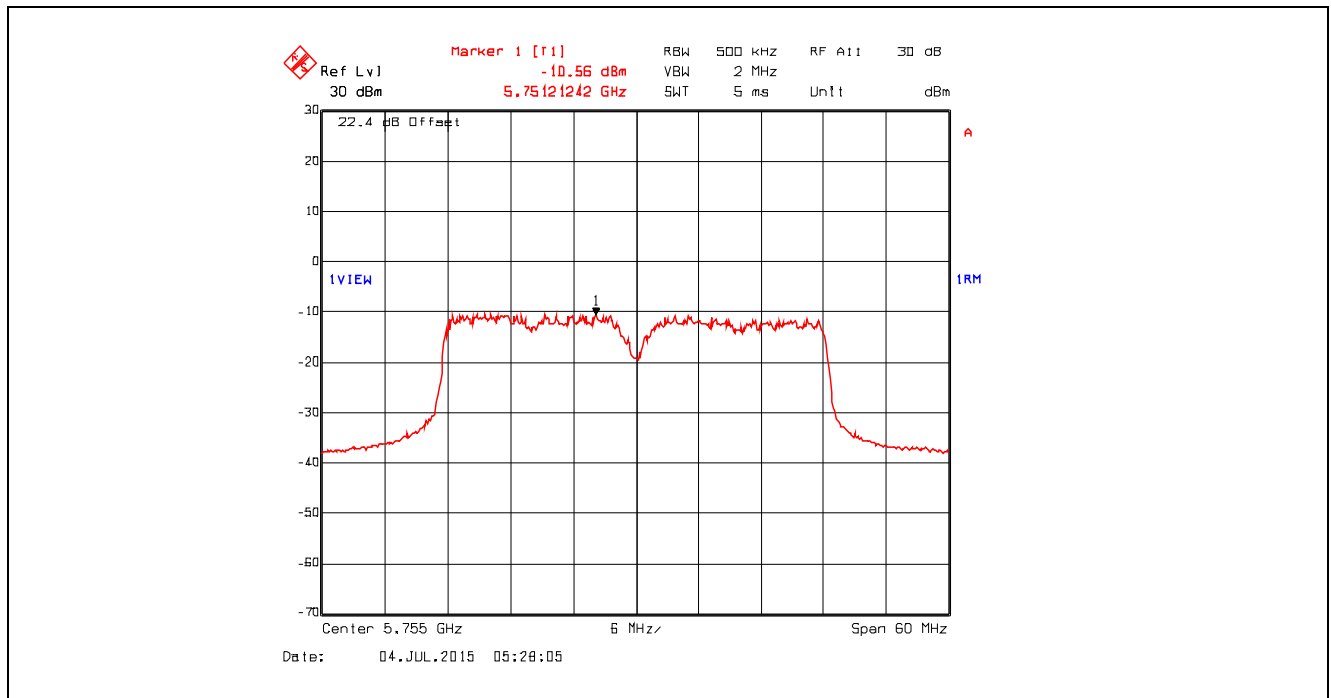
Plot 5.4.4.59. Power Spectral Density, Data Rate 11, Chain # 1, Ch 159, 5795 MHz, Software Output Power Setting 18



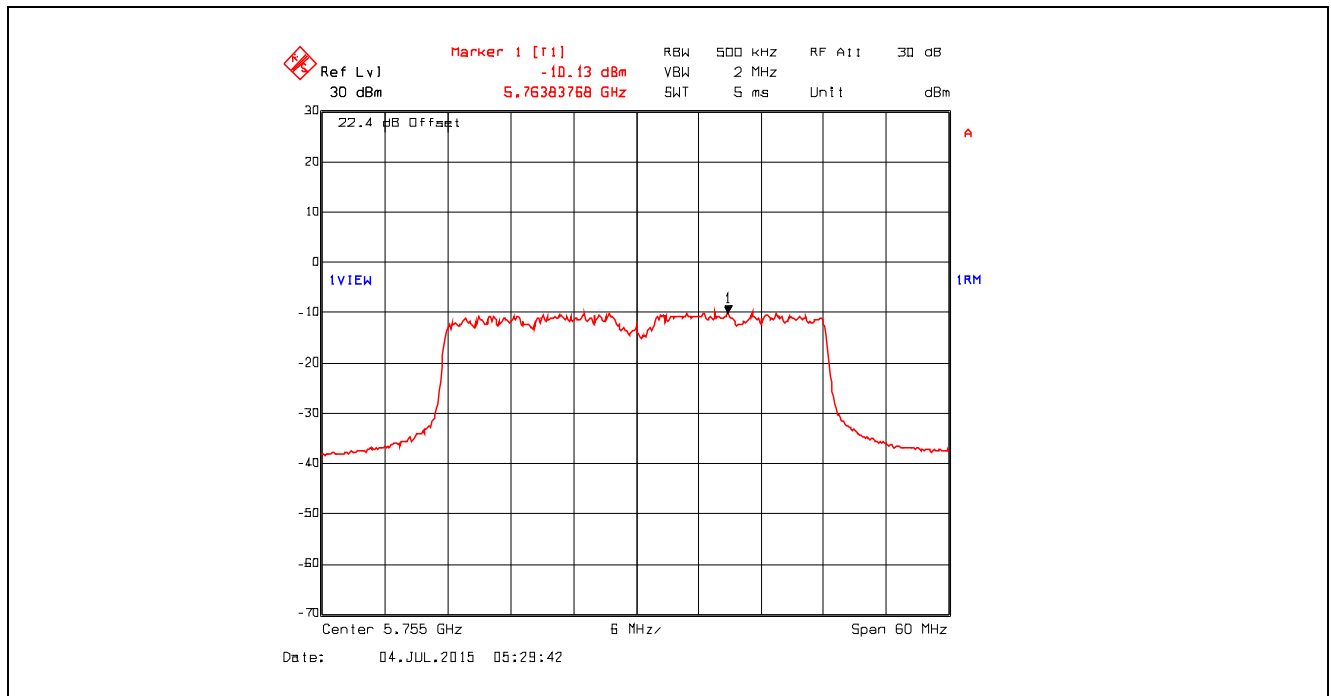
Plot 5.4.4.60. Power Spectral Density, Data Rate 11, Chain # 2, Ch 159, 5795 MHz, Software Output Power Setting 18



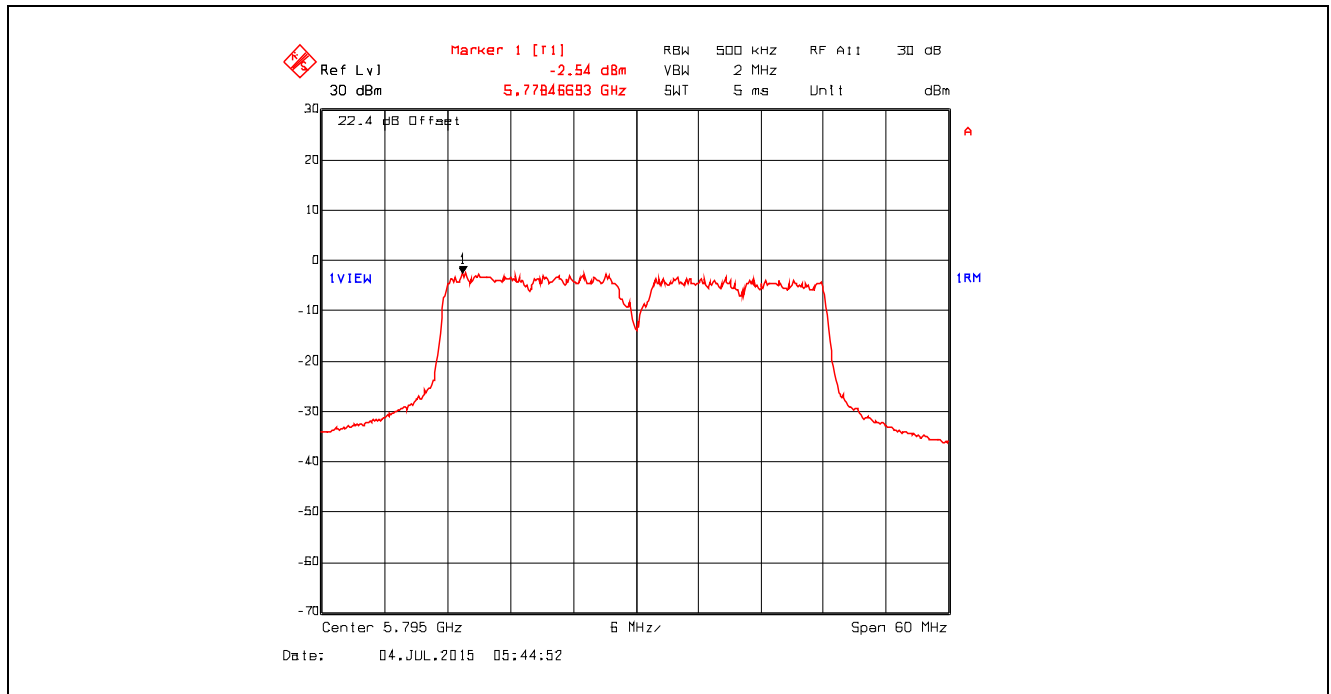
Plot 5.4.4.61. Power Spectral Density, Data Rate 12, Chain # 1, Ch 151, 5755 MHz, Software Output Power Setting 7



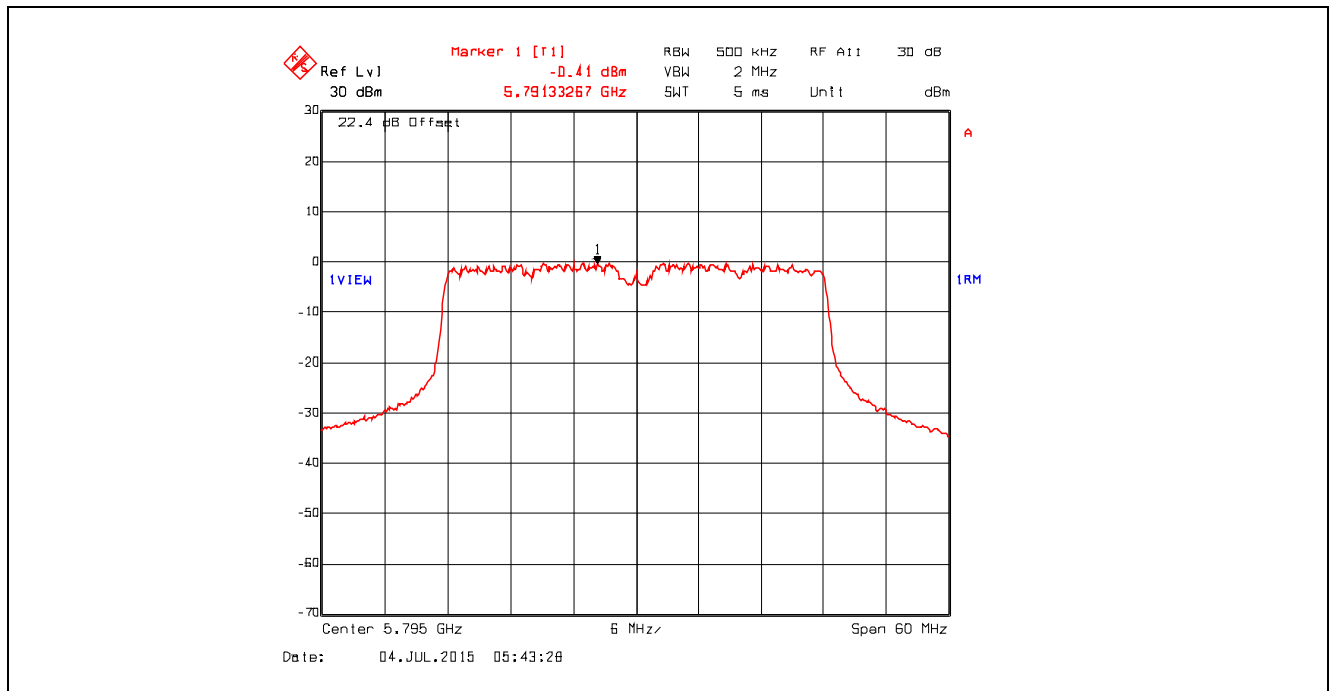
Plot 5.4.4.62. Power Spectral Density, Data Rate 12, Chain # 2, Ch 151, 5755 MHz, Software Output Power Setting 7



Plot 5.4.4.63. Power Spectral Density, Data Rate 12, Chain # 1, Ch 159, 5795 MHz, Software Output Power Setting 18



Plot 5.4.4.64. Power Spectral Density, Data Rate 12, Chain # 2, Ch 159, 5795 MHz, Software Output Power Setting 18



5.5. UNDESIRABLE EMISSIONS [§ 15.407(b)]

5.5.1. Limit(s)

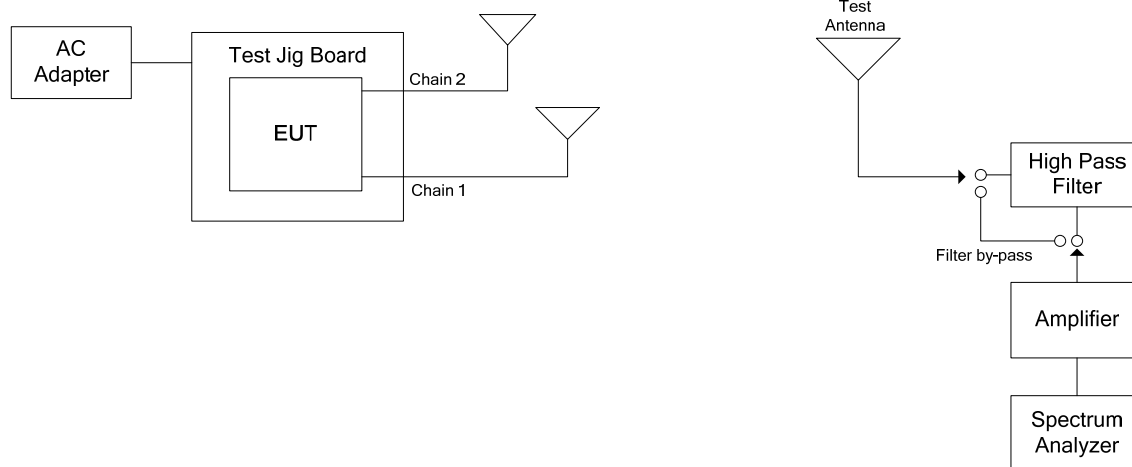
§ 15.407(b) *Undesirable emission limits.* Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

- (1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (4) For transmitters operating in the 5.725-5.85 GHz band: All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of -17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (5) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.
- (6) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207.
- (7) The provisions of §15.205 apply to intentional radiators operating under this section.
- (8) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency band edges as the design of the equipment permits.

5.5.2. Method of Measurements

FCC KDB 789033 D02 General UNII Test Procedures New Rules v01, Section II.G.

5.5.3. Test Arrangement

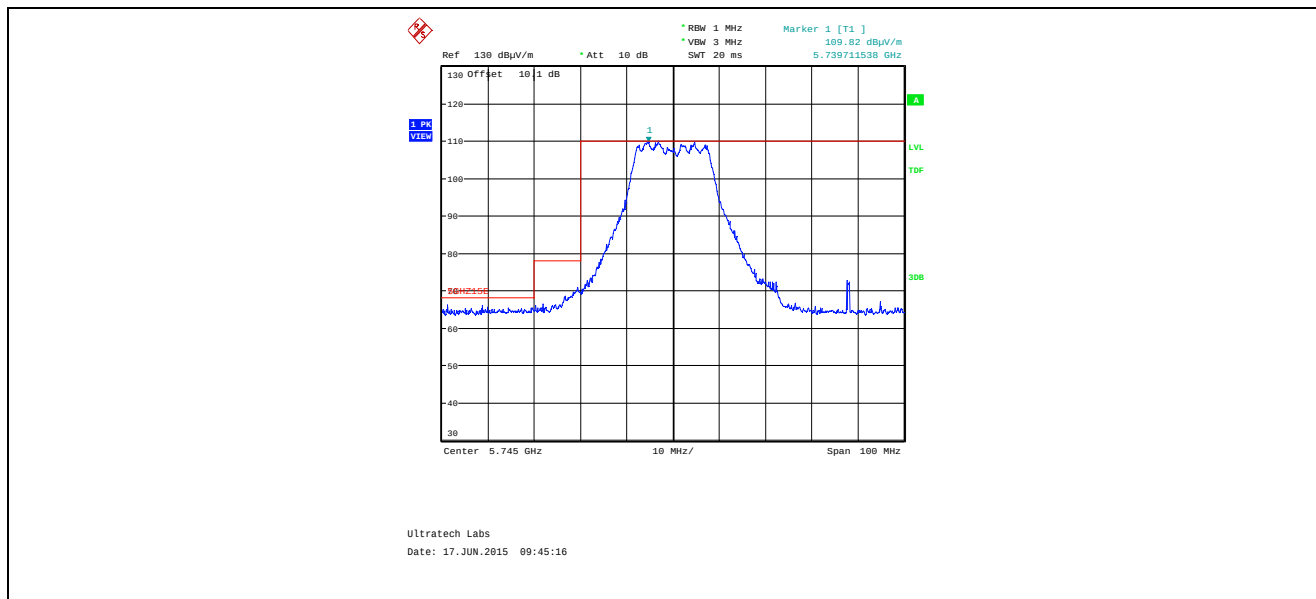


5.5.4. Test Data

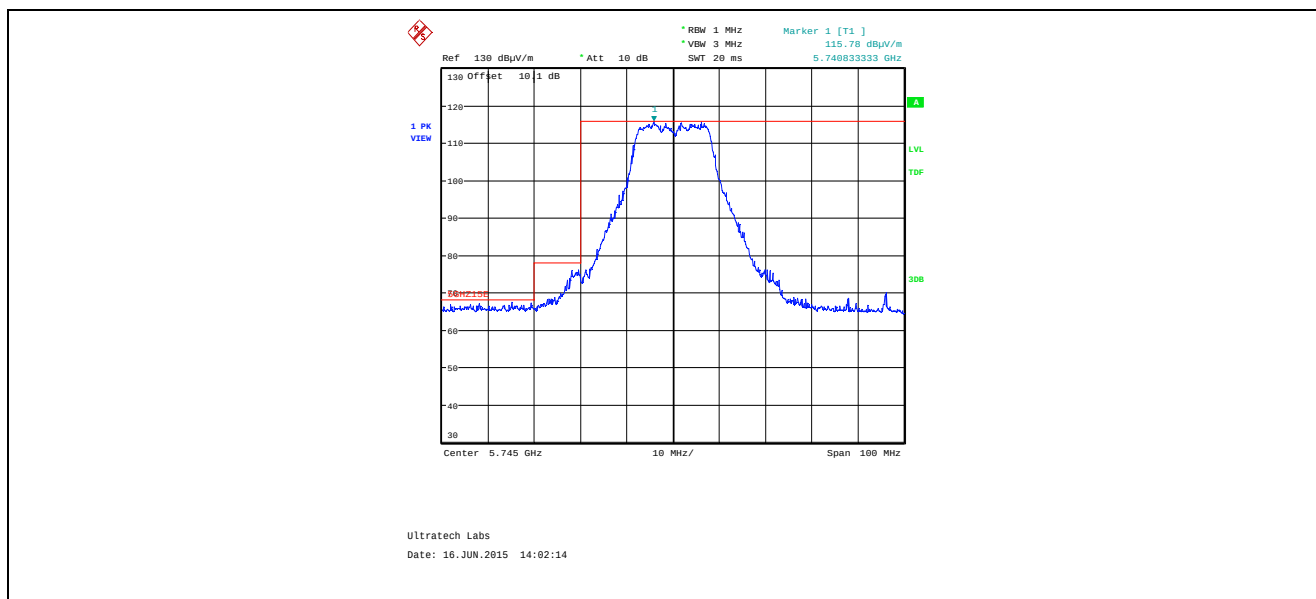
Remark(s): Exploratory tests performed to determined worst-case test configurations, the following test results represent the worst-case.

5.5.4.1. Band-Edge Radiated Emissions

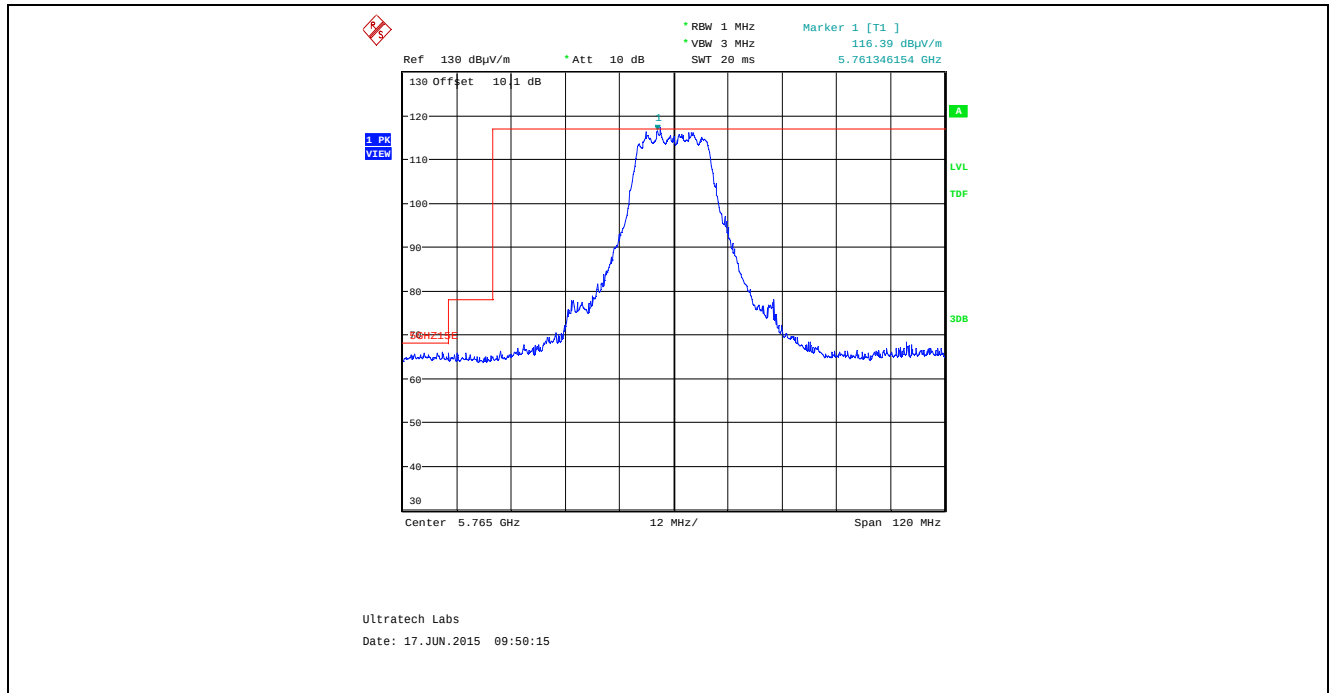
Plot 5.5.4.1.1. Band-Edge Radiated Emissions, Data Rate 4, Ch 149, 5745 MHz, Software Output Power Setting 13
Receiver Antenna Orientation: Horizontal



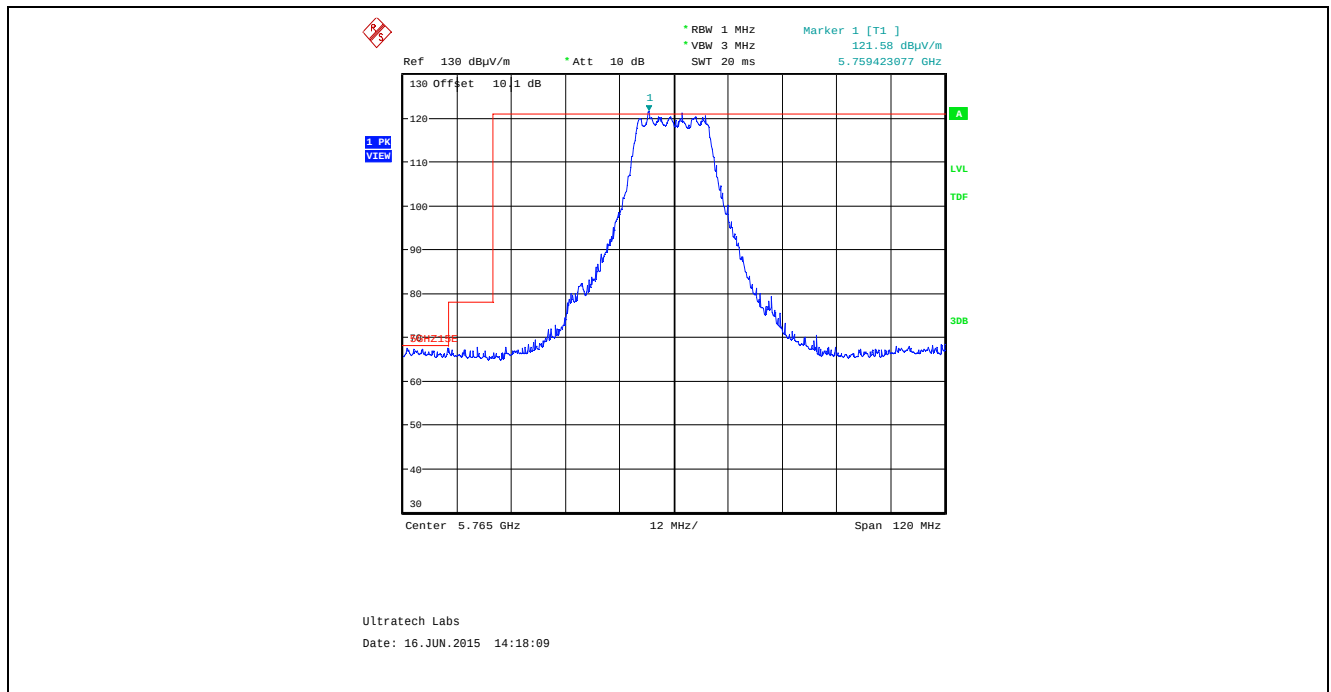
Plot 5.5.4.1.2. Band-Edge Radiated Emissions, Data Rate 4, Ch 149, 5745 MHz, Software Output Power Setting 13
Receiver Antenna Orientation: Vertical



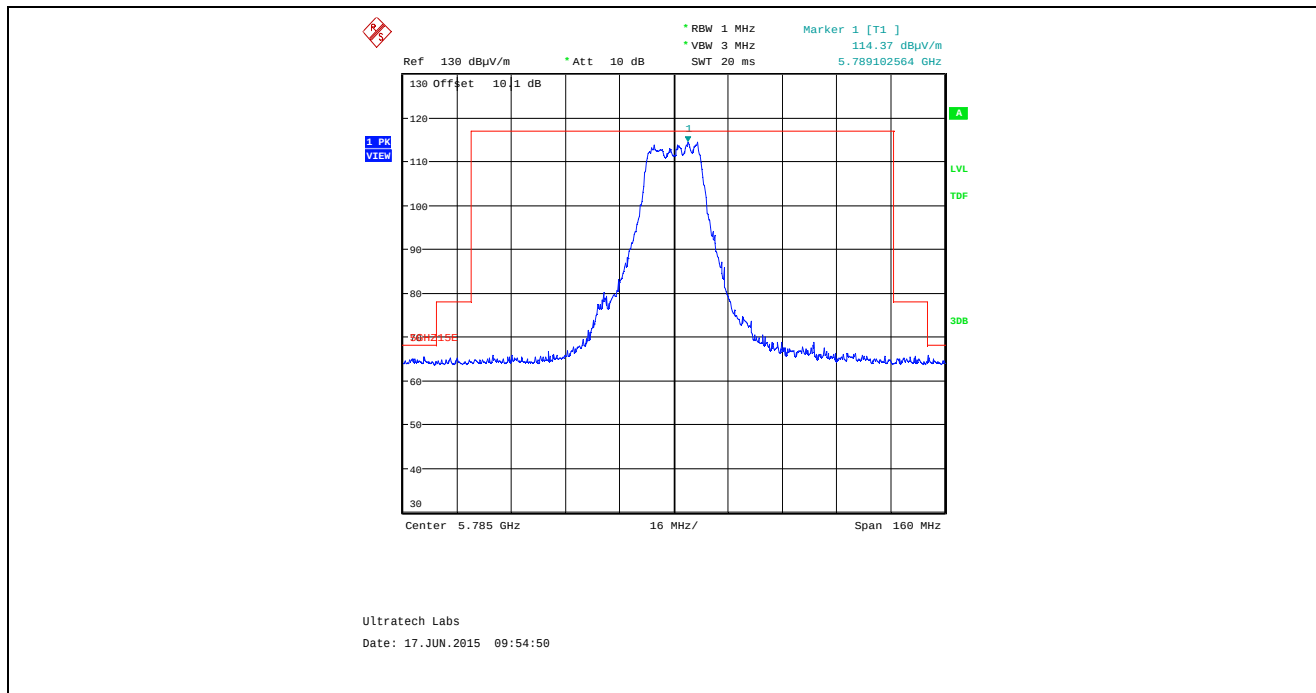
Plot 5.5.4.1.3. Band-Edge Radiated Emissions, Data Rate 4, Ch 153, 5765 MHz, Software Output Power Setting 19
Receiver Antenna Orientation: Horizontal



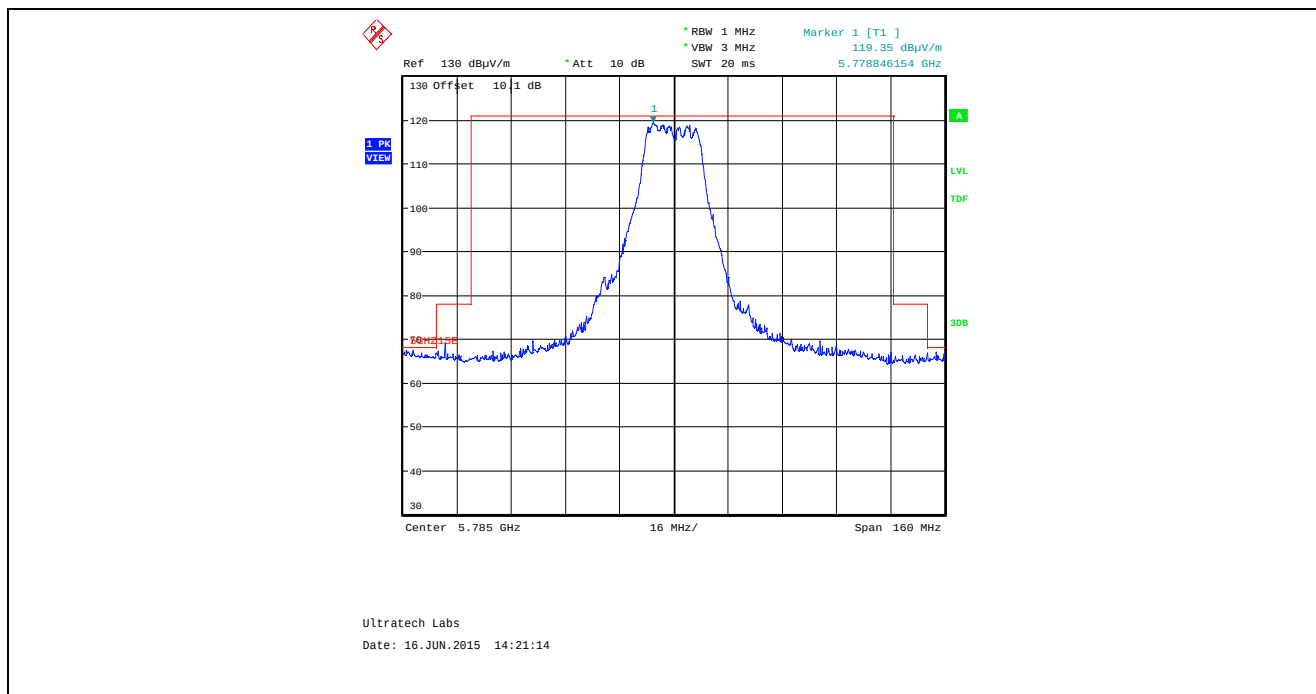
Plot 5.5.4.1.4. Band-Edge Radiated Emissions, Data Rate 4, Ch 153, 5765 MHz, Software Output Power Setting 19
Receiver Antenna Orientation: Vertical



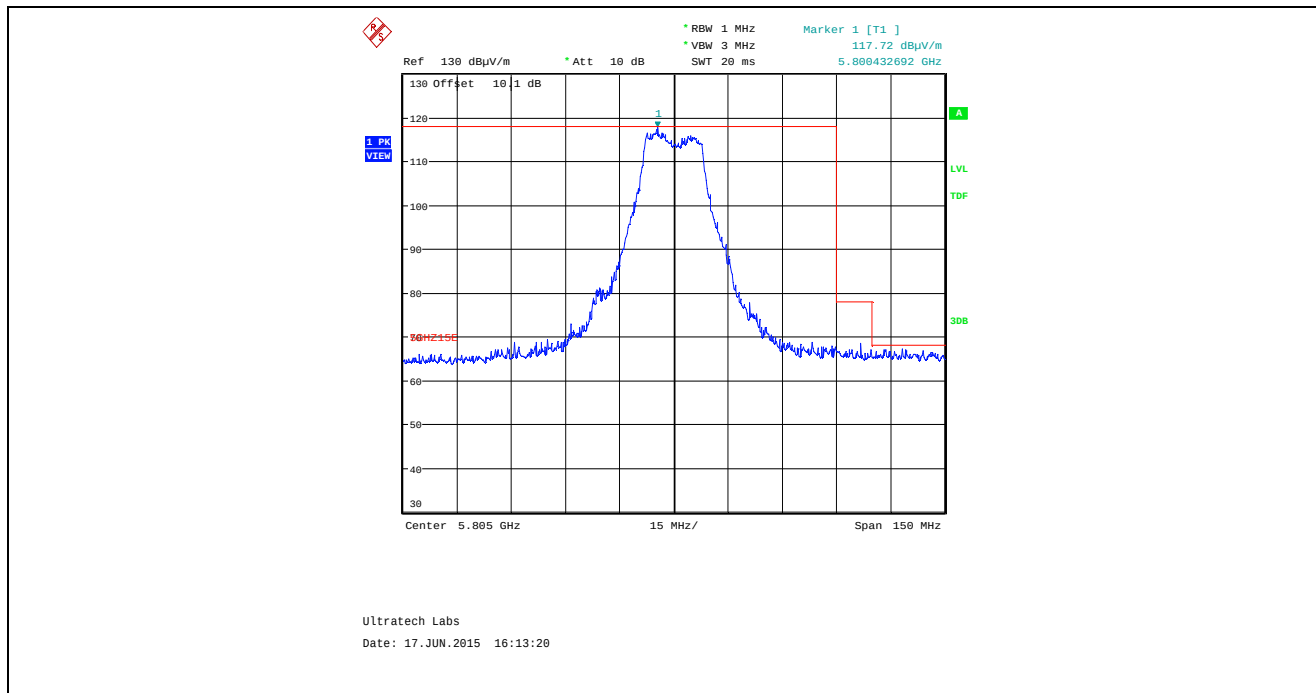
Plot 5.5.4.1.5. Band-Edge Radiated Emissions, Data Rate 4, Ch 157, 5785 MHz, Software Output Power Setting 19
Receiver Antenna Orientation: Horizontal



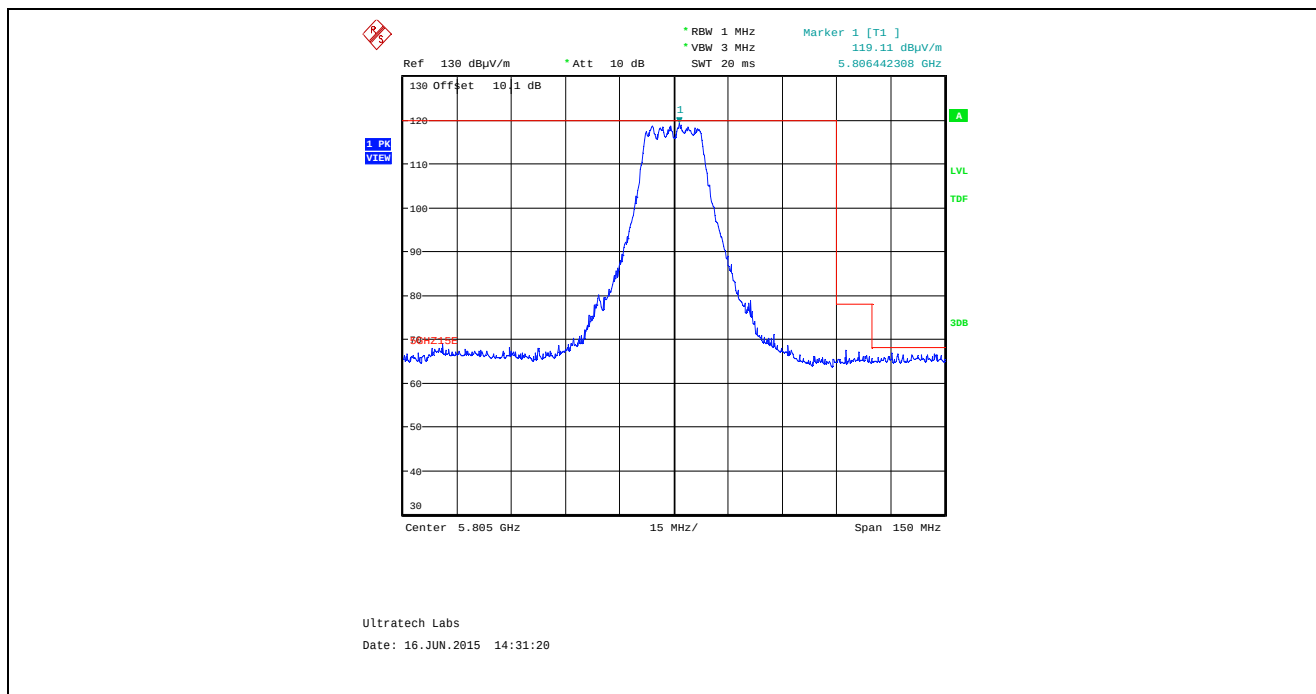
Plot 5.5.4.1.6. Band-Edge Radiated Emissions, Data Rate 4, Ch 157, 5785 MHz, Software Output Power Setting 19
Receiver Antenna Orientation: Vertical



Plot 5.5.4.1.7. Band-Edge Radiated Emissions, Data Rate 4, Ch 161, 5805 MHz, Software Output Power Setting 19
Receiver Antenna Orientation: Horizontal



Plot 5.5.4.1.8. Band-Edge Radiated Emissions, Data Rate 4, Ch 161, 5805 MHz, Software Output Power Setting 19
Receiver Antenna Orientation: Vertical



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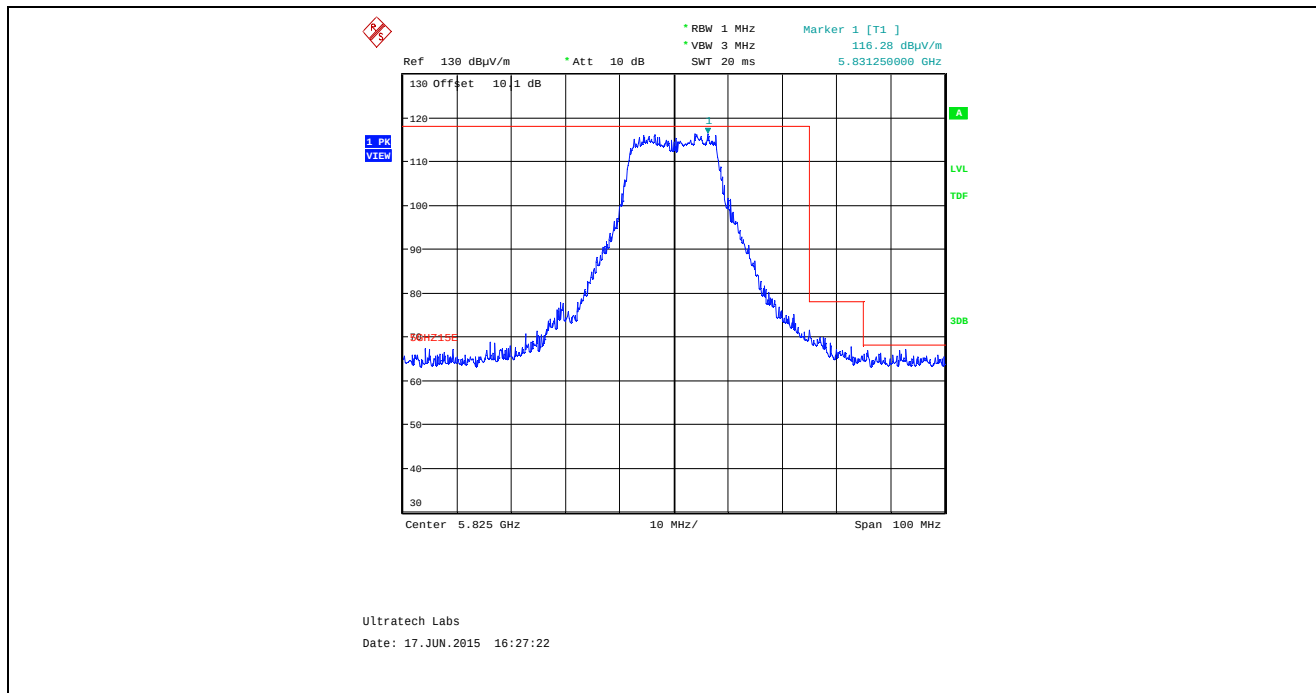
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 15MCRS079_FCC15E407

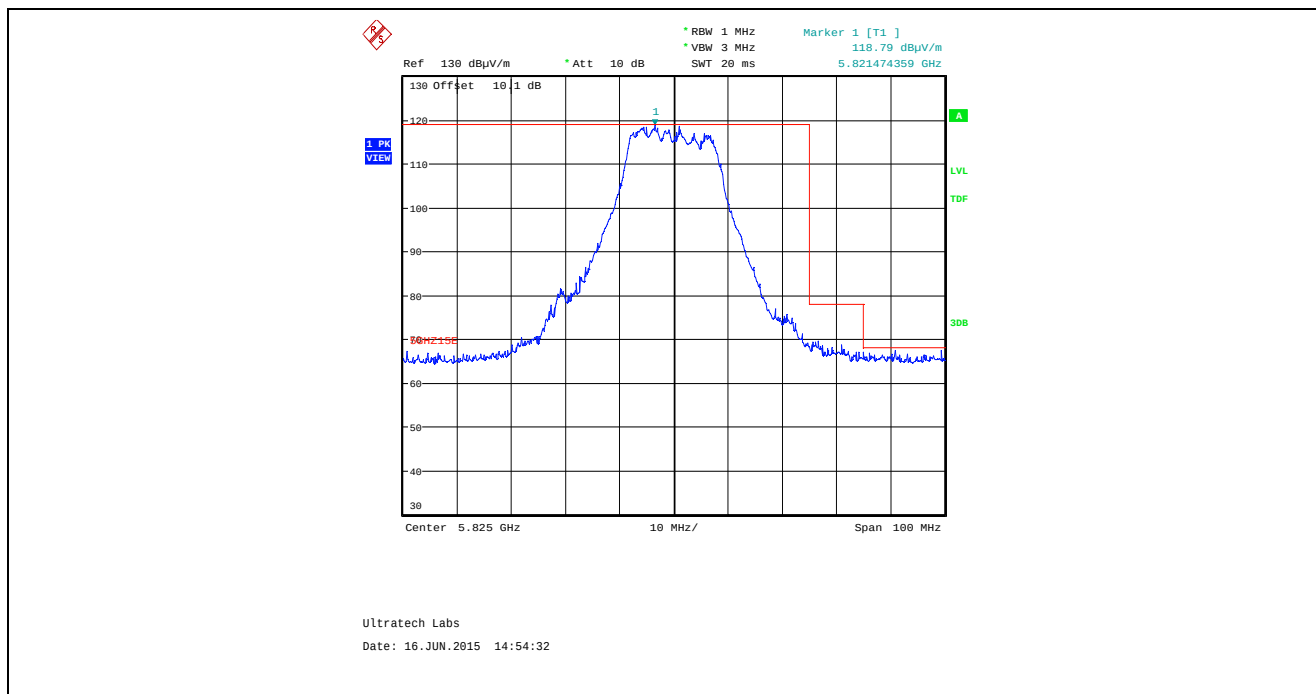
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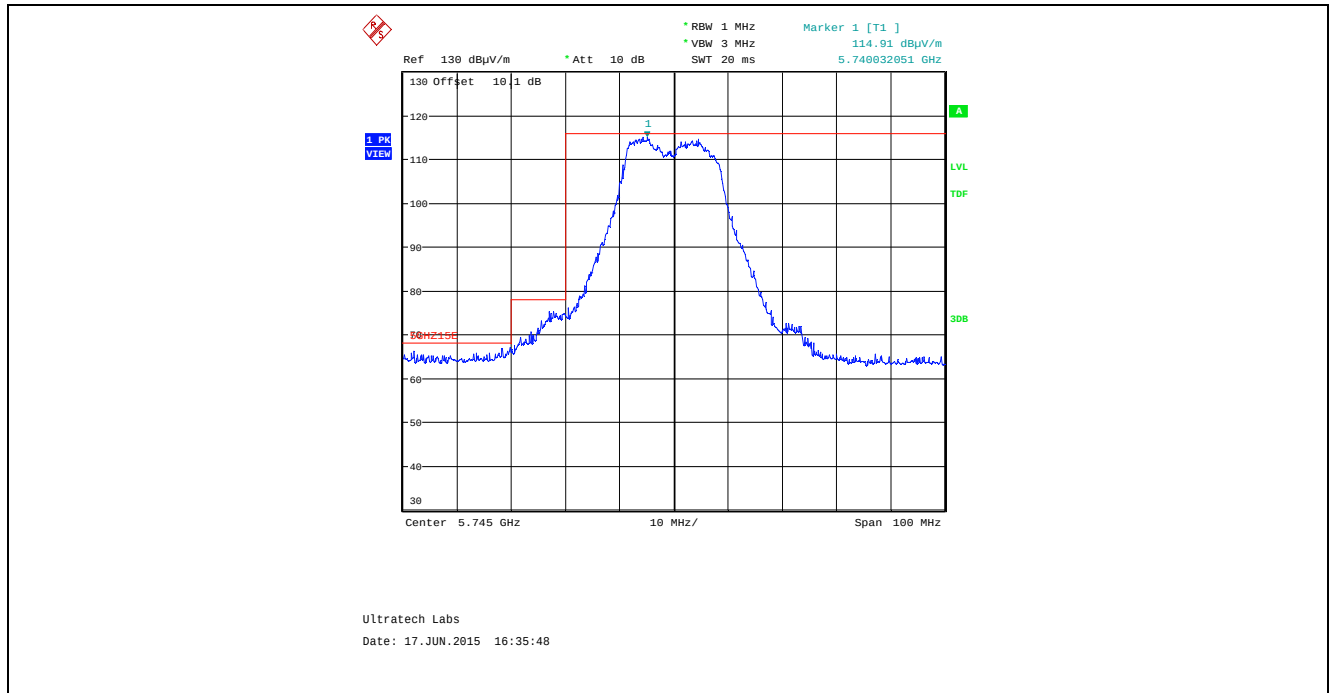
Plot 5.5.4.1.9. Band-Edge Radiated Emissions, Data Rate 4, Ch 165, 5825 MHz, Software Output Power Setting 18
Receiver Antenna Orientation: Horizontal



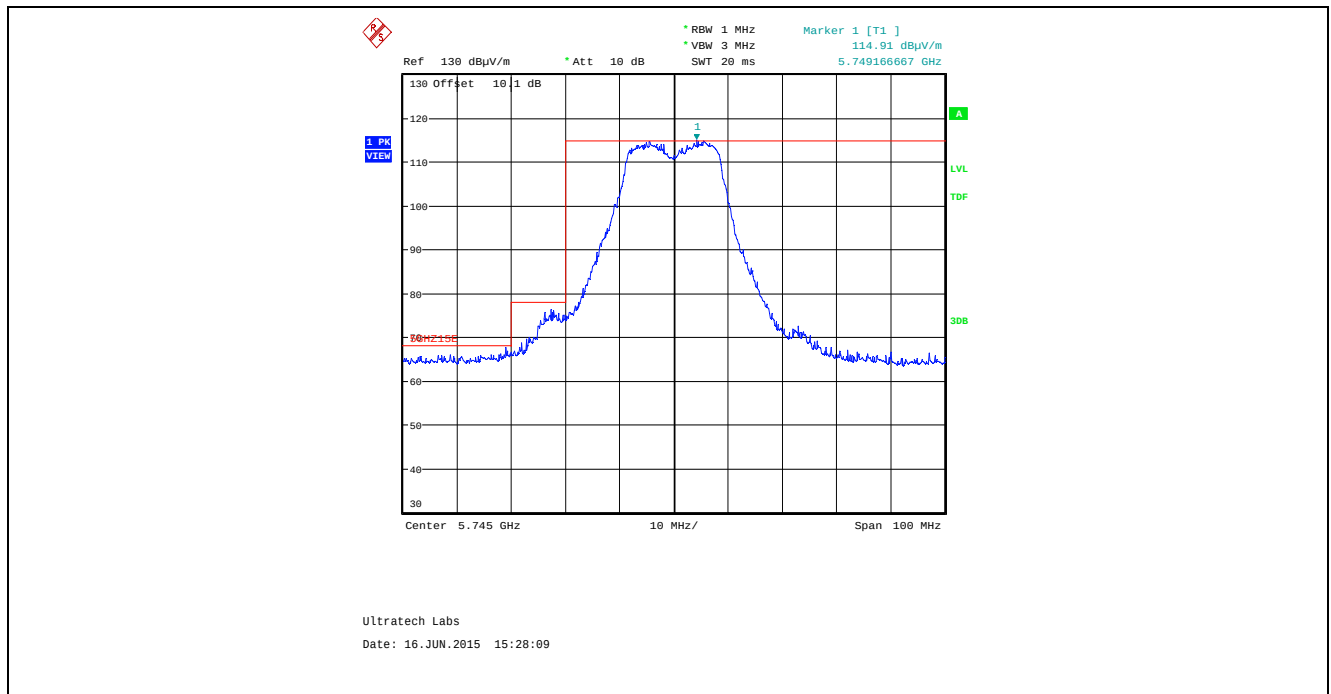
Plot 5.5.4.1.10. Band-Edge Radiated Emissions, Data Rate 4, Chain # 2, Ch 165, 5825 MHz, Software Output Power Setting 18
Receiver Antenna Orientation: Vertical



Plot 5.5.4.1.11. Band-Edge Radiated Emissions, Data Rate 8, Ch 149, 5745 MHz, Software Output Power Setting 13
Receiver Antenna Orientation: Horizontal



Plot 5.5.4.1.12. Band-Edge Radiated Emissions, Data Rate 8, Ch 149, 5745 MHz, Software Output Power Setting 13
Receiver Antenna Orientation: Vertical



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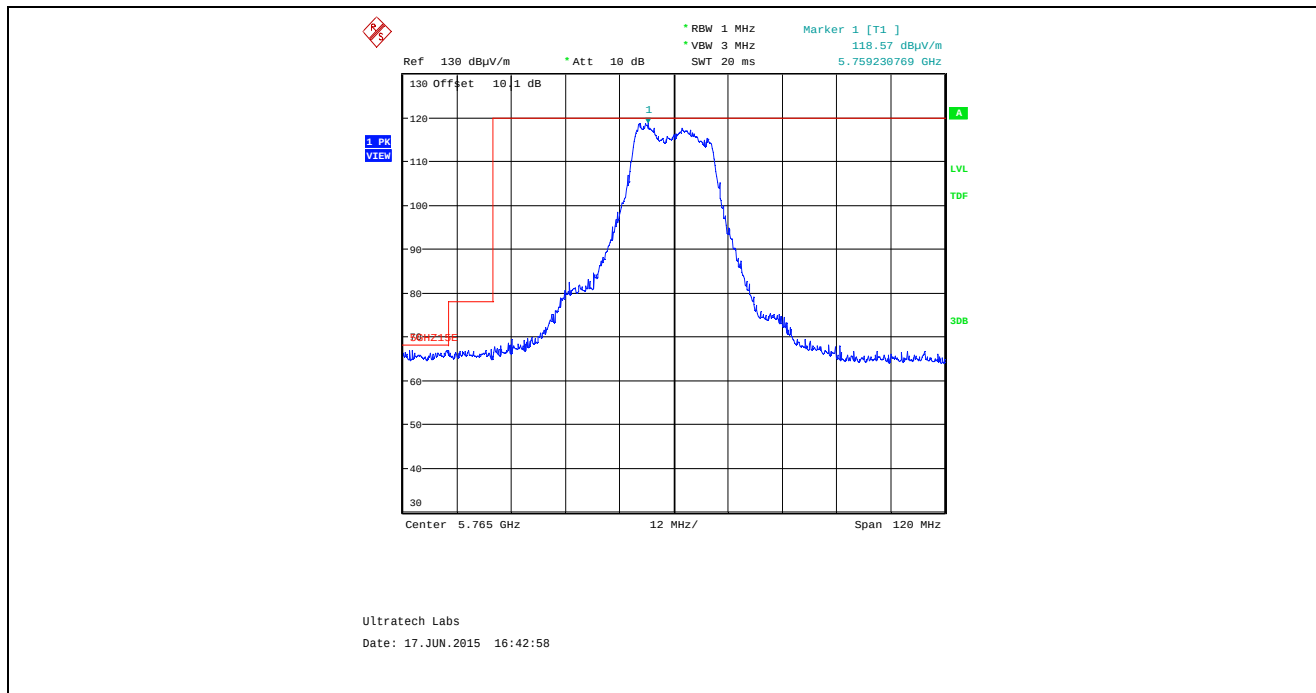
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 15MCRS079_FCC15E407

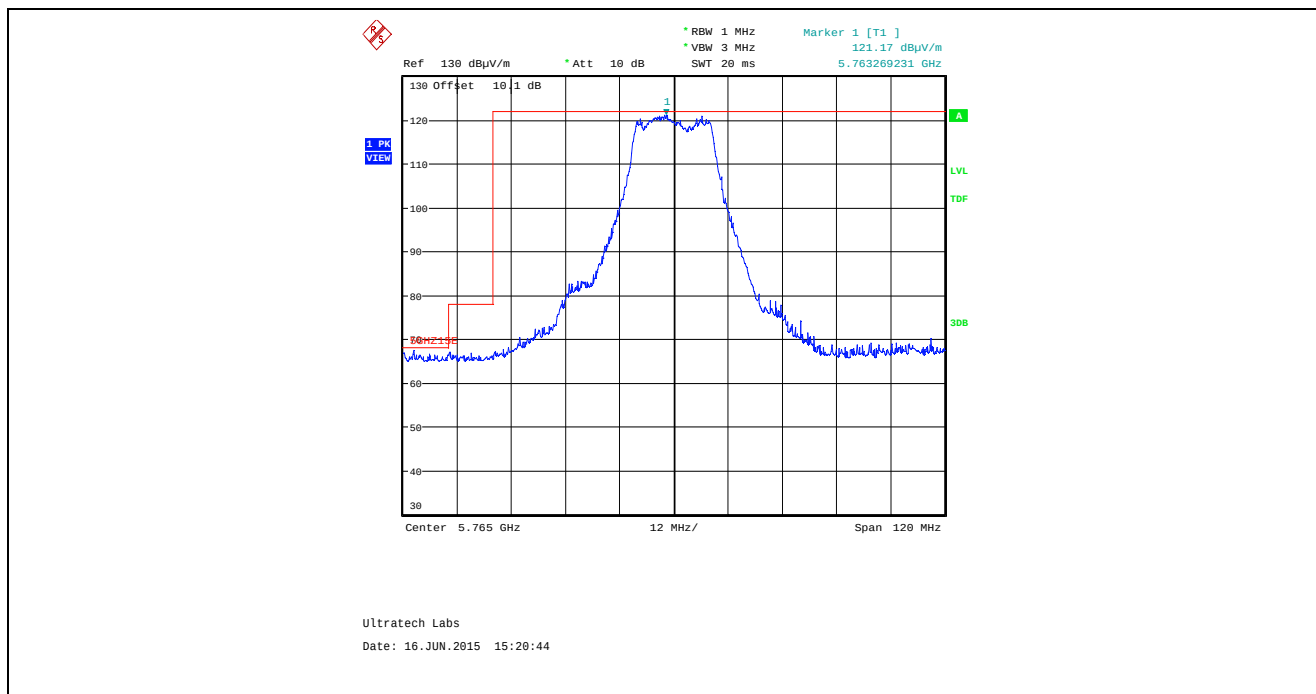
November 16, 2015

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

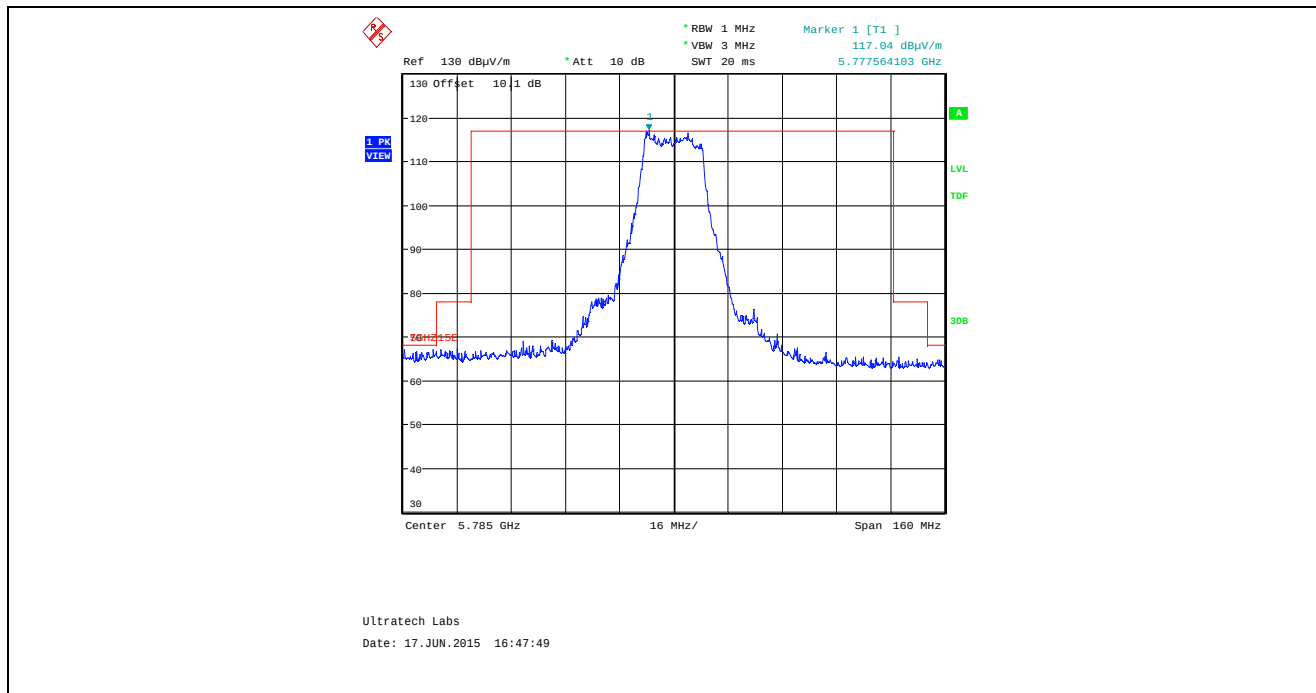
Plot 5.5.4.1.13. Band-Edge Radiated Emissions, Data Rate 8, Ch 153, 5765 MHz, Software Output Power Setting 19
Receiver Antenna Orientation: Horizontal



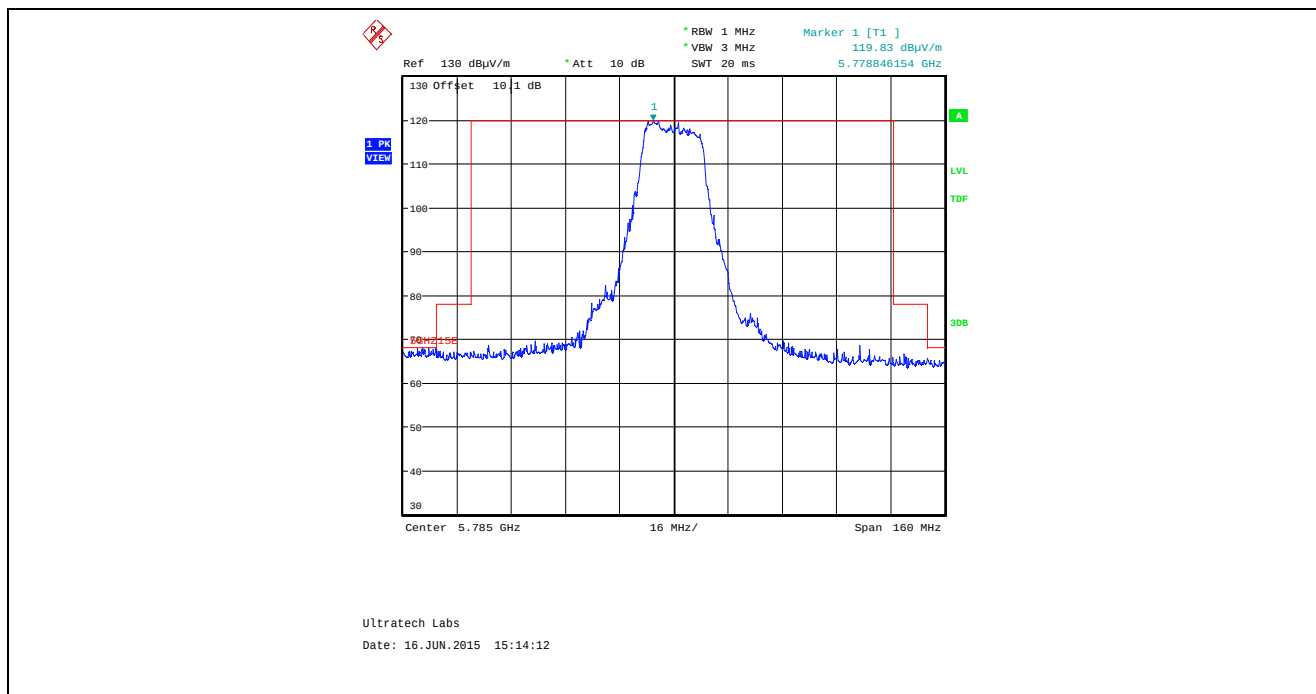
Plot 5.5.4.1.14. Band-Edge Radiated Emissions, Data Rate 8, Ch 153, 5765 MHz, Software Output Power Setting 19
Receiver Antenna Orientation: Vertical



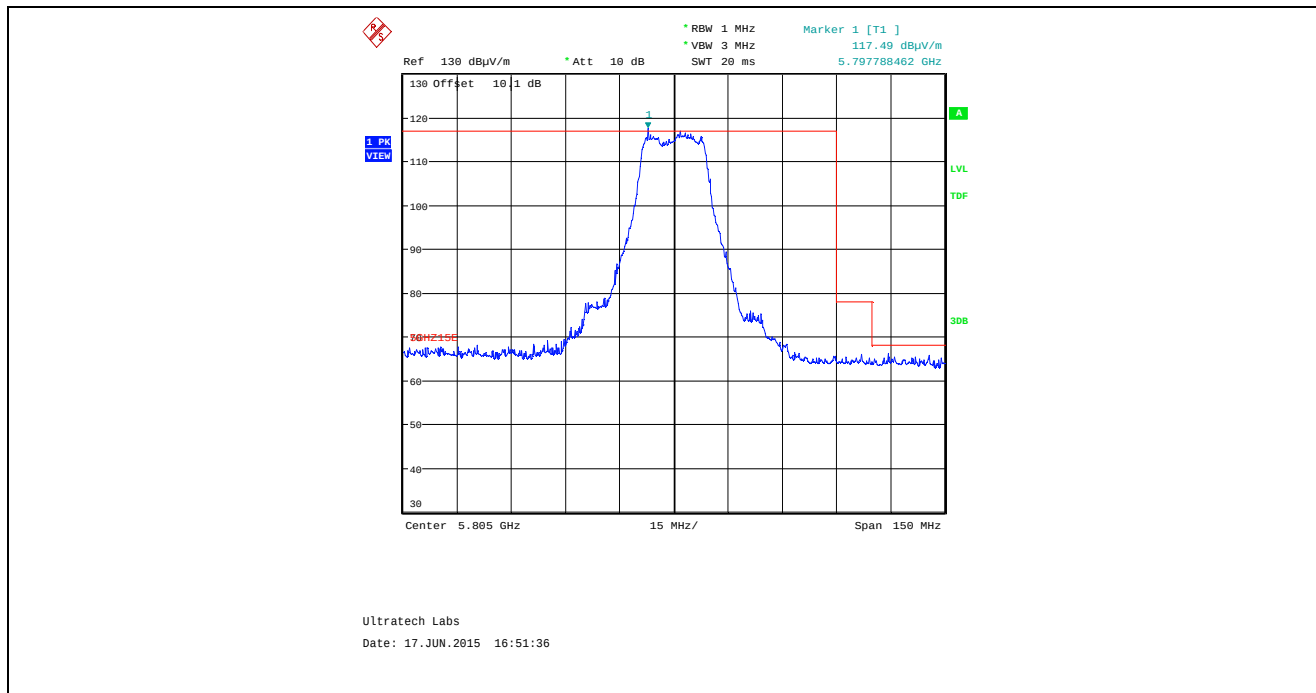
Plot 5.5.4.1.15. Band-Edge Radiated Emissions, Data Rate 8, Ch 157, 5785 MHz, Software Output Power Setting 19
Receiver Antenna Orientation: Horizontal



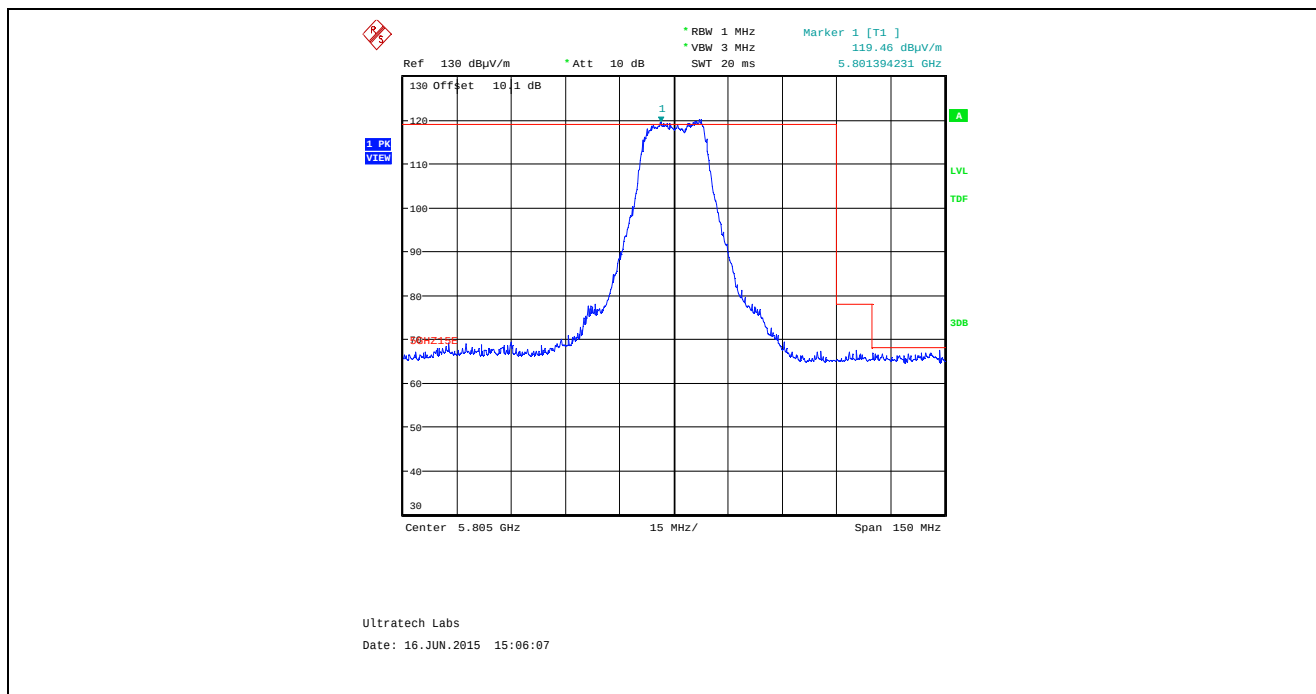
Plot 5.5.4.1.16. Band-Edge Radiated Emissions, Data Rate 8, Ch 157, 5785 MHz, Software Output Power Setting 19
Receiver Antenna Orientation: Vertical



Plot 5.5.4.1.17. Band-Edge Radiated Emissions, Data Rate 8, Ch 161, 5805 MHz, Software Output Power Setting 19
Receiver Antenna Orientation: Horizontal



Plot 5.5.4.1.18. Band-Edge Radiated Emissions, Data Rate 8, Ch 161, 5805 MHz, Software Output Power Setting 19
Receiver Antenna Orientation: Vertical



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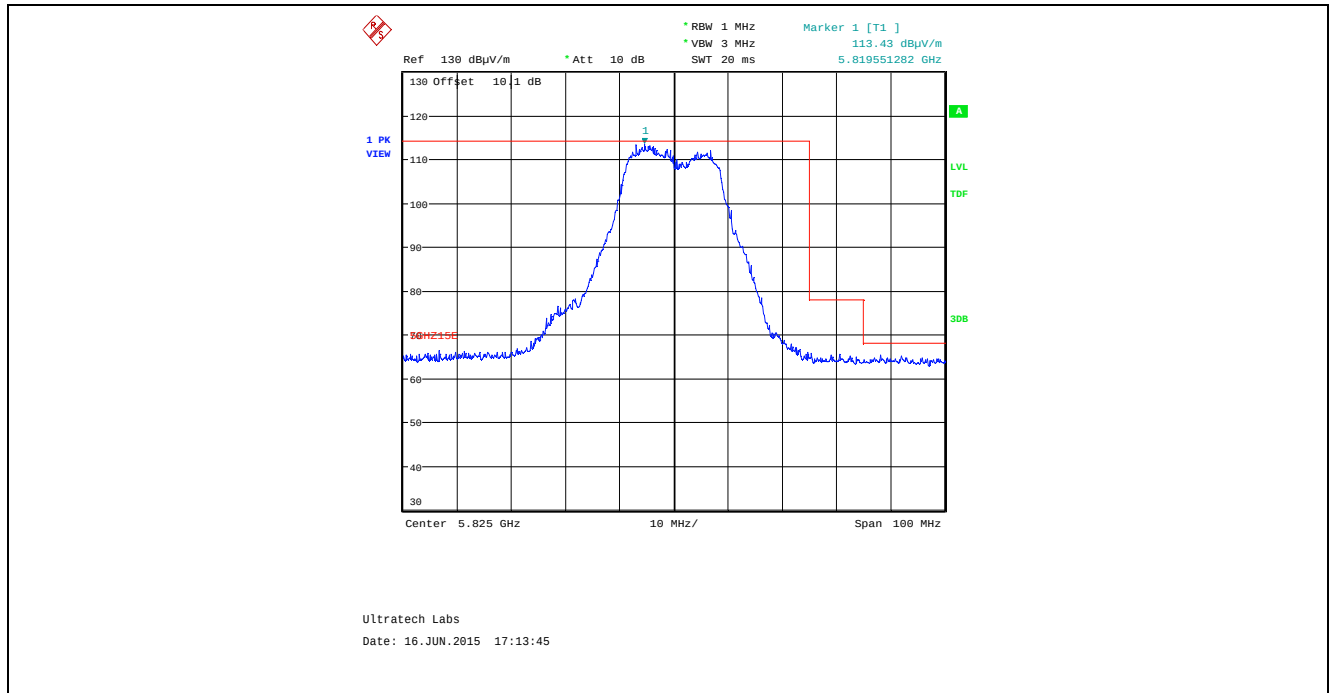
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 15MCRS079_FCC15E407

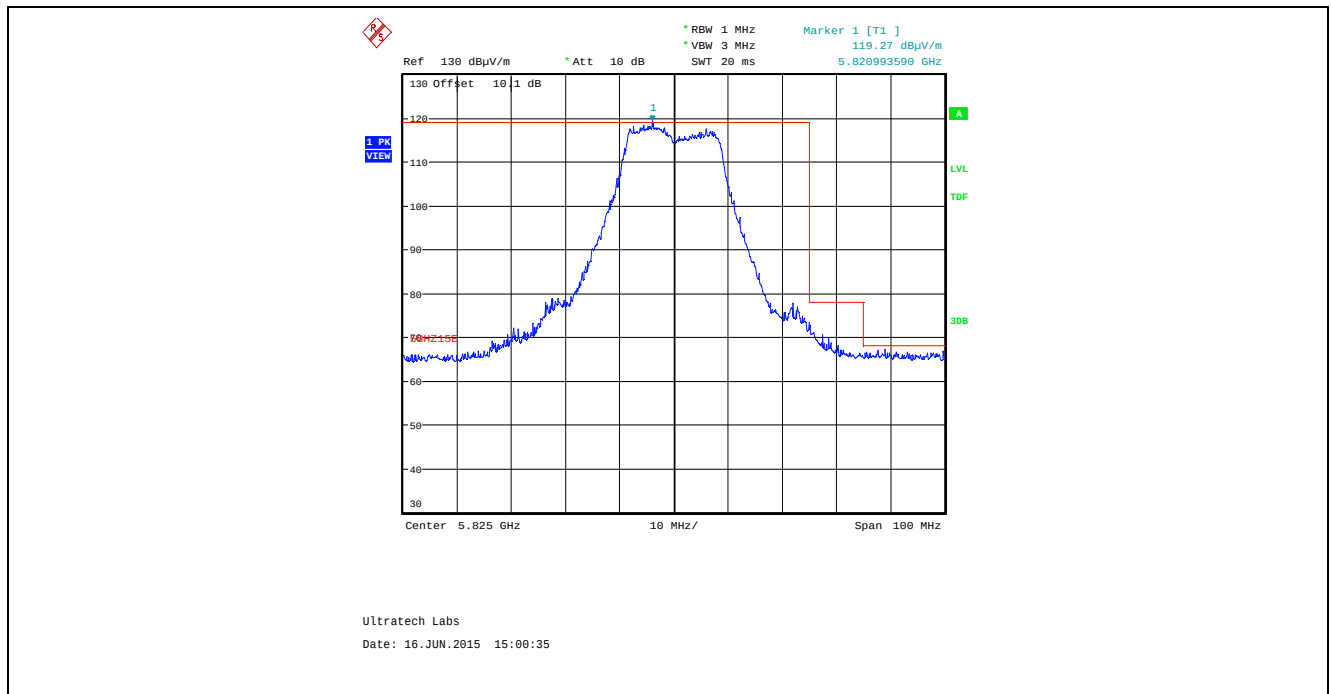
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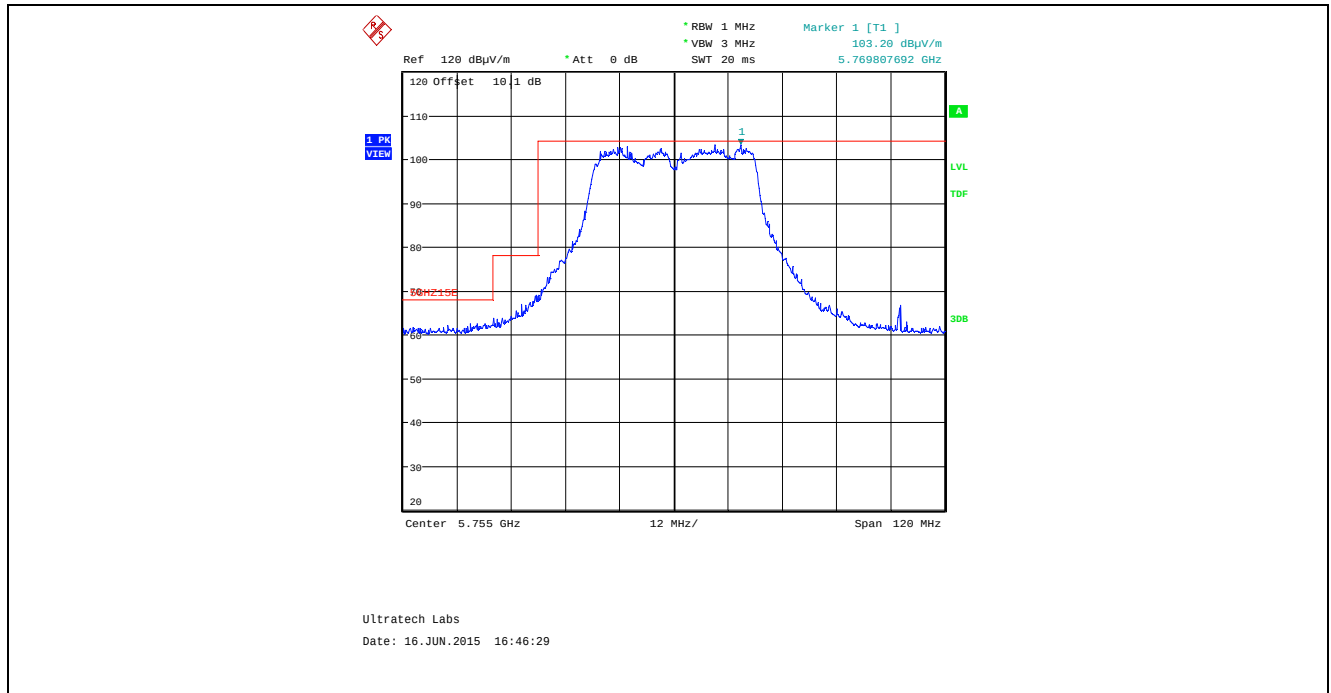
Plot 5.5.4.1.19. Band-Edge Radiated Emissions, Data Rate 8, Ch 165, 5825 MHz, Software Output Power Setting 18
Receiver Antenna Orientation: Horizontal



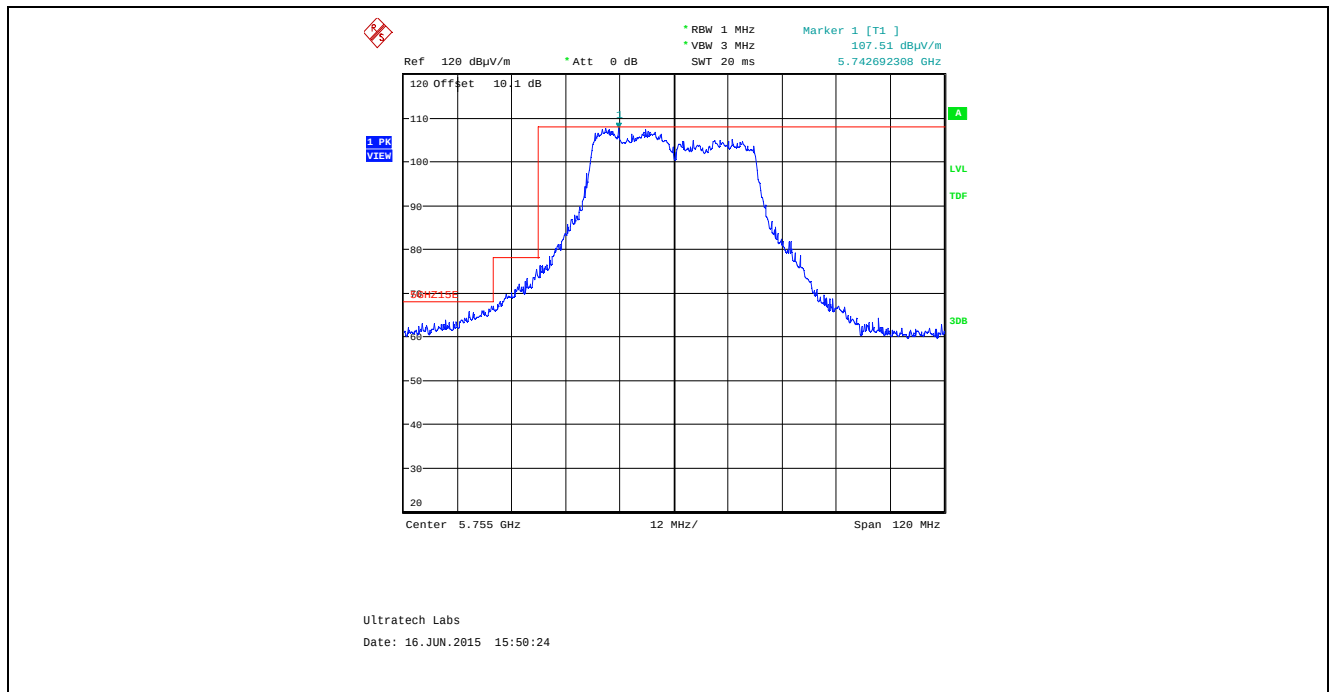
Plot 5.5.4.1.20. Band-Edge Radiated Emissions, Data Rate 8, Ch 165, 5825 MHz, Software Output Power Setting 18
Receiver Antenna Orientation: Vertical



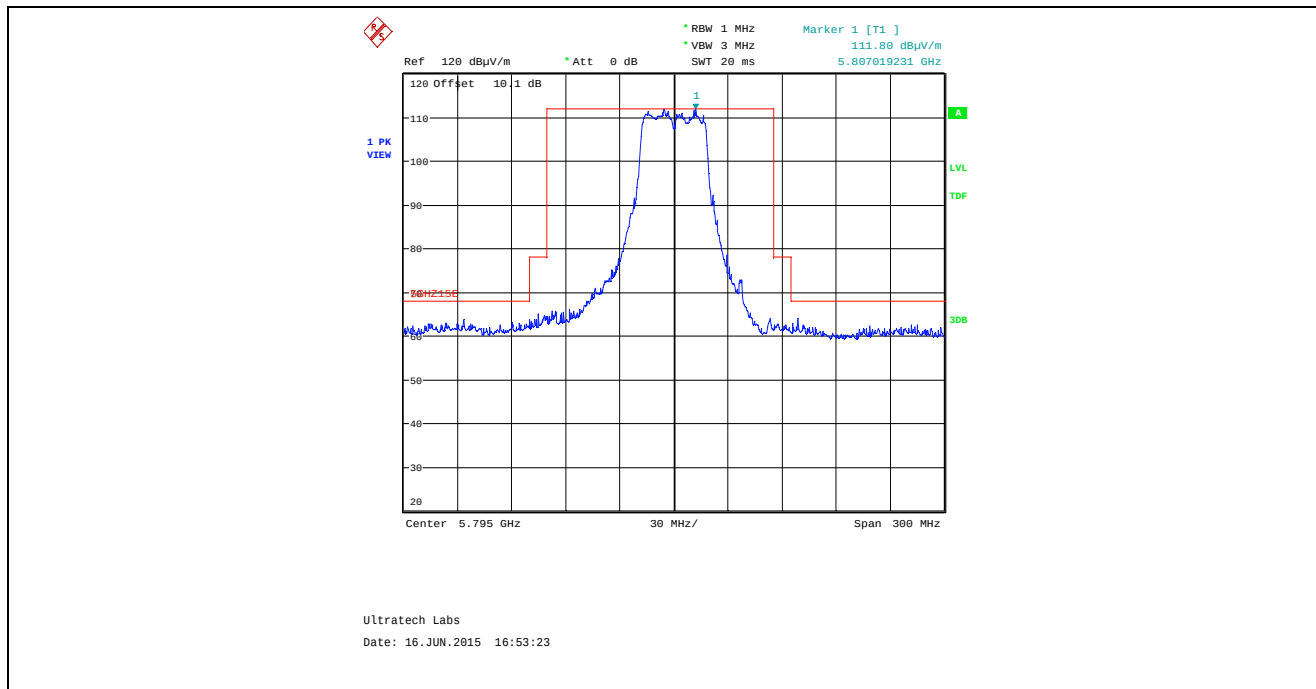
Plot 5.5.4.1.21. Band-Edge Radiated Emissions, Data Rate 12, Ch 151, 5755 MHz, Software Output Power Setting 7
Receiver Antenna Orientation: Horizontal



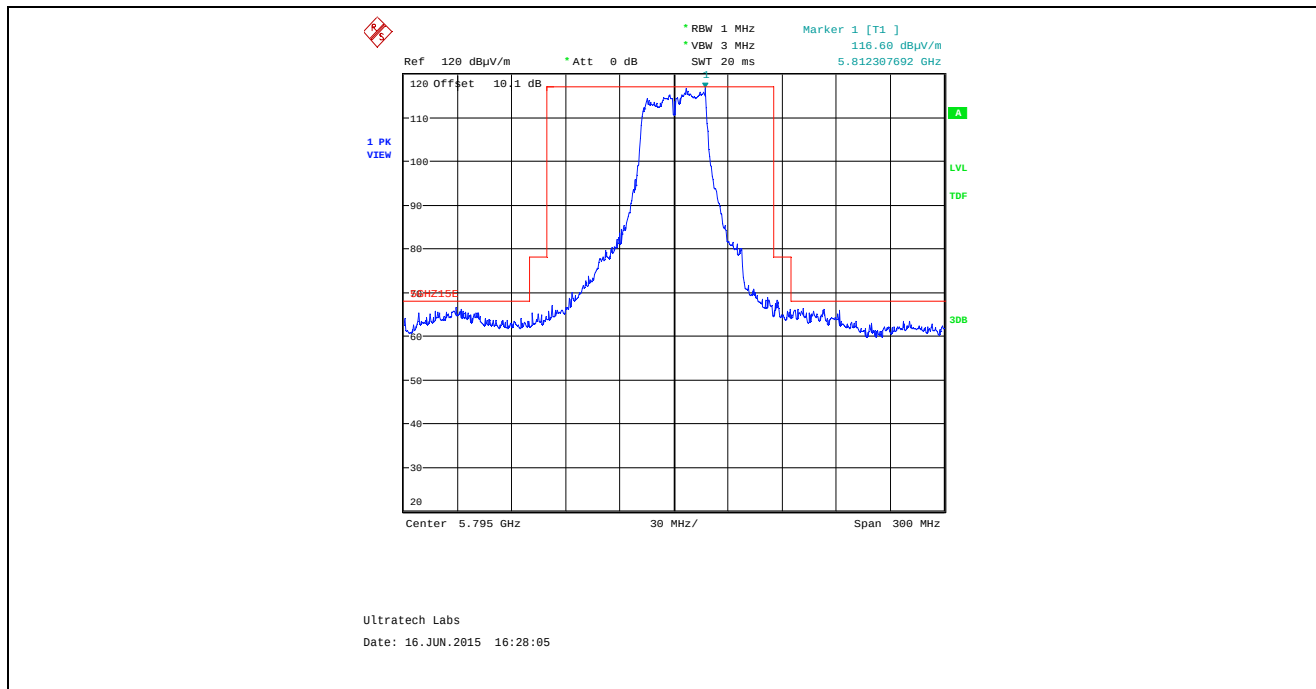
Plot 5.5.4.1.22. Band-Edge Radiated Emissions, Data Rate 12, Ch 151, 5755 MHz, Software Output Power Setting 7
Receiver Antenna Orientation: Vertical



Plot 5.5.4.1.23. Band-Edge Radiated Emissions, Data Rate 12, Ch 159, 5795 MHz, Software Output Power Setting 18
Receiver Antenna Orientation: Horizontal



Plot 5.5.4.1.24. Band-Edge Radiated Emissions, Data Rate 12, Ch 159, 5795 MHz, Software Output Power Setting 18
Receiver Antenna Orientation: Vertical



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5.5.4.2. Radiated Emissions

Remark(s):

- All spurious emissions that are in excess of 20 dB below the specified limit shall be recorded.
- EUT shall be tested in three orthogonal positions.
- EIRP[dBm] = E[dBμV/m] - 95.2, for 3 meters measurement distance.
- Exploratory tests performed to determined worst-case test configurations, the following test results at high power setting represent the worst-case.

5.5.4.2.1. Data Rate 4, EUT with 3 dBi Dipole Antennas

Fundamental Frequency:		5745 MHz						
Software Output Power Setting		13						
Frequency Test Range		30 MHz – 40 GHz						
Frequency (MHz)	RF Peak Level (dBμV/m)	RF QP/Avg Level		Antenna Plane (H/V)	Limit 15.209 (dBμV/m)	Limit 15.407(b)(4) (dBm/MHz)	Margin (dB)	Pass/Fail
		(dBμV/m)	(dBm/MHz)					
11490	60.55	46.08	-49.12	V	54.0	-27.0	-7.9	Pass*
11490	58.57	45.07	-50.13	H	54.0	-27.0	-8.9	Pass*
*Emission within the restricted bands, limits in section 15.209 applied.								

Fundamental Frequency:		5785 MHz						
Software Output Power Setting		19						
Frequency Test Range		30 MHz – 40 GHz						
Frequency (MHz)	RF Peak Level (dBμV/m)	RF QP/Avg Level		Antenna Plane (H/V)	Limit 15.209 (dBμV/m)	Limit 15.407(b)(4) (dBm/MHz)	Margin (dB)	Pass/Fail
		(dBμV/m)	(dBm/MHz)					
11570	62.53	49.49	-45.71	V	54.0	-27.0	-4.5	Pass*
11570	63.89	49.33	-45.87	H	54.0	-27.0	-4.7	Pass*
*Emission within the restricted bands, limits in section 15.209 applied.								

Fundamental Frequency:		5825 MHz						
Software Output Power Setting		18						
Frequency Test Range		30 MHz – 40 GHz						
Frequency (MHz)	RF Peak Level (dBμV/m)	RF QP/Avg Level		Antenna Plane (H/V)	Limit 15.209 (dBμV/m)	Limit 15.407(b)(4) (dBm/MHz)	Margin (dB)	Pass/Fail
		(dBμV/m)	(dBm/MHz)					
11650	61.97	48.36	-46.84	V	54.0	-27.0	-5.6	Pass*
11650	63.04	47.61	-47.59	H	54.0	-27.0	-6.4	Pass*
*Emission within the restricted bands, limits in section 15.209 applied.								

5.5.4.2.2. Data Rate 8, EUT with 3 dBi Dipole Antennas

Fundamental Frequency:		5745 MHz						
Software Output Power Setting		13						
Frequency Test Range		30 MHz – 40 GHz						
Frequency (MHz)	RF Peak Level (dBμV/m)	RF QP/Avg Level		Antenna Plane (H/V)	Limit 15.209 (dBμV/m)	Limit 15.407(b)(4) (dBm/MHz)	Margin (dB)	Pass/Fail
		(dBμV/m)	(dBm/MHz)					
11490	60	44.44	-50.76	V	54.0	-27.0	-9.6	Pass*
11490	59.8	44.43	-50.77	H	54.0	-27.0	-9.6	Pass*
*Emission within the restricted bands, limits in section 15.209 applied.								

Fundamental Frequency:		5785 MHz						
Software Output Power Setting		19						
Frequency Test Range		30 MHz – 40 GHz						
Frequency (MHz)	RF Peak Level (dBμV/m)	RF QP/Avg Level		Antenna Plane (H/V)	Limit 15.209 (dBμV/m)	Limit 15.407(b)(4) (dBm/MHz)	Margin (dB)	Pass/Fail
		(dBμV/m)	(dBm/MHz)					
11570	63.57	47.38	-47.82	V	54.0	-27.0	-6.6	Pass*
11570	63.88	48.35	-46.85	H	54.0	-27.0	-5.7	Pass*
*Emission within the restricted bands, limits in section 15.209 applied.								

Fundamental Frequency:		5825 MHz						
Software Output Power Setting		18						
Frequency Test Range		30 MHz – 40 GHz						
Frequency (MHz)	RF Peak Level (dBμV/m)	RF QP/Avg Level		Antenna Plane (H/V)	Limit 15.209 (dBμV/m)	Limit 15.407(b)(4) (dBm/MHz)	Margin (dB)	Pass/Fail
		(dBμV/m)	(dBm/MHz)					
11650	60.1	47.59	-47.61	V	54.0	-27.0	-6.4	Pass*
11650	62.07	48.87	-46.33	H	54.0	-27.0	-5.1	Pass*
*Emission within the restricted bands, limits in section 15.209 applied.								

5.5.4.2.3. Data Rate 12, EUT with 3 dBi Dipole Antennas

Fundamental Frequency:		5755 MHz						
Software Output Power Setting		7						
Frequency Test Range		30 MHz – 40 GHz						
Frequency (MHz)	RF Peak Level (dBμV/m)	RF QP/Avg Level		Antenna Plane (H/V)	Limit 15.209 (dBμV/m)	Limit 15.407(b)(4) (dBm/MHz)	Margin (dB)	Pass/Fail
		(dBμV/m)	(dBm/MHz)					
30 - 40000	*	*	*	V/H	*	*	*	*
*All emissions were greater than 20 dB below the limit.								

Fundamental Frequency:		5795 MHz						
Software Output Power Setting		18						
Frequency Test Range		30 MHz – 40 GHz						
Frequency (MHz)	RF Peak Level (dBμV/m)	RF QP/Avg Level		Antenna Plane (H/V)	Limit 15.209 (dBμV/m)	Limit 15.407(b)(4) (dBm/MHz)	Margin (dB)	Pass/Fail
		(dBμV/m)	(dBm/MHz)					
11590	60.41	46.78	-48.42	V	54.0	-27.0	-7.2	Pass*
11590	59.32	45.67	-49.53	H	54.0	-27.0	-8.3	Pass*
*Emission within the restricted bands, limits in section 15.209 applied.								

5.6. EMISSION BANDWIDTH, 6 dB BANDWIDTH, 99% OCCUPIED BANDWIDTH [§§ 15.403(i) & 15.407(e)]

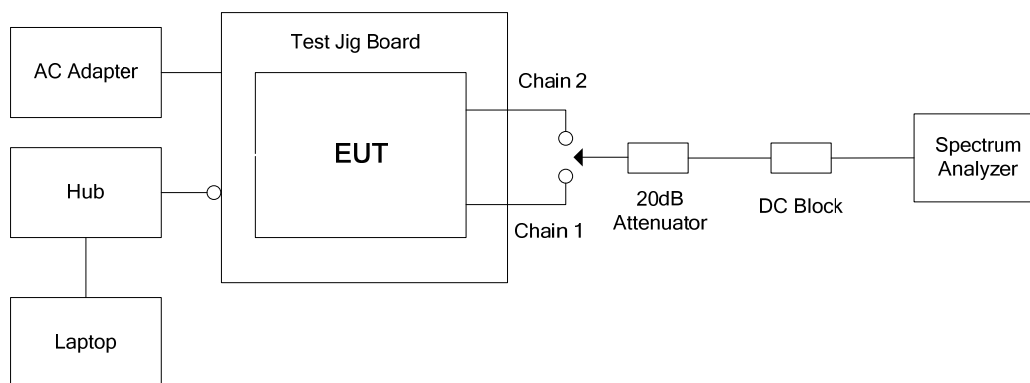
5.6.1. Limit(s)

Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

5.6.2. Method of Measurements

KDB Publication No. 789033 D02 General UNII Test Procedures New Rules v01, Section II.C and D.

5.6.3. Test Arrangement



5.6.4. Test Data

5.6.4.1. Emissions Bandwidth (26 dB Bandwidth)

Operating Mode	Software Output Power Setting	Channel Number	Frequency (MHz)	26dB BW (MHz)	
				Chain # 1	Chain # 2
Data Rate 1	13	149	5745	24.75	26.05
	19	157	5785	24.45	25.95
	18	165	5825	24.25	25.95
Data Rate 2	13	149	5745	23.95	25.25
	19	157	5785	23.85	25.05
	18	165	5825	23.75	24.75

Operating Mode	Software Output Power Setting	Channel Number	Frequency (MHz)	26dB BW (MHz)	
				Chain # 1	Chain # 2
Data Rate 3	13	149	5745	24.04	25.15
	19	157	5785	24.25	24.45
	18	165	5825	23.65	24.85
Data Rate 4	13	149	5745	23.45	24.35
	19	157	5785	24.15	24.45
	18	165	5825	23.75	24.25
Data Rate 5	13	149	5745	25.73	25.97
	19	157	5785	25.61	26.45
	18	165	5825	25.73	26.69
Data Rate 6	13	149	5745	25.85	24.65
	19	157	5785	24.77	25.37
	18	165	5825	25.73	25.61
Data Rate 7	13	149	5745	24.89	25.25
	19	157	5785	24.89	25.25
	18	165	5825	25.13	25.25
Data Rate 8	13	149	5745	24.29	25.61
	19	157	5785	24.65	25.25
	18	165	5825	24.77	25.25
Data Rate 9	7	151	5755	50.26	51.46
	18	159	5795	49.78	50.98
Data Rate 10	7	151	5755	47.37	49.30
	18	159	5795	47.62	48.10
Data Rate 11	7	151	5755	48.10	48.58
	18	159	5795	48.34	49.06
Data Rate 12	7	151	5755	47.13	47.86
	18	159	5795	46.41	49.78

See the following plots for detailed measurements.

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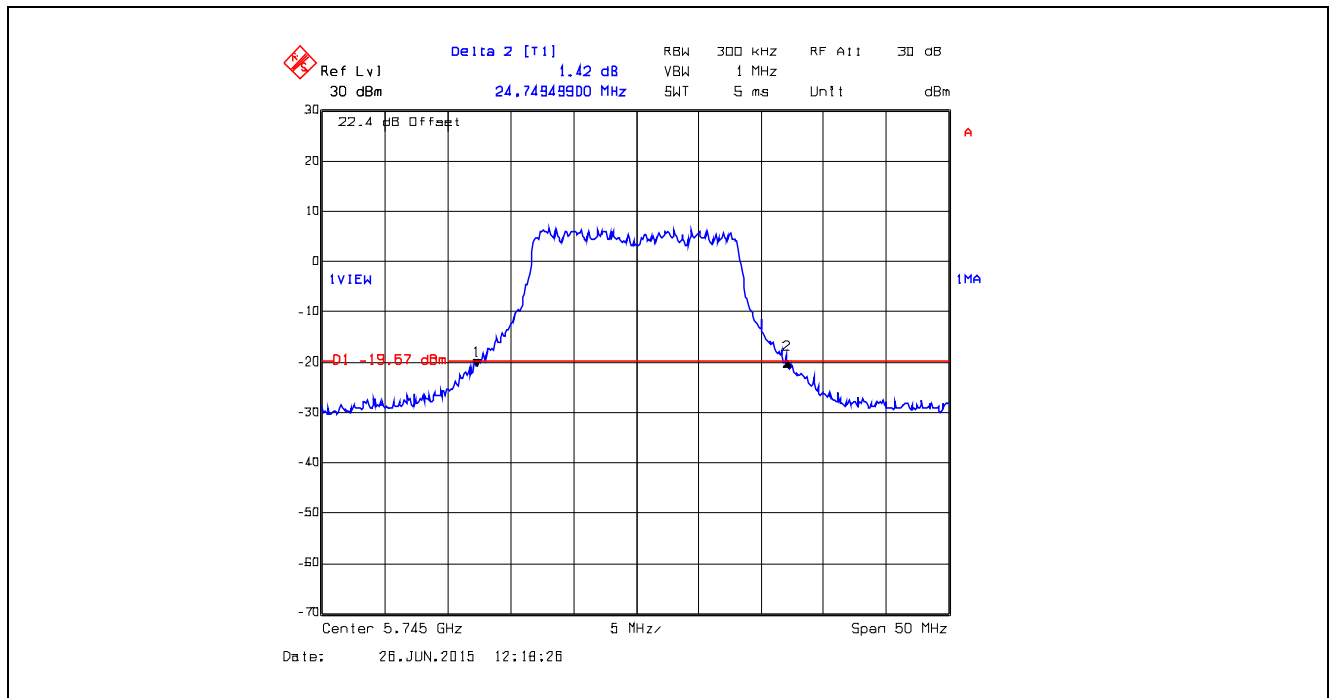
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

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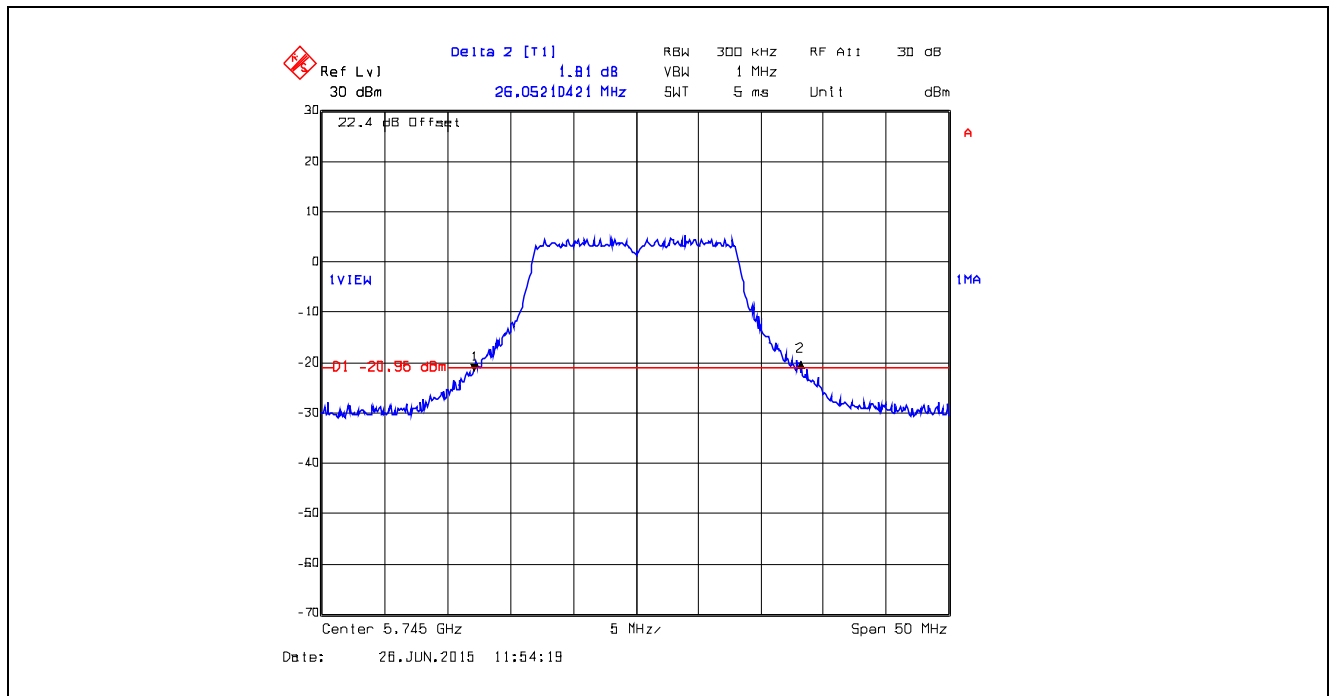
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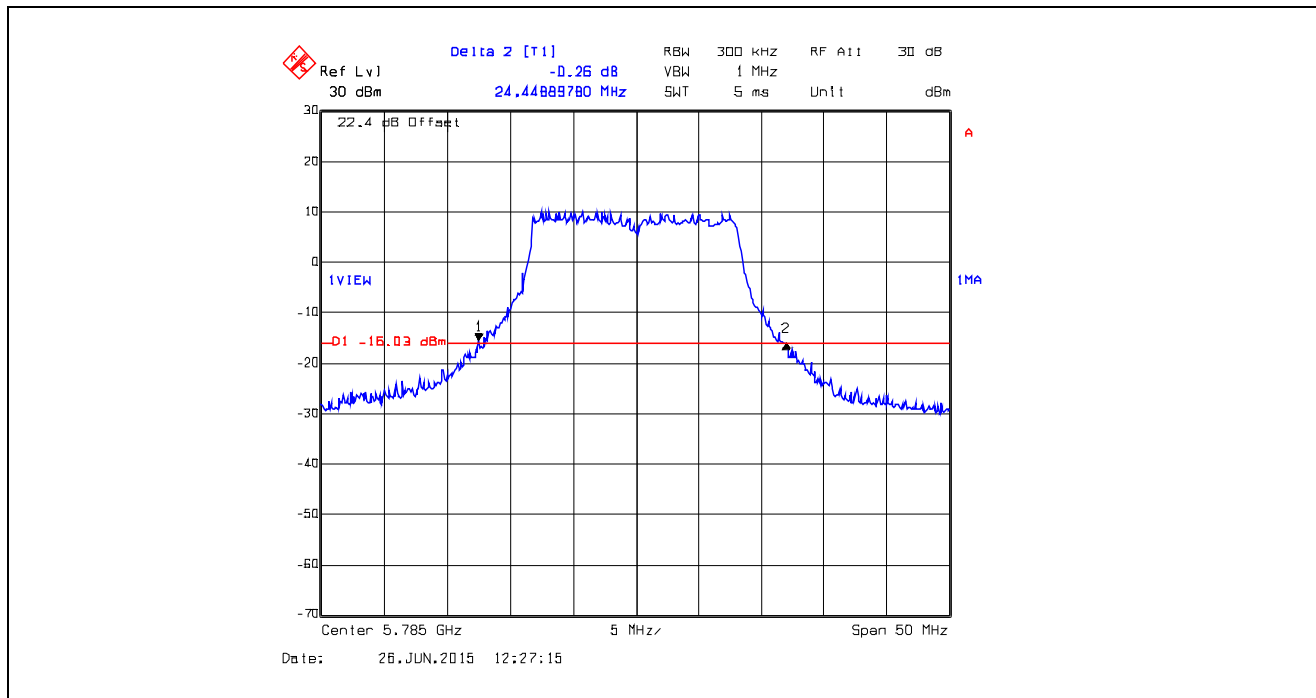
Plot 5.6.4.1.1. 26 dB Bandwidth, Data Rate 1, Chain # 1, Ch 149, 5745 MHz, Software Output Power Setting 13



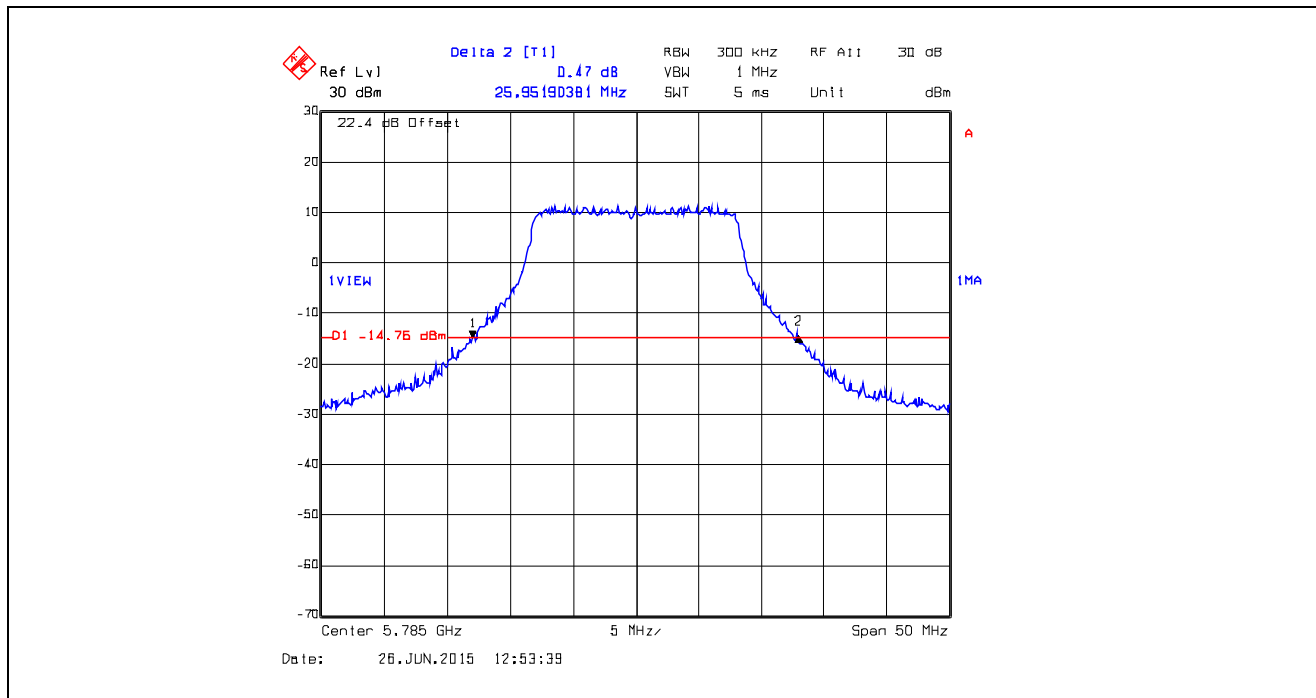
Plot 5.6.4.1.2. 26 dB Bandwidth, Data Rate 1, Chain # 2, Ch 149, 5745 MHz, Software Output Power Setting 13



Plot 5.6.4.1.3. 26 dB Bandwidth, Data Rate 1, Chain # 1, Ch 157, 5785 MHz, Software Output Power Setting 19



Plot 5.6.4.1.4. 26 dB Bandwidth, Data Rate 1, Chain # 2, Ch 157, 5785 MHz, Software Output Power Setting 19



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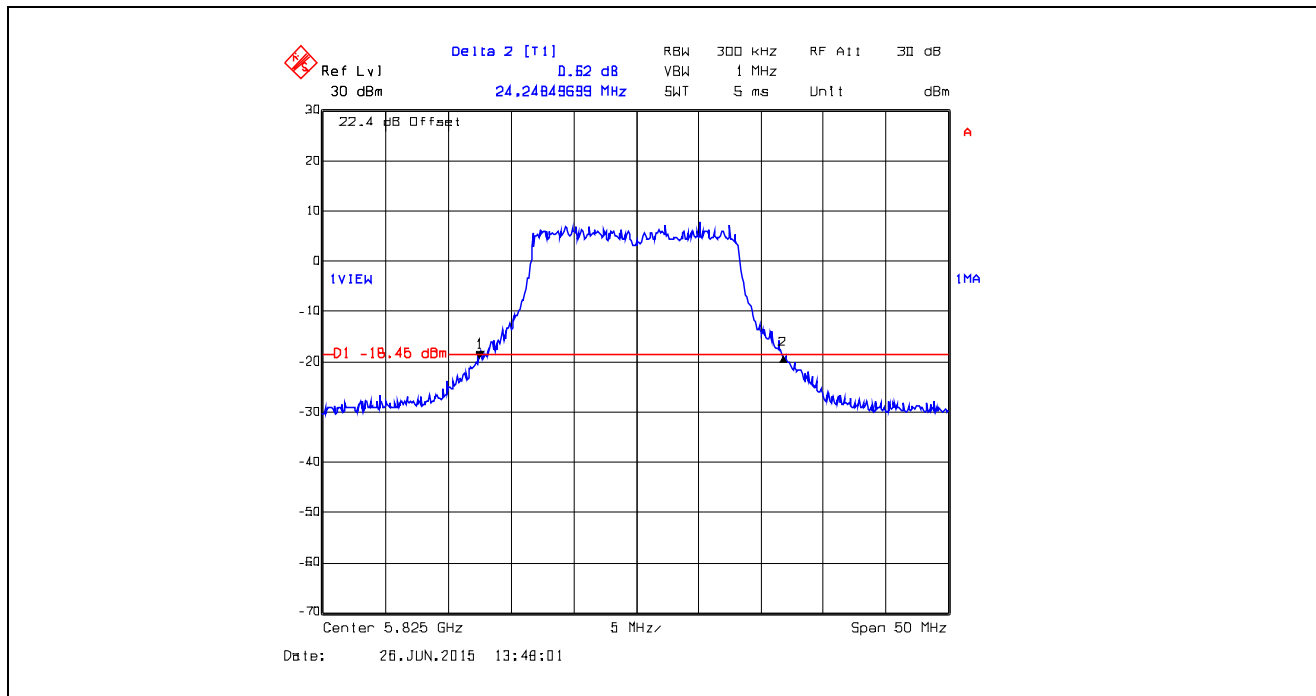
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

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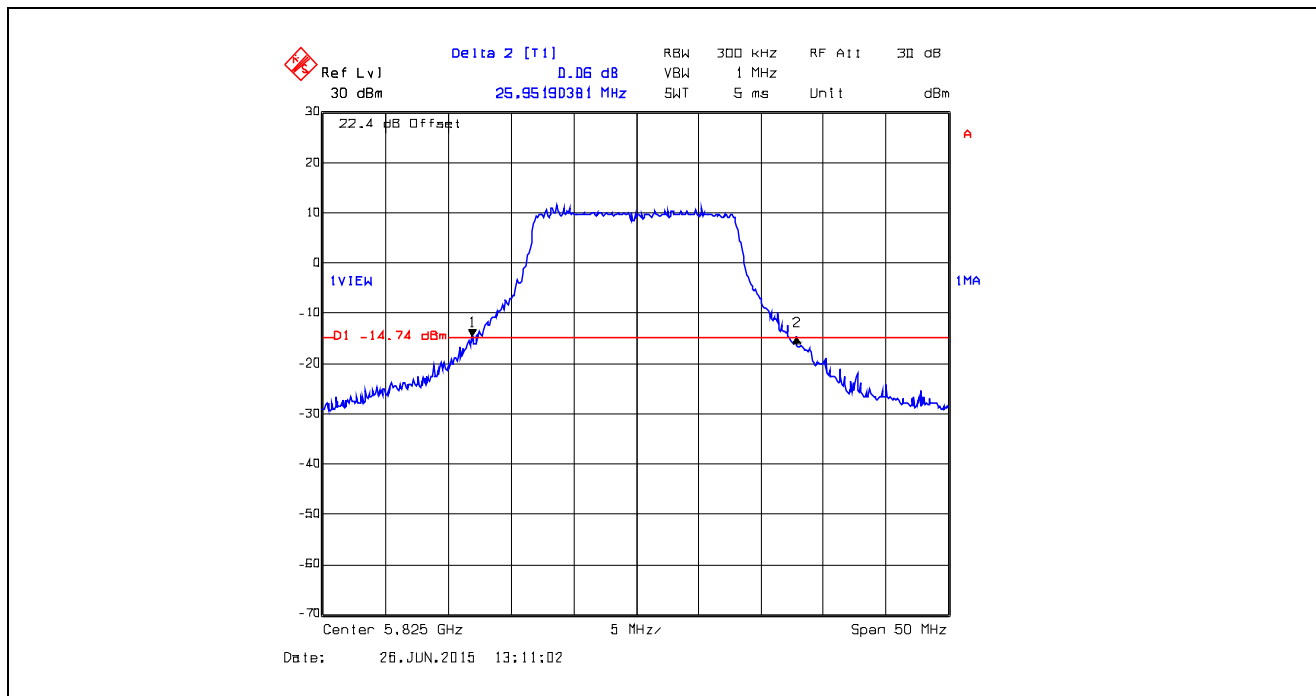
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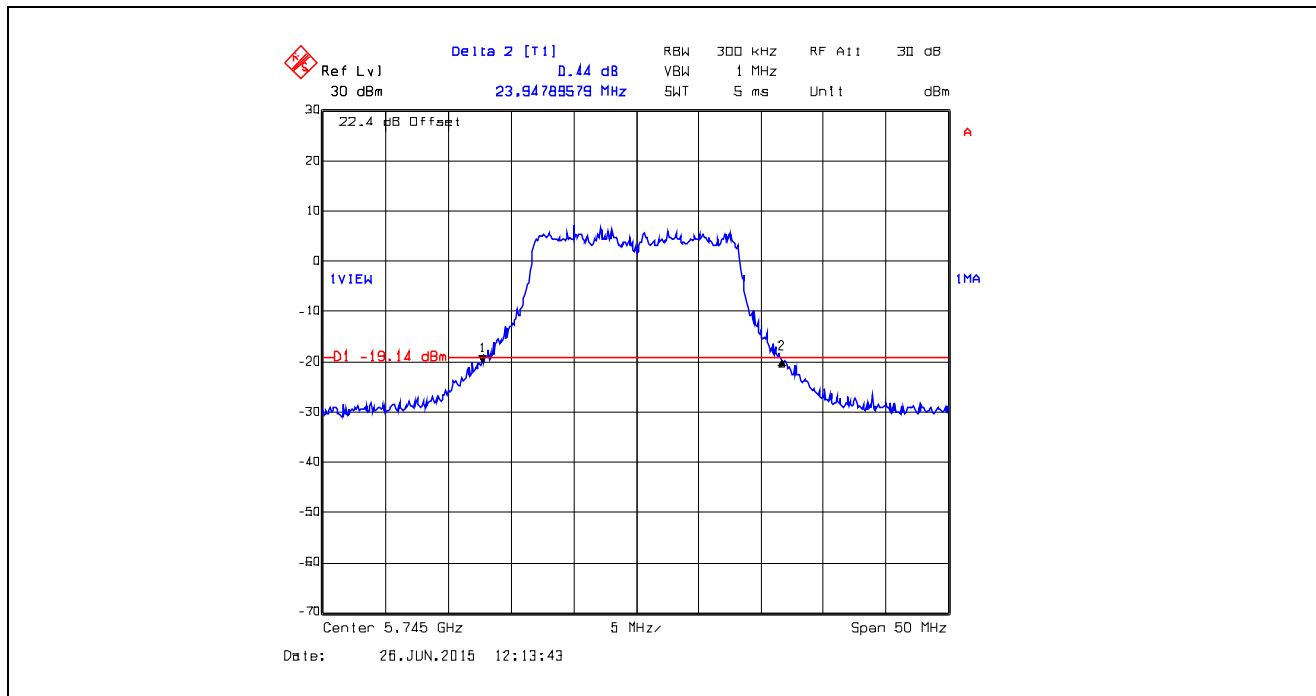
Plot 5.6.4.1.5. 26 dB Bandwidth, Data Rate 1, Chain # 1, Ch 165, 5825 MHz, Software Output Power Setting 18



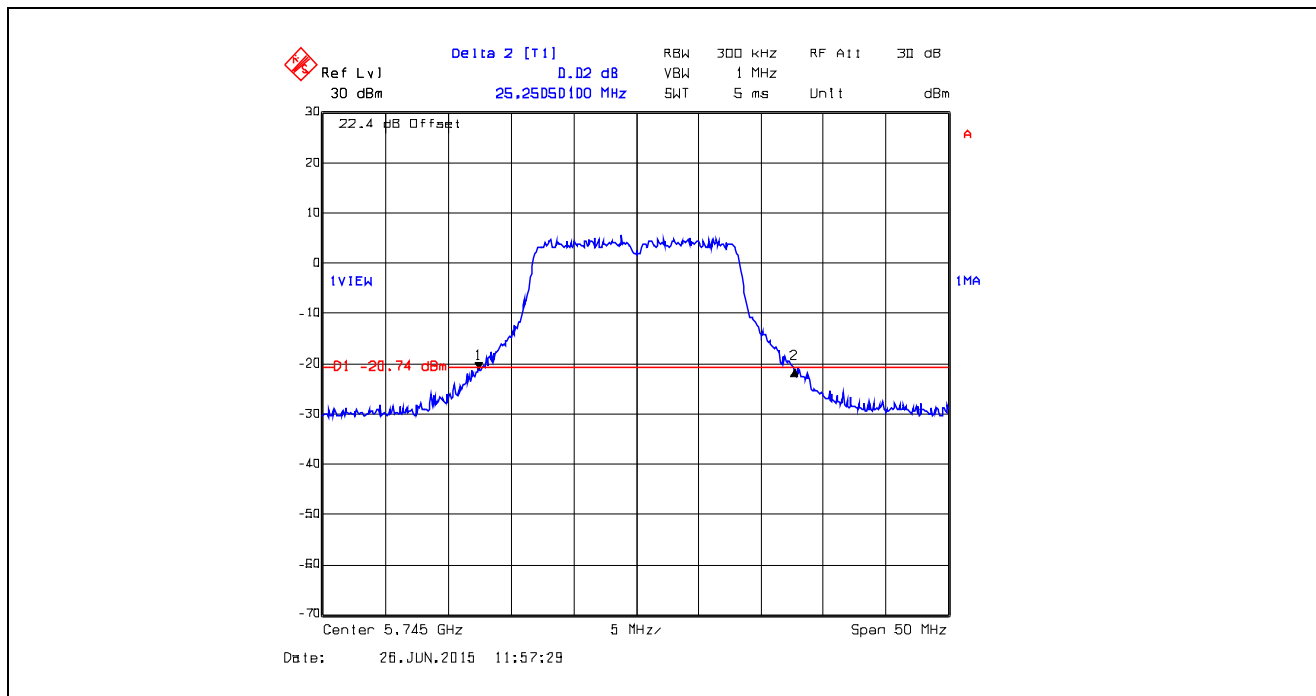
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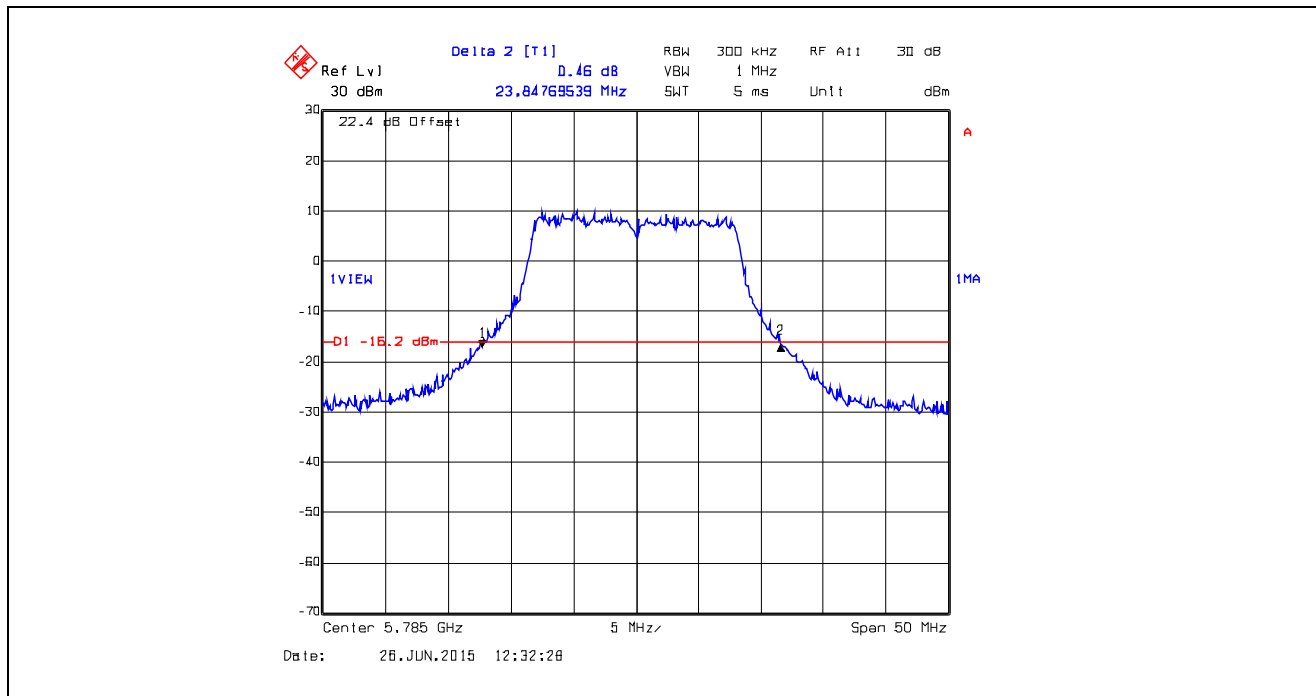
Plot 5.6.4.1.7. 26 dB Bandwidth, Data Rate 2, Chain # 1, Ch 149, 5745 MHz, Software Output Power Setting 13



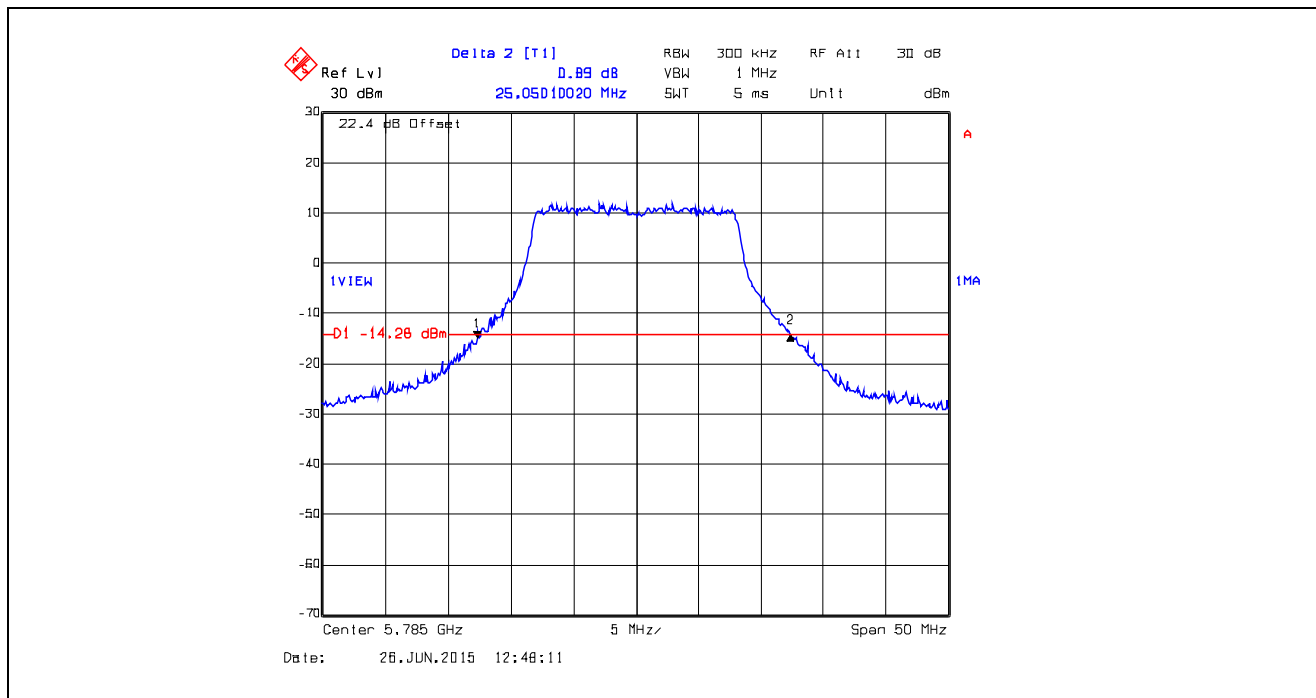
Plot 5.6.4.1.8. 26 dB Bandwidth, Data Rate 2, Chain # 2, Ch 149, 5745 MHz, Software Output Power Setting 13



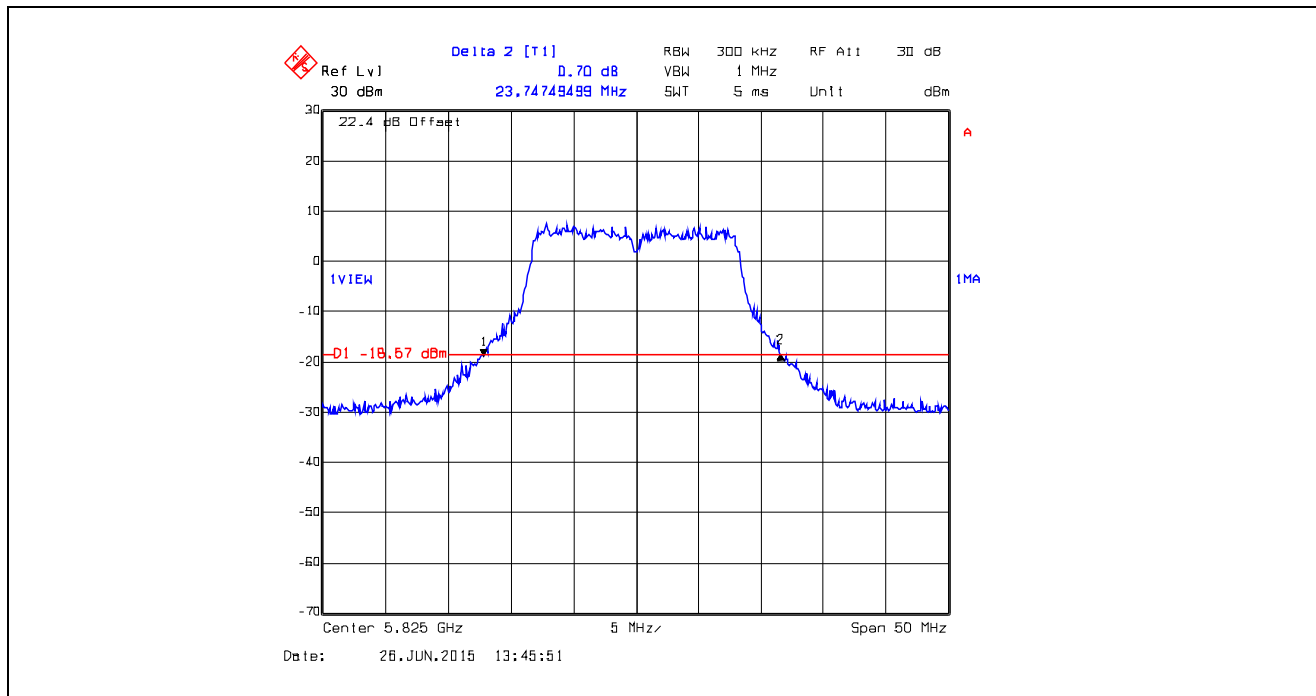
Plot 5.6.4.1.9. 26 dB Bandwidth, Data Rate 2, Chain # 1, Ch 157, 5785 MHz, Software Output Power Setting 19



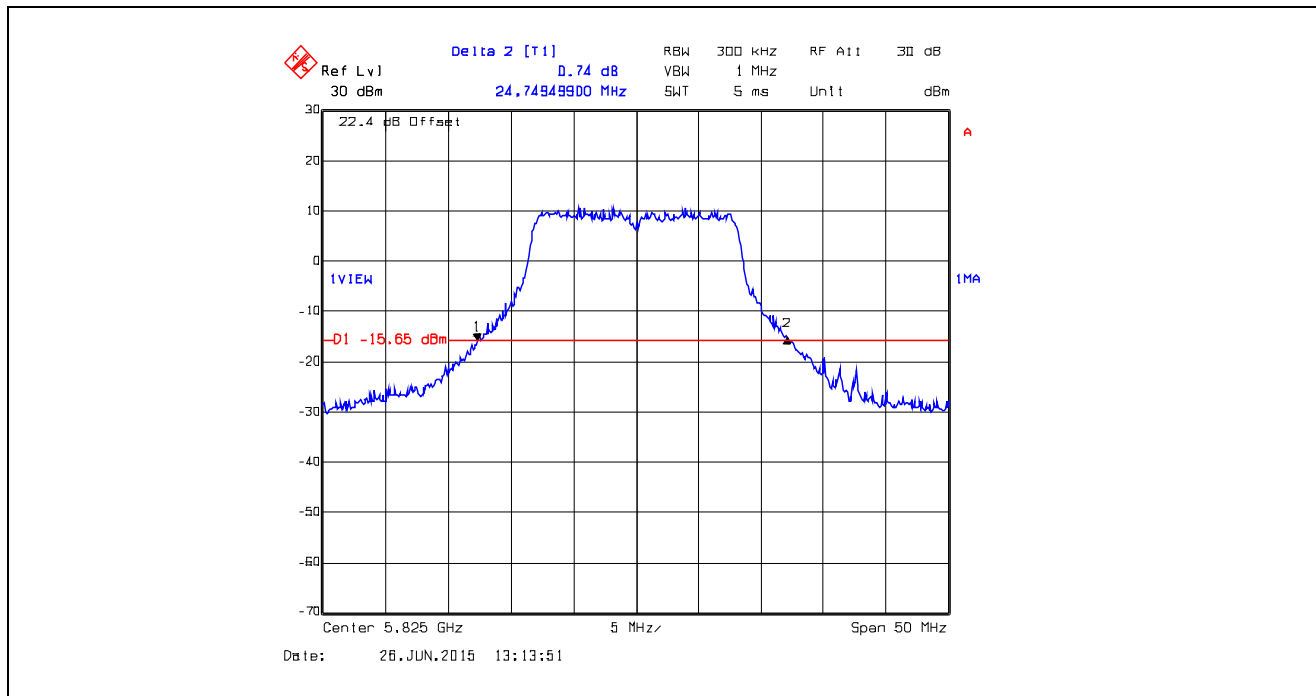
Plot 5.6.4.1.10. 26 dB Bandwidth, Data Rate 2, Chain # 2, Ch 157, 5785 MHz, Software Output Power Setting 19



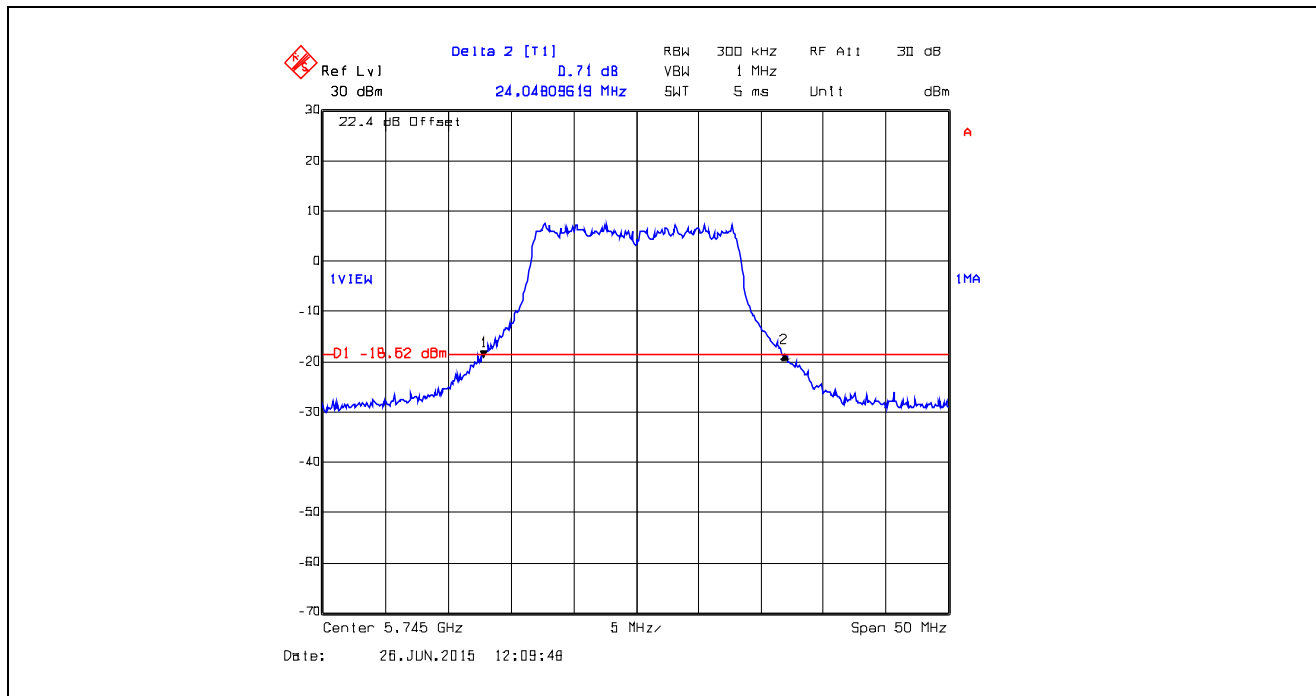
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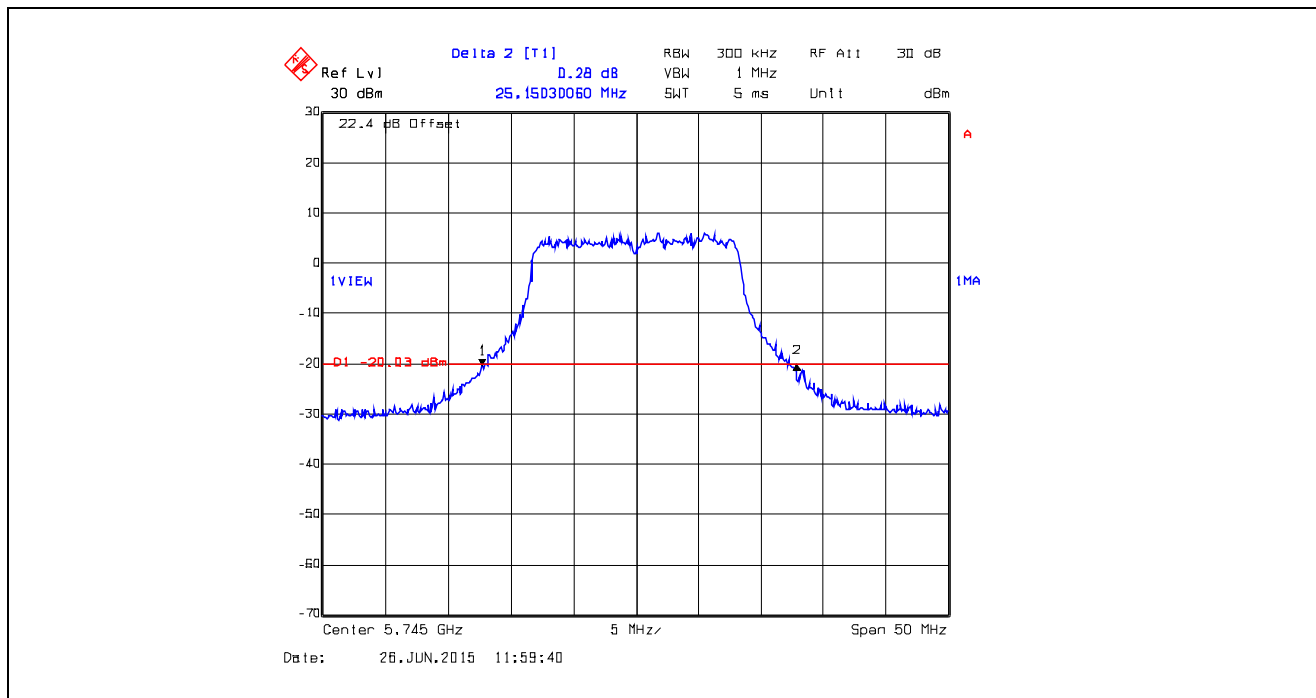
Plot 5.6.4.1.12. 26 dB Bandwidth, Data Rate 2, Chain # 2, Ch 165, 5825 MHz, Software Output Power Setting 18



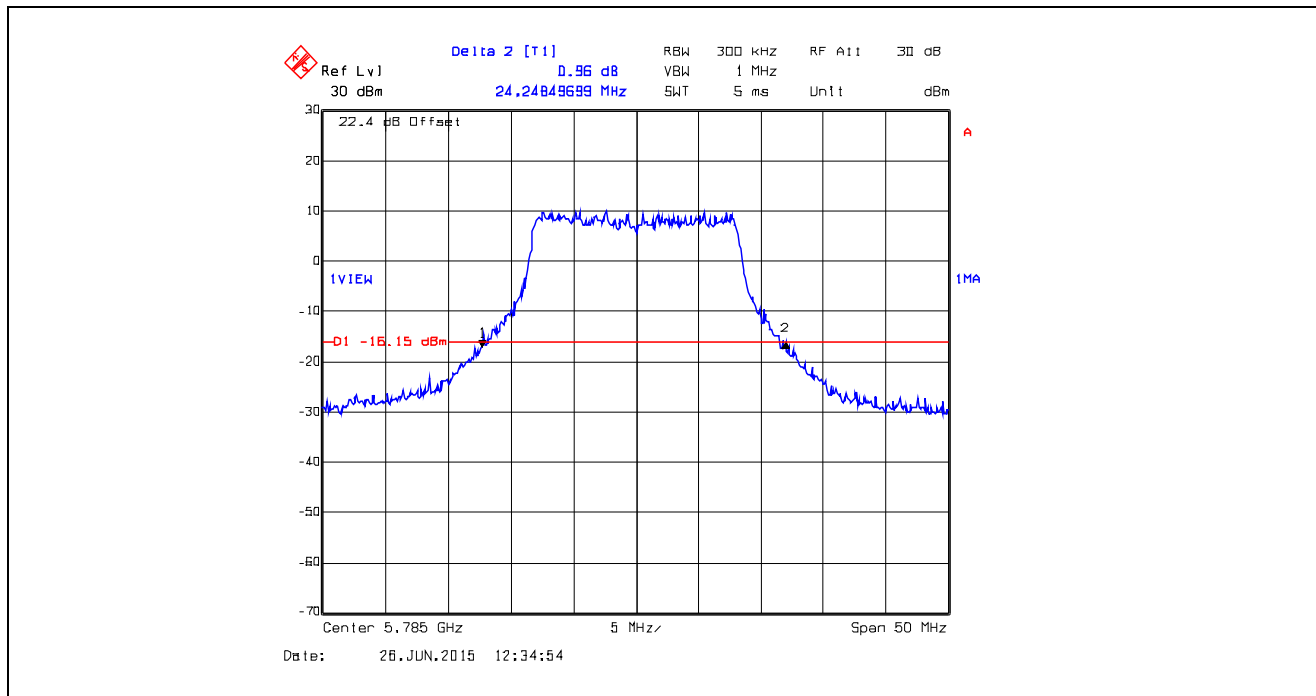
Plot 5.6.4.1.13. 26 dB Bandwidth, Data Rate 3, Chain # 1, Ch 149, 5745 MHz, Software Output Power Setting 13



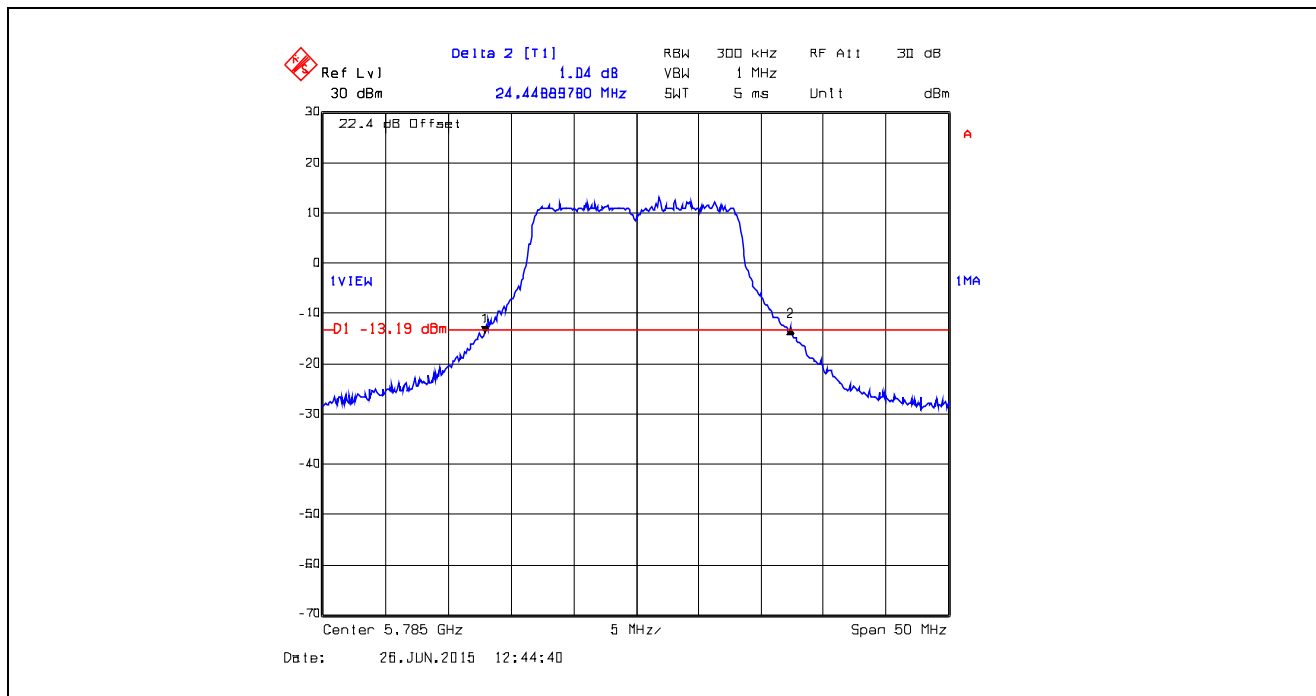
Plot 5.6.4.1.14. 26 dB Bandwidth, Data Rate 3, Chain # 2, Ch 149, 5745 MHz, Software Output Power Setting 13



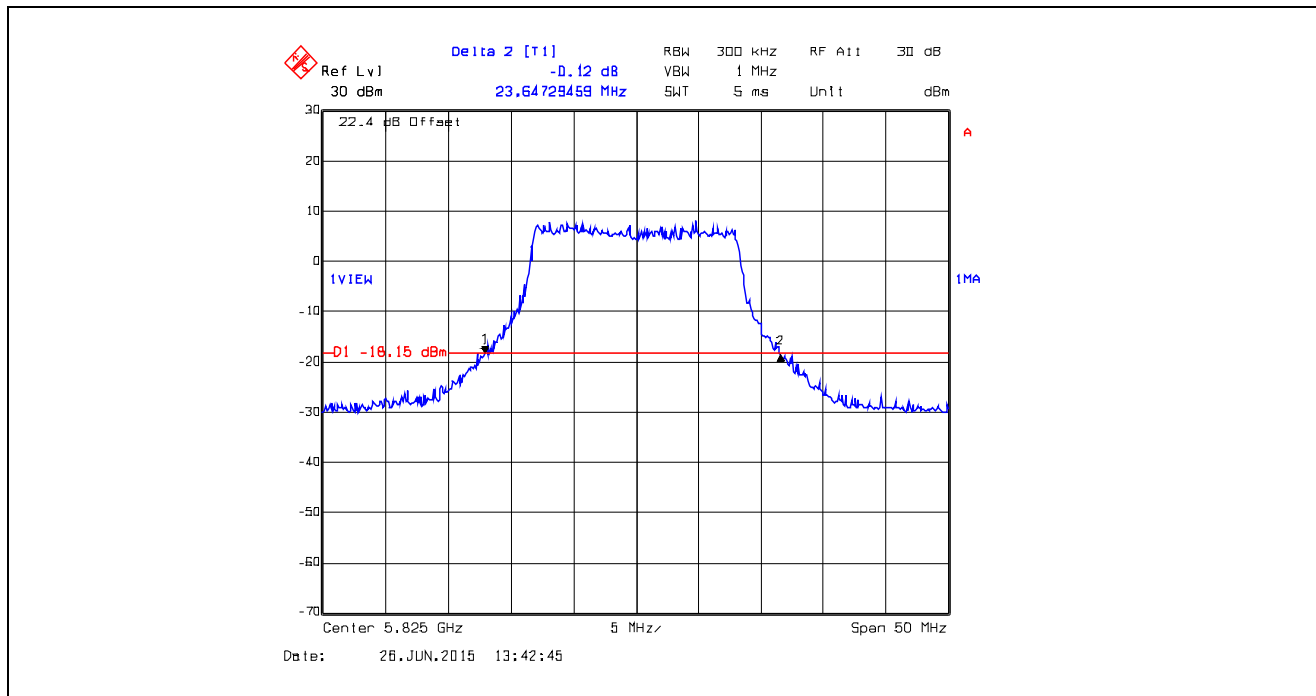
Plot 5.6.4.1.15. 26 dB Bandwidth, Data Rate 3, Chain # 1, Ch 157, 5785 MHz, Software Output Power Setting 19



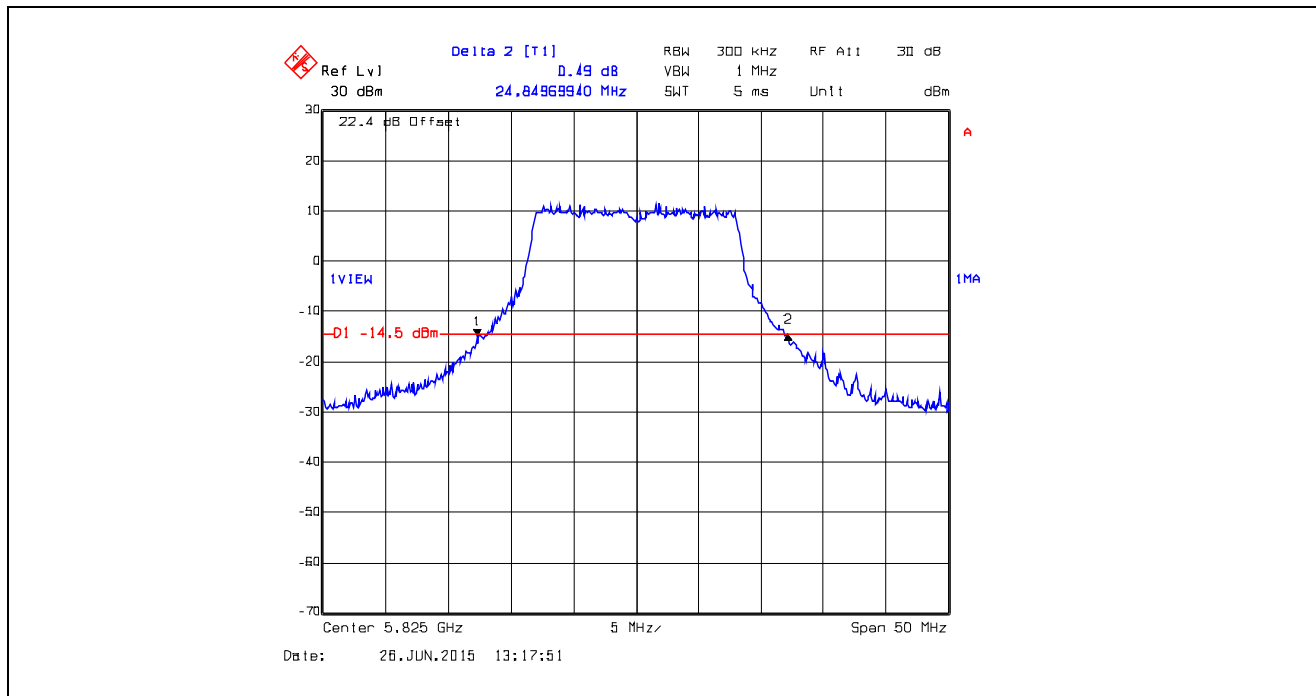
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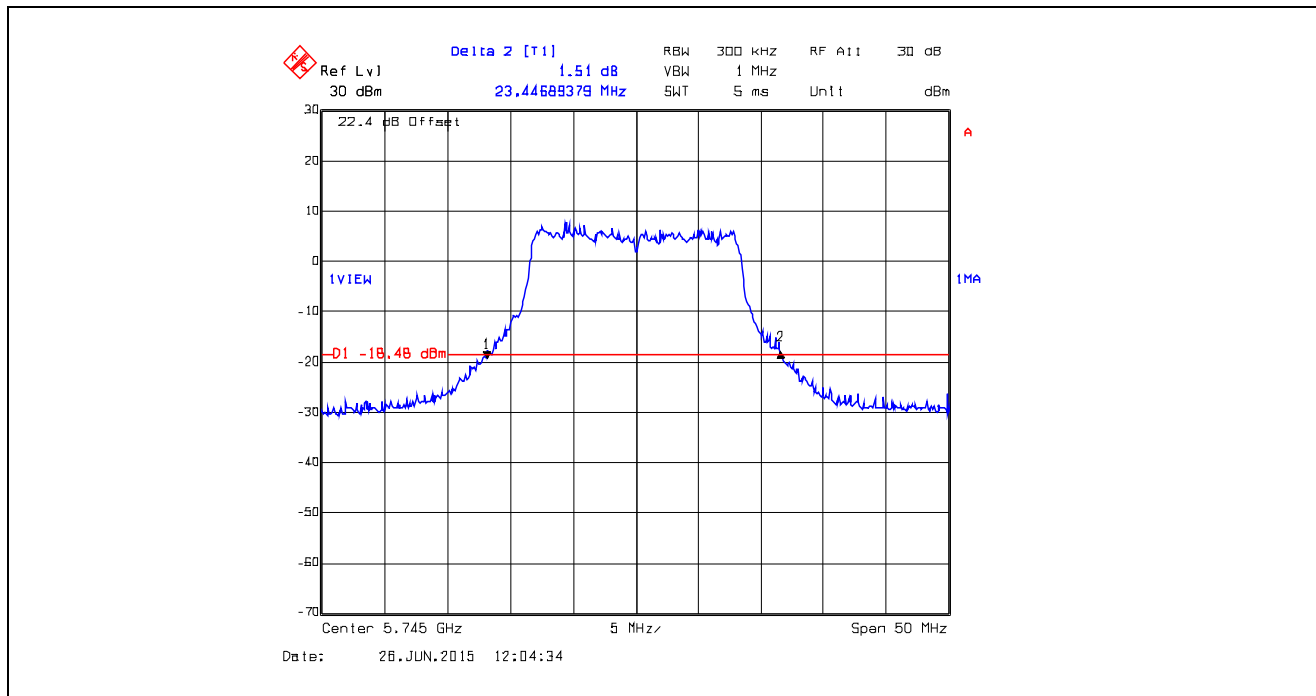
Plot 5.6.4.1.17. 26 dB Bandwidth, Data Rate 3, Chain # 1, Ch 165, 5825 MHz, Software Output Power Setting 18



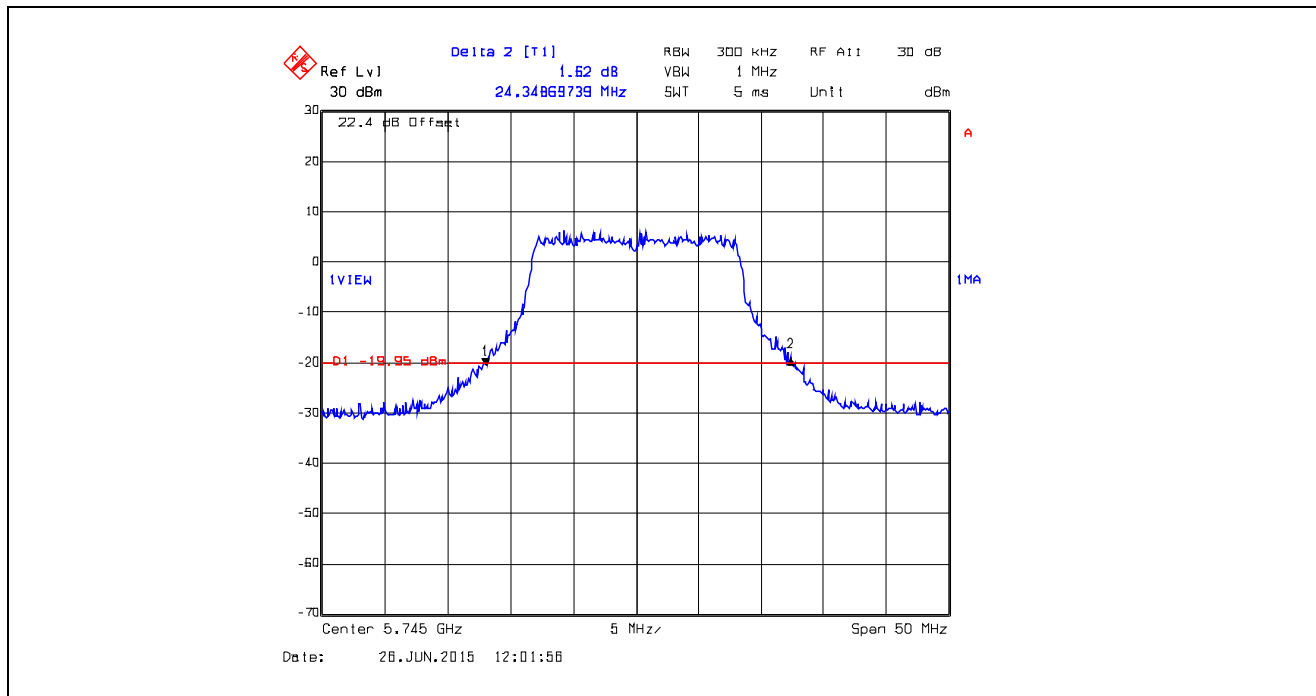
Plot 5.6.4.1.18. 26 dB Bandwidth, Data Rate 3, Chain # 2, Ch 165, 5825 MHz, Software Output Power Setting 18



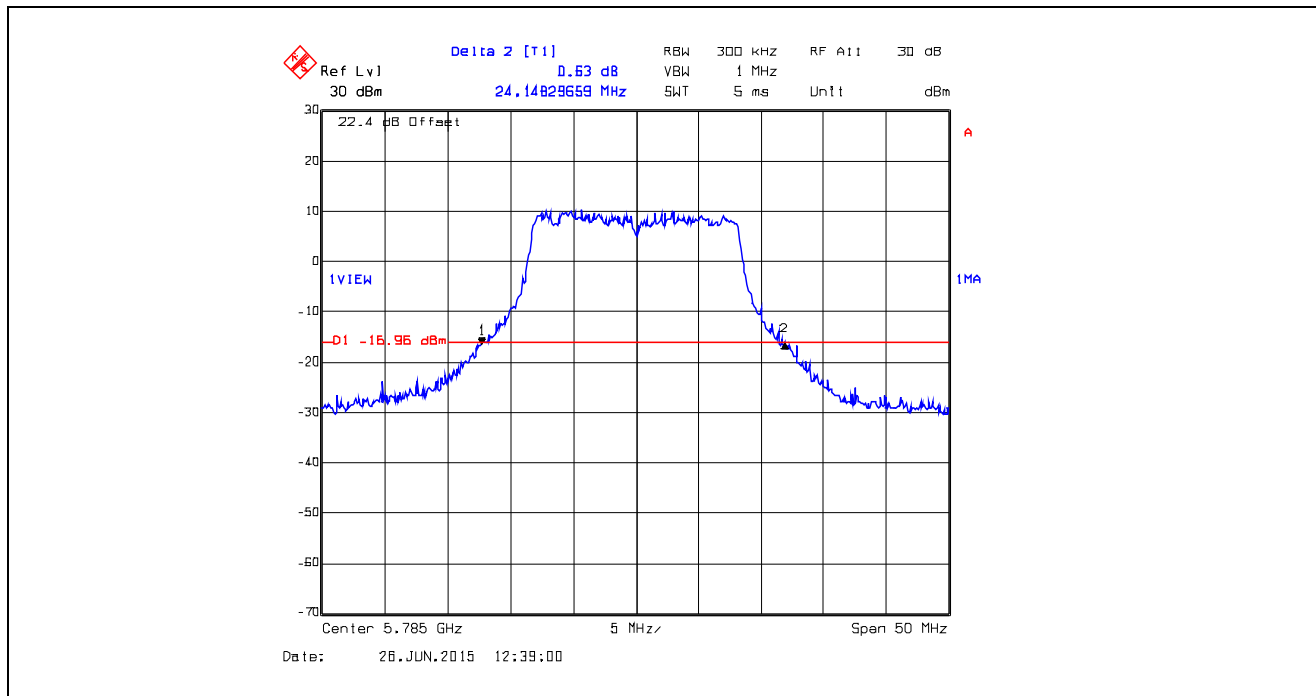
Plot 5.6.4.1.19. 26 dB Bandwidth, Data Rate 4, Chain # 1, Ch 149, 5745 MHz, Software Output Power Setting 13



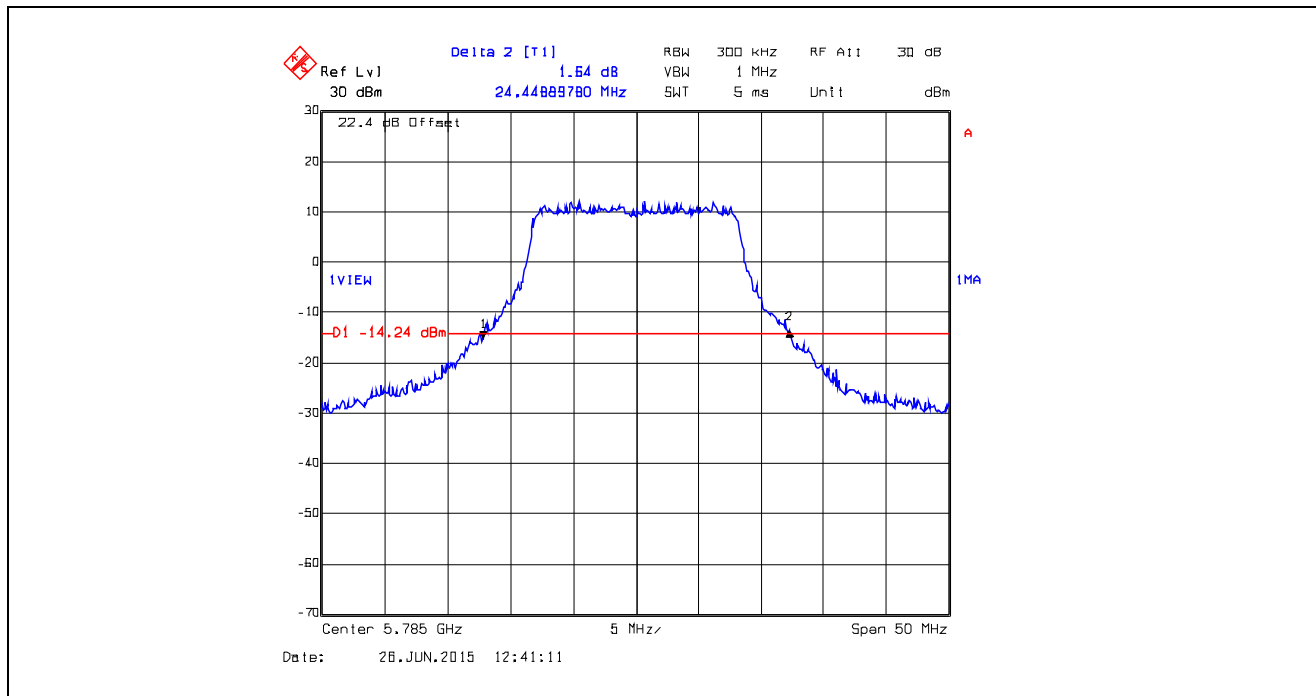
Plot 5.6.4.1.20. 26 dB Bandwidth, Data Rate 4, Chain # 2, Ch 149, 5745 MHz, Software Output Power Setting 13



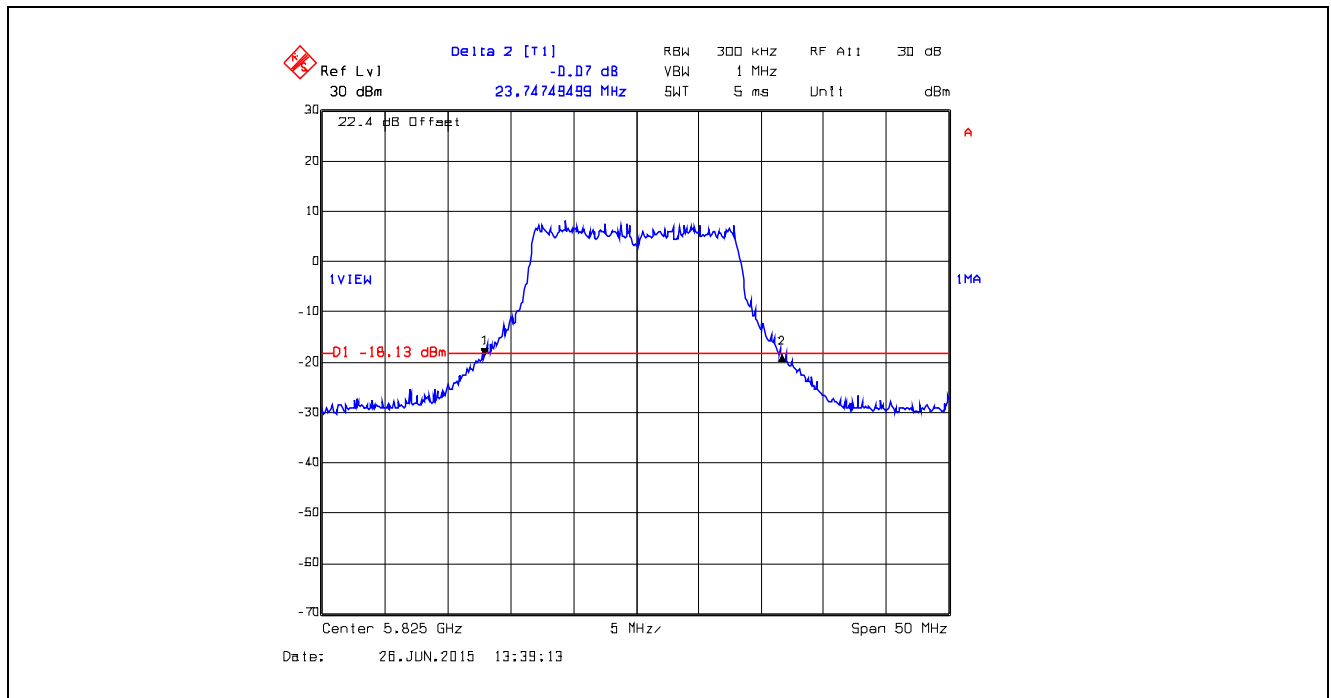
Plot 5.6.4.1.21. 26 dB Bandwidth, Data Rate 4, Chain # 1, Ch 157, 5785 MHz, Software Output Power Setting 19



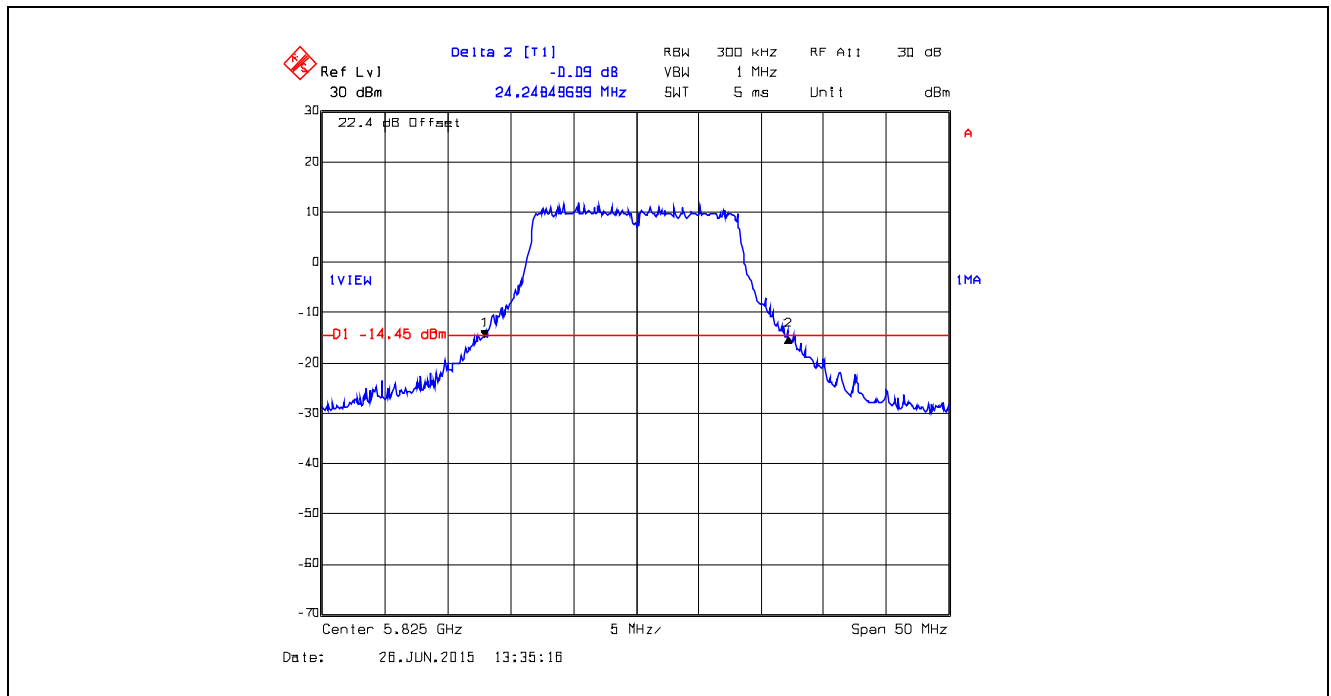
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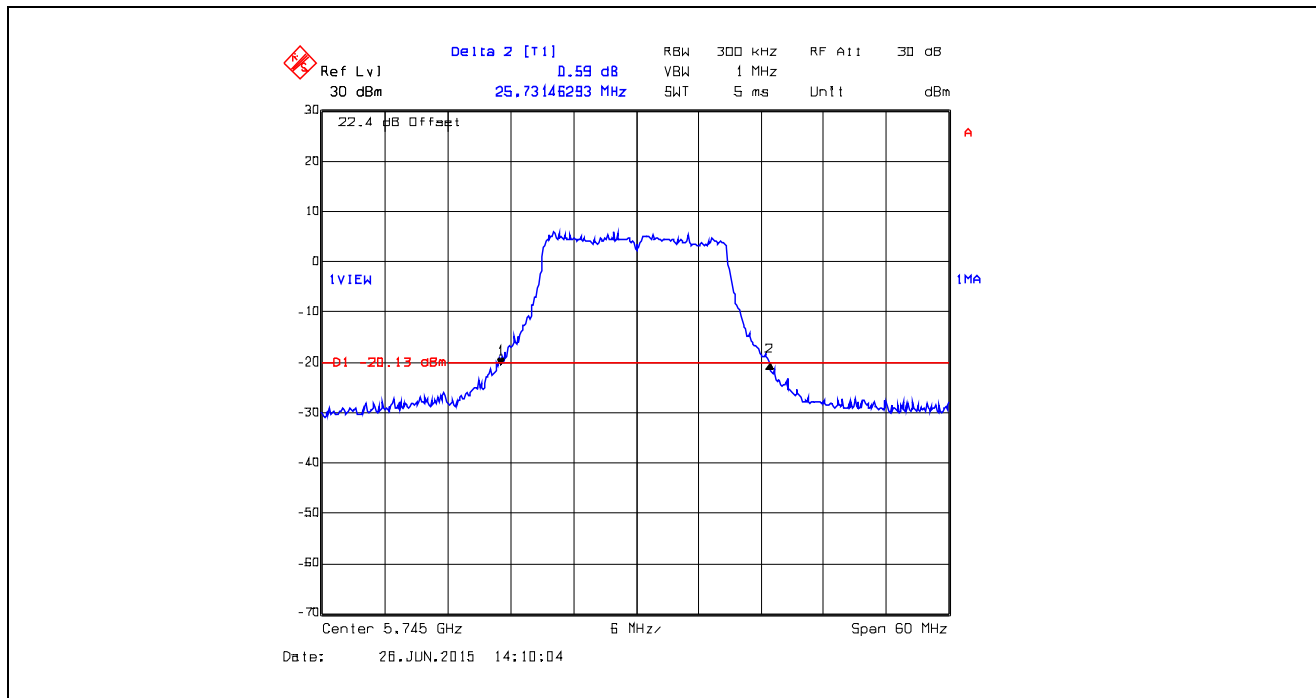
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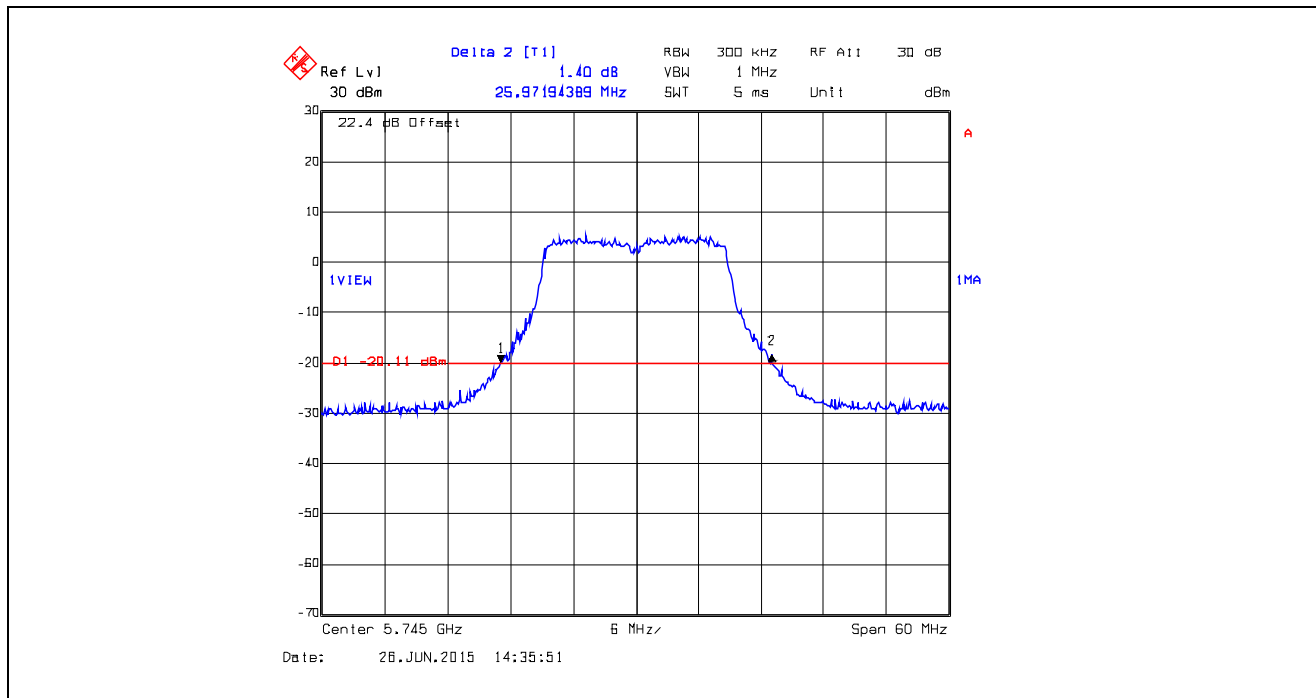
Plot 5.6.4.1.24. 26 dB Bandwidth, Data Rate 4, Chain # 2, Ch 165, 5825 MHz, Software Output Power Setting 18



Plot 5.6.4.1.25. 26 dB Bandwidth, Data Rate 5, Chain # 1, Ch 149, 5745 MHz, Software Output Power Setting 13



Plot 5.6.4.1.26. 26 dB Bandwidth, Data Rate 5, Chain # 2, Ch 149, 5745 MHz, Software Output Power Setting 13



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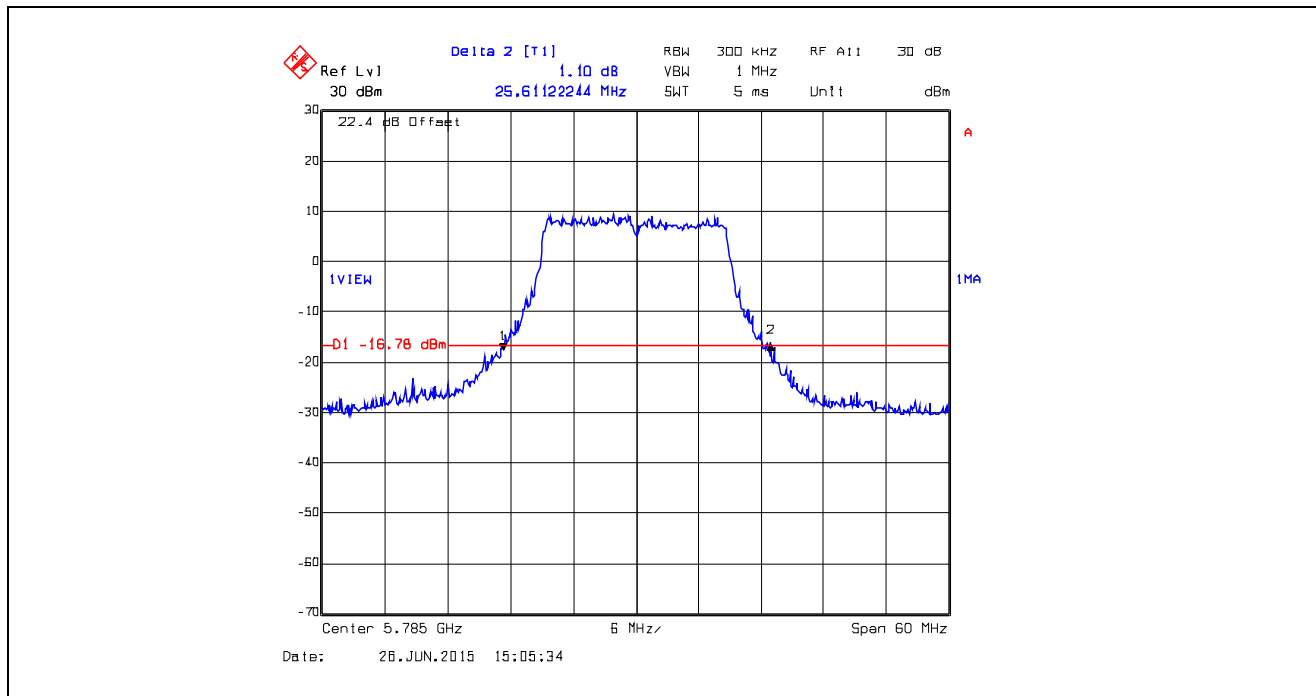
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

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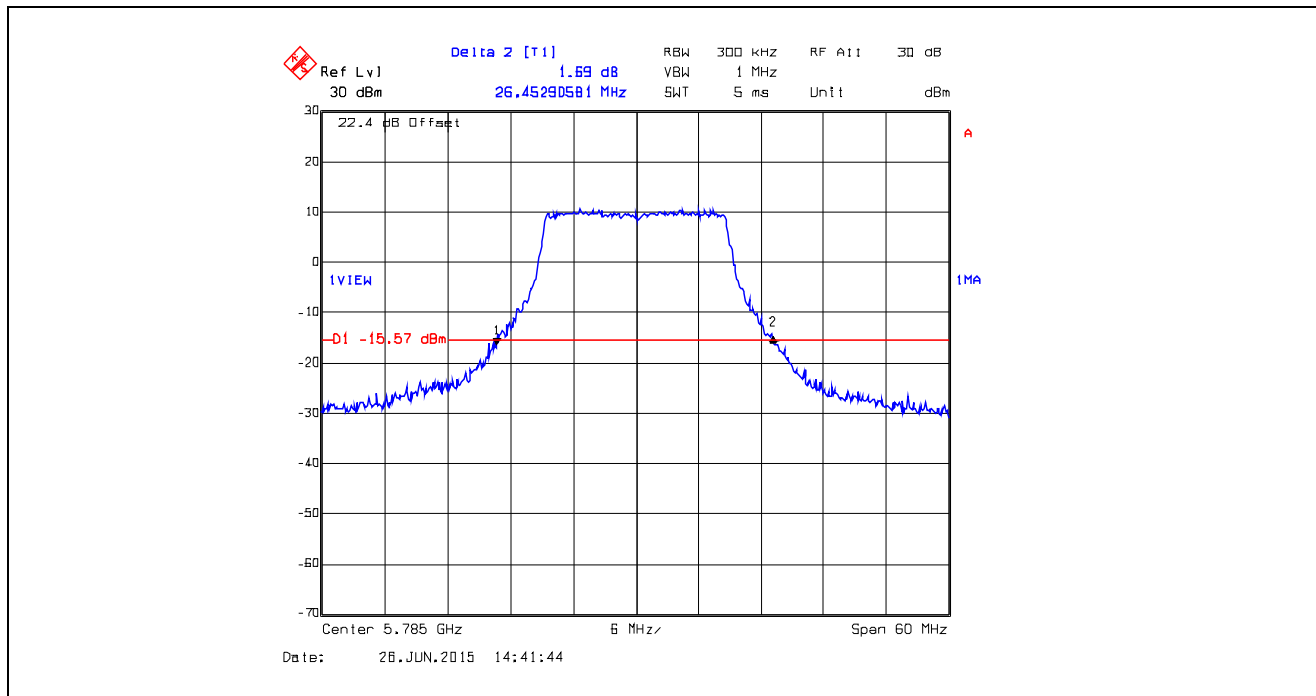
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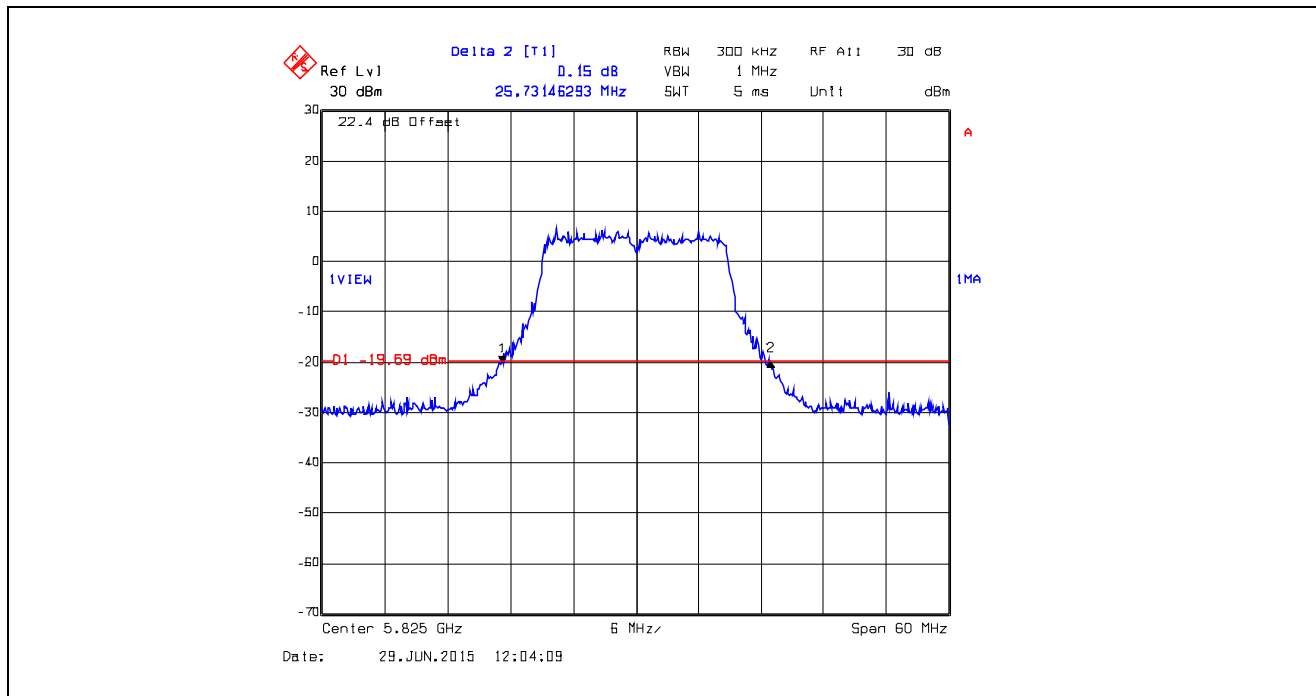
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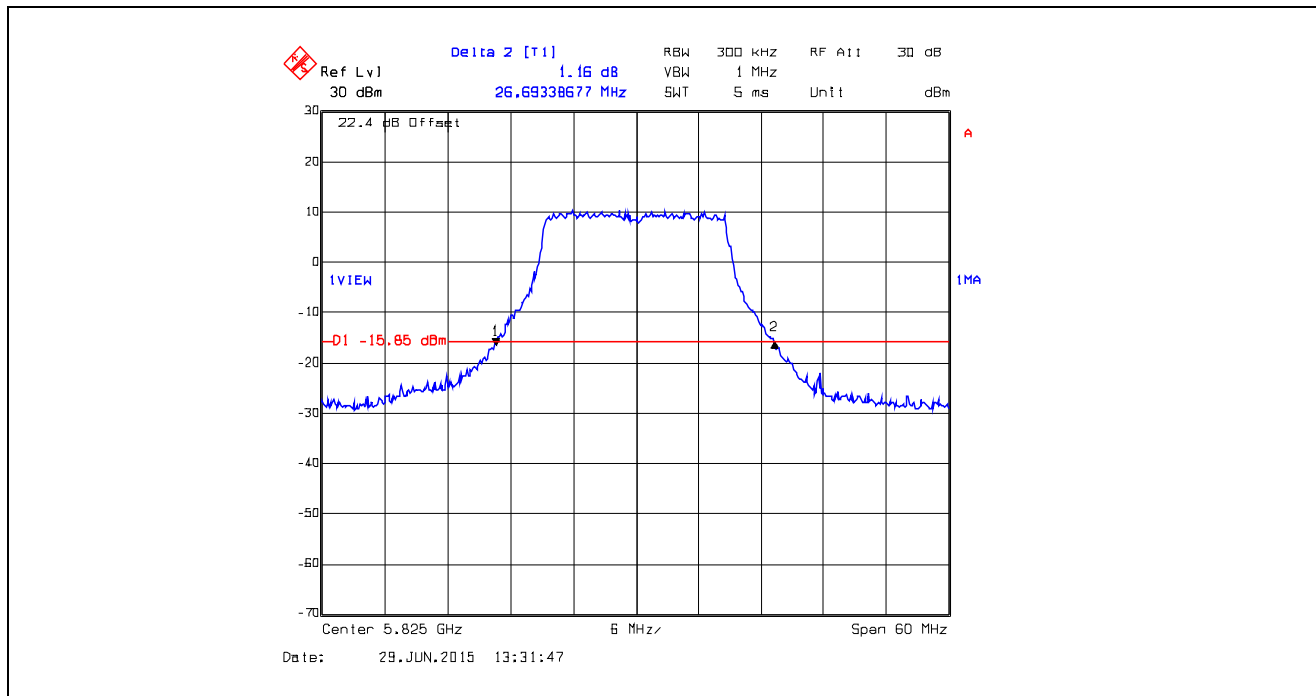
Plot 5.6.4.1.28. 26 dB Bandwidth, Data Rate 5, Chain # 2, Ch 157, 5785 MHz, Software Output Power Setting 19



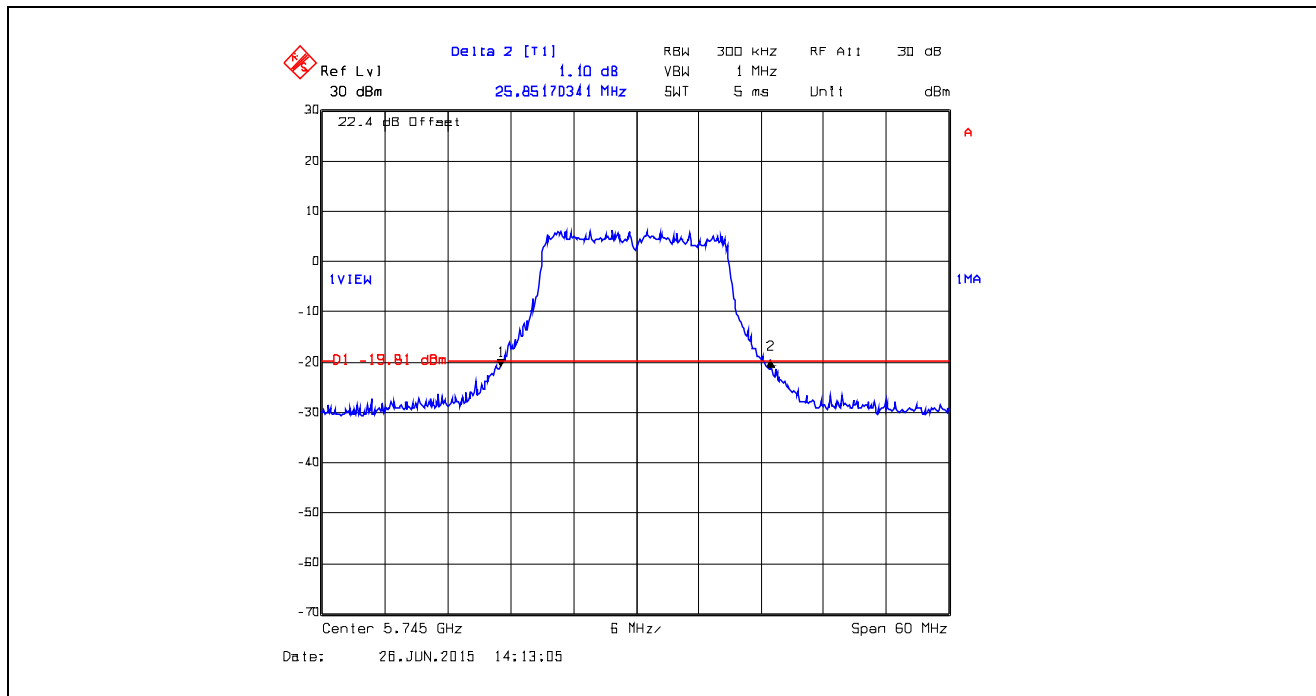
Plot 5.6.4.1.29. 26 dB Bandwidth, Data Rate 5, Chain # 1, Ch 165, 5825 MHz, Software Output Power Setting 18



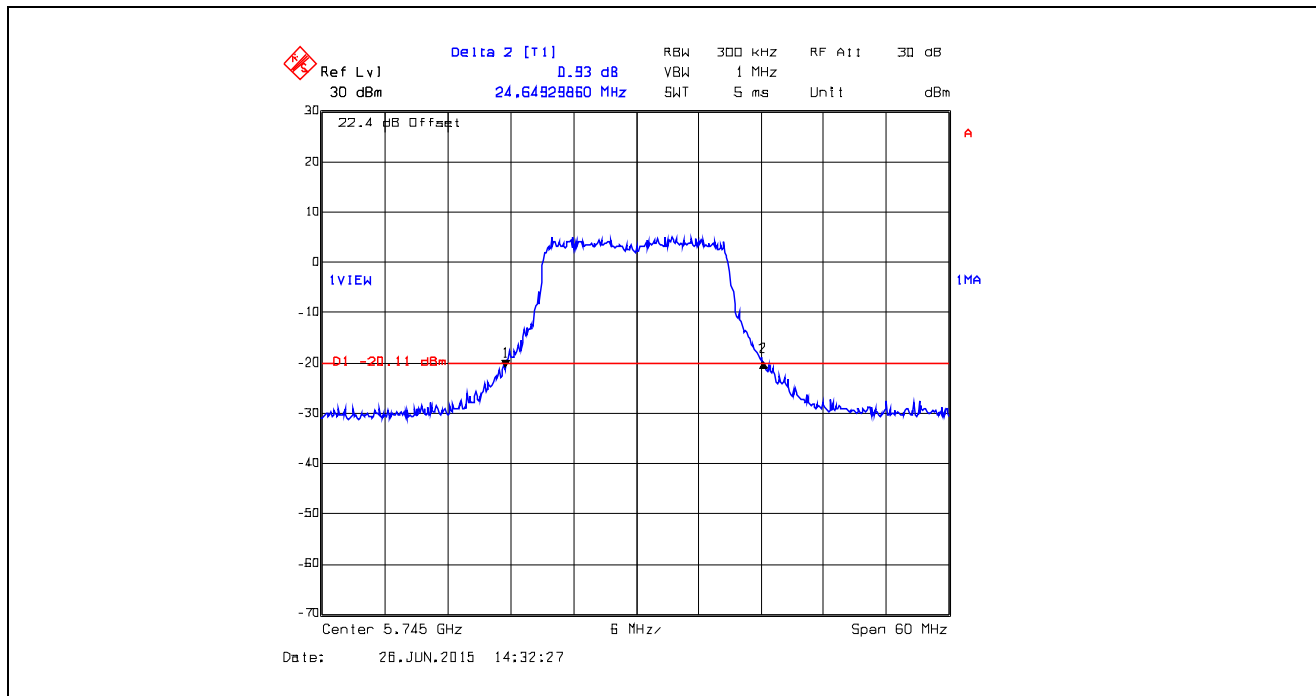
Plot 5.6.4.1.30. 26 dB Bandwidth, Data Rate 5, Chain # 2, Ch 165, 5825 MHz, Software Output Power Setting 18



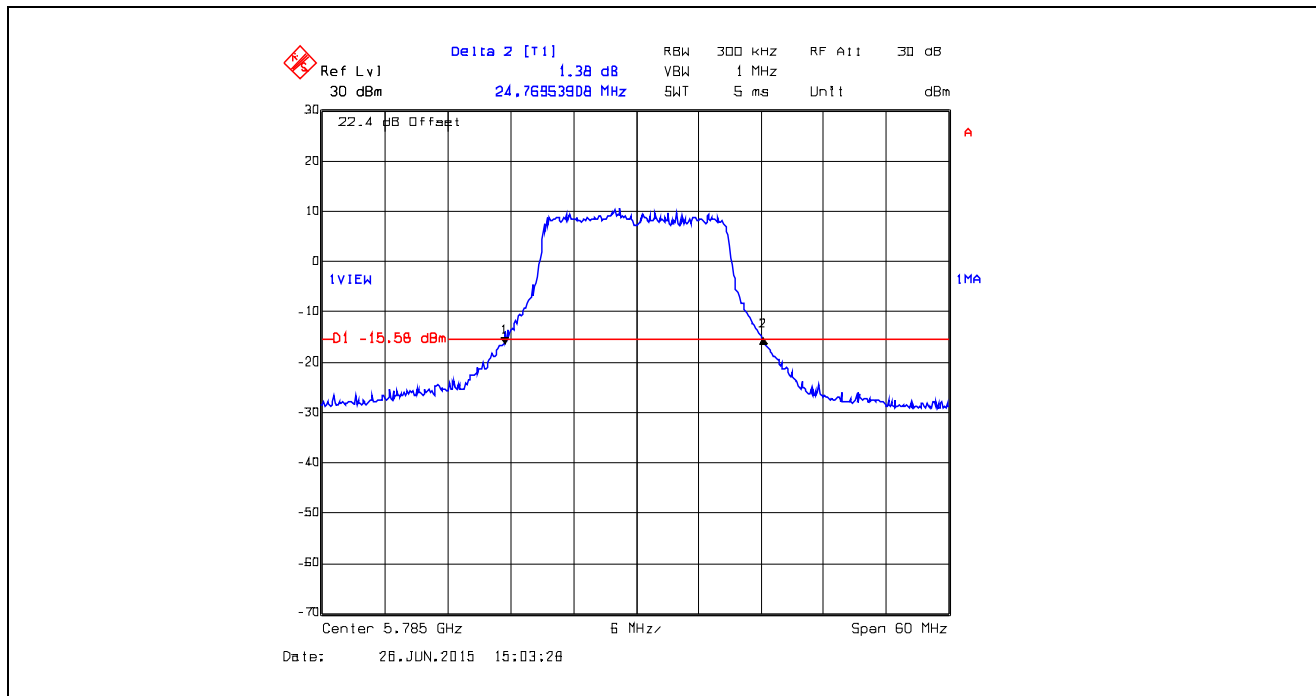
Plot 5.6.4.1.31. 26 dB Bandwidth, Data Rate 6, Chain # 1, Ch 149, 5745 MHz, Software Output Power Setting 13



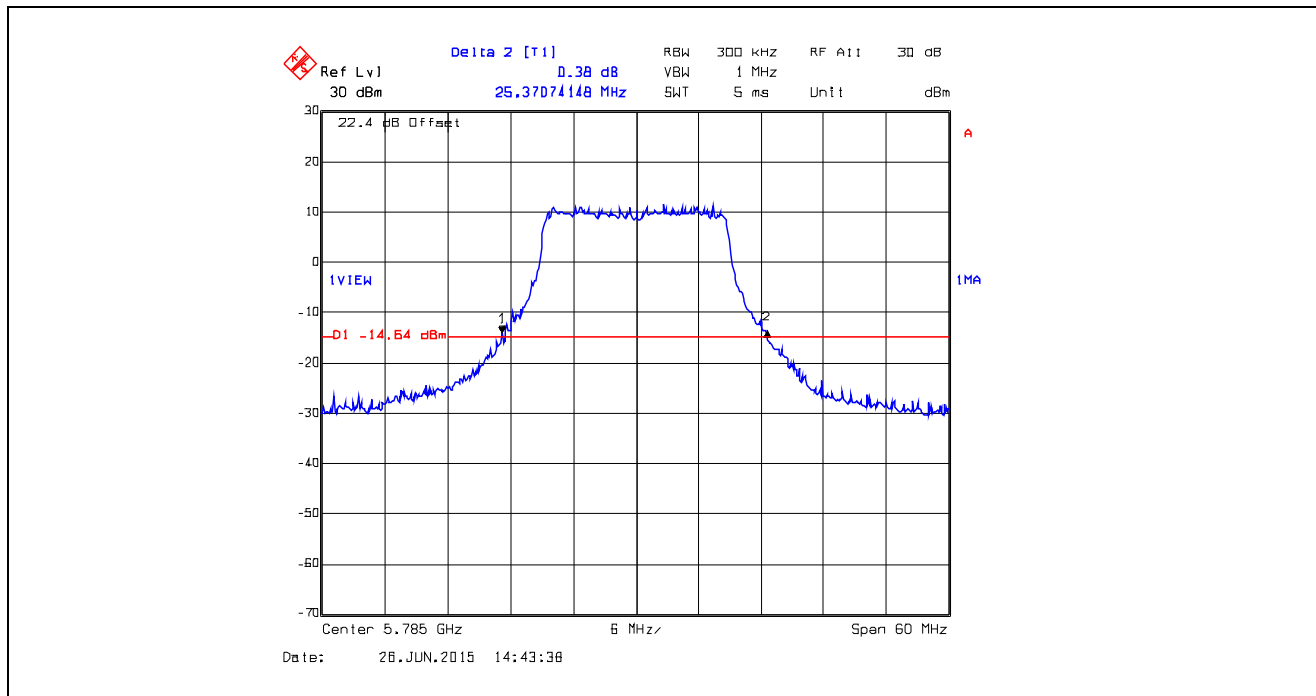
Plot 5.6.4.1.32. 26 dB Bandwidth, Data Rate 6, Chain # 2, Ch 149, 5745 MHz, Software Output Power Setting 13



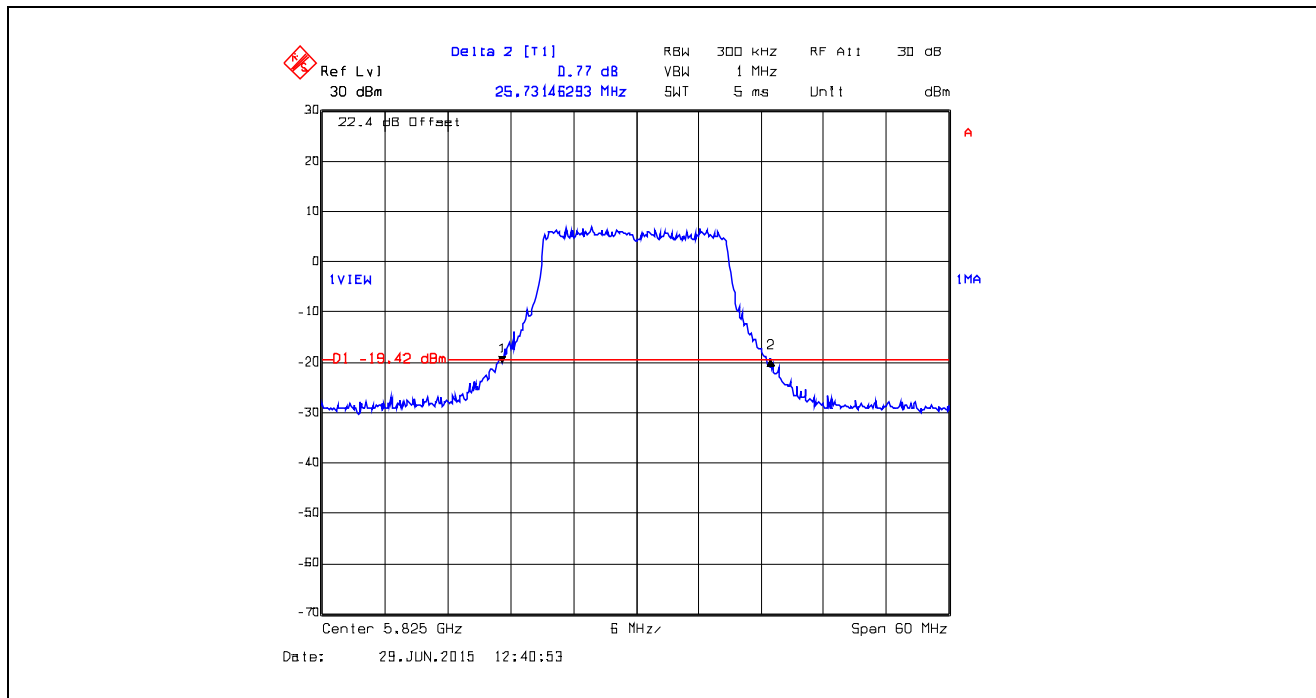
Plot 5.6.4.1.33. 26 dB Bandwidth, Data Rate 6, Chain # 1, Ch 157, 5785 MHz, Software Output Power Setting 19



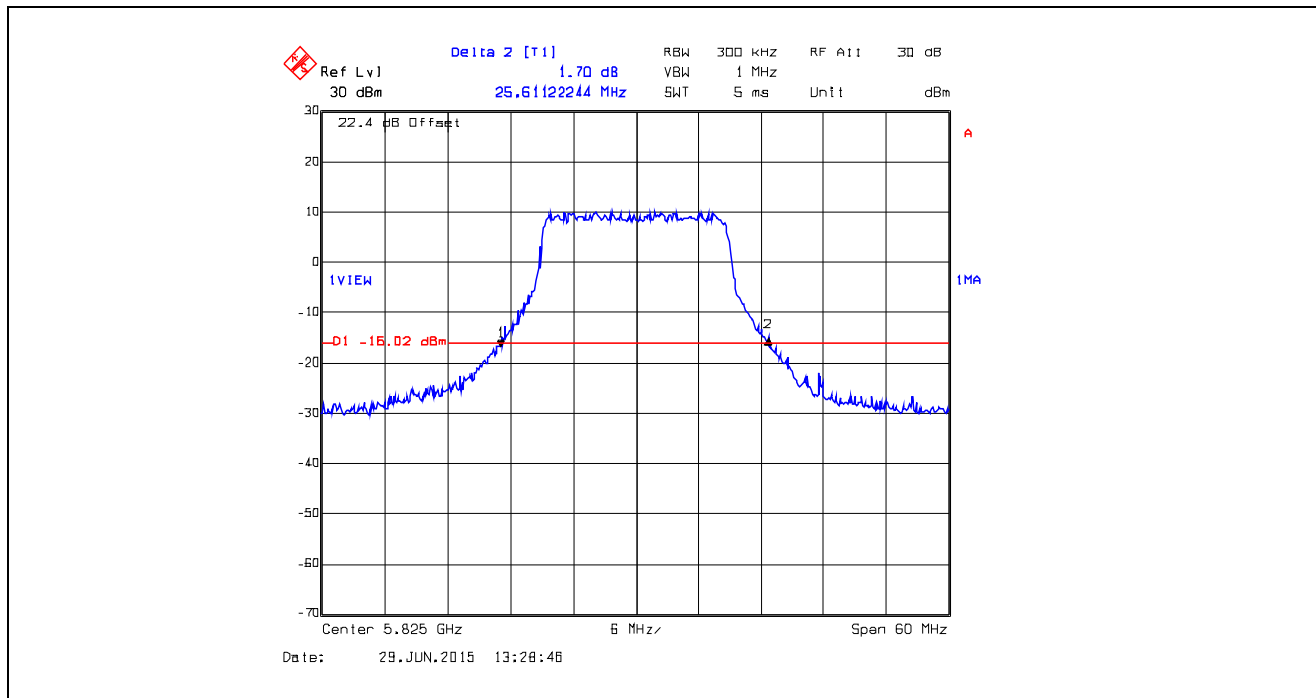
Plot 5.6.4.1.34. 26 dB Bandwidth, Data Rate 6, Chain # 2, Ch 157, 5785 MHz, Software Output Power Setting 19



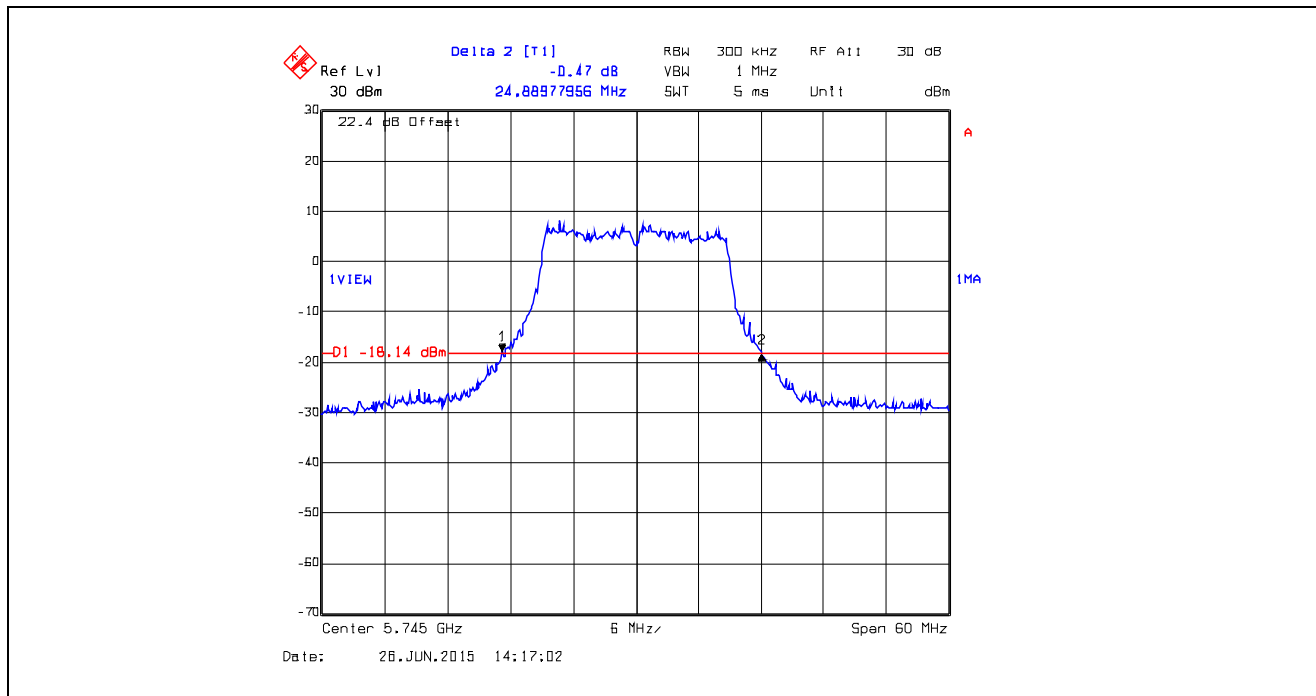
Plot 5.6.4.1.35. 26 dB Bandwidth, Data Rate 6, Chain # 1, Ch 165, 5825 MHz, Software Output Power Setting 18



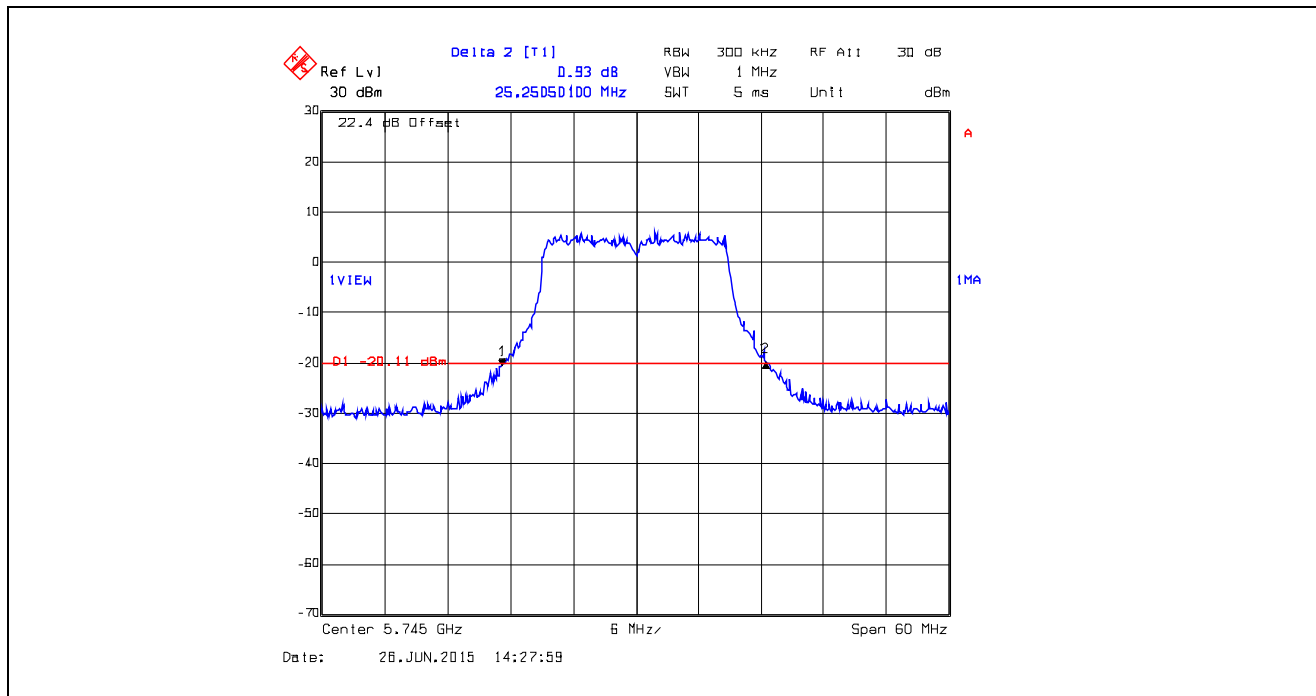
Plot 5.6.4.1.36. 26 dB Bandwidth, Data Rate 6, Chain # 2, Ch 165, 5825 MHz, Software Output Power Setting 18



Plot 5.6.4.1.37. 26 dB Bandwidth, Data Rate 7, Chain # 1, Ch 149, 5745 MHz, Software Output Power Setting 13



Plot 5.6.4.1.38. 26 dB Bandwidth, Data Rate 7, Chain # 2, Ch 149, 5745 MHz, Software Output Power Setting 13



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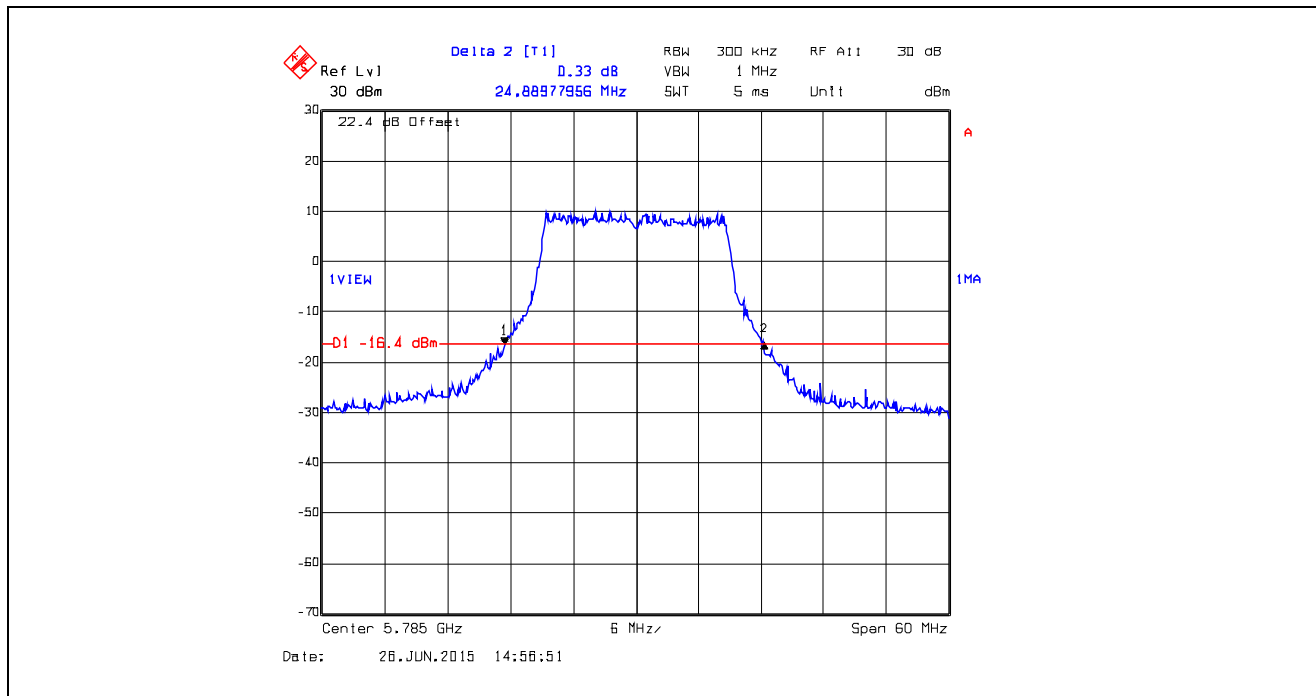
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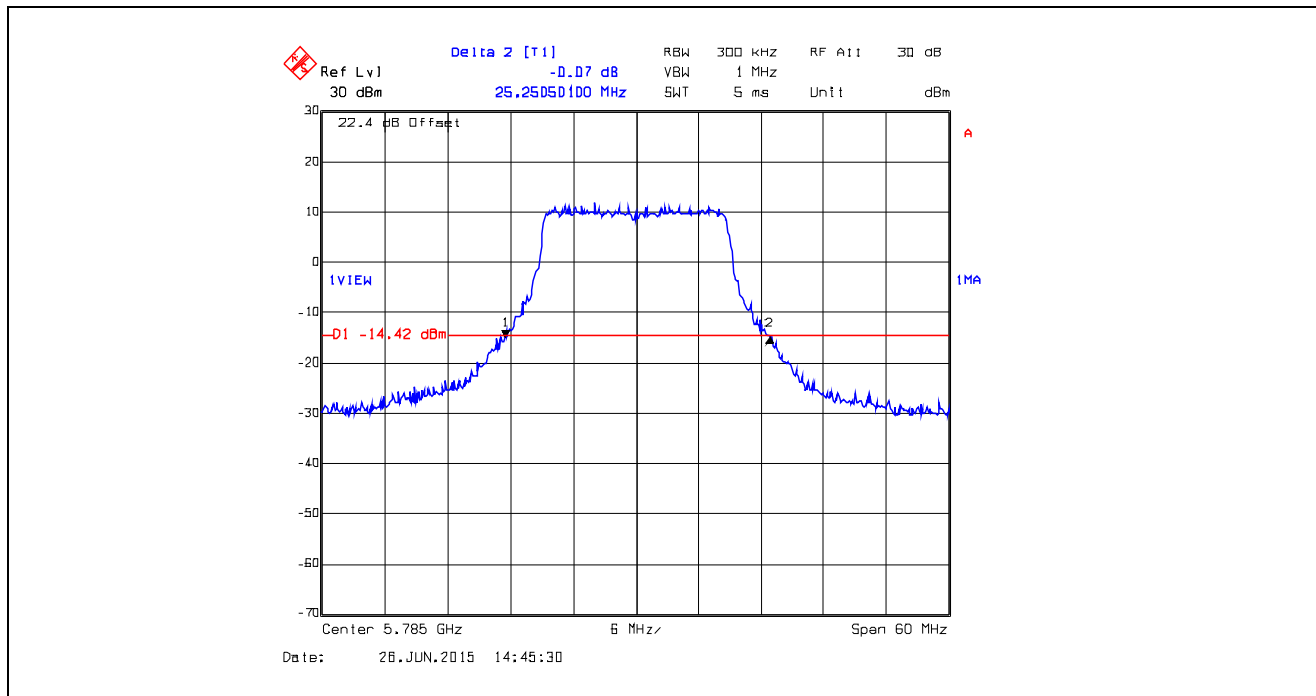
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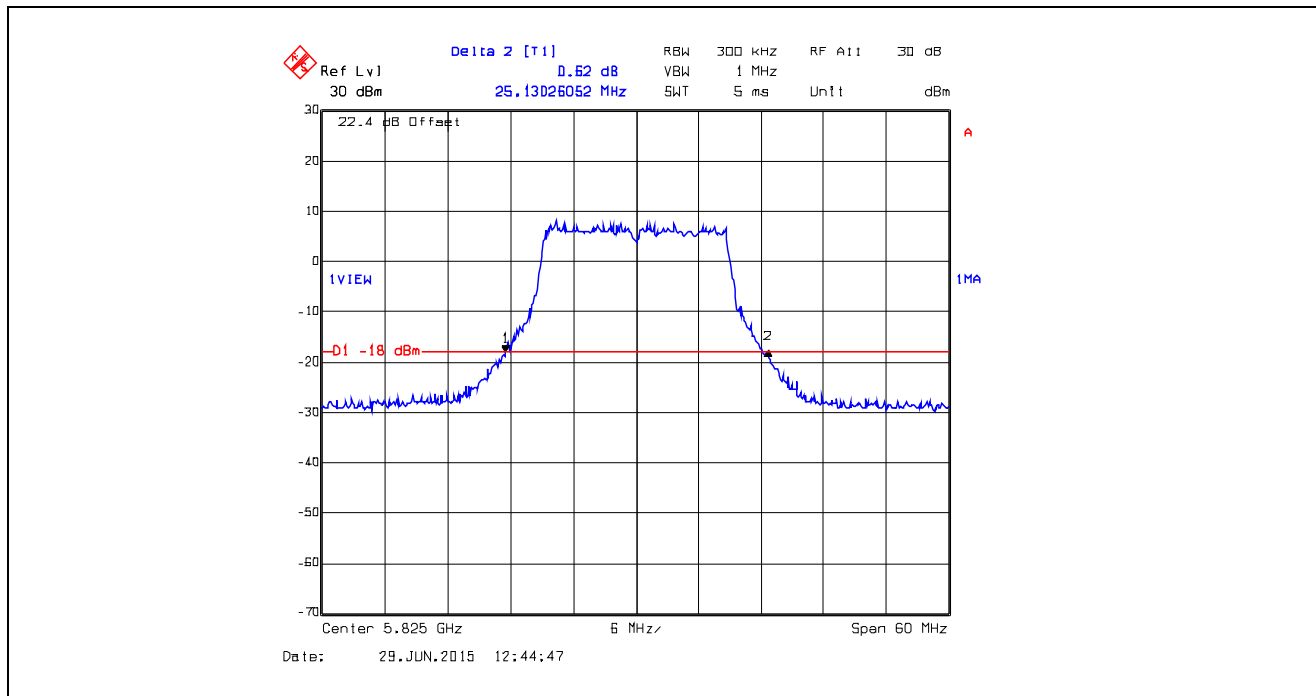
Plot 5.6.4.1.39. 26 dB Bandwidth, Data Rate 7, Chain # 1, Ch 157, 5785 MHz, Software Output Power Setting 19



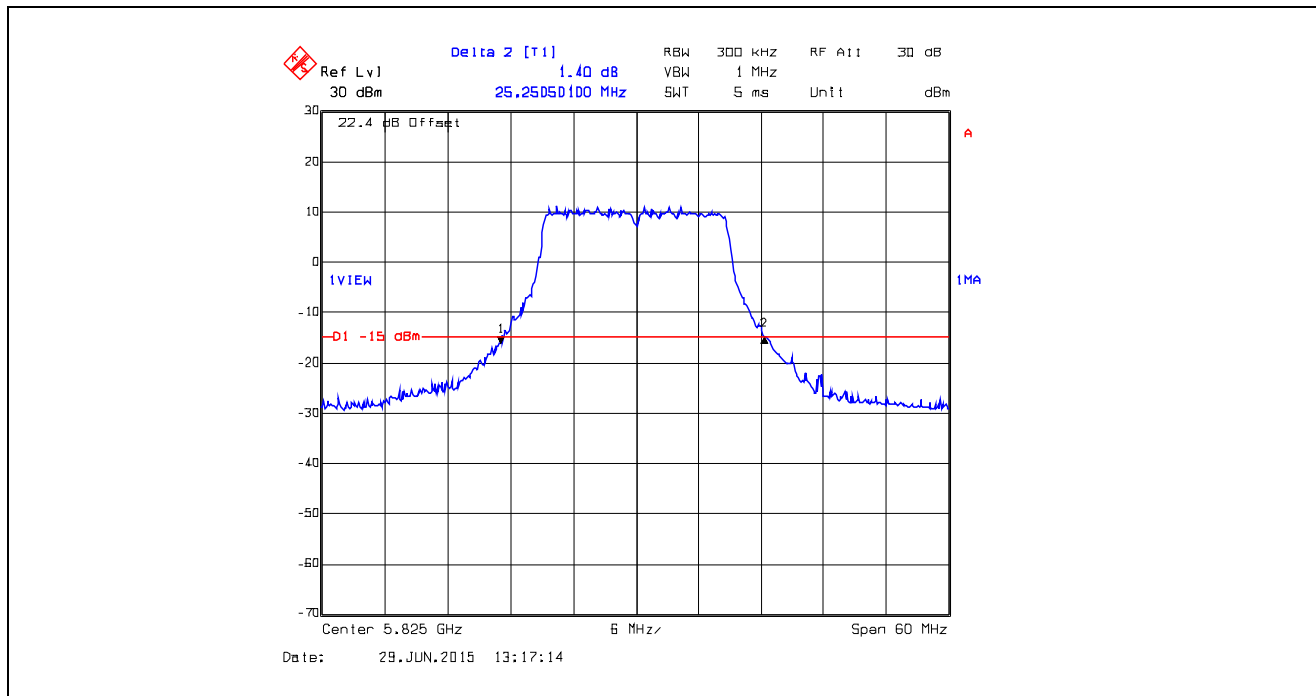
Plot 5.6.4.1.40. 26 dB Bandwidth, Data Rate 7, Chain # 2, Ch 157, 5785 MHz, Software Output Power Setting 19



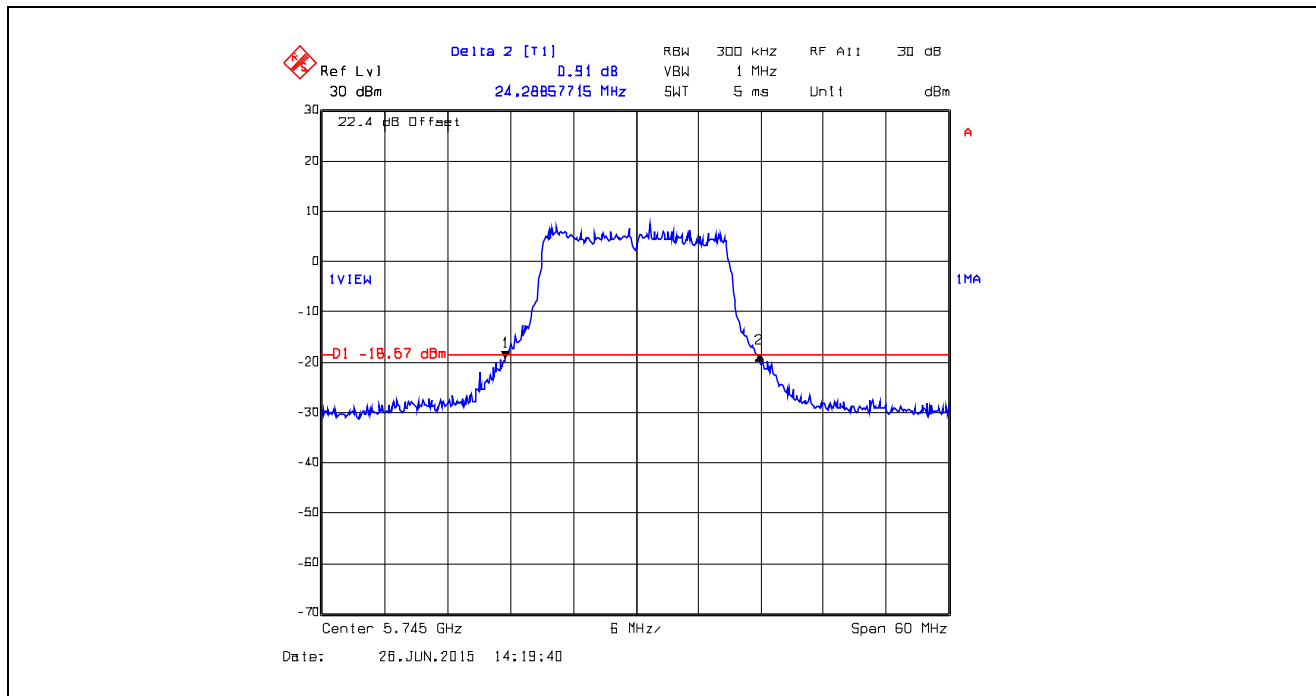
Plot 5.6.4.1.41. 26 dB Bandwidth, Data Rate 7, Chain # 1, Ch 165, 5825 MHz, Software Output Power Setting 18



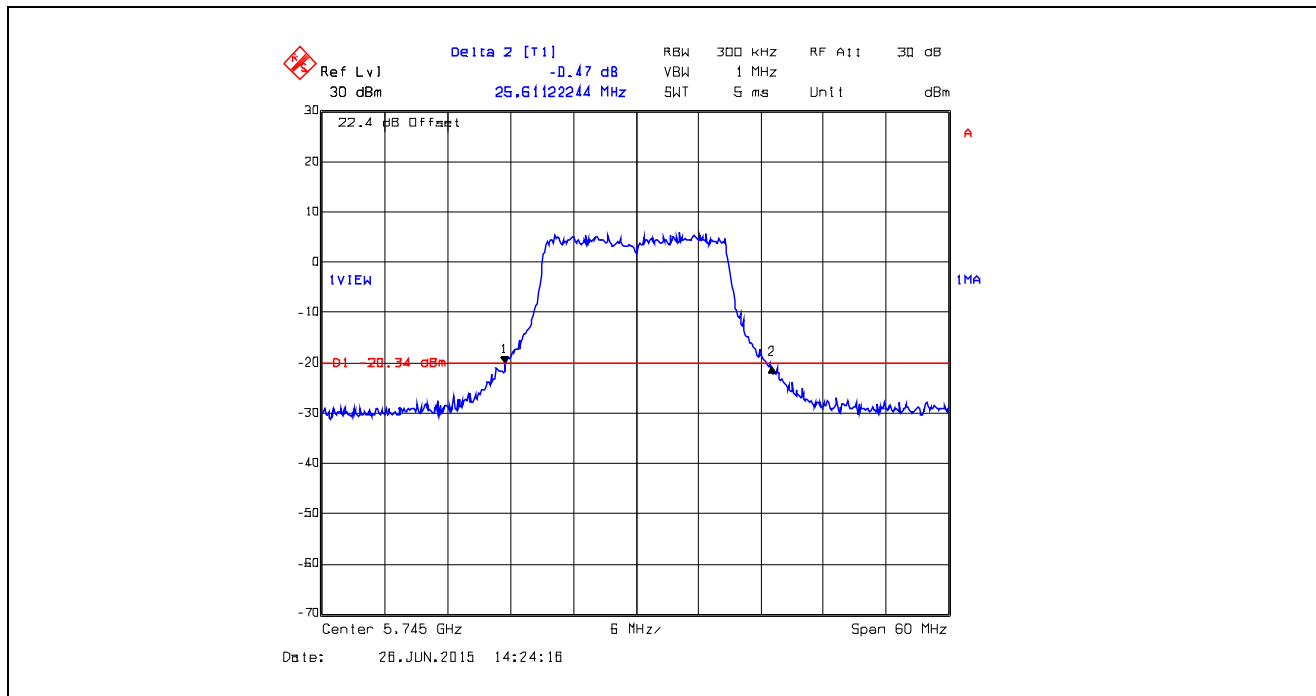
Plot 5.6.4.1.42. 26 dB Bandwidth, Data Rate 7, Chain # 2, Ch 165, 5825 MHz, Software Output Power Setting 18



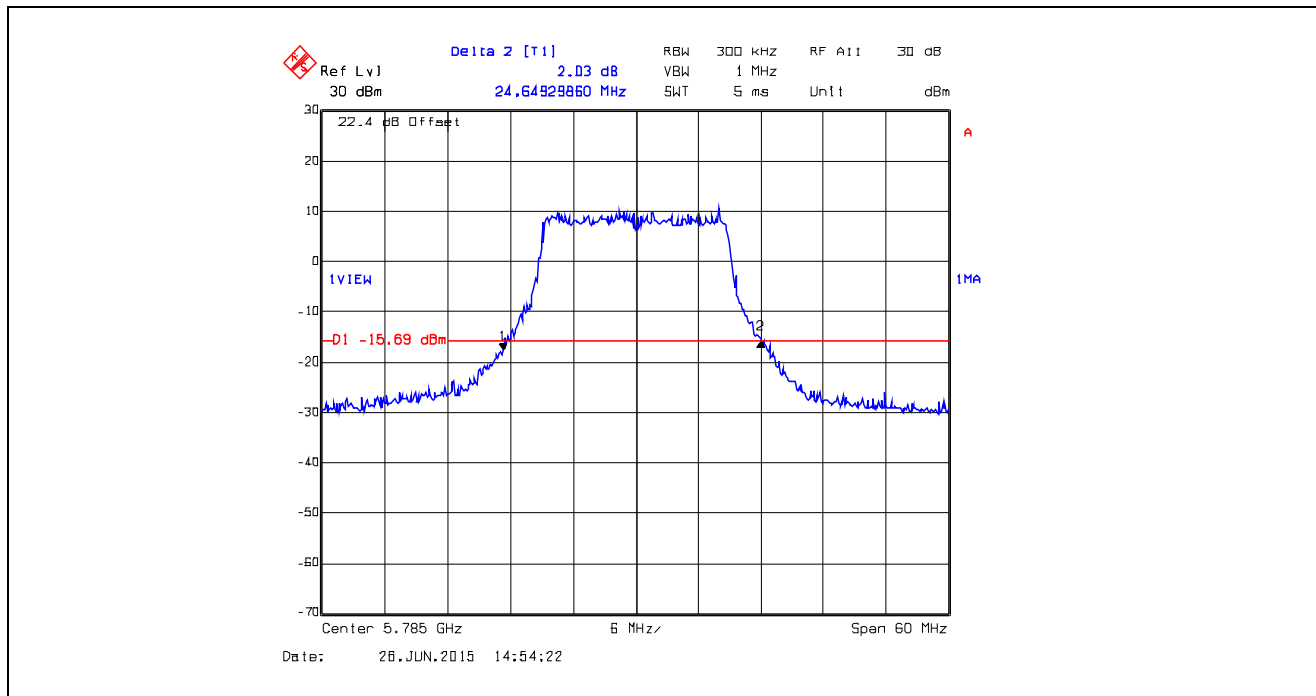
Plot 5.6.4.1.43. 26 dB Bandwidth, Data Rate 8, Chain # 1, Ch 149, 5745 MHz, Software Output Power Setting 13



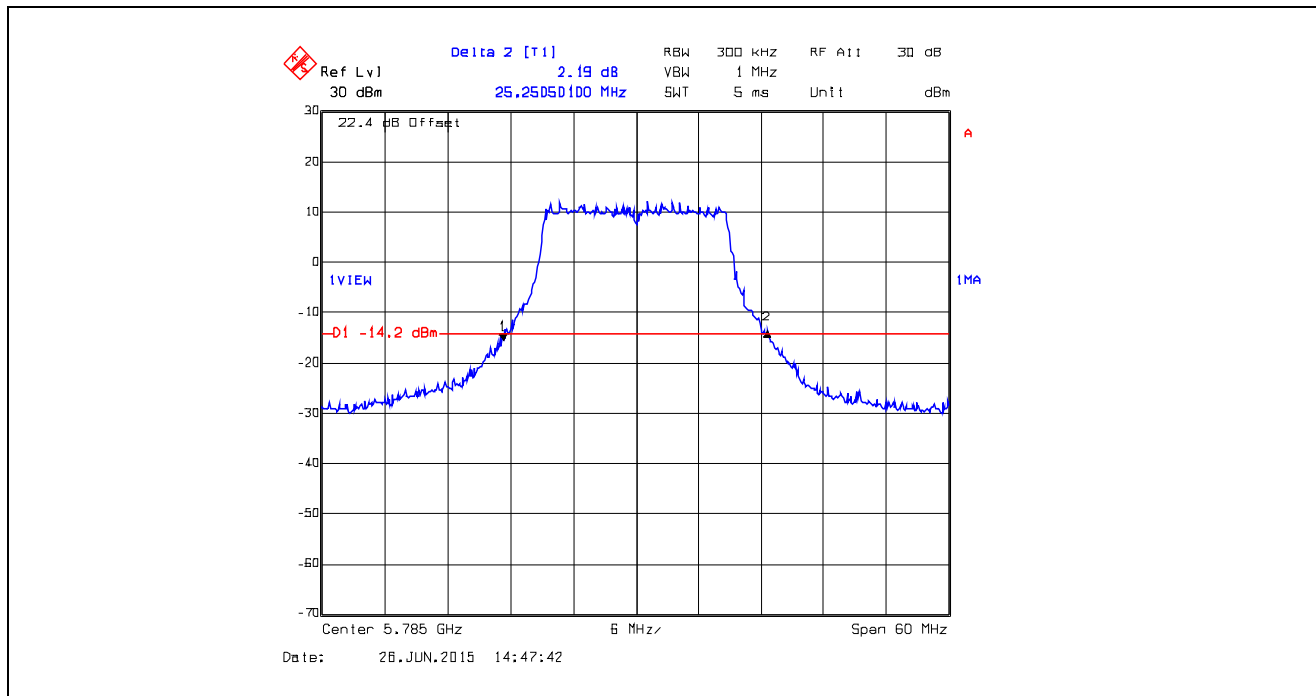
Plot 5.6.4.1.44. 26 dB Bandwidth, Data Rate 8, Chain # 2, Ch 149, 5745 MHz, Software Output Power Setting 13



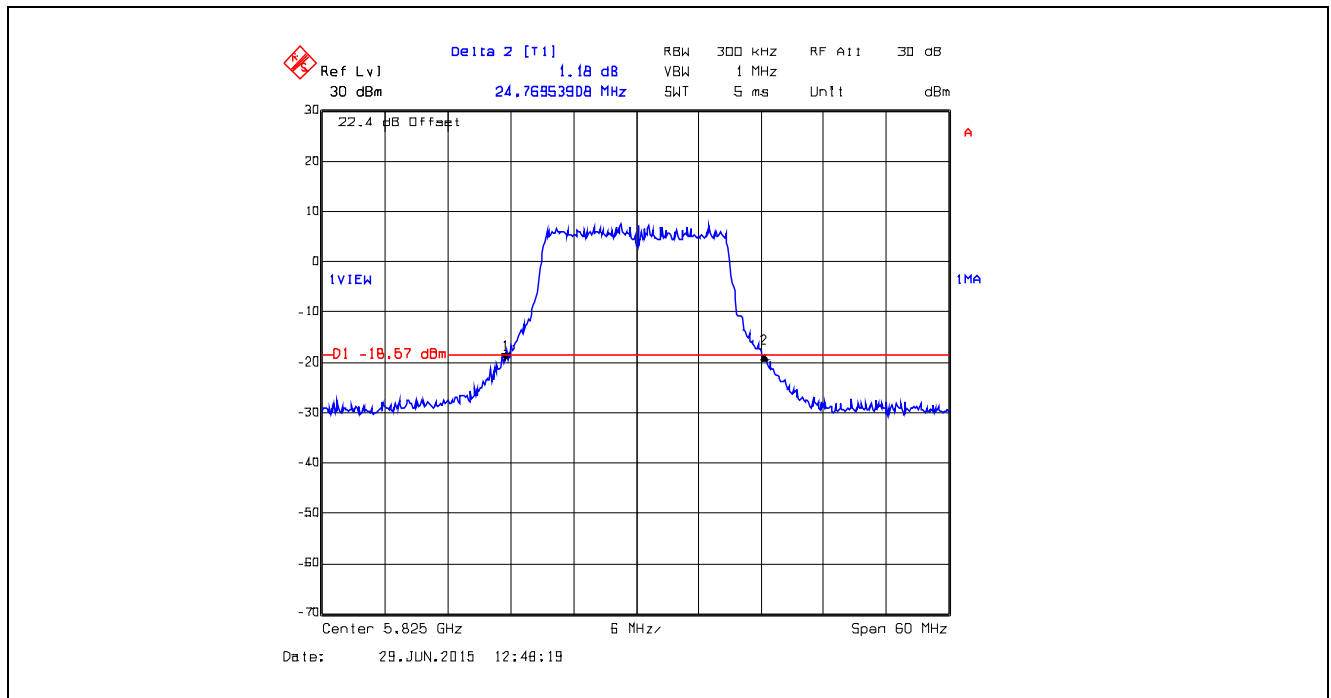
Plot 5.6.4.1.45. 26 dB Bandwidth, Data Rate 8, Chain # 1, Ch 157, 5785 MHz, Software Output Power Setting 19



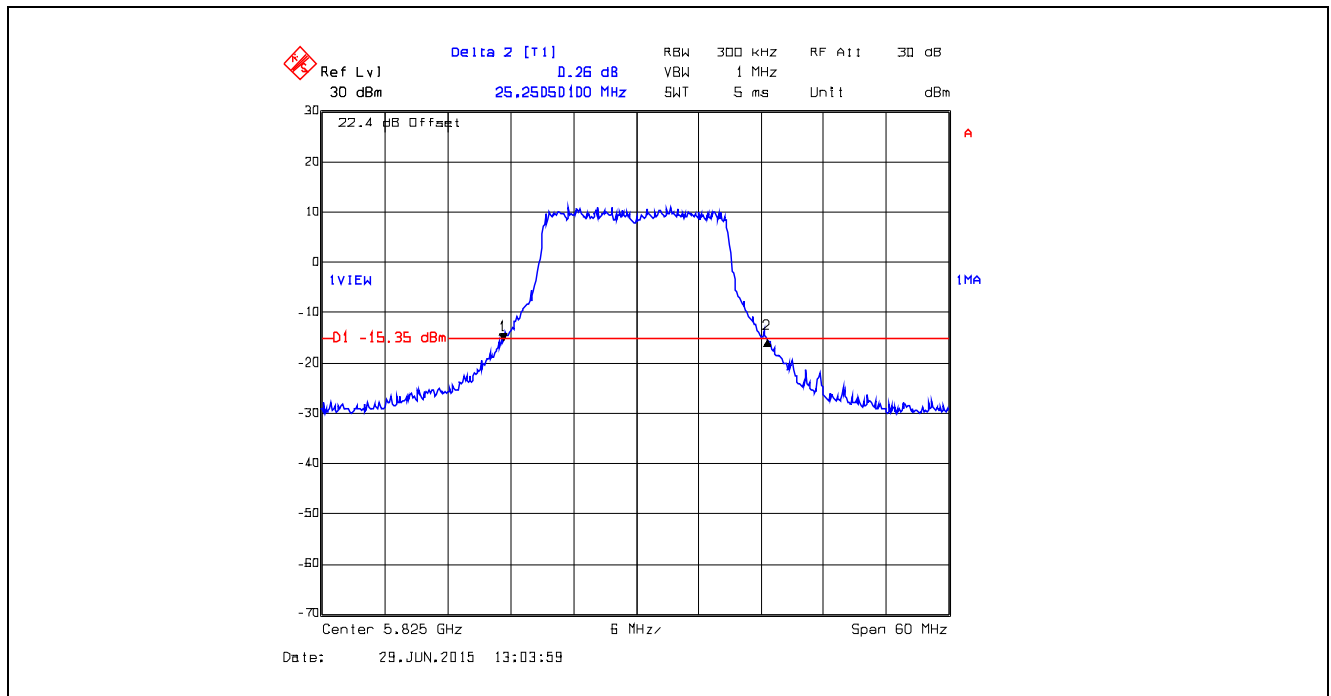
Plot 5.6.4.1.46. 26 dB Bandwidth, Data Rate 8, Chain # 2, Ch 157, 5785 MHz, Software Output Power Setting 19



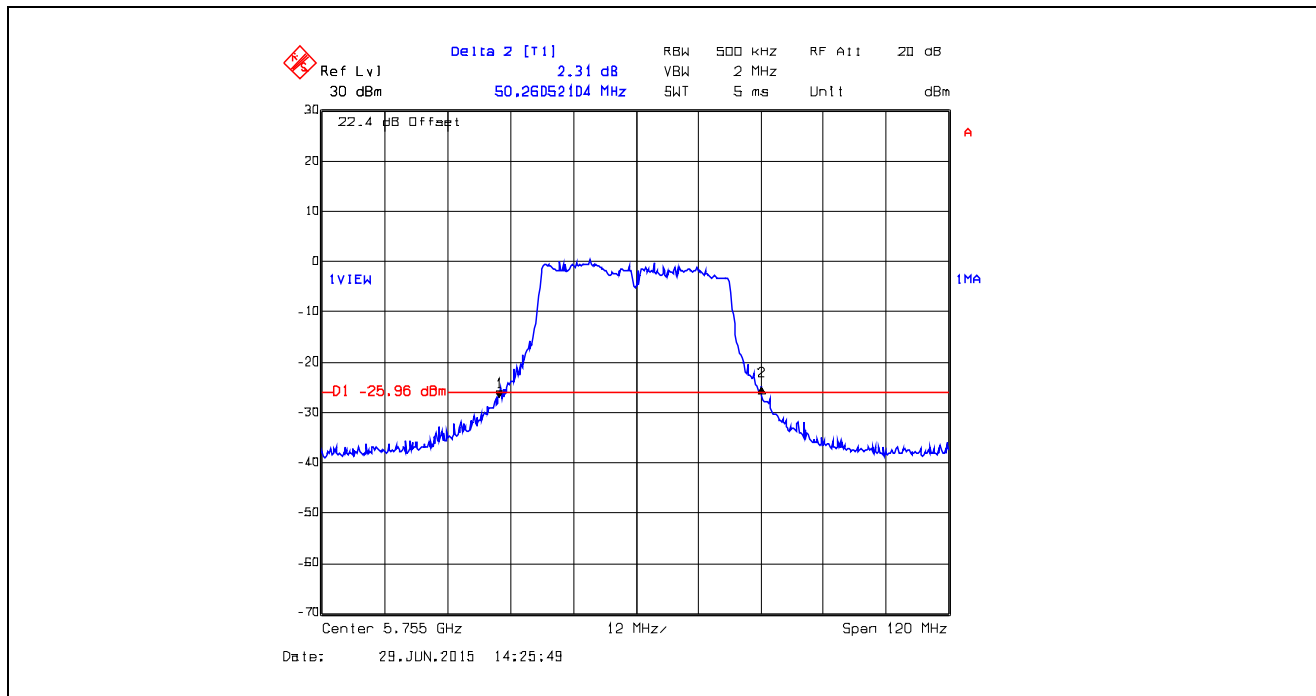
Plot 5.6.4.1.47. 26 dB Bandwidth, Data Rate 8, Chain # 1, Ch 165, 5825 MHz, Software Output Power Setting 18



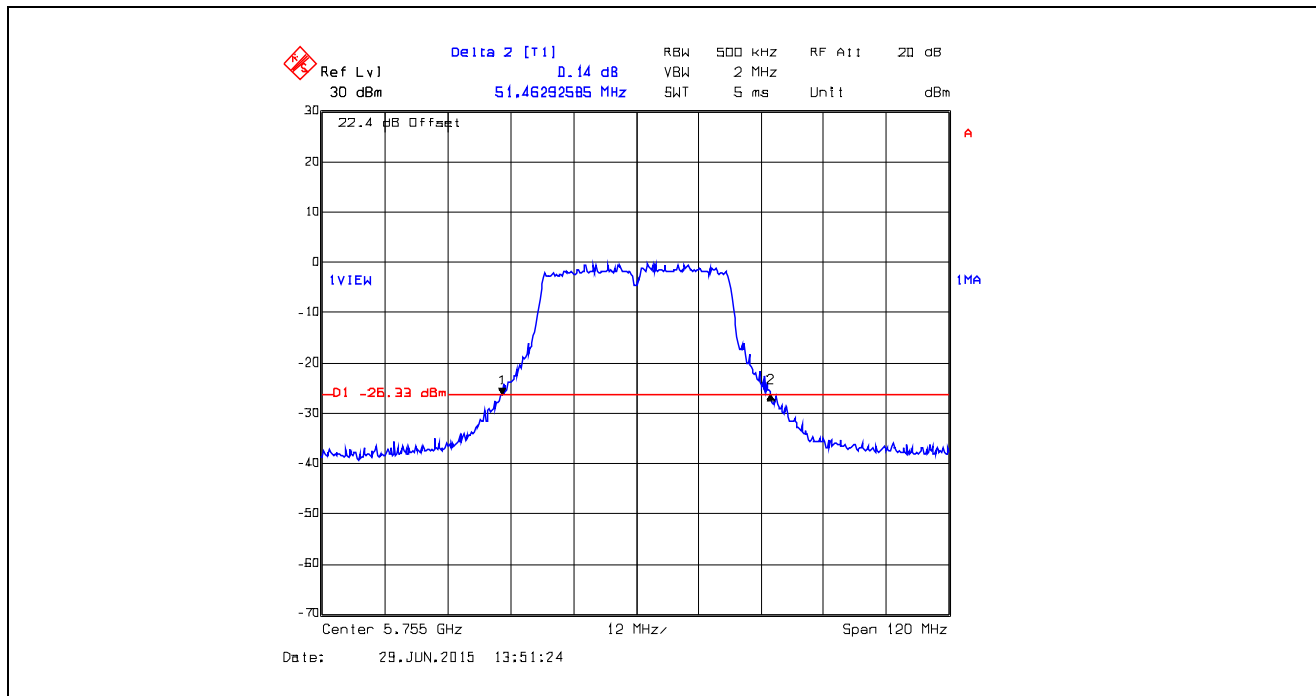
Plot 5.6.4.1.48. 26 dB Bandwidth, Data Rate 8, Chain # 2, Ch 165, 5825 MHz, Software Output Power Setting 18



Plot 5.6.4.1.49. 26 dB Bandwidth, Data Rate 9, Chain # 1, Ch 151, 5755 MHz, Software Output Power Setting 7



Plot 5.6.4.1.50. 26 dB Bandwidth, Data Rate 9, Chain # 2, Ch 151, 5755 MHz, Software Output Power Setting 7



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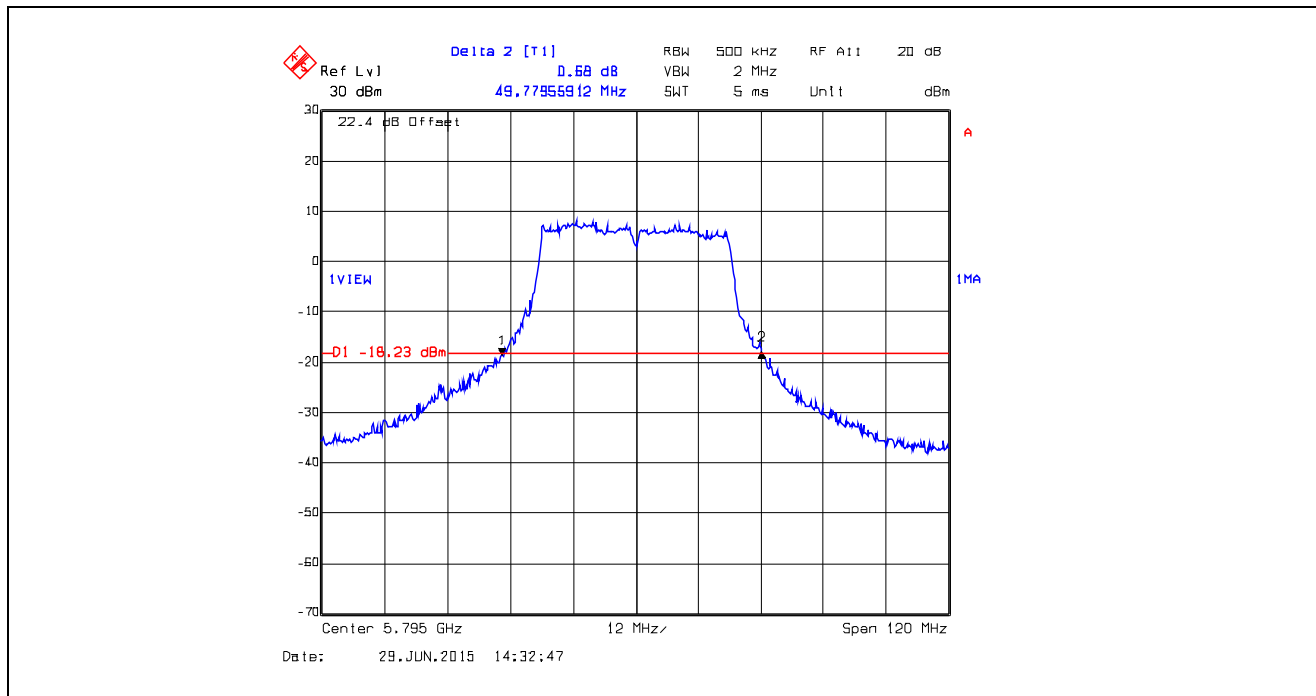
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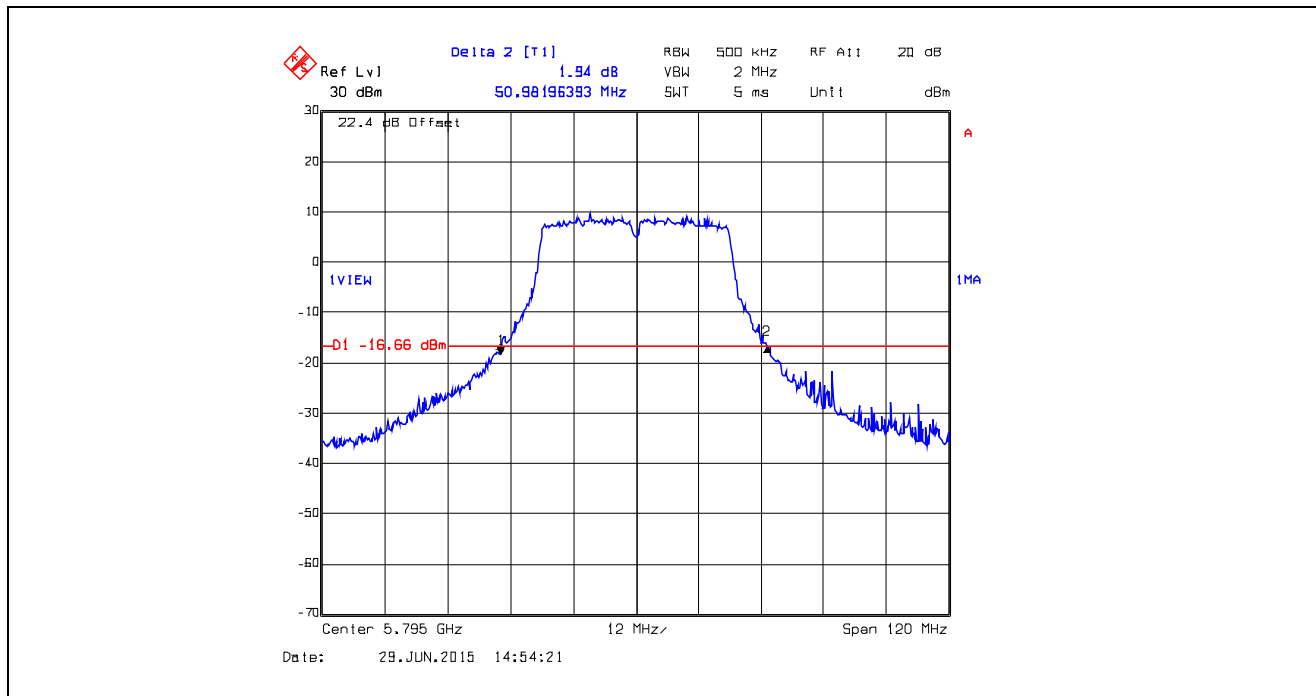
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Plot 5.6.4.1.51. 26 dB Bandwidth, Data Rate 9, Chain # 1, Ch 159, 5795 MHz, Software Output Power Setting 18



Plot 5.6.4.1.52. 26 dB Bandwidth, Data Rate 9, Chain # 2, Ch 159, 5795 MHz, Software Output Power Setting 18



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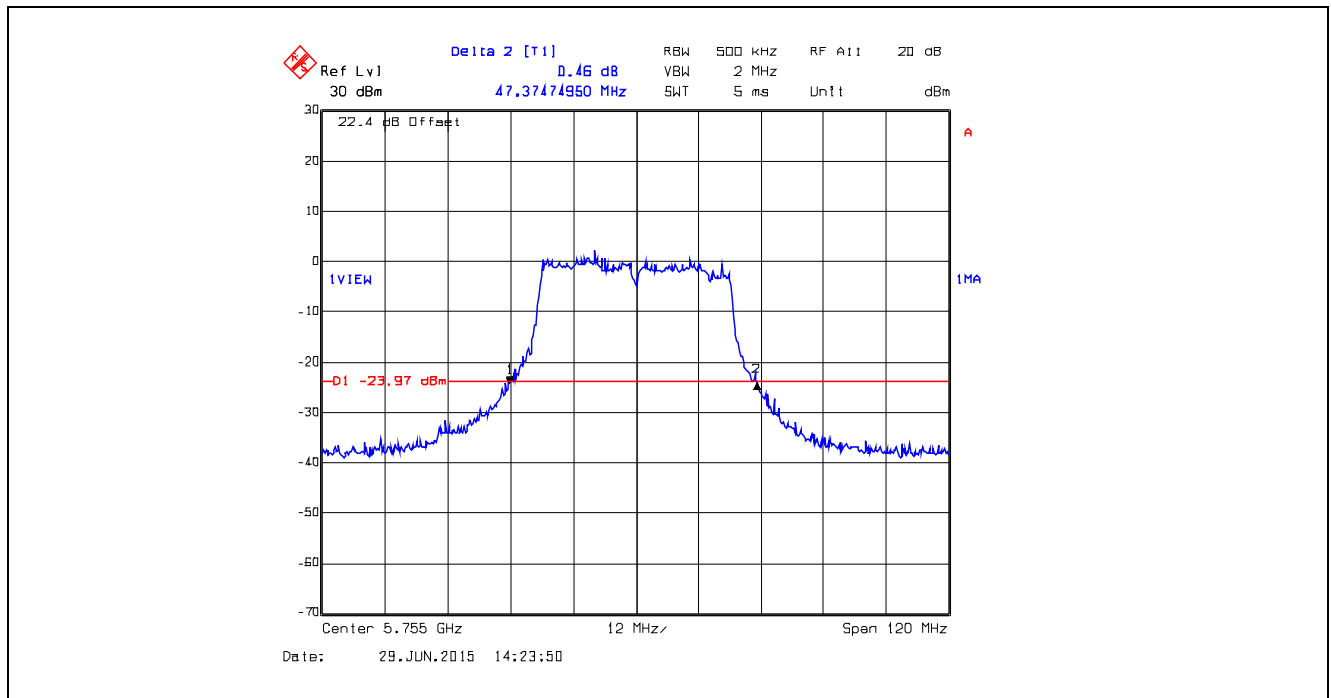
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 15MCRS079_FCC15E407

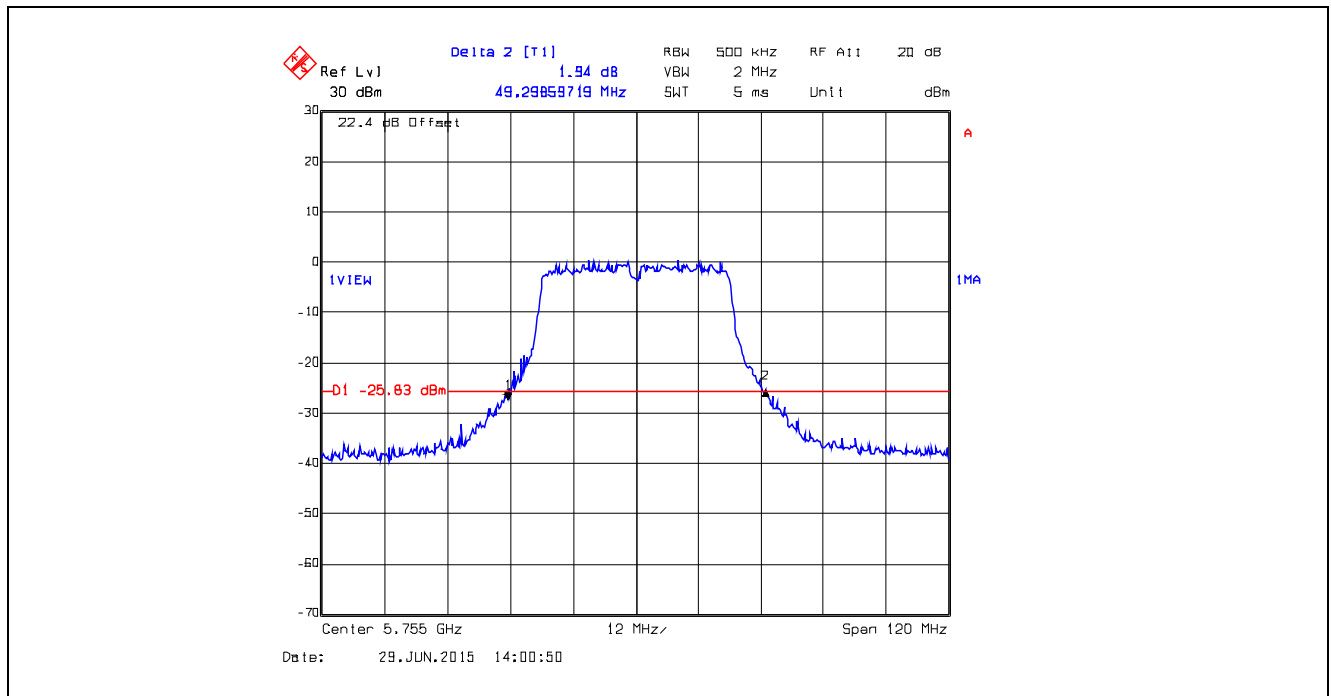
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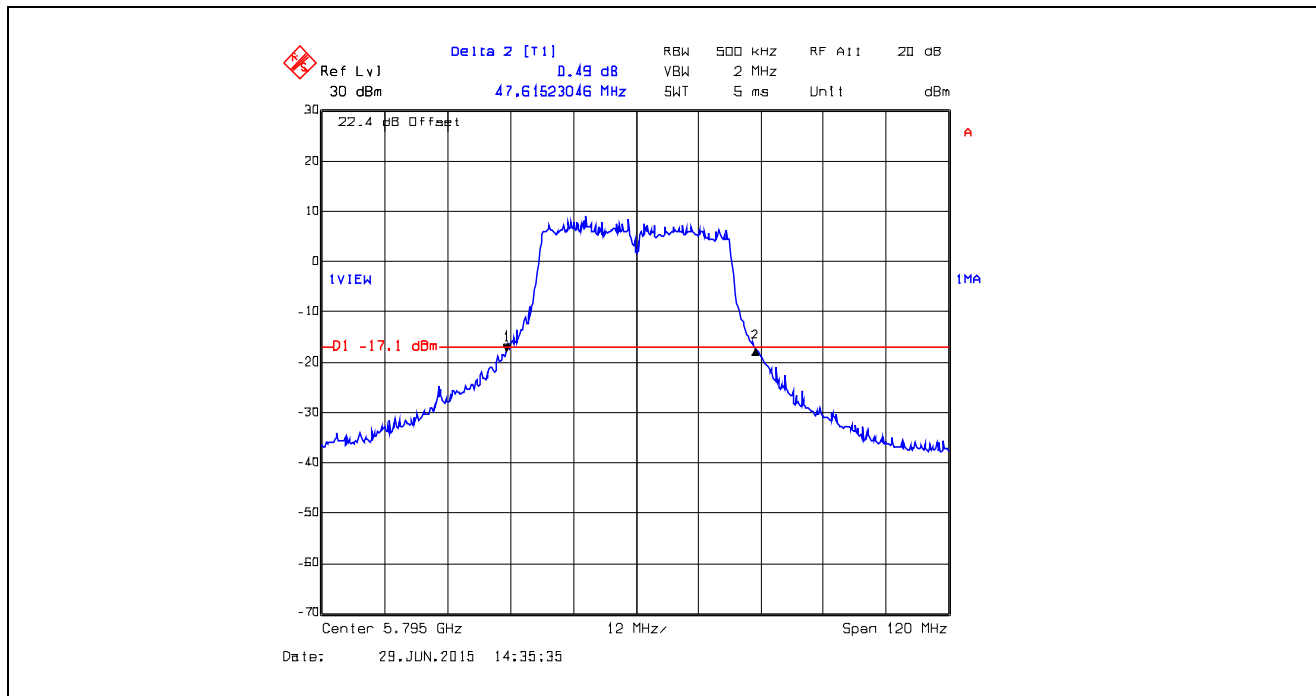
Plot 5.6.4.1.53. 26 dB Bandwidth, Data Rate 10, Chain # 1, Ch 151, 5755 MHz, Software Output Power Setting 7



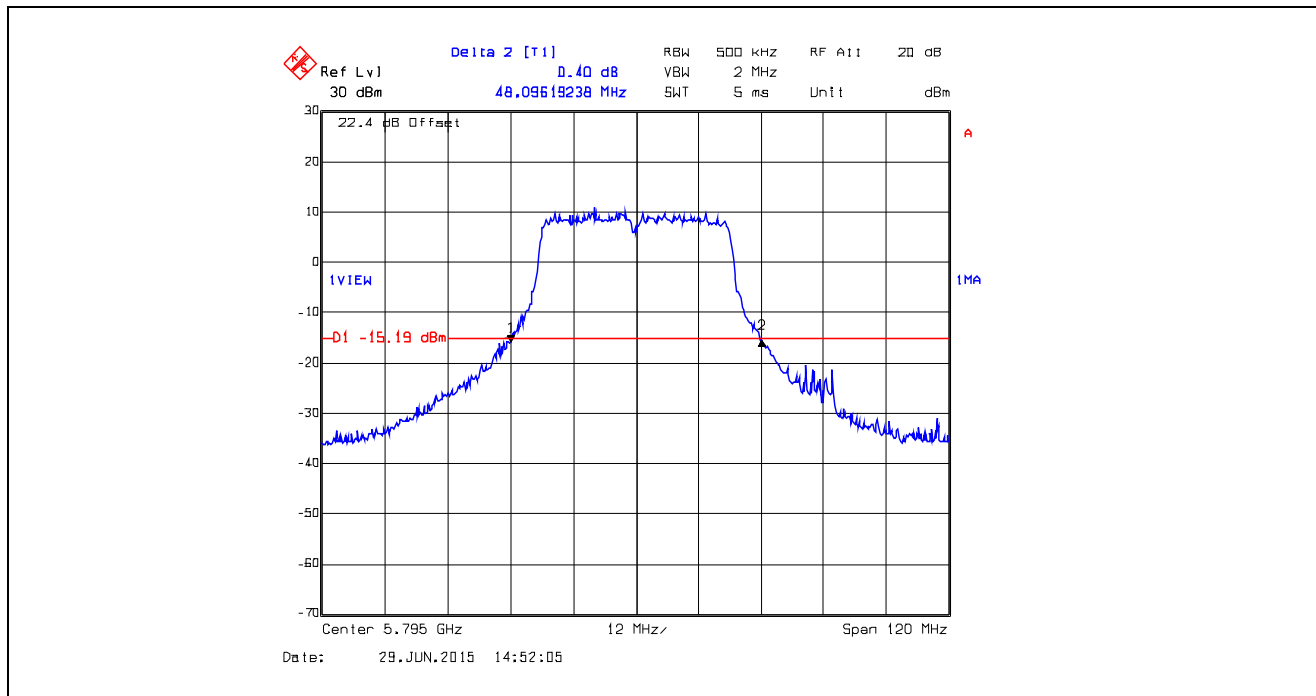
Plot 5.6.4.1.54. 26 dB Bandwidth, Data Rate 10, Chain # 2, Ch 151, 5755 MHz, Software Output Power Setting 7



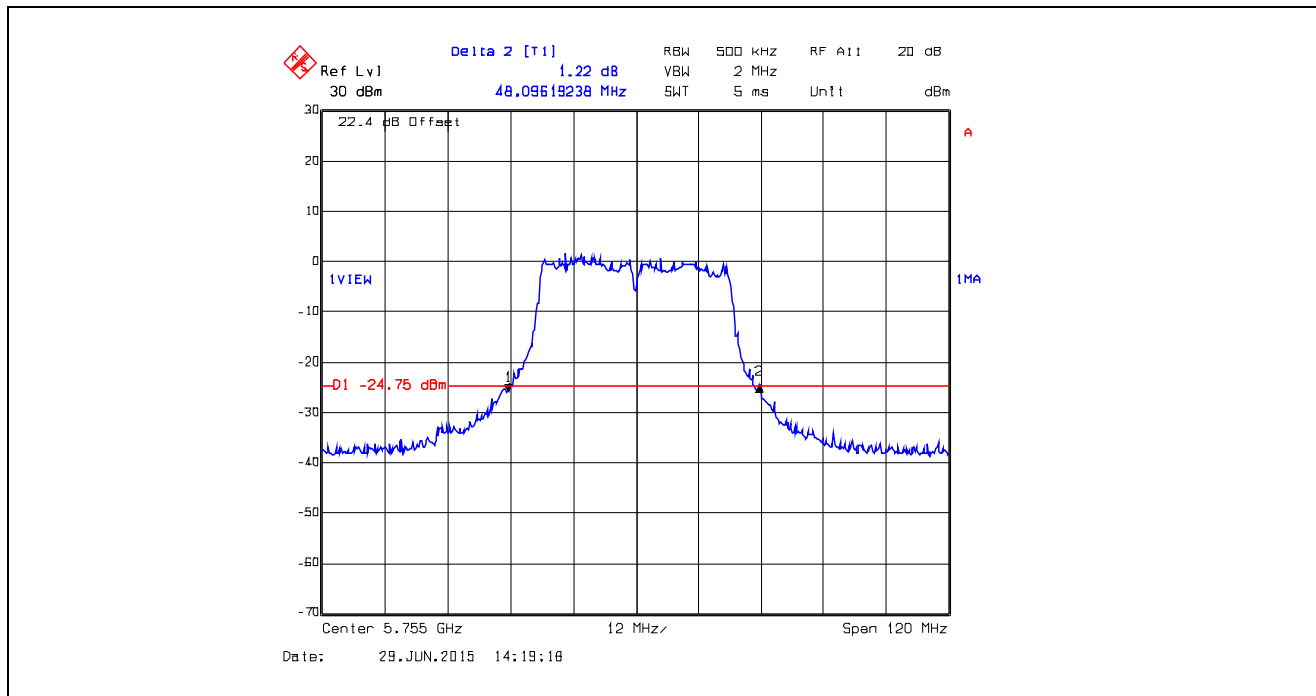
Plot 5.6.4.1.55. 26 dB Bandwidth, Data Rate 10, Chain # 1, Ch 159, 5795 MHz, Software Output Power Setting 18



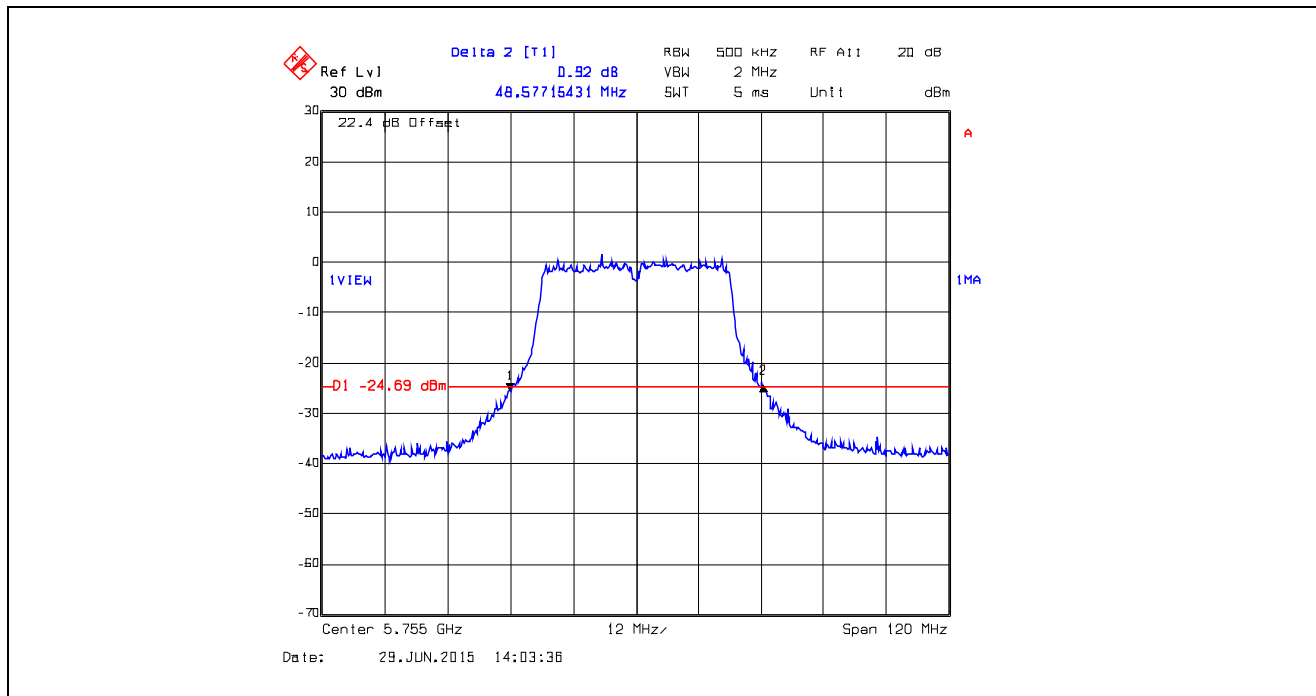
Plot 5.6.4.1.56. 26 dB Bandwidth, Data Rate 10, Chain # 2, Ch 159, 5795 MHz, Software Output Power Setting 18



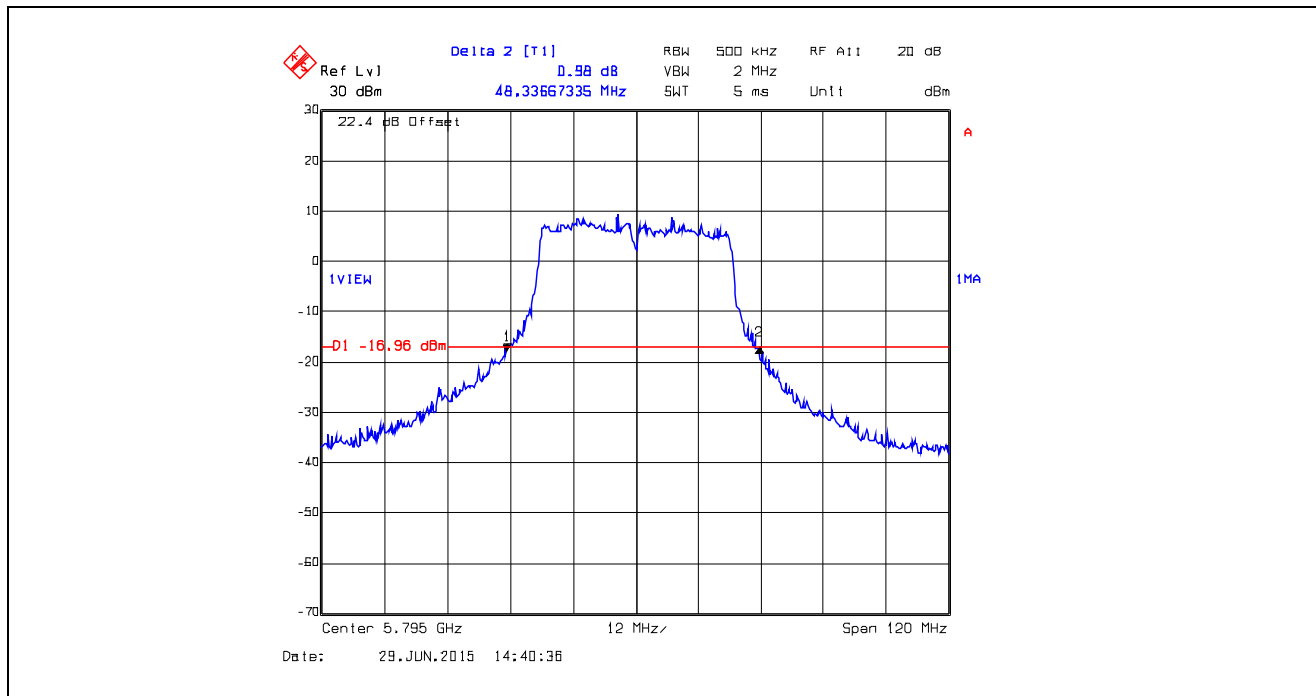
Plot 5.6.4.1.57. 26 dB Bandwidth, Data Rate 11, Chain # 1, Ch 151, 5755 MHz, Software Output Power Setting 7



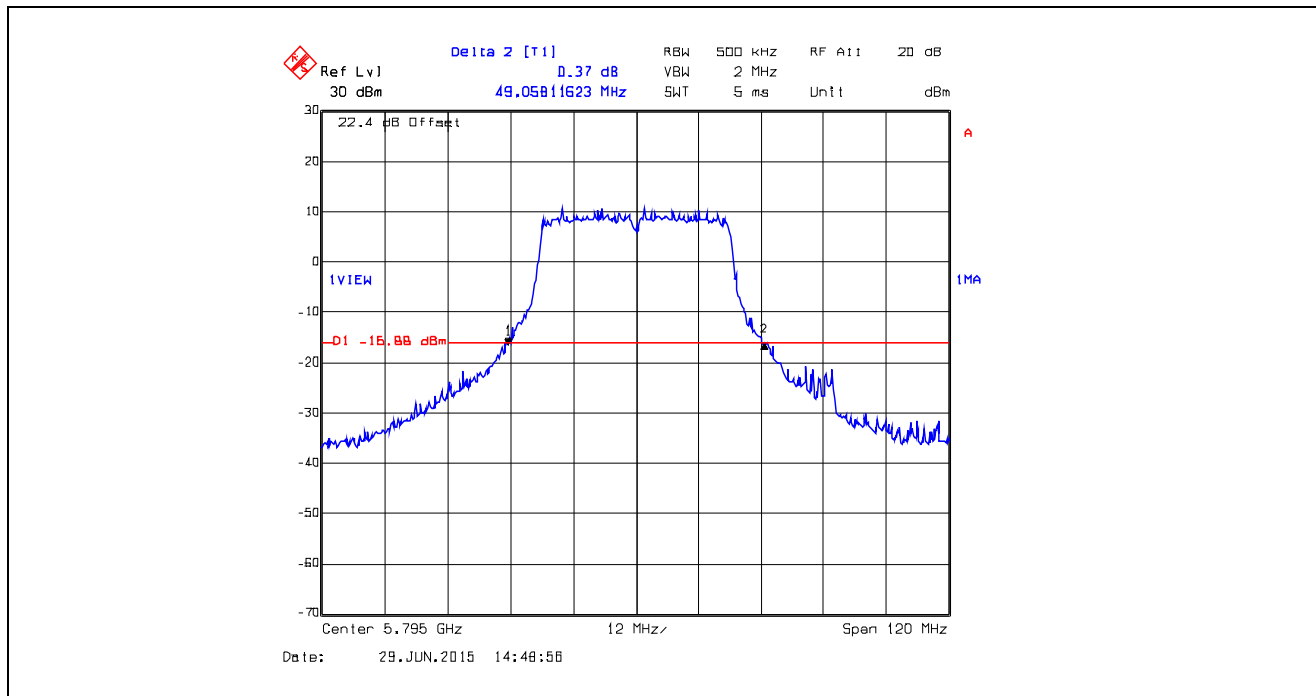
Plot 5.6.4.1.58. 26 dB Bandwidth, Data Rate 11, Chain # 2, Ch 151, 5755 MHz, Software Output Power Setting 7



Plot 5.6.4.1.59. 26 dB Bandwidth, Data Rate 11, Chain # 1, Ch 159, 5795 MHz, Software Output Power Setting 18



Plot 5.6.4.1.60. 26 dB Bandwidth, Data Rate 11, Chain # 2, Ch 159, 5795 MHz, Software Output Power Setting 18



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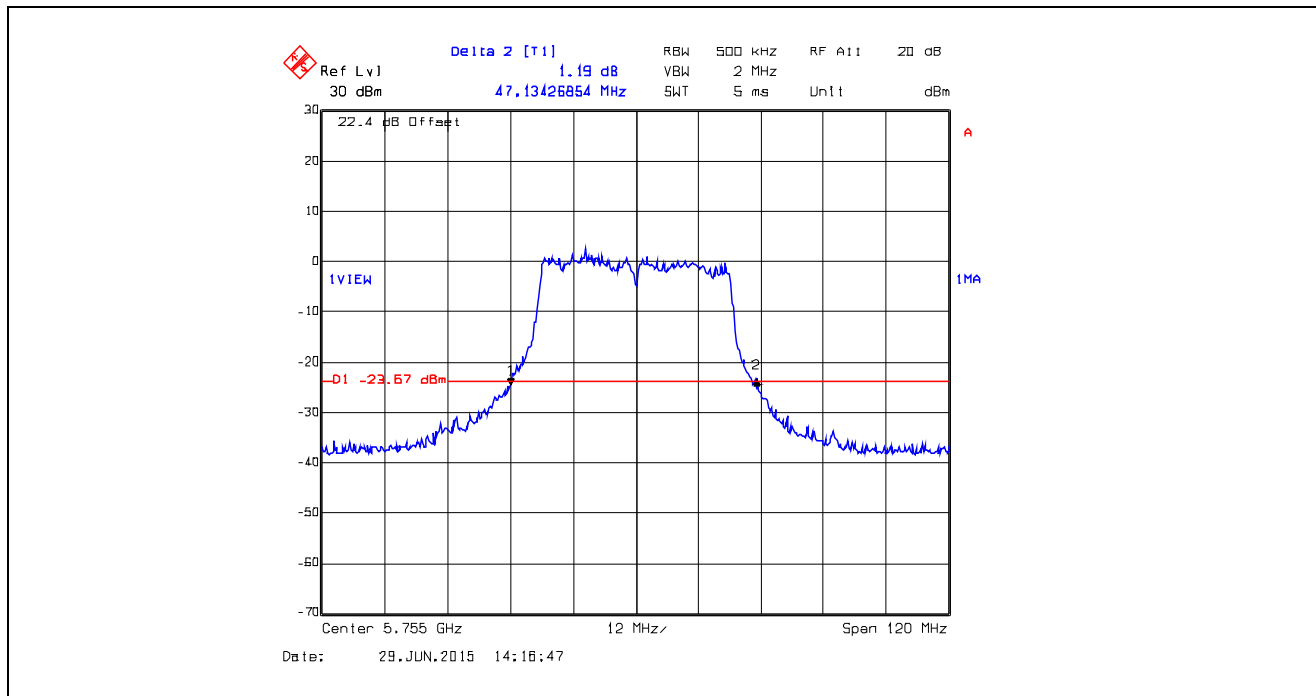
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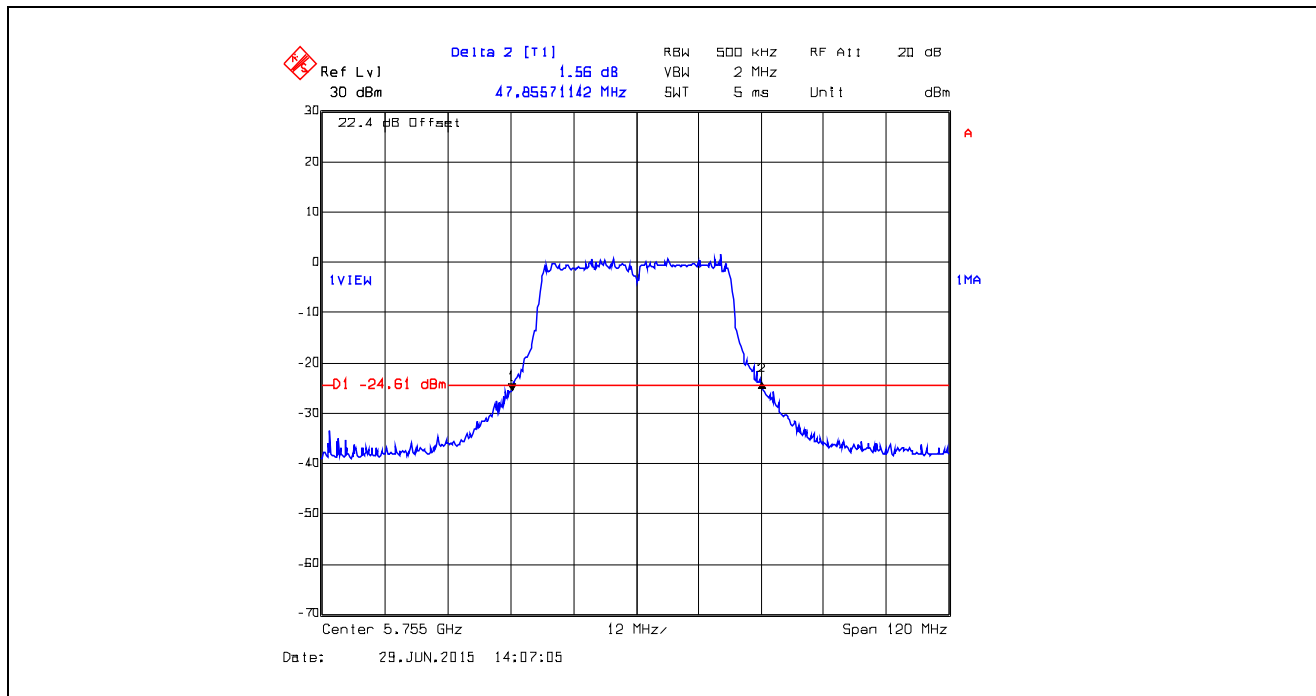
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Plot 5.6.4.1.61. 26 dB Bandwidth, Data Rate 12, Chain # 1, Ch 151, 5755 MHz, Software Output Power Setting 7



Plot 5.6.4.1.62. 26 dB Bandwidth, Data Rate 12, Chain # 2, Ch 151, 5755 MHz, Software Output Power Setting 7



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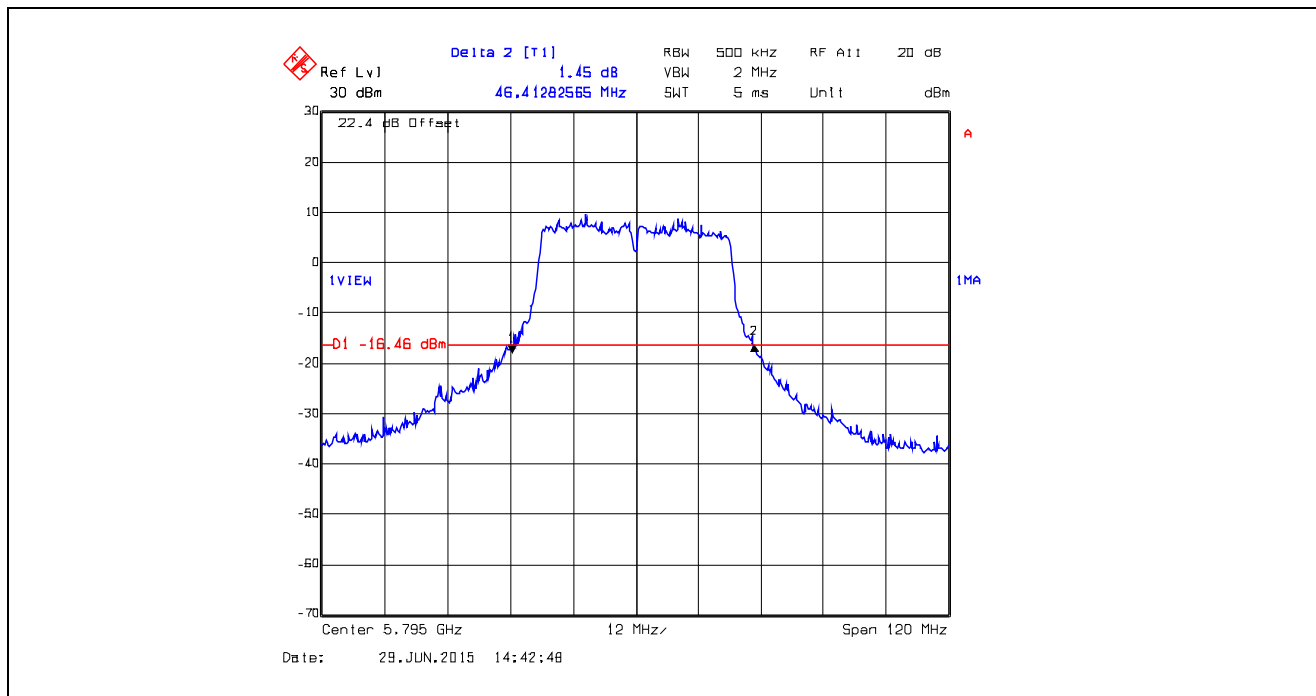
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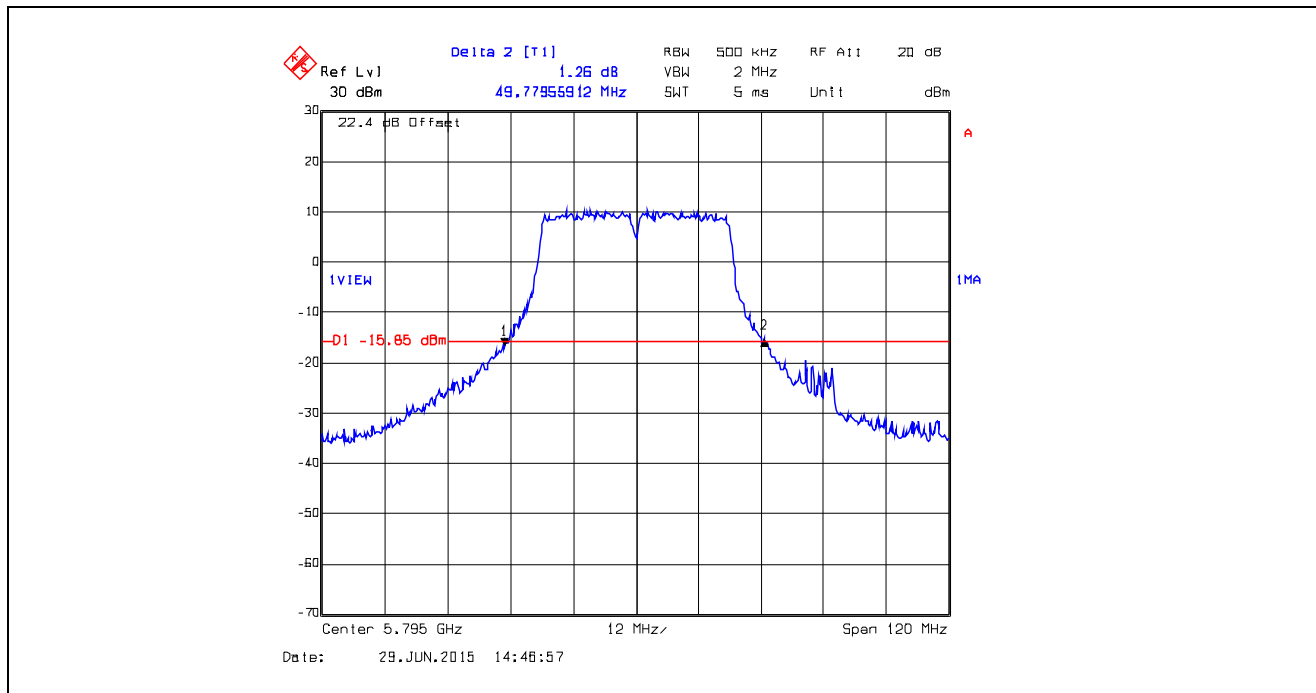
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Plot 5.6.4.1.63. 26 dB Bandwidth, Data Rate 12, Chain # 1, Ch 159, 5795 MHz, Software Output Power Setting 18



Plot 5.6.4.1.64. 26 dB Bandwidth, Data Rate 12, Chain # 2, Ch 159, 5795 MHz, Software Output Power Setting 18



5.6.4.2. 6 dB Bandwidth

Operating Mode	Software Output Power Setting	Channel Number	Frequency (MHz)	6dB BW (MHz)		Min. Limit (kHz)
				Chain # 1	Chain # 2	
Data Rate 1	13	149	5745	16.48	16.62	500
	19	157	5785	16.55	16.62	500
	18	165	5825	16.62	16.48	500
Data Rate 2	13	149	5745	16.48	16.62	500
	19	157	5785	16.55	16.62	500
	18	165	5825	16.55	16.48	500
Data Rate 3	13	149	5745	16.62	16.62	500
	19	157	5785	16.62	16.62	500
	18	165	5825	16.62	16.48	500
Data Rate 4	13	149	5745	16.62	16.62	500
	19	157	5785	16.62	16.62	500
	18	165	5825	16.62	16.62	500
Data Rate 5	13	149	5745	17.75	17.82	500
	19	157	5785	17.82	17.75	500
	18	165	5825	17.82	17.68	500
Data Rate 6	13	149	5745	17.75	17.89	500
	19	157	5785	17.82	17.82	500
	18	165	5825	17.75	17.61	500
Data Rate 7	13	149	5745	17.89	17.89	500
	19	157	5785	17.89	17.89	500
	18	165	5825	17.89	17.82	500
Data Rate 8	13	149	5745	17.89	17.89	500
	19	157	5785	17.89	17.89	500
	18	165	5825	17.89	17.75	500

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File #: 15MCRS079_FCC15E407

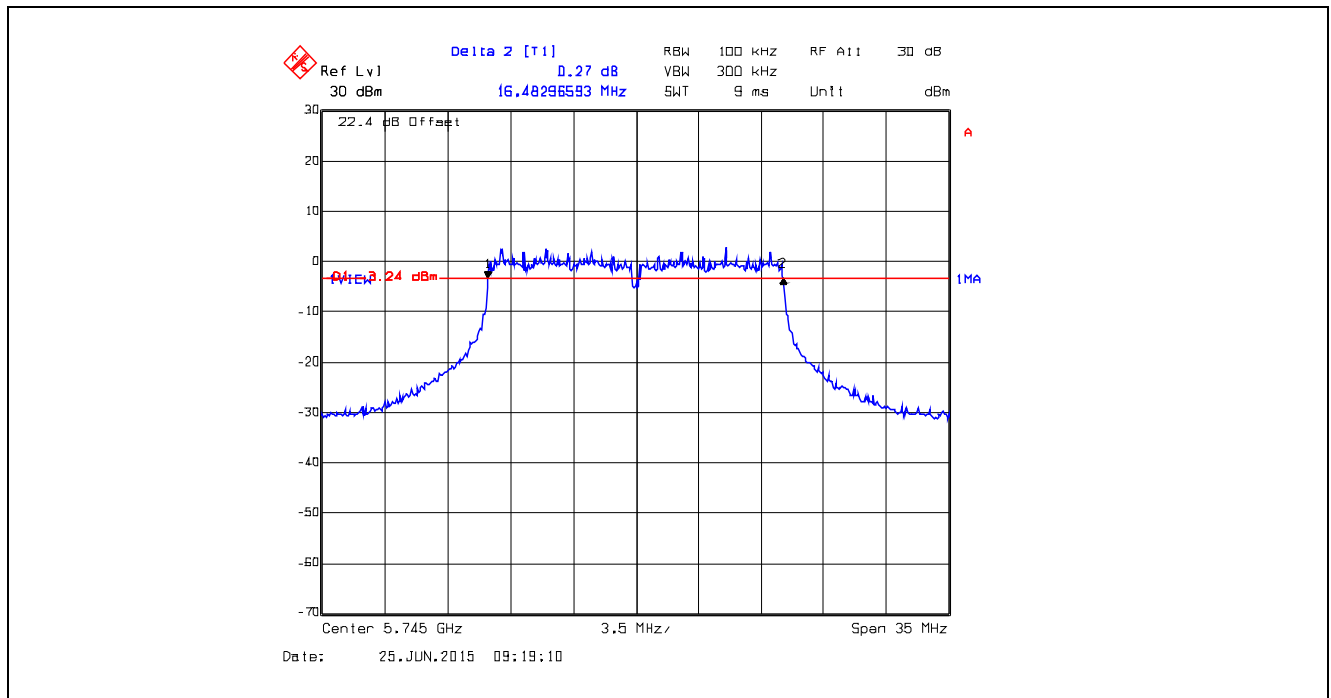
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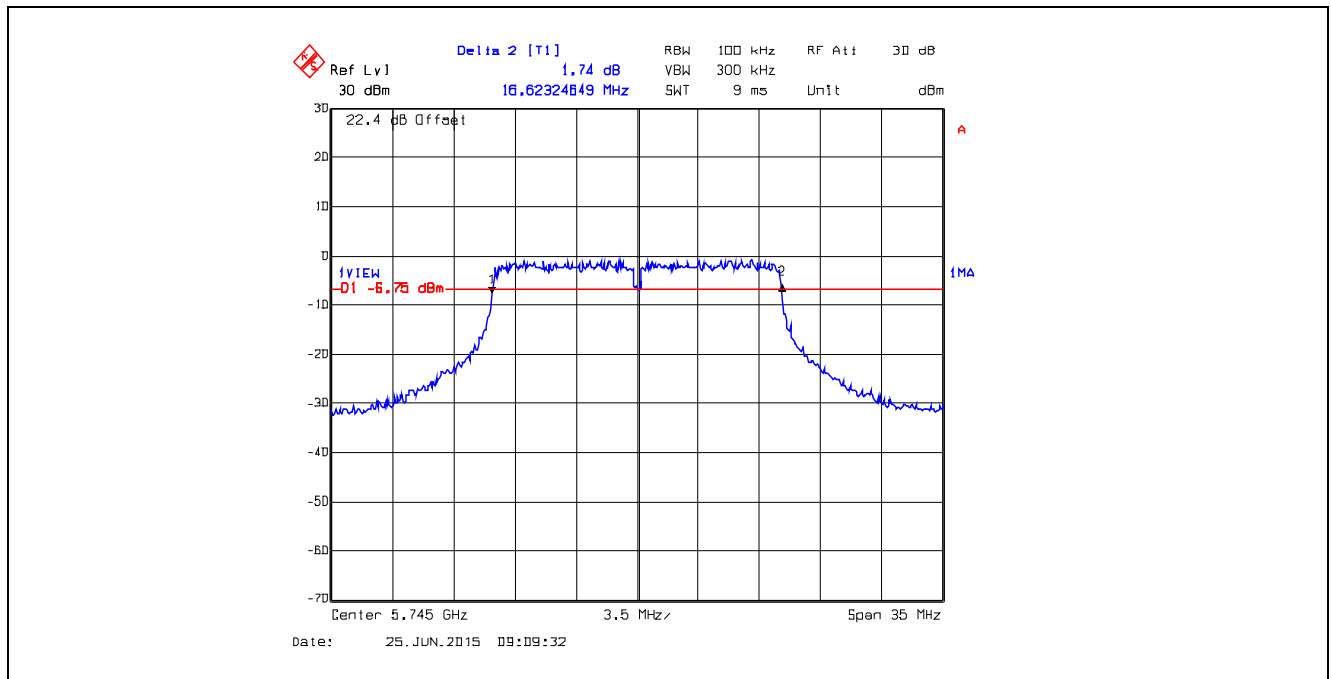
Operating Mode	Software Output Power Setting	Channel Number	Frequency (MHz)	6dB BW (MHz)		Min. Limit (kHz)
				Chain # 1	Chain # 2	
Data Rate 9	7	151	5755	36.52	36.52	500
	18	159	5795	36.52	36.52	500
Data Rate 10	7	151	5755	36.22	36.67	500
	18	159	5795	36.52	36.67	500
Data Rate 11	7	151	5755	36.52	36.67	500
	18	159	5795	36.52	36.67	500
Data Rate 12	7	151	5755	36.67	36.67	500
	18	159	5795	36.67	36.67	500

See the following plots for detailed measurements.

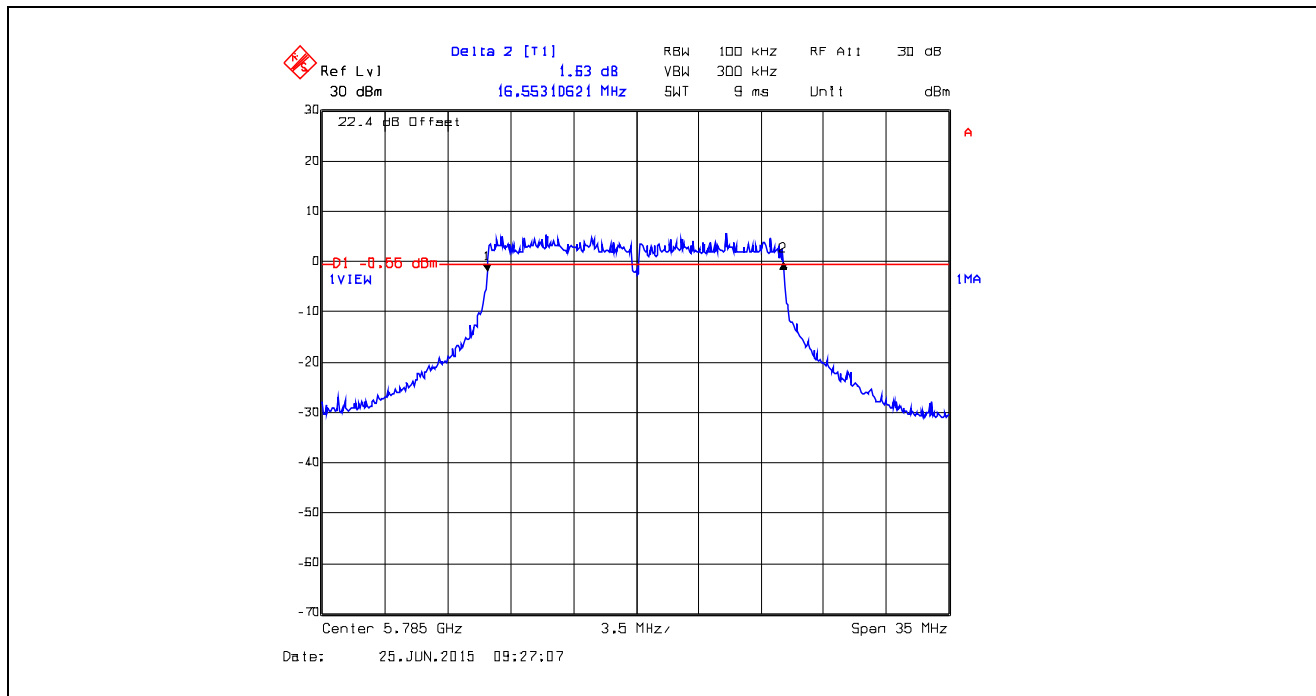
Plot 5.6.4.2.1. 6 dB Bandwidth, Data Rate 1, Chain # 1, Ch 149, 5745 MHz, Software Output Power Setting 13



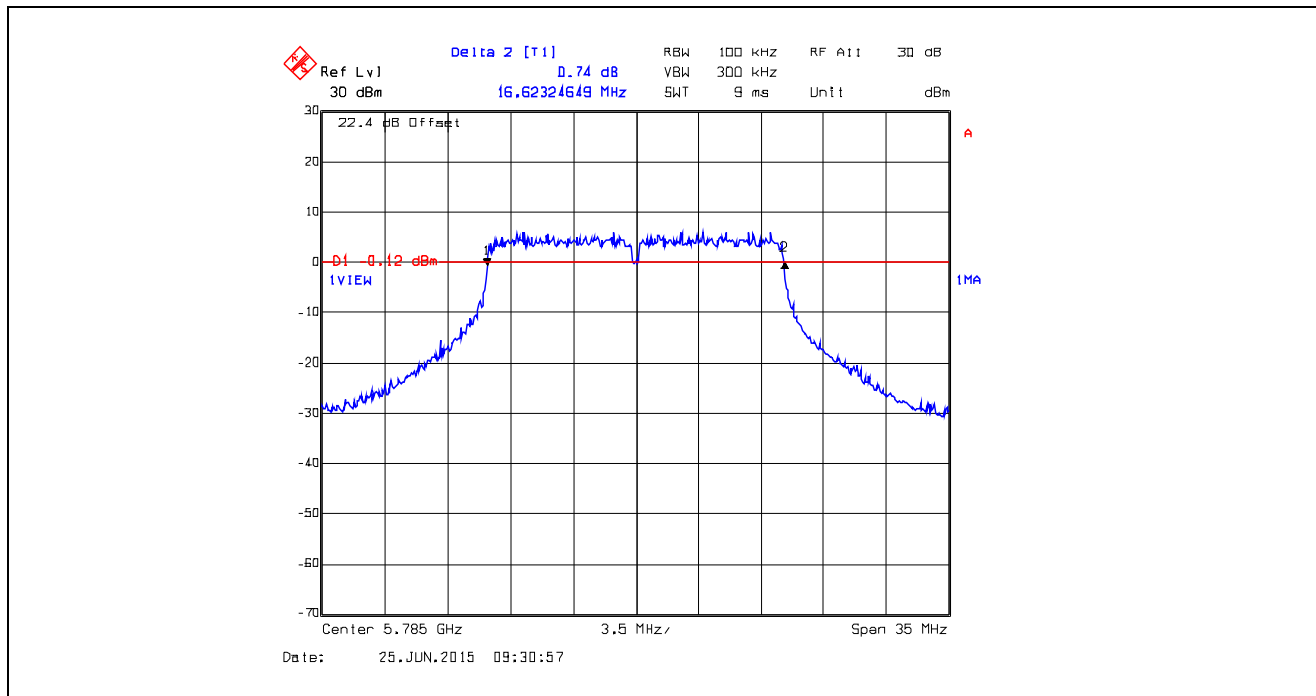
Plot 5.6.4.2.2. 6 dB Bandwidth, Data Rate 1, Chain # 2, Ch 149, 5745 MHz, Software Output Power Setting 13



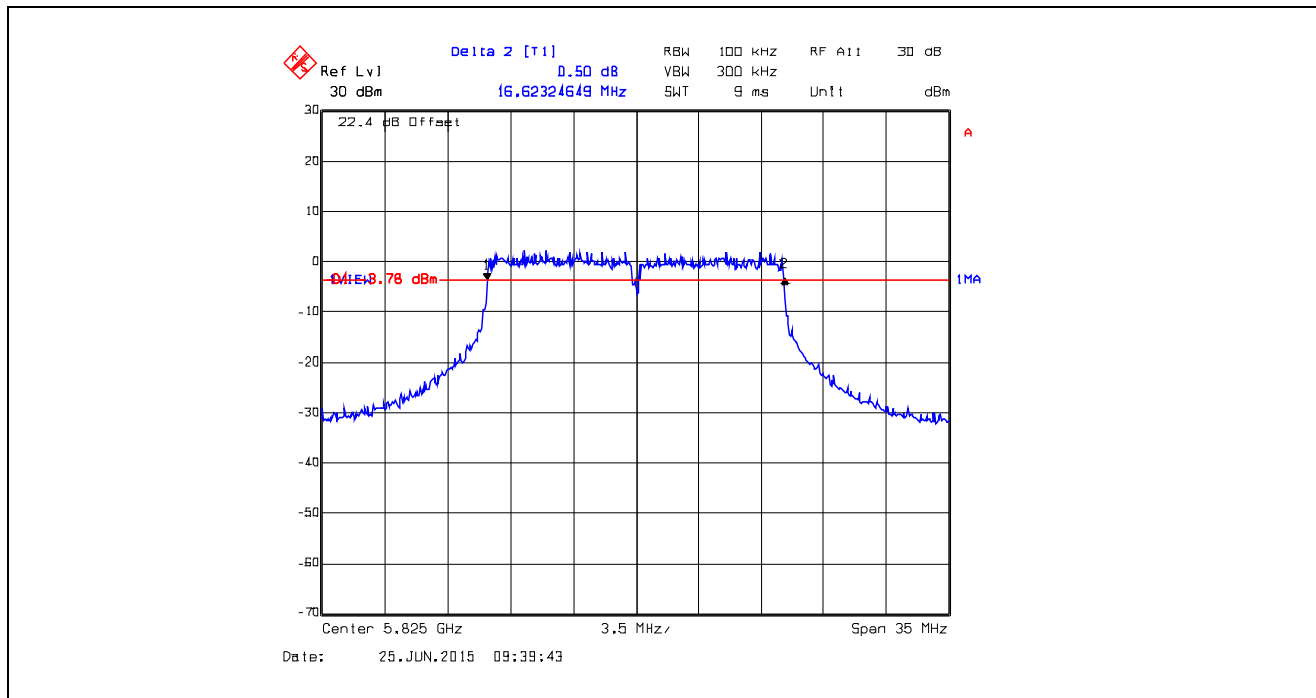
Plot 5.6.4.2.3. 6 dB Bandwidth, Data Rate 1, Chain # 1, Ch 157, 5785 MHz, Software Output Power Setting 19



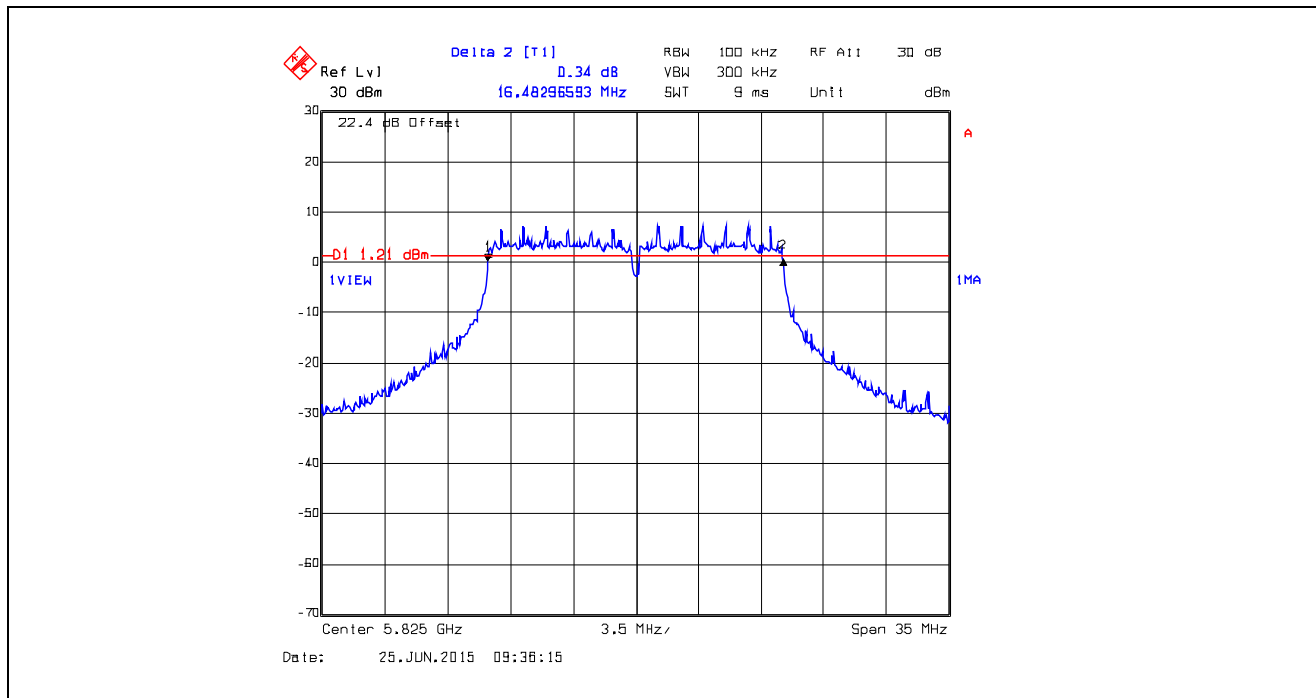
Plot 5.6.4.2.4. 6 dB Bandwidth, Data Rate 1, Chain # 2, Ch 157, 5785 MHz, Software Output Power Setting 19



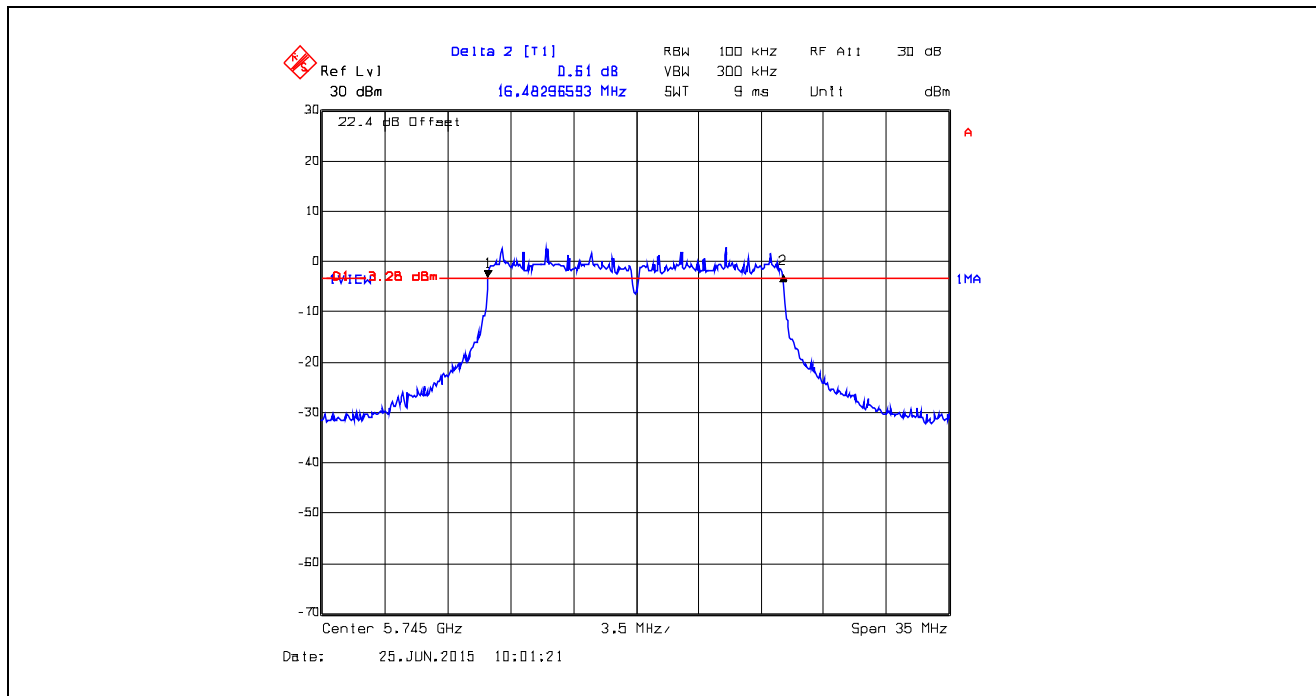
Plot 5.6.4.2.5. 6 dB Bandwidth, Data Rate 1, Chain # 1, Ch 165, 5825 MHz, Software Output Power Setting 18



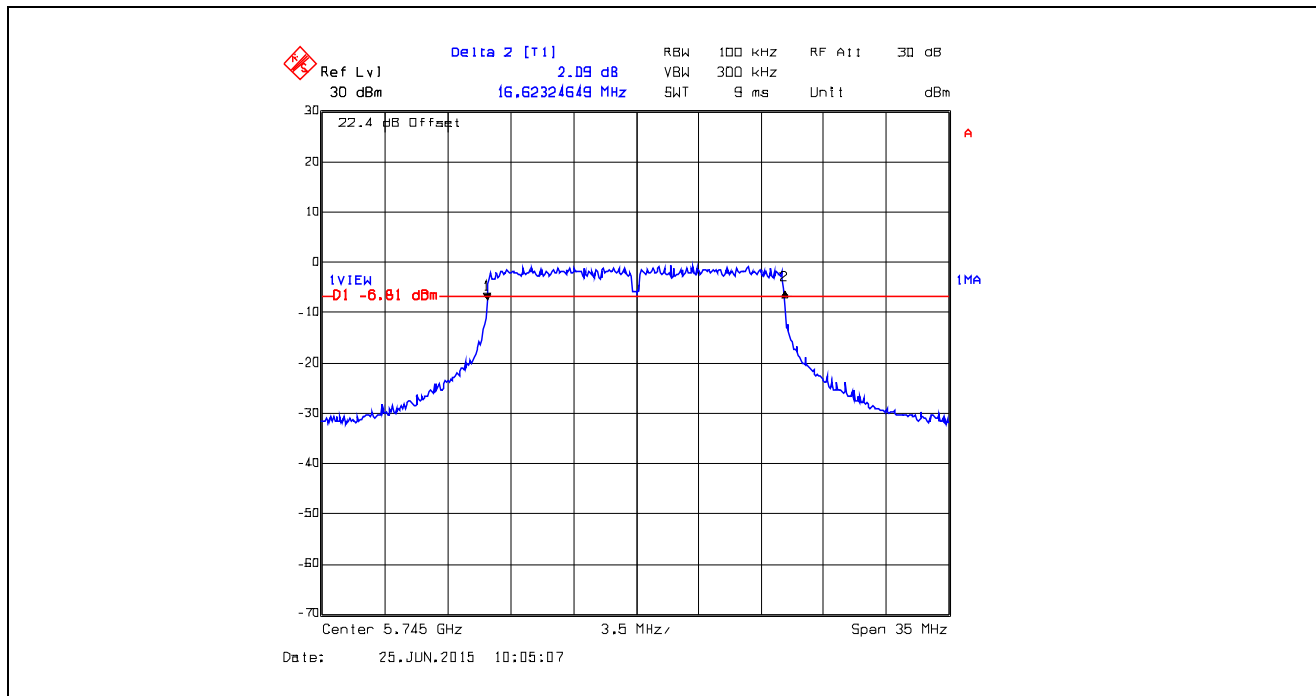
Plot 5.6.4.2.6. 6 dB Bandwidth, Data Rate 1, Chain # 2, Ch 165, 5825 MHz, Software Output Power Setting 18



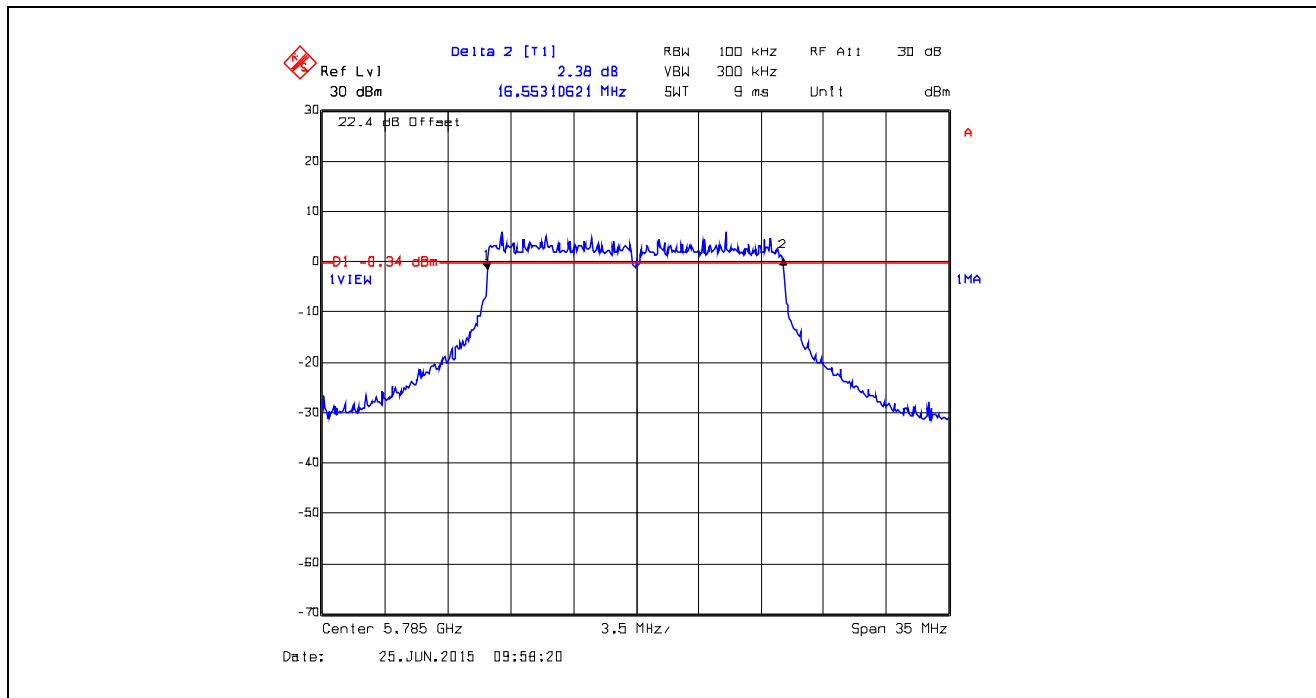
Plot 5.6.4.2.7. 6 dB Bandwidth, Data Rate 2, Chain # 1, Ch 149, 5745 MHz, Software Output Power Setting 13



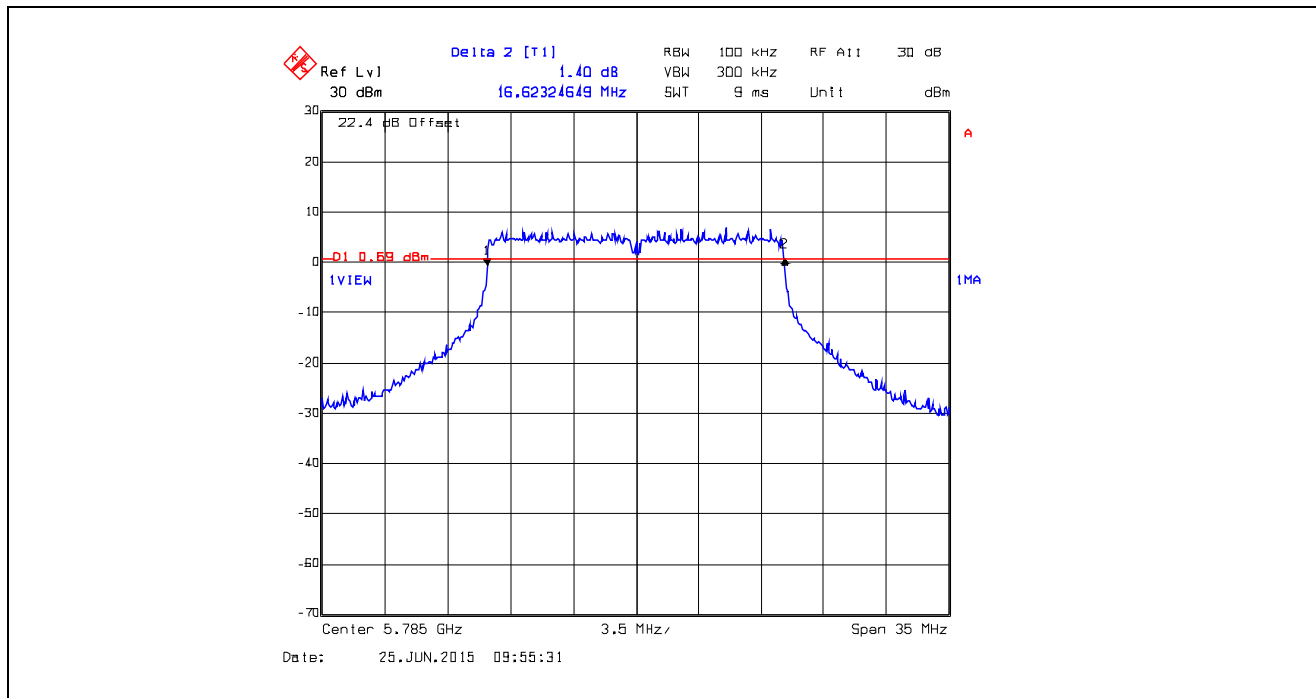
Plot 5.6.4.2.8. 6 dB Bandwidth, Data Rate 2, Chain # 2, Ch 149, 5745 MHz, Software Output Power Setting 13



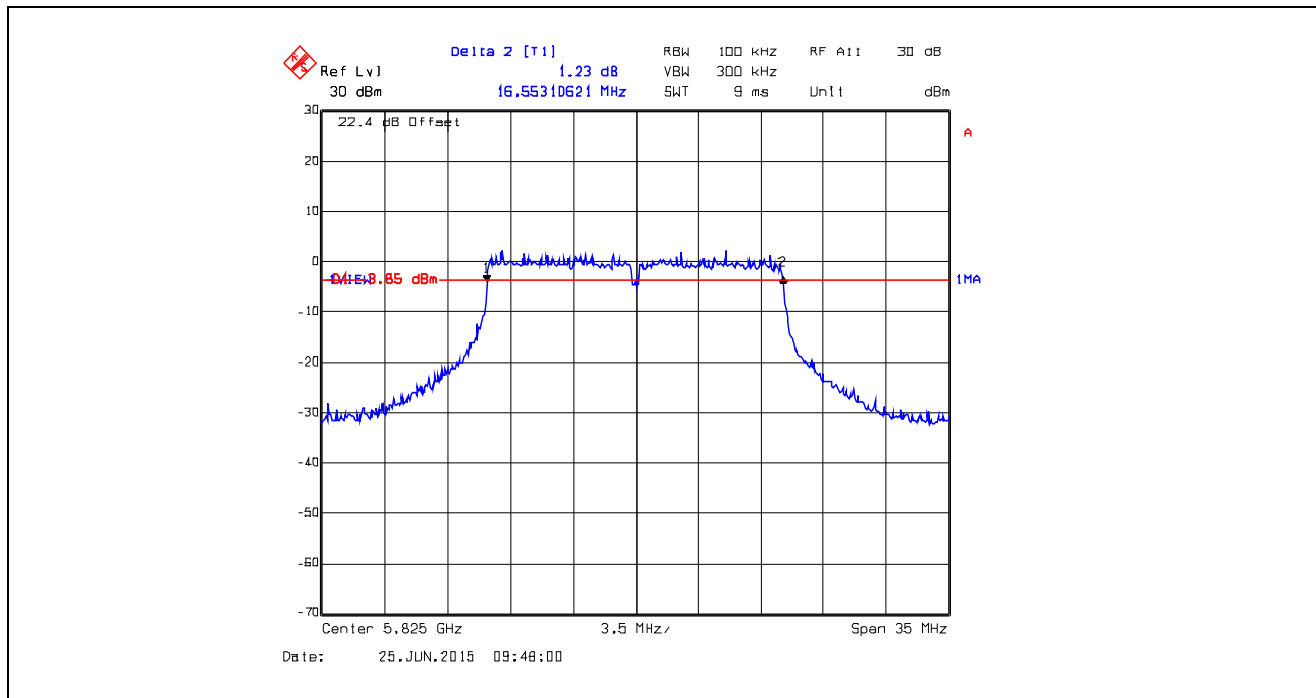
Plot 5.6.4.2.9. 6 dB Bandwidth, Data Rate 2, Chain # 1, Ch 157, 5785 MHz, Software Output Power Setting 19



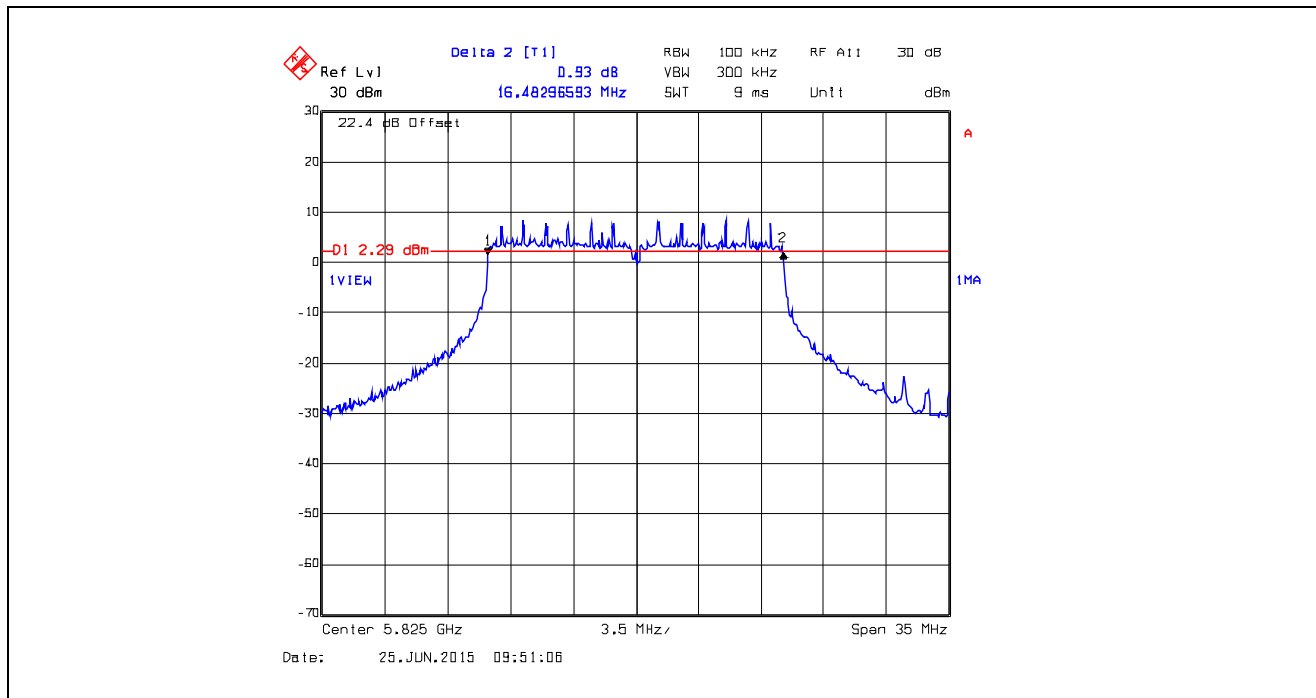
Plot 5.6.4.2.10. 6 dB Bandwidth, Data Rate 2, Chain # 2, Ch 157, 5785 MHz, Software Output Power Setting 19



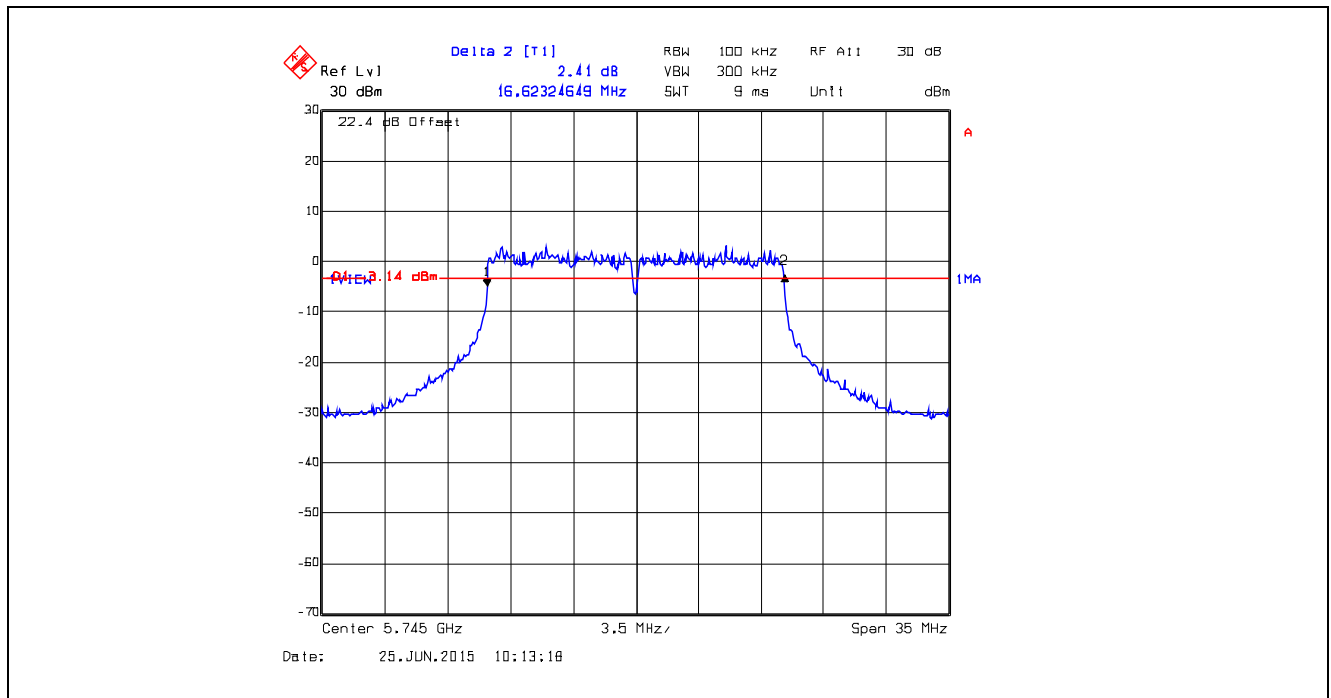
Plot 5.6.4.2.11. 6 dB Bandwidth, Data Rate 2, Chain # 1, Ch 165, 5825 MHz, Software Output Power Setting 18



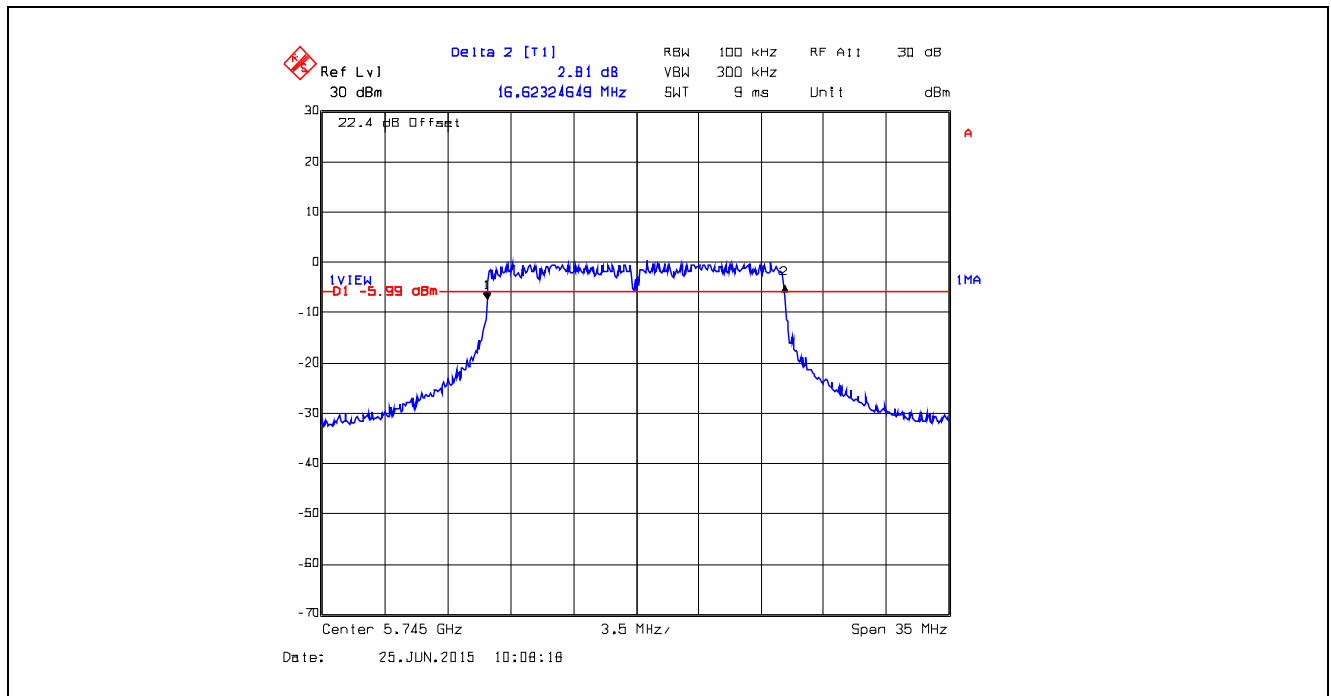
Plot 5.6.4.2.12. 6 dB Bandwidth, Data Rate 2, Chain # 2, Ch 165, 5825 MHz, Software Output Power Setting 18



Plot 5.6.4.2.13. 6 dB Bandwidth, Data Rate 3, Chain # 1, Ch 149, 5745 MHz, Software Output Power Setting 13



Plot 5.6.4.2.14. 6 dB Bandwidth, Data Rate 3, Chain # 2, Ch 149, 5745 MHz, Software Output Power Setting 13



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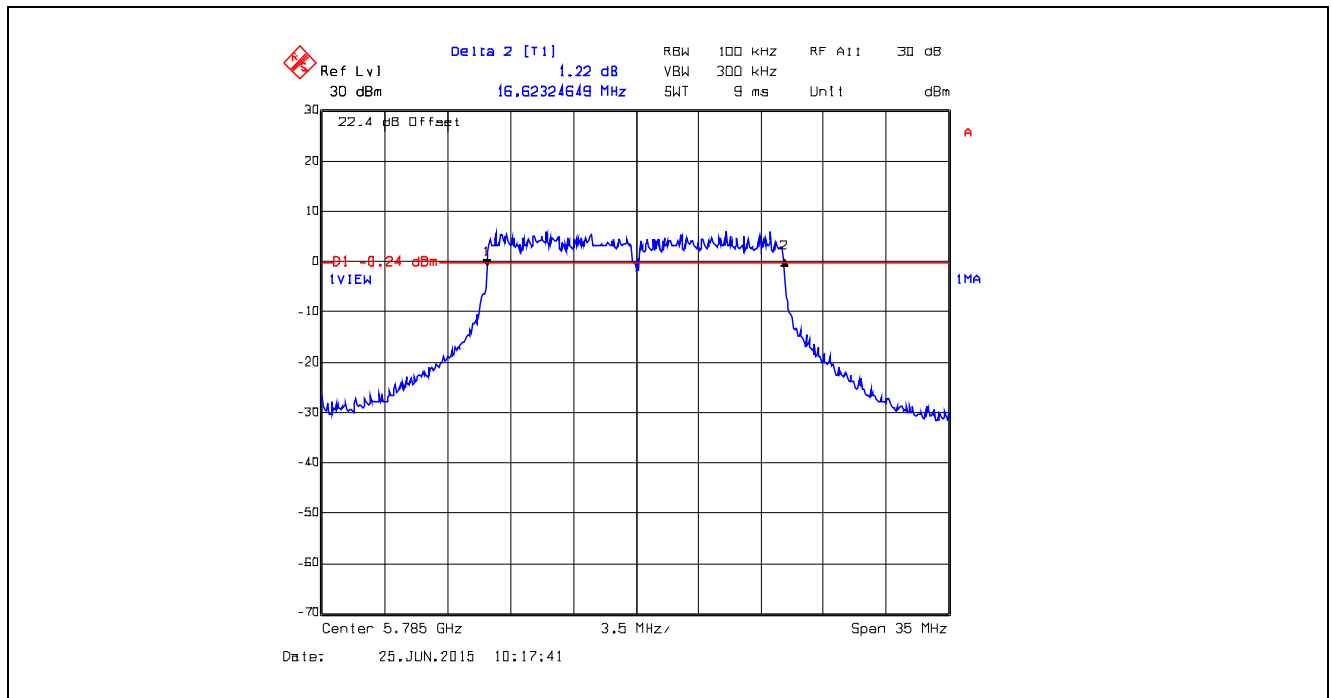
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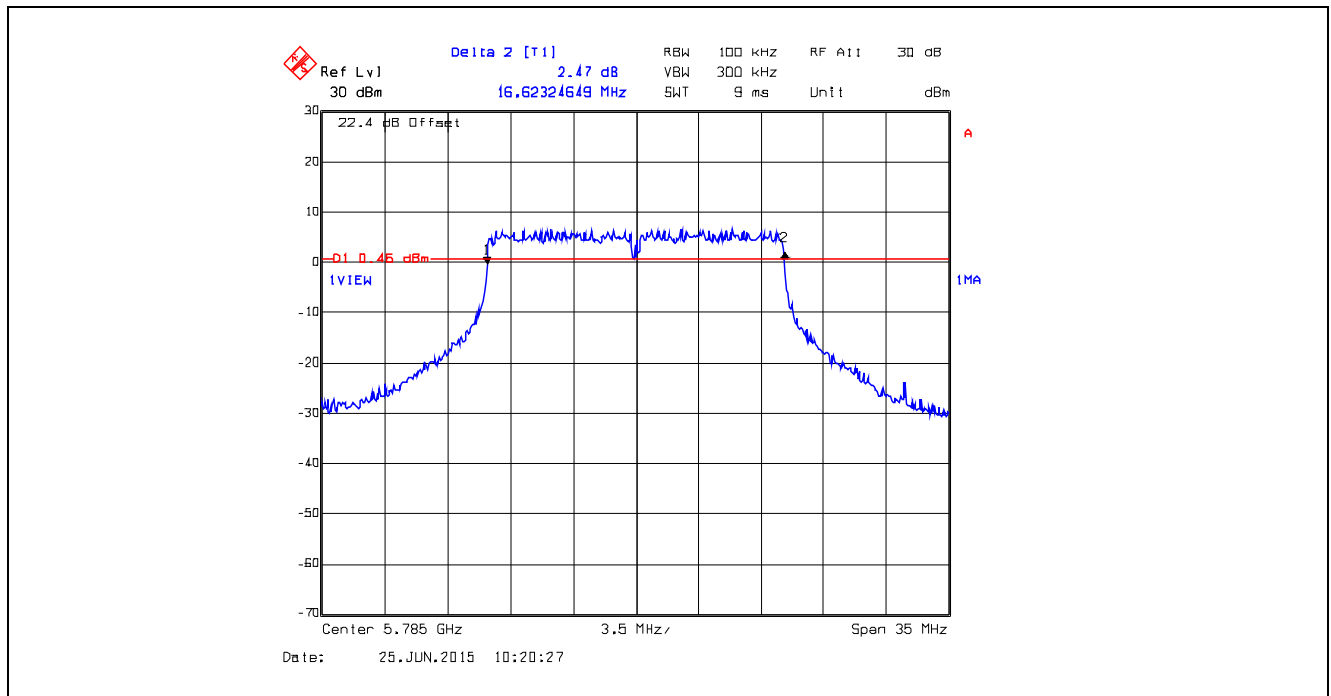
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Plot 5.6.4.2.15. 6 dB Bandwidth, Data Rate 3, Chain # 1, Ch 157, 5785 MHz, Software Output Power Setting 19



Plot 5.6.4.2.16. 6 dB Bandwidth, Data Rate 3, Chain # 2, Ch 157, 5785 MHz, Software Output Power Setting 19



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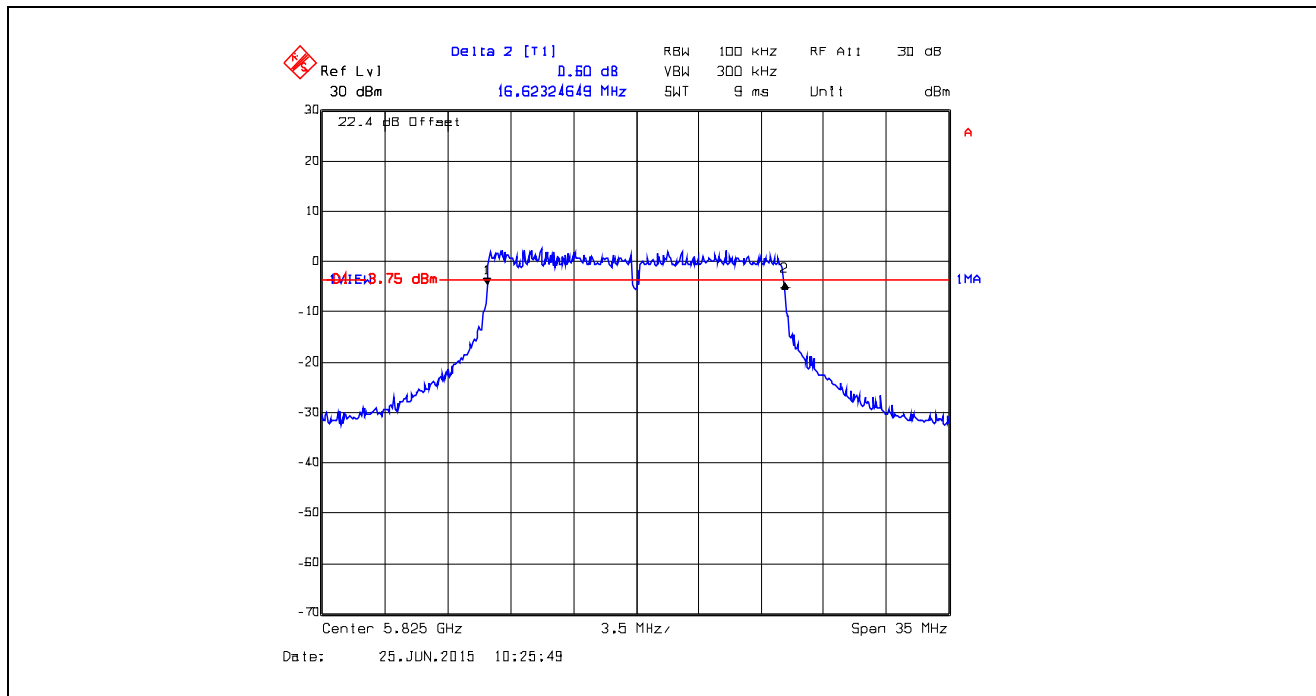
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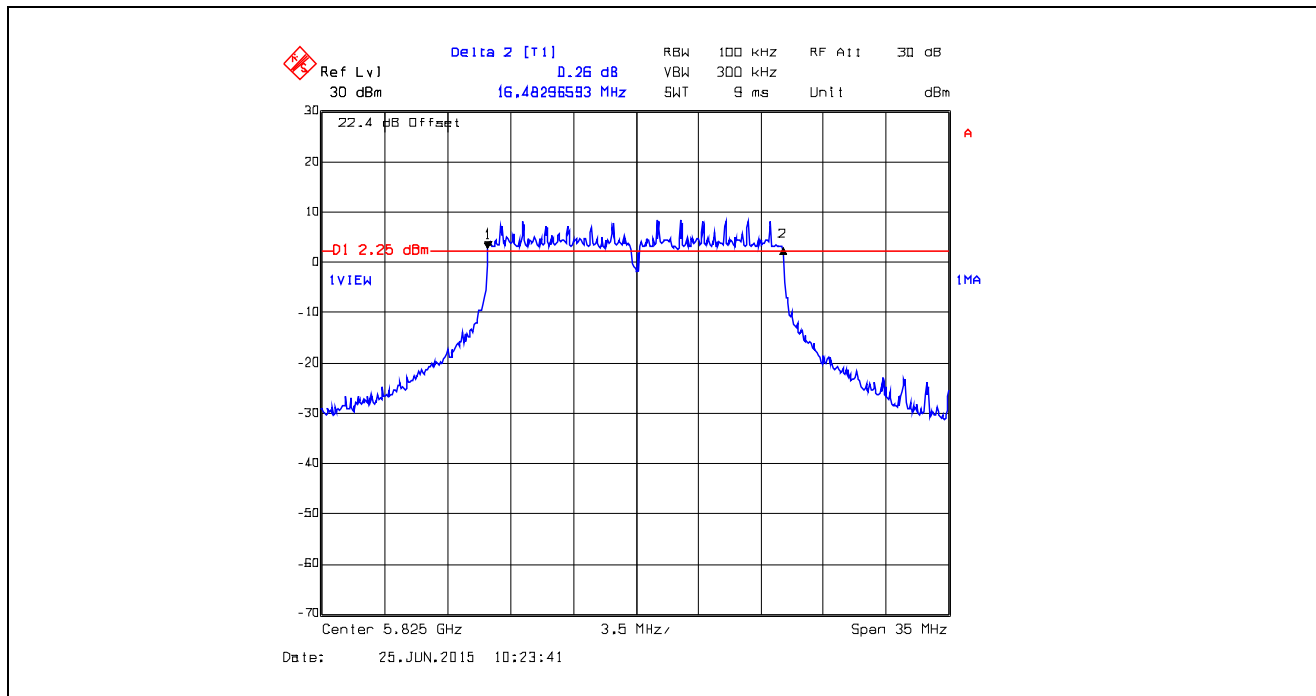
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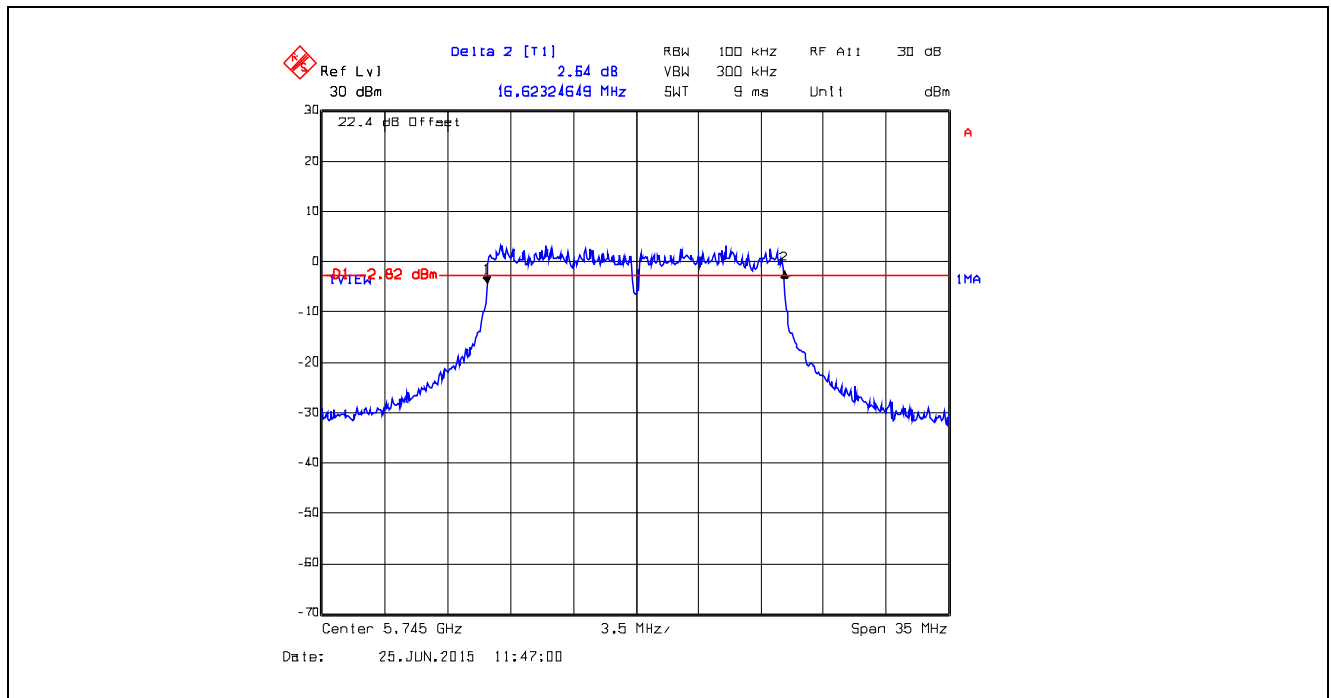
Plot 5.6.4.2.17. 6 dB Bandwidth, Data Rate 3, Chain # 1, Ch 165, 5825 MHz, Software Output Power Setting 18



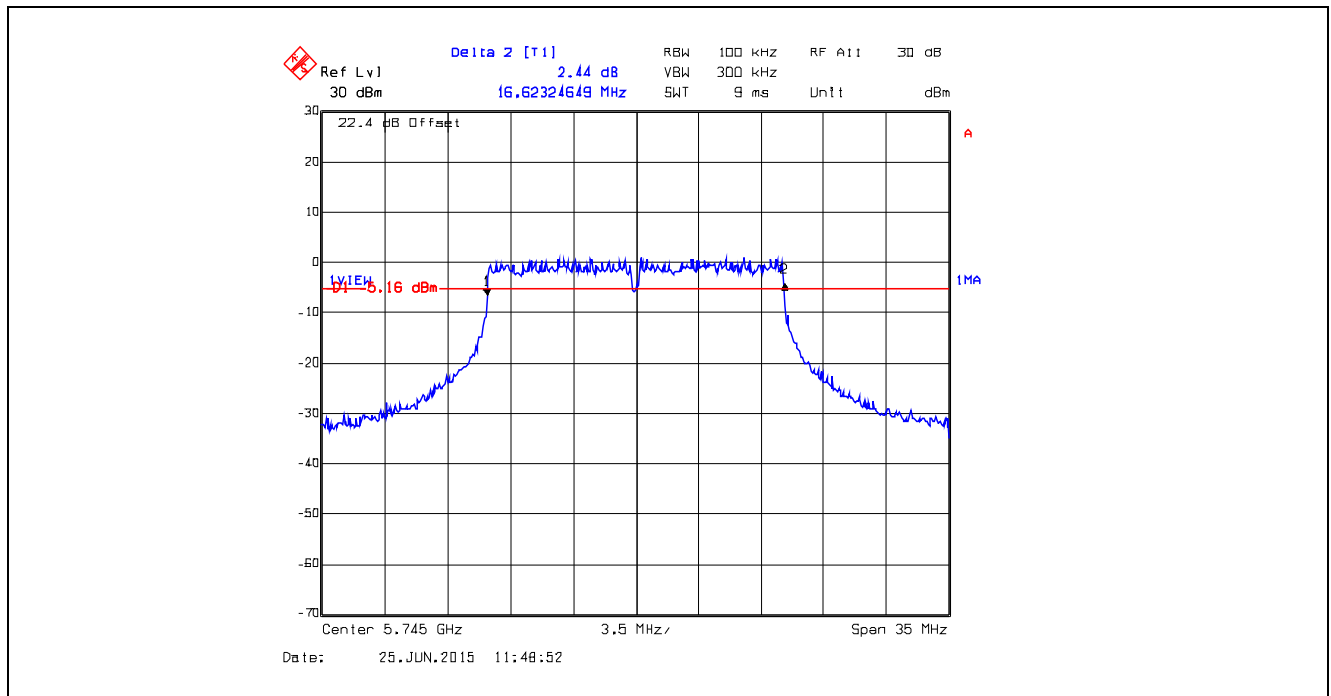
Plot 5.6.4.2.18. 6 dB Bandwidth, Data Rate 3, Chain # 2, Ch 165, 5825 MHz, Software Output Power Setting 18



Plot 5.6.4.2.19. 6 dB Bandwidth, Data Rate 4, Chain # 1, Ch 149, 5745 MHz, Software Output Power Setting 13



Plot 5.6.4.2.20. 6 dB Bandwidth, Data Rate 4, Chain # 2, Ch 149, 5745 MHz, Software Output Power Setting 13



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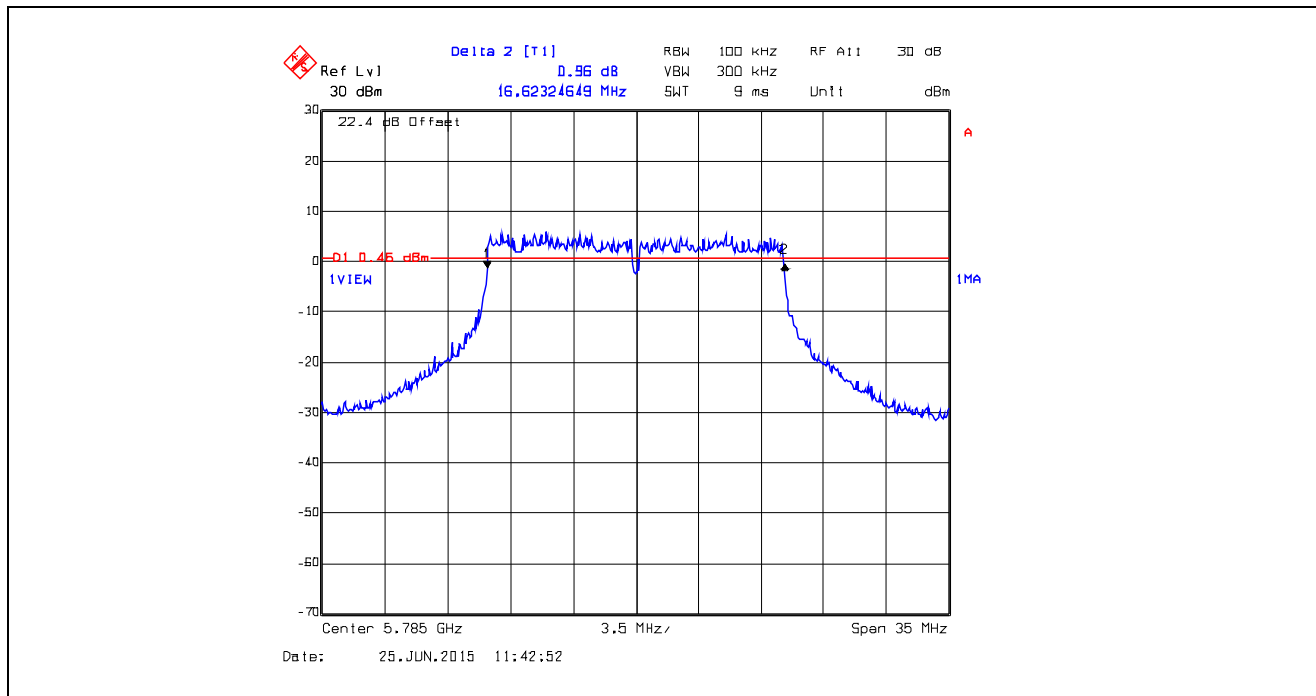
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 15MCRS079_FCC15E407

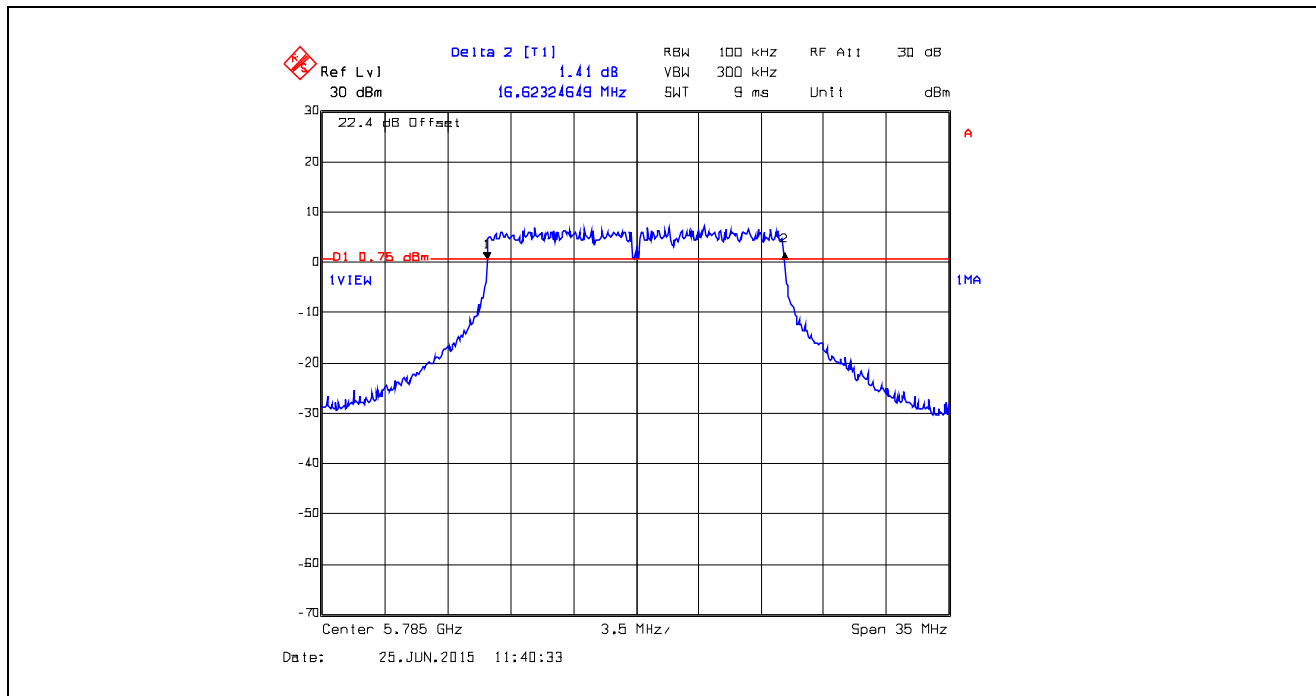
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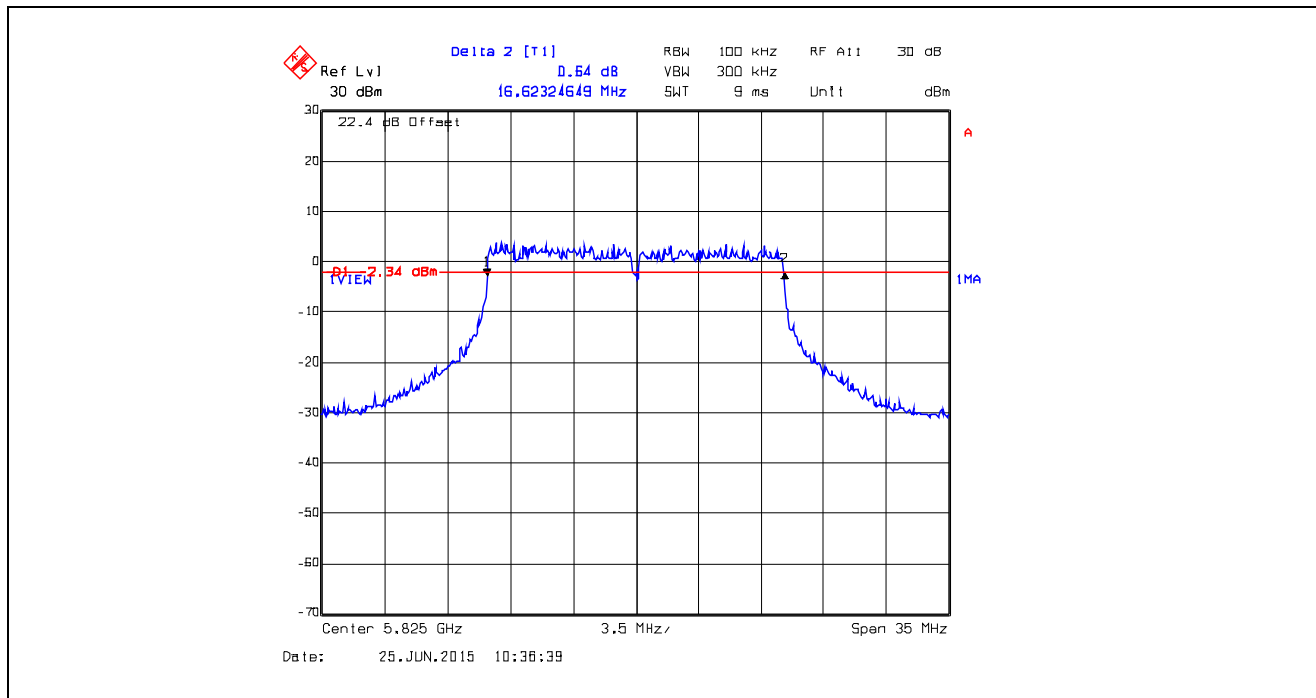
Plot 5.6.4.2.21. 6 dB Bandwidth, Data Rate 4, Chain # 1, Ch 157, 5785 MHz, Software Output Power Setting 19



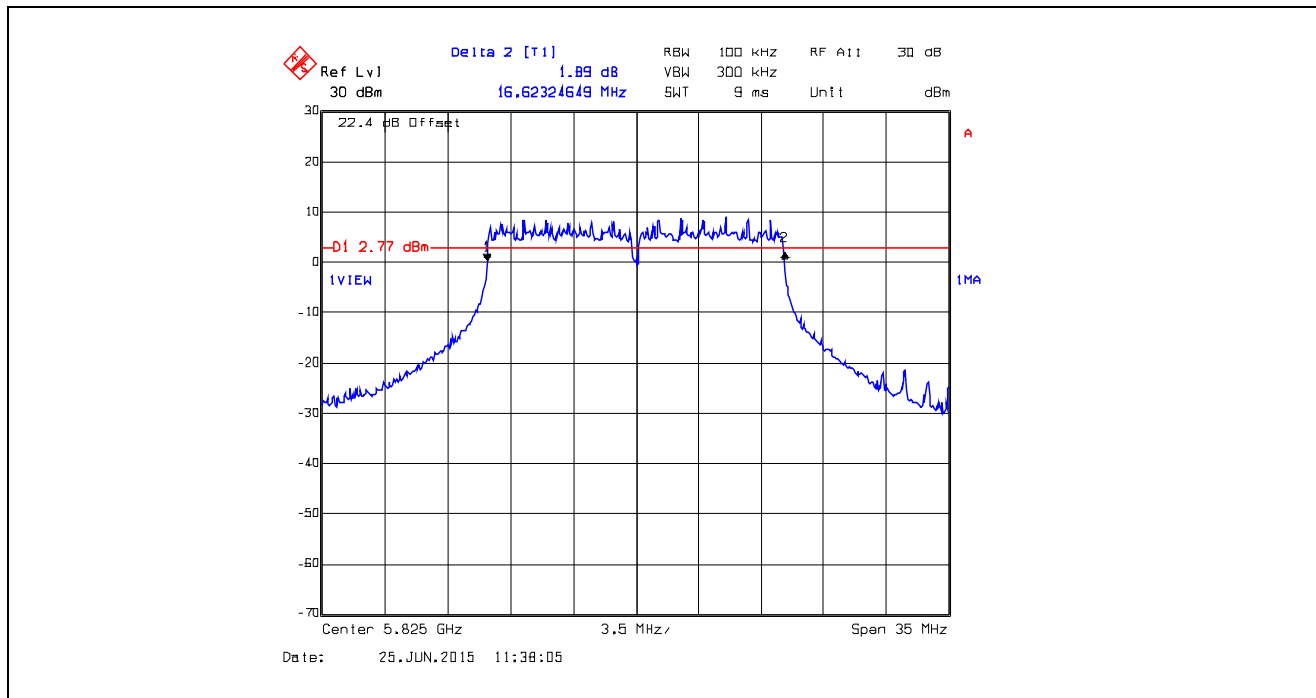
Plot 5.6.4.2.22. 6 dB Bandwidth, Data Rate 4, Chain # 2, Ch 157, 5785 MHz, Software Output Power Setting 19



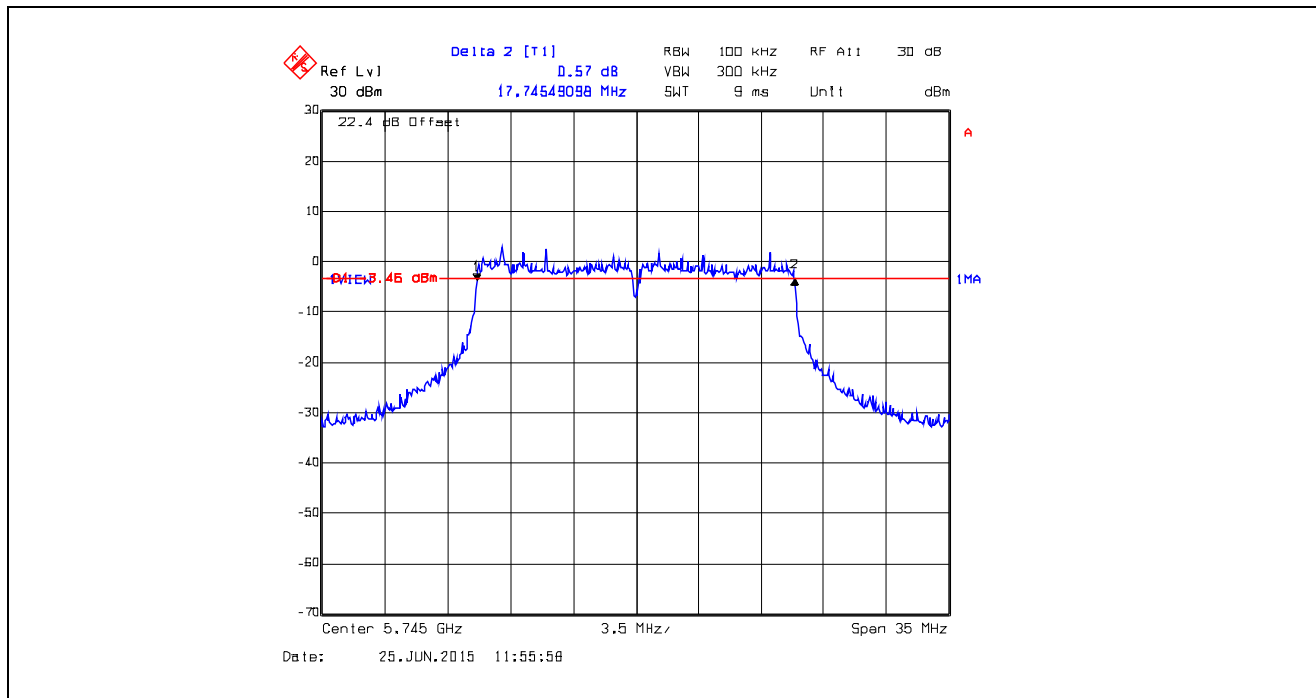
Plot 5.6.4.2.23. 6 dB Bandwidth, Data Rate 4, Chain # 1, Ch 165, 5825 MHz, Software Output Power Setting 18



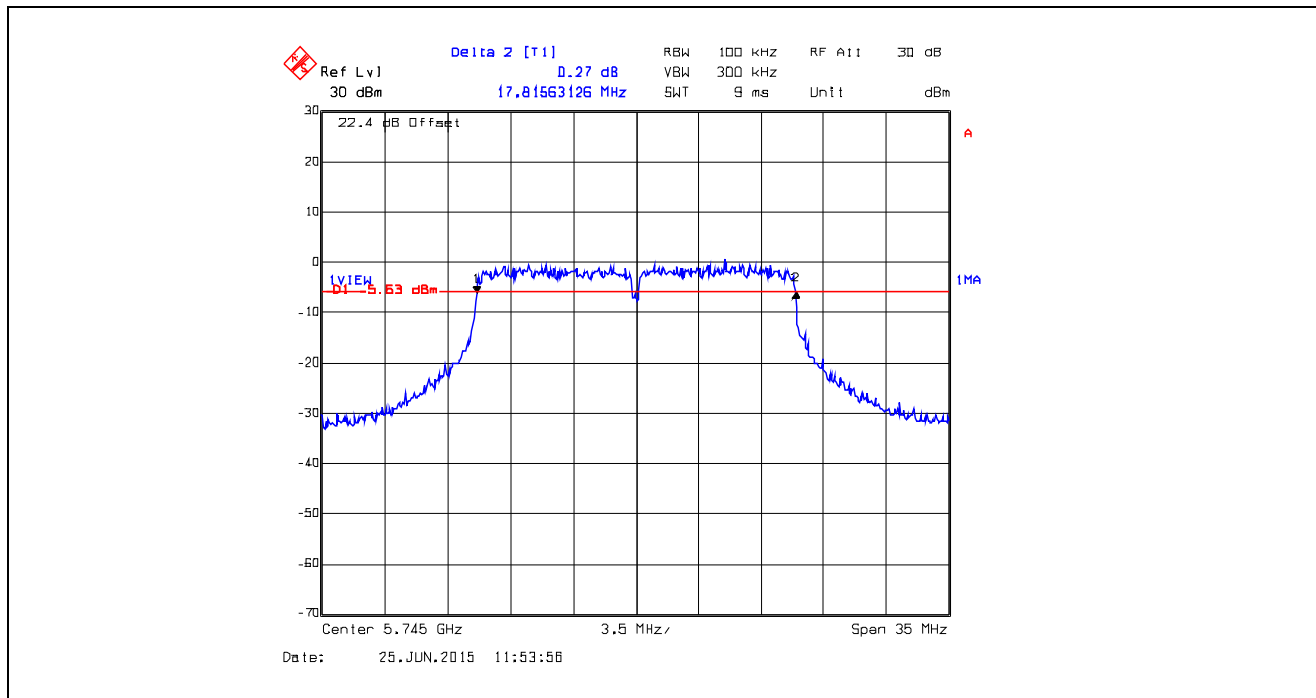
Plot 5.6.4.2.24. 6 dB Bandwidth, Data Rate 4, Chain # 2, Ch 165, 5825 MHz, Software Output Power Setting 18



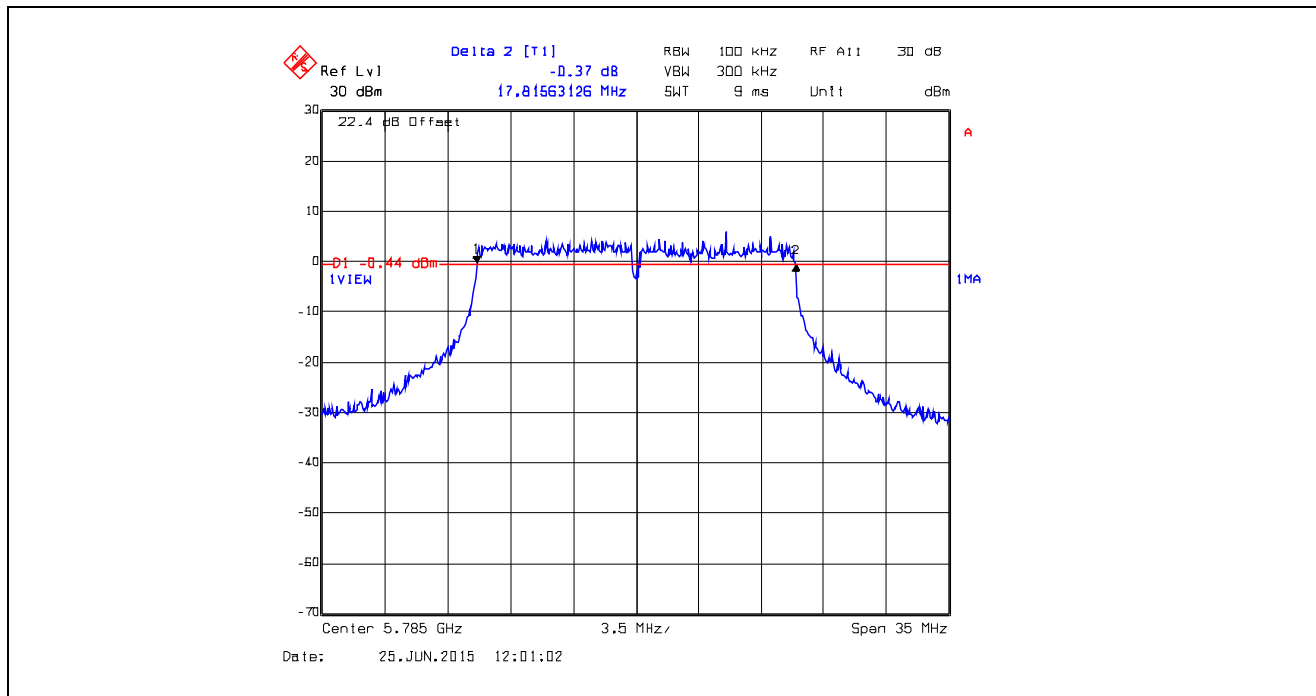
Plot 5.6.4.2.25. 6 dB Bandwidth, Data Rate 5, Chain # 1, Ch 149, 5745 MHz, Software Output Power Setting 13



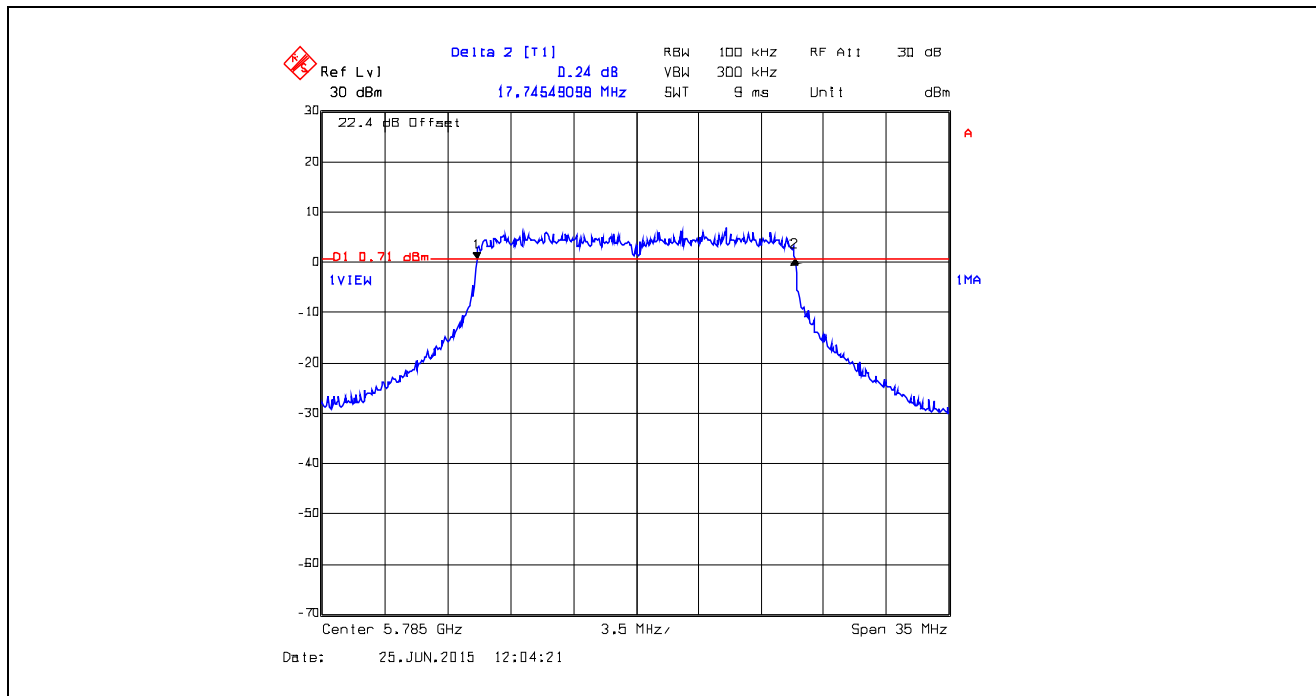
Plot 5.6.4.2.26. 6 dB Bandwidth, Data Rate 5, Chain # 2, Ch 149, 5745 MHz, Software Output Power Setting 13



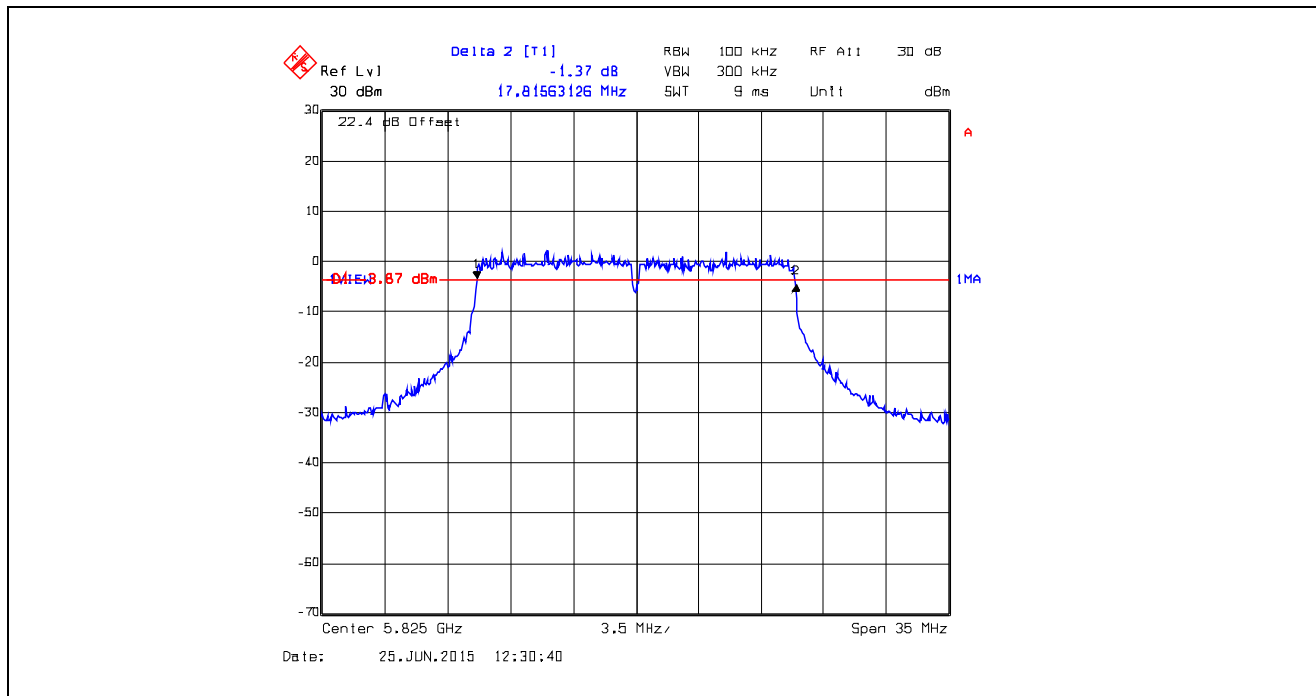
Plot 5.6.4.2.27. 6 dB Bandwidth, Data Rate 5, Chain # 1, Ch 157, 5785 MHz, Software Output Power Setting 19



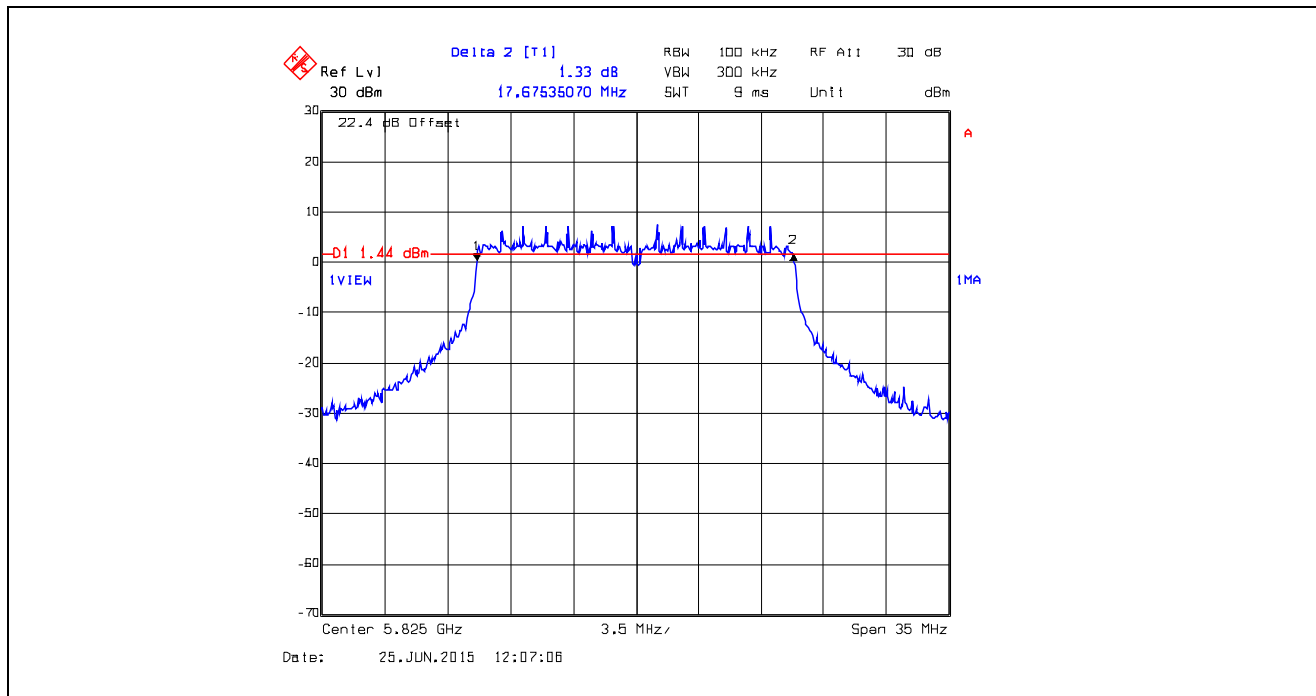
Plot 5.6.4.2.28. 6 dB Bandwidth, Data Rate 5, Chain # 2, Ch 157, 5785 MHz, Software Output Power Setting 19



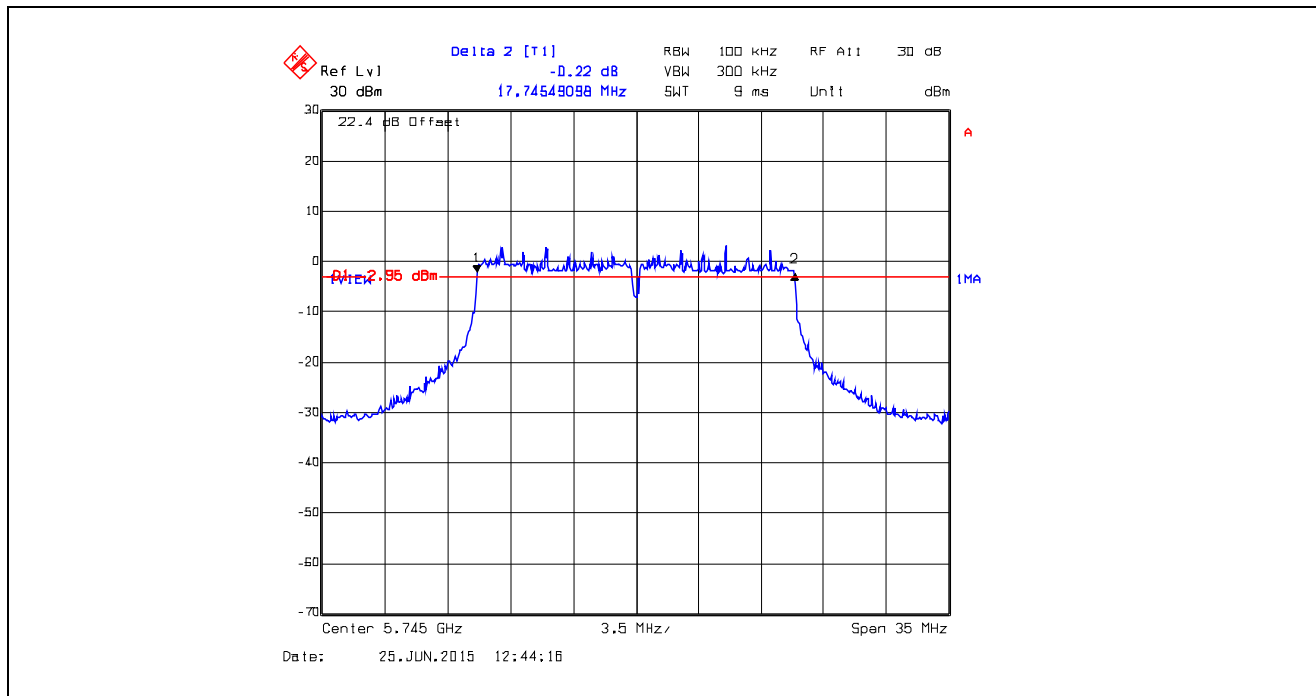
Plot 5.6.4.2.29. 6 dB Bandwidth, Data Rate 5, Chain # 1, Ch 165, 5825 MHz, Software Output Power Setting 18



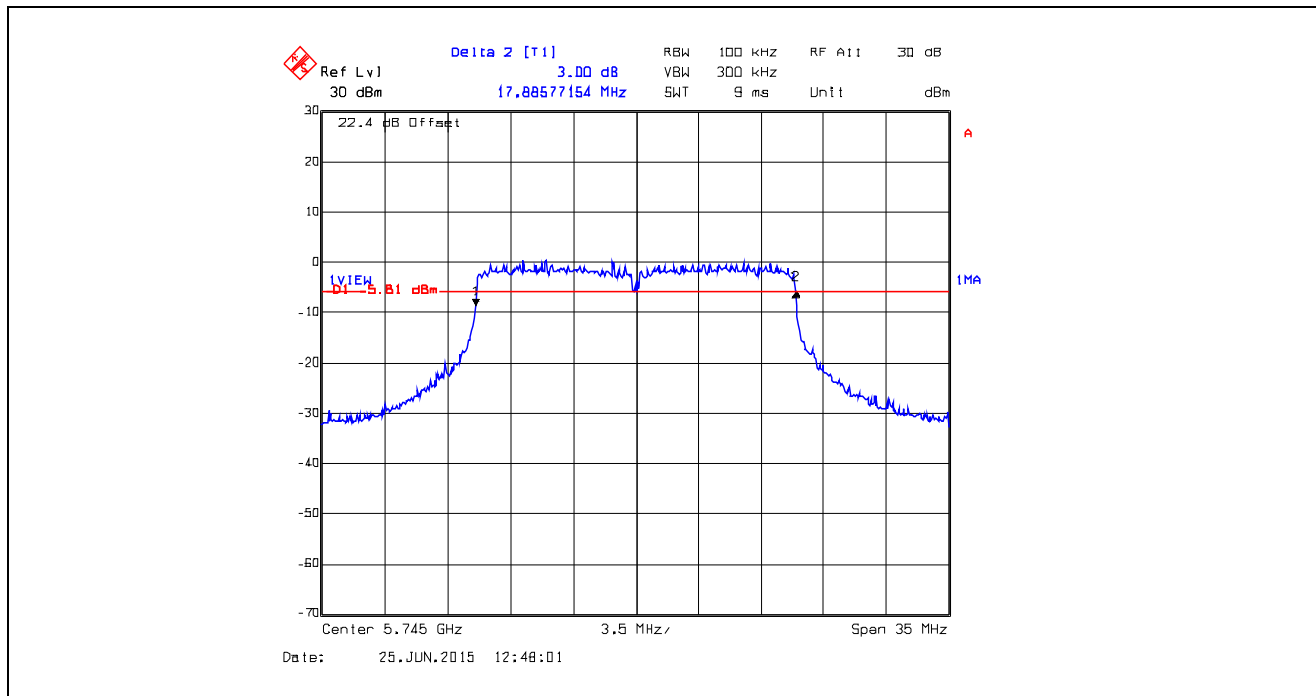
Plot 5.6.4.2.30. 6 dB Bandwidth, Data Rate 5, Chain # 2, Ch 165, 5825 MHz, Software Output Power Setting 18



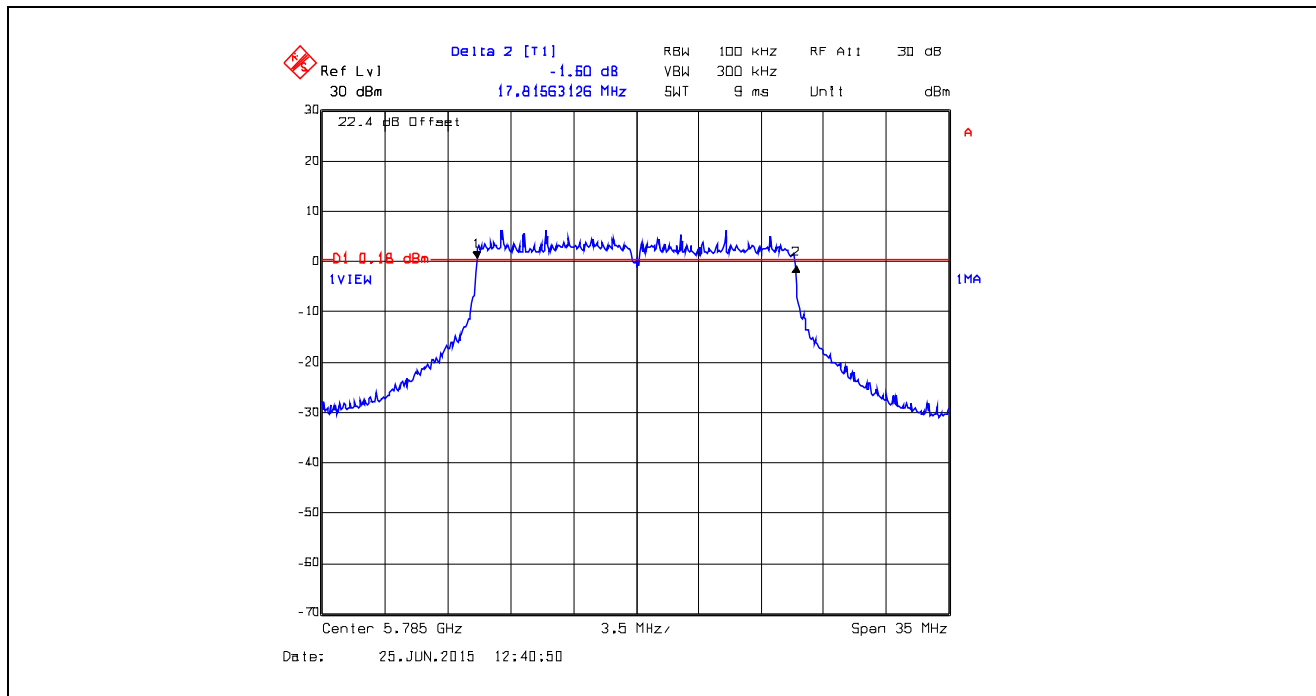
Plot 5.6.4.2.31. 6 dB Bandwidth, Data Rate 6, Chain # 1, Ch 149, 5745 MHz, Software Output Power Setting 13



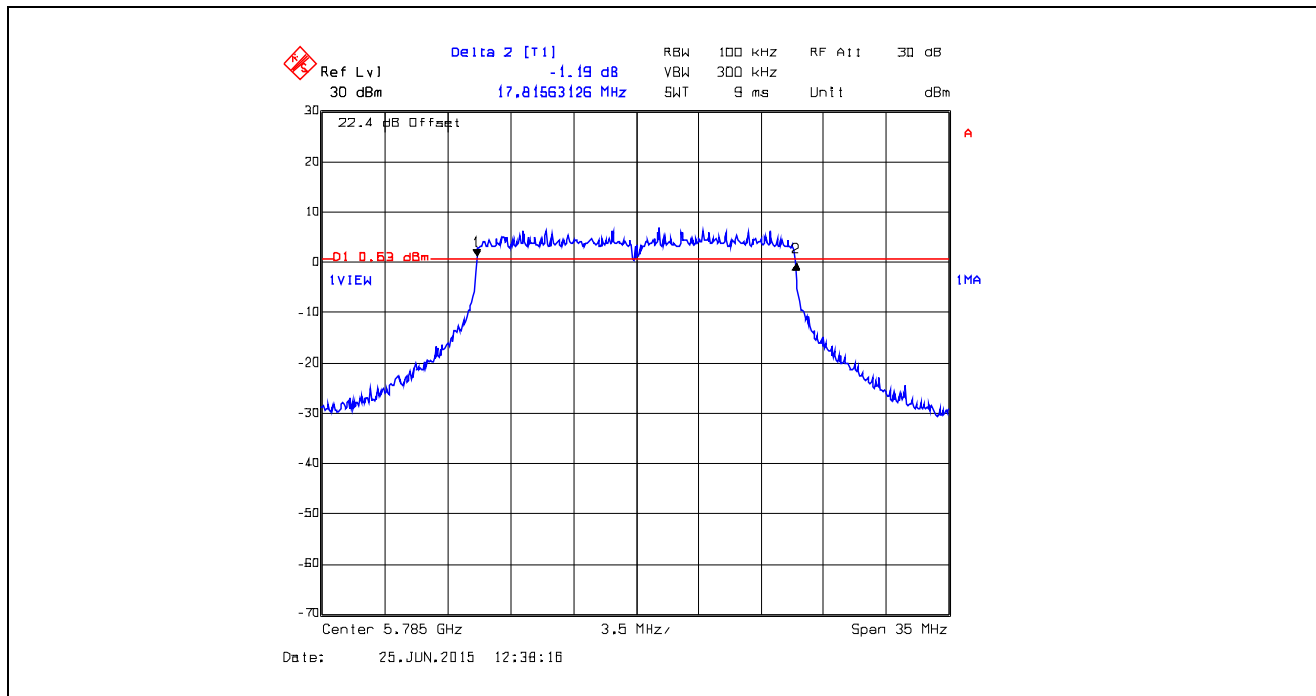
Plot 5.6.4.2.32. 6 dB Bandwidth, Data Rate 6, Chain # 2, Ch 149, 5745 MHz, Software Output Power Setting 13



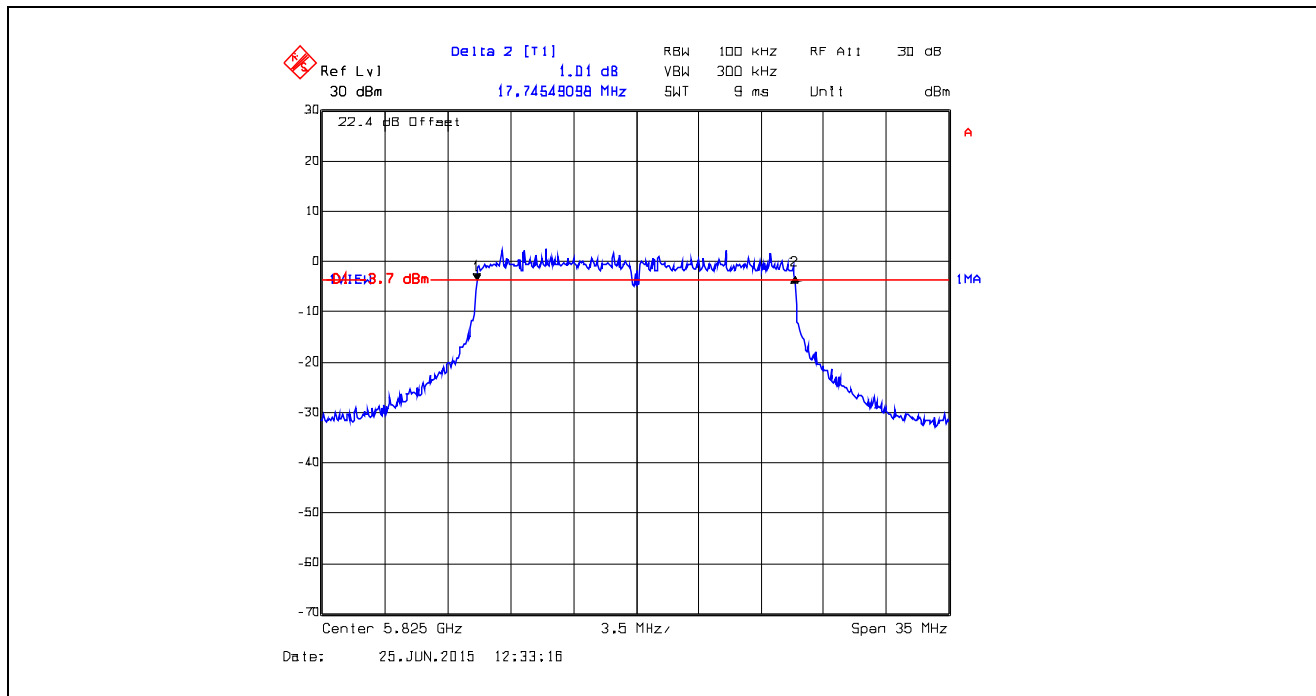
Plot 5.6.4.2.33. 6 dB Bandwidth, Data Rate 6, Chain # 1, Ch 157, 5785 MHz, Software Output Power Setting 19



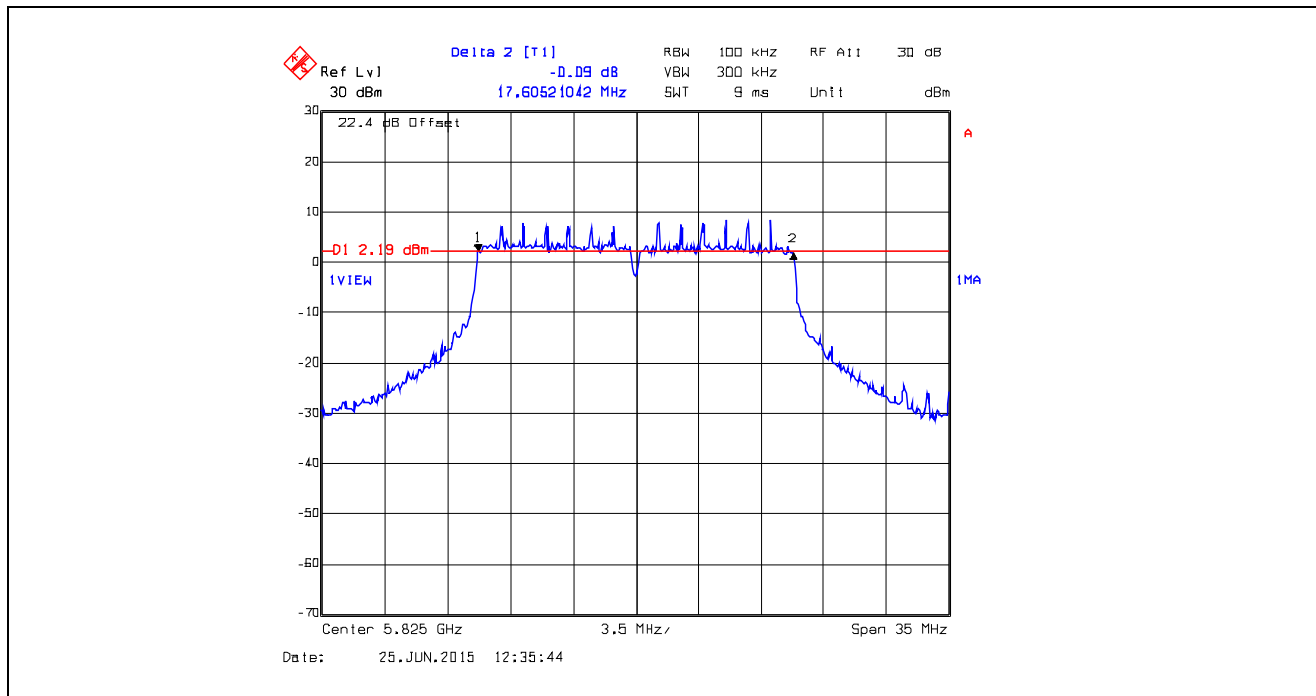
Plot 5.6.4.2.34. 6 dB Bandwidth, Data Rate 6, Chain # 2, Ch 157, 5785 MHz, Software Output Power Setting 19



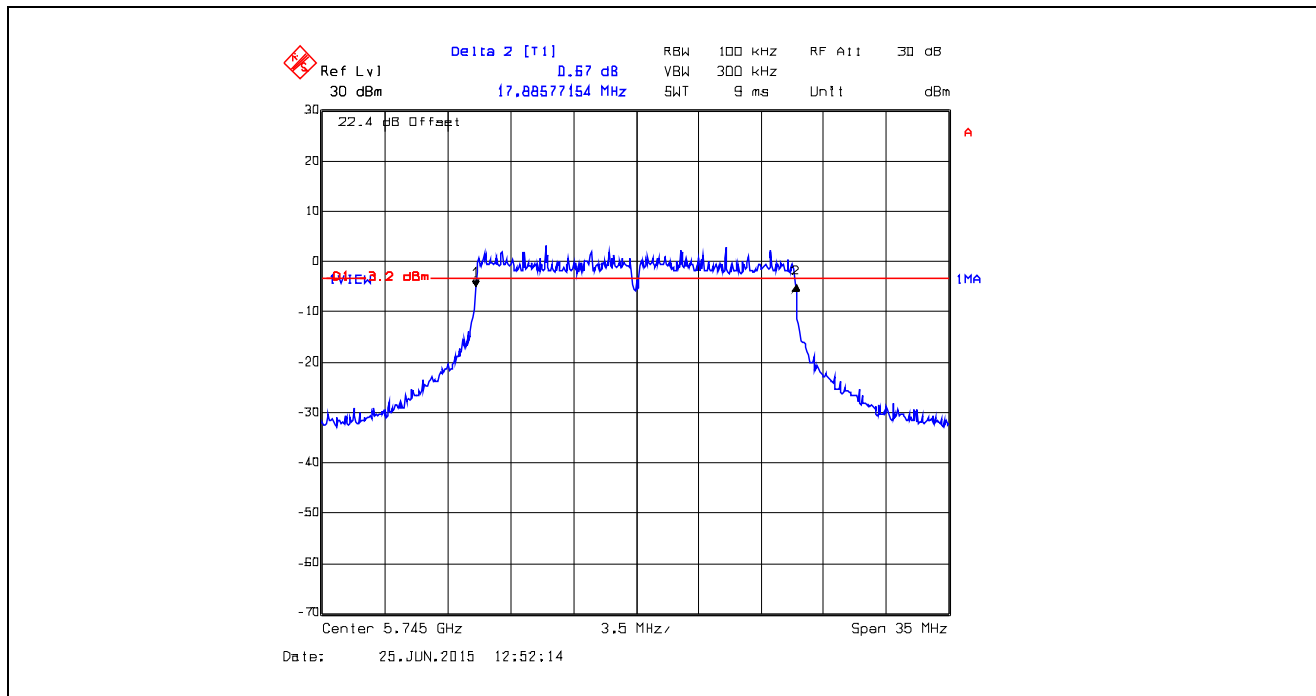
Plot 5.6.4.2.35. 6 dB Bandwidth, Data Rate 6, Chain # 1, Ch 165, 5825 MHz, Software Output Power Setting 18



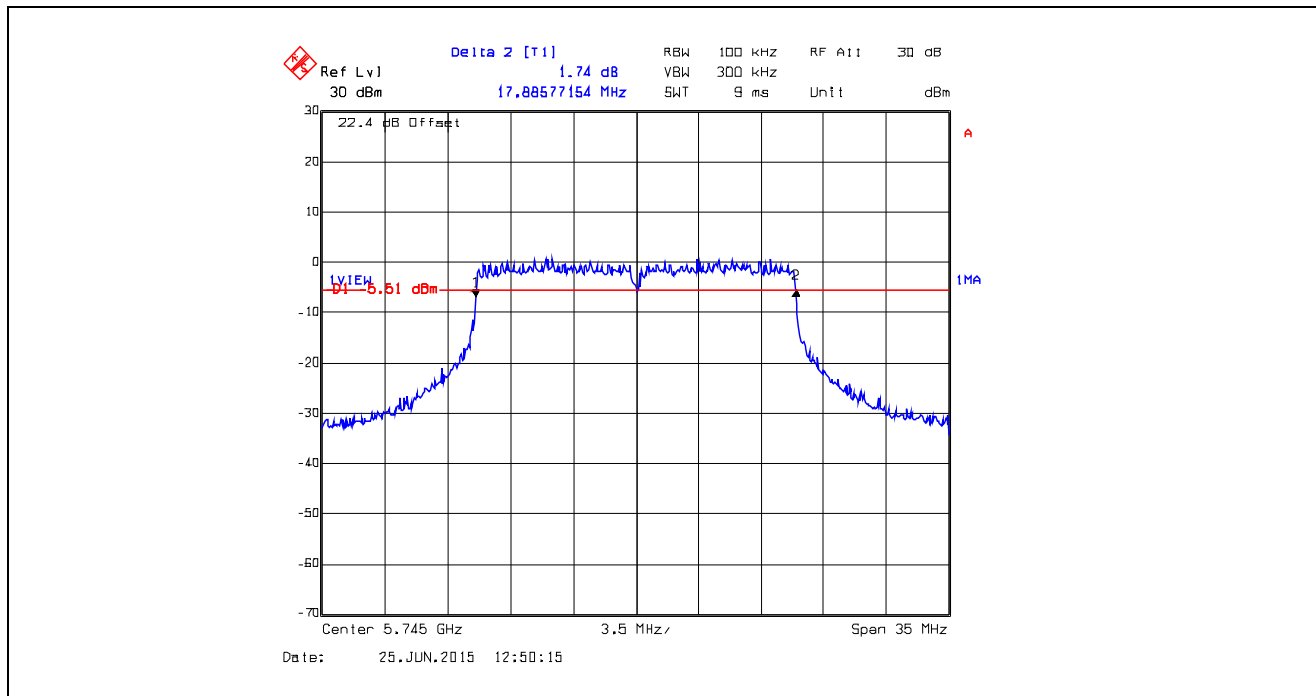
Plot 5.6.4.2.36. 6 dB Bandwidth, Data Rate 6, Chain # 2, Ch 165, 5825 MHz, Software Output Power Setting 18



Plot 5.6.4.2.37. 6 dB Bandwidth, Data Rate 7, Chain # 1, Ch 149, 5745 MHz, Software Output Power Setting 13



Plot 5.6.4.2.38. 6 dB Bandwidth, Data Rate 7, Chain # 2, Ch 149, 5745 MHz, Software Output Power Setting 13



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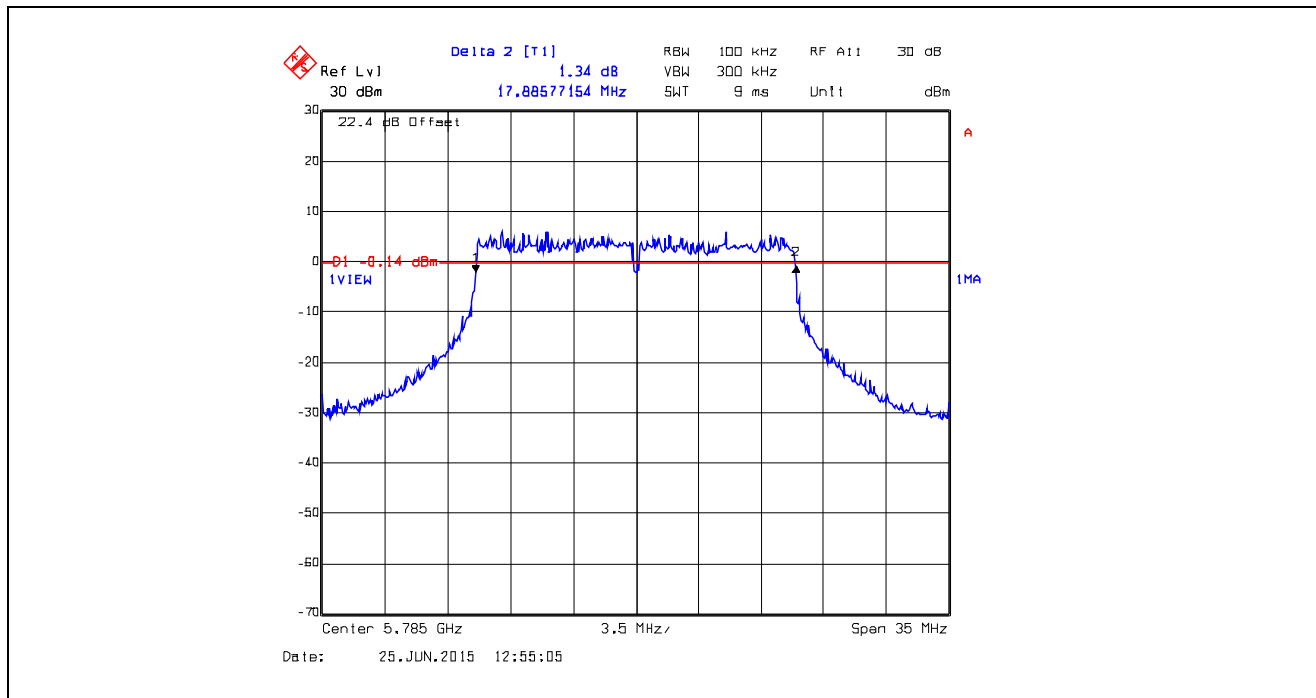
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 15MCRS079_FCC15E407

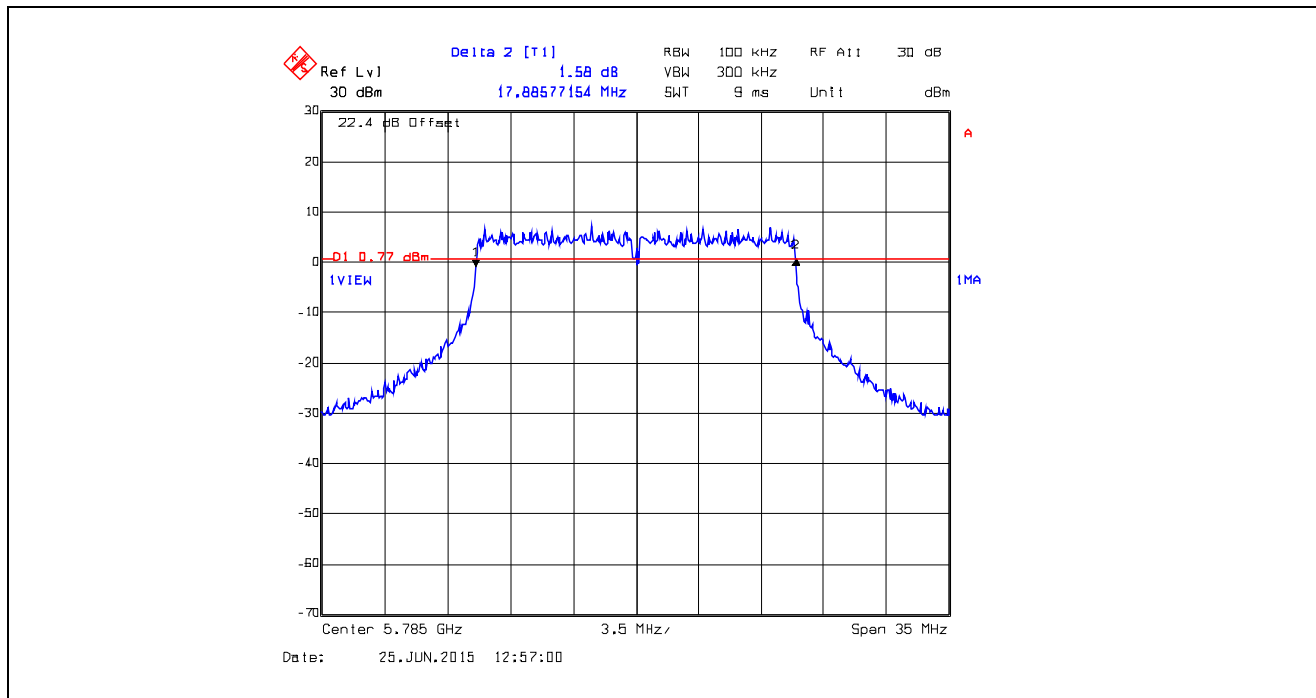
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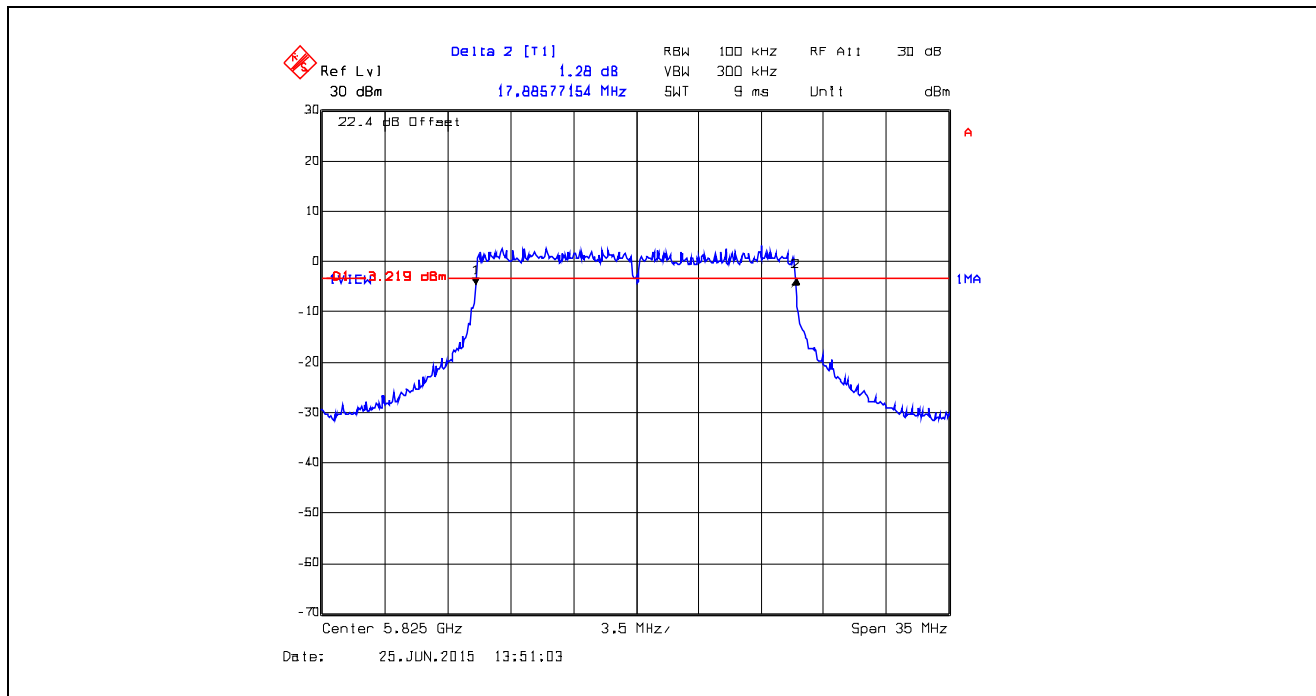
Plot 5.6.4.2.39. 6 dB Bandwidth, Data Rate 7, Chain # 1, Ch 157, 5785 MHz, Software Output Power Setting 19



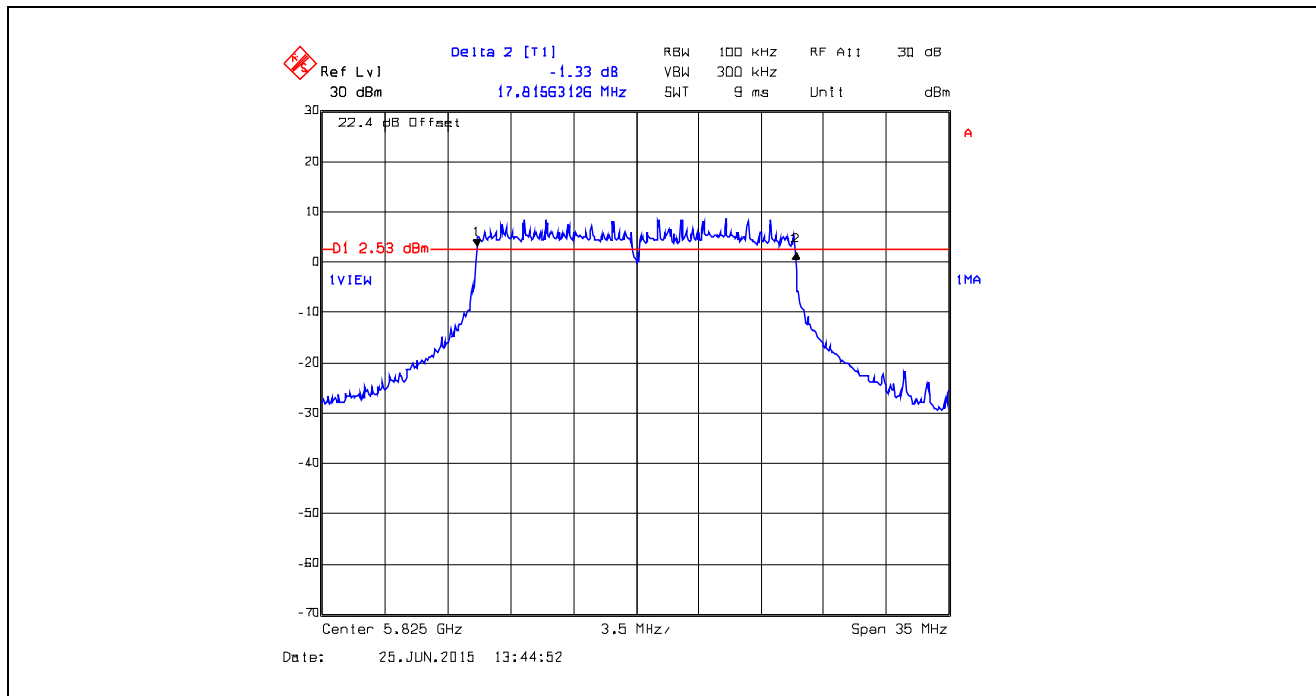
Plot 5.6.4.2.40. 6 dB Bandwidth, Data Rate 7, Chain # 2, Ch 157, 5785 MHz, Software Output Power Setting 19



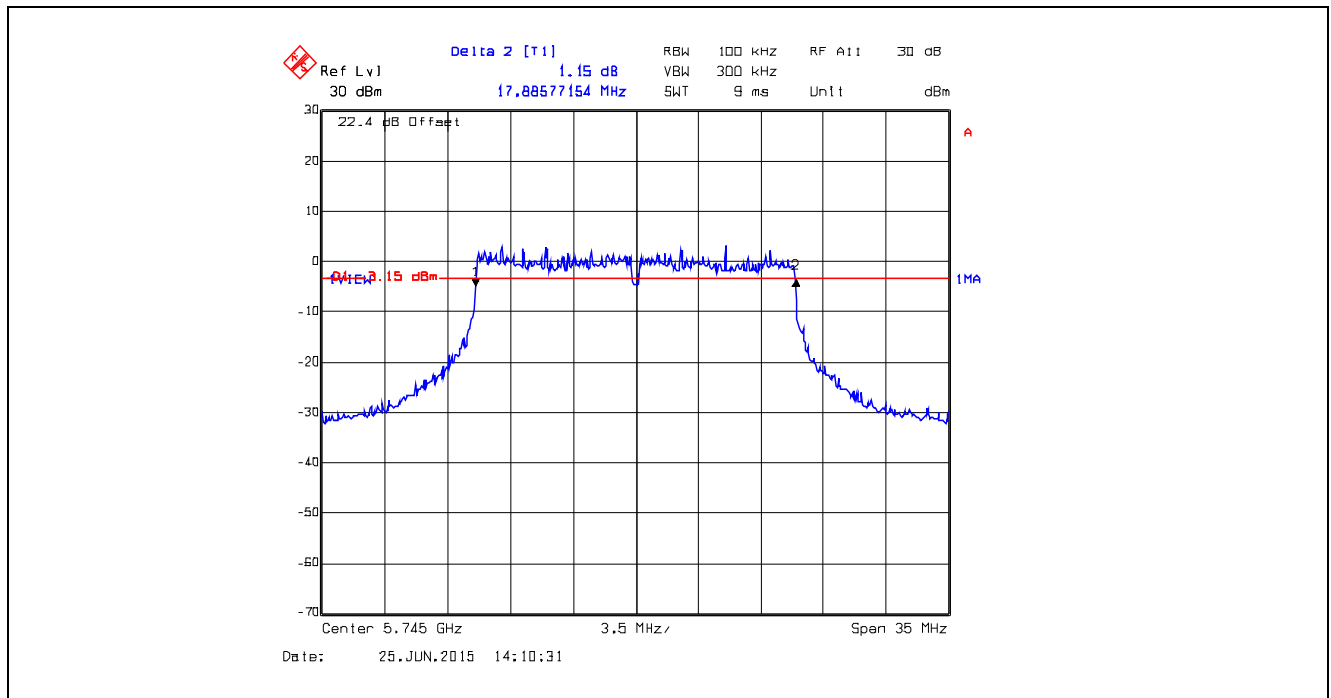
Plot 5.6.4.2.41. 6 dB Bandwidth, Data Rate 7, Chain # 1, Ch 165, 5825 MHz, Software Output Power Setting 18



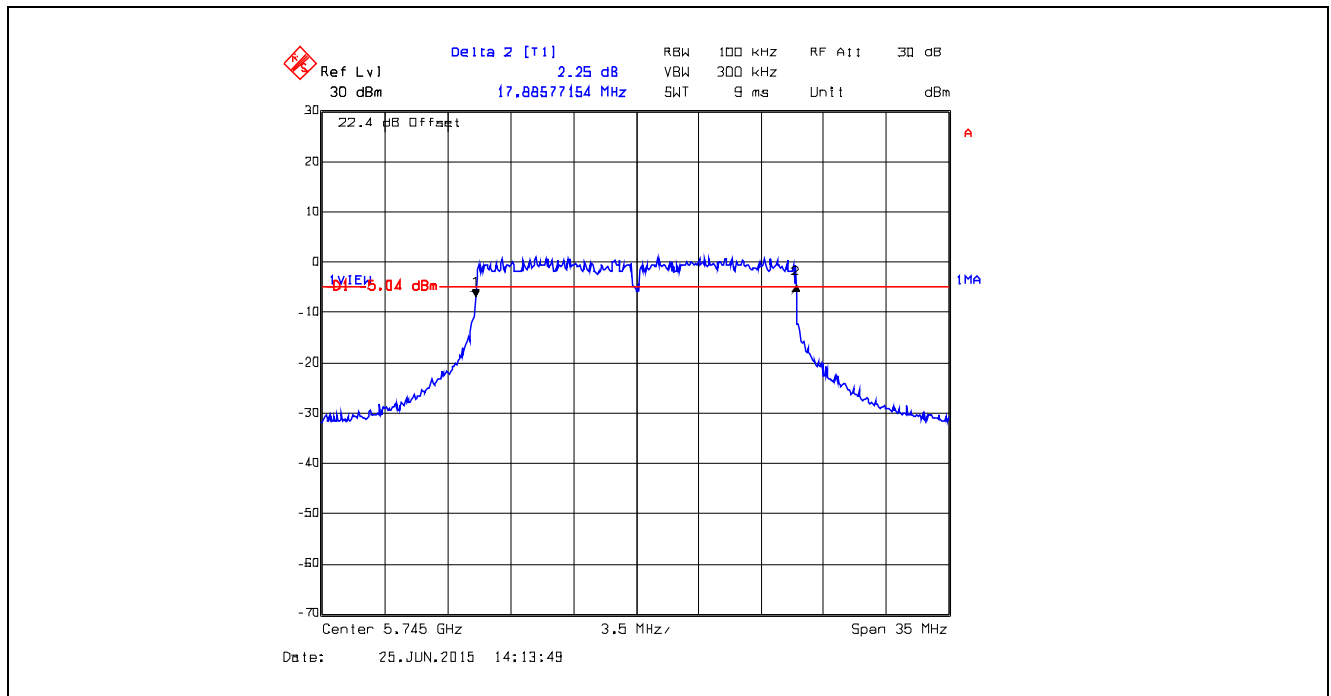
Plot 5.6.4.2.42. 6 dB Bandwidth, Data Rate 7, Chain # 2, Ch 165, 5825 MHz, Software Output Power Setting 18



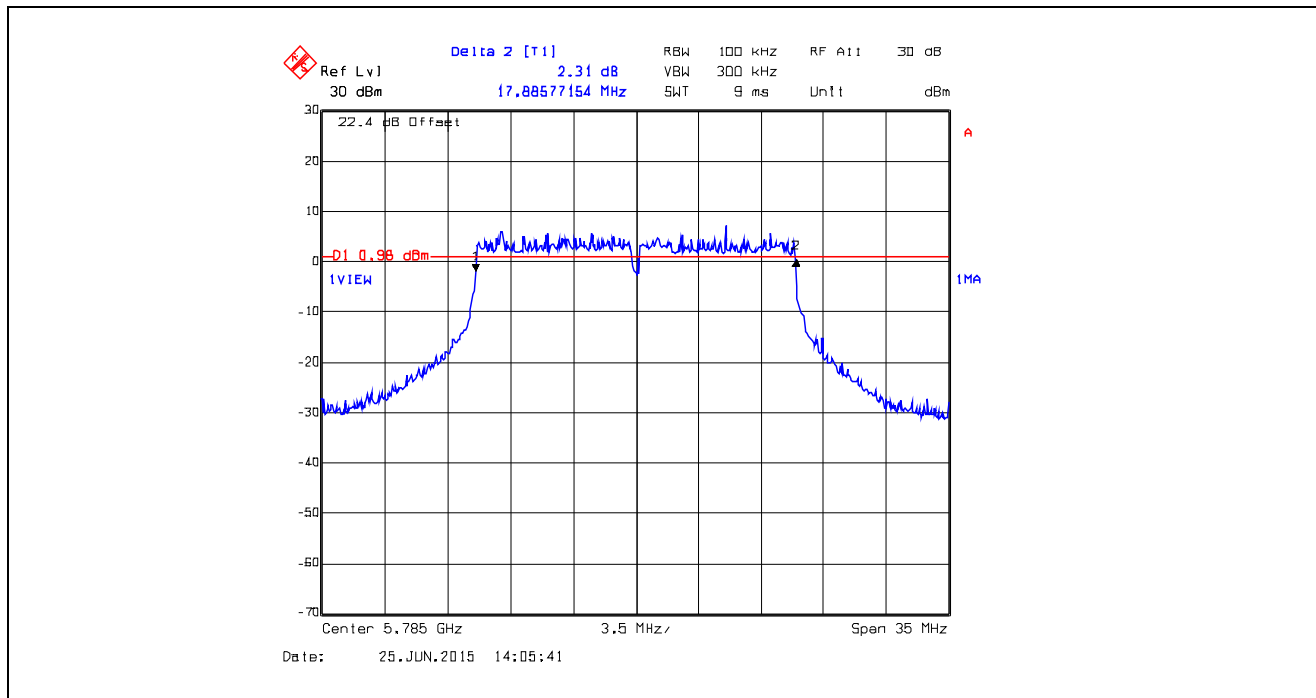
Plot 5.6.4.2.43. 6 dB Bandwidth, Data Rate 8, Chain # 1, Ch 149, 5745 MHz, Software Output Power Setting 13



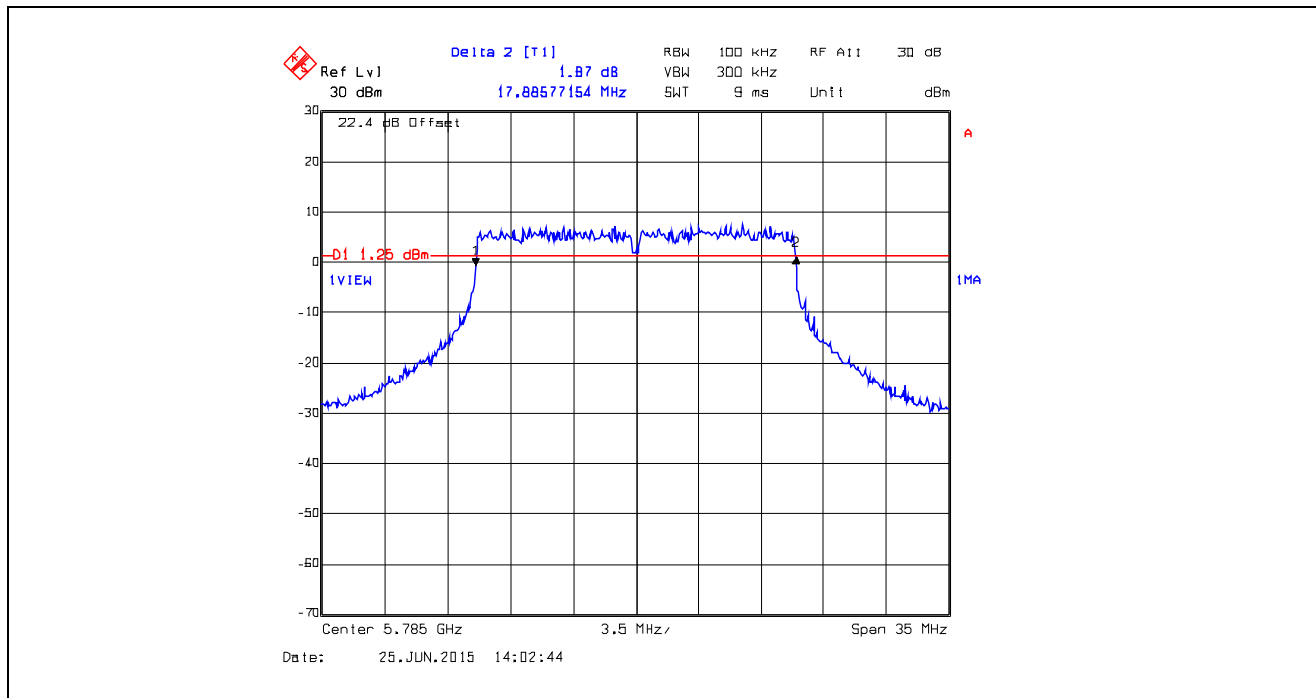
Plot 5.6.4.2.44. 6 dB Bandwidth, Data Rate 8, Chain # 2, Ch 149, 5745 MHz, Software Output Power Setting 13



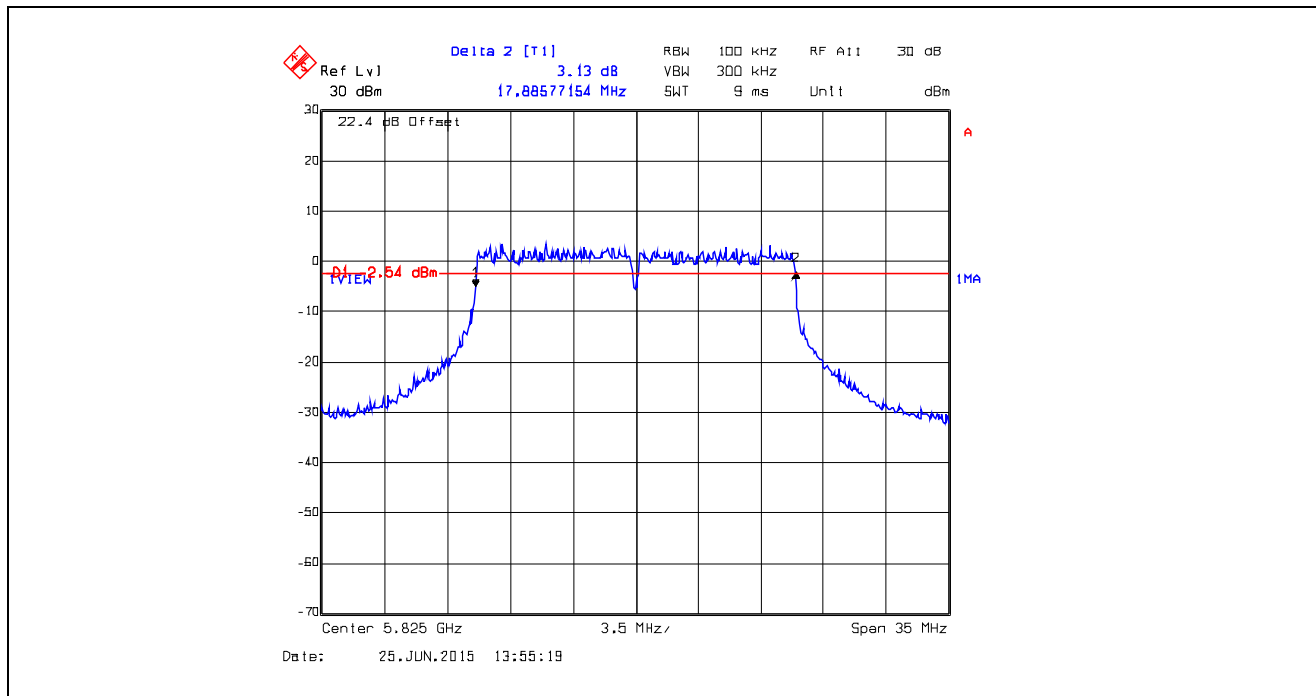
Plot 5.6.4.2.45. 6 dB Bandwidth, Data Rate 8, Chain # 1, Ch 157, 5785 MHz, Software Output Power Setting 19



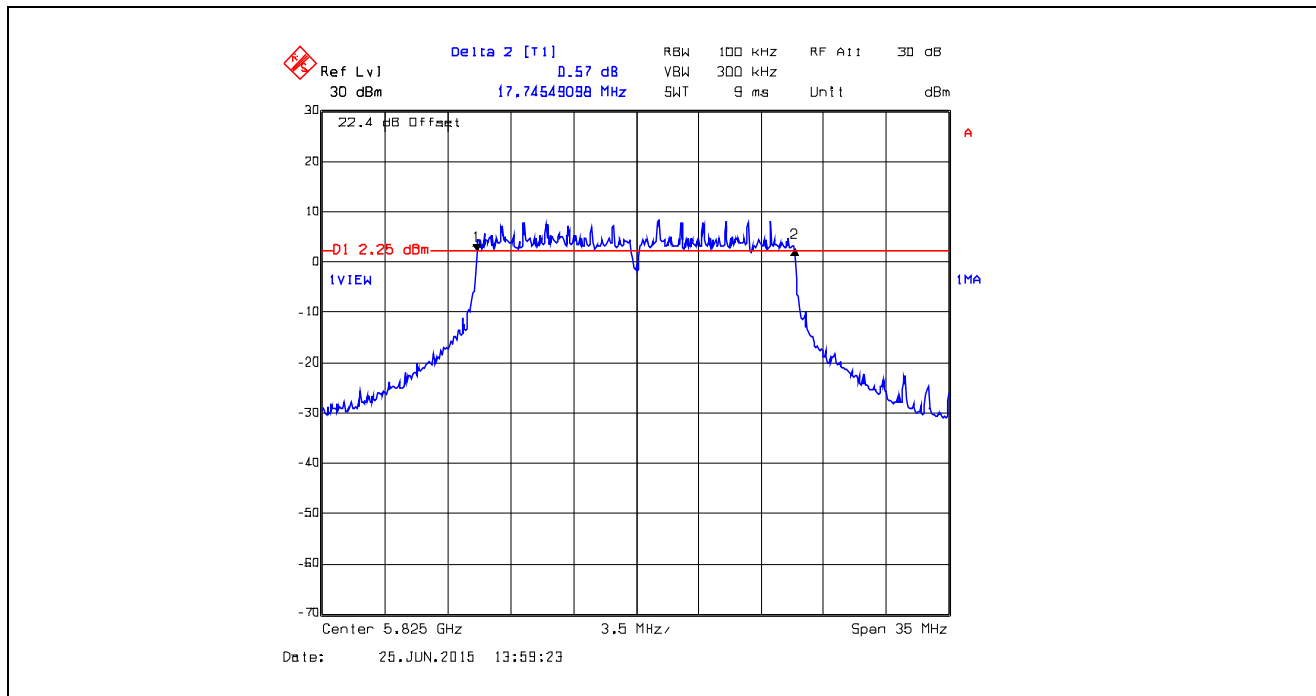
Plot 5.6.4.2.46. 6 dB Bandwidth, Data Rate 8, Chain # 2, Ch 157, 5785 MHz, Software Output Power Setting 19



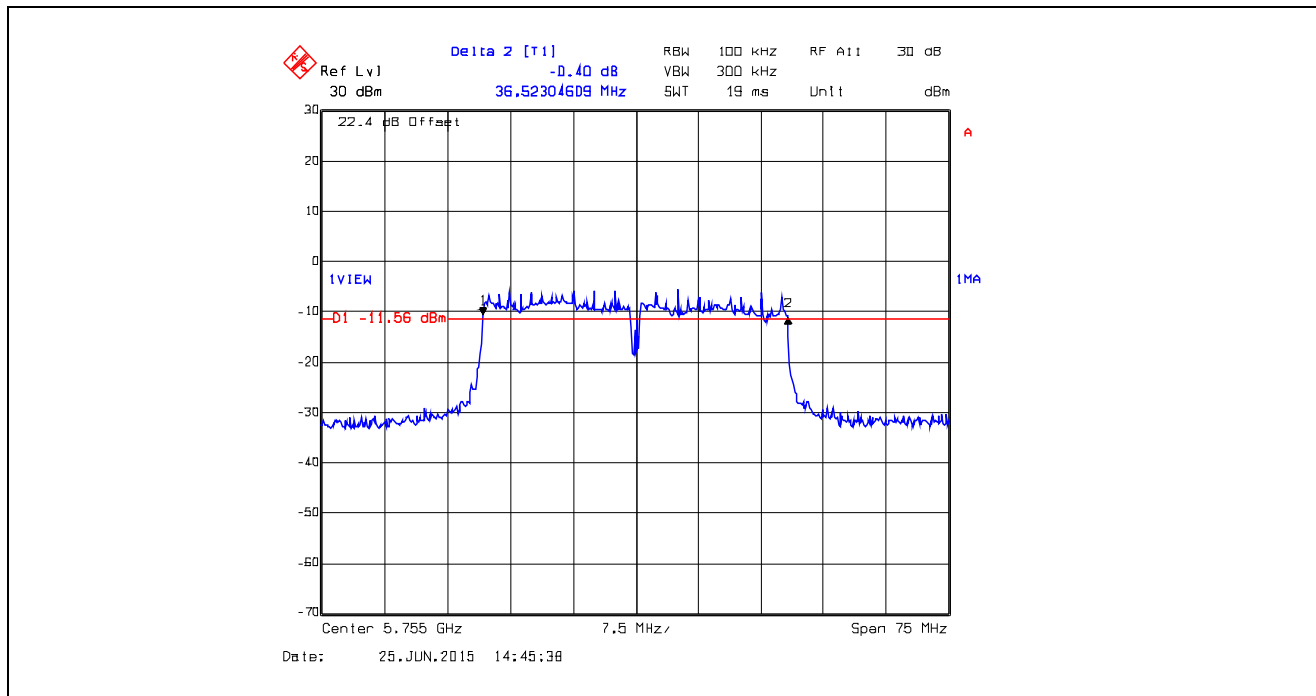
Plot 5.6.4.2.47. 6 dB Bandwidth, Data Rate 8, Chain # 1, Ch 165, 5825 MHz, Software Output Power Setting 18



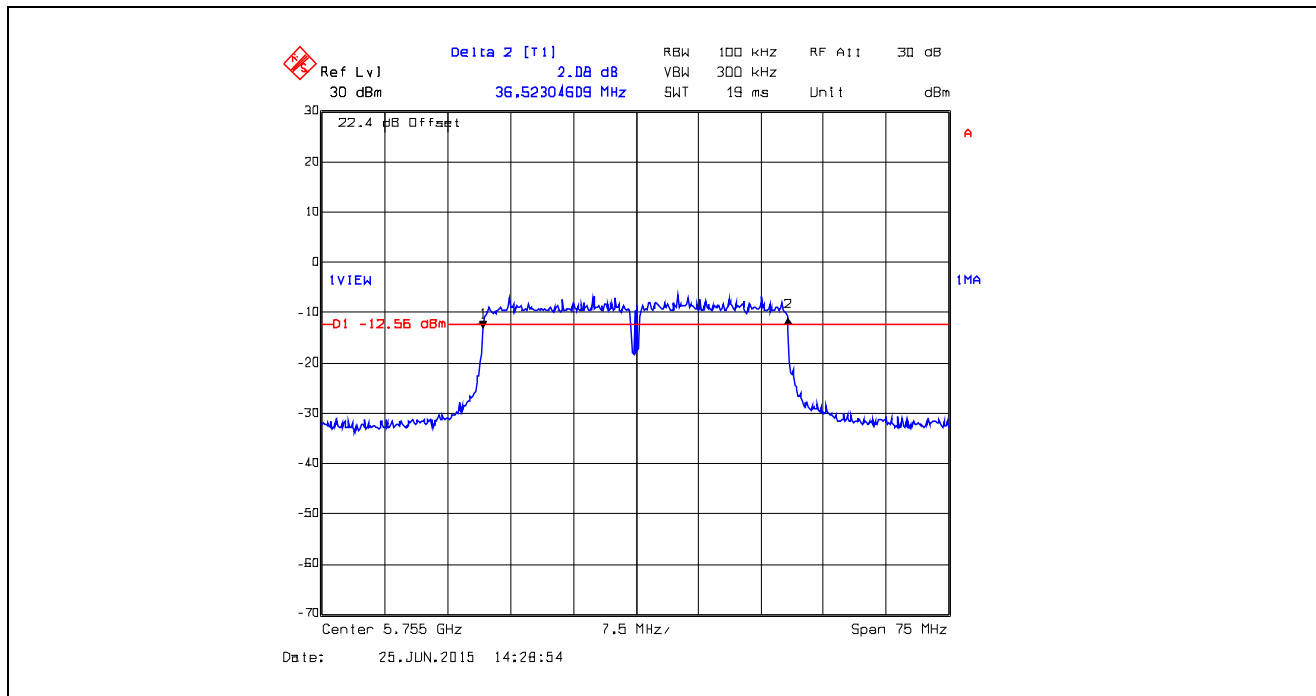
Plot 5.6.4.2.48. 6 dB Bandwidth, Data Rate 8, Chain # 2, Ch 165, 5825 MHz, Software Output Power Setting 18



Plot 5.6.4.2.49. 6 dB Bandwidth, Data Rate 9, Chain # 1, Ch 151, 5755 MHz, Software Output Power Setting 7



Plot 5.6.4.2.50. 6 dB Bandwidth, Data Rate 9, Chain # 2, Ch 151, 5755 MHz, Software Output Power Setting 7



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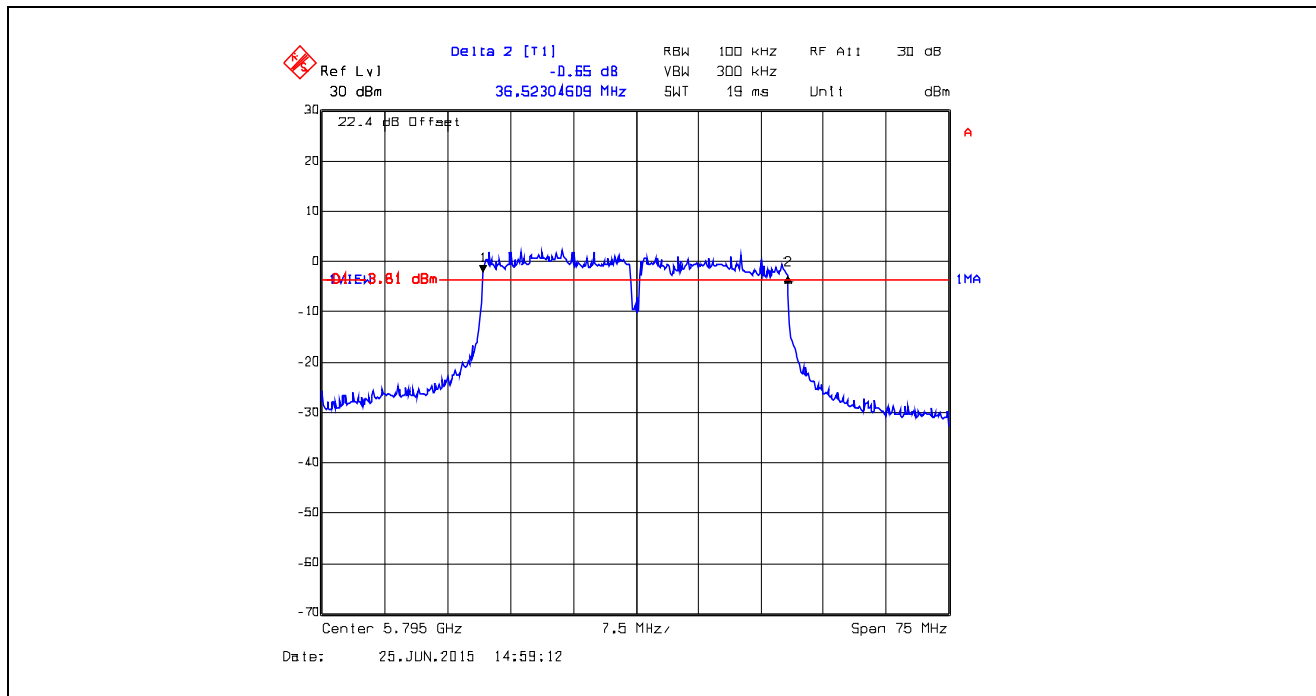
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 15MCRS079_FCC15E407

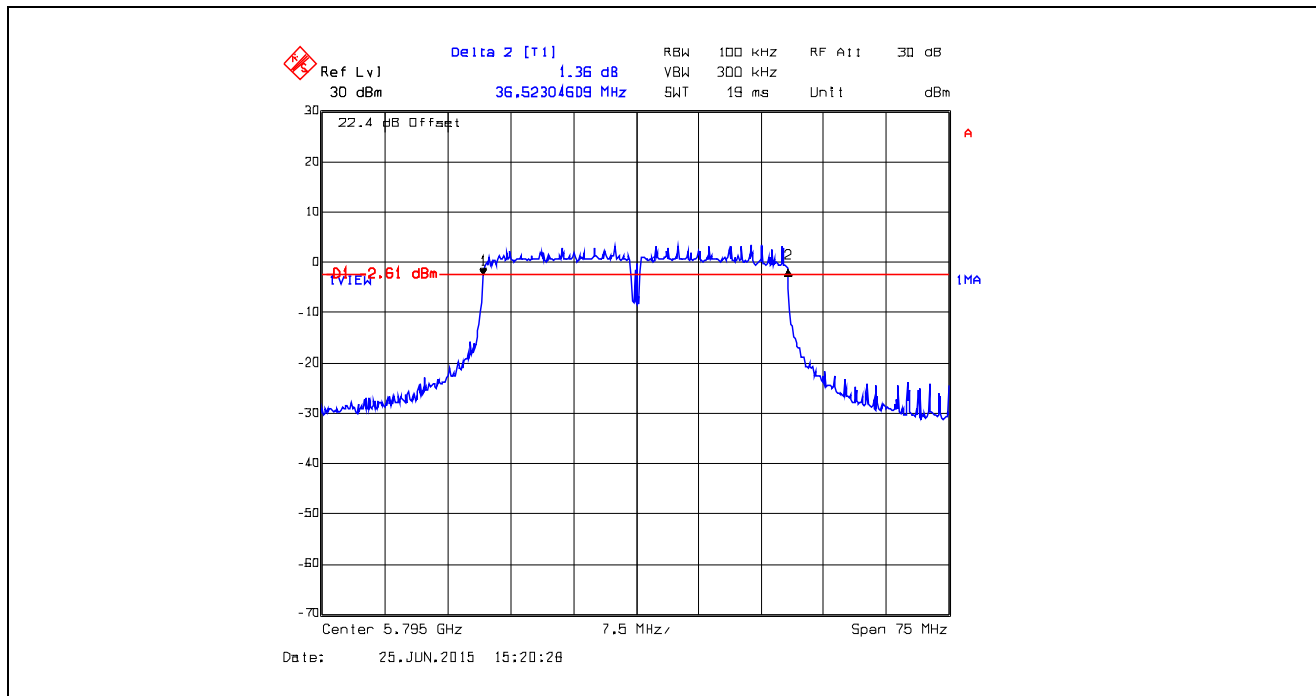
November 16, 2015

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Plot 5.6.4.2.51. 6 dB Bandwidth, Data Rate 9, Chain # 1, Ch 159, 5795 MHz, Software Output Power Setting 18



Plot 5.6.4.2.52. 6 dB Bandwidth, Data Rate 9, Chain # 2, Ch 159, 5795 MHz, Software Output Power Setting 18



Delta 2 [T1] -0.29 dB

Ref Lvl 30 dBm

RBW 100 kHz

VBW 300 kHz

SFT 5

19 ms

Unit

dBm

22.4 dB Offset

1VIEW

01 -10.36 dBm

1MA

Center 5.755 GHz

Span 75 MHz

Date: 25.JUN.2015 14:43:42

Delta 2 [T1]
-3.89 dB
36.67334669 MHz

RBW 100 kHz
VBW 300 kHz
SWT 19 ms
RF Att 30 dB
Unit dBm

Ref Lvl 30 dBm

22.4 dB Offset

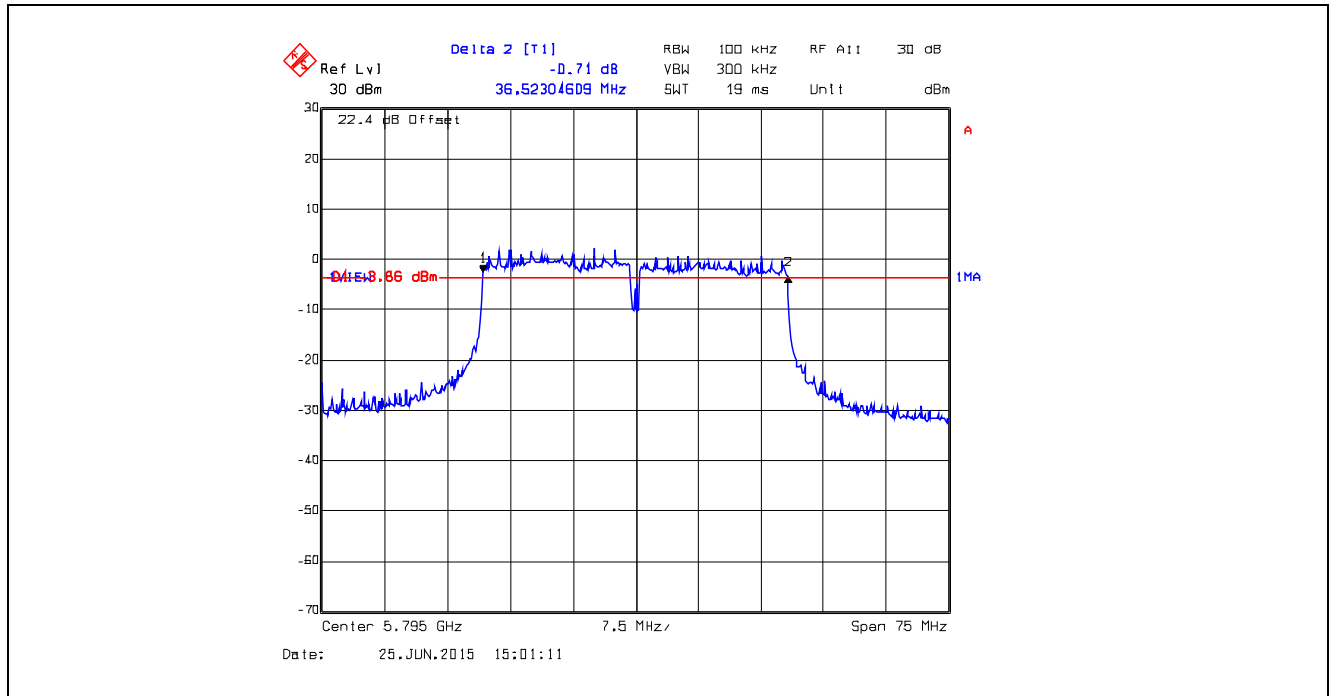
1VIEW

D1 -12.64 dBm

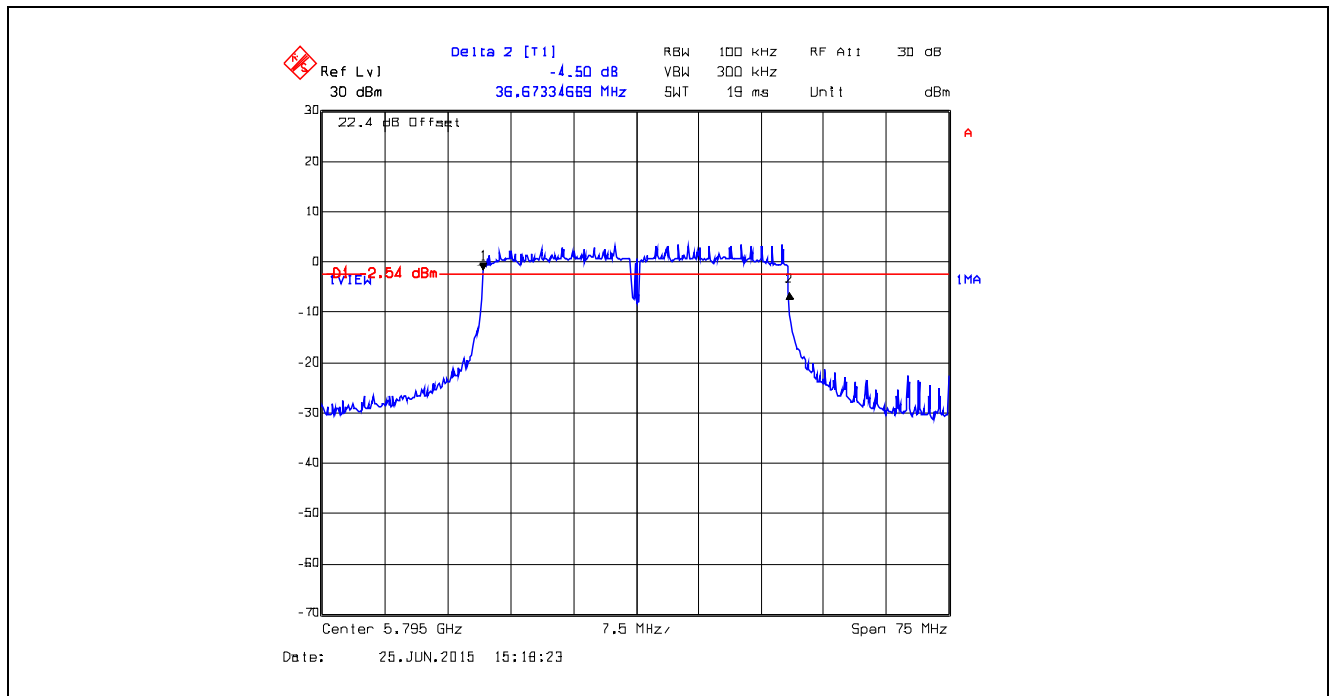
Center 5.755 GHz
7.5 MHz
Span 75 MHz

Date: 25.JUN.2015 14:32:57

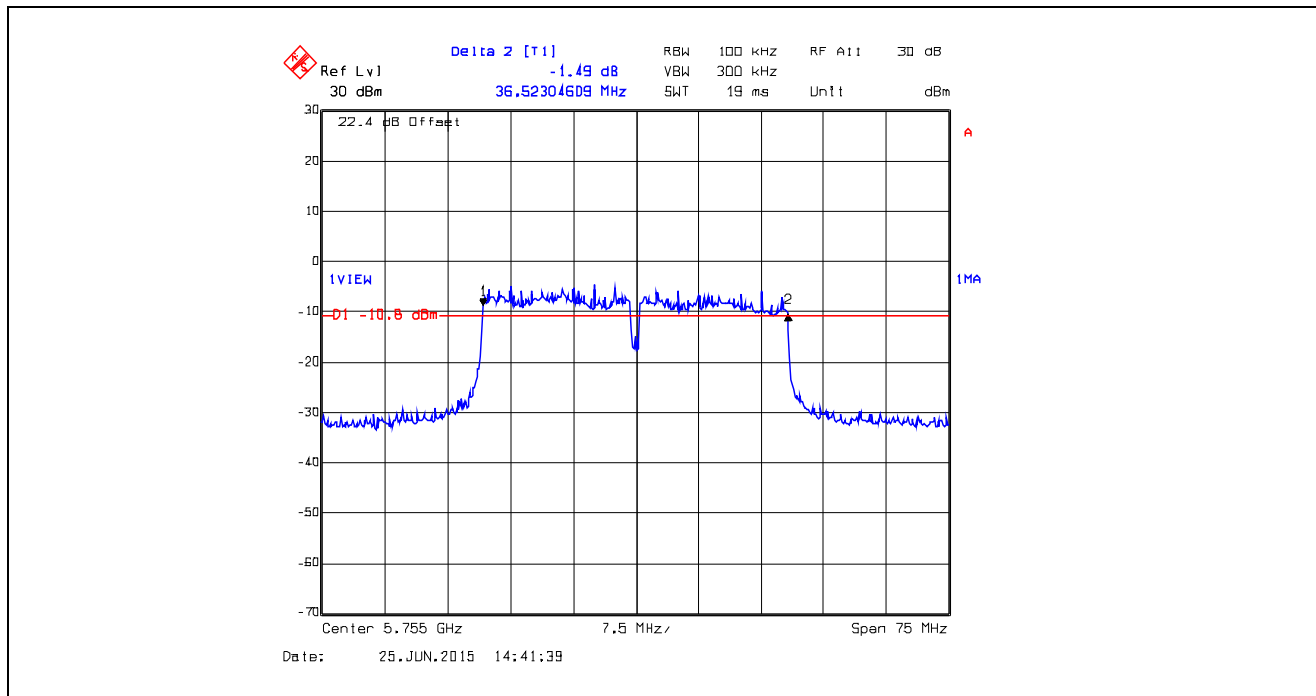
Plot 5.6.4.2.55. 6 dB Bandwidth, Data Rate 10, Chain # 1, Ch 159, 5795 MHz, Software Output Power Setting 18



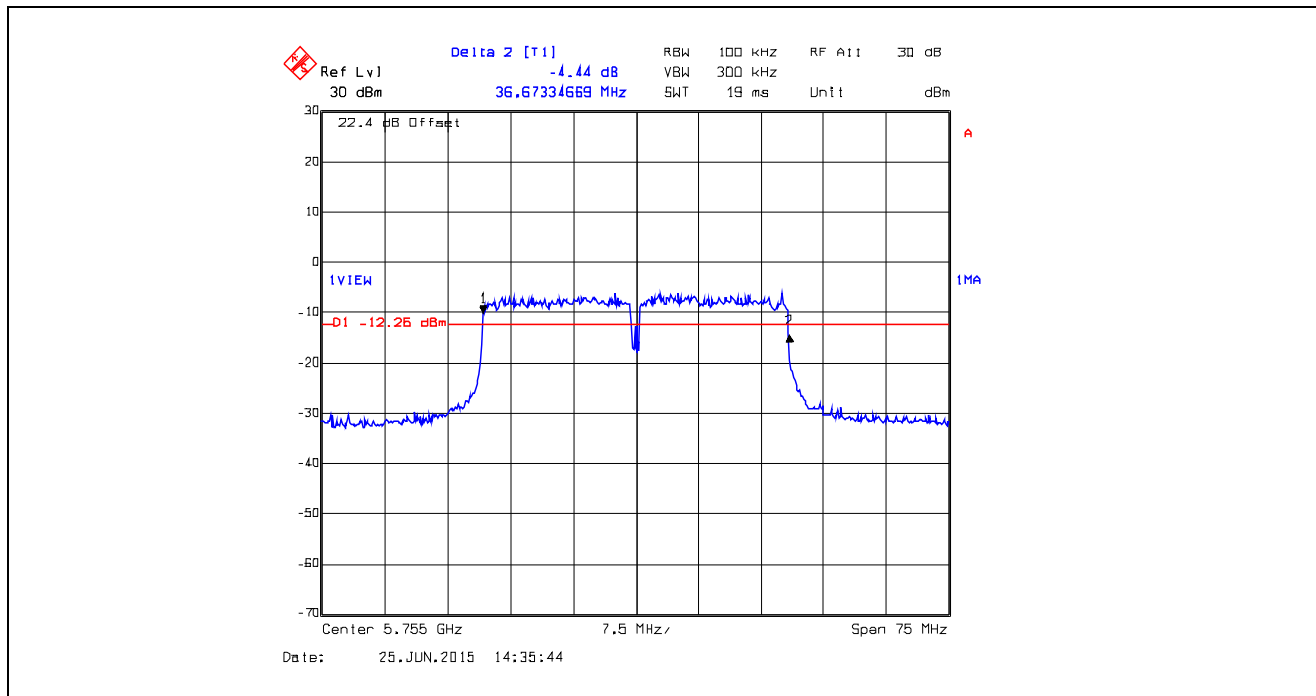
Plot 5.6.4.2.56. 6 dB Bandwidth, Data Rate 10, Chain # 2, Ch 159, 5795 MHz, Software Output Power Setting 18



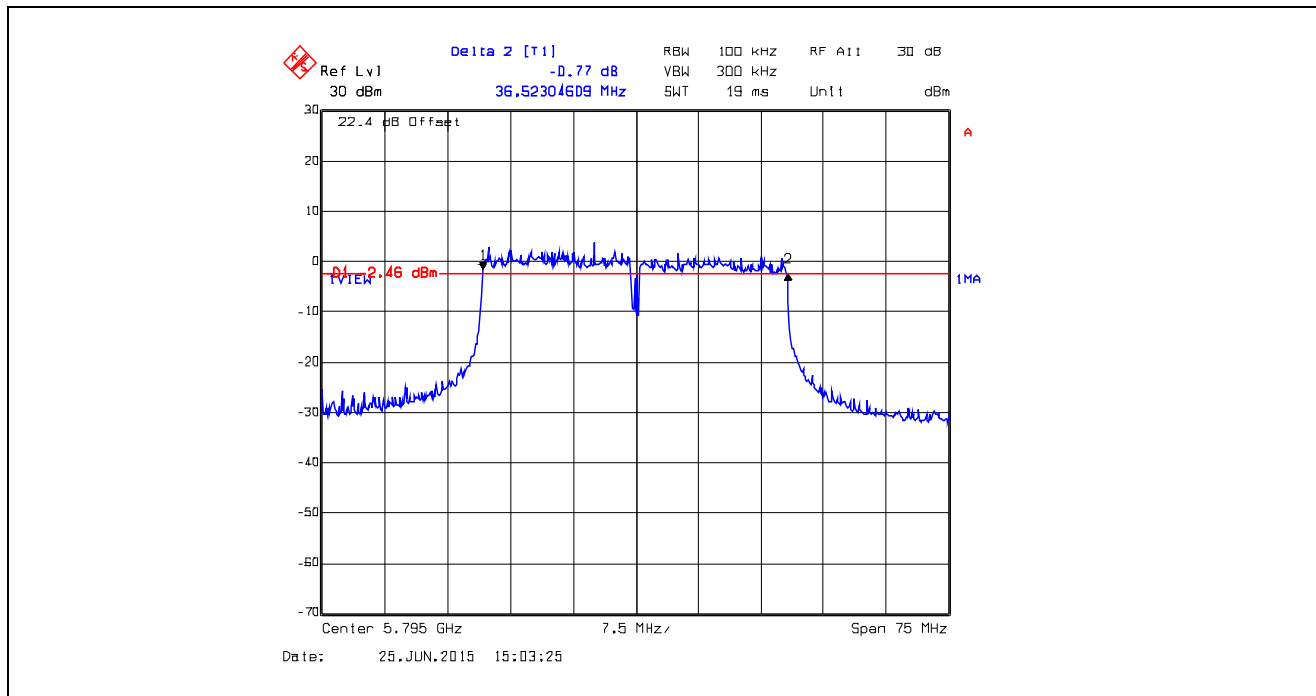
Plot 5.6.4.2.57. 6 dB Bandwidth, Data Rate 11, Chain # 1, Ch 151, 5755 MHz, Software Output Power Setting 7



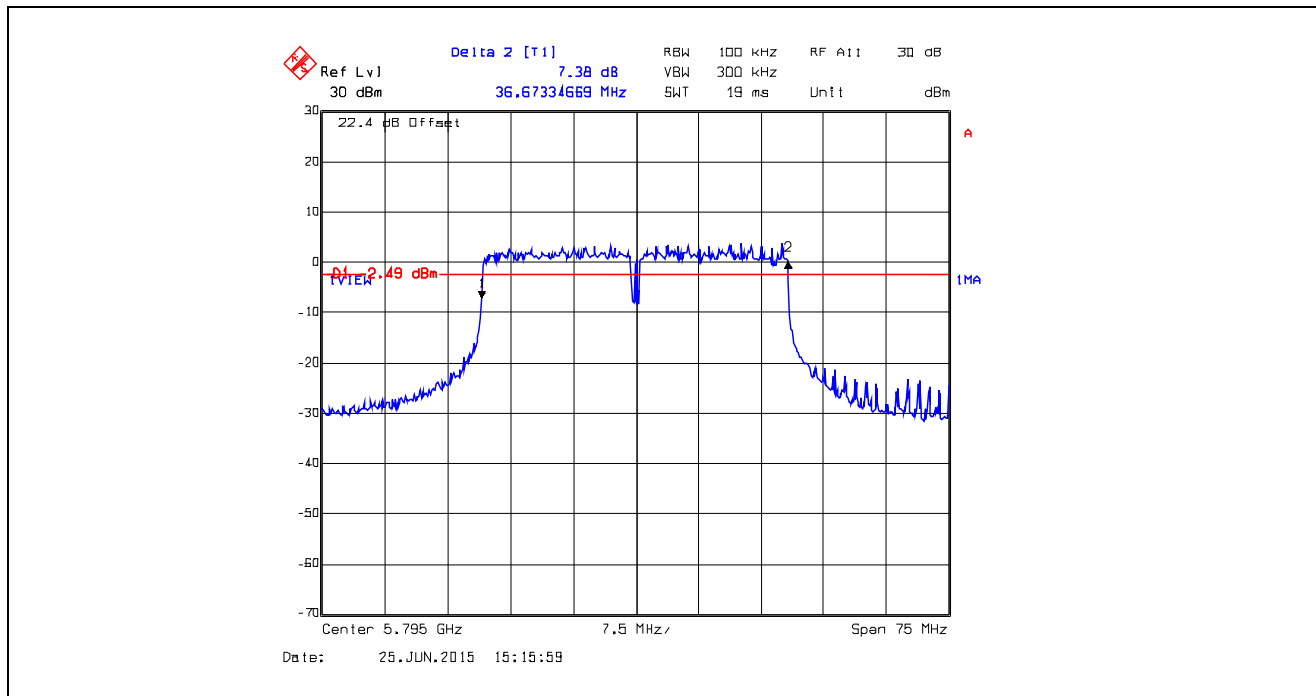
Plot 5.6.4.2.58. 6 dB Bandwidth, Data Rate 11, Chain # 2, Ch 151, 5755 MHz, Software Output Power Setting 7



Plot 5.6.4.2.59. 6 dB Bandwidth, Data Rate 11, Chain # 1, Ch 159, 5795 MHz, Software Output Power Setting 18



Plot 5.6.4.2.60. 6 dB Bandwidth, Data Rate 11, Chain # 2, Ch 159, 5795 MHz, Software Output Power Setting 18



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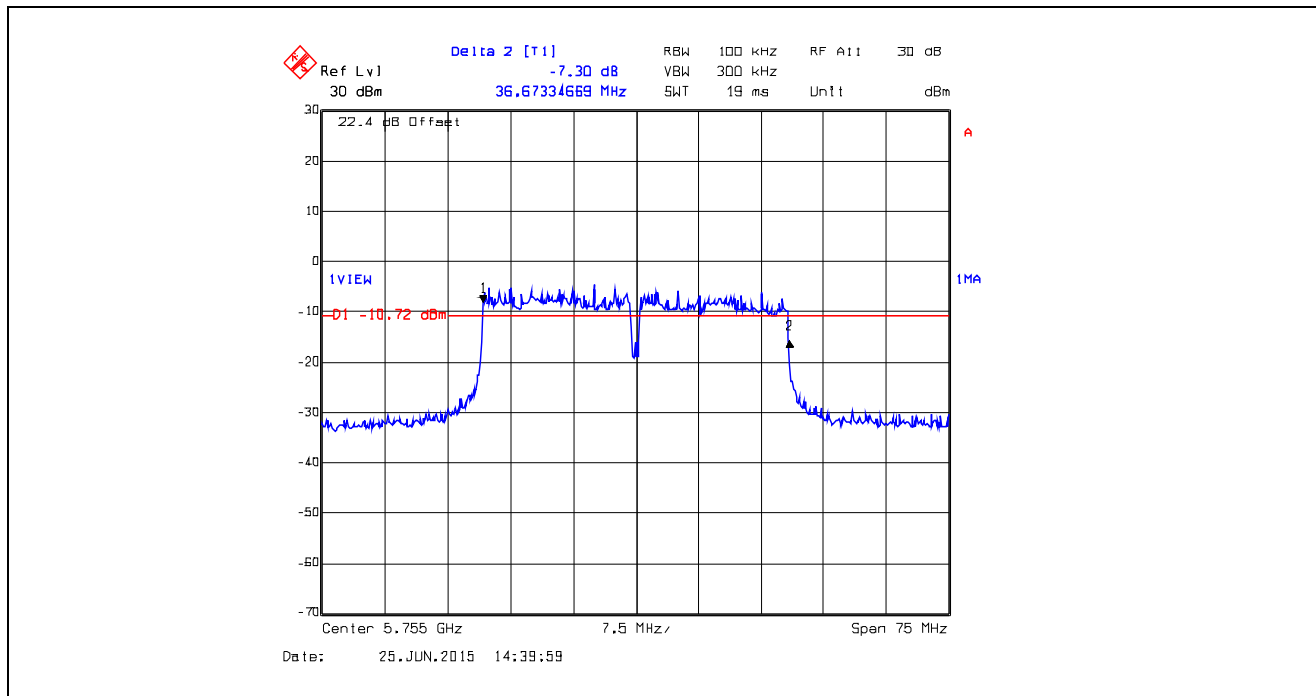
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

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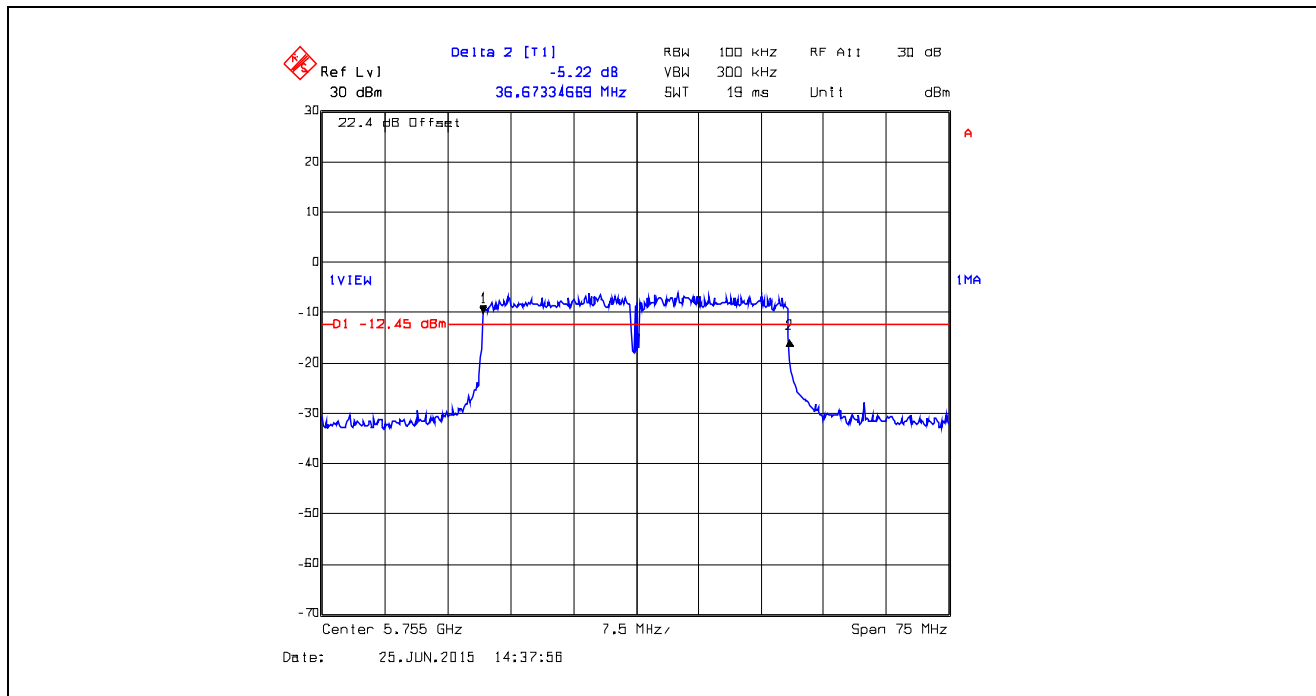
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Plot 5.6.4.2.61. 6 dB Bandwidth, Data Rate 12, Chain # 1, Ch 151, 5755 MHz, Software Output Power Setting 7



Plot 5.6.4.2.62. 6 dB Bandwidth, Data Rate 12, Chain # 2, Ch 151, 5755 MHz, Software Output Power Setting 7



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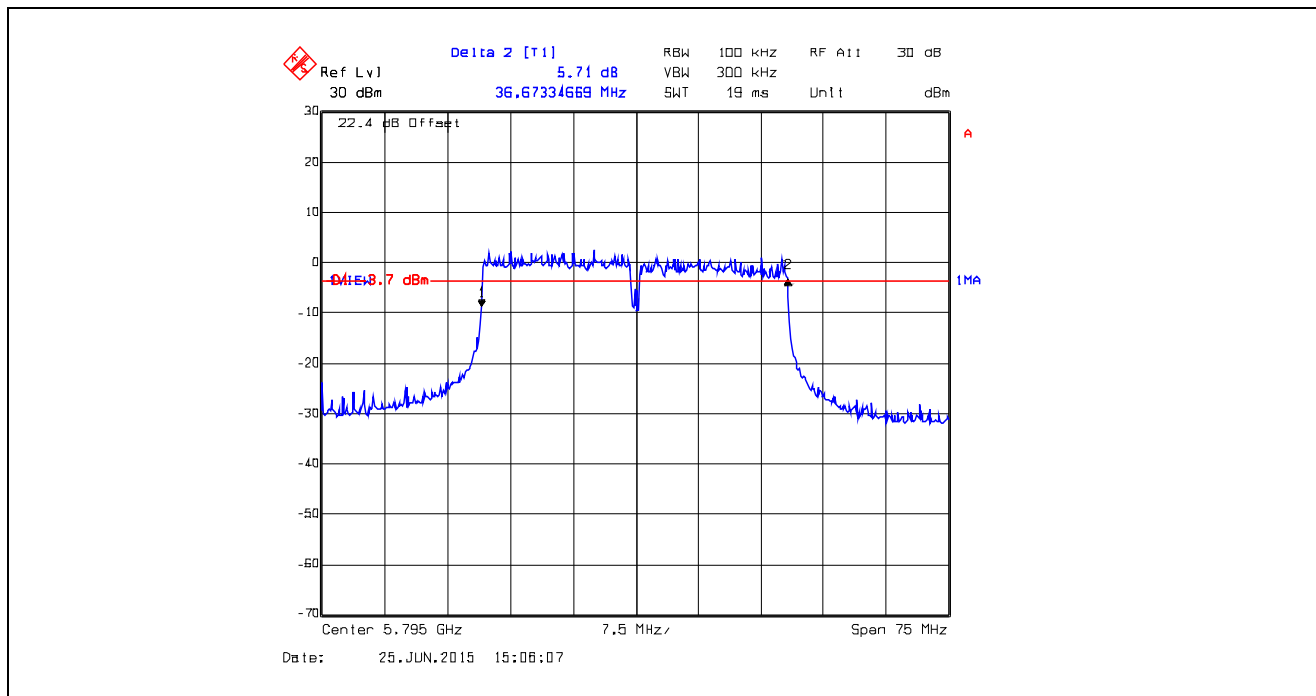
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

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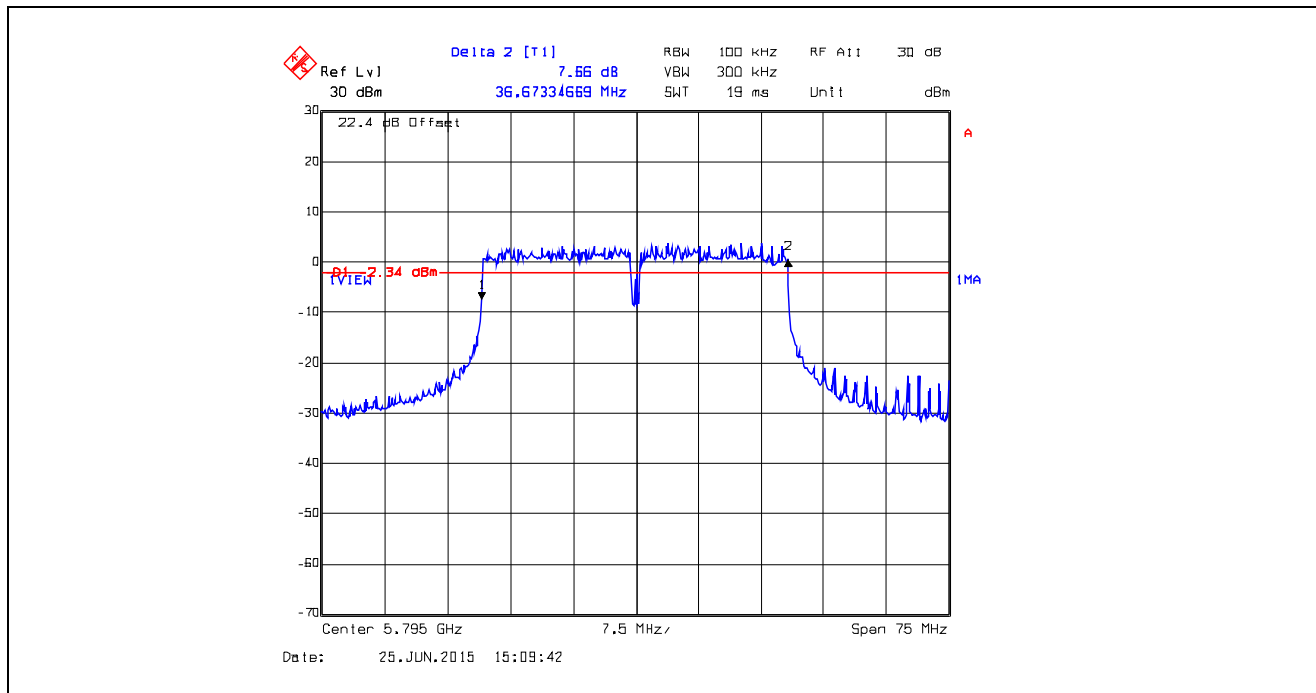
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Plot 5.6.4.2.63. 6 dB Bandwidth, Data Rate 12, Chain # 1, Ch 159, 5795 MHz, Software Output Power Setting 18



Plot 5.6.4.2.64. 6 dB Bandwidth, Data Rate 12, Chain # 2, Ch 159, 5795 MHz, Software Output Power Setting 18



5.6.4.3. 99% Occupied Bandwidth

Operating Mode	Software Output Power Setting	Channel Number	Frequency (MHz)	99% Occupied Bandwidth (MHz)	
				Chain # 1	Chain # 2
Data Rate 1	13	149	5745	16.99	17.15
	19	157	5785	16.83	17.07
	18	165	5825	16.91	17.07
Data Rate 2	13	149	5745	16.91	16.99
	19	157	5785	16.99	16.91
	18	165	5825	16.83	16.91
Data Rate 3	13	149	5745	16.83	16.83
	19	157	5785	16.83	16.83
	18	165	5825	16.83	16.83
Data Rate 4	13	149	5745	16.91	16.83
	19	157	5785	16.75	16.91
	18	165	5825	16.91	16.83
Data Rate 5	13	149	5745	18.20	18.28
	19	157	5785	18.12	18.12
	18	165	5825	18.12	18.12
Data Rate 6	13	149	5745	18.12	18.04
	19	157	5785	18.04	18.04
	18	165	5825	18.04	17.96
Data Rate 7	13	149	5745	17.96	17.96
	19	157	5785	18.04	18.04
	18	165	5825	18.04	18.04
Data Rate 8	13	149	5745	18.04	18.04
	19	157	5785	18.04	17.96
	18	165	5825	18.04	17.96

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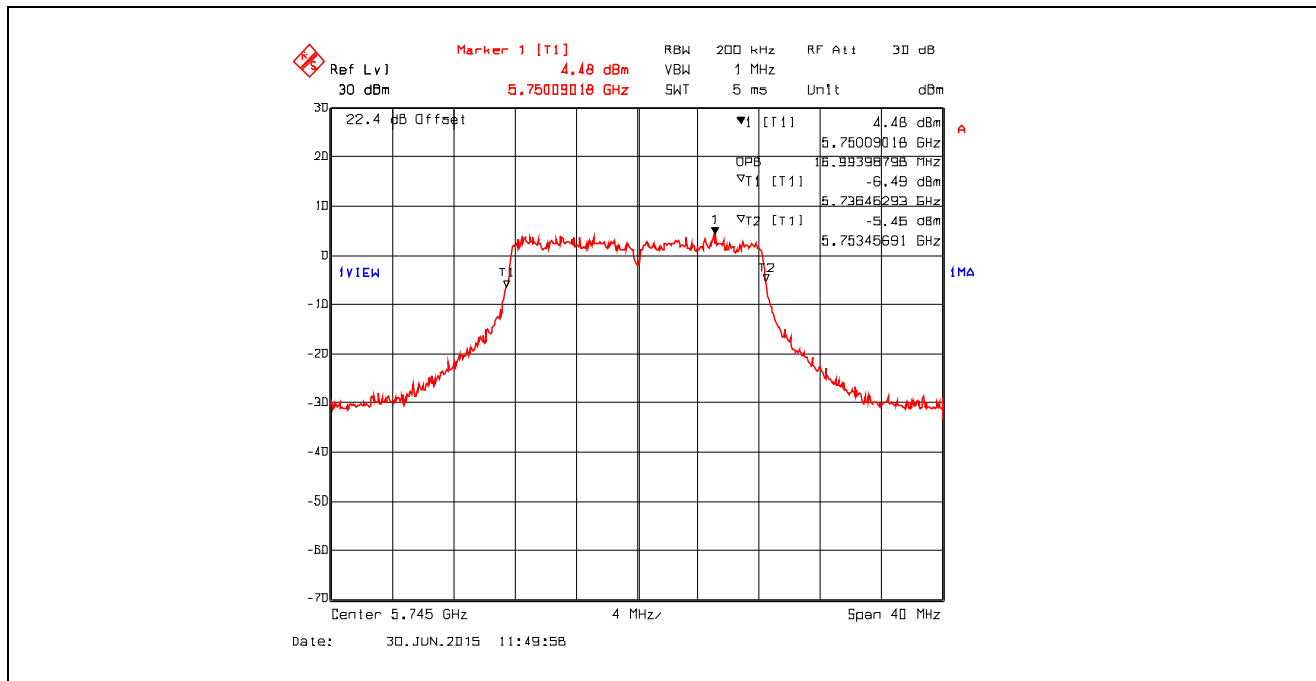
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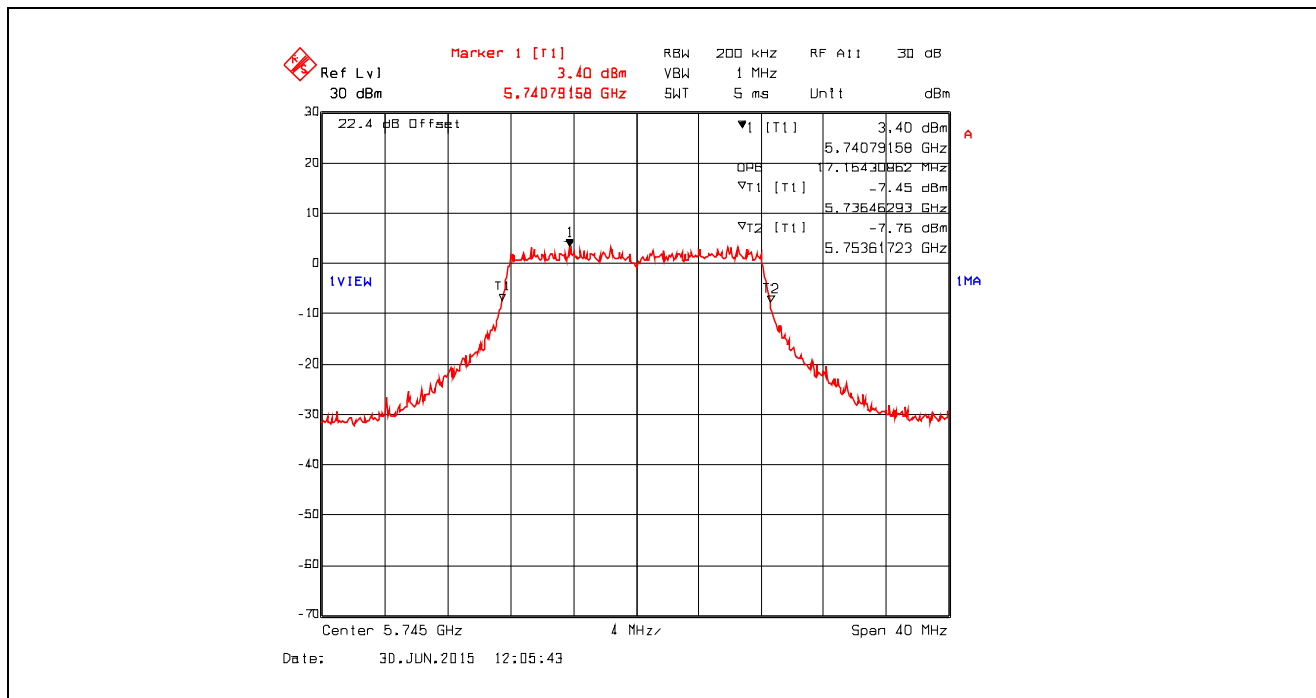
Operating Mode	Software Output Power Setting	Channel Number	Frequency (MHz)	99% Occupied Bandwidth (MHz)	
				Chain # 1	Chain # 2
Data Rate 9	7	151	5755	37.68	37.84
	18	159	5795	37.35	37.35
Data Rate 10	7	151	5755	37.35	37.52
	18	159	5795	37.03	37.03
Data Rate 11	7	151	5755	37.19	37.19
	18	159	5795	37.03	36.87
Data Rate 12	7	151	5755	37.19	37.19
	18	159	5795	37.03	37.03

See the following plots for detailed measurements.

Plot 5.6.4.3.1. 99% Occupied Bandwidth, Data Rate 1, Chain # 1, Ch 149, 5745 MHz, Software Output Power Setting 13



Plot 5.6.4.3.2. 99% Occupied Bandwidth, Data Rate 1, Chain # 2, Ch 149, 5745 MHz, Software Output Power Setting 13



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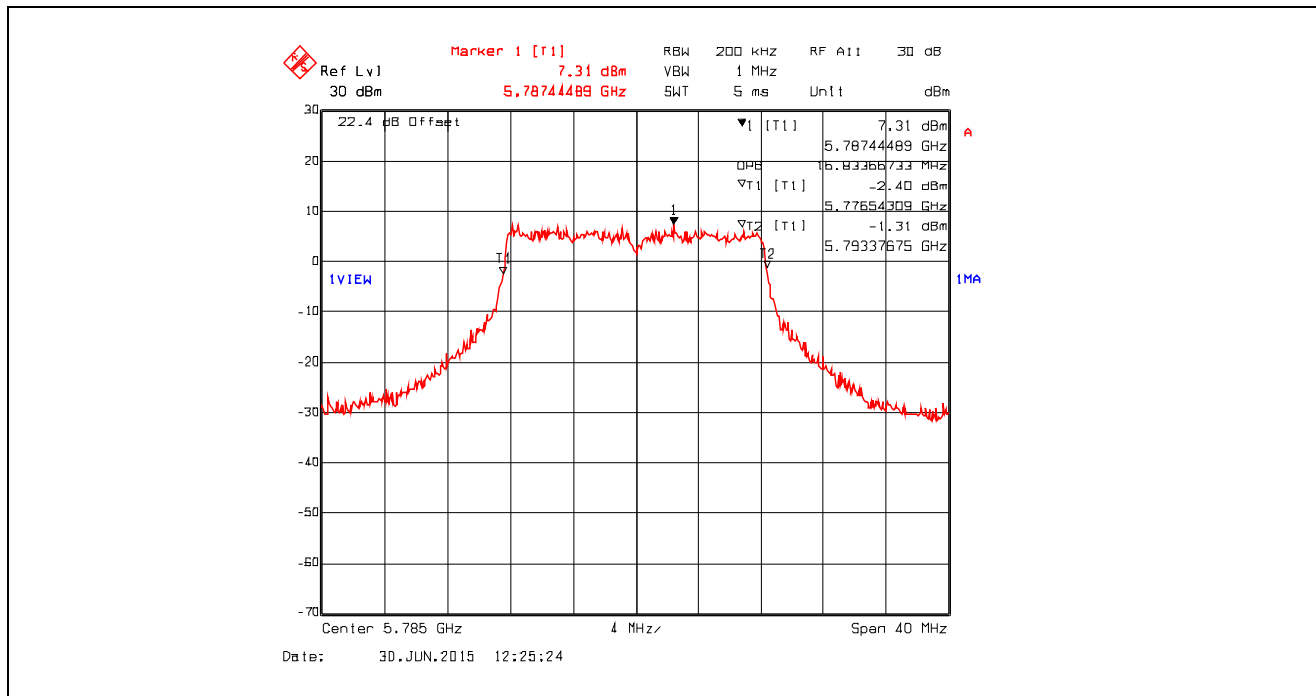
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

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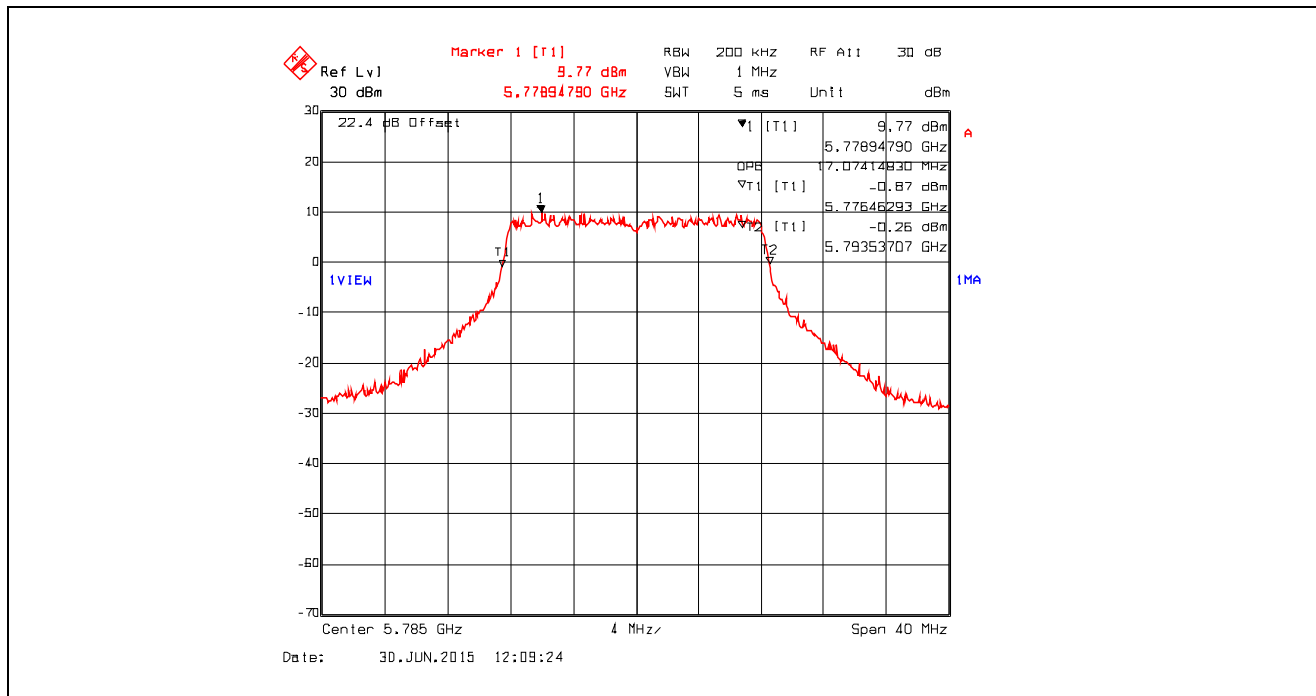
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Plot 5.6.4.3.3. 99% Occupied Bandwidth, Data Rate 1, Chain # 1, Ch 157, 5785 MHz, Software Output Power Setting 19



Plot 5.6.4.3.4. 99% Occupied Bandwidth, Data Rate 1, Chain # 2, Ch 157, 5785 MHz, Software Output Power Setting 19



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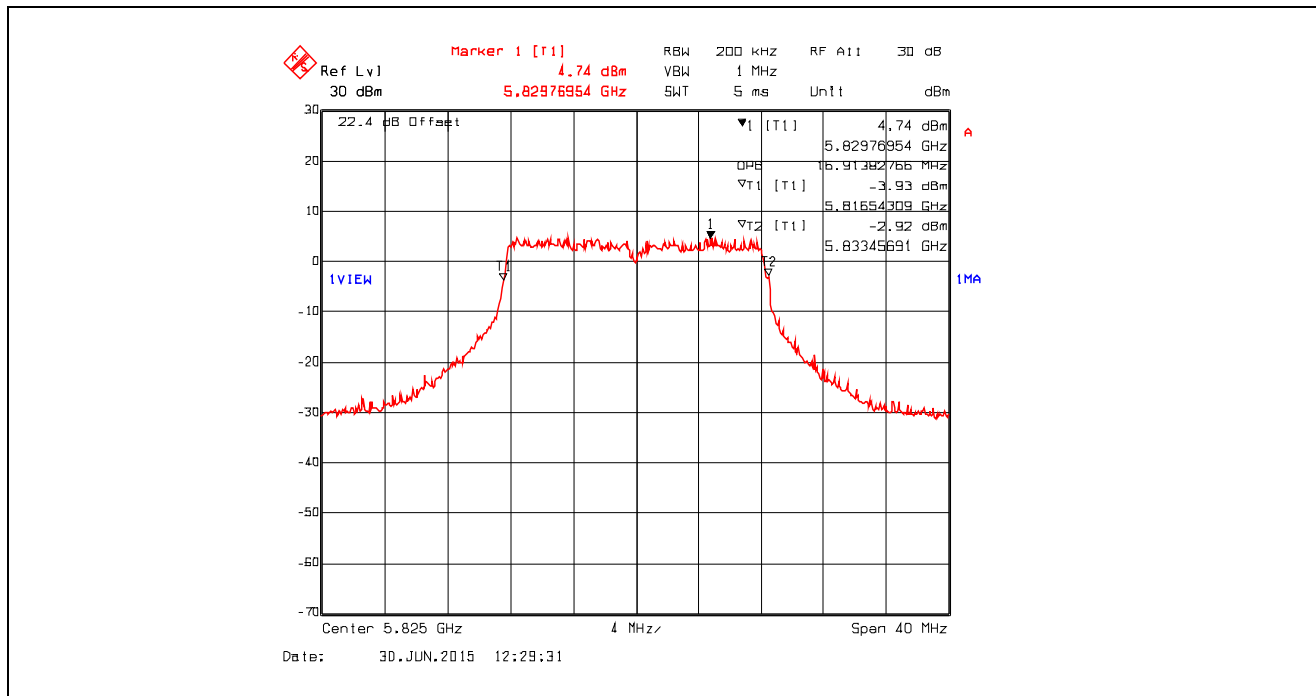
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

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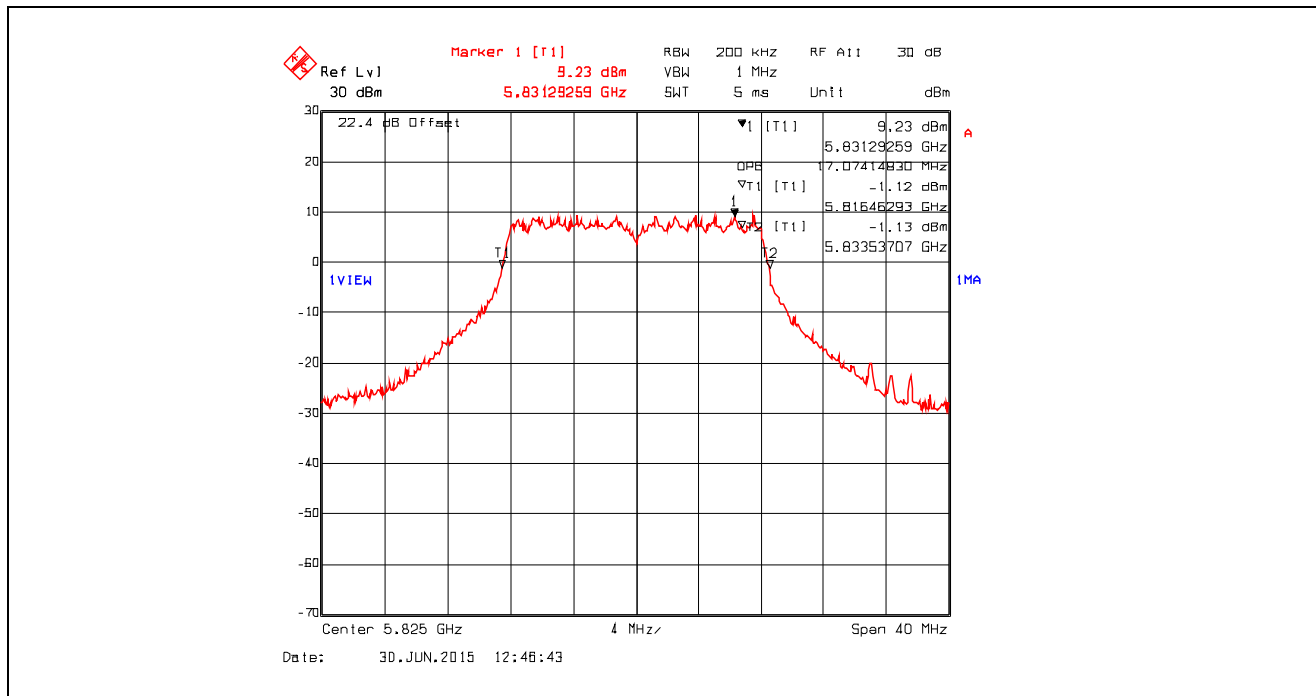
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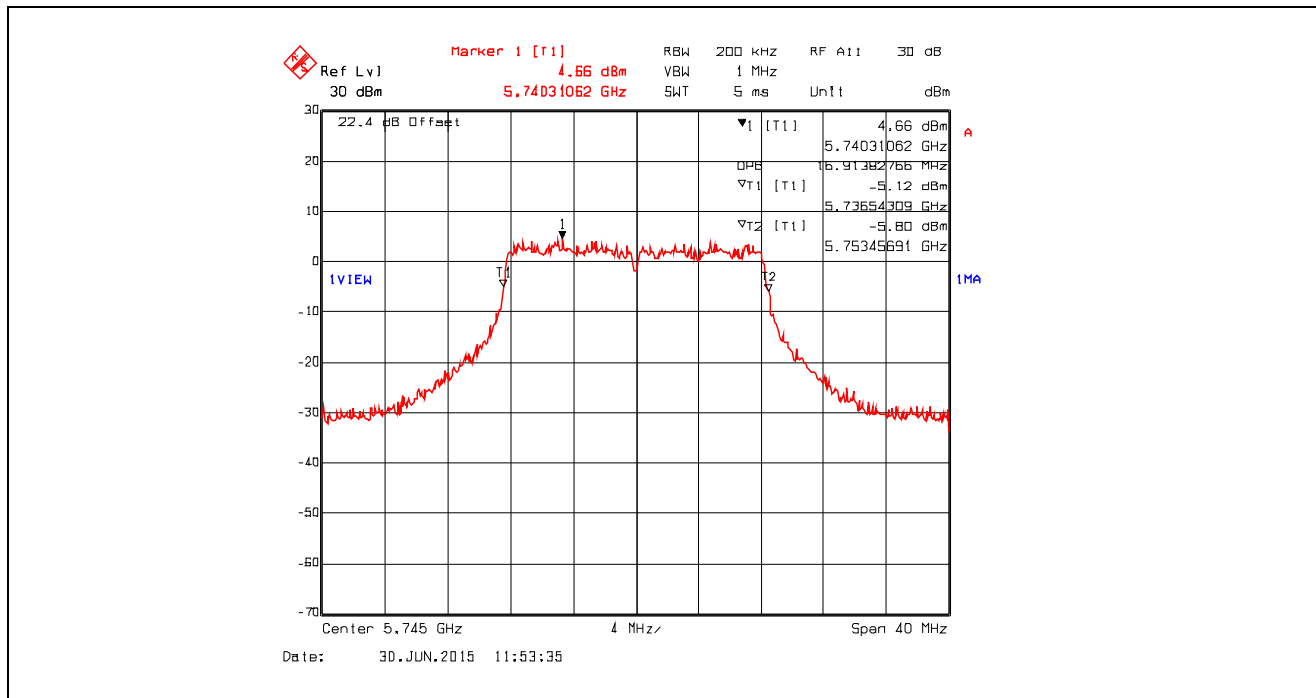
Plot 5.6.4.3.5. 99% Occupied Bandwidth, Data Rate 1, Chain # 1, Ch 165, 5825 MHz, Software Output Power Setting 18



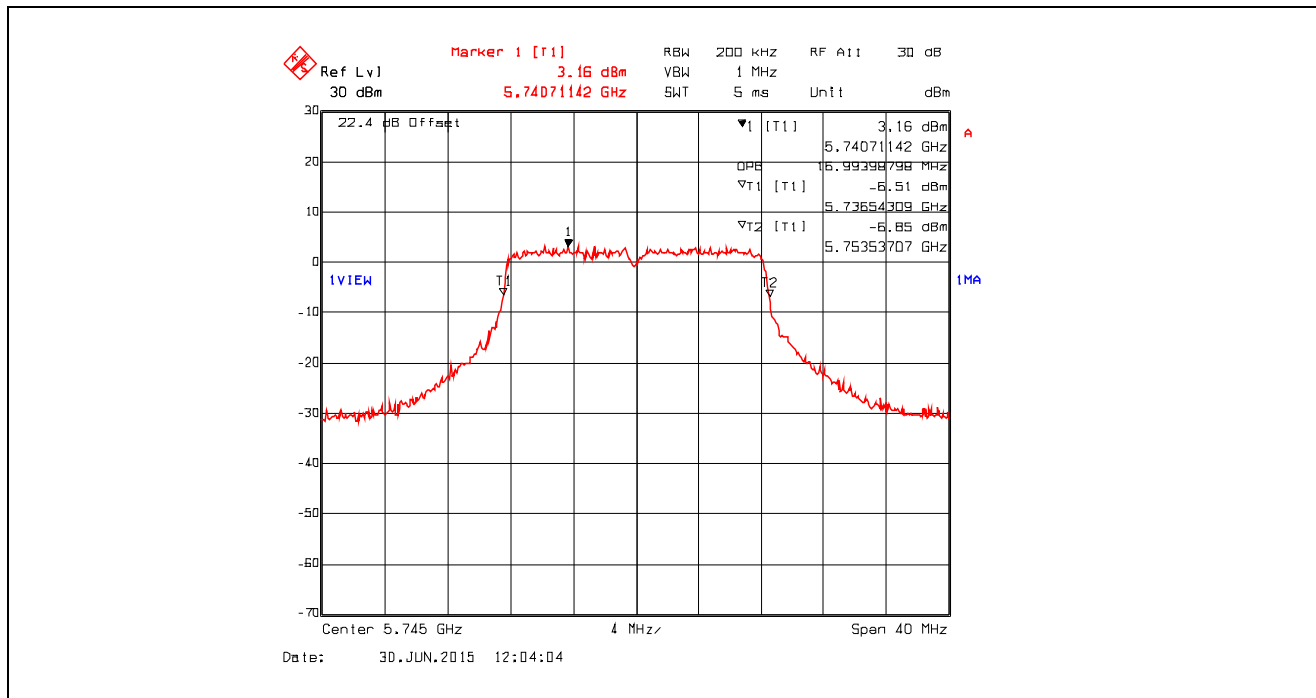
Plot 5.6.4.3.6. 99% Occupied Bandwidth, Data Rate 1, Chain # 2, Ch 165, 5825 MHz, Software Output Power Setting 18



Plot 5.6.4.3.7. 99% Occupied Bandwidth, Data Rate 2, Chain # 1, Ch 149, 5745 MHz, Software Output Power Setting 13



Plot 5.6.4.3.8. 99% Occupied Bandwidth, Data Rate 2, Chain # 2, Ch 149, 5745 MHz, Software Output Power Setting 13



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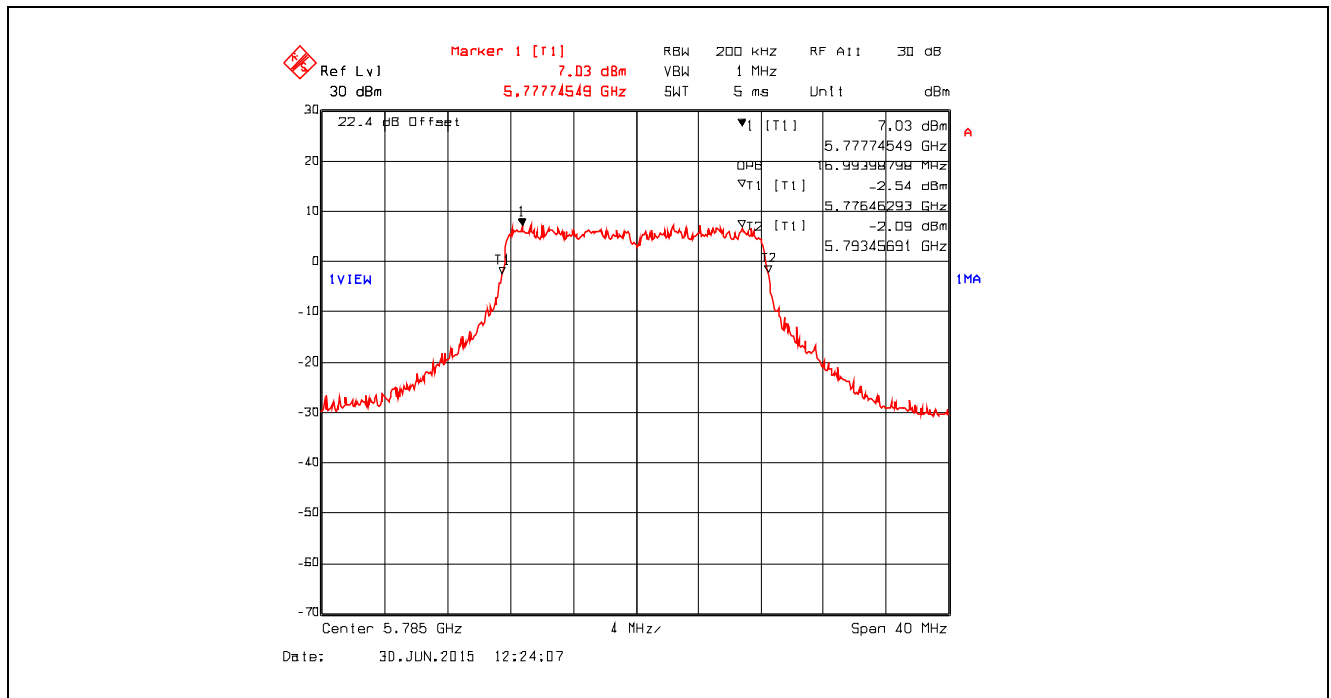
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 15MCRS079_FCC15E407

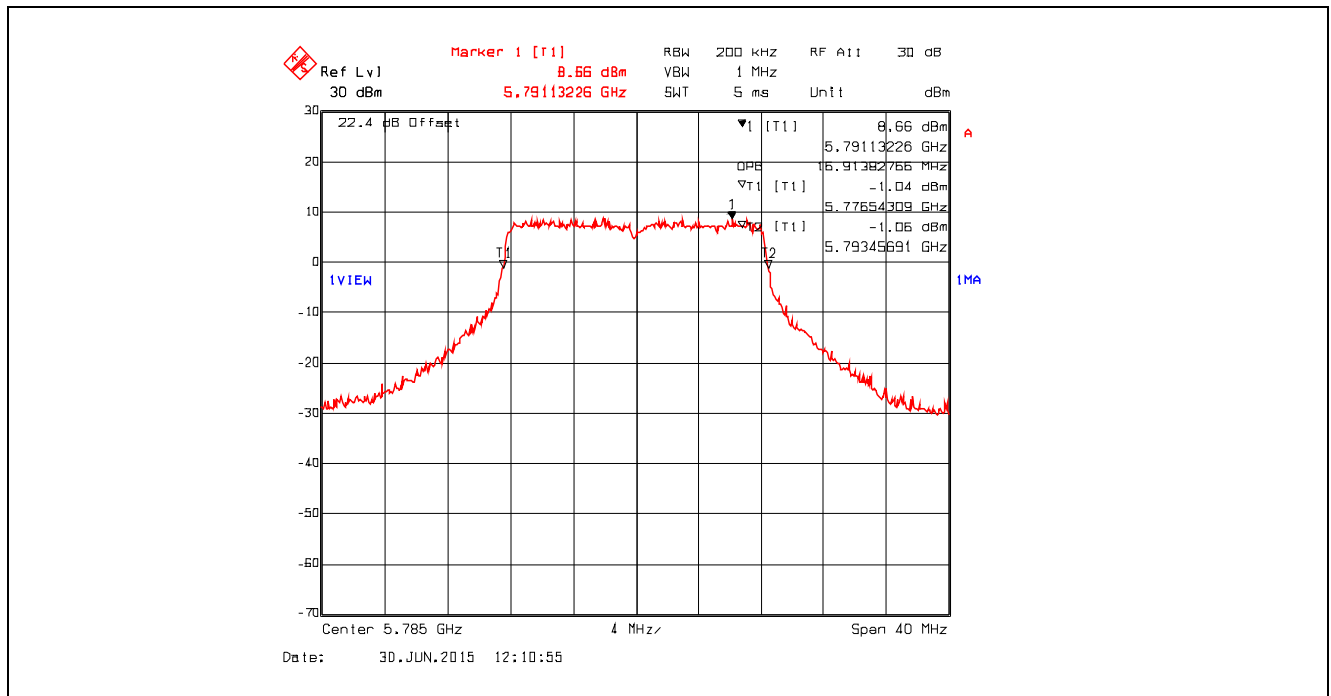
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Plot 5.6.4.3.9. 99% Occupied Bandwidth, Data Rate 2, Chain # 1, Ch 157, 5785 MHz, Software Output Power Setting 19



Plot 5.6.4.3.10. 99% Occupied Bandwidth, Data Rate 2, Chain # 2, Ch 157, 5785 MHz, Software Output Power Setting 19



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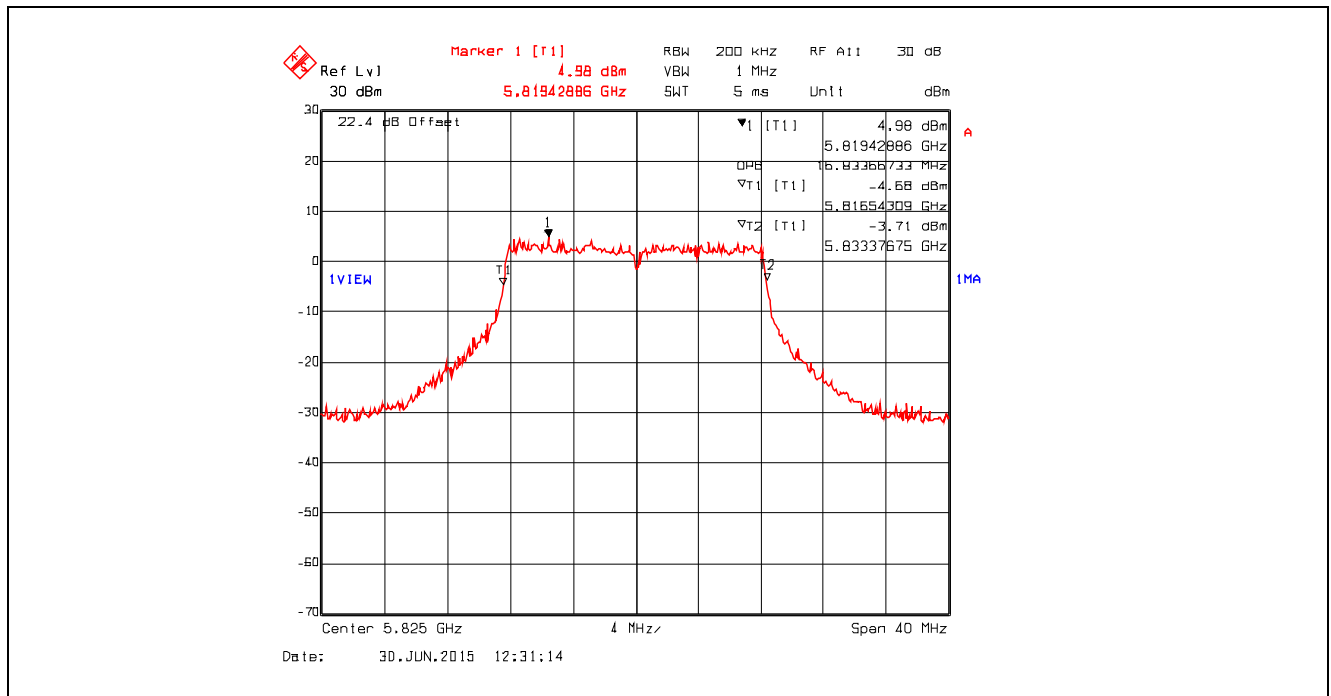
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 15MCRS079_FCC15E407

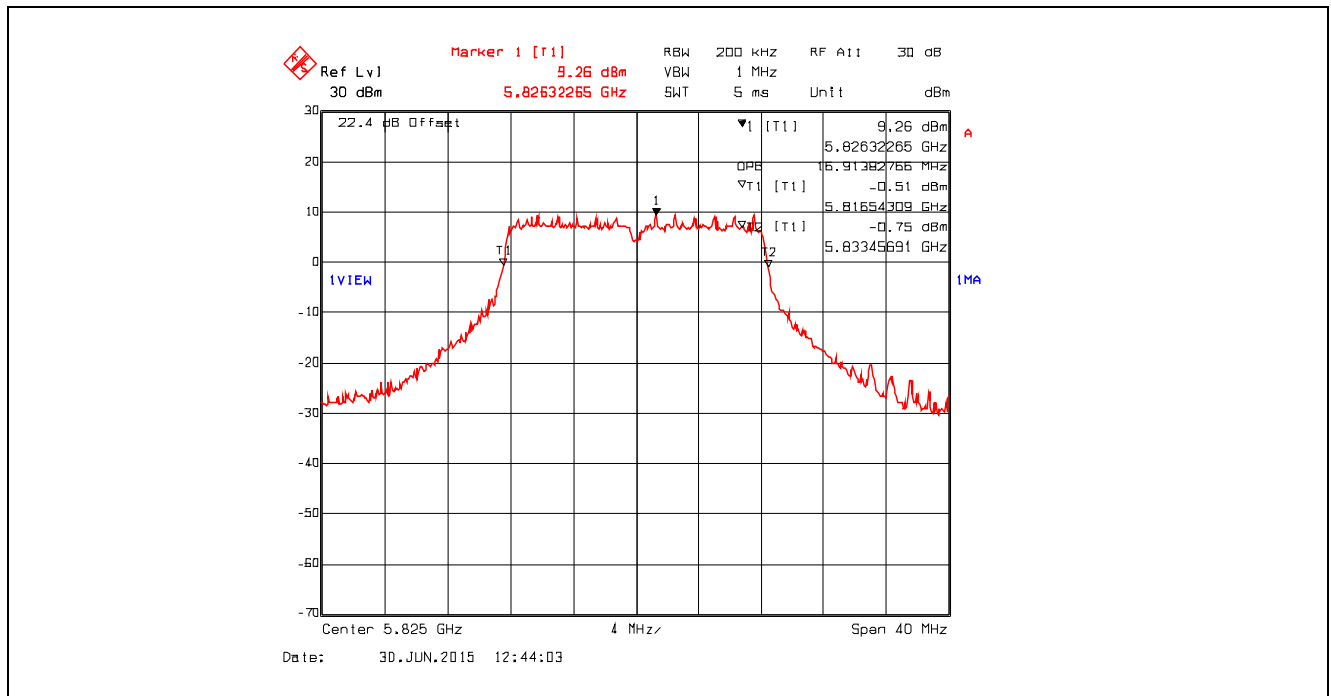
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All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

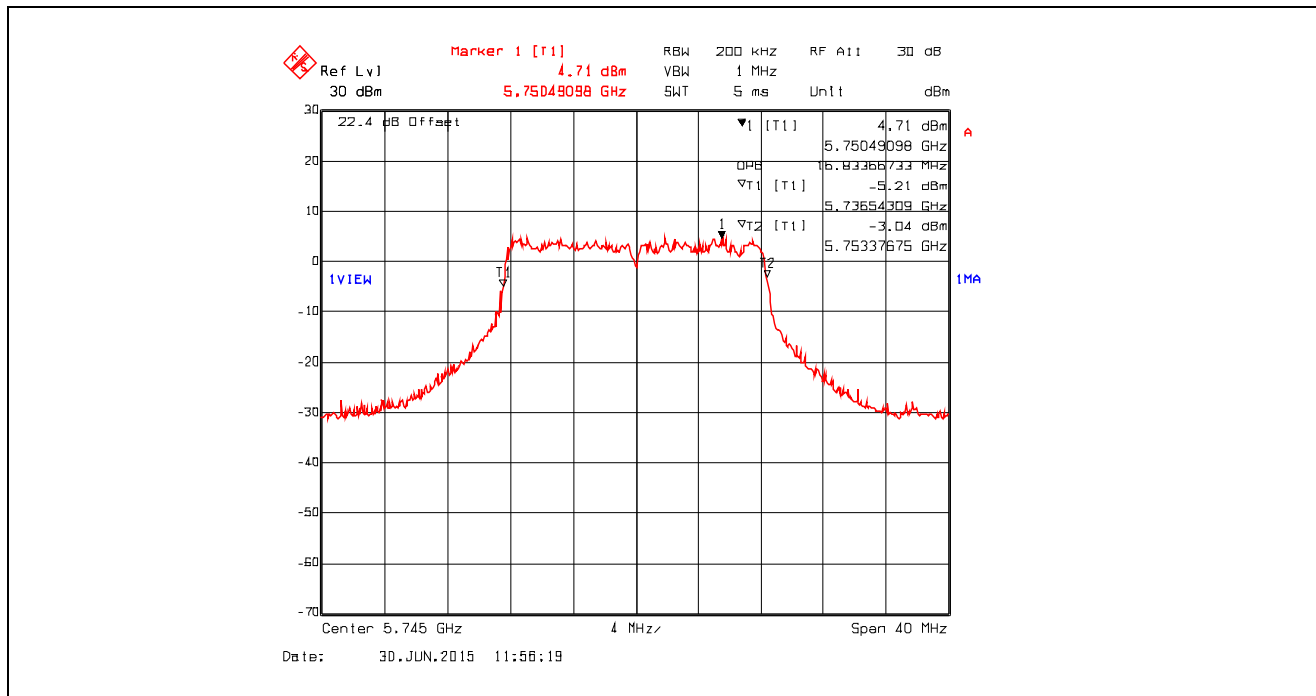
Plot 5.6.4.3.11. 99% Occupied Bandwidth, Data Rate 2, Chain # 1, Ch 165, 5825 MHz, Software Output Power Setting 18



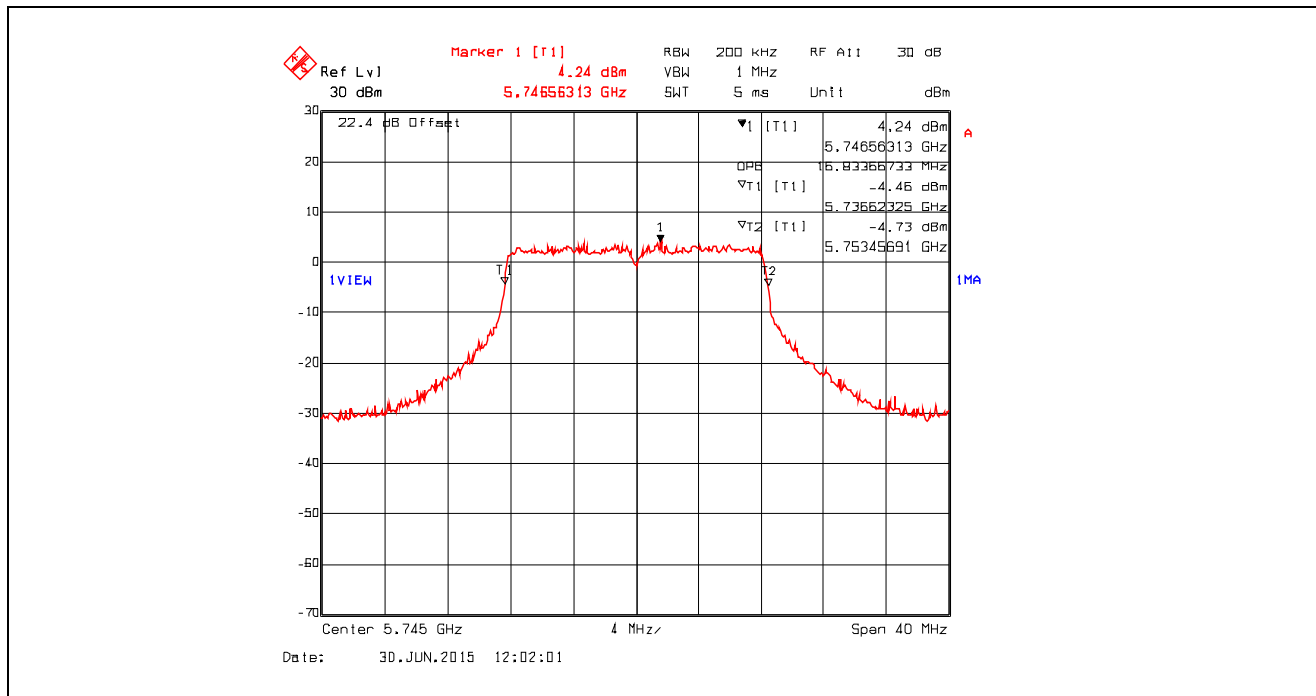
Plot 5.6.4.3.12. 99% Occupied Bandwidth, Data Rate 2, Chain # 2, Ch 165, 5825 MHz, Software Output Power Setting 18



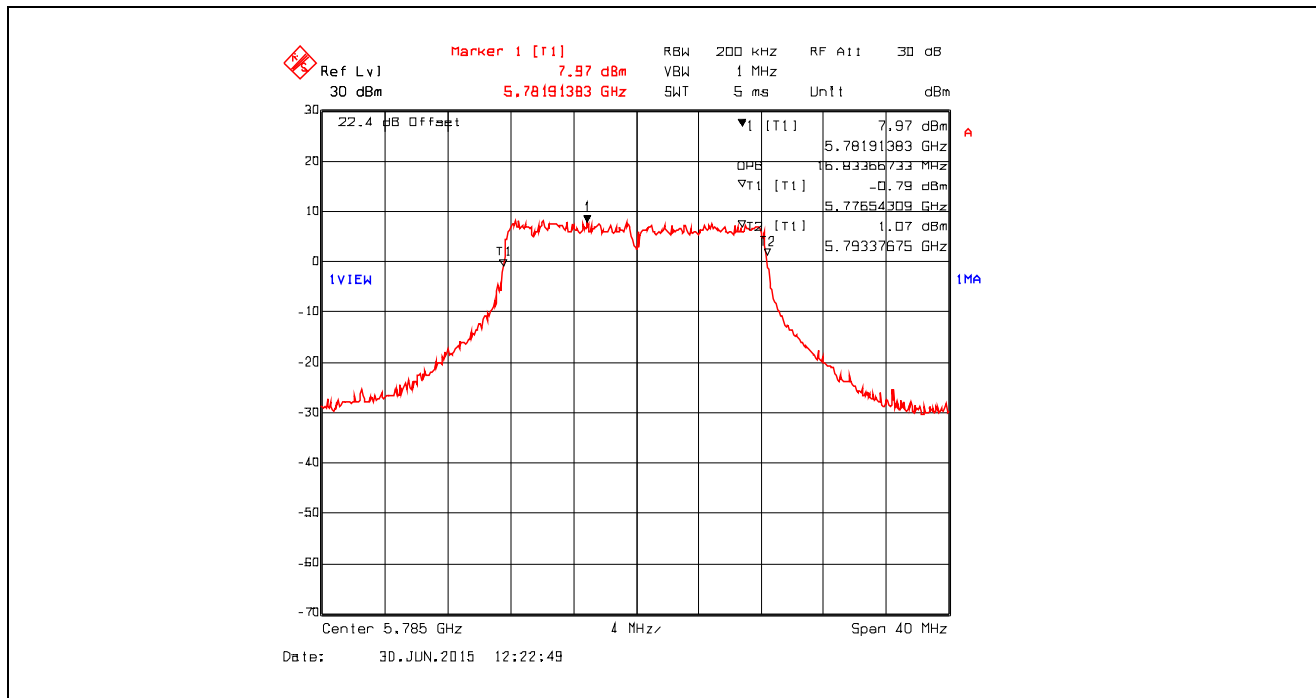
Plot 5.6.4.3.13. 99% Occupied Bandwidth, Data Rate 3, Chain # 1, Ch 149, 5745 MHz, Software Output Power Setting 13



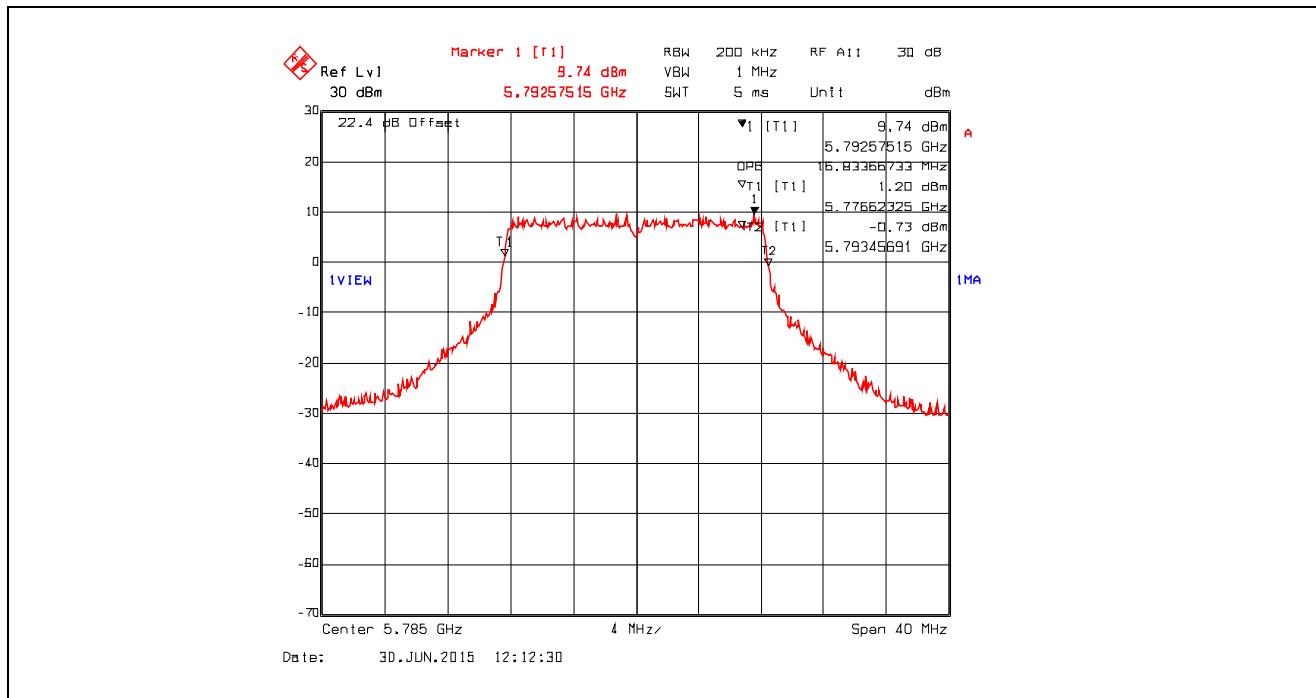
Plot 5.6.4.3.14. 99% Occupied Bandwidth, Data Rate 3, Chain # 2, Ch 149, 5745 MHz, Software Output Power Setting 13



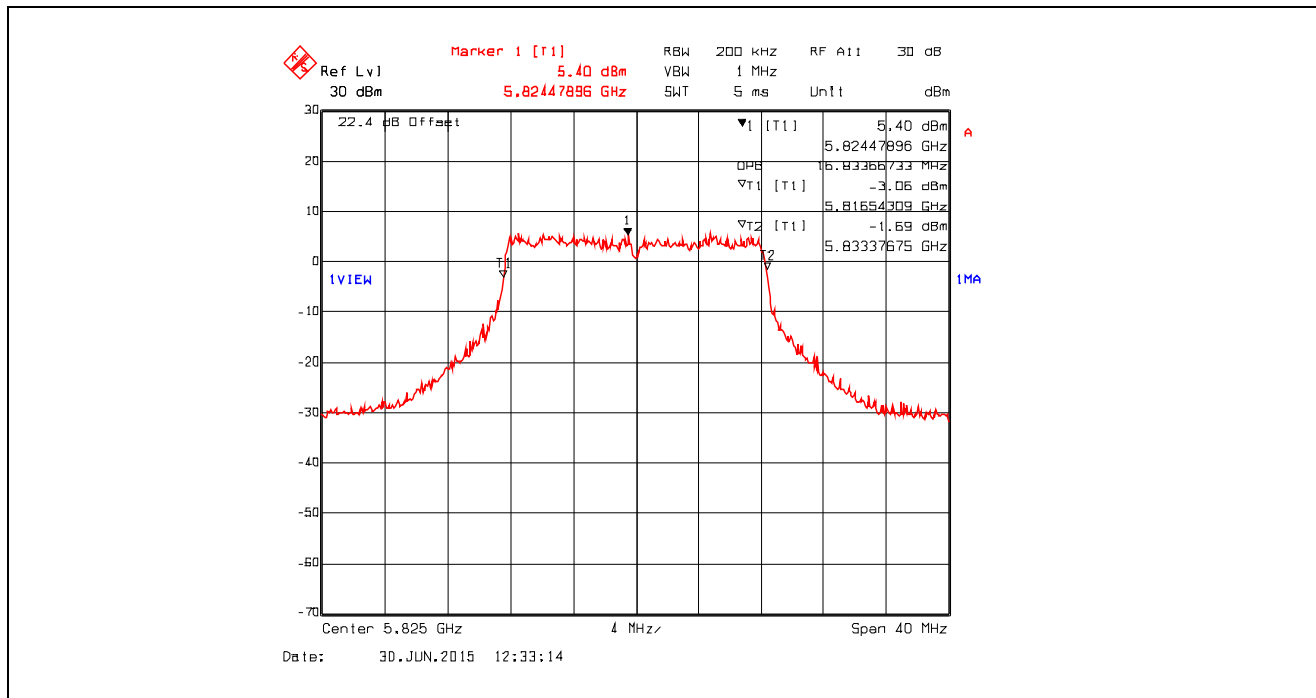
Plot 5.6.4.3.15. 99% Occupied Bandwidth, Data Rate 3, Chain # 1, Ch 157, 5785 MHz, Software Output Power Setting 19



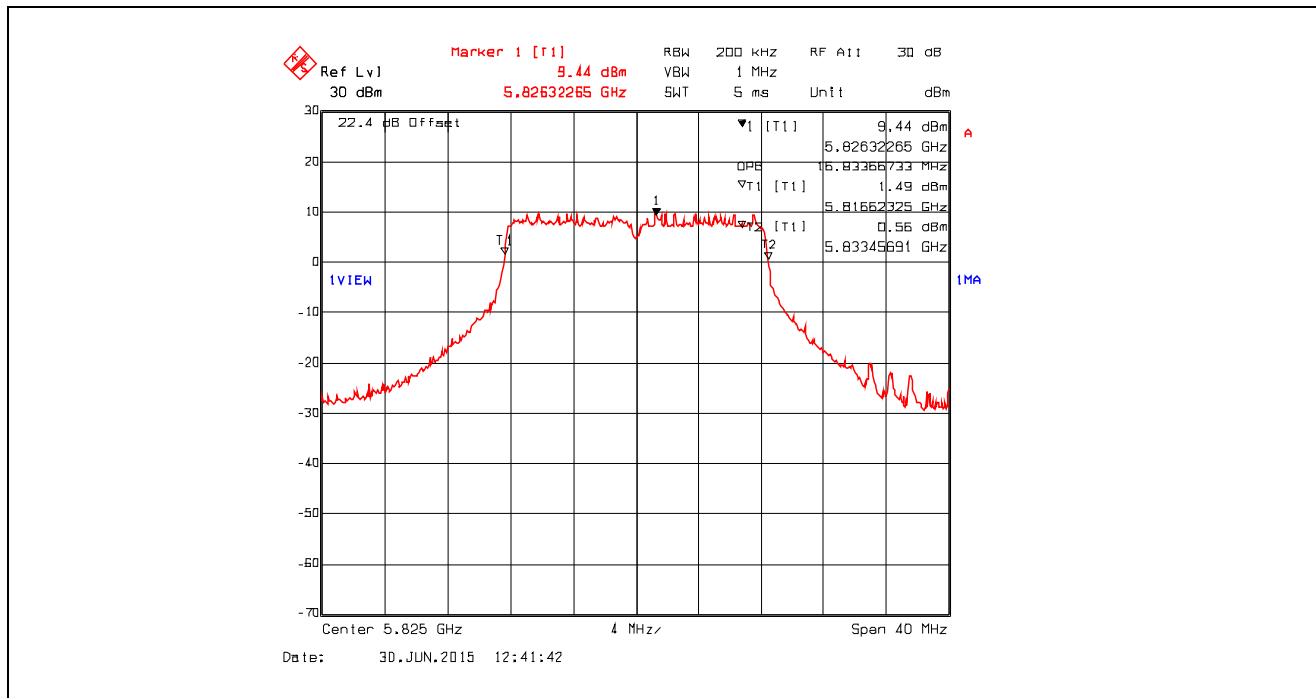
Plot 5.6.4.3.16. 99% Occupied Bandwidth, Data Rate 3, Chain # 2, Ch 157, 5785 MHz, Software Output Power Setting 19



Plot 5.6.4.3.17. 99% Occupied Bandwidth, Data Rate 3, Chain # 1, Ch 165, 5825 MHz, Software Output Power Setting 18



Plot 5.6.4.3.18. 99% Occupied Bandwidth, Data Rate 3, Chain # 2, Ch 165, 5825 MHz, Software Output Power Setting 18



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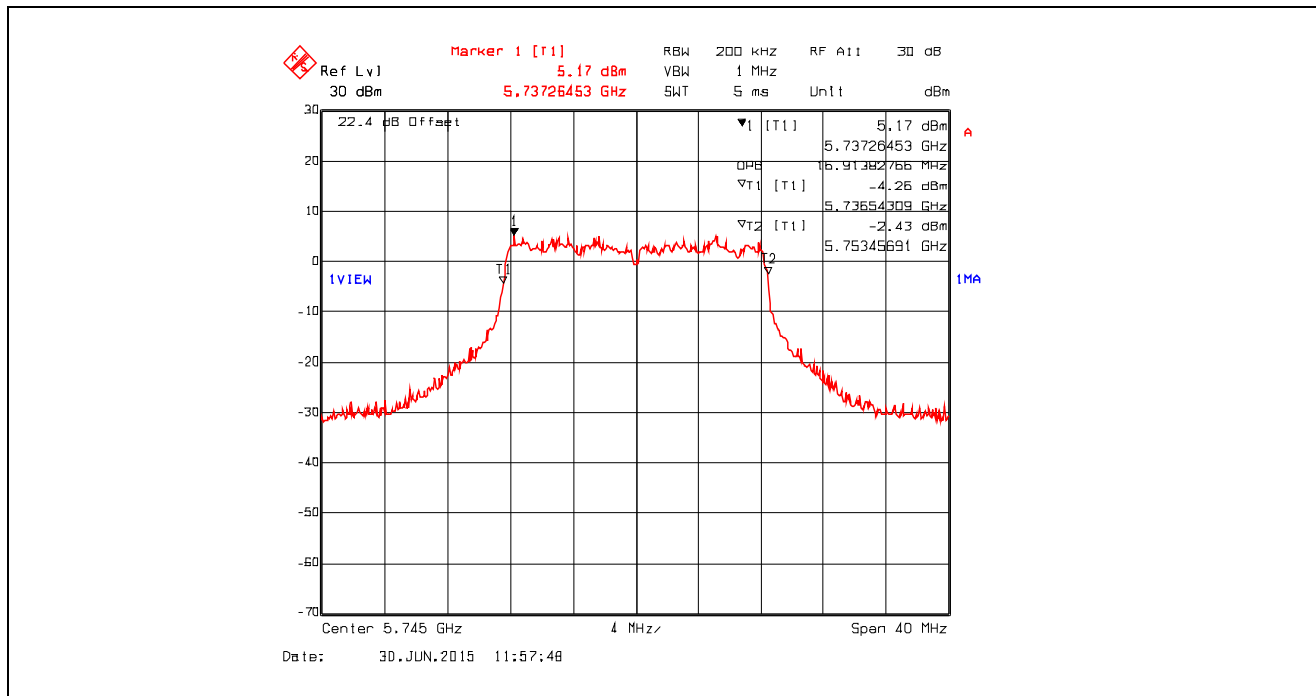
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

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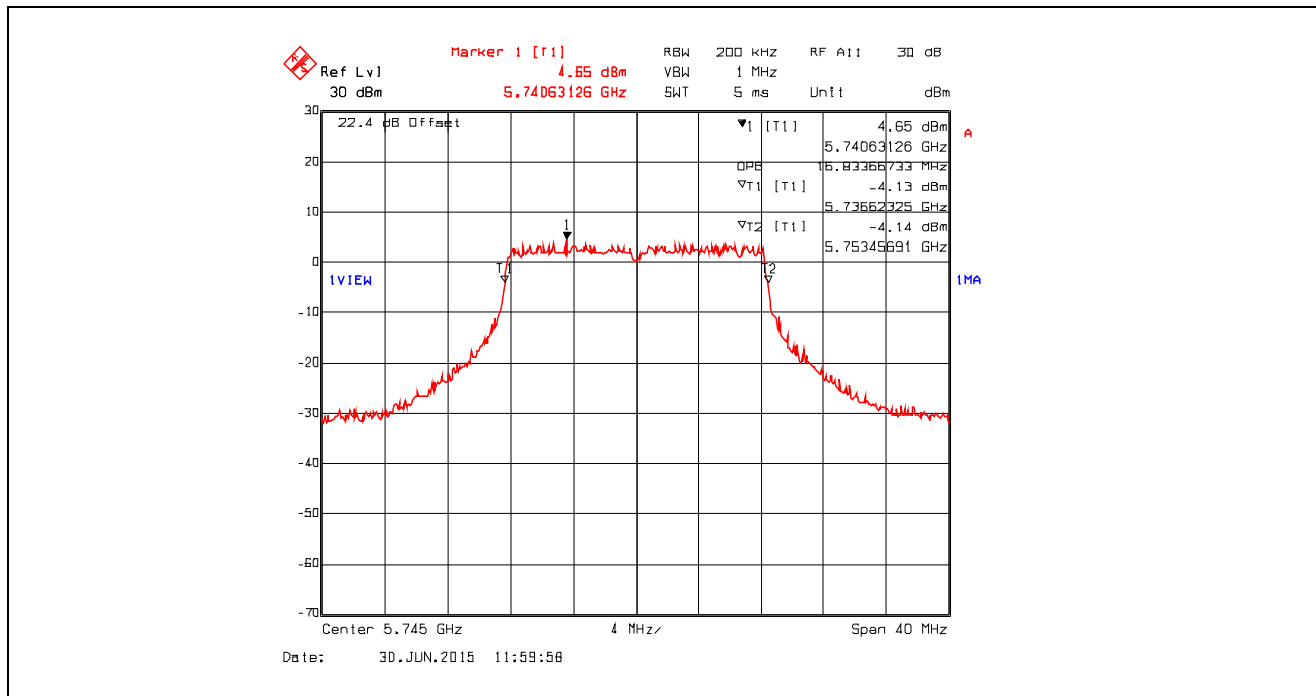
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Plot 5.6.4.3.19. 99% Occupied Bandwidth, Data Rate 4, Chain # 1, Ch 149, 5745 MHz, Software Output Power Setting 13



Plot 5.6.4.3.20. 99% Occupied Bandwidth, Data Rate 4, Chain # 2, Ch 149, 5745 MHz, Software Output Power Setting 13



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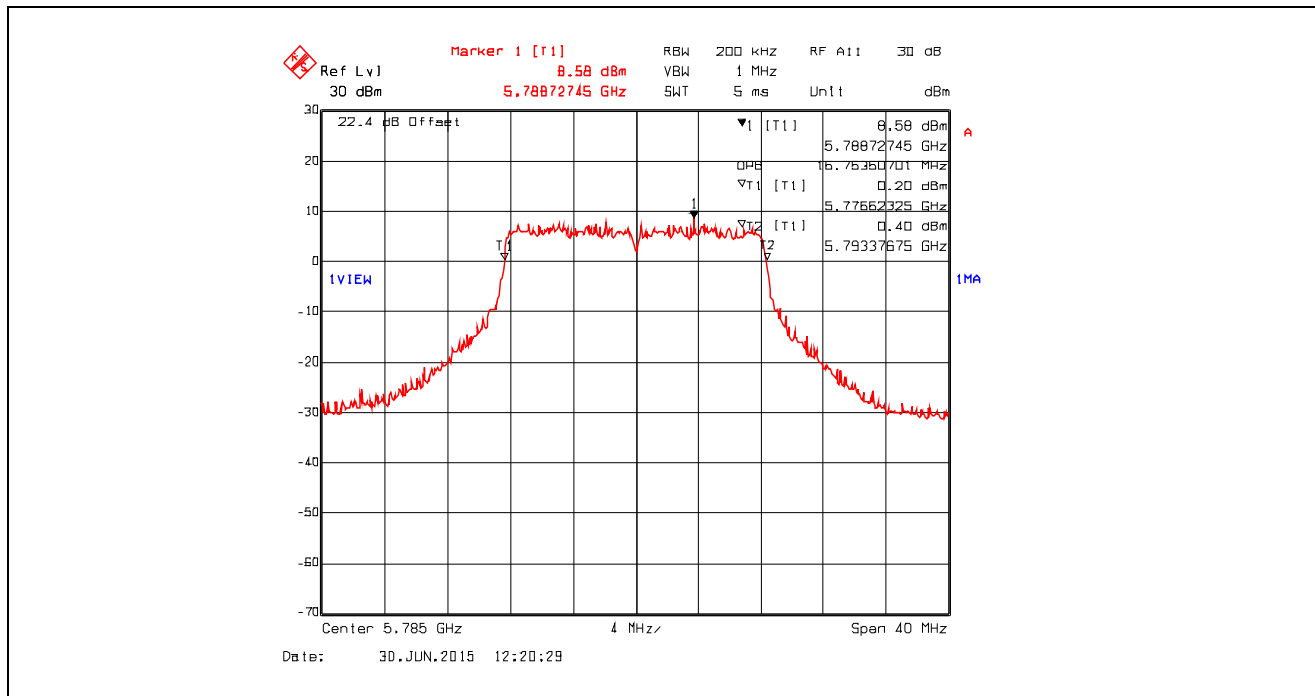
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

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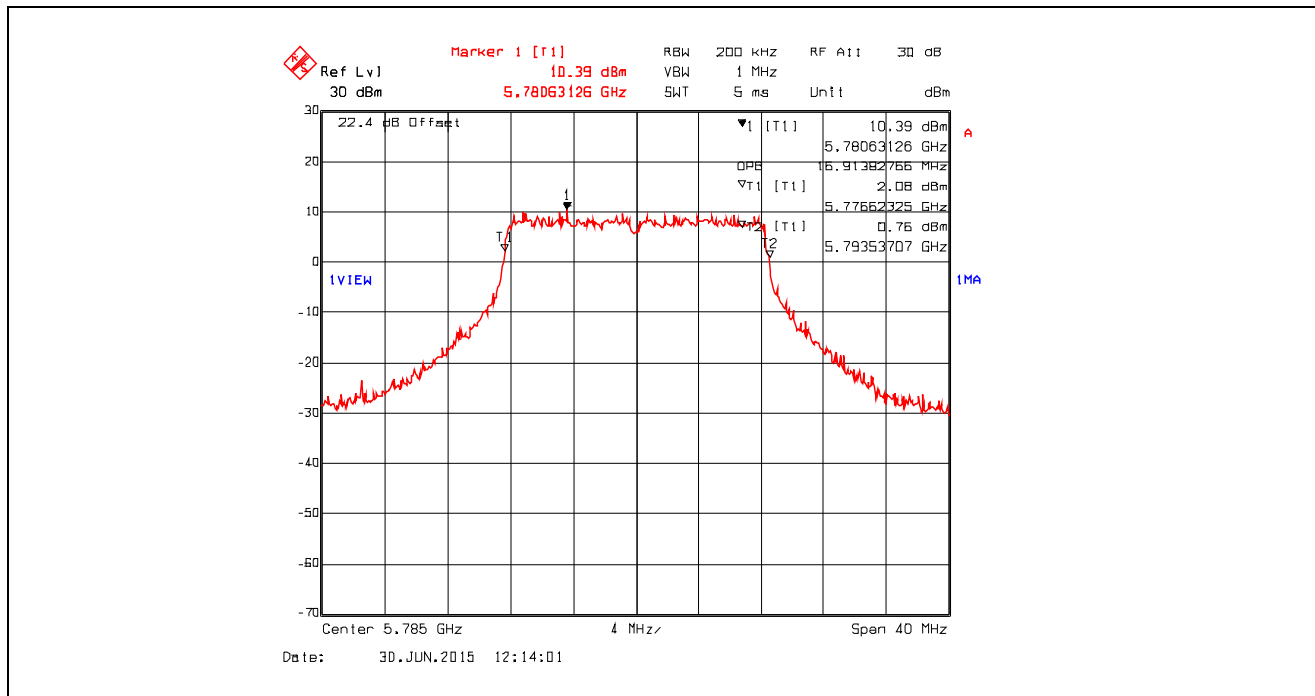
November 16, 2015

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

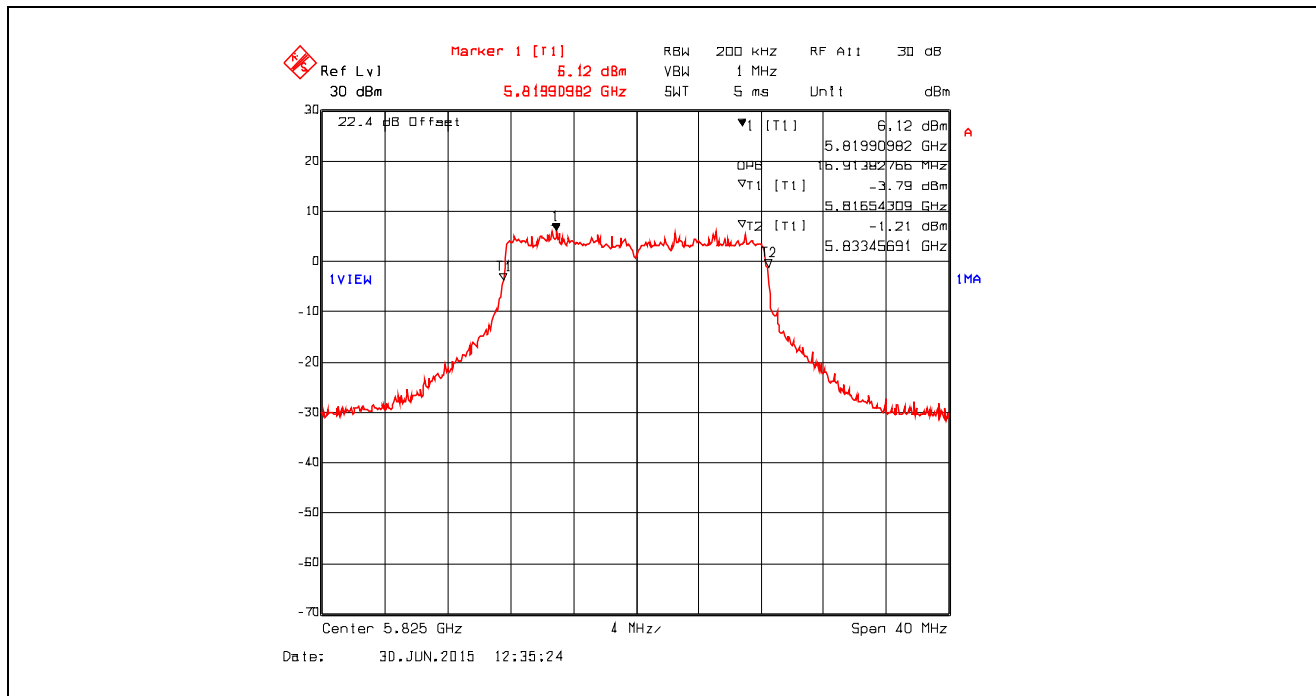
Plot 5.6.4.3.21. 99% Occupied Bandwidth, Data Rate 4, Chain # 1, Ch 157, 5785 MHz, Software Output Power Setting 19



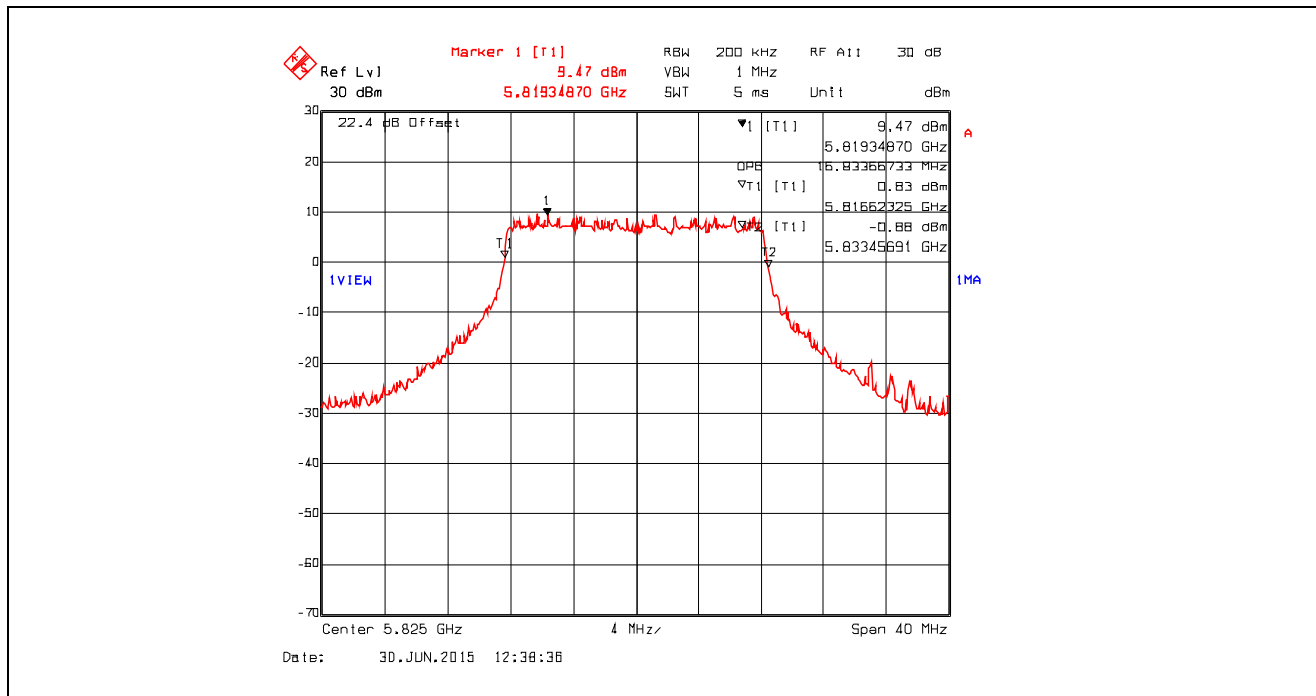
Plot 5.6.4.3.22. 99% Occupied Bandwidth, Data Rate 4, Chain # 2, Ch 157, 5785 MHz, Software Output Power Setting 19



Plot 5.6.4.3.23. 99% Occupied Bandwidth, Data Rate 4, Chain # 1, Ch 165, 5825 MHz, Software Output Power Setting 18



Plot 5.6.4.3.24. 99% Occupied Bandwidth, Data Rate 4, Chain # 2, Ch 165, 5825 MHz, Software Output Power Setting 18



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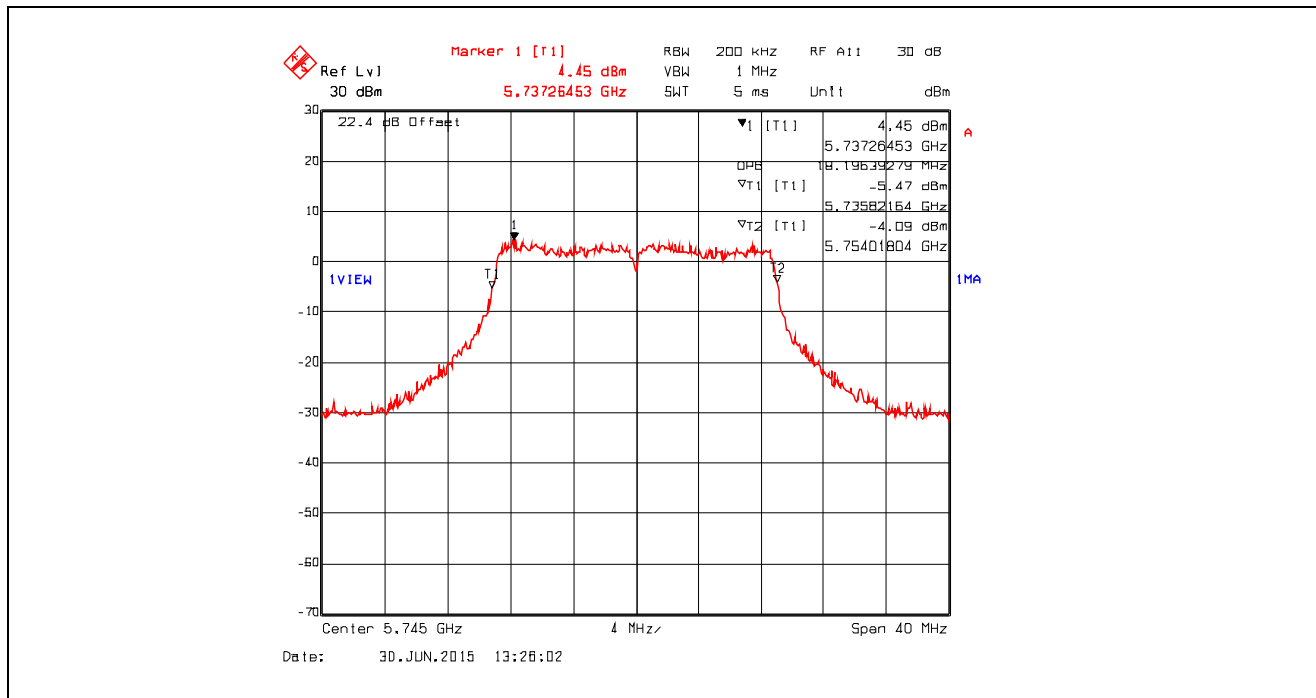
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

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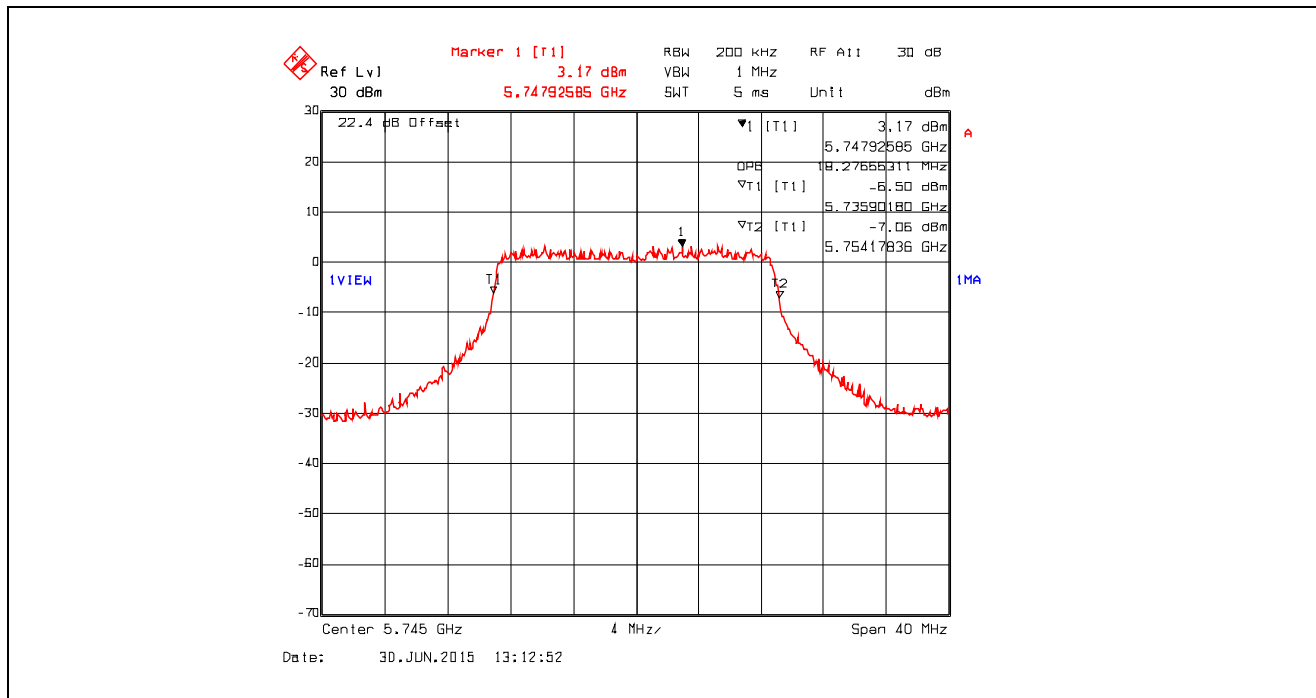
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Plot 5.6.4.3.25. 99% Occupied Bandwidth, Data Rate 5, Chain # 1, Ch 149, 5745 MHz, Software Output Power Setting 13



Plot 5.6.4.3.26. 99% Occupied Bandwidth, Data Rate 5, Chain # 2, Ch 149, 5745 MHz, Software Output Power Setting 13



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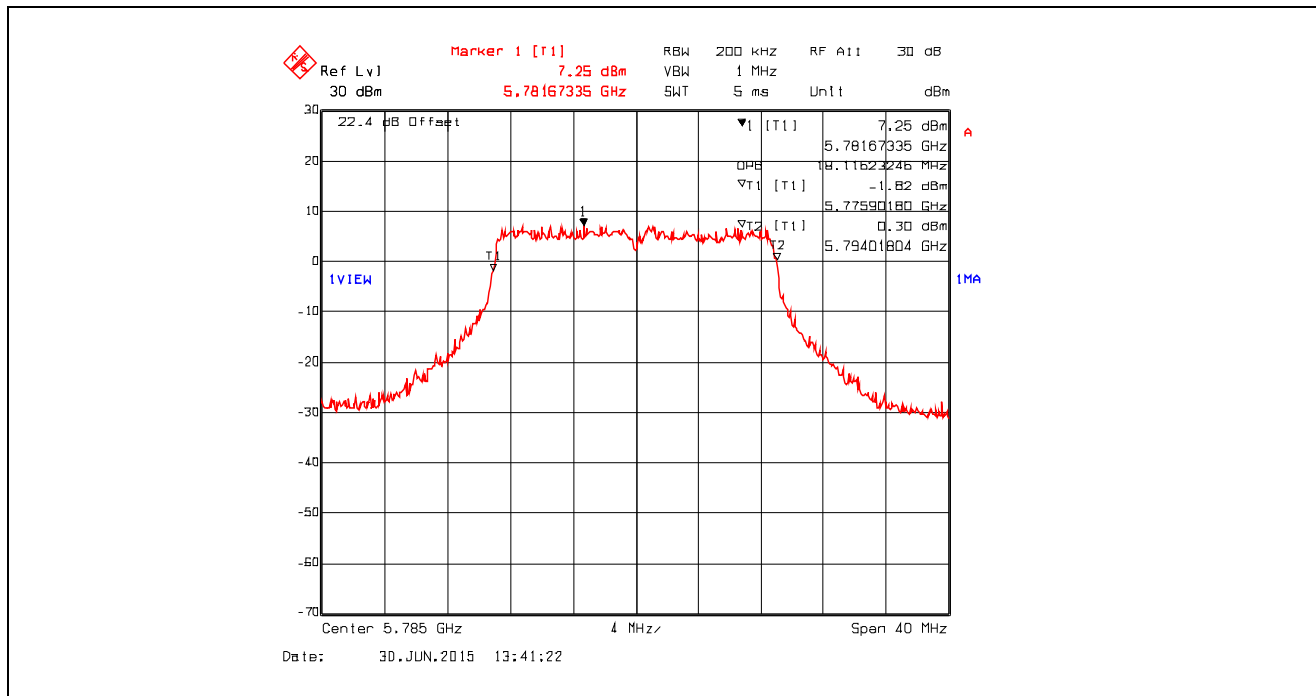
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

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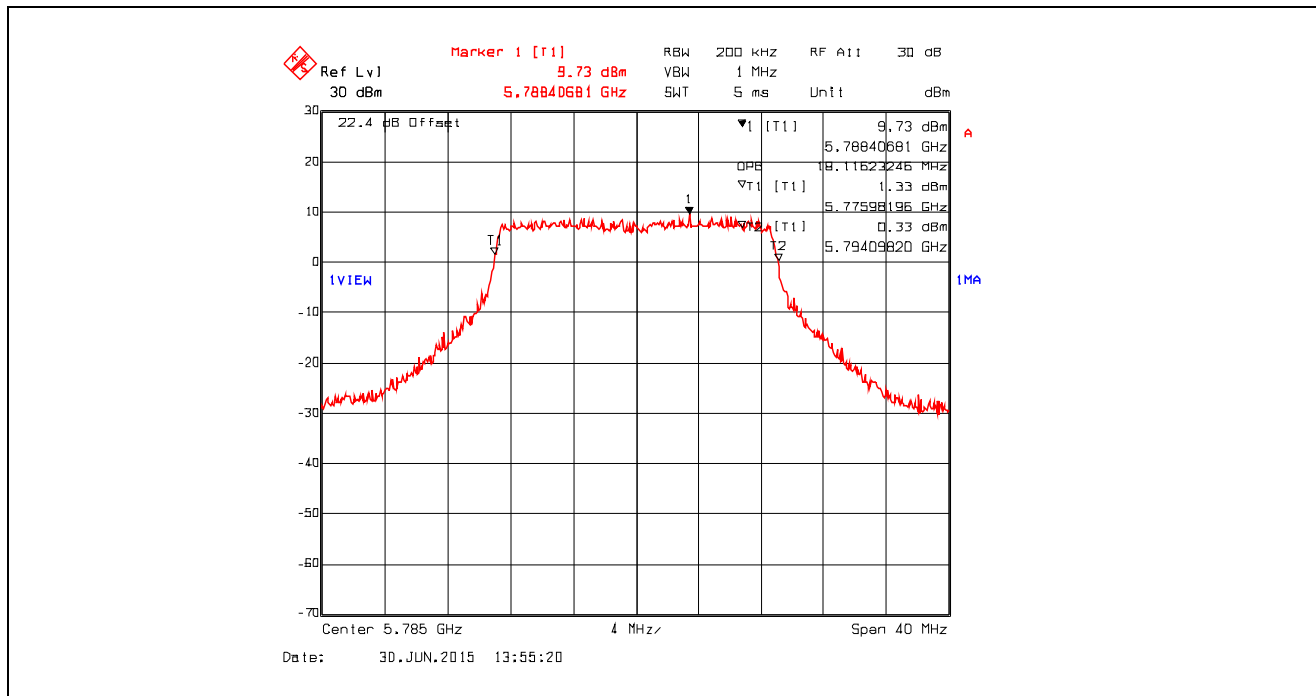
November 16, 2015

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

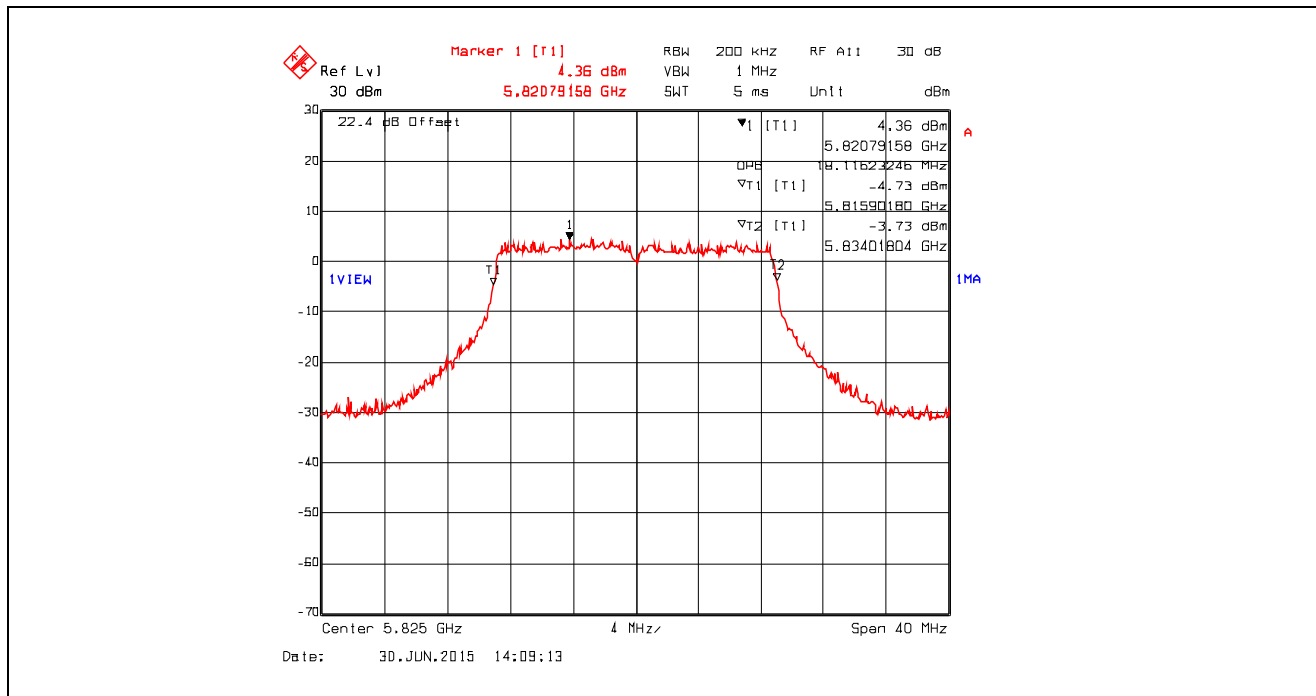
Plot 5.6.4.3.27. 99% Occupied Bandwidth, Data Rate 5, Chain # 1, Ch 157, 5785 MHz, Software Output Power Setting 19



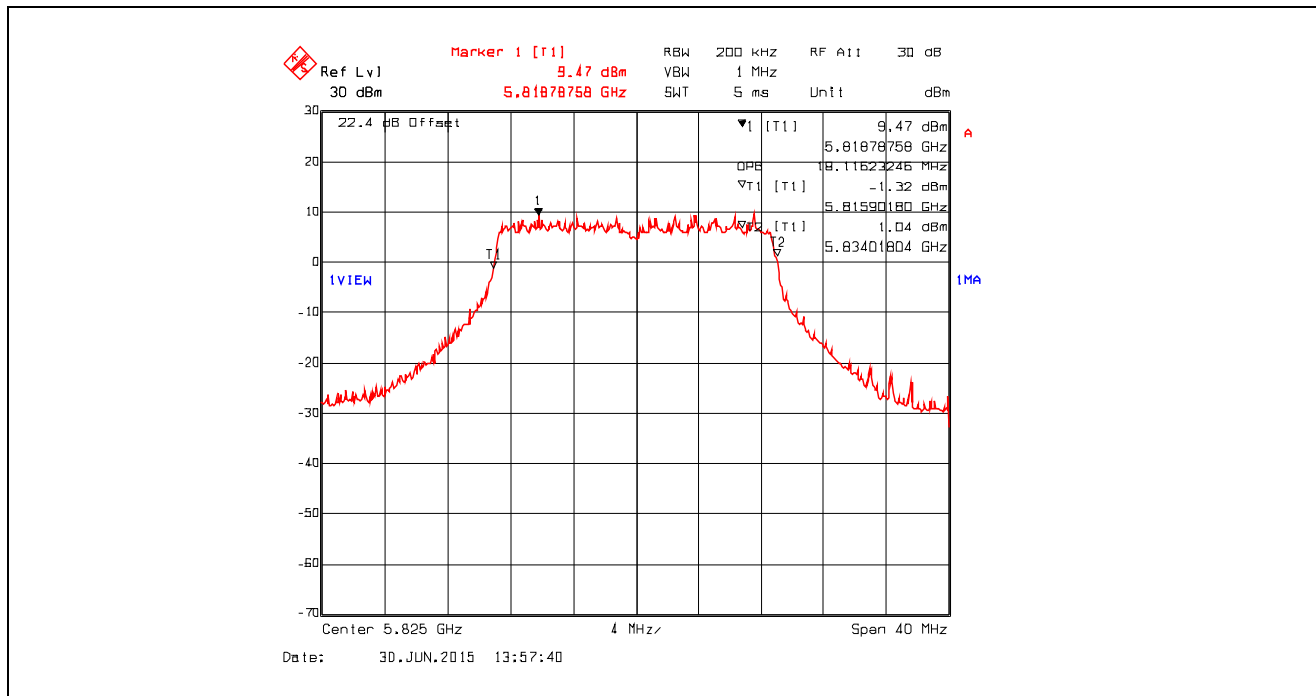
Plot 5.6.4.3.28. 99% Occupied Bandwidth, Data Rate 5, Chain # 2, Ch 157, 5785 MHz, Software Output Power Setting 19



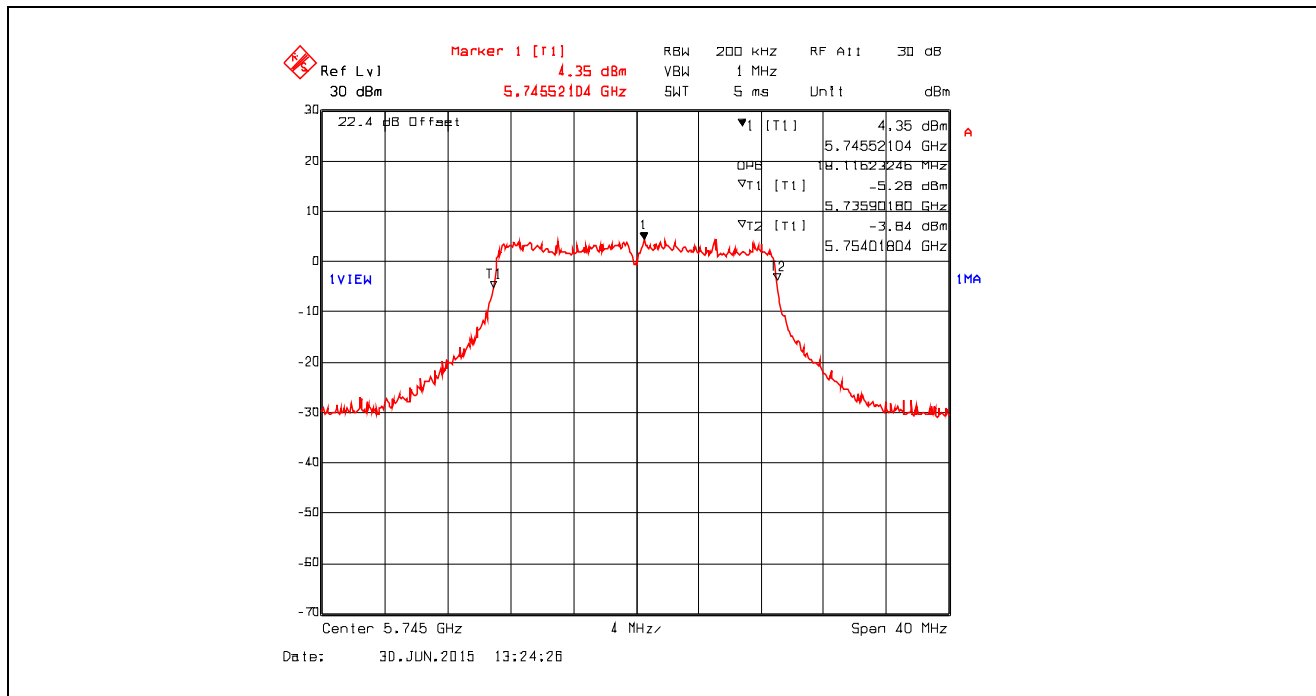
Plot 5.6.4.3.29. 99% Occupied Bandwidth, Data Rate 5, Chain # 1, Ch 165, 5825 MHz, Software Output Power Setting 18



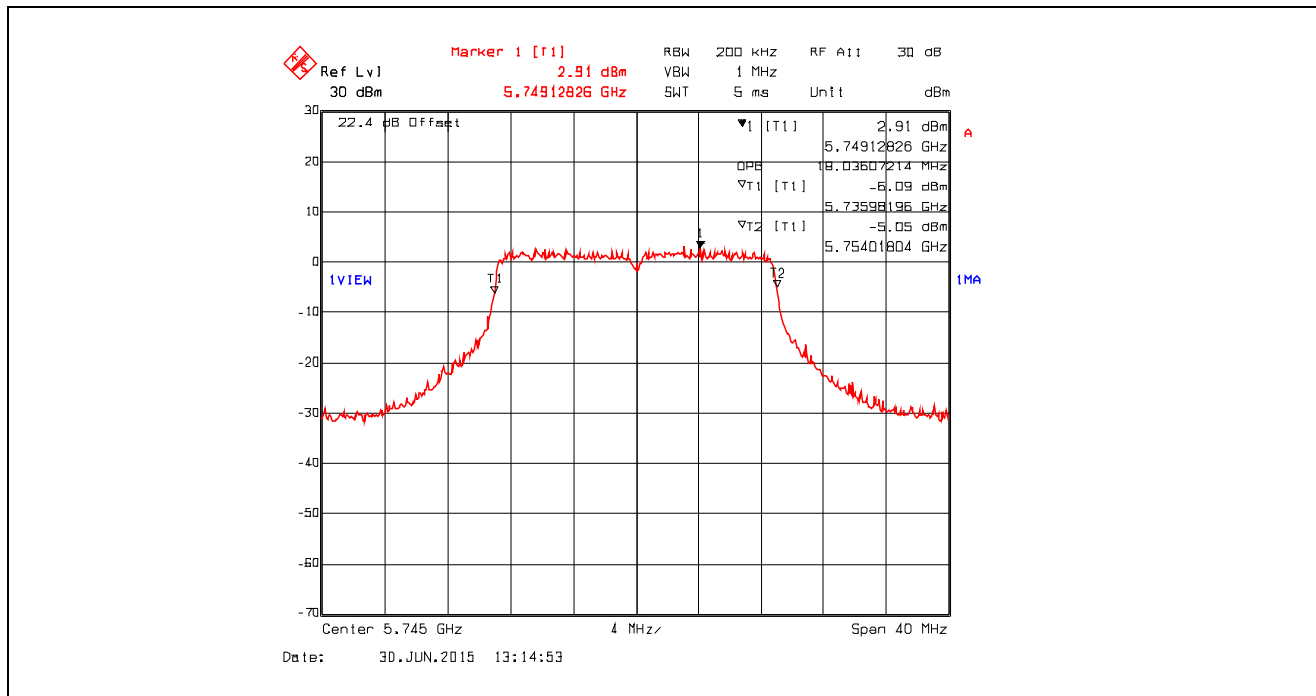
Plot 5.6.4.3.30. 99% Occupied Bandwidth, Data Rate 5, Chain # 2, Ch 165, 5825 MHz, Software Output Power Setting 18



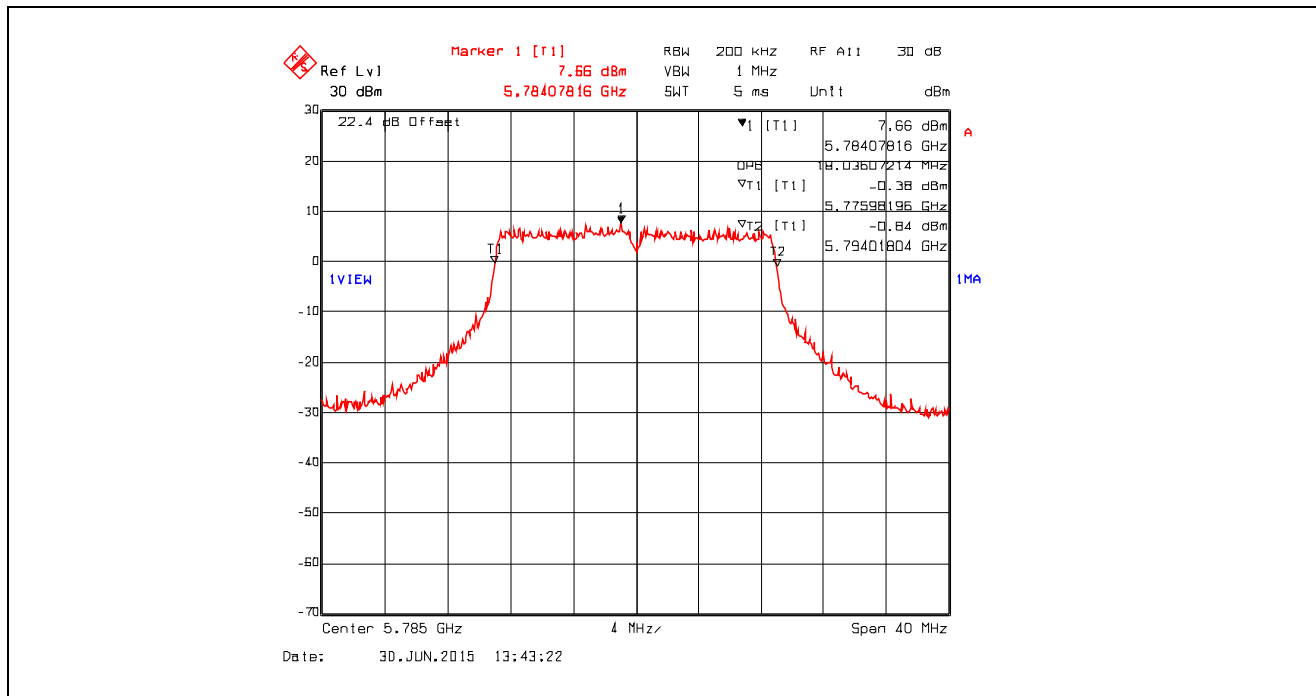
Plot 5.6.4.3.31. 99% Occupied Bandwidth, Data Rate 6, Chain # 1, Ch 149, 5745 MHz, Software Output Power Setting 13



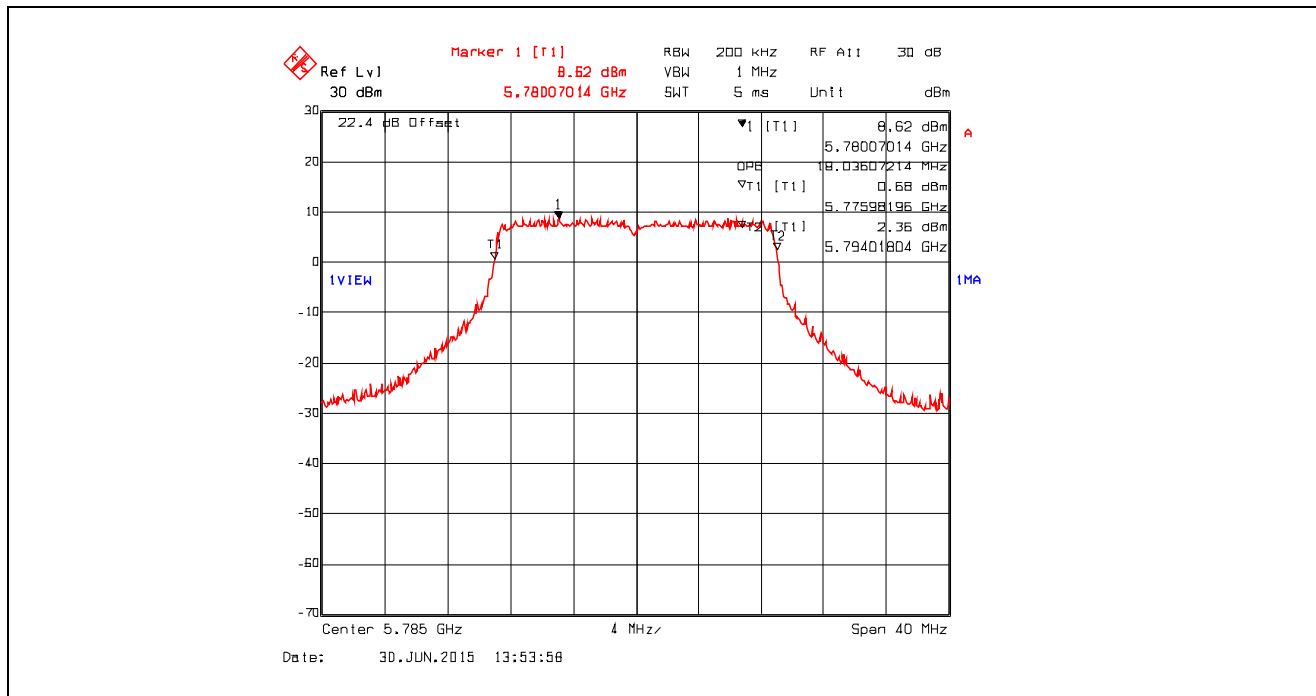
Plot 5.6.4.3.32. 99% Occupied Bandwidth, Data Rate 6, Chain # 2, Ch 149, 5745 MHz, Software Output Power Setting 13



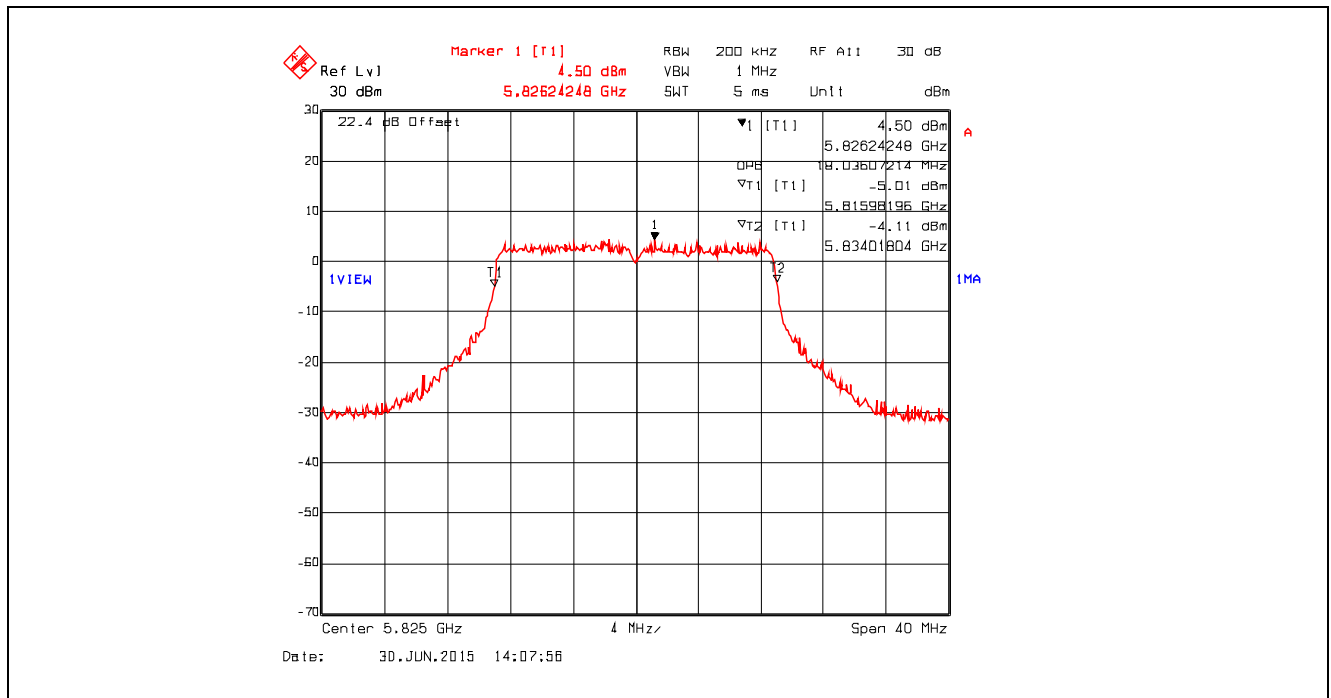
Plot 5.6.4.3.33. 99% Occupied Bandwidth, Data Rate 6, Chain # 1, Ch 157, 5785 MHz, Software Output Power Setting 19



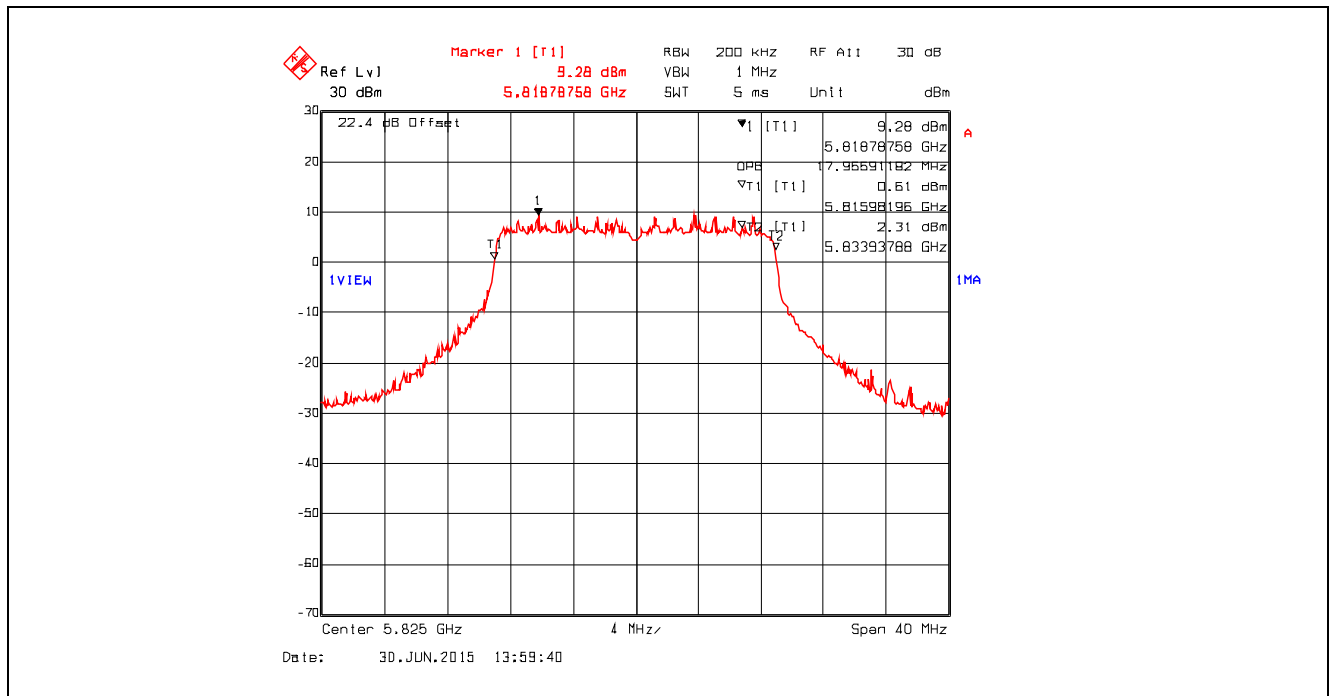
Plot 5.6.4.3.34. 99% Occupied Bandwidth, Data Rate 6, Chain # 2, Ch 157, 5785 MHz, Software Output Power Setting 19



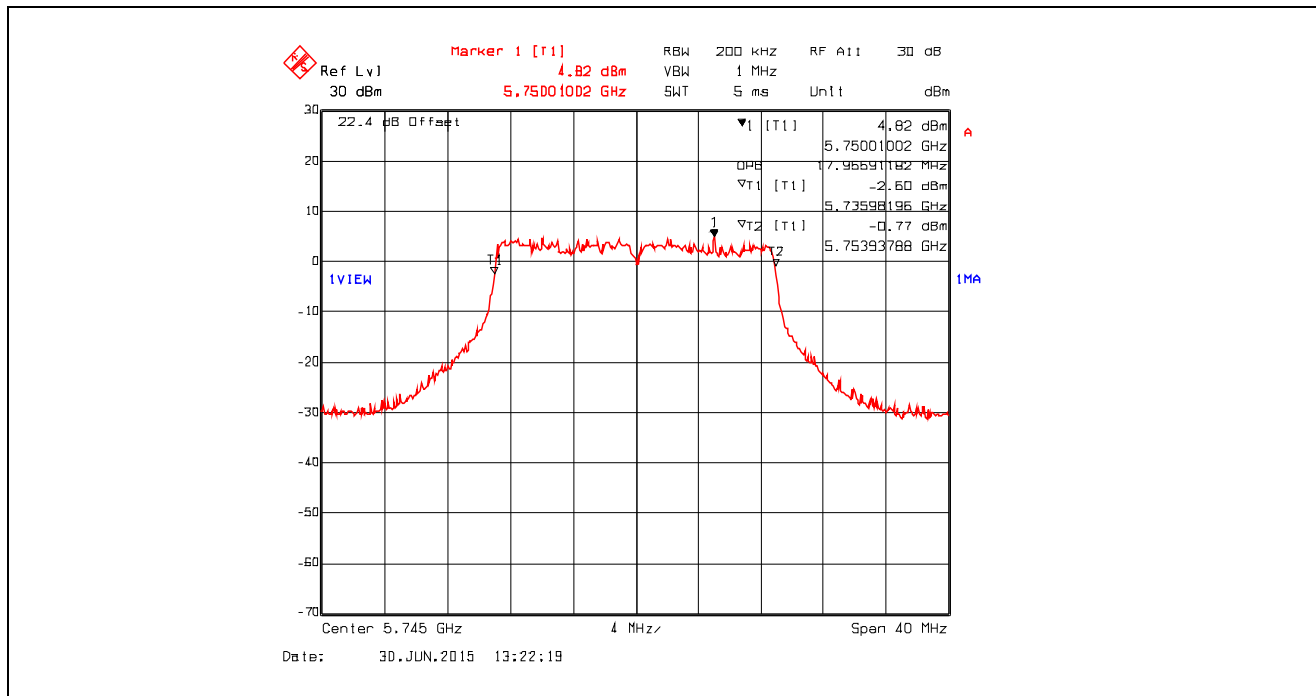
Plot 5.6.4.3.35. 99% Occupied Bandwidth, Data Rate 6, Chain # 1, Ch 165, 5825 MHz, Software Output Power Setting 18



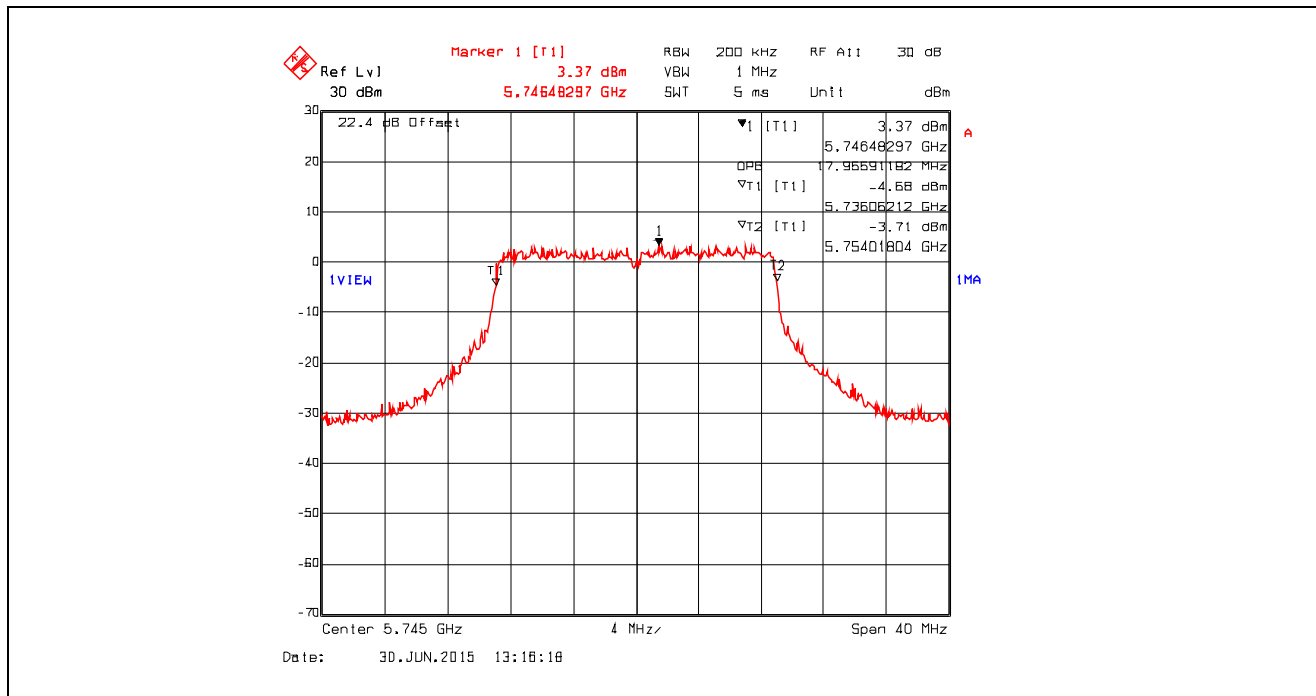
Plot 5.6.4.3.36. 99% Occupied Bandwidth, Data Rate 6, Chain # 2, Ch 165, 5825 MHz, Software Output Power Setting 18



Plot 5.6.4.3.37. 99% Occupied Bandwidth, Data Rate 7, Chain # 1, Ch 149, 5745 MHz, Software Output Power Setting 13



Plot 5.6.4.3.38. 99% Occupied Bandwidth, Data Rate 7, Chain # 2, Ch 149, 5745 MHz, Software Output Power Setting 13



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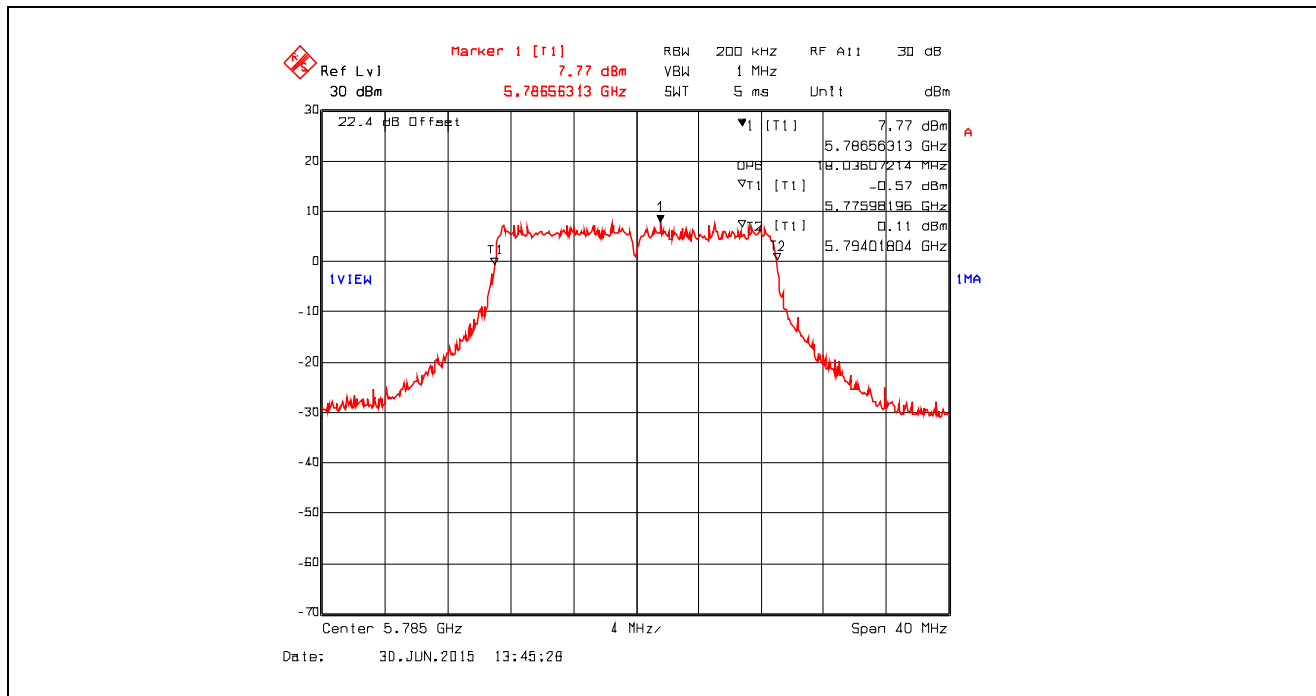
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

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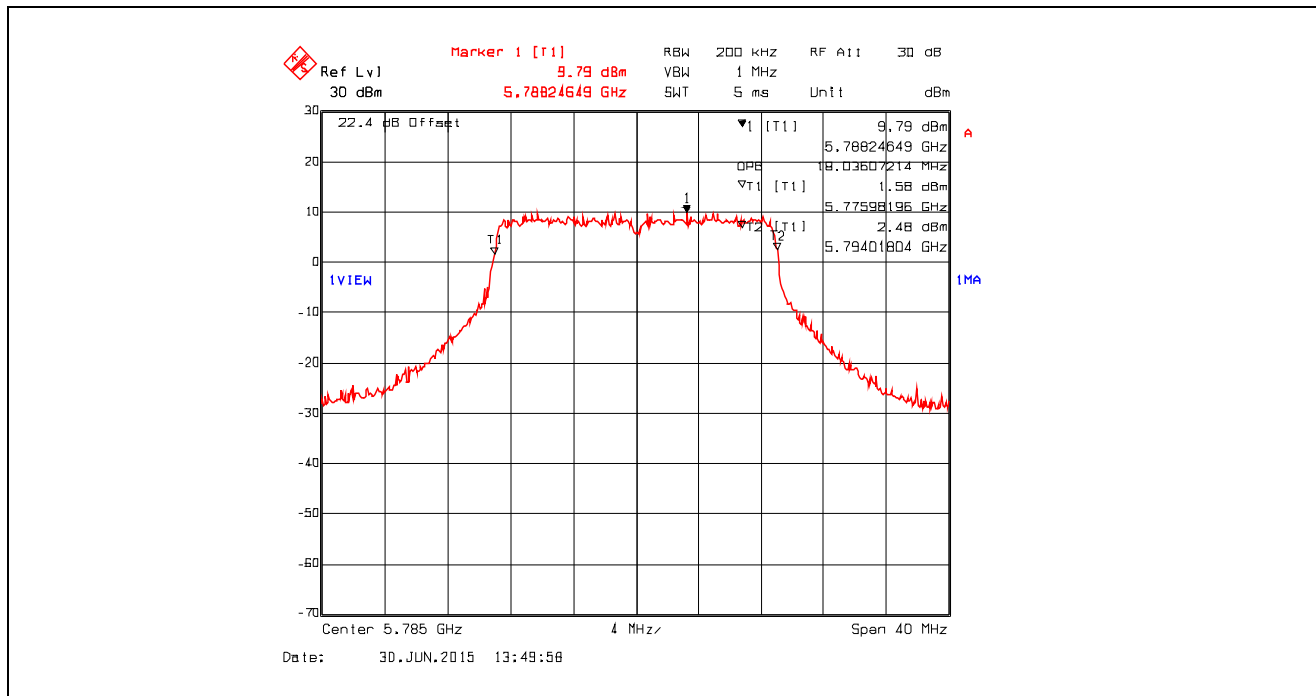
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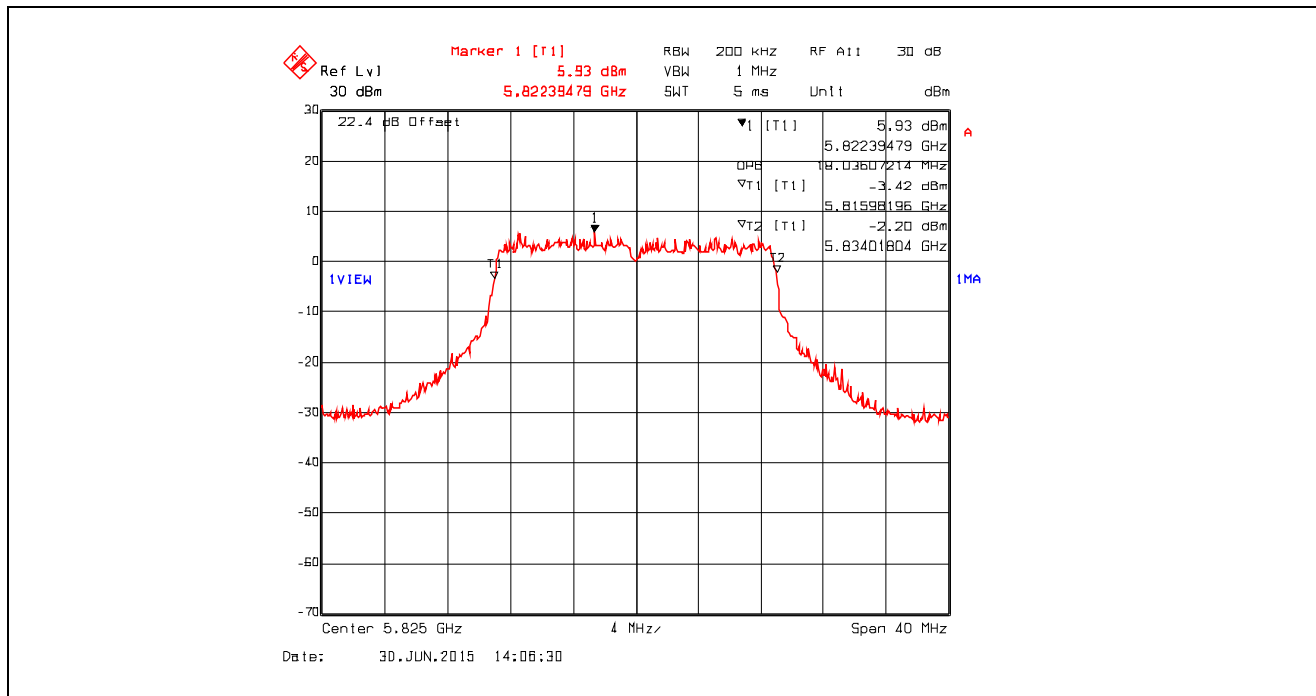
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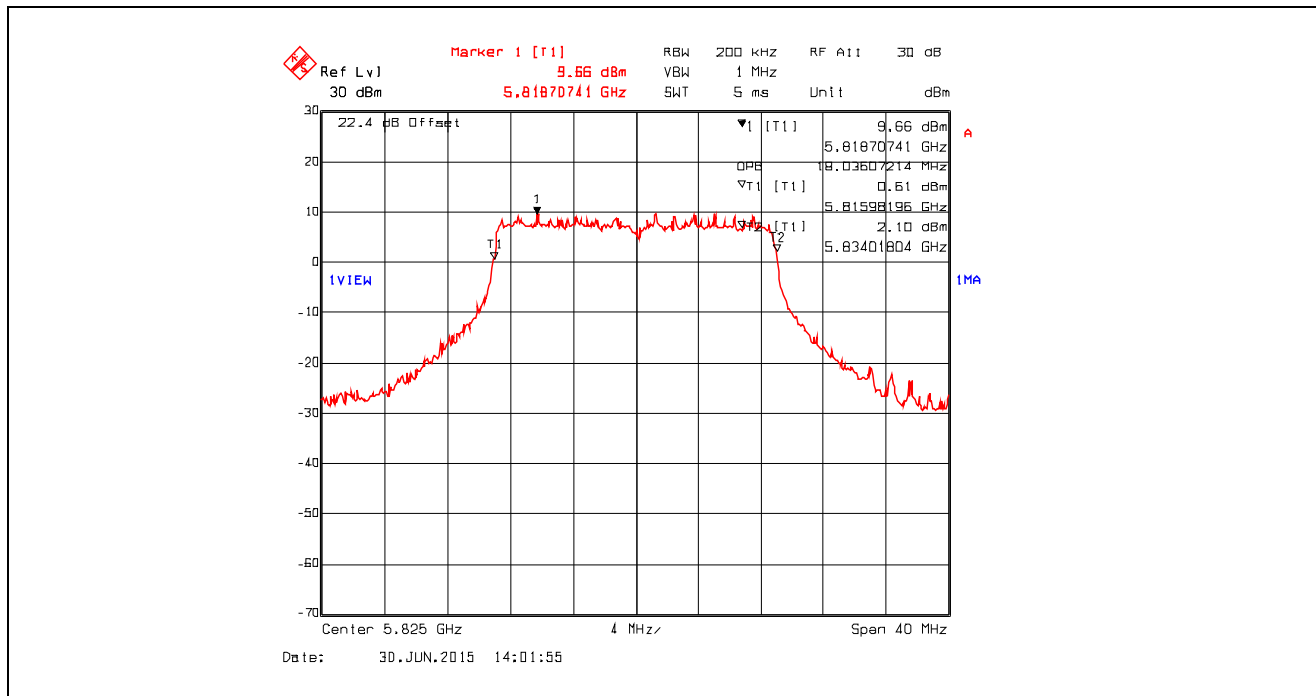
Plot 5.6.4.3.40. 99% Occupied Bandwidth, Data Rate 7, Chain # 2, Ch 157, 5785 MHz, Software Output Power Setting 19



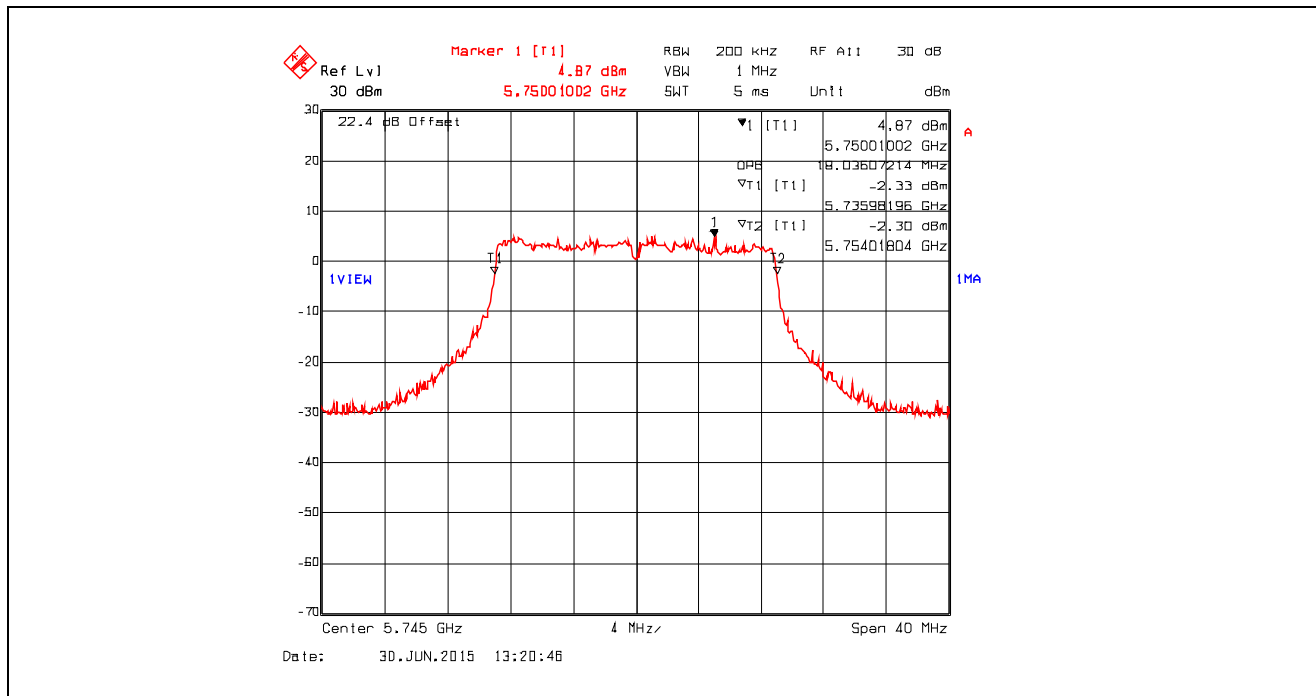
Plot 5.6.4.3.41. 99% Occupied Bandwidth, Data Rate 7, Chain # 1, Ch 165, 5825 MHz, Software Output Power Setting 18



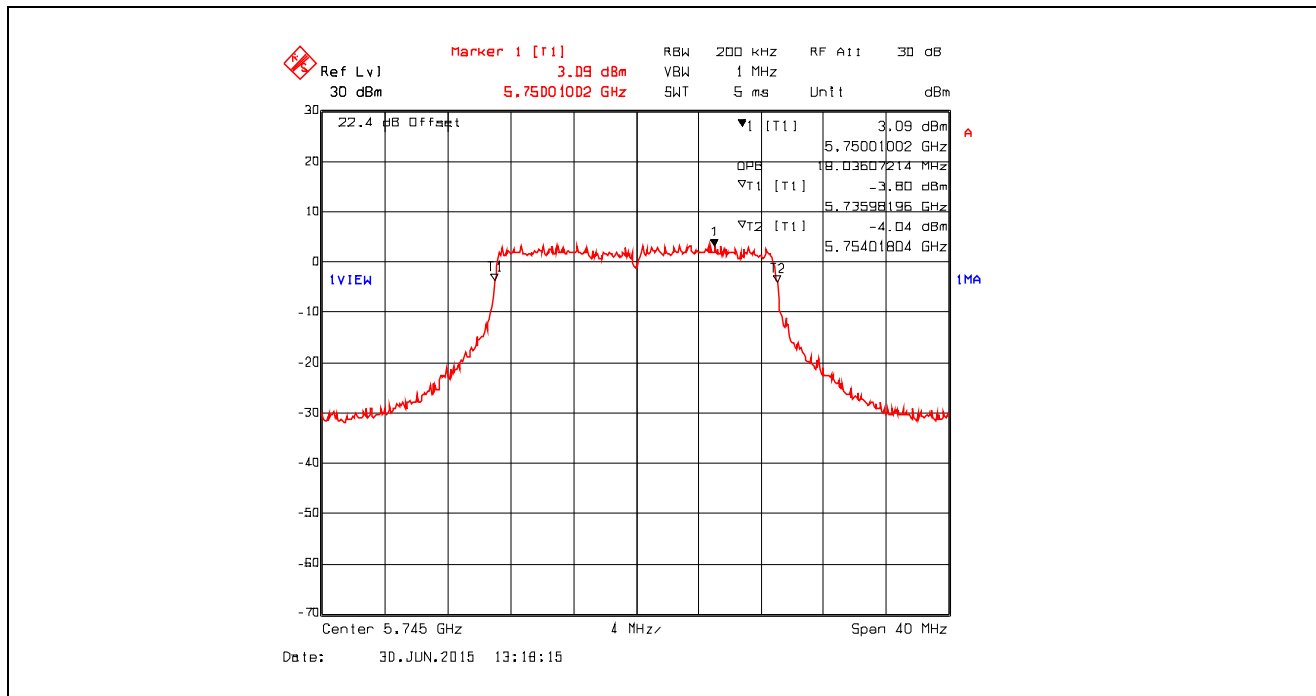
Plot 5.6.4.3.42. 99% Occupied Bandwidth, Data Rate 7, Chain # 2, Ch 165, 5825 MHz, Software Output Power Setting 18



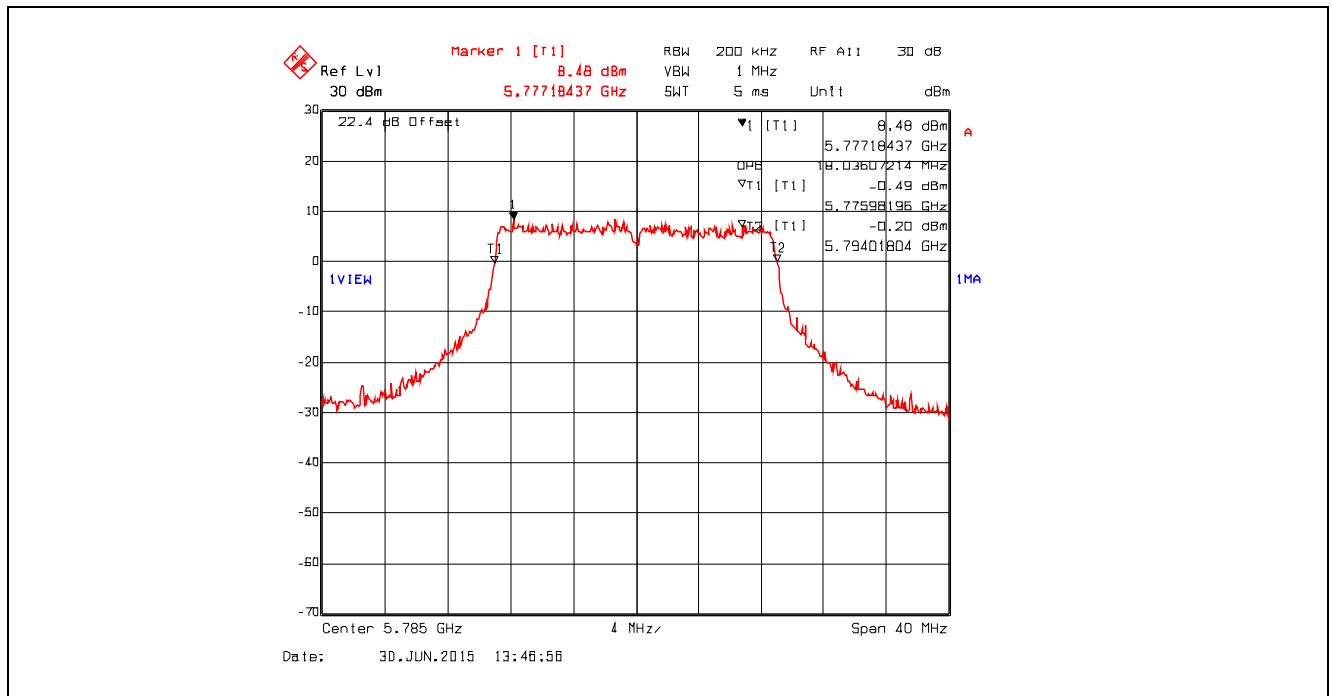
Plot 5.6.4.3.43. 99% Occupied Bandwidth, Data Rate 8, Chain # 1, Ch 149, 5745 MHz, Software Output Power Setting 13



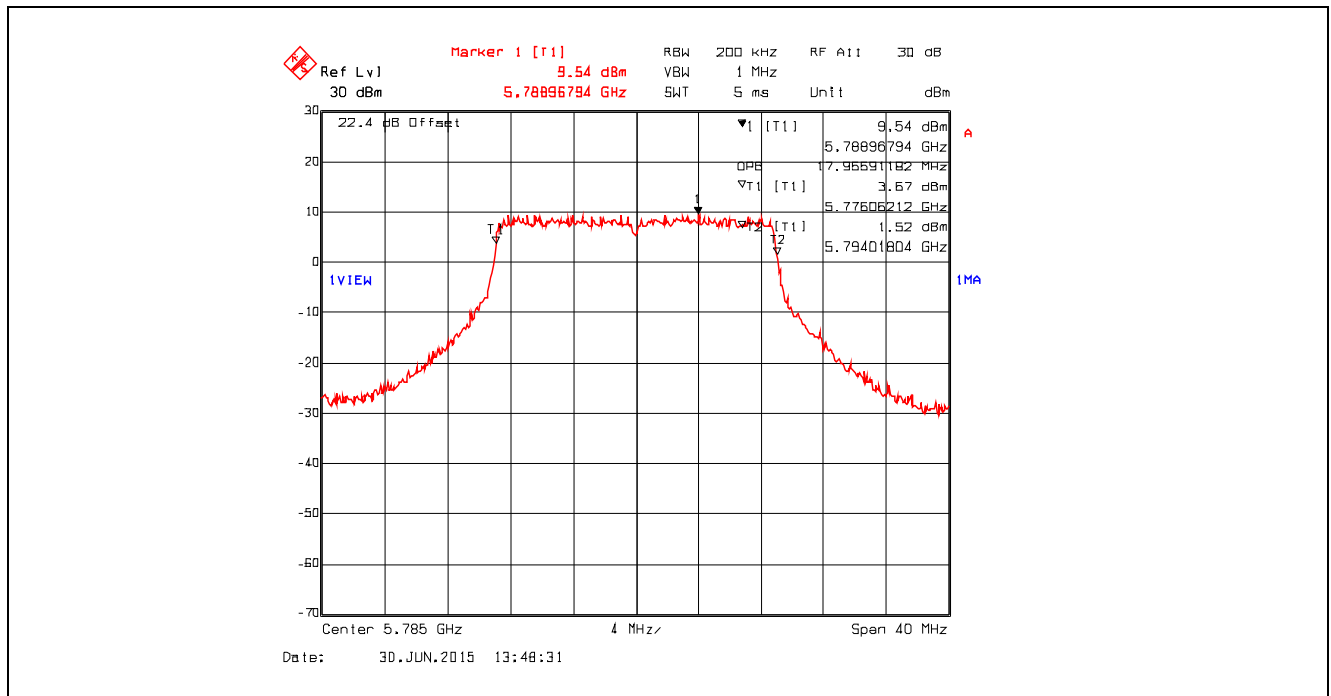
Plot 5.6.4.3.44. 99% Occupied Bandwidth, Data Rate 8, Chain # 2, Ch 149, 5745 MHz, Software Output Power Setting 13



Plot 5.6.4.3.45. 99% Occupied Bandwidth, Data Rate 8, Chain # 1, Ch 157, 5785 MHz, Software Output Power Setting 19



Plot 5.6.4.3.46. 99% Occupied Bandwidth, Data Rate 8, Chain # 2, Ch 157, 5785 MHz, Software Output Power Setting 19



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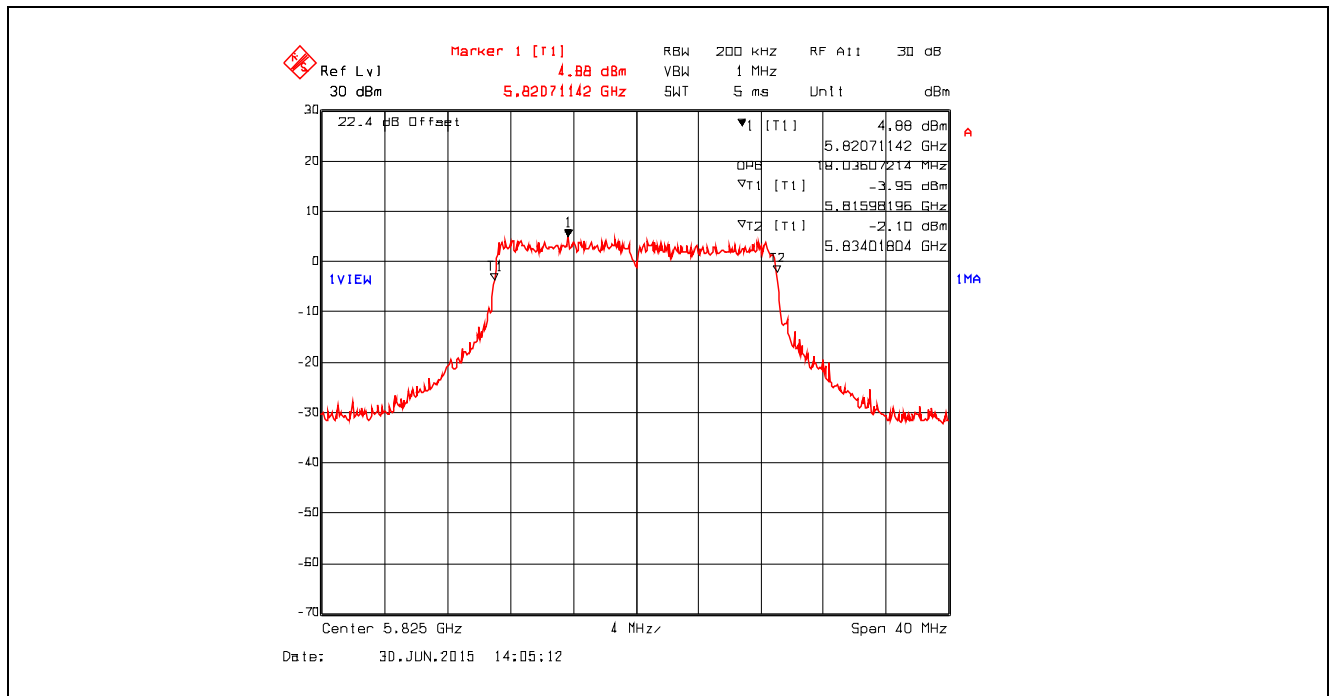
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

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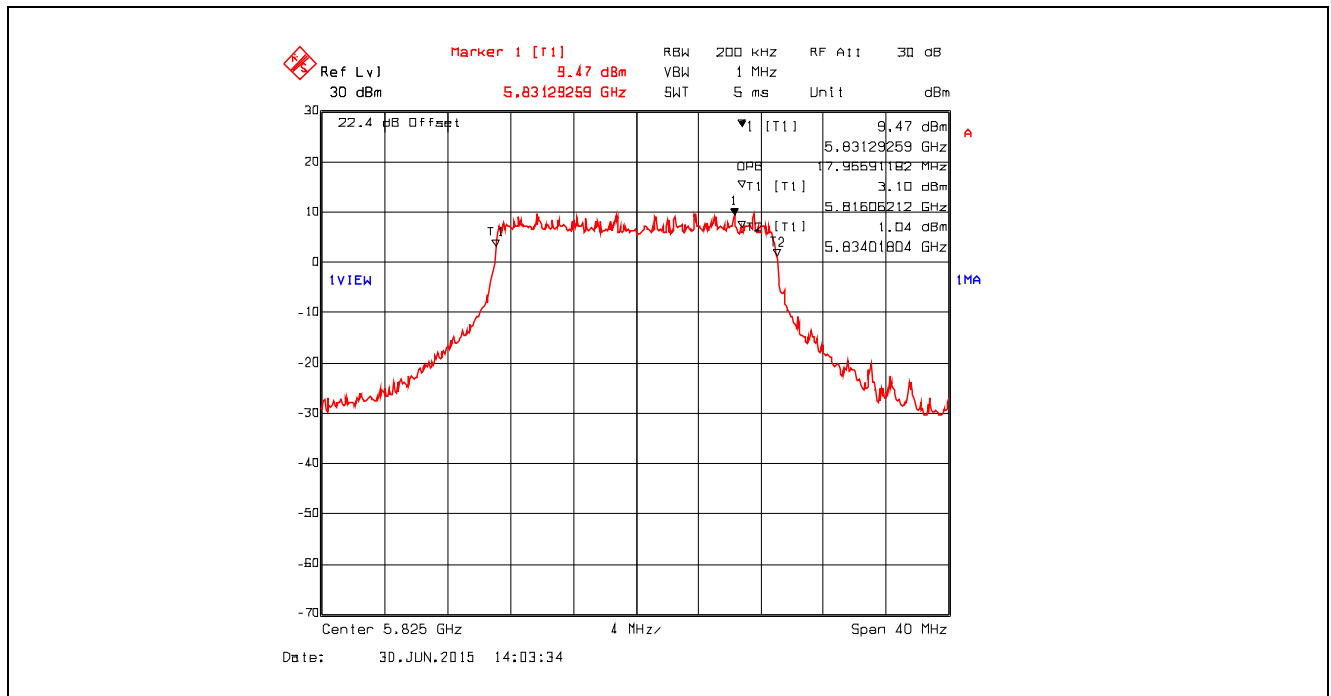
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Plot 5.6.4.3.47. 99% Occupied Bandwidth, Data Rate 8, Chain # 1, Ch 165, 5825 MHz, Software Output Power Setting 18



Plot 5.6.4.3.48. 99% Occupied Bandwidth, Data Rate 8, Chain # 2, Ch 165, 5825 MHz, Software Output Power Setting 18



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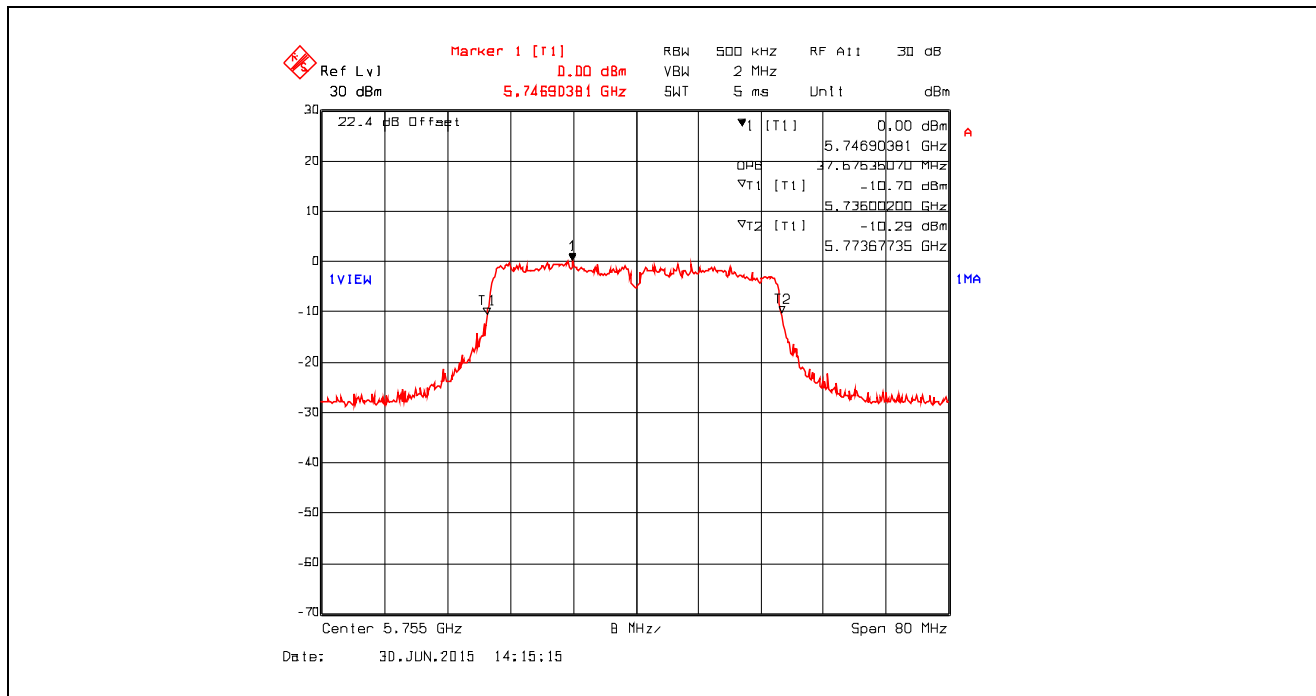
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 15MCRS079_FCC15E407

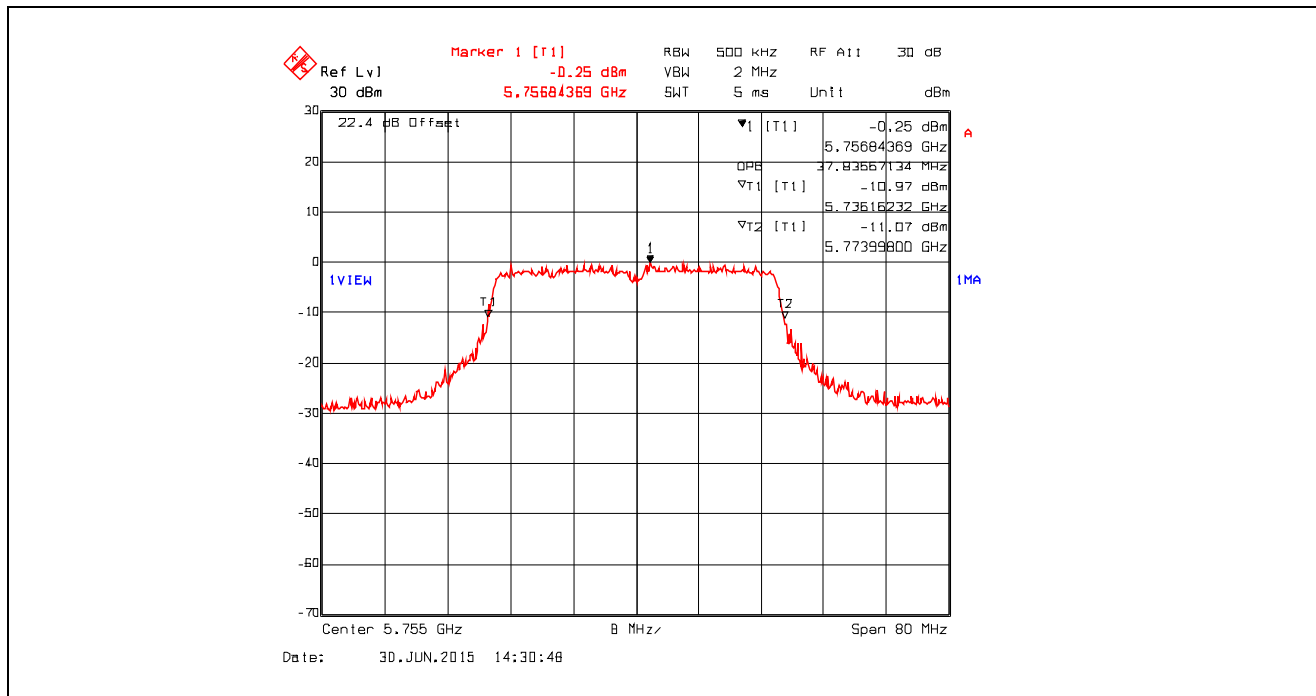
November 16, 2015

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

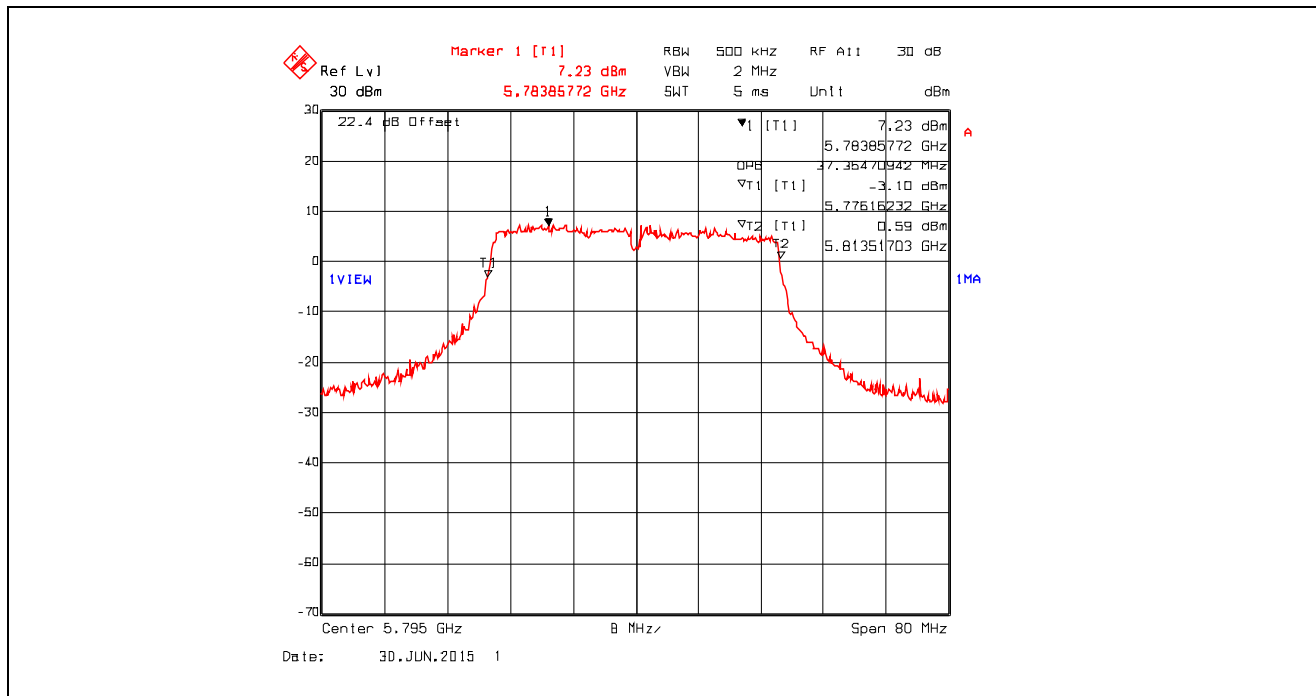
Plot 5.6.4.3.49. 99% Occupied Bandwidth, Data Rate 9, Chain # 1, Ch 151, 5755 MHz, Software Output Power Setting 7



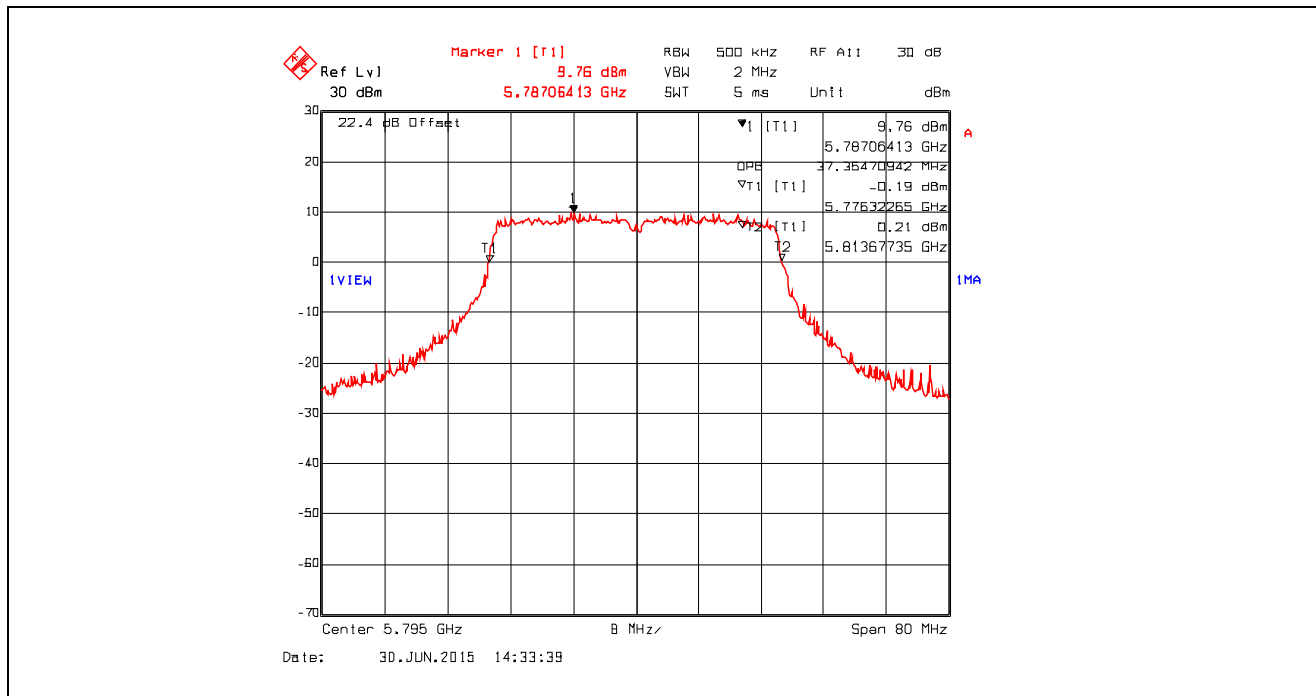
Plot 5.6.4.3.50. 99% Occupied Bandwidth, Data Rate 9, Chain # 2, Ch 151, 5755 MHz, Software Output Power Setting 7



Plot 5.6.4.3.51. 99% Occupied Bandwidth, Data Rate 9, Chain # 1, Ch 159, 5795 MHz, Software Output Power Setting 18



Plot 5.6.4.3.52. 99% Occupied Bandwidth, Data Rate 9, Chain # 2, Ch 159, 5795 MHz, Software Output Power Setting 18



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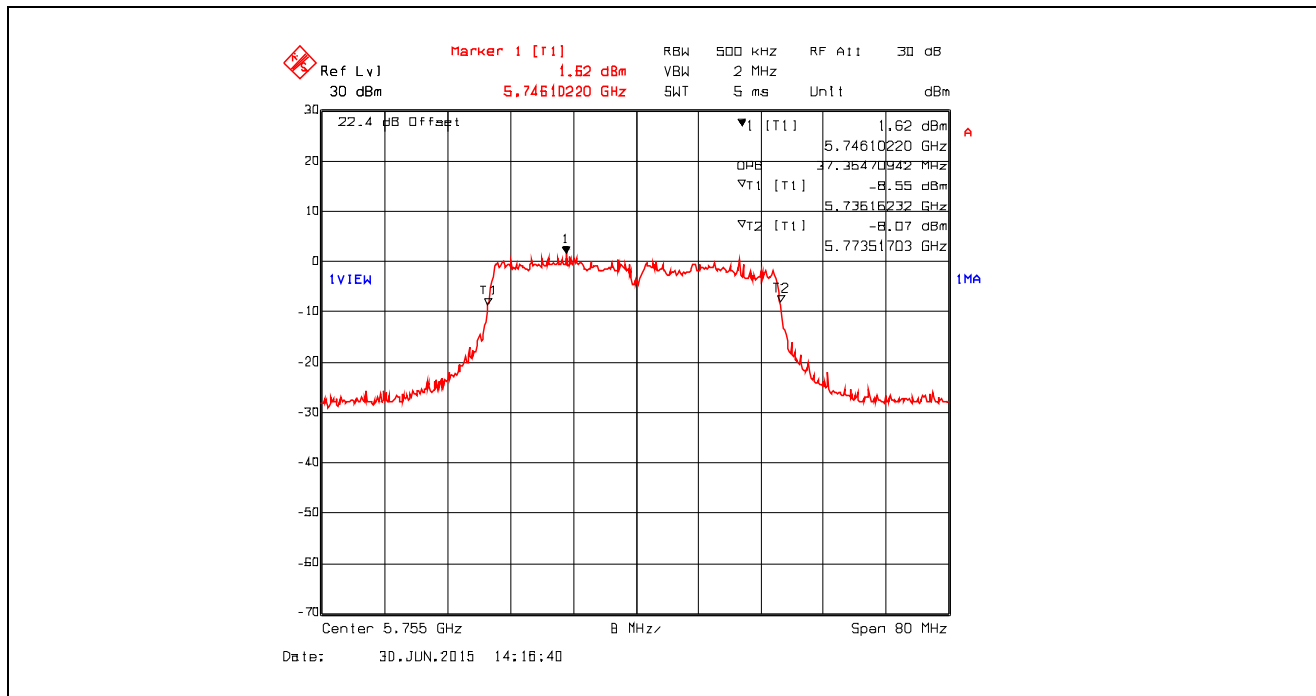
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

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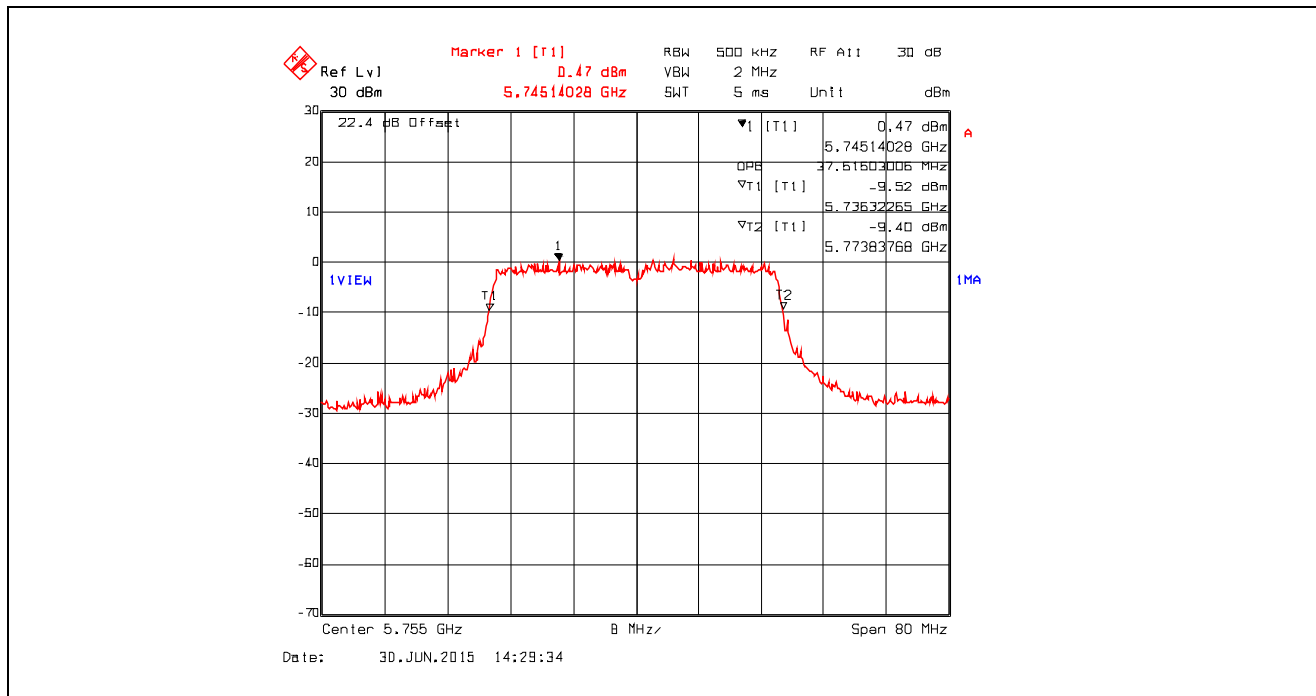
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All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

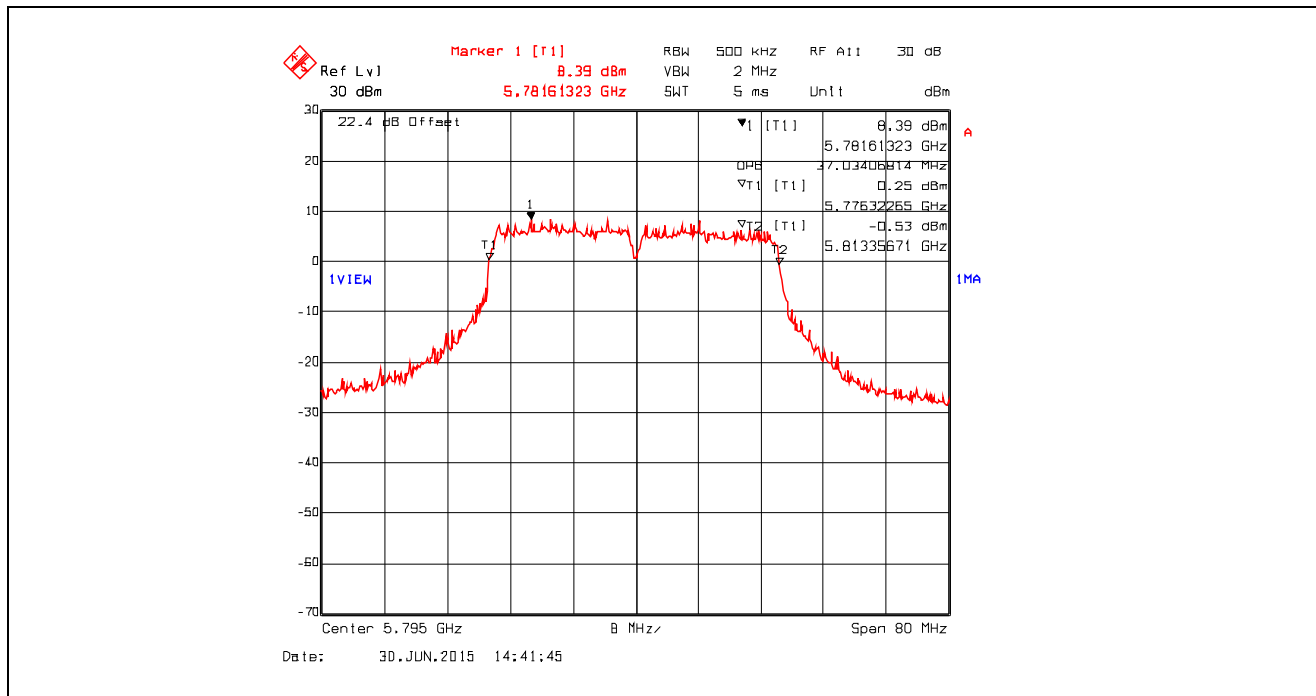
Plot 5.6.4.3.53. 99% Occupied Bandwidth, Data Rate 10, Chain # 1, Ch 151, 5755 MHz, Software Output Power Setting 7



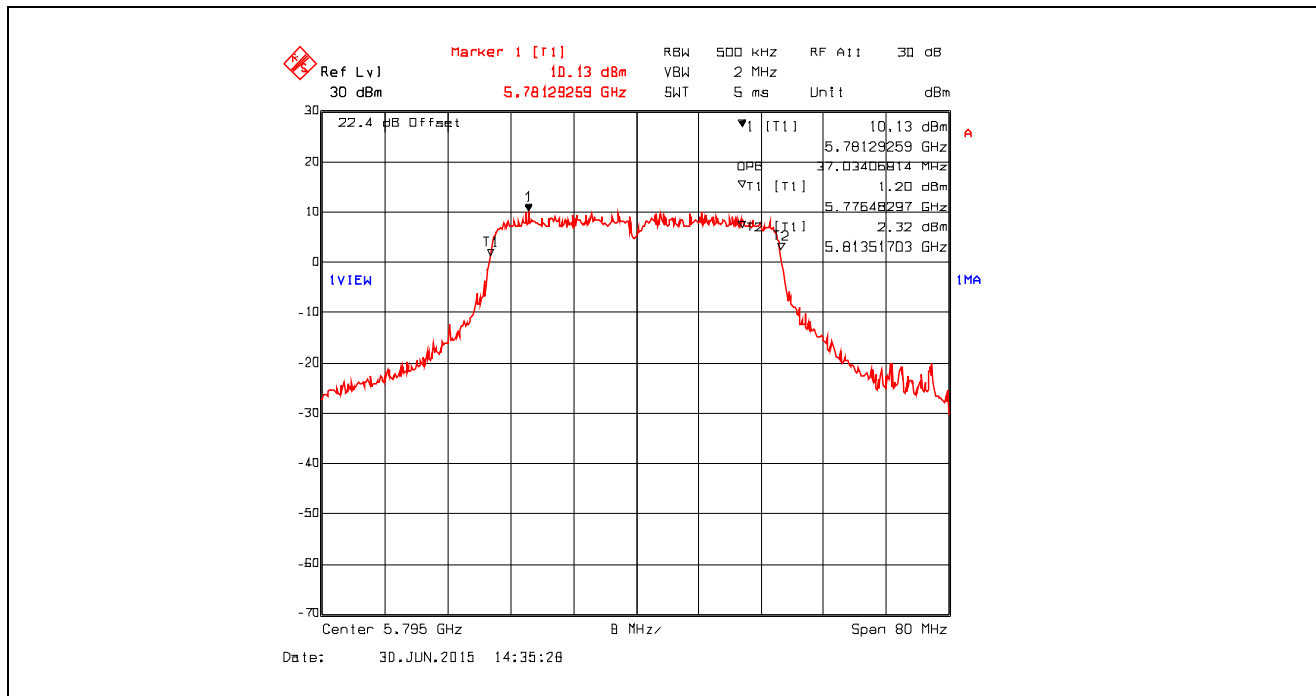
Plot 5.6.4.3.54. 99% Occupied Bandwidth, Data Rate 10, Chain # 2, Ch 151, 5755 MHz, Software Output Power Setting 7



Plot 5.6.4.3.55. 99% Occupied Bandwidth, Data Rate 10, Chain # 1, Ch 159, 5795 MHz, Software Output Power Setting 18



Plot 5.6.4.3.56. 99% Occupied Bandwidth, Data Rate 10, Chain # 2, Ch 159, 5795 MHz, Software Output Power Setting 18



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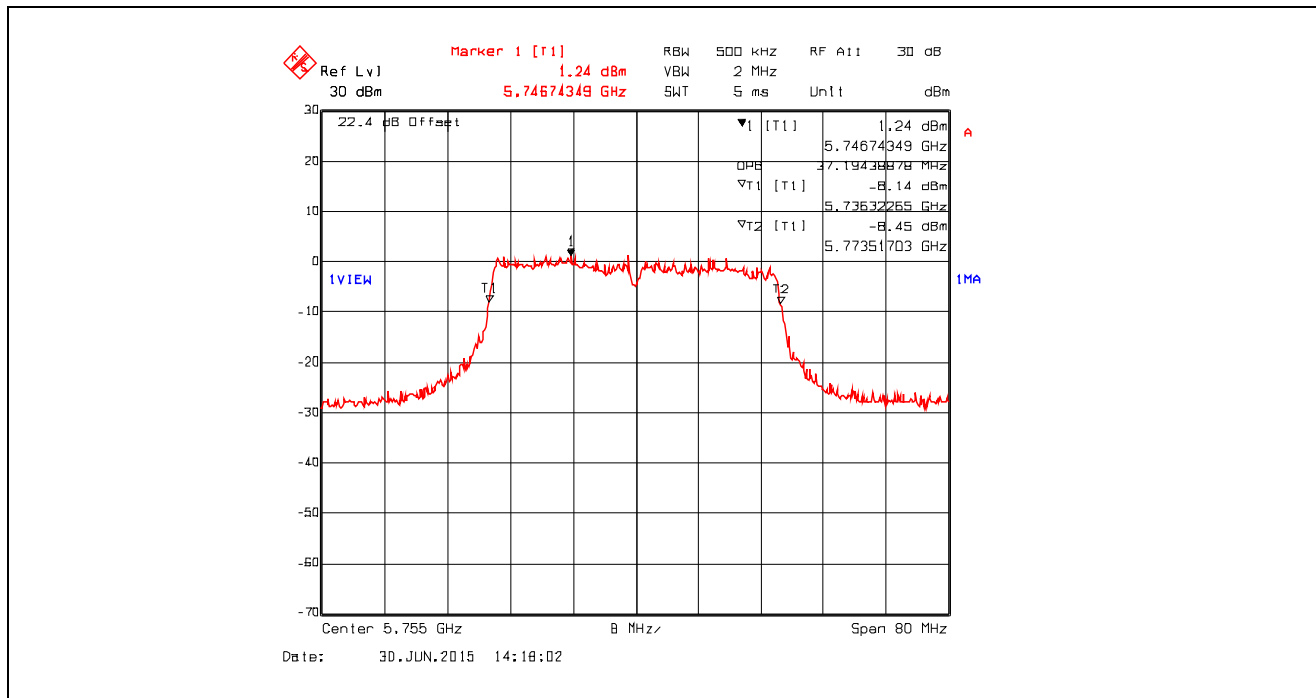
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: 15MCRS079_FCC15E407

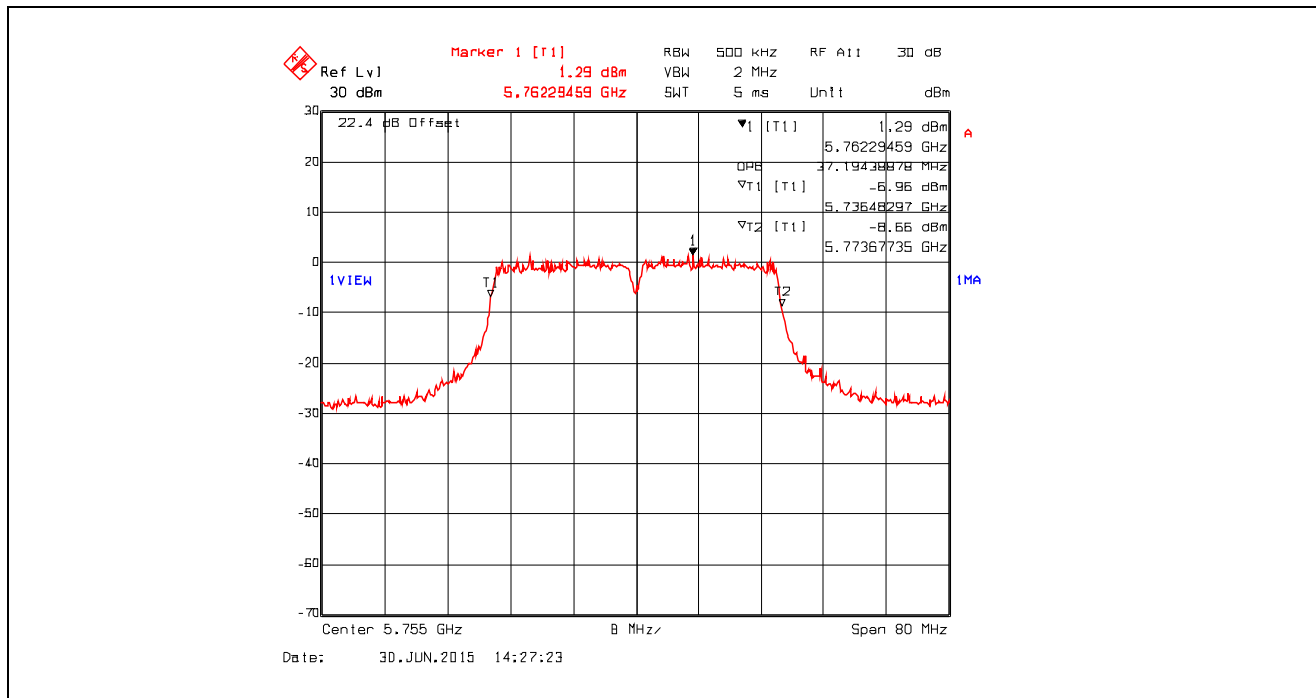
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All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

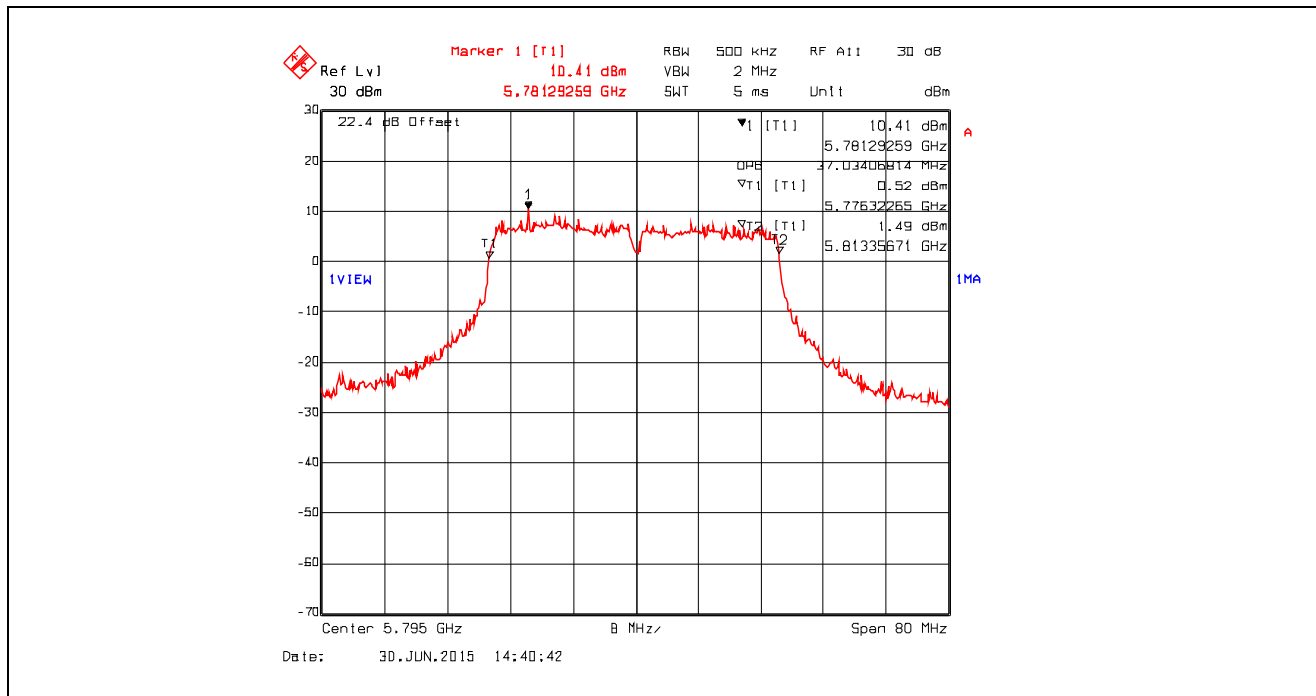
Plot 5.6.4.3.57. 99% Occupied Bandwidth, Data Rate 11, Chain # 1, Ch 151, 5755 MHz, Software Output Power Setting 7



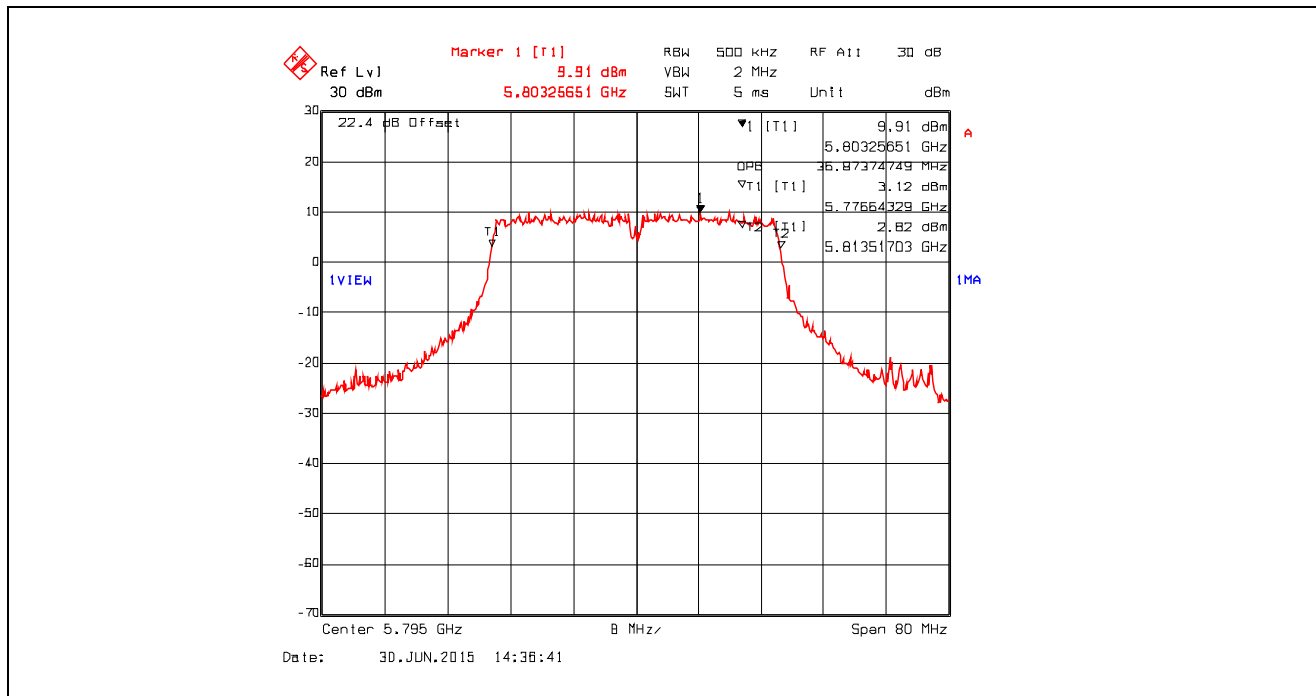
Plot 5.6.4.3.58. 99% Occupied Bandwidth, Data Rate 11, Chain # 2, Ch 151, 5755 MHz, Software Output Power Setting 7



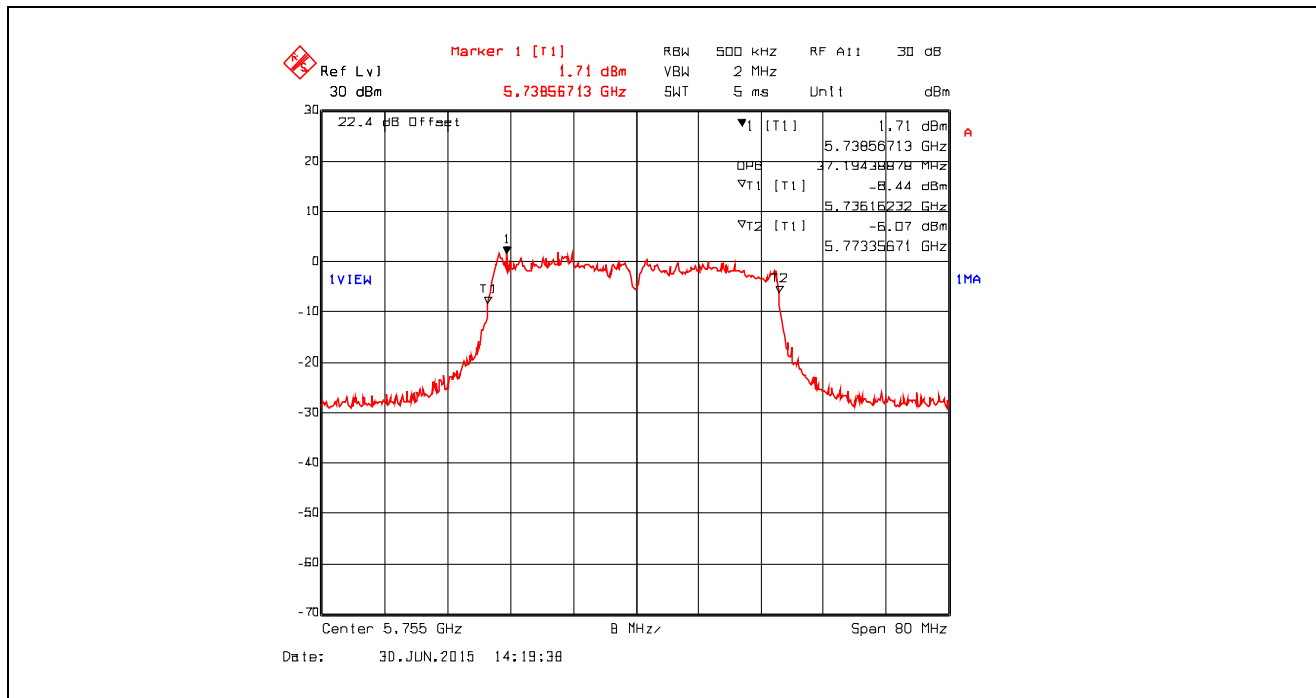
Plot 5.6.4.3.59. 99% Occupied Bandwidth, Data Rate 11, Chain # 1, Ch 159, 5795 MHz, Software Output Power Setting 18



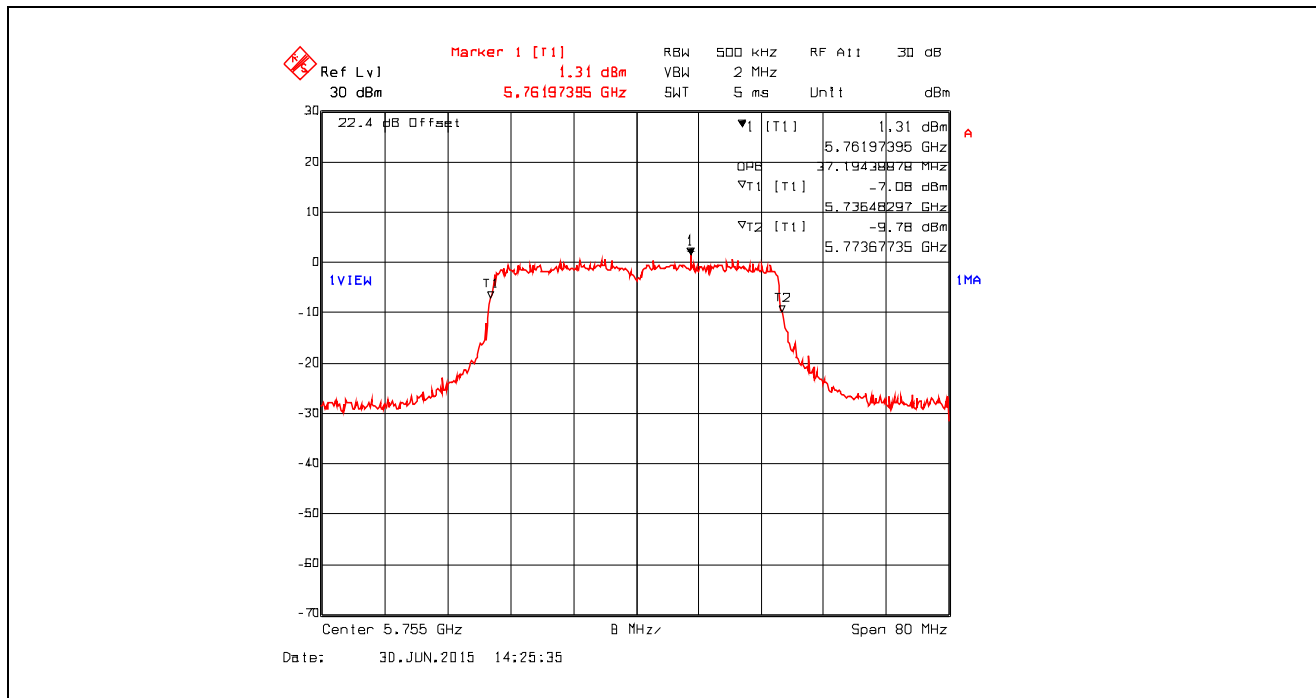
Plot 5.6.4.3.60. 99% Occupied Bandwidth, Data Rate 11, Chain # 2, Ch 159, 5795 MHz, Software Output Power Setting 18



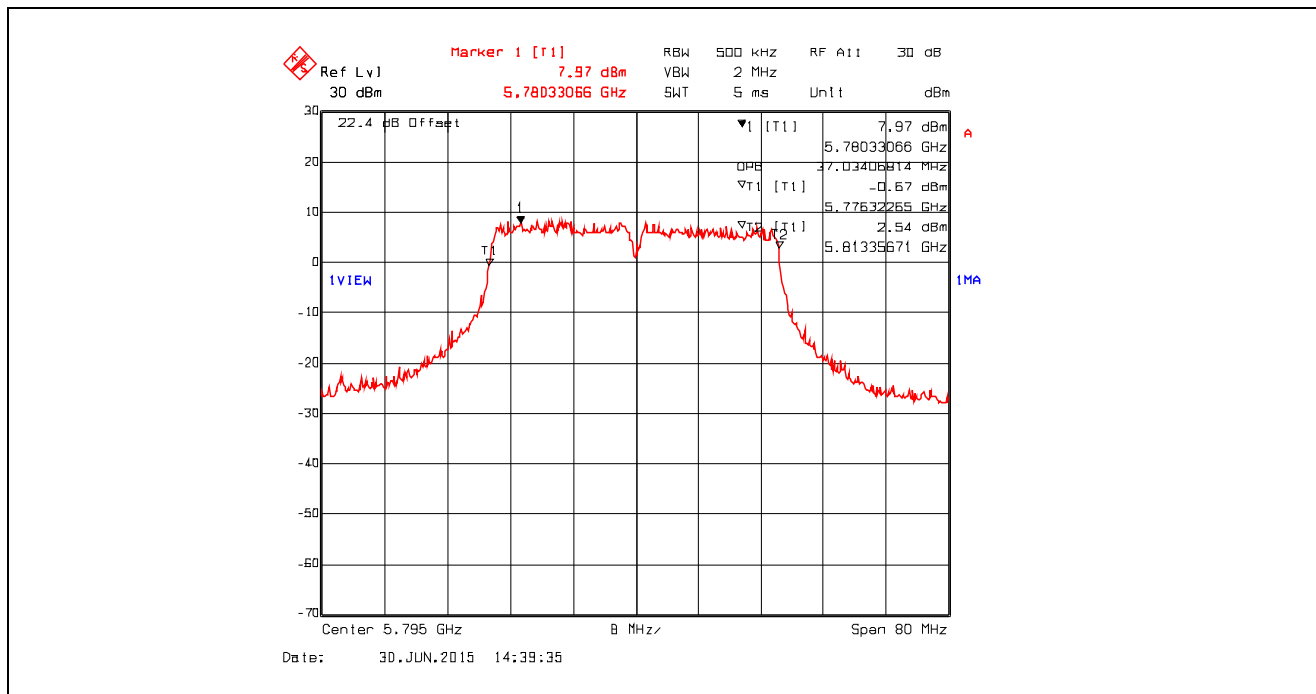
Plot 5.6.4.3.61. 99% Occupied Bandwidth, Data Rate 12, Chain # 1, Ch 151, 5755 MHz, Software Output Power Setting 7



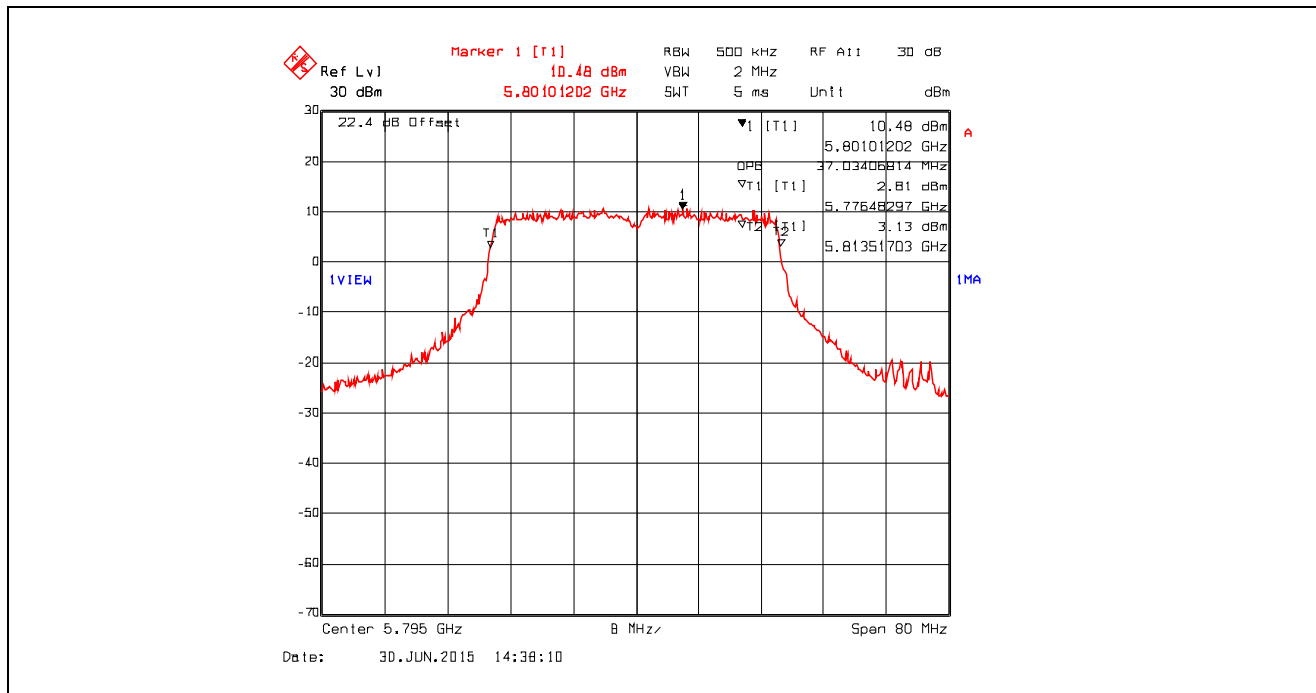
Plot 5.6.4.3.62. 99% Occupied Bandwidth, Data Rate 12, Chain # 2, Ch 151, 5755 MHz, Software Output Power Setting 7



Plot 5.6.4.3.63. 99% Occupied Bandwidth, Data Rate 12, Chain # 1, Ch 159, 5795 MHz, Software Output Power Setting 18



Plot 5.6.4.3.64. 99% Occupied Bandwidth, Data Rate 12, Chain # 2, Ch 159, 5795 MHz, Software Output Power Setting 18



5.7. RF EXPOSURE REQUIREMENTS [§§ 15.407(f), 1.1310 & 2.1091]

5.7.1. Limits

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

Limits for Maximum Permissible Exposure (MPE)

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

f = frequency in MHz

* = Plane-wave equivalent power density

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

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

5.7.2. Method of Measurements

Calculation Method of Power Density/RF Safety Distance:

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

Where,
P: power input to the antenna in mW
EIRP: Equivalent (effective) isotropic radiated power.
S: power density mW/cm²
G: numeric gain of antenna relative to isotropic radiator
r: distance to centre of radiation in cm

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

5.7.3. RF Evaluation

5.7.3.1. Standalone

Maximum EIRP, P_{EIRP}[dBm] :	26.31
MPE Limit for General Population/Uncontrolled Exposure, S_{uncontrolled}[mW/cm²]	1.0
Calculated RF Safety Distance for General Population/Uncontrolled Exposure, r_{safety uncontrolled}[cm]	5.8

5.7.3.2. Co-location

Pursuant to KDB 447498 D01 General RF Exposure Guidance v05r02, Section 7.2:

Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneous transmitting antennas incorporated in a host device, based on the calculated/estimated, numerically modeled or measured field strengths or power density, is ≤ 1.0 .

The worst case EIRP of 26.31 dBm will be used in co-location at the minimum 23 cm evaluation separation distance required by the operating configurations and exposure conditions of the host device.

The maximum calculated MPE ratio of the EUT

Frequency (MHz)	EUT EIRP (dBm)	EUT EIRP (mW)	Evaluation Distance (cm)	Power Density (mW/cm ²)	FCC/IC MPE Limit (mW/cm ²)	MPE Ratio
5745	26.31	427.563	23	0.064	1.0	0.064

The maximum calculated MPE ratio for the EUT is 0.064, this configuration can be co-located with other antennas provided the sum of the MPE ratios for all the other simultaneous transmitting antennas incorporated in a host device is ≤ 1.0 - $0.064 \leq 0.936$. The following table addresses the co-location of the EUT with the specified radio modules.

EUT co-location with radio module identified in this table

*Radio Module	Frequency (MHz)	EIRP (mW)	Evaluation Distance (cm)	Power Density (mW/cm ²)	FCC MPE Limit (mW/cm ²)	MPE Ratio	MPE Ratio of EUT	Sum of MPE Ratio	Verdict
Data Card Module (FCC ID: RI7LN930, IC: 5131A-LN930)	824.2	2511.89	23	0.378	0.549	0.689	0.064	0.753	Compliant
LTE Data Transmitter Module (FCC ID: R5Q-TOBYL100, IC: 8595B-TOBYL100)	782	2564.484	23	0.386	0.521	0.741	0.064	0.805	Compliant
GSM/UMTS/LTE Data Module (FCC ID: XPYTOBYL200, IC: 8595A-TOBYL200)	1909.8	2944.219	23	0.443	1.0	0.443	0.064	0.507	Compliant

* The test data of the radio modules represented in this table is the worst-case configuration (maximum MPE ratio) derived from the original radio modules MPE reports. Refer to these reports for details.

5.8. FREQUENCY STABILITY [§ 15.407(g)]

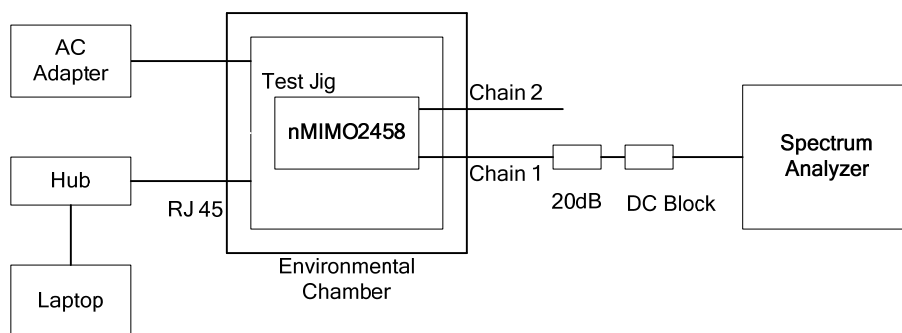
5.8.1. Limit(s)

§ 15.407(g) Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual.

5.8.2. Method of Measurements

ANSI C63.10-2013, Section 6.8.

5.8.3. Test Arrangement



5.8.4. Test Data

Remarks: Temperature range: -30 °C to +50 °C
Supply voltage range: 3 – 3.6 VDC

Test Condition	Data Rate	Channel Number	Frequency (MHz)	Chain # 1	Chain # 2
20°C & 3.0 VDC	4	149	5745	See Note	See Note
20°C & 3.0 VDC	4	165	5825	See Note	See Note
20°C & 3.0 VDC	8	149	5745	See Note	See Note
20°C & 3.0 VDC	8	165	5825	See Note	See Note
20°C & 3.0 VDC	12	151	5755	See Note	See Note
20°C & 3.0 VDC	12	159	5795	See Note	See Note
20°C & 3.6 VDC	4	149	5745	See Note	See Note
20°C & 3.6 VDC	4	165	5825	See Note	See Note
20°C & 3.6 VDC	8	149	5745	See Note	See Note
20°C & 3.6 VDC	8	165	5825	See Note	See Note
20°C & 3.6 VDC	12	151	5755	See Note	See Note
20°C & 3.6 VDC	12	159	5795	See Note	See Note
20°C & 3.3 VDC	4	149	5745	See Note	See Note
20°C & 3.3 VDC	4	165	5825	See Note	See Note
20°C & 3.3 VDC	8	149	5745	See Note	See Note
20°C & 3.3 VDC	8	165	5825	See Note	See Note
20°C & 3.3 VDC	12	151	5755	See Note	See Note
20°C & 3.3 VDC	12	159	5795	See Note	See Note
10°C & 3.3 VDC	4	149	5745	See Note	See Note
10°C & 3.3 VDC	4	165	5825	See Note	See Note
10°C & 3.3 VDC	8	149	5745	See Note	See Note
10°C & 3.3 VDC	8	165	5825	See Note	See Note
10°C & 3.3 VDC	12	151	5755	See Note	See Note
10°C & 3.3 VDC	12	159	5795	See Note	See Note
0°C & 3.3 VDC	4	149	5745	See Note	See Note
0°C & 3.3 VDC	4	165	5825	See Note	See Note
0°C & 3.3 VDC	8	149	5745	See Note	See Note
0°C & 3.3 VDC	8	165	5825	See Note	See Note
0°C & 3.3 VDC	12	151	5755	See Note	See Note
0°C & 3.3 VDC	12	159	5795	See Note	See Note
NOTE: Emission bandwidth is within the band of operation.					

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November 16, 2015

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Test Condition	Data Rate	Channel Number	Frequency (MHz)	Chain # 1	Chain # 2
-10°C & 3.3 VDC	4	149	5745	See Note	See Note
-10°C & 3.3 VDC	4	165	5825	See Note	See Note
-10°C & 3.3 VDC	8	149	5745	See Note	See Note
-10°C & 3.3 VDC	8	165	5825	See Note	See Note
-10°C & 3.3 VDC	12	151	5755	See Note	See Note
-10°C & 3.3 VDC	12	159	5795	See Note	See Note
-20°C & 3.3 VDC	4	149	5745	See Note	See Note
-20°C & 3.3 VDC	4	165	5825	See Note	See Note
-20°C & 3.3 VDC	8	149	5745	See Note	See Note
-20°C & 3.3 VDC	8	165	5825	See Note	See Note
-20°C & 3.3 VDC	12	151	5755	See Note	See Note
-20°C & 3.3 VDC	12	159	5795	See Note	See Note
-30°C & 3.3 VDC	4	149	5745	See Note	See Note
-30°C & 3.3 VDC	4	165	5825	See Note	See Note
-30°C & 3.3 VDC	8	149	5745	See Note	See Note
-30°C & 3.3 VDC	8	165	5825	See Note	See Note
-30°C & 3.3 VDC	12	151	5755	See Note	See Note
-30°C & 3.3 VDC	12	159	5795	See Note	See Note
30°C & 3.3 VDC	4	149	5745	See Note	See Note
30°C & 3.3 VDC	4	165	5825	See Note	See Note
30°C & 3.3 VDC	8	149	5745	See Note	See Note
30°C & 3.3 VDC	8	165	5825	See Note	See Note
30°C & 3.3 VDC	12	151	5755	See Note	See Note
30°C & 3.3 VDC	12	159	5795	See Note	See Note
40°C & 3.3 VDC	4	149	5745	See Note	See Note
40°C & 3.3 VDC	4	165	5825	See Note	See Note
40°C & 3.3 VDC	8	149	5745	See Note	See Note
40°C & 3.3 VDC	8	165	5825	See Note	See Note
40°C & 3.3 VDC	12	151	5755	See Note	See Note
40°C & 3.3 VDC	12	159	5795	See Note	See Note
50°C & 3.3 VDC	4	149	5745	See Note	See Note
50°C & 3.3 VDC	4	165	5825	See Note	See Note
50°C & 3.3 VDC	8	149	5745	See Note	See Note
50°C & 3.3 VDC	8	165	5825	See Note	See Note
50°C & 3.3 VDC	12	151	5755	See Note	See Note
50°C & 3.3 VDC	12	159	5795	See Note	See Note
NOTE: Emission bandwidth is within the band of operation.					

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EXHIBIT 6. TEST EQUIPMENT LIST

Test Instruments	Manufacturer	Model No.	Serial No.	Frequency Range	Cal. Due Date
Spectrum Analyzer	Hewlett Packard	HP 8593EM	3412A00103	9 kHz–26.5 GHz	Apr. 9, 2017
Attenuator	Pasternack	PE7010-20	-	DC–2 GHz	Jan. 2, 2016
L.I.S.N	EMCO	3825/2	2209	0.10 -100 MHz	Sep. 3, 2015
Spectrum Analyzer	Rohde & Schwarz	FSEK30	100077	20Hz–40 GHz	Nov. 21, 2015
Attenuator	Pasternack	7024-20	6	DC–26.5 GHz	Cal on use
DC Block	Hewlett Packard	11742A	12460	0.045 – 26.5 GHz	Cal on use
DC Block	Picosecond Pulse Labs	5501A	4678	0.7 kHz–26 GHz	Cal on use
Peak Power Analyzer	Hewlett Packard	8990A	3314A00602	0.5 - 40 GHz	Nov. 11, 2015
Peak Power Sensor	Hewlett Packard	84814A	3205A00175	0.5 - 40 GHz	Nov. 13, 2015
Spectrum Analyzer	Rohde & Schwarz	ESU40	100037	20Hz–40 GHz	May. 8, 2017
RF Amplifier	Hewlett Packard	84498	3008A00769	1 – 26.5 GHz	Feb. 4, 2016
Biconilog	EMCO	3142C	26873	26-3000 MHz	Apr. 14, 2016
Horn Antenna	EMCO	3155	6570	1 – 18 GHz	Sep. 11, 2015
Horn Antenna	EMCO	3160-09	118385	18 – 26.5 GHz	Aug. 4, 2016
Horn Antenna	EMCO	3160-10	102686	26.5 – 40 GHz	Aug. 4, 2016
High Pass Filter	K & L	11SH10-8000/T18000	3	Cut off 5.8 GHz	Cal on use
Environmental Chamber	Envirotronics	SSH32C	11994847-S-11059	-60 to 177°C	Jun 2, 2016

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EXHIBIT 7. MEASUREMENT UNCERTAINTY

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

7.1. LINE CONDUCTED EMISSION MEASUREMENT UNCERTAINTY

	Line Conducted Emission Measurement Uncertainty (9 kHz – 30 MHz):	Measured	Limit
u_c	Combined standard uncertainty: $u_c(y) = \sqrt{\sum_{i=1}^m u_i^2(y)}$	± 1.44	± 1.8
U	Expanded uncertainty U: $U = 2u_c(y)$	± 2.89	± 3.6

7.2. RADIATED EMISSION MEASUREMENT UNCERTAINTY

	Radiated Emission Measurement Uncertainty @ 3m, Horizontal (30-1000 MHz):	Measured (dB)	Limit (dB)
u_c	Combined standard uncertainty: $u_c(y) = \sqrt{\sum_{i=1}^m u_i^2(y)}$	± 2.39	± 2.6
U	Expanded uncertainty U: $U = 2u_c(y)$	± 4.79	± 5.2

	Radiated Emission Measurement Uncertainty @ 3m, Vertical (30-1000 MHz):	Measured (dB)	Limit (dB)
u_c	Combined standard uncertainty: $u_c(y) = \sqrt{\sum_{i=1}^m u_i^2(y)}$	± 2.39	± 2.6
U	Expanded uncertainty U: $U = 2u_c(y)$	± 4.78	± 5.2

	Radiated Emission Measurement Uncertainty @ 3 m, Horizontal & Vertical (1 – 18 GHz):	Measured (dB)	Limit (dB)
u_c	Combined standard uncertainty: $u_c(y) = \sqrt{\sum_{i=1}^m u_i^2(y)}$	± 1.87	Under consideration
U	Expanded uncertainty U: $U = 2u_c(y)$	± 3.75	Under consideration