

FCC Part 90

Measurement and Test Report

For

KZ Broadband Technologies, Ltd.

**1601 Tower C, Skyworth Building, High-Tech Industrial Park
Nanshan District, Shenzhen, Guangdong, China**

FCC ID: A28AIRSTREAM4000

FCC Rules:	<u>FCC Part 90Z</u>
Product Description:	<u>WIMAX Outdoor CPE</u>
Tested Model:	<u>AirStream 4000</u>
Report No.:	<u>STR15068199I-1</u>
Tested Date:	<u>2015-06-23 to 2014-07-07</u>
Issued Date:	<u>2015-07-08</u>
Tested By:	<u>Seven Song/ Engineer</u>
Reviewed By:	<u>Lahm Peng / EMC Manager</u>
Approved & Authorized By:	<u>Jandy So / PSQ Manager</u>
Prepared By:	

Seven Song

Lahm peng

Jandyso

Shenzhen SEM.Test Technology Co., Ltd.

1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road,
Bao'an District, Shenzhen, P.R.C. (518101)

Tel.: +86-755-33663308 Fax.: +86-755-33663309 Website: www.semtest.com.cn

Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by Shenzhen SEM. Test Technology Co., Ltd.

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: KZ Broadband Technologies, Ltd.
 Address of applicant: 1601 Tower C, Skyworth Building, High-Tech Industrial Park Nanshan District, Shenzhen, Guangdong, China

Manufacturer: KZ Broadband Technologies, Ltd.
 Address of manufacturer: 1601 Tower C, Skyworth Building, High-Tech Industrial Park Nanshan District, Shenzhen, Guangdong, China

General Description of EUT	
Product Name:	WIMAX Outdoor CPE
Brand Name:	AirStream
Model No.:	AirStream 4000
Adding Model:	AirStream 4000 Fxx, CPE8000, AirStream 4000D Fxx
Rated Voltage:	DC 48V Adapter by PoE port
Adapter Model:	G0549-480-032 (Input: AC100-240V; Output: DC48V)
Device Category:	Fixed
<i>Note: The test data is gathered from a production sample, provided by the manufacturer. The appearance of others models listed in the report is different from main-test model AirStream 4000, but the circuit and the electronic construction do not change, declared by the manufacturer.</i>	

Technical Characteristics of EUT	
Support Band:	3650-3675MHz
Channel Bandwidth:	7MHz, 8.75MHz, 10MHz
Frequencies Range:	7MHzBandwidth: 3653.5~3671.5MHz 8.75MHzBandwidth: 3654.375~3670.625MHz 10MHzBandwidth: 3655~3670MHz
Type of Modulation:	OFDM (Worst Case QPSK)
Type of Emission:	7M0X1D, 8M8X1D, 10M0X1D
Type of Antenna:	Integral Antenna
Antenna Gain:	15 dBi

1.2 Test Standards

The following report is prepared on behalf of the KZ Broadband Technologies, Ltd. in accordance with FCC Part 2 subpart J, FCC Part 90 Z of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 2 subpart J, FCC Part 90 Z of the Federal Communication Commissions rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with the standards and measurement guide as the below table:

Description	Procedure	Note
Transmitter Output Power and Power Density	FCC Publication KDB 971168 D01 v02r02 section 5.2.2	1
Emission Bandwidth	FCC Publication KDB 971168 D01 v02r02 section 4.2	1
Spurious Emissions at Antenna Terminal	FCC Publication KDB 971168 D01 v02r02 section 6	1
Spurious Radiation Emissions	FCC Publication KDB 971168 D01 v02r02 section 7	2
Out of Band Emissions	FCC Publication KDB 971168 D01 v02r02 section 7	1 & 2
Frequency Stability	FCC Publication KDB 971168 D01 v02r02 section 9	1

Note 1: RF conducted measurement.

Note 2: Radiated emission measurement.

1.4 Test Facility

- **FCC – Registration No.: 934118**

Shenzhen SEM.Test Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files and the Registration is 934118.

- **Industry Canada (IC) Registration No.: 11464A**

The 3m Semi-anechoic chamber of Shenzhen SEM.Test Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

- **CNAS Registration No.: L4062**

Shenzhen SEM.Test Technology Co., Ltd. is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L4062. All measurement facilities used to collect the measurement data are located at 1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road, Bao'an District, Shenzhen, P.R.C (518101)

1.5 EUT Setup and Test Mode

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	7MHzBandwidth	3653.5, 3662.5, 3671.5MHz
TM2	8.75MHzBandwidth	3654.375, 3662.5, 3670.625MHz
TM3	10MHzBandwidth	3655, 3662.5, 3670MHz

Only tested QPSK modulation mode as determined worst case by manufacturer

Only tested output port A (antenna 1) as determined worst case by manufacturer.

EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
Power Cable	0.4	Unshielded	Without Core
RJ45	1.5	Unshielded	Without Core

Auxiliary Equipment List and Details

Description	Manufacturer	Model	Serial Number
Notebook	Lenovo	T410	/

Special Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
RJ45	1.5	Unshielded	/

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§ 1.1307	RF Exposure	Compliant
§ 90.1321, § 2.1046	Transmitter Output Power and Power Density	Compliant
§ 90.209, § 2.1049	Emission Bandwidth	Compliant
§ 90.1323, § 2.1051	Spurious Emissions at Antenna Terminal	Compliant
§ 90.1323, § 2.1053	Spurious Radiation Emissions	Compliant
§ 90.1323 (a), § 2.1051, § 2.1053	Out of Band Emissions	Compliant
§ 90.213, § 2.1055	Frequency Stability	Compliant

3. RF Exposure

3.1 Standard Applicable

According to § 1.1307, the portable transmitter must comply the RF exposure requirements.

3.2 Test Result

This product complied with the requirement of the RF exposure, please see the MPE report.

4. RF Output Power

4.1 Standard Applicable

According to § 90.1321 Base and fixed stations are limited to 25 watts/25 MHz equivalent isotropically radiated power (EIRP). In any event, the peak EIRP power density shall not exceed 1 Watt in any one-megahertz slice of spectrum.

Duty cycle correction needed for special procedure for Output Power and Power Density test per the FCC accepted KDB procedure

4.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Aglient	Spectrum Analyzer	E4407B	MY41440400	2015-05-28	2016-05-27
Attenuator	ATTEN	ATS100-20-10	/	2015-05-28	2016-05-27

4.3 Test Procedure

Conducted output power test method:



4.4 Environmental Conditions

Temperature:	24 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

4.5 Summary of Test Results/Plots

EIRP Power

For Ant Port 0

Test Mode	Channel	Conducted Power (dBm/25MHz)	Conducted Power (dBm/MHz)	Antenna Gain (dB)	EIRP (dBm/25MHz)	EIRP (dBm/MHz)	EIRP Limit (dBm/25MHz)	EIRP Limit (dBm/MHz)
7MHz Bandwidth	Low Channel	20.67	11.70	15	35.47	26.7	44	30
	Middle Channel	20.67	11.59	15	35.35	26.59	44	30
	High Channel	20.60	11.56	15	35.6	26.56	44	30
8.75MHz Bandwidth	Low Channel	20.32	11.48	15	35.72	26.48	44	30
	Middle Channel	20.50	11.60	15	35.82	26.6	44	30
	High Channel	20.65	12.03	15	35.89	27.03	44	30
10MHz Bandwidth	Low Channel	21.40	10.78	15	36.41	25.78	44	30
	Middle Channel	21.91	10.73	15	36.42	25.73	44	30
	High Channel	21.87	10.82	15	36.46	25.82	44	30

For Ant Port 1

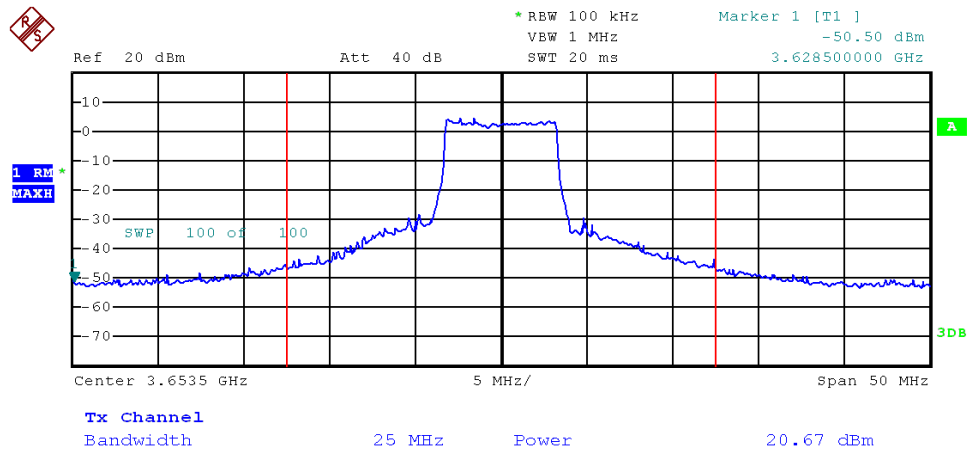
Test Mode	Channel	Conducted Power (dBm/25MHz)	Conducted Power (dBm/MHz)	Antenna Gain (dB)	EIRP (dBm/25MHz)	EIRP (dBm/MHz)	EIRP Limit (dBm/25MHz)	EIRP Limit (dBm/MHz)
7MHz Bandwidth	Low Channel	20.41	11.83	15	35.55	26.83	44	30
	Middle Channel	20.65	11.90	15	35.58	26.9	44	30
	High Channel	20.42	11.59	15	35.72	26.59	44	30
8.75MHz Bandwidth	Low Channel	20.24	11.51	15	35.69	26.51	44	30
	Middle Channel	20.42	11.38	15	35.93	26.38	44	30
	High Channel	20.55	11.73	15	35.95	26.73	44	30
10MHz Bandwidth	Low Channel	21.30	11.33	15	36.59	26.33	44	30
	Middle Channel	21.73	10.54	15	36.56	25.54	44	30
	High Channel	21.56	10.92	15	36.81	25.92	44	30

EIRP=Conducted RF Power+Antenna Gain

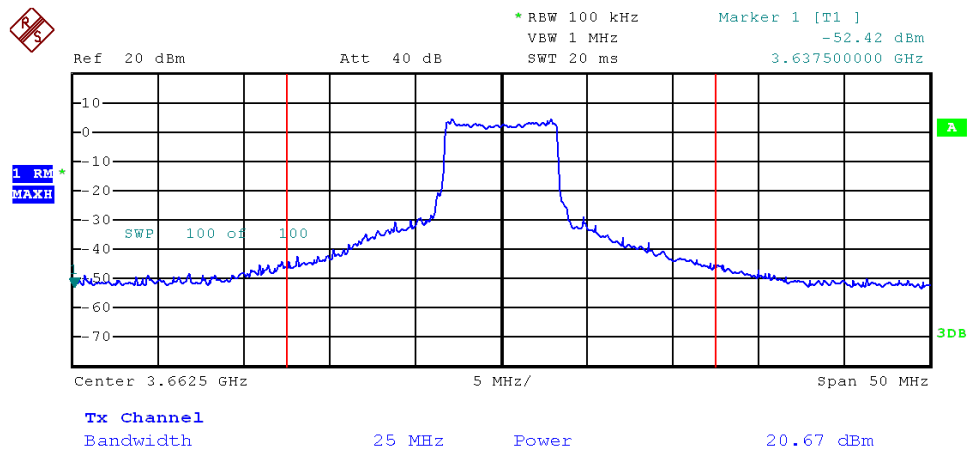
Antenna Gain=15 dBi

For Power
Ant Port 0

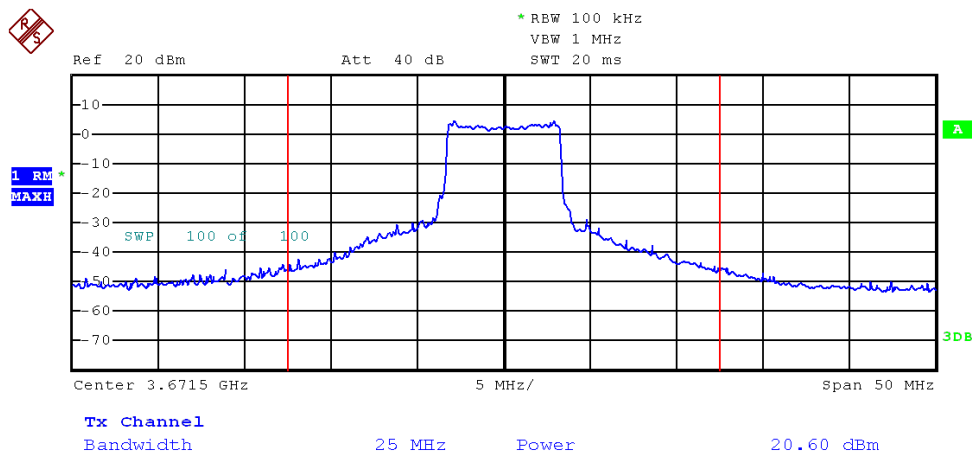
7MHz Bandwidth
Low Channel



Middle Channel

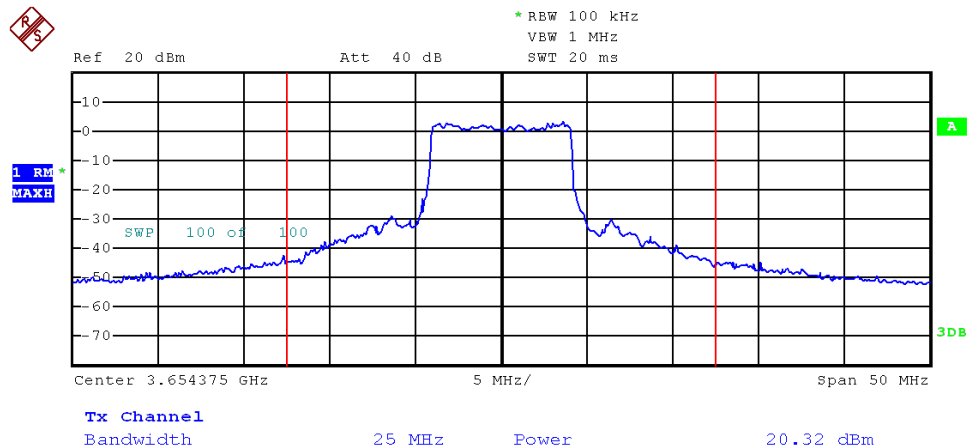


High Channel

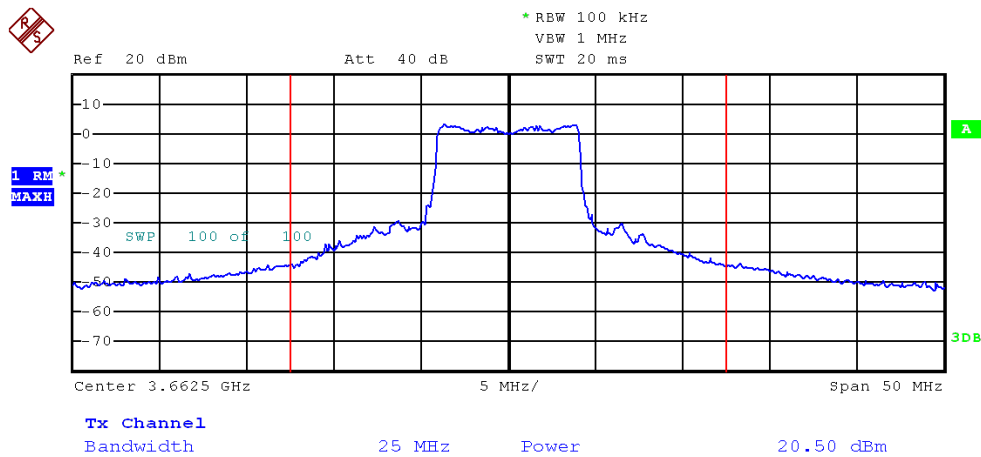


8.75MHz Bandwidth

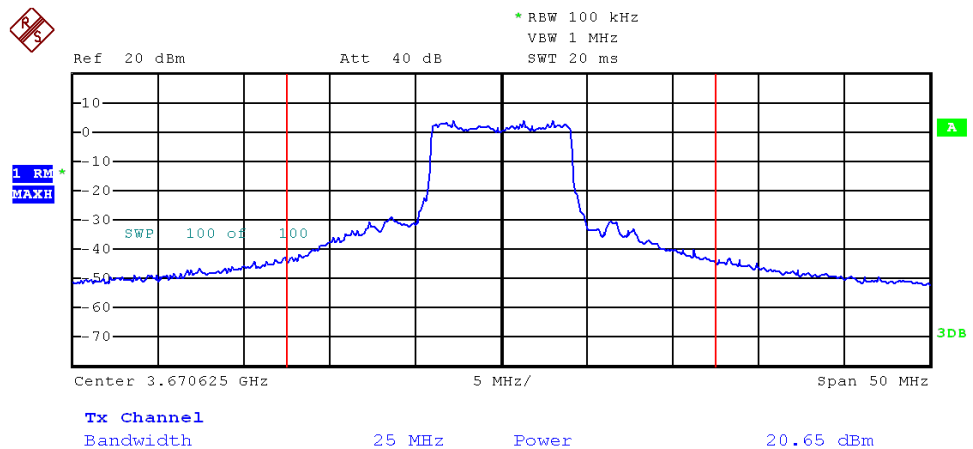
Low Channel



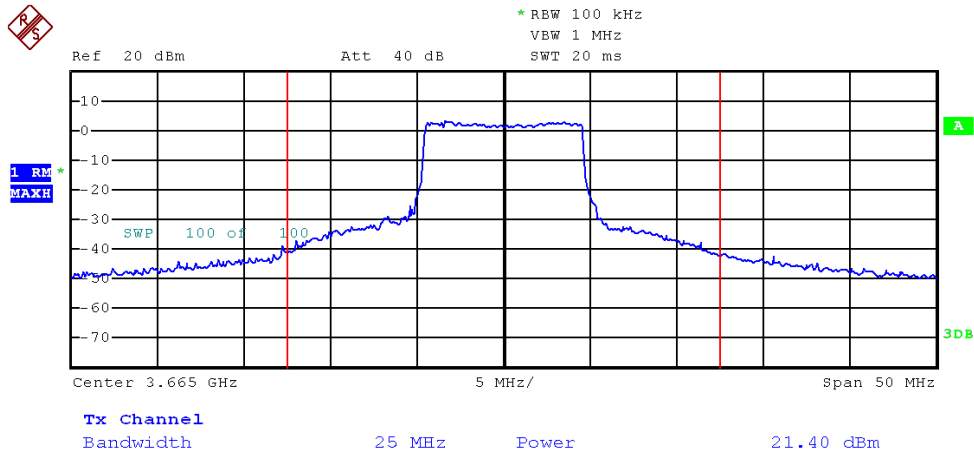
Middle Channel



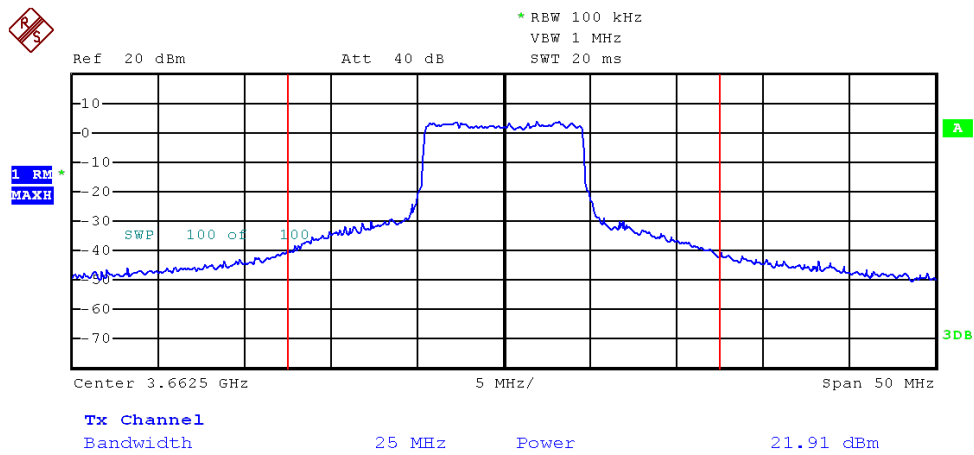
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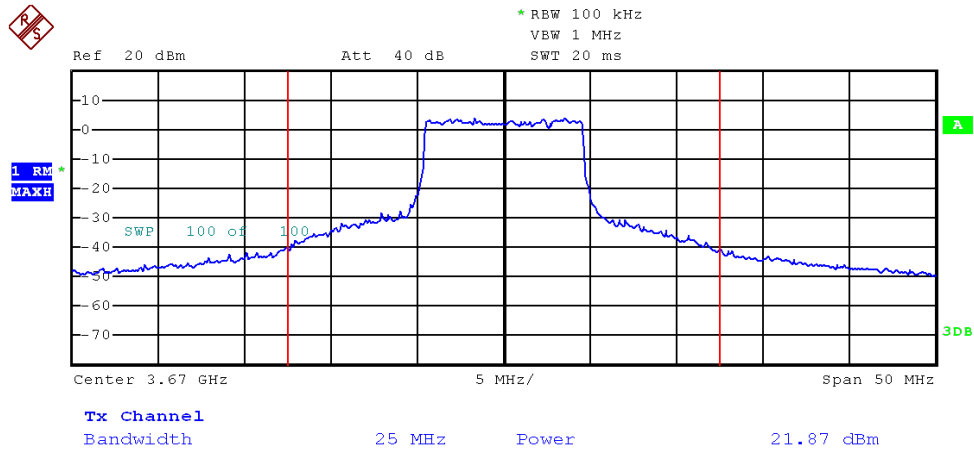
10MHz Bandwidth
Low Channel



Middle Channel



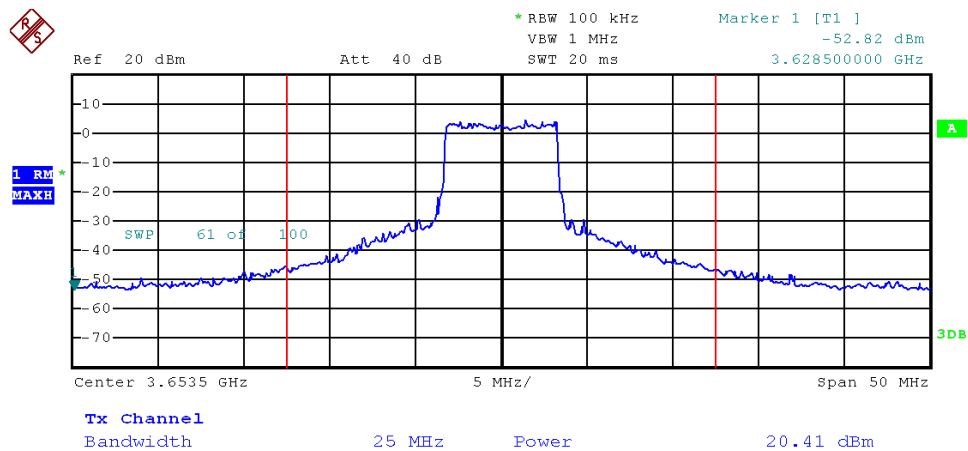
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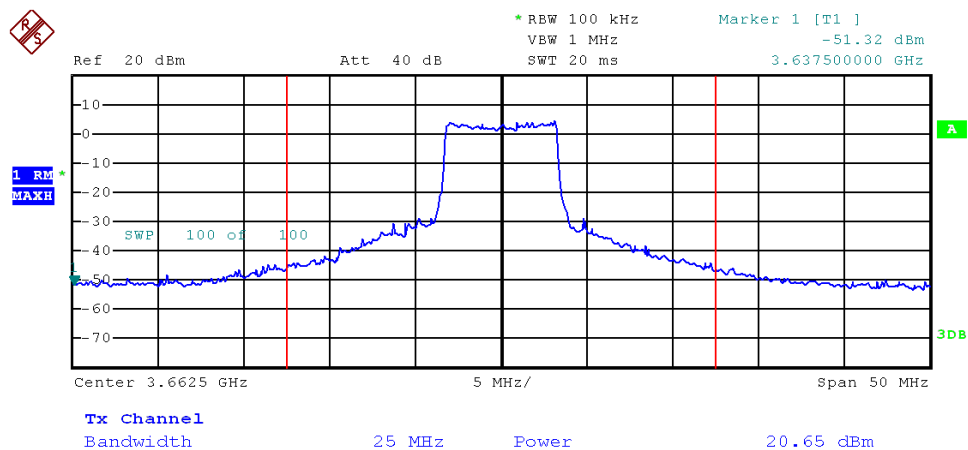
Ant Port 1

7MHz Bandwidth

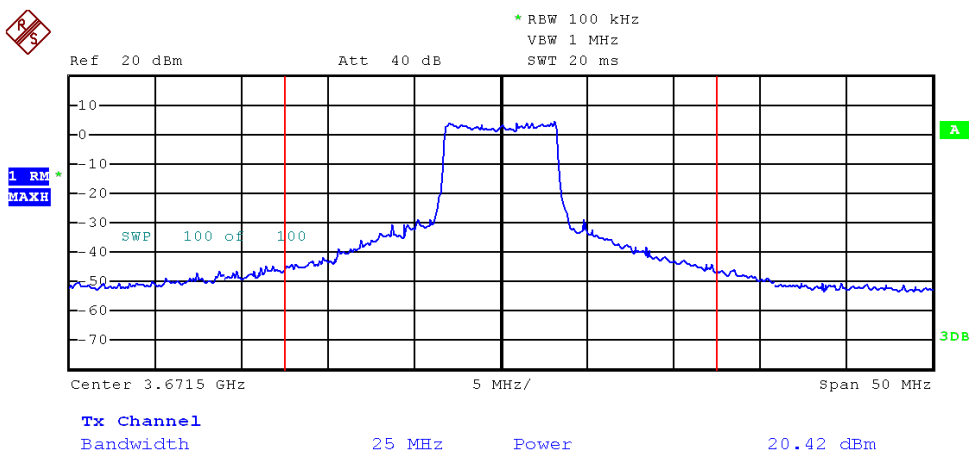
Low Channel



Middle Channel

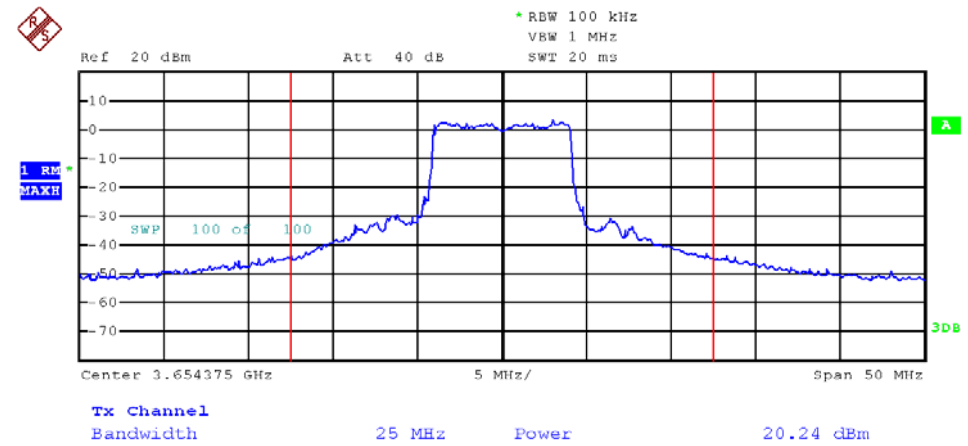


High Channel

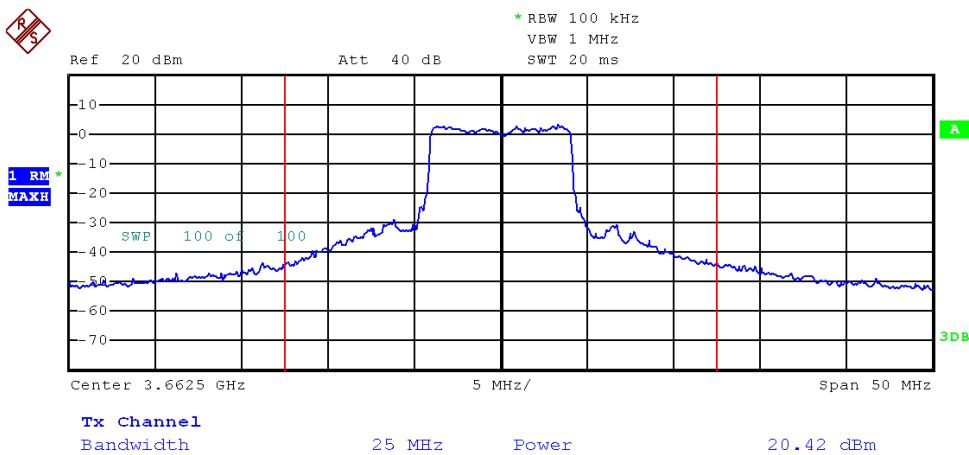


8.75MHz Bandwidth

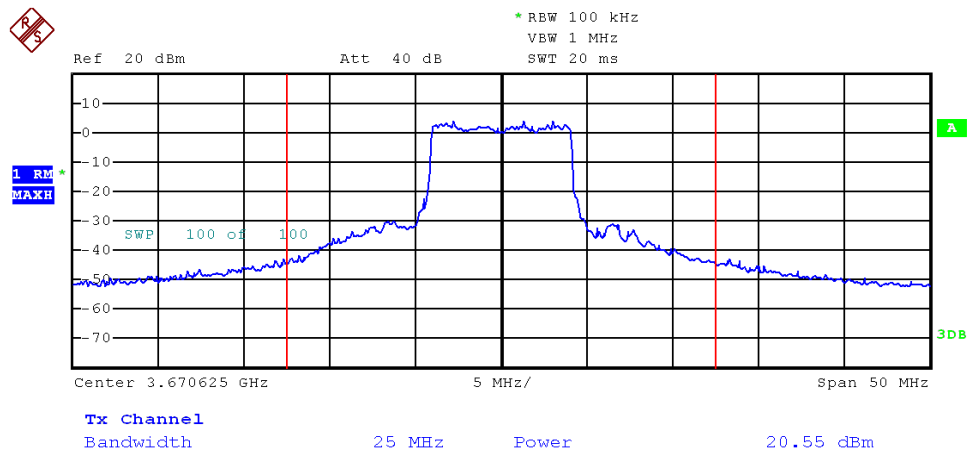
Low Channel



Middle Channel

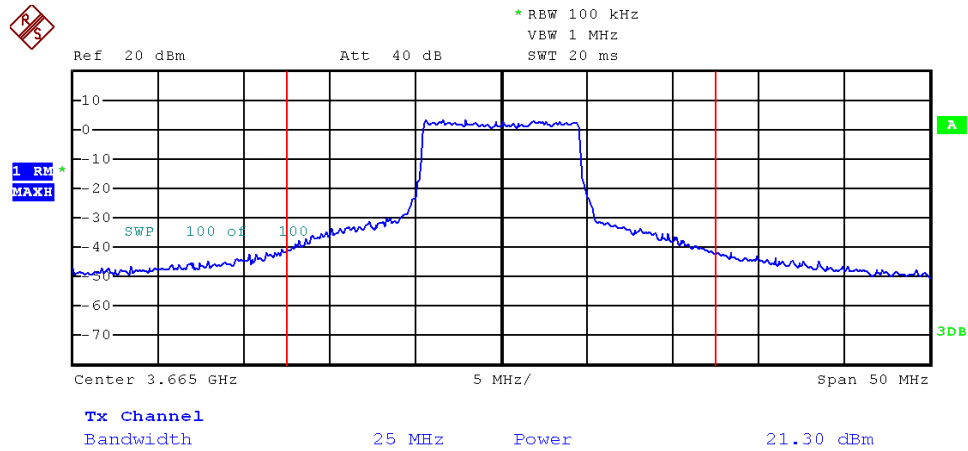


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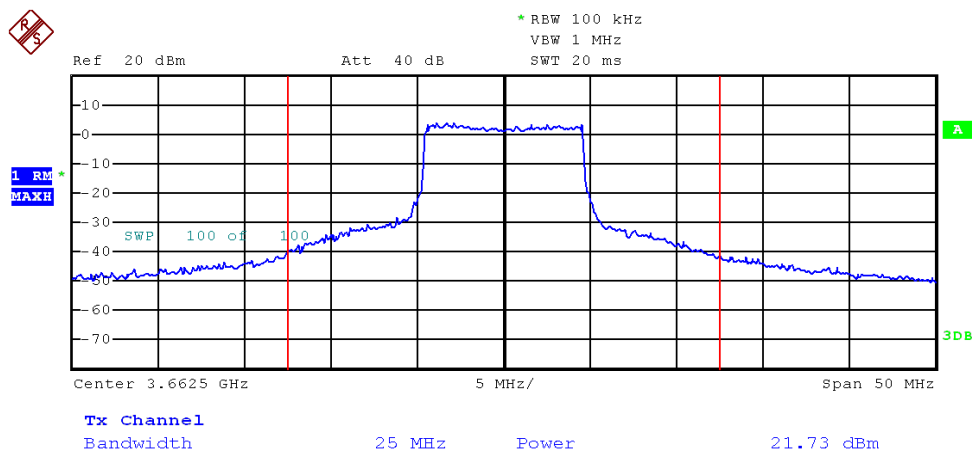


10MHz Bandwidth

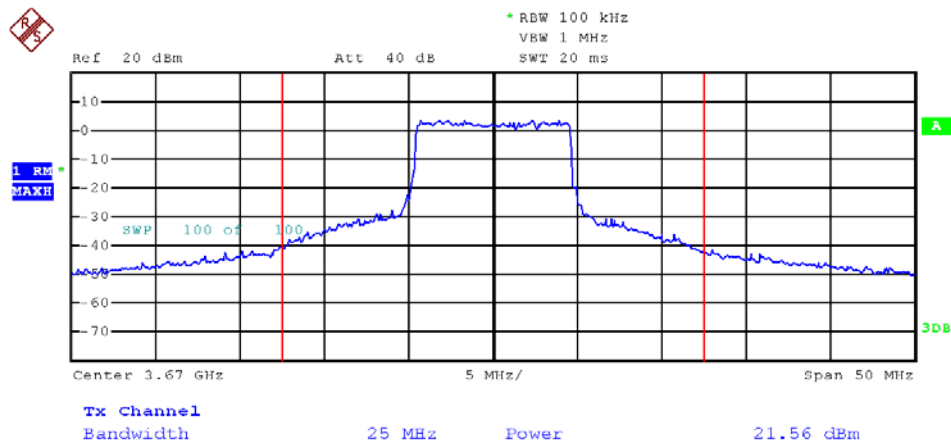
Low Channel



Middle Channel



High Channel

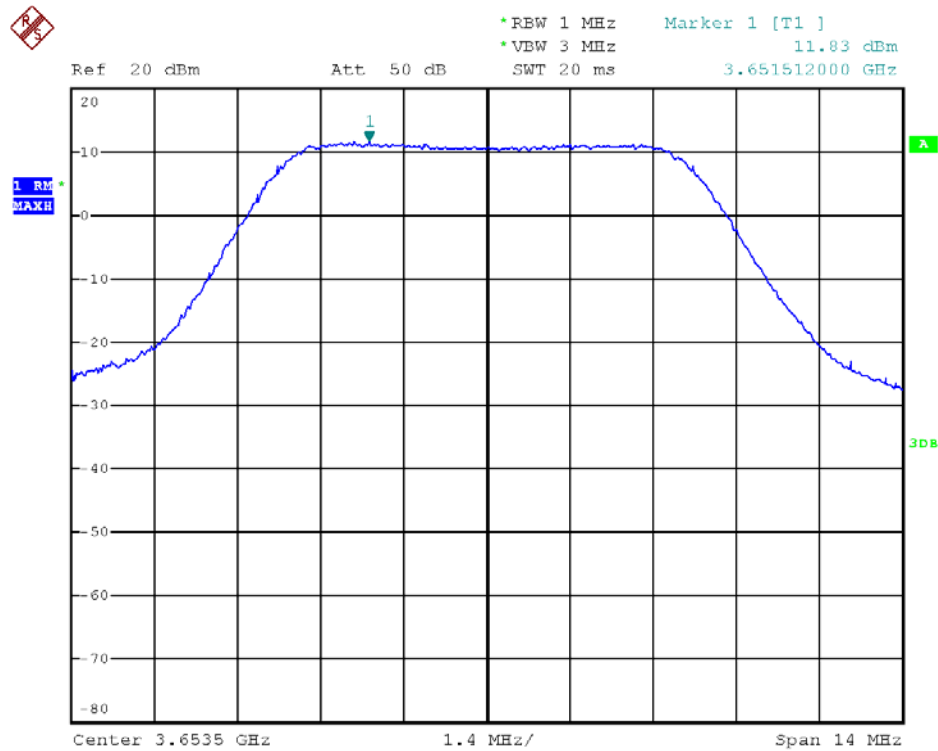


For power/MHz

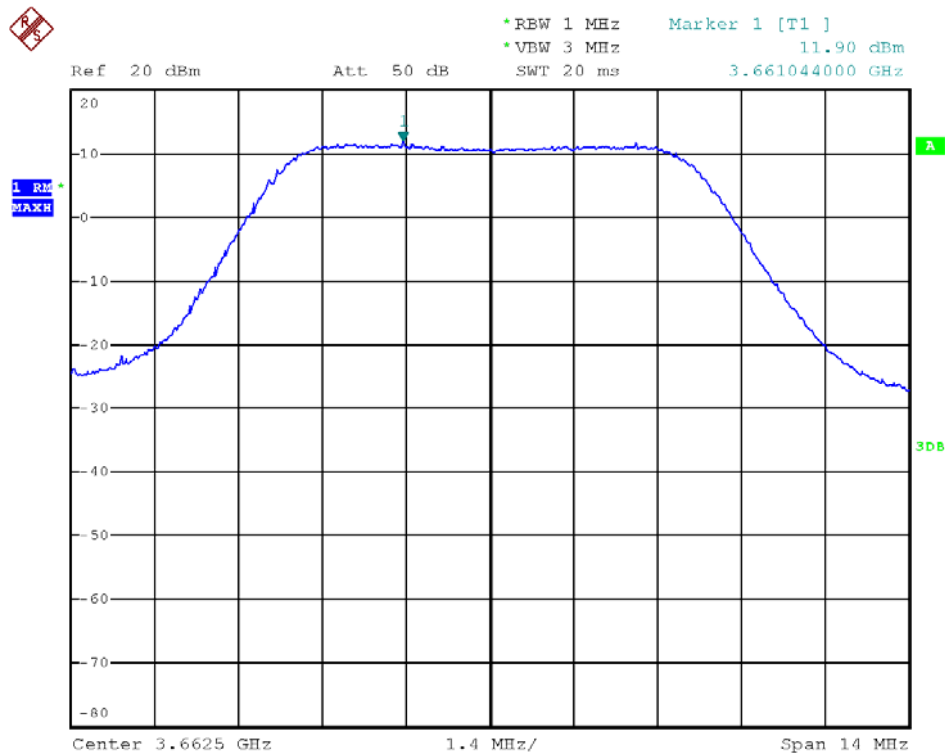
Ant Port 0

7MHz Bandwidth

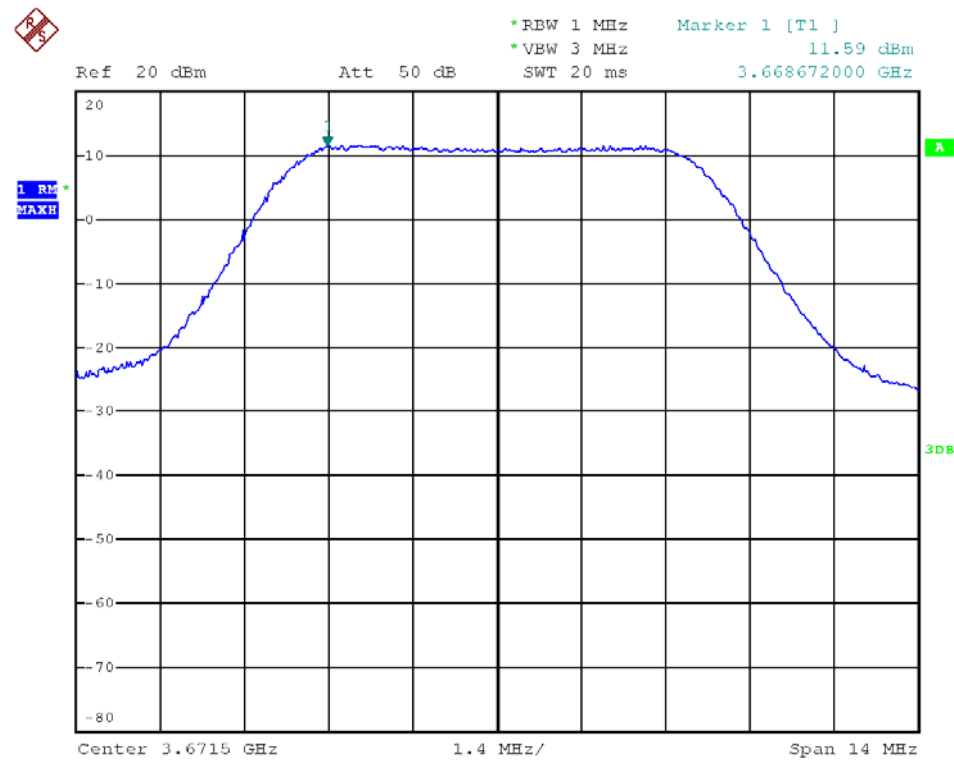
Low Channel



Middle Channel

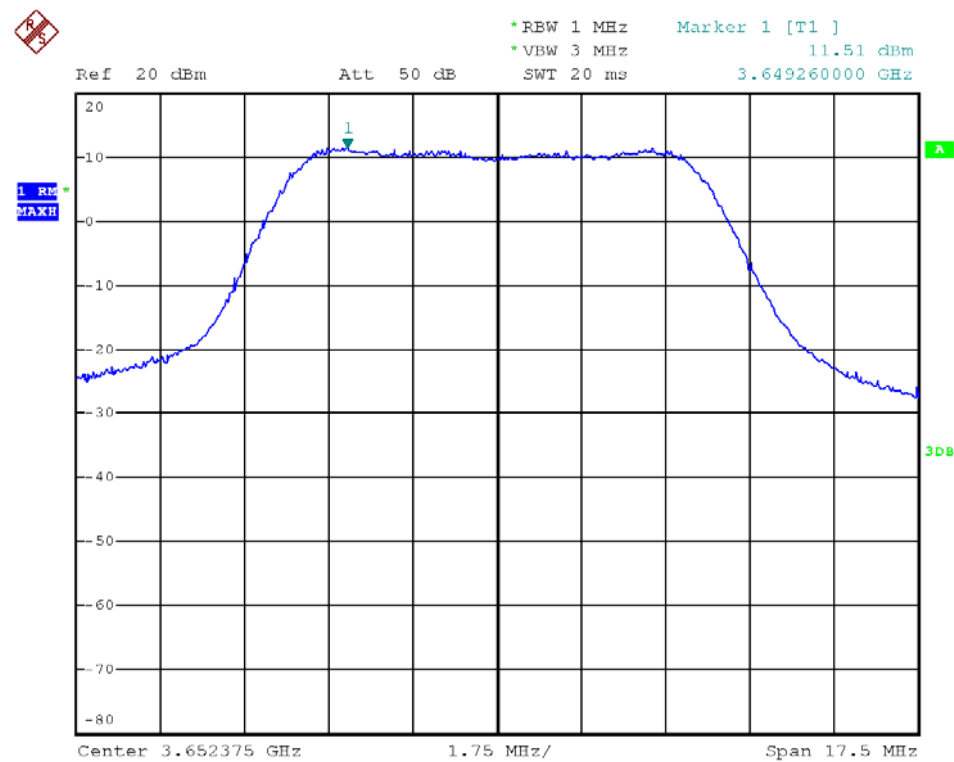


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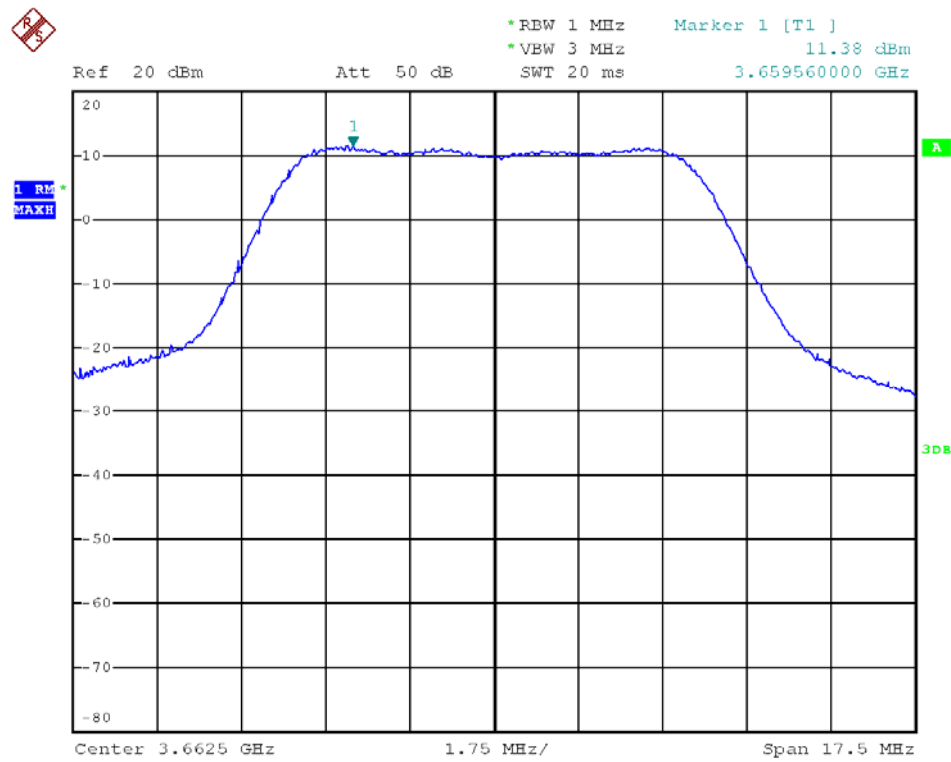


8.75MHz Bandwidth

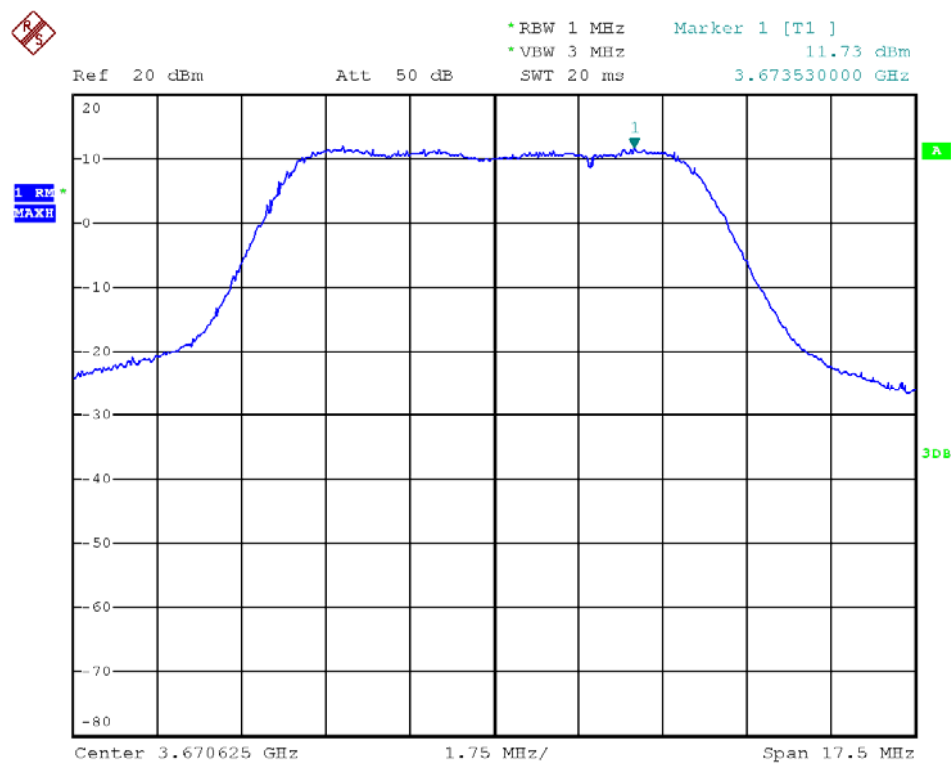
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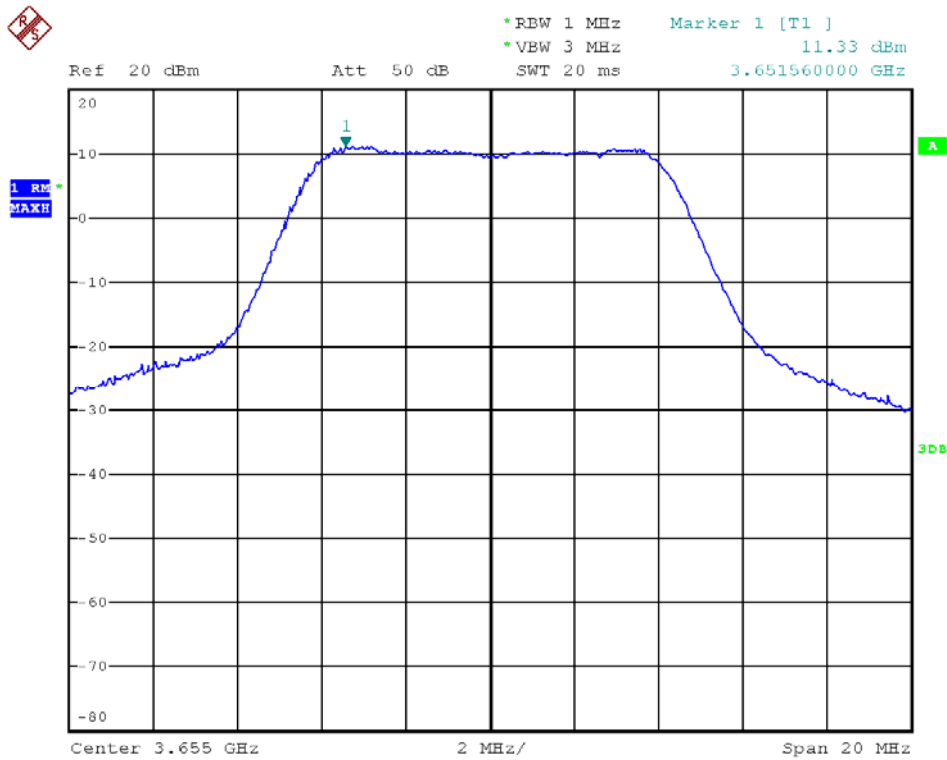
Middle Channel



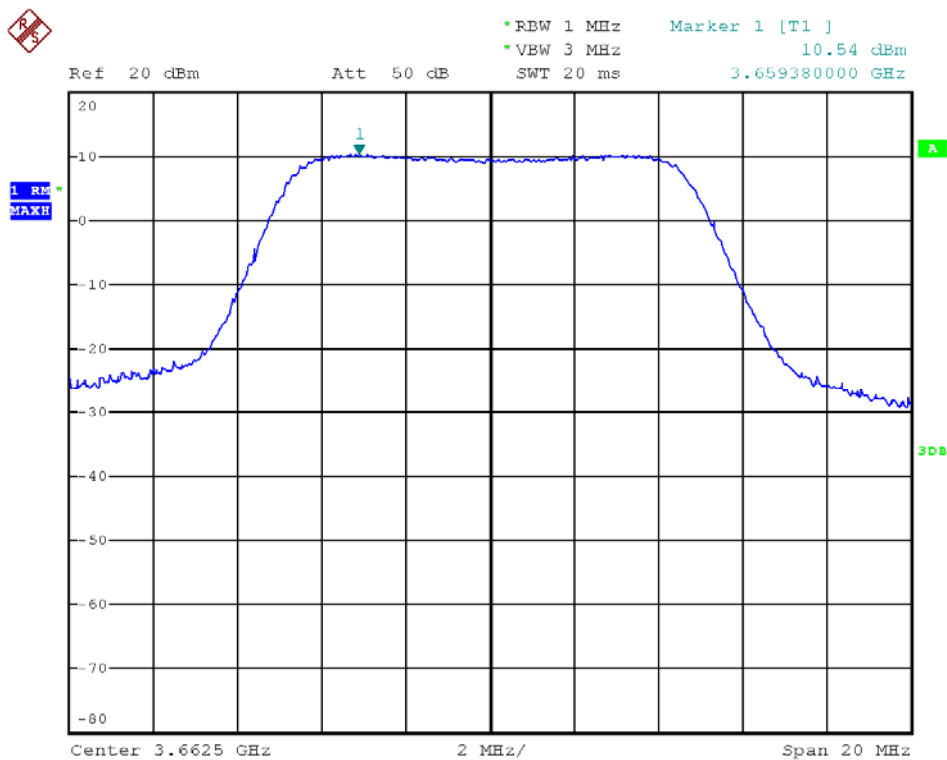
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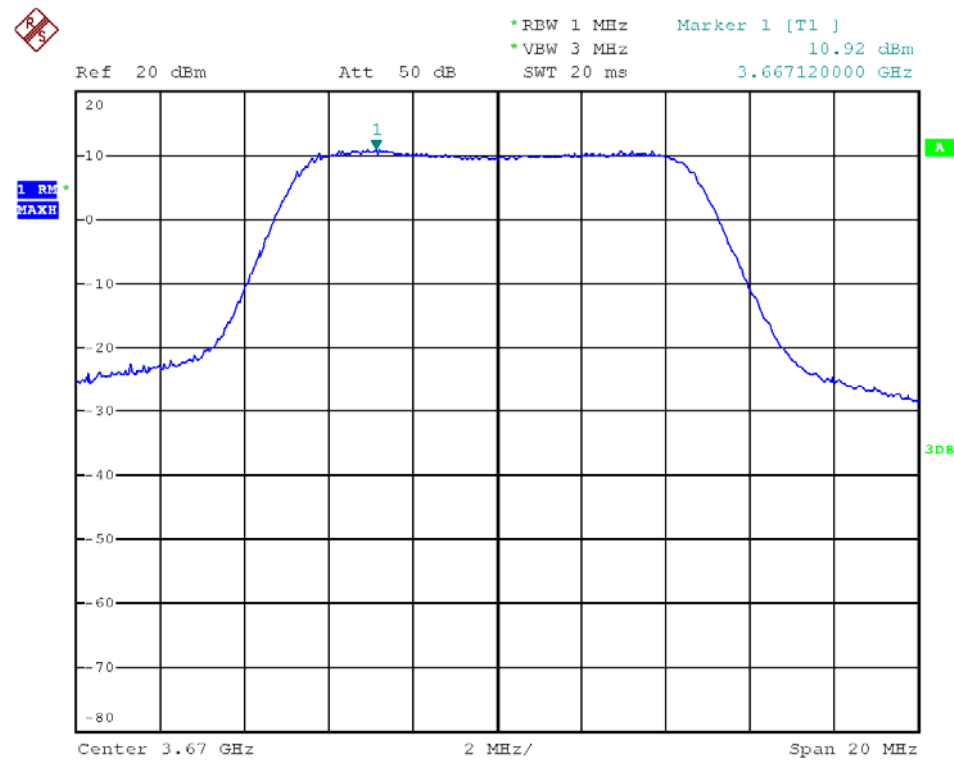
10MHz Bandwidth
Low Channel



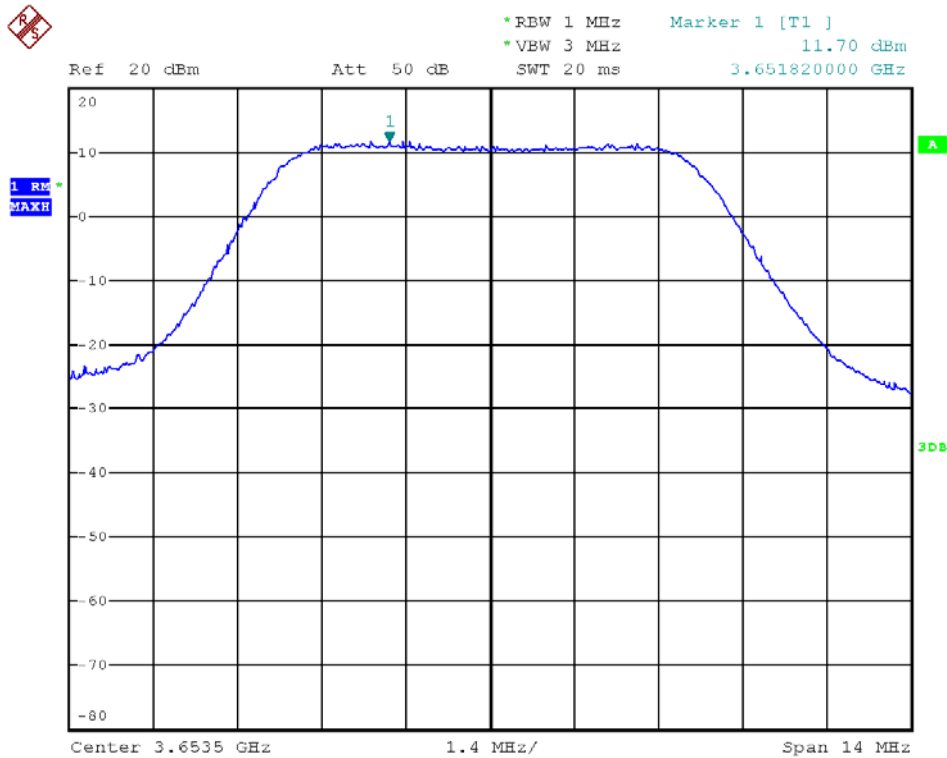
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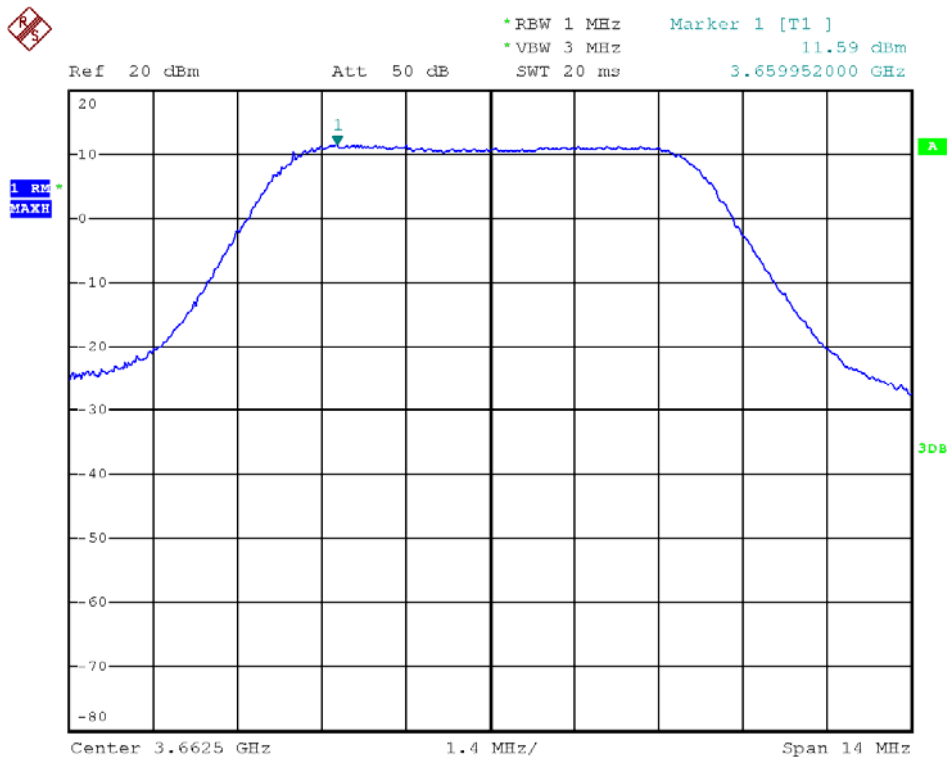
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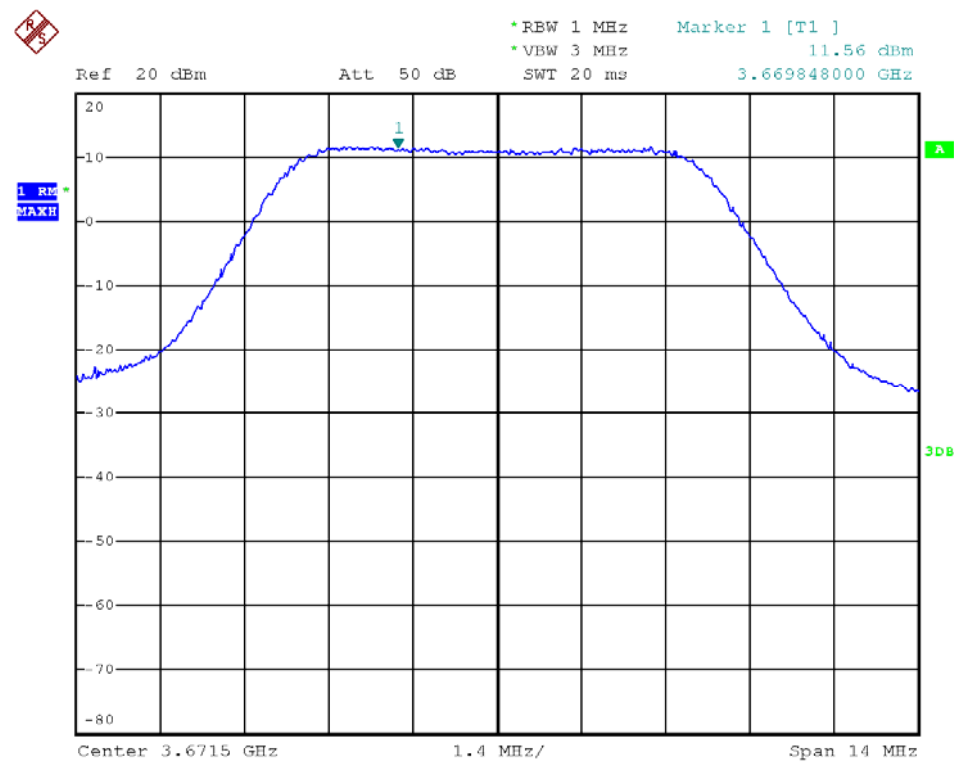
Ant Port 1
7MHz Bandwidth
Low Channel



Middle Channel

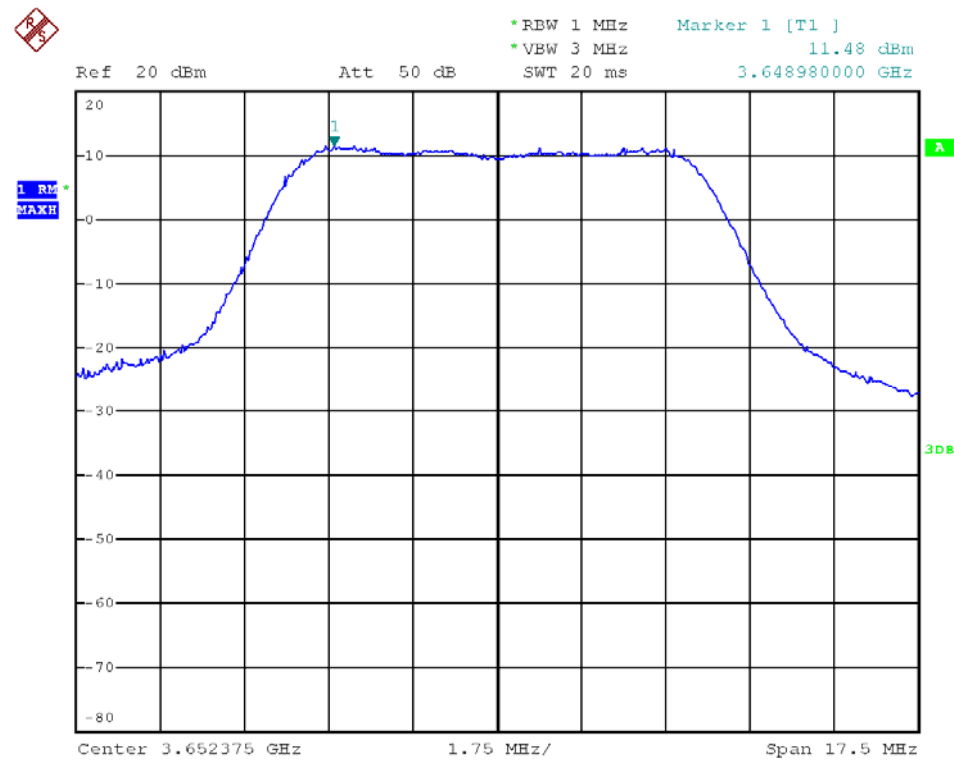


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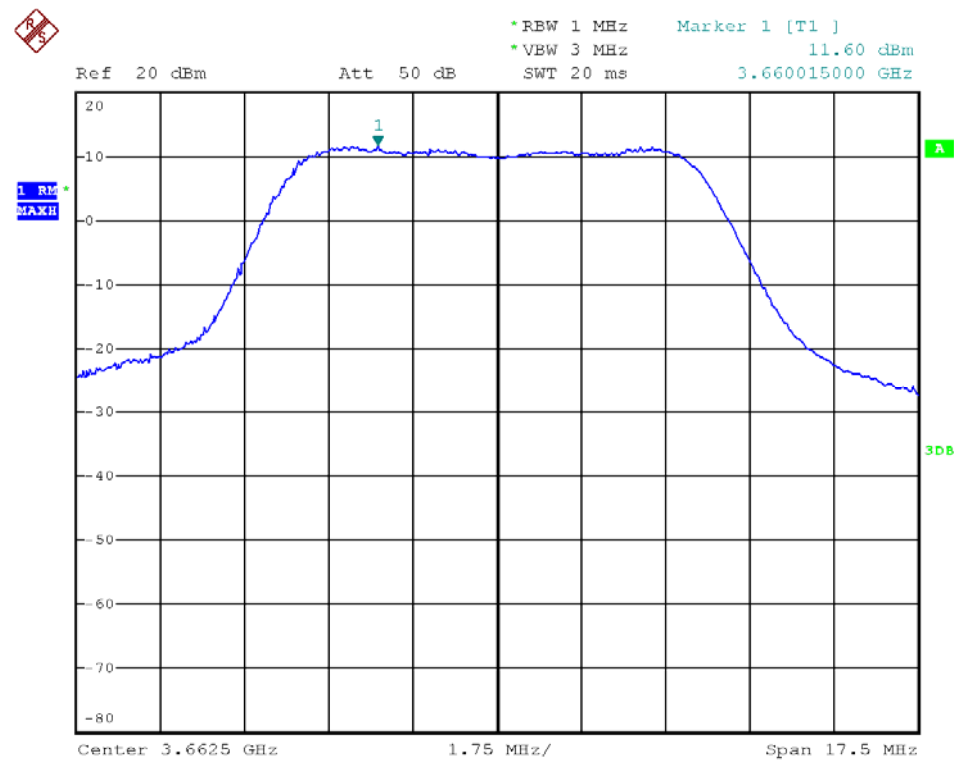


8.75MHz Bandwidth

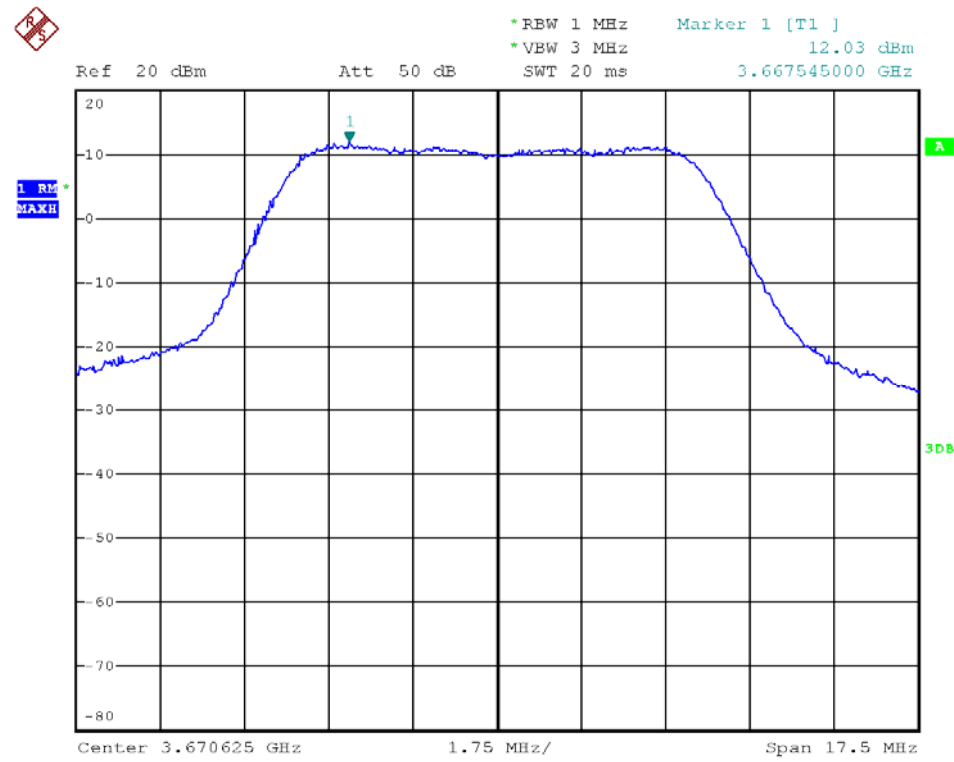
Low Channel



Middle Channel

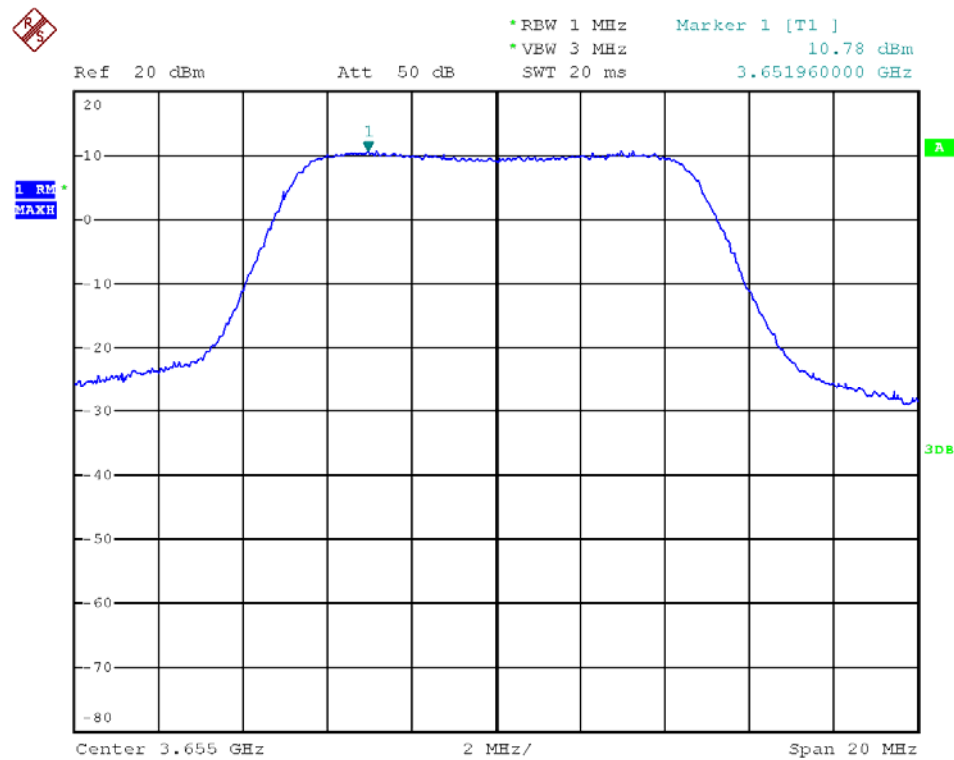


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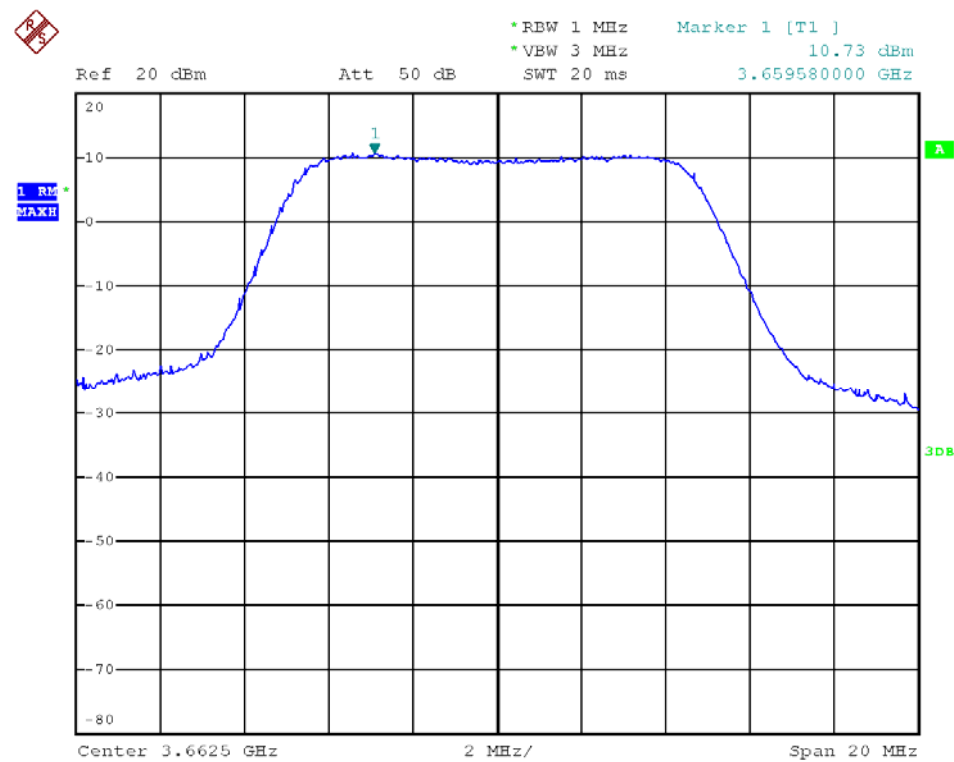


10MHz Bandwidth

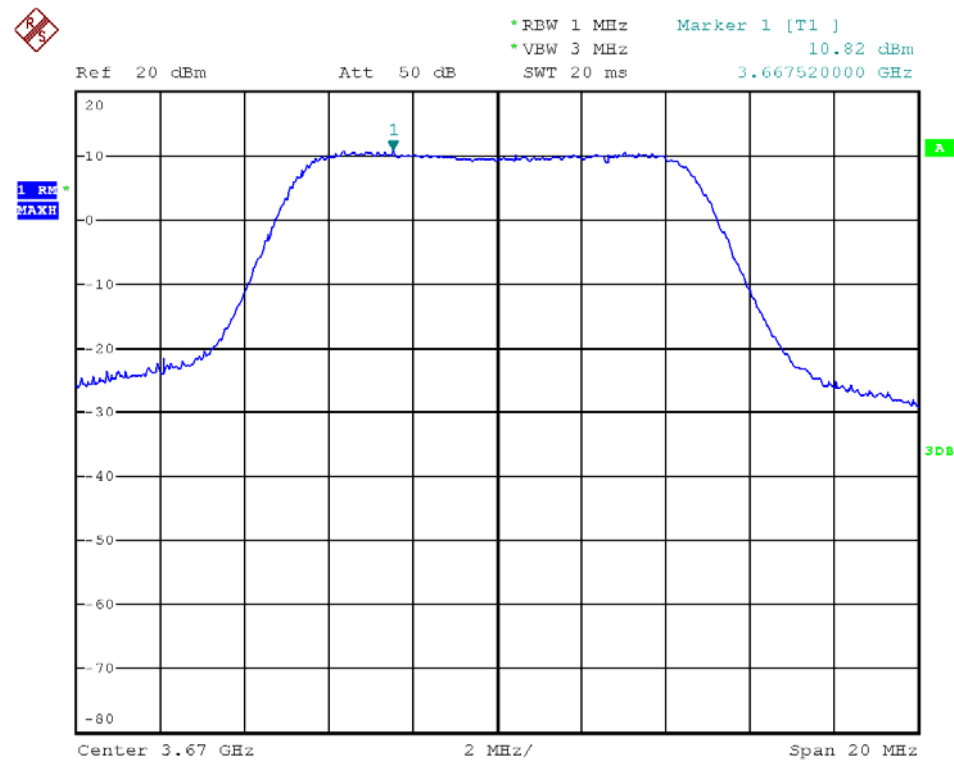
Low Channel



Middle Channel



High Channel



5. Emission Bandwidth

5.1 Standard Applicable

According to FCC Part 2.1049 - Occupied bandwidth

Measure the width of the emission using the 99% power bandwidth function of the spectrum analyzer

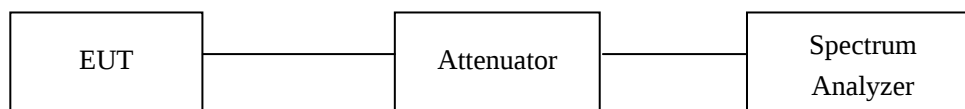
5.2 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Aglient	Spectrum Analyzer	E4407B	MY41440400	2015-05-28	2016-05-27
Attenuator	ATTEN	ATS100-20-10	/	2015-05-28	2016-05-27

5.3 Test Procedure

KDB 971168 D01 Power Meas License Digital Systems v02r02 4.2 Occupied bandwidth - power bandwidth (99%)

Test Configuration for the emission bandwidth testing:



5.4 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

5.5 Summary of Test Results/Plots

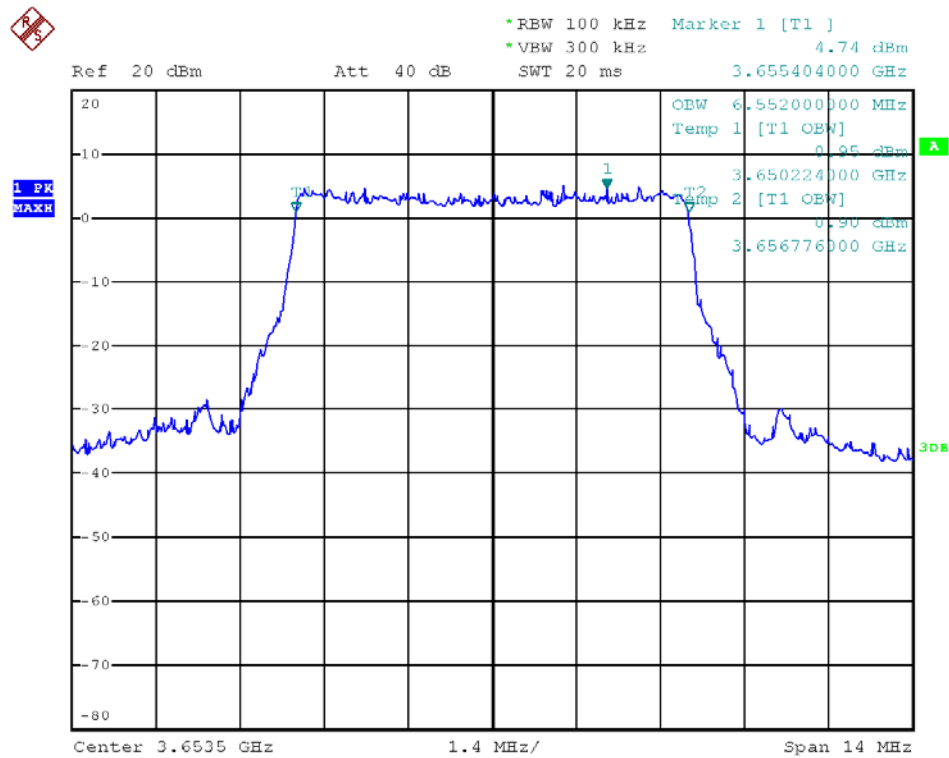
Test Mode	Channel	Occupied bandwidth Antenna Port 0 (MHz)	Occupied bandwidth Antenna Port 1 (MHz)
7MHz Bandwidth	Low Channel	6.552	6.552
	Middle Channel	6.552	6.552
	High Channel	6.580	6.580
8.75MHz Bandwidth	Low Channel	8.190	8.155
	Middle Channel	8.155	8.155
	High Channel	8.190	8.190
10MHz Bandwidth	Low Channel	9.135	9.170
	Middle Channel	9.170	9.135
	High Channel	9.170	9.17

Only tested QPSK modulation mode as determined worst case by manufacturer

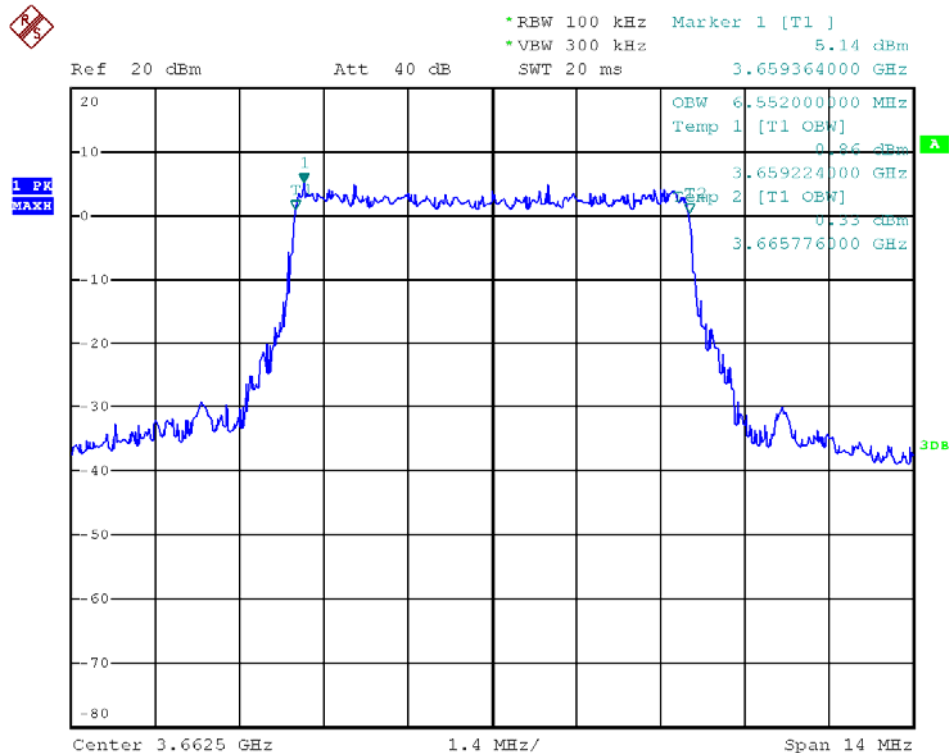
Ant Port 1

7MHz Bandwidth

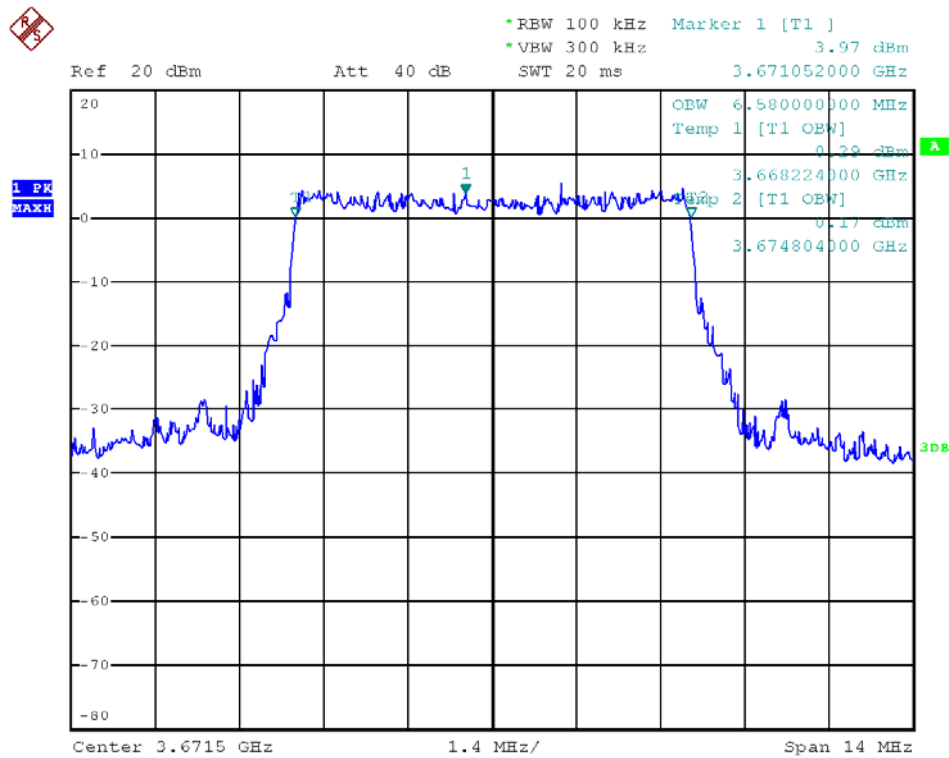
Low Channel



Middle Channel

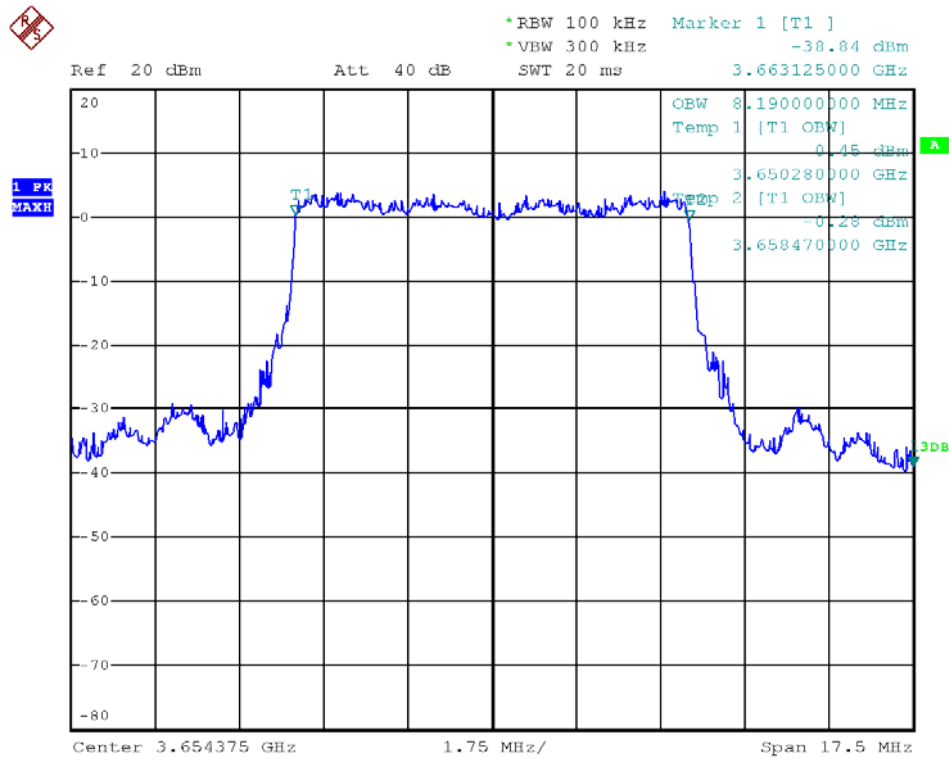


High Channel

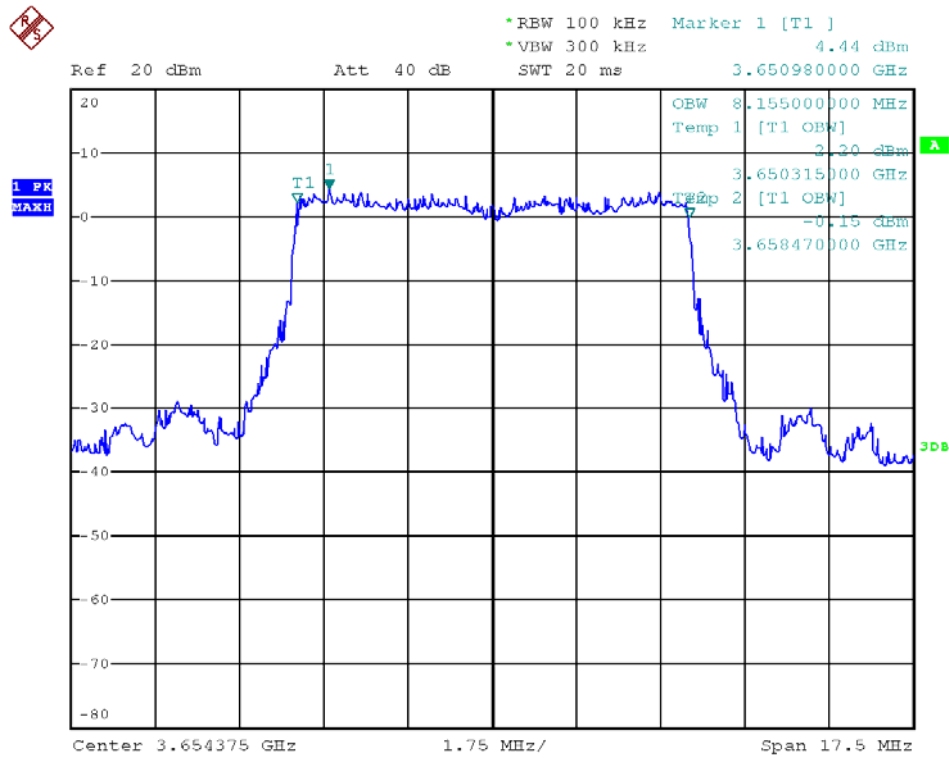


8.75MHz Bandwidth

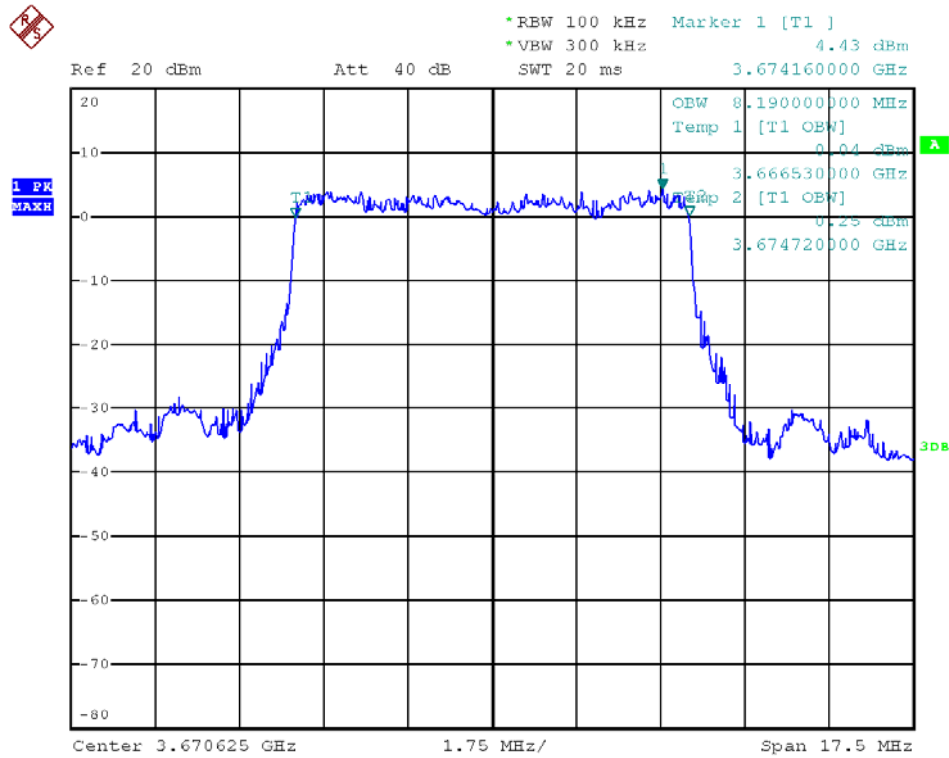
Low Channel



Middle Channel

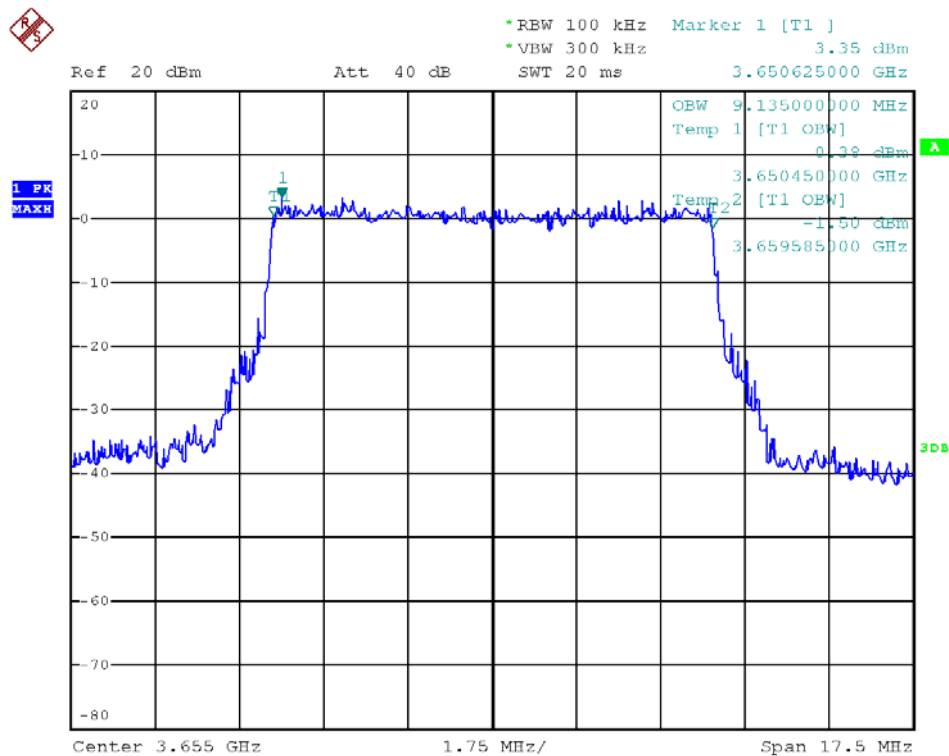


High Channel

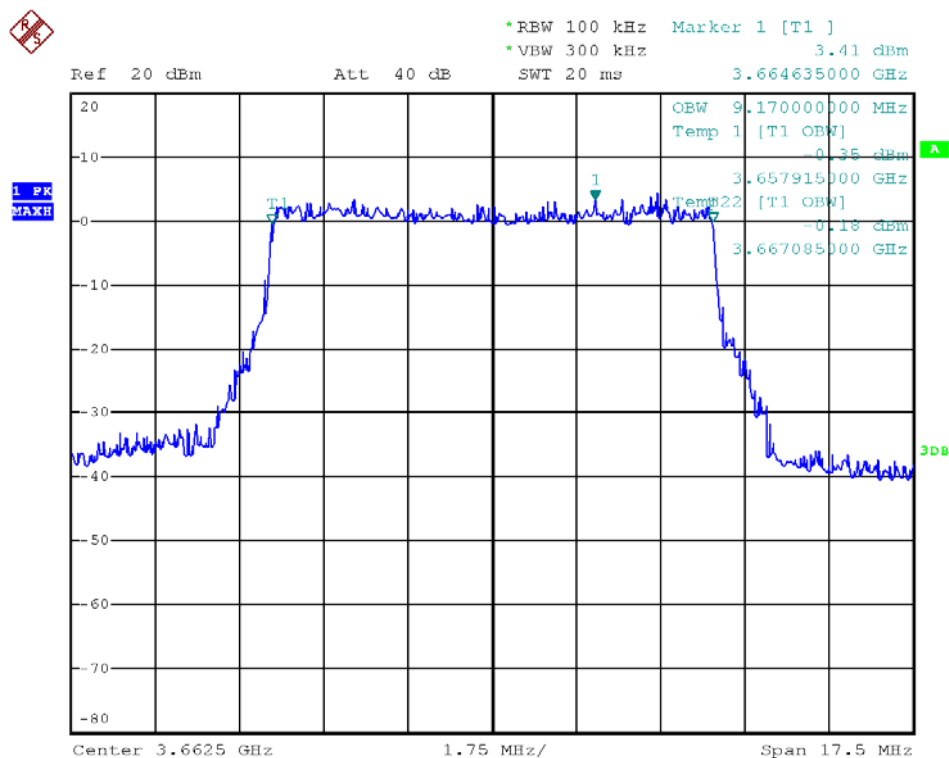


10MHz Bandwidth

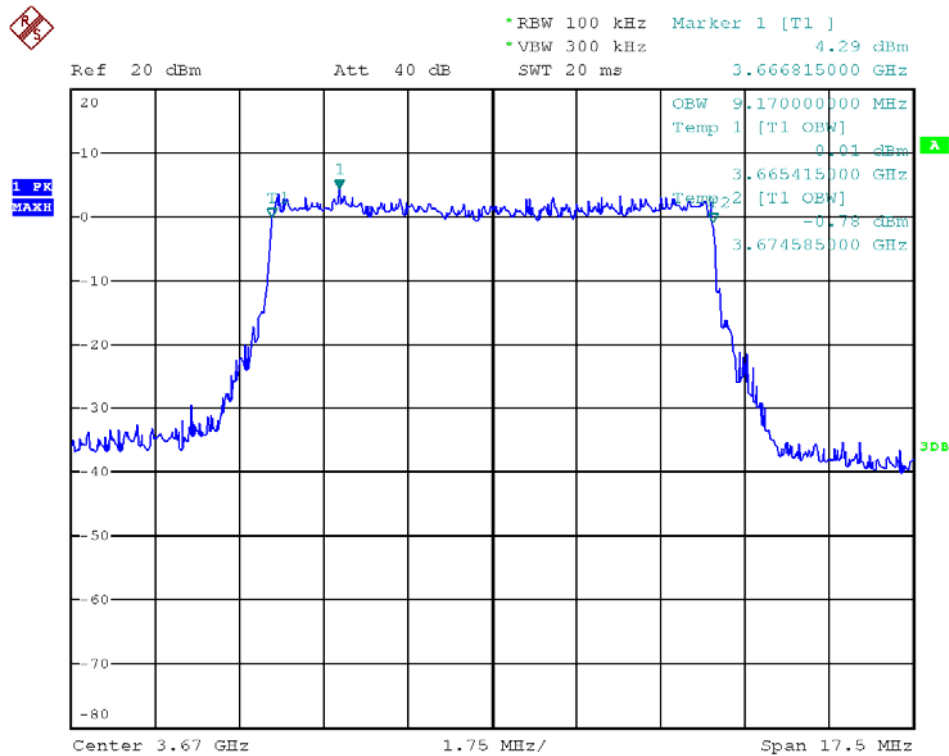
Low Channel



Middle Channel



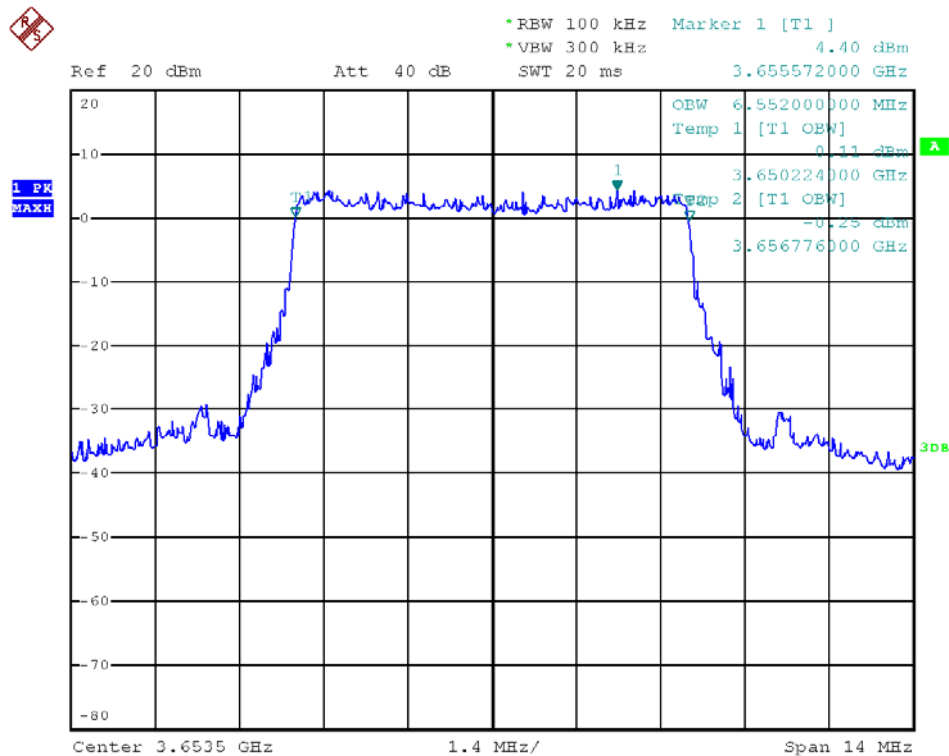
High Channel



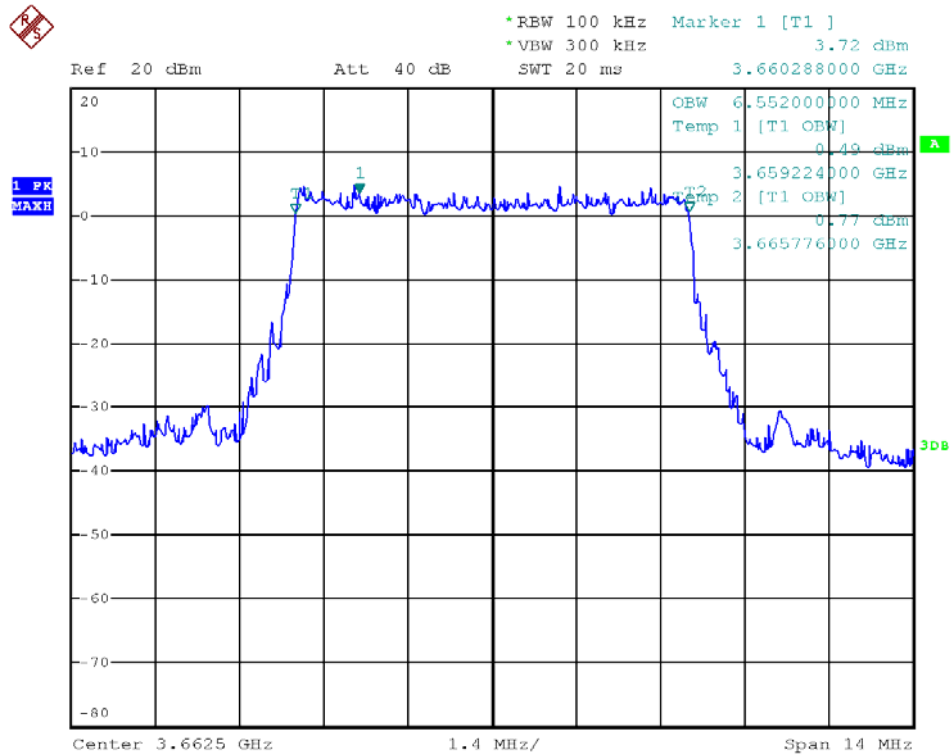
Ant Port 1

7MHz Bandwidth

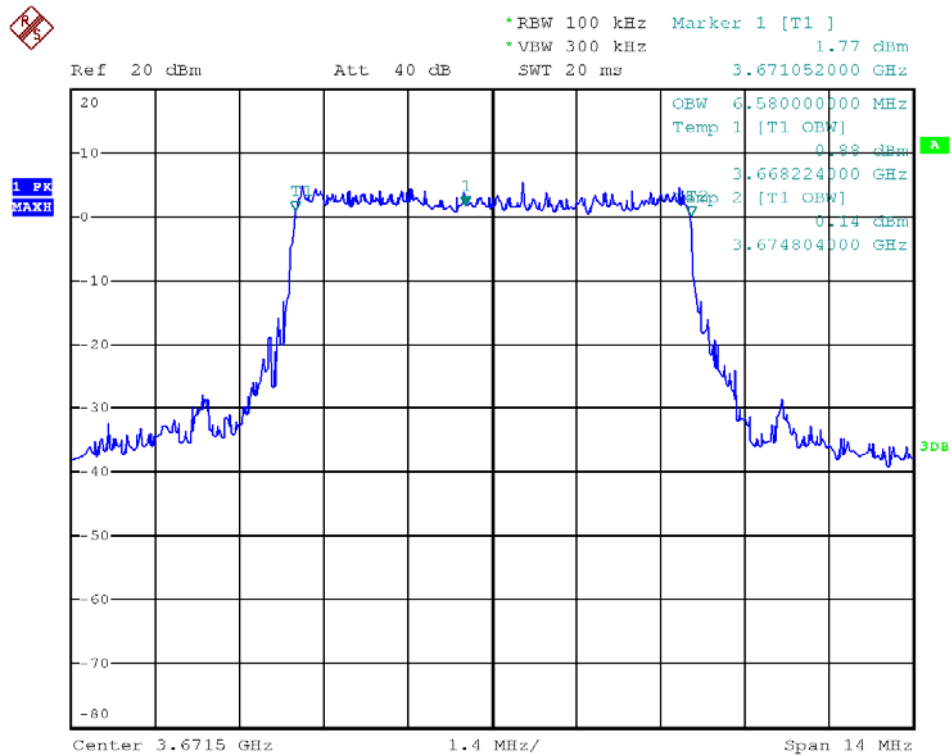
Low Channel



Middle Channel

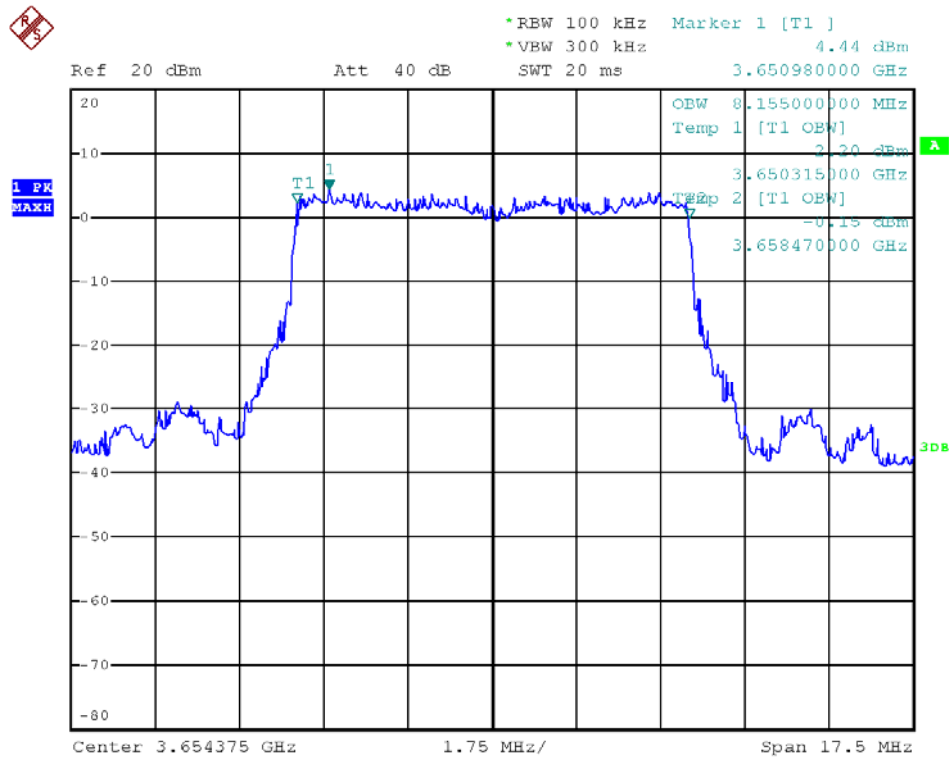


High Channel

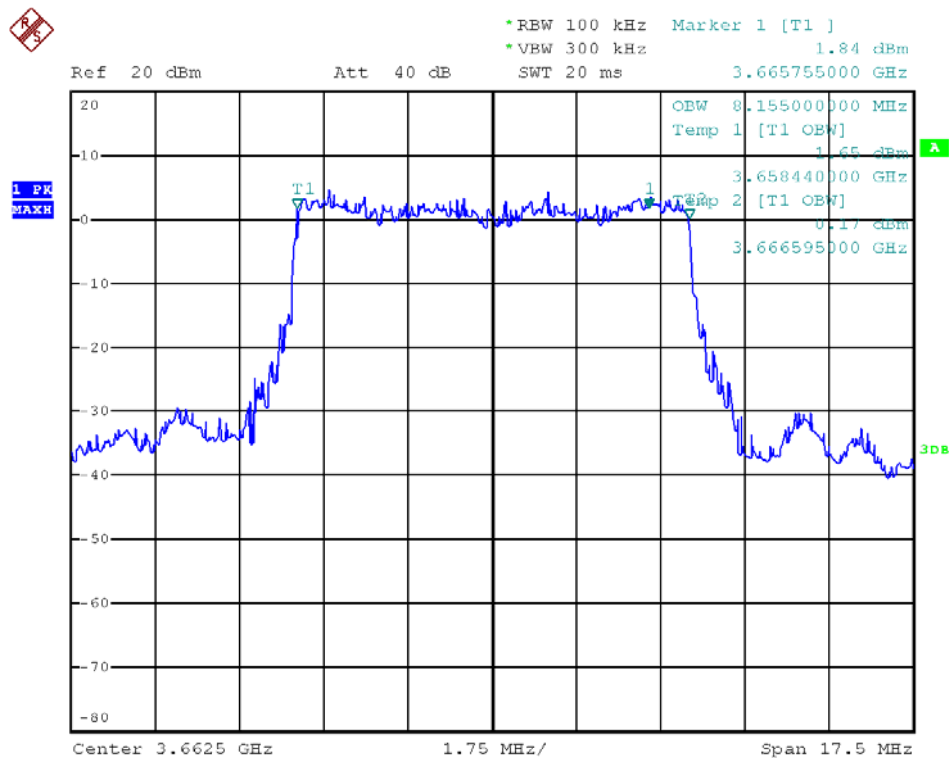


8.75MHz Bandwidth

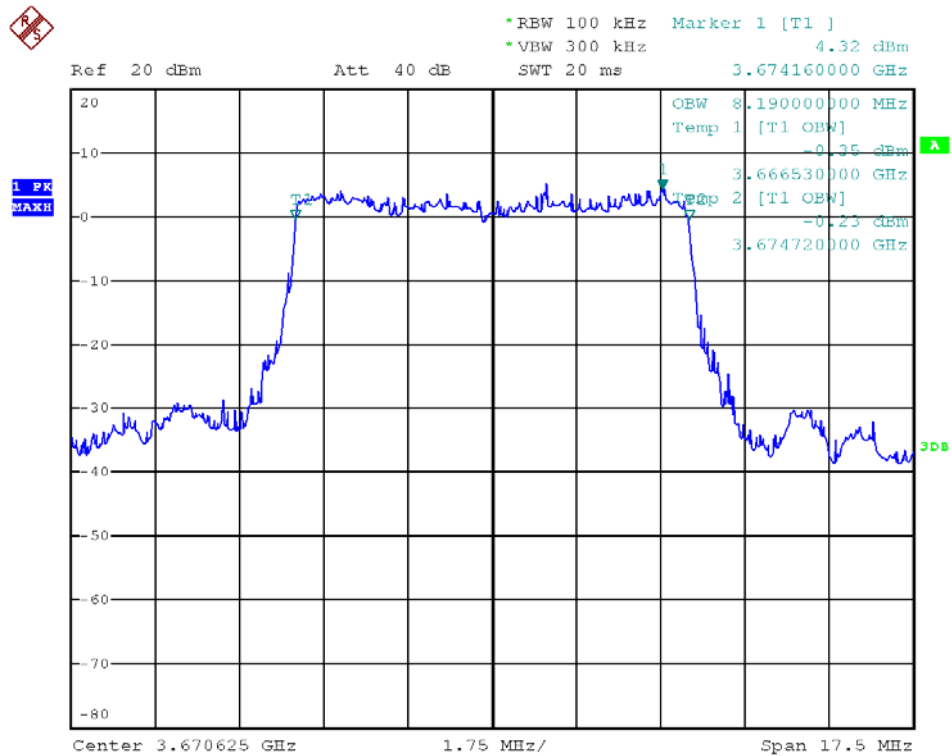
Low Channel



Middle Channel

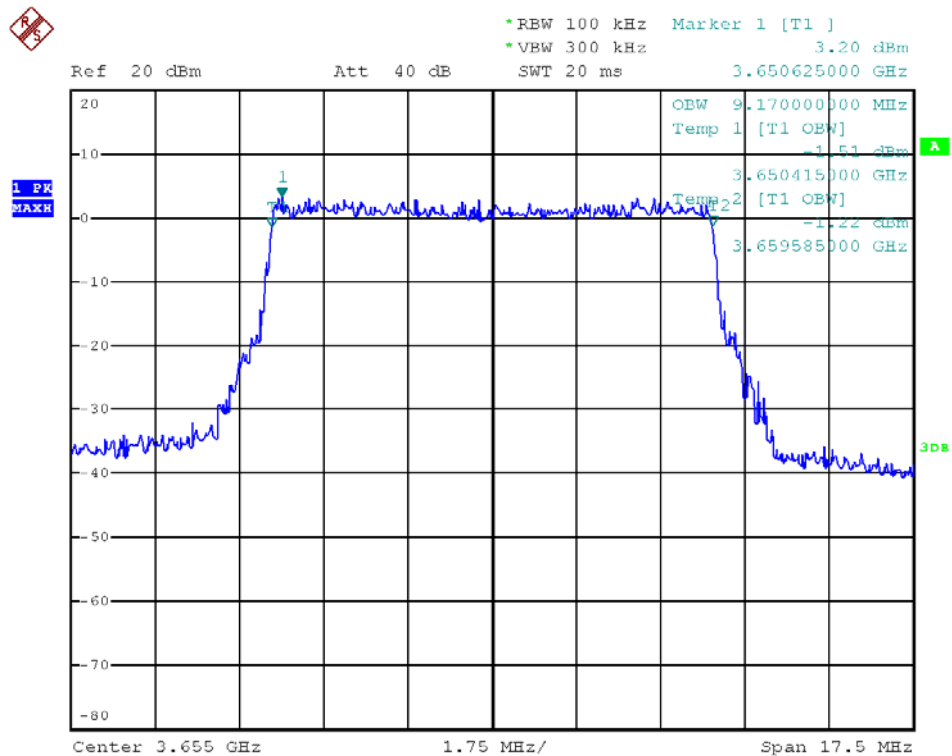


High Channel

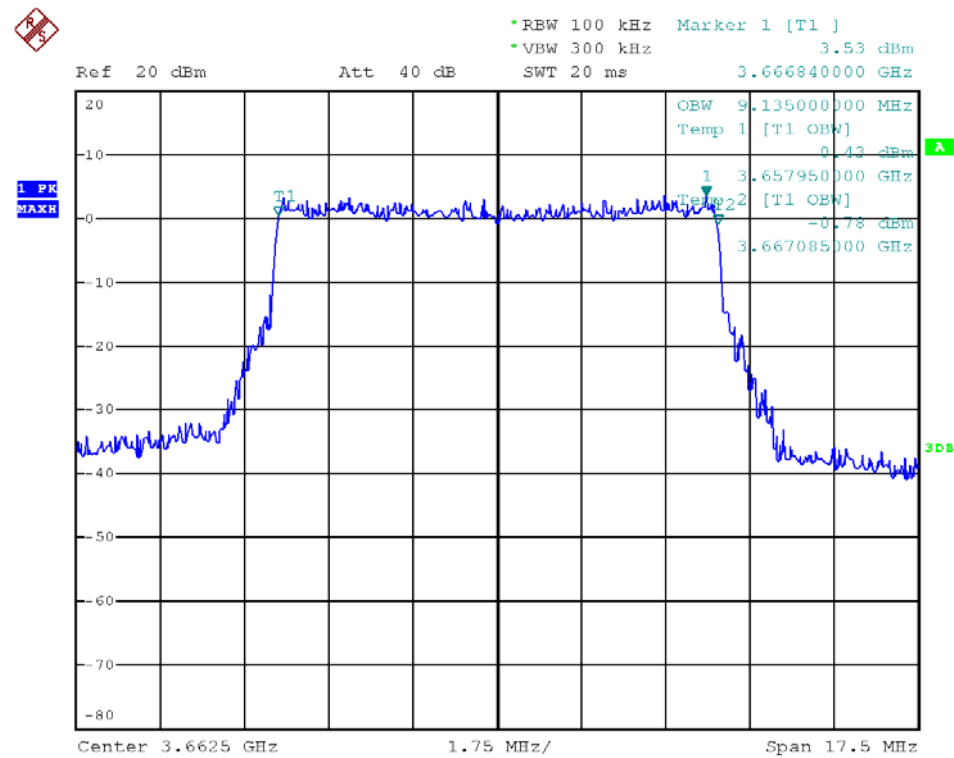


10MHz Bandwidth

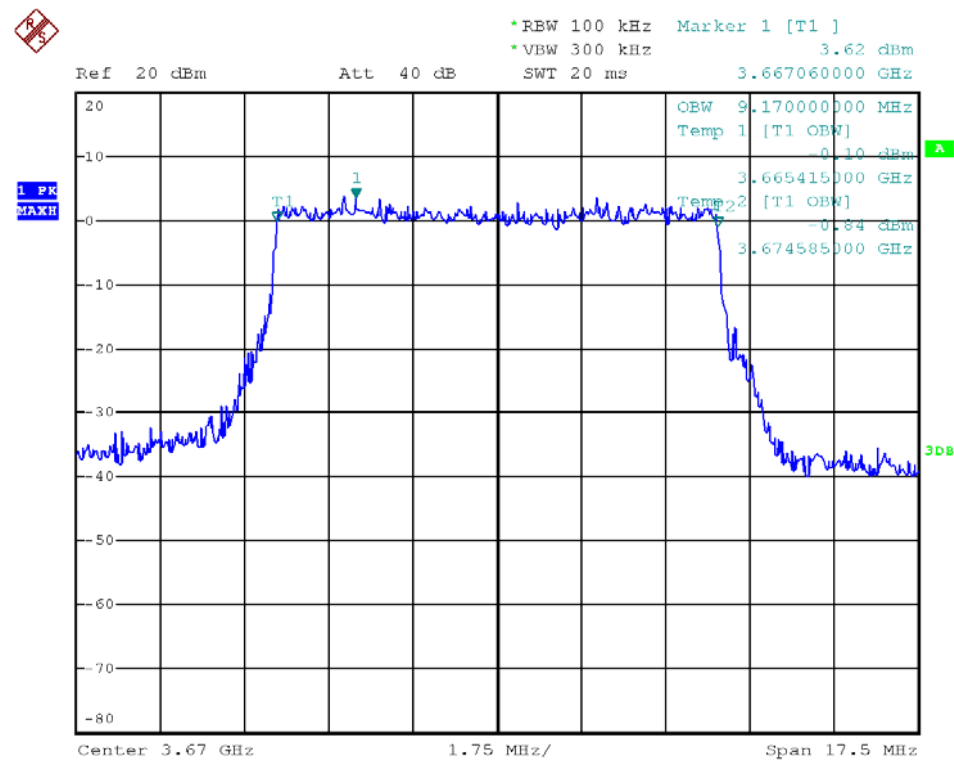
Low Channel



Middle Channel



High Channel



6. Spurious Conducted Emissions

6.1 Standard Applicable

According to §90.1323 (a) The power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or less, but at least one percent of the emission bandwidth of the fundamental emission of the transmitter, provided the measured energy is integrated over a 1 MHz bandwidth.

6.2 Test Equipment List and Details

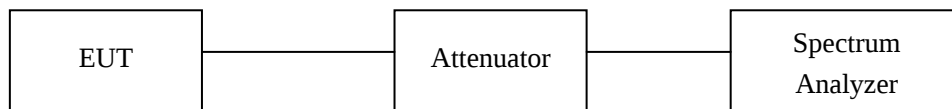
Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Aglient	Spectrum Analyzer	E4407B	US41192821	2015-05-28	2016-05-27
Aglient	Spectrum Analyzer	E4446A	US51645900	2015-05-28	2016-05-27
Attenuator	ATTEN	ATS100-20-10	/	2015-05-28	2016-05-27

6.3 Test Procedure

KDB 971168 D01 Power Meas License Digital Systems v02r02.

6.0 Spurious Emissions at Antenna Terminals

Test Configuration for the out of band emissions testing:



6.4 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56%
ATM Pressure:	1018 mbar

6.5 Summary of Test Results/Plots

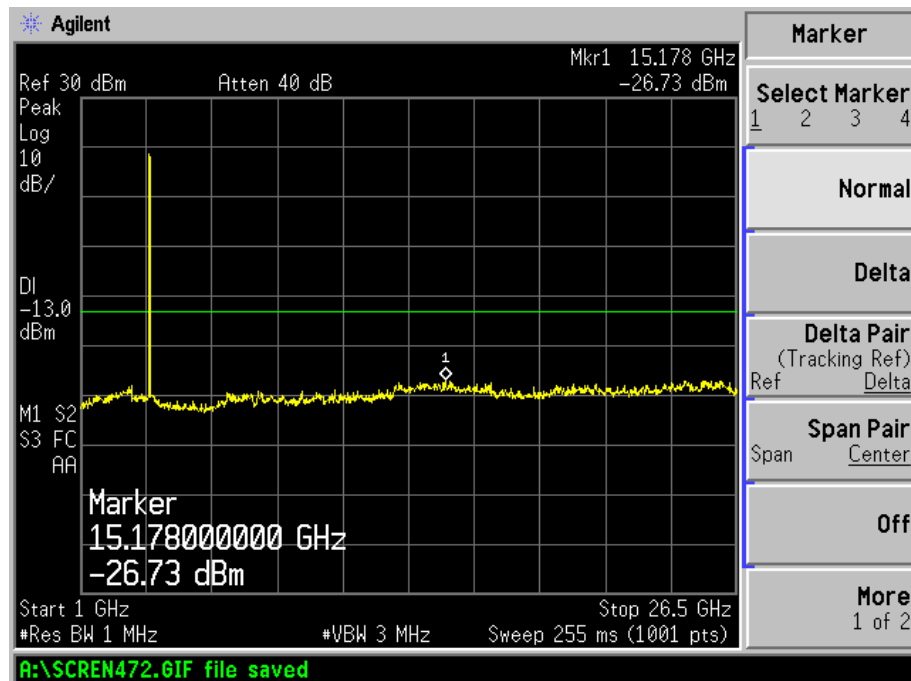
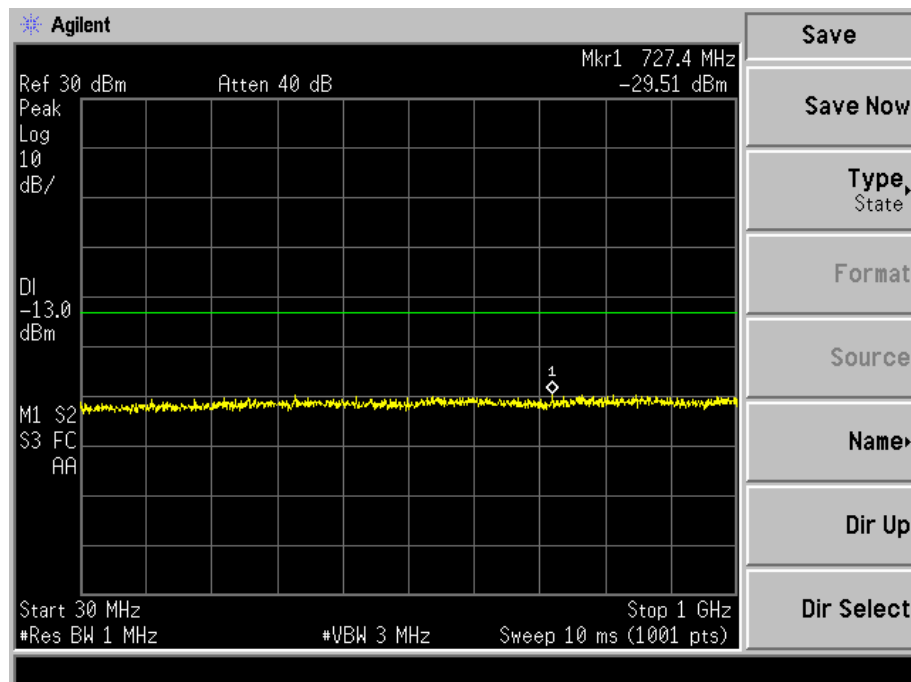
Calculated limit = -13 dBm.

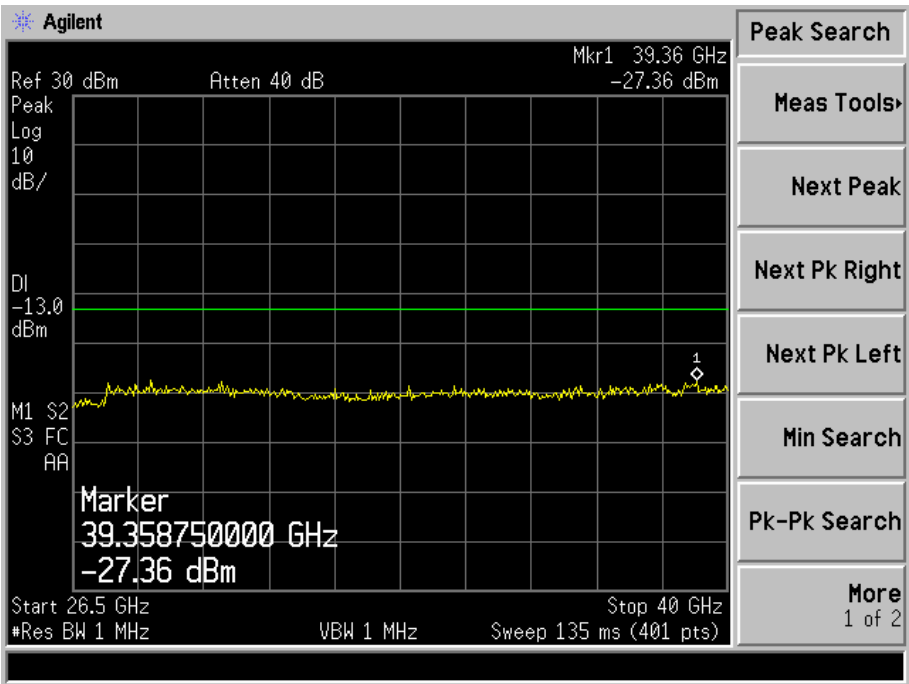
Test Result: Pass

All test modes are performed, but only the worst case (Antenna 0) is recorded in this report.

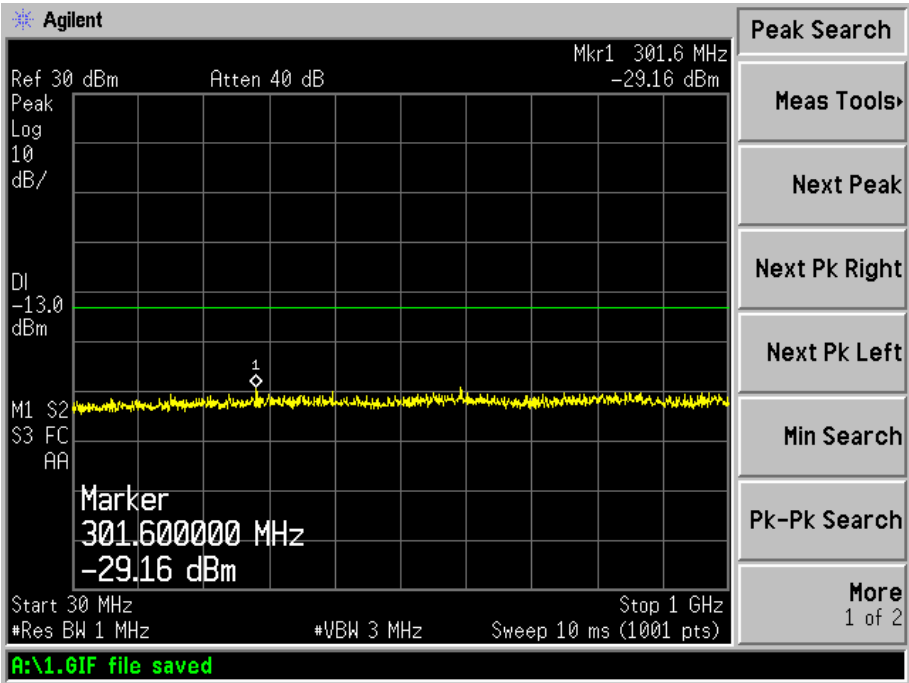
7MHz Bandwidth

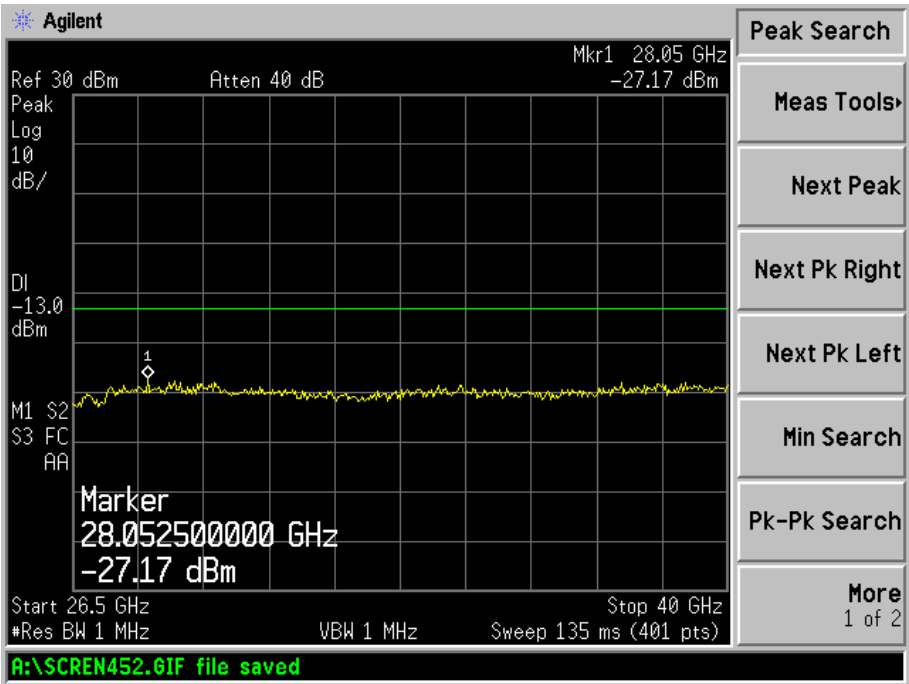
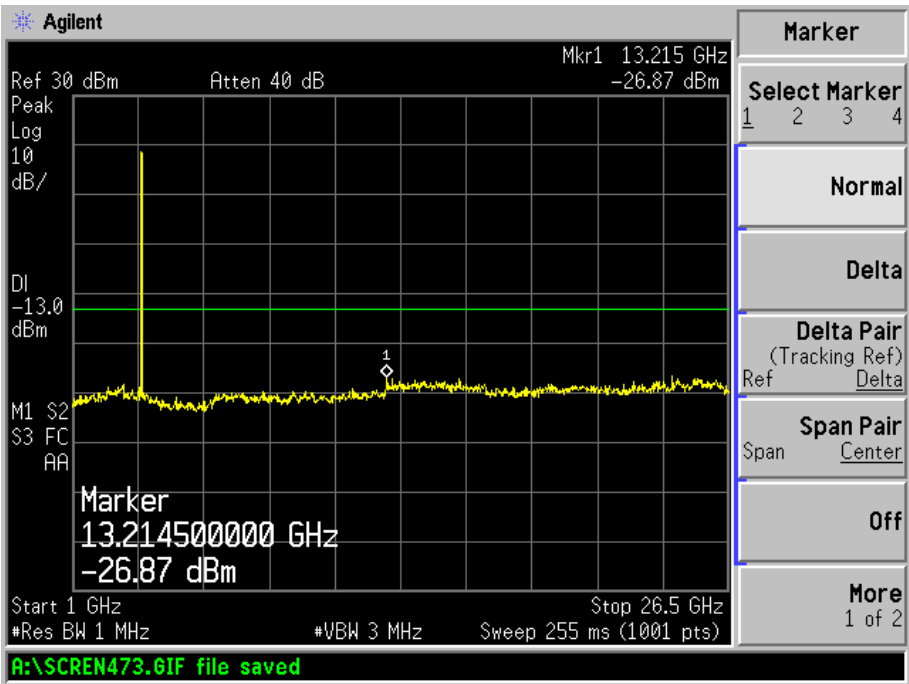
Low Channel



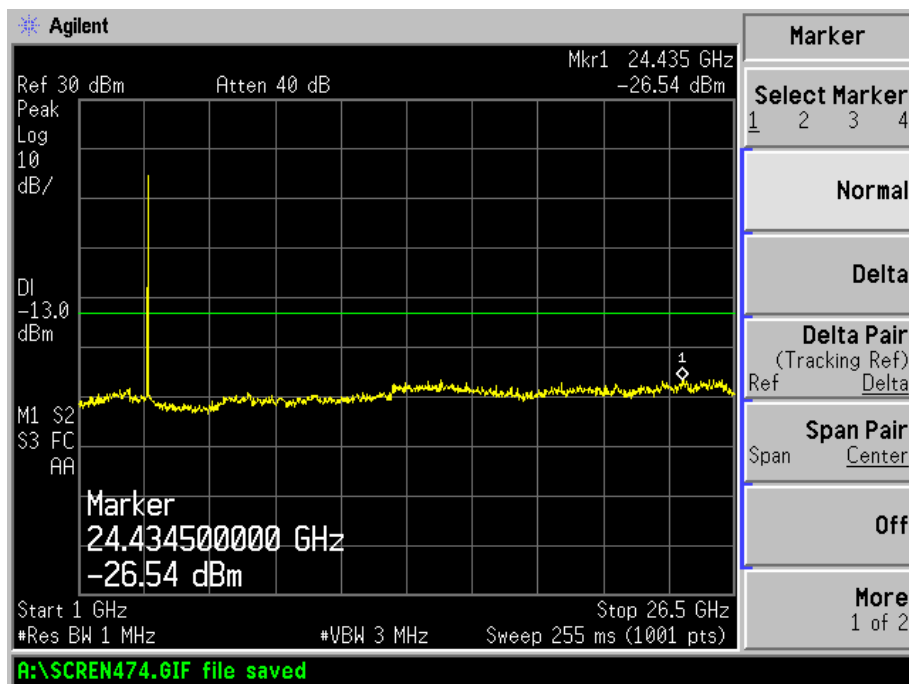
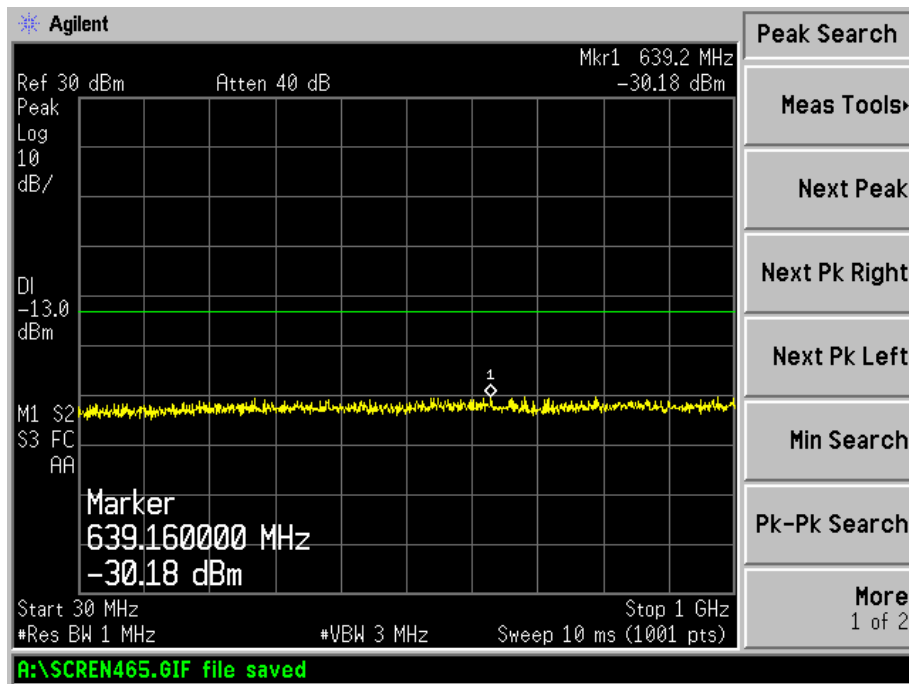


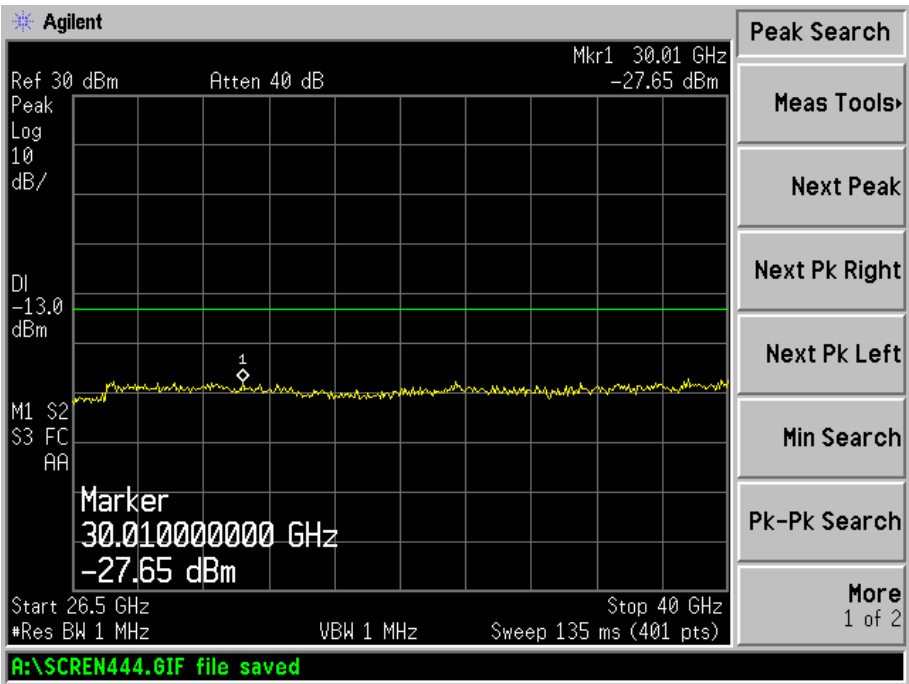
Middle Channel



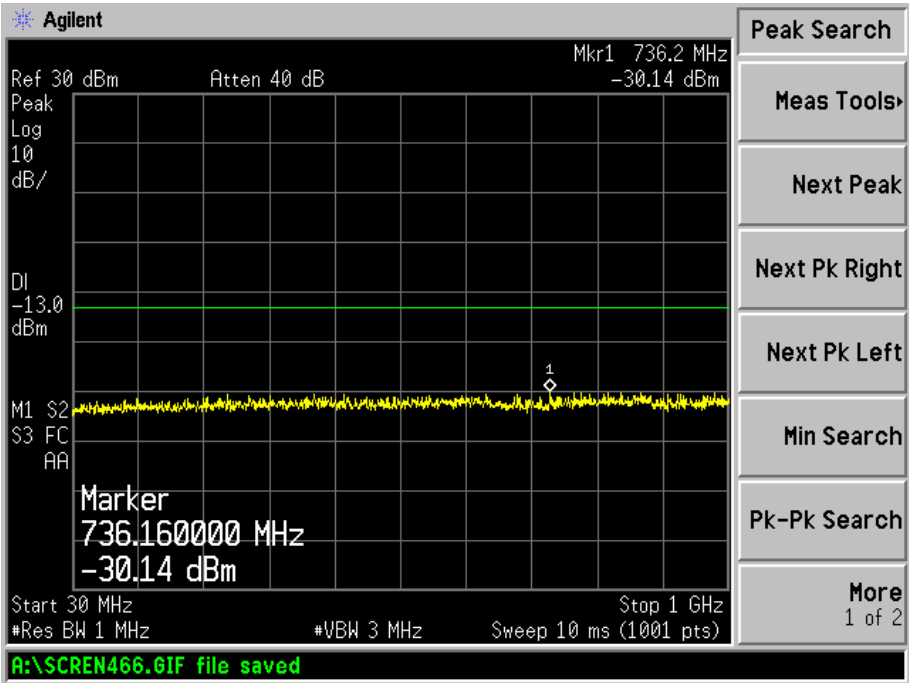


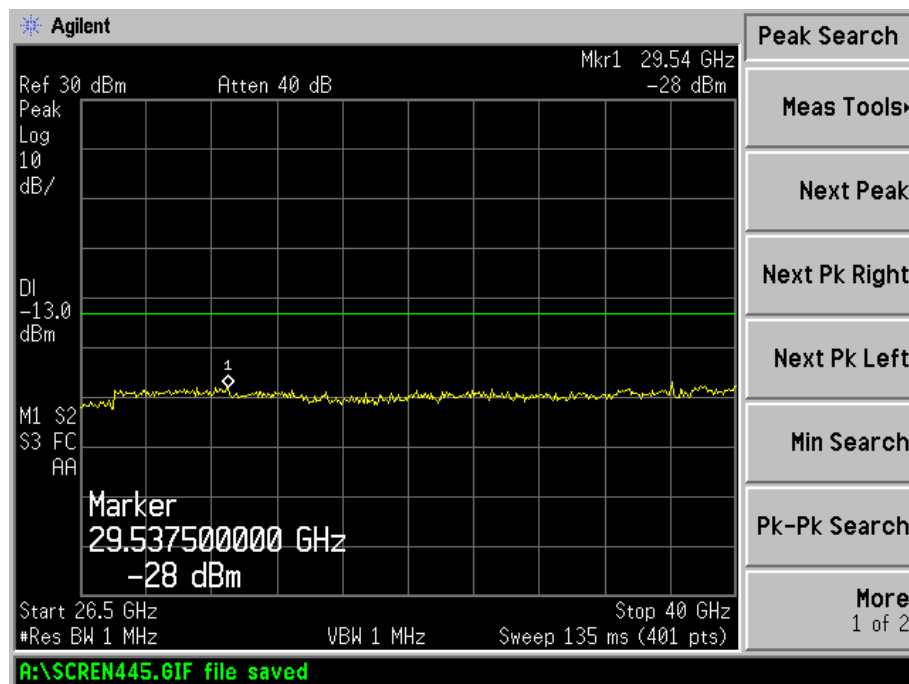
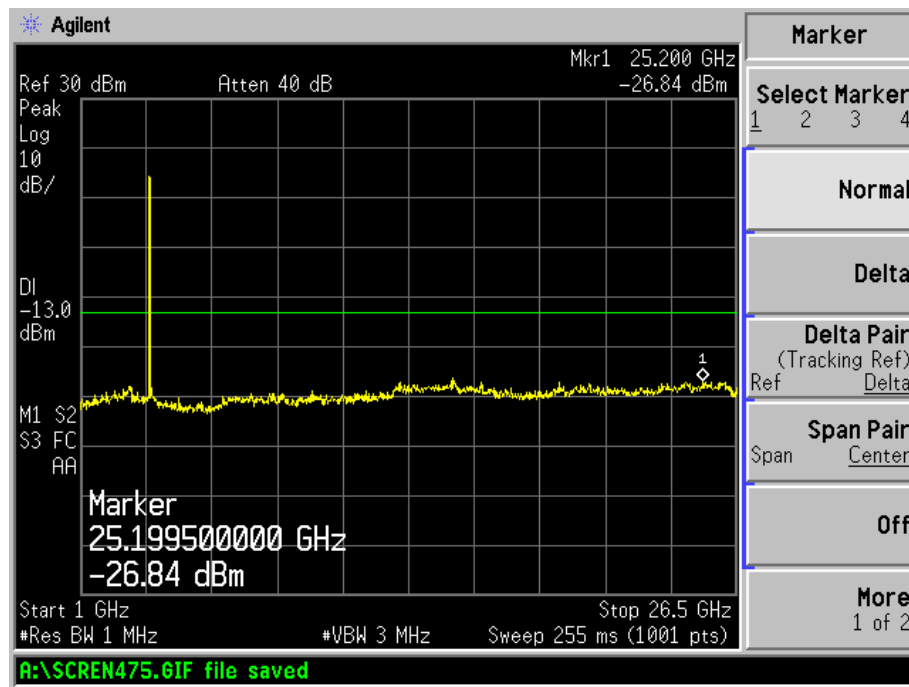
High Channel



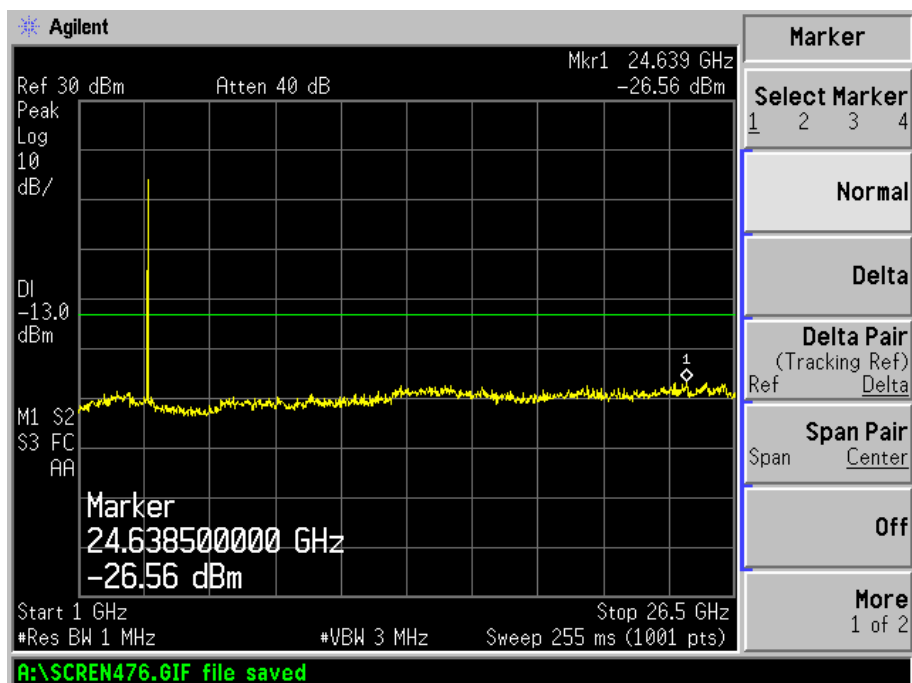
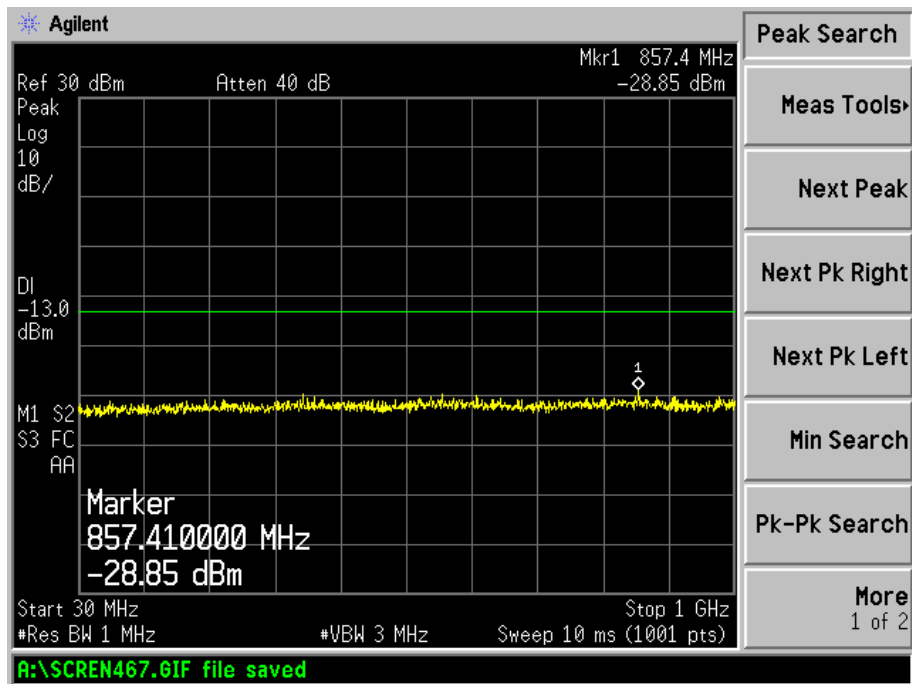


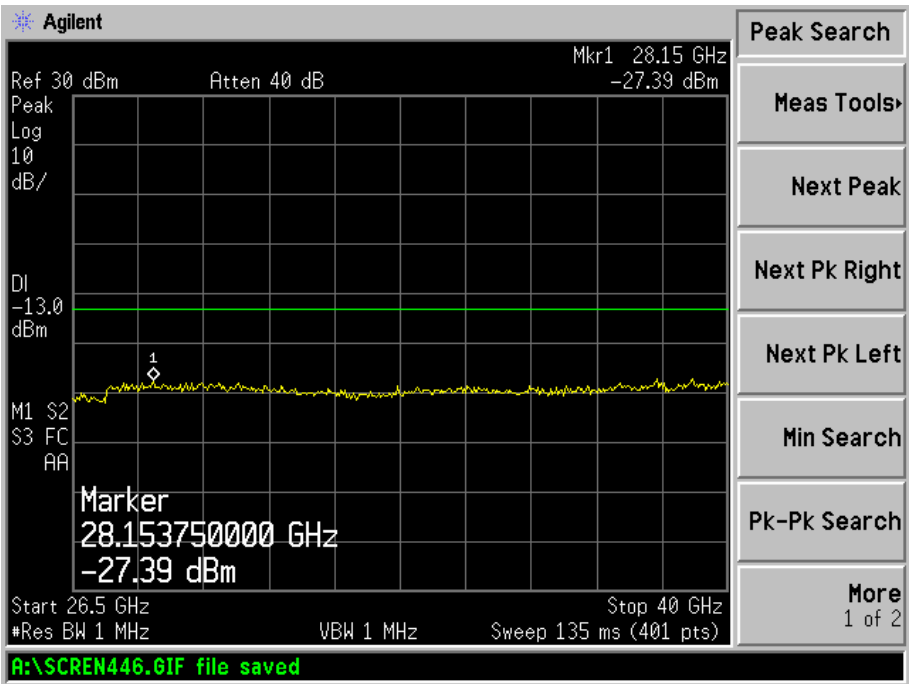
8.75MHz Bandwidth
Low Channel



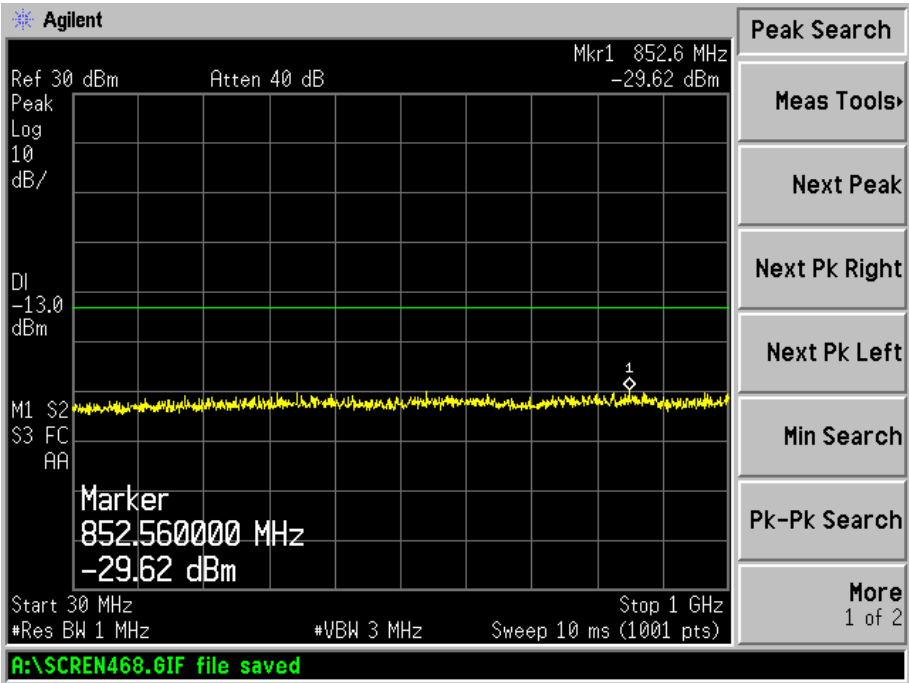


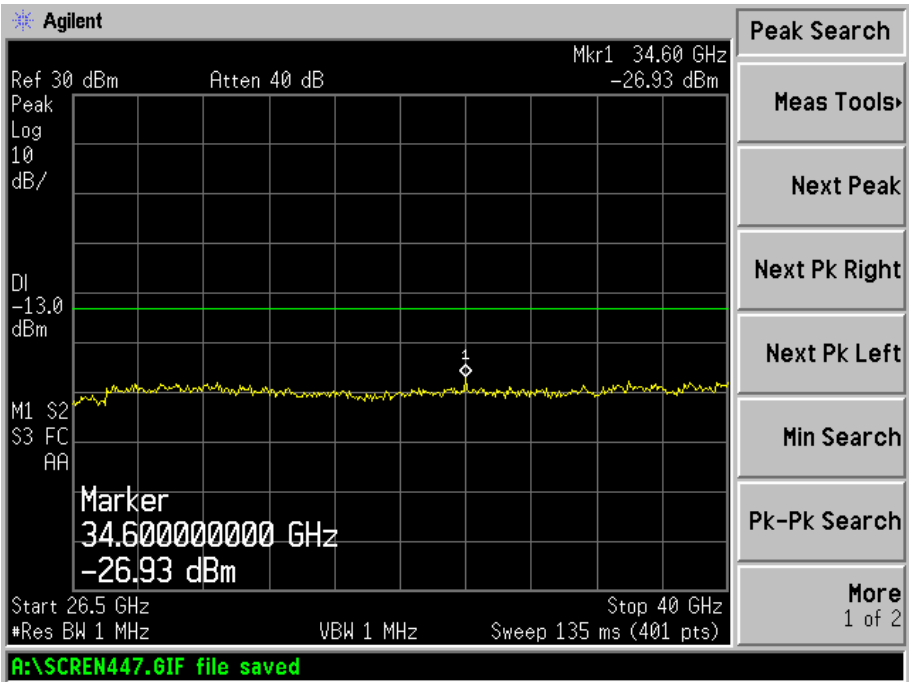
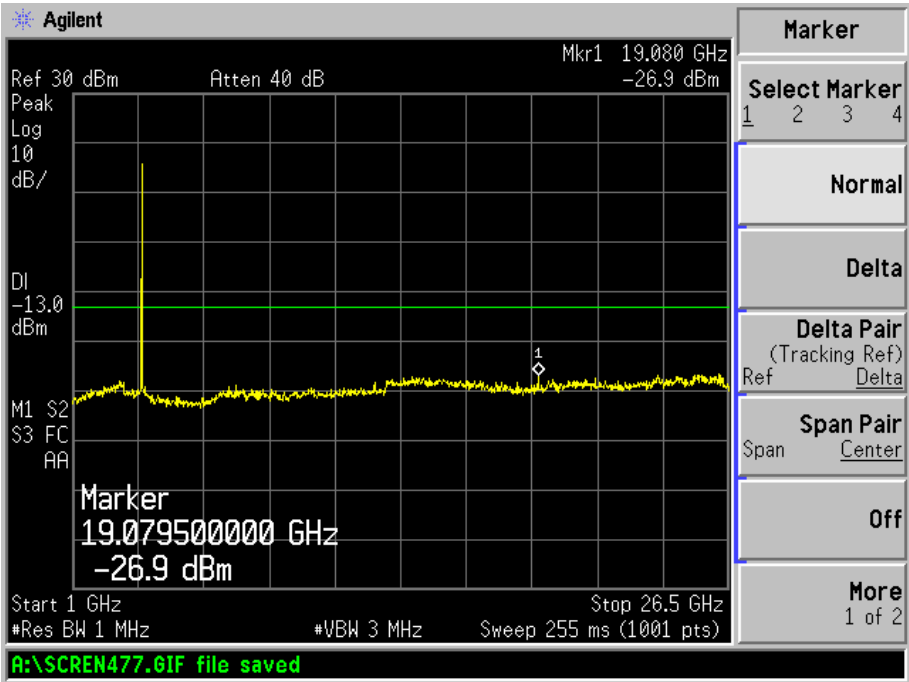
Middle Channel



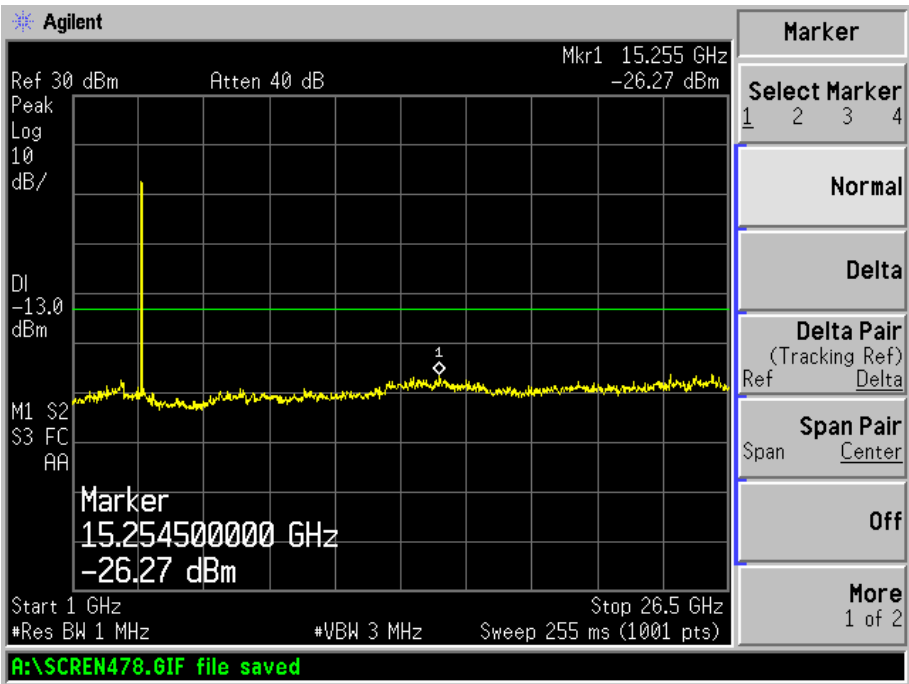
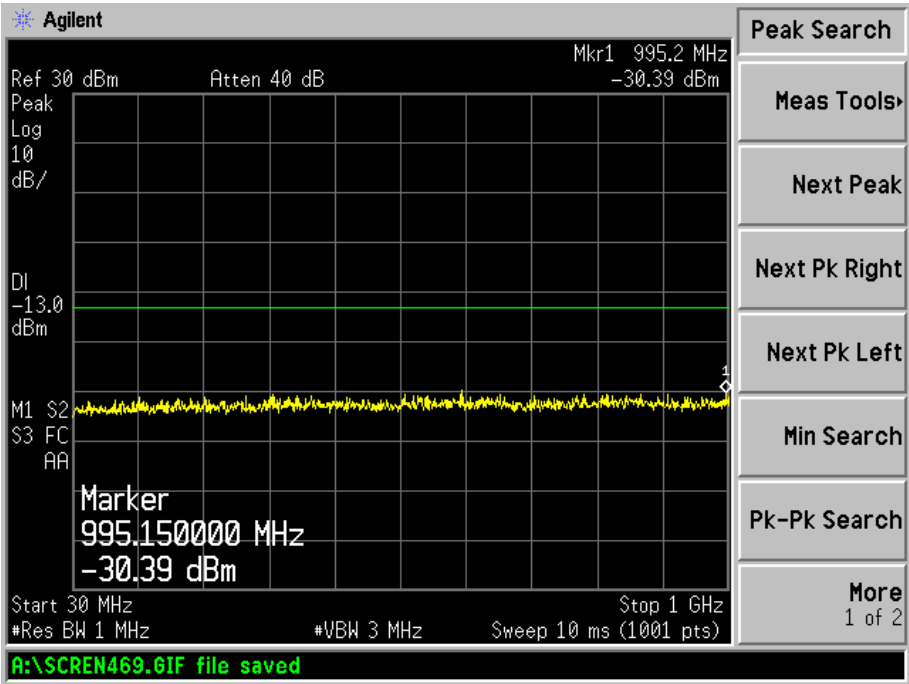


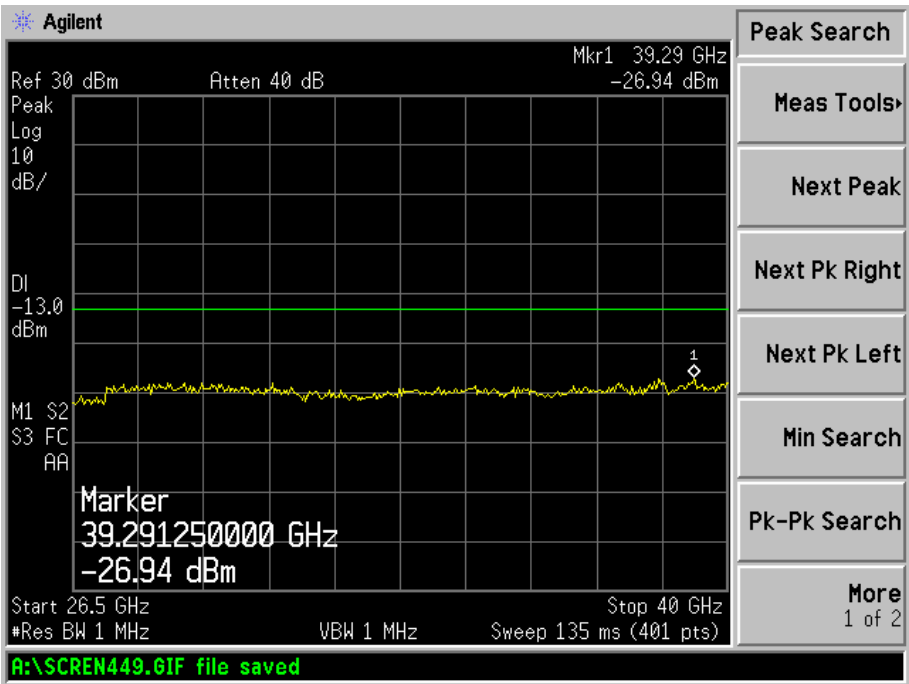
High Channel



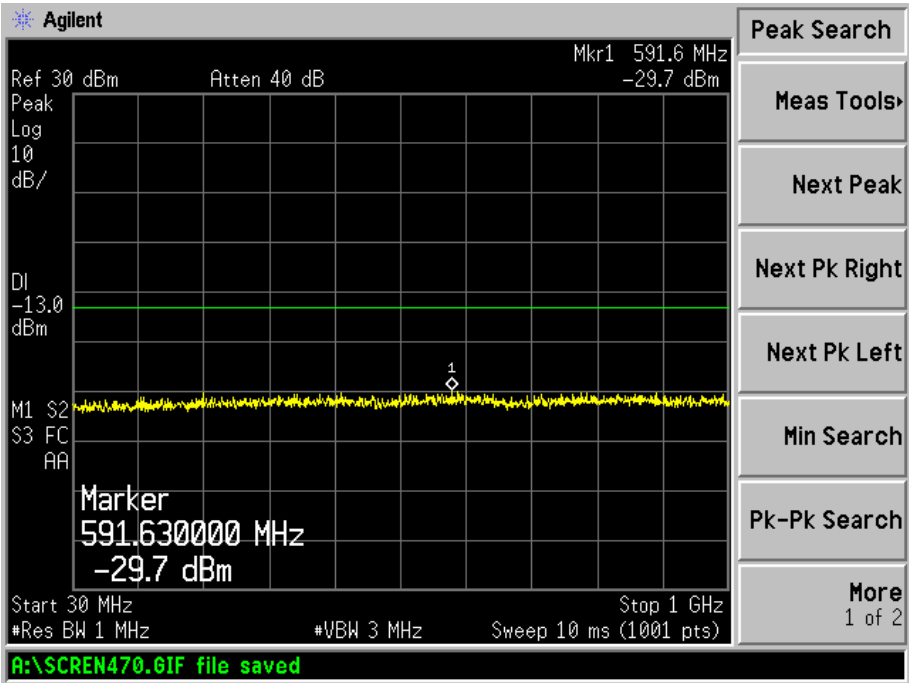


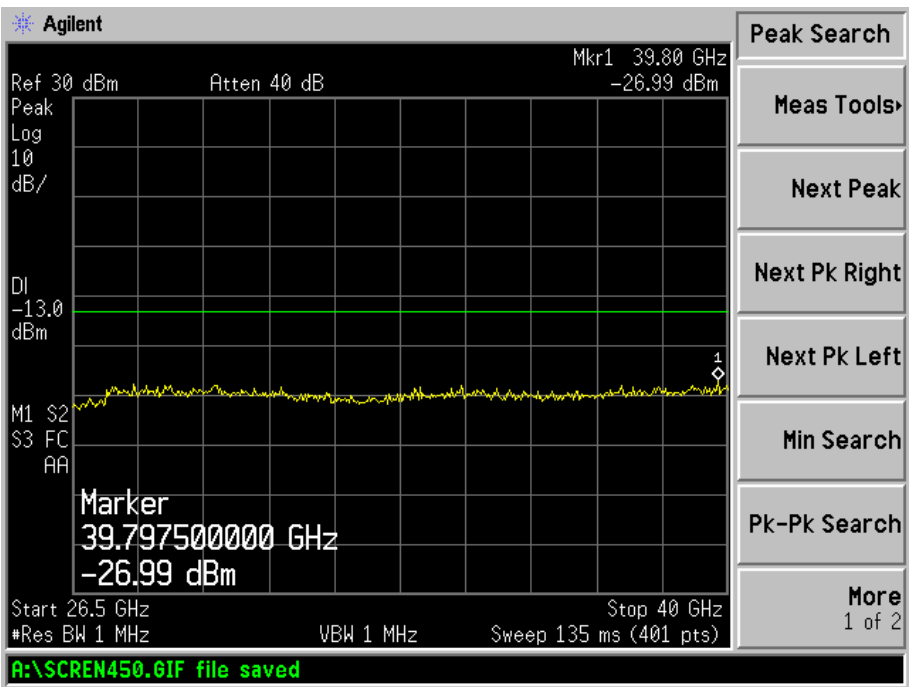
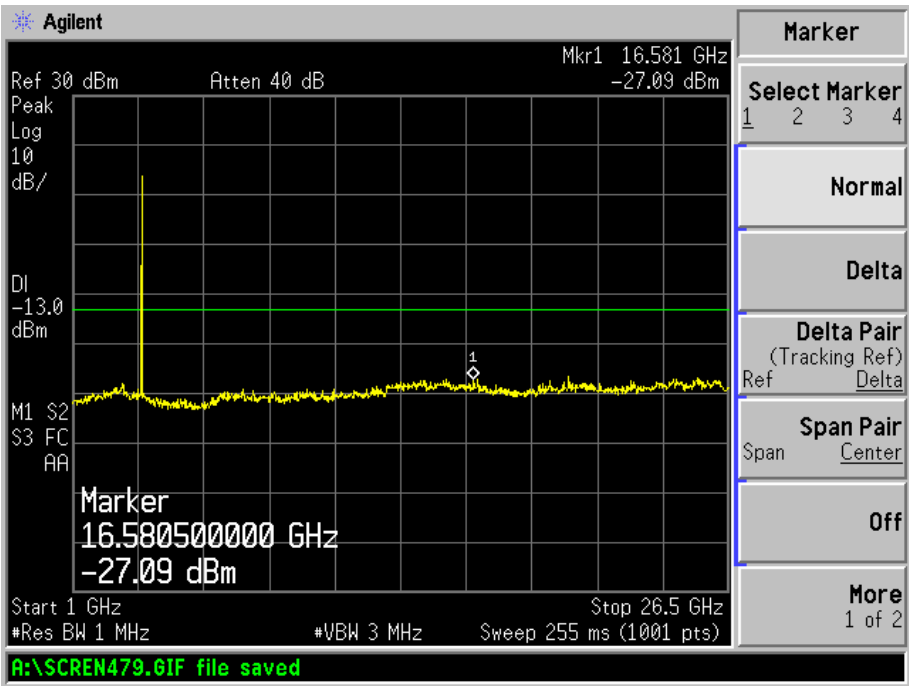
10MHz Bandwidth
Low Channel



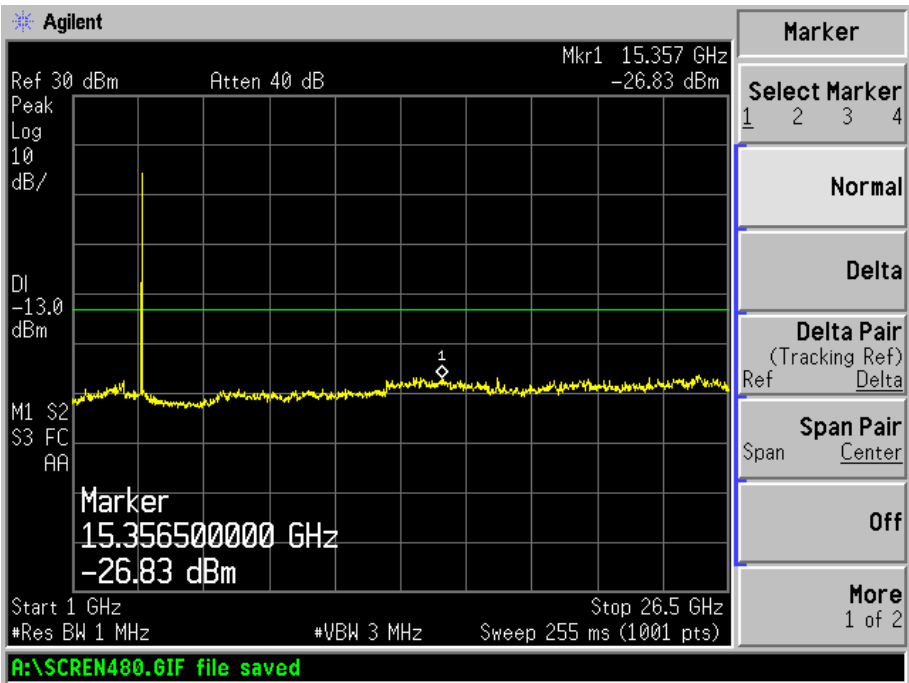
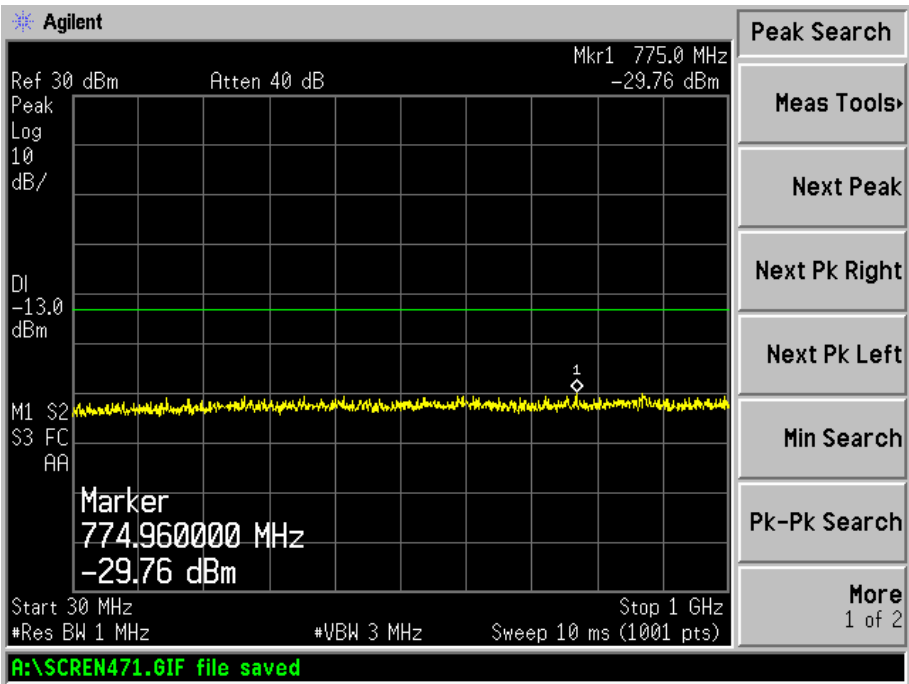


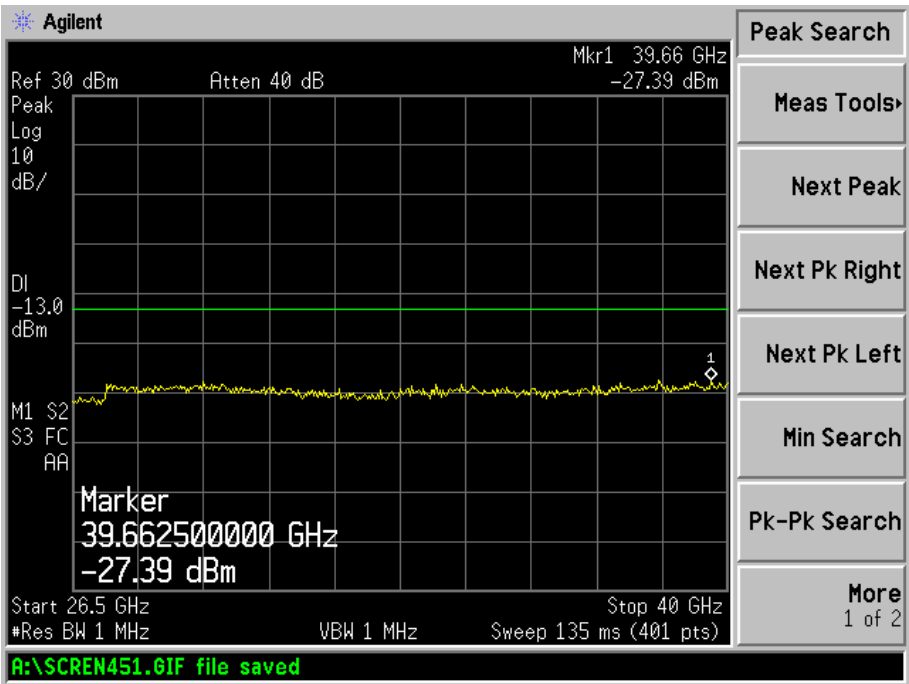
Middle Channel





High Channel





7. Spurious Radiated Emissions

7.1 Standard Applicable

According to §90.1323 (a) The power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or less, but at least one percent of the emission bandwidth of the fundamental emission of the transmitter, provided the measured energy is integrated over a 1 MHz bandwidth.

7.3 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP40	836079/035	2015-05-28	2016-05-27
Pre-amplifier	Agilent	8447F	3113A06717	2015-05-28	2016-05-27
Pre-amplifier	Compliance Direction	PAP-0140	24002	2015-05-28	2016-05-27
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2015-05-24	2016-05-23
Horn Antenna	ETS	3117	00086197	2015-05-24	2016-05-23
Horn Antenna	EMCO	3116	9203-2178	2015-05-24	2016-05-23
Universal Radio Communication Tester	Rohde & Schwarz	CMU200	112012	2015-05-28	2016-05-27
Signal Generator	R&S	SMR20	100047	2015-05-28	2016-05-27

7.4 Test Procedure

KDB 971168 D01 Power Meas License Digital Systems v02r02

7.0 Field Strength of Spurious Radiation

Spurious attenuation limit in dB $= 43 + 10 \log_{10} (\text{power out in Watts})$

7.5 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	52%
ATM Pressure:	1012 mbar

7.6 Summary of Test Results/Plots

According to the data below, the FCC Part § 90.1323 standards, and had the worst margin of:

-24.25 dB at 7305 MHz in the Horizontal polarization, 9 kHz to 37 GHz, 3Meters

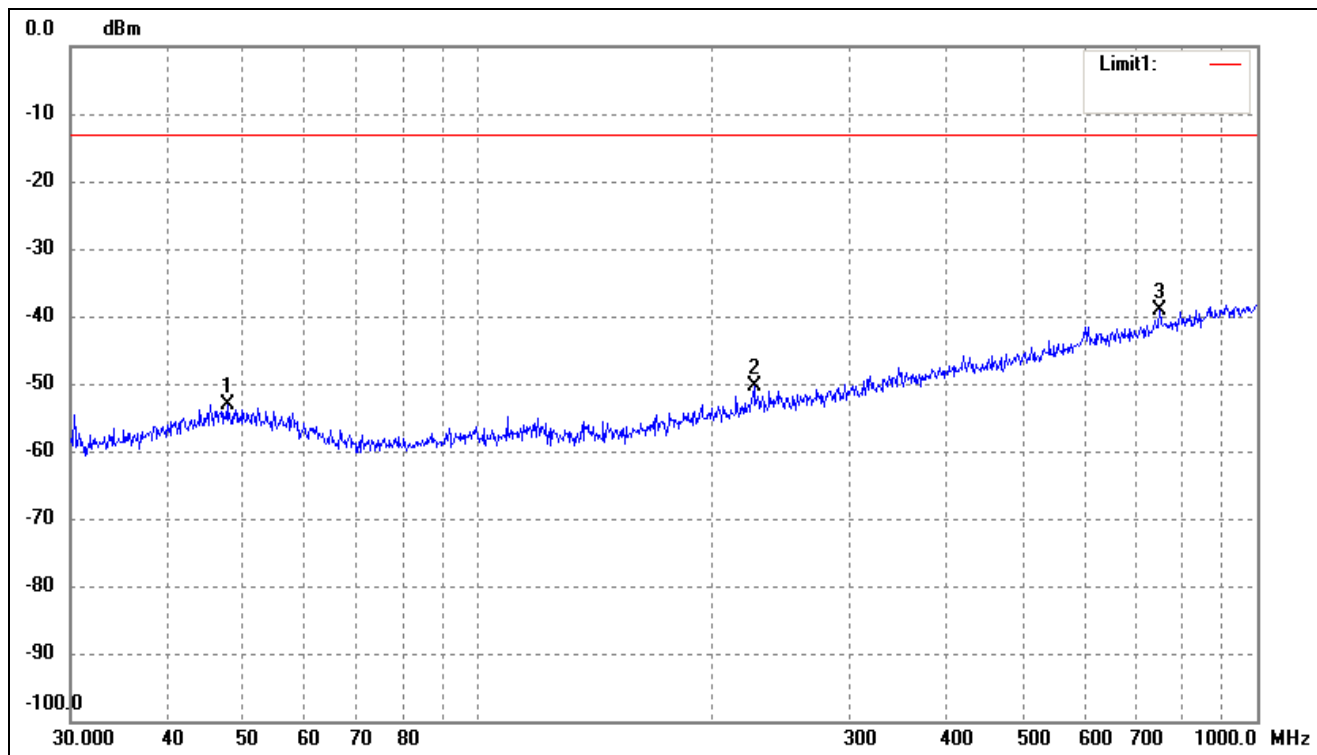
Note: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.

All test modes are performed, but only the worst case (Antenna 0) is recorded in this report.

Spurious Emission From 30MHz to 1GHz

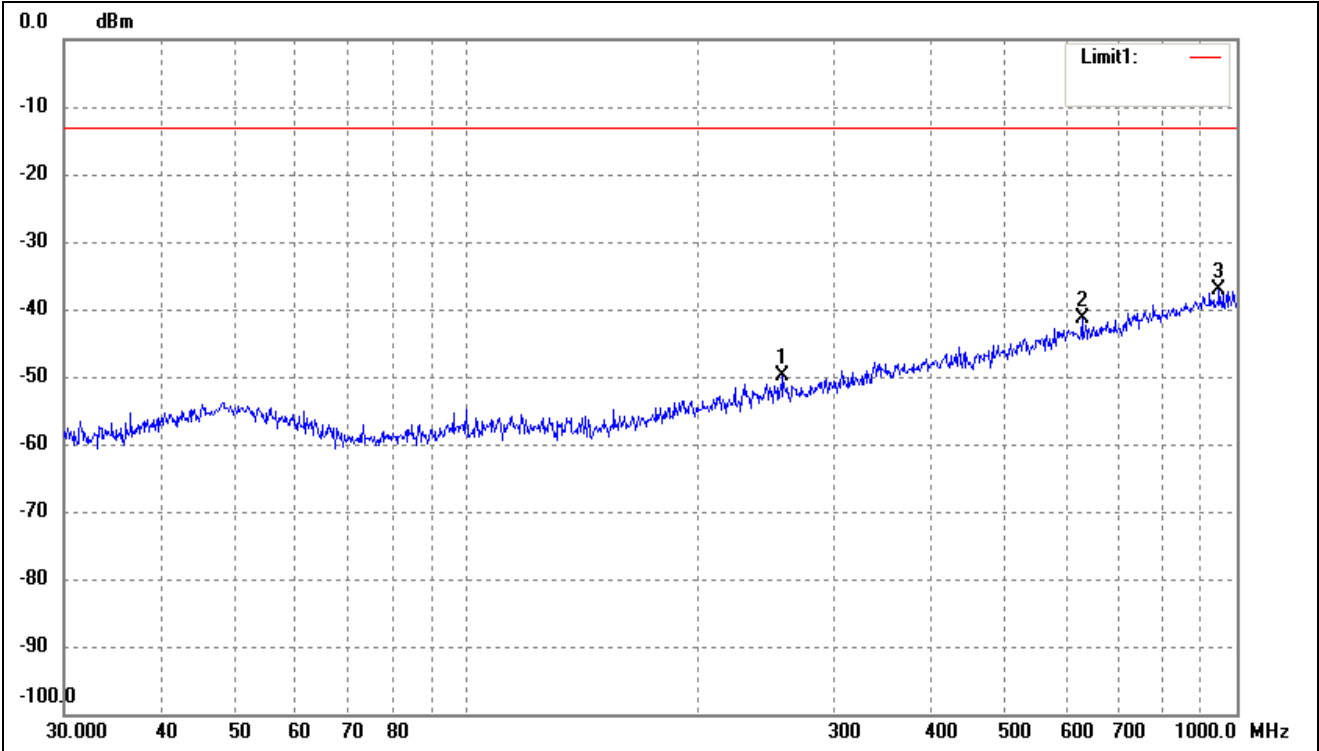
7MHz Bandwidth Low Channel

Horizontal:



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	
1	47.6586	-56.20	3.10	-53.10	-13.00	-40.10	ERP
2	226.0994	-55.10	4.82	-50.28	-13.00	-37.28	ERP
3	750.1083	-54.83	15.63	-39.20	-13.00	-26.20	ERP

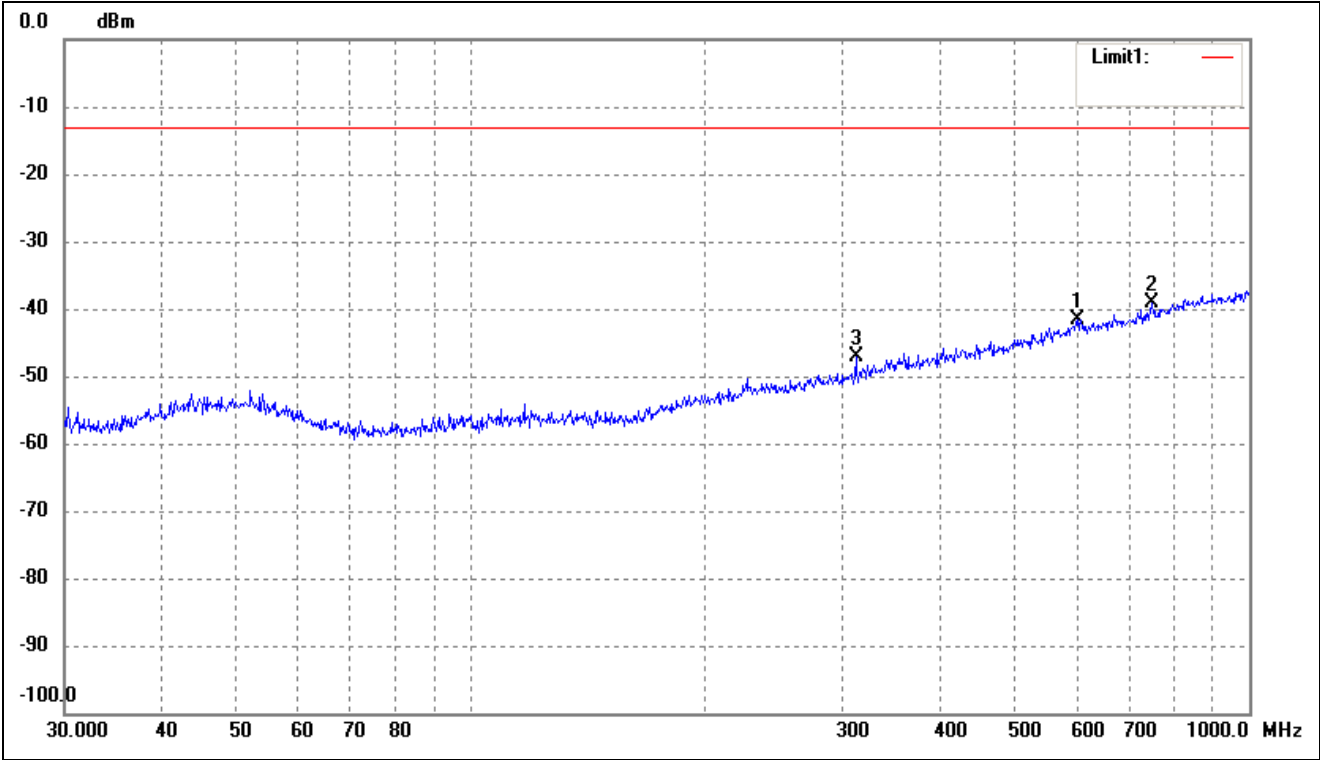
Vertical:



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	
1	257.4222	-55.49	5.69	-49.80	-13.00	-36.80	ERP
2	629.4772	-55.20	13.75	-41.45	-13.00	-28.45	ERP
3	948.7610	-54.80	17.74	-37.06	-13.00	-24.06	ERP

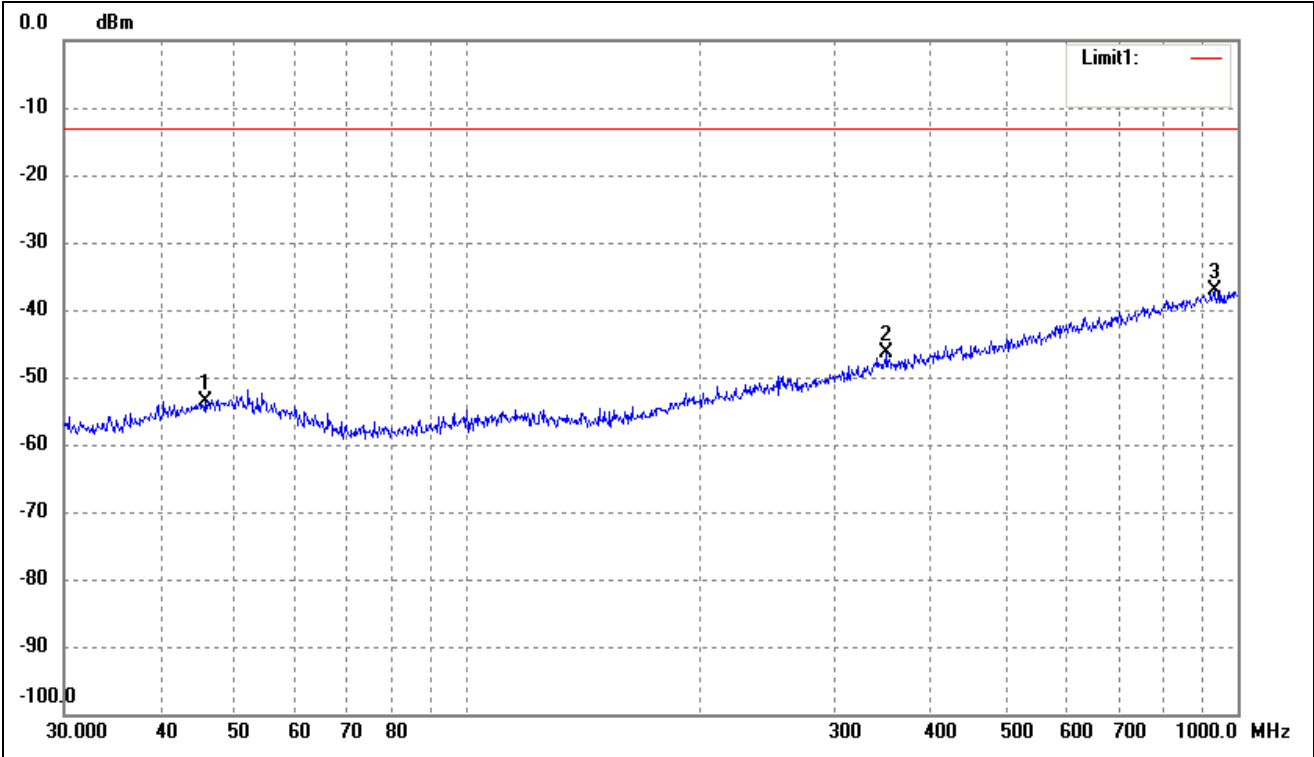
7MHz Bandwidth Middle Channel

Horizontal:



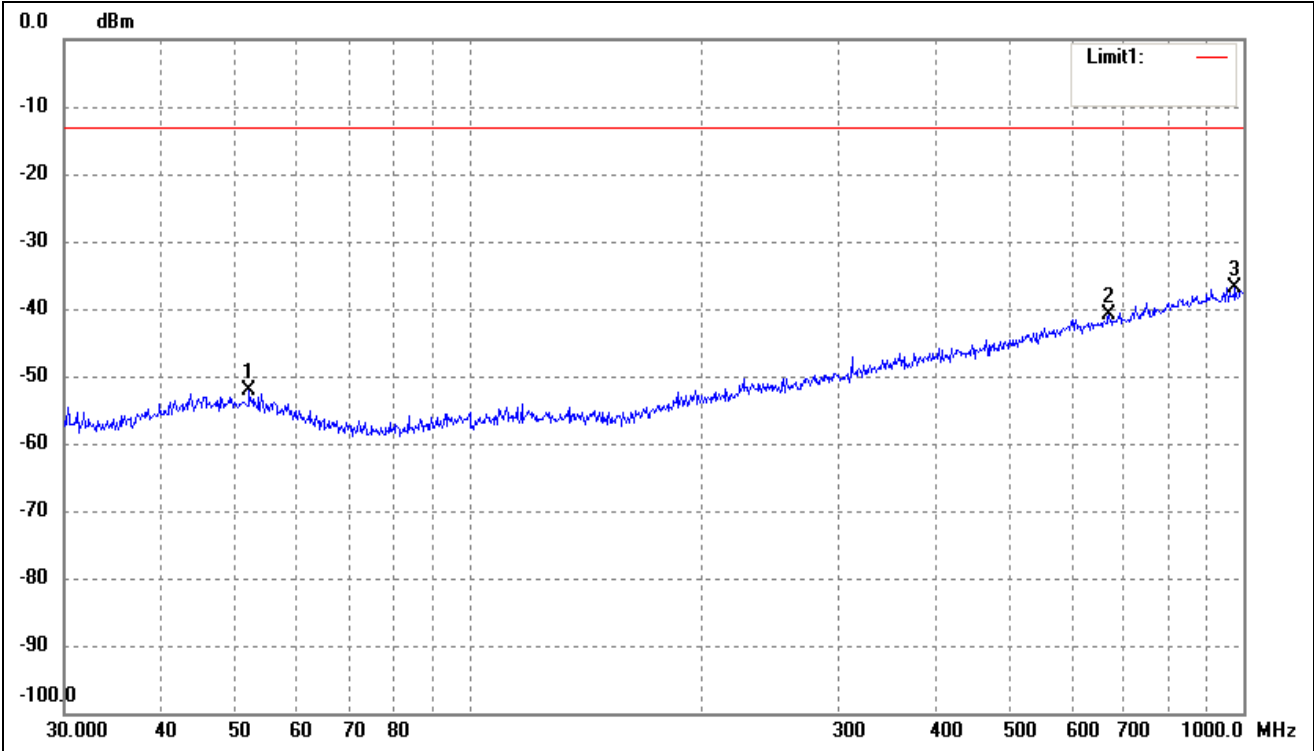
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	
1	601.4265	-55.22	13.55	-41.67	-13.00	-28.67	ERP
2	750.1083	-54.83	15.63	-39.20	-13.00	-26.20	ERP
3	312.1794	-54.27	7.12	-47.15	-13.00	-34.15	ERP

Vertical:



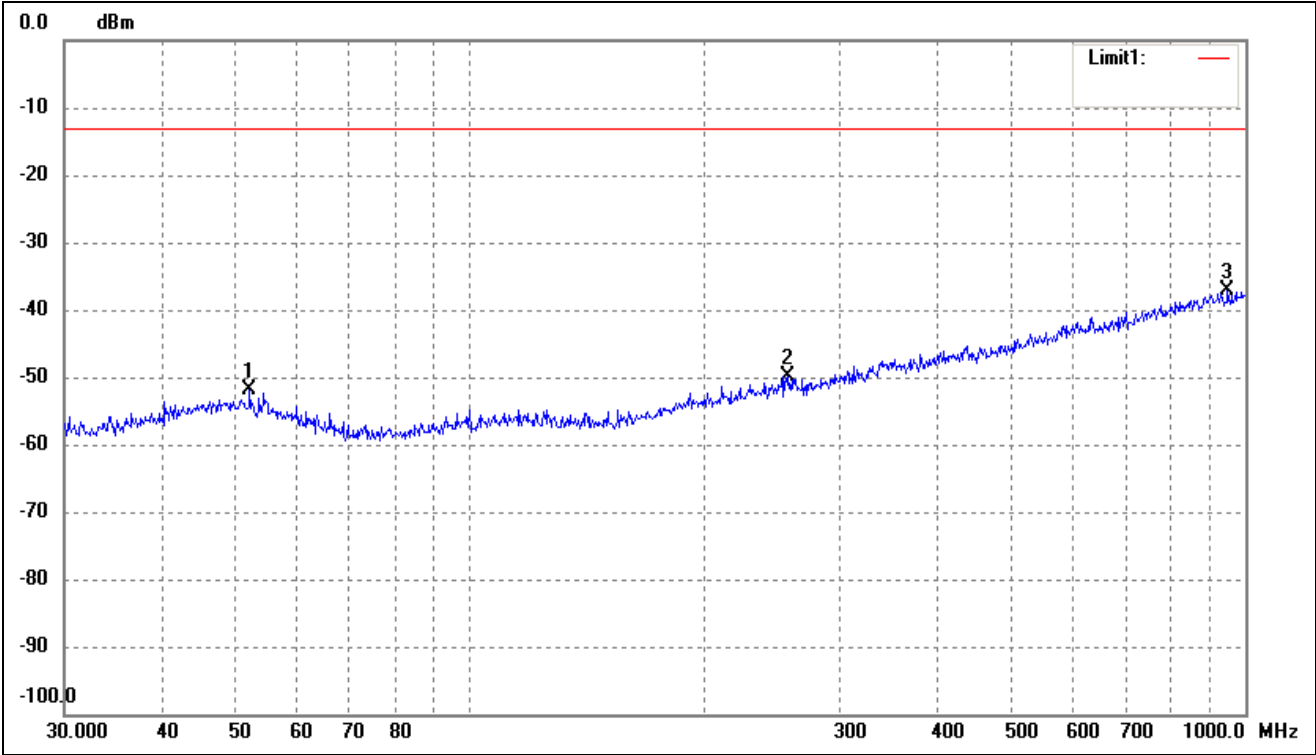
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	
1	45.6948	-56.49	2.82	-53.67	-13.00	-40.67	ERP
2	350.4768	-55.05	8.69	-46.36	-13.00	-33.36	ERP
3	932.2715	-54.63	17.62	-37.01	-13.00	-24.01	ERP

7MHz Bandwidth High Channel
Horizontal:



No.	Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	52.0251	-55.07	3.03	-52.04	-13.00	-39.04	ERP
2	670.4893	-55.26	14.30	-40.96	-13.00	-27.96	ERP
3	975.7529	-54.93	18.00	-36.93	-13.00	-23.93	ERP

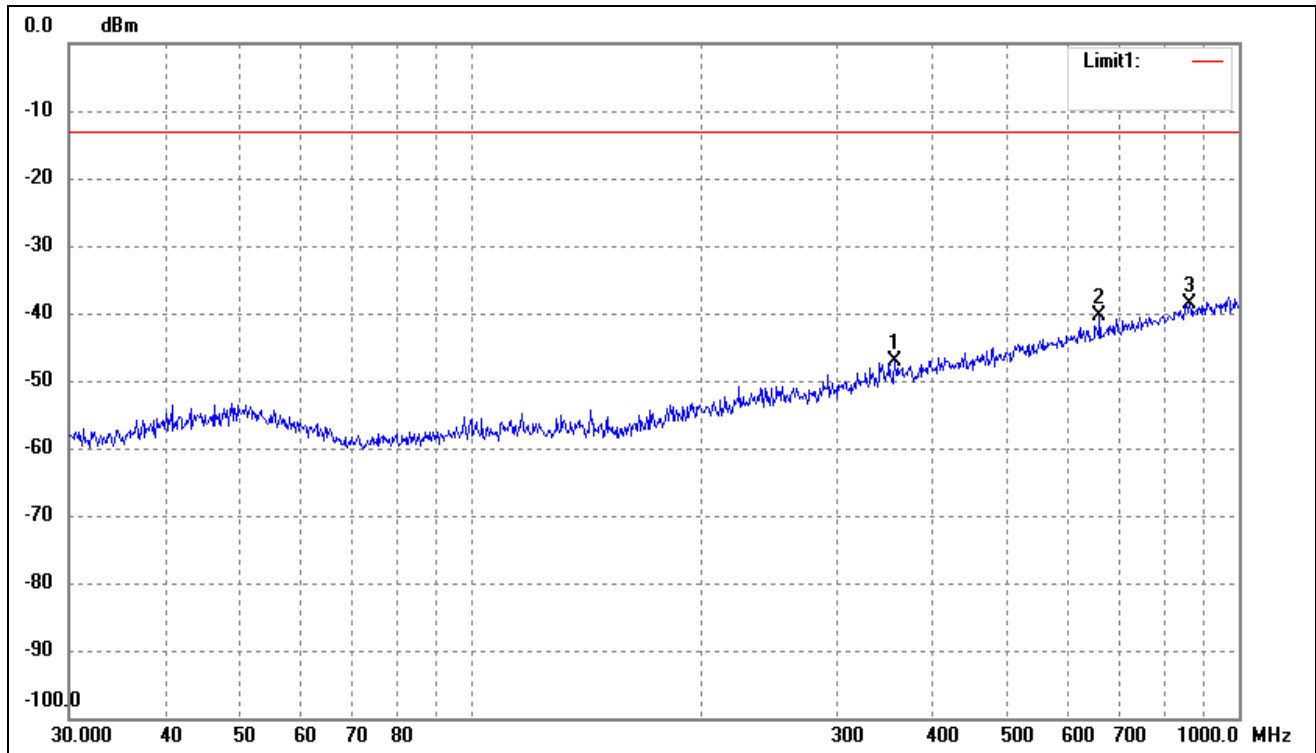
Vertical:



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	
1	52.0251	-54.84	3.03	-51.81	-13.00	-38.81	ERP
2	257.4222	-55.49	5.69	-49.80	-13.00	-36.80	ERP
3	948.7610	-54.80	17.74	-37.06	-13.00	-24.06	ERP

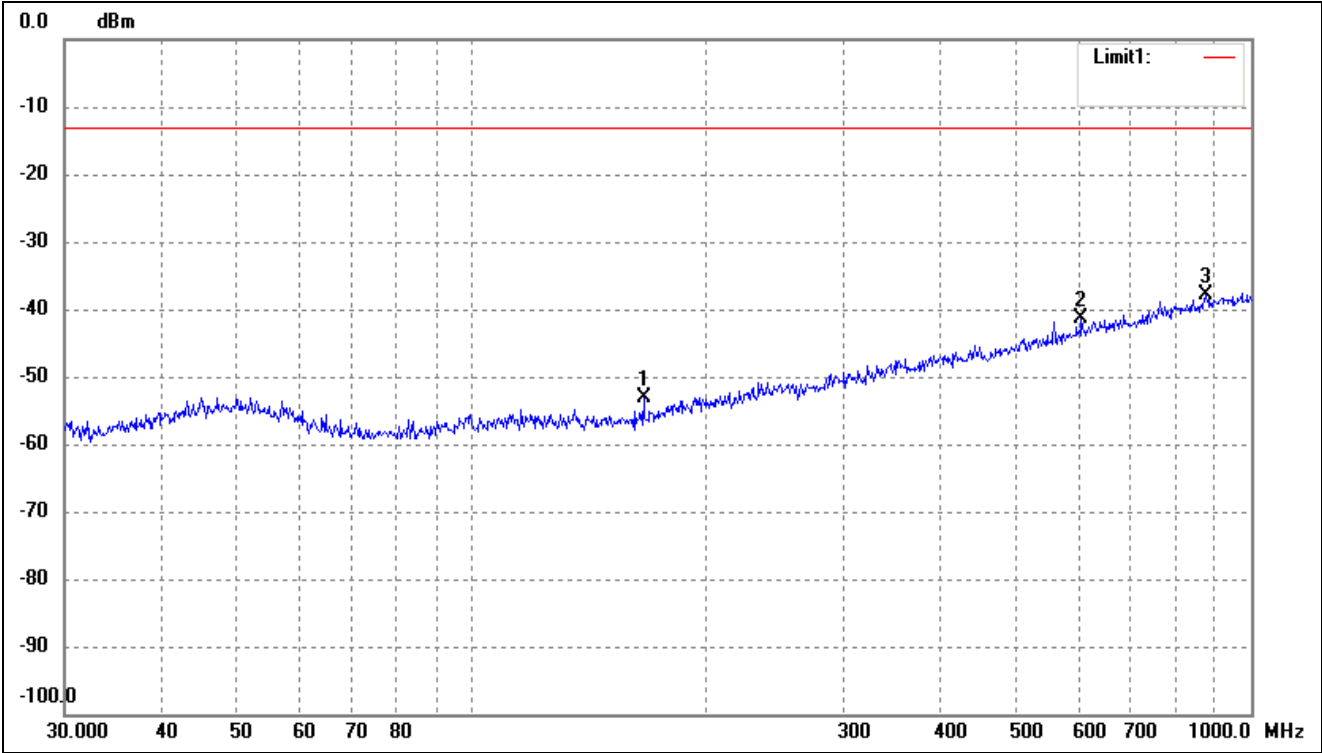
8.75MHz Bandwidth Low Channel

Horizontal:



No.	Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	356.6758	-55.76	8.66	-47.10	-13.00	-34.10	ERP
2	658.8362	-54.48	14.17	-40.31	-13.00	-27.31	ERP
3	863.0562	-55.56	16.93	-38.63	-13.00	-25.63	ERP

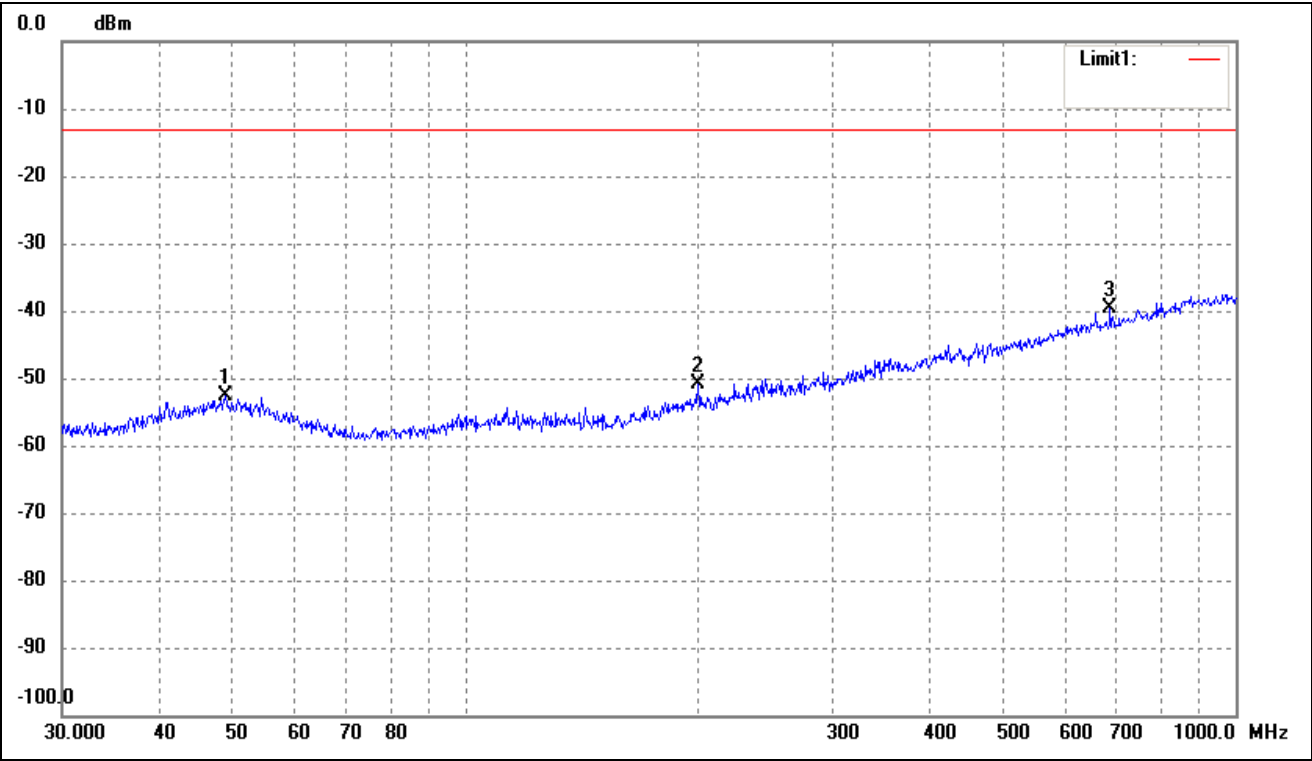
Vertical:



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	
1	166.0680	-54.73	1.54	-53.19	-13.00	-40.19	ERP
2	605.6592	-54.93	13.56	-41.37	-13.00	-28.37	ERP
3	875.2470	-55.07	17.16	-37.91	-13.00	-24.91	ERP

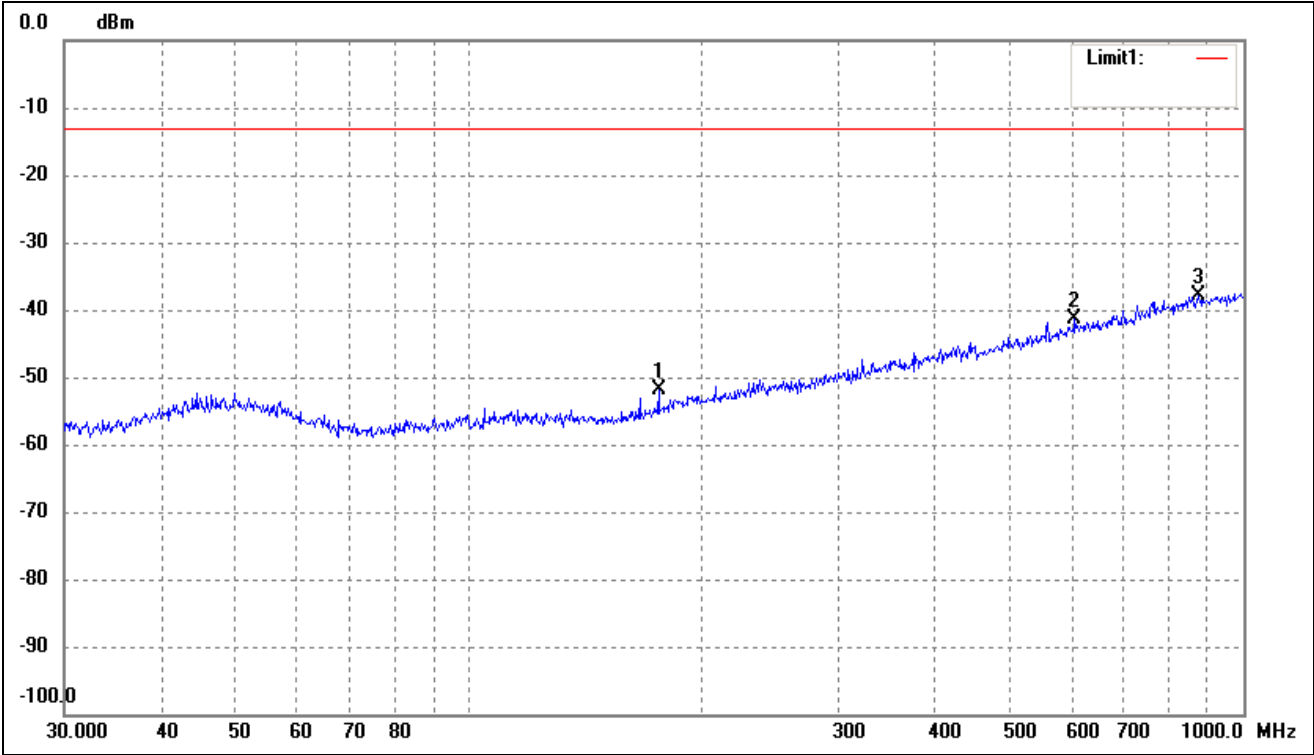
8.75MHz Bandwidth Middle Channel

Horizontal:



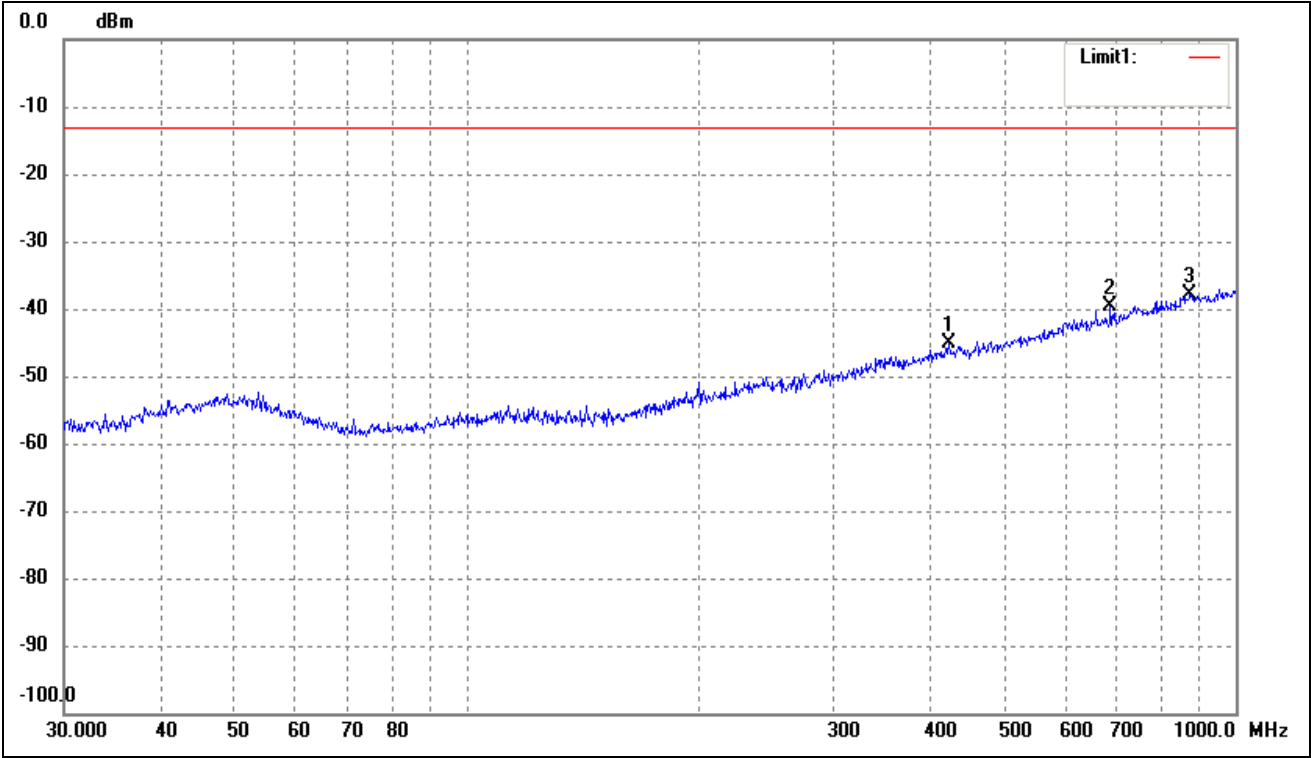
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	
1	48.8429	-55.94	3.28	-52.66	-13.00	-39.66	ERP
2	200.6881	-54.59	3.66	-50.93	-13.00	-37.93	ERP
3	687.1507	-54.20	14.48	-39.72	-13.00	-26.72	ERP

Vertical:



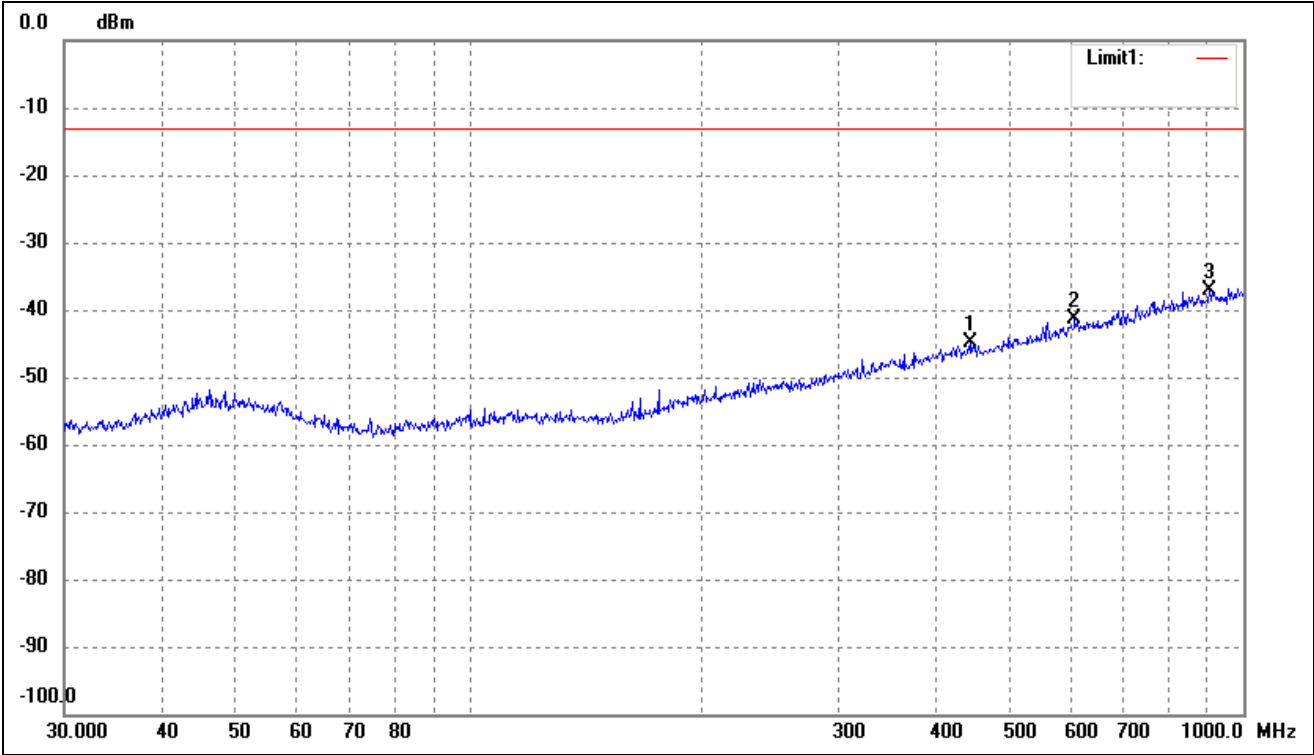
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	
1	175.6516	-54.18	2.19	-51.99	-13.00	-38.99	ERP
2	605.6592	-54.93	13.56	-41.37	-13.00	-28.37	ERP
3	875.2470	-55.07	17.16	-37.91	-13.00	-24.91	ERP

8.75MHz Bandwidth High Channel
Horizontal:



No.	Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	423.5403	-55.24	10.01	-45.23	-13.00	-32.23	ERP
2	687.1507	-54.20	14.48	-39.72	-13.00	-26.72	ERP
3	872.1832	-54.97	17.09	-37.88	-13.00	-24.88	ERP

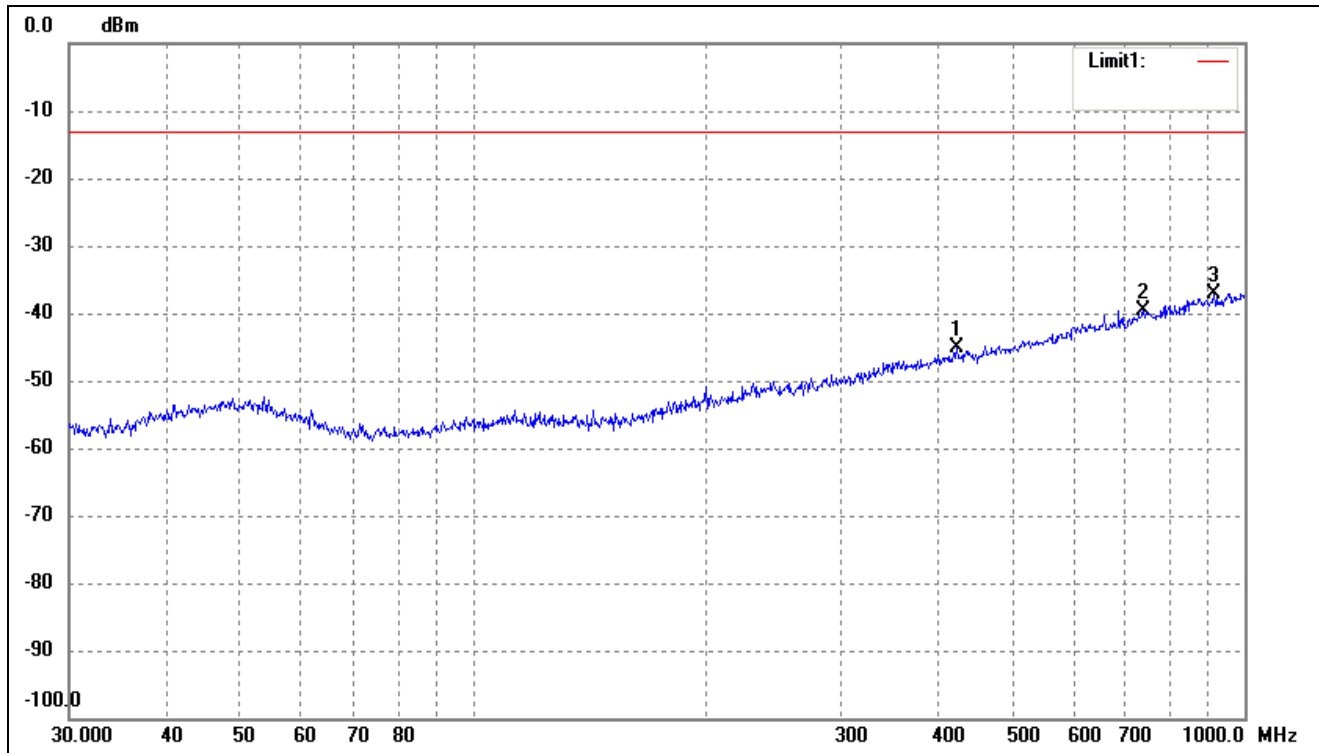
Vertical:



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	
1	444.8514	-55.14	10.19	-44.95	-13.00	-31.95	ERP
2	605.6592	-54.93	13.56	-41.37	-13.00	-28.37	ERP
3	903.3094	-54.69	17.46	-37.23	-13.00	-24.23	ERP

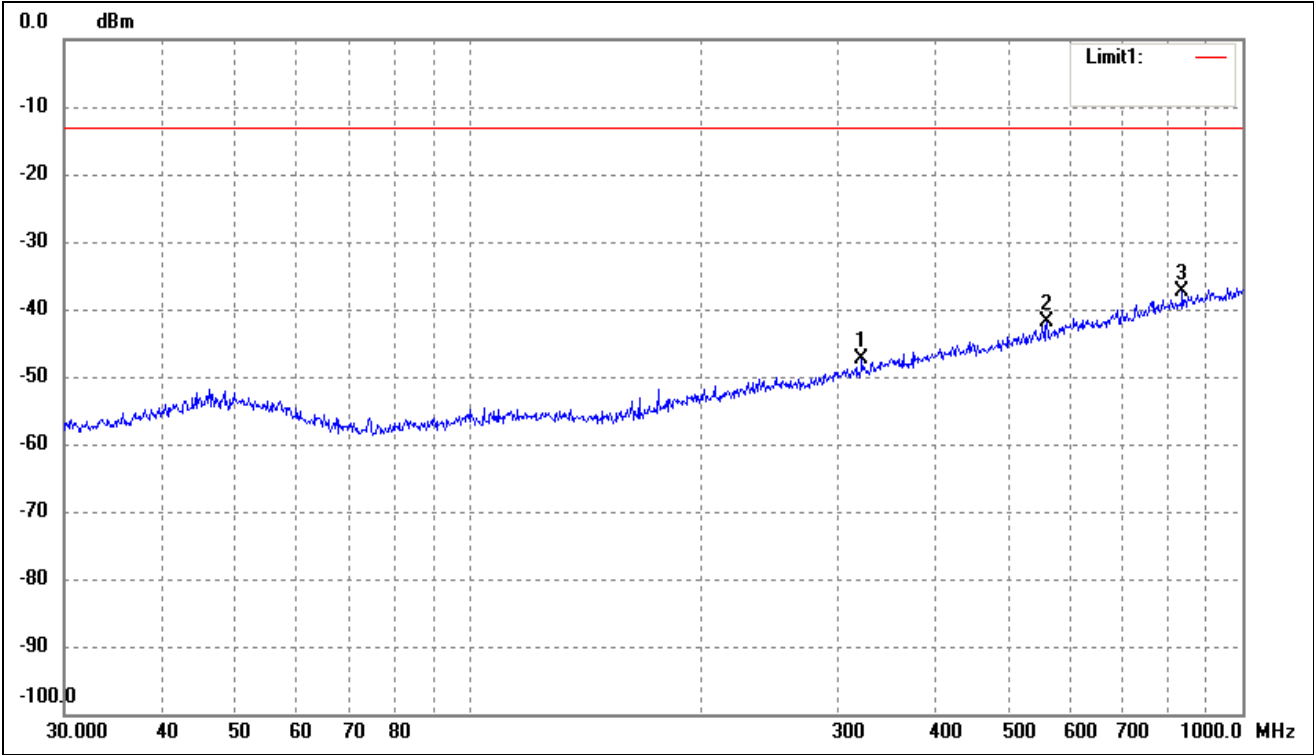
10MHz Bandwidth Low Channel

Horizontal:



No.	Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	423.5403	-55.24	10.01	-45.23	-13.00	-32.23	ERP
2	739.6605	-55.02	15.46	-39.56	-13.00	-26.56	ERP
3	912.8620	-54.58	17.53	-37.05	-13.00	-24.05	ERP

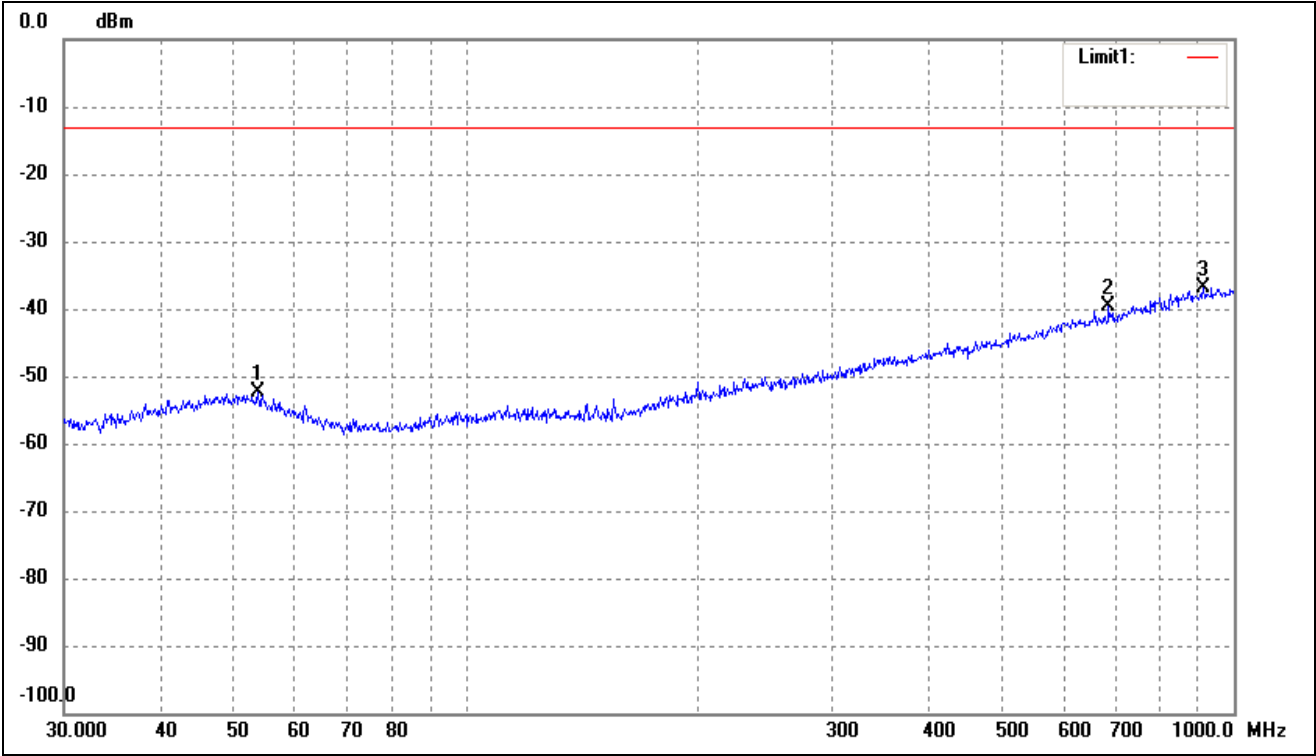
Vertical:



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	
1	322.1886	-54.97	7.48	-47.49	-13.00	-34.49	ERP
2	558.7302	-54.06	12.25	-41.81	-13.00	-28.81	ERP
3	836.2443	-53.75	16.47	-37.28	-13.00	-24.28	ERP

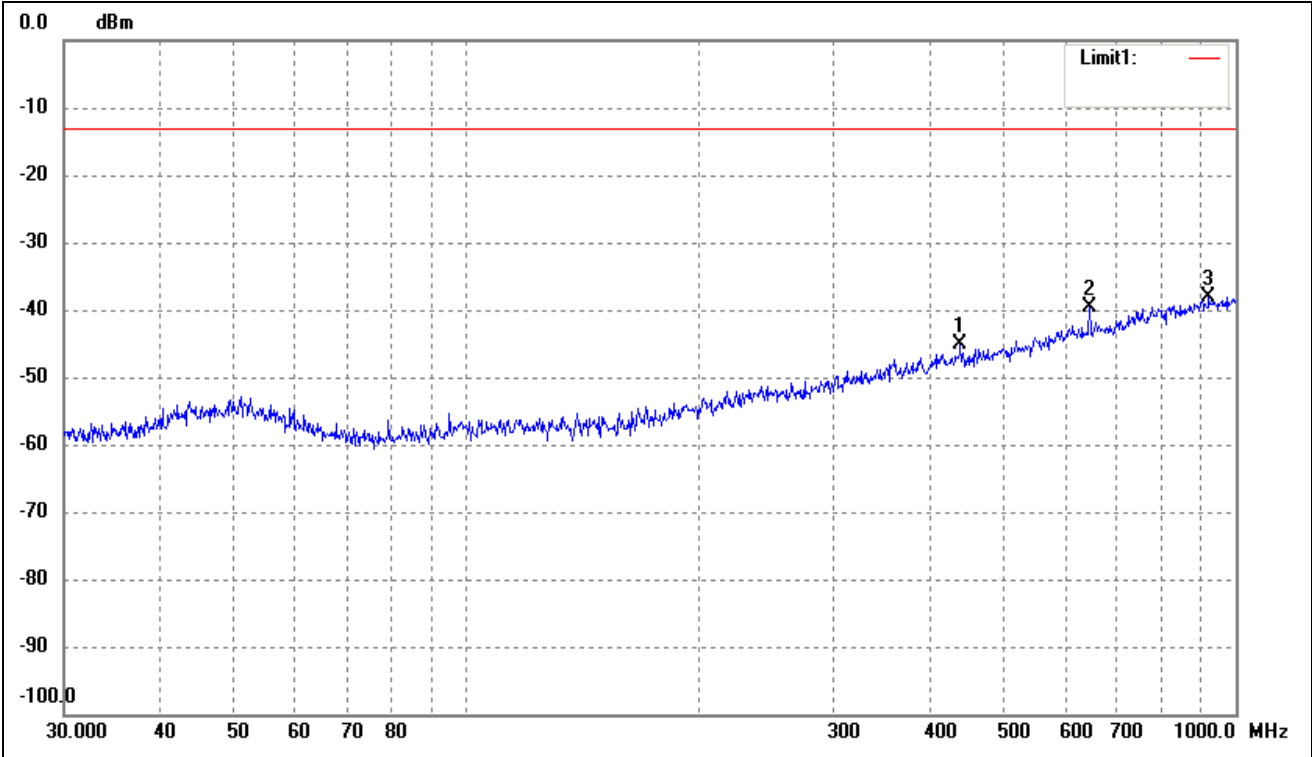
10MHz Bandwidth Middle Channel

Horizontal:



No.	Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	53.6932	-55.15	2.67	-52.48	-13.00	-39.48	ERP
2	687.1507	-54.20	14.48	-39.72	-13.00	-26.72	ERP
3	912.8620	-54.51	17.53	-36.98	-13.00	-23.98	ERP

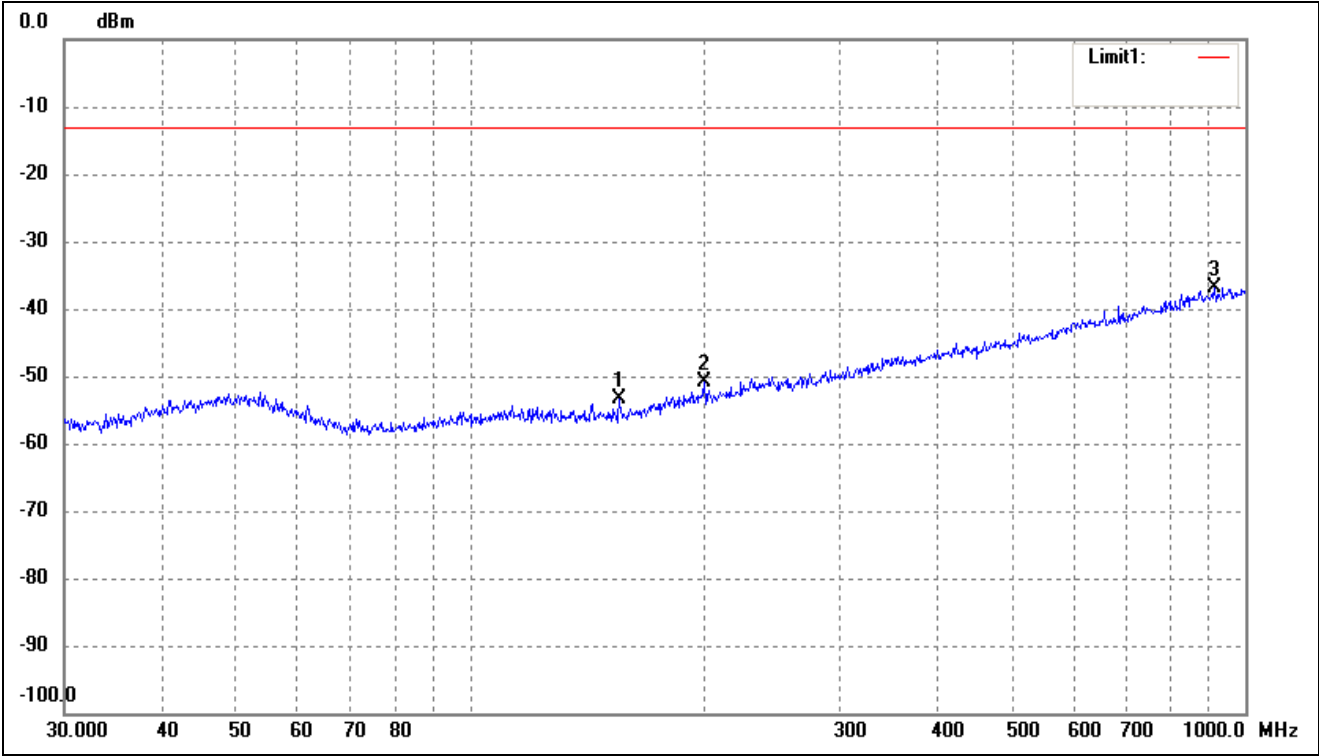
Vertical:



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	
1	438.6554	-55.37	10.15	-45.22	-13.00	-32.22	ERP
2	645.1195	-53.69	13.97	-39.72	-13.00	-26.72	ERP
3	922.5157	-55.77	17.59	-38.18	-13.00	-25.18	ERP

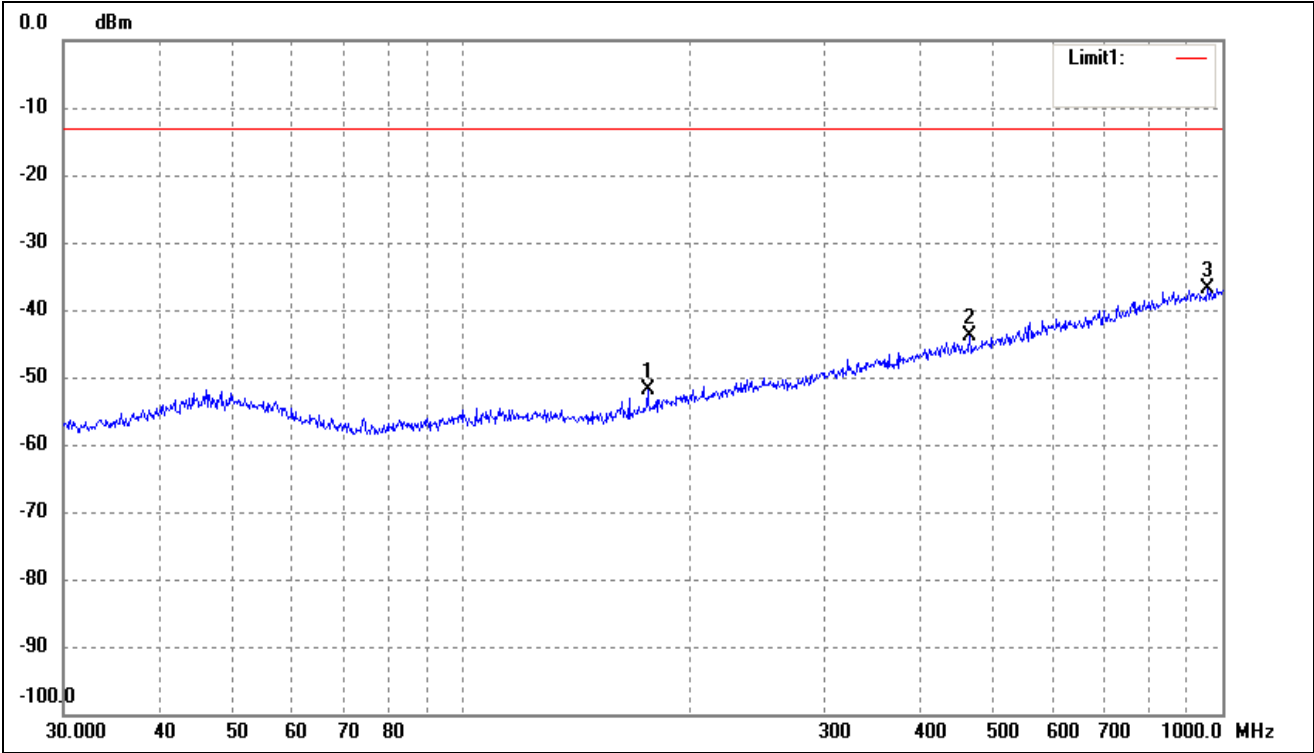
10MHz Bandwidth High Channel

Horizontal:



No.	Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	155.9101	-54.53	1.04	-53.49	-13.00	-40.49	ERP
2	200.6881	-54.59	3.66	-50.93	-13.00	-37.93	ERP
3	912.8620	-54.51	17.53	-36.98	-13.00	-23.98	ERP

Vertical:



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	
1	175.6516	-54.18	2.19	-51.99	-13.00	-38.99	ERP
2	465.5994	-54.33	10.48	-43.85	-13.00	-30.85	ERP
3	955.4381	-54.58	17.80	-36.78	-13.00	-23.78	ERP

*Spurious Emissions Above 1GHz**For 7MHz Bandwidth*

Frequency	Reading	Correct	Result	Limit	Margin	Polar
(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	H/V
Low Channel (3653.5MHz)						
7307	-50.48	14.16	-36.32	-13	-23.32	H
7305.0	-52.10	14.16	-37.94	-13	-24.94	V
10960.5	-65.26	19.54	-45.72	-13	-32.72	H
10960.5	-66.31	19.54	-46.77	-13	-33.77	V
Middle Channel (3662.5MHz)						
7325	-52.92	14.16	-38.76	-13	-25.76	H
7325	-53.57	14.16	-39.41	-13	-26.41	V
10987.5	-67.78	19.54	-48.24	-13	-35.24	H
10987.5	-67.30	19.54	-47.76	-13	-34.76	V
High Channel (3671.5MHz)						
7343	-53.34	14.16	-39.18	-13	-26.18	H
7343	-53.03	14.16	-38.87	-13	-25.87	V
11014.5	-66.15	19.54	-46.61	-13	-33.61	H
11014.5	-66.97	19.54	-47.43	-13	-34.43	V

For 8.75MHz Bandwidth

Frequency	Reading	Correct	Result	Limit	Margin	Polar
(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	H/V
Low Channel (3654.375MHz)						
7308.75	-53.61	14.16	-39.45	-13	-26.45	H
7308.75	-52.59	14.16	-38.43	-13	-25.43	V
10963.13	-66.30	19.54	-46.76	-13	-33.76	H
10963.13	-67.63	19.54	-48.09	-13	-35.09	V
Middle Channel (3662.5MHz)						
7325	-53.29	14.16	-39.13	-13	-26.13	H
7325	-52.94	14.16	-38.78	-13	-25.78	V
10987.5	-66.12	19.54	-46.58	-13	-33.58	H
10987.5	-66.63	19.54	-47.09	-13	-34.09	V
High Channel (3670.625MHz)						
7342.25	-52.39	14.16	-38.23	-13	-25.23	H
7341.25	-51.32	14.16	-37.16	-13	-24.16	V
11011.875	-66.05	19.54	-46.51	-13	-33.51	H
11011.875	-67.35	19.54	-47.81	-13	-34.81	V

For 10MHz Bandwidth

Frequency	Reading	Correct	Result	Limit	Margin	Polar
(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	H/V
Low Channel (3655MHz)						
7310	-52.61	14.16	-38.45	-13	-25.45	H
7310	-54.61	14.16	-40.45	-13	-27.45	V
10965	-66.52	19.54	-46.98	-13	-33.98	H
10965	-67.67	19.54	-48.13	-13	-35.13	V
Middle Channel (3662.5MHz)						
7325	-53.58	14.16	-39.42	-13	-26.42	H
7325	-54.47	14.16	-40.31	-13	-27.31	V
10987.5	-66.30	19.54	-46.76	-13	-33.76	H
10987.5	-66.95	19.54	-47.41	-13	-34.41	V
High Channel (3670MHz)						
7340	-53.26	14.16	-39.10	-13	-26.10	H
7390	-54.301	14.16	-40.141	-13	-27.141	V
11010	-67.41	19.54	-47.87	-13	-34.87	H
11010	-68.44	19.54	-48.90	-13	-35.90	V

For Note: Result=Reading+ Correct, Margin= Result- Limit

Testing is carried out with frequency rang 9kHz to 37GHz, which above 3th Harmonics are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured, so the data is not display.

8. Transmitter RF Conducted Band-edge with Frequency Stability

8.1 Standard Applicable

According to §90.1323 (a) The power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or less, but at least one percent of the emission bandwidth of the fundamental emission of the transmitter, provided the measured energy is integrated over a 1 MHz bandwidth.

8.2 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Rohde & Schwarz	Spectrum Analyzer	FSP40	836079/035	2015-05-28	2016-05-27
Attenuator	ATTEN	ATS100-20-10	/	2015-05-28	2016-05-27
GONGWEN	Moisture Test Chamber	GDS-150	SEMT-0013	2015-05-28	2016-05-27

8.3 Test Procedure

According to KDB 971168 D01 Power Meas License Digital Systems v02r02 9 Frequency Stability

The EUT was connected to a spectrum analyzer through a cable and attenuator. The ambient temperature was varied from -30 °C to +50 °C, and the supply voltage was varied from 102 VAC to 138 VAC. For each condition, the lower and upper band edge was measured to show the frequency of the transmitter does not drift out of its authorized band of operation.

Temperature:	Supply Voltage
20°C	85-115% of declared nominal voltage
-30°C to +50°C	Normal

8.4 Environmental Conditions

Temperature:	20°C
Relative Humidity:	57%
ATM Pressure:	1011 mbar

8.5 Summary of Test Results/Plots

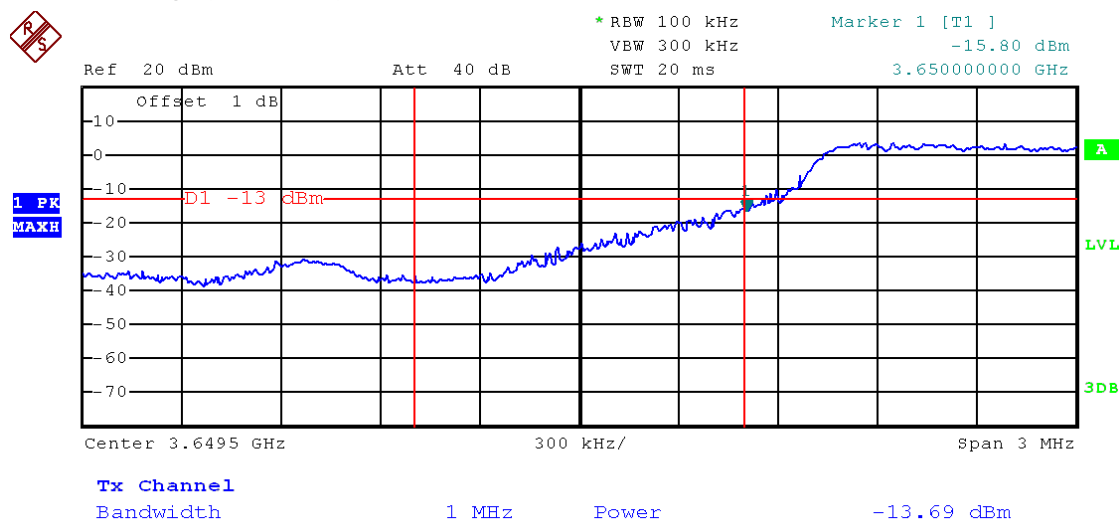
Limit: $43 + 10 \log (P)$ below the channel transmitter power = -13 dBm/MHz

All the Plots is below -13dBm/MHz

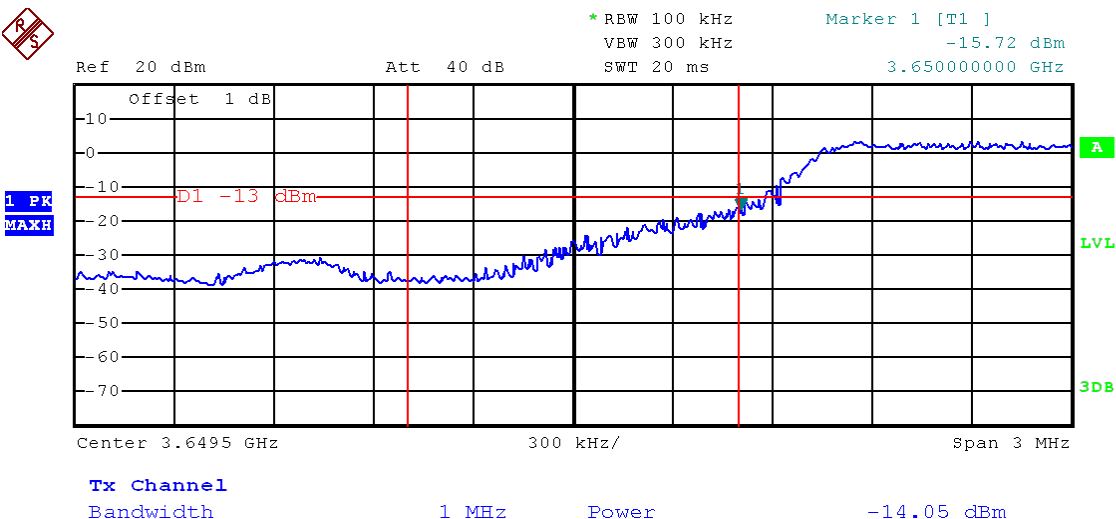
Test Result: Pass

For 7 MHz Bandwidth

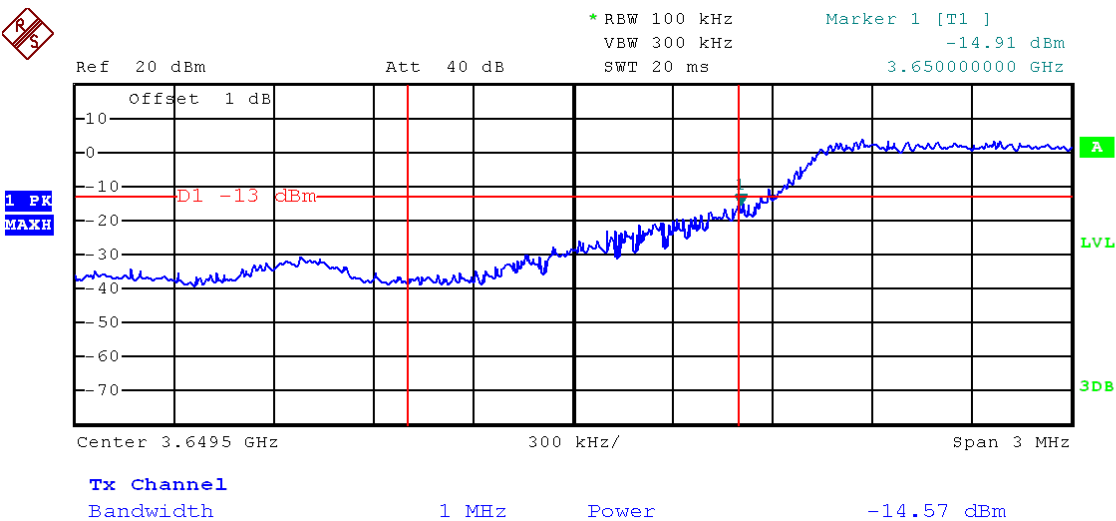
Lower band edge (20°C,120V) -13.69dBm<13dBm



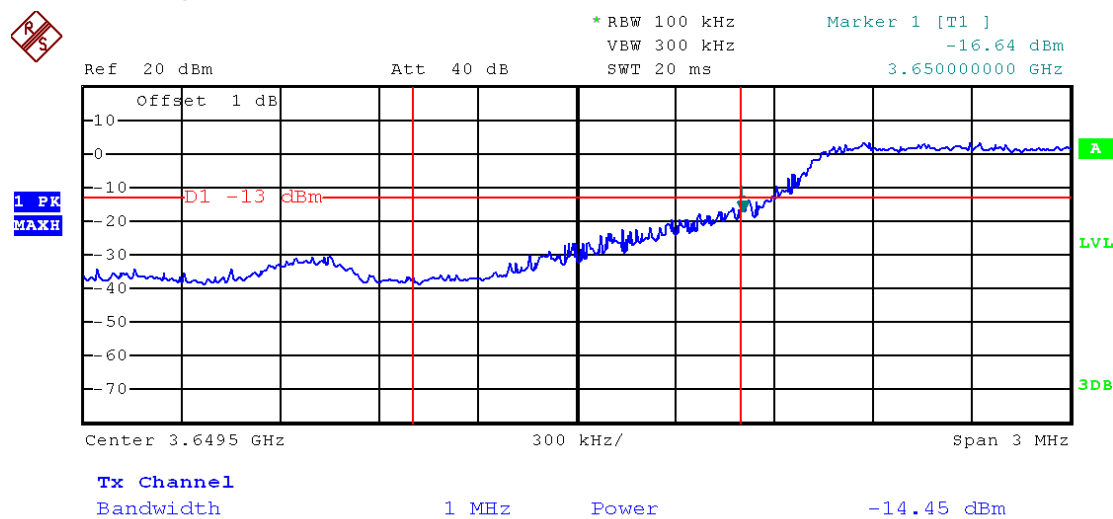
Lower band edge (20°C,102V) -14.05dBm<13dBm



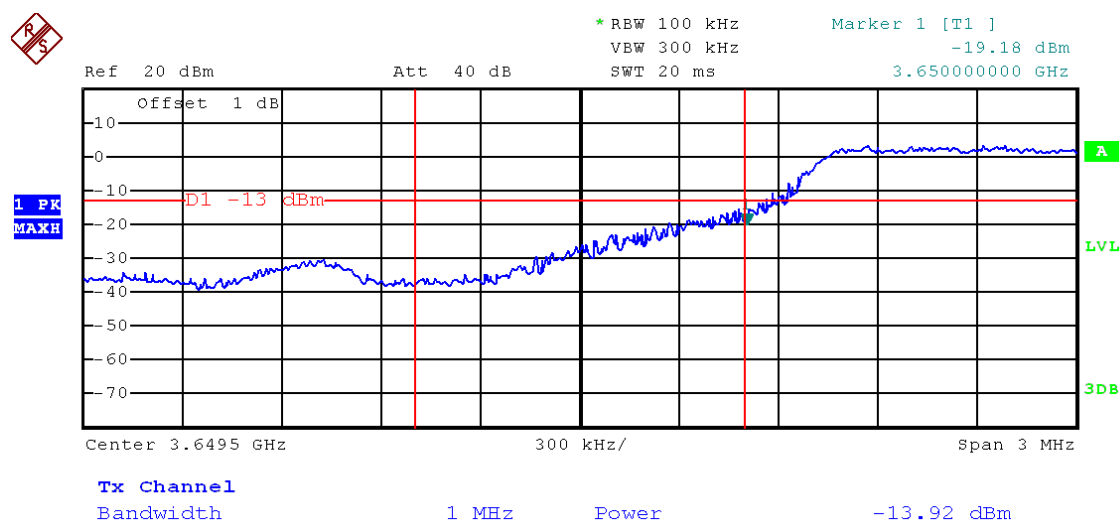
Lower band edge (20°C,138V) -14.57dBm<13dBm



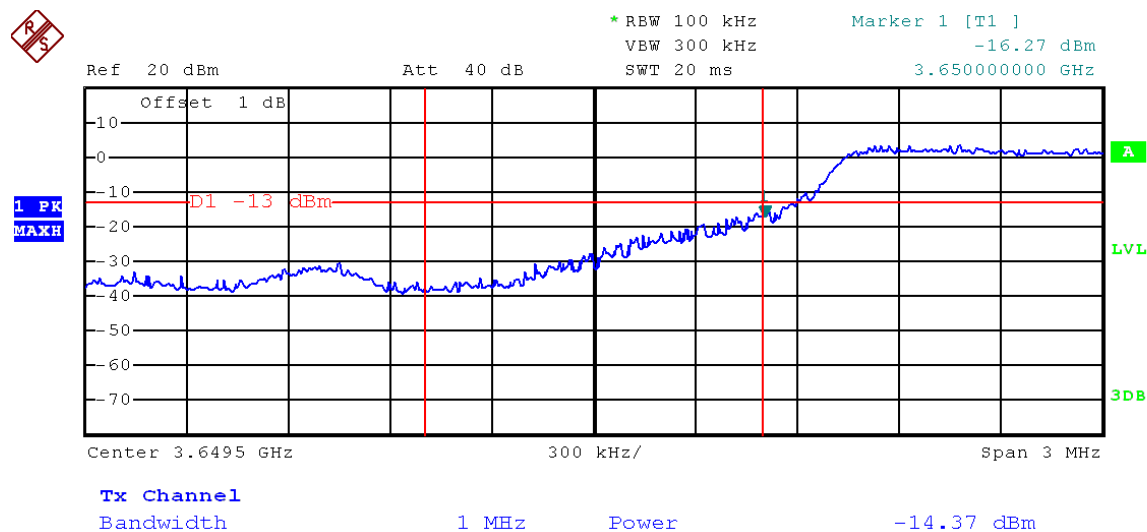
Lower band edge (30°C,120V) -14.45dBm<13dBm



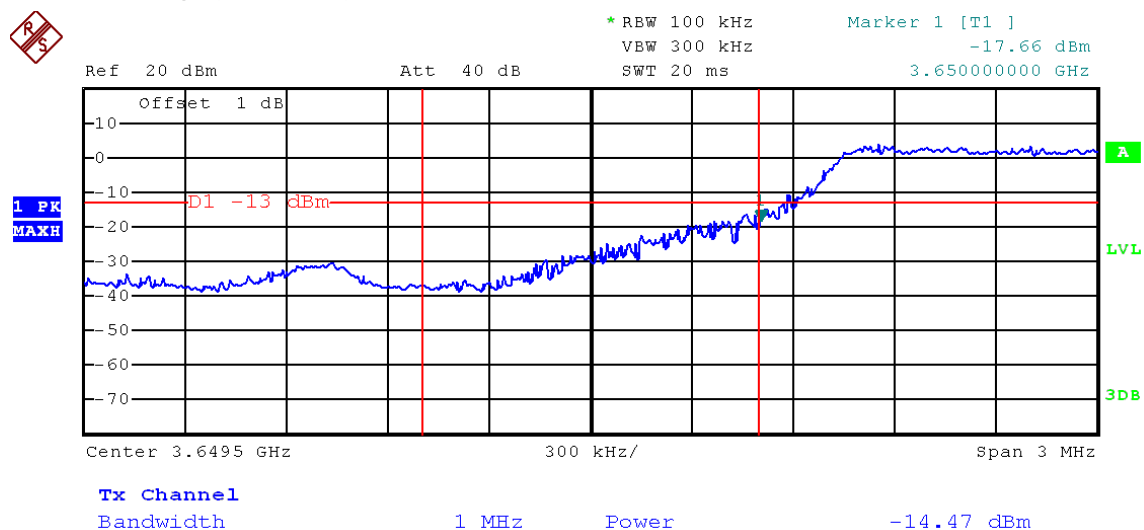
Lower band edge (40°C,120V) -13.92dBm<13dBm



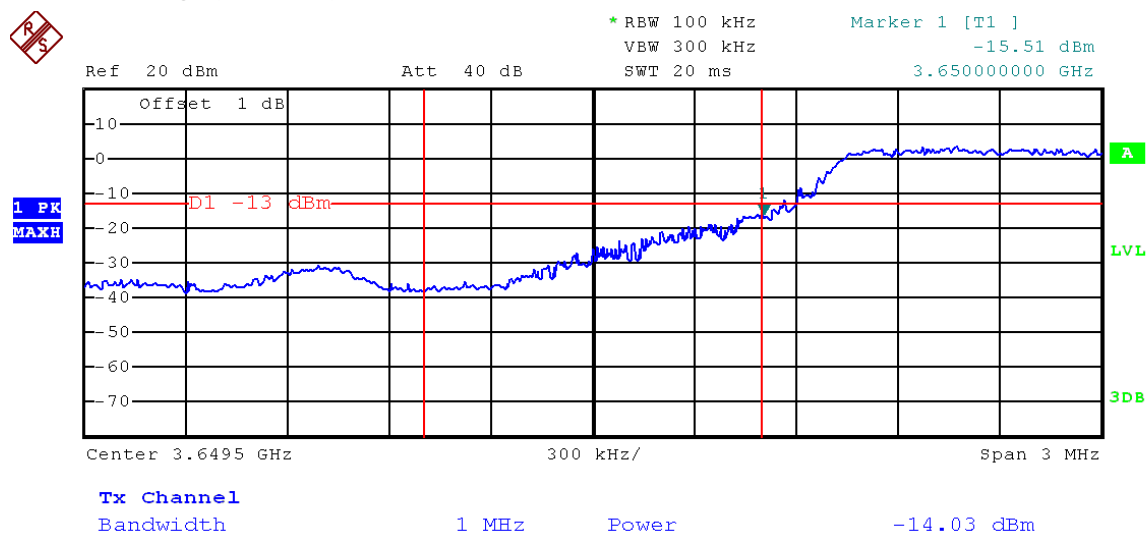
Lower band edge (50°C,120V) -14.37dBm<13dBm



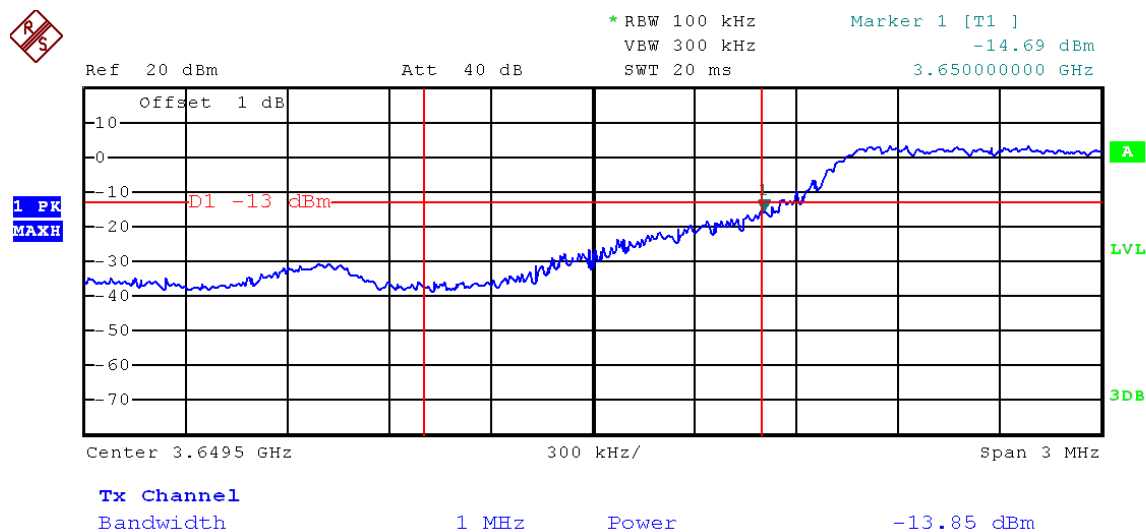
Lower band edge (10°C,120V) -14.47dBm<13dBm



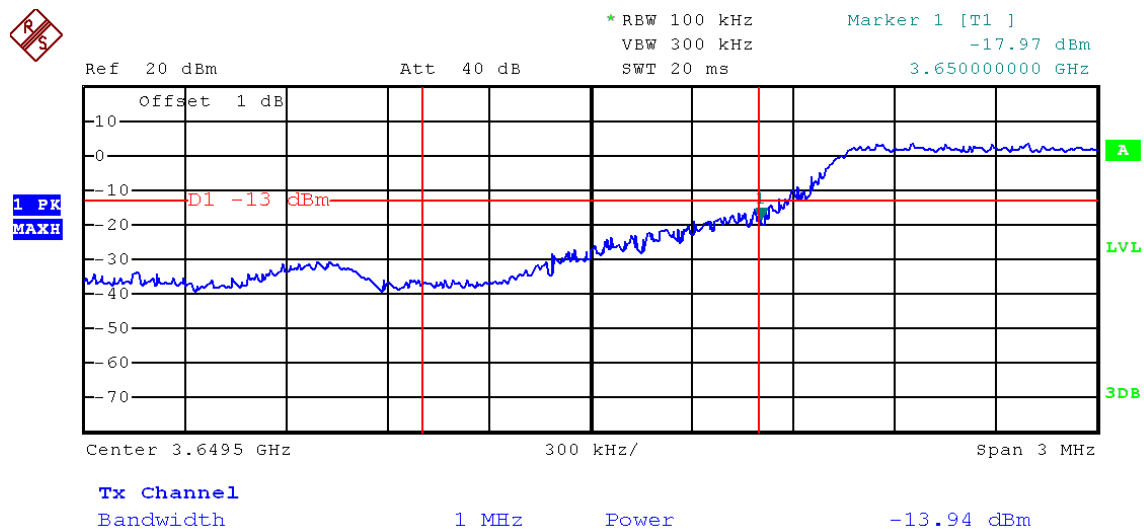
Lower band edge (0°C,120V) -14.03dBm<13dBm



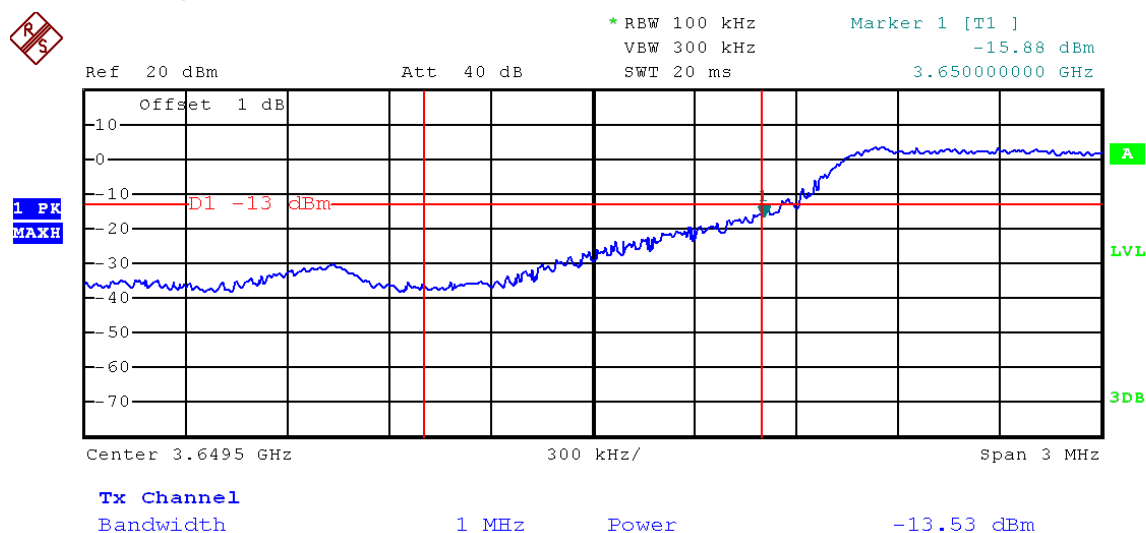
Lower band edge (-10°C,120V) -13.85dBm<13dBm



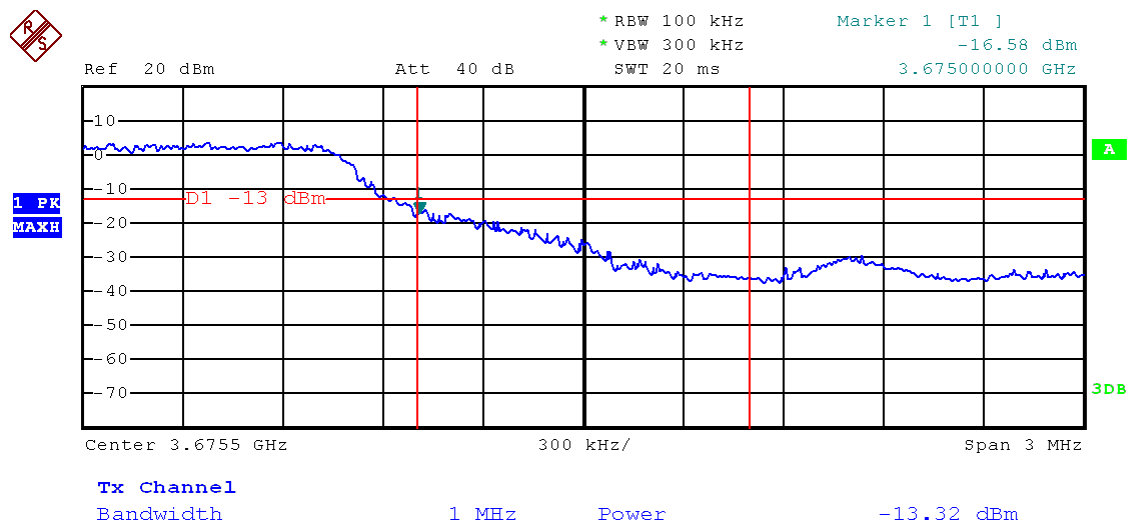
Lower band edge (-20°C,120V) -13.94dBm<13dBm



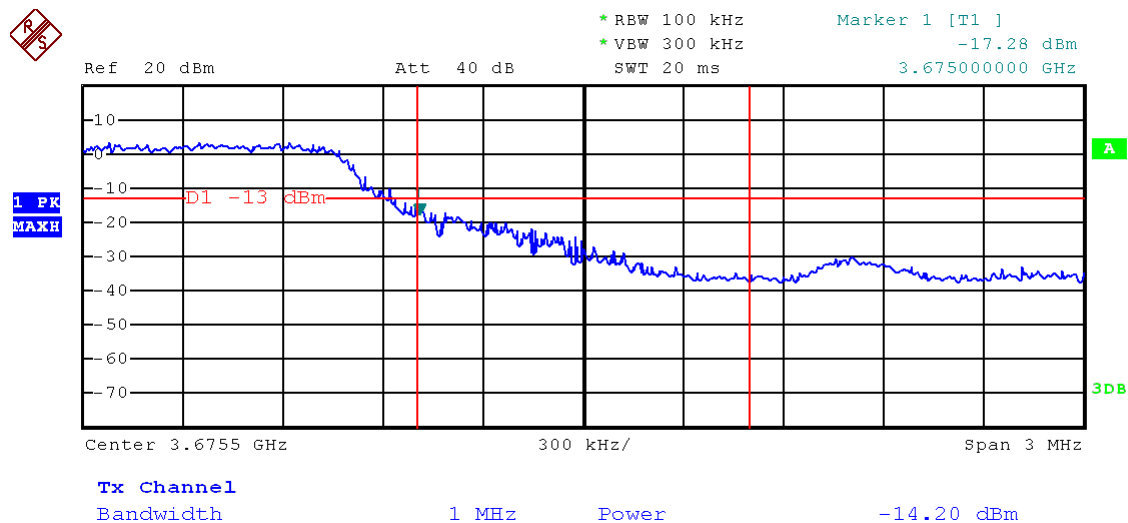
Lower band edge (-30°C,120V) -13.53dBm<13dBm



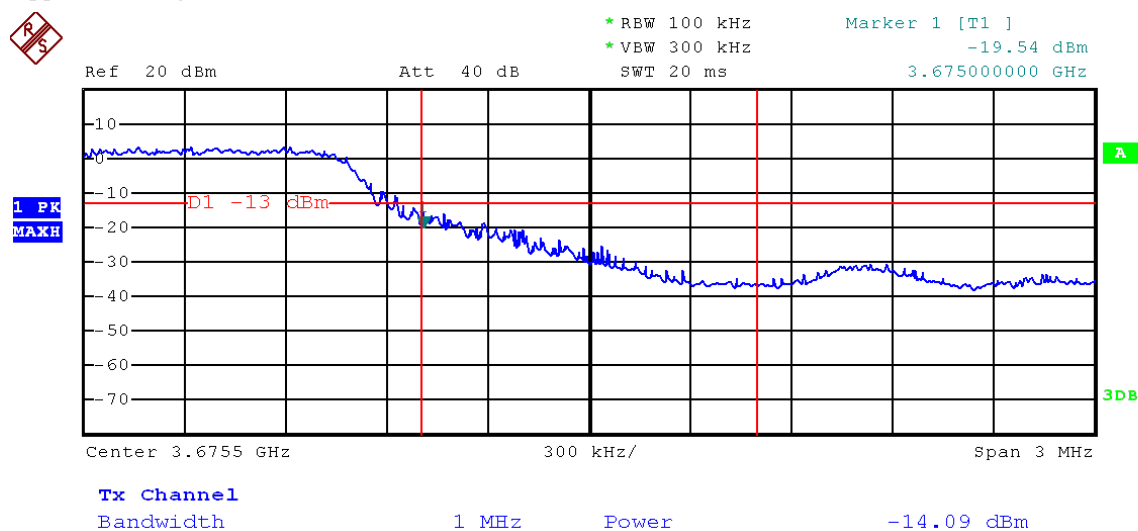
Upper band edge (20°C,120V) -13.32dBm<13dBm



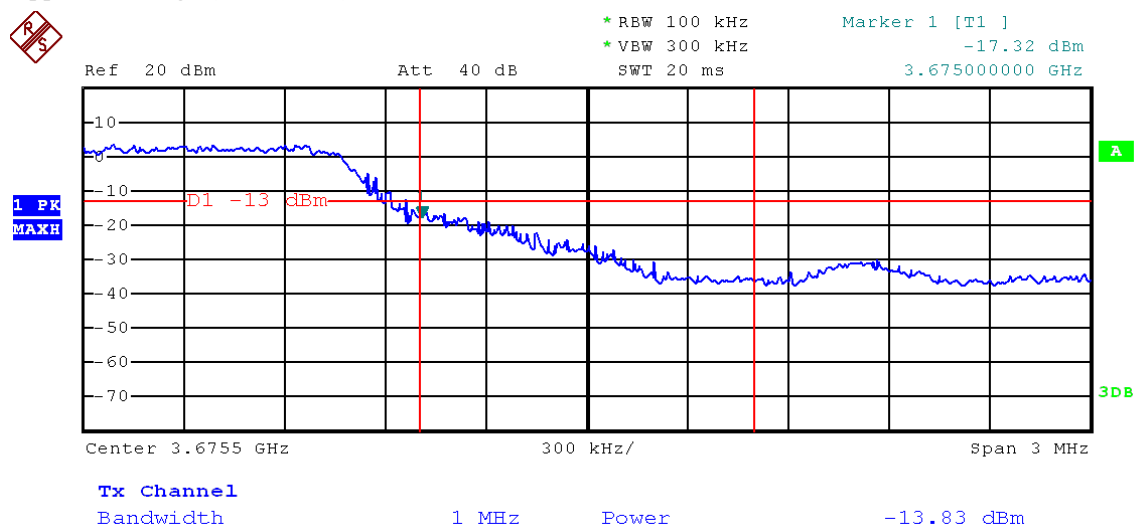
Upper band edge (20°C,102V) -14.20dBm<13dBm



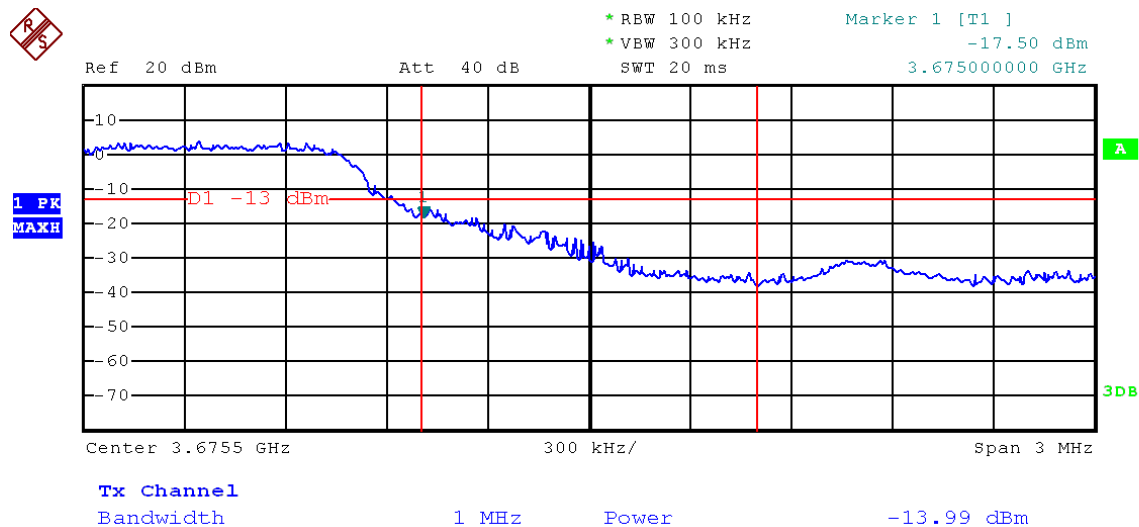
Upper band edge (20°C,138V) -14.09dBm<13dBm



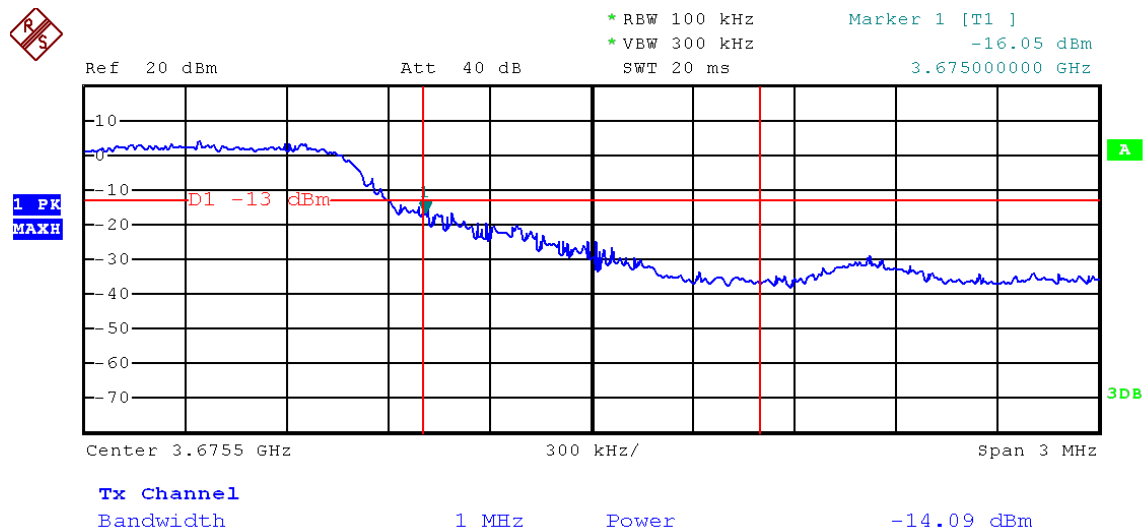
Upper band edge (30°C,120V) -13.83dBm<13dBm



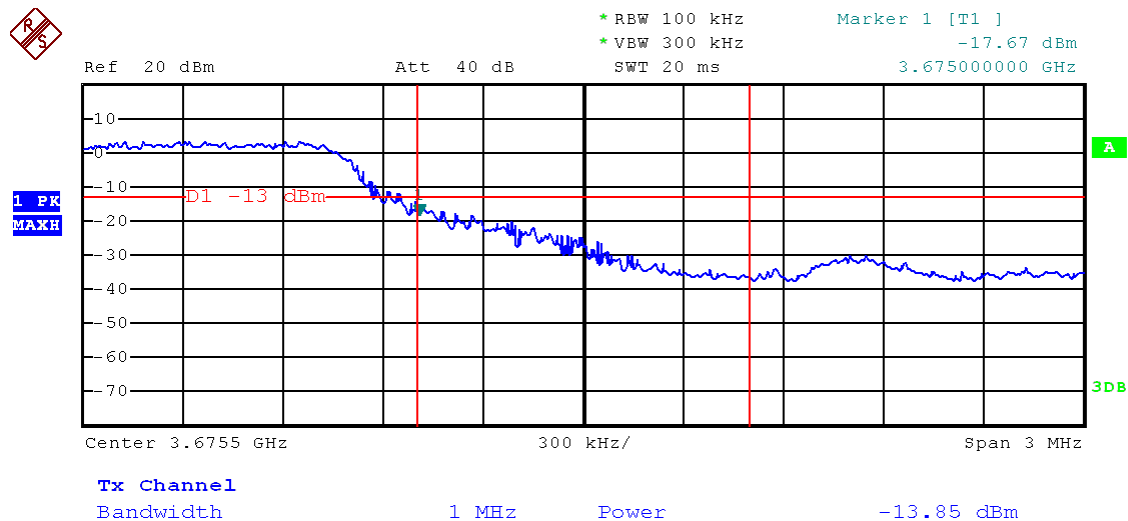
Upper band edge (40°C,120V) -13.99dBm<13dBm



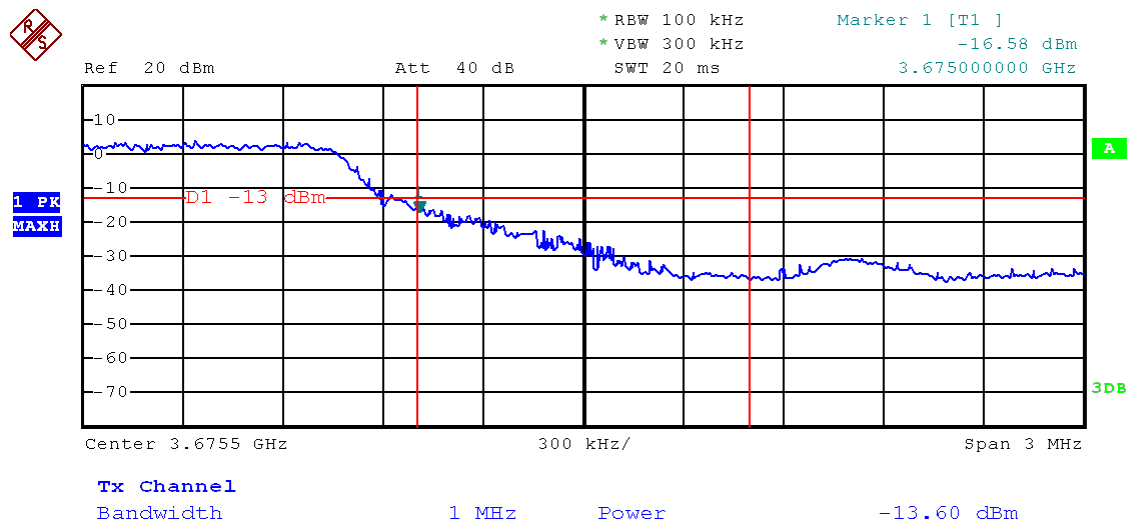
Upper band edge (50°C,120V) -14.09dBm<13dBm



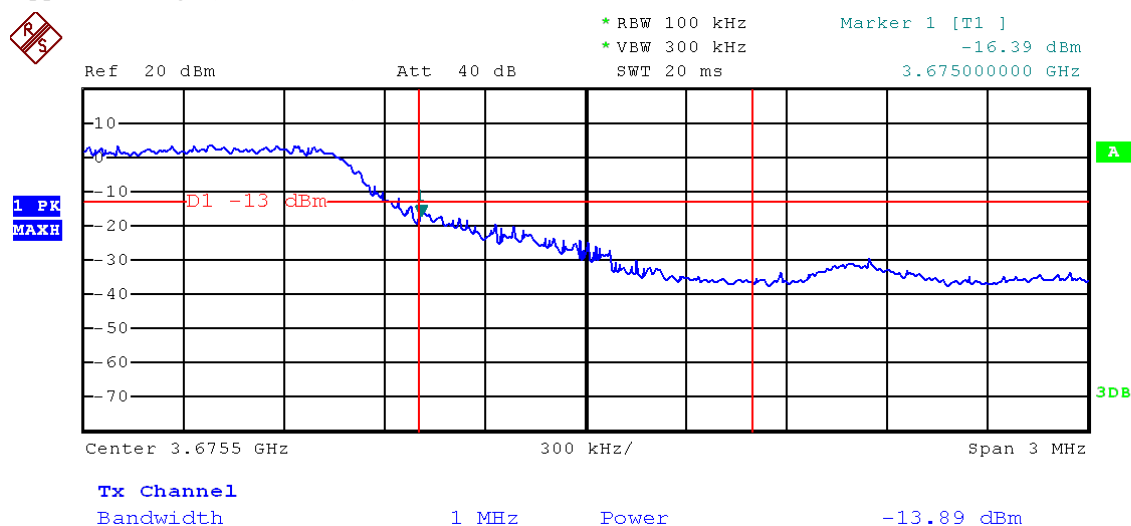
Upper band edge (10°C,120V) -13.85dBm<13dBm



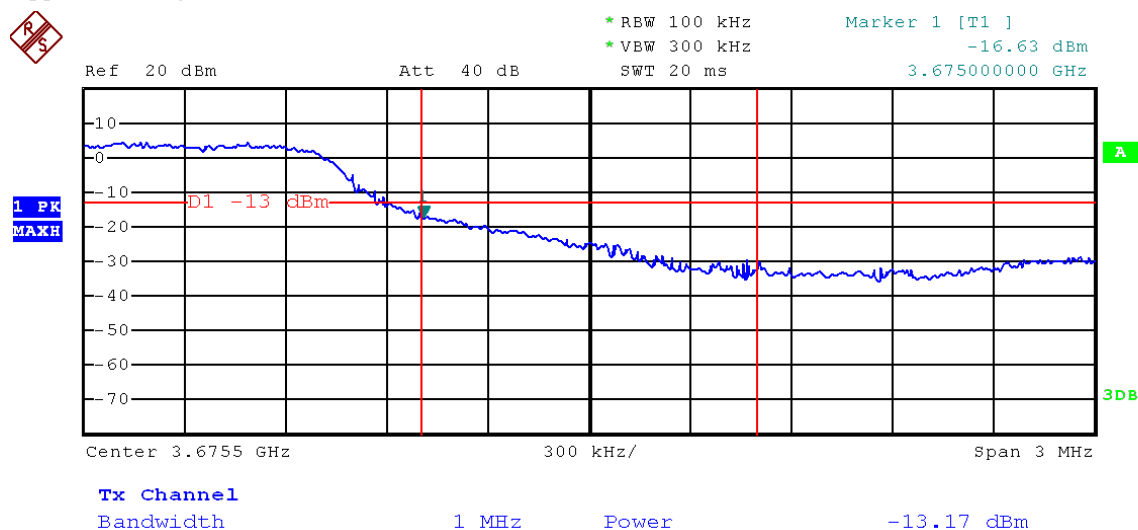
Upper band edge (0°C,120V) -13.60dBm<13dBm



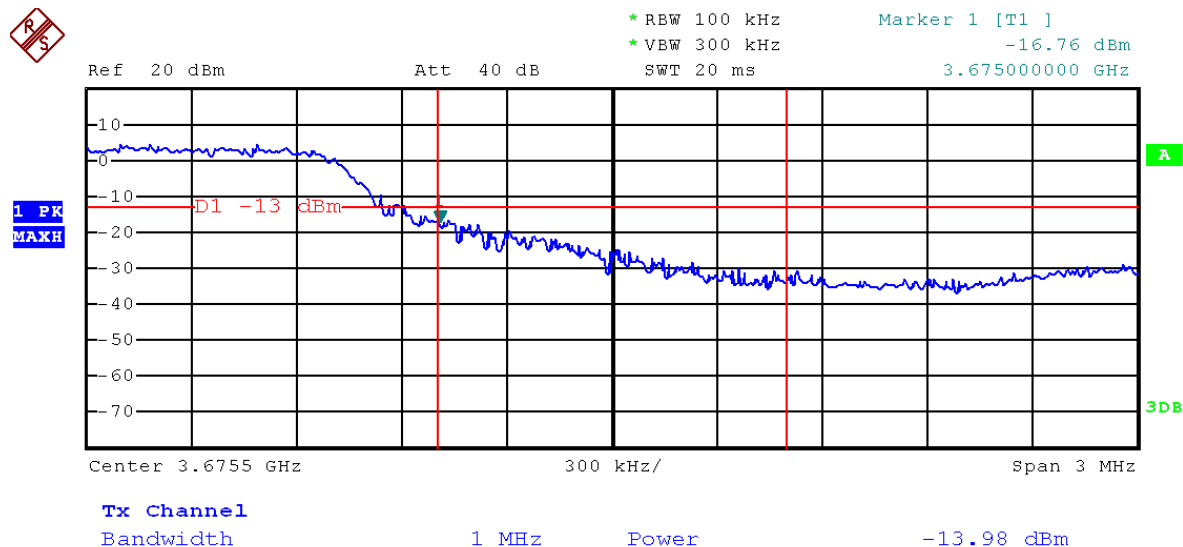
Upper band edge (-10°C,120V) -13.89 dBm<13dBm



Upper band edge (-20°C,120V) -13.17dBm<13dBm

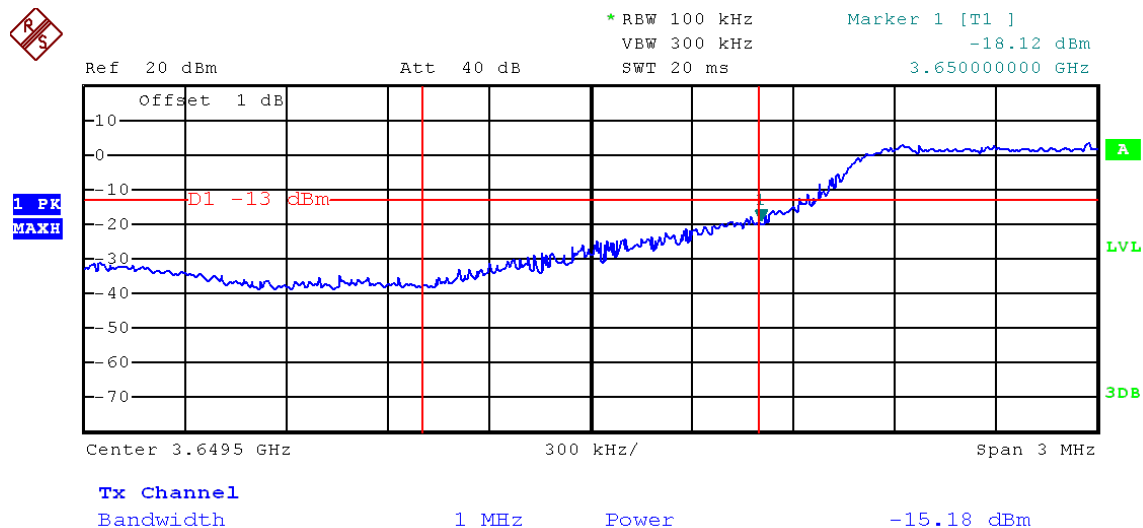


Upper band edge (-30°C,120V) -13.98dBm<13dBm

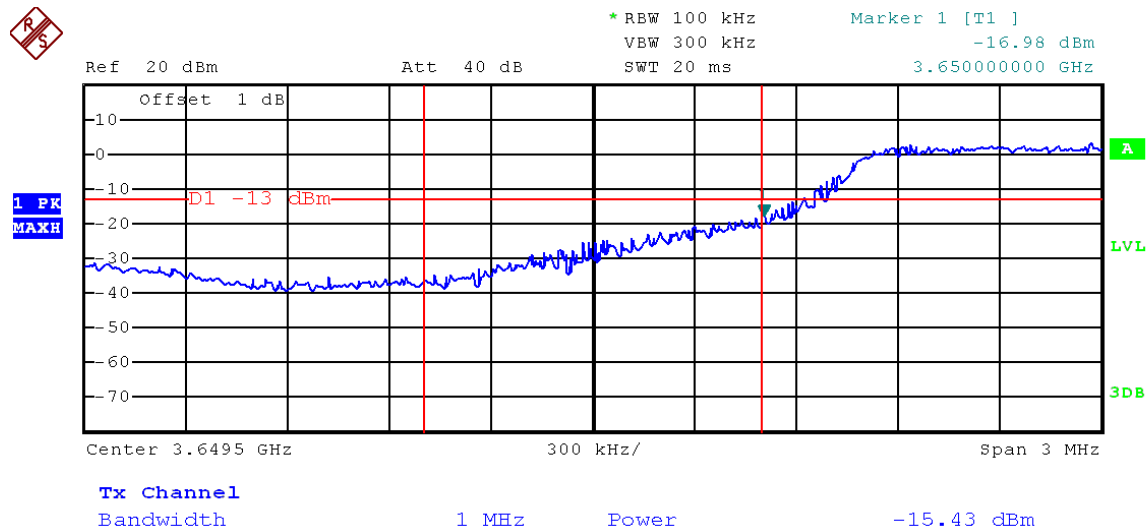


For 8.75 MHz Bandwidth

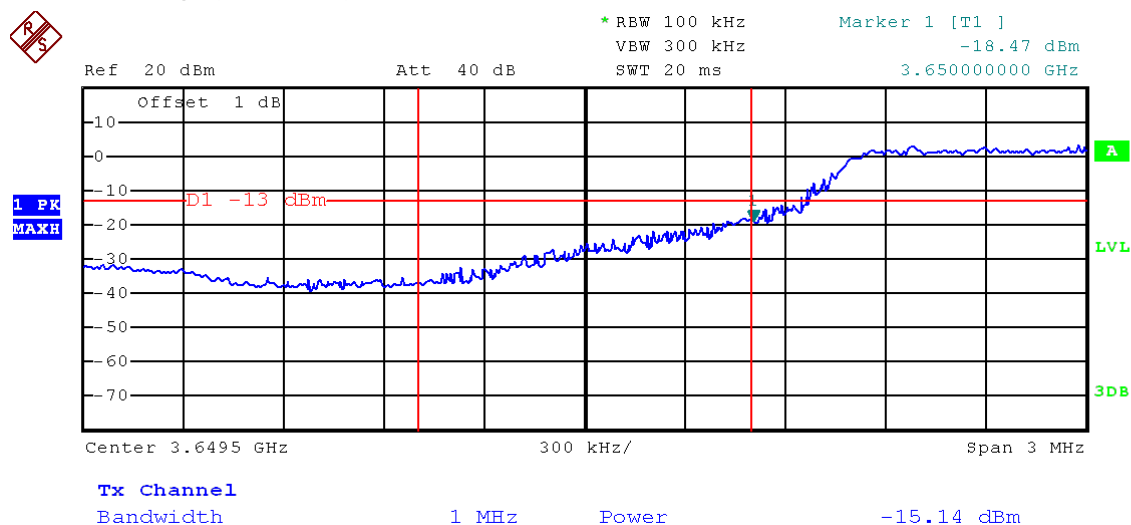
Lower band edge (20°C,120V) -15.18dBm<13dBm



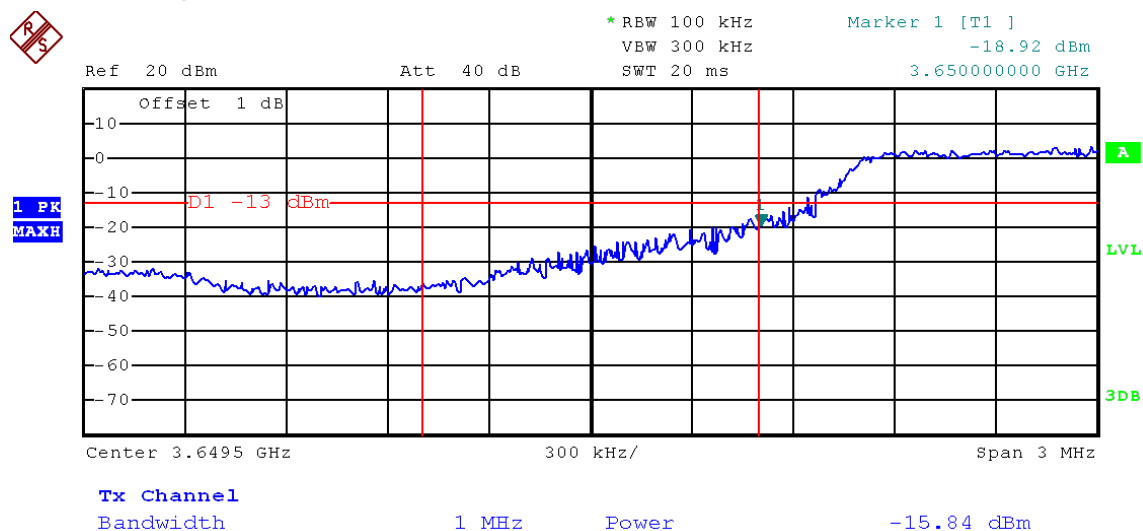
Lower band edge (20°C,102V) -15.43dBm<13dBm



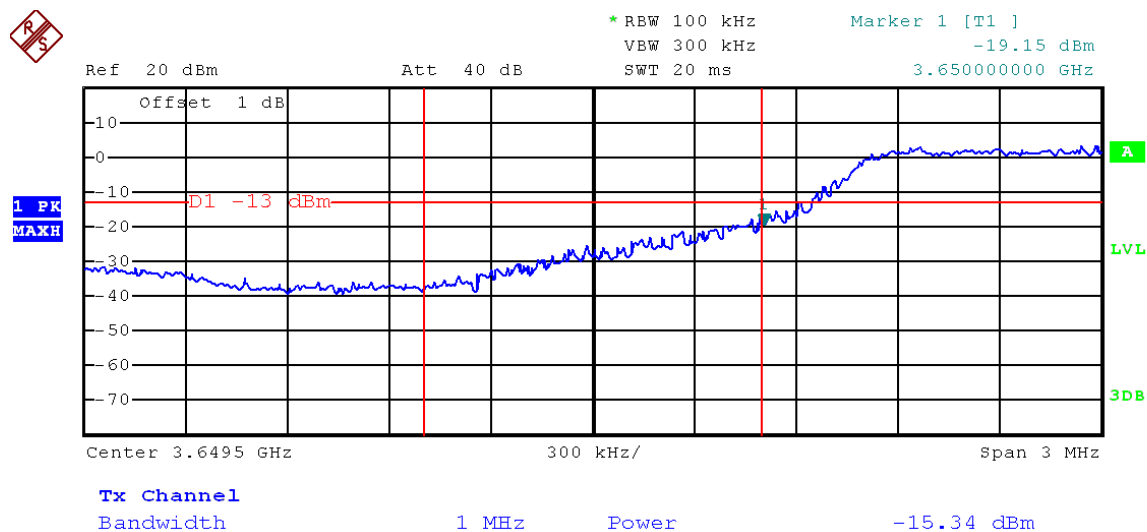
Lower band edge (20°C,138V) -15.14dBm<13dBm



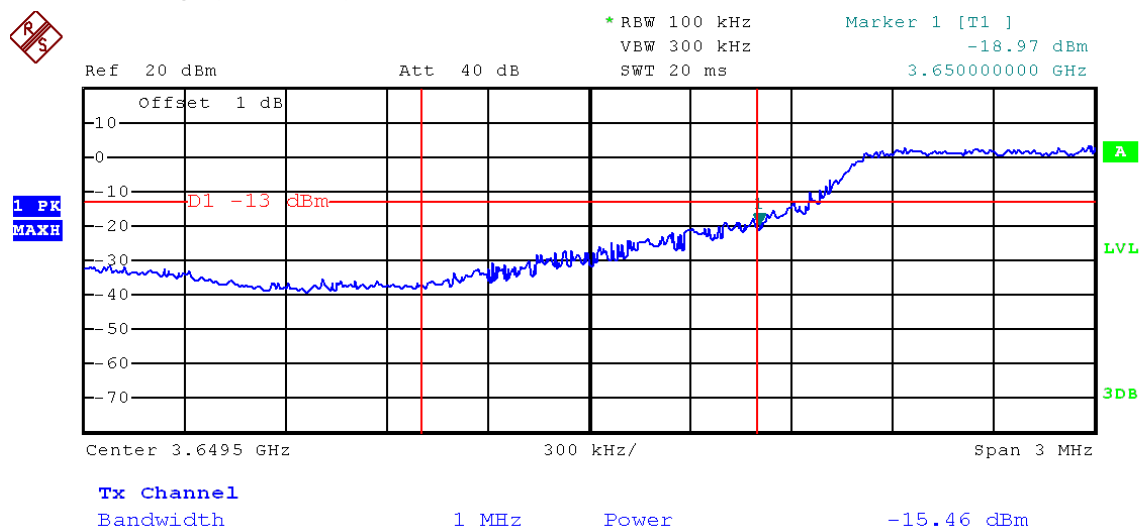
Lower band edge (30°C,120V) -15.84dBm<13dBm



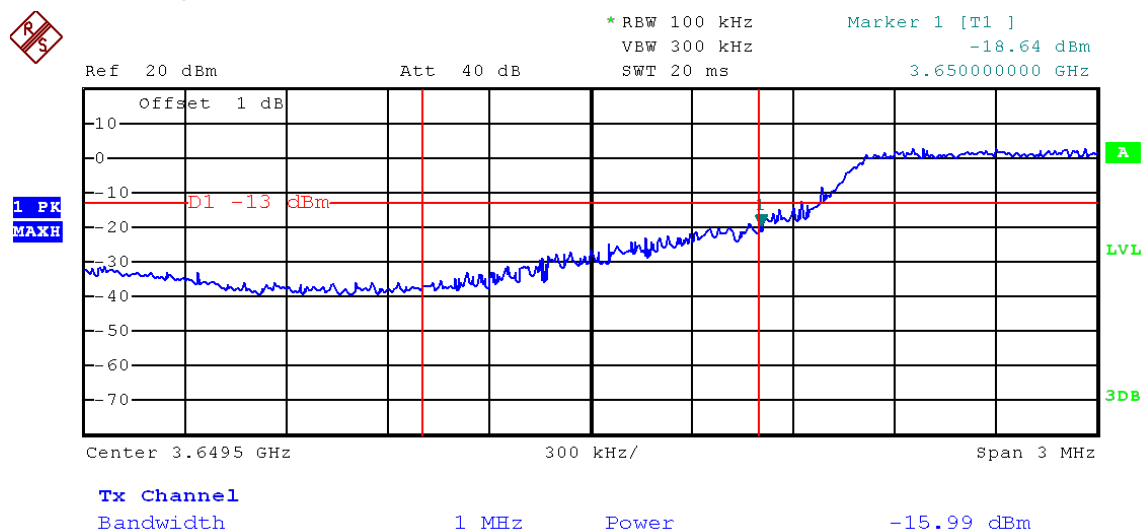
Lower band edge (40°C,120V) -15.34dBm<13dBm



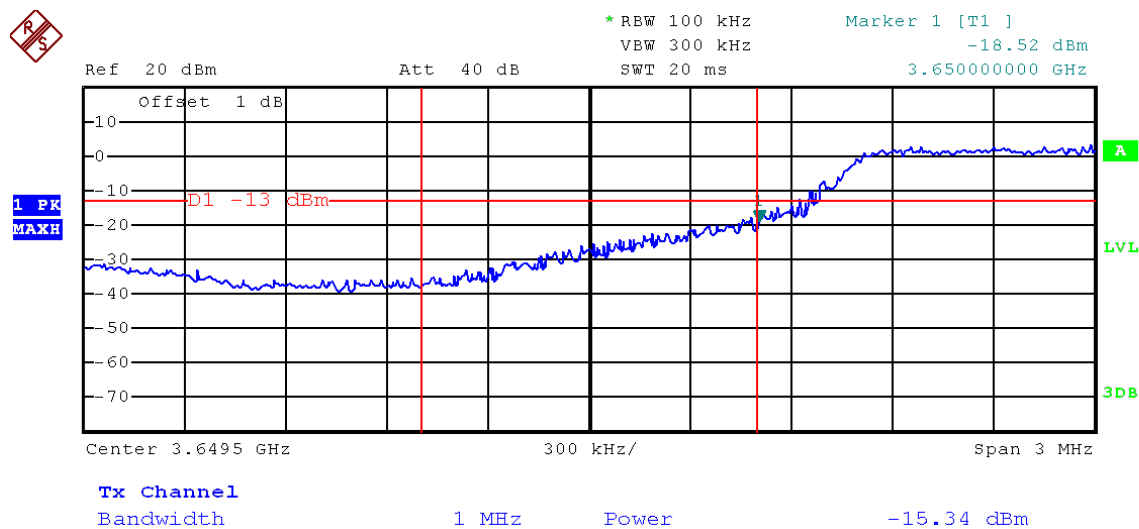
Lower band edge (50°C,120V) -15.46dBm<13dBm



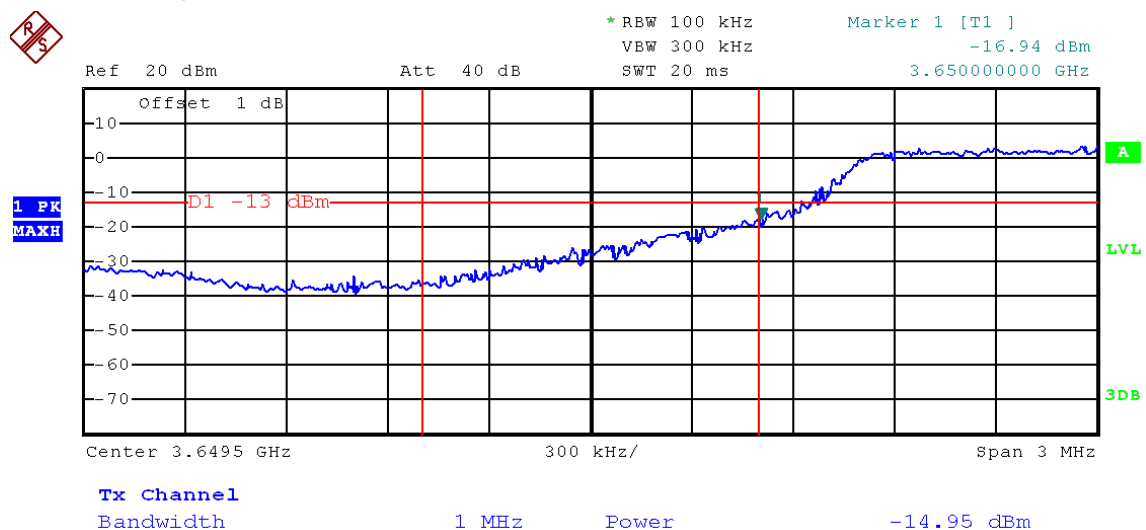
Lower band edge (10°C,120V) -15.99dBm<13dBm



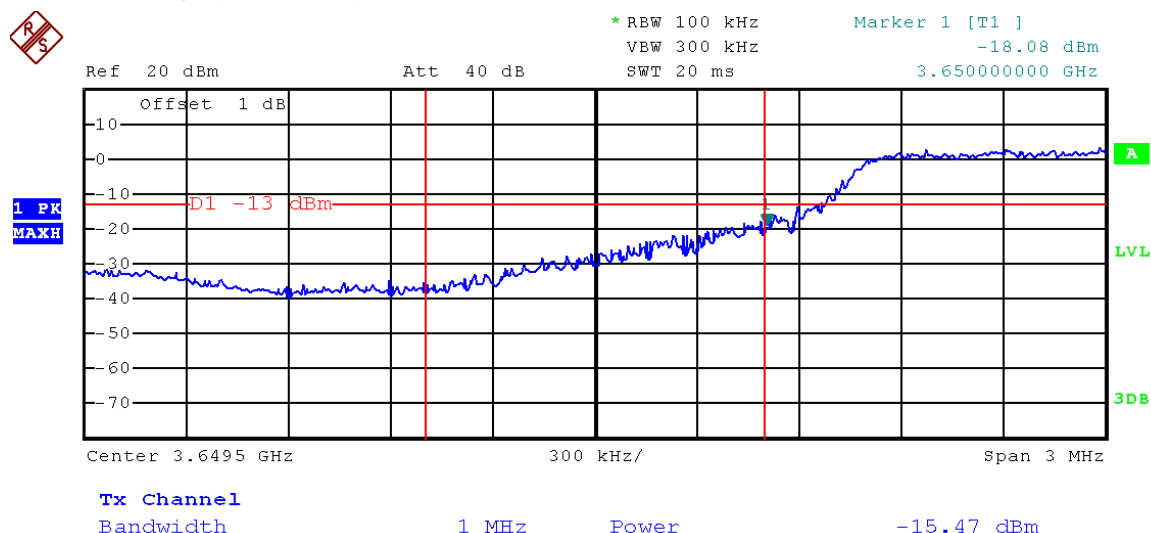
Lower band edge (0°C,120V) -15.34dBm<13dBm



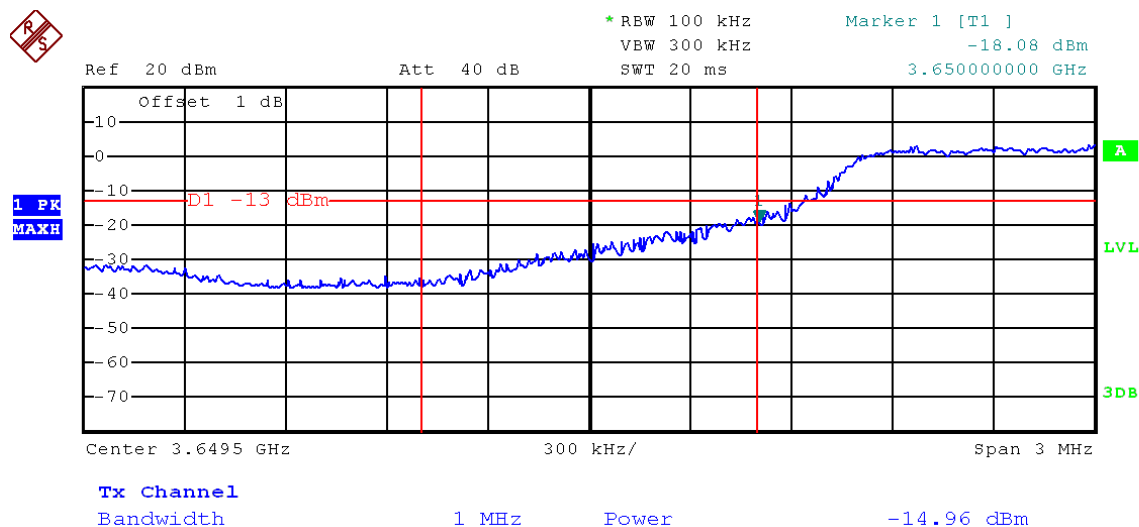
Lower band edge (-10°C,120V) -14.95dBm<13dBm



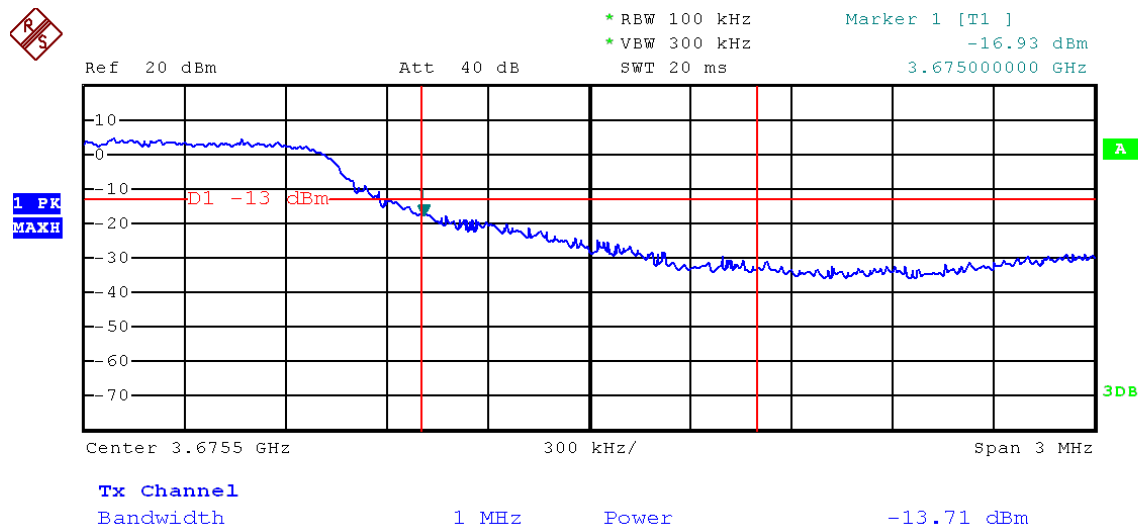
Lower band edge (-20°C,120V) -15.47dBm<13dBm



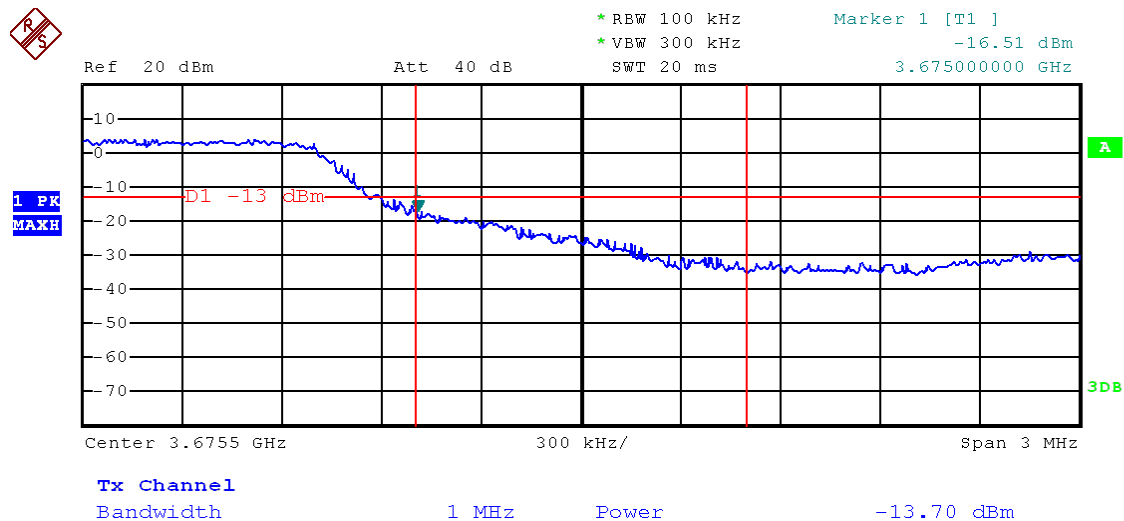
Lower band edge (-30°C,120V) -14.96dBm<13dBm



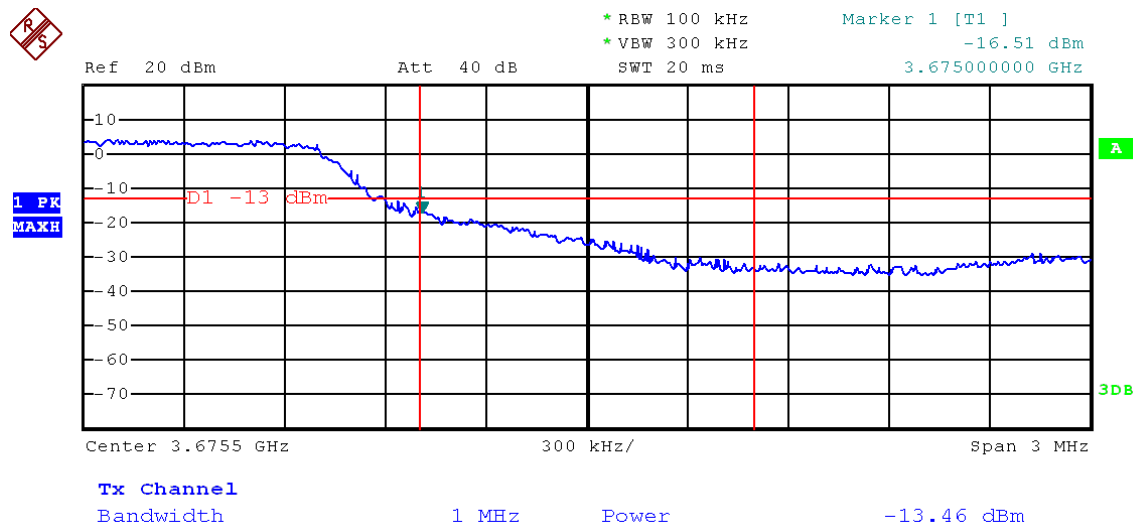
Upper band edge (20°C,120V) -13.71dBm<13dBm



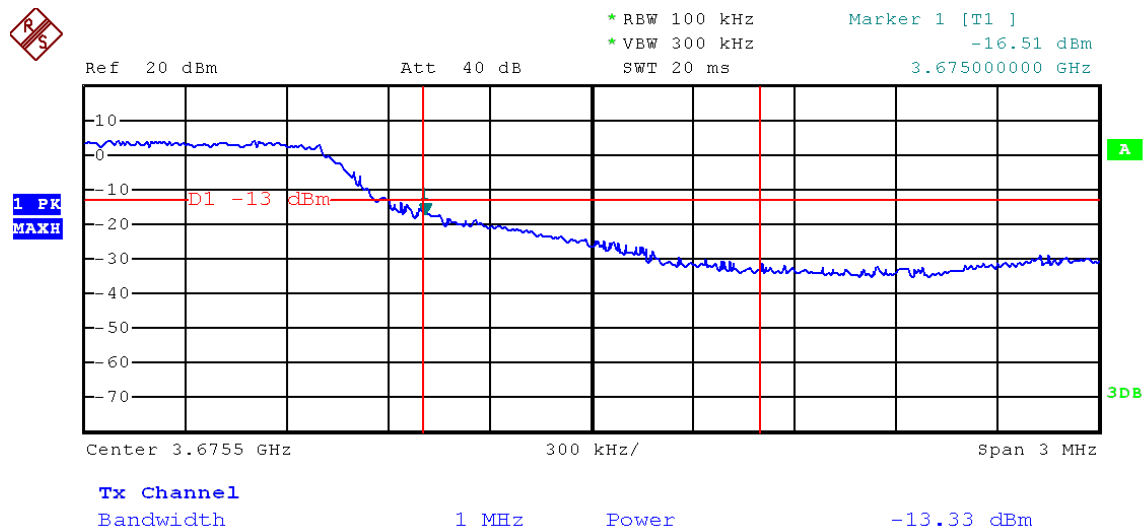
Upper band edge (20°C,102V) -13.70dBm<13dBm



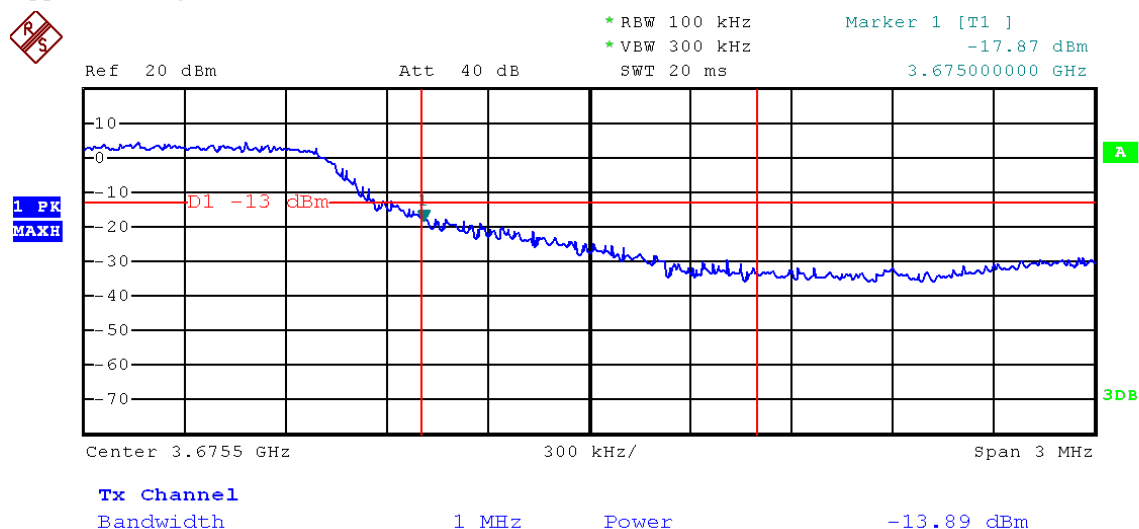
Upper band edge (20°C,138V) -13.46dBm<13dBm



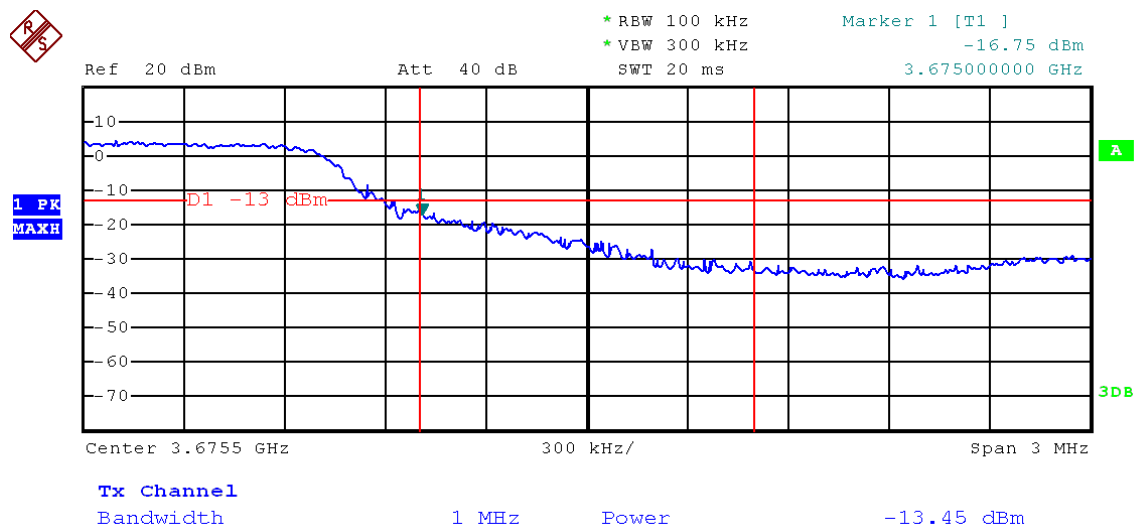
Upper band edge (30°C,120V) -13.33dBm<13dBm



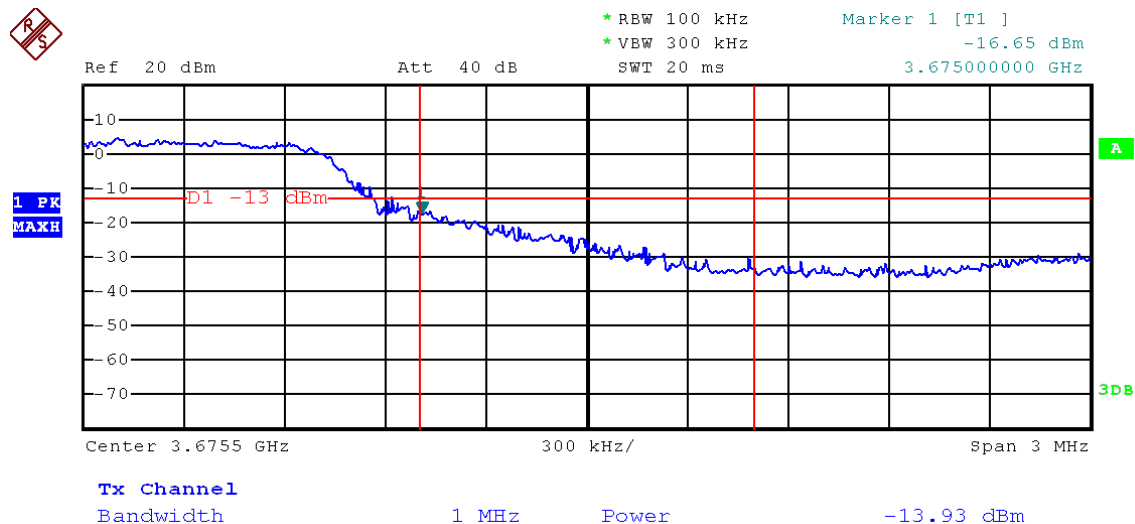
Upper band edge (40°C,120V) -13.89dBm<13dBm



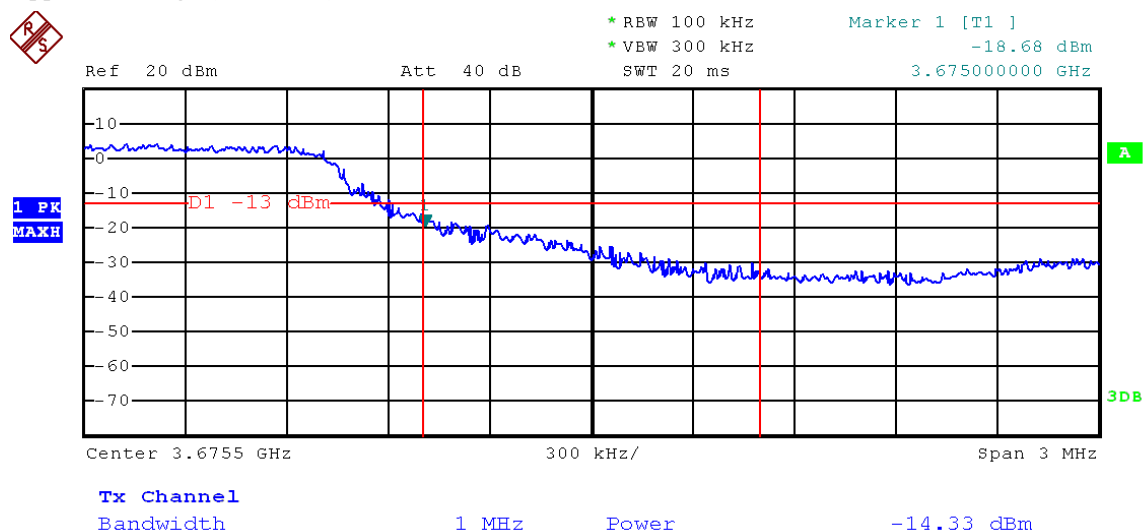
Upper band edge (50°C,120V) -13.45dBm<13dBm



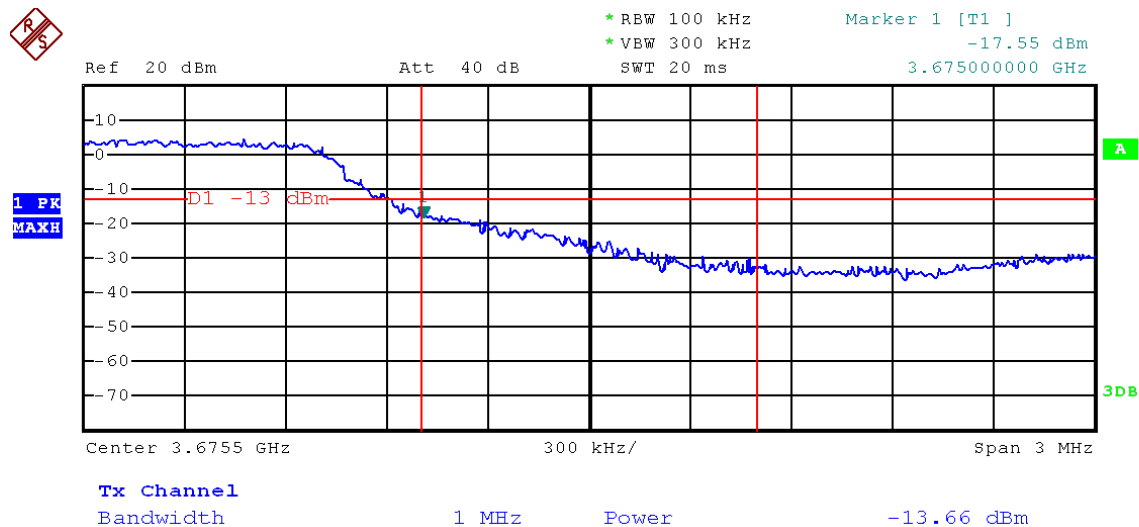
Upper band edge (10°C,120V) -13.93dBm<13dBm



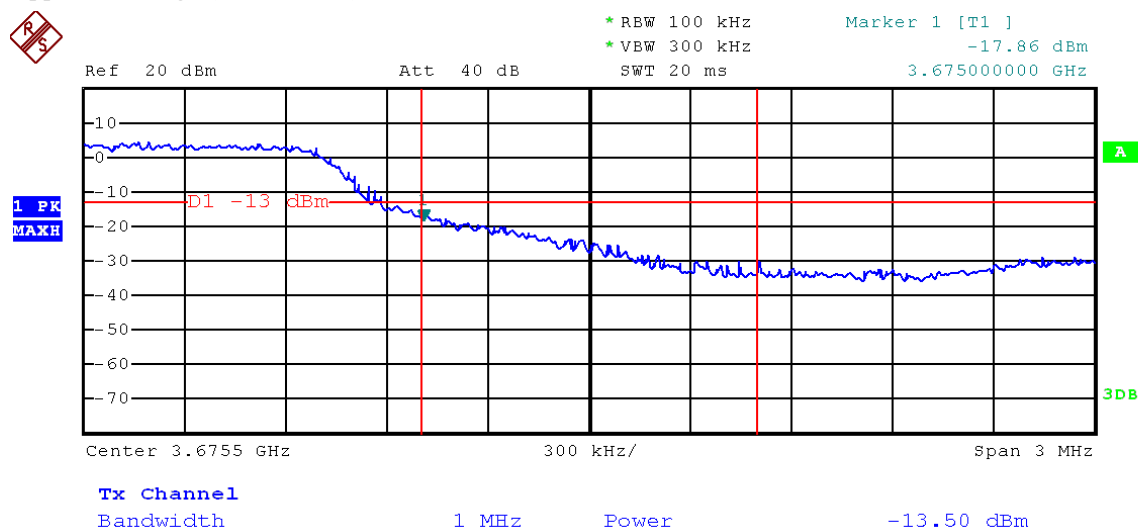
Upper band edge (0°C,120V) -14.33dBm<13dBm



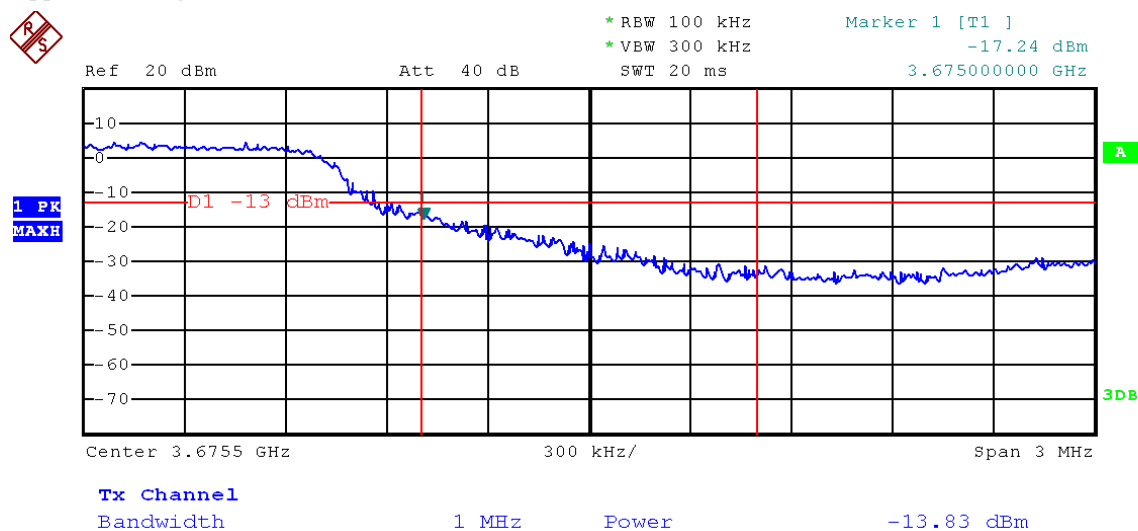
Upper band edge (-10°C,120V) -13.66dBm<13dBm



Upper band edge (-20°C,120V) -13.50dBm<13dBm

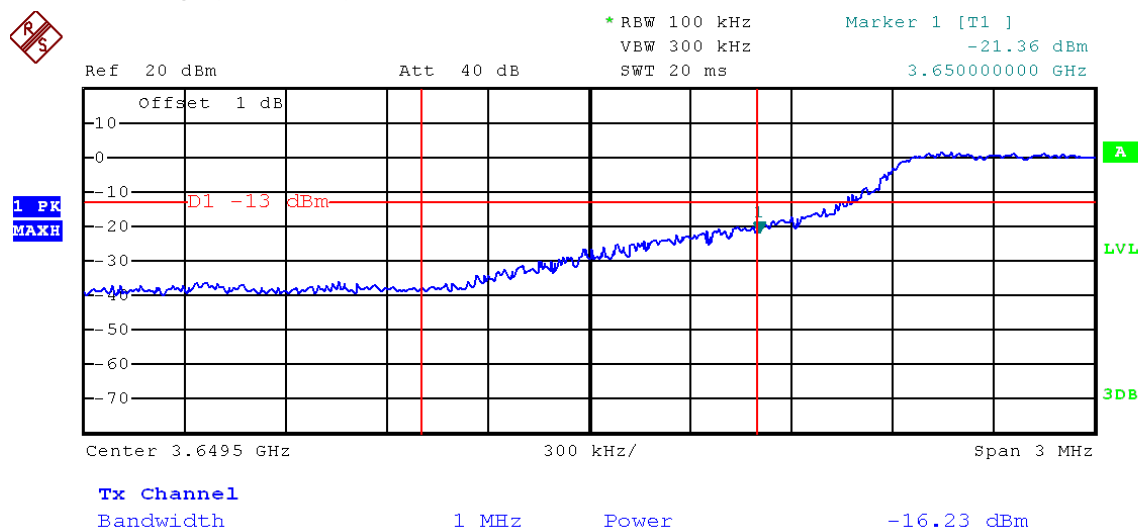


Upper band edge (-30°C,120V) -13.83dBm<13dBm

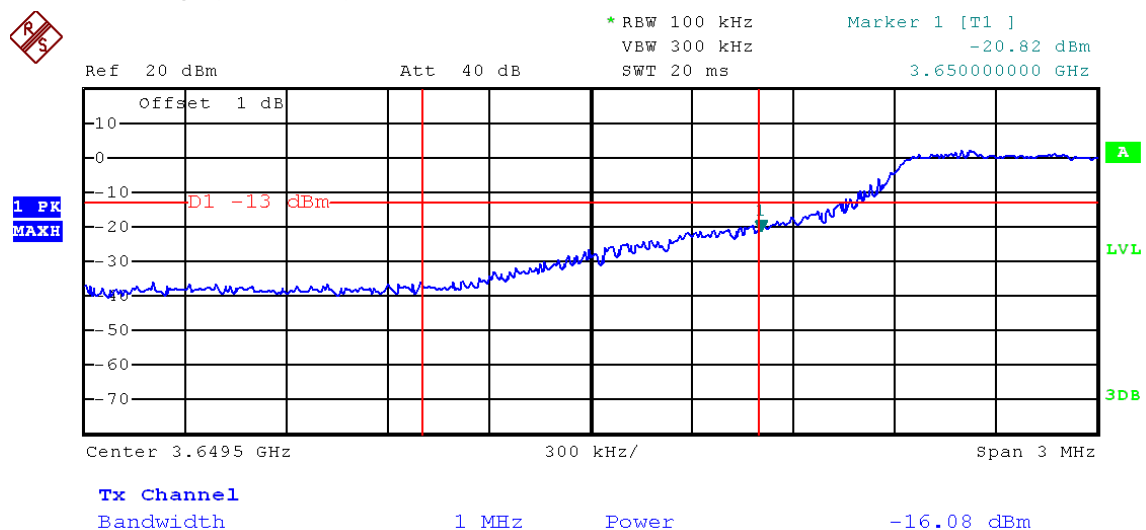


For 10 MHz Bandwidth

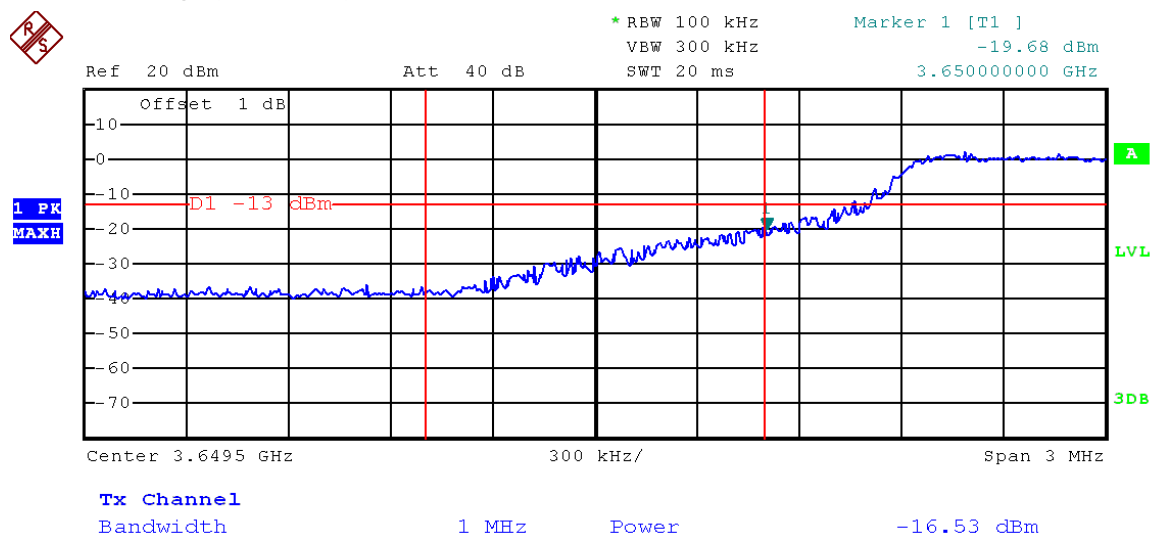
Lower band edge (20°C,120V) -16.23dBm<13dBm



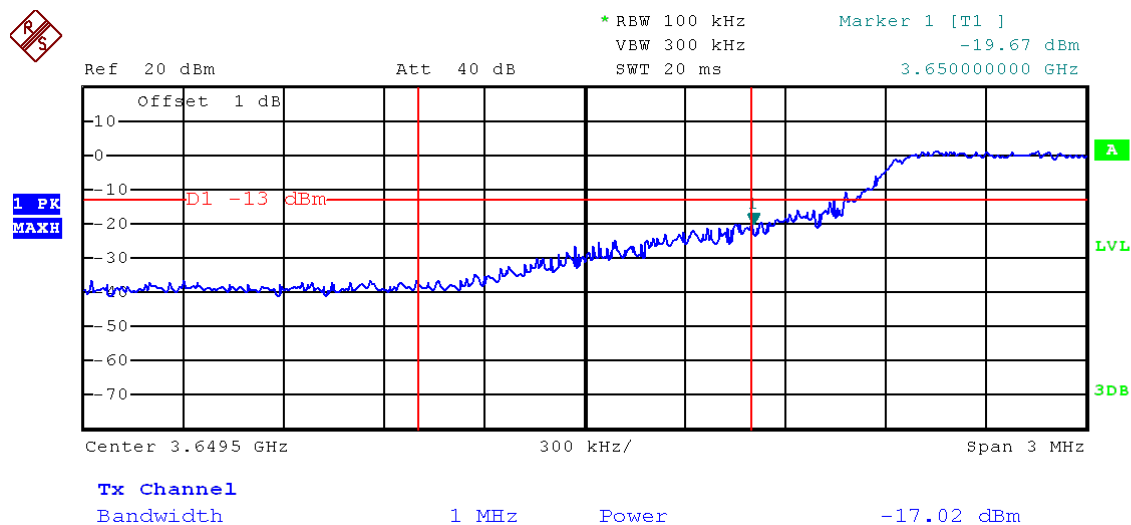
Lower band edge (20°C,102V) -16.08dBm<13dBm



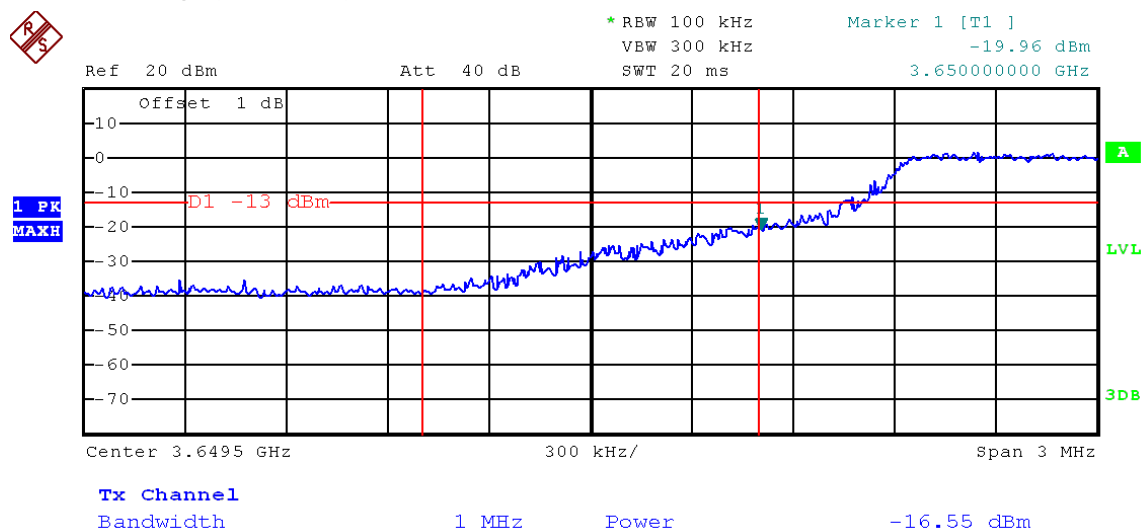
Lower band edge (20°C,138V) -16.53dBm<13dBm



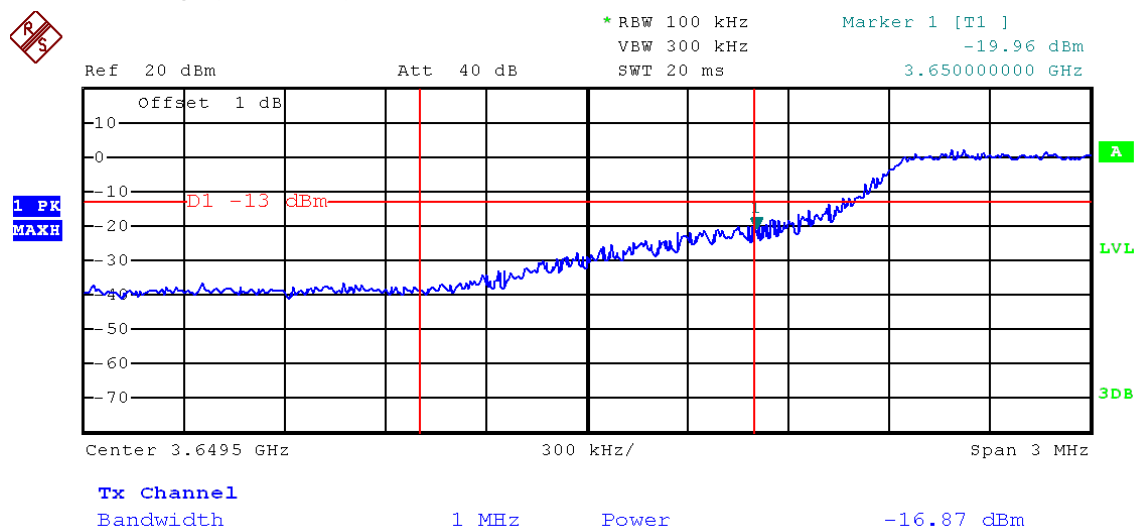
Lower band edge (30°C,120V) -17.02dBm<13dBm



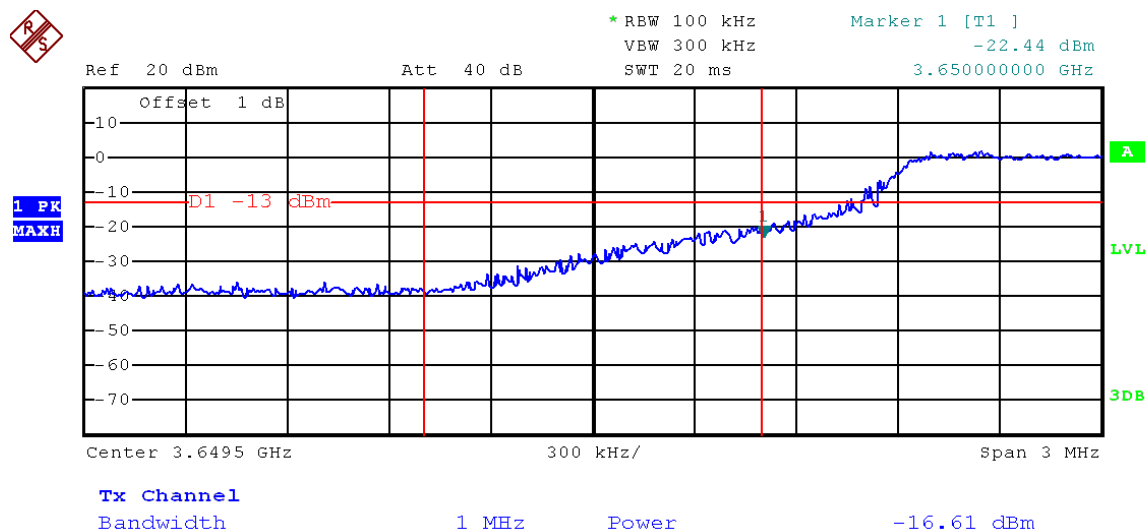
Lower band edge (40°C,120V) -16.55dBm<13dBm



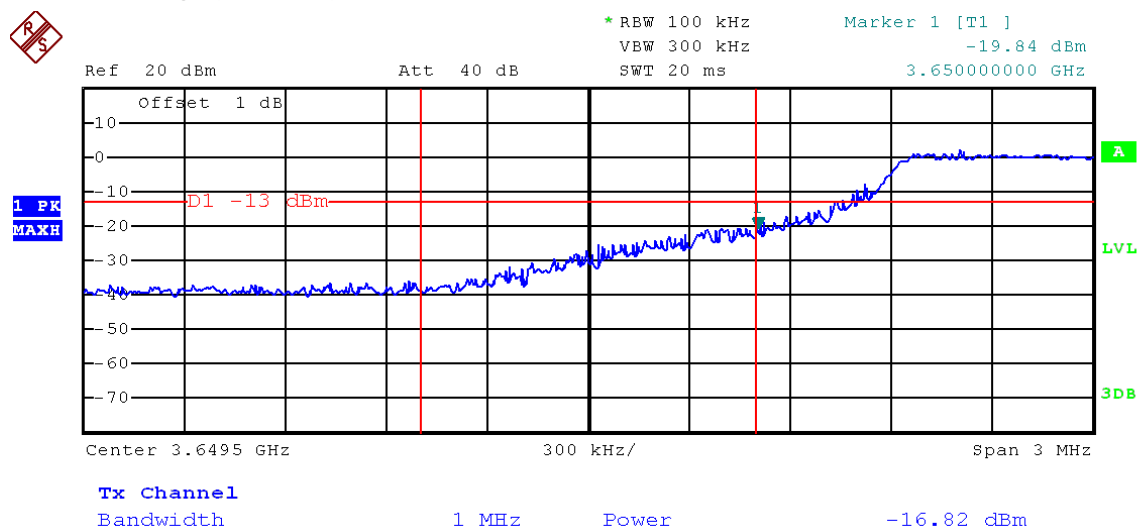
Lower band edge (50°C,120V) -16.87dBm<13dBm



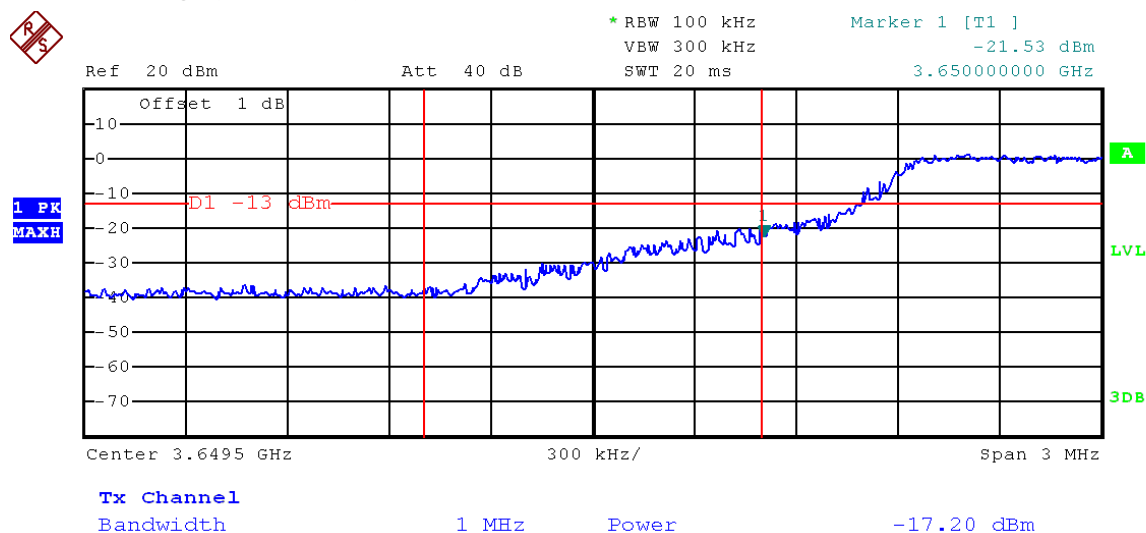
Lower band edge (10°C,120V) -16.61dBm<13dBm



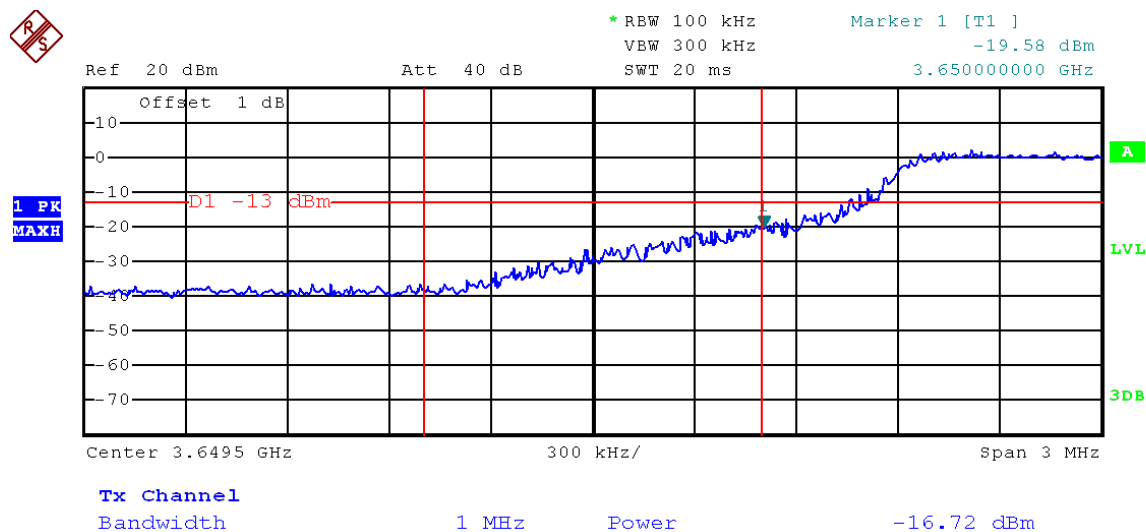
Lower band edge (0°C,120V) -16.82dBm<13dBm



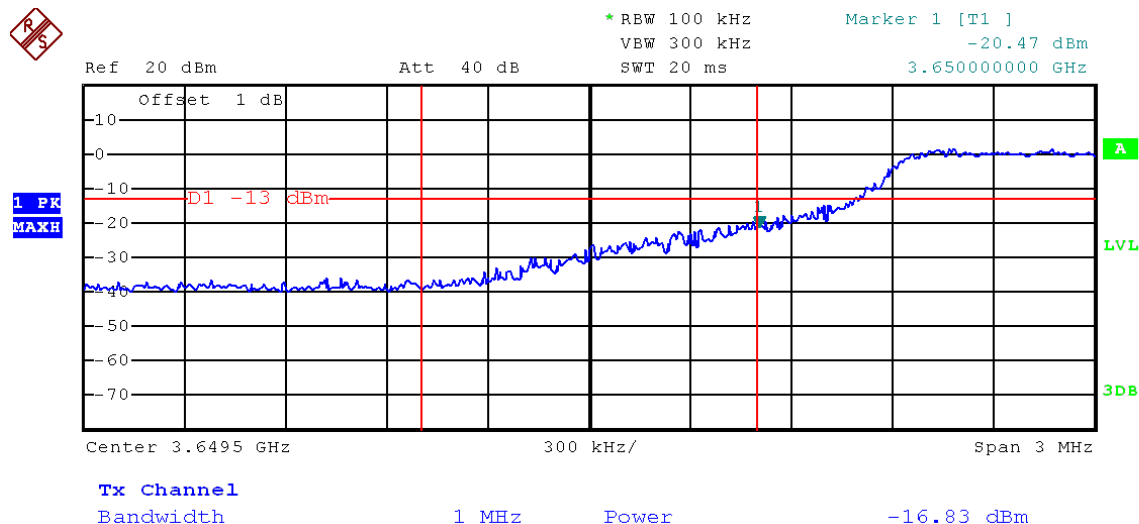
Lower band edge (-10°C,120V) -17.20dBm<13dBm



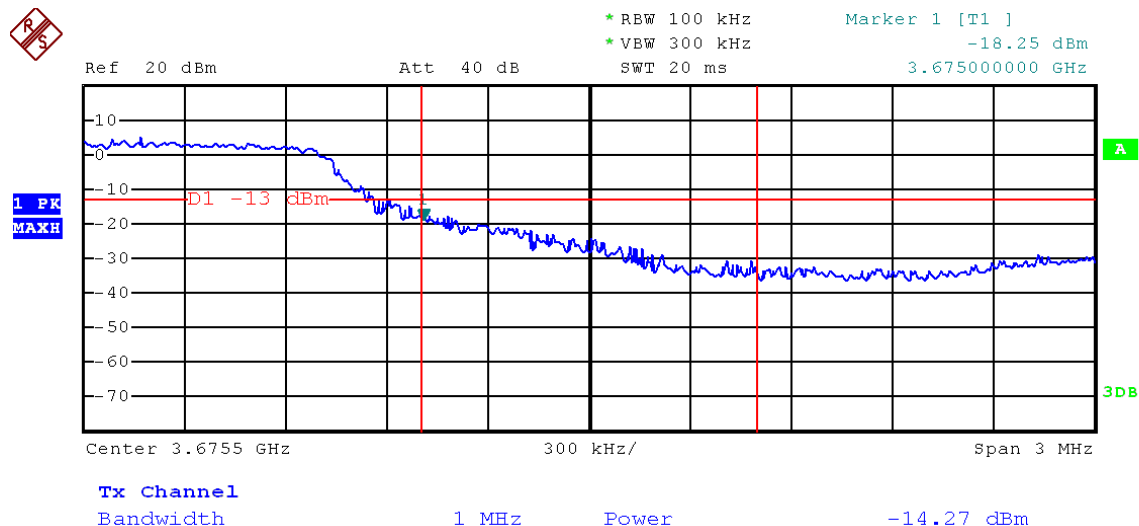
Lower band edge (-20°C,120V) -16.72dBm<13dBm



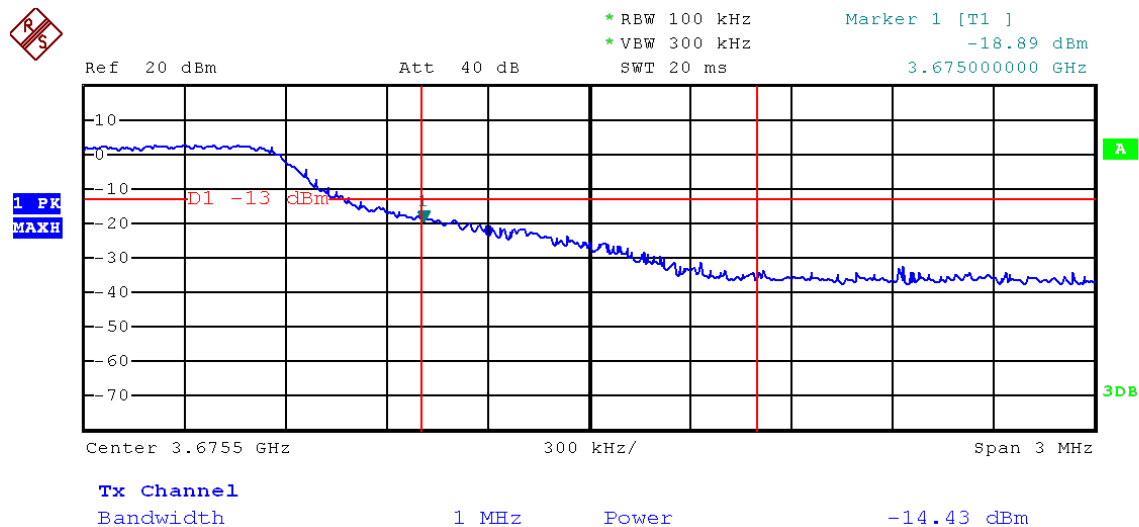
Lower band edge (-30°C,120V) -16.83dBm<13dBm



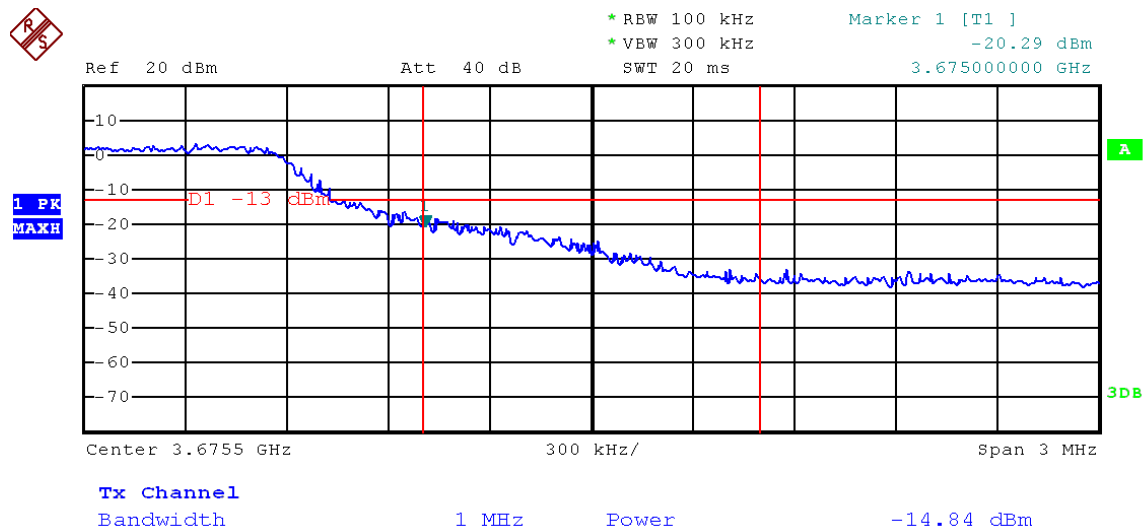
Upper band edge (20°C,120V) -14.27dBm<13dBm



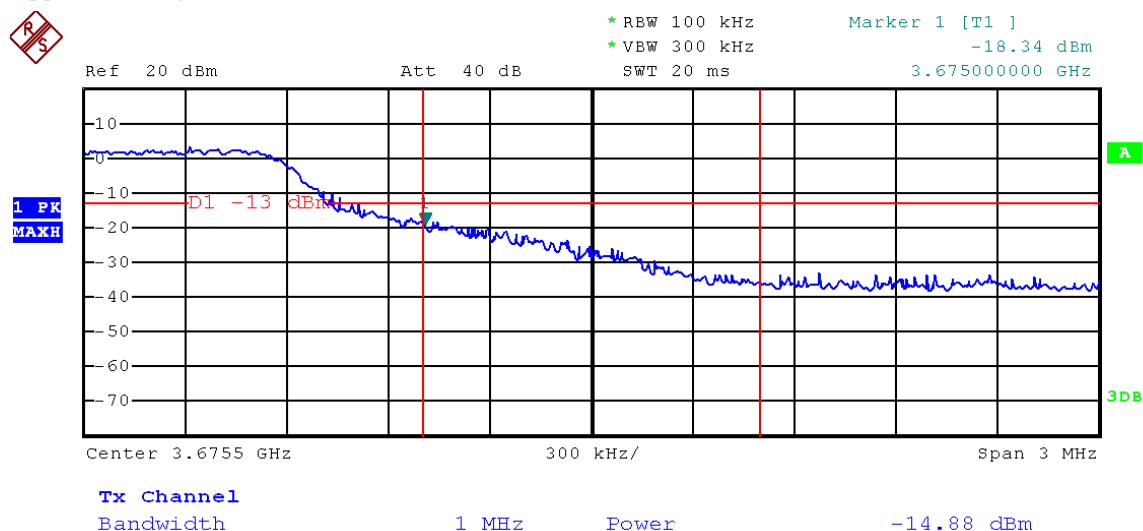
Upper band edge (20°C,102V) -14.43dBm<13dBm



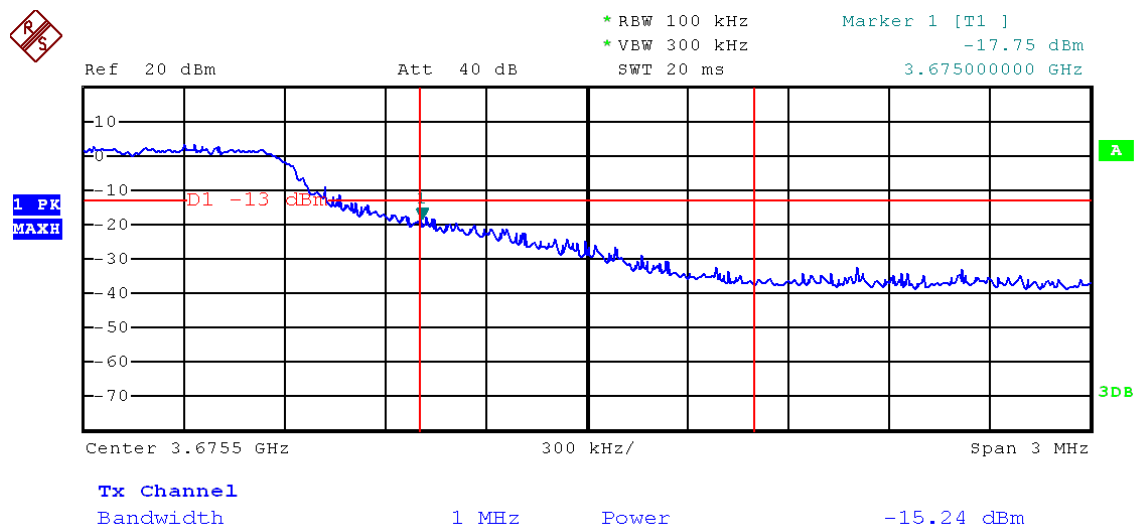
Upper band edge (20°C,138V) -14.84dBm<13dBm



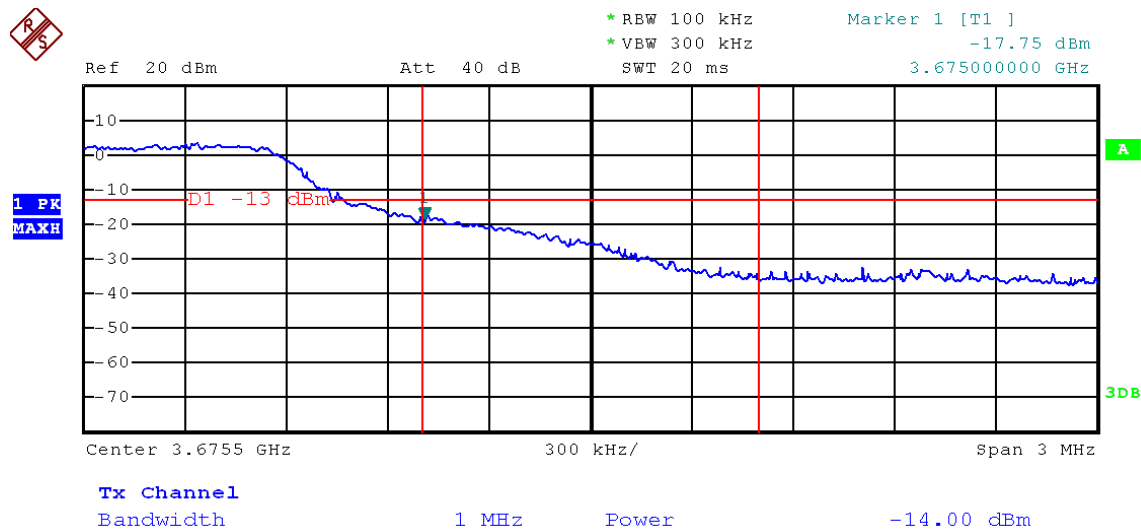
Upper band edge (30°C,120V) 14.88dBm<13dBm



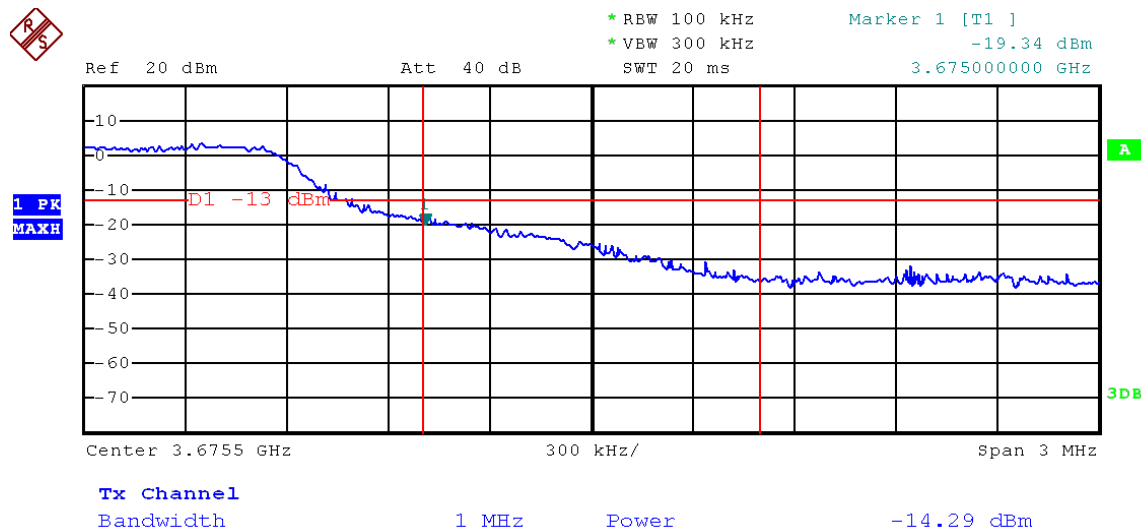
Upper band edge (40°C,120V) 15.24dBm<13dBm



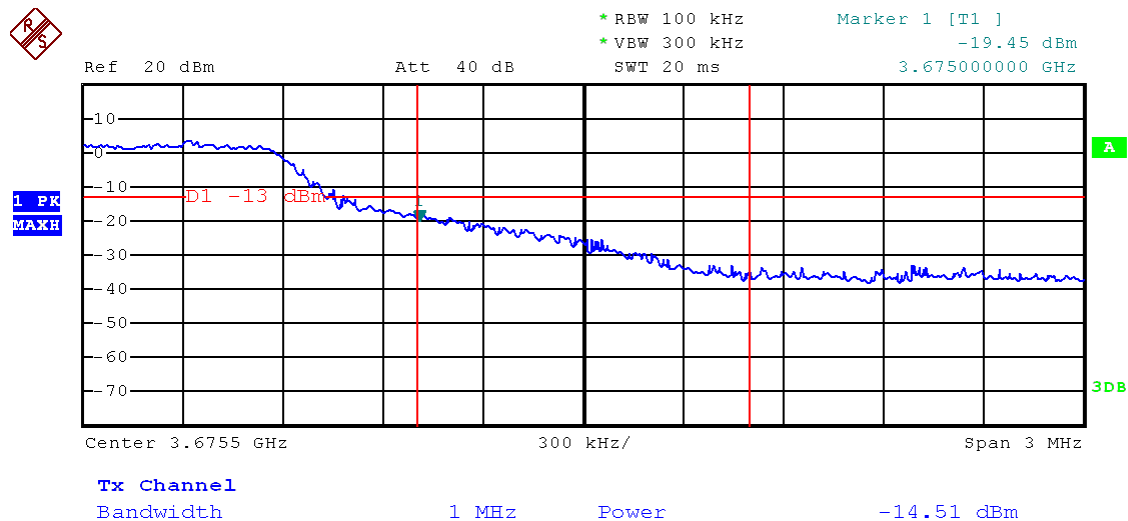
Upper band edge (50°C,120V) -14.00dBm<13dBm



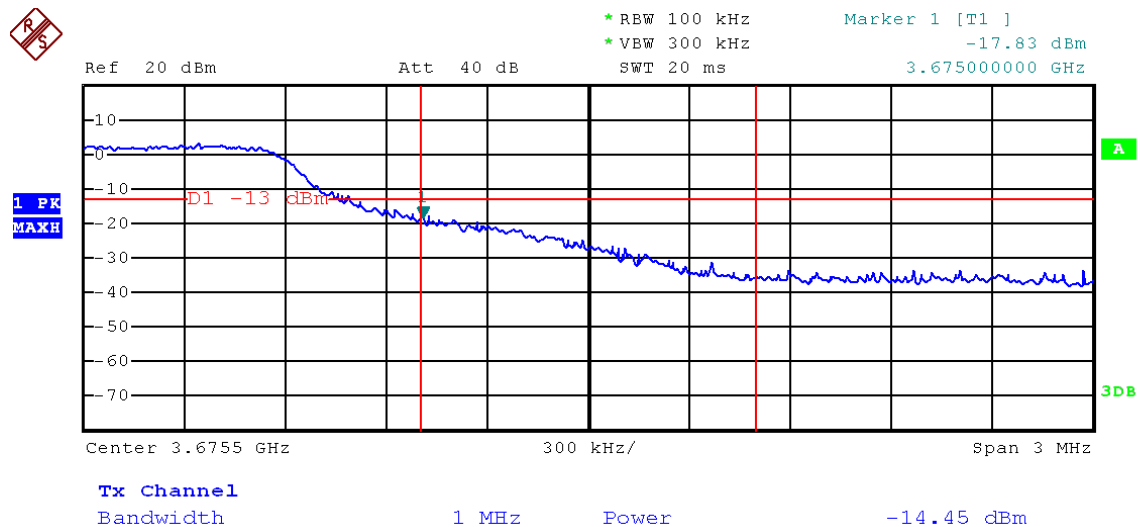
Upper band edge (10°C,120V) -14.29dBm<13dBm



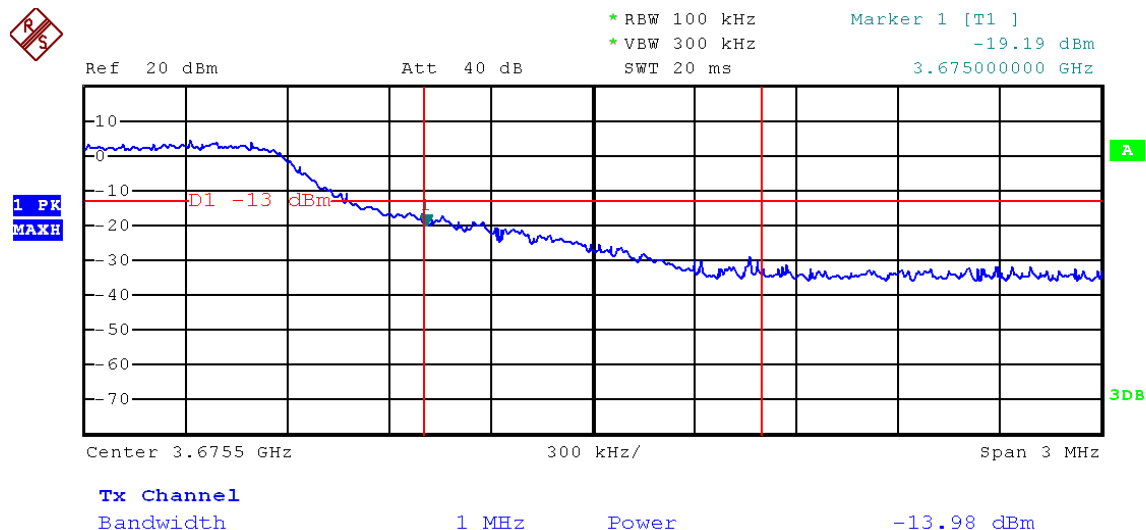
Upper band edge (0°C,120V) -14.51dBm<13dBm



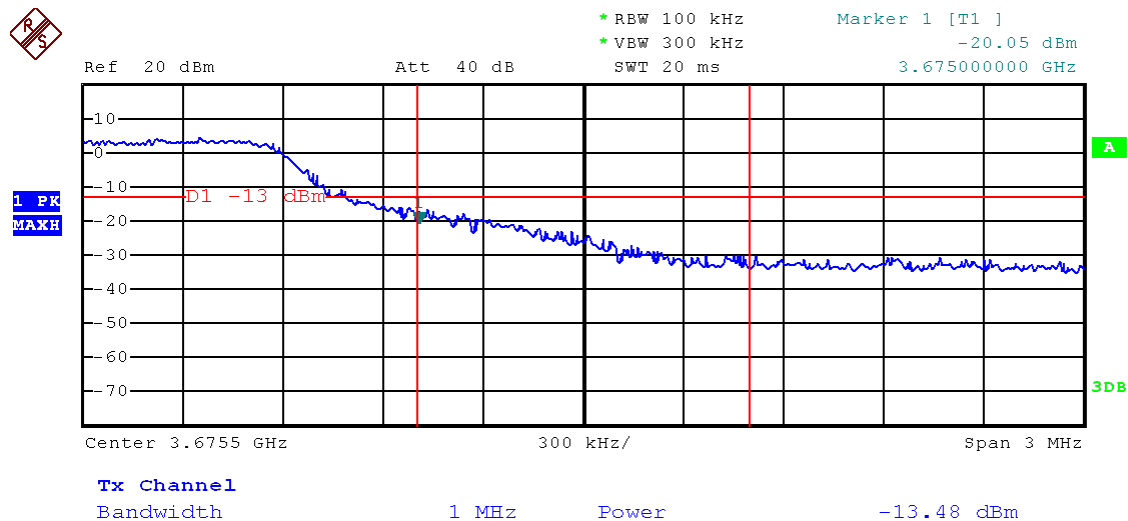
Upper band edge (-10°C,120V) -14.45dBm<13dBm



Upper band edge (-20°C,120V) -13.98dBm<13dBm



Upper band edge (-30°C,120V) -13.48dBm<13dBm



9. Radiated Band Edge

9.1 Standard Applicable

According to §90.1323 (a) The power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or less, but at least one percent of the emission bandwidth of the fundamental emission of the transmitter, provided the measured energy is integrated over a 1 MHz bandwidth.

9.3 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP40	836079/035	2015-05-28	2016-05-27
Pre-amplifier	Agilent	8447F	3113A06717	2015-05-28	2016-05-27
Pre-amplifier	Compliance Direction	PAP-0140	24002	2015-05-28	2016-05-27
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2015-05-24	2016-05-23
Horn Antenna	ETS	3117	00086197	2015-05-24	2016-05-23
Horn Antenna	EMCO	3116	9203-2178	2015-05-24	2016-05-23
Universal Radio Communication Tester	Rohde & Schwarz	CMU200	112012	2015-05-28	2016-05-27
Signal Generator	R&S	SMR20	100047	2015-05-28	2016-05-27

9.4 Test Procedure

KDB 971168 D01 Power Meas License Digital Systems v02r02

7.0 Field Strength of Spurious Radiation

Spurious attenuation limit in dB = $43 + 10 \log_{10}$ (power out in Watts)

Calculated limit = -13 dBm.

9.5 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	52%
ATM Pressure:	1012 mbar

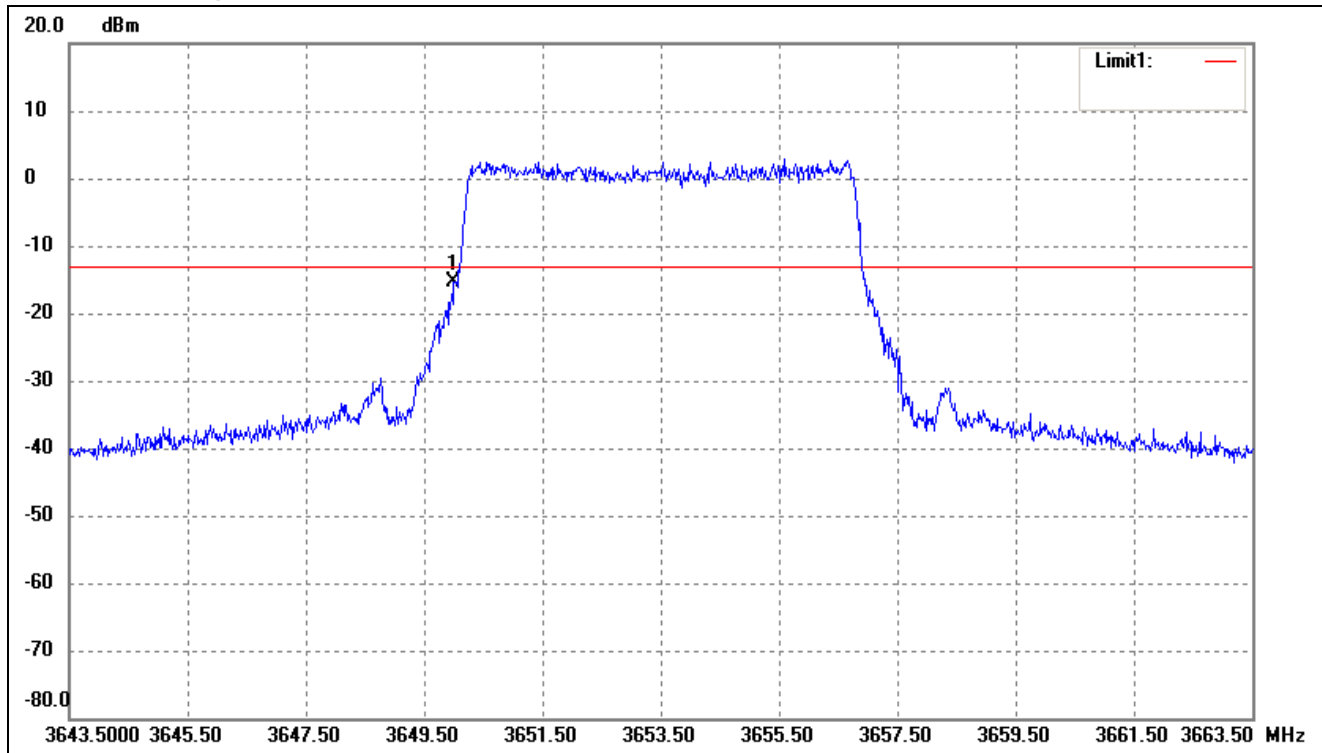
9.6 Summary of Test Results/Plots

According to the data below, the FCC Part § 90.1323 standards, and had the worst margin of:

All test modes are performed, but only the worst case (Antenna 0) is recorded in this report.

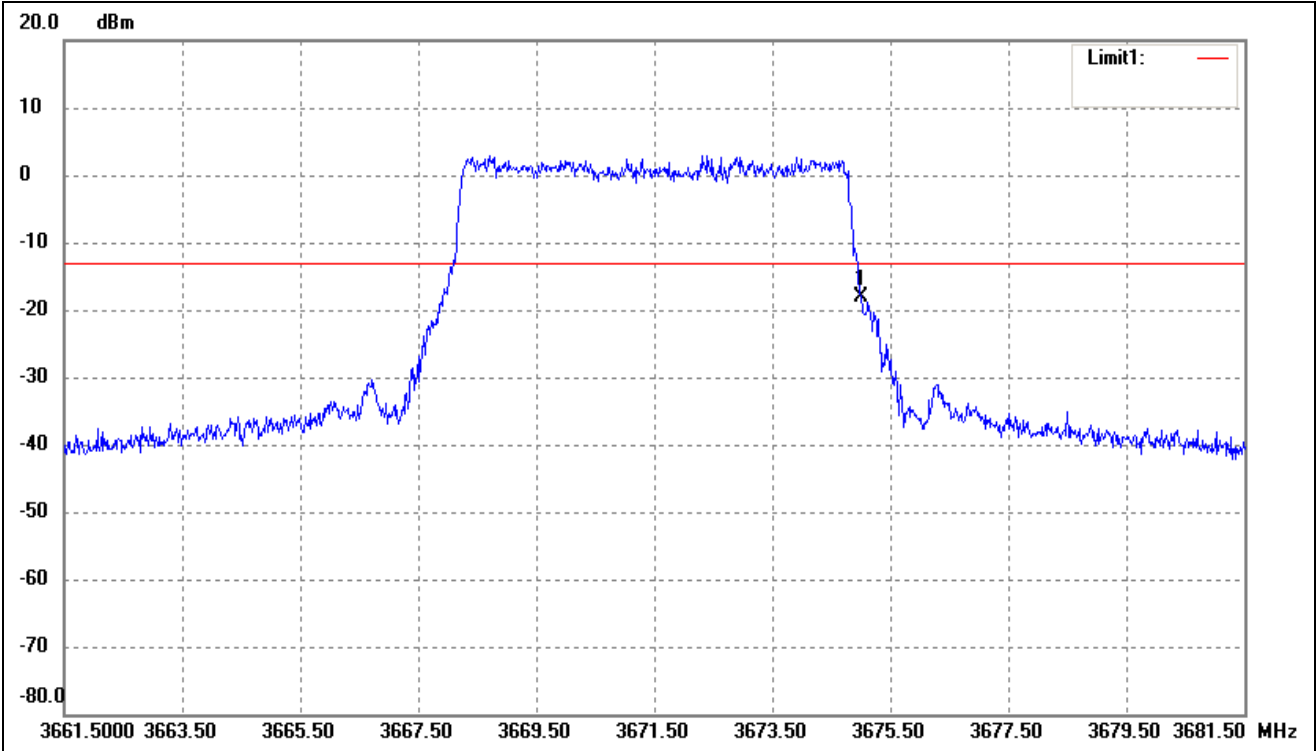
7MHz Bandwidth

Lower Band Edge



No.	Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	3650.000	-21.46	6.18	-15.28	-13.00	-2.28	EIRP

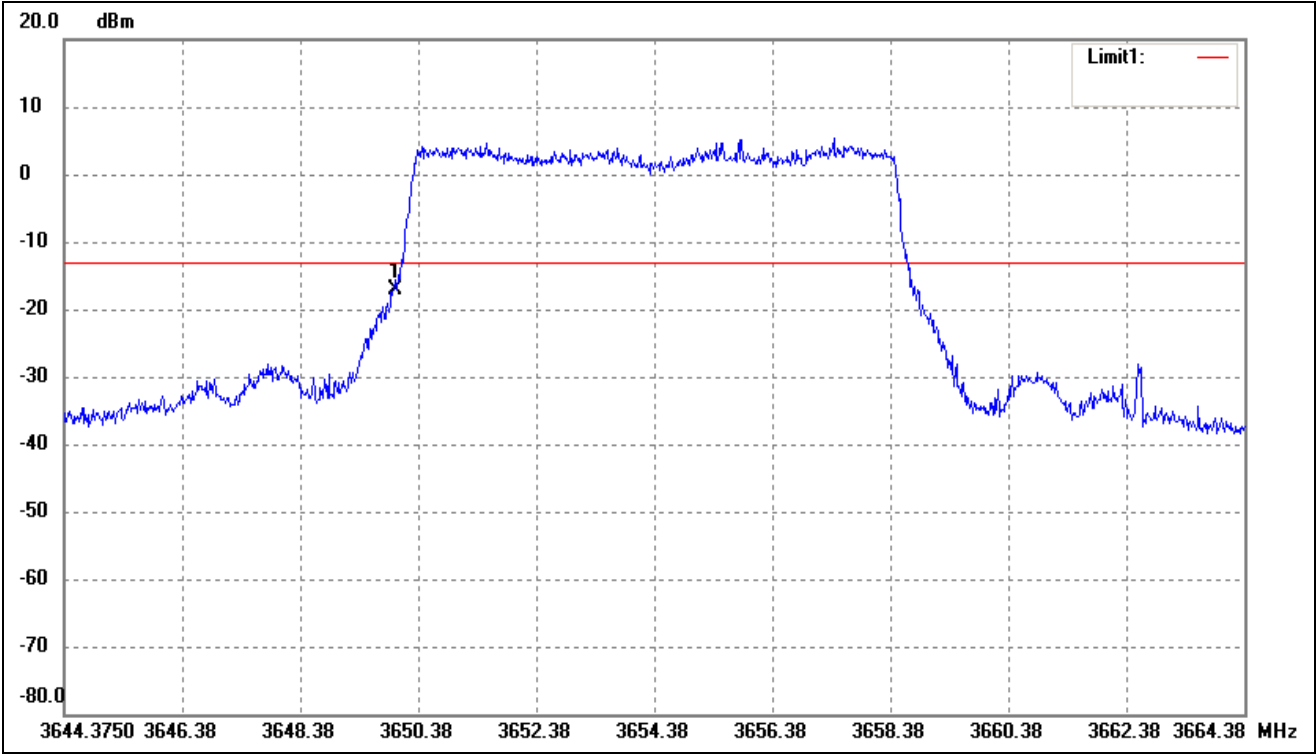
Upper Band Edge



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	
1	3675.000	-24.38	6.21	-18.17	-13.00	-5.17	EIRP

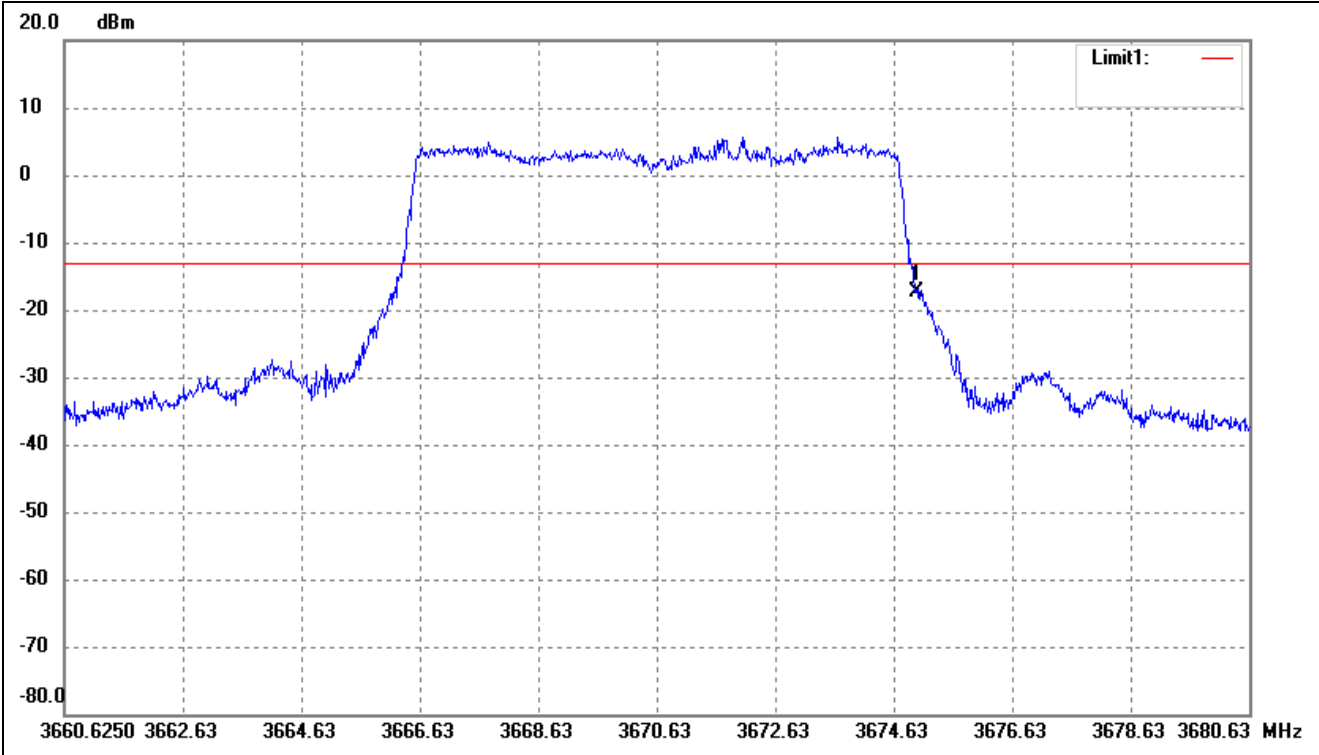
8.75MHz Bandwidth

Lower Band Edge



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	
1	3650.000	-23.31	6.18	-17.13	-13.00	-4.13	EIRP

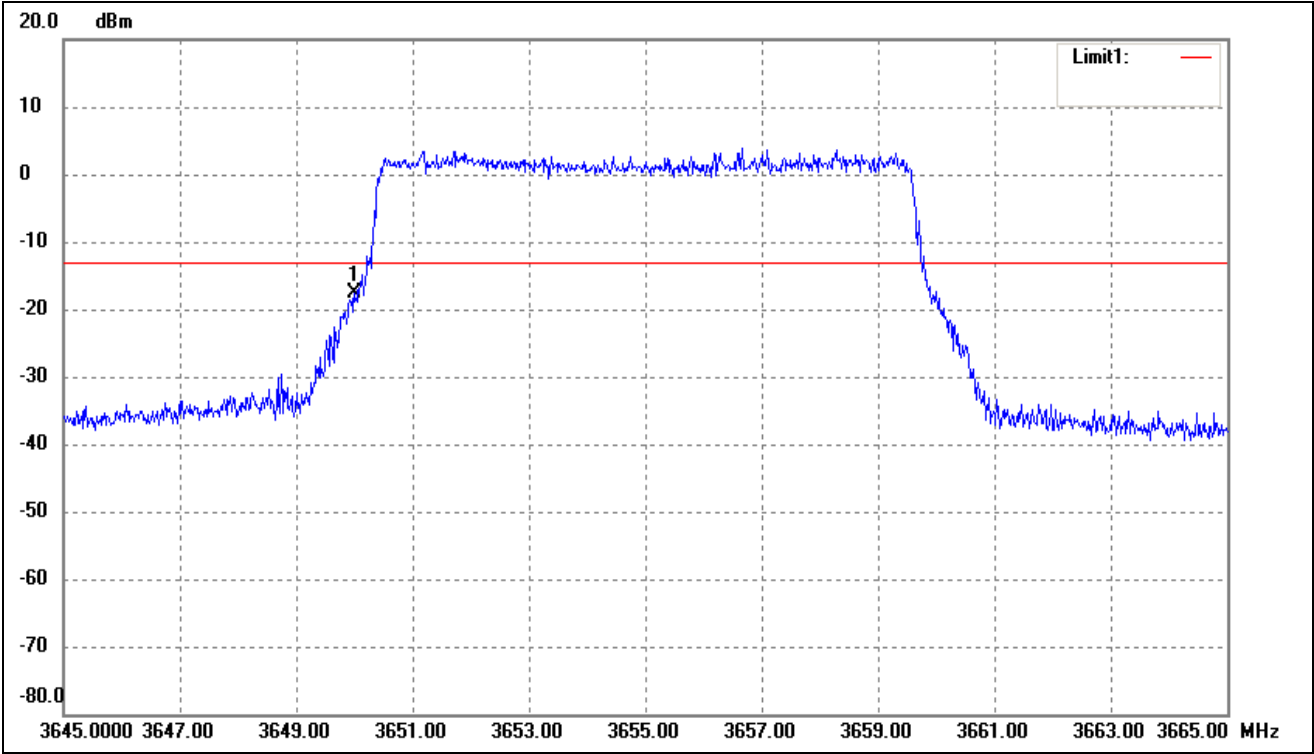
Upper Band Edge



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	
1	3675.000	-23.47	6.21	-17.26	-13.00	-4.26	EIRP

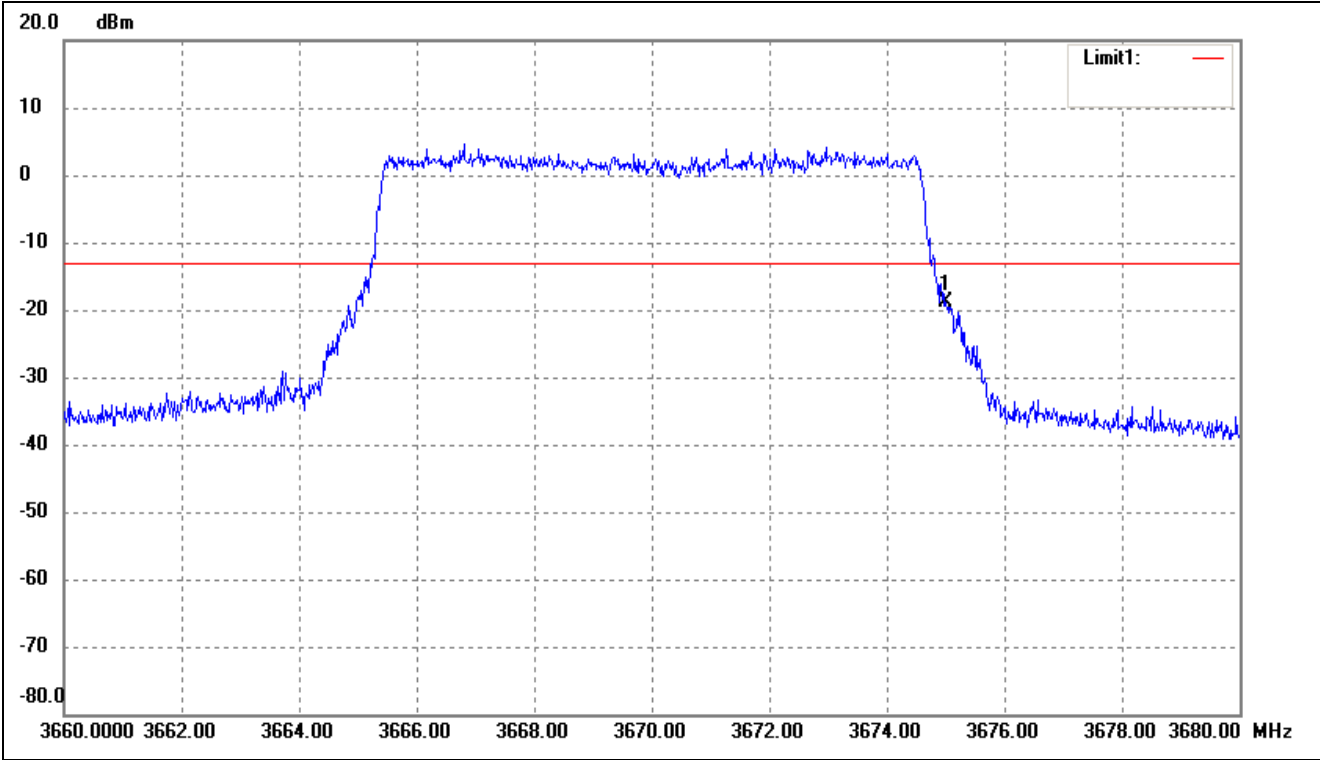
10MHz Bandwidth

Lower Band Edge



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	
1	3650.000	-23.86	6.18	-17.68	-13.00	-4.68	EIRP

Upper Band Edge



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	
1	3675.000	-25.13	6.21	-18.92	-13.00	-5.92	EIRP

10. Frequency Stability

10.1 Standard Applicable

According to §90.213, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table below:

Minimum Frequency Stability for Fixed and base station

Frequency range (MHz)	Fixed and base stations	Mobile stations	
		Over 2 watts output power	2 watts or less output power
Below 25	^{1 2 3} 100	100	200
25-50	20	20	50
72-76	5		50
150-174	^{5 11} 5	⁶ 5	^{4 6} 50
216-220	1.0		1.0
220-222 ¹²	0.1	1.5	1.5
421-512	^{7 11 14} 2.5	⁸ 5	⁸ 5
806-809	¹⁴ 1.0	1.5	1.5
809-824	¹⁴ 1.5	2.5	2.5
851-854	1.0	1.5	1.5
854-869	1.5	2.5	2.5
896-901	¹⁴ 0.1	1.5	1.5
902-928	2.5	2.5	2.5
902-928 ¹³	2.5	2.5	2.5
929-930	1.5		
935-940	0.1	1.5	1.5
1427-1435	⁹ 300	300	300
Above 2450 ¹⁰			

10.2 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Aglient	Spectrum Analyzer	E4407B	MY41440400	2015-05-28	2016-05-27
GONGWEN	Moisture Test Chamber	GDS-150	SEMT-0013	2015-05-28	2016-05-27

10.3 Test Procedure

According to §2.1055, the following test procedure was performed.

The Frequency Stability is measured directly with a Frequency Domain Analyzer. Frequency Deviation in ppm is calculated from the measured peak to peak value.

The Carrier Frequency Stability over Power Supply Voltage and over Temperature is measured with a Frequency Domain Analyzer in histogram mode

Temperature:	Supply Voltage
20°C	85-115% of declared nominal voltage
-30°C to +50°C	Normal

10.4 Environmental Conditions

Temperature:	20°C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

10.5 Summary of Test Results/Plots

For 7MHz Bandwidth

Reference Frequency(Middle Channel): 3662.5 MHz			
Environment Temperature (°C)	Power Supplied (VAC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	120	121	0.0330
40	120	118	0.0322
30	120	116	0.0317
20	120	124	0.0339
10	120	136	0.0371
0	120	141	0.0385
-10	120	133	0.0363
-20	120	128	0.0349
-30	120	144	0.0393

For 8.75MHz Bandwidth

Reference Frequency(Middle Channel): 3662.5 MHz			
Environment Temperature (°C)	Power Supplied (VAC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	120	141	0.0385
40	120	145	0.0396
30	120	141	0.0385
20	120	131	0.0358
10	120	148	0.0404
0	120	152	0.0415
-10	120	158	0.0431
-20	120	151	0.0412
-30	120	149	0.0407

For 10MHz Bandwidth

Reference Frequency(High Channel): 3662.5 MHz			
Environment Temperature (°C)	Power Supplied (VAC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	120	148	0.0404
40	120	149	0.0407
30	120	151	0.0412
20	120	144	0.0393
10	120	151	0.0412
0	120	156	0.0426
-10	120	161	0.0440
-20	120	154	0.0420
-30	120	160	0.0437

So, Frequency Stability Versus Input Voltage is:

For 7MHz Bandwidth

Reference Frequency(Middle Channel): 3662.5 MHz			
Environment Temperature (°C)	Power Supplied (VAC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	102	139	0.0380
	120	136	0.0371
	138	133	0.0363

For 8.75MHz Bandwidth

Reference Frequency(Middle Channel): 3662.5 MHz			
Environment Temperature (°C)	Power Supplied (VAC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	102	152	0.0415
	120	148	0.0404
	138	146	0.0399

For 10MHz Bandwidth

Reference Frequency(Middle Channel): 3675 MHz			
Environment Temperature (°C)	Power Supplied (VAC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	102	155	0.0423
	120	151	0.0412
	138	158	0.0431

******* END OF REPORT *******