

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: A28AIRMMASTER4000D

FCC Rules:	<u>FCC Part 90Z</u>
Product Description:	<u>LTE Outdoor CPE</u>
Tested Model:	<u>AirMaster 4000D</u>
Report No.:	<u>STR15038046I-1</u>
Tested Date:	<u>2015-03-09 to 2014-05-06</u>
Issued Date:	<u>2015-05-07</u>
Tested By:	<u>Seven Song / Engineer</u> <i>Seven Song</i>
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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:	LTE Outdoor CPE
Brand Name:	AirMaster
Model No.:	AirMaster 4000D
Adding Model:	WF820, WF820+, AirMaster 4000X, AM4000D, AM4000x (x – any character), WF820x (x – any character) TLRD-UE-xxx (x – any character)
IMEI:	864423020016878
Rated Voltage:	DC 48V Adapter by PoE port
Device Category:	Fixed
Adapter Model:	G0549-480-032 (Input: AC100-240V; Output: DC48V)
<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 AirMaster 4000D, 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:	5MHz, 10MHz, 15MHz, 20MHz
Frequencies Range:	5MHzBandwidth: 3652.5~3672.5MHz 10MHzBandwidth: 3655~3670MHz 15MHzBandwidth: 3657.5~3667.5MHz 20MHzBandwidth: 3660~3670MHz
Type of Modulation:	OFDM (Worst Case QPSK)
Type of Emission:	5M0X1D, 10M0X1D, 15M0X1D, 20M0X1D
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	5MHzBandwidth	3652.5, 3662.5, 3672.5MHz
TM2	10MHzBandwidth	3655, 3662.5, 3670MHz
TM3	15MHzBandwidth	3657.5,3667.5MHz
TM4	20MHzBandwidth	3660, 3665MHz

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	0.8	Unshielded	Without Core
RJ45	2.0	Unshielded	Without Core

Auxiliary Equipment List and Details

Description	Manufacturer	Model	Serial Number
PC	DELL	OPTIPLEX 380	/

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.

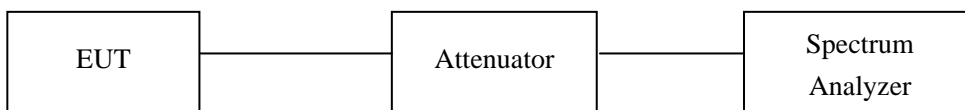
Duty cycle correction needed for special procedure for Output Power and Power Density test per the FCC accepted KDB procedure

4.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Aglient	Spectrum Analyzer	E4407B	MY41440400	2014-05-28	2015-05-27
Attenuator	ATTEN	ATS100-20-10	/	2014-05-28	2015-05-27

4.3 Test Procedure

Conducted output power test method:



Radiated power test method:

1. The setup of EUT is according with per KDB 971168 D01 v02r02 measurement procedure.
2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.
3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
4. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

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 1

Test Mode	Channel	EIRP/25 MHz (dBm)	FCC Part 90.1321 Limit (dBm/25MHz)	EIRP/MHz (dBm/MHz)	FCC Part 90.1321 Limit (dBm/MHz)
5MHz Bandwidth	Low Channel	32.63	44	26.92	30
	Middle Channel	32.43	44	26.45	30
	High Channel	32.34	44	26.33	30
10MHz Bandwidth	Low Channel	37.17	44	29.05	30
	Middle Channel	37.05	44	28.84	30
	High Channel	37.00	44	28.67	30
15MHz Bandwidth	Low Channel	37.17	44	27.26	30
	High Channel	36.89	44	27.13	30
20MHz Bandwidth	Low Channel	39.24	44	28.68	30
	High Channel	38.93	44	28.34	30

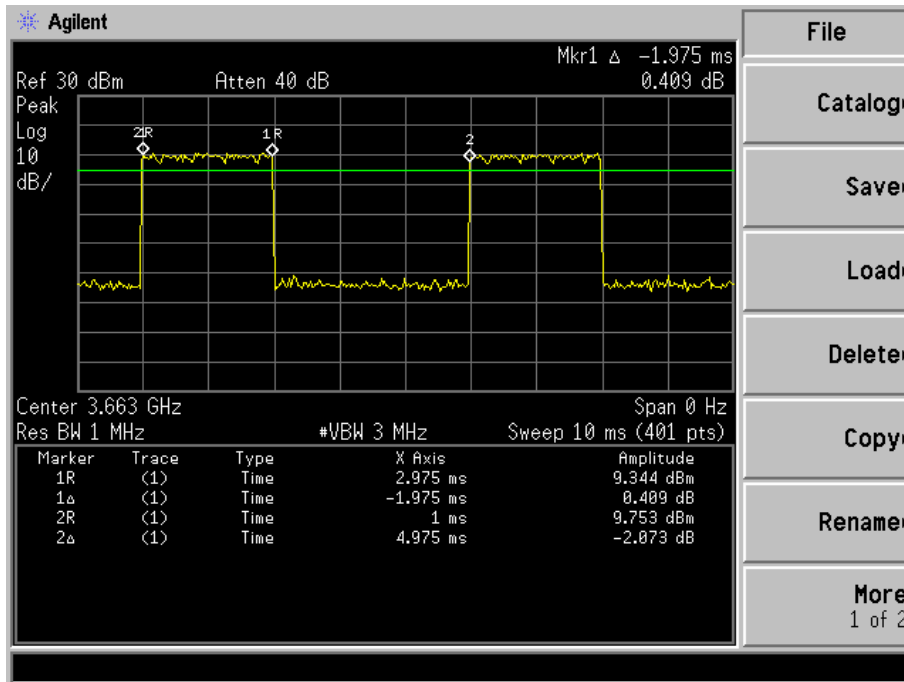
For Ant Port 0

Test Mode	Channel	EIRP/25 MHz (dBm)	FCC Part 90.1321 Limit (dBm/25MHz)	EIRP/MHz (dBm/MHz)	FCC Part 90.1321 Limit (dBm/MHz)
5MHz Bandwidth	Low Channel	32.51	44	26.67	30
	Middle Channel	32.24	44	26.36	30
	High Channel	32.16	44	26.11	30
10MHz Bandwidth	Low Channel	37.11	44	28.95	30
	Middle Channel	36.87	44	28.32	30
	High Channel	36.64	44	28.13	30
15MHz Bandwidth	Low Channel	37.08	44	27.16	30
	High Channel	36.43	44	26.87	30
20MHz Bandwidth	Low Channel	39.21	44	28.58	30
	High Channel	38.54	44	27.89	30

EIRP=Conducted RF Power+Correction(1/x)+Antenna Gain (x means Duty Cycle)

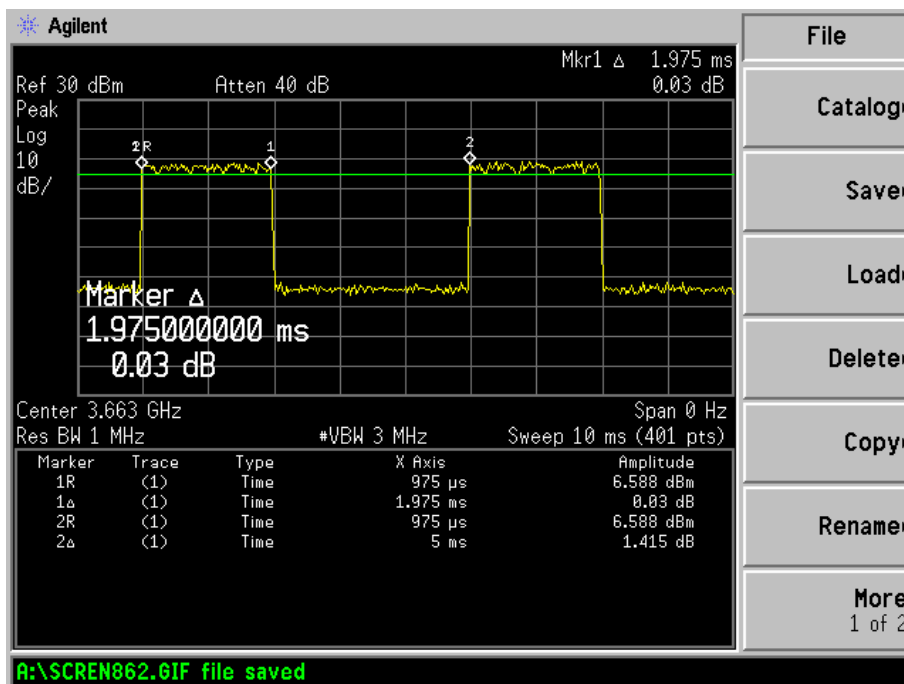
Antenna Gain=15 dBi

5MHz Bandwidth



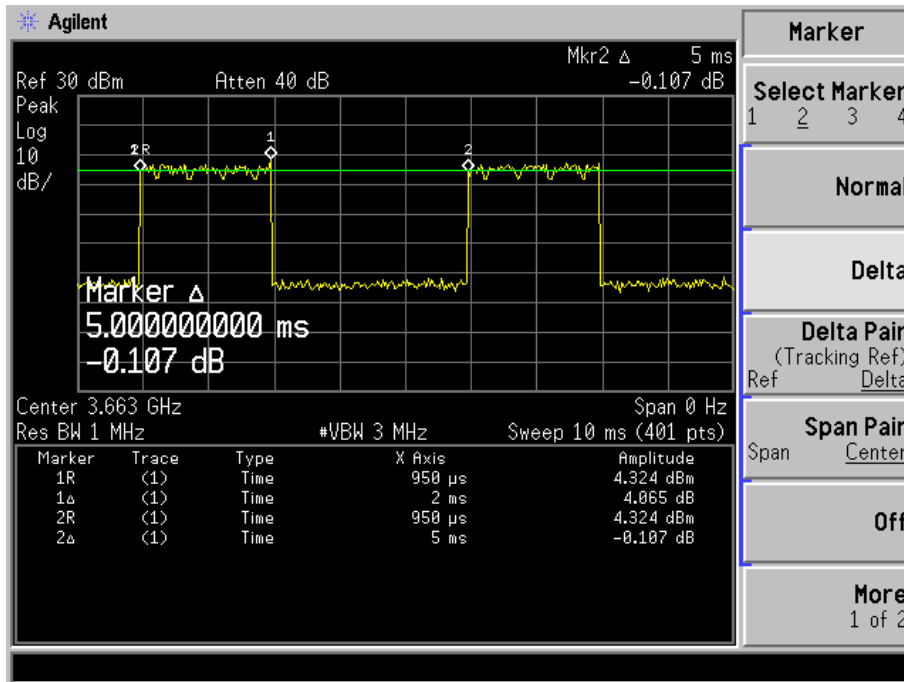
Duty cycle correction factor = $10\log(1/x) = 10\log(1/(1.975/4.975))=4.01$ dB

10MHz Bandwidth



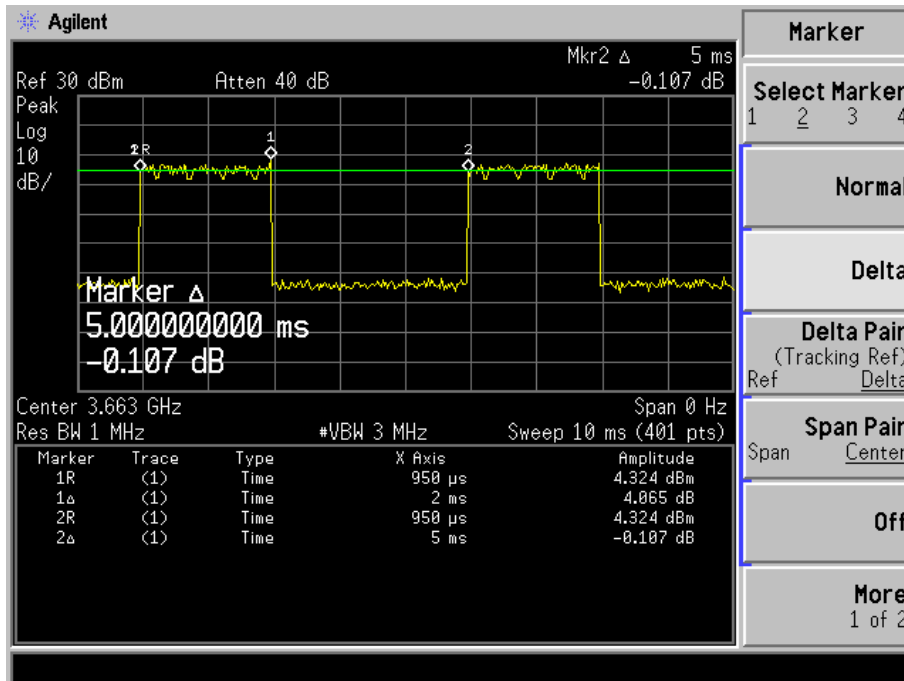
Duty cycle correction factor = $10\log(1/x) = 10\log(1/(1.975/5))=4.03$ dB

15MHz Bandwidth



Duty cycle correction factor = $10\log(1/x) = 10\log(1/(2/5))=3.98$ dB

20MHz Bandwidth



Duty cycle correction factor = $10\log(1/x) = 10\log(1/(2/5))=3.98$ dB

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

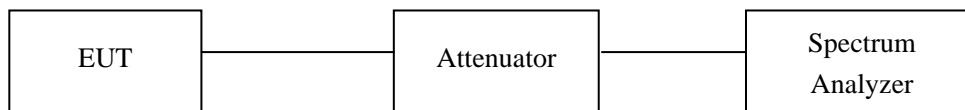
5.2 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Aglient	Spectrum Analyzer	E4407B	MY41440400	2014-05-28	2015-05-27
Attenuator	ATTEN	ATS100-20-10	/	2014-05-28	2015-05-27

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

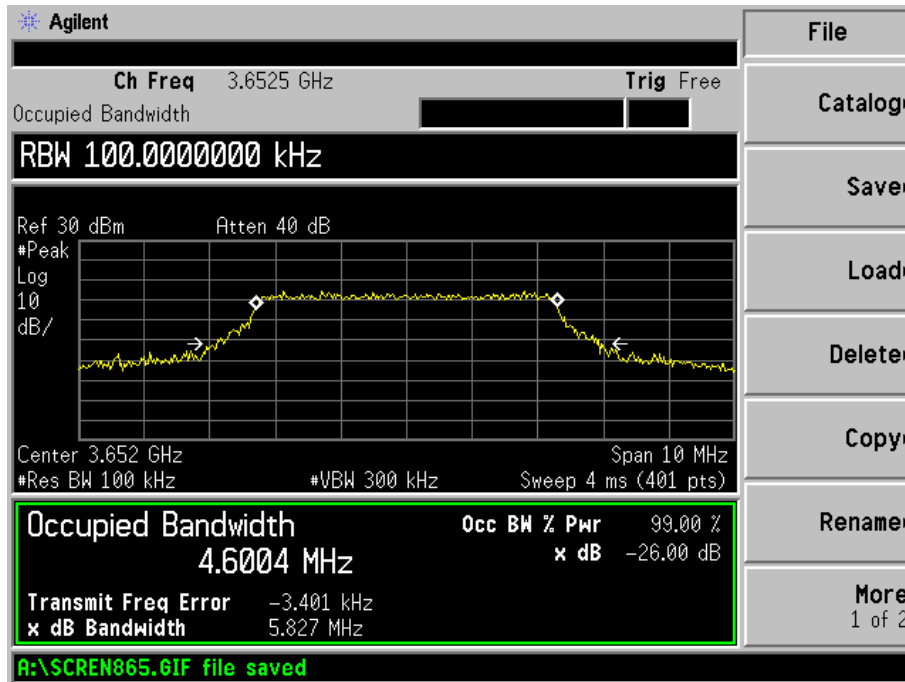
Temperature:	25 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

5.5 Summary of Test Results/Plots

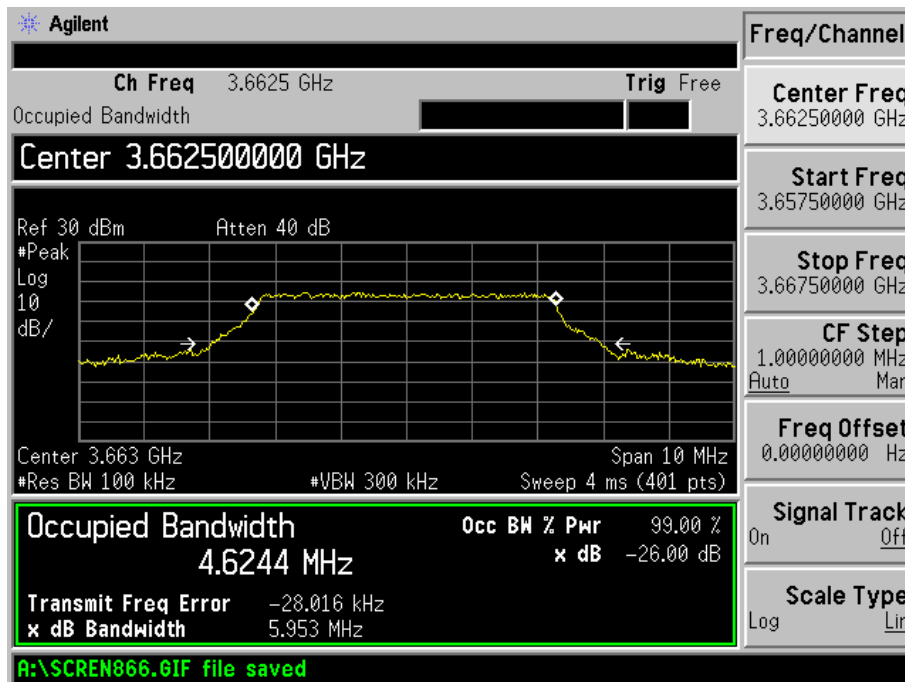
Test Mode	Channel	Occupied bandwidth Antenna Port 0	Occupied bandwidth Antenna Port 1
5MHz Bandwidth	Low Channel	4.6046	4.6004
	Middle Channel	4.5399	4.6244
	High Channel	4.5614	4.5302
10MHz Bandwidth	Low Channel	8.9290	8.9554
	Middle Channel	8.9740	8.9560
	High Channel	8.9490	8.9206
15MHz Bandwidth	Low Channel	13.6119	13.4982
	High Channel	13.5782	13.4791
20MHz Bandwidth	Low Channel	17.9042	17.9905
	High Channel	17.9285	17.9621

Only tested QPSK modulation mode as determined worst case by manufacturer

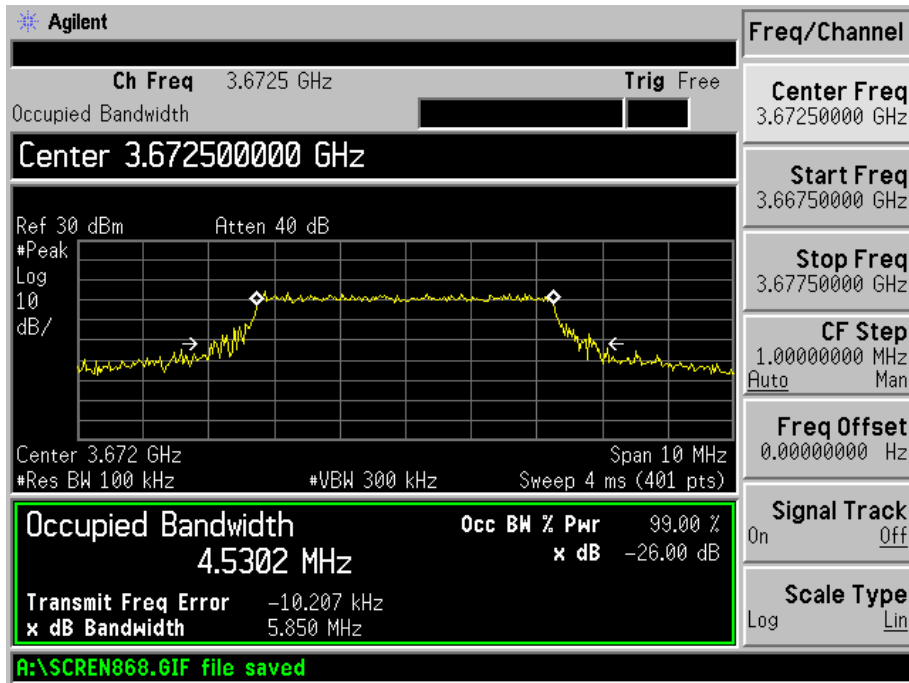
Ant Port 1
 5MHz Bandwidth
 Low Channel



Middle Channel

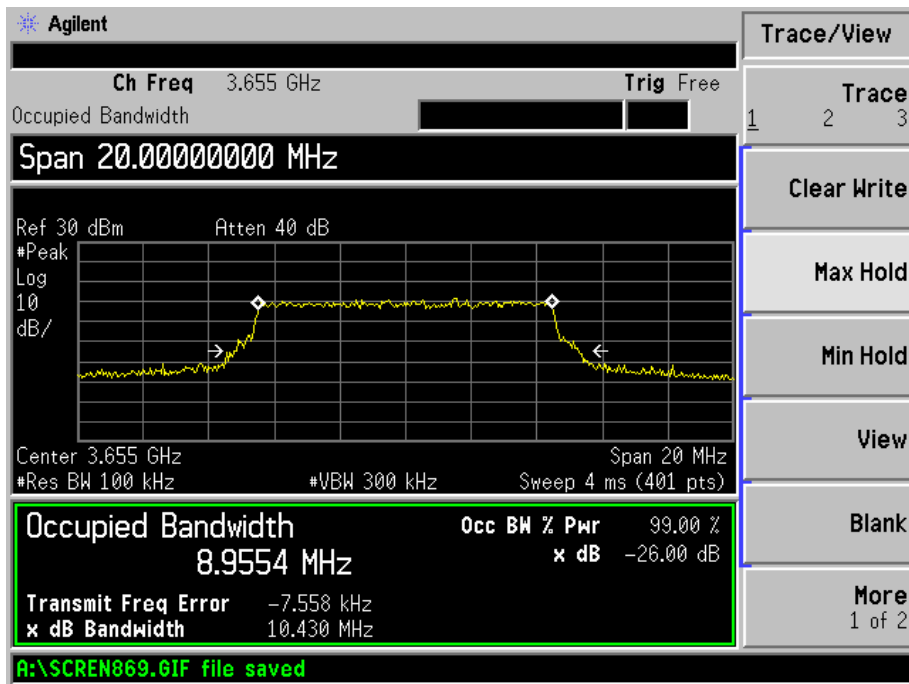


High Channel

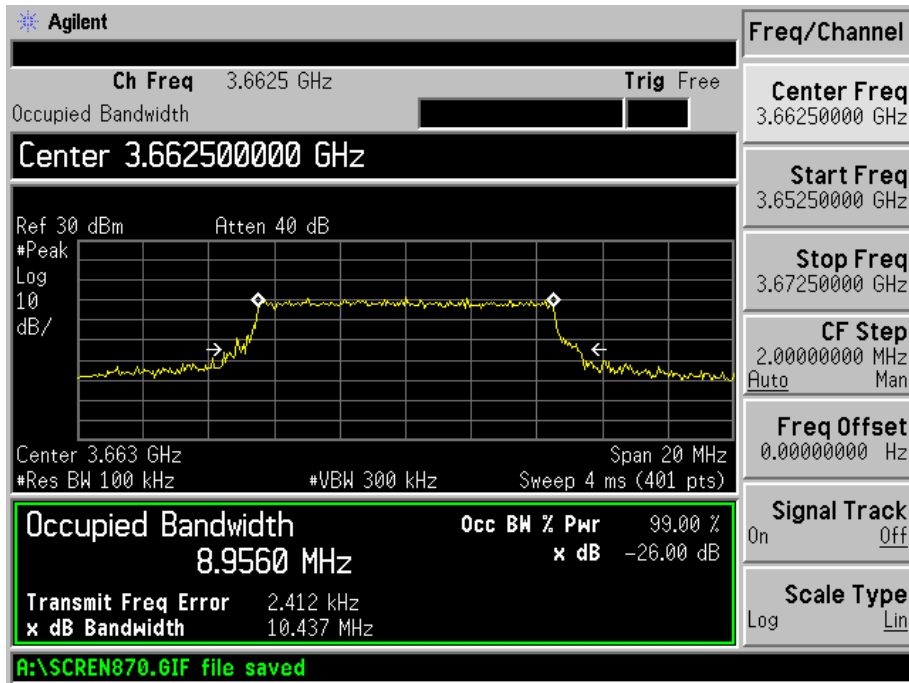


10MHz Bandwidth

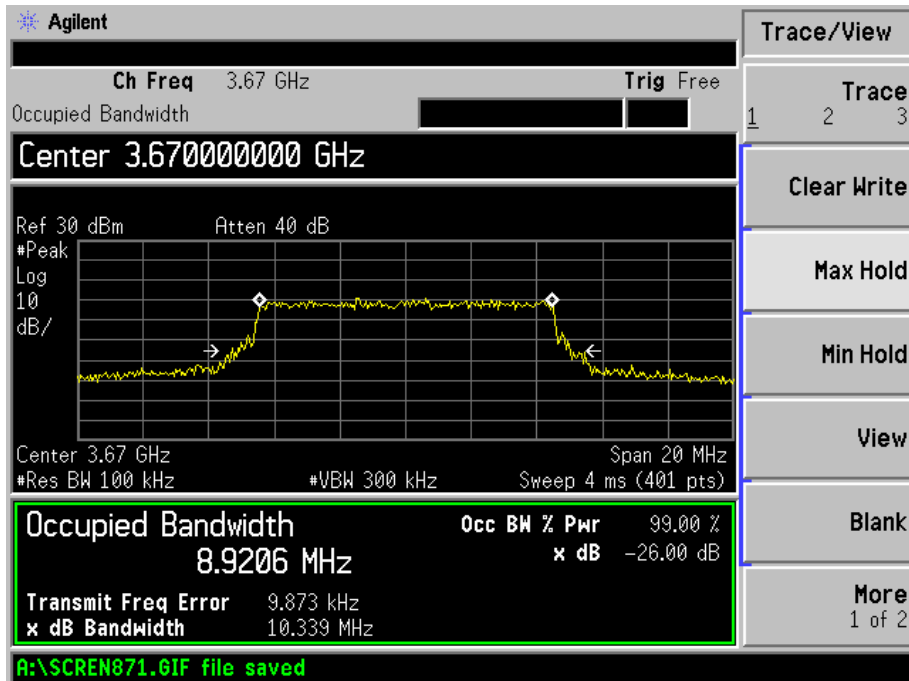
Low Channel



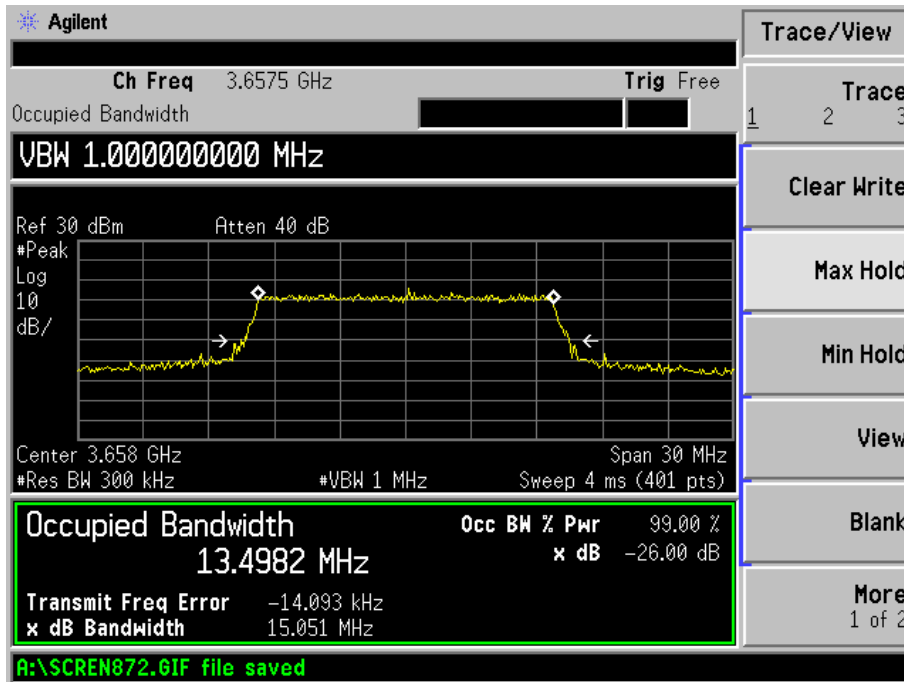
Middle Channel



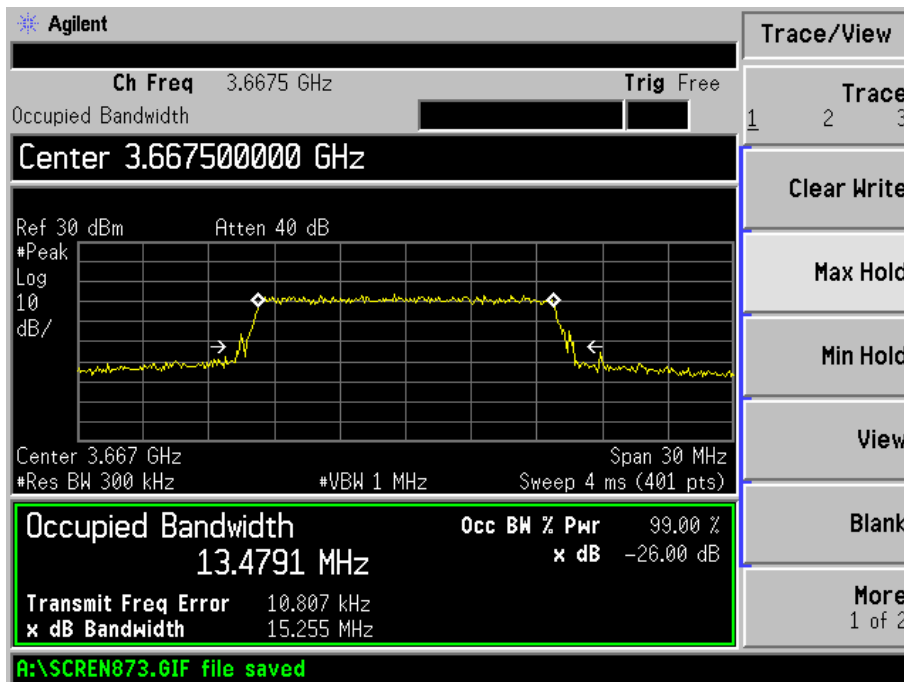
High Channel



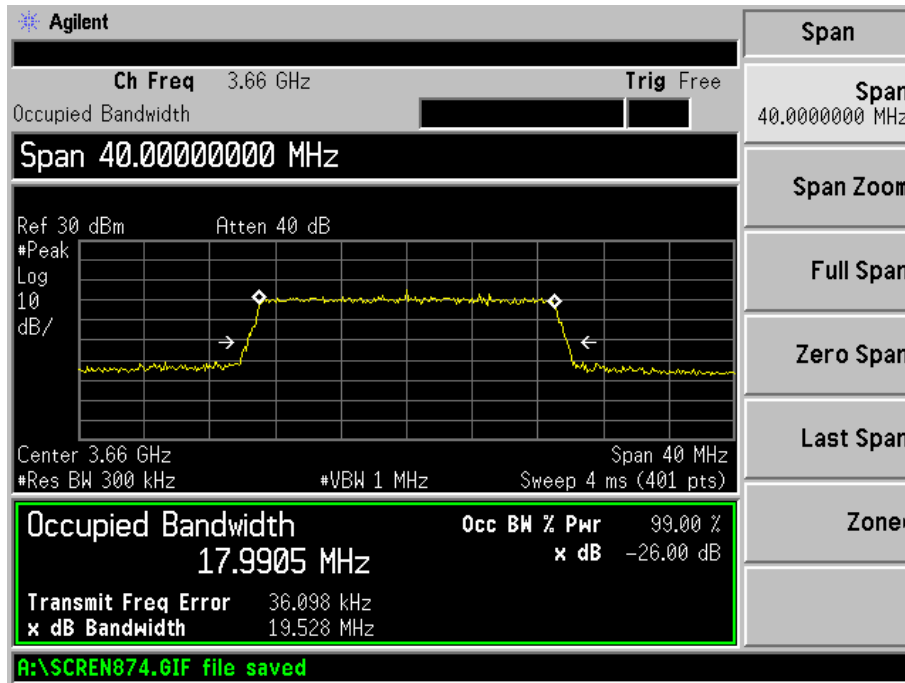
15MHz Bandwidth
Low Channel



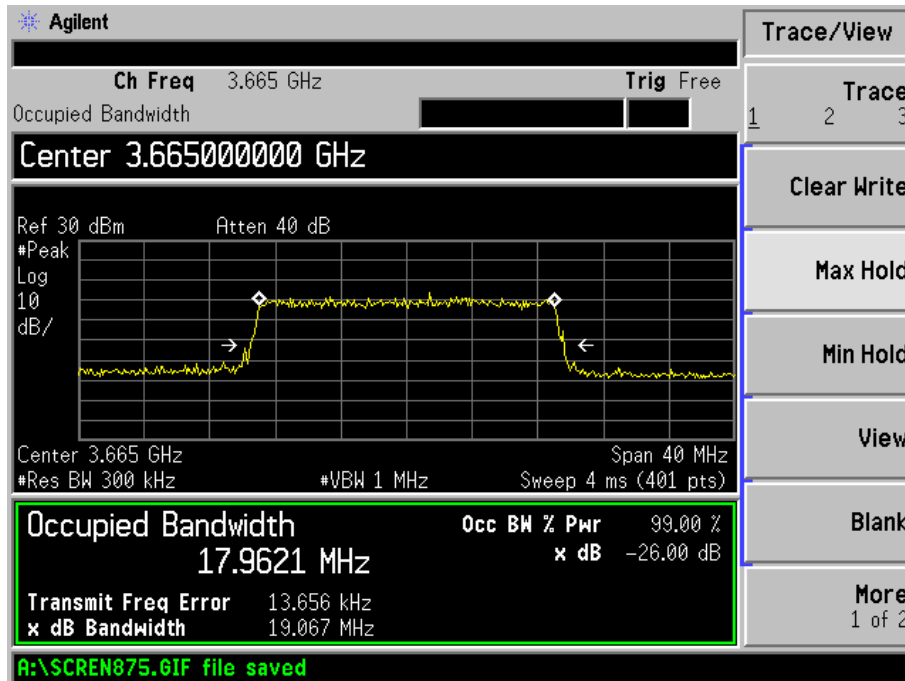
High Channel



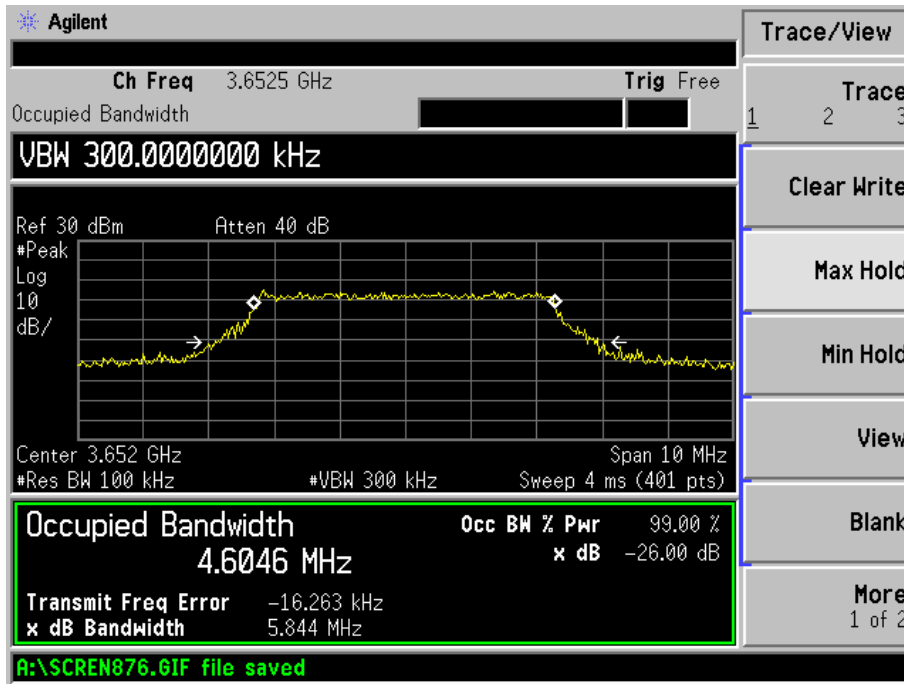
20MHz Bandwidth Low Channel



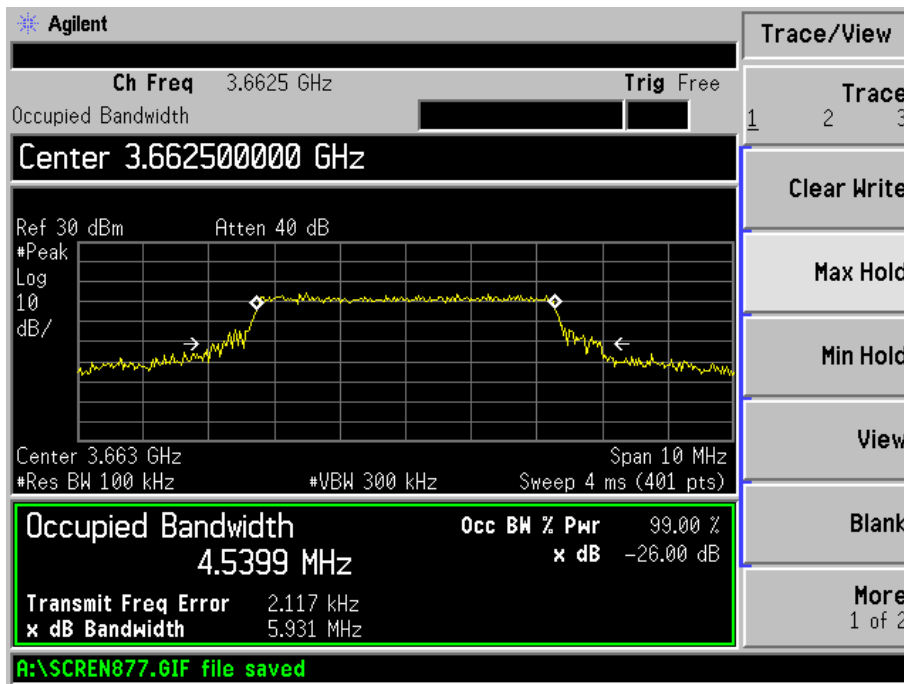
High Channel



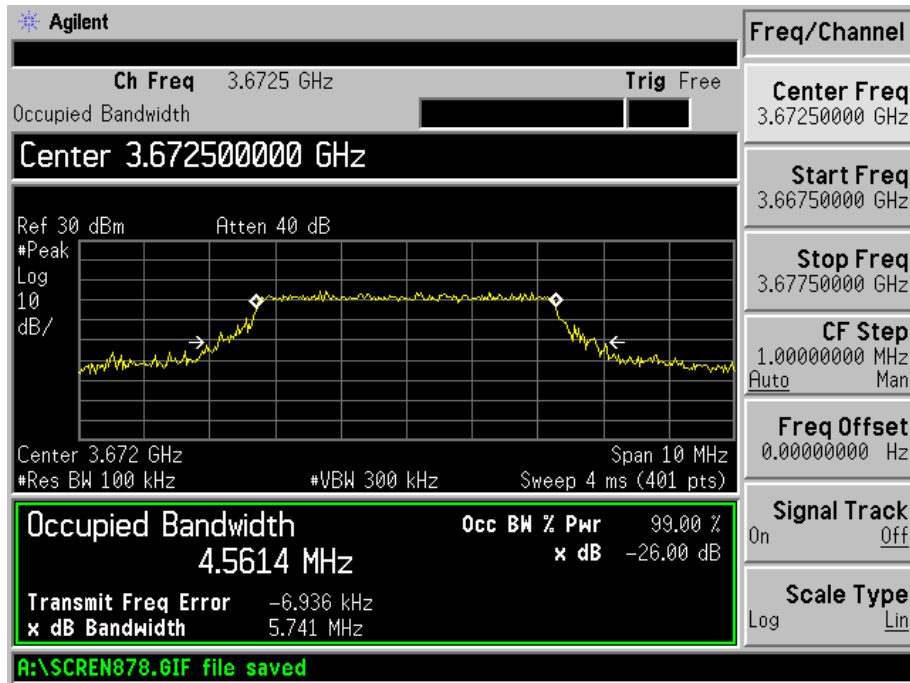
Ant Port 0
5MHz Bandwidth
Low Channel



Middle Channel

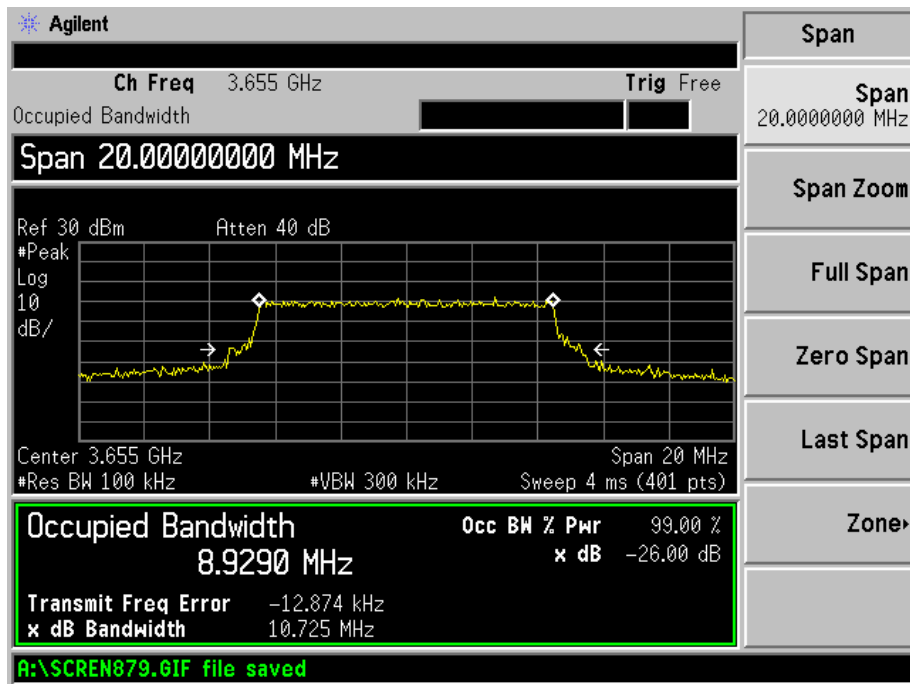


High Channel

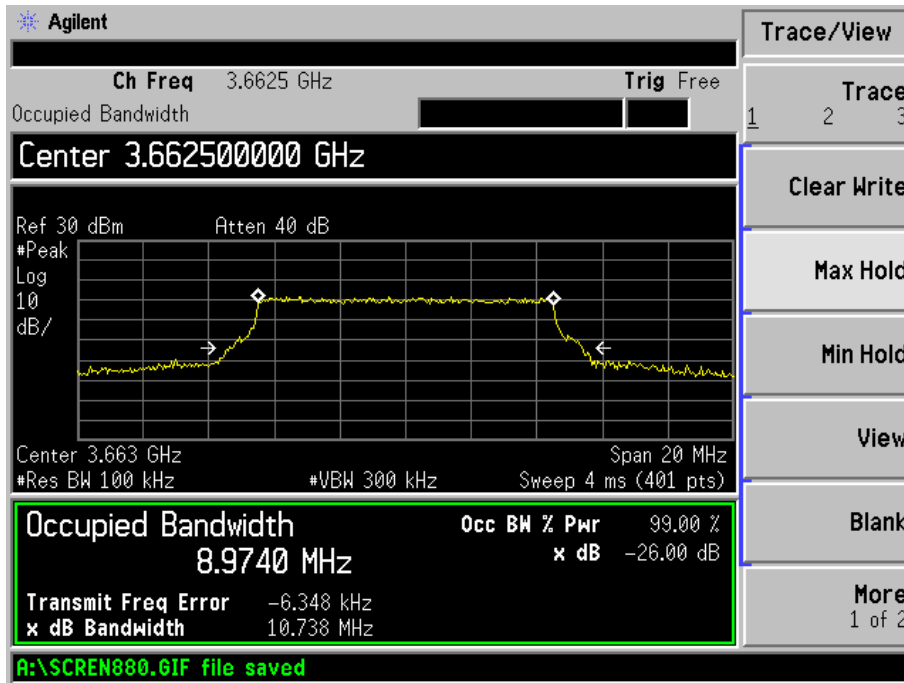


10MHz Bandwidth

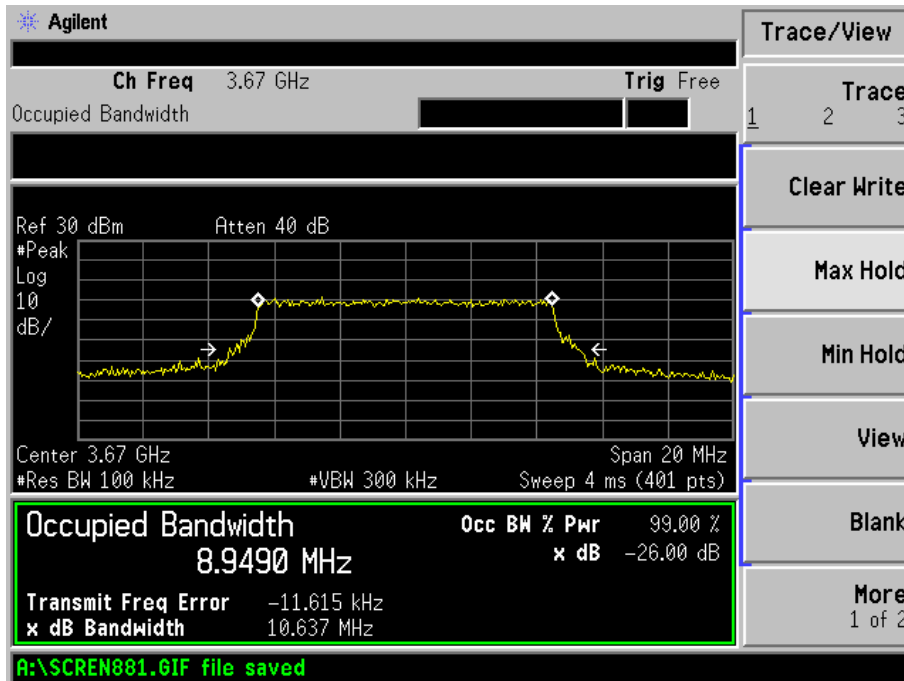
Low Channel



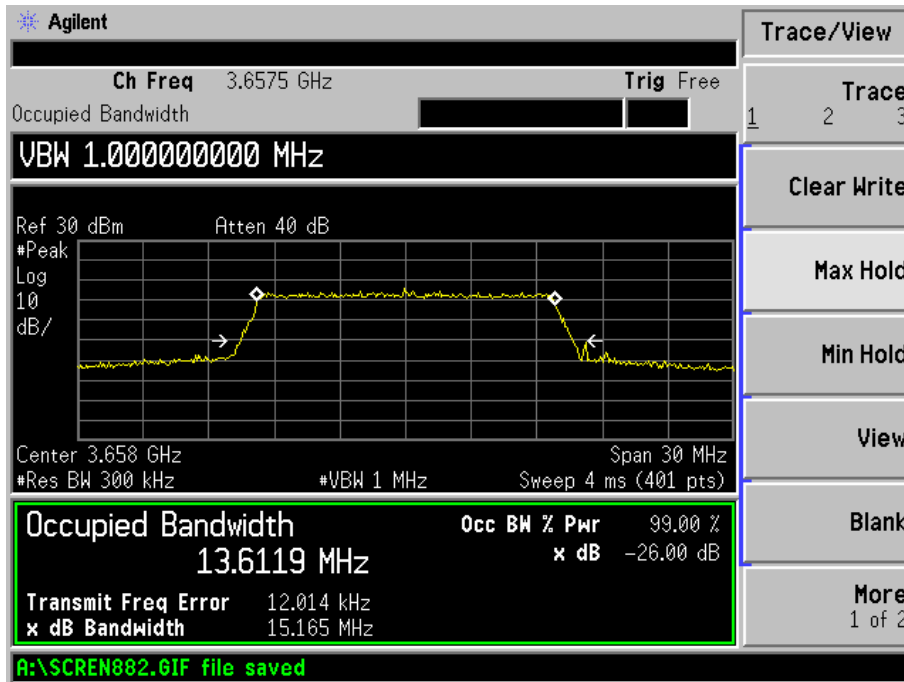
Middle Channel



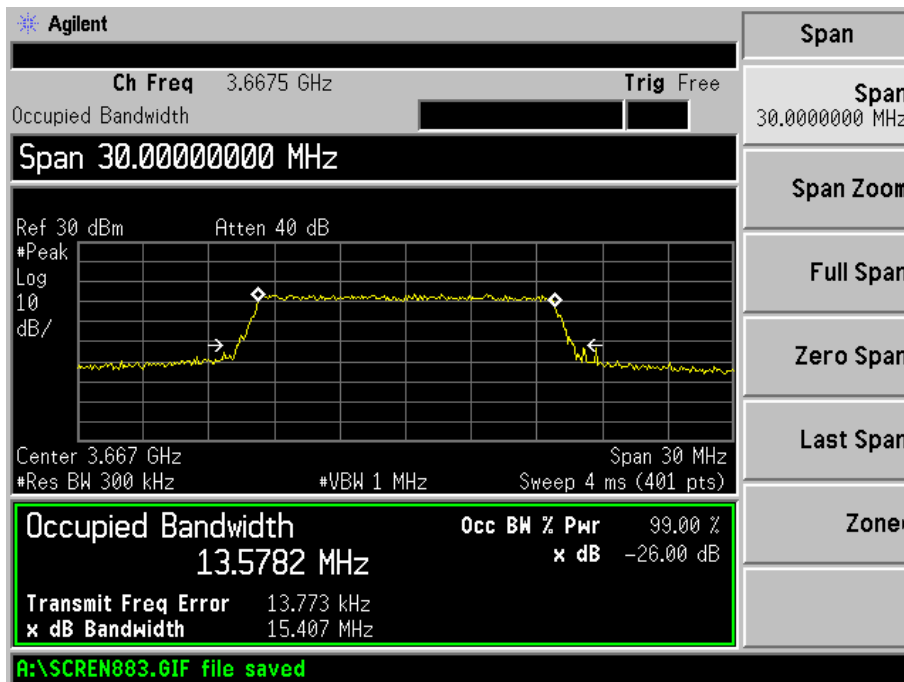
High Channel



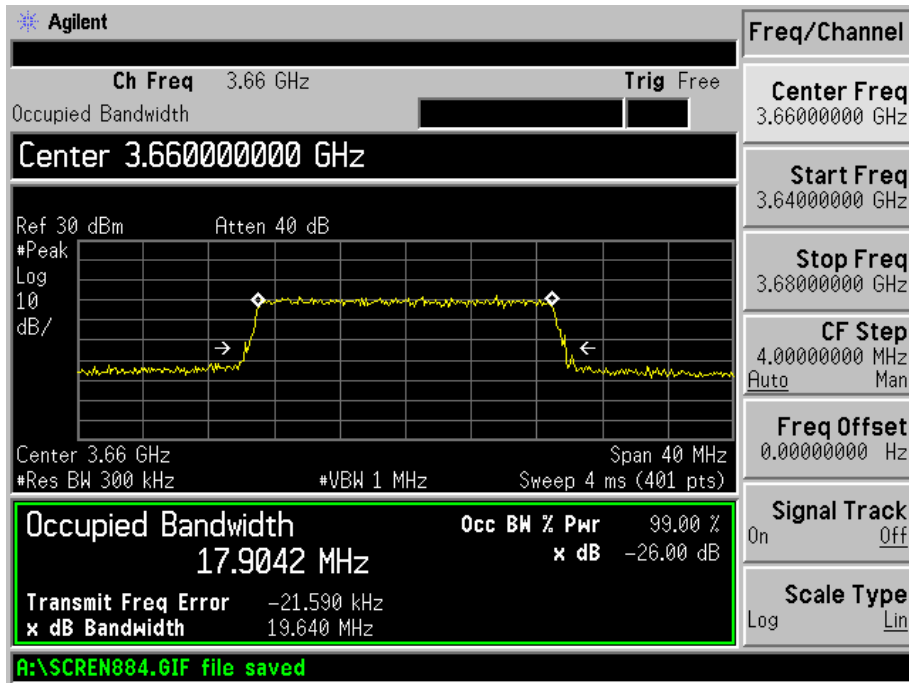
15MHz Bandwidth
Low Channel



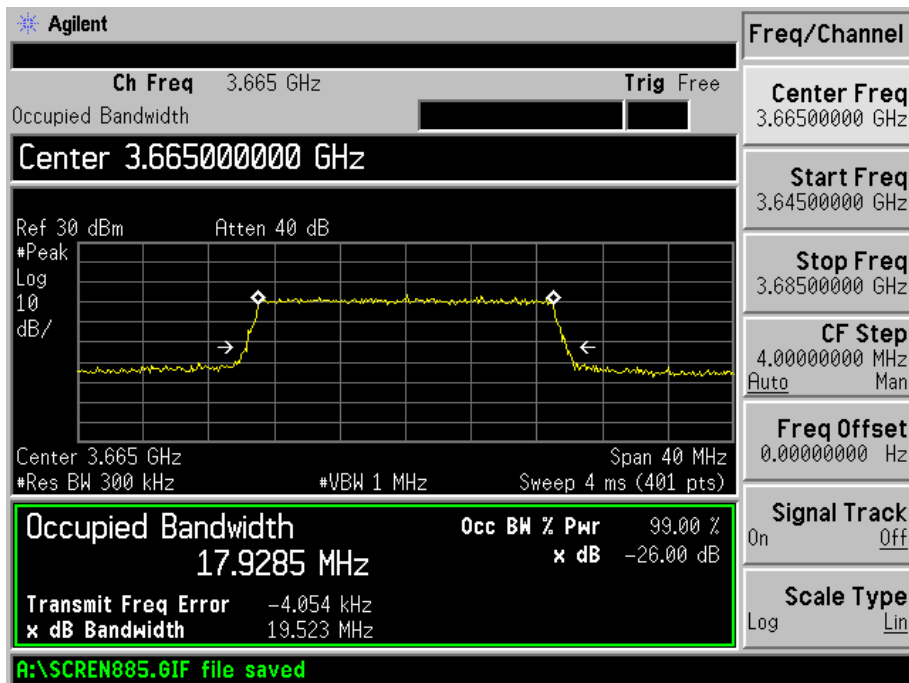
High Channel



20MHz Bandwidth Low 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

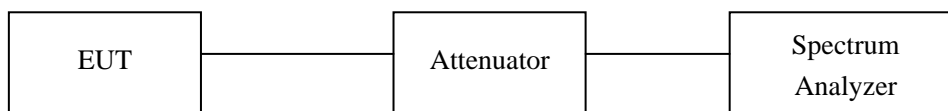
Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Aglient	Spectrum Analyzer	E4407B	US41192821	2014-05-28	2015-05-27
Rohde & Schwarz	Spectrum Analyzer	FSP40	836079/035	2014-05-28	2015-05-27
Attenuator	ATTEN	ATS100-20-10	/	2014-05-28	2015-05-27

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

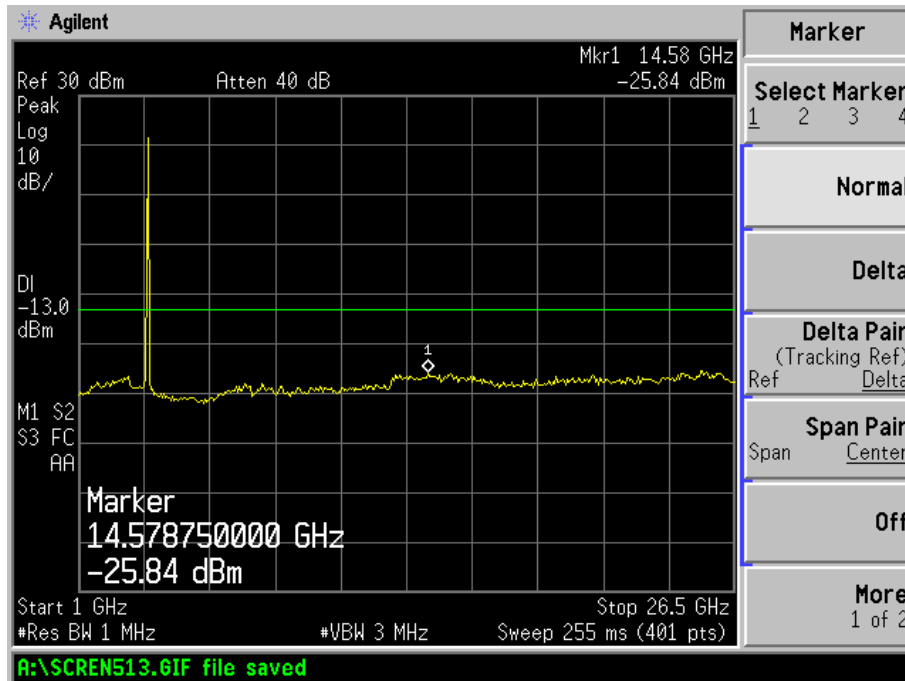
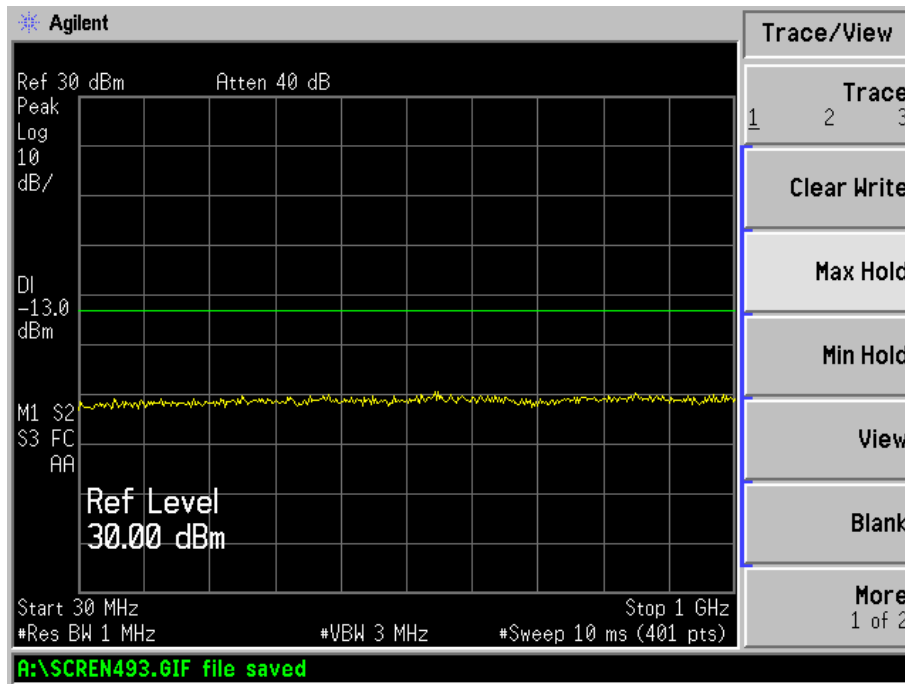
Temperature:	25 °C
Relative Humidity:	56%
ATM Pressure:	1018 mbar

6.5 Summary of Test Results/Plots

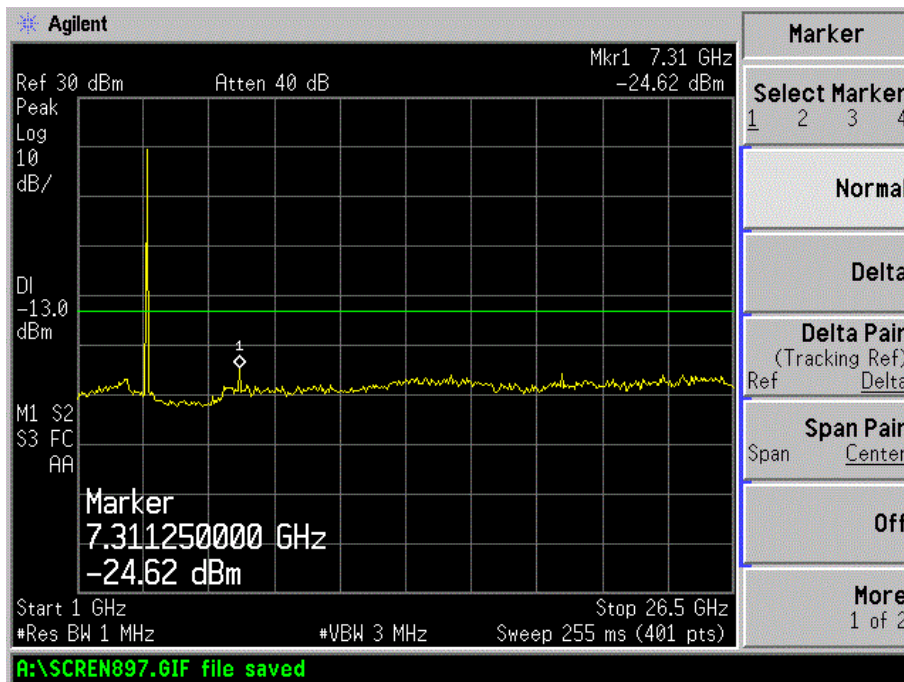
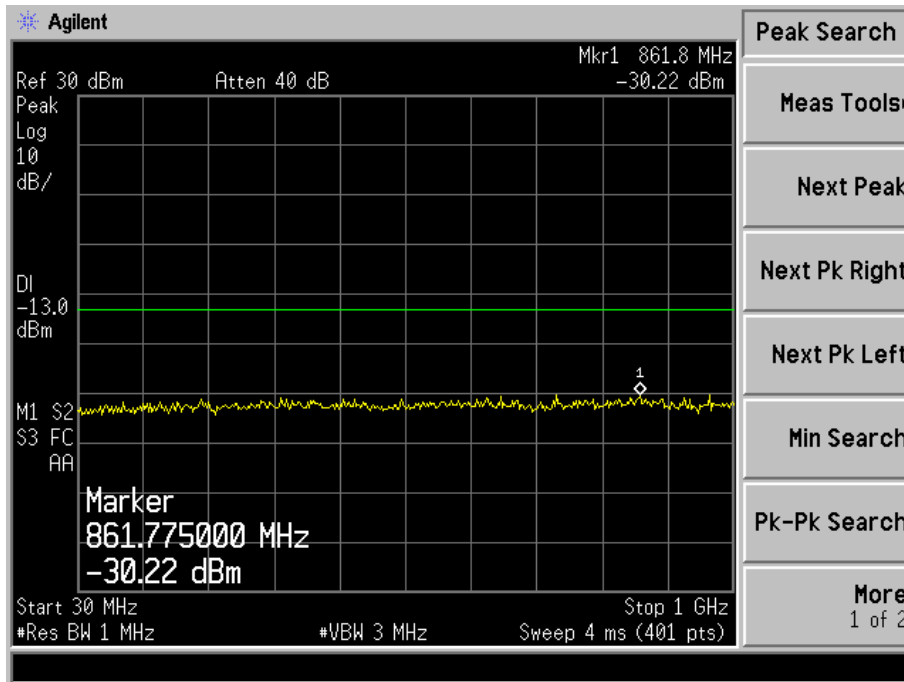
Calculated limit = -13 dBm.

Test Result: Pass

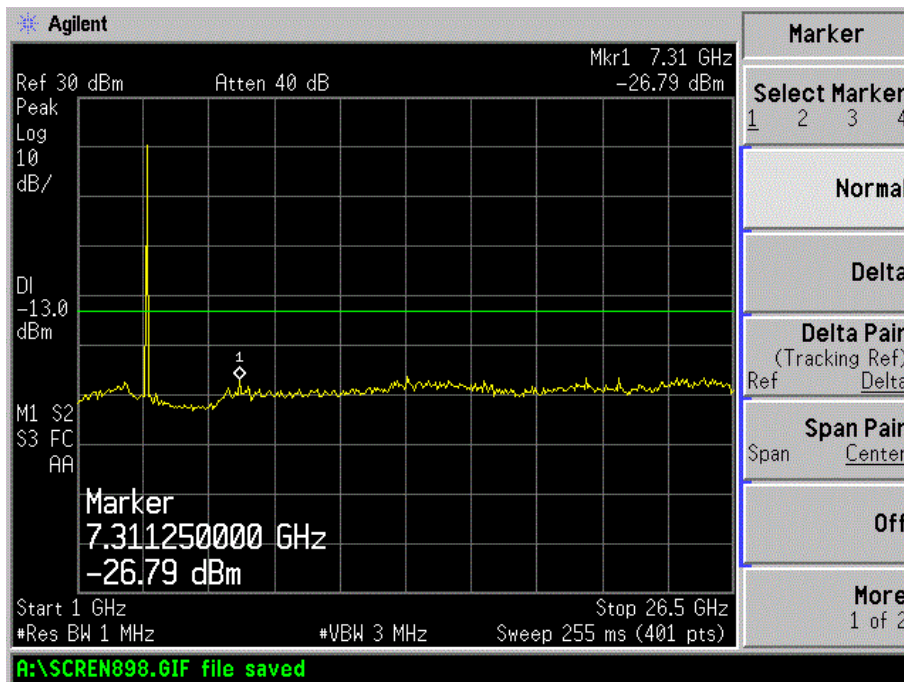
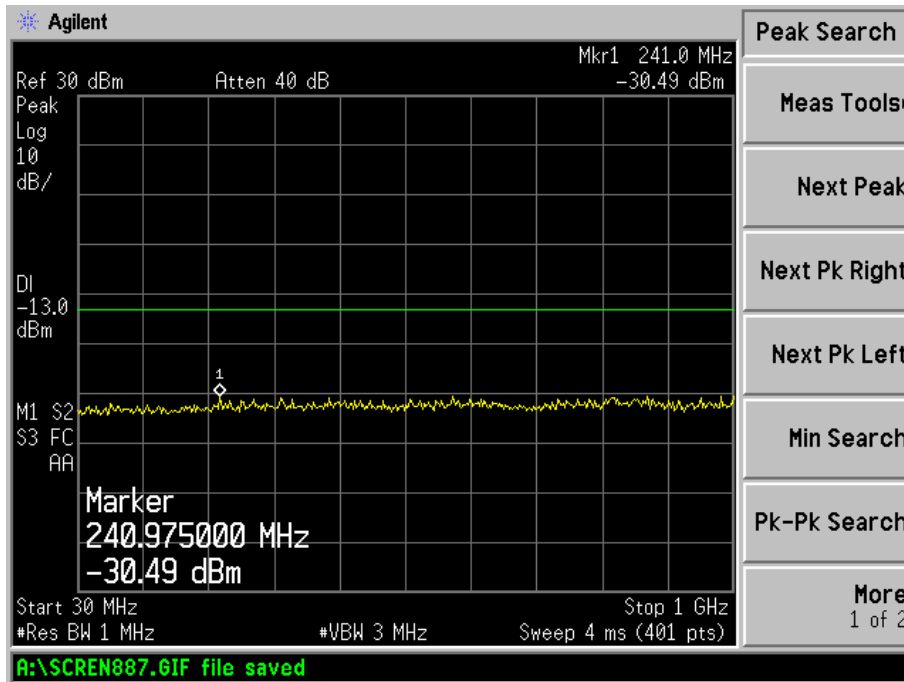
5MHz Bandwidth
Low Channel



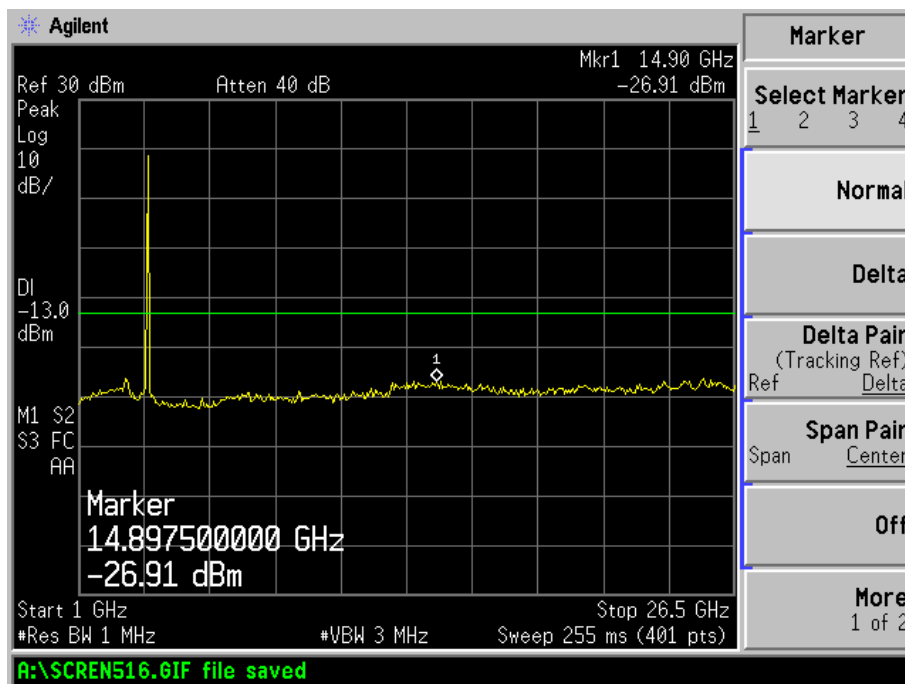
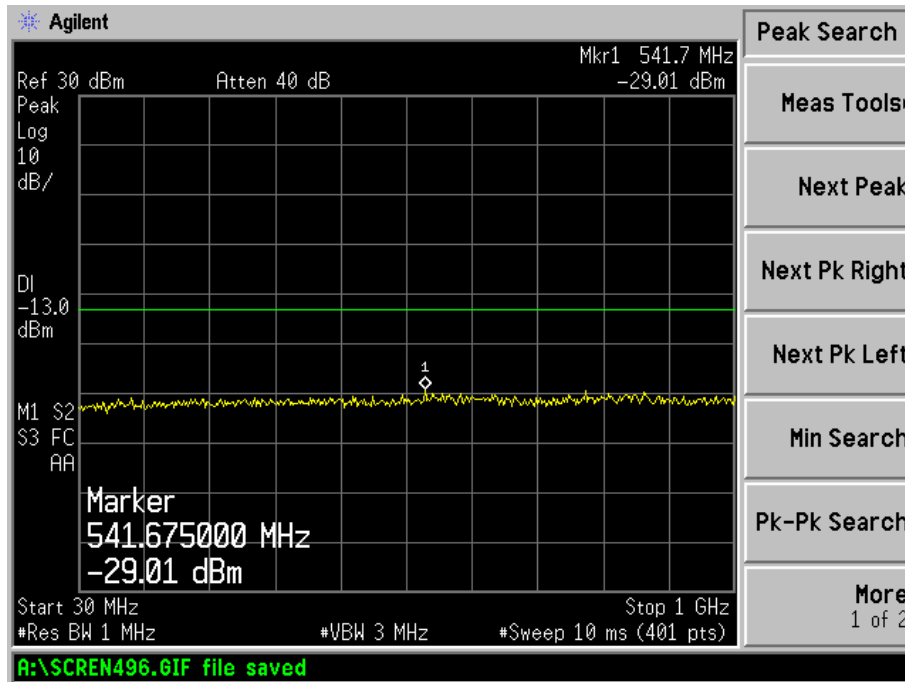
Middle Channel



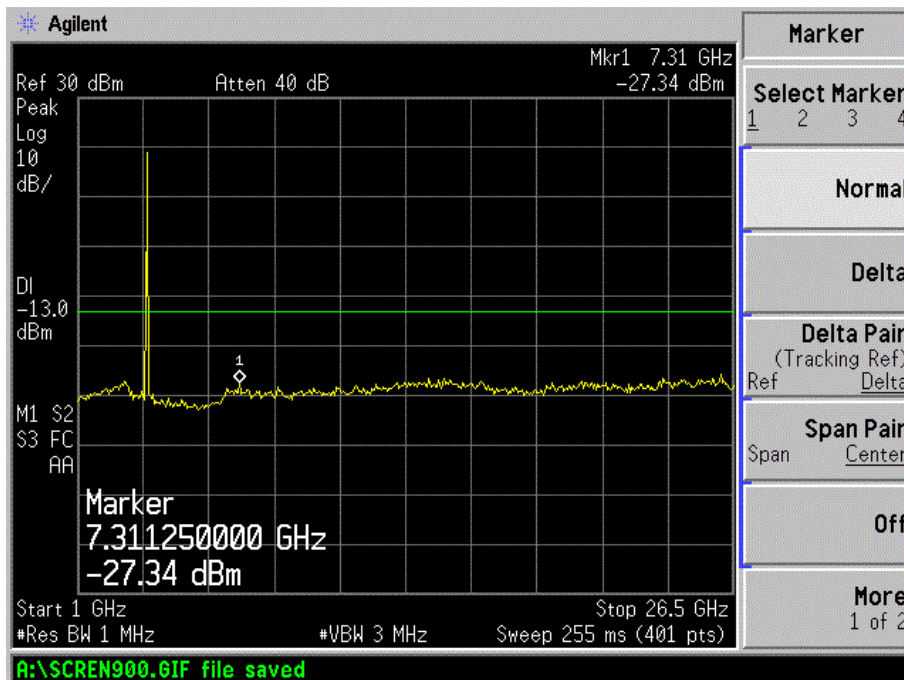
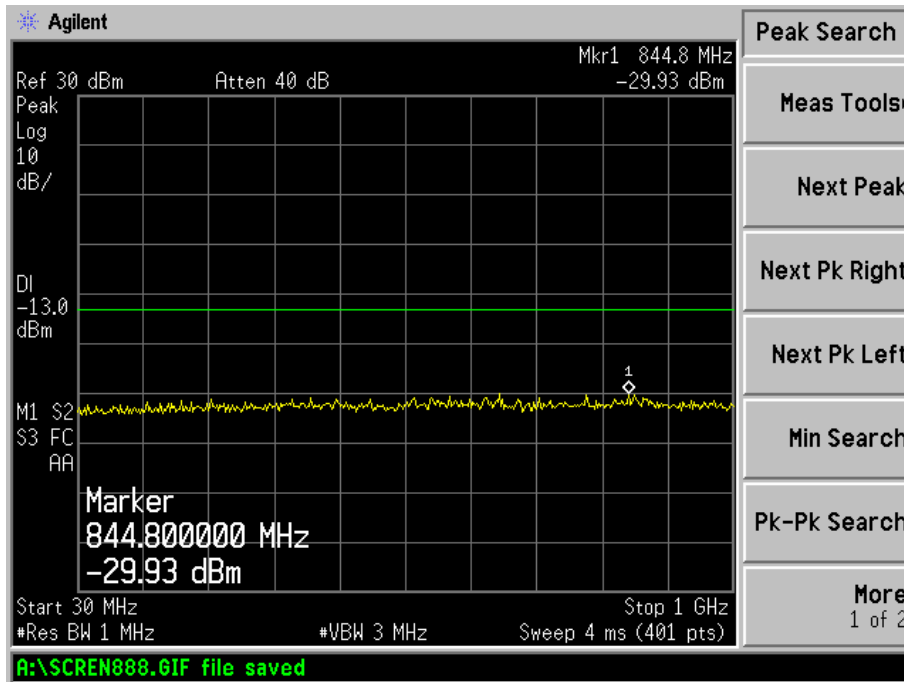
High Channel



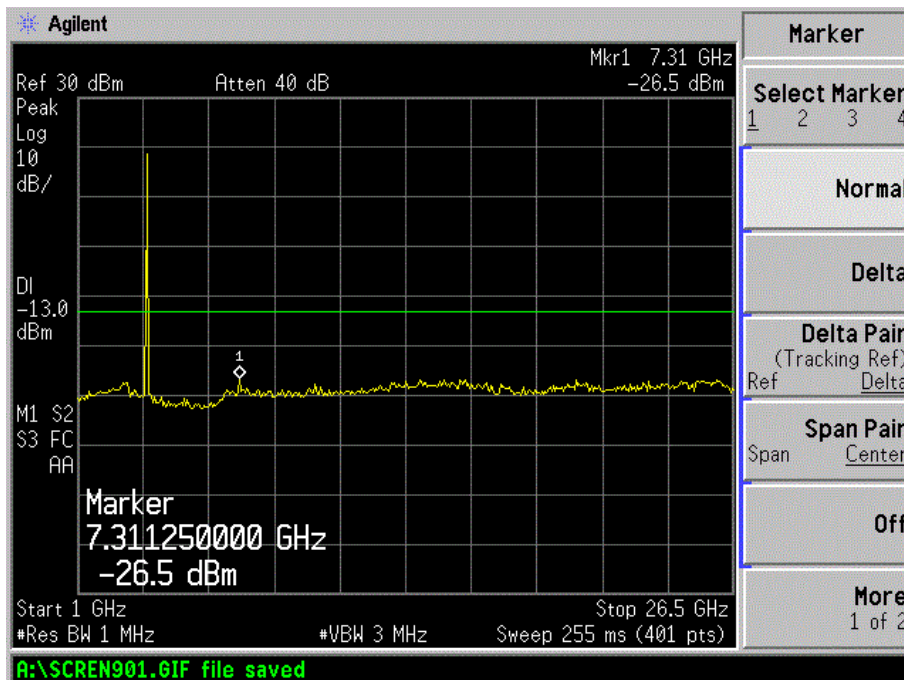
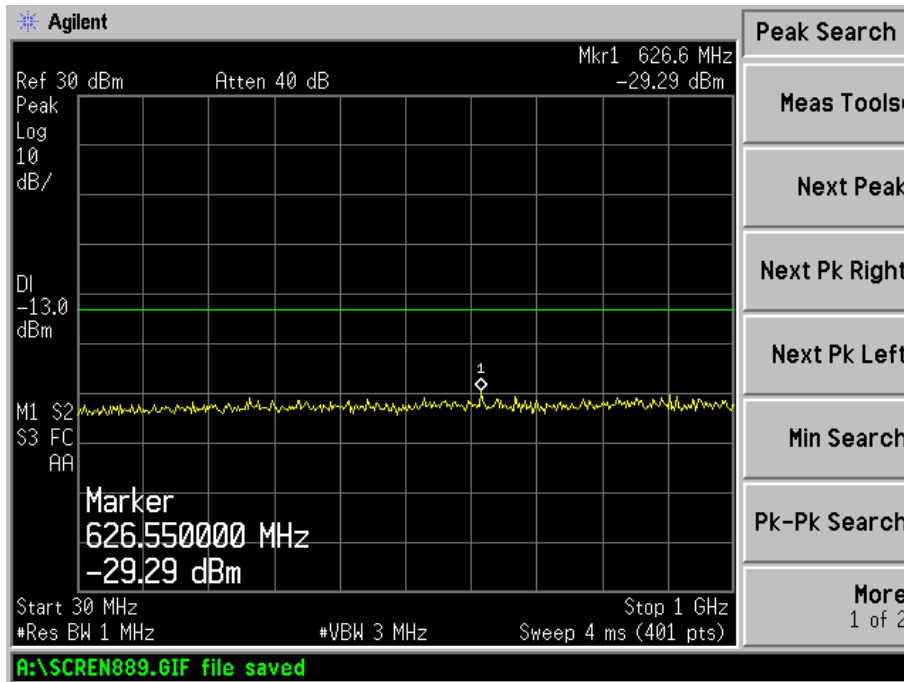
10MHz Bandwidth
Low Channel



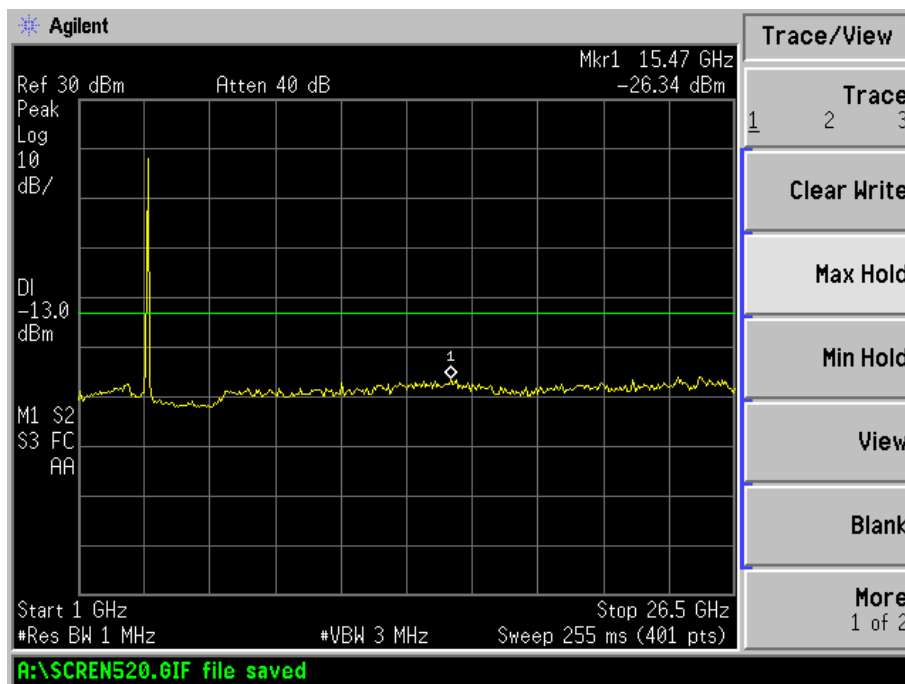
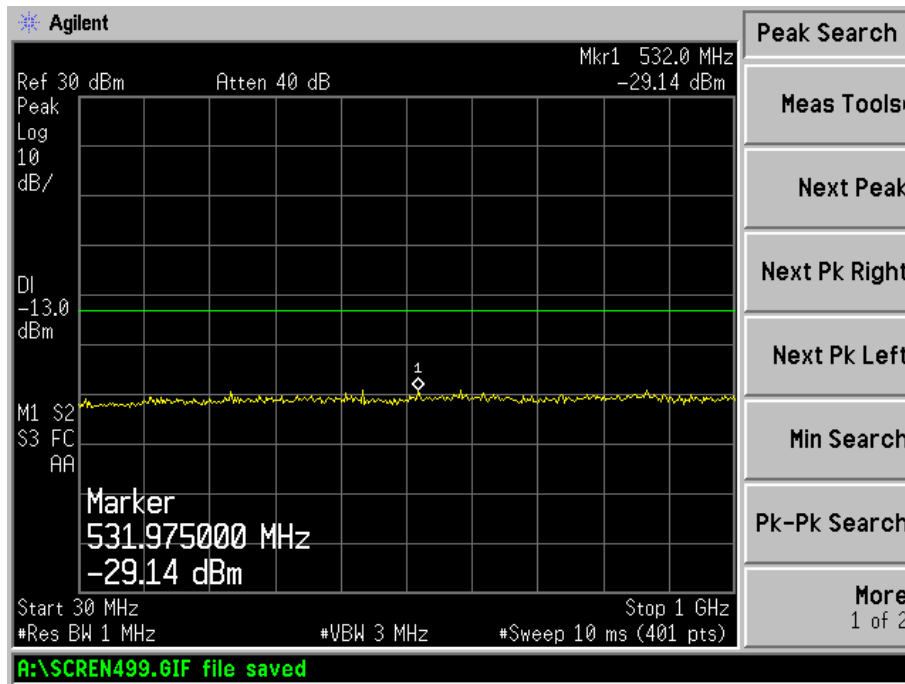
Middle Channel



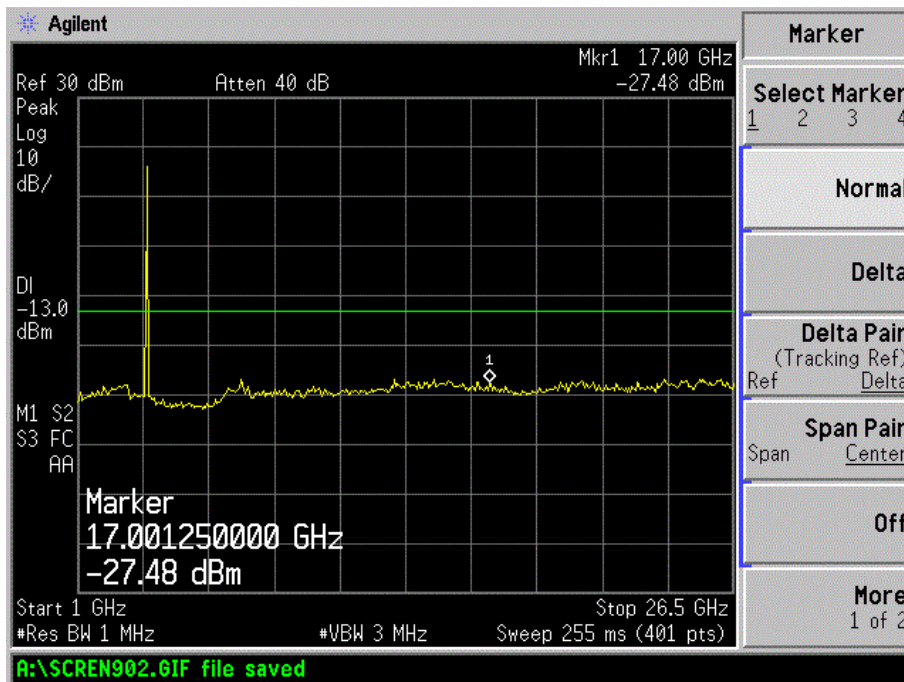
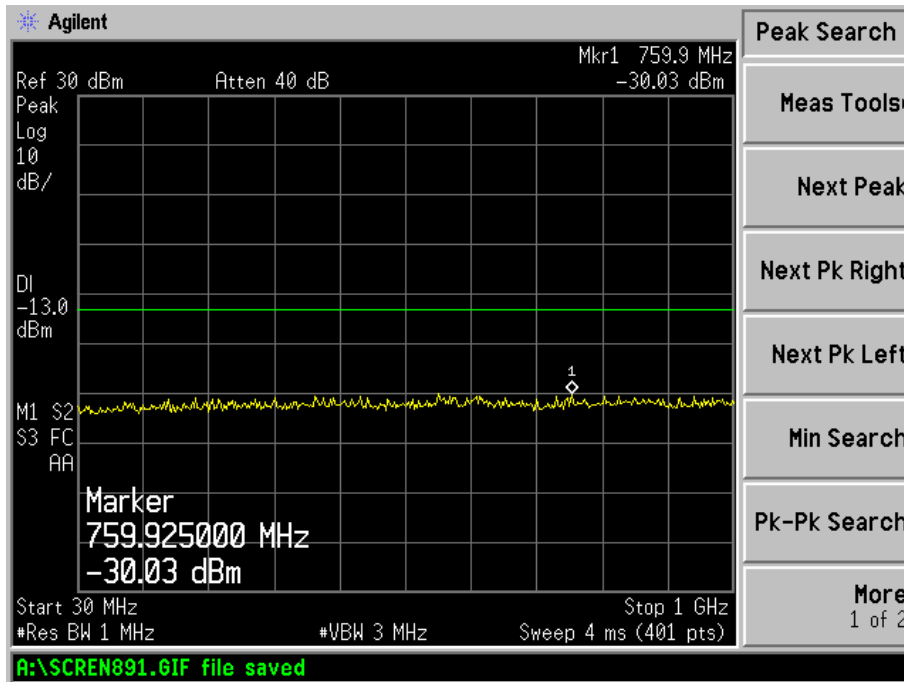
High Channel



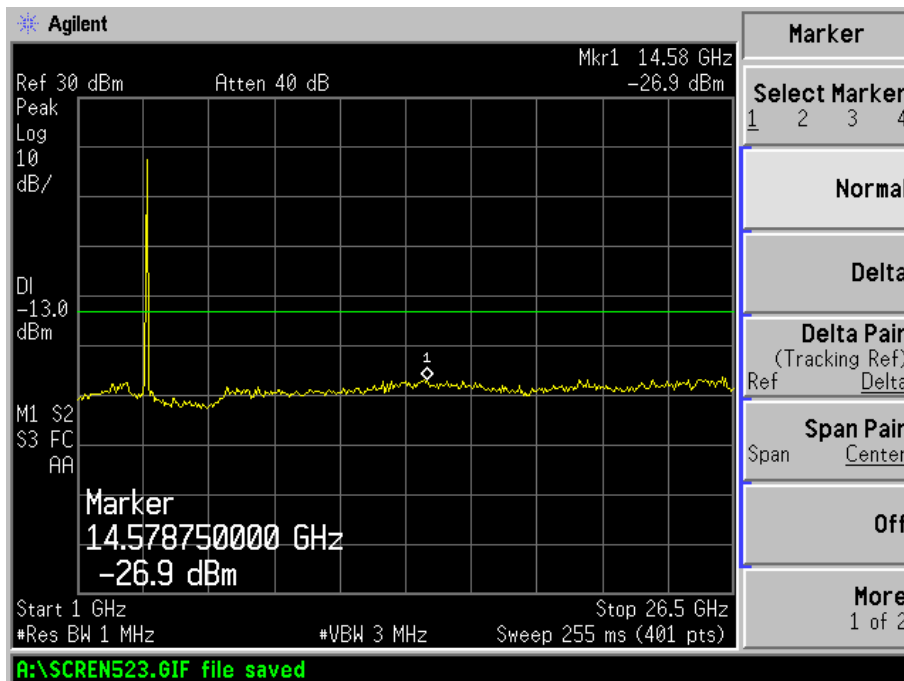
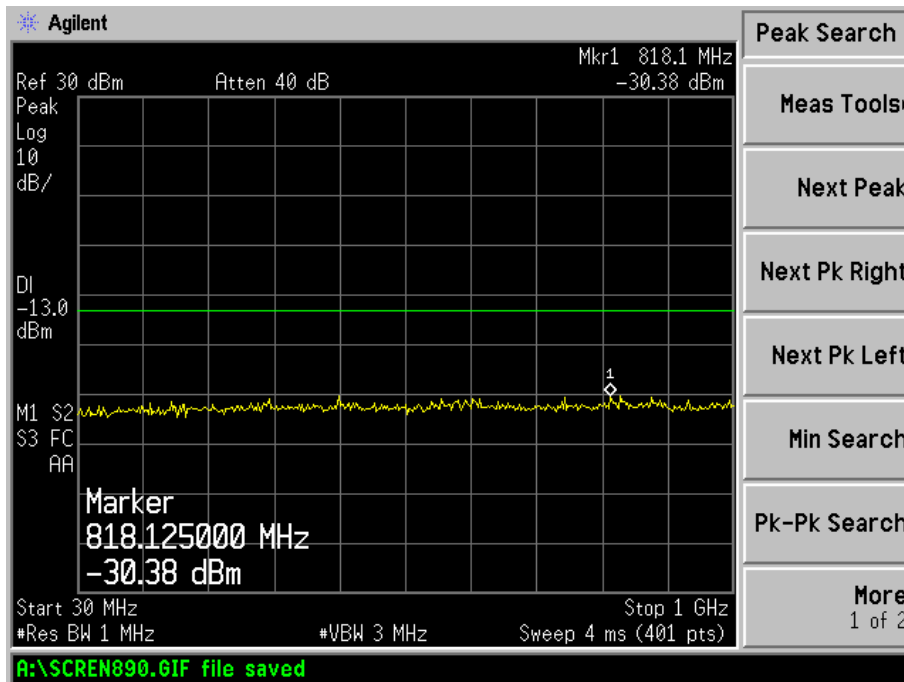
15MHz Bandwidth
Low Channel



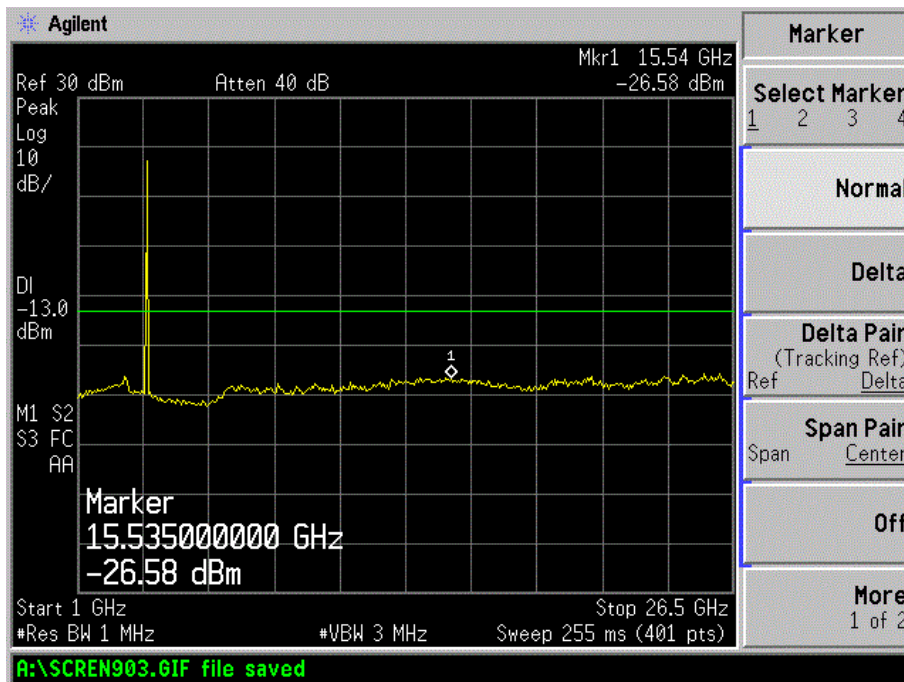
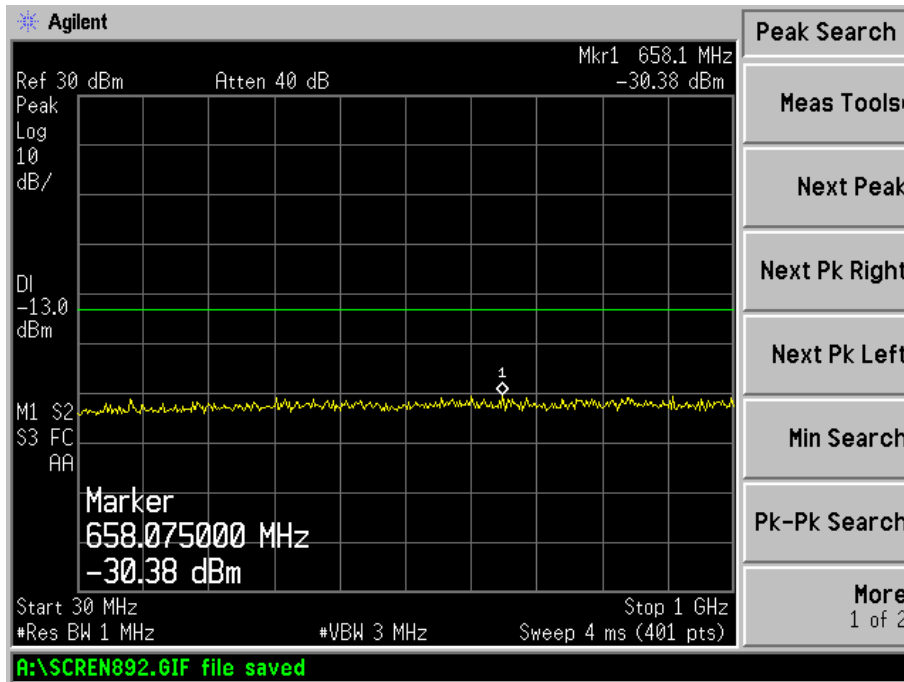
High Channel



20MHz Bandwidth
Low 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	2014-05-28	2015-05-27
Pre-amplifier	Agilent	8447F	3113A06717	2014-05-28	2015-05-27
Pre-amplifier	Compliance Direction	PAP-0140	24002	2014-05-28	2015-05-27
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2014-05-24	2015-05-23
Horn Antenna	ETS	3117	00086197	2014-05-24	2015-05-23
Horn Antenna	EMCO	3116	9203-2178	2014-05-24	2015-05-23
Universal Radio Communication Tester	Rohde & Schwarz	CMU200	112012	2014-05-28	2015-05-27
Signal Generator	R&S	SMR20	100047	2014-05-28	2015-05-27

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:

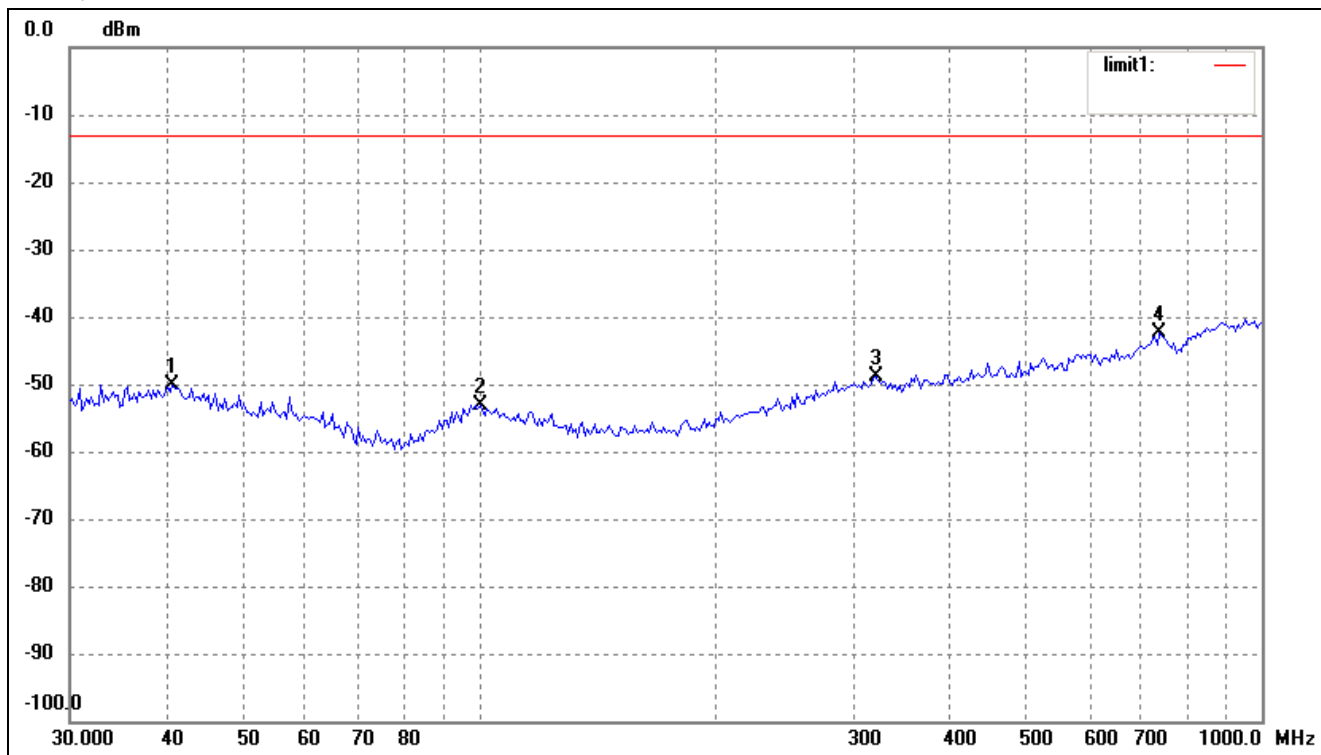
-24.25 dB at 7305 MHz in the Horizontal polarization, , 9 kHz to 37 GHz, 3Meters

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

Spurious Emission From 30MHz to 1GHz

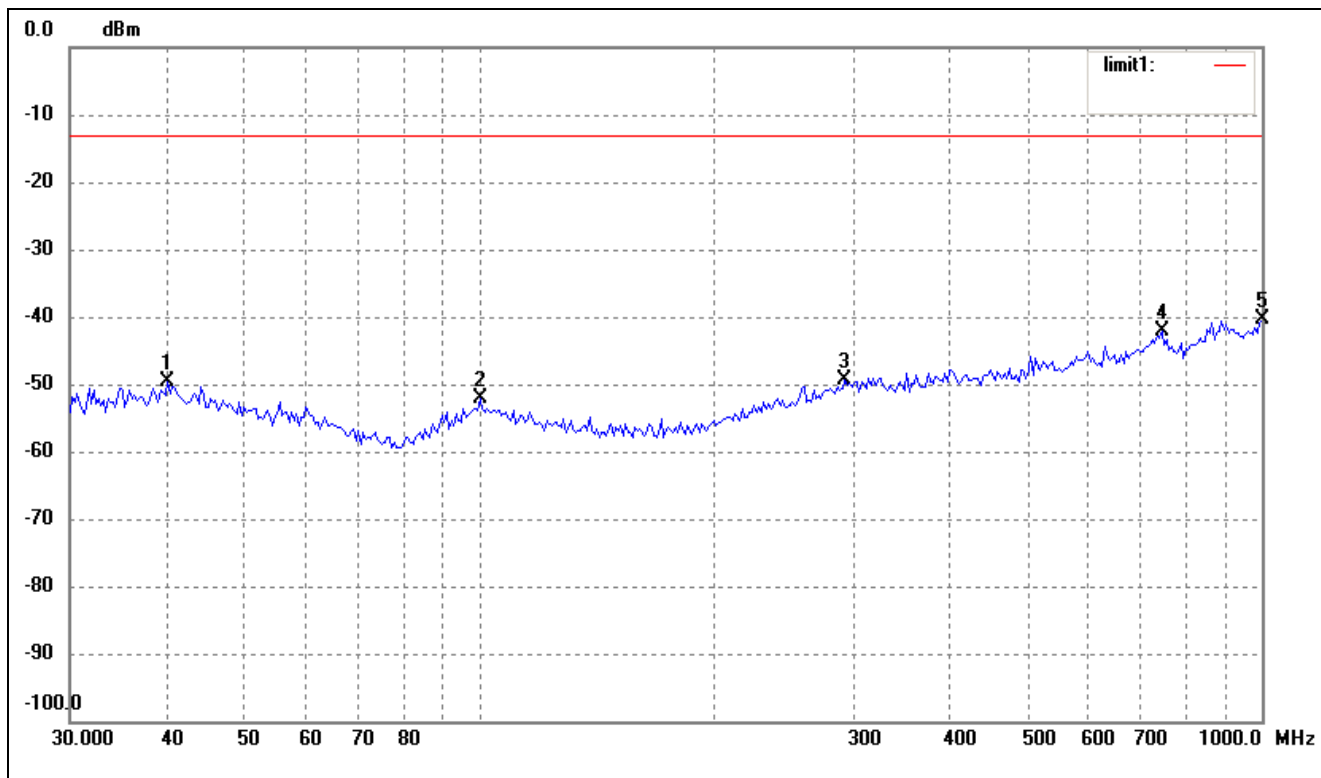
5MHz Bandwidth Low Channel

Horizontal:



No.	Frequency (MHz)	Reading (dBm)	Correct (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	40.5591	-70.51	20.41	-50.10	-13.00	-37.10	ERP
2	100.2286	-70.61	17.60	-53.01	-13.00	-40.01	ERP
3	321.0608	-69.77	20.80	-48.97	-13.00	-35.97	ERP
4	739.6605	-69.98	27.51	-42.47	-13.00	-29.47	ERP

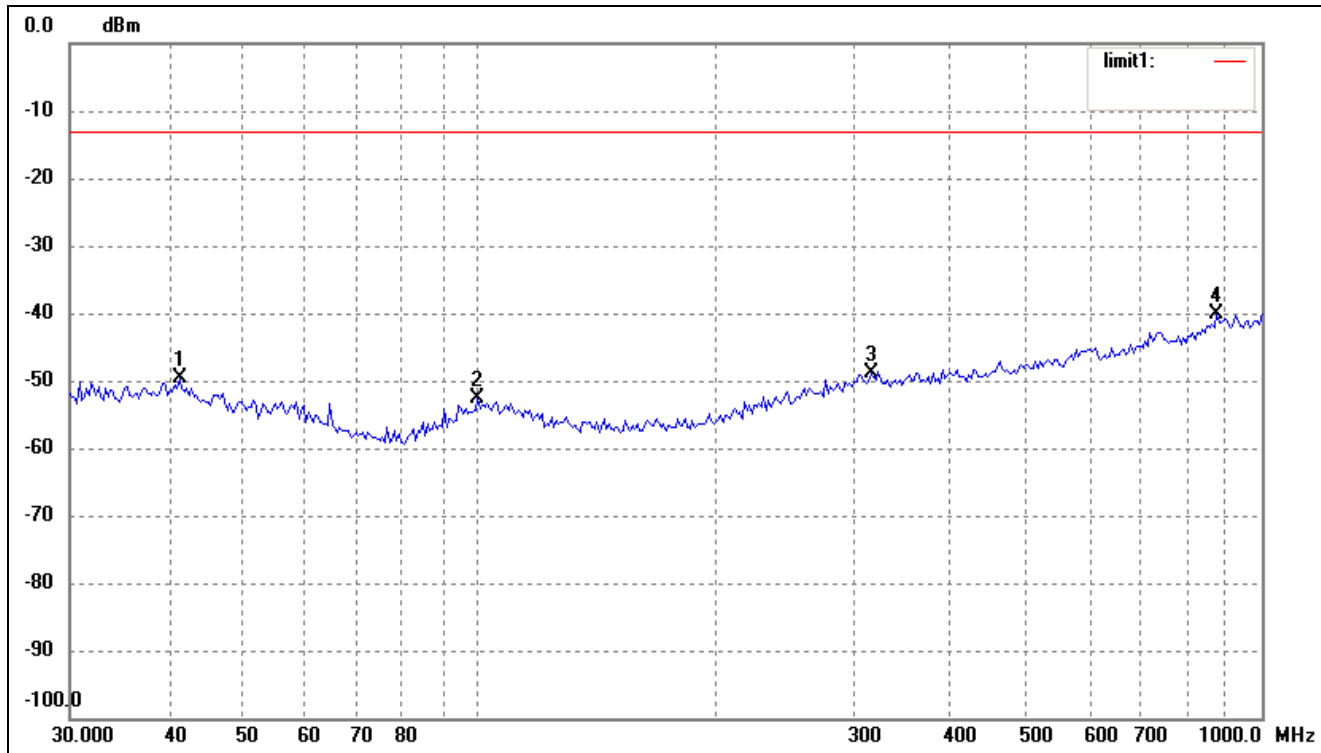
Vertical:



No.	Frequency (MHz)	Reading (dBm)	Correct (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	39.9942	-70.32	20.66	-49.66	-13.00	-36.66	ERP
2	100.2286	-69.95	17.92	-52.03	-13.00	-39.03	ERP
3	293.0842	-69.95	20.66	-49.29	-13.00	-36.29	ERP
4	744.8661	-69.34	27.10	-42.24	-13.00	-29.24	ERP
5	1000.0000	-69.49	29.05	-40.44	-13.00	-27.44	ERP

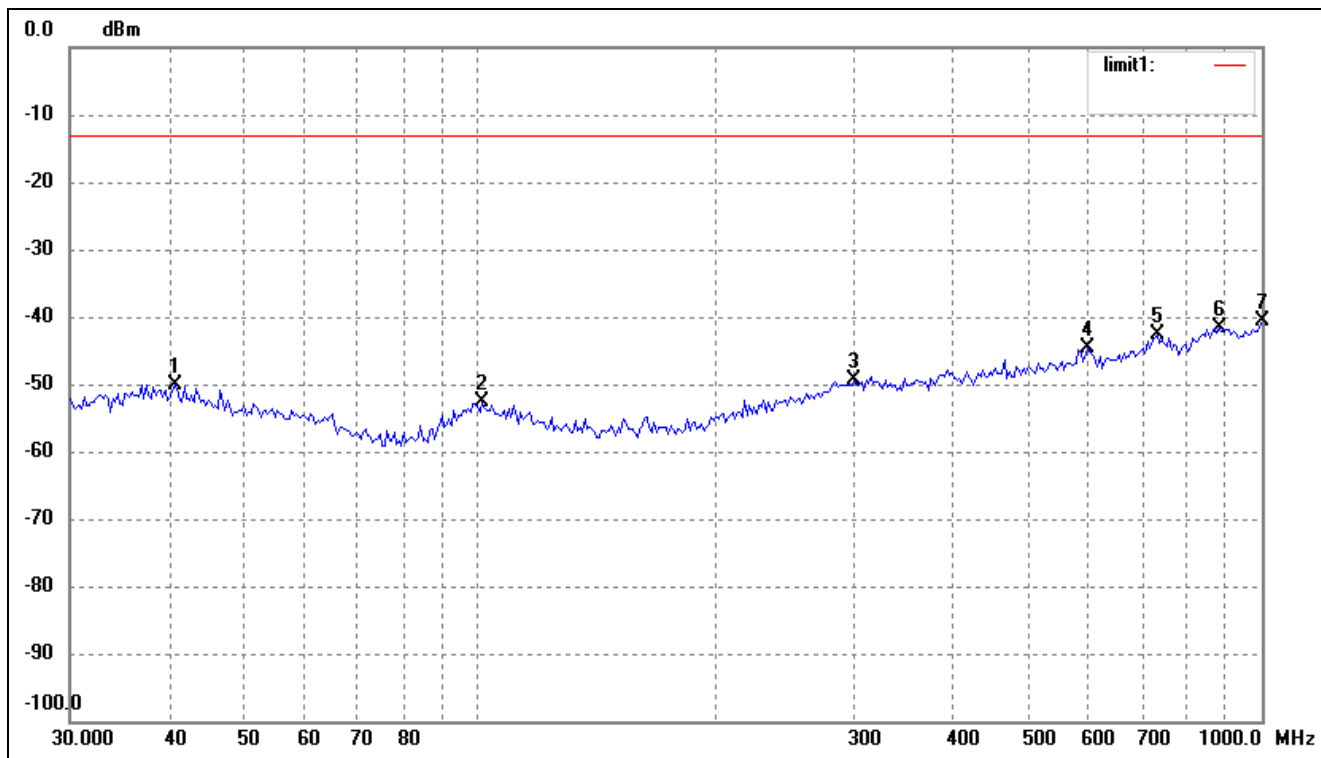
5MHz Bandwidth Middle Channel

Horizontal:



No.	Frequency (MHz)	Reading (dBm)	Correct (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	41.4215	-69.79	20.15	-49.64	-13.00	-36.64	ERP
2	99.5281	-70.15	17.50	-52.65	-13.00	-39.65	ERP
3	316.5890	-69.78	20.81	-48.97	-13.00	-35.97	ERP
4	875.2470	-68.92	28.80	-40.12	-13.00	-27.12	ERP

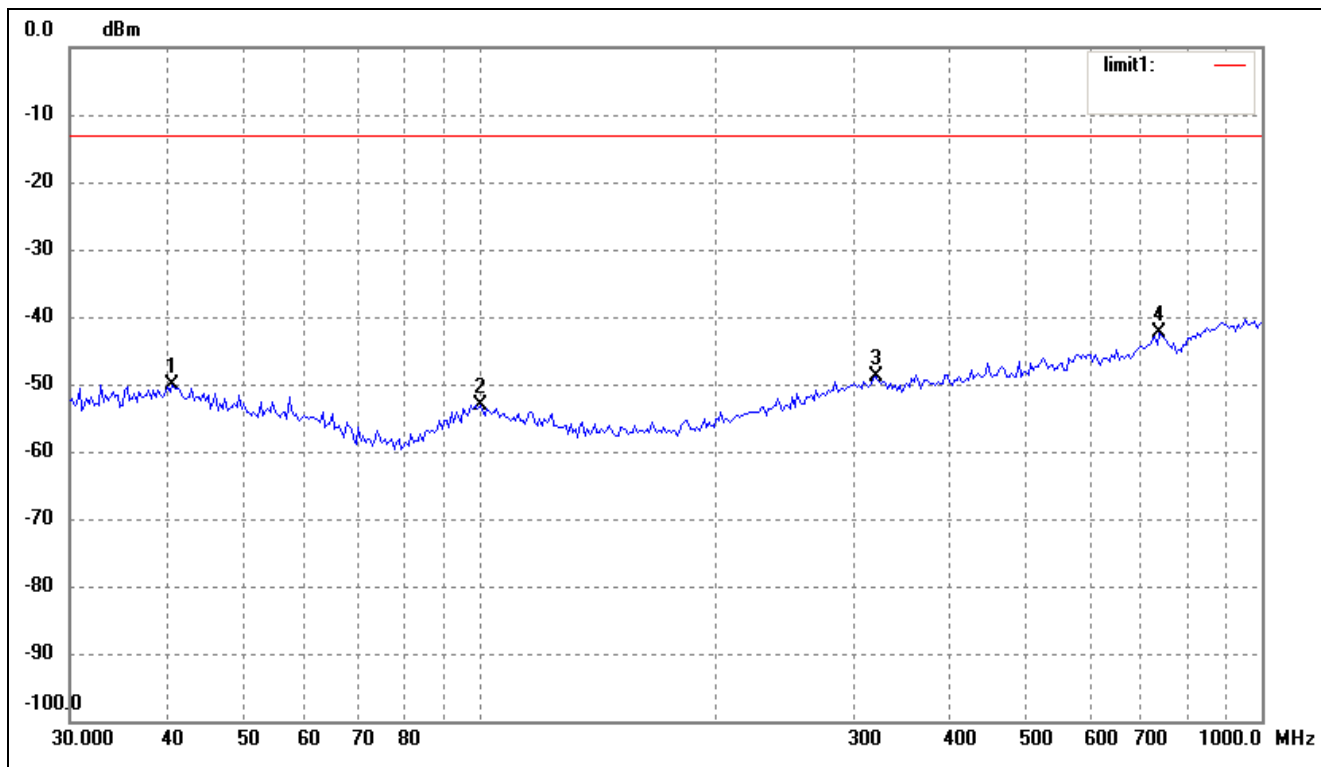
Vertical:



No.	Frequency (MHz)	Reading (dBm)	Correct (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	40.8446	-70.49	20.42	-50.07	-13.00	-37.07	ERP
2	100.9340	-70.39	17.85	-52.54	-13.00	-39.54	ERP
3	301.4224	-70.37	20.95	-49.42	-13.00	-36.42	ERP
4	599.3213	-69.53	25.00	-44.53	-13.00	-31.53	ERP
5	734.4913	-69.72	26.98	-42.74	-13.00	-29.74	ERP
6	881.4067	-70.06	28.53	-41.53	-13.00	-28.53	ERP

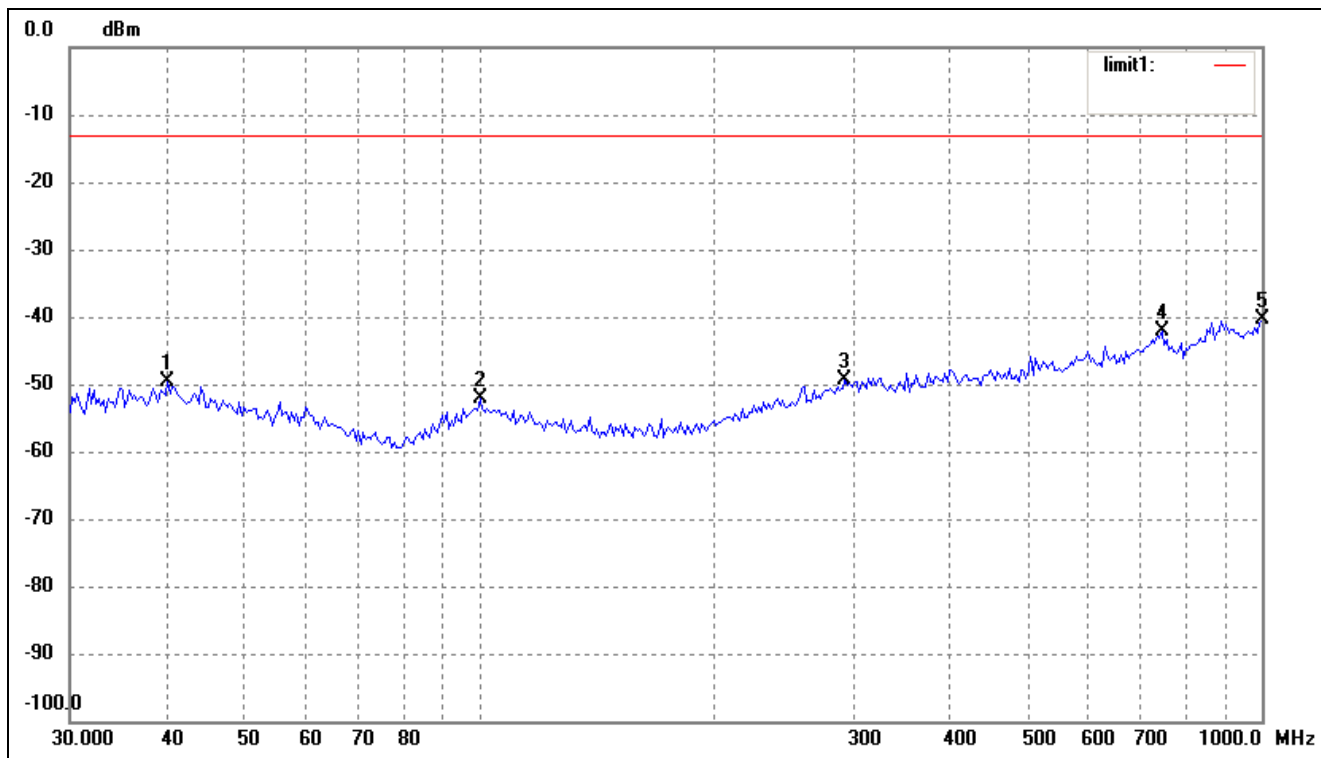
5MHz Bandwidth High Channel

Horizontal:



No.	Frequency (MHz)	Reading (dBm)	Correct (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	40.5591	-70.51	20.41	-50.10	-13.00	-37.10	ERP
2	100.2286	-70.61	17.60	-53.01	-13.00	-40.01	ERP
3	321.0608	-69.77	20.80	-48.97	-13.00	-35.97	ERP
4	739.6605	-69.98	27.51	-42.47	-13.00	-29.47	ERP

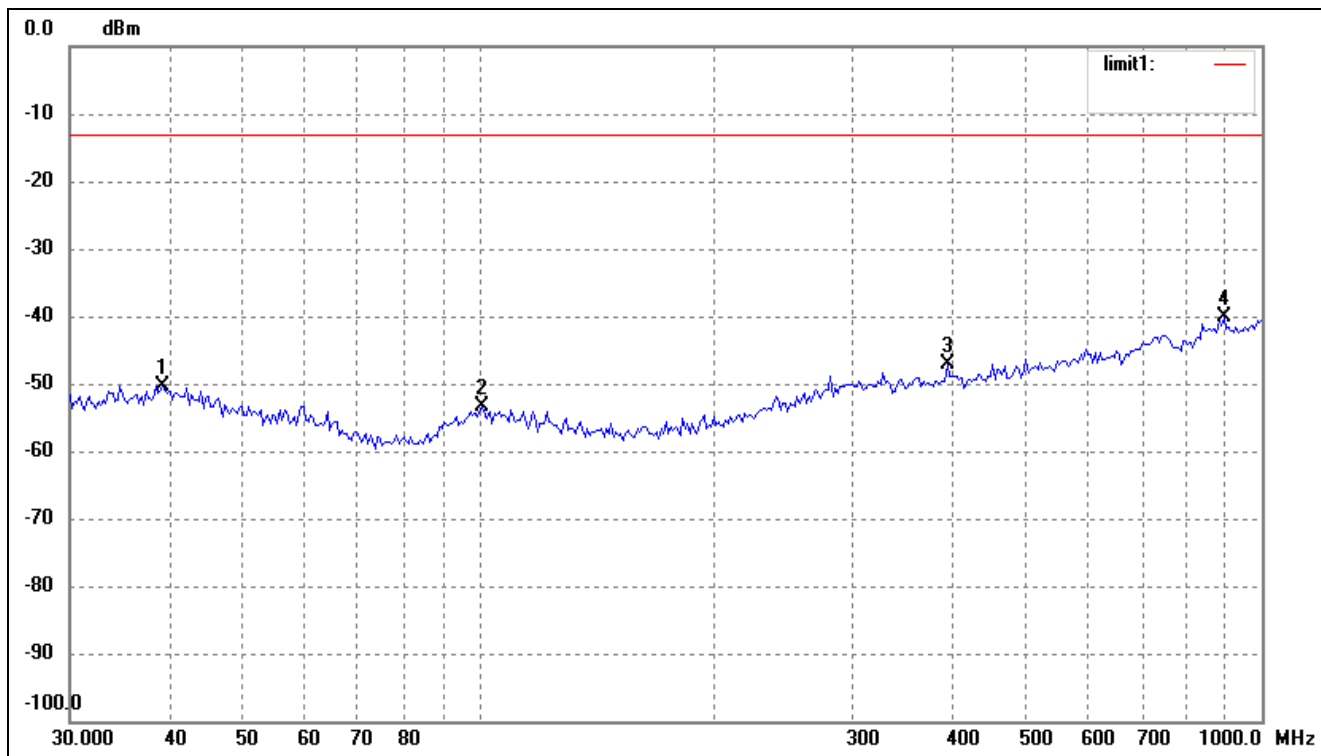
Vertical:



No.	Frequency (MHz)	Reading (dBm)	Correct (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	39.9942	-70.32	20.66	-49.66	-13.00	-36.66	ERP
2	100.2286	-69.95	17.92	-52.03	-13.00	-39.03	ERP
3	293.0842	-69.95	20.66	-49.29	-13.00	-36.29	ERP
4	744.8661	-69.34	27.10	-42.24	-13.00	-29.24	ERP
5	1000.0000	-69.49	29.05	-40.44	-13.00	-27.44	ERP

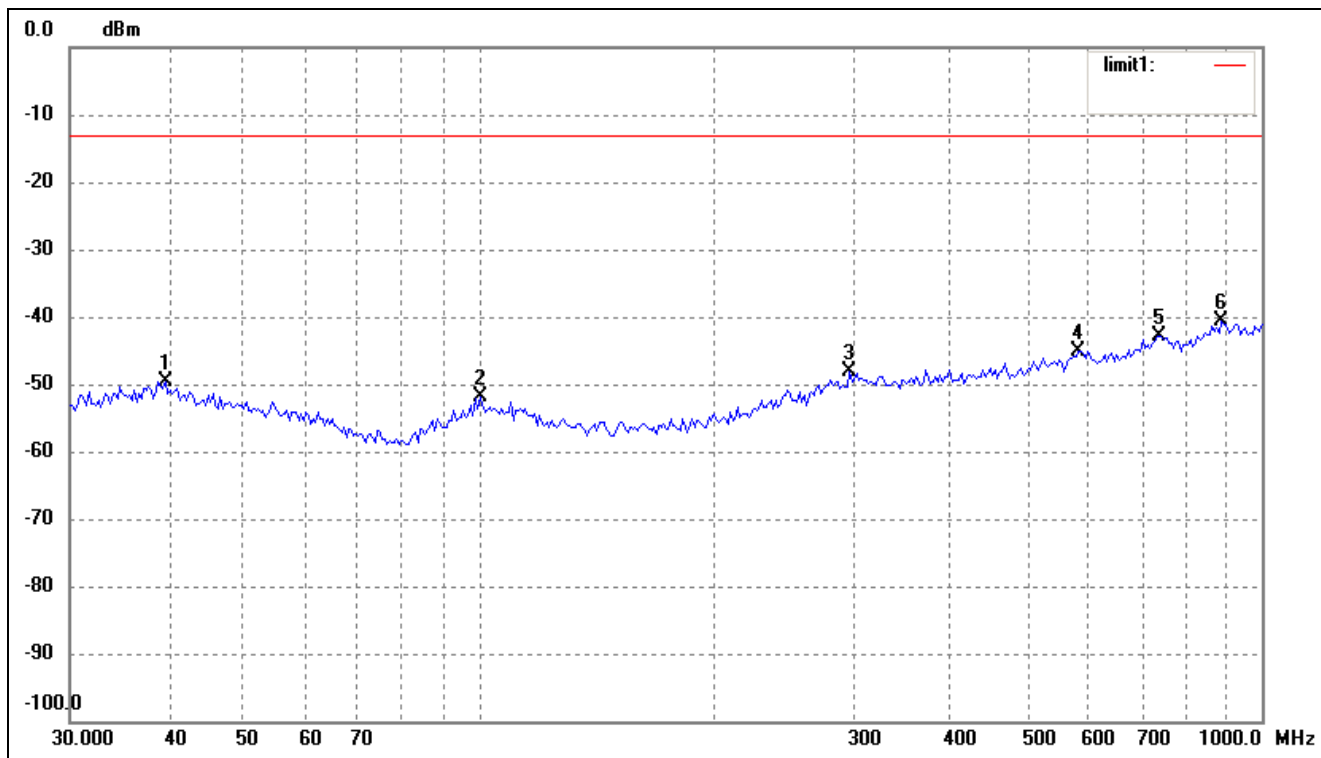
10MHz Bandwidth Low Channel

Horizontal:



No.	Frequency (MHz)	Reading (dBm)	Correct (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	39.4372	-70.80	20.50	-50.30	-13.00	-37.30	ERP
2	100.9340	-70.83	17.53	-53.30	-13.00	-40.30	ERP
3	396.2415	-68.67	21.58	-47.09	-13.00	-34.09	ERP
4	893.8567	-69.07	28.96	-40.11	-13.00	-27.11	ERP

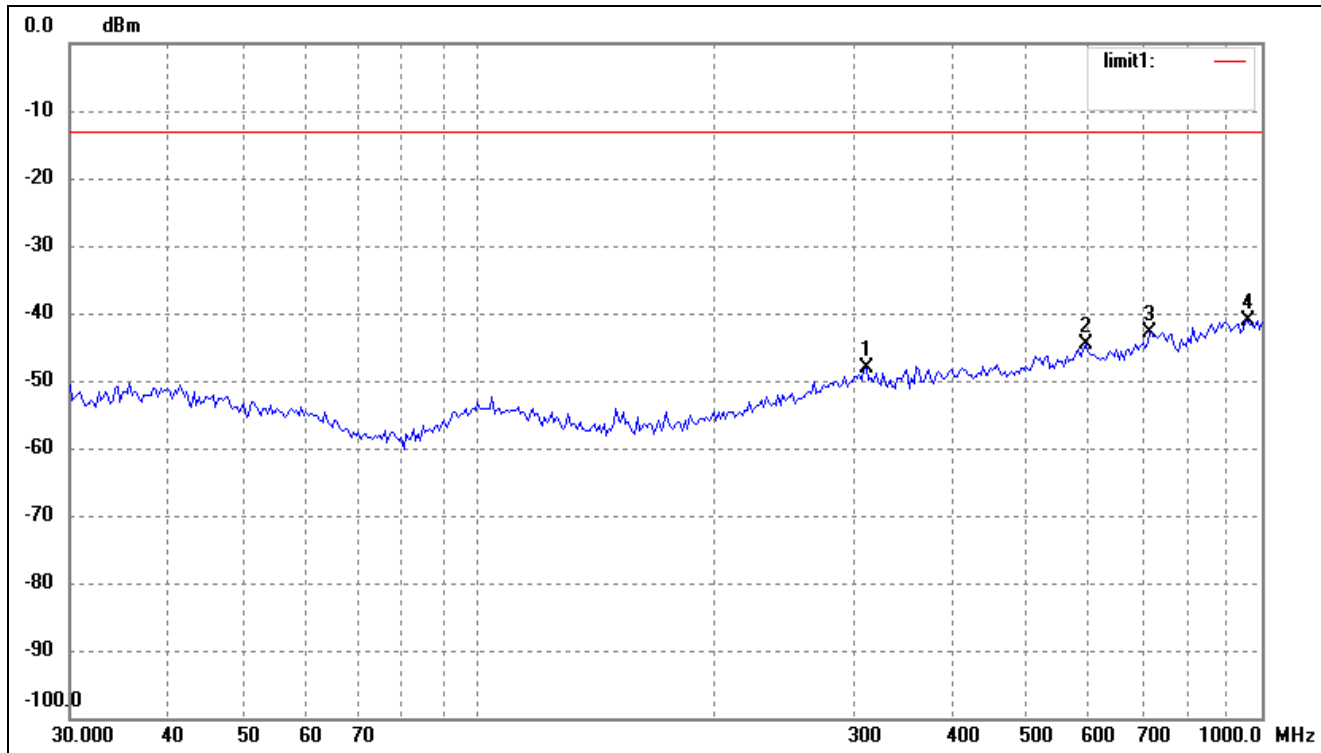
Vertical:



No.	Frequency (MHz)	Reading (dBm)	Correct (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	39.7147	-70.13	20.62	-49.51	-13.00	-36.51	ERP
2	100.2286	-69.82	17.92	-51.90	-13.00	-38.90	ERP
3	297.2241	-68.87	20.82	-48.05	-13.00	-35.05	ERP
4	582.7425	-69.49	24.40	-45.09	-13.00	-32.09	ERP
5	739.6605	-70.17	27.29	-42.88	-13.00	-29.88	ERP
6	887.6099	-69.26	28.54	-40.72	-13.00	-27.72	ERP

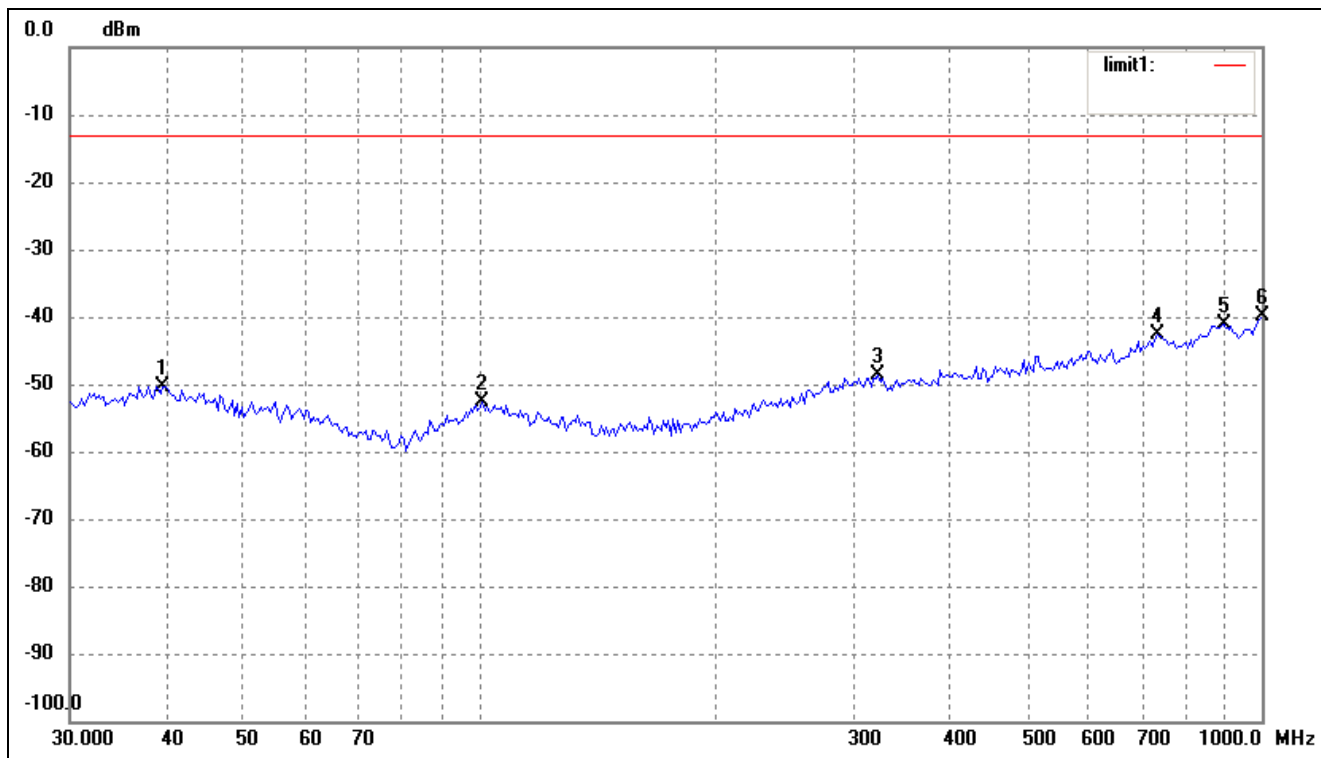
10MHz Bandwidth Middle Channel

Horizontal:



No.	Frequency (MHz)	Reading (dBm)	Correct (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	312.1794	-69.16	21.02	-48.14	-13.00	-35.14	ERP
2	595.1329	-69.56	24.84	-44.72	-13.00	-31.72	ERP
3	719.1995	-68.88	26.08	-42.80	-13.00	-29.80	ERP
4	958.7943	-69.09	28.00	-41.09	-13.00	-28.09	ERP

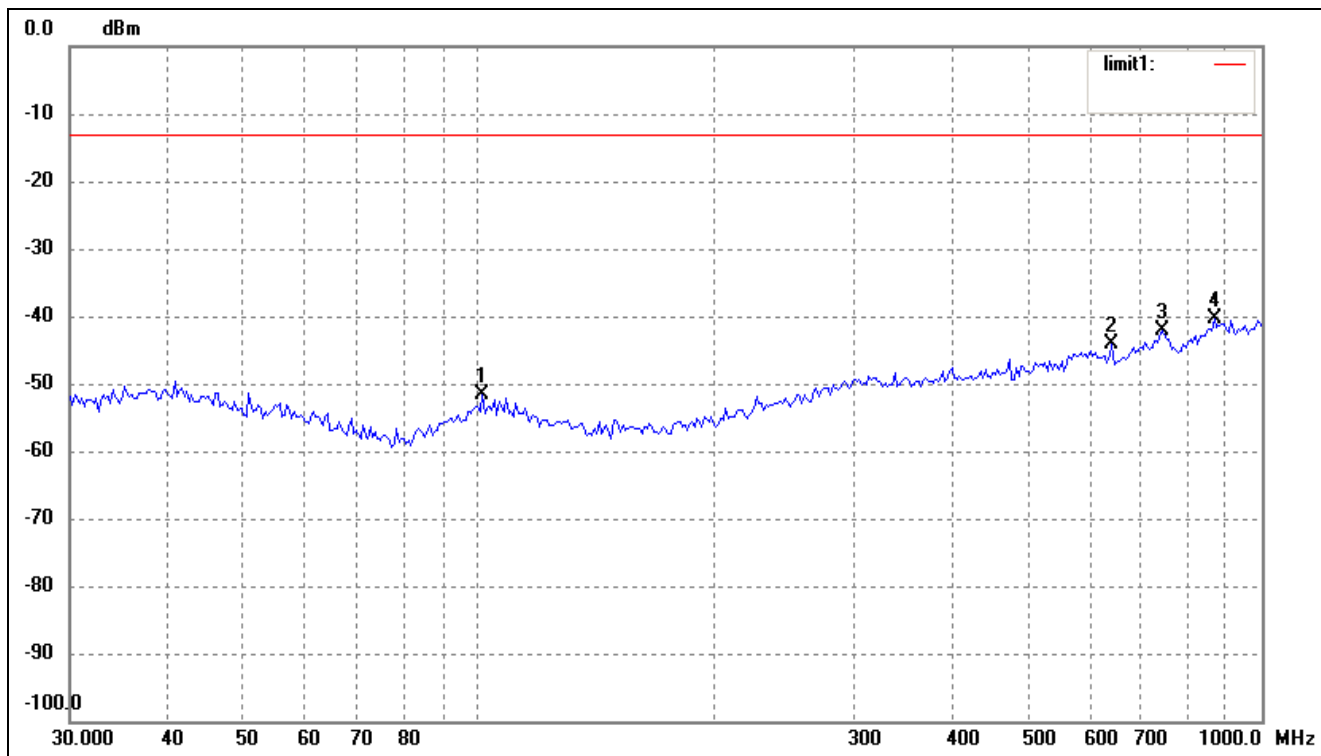
Vertical:



No.	Frequency (MHz)	Reading (dBm)	Correct (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	39.4372	-70.83	20.58	-50.25	-13.00	-37.25	ERP
2	100.9340	-70.37	17.85	-52.52	-13.00	-39.52	ERP
3	323.3204	-69.51	20.99	-48.52	-13.00	-35.52	ERP
4	734.4913	-69.67	26.98	-42.69	-13.00	-29.69	ERP
5	893.8567	-69.79	28.55	-41.24	-13.00	-28.24	ERP
6	1000.0000	-68.99	29.05	-39.94	-13.00	-26.94	ERP

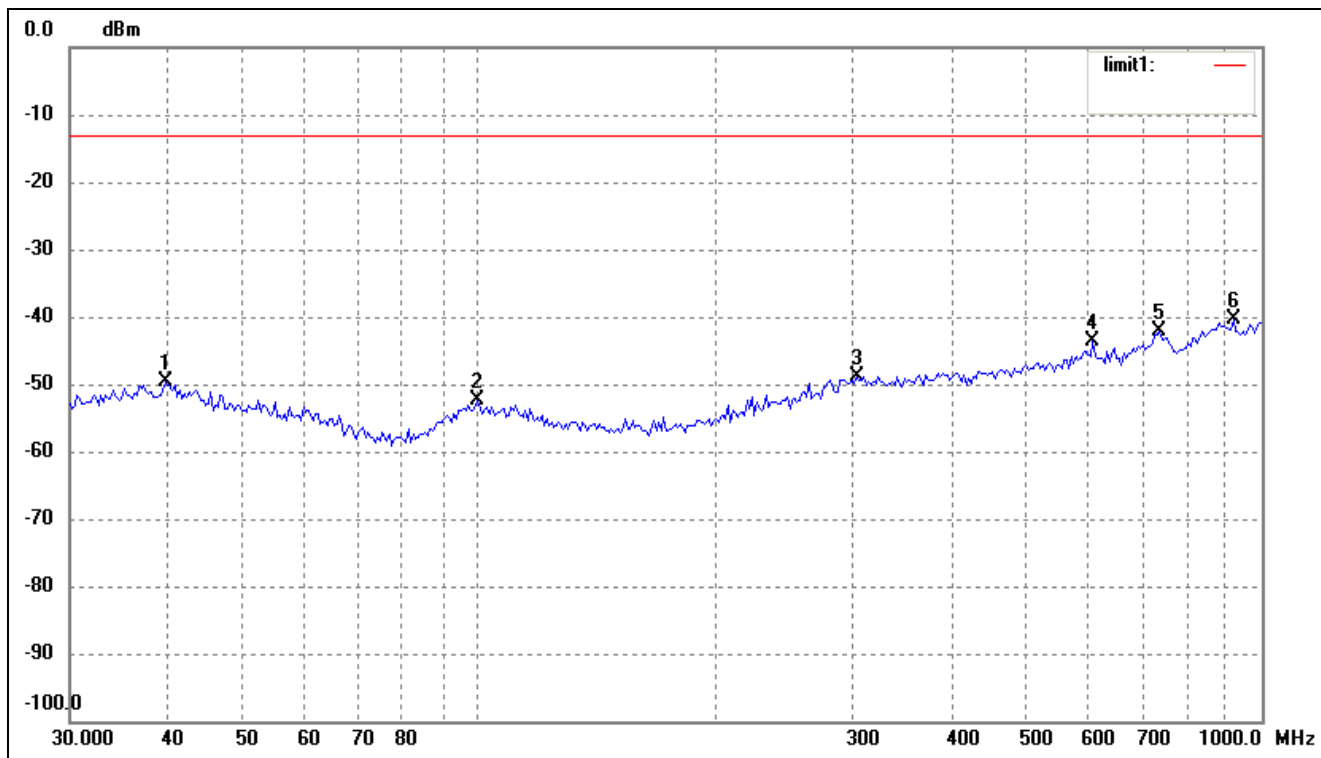
10MHz Bandwidth High Channel

Horizontal:



No.	Frequency (MHz)	Reading (dBm)	Correct (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	100.9340	-69.38	17.85	-51.53	-13.00	-38.53	ERP
2	642.8613	-68.39	24.27	-44.12	-13.00	-31.12	ERP
3	744.8661	-69.31	27.10	-42.21	-13.00	-29.21	ERP
4	869.1302	-68.71	28.26	-40.45	-13.00	-27.45	ERP

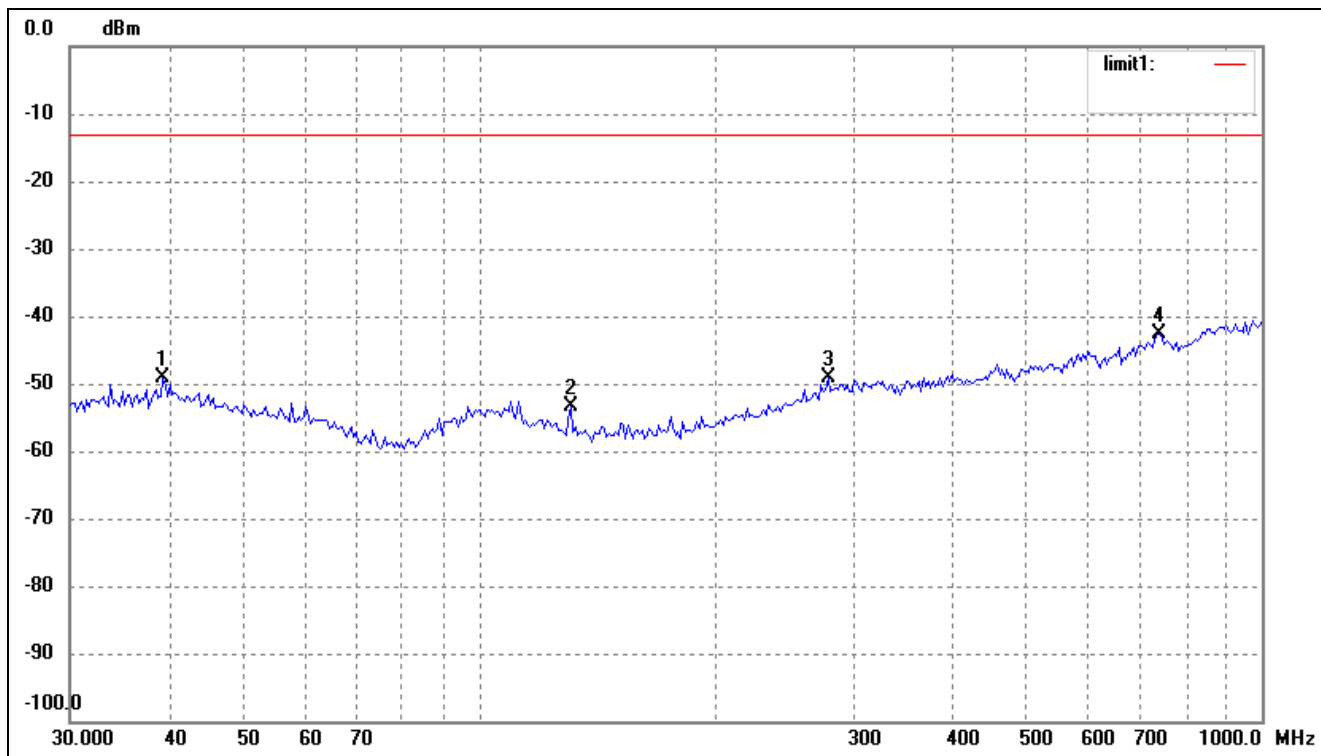
Vertical:



No.	Frequency (MHz)	Reading (dBm)	Correct (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	39.7147	-70.20	20.62	-49.58	-13.00	-36.58	ERP
2	99.5281	-70.25	17.83	-52.42	-13.00	-39.42	ERP
3	303.5437	-69.77	20.97	-48.80	-13.00	-35.80	ERP
4	607.7867	-68.21	24.47	-43.74	-13.00	-30.74	ERP
5	739.6605	-69.46	27.29	-42.17	-13.00	-29.17	ERP
6	919.2866	-68.64	28.19	-40.45	-13.00	-27.45	ERP

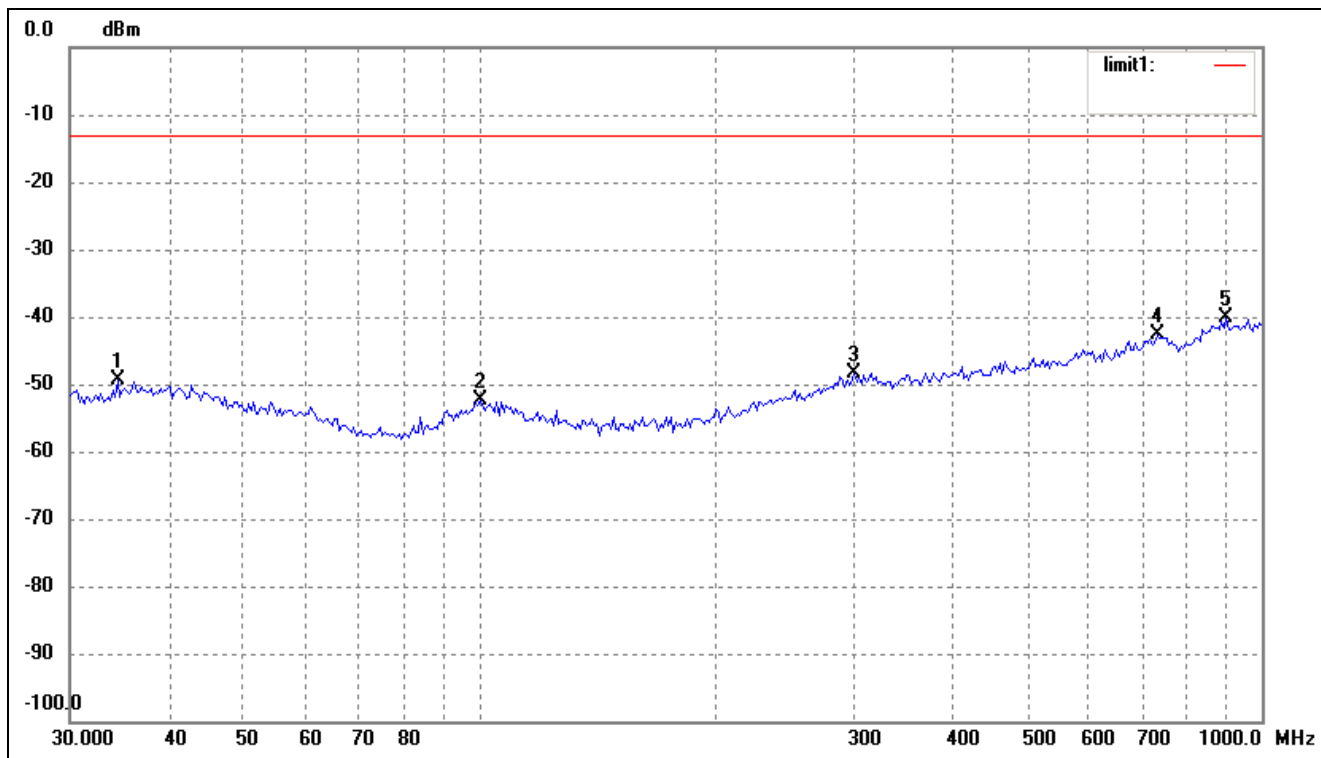
15MHz Bandwidth Low Channel

Horizontal:



No.	Frequency (MHz)	Reading (dBm)	Correct (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	39.4372	-69.57	20.50	-49.07	-13.00	-36.07	ERP
2	130.8369	-68.02	14.67	-53.35	-13.00	-40.35	ERP
3	279.0436	-68.83	19.80	-49.03	-13.00	-36.03	ERP
4	739.6605	-70.07	27.51	-42.56	-13.00	-29.56	ERP

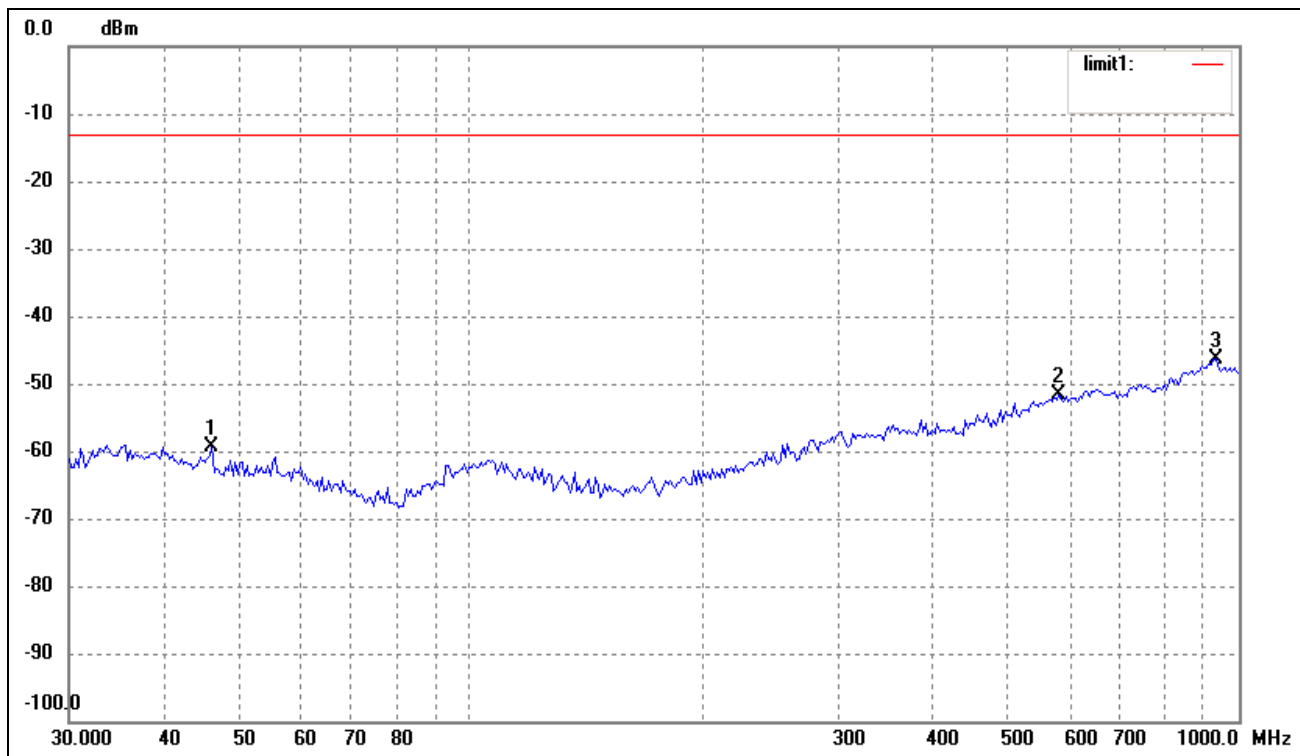
Vertical:



No.	Frequency (MHz)	Reading (dBm)	Correct (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	34.5173	-69.26	19.79	-49.47	-13.00	-36.47	ERP
2	100.2286	-70.19	17.92	-52.27	-13.00	-39.27	ERP
3	301.4224	-69.33	20.95	-48.38	-13.00	-35.38	ERP
4	734.4913	-69.48	26.98	-42.50	-13.00	-29.50	ERP
5	900.1474	-68.72	28.55	-40.17	-13.00	-27.17	ERP

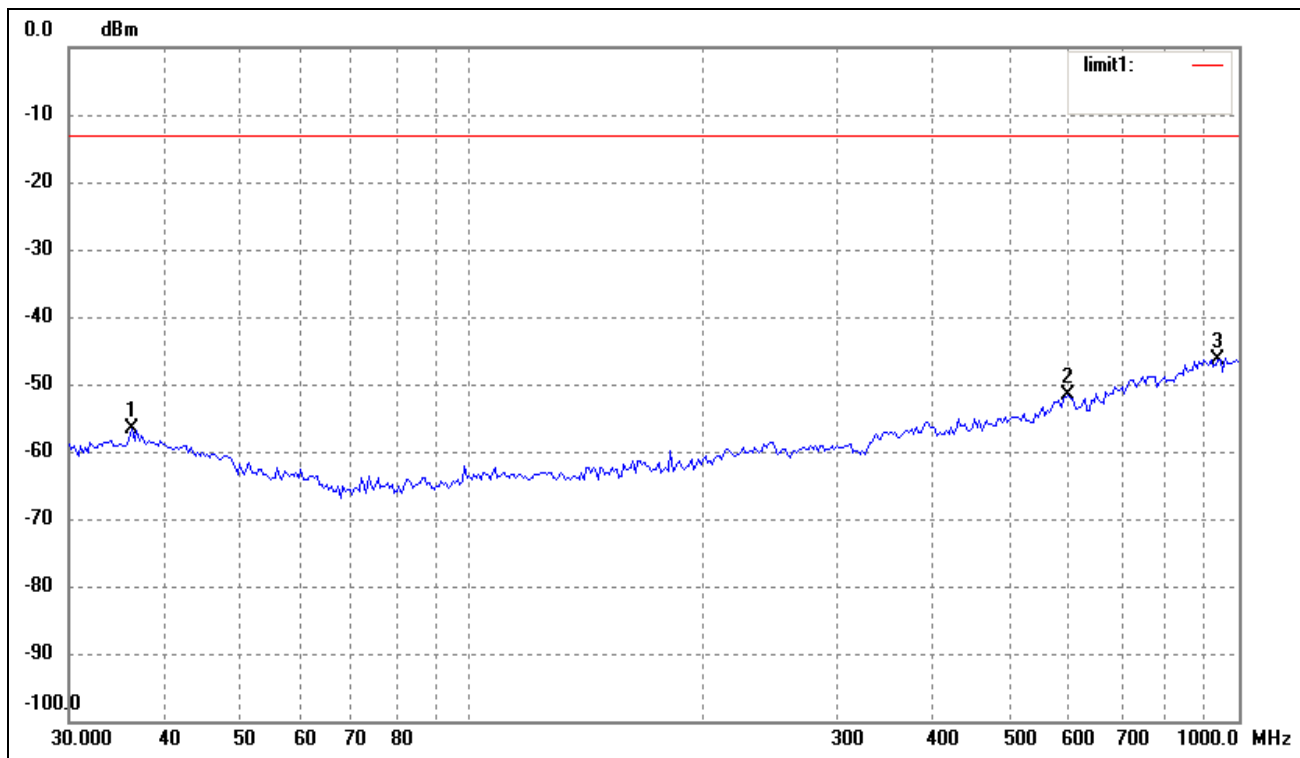
15MHz Bandwidth High Channel

Horizontal:



No.	Frequency (MHz)	Reading (dBm)	Correct (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	46.0163	-79.05	19.65	-59.40	-13.00	-46.40	ERP
2	582.7423	-77.80	26.07	-51.73	-13.00	-38.73	ERP
3	932.2713	-76.49	30.11	-46.38	-13.00	-33.38	ERP

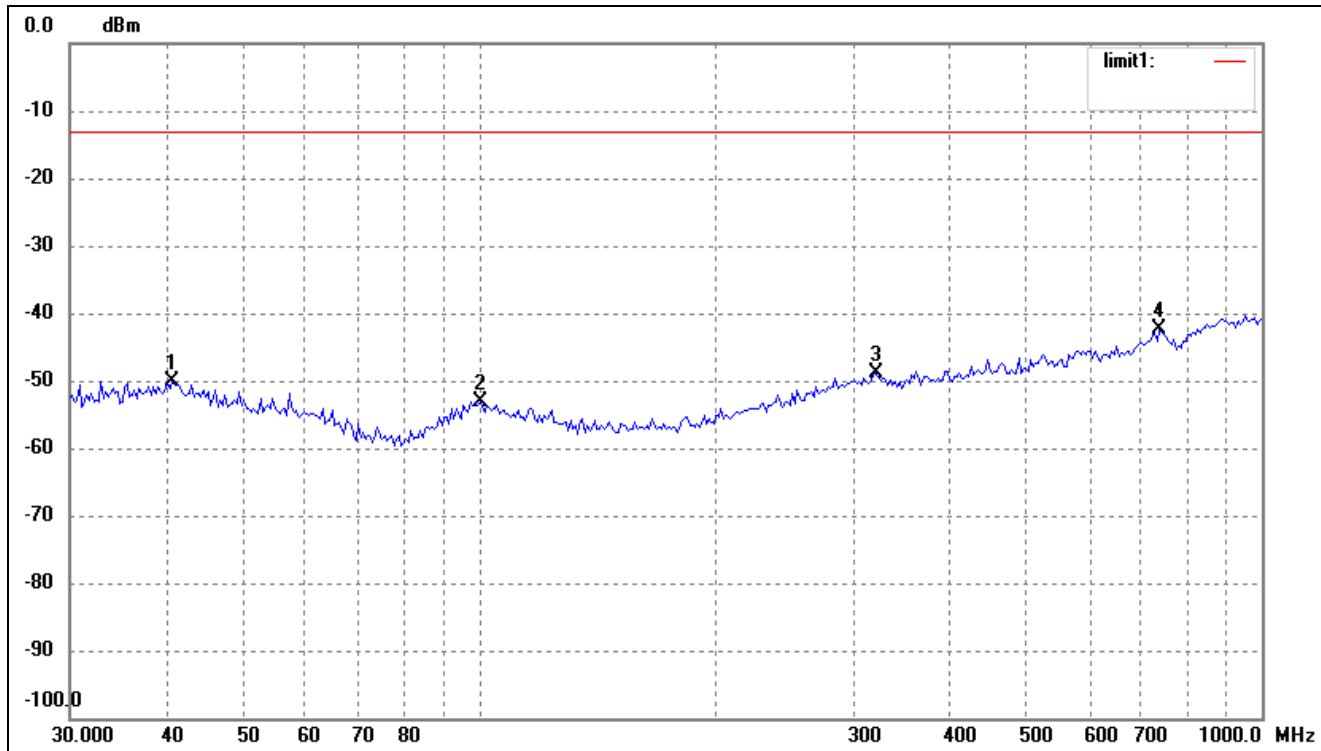
Vertical:



No.	Frequency (MHz)	Reading (dBm)	Correct (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	36.2541	-77.52	20.89	-56.63	-13.00	-43.63	ERP
2	599.3211	-78.06	26.56	-51.50	-13.00	-38.50	ERP
3	938.8324	-76.22	29.91	-46.31	-13.00	-33.31	ERP

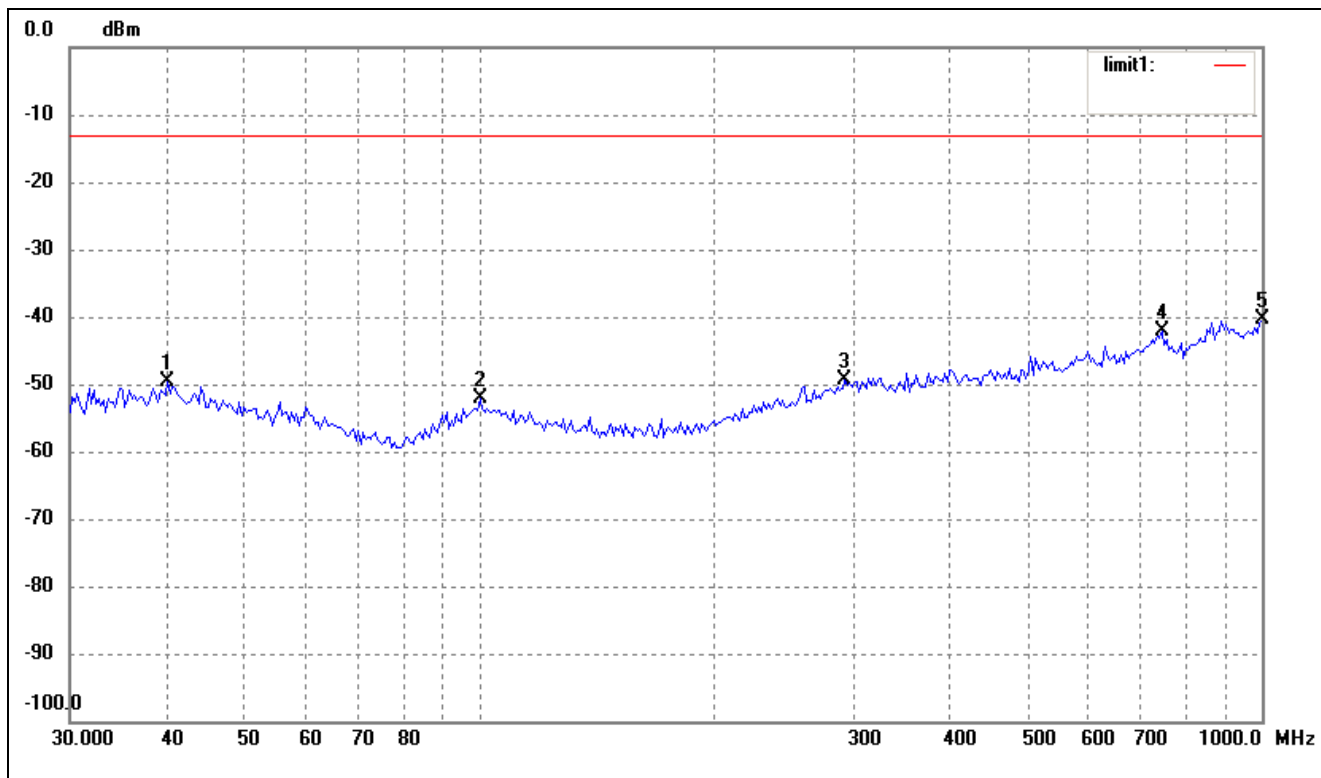
20MHz Bandwidth Low Channel

Horizontal:



No.	Frequency (MHz)	Reading (dBm)	Correct (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	40.5591	-70.51	20.41	-50.10	-13.00	-37.10	ERP
2	100.2286	-70.61	17.60	-53.01	-13.00	-40.01	ERP
3	321.0608	-69.77	20.80	-48.97	-13.00	-35.97	ERP
4	739.6605	-69.98	27.51	-42.47	-13.00	-29.47	ERP

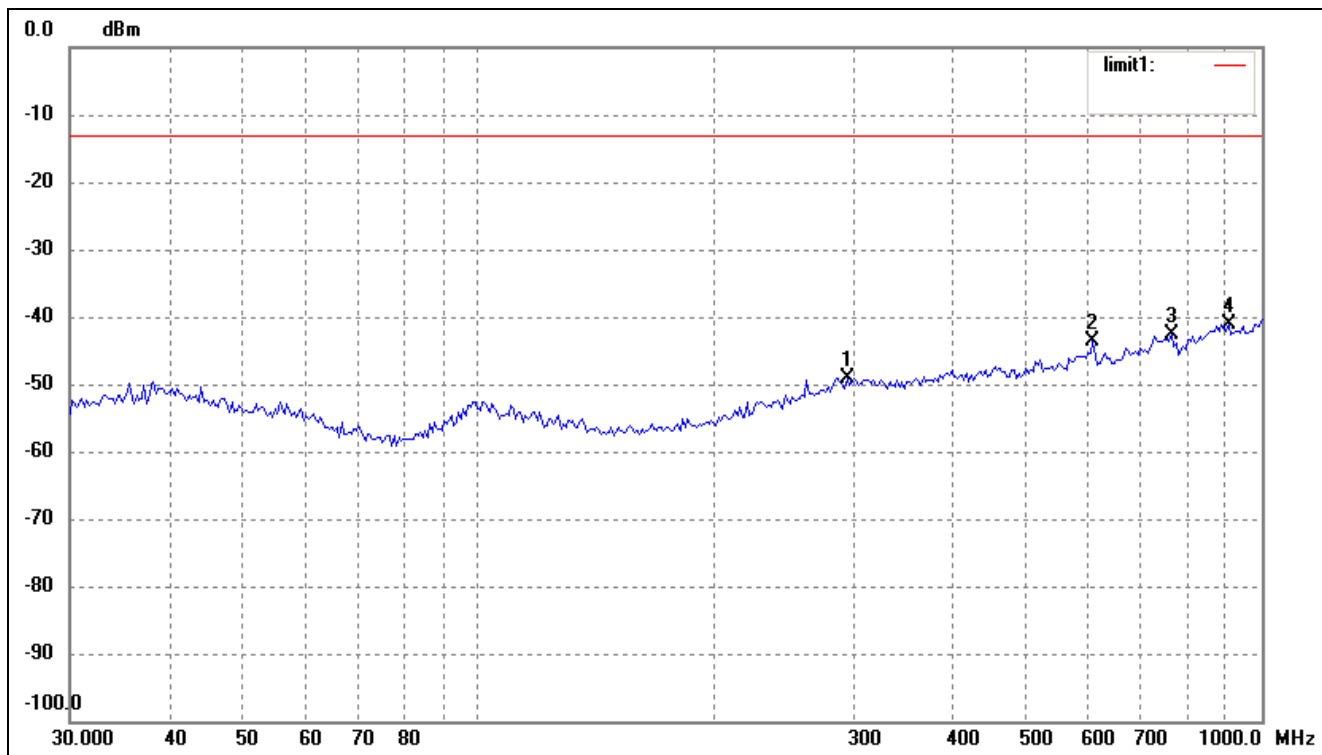
Vertical:



No.	Frequency (MHz)	Reading (dBm)	Correct (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	39.9942	-70.32	20.66	-49.66	-13.00	-36.66	ERP
2	100.2286	-69.95	17.92	-52.03	-13.00	-39.03	ERP
3	293.0842	-69.95	20.66	-49.29	-13.00	-36.29	ERP
4	744.8661	-69.34	27.10	-42.24	-13.00	-29.24	ERP
5	1000.0000	-69.49	29.05	-40.44	-13.00	-27.44	ERP

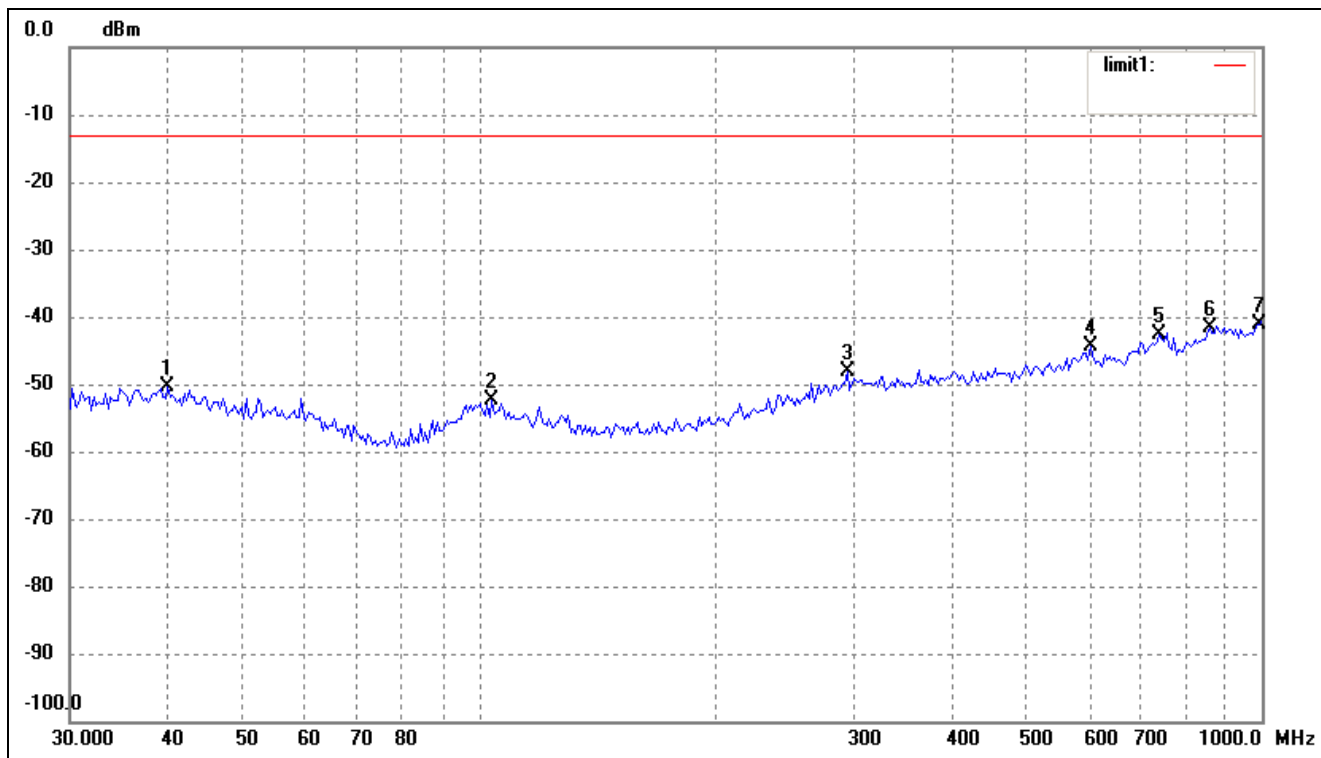
20MHz Bandwidth High Channel

Horizontal:



No.	Frequency (MHz)	Reading (dBm)	Correct (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	295.1469	-69.76	20.75	-49.01	-13.00	-36.01	ERP
2	607.7867	-68.19	24.47	-43.72	-13.00	-30.72	ERP
3	766.0572	-68.82	26.08	-42.74	-13.00	-29.74	ERP
4	906.4824	-69.62	28.43	-41.19	-13.00	-28.19	ERP

Vertical:



No.	Frequency (MHz)	Reading (dBm)	Correct (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	39.9942	-71.08	20.66	-50.42	-13.00	-37.42	ERP
2	103.8055	-70.03	17.55	-52.48	-13.00	-39.48	ERP
3	295.1469	-68.77	20.75	-48.02	-13.00	-35.02	ERP
4	603.5392	-69.16	24.77	-44.39	-13.00	-31.39	ERP
5	739.6605	-69.84	27.29	-42.55	-13.00	-29.55	ERP
6	857.0247	-69.62	27.91	-41.71	-13.00	-28.71	ERP
7	993.0114	-70.00	28.80	-41.20	-13.00	-28.20	ERP

*Spurious Emissions Above 1GHz**For 5MHz Bandwidth*

Frequency	Reading	Correct	Result	Limit	Margin	Polar
(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	H/V
Low Channel (3652.5MHz)						
7305.0	-51.41	14.16	-37.25	-13	-24.25	H
7305.0	-53.38	14.16	-39.22	-13	-26.22	V
10957.5	-68.06	19.54	-48.52	-13	-35.52	H
10957.5	-68.87	19.54	-49.33	-13	-36.33	V
Middle Channel (3662.5MHz)						
7325.0	-54.49	14.16	-40.33	-13	-27.33	H
7325.0	-53.39	14.16	-39.23	-13	-26.23	V
10987.5	-67.30	19.54	-47.76	-13	-34.76	H
10987.5	-68.97	19.54	-49.43	-13	-36.43	V
High Channel (3672.5MHz)						
7345.0	-53.59	14.16	-39.43	-13	-26.43	H
11017.5	-55.28	14.16	-41.12	-13	-28.12	V
7345.0	-66.63	19.54	-47.09	-13	-34.09	H
11017.5	-68.34	19.54	-48.80	-13	-35.80	V

For 10MHz Bandwidth

Frequency	Reading	Correct	Result	Limit	Margin	Polar
(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	H/V
Low Channel (3655MHz)						
7310.0	-51.52	14.16	-37.46	-13	-24.46	H
7310.0	-54.29	14.16	-40.13	-13	-27.13	V
10965.0	-69.12	19.54	-49.58	-13	-36.58	H
10965.0	-67.98	19.54	-48.44	-13	-35.44	V
Middle Channel (3662.5MHz)						
7325.0	-53.30	14.16	-39.14	-13	-26.14	H
7325.0	-54.57	14.16	-40.41	-13	-27.41	V
10987.5	-68.30	19.54	-48.76	-13	-35.76	H
10987.5	-68.58	19.54	-49.04	-13	-36.04	V
High Channel (3670MHz)						
7340.0	-54.28	14.16	-40.12	-13	-27.12	H
11010.0	-55.29	14.16	-41.13	-13	-28.13	V
7340.0	-68.79	19.54	-49.25	-13	-36.25	H
11010.0	-69.85	19.54	-50.31	-13	-37.31	V

For 15MHz Bandwidth

Frequency	Reading	Correct	Result	Limit	Margin	Polar
(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	H/V
Low Channel (3657.5MHz)						
7315.0	-53.58	14.16	-39.52	-13	-26.52	H
7315.0	-54.49	14.16	-40.33	-13	-27.33	V
10972.5	-68.33	19.54	-48.79	-13	-35.79	H
10972.5	-66.83	19.54	-47.29	-13	-34.29	V
High Channel (3667.5MHz)						
7335.0	-52.61	14.16	-38.45	-13	-25.45	H
11002.5	-54.29	14.16	-40.13	-13	-27.13	V
7335.0	-69.30	19.54	-49.76	-13	-36.76	H
11002.5	-70.30	19.54	-50.76	-13	-37.76	V

For 20MHz Bandwidth

Frequency	Reading	Correct	Result	Limit	Margin	Polar
(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	H/V
Low Channel (3660MHz)						
7320.0	-52.37	14.16	-39.54	-13	-25.31	H
7320.0	-52.01	14.16	-38.09	-13	-24.85	V
10980.0	-66.95	19.54	-48.87	-13	-34.41	H
10980.0	-66.39	19.54	-49.13	-13	-33.85	V
High Channel (3665MHz)						
7330.0	-52.47	14.16	-38.31	-13	-25.31	H
10995.0	-53.38	14.16	-39.22	-13	-26.22	V
7330.0	-69.24	19.54	-49.70	-13	-36.70	H
10995.0	-67.66	19.54	-48.12	-13	-35.12	V

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	2014-05-28	2015-05-27
Attenuator	ATTEN	ATS100-20-10	/	2014-05-28	2015-05-27
GONGWEN	Moisture Test Chamber	GDS-150	SEMT-0013	2014-05-28	2015-05-27

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

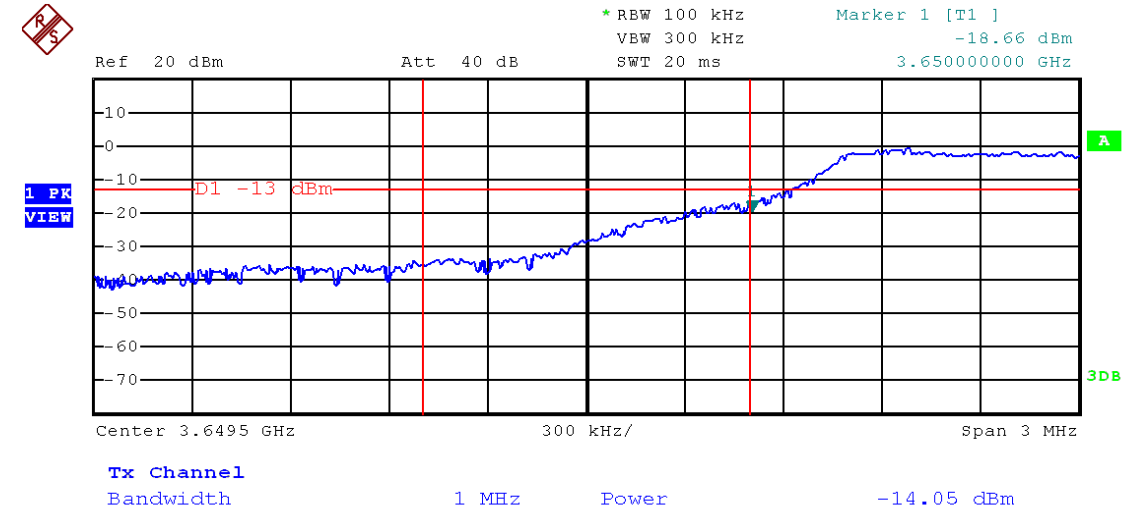
Limit: $43 + 10 \log (P)$ below the channel transmitter power = -13 dBm/MHz

All the Plots is below -13dBm/MHz

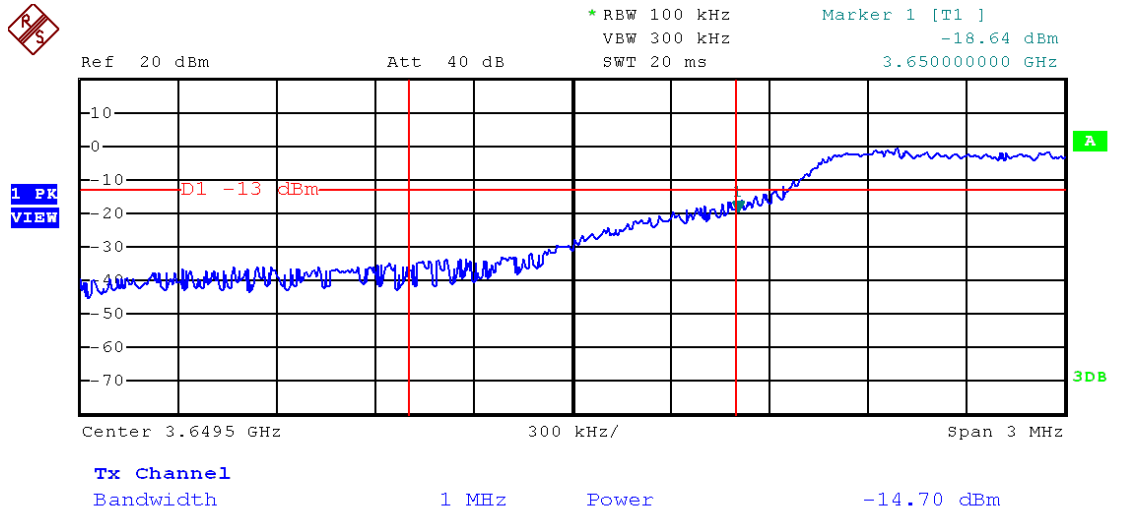
Test Result: Pass

For 5 MHz Bandwidth

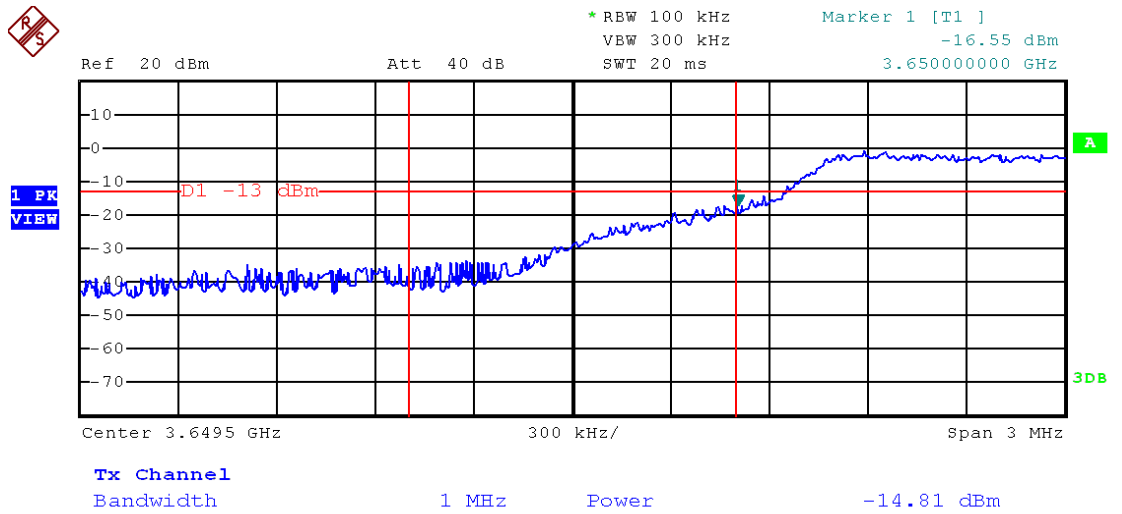
Lower band edge (20°C,120V) -14.05dBm<13dBm



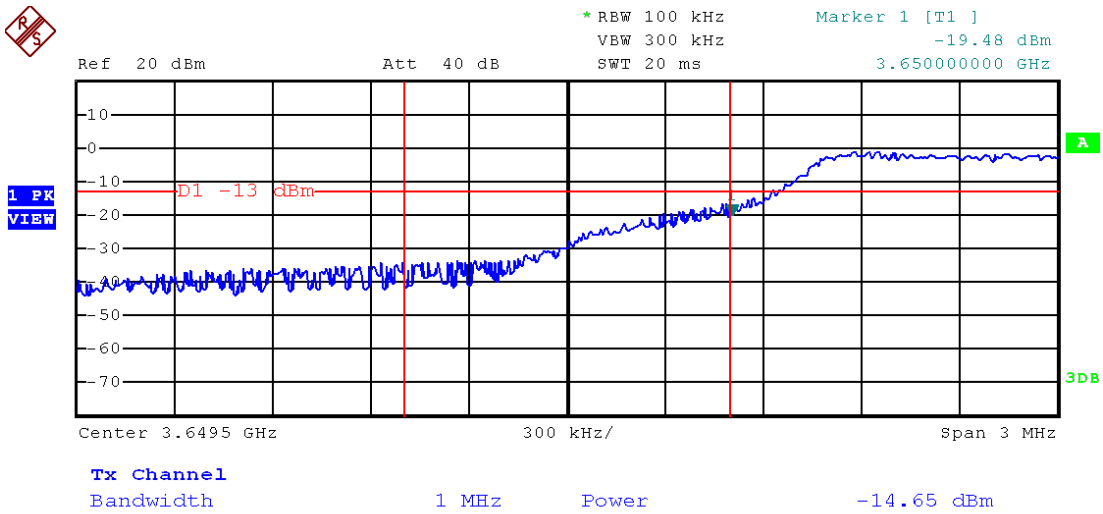
Lower band edge (20°C,102V) -14.70dBm<13dBm



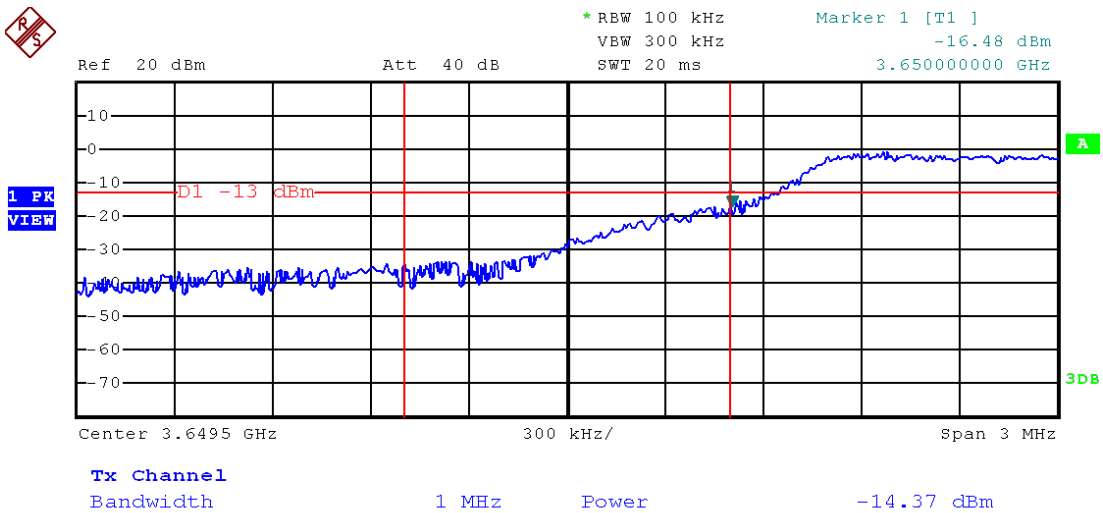
Lower band edge (20°C,138V) -14.81dBm<13dBm



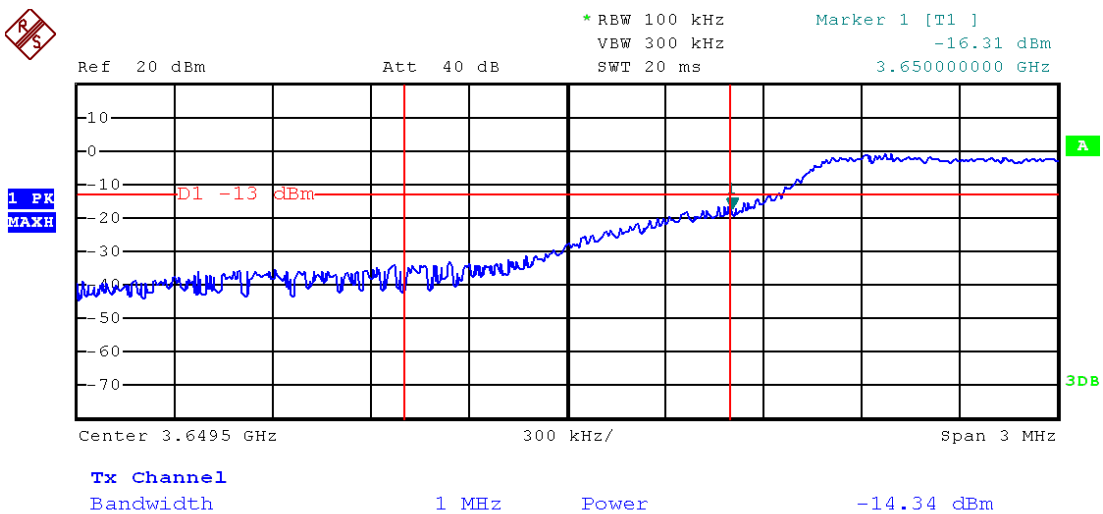
Lower band edge (30°C,120V) -14.65dBm<13dBm



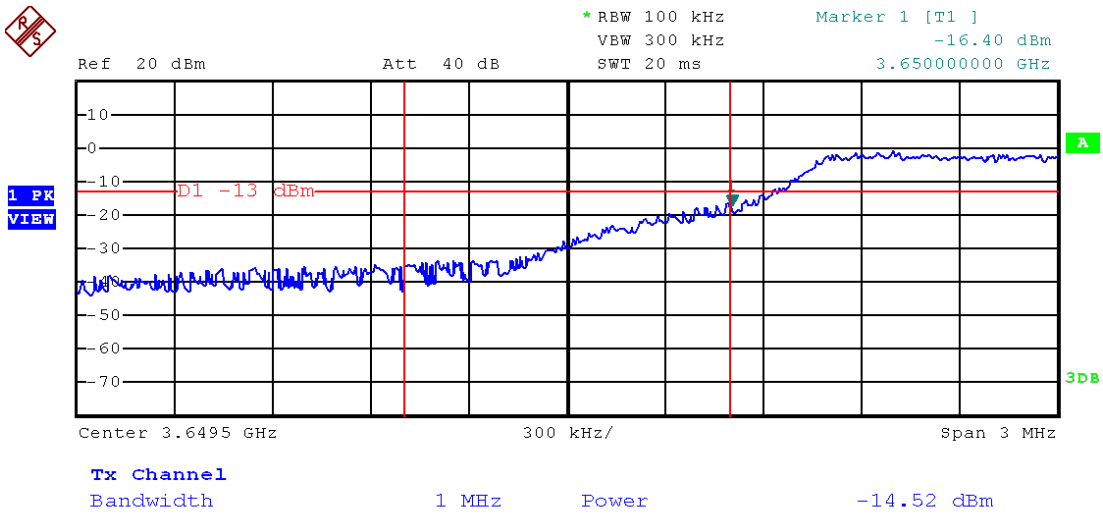
Lower band edge (40°C,120V) -14.37dBm<13dBm



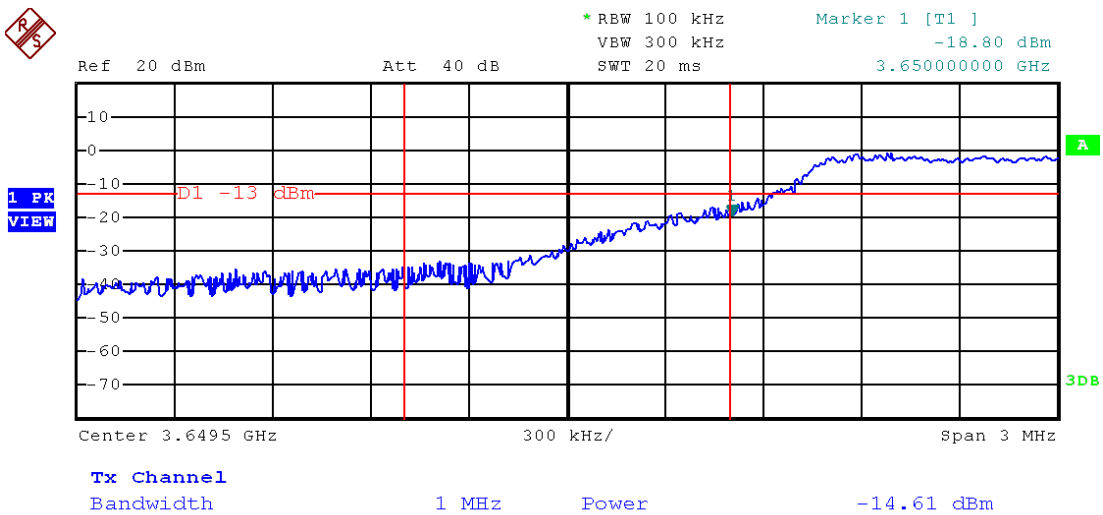
Lower band edge (50°C,120V) -14.34dBm<13dBm



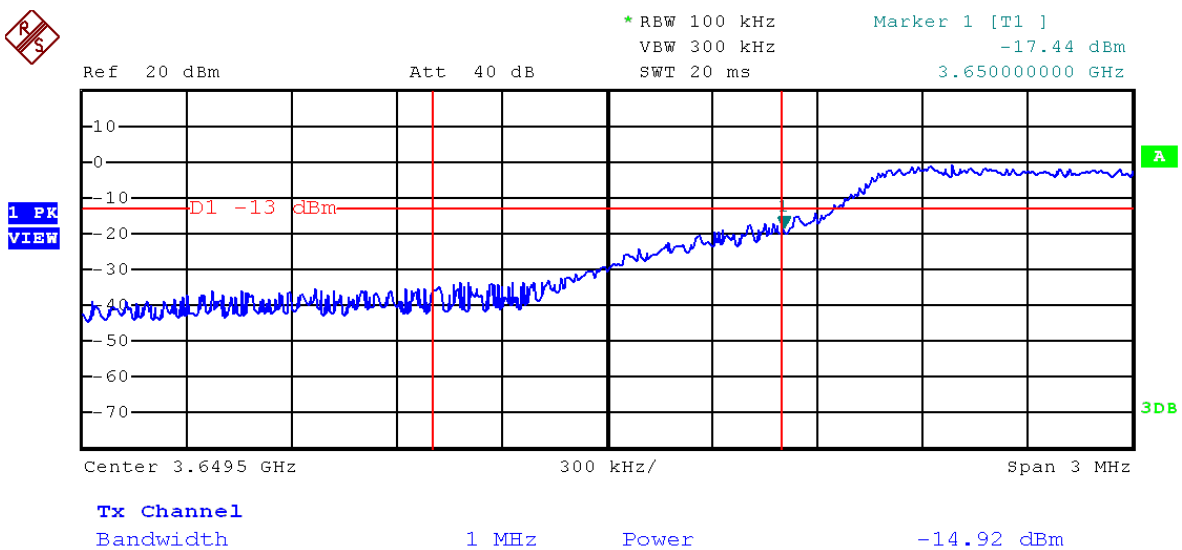
Lower band edge (10°C,120V) -14.52dBm<13dBm



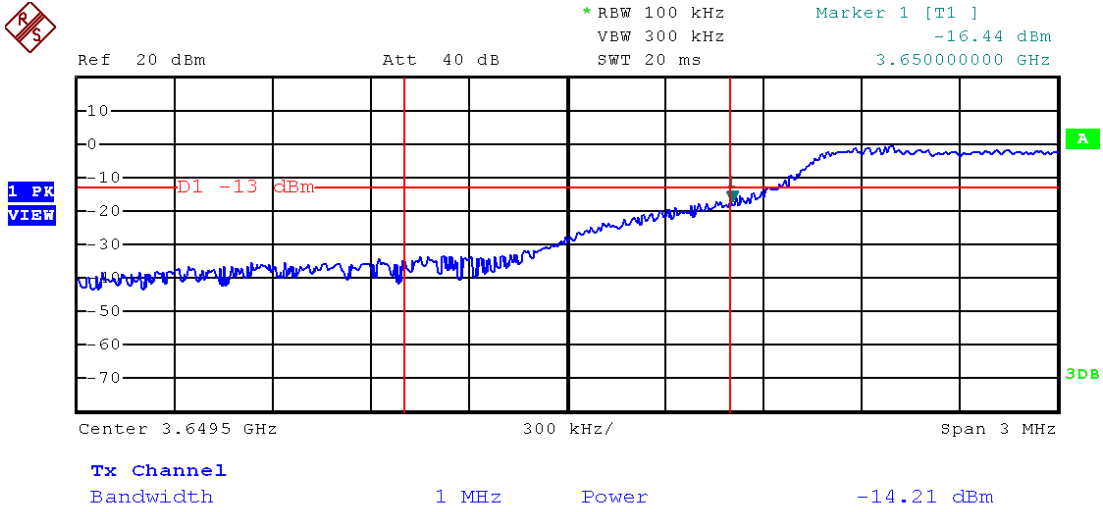
Lower band edge (0°C,120V) -14.61dBm<13dBm



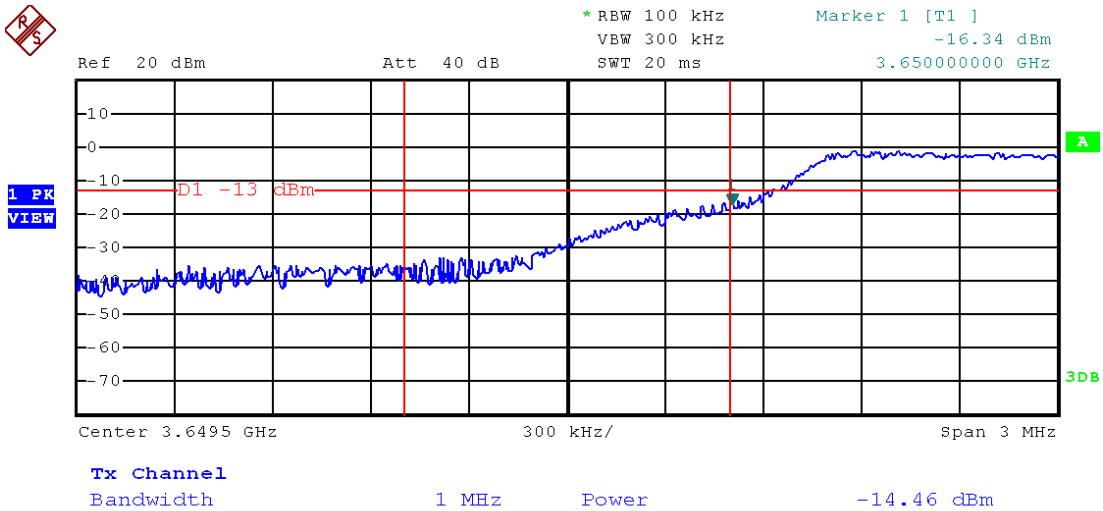
Lower band edge (-10°C,120V) -14.92dBm<13dBm



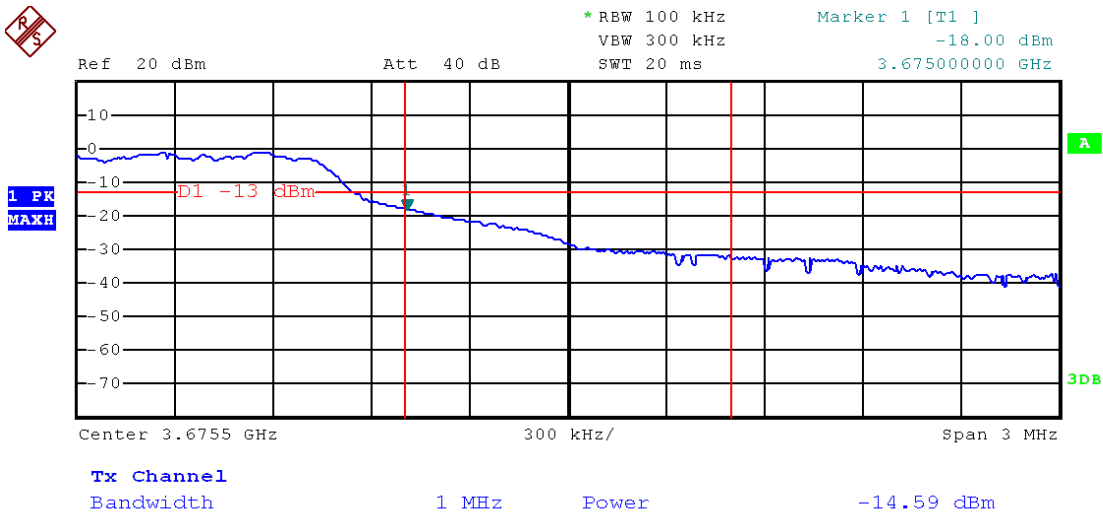
Lower band edge (-20°C, 120V) -14.21dBm<13dBm



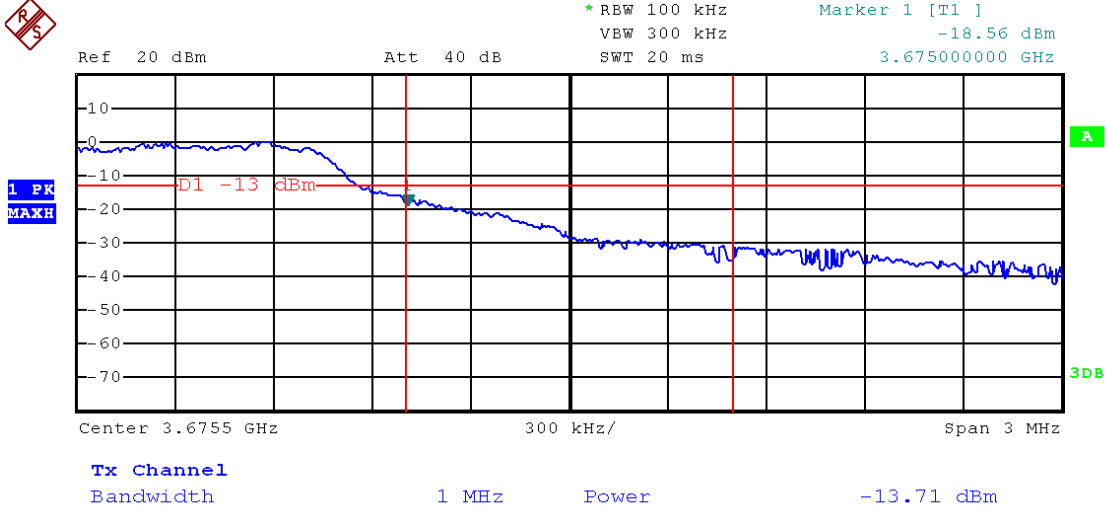
Lower band edge (-30°C, 120V) -14.46dBm<13dBm



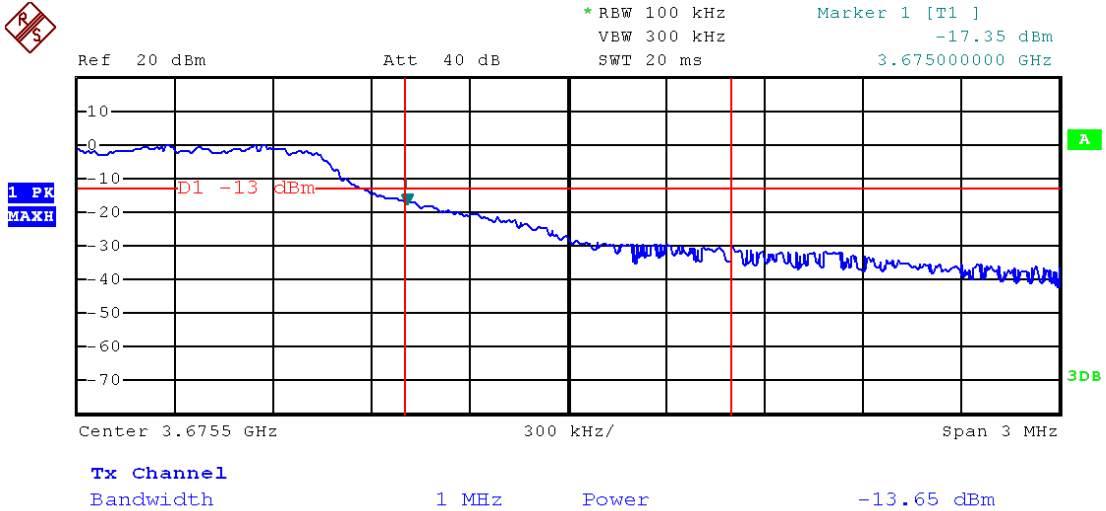
Upper band edge (20°C, 120V) -14.59dBm<13dBm



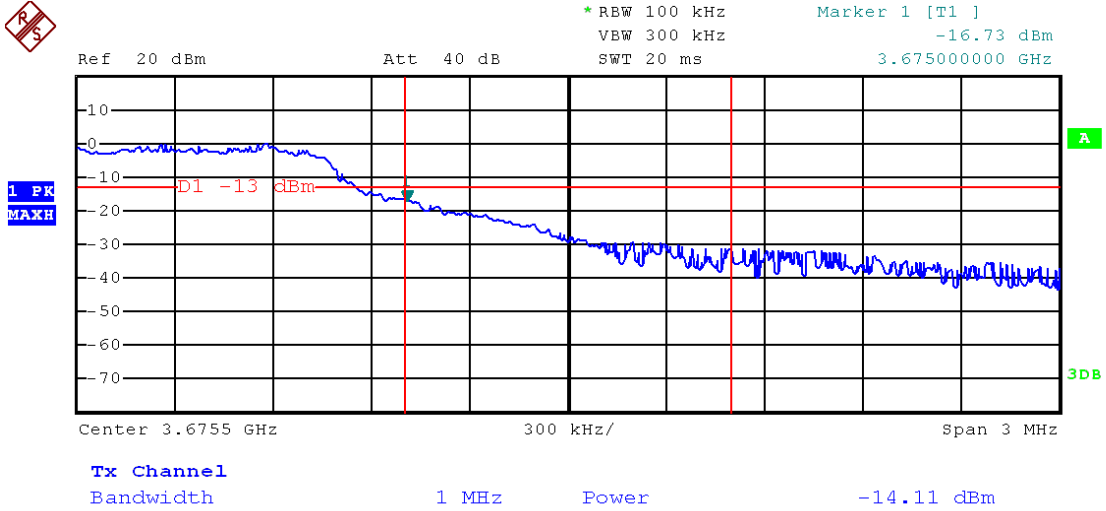
Upper band edge (20°C,102V) -13.71dBm<13dBm



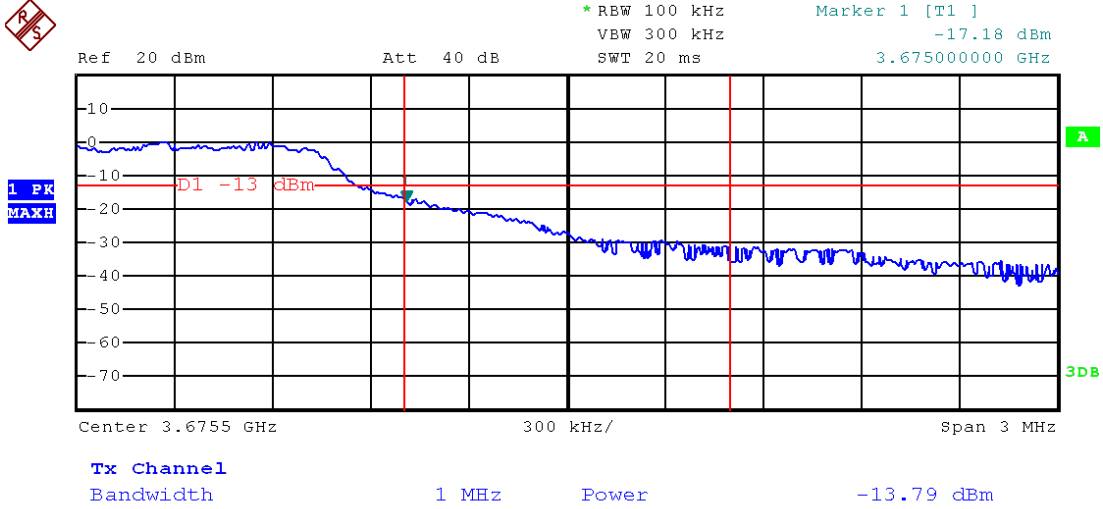
Upper band edge (20°C,138V) -13.65dBm<13dBm



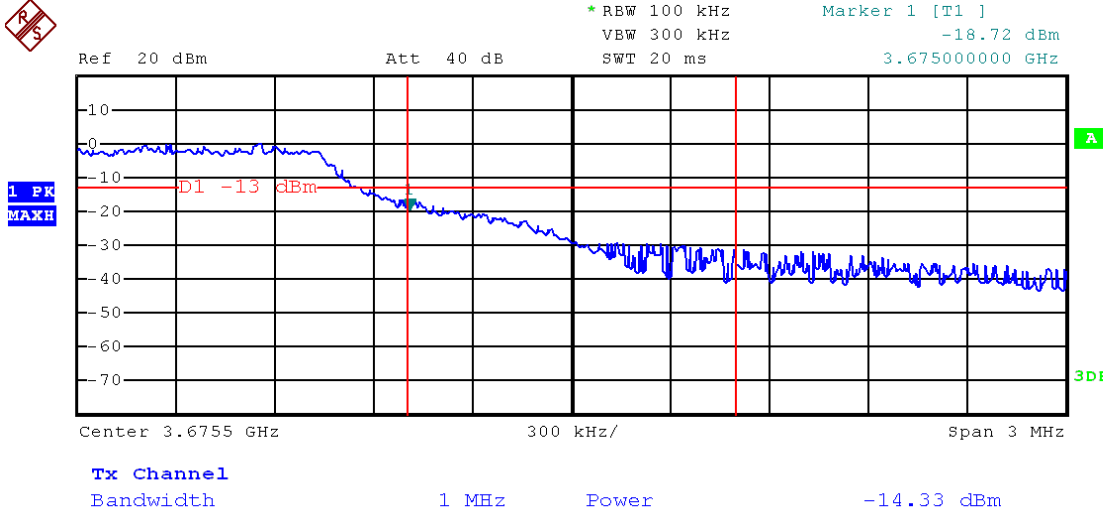
Upper band edge (30°C,120V) -14.11dBm<13dBm



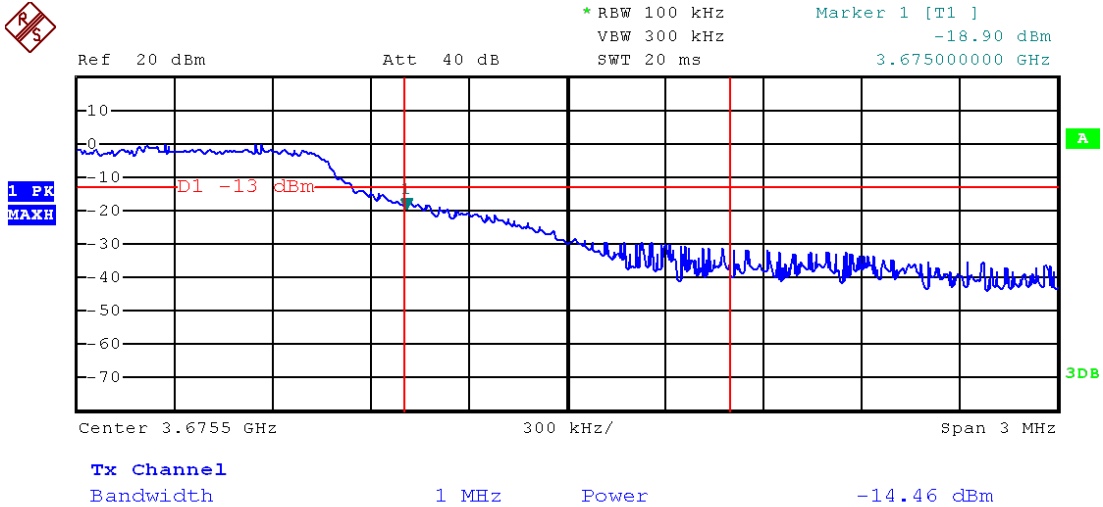
Upper band edge (40°C,120V) -13.79dBm<13dBm



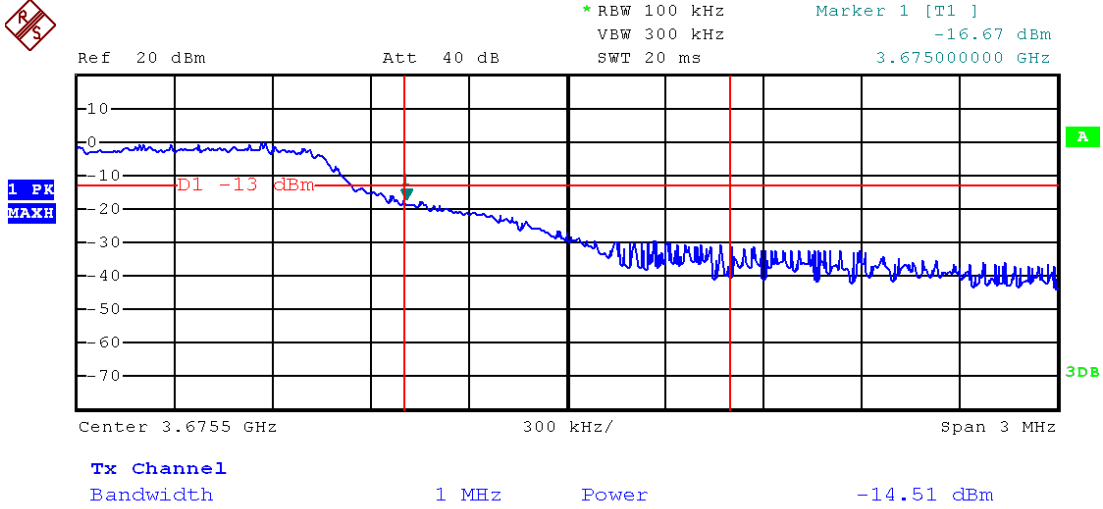
Upper band edge (50°C,120V) -14.33dBm<13dBm



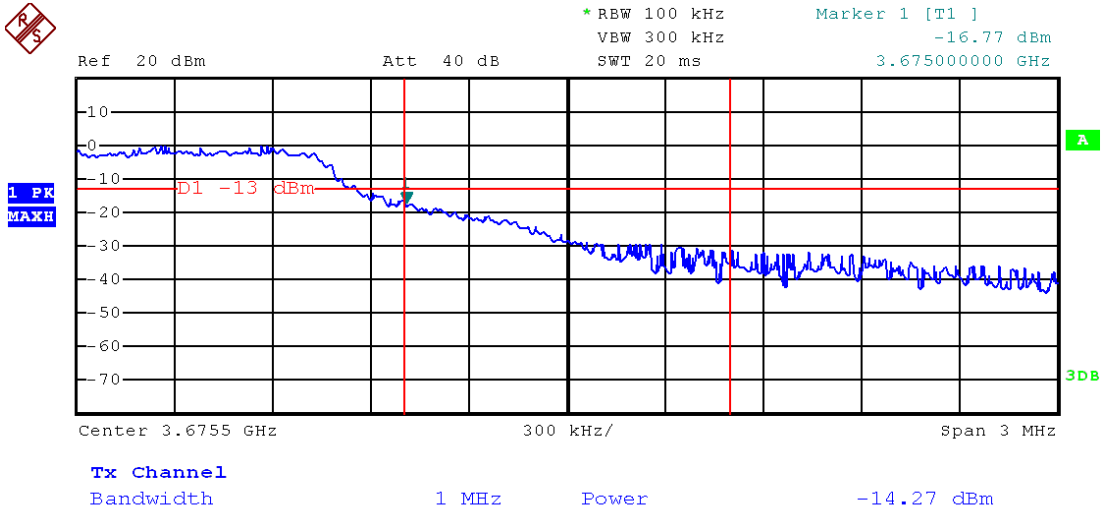
Upper band edge (10°C,120V) -14.46dBm<13dBm



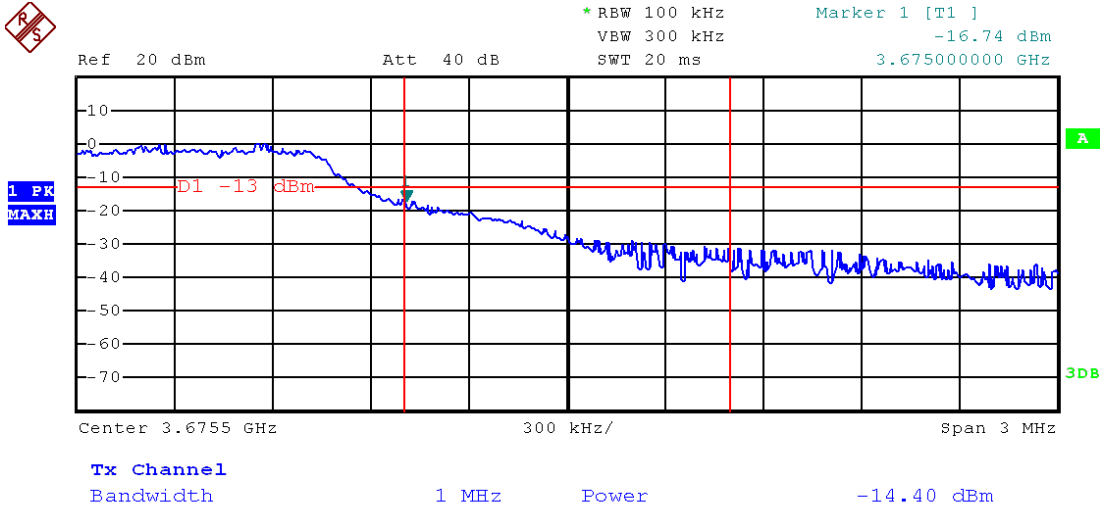
Upper band edge (0°C,120V) -14.51dBm<13dBm



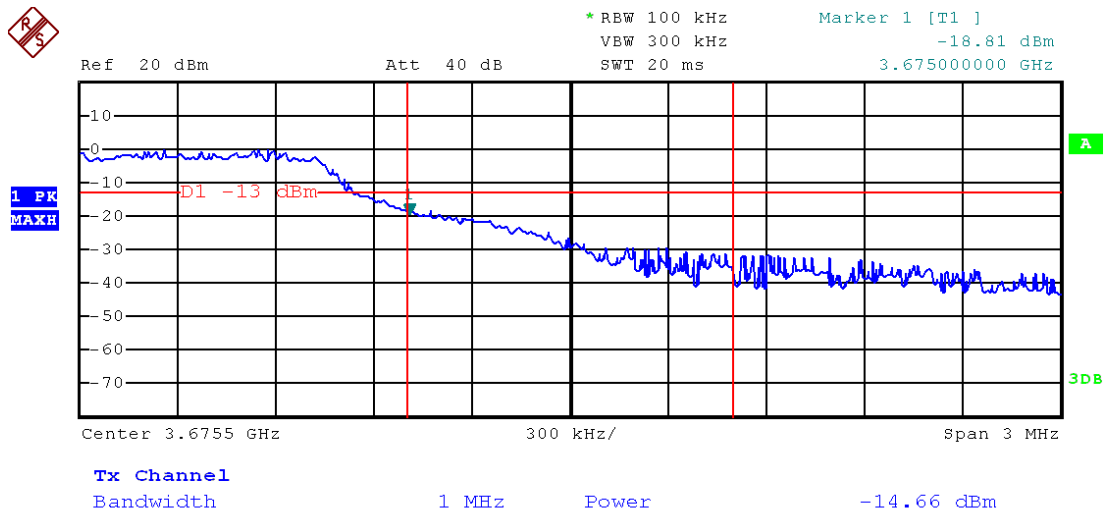
Upper band edge (-10°C,120V) -14.27dBm<13dBm



Upper band edge (-20°C,120V) -14.40 dBm<13dBm

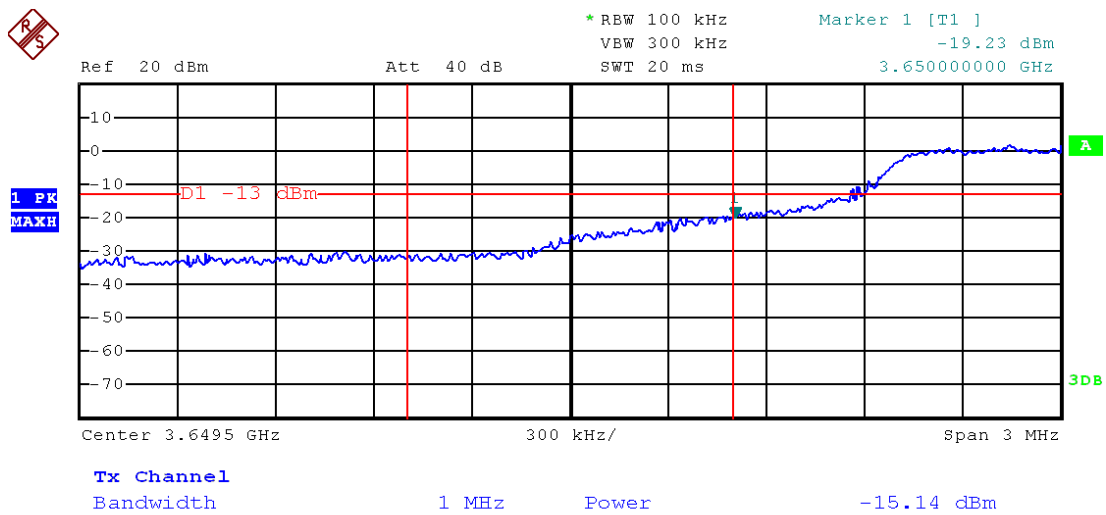


Upper band edge (-30°C,120V) -14.66dBm<13dBm

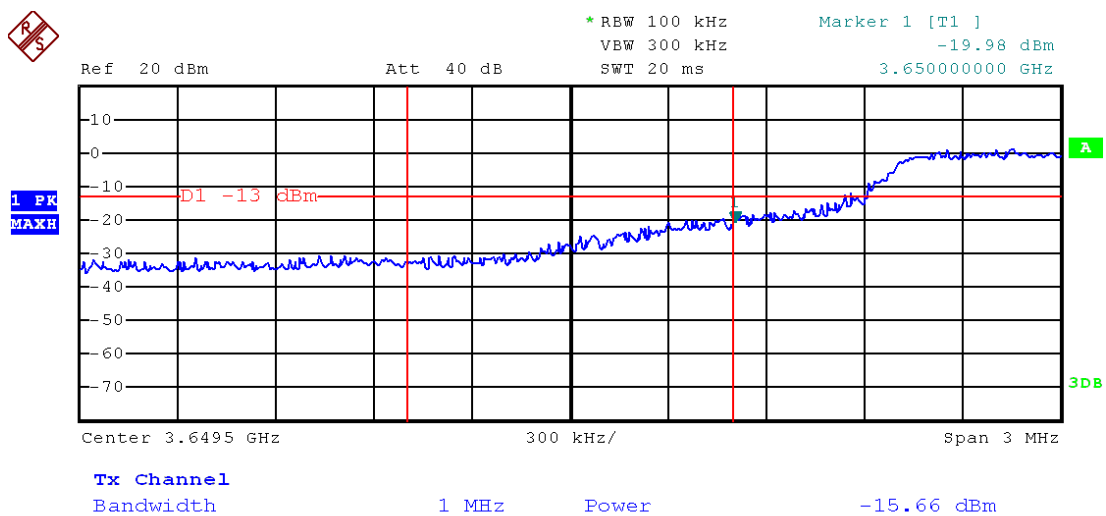


For 10 MHz Bandwidth

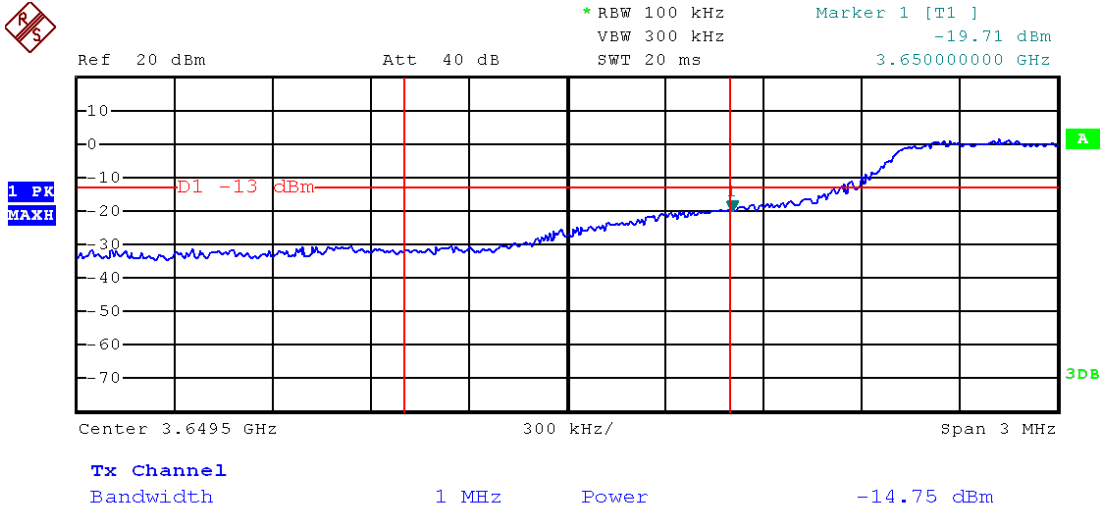
Lower band edge (20°C,120V) -15.14dBm<13dBm



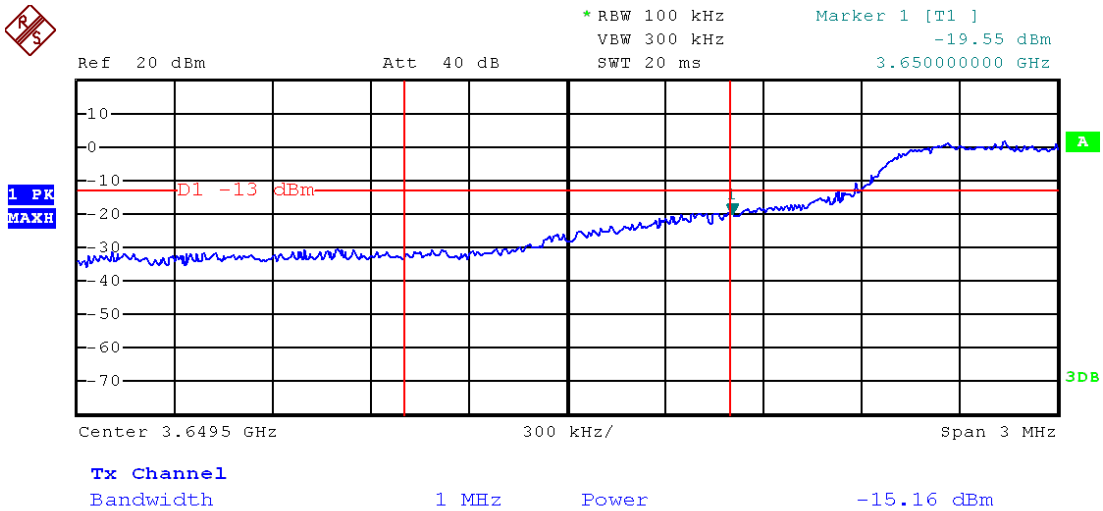
Lower band edge (20°C,102V) -15.66dBm<13dBm



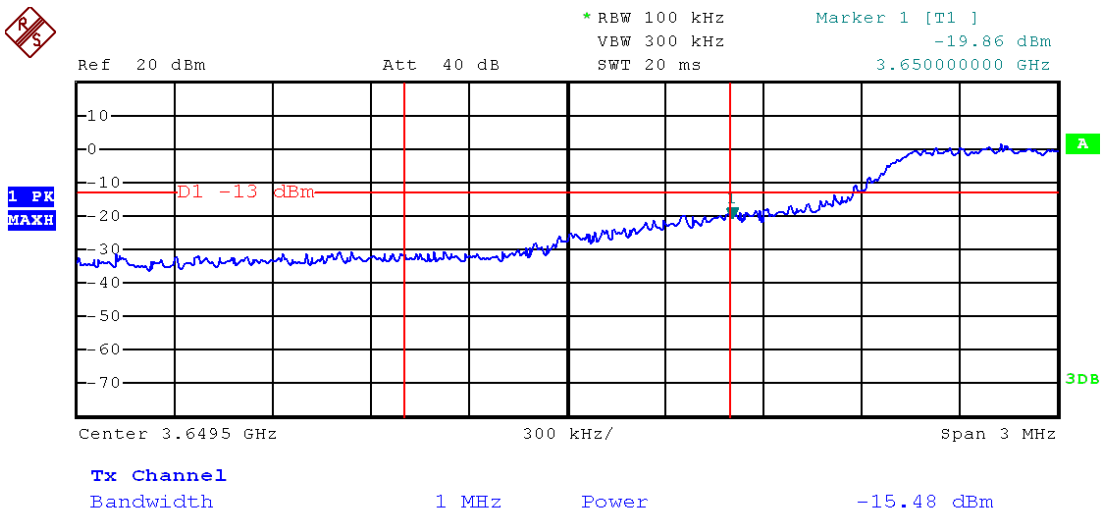
Lower band edge (20°C,138V) -14.75dBm<13dBm



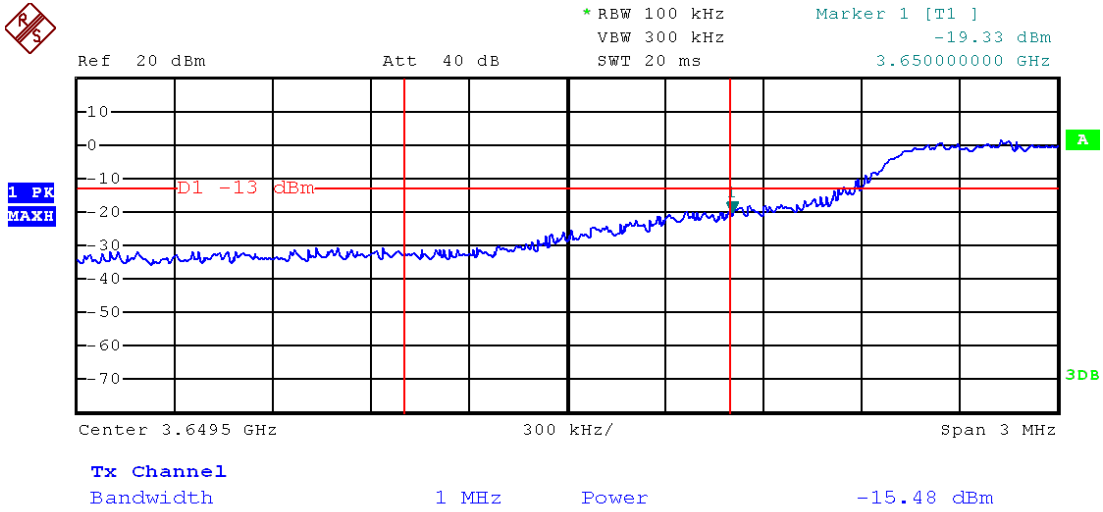
Lower band edge (30°C,120V) -15.16dBm<13dBm



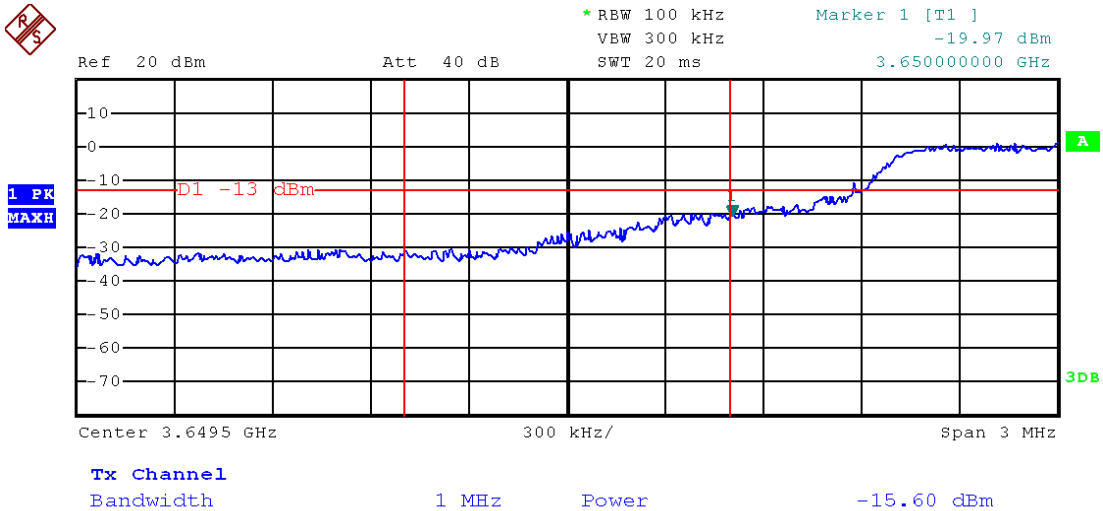
Lower band edge (40°C,120V) -15.48dBm<13dBm



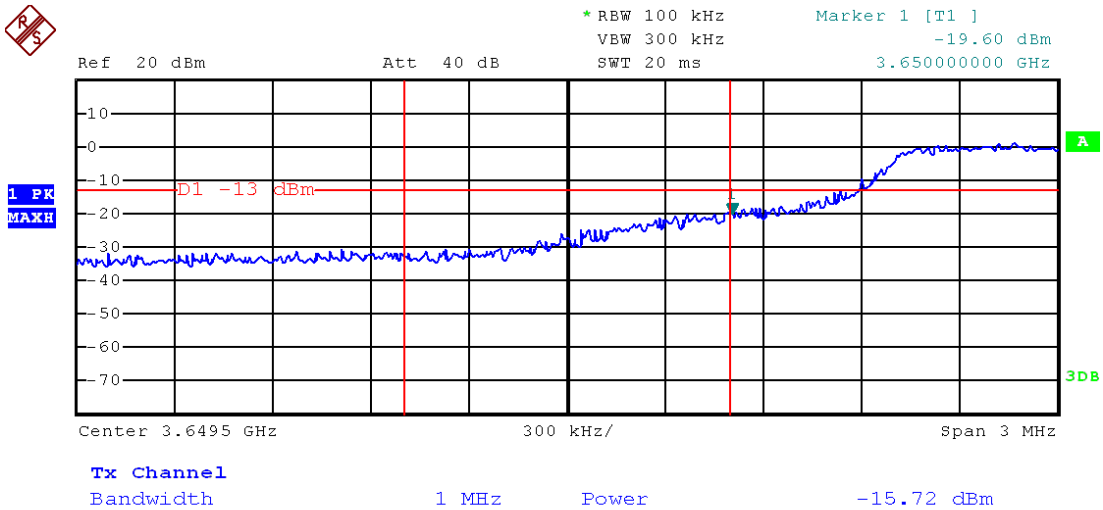
Lower band edge (50°C,120V) -15.48dBm<13dBm



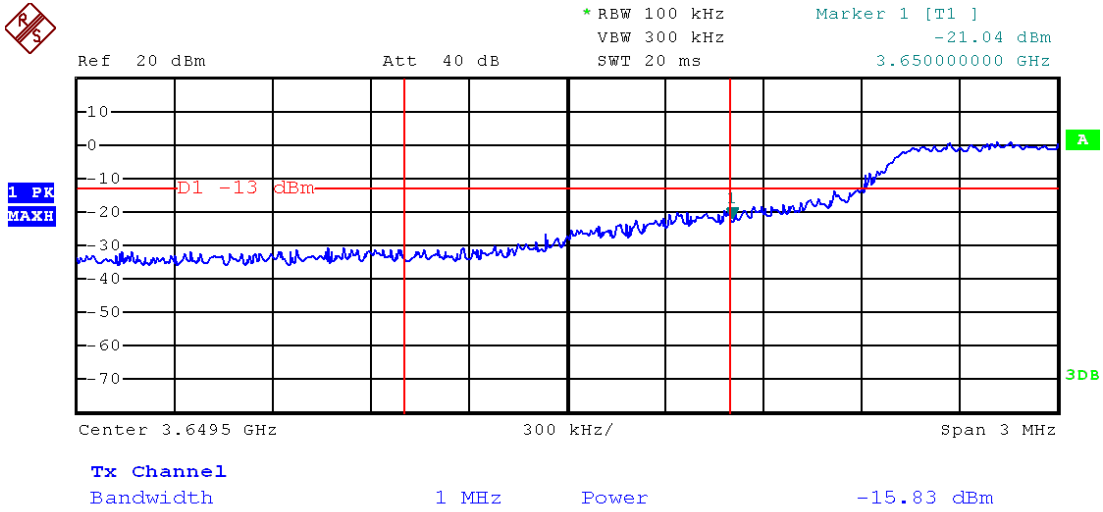
Lower band edge (10°C,120V) -15.60dBm<13dBm



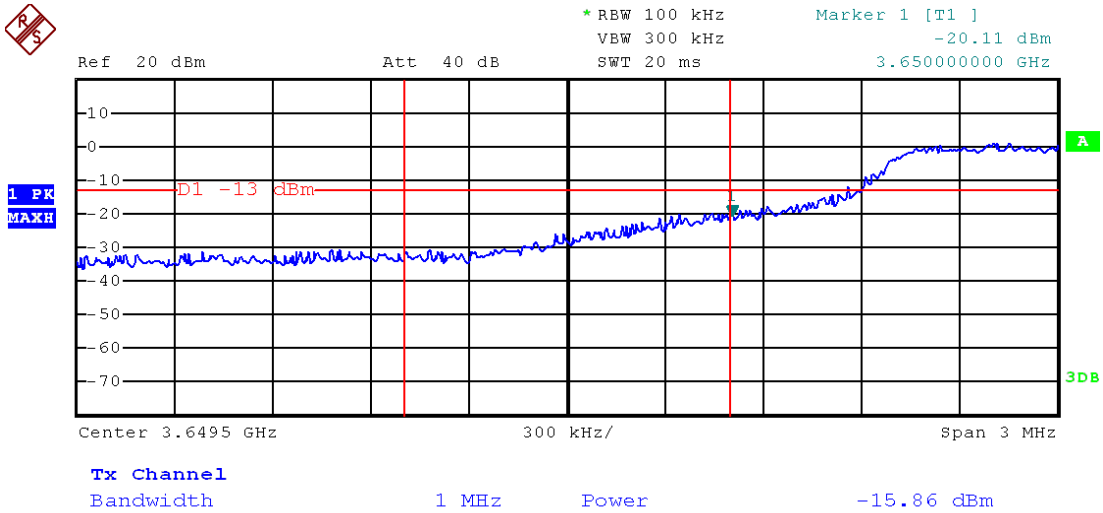
Lower band edge (0°C,120V) -15.72dBm<13dBm



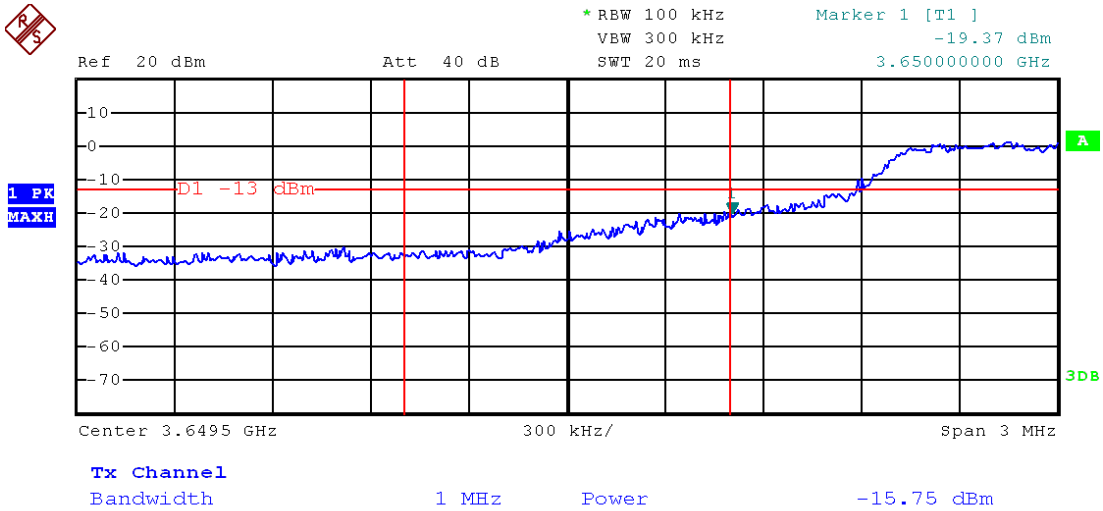
Lower band edge (-10°C,120V) -15.83dBm<13dBm



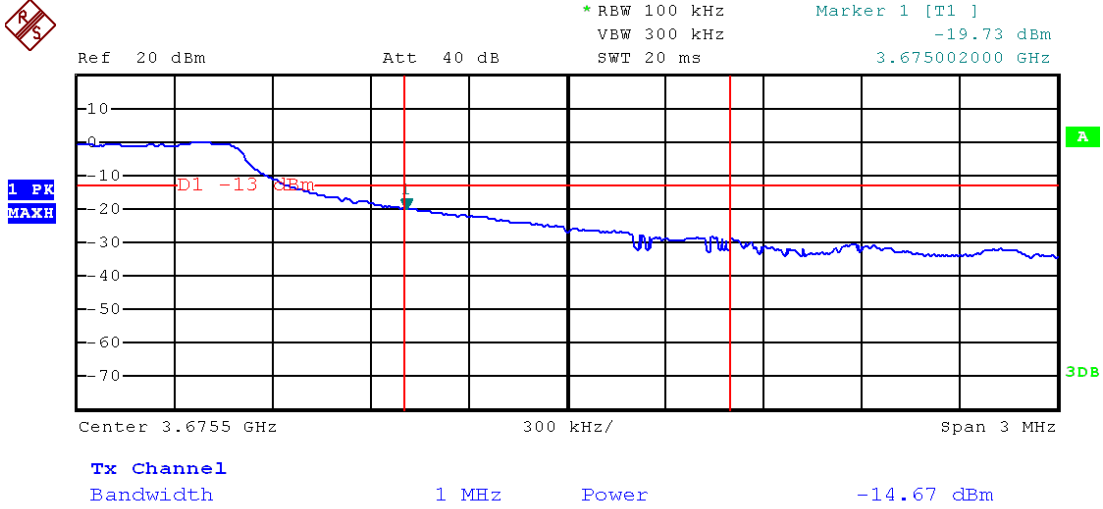
Lower band edge (-20°C,120V) dBm<13dBm



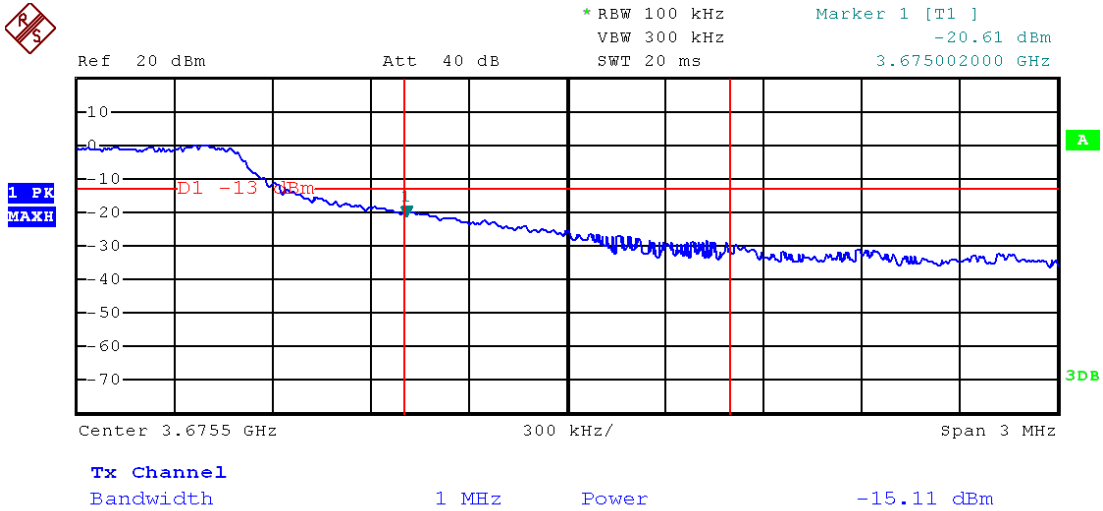
Lower band edge (-30°C,120V) -15.75dBm<13dBm



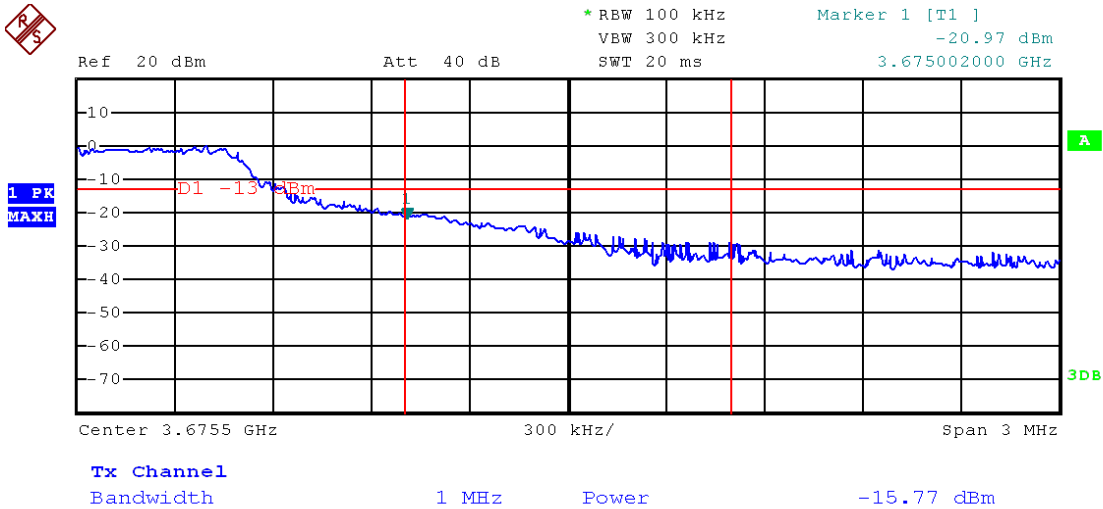
Upper band edge (20°C,120V) -14.67dBm<13dBm



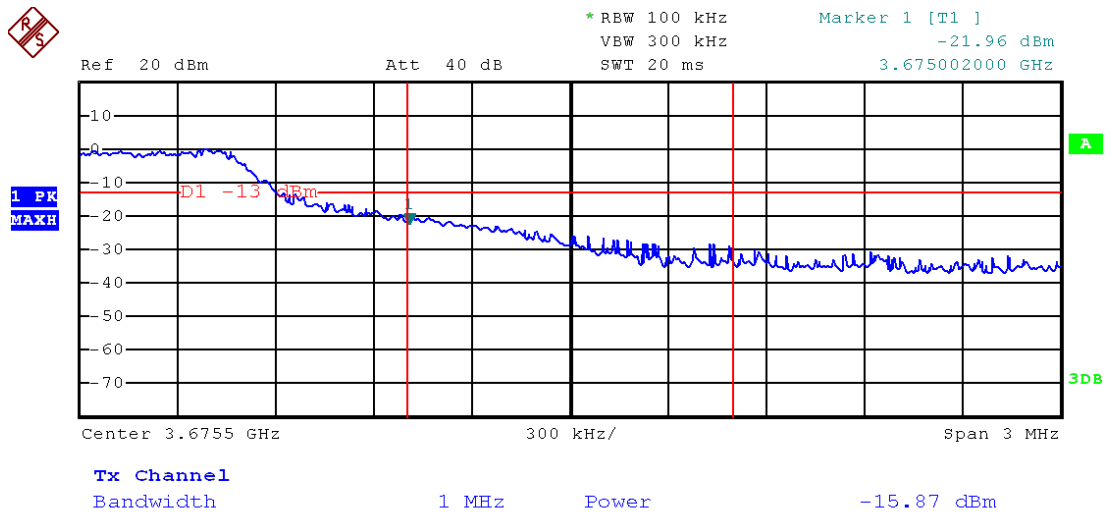
Upper band edge (20°C,102V) -15.11dBm<13dBm



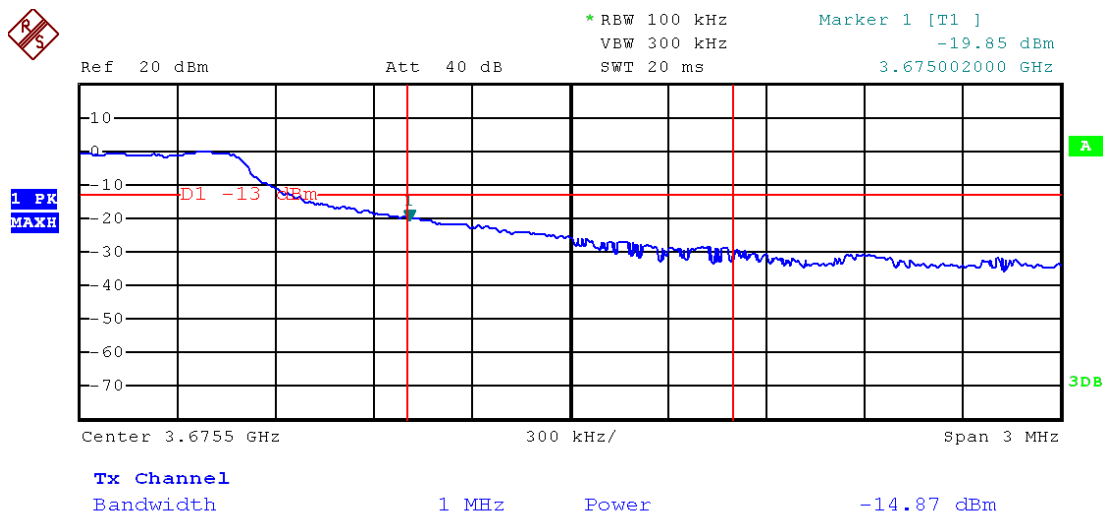
Upper band edge (20°C,138V) -15.77dBm<13dBm



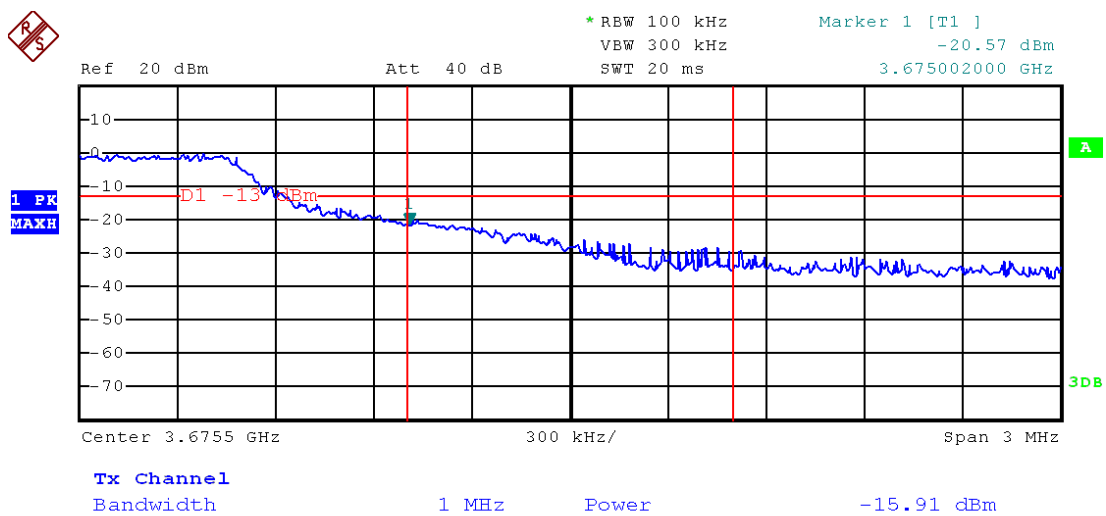
Upper band edge (30°C,120V) -15.87dBm<13dBm



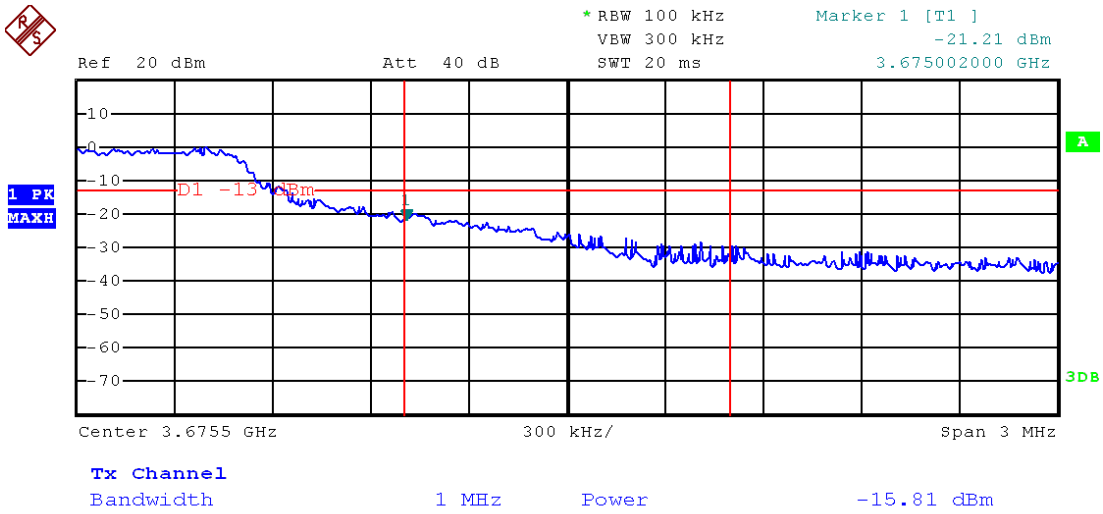
Upper band edge (40°C,120V) -14.87dBm<13dBm



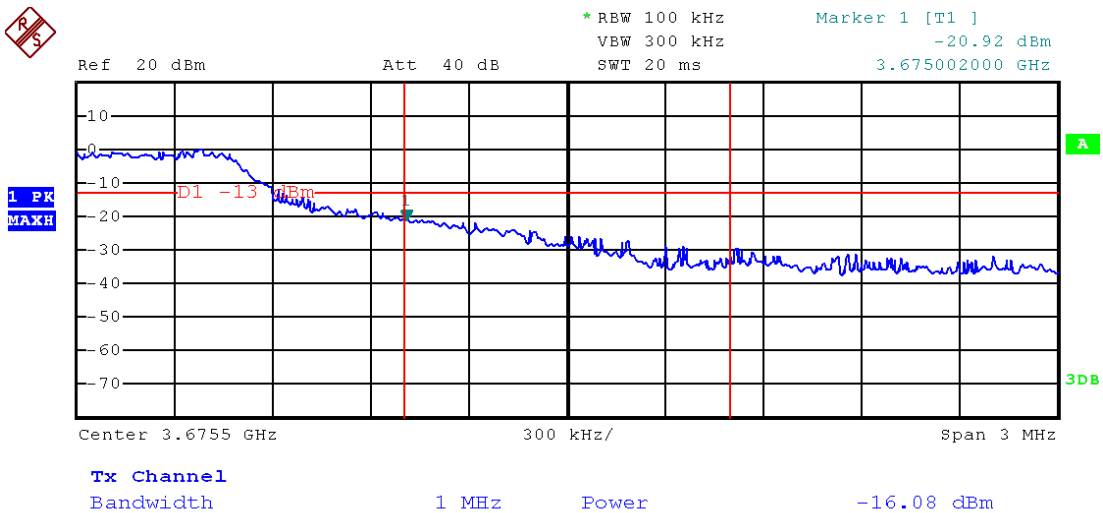
Upper band edge (50°C,120V) -15.91dBm<13dBm



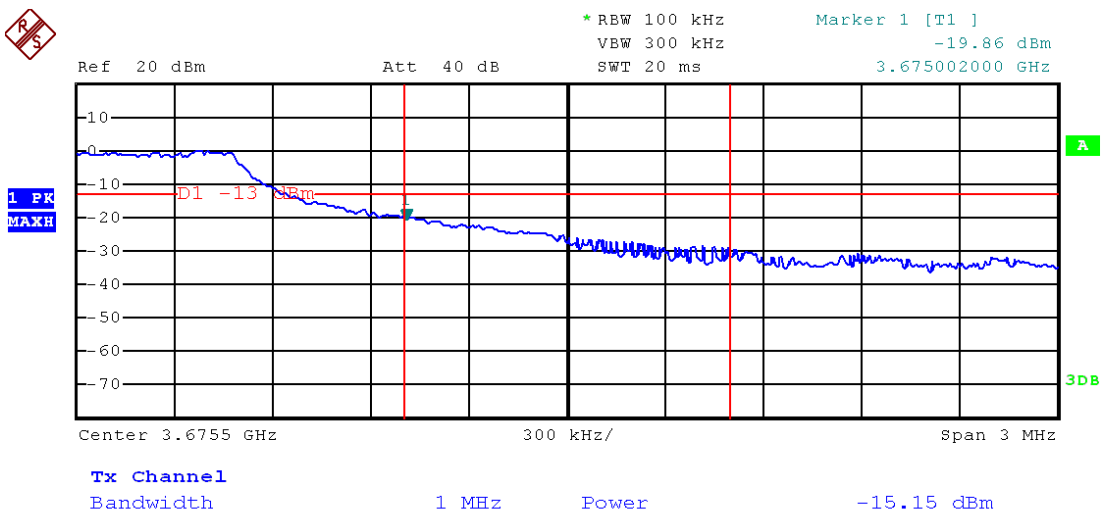
Upper band edge (10°C,120V) -15.81dBm<13dBm



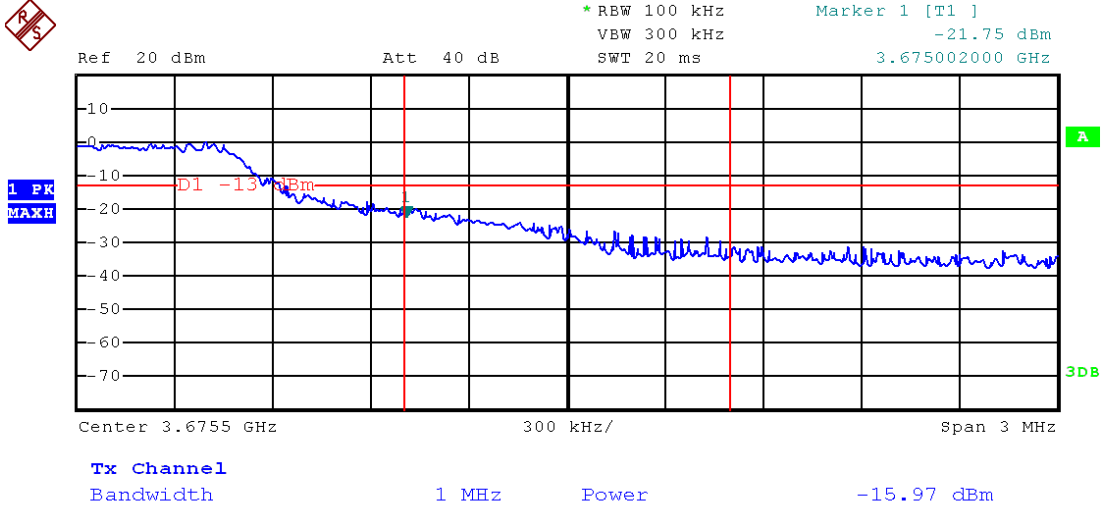
Upper band edge (0°C,120V) -16.08dBm<13dBm



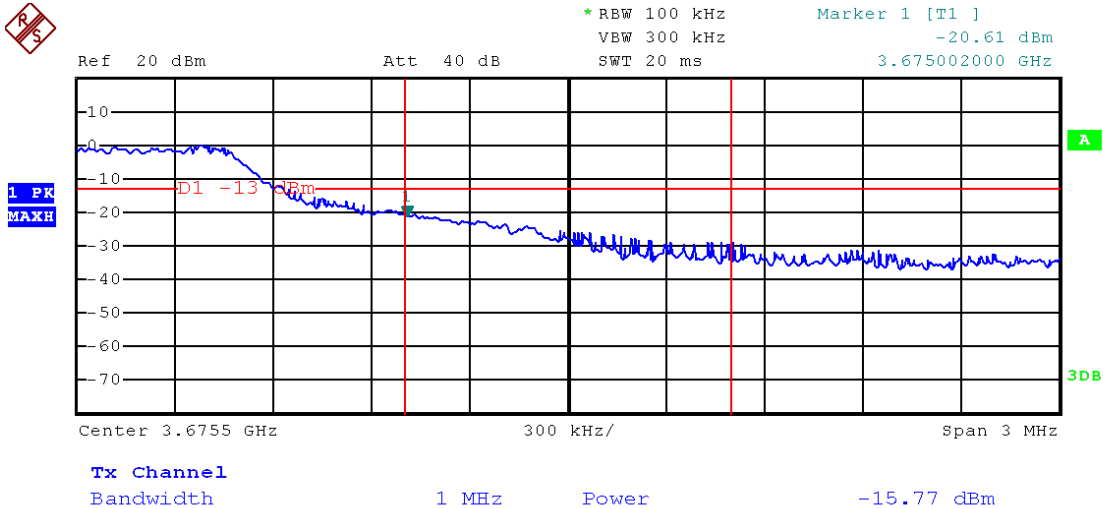
Upper band edge (-10°C,120V) -15.15dBm<13dBm



Upper band edge (-20°C,120V) -15.97dBm<13dBm

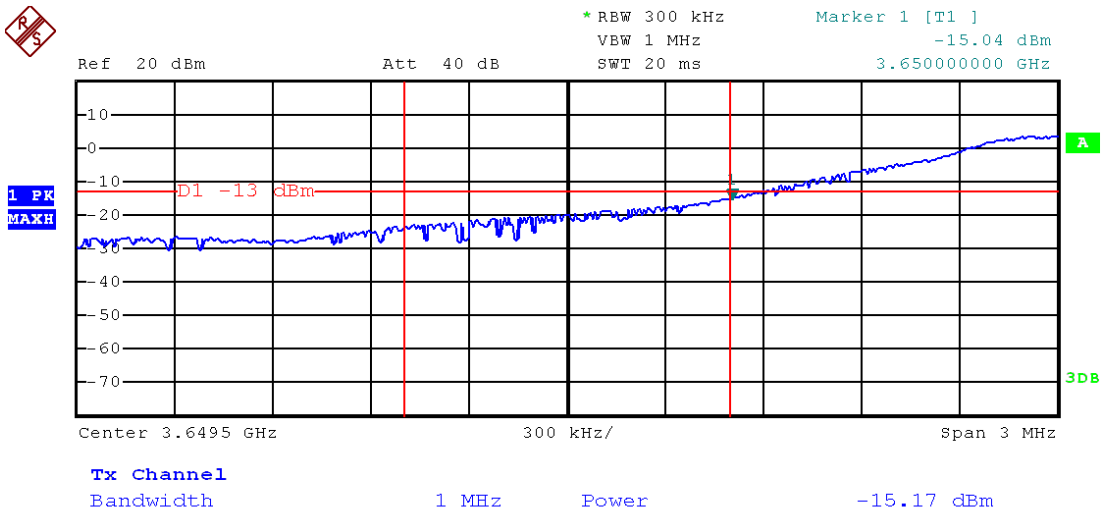


Upper band edge (-30°C,120V) -15.77dBm<13dBm

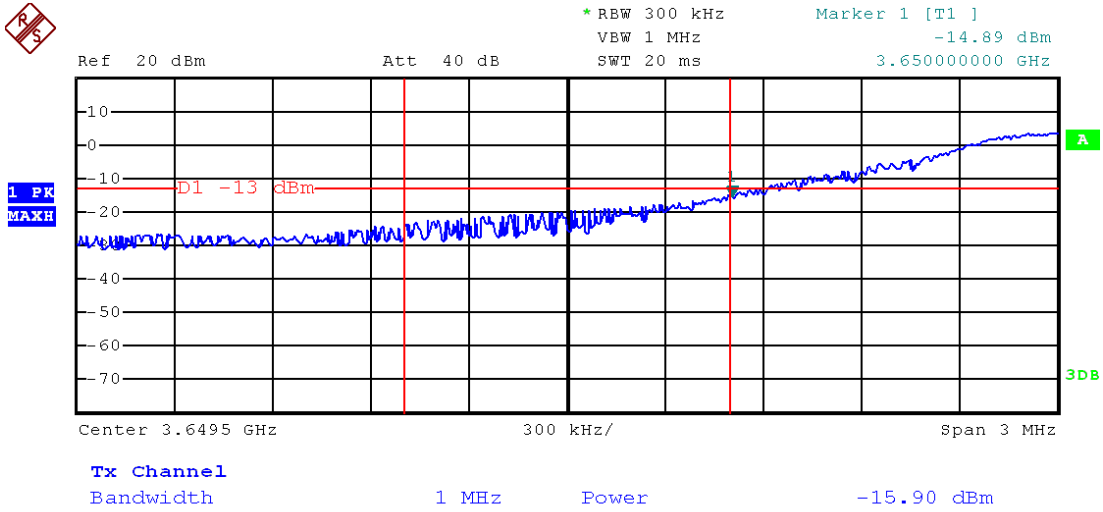


For 15 MHz Bandwidth

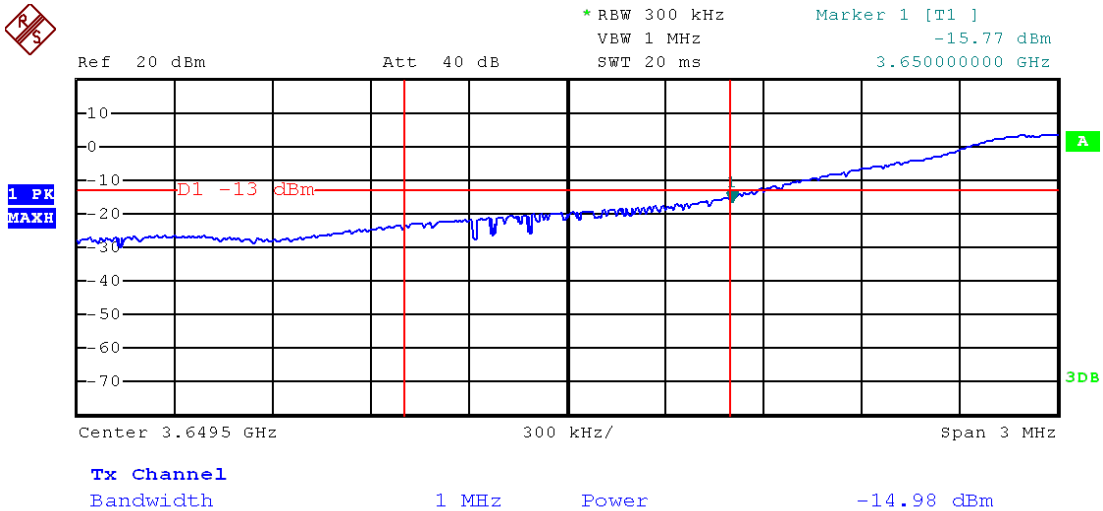
Lower band edge (20°C,120V) -15.17dBm<13dBm



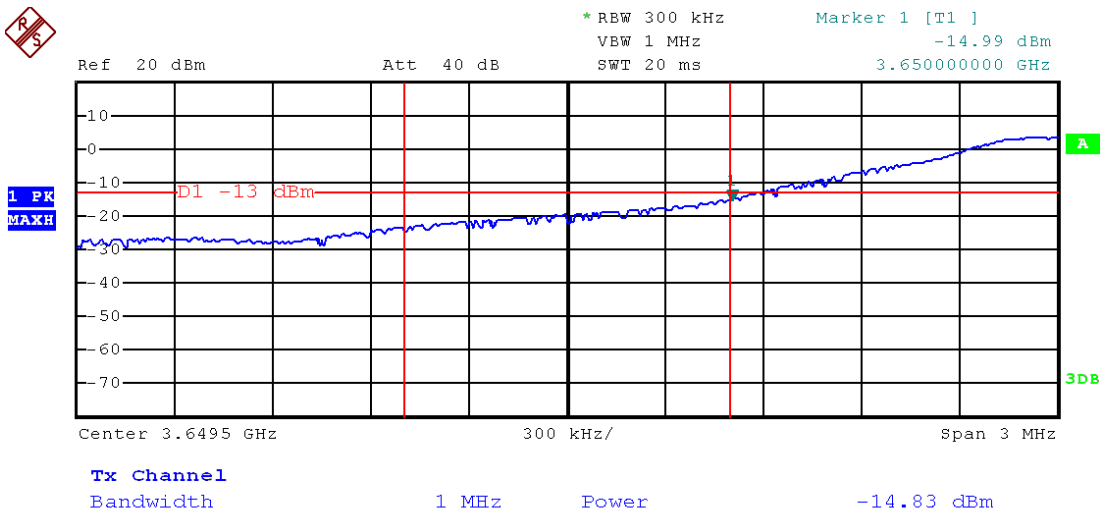
Lower band edge (20°C,102V) -15.90dBm<13dBm



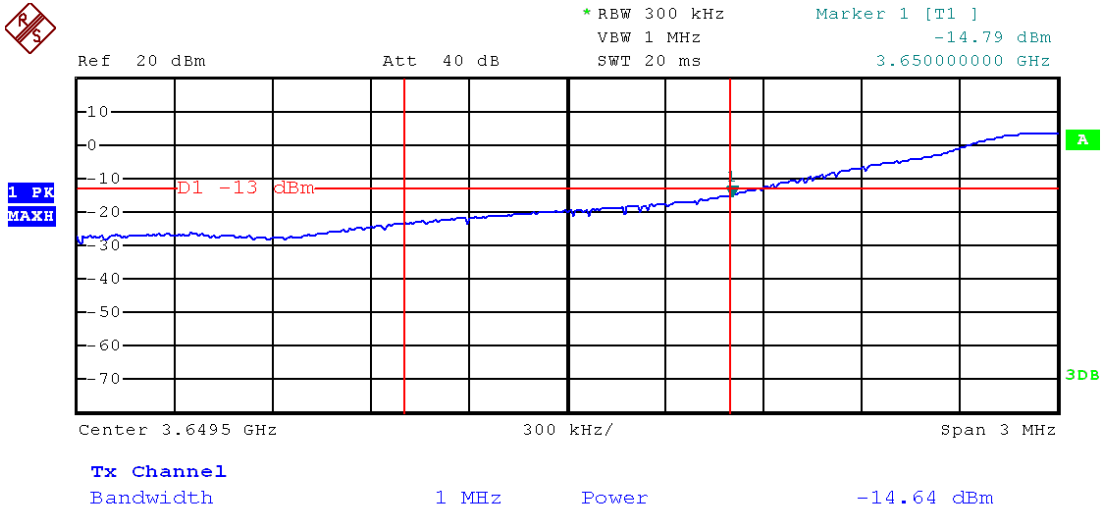
Lower band edge (20°C,138V) -14.98dBm<13dBm



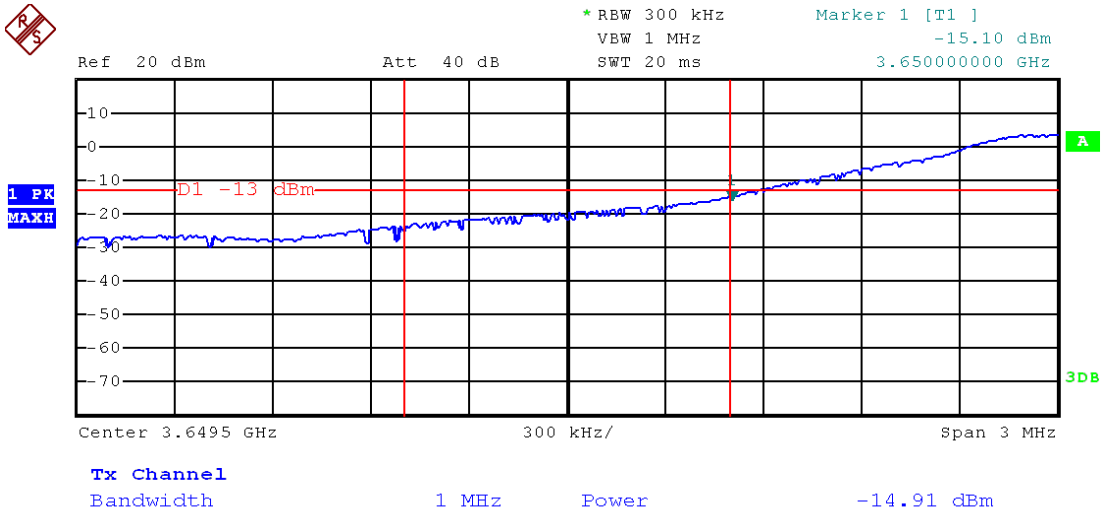
Lower band edge (30°C,120V) -14.83dBm<13dBm



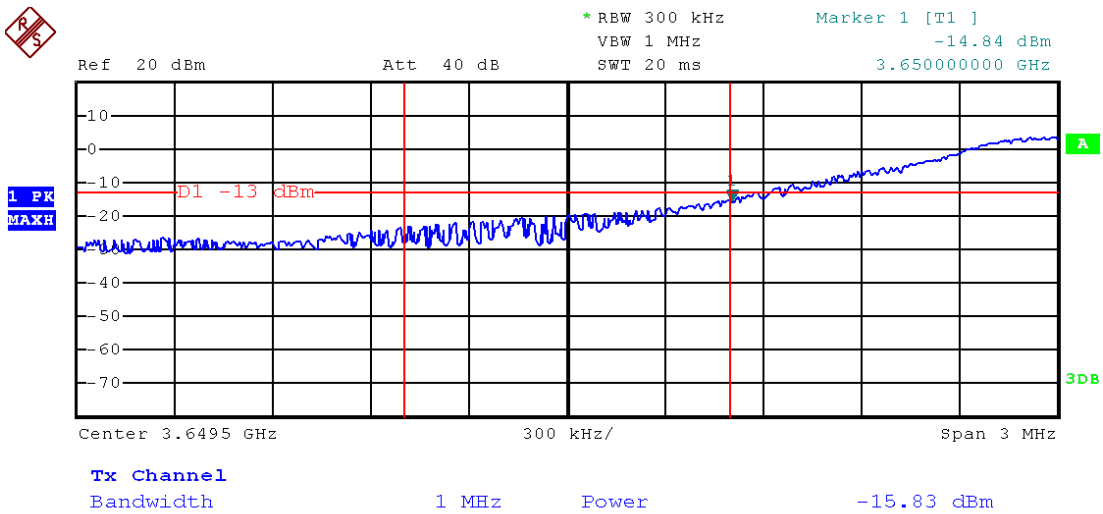
Lower band edge (40°C,120V) -14.64dBm<13dBm



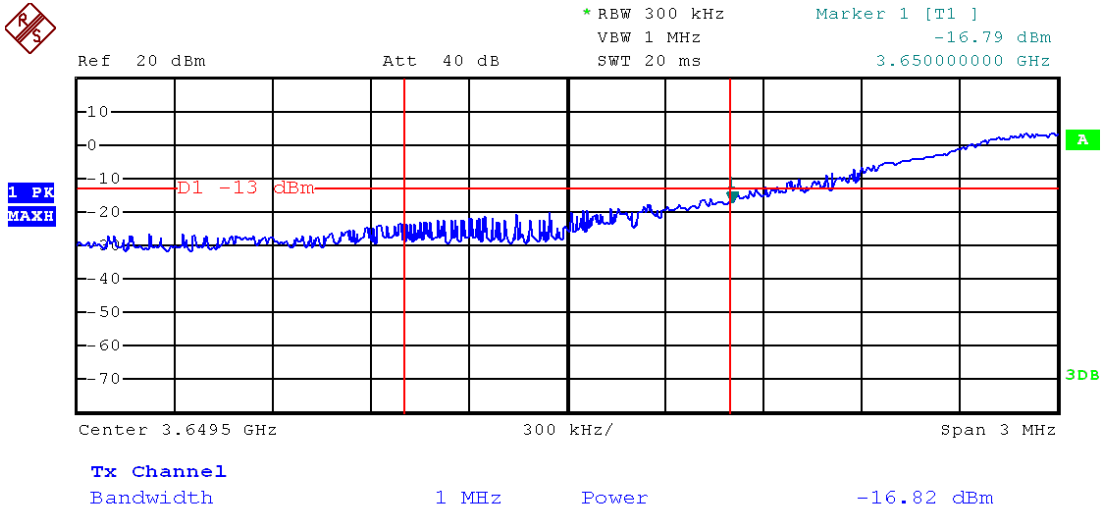
Lower band edge (50°C,120V) -14.91dBm<13dBm



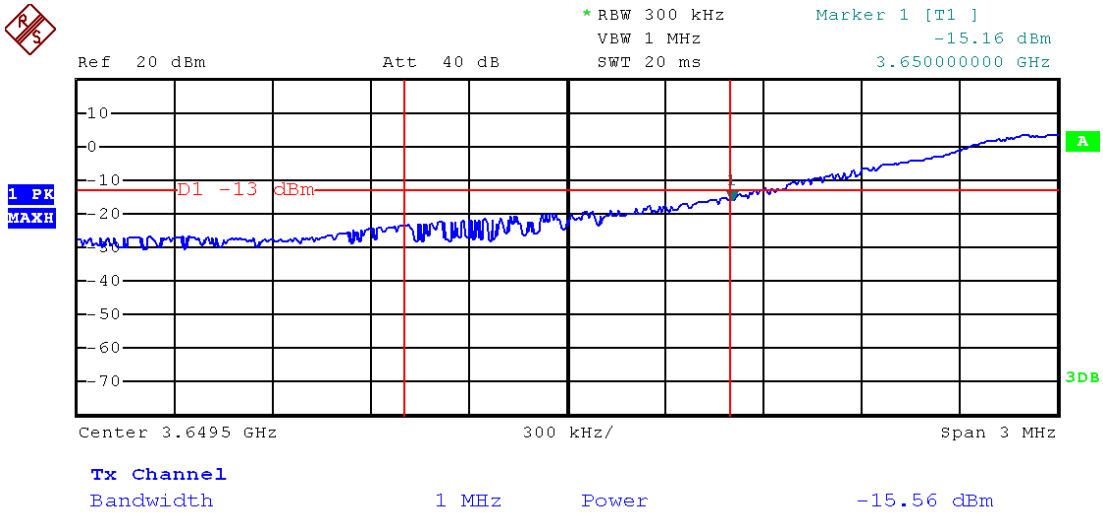
Lower band edge (10°C,120V) -15.83dBm<13dBm



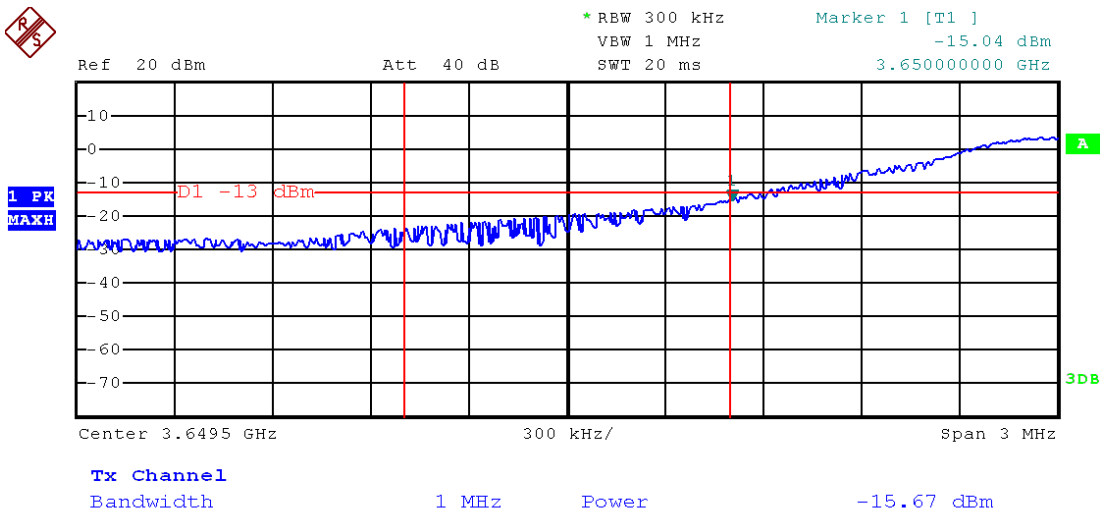
Lower band edge (0°C,120V) -16.82dBm<13dBm



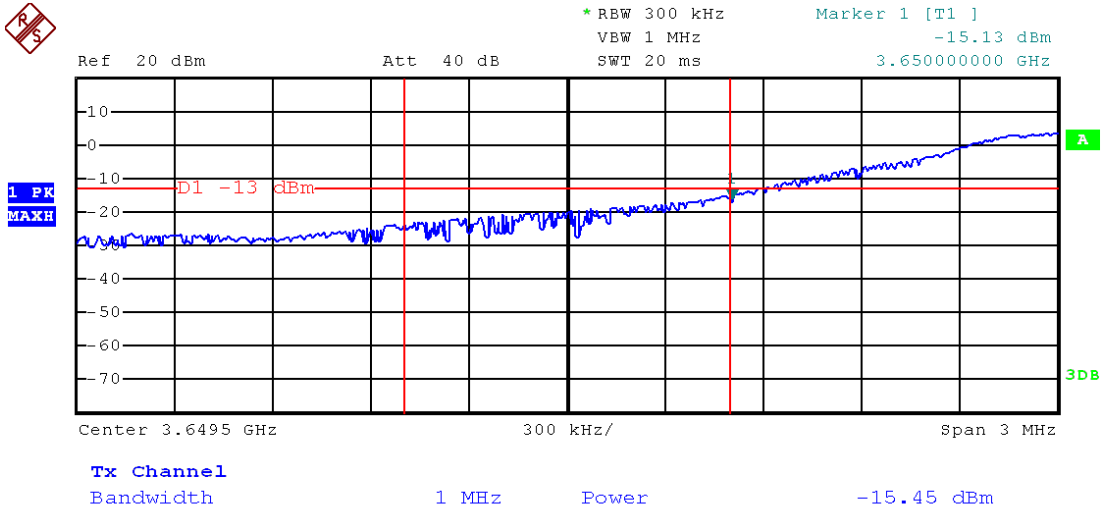
Lower band edge (-10°C,120V) -15.56dBm<13dBm



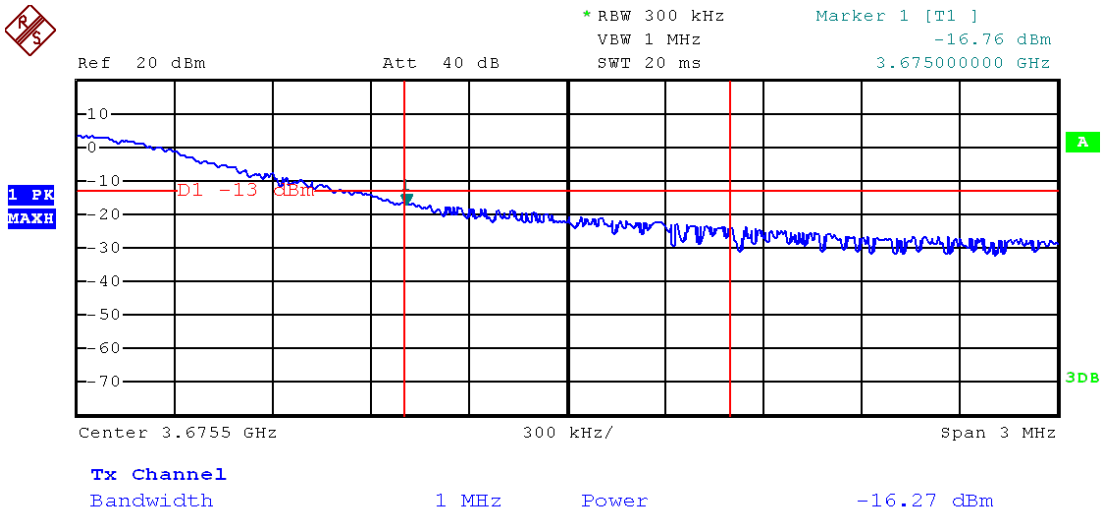
Lower band edge (-20°C,120V) -15.67dBm<13dBm



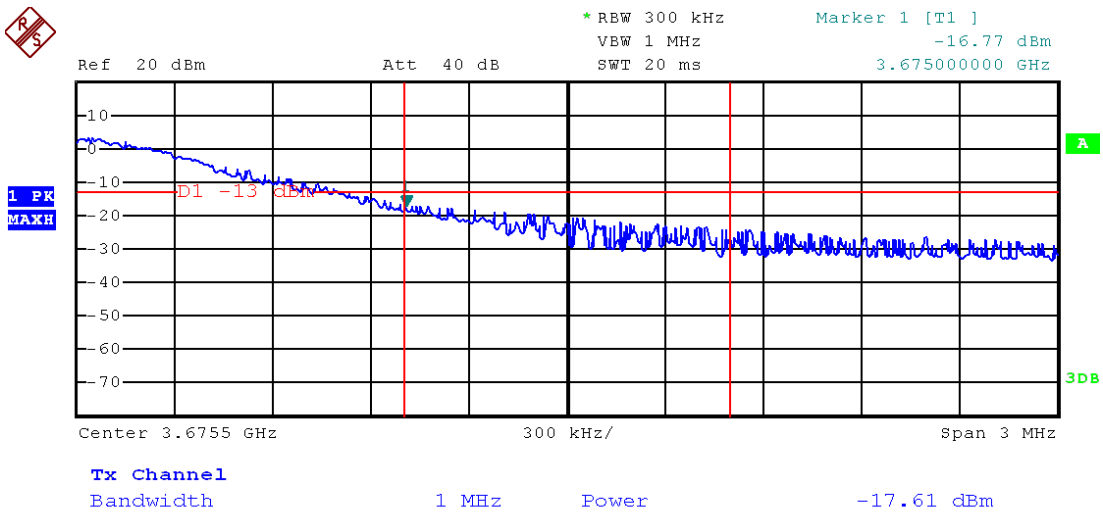
Lower band edge (-30°C,120V) -15.45dBm<13dBm



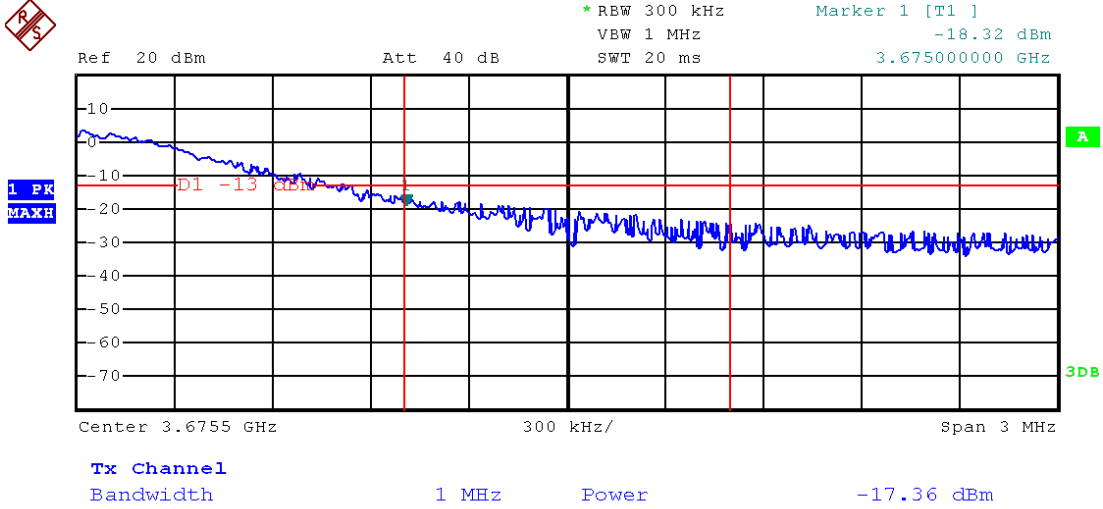
Upper band edge (20°C,120V) -16.27dBm<13dBm



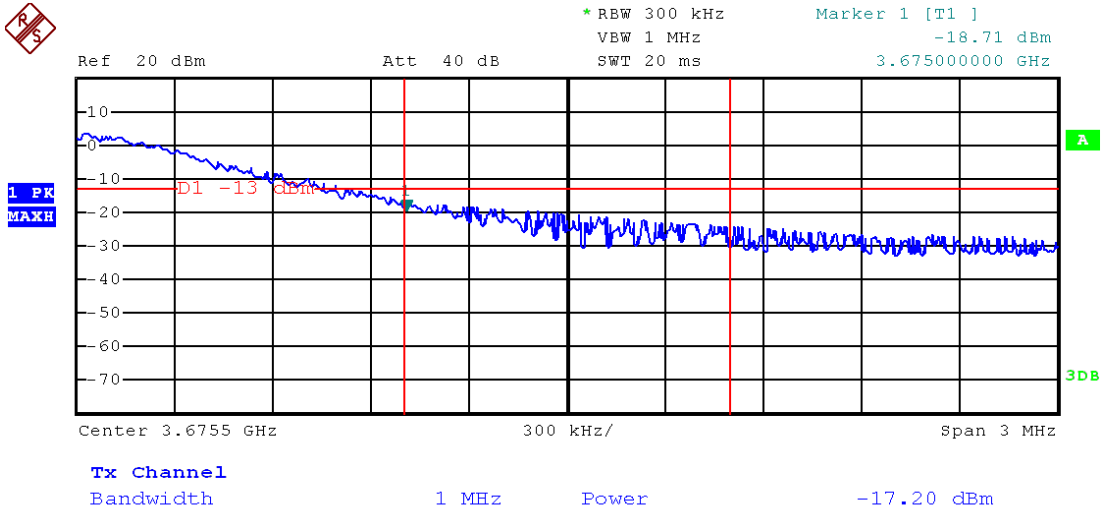
Upper band edge (20°C,102V) -17.61dBm<13dBm



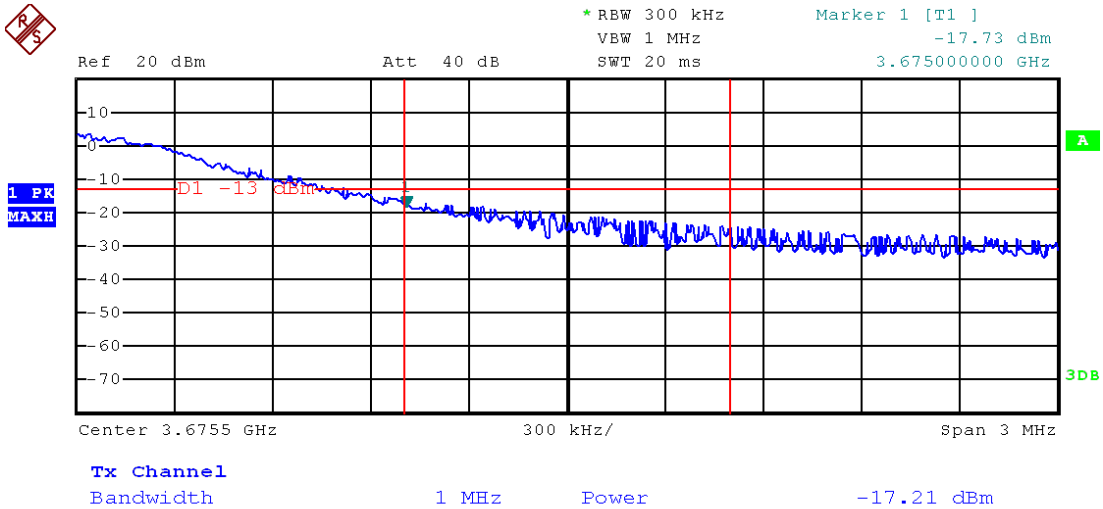
Upper band edge (20°C,138V) -17.36dBm<13dBm



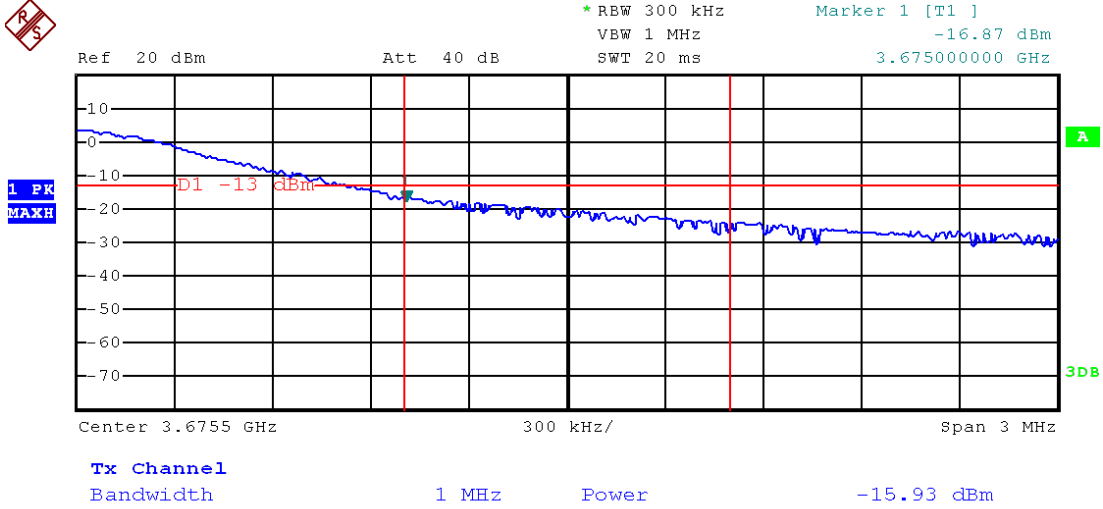
Upper band edge (30°C,120V) 17.20dBm<13dBm



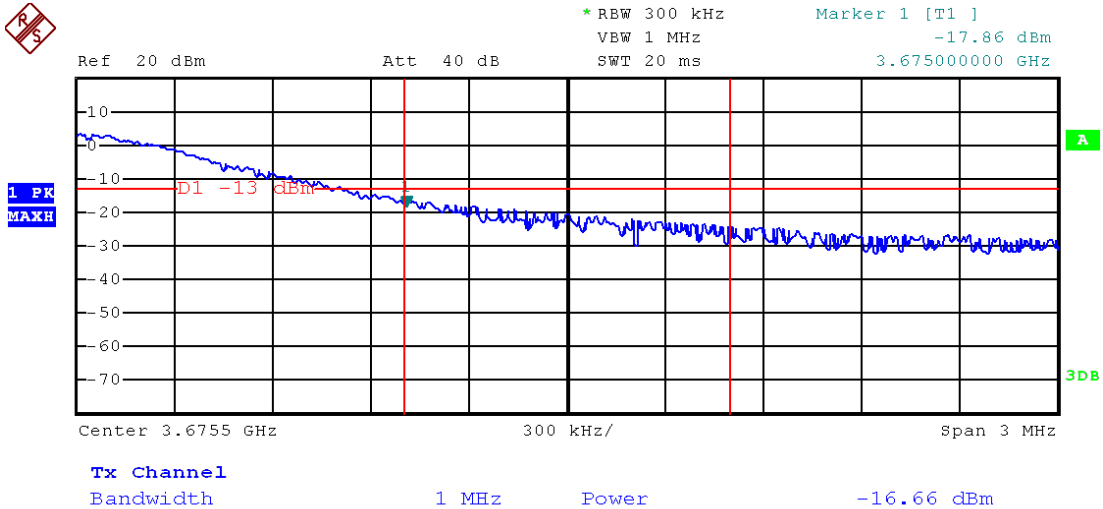
Upper band edge (40°C,120V) 17.21dBm<13dBm



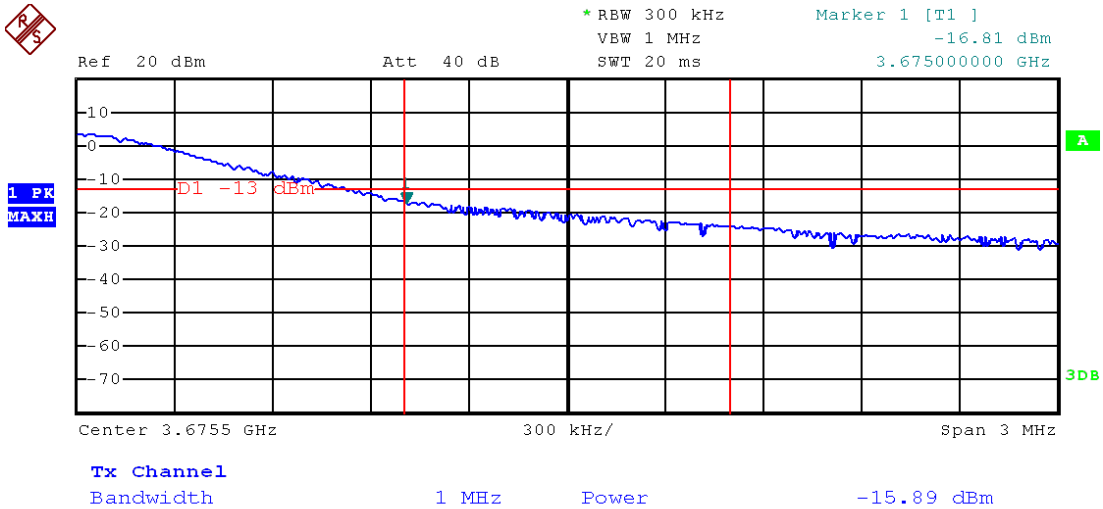
Upper band edge (50°C,120V) -15.93dBm<13dBm



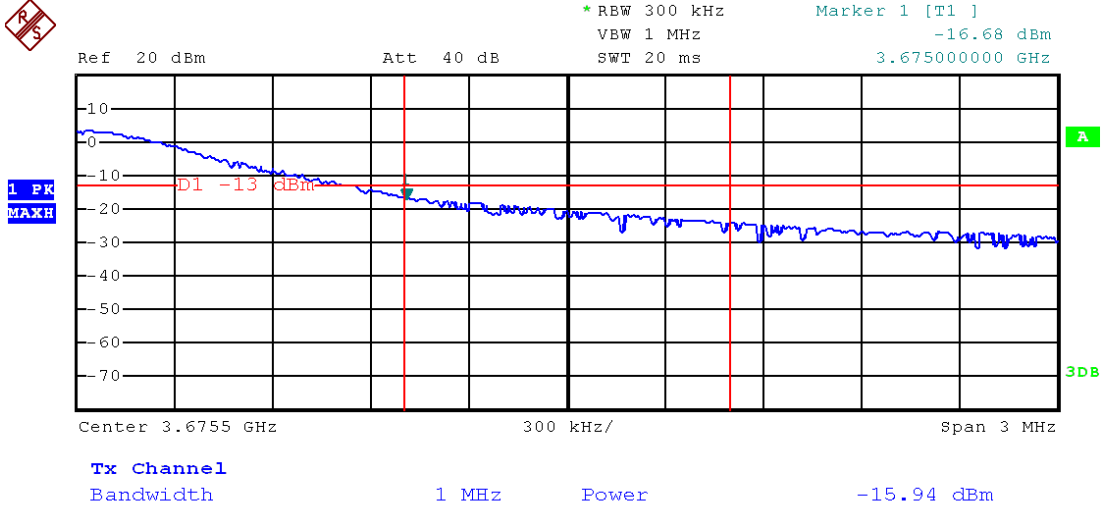
Upper band edge (10°C,120V) -16.66dBm<13dBm



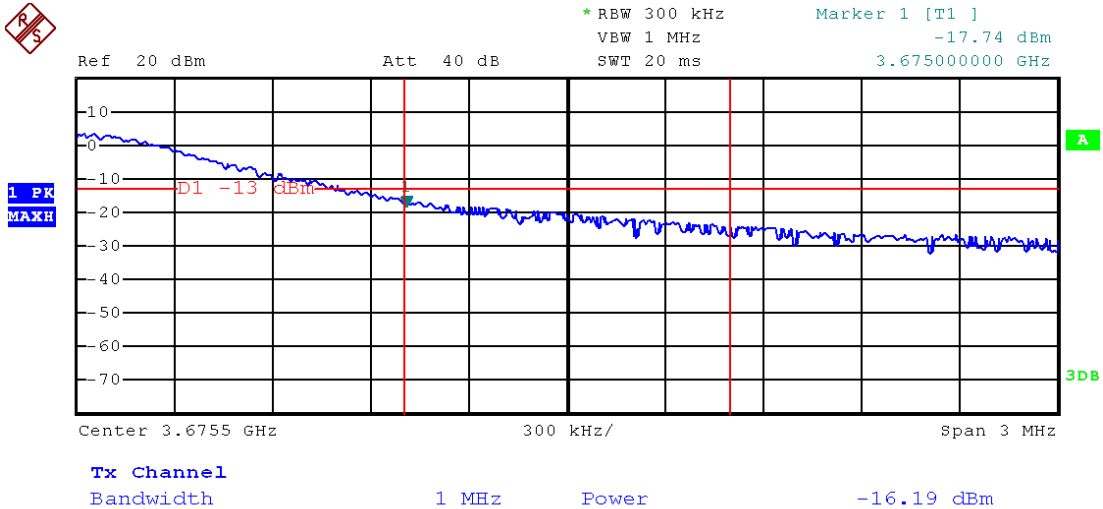
Upper band edge (0°C,120V) -15.89dBm<13dBm



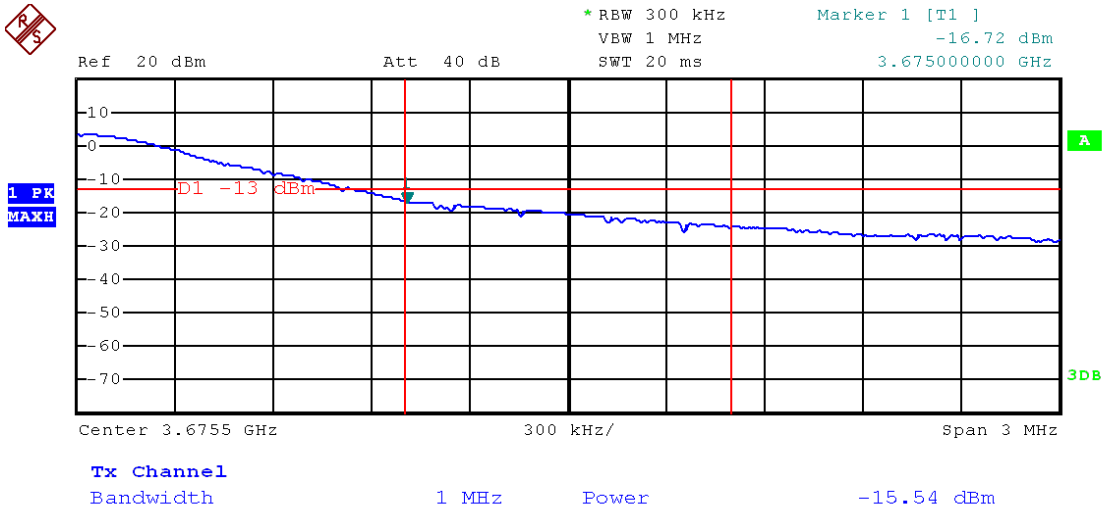
Upper band edge (-10°C,120V) -15.94dBm<13dBm



Upper band edge (-20°C,120V) -16.19dBm<13dBm

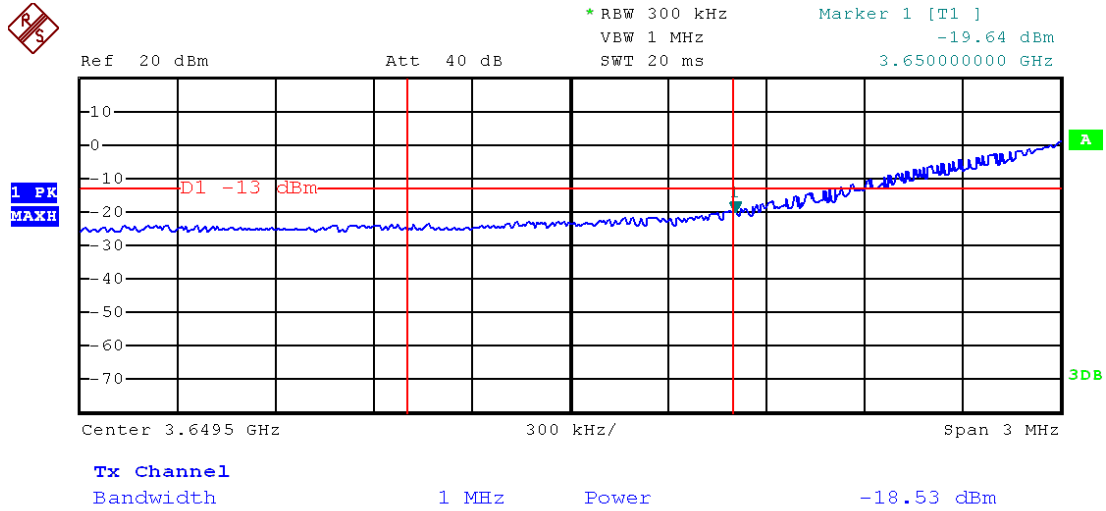


Upper band edge (-30°C,120V) -15.54dBm<13dBm

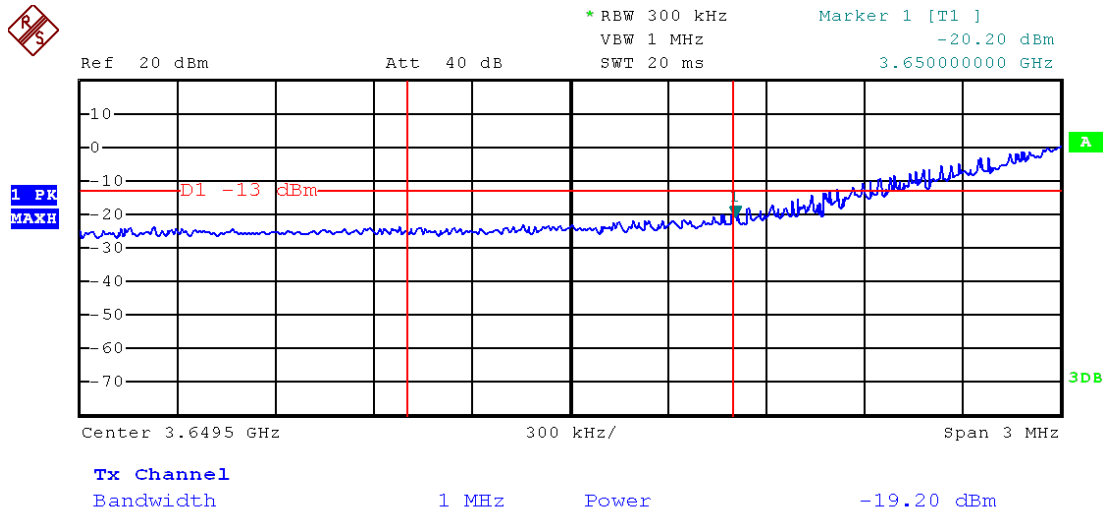


For 20MHz Bandwidth

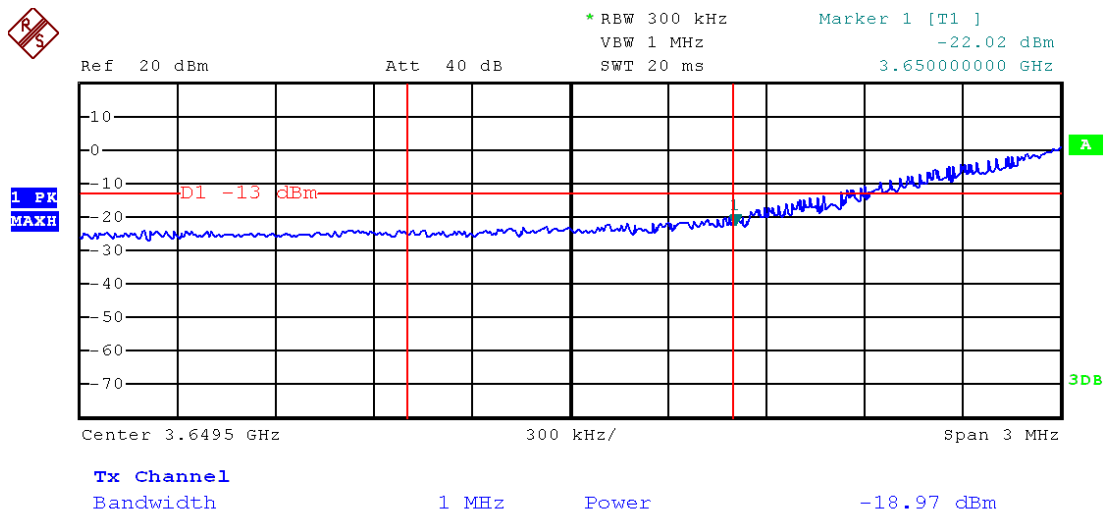
Lower band edge (20°C,120V) -18.53dBm<13dBm



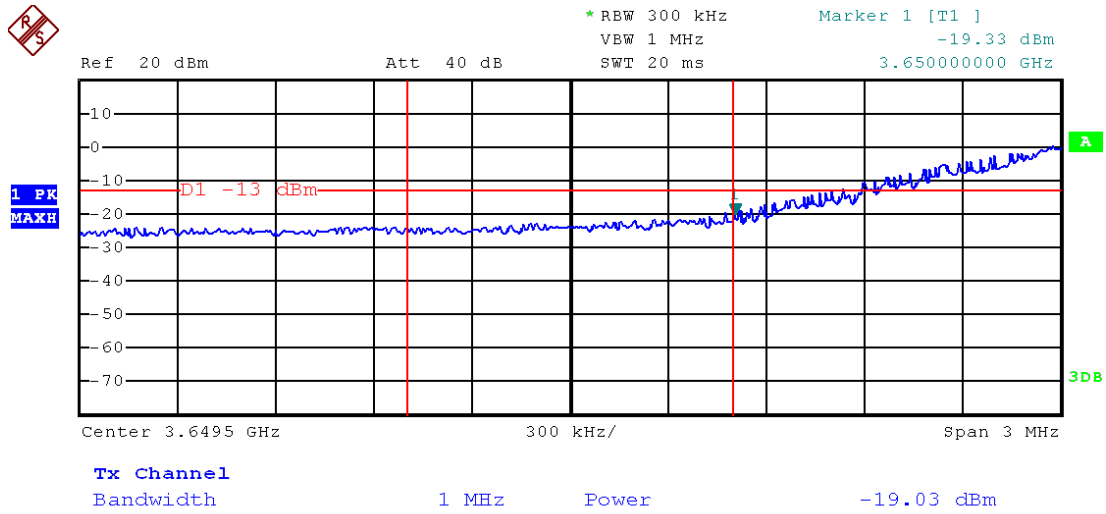
Lower band edge (20°C,102V) -19.20dBm<13dBm



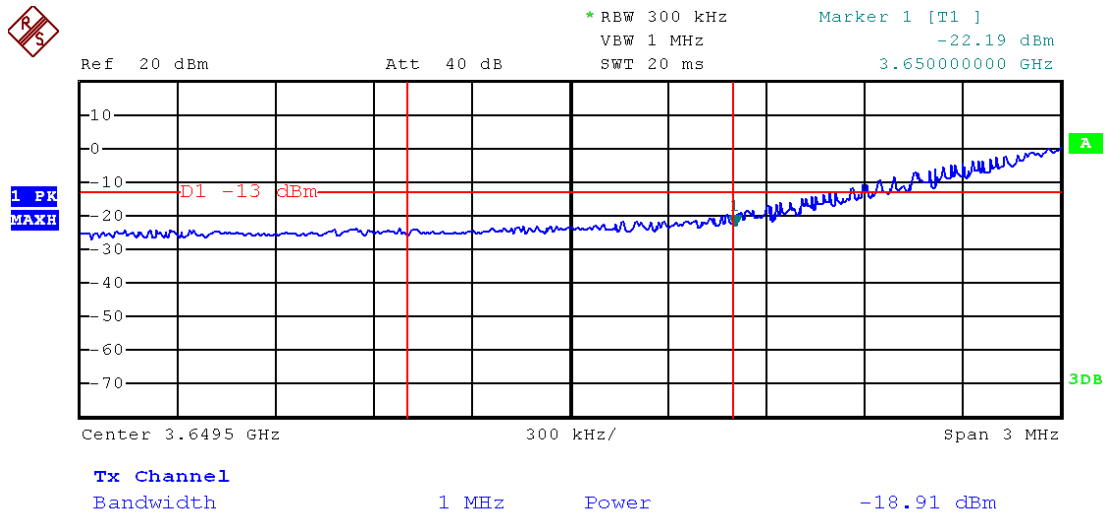
Lower band edge (20°C,138V) -18.97dBm<13dBm



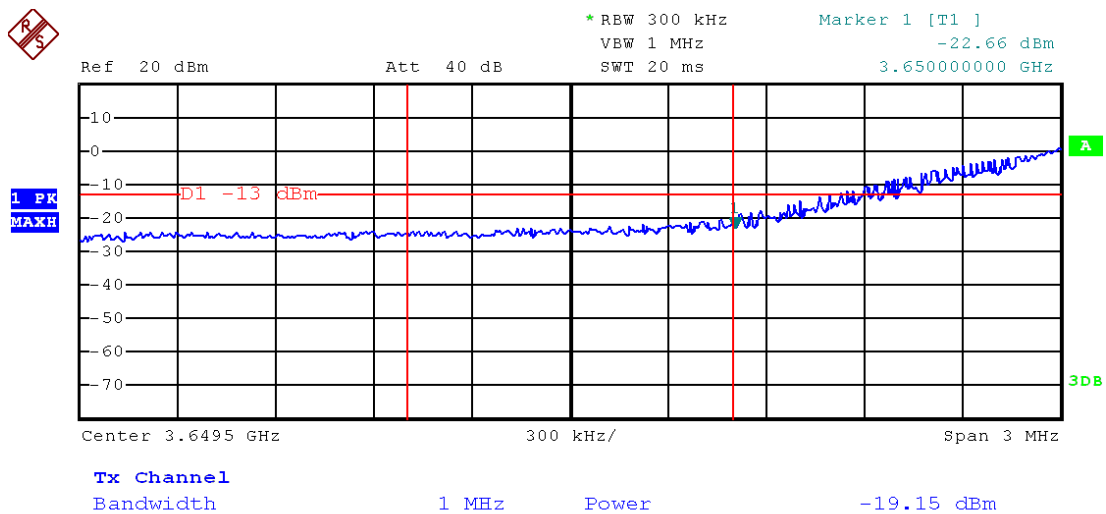
Lower band edge (30°C,120V) -19.03dBm<13dBm



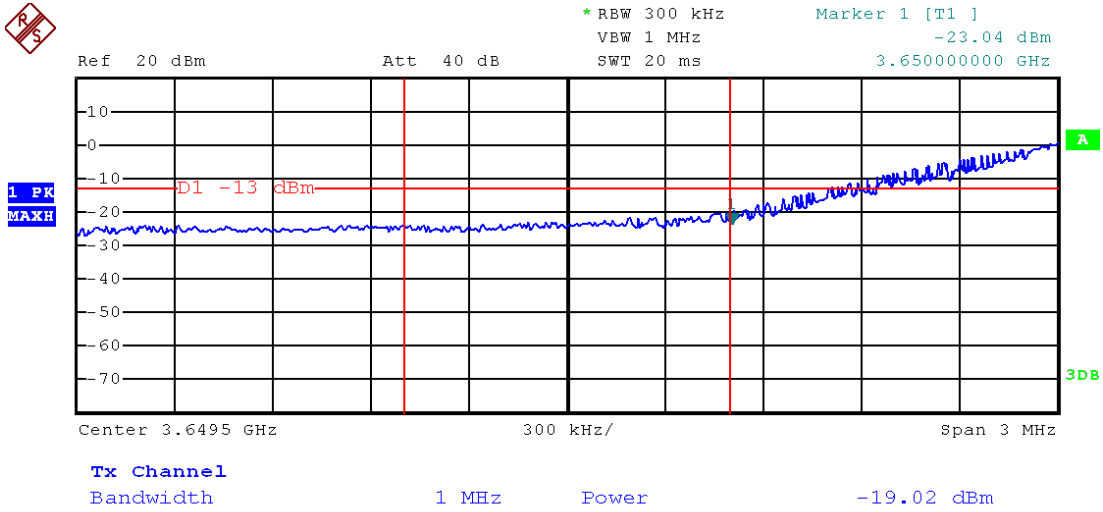
Lower band edge (40°C,120V) -18.91dBm<13dBm



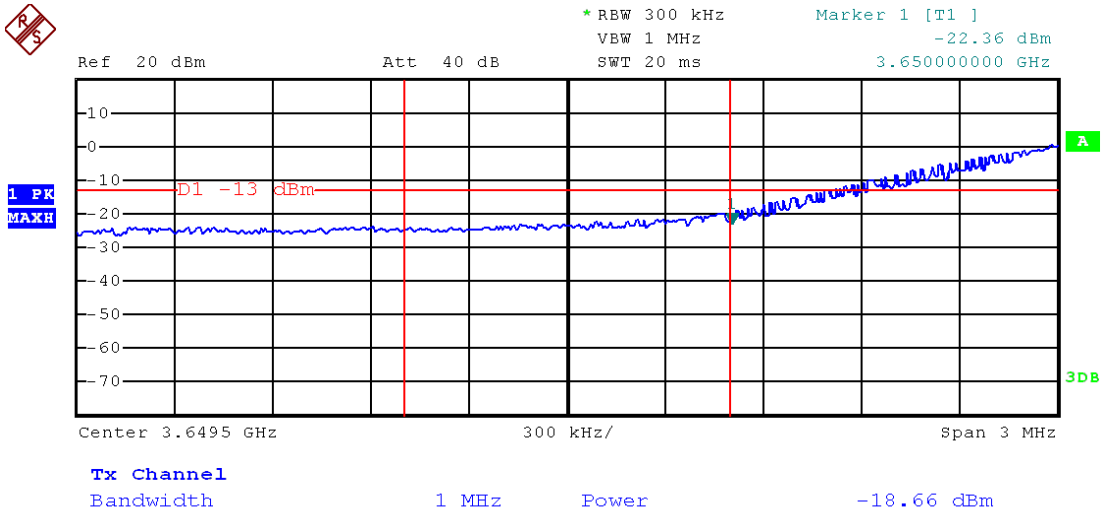
Lower band edge (50°C,120V) -19.15dBm<13dBm



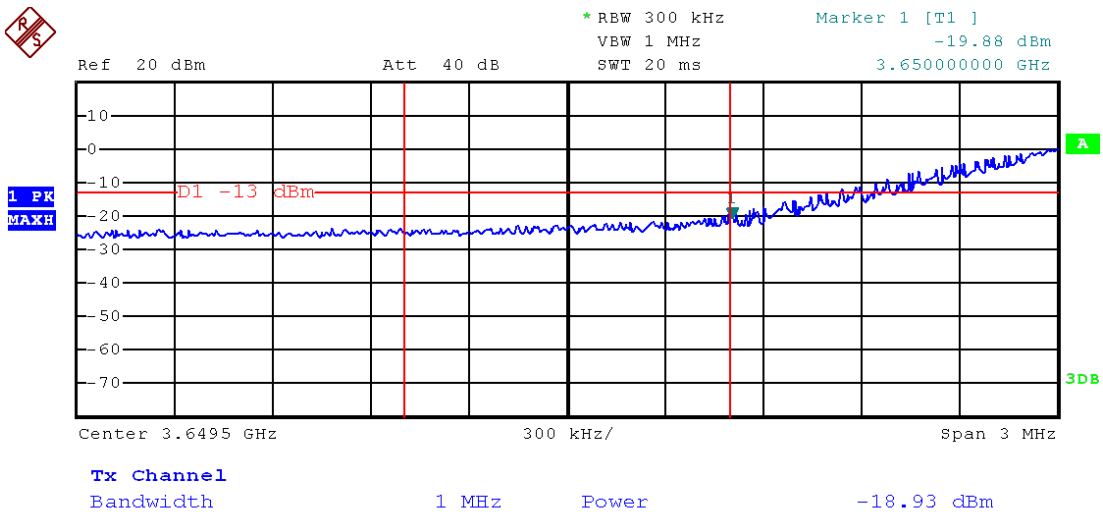
Lower band edge (10°C,120V) -19.02dBm<13dBm



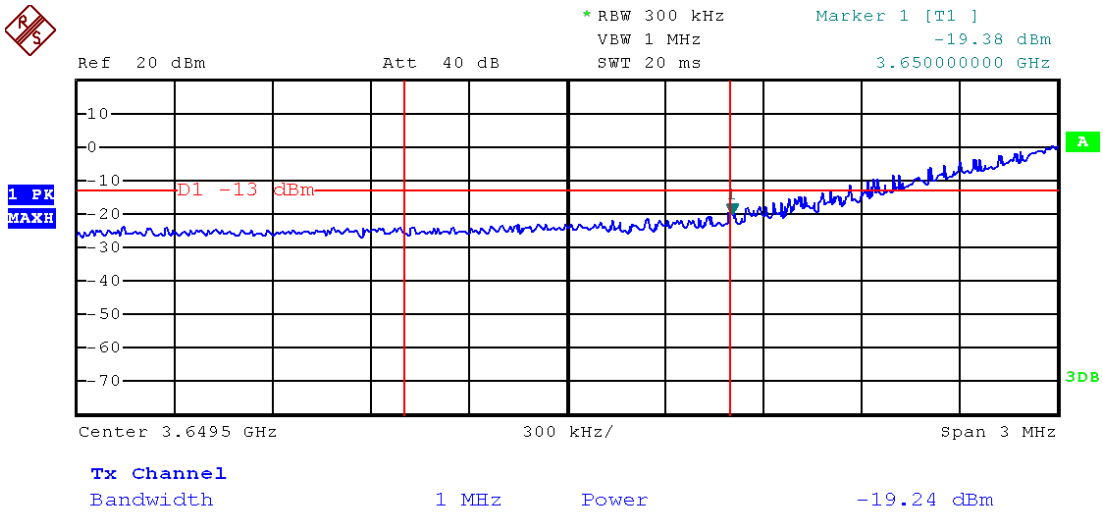
Lower band edge (0°C,120V) -18.66dBm<13dBm



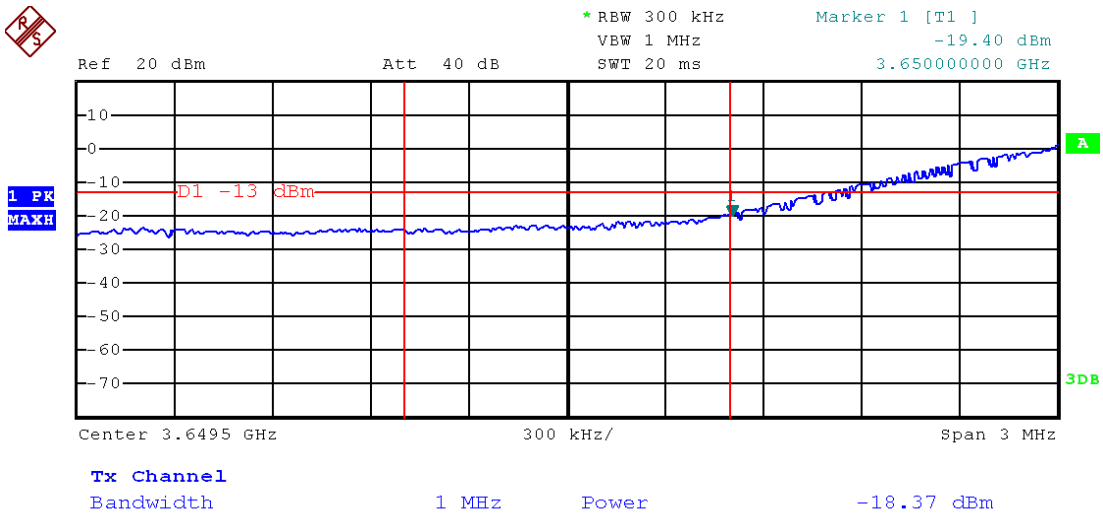
Lower band edge (-10°C,120V) -18.93dBm<13dBm



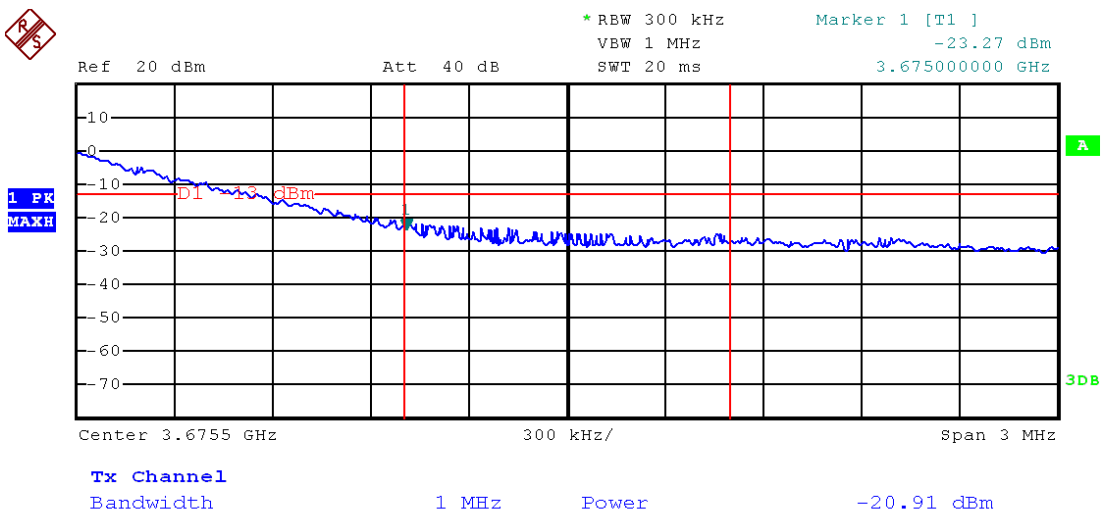
Lower band edge (-20°C,120V) -19.24dBm<13dBm



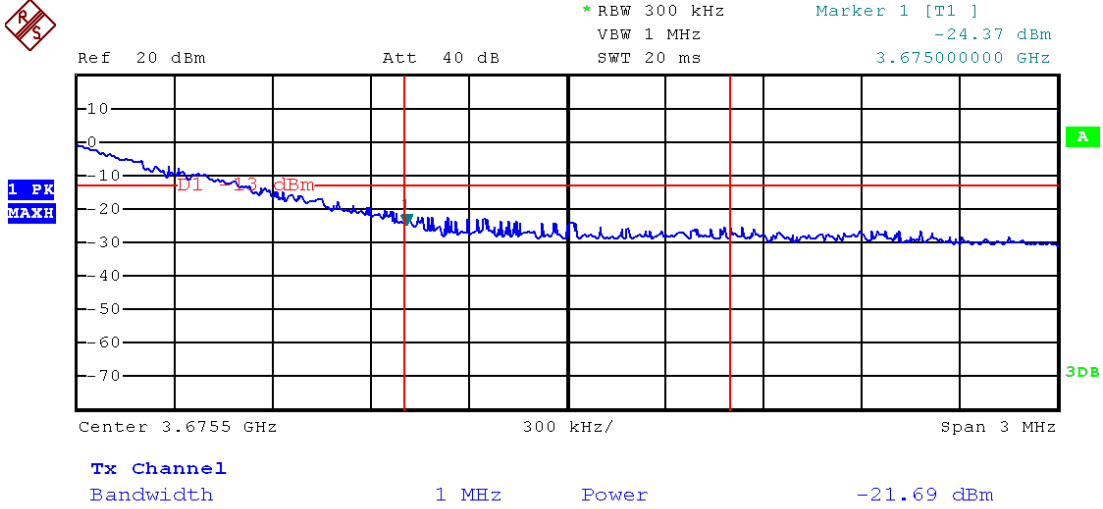
Lower band edge (-30°C,120V) -18.37dBm<13dBm



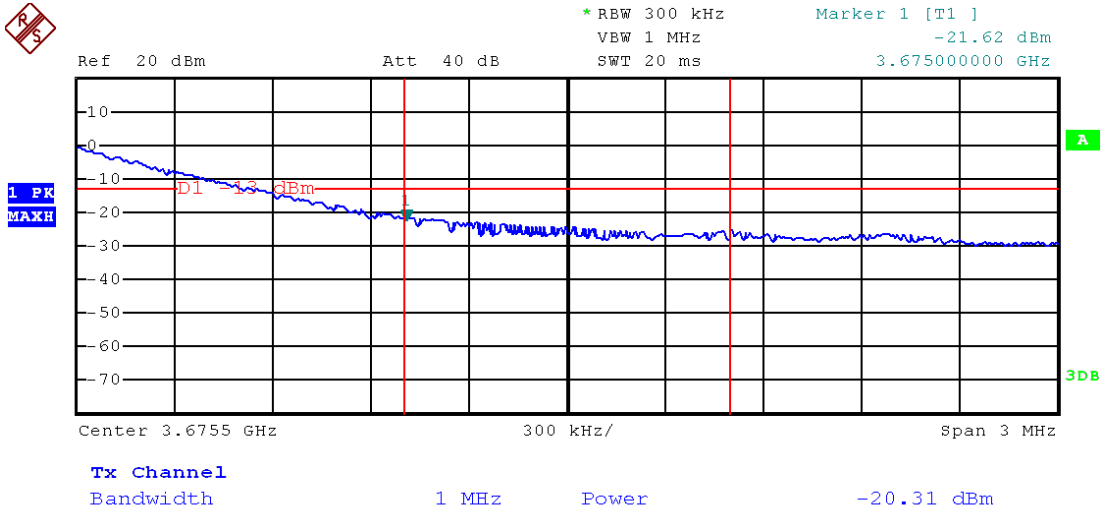
Upper band edge (20°C,120V) -20.91dBm<13dBm



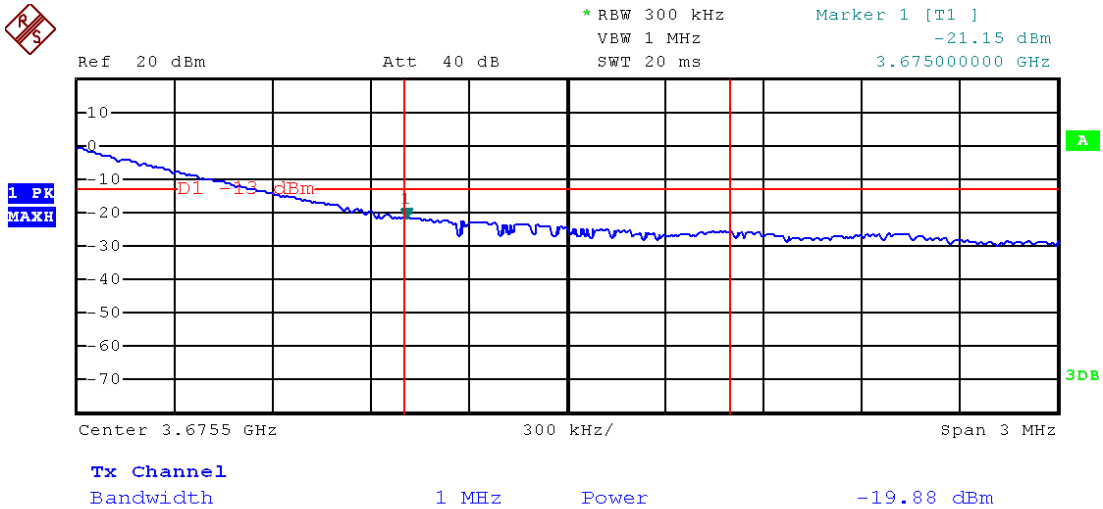
Upper band edge (20°C,102V) -21.69dBm<13dBm



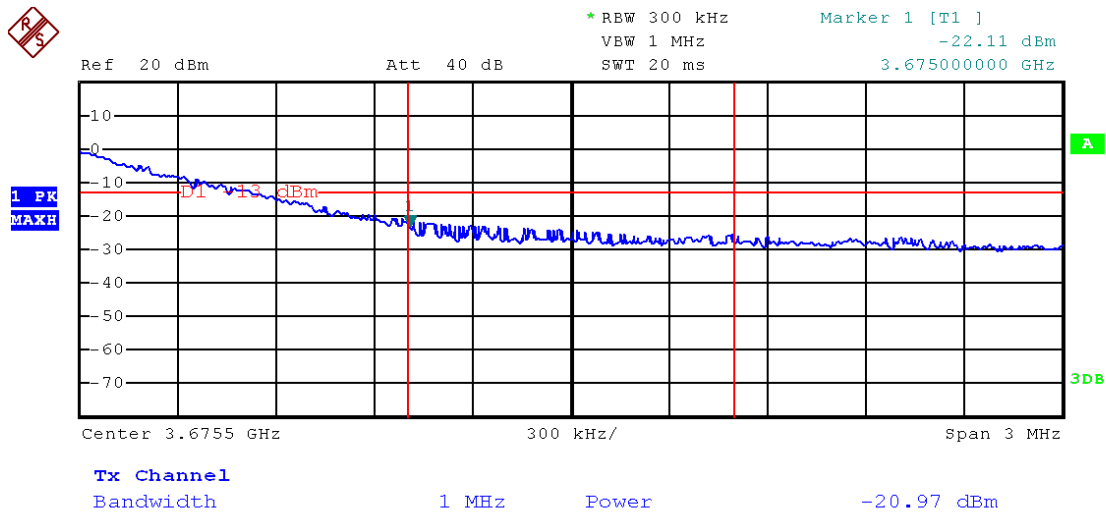
Upper band edge (20°C,138V) -20.31dBm<13dBm



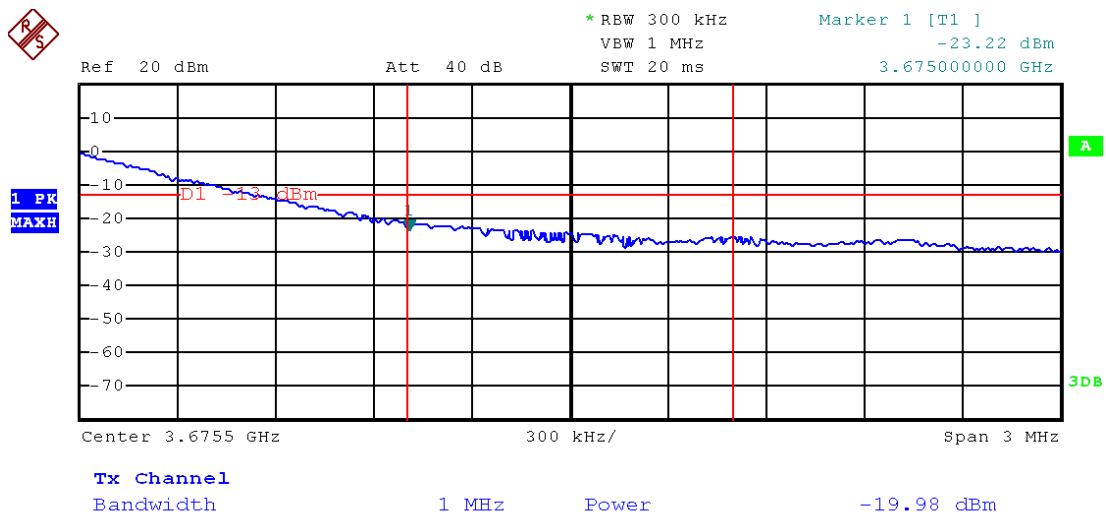
Upper band edge (30°C,120V) -19.88dBm<13dBm



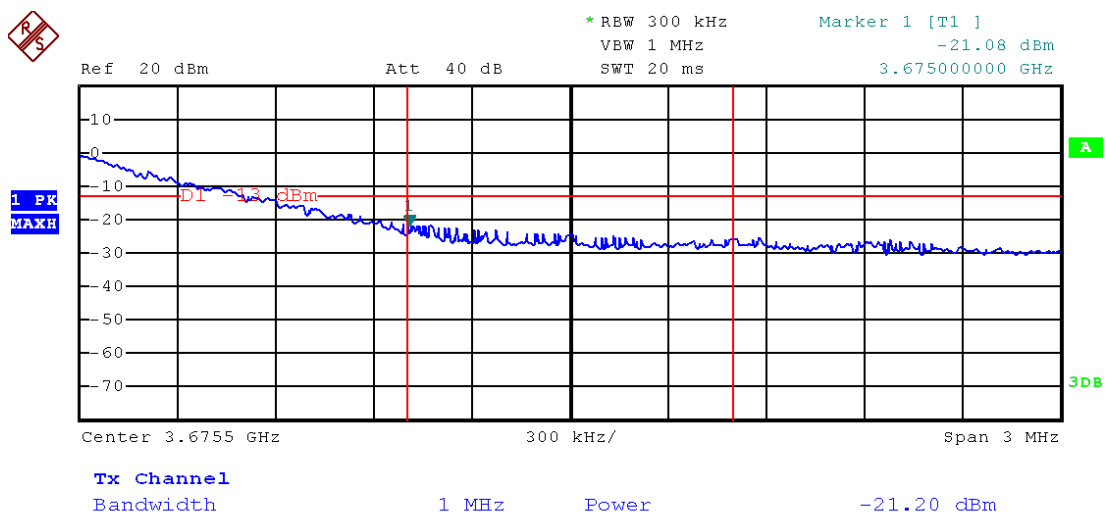
Upper band edge (40°C,120V) -20.97dBm<13dBm



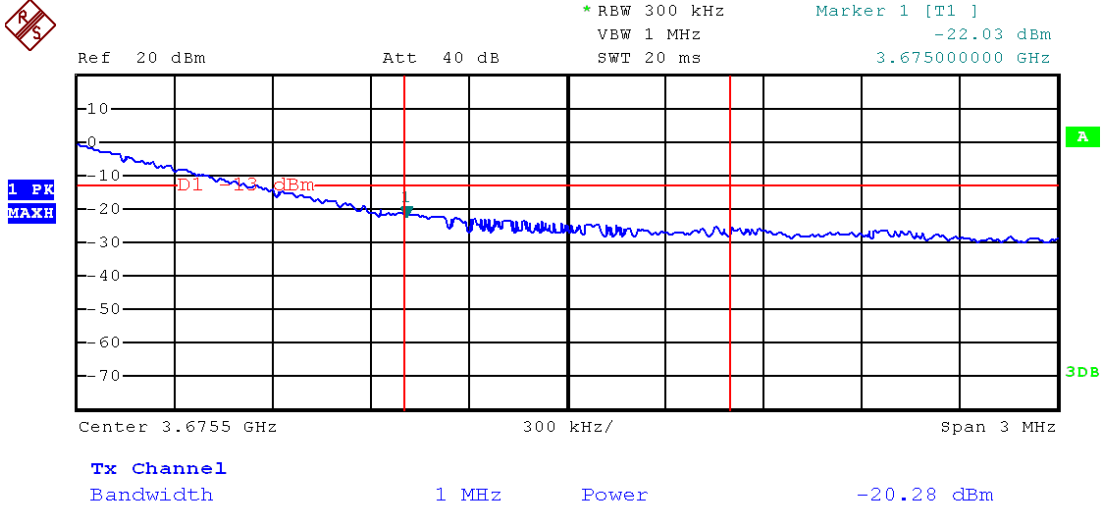
Upper band edge (50°C,120V) -19.98dBm<13dBm



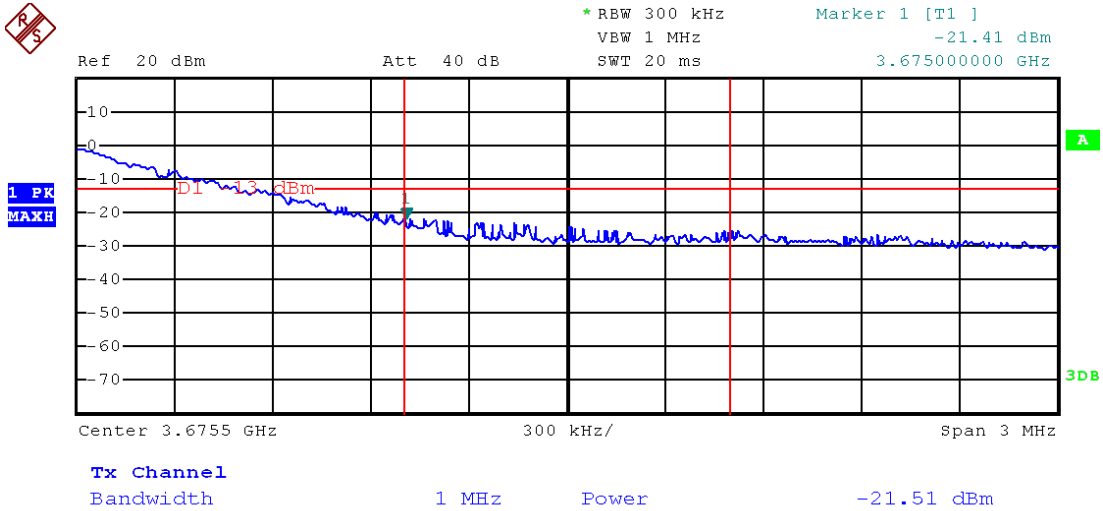
Upper band edge (10°C,120V) -21.20dBm<13dBm



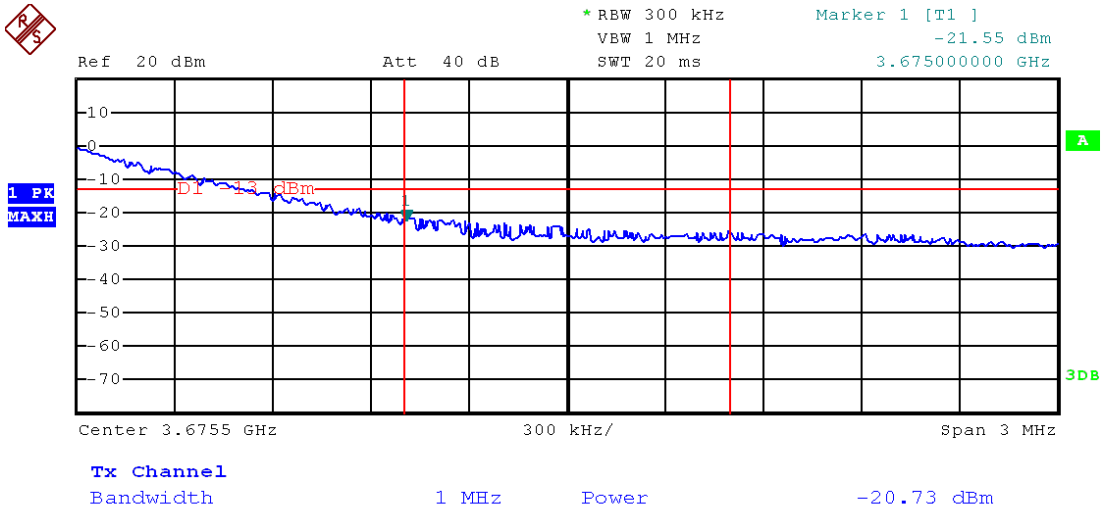
Upper band edge (0°C,120V) -20.28dBm<13dBm



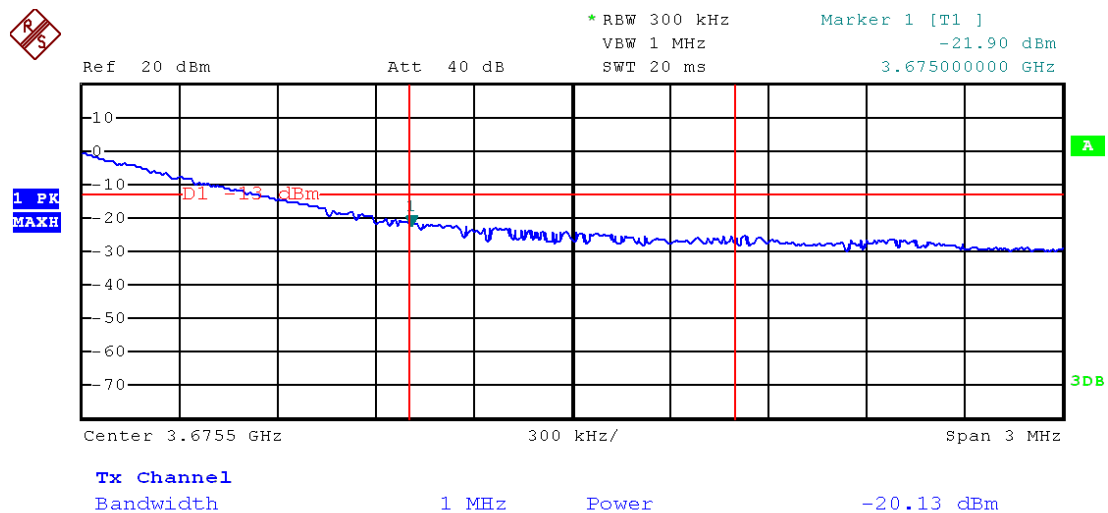
Upper band edge (-10°C,120V) -21.51dBm<13dBm



Upper band edge (-20°C,120V) -20.73dBm<13dBm



Upper band edge (-30°C,120V) -20.13dBm<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	2014-05-28	2015-05-27
Pre-amplifier	Agilent	8447F	3113A06717	2014-05-28	2015-05-27
Pre-amplifier	Compliance Direction	PAP-0140	24002	2014-05-28	2015-05-27
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2014-05-24	2015-05-23
Horn Antenna	ETS	3117	00086197	2014-05-24	2015-05-23
Horn Antenna	EMCO	3116	9203-2178	2014-05-24	2015-05-23
Universal Radio Communication Tester	Rohde & Schwarz	CMU200	112012	2014-05-28	2015-05-27
Signal Generator	R&S	SMR20	100047	2014-05-28	2015-05-27

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.

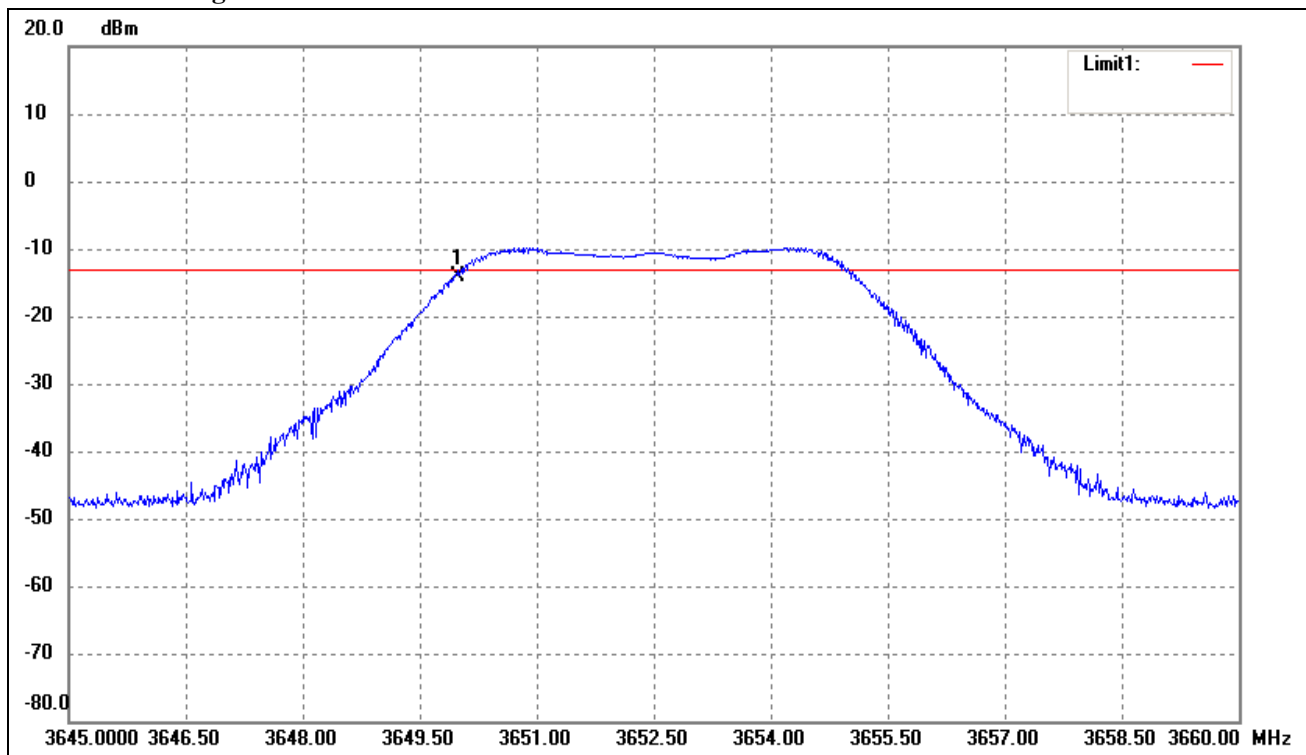
9.5 Environmental Conditions

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

9.6 Summary of Test Results/Plots

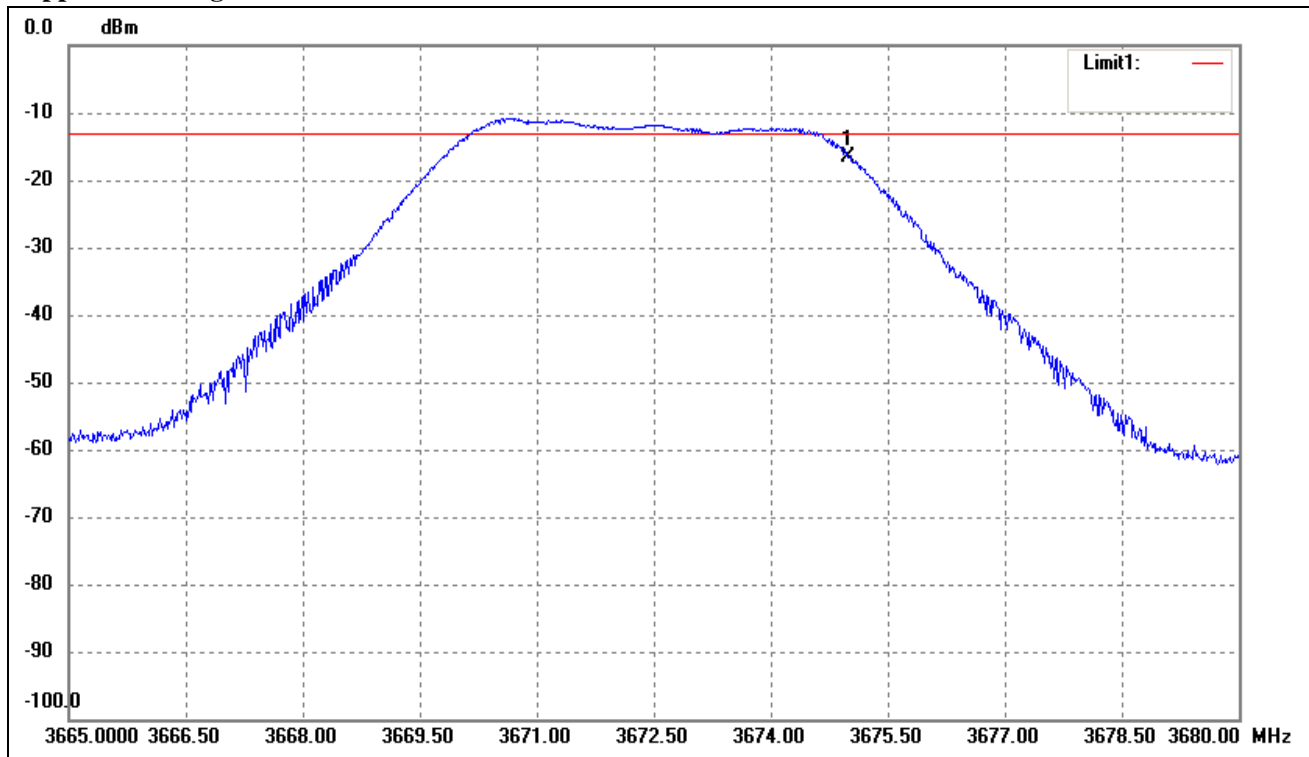
According to the data below, the FCC Part § 90.1323 standards, and had the worst margin of:

5MHz Bandwidth
Lower Band Edge



No.	Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	3650.000	-12.65	-1.35	-14.00	-13.00	-1.00	EIRP

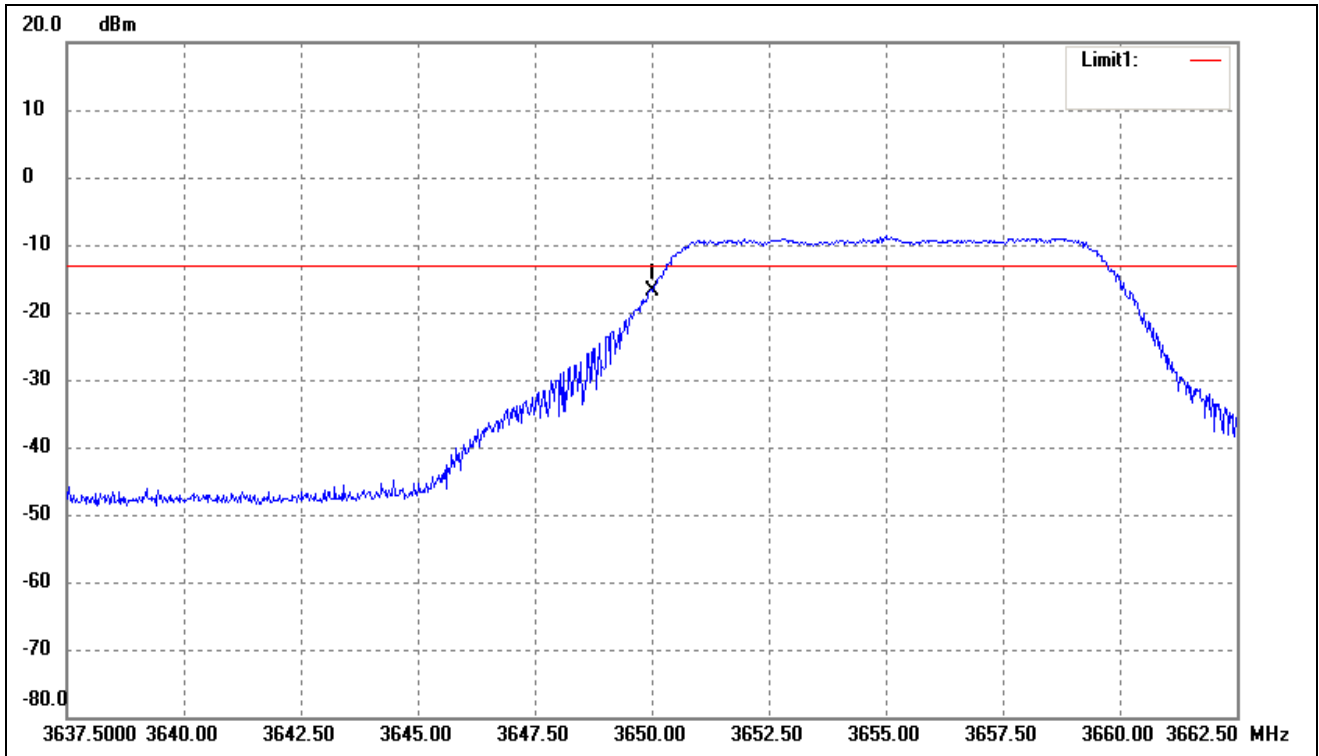
Upper Band Edge



No.	Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	3675.000	-15.91	-0.75	-16.66	-13.00	-3.66	EIRP

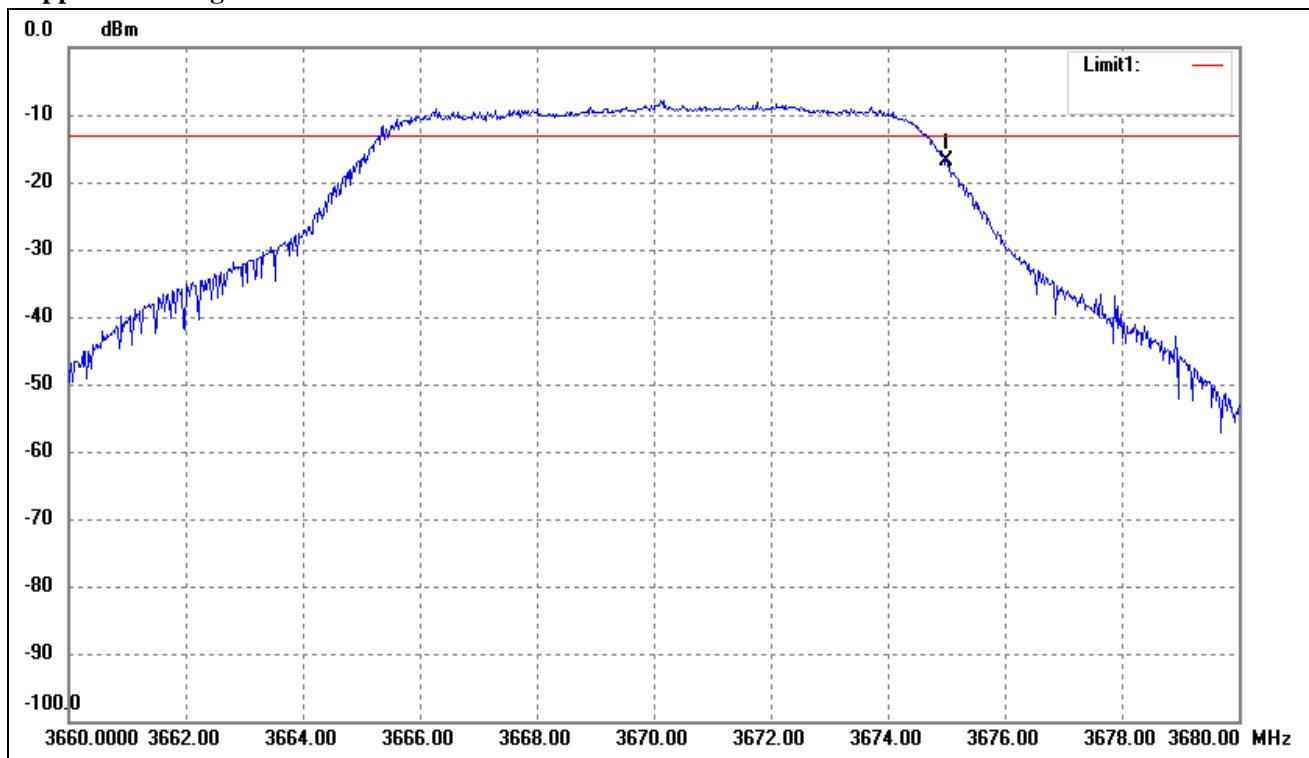
10MHz Bandwidth

Lower Band Edge



No.	Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	3650.000	-15.42	-1.35	-16.77	-13.00	-3.77	EIRP

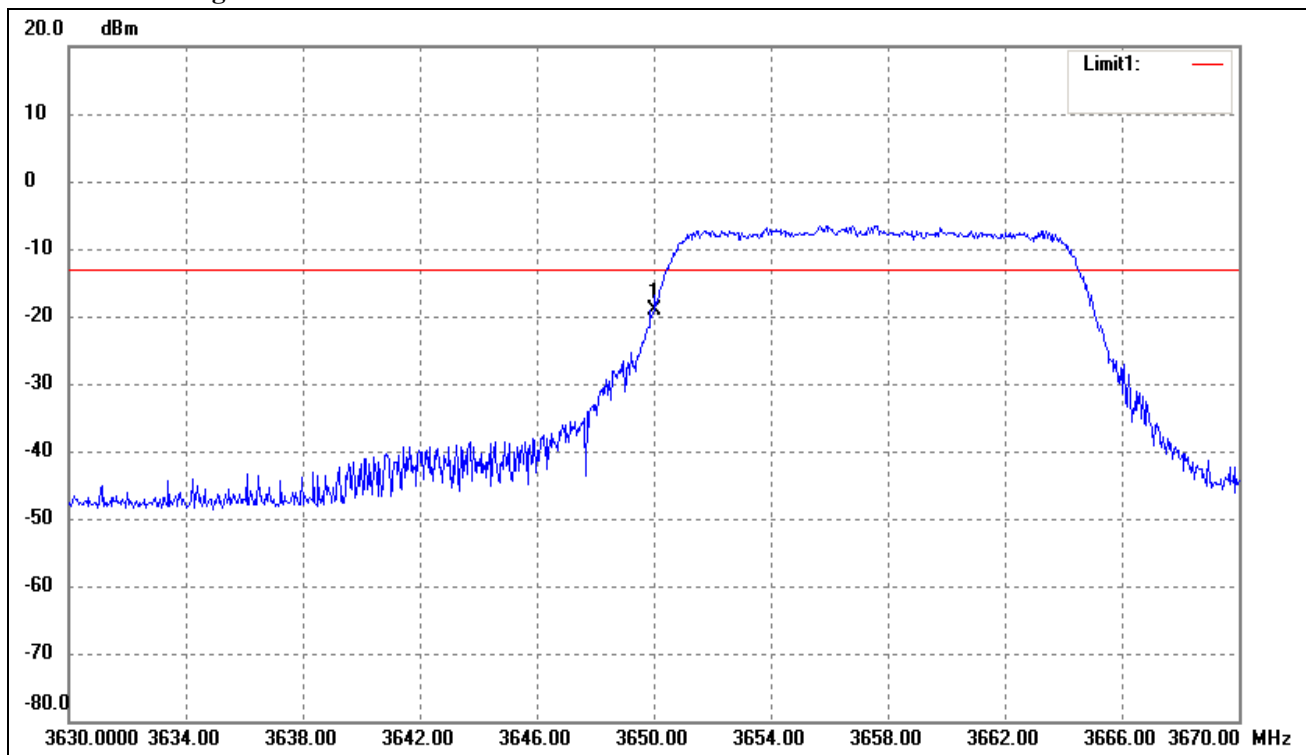
Upper Band Edge



No.	Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	3675.000	-16.23	-0.75	-16.98	-13.00	-3.98	EIRP

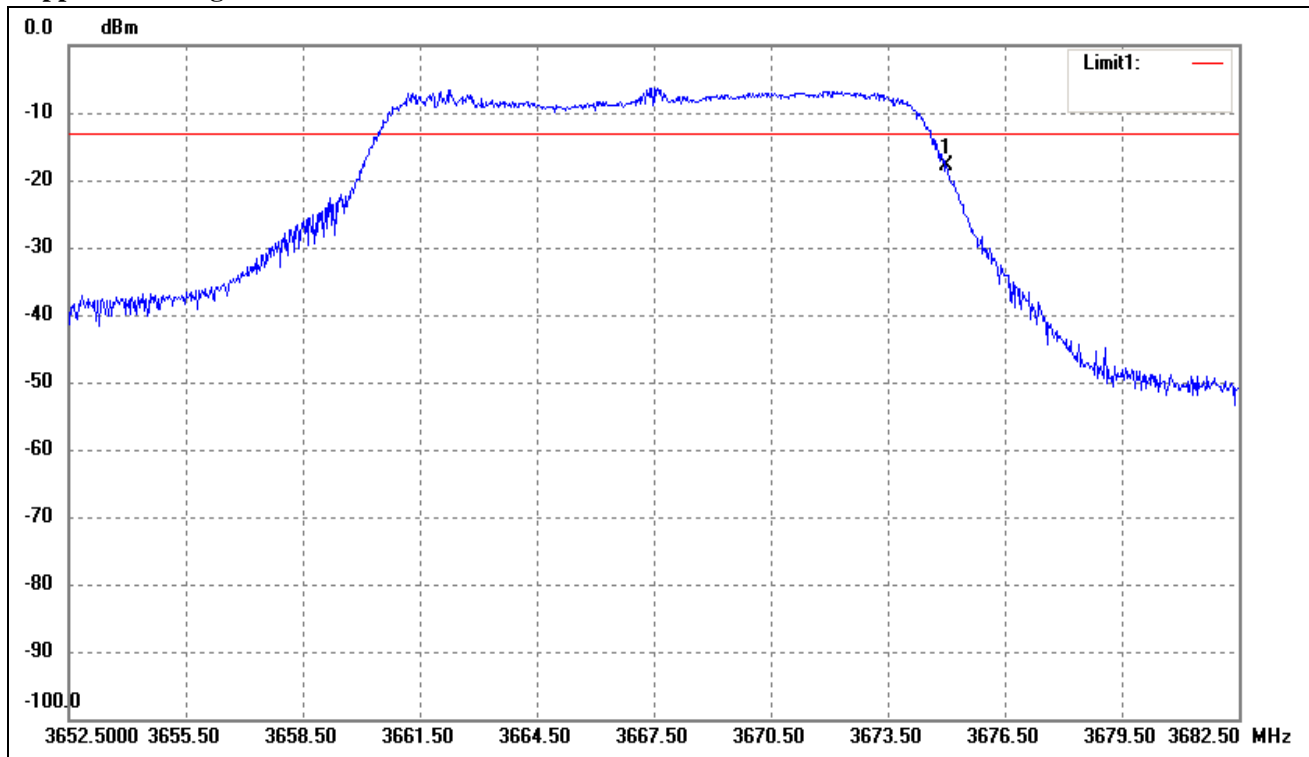
15MHz Bandwidth

Lower Band Edge



No.	Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	3650.000	-17.89	-1.35	-19.24	-13.00	-6.24	EIRP

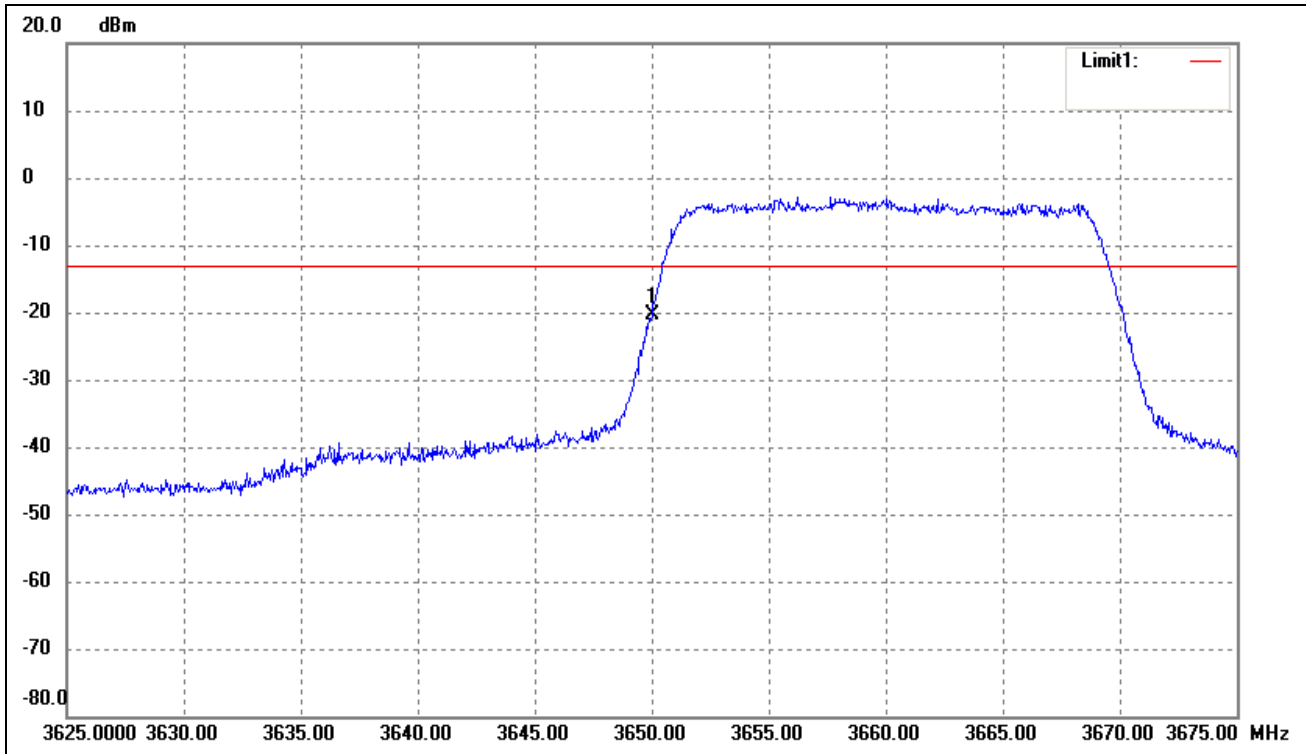
Upper Band Edge



No.	Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	3675.000	-17.22	-0.75	-17.97	-13.00	-4.97	EIRP

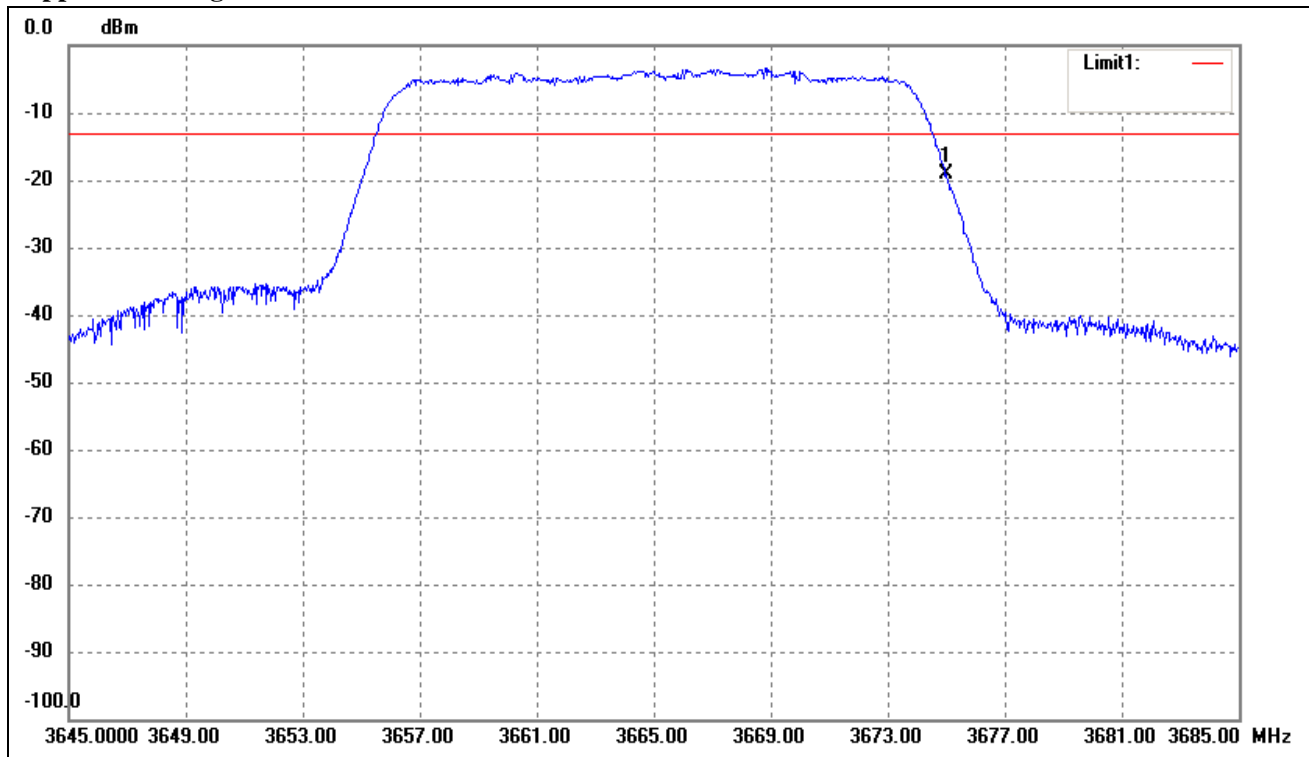
20MHz Bandwidth

Lower Band Edge



No.	Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	3650.000	-18.91	-1.35	-20.26	-13.00	-7.26	EIRP

Upper Band Edge



No.	Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	3675.000	-18.25	-0.75	-19.00	-13.00	-6.00	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	E4402B-ESA	US41192821	2014-05-28	2015-05-27
Rohde & Schwarz	Universal Radio Communication	CMU200	112012	2014-05-28	2015-05-27
GONGWEN	Moisture Test Chamber	GDS-150	SEMT-0013	2014-05-28	2015-05-27

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 5MHz 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	124	0.0339
40	120	120	0.0328
30	120	113	0.0309
20	120	114	0.0311
10	120	120	0.0328
0	120	129	0.0352
-10	120	132	0.0360
-20	120	136	0.0371
-30	120	139	0.0380

For 10MHz 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	162	0.0442
40	120	158	0.0431
30	120	159	0.0434
20	120	147	0.0401
10	120	146	0.0399
0	120	148	0.0404
-10	120	153	0.0418
-20	120	161	0.0440
-30	120	165	0.0451

For 15MHz Bandwidth

Reference Frequency(High Channel): 3667.5 MHz			
Environment Temperature (°C)	Power Supplied (VAC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	120	164	0.0448
40	120	159	0.0434
30	120	148	0.0404
20	120	146	0.0399
10	120	152	0.3145
0	120	157	0.0429
-10	120	166	0.0453
-20	120	172	0.0470
-30	120	176	0.0481

For 20MHz Bandwidth

Reference Frequency(High Channel): 3665 MHz			
Environment Temperature (°C)	Power Supplied (VAC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	120	165	0.0451
40	120	158	0.0431
30	120	151	0.0412
20	120	145	0.0396
10	120	149	0.0407
0	120	156	0.0426
-10	120	167	0.0456
-20	120	173	0.0472
-30	120	178	0.0486

So, Frequency Stability Versus Input Voltage is:

For 5MHz 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	118	0.0322
	120	114	0.0311
	138	120	0.0328

For 10MHz 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	151	0.0412
	120	147	0.0401
	138	154	0.0420

For 15MHz Bandwidth

Reference Frequency(Middle Channel): 3667.5 MHz			
Environment Temperature (°C)	Power Supplied (VAC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	102	149	0.0407
	120	146	0.0399
	138	154	0.0420

For 20MHz Bandwidth

Reference Frequency(High Channel): 3665 MHz			
Environment Temperature (°C)	Power Supplied (VAC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	102	154	0.0420
	120	145	0.0396
	138	158	0.0431

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