



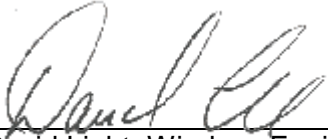
Nemko Test Report: 2015 281847 FCC PT27 R3

Applicant: Fujitsu Network Communications, Inc.
Two Blue Hill Plaza
2nd Floor
Pearl River, NY 10965

**Equipment Under Test:
(E.U.T.)** LS112-Z3

In Accordance With: **CFR 47, Part 27, Subpart C**
Miscellaneous Wireless Communication Services

Tested By: Nemko USA, Inc.
2210 Faraday Ave, Suite 150
Carlsbad, CA 92008

TESTED BY:  **DATE:** 29 April 2015
David Light, Wireless Engineer

APPROVED BY:  **DATE:** 6 May 2015

Number of Pages: 74

Table of Contents

Section 1. Summary of Test Results 3

Section 2. General Equipment Specification 5

Section 3. RF Power Output 6

Section 4. Occupied Bandwidth..... 7

Section 5. Spurious Emissions at Antenna Terminals 13

Section 6. Field Strength of Spurious 26

Section 7. Frequency Stability 27

Section 8. Test Equipment List..... 69

Section 9. Test Setup Photo 70

ANNEX A - TEST DIAGRAMS..... 71

Section 1. Summary of Test Results

Manufacturer: Fujitsu Network Communications, Inc.

Model No.: LS112-Z3

Serial No.: None

General: **All measurements are traceable to national standards.**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 27, Subpart C.

- | | | | |
|-------------------------------------|----------------------------|-------------------------------------|---------------------|
| <input checked="" type="checkbox"/> | New Submission | <input type="checkbox"/> | Production Unit |
| <input type="checkbox"/> | Class II Permissive Change | <input checked="" type="checkbox"/> | Pre-Production Unit |

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE.

See " Summary of Test Data".



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This report applies only to the items tested.

Summary of Test Data

NAME OF TEST	PARA. NO.	SPEC.	RESULT
RF Power Output	27.50(b) and (d)	1000/3280 W	Complies
Occupied Bandwidth	Not defined		Complies
Spurious Emissions at Antenna Terminals	27.53 (h)	-13 dBm	Complies
Field Strength of Spurious Emissions	27.53(c),(f)	-70 dBW/MHz	Complies
Field Strength of Spurious Emissions	27.53(h)	-13 dBm	Complies
Frequency Stability	27.54	Must stay in band	Complies

Section 2. General Equipment Specification

Supply Voltage Input:	120 Vac		
Frequency Bands:	746 to 756 MHz		
	2110 to 2155 MHz		
Type of Modulation and Designator:	LTE (5M00G7W)	10M00G7W	15M0G7W
Maximum No. of Carriers:	1		
Output Impedance:	50 ohms		
RF Output (Rated):	Per channel:	0.05 W	
	Total:	0.05 W	

System Description

LTE, band selectable, 2x2 MIMO, low-power cellular base station, typically designed for use in a home or small business.

Section 3. RF Power Output

NAME OF TEST: RF Power Output	PARA. NO.: 2.1046
TESTED BY: David Light	DATE: 21 April 2015

Test Results: Complies.

Measurement Data:

Emission Bandwidth (MHz)	Antenna Port	Frequency (MHz)	Measured Output Power (dBm)	Measured Output Power (W)
5	1	2132.5	15.4	0.035
10	1	2132.5	15.6	0.036
15	1	2132.5	15.2	0.033
5	1	751.0	16.6	0.046
10	1	751.0	16.3	0.043
5	2	2132.5	15.6	0.036
10	2	2132.5	15.4	0.035
15	2	2132.5	15.4	0.035
5	2	751.0	16.3	0.043
10	2	751.0	16.5	0.045

Composite power:

Band	Bandwidth (MHz)	Power (dBm)	Power (Watts)
2 GHz	5	18.5	0.071
2 GHz	10	18.5	0.071
2 GHz	15	18.3	0.068
700 MHz	5	19.5	0.089
700 MHz	10	19.4	0.088

Note: These measurements were made using FCC Measurement Guidance document 662911

Equipment Used: E1061

Measurement Uncertainty: +/- 1.7 dB

Temperature: 22 °C

Relative Humidity: 45 %

Section 4. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 2.1049
TESTED BY: David Light	DATE: 21 April 2015

Test Results: Complies.

Test Data: See attached plot(s).

Equipment Used:

Measurement Uncertainty: +/- 1.6 dB

Temperature: 22 °C

Relative Humidity: 45 %

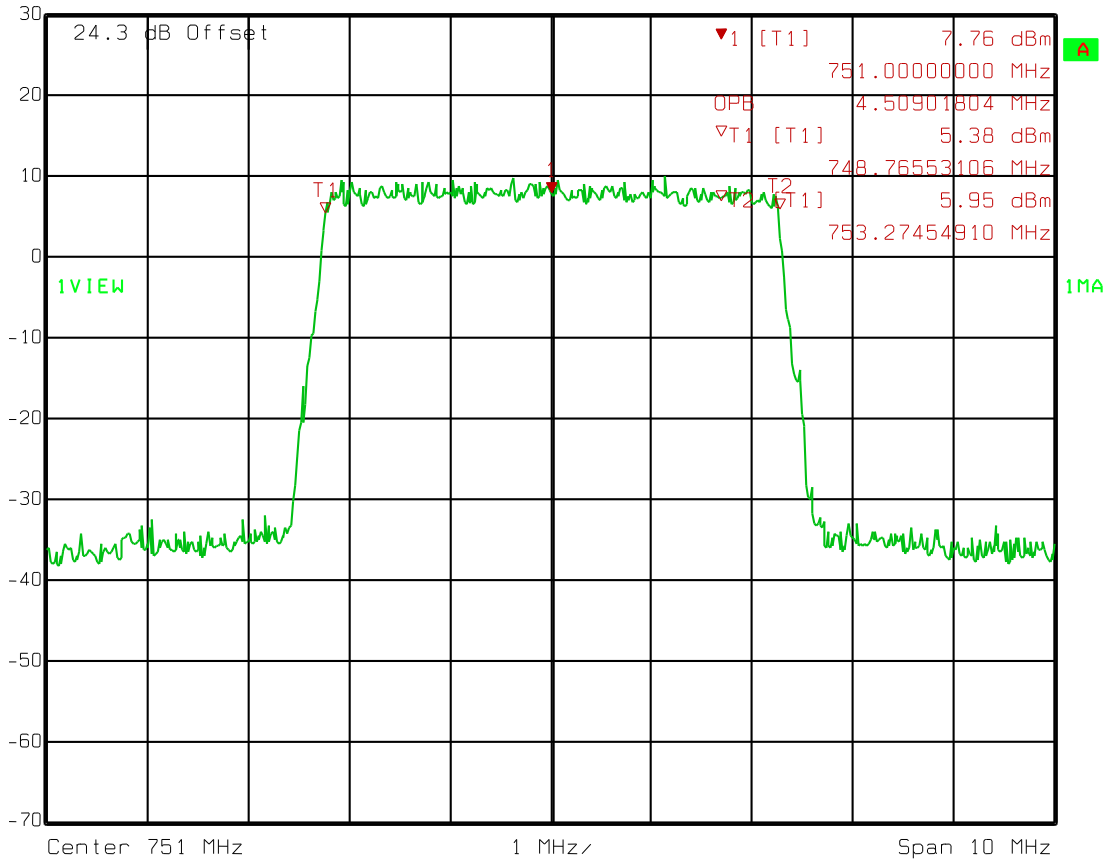
Note: All measurements presented were made with the EUT in QPSK mode. These measurements are consistent with all modulations and data rates.

Test Data – Occupied Bandwidth

QPSK
5 MHz



Marker 1 [T1] RBW 50 kHz RF Att 30 dB
 Ref Lvl 7.76 dBm VBW 200 kHz
 30 dBm 751.0000000 MHz SWT 10 ms Unit dBm

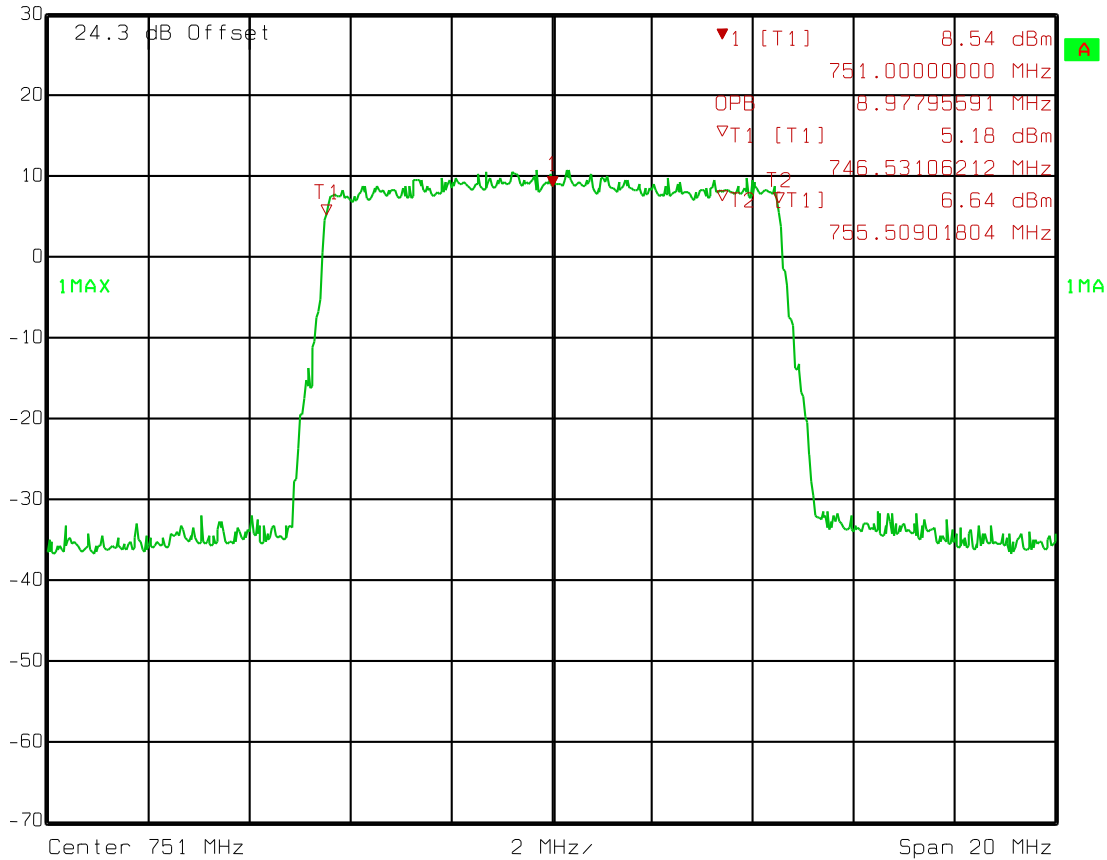


Date: 21.APR.2015 09:04:43

Test Data – Occupied Bandwidth

QPSK
10 MHz

	Marker 1 [T1]	RBW	100 kHz	RF Att	30 dB
	Ref Lvl	8.54 dBm	VBW	300 kHz	
	30 dBm	751.00000000 MHz	SWT	5 ms	Unit dBm



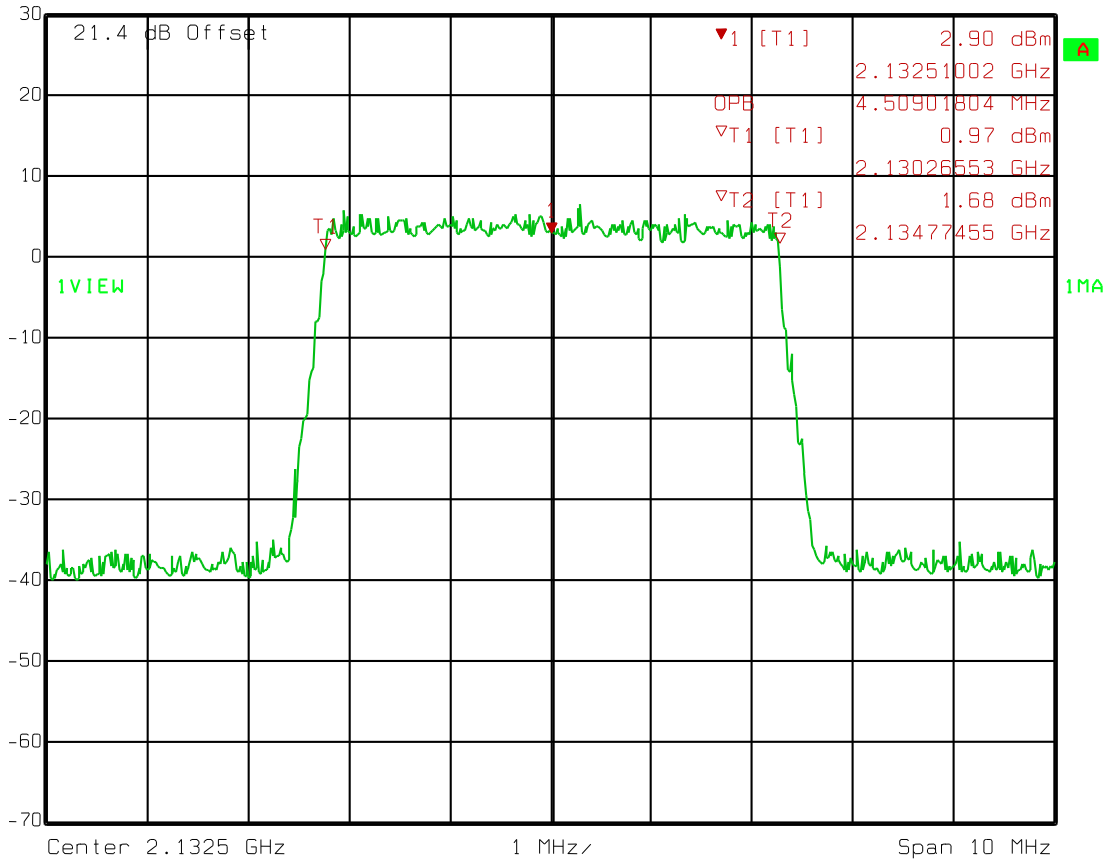
Date: 21.APR.2015 09:15:21

Test Data – Occupied Bandwidth

QPSK
5 MHz



Marker 1 [T1] RBW 50 kHz RF Att 30 dB
 Ref Lvl 2.90 dBm VBW 200 kHz
 30 dBm 2.13251002 GHz SWT 10 ms Unit dBm



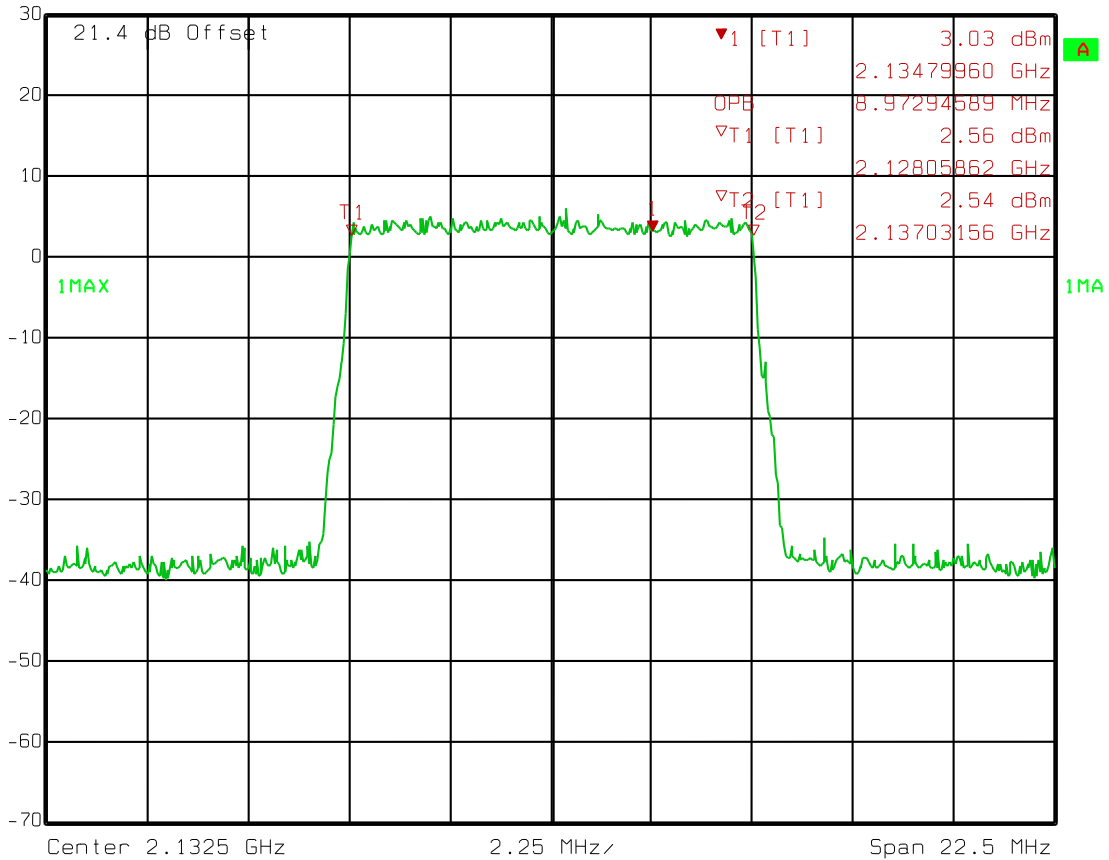
Date: 21.APR.2015 08:32:07

Test Data – Occupied Bandwidth

QPSK
10 MHz



Ref Lvl	30 dBm	Marker 1 [T1]	3.03 dBm	RBW	100 kHz	RF Att	30 dB
			2.13479960 GHz	VBW	100 kHz		
				SWT	6 ms	Unit	dBm



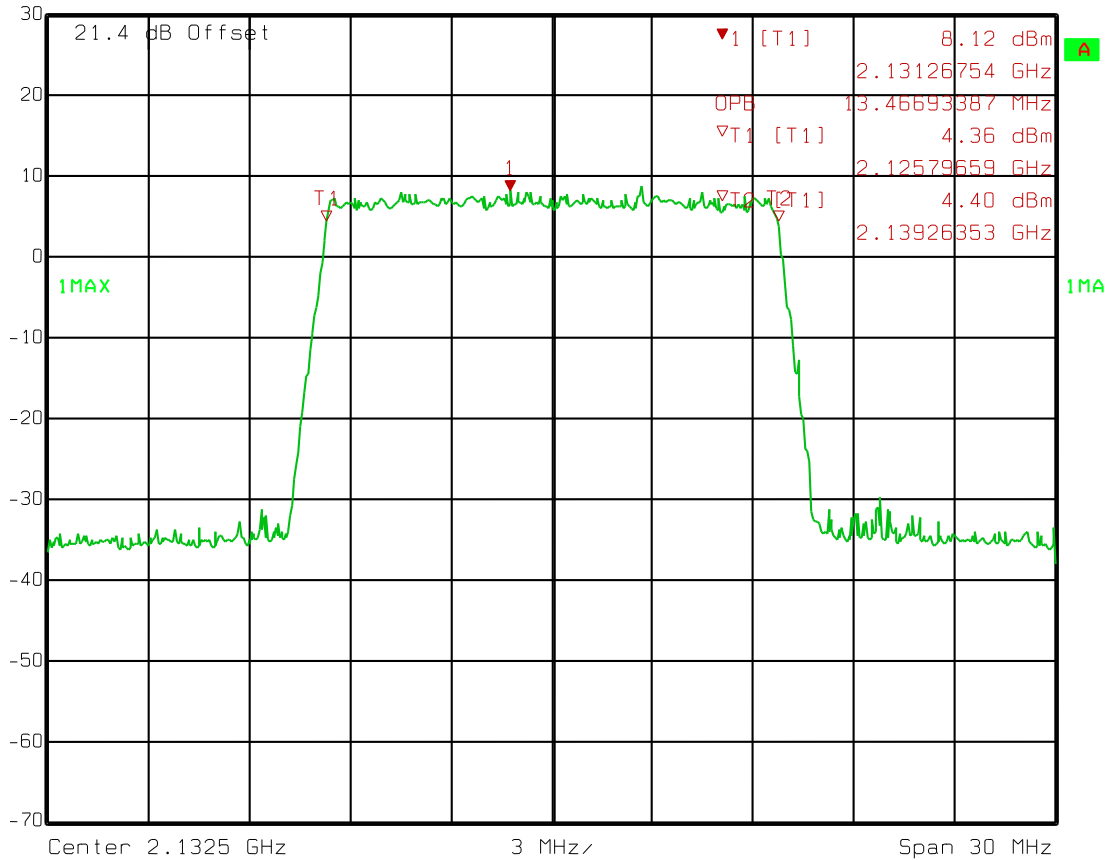
Date: 21.APR.2015 07:55:17

Test Data – Occupied Bandwidth

QPSK
15 MHz



Marker 1 [T1] RBW 200 kHz RF Att 30 dB
 Ref Lvl 8.12 dBm VBW 500 kHz
 30 dBm 2.13126754 GHz SWT 5 ms Unit dBm



Date: 21.APR.2015 08:45:32

Section 5. Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 2.1051
TESTED BY: David Light	DATE: 21 April 2015

Test Results: Complies.

Test Data: Refer to plots below.

Equipment Used: 1036

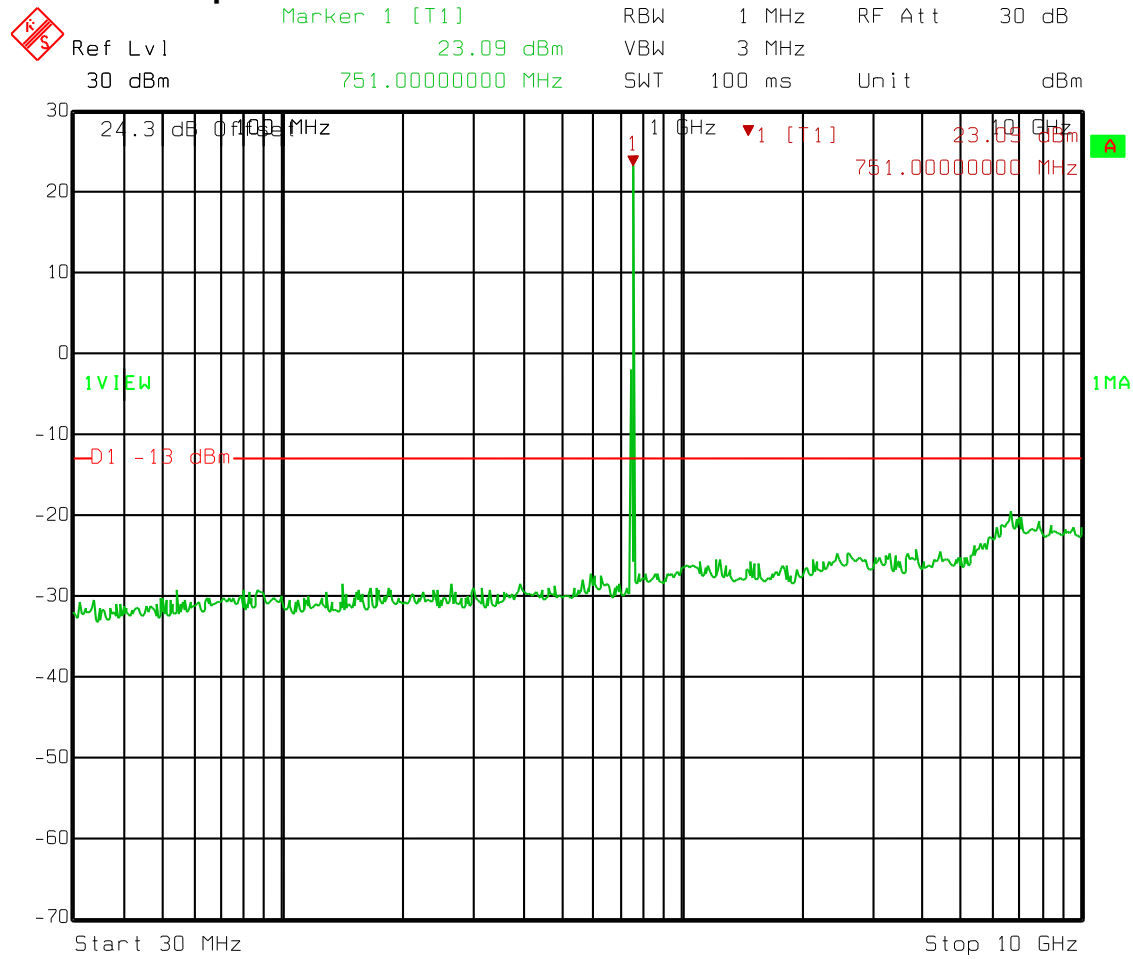
Measurement Uncertainty: +/- 1.7 dB

Temperature: 22 °C

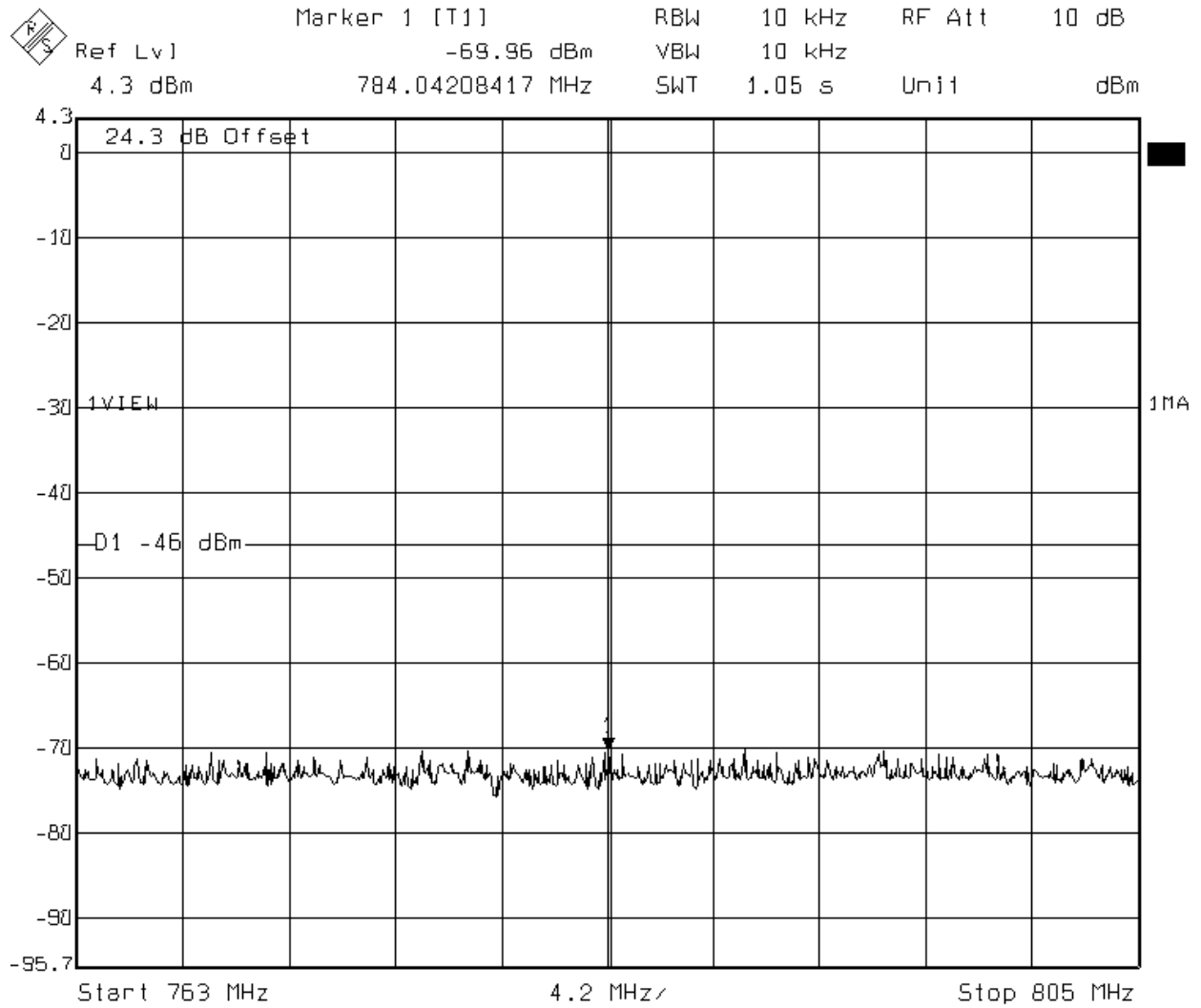
Relative Humidity: 45 %

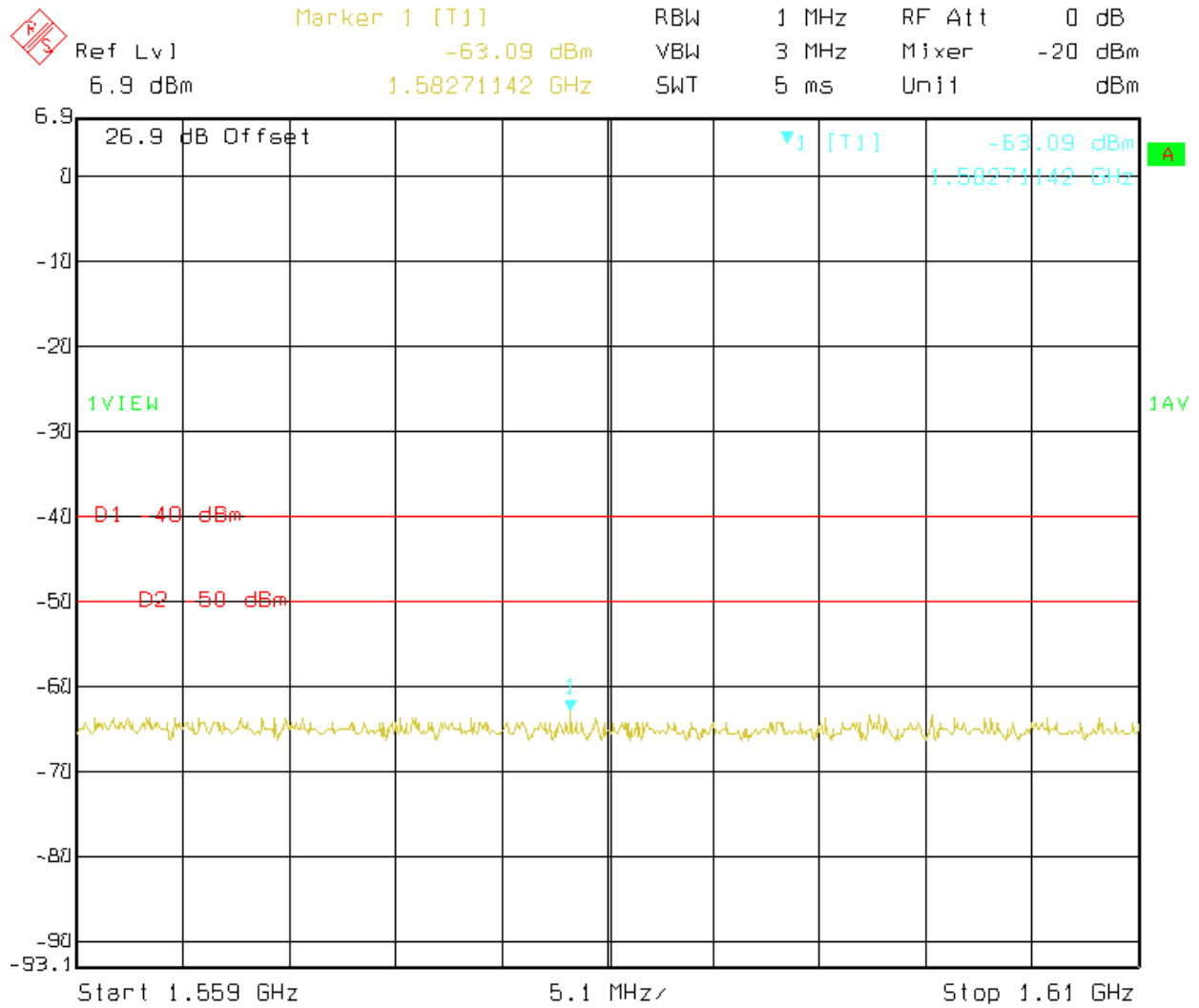
Note: These measurements were made using FCC Measurement Guidance document 662911. All measurements include 3 dB offset for 2x2 MIMO.
 $10 \log (N_{ANT}) = 3 \text{ dB}$

Test Data – Spurious Emissions at Antenna Terminals – Band13 5MHz BW QPSK



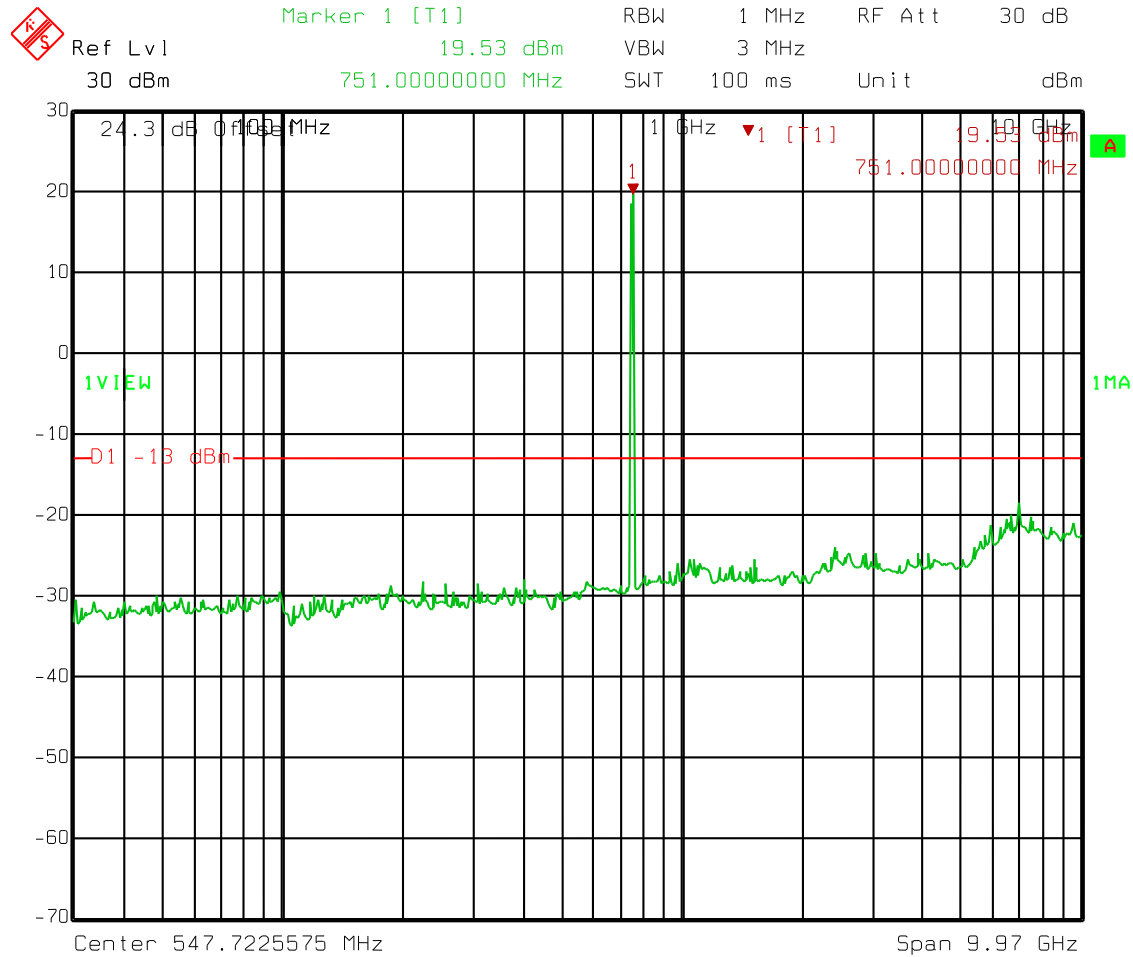
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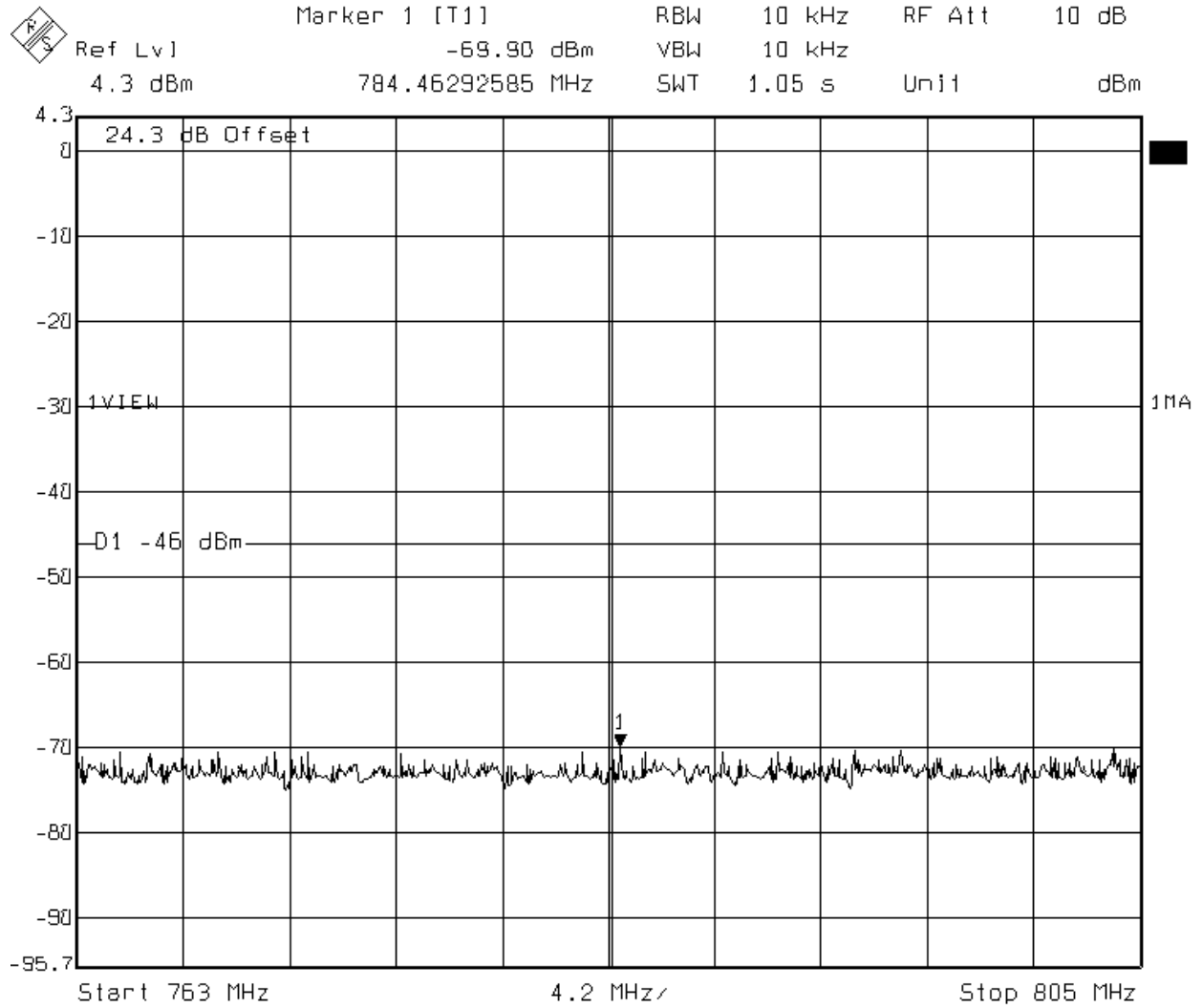


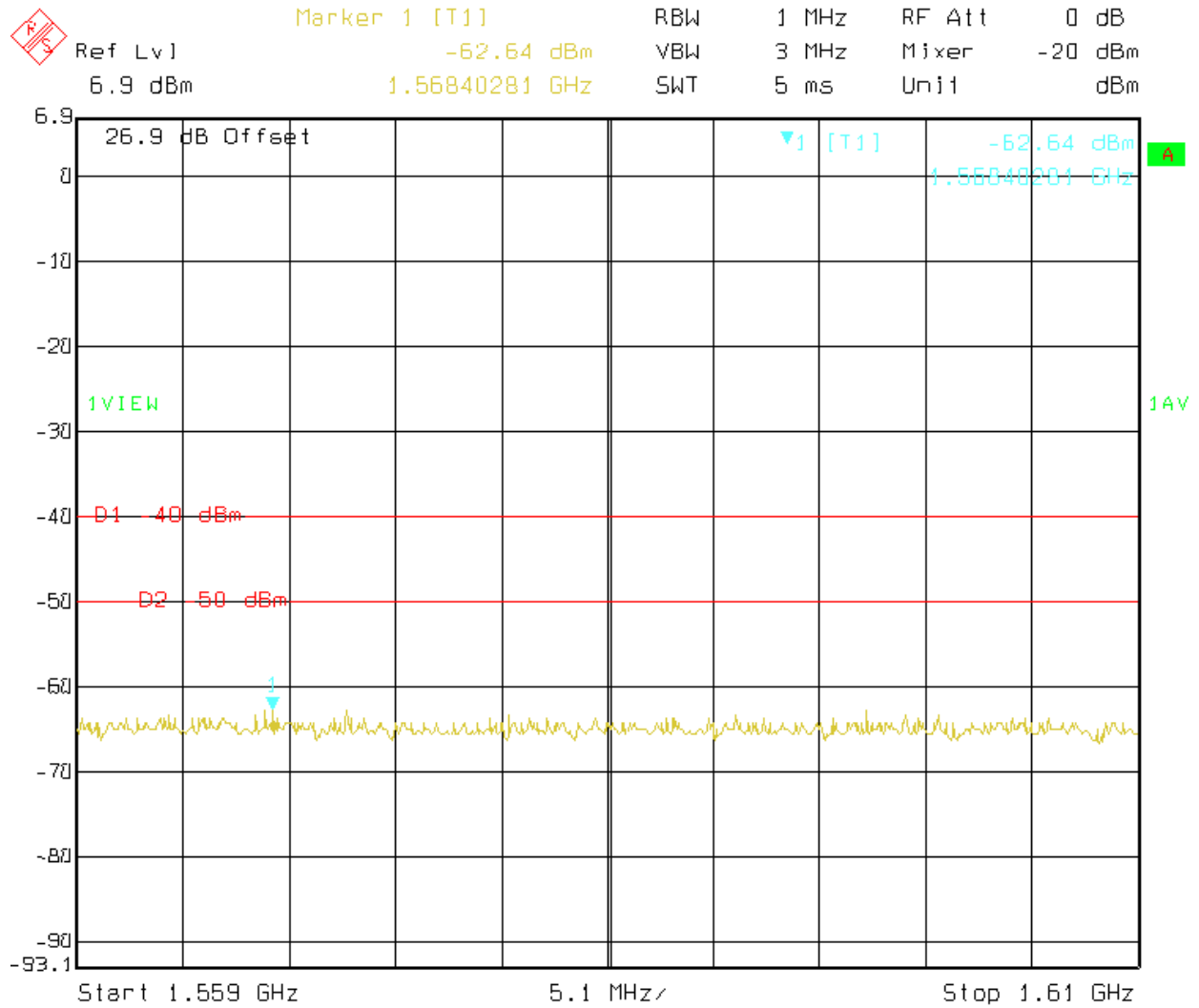
1.5GHz Highpass Filter used.

Test Data – Spurious Emissions at Antenna Terminals - Band13 10MHz BW QPSK



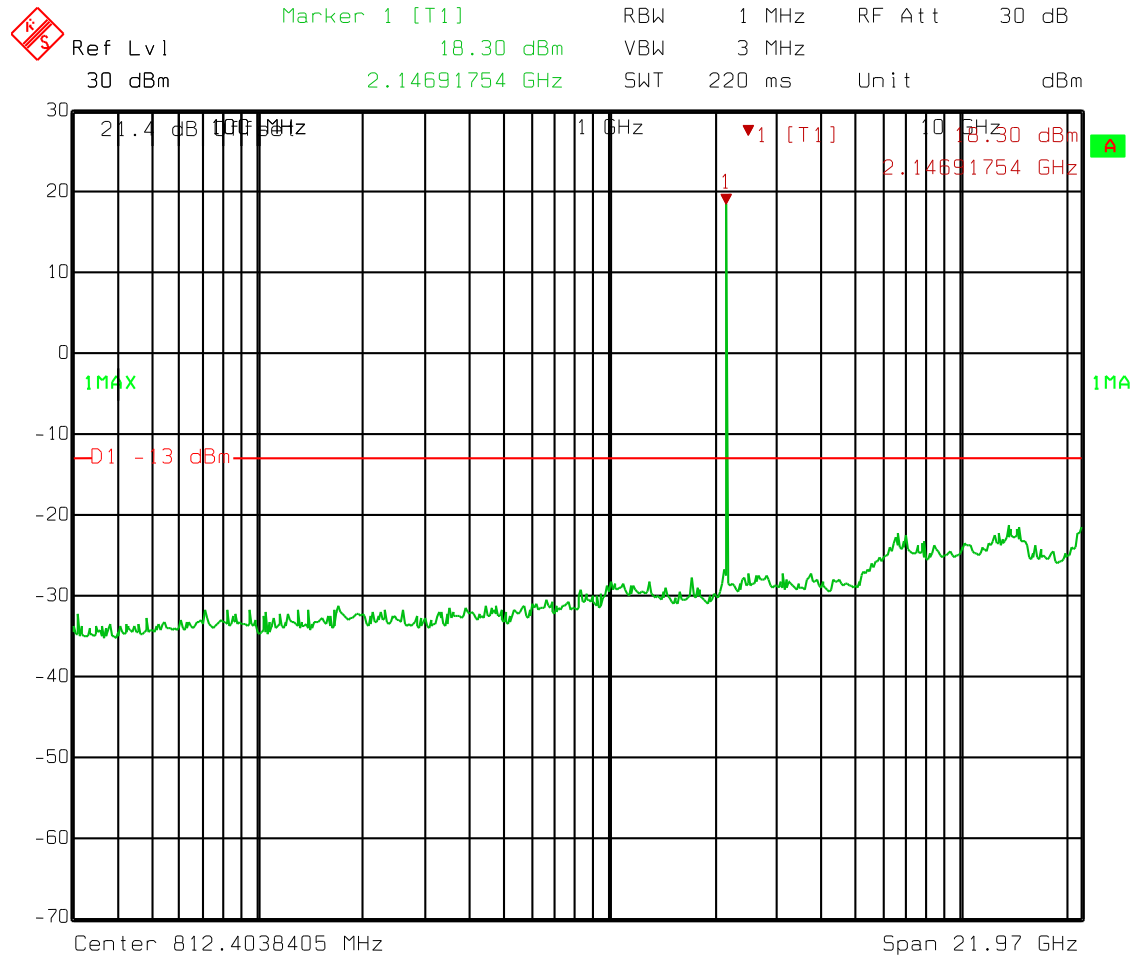
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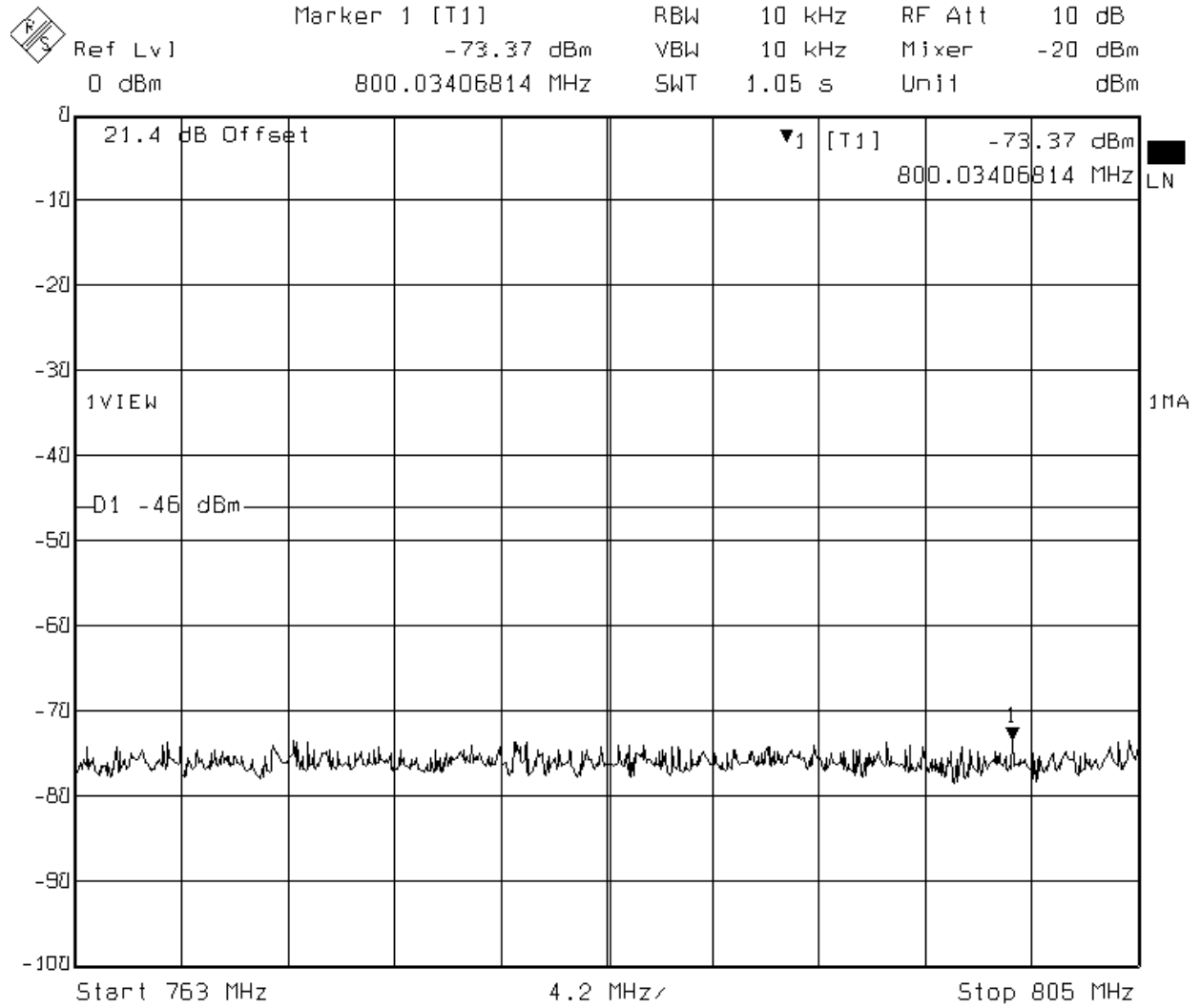


1.5GHz Highpass Filter used.

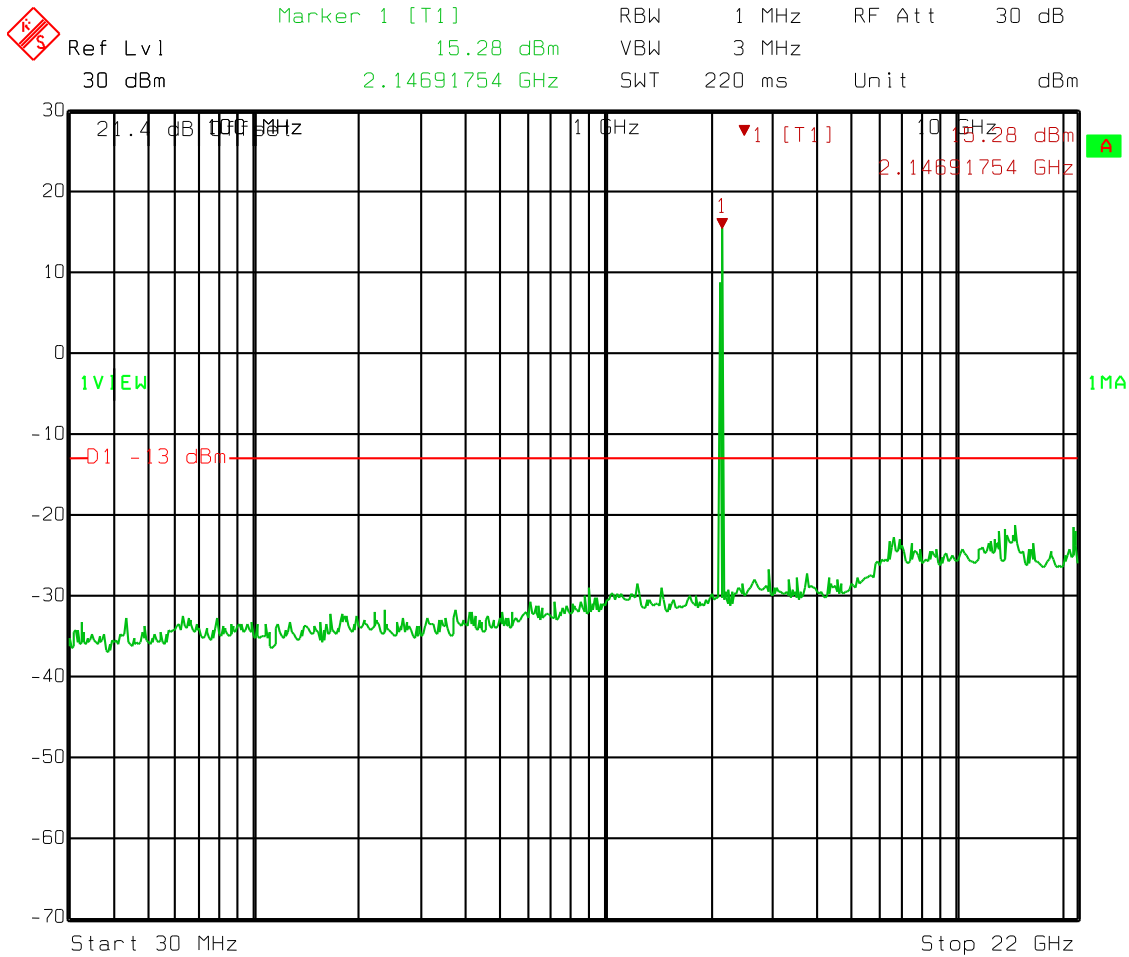
Test Data – Spurious Emissions at Antenna Terminals – Band4 5MHz BW QPSK



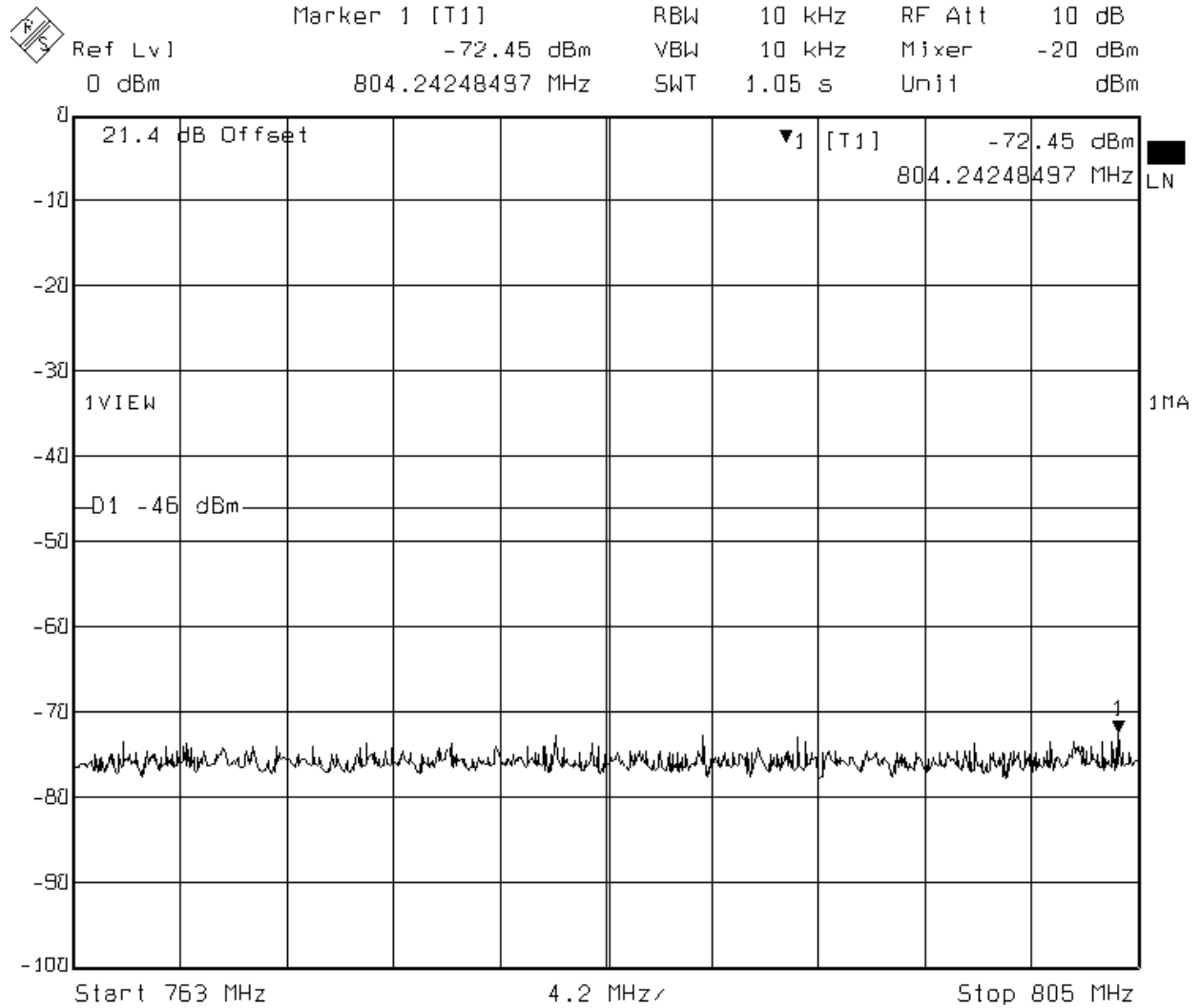
Date: 21.APR.2015 08:36:12



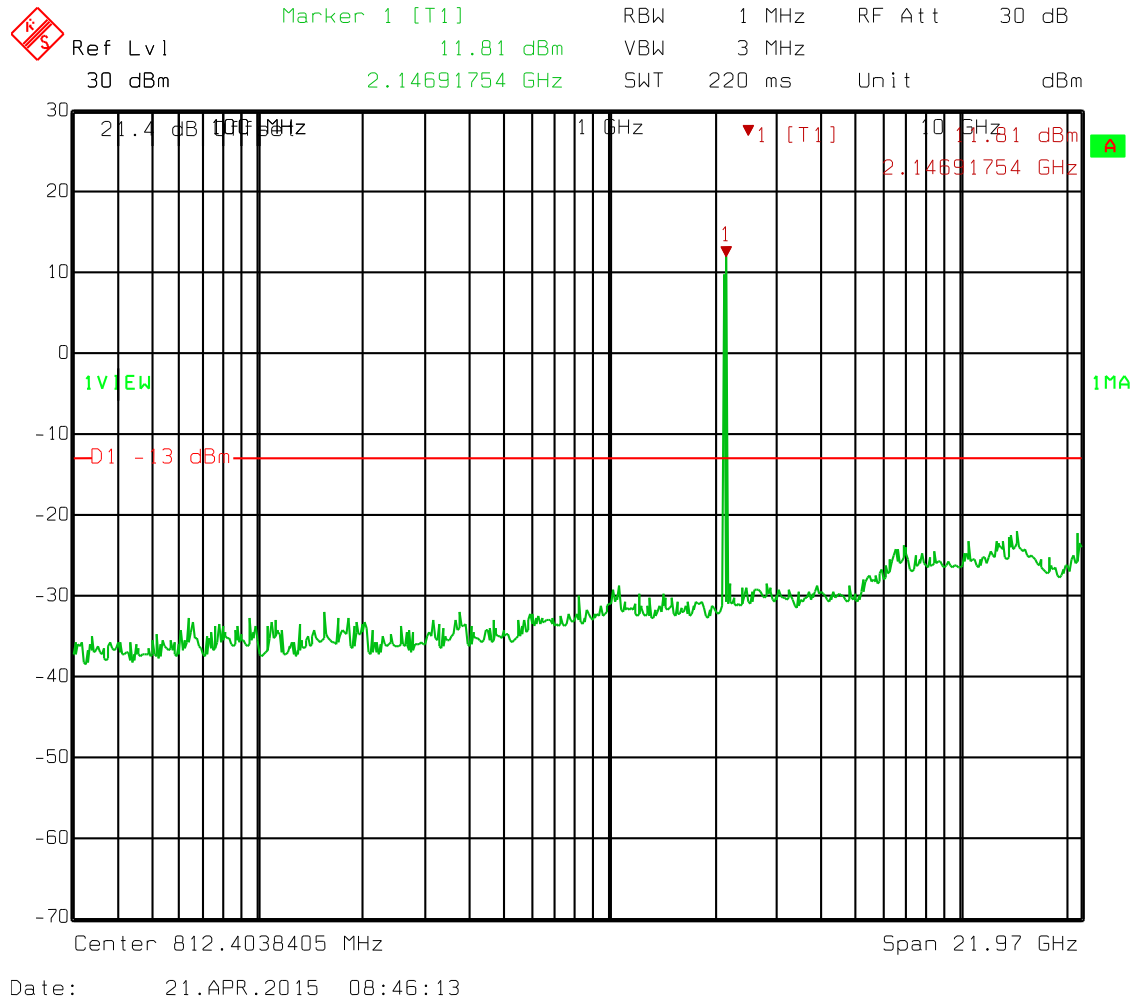
Test Data – Spurious Emissions at Antenna Terminals – Band4 10MHz BW QPSK

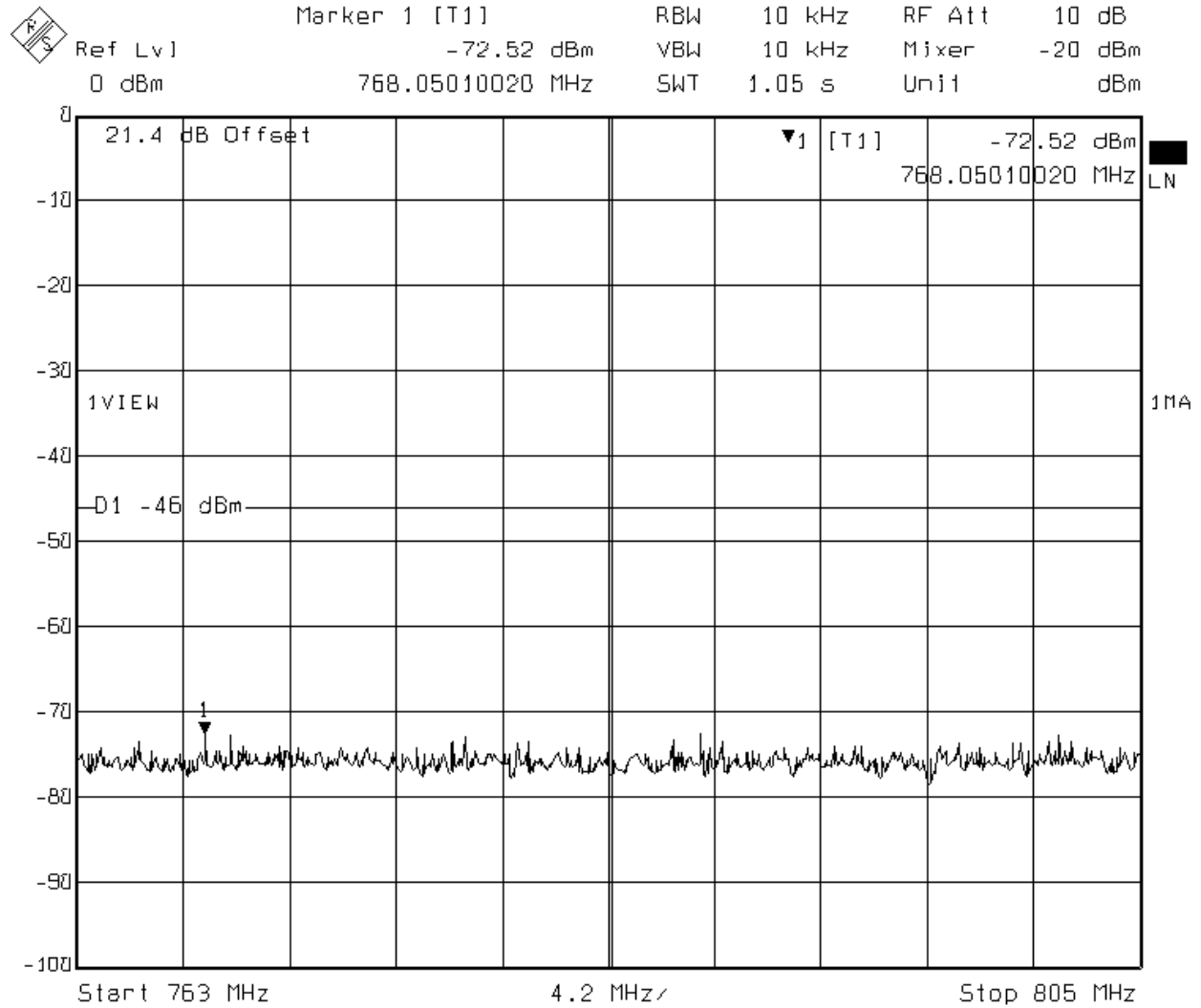


Date: 21.APR.2015 08:02:28



Test Data – Spurious Emissions at Antenna Terminals – Band4 15MHz BW QPSK





Date: 29.JUL.2015 13:07:28

Section 6. Field Strength of Spurious

NAME OF TEST: Field Strength of Spurious Emissions	PARA. NO.: 2.1051
TESTED BY: David Light	DATE: 21 April 2015

Test Results: Complies.

Test Data: There were no emissions detected above the noise floor which was at least 20 dB below the specification. The spectrum was searched from 30 MHz to 22 GHz in each mode and modulation.

Equipment Used: 1036-1480-E1029-993

Measurement Uncertainty: +/- 1.7 dB

Temperature: 22 °C

Relative Humidity: 45 %

Note: These measurements were made using FCC Measurement Guidance document 662911. All measurements include 3 dB offset for 2x2 MIMO.
 $10 \log (N_{ANT}) = 3 \text{ dB}$

Section 7. Frequency Stability

NAME OF TEST: Frequency Stability	PARA. NO.: 2.1055
TESTED BY: David Light	DATE: 22 April 2015

Test Results: Complies

Measurement Data: Refer to plots below

Equipment Used: 1036

Measurement Uncertainty: +/- 1.7 dB

Temperature: 22 °C

Relative Humidity: 45 %

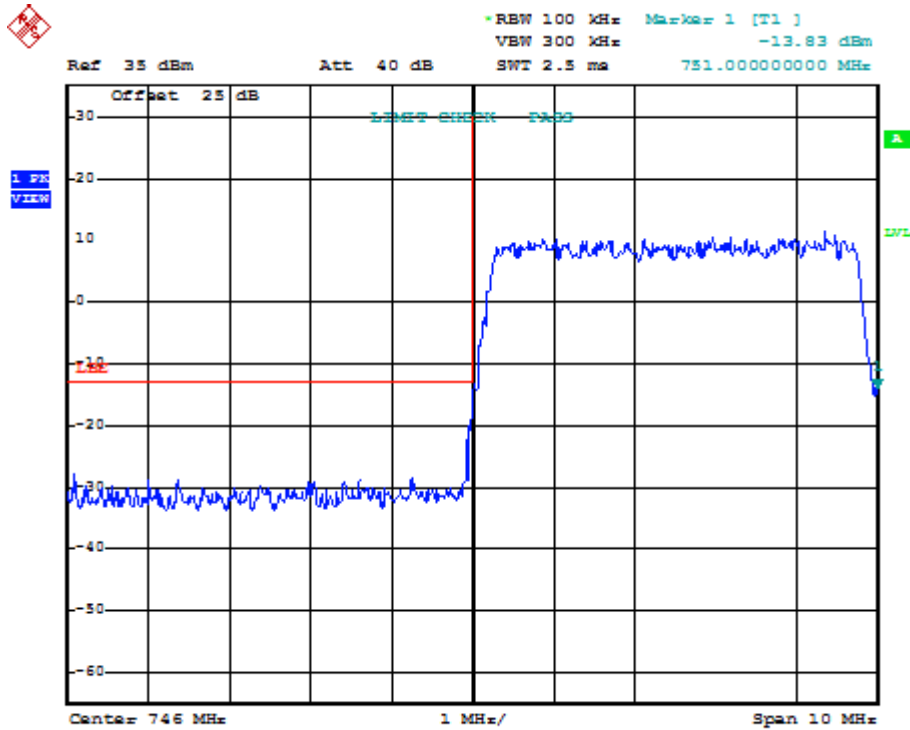
Test Data – Frequency Stability

NOTE: Manufacturer has included a temperature cutoff function to ensure EUT ceases operation at any temperature between -3°C to -10C.

Test Data – Frequency Stability

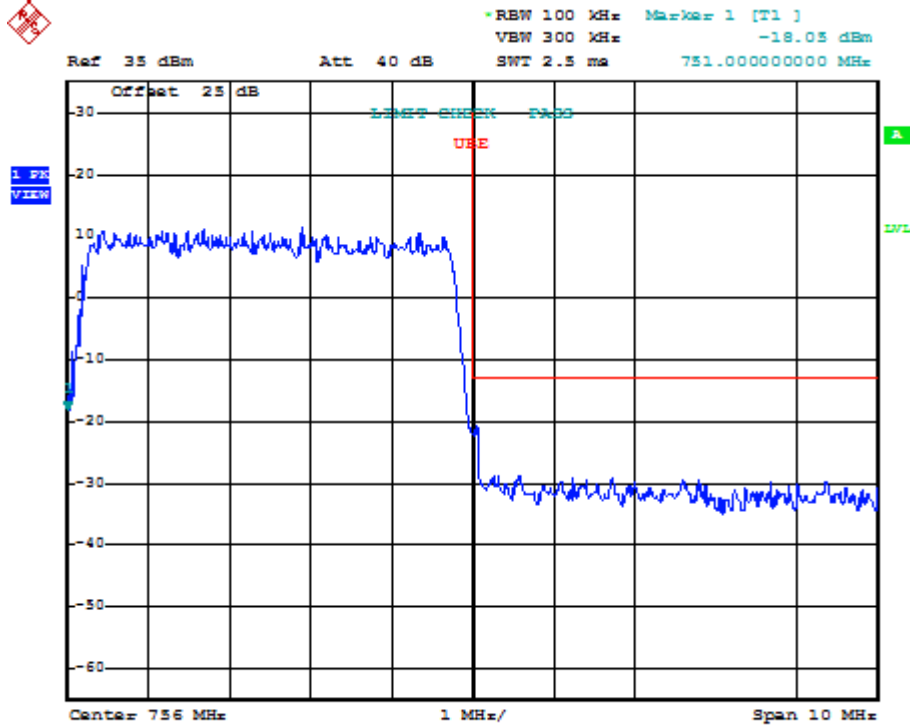
-10C

Lower Edge



Test Data – Frequency Stability

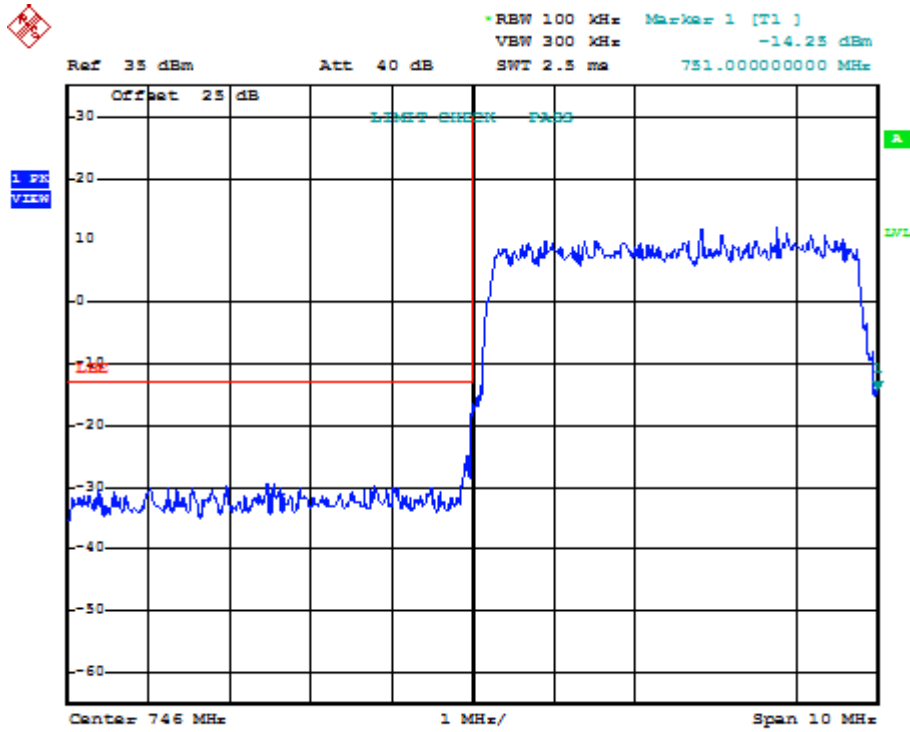
-10C
Upper Edge



Test Data – Frequency Stability

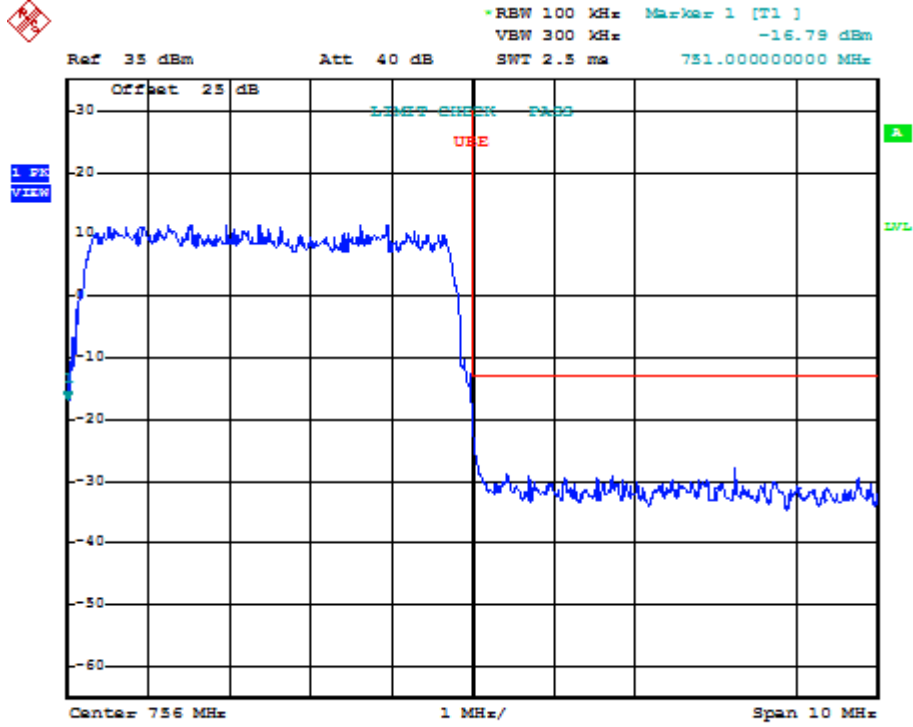
0C

Lower Edge



Test Data – Frequency Stability

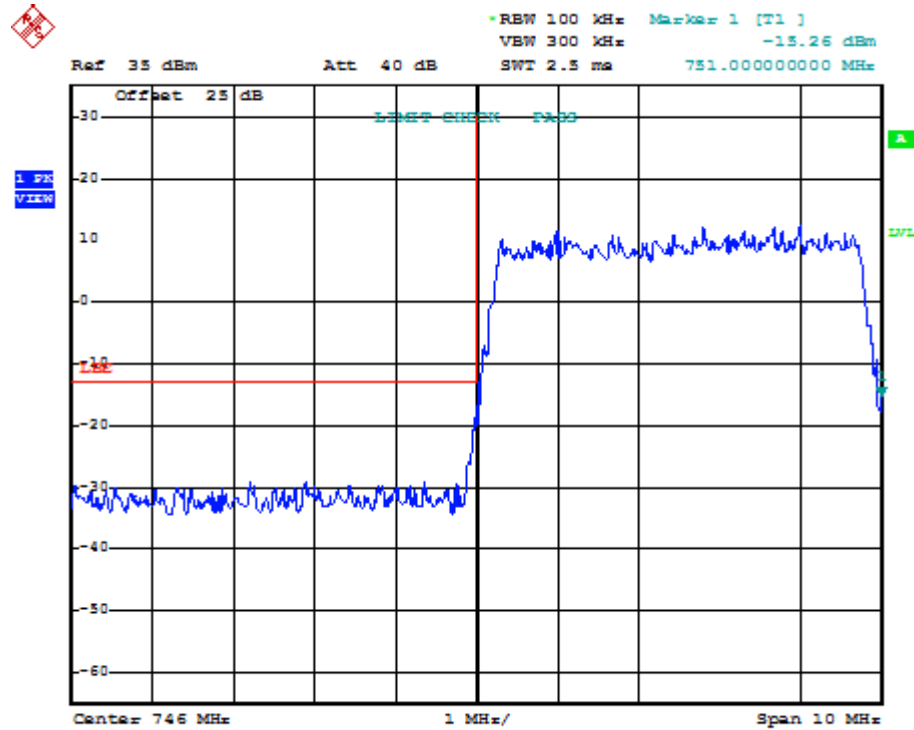
0C
Upper Edge



Test Data – Frequency Stability

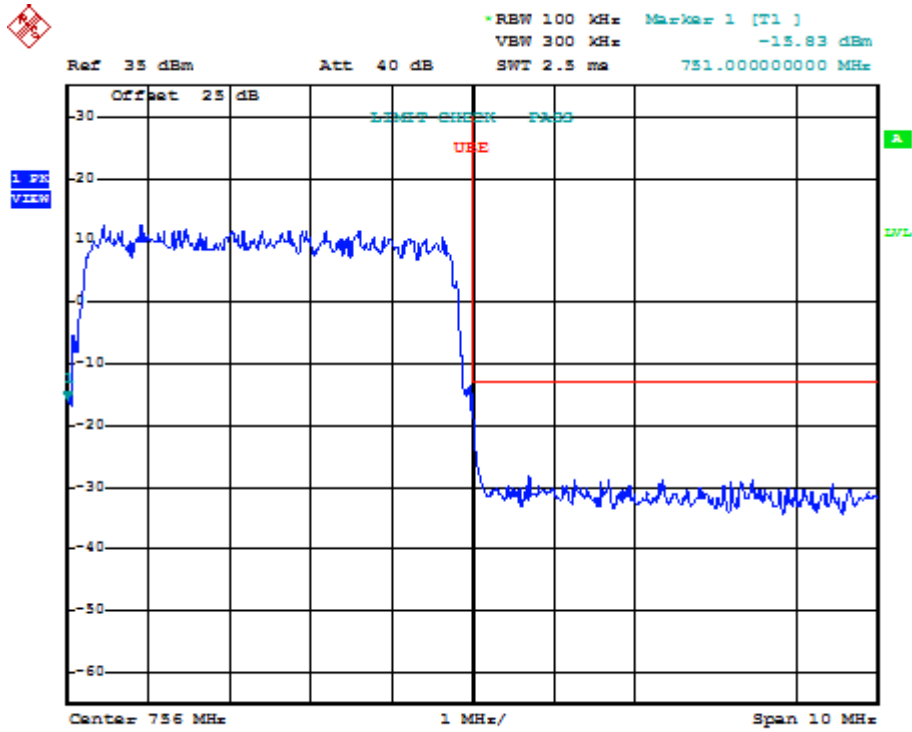
+10C

Lower Edge



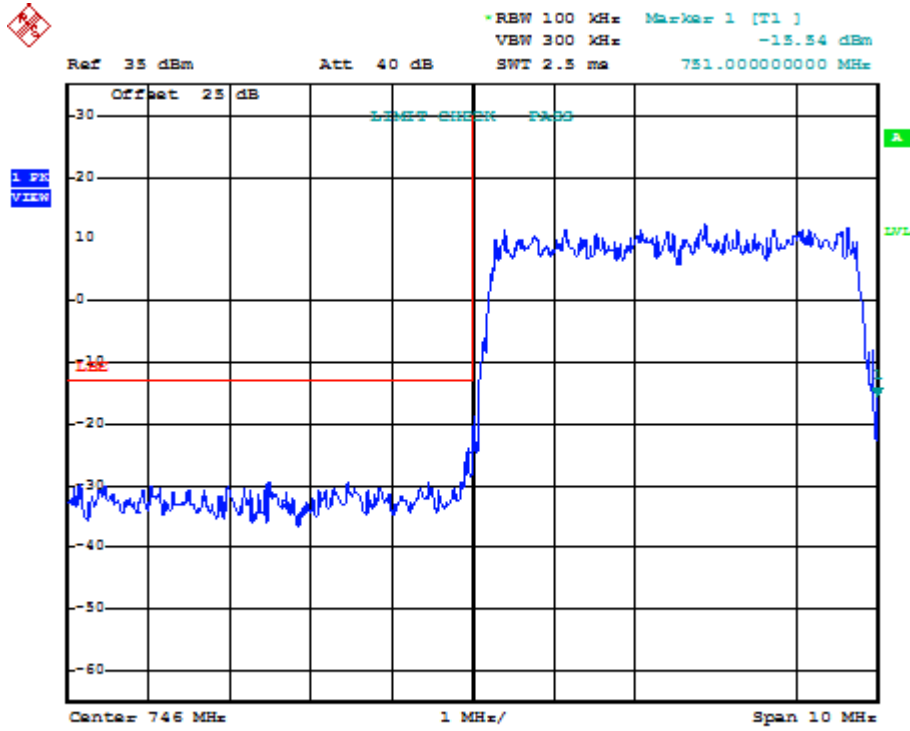
Test Data – Frequency Stability

+10C
Upper Edge



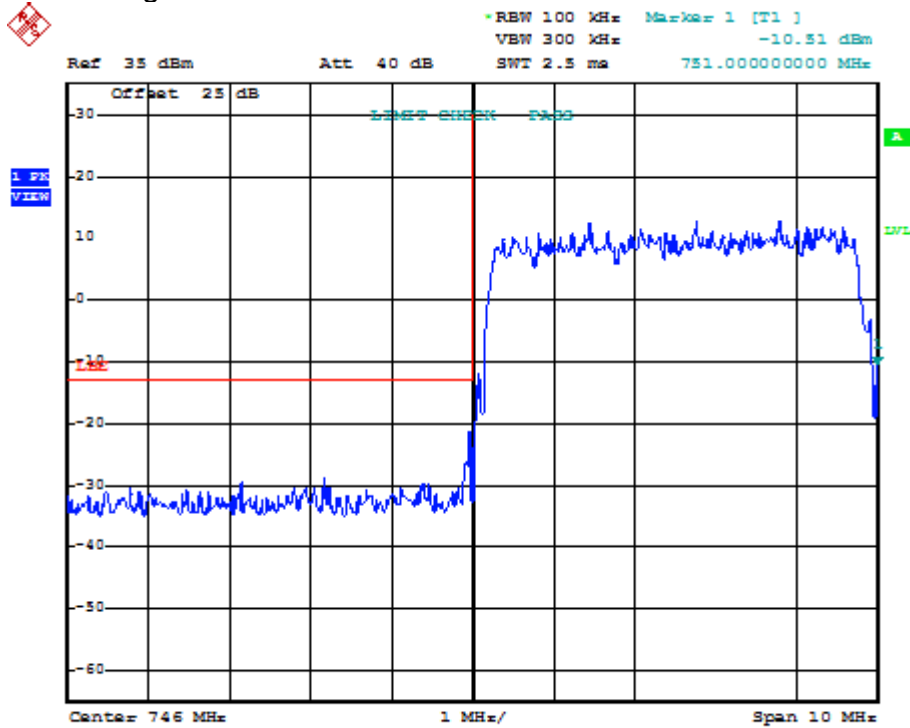
Test Data – Frequency Stability

+20
Vnom
Lower Edge



Test Data – Frequency Stability

+20C
Vmin
Lower Edge

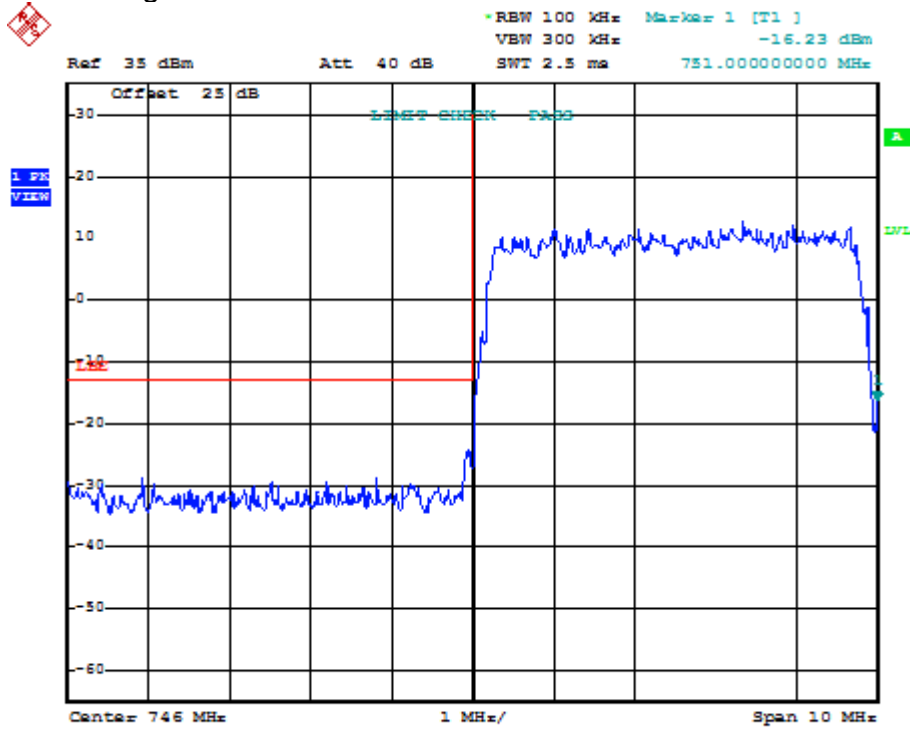


Test Data – Frequency Stability

+20C

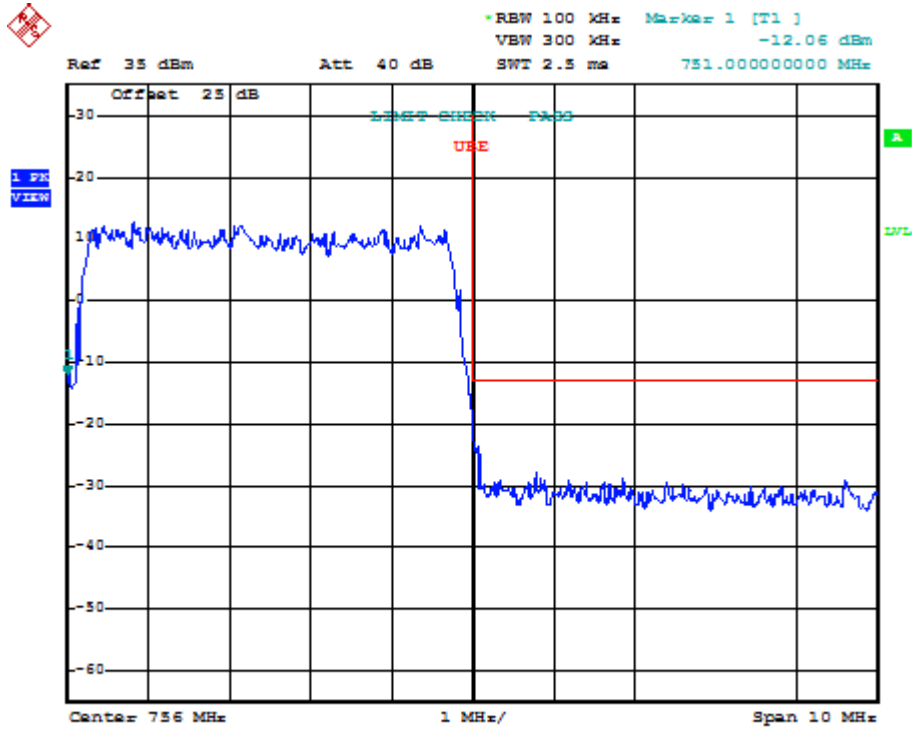
Vmax

Lower Edge



Test Data – Frequency Stability

+20C
Vnom
Upper Edge

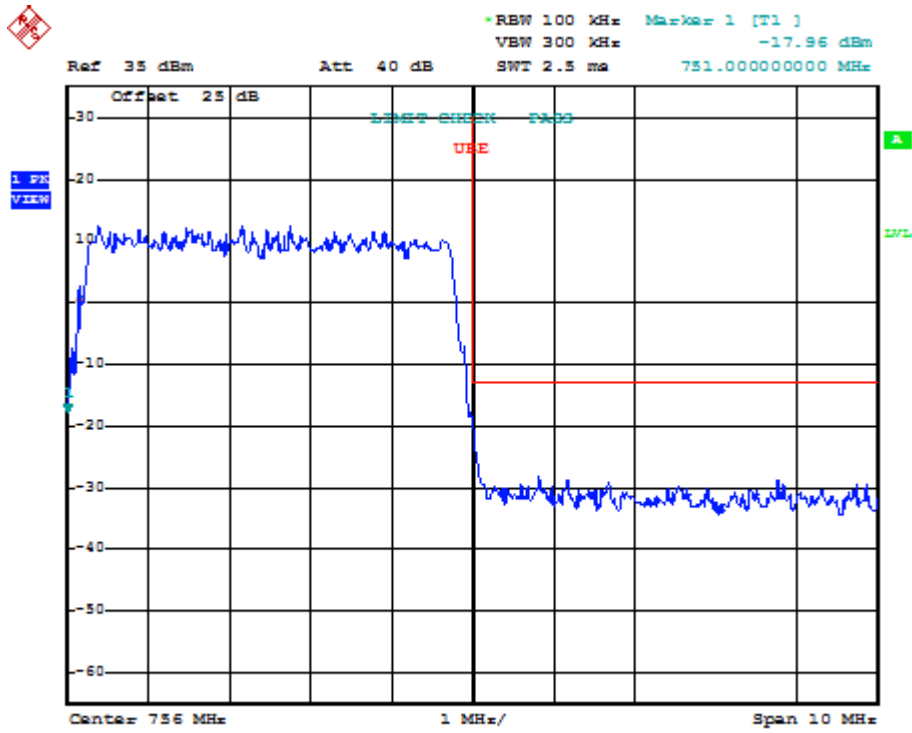


Test Data – Frequency Stability

+20C

Vmin

Upper Edge

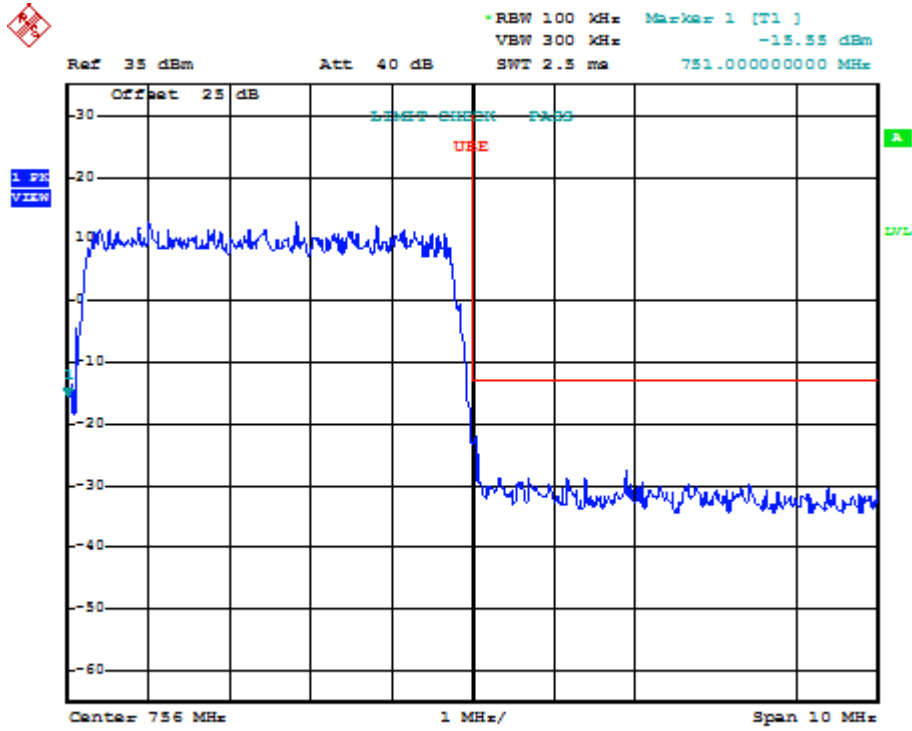


Test Data – Frequency Stability

+20C

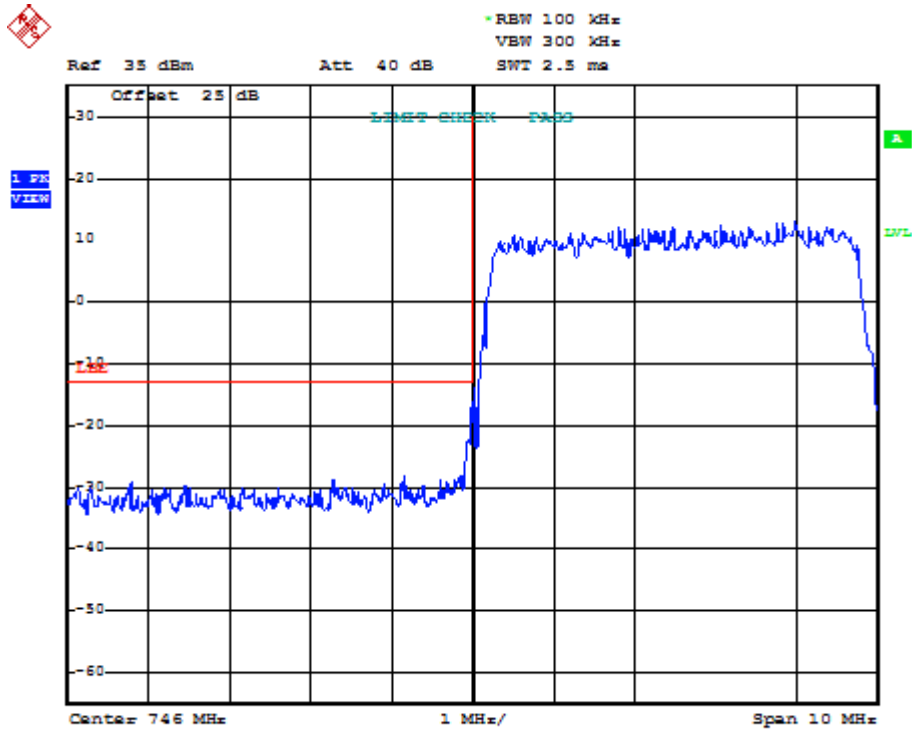
Vmax

Upper Edge



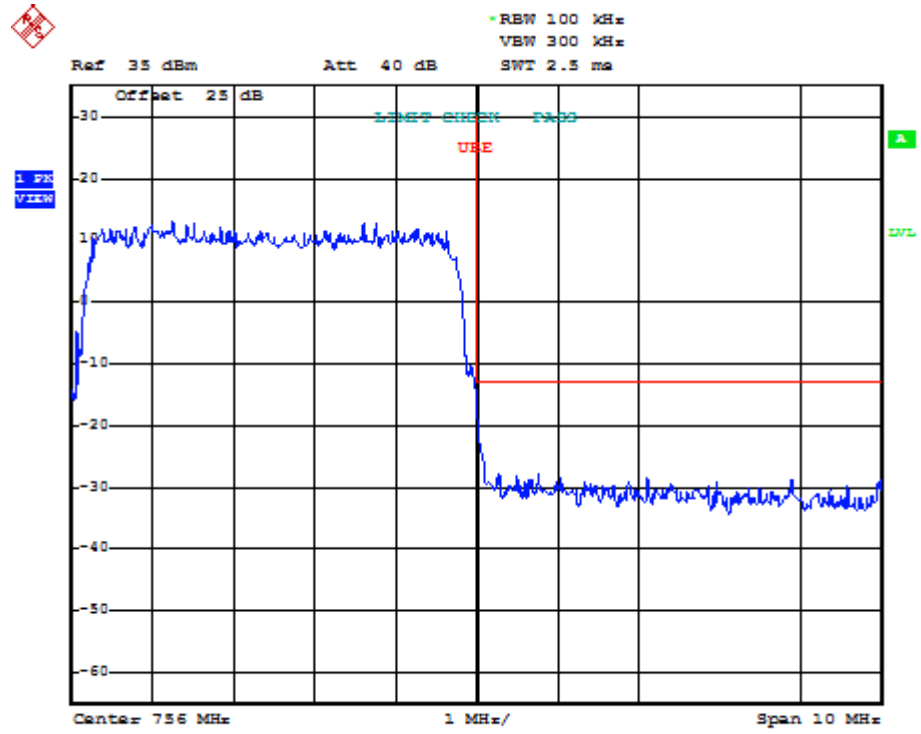
Test Data – Frequency Stability

+30
Lower Edge



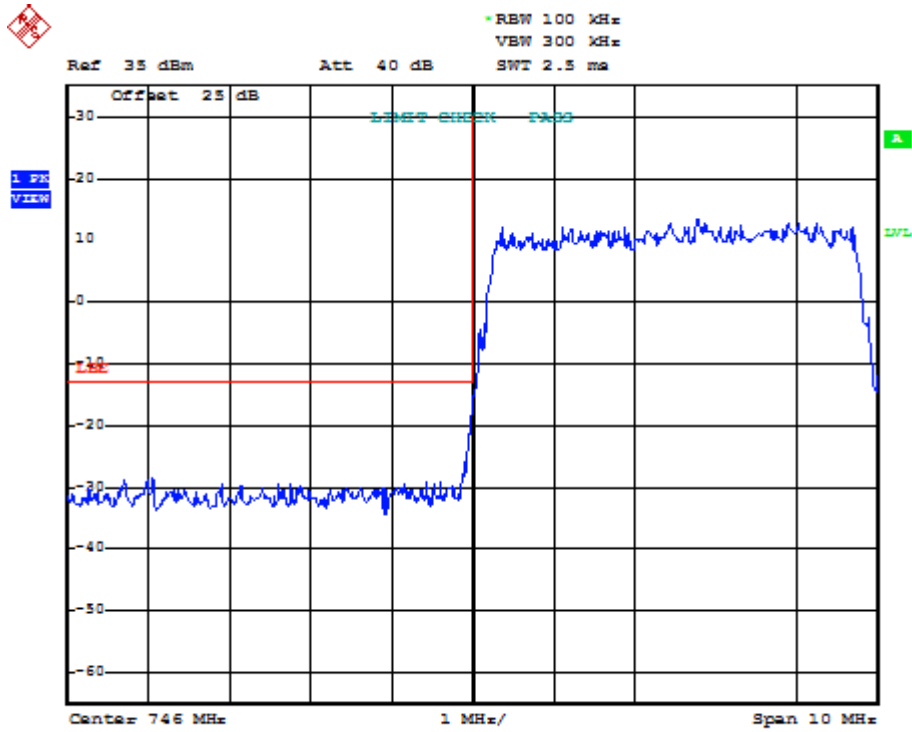
Test Data – Frequency Stability

+30
Upper Edge



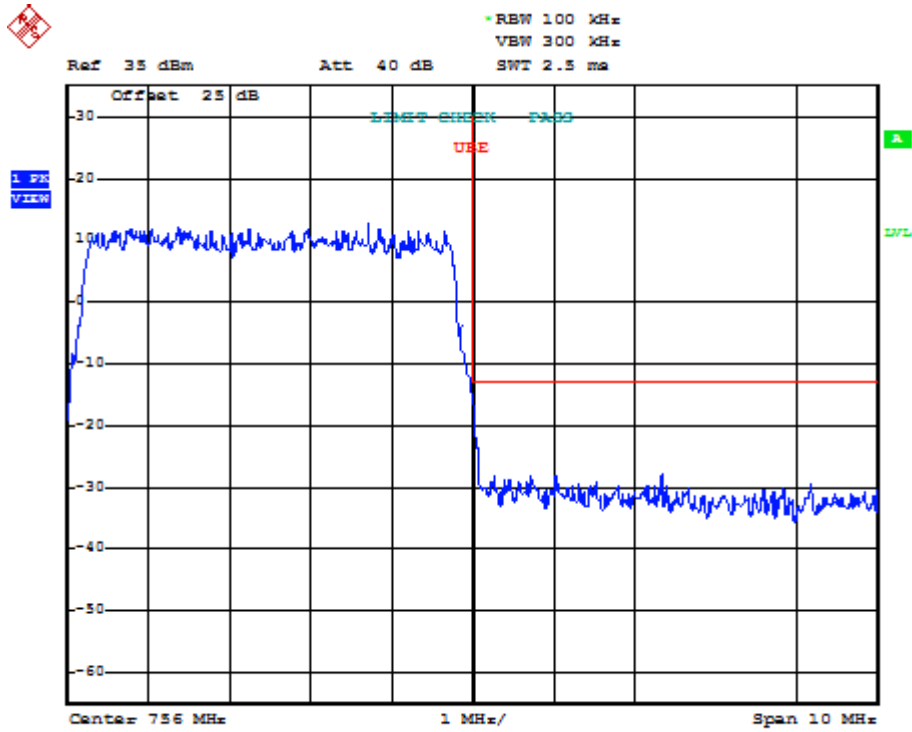
Test Data – Frequency Stability

+40
Lower Edge



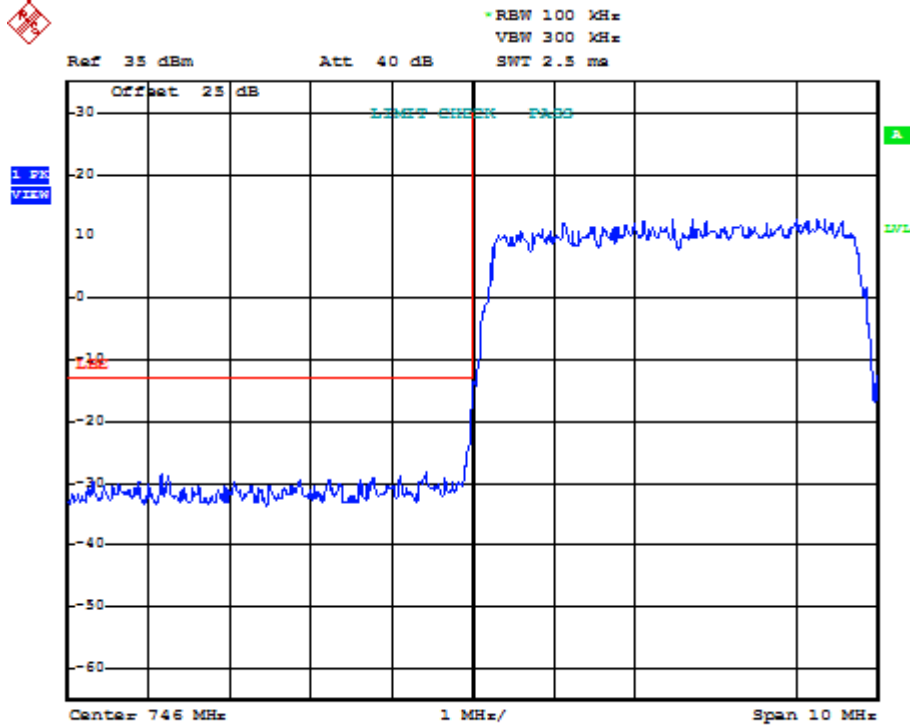
Test Data – Frequency Stability

+40
Upper Edge



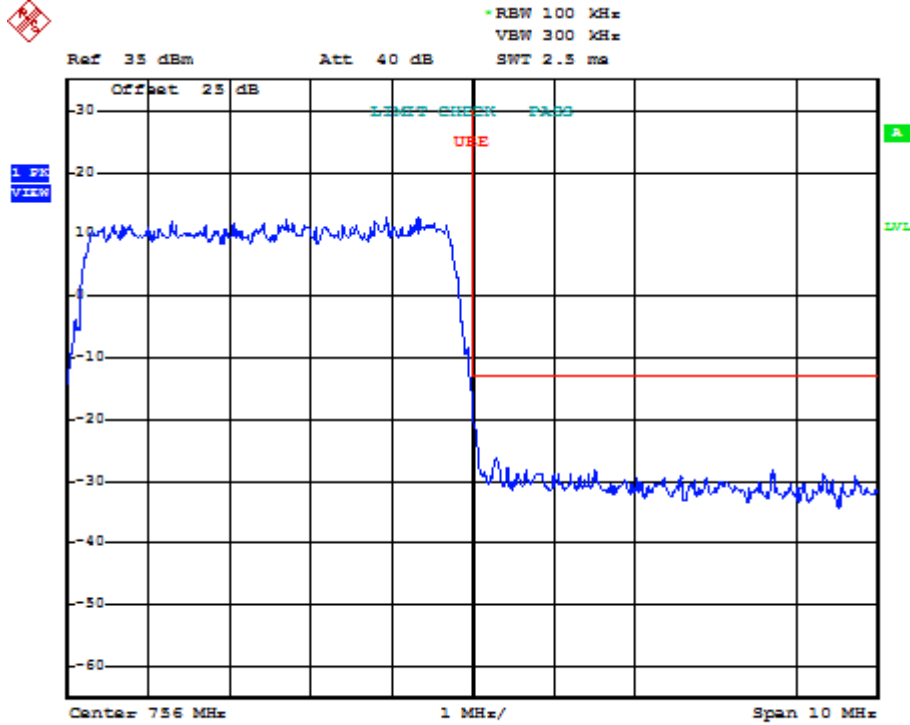
Test Data – Frequency Stability

+50
Lower Edge



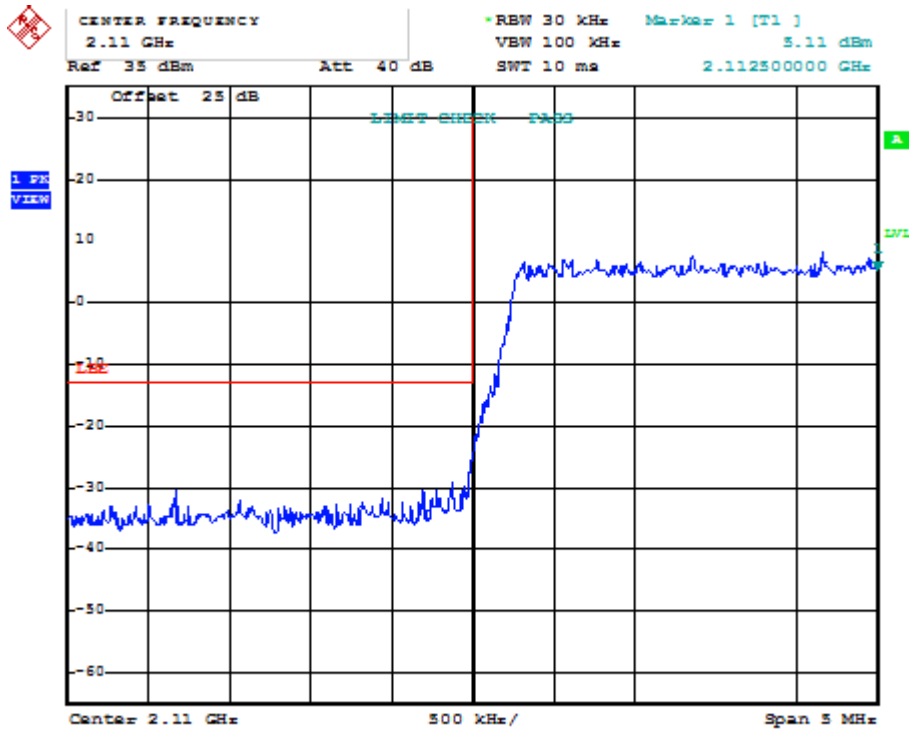
Test Data – Frequency Stability

+50
Upper Edge



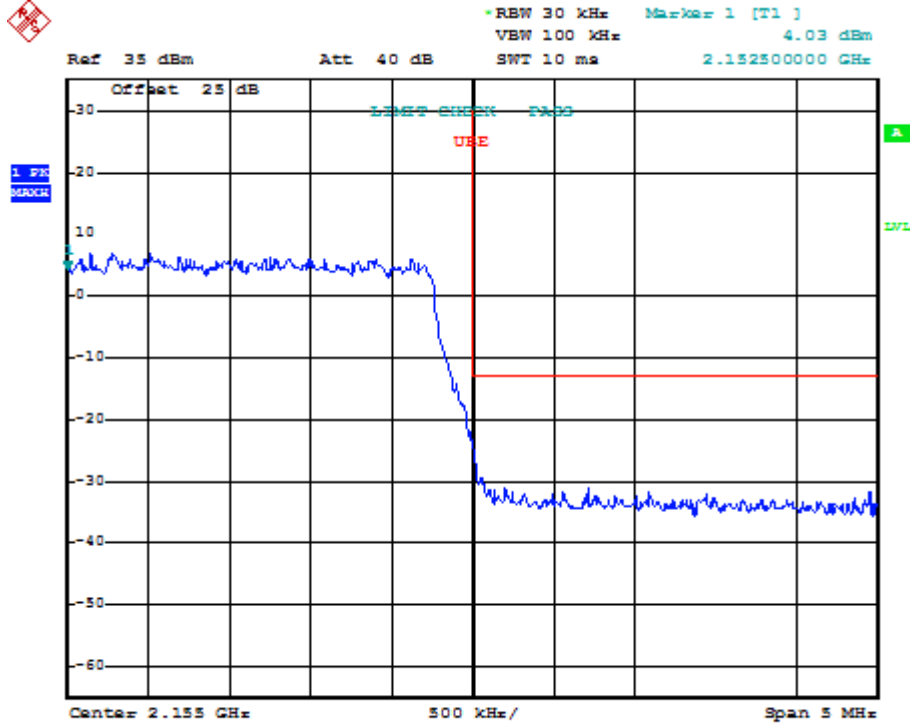
Test Data – Frequency Stability

-30C
Lower Edge



Test Data – Frequency Stability

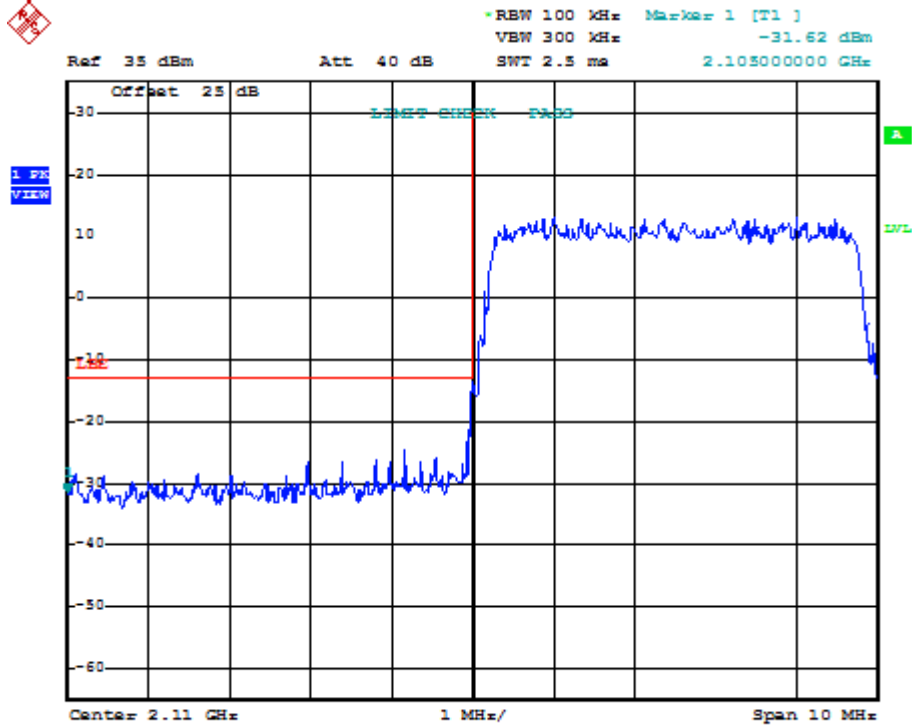
-30C
Upper Edge



Test Data – Frequency Stability

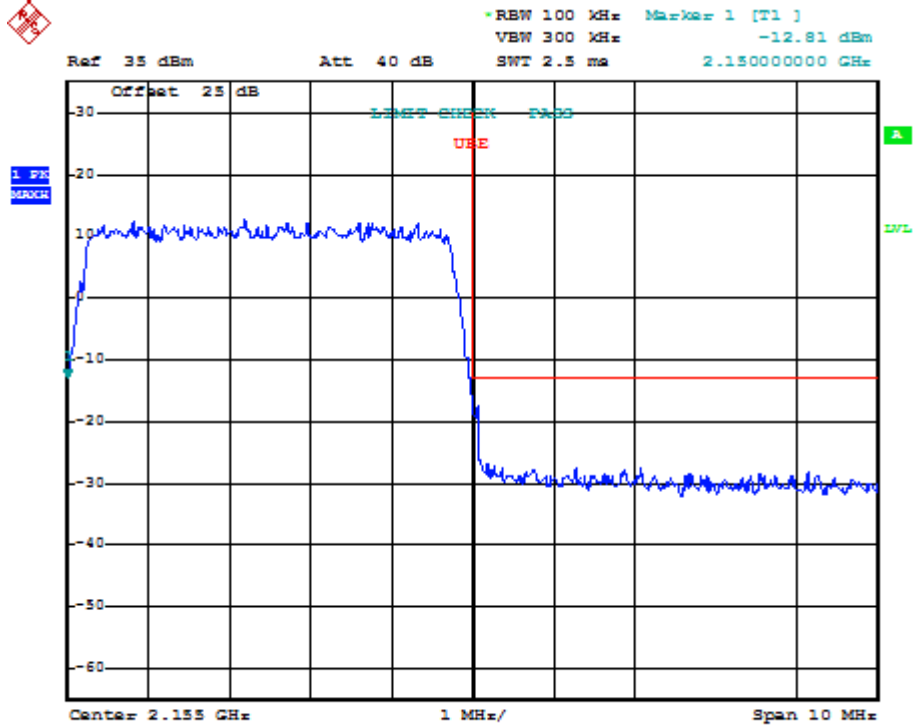
-20C

Lower Edge



Test Data – Frequency Stability

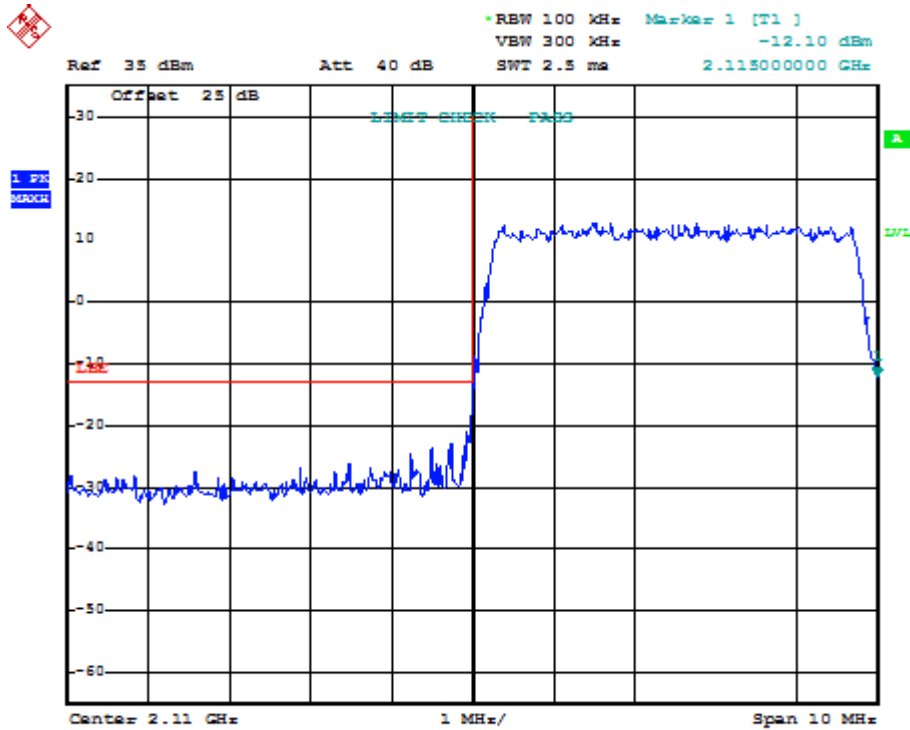
-20
Upper Edge



Test Data – Frequency Stability

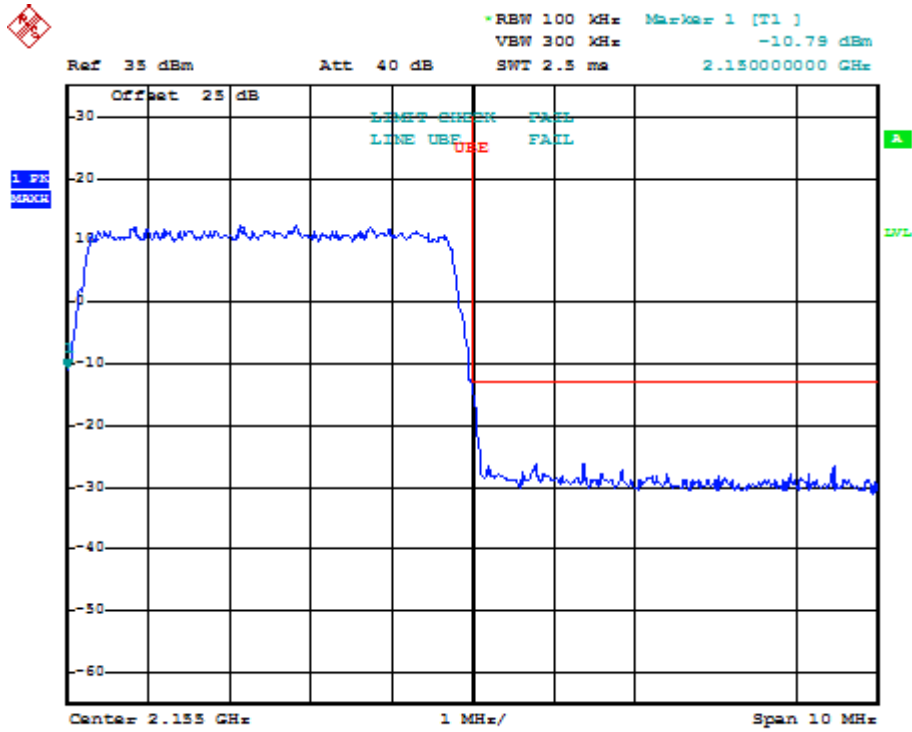
-10C

Lower Edge



Test Data – Frequency Stability

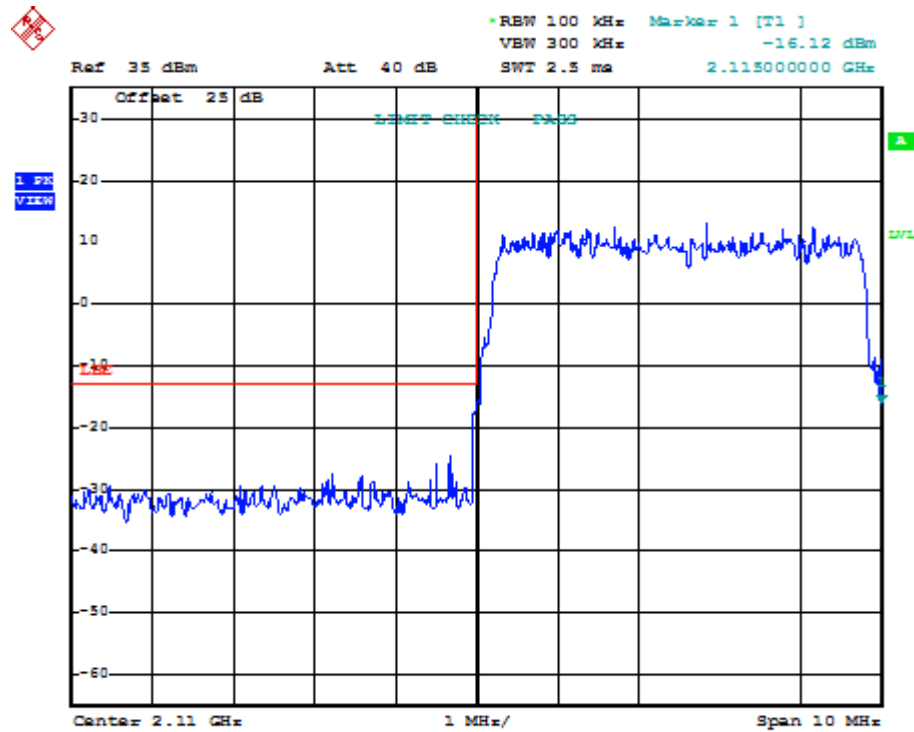
-10C
Upper Edge



Test Data – Frequency Stability

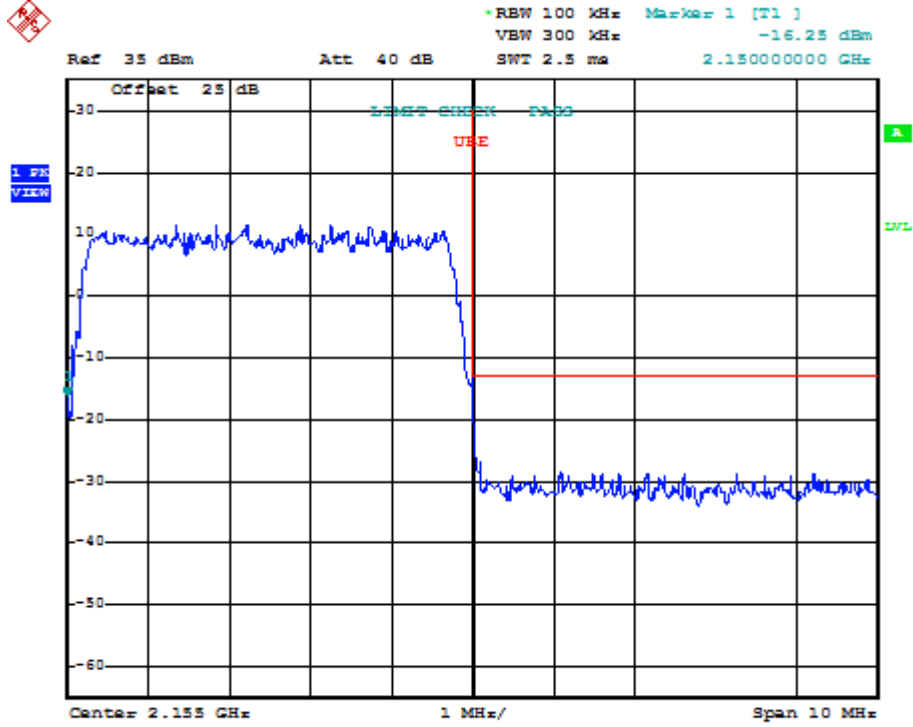
0C

Lower Edge



Test Data – Frequency Stability

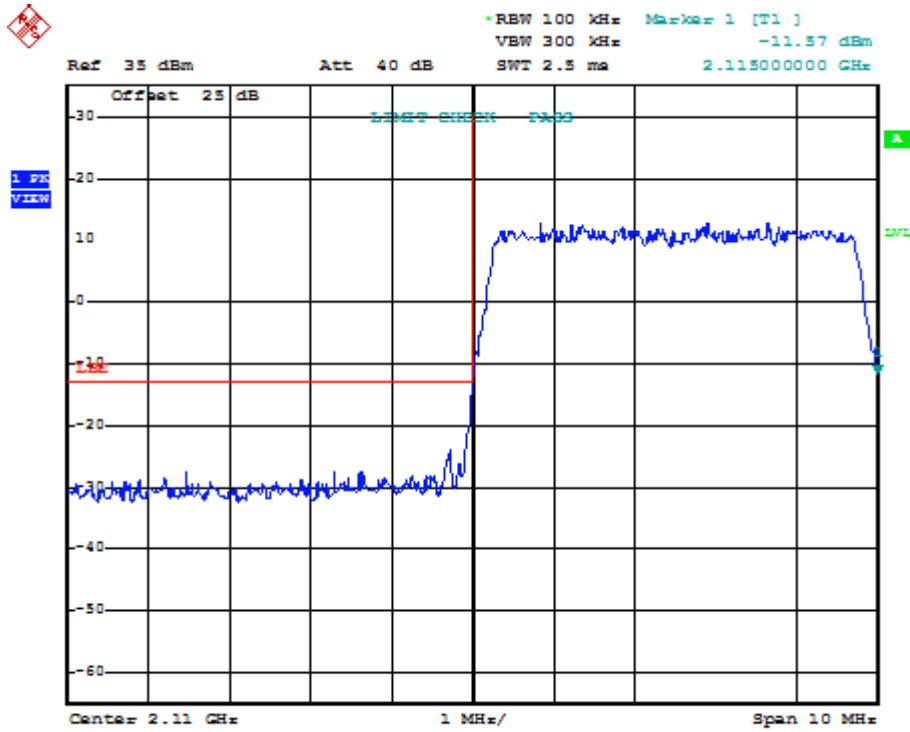
0C
Upper Edge



Test Data – Frequency Stability

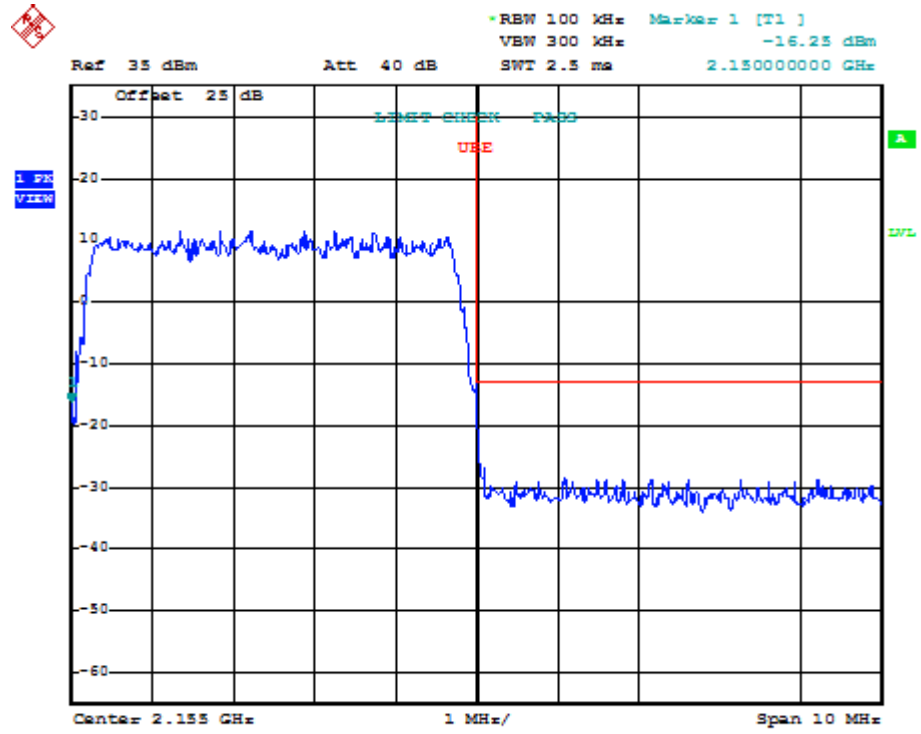
+10C

Lower Edge



Test Data – Frequency Stability

+10C
Upper Edge

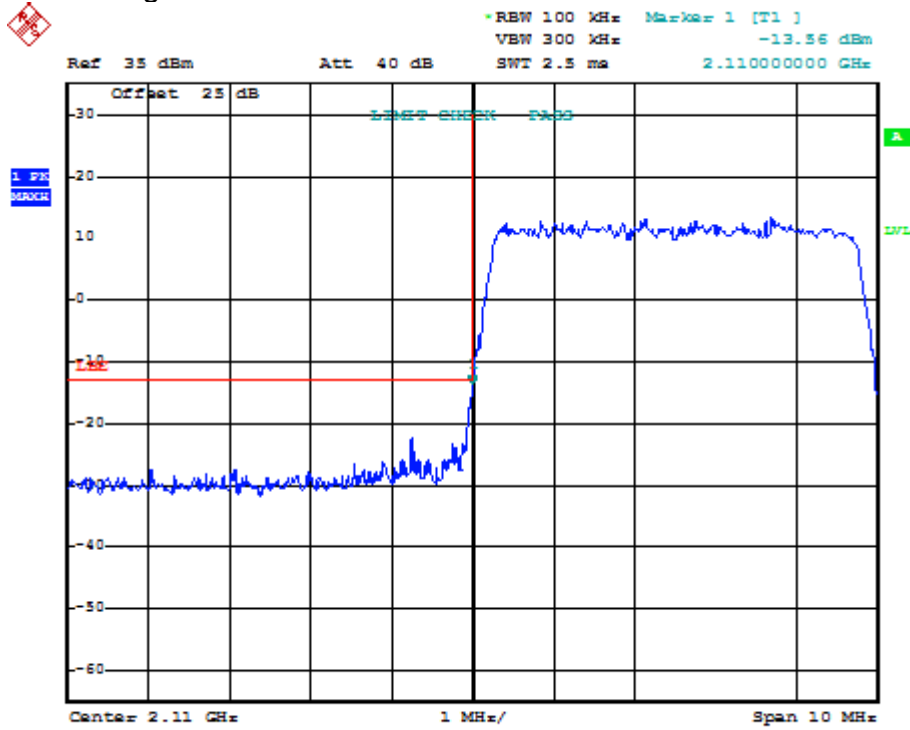


Test Data – Frequency Stability

+20C

Vnom

Lower Edge

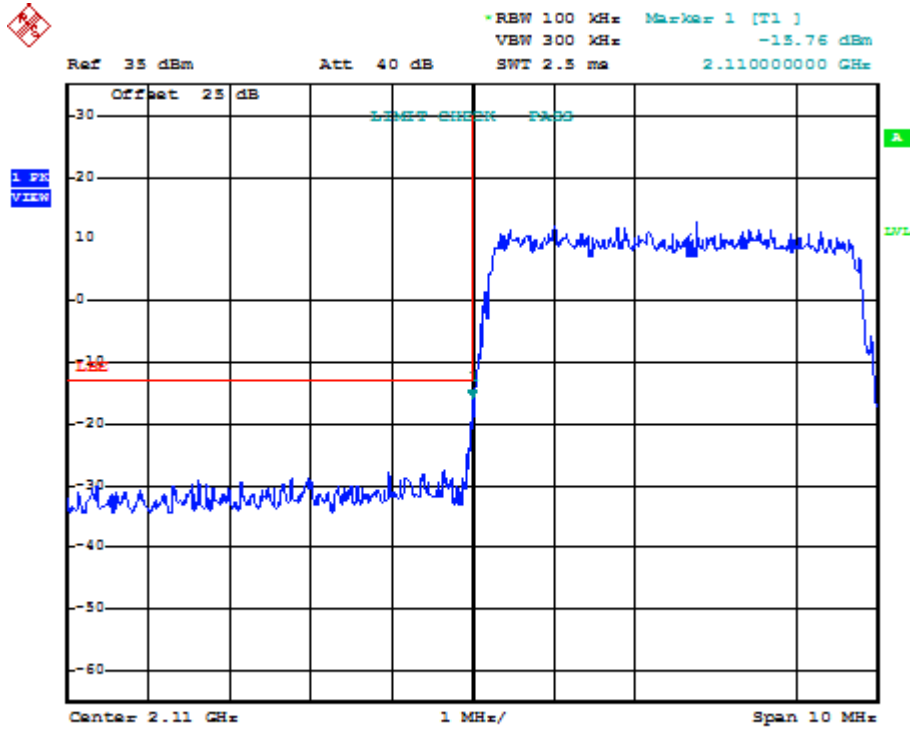


Test Data – Frequency Stability

+20C

Vmin

Lower Edge

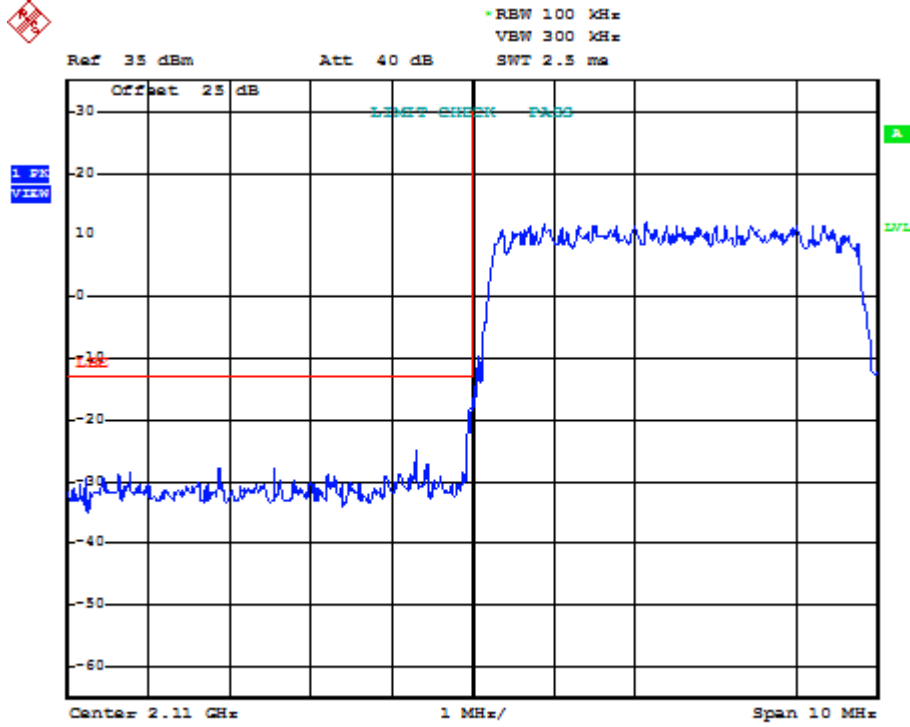


Test Data – Frequency Stability

+20C

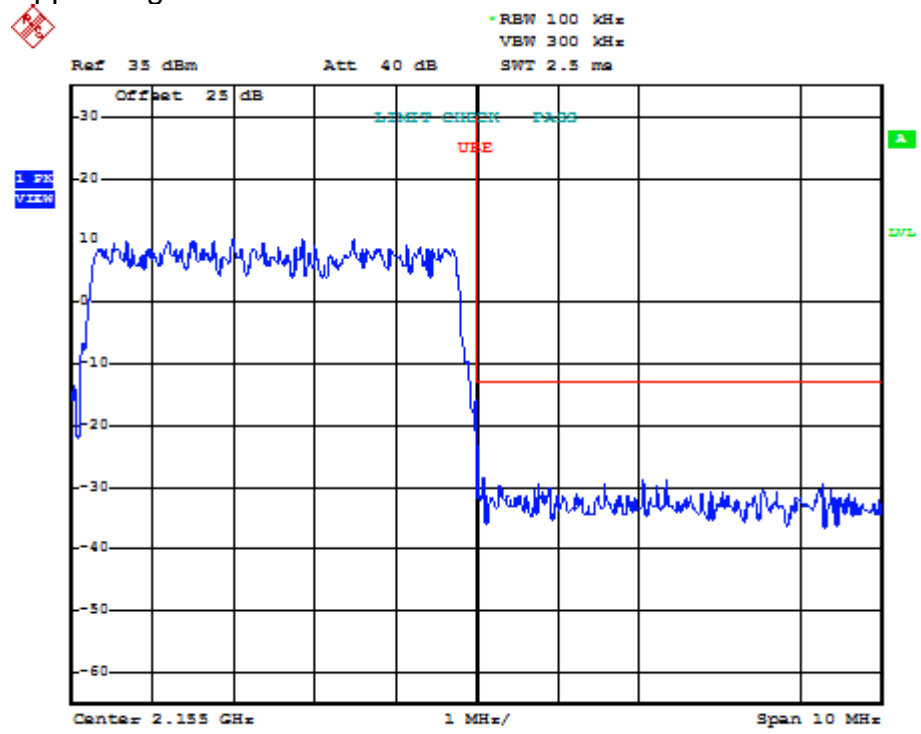
Vmax

Lower Edge



Test Data – Frequency Stability

+20C
Vnom
Upper Edge

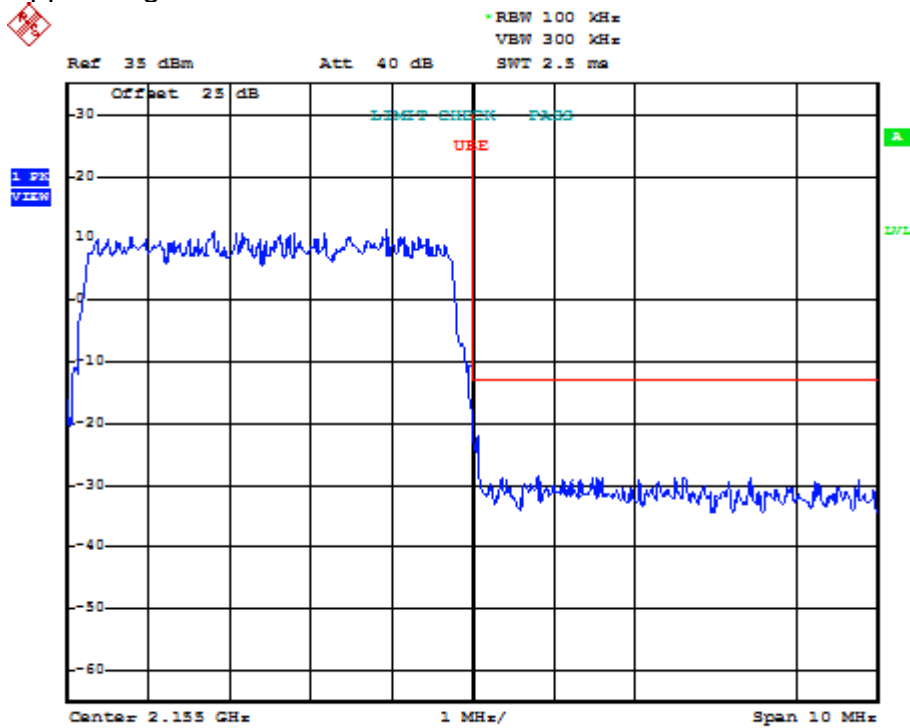


Test Data – Frequency Stability

+20C

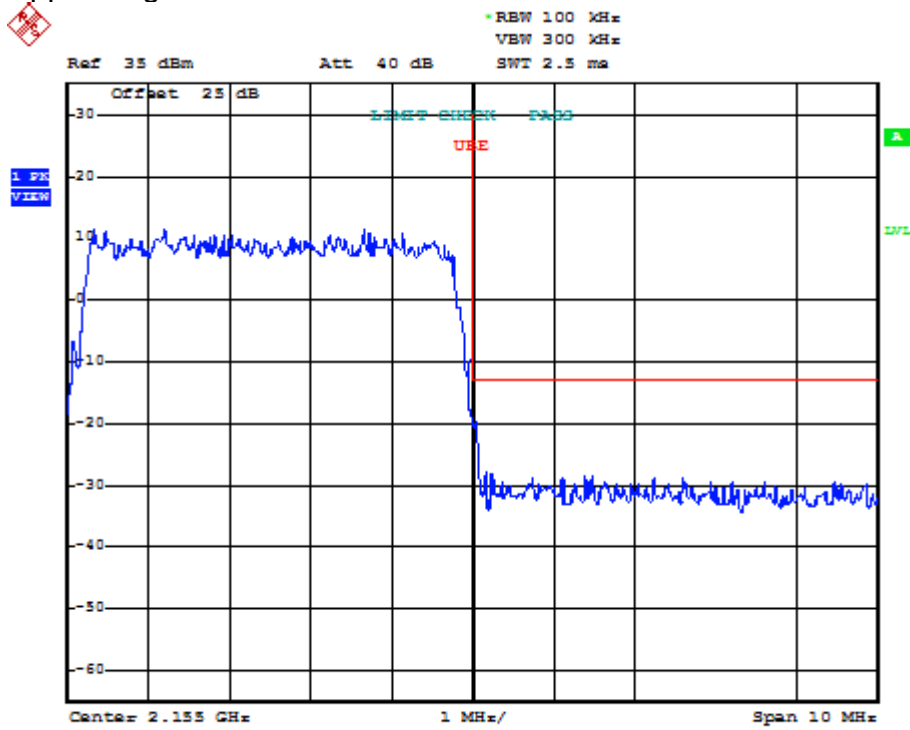
Vmin

Upper Edge



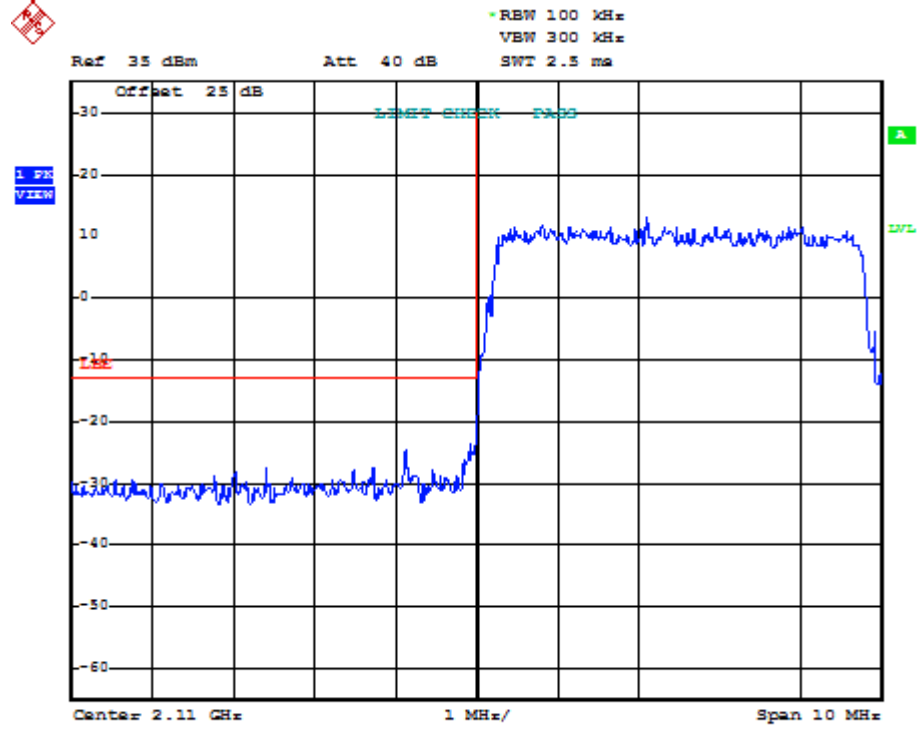
Test Data – Frequency Stability

+20C
Vmax
Upper Edge



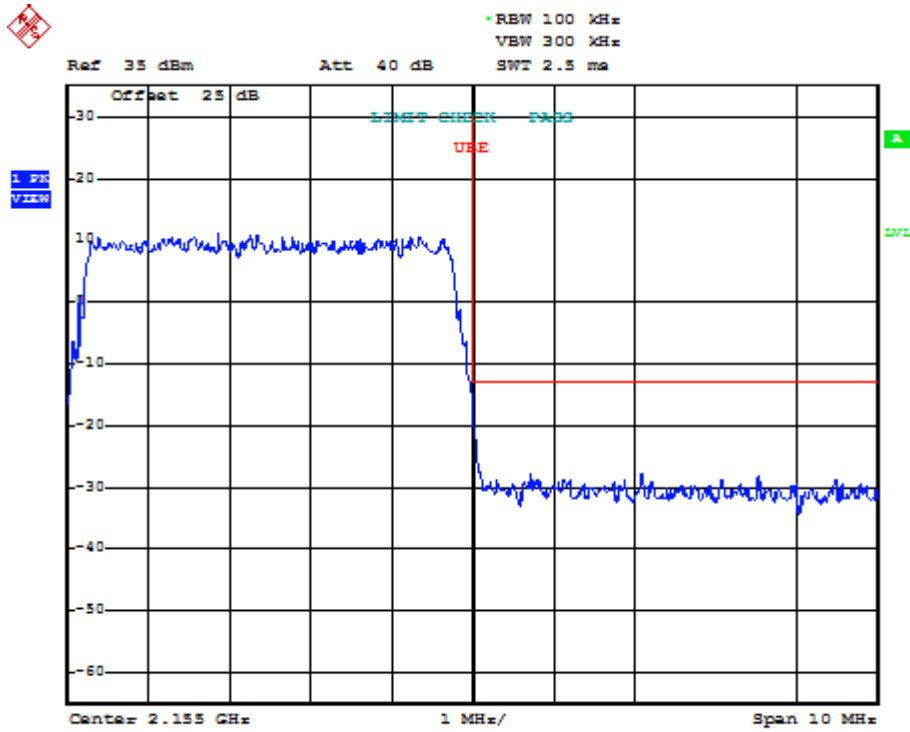
Test Data – Frequency Stability

+30C
Lower Edge



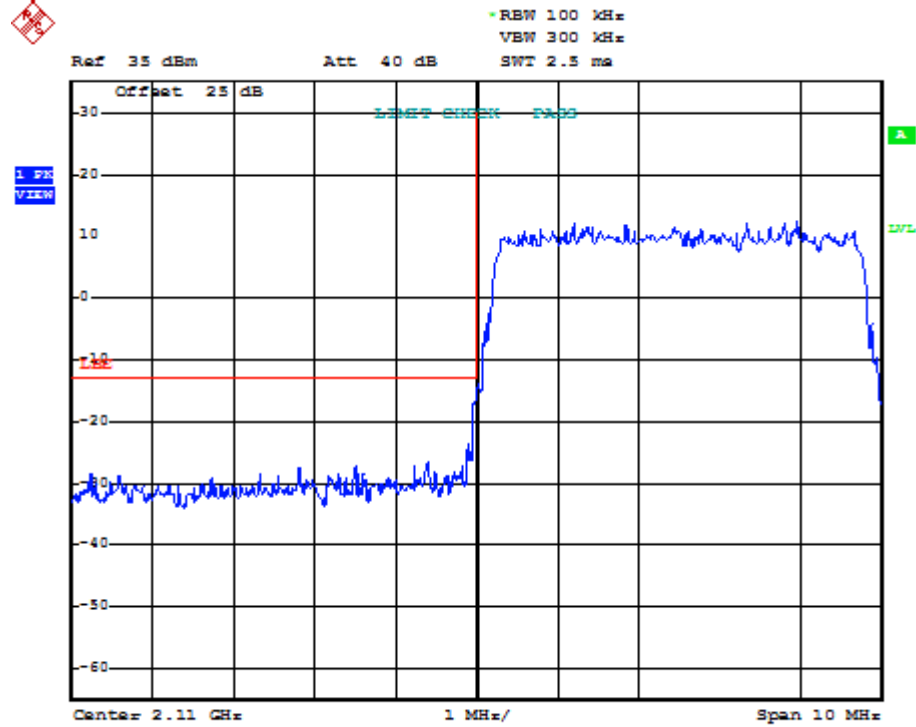
Test Data – Frequency Stability

+30C
Upper Edge



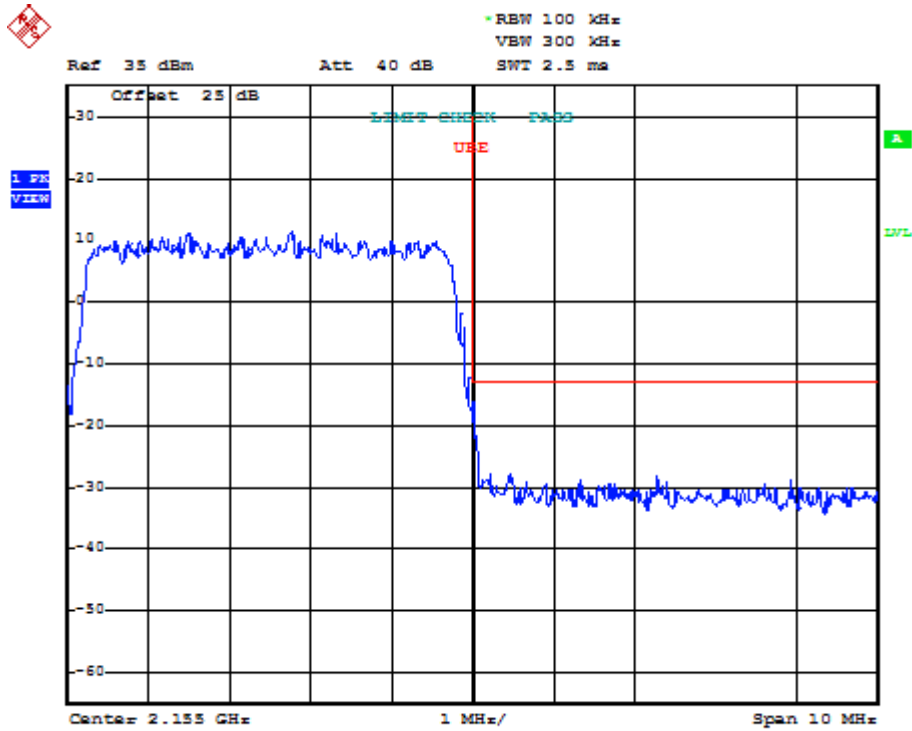
Test Data – Frequency Stability

+40
Lower Edge



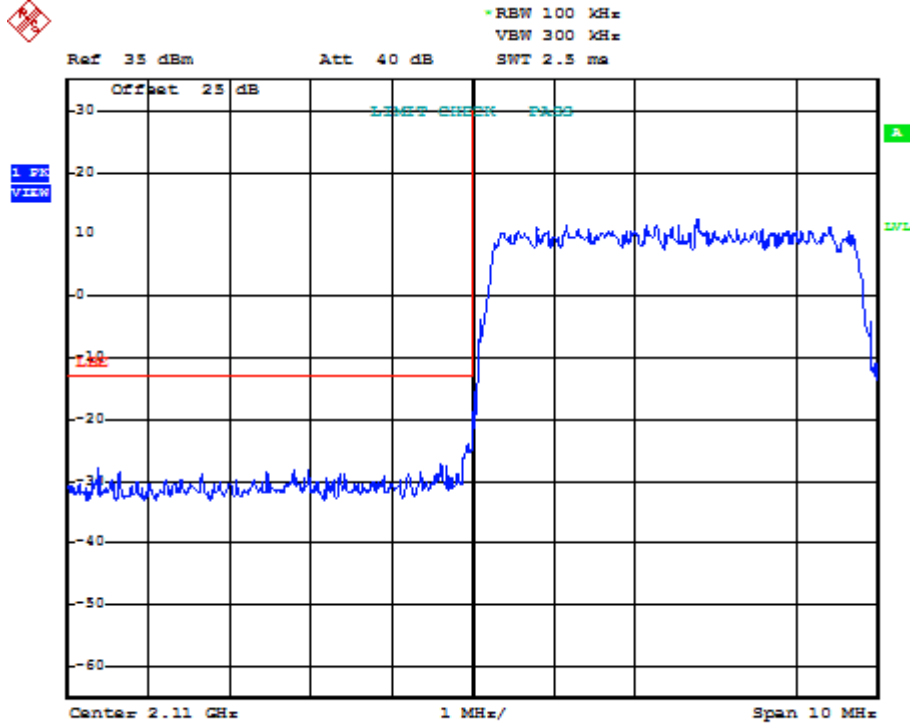
Test Data – Frequency Stability

+40 Upper Edge



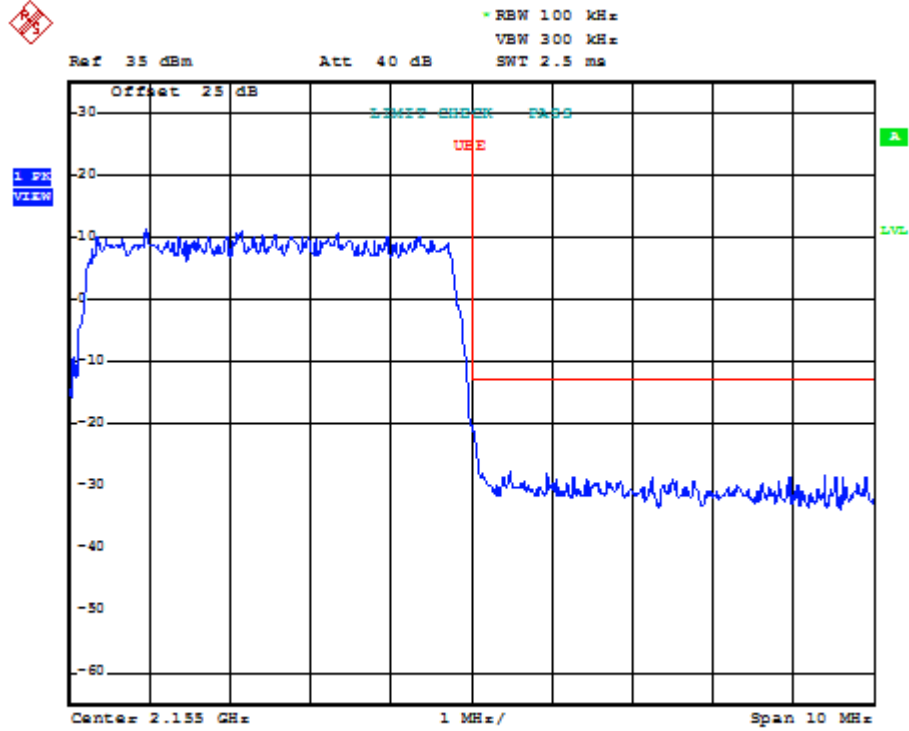
Test Data – Frequency Stability

+50
Lower Edge



Test Data – Frequency Stability

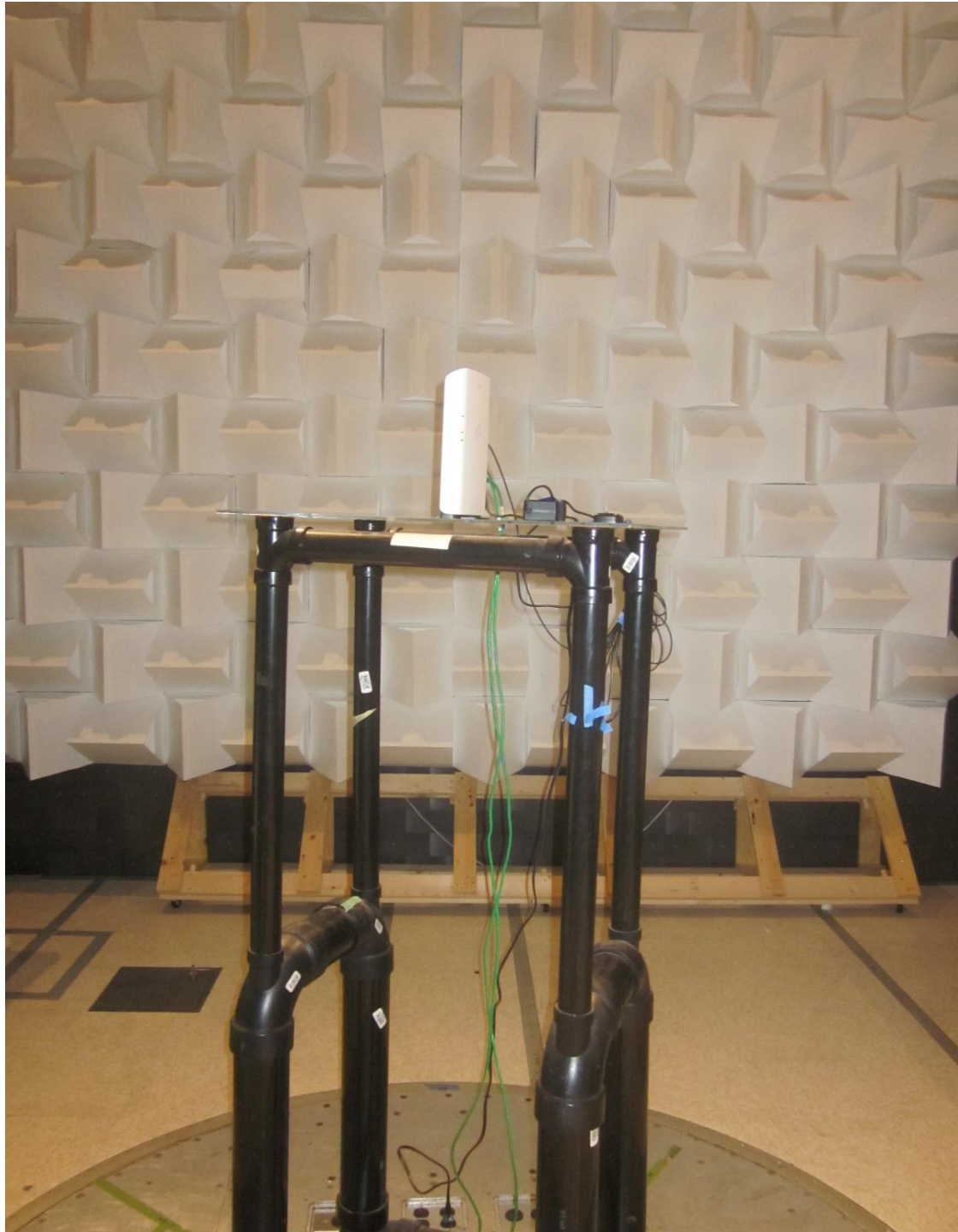
+50
Upper Edge



Section 8. Test Equipment List

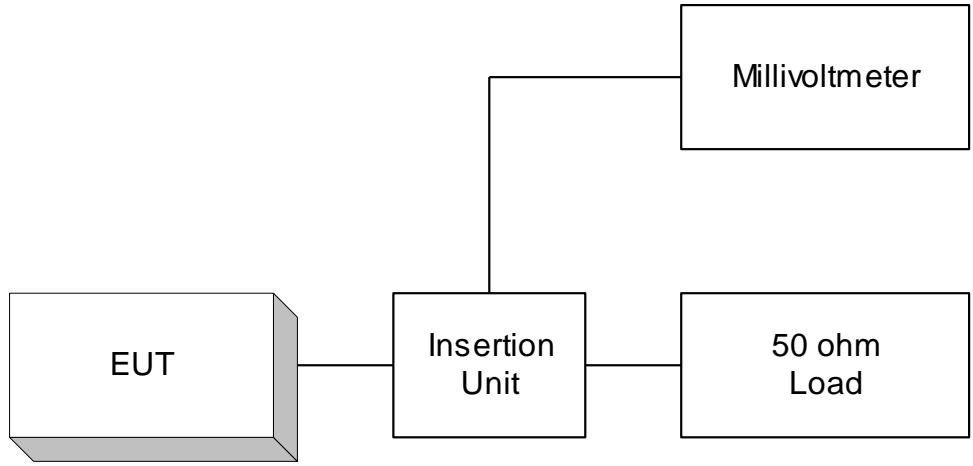
Asset Tag	Description	Manufacturer	Model	Serial #	Last Cal	Next Cal
E1029	Preamplifier	A.H. Systems,	PAM-0118	343	12-Aug-2014	12-Aug-2015
993	Antenna, Horn	A.H. Systems	SAS-200/571	162	23-Dec-2014	23-Dec-2016
1036	Spectrum Analyzer	Rohde & Schwartz	FSEK30	830844/006	15-Jul-2013	15-Jul-2015
1763	Antenna, Bilog	Schaffner	CBL 6111D	22926	13-May-2014	13-May-2015
E1061	Power Sensor	ETS-Lindgren	7002-006	00160096	21-Oct-2014	21-Oct-2015

Section 9. Test Setup Photo

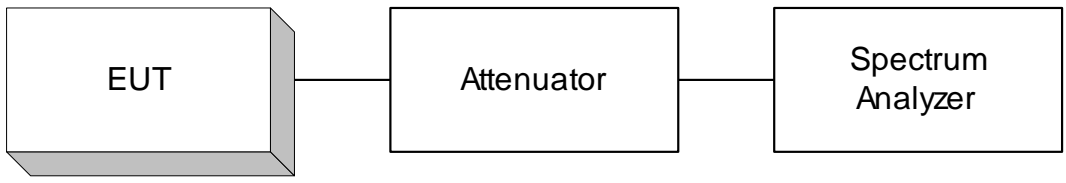


ANNEX A - TEST DIAGRAMS

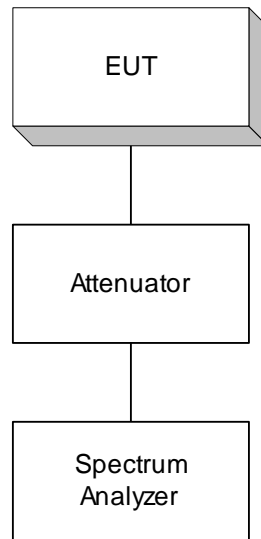
Para. No. 2.985 - R.F. Power Output



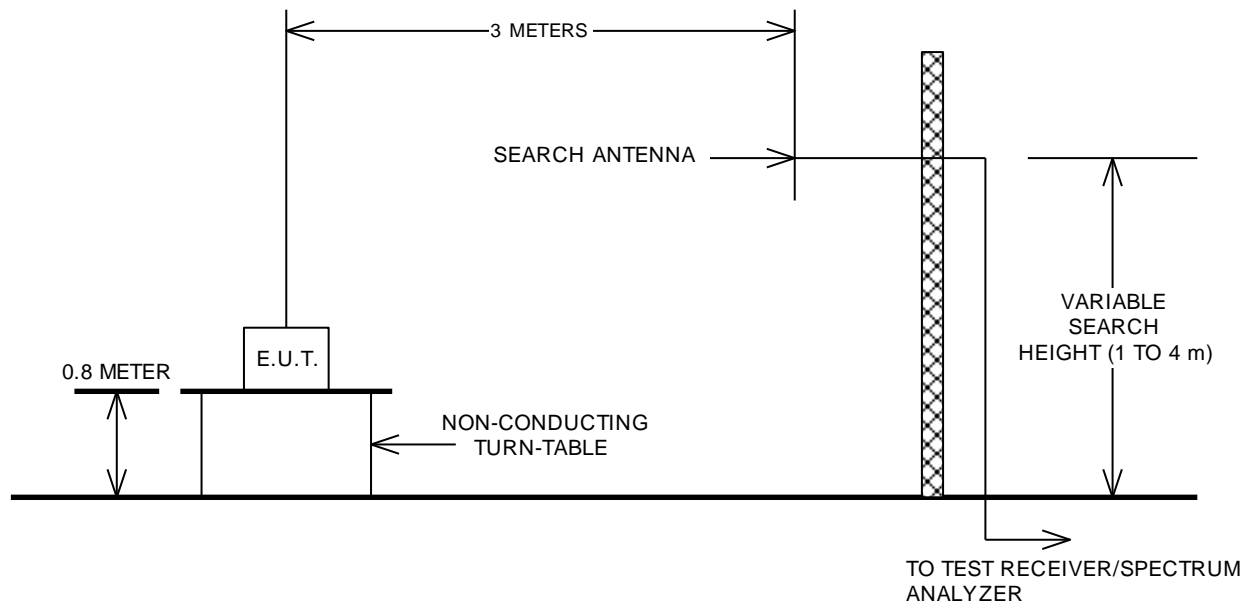
Para. No. 2.989 - Occupied Bandwidth



Para. No. 2.991 Spurious Emissions at Antenna Terminals



Para. No. 2.993 - Field Strength of Spurious Radiation



Para. No. 2.995 - Frequency Stability

