SHURE

ELECTROMAGNETIC COMPATIBILITY LABORATORY
TEST REPORT

TEST REPORT TITLE: Electromagnetic Compatibility Tests of the Shure QLXD2 Transmitter

TEST ITEM DESCRIPTION:

QLXD2 is a digital wireless microphone transmitter intended for use in mid-tier presentation, installed, and performance markets. The system operates in the UHF TV band (470 to 696 MHz) with individual models for specific regional bands. Regionally dependent 1mW and 10mW output power modes are available. Both transmitters are capable of operating with AA alkaline batteries or Shure SB900 rechargeable battery packs.

For: Shure Incorporated
5800 West Touhy Avenue
Niles, IL 60714

Project ID Number: SEL-015

Date Tested: October 14, 2013 – March 17, 2014

Test Personnel: Lovell Cueto, Tom Braxton

Test Specification: FCC Part 74, Subpart H – Low Power Auxiliary Stations
IC RSS-Gen – General Requirements and Information for the Certification of Radio Apparatus
IC RSS-123 – Spectrum Management and Telecommunications Radio Standards Specification: Licensed Low-Power Radio Apparatus

TEST REPORT BY:	Thomas E Braxton (SIGNATURE)	EMC Project Engineer (POSITION)	4/30/14 (DATE)
APPROVED BY:	(SIGNATURE)	EMC PROJECT ENGINEER (POSITION)	APRIL 30, 2014 (DATE)

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REPORT REVISION HISTORY

Revision	Date	Description
0	4/30/14	Initial Release

Report Title:

1. INTRODUCTION

1.1. Scope of Tests

This document presents the results of a series of electromagnetic compatibility (EMC) tests performed on the Shure QLXD2 transmitter. The test items were manufactured and submitted for testing by Shure Incorporated located in Niles, IL. The data was taken following the measurement methods as described in the test specifications listed in the individual appendices of this document. This document provides the data for the test samples, including a summary of the measurements made and descriptions of the measurement setup. The equipment under test (EUT) contained a transmitter that was designed to transmit in the following UHF frequency bands:

Model	Band	Frequency (MHz)	Output Power (mW)
QLXD2	G50	470.125-534.000	1, 10
QLXD2	H50	534.000-598.000	1, 10
QLXD2	J50	572.000-607.875, 614-125-636.000	1, 10
QLXD2	L50	632.000-696.000	1, 10

1.2. Purpose

This series of tests was performed to determine if the test items would meet the specifications of FCC Part 74, Subpart H, and IC RSS-123.

1.3. Deviations, Additions and Exclusions

None.

1.4. EMC Laboratory Identification

The electromagnetic compatibility tests were performed at the Shure Electromagnetic Laboratory, Shure Incorporated, 5800 West Touhy Ave, Niles, Illinois 60714-4608. The Shure Electromagnetic Laboratory is accredited by the National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP). The NVLAP Lab Code is: 200946-0.

1.5. Summary of Tests Performed

The following electromagnetic compatibility tests (Table 1) were performed on the EUT in accordance with FCC Part 74 and RSS-123.

Table 1: Summary of tests performed

Test Spec (STD)	Description	Tested Range	Described in Appendix	Test Results
FCC 74, RSS-123	**Radiated RF Power Output**	**470.125 – 598.000 MHz**	**A**	PASS
FCC 74, RSS-123	**Frequency Stability**	**470.125 – 598.00 MHz -30°C to +50°C**	**B**	PASS
FCC 74, RSS-123	**Occupied Bandwidth**	**470.125 – 598.000 MHz**	**C**	PASS
FCC 74, RSS-123	**Spurious Emissions**	**30 MHz – 10 GHz**	**D**	PASS

2. APPLICABLE DOCUMENTS

The following documents of the exact issue designated form part of this document to the extent specified herein:

- FCC Part 74, Subpart H – Low Power Auxiliary Stations
- IC RSS-Gen – General Requirements and Information for the Certification of Radio Apparatus
- IC RSS-123 – Spectrum Management and Telecommunications Radio Standards Specification: Licensed Low-Power Radio Apparatus
- ANSI C63.4-2003, "American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz"
- TIA-603-C-2004, “Land Mobile FM or PM Communications Equipment Measurement and Performance Standard”

3. EUT SET-UP AND OPERATION

3.1. General Description

The EUTs are wireless digital microphone transmitters. The EUT arrangement in which the testing was conducted can be found in the individual appendices.

3.2. Test Samples

The following product samples were tested:

Model	Band	Frequency (MHz)	Serial #
QLXD2	G50	479.125-533.875	EMC8 EMC7 (connectorized for occupied bandwidth
QLXD2	H50	534.125-564.975	EMC2 EMC1 (connectorized for occupied bandwidth
QLXD2	J50	479.125-533.875	EMC4 EMC3 (connectorized for occupied bandwidth
QLXD2	L50	534.125-564.975	EMC5 EMC6 (connectorized for occupied bandwidth

3.3. Test Setup

3.3.1. Power Input

The EUT was powered with 3VDC from a Shure SB900 rechargeable battery.

3.3.2. Signal Input /Output Ports

For all emission tests the EUT was configured as follows:

- The microphone port of QLXD2 was terminated with a Shure SM58 microphone head, and its antenna port was terminated with an integral antenna. Connectorized samples were made available for occupied-bandwidth testing.

3.3.3. Test Frequency Range

Per FCC Part 74 and IC RSS-123, for spurious radiated emissions measurements the frequency spectrum shall be investigated from 30 MHz to 10 GHz to accommodate 10x the highest frequency.

3.3.4. Grounding Considerations
The EUT was not grounded during testing.

3.4. Operational Mode

3.4.1. Frequency and Power Output:
All emissions tests were performed separately in the following transmit frequency and output power modes:

Band	Freq. (MHz)	L/M/H	Power Level (mW)
G50	470.125	Low	1.0
			10.0
	502.000	Medium	1.0
			10.0
	534.000	High	1.0
			10.0
H50	534.000	Low	1.0
			10.0
	566.000	Medium	1.0
			10.0
	598.000	High	1.0
			10.0
J50	572.000	Low	1.0
			10.0
	604.000	Medium	1.0
			10.0
	636.000	High	1.0
			10.0
L50	632.000	Low	1.0
			10.0
	664.000	Medium	1.0
			10.0
	696.000	High	1.0
			10.0

4. TEST INSTRUMENTATION

A list of the test equipment used can be found in table 10-1. All equipment used was within calibration terms during and throughout the duration of the tests. All calibrations are traceable to the National Institute of Standards and Technology (NIST).

5. TEST PROCEDURES

The specific test procedures are presented in the individual appendices.

6. OTHER TEST CONDITIONS

6.1. Test Personnel
All EMC tests were performed by qualified personnel from the Shure EMC Laboratory.

6.2. Disposition of the EUT
The EUTs and all associated equipment were returned to Shure Incorporated upon completion of the tests.

7. RESULTS OF TESTS

The results are presented in the individual test appendices. In general, it was found that the Shure Incorporated QLXD2 meets the radiated and RF emission specifications of FCC Part 74, Subpart H and IC RSS-123.

8. CONCLUSIONS

It was determined that the Shure Incorporated QLXD2 did fully comply with the radiated and conducted RF emissions requirements of FCC Part 74, Subpart H, and IC RSS-123.

9. CERTIFICATION

Shure EMC Laboratory certifies that the information contained in this report was obtained under conditions which meet or exceed those specified in the test specifications.

The data presented in this test report pertains to the EUTs at the test date. Any electrical or mechanical modification made to the EUTs subsequent to the specified test date will serve to invalidate the data and void this certification.

This report must not be used to claim product endorsement by NVLAP or any agency of the US Government.

10. EQUIPMENT LIST

Table 10-1: Test Equipment

L# or ID	Description	Manufacturer	Model #	Serial #	Range	Cal Date	Due Date
L23-011-01	3 meter RF Chamber	ETS Lindgren	FACT-3	AJ640	25MHz - 18GHz	10/1/2013	9/30/2014
L23-011-02	Electric Powered Turntable	ETS Lindgren	2088	N/A	N/A	N/A	N/A
L23-011-08	Controller	EMCO	2090	29799	N/A	N/A	N/A
L23-011-09	Antenna Positioner	ETS Lindgren	2071-2	35500	N/A	N/A	N/A
L23-011-15	BiConiLog Antenna	ETS Lindgren	3142C	34790	25MHz-1GHz	3/6/2013	3/6/2014
L23-011-16	Waveguide Horn Ant	ETS Lindgren	3115	29851	1-18 GHz	5/21/2013	5/21/2014
L23-011-19	PreAmp	Rohde & Schwarz	TS-PR18	100015	1-18 GHz	6/20/2013	6/20/2014
L23-011-25	EMI Test Receiver	Rohde & Schwarz	ESIB 40	100220	20Hz-40GHz	3/5/2013	3/5/2014
L23-011-31	EMI/EMS Test Software	Rohde & Schwarz	EMC32	V.4.04 100061	20Hz - 40GHz	N/A	N/A
L23-022-01	Spectrum Analyzer	Rohde & Schwarz	FSU 1166.1660. K26	201043	20Hz – 26.5GHz	1/28/2014	1/28/2015
L23-040-09	20dB Attenuator	Mini Circuits	S20-W2+	0941	DC-18GHz	10/16/2013	10/16/2014
L23-031-01	Power Meter	AR	PM2003	0335363	10kHz – 40GHz	1/6/2014	1/6/2015
L23-032-01	Power Head	AR	PH2008	336213	100 kHz - 18GHz -40 to +33 dBm	1/6/2014	1/6/2015
L19-06-01	Temp. Chamber	ESPEC	SU-24	91004211	-40C - +130C	2/28/2013	2/28/2014
L23-011-41	Waveguide Horn Antenna	EMCO	3117	123511	1GHz -18GHz	10/24/2013	10/24/2014
L23-011-36D	Tuned Dipole Antenna	ETS Lindgren	312D-DB-4	123695	400-1000MHz	3/21/2013	3/21/2014
L23-023-01	Signal Generator	Rohde & Schwarz	SMF100A	101553	100kHz-22GHz	1/23/2014	1/23/2015
L23-026-01	Tunable Notch Filter	Trilithic	3VNF500/1000-50-AA	200908026	500-1000 MHz	9/26/2013	9/26/2014
L23-027-01	Tunable Notch Filter	Trilithic	3VNF300/600-50-AA	20100453	300-600 MHz	9/26/2013	9/26/2014
L19-6-1	Temperature Chamber	Espec	SU-240	9100421	-----	2/28/2013	2/28/2014
L23-034-08	Digital Thermometer	Extech	TM100/ TP870	13018733/ TE701576	-----	8/19/2013	8/19/2014

A. RF POWER OUTPUT MEASUREMENTS

A.1. PURPOSE:

This test was performed to determine if the EUT meets the RF power output requirements of FCC Part 74.861 and IC RSS-123.

A.2. REQUIREMENTS:

As stated in FCC Part 74.861(e) and RSS-123 Section 5.1, the power of the measured carrier power may not exceed 250mW.

A.3. MEASUREMENT UNCERTAINTY

All measurements are an estimate of their true value. The measurement uncertainty characterizes, with a specified confidence level, the spread of values which may be possible for a given measurement system.

Values of Expanded Measurement Uncertainty (95% Confidence):

Measurement Type	U_{LAB}
RF Power Output	**±0.354 dB**

U_{lab} = Determined for Shure EMC Laboratory

- Compliance is deemed to occur if no measured disturbance exceeds the disturbance limit;
- Non-compliance is deemed to occur if any measured disturbance exceeds the disturbance limit.

A.4. TEST SETUP AND INSTRUMENTATION:

The test instrumentation can be determined from Table 10-1.

A.5. EUT OPERATION:

The EUT was powered up and the transmit frequency and power output level of the transmitter was selected using the front panel controls. The EUT was powered at 3VDC by a Shure SB900 battery. The EUT was checked for proper operation after it was setup for the test. Testing was conducted with the EUT set to transmit at the frequencies and power levels shown in the following table.

Band	Freq. (MHz)	L/M/H	Power Level (mW)
G50	470.125	Low	1.0
			10.0
	502.000	Medium	1.0
			10.0
	534.000	High	1.0
			10.0
H50	534.000	Low	1.0
			10.0
	566.000	Medium	1.0
			10.0
	598.000	High	1.0
			10.0
J50	572.000	Low	1.0
			10.0
	604.000	Medium	1.0
			10.0
	636.000	High	1.0
			10.0
L50	632.000	Low	1.0
			10.0
	664.000	Medium	1.0
			10.0
	696.000	High	1.0
			10.0

A.6. TEST PROCEDURES:

a. The EUT was connected to an RF power meter through a calibrated power measurement head.
b. The frequency of the power meter was set to the operating frequency of the EUT.
c. The RF power meter was allowed to stabilize and then the output power measurement was recorded.

A.7. RESULTS:

The output power measurement data is presented below. As shown by the test data, the power output of the EUT is within the requirements of FCC Part 74.861 and RSS-123.

Band	L/M/H	Freq. (MHz)	Power (mW)	Measured Level (dBm)	Measured Level (mW)
G50	Low	470.125	1	-0.14	0.97
			10	9.84	9.64
	Med	502.000	1	0.02	1.01
			10	9.91	9.79
	High	534.000	1	-0.19	0.96
			10	9.65	9.23
H50	Low	534.000	1	-0.63	0.87
			10	9.75	9.44
	Med	566.000	1	-0.16	0.96
			10	10.21	10.49
	High	598.000	1	-0.10	9.77
			10	10.21	10.49
J50	Low	572.000	1	-0.03	0.99
			10	10.25	10.59
	Med	604.000	1	-0.04	0.99
			10	10.09	10.21
	High	636.000	1	-0.09	0.98
			10	9.87	9.71
L50	Low	632.000	1	0.5	1.12
			10	10.37	10.89
	Med	664.000	1	0.41	1.1
			10	10.21	10.49
	High	696.000	1	0.31	1.07
			10	10.12	10.28

Conducted Power Output: QLXD2

B. FREQUENCY STABILITY

B.1. PURPOSE:

This test was performed to determine if the EUT meets the frequency stability requirements of FCC Part 74.861(e)(4) and RSS-123 Paragraph 7 over the operating range of 470-696 MHz.

B.2. REQUIREMENTS:

As stated in FCC Part 74.861(e)(4) and RSS-123, Section 5.1, the tolerance of the transmitter shall be 0.005%.

B.3 MEASUREMENT UNCERTAINTY:

All measurements are an estimate of their true value. The measurement uncertainty characterizes, with a specified confidence level, the spread of values which may be possible for a given measurement system.

Values of Expanded Measurement Uncertainty (95% Confidence):

Measurement Type	U_{lab}
Frequency Error (Stability)	27.54 Hz or 0.00000396%

- Compliance is deemed to occur if no measured disturbance exceeds the disturbance limit;
- Non-compliance is deemed to occur if any measured disturbance exceeds the disturbance limit.

B.4. TEST SETUP AND INSTRUMENTATION:

The EUT was heated and cooled in an Espec temperature chamber over a temperature range of -30°C to +50°C in 10°C increments. The temperature around the EUT was measured and monitored by an Extech digital thermometer. The EUT's frequency was measured with a spectrum analyzer set to measure signal count at 0.1Hz resolution. The center frequency of the spectrum analyzer was set to the selected transmit frequency of the EUT (Low, Mid or High). The test instrumentation can be determined from Table 10-1

B.5. EUT OPERATION:

The antenna port of the EUT was connected to the 50 Ohm input of a spectrum analyzer. The EUT was set at its lowest power output setting (1mW) as representative of the worst case operational condition for this test. Each EUT was set to transmit at a low, mid or high frequency within its operating bands.

B.6. TEST PROCEDURES:

a. The measured frequency of the transmitter was captured at ambient temperature with the frequency counter function of the spectrum analyzer. The value was recorded.
b. The temperature chamber was set to -30C with the EUT inside and powered off.
c. The EUT was allowed to soak for ~30 minutes after the temperature chamber reached the set temperature.
d. The EUT was then powered on and allowed to stabilize for ~ 1 minute.
e. The measured frequency of the transmitter was captured with the frequency counter function of the spectrum analyzer. The value was recorded.
f. The temperature chamber was incremented by 10°C with the EUT inside and powered off.
g. The EUT was allowed to soak for ~30 minutes after the temperature chamber reached the set temperature.
h. The EUT was then powered on and allowed to stabilize for ~ 1 minute.
i. The measured frequency of the transmitter was captured with the frequency counter function of the spectrum analyzer. The value was recorded.
j. Steps f. through j. were repeated up to +50°C
k. Steps a. through i. were repeated for representative low, mid and high frequencies within the EUT's operational bands.

B.7 RESULTS:

The frequency stability measurements are presented in tables B-1 through B-8. As shown by the test data, the test frequency deviation was within the 0.005% limit specified in FCC Part 74.861(e)(4) and RSS-123, Section 5.1

Temp °C	Nominal Frequency (MHz)	Measured Frequency (MHz)	Deviation (%)	Frequency Stability Limit (%)	Deviation (Hz)	Frequency Stability (Hz)	Pass Or Fail
-30	470.125	470.1251155	0.0000246	0.005	115	23506.25	PASS
-20	470.125	470.1251288	0.0000274	0.005	129	23506.25	PASS
-10	470.125	470.1250585	0.0000124	0.005	59	23506.25	PASS
0	470.125	470.1250933	0.0000198	0.005	93	23506.25	PASS
10	470.125	470.1251085	0.0000231	0.005	109	23506.25	PASS
20	470.125	470.1246457	-0.0000754	0.005	-354	23506.25	PASS
30	470.125	470.1250424	0.0000090	0.005	42	23506.25	PASS
40	470.125	470.1248564	-0.0000305	0.005	-144	23506.25	PASS
50	470.125	470.1247993	-0.0000427	0.005	-201	23506.25	PASS
-30	502	502.0001316	0.0000262	0.005	132	25100	PASS
-20	502	502.0001182	0.0000235	0.005	118	25100	PASS
-10	502	502.0000492	0.0000098	0.005	49	25100	PASS
0	502	502.0001022	0.0000204	0.005	102	25100	PASS
10	502	502.0001357	0.0000270	0.005	136	25100	PASS
20	502	501.9999606	-0.0000078	0.005	-39	25100	PASS
30	502	502.0000427	0.0000085	0.005	43	25100	PASS
40	502	501.9998452	-0.0000308	0.005	-155	25100	PASS
50	502	501.9997649	-0.0000468	0.005	-235	25100	PASS
-30	534	534.0001828	0.0000342	0.005	183	26700	PASS
-20	534	534.0002141	0.0000401	0.005	214	26700	PASS
-10	534	534.0001489	0.0000279	0.005	149	26700	PASS
0	534	534.0001072	0.0000201	0.005	107	26700	PASS
10	534	534.0001374	0.0000257	0.005	137	26700	PASS
20	534	534.0001063	0.0000199	0.005	106	26700	PASS
30	534	534.0000261	0.0000049	0.005	26	26700	PASS
40	534	533.999979	-0.0000039	0.005	-21	26700	PASS
50	534	533.9997397	-0.0000487	0.005	-260	26700	PASS

Table B-1. QLXD2 G50 Frequency Stability Data

Temp °C	Nominal Frequency (MHz)	Measured Frequency (MHz)	Deviation (%)	Frequency Stability Limit (%)	Deviation (Hz)	Frequency Stability (Hz)	Pass Or Fail
-30	534	533.9994476	-0.0001034	0.005	-552	26700	PASS
-20	534	533.9995965	-0.0000756	0.005	-403	26700	PASS
-10	534	534.0001560	0.0000292	0.005	156	26700	PASS
0	534	533.9997420	-0.0000483	0.005	-258	26700	PASS
10	534	533.9997752	-0.0000421	0.005	-225	26700	PASS
20	534	534.0000053	0.0000010	0.005	5	26700	PASS
30	534	533.9998517	-0.0000278	0.005	-148	26700	PASS
40	534	533.9997941	-0.0000386	0.005	-206	26700	PASS
50	534	533.9998609	-0.0000260	0.005	-139	26700	PASS
-30	566	565.9994113	-0.0001040	0.005	-589	28300	PASS
-20	566	565.9994946	-0.0000893	0.005	-505	28300	PASS
-10	566	565.9996885	-0.0000550	0.005	-311	28300	PASS
0	566	565.9997331	-0.0000472	0.005	-267	28300	PASS
10	566	565.9996330	-0.0000648	0.005	-367	28300	PASS
20	566	565.9999379	-0.0000110	0.005	-62	28300	PASS
30	566	565.9998612	-0.0000245	0.005	-139	28300	PASS
40	566	565.9997376	-0.0000464	0.005	-262	28300	PASS
50	566	565.9997926	-0.0000366	0.005	-207	28300	PASS
-30	598	597.9993863	-0.0001026	0.005	-614	29900	PASS
-20	598	597.9994658	-0.0000893	0.005	-534	29900	PASS
-10	598	597.9996624	-0.0000565	0.005	-338	29900	PASS
0	598	598.0002763	0.0000462	0.005	276	29900	PASS
10	598	597.9995060	-0.0000826	0.005	-494	29900	PASS
20	598	597.9997793	-0.0000369	0.005	-221	29900	PASS
30	598	597.9998613	-0.0000232	0.005	-139	29900	PASS
40	598	597.9997491	-0.0000420	0.005	-251	29900	PASS
50	598	597.9997408	-0.0000433	0.005	-259	29900	PASS

Table B-2. QLXD2 H50 Frequency Stability Data

Temp °C	Nominal Frequency (MHz)	Measured Frequency (MHz)	Deviation (%)	Frequency Stability Limit (%)	Deviation (Hz)	Frequency Stability (Hz)	Pass Or Fail
-30	572	572.0003641	0.0000637	0.005	364	28600	PASS
-20	572	572.0011077	0.0001937	0.005	1108	28600	PASS
-10	572	572.0007111	0.0001243	0.005	711	28600	PASS
0	572	572.0005469	0.0000956	0.005	547	28600	PASS
10	572	572.0005459	0.0000954	0.005	546	28600	PASS
20	572	572.0003066	0.0000536	0.005	307	28600	PASS
30	572	572.0003481	0.0000609	0.005	348	28600	PASS
40	572	572.000203	0.0000355	0.005	203	28600	PASS
50	572	572.0000546	0.0000095	0.005	55	28600	PASS
-30	604	604.0003611	0.0000598	0.005	361	30200	PASS
-20	604	604.0009419	0.0001559	0.005	942	30200	PASS
-10	604	604.0005238	0.0000867	0.005	524	30200	PASS
0	604	604.0001475	0.0000244	0.005	148	30200	PASS
10	604	604.0005824	0.0000964	0.005	582	30200	PASS
20	604	604.0003244	0.0000537	0.005	324	30200	PASS
30	604	604.0003664	0.0000607	0.005	366	30200	PASS
40	604	604.000215	0.0000356	0.005	215	30200	PASS
50	604	604.0000513	0.0000085	0.005	51	30200	PASS
-30	636	636.0007989	0.0001256	0.005	799	31800	PASS
-20	636	636.0007415	0.0001166	0.005	742	31800	PASS
-10	636	636.0008889	0.0001398	0.005	889	31800	PASS
0	636	636.0007633	0.0001200	0.005	763	31800	PASS
10	636	636.0005726	0.0000900	0.005	573	31800	PASS
20	636	636.0003412	0.0000536	0.005	341	31800	PASS
30	636	636.0003835	0.0000603	0.005	383	31800	PASS
40	636	636.0002287	0.0000360	0.005	229	31800	PASS
50	636	635.9992675	-0.0001152	0.005	-733	31800	PASS

Table B-3. QLXD2 J50 Frequency Stability Data

Temp °C	Nominal Frequency (MHz)	Measured Frequency (MHz)	Deviation (%)	Frequency Stability Limit (%)	Deviation (Hz)	Frequency Stability (Hz)	Pass Or Fail
-30	632	632.0001216	0.0000192	0.005	122	31600	PASS
-20	632	631.9998620	-0.0000218	0.005	-138	31600	PASS
-10	632	632.0000812	0.0000128	0.005	81	31600	PASS
0	632	632.0001051	0.0000166	0.005	105	31600	PASS
10	632	632.0000100	0.0000016	0.005	10	31600	PASS
20	632	631.9999563	-0.0000069	0.005	-44	31600	PASS
30	632	631.9999942	-0.0000009	0.005	-6	31600	PASS
40	632	631.9999390	-0.0000097	0.005	-61	31600	PASS
50	632	631.9999391	-0.0000096	0.005	-61	31600	PASS
-30	664	664.0001271	0.0000191	0.005	127	33200	PASS
-20	664	664.0002278	0.0000343	0.005	228	33200	PASS
-10	664	664.0001189	0.0000179	0.005	119	33200	PASS
0	664	664.0001388	0.0000209	0.005	139	33200	PASS
10	664	664.0000144	0.0000022	0.005	14	33200	PASS
20	664	663.9999513	-0.0000073	0.005	-49	33200	PASS
30	664	663.9999688	-0.0000047	0.005	-31	33200	PASS
40	664	663.9999290	-0.0000107	0.005	-71	33200	PASS
50	664	663.9999486	-0.0000077	0.005	-51	33200	PASS
-30	696	696.0001335	0.0000192	0.005	133	34800	PASS
-20	696	696.0000332	0.0000048	0.005	33	34800	PASS
-10	696	696.0001354	0.0000195	0.005	135	34800	PASS
0	696	695.9998408	-0.0000229	0.005	-159	34800	PASS
10	696	695.9998736	-0.0000182	0.005	-126	34800	PASS
20	696	695.9999455	-0.0000078	0.005	-55	34800	PASS
30	696	695.9999855	-0.0000021	0.005	-15	34800	PASS
40	696	695.9999211	-0.0000113	0.005	-79	34800	PASS
50	696	695.9992659	-0.0001055	0.005	-734	34800	PASS

Table B-4. QLXD2 L50 Frequency Stability Data

C. OCCUPIED BANDWIDTH MEASUREMENTS

C.1. PURPOSE:

This test was performed to determine if the EUT meets the occupied bandwidth requirements of FCC Part 74.861(e)(5) and (6), and RSS-123 Section 5.3.

C.2. REQUIREMENTS:

As stated in paragraph 74.861(e)(5) and (6), for low power auxiliary stations operating in the bands allocated for TV broadcasting, the following technical requirements apply:

a) The operating bandwidth shall not exceed 200 kHz.

b) The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:

i. On any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least 25 dB;

ii. On any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: at least 35 dB;

iii. On any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth: at least 43+10log10 (mean output power in watts) dB.

Per the specifications set out in RSS-123 paragraph 5.3 and 5.5.1, the following technical requirements apply:

a) The authorized bandwidth shall not exceed 200 kHz.

b) The power of unwanted emissions shall be attenuated below the mean transmitter power in accordance with the following schedule:

i. On any frequency removed from the carrier frequency by more than 50% up to and including 100% of the authorized bandwidth: at least 25 dB.

ii. On any frequency removed from the carrier frequency by more than 100% up to and including 250% of the authorized bandwidth: at least 35 dB.

iii. On any frequency removed from the carrier frequency by more than 250% of the authorized bandwidth: at least 55 + 10 Log (P) dB.

C.3. TEST SETUP AND INSTRUMENTATION:

The test instrumentation can be determined from Table 10-1.

C.4. EUT OPERATION:

The EUT was powered up and the transmit frequency and power output level of the transmitter was selected using the front panel controls. The EUT was powered with a Shure SB900 rechargeable battery. The EUT was checked for proper operation after it was set up for the test. Testing was conducted with the EUT set to transmit at the low, medium, and high frequencies of its operating band. Testing was performed at an output power level of 1mW and 10 mW. For the purpose of measuring and setting the peak output power reference level on the spectrum analyzer, the EUT was programmed to transmit a continuous string of "0"s in order to simulate an unmodulated carrier condition. The EUT was then returned to normal operation for the occupied bandwidth testing.

C.5. TEST PROCEDURES:

a) The EUT was connected to the 50 ohm input of a spectrum analyzer through 20dB of attenuation; the reference offset of the spectrum analyzer was set to the measured value of the attenuation path.

b) The EUT was modulated with typical digital modulation.

c) The spectrum analyzer center frequency was set to the EUT operating frequency; span was set to 2 MHz; resolution bandwidth was set to 1 MHz; video bandwidth set to 3 MHz; sweep time set to 3 s; after clear/write, max-hold was set; Marker 1 was set to Peak, then Marker 1 was set to reference value.

d) The peak output power was recorded and used to set the reference level on the spectrum analyzer.

f) The spectrum analyzer span was then set to 1.5 MHz; resolution bandwidth set to 2kHz, video bandwidth set to 5 kHz, sweep time to Auto; trace set to Max Hold;

g) The FCC and RSS-123 emission limits were overlaid on the spectrum analyzer display and the trace was recorded.

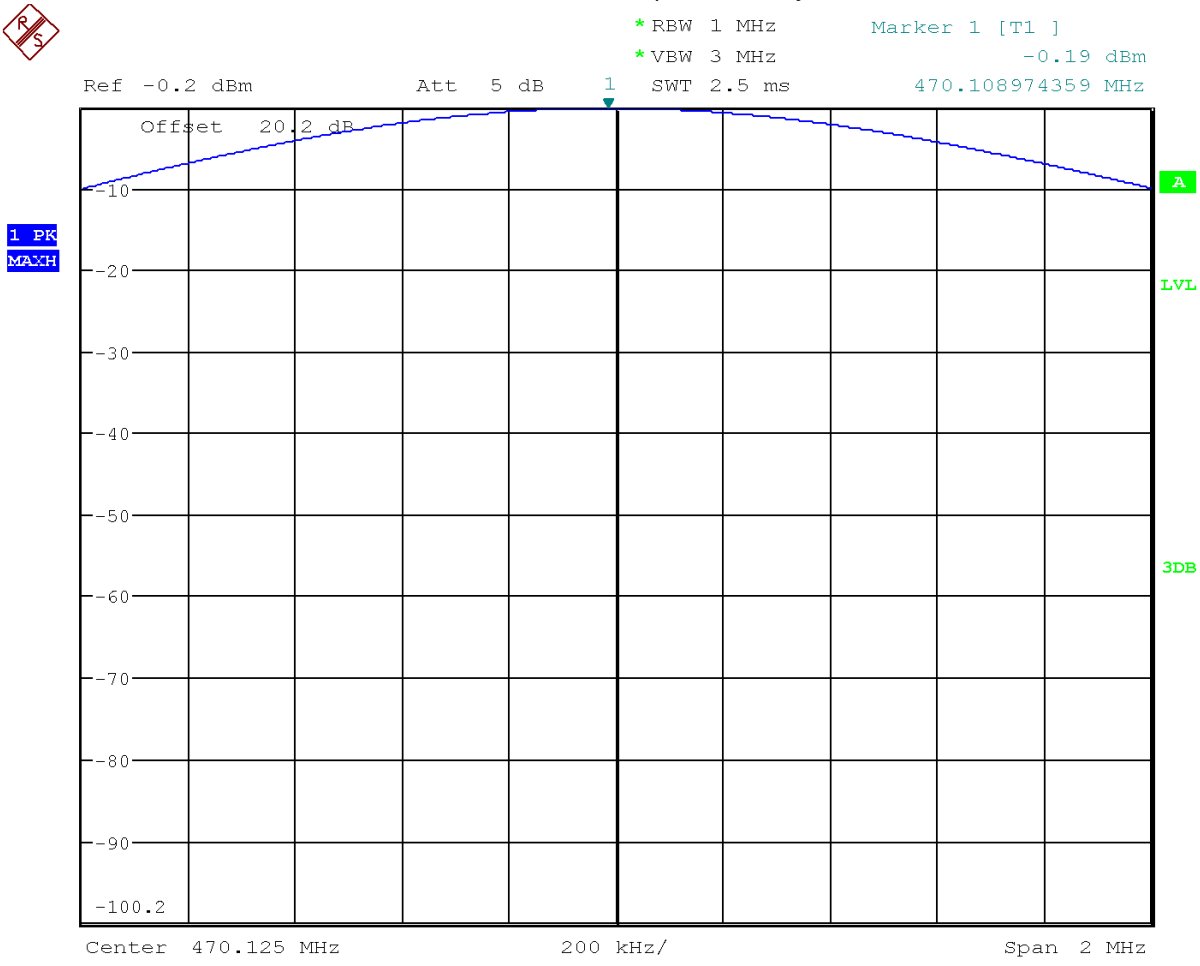
h) Steps a) through g) were repeated at 1mW and 10mW at the high, medium, and low frequencies of the EUT's frequency bands.

C.6. RESULTS:

The QLXD2 occupied bandwidth data is presented on Pages 22 - 69. Data are shown as pairs of figures at each frequency, the first figure showing the reference carrier power, the second figure showing the maximum relative level within the emission mask. As shown by the test data, the occupied bandwidth of the EUT meets the requirements of FCC Part 74.861 and RSS-123.

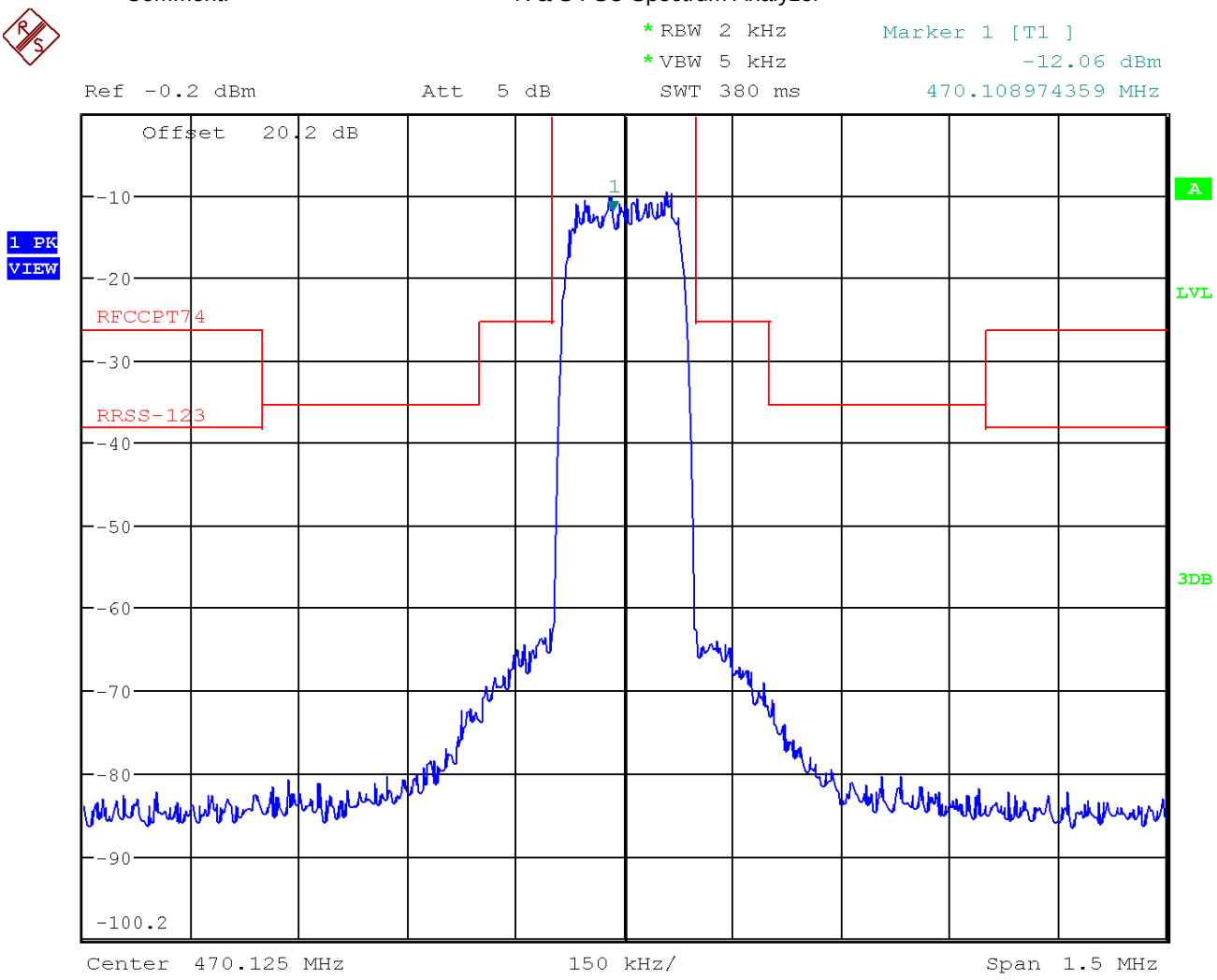
QLXD2 Occupied Bandwidth Data

EUT	QLXD2 G50
Serial Number:	EMC7
Test Description:	OBW RF Power Output
Date of Test:	January 21, 2014
Operating Conditions:	Low Frequency (470.125 MHz) at 1mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



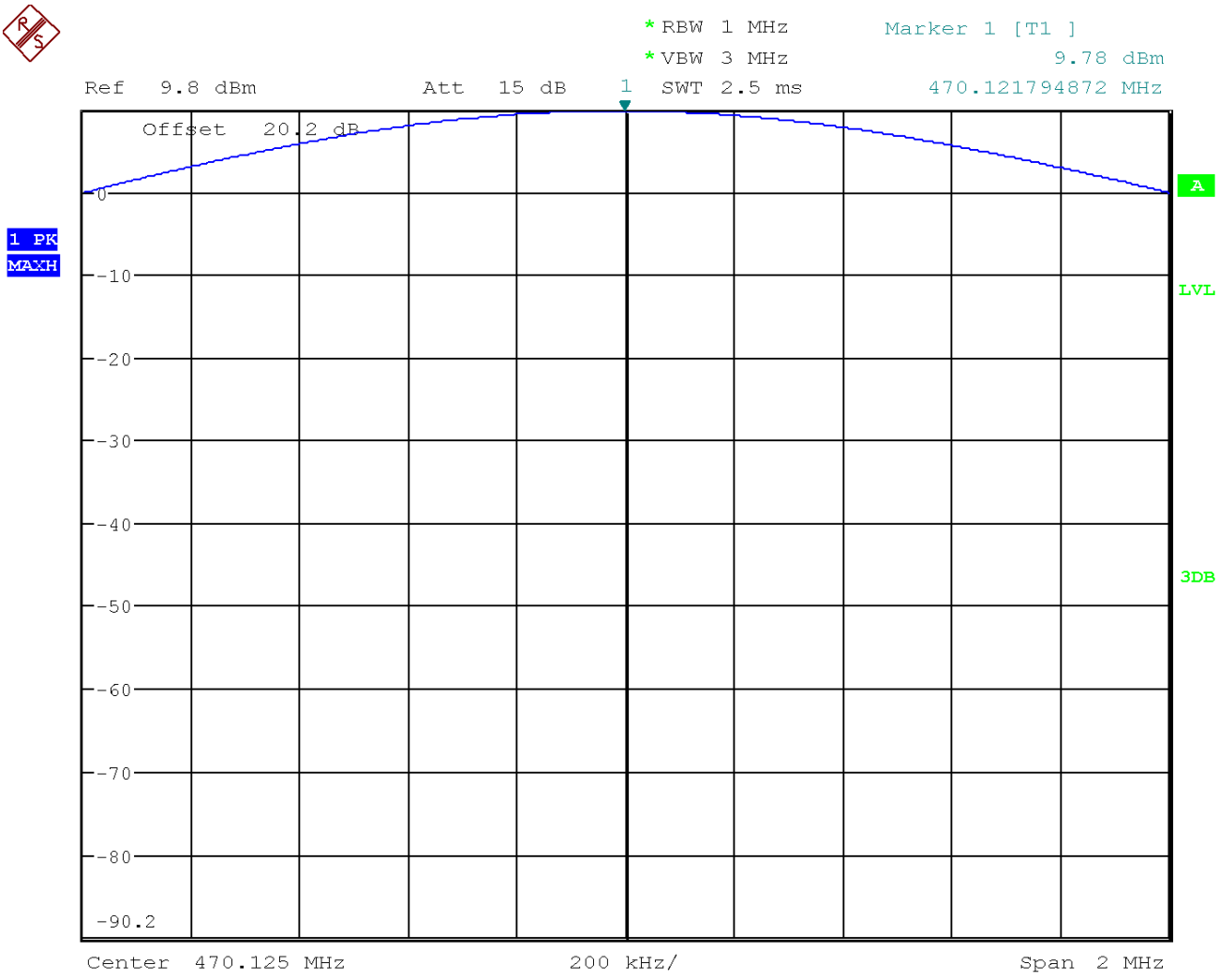
Date: 21.JAN.2014 14:17:47

EUT	QLXD2 G50
Serial Number:	EMC7
Test Description:	FCC/RSS Occupied Bandwidth Measurement
Date of Test:	January 21, 2014
Operating Conditions:	Low Frequency (470.125 MHz) at 1mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



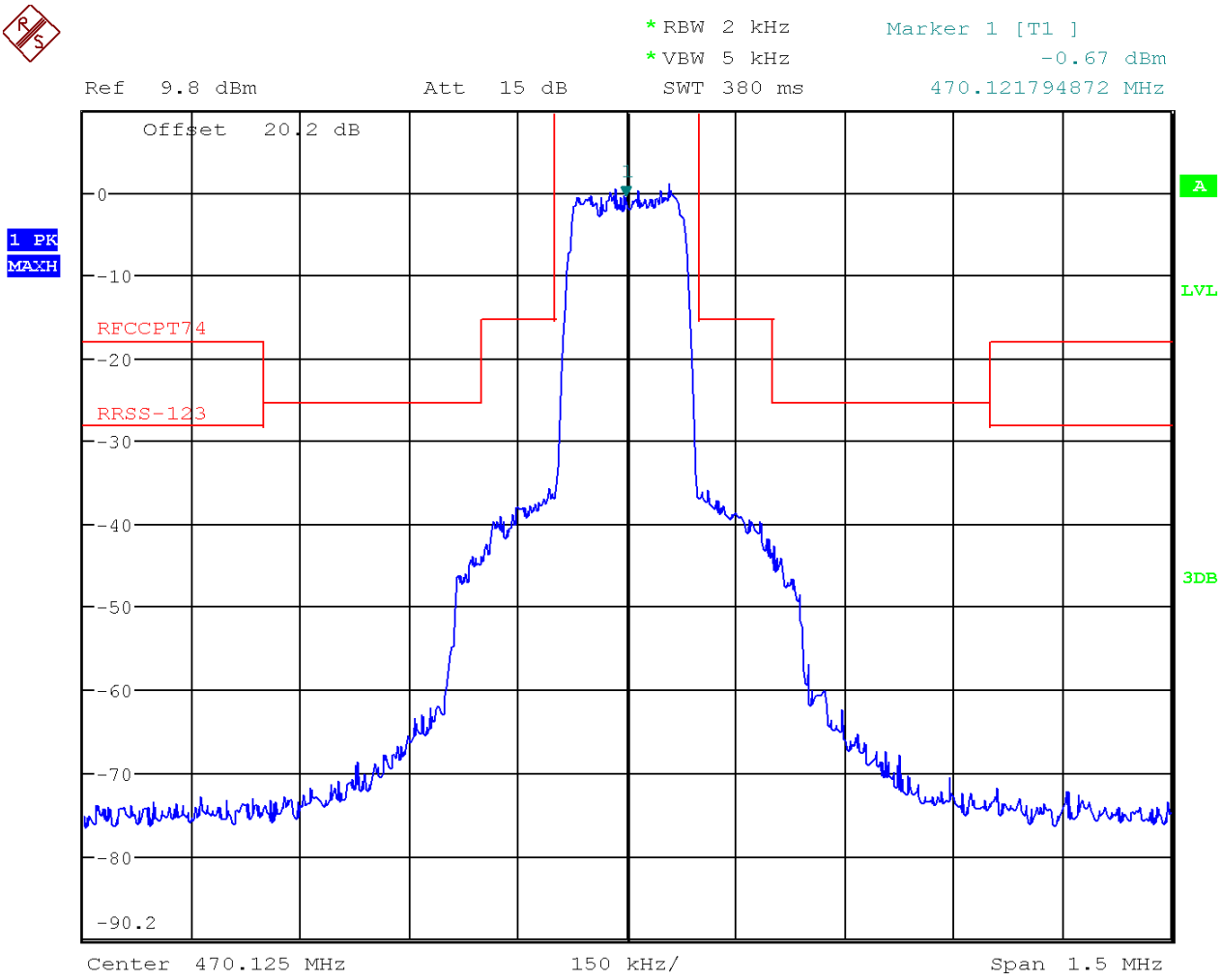
Date: 21.JAN.2014 14:19:54

EUT	QLXD2 G50
Serial Number:	EMC7
Test Description:	OBW RF Power Output
Date of Test:	March 17, 2014
Operating Conditions:	Low Frequency (470.125 MHz) at 10mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



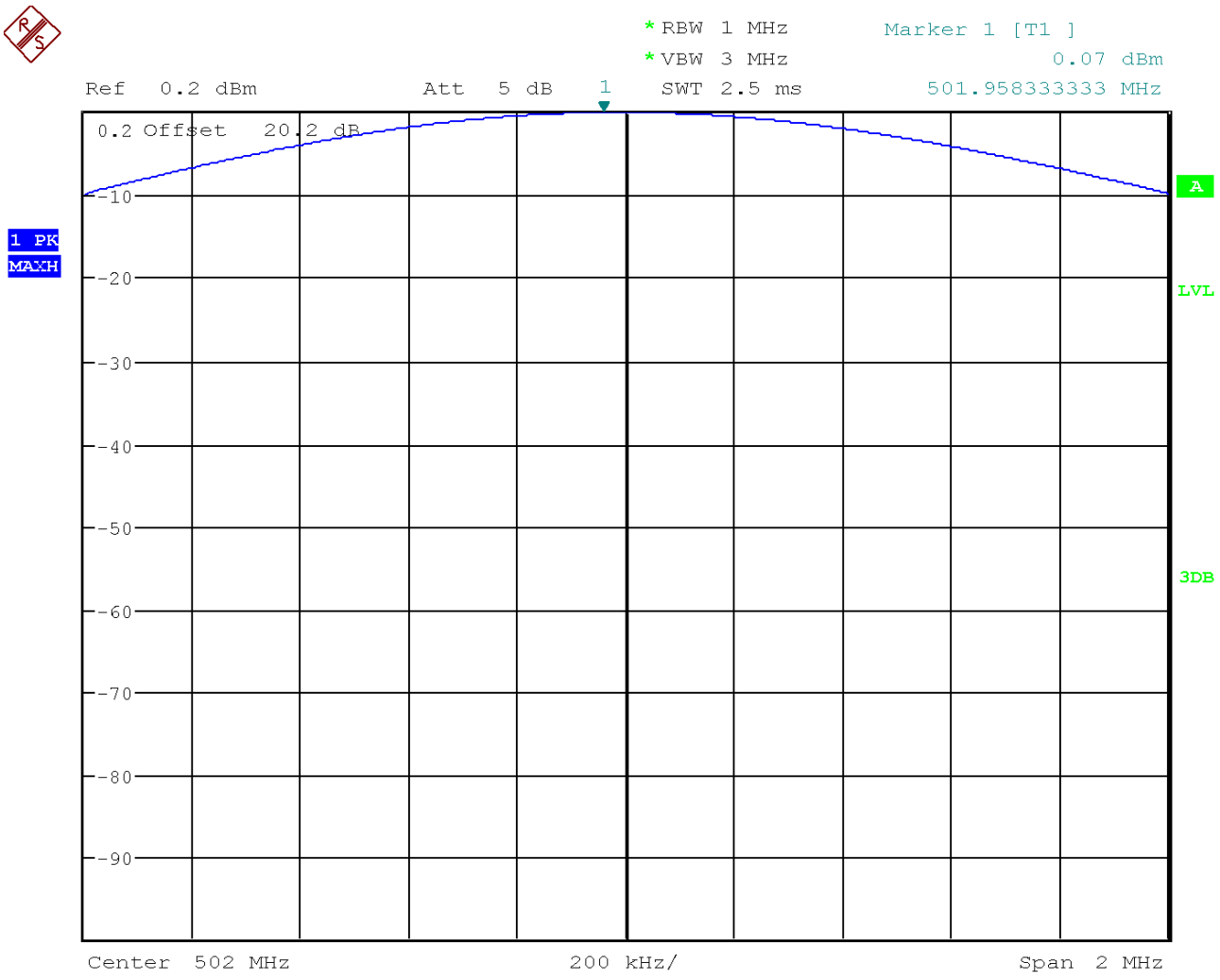
Date: 17.MAR.2014 18:49:01

EUT	QLXD2 G50
Serial Number:	EMC7
Test Description:	FCC/RSS Occupied Bandwidth Measurement
Date of Test:	March 17, 2014
Operating Conditions:	Low Frequency (470.125 MHz) at 10mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



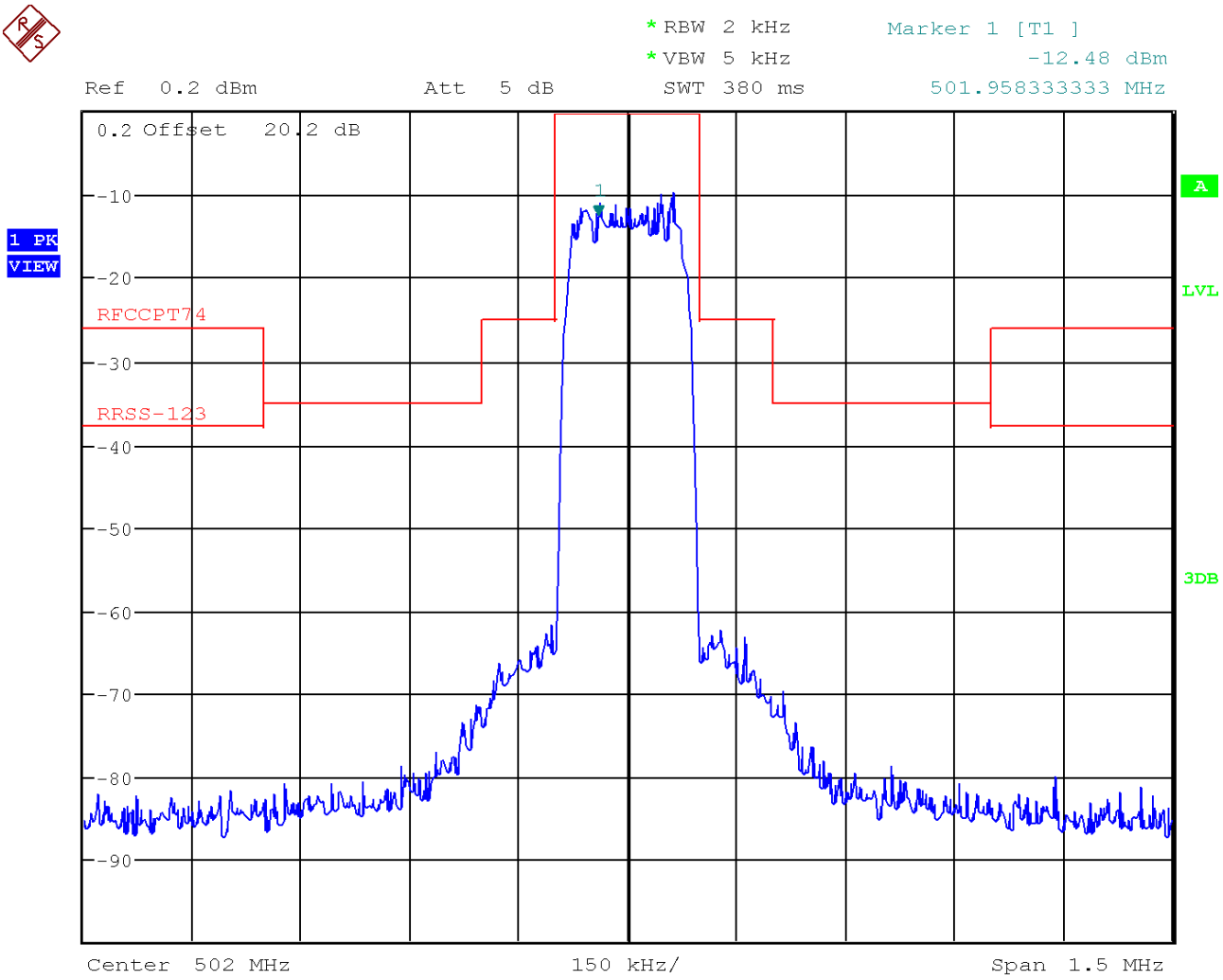
Date: 17.MAR.2014 18:50:03

EUT	QLXD2 G50
Serial Number:	EMC7
Test Description:	OBW RF Power Output
Date of Test:	January 21, 2014
Operating Conditions:	Mid Frequency (502.000 MHz) at 1mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



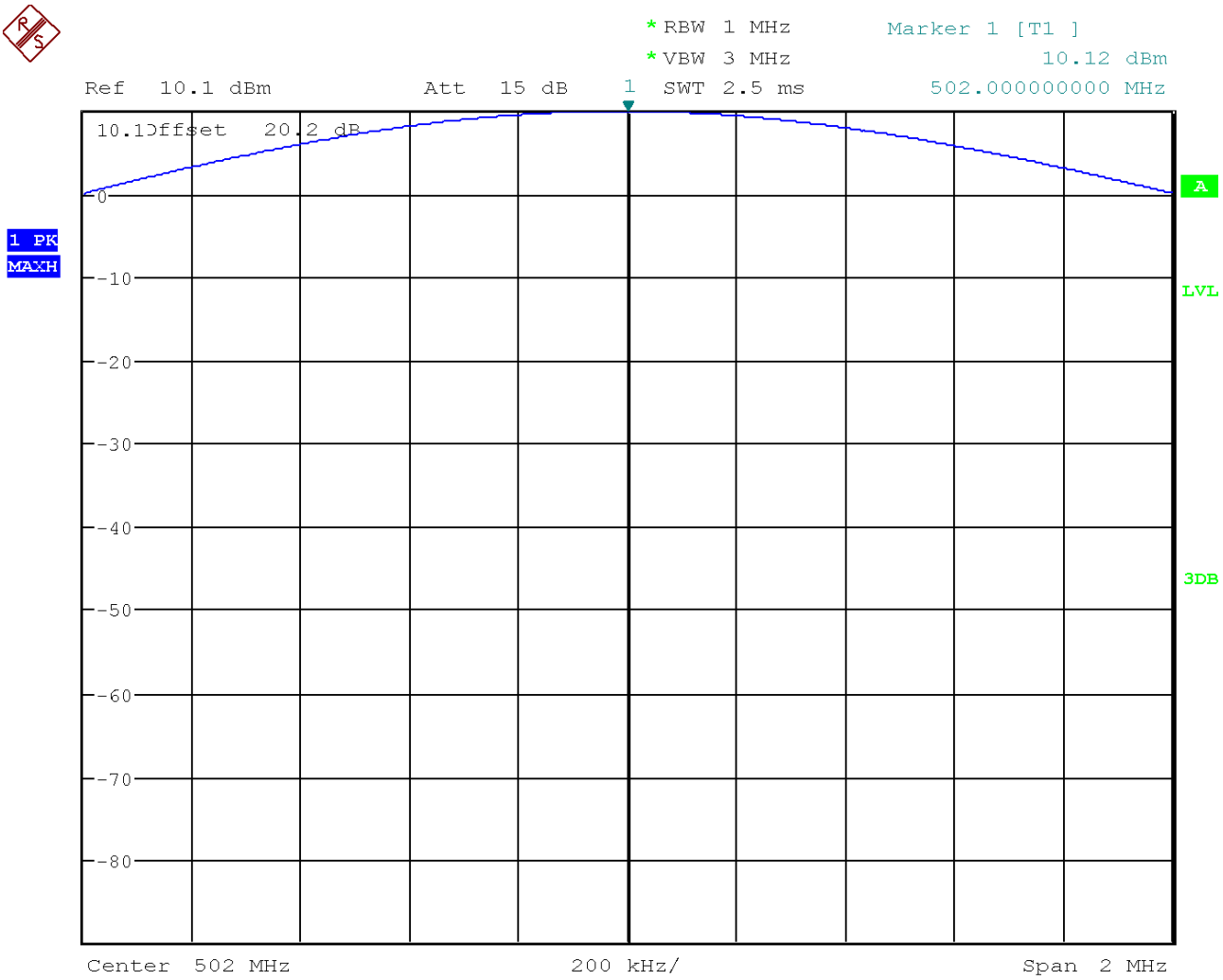
Date: 21.JAN.2014 14:32:11

EUT	QLXD2 G50
Serial Number:	EMC7
Test Description:	FCC/RSS Occupied Bandwidth Measurement
Date of Test:	January 21, 2014
Operating Conditions:	Mid Frequency (502.000 MHz) at 1mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



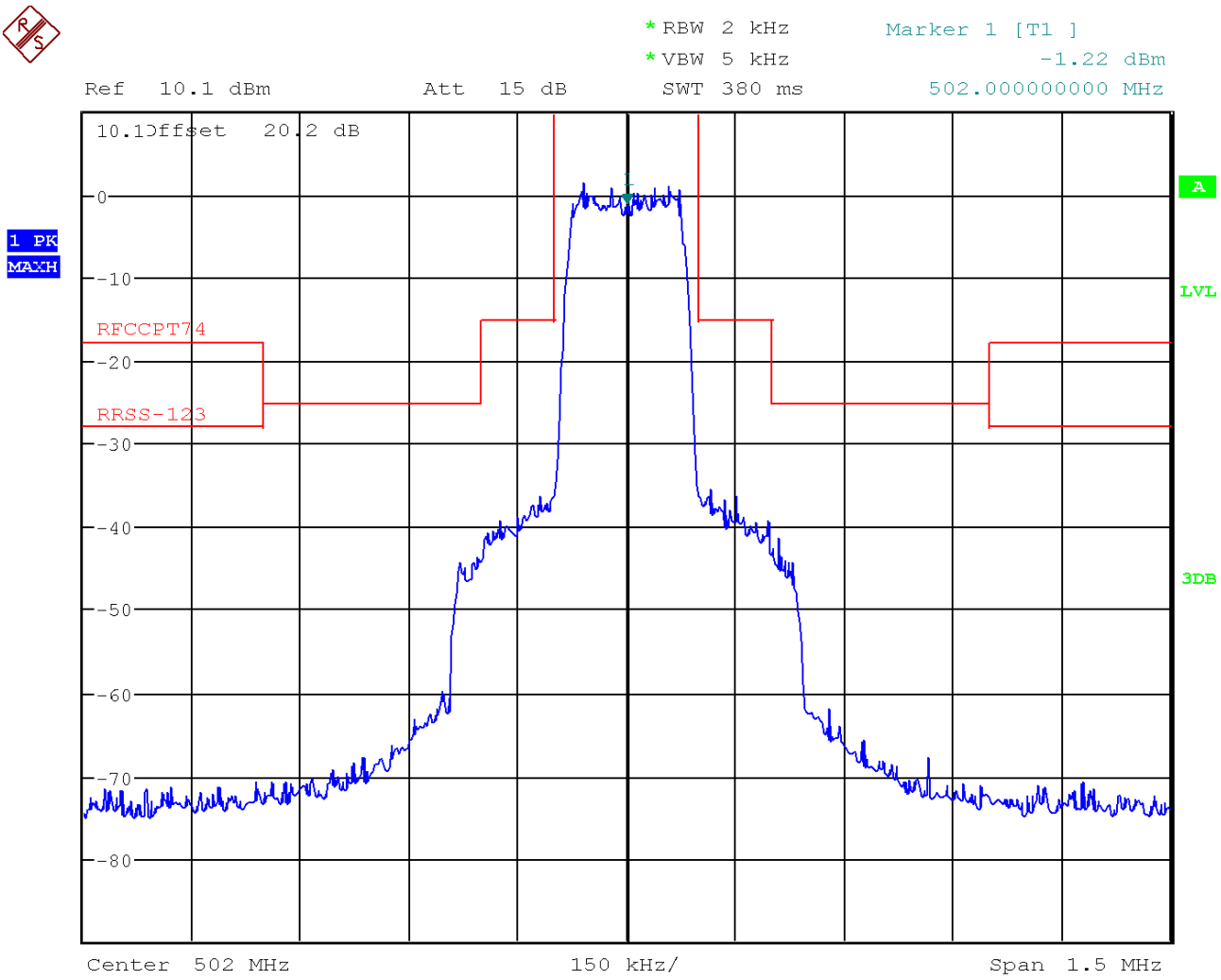
Date: 21.JAN.2014 14:33:43

EUT	QLXD2 G50
Serial Number:	EMC7
Test Description:	OBW RF Power Output
Date of Test:	March 17, 2014
Operating Conditions:	Mid Frequency (502.000 MHz) at 10mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



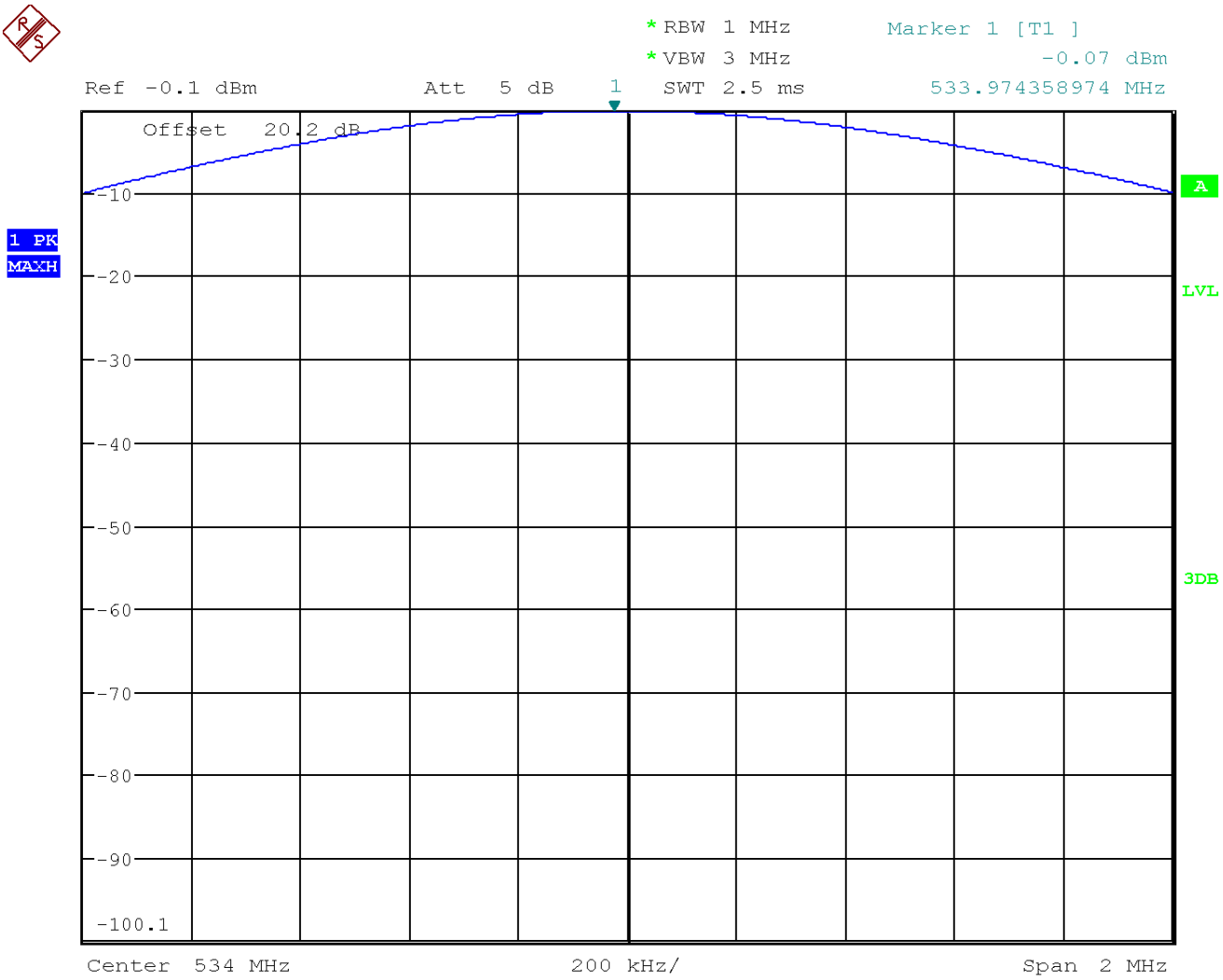
Date: 17.MAR.2014 18:52:50

EUT	QLXD2 G50
Serial Number:	EMC7
Test Description:	FCC/RSS Occupied Bandwidth Measurement
Date of Test:	March 17, 2014
Operating Conditions:	Mid Frequency (502.000 MHz) at 10mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



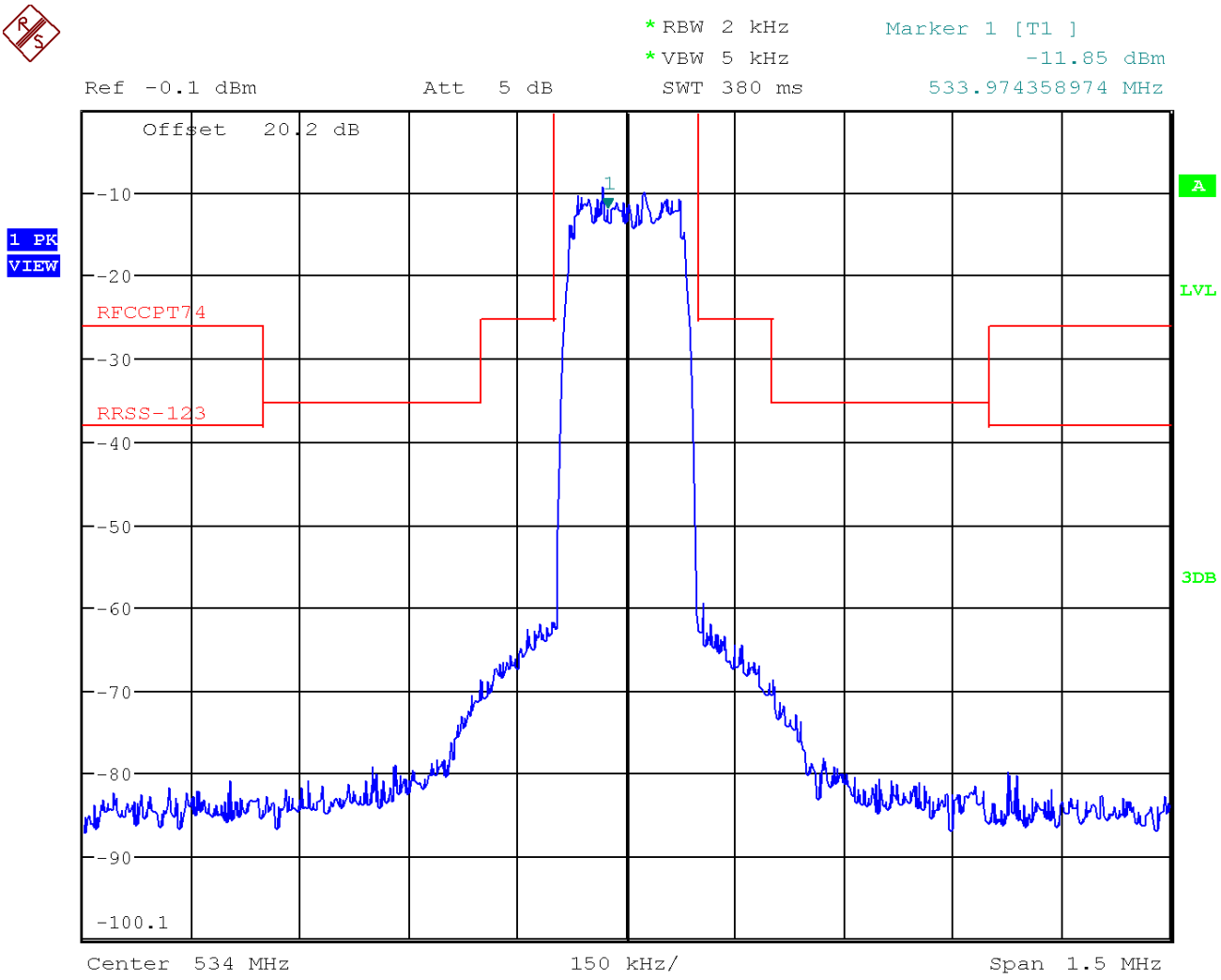
Date: 17.MAR.2014 18:54:05

EUT	QLXD2 G50
Serial Number:	EMC7
Test Description:	OBW RF Power Output
Date of Test:	January 21, 2014
Operating Conditions:	High Frequency (534.000 MHz) at 1mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



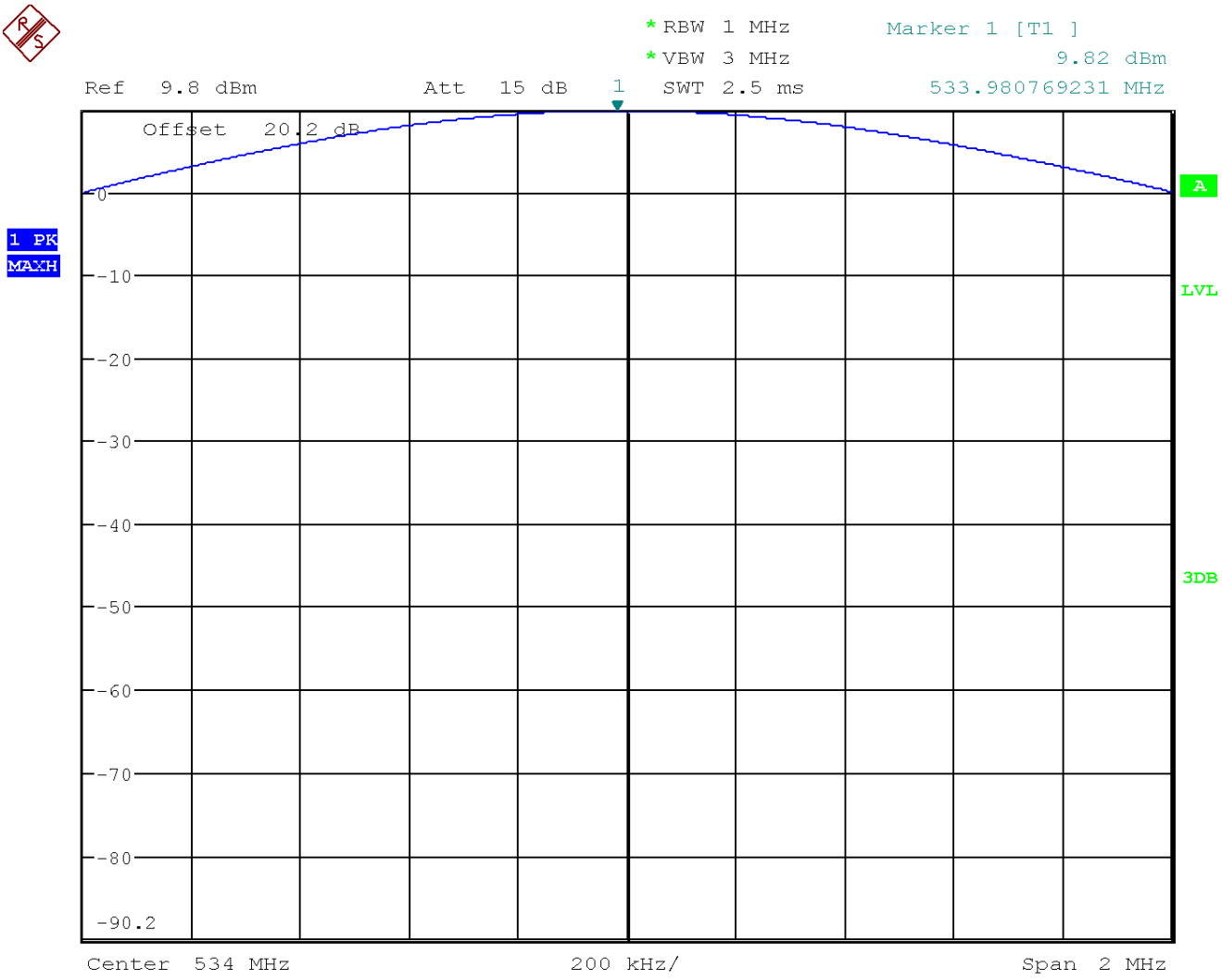
Date: 21.JAN.2014 14:55:49

EUT	QLXD2 G50
Serial Number:	EMC7
Test Description:	FCC/RSS Occupied Bandwidth Measurement
Date of Test:	January 21, 2014
Operating Conditions:	High Frequency (534.000 MHz) at 1mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



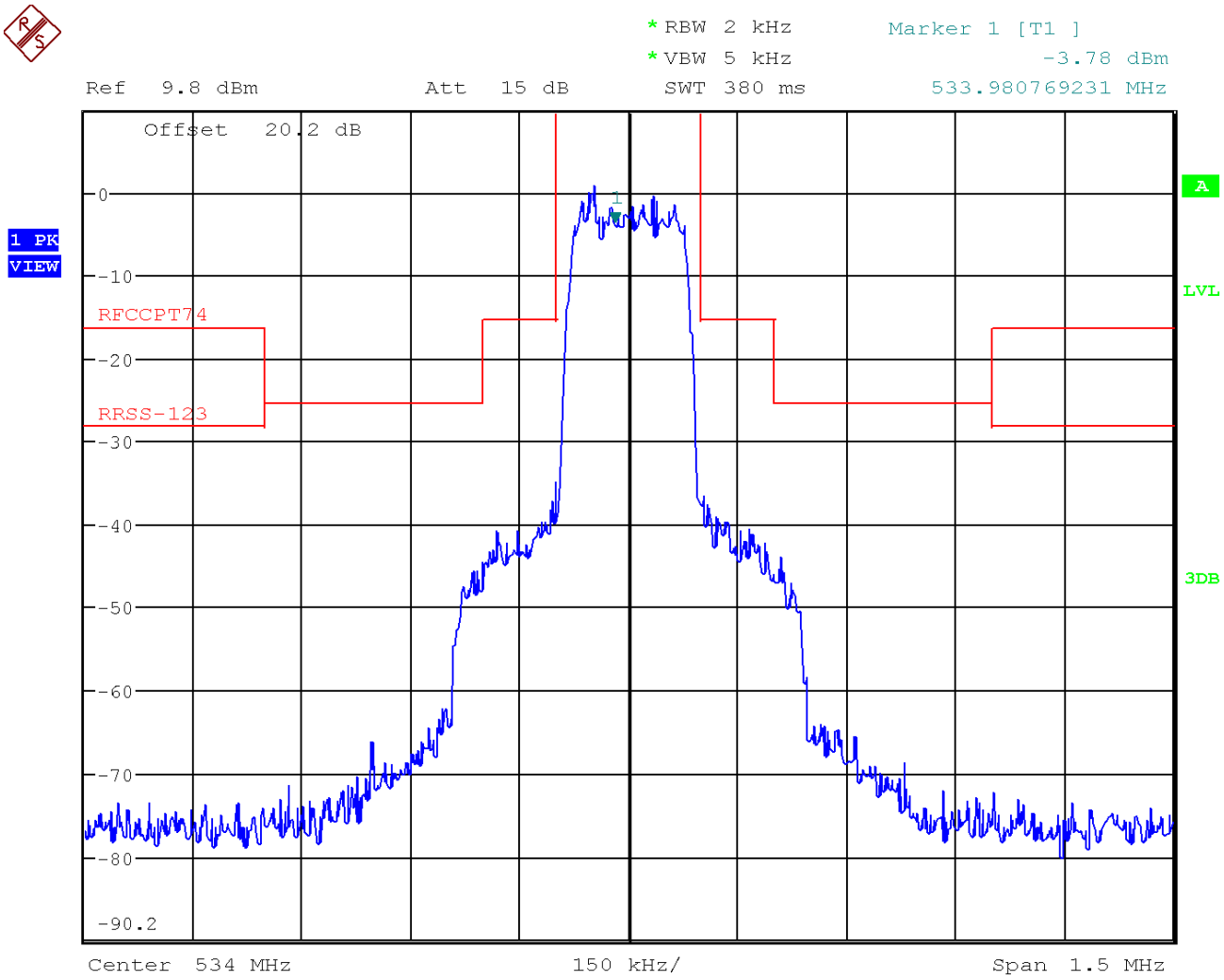
Date: 21.JAN.2014 14:57:08

EUT	QLXD2 G50
Serial Number:	EMC7
Test Description:	OBW RF Power Output
Date of Test:	January 21, 2014
Operating Conditions:	High Frequency (534.000 MHz) at 10mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



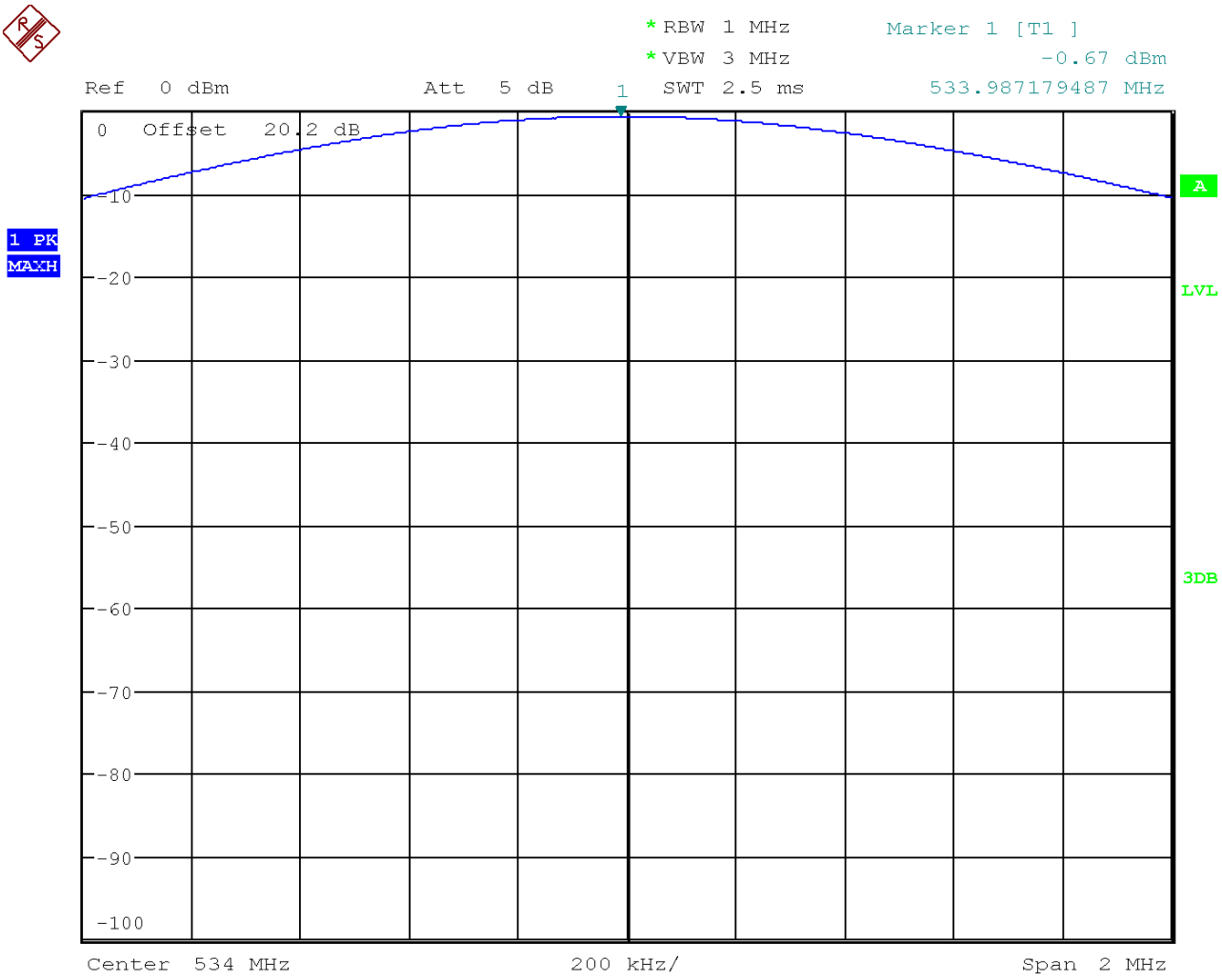
Date: 21.JAN.2014 15:01:00

EUT	QLXD2 G50
Serial Number:	EMC7
Test Description:	FCC/RSS Occupied Bandwidth Measurement
Date of Test:	January 21, 2014
Operating Conditions:	High Frequency (534.000 MHz) at 10mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



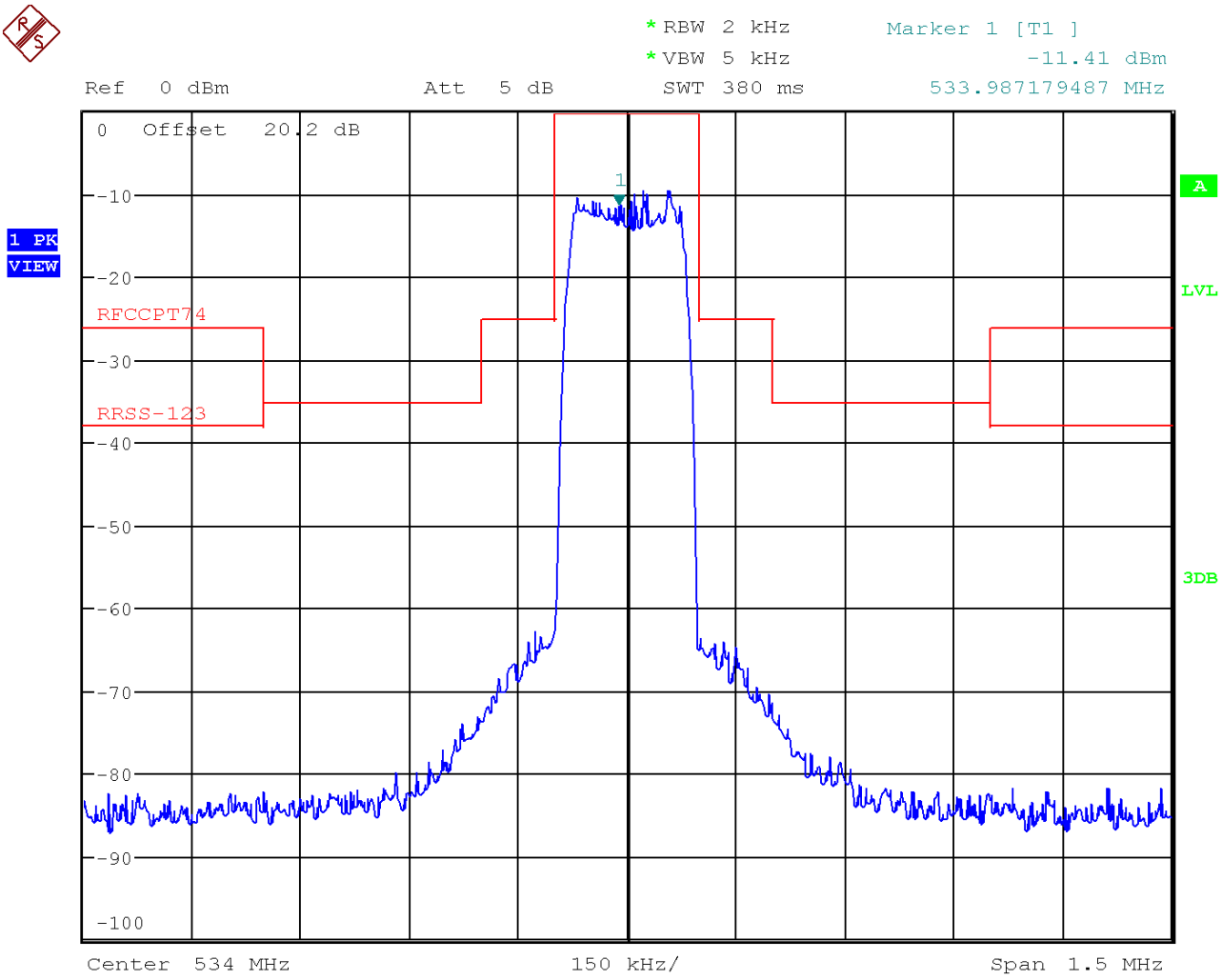
Date: 21.JAN.2014 15:02:38

EUT	QLXD2 H50
Serial Number:	EMC1
Test Description:	OBW RF Power Output
Date of Test:	January 21, 2014
Operating Conditions:	Low Frequency (534.000 MHz) at 1mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



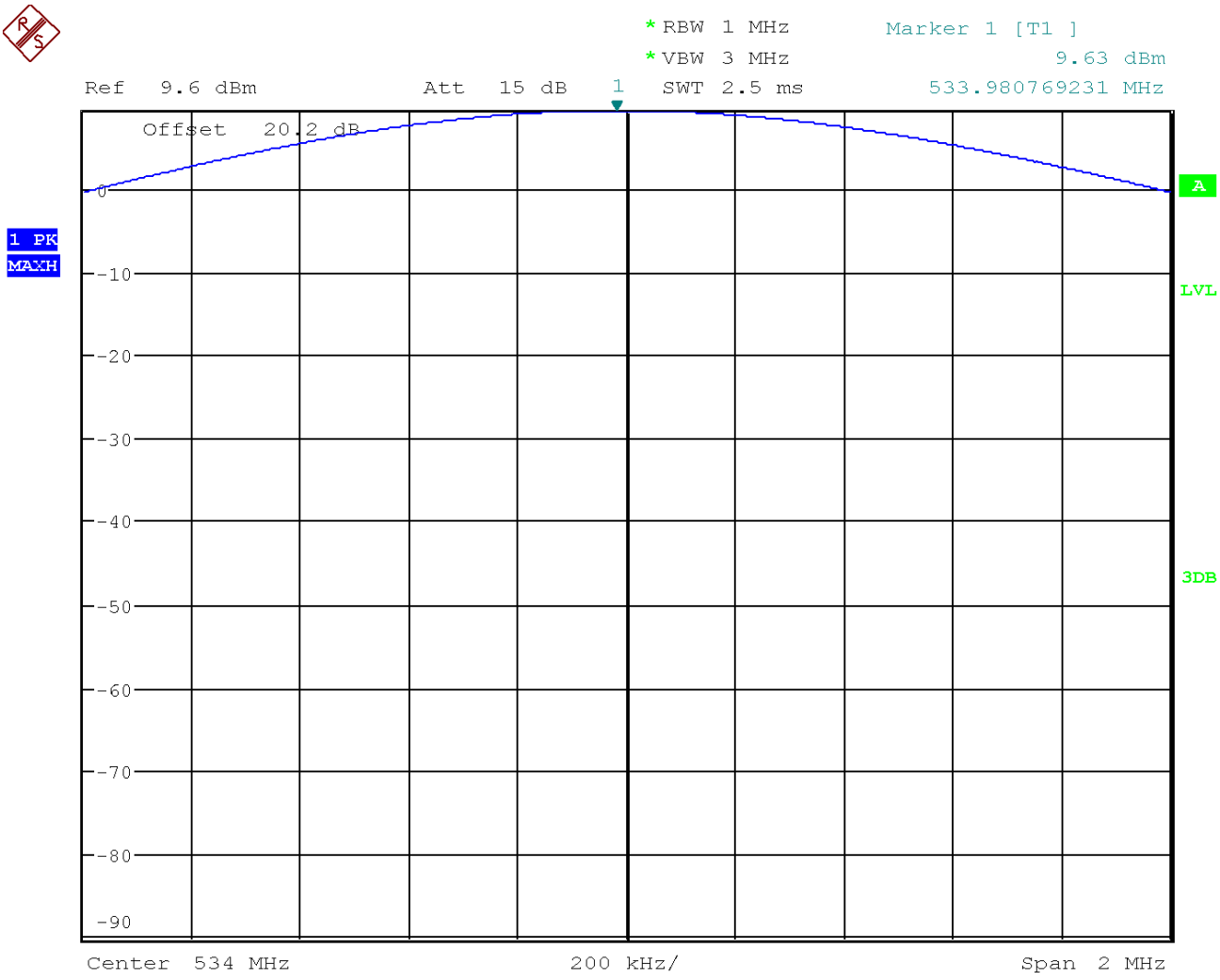
Date: 21.JAN.2014 15:08:15

EUT	QLXD2 H50
Serial Number:	EMC1
Test Description:	FCC/RSS Occupied Bandwidth Measurement
Date of Test:	January 21, 2014
Operating Conditions:	Low Frequency (534.000 MHz) at 1mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



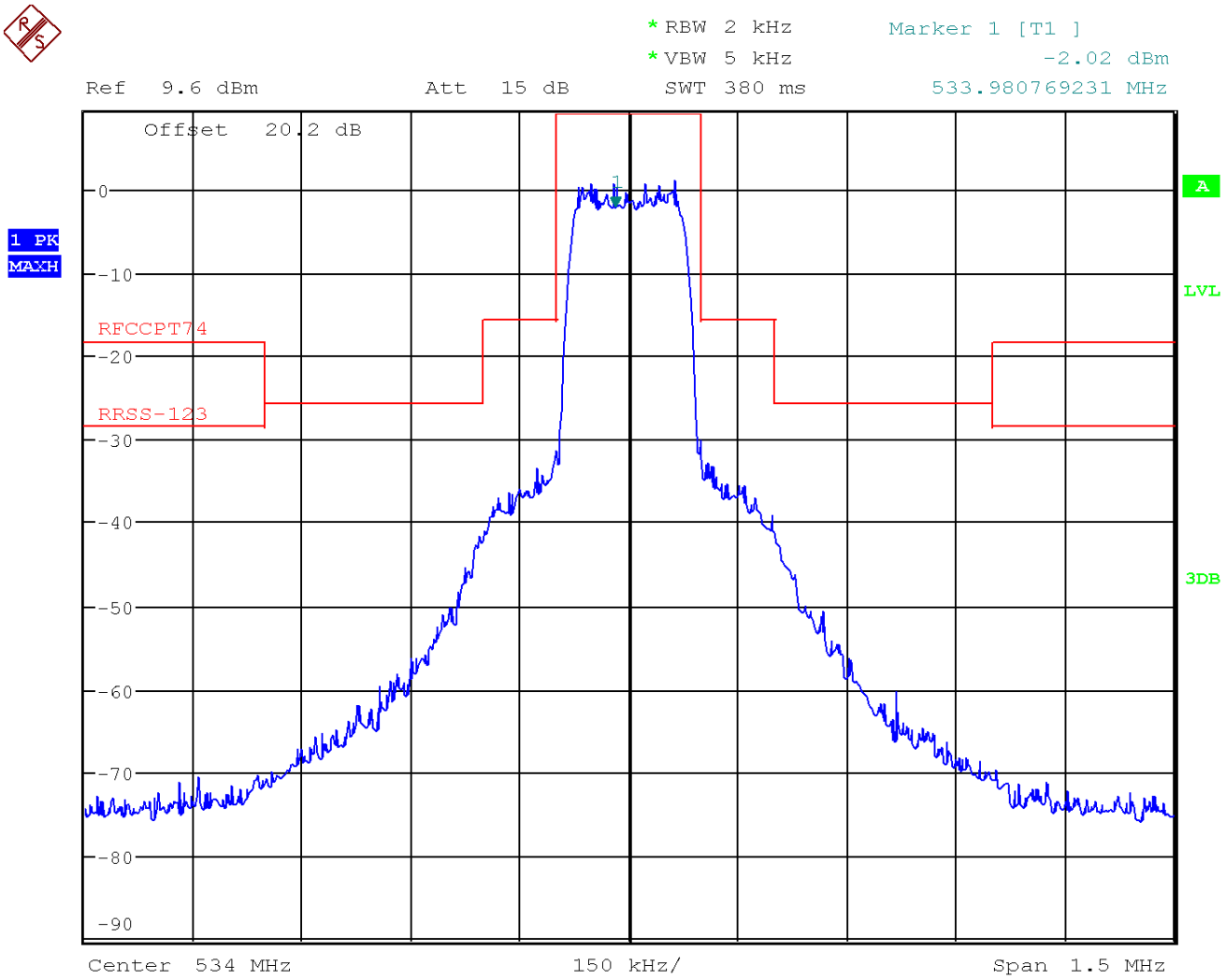
Date: 21.JAN.2014 15:09:44

EUT	QLXD2 H50
Serial Number:	EMC1
Test Description:	OBW RF Power Output
Date of Test:	March 17, 2014
Operating Conditions:	Low Frequency (534.000 MHz) at 10mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



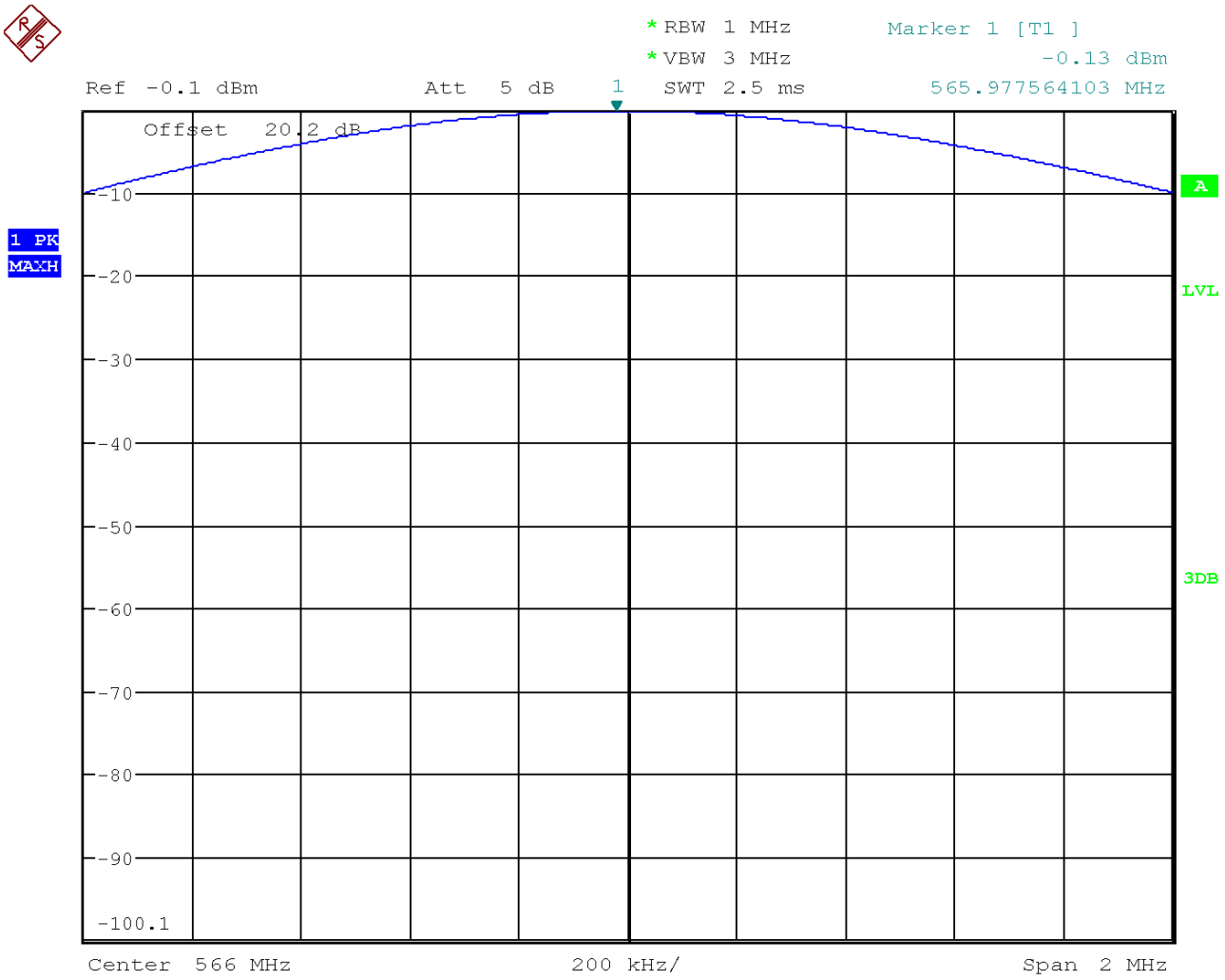
Date: 17.MAR.2014 19:00:08

EUT	QLXD2 H50
Serial Number:	EMC1
Test Description:	FCC/RSS Occupied Bandwidth Measurement
Date of Test:	March 17, 2014
Operating Conditions:	Low Frequency (534.000 MHz) at 10mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



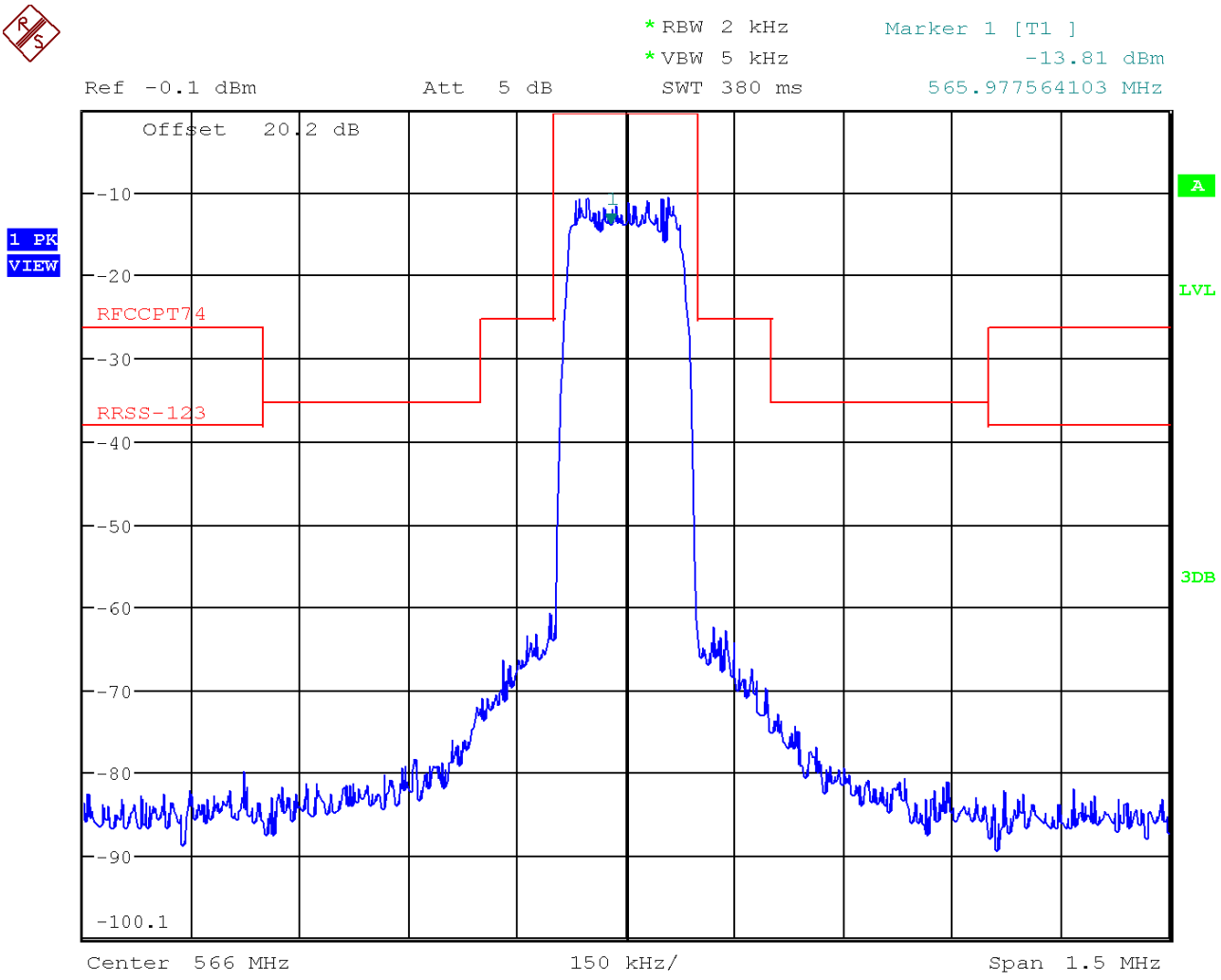
Date: 17.MAR.2014 19:01:18

EUT	QLXD2 H50
Serial Number:	EMC1
Test Description:	OBW RF Power Output
Date of Test:	January 21, 2014
Operating Conditions:	Mid Frequency (566.000 MHz) at 1mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



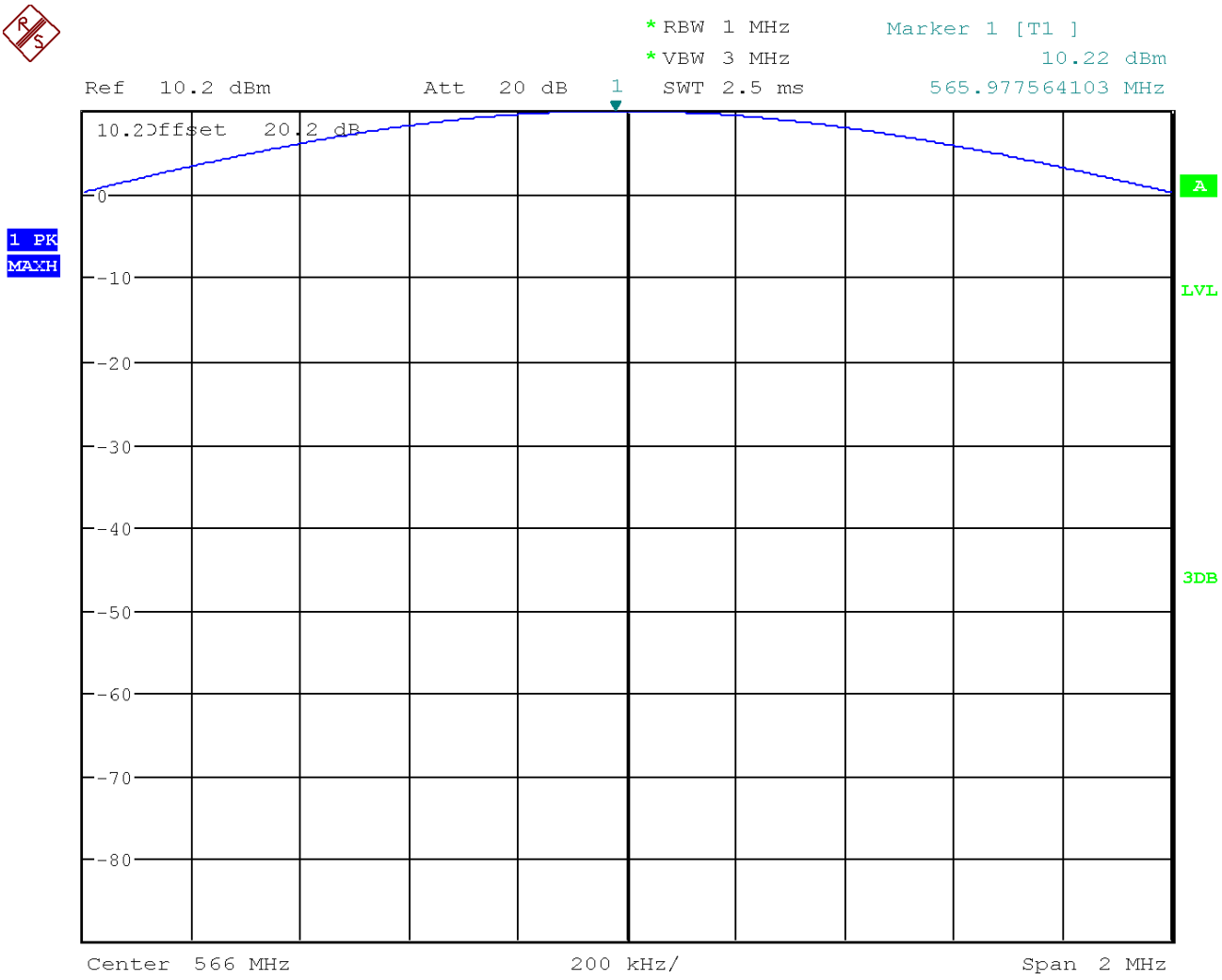
Date: 21.JAN.2014 15:17:21

EUT	QLXD2 H50
Serial Number:	EMC1
Test Description:	FCC/RSS Occupied Bandwidth Measurement
Date of Test:	January 21, 2014
Operating Conditions:	Mid Frequency (566.000 MHz) at 1mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



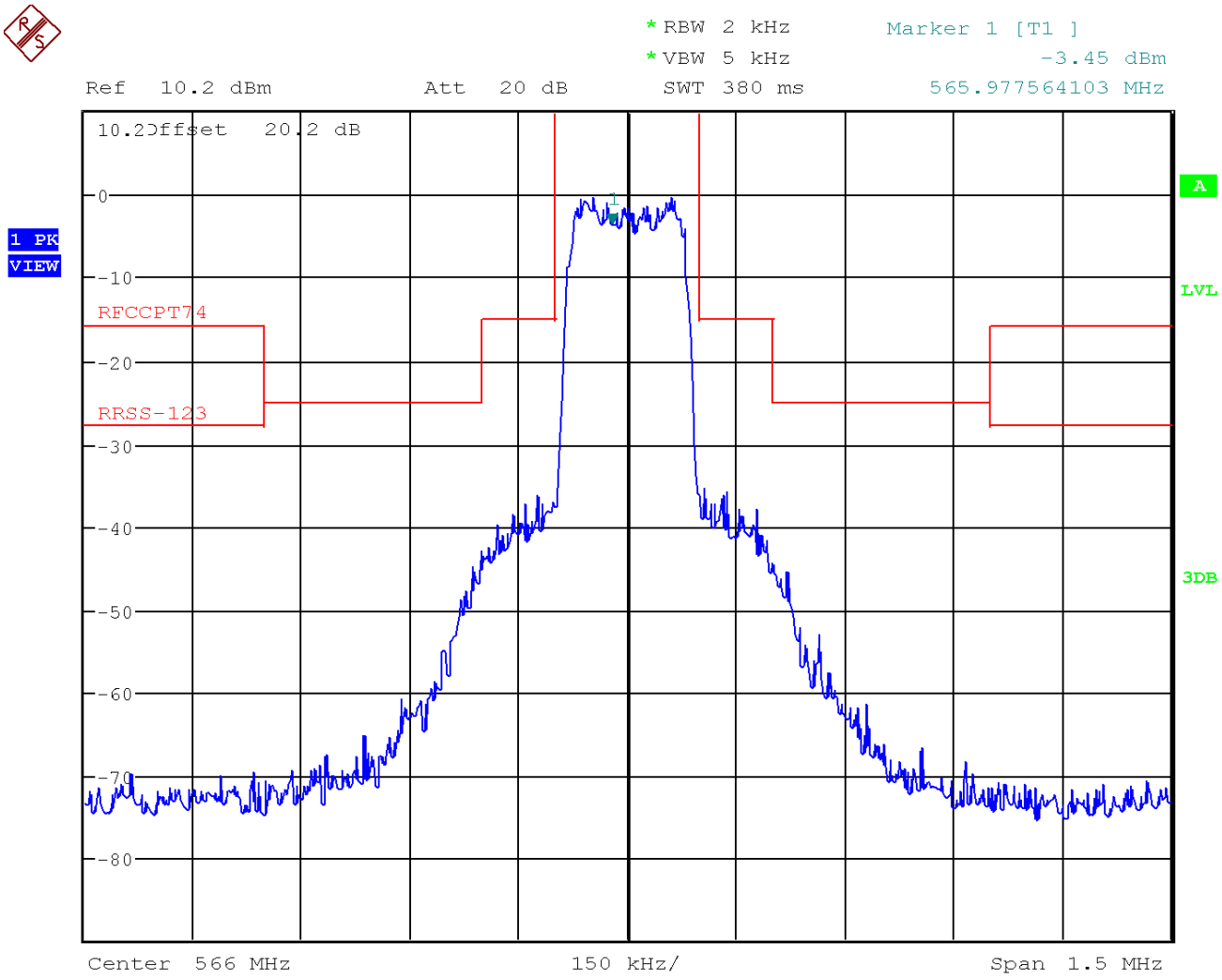
Date: 21.JAN.2014 15:18:41

EUT	QLXD2 H50
Serial Number:	EMC1
Test Description:	OBW RF Power Output
Date of Test:	January 21, 2014
Operating Conditions:	Mid Frequency (566.000 MHz) at 10mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



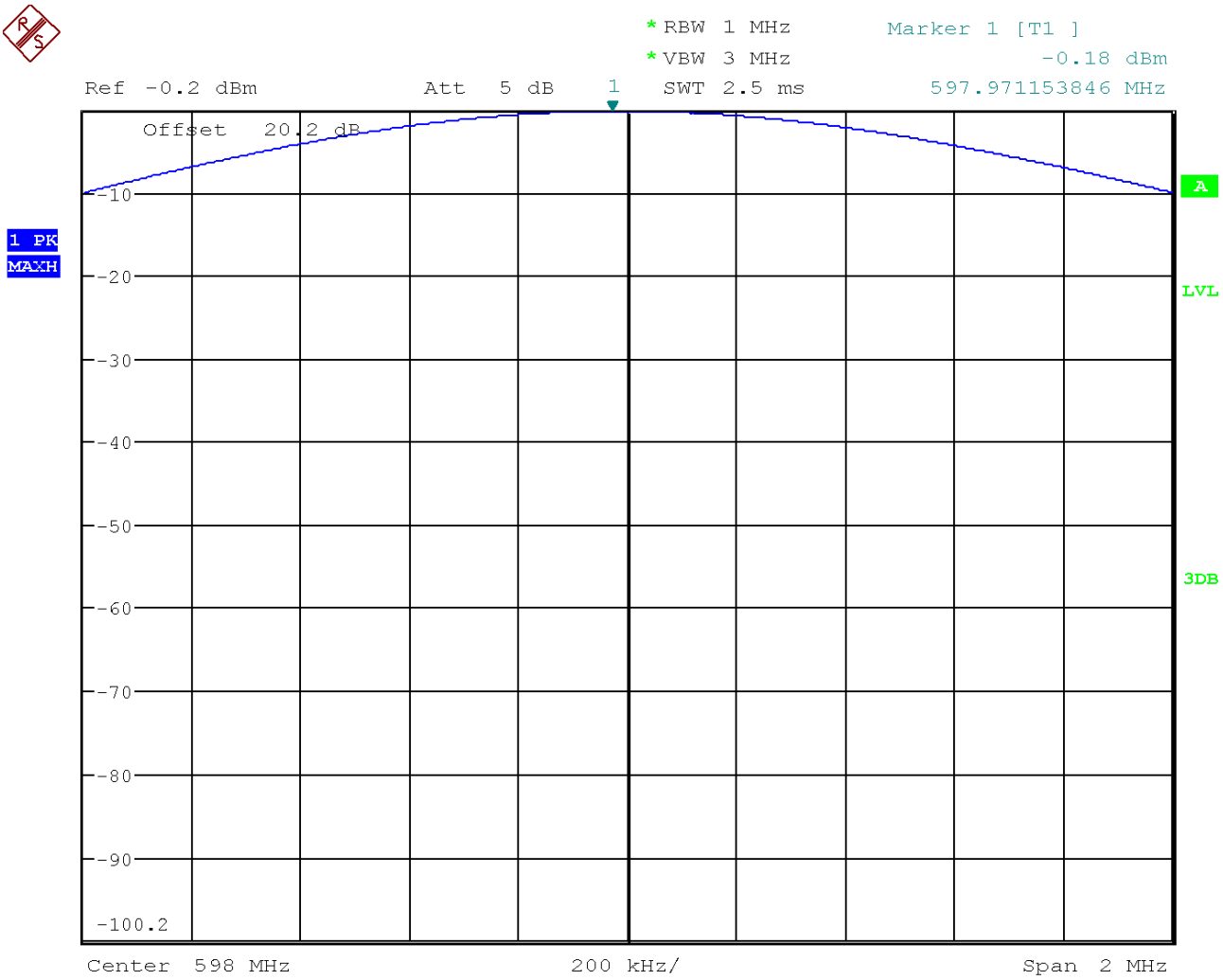
Date: 21.JAN.2014 15:20:59

EUT	QLXD2 H50
Serial Number:	EMC1
Test Description:	FCC/RSS Occupied Bandwidth Measurement
Date of Test:	January 21, 2014
Operating Conditions:	Mid Frequency (566.000 MHz) at 10mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



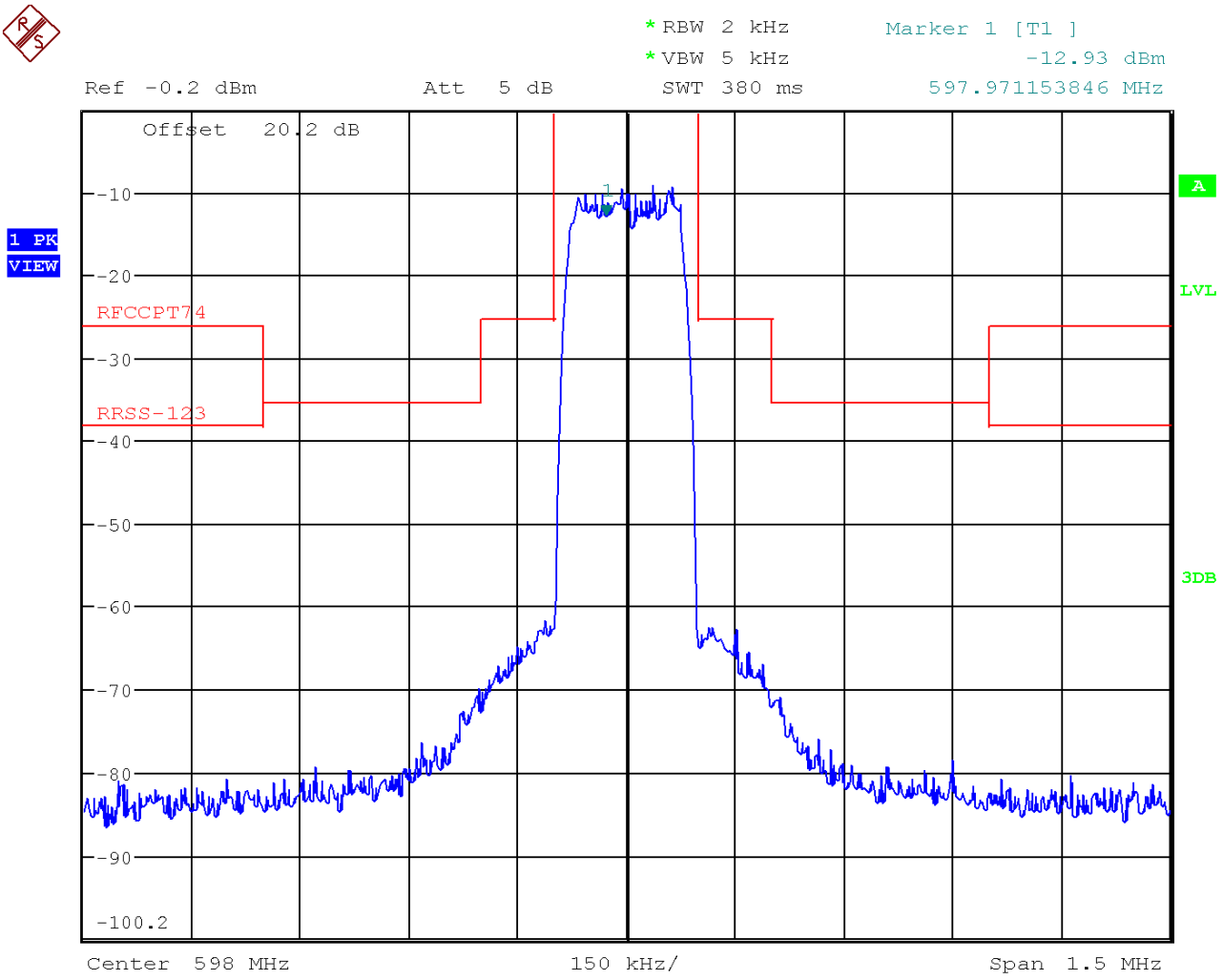
Date: 21.JAN.2014 15:22:36

EUT	QLXD2 H50
Serial Number:	EMC1
Test Description:	OBW RF Power Output
Date of Test:	January 21, 2014
Operating Conditions:	High Frequency (598.000 MHz) at 1mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



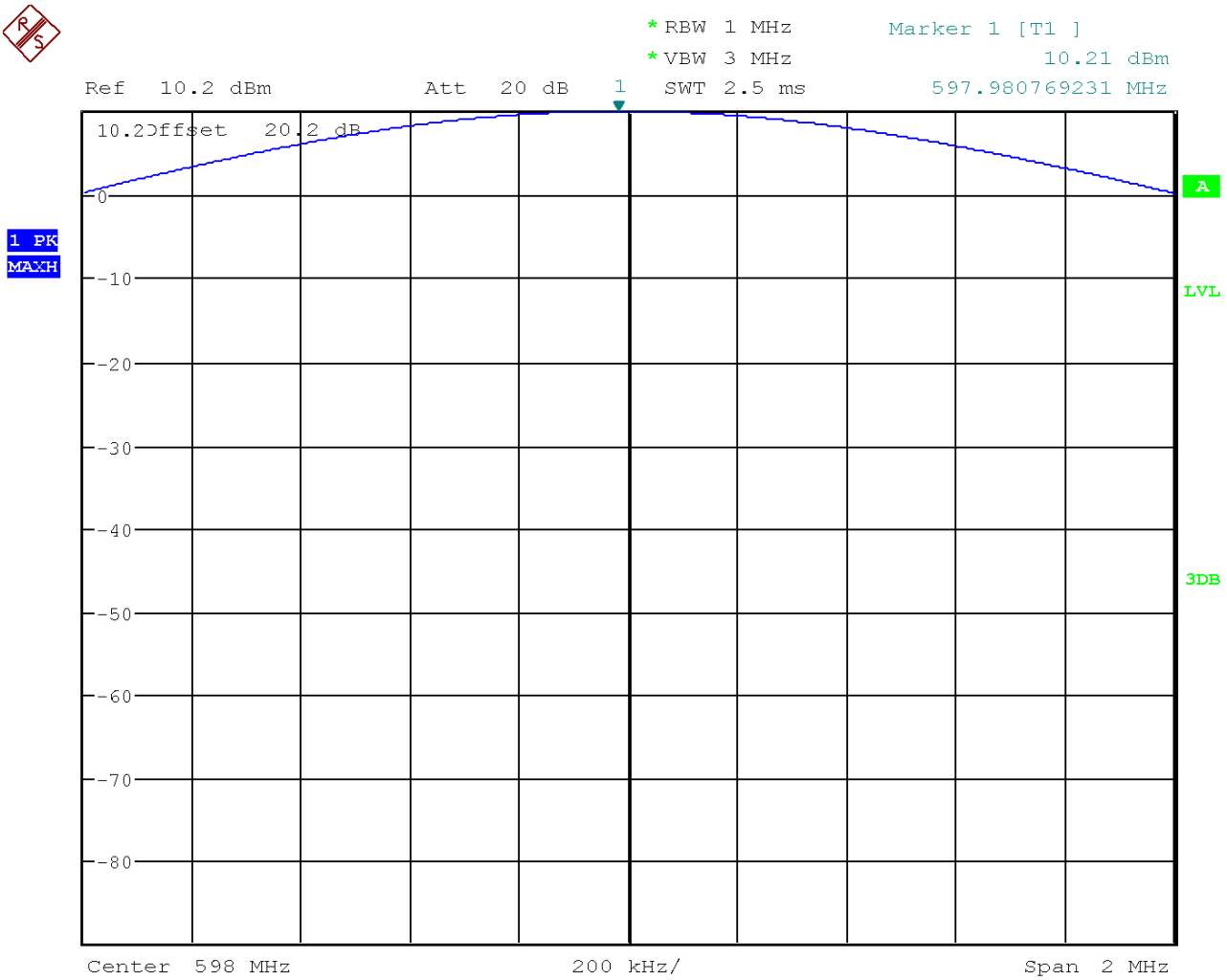
Date: 21.JAN.2014 15:25:04

EUT	QLXD2 H50
Serial Number:	EMC1
Test Description:	FCC/RSS Occupied Bandwidth Measurement
Date of Test:	January 21, 2014
Operating Conditions:	High Frequency (598.000 MHz) at 1mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



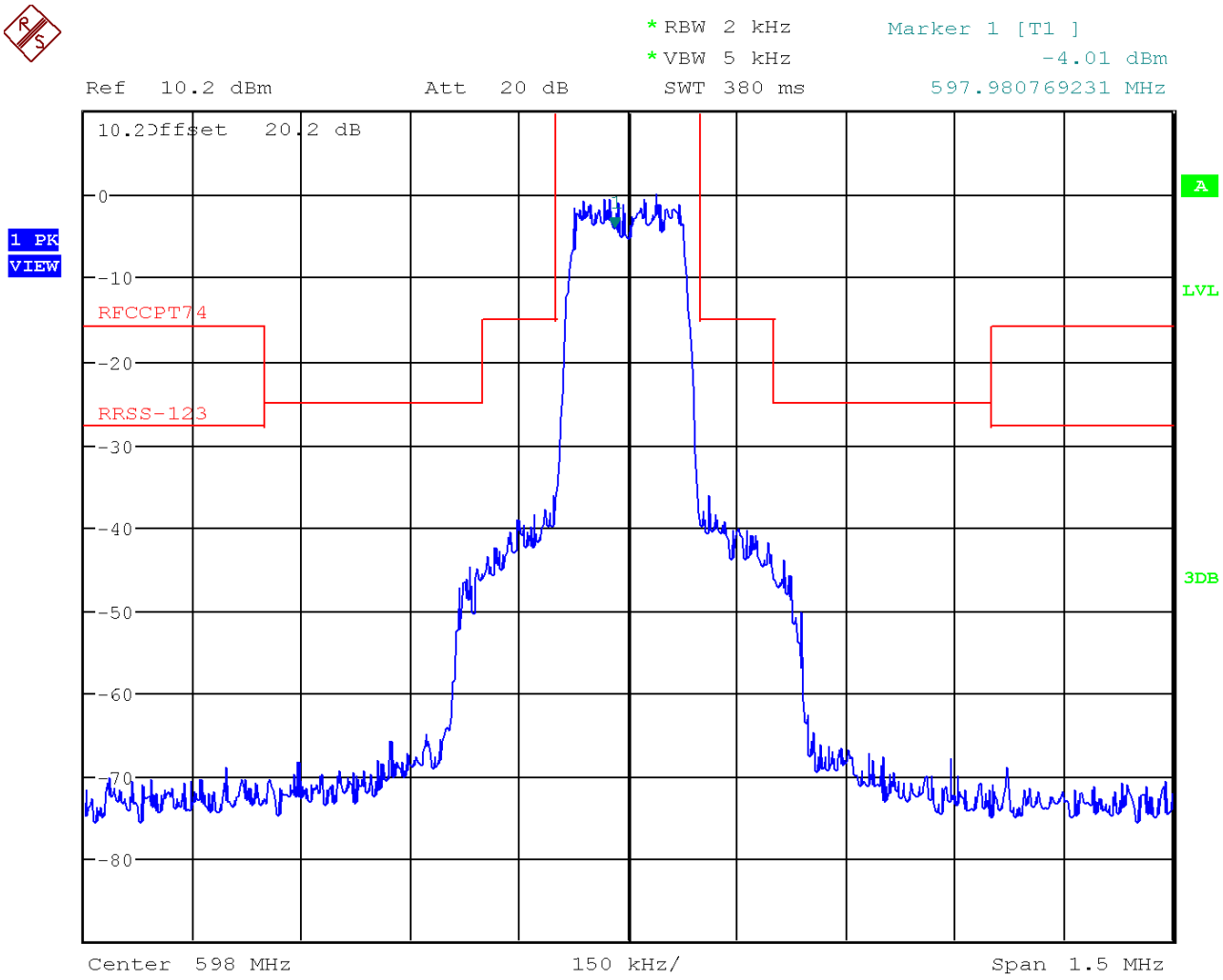
Date: 21.JAN.2014 15:26:21

EUT	QLXD2 H50
Serial Number:	EMC1
Test Description:	OBW RF Power Output
Date of Test:	January 21, 2014
Operating Conditions:	High Frequency (598.000 MHz) at 10mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



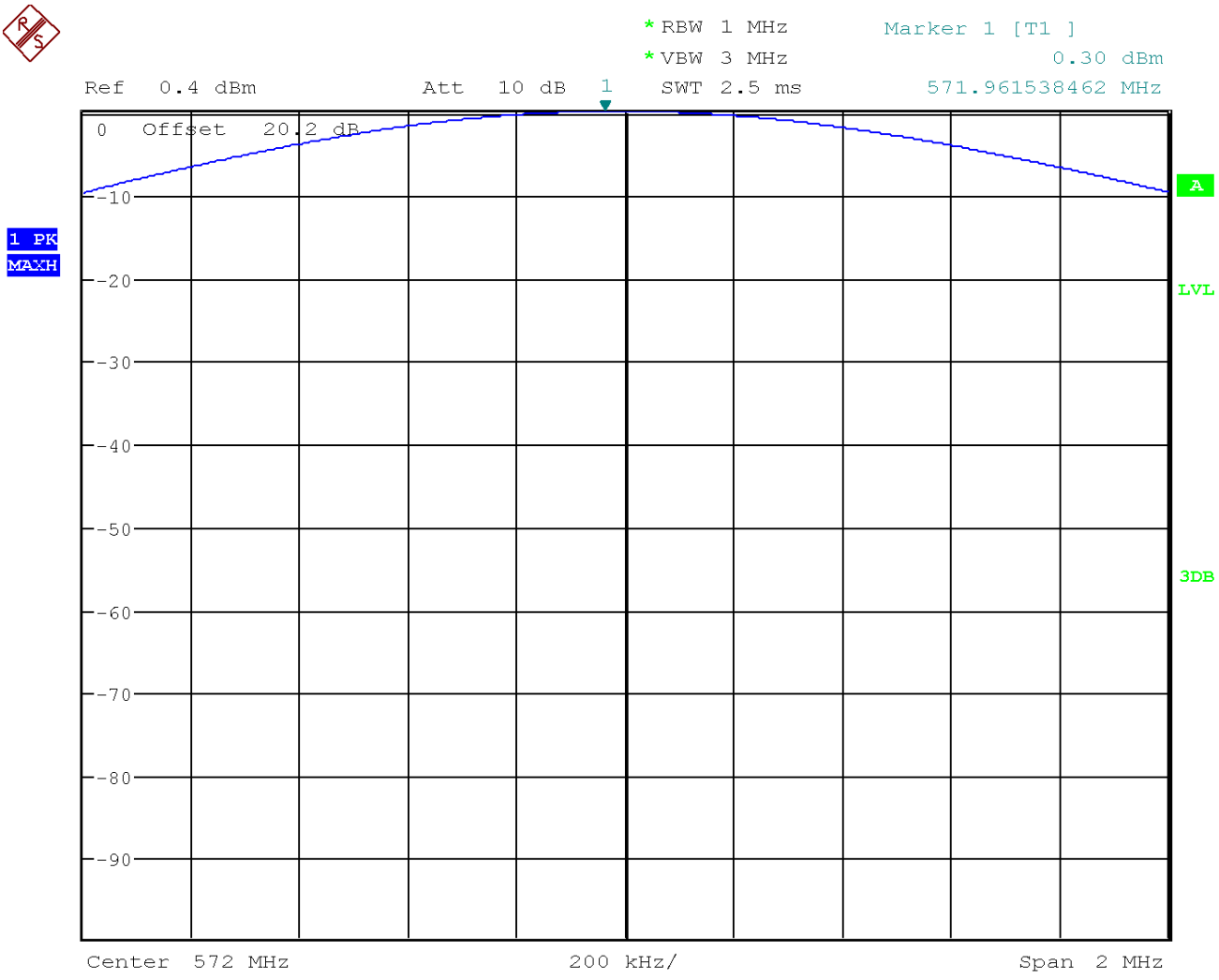
Date: 21.JAN.2014 15:29:48

EUT	QLXD2 H50
Serial Number:	EMC1
Test Description:	FCC/RSS Occupied Bandwidth Measurement
Date of Test:	January 21, 2014
Operating Conditions:	High Frequency (598.000 MHz) at 10mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



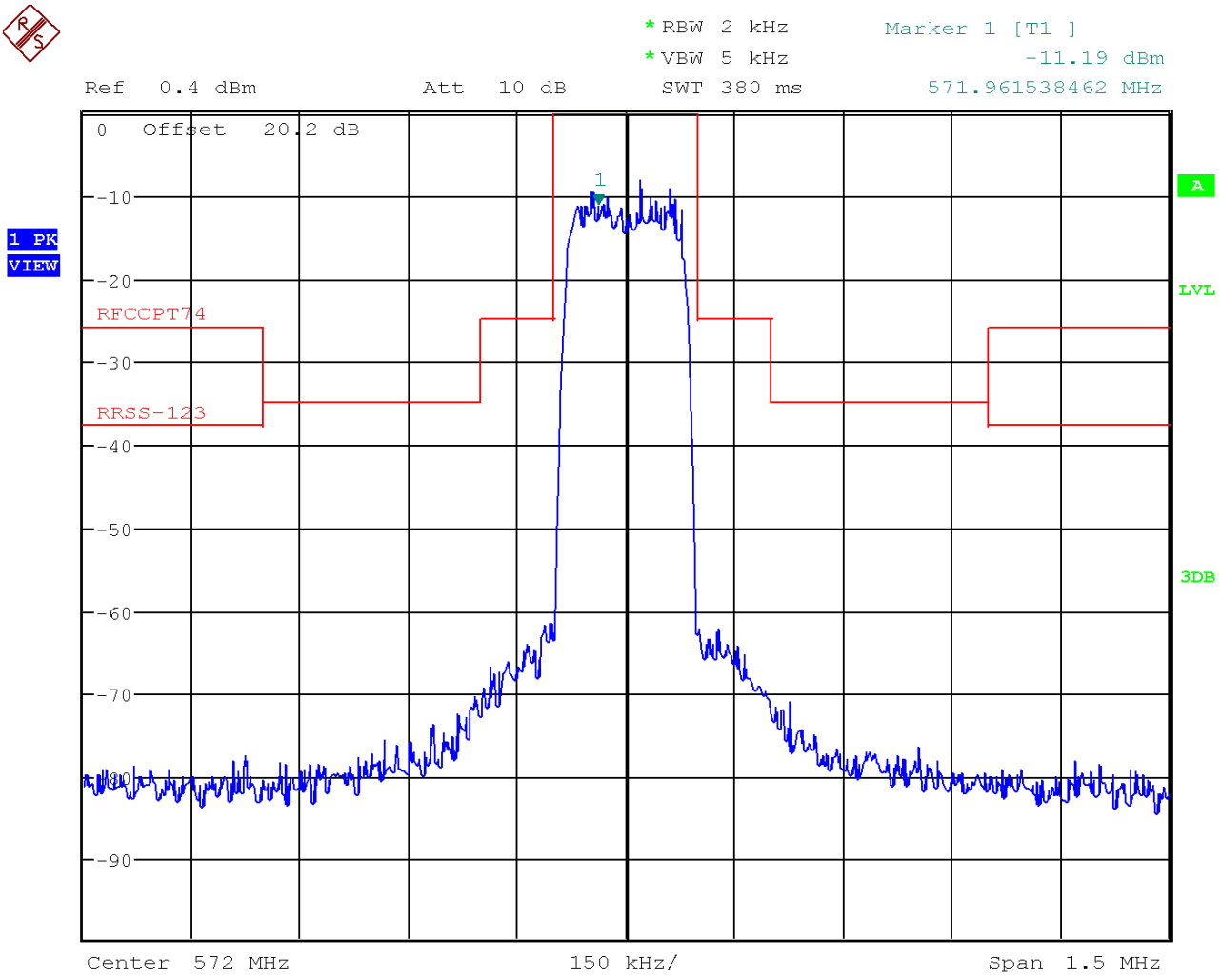
Date: 21.JAN.2014 15:31:21

EUT	QLXD2 J50
Serial Number:	EMC3
Test Description:	OBW RF Power Output
Date of Test:	January 21, 2014
Operating Conditions:	Low Frequency (572.000 MHz) at 1mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



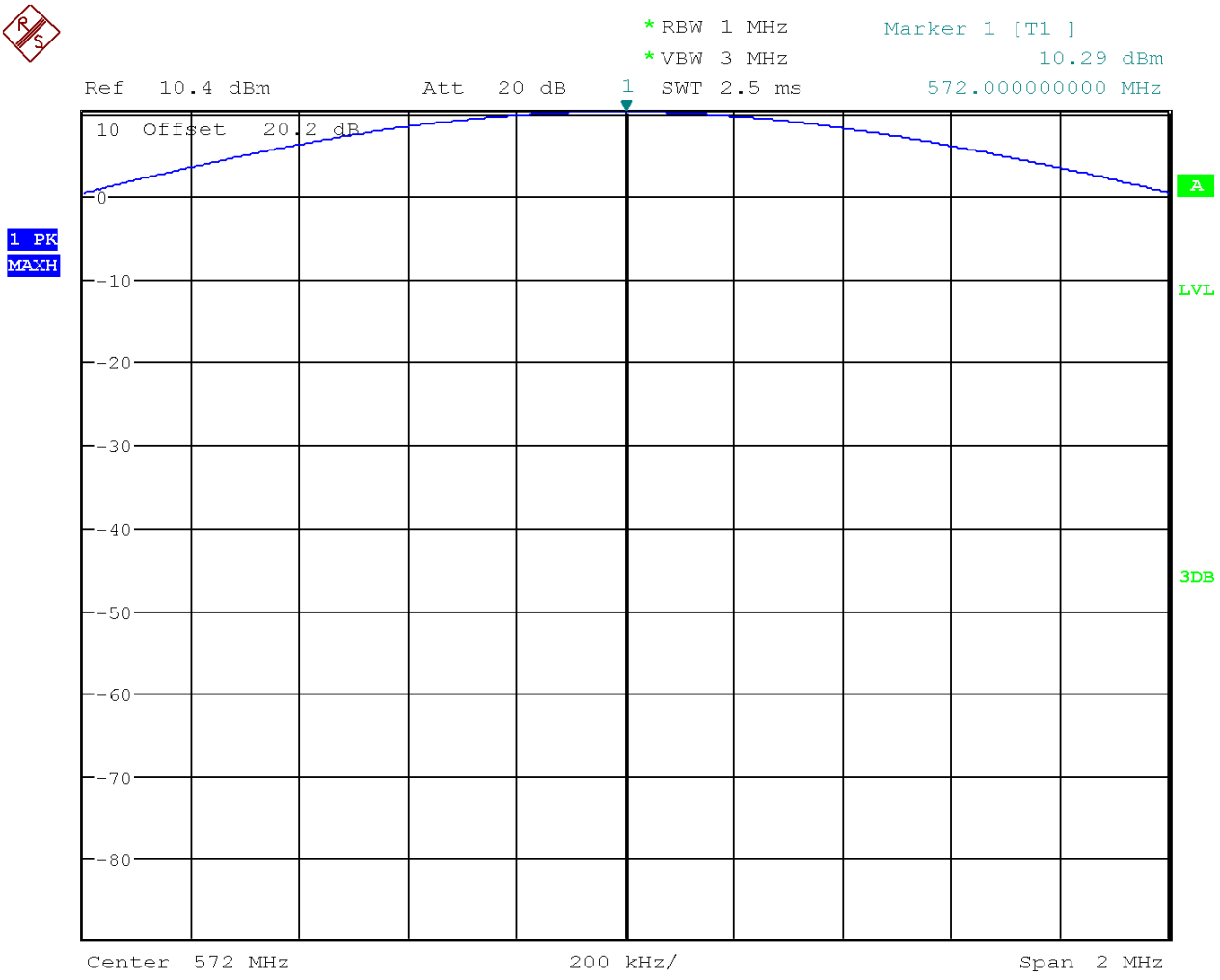
Date: 21.JAN.2014 16:07:53

EUT	QLXD2 J50
Serial Number:	EMC3
Test Description:	FCC/RSS Occupied Bandwidth Measurement
Date of Test:	January 21, 2014
Operating Conditions:	Low Frequency (572.000 MHz) at 1mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



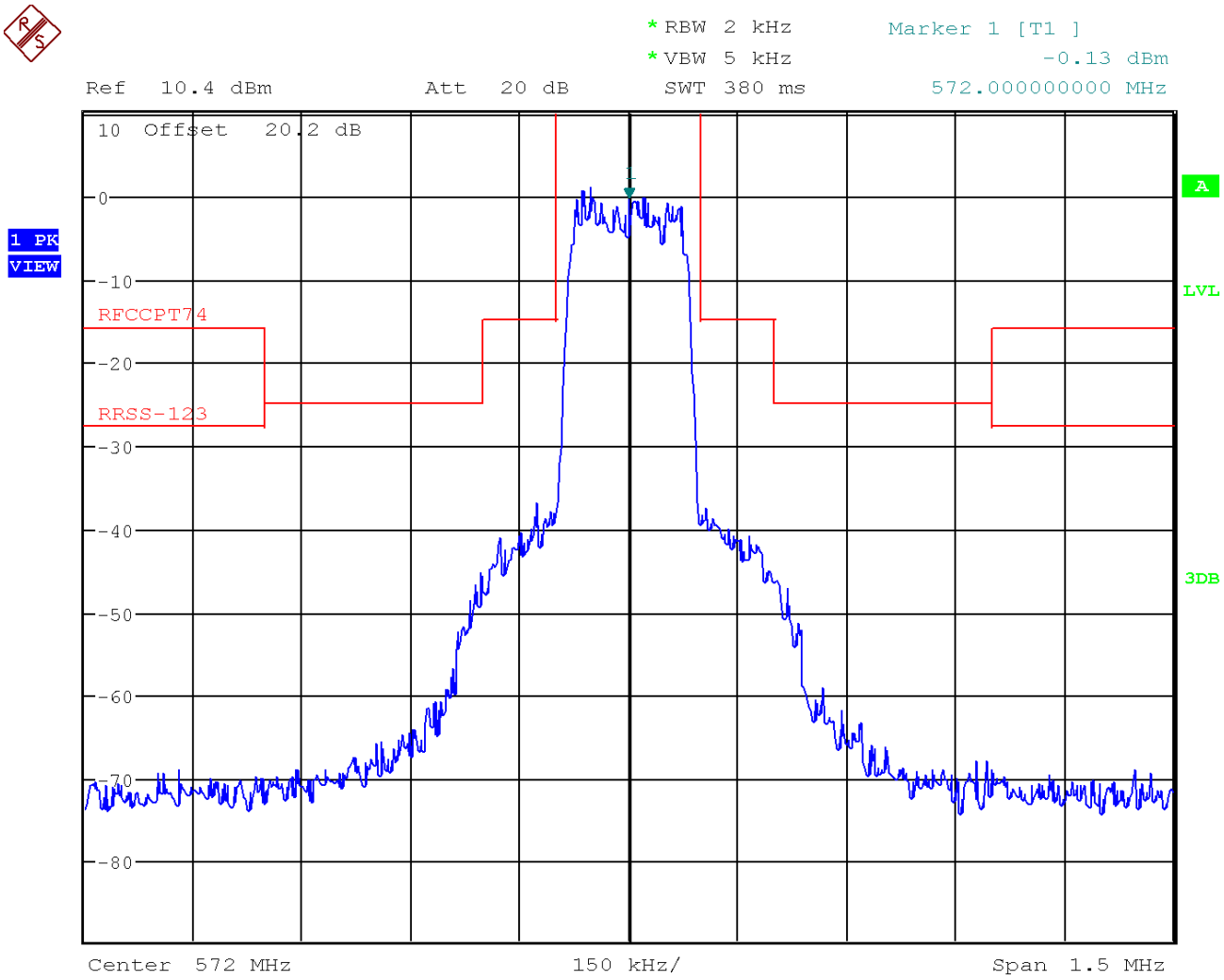
Date: 21.JAN.2014 16:10:25

EUT	QLXD2 J50
Serial Number:	EMC3
Test Description:	OBW RF Power Output
Date of Test:	January 21, 2014
Operating Conditions:	Low Frequency (572.000 MHz) at 10mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



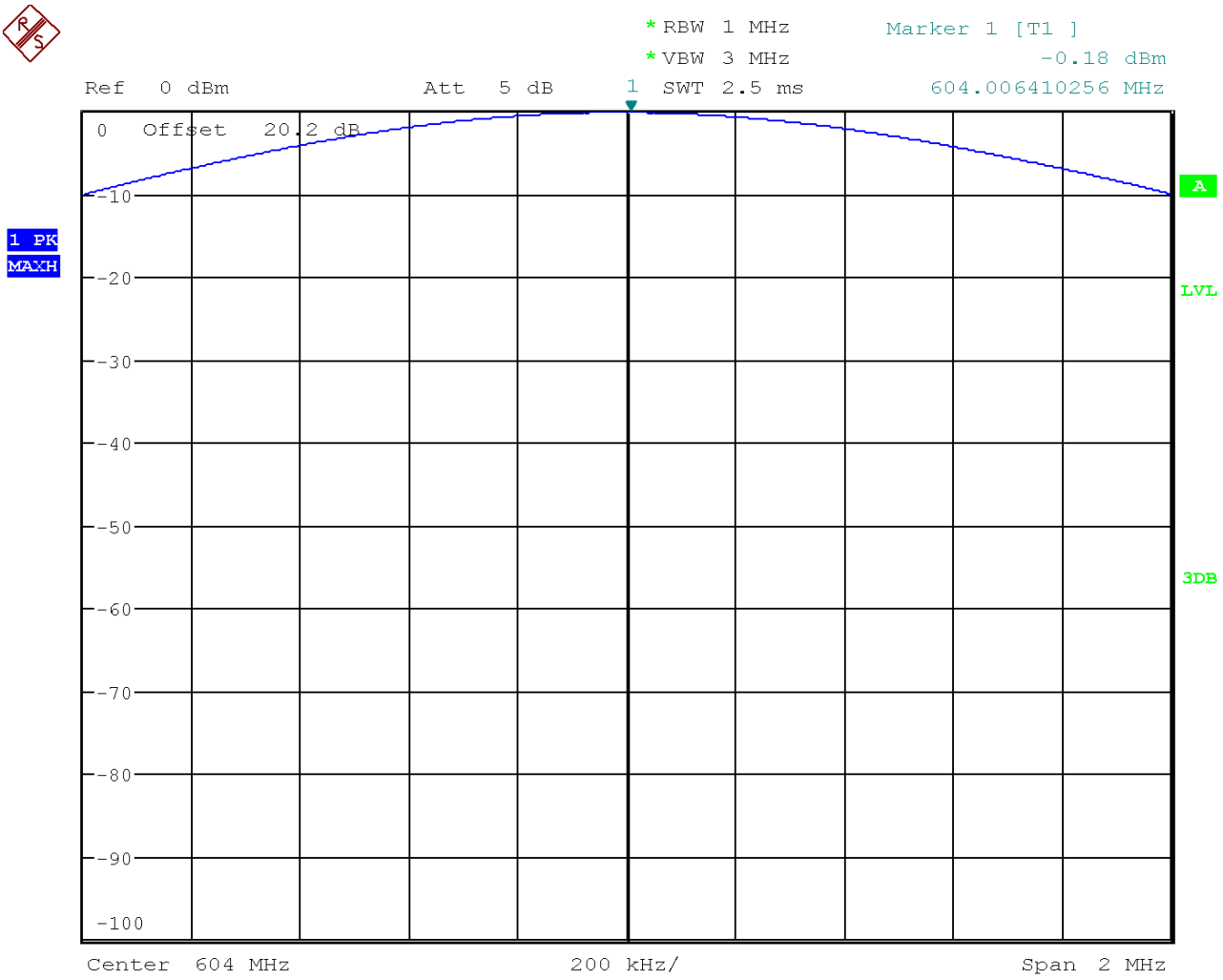
Date: 21.JAN.2014 16:04:29

EUT	QLXD2 J50
Serial Number:	EMC3
Test Description:	FCC/RSS Occupied Bandwidth Measurement
Date of Test:	January 21, 2014
Operating Conditions:	Low Frequency (572.000 MHz) at 10mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



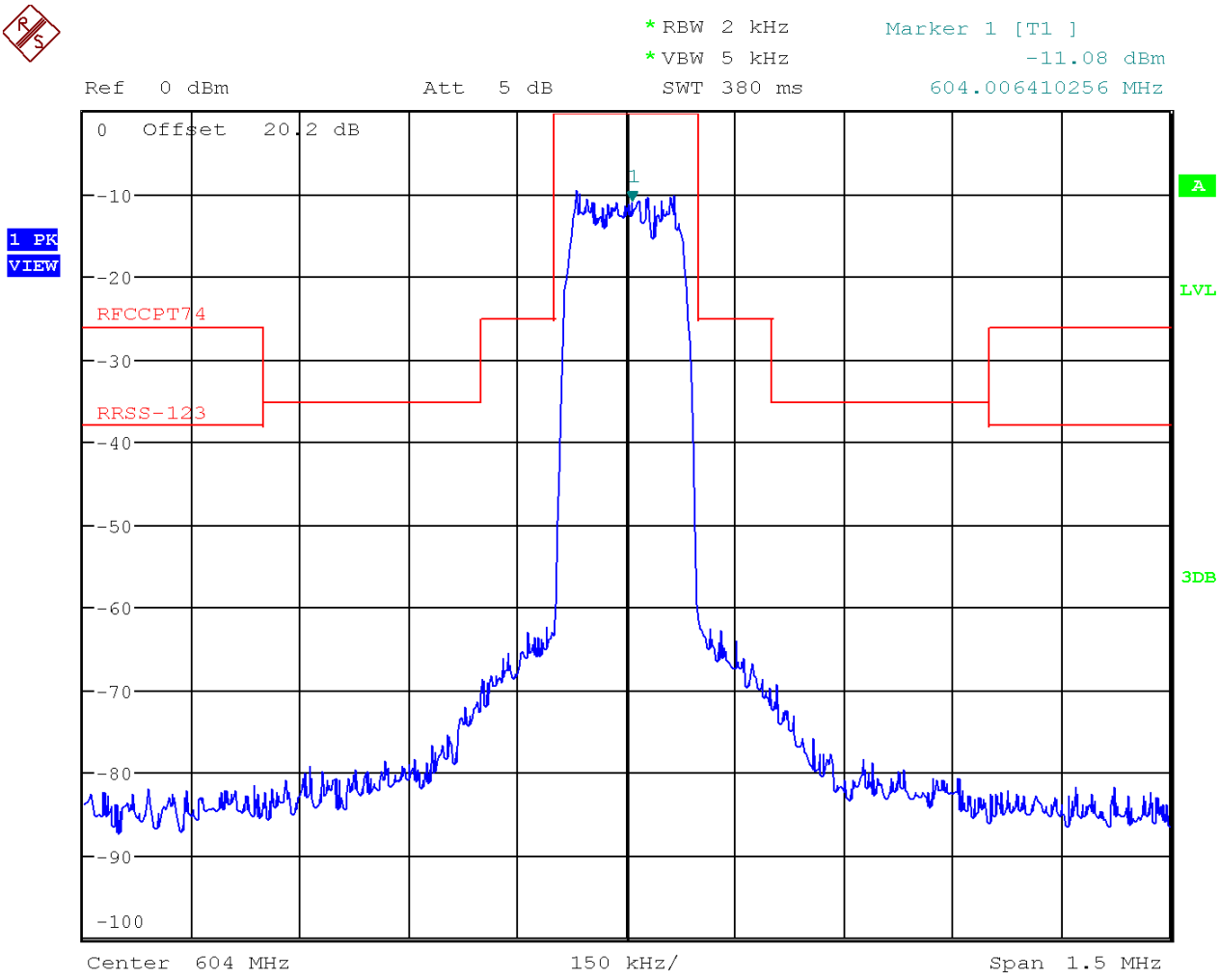
Date: 21.JAN.2014 16:05:55

EUT	QLXD2 J50
Serial Number:	EMC3
Test Description:	OBW RF Power Output
Date of Test:	January 21, 2014
Operating Conditions:	Mid Frequency (604.000 MHz) at 1mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



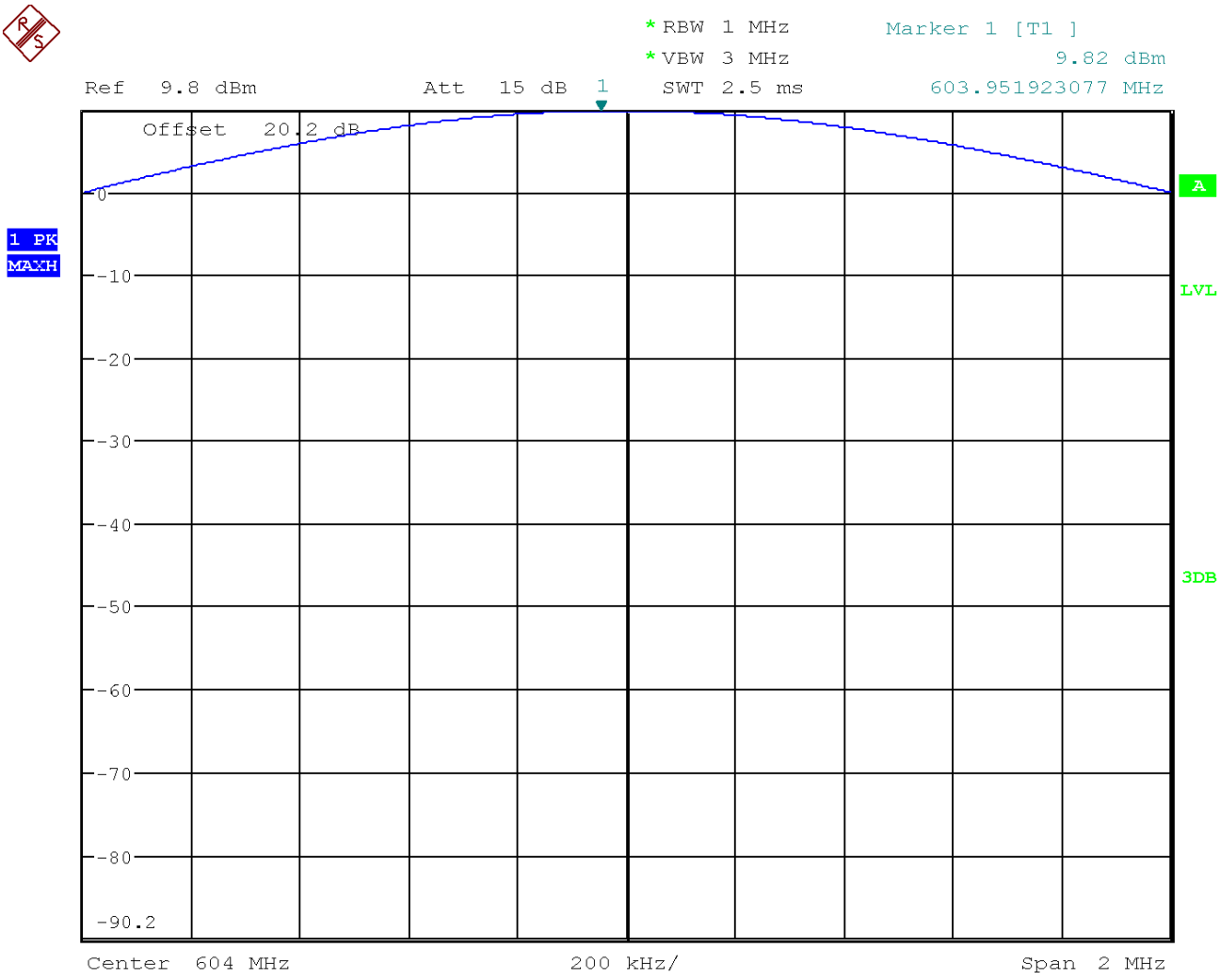
Date: 21.JAN.2014 16:13:36

EUT	QLXD2 J50
Serial Number:	EMC3
Test Description:	FCC/RSS Occupied Bandwidth Measurement
Date of Test:	January 21, 2014
Operating Conditions:	Mid Frequency (604.000 MHz) at 1mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



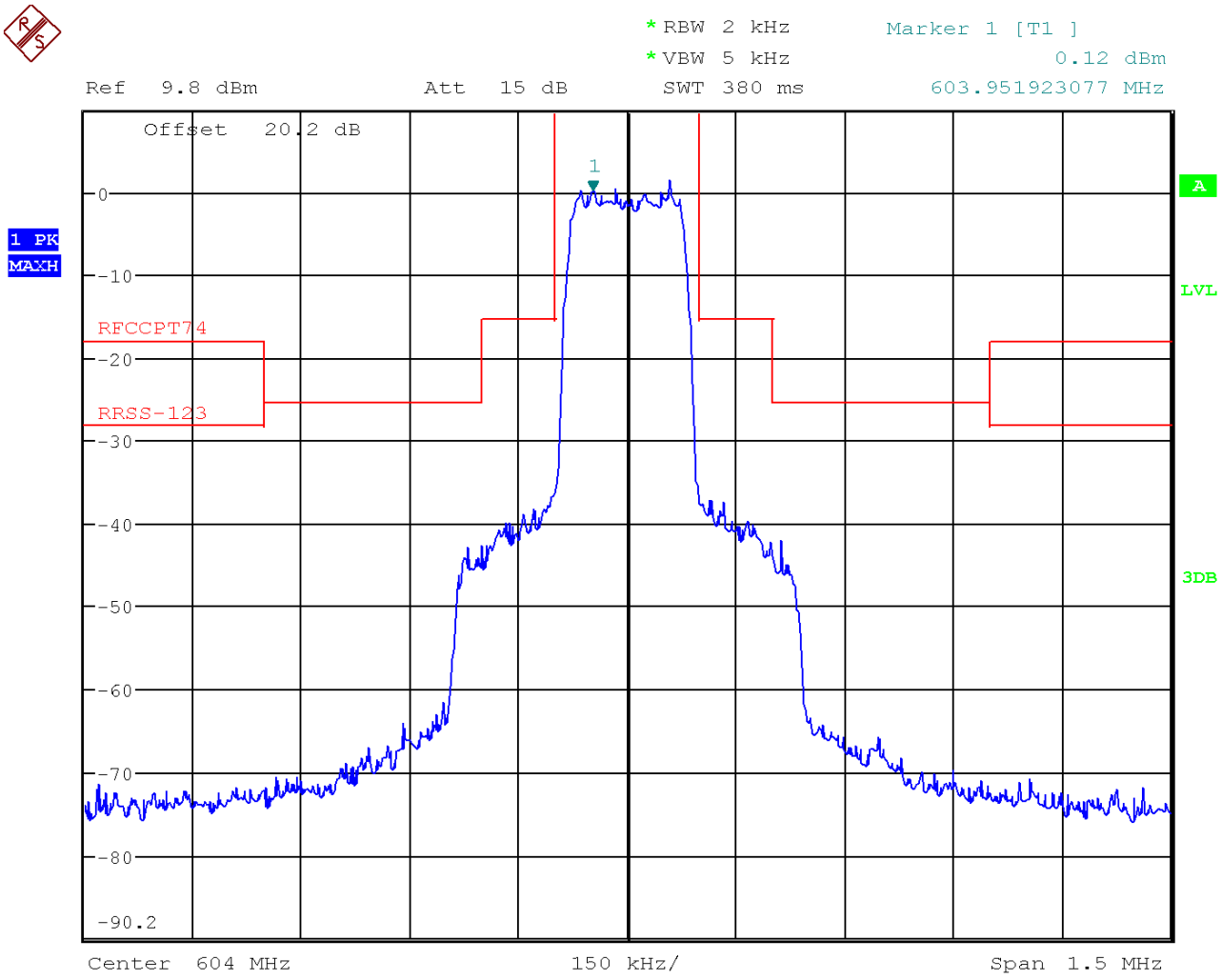
Date: 21.JAN.2014 16:15:10

EUT	QLXD2 J50
Serial Number:	EMC3
Test Description:	OBW RF Power Output
Date of Test:	March 17, 2014
Operating Conditions:	Mid Frequency (604.000 MHz) at 10mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



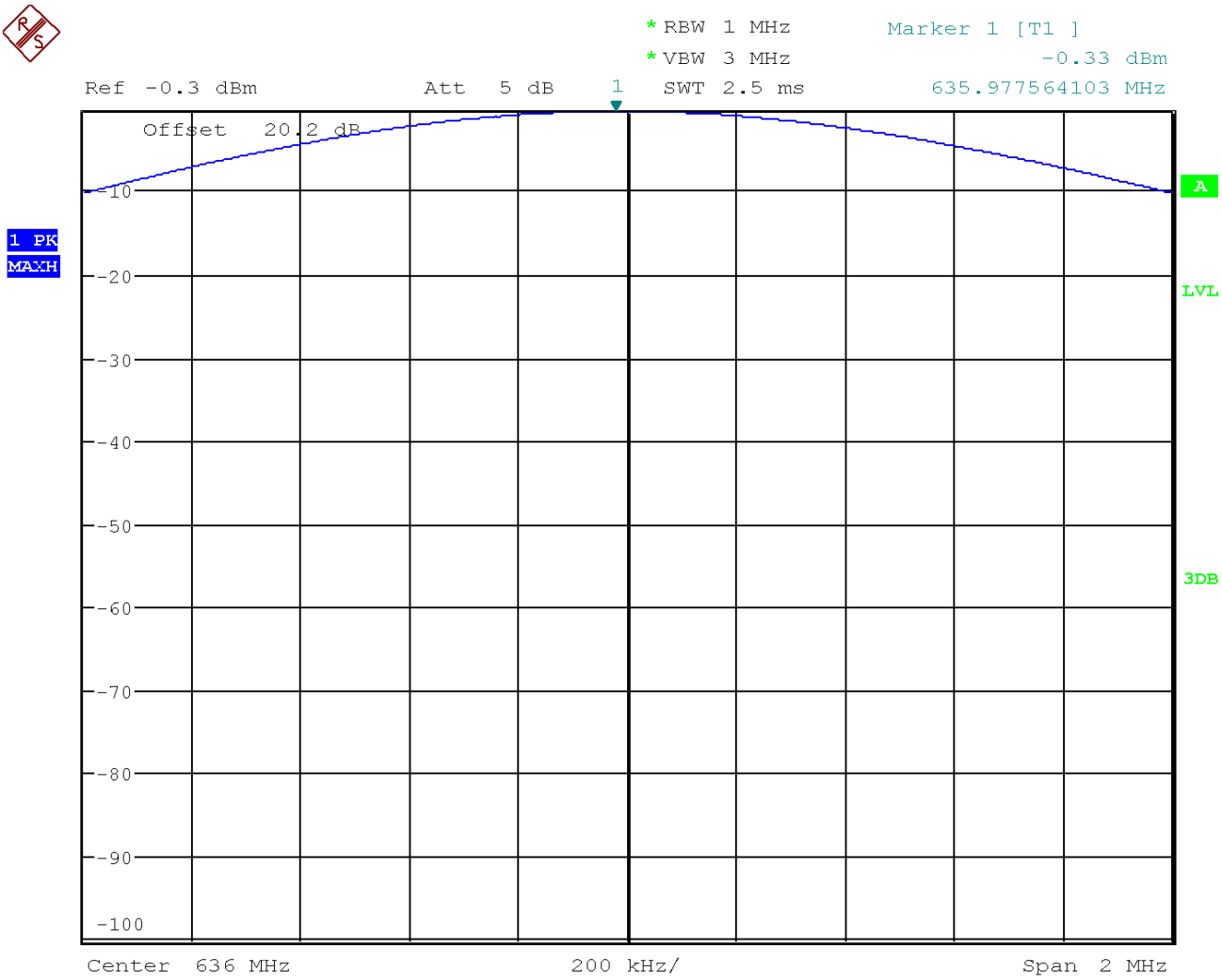
Date: 17.MAR.2014 19:05:34

EUT	QLXD2 J50
Serial Number:	EMC3
Test Description:	FCC/RSS Occupied Bandwidth Measurement
Date of Test:	March 17, 2014
Operating Conditions:	Mid Frequency (604.000 MHz) at 10mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



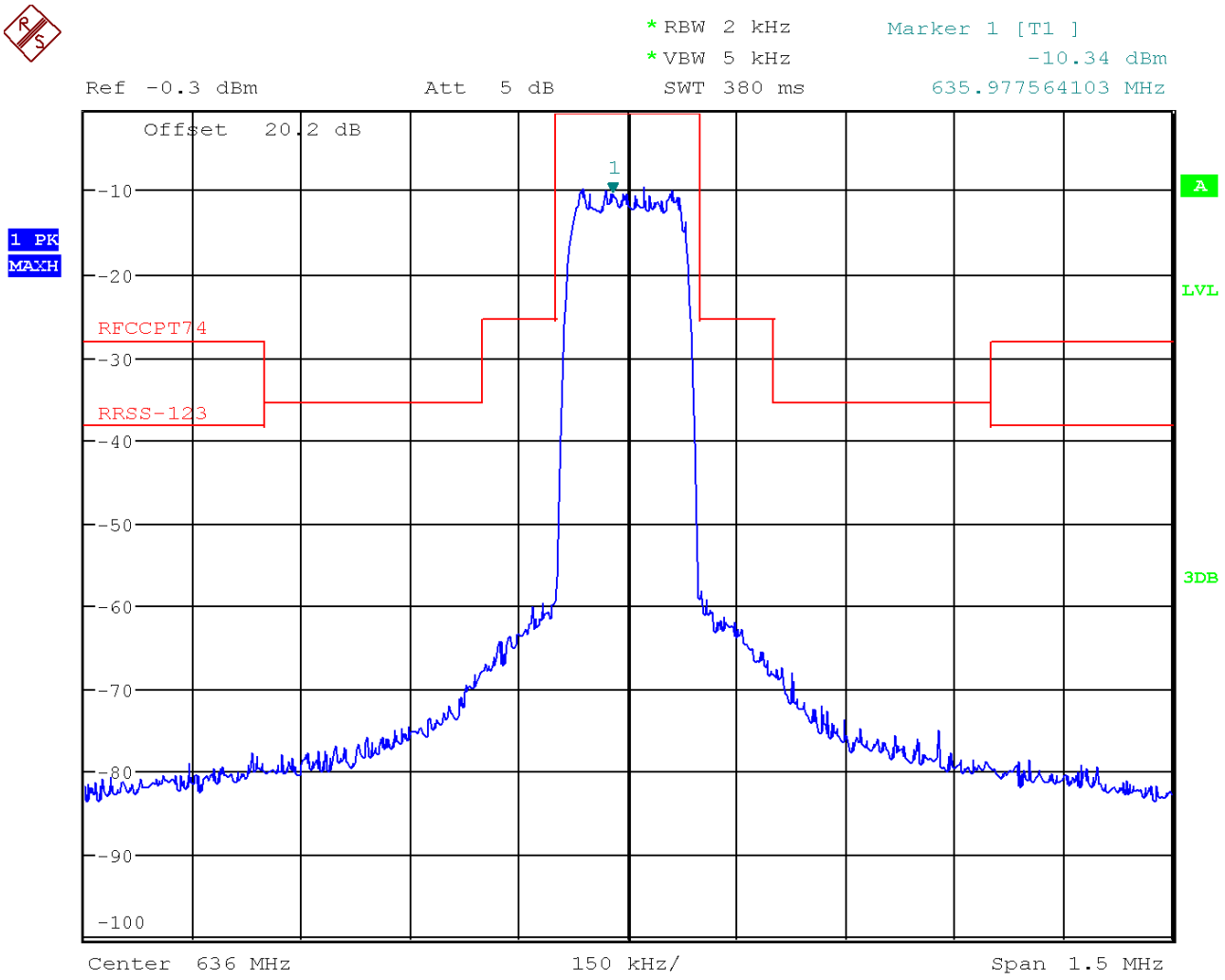
Date: 17.MAR.2014 19:06:41

EUT	QLXD2 J50
Serial Number:	EMC3
Test Description:	OBW RF Power Output
Date of Test:	March 17, 2014
Operating Conditions:	High Frequency (636.000 MHz) at 1mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



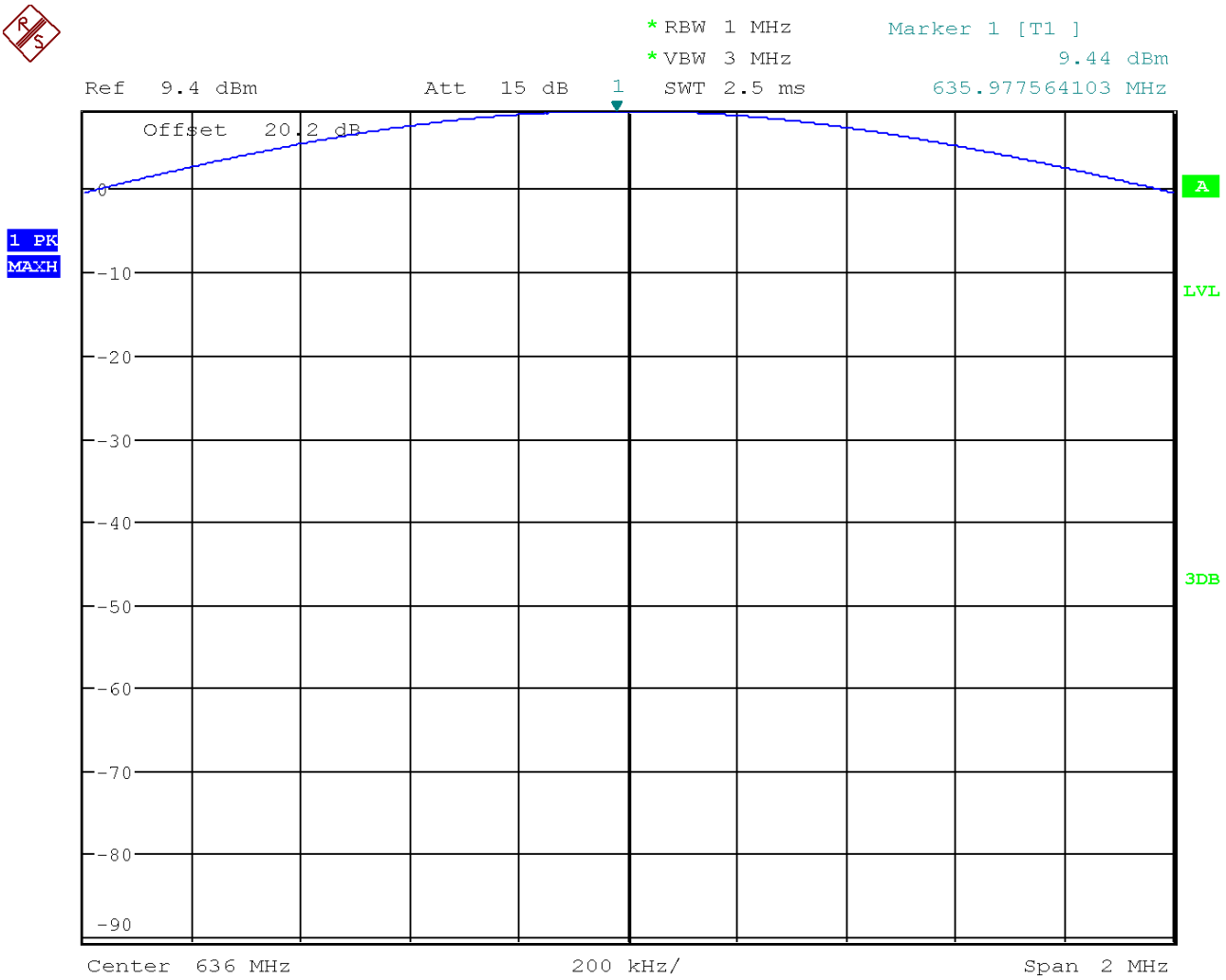
Date: 17.MAR.2014 19:12:57

EUT	QLXD2 J50
Serial Number:	EMC3
Test Description:	FCC/RSS Occupied Bandwidth Measurement
Date of Test:	March 17, 2014
Operating Conditions:	High Frequency (636.000 MHz) at 1mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



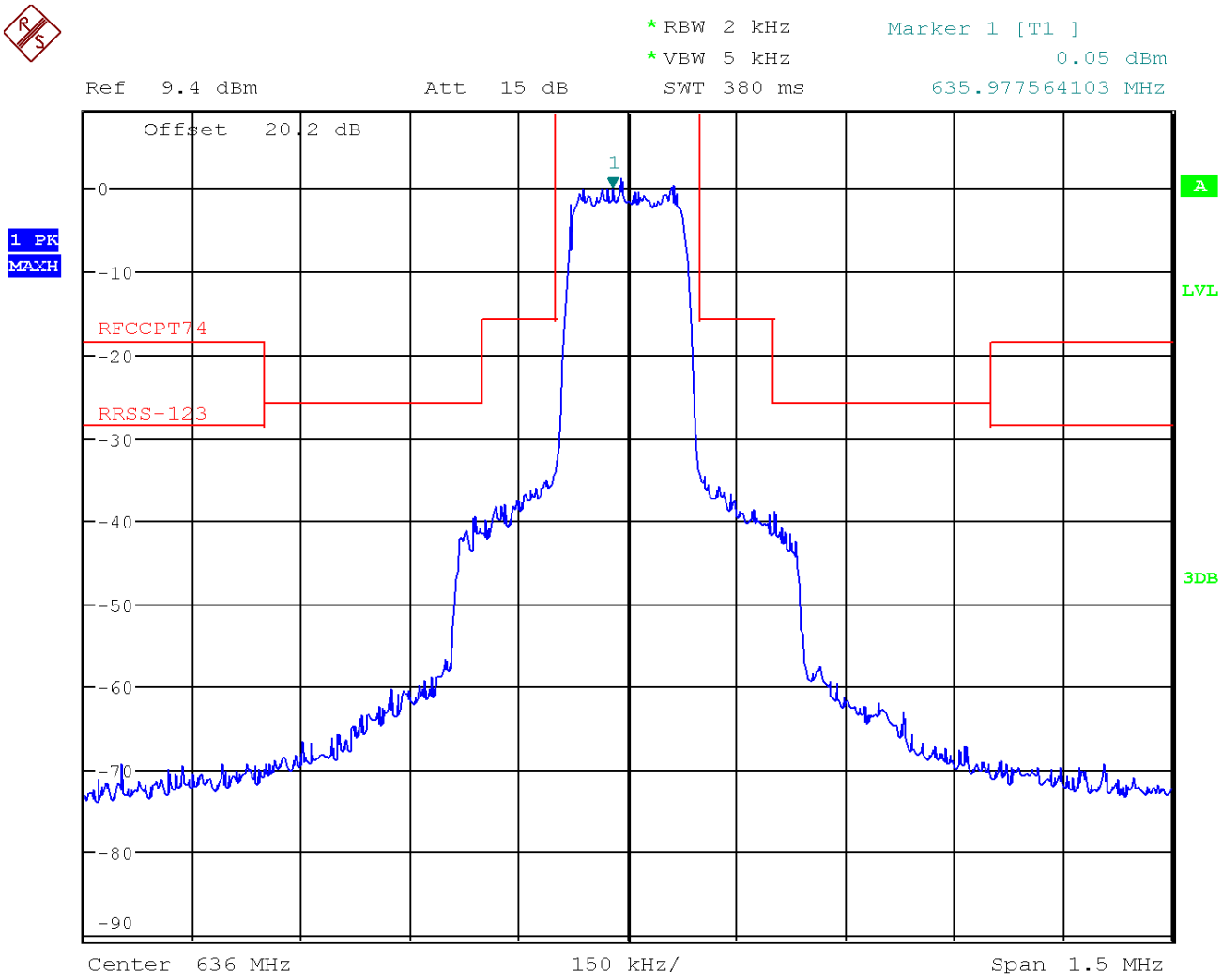
Date: 17.MAR.2014 19:14:18

EUT	QLXD2 J50
Serial Number:	EMC3
Test Description:	OBW RF Power Output
Date of Test:	March 17, 2014
Operating Conditions:	High Frequency (636.000 MHz) at 10mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



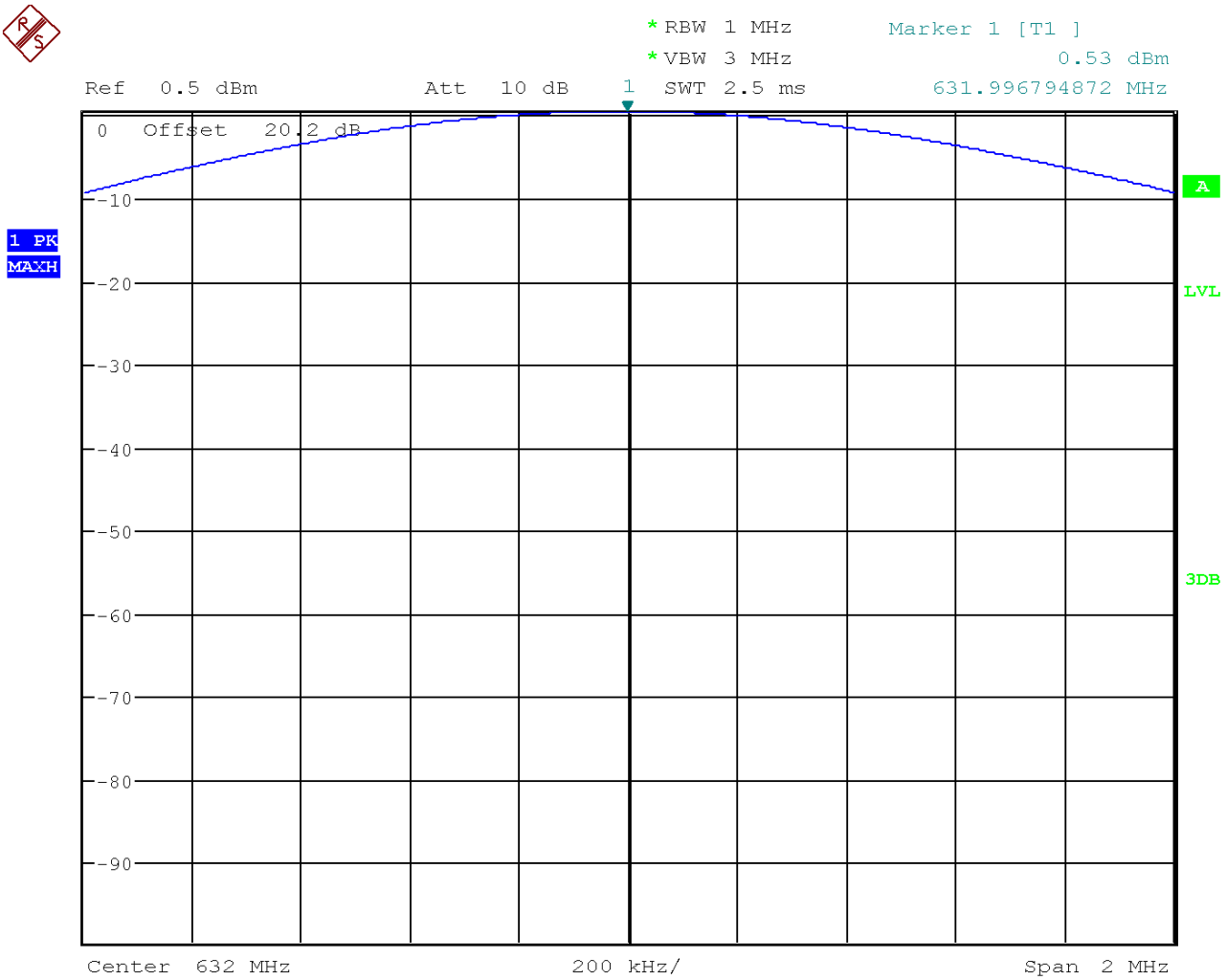
Date: 17.MAR.2014 19:16:20

EUT	QLXD2 J50
Serial Number:	EMC3
Test Description:	FCC/RSS Occupied Bandwidth Measurement
Date of Test:	March 17, 2014
Operating Conditions:	High Frequency (636.000 MHz) at 10mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



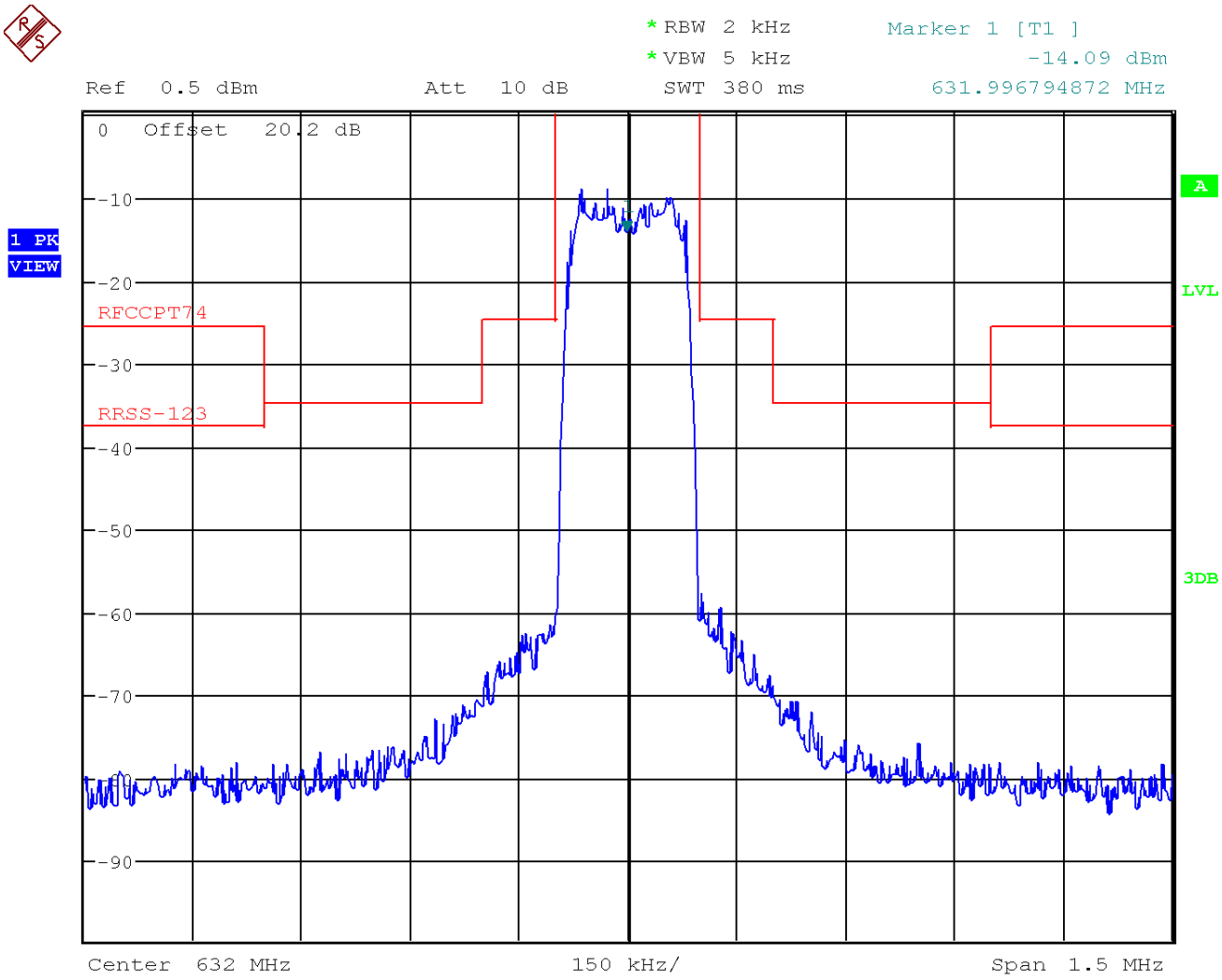
Date: 17.MAR.2014 19:17:46

EUT	QLXD2 L50
Serial Number:	EMC6
Test Description:	OBW RF Power Output
Date of Test:	January 21, 2014
Operating Conditions:	Low Frequency (632.000 MHz) at 1mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



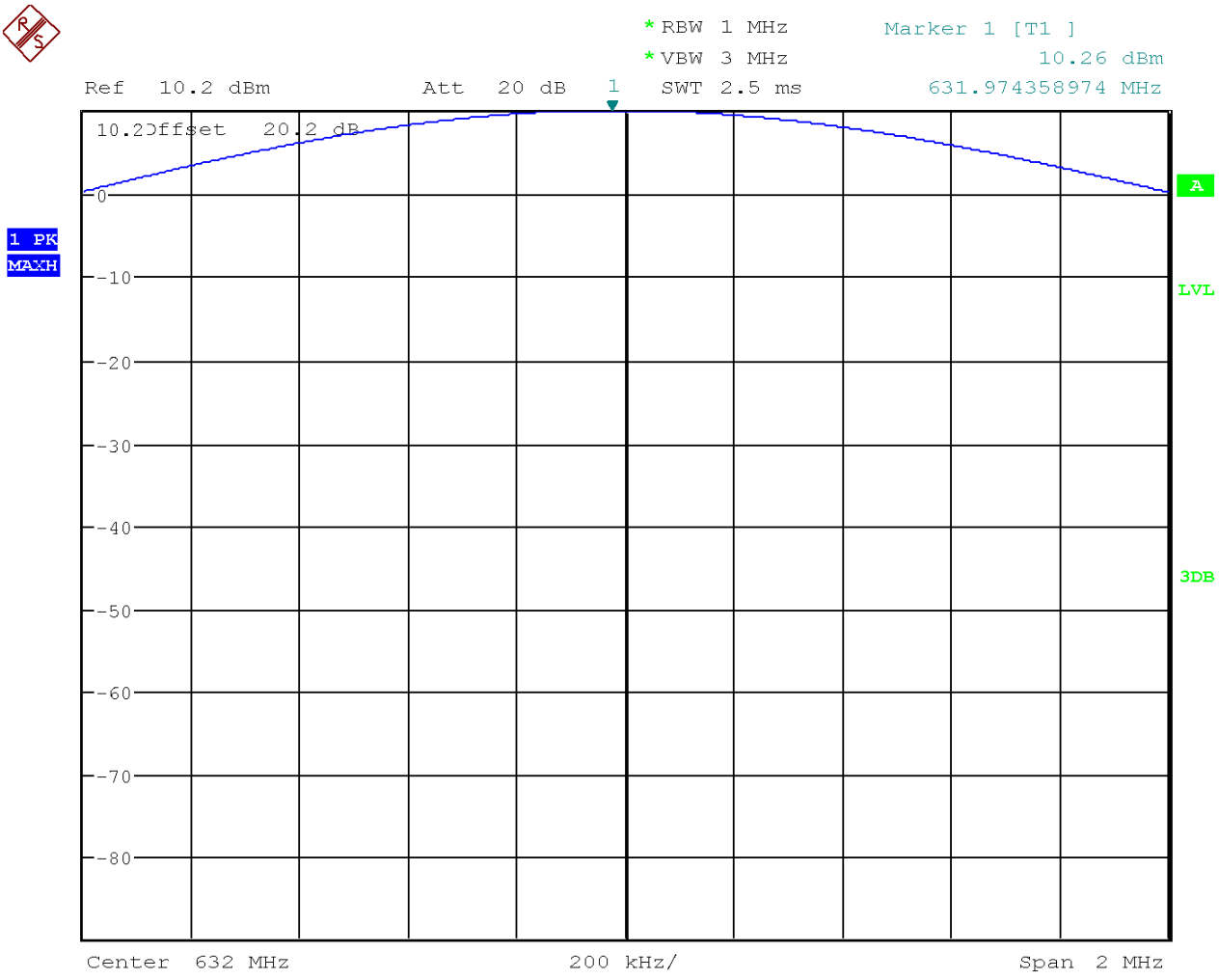
Date: 21.JAN.2014 15:35:37

EUT	QLXD2 L50
Serial Number:	EMC6
Test Description:	FCC/RSS Occupied Bandwidth Measurement
Date of Test:	January 21, 2014
Operating Conditions:	Low Frequency (632.000 MHz) at 1mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



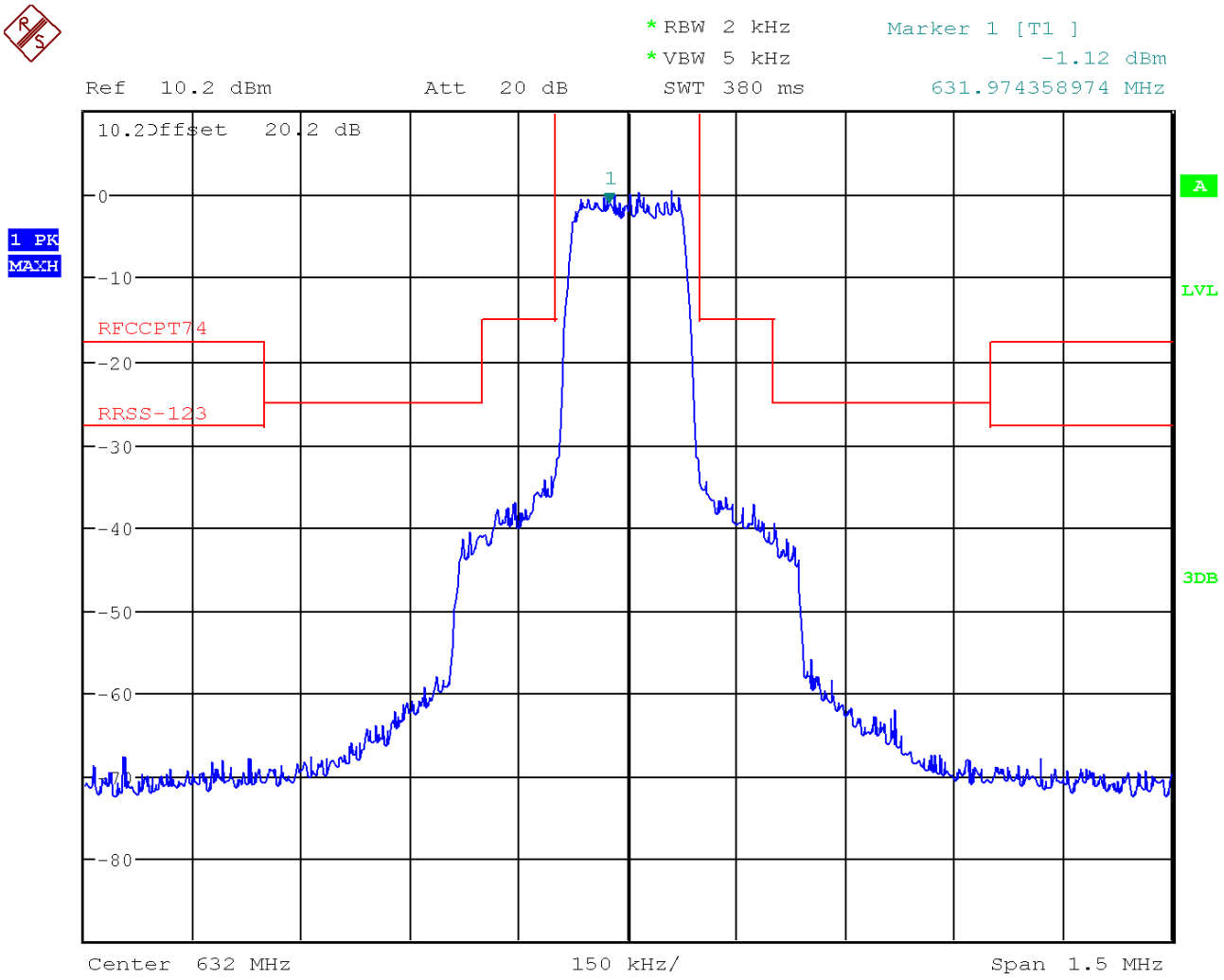
Date: 21.JAN.2014 15:36:49

EUT	QLXD2 L50
Serial Number:	EMC6
Test Description:	OBW RF Power Output
Date of Test:	March 17, 2014
Operating Conditions:	Low Frequency (632.000 MHz) at 10mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



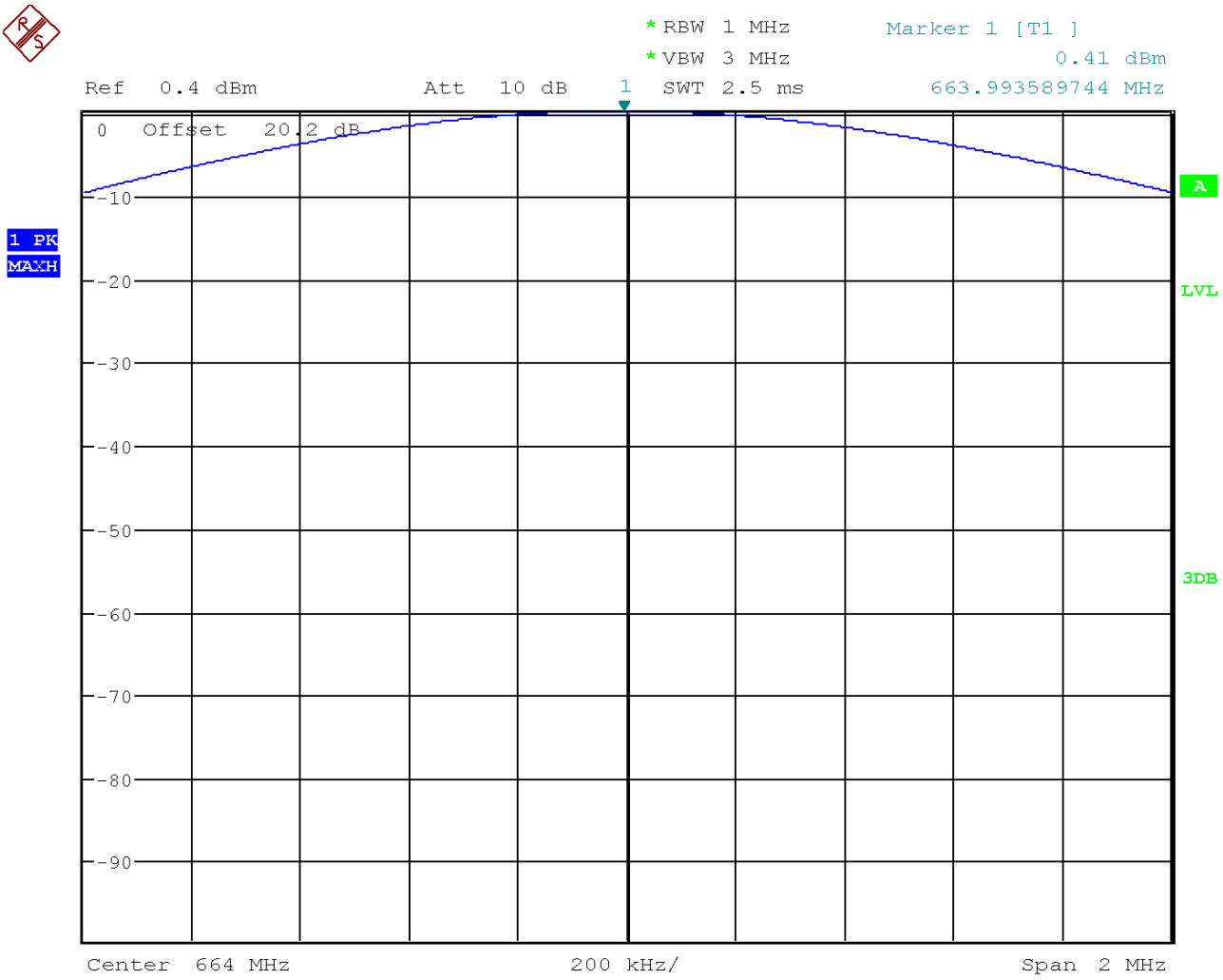
Date: 17.MAR.2014 19:21:25

EUT	QLXD2 L50
Serial Number:	EMC6
Test Description:	FCC/RSS Occupied Bandwidth Measurement
Date of Test:	March 17, 2014
Operating Conditions:	Low Frequency (632.000 MHz) at 10mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



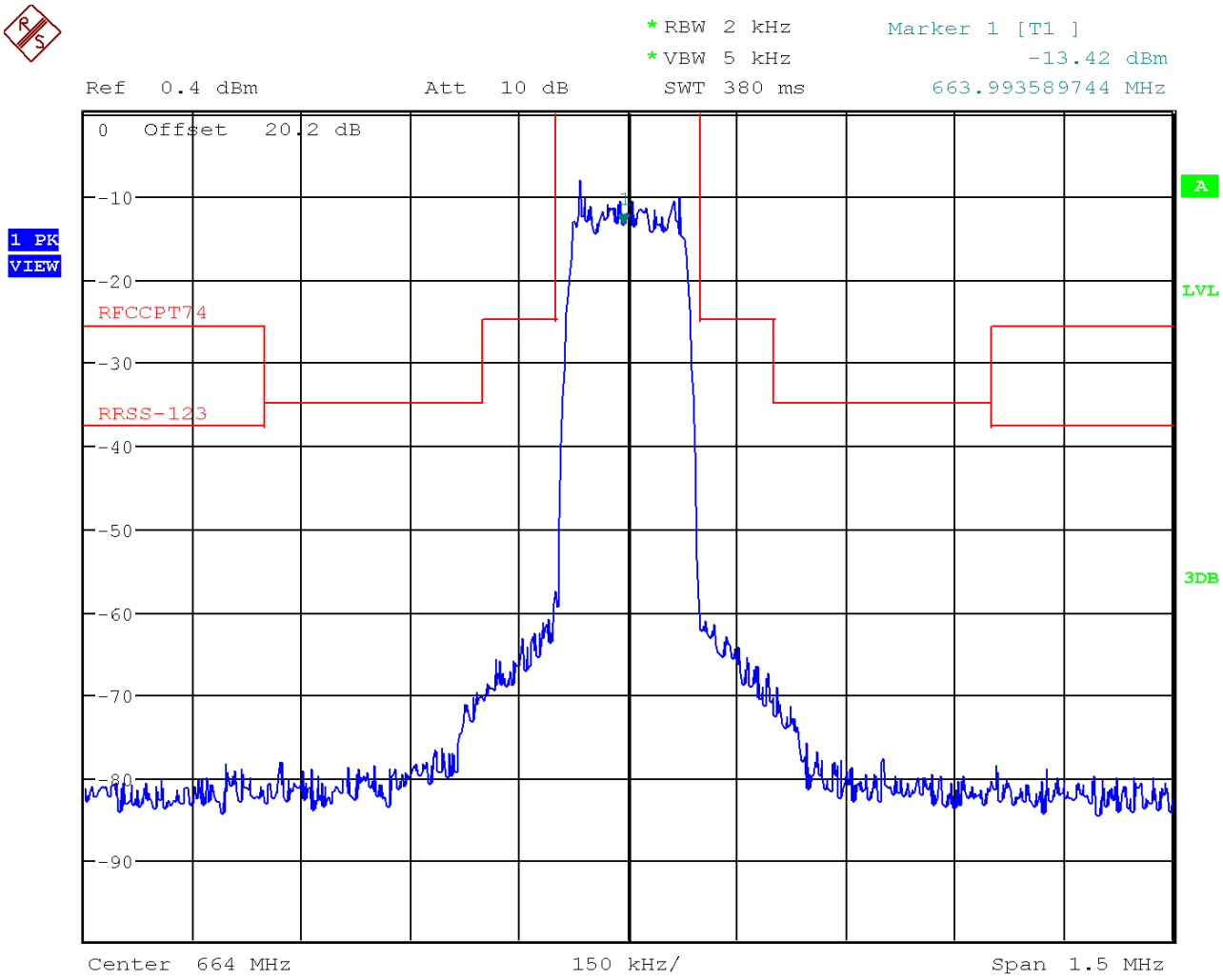
Date: 17.MAR.2014 19:22:39

EUT	QLXD2 L50
Serial Number:	EMC6
Test Description:	OBW RF Power Output
Date of Test:	January 21, 2014
Operating Conditions:	Mid Frequency (664.000 MHz) at 1mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



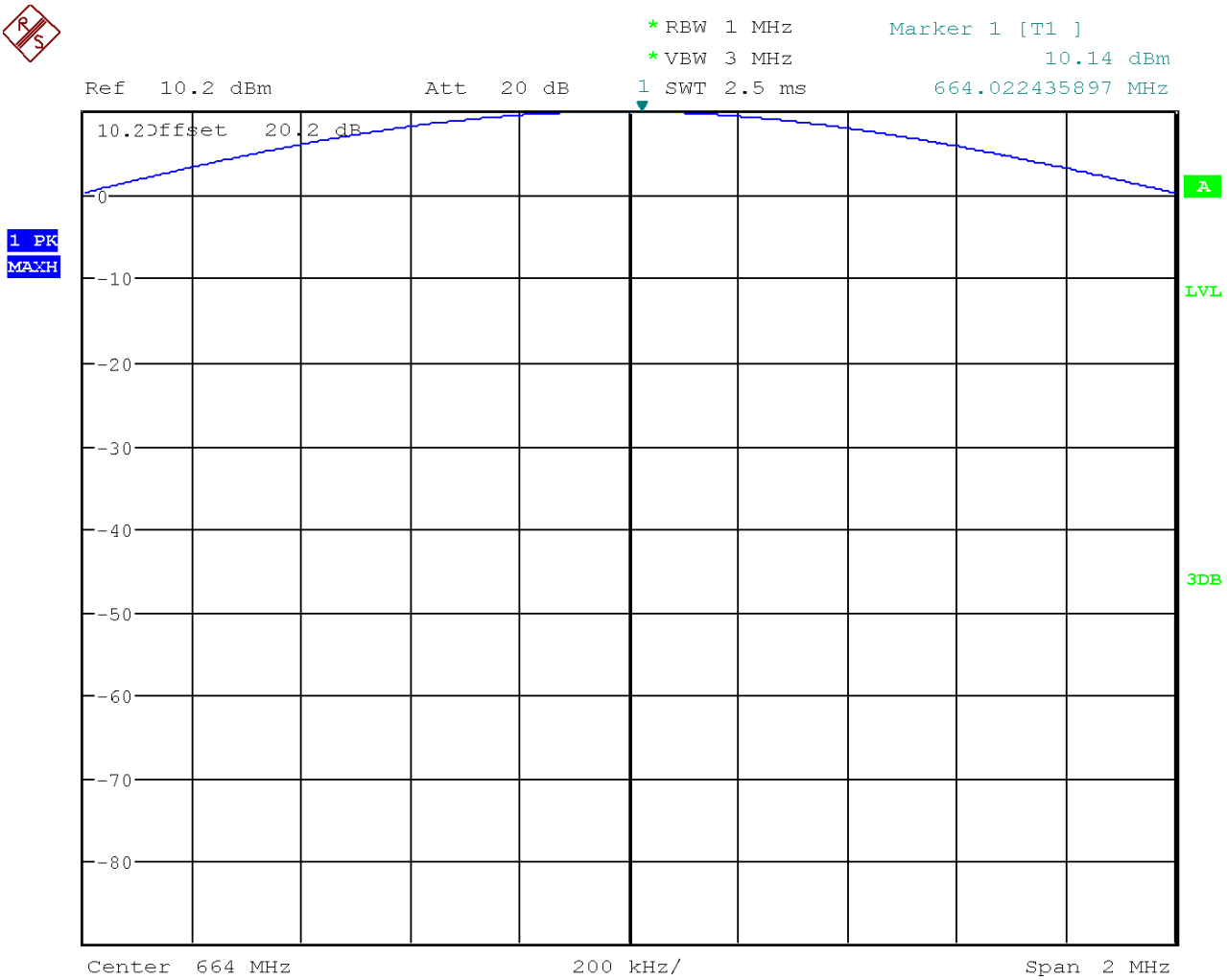
Date: 21.JAN.2014 15:43:50

EUT	QLXD2 L50
Serial Number:	EMC6
Test Description:	FCC/RSS Occupied Bandwidth Measurement
Date of Test:	January 21, 2014
Operating Conditions:	Mid Frequency (664.000 MHz) at 1mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



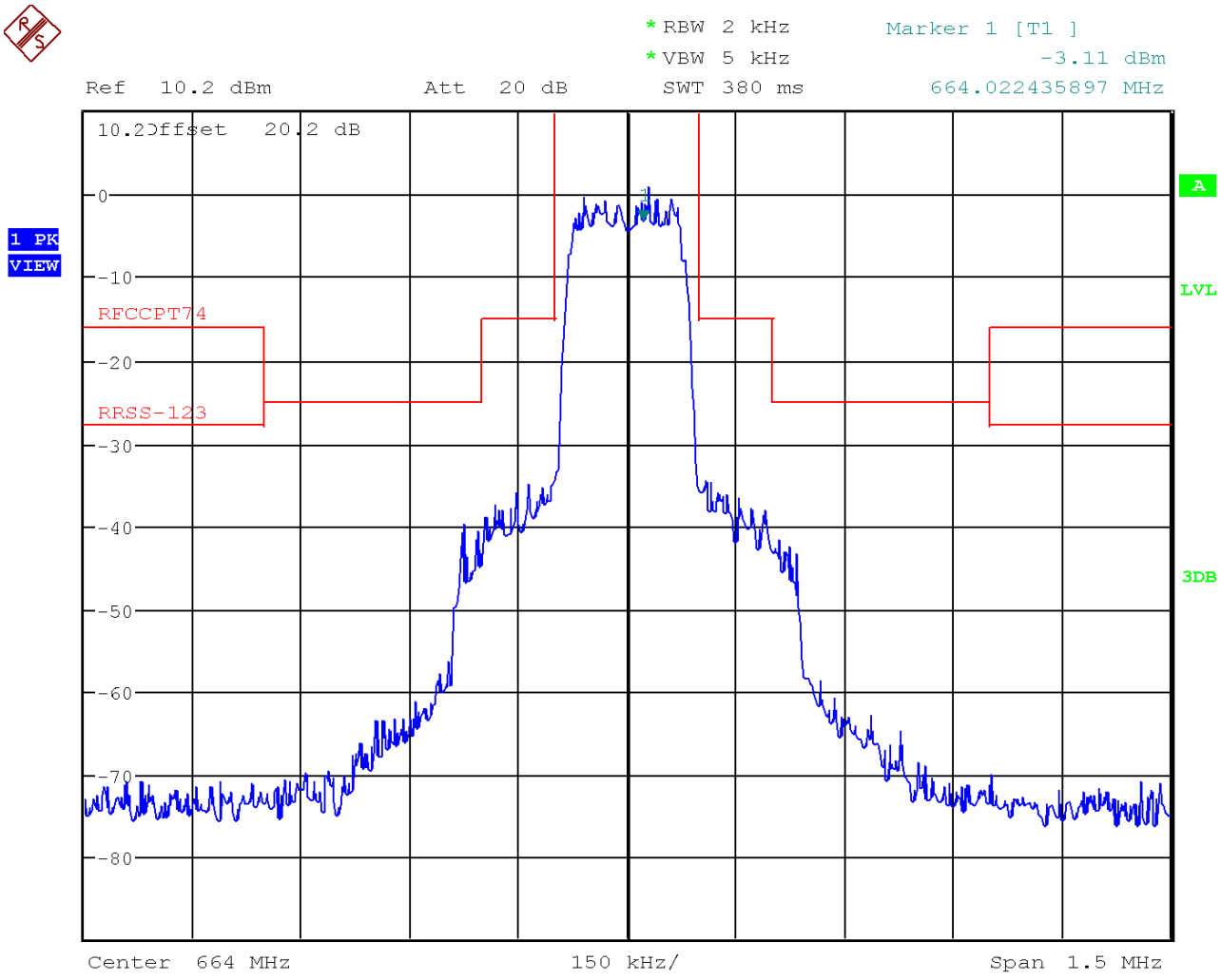
Date: 21.JAN.2014 15:45:19

EUT	QLXD2 L50
Serial Number:	EMC6
Test Description:	OBW RF Power Output
Date of Test:	January 21, 2014
Operating Conditions:	Mid Frequency (664.000 MHz) at 10mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



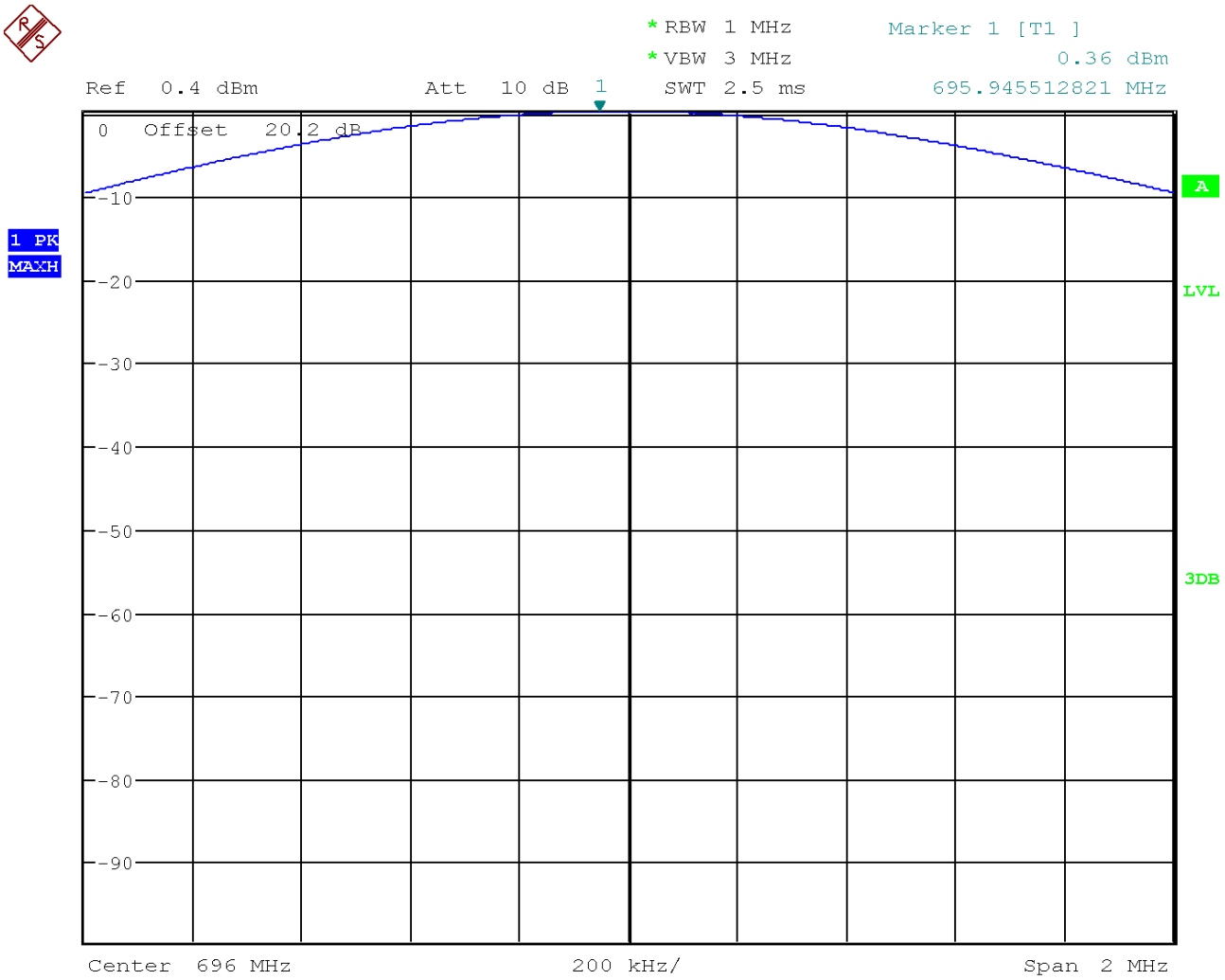
Date: 21.JAN.2014 15:47:38

EUT	QLXD2 L50
Serial Number:	EMC6
Test Description:	FCC/RSS Occupied Bandwidth Measurement
Date of Test:	January 21, 2014
Operating Conditions:	Mid Frequency (664.000 MHz) at 10mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



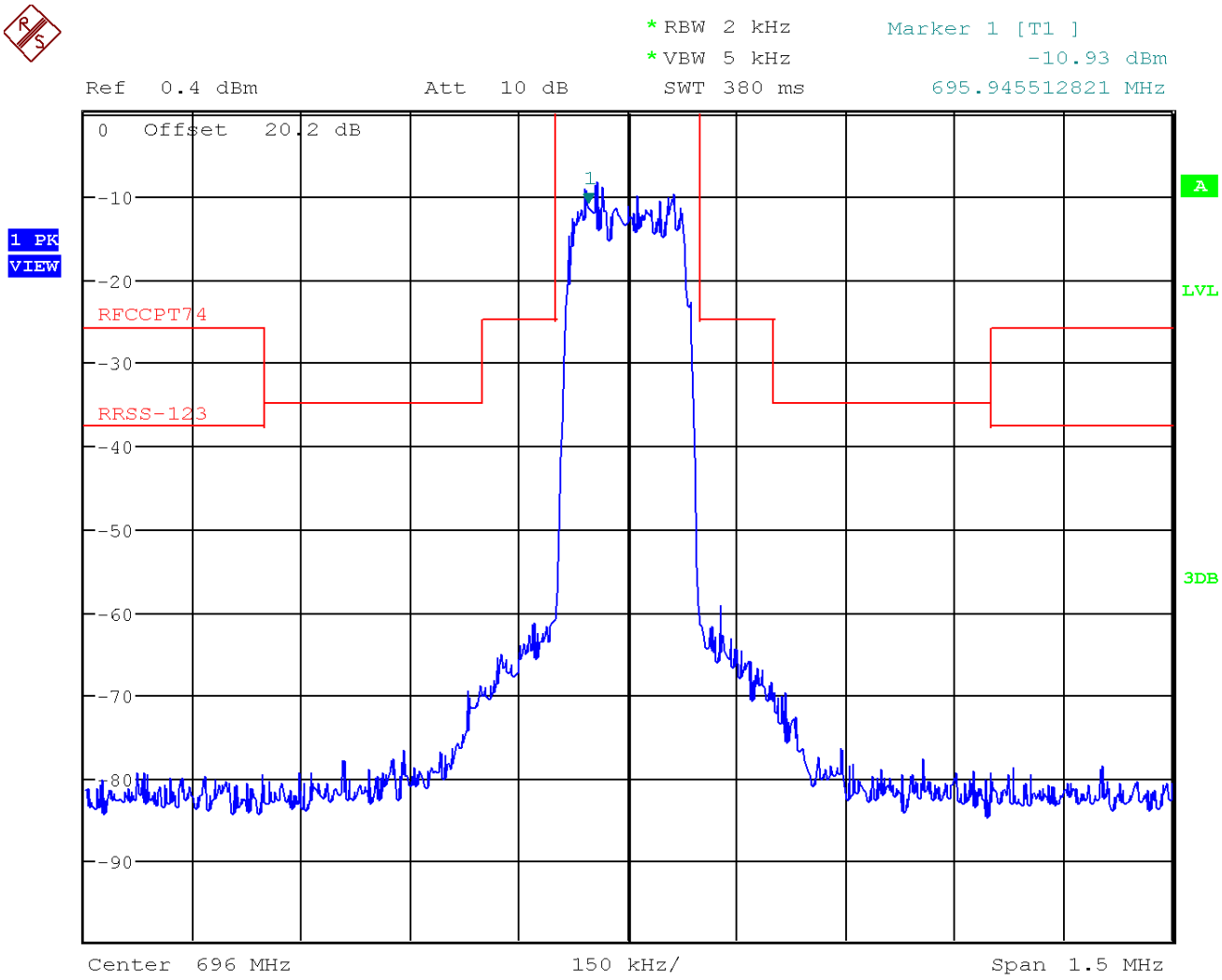
Date: 21.JAN.2014 15:48:59

EUT	QLXD2 L50
Serial Number:	EMC6
Test Description:	OBW RF Power Output
Date of Test:	January 21, 2014
Operating Conditions:	High Frequency (696.000 MHz) at 1mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



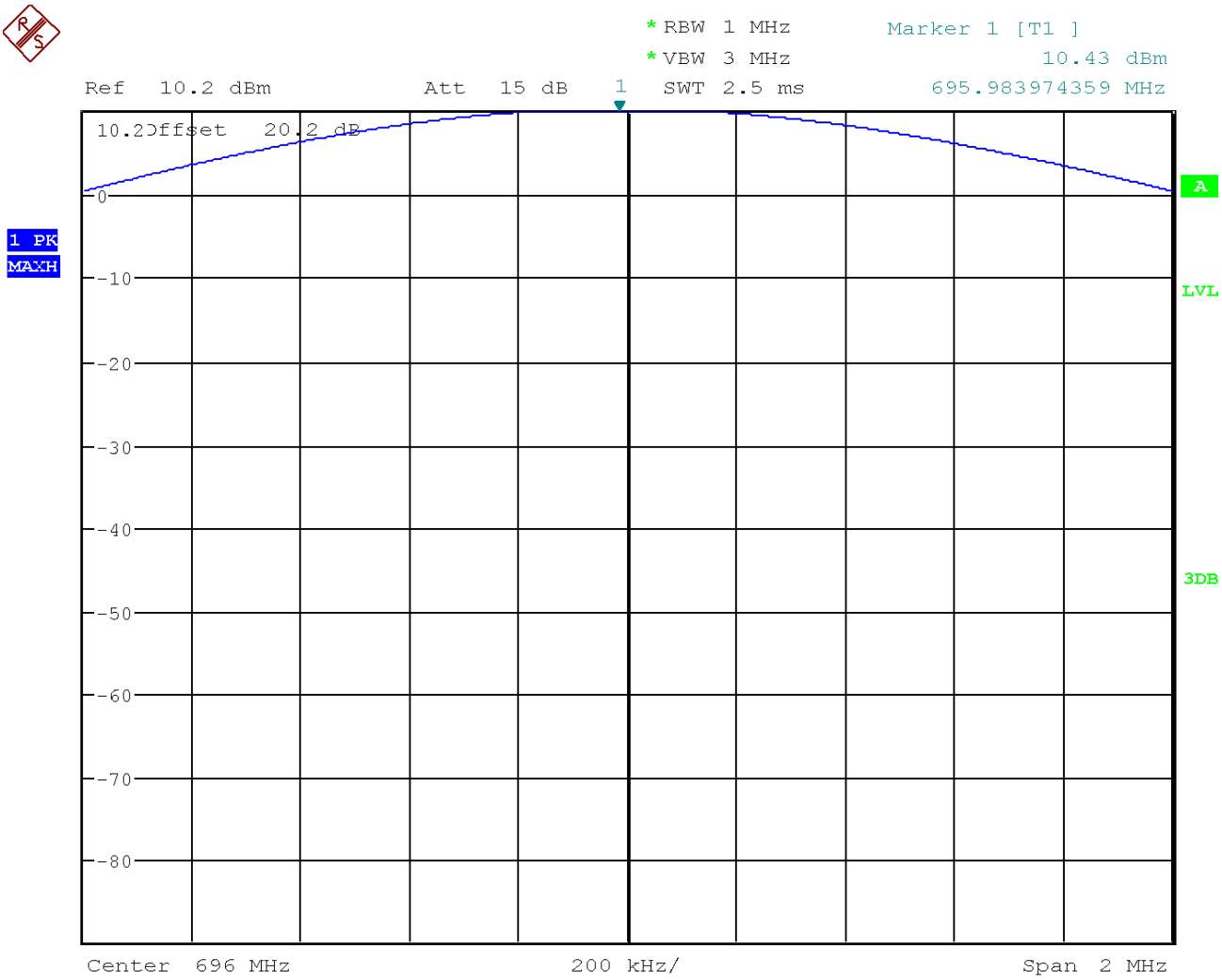
Date: 21.JAN.2014 15:51:52

EUT	QLXD2 L50
Serial Number:	EMC6
Test Description:	FCC/RSS Occupied Bandwidth Measurement
Date of Test:	January 21, 2014
Operating Conditions:	High Frequency (696.000 MHz) at 1mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



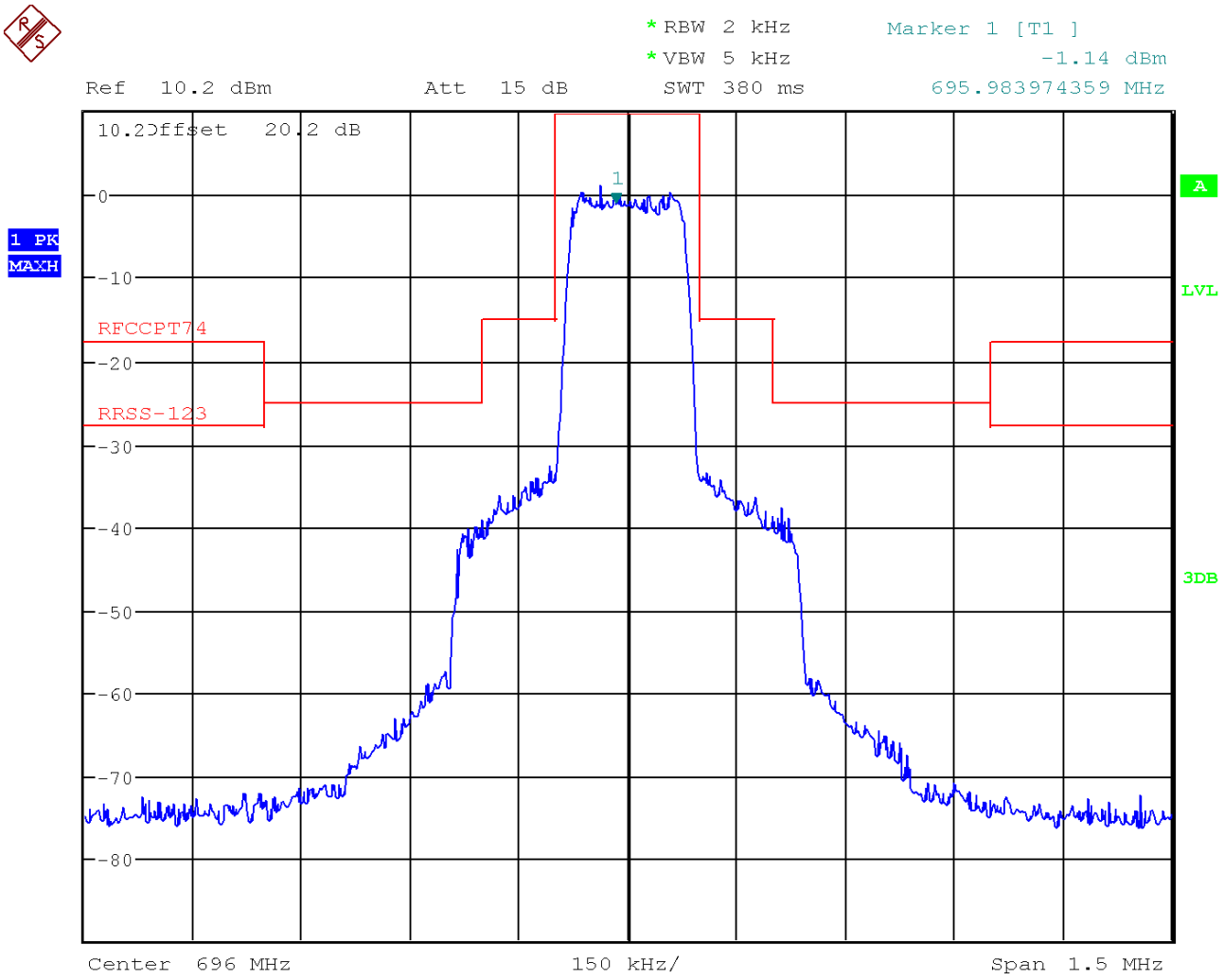
Date: 21.JAN.2014 15:53:22

EUT	QLXD2 L50
Serial Number:	EMC6
Test Description:	OBW RF Power Output
Date of Test:	March 17, 2014
Operating Conditions:	High Frequency (696.000 MHz) at 10mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



Date: 17.MAR.2014 19:26:46

EUT	QLXD2 L50
Serial Number:	EMC6
Test Description:	FCC/RSS Occupied Bandwidth Measurement
Date of Test:	March 17 2014
Operating Conditions:	High Frequency (696.000 MHz) at 10mW
Operator Name:	Tom Braxton
Comment:	R & S FSU Spectrum Analyzer



Date: 17.MAR.2014 19:27:57

FIELD STRENGTH OF SPURIOUS EMISSIONS

D.1. PURPOSE:

This test was performed to determine if the QLXD2 (EUT) meets the radiated RF emission requirements of the FCC Part 74 and RSS-123 over the frequency range from 30MHz to 10GHz.

D.2. REQUIREMENTS:

As stated in FCC Part 74, spurious emissions must fall below the limits given below.

(i) On any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least 25 dB;

(ii) On any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: at least 35 dB;

(iii) On any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth: at least 43+10log10 (mean output power in watts) dB.

And as stated in RSS-123, Clause 5.5.1:

The power of unwanted emissions (measured with a resolution bandwidth of 1% of the authorized bandwidth) shall be attenuated below the mean output power, P_{MEAN} in dBW, of the transmitter as follows:

i. at least 25 dB on any frequency removed from the operating frequency by more than 50% up to and including 100% of the authorized bandwidth; and

ii. at least 35 dB on any frequency removed from the operating frequency by more than 100% up to and including 250% of the authorized bandwidth.

The power of unwanted emissions (measured with a resolution bandwidth of 30 kHz) shall be attenuated below the mean output power, PMEAN in dBW, of the transmitter as follows:

i. at least $55 + 10\log_{10}$ (P_{MEAN} in watts) dB: on any frequency removed from the operating frequency by more than 250% of the authorized bandwidth.

D.3. MEASUREMENT UNCERTAINTY

All measurements are an estimate of their true value. The measurement uncertainty characterizes, with a specified confidence level, the spread of values which may be possible for a given measurement system.

Values of Expanded Measurement Uncertainty (95% Confidence):

Measurement Type	U_{LAB}
Radiated disturbance (electric field strength on an open area test site or alternative test site) (30 MHz – 1000 MHz)	**4.17 dB**
Radiated disturbance (electric field strength on an open area test site or alternative test site) (1 GHz – 12.75 GHz)	**4.60 dB**

U_{lab} = Determined for Shure EMC Laboratory

- Compliance is deemed to occur if no measured disturbance exceeds the disturbance limit;
- Non-compliance is deemed to occur if any measured disturbance exceeds the disturbance limit.

D.4. TEST SETUP AND INSTRUMENTATION:

The test instrumentation can be determined from Table 10-1.

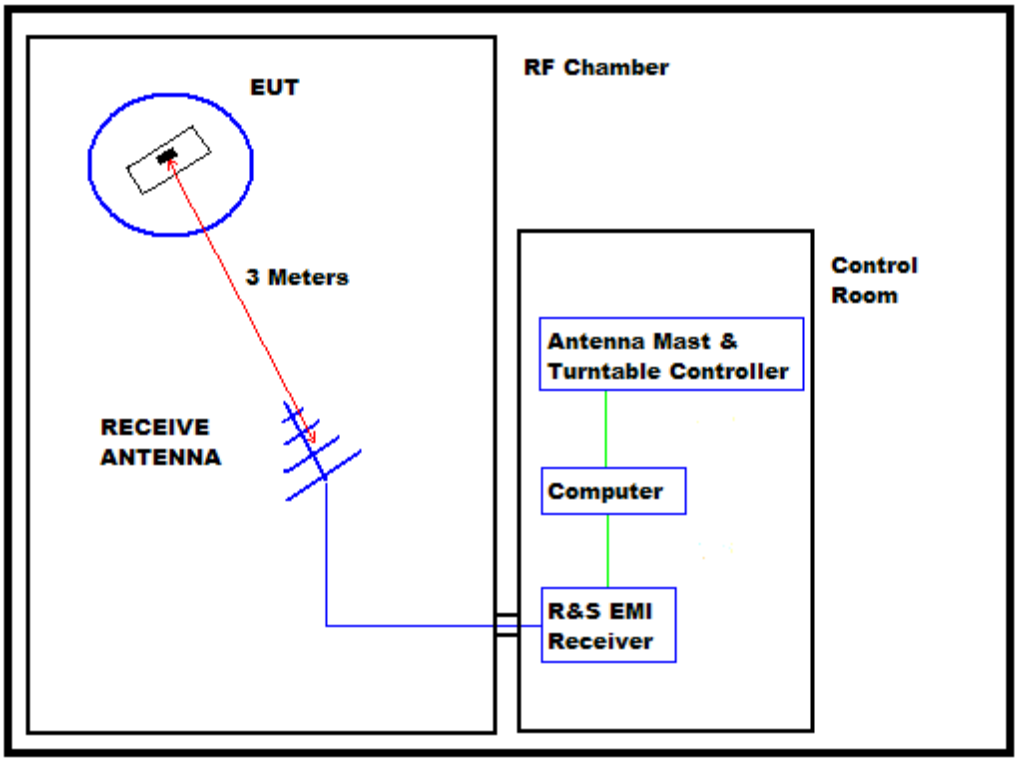
D.5. EUT OPERATION:

The EUT was powered up and the frequency of the transmitter was selected using the front panel controls. The EUT was checked for proper operation after it was setup on the table. Testing was conducted with the EUT set to the Low, Mid and High frequency within the operating frequency range, and powered with a Shure SB900 rechargeable battery.

D.6. SPECIFIC TEST PROCEDURES:

All tests were performed in a 28ft. x 20ft. x 18.5ft. 3m semi-anechoic test chamber. The walls and ceiling of the shielded chamber are lined with ferrite tiles. Anechoic absorber material is installed over the ferrite tile. The floor of the chamber is used as the ground plane. The chamber complies with ANSI C63.4-2003 for site attenuation.

The shielded enclosure prevents emissions from other sources, such as radio and TV stations from interfering with the measurements. All power lines and signal lines entering the enclosure pass through filters on the enclosure wall. The power line filters prevent extraneous signals from entering the enclosure on these leads.



BLOCK DIAGRAM OF SHIELDED ENCLOSURE

Preliminary radiated measurements were performed to determine the frequencies where the significant emissions might be found. The broadband measuring antenna was positioned at a 3 meter distance from the EUT. The frequency range from 25MHz to 1GHz was investigated using a peak detector function with the BiConiLog antenna at horizontal and vertical polarization, and with several different orientations of the EUT with respect to the antenna. The maximum levels measured for each antenna polarization were then automatically plotted. The resultant field strength (FS) is a summation in decibels (dB) of the EMI receiver measurement (ERM), the antenna correction factor (AF), and the cable loss factor (CF). If an external pre-amplifier is used, the total is reduced by its gain (-PA).
Formula 1: FS (dBµV/m) = MTR (dBµV) + AF (dB/m) + CF (dB) + (- PA (dB))

To convert the Field Strength dBµV/m term to µV/m, the dBµV/m is first divided by 20. The Base 10 AntiLog is taken of this quotient. The result is the Field Strength value in µV/m terms.

Formula 2: FS (µV/m) = AntiLog [(FS (dBµV/m))/20]

Initial relative measurements were performed to determine whether the use of AA alkaline batteries or Shure rechargeable batteries would result in different emission levels. A judgment was made that a slightly higher emission level was seen when the Shure SB900 battery was used to power the EUT.

Final radiated RF emissions were performed on all significant broadband and narrowband emissions found in the preliminary sweeps using the following methods:

1) Measurements of all significant broadband and narrowband signals from 25MHz to 1GHz were made using a quasi-peak detector and a BiConiLog antenna. Measurements above 1GHz were made using an average detector and a broadband double ridged waveguide antenna.

2) To ensure that maximum or worst case, emission levels were measured, the following steps were taken:

i. The EUT was rotated so that all of its sides were exposed to the receiving antenna.
ii. Since the measuring antenna is linearly polarized, both horizontal and vertical field components were measured.
iii. The measuring antenna was raised and lowered from 1 to 4 meters for each antenna polarization to maximize the readings.

3) Once the significant narrowband emissions were defined and their measurements maximized, the measurement s were confirmed by matching the field strength of the maximized signal from the EUT by substituting the EUT with a dipole antenna below 1GHz and a waveguide horn antenna above 1GHz, and by those means reproducing the field strength measurement.

i. The substitution antenna was positioned in the same orientation as the EUT.
ii. The output of a signal generator set at the same frequency as the significant narrow band emission was fed into the substitution antenna.
iii. The test antenna was raised or lowered as necessary to ensure that the maximum signal was still received.
iv. The output power level (in dBm) of the signal generator was increased until the corresponding reading on the test receiver matched the maximized field strength measurement.
v. The output power level of the signal generator was recorded as the absolute level of the spurious radiated emission in dBm taking into account any cable loss and antenna gain inherent in the substitution test setup.

D.7. RESULTS:

The radiated voltage level data are presented as follows:

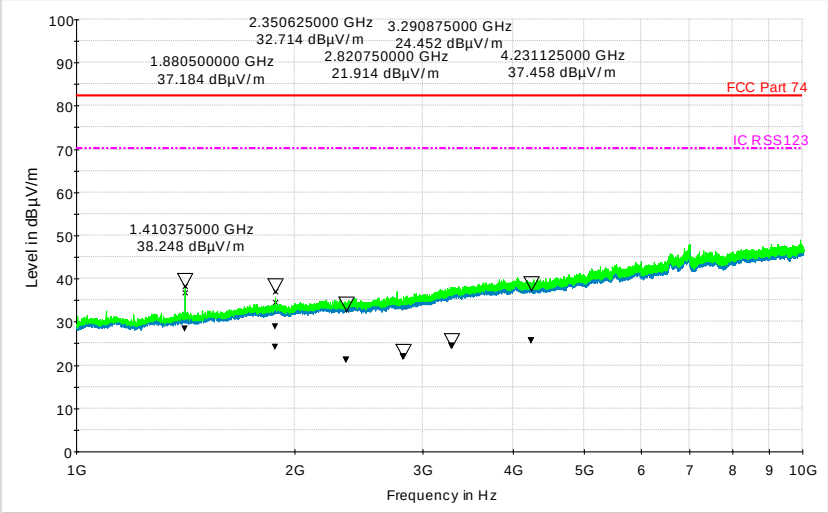
- QLXD2 G50 Pages 75- 82
- QLXD2 H50 Pages 83 - 89
- QLXD2 J50 Pages 90 - 97
- QLXD2 L50 Pages 97 -103

The graphs following the tabular data for each transmitter show the FCC and Industry Canada emission limits as lines near the top of each graph. All emissions measured from QLXD2 were within the limits set in FCC Part 74.861 and RSS-123, Clause 5.5.1.

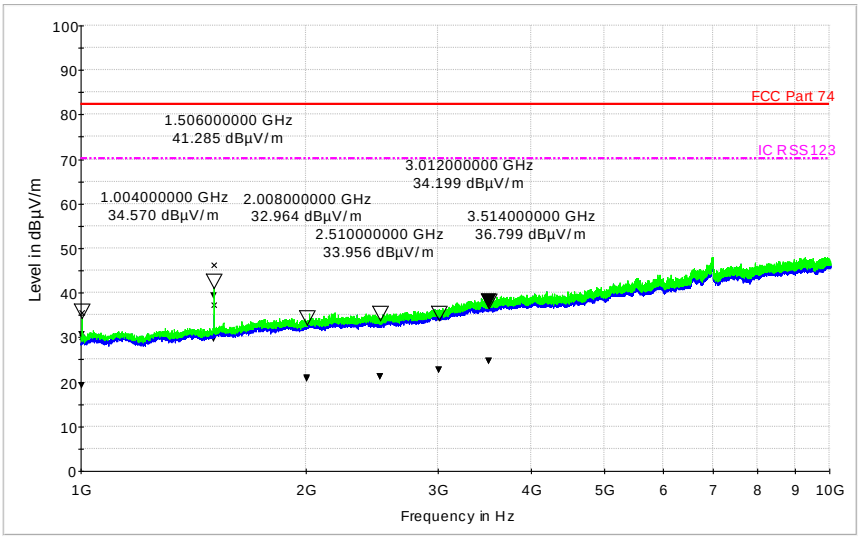
QLXD2 G50 Band Spurious Emission Data

Freq level	Actual Freq (MHz)	Harmonics (MHz)	Polarity	QLXD2	Cable Loss (dB)	Antenna Gain (dB)	10mW Scan (dBµV)	10mW Equivalent Measured from Sig Gen (dBm)	10 mW ERP Total (dBm)	1mW Scan (dBµV)	1mW Equivalent Measured from Sig Gen (dBm)	1 mW ERP Total (dBm)
Low	470.125	940.25	H	1	2.1	0.0	30.0	-83.5	-85.6	28.8	-97.0	-99.1
		940.25	H		2.1	0.0	30.5	-80.1	-82.2	29.4	-88.6	-90.7
		1410.375	H	2	2.6	5.5	45.1	-61.6	-58.7	36.9	-75.8	-72.9
		1410.375	V		2.6	5.5	50.8	-52.7	-49.8	38.2	-70.8	-67.9
		1880.5	H	3	3.0	5.5	47.7	-59.2	-56.7	34.5	-99.0	-96.5
		1880.5	V		3.0	5.5	51.8	-52.6	-50.1	37.2	-79.3	-76.8
		2350.625	H	4	3.4	5.4	47.1	-60.5	-58.5	33.1	-95.0	-93.0
		2350.625	V		3.4	5.4	50.1	-55.1	-53.1	32.8	-95.4	-93.4
		2820.75	H	5	3.6	6.6	38.7	-77.4	-74.4	34.1	-95.0	-92.0
		2820.75	V		3.6	6.6	41.3	-68.7	-65.7	33.5	-94.8	-91.8
		3290.875	H	6	4.0	7.6	41.3	-70.1	-66.5	36.4	-90.0	-86.4
		3290.875	V		4.0	7.6	44.6	-62.6	-59.0	36.4	-92.3	-88.7
Mid	502	1004	H	1	2.2	1.8	32.1	-95.0	-95.4	30.2	-95.0	-95.4
		1004	V		2.2	1.8	44.9	-59.9	-60.3	35.5	-75.9	-76.3
		1506	H	2	2.7	5.5	46.6	-60.2	-57.4	37.4	-75.3	-72.5
		1506	V		2.7	5.5	55.4	-49.2	-46.4	46.2	-59.9	-57.1
		2008	H	3	3.1	5.0	41.6	-66.9	-65.0	33.4	-93.0	-91.1
		2008	V		3.1	5.0	43.0	-65.3	-63.4	33.1	-95.2	-93.3
		2510	H	4	3.4	6.0	39.7	-75.2	-72.6	33.4	-94.0	-91.4
		2510	V		3.4	6.0	45.0	-61.8	-59.2	33.4	-95.9	-93.3
		3012	H	5	3.8	7.0	41.5	-82.5	-79.3	34.5	-95.0	-91.8
		3012	V		3.8	7.0	41.9	-80.1	-76.9	34.7	-95.8	-92.6
		3514	H	6	4.2	8.2	41.1	-85.3	-81.3	36.6	-96.0	-92.0
		3514	V		4.2	8.2	41.4	-82.7	-78.7	36.9	-92.9	-88.9
High	534	1068	H	1	2.3	1.8	33.0	-95.0	-95.5	30.6	-95.0	-95.5
		1068	V		2.3	1.8	44.0	-61.5	-62.0	34.9	-81.7	-82.2
		1602	H	2	2.8	5.5	37.4	-74.4	-71.7	31.5	-95.0	-92.3
		1602	V		2.8	5.5	44.2	-61.4	-58.7	34.3	-86.5	-83.8
		2136	H	3	3.3	5.0	33.1	-95.0	-93.3	34.1	-95.0	-93.3
		2136	V		3.3	5.0	33.6	-98.8	-97.1	32.9	-98.8	-97.1
		2670	H	4	3.6	6.0	33.7	-95.0	-92.6	33.8	-95.0	-92.6
		2670	V		3.6	6.0	34.6	-96.8	-94.4	33.8	-96.8	-94.4
		3204	H	5	3.9	7.6	35.7	-90.0	-86.3	36.2	-90.0	-86.3
		3204	V		3.9	7.6	36.3	-93.6	-89.9	35.1	-93.6	-89.9
		3738	H	6	4.5	8.4	37.2	-90.0	-86.1	37.3	-90.0	-86.1
		3738	V		4.5	8.4	37.5	-92.1	-88.2	37.1	-92.1	-88.2

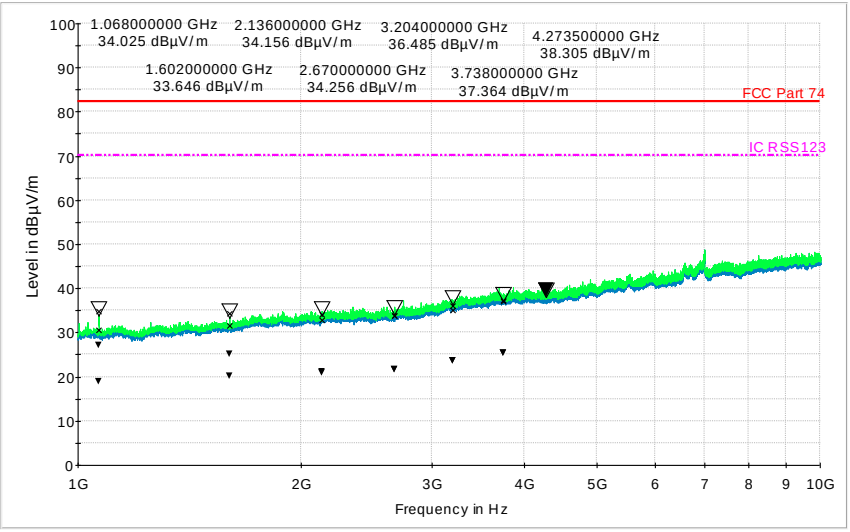
EUT Name:	QLXD2 G50
Serial Number:	EMC7
Test Description:	Radiated RF Emissions 10 GHz
Operating Conditions:	1 mW, Low Freq 470.125 MHz
Operator Name:	Tom Braxton
Comment:	Horizontal-Vertical Antenna, Max



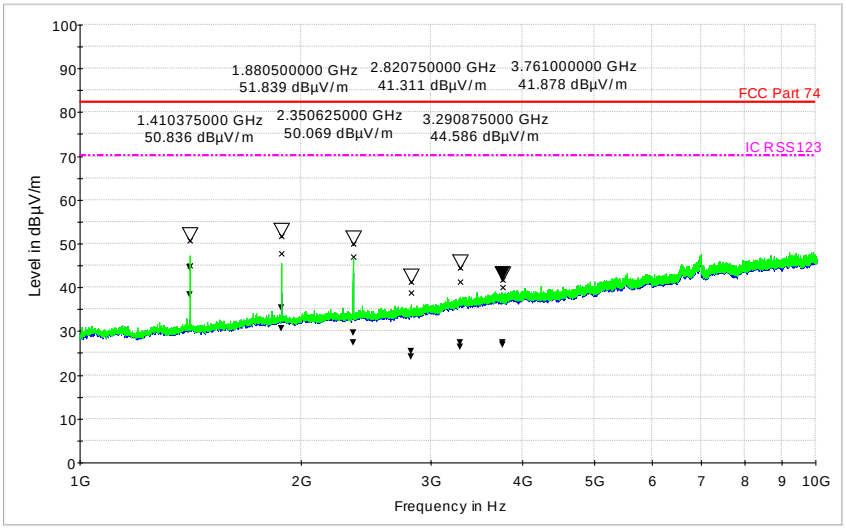
EUT Name:	QLXD2 G50
Serial Number:	EMC7
Test Description:	Radiated RF Emissions 10 GHz
Operating Conditions:	1 mW, Mid Freq 502 MHz
Operator Name:	Lovell Cueto
Comment:	Horizontal-Vertical Antenna, Max



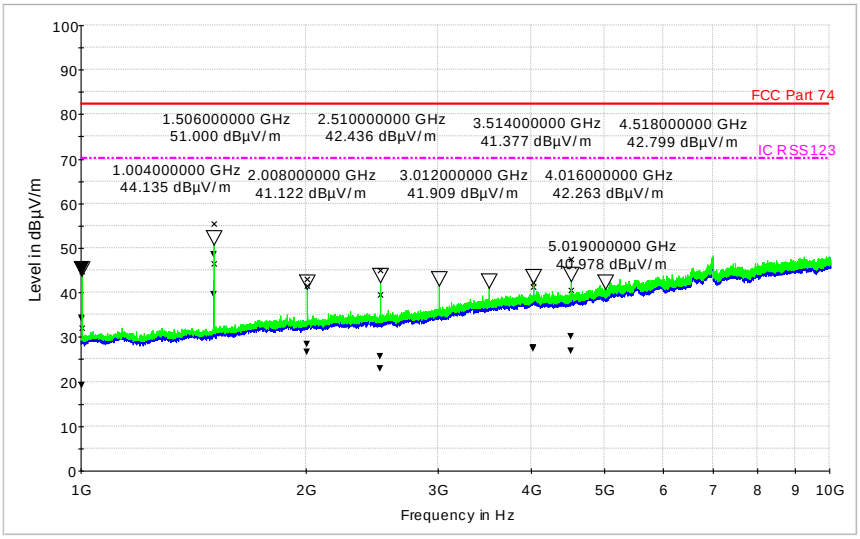
EUT Name:	QLXD2 G50
Serial Number:	EMC7
Test Description:	Radiated RF Emissions 10 GHz
Operating Conditions:	1 mW, High Freq 534 MHz
Operator Name:	Tom Braxton
Comment:	Horizontal-Vertical Antenna, Max



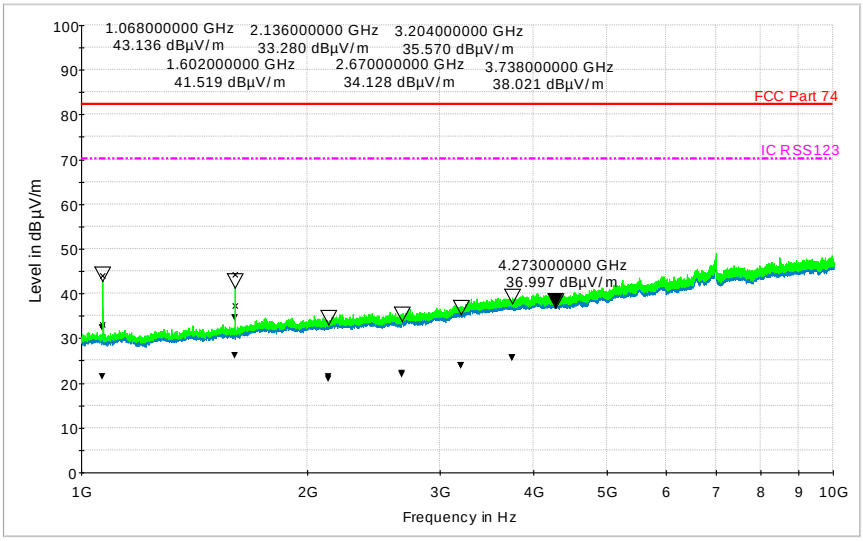
EUT Name:	QLXD2 G50
Serial Number:	EMC7
Test Description:	Radiated RF Emissions 10 GHz
Operating Conditions:	10 mW, Low Freq 470.125 MHz
Operator Name:	Lovell Cueto
Comment:	Horizontal-Vertical Antenna, Max



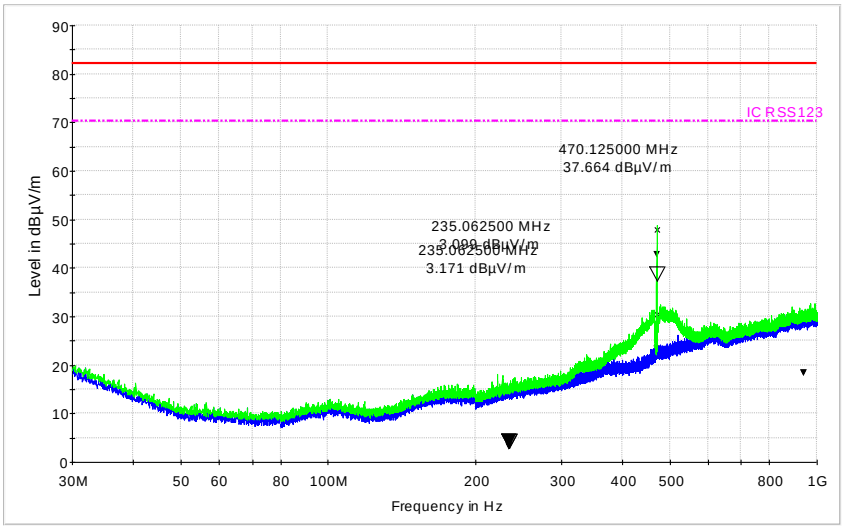
EUT Name:	QLXD2 G50
Serial Number:	EMC7
Test Description:	Radiated RF Emissions 10 GHz
Operating Conditions:	10 mW, Mid Freq 502 MHz
Operator Name:	Tom Braxton
Comment:	Horizontal-Vertical Antenna, Max



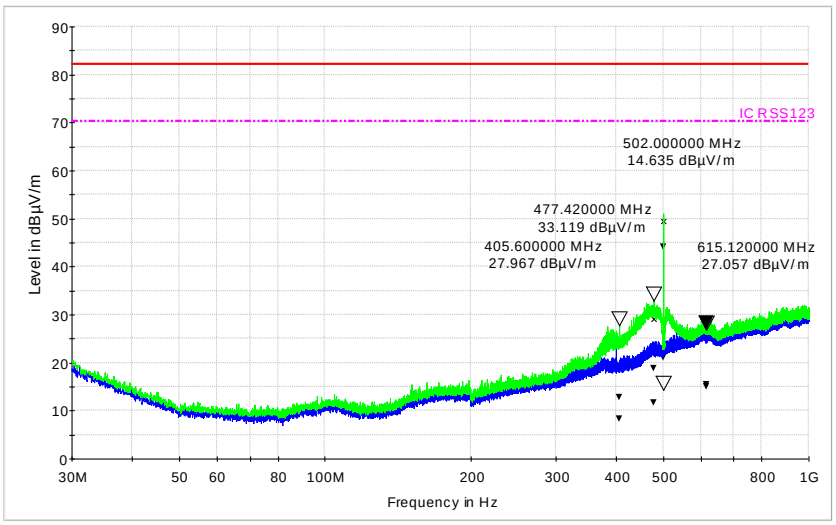
EUT Name:	QLXD2 G50
Serial Number:	EMC7
Test Description:	Radiated RF Emissions 10 GHz
Operating Conditions:	10 mW, High Freq 534 MHz
Operator Name:	Tom Braxton
Comment:	Horizontal-Vertical Antenna, Max



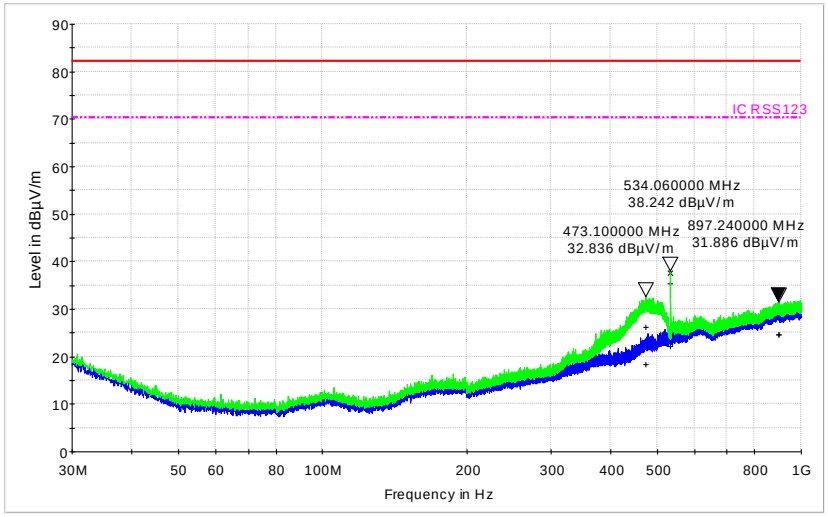
EUT Name:	QLXD2 G50
Serial Number:	EMC7
Test Description:	Radiated RF Emissions 30-1000 MHz
Operating Conditions:	1 mW, Low Freq 470.125 MHz
Operator Name:	Tom Braxton
Comment:	Horizontal-Vertical Antenna, Max



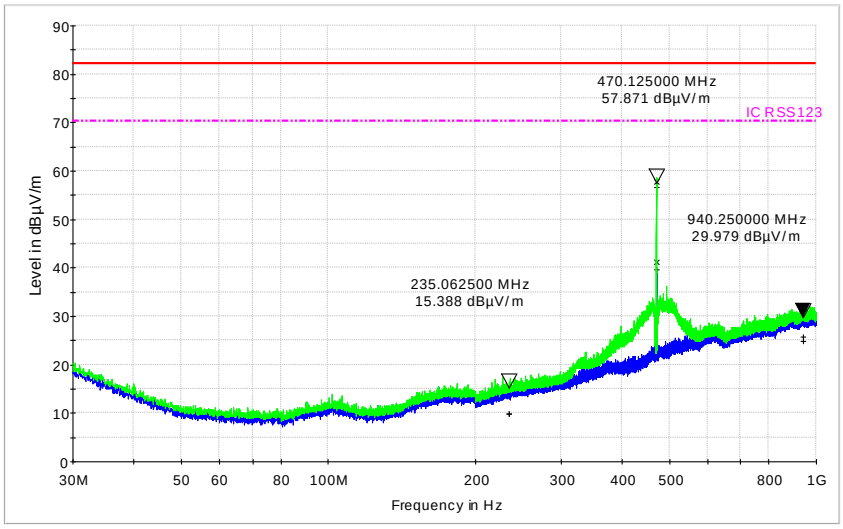
EUT Name:	QLXD2 G50
Serial Number:	EMC7
Test Description:	Radiated RF Emissions 30-1000 MHz
Operating Conditions:	1 mW, Mid Freq 502 MHz
Operator Name:	Tom Braxton
Comment:	Horizontal-Vertical Antenna, Max



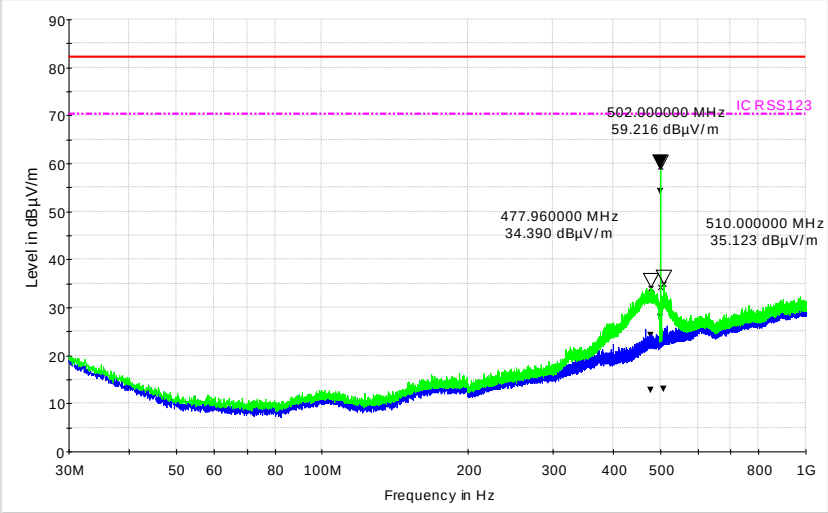
EUT Name:	QLXD2 G50
Serial Number:	EMC8
Test Description:	Radiated RF Emissions 30-1000 MHz
Operating Conditions:	1 mW, High Freq 534 MHz
Operator Name:	Lovell Cueto
Comment:	Horizontal-Vertical Antenna, Max



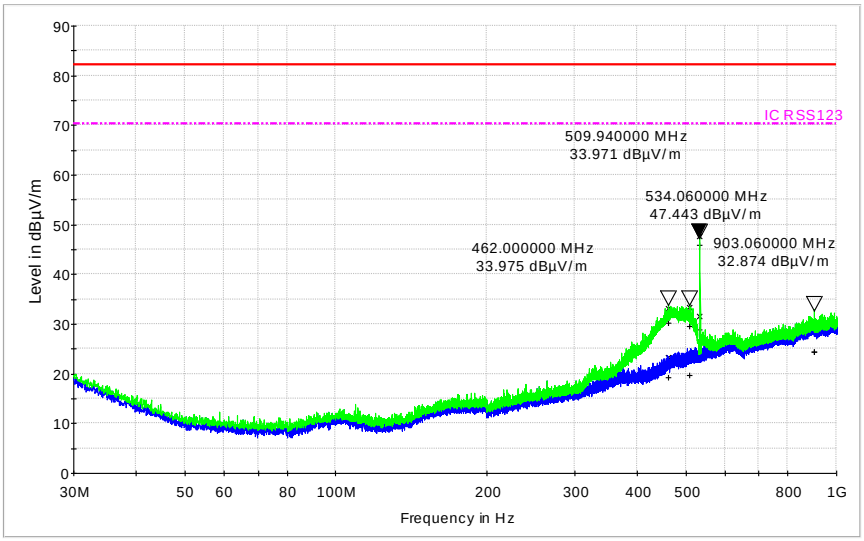
EUT Name:	QLXD2 G50
Serial Number:	EMC8
Test Description:	Radiated RF Emissions 30-1000 MHz
Operating Conditions:	10 mW, Low Freq 470.125 MHz
Operator Name:	Tom Braxton
Comment:	Horizontal-Vertical Antenna, Max



EUT Name:	QLXD2 G50
Serial Number:	EMC8
Test Description:	Radiated RF Emissions 30-1000 MHz
Operating Conditions:	10 mW, Mid Freq 502 MHz
Operator Name:	Tom Braxton
Comment:	Horizontal-Vertical Antenna, Max



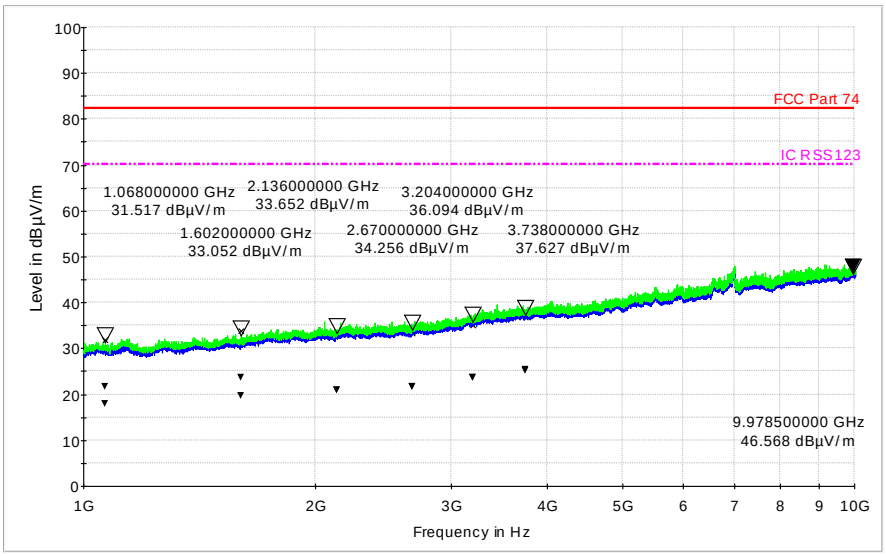
EUT Name:	QLXD2 G50
Serial Number:	EMC8
Test Description:	Radiated RF Emissions 30-1000 MHz
Operating Conditions:	10 mW, High Freq 534 MHz
Operator Name:	Tom Braxton
Comment:	Horizontal-Vertical Antenna, Max



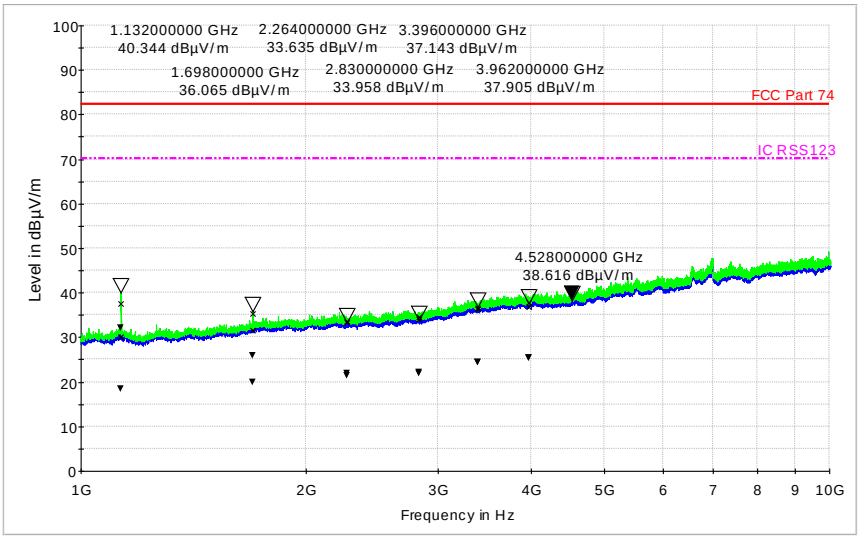
QLXD2 H50 Band Spurious Emission Data

Freq level	Actual Freq (MHz)	Harmonics (MHz)	Polarity	QLXD1	Cable Loss (dB)	Antenna Gain (dB)	10mW Scan (dBµV)	10mW Equivalent Measured from Sig Gen (dBm)	10 mW ERP Total (dBm)	1mW Scan (dBµV)	1mW Equivalent Measured from Sig Gen (dBm)	1 mW ERP Total (dBm)
Low	534	1068	H	1	2.3	1.8	41.6	-64.6	-65.1	30.9	-95.0	-95.5
		1068	V		2.3	1.8	54.0	-49.6	-50.1	36.3	-75.9	-76.4
		1602	H	2	2.8	5.6	38.4	-72.3	-69.5	32.6	-95.0	-92.2
		1602	V		2.8	5.6	44.7	-60.7	-57.9	34.1	-87.0	-84.2
		2136	H	3	3.3	5.0	36.1	-95.0	-93.3	33.0	-95.0	-93.3
		2136	V		3.3	5.0	39.2	-73.7	-72.0	33.4	-98.8	-97.1
		2670	H	4	3.6	6.6	42.8	-66.0	-63.0	34.1	-95.0	-92.0
		2670	V		3.6	6.6	42.5	-66.8	-63.8	34.5	-96.8	-93.8
		3204	H	5	3.9	7.6	38.2	-83.9	-80.2	36.2	-90.0	-86.3
		3204	V		3.9	7.6	43.2	-63.9	-60.2	36.1	-93.6	-89.9
		3738	H	6	4.5	8.4	42.8	-66.5	-62.6	37.6	-90.0	-86.1
		3738	V		4.5	8.4	44.3	-62.5	-58.6	37.3	-92.1	-88.2
Mid	566	1132	H	1	2.3	2.5	43.8	-62.5	-62.3	31.3	-96.6	-96.4
		1132	V		2.3	2.5	51.9	-52.9	-52.7	32.1	-99.2	-99.0
		1698	H	2	2.9	5.6	39.6	-70.7	-68.0	33.2	-99.4	-96.7
		1698	V		2.9	5.6	43.4	-62.0	-59.3	35.1	-83.9	-81.2
		2264	H	3	3.3	5.4	36.1	-100.0	-97.9	33.8	-100.0	-97.9
		2264	V		3.3	5.4	36.2	-94.9	-92.8	33.2	-94.9	-92.8
		2830	H	4	3.6	6.0	37.5	-90.0	-87.6	34.3	-93.2	-90.8
		2830	V		3.6	6.0	44.9	-61.9	-59.5	34.1	-93.2	-90.8
		3396	H	5	4.0	7.6	41.2	-71.9	-68.3	36.3	-95.9	-92.3
		3396	V		4.0	7.6	48.5	-57.1	-53.5	36.3	-92.5	-88.9
		3962	H	6	4.5	8.9	37.5	-93.3	-88.9	37.7	-92.1	-87.7
		3962	V		4.5	8.9	37.7	-92.5	-88.1	37.5	-93.3	-88.9
High	598	1196	H	1	2.4	2.5	33.2	-82.3	-82.2	29.0	-96.2	-96.1
		1196	V		2.4	2.5	44.0	-58.9	-58.8	29.4	-99.1	-99.0
		1794	H	2	2.9	5.6	42.7	-63.5	-60.8	34.0	-96.0	-93.3
		1794	V		2.9	5.6	43.4	-62.1	-59.4	34.3	-94.9	-92.2
		2392	H	3	3.4	6.0	35.4	-96.0	-93.4	33.9	-96.0	-93.4
		2392	V		3.4	6.0	38.9	-78.7	-76.1	33.8	-96.3	-93.7
		2990	H	4	3.8	7.0	41.5	-69.9	-66.7	34.3	-99.5	-96.3
		2990	V		3.8	7.0	43.0	-64.9	-61.7	34.4	-97.8	-94.6
		3588	H	5	4.2	8.2	47.1	-60.3	-56.3	36.9	-98.5	-94.5
		3588	V		4.2	8.2	50.0	-54.6	-50.6	37.3	-92.4	-88.4
		4186	H	6	4.8	9.3	37.5	-100.0	-95.5	38.8	-100.0	-95.5
		4186	V		4.8	9.3	38.7	-91.4	-86.9	36.9	-91.4	-86.9

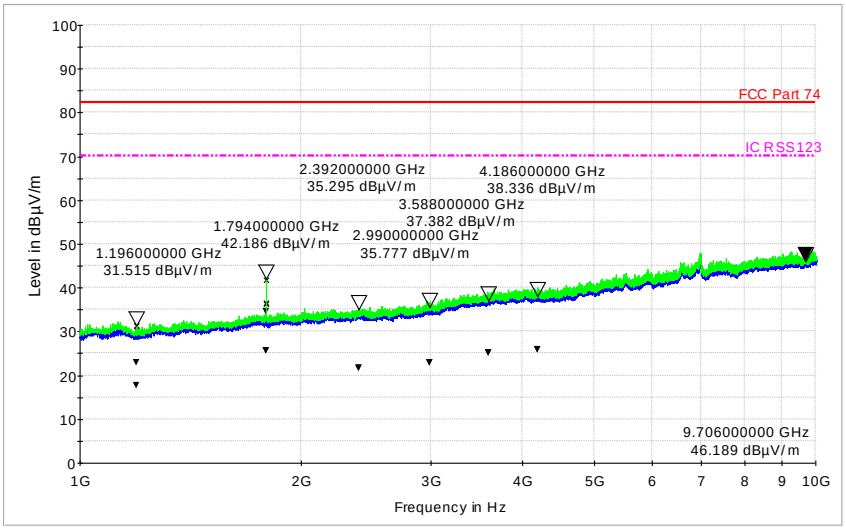
EUT Name: QLXD2 H50
Serial Number: EMC1
Test Description: Radiated RF Emissions 30-1000 MHz
Operating Conditions: 1 mW, Low Freq 534 MHz
Operator Name: Lovell Cueto
Comment: Horizontal-Vertical Antenna, Max



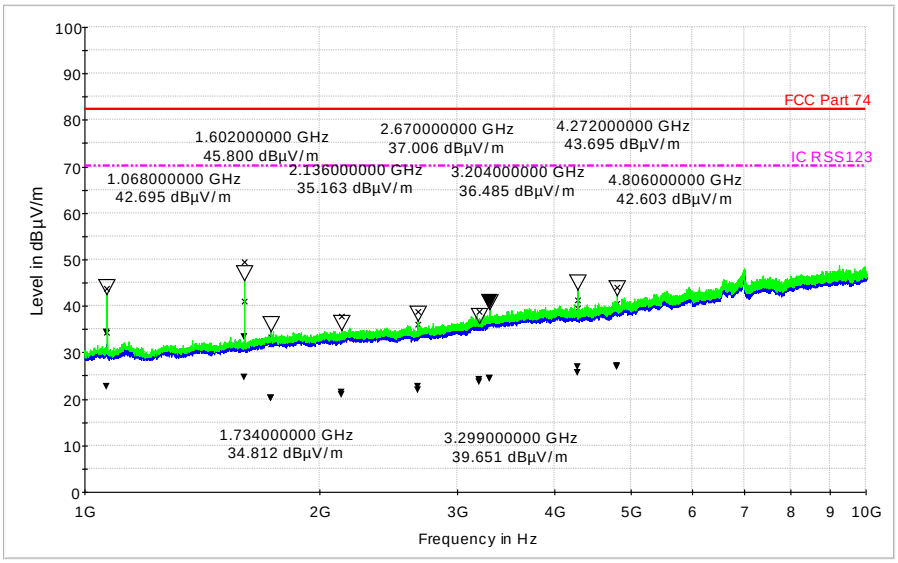
EUT Name: QLXD2 H50
Serial Number: EMC1
Test Description: Radiated RF Emissions 10 GHz
Operating Conditions: 1 mW, Mid Freq 566 MHz
Operator Name: Tom Braxton
Comment: Horizontal-Vertical Antenna, Max



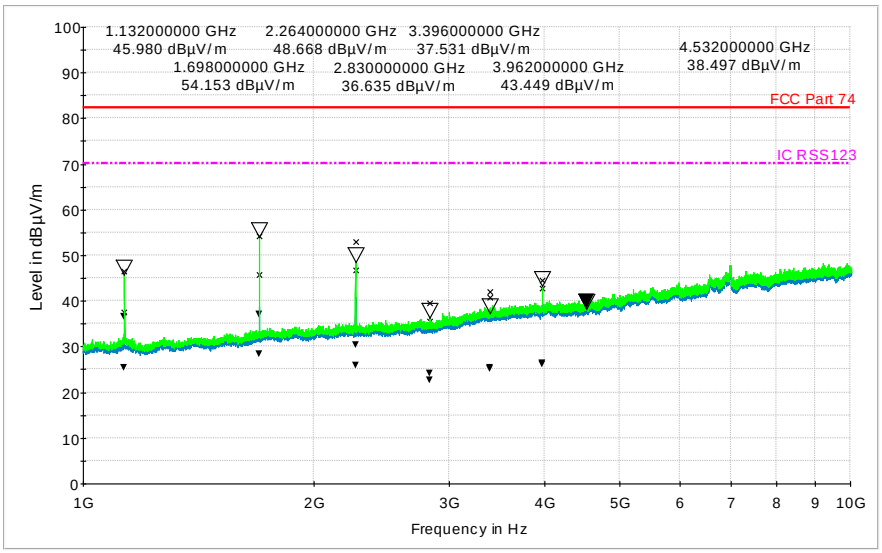
EUT Name: QLXD2 H50
Serial Number: EMC1
Test Description: Radiated RF Emissions 10 GHz
Operating Conditions: 1 mW, High Freq 598 MHz
Operator Name: Lovell Cueto
Comment: Horizontal-Vertical Antenna, Max



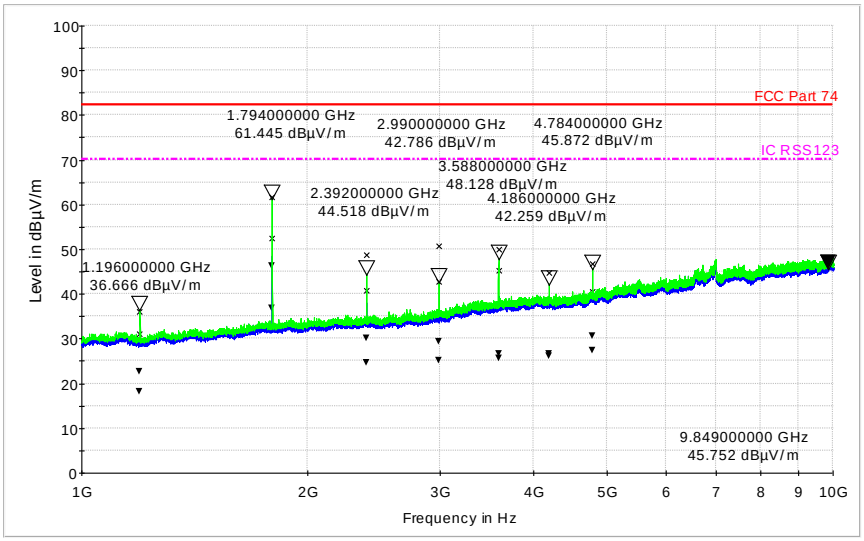
EUT Name: QLXD2 H50
Serial Number: EMC1
Test Description: Radiated RF Emissions 10 GHz
Operating Conditions: 10 mW, Low Freq 534 MHz
Operator Name: Lovell Cueto
Comment: Horizontal-Vertical Antenna, Max



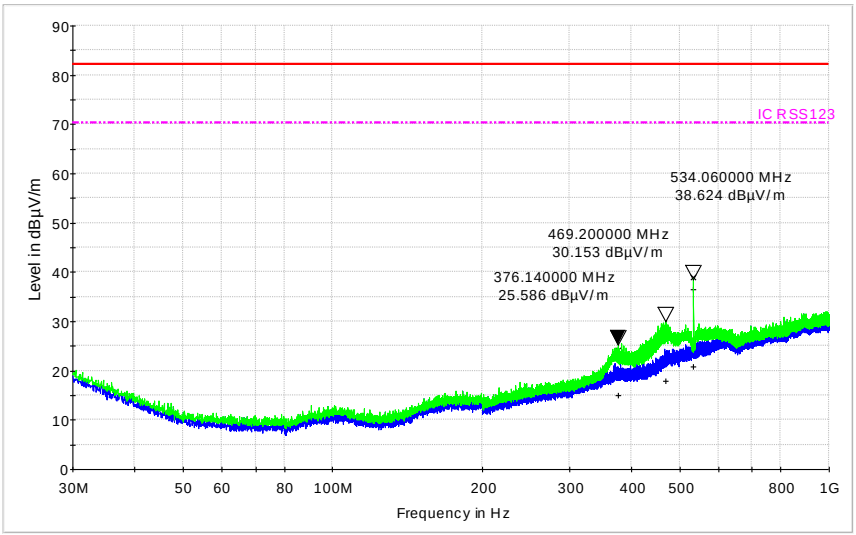
EUT Name: QLXD2 H50
Serial Number: EMC1
Test Description: Radiated RF Emissions 10 GHz
Operating Conditions: 10 mW, Mid Freq 566 MHz
Operator Name: Tom Braxton
Comment: Horizontal-Vertical Antenna, Max



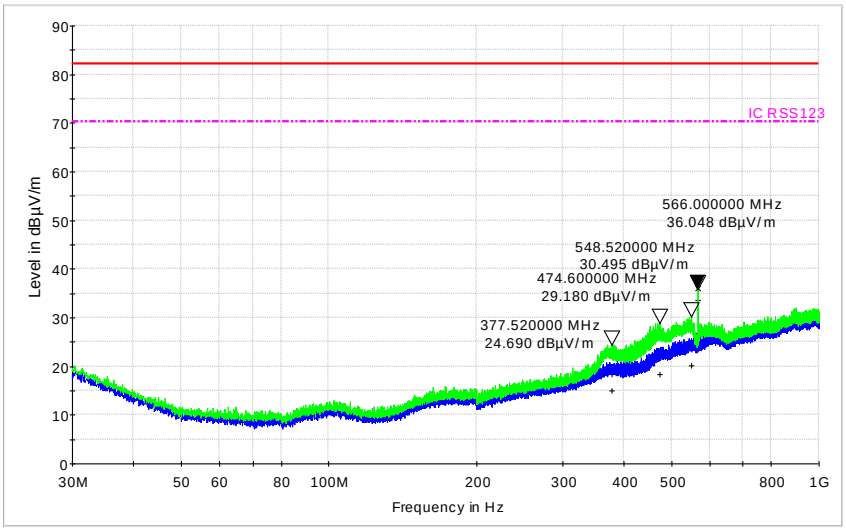
EUT Name: QLXD2 H50
Serial Number: EMC1
Test Description: Radiated RF Emissions 10 GHz
Operating Conditions: 10 mW, High Freq 598 MHz
Operator Name: Lovell Cueto
Comment: Horizontal-Vertical Antenna, Max



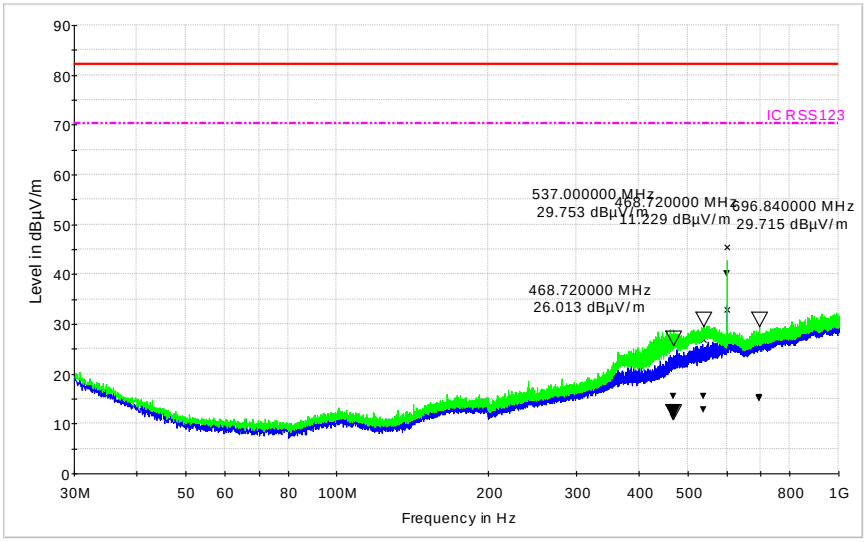
EUT Name:	QLXD2 H50
Serial Number:	EMC1
Test Description:	Radiated RF Emissions 30-1000 MHz
Operating Conditions:	1 mW, Low Freq 534 MHz
Operator Name:	Lovell Cueto
Comment:	Horizontal-Vertical Antenna, Max



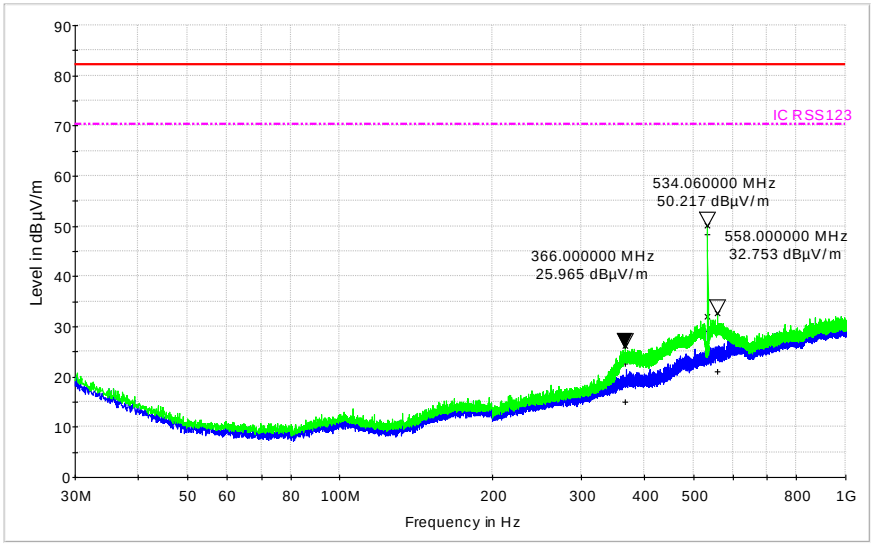
EUT Name:	QLXD2 H50
Serial Number:	EMC1
Test Description:	Radiated RF Emissions 30-1000 MHz
Operating Conditions:	1 mW, Mid Freq 566 MHz
Operator Name:	Lovell Cueto
Comment:	Horizontal-Vertical Antenna, Max



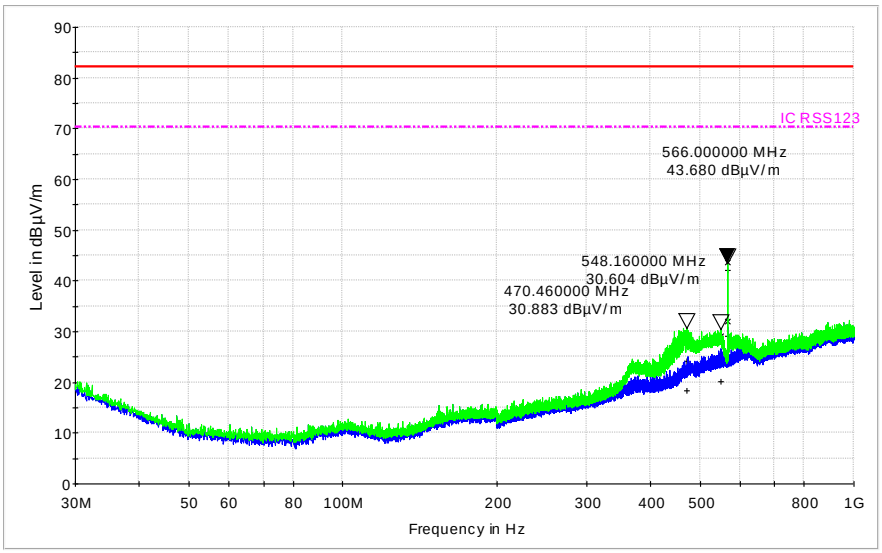
EUT Name: QLXD2 H50
Serial Number: EMC2
Test Description: Radiated RF Emissions 30-1000 MHz
Operating Conditions: 1 mW, High Freq 598 MHz
Operator Name: Tom Braxton
Comment: Horizontal-Vertical Antenna, Max



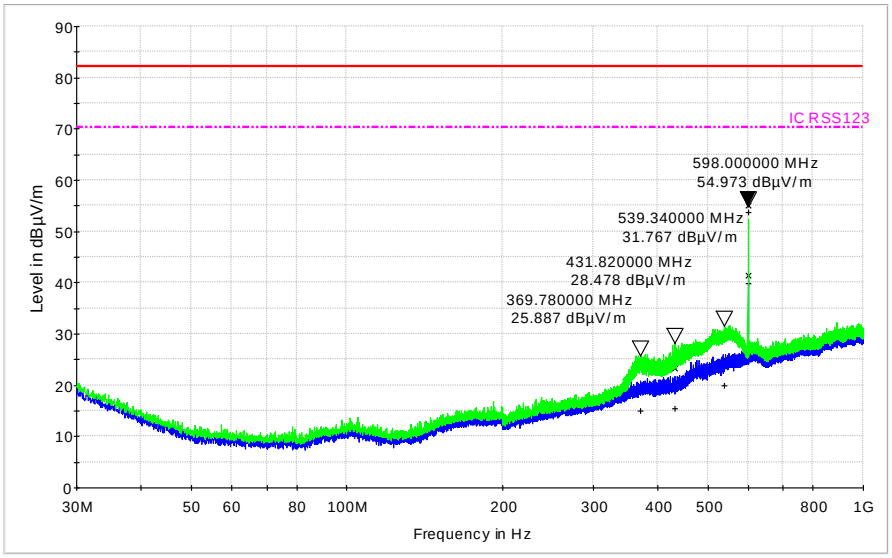
EUT Name: QLXD2 H50
Serial Number: EMC2
Test Description: Radiated RF Emissions 30-1000 MHz
Operating Conditions: 10 mW, Low Freq 534 MHz
Operator Name: Lovell Cueto
Comment: Horizontal-Vertical Antenna, Max



EUT Name:	QLXD2 H50
Serial Number:	EMC2
Test Description:	Radiated RF Emissions 30-1000 MHz
Operating Conditions:	10 mW, Mid Freq 566 MHz
Operator Name:	Lovell Cueto
Comment:	Horizontal-Vertical Antenna, Max



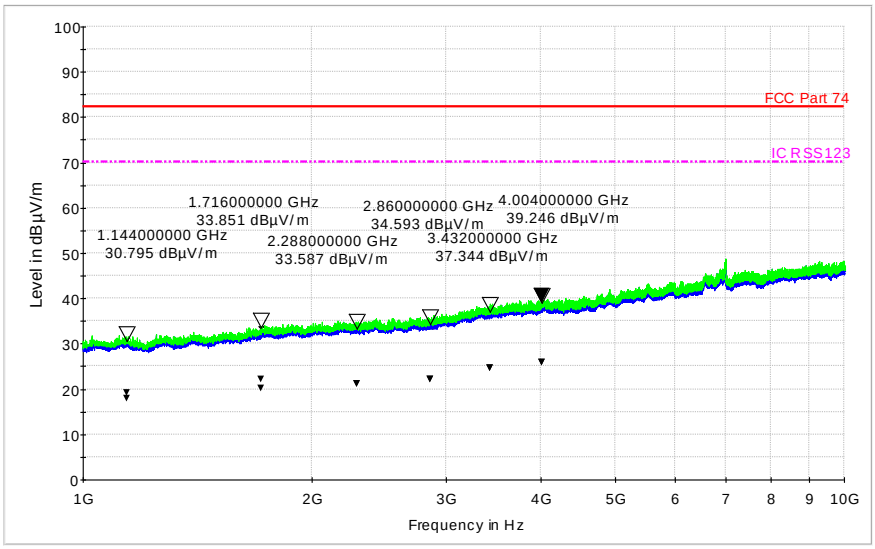
EUT Name:	QLXD2 H50
Serial Number:	EMC2
Test Description:	Radiated RF Emissions 30-1000 MHz
Operating Conditions:	10 mW, High Freq 598 MHz
Operator Name:	Lovell Cueto
Comment:	Horizontal-Vertical Antenna, Max



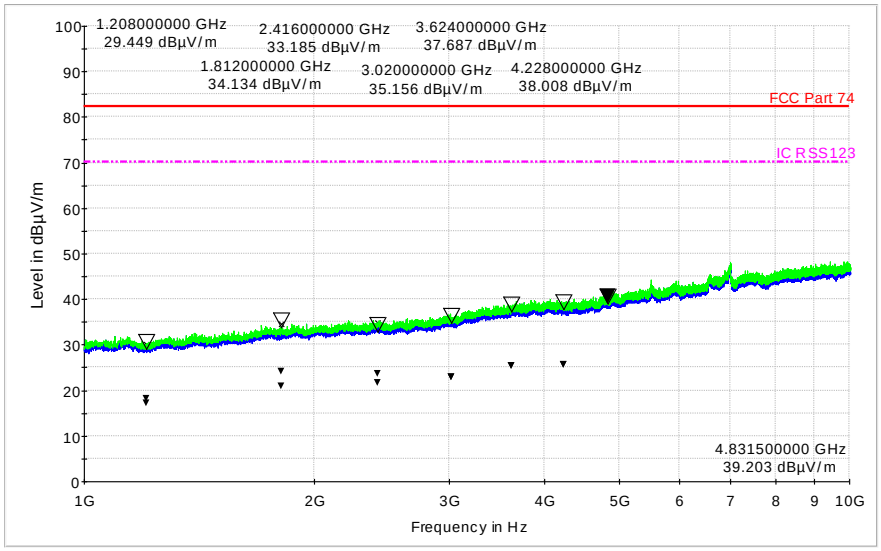
QLXD2 J50 Band Spurious Emission Data

Freq level	Actual Freq (MHz)	Harmonics (MHz)	Polarity	QLXD1	Cable Loss (dB)	Antenna Gain (dB)	10mW Scan (dBµV)	10mW Equivalent Measured from Sig Gen (dBm)	10 mW ERP Total (dBm)	1mW Scan (dBµV)	1mW Equivalent Measured from Sig Gen (dBm)	1 mW ERP Total (dBm)
Low	572	1144	H	1	2.3	2.5	36.6	-76.0	-75.8	29.7	-99.4	-99.2
		1144	V		2.3	2.5	46.0	-58.0	-57.8	30.9	-96.0	-95.8
		1716	H	2	2.9	5.6	33.9	-97.8	-95.1	33.3	-97.8	-95.1
		1716	V		2.9	5.6	41.2	-65.0	-62.3	33.3	-96.0	-93.3
		2288	H	3	3.4	5.4	36.5	-94.8	-92.8	33.6	-94.8	-92.8
		2288	V		3.4	5.4	40.3	-69.0	-67.0	33.2	-96.0	-94.0
		2860	H	4	3.6	6.6	35.8	-100.0	-97.0	33.9	-100.0	-97.0
		2860	V		3.6	6.6	43.4	-62.0	-59.0	33.9	-97.0	-94.0
		3432	H	5	4.1	8.2	38.6	-88.1	-84.0	37.1	-96.1	-92.0
		3432	V		4.1	8.2	40.3	-70.0	-65.9	37.3	-95.0	-90.9
		4004	H	6	4.7	8.9	40.5	-76.2	-72.0	38.3	-100.0	-95.8
		4004	V		4.7	8.9	38.6	-87.0	-82.8	37.9	-98.0	-93.8
Mid	604	1208	H	1	2.4	4.0	30.8	-95.5	-93.9	29.7	-95.5	-93.9
		1208	V		2.4	4.0	33.7	-84.0	-82.4	30.0	-99.0	-97.4
		1812	H	2	3.0	5.6	38.6	-72.7	-70.1	32.5	-100.0	-97.4
		1812	V		3.0	5.6	48.3	-55.0	-52.4	34.5	-95.0	-92.4
		2416	H	3	3.4	6.0	47.6	-60.6	-58.0	34.1	-94.0	-91.4
		2416	V		3.4	6.0	54.0	-51.0	-48.4	34.9	-95.5	-92.9
		3020	H	4	3.8	7.0	45.9	-61.2	-58.0	35.0	-94.7	-91.5
		3020	V		3.8	7.0	54.7	-48.0	-44.8	35.2	-95.0	-91.8
		3624	H	5	4.5	8.2	40.1	-77.1	-73.4	37.4	-96.6	-92.9
		3624	V		4.5	8.2	43.6	-60.0	-56.3	37.8	-94.0	-90.3
		4228	H	6	4.8	9.3	40.4	-77.4	-72.9	37.8	-93.9	-89.4
		4228	V		4.8	9.3	48.3	-55.0	-50.5	37.7	-94.5	-90.0
High	636	1272	H	1	2.5	4.0	35.8	-76.6	-75.1	31.1	-97.0	-95.5
		1272	V		2.5	4.0	44.3	-58.0	-56.5	31.6	-96.5	-95.0
		1908	H	2	3.0	5.0	40.2	-69.7	-67.7	33.5	-95.4	-93.4
		1908	V		3.0	5.0	48.4	-56.0	-54.0	36.6	-86.0	-84.0
		2544	H	3	3.5	6.0	35.8	-93.3	-90.8	33.2	-93.3	-90.8
		2544	V		3.5	6.0	40.0	-73.0	-70.5	33.8	-96.0	-93.5
		3180	H	4	3.9	7.6	41.1	-72.1	-68.4	36.2	-94.5	-90.8
		3180	V		3.9	7.6	43.7	-65.0	-61.3	35.7	-96.0	-92.3
		3816	H	5	4.6	8.4	41.0	-69.0	-65.2	36.9	-92.2	-88.4
		3816	V		4.6	8.4	42.2	-66.0	-62.2	37.2	-93.0	-89.2
		4452	H	6	5.1	9.4	38.0	-92.2	-87.9	37.2	-92.2	-87.9
		4452	V		5.1	9.4	41.2	-71.0	-66.7	37.2	-96.0	-91.7

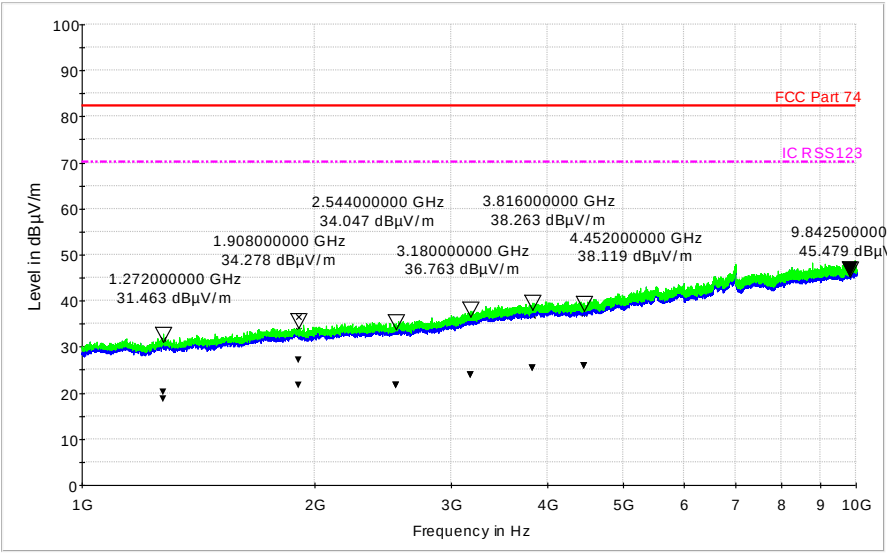
EUT Name:	QLXD2 J50
Serial Number:	EMC15
Test Description:	Radiated RF Emissions 10 GHz
Operating Conditions:	1 mW, Low Freq 572 MHz
Operator Name:	Lovell Cueto
Comment:	Horizontal-Vertical Antenna, Max



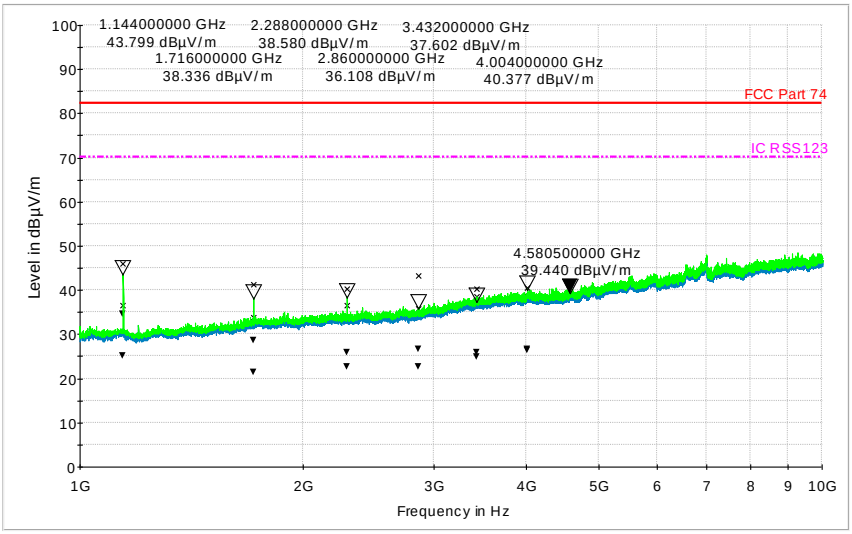
EUT Name:	QLXD2 J50
Serial Number:	EMC3
Test Description:	Radiated RF Emissions 10 GHz
Operating Conditions:	1 mW, Mid Freq 604 MHz
Operator Name:	Lovell Cueto
Comment:	Horizontal-Vertical Antenna, Max



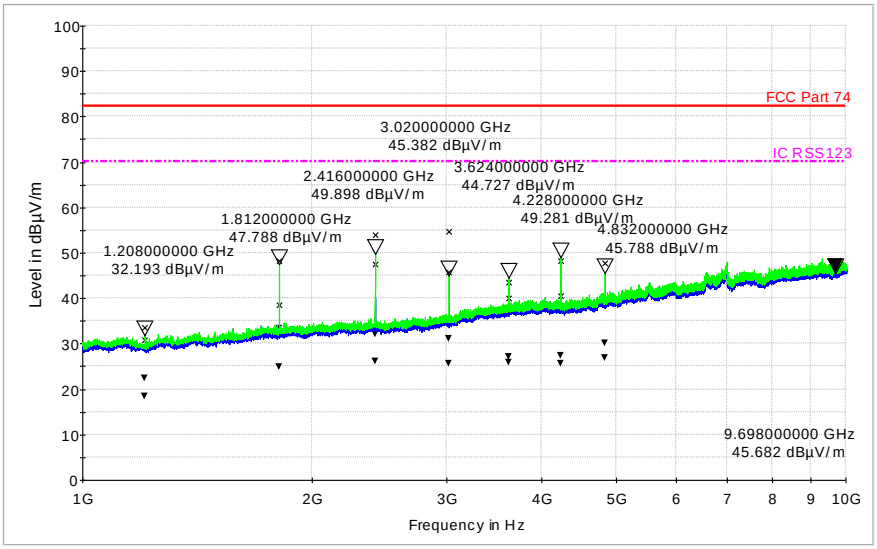
EUT Name:	QLXD2 J50
Serial Number:	EMC3
Test Description:	Radiated RF Emissions 10 GHz
Operating Conditions:	1 mW, High Freq 636 MHz
Operator Name:	Tom Braxton
Comment:	Horizontal-Vertical Antenna, Max



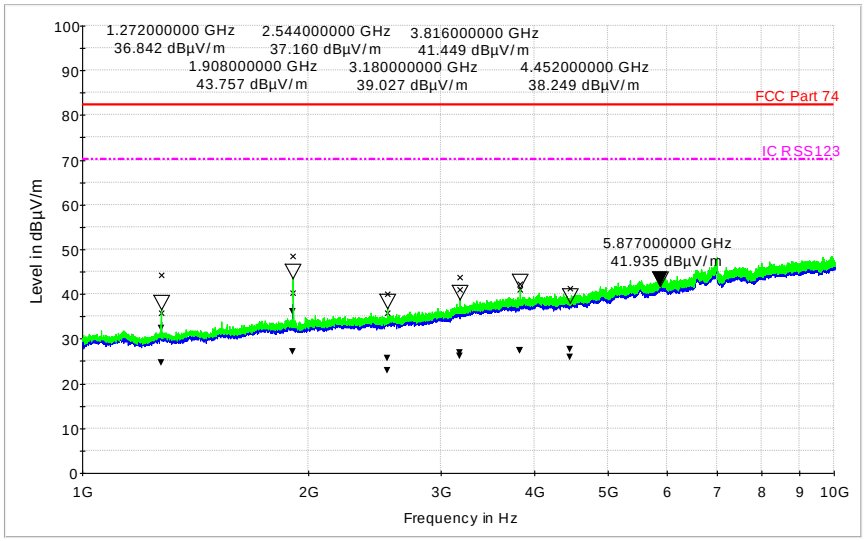
EUT Name:	QLXD2 J50
Serial Number:	EMC3
Test Description:	Radiated RF Emissions 10 GHz
Operating Conditions:	10 mW, Low Freq 572 MHz
Operator Name:	Tom Braxton
Comment:	Horizontal-Vertical Antenna, Max



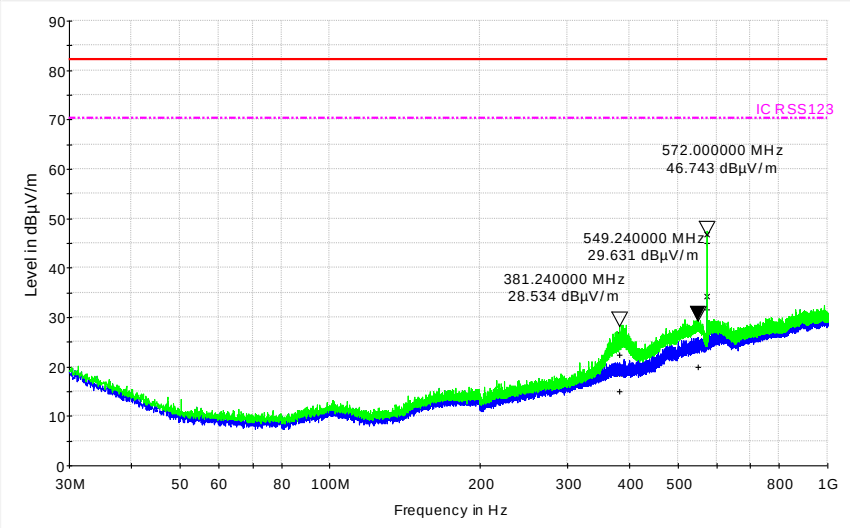
EUT Name:	QLXD2 J50
Serial Number:	EMC3
Test Description:	Radiated RF Emissions 10 GHz
Operating Conditions:	10 mW, Mid Freq 604 MHz
Operator Name:	Lovell Cueto
Comment:	Horizontal-Vertical Antenna, Max



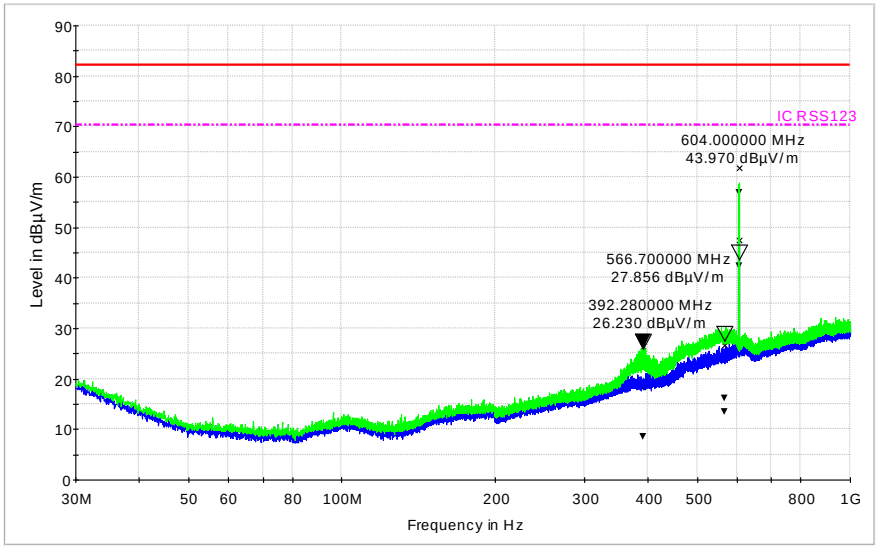
EUT Name:	QLXD2 J50
Serial Number:	EMC3
Test Description:	Radiated RF Emissions 10 GHz
Operating Conditions:	10 mW, High Freq 636 MHz
Operator Name:	Tom Braxton
Comment:	Horizontal-Vertical Antenna, Max



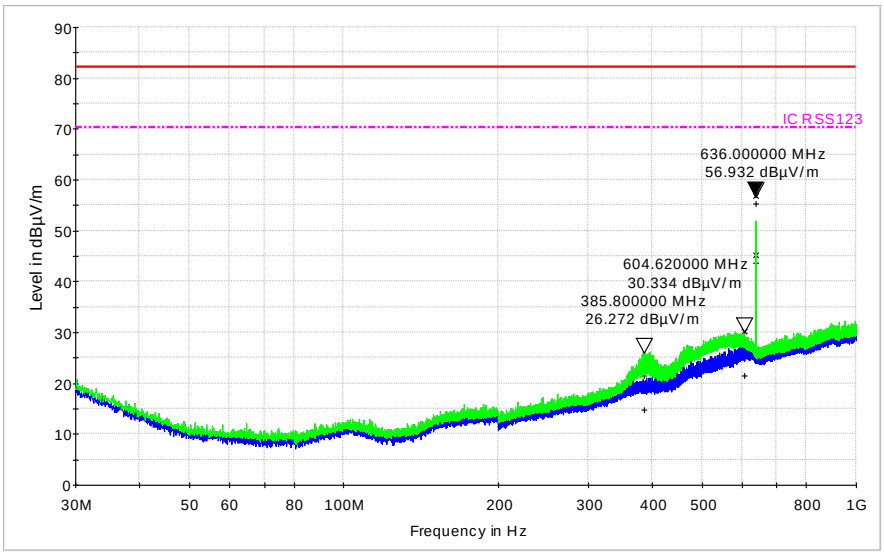
EUT Name:	QLXD2 J50
Serial Number:	EMC4
Test Description:	Radiated RF Emissions 30-1000 MHz
Operating Conditions:	1 mW, Low Freq 572 MHz
Operator Name:	Lovell Cueto
Comment:	Horizontal-Vertical Antenna, Max



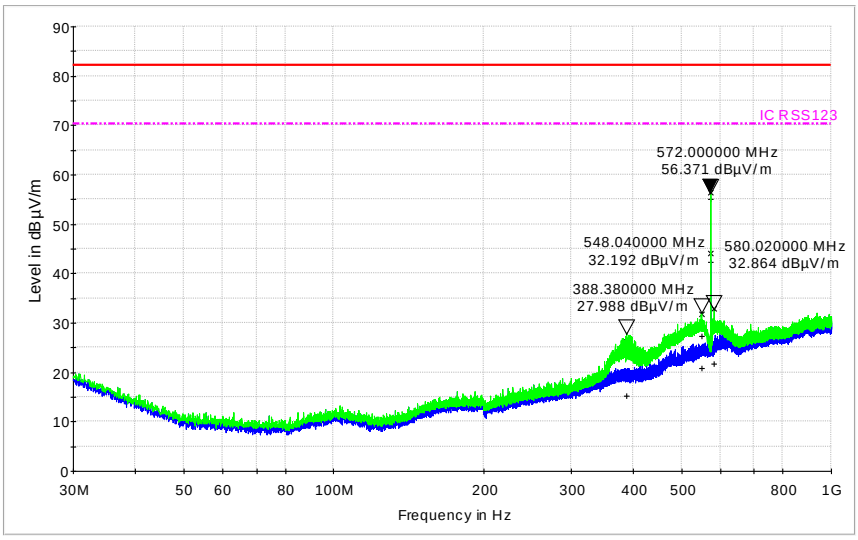
EUT Name:	QLXD2 J50
Serial Number:	EMC4
Test Description:	Radiated RF Emissions 30-1000 MHz
Operating Conditions:	1 mW, Mid Freq 604 MHz
Operator Name:	Tom Braxton
Comment:	Horizontal-Vertical Antenna, Max



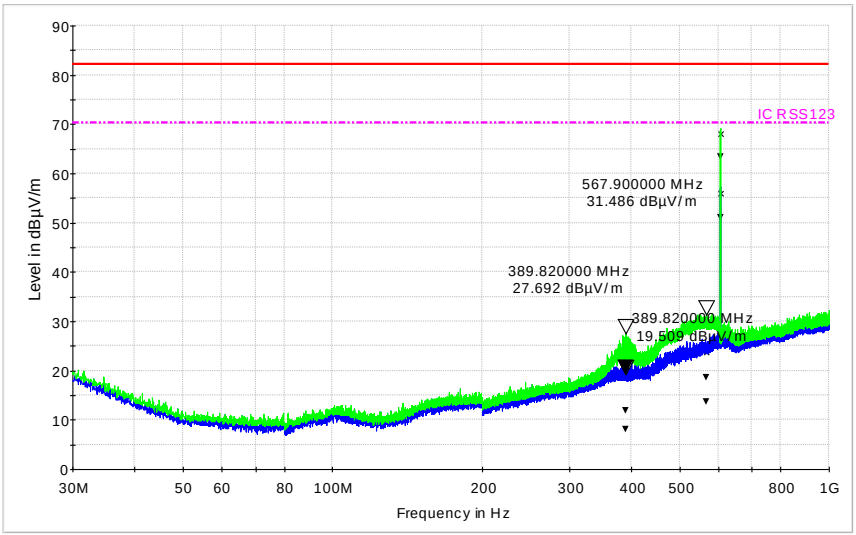
EUT Name: QLXD2 J50
Serial Number: EMC4
Test Description: Radiated RF Emissions 30-1000 MHz
Operating Conditions: 1 mW, High Freq 636 MHz
Operator Name: Lovell Cueto
Comment: Horizontal-Vertical Antenna, Max



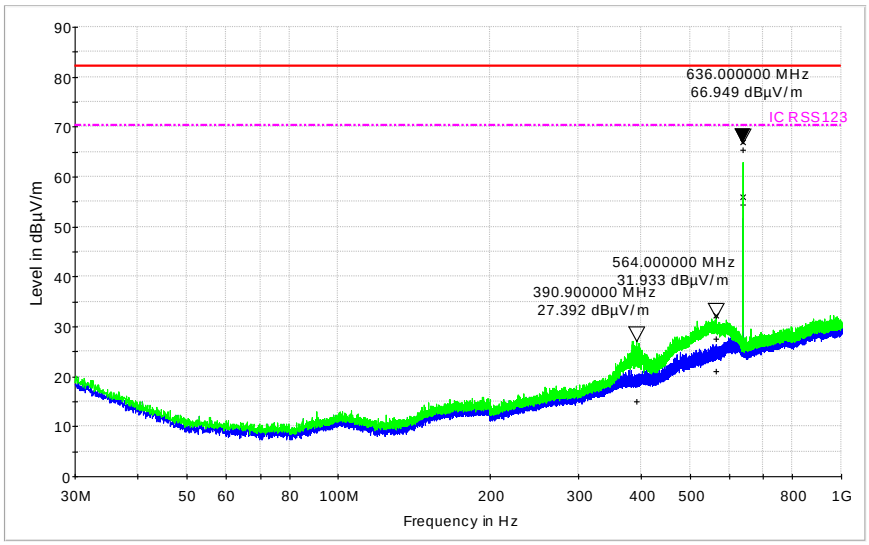
EUT Name: QLXD2 J50
Serial Number: EMC4
Test Description: Radiated RF Emissions 30-1000 MHz
Operating Conditions: 10 mW, Low Freq 572MHz
Operator Name: Lovell Cueto
Comment: Horizontal-Vertical Antenna, Max



EUT Name: QLXD2 J50
Serial Number: EMC4
Test Description: Radiated RF Emissions 30-1000 MHz
Operating Conditions: 10 mW, Mid Freq 604MHz
Operator Name: Tom Braxton
Comment: Horizontal-Vertical Antenna, Max



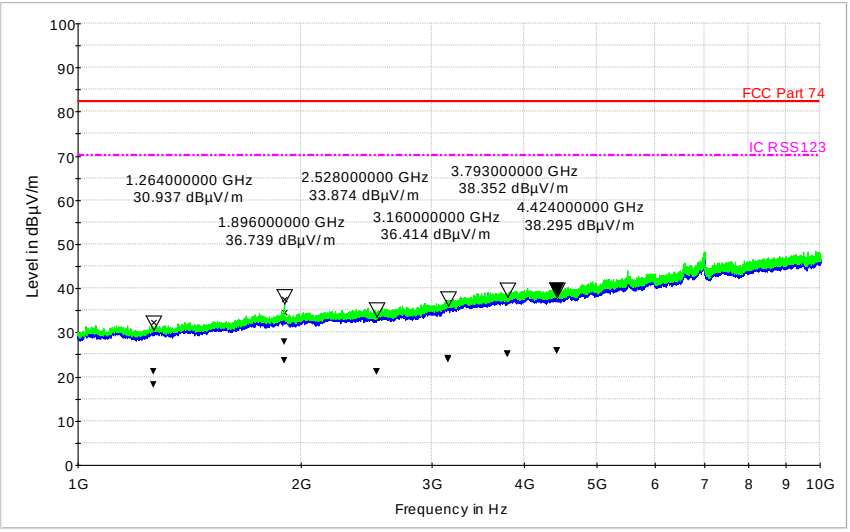
EUT Name: QLXD2 J50
Serial Number: EMC4
Test Description: Radiated RF Emissions 30-1000 MHz
Operating Conditions: 10 mW, High Freq 636 MHz
Operator Name: Lovell Cueto
Comment: Horizontal-Vertical Antenna, Max



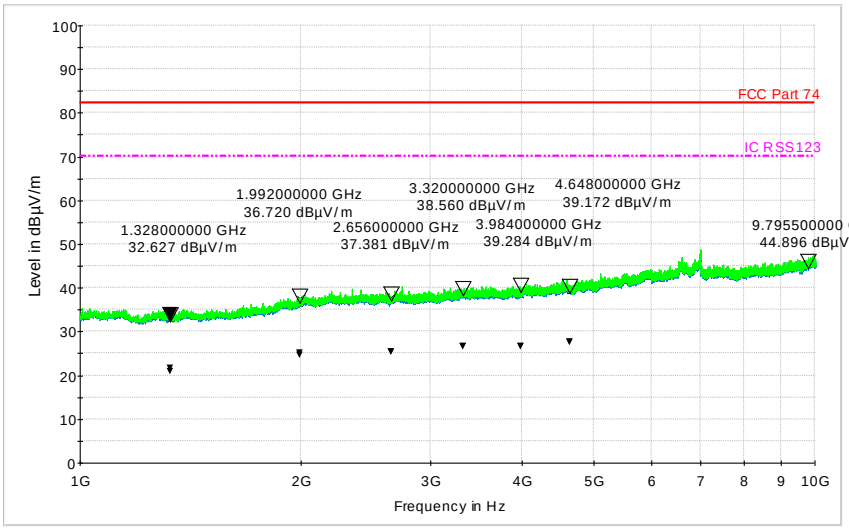
QLXD2 L50 Band Spurious Emission Data

Freq level	Actual Freq (MHz)	Harmonics (MHz)	Polarity	QLXD2	Cable Loss (dB)	Antenna Gain (dB)	10mW Scan (dBµV)	10mW Equivalent Measured from Sig Gen (dBm)	10 mW ERP Total (dBm)	1mW Scan (dBµV)	1mW Equivalent Measured from Sig Gen (dBm)	1 mW ERP Total (dBm)
Low	632	1264	H	1	2.4	4.0	43.2	-61.6	-60.0	30.8	-96.9	-95.3
		1264	V		2.4	4.0	52.8	-50.4	-48.8	32.3	-94.5	-92.9
		1896	H	2	3.0	5.0	51.5	-54.3	-52.3	34.5	-95.4	-93.4
		1896	V		3.0	5.0	58.7	-45.2	-43.2	37.5	-90.0	-88.0
		2528	H	3	3.5	6.0	43.2	-66.2	-63.7	34.0	-97.3	-94.8
		2528	V		3.5	6.0	43.8	-64.5	-62.0	33.5	-94.5	-92.0
		3160	H	4	3.9	7.6	46.6	-61.9	-58.2	36.6	-96.9	-93.2
		3160	V		3.9	7.6	48.3	-57.5	-53.8	36.8	-95.5	-91.8
		3792	H	5	4.7	8.4	48.6	-55.9	-52.2	38.2	-92.7	-89.0
		3792	V		4.7	8.4	51.4	-48.7	-45.0	38.3	-93.5	-89.8
		4424	H	6	4.9	9.4	40.0	-88.2	-83.7	38.6	-90.9	-86.4
		4424	V		4.9	9.4	40.3	-87.5	-83.0	38.0	-91.5	-87.0
Mid	664	1328	H	1	2.5	4.0	36.6	-72.5	-71.0	32.9	-91.0	-89.5
		1328	V		2.5	4.0	43.2	-53.2	-51.7	33.2	-92.5	-91.0
		1992	H	2	3.1	5.0	43.8	-65.2	-63.3	36.3	-94.0	-92.1
		1992	V		3.1	5.0	48.7	-53.8	-51.9	37.6	-95.5	-93.6
		2656	H	3	3.5	6.0	37.6	-76.8	-74.3	37.0	-95.5	-93.0
		2656	V		3.5	6.0	49.6	-54.8	-52.3	37.9	-94.8	-92.3
		3320	H	4	4.0	7.6	38.6	-78.0	-74.4	38.5	-95.5	-91.9
		3320	V		4.0	7.6	46.1	-56.7	-53.1	38.6	-96.0	-92.4
		3984	H	5	4.6	8.9	42.6	-68.3	-64.0	38.3	-94.5	-90.2
		3984	V		4.6	8.9	45.9	-57.8	-53.5	39.1	-95.0	-90.7
		4648	H	6	5.1	9.7	39.4	-80.1	-75.5	39.3	-91.0	-86.4
		4648	V		5.1	9.7	42.0	-71.0	-66.4	39.4	-91.5	-86.9
High	696	1392	H	1	2.6	4.0	47.5	-55.5	-54.1	34.7	-80.3	-78.9
		1392	V		2.6	4.0	54.0	-49.5	-48.1	37.8	-74.0	-72.6
		2088	H	2	3.2	5.0	41.5	-68.5	-66.7	36.5	-89.5	-87.7
		2088	V		3.2	5.0	46.0	-58.0	-56.2	36.3	-90.5	-88.7
		2784	H	3	3.7	6.6	39.0	-73.0	-70.1	37.6	-81.5	-78.6
		2784	V		3.7	6.6	40.3	-67.0	-64.1	38.5	-86.5	-83.6
		3480	H	4	4.1	8.2	46.1	-63.4	-59.3	38.6	-81.0	-76.9
		3480	V		4.1	8.2	49.2	-55.0	-50.9	39.4	-78.0	-73.9
		4176	H	5	4.8	9.3	48.2	-58.0	-53.5	39.4	-76.5	-72.0
		4176	V		4.8	9.3	51.2	-49.0	-44.5	39.5	-79.0	-74.5
		4872	H	6	5.2	9.7	40.8	-78.2	-73.7	40.5	-76.0	-71.5
		4872	V		5.2	9.7	42.3	-67.0	-62.5	40.6	-77.0	-72.5

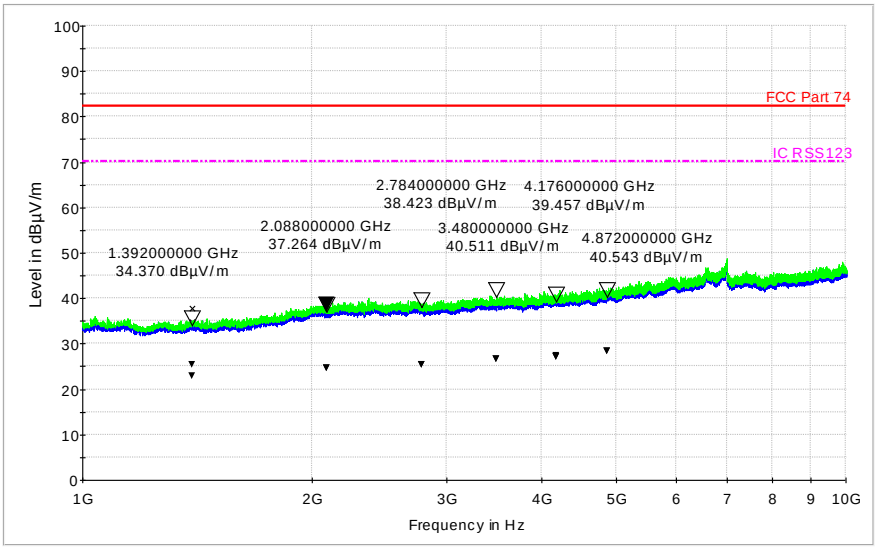
EUT Name:	QLXD2 L50
Serial Number:	EMC6
Test Description:	Radiated RF Emissions 10 GHz
Operating Conditions:	1 mW, Low Freq 632 MHz
Operator Name:	Tom Braxton
Comment:	Horizontal-Vertical Antenna, Max



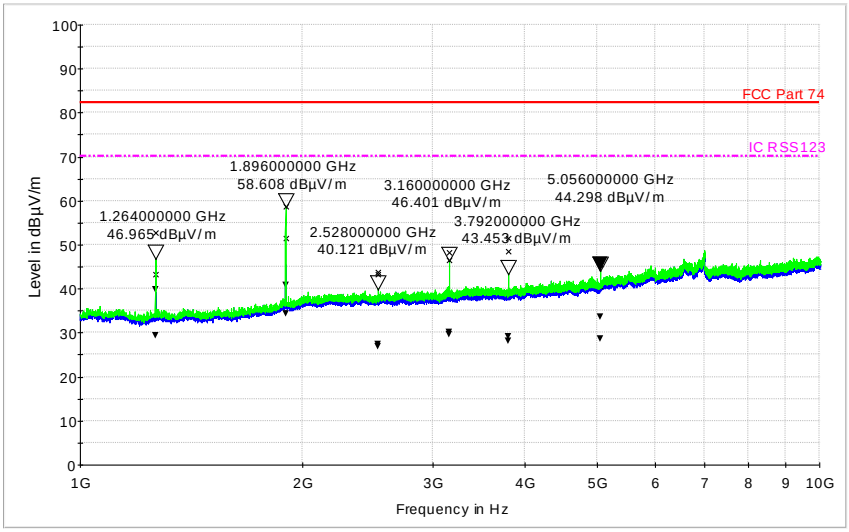
EUT Name:	QLXD2 L50
Serial Number:	EMC6
Test Description:	Radiated RF Emissions 10 GHz
Operating Conditions:	1 mW, Mid Freq 664 MHz
Operator Name:	Tom Braxton
Comment:	Horizontal-Vertical Antenna, Max



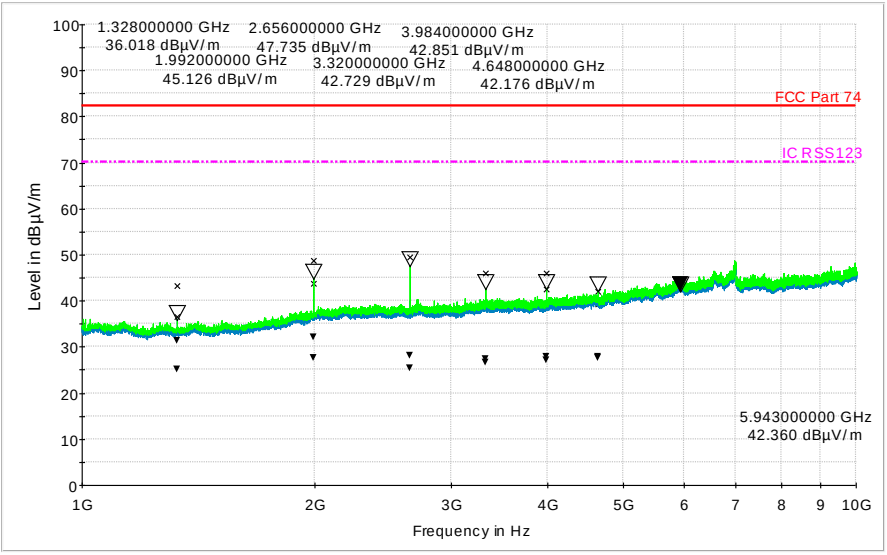
EUT Name:	QLXD2 L50
Serial Number:	EMC6
Test Description:	Radiated RF Emissions 10 GHz
Operating Conditions:	1 mW, High Freq 696 MHz
Operator Name:	Lovell Cueto
Comment:	Horizontal-Vertical Antenna, Max



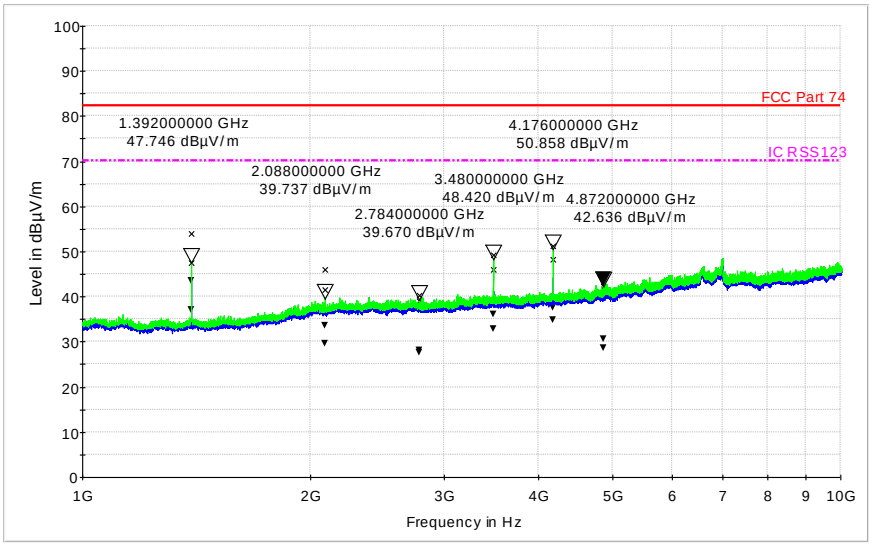
EUT Name:	QLXD2 L50
Serial Number:	EMC6
Test Description:	Radiated RF Emissions 10 GHz
Operating Conditions:	10 mW, Low Freq 632 MHz
Operator Name:	Lovell Cueto
Comment:	Horizontal-Vertical Antenna, Max



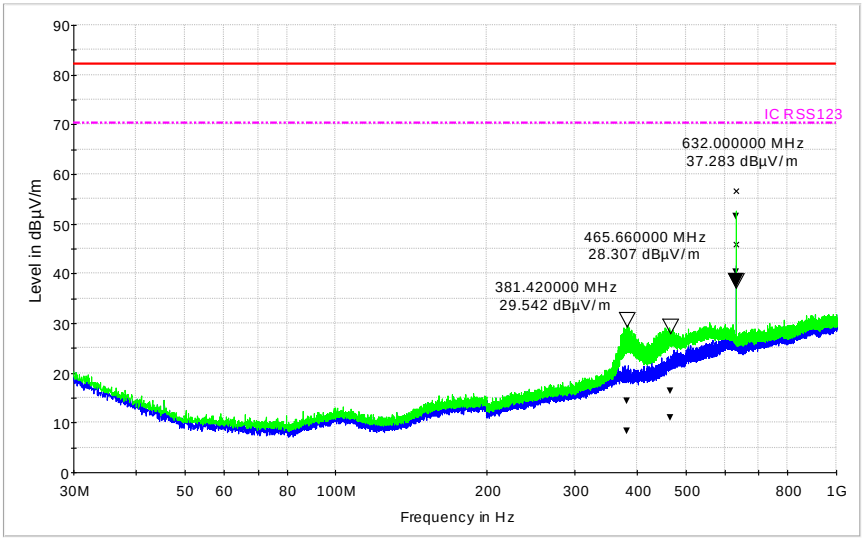
EUT Name:	QLXD2 L50
Serial Number:	EMC6
Test Description:	Radiated RF Emissions 10 GHz
Operating Conditions:	10 mW, Mid Freq 664 MHz
Operator Name:	Tom Braxton
Comment:	Horizontal-Vertical Antenna, Max



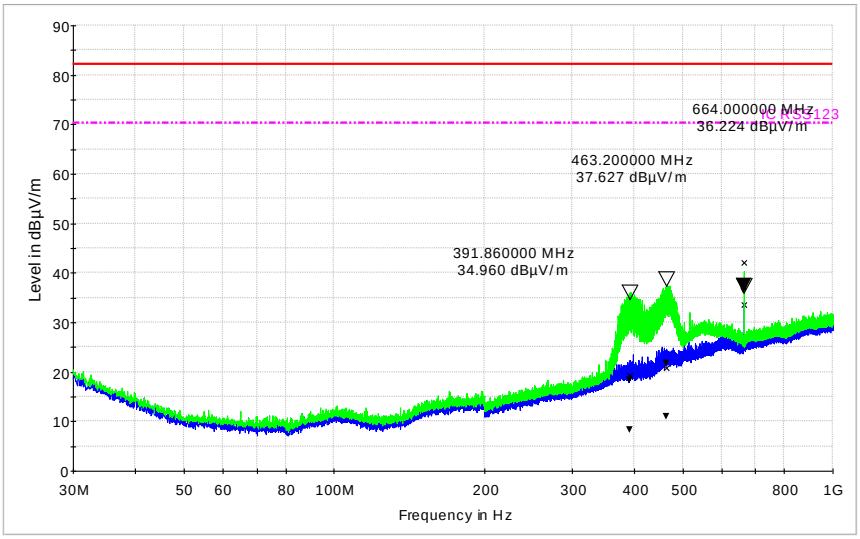
EUT Name:	QLXD2 L50
Serial Number:	EMC6
Test Description:	Radiated RF Emissions 10 GHz
Operating Conditions:	10 mW, High Freq 696 MHz
Operator Name:	Lovell Cueto
Comment:	Horizontal-Vertical Antenna, Max



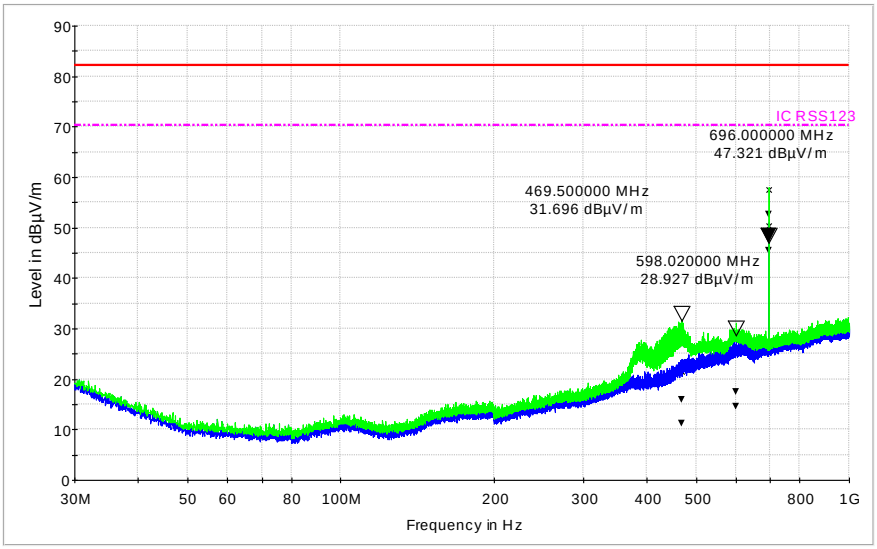
EUT Name:	QLXD2 L50
Serial Number:	EMC5
Test Description:	Radiated RF Emissions 30-1000 MHz
Operating Conditions:	1 mW, Low Freq 632 MHz
Operator Name:	Tom Braxton
Comment:	Horizontal-Vertical Antenna, Max



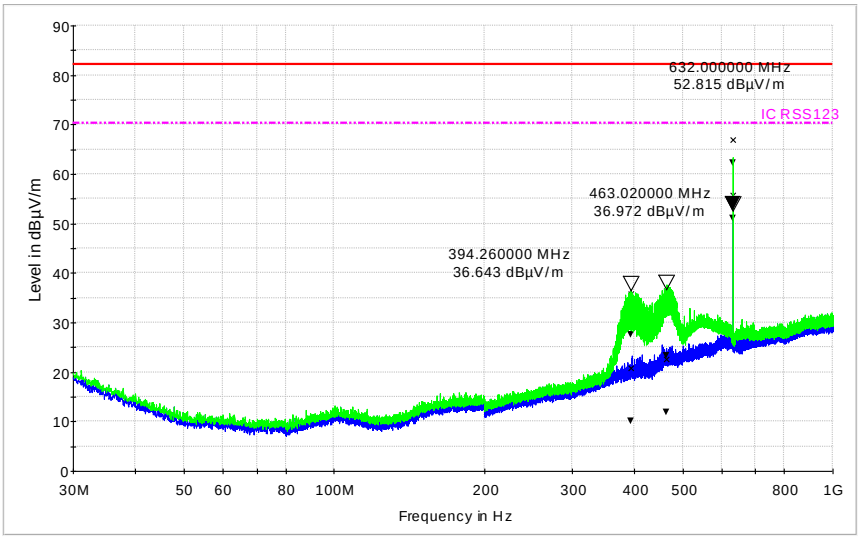
EUT Name:	QLXD2 L50
Serial Number:	EMC5
Test Description:	Radiated RF Emissions 30-1000 MHz
Operating Conditions:	1 mW, Mid Freq 664 MHz
Operator Name:	Lovell Cueto
Comment:	Horizontal-Vertical Antenna, Max



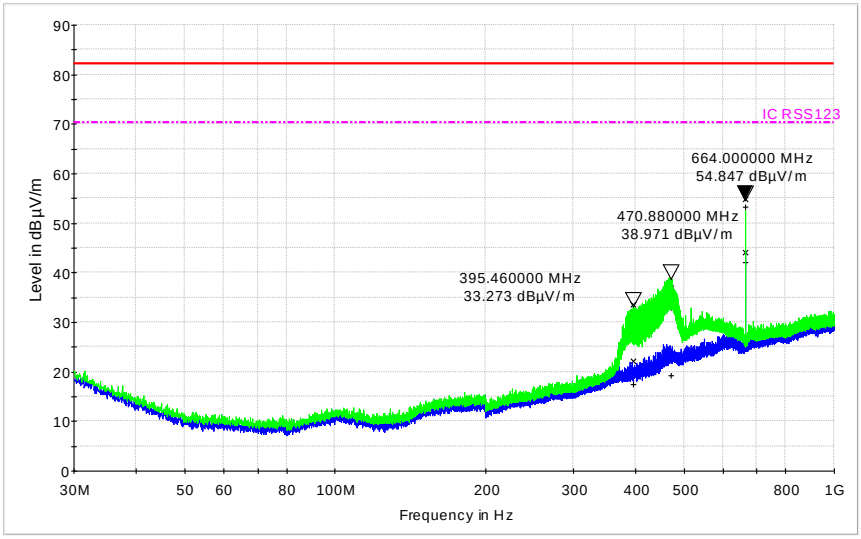
EUT Name:	QLXD2 L50
Serial Number:	EMC5
Test Description:	Radiated RF Emissions 30-1000 MHz
Operating Conditions:	1 mW, High Freq 696 MHz
Operator Name:	Tom Braxton
Comment:	Horizontal-Vertical Antenna, Max



EUT Name:	QLXD2 L50
Serial Number:	EMC5
Test Description:	Radiated RF Emissions 30-1000 MHz
Operating Conditions:	10 mW, Low Freq 632 MHz
Operator Name:	Tom Braxton
Comment:	Horizontal-Vertical Antenna, Max



EUT Name:	QLXD2 L50
Serial Number:	EMC5
Test Description:	Radiated RF Emissions 30-1000 MHz
Operating Conditions:	10 mW, Mid Freq 664 MHz
Operator Name:	Tom Braxton
Comment:	Horizontal-Vertical Antenna, Max



EUT Name:	QLXD2 L50
Serial Number:	EMC5
Test Description:	Radiated RF Emissions 30-1000 MHz
Operating Conditions:	10 mW, High Freq 696 MHz
Operator Name:	Tom Braxton
Comment:	Horizontal-Vertical Antenna, Max