



Nemko Test Report: 2014 258169 FCC PT90rev2

Applicant: E.F. Johnson
1440 Corporate Drive
Irving, TX 75038

**Equipment Under Test:
(E.U.T.)** 242-5770

In Accordance With: **CFR 47 Part 90, Subpart I and
Industry Canada RSS-119, Issue 11**
Private Land Mobile Transmitters

FCC Identifier: ATH2425770

IC Identifier: 933B-2425770

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

TESTED BY:

A handwritten signature in black ink, appearing to read 'David Light'.

David Light, Wireless Engineer

DATE: 08 Sept. 2014
Date

APPROVED BY:

A handwritten signature in black ink, appearing to read 'B. Ketterling'.

Bruce Ketterling, EMC Manager

DATE: 08 Sept 2014
Date

Number of Pages: 27

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EQUIPMENT: 242-5770PROJECT NO.: 2014 258169 FCC PT90rev2**Section 1. Summary of Test Results**

Manufacturer: E.F. Johnson

Model No.: 242-5770

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 CFR Part 90, Subpart I and Industry Canada RSS-119, Issue 11. EIA/TIA 603 and ANSI C63.4:2003 were used as a test method for these measurements.



New Submission



Production Unit



Class II Permissive Change



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".



NVLAP Lab Code

200116-0

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Summary of Test Data

NAME OF TEST	PARA. NO.	RESULT
RF Power Output	90.205 / 5.4.5	NT
Audio Frequency Response	TIA EIA-6.3.2.6	NT
Audio Low Pass Filter Response	TIA EIA-6.3.2.6	NT
Modulation Limiting	TIA EIA-6.3.2.6	NT
Spurious Emissions at Antenna Terminals	90.210 / 5.8.9.2	Complies
Field Strength of Spurious Emissions	90.210 / 5.8.9.2	NT
Frequency Stability	90.213 / 5.3	NT
Transient Frequency Behavior	90.214 / 5.9	NT
Adjacent Channel Power	90.543 / 5.8.9.1	Complies
Receiver Spurious Emissions	RSS-Gen 6.1	NT

Footnotes:

- 1) Transient Frequency Behavior is not required for this band.
- 2) Class II permissive change. Adding emission designator 8K10F7E. The only test needed were spurious emissions at antenna and adjacent channel power.

Revisions:

- Rev1) Added data for adjacent channel power in upper 700 MHz band. (Page 22)
Added data for additional masks. (Pages 16-20)
- Rev2) Remeasured and updated data pages 12 and 15.
Removed duplicate data page 16.
Provided emission mask H for data page 18.
Provided emission mask D for data page 20.
Listed ACP test frequencies page 23.

Section 2. General Equipment Specification

Supply Voltage Input:	7.5 Vdc				
Frequency Range:	763 – 775 MHz 793 – 805 MHz 806 – 824 MHz 851 – 869 MHz				
Emission Designator:	8K10F7E				
Output Impedance:	50 Ohms				
RF Power Output (rated):	<table><tr><td><u>3.0</u></td><td>W (763 – 806 MHz)</td></tr><tr><td><u>3.5</u></td><td>W (806 – 869 MHz)</td></tr></table>	<u>3.0</u>	W (763 – 806 MHz)	<u>3.5</u>	W (806 – 869 MHz)
<u>3.0</u>	W (763 – 806 MHz)				
<u>3.5</u>	W (806 – 869 MHz)				
Operator Selection of Operating Frequency:	Pre-programmed channel selection				
Power Output Adjustment Capability:	None				

System Description

3.5 Watt 700/800 MHz Land Mobile Radio transceiver

EQUIPMENT: 242-5770PROJECT NO.: 2014 258169 FCC PT90rev2**Section 3. Spurious Emissions at Antenna Terminals**

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 2.1051
TESTED BY: David Light	DATE: 07 May 2014

Test Results: Complies.**Test Data:** See attached plot(s).**Equipment Used:**

Asset Tag	Description	Manufacturer	Model	Serial #	Last Cal	Next Cal
1036	Spectrum Analyzer	Rohde & Schwartz	FSEK30	830844/006	15-Jul-2013	15-Jul-2015

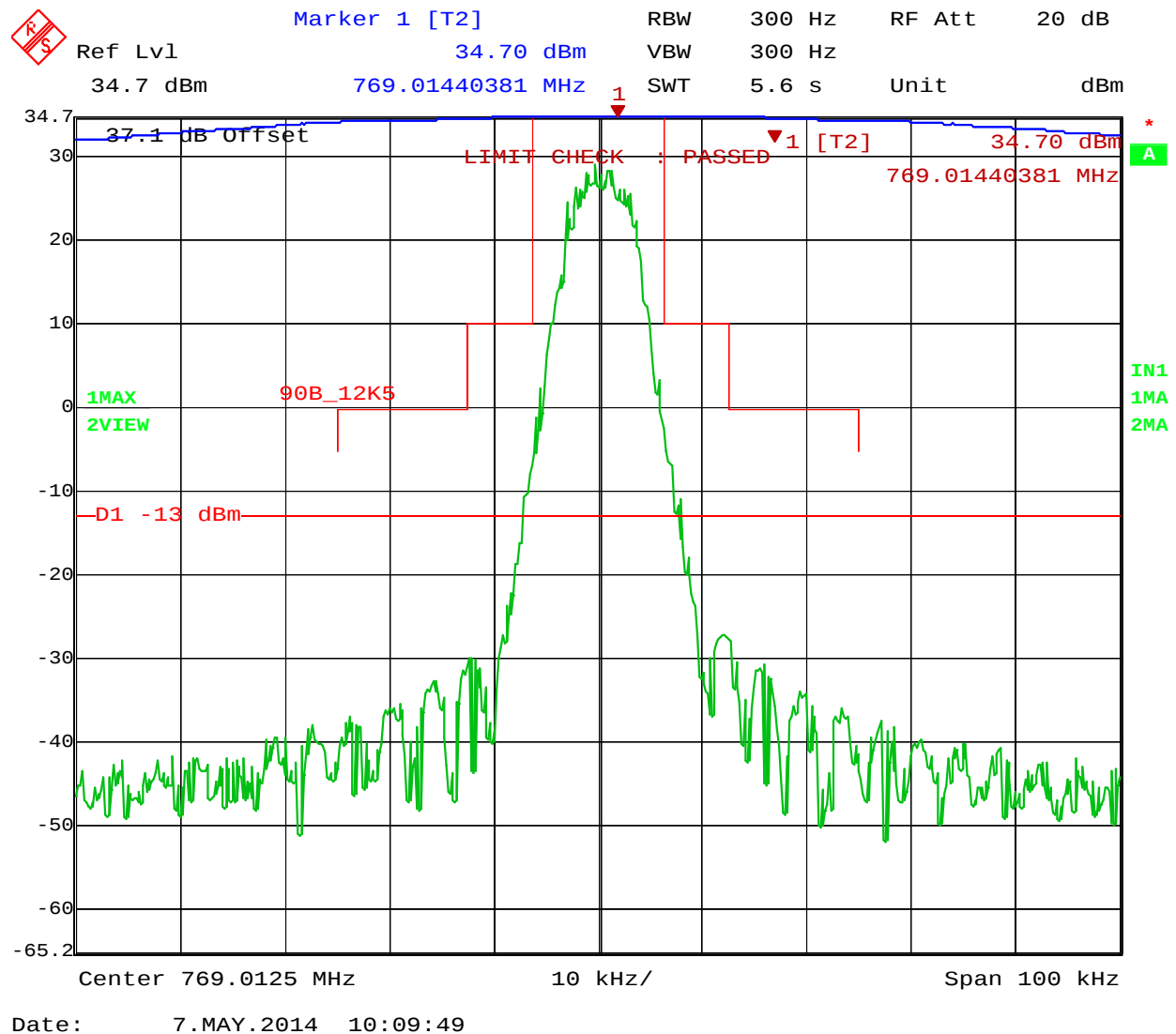
Measurement Uncertainty: +/- 1.7 dB**Temperature:** 22 °C**Relative Humidity:** 35 %

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Test Data Spurious Emissions at Antenna Port

1031 0 S

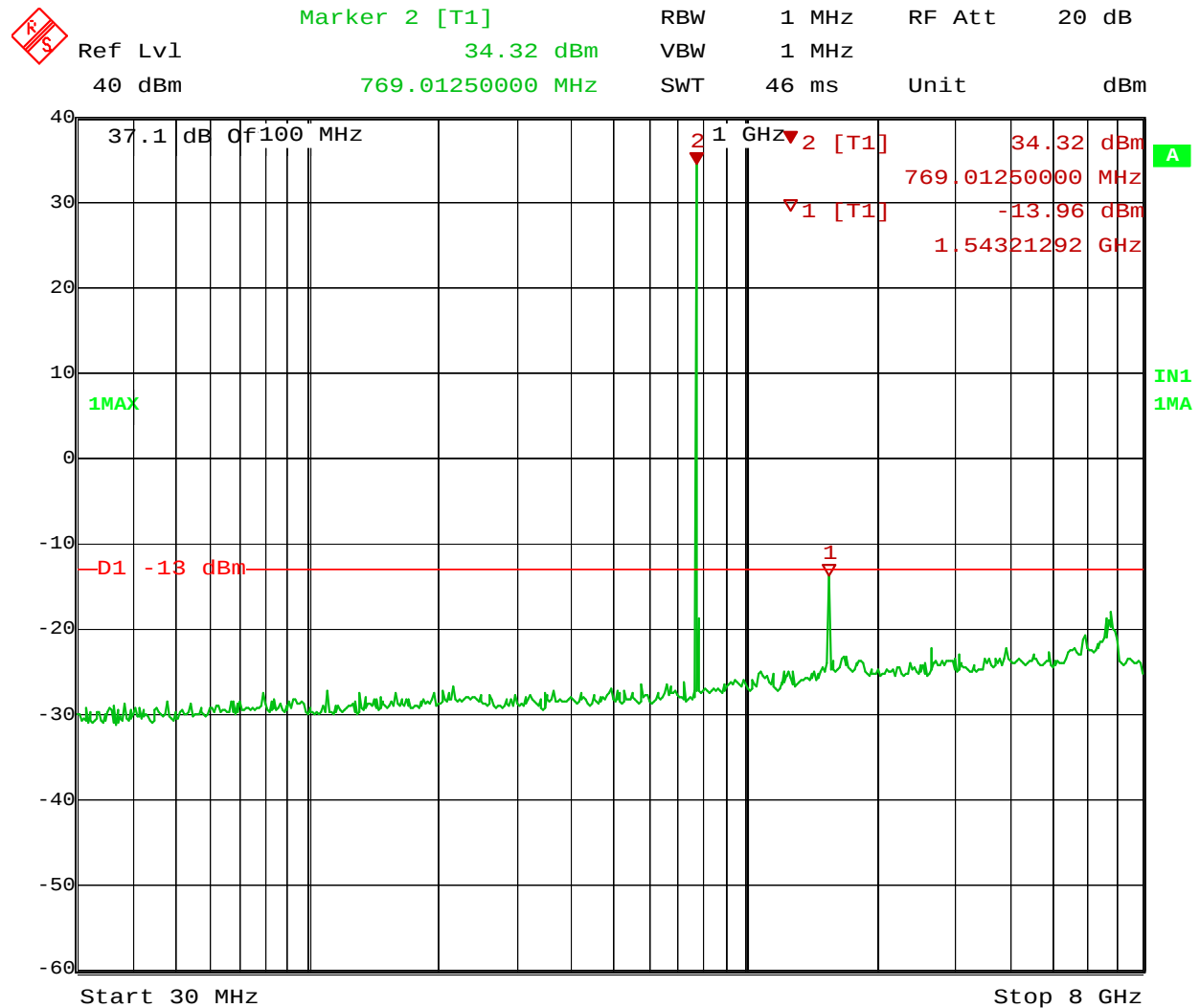


EQUIPMENT: 242-5770

PROJECT NO.: 2014 258169 FCC PT90rev2

Test Data Spurious Emissions at Antenna Port

1031 0 S



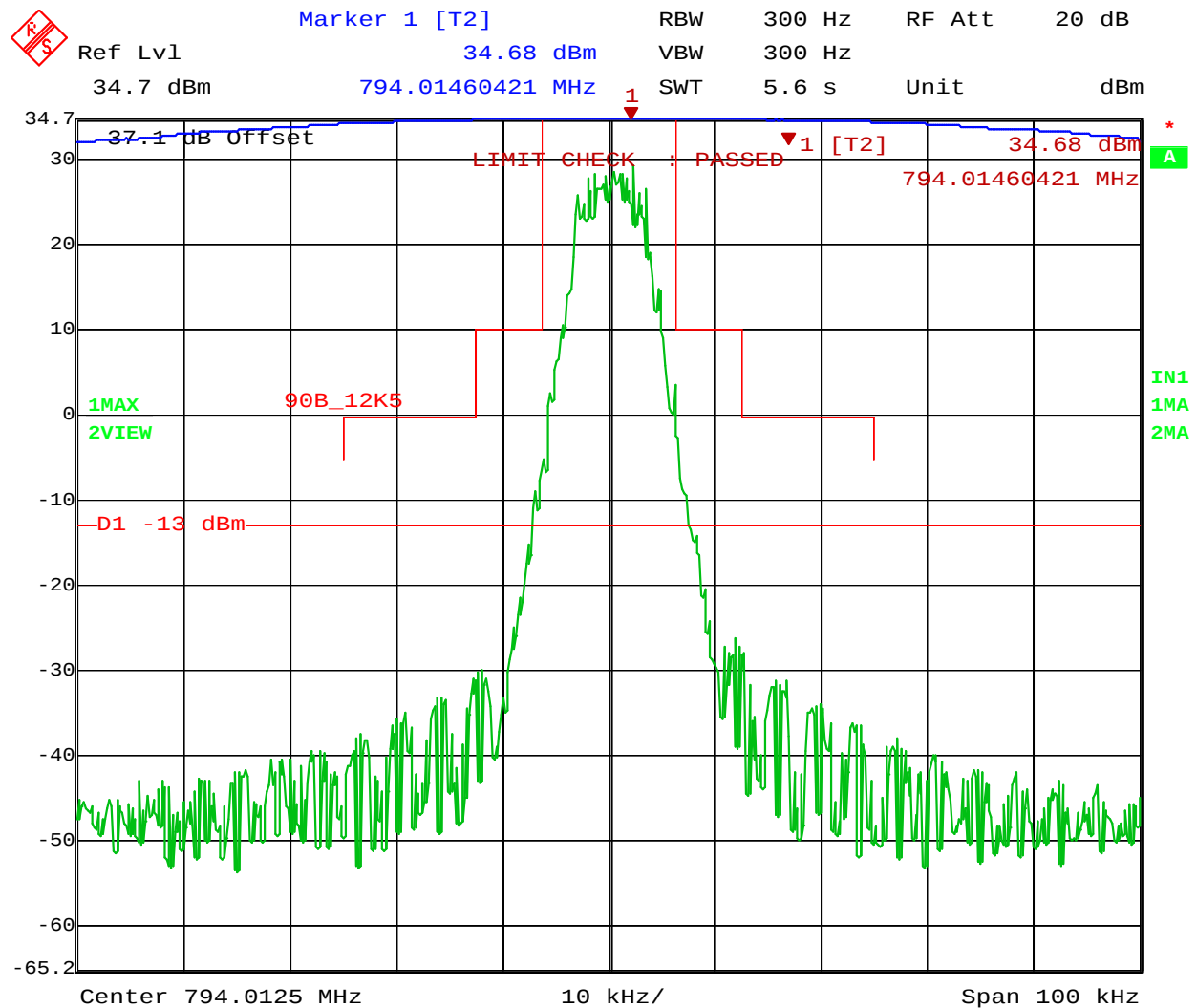
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EQUIPMENT: 242-5770

PROJECT NO.: 2014 258169 FCC PT90rev2

Test Data Spurious Emissions at Antenna Port

1031 0 S



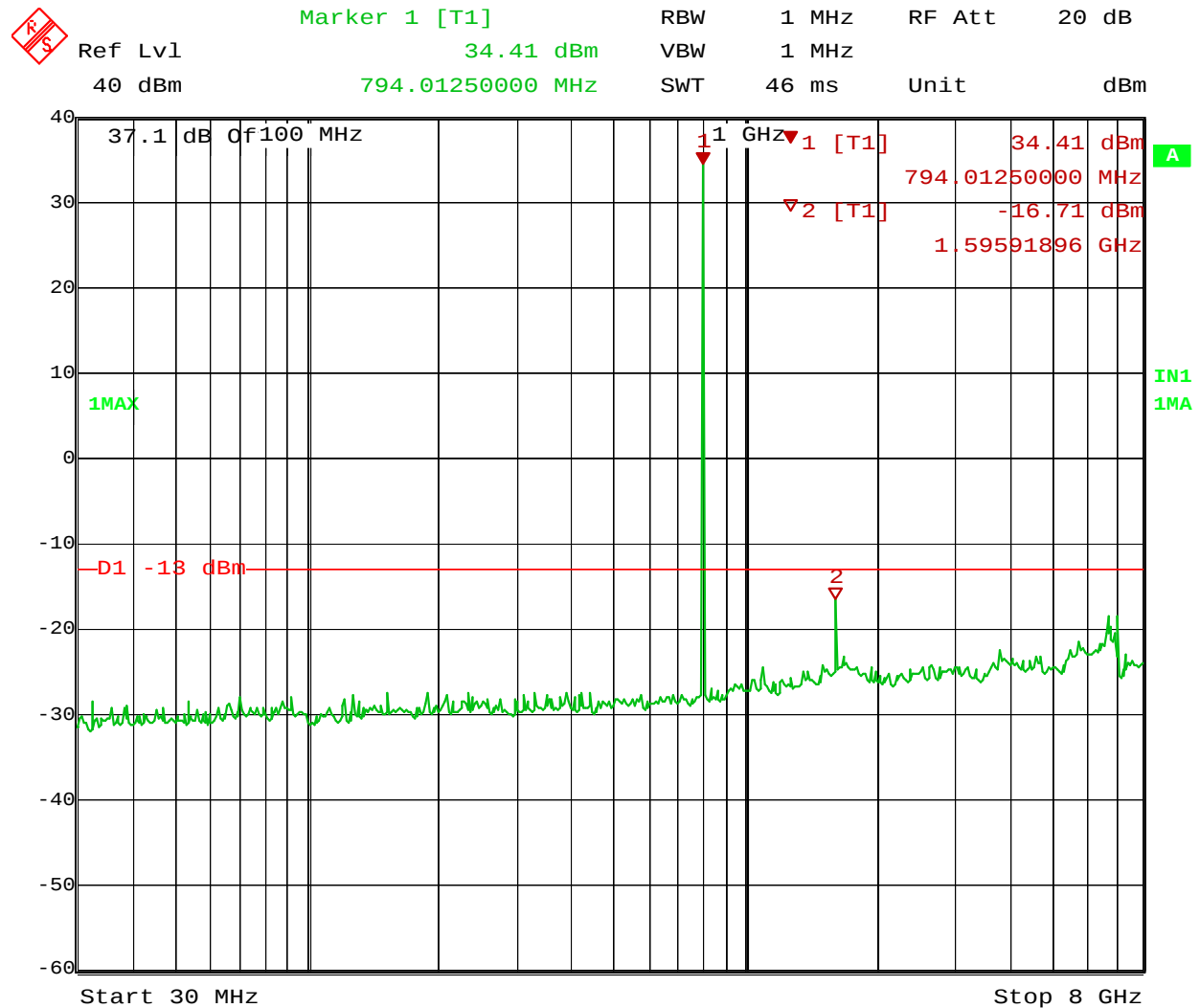
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EQUIPMENT: 242-5770

PROJECT NO.: 2014 258169 FCC PT90rev2

Test Data Spurious Emissions at Antenna Port

1031 0 S



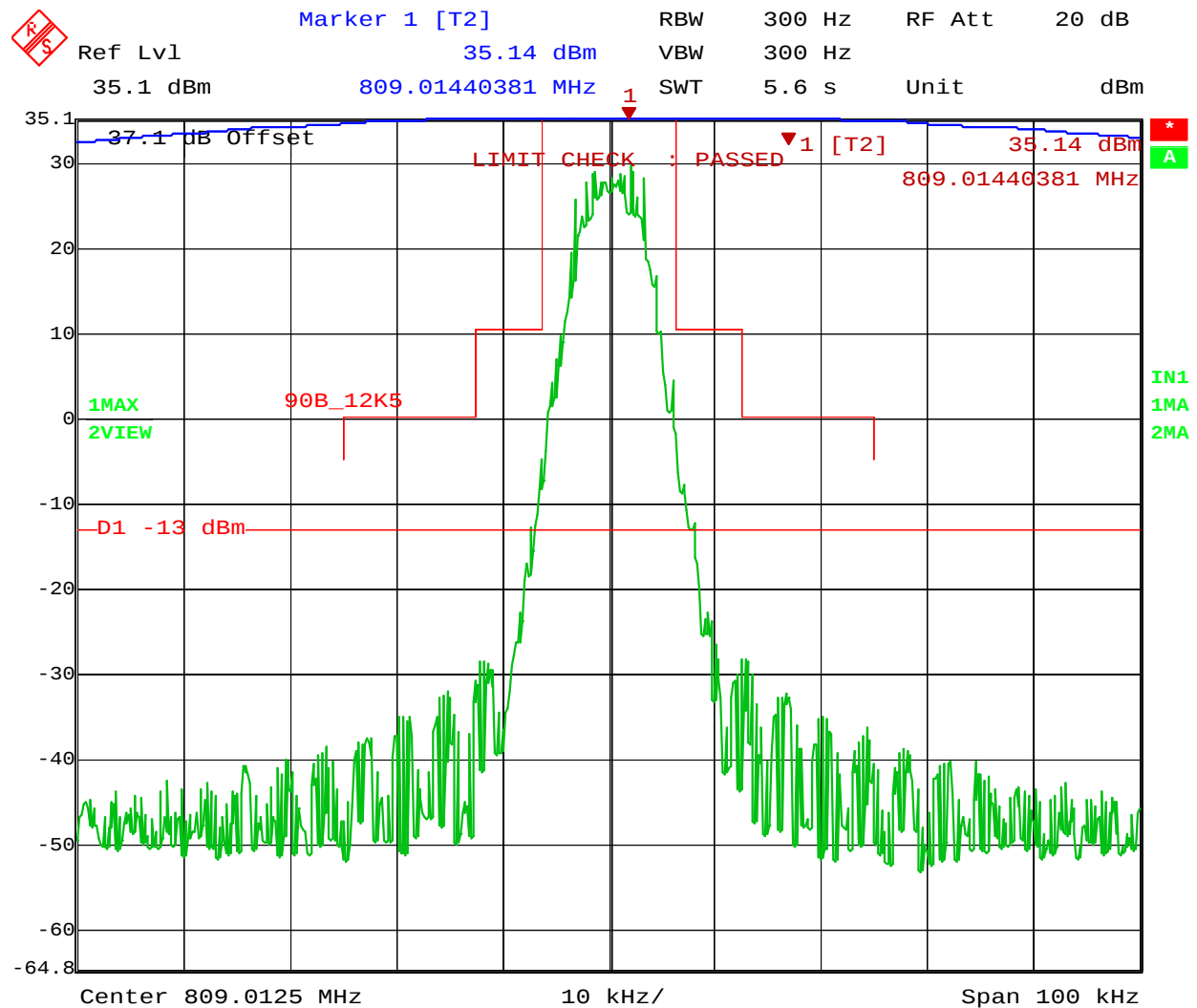
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EQUIPMENT: 242-5770

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Test Data Spurious Emissions at Antenna Port

1031 0 S



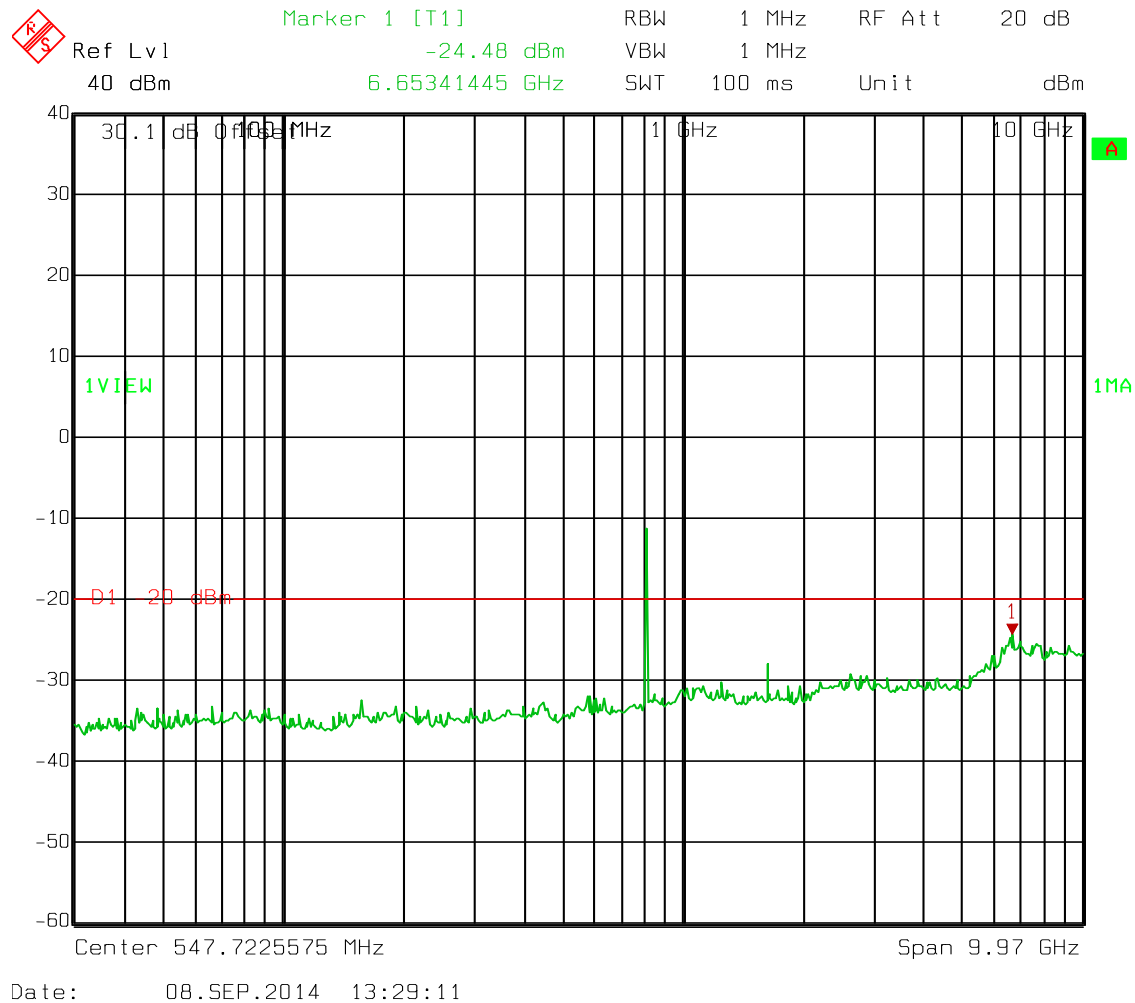
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EQUIPMENT: 242-5770

PROJECT NO.: 2014 258169 FCC PT90rev2

Test Data Spurious Emissions at Antenna Port

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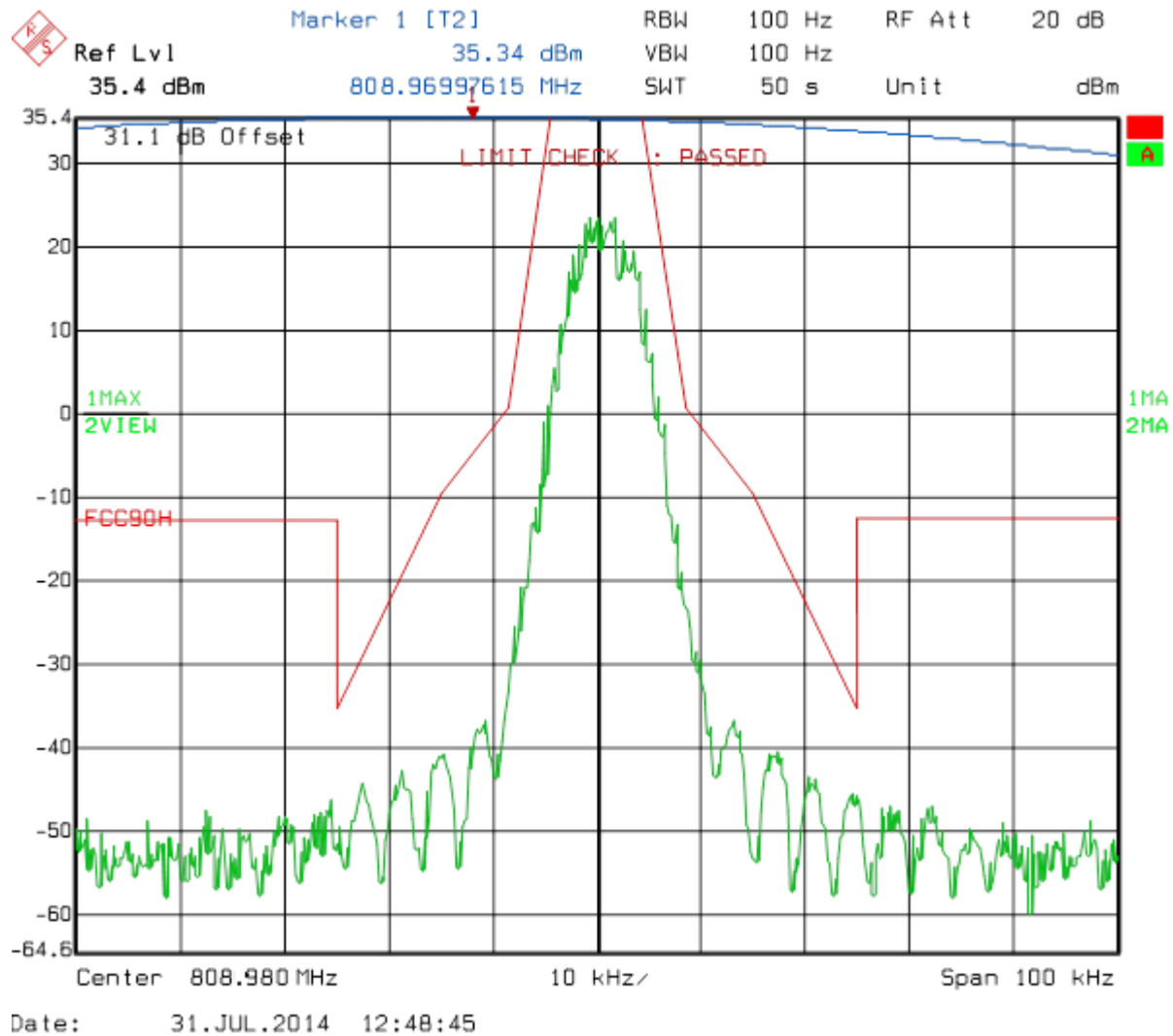


EQUIPMENT: 242-5770

PROJECT NO.: 2014 258169 FCC PT90rev2

Test Data Spurious Emissions at Antenna Port

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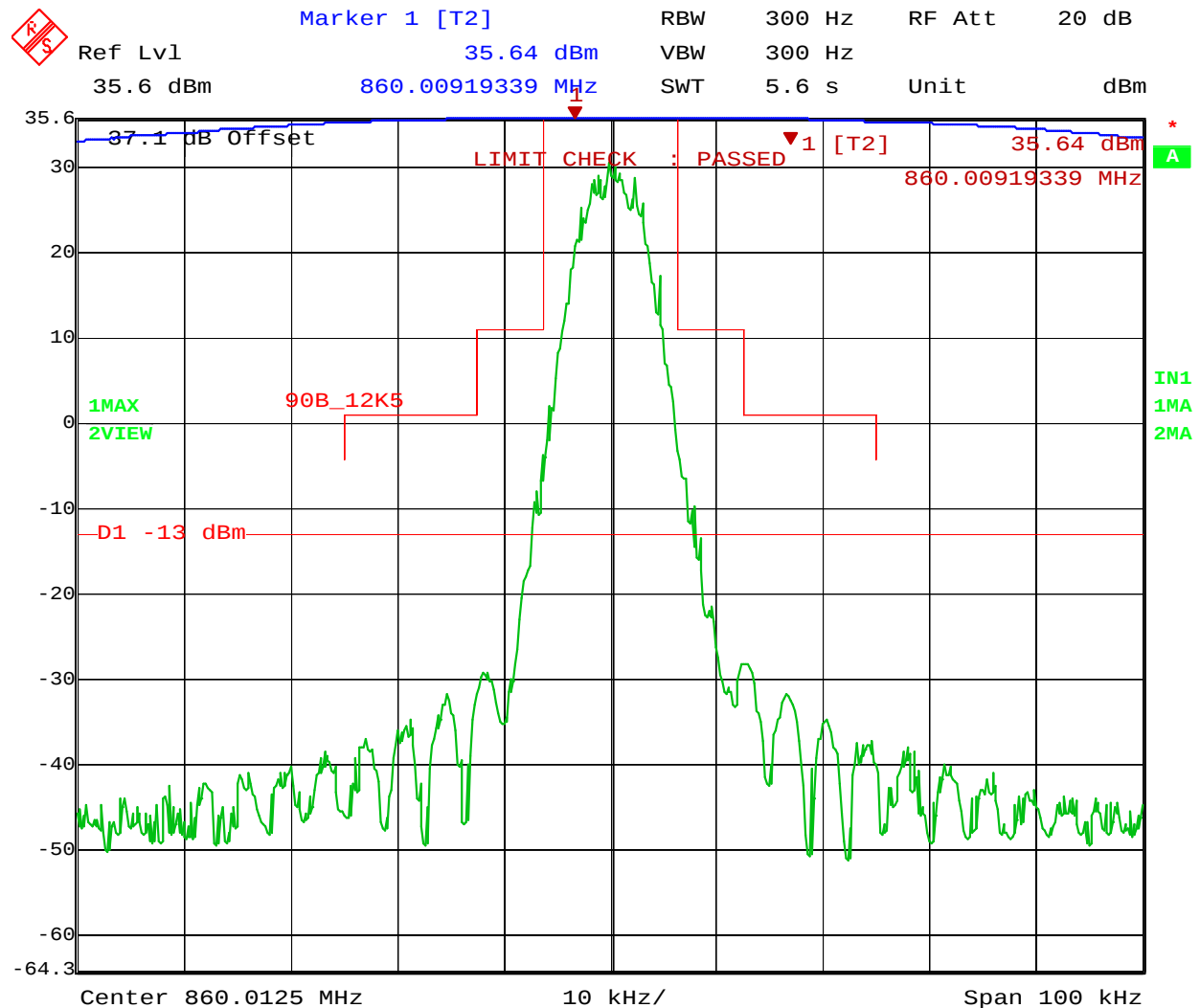


EQUIPMENT: 242-5770

PROJECT NO.: 2014 258169 FCC PT90rev2

Test Data Spurious Emissions at Antenna Port

1031 0 S



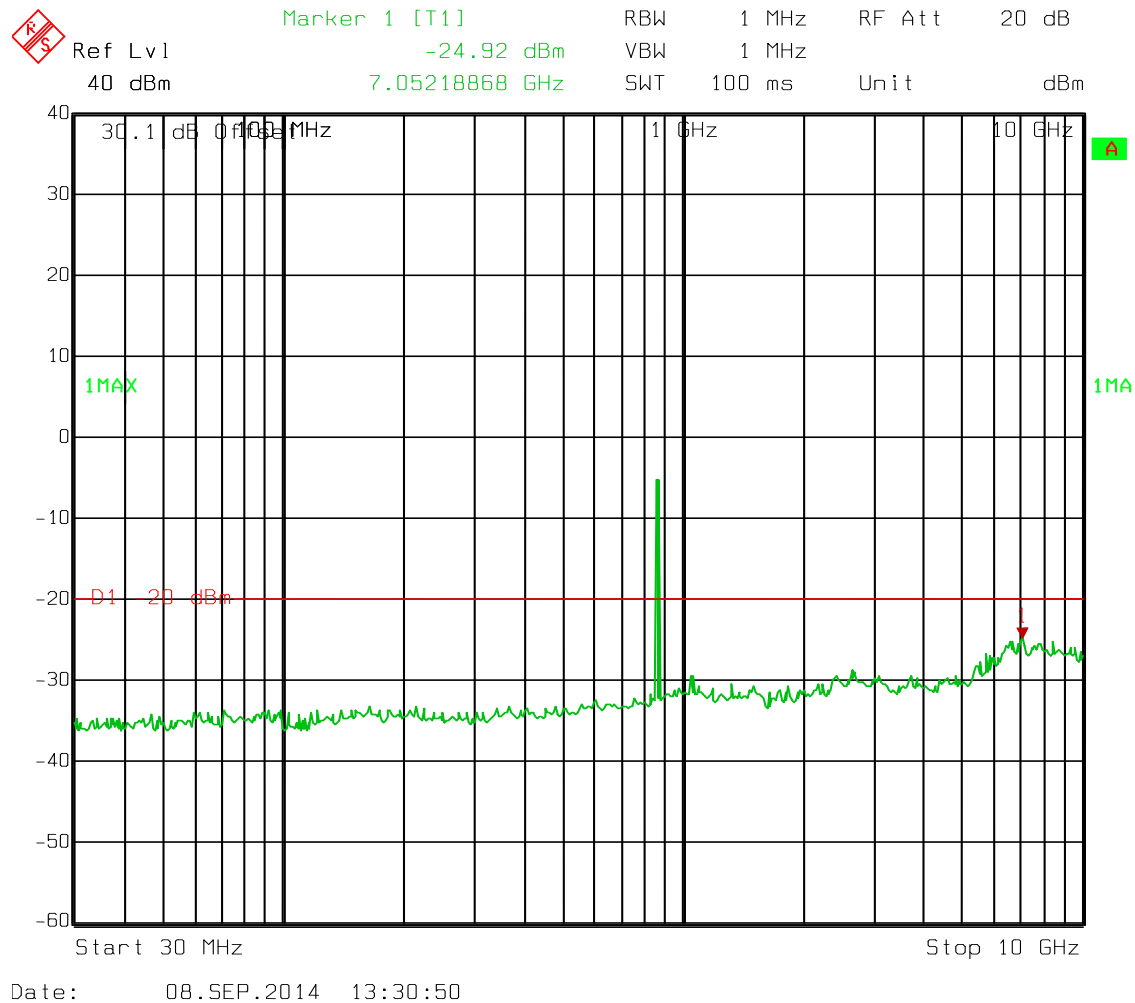
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EQUIPMENT: 242-5770

PROJECT NO.: 2014 258169 FCC PT90rev2

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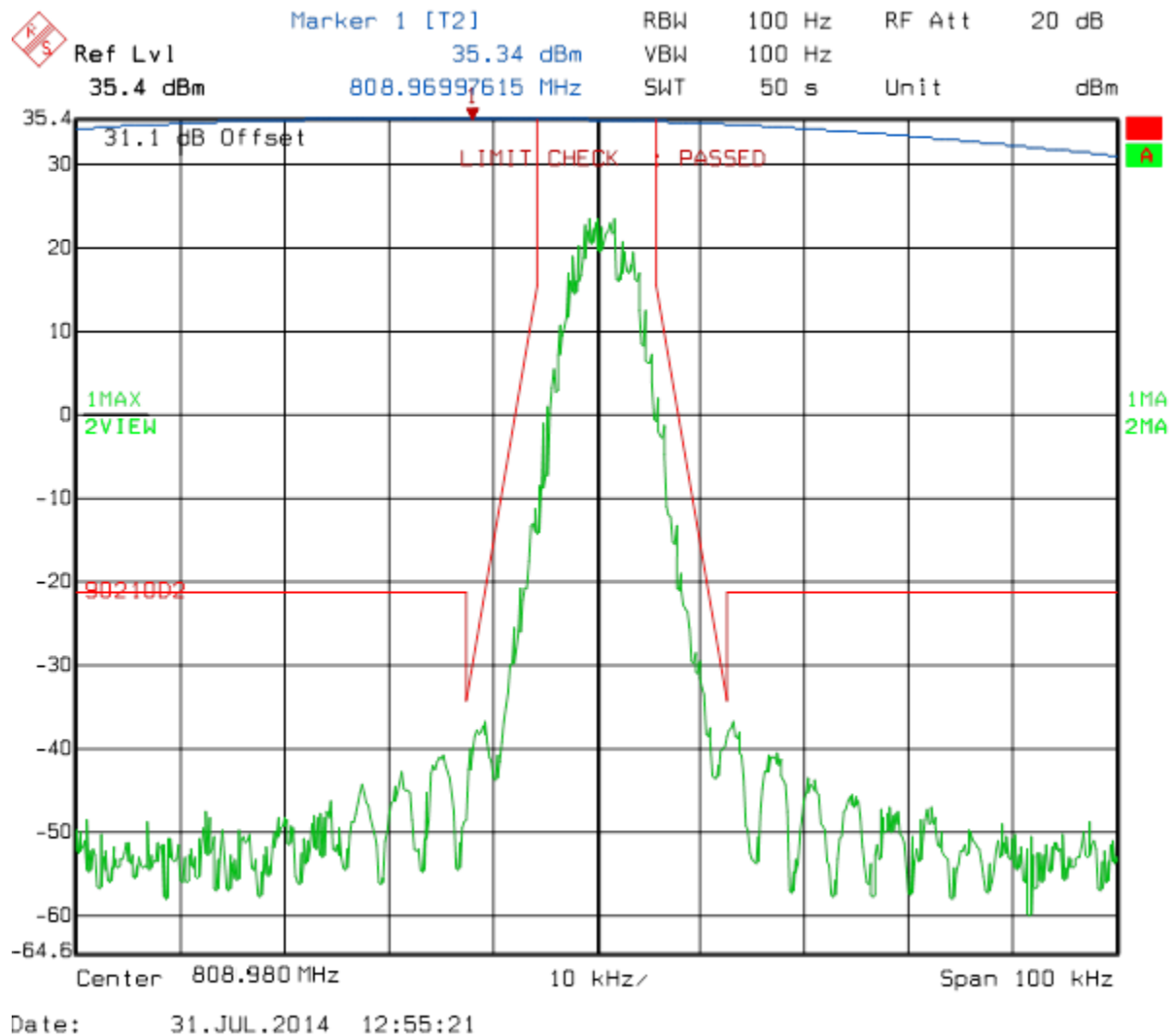


EQUIPMENT: 242-5770

PROJECT NO.: 2014 258169 FCC PT90rev2

Test Data Spurious Emissions at Antenna Port

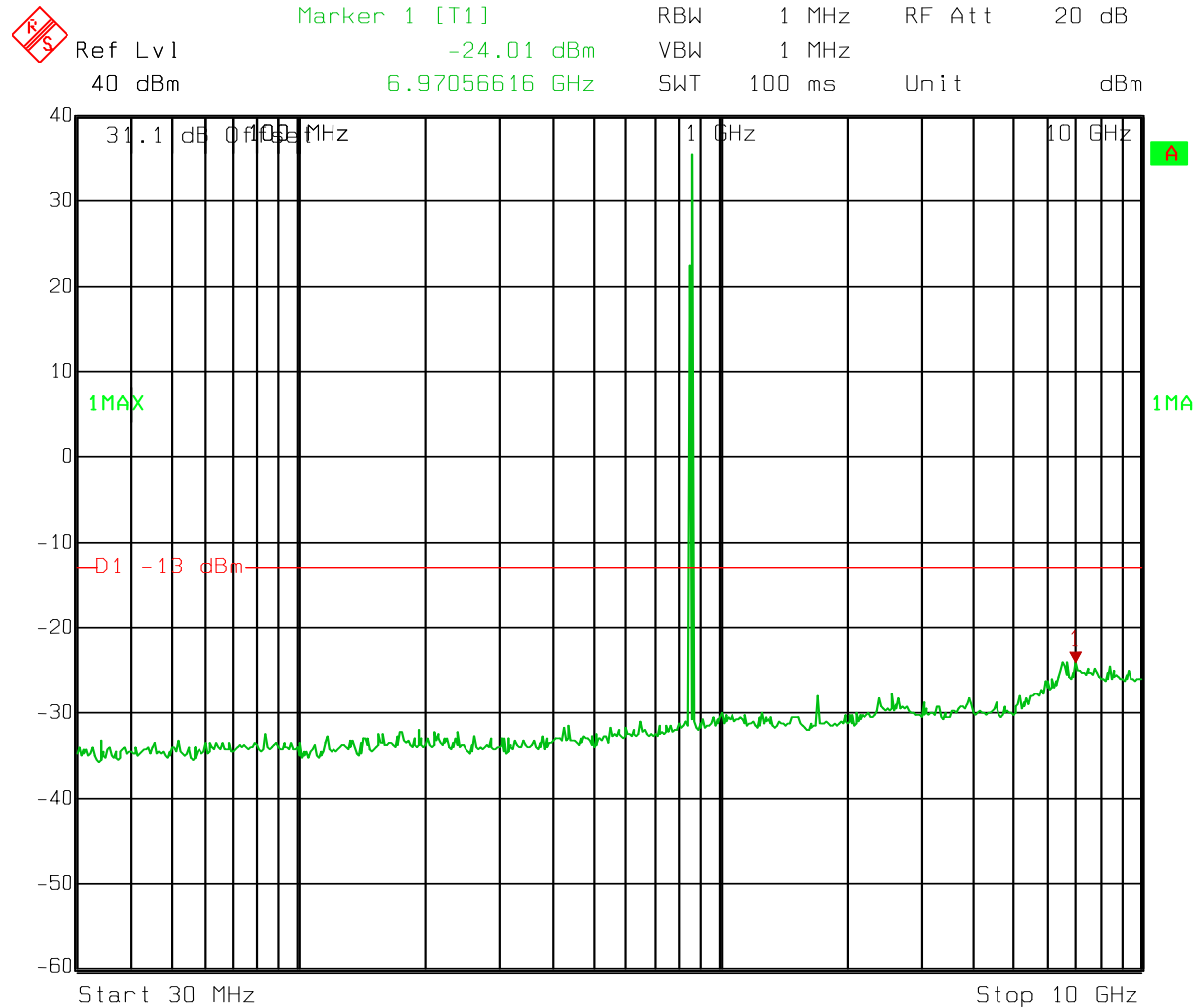
90.210(d)



EQUIPMENT: 242-5770

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Test Data Spurious Emissions at Antenna Port



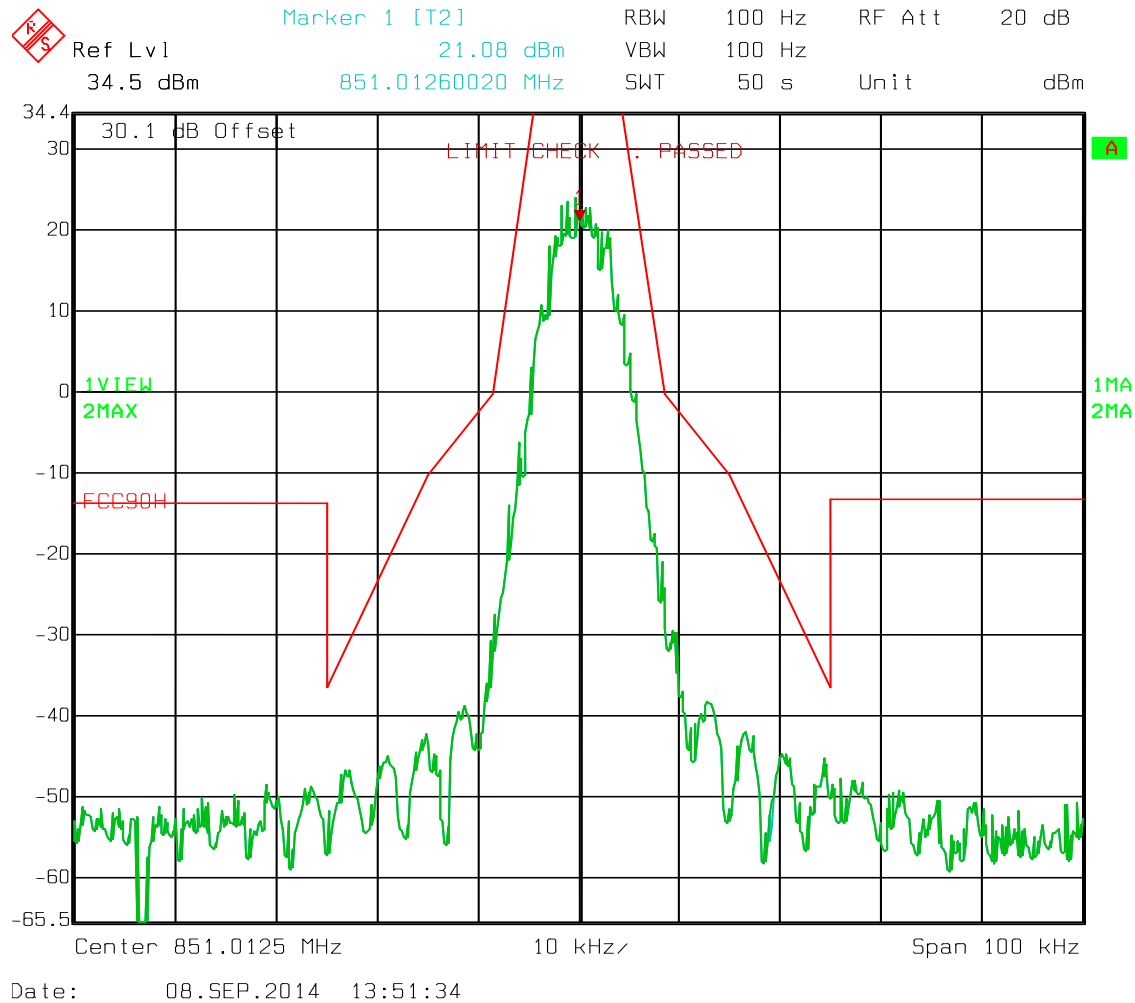
Date: 31.JUL.2014 12:58:21

EQUIPMENT: 242-5770

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Test Data Spurious Emissions at Antenna Port

Mask H



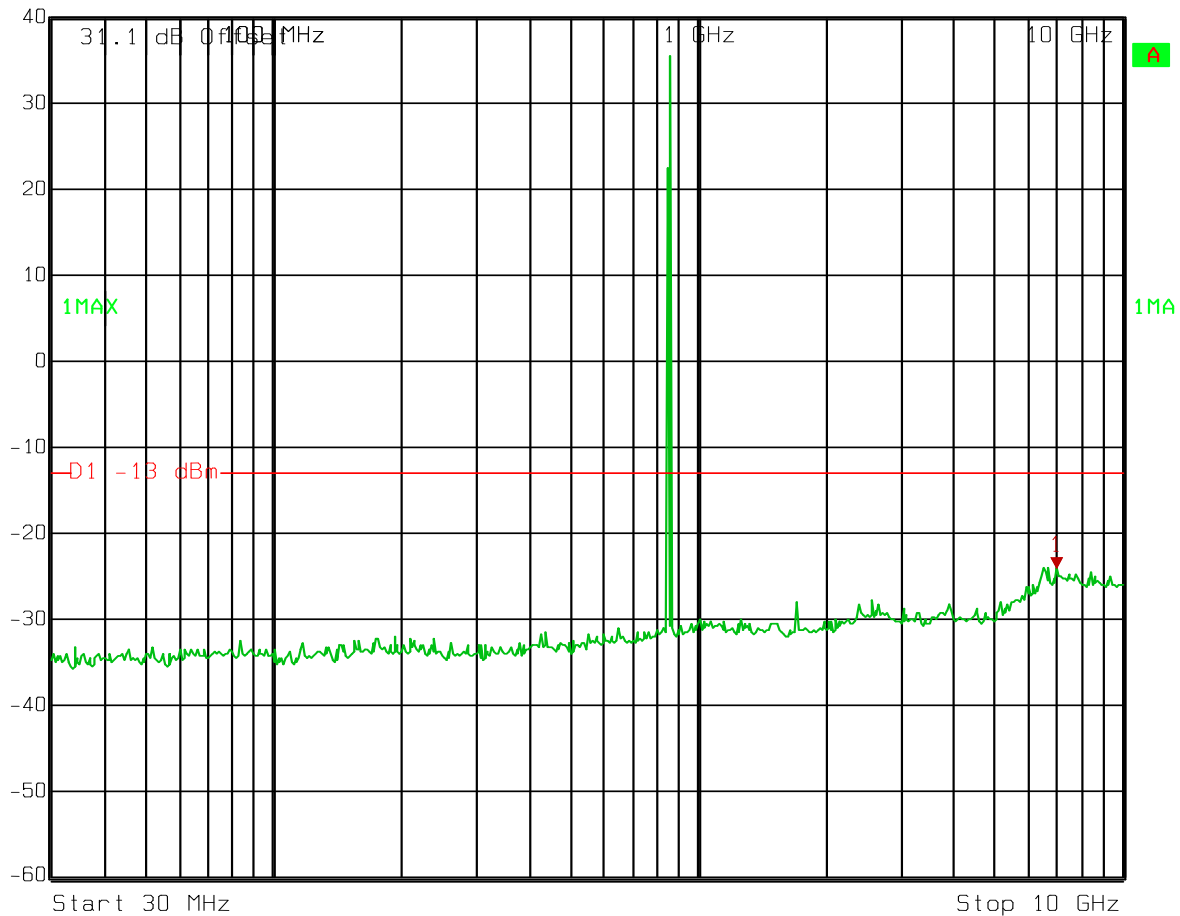
EQUIPMENT: 242-5770

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Test Data Spurious Emissions at Antenna Port

Mask H
851-864 MHz

Marker 1 [T1] RBW 1 MHz RF Att 20 dB
Ref Lvl -24.01 dBm VBW 1 MHz
40 dBm 6.97056616 GHz SWT 100 ms Unit dBm

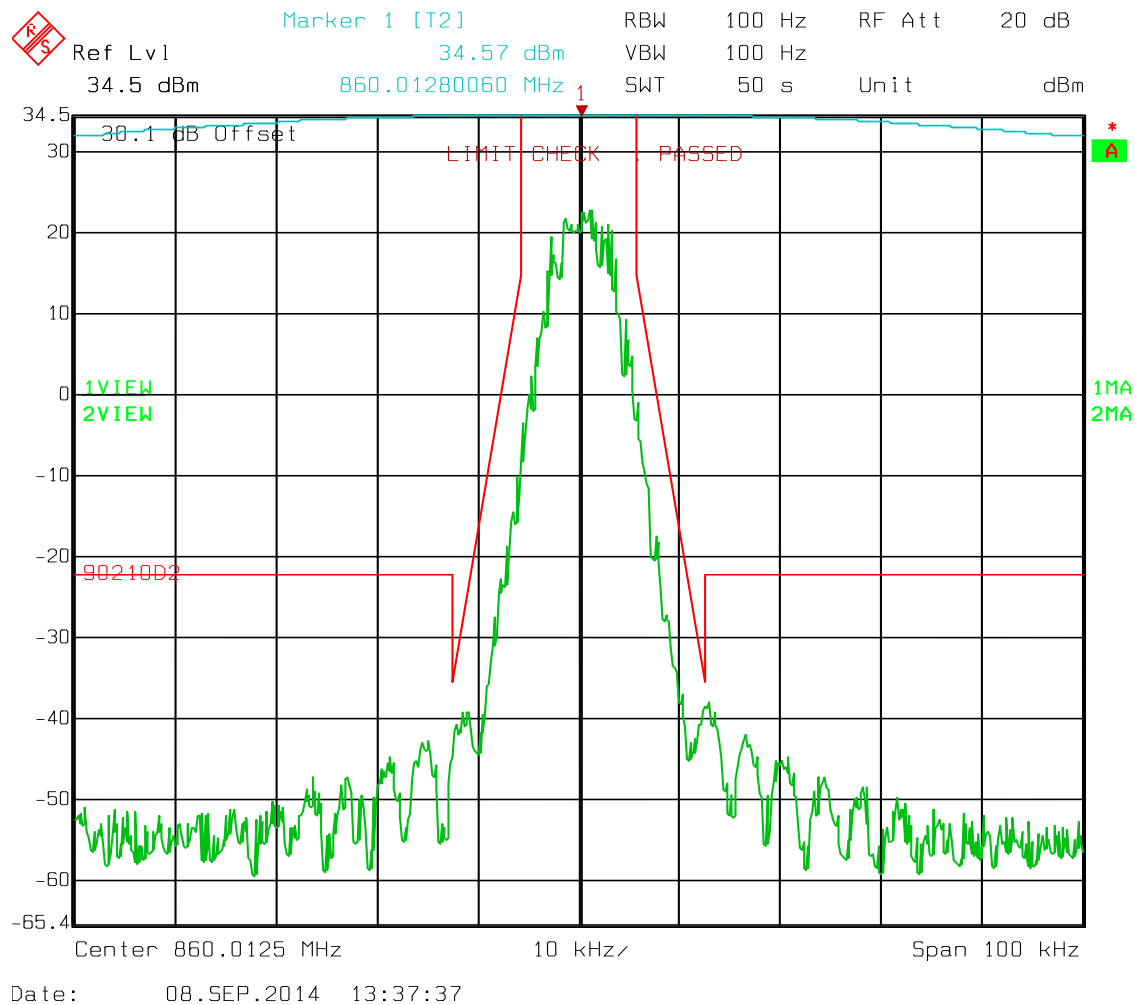


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EQUIPMENT: 242-5770

PROJECT NO.: 2014 258169 FCC PT90rev2

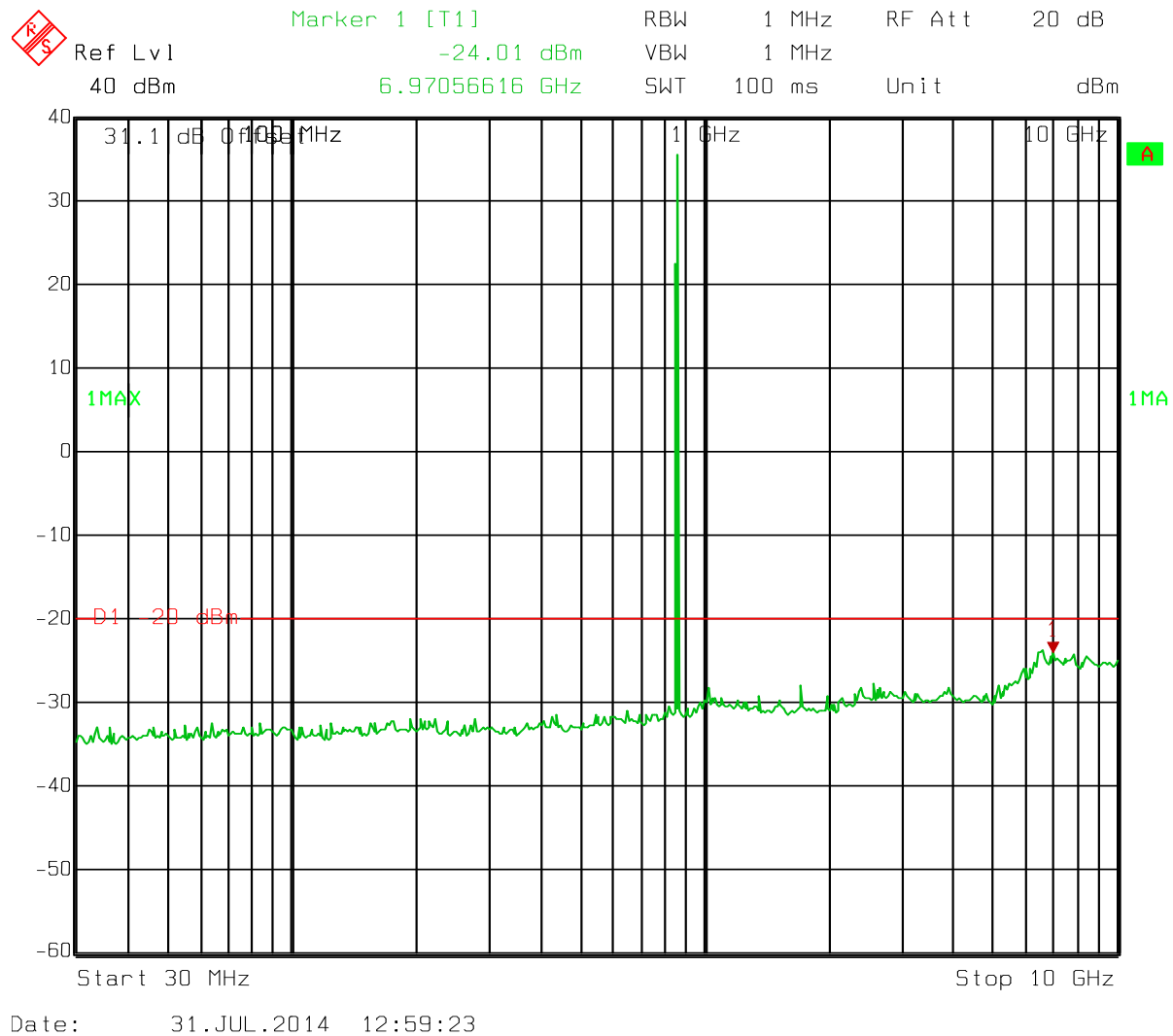
Test Data Spurious Emissions at Antenna Port

Mask D
Canada 851-864

EQUIPMENT: 242-5770

PROJECT NO.: 2014 258169 FCC PT90rev2

Test Data Spurious Emissions at Antenna Port

Mask D
Canada 851-864

EQUIPMENT: 242-5770

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Section 4. Adjacent Channel Power

NAME OF TEST: Adjacent Channel Power	PARA. NO.: 90.543/5.8.9.1
TESTED BY: David Light	DATE: 07 May 2014

Test Results: Complies.**Test Data:** See attached table.**Equipment Used:**

Asset Tag	Description	Manufacturer	Model	Serial #	Last Cal	Next Cal
1036	Spectrum Analyzer	Rohde & Schwartz	FSEK30	830844/006	15-Jul-2013	15-Jul-2015

Measurement Uncertainty: +/-1.7 dB**Temperature:** 22 °C**Relative Humidity:** 35 %**Limits**

Offset from center frequency (kHz)	Measurement bandwidth (kHz)	Maximum ACP relative (dBc)
9.375	6.25	-40
15.625	6.25	-60
21.875	6.25	-60
37.50	25.00	-60
62.50	25.00	-65
87.50	25.00	-65
150.00	100	-65
250.00	100	-65
350.00	100	-65
>400 to 12 MHz	30 (s)	-75
12 MHz to paired receive band	30 (s)	-75
In the paired receive band	30 (s)	-100

EQUIPMENT: 242-5770PROJECT NO.: 2014 258169 FCC PT90rev2**Test Data – Adjacent Channel Power**

1031 0 S

Lower Band TX 764.0125 MHz

Offset from center frequency (kHz)	Measurement bandwidth (kHz)	Maximum ACP relative (dBc)	Measured ACP Upper (dBc)	Measured ACP Lower (dBc)
9.375	6.25	-40	-40.5	-41.9
15.625	6.25	-60	-66.5	-73.0
21.875	6.25	-60	-79.7	-73.4
37.5	25	-60	-67.7	-67.0
62.5	25	-65	-68.3	-70.0
87.5	25	-65	-76.1	76.1
150	100	-65	-69.7	-69.3
250	100	-65	-74.9	-75.7
350	100	-65	-74.5	-74.5
>400 to 12 MHz	30 (s)	-75	-76.2	-75.9
12 MHz to paired receive band	30 (s)	-75	-77.1	-76.8
In the paired receive band	30 (s)	-100	-102.1	-103.0

Upper Band TX 794.0124 MHz

Offset from center frequency (kHz)	Measurement bandwidth (kHz)	Maximum ACP relative (dBc)	Measured ACP Upper (dBc)	Measured ACP Lower (dBc)
9.375	6.25	-40	-43.4	-41.2
15.625	6.25	-60	-66.0	-66.9
21.875	6.25	-60	-67.2	-66.6
37.5	25	-60	-67.0	-67.3
62.5	25	-65	-67.0	-67.3
87.5	25	-65	-70.2	-70.9
150	100	-65	-66.1	-67.4
250	100	-65	-76.5	-75.9
350	100	-65	-77.8	-77.0
>400 to 12 MHz	30 (s)	-75	-76.1	-76.0
12 MHz to paired receive band	30 (s)	-75	-77.0	-76.5
In the paired receive band	30 (s)	-100	-103.0	-103.0

ANNEX A - TEST METHODOLOGIES

EQUIPMENT: 242-5770

PROJECT NO.: 2014 258169 FCC PT90rev2

**NAME OF TEST: Spurious Emissions at Antenna
Terminals****PARA. NO.: 2.991****Minimum Standard:**

90.210, Table 1

Table 1

Frequency Band (MHz)	Mask for equipment with Low Pass Filter	Mask for equipment without Low Pass Filter
Below 25	A or B	A or C
25 - 50	B	C
72 - 76	B	C
150 - 174	B, D or E	C, D or E
150 Paging only	B	C
220 - 222	F	F
421 - 512	B, D or E	C, D or E
450 paging only	B	H
806 - 821/ 851 - 866	B	G
821 - 824/ 866 - 869	B	H
896 - 901/ 935 - 940	I	J
902 - 928	K	K
929 - 930	B	G
Above 940	B	C
All other bands	B	C

MASK	Spurious Limit	FS Limit Below 1 GHz	FS Limit Above 1 GHz
A,B,C,G,H,I	-13dBm	84.4 dB μ V/m@3m	82.2 dB μ V/m@3m
D,J	-20dBm	77.4 dB μ V/m@3m	75.2 dB μ V/m@3m
E,F,K	-25dBm	72.4 dB μ V/m@3m	70.2 dB μ V/m@3m

Test Method:

RBW: 1% of emission bandwidth in the 0 - 1 GHz range.
1 MHz at frequencies above 1 GHz.
VBW: $\Rightarrow$ RBW

The spectrum is searched up to 10 times the fundamental frequency.

ANNEX B - TEST DIAGRAMS

Para. No. 2.991 - Spurious Emissions at Antenna Terminals

