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A				05.06.07	S.Cohen	S.Cohen

EMC Laboratory

PC-830

FCCID: QUX-PC-830
 Manufactured by
 HomeFree Ltd.

EMC Test Report

According FCC Part 15 Requirements

June 07

	Function/Title	Name	Signature	Date
Prepared by	Test Engineer	S.Cohen		05.06.07
Checked by	Test Engineer	S.Cohen		05.06.07
Approved by	EMC Lab. Manager	S.Cohen		05.06.07

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1 Introduction

a. Scope

This document describes the measurement procedures and tests for FCC part 15 of the QUX-PC-830 Manufactured by HomeFree Ltd.

Equipment Under Test:	PC-830
FCCID	QUX-PC-830
Manufacturer:	HomeFree Ltd.
Serial Numbers:	31801
Mode of Operation:	TX & STBY MODE
Receiver operating frequency:	318MHZ
Year of Manufacture:	2007

b. Applicant Information:

Applicant:	HomeFree Ltd.
Applicant Address	2, Habarzel Street Tel-Aviv
Telephone:	+972-3-6478871
FAX:	+972-3-6478872
The testing was observed by:	LEV ROSMAN
Following applicant's personnel:	

c. Test Performance:

Date of reception for testing:	15.05.07
Dates of testing;	15.05.07
Test Laboratory Name:	Tadiran EMC Laboratory
Address:	Hashoftim 26 Holon
Zip Code:	267,5812
City:	Holon
Country:	Israel
Telephone:	03-5574476
Fax:	03-5575320
Email:	Shmuel_cohen@tadcomm.com

Applicable EMC Specification:	Federal Communication Commission (FCC), Code of Federal Regulations 47, FCC Docket 89-103, Part 15: Radio Frequency Devices, Sections 15.109, 15.209 & 15.231.
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Applicable EMC Specification:	Federal Communication Commission (FCC), FCC Part 15: Radio Frequency Devices, Sections 15.109, 15.209 & 15.231.
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2 Test Summary and Signatures.

TADIRAN EMC Laboratory has completed testing of E.U.T in accordance with the requirements of the FCC Part 15 Regulations for Class B equipment.

The E.U.T was found to comply with the requirements of the FCC Part 15 Regulations given below

Test	Test Description	Section	PASS/FAIL
1	Bandwidth of the emission	15.231	PASS
2	Field strength of fundamental	15.231	PASS
3	Radiation emission	15.231 & 15.205	PASS
4	Radiation emission	15.109	PASS

a. Test performed by:

Mr. S. Kozliner Test Engineer

b. Test Report prepared by:

Mr. S. Cohen EMC Lab. Manager



c. Test Report Approved by:

Mr. Samuel Cohen EMC Lab. Manager



3 E.U.T information

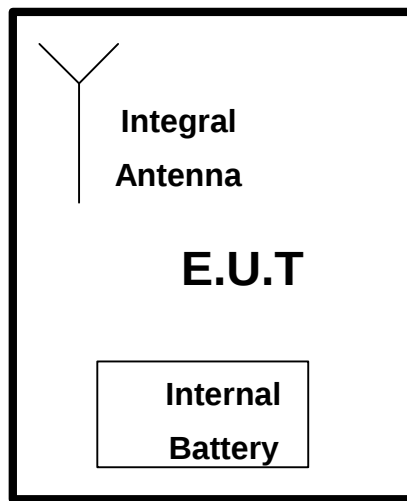
a. E.U.T description

The Pull Cord (PC-830) is a compact RF transmitter unit operates at 318MHz that is generally carried out and can be used in several modes of operation.

The EUT is a wall-mounted device, powered by Lithium Thionyl Chloride battery (operation voltage 3.6V).

b. E.U.T Test Configuration

E.UT. Test configuration is shown in figure bellow



c. E.U.T Mode of Operation description

- (1) 318MHz TX Mode
- (2) STBY Mode

4 BANDWIDTH OF THE EMISSION part 15.231.c—TEST RESULTS

E.U.T: PC-830 S/N 31801
 Test Method: ANSI C63.4
 Date: 15/05/2007
 Relative Humidity: 37%
 Ambient Temperature: 22c
 Air Pressure: 1042hpa
 Test Setup: Figure 1

Testing Engineer: S.Kozliner

Date 15.05.07

a. Test Results Summary & Conclusions

The E.U.T was found in compliance with Bandwidth of Radiated Emission fundamental frequency requirement according to section 15.231.c

b. Limits of bandwidth

The test unit shall meet the limits of Table 1

Table- 1 Limits For Bandwidth

Frequency (MHz)	Bandwidth Max Limits (%)	Bandwidth Max Limits (KHz)
318	0.25	1085

c. Test Instrumentation and Equipment

Table- 2 Test Instrumentation and Equipment

Item	Model	Manufacturer	Next Date Calibration
Spectrum Analyzer	8593E	HP	31/05/08
Broadband Antenna	BTA-L	FRANKONIA	15.04.08

d. Results

Table- 3 Bandwidth Test Result

Frequency (MHz)	Bandwidth (KHz)	Bandwidth Max Limit (KHz)	Plot No	PASS/FAIL
318	414	1085	1	PASS

e. Procedure

The Bandwidth is determined at the point 20db down from the modulated carrier, while the spectrum analyzer was set to "max hold" and VBW 10 KHz.

5 Field strength of fundamental part 15.231-TEST RESULTS

E.U.T:	PC-830	S/N 31801
Test Method:	ANSI C63.4	
Date:	15/05/2007	
Relative Humidity:	37%	
Ambient Temperature:	22c	
Air Pressure:	1042hpa	
Test Setup:	Figure 1	

Testing Engineer: S.Kozliner

Date 15.05.07

a. Test Results Summary & Conclusions

The E.U.T was found in compliance with fundamental frequency requirement

b. Limits of Field Strength for fundamental according 15.231

The test unit shall meet the limits of Table 4.

Table- 4 Limits For Fundamental

Frequency (MHz)	Average Max Limits (dB μ V/m)	Peak Max Limits (dB μ V/m)
317.945	75.8	95.8

c. Test Instrumentation and Equipment

Table- 5 Test Instrumentation and Equipment

Item	Model	Manufacturer	Next Date Calibration
Spectrum Analyzer	8593E	HP	31/05/08
Broadband Antenna	BTA-L	FRANKONIA	15.04.08

d. Test Results

Table- 6 Average Factor

TX Period (min)	Duty Cycle (min)	Average Factor (db)	Plot Ref
5.2ms	$5.2/100=0.052$	$20\log 0.064=-25.67$	13, 14

Table- 7 Peak Result of Fundamental

Frequency (MHz)	Peak Result (dB μ V/m)	Peak Limits (dB μ V/m)	Margin (dB)	Plot No	Pass/Fail
317.945	85.7	95.8	10.1	Plot-2	PASS

Table- 8 Average Result of Fundamental

Peak Result (dB μ V/m)	Average Factor	Calculation Results	Average Limits (dB μ V/m)	Margin (dB)	Pass/Fail
85.7	-25.67	60.03	75.8	15.77	PASS

e. Test Procedure

The EUT was placed on the top of rotating table 0.8 meters above the ground and the table was rotated 360°, the height of antenna is varied from one to 4 meters (vertical and horizontal polarization) to determine the max field strength of fundamental

6 Radiated emission part 15.231 & 15.205-test results

E.U.T: PC-830 S/N 31801
 Test Method: ANSI C63.4
 Date: 15/05/2007
 Relative Humidity: 37%
 Ambient Temperature: 22c
 Air Pressure: 1042hpa
 Test Setup: Figure 1

Testing Engineer: S.Kozliner

Date 15.05.07

a. Test Results Summary & Conclusions

The E.U.T was found in compliance with 15.231

b. Limits of Radiated Interference Field Strength according 15.231

The test unit shall meet the limits of Table 9.

Table- 9 Limits For 15.231(b)

Frequency range (MHz)	Average Limits (dBμV/m)	Peak Limits (dBμV/m)
0.009 – 4000	75.8	95.8

c. Test Instrumentation and Equipment

Table- 10 Test Instrumentation and Equipment

Item	Model	Manufacturer	Next Date Calibration
Spectrum Analyzer	8593E	HP	31/05/08
Loop Antenna(10KHz-30MHz)	HFH 2-Z2	Rohde&Schwarz	31/02/08
Double Ridge Guide Antenna (1-18GHz)	3105	EMCO	15.04.08
Broadband Antenna	BTA-L	FRANKONIA	15.04.08
Low Noise Amplifier (0-1GHz)	AM-1300-N	MITEQ	24.03.08
Low Noise Amplifier (1-2GHz)	SMC-09	MITEQ	24.03.08
Low Noise Amplifier (2-6GHz)	SMC-09	MITEQ	24.03.08

d. Preliminary Results

**Table- 11 Preliminary Test Results for intentional Emissions
in TX Mode 15.231**

Antenna Polarization	Freq. Range MHz	Res. BW (kHz)	Plot No.	Pass/Fail
Horizontal	0.009 – 0.15	0.2	Plot-3	Pass
Vertical			Plot-4	Pass
Vertical	0.15 - 30	9	Plot-5	Pass
Horizontal			Plot-6	Pass
Both Hor.& Ver	30-1000	120	Plot-7	Pass
	1,000-2.800	1000	Plot-8	Pass
	2.800-4,400	1000	Plot-9	Pass

e. Final Results

Table- 12 Six Highest Peak Emission Test Results

Freq. (MHz)	Peak Reading (*) (dB μ V/m)	Limit dB μ V/m	Margin (dB)	Pass/Fail
The Emission are at least 20db below the limit				

f. Test Procedure**(1) Preliminary Test Procedure**

- a) The EUT was placed on the top of a rotating table 0.8 meters above the ground at a chamber shielded
- b) The E.U.T was set 3 meters away from the receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c) The Antenna height varied from one meter above the ground over its full-allowed range of travel and the table was rotated 360° to determine the maximum value of the field strength
- d) The antenna was set both horizontal and vertical polarization.

(2) Final Test Procedure

- a) The EUT was tested at open area for each suspected emission
- b) The test procedure was performed according paragraph (1) and figure 11

g. Final Test Setup

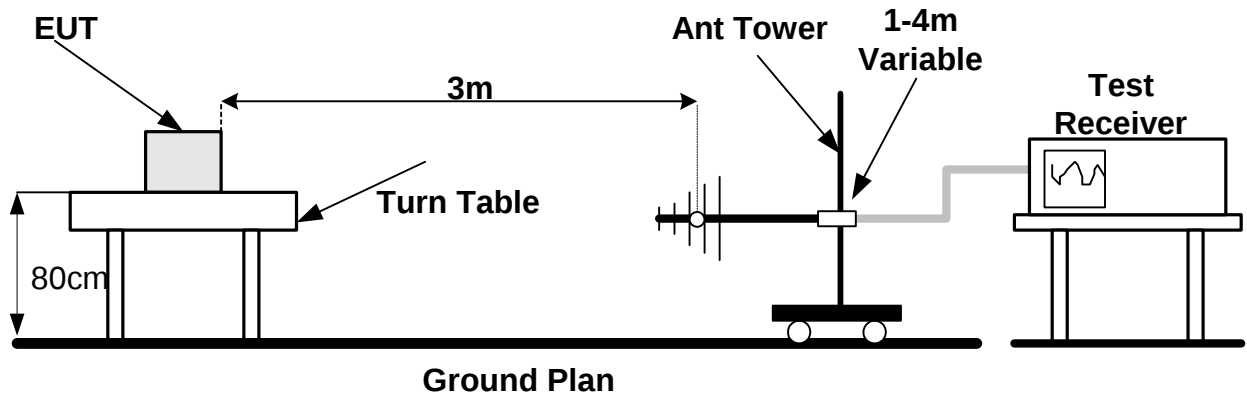


Figure 1 Radiated Emission Set up

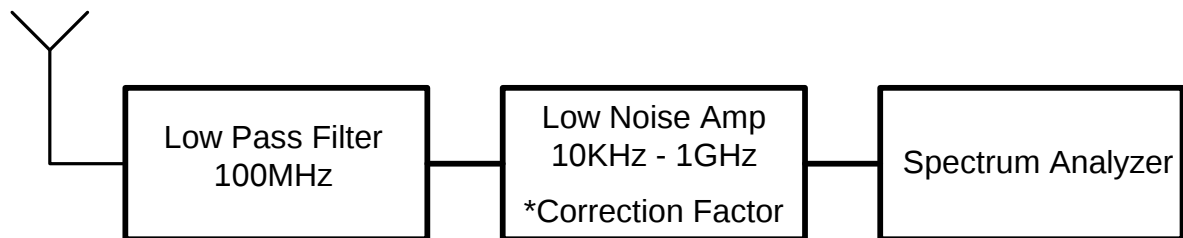


Figure 2 Radiated Emission test 10 KHz – 30MHz

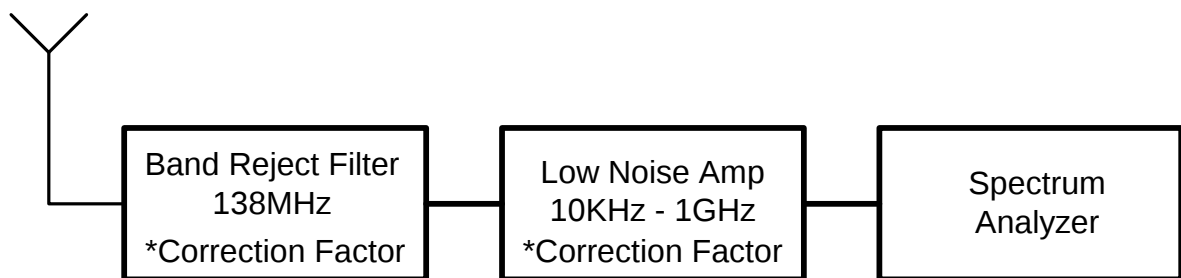


Figure 3 Radiated Emission test 30MHz – 1GHz

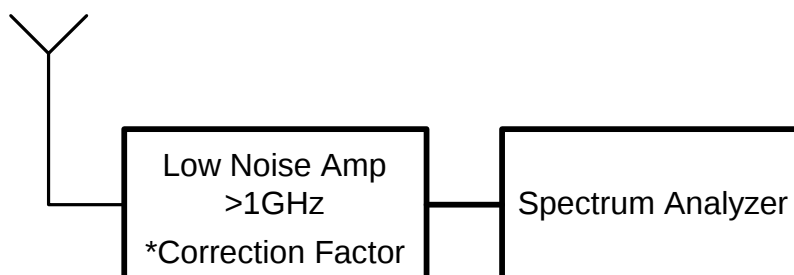


Figure 4 Radiated Emission test above 1GHz

7 Radiated emission part 15.109-test results (for STBY mode).

a. Preliminary Radiated emission Test Result According Part 15.109

E.U.T:	PC-830	S/N 31801
Test Method:	ANSI C63.4	
Date:	15/05/2007	
Relative Humidity:	37%	
Ambient Temperature:	22c	
Air Pressure:	1042hpa	
Test Setup:	Figure 1	

Testing Engineer: S.Kozliner

Date 15.05.07

b. Test Results Summary & Conclusions

The E.U.T was found in compliance with 15.109

c. Limits of Radiated Interference Field Strength according 15.109

The test unit shall meet the limits of Table 14 for Class B equipment.

Table- 13 Limits For 15.109 Class B equipment

Frequency Range (MHz)	Quasi-peak Limits (dB μ V/m)
30 - 88	40
88 - 216	43
216 - 960	46
960 - 2000	54

d. Test Instrumentation and Equipment

Table- 14 Test Instrumentation and Equipment

Item	Model	Manufacturer	Next Date Calibration
Spectrum Analyzer	8593E	HP	31/01/08
Double Ridge Guide Antenna (1-18GHz)	3105	EMCO	24.04.08
Broadband Antenna (30-1000MHz)	BTA-L	FRANKONIA	10.04.08
Low Noise Amplifier (0-1GHz)	AM-1300-N	MITEQ	14.01.08
Low Noise Amplifier (1-2GHz)	SMC-09	MITEQ	14.01.08
Low Noise Amplifier (2-6GHz)	SMC-09	MITEQ	14.01.08

e. Results

(1) Preliminary Test Results

Table- 15 Preliminary Test Results for Unintentional Emissions in RX Mode 15.109

Antenna Polarization	Freq. Range MHz	Res. BW (kHz)	Plot No.	PASS/F AIL
Both	30-1000	120	Plot-10	Pass
	1000-2.800	120	Plot-11	Pass
	2,800-4,400	1000	Plot-12	Pass

(2) Final Test Results

Table- 16 Six Highest RX Mode 15.109

Freq. (MHz)	Peak Reading (*) (dB μ V/m)	Limit dB μ V/m	Margin (dB)	Pass/Fail
The Emission are at least 20db below the limit				

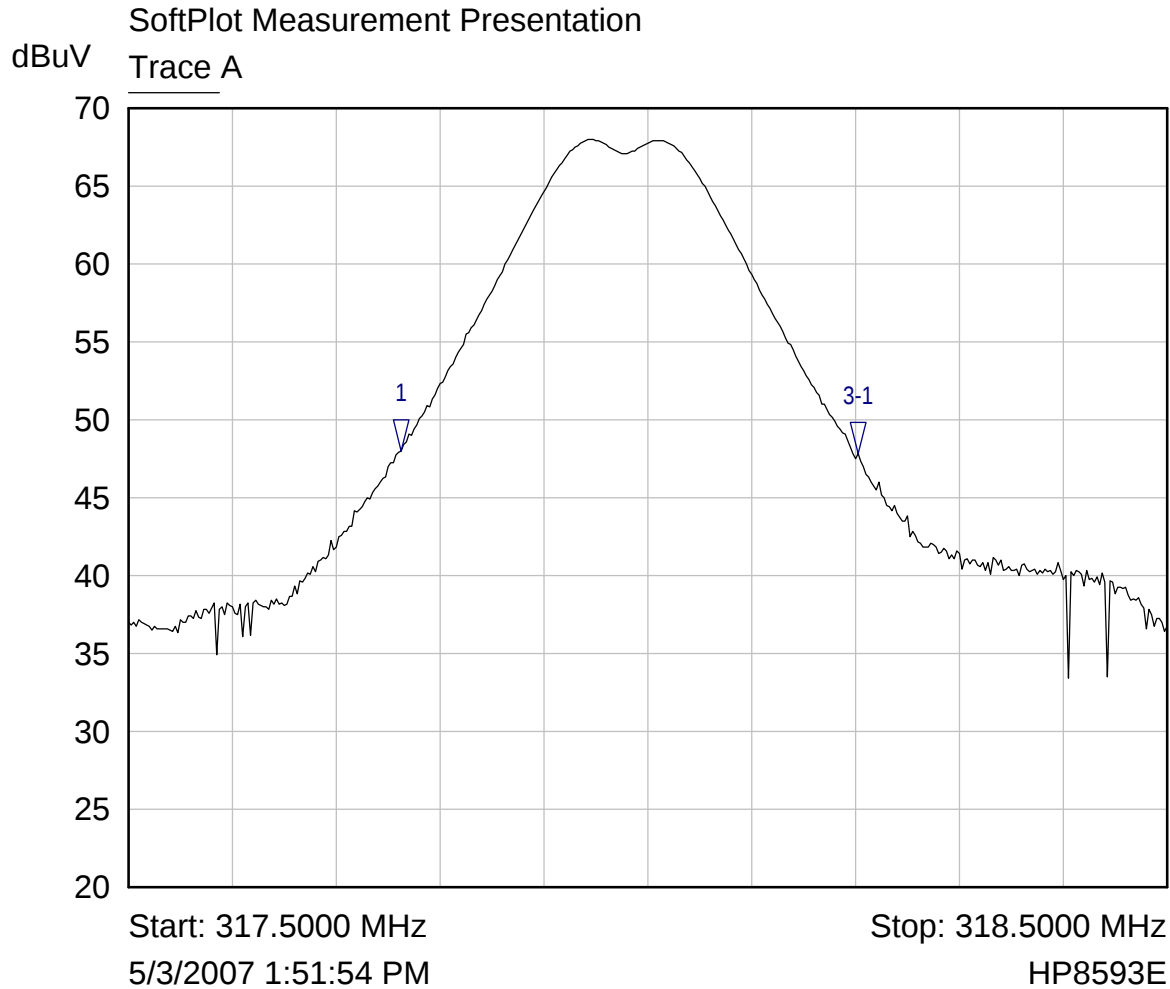
f. Test Procedure

See paragraph 6.f

8 Plots

Test Results Plot No 1

Modulation Bandwidth



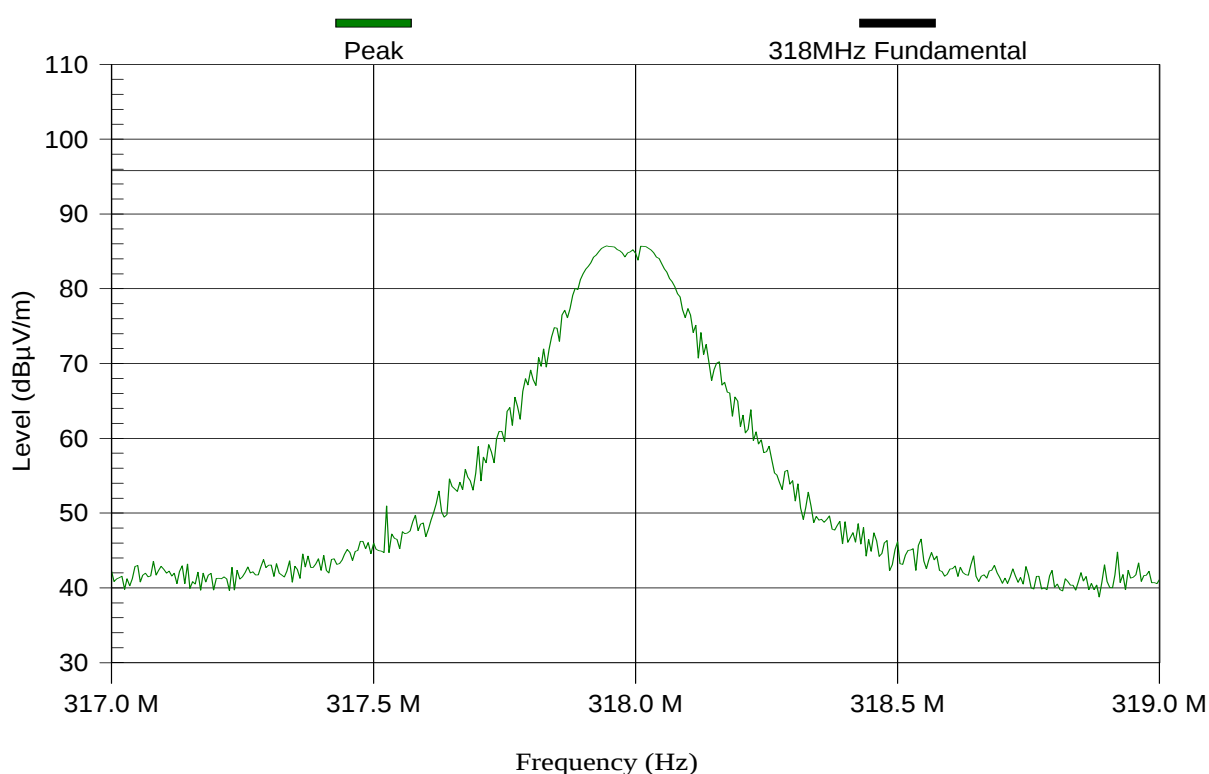
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	317.7625 MHz	47.96 dBuV	
3-1 ▽	Trace A	440.0000 kHz	-0.09 dB	

Test Results Plot No 2

FUNDAMENTAL FCC 318MHz

Test & EUT General Information		Receiver Setting	
EUT Name:	PC-830	Spect Analyzer	S.A HP 8593E
S/N:	31801	Ref. Level:	100 dB μ V
Date of Test:		RBW:	120 kHz
Test Engineer:	SHIMON KOZLINER	VBW:	1000 kHz
Antenna:	Frankonia BTA red -L_A 3m	Sweep Time:	Auto: 20 ms
Polarization:	Horizontal and Vertical	Pre Amplifier	No Description Available

TEST REMARKS:



MAXIMUM RESULT DEVIATION:

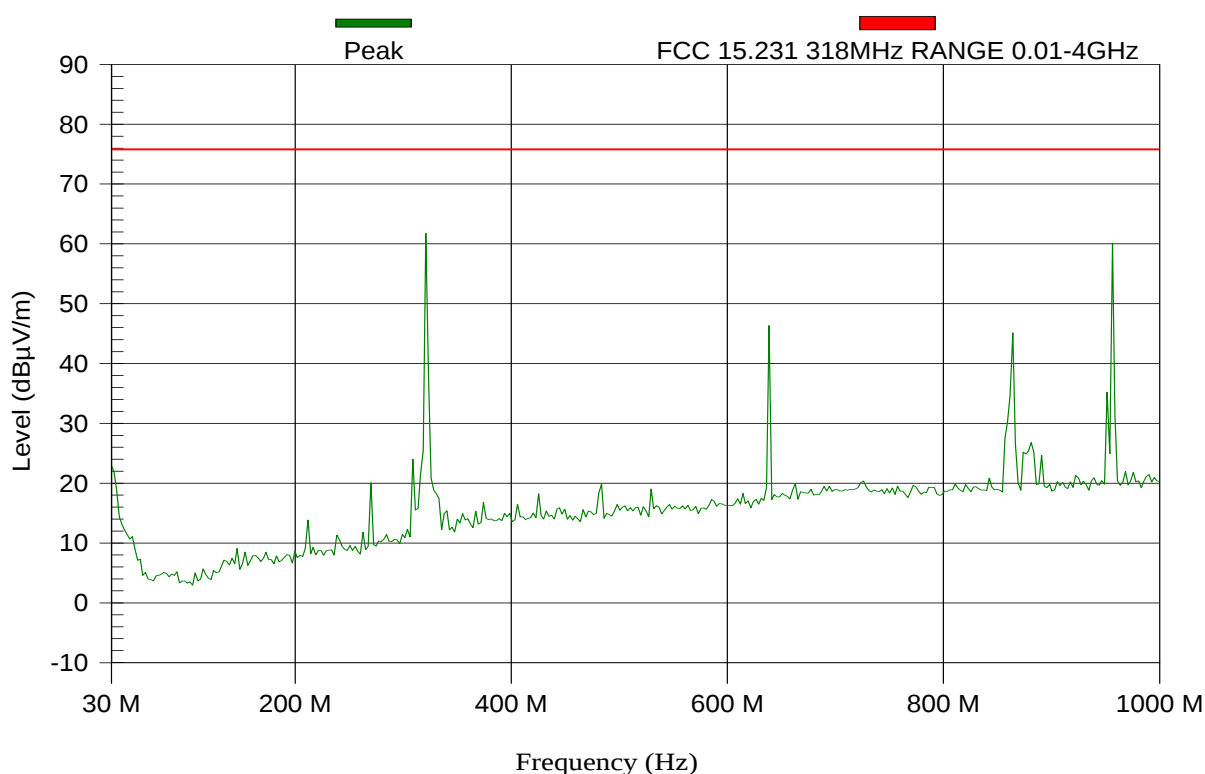
Detect all peaks above 6 dB below the limit line with a maximum of 6 peaks.

Nr	Frequency (MHz)	PK MaxHold (dB μ V/m)	PK Limit (dB μ V/m)	Result	Angle (degrees)	Height (m)	H/V
1	317.945	85.7	95.8	Pass	270	1	V

Test Results Plot No 3
FCC 15-231 30-1000MHz

Test & EUT General Information		Receiver Setting	
EUT Name:	PC-830	Spect Analyzer	S.A HP 8593E
S/N:	31801	Ref. Level:	80 dB μ V
Date of Test:		RBW:	120 kHz
Test Engineer:	Shmuel Cohen	VBW:	1000 kHz
Antenna:	Frankonia BTA red -L_A 3m	Sweep Time:	Auto: 202.08 ms
Polarization:	Horizontal and Vertical	Pre Amplifier	LNA MITEQ 0.01-1GHz No-3

TEST REMARKS:



MAXIMUM RESULT DEVIATION:

Detect all peaks above 6 dB below the limit line with a maximum of 6 peaks.

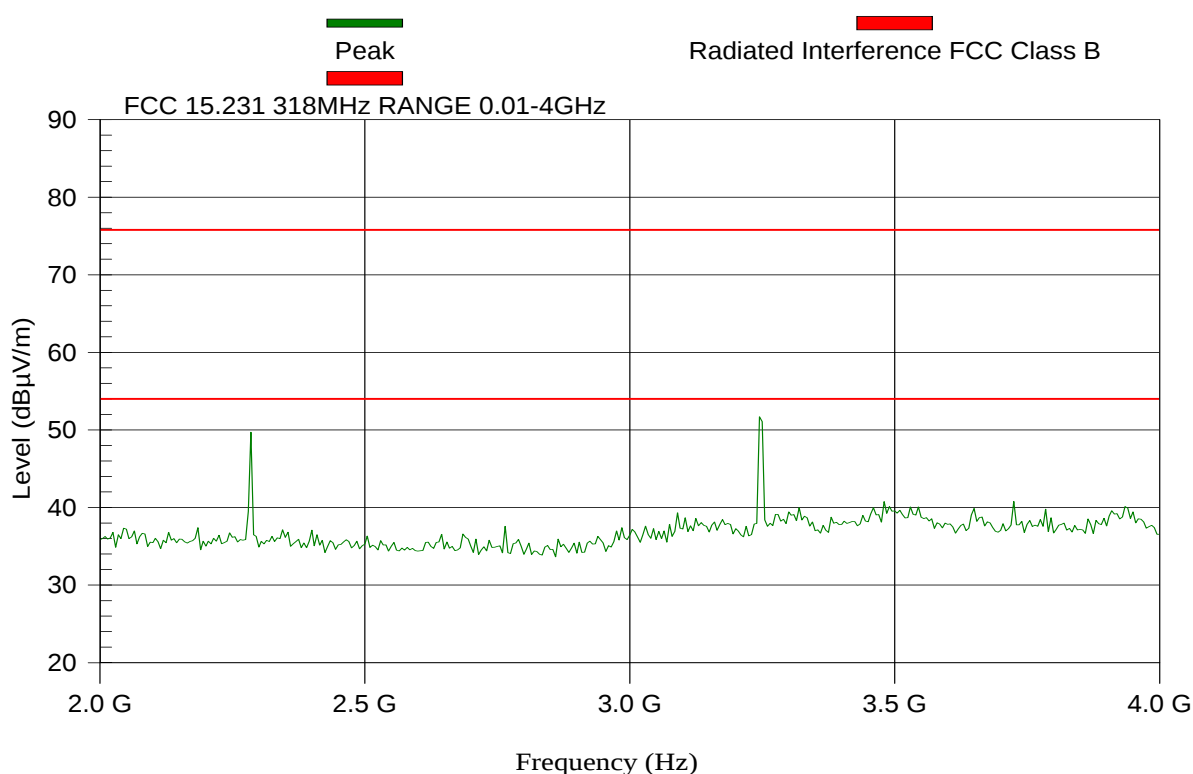
Nr	Frequency (MHz)	PK Value (dB μ V/m)	QP Value (dB μ V/m)	PK Limit (dB μ V/m)	Result	Angle (degrees)	Height (m)	H/V
1	318.018	62.6	62.2	75.8	Pass	275	1	V
2	953.888	61	60.9	75.8	Pass	95	1.1	V

Test Results Plot No 4

FCC 15-231 2.0-4GHz TX

Test & EUT General Information		Receiver Setting	
EUT Name:	PC-830	Spect Analyzer	S.A HP 8593E
S/N:	31801	Ref. Level:	80 dB μ V
Date of Test:		RBW:	1000 kHz
Test Engineer:	Shmuel Cohen	VBW:	1000 kHz
Antenna:	ARA DRG-118/A 1-18GHz 1319	Sweep Time:	Auto: 26.43 ms
Polarization:	Horizontal and Vertical	Pre Amplifier	ELISRA AMP 2-6 GHz

TEST REMARKS:



MAXIMUM RESULT DEVIATION:

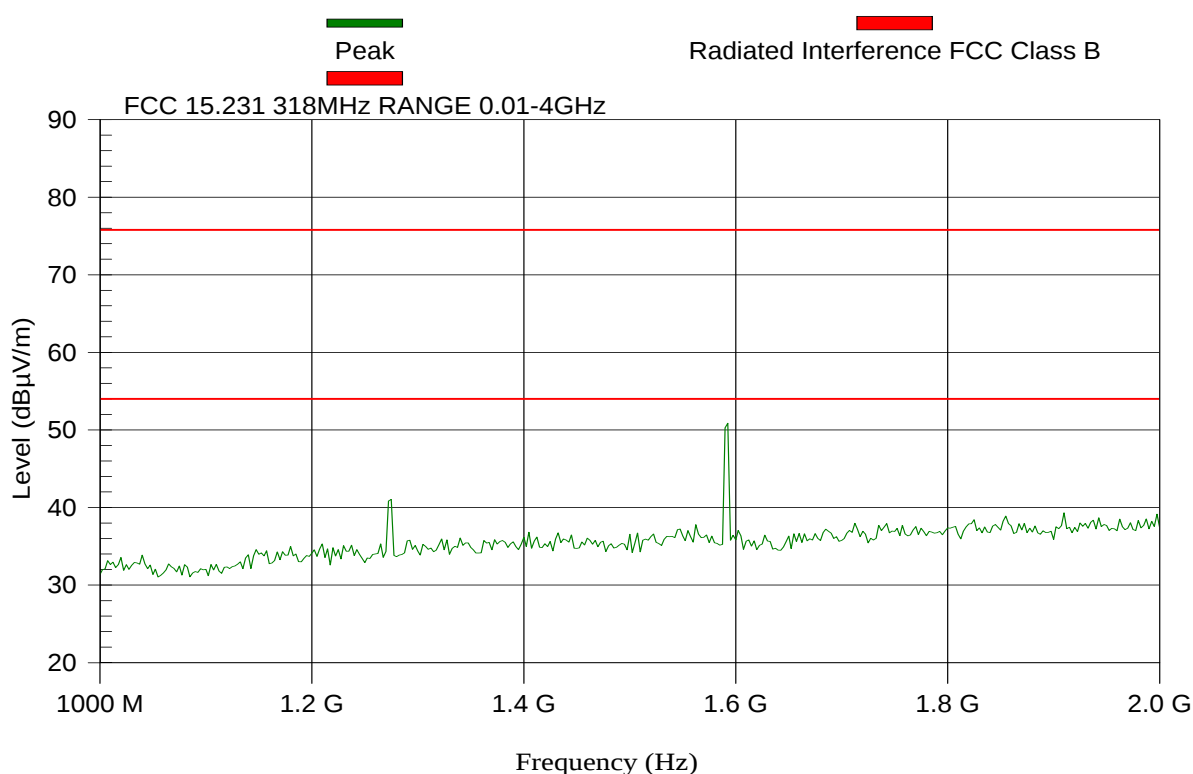
Detect all peaks above 6 dB below the limit line with a maximum of 6 peaks.

Nr	Frequency (MHz)	PK MaxHold (dB μ V/m)	QP Value (dB μ V/m)	PK Limit (dB μ V/m)	QP Limit (dB μ V/m)	Result	Angle (degrees)	Height (m)	H/V
1	2285	49.7	43.3	75.8	54	Pass	180	1.6	H
2	3497.647	53.6	52.2	75.8	54	Pass	180	1.6	V
3	3497.714	51.5	49	75.8	54	Pass	270	1.3	H

Test Results Plot No 5
FCC 15-231 1-2.0GHz TX

Test & EUT General Information		Receiver Setting	
EUT Name:	PC-830	Spect Analyzer	S.A HP 8593E
S/N:	31801	Ref. Level:	80 dB μ V
Date of Test:		RBW:	1000 kHz
Test Engineer:	Shmuel Cohen	VBW:	1000 kHz
Antenna:	ARA DRG-118/A 1-18GHz 1319	Sweep Time:	Auto: 20 ms
Polarization:	Horizontal and Vertical	Pre Amplifier	AVANTEK 1-2GHz

TEST REMARKS:



MAXIMUM RESULT DEVIATION:

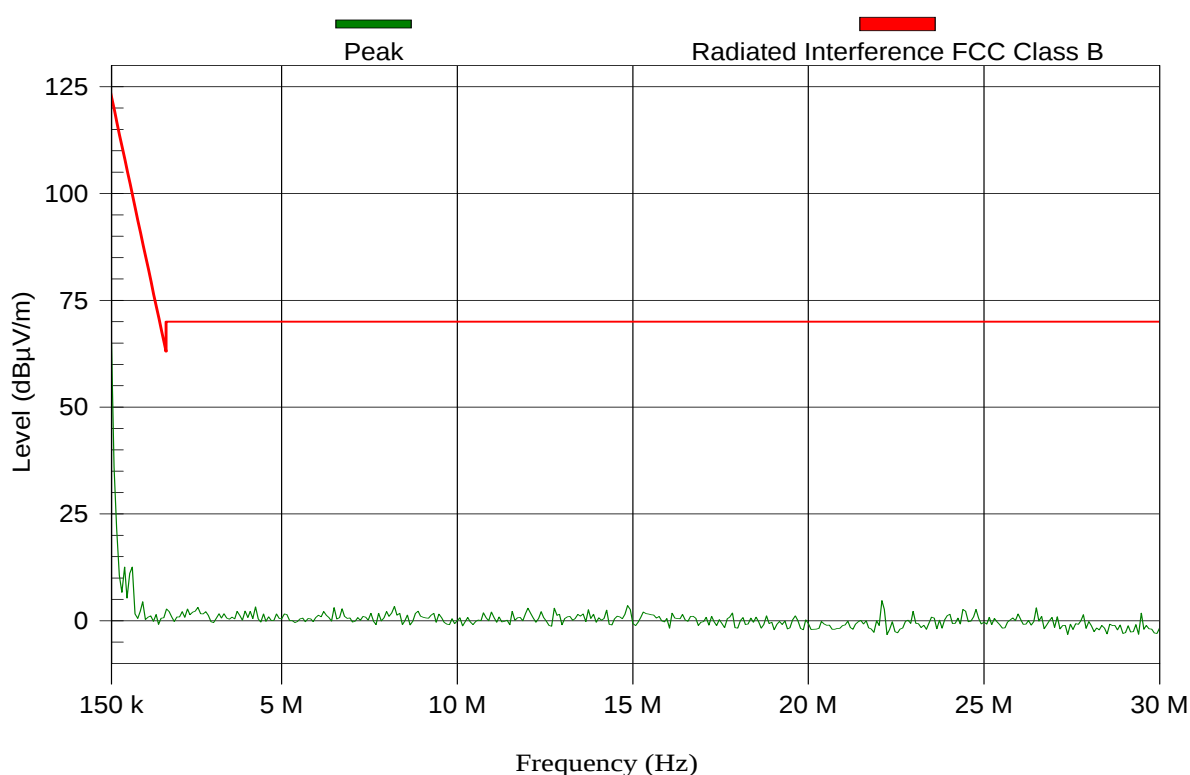
Detect all peaks above 6 dB below the limit line with a maximum of 6 peaks.

Nr	Frequency (MHz)	PK Value (dB μ V/m)	QP Value (dB μ V/m)	PK Limit (dB μ V/m)	QP Limit (dB μ V/m)	Result	Angle (degrees)	Height (m)	H/V
1	1589.72	52	50.4	75.8	54	Pass	355	1	V
2	1590.186	50.3	49.1	75.8	54	Pass	265	1.3	H

Test Results Plot No 6
FCC 15-209 0.15-30MHz

Test & EUT General Information		Receiver Setting	
EUT Name:	PC-830	Spect Analyzer	S.A HP 8593E
S/N:	31801	Ref. Level:	80 dB μ V
Date of Test:		RBW:	9 kHz
Test Engineer:	Shmuel Cohen	VBW:	30 kHz
Antenna:	E-FIELD R&S 9K-30M ANTENNA	Sweep Time:	Auto: 1.11 s
Polarization:	Vertical	Pre Amplifier	LNA MITEQ 0.01-1GHz No-3

TEST REMARKS:Thursday, May 03, 2007 3:35:26 PM



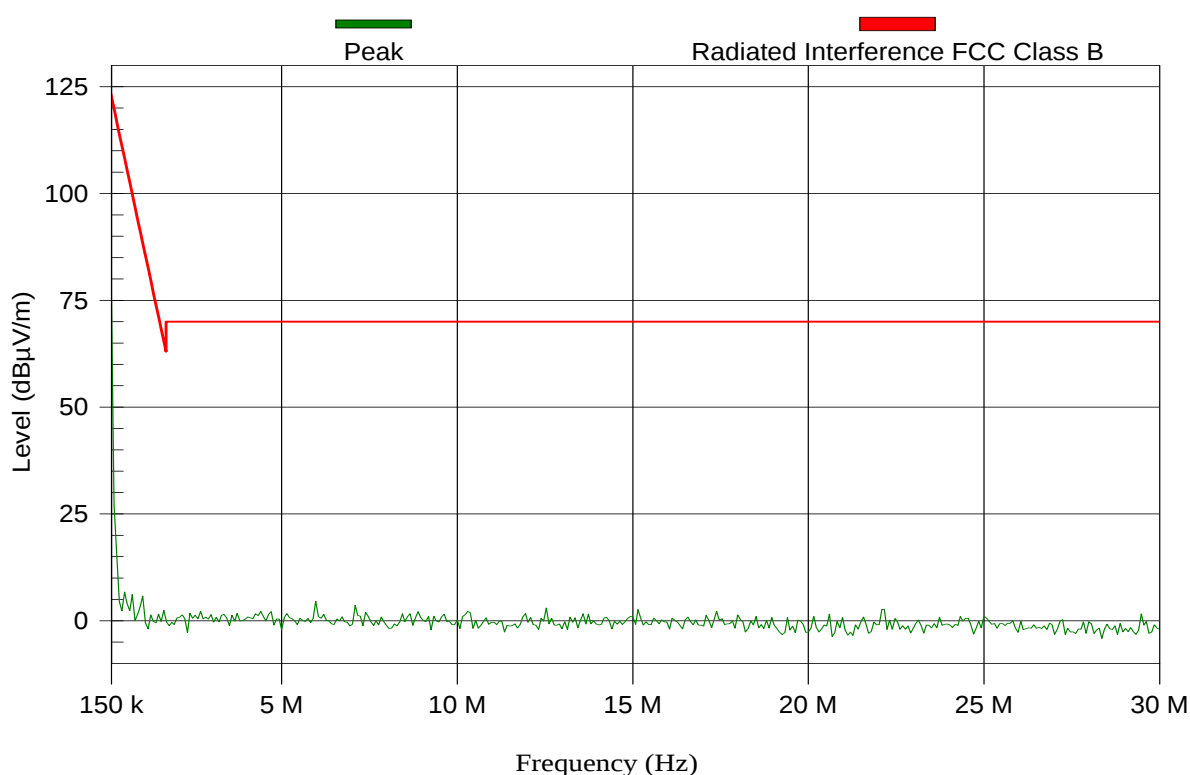
MAXIMUM RESULT DEVIATION:

Detect all peaks above 6 dB below the limit line with a maximum of 6 peaks.
None

Test Results Plot No 7
FCC 15-209 0.15-30MHz

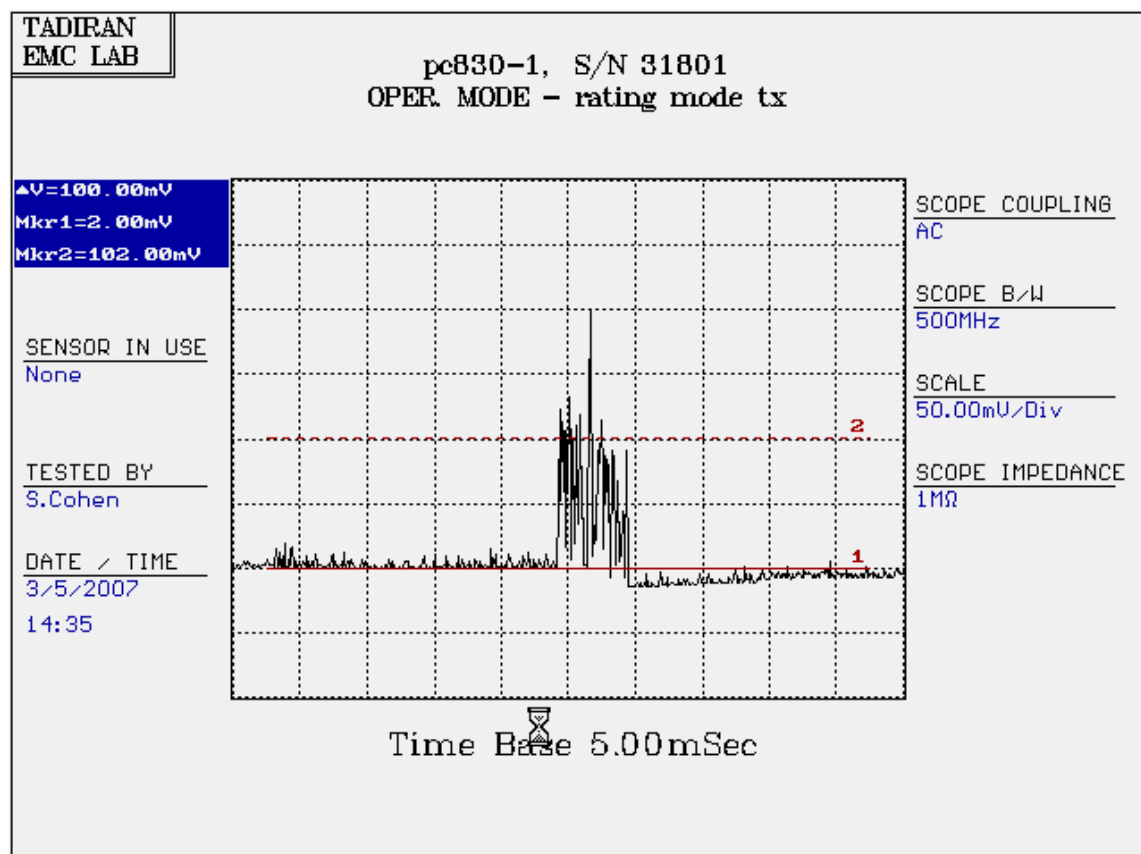
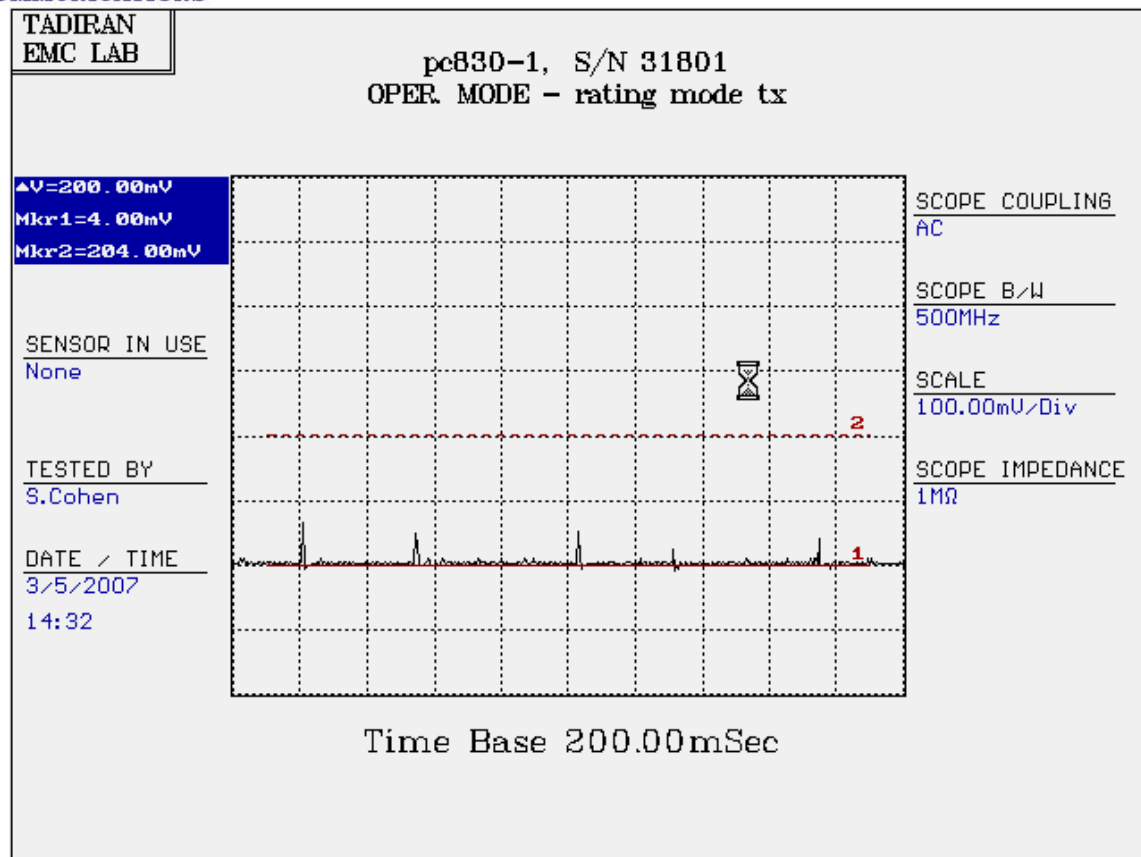
Test & EUT General Information		Receiver Setting	
EUT Name:	PC-830	Spect Analyzer	S.A HP 8593E
S/N:	31801	Ref. Level:	80 dB μ V
Date of Test:		RBW:	9 kHz
Test Engineer:	Shmuel Cohen	VBW:	30 kHz
Antenna:	E-FIELD R&S 9K-30M ANTENNA	Sweep Time:	Auto: 1.11 s
Polarization:	Horizontal	Pre Amplifier	LNA MITEQ 0.01-1GHz No-3

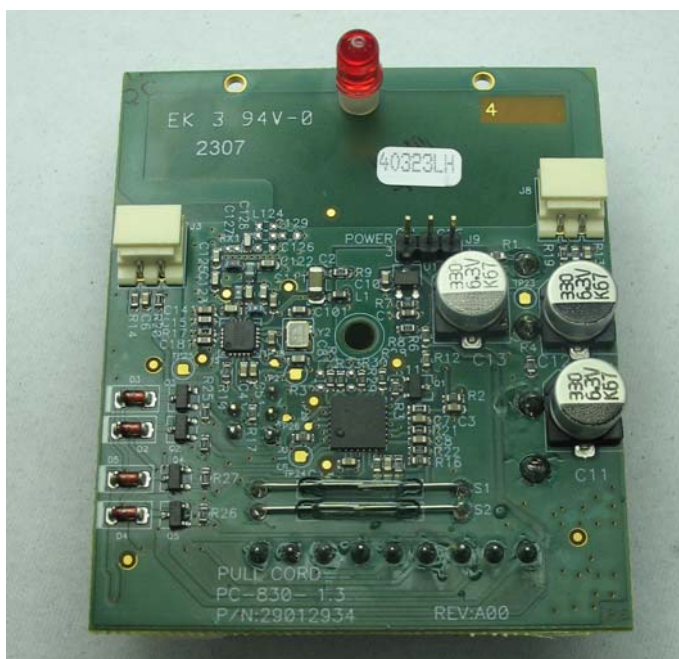
TEST REMARKS:



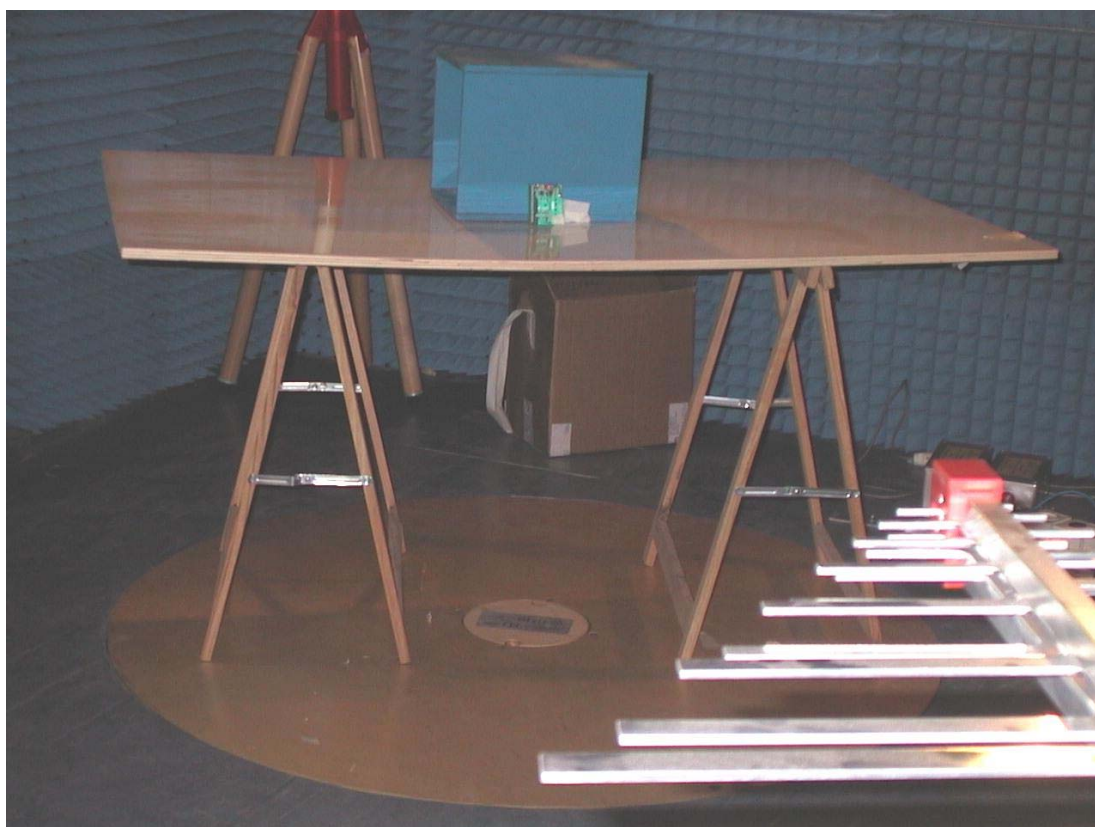
MAXIMUM RESULT DEVIATION:

Detect all peaks above 6 dB below the limit line with a maximum of 6 peaks.
None





Picture RE/1 E.U.T



Picture RE/2 Radiated Emission Setup 30MHz-1000MHz



Picture RE/4 Radiated Emission Setup 1GHz-3.5GHz

9 CORRECTION FACTORS

DOUBLE RIDGE HORN Model 3105 S/N:00-50C2-1C-C468 2052 Antenna Factor

Frequency (MHz)	Ant. Factor (db/m)
1000	24.4
2000	26.2
3000	30
4000	32.6
5000	33.8
6000	34.9
7000	36.2
8000	36.9
9000	37.8
10000	38.4
11000	39.1
12000	40.1
13000	42
14000	40.6
15000	39.3
16000	40.3

Antenna Factor for broadband antenna model BTA-L S/N:00-50C2-1C-C468 980045L

Frequency (KHz)	Ant. Factor (db/m)	Frequency (KHz)	Ant. Factor (db/m)
30	19.05	300	14.35
32	19.13	310	14.28
34	18.74	320	14.43
36	18.03	330	14.13
38	16.61	340	14.48
40	15.44	350	14.89
45	13.66	360	15.12
50	11.52	370	15.70
55	10.04	380	15.78
60	7.68	390	16.22
65	6.11	400	16.45
70	5.47	425	16.99
75	5.98	450	17.59
80	6.86	475	17.28
85	7.20	500	17.69
90	7.47	525	18.91
95	7.23	550	19.06
100	7.20	575	18.20
105	7.30	600	18.87
110	7.37	625	18.81
115	7.02	650	19.64
120	6.82	675	19.92
125	7.05	700	20.66
130	7.83	725	21.08
135	9.61	750	21.53
140	7.93	775	22.39
145	8.03	800	22.66
150	8.29	825	22.87
160	8.72	850	22.65
170	9.18	875	23.12
180	9.05	900	23.70
190	9.80	925	23.40
200	10.61	950	23.43
210	10.34	975	23.30
220	11.21	1000	24.02
230	11.69		
240	11.62		
250	11.85		
260	12.45		
270	13.16		
280	13.48		
290	13.74		

10 Abbreviations and Acronyms

The following abbreviations and acronyms are applicable in this document

BW Bandwidth

R.BW Resolution Bandwidth

V.BW Video Bandwidth

db Decibel

EMI Electromagnetic interference

E.U.T Equipment under test

LISN Line impedance stabilization network

N.P.C.R Non Periodic Calibration Requisite

S/N Serial number

QP Quasi peak

PK Peak