FCC 47 CFR PART 15 SUBPART B & IC ICES-003

TEST REPORT

For

Optical Mouse

Model: M879U

Trade Name: Emprex

Issued to

BEHAVIOR TECH COMPUTER CORP.
20F, 98, Sec. 1, Hsin Tai Wu Rd., Hsichih,
Taipei Hsien 221, Taiwan, R.O.C.

Issued by

Compliance Certification Services Inc.
No. 81-1, Lane 210, Bade Rd. 2, Luchu Hsiang,
Taoyuan Hsien, (338) Taiwan, R.O.C.
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ACCREDITED
No. 0824-01

TAF
Testing Laboratory
0363

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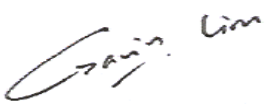
1 TEST RESULT CERTIFICATION

Applicant:	BEHAVIOR TECH COMPUTER CORP. 20F, 98, Sec. 1, Hsin Tai Wu Rd., Hsichih, Taipei Hsien 221, Taiwan, R.O.C.
Manufacturer:	BEHAVIOR TECH COMPUTER CORP. 20F, 98, Sec. 1, Hsin Tai Wu Rd., Hsichih, Taipei Hsien 221, Taiwan, R.O.C.
Equipment Under Test:	Optical Mouse
Trade Name:	Emprex
Model:	M879U
Detailed EUT Description:	See Item 2 of this report
Date of Test:	August 6 ~ 9, 2006

Applicable Standard	Class / Limit	Test Result
FCC Part 15 Subpart B, IC ICES-003	Class B	No non-compliance noted
Deviation from Applicable Standard		
None		

The above equipment was tested by Compliance Certification Services Inc. for compliance with the requirements set forth in the FCC Part 15, Subpart B, and Industry Canada ICES-003. The measurement procedures were according to ANSI C63.4: 2003. This said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment are within the compliance requirements.

Approved by:



Gavin Lim
Section Manager
Compliance Certification Services Inc.

Reviewed by:

Amanda Wu
Section Manager
Compliance Certification Services Inc.

2 EUT DESCRIPTION

Product	Optical Mouse
Trade Name	Emprex
Model	M879U
Model Discrepancy	N/A
Housing Type	Plastic
Power Supply	Powered from host device

3 TEST METHODOLOGY

3.1 EUT SYSTEM OPERATION

Software Used During the Test	
Operating System	Windows XP
File Name	EMCTEST.EXE
Program Sequence	1. EMI test program (file name: EMCTEST) was loaded and executed in "Windows XP" mode. 2. The detect signal was sent to EUT. 3. Data was sent to the monitor, filling the screen with upper case of "H" patterns. 4. Test program sequentially all related I/O's of Host PC include EUT and sent "H" patterns to all applicable output ports of Host PC. 5. Repeat 2 to 4.
RF Management Software	DOS/TEST MODE SETUP

Remark: *Test program is self-repeating throughout the test.*

3.2 DECISION OF FINAL TEST MODE

The EUT (model: M879U) had been tested under operating condition.

1. The following test mode was scanned during the preliminary test:

   Mode 1
   Operating

2. After the preliminary scan, the following test mode was found to produce the highest emission level.

   Mode 1

   Then, the EUT configuration and cable configuration of the above highest emission mode was chosen for all final test items.

4 INSTRUMENT AND CALIBRATION

4.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the IEC 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

4.2 TEST AND MEASUREMENT EQUIPMENT

The following list contains measurement equipment used for testing. The equipment conforms to the requirement of CISPR 16-1, ANSI C63.2 and other equivalent standards.

Calibration of all test and measurement, including any accessories that may effect such calibration, is checked frequently to ensure the accuracy. Adjustments are made and correction factors are applied in accordance with the instructions contained in the respective manual.

Equipment Used for Emission Measurement

Open Area Test Site # 3				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
EMI Test Receiver	R&S	ESVS20	838804/004	01/18/2007
Spectrum Analyzer	R&S	FSP30	100112	09/12/2006
Spectrum Analyzer	Agilent	E4446A	MY43360131	01/18/2007
Pre-Amplifier	MITEC	AFS42-00102650	924206	N.C.R.
Bilog Antenna	SCHWAZBECK	VULB9163	145	07/05/2007
Turn Table	EMCO	2081-1.21	9709-1885	N.C.R.
Antenna Tower	EMCO	2075-2	9707-2060	N.C.R.
Controller	EMCO	2090	9709-1256	N.C.R.
RF Switch	ANRITSU	MP59B	M53867	N.C.R.
Site NSA	CCS	N/A	N/A	09/06/2006

Remark: *The measurement uncertainty is less than +/- 2.16dB, which is evaluated as per the NAMAS NIS 81 and CISPR/A/291/CDV.*

Conducted Emission Test Site # 4				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
EMI Test Receiver	R&S	ESCS30	847793/012	02/12/2007
LISN	EMCO	3825/2	9003-1628	07/28/2007
LISN	R&S	ENV 4200	830326/016	03/28/2007

Remark: *The measurement uncertainty is less than +/- 2.83dB, which is evaluated as per the NAMAS NIS 81 and CISPR/A/291/CDV.*

5 FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

☐ No.199, Chunghsen Road, Hsintien City, Taipei Hsien, Taiwan, R.O.C.
Tel: 886-2-2217-0894 / Fax: 886-2-2217-1029

☒ No.11, Wugong 6th Rd., Wugu Industrial Park, Taipei Hsien 248, Taiwan
Tel: 886-2-2299-9720 / Fax: 886-2-2298-4045

☒ No.81-1, Lane 210, Bade 2nd Rd., Luchu Hsiang, Taoyuan Hsien 338, Taiwan
Tel: 886-3-324-0332 / Fax: 886-3-324-5235

The measurement facilities are constructed in conformance with the requirements of CISPR 16-1, ANSI C63.4 and other equivalent standards.

5.2 TABLE OF ACCREDITATIONS AND LISTINGS

The test facilities used to perform Electromagnetic compatibility tests are registered or accredited by the organizations listed in the following table which includes the recognized scope specifically.

Country	Agency	Scope of Accreditation	Logo
USA	A2LA	EN 55011, EN 55014-1/2, CISPR 11, CISPR 14-1/2, EN 55022, EN 55015, CISPR 22, CISPR 15, AS/NZS 3548, VCCI V3 (2001), CFR 47, FCC Part 15/18, CNS 13783-1, CNS 13439, CNS 13438, CNS 13803, CNS 14115, EN 55024, IEC 801-2, IEC 801-3, IEC 801-4, IEC/EN 61000-3-2, EIC/EN 61000-3-3, IEC/EN 61000-4-2/3/4/5/6/8/11, EN 50081-1/ EN 61000-6-3, EN 50081-2/EN 61000-6-4, EN 50081-2/EN 61000-6-1: 2001	ACCREDITED 0824-01
USA	FCC	3/10 meter Open Area Test Sites (93105, 90471) / 3M Semi Anechoic Chamber (965860) to perform FCC Part 15/18 measurements	93105, 90471 965860
Japan	VCCI	3/10 meter Open Area Test Sites to perform conducted/radiated measurements	R-393/1066/725/879 C-402/747/912
Norway	NEMKO	EN 50081-1/2, EN 50082-1/2, IEC 61000-6-1/2, EN 50091-2, EN 50130-4, EN 55011, EN 55013, EN 55014-1/2, EN 55015, EN 55022, EN 55024, EN 61000-3-2/3, EN 61326-1, IEC 61000-4-2/3/4/5/6/8/11, EN 60601-1-2, EN 300 328, EN 300 422-2, EN 301 419-1, EN 301 489-01/03/07/08/09/17, EN 301 419-2/3, EN 300 454-2, EN 301 357-2	ELA 124a ELA 124b ELA 124c
Taiwan	TAF	EN 300 328, EN 300 220-1, EN 300 220-2, EN 300 220-3, 47 CFR FCC Part 15 Subpart C, EN 61000-3-2, EN 61000-3-3, CNS 13439, CNS 13783-1, CNS 14115, CNS 13438, AS/NZS CISPR 22, CNS 13022-1, IEC 61000-4-2/3/4/5/6/8/11, CNS 13022-2/3	Testing Laboratory 0363
Taiwan	BSMI	CNS 13438, CNS 13783-1, CNS 13439, CNS 14115	SL2-IS-E-0014 SL2-IN-E-0014 SL2-A1-E-0014 SL2-R1-E-0014 SL2-R2-E-0014 SL2-L1-E-0014
Canada	Industry Canada	3/10 meter Open Area Test Sites (IC 3991-3, IC 3991-4) / 3M Semi Anechoic Chamber (IC 6106) to perform RSS 212 Issue 1	IC 3991-3 IC 3991-4 IC 6106

** No part of this report may be used to claim or imply product endorsement by A2LA or any agency of the US Government.*

6 SETUP OF EQUIPMENT UNDER TEST

6.1 SETUP DIAGRAM

See test photographs attached in Appendix I for the actual connections between EUT and support equipment.

6.2 SUPPORT EQUIPMENT

No	Equipment	Brand	Model	Serial No.	FCC ID	Data Cable	Power Cord
1.	PC	HP	PL926AV	SGH528048P	FCC DoC	N/A	Unshielded, 1.8m
2.	CRT Monitor	Samsung	959NF	AQ19H2RT706139P	FCC DoC	Shielded, 1.8m with two cores	Unshielded, 1.8m
3.	USB Keyboard	Compaq	KU-9978	B463AOAGALT097	FCC DoC	Shielded, 1.8m	N/A
4.	Printer	EPSON	STYLUS C60	DR3K039633	FCC DoC	Shielded, 1.8m	Unshielded, 1.8m
5.	Modem	Hayes	231AA	A08431083982	BFJ9D93108US	Shielded, 1.2m	Unshielded, 1.8m
6.	Test kit	N/A	N/A	N/A	N/A	N/A	N/A

Remark: *All the above equipment/cables were placed in worse case positions to maximize emission signals during emission test.*

Grounding: *Grounding was in accordance with the manufacturer's requirements and conditions for the intended use.*

7 LINE CONDUCTED & RADIATED EMISSION TEST

7.1 LIMIT

Maximum permissible level of Line Conducted Emission

Frequency (MHZ)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

Remark: *The lower limit shall apply at the transition frequency.*

Maximum permissible level of Radiated Emission measured at 10 meter

Frequency (MHZ)	Class A (dBuV/m) Quasi-peak	Class B (dBuV/m) Quasi-peak
30 – 230	40	30
230 - 1000	47	37

Maximum permissible level of Radiated Emission measured at 3 meter

Frequency (MHZ)	Class A (dBuV/m)		Class B (dBuV/m)	
	Average	Peak	Average	Peak
Above 1000	59.3	79.3	53.9	73.9

Remark: *The lower limit shall apply at the transition frequency.*

Maximum permissible level of Radiated Emission measured at 3 meter

Frequency (MHz)	Field Strength (μV/m at 3-meter) Average	Field Strength (dBμV/m at 3-meter) Average
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Remark: *The lower limit shall apply at the transition frequency.*

7.2 TEST PROCEDURE OF LINE CONDUCTED EMISSION

Procedure of Preliminary Test

- The EUT was set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- Support equipment, if needed, was placed as per ANSI C63.4.
- All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
- The test equipment EUT installed received AC power, 120VAC/60Hz, through a Line Impedance Stabilization Network (LISN), which supplied power source and was grounded to the ground plane.
- All support equipment received power from a second LISN.
- The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a EMI Test Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to the Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Receiver.
- The Receiver scanned from 150kHz to 30MHz for emissions in each of the test modes.
- During the above scans, the emissions were maximized by cable manipulation.
- The test mode(s) described in Item 3.2 were scanned during the preliminary test.
- After the preliminary scan, we found the test mode described in Item 3.2 producing the highest emission level.
- The EUT configuration and cable configuration of the above highest emission level were recorded for reference of the final test.

Procedure of Final Test

- EUT and support equipment were set up on the test bench as per step 10 of the preliminary test.
- A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.
- The test data of the worst-case condition(s) was recorded.

7.3 TEST PROCEDURE OF RADIATED EMISSION

Procedure of Preliminary Test

- The equipment was set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane. When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- Support equipment, if needed, was placed as per ANSI C63.4.
- All I/O cables were positioned to simulate typical usage as per ANSI C63.4.
- The EUT received AC power source, 120VAC/60Hz, from the outlet socket under the turntable. All support equipment received power from another socket under the turntable.
- The antenna was placed at 10 meter away from the EUT as stated in ANSI C63.4. The antenna connected to the Spectrum Analyzer via a cable and at times a pre-amplifier would be used.
- The Analyzer / Receiver quickly scanned from 30MHz to 40GHz maximum, if any. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- The test mode(s) described in Item 3.2 were scanned during the preliminary test:
- After the preliminary scan, we found the test mode described in Item 3.2 producing the highest emission level.
- The EUT and cable configuration, antenna position, polarization and turntable position of the above highest emission level were recorded for the final test.

Procedure of Final Test

- EUT and support equipment were set up on the turntable as per step 8 of the preliminary test.
- The Analyzer / Receiver scanned from 30MHz to 40GHz maximum, if any. Emissions were scanned and measured rotating the EUT to 360 degrees, varying cable placement and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- Recorded at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and only Q.P. reading is presented.
- The test data of the worst case condition(s) was recorded.

7.4 TEST RESULTS

Line Conducted Emission

Operation Mode:	Mode 1	**Test Date:**	August 6, 2006
Temperature:	25°C	**Tested by:**	Jason Chang
Humidity:	55% RH		

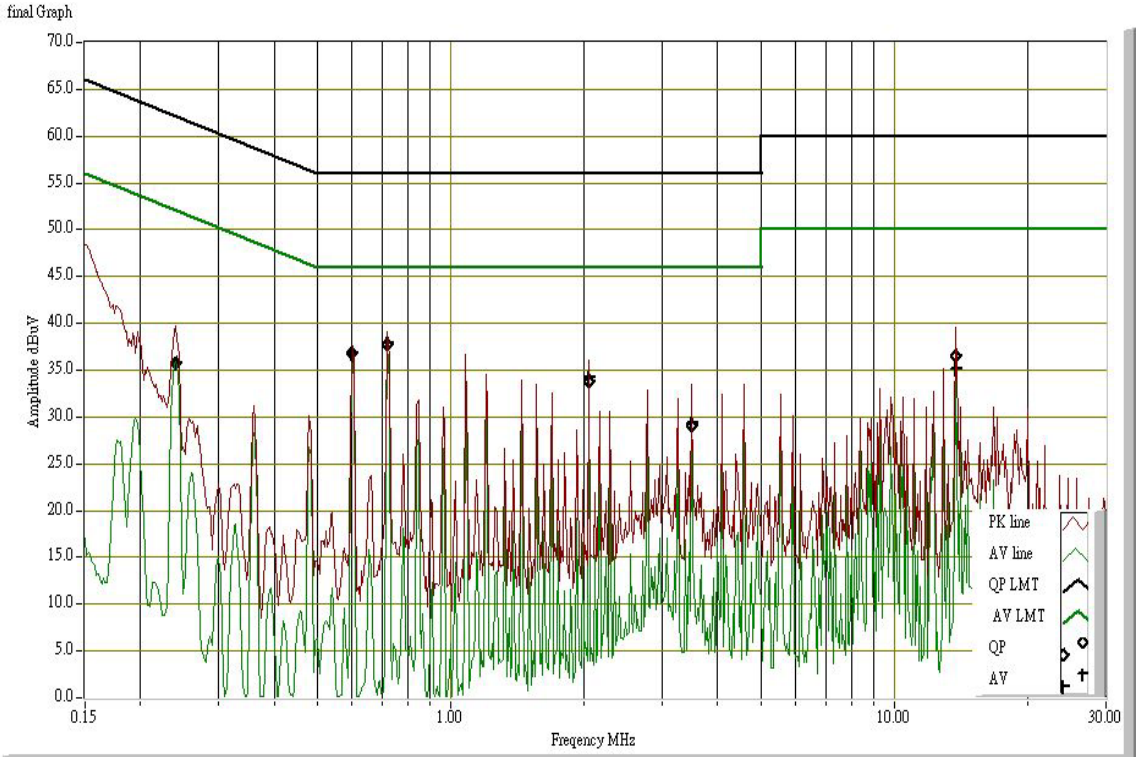
Frequency (MHz)	QP Reading (dBuV)	AV Reading (dBuV)	Corr. factor (dB)	QP Result (dBuV)	AV Result (dBuV)	QP Limit (dBuV)	AV Limit (dBuV)	QP Margin (dB)	AV Margin (dB)	Note
0.240	35.770	35.740	0.100	35.870	35.840	62.096	52.096	-26.226	-16.256	L1
0.600	36.850	36.820	0.100	36.950	36.920	56.000	46.000	-19.050	-9.080	L1
0.721	37.820	37.740	0.100	37.920	37.840	56.000	46.000	-18.080	-8.160	L1
2.047	34.230	33.710	0.100	34.330	33.810	56.000	46.000	-21.670	-12.190	L1
3.491	29.320	29.040	0.100	29.420	29.140	56.000	46.000	-26.580	-16.860	L1
13.747	36.530	35.080	0.775	37.305	35.855	60.000	50.000	-22.695	-14.145	L1
0.240	37.930	37.110	0.100	38.030	37.210	62.096	52.096	-24.066	-14.886	L2
0.360	34.480	34.240	0.100	34.580	34.340	58.729	48.729	-24.149	-14.389	L2
0.600	34.920	34.640	0.100	35.020	34.740	56.000	46.000	-20.980	-11.260	L2
0.721	36.700	36.640	0.100	36.800	36.740	56.000	46.000	-19.200	-9.260	L2
3.491	30.480	30.340	0.100	30.580	30.440	56.000	46.000	-25.420	-15.560	L2
9.304	28.670	28.370	0.630	29.300	29.000	60.000	50.000	-30.700	-21.000	L2

Remark:

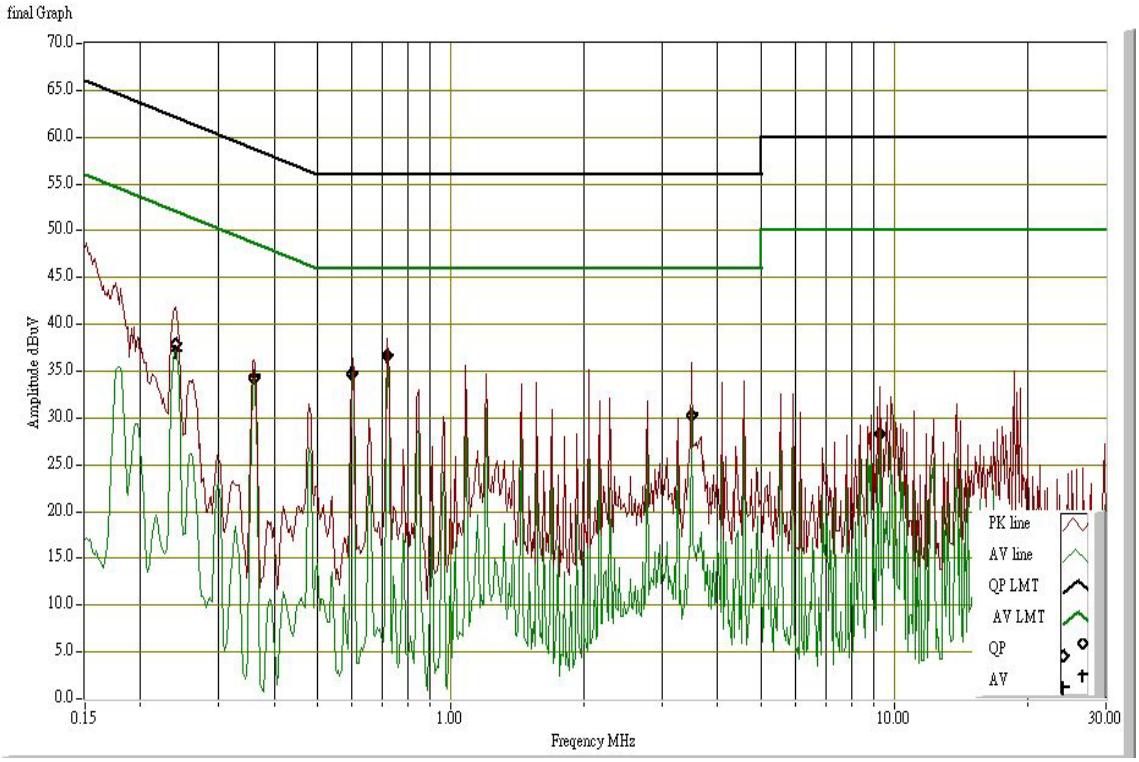
1. *Measuring frequencies from 0.15 MHz to 30MHz.*
2. *The emissions measured in frequency range from 0.15 MHz to 30MHz were made with an instrument using Quasi-peak detector and average detector.*
3. *The IF bandwidth of SPA between 0.15MHz to 30MHz was 10kHz; the IF bandwidth of Test Receiver between 0.15MHz to 30MHz was 9kHz;*
4. *L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)*

Test Plots

Conducted emissions (Line 1)



Conducted emissions (Line 2)



Radiated Emission

Operation Mode: Mode 1 **Test Date:** August 9, 2006

Temperature: 26°C **Tested by:** Ivan Tsai

Humidity: 55 % RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Ant.Pol. (H/V)	Detector Mode (PK/QP)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit 10m (dBuV/m)	Margin (dB)
51.82	V	Peak	5.97	13.39	19.36	30.00	-10.64
211.84	V	Peak	3.53	12.75	16.28	30.00	-13.72
260.48	V	Peak	0.44	14.54	14.98	37.00	-22.02
346.03	V	Peak	-2.21	16.98	14.77	37.00	-22.23
600.01	V	Peak	2.67	22.26	24.93	37.00	-12.07
854.31	V	Peak	1.52	25.07	26.59	37.00	-10.41
39.70	H	Peak	8.29	13.85	22.14	30.00	-7.86
127.00	H	Peak	8.47	10.47	18.94	30.00	-11.06
211.88	H	Peak	10.14	12.76	22.90	30.00	-7.10
357.39	H	Peak	2.70	17.26	19.96	37.00	-17.04
598.03	H	Peak	7.56	22.22	29.78	37.00	-7.22
784.19	H	Peak	-0.62	24.18	23.56	37.00	-13.44

Remark:

1. *Measuring frequencies from 30 MHz to the 1GHz.*
2. *Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak detector mode.*
3. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
4. *The IF bandwidth of SPA between 30MHz to 1GHz was 100kHz.*