

FCC Part 15B

Measurement and Test Report

For

ELECTRONICS TECHNOLOGY(DONG GUAN) COMPANY LIMITED

No.161, Xin Min Road, Tong Luo Wei Industrial Zone, Dong Guan City,

China

FCC ID: ZL9-M87EF2

Test Rule(s):	<u>FCC Part 15 Subpart B</u>
Product Description:	<u>Tablet PC</u>
Tested Model:	<u>M87EF2</u>
Report No.:	<u>STR14108015E-4</u>
Tested Date:	<u>2014-10-09 to 2014-10-30</u>
Issued Date:	<u>2014-10-30</u>
Tested By:	<u>Lebron Wang / Engineer</u>
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Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by Shenzhen SEM.Test Technology Co., Ltd.

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: ELECTRONICS TECHNOLOGY(DONG GUAN) COMPANY LIMITED

Address of applicant: No. 161, Xin Min Road, Tong Luo Wei Industrial Zone, Dong Guan City, China

Manufacturer: ELECTRONICS TECHNOLOGY(DONG GUAN) COMPANY LIMITED

Address of manufacturer: No. 161, Xin Min Road, Tong Luo Wei Industrial Zone, Dong Guan City, China

General Description of EUT

Product Name:	Tablet PC
Trade Name:	/
Model No.:	M87EF2
Adding Model(s):	Trio PRO-8 for Windows

Note: The test data is gathered from a production sample, provided by the manufacturer. The appearance of others models listed in the report is different from main-test model M87EF2, but the circuit and the electronic construction do not change, declared by the manufacturer.

Technical Characteristics of EUT

Rated Voltage:	DC 5V
Rated Current:	2A
Rated Power:	/
Power Adapter Model:	PGAE0500200U1UL
Lowest Internal Frequency:	32.768 kHz
Highest Internal Frequency:	1.83GHz
Classification of ITE:	CLASS B

1.2 Test Standards

The following report is prepared on behalf of the ELECTRONICS TECHNOLOGY(DONG GUAN) COMPANY LIMITED in accordance with Part 2, Subpart J, and Part 15, Subparts A and B of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15, Subpart B, and section 15.205, 15.107, and 15.109 rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with 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.

1.4 Test Facility

FCC – Registration No.: 934118

Shenzhen SEM.Test Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files and the Registration is 934118.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Shenzhen SEM.Test Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

CNAS Registration No.: L4062

Shenzhen SEM.Test Technology Co., Ltd. is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L4062. All measurement facilities used to collect the measurement data are located at 1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road, Bao'an District, Shenzhen, P.R.C (518101).

1.5 EUT Setup and Operation Mode

The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted according to the operation manual for use, more detailed description as follows:

Test Mode List:

Test Mode	Description	Remark
TM1	Charging & Playing	Connect to Adapter, Earphone
TM2	Downloading	Connect to U-Disk, TF card

EUT Cable List and Details

Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
USB Cable	1.2	Unshielded	Without Ferrite

Special Cable List and Details

Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
USB Patch Cord	0.1	Unshielded	Without Core

Auxiliary Equipment List and Details

Description	Manufacturer	Model	Serial Number
TF Card	Kingston	4GB	/
U-Disk	SanDisk	2GB	/

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§ 15.107 (a)	Conducted Emissions	Compliant
§ 15.109 (a)	Radiated Emissions	Compliant

N/A: not applicable

3. Conducted Emissions

3.1 Measurement Uncertainty

Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement is ± 2.88 dB.

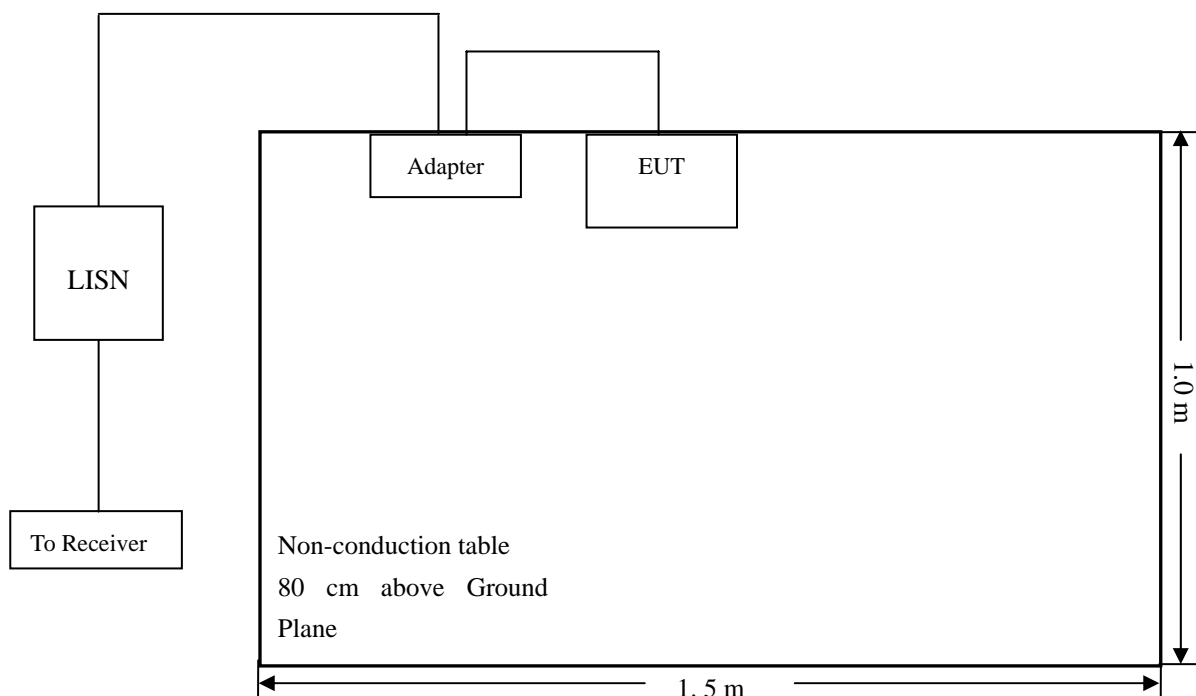
3.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2014-05-28	2015-05-27
L.I.S.N	Schwarz beck	NSLK8126	8126-224	2014-05-28	2015-05-27
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2014-05-28	2015-05-27

3.3 Test Procedure

Test is conducting under the description of 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.

3.4 Basic Test Setup Block Diagram



3.5 Environmental Conditions

Temperature:	23 °C
Relative Humidity:	52%
ATM Pressure:	1011 mbar

3.6 Summary of Test Results/Plots

According to the data in section 3.7, the EUT complied with the FCC Part 15.107(a) Conducted margin for a Class B device, with the *worst* margin reading of:

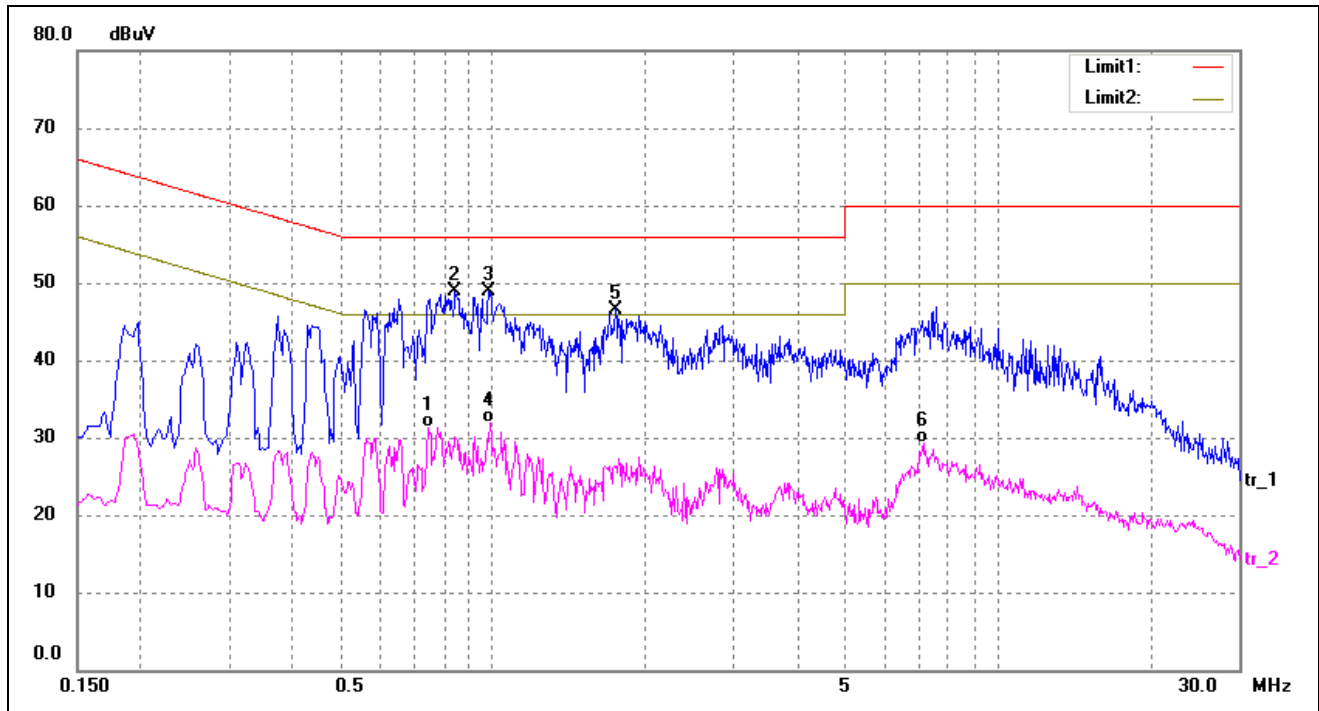
-5.58 dB at 0.8580 MHz in the **Line, Peak** detector, 0.15-30MHz

3.7 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data

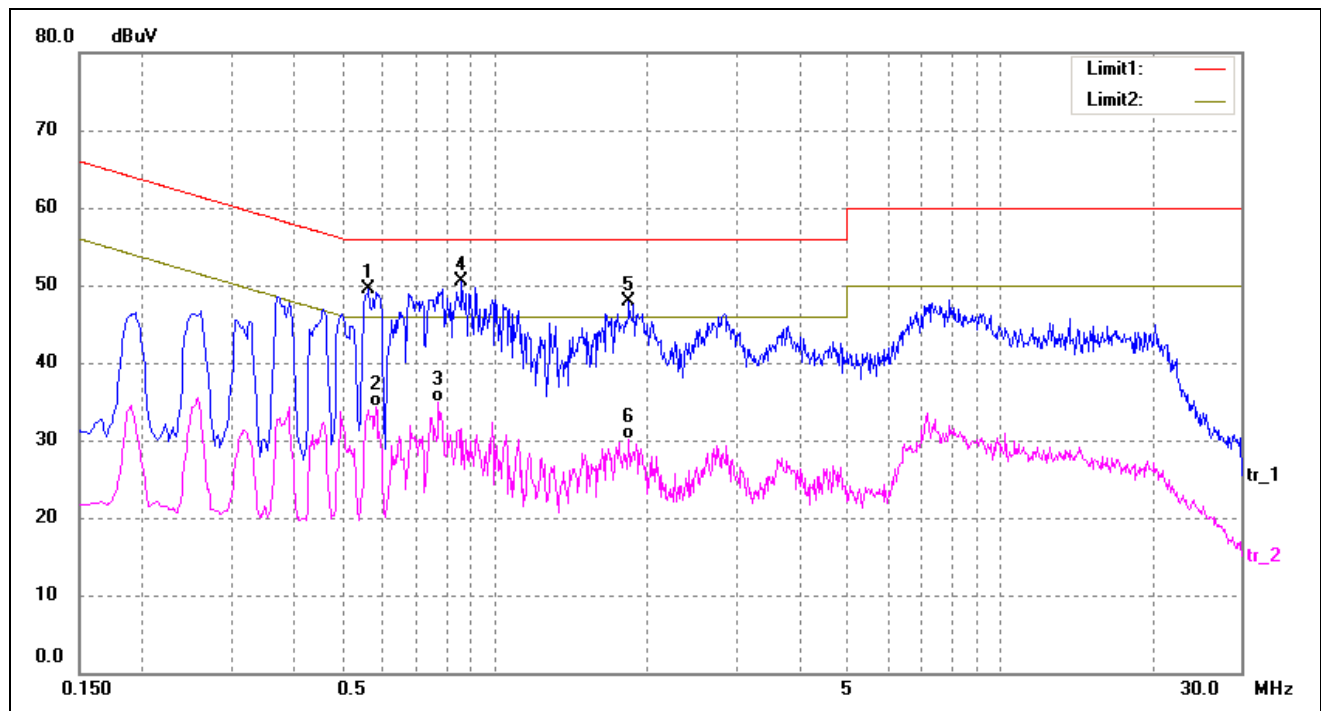
EUT: Tablet PC
 Tested Model: M87EF2
 Operating Condition: AC 120V/60Hz; Adapter DC 5V
 Comment: Charging & Playing

Test Specification: Neutral



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.7460	21.52	9.75	31.27	46.00	-14.73	AVG
2	0.8420	39.06	9.84	48.90	56.00	-7.10	peak
3*	0.9820	39.01	9.98	48.99	56.00	-7.01	peak
4	0.9860	21.96	9.99	31.95	46.00	-14.05	AVG
5	1.7500	36.60	10.00	46.60	56.00	-9.40	peak
6	7.1140	19.39	10.00	29.39	50.00	-20.61	AVG

Test Specification: Line



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.5620	39.85	9.56	49.41	56.00	-6.59	peak
2	0.5820	24.65	9.58	34.23	46.00	-11.77	AVG
3	0.7740	25.12	9.77	34.89	46.00	-11.11	AVG
4	0.8580	40.56	9.86	50.42	56.00	-5.58	peak
5	1.8420	37.82	10.00	47.82	56.00	-8.18	peak
6	1.8420	20.03	10.00	30.03	46.00	-15.97	AVG

4. Radiated Emissions

4.1 Measurement Uncertainty

Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any radiation emissions measurement is ± 5.10 dB.

4.2 Test Equipment List and Details

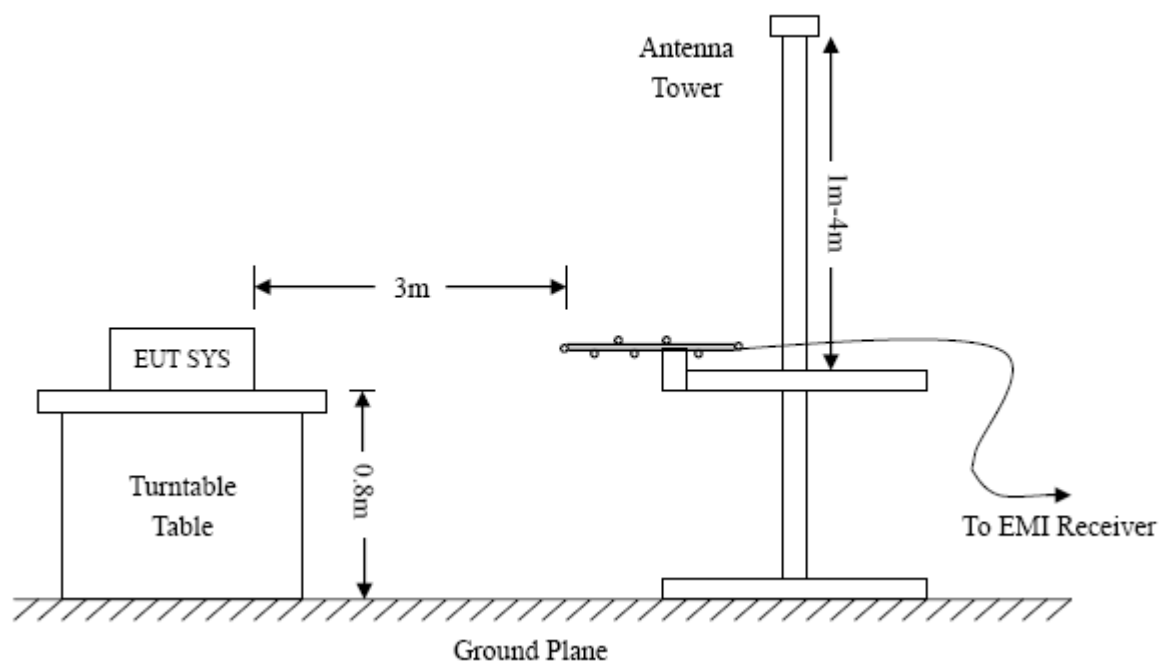
Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2014-05-28	2015-05-27
EMI Test Receiver	R&S	ESVB	825471/005	2014-05-28	2015-05-27
Pre-amplifier	Agilent	8447F	3113A06717	2014-05-28	2015-05-27
Pre-amplifier	Compliance Direction	PAP-0118	24002	2014-05-28	2015-05-27
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2014-05-24	2015-05-23
Horn Antenna	ETS	3117	00086197	2014-05-24	2015-05-23
Loop Antenna	SCHWARZECK	HFRA 5165	9365	2014-05-24	2015-05-23

4.3 Test Procedure

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.109 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.



4.4 Test Receiver Setup

Frequency :9kHz-30MHz

RBW=10KHz,

VBW =30KHz

Sweep time= Auto

Trace = max hold

Detector function = peak

Frequency :30MHz-1GHz

RBW=120KHz,

VBW=300KHz

Sweep time= Auto

Trace = max hold

Detector function = peak, QP

Frequency :Above 1GHz

RBW=1MHz,

VBW=3MHz(Peak), 10Hz(AV)

Sweep time= Auto

Trace = max hold

Detector function = peak, AV

4.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} - \text{Corr. Factor}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dB μ V means the emission is 6dB μ V below the maximum limit for a Class B device. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15.109(a) Limit}$$

4.6 Environmental Conditions

Temperature:	23 °C
Relative Humidity:	55 %
ATM Pressure:	1011 mbar

4.7 Summary of Test Results/Plots

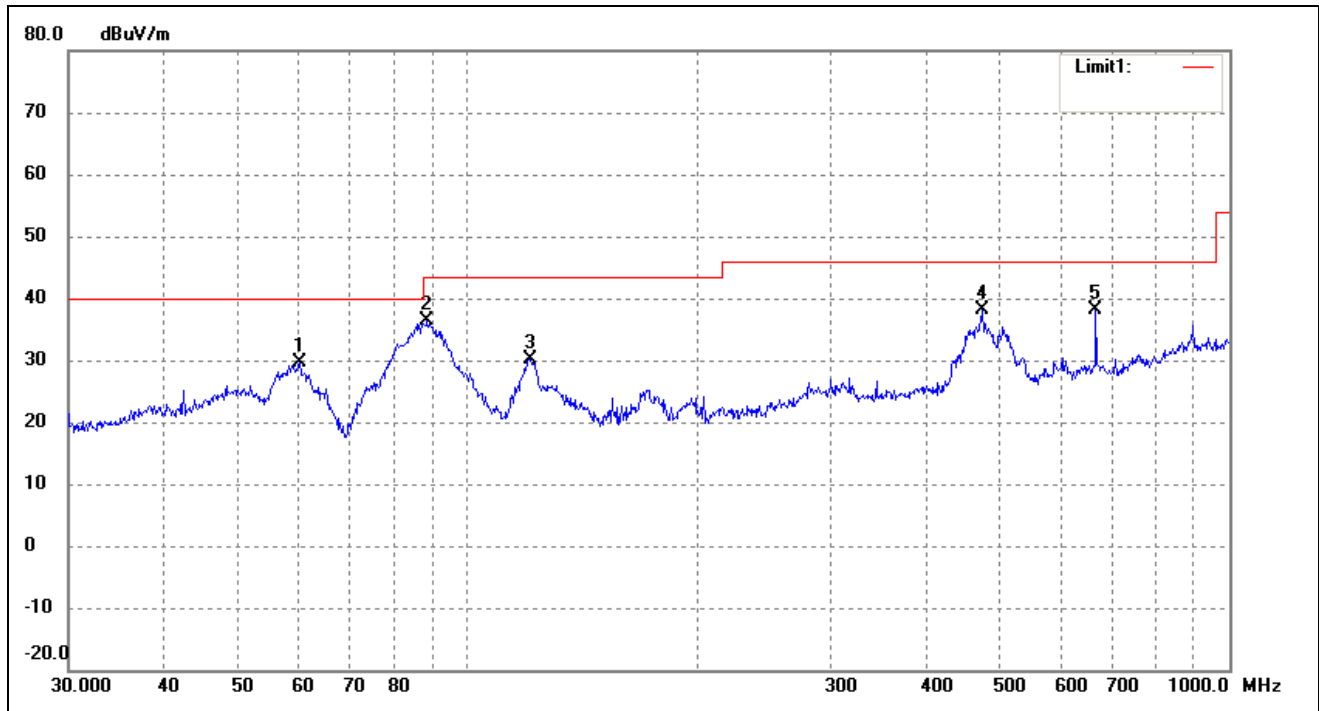
According to the data, the EUT complied with the FCC Part 15.109(a) rule, and had the worst margin of:

-3.93 dB at 79.2426 MHz in the Vertical polarization, Downloading Mode, 9 kHz to 6 GHz, 3Meters

Plot of Radiated Emissions Test Data

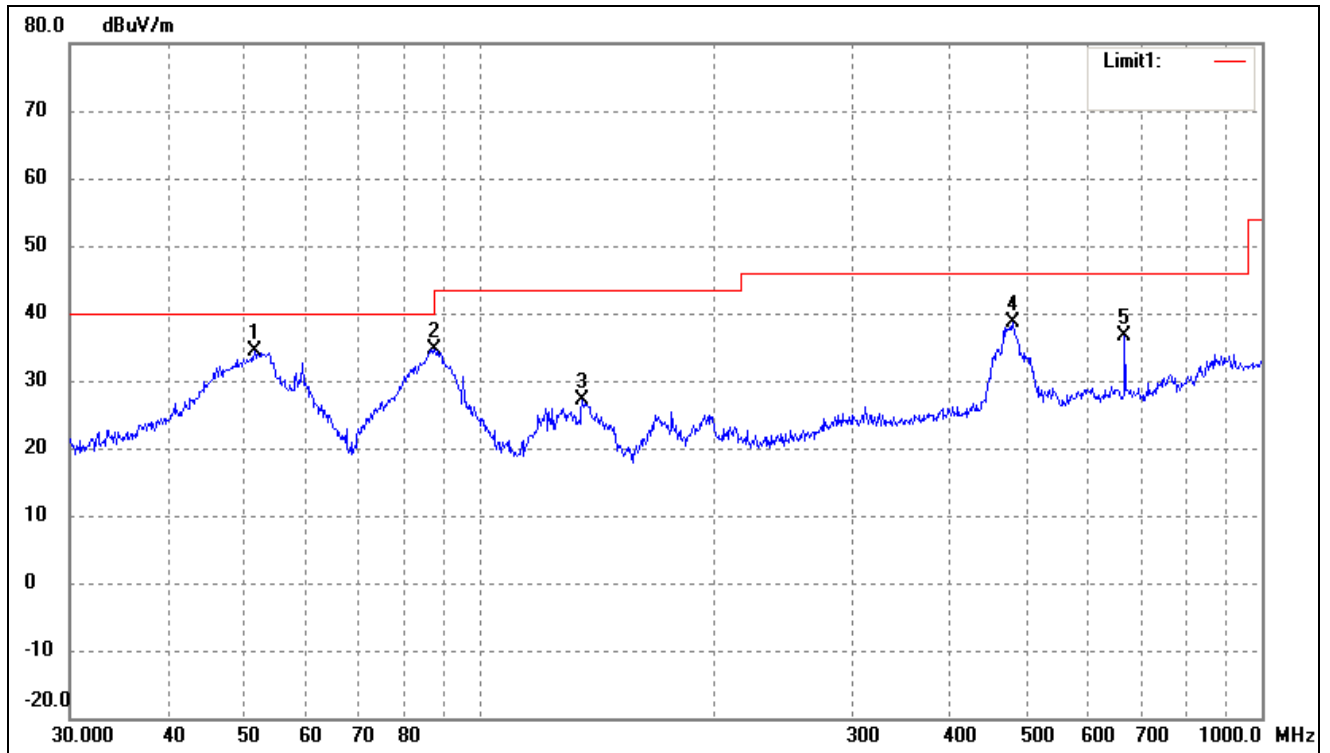
EUT: Tablet PC
Tested Model: M87EF2
Operating Condition: AC 120V/60Hz;Adapter DC 5V
Comment: Charging & Playing

Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	60.2801	24.34	5.29	29.63	40.00	-10.37	58	150	QP
2	88.6525	33.03	3.26	36.29	43.50	-7.21	326	100	QP
3	121.1231	26.26	3.92	30.18	43.50	-13.32	29	120	QP
4	473.8347	27.84	10.25	38.09	46.00	-7.91	209	100	peak
5	668.1423	25.93	12.19	38.12	46.00	-7.88	359	200	peak

Test Specification: Vertical

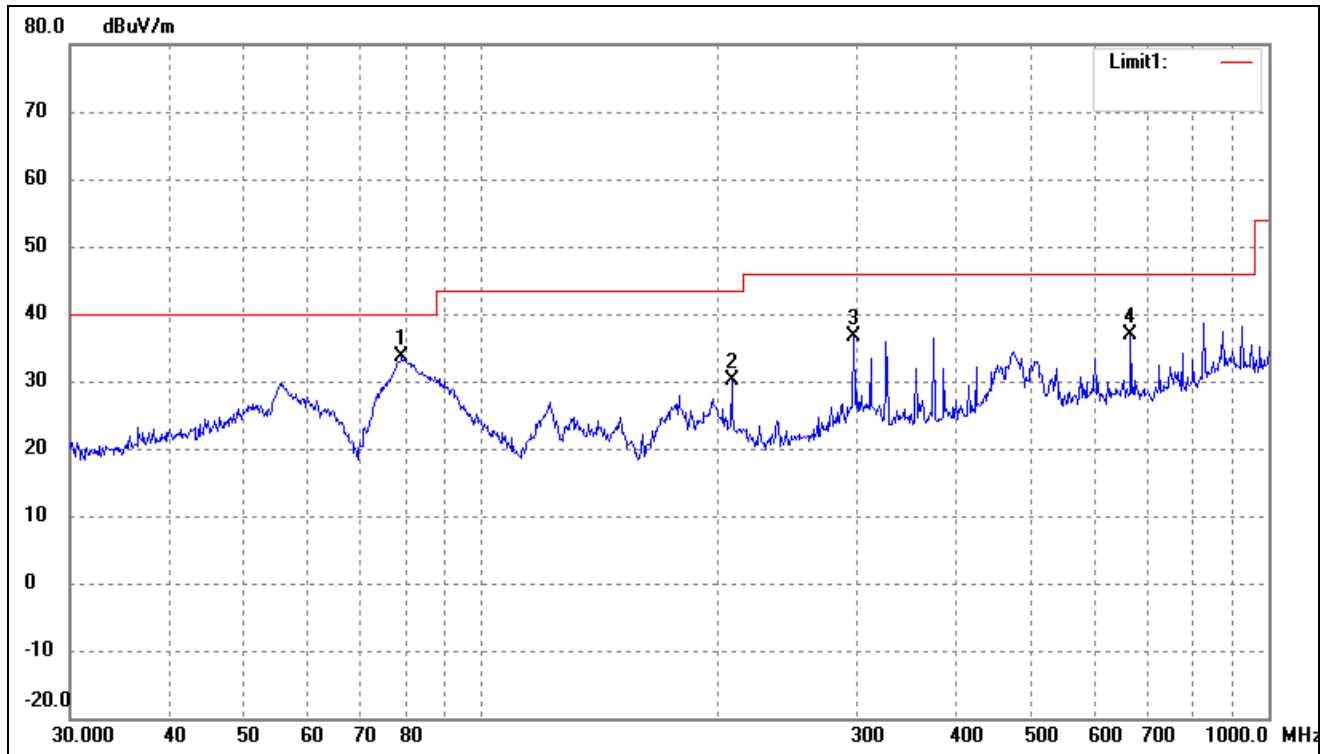


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	51.6616	28.14	6.12	34.26	40.00	-5.74	51	100	peak
2	87.7248	31.56	3.02	34.58	40.00	-5.42	308	100	peak
3	135.5062	24.46	2.77	27.23	43.50	-16.27	120	100	peak
4	480.5276	28.60	10.12	38.72	46.00	-7.28	359	100	peak
5	668.1423	24.10	12.60	36.70	46.00	-9.30	359	100	peak

Plot of Radiated Emissions Test Data

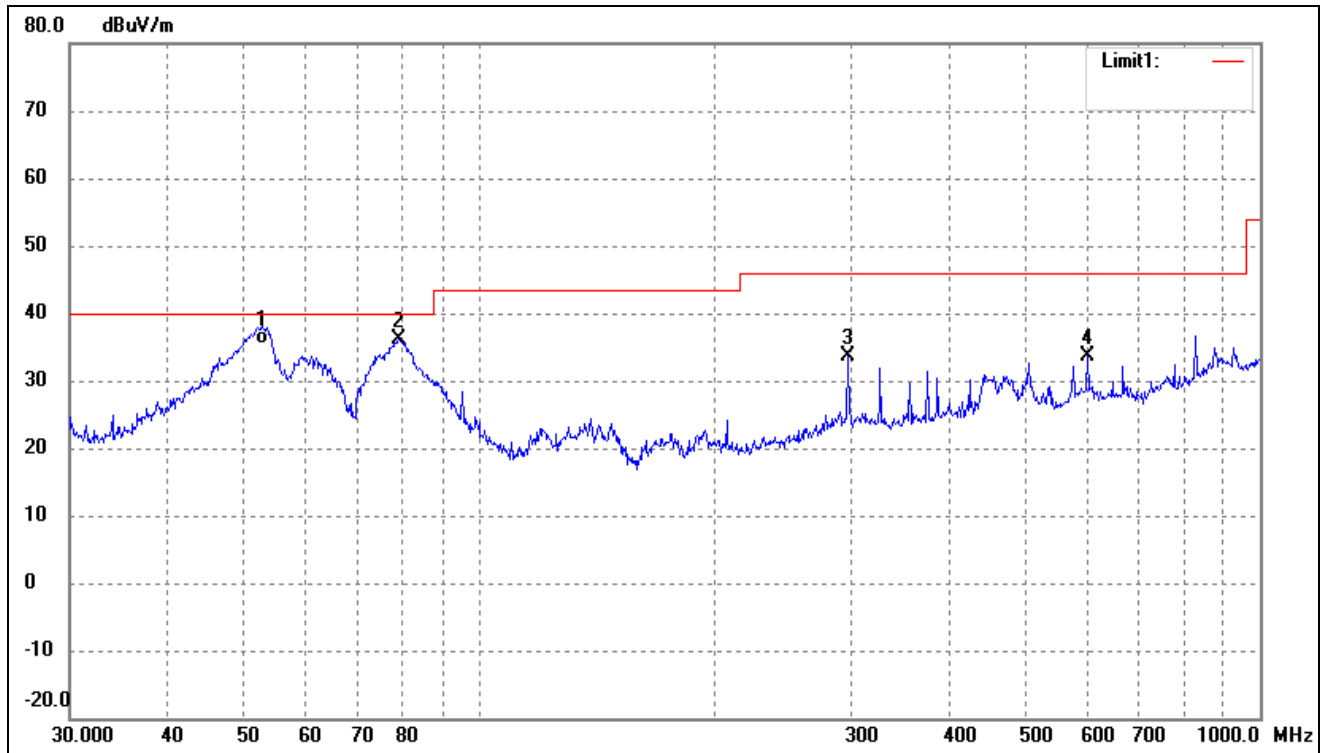
EUT: Tablet PC
Tested Model: M87EF2
Operating Condition: AC 120V/60Hz; USB DC 5V
Comment: Downloading

Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	79.2426	32.43	1.09	33.52	40.00	-6.48	58	150	QP
2	207.8501	25.99	4.23	30.22	43.50	-13.28	326	100	QP
3	297.2241	27.49	9.06	36.55	46.00	-9.45	29	120	QP
4	668.1423	24.73	12.19	36.92	46.00	-9.08	209	100	peak

Test Specification: Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	52.9453	29.50	6.00	35.50	40.00	-4.50	51	100	peak
2	79.2426	34.98	1.09	36.07	40.00	-3.93	308	100	peak
3	297.2241	24.47	9.06	33.53	46.00	-12.47	120	100	peak
4	601.4265	20.36	13.22	33.58	46.00	-12.42	359	100	peak

Note: Testing is carried out with frequency rang 9kHz to the 6GHz, which above 1GHz is close to the noise base even antenna close up to 1meter distance according the measurement of ANSI C63.4.

The measurements greater than 20dB below the limit from 9kHz to 30MHz and test data are not provided.

***** END OF REPORT *****