

FCC TEST REPORT

REPORT NO.: FCI0901014R

MODEL NO.: V1

LISTED MODELS: N/A

RECEIVED: Jan 04, 2009

TESTED: Jan 04, 2009 to Jan 12, 2009

APPLICANT: XIAMEN YASEN ELECTRONICS CO., LID.

ADDRESS: 603,Chuangye Building,Chuang Ye Yuan,Huoju Gaoxin District,Xiamen

ISSUED BY: SHENZHEN SETEK TECHNOLOGY CO., LTD.

LAB LOCATION: 2/F,A3 Bldg, East Industry Zone, Overseas Chinese Town,
Shenzhen,China

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SHENZHEN SETEK TECHNOLOGY CO., LTD.

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Prepared for : XIAMEN YASEN ELECTRONICS CO., LID.

Address : 603,Chuangye Building,Chuang Ye Yuan,Huoju Gaoxin District,Xiamen

Product : Wireless Keyboard

Model No(s). : V1

Trademark : 

Test Standard : FCC Part 15 Paragraph 15.249

Prepared by : SHENZHEN SETEK TECHNOLOGY CO., LTD.

Address : 2/F, A3 Bldg, East Industry Zone, Overseas Chinese Town, Shenzhen, China

FCC Registration Number: 966959

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(Engineer)

Reviewer by : 
(Project Engineer)

Approved by : 
(Manager)

Report Number : FCI0901014R

Date of Test : Jan 04, 2009 to Jan 12, 2009

Date of Report : Jan 13, 2009

The device described above is tested by SHENZHEN SETEK TECHNOLOGY CO., LTD. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. This report applies to above tested sample only and shall not be reproduced in part without written approval of SHENZHEN SETEK TECHNOLOGY CO., LTD.

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1. GENERAL INFORMATION

1.1 Description of Device (EUT)

Applicant : XIAMEN YASEN ELECTRONICS CO. , LID.

Address : 603, Chuangye Bui lding, Chuang Ye Yuan, Huoj u Gaoxi n District, Xi amen

Manufacturer : XIAMEN YASEN ELECTRONICS CO . , LID.

Address : 603, Chuangye Bui lding, Chuang Ye Yuan, Huoj u Gaoxi n District, Xi amen

EUT : Wireless Keyboard

Model Number(s) : V1

Description of EUT : Wireless Keyboard

Description of Antenna : PCB printed Antenna

Power Supply : DC6.0V (4 PCS AAA batterires)

Operation Frequency : 2404 MHz ~ 2480 MHz

Number of Channels : 77

Type of Modulation : GFSK

Received : Jan 04, 2009

Date of Test : Jan 04, 2009 to Jan 12, 2009

1.2. Test Summary

Test	Test Requirement	Test Method	Class / Severity	Result
Radiated Emission (30MHz to 25GHz)	FCC PART 15: 2007	ANSI C63.4: 2003	Class B	PASS
Conducted Emission (150KHz to 30MHz)	FCC PART 15: 2007	ANSI C63.4: 2003	Class B	N/A

1.3. Description of Support Device

The EUT has been tested as an independent unit.

1.4. Standards Applicable for Testing

The customer requested FCC tests for a Wireless Keyboard. The standards used were FCC 15 Paragraph 15.249, Paragraph 15.207, Paragraph 15.209, Paragraph 15.31, Paragraph 15.33, Paragraph 15.35.

1.5. List of Measuring Equipments Used

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	Agilent	E4408B	MY44210575	May 29,2008	1 Year
2.	Test Receiver	Rohde & Schwarz	ESIB26	100234	May 29,2008	1 Year
3.	Bilog Antenna	Schwarzbeck	VULB9163	142	May 29,2008	1 Year
4.	Loop Antenna	EMCO	6502	00042960	May 29,2008	1 Year
5.	50 Coaxial Switch	Anritsu Corp	MP59B	6100237248	May 29,2008	1 Year
6.	Cable	Schwarzbeck	AK9513(1m)	CR RX2	May 29,2008	1 Year
7.	Cable	Schwarzbeck	AK9513(10m)	AC RX1	May 29,2008	1 Year
8.	Cable	Rosenberger	N/A(6m)	CR RX1	May 29,2008	1 Year
9.	Cable	Rosenberger	N/A(10m)	FP2RX2	May 29,2008	1 Year
9.	DC Power Filter	MPE	23872C	N/A	May 29,2008	1 Year
10.	Single Phase Power Line Filter	MPE	23332C	N/A	May 29,2008	1 Year
11.	3 Phase Power Line Filter	MPE	23333C	N/A	May 29,2008	1 Year
12.	Signal Generator	HP	8648A	3625U00573	May 29,2008	1 Year
13.	Test Receiver	Rohde & Schwarz	ESCS30	100350	May 29,2008	1 Year
14.	L.I.S.N.	Rohde & Schwarz	ESH2-Z5	834549/005	May 29,2008	1 Year
15.	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100006	May 29,2008	1 Year
16.	RF Cable	FUJIKURA	RG-55/U	LISN Cable	May 29,2008	1 Year
17.	Spectrum Analyzer	Agilent	E4446A	MY43360126	May 29,2008	1 Year
18.	Spectrum Analyzer	Agilent	E7405A	US41160416	May 29,2008	1 Year
19.	Horn Antenna	Rohde & Schwarz	HF906	100039	May 29,2008	1 Year
20.	Horn Antenna	Schwarzbeck	BBHA9170	154	May 29,2008	1 Year

1.6. Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

FCC – Registration No.: 966959

SHENZHEN SETEK TECHNOLOGY CO., LTD, the EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission.

1.7. Measurement Uncertainty

Radiation Uncertainty : Ur = 3.84dB

Conduction Uncertainty : Uc = 2.72dB

2 Conducted Emission Test

Product Name:	Wireless Keyboard
Test Requirement:	FCC Part15 Paragraph 15.207
Test Method:	Based on FCC Part15 Paragraph 15.207
Test Date:	Jan 04, 2009
Frequency Range:	150 kHz to 30MHz
Class:	Class B
Detector:	Peak for pre-scan (9 kHz Resolution Bandwidth) Quasi-Peak & Average if maximised peak within 6dB of Average Limit

2.1. Test Equipment

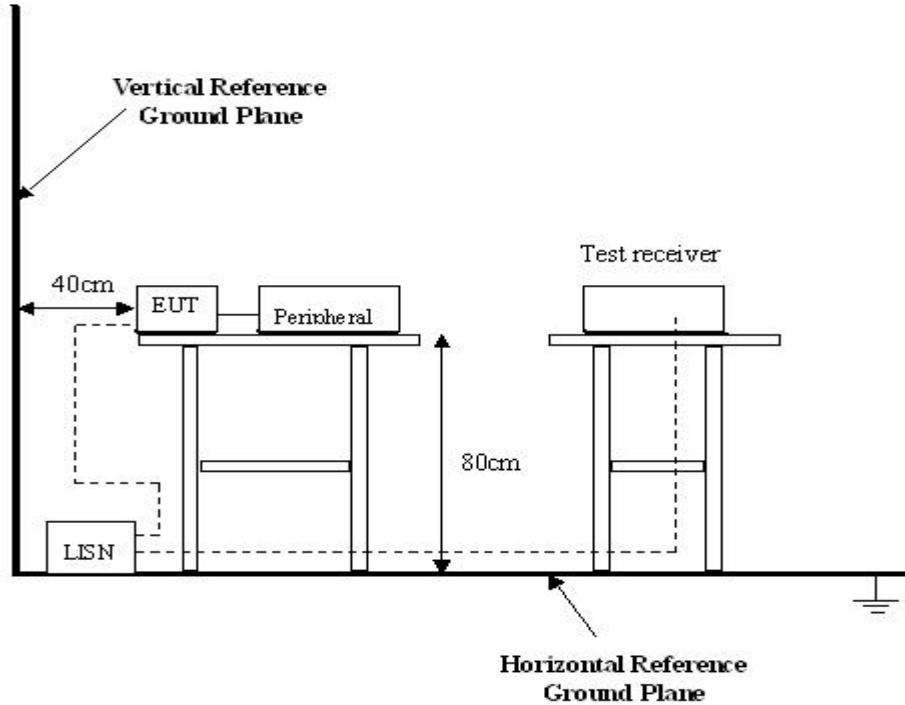
Please refer to Section 1.5. this report.

2.2. Test Procedure

1. The EUT was tested according to ANSI C63.4: 2003. The frequency spectrum from 150kHz to 30MHz was investigated.
2. The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

2.3. Conducted Test Setup

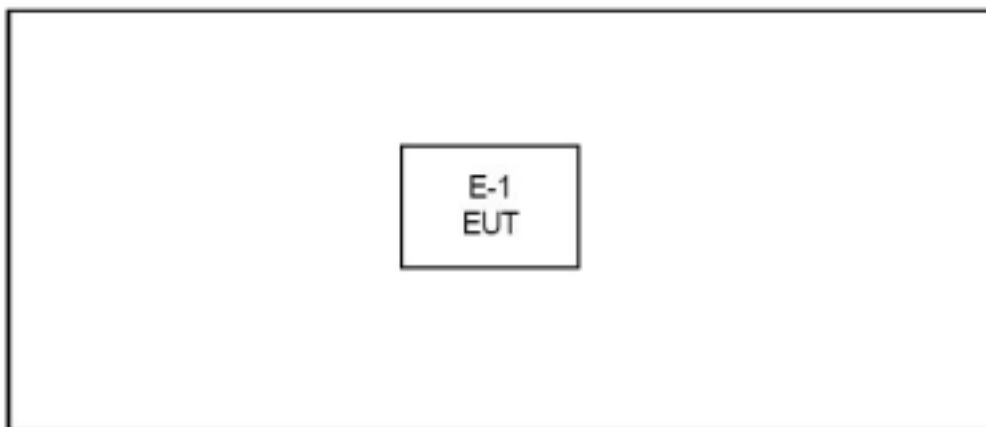
The conducted emission tests were performed using the setup accordance with the ANSI C63.4:2003, The specification used in this report was the FCC Part15 Paragraph 15.207 limits.



2.4. EUT Operating Condition

Operating condition is according to ANSI C63.4: 2003.

- Setup the EUT and simulators as shown on follow.
- Enable RF signal and confirm EUT active.
- Modulate output capacity of EUT up to specification.



2.5. Conducted Emission Limits

66-56 dBuV/m between 0.15MHz & 0.5MHz

56 dBuV/m between 0.5MHz & 5MHz

60 dBuV/m between 5MHz & 30MHz

Note: In the above limits, the tighter limit applies at the band edges.

2.6. Test Result

Note: Powered by AAA batteries, this test item not applicable.

3. Radiation Emission Test

Product Name:	Wireless Keyboard
Test Requirement:	FCC Part15 Paragraph 15.249
Test Method:	Based on FCC Part15 Paragraph 15.31 and Paragraph 15.33
Test Date:	Jan 12, 2009
Frequency Range:	30MHz to 25GHz
Measurement Distance:	3m
Detector:	Peak for pre-scan (120kHz resolution bandwidth) Quasi-Peak if maximised peak within 6dB of limit

3.1. Test Equipment

Please refer to Section 1.5. this report.

3.2. Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase centre variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

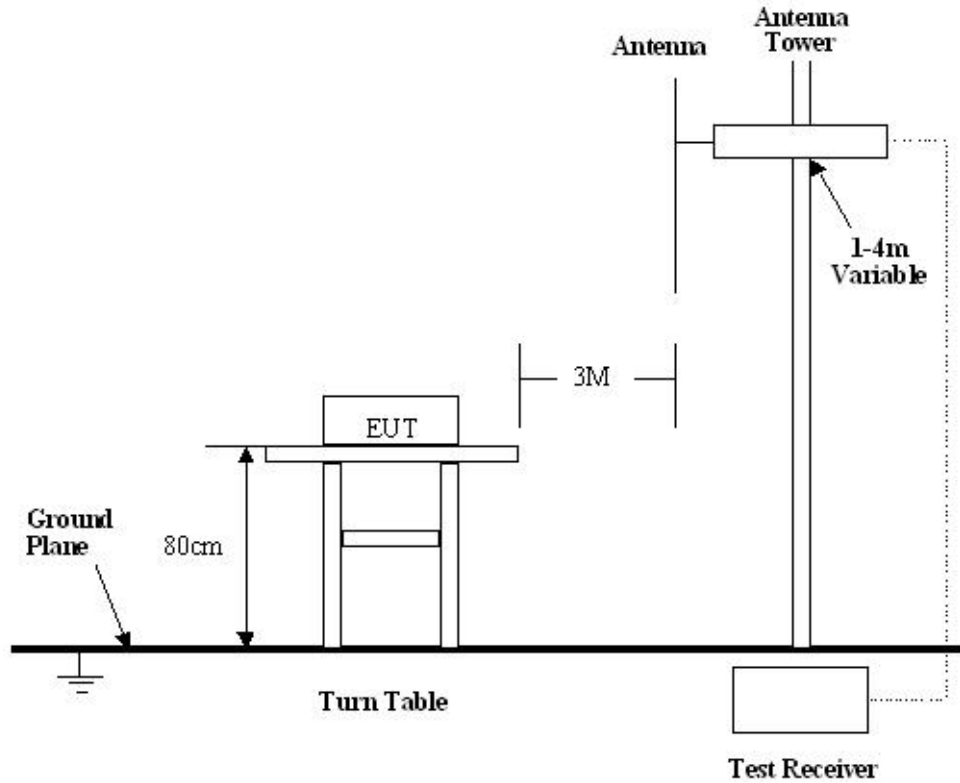
Based on ANSI C63.4: 2003, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at EMC Lab is 3.84 dB.

3.3. Test Procedure

1. Maximizing procedure was performed on the six (6) highest emissions to ensure EUT is compliant with all installation combinations.
2. All data was recorded in the peak detection mode.
3. The EUT was under normal mode during the final qualification test and the configuration was used to represent the worst case results.
4. According to the FCC Part 15 Paragraph 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna to the intentional radiator shall be considered sufficient to comply with the provisions of this section. This product has a permanent antenna, fulfill the requirement of this section.

3.4. Radiated Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.4: 2003, The specification used in this report was the FCC Part15 Paragraph 15.249 and Paragraph 15.209 limits.



3.5. Spectrum Analyzer Setup

According to FCC Part15 Paragraph 15.249 Rules, the system was tested to 25000 MHz.

Start Frequency..... 30 MHz
 Stop Frequency..... 25000 MHz
 Resolution Bandwidth..... 1MHz (1G-25G) &
 120kHz (30-1000MHz)
 Video Bandwidth.....120 kHz
 (30-1000MHz,PK) ,10Hz (1G-25G,AV) & 1M (1G-25G,
 PK)

3.6. Corrected Amplitude & Margin Calculation

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

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dBuV means the emission is 7dBuV below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Class B Limit}$$

3.7. Summary of Test Results

According to the data in section 7.10, the EUT complied with the FCC Part15 Paragraph 15.249 standards.

3.8. EUT Operating Condition

Same as section 6.4 of this report.

3.9. Radiated Emissions Limit

A. FCC Part 15 subpart C Paragraph 15.249 Limit

Fundamental Frequency	Field Strength of Fundamental		Field Strength of Harmonics	
	mV/m	dBuV/m	uV/m	dBuV/m
902-928MHz	50	94	500	54
2400-2483.5 MHz	50	94	500	54
5725-5875 MHz	50	94	500	54
24.0-24.25GHz	250	108	2500	68

- Note:**
- (1) RF Voltage(dBuV)=20 log RF Voltage(uV)
 - (2) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
 - (3)The emission limit in this paragraph is based on measurement instrumentaion employing an average detector. Measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.
 - (4) Limit fundamental is 94dBuV/m@3m(AV)and114dBuV/m@3m(PK)
Limit field strength of harmonics: 54 dBuV/m@3m(AV)and74dBuV/m@3m(PK)

B. Frequencies in restricted band are complied to limit on Paragraph 15.209

Frequency(MHZ)	Distance(m)	Field strength(dBuV/m)
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

Note: (1) RF Voltage(dBuV)=20 log RF Voltage(uV)
 (2) In the Above Table, the tighter limit applies at the band edges.
 (3) Distance refers to the distance in meters between the measuring instrument antenna.

3.10. Radiated Emissions Test Result

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading.

The basic equation with a sample calculation is as follows:

Example:

ACF=Cable Loss + Antenna Factor – Amplifier Gain

Freq (MHz) Meter Reading +ACF=FS

2404 70.12dBuV + (-3.50)dB=66.62dBuV/m @3m

Radiated Emission Test Data

Test Voltage: DC 6V

Test Mode: TX On

Temperature: 24 °C

Humidity: 52%RH

Test Result: PASS

Remarks: No further spurious emission found between lowest internal generated/used frequency to 30 MHz

30-1000MHz radiation test no significant emissions above the equipment noise floor were detected.

Frequency (MHz)	Reading (dB μ V)	Antenna Factor (dB/m)	Cable Loss (dB)	Amplifier Gain (dB)
2404 AV	78.15 Vertical	27.5	4.00	35.00
2404 PK	89.94 Vertical	27.5	4.00	35.00
2404 AV	73.65 Horizontal	27.5	4.00	35.00
2404 PK	85.22 Horizontal	27.5	4.00	35.00
2442 AV	78.27 Vertical	27.5	4.12	35.00
2442 PK	90.06 Vertical	27.5	4.12	35.00
2442 PK	85.93 Horizontal	27.5	4.12	35.00
2442 AV	74.37 Horizontal	27.5	4.12	35.00
2480 AV	79.59 Vertical	27.5	4.38	35.00
2480 PK	90.78 Vertical	27.5	4.38	35.00
2480 AV	73.33 Horizontal	27.5	4.38	35.00
2480 PK	85.84 Horizontal	27.5	4.38	35.00

Frequency (MHz)	Detector	Antenna Polarization	Emission Level (dBuV/m)	FCC 15 Subpart C Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Turntable Angle (°)
Low frequency							
2404.0	AV	Vertical	74.65	94.00	19.05	1.0	100
2404.0	PK	Vertical	86.44	114.00	27.56	1.5	45
2404.0	AV	Horizontal	70.15	94.00	23.85	1.5	120
2404.0	PK	Horizontal	81.72	114.00	32.28	1.6	180
Middle frequency							
2442.00	AV	Vertical	74.89	94.00	19.11	1.5	60
2442.00	PK	Vertical	86.67	114.00	27.33	1.5	90
2442.00	PK	Horizontal	82.55	114.00	31.45	1.5	180
2442.00	AV	Horizontal	70.99	94.00	23.01	1.8	90
High frequency							
2480.00	AV	Vertical	76.47	94.00	17.53	1.5	120
2480.00	PK	Vertical	87.66	114.00	26.34	1.5	180
2480.00	AV	Horizontal	70.21	94.00	23.79	1.5	180
2480.00	PK	Horizontal	82.72	114.00	31.28	1.5	60

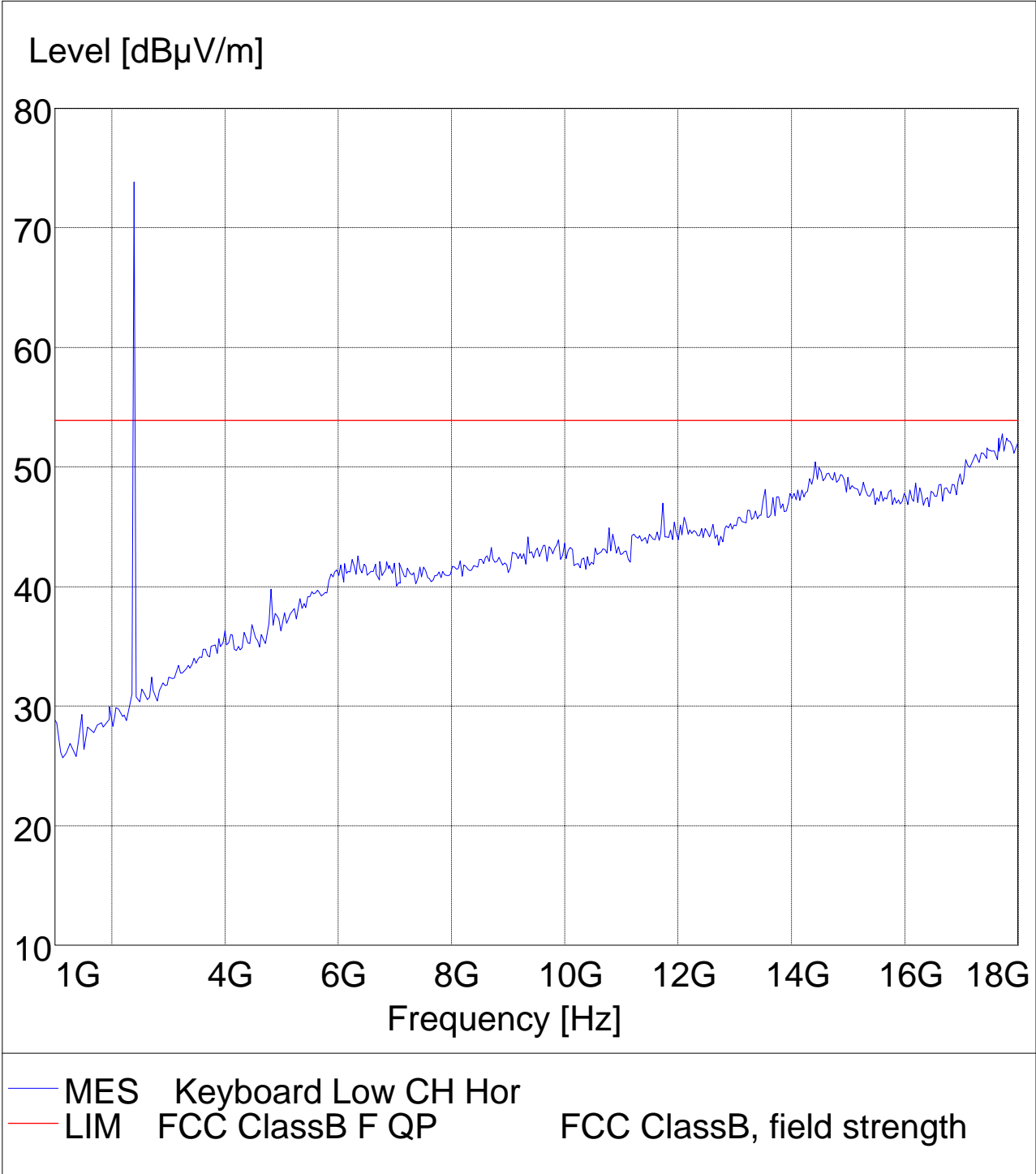
Note: 1.Above 1GHz,do a Peak and Average measurements for all emissions:
Limit fundamental is 94dBuV/m@3m(AV)and114dBuV/m@3m(PK)
Limit field strength of harmonics: 54 dBuV/m@3m(AV)and74dBuV/m@3m(PK)

2. New batteries was used in the test

3. Peak detector was used when scanning

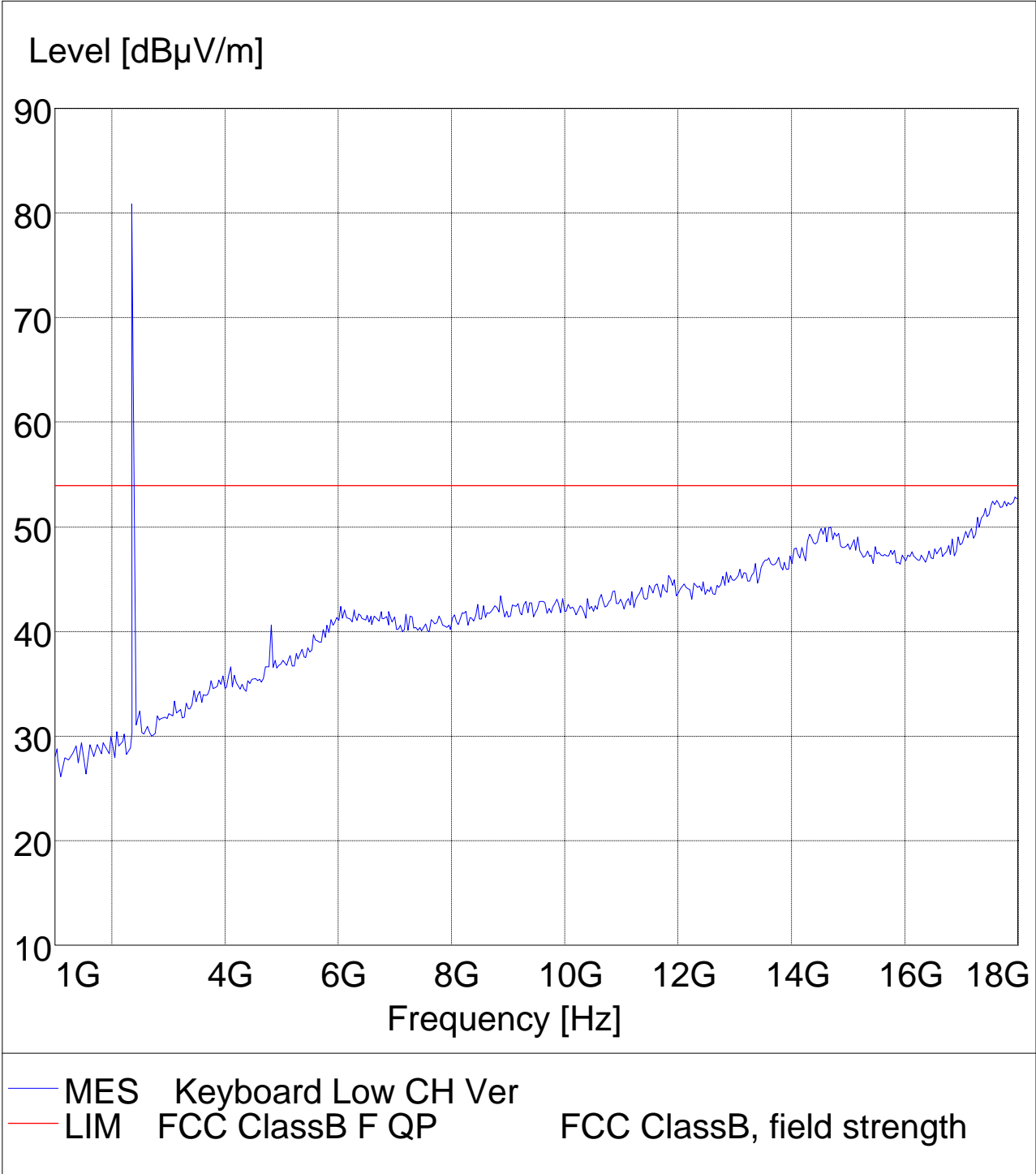
**4. Emission Level=Reading + ACF,
ACF=Antenna Factor +Cable Loss-Amplifier Gain**

Test plots:
Low Channel Horizontal above 1G



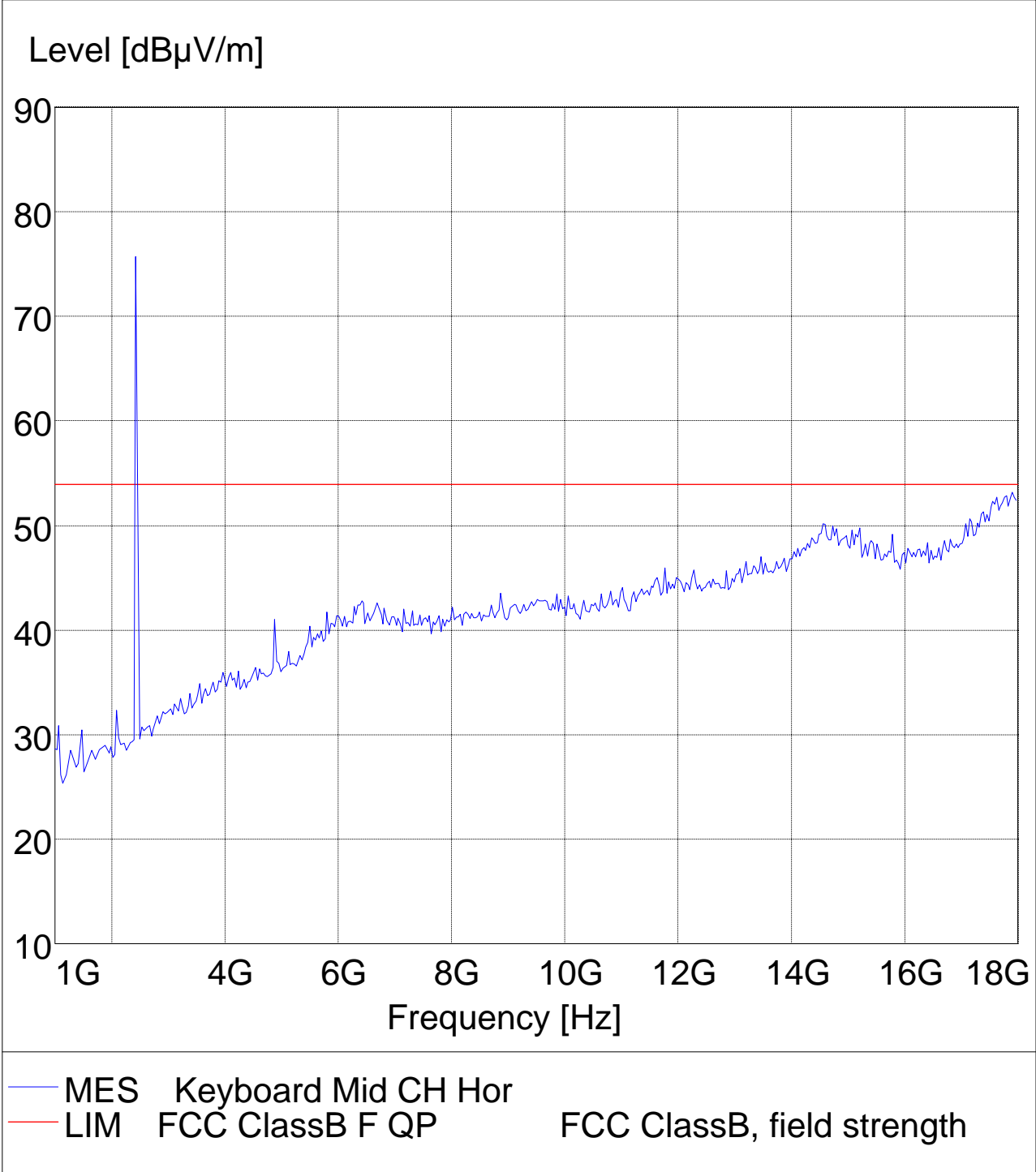
Note: Peak detector used when scanning. The plots shown above got from pre-scanning. Please see the final test data on page 17 and 16.

Low Channel Vertical above 1G



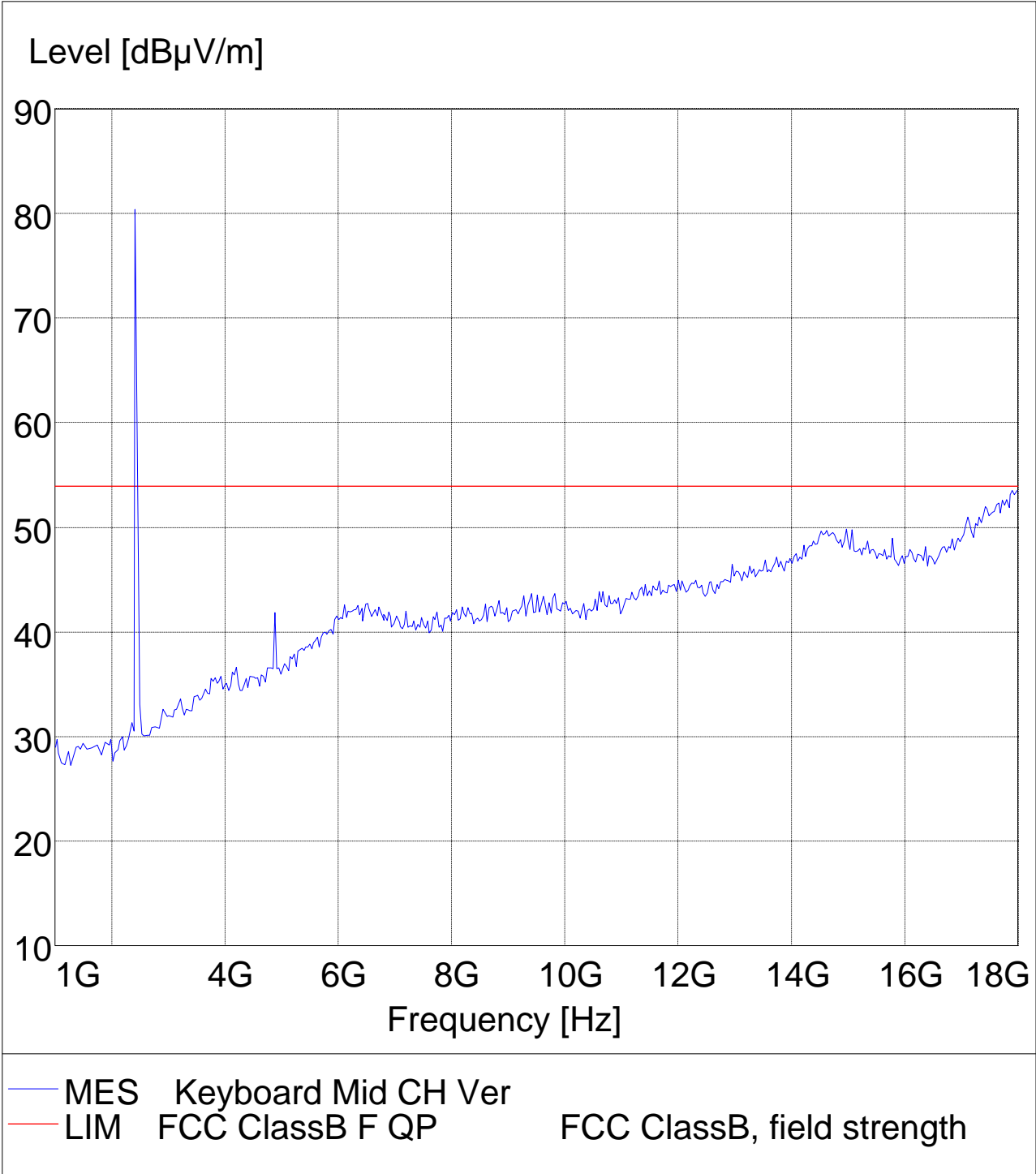
Note: Peak detector used when scanning. The plots shown above got from pre-scanning. Please see the final test data on page 17 and 16.

Middle Channel Horizontal above 1G



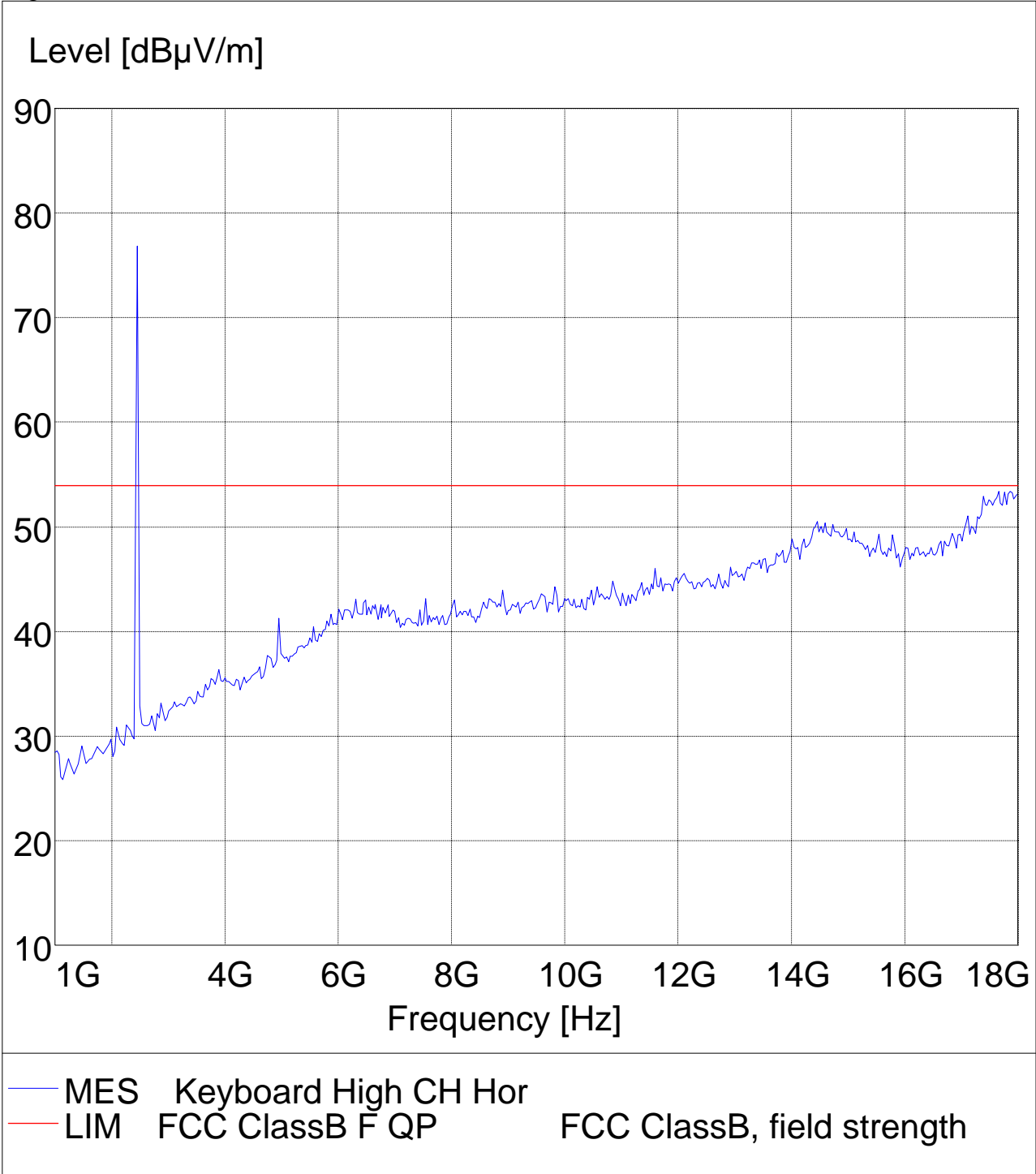
Note: Peak detector used when scanning. The plots shown above got from pre-scanning. Please see the final test data on page 17 and 16.

Middle Channel Vertical above 1G



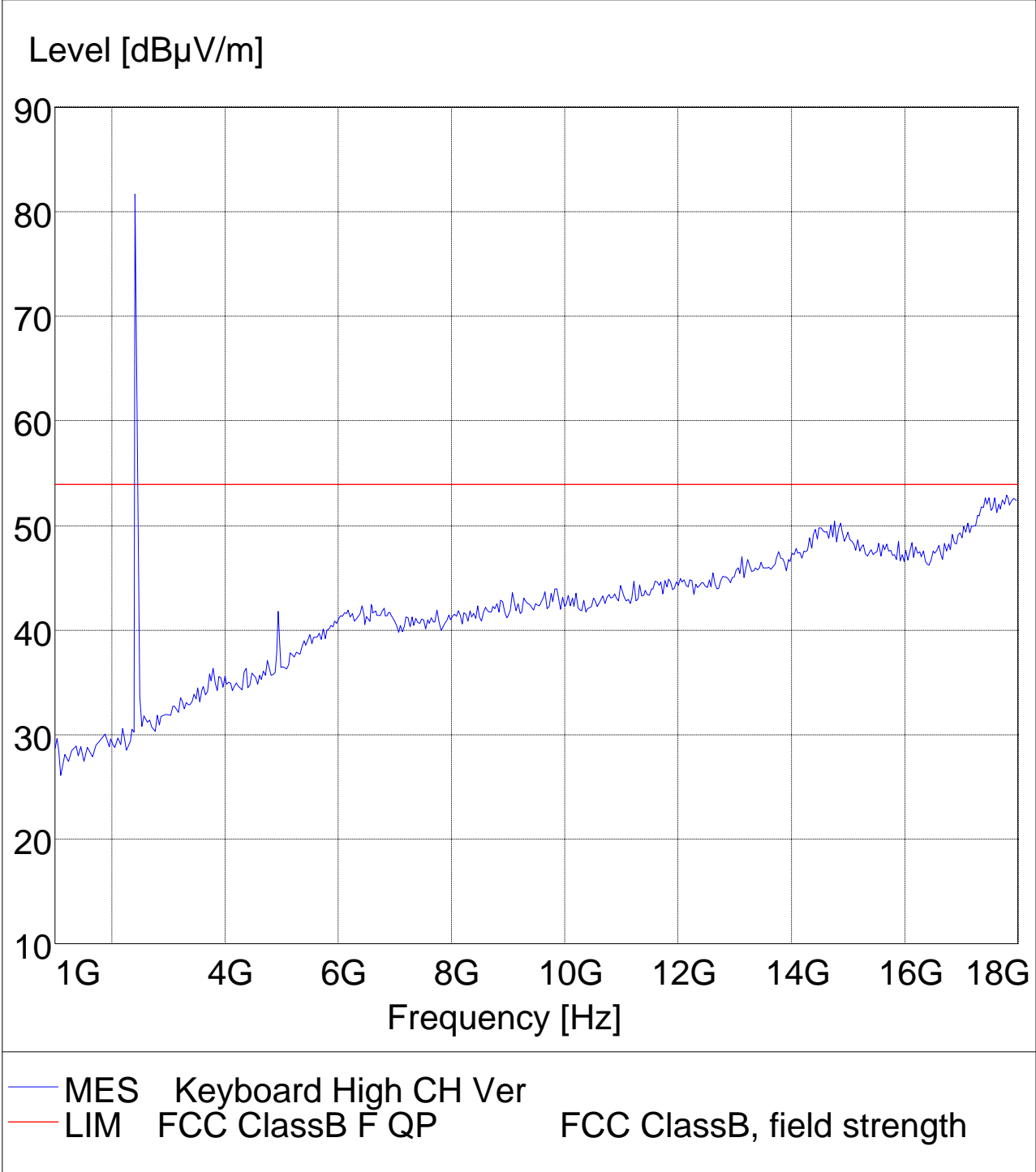
Note: Peak detector used when scanning. The plots shown above got from pre-scanning. Please see the final test data on page 17 and 16.

High Channel Horizontal above 1G



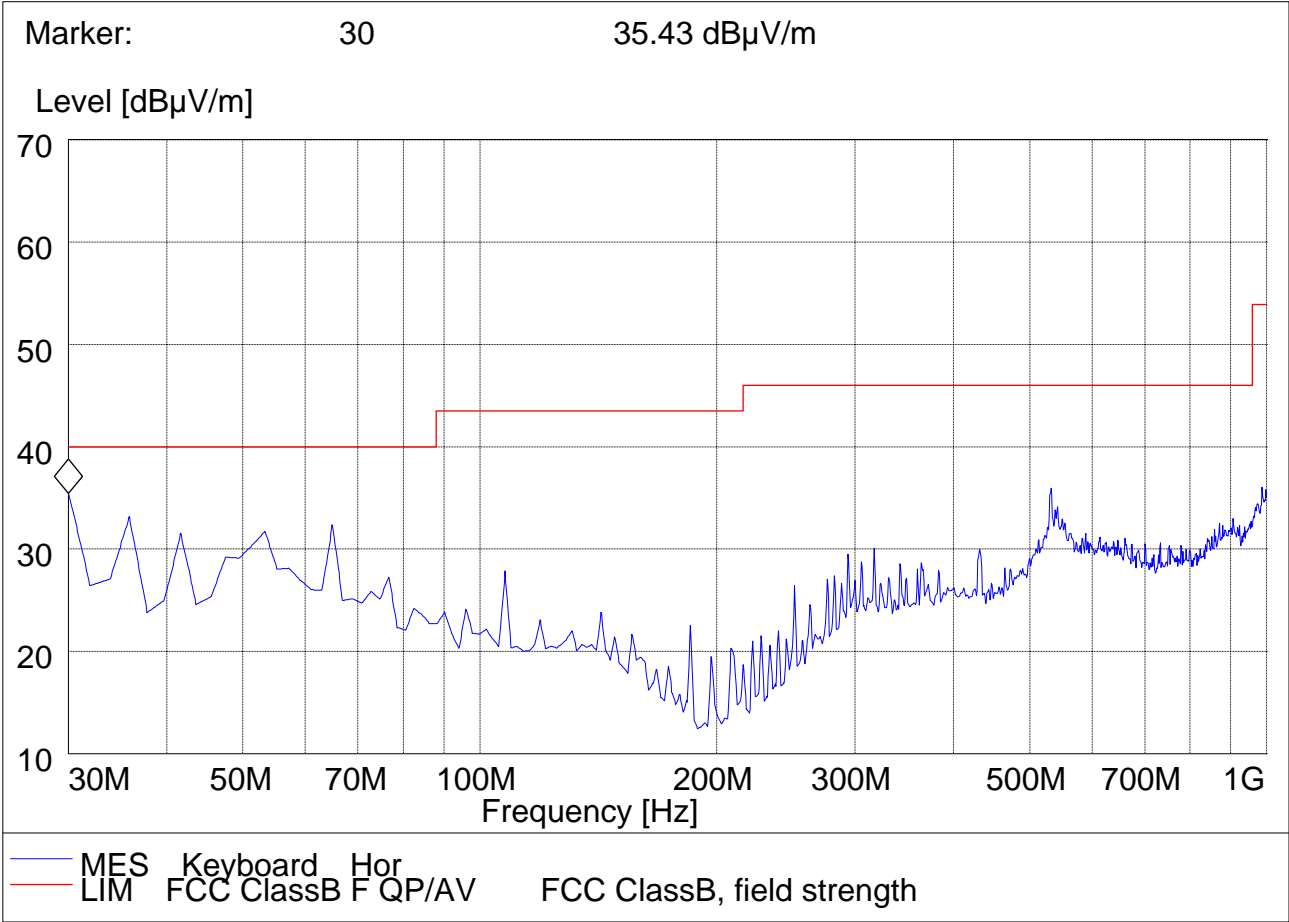
Note: Peak detector used when scanning. The plots shown above got from pre-scanning. Please see the final test data on page 17 and 16.

High Channel Vertical above 1G



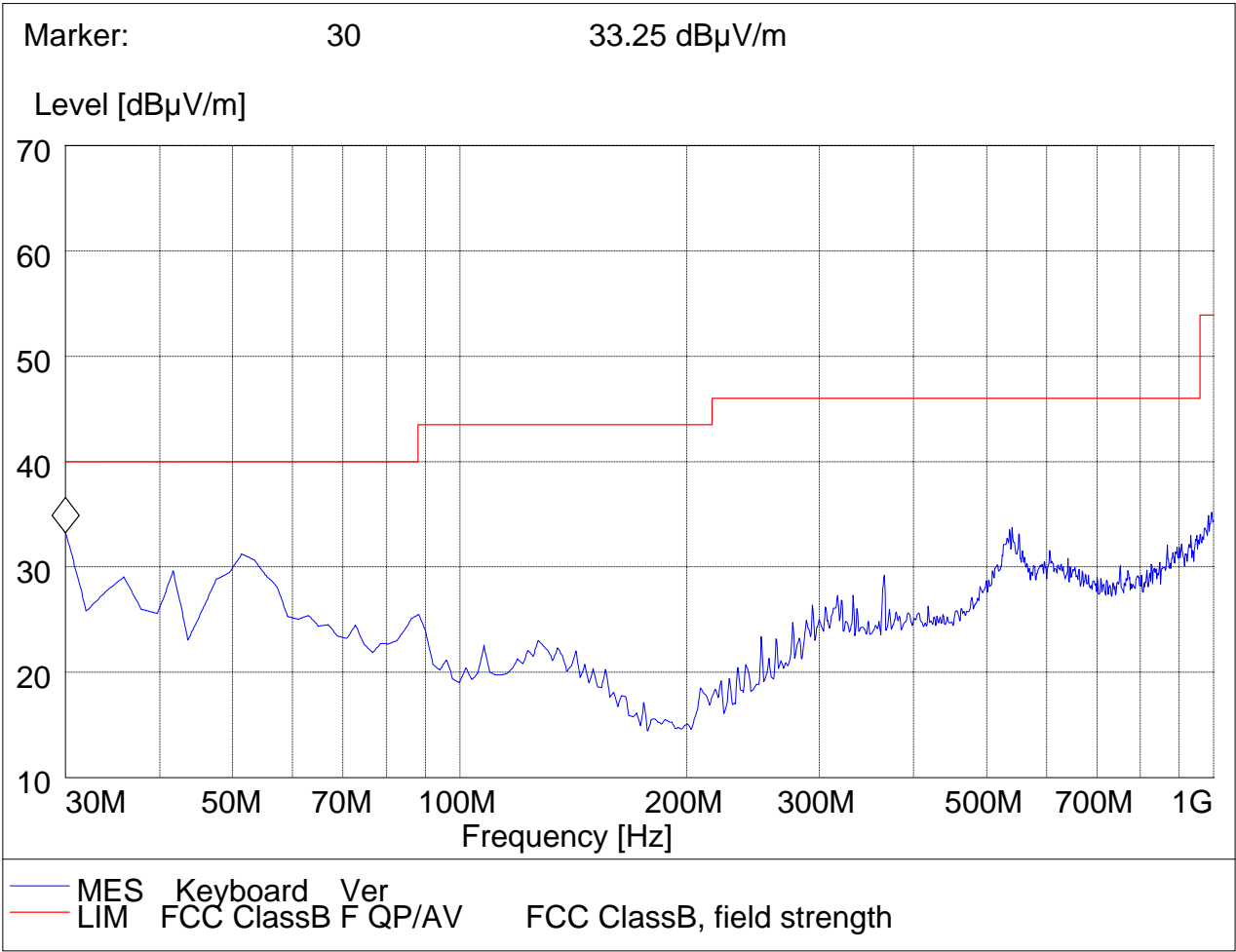
Note: Peak detector used when scanning. The plots shown above got from pre-scanning. Please see the final test data on page 17 and 16.

Test plots:
High Channel below 1G
Horizontal



Note: Peak detector used when scanning

High Channel below 1G
Vertical



Note: Peak detector used when scanning

4 Band Edge

4.1. Test Equipment

Please refer to Section 1.5. this report.

4.2. Test Procedure

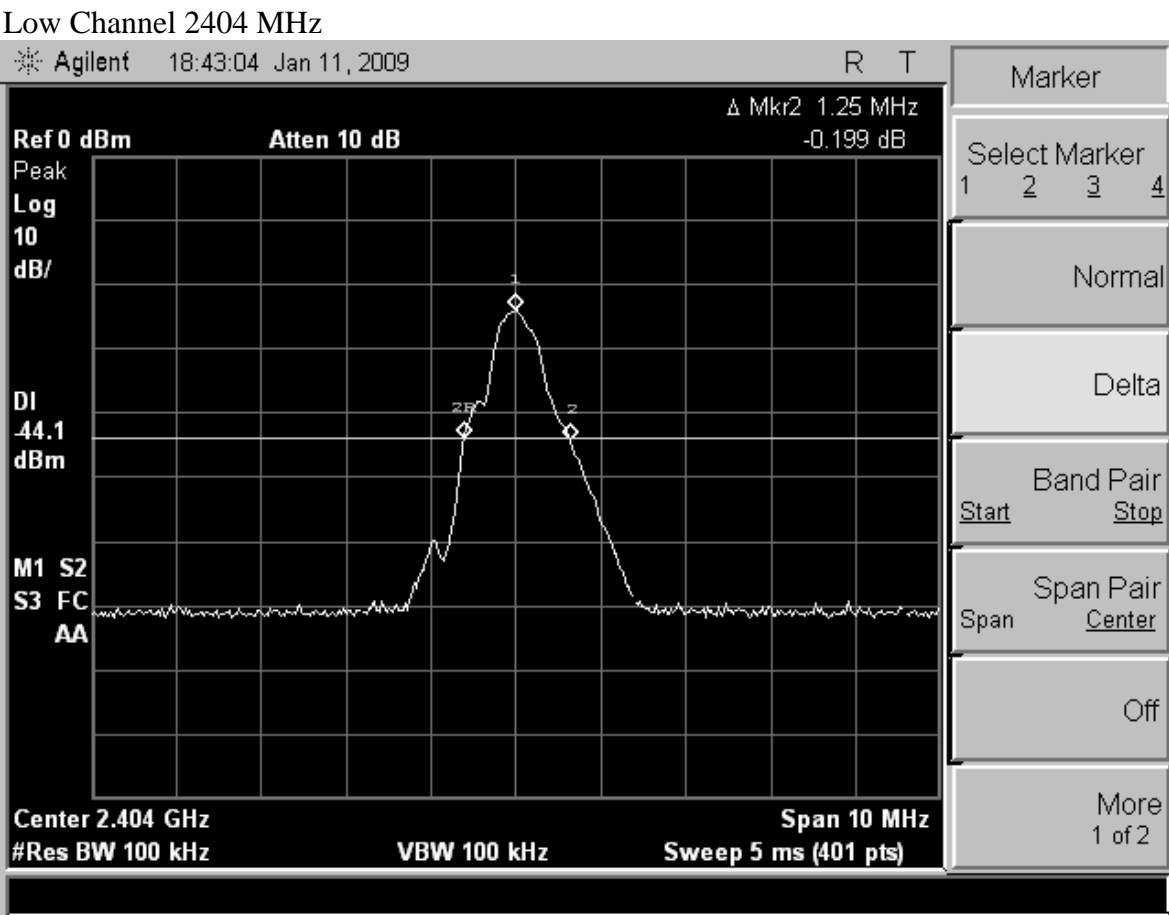
1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below:



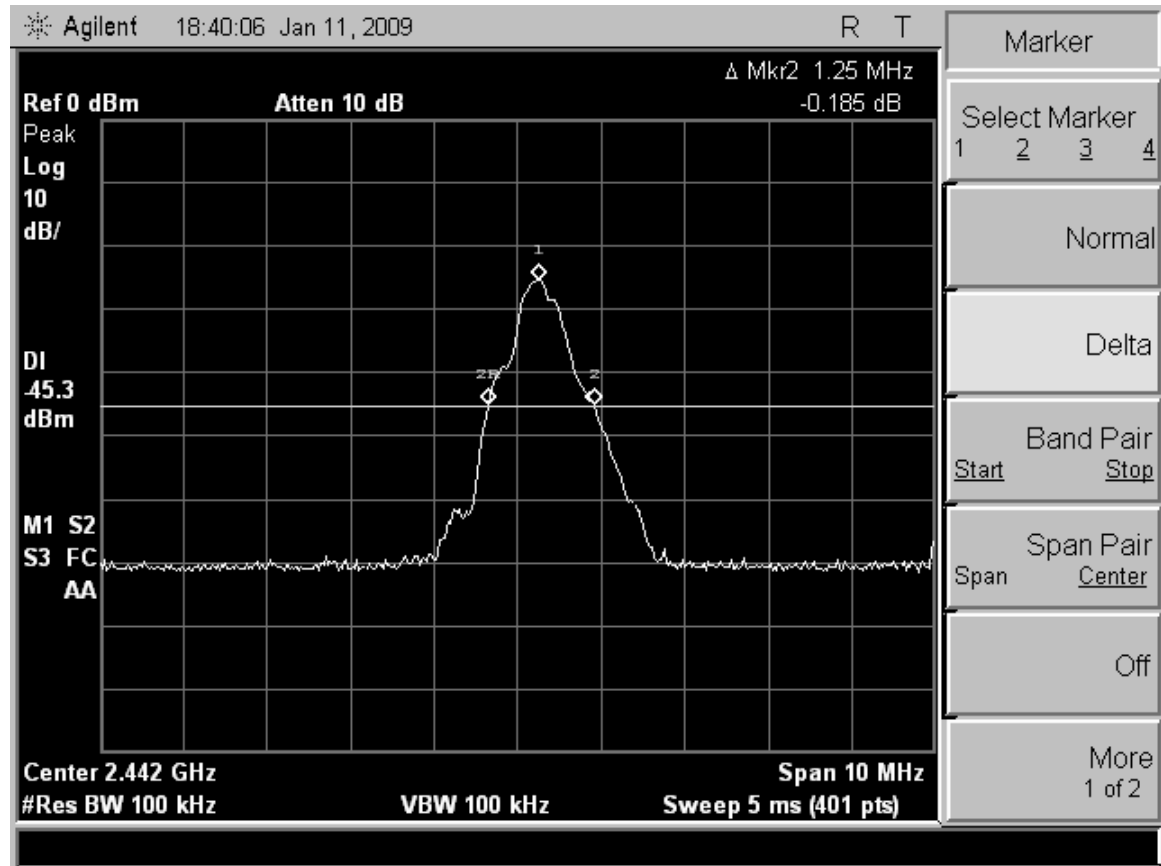
2. The bandwidth of the fundamental frequency was measure by spectrum analyser with 1MHz RBW and 1MHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power 20dB.

4.3. 20db Bandwidth Test Result

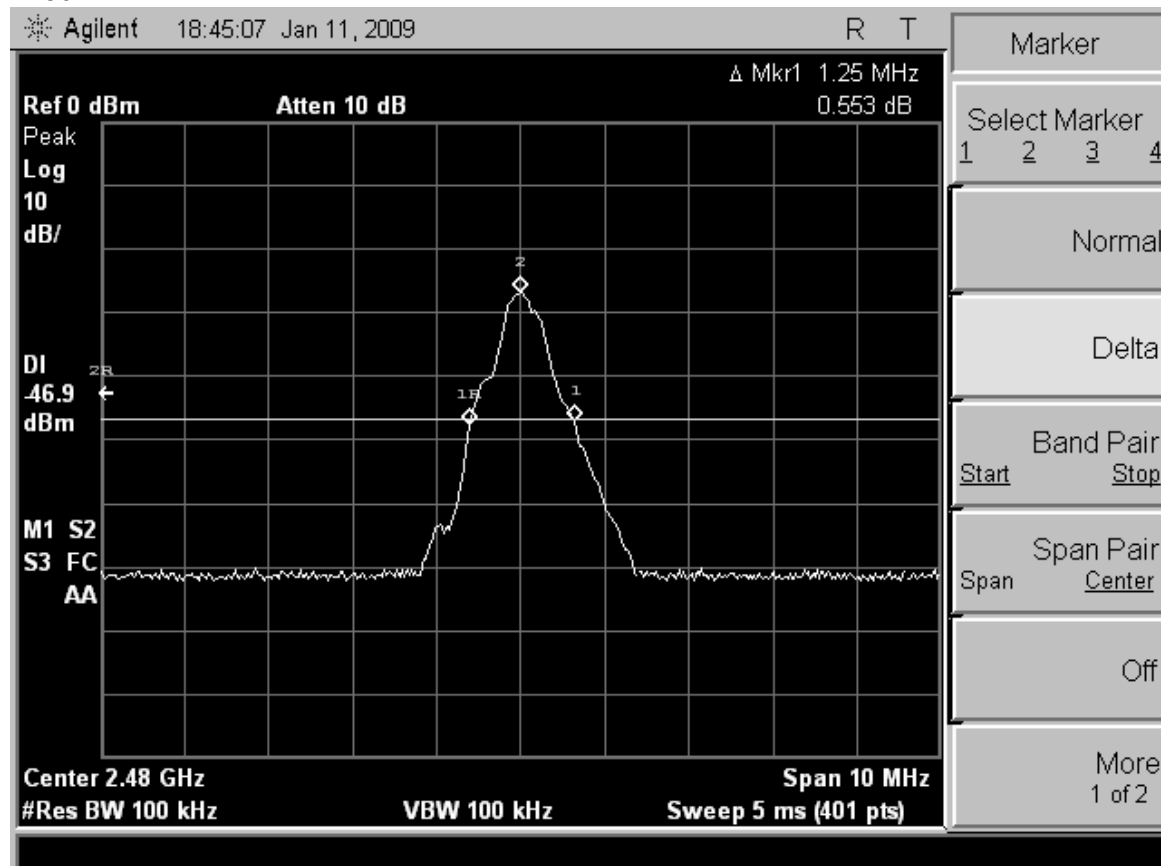
Product Name: Wireless Keyboard
Test Item: 20db Band Edge Test
Test Voltage: DC 6.0V
Mode: TX On
Temperature: 24 °C
Humidity: 52%RH



2442 MHz



2480 MHz

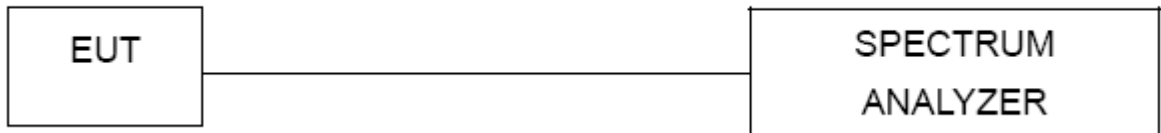


4.4. Test Equipment

Please refer to Section 1.5. this report.

4.5. Test Procedure

1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below:



2. Emissions radiated outside of the specified frequency bands was measure by spectrum analyser with 1MHz RBW , 1MHz VBW and PK detector

4.6. Applied Procedures/Limit

Requirements: FCC 15.249(d), the emission power at the START and STOP frequencies shall be at least 50dB below the level of the fundamental or to the general radiated emission limits in FCC 15.209.

4.7. Band Edge Test Result

Product Name:	Wireless Keyboard
Test Item:	Emissions radiated outside of the specified frequency bands
Test Voltage:	DC 6V
Test Mode:	TX On
Temperature:	24 °C
Humidity:	52%RH

Maximum Radiated Emissions field strength at the band edge

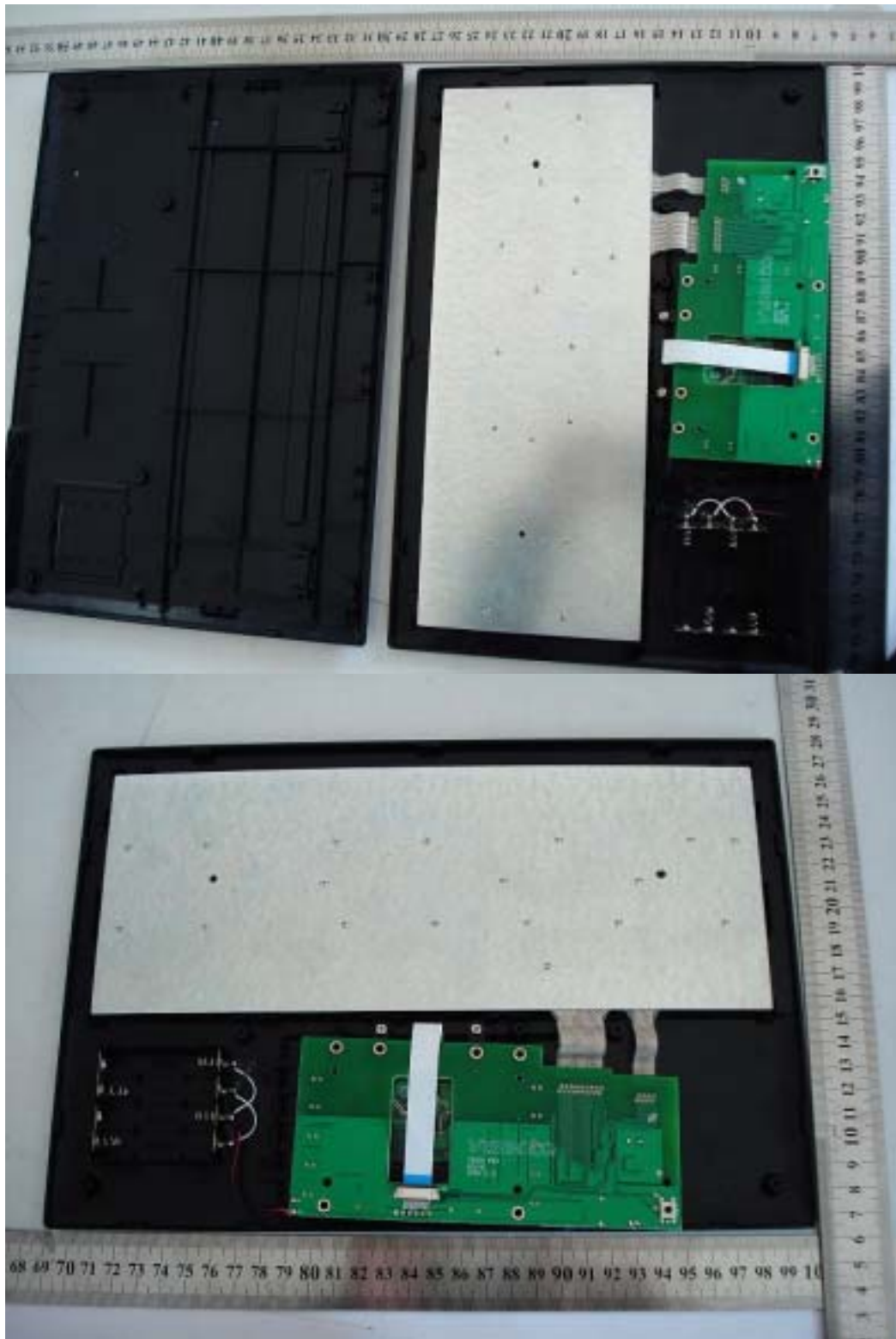
Frequency (MHz)	Detector	Emission Level (dBuV/m)	FCC 15 Subpart C Limit (dBuV/m)
2390.0	AV	24.17	54.00
2390.0	PK	35.48	74.00
2483.5	AV	26.22	54.00
2483.5	PK	37.58	74.00

5. Photographs of Test setup

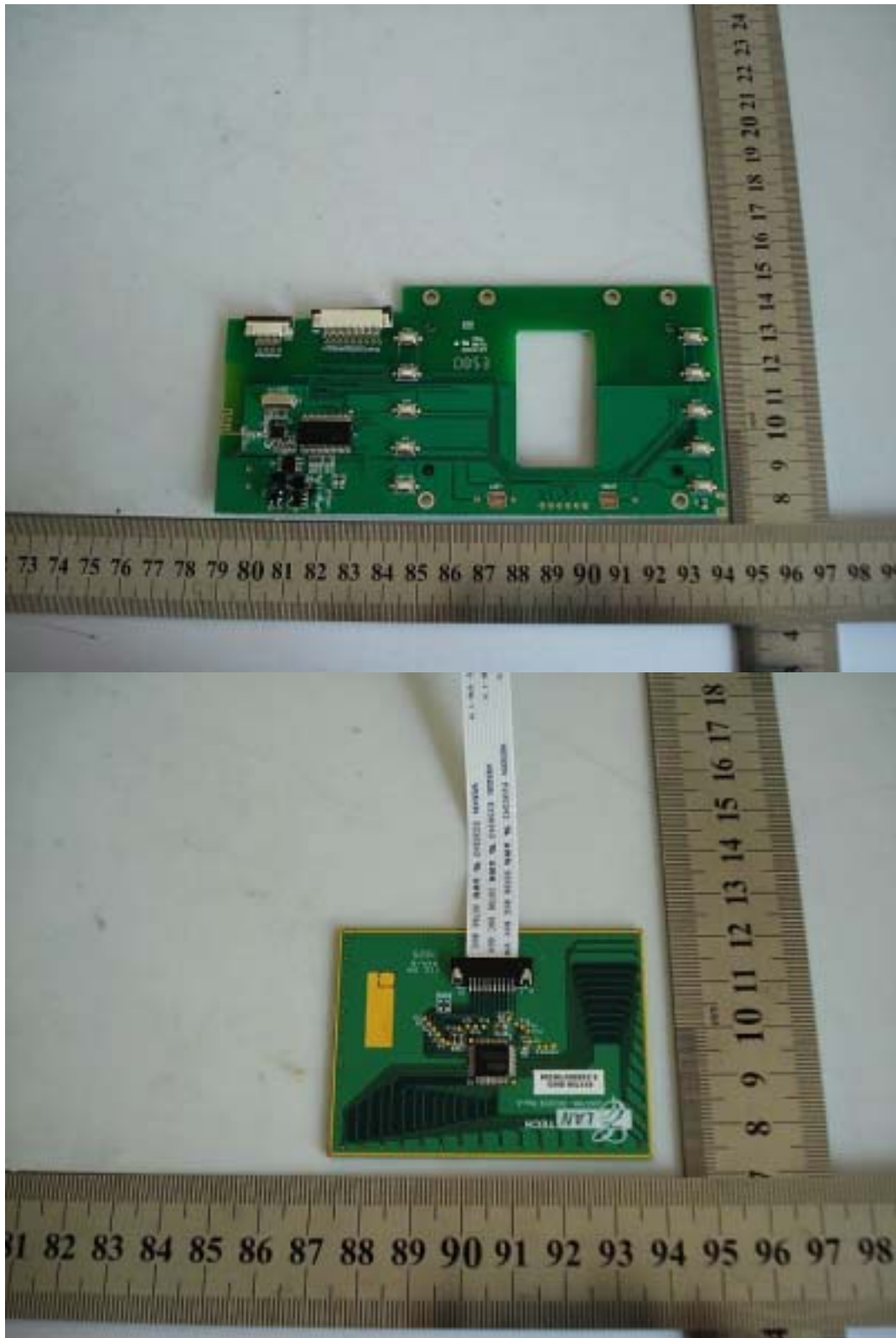


6 Photographs of EUT











7 FCC ID Label

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:(1)this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The Label must not be a stick-on paper. The Label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.



FCC ID Label Location

END of Report