

# FCC Part 15C

## Measurement and Test Report

For

### Penclic AB

Vendev. 90, 7tr182 32 Danderyd, Sweden

**FCC ID: ZRQ-R5**

<b>FCC Rule(s):</b>	<u>FCC Part 15.249</u>
<b>Product Description:</b>	<u>Penclic mouse</u>
<b>Tested Model:</b>	<u>R2.1</u>
<b>Report No.:</b>	<u>STR14058161I</u>
<b>Tested Date:</b>	<u>2014-05-13 to 2014-05-19</u>
<b>Issued Date:</b>	<u>2014-05-21</u>
<b>Tested By:</b>	<u>Susan Su / Engineer</u> <i>Susan Su</i>
<b>Reviewed By:</b>	<u>Lahm Peng / EMC Manager</u> <i>Lahm peng</i>
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## 1. GENERAL INFORMATION

### 1.1 Product Description for Equipment Under Test (EUT)

#### Client Information

Applicant: Penclic AB  
 Address of applicant: Vendev. 90, 7tr182 32 Danderyd, Sweden

Manufacturer: SUNSONNY INTERNATIONAL GROUP LIMITED  
 Address of manufacturer: NO.68, Meihua Road, Eastern Area, Baishixia industrial Park, Fuyong Town, Bao' an District, Shenzhen, China

General Description of EUT	
Product Name:	Penclic mouse
Trade Name:	Penclic
Model No.:	R2.1
Adding Model(s):	/
Rated Voltage:	DC 1.2V by NI-MH rechargeable battery
<i>Note: The test data is gathered from a production sample, provided by the manufacturer.</i>	

Technical Characteristics of EUT	
Frequency Range:	2407~2477MHz
Max. Field Strength:	93.9dB $\mu$ V/m
Data Rate:	/
Modulation:	GFSK
Quantity of Channels:	71
Channel Separation:	1MHz
Antenna Type:	PCB Antenna
Antenna Gain:	-1.2dBi
Lowest Internal Frequency of EUT:	16MHz
Device Category:	Portable device

## 1.2 Test Standards

The following report is prepared on behalf of the Penclic AB in accordance with FCC Part 15, Subpart B, Subpart C, and section 15.107, 15.203, 15.205, 15.207, 15.209 and 15.249 of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15, Subpart C, and section 15.107,15.203, 15.205, 15.207, 15.209 and 15.249 of the Federal Communication Commissions rules.

**Maintenance of compliance** is the responsibility of the manufacturer. Any modification of the product, which results 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 2<sup>nd</sup> Road, Bao'an District, Shenzhen, P.R.C (518101).

### 1.5 EUT Setup and Test Mode

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

<b>Test Mode List</b>		
Test Mode	Description	Remark
TM1	Low Channel	2407MHz
TM2	Middle Channel	2442MHz
TM3	High Channel	2477MHz
TM4	Charging	/

<b>Special Cable List and Details</b>			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

<b>Auxiliary Equipment List and Details</b>			
Description	Manufacturer	Model	Serial Number
/	/	/	/

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## 2. SUMMARY OF TEST RESULTS

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<b>FCC Rules</b>	<b>Description of Test Item</b>	<b>Result</b>
§ 15.203	Antenna Requirement	Compliant
§15.205	Restricted Band of Operation	Compliant
§ 15.207(a)	Conducted Emission	Compliant
§ 15.209(a)(f)	Radiated Spurious Emissions	Compliant
§15.249(a)	Field Strength of Emissions	Compliant
§15.249(d)	Out of Band Emission	Compliant
§15.215 (c)	Emission Bandwidth	Compliant

### **3. Antenna Requirements**

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#### **3.1 Standard Applicable**

According to FCC Part 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 or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

#### **3.2 Test Result**

This product has a PCB antenna, fulfill the requirement of this section.

## 4. Radiated Emissions

### 4.1 Measurement Uncertainty

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement is  $\pm 5.10$  dB.

### 4.2 Standard Applicable

According to §15.249(a), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental Frequency	Field strength of fundamental (milli-volts/meter)	Field strength of Harmonics (micro-volts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply. Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

### 4.3 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2014-05-07	2015-05-06
EMI Test Receiver	R&S	ESVB	825471/005	2014-05-07	2015-05-06
Pre-amplifier	Agilent	8447F	3113A06717	2014-05-07	2015-05-06
Pre-amplifier	Compliance Direction	PAP-0118	24002	2014-05-07	2015-05-06
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2014-04-20	2015-04-19
Horn Antenna	ETS	3117	00086197	2014-04-20	2015-04-19
Horn Antenna	ETS	3116B	00088203	2013-04-20	2014-04-19
Loop Antenna	SCHWARZECK	HFRA 5165	9365	2014-04-20	2015-04-19

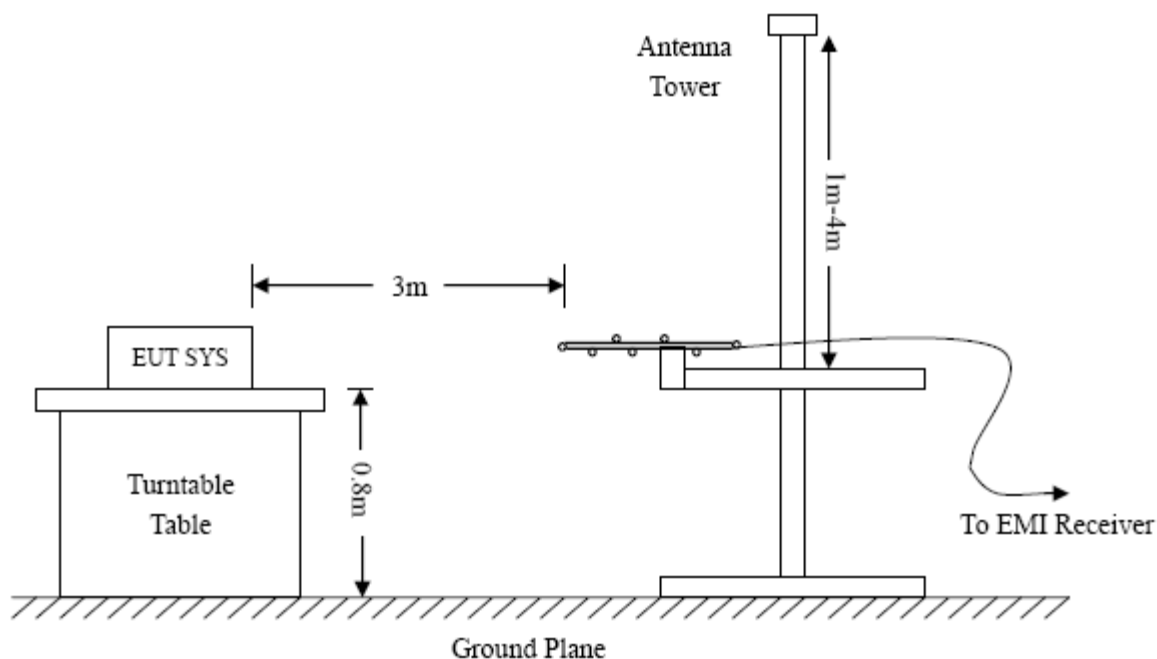


### 4.4 Test Procedure

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.205 15.249(a) and FCC Part 15.209 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.



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:

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

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

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15C Limit}$$

#### 4.6 Environmental Conditions

Temperature:	24 °C
Relative Humidity:	60 %
ATM Pressure:	1012 mbar

#### 4.7 Summary of Test Results/Plots

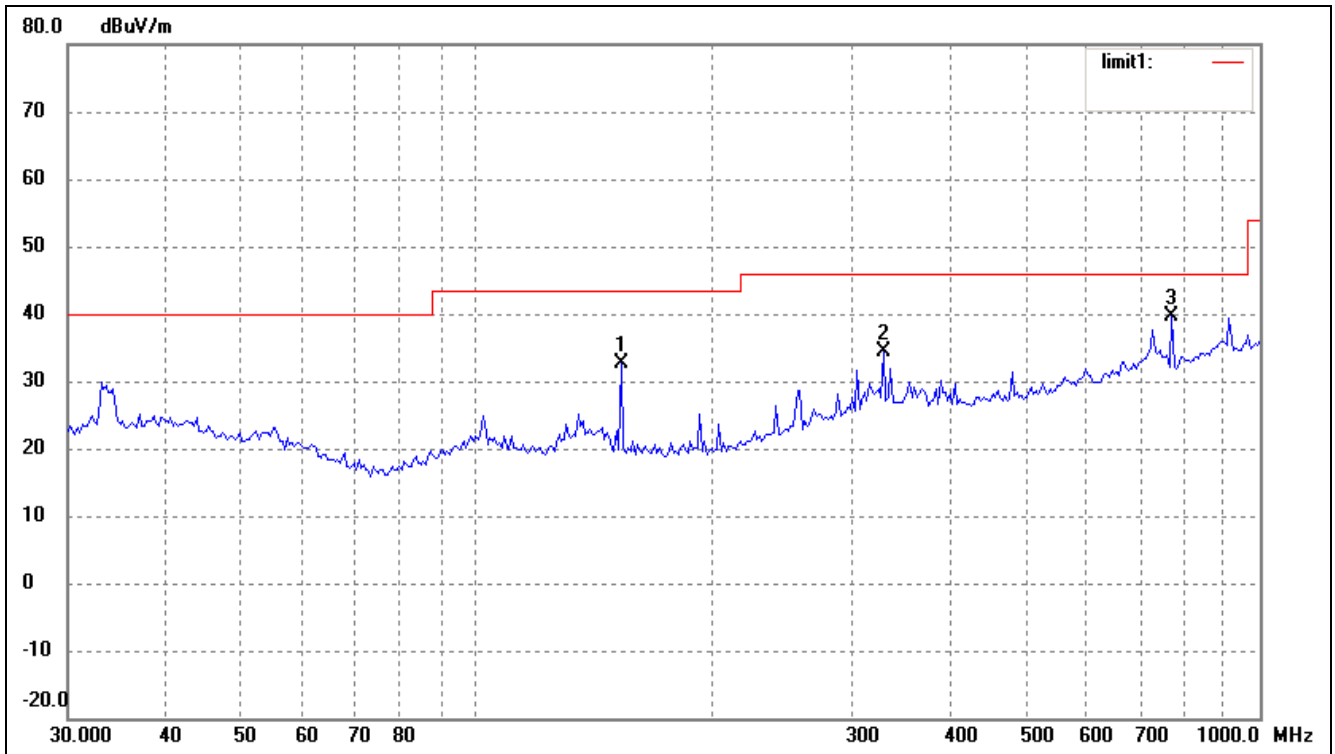
According to the data below, the FCC Part 15.205, 15.209 and 15.249 standards, and had the worst margin of:

**-4.90 dB $\mu$ V at 7317.0 MHz in the Horizontal polarization, Low Channel, 9 kHz to 25 GHz, 3Meters**

*Note: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.*

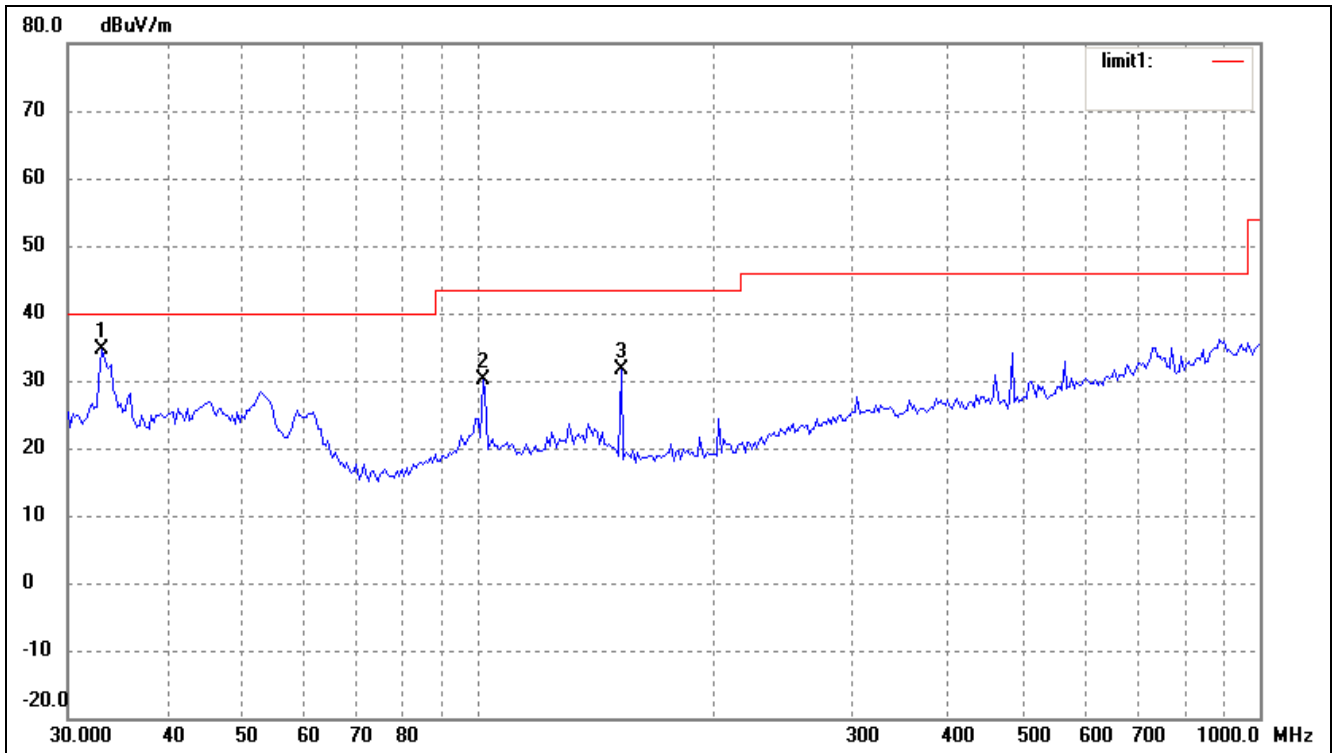
**Plot of Radiated Emissions Test Data (30MHz to 1GHz)**

EUT: *Penclic mouse*  
 Tested Model: *R2.1*  
 Operating Condition: *Charging*  
 Comment: *AC 120V/60Hz; USB 5V charging*  
  
 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	152.6641	29.14	3.58	32.72	43.50	-10.78	240	100	peak
2	330.1949	24.22	10.28	34.50	46.00	-11.50	187	100	peak
3	771.4486	23.22	16.37	39.59	46.00	-6.41	220	100	peak

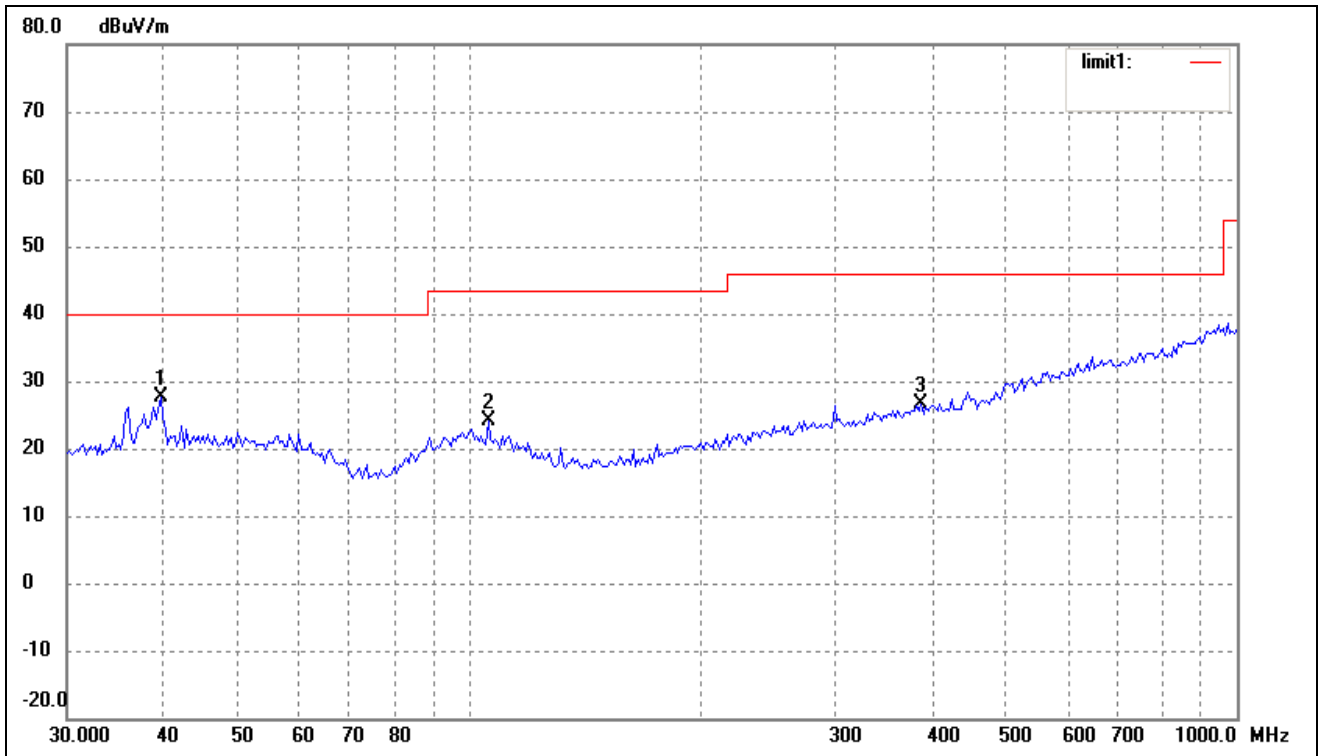
Test Specification: Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	33.0950	26.05	8.56	34.61	40.00	-5.39	162	100	peak
2	101.6443	23.43	6.67	30.10	43.50	-13.40	200	100	peak
3	152.6641	27.93	3.58	31.51	43.50	-11.99	360	100	peak

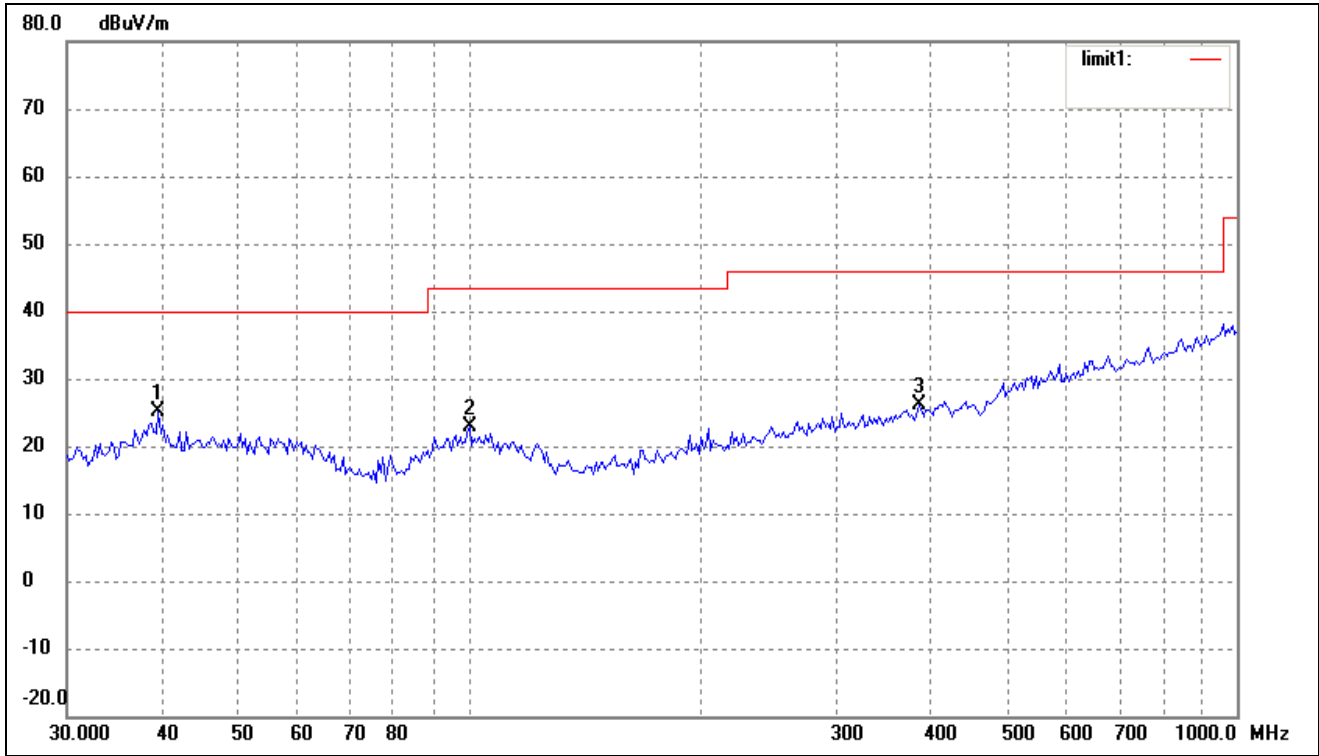
**Plot of Radiated Emissions Test Data (30MHz to 1GHz)**

EUT: *Penclic mouse*  
 Tested Model: *R2.1*  
 Operating Condition: *Transmitting Low Channel (2407MHz)*  
 Comment: *DC 1.2V by NI-MH rechargeable battery*  
 Test Specification: *Horizontal*



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ( ° )	Height (cm)	Remark
1	39.7147	19.67	8.07	27.74	40.00	-12.26	360	100	peak
2	106.0126	16.23	7.93	24.16	43.50	-19.34	360	100	peak
3	387.9920	15.32	11.29	26.61	46.00	-19.39	360	100	peak

Test Specification: Vertical

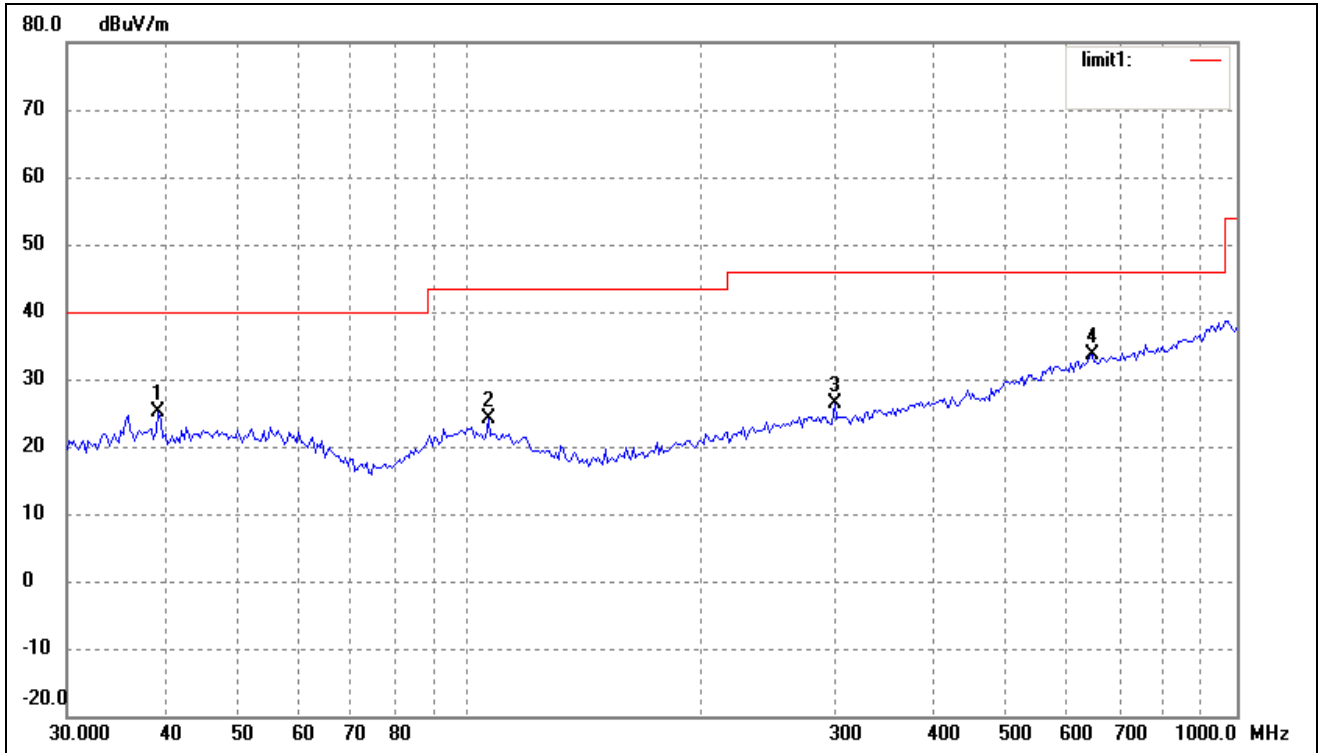


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	39.4372	17.08	7.99	25.07	40.00	-14.93	360	100	peak
2	100.2286	14.41	8.41	22.82	43.50	-20.68	360	100	peak
3	385.2805	14.90	11.25	26.15	46.00	-19.85	360	100	peak

Operating Condition: Transmitting Middle Channel (2442MHz)

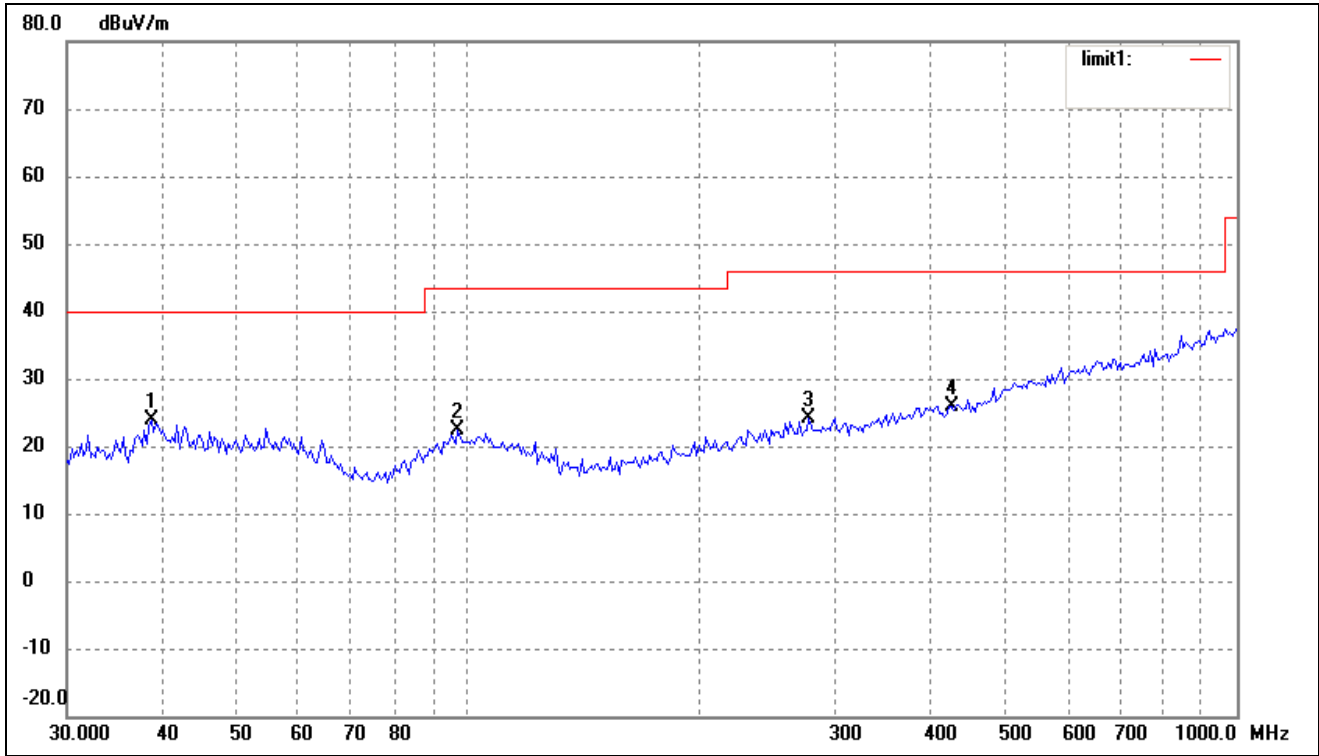
Comment: DC 1.2V by NI-MH rechargeable battery

Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	39.4372	17.18	7.99	25.17	40.00	-14.83	360	100	peak
2	106.0126	16.23	7.93	24.16	43.50	-19.34	360	100	peak
3	299.3158	16.64	9.77	26.41	46.00	-19.59	360	100	peak
4	647.3856	16.47	17.07	33.54	46.00	-12.46	360	100	peak

Test Specification: Vertical



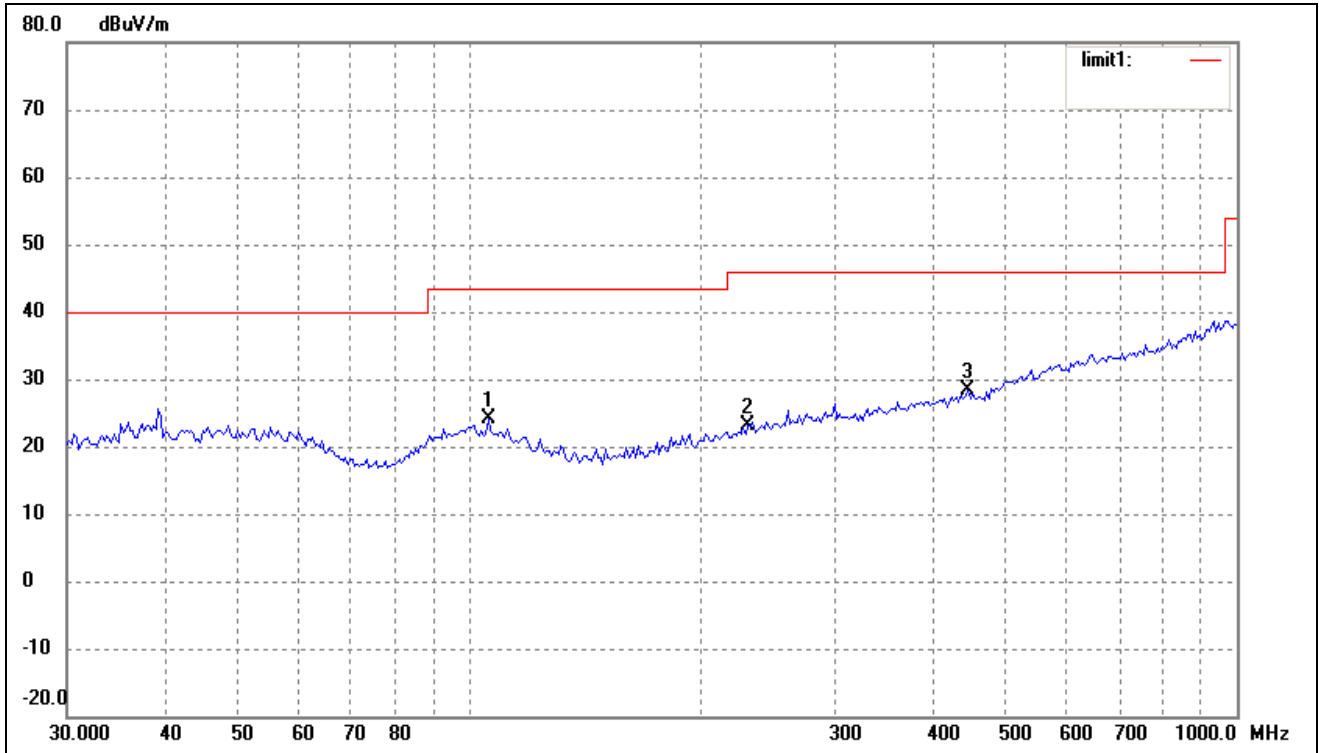
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	38.6161	16.22	7.77	23.99	40.00	-16.01	360	100	peak
2	96.7749	14.11	8.19	22.30	43.50	-21.20	360	100	peak
3	277.0935	14.71	9.43	24.14	46.00	-21.86	360	100	peak
4	425.0280	14.43	11.57	26.00	46.00	-20.00	360	100	peak



Operating Condition: Transmitting High Channel (2477MHz)

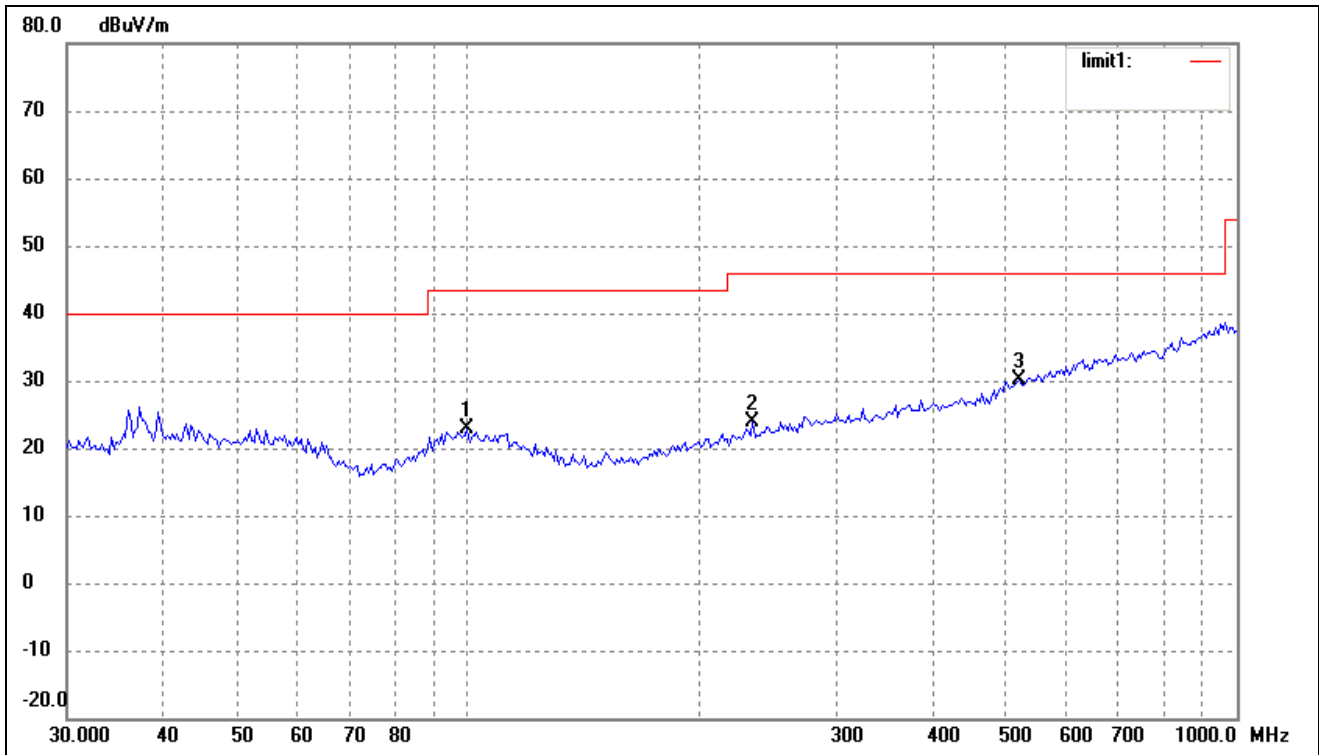
Comment: DC 1.2V by NI-MH rechargeable battery

Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	106.0126	16.23	7.93	24.16	43.50	-19.34	360	100	peak
2	230.9068	15.12	7.91	23.03	46.00	-22.97	360	100	peak
3	446.4141	16.29	12.05	28.34	46.00	-17.66	360	100	peak

Test Specification: Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	99.5281	14.57	8.40	22.97	43.50	-20.53	360	100	peak
2	234.1684	15.69	8.10	23.79	46.00	-22.21	360	100	peak
3	520.8882	15.18	14.89	30.07	46.00	-15.93	360	100	peak

*Spurious Emissions Above 1GHz*

Frequency MHz	Detector	Meter Reading dBuV	Direction Degree	Polar H / V	Antenna Loss dB	Cable loss dB	Amplifier dB	Correction Amplitude dBuV/m	Limit dBuV/m	Margin dB
Low Channel (2407MHz)										
4814.0	AV	36.30	57	H	34.1	5.2	33.0	42.6	54	-11.40
4814.0	AV	37.30	35	V	34.1	5.2	33.0	43.6	54	-10.40
4814.0	PK	45.30	65	H	34.1	5.2	33.0	51.6	74	-22.40
4814.0	PK	47.10	98	V	34.1	5.2	33.0	53.4	74	-20.60
7221.0	AV	35.00	60	H	37.4	6.1	33.5	45.0	54	-9.00
7221.0	AV	35.30	79	V	37.4	6.1	33.5	45.3	54	-8.70
7221.0	PK	39.90	256	H	37.4	6.1	33.5	49.9	74	-24.10
7221.0	PK	40.30	185	V	37.4	6.1	33.5	50.3	74	-23.70
2407.0	AV	60.2	45	H	29.1	3.7	34.0	63.0	94	-31.0
2407.0	AV	61.4	359	V	29.1	3.7	34.0	64.9	94	-29.1
2407.0	PK	78.7	78	H	29.1	3.7	34.0	81.6	114	-32.4
2407.0	PK	90.1	44	V	29.1	3.7	34.0	93.9	114	-20.1
Middle Channel (2442MHz)										
4884.0	AV	35.70	24	H	34.1	5.2	33	42.0	54	-12.00
4884.0	AV	36.60	341	V	34.1	5.2	33	42.9	54	-11.10
4884.0	PK	48.30	177	H	34.1	5.2	33	54.6	74	-19.40
4884.0	PK	46.00	28	V	34.1	5.2	33	52.3	74	-21.70
7336.0	AV	39.10	325	H	37.4	6.1	33.5	49.1	54	-4.90
7336.0	AV	35.20	91	V	37.4	6.1	33.5	45.2	54	-8.80
7336.0	PK	40.10	77	H	37.4	6.1	33.5	50.1	74	-23.90
7336.0	PK	41.50	267	V	37.4	6.1	33.5	51.5	74	-22.50
2442.0	AV	60.3	33	H	29.1	3.7	34	63.5	94	-30.5
2442.0	AV	57.3	34	V	29.1	3.7	34	60.4	94	-33.6
2442.0	PK	93.2	164	H	29.1	3.7	34	81.7	114	-32.3
2442.0	PK	87.1	159	V	29.1	3.7	34	90.3	114	-23.7

Frequency MHz	Detector	Meter Reading dBuV	Direction Degree	Polar H / V	Antenna Loss dB	Cable loss dB	Amplifier dB	Correction Amplitude dBuV/m	Limit dBuV/m	Margin dB
High Channel (2477MHz)										
4954.0	AV	36.90	17	H	34.1	5.2	33.0	43.2	54	-10.80
4954.0	AV	36.70	13	V	34.1	5.2	33.0	43.0	54	-11.00
4954.0	PK	45.60	50	H	34.1	5.2	33.0	51.9	74	-22.10
4954.0	PK	46.00	59	V	34.1	5.2	33.0	52.3	74	-21.70
7431.0	AV	37.00	355	H	37.4	6.1	33.5	47.0	54	-7.00
7431.0	AV	32.30	66	V	37.4	6.1	33.5	42.3	54	-11.70
7431.0	PK	38.20	269	H	37.4	6.1	33.5	48.2	74	-25.80
7431.0	PK	40.80	64	V	37.4	6.1	33.5	50.8	74	-23.20
2477.0	AV	58.3	63	H	29.1	3.7	34.0	61.5	94	-32.5
2477.0	AV	61.7	85	V	29.1	3.7	34.0	65.3	94	-28.7
2477.0	PK	76.2	85	H	29.1	3.7	34.0	79.8	114	-34.2
2477.0	PK	82.9	55	V	29.1	3.7	34.0	85.4	114	-28.6

*Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, which above 5<sup>th</sup> Harmonics are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured. The measurements greater than 20dB below the limit from 9kHz to 30MHz..*

## 5. Out of Band Emissions

### 5.1 Standard Applicable

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

### 5.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2014-05-07	2015-05-06
EMI Test Receiver	R&S	ESVB	825471/005	2014-05-07	2015-05-06
Pre-amplifier	Agilent	8447F	3113A06717	2014-05-07	2015-05-06
Pre-amplifier	Compliance Direction	PAP-0118	24002	2014-05-07	2015-05-06
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2014-04-20	2015-04-19
Horn Antenna	ETS	3117	00086197	2014-04-20	2015-04-19

### 5.3 Test Procedure

As the radiation test, set the Lowest and Highest Transmitting Channel, observed the outside band of 2400MHz to 2483.5MHz, than mark the higher-level emission for comparing with the FCC rules.

### 5.4 Environmental Conditions

Temperature:	24 °C
Relative Humidity:	60 %
ATM Pressure:	1012 mbar

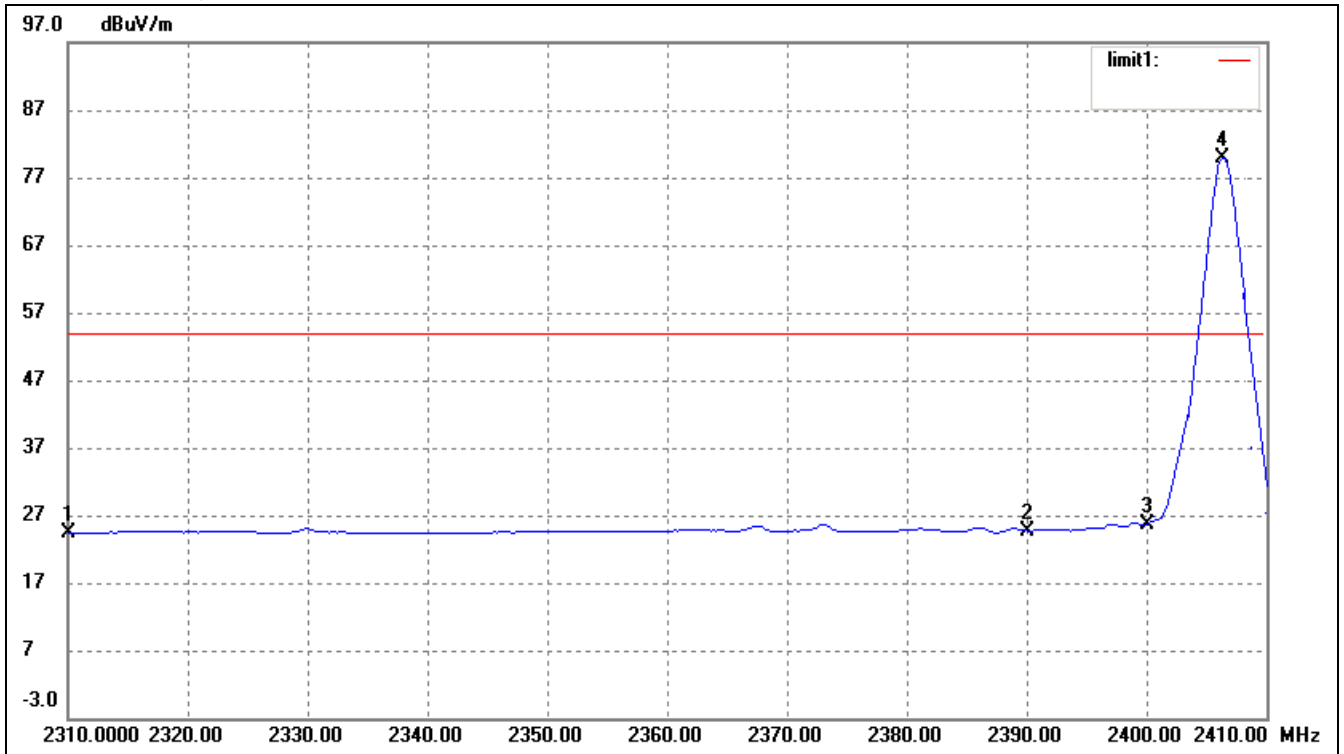
### 5.5 Summary of Test Results/Plots

Test mode	Frequency	Limit	Result
	MHz	dBuV / dBc	
Lowest	2310.00	<54 dBuV	Pass
	2390.00	<54 dBuV	Pass
	2400.00	>50 dBc	Pass
Highest	2483.50	<54 dBuV	Pass
	2500.00	<54 dBuV	Pass

The edge emissions are below the FCC 15.209 Limits or complies with the 15.249 requirements.

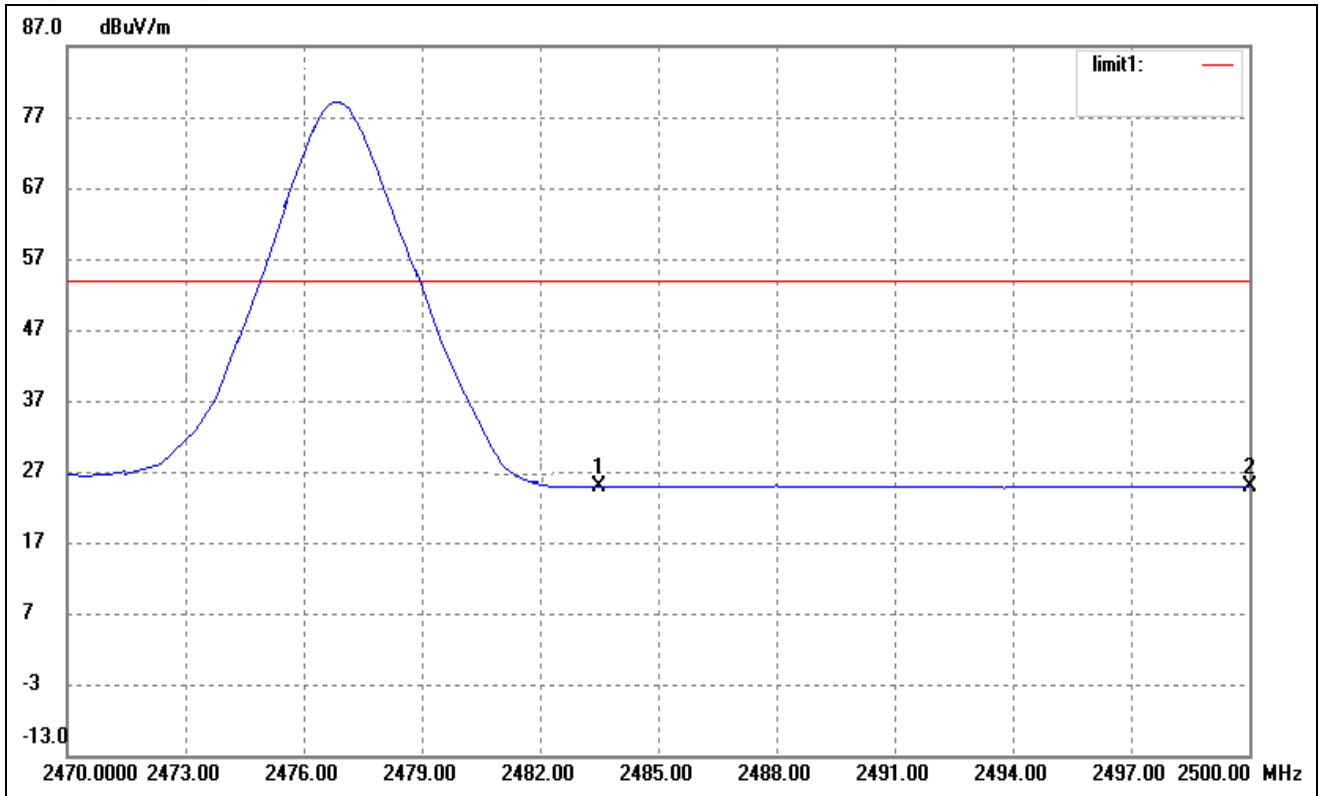
Please refer to the test plots as below.

Lowest Bandedge



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	31.94	-7.51	24.43	54.00	-29.57	Ave Detector
	2310.000	39.63	-7.51	32.12	74.00	-41.88	Peak Detector
2	2390.000	32.07	-7.34	24.73	54.00	-29.27	Ave Detector
	2390.000	39.86	-7.34	32.52	74.00	-41.48	Peak Detector
3	2400.000	32.83	-7.31	25.52	Delta=54.28dBc		Ave Detector
4	2407.000	87.10	-7.30	79.80			Ave Detector

Highest Bandedge



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	31.97	-7.13	24.84	54.00	-29.16	Ave Detector
	2483.500	41.91	-7.13	34.78	74.00	-39.22	Peak Detector
2	2500.000	32.02	-7.08	24.94	54.00	-29.06	Ave Detector
	2500.000	42.10	-7.08	35.02	74.00	-38.98	Peak Detector

## 6. Emission Bandwidth

### 6.1 Standard Applicable

According to 15.215 (c), intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

### 6.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	Agilent	E4402B	US41192821	2014-05-07	2015-05-06
Attenuator	ATTEN	ATS100-4-20	/	2014-05-07	2015-05-06

### 6.3 Test Procedure

According to the ANSI 63.4-2003, the emission bandwidth test method as follows.

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

Set span = 1MHz, centered on a transmitting channel

RBW  $\geq$ 1% 20dB Bandwidth, VBW  $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

All the trace to stabilize, use the marker-to-peak function to set the marker to the peak of the emission, use the marker-delta function to measure and record the 20dB down and 99% bandwidth of the emission.

### 6.4 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

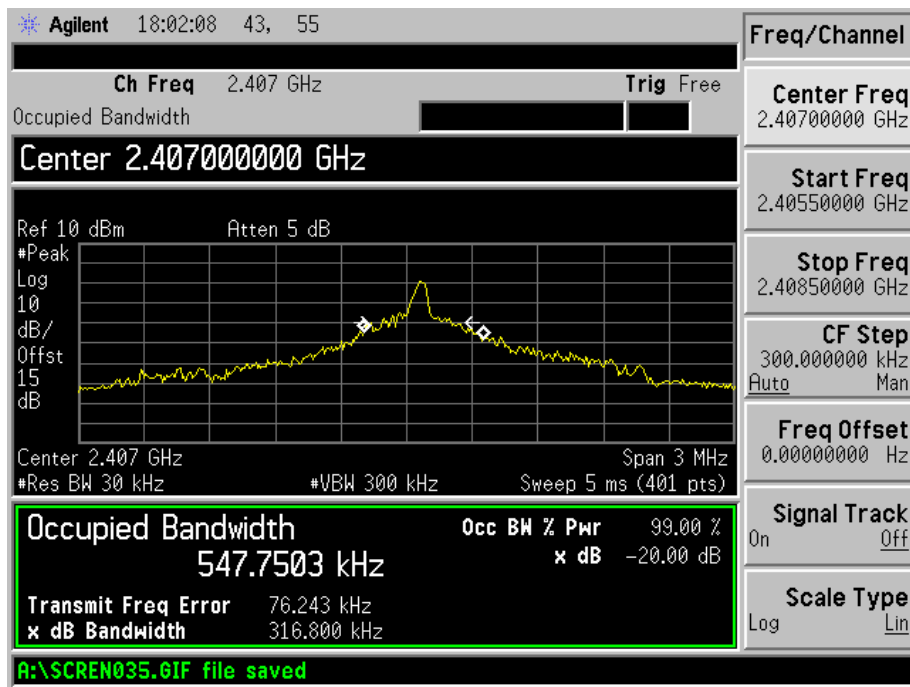
### 6.5 Summary of Test Results/Plots



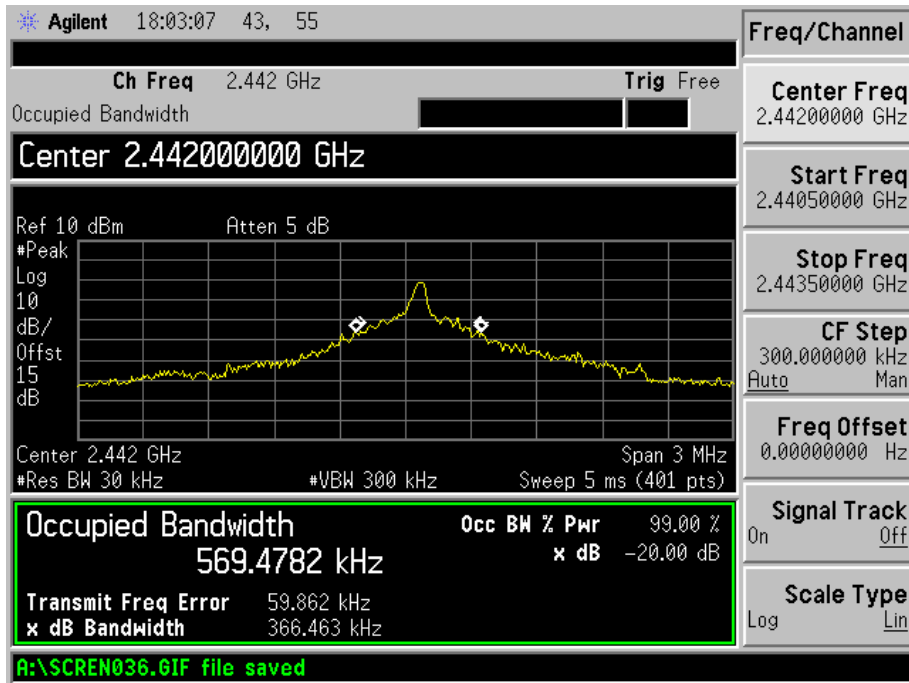
Channel	Frequency MHz	20dB Bandwidth kHz	99% Bandwidth kHz
Low Channel	2407	316.800	547.7503
Middle Channel	2442	366.463	569.4782
High Channel	2477	381.288	627.5331

Please refer to the following test plots

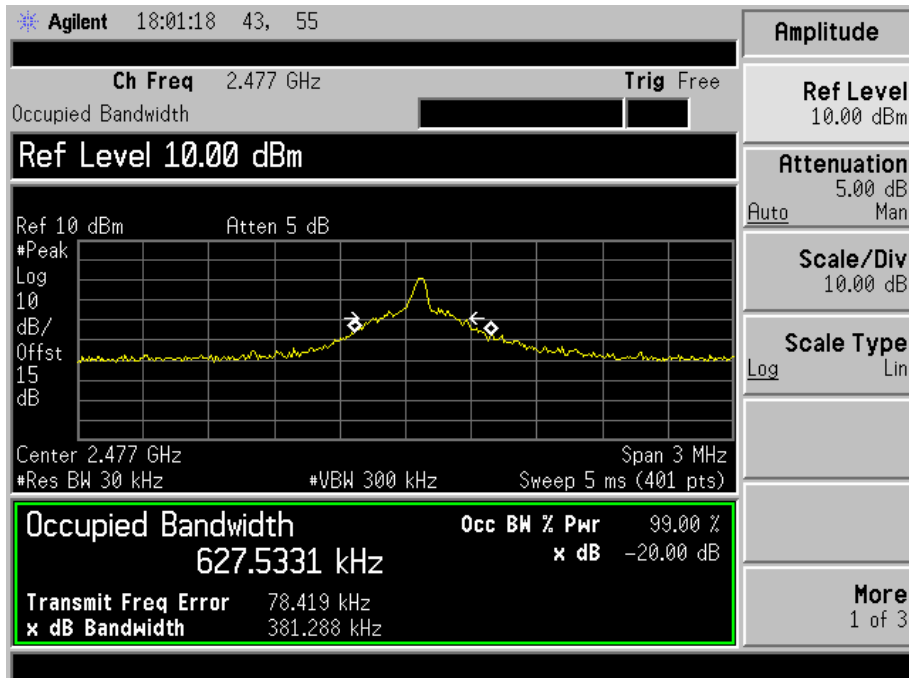
Low Channel:



Middle Channel:



High Channel:



## 7. Conducted Emissions

### 7.1 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  $\pm 2.88$  dB.

### 7.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2014-05-07	2015-05-06
L.I.S.N	Schwarz beck	NSLK8126	8126-224	2014-05-07	2015-05-06
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2014-05-07	2015-05-06

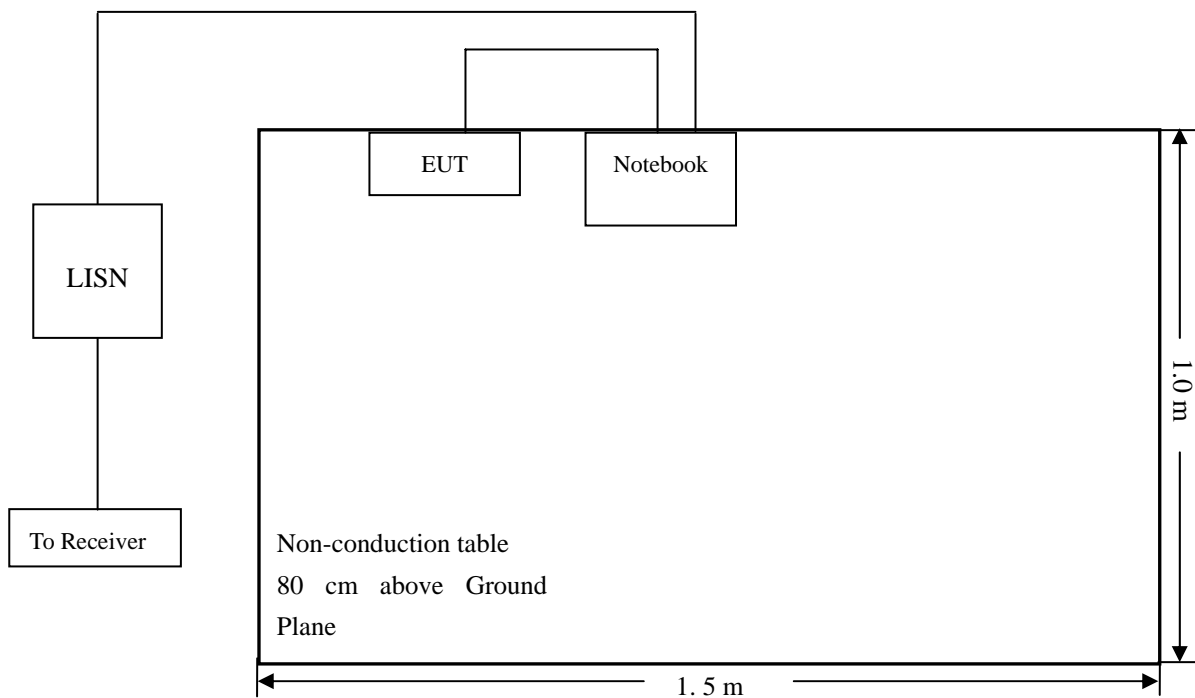
### 7.3 Test Procedure

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.207 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.

### 7.4 Basic Test Setup Block Diagram



### 7.5 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	52%
ATM Pressure:	1012 mbar

### 7.6 Test Receiver Setup

During the conducted emission test, the test receiver was set with the following configurations:

Start Frequency ..... 150 kHz  
 Stop Frequency..... 30 MHz  
 Sweep Speed ..... Auto  
 IF Bandwidth..... 10 kHz  
 Quasi-Peak Adapter Bandwidth ..... 9 kHz  
 Quasi-Peak Adapter Mode ..... Normal

### 7.7 Summary of Test Results/Plots

According to the data in section 12.8, the EUT complied with the FCC Part 15.207 Conducted margin for a Class B device, with the *worst* margin reading of:

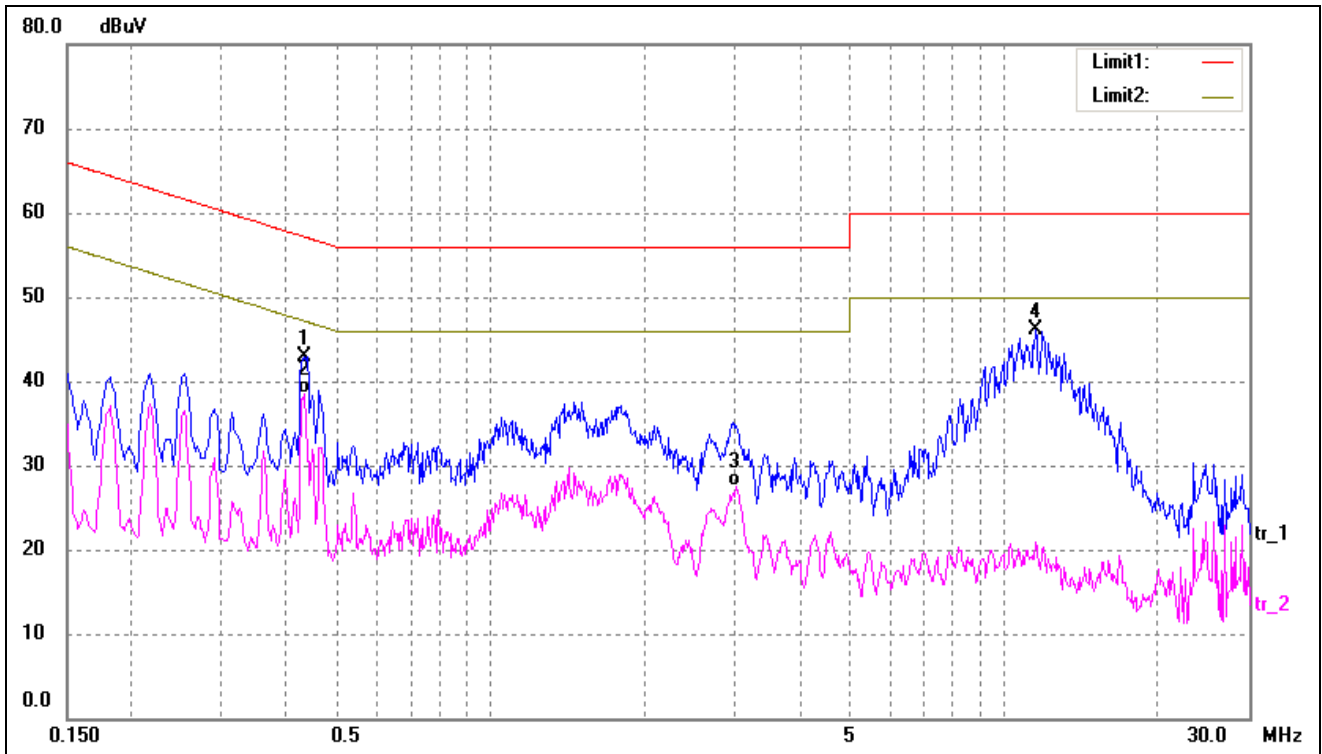
**-3.90 dB at 0.4340 MHz in the Line mode, Ave detector, 0.15-30MHz**

### 7.8 Conducted Emissions Test Data

**Plot of Conducted Emissions Test Data**

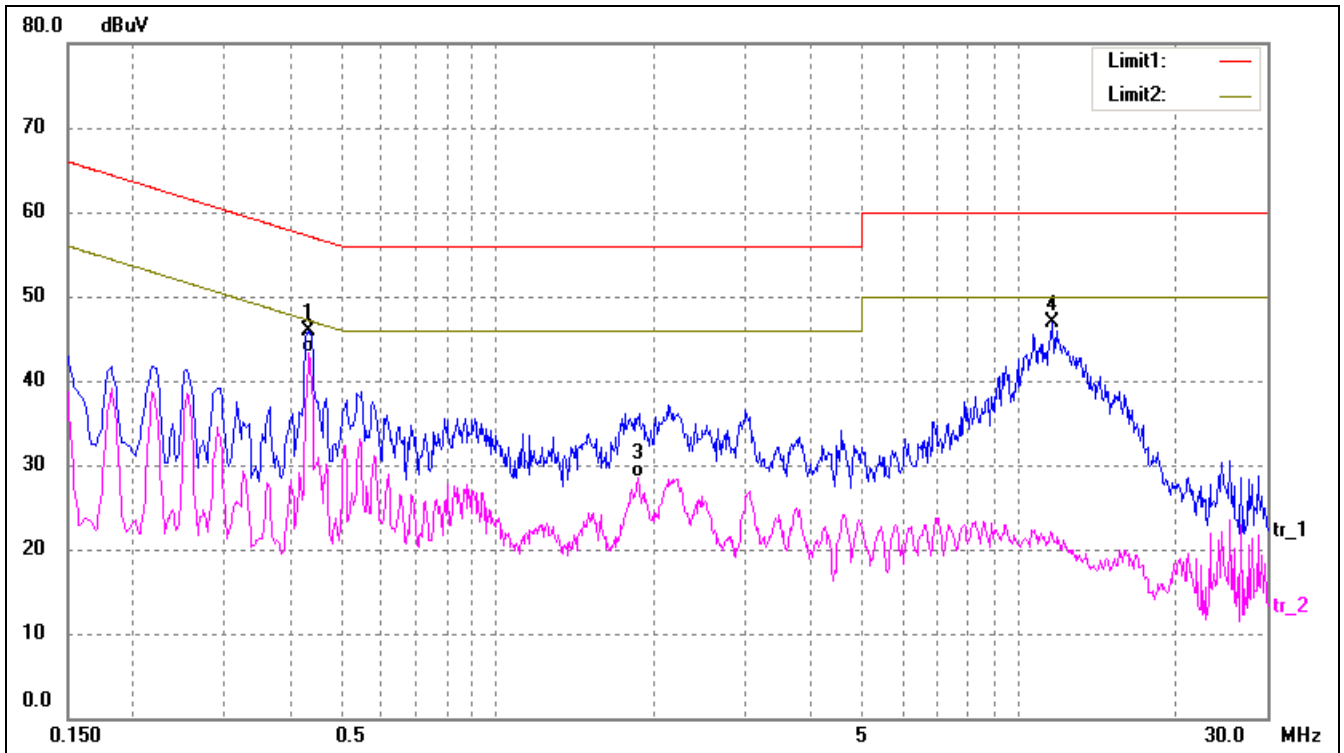
EUT: *Pencil mouse*  
 Tested Model: *R2.1*  
 Operating Condition: *TM4*  
 Comment: *AC 120V/60Hz; USB 5V charging*

Test Specification: *Neutral*



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.4340	33.45	9.50	42.95	57.18	-14.23	peak
2*	0.4340	28.94	9.50	38.44	47.18	-8.74	AVG
3	3.0180	17.52	10.00	27.52	46.00	-18.48	AVG
4	11.5340	35.75	10.31	46.06	60.00	-13.94	peak

Test Specification: Line



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.4340	36.37	9.50	45.87	57.18	-11.31	peak
2*	0.4340	33.78	9.50	43.28	47.18	-3.90	AVG
3	1.8620	18.52	10.00	28.52	46.00	-17.48	AVG
4	11.6740	36.52	10.33	46.85	60.00	-13.15	peak

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