

# FCC Part 15B Measurement and Test Report

For

**LM Technologies Ltd.**

**Unit19, Spectrum House, 32-34, Gordon House Road, London, NW5 1LP,**

**United Kingdom**

**FCC ID: VVXLM505U**

<b>Test Standards:</b>	<u>FCC Part 15 Subpart B</u>	
<b>Product Description:</b>	<u>Bluetooth USB Adapter</u>	
<b>Tested Model:</b>	<u>LM505-0511</u>	
<b>Report No.:</b>	<u>STR12078310I-2</u>	
<b>Tested Date:</b>	<u>2012-07-31 to 2012-08-06</u>	
<b>Issued Date:</b>	<u>2012-08-13</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 SEM.Test Compliance Service Co., Ltd

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## 1. GENERAL INFORMATION

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

#### Client Information

Applicant: LM Technologies Ltd.  
 Address of applicant: Unit19, Spectrum House, 32-34, Gordon House Road, London, NW5 1LP, United Kingdom  
 Manufacturer: LM Technologies Ltd.  
 Address of manufacturer: Unit19, Spectrum House, 32-34, Gordon House Road, London, NW5 1LP, United Kingdom

General Description of EUT	
Product Name:	Bluetooth USB Adapter
Trade Name:	LM
Model No.:	LM505-0511
Adding Model(s):	/
<i>Note: The test data is gathered from a production sample, provided by the manufacturer.</i>	

Technical Characteristics of EUT	
Rated Voltage:	USB 5V
Rated Current:	/
Rated Power:	/
Power Adapter Model:	/
Highest Internal Frequency:	26MHz
Classification of ITE:	Class B
Support Interface:	USB 2.0

## 1.2 Test Standards

The following report is prepared on behalf of the LM Technologies Ltd. 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.: 994117**

SEM.Test Compliance Services 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 994117.

- **Industry Canada (IC) Registration No.: 7673A**

The 3m Semi-anechoic chamber of SEM.Test Compliance Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 7673A.

- **CNAS Registration No.: L4062**

Shenzhen SEM.Test Electronics Service 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 3/F, Jinbao Commerce Building, Xin'an Fanshen 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	Transmitting	/
TM2	/	/

EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
/	/	/	/

Auxiliary Equipment List and Details

Description	Manufacturer	Model	Serial Number
/	/	/	/

Special Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
/	/	/	/

## 2. SUMMARY OF TEST RESULTS

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<b>FCC Rules</b>	<b>Description of Test Item</b>	<b>Result</b>
§ 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  $\pm 2.88$  dB.

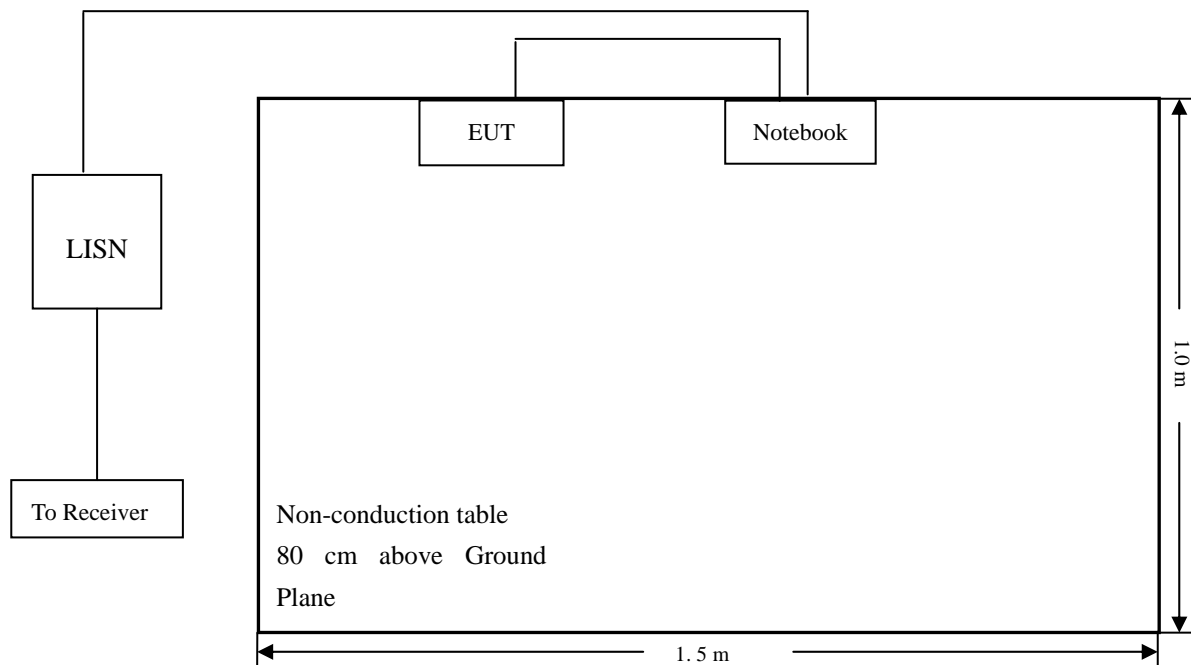
#### 3.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2012-03-28	2013-03-27
L.I.S.N	Schwarz beck	NSLK8126	8126-224	2012-03-28	2013-03-27
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2012-03-28	2013-03-27

#### 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:

**-2.98 dB $\mu$ V at 0.178 MHz in the Line mode, Peak detector, 0.15-30MHz**

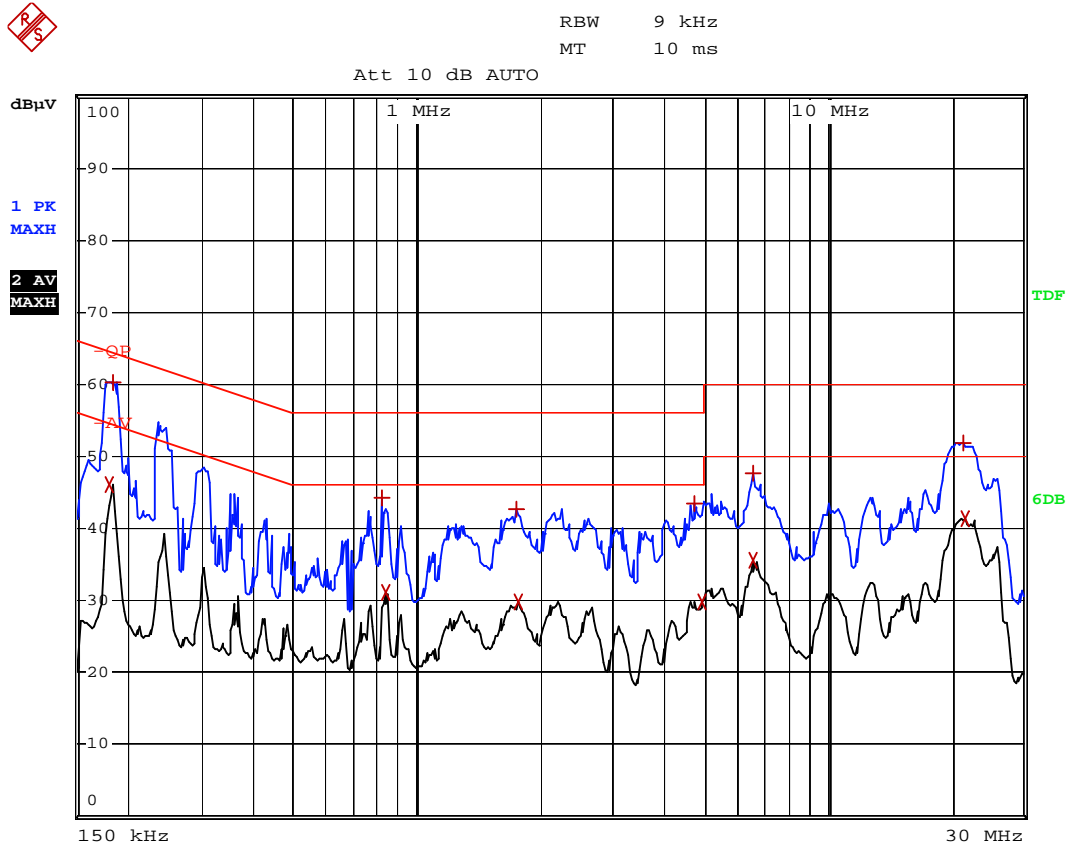
### 3.7 Conducted Emissions Test Data



**Plot of Conducted Emissions Test Data**

EUT: Bluetooth USB Adapter  
 Tested Model: LM505-0511  
 Operating Condition: Transmitting  
 Comment: Connected to PC

Test Specification: Line



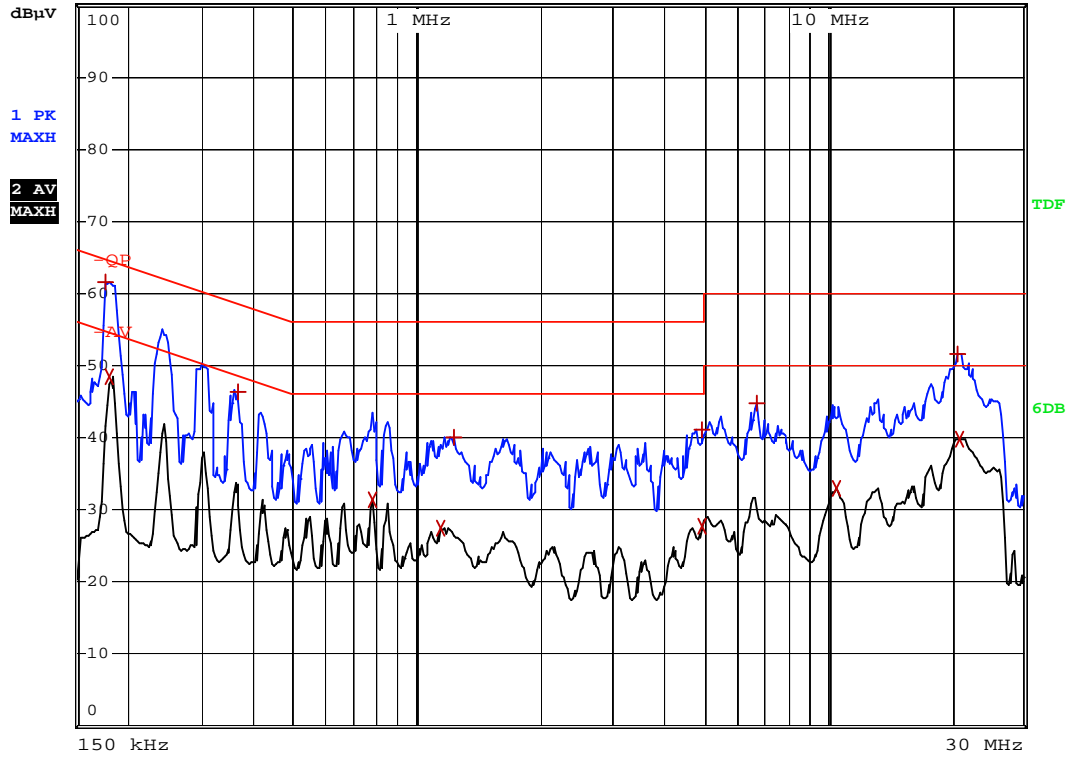
EDIT PEAK LIST (Prescan Results)				
TRACE		FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
Trace1:		-QP		
Trace2:		-AV		
Trace3:		---		
2	Average	182 kHz	46.02	-8.37
1	Max Peak	186 kHz	60.20	-4.01
1	Max Peak	826 kHz	44.33	-11.66
2	Average	838 kHz	31.05	-14.94
1	Max Peak	1.746 MHz	42.61	-13.38
2	Average	1.766 MHz	29.67	-16.32
1	Max Peak	4.742 MHz	43.38	-12.62
2	Average	4.97 MHz	29.89	-16.10
1	Max Peak	6.578 MHz	47.71	-12.28
2	Average	6.59 MHz	35.53	-14.46
1	Max Peak	21.314 MHz	51.92	-8.07
2	Average	21.526 MHz	41.38	-8.61

Test Specification: Neutral



RBW 9 kHz  
MT 10 ms

Att 10 dB AUTO



EDIT PEAK LIST (Prescan Results)			
TRACE	FREQUENCY	LEVEL dBμV	DELTA LIMIT dB
Trace1:	-QP		
Trace2:	-AV		
Trace3:	---		
1 Max Peak	178 kHz	61.59	-2.98
2 Average	182 kHz	48.53	-5.86
1 Max Peak	366 kHz	46.26	-12.32
2 Average	778 kHz	31.48	-14.51
2 Average	1.146 MHz	27.53	-18.46
1 Max Peak	1.234 MHz	40.09	-15.90
1 Max Peak	4.95 MHz	41.11	-14.88
2 Average	4.978 MHz	27.59	-18.40
1 Max Peak	6.762 MHz	44.62	-15.37
2 Average	10.47 MHz	32.87	-17.12
1 Max Peak	20.734 MHz	51.60	-8.39
2 Average	20.942 MHz	39.89	-10.10

## 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  $\pm 5.10$  dB.

### 4.2 Test Equipment List and Details

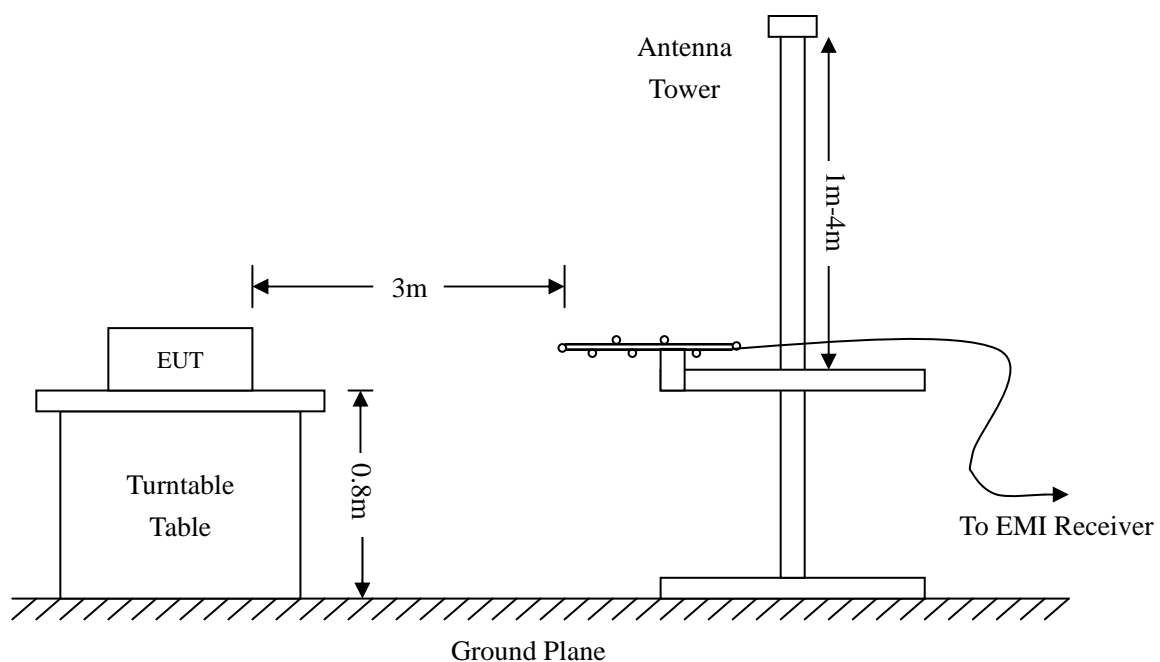
Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2012-03-28	2013-03-27
EMI Test Receiver	R&S	ESVB	825471/005	2012-03-28	2013-03-27
Pre-amplifier	Agilent	8447F	3113A06717	2012-03-28	2013-03-27
Pre-amplifier	Compliance Direction	PAP-0118	24002	2012-03-28	2013-03-27
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2012-02-25	2013-02-24
Horn Antenna	ETS	3117	00086197	2012-02-25	2013-02-24

### 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

During the radiated emission test for above 1GHz, the test receiver was set with the following configurations:

For peak detector:

RBW = 1000kHz, VBW = 3000kHz, Sweep Time = Auto

For average detector:

RBW = 1000kHz, VBW = 10Hz, Sweep Time = Auto

#### 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 $\mu$ V means the emission is 6dB $\mu$ 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:

**-2.49 dB $\mu$ V at 32.4059 MHz in the Horizontal polarization, 30 MHz to 1 GHz, 3Meters**

**Plot of Radiated Emissions Test Data**

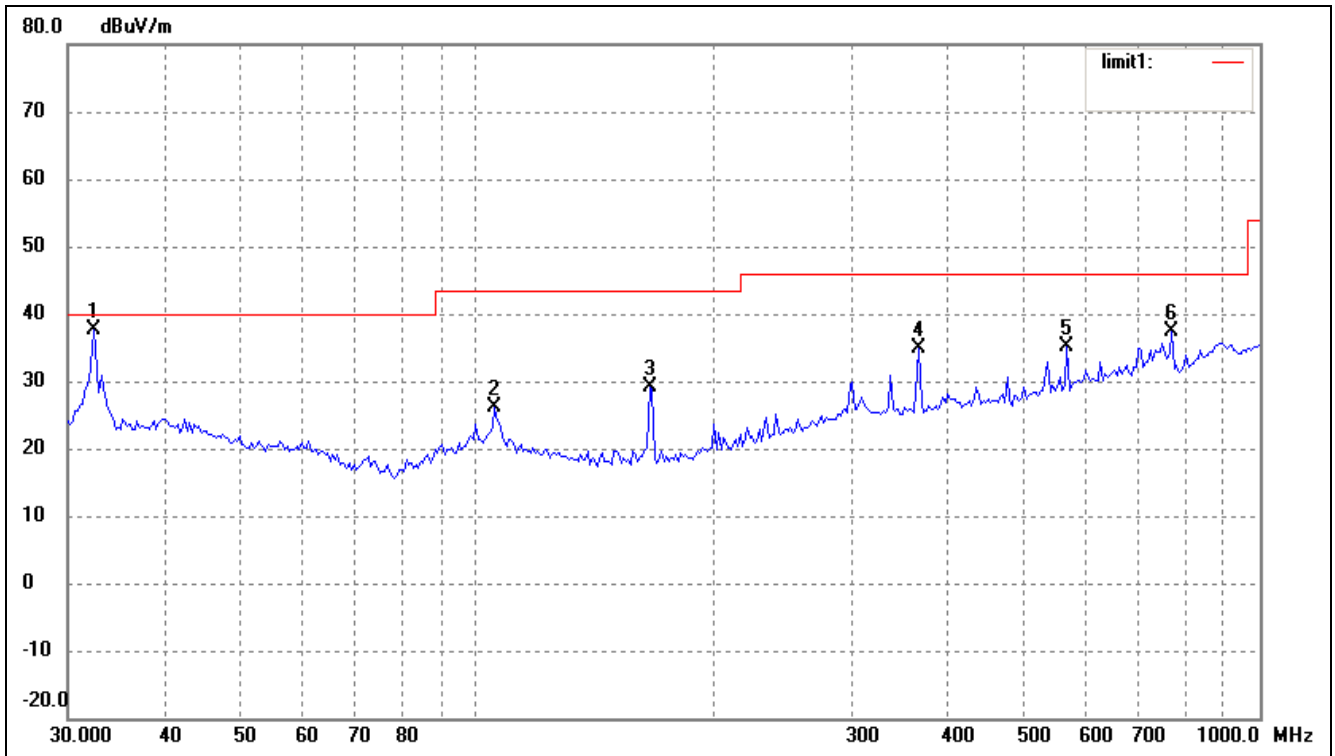
EUT: *Bluetooth USB Adapter*

Tested Model: *LM505-0511*

Operating Condition: *Transmitting*

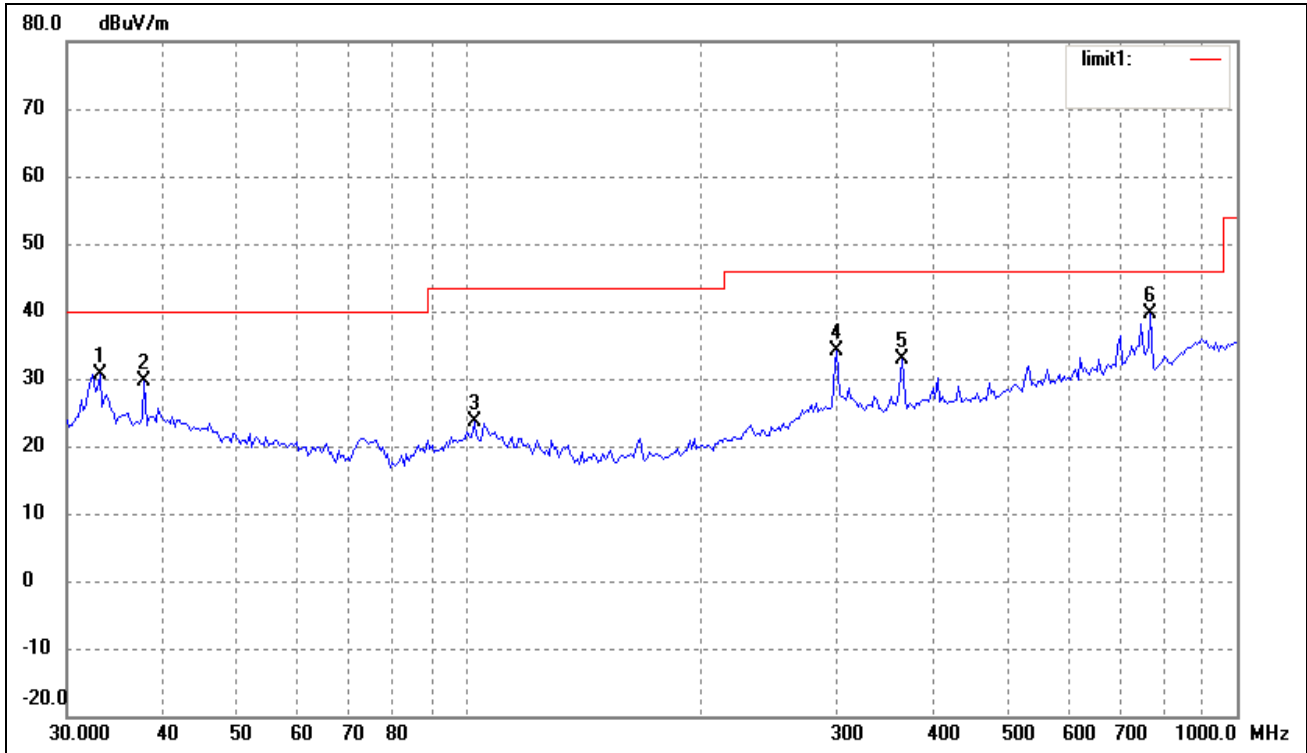
Comment: *Connected to PC*

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	32.4059	29.07	8.44	37.51	40.00	-2.49	54	100	peak
2	105.2718	19.83	6.32	26.15	43.50	-17.35	285	100	peak
3	166.0680	25.48	3.68	29.16	43.50	-14.34	66	100	peak
4	366.8231	24.28	10.67	34.95	46.00	-11.05	210	100	peak
5	566.6223	21.61	13.58	35.19	46.00	-10.81	285	100	peak
6	771.4486	21.00	16.37	37.37	46.00	-8.63	21	100	peak

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	33.0950	22.01	8.56	30.57	40.00	-9.43	306	100	peak
2	37.8121	20.24	9.33	29.57	40.00	-10.43	35	100	peak
3	101.6443	16.85	6.67	23.52	43.50	-19.98	112	100	peak
4	301.4224	23.83	10.20	34.03	46.00	-11.97	25	100	peak
5	366.8231	22.12	10.67	32.79	46.00	-13.21	31	100	peak
6	771.4486	23.29	16.37	39.66	46.00	-6.34	25	100	peak

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