

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: VVX-816-0648

Test Rule(s):	<u>FCC Part 15 Subpart B</u>	
Product Description:	<u>LM816 802.11n USB Adapter 150Mbps</u>	
Tested Model:	<u>816-0648</u>	
Report No.:	<u>STR16048077I-2</u>	
Tested Date:	<u>2016-04-10 to 2016-04-26</u>	
Issued Date:	<u>2016-04-26</u>	
Tested By:	<u>Jong Wang / Engineer</u>	<i>Jong Wang</i>
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Approved & Authorized By:	<u>Jandy so / PSQ Manager</u>	<i>Jandyso</i>
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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: 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:	LM816 802.11n USB Adapter 150Mbps
Trade Name:	LM816 WLAN USB Adapter
Model No.:	816-0648
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:	DC 5V
Rated Current:	125mA
Rated Power:	0.625W
Power Adapter Model:	/
Highest Internal Frequency:	40MHz
Classification of ITE:	Class B

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 C63.4-2014, 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	Working	/
TM2		/
TM3		

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
Notebook	Lenovo	E10	LR-63C8R

1.6 Measurement Uncertainty

Measurement uncertainty		
Parameter	Conditions	Uncertainty
Conducted Emissions	Conducted	$\pm 2.88\text{dB}$
Transmitter Spurious Emissions	Radiated	$\pm 5.1\text{dB}$

1.7 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal Date	Due Date
Spectrum Analyzer	Agilent	E4407B	MY41440400	2015-06-17	2016-06-16
Spectrum Analyzer	Rohde & Schwarz	FSP	836079/035	2015-06-17	2016-06-16
EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2015-06-17	2016-06-16
Amplifier	Agilent	8447F	3113A06717	2015-06-17	2016-06-16
Amplifier	C&D	PAP-1G18	2002	2015-06-17	2016-06-16
Broadband Antenna	Schwarz beck	VULB9163	9163-333	2015-06-17	2016-06-16
Horn Antenna	ETS	3117	00086197	2015-06-17	2016-06-16
Loop Antenna	Schwarz beck	FMZB 1516	9773	2015-06-17	2016-06-16
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2015-06-17	2016-06-16
L.I.S.N	Schwarz beck	NSLK8126	8126-224	2015-06-17	2016-06-16
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2015-06-17	2016-06-16

2. SUMMARY OF TEST RESULTS

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

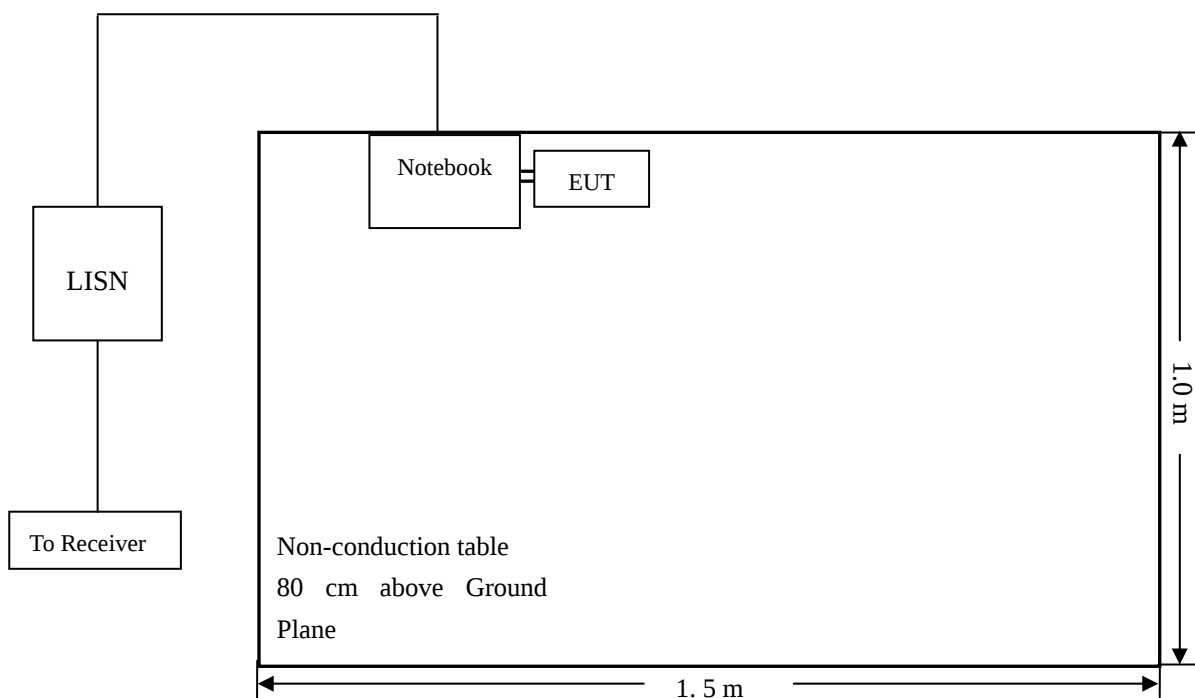
N/A: not applicable

3. Conducted Emissions

3.1 Test Procedure

Test is conducting under the description of ANSI C63.4-2014, 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.

3.2 Basic Test Setup Block Diagram



3.3 Environmental Conditions

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

3.4 Summary of Test Results/Plots

According to the data in section 3.5, the EUT complied with the FCC Part 15.107(a) Conducted margin for a Class B device, with the *worst* margin reading of:

-10.69 dB at 4.5860 MHz in the Neutral mode, Peak detector, 0.15-30MHz

3.5 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data

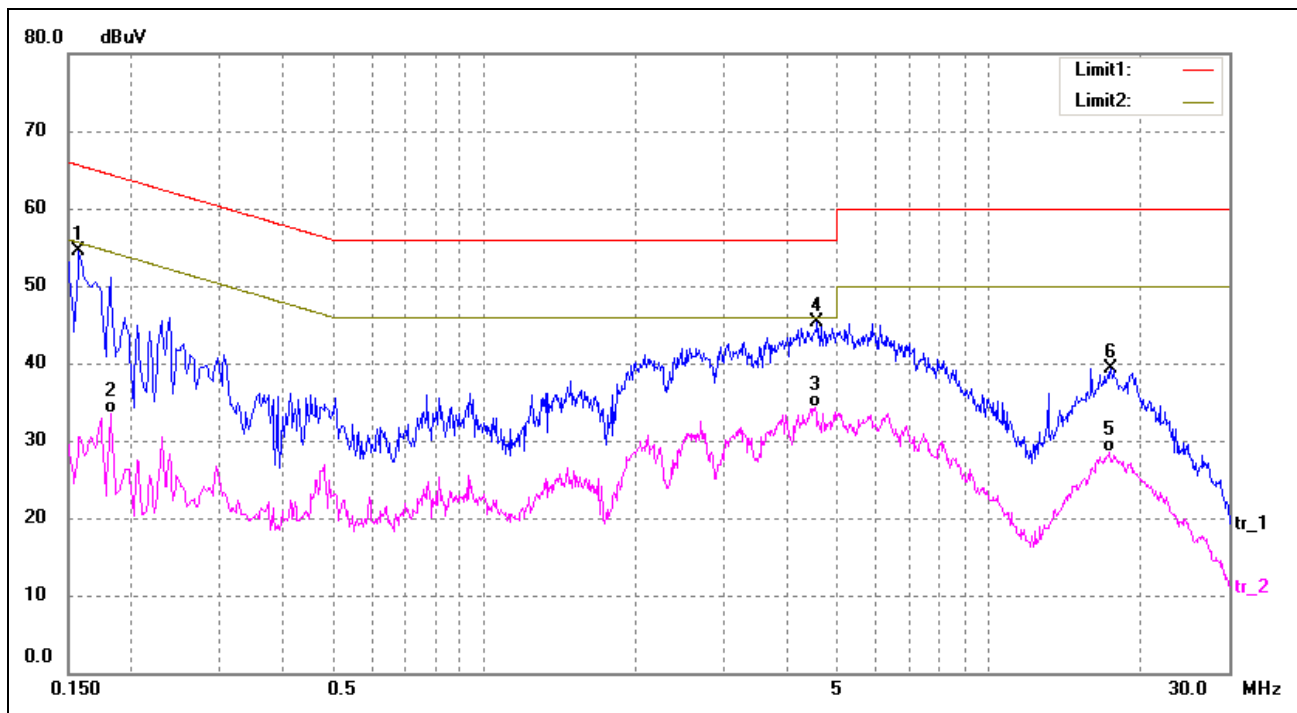
EUT: LM816 802.11n USB Adapter 150Mbps

Tested Model: 816-0648

Operating Condition: TM1

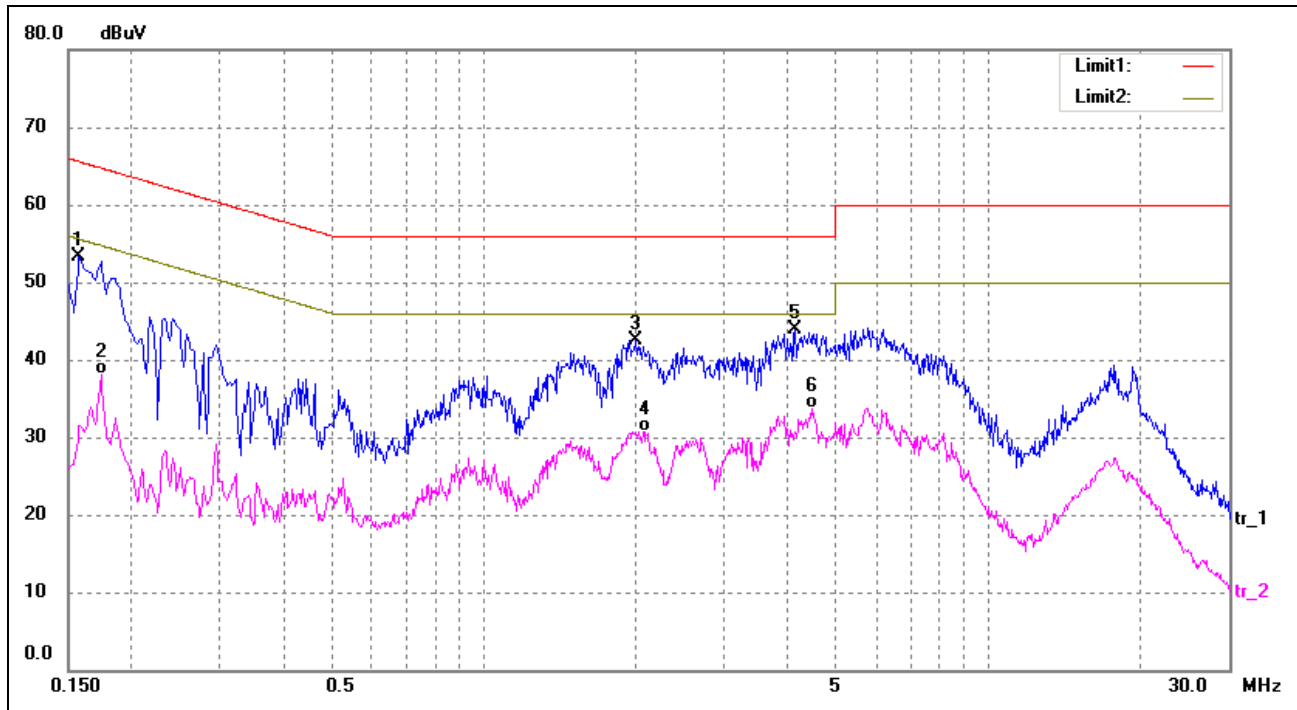
Comment: AC 120V/60Hz; USB 5V

Test Specification: Neutral



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1580	44.52	10.02	54.54	65.57	-11.03	peak
2	0.1820	25.02	8.58	33.60	54.39	-20.79	AVG
3	4.5340	21.68	12.69	34.37	46.00	-11.63	AVG
4*	4.5860	32.59	12.72	45.31	56.00	-10.69	peak
5	17.4700	16.97	11.49	28.46	50.00	-21.54	AVG
6	17.5060	27.86	11.50	39.36	60.00	-20.64	peak

Test Specification: Live



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1*	0.1580	43.37	10.02	53.39	65.57	-12.18	peak
2	0.1740	28.98	9.06	38.04	54.77	-16.73	AVG
3	2.0100	31.53	11.01	42.54	56.00	-13.46	peak
4	2.0980	19.66	11.07	30.73	46.00	-15.27	AVG
5	4.1540	31.38	12.44	43.82	56.00	-12.18	peak
6	4.4740	21.09	12.65	33.74	46.00	-12.26	AVG

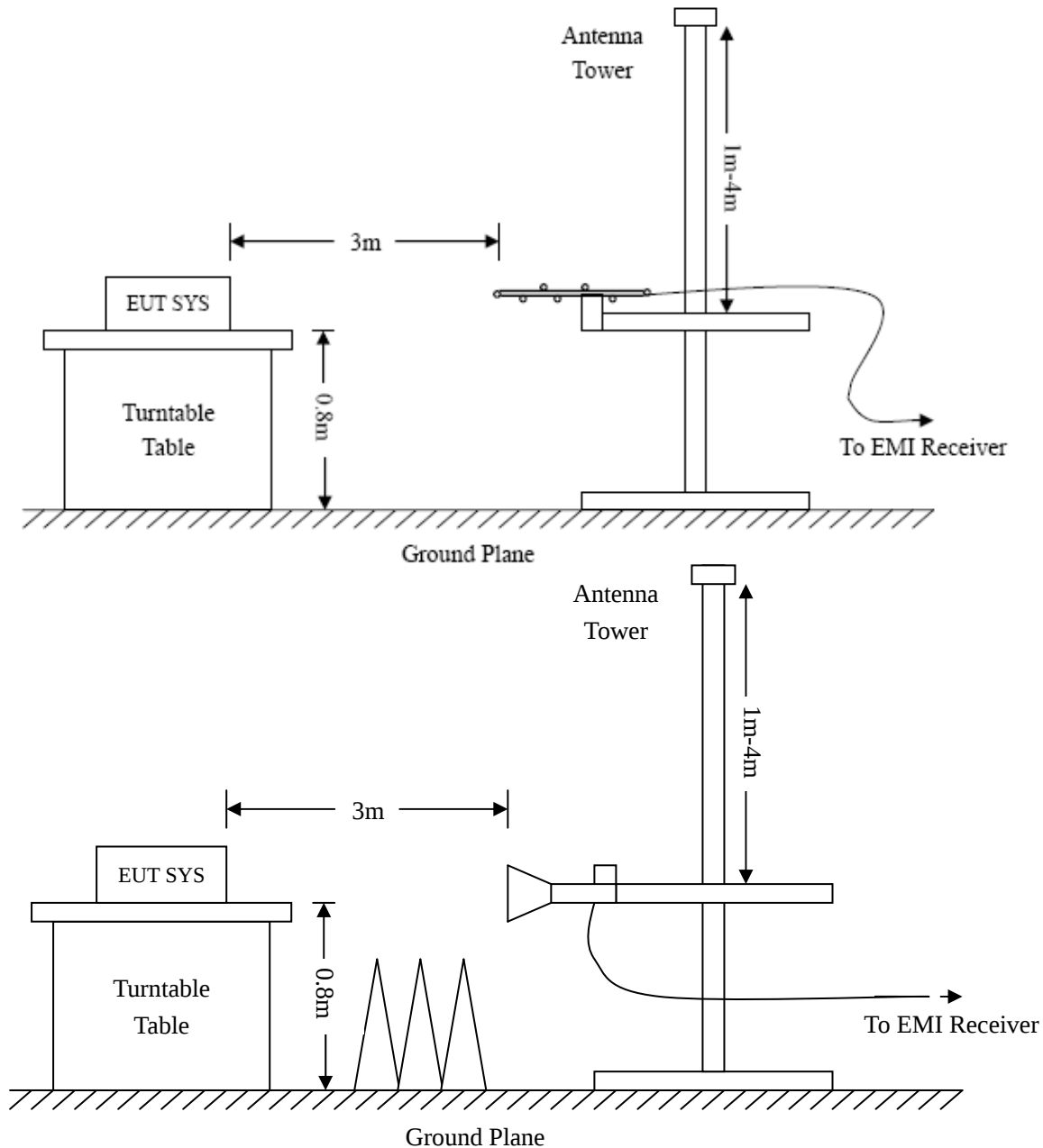
4. Radiated Emissions

4.1 Test Procedure

The setup of EUT is according with per ANSI C63.4-2014 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.



4.2 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

4.3 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:

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

4.4 Environmental Conditions

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

4.5 Summary of Test Results/Plots

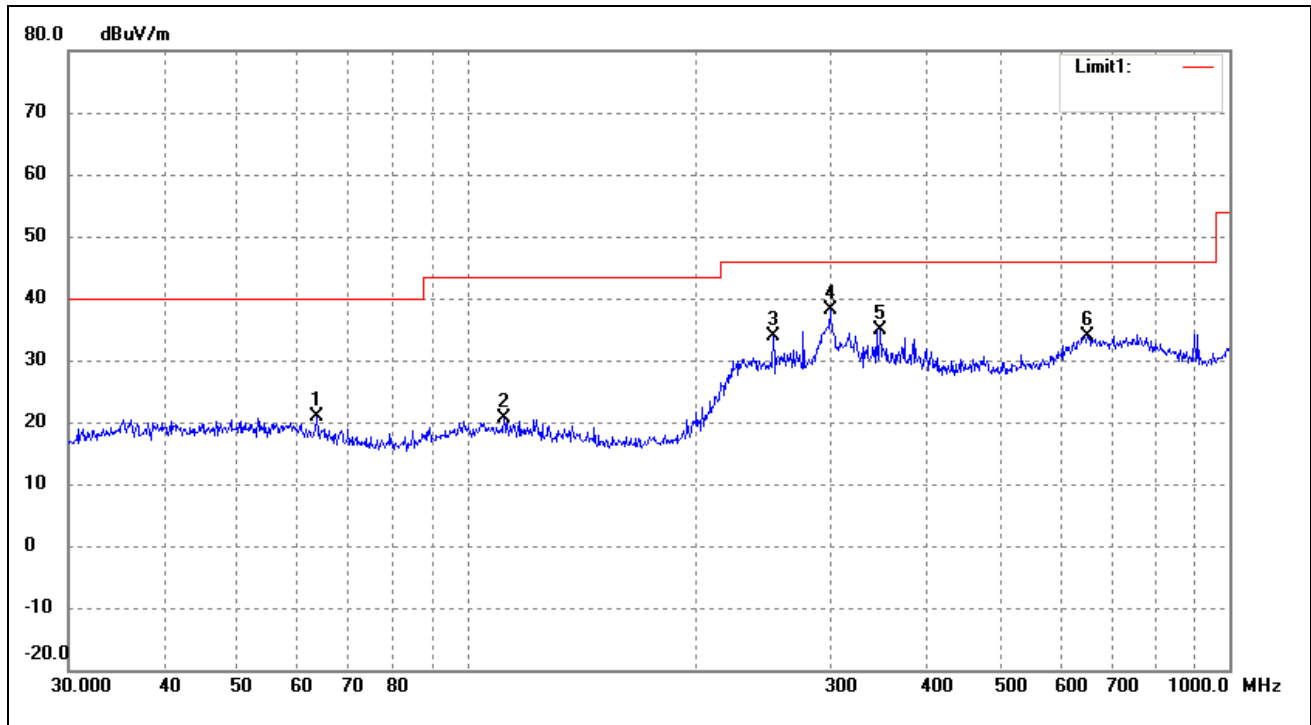
According to the data, the EUT complied with the FCC Part 15.109(a) rule, and had the worst margin of:

-7.95 dB at 299.3158 MHz in the Horizontal polarization, 30MHz to 1 GHz, 3Meters

Plot of Radiated Emissions Test Data

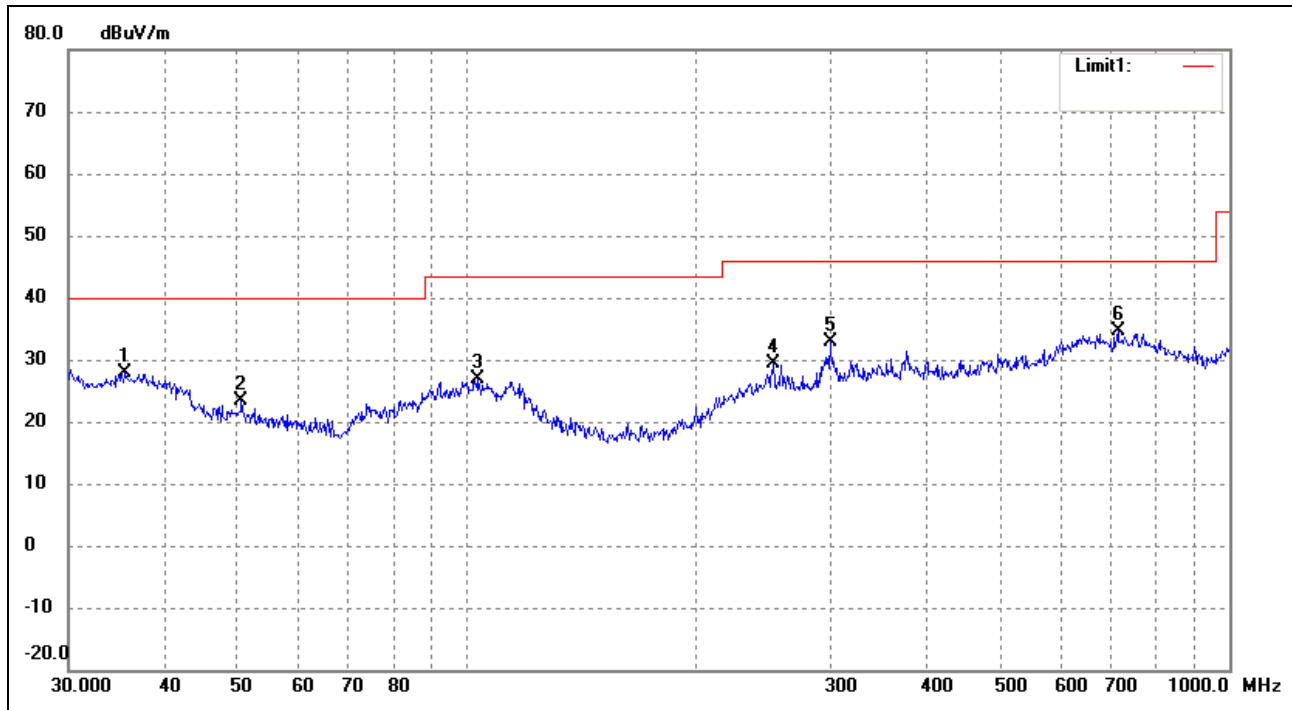
EUT: LM816 802.11n USB Adapter 150Mbps
Tested Model: 816-0648
Operating Condition: TM1
Comment: AC 120V/60Hz; USB 5V

Test Specification: Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	63.5356	16.69	4.30	20.99	40.00	-19.01	67	100	peak
2	111.7380	15.67	4.86	20.53	43.50	-22.97	94	100	peak
3	252.0627	24.41	9.38	33.79	46.00	-12.21	135	100	peak
4	299.3158	26.13	11.92	38.05	46.00	-7.95	159	100	peak
5	348.0274	23.36	11.59	34.95	46.00	-11.05	193	100	peak
6	651.9417	16.15	17.77	33.92	46.00	-12.08	265	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	35.6240	23.63	4.27	27.90	40.00	-12.10	37	100	peak
2	50.5860	18.44	5.00	23.44	40.00	-16.56	69	100	peak
3	103.0800	21.96	4.90	26.86	43.50	-16.64	123	100	peak
4	252.0627	19.94	9.38	29.32	46.00	-16.68	210	100	peak
5	299.3158	20.84	11.92	32.76	46.00	-13.24	197	100	peak
6	714.1734	17.11	17.63	34.74	46.00	-11.26	239	100	peak

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