

FCC Part 15B Measurement and Test Report

For

Winstars Technology Limited

Block 4, TaiSong Industrial Park, Dalang Street, LongHua Town,

Bao'an district, Shenzhen, China

FCC ID: NZ3WS-WN565N1

Test Rule(s):	<u>FCC Part 15 Subpart B</u>
Product Description:	<u>Wireless N Travel AP/Router</u>
Tested Model:	<u>WS-WN565N1</u>
Report No.:	<u>STR16018223I-2</u>
Tested Date:	<u>2016-02-02 to 2016-02-25</u>
Issued Date:	<u>2016-02-25</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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History of this report		
Version	Description	Date
1.0	First Edition	2016-02-25
Rev1	Second Edition	2016-03-17

1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: Winstars Technology Limited
Address of applicant: Block 4, TaiSong Industrial Park, Dalang Street,
LongHua Town, Bao`an district,Shenzhen,China

Manufacturer: Winstars Technology Limited
Address of manufacturer: Block 4, TaiSong Industrial Park, Dalang Street,
LongHua Town, Bao`an district,Shenzhen,China

General Description of EUT

Product Name:	Wireless N Travel AP/Router
Trade Name:	/
Model No.:	WS-WN565N1
Hardware Version:	WS-WN565N1-A V1
Software Version:	TRN-A2.3463.1.20140520

Note: The test data is gathered from a production sample, provided by the manufacturer.

Technical Characteristics of EUT

Rated Voltage:	DC 5V
Rated Current:	0.5A
Rated Power:	2W
Lowest Internal Frequency:	40MHz
Highest Internal Frequency:	400MHz
Classification of ITE:	Class B

1.2 Test Standards

The following report is prepared on behalf of the Winstars Technology 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 C63.4-2014, 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	AP Mode	/
TM2	Repeater Mode	/
TM3	Router Mode	/

EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
USB cable	0.2	Unshielded	Without Ferrite

Auxiliary Equipment List and Details

Description	Manufacturer	Model	Serial Number
Notebook	Lenovo	E10	Supplied by SEM
Adapter	\	XHY050200UECH	Supplied by SEM
Router	TP-LINK	/	/
ADSL	TP-LINK	/	/

Special Cable List and Details

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

1.6 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

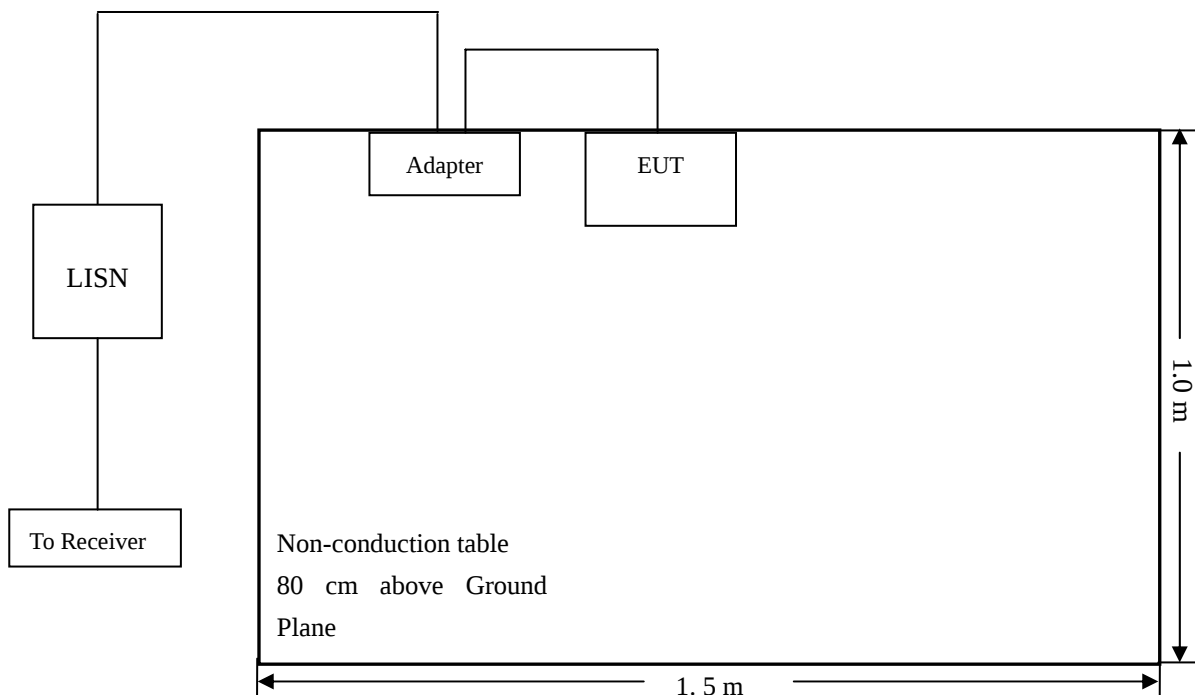
3.1 Measurement Uncertainty

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 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.

3.3 Basic Test Setup Block Diagram



3.4 Environmental Conditions

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

3.5 Summary of Test Results/Plots

According to the data in section 3.6, the EUT complied with the FCC Part 15.107(a) Conducted margin for a Class B device, with the *worst* margin reading of:

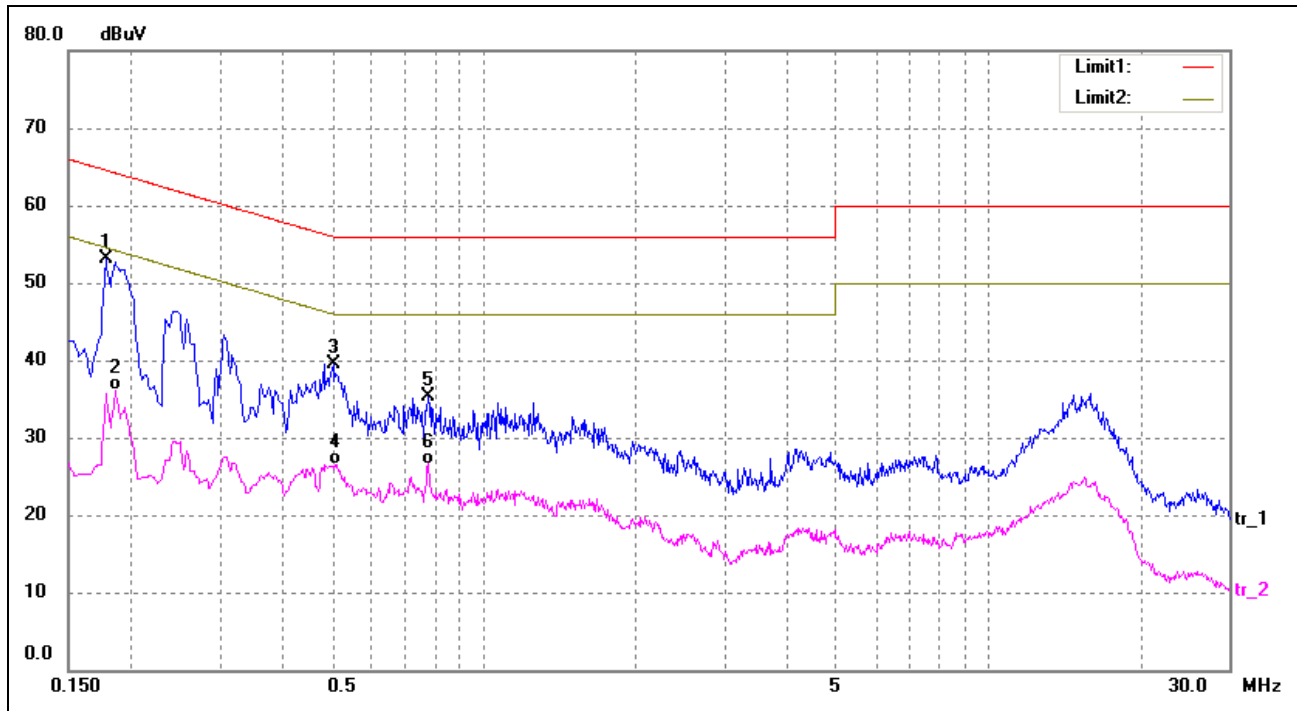
-10.94 dB at 0.4420 MHz in the Line mode, TM3, AVG detector, 0.15-30MHz

3.6 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data

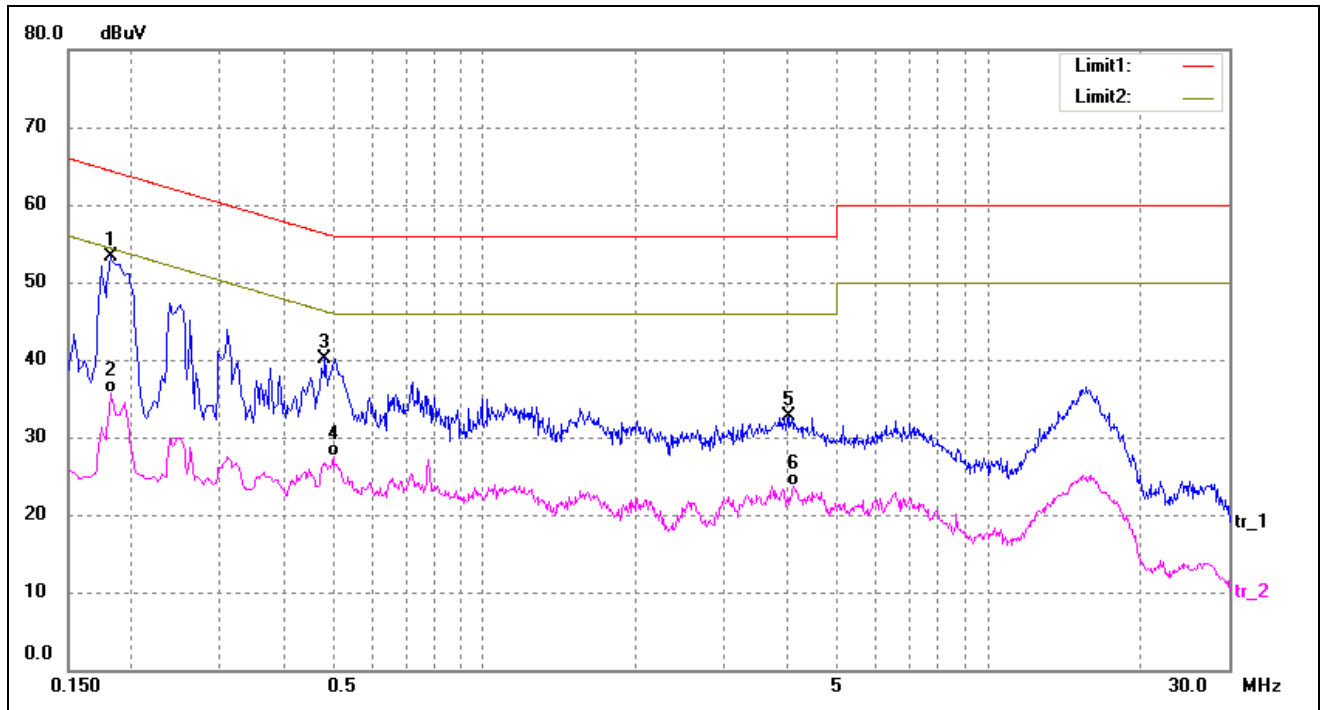
EUT: Wireless N Travel AP/Router
 Tested Model: WS-WN565N1
 Operating Condition: TM1
 Comment: AC 120V/60Hz; Adapter DC 5V

Test Specification: Neutral



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1*	0.1780	40.52	12.50	53.02	64.58	-11.56	peak
2	0.1860	23.65	12.50	36.15	54.21	-18.06	AVG
3	0.5020	27.09	12.50	39.59	56.00	-16.41	peak
4	0.5100	13.98	12.51	26.49	46.00	-19.51	AVG
5	0.7780	22.60	12.78	35.38	56.00	-20.62	peak
6	0.7780	13.82	12.78	26.60	46.00	-19.40	AVG

Test Specification: Live

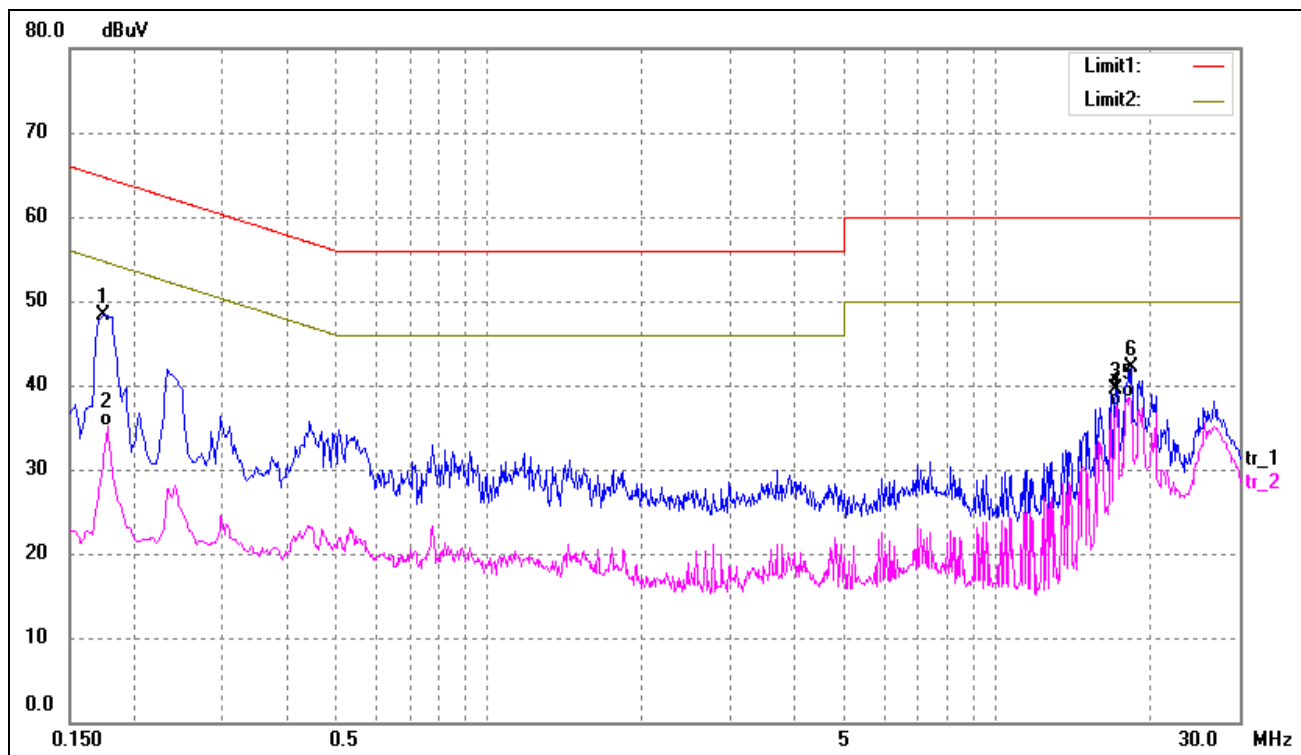


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1*	0.1820	40.77	12.50	53.27	64.39	-11.12	peak
2	0.1820	23.18	12.50	35.68	54.39	-18.71	AVG
3	0.4860	27.70	12.50	40.20	56.24	-16.04	peak
4	0.5020	15.05	12.50	27.55	46.00	-18.45	AVG
5	4.0420	19.65	13.00	32.65	56.00	-23.35	peak
6	4.1220	10.78	13.00	23.78	46.00	-22.22	AVG

Plot of Conducted Emissions Test Data

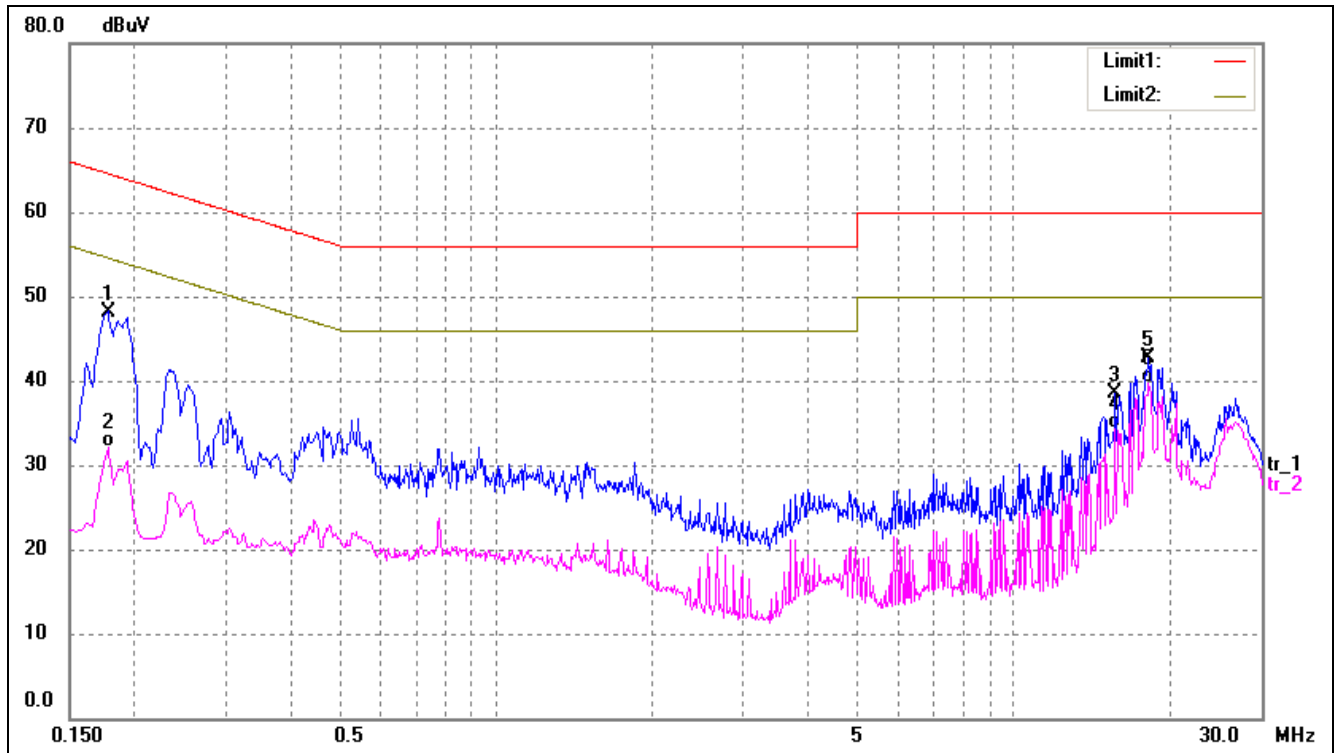
EUT: Wireless N Travel AP/Router
 Tested Model: WS-WN565N1
 Operating Condition: TM2
 Comment: AC 120V/60Hz; Adapter DC 5V

Test Specification: Neutral



No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV)	(dBuV)	(dB)	
1	0.1740	38.88	9.50	48.38	64.77	-16.39	peak
2	0.1780	25.66	9.50	35.16	54.58	-19.42	AVG
3	17.1380	28.06	11.43	39.49	60.00	-20.51	peak
4	17.2420	26.00	11.45	37.45	50.00	-12.55	AVG
	18.1660	26.96	11.63	38.59	50.00	-11.41	AVG
6	18.3700	30.34	11.67	42.01	60.00	-17.99	peak

Test Specification: Line

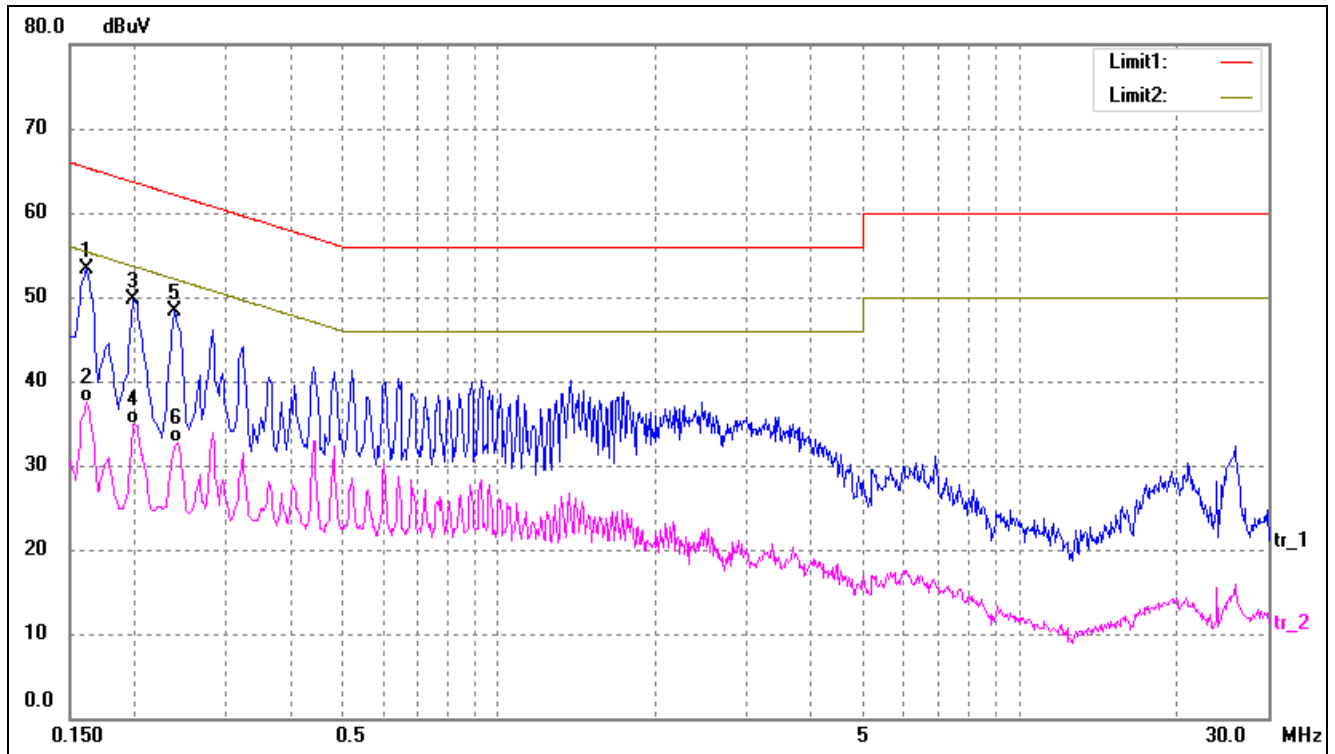


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1780	38.70	9.50	48.20	64.58	-16.38	peak
2	0.1780	22.63	9.50	32.13	54.58	-22.45	AVG

Plot of Conducted Emissions Test Data

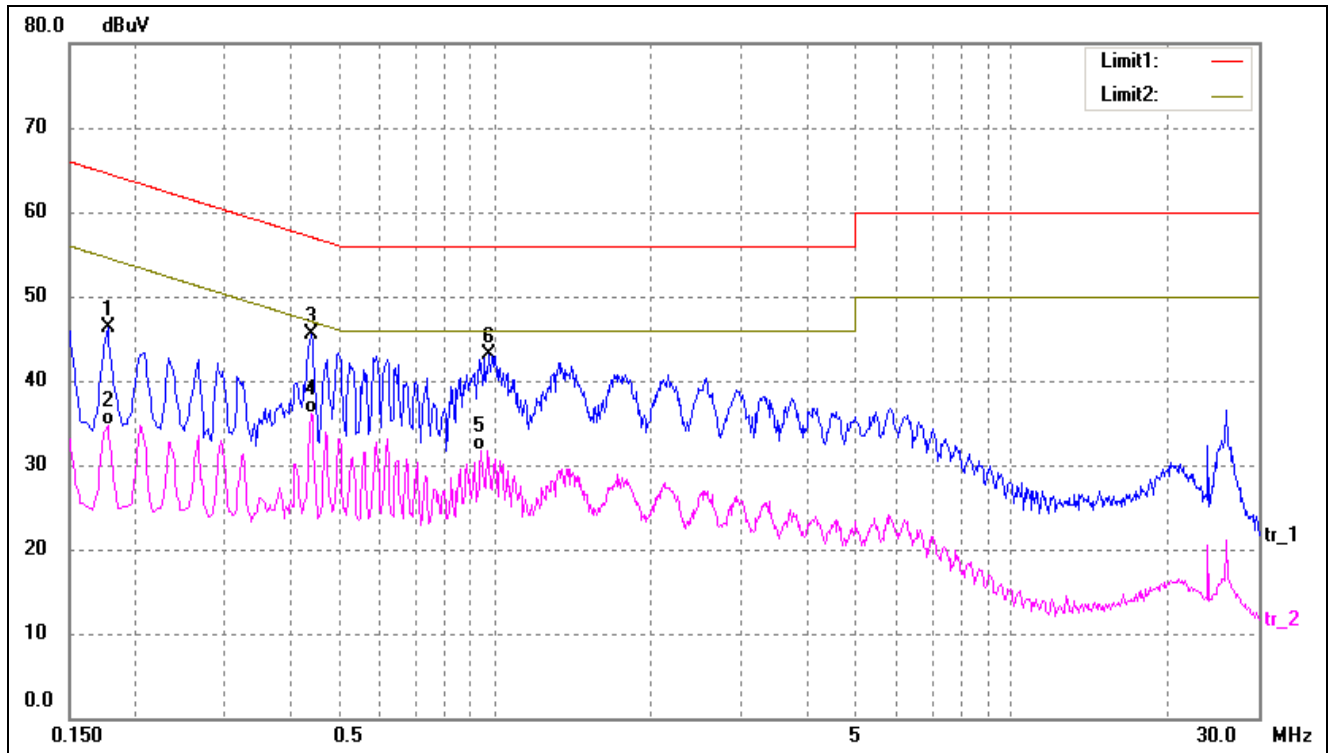
EUT: Wireless N Travel AP/Router
 Tested Model: WS-WN565N1
 Operating Condition: TM3
 Comment: AC 120V/60Hz; Adapter DC 5V

Test Specification: Neutral



No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV)	(dBuV)	(dB)	
1*	0.1620	40.86	12.50	53.36	65.36	-12.00	peak
2	0.1620	24.98	12.50	37.48	55.36	-17.88	AVG
3	0.1980	37.21	12.50	49.71	63.69	-13.98	peak
4	0.1980	22.35	12.50	34.85	53.69	-18.84	AVG
5	0.2380	35.81	12.50	48.31	62.17	-13.86	peak
6	0.2420	20.24	12.50	32.74	52.03	-19.29	AVG

Test Specification: Line



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1780	33.71	12.50	46.21	64.58	-18.37	peak
2	0.1780	22.16	12.50	34.66	54.58	-19.92	AVG
3	0.4420	33.05	12.50	45.55	57.02	-11.47	peak
4*	0.4420	23.58	12.50	36.08	47.02	-10.94	AVG
5	0.9420	18.85	12.94	31.79	46.00	-14.21	AVG
6	0.9740	30.08	12.97	43.05	56.00	-12.95	peak

4. Radiated Emissions

4.1 Measurement Uncertainty

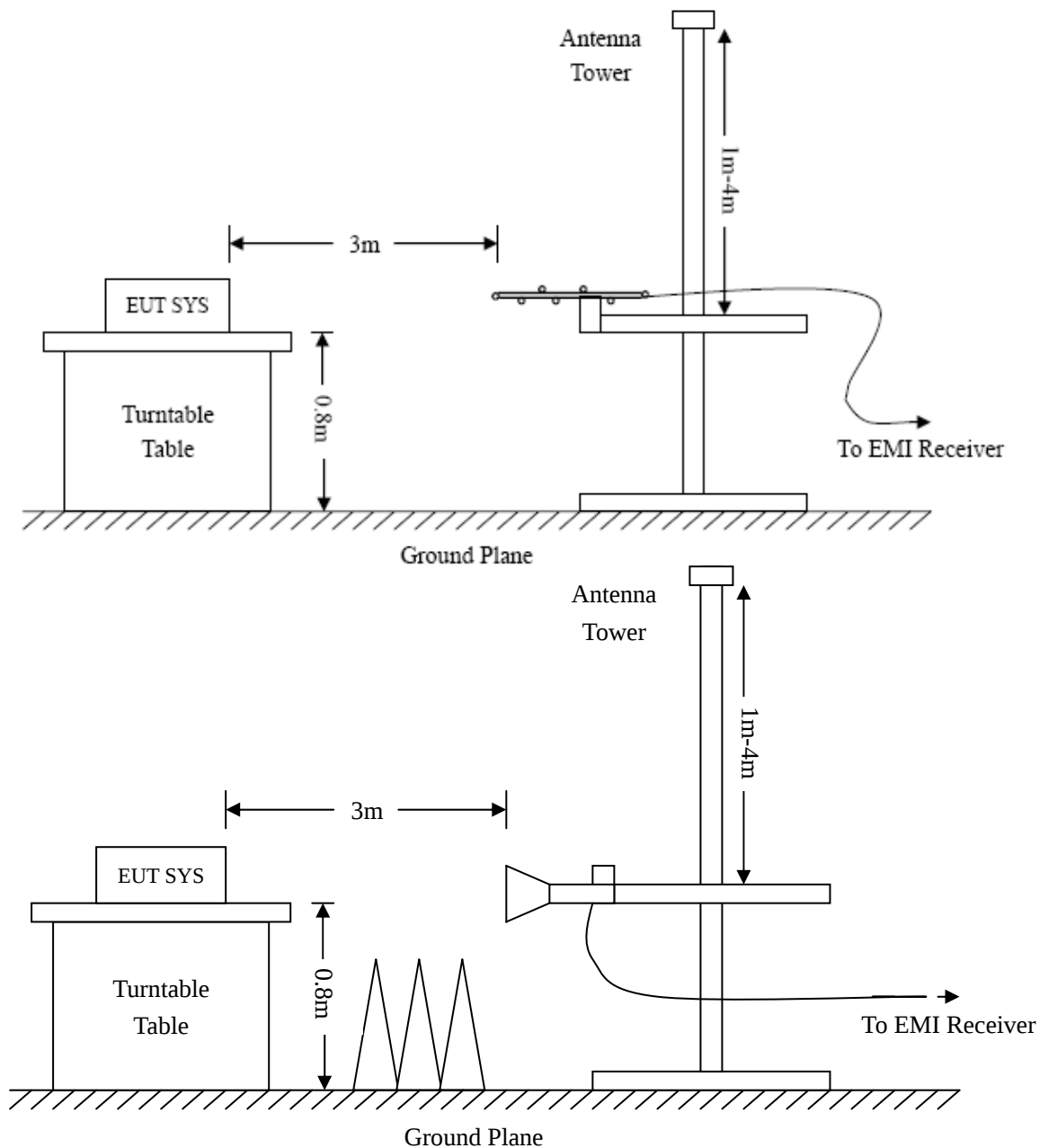
Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any radiation emissions measurement is ± 5.10 dB.

4.2 Test 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.



4.3 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

4.4 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:

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

4.5 Environmental Conditions

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

4.6 Summary of Test Results/Plots

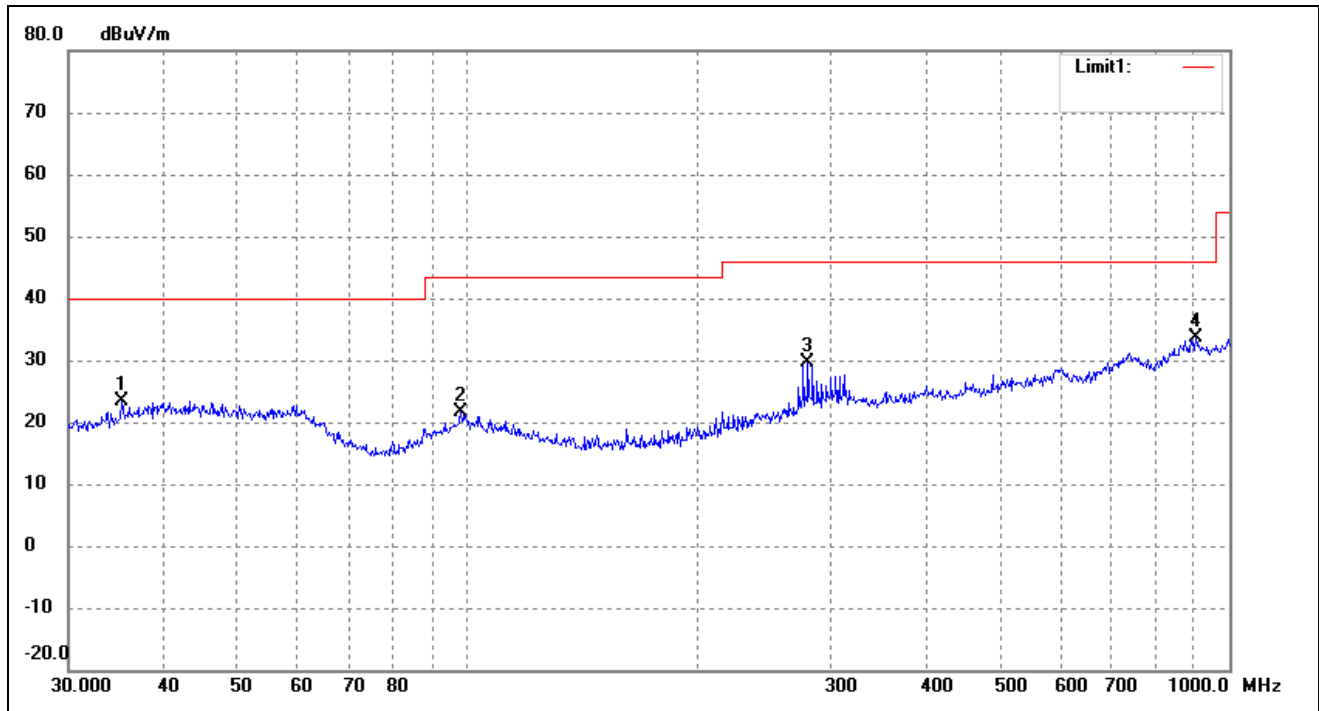
According to the data, the EUT complied with the FCC Part 15.109(a) rule, and had the worst margin of:

-7.57 dB at 61.3463 MHz in the Horizontal polarization, TM3 mode 30 MHz to 2 GHz, 3Meters

Plot of Radiated Emissions Test Data

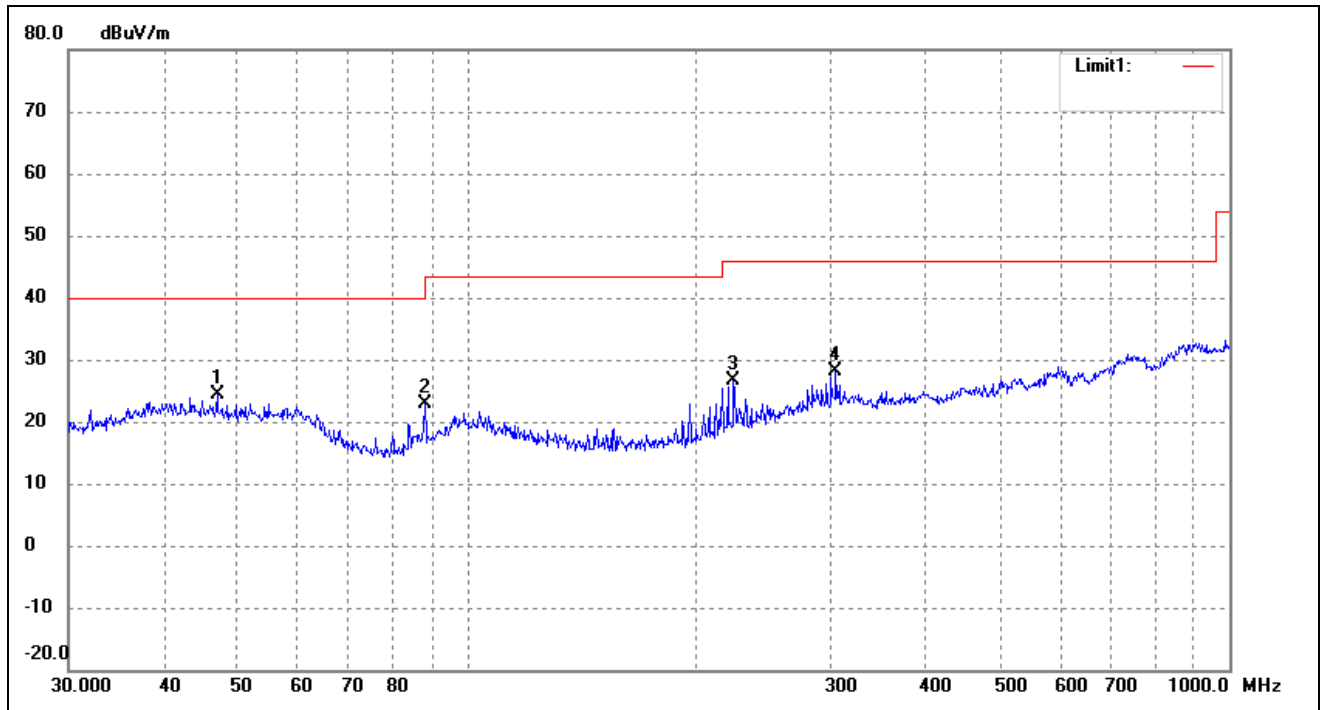
EUT: Wireless N Travel AP/Router
 Tested Model: WS-WN565N1
 Operating Condition: TM1
 Comment: AC 120V/60Hz; Adapter DC 5V

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	35.2512	19.04	4.44	23.48	40.00	-16.52	254	100	peak
2	98.1419	16.80	4.85	21.65	43.50	-21.85	183	100	peak
3	280.0237	18.16	11.40	29.56	46.00	-16.44	169	100	peak
4	903.3094	16.96	16.63	33.59	46.00	-12.41	244	100	peak

Test Specification: Vertical

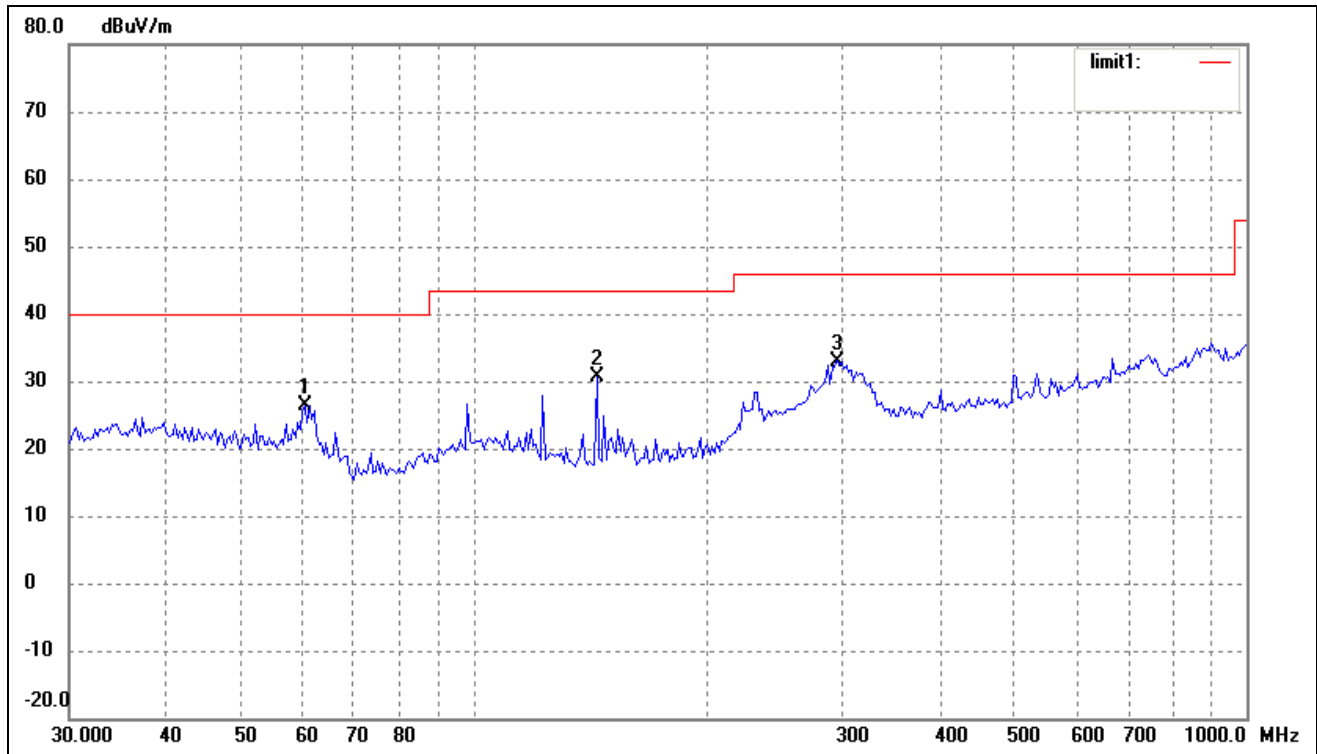


No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	46.9948	19.00	5.26	24.26	40.00	-15.74	132	100	peak
2	88.0329	19.70	3.30	23.00	43.50	-20.50	269	100	peak
3	223.7334	18.39	8.33	26.72	46.00	-19.28	311	100	peak
4	304.6099	15.88	12.19	28.07	46.00	-17.93	247	100	peak

Plot of Radiated Emissions Test Data

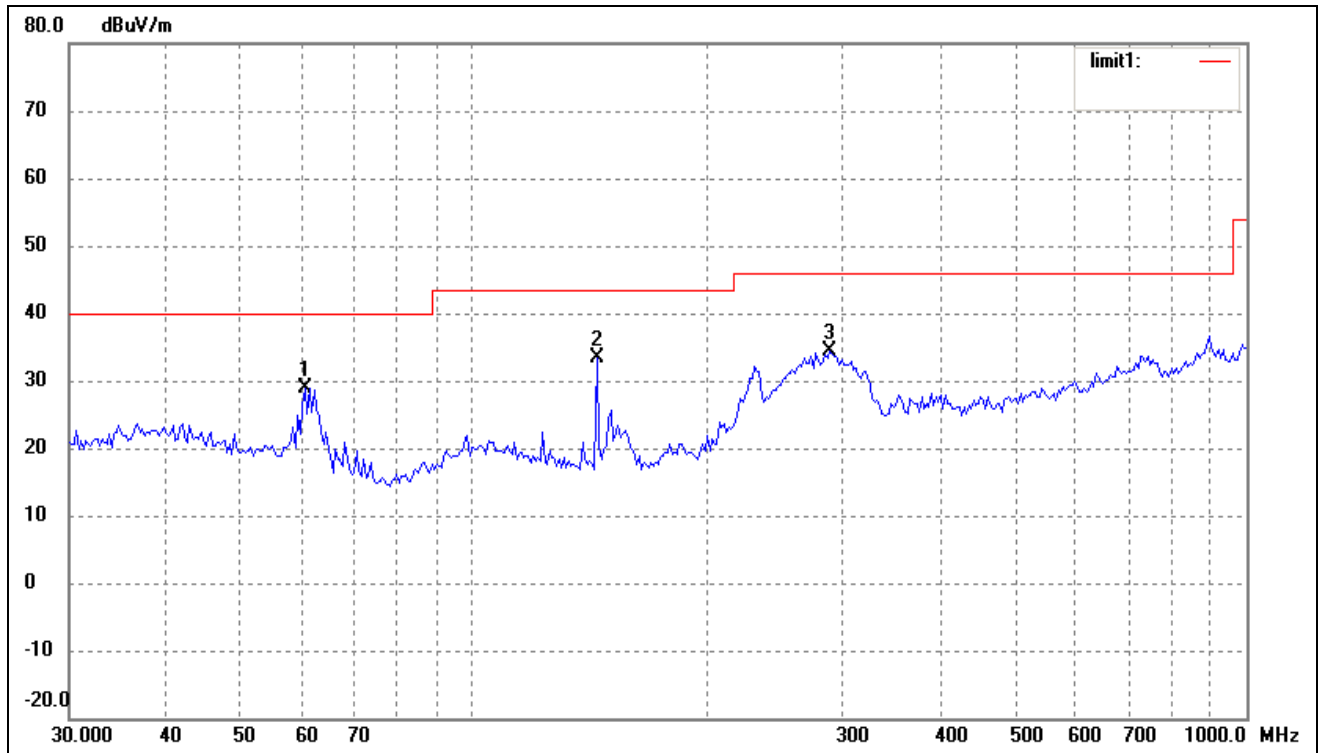
EUT: Wireless N Travel AP/Router
 Tested Model: WS-WN565N1
 Operating Condition: TM2
 Comment: AC 120V/60Hz; Adapter DC 5V

Test Specification: Horizontal



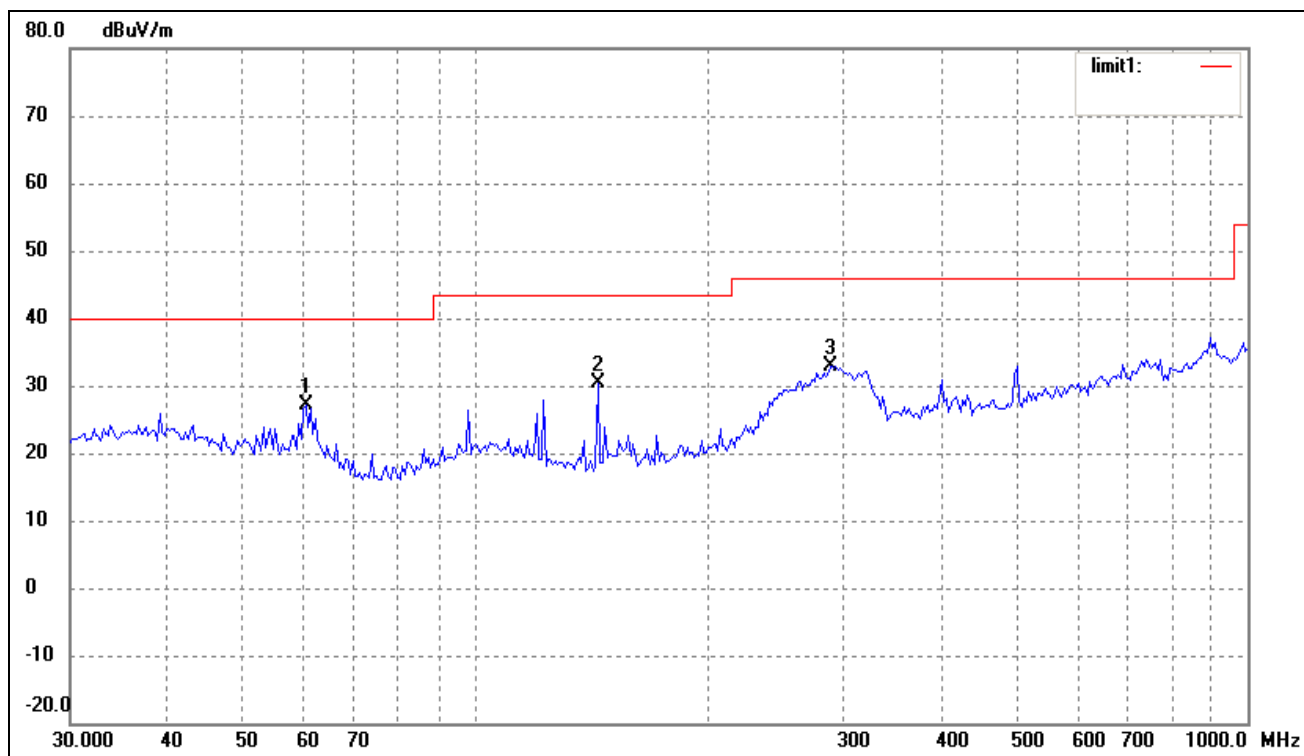
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	60.4919	20.91	5.53	26.44	40.00	-13.56	360	100	peak
2	144.3348	27.16	3.46	30.62	43.50	-12.88	360	100	peak
3	295.1469	23.05	9.95	33.00	46.00	-13.00	360	100	peak

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	60.4919	23.26	5.53	28.79	40.00	-11.21	360	100	peak
2	144.3348	29.89	3.46	33.35	43.50	-10.15	360	100	peak
3	289.0021	24.70	9.67	34.37	46.00	-11.63	360	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	60.4919	21.67	5.53	27.20	40.00	-12.80	360	100	peak
2	144.3348	26.89	3.46	30.35	43.50	-13.15	360	100	peak
3	289.0021	23.23	9.67	32.90	46.00	-13.10	360	100	peak

Plot of Radiated Emissions Test Data

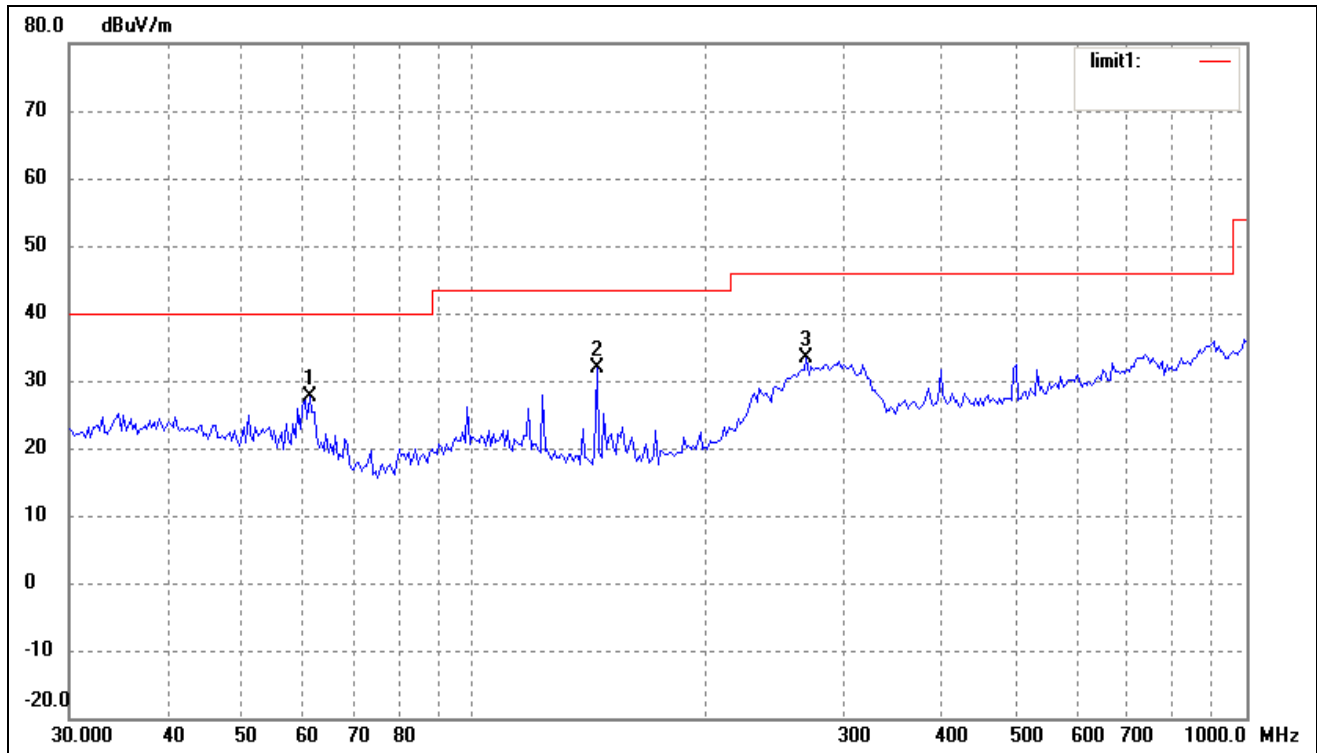
EUT: Wireless N Travel AP/Router
 Tested Model: WS-WN565N1
 Operating Condition: TM3
 Comment: AC 120V/60Hz; Adapter DC 5V

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	61.3463	27.16	5.27	32.43	40.00	-7.57	360	100	peak
2	144.3348	28.38	3.46	31.84	43.50	-11.66	360	100	peak
3	267.5455	29.50	8.28	37.78	46.00	-8.22	360	100	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	61.3463	22.46	5.27	27.73	40.00	-12.27	360	100	peak
2	144.3348	28.30	3.46	31.76	43.50	-11.74	360	100	peak
3	269.4284	24.95	8.43	33.38	46.00	-12.62	360	100	peak

Note: Testing is carried out with frequency rang 30MHz to the 2GHz, which above 2GHz is close to the noise base even antenna close up to 1meter distance according the measurement of ANSI C63.4.

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