

FCC Part 15C Measurement and Test Report

For

ATID Co., Ltd.

(Gasandong, #1210 Byuksan/Kyungin Digitalvalley II),184,Gasandigital2-ro,

Geumcheon-gu, Seoul, Korea

FCC ID: VUJAT911N

FCC Rule(s):	<u>FCC Part 15C</u>
Product Description:	<u>WCDMA wireless data terminal</u>
Tested Model:	<u>AT911N</u>
Report No.:	<u>STR16038164I-4</u>
Tested Date:	<u>2016-03-26 to 2016-04-05</u>
Issued Date:	<u>2016-04-06</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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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: ATID Co., Ltd.
 Address of applicant: (Gasan-dong, #1210 Byuksan/Kyungin Digitalvalley II), 184,
 Gasandigital2-ro, Geumcheon-gu, Seoul, Korea

Manufacturer: ATID Co., Ltd.
 Address of manufacturer: (Gasan-dong, #1210 Byuksan/Kyungin Digitalvalley II), 184,
 Gasandigital2-ro, Geumcheon-gu, Seoul, Korea

General Description of EUT	
Product Name:	WCDMA wireless data terminal
Brand Name:	
Model No.:	AT911N
Adding Model:	/
Hardware Version:	AT911N MAIN PCB
Software Version:	STD0110P4MXGC
IMEI:	358625050875212
Rated Voltage:	DC 3.7V Li-ion Battery
Battery capacity:	Main Battery:2200mAh Gun Battery :5200mAh
Power Adaptor:	GT-46180-1505
	Input: 100-240V~50/60Hz 0.6A; Output: DC5V /3.0A
Device Category:	Portable Device
<i>Note: The test data is gathered from a production sample provided by the manufacturer.</i>	

Technical Characteristics of EUT	
Support Standards:	802.11b, 802.11g, 802.11n(HT20)
Frequency Range:	2412-2462MHz
RF Output Power:	16.06dBm (Conducted)
Type of Modulation:	CCK, OFDM, QPSK, BPSK, 16QAM, 64QAM
Data Rate:	1-11Mbps, 6-54Mbps, up to 150Mbps
Quantity of Channels:	11
Channel Separation:	5MHz
Type of Antenna:	Integral
Antenna Gain:	0dBi
Lowest Internal Frequency	32.768kHz

1.2 Test Standards

The following report is prepared on behalf of the ATID Co., Ltd. in accordance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 of the Federal Communication Commissions 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 C63.10-2013, American National Standard for Testing Unlicensed Wireless Devices, and 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. The measurement guide KDB 558074 D01 V03r05 for digital transmission systems shall be performed also.

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 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:

Test Mode List		
Test Mode	Description	Remark
TM1	802.11b	2412MHz, 2437MHz, 2462MHz
TM2	802.11g	2412MHz, 2437MHz, 2462MHz
TM3	802.11n-HT20	2412MHz, 2437MHz, 2462MHz

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
Adapter Cable	1.5	shielded	With Core
USB Cable	1.0	shielded	Without Core

Special Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
Earphone	1.2	shielded	Without Core

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
Notebook	Lenovo	E10	LR-63C8R

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
Horn Antenna	ETS	3116B	00088203	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
§ 2.1093	RF Exposure	Compliant
§ 15.203; § 15.247(b)(4)(i)	Antenna Requirement	Compliant
§ 15.207(a)	Conducted Emission	Compliant
§ 15.247(e)	Power Spectral Density	Compliant
§ 15.247(a)(2)	6 dB Bandwidth	Compliant
§ 15.247(b)(3)	RF Output Power	Compliant
§ 15.209(a)	Radiated Emission	Compliant
§ 15.247(d)	Band Edge (Out of Band Emissions)	Compliant

N/A: not applicable

3. RF Exposure

3.1 Standard Applicable

According to § 1.1307 and § 2.1093, the portable transmitter must comply the RF exposure requirements.

3.2 Test Result

This product complied with the requirement of the RF exposure, please see the SAR Report.

4. Antenna Requirement

4.1 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.

4.2 Evaluation Information

This product has an integral antenna, fulfill the requirement of this section.

5. Power Spectral Density

5.1 Standard Applicable

According to 15.247(a)(1)(iii), For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

5.2 Test Procedure

According to the KDB 558074 D01 V03r05, such specifications require that the same method as used to determine the conducted output power shall also be used to determine the power spectral density. The test method of power spectral density as below:

- a) Set instrument center frequency to DTS channel center frequency.
- b) Set span to at least 1.5 times the OBW.
- c) Set RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- d) Set VBW $\geq 3 \times \text{RBW}$.
- e) Detector = power averaging (RMS) or sample detector (when RMS not available).
- f) Ensure that the number of measurement points in the sweep $\geq 2 \times \text{span/RBW}$.
- g) Sweep time = auto couple.
- h) Employ trace averaging (RMS) mode over a minimum of 100 traces.
- i) Use the peak marker function to determine the maximum amplitude level.
- j) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat (note that this may require zooming in on the emission of interest and reducing the span in order to meet the minimum measurement point requirement as the RBW is reduced).

5.3 Environmental Conditions

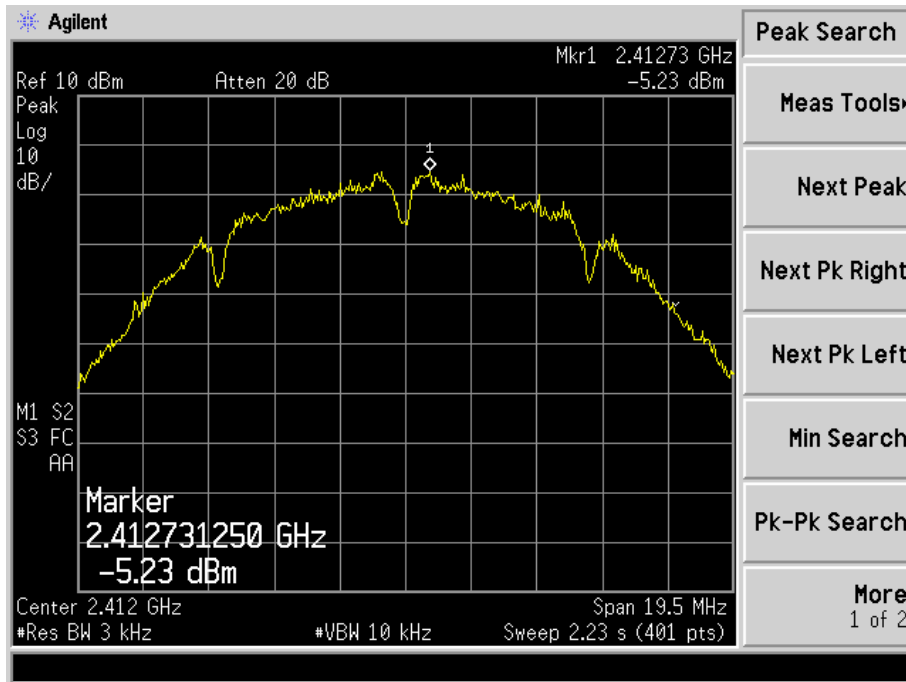
Temperature:	26° C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

5.4 Summary of Test Results/Plots

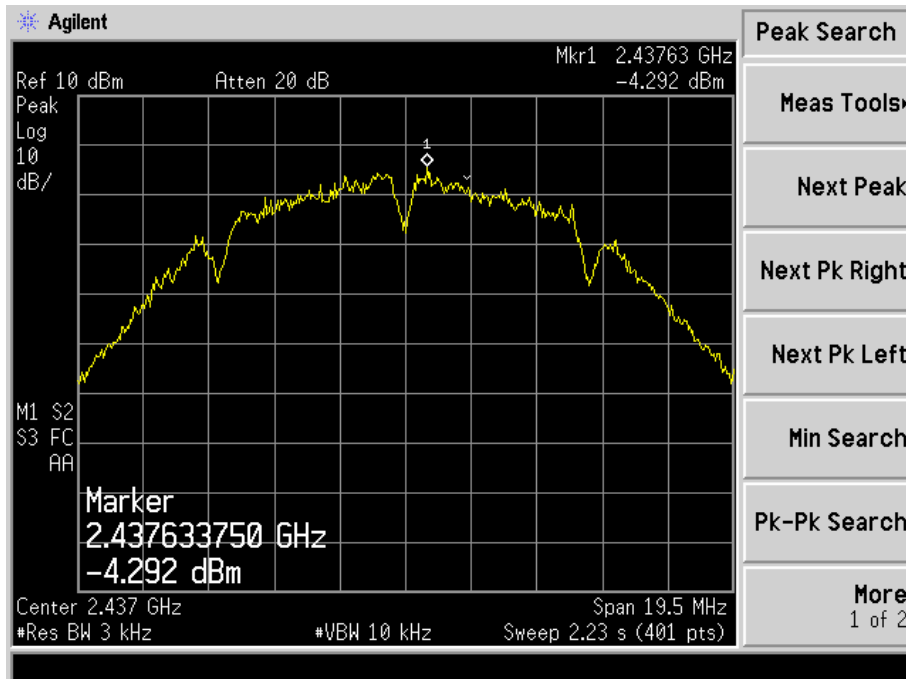
Test Mode	Test Channel MHz	Power Spectral Density dBm/3kHz	Limit dBm/3kHz
802.11b	2412	-5.230	8
	2437	-4.292	8
	2462	-5.444	8
802.11g	2412	-8.664	8
	2437	-7.596	8
	2462	-8.991	8
802.11n HT20	2412	-8.340	8
	2437	-9.620	8
	2462	-8.842	8

Please refer to the following test plots:

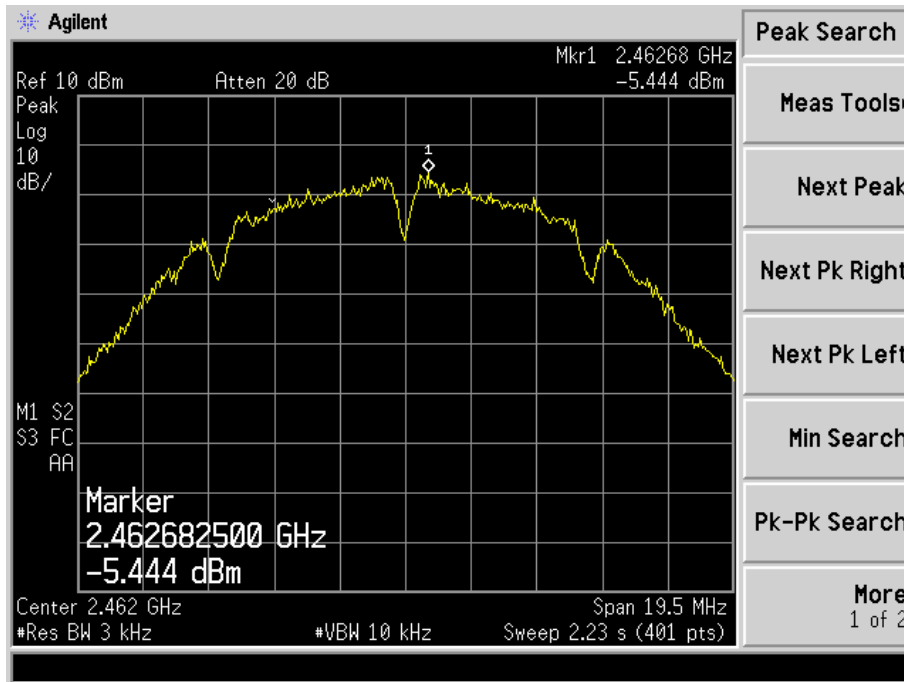
802.11b-Low Channel



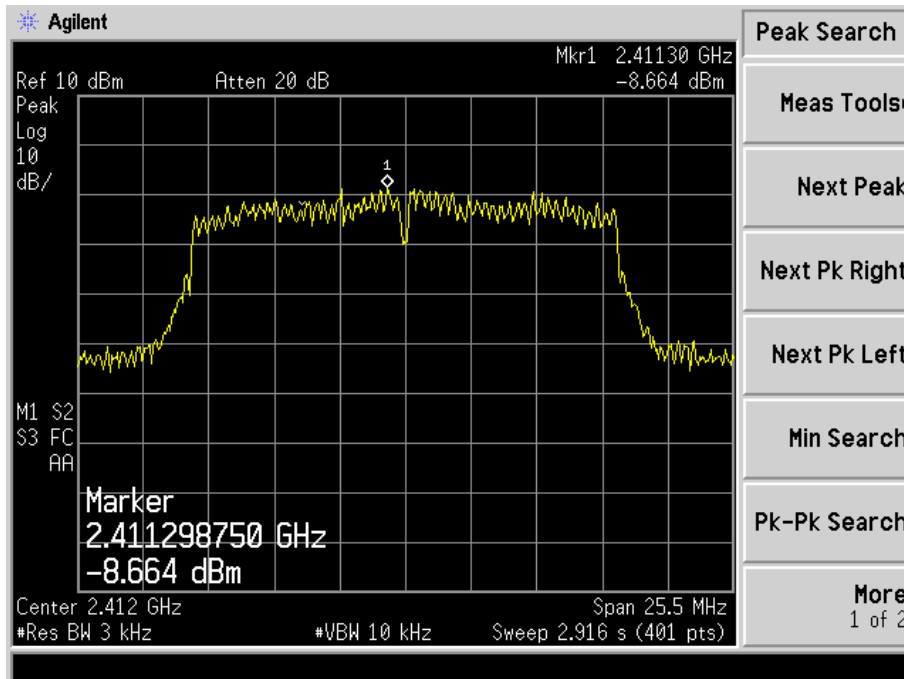
802.11b-Middle Channel



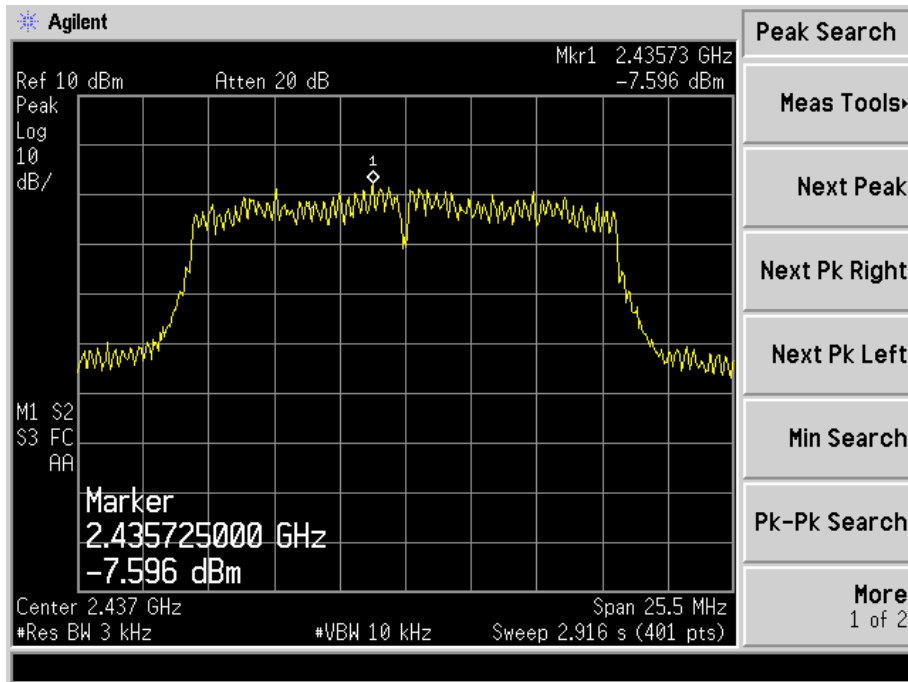
802.11b-High Channel



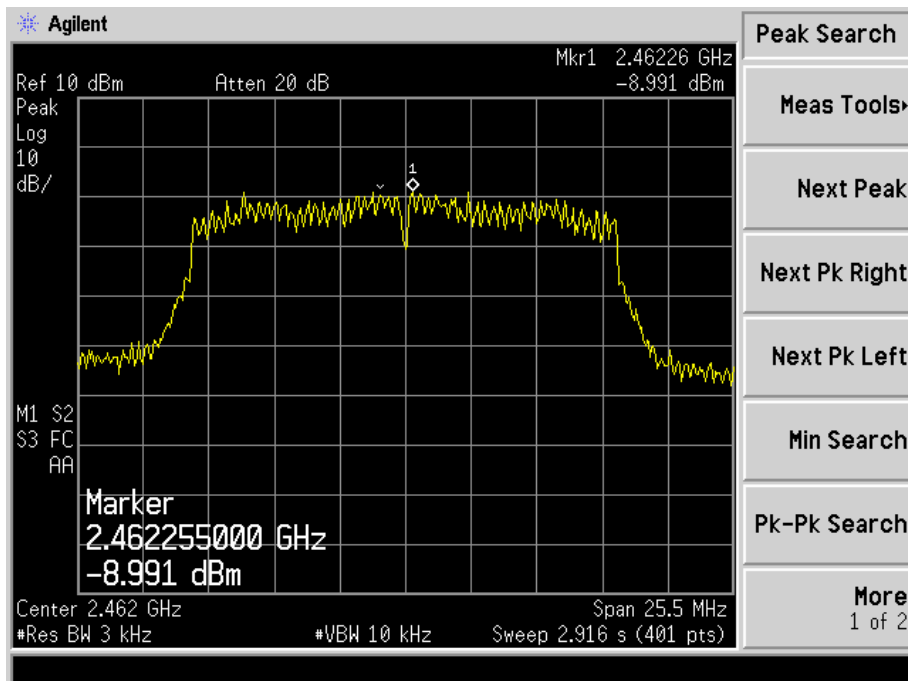
802.11g-Low Channel



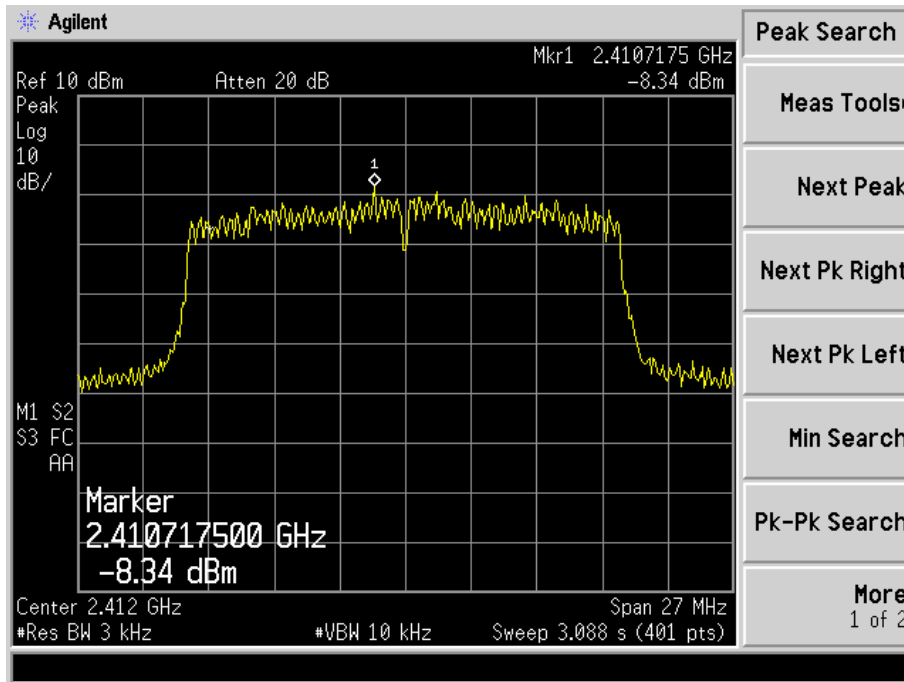
802.11g-Middle Channel



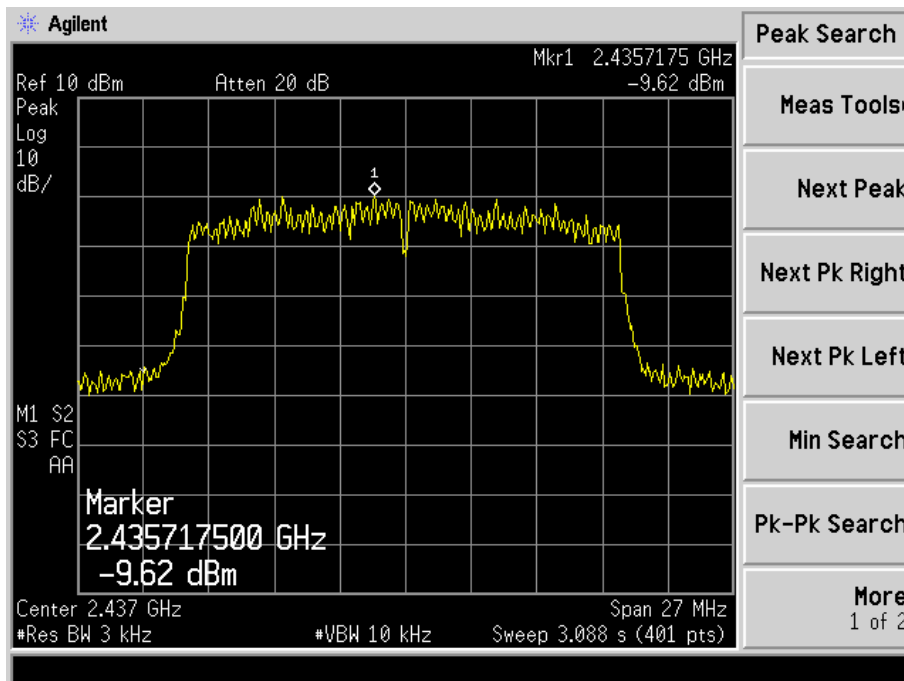
802.11g-High Channel



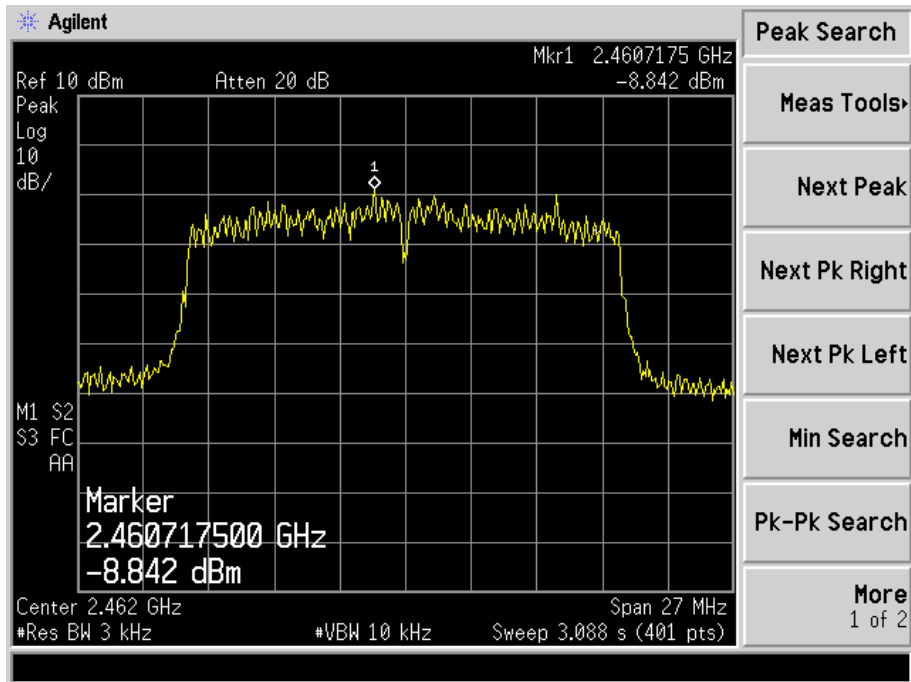
802.11n-HT20-Low Channel



802.11n-HT20-Middle Channel



802.11n-HT20-High Channel



6. 6dB Bandwidth

6.1 Standard Applicable

According to 15.247(a)(2). Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

6.2 Test Procedure

- a) Set RBW = 100 kHz.
- b) Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Sweep = auto couple.
- f) Allow the trace to stabilize.
- g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

6.3 Environmental Conditions

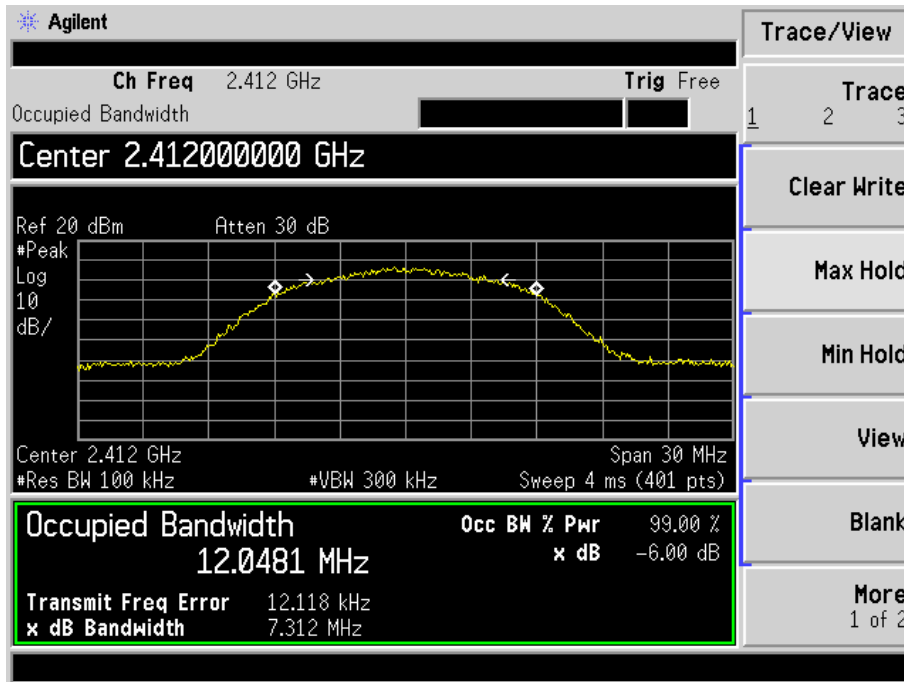
Temperature:	25° C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

6.4 Summary of Test Results/Plots

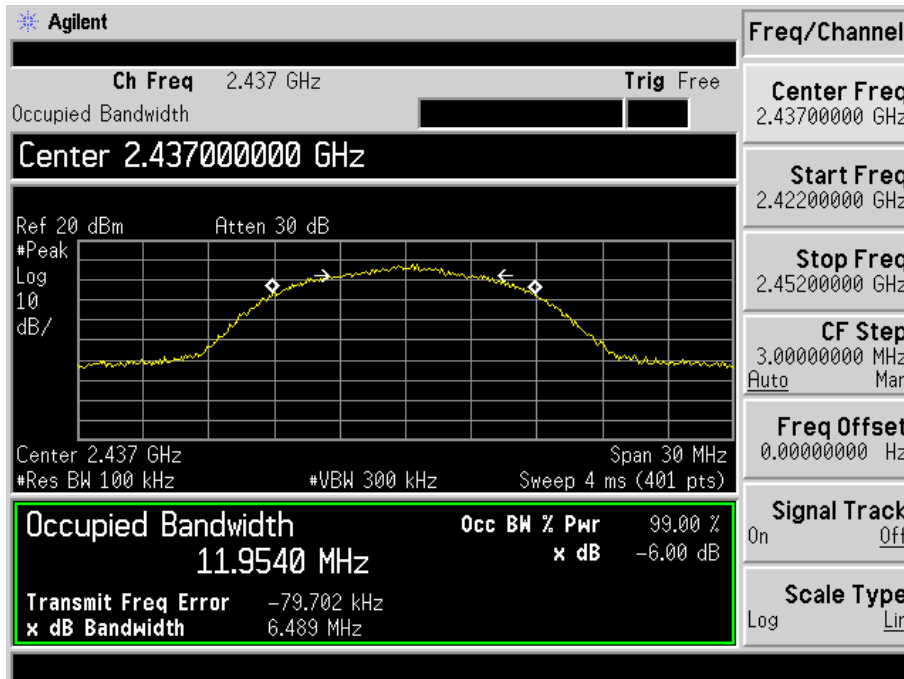
Test Mode	Test Channel MHz	6 dB Bandwidth kHz	99% Bandwidth kHz	Limit kHz
802.11b	2412	7312	12048.1	500
	2437	6489	11954.0	500
	2462	7489	12010.6	500
802.11g	2412	15479	16300.8	500
	2437	15174	16304.7	500
	2462	15188	16296.9	500
802.11n-HT20	2412	16571	17439.3	500
	2437	16955	17455.4	500
	2462	16325	17433.4	500

Please refer to the following test plots:

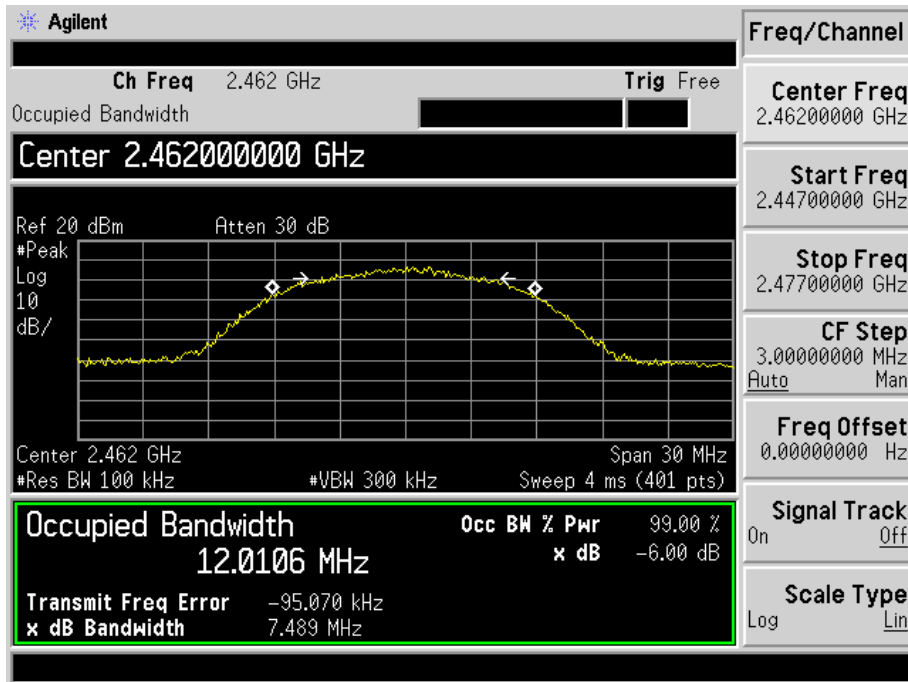
802.11b-Low Channel



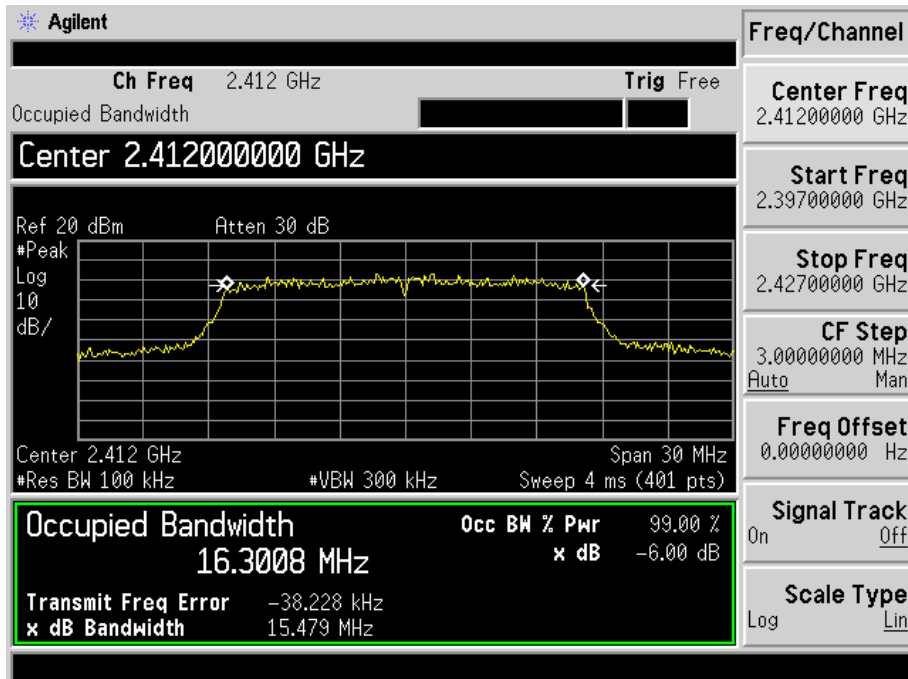
802.11b-Middle Channel



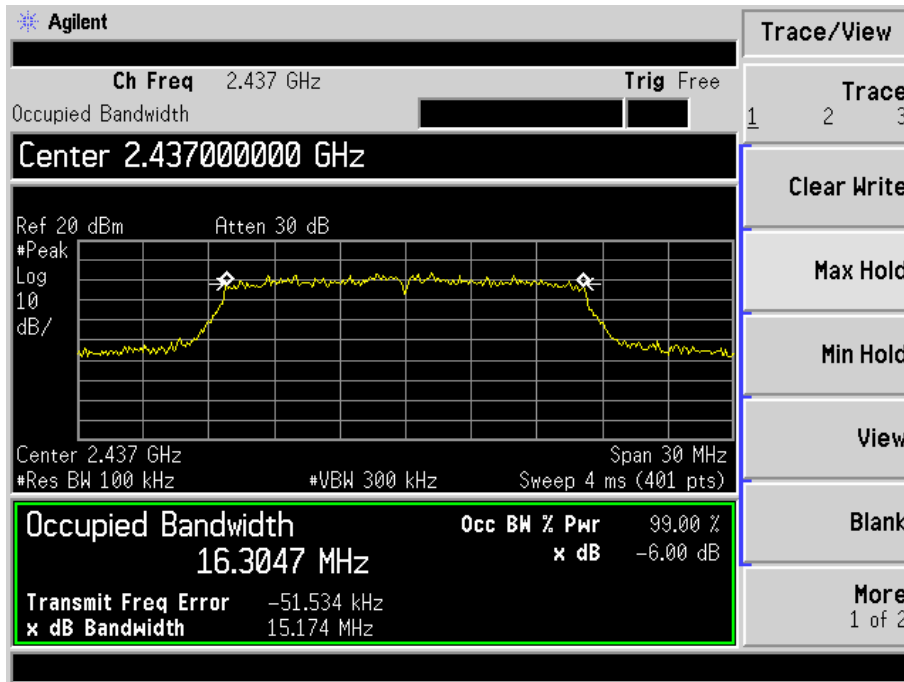
802.11b-High Channel



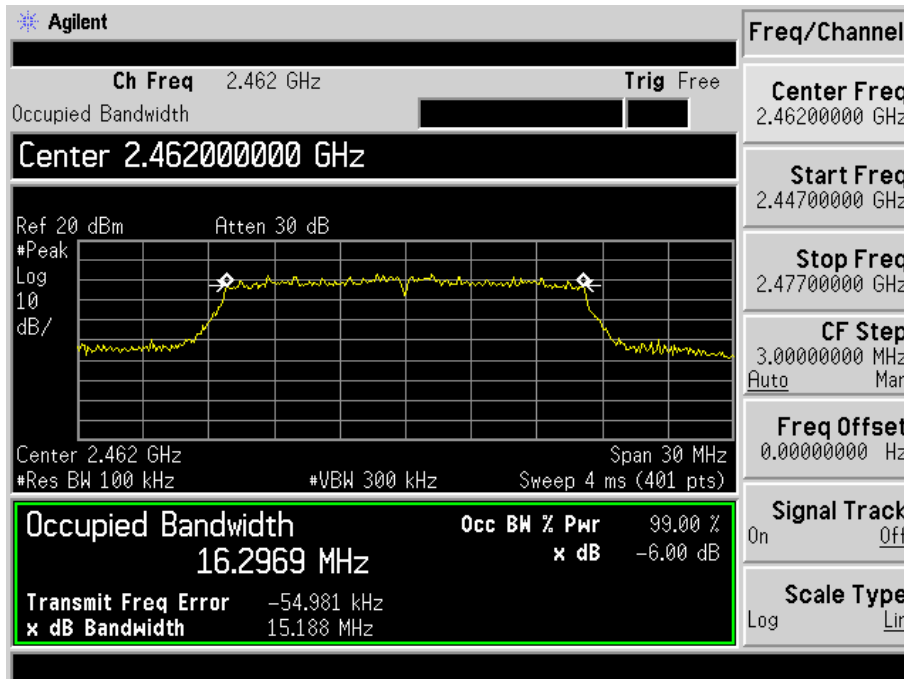
802.11g-Low Channel



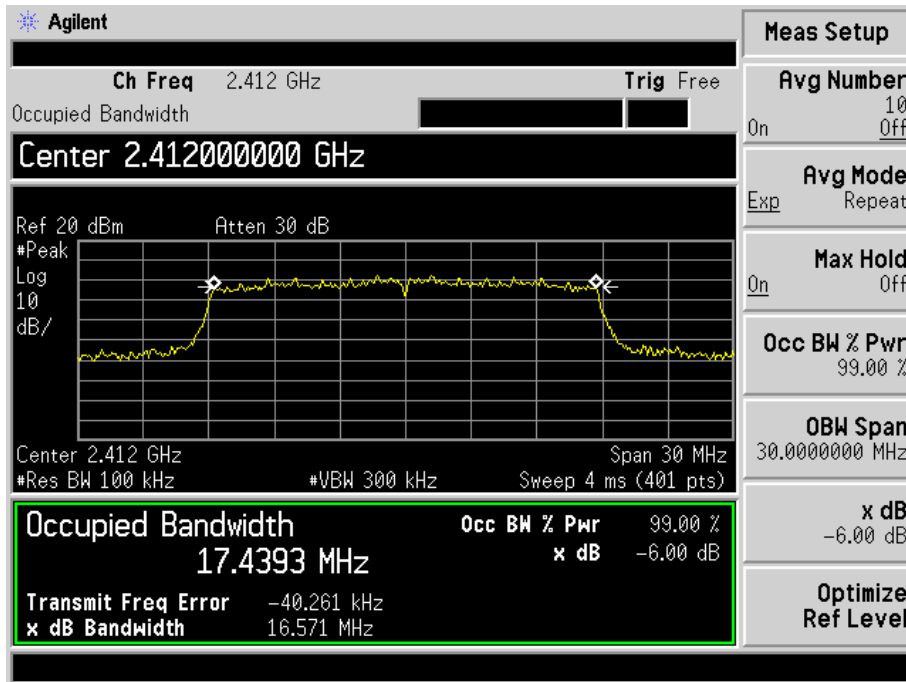
802.11g-Middle Channel



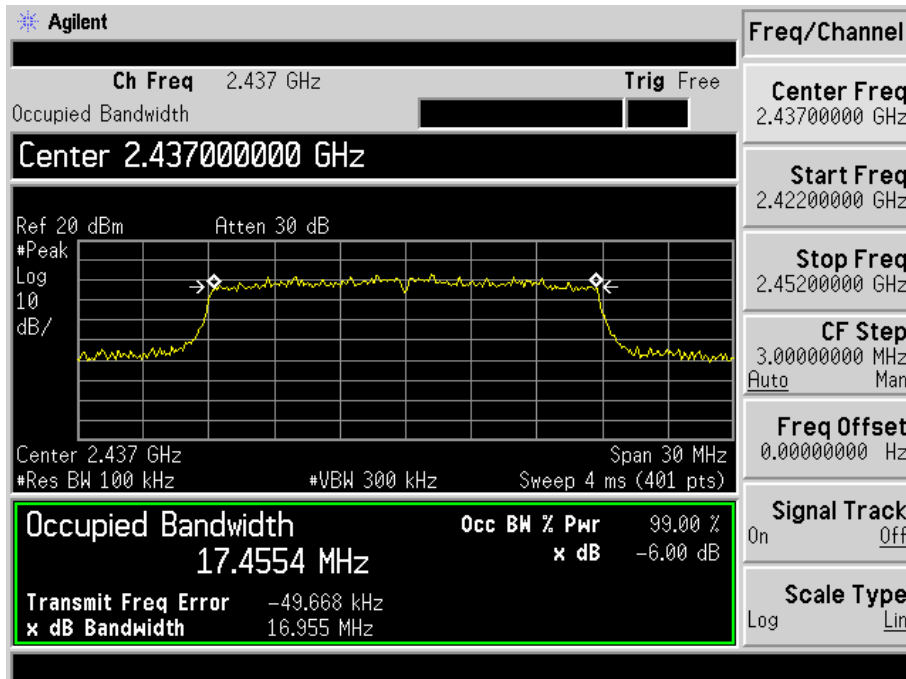
802.11g-High Channel



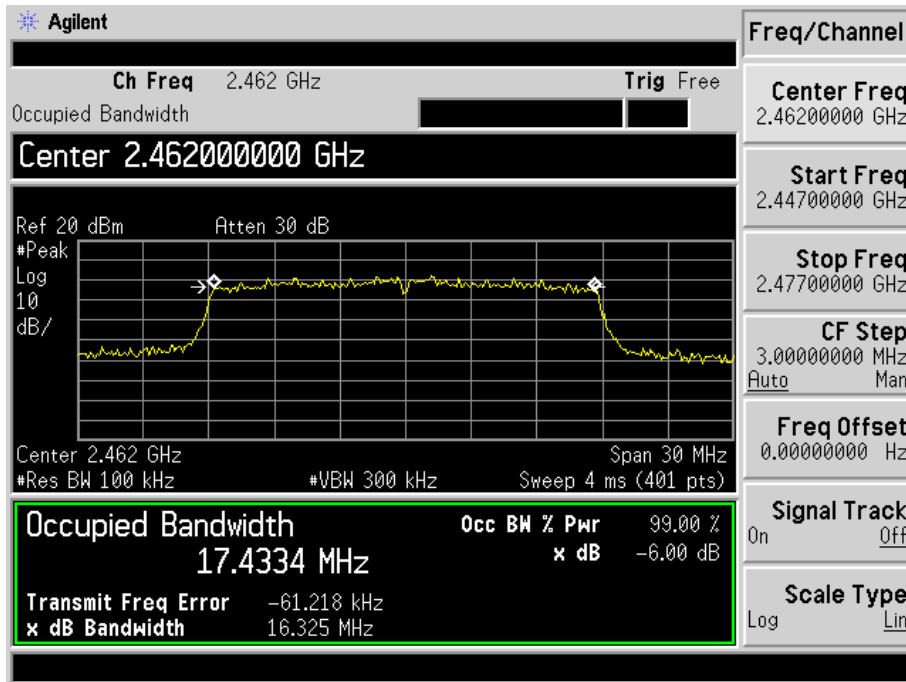
802.11n-HT20-Low Channel



802.11n-HT20-Middle Channel



802.11n-HT20-High Channel



7. RF Output Power

7.1 Standard Applicable

According to 15.247(b)(3). For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt.

7.2 Test Procedure

According to KDB-558074 D01 V03r05, 9.2.2.2 (channel integration method) When this option is exercised, the measured power is to be referenced to the OBW rather than the DTS bandwidth

- a) Set span to at least 1.5 times the OBW.
- b) Set RBW = 1-5% of the OBW, not to exceed 1 MHz.
- c) Set VBW $\geq 3 \times$ RBW.
- d) Number of points in sweep $\geq 2 \times$ span / RBW. (This gives bin-to-bin spacing \leq RBW/2, so that narrowband signals are not lost between frequency bins.)
- e) Sweep time = auto.
- f) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.
- g) If transmit duty cycle < 98 %, use a sweep trigger with the level set to enable triggering only on full power pulses. The transmitter shall operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle ≥ 98 %, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to “free run” .
- h) Trace average at least 100 traces in power averaging (i.e., RMS) mode.
- i) Compute power by integrating the spectrum across the OBW of the signal using the instrument’s band power measurement function, with band limits set equal to the OBW band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

7.3 Environmental Conditions

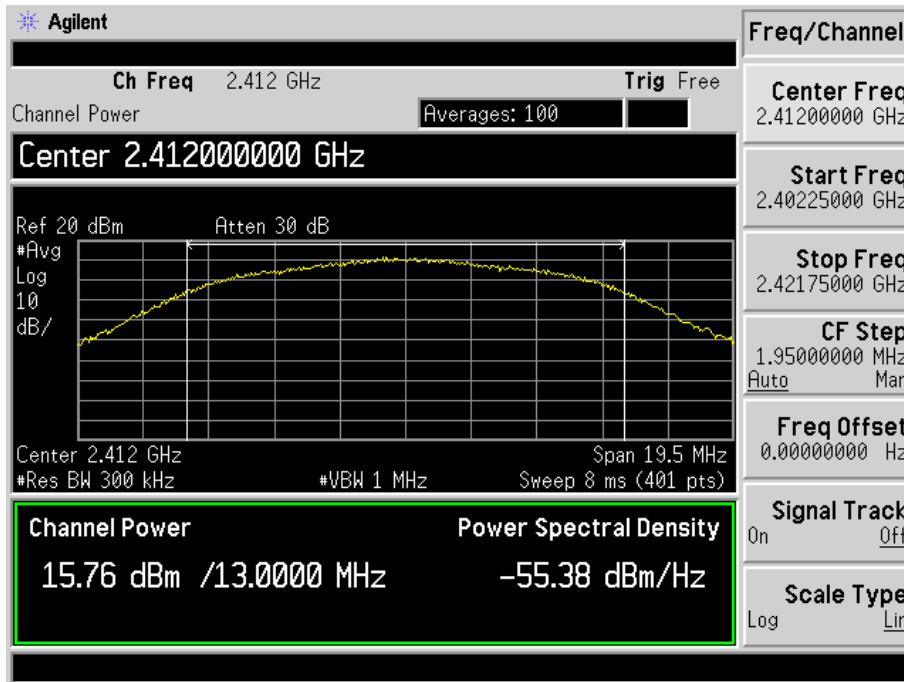
Temperature:	26° C
Relative Humidity:	57%
ATM Pressure:	1011 mbar

7.4 Summary of Test Results/Plots

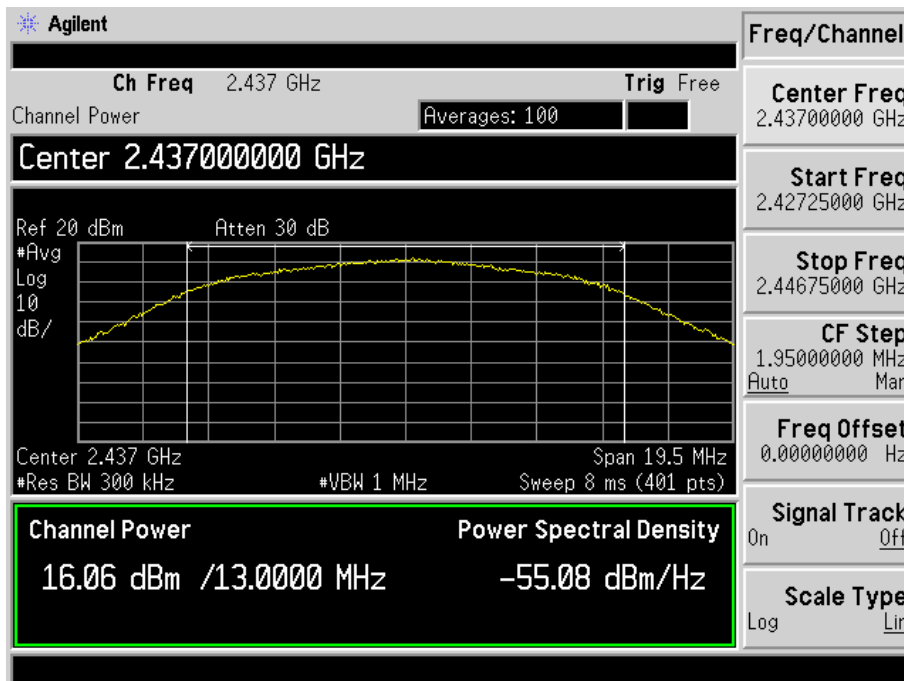
Test Mode	Frequency MHz	Reading dBm	Output Power mW	Limit mW
802.11b_11Mbps	2412	15.76	37.67	1000
	2437	16.06	40.36	1000
	2462	15.51	35.56	1000
802.11g_54Mbps	2412	14.96	31.33	1000
	2437	15.24	33.42	1000
	2462	14.71	29.58	1000
802.11n HT20_MCS7	2412	13.37	21.73	1000
	2437	13.68	23.33	1000
	2462	13.10	20.42	1000

Please refer to the following test plots:

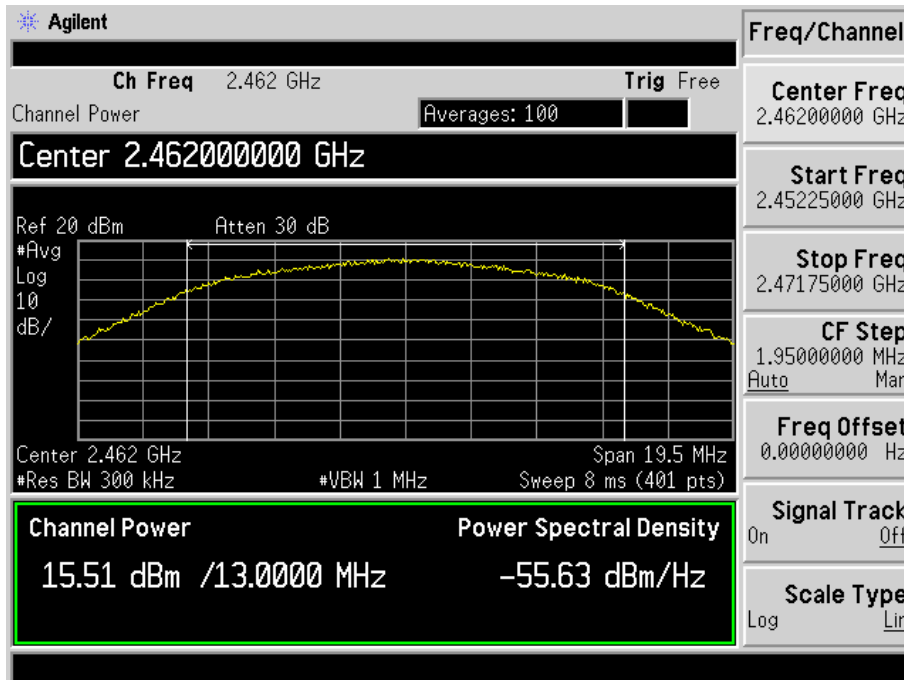
802.11-11Mbps-Low Channel



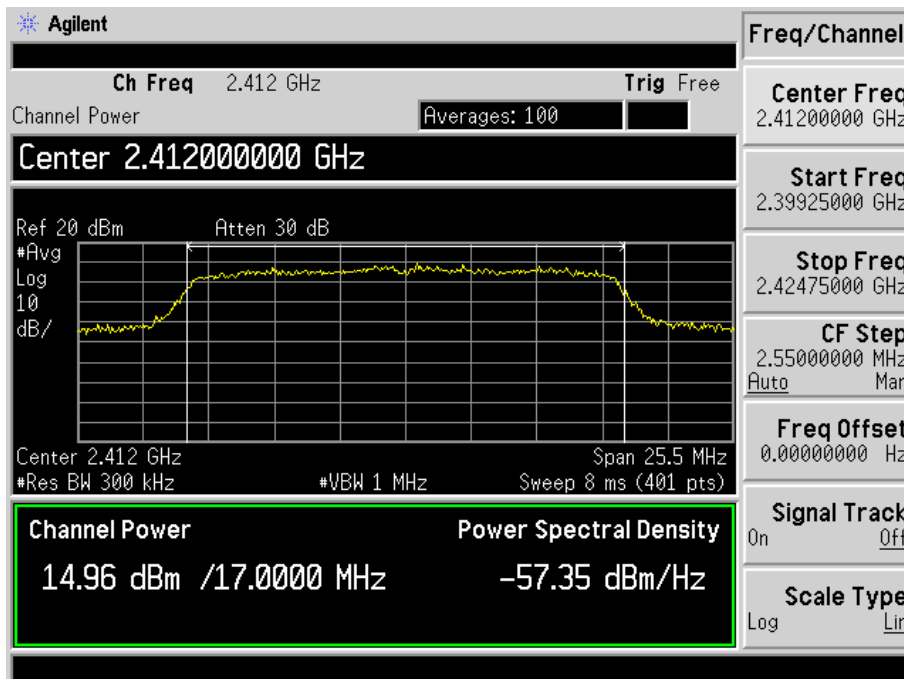
802.11b -11Mbps-Middle Channel



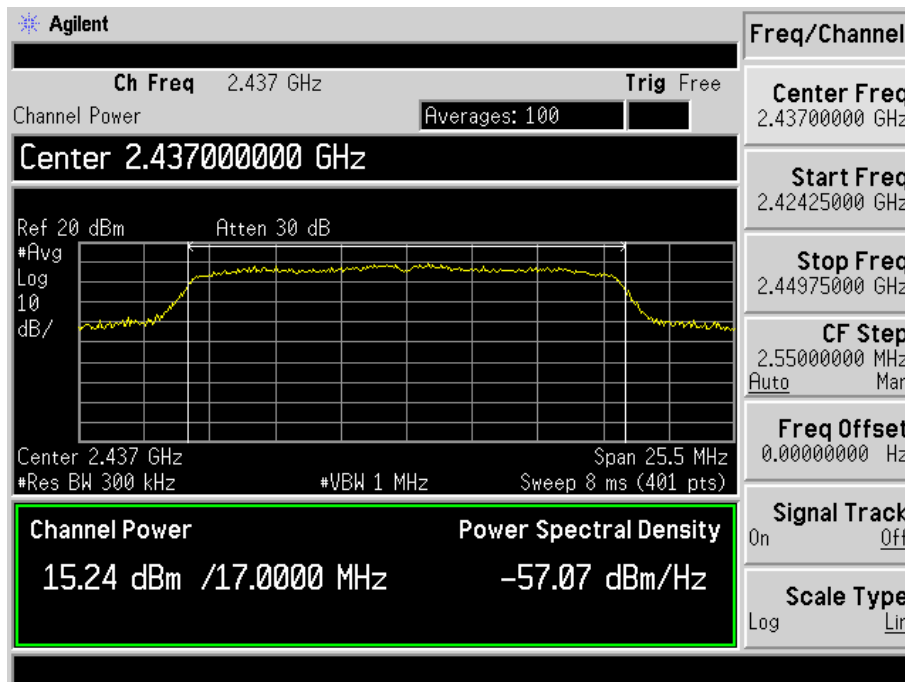
802.11b -11Mbps-High Channel



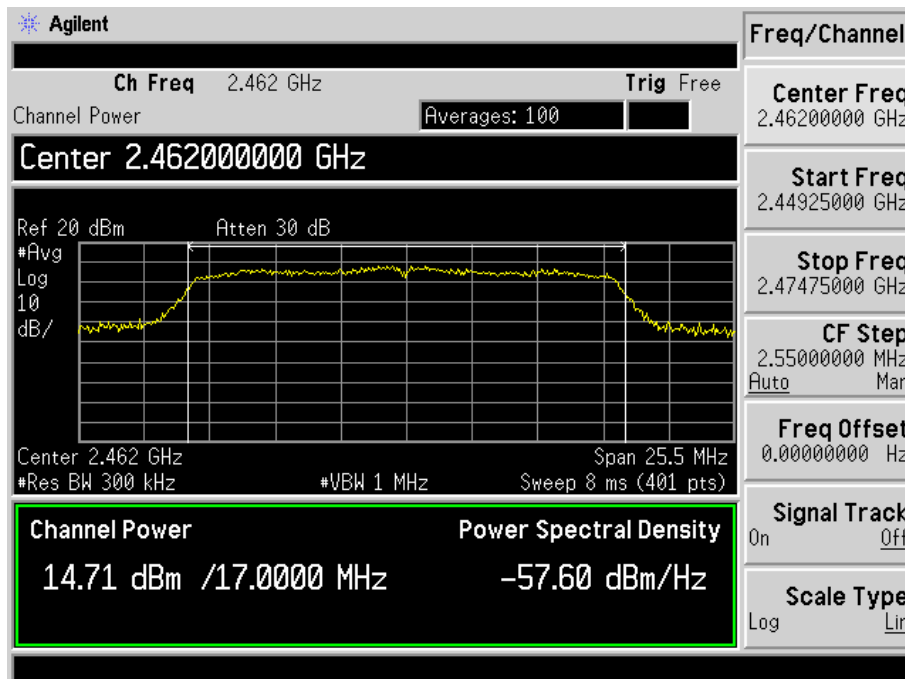
802.11g-54Mbps-Low Channel



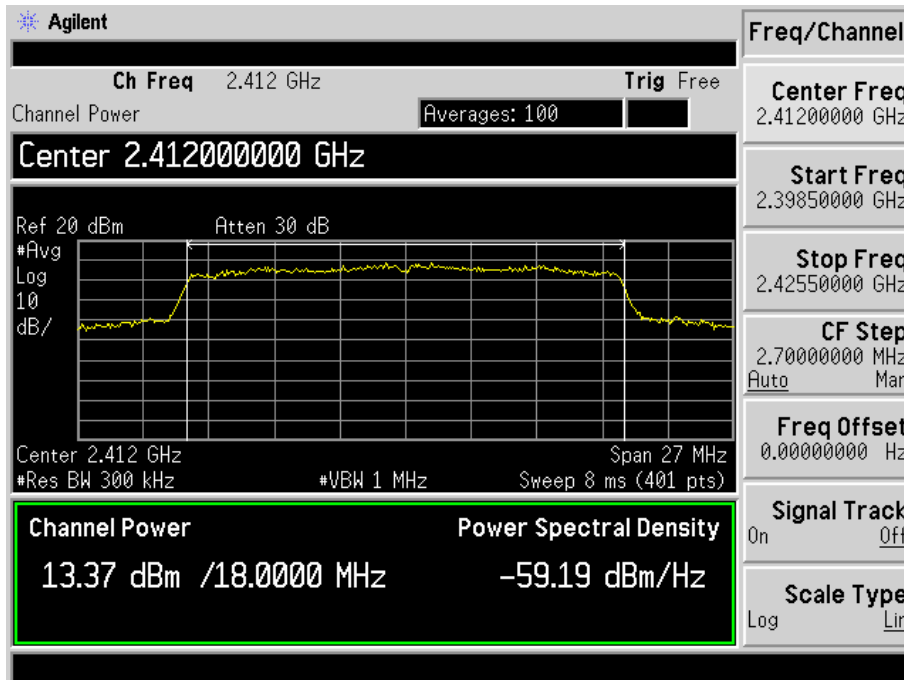
802.11g-54Mbps-Middle Channel



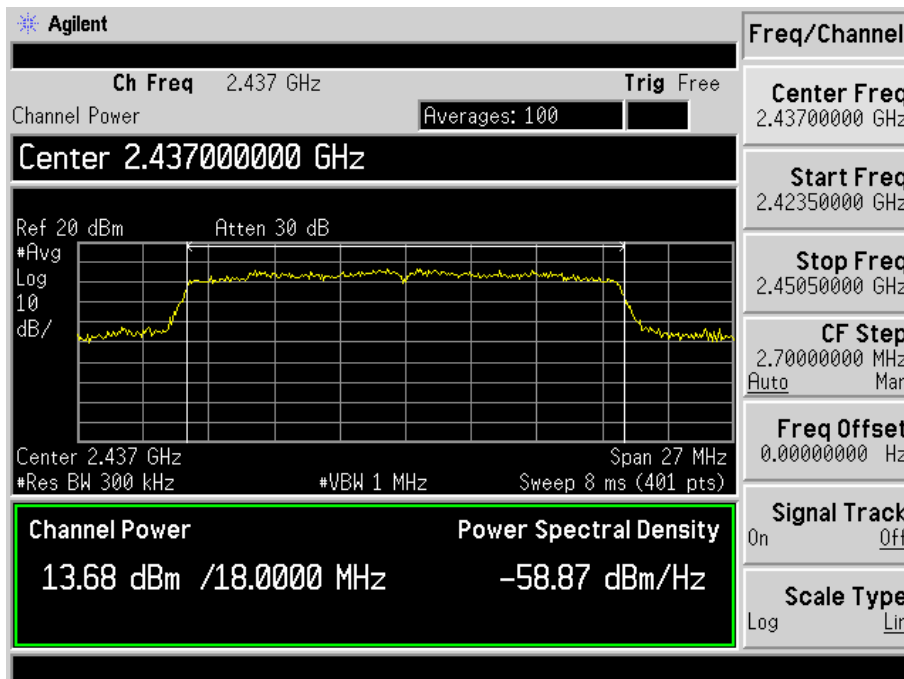
802.11g-54Mbps-High Channel



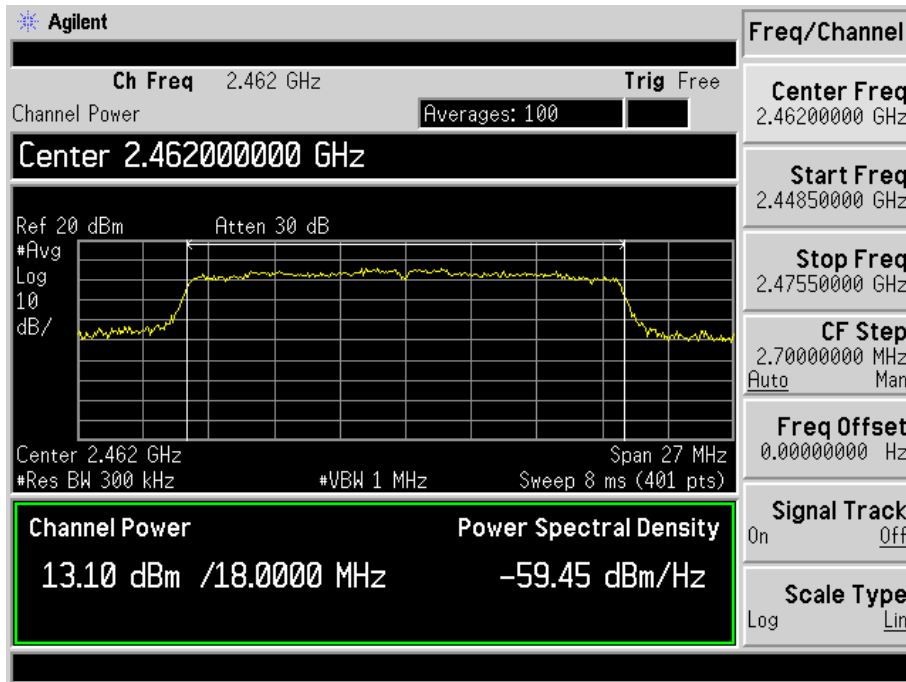
802.11n-HT20-MCS7-Low Channel



802.11n-HT20-MCS7-Middle Channel



802.11n-HT20-MCS7-High Channel



8. Field Strength of Spurious Emissions

8.1 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 ± 5.10 dB.

8.2 Standard Applicable

According to §15.247(d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

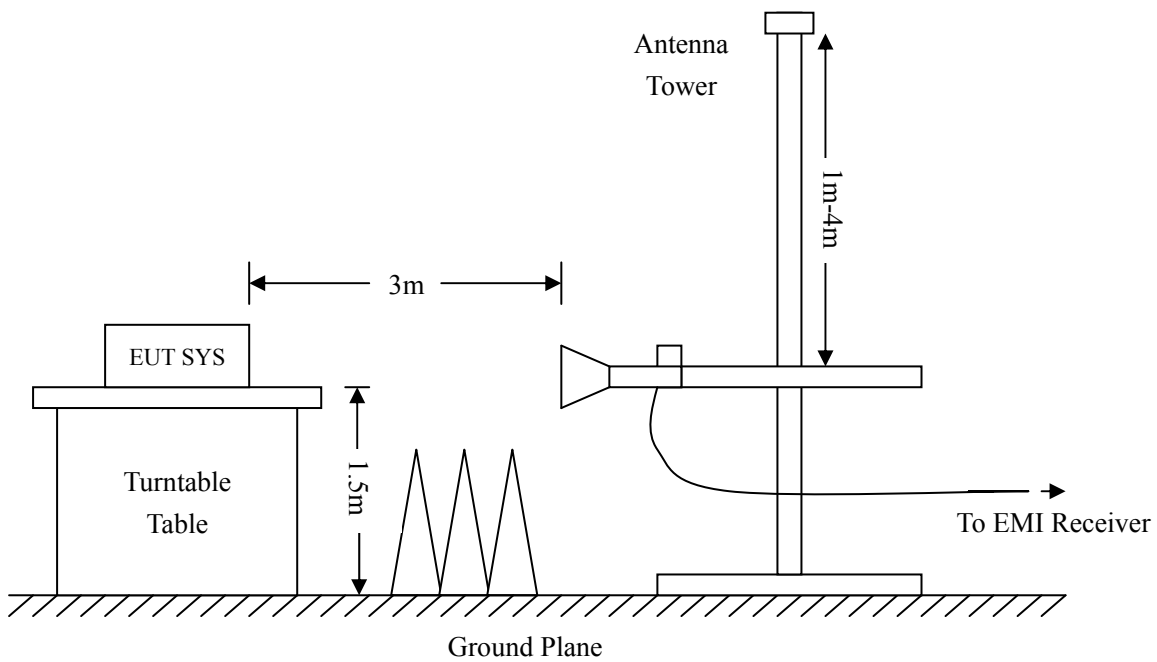
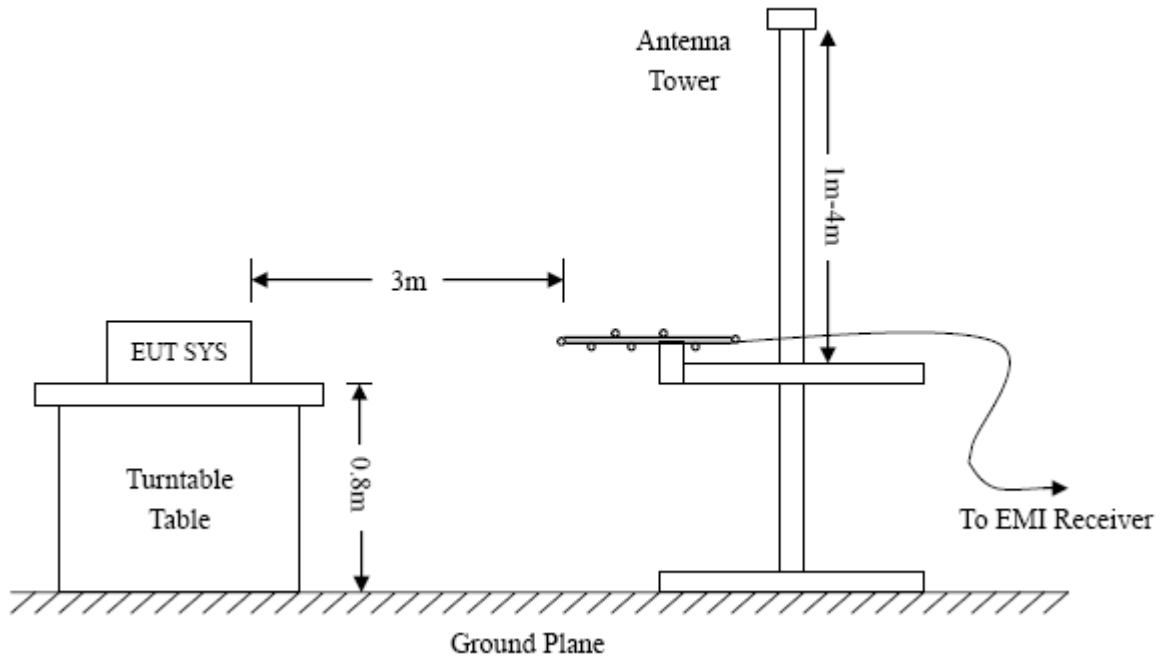
The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply. Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

8.3 Test Procedure

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.205 15.247(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

8.4 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:

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

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

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

8.5 Environmental Conditions

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

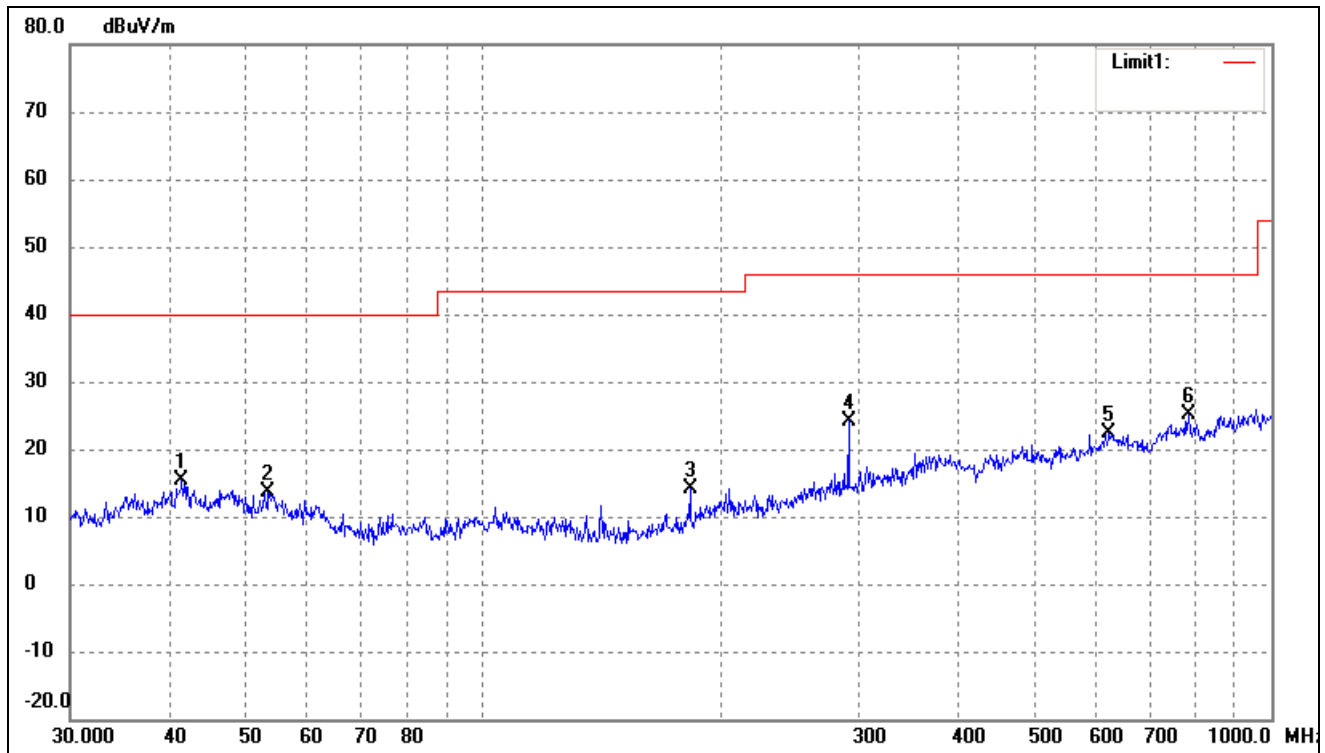
8.6 Summary of Test Results/Plots

According to the data below, the FCC Part 15.205, 15.209 and 15.247 standards, and had the worst cases:

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

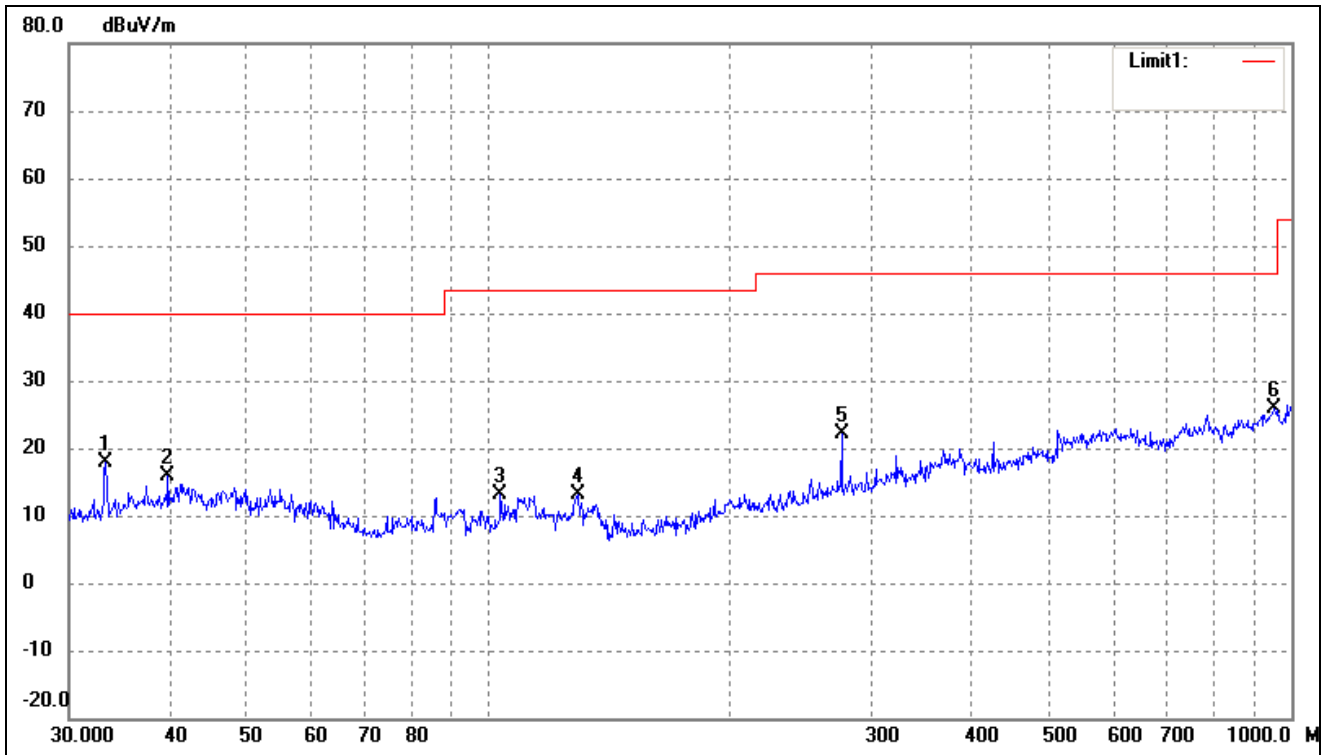
Plot of Radiated Emissions Test Data (30MHz to 1GHz)

EUT: WCDMA wireless data terminal
 Tested Model: AT911N
 Operating Condition: 802.11b Transmitting Low Channel-2412MHz (worst case)
 Comment: DC 3.7V
 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	41.5670	23.08	-7.77	15.31	40.00	-24.69	105	100	peak
2	53.5052	22.40	-8.76	13.64	40.00	-26.36	160	100	peak
3	183.2005	25.03	-10.93	14.10	43.50	-29.40	180	100	peak
4	291.0360	30.10	-5.85	24.25	46.00	-21.75	181	100	peak
5	622.8900	21.22	1.16	22.38	46.00	-23.62	162	100	peak
6	785.0935	22.46	2.65	25.11	46.00	-20.89	185	100	peak

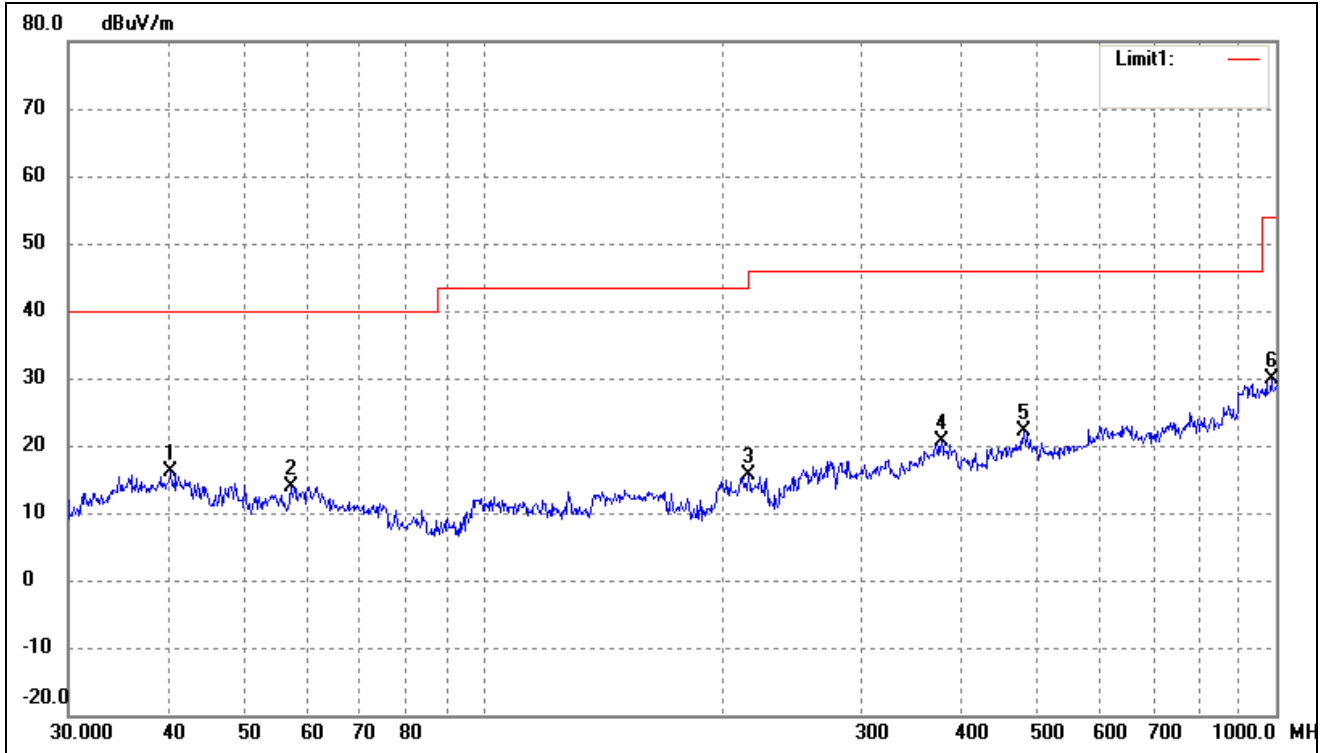
Test Specification: Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	33.3279	27.27	-9.46	17.81	40.00	-22.19	140	100	peak
2	39.8542	23.58	-7.71	15.87	40.00	-24.13	250	100	peak
3	103.4421	24.16	-10.99	13.17	43.50	-30.33	120	100	peak
4	129.4678	24.98	-11.97	13.01	43.50	-30.49	180	100	peak
5	275.1570	28.44	-6.30	22.14	46.00	-23.86	345	100	peak
6	952.0937	22.07	3.85	25.92	46.00	-20.08	27	100	peak

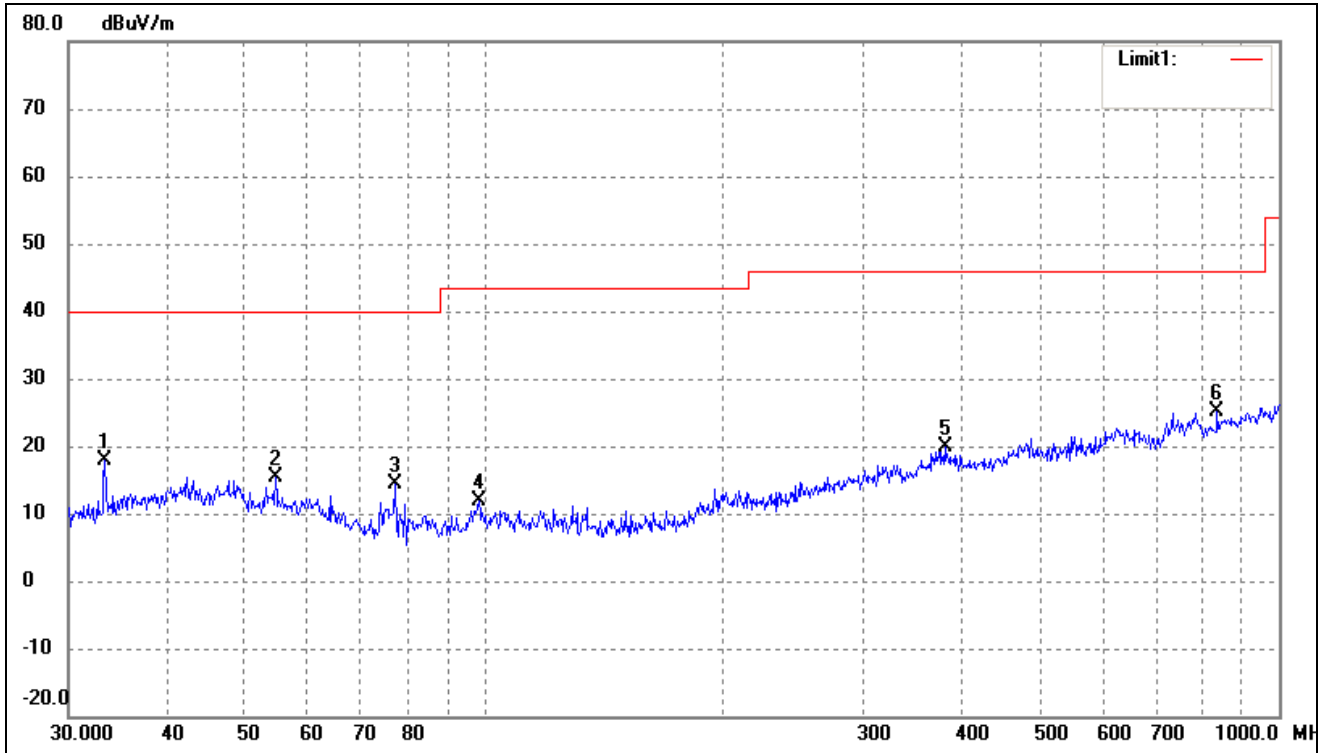
Plot of Radiated Emissions Test Data (30MHz to 1GHz)

EUT: WCDMA wireless data terminal
 Tested Model: AT911N
 Operating Condition: 802.11g Transmitting Low Channel-2437MHz (worst case)
 Comment: DC 3.7V
 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	40.4172	23.89	-7.70	16.19	40.00	-23.81	170	100	peak
2	57.1914	23.21	-9.22	13.99	40.00	-26.01	20	100	peak
3	216.0240	24.55	-8.81	15.74	46.00	-30.26	320	100	peak
4	378.5843	22.70	-2.17	20.53	46.00	-25.47	185	100	peak
5	480.5276	23.15	-1.08	22.07	46.00	-23.93	32	100	peak
6	986.0717	25.80	4.16	29.96	54.00	-24.04	355	100	peak

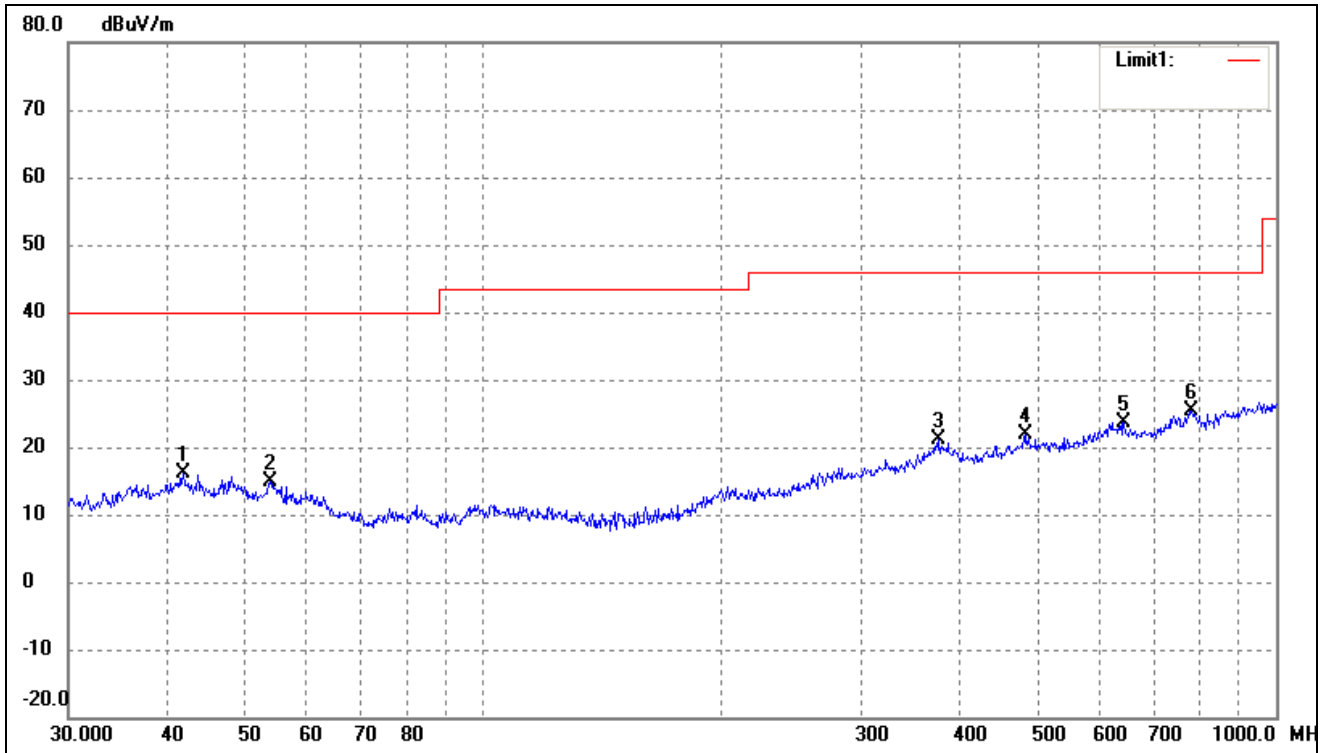
Test Specification: Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	33.3279	27.24	-9.46	17.78	40.00	-22.22	270	100	peak
2	54.6429	24.23	-8.91	15.32	40.00	-24.68	190	100	peak
3	77.3212	26.57	-12.21	14.36	40.00	-25.64	360	100	peak
4	98.4866	23.13	-11.21	11.92	43.50	-31.58	352	100	peak
5	379.9141	22.08	-2.11	19.97	46.00	-26.03	181	100	peak
6	836.2443	23.25	1.84	25.09	46.00	-20.91	185	100	peak

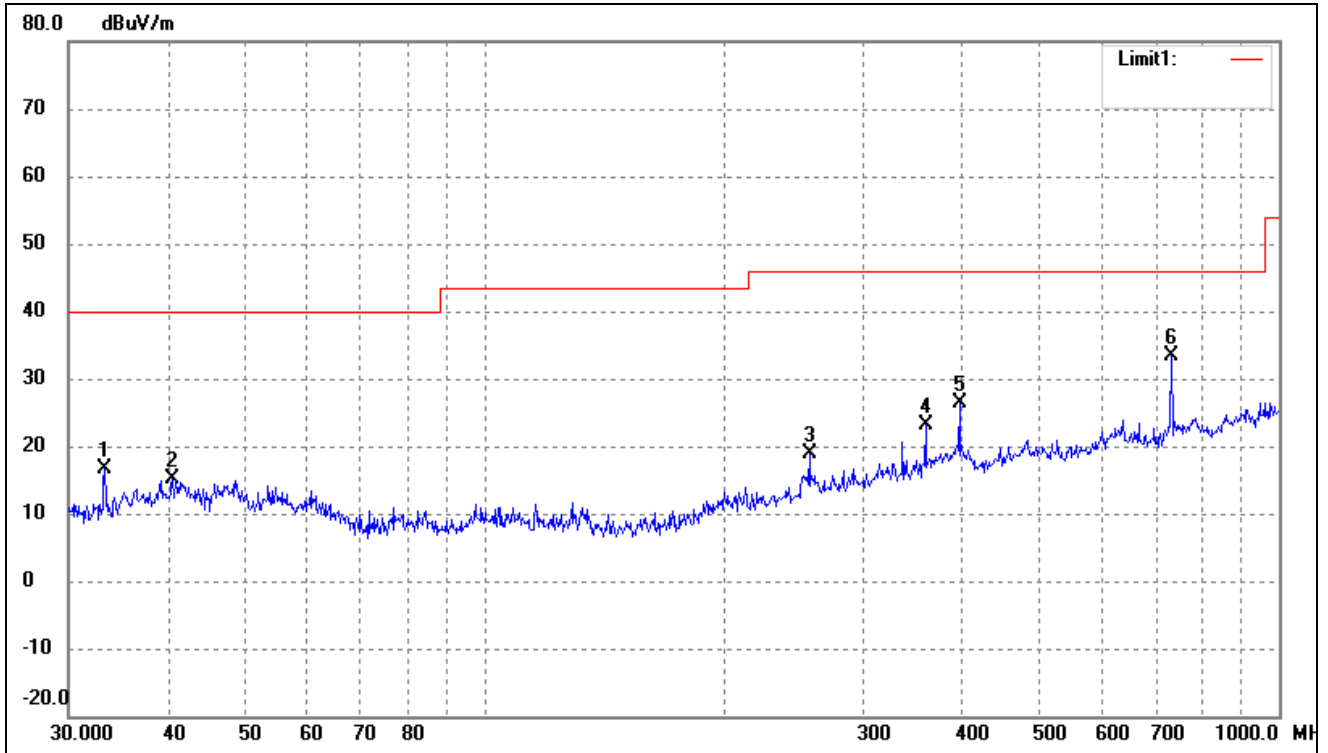
Plot of Radiated Emissions Test Data (30MHz to 1GHz)

EUT: WCDMA wireless data terminal
 Tested Model: AT911N
 Operating Condition: 802.11n-HT20 Transmitting Low Channel-2412MHz (worst case)
 Comment: DC 3.7V
 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	41.8596	23.85	-7.79	16.06	40.00	-23.94	260	100	peak
2	53.8818	23.75	-8.81	14.94	40.00	-25.06	120	200	peak
3	375.9385	23.42	-2.33	21.09	46.00	-24.91	289	200	peak
4	483.9094	23.03	-1.27	21.76	46.00	-24.24	352	100	peak
5	642.8613	22.99	0.65	23.64	46.00	-22.36	183	200	peak
6	782.3453	22.63	2.78	25.41	46.00	-20.59	185	200	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	33.3279	26.14	-9.46	16.68	40.00	-23.32	130	100	peak
2	40.5591	22.85	-7.70	15.15	40.00	-24.85	120	100	peak
3	256.5211	26.02	-7.18	18.84	46.00	-27.16	360	100	peak
4	359.1860	26.57	-3.32	23.25	46.00	-22.75	185	100	peak
5	396.2415	29.28	-2.95	26.33	46.00	-19.67	180	100	peak
6	731.9203	31.73	1.66	33.39	46.00	-12.61	352	100	peak

Spurious Emissions Above 1GHz
Test Mode: 802.11b

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel-2412MHz							
4824.00	58.74	-3.87	54.87	74.00	-19.13	H	PK
4824.00	43.75	-3.87	39.88	54.00	-14.12	H	AV
7236.00	52.53	1.14	53.67	74.00	-20.33	H	PK
7236.00	39.21	1.19	40.4	54.00	-13.6	H	AV
4824.00	60.62	-3.86	56.76	74.00	-17.24	V	PK
4824.00	41.12	-3.86	37.26	54.00	-16.74	V	AV
7236.00	54.03	1.10	55.13	74.00	-18.87	V	PK
7236.00	39.03	1.10	40.13	54.00	-13.87	V	AV
Middle Channel-2437MHz							
4874.00	58.17	-3.74	54.43	74.00	-19.57	H	PK
4874.00	41.33	-3.74	37.59	54.00	-16.41	H	AV
7311.00	53.66	1.47	55.13	74.00	-18.87	H	PK
7311.00	39.66	1.47	41.13	54.00	-12.87	H	AV
4874.00	60.69	-3.74	56.95	74.00	-17.05	V	PK
4874.00	42.99	-3.74	39.25	54.00	-14.75	V	AV
7311.00	52.53	1.47	54	74.00	-20.00	V	PK
7311.00	40.34	1.47	41.81	54.00	-12.19	V	AV
High Channel-2462MHz							
4924.00	59.26	-3.59	55.67	74.00	-18.33	H	PK
4924.00	42.26	-3.59	38.67	54.00	-15.33	H	AV
7386.00	55.36	1.79	57.15	74.00	-16.85	H	PK
7386.00	40.76	1.79	42.55	54.00	-11.45	H	AV
4924.00	60.04	-3.59	56.45	74.00	-17.55	V	PK
4924.00	41.57	-3.59	37.98	54.00	-16.02	V	AV
7386.00	52.47	1.79	54.26	74.00	-19.74	V	PK
7386.00	39.54	1.79	41.33	54.00	-12.67	V	AV

Test Mode: 802.11g

Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polar H/V	Detector
Low Channel-2412MHz							
4824.00	60.66	-3.87	56.79	74.00	-17.21	H	PK
4824.00	42.1	-3.87	38.23	54.00	-15.77	H	AV
7236.00	55.67	1.14	56.81	74.00	-17.19	H	PK
7236.00	40.82	1.19	42.01	54.00	-11.99	H	AV
4824.00	61.75	-3.86	57.89	74.00	-16.11	V	PK
4824.00	42.3	-3.86	38.44	54.00	-15.56	V	AV
7236.00	54.55	1.10	55.65	74.00	-18.35	V	PK
7236.00	40.07	1.10	41.17	54.00	-12.83	V	AV
Middle Channel-2437MHz							
4874.00	59.06	-3.74	55.32	74.00	-18.68	H	PK
4874.00	43.29	-3.74	39.55	54.00	-14.45	H	AV
7311.00	54.59	1.47	56.06	74.00	-17.94	H	PK
7311.00	40.77	1.47	42.24	54.00	-11.76	H	AV
4874.00	59.69	-3.74	55.95	74.00	-18.05	V	PK
4874.00	43.78	-3.74	40.04	54.00	-13.96	V	AV
7311.00	54.9	1.47	56.37	74.00	-17.63	V	PK
7311.00	38.63	1.47	40.1	54.00	-13.9	V	AV
High Channel-2462MHz							
4924.00	60.75	-3.59	57.16	74.00	-16.84	H	PK
4924.00	41.76	-3.59	38.17	54.00	-15.83	H	AV
7386.00	54.75	1.79	56.54	74.00	-17.46	H	PK
7386.00	40.24	1.79	42.03	54.00	-11.97	H	AV
4924.00	59.18	-3.59	55.59	74.00	-18.41	V	PK
4924.00	43.28	-3.59	39.69	54.00	-14.31	V	AV
7386.00	55.74	1.79	57.53	74.00	-16.47	V	PK
7386.00	38.04	1.79	39.83	54.00	-14.17	V	AV

Test Mode: 802.11n-HT20

Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polar H/V	Detector
Low Channel-2412MHz							
4824.00	61.7	-3.87	57.83	74.00	-16.17	H	PK
4824.00	41.02	-3.87	37.15	54.00	-16.85	H	AV
7236.00	54.98	1.14	56.12	74.00	-17.88	H	PK
7236.00	39.88	1.19	41.07	54.00	-12.93	H	AV
4824.00	60.67	-3.86	56.81	74.00	-17.19	V	PK
4824.00	42.62	-3.86	38.76	54.00	-15.24	V	AV
7236.00	52.02	1.10	53.12	74.00	-20.88	V	PK
7236.00	40.95	1.10	42.05	54.00	-11.95	V	AV
Middle Channel-2437MHz							
4874.00	59.37	-3.74	55.63	74.00	-18.37	H	PK
4874.00	42.38	-3.74	38.64	54.00	-15.36	H	AV
7311.00	55	1.47	56.47	74.00	-17.53	H	PK
7311.00	40.1	1.47	41.57	54.00	-12.43	H	AV
4874.00	59.07	-3.74	55.33	74.00	-18.67	V	PK
4874.00	41.03	-3.74	37.29	54.00	-16.71	V	AV
7311.00	53.54	1.47	55.01	74.00	-18.99	V	PK
7311.00	38.13	1.47	39.6	54.00	-14.4	V	AV
High Channel-2462MHz							
4924.00	61.61	-3.59	58.02	74.00	-15.98	H	PK
4924.00	43.76	-3.59	40.17	54.00	-13.83	H	AV
7386.00	55.3	1.79	57.09	74.00	-16.91	H	PK
7386.00	39.8	1.79	41.59	54.00	-12.41	H	AV
4924.00	60.8	-3.59	57.21	74.00	-16.79	V	PK
4924.00	43.71	-3.59	40.12	54.00	-13.88	V	AV
7386.00	55.33	1.79	57.12	74.00	-16.88	V	PK
7386.00	38.48	1.79	40.27	54.00	-13.73	V	AV

Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, which above 3th 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.

9. Out of Band Emissions

9.1 Standard Applicable

According to §15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

9.2 Test Procedure

According to the KDB 558074D01 v03r05, the band-edge radiated test method as follows:

Set span = wide enough to capture the peak level of the emission operating on the channel closest to the bandedge, as well as any modulation products which fall outside of the authorized band of operation (2310MHz to 2420MHz for low bandedge, 2460MHz to 2500MHz for the high bandedge)

RBW = 1MHz, VBW = 1MHz for peak value measured

RBW = 1MHz, VBW = 10Hz for average value measured

Sweep = auto; Detector function = peak/average; Trace = max hold

All the trace to stabilize, set the marker on the emission at the bandedge, or on the highest modulation product outside of the band, if this level is greater than that at the bandedge. Enable the marker-delta function, then use the marker-to-peak function to move the marker to the peak of the in-band emission. Those emission must comply with the 15.209 limit for fall in the restricted bands listed in section 15.205. Note that the method of measurement KDB publication number: 913591 may be used for the radiated bandedge measurements.

According to the KDB 558074 D01 V03r05, the conducted spurious emissions test method as follows:

1. Set start frequency to DTS channel edge frequency.
2. Set stop frequency so as to encompass the spectrum to be examined.
3. Set RBW = 100 kHz.
4. Set VBW \geq 300 kHz.
5. Detector = peak.
6. Trace Mode = max hold.
7. Sweep = auto couple.
8. Allow the trace to stabilize (this may take some time, depending on the extent of the span).
9. Use peak marker function to determine maximum amplitude of all unwanted emissions within any 100 kHz bandwidth.

Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements specified in section 8.1. Report the three highest emissions relative to the limit.

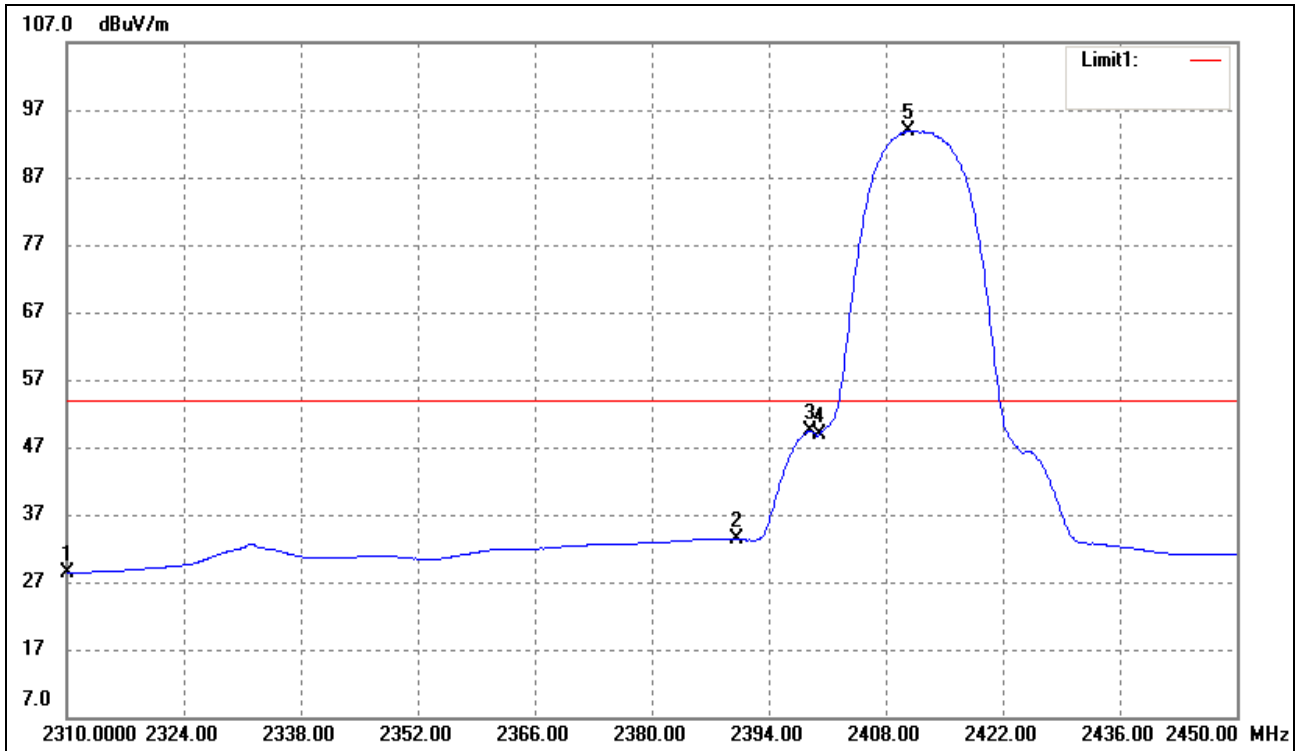
9.3 Environmental Conditions

Temperature:	23°C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

9.4 Summary of Test Results/Plots

802.11b-Lowest Bandedge

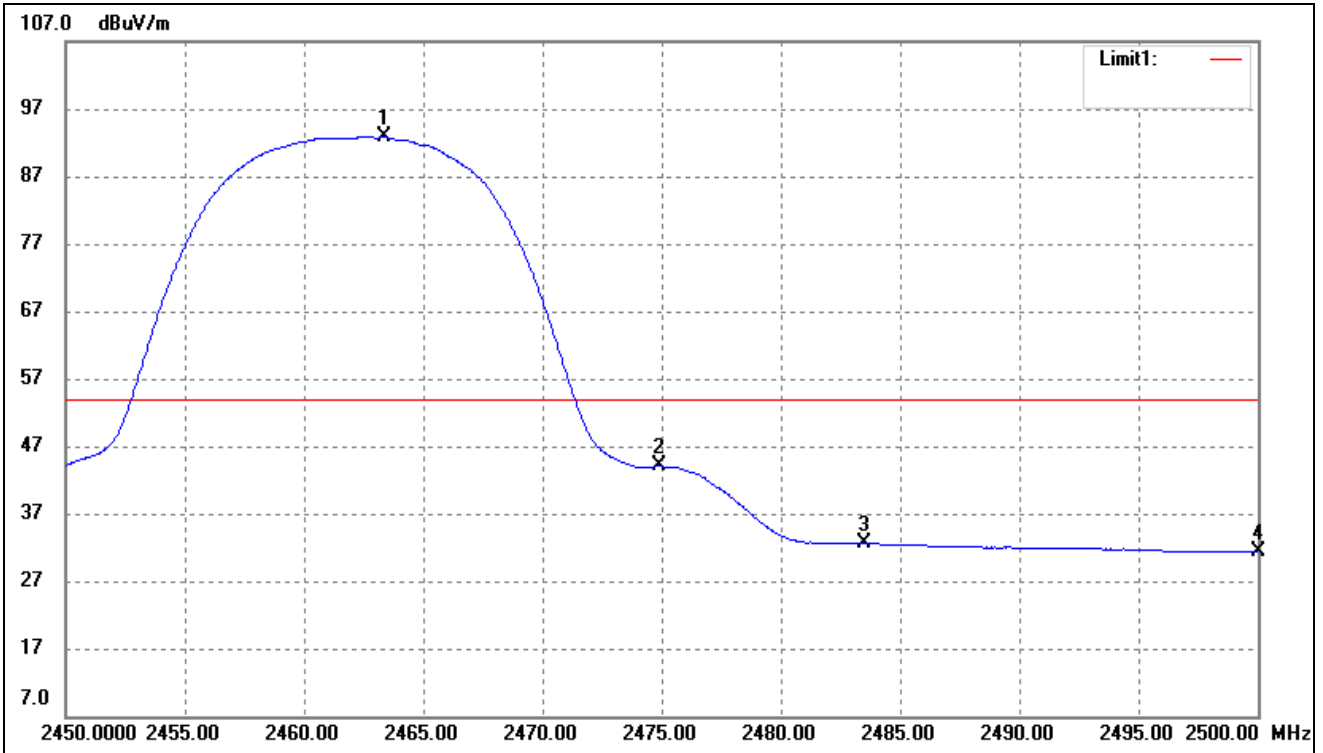
Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	32.00	-3.71	28.29	54.00	-25.71	Average Detector
	2310.000	44.68	-3.71	40.97	74.00	-33.03	Peak Detector
2	2390.000	37.01	-3.54	33.47	54.00	-20.53	Average Detector
	2390.000	49.35	-3.54	45.81	74.00	-28.19	Peak Detector
3	2398.900	52.85	-3.51	49.34	54.00	-4.66	Average Detector
	2398.900	62.87	-3.51	59.36	74.00	-14.64	Peak Detector
4	2400.000	52.32	-3.51	48.81	Delta =45.04dBc		Average Detector
5	2410.660	97.33	-3.48	93.85			Average Detector

802.11b-Highest Bandedge

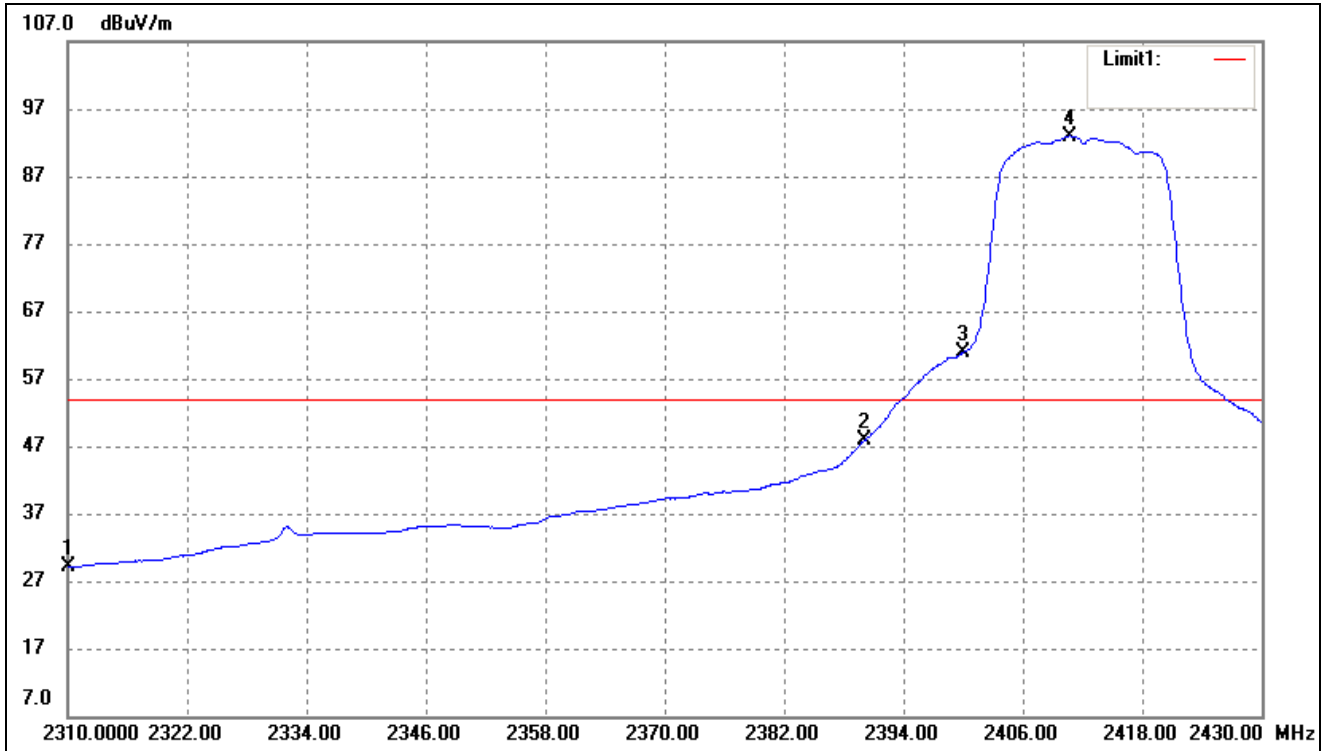
Vertical (Worst case)



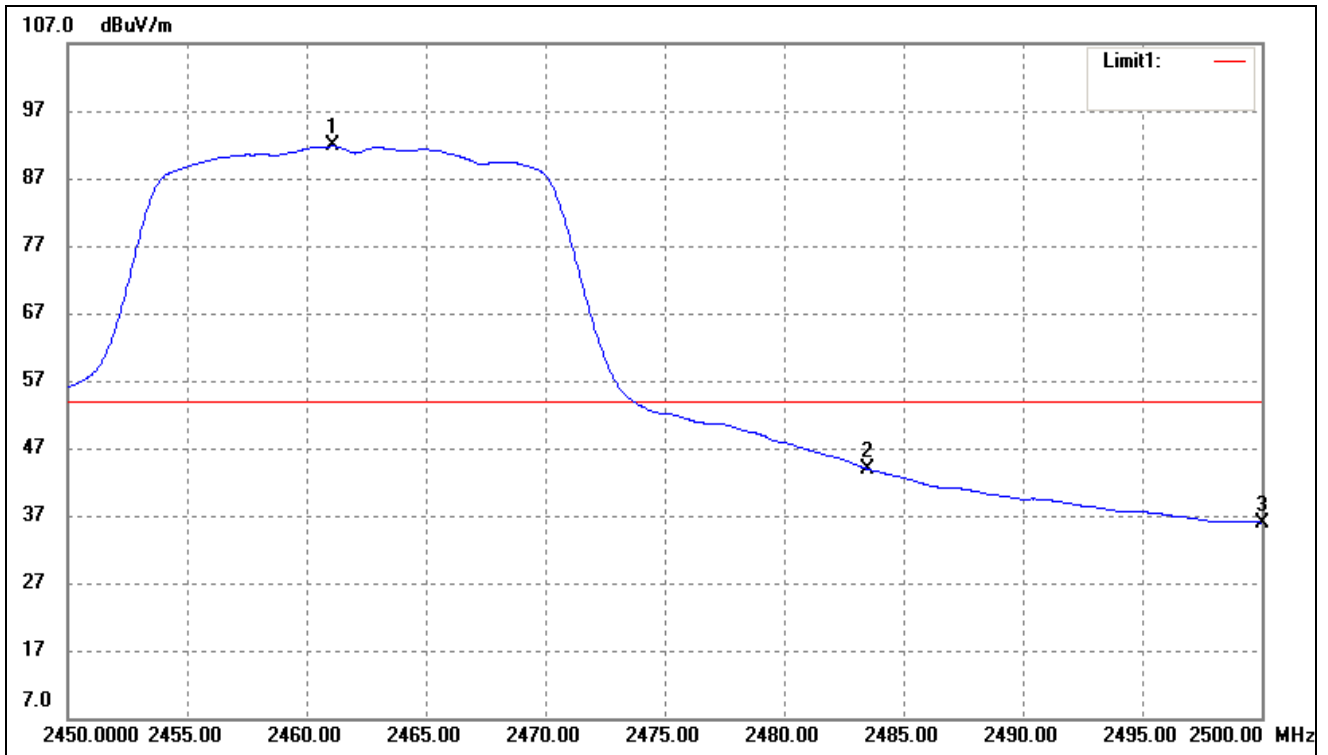
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2463.350	96.21	-3.36	92.85	/	/	Average Detector
	2463.300	104.80	-3.36	101.44	/	/	Peak Detector
2	2474.900	47.38	-3.33	44.05	54.00	-9.95	Average Detector
	2474.800	58.85	-3.33	55.52	74.00	-18.48	Peak Detector
3	2483.500	35.96	-3.33	32.63	54.00	-21.37	Average Detector
	2483.500	47.98	-3.33	44.65	74.00	-29.35	Peak Detector
4	2500.000	34.61	-3.28	31.33	54.00	-22.67	Average Detector
	2500.000	46.84	-3.28	43.56	74.00	-30.44	Peak Detector

802.11g-Lowest Bandedge

Vertical (Worst case)

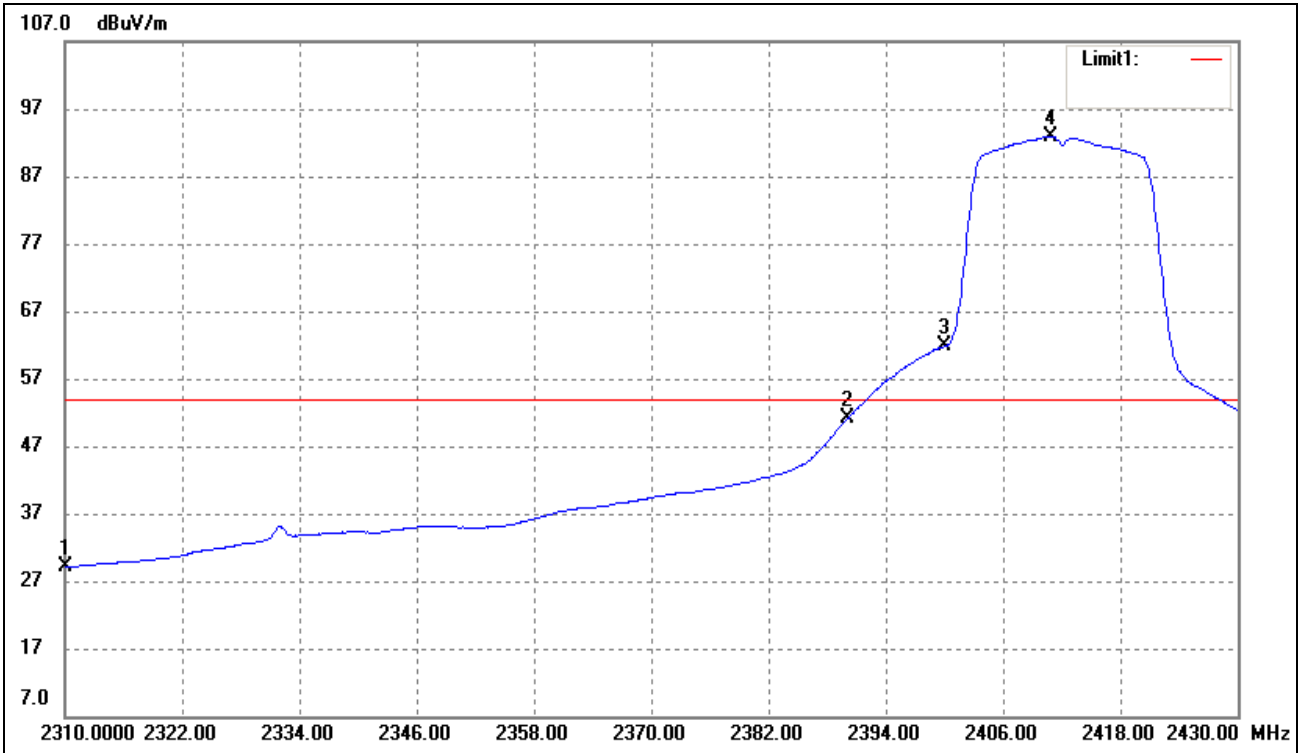


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	32.78	-3.71	29.07	54.00	-24.93	Average Detector
		45.98	-3.71	42.27	74.00	-31.73	Peak Detector
2	2390.000	51.37	-3.54	47.83	54.00	-6.17	Average Detector
		69.12	-3.54	65.58	74.00	-8.42	Peak Detector
3	2400.000	64.41	-3.51	60.90	Delta =33.10dBc		Average Detector
4	2410.680	96.48	-3.48	93.00			Average Detector

802.11g-Highest Bandedge
 Vertical (Worst case)


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2461.100	95.13	-3.37	91.76	/	/	Average Detector
	2463.750	107.16	-3.36	103.80	/	/	Peak Detector
2	2483.500	47.27	-3.33	43.94	54.00	-10.06	Average Detector
	2483.500	68.14	-3.33	64.81	74.00	-9.19	Peak Detector
3	2500.000	39.25	-3.28	35.97	54.00	-18.03	Average Detector
	2500.000	53.89	-3.28	50.61	74.00	-23.39	Peak Detector

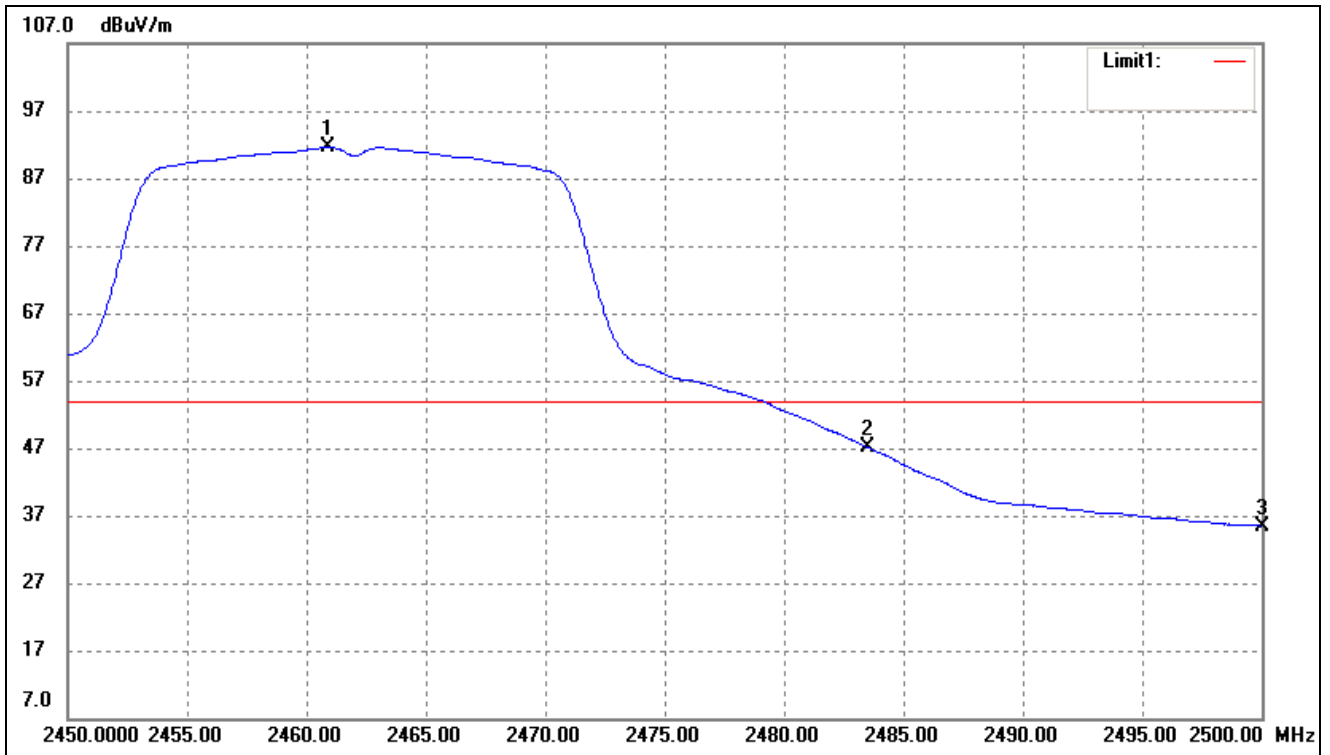
802.11n-HT20-Lowest Bandedge
Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	32.76	-3.71	29.05	54.00	-24.95	Average Detector
	2310.000	45.71	-3.71	42.00	74.00	-32.00	Peak Detector
2	2390.000	54.55	-3.54	51.01	54.00	-2.99	Average Detector
	2390.000	72.98	-3.54	69.44	74.00	-4.56	Peak Detector
3	2400.000	65.28	-3.51	61.77	Delta =31.22dBc		Average Detector
4	2410.800	96.47	-3.48	92.99		Average Detector	

802.11n-HT20-Highest Bandedge

Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2460.900	94.97	-3.37	91.60	/	/	Average Detector
	2461.400	106.90	-3.37	103.53	/	/	Peak Detector
2	2483.500	50.40	-3.33	47.07	54.00	-6.93	Average Detector
	2483.500	68.86	-3.33	65.53	74.00	-8.47	Peak Detector
3	2500.000	38.74	-3.28	35.46	54.00	-18.54	Average Detector
	2500.000	51.67	-3.28	48.39	74.00	-25.61	Peak Detector

10. Conducted Emissions

10.1 Measurement Uncertainty

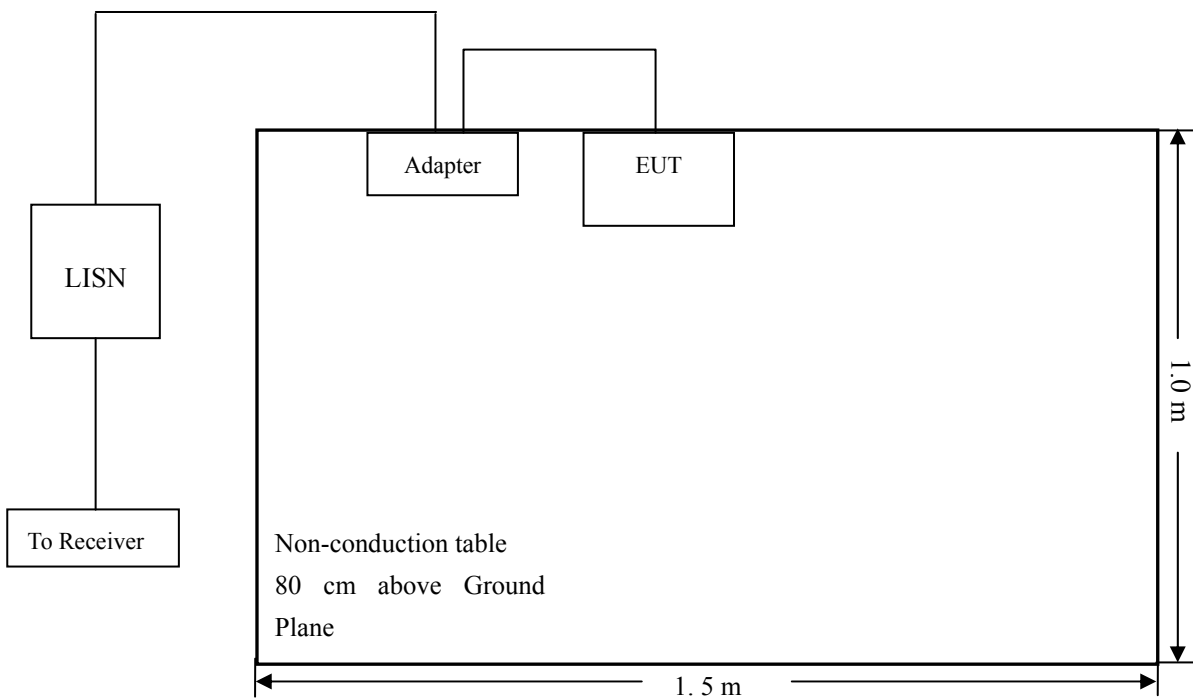
Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement is ± 2.88 dB.

10.2 Test Procedure

The setup of EUT is according with per ANSI C63.4-2014 measurement procedure. The specification used was with the FCC Part 15.207 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.

10.3 Basic Test Setup Block Diagram



10.4 Environmental Conditions

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

10.5 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

10.6 Summary of Test Results/Plots

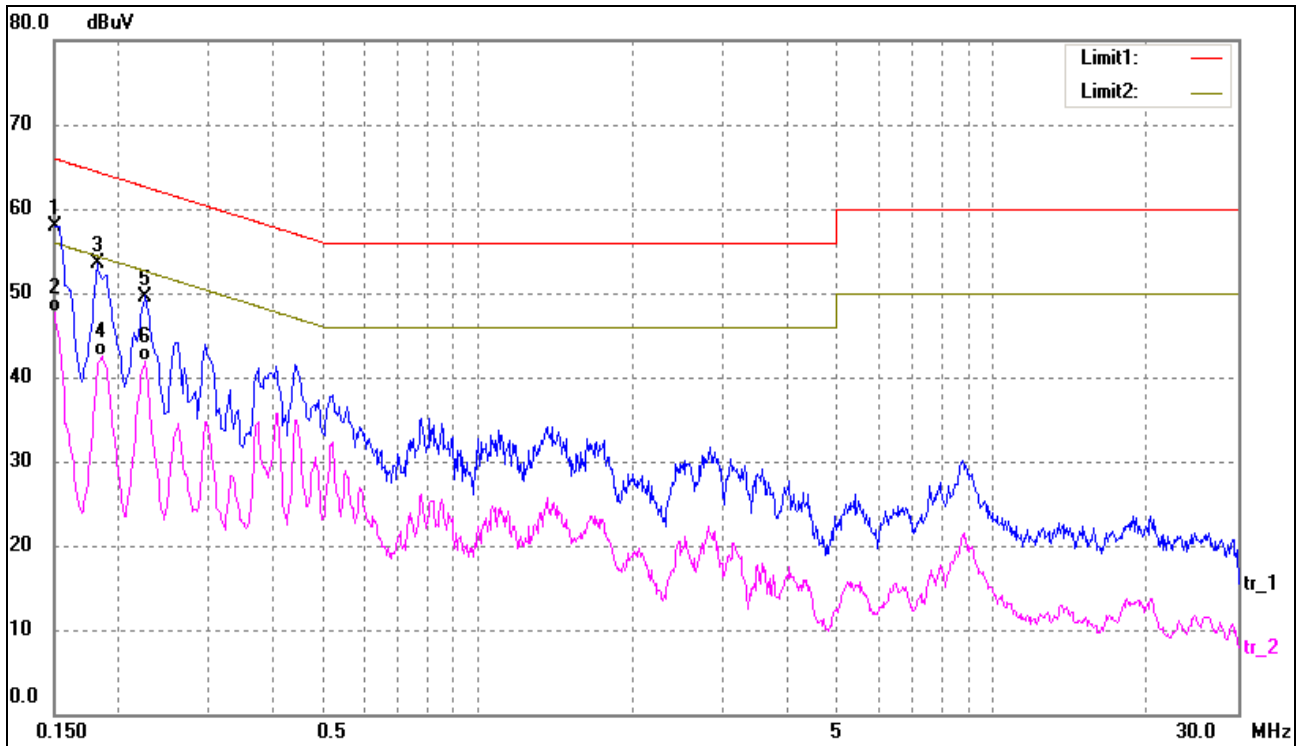
According to the data in section 10.7, the EUT complied with the FCC Part 15.207 Conducted margin for this device, with the *worst* margin reading of:

-8.05 dB at 0.1500 MHz in the **Neutral, Peak** detector, 0.15-30MHz

10.7 Conducted Emissions Test Data

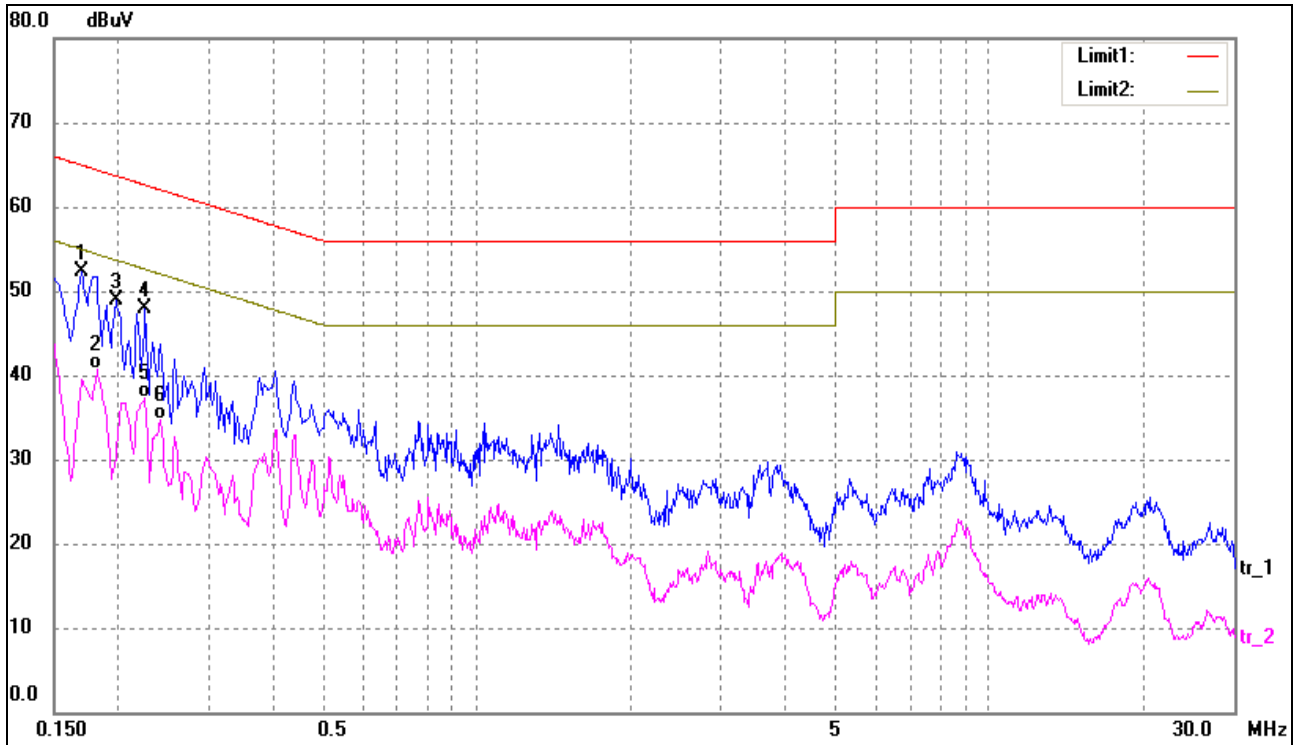
Plot of Conducted Emissions Test Data

EUT: WCDMA wireless data terminal
 Tested Model: AT911N
 Operating Condition: Transmitting(Wi-Fi)
 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*	0.1500	48.45	9.50	57.95	66.00	-8.05	peak
2	0.1500	38.15	9.50	47.65	56.00	-8.35	AVG
3	0.1820	43.94	9.50	53.44	64.39	-10.95	peak
4	0.1860	33.01	9.50	42.51	54.21	-11.70	AVG
5	0.2260	40.10	9.50	49.60	62.60	-13.00	peak
6	0.2260	32.34	9.50	41.84	52.60	-10.76	AVG

Test Specification: Line



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1*	0.1700	42.78	9.50	52.28	64.96	-12.68	peak
2	0.1820	31.14	9.50	40.64	54.39	-13.75	AVG
3	0.1980	39.40	9.50	48.90	63.69	-14.79	peak
4	0.2260	38.37	9.50	47.87	62.60	-14.73	peak
5	0.2260	27.88	9.50	37.38	52.60	-15.22	AVG
6	0.2420	25.27	9.50	34.77	52.03	-17.26	AVG

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