TEST REPORT

Reference No......	:	WTX24X08010063W001
FCC ID.....	:	2BHLL-V25
Applicant.....	:	Shenzhen Chuanghongyu Technology Co., Ltd
Address.....	:	301 Jinjin Building, No. 242 Jihua Road, Jihua Street, Longgang District, Shenzhen,Guangdong,China
Product Name.....	:	Dash camera,Car Dvr
Test Model.....	:	V25
Standards.....	:	FCC Part 15.247
Date of Receipt sample....	:	August o1, 2024
Date of Test.....	:	August 02~08, 2024
Date of Issue.....	:	August 08, 2024
Test Result.....	:	**Pass**

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

Prepared By:

Waltek Testing Group (Shenzhen) Co., Ltd.

Address: 1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian 2nd Road, Block 70 Bao'an District, Shenzhen, Guangdong, China

Tested by:

Tom Wang

Tom Wang/ Project Engineer

Approved & Authorized By:

Silin Chen

Silin Chen / Manager

TABLE OF CONTENTS

1. GENERAL INFORMATION **4**
1.1 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) 4
1.2 TEST STANDARDS 5
1.3 TEST METHODOLOGY 5
1.4 TEST FACILITY 5
1.5 EUT SETUP AND TEST MODE 6
1.6 MEASUREMENT UNCERTAINTY 7
1.7 TEST EQUIPMENT LIST AND DETAILS 8
2. SUMMARY OF TEST RESULTS **10**
3. ANTENNA REQUIREMENT **11**
3.1 STANDARD APPLICABLE 11
3.2 EVALUATION INFORMATION 11
4. POWER SPECTRAL DENSITY **12**
4.1 STANDARD APPLICABLE 12
4.2 TEST SETUP BLOCK DIAGRAM 12
4.3 TEST PROCEDURE 12
4.4 SUMMARY OF TEST RESULTS/PLOTS 12
5. DTS BANDWIDTH **13**
5.1 STANDARD APPLICABLE 13
5.2 TEST SETUP BLOCK DIAGRAM 13
5.3 TEST PROCEDURE 13
5.4 SUMMARY OF TEST RESULTS/PLOTS 13
6. RF OUTPUT POWER **14**
6.1 STANDARD APPLICABLE 14
6.2 TEST SETUP BLOCK DIAGRAM 14
6.3 TEST PROCEDURE 14
6.4 SUMMARY OF TEST RESULTS/PLOTS 14
7. FIELD STRENGTH OF SPURIOUS EMISSIONS **15**
7.1 STANDARD APPLICABLE 15
7.2 TEST PROCEDURE 15
7.3 CORRECTED AMPLITUDE & MARGIN CALCULATION 17
7.4 SUMMARY OF TEST RESULTS/PLOTS 17
8. OUT OF BAND EMISSIONS **21**
8.1 STANDARD APPLICABLE 21
8.2 TEST PROCEDURE 21
8.3 SUMMARY OF TEST RESULTS/PLOTS 22
9. CONDUCTED EMISSIONS **26**
9.1 TEST PROCEDURE 26
9.2 BASIC TEST SETUP BLOCK DIAGRAM 26
9.3 TEST RECEIVER SETUP 26
9.4 SUMMARY OF TEST RESULTS/PLOTS 26
APPENDIX SUMMARY **29**
APPENDIX A **30**
APPENDIX B **36**
APPENDIX C **41**
APPENDIX D **42**
APPENDIX E **46**
APPENDIX PHOTOGRAPHS **59**

Report version

Version No.	Date of issue	Description
Rev.00	August 08, 2024	Original
/	/	/

1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant:	Shenzhen Chuanghongyu Technology Co., Ltd
Address of applicant:	301 Jinjin Building, No. 242 Jihua Road, Jihua Street, Longgang District, Shenzhen,Guangdong,China
Manufacturer:	Shenzhen Chuanghongyu Technology Co., Ltd
Address of manufacturer:	301 Jinjin Building, No. 242 Jihua Road, Jihua Street, Longgang District, Shenzhen,Guangdong,China

General Description of EUT	
Product Name:	Dash camera,Car Dvr
Trade Name:	/
Model No.:	V25
Adding Model(s):	/
Rated Voltage:	DC5V, 2A from Car charging
Power Adapter Model:	/
Serial number:	S-01
Note: The test data is gathered from a production sample provided by the manufacturer.	

Technical Characteristics of EUT	
Support Standards:	802.11b, 802.11g, 802.11n
Frequency Range:	2412-2462MHz for 802.11b/g/n(HT20) 2422-2452MHz for 802.11n(HT40)
RF Output Power:	18.50dBm (Conducted)
Type of Modulation:	DBPSK,BPSK,DQPSK,QPSK,16QAM,64QAM
Quantity of Channels:	11 for 802.11b/g/n(HT20); 7 for 802.11n(HT40)
Channel Separation:	5MHz
Type of Antenna:	Integral Antenna
Antenna Gain:	-1.0dBi

1.2 Test Standards

The tests were performed according to following standards:

FCC Rules Part 15.247: Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz.
558074 D01 15.247 Meas Guidance v05r02: Guidance for Compliance Measurements on Digital Transmission System, Frequency Hopping Spread Spectrum System, and Hybrid System Devices Operating undersection 15.247 of the Fcc rules.
ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.

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, KDB 558074 D01 15.247 Meas Guidance v05r02.
The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted accordingly in reference to the Operating Instructions.

1.4 Test Facility

Address of the test laboratory
Laboratory: Waltek Testing Group (Shenzhen) Co., Ltd.
Address: 1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian 2nd Road, Block 70 Bao'an District, Shenzhen, Guangdong, China

FCC – Registration No.: 125990
Waltek Testing Group (Shenzhen) 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 maintain ed in our files. The Designation Number is CN5010, and Test Firm Registration Number is 125990.

Industry Canada (IC) Registration No.: 11464A
The 3m Semi-anechoic chamber of Waltek Testing Group (Shenzhen) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

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, with a duty cycle equal to 100%, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	802.11b	Low:2412MHz, Middle:2437MHz,High:2462MHz
TM2	802.11g	Low:2412MHz, Middle:2437MHz,High:2462MHz
TM3	802.11n-HT20	Low:2412MHz, Middle:2437MHz,High:2462MHz
TM4	802.11n-HT40	Low:2422MHz, Middle:2437MHz,High:2452MHz

Test Conditions	
Temperature:	22~25 ℃
Relative Humidity:	45~55 %.
ATM Pressure:	1019 mbar

Test software(Fix the Tx frequency)	**Power level(Testing)**
Name	level
Putty	Index

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite

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

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number

1.6 Measurement Uncertainty

Measurement uncertainty		
Parameter	Conditions	Uncertainty
RF Output Power	Conducted	±0.42dB
Occupied Bandwidth	Conducted	±1.5%
Power Spectral Density	Conducted	±1.8dB
Conducted Spurious Emission	Conducted	±2.17dB
Conducted Emissions	Conducted	9-150kHz ±3.74dB
		0.15-30MHz ±3.34dB
Transmitter Spurious Emissions	Radiated	30-200MHz ±4.52dB
		0.2-1GHz ±5.56dB
		1-6GHz ±3.84dB
		6-26GHz ±3.92dB

1.7 Test Equipment List and Details

No.	Description	Manufacturer	Model	Serial No.	Cal Date	Due. Date
SEMT-1075	Communication Tester	Rohde & Schwarz	CMW500	148650	2024-03-27	2025-03-26
SEMT-1063	GSM Tester	Rohde & Schwarz	CMU200	114403	2024-03-27	2025-03-26
SEMT-1072	Spectrum Analyzer	Agilent	E4407B	MY41440400	2024-03-27	2025-03-26
SEMT-1079	Spectrum Analyzer	Agilent	N9020A	US47140102	2024-03-27	2025-03-26
SEMT-1080	Signal Generator	Agilent	83752A	3610A01453	2024-03-27	2025-03-26
SEMT-1081	Vector Signal Generator	Agilent	N5182A	MY47070202	2024-03-27	2025-03-26
SEMT-1028	Power Divider	Weinschel	1506A	PM204	2024-03-27	2025-03-26
SEMT-1082	Power Divider	RF-Lambda	RFLT4W5M18G	14110400027	2024-03-27	2025-03-26
SEMT-1031	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2024-03-27	2025-03-26
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2024-03-27	2025-03-26
SEMT-1008	Amplifier	Agilent	8447F	3113A06717	2023-04-12	2024-04-11
SEMT-1043	Amplifier	C&D	PAP-1G18	2002	2023-04-12	2024-04-11
SEMT-1069	Loop Antenna	Schwarz beck	FMZB 1516	9773	2023-03-19	2025-03-18
SEMT-1068	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2023-03-19	2025-03-18
SEMT-1042	Horn Antenna	ETS	3117	00086197	2023-03-19	2025-03-18
SEMT-1121	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170582	2024-03-27	2025-03-26
SEMT-1169	Pre-amplifier	Direction Systems Inc.	PAP-2640	14145-14153	2024-03-27	2025-03-26
SEMT-1163	Spectrum Analyzer	Rohde & Schwarz	FSP40	100612	2024-03-27	2025-03-26
SEMT-1166	Power Limiter	Agilent	N9356B	MY45450376	2024-03-27	2025-03-26
SEMT-1076	RF Switcher	Top Precision	RCS03-A2	/	2023-03-19	2025-03-18
SEMT-1096	Power Sensor	Agilent	U2021XA	MY54250019	2024-03-27	2025-03-26
SEMT-C001	Cable	Zheng DI	LL142-07-07-10M(A)	/	/	/
SEMT-C002	Cable	Zheng DI	ZT40-2.92J-2.92J-6M	/	/	/
SEMT-C003	Cable	Zheng DI	ZT40-2.92J-2.92J-2.5M	/	/	/
SEMT-C004	Cable	Zheng DI	2M0RFC	/	/	/
SEMT-C005	Cable	Zheng DI	1M0RFC	/	/	/
SEMT-C006	Cable	Zheng DI	1M0RFC	/	/	/

Software List			
Description	**Manufacturer**	**Model**	**Version**
EMI Test Software (Radiated Emission)*	Farad	EZ-EMC	RA-03A1
EMI Test Software (Conducted Emission)*	Farad	EZ-EMC	RA-03A1

*Remark: indicates software version used in the compliance certification testing.

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§15.203; §15.247(b)(4)(i)	Antenna Requirement	Compliant
§15.205	Restricted Band of Operation	Compliant
§15.207(a)	Conducted Emission	Compliant
§15.247(e)	Power Spectral Density	Compliant
§15.247(a)(2)	DTS 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. Antenna Requirement

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 Evaluation Information

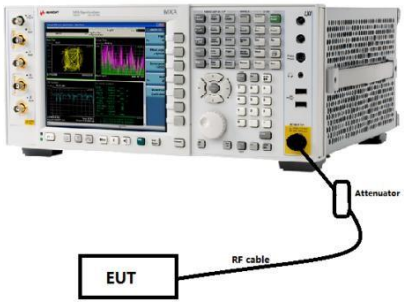
This product has an integral antenna, fulfill the requirement of this section.

4. Power Spectral Density

4.1 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 8dBm in any 3kHz band during any time interval of continuous transmission.

4.2 Test Setup Block Diagram



4.3 Test Procedure

According to the KDB 558074 D01 v05r02 Subclause 8.4 and ANSI C63.10-2013 Subclause 11.10.3, 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: 3kHz ≤ RBW ≤ 100kHz. .
d) Set VBW ≥3 x RBW.
e) Detector = power averaging (RMS) or sample detector (when RMS not available).
f) Ensure that the number of measurement points in the sweep ≥ 2 x 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).

4.4 Summary of Test Results/Plots

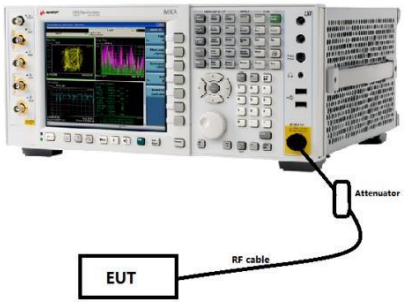
Please refer to Appendix A

5. DTS Bandwidth

5.1 Standard Applicable

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

5.2 Test Setup Block Diagram



5.3 Test Procedure

According to the KDB 558074 D01 v05r02 Subclause 8.2 and ANSI C63.10-2013 Subclause 11.8.1, the test method of DTS Bandwidth as below:

a) Set RBW = 100kHz.
b) Set the video bandwidth (VBW) ≥ 3 × 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.

5.4 Summary of Test Results/Plots

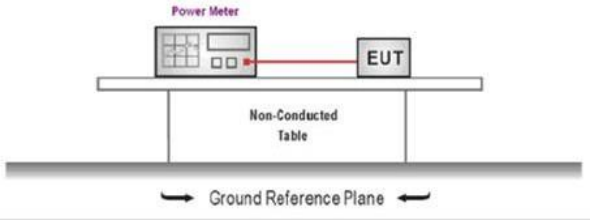
Please refer to Appendix B

6. RF Output Power

6.1 Standard Applicable

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

6.2 Test Setup Block Diagram



6.3 Test Procedure

According to the KDB-558074 D01 v05r02 Subclause 8.3.1.1 and ANSI C63.10-2013 Subclause 11.9.1.1, this procedure shall be used when the measurement instrument has available a resolution bandwidth that is greater than the DTS bandwidth.

a) The maximum peak conducted output power may be measured using a broadband peak RF power meter.
b) The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.
c) Record the measurement data.

6.4 Summary of Test Results/Plots

Please refer to Appendix C

7. Field Strength of Spurious Emissions

7.1 Standard Applicable

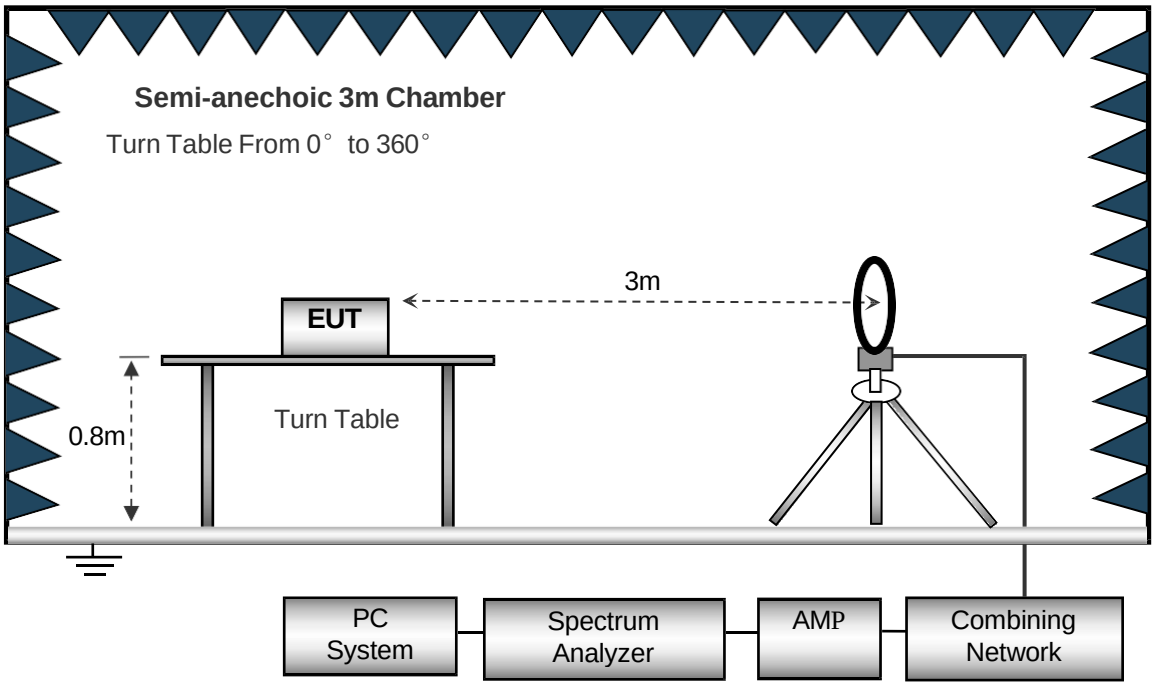
According to §15.247(d), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the 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 30dB instead of 20dB. 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.

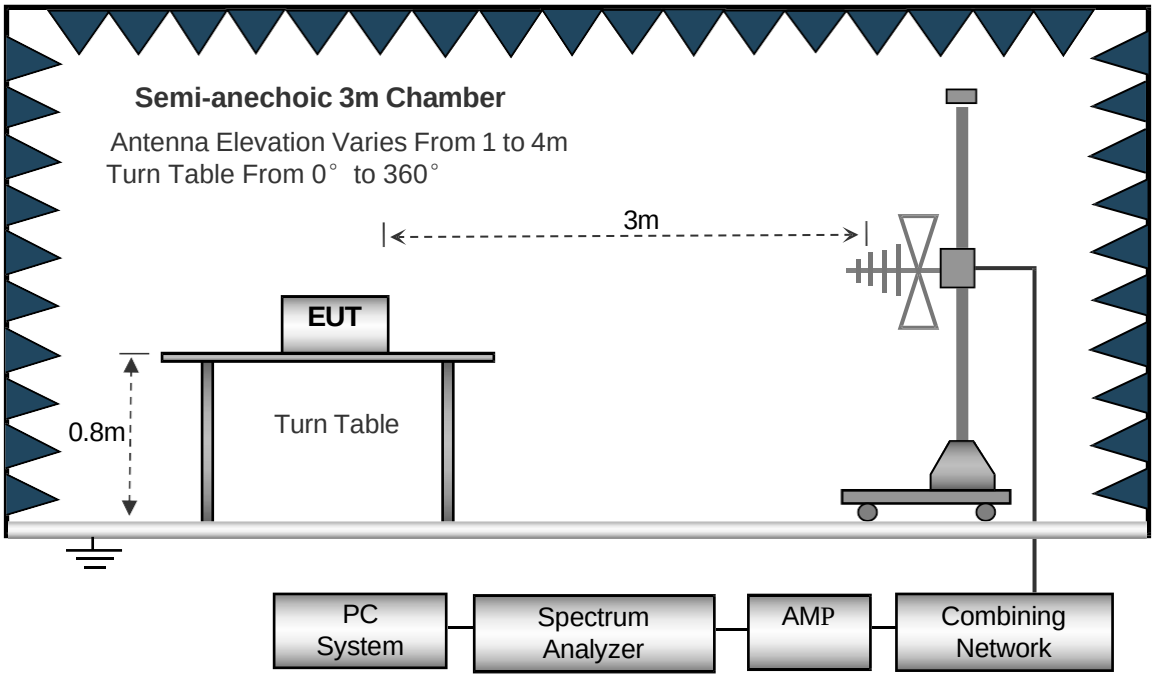
7.2 Test Procedure

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 40cm long in the middle.
The spacing between the peripherals was 10cm.

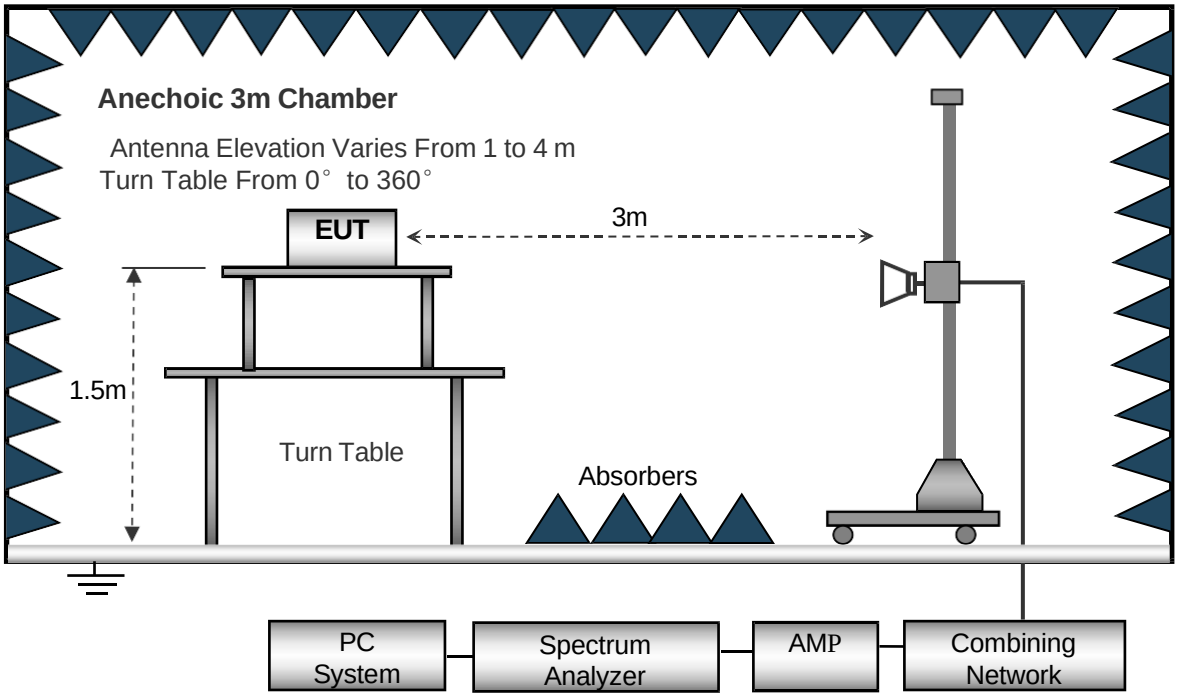
The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30MHz to 1GHz.



The test setup for emission measurement above 1GHz.



Frequency :9kHz-30MHz	Frequency :30MHz-1GHz	Frequency :Above 1GHz
RBW=10KHz,	RBW=120KHz,	RBW=1MHz,
VBW =30KHz	VBW=300KHz	VBW=3MHz(Peak), 10Hz(AV)
Sweep time= Auto	Sweep time= Auto	Sweep time= Auto
Trace = max hold	Trace = max hold	Trace = max hold
Detector function = peak	Detector function = peak, QP	Detector function = peak, AV

7.3 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:

Result = Indicated Reading + Correct
Correct =Ant. Factor + Cable Loss – 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:

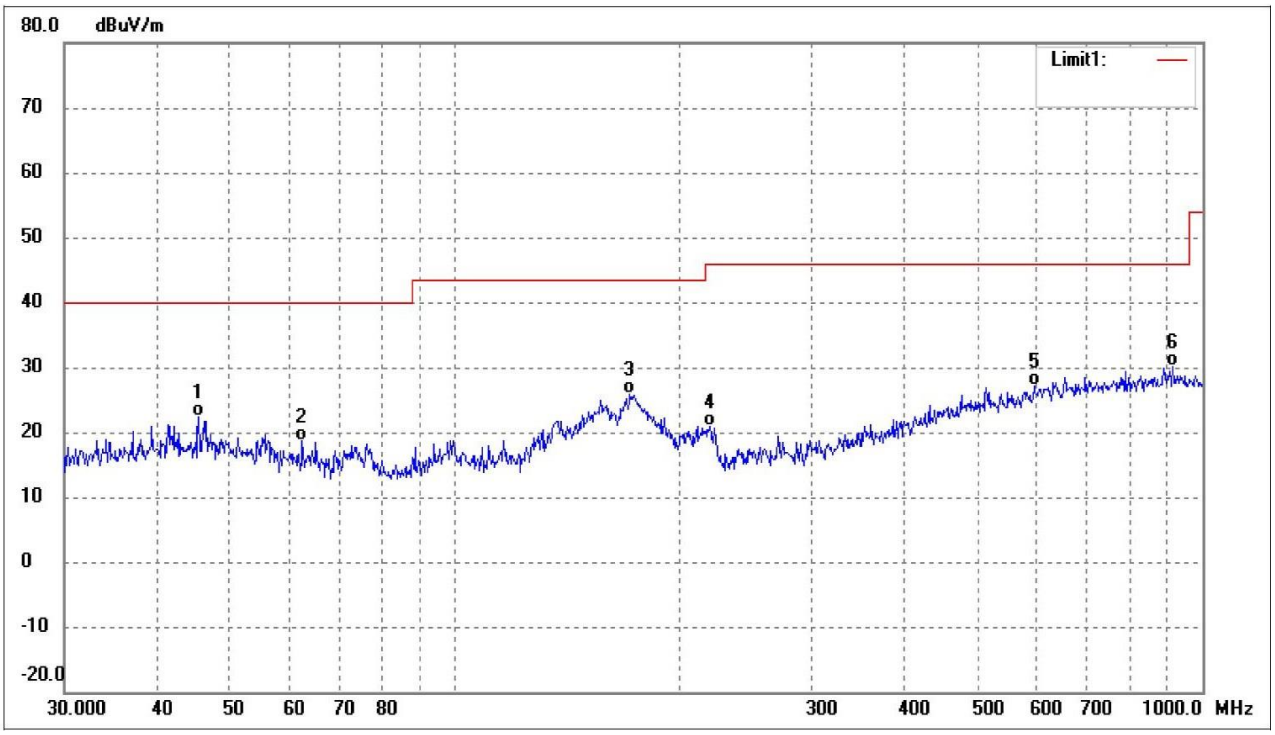
Margin = Result – FCC Part 15 Limit

7.4 Summary of Test Results/Plots

Note: 1.This EUT was tested in 3 orthogonal positions and the worst case position data was reported.
All test modes (different data rate and different modulation) are performed, but only the worst case(802.11b_ low channel 11Mbps) is recorded in this report.

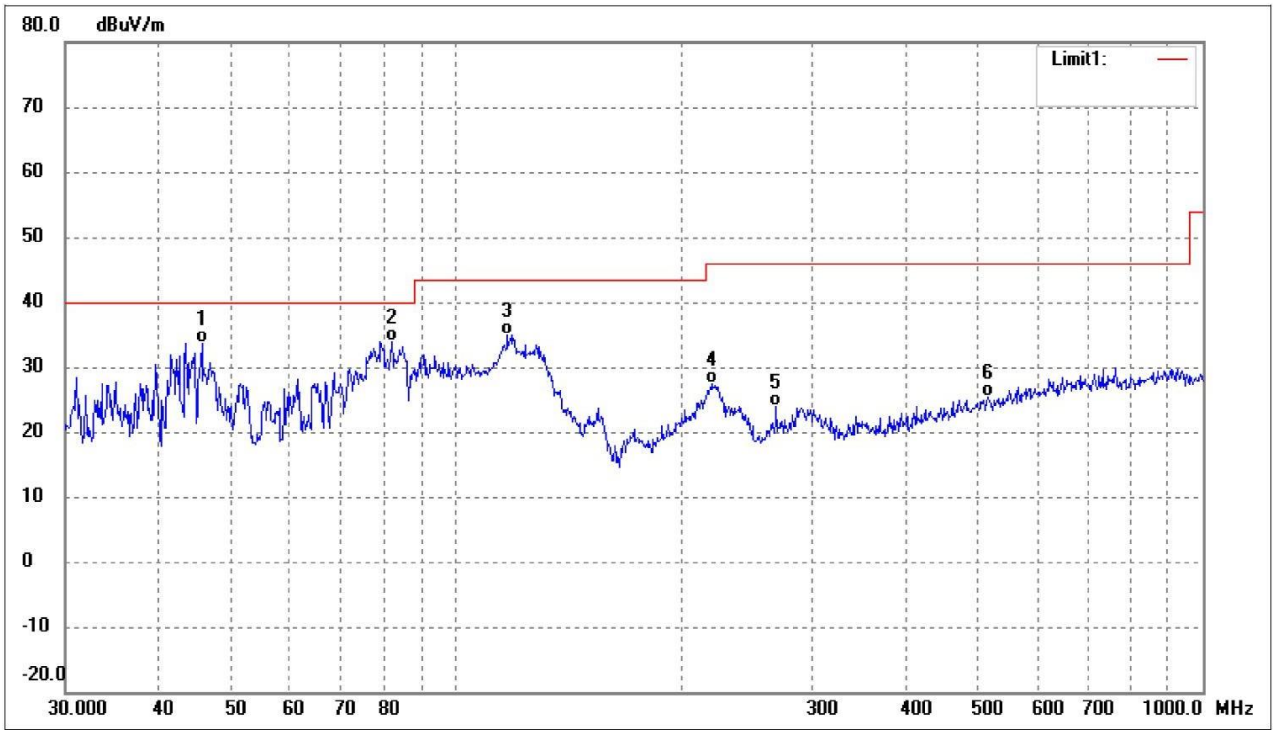
➢ Spurious Emissions Below 1GHz

802.11b_11Mbps			
Test Channel	Low	Polarity:	Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	45.3755	29.36	-6.97	22.39	40.00	-17.61	-	-	QP
2	62.4314	27.58	-8.85	18.73	40.00	-21.27	-	-	QP
3	171.3926	37.51	-11.66	25.85	43.50	-17.65	-	-	QP
4	219.0753	30.12	-9.18	20.94	46.00	-25.06	-	-	QP
5	595.1329	26.82	0.29	27.11	46.00	-18.89	-	-	QP
6	912.8620	27.47	2.70	30.17	46.00	-15.83	-	-	QP

802.11b_11Mbps			
Test Channel	Low	Polarity:	Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	45.6948	40.68	-6.98	33.70	40.00	-6.30	-	-	QP
2	82.0706	44.67	-10.70	33.97	40.00	-6.03	-	-	QP
3	117.3603	44.37	-9.40	34.97	43.50	-8.53	-	-	QP
4	220.6171	36.49	-9.14	27.35	46.00	-18.65	-	-	QP
5	268.4853	31.65	-7.81	23.84	46.00	-22.16	-	-	QP
6	515.4374	26.32	-1.04	25.28	46.00	-20.72	-	-	QP

- Spurious Emissions Above 1GHz
- *Test Mode: 802.11b_11Mbps (worst case)*

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel-2412MHz							
4824.000	60.55	-4.50	56.05	74	-17.95	H	PK
4824.000	50.69	-4.50	46.19	54	-7.81	H	AV
7236.000	53.60	1.14	54.74	74	-19.26	H	PK
7236.000	46.24	1.14	47.38	54	-6.62	H	AV
4824.000	61.17	-4.50	56.67	74	-17.33	V	PK
4824.000	50.43	-4.50	45.93	54	-8.07	V	AV
7236.000	50.14	1.14	51.28	74	-22.72	V	PK
7236.000	41.24	1.14	42.38	54	-11.62	V	AV
Middle Channel-2437MHz							
4874.000	61.20	-4.47	56.73	74	-17.27	H	PK
4874.000	49.13	-4.47	44.66	54	-9.34	H	AV
7311.000	53.67	1.47	55.14	74	-18.86	H	PK
7311.000	46.21	1.47	47.68	54	-6.32	H	AV
4874.000	60.57	-4.47	56.10	74	-17.90	V	PK
4874.000	49.52	-4.47	45.05	54	-8.95	V	AV
7311.000	48.88	1.47	50.35	74	-23.65	V	PK
7311.000	41.71	1.47	43.18	54	-10.82	V	AV
High Channel-2462MHz							
4924.000	56.65	-4.44	52.21	74	-21.79	H	PK
4924.000	51.08	-4.44	46.64	54	-7.36	H	AV
7386.000	52.70	1.79	54.49	74	-19.51	H	PK
7386.000	43.62	1.79	45.41	54	-8.59	H	AV
4924.000	60.23	-4.44	55.79	74	-18.21	V	PK
4924.000	49.30	-4.44	44.86	54	-9.14	V	AV
7386.000	52.82	1.79	54.61	74	-19.39	V	PK
7386.000	41.63	1.79	43.42	54	-10.58	V	AV

Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, other than listed in the table above are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

- Conducted test

Please refer to Appendix E

8. Out of Band Emissions

8.1 Standard Applicable

According to §15.247(d), in any 100kHz 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 20dB below that in the 100kHz 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 30dB instead of 20dB. 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).

8.2 Test Procedure

According to the KDB 558074D01 v05r02 Subclause 8.4 and ANSI C63.10-2013 Subclause 11.11, the Emissions in nonrestricted frequency bands test method as follows:

a) Set the center frequency and span to encompass frequency range to be measured.
b) Set the RBW = 100kHz.
c) Set the VBW ≥ [3 × RBW].
d) Detector = peak.
e) Sweep time = auto couple.
f) Trace mode = max hold.
g) Allow trace to fully stabilize.
h) Use the peak marker function to determine the maximum amplitude level.

According to the KDB 558074 D01 v05r02 Subclause 8.5 and ANSI C63.10-2013 Subclause 11.12, the Emissions in restricted frequency bands test method as follows:

A. Radiated emission measurements:
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.

B. Antenna-port conducted measurements

Peak emission levels are measured by setting the instrument as follows:

a) RBW = as specified in Table 9.

b) VBW ≥ [3 × RBW].

c) Detector = peak.

d) Sweep time = auto.

e) Trace mode = max hold.

f) Allow sweeps to continue until the trace stabilizes. (Note that the required measurement time may be lengthened for low-duty-cycle applications.)

Table 9—RBW as a function of frequency

Frequency	RBW
9 kHz to 150 kHz	200 Hz to 300 Hz
0.15 MHz to 30 MHz	9 kHz to 10 kHz
30 MHz to 1000 MHz	100 kHz to 120 kHz
>1000 MHz	1 MHz

If the peak-detected amplitude can be shown to comply with the average limit, then it is not necessary to perform a separate average measurement.

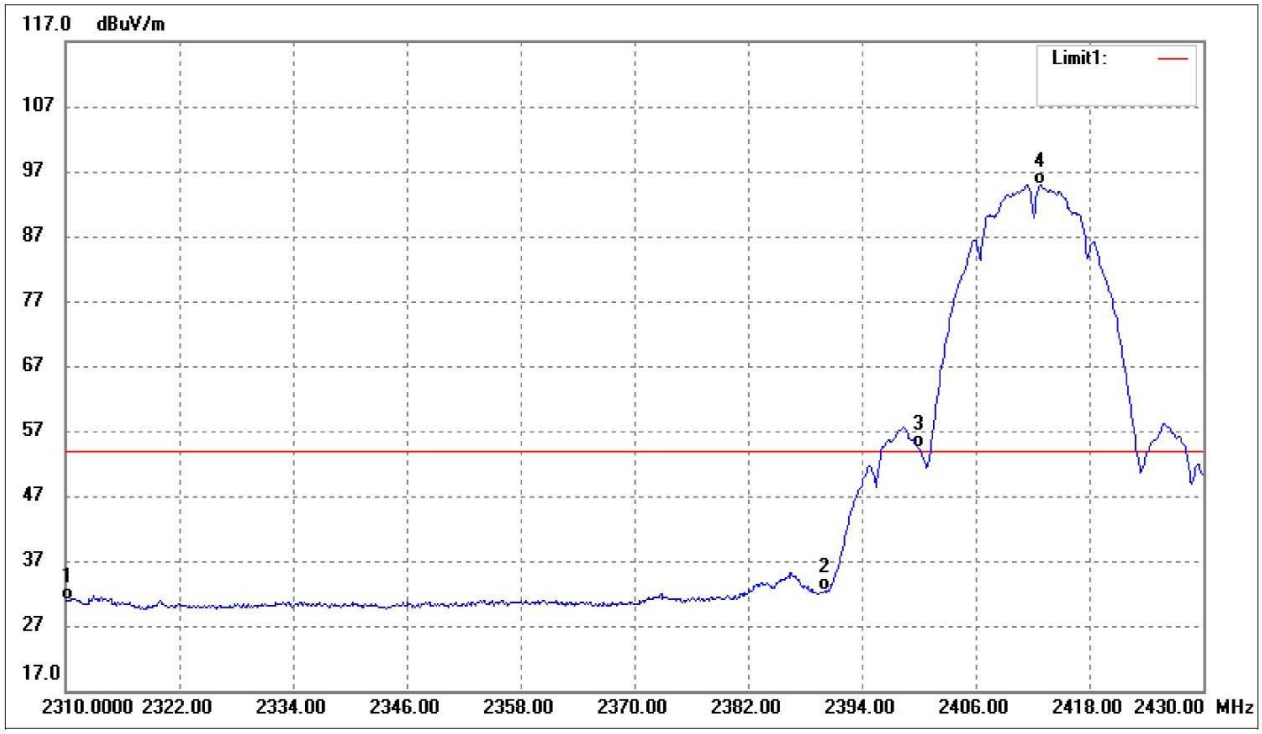
Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements specified in section 8.1. Report the three highest emissions relative to the limit.

8.3 Summary of Test Results/Plots

Note: All test modes (different data rate and different modulation) are performed, but only the worst case(802.11g_54Mbps Vertical) is recorded in this report.

➢ Radiated test

802.11b_11Mbps			
Test Channel	Low	Polarity:	Horizontal (worst case)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2310.000	41.81	-10.82	30.99	54.00	-23.01	Average Detector
	2310.000	53.23	-10.82	42.41	74.00	-31.59	Peak Detector
2	2390.000	43.02	-10.70	32.32	54.00	-21.68	Average Detector
	2390.000	55.18	-10.70	44.48	74.00	-29.52	Peak Detector
3	2400.000	65.18	-10.69	54.49	/		Average Detector
4	2412.840	105.59	-10.67	94.92			Average Detector

802.11b_11Mbps			
Test Channel	High	Polarity:	Horizontal (worst case)

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2461.300	103.99	-10.61	93.38	/	/	Average Detector
	2463.100	108.51	-10.60	97.91	/	/	Peak Detector
2	2483.500	41.88	-10.58	31.30	54.00	-22.70	Average Detector
	2483.500	53.46	-10.58	42.88	74.00	-31.12	Peak Detector
3	2500.000	40.42	-10.55	29.87	54.00	-24.13	Average Detector
	2500.000	53.34	-10.55	42.79	74.00	-31.21	Peak Detector

- Conducted test

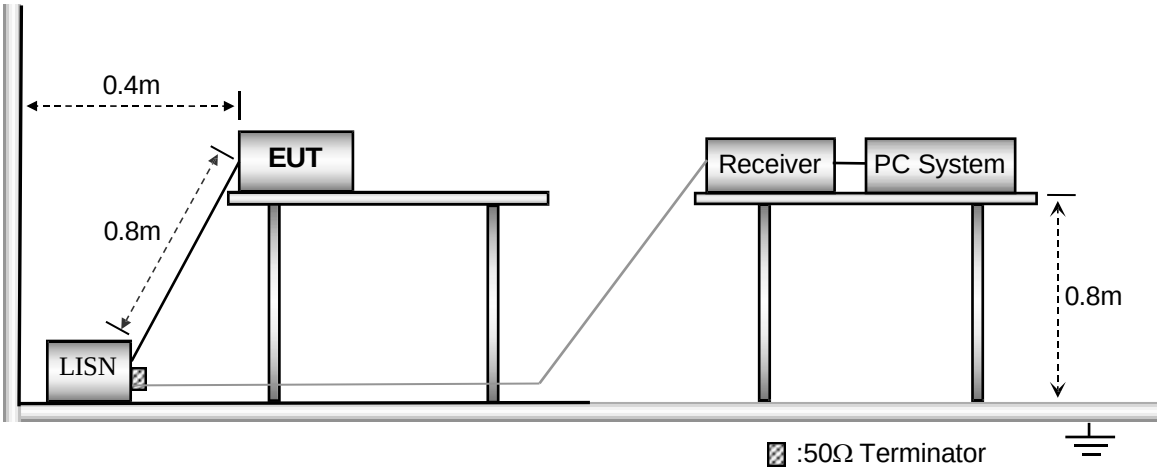
Please refer to Appendix D

9. Conducted Emissions

9.1 Test Procedure

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 Limit.
The external I/O cables were draped along the test table and formed a bundle 30 to 40cm long in the middle.
The spacing between the peripherals was 10cm.

9.2 Basic Test Setup Block Diagram



9.3 Test Receiver Setup

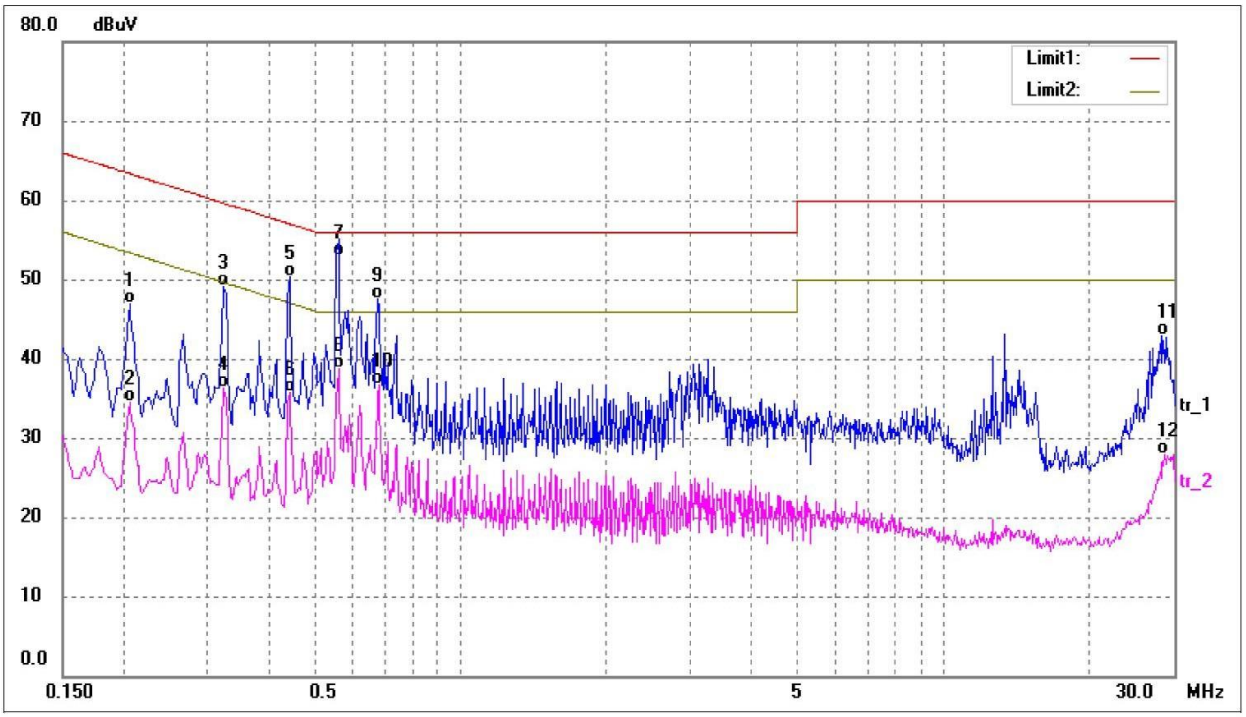
During the conducted emission test, the test receiver was set with the following configurations:

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

9.4 Summary of Test Results/Plots

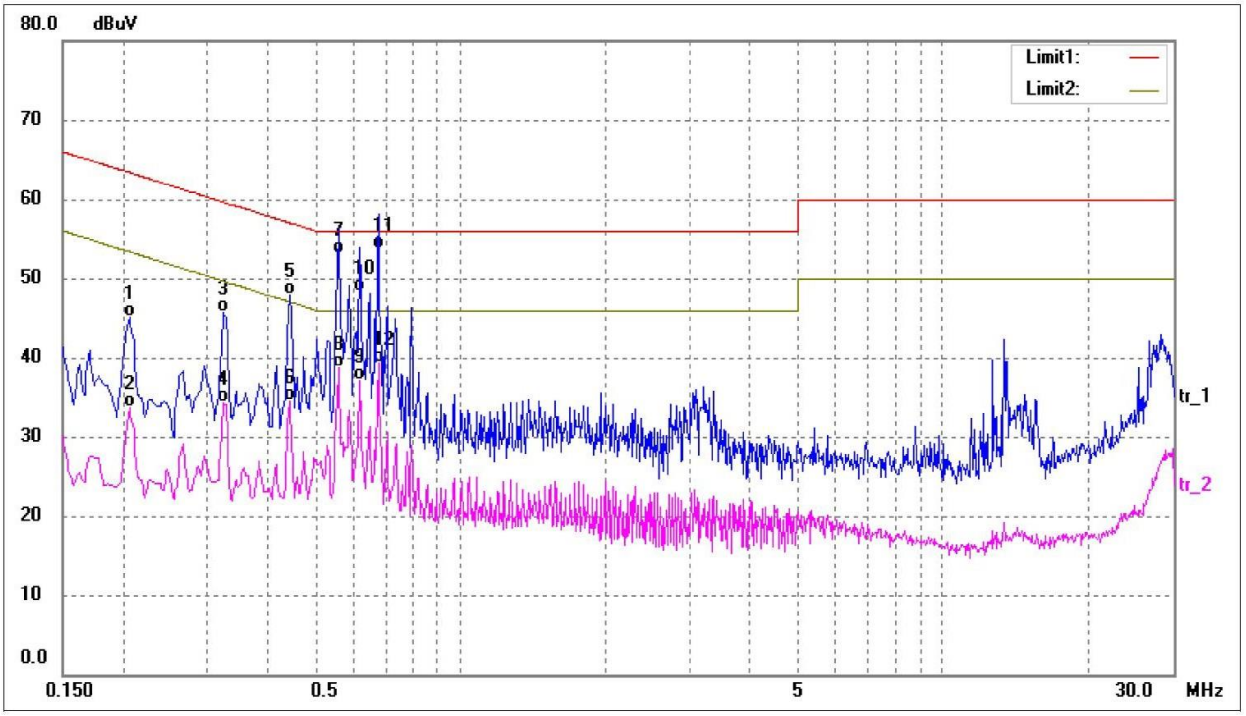
Remark:
Result = Indicated Reading + Correct
Correct=Cable lose + Pulse Limiter Factor + Artificial Mains Factor
Margin=Result- Limit

Test Mode	Communication	AC120V 60Hz	Polarity:	Neutral



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.2059	36.58	10.37	46.95	63.37	-16.42	QP
2	0.2059	24.10	10.37	34.47	53.37	-18.90	AVG
3	0.3220	38.86	10.33	49.19	59.65	-10.46	QP
4	0.3220	25.91	10.33	36.24	49.65	-13.41	AVG
5	0.4420	39.99	10.28	50.27	57.02	-6.75	QP
6	0.4420	25.39	10.28	35.67	47.02	-11.35	AVG
7*	0.5580	42.61	10.29	52.90	56.00	-3.10	QP
8	0.5580	28.37	10.29	38.66	46.00	-7.34	AVG
9	0.6740	37.14	10.36	47.50	56.00	-8.50	QP
10	0.6780	26.32	10.37	36.69	46.00	-9.31	AVG
11	28.3099	32.67	10.23	42.90	60.00	-17.10	QP
12	28.6499	17.72	10.23	27.95	50.00	-22.05	AVG

Test Mode	Communication	AC120V 60Hz	Polarity:	Line



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.2058	34.79	10.37	45.16	63.37	-18.21	QP
2	0.2058	23.30	10.37	33.67	53.37	-19.70	AVG
3	0.3220	35.30	10.33	45.63	59.65	-14.02	QP
4	0.3220	24.01	10.33	34.34	49.65	-15.31	AVG
5	0.4420	37.70	10.28	47.98	57.02	-9.04	QP
6	0.4420	24.16	10.28	34.44	47.02	-12.58	AVG
7	0.5580	42.77	10.29	53.06	56.00	-2.94	QP
8	0.5580	28.39	10.29	38.68	46.00	-7.32	AVG
9	0.6179	26.68	10.33	37.01	46.00	-8.99	AVG
10	0.6180	38.04	10.33	48.37	56.00	-7.63	QP
11*	0.6780	43.40	10.37	53.77	56.00	-2.23	QP
12	0.6780	29.03	10.37	39.40	46.00	-6.60	AVG

APPENDIX SUMMARY

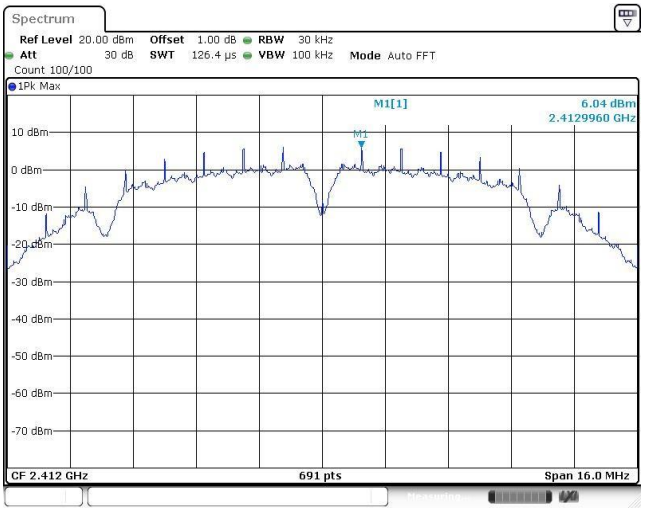
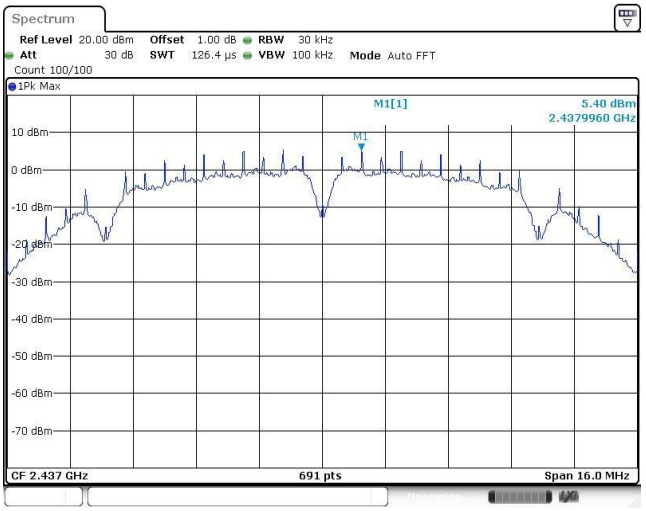
Project No.	WTX24X08010063W001	Test Engineer	Tom Wang
Start date	2024/08/02	Finish date	2024/08/06
Temperature	24.9℃	Humidity	48%
RF specifications	WIFI-2.4G		

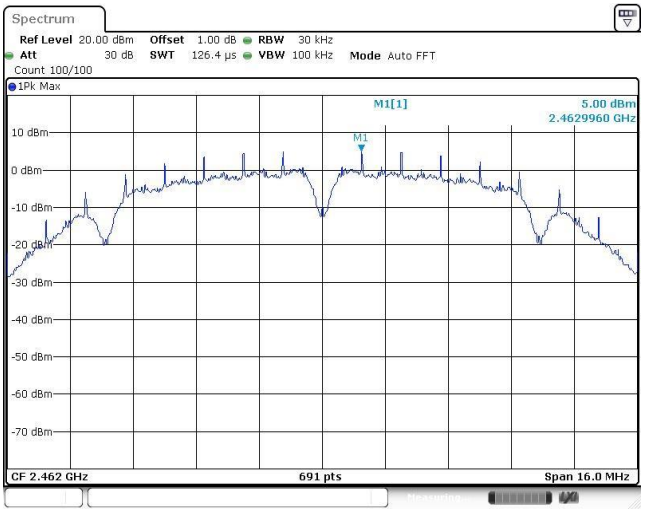
APPENDIX	Description of Test Item	Result
A	Power Spectral Density	Compliant
B	DTS Bandwidth	Compliant
C	RF Output Power	Compliant
D	Conducted Out of Band Emissions	Compliant
E	Conducted Sprious Emissions	Compliant

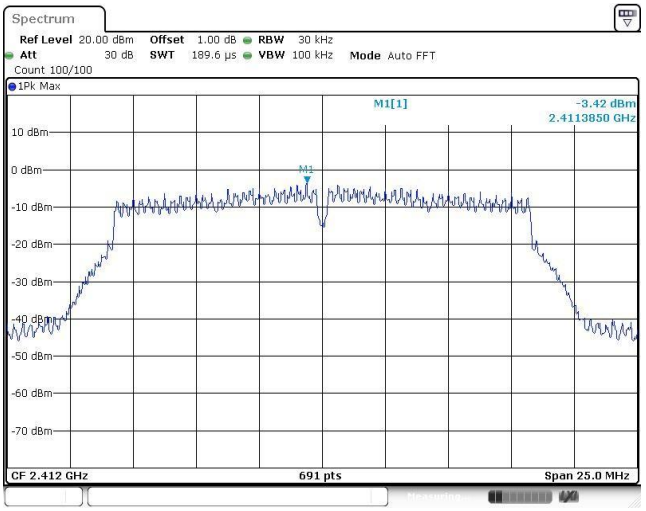
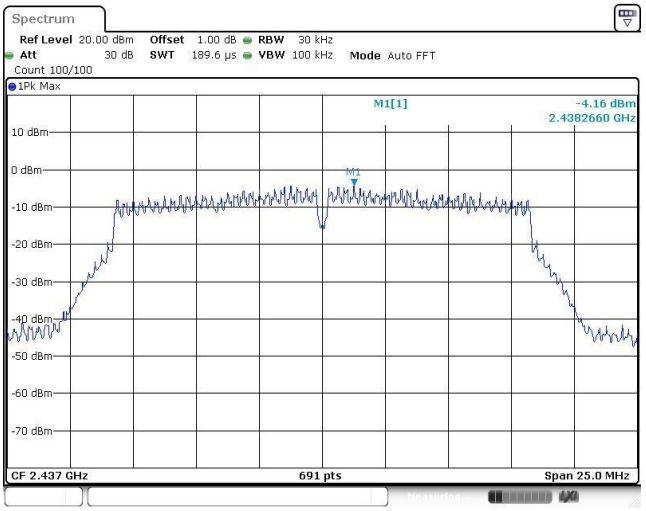
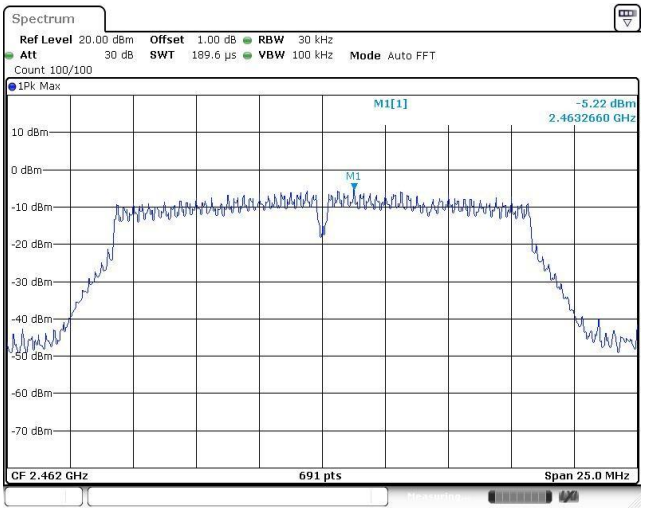
APPENDIXA

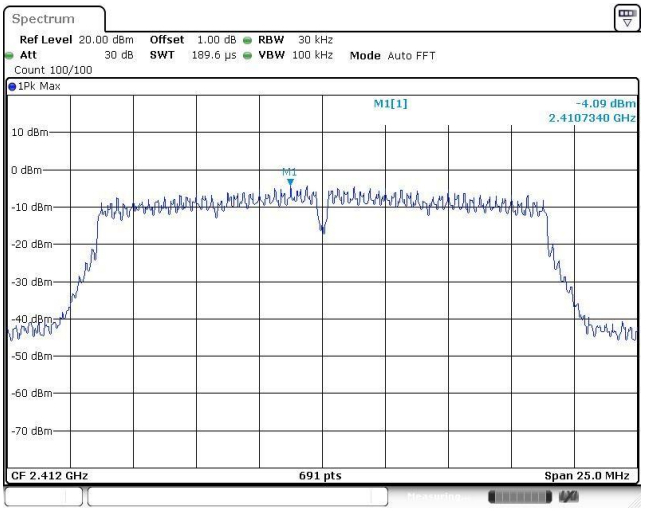
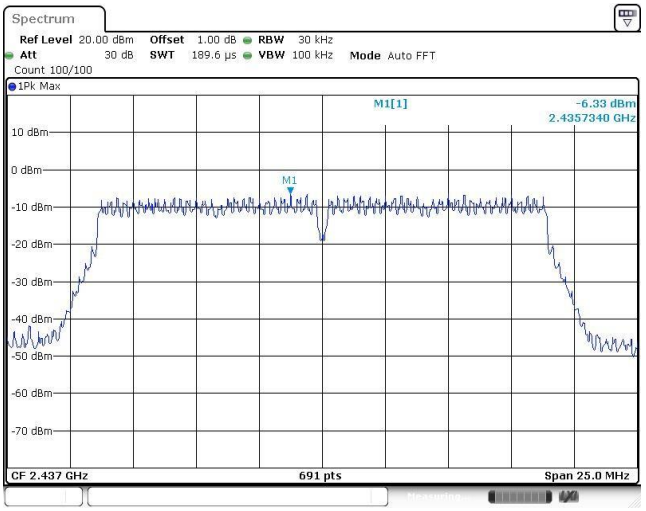
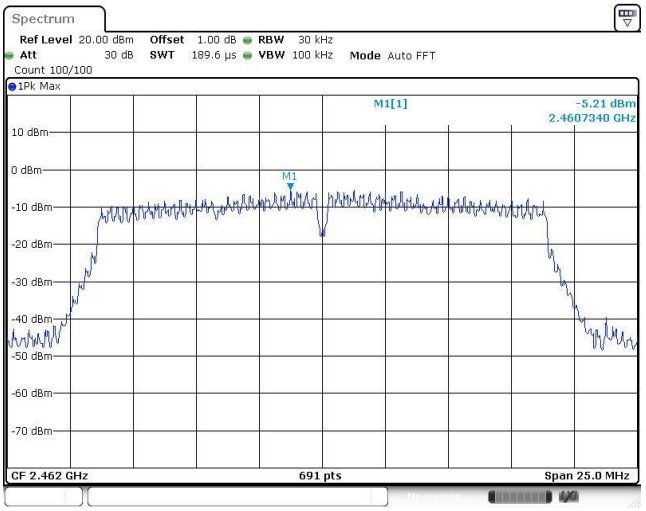
Power Spectral Density			
Test Mode	**Test Channel MHz**	**Power Spectral Density dBm/3kHz**	**Limit dBm/3kHz**
802.11b_11Mbps	2412	6.04	8
	2437	5.40	8
	2462	5.00	8
802.11g_54Mbps	2412	-3.42	8
	2437	-4.16	8
	2462	-5.22	8
802.11n-HT20_MCS7	2412	-4.09	8
	2437	-6.33	8
	2462	-5.21	8
802.11n-HT40_MCS7	2422	-12.08	8
	2437	-12.85	8
	2452	-12.11	8

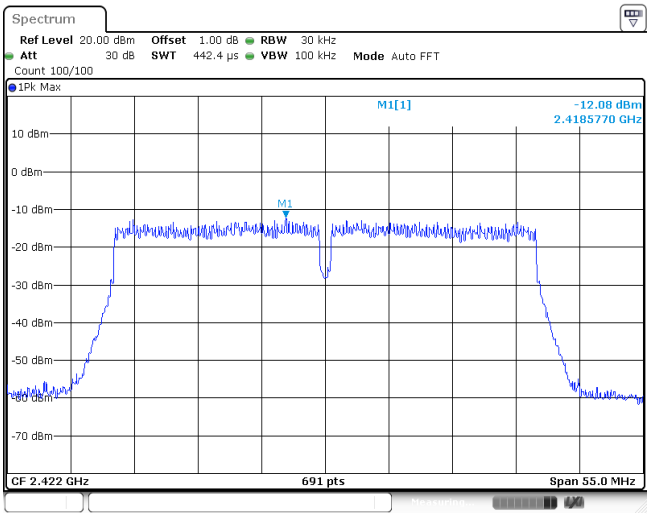
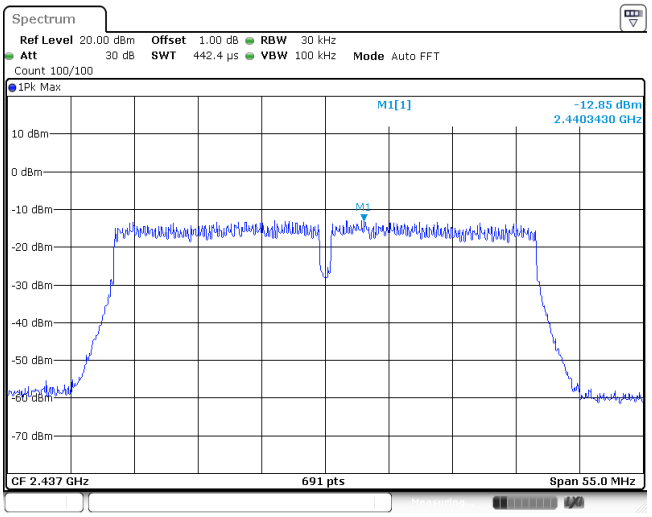
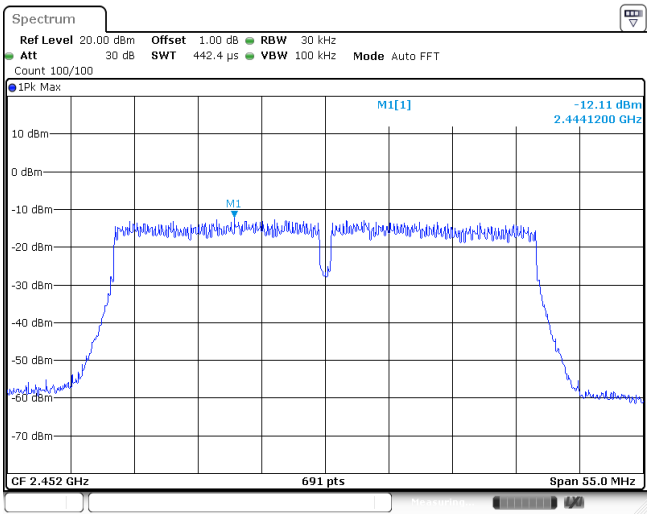
Please refer to the following test plots:

Type:	**802.11b**
CH01	
CH06	

CH11	 Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 30 kHz Att 30 dB SWT 126.4 µs VBW 100 kHz Mode Auto FFT Count 100/100 1Pk Max M1[1] 5.00 dBm 2.4629960 GHz M1 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm CF 2.462 GHz 691 pts Span 16.0 MHz

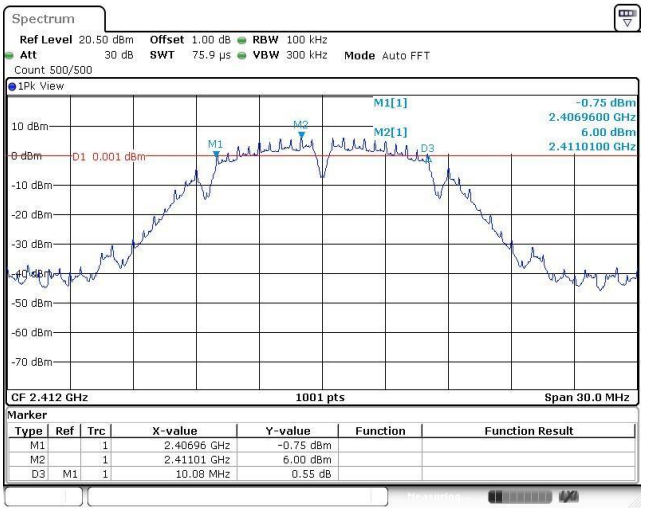
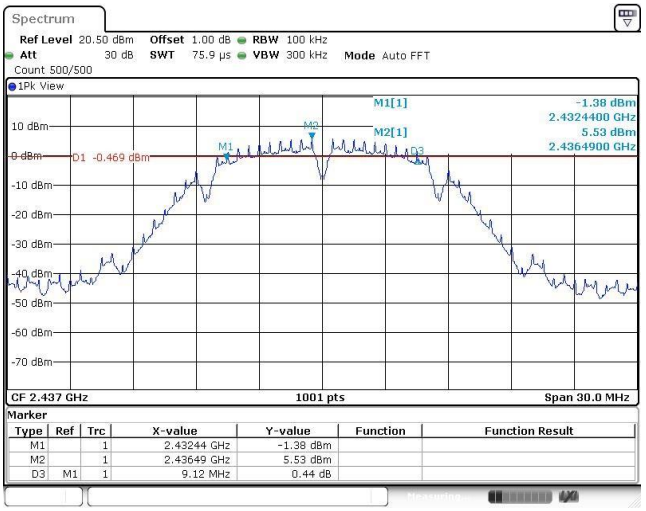
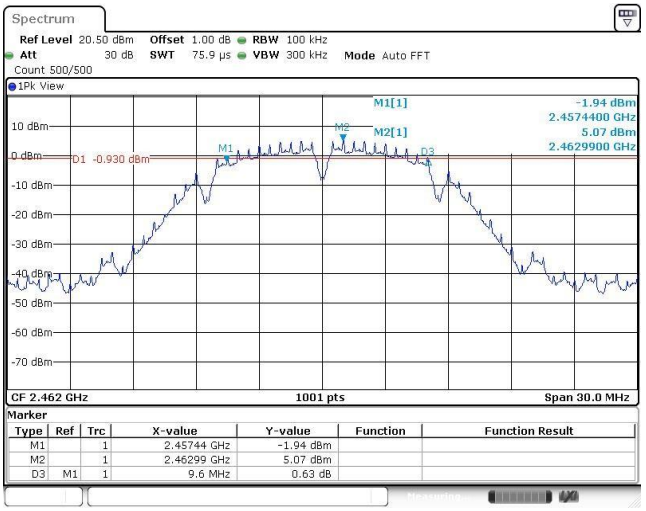
Type:	802.11g
CH01	
CH06	
CH11	

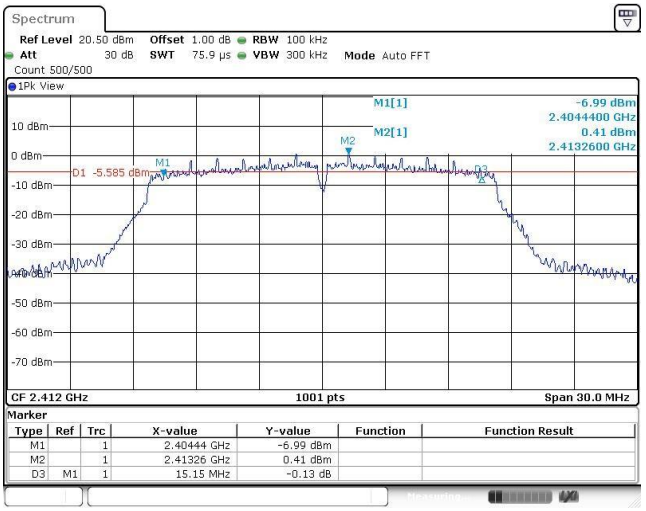
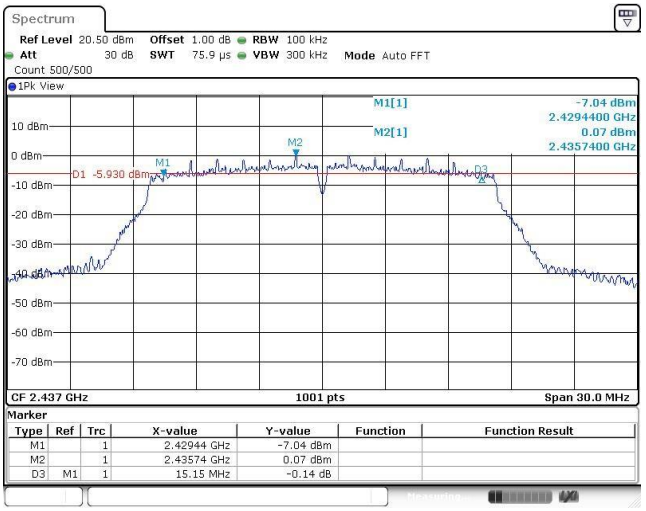
Type:	802.11n(HT20)
CH01	
CH06	
CH11	

Type:	802.11n(HT40)
CH03	
CH06	
CH09	

APPENDIX B

DTS Bandwidth			
Test Mode	**Test Channel MHz**	**6 dB Bandwidth MHz**	**Limit kHz**
802.11b_11Mbps	2412	10.08	≥500
	2437	9.12	≥500
	2462	9.60	≥500
802.11g_54Mbps	2412	15.15	≥500
	2437	15.15	≥500
	2462	15.48	≥500
802.11n-HT20_MCS7	2412	15.15	≥500
	2437	17.64	≥500
	2462	15.93	≥500
802.11n-HT40_MCS7	2422	35.28	≥500
	2437	35.28	≥500
	2452	35.28	≥500

Type:	802.11b
CH01	
CH06	
CH11	

Type:	802.11g
CH01	
CH06	
CH11