TEST REPORT

REPORT NUMBER: B19W50225-WLAN_Rev4

ON

Type of Equipment:	LTE Tracker
Model Name:	AT Plus 4E
Manufacturer:	Micron Electronics LLC.

ACCORDING TO

FCC Part 15, Subpart C, 2015:
15.205 Restricted bands of operation,
15.209 Radiated emission limits; general requirements,
15.247 Operation within the bands 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz
ANSI C63.10-2013:American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

Chongqing Academy of Information and Communications Technology

Month date, year
Sep, 30, 2019

Signature

Zhang Yan
Director

Note:
The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of Chongqing Academy of Information and Communications Technology.

Revision Version

Report Number	Revision	Date	Memo
B19W50225-WLAN	V0.0	2019-08-07	--
B19W50225-WLAN	V1.0	2019-09-17	--
B19W50225-WLAN	V2.0	2019-09-27	--
B19W50225-WLAN	V3.0	2019-09-30	--
B19W50225-WLAN	V4.0	2019-09-30	--

FCC ID:	ZKQ-ATP4E
Report Date:	2019-09-30
Test Firm Name:	Chongqing Academy of Information and Communications Technology
FCC Registration Number:	CN1239

Statement

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported tests were carried out on a sample equipment to demonstrate limited compliance with FCC Parts 15, subpart C. The sample tested was found to comply with the requirements defined in the applied rules.

CONTENTS

1 General Information

1.1 Notes

All reported tests were carried out on a sample equipment to demonstrate limited compliance with FCC Parts 15, subpart C and ANSI C63.10-2013 and FCC DA 00-705.

The test results of this test report relate exclusively to the item(s) tested as specified in section 2.

The following deviation from, additions to, or exclusions from the test specifications have been made. See Annex B.

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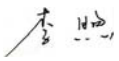
1.2 Testers

Name:	Li Xu
Position:	Engineer
Department:	Department of RF test
Date:	2019-07-02 to 2019-09-27
Signature:	

Editor of this test report:

Name:	Chen Wen
Position:	Engineer
Department:	Department of RF test
Date:	2019-09-30
Signature:	

Technical responsibility for area of testing:

Name:	Zhang Yan
Position:	Manager
Department:	Director of the laboratory
Date:	2019-09-30
Signature:	

1.3 Testing Laboratory information

1.3.1 Location

Name:	Chongqing Academy of Information and Communications Technology
Address:	Building B, Technology Innovation Center, No.8, Yuma Road, Chayuan New Area, Nan'an District, Chongqing, People's Republic of China, 401336
Tel:	+86-23-88069965
Fax:	+86-23-88608777
Email:	liqiao@caict.ac.cn

1.3.2 Test location, where different from section 1.3.1

Name:	------
Street:	------
City:	------
Country:	------
Telephone:	------
Fax:	------
Postcode:	------

1.4 Details of applicant or manufacturer

1.4.1 Applicant

Name:	Micron Electronics LLC.
Address:	1001 Yamato Road, Suite 400, Boca Raton, FL 33431, USA
Country:	USA
Telephone:	+18885383489
Fax:	+18885501805
Contact:	Ping Cheng
Email:	pcheng@micron-electronics.com

1.4.2 Manufacturer (if different from applicant in section 1.4.1)

Name:	--
Address:	--
Country:	--
Telephone:	--
Fax:	--
Contact:	--
Email:	--

2 Test Item

2.1 General Information

Manufacturer:	Micron Electronics LLC.
Type of Equipment:	LTE Tracker
Model Name:	AT Plus 4E
Production Status:	Product
Hardware Version:	A502_V1_PCB
Software Version:	P51MAV01.01B01.I03
Normal Voltages	3.80 V
High Voltages	4.20 V
Low Voltages	3.40 V
Receipt date of test item:	2019-06-11

2.2 Outline of Equipment under Test

The AT Plus 4E, referred to as "EUT" hereafter, is a a multi-Band wireless modem operating on the GSM/CAT-M1/NB-IoT/Wi-Fi networks. The table below shows the supported bands for the EUT.

Technology	Freq.(MHz)	Note
2.4G WLAN	2400-2483.5	--

2.3 Modifications Incorporated in EUT

The EUT has not been modified from what is described by the brand name and unique type identification stated above.

2.4 Equipment Configuration

Equipment configuration list:

Item	Generic Description	Manufacturer	Type	Serial No.	Remarks
A	Modules	Micron Electronics LLC.	AT Plus 4E	353081090308407	None
B	Modules	Micron Electronics LLC.	AT Plus 4E	353081090308282	None
C	Adapter	Shenzhen Linksooner Technology Co.,Ltd.	YXT917-0501000EU	--	Input Voltage: 100-240V~50/60Hz, 0.20A Max Output Voltage: 4-5V ⎓0.1-1A
D	Data line	--	--	--	--
E	Rechargeable Li-polymer Battery	--	--	--	Nominal capacity: 2600mAh Nominal Voltage: +3.7V Maximum Charging Voltage: +4.2V

2.5 Other Information

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3 Summary of Test Results

A brief summary of the tests carried out is shown as following.

FCC Rules	Name of Test	Result
15.247(b)	Maximum Peak Output Power	Pass
15.247(e)	Peak Power Spectral Density	Pass
15.247(a)	6dB Occupied Bandwidth	Pass
15.247(d)	Band Edges Compliance	Pass
15.247 (d)	Transmitter Spurious Emission-Conducted	Pass
15.247, 15.205, 15.209	Transmitter Spurious Emission-Radiated	Pass
ANSI C63.4 voltage mains test	Power line Conducted Emissions	Pass
Note:--		

4 Test Equipments and Ancillaries Used For Tests

The test equipments and ancillaries used are as follows.

No.	Equipment	Model	SN	Manufacture	Cal. Due Date
1	EMI Test Receiver	ESU26	100367	R&S	2020-03-01
2	Trilog super broad band test antenna	VULB 9163	9163-544	R&S	2019-11-24
3	Double-Ridged Horn Antenna	HF907	100357	R&S	2021-06-22
4	Fully-Anechoic Chamber	11.8m×6.5 m×6.3m	--	ETS	2019-10-23
5	Universal Radio Communication Tester	SP8315	SP8315-1249	StarPoint	2020-03-01
6	Signal Generator	SMU200A	104517	R&S	2020-03-01
7	Spectrum analyzer	FSQ 26	201137/026	R&S	2020-03-01
8	spectrum analyzer	N9020A	MY50200376	Agilent	2020-03-01
9	DC Power Supply	N6705B	MY50000919	Agilent	2019-12-05
10	Climate chamber	SH-241	92010759	ESPEC	2020-03-01

5 Test Results

5.1 Maximum Peak Output Power

Specifications:	FCC Part 15.247(b)
DUT Serial Number:	353081090308407
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	Pass

Limit Level Construction:

The maximum peak output power of the intentional radiator shall not exceed the following:

1. For systems using digital modulation in the bands of 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz: 1 watt.

2. Except as shown in paragraphs (b)(3) (i), (ii) and (iii) of this section, if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Measurement Uncertainty:

Measurement Uncertainty	±1.0dB

Test Method:

The measurement is according to ANSI C63.10 clause 11.2

1. The output power of EUT was connected to the spectrum analyzer. The path loss was compensated to the results for each measurement.
2. Enable EUT transmitter maximum power continuously.
3. Set RBW ≥ OBW, Set the appropriate VBW
4. Detector : Peak.
5. Trace mode: Max Hold

Note: --

Measurement Results:

802.11b/g mode

Mode	Data Rate(Mbps)	Teat Result(dBm)			Conclusion
		Ch1	Ch6	Ch11	
802.11b	1	16.83	17.06	17.09	Pass
	2	16.87	17.10	17.18	Pass
	5.5	16.76	16.95	17.11	Pass
	11	16.76	16.96	17.09	Pass
802.11g	6	17.09	16.94	16.36	Pass
	9	16.25	17.01	16.91	Pass
	12	16.85	17.00	16.23	Pass
	18	16.19	16.83	15.84	Pass
	24	16.40	17.14	15.76	Pass
	36	16.07	17.00	15.72	Pass
	48	16.26	16.92	16.08	Pass
	54	16.26	17.08	15.70	Pass

802.11n mode

Mode	Data Rate(Mbps)	Teat Result(dBm)			Conclusion
		Ch1	Ch6	Ch11	
802.11n (20MHz)	MCS0	15.56	17.04	17.04	Pass
	MCS1	15.87	16.86	16.72	Pass
	MCS2	16.65	17.27	16.96	Pass
	MCS3	16.84	17.04	16.93	Pass
	MCS4	17.48	17.13	16.95	Pass
	MCS5	17.22	17.19	16.84	Pass
	MCS6	17.37	17.18	16.79	Pass
	MCS7	17.15	16.96	17.04	Pass
802.11n (40MHz)	MCS0	16.71	16.32	17.14	Pass
	MCS1	16.41	15.97	16.91	Pass
	MCS2	16.04	15.97	16.79	Pass
	MCS3	16.07	15.81	17.16	Pass
	MCS4	16.27	16.36	16.94	Pass
	MCS5	16.50	16.08	16.91	Pass
	MCS6	16.46	16.09	16.80	Pass
	MCS7	16.40	16.02	16.97	Pass

Conclusion: PASS

Test figure as below:

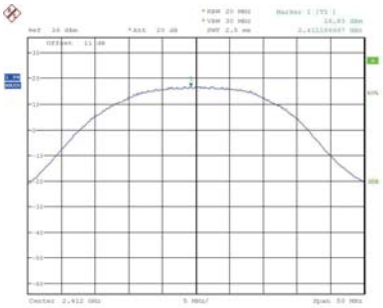

Fig.1 Peak Conducted Output Power CH1, 11b, Rate1

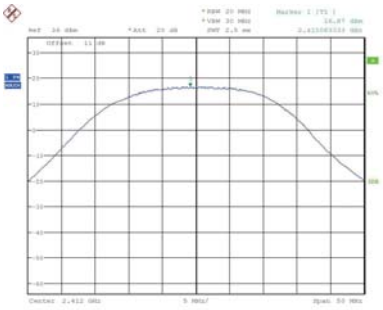

Fig.2 Peak Conducted Output Power CH1, 11b, Rate2

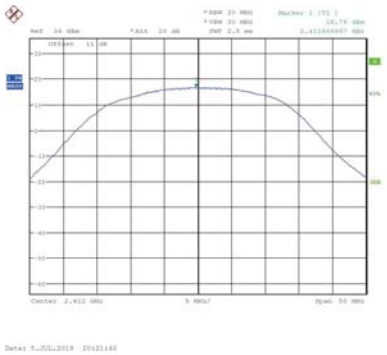

Fig.3 Peak Conducted Output Power CH1, 11b, Rate5.5

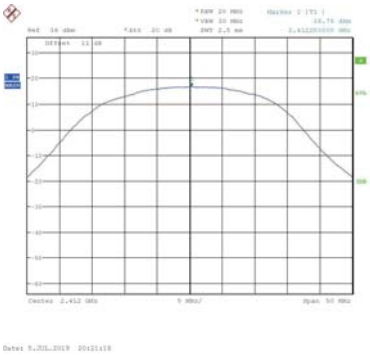

Fig.4 Peak Conducted Output Power CH1, 11b, Rate11

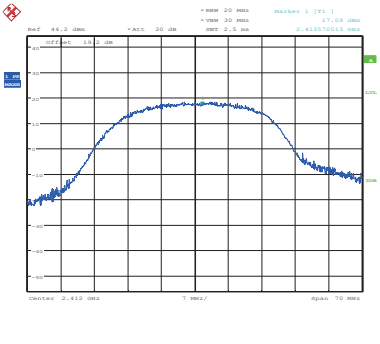

Fig.5 Peak Conducted Output Power CH1, 11g, Rate6

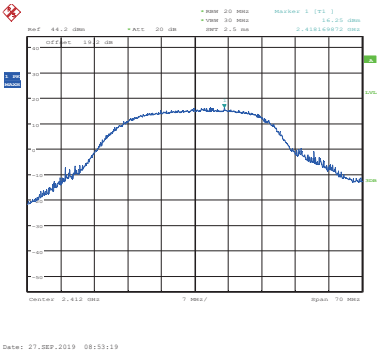

Fig.6 Peak Conducted Output Power CH1, 11g, Rate9

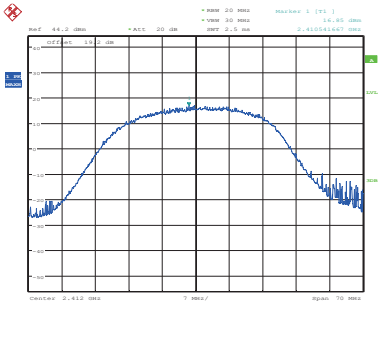

Fig.7 Peak Conducted Output Power CH1, 11g, Rate12

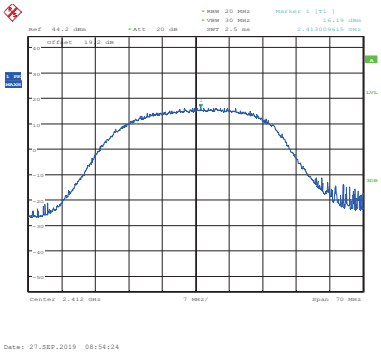

Fig.8 Peak Conducted Output Power CH1, 11g, Rate18

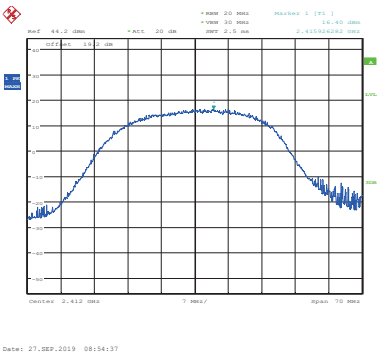

Fig.9 Peak Conducted Output Power CH1, 11g, Rate24

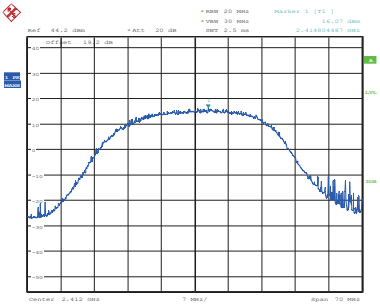

Fig.10 Peak Conducted Output Power CH1, 11g, Rate36

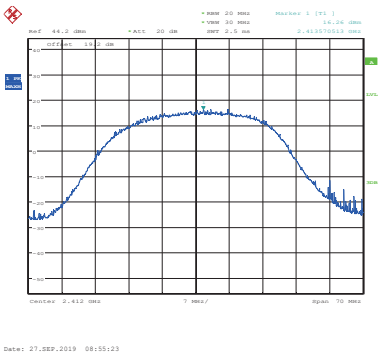

Fig.11 Peak Conducted Output Power CH1, 11g, Rate48

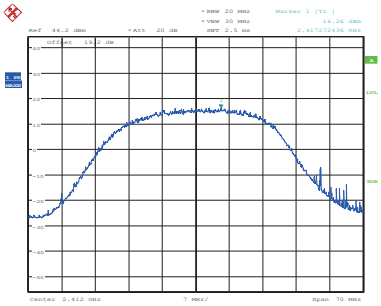

Fig.12 Peak Conducted Output Power CH1, 11g, Rate54

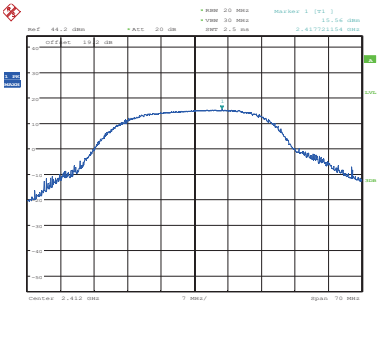

Fig.13 Conducted Output Power CH1, 11n, Rate MCS0

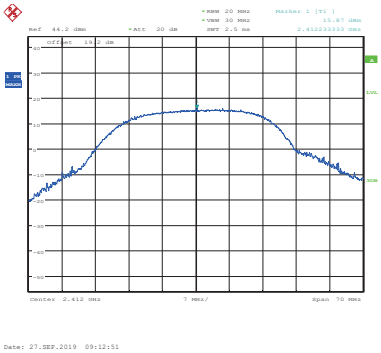

Fig.14 Conducted Output Power CH1, 11n, Rate MCS1

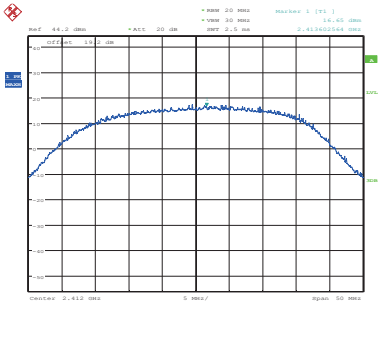

Fig.15 Conducted Output Power CH1, 11n, Rate MCS2

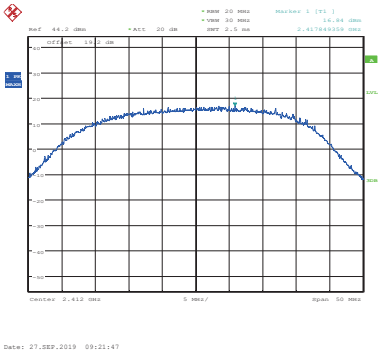

Fig.16 Conducted Output Power CH1, 11n, Rate MCS3

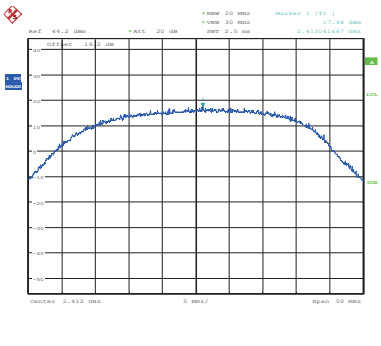

Fig.17 Conducted Output Power CH1, 11n, Rate MCS4

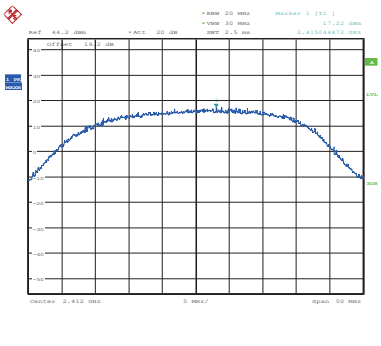

Fig.18 Conducted Output Power CH1, 11n, Rate MCS5

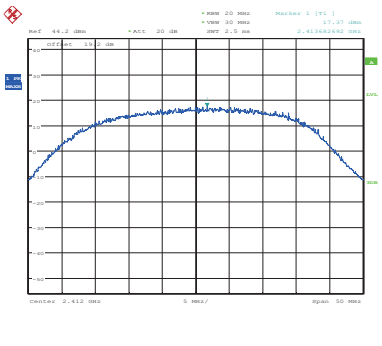

Fig.19 Conducted Output Power CH1, 11n, Rate MCS6

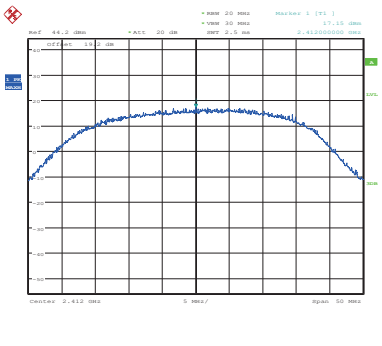

Fig.20 Conducted Output Power CH1, 11n, Rate MCS7

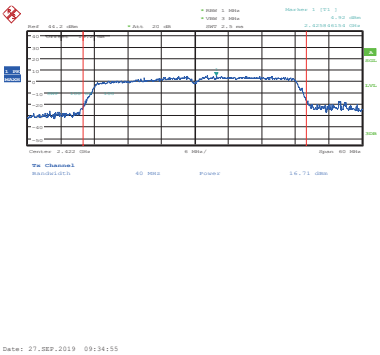

Fig.21 Conducted Output Power CH1, 11n(40M), Rate MCS0

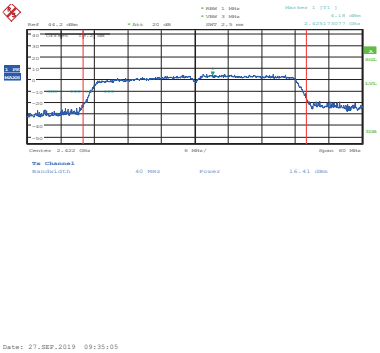

Fig.22 Conducted Output Power CH1, 11n(40M), Rate MCS1

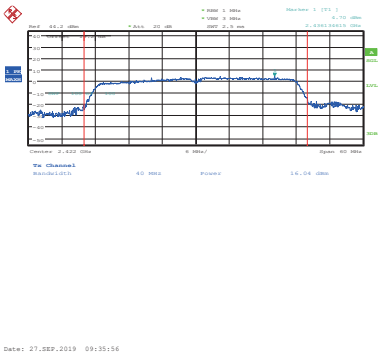

Fig.23 Conducted Output Power CH1, 11n(40M), Rate MCS2

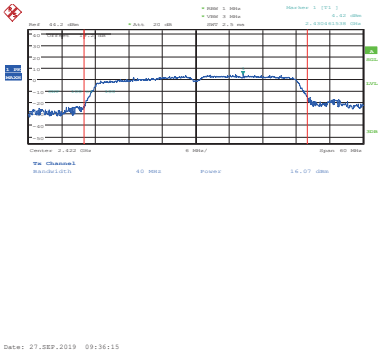

Fig.24 Conducted Output Power CH1, 11n(40M), Rate MCS3

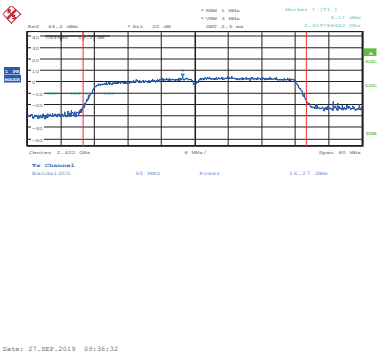

Fig.25 Conducted Output Power CH1, 11n(40M), Rate MCS4

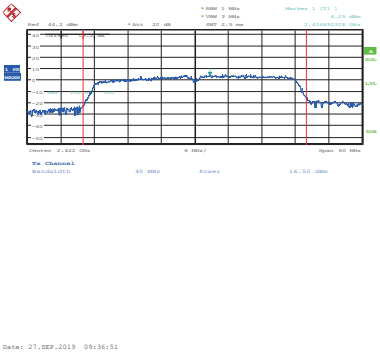

Fig.26 Conducted Output Power CH1, 11n(40M), Rate MCS5

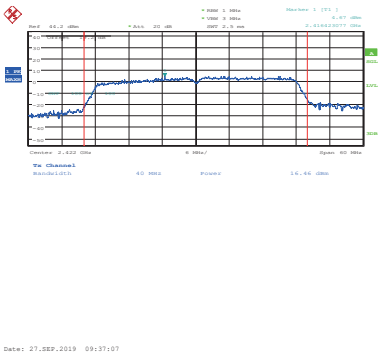

Fig.27 Conducted Output Power CH1, 11n(40M), Rate MCS6

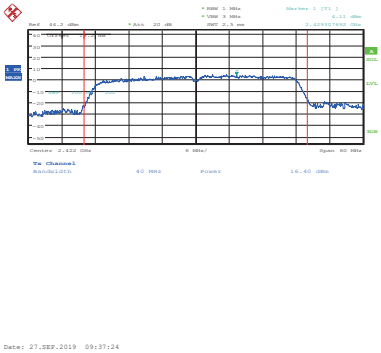

Fig.28 Conducted Output Power CH1, 11n(40M), Rate MCS7

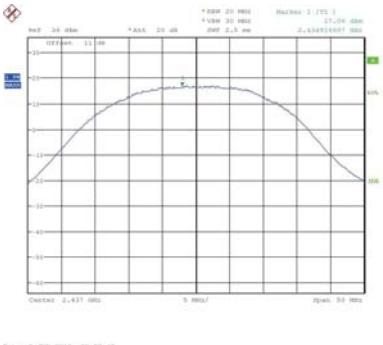

Fig.29 Peak Conducted Output Power CH6, 11b, Rate1

Fig.30 Peak Conducted Output Power CH6, 11b, Rate2

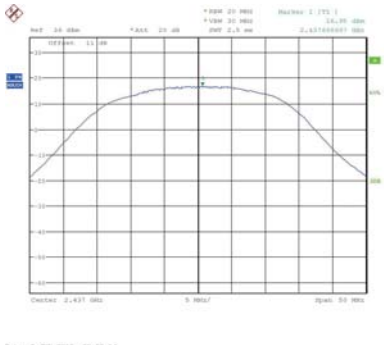

Fig.31 Peak Conducted Output Power CH6, 11b, Rate5.5

Fig.32 Peak Conducted Output Power CH6, 11b, Rate11

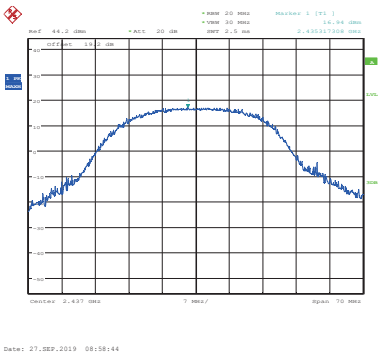

Fig.33 Peak Conducted Output Power CH6, 11g, Rate6

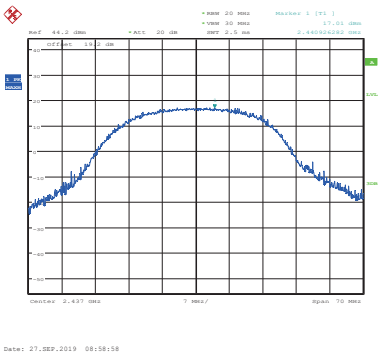

Fig.34 Conducted Output Power CH6, 11g, Rate9

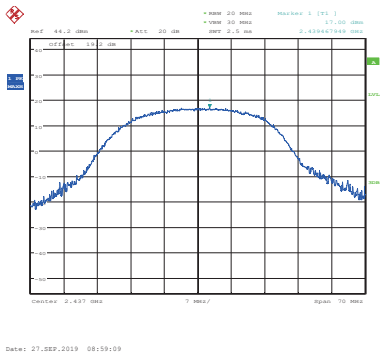

Fig.35 Conducted Output Power CH6, 11g, Rate12

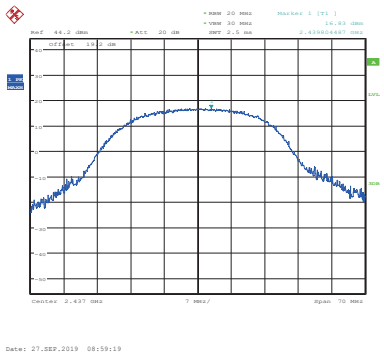

Fig.36 Conducted Output Power CH6, 11g, Rate18

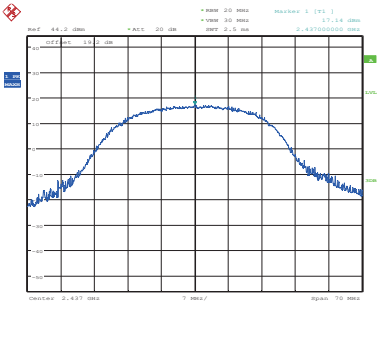

Fig.37 Conducted Output Power CH6, 11g, Rate24

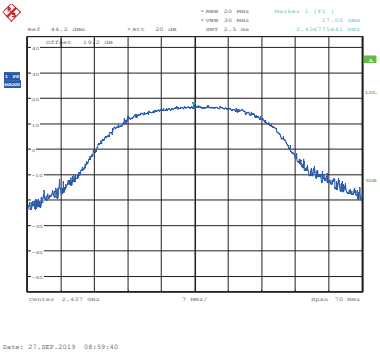

Fig.38 Conducted Output Power CH6, 11g, Rate36

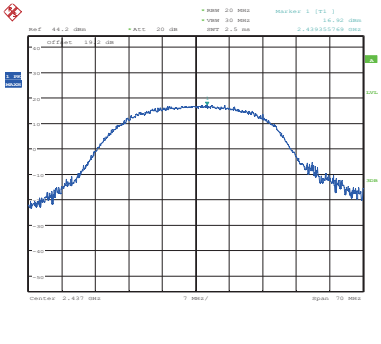

Fig.39 Conducted Output Power CH6, 11g, Rate48

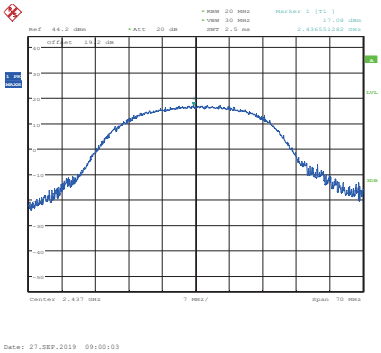

Fig.40 Conducted Output Power CH6, 11g, Rate54

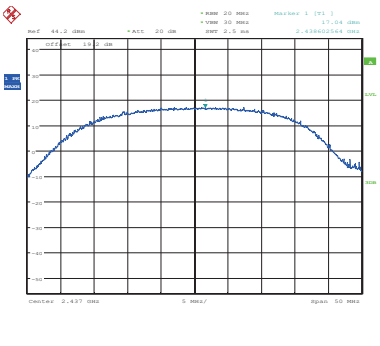

Fig.41 Conducted Output Power CH6, 11n, Rate MCS0

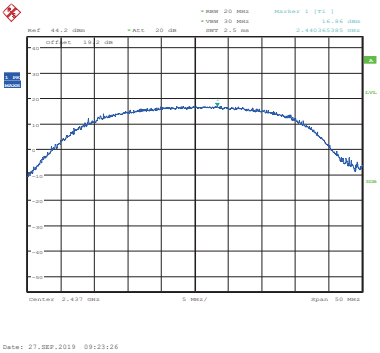

Fig.42 Conducted Output Power CH6, 11n, Rate MCS1

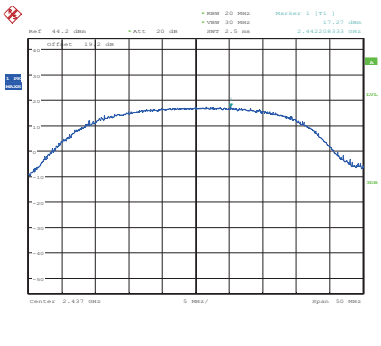

Fig.43 Conducted Output Power CH6, 11n, Rate MCS2

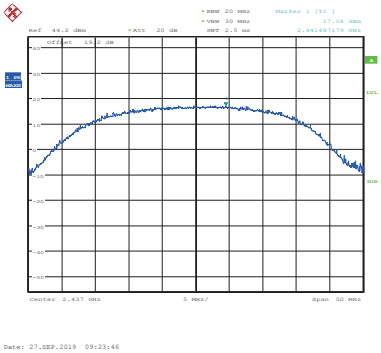

Fig.44 Conducted Output Power CH6, 11n, Rate MCS3

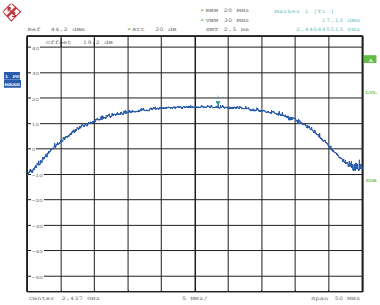

Fig.45 Conducted Output Power CH6, 11n, Rate MCS4

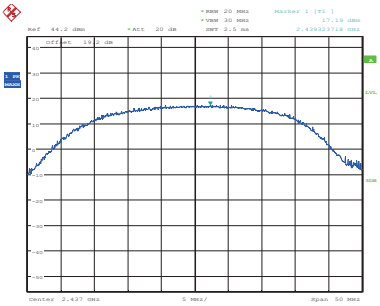

Fig.46 Conducted Output Power CH6, 11n, Rate MCS5

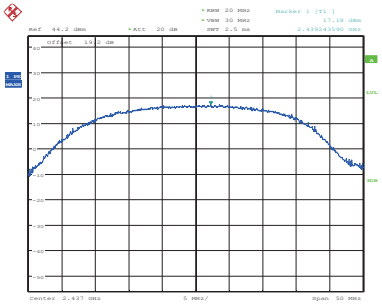

Fig.47 Conducted Output Power CH6, 11n, Rate MCS6

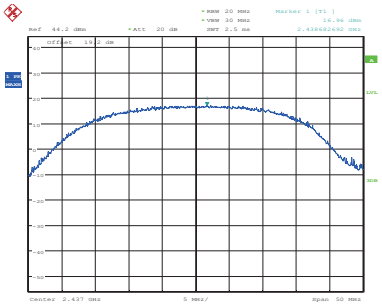

Fig.48 Conducted Output Power CH6, 11n, Rate MCS7

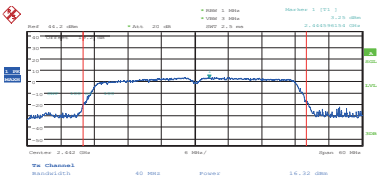

Fig.49 Conducted Output Power CH6, 11n(40M), Rate MCS0

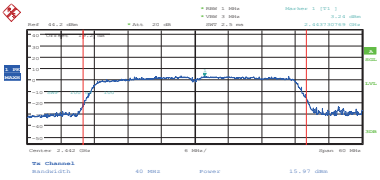

Fig.50 Conducted Output Power CH6, 11n(40M), Rate MCS1

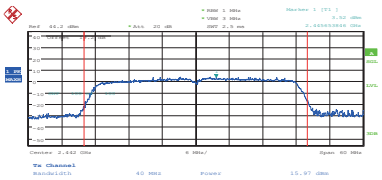

Fig.51 Conducted Output Power CH6, 11n(40M), Rate MCS2

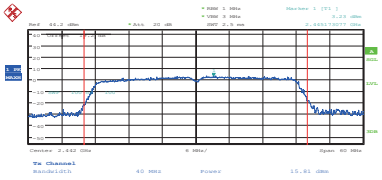

Fig.52 Conducted Output Power CH6, 11n(40M), Rate MCS3

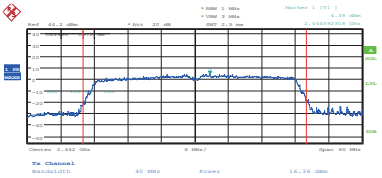

Fig.53 Conducted Output Power CH6, 11n(40M), Rate MCS4

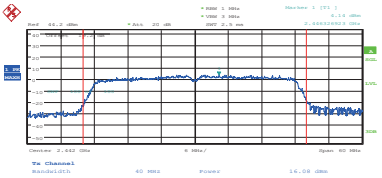

Fig.54 Conducted Output Power CH6, 11n(40M), Rate MCS5

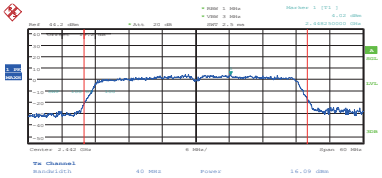

Fig.55 Conducted Output Power CH6, 11n(40M), Rate MCS6

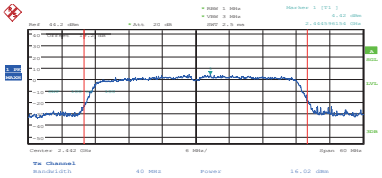

Fig.56 Conducted Output Power CH6, 11n(40M), Rate MCS7

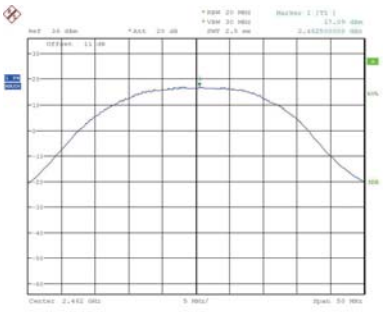

Fig.57 Conducted Output Power CH11, 11b, Rate1

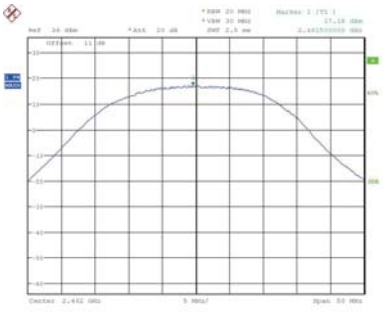

Fig.58 Conducted Output Power CH11, 11b, Rate2

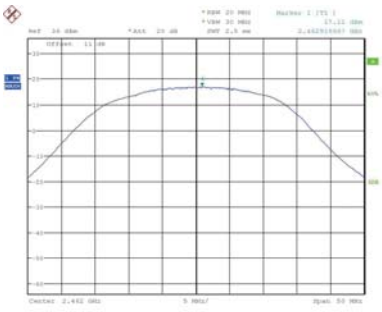

Fig.59 Conducted Output Power CH11, 11b, Rate5.5

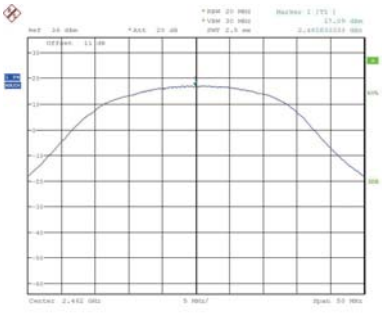

Fig.60 Conducted Output Power CH11, 11b, Rate11

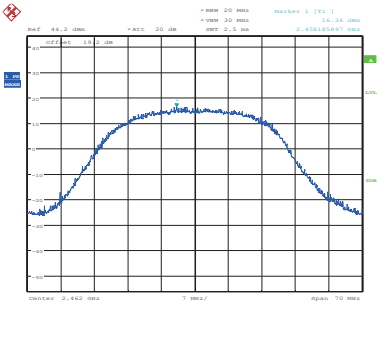

Fig.61 Conducted Output Power CH11, 11g, Rate6

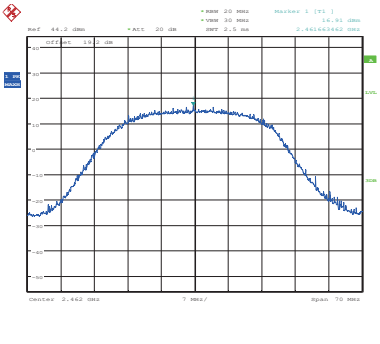

Fig.62 Conducted Output Power CH11, 11g, Rate9

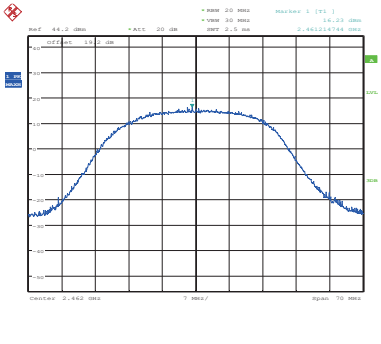

Fig.63 Conducted Output Power CH11, 11g, Rate12

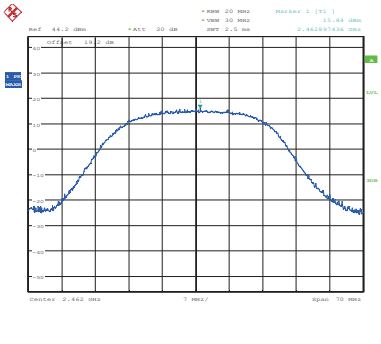

Fig.64 Conducted Output Power CH11, 11g, Rate18

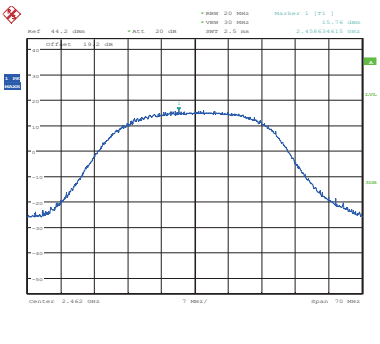

Fig.65 Conducted Output Power CH11, 11g, Rate24

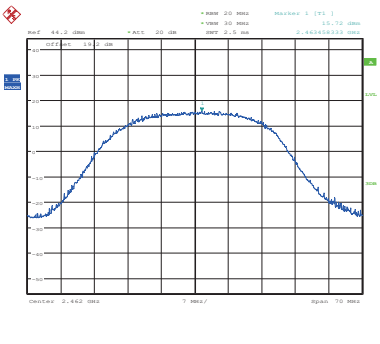

Fig.66 Conducted Output Power CH11, 11g, Rate36

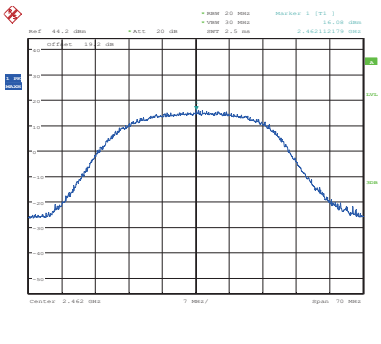

Fig.67 Conducted Output Power CH11, 11g, Rate48

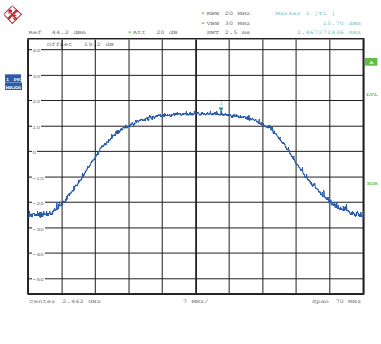

Fig.68 Conducted Output Power CH11, 11g, Rate54

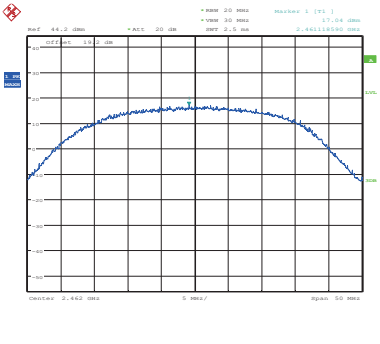

Fig.69 Conducted Output Power CH11, 11n, Rate MCS0

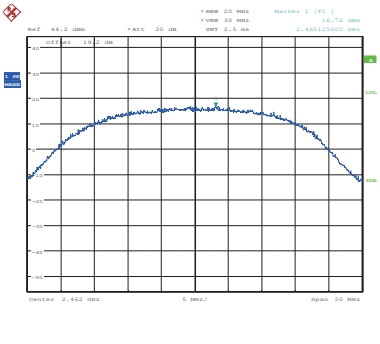

Fig.70 Conducted Output Power CH11, 11n, Rate MCS1

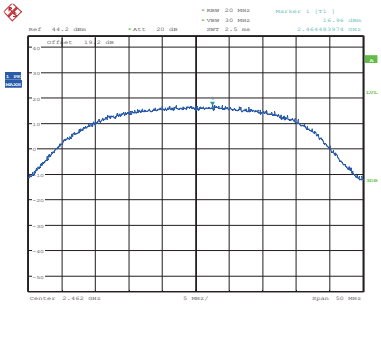

Fig.71 Conducted Output Power CH11, 11n, Rate MCS2

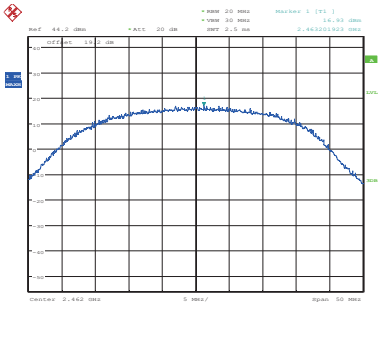

Fig.72 Conducted Output Power CH11, 11n, Rate MCS3

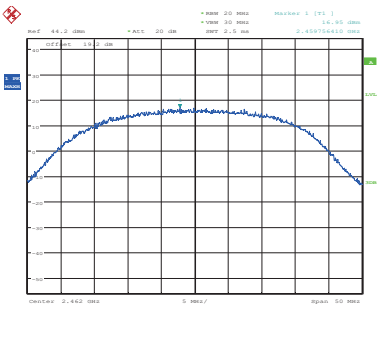

Fig.73 Conducted Output Power CH11, 11n, Rate MCS4

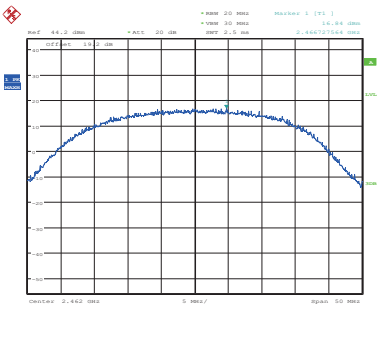

Fig.74 Conducted Output Power CH11, 11n, Rate MCS5

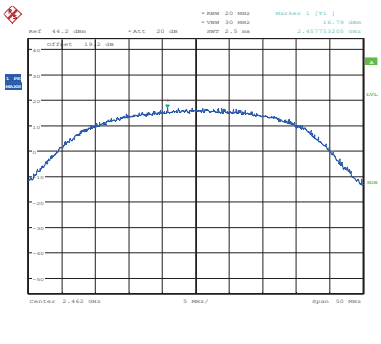

Fig.75 Conducted Output Power CH11, 11n, Rate MCS6

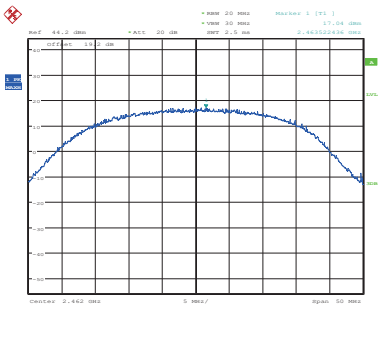

Fig.76 Conducted Output Power CH11, 11n, Rate MCS7

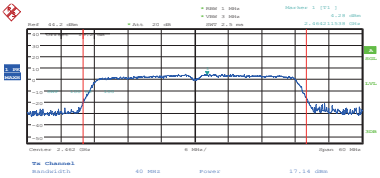

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Fig.77 Conducted Output Power CH11, 11n(40M), Rate MCS0

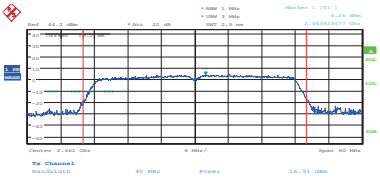

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Fig.78 Conducted Output Power CH11, 11n(40M), Rate MCS1

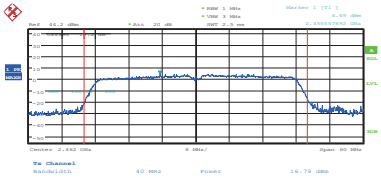

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Fig.79 Conducted Output Power CH11, 11n(40M), Rate MCS2

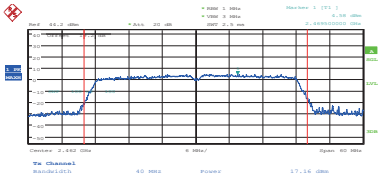

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Fig.80 Conducted Output Power CH11, 11n(40M), Rate MCS3

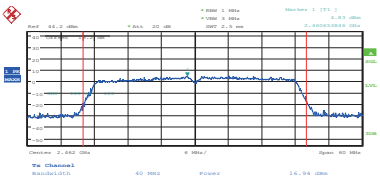

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Fig.81 Conducted Output Power CH11, 11n(40M), Rate MCS4

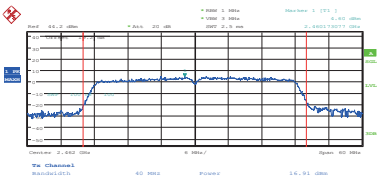

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Fig.82 Conducted Output Power CH11, 11n(40M), Rate MCS5

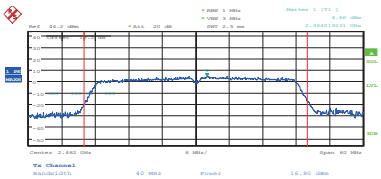

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Fig.83 Conducted Output Power CH11, 11n(40M), Rate MCS6

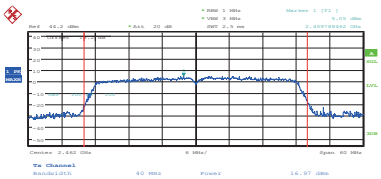

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Fig.84 Conducted Output Power CH11, 11n(40M), Rate MCS7

5.2 Peak Power Spectral Density

Specifications:	FCC CFR Part 15.247(e)
DUT Serial Number:	353081090308407
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	--

Limit Level Construction:

Standard	Limit
FCC CFR Part 15.247(e)	< 8dBm/3 KHz

Measurement Uncertainty:

Measurement Uncertainty	±0.82dBm/KHz

Test procedure:

The measurement is according to ANSI C63.10 clause 11.10.

1. The output power of EUT was connected to the spectrum analyzer. The path loss was compensated to the results for each measurement.
2. Enable EUT transmitter maximum power continuously.
3. Set analyzer center frequency to DTS channel center frequency.
4. Set the span to 1.5 times the DTS bandwidth.
5. Set the RBW to 3 kHz ≤ RBW ≤ 100 kHz.
6. Set the VBW ≥ [3 × RBW].
7. Detector = peak.
8. Sweep time = auto couple.
9. Trace mode = max hold.
10. Allow trace to fully stabilize.
11. Use the peak marker function to determine the maximum amplitude level within the RBW.
12. If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat.

Note: --

Test Results:

802.11b/g/n mode

Mode	Power Spectral Density(dBm/3kHz)			Conclusion
	Ch1	Ch6	Ch11	
802.11b	-9.08	-9.68	-9.79	Pass
802.11g	-17.80	-15.77	-16.88	Pass
802.11n(20MHz)	-17.80	-16.87	-16.95	Pass
802.11n(40MHz)	-19.82	-19.23	-19.98	Pass

Conclusion: PASS

Test figure as below:

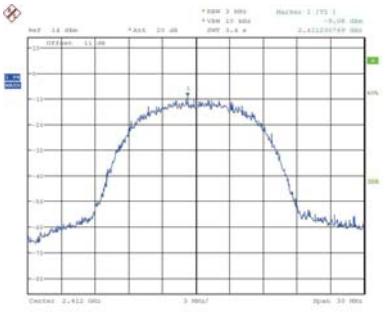


Fig.85 Power spectral density: CH1,11b

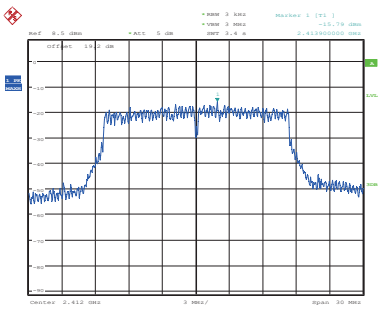


Fig.86 Power spectral density: CH1,11g

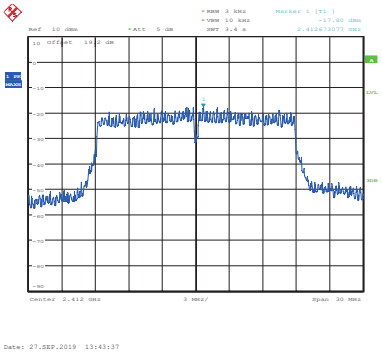


Fig.87 Power spectral density: CH1,11n

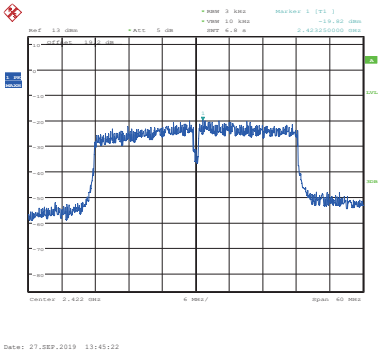


Fig.88 Power spectral density: CH1,11n(40M)

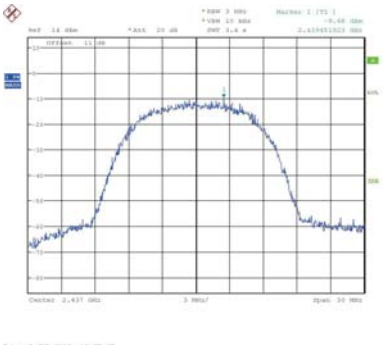


Fig.89 Power spectral density: CH6,11b

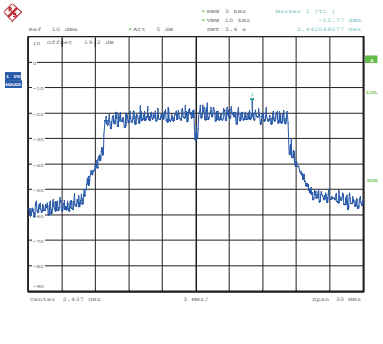


Fig.90 Fig.66 Power spectral density: CH6,11g

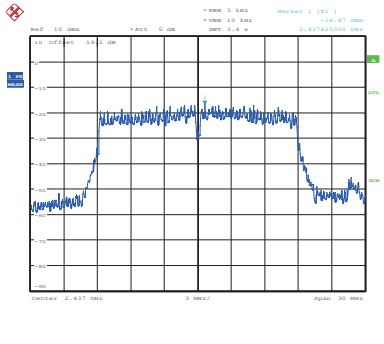


Fig.91 Power spectral density: CH6,11n

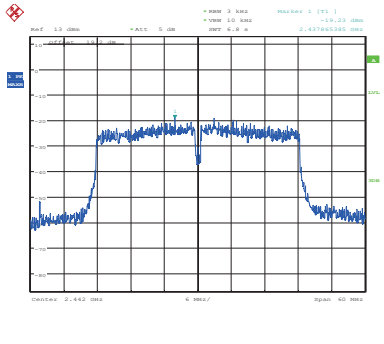


Fig.92 Power spectral density: CH6,11n(40M)

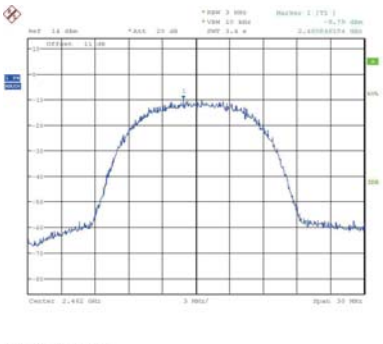


Fig.93 Power spectral density: CH11,11b

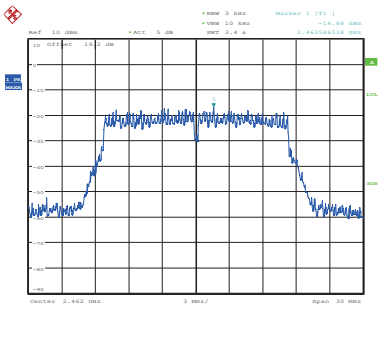


Fig.94 Power spectral density: CH11,11g

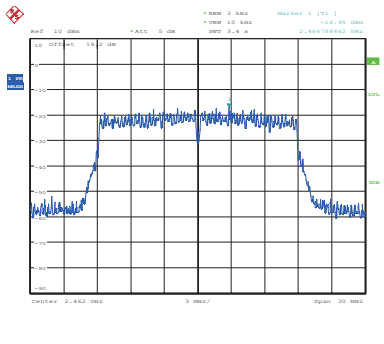


Fig.95 Power spectral density: CH11,11n

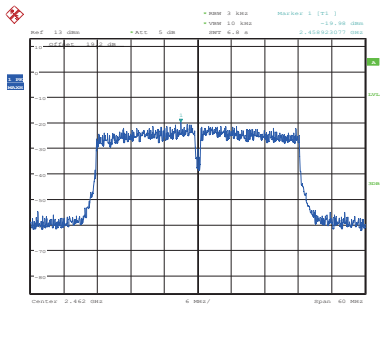


Fig.96 Power spectral density: CH11,11n(40M)

5.3 6dB Occupied Bandwidth

Specifications:	FCC 47 CFR Part 15.247(a)
DUT Serial Number:	353081090308407
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	--

Limit Level Construction:

Standard	Limit(KHz)
FCC 47 CFR Part 15.247(a)	≥500

Measurement Uncertainty:

Measurement Uncertainty	±1.1KHz

Test Procedure

The measurement is according to ANSI C63.10 clause 11.8.

1. The output power of EUT was connected to the spectrum analyzer. The path loss was compensated to the results for each measurement.
2. Enable EUT transmitter maximum power continuously.
3. Set RBW = 100 kHz.
4. Set the VBW ≥ [3 × RBW].
5. Detector = peak.
6. Trace mode = max hold.
7. Sweep = auto couple.
8. Allow the trace to stabilize.
9. 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.

Note: --

Test Result:

802.11b/g/n mode

Mode	Occupied 6dB Bandwidth(MHz)			Conclusion
	Ch1	Ch6	Ch11	
802.11b	9.295	9.455	8.574	Pass
802.11g	4.247	5.529	7.452	Pass
802.11n(20MHz)	4.086	5.529	5.583	Pass
802.11n(40MHz)	17.468	11.378	15.224	Pass

Conclusion: PASS

Test figure as below:

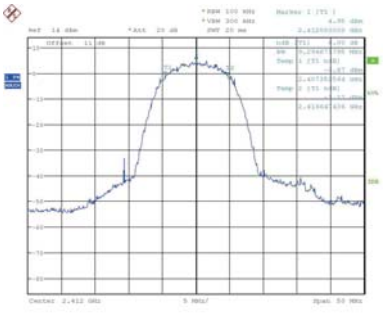


Fig.97 6dB Bandwidth: Ch1,11b

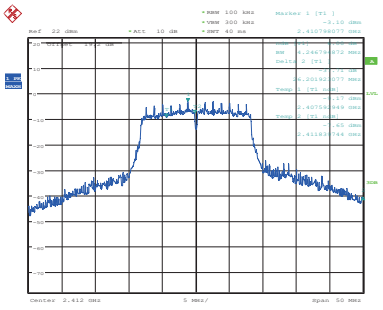


Fig.98 6dB Bandwidth: Ch1,11g

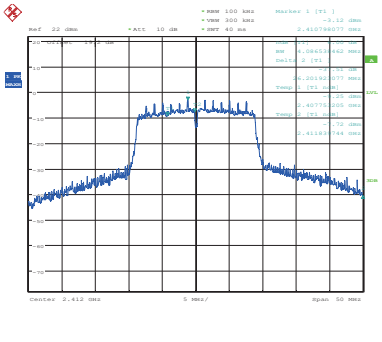


Fig.99 6dB Bandwidth: Ch1,11n

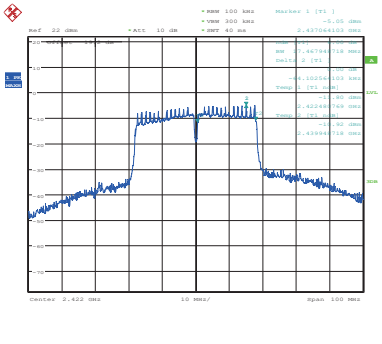


Fig.100 6dB Bandwidth: Ch1,11n(40M)

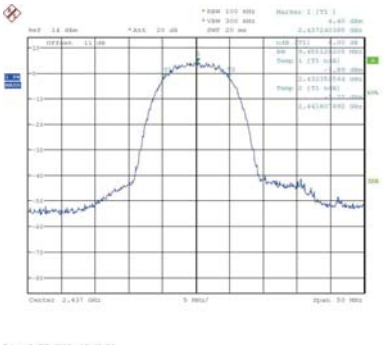


Fig.101 6dB Bandwidth: Ch6,11b

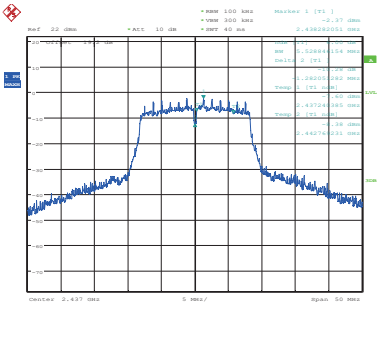


Fig.102 6dB Bandwidth: Ch6,11g

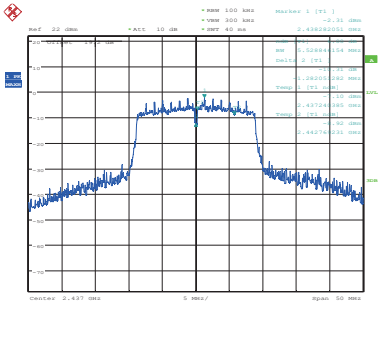


Fig.103 6dB Bandwidth: Ch6,11n

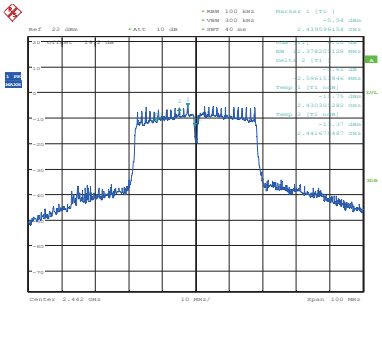


Fig.104 6dB Bandwidth: Ch6,11n(40M)

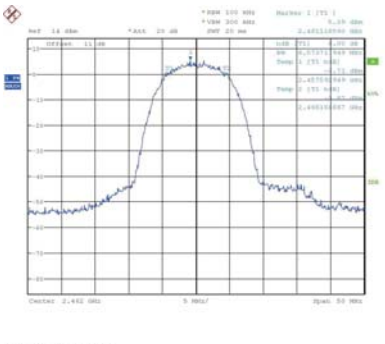


Fig.105 6dB Bandwidth: Ch11,11b

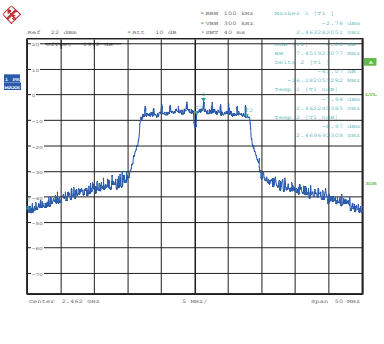


Fig.106 6dB Bandwidth: Ch11,11g

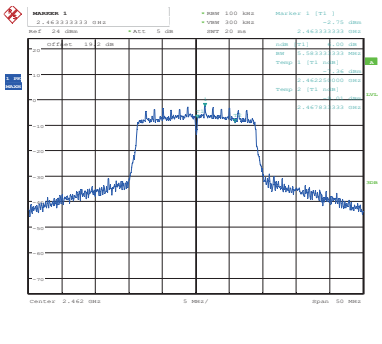


Fig.107 6dB Bandwidth: Ch11,11n

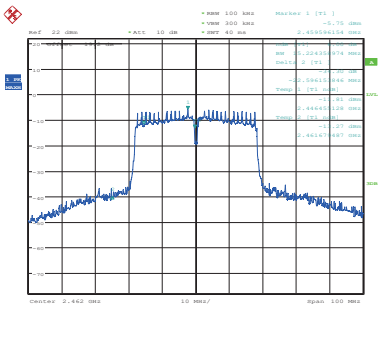


Fig.108 6dB Bandwidth: Ch11,11n(40M)

5.4 Band Edges Compliance

Specifications:	FCC 47 CFR Part 15.247(d)
DUT Serial Number:	353081090308282
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	--

Limit Level Construction:

Standard	Limited(dBuV/m)	
FCC 47 CFR Part 15.247(d)	Peak	74
	Average	54

Measurement Uncertainty:

Frequency Range	Uncertainty
1 GHz to 6 GHz	4.68

Test Procedure

The measurement is according to ANSI C63.10 clause11.13.

1. Span: Wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products that fall outside of the authorized band of operation.
2. Reference level offset: Corrected for gains and losses of test antenna factor, preamp gain and cable loss, so as to indicate field strength, in units of dBμV/m at 3 m, directly on the instrument display. Alternatively, the reference level offset may be set to zero and calculations shall be provided showing the conversion of raw measured data to thefield strength in dBμV/m at 3 m.
3. Reference level: As required to keep the signal from exceeding the maximum spectrum analyzer input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.5.2..
4. Attenuation: Auto (at least 10 dB preferred).
5. Sweep time: Coupled.
6. Resolution bandwidth: Above 1 GHz: 1 MHz
7. Video bandwidth: VBW for Peak, Quasi-peak, or Average Detector Function: 3×RBW
8. Detector (unless specified otherwise): Peak and average above 1 GHz
9. Trace: Max hold for final measurement; a combination of two traces, clear-write and max hold, is recommended for maximizing the emission.

Note: --

Test Result:

802.11b/g mode

mode	Channel	Test Results(dBuV/m)			Conclusion
802.11b	1	Peak	2390.000MHz	43.216	Pass
		Average	2390.000MHz	31.600	
		Fig.109			
	11	Peak	2483.500MHz	44.704	Pass
		Average	2483.500MHz	33.678	
		Fig.110			
802.11g	1	Peak	2390.000MHz	45.865	Pass
		Average	2390.000MHz	33.385	
		Fig.111			
	11	Peak	2483.500MHz	43.889	Pass
		Average	2483.500MHz	32.638	
		Fig.112			

802.11n mode

mode	Channel	Test Results(dBuV/m)			Conclusion
802.11n (20MHz)	3	Peak	2390.000MHz	47.269	Pass
		Average	2390.000MHz	33.702	
		Fig.113			
	11	Peak	2483.500MHz	45.420	Pass
		Average	2483.500MHz	34.594	
		Fig.114			
802.11n (40MHz)	3	Peak	2380.000MHz	43.693	Pass
		Average	2380.000MHz	33.303	
		Fig.115			
	9	Peak	2485.200MHz	50.455	Pass
		Average	2483.500MHz	35.874	
		Fig.116			

Conclusion: PASS

Test figure as below:

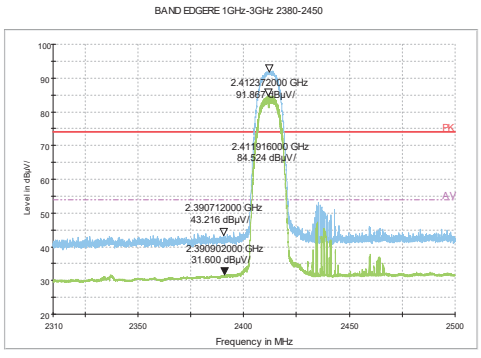


Fig.109 Frequency Band Edge: Ch1,11b

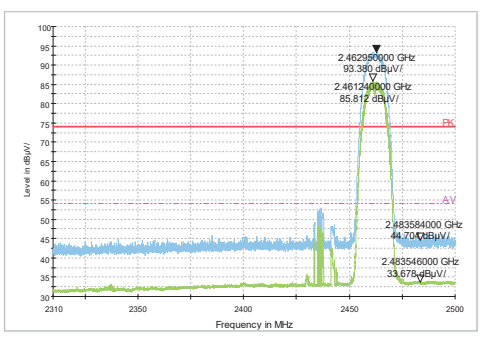


Fig.110 Frequency Band Edge: Ch11,11b

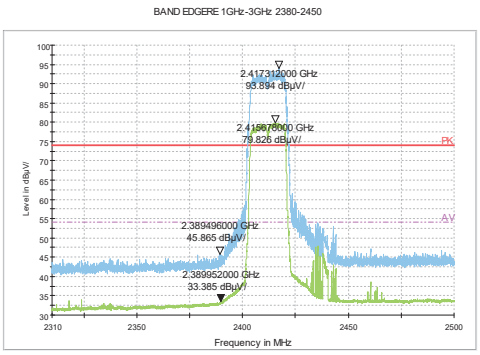


Fig.111 Frequency Band Edge: Ch1,11g

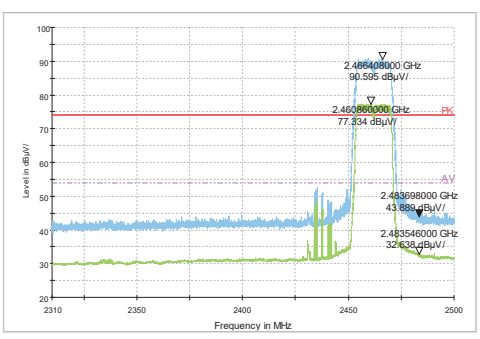


Fig.112 Frequency Band Edge: Ch11,11g

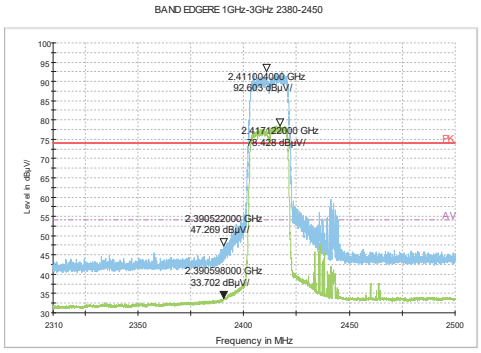


Fig.113 Frequency Band Edge: Ch1,11n(20M)

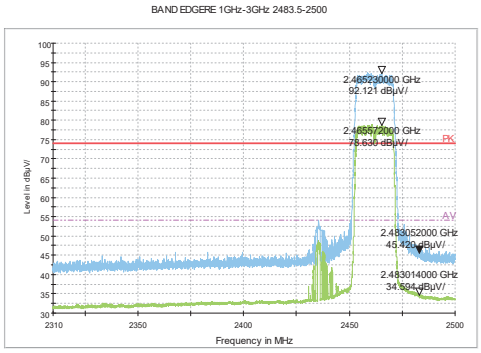


Fig.114 Frequency Band Edge: Ch11,11n(20M)

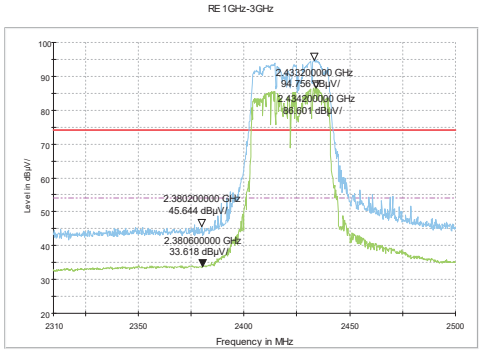


Fig.115 Frequency Band Edge: Ch3,11n(40M)

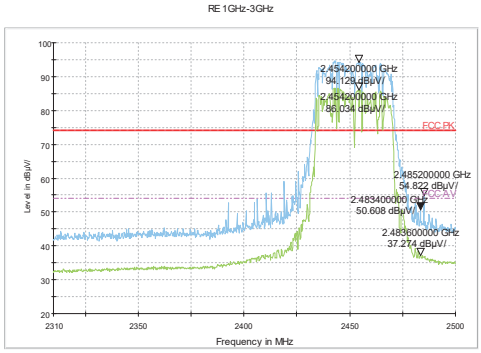


Fig.116 Frequency Band Edge: Ch9,11n(40M)

5.5 Transmitter Spurious Emission-Conducted

Specifications:	FCC 47 CFR Part15.247 (d)
DUT Serial Number:	353081090308407
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	--

Limit

Standard	Limit
FCC 47 CFR Part15.247 (d)	20dB below peak output power in 100KHz bandwidth

Measurement Uncertainty:

Frequency Range	Uncertainty
30MHz ≤ f ≤ 26GHz	±2.7

Test Procedure

This measurement is according to ANSI C63.10 clause 11.11.

1. The output power of EUT was connected to the spectrum analyzer. The path loss was compensated to the results for each measurement.
2. Enable EUT transmitter maximum power continuously.

Reference level measurement

3. Set instrument center frequency to DTS channel center frequency.
4. Set the span to ≥ 1.5 times the DTS bandwidth.
5. Set the RBW = 100 kHz.
6. Set the VBW ≥ [3 × RBW].
7. Detector = peak.
8. Sweep time = auto couple.
9. Trace mode = max hold.
10. Allow trace to fully stabilize.
11. Use the peak marker function to determine the maximum PSD level.

Emission level measurement

12. Set the center frequency and span to encompass frequency range to be measured.
13. Set the RBW = 100 kHz.
14. Set the VBW ≥ [3 × RBW].
15. Detector = peak.
16. Sweep time = auto couple.
17. Trace mode = max hold.
18. Allow trace to fully stabilize.
19. Use the peak marker function to determine the maximum amplitude level.

Test Result:

802.11b/g mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11b	1	2.412GHz	Fig.117	Pass
		30MHz~26GHz	Fig.118	Pass
	6	2.437GHz	Fig.119	Pass
		30MHz~26GHz	Fig.120	Pass
	11	2.462GHz	Fig.121	Pass
		30MHz~26GHz	Fig.122	Pass
802.11g	1	2.412GHz	Fig.123	Pass
		30MHz~26GHz	Fig.124	Pass
	6	2.437GHz	Fig.125	Pass
		30MHz~26GHz	Fig.126	Pass
	11	2.462GHz	Fig.127	Pass
		30MHz~26GHz	Fig.128	Pass

802.11n mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11n (20MHz)	1	2.412GHz	Fig.129	Pass
		30MHz~26GHz	Fig.130	Pass
	6	2.437GHz	Fig.131	Pass
		30MHz~26GHz	Fig.132	Pass
	11	2.462GHz	Fig.133	Pass
		30MHz~26GHz	Fig.134	Pass
802.11n (40MHz)	1	2.422GHz	Fig.135	Pass
		30MHz~26GHz	Fig.136	Pass
	6	2.442GHz	Fig.137	Pass
		30MHz~26GHz	Fig.138	Pass
	11	2.462GHz	Fig.139	Pass
		30MHz~26GHz	Fig.140	Pass

Conclusion: PASS

Test figure as below:

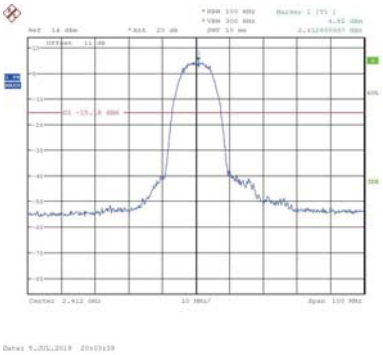


Fig.117 Conducted spurious emission: Ch1,11b,2412MHz

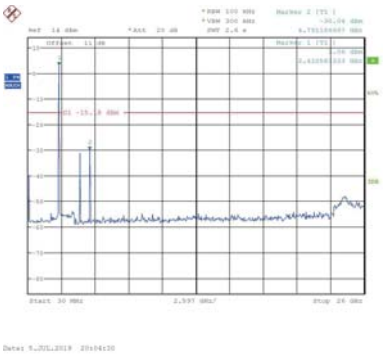


Fig.118 Conducted spurious emission: Ch1,11b,30MHz~26GHz

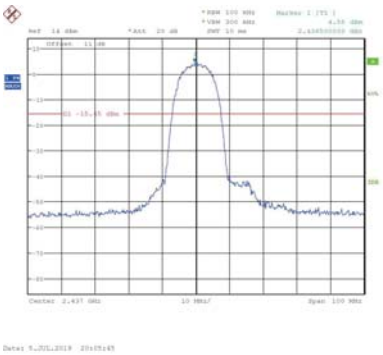


Fig.119 Conducted spurious emission: Ch6,11b,2437MHz

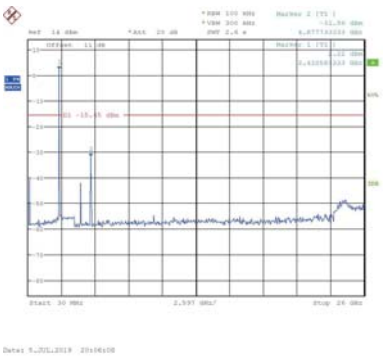


Fig.120 Conducted spurious emission: Ch6,11b,30MHz~26GHz

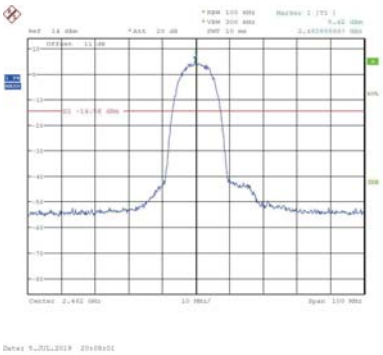


Fig.121 Conducted spurious emission: Ch11,11b,2462MHz

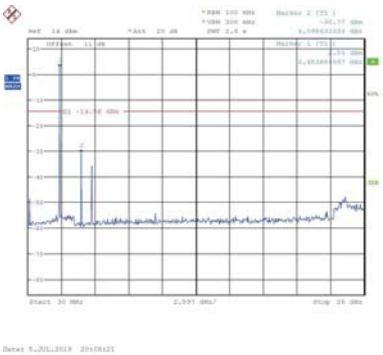


Fig.122 Conducted spurious emission: Ch11,11b,30MHz~26GHz

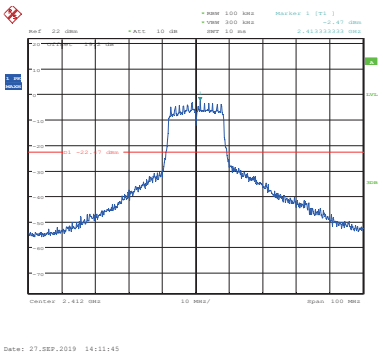


Fig.123 Conducted spurious emission: Ch1,11g,2412MHz

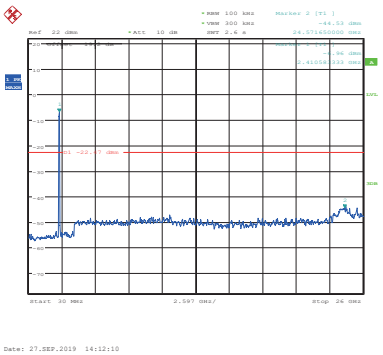


Fig.124 Conducted spurious emission: Ch1,11g,30MHz~26GHz

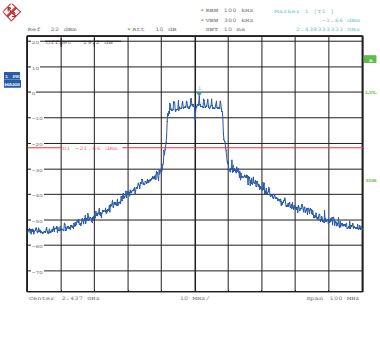


Fig.125 Conducted spurious emission: Ch6,11g,2437MHz

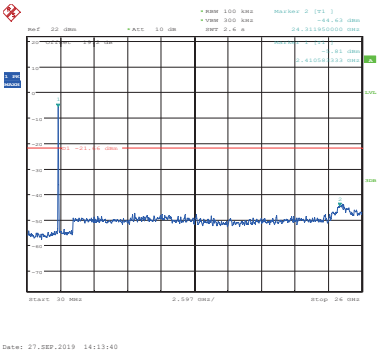


Fig.126 Conducted spurious emission: Ch6,11g,30MHz~26GHz

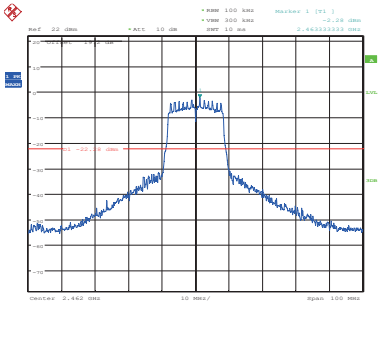


Fig.127 Conducted spurious emission: Ch11,11g,2462MHz

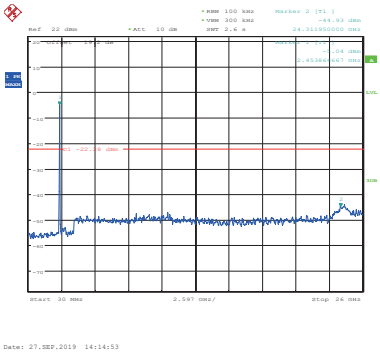


Fig.128 Conducted spurious emission: Ch11,11g,30MHz~26GHz

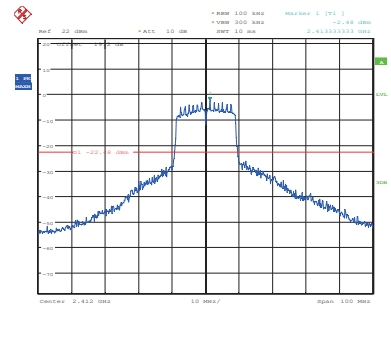


Fig.129 Conducted spurious emission: Ch1,11n,2412MHz

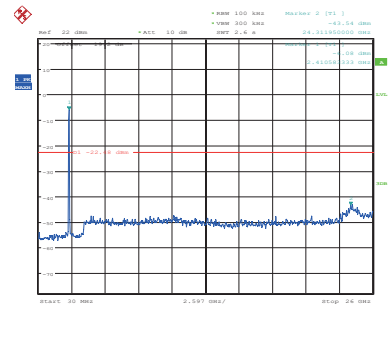


Fig.130 Conducted spurious emission: Ch1,11n,30MHz~26GHz

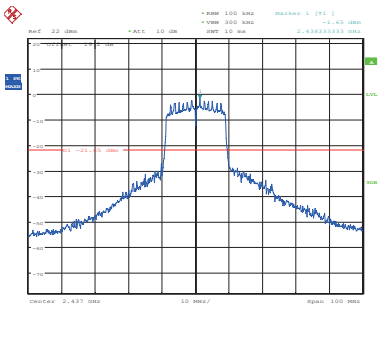


Fig.131 Conducted spurious emission: Ch6,11n,2437MHz

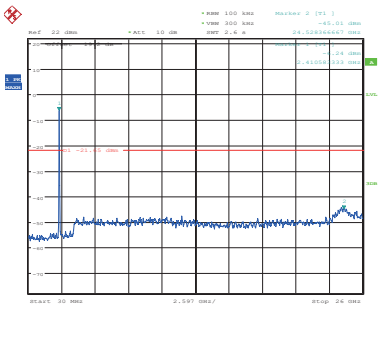


Fig.132 Conducted spurious emission: Ch6,11n,30MHz~26GHz

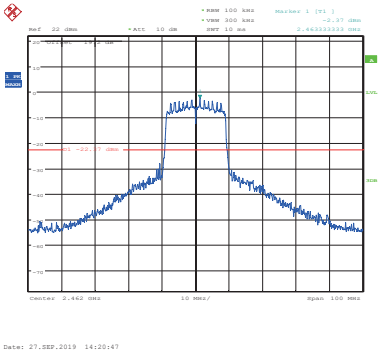


Fig.133 Conducted spurious emission: Ch11,11n,2462MHz

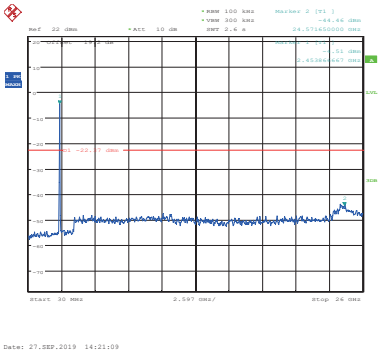


Fig.134 Conducted spurious emission: Ch11,11n,30MHz~26GHz

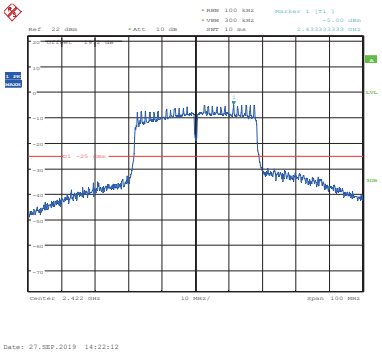


Fig.135 Conducted spurious emission: Ch1,11n(40M),2422MHz

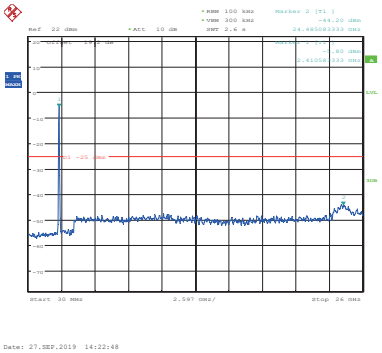


Fig.136 Conducted spurious emission: Ch1,11n(40M),30MHz~26GHz

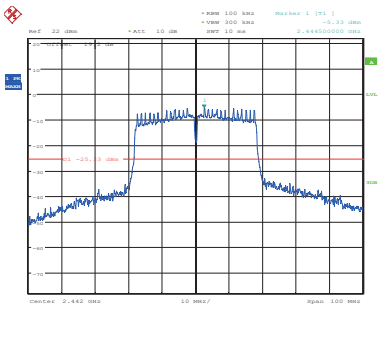


Fig.137 Conducted spurious emission: Ch6,11n(40M),2442MHz

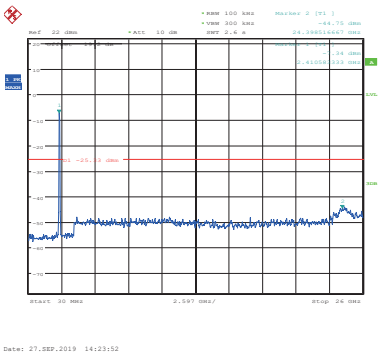


Fig.138 Conducted spurious emission: Ch6,11n(40M),30MHz~26GHz

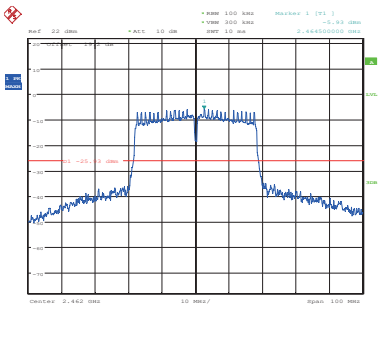


Fig.139 Conducted spurious emission: Ch11,11n(40M),2462MHz

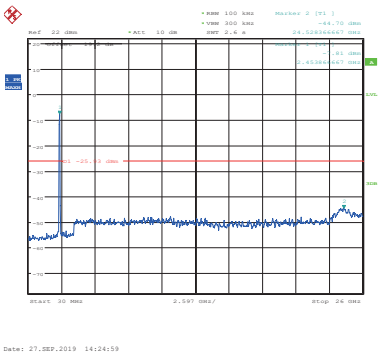


Fig.140 Conducted spurious emission: Ch11,11n(40M),30MHz~26GHz

5.6 Transmitter Spurious Emission-Radiated

Specifications:	FCC 47 CFR Part 15.247, 15.205, 15.209
DUT Serial Number:	353081090308282
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	--

Limit

Standard	Limit
FCC 47 CFR Part 15.247, 15.205, 15.209	20dB below peak output power

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) (see 15.205(c)).

Measurement Uncertainty:

Frequency Range	Uncertainty
30MHz ≤ f ≤ 2GHz	±1.13
2GHz ≤ f ≤3.6GHz	±1.16
3.6GHz ≤ f ≤8GHz	±2.45
8GHz ≤ f ≤12.75GHz	±2.99

Limit in restricted band:

Frequency of emission (MHz)	Field strength (uV/m)	Field strength (dBuV/m)
30~88	100	40
88~216	150	43.5
216~960	200	46
Above 960	500	54

Test Procedure

Portable, small, lightweight, or modular devices that may be handheld, worn on the body, or placed on a table during operation shall be positioned on a non-conducting platform, the top of which is 80 cm above the reference ground plane. The preferred area occupied by the EUT arrangement is 1 m by 1.5 m, but it may be larger or smaller to accommodate various sized EUTs.

For testing purposes, ceiling- and wall-mounted devices also shall be positioned on a tabletop (see also ANSI C63.10-2013 section 6.3.4 and 6.3.5). In making any tests involving handheld, body-worn, or ceiling-mounted equipment, it is essential to recognize that the measured levels may be dependent on the orientation (attitude) of the three orthogonal axes of the EUT. Thus, exploratory tests as specified in 8.3.1 shall be carried out for various axes orientations to determine the attitude having maximum or near-maximum emission level.

The EUT was placed on a non-conductive table. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

Frequency of emission (MHz)	RBW/VBW	Sweep Time (s)
30~1000	100KHz/300KHz	5
1000~4000	1MHz/1MHz	15
4000~18000	1MHz/1MHz	40
18000~26500	1MHz/1MHz	20

Test Result:

A "reference path loss" is established and ARpi is the attenuation of "reference path loss", and including the gain of receive antenna , the gain of the preamplifier, the cable loss.

The measurement results are obtained as described below:

ARpi= Cable loss + Antenna Gain-Preamplifier gain

Result=PMea + ARpi

Channel	Frequency Range	Test Results	Conclusion
Ch1	30MH-1GHz	Fig.141	Pass
	1GHz-3GHz	Fig.142	Pass
	3GHz-18GHz	Fig.143	Pass

Channel	Frequency Range	Test Results	Conclusion
Ch6	30MH-1GHz	Fig.144	Pass
	1GHz-3GHz	Fig.145	Pass

	3GHz-18GHz	Fig.146	Pass

Channel	Frequency Range	Test Results	Conclusion
Ch11	30MH-1GHz	Fig.147	Pass
	1GHz-3GHz	Fig.148	Pass
	3GHz-18GHz	Fig.149	Pass
All channels	18GHz-26GHz	Fig.150	Pass

Note: all the test data shown was peak detected.

Conclusion: PASS

Test graphs as below:

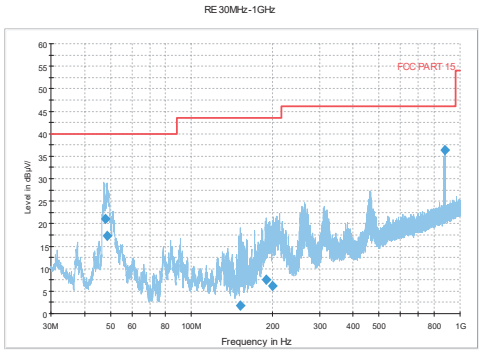


Fig.141 Radiated emission: Ch1, 30MHz-1GHz

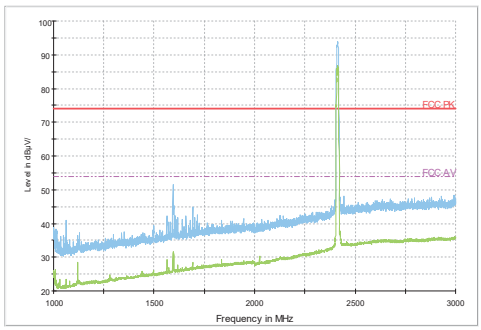


Fig.142 Radiated emission: Ch1, 1GHz-3GHz

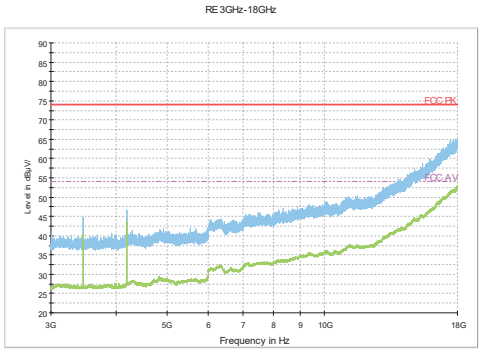


Fig.143 Radiated emission: Ch1, 3GHz-18GHz

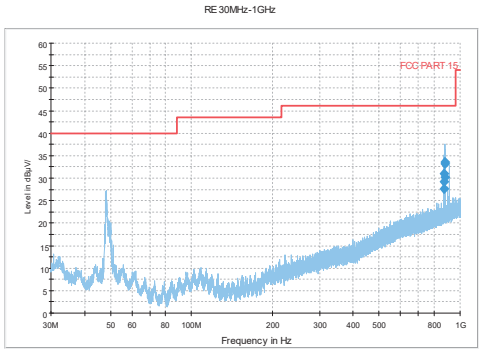


Fig.144 Radiated emission:Ch6, 30MHz-1GHz

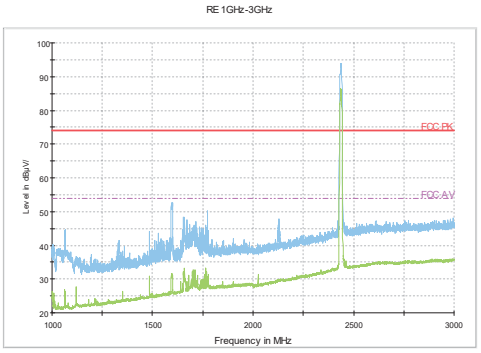


Fig.145 Radiated emission: Ch6, 1GHz-3GHz

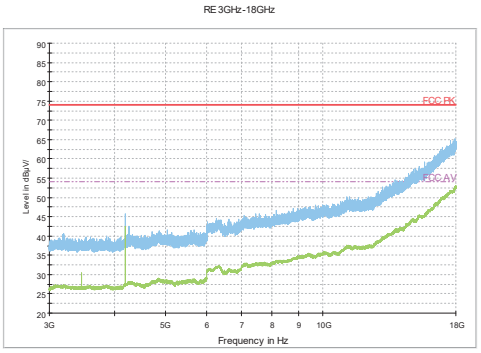


Fig.146 Radiated emission: Ch6, 3GHz-18GHz

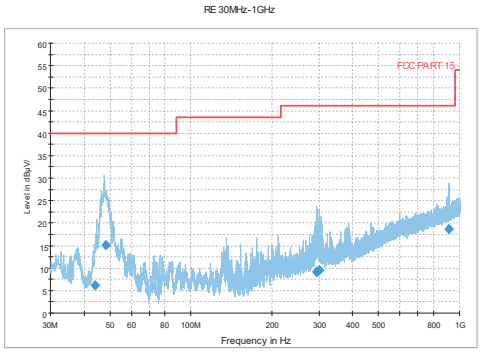


Fig.147 Radiated emission: Ch11, 30MHz-1GHz

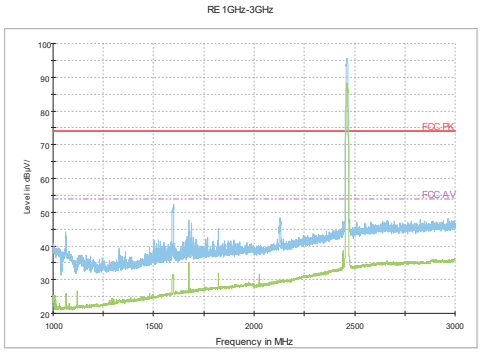


Fig.148 Radiated emission: Ch11, 1GHz-3GHz

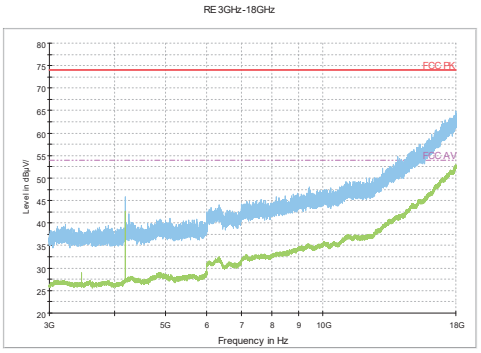


Fig.149 Radiated emission: Ch11, 3GHz-18GHz

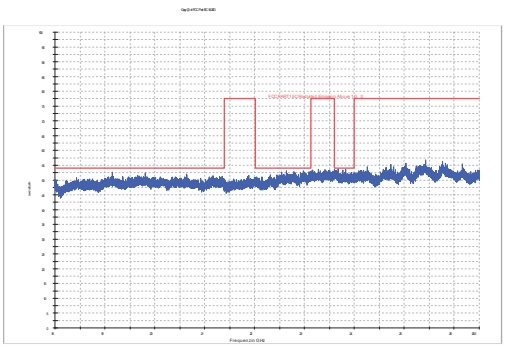


Fig.150 Radiated emission: 18 GHz - 26 GHz

Test photo

See the Pic1- Pic 2 in document" AT Plus 4E _Wifi_BT_Test Setup Photos".

5.7 Power line Conducted Emissions

Specifications:	ANSI C63.4 voltage mains test
DUT Serial Number:	353081090308282
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	--

Limit

The EUT meets the requirement of having a peak to average ratio of less than 13dB.

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolt (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range are listed as follows:

Measurement Uncertainty:

Frequency Range	Uncertainty
150 kHz to 30 MHz	1.83

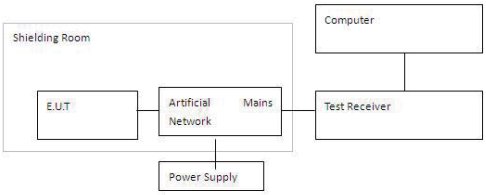
Limits of the conducted disturbance at the AC mains ports:

Frequency range	Limit(Quasi-peak)	Limit(Average)
0.15 MHz to 0.5 MHz	66 dBμV – 56 dBμV	56 dBμV – 46 dBμV
>0.5 MHz to 5MHz	56 dBμV	46 dBμV
>5 MHz to 30 MHz	60 dBμV	50 dBμV
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

Test Setup

The EUT was placed in a shielding room. The WLAN TESTER was used to set the TX channel and power level. The ac adapter output is connected to Receiver through an AMN (Artificial Mains Network).



Test Procedure

1. The EUT is placed on a wooden table 80 cm above the reference ground plane.
2. The EUT is connected via LISN to a test power supply.
3. The measurement results are obtained as described below:
4. Detectors – Quasi Peak and Average Detector.

The measurement is made according to Public notice FCC Public Notice DA 00-705, March 2000, and ANSI C63.4-2014.

Test Result:

Line L

Line L					
Detector (QP)	**Frequency (MHz)**	**Level (dBμV)**	**Limit (dBμV)**	**Line**	**PE**
QP	0.488112	33.6	56.2	L1	FLO
QP	0.491544	31.8	56.1	L1	FLO
QP	1.674381	29.6	56.0	L1	FLO
QP	2.349975	27.8	56.0	L1	FLO
QP	2.385644	27.8	56.0	L1	FLO
QP	3.673462	37.8	56.0	L1	FLO

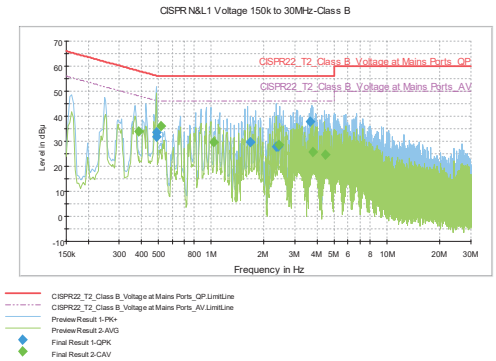
Line L					
Detector (AV)	**Frequency (MHz)**	**Level (dBμV)**	**Limit (dBμV)**	**Line**	**PE**
AV	0.388144	33.8	48.1	L1	FLO
AV	0.515544	36.2	46.0	L1	FLO
AV	1.039262	29.5	46.0	L1	FLO
AV	2.429975	28.6	46.0	L1	FLO
AV	3.789162	25.8	46.0	L1	FLO
AV	4.478431	24.5	46.0	L1	FLO

Line N

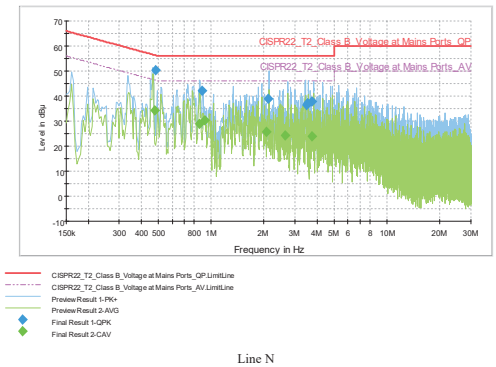
Line N					
Detector (QP)	**Frequency (MHz)**	**Level (dBμV)**	**Limit (dBμV)**	**Line**	**PE**
QP	0.481156	50.3	56.3	N	FLO
QP	0.888938	42.0	56.0	N	FLO
QP	2.117294	39.0	56.0	N	FLO
QP	3.494631	36.5	56.0	N	FLO
QP	3.515769	37.0	56.0	N	FLO
QP	3.739281	38.0	56.0	N	FLO

Line N					
Detector (AV)	**Frequency (MHz)**	**Level (dBμV)**	**Limit (dBμV)**	**Line**	**PE**
AV	0.477156	34.3	46.4	N	FLO
AV	0.858312	29.0	46.0	N	FLO
AV	0.920938	30.4	46.0	N	FLO
AV	2.053294	25.7	46.0	N	FLO
AV	2.642025	24.4	46.0	N	FLO
AV	3.739281	24.0	46.0	N	FLO

Conclusion: PASS



Line L



Line N

Test photo

See the Pic3 in document" AT Plus 4E _Wifi_BT_Test Setup Photos".

Annex A EUT Photos

See the document" AT Plus 4E -External Photos".
See the document" AT Plus 4E -Internal Photos".

ANNEX B Deviations from Prescribed Test Methods

No deviation from Prescribed Test Methods.

End Of Report