Full

TEST REPORT

No. I18D00191-SRD03

For

Client :	**Shanghai Sunmi Technology Co.,Ltd.**
Production :	**POS System**
Model Name :	**L1320/L1322**
Brand Name :	**SUNMI**
FCC ID :	**2AH25T2MINI**
Hardware Version:	**V1.03**
Software Version:	**MST2MINI_EQ000_2EE0.123BBE2.9530762_180824_100_V01_T15**
Issued date:	**2018-12-25**

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 ECIT Shanghai.

Test Laboratory:

ECIT Shanghai, East China Institute of Telecommunications

Add: 7-8F, G Area, No.668, Beijing East Road, Huangpu District, Shanghai, P. R. China

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Revision Version

Report Number	Revision	Date	Memo
I18D00191-SRD03	00	2018-12-25	Initial creation of test report

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1. Test Laboratory

1.1. Testing Location

Company Name:	ECIT Shanghai, East China Institute of Telecommunications
Address:	7-8F, G Area, No. 668, Beijing East Road, Huangpu District, Shanghai, P. R. China
Postal Code:	200001
Telephone:	(+86)-021-63843300
Fax:	(+86)-021-63843301
FCC registration No	958356

1.2. Testing Environment

Normal Temperature:	15-35℃
Extreme Temperature:	-30/+50℃
Relative Humidity:	20-75%

1.3. Project data

Project Leader:	Zhou Yan
Testing Start Date:	2018-09-13
Testing End Date:	2018-09-30

1.4. Signature

Yang Dejun
(Prepared this test report)

Shi Hongqi
(Reviewed this test report)

Zheng Zhongbin
(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name:	Shanghai Sunmi Technology Co.,Ltd.
Address:	Room 505, KIC Plaza, No.388 Song Hu Road, Yang Pu District, Shanghai, China
Telephone:	8618721763396
Postcode:	200433

2.2. Manufacturer Information

Company Name:	Shanghai Sunmi Technology Co.,Ltd.
Address:	Room 505, KIC Plaza, No.388 Song Hu Road, Yang Pu District, Shanghai, China
Telephone:	8618721763396
Postcode:	200433

3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

EUT Description	POS System
Model name	L1320/L1322
WLAN Frequency(2.4G)	2412MHz-2462MHz
WLAN Channel(2.4G)	Channel1-Channel11
WLAN type of modulation	802.11b:DSSS 802.11g/n: OFDM
GSM Frequency Band	GSM 850/GSM 1900
UMTS Frequency Band	Band 2/5
CDMA Frequency Band	BC 0
LTE Frequency Band	Band 38/41
Additional Communication Function	BT/BLE/2.4G WLAN b/g/n20/n40/NFC
Extreme Temperature	-30/+50℃
Nominal Voltage	24V
Extreme High Voltage	25V
Extreme Low Voltage	23V

Note: Photographs of EUT are shown in ANNEX A of this test report.

3.2. Internal Identification of EUT used during the test

EUT ID*	Model Name	SN or IMEI	HW Version	SW Version	Date of receipt
N02	L1320	/	V1.03	MST2MINI_EQ000_2EE0.123BBE2.9530762_180824_100_V01_T15	2018-09-07
N01	L1322	/	V1.03	MST2MINI_EQ000_2EE0.123BBE2.9530762_180824_100_V01_T15	2018-09-07

*EUT ID: is used to identify the test sample in the lab internally.

3.3. Internal Identification of AE used during the test

AE ID*	Description	SN
AE1	RF cable	---

*AE ID: is used to identify the test sample in the lab internally.

4. Reference Documents

4.1. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part15	FCC CFR 47, Part 15,Subpart C: 15.205 Restricted bands of operation; 15.209 Radiated emission limits, general requirements; 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz.	2017/10/01
ANSI 63.10	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9KHz to 40GHz	2013

5. Summary of Test Results

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

Measurement Items	Sub-clause of Part15C	Sub-clause of IC	Verdict
Maximum Peak Output Power	15.247(a)	/	P
Peak Power Spectral Density	15.247(e)	/	P
Occupied 6dB Bandwidth	15.247(d)	/	P
Band Edges Compliance	15.247(b)	/	P
Transmitter Spurious Emission-Conducted	15.247	/	P
Transmitter Spurious Emission-Radiated	15.247,15.209,	/	P
AC Powerline Conducted Emission	15.107,15.207	/	P

Please refer to part 5 for detail.

The measurements are according to Public notice KDB558074 and ANSI C63.4.

Terms used in Verdict column

P	Pass, the EUT complies with the essential requirements in the standard.
NP	Not Perform, the test was not performed by ECIT.
NA	Not Applicable, the test was not applicable.
F	Fail, the EUT does not comply with the essential requirements in the standard.

Test Conditions

Tnom	Normal temperature
Tmin	Low Temperature
Tmax	High Temperature
Vnom	Normal Voltage
Vmin	Low Voltage
Vmax	High Voltage
Hnom	Norm Humidity
Anom	Norm Air Pressure

For this report, all the test case listed above are tested under Normal Temperature and Normal Voltage, and also under norm humidity, the specific conditions as following:

Temperature	Tnom	25℃
Voltage	Vnom	24V
Humidity	Hnom	48%
Air Pressure	Anom	1010hPa

5.1. Notes

All reported tests were carried out on a sample equipment to demonstrate limited compliance with section 3.

The test results of this test report relate exclusively to the item(s) tested as specified in section 5.

5.2. Statements

The L1320/L1322, supporting GPRS/EDGE/WCDMA/CDMA/LTE/BT/WLAN/BLE/NFC, manufactured by Shanghai Sunmi Technology Co.,Ltd., which is a variant product for testing.

Note: The project has two prototypes, L1320 and L1322. In this report, we only tested AC Powerline and the worse case of RSE, the other test cases please refer to the report No: I18D00189-SRD03, which was prepared by East China Institute of Telecommunications.

ECIT has verified that the compliance of the tested device specified in section 5 of this test report is successfully evaluated according to the procedure and test methods as defined in type certification requirement listed in section 5 of this test report.

6. Test result

6.1. Maximum Output Power

6.1.1 Measurement Limit and method:

Standard	Limit(dBm)
FCC CRF 15.247(b)	< 30

6.1.2 Test procedure

The measurement is according to ANSI C63.10 clause 11.9

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, VBW ⩾ 3RBW.
4. Detector : Peak.
5. Trace mode: Max Hold

6.1.3 Measurement Uncertainty:

Measurement Uncertainty	±0.88dB

6.1.4 Maximum Peak Output Power-conducted

Measurement Results:

802.11b/g mode

Mode	Data Rate(Mbps)	Teat Result(dBm)		
		2412MHz(Ch1)	2437MHz(Ch6)	2462MHz(Ch11)
802.11b	1	16.05	/	/
	2	16.43	/	/
	5.5	17.96	/	/
	11	19.48	18.95	18.83
802.11g	6	16.88	/	/
	9	16.95	/	/
	12	17.18	/	/
	18	17.34	/	/

	24	17.64	/	/
	36	17.79	/	/
	48	17.90	/	/
	54	18.02	17.59	17.18

The data rate 11 Mbps and 54 Mbps are selected as worse condition, and the following cases are performed with this condition.

802.11n mode

Mode	Data Rate(Index)	Teat Result(dBm)		
		2412MHz(Ch1)	2437MHz(Ch6)	2462MHz(Ch11)
802.11n(20MHz)	MCS0	15.06	/	/
	MCS1	15.30	/	/
	MCS2	15.45	/	/
	MCS3	15.63	/	/
	MCS4	15.95	/	/
	MCS5	16.08	/	/
	MCS6	16.12	/	/
	MCS7	16.31	15.57	15.29
Mode	**Data Rate(Index)**	**Teat Result(dBm)**		
		2422MHz(Ch3)	**2437MHz(Ch6)**	**2452MHz(Ch9)**
802.11n(40MHz)	MCS0	14.16	/	/
	MCS1	14.58	/	/
	MCS2	14.78	/	/
	MCS3	14.81	/	/
	MCS4	14.97	/	/
	MCS5	15.03	/	/
	MCS6	15.08	/	/

	MCS7	15.13	14.67	14.06

The data rate MCS7 for 802.11n(20M) and MCS7 for 802.11n(40M) are selected as worse condition, and the following case are performed with this condition.

6.1.5 Maximum Average Output Power-conducted

802.11b/g mode

Mode	Test Result(dBm)		
	2412MHz (Ch1)	**2437MHz (Ch6)**	**2462MHz (Ch11)**
802.11b	15.36	14.78	14.66
802.11g	11.50	11.23	11.16

802.11n mode

Mode	Test Result(dBm)		
	2412MHz (Ch1)	**2437MHz (Ch6)**	**2462MHz (Ch11)**
802.11n(20MHz)	9.44	9.25	8.94
Mode	**Test Result(dBm)**		
	2422MHz (Ch3)	**2437MHz (Ch6)**	**2452MHz (Ch9)**
802.11n(40MHz)	8.55	8.13	7.96

Conclusion: PASS

6.2. Peak Power Spectral Density

6.2.1 Measurement Limit:

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

6.2.2 Test procedures

The measurement is according to ANSI C63.10 clause 11.10.2.

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 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.

6.2.3 Measurement Uncertainty:

Measurement Uncertainty	±0.88dB

6.2.4 Measurement Results:

802.11b/g mode

Mode	Channel	Power Spectral Density(dBm/3kHz)		Conclusion
802.11b	1	Fig 1.	-1.253	P
	6	Fig 2.	-0.416	P
	11	Fig 3.	-1.158	P
802.11g	1	Fig 4.	-7.270	P
	6	Fig 5.	-6.159	P
	11	Fig 6.	-6.735	P

802.11n mode

Mode	Channel	Power Spectral Density(dBm/3kHz)		Conclusion
802.11n(20MHz)	1	Fig 7.	-2.681	P
	6	Fig 8.	-3.374	P
	11	Fig 9.	-4.354	P
802.11n(40MHz)	3	Fig 10.	-5.845	P

	6	Fig 11.	-7.742	P
	9	Fig 12.	-7.246	P

Conclusion: PASS

Test graphs as below:

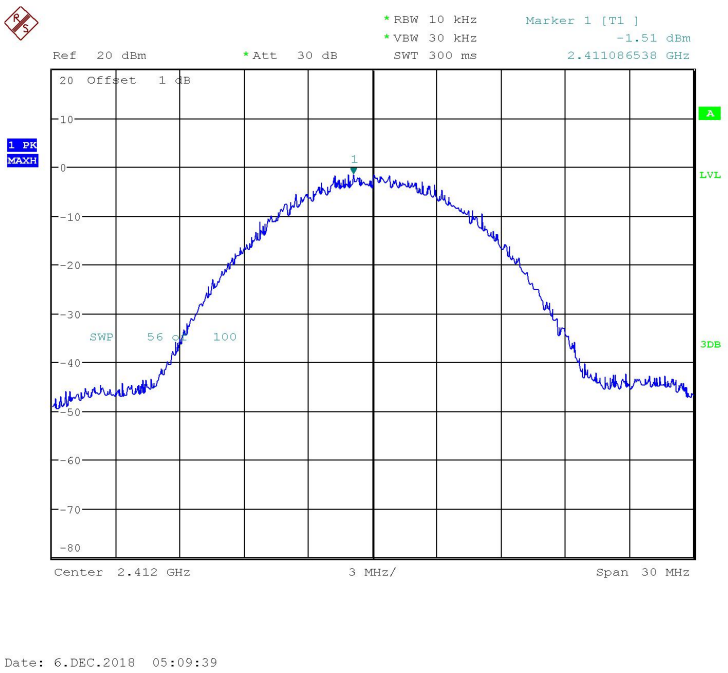


Fig 1. Power Spectral Density (802.11b, Ch1)

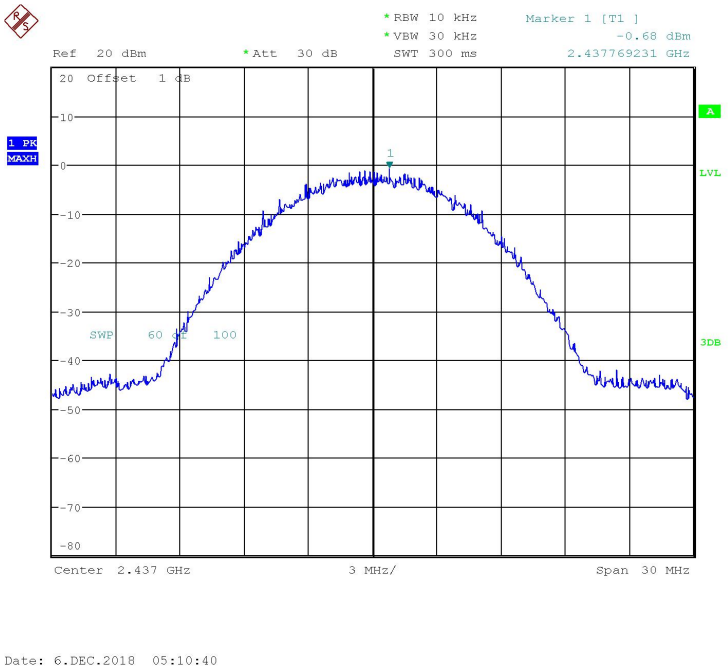


Fig 2. Power Spectral Density (802.11b, Ch6)

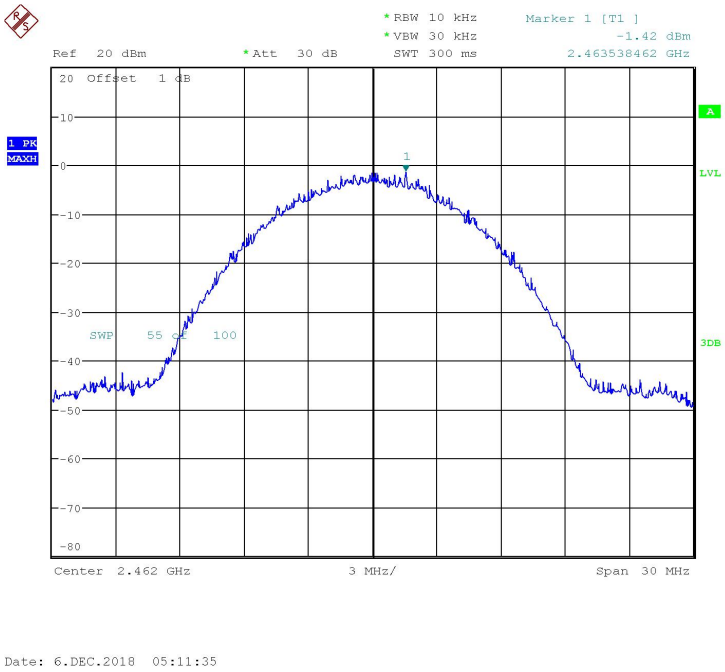


Fig 3. Power Spectral Density (802.11b, Ch11)

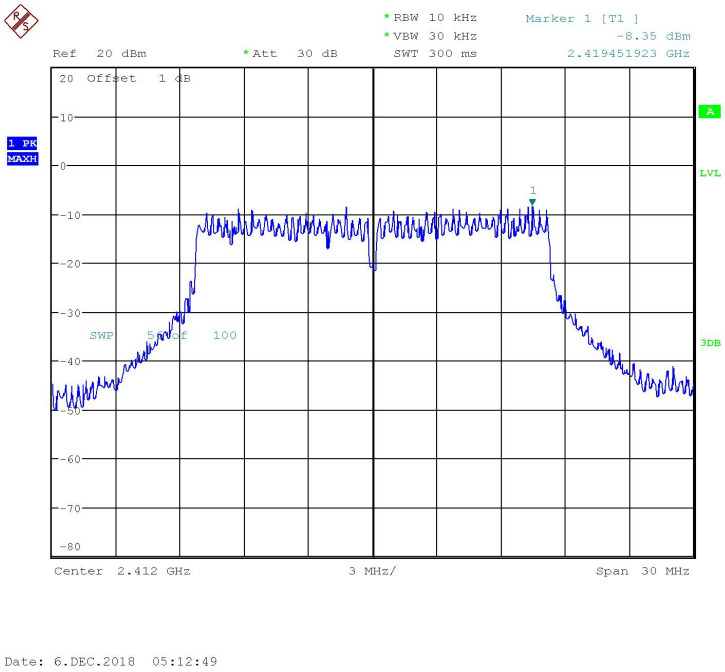


Fig 4. Power Spectral Density (802.11g, Ch1)

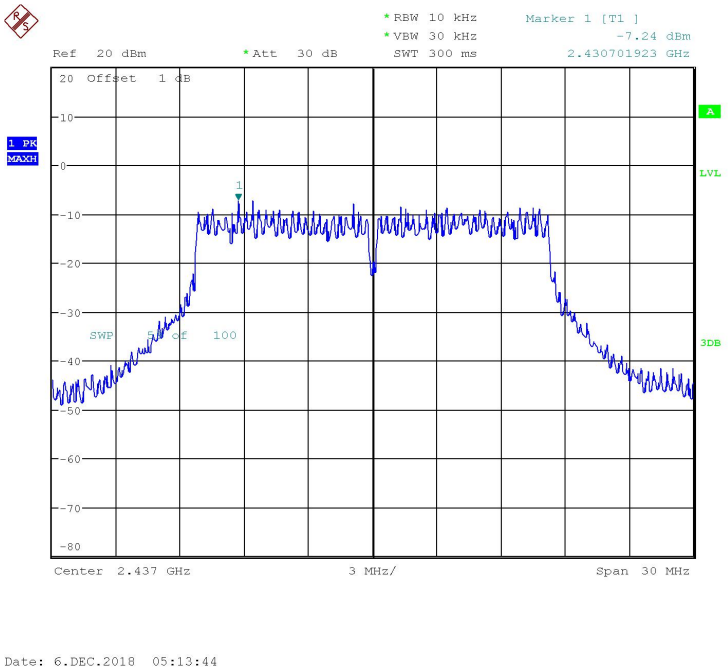


Fig 5. Power Spectral Density (802.11g, Ch6)

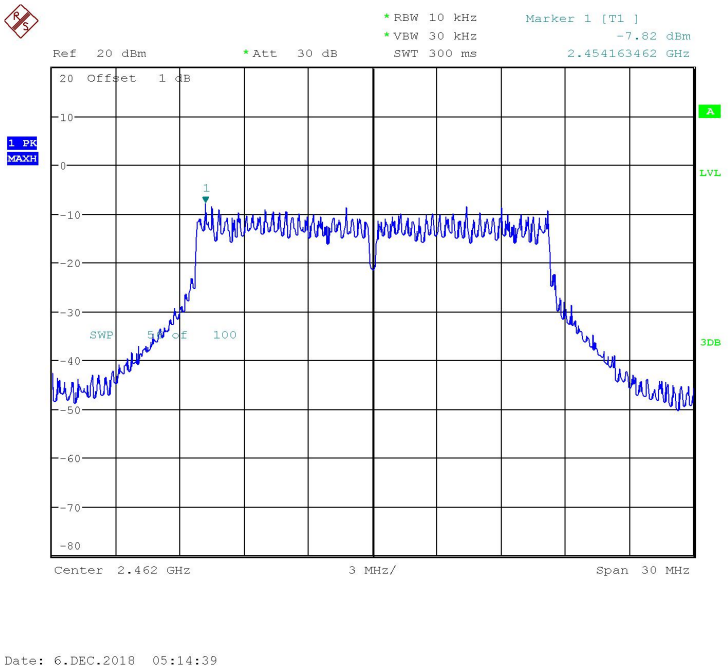


Fig 6. Power Spectral Density (802.11g, Ch11)

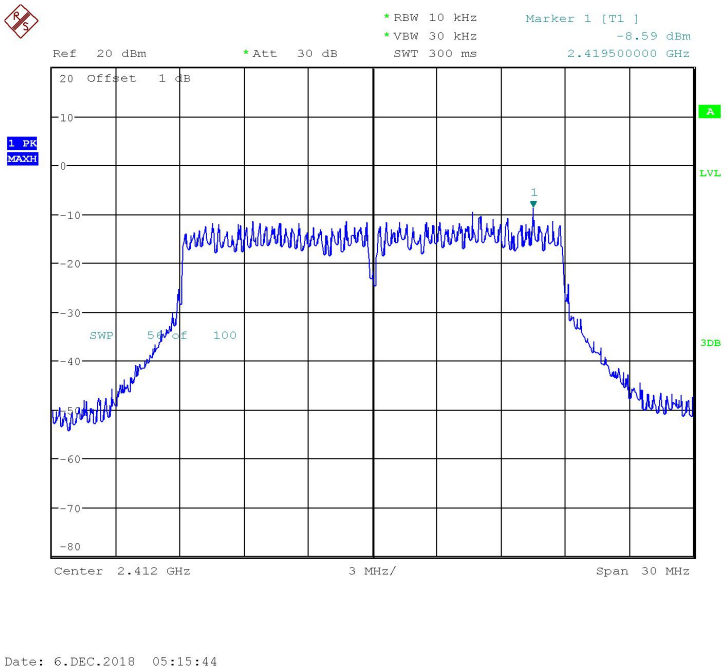


Fig 7. Power Spectral Density (802.11n-20MHz, Ch1)

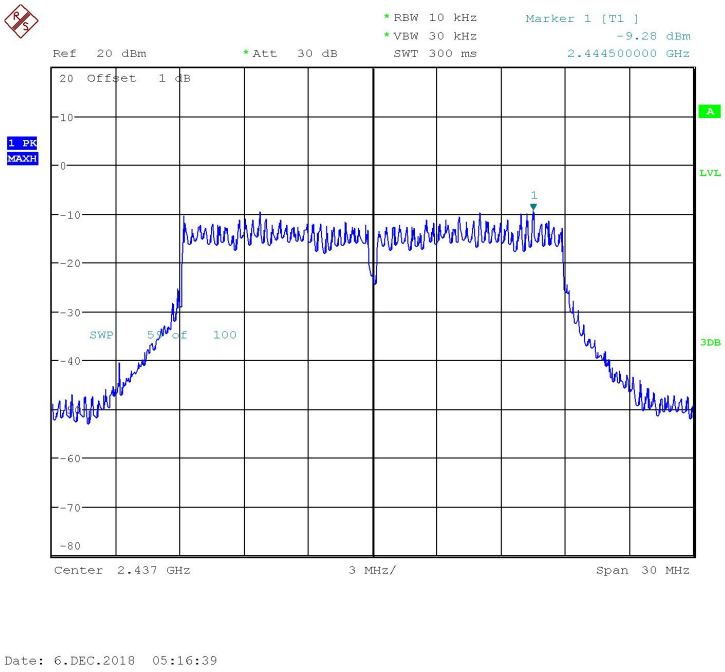


Fig 8. Power Spectral Density (802.11n-20MHz, Ch6)

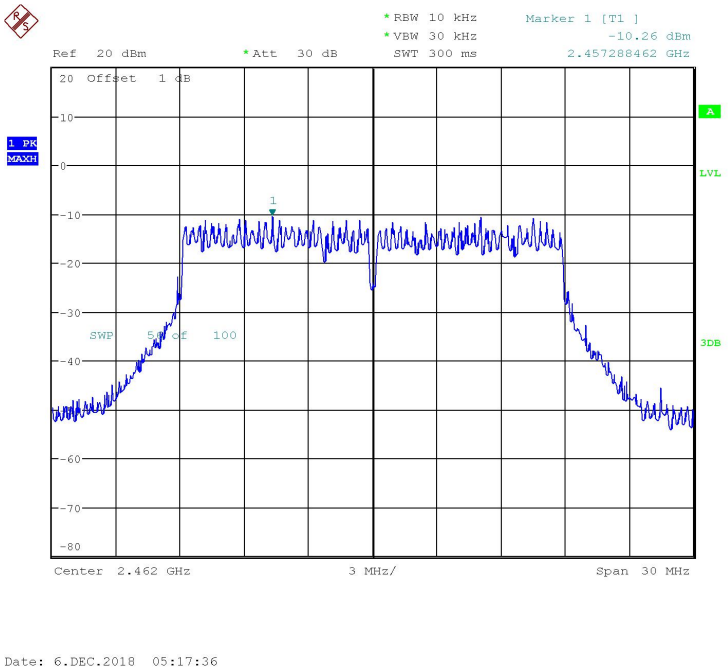


Fig 9. Power Spectral Density (802.11n-20MHz, Ch11)

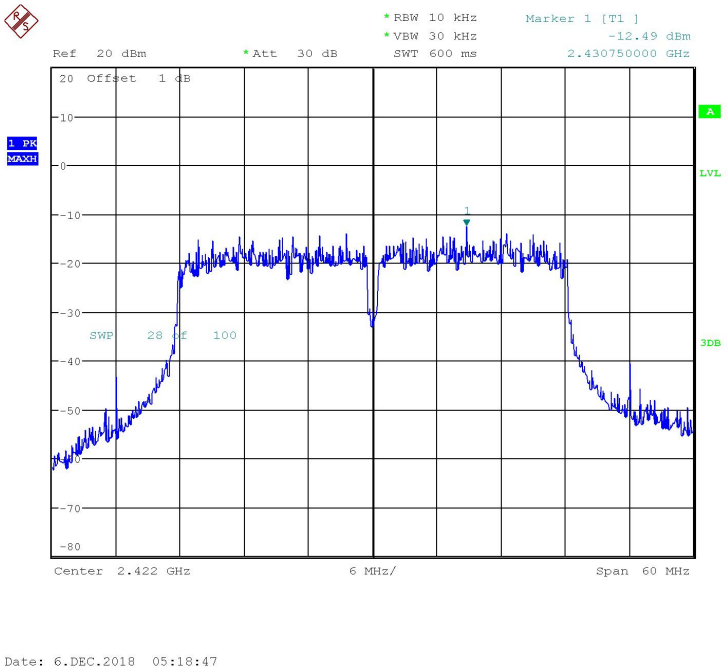


Fig 10. Power Spectral Density (802.11n-40MHz, Ch3)

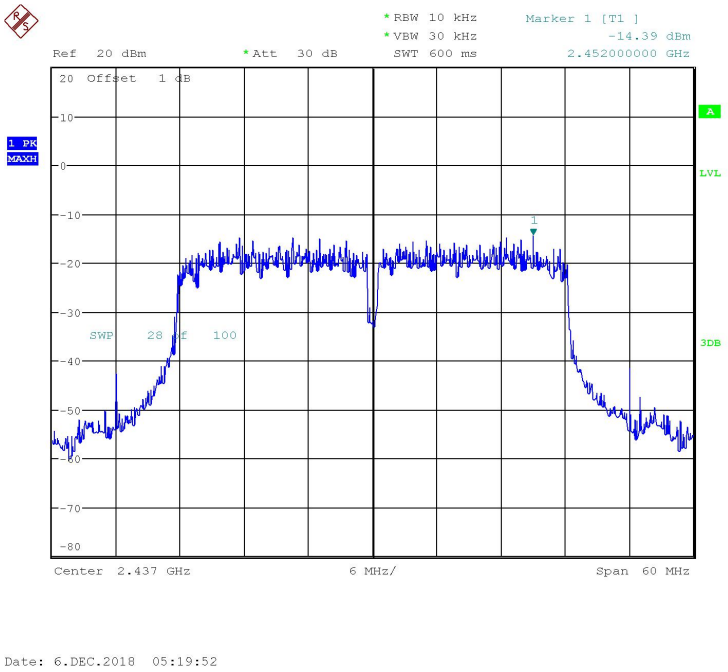


Fig 11. Power Spectral Density (802.11n-40MHz, Ch6)

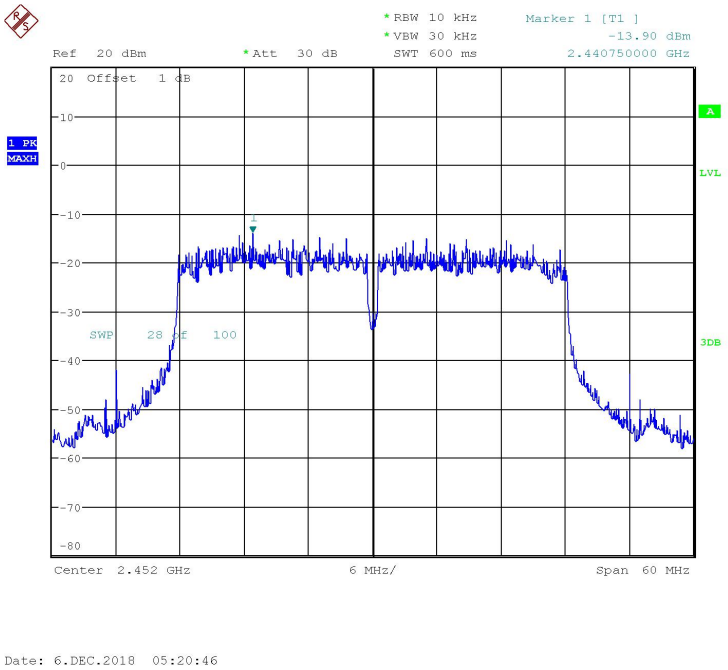


Fig 12. Power Spectral Density (802.11n-40MHz, Ch9)

6.3. Occupied 6dB Bandwidth

6.3.1 Measurement Limit:

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

6.3.2 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.

6.3.4 Measurement Uncertainty:

Measurement Uncertainty	±0.0031MHz

6.3.5 Measurement Result:

802.11b/g mode

Mode	Channel	Occupied 6dB Bandwidth(MHz)		Conclusion
802.11b	1	Fig 13.	7.612	P
	6	Fig 14.	7.292	P
	11	Fig 15.	7.452	P
802.11g	1	Fig 16.	16.506	P
	6	Fig 17.	16.587	P
	11	Fig 18.	16.587	P

802.11n mode

Mode	Channel	Occupied 6dB Bandwidth(MHz)		Conclusion
802.11n(20MHz)	1	Fig 19.	17.788	P
	6	Fig 20.	17.708	P
	11	Fig 21.	17.788	P
802.11n(40MHz)	3	Fig 22.	35.577	P

	6	Fig 23.	35.497	P
	9	Fig 24.	35.417	P

Conclusion: PASS

Test graphs as below:

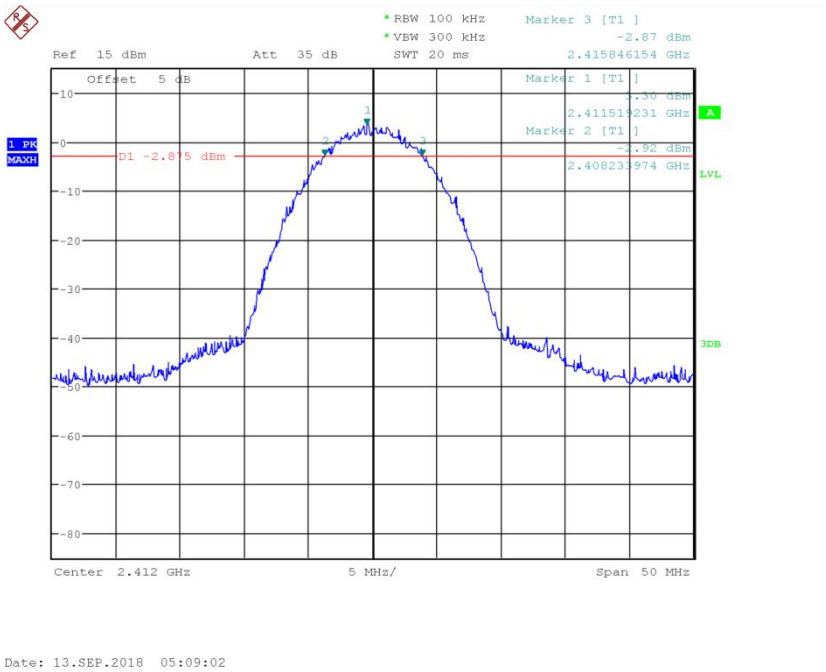


Fig 13. Occupied 6dB Bandwidth (802.11b, Ch1)

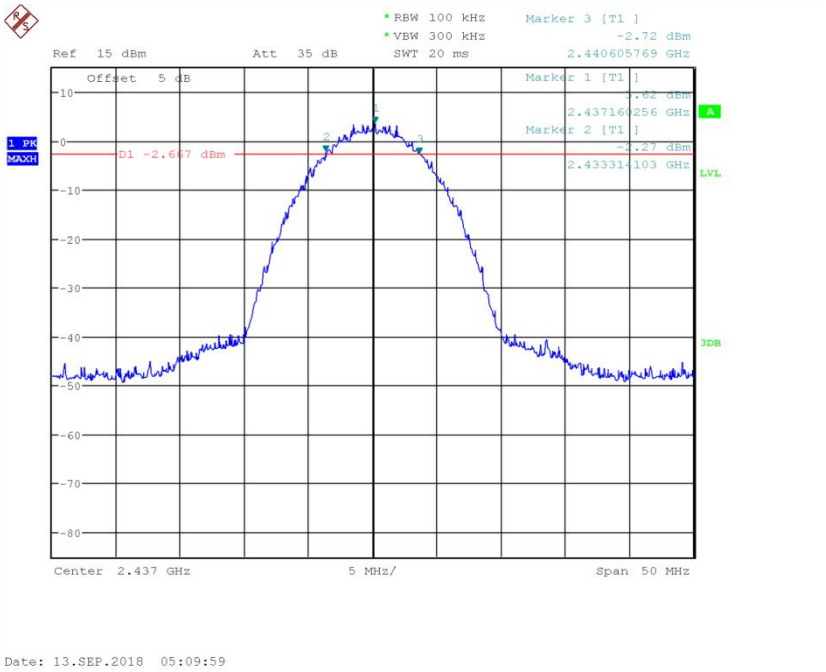


Fig 14. Occupied 6dB Bandwidth (802.11b, Ch6)

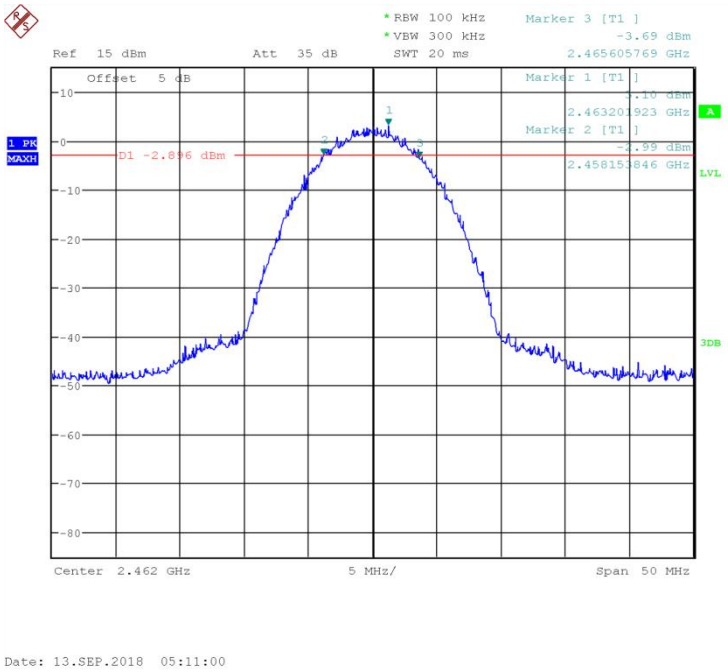


Fig 15. Occupied 6dB Bandwidth (802.11b, Ch11)

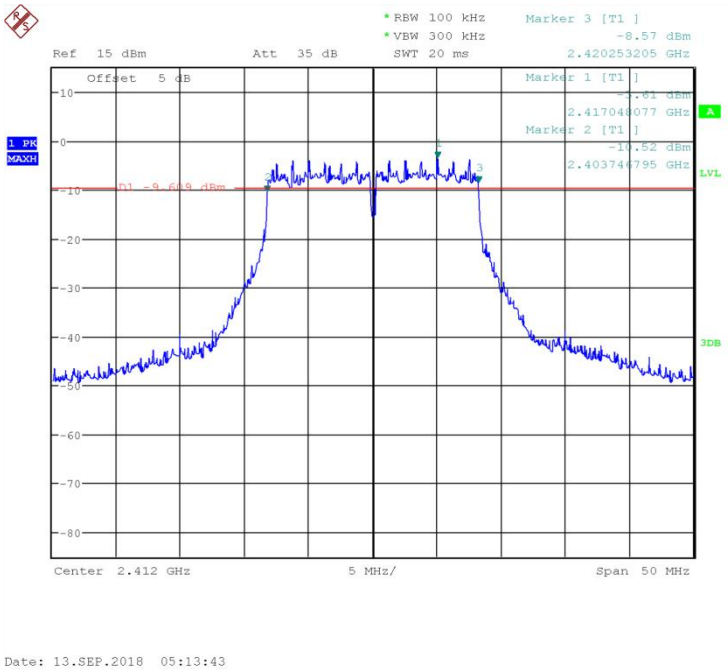


Fig 16. Occupied 6dB Bandwidth (802.11g, Ch1)

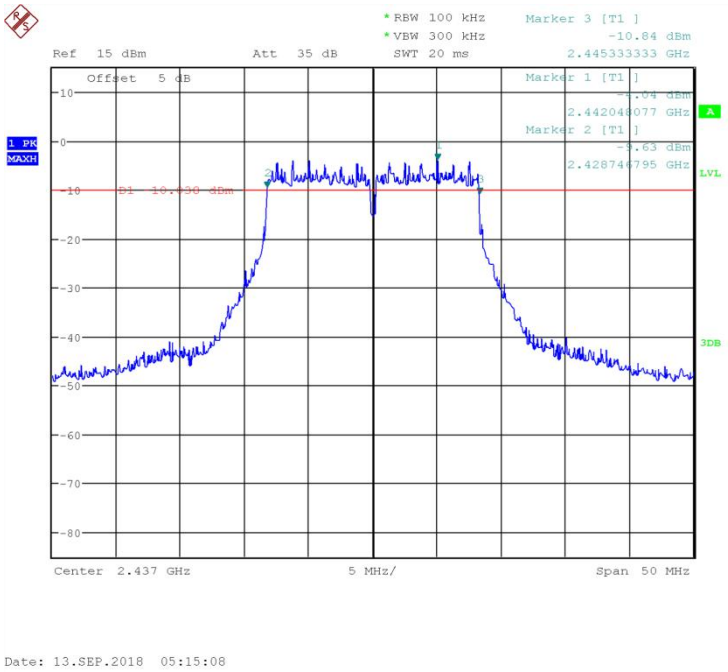


Fig 17. Occupied 6dB Bandwidth (802.11g, Ch6)

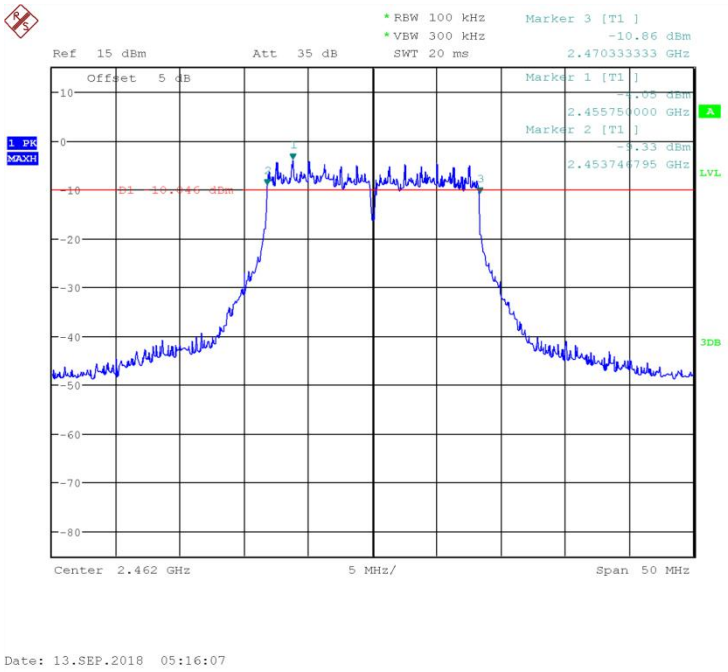


Fig 18. Occupied 6dB Bandwidth (802.11g, Ch11)

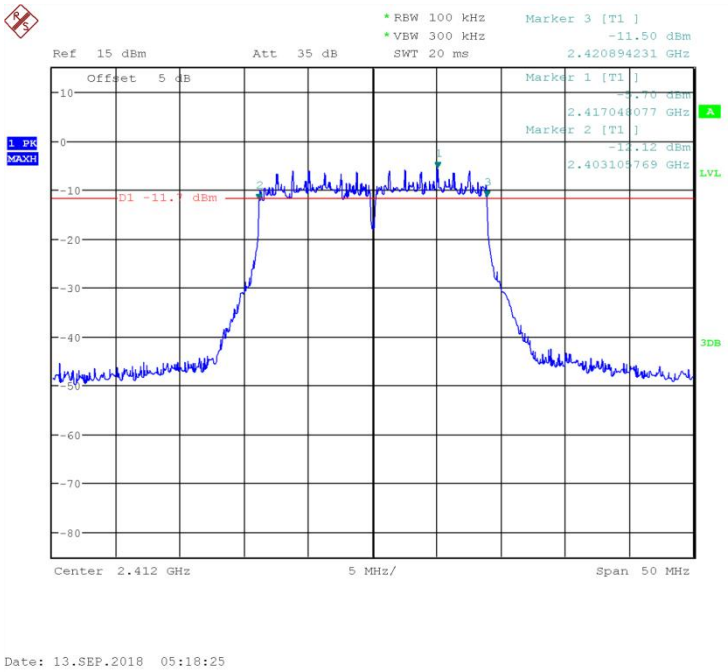


Fig 19. Occupied 6dB Bandwidth (802.11n-20MHz, Ch1)

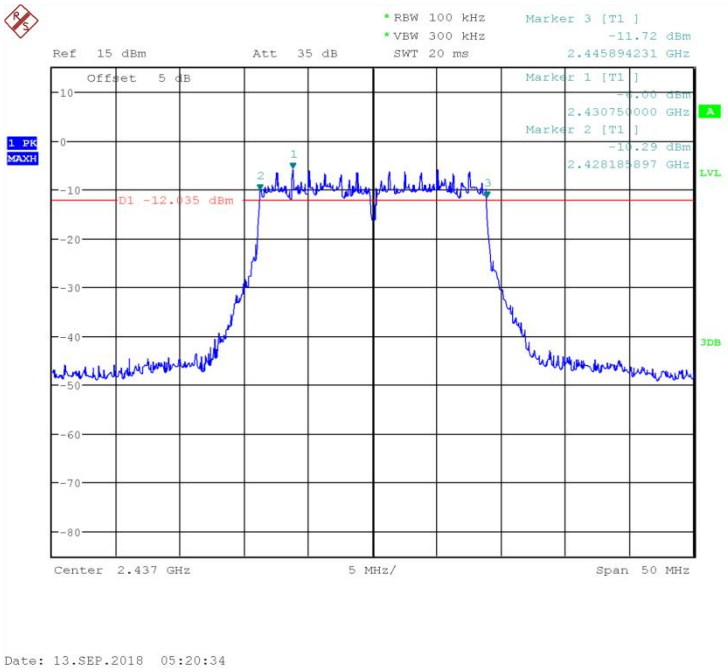


Fig 20. Occupied 6dB Bandwidth (802.11n-20MHz, Ch6)

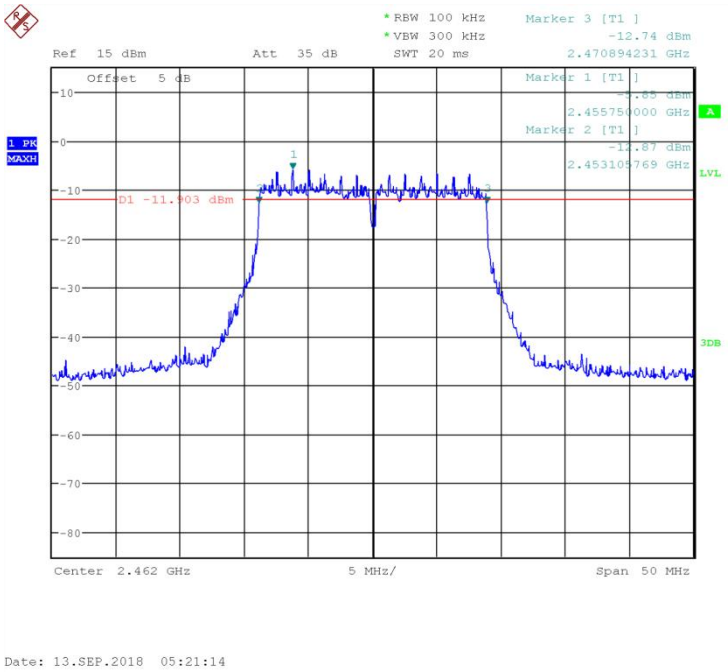


Fig 21. Occupied 6dB Bandwidth (802.11n-20MHz, Ch11)

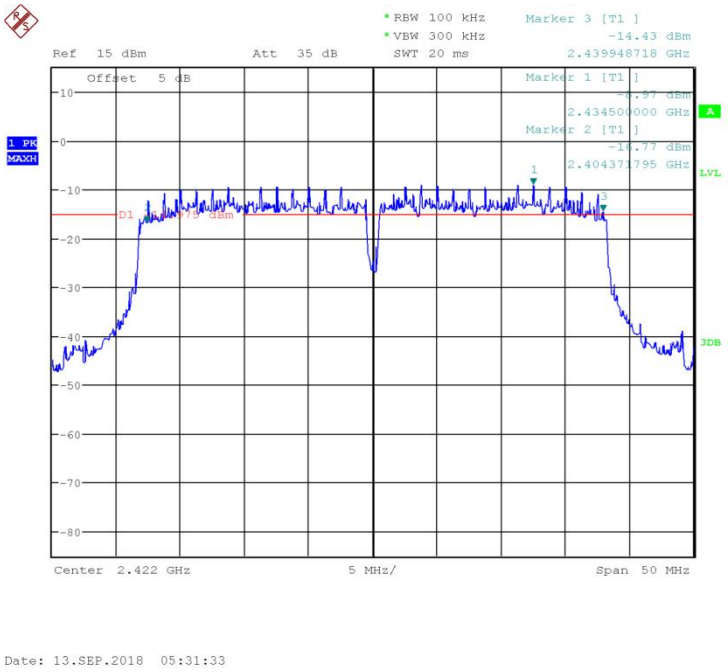


Fig 22. Occupied 6dB Bandwidth (802.11n-40MHz, Ch3)

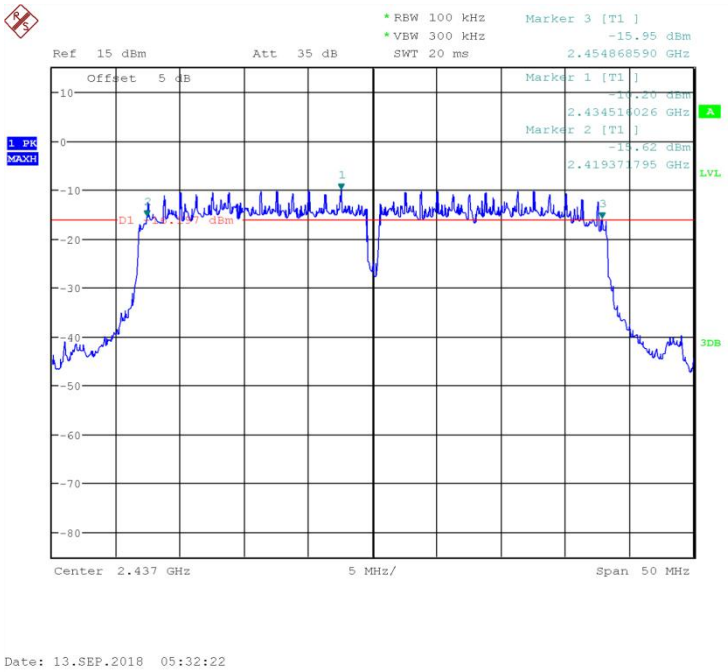


Fig 23. Occupied 6dB Bandwidth (802.11n-40MHz, Ch6)

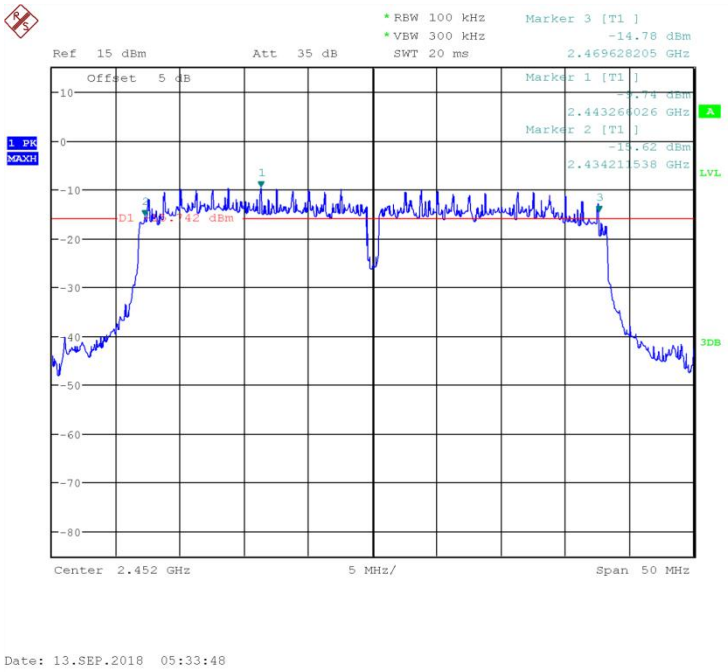


Fig 24. Occupied 6dB Bandwidth (802.11n-40MHz, Ch9)

6.4. Band Edges Compliance

6.4.1 Measurement Limit:

Standard	Limited(dBc)
FCC 47 CFR Part 15.247(d)	>30

6.4.2 Test procedures

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

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 instrument center frequency to the frequency of the emission to be measured (must be within 2MHz of the authorized band edge).
4. Set span to 2 MHz.
5. RBW = 100 kHz.
6. VBW ⩾ [3 × RBW].
7. Detector = RMS.
8. Sweep time = auto.
9. Trace mode = max hold.
10. Allow sweep to continue until the trace stabilizes

6.4.3 Measurement Uncertainty:

Measurement Uncertainty	±4.56dB

6.4.4 Measurement results

802.11b/g mode

Mode	Channel	Test Results	Conclusion
802.11b	1	Fig 25.	P
	11	Fig 26.	P
802.11g	1	Fig 27.	P
	11	Fig 28.	P

802.11n mode

Mode	Channel	Test Results	Conclusion
802.11n(20MHz)	1	Fig 29.	P
	11	Fig 30.	P
802.11n(40MHz)	3	Fig 31.	P
	9	Fig 32.	P

Conclusion: PASS

Test graphs as blew:

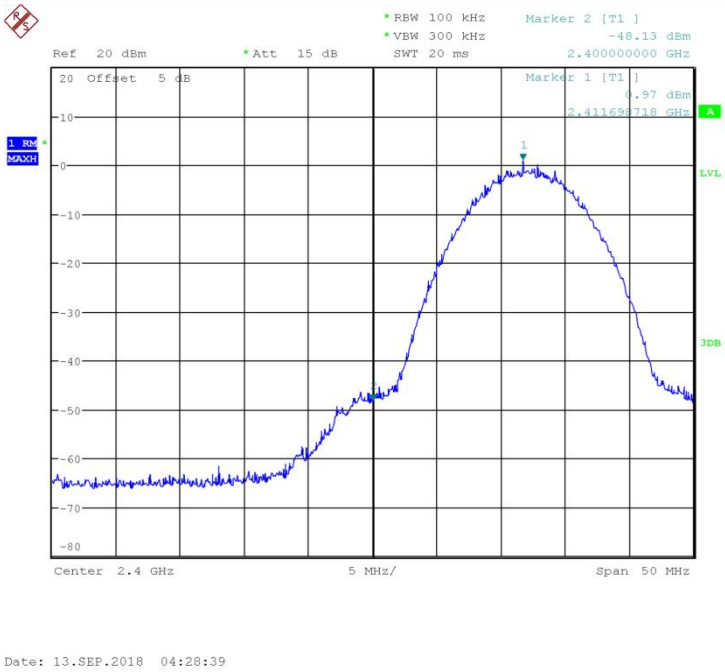


Fig 25. Band Edges (802.11b, Ch1)

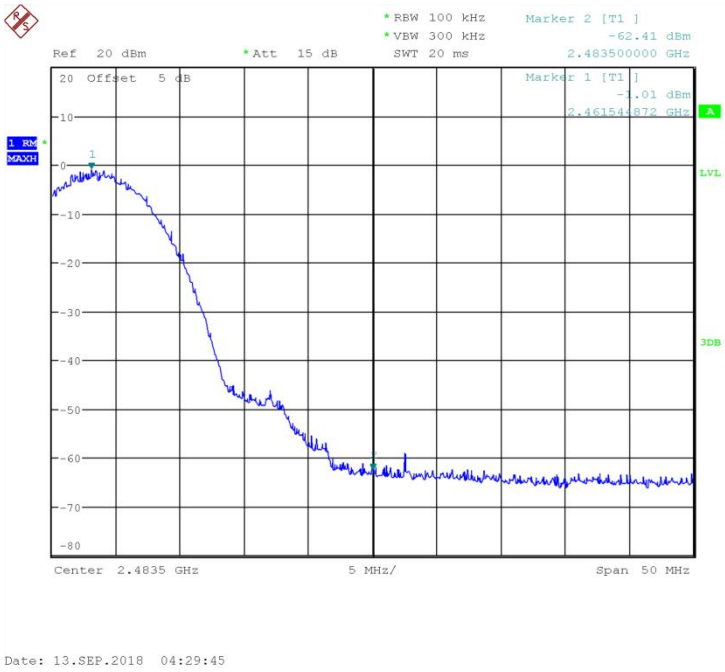


Fig 26. Band Edges (802.11b, Ch11)

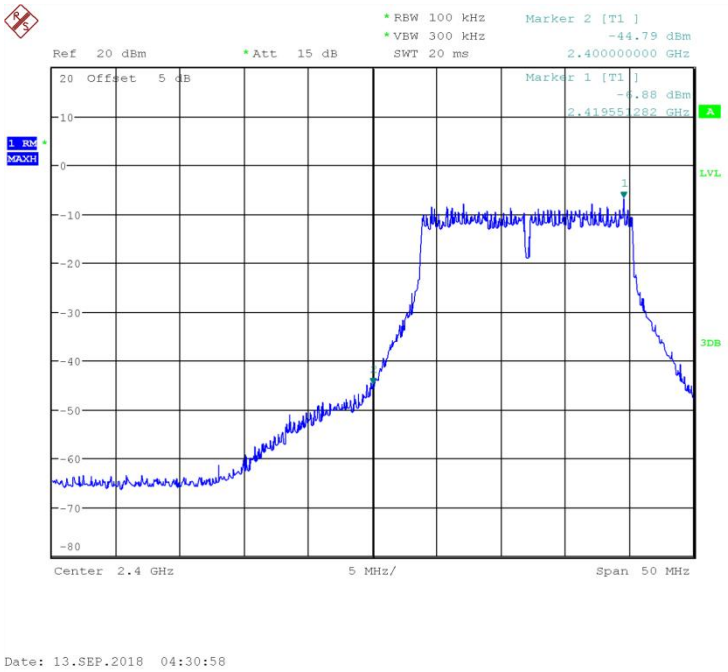


Fig 27. Band Edges (802.11g, Ch1)

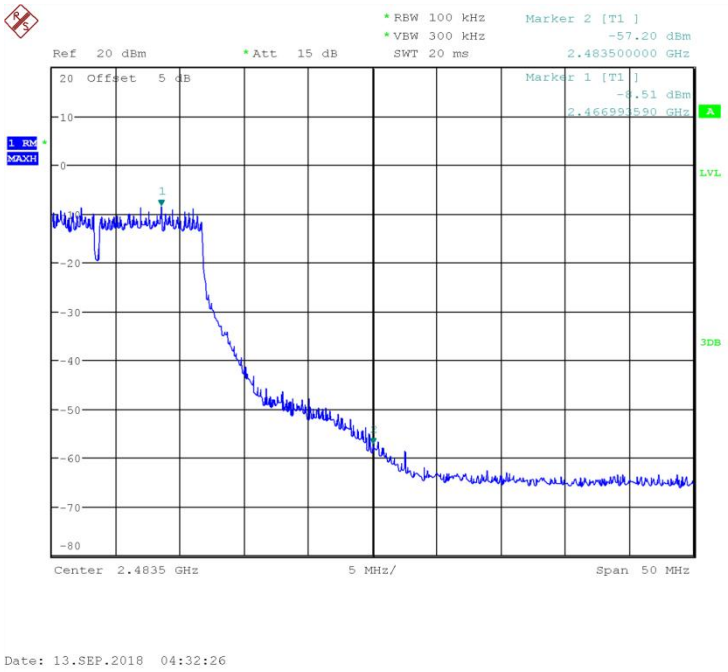


Fig 28. Band Edges (802.11g, Ch11)

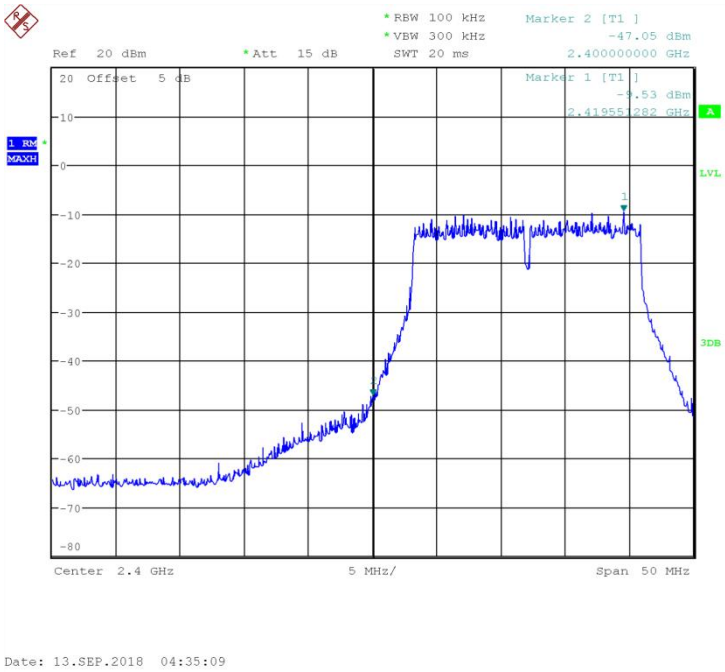


Fig 29. Band Edges (802.11n-20MHz, Ch1)

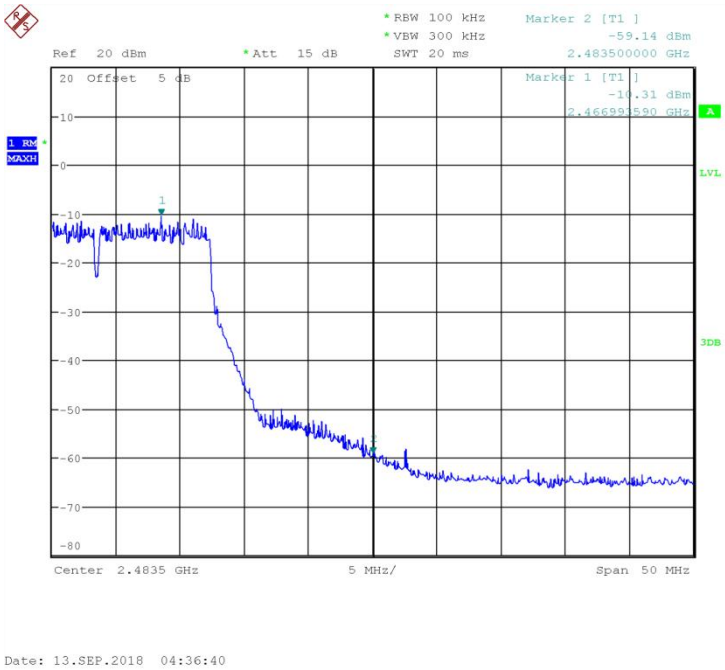


Fig 30. Band Edges (802.11n-20MHz, Ch11)

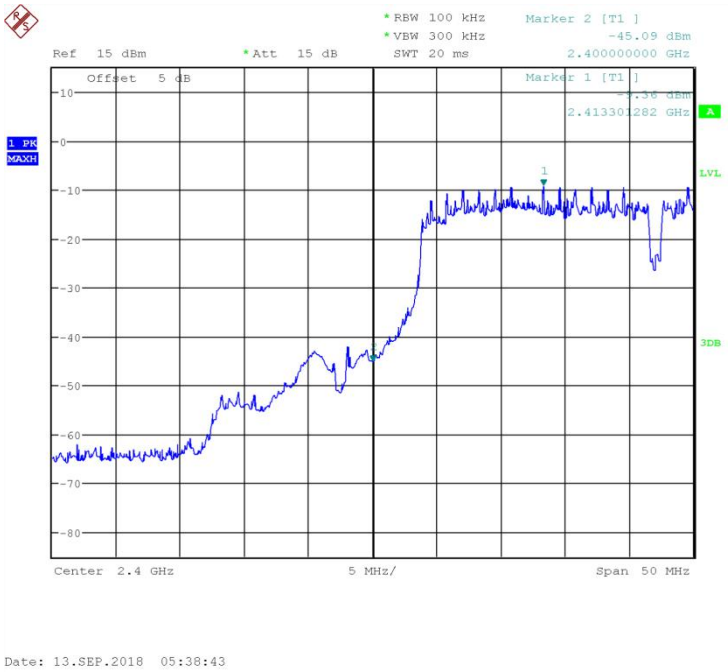


Fig 31. Band Edges (802.11n-40MHz, Ch3)

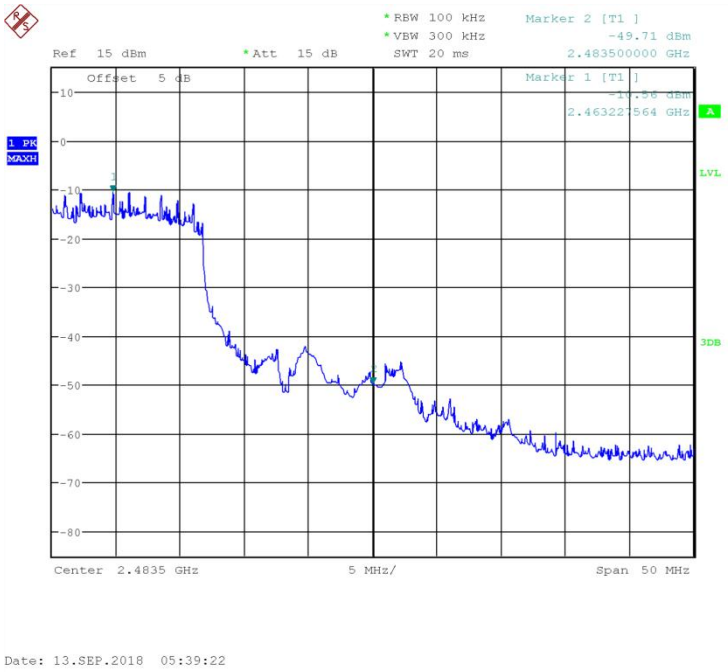


Fig 32. Band Edges (802.11n-40MHz, Ch9)

6.5. Transmitter Spurious Emission-conducted

6.5.1 Measurement Limit:

Standard	Limit

FCC 47 CFR Part 15.247(d)	20dB below peak output power in 100KHz bandwidth

6.5.2 Test procedures

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.

6.5.3 Measurement Uncertainty:

Frequency Range	Uncertainty
30MHz≤ f ≤2GHz	0.63
2GHz≤ f ≤3.6GHz	0.82
3.6GHz≤ f ≤8GHz	1.55
8GHz≤ f ≤20GHz	1.86
20GHz≤ f ≤22GHz	1.90
22GHz≤ f ≤26GHz	2.20

6.5.4 Measurement Result:

802.11b/g mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11b	1	2.412GHz	Fig 33.	P
		30MHz~26GHz	Fig 34.	P
	6	2.437GHz	Fig 35.	P
		30MHz~26GHz	Fig 36.	P
	11	2.462GHz	Fig 37.	P
		30MHz~26GHz	Fig 38.	P
802.11g	1	2.412GHz	Fig 39.	P
		30MHz~26GHz	Fig 40.	P
	6	2.437GHz	Fig 41.	P
		30MHz~26GHz	Fig 42.	P
	11	2.462GHz	Fig 43.	P
		30MHz~26GHz	Fig 44.	P

802.11n mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11n(20MHz)	1	2.412GHz	Fig 45.	P
		30MHz~26GHz	Fig 46.	P
	6	2.437GHz	Fig 47.	P
		30MHz~26GHz	Fig 48.	P
	11	2.462GHz	Fig 49.	P
		30MHz~26GHz	Fig 50.	P
802.11n(40MHz)	3	2.422GHz	Fig 51.	P
		30MHz~26GHz	Fig 52.	P
	6	2.437GHz	Fig 53.	P
		30MHz~26GHz	Fig 54.	P

	9	2.452GHz	Fig 55.	P
		30MHz~26GHz	Fig 56.	P

Conclusion: PASS

Test graphs as below:

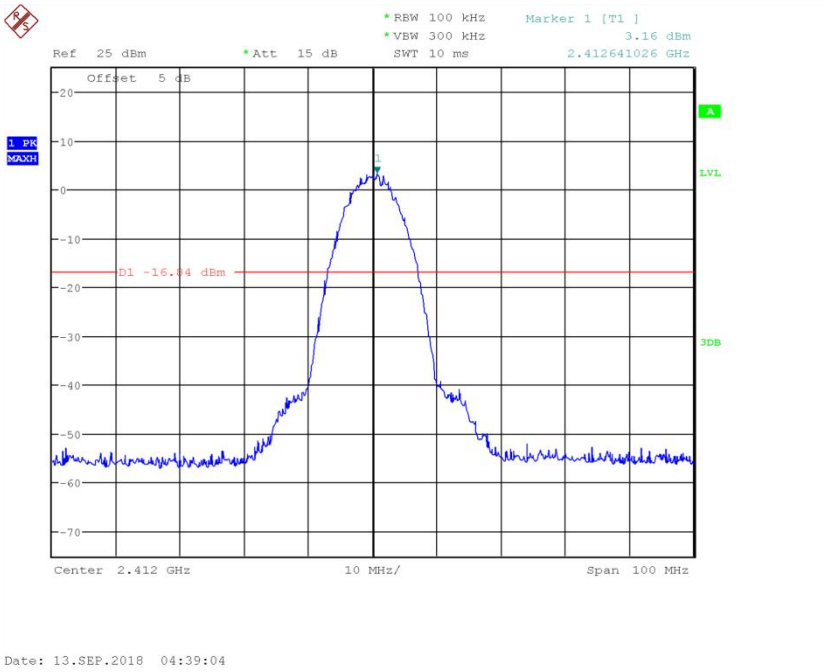


Fig 33. Conducted Spurious Emission (802.11b, Ch1)

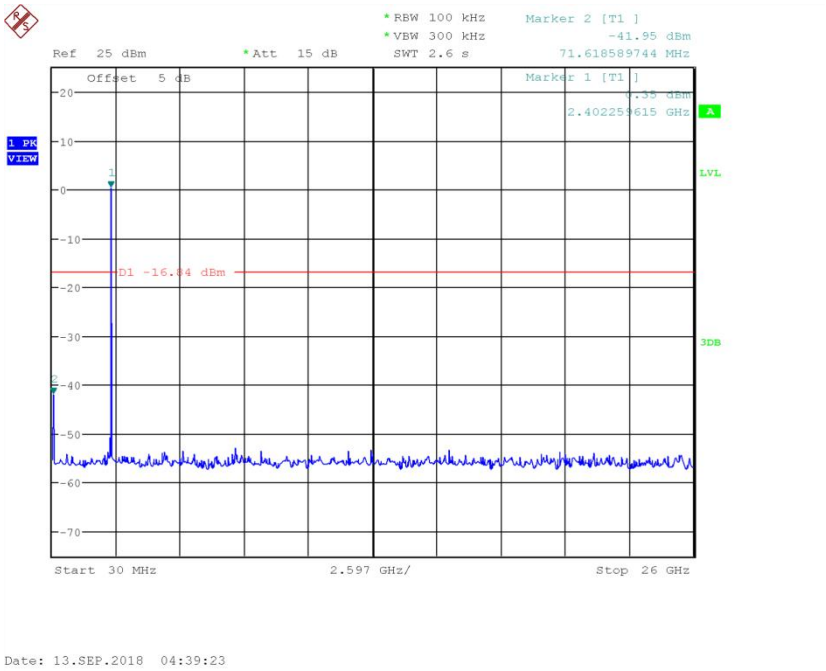


Fig 34. Conducted Spurious Emission (802.11b, Ch1, 30MHz~26GHz)

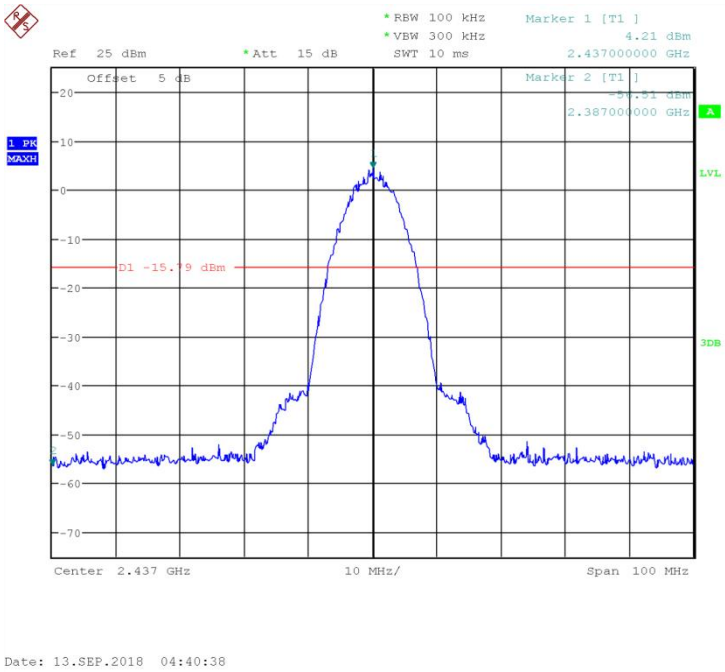


Fig 35. Conducted Spurious Emission (802.11b, Ch6)

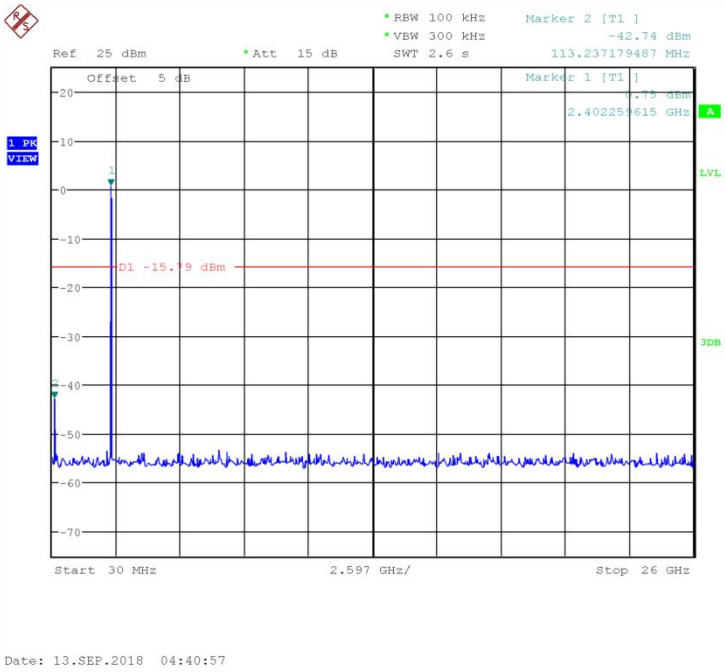


Fig 36. Conducted Spurious Emission (802.11b, Ch6, 30MHz~26GHz)

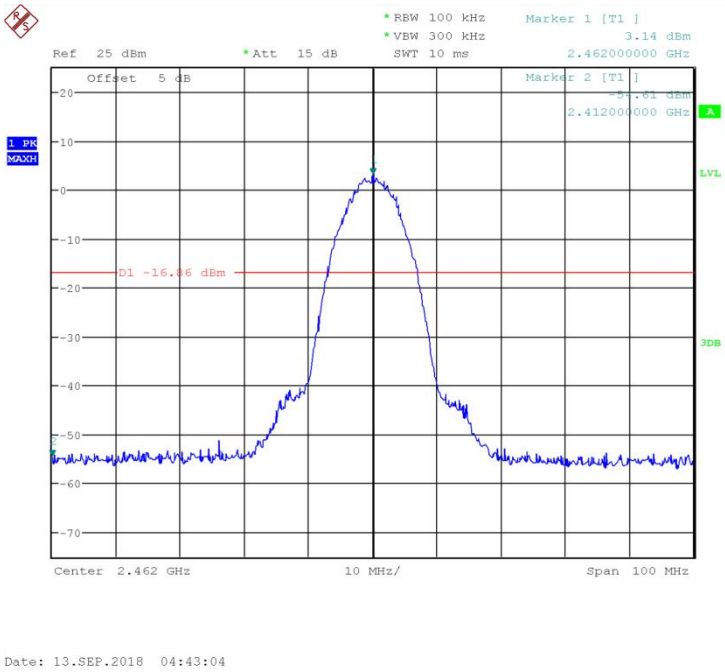


Fig 37. Conducted Spurious Emission (802.11b, Ch11)

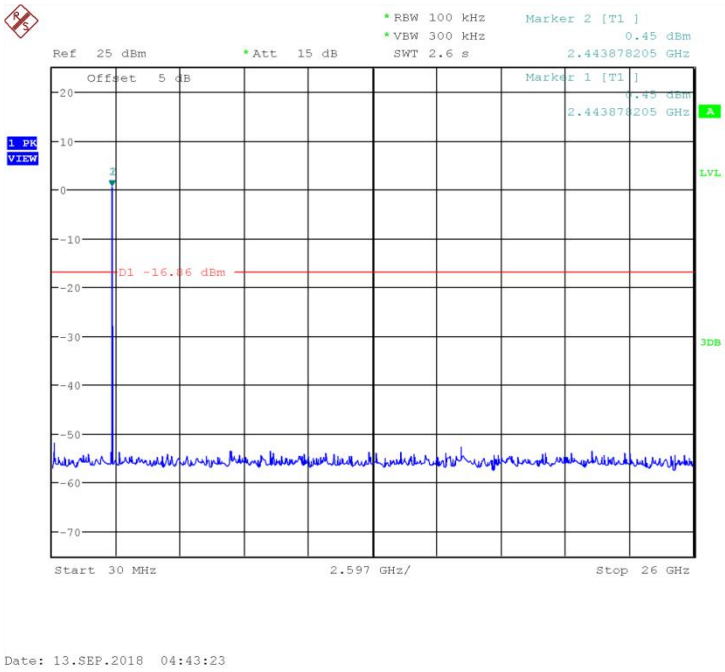


Fig 38. Conducted Spurious Emission (802.11b, Ch11, 30MHz~26GHz)

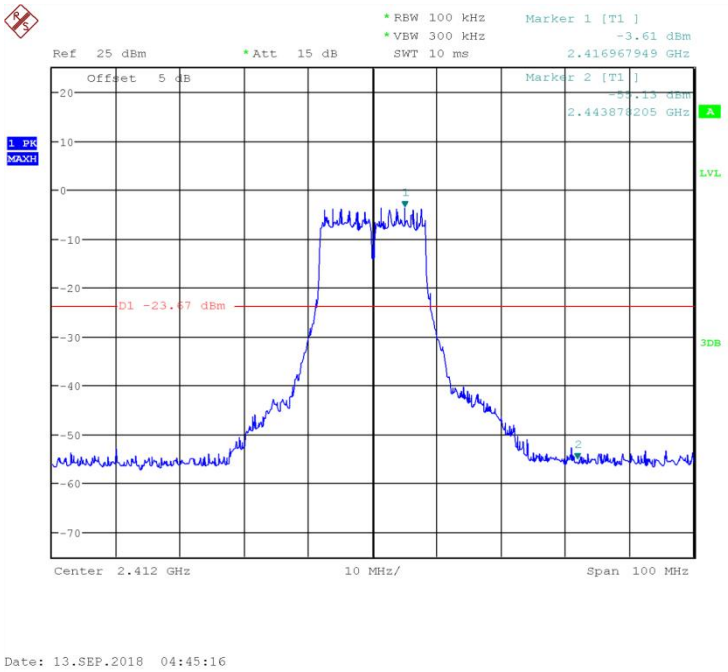


Fig 39. Conducted Spurious Emission (802.11g, Ch1)

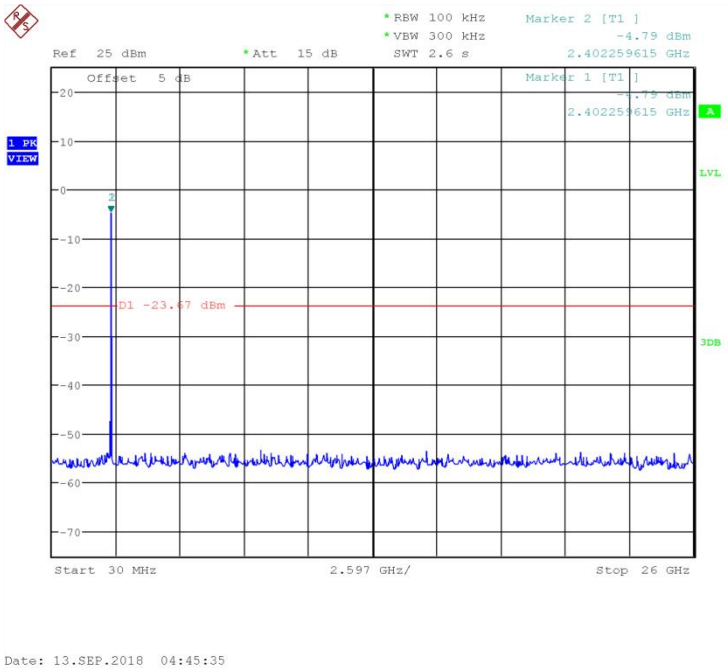


Fig 40. Conducted Spurious Emission (802.11g, Ch1, 30MHz~26GHz)

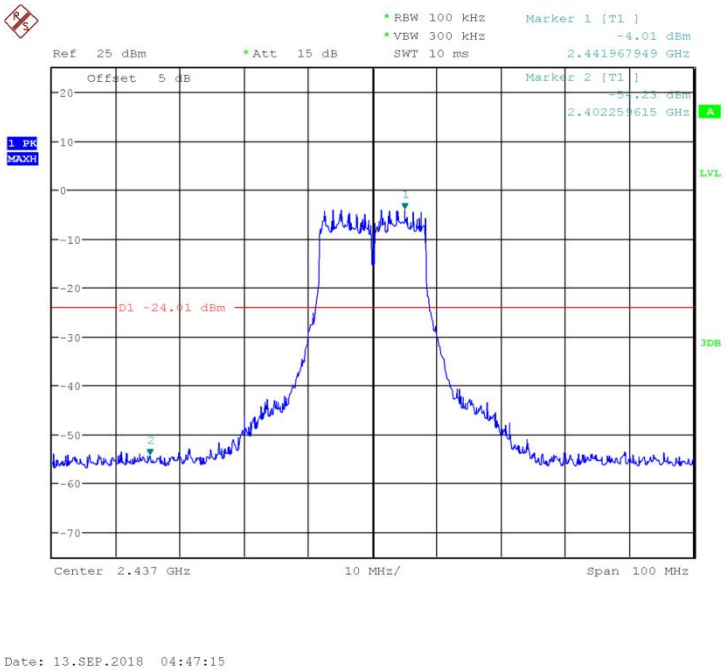


Fig 41. Conducted Spurious Emission (802.11g, Ch6)

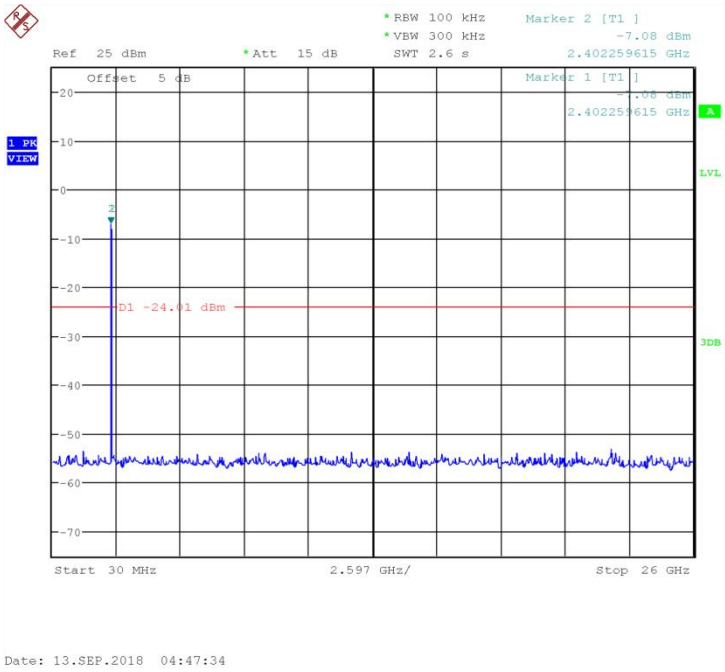


Fig 42. Conducted Spurious Emission (802.11g, Ch6, 30MHz~26GHz)

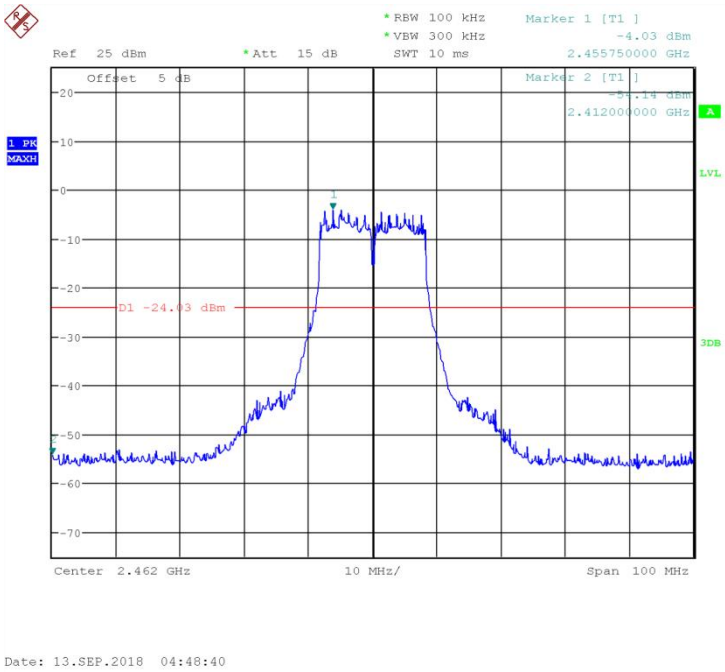


Fig 43. Conducted Spurious Emission (802.11g, Ch11)

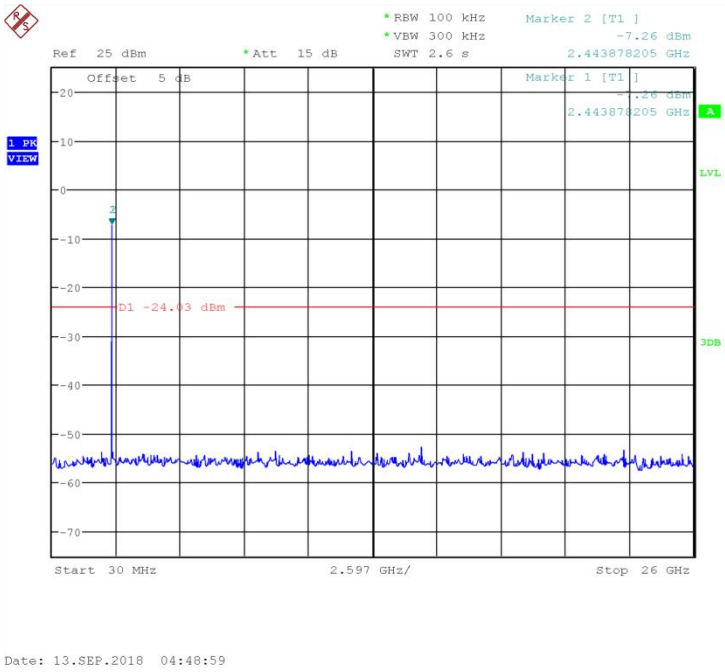


Fig 44. Conducted Spurious Emission (802.11g, Ch11, 30MHz~26GHz)

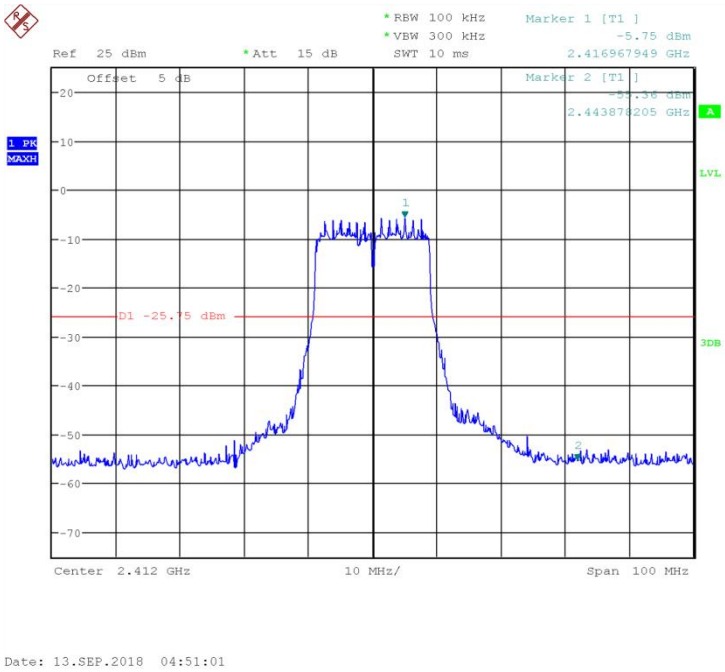


Fig 45. Conducted Spurious Emission (802.11n-20MHz, Ch1)

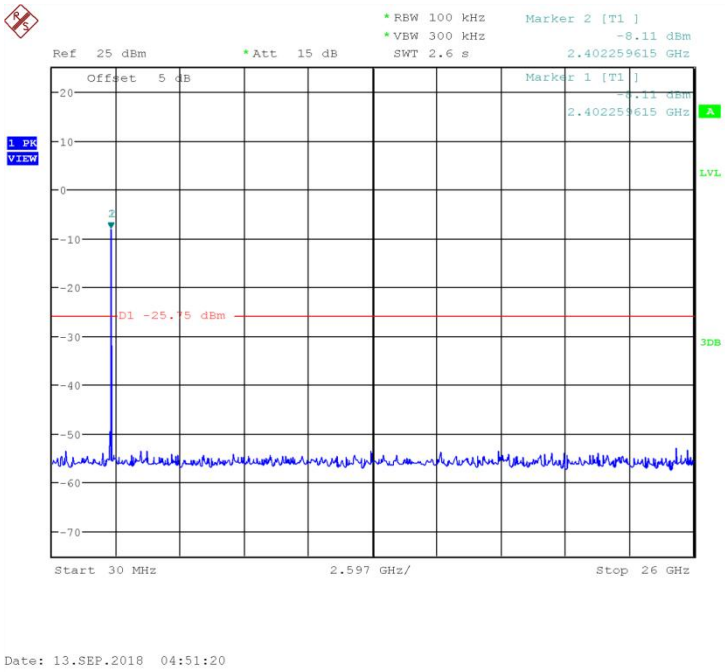


Fig 46. Conducted Spurious Emission (802.11n-20MHz, Ch1, 30MHz~26GHz)

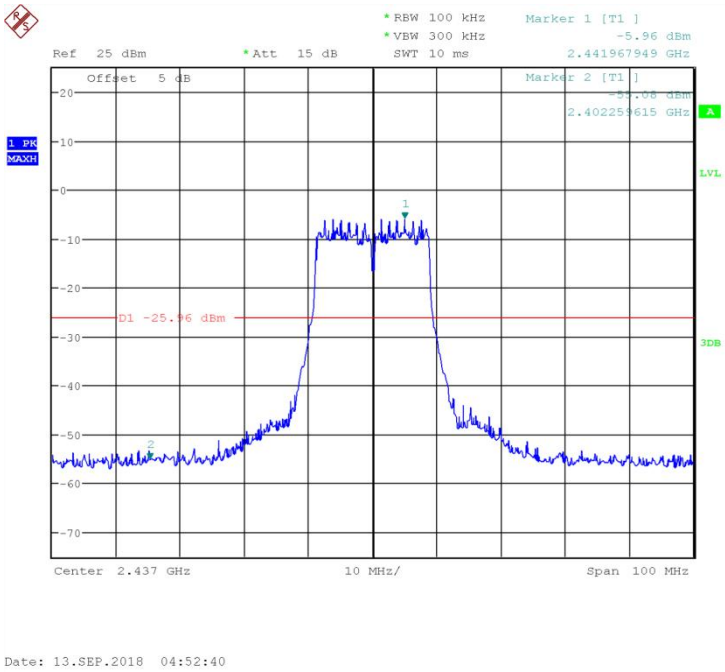


Fig 47. Conducted Spurious Emission (802.11n-20MHz, Ch6)

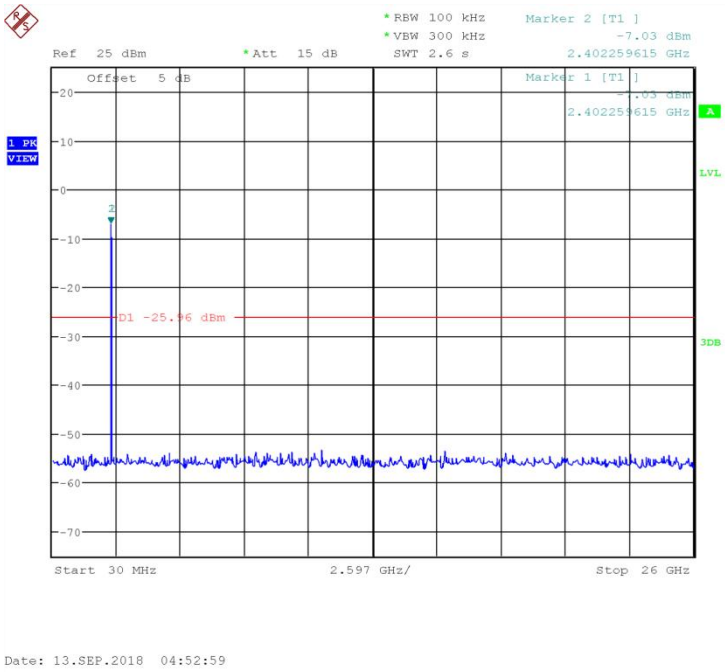


Fig 48. Conducted Spurious Emission (802.11n-20MHz, Ch6, 30MHz~26GHz)

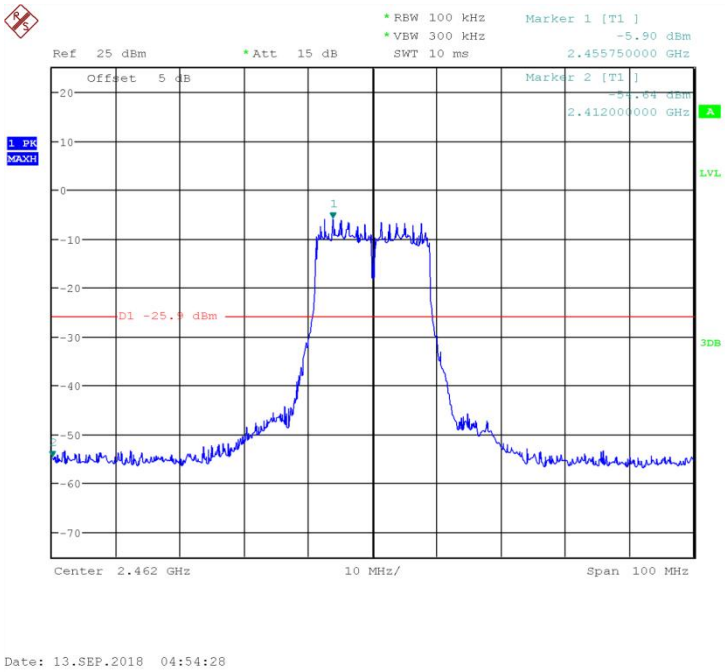


Fig 49. Conducted Spurious Emission (802.11n-20MHz, Ch11)

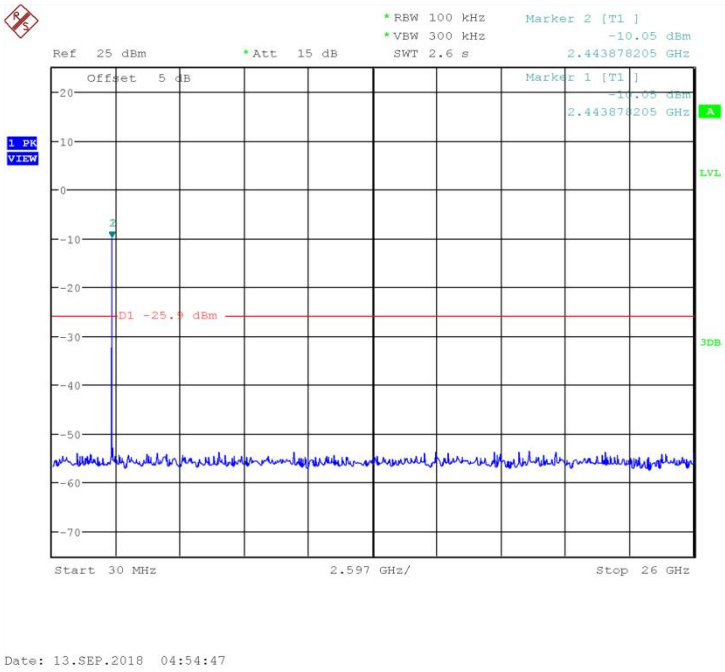


Fig 50. Conducted Spurious Emission (802.11n-20MHz, Ch11, 30MHz~26GHz)

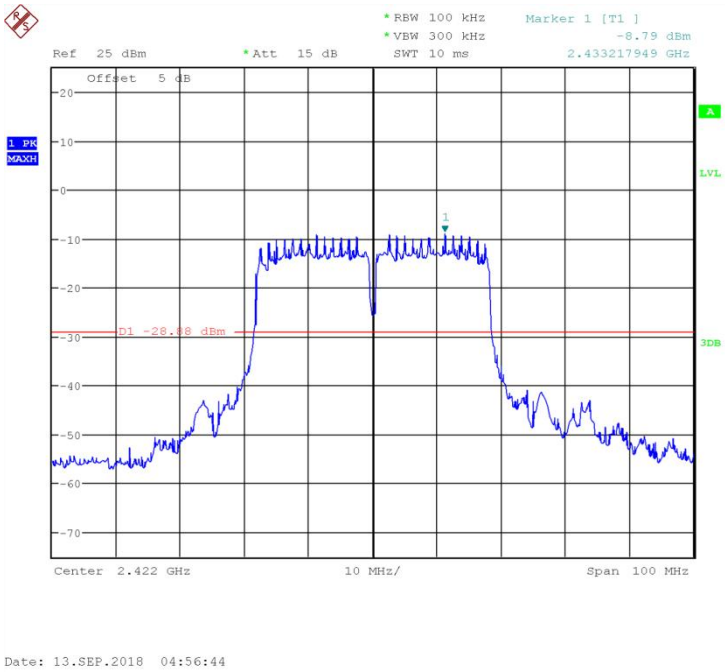


Fig 51. Conducted Spurious Emission (802.11n-40MHz, Ch3)

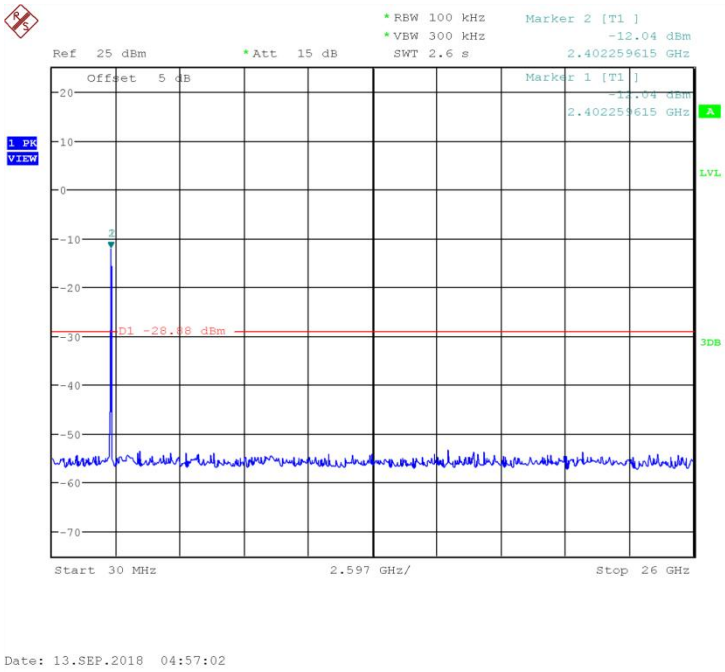


Fig 52. Conducted Spurious Emission (802.11n-40MHz, Ch3, 30MHz~26GHz)

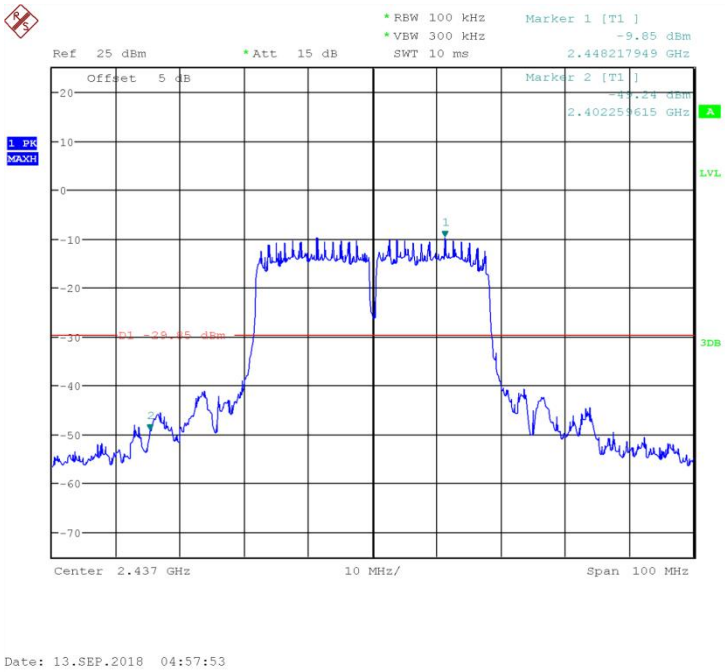


Fig 53. Conducted Spurious Emission (802.11n-40MHz, Ch6)

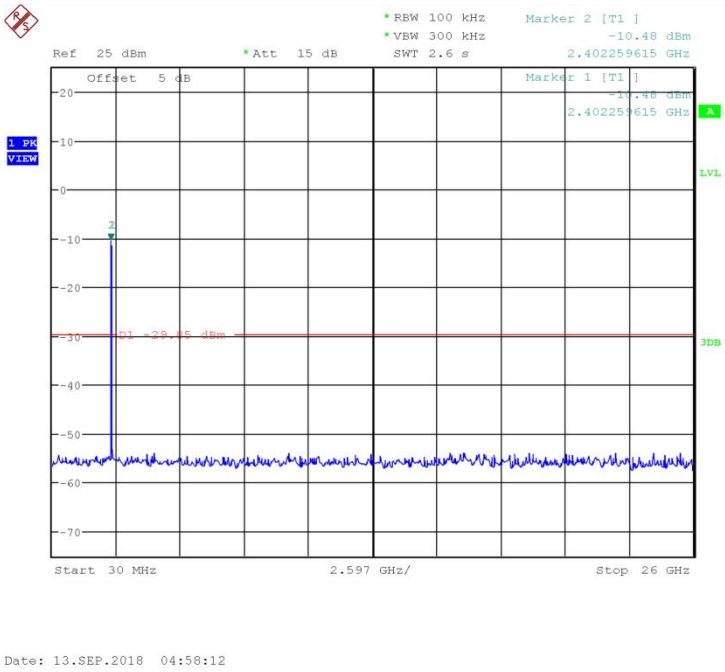


Fig 54. Conducted Spurious Emission (802.11n-40MHz, Ch6, 30MHz~26GHz)

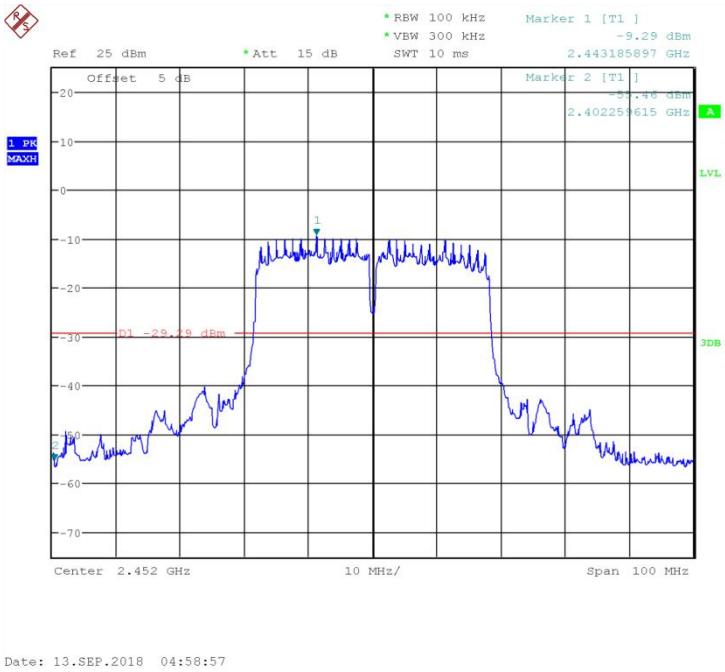


Fig 55. Conducted Spurious Emission (802.11n-40MHz, Ch9)

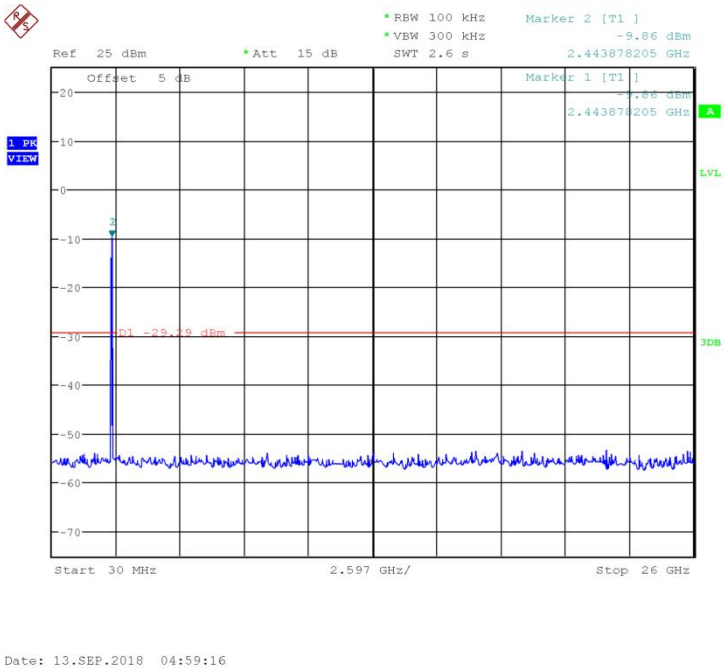


Fig 56. Conducted Spurious Emission (802.11n-40MHz, Ch9, 30MHz~26GHz)

6.6. Transmitter Spurious Emission-Radiated

6.6.1 Measurement 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 25.205(a), must also comply with the radiated emission limits specified in 15.209(a)(see 15.205(c)). The measurement is according to ANSI C63.10 clause 11.11 and 11.12.

6.6.2 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

Measurement Uncertainty

Measurement Items	Range	Confidence Level	Calculated Uncertainty
Transmitter Spurious Emission-Radiated	9KHz-30MHz	95%	±5.66db
Transmitter Spurious Emission-Radiated	30MHz-1000MHz	95%	±4.98db
Transmitter Spurious Emission-Radiated	1000MHz -18000MHz	95%	±5.06db
Transmitter Spurious Emission-Radiated	18000MHz -40000MHz	95%	±5.20db

6.6.3 Test procedures

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 nonconducting 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, For emissions testing at or below 1 GHz, the table height shall be 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 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 C63.4-2013 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 testing, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emission from the EUT. This

maximization process was repeated with the EUT positioned in each of its three rthogonal orientations.

Frequency of emission (MHz)	RBW/VBW	Sweep Times (s)
30~1000	100kHz/300kHz	5
1000~4000	1MHz/3MHz	15
4000~18000	1MHz/3MHz	40
18000~26500	1MHz/3MHz	20

L1320

802.11b/g mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11b	Power（low）	2.31GHz~2.5GHz	Fig 57.	P
	Power（high）	2.31GHz~2.5GHz	Fig 58.	P
	1	30MHz~1GHz	Fig 59.	P
		1GHz~3GHz	Fig 60.	P
		3GHz~18GHz	Fig 61.	P

Conclusion: PASS

Note:

A ”reference path loss” is established and A_{Rpi} is the attenuation of “reference path loss”, and including the gain of receive antenna , the gain of the preamplifier, the cable loss.

P_{Mea} is the field strength recorded from the instrument.

The measurement results are obtained as described below:

ARpi = Cable loss + Antenna Gain-Preamplifier gain

Result = P_{Mea} + Cable loss + Antenna Gain-Preamplifier gain = P_{Mea} + ARpi .

802.11b mode

Ch1 30MHz~1GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
45.1	30.94	-20.2	51.14	V
53.1	26.93	-20.6	47.53	V
179.1	26.85	-25.3	52.15	H
236.0	31.6	-23.2	54.8	V
288.0	33.2	-22.2	55.4	H

476.8	24.13	-17.4	41.53	V

Ch1 1GHz~3GHz(Peak)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
2690.5	54.25	7.9	46.35	V
2742.4	54.23	7.7	46.53	V
2787.2	55.24	7.8	47.44	V
2844.8	54.77	8.3	46.47	V
2904.4	54.77	8.9	45.87	V
2945.6	55.05	8.6	46.45	H

Ch1 1GHz~3GHz(Average)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
2690.5	42.32	7.9	34.42	V
2742.4	42.29	7.7	34.59	V
2787.2	42.44	7.8	34.64	V
2844.8	42.7	8.3	34.4	V
2904.4	43.24	8.9	34.34	V
2945.6	43.32	8.6	34.72	H

Ch1 3GHz~18GHz(Peak)

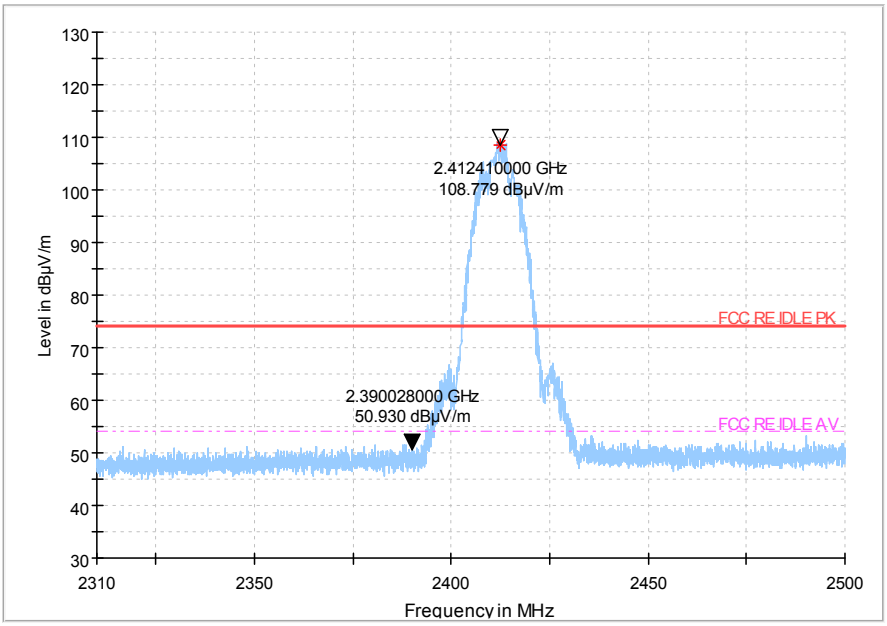
Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
4822.5	54.77	0	54.77	H
14288.0	55.08	20.6	34.48	H
15090.1	55.76	21.2	34.56	H
15732.5	57.21	23.2	34.01	V
16220.0	58.51	25.1	33.41	V
16751.8	59.18	26.6	32.58	H

Ch1 3GHz~18GHz(Average)

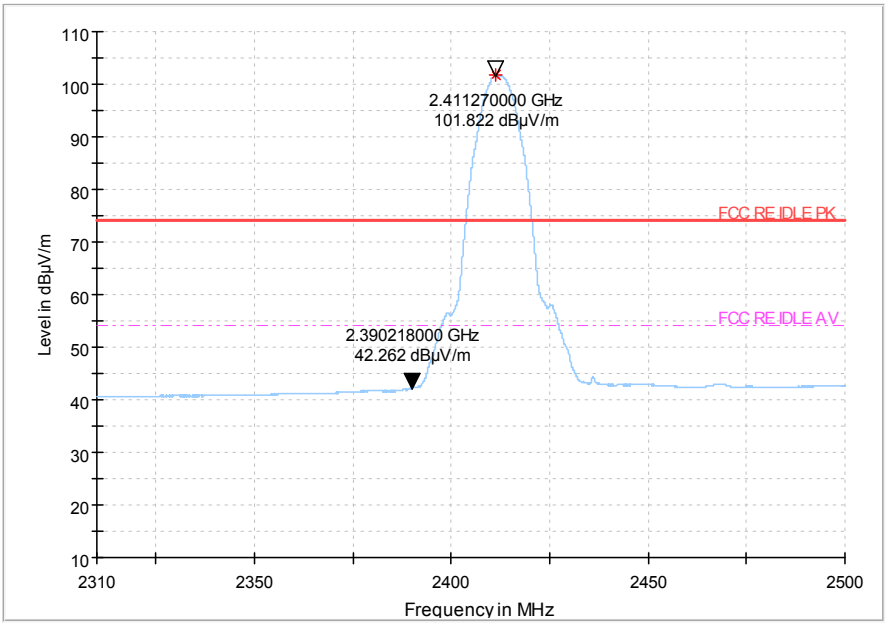
Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
4822.5	42.13	0	42.13	H
14288.0	42.98	20.6	22.38	H
15090.1	42.8	21.2	21.6	H
15732.5	44.87	23.2	21.67	V
16220.0	46.07	25.1	20.97	V
16751.8	47.12	26.6	20.52	H

Note: Only the worst case is written in the report.

Test graphs as below:

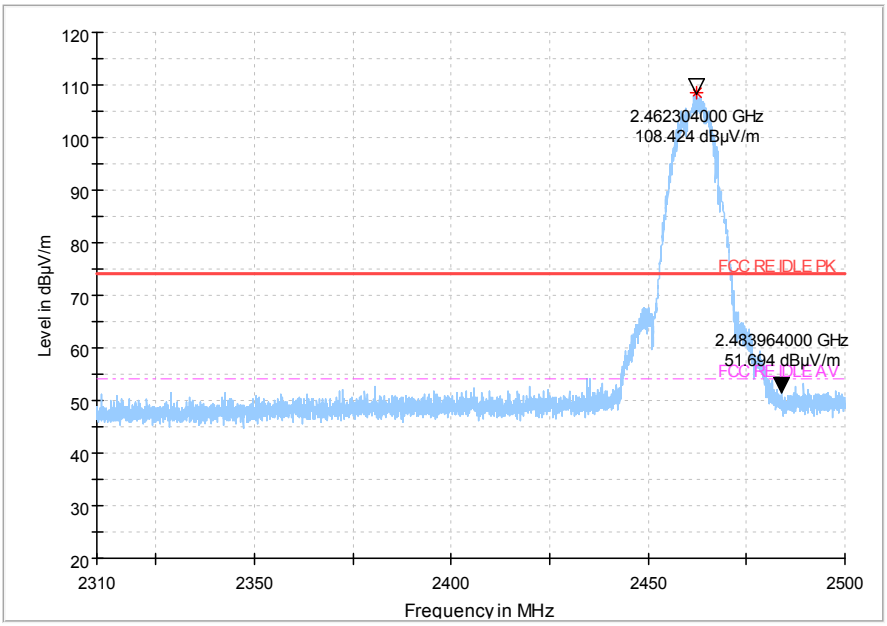


Peak detector

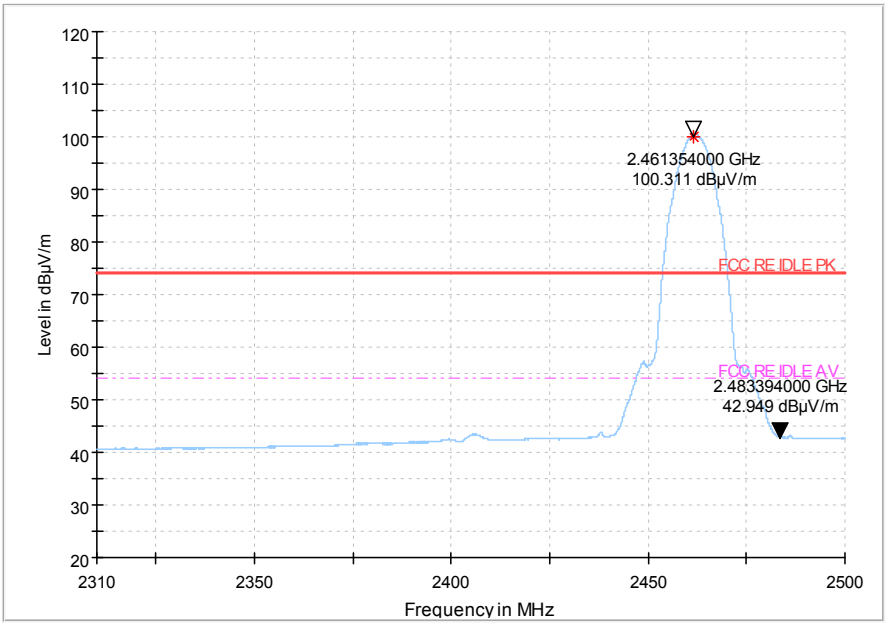


AV detector

Fig 57. Radiated emission (Power): 802.11b, low channel



Peak detector



AV detector

Fig 58. Radiated emission (Power): 802.11b, high channel

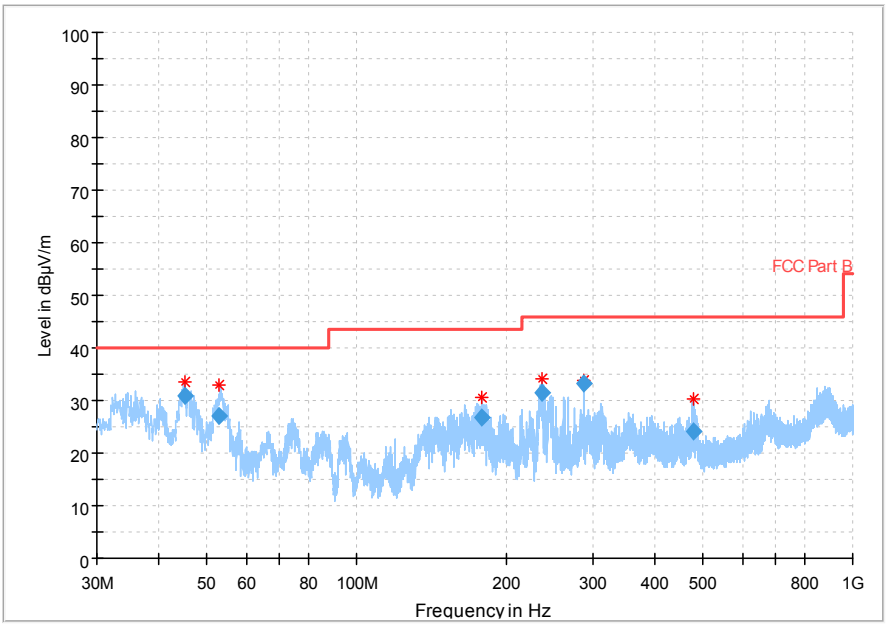


Fig 59. Radiated Spurious Emission (802.11b, Ch1,30MHz~1GHz)

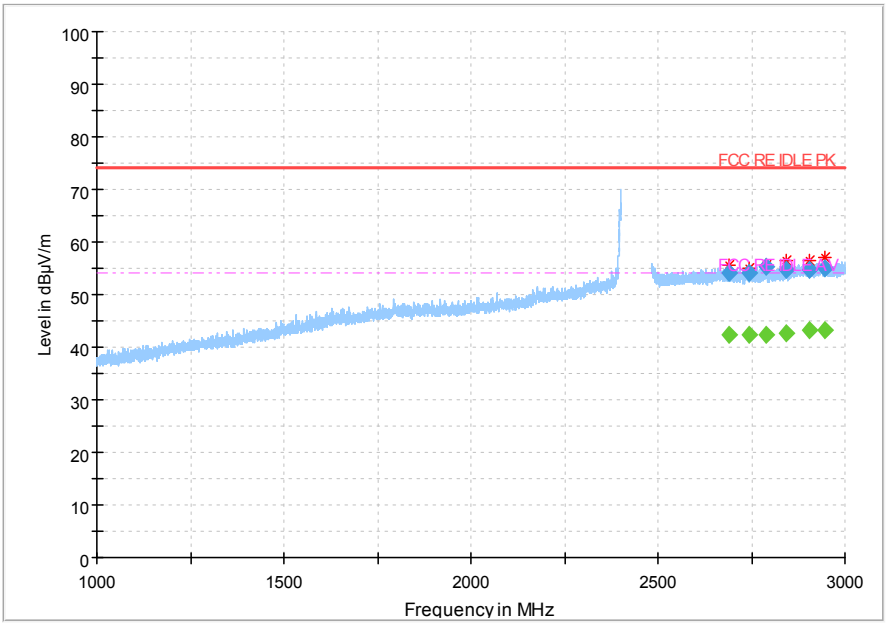


Fig 60. Radiated Spurious Emission (802.11b, Ch1,1GHz~3GHz)

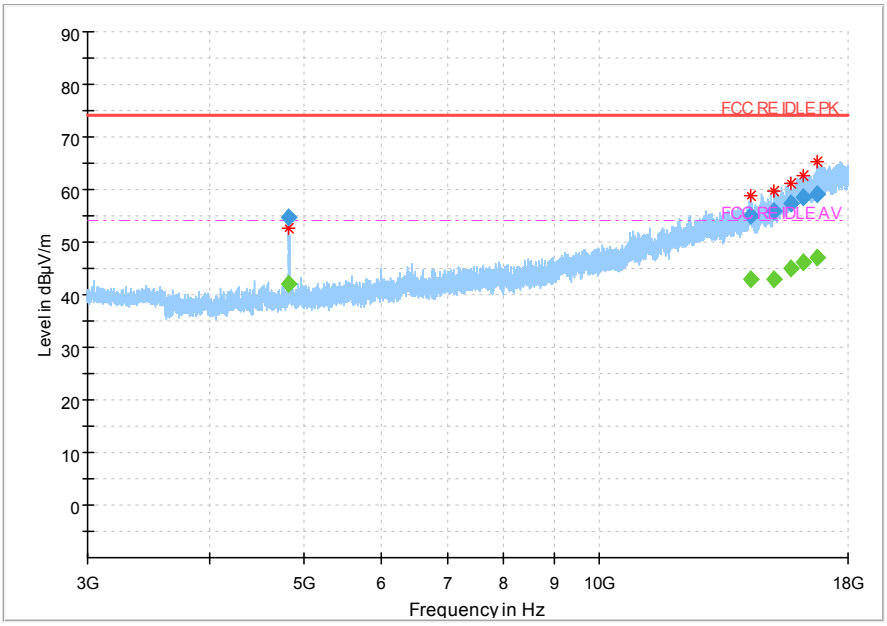


Fig 61. Radiated Spurious Emission (802.11b, Ch1,3GHz~18GHz)

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802.11b/g mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11b	Power（low）	2.31GHz~2.5GHz	Fig 62.	P

	Power（high）	2.31GHz~2.5GHz	Fig 63.	P
	1	30MHz~1GHz	Fig 64.	P
		1GHz~3GHz	Fig 65.	P
		3GHz~18GHz	Fig 66.	P

802.11b mode

Ch1 30MHz~1GHz

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
44.8	30.52	-20.3	50.82	V
52.7	24.92	-20.5	45.42	V
120.0	25.25	-25.4	50.65	H
181.9	25.27	-25.1	50.37	H
240.0	34.3	-23	57.3	H
288.0	31.8	-22.2	54	H

Ch1 1GHz~3GHz(Peak)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
2581.2	53.53	7.3	46.23	H
2650.0	54.07	7.7	46.37	V
2711.8	54.64	7.8	46.84	H
2798.6	54.54	7.9	46.64	V
2879.2	55.51	8.6	46.91	H
2933.0	55.91	8.7	47.21	V

Ch1 1GHz~3GHz(Average)

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
2650.0	42.19	7.7	34.49	V
2711.8	42.2	7.8	34.4	H
2798.6	42.51	7.9	34.61	V
2879.2	43.19	8.6	34.59	H

2933.0	43.41	8.7	34.71	V

Ch1 3GHz~18GHz(Peak)

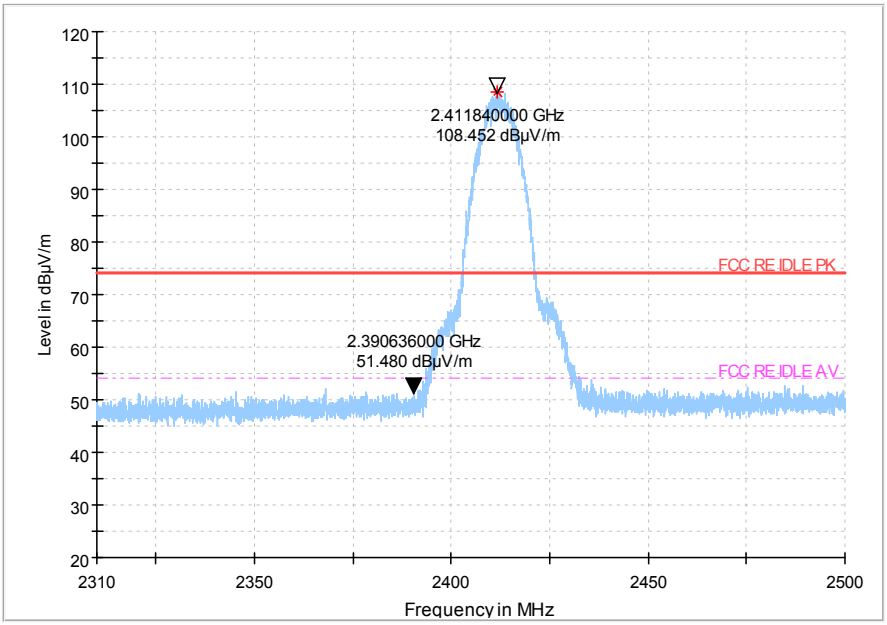
Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
4823.9	61.41	0	61.41	V
5997.2	42.82	2.3	40.52	V
15598.0	57.19	22.8	34.39	V
16934.5	61.06	27.3	33.76	V
17460.5	59.25	27.1	32.15	H
17795.2	60.96	28.4	32.56	V

Ch1 3GHz~18GHz(Average)

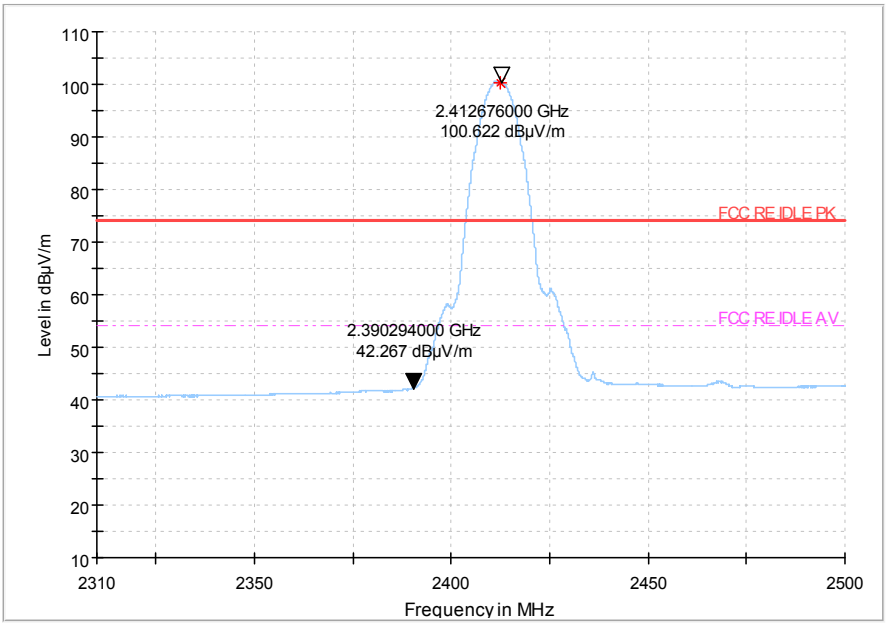
Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	PMea(dBuV/m)	Polarity
4823.9	50.71	0	50.71	V
15598.0	44.28	22.8	21.48	V
16934.5	48.02	27.3	20.72	V
17460.5	46.92	27.1	19.82	H
17795.2	48.3	28.4	19.9	V

Note: Only the worst case is written in the report.

Test graphs as below:

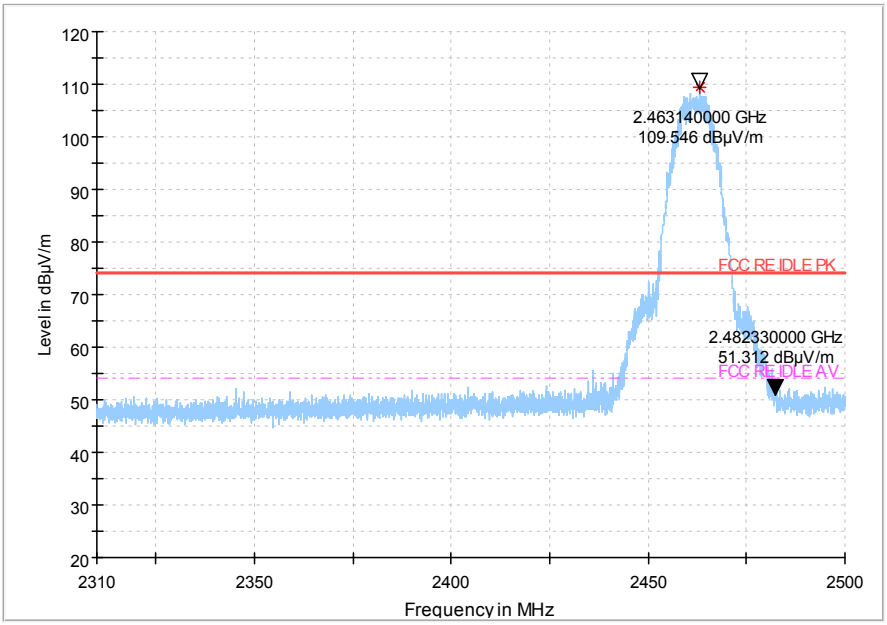


Peak detector

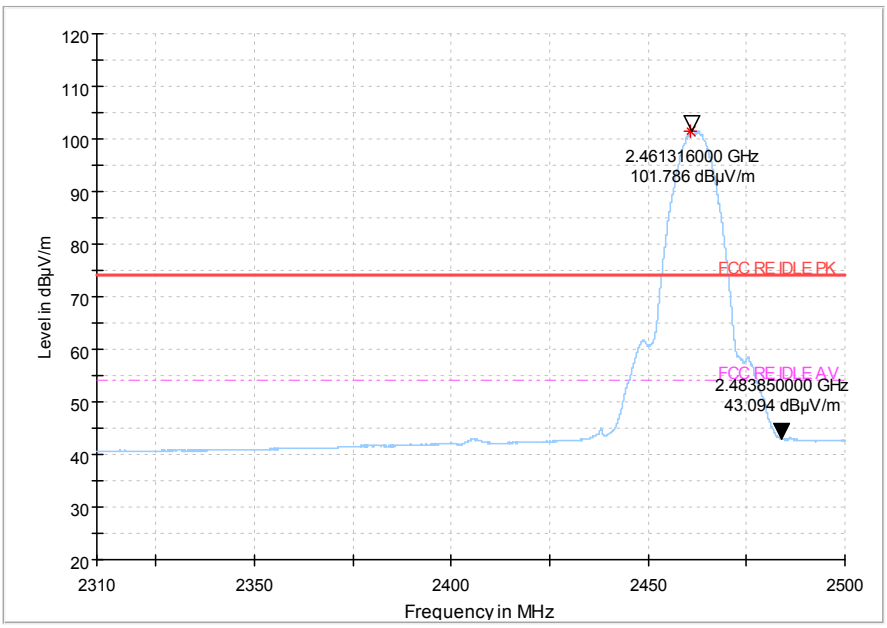


AV detector

Fig 62. Radiated emission (Power): 802.11b, low channel



Peak detector



AV detector

Fig 63. Radiated emission (Power): 802.11b, high channel

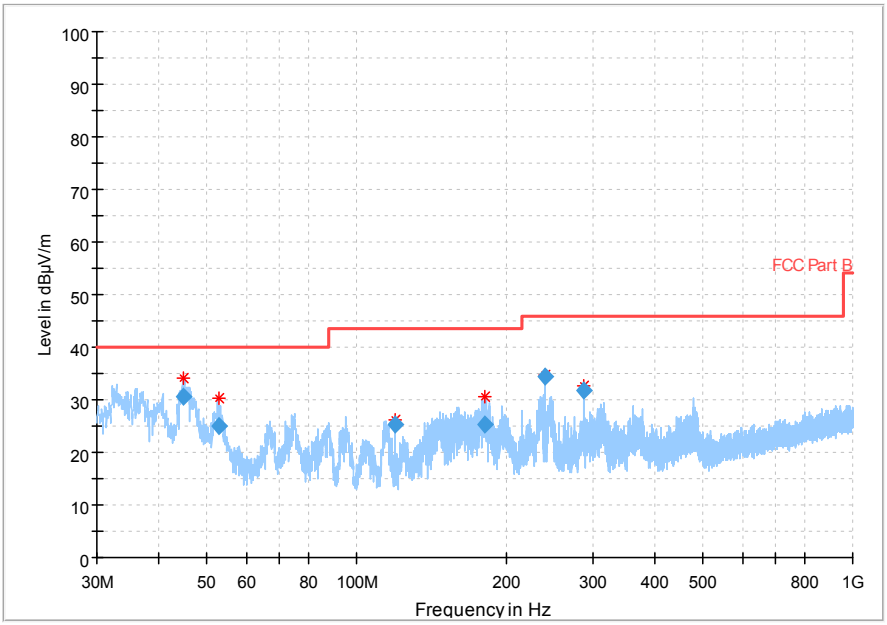


Fig 64. Radiated Spurious Emission (802.11b, Ch1,30MHz~1GHz)

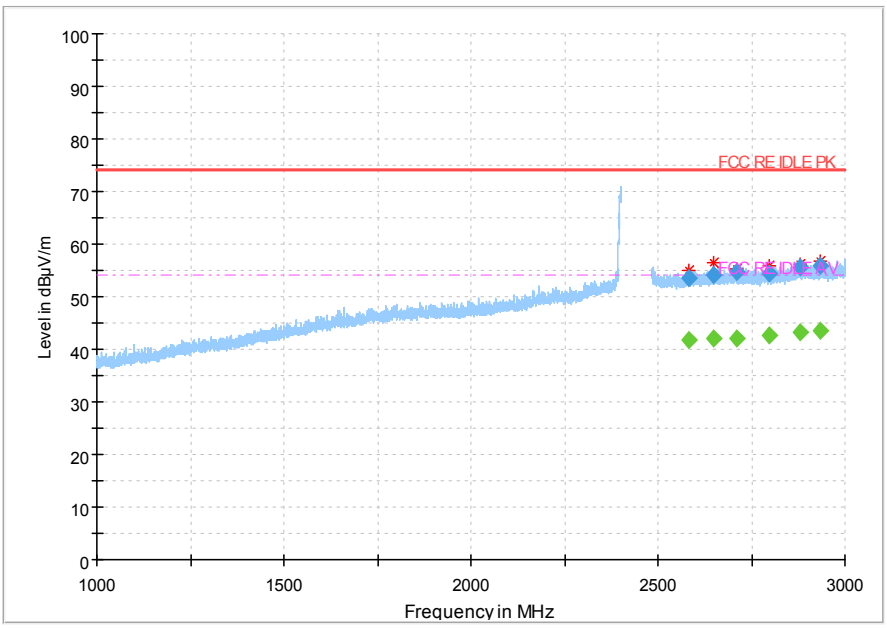


Fig 65. Radiated Spurious Emission (802.11b, Ch1,1GHz~3GHz)

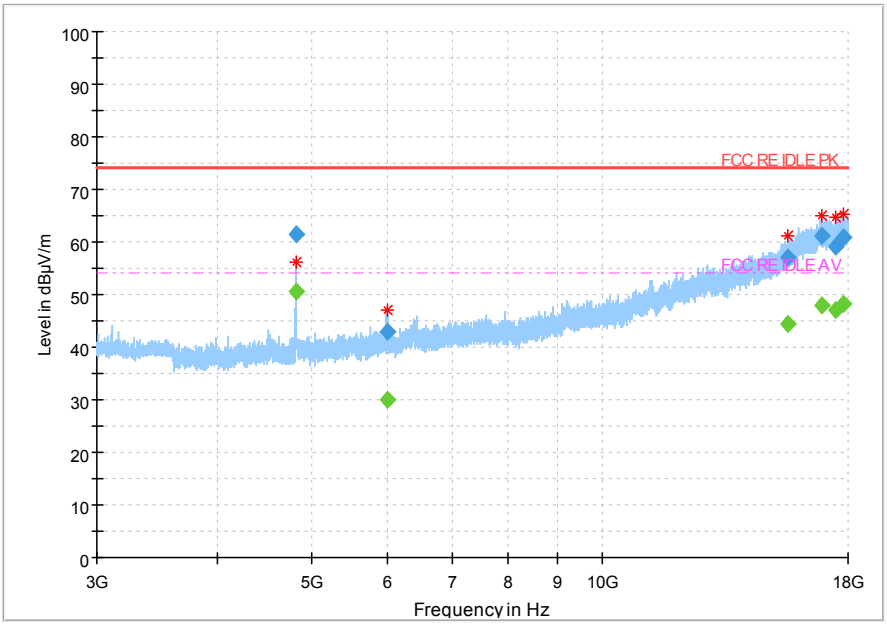
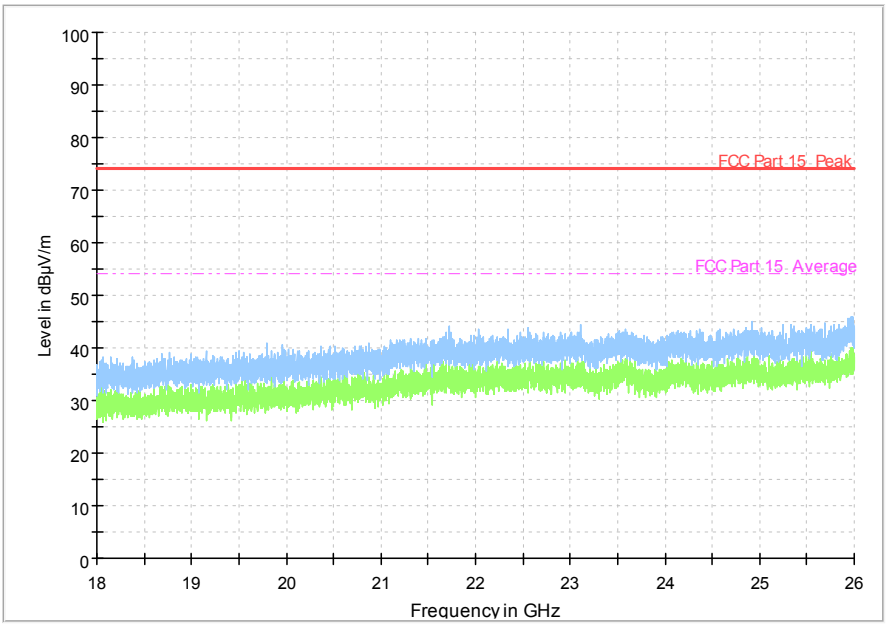


Fig 66. Radiated Spurious Emission (802.11b, Ch1,3GHz~18GHz)



All Channel

6.7. AC Powerline Conducted Emission

Method of Measurement: See ANSI C63.10 clause 6.2

1 The one EUT cable configuration and arrangement and mode of operation that produced the emission with the highest amplitude relative to the limit is selected for the final measurement, while applying the appropriate modulating signal to the EUT.

2 If the EUT is relocated from an exploratory test site to a final test site, the highest emissions shall be remaximized at the final test location before final ac power-line conducted emission measurements are performed.

3 The final test on all current-carrying conductors of all of the power cords to the equipment that comprises the EUT (but not the cords associated with other non-EUT equipment in the system) is then performed for the full frequency range for which the EUT is being tested for compliance without further variation of the EUT arrangement, cable positions, or EUT mode of operation.

4 If the EUT is comprised of equipment units that have their own separate ac power connections, e.g., floor-standing equipment with independent power cords for each shelf that are able to connect directly to the ac power network, each current-carrying conductor of one unit is measured while the other units are connected to a second (or more) LISN(s). All units shall be separately measured. If a power strip is provided by the manufacturer, to supply all of the units making up the EUT, only the conductors in the power cord of the power strip shall be measured.

If the EUT uses a detachable antenna, these measurements shall be made with a suitable dummy load connected to the antenna output terminals; otherwise, the tests shall be made with the antenna connected and, if adjustable, fully extended. When measuring the ac conducted emissions from a device that operates between 150 kHz and 30 MHz a non-detachable antenna may be replaced with a dummy load for the measurements within the fundamental emission band of the transmitter, but only for those measurements.36 Record the six highest EUT emissions relative to the limit of each of the current-carrying conductors of the power cords of the equipment that comprises the EUT over the frequency range specified by the procuring or regulatory agency. Diagram or photograph the test setup that was used. See Clause 8 for full reporting requirements.

Test Condition:

Voltage（V）	Frequency（Hz）
120	60

Measurement Uncertainty

Measurement Items	Range	Confidence Level	Calculated Uncertainty
AC Power line Conducted Emission	0.15MHz-30MHz	95%	±5.66 db

Measurement Result and limit:

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(Quasi-peak-average Limit)

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Average Limit (dBμV)	Result (dBμV) With charger 802.11b	Conclusion
0.15 to 0.5	66 to 56	56 to 46	Fig 67.	P
0.5 to 5	56	46		

5 to 30	60	50		
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.				

Conclusion: Pass

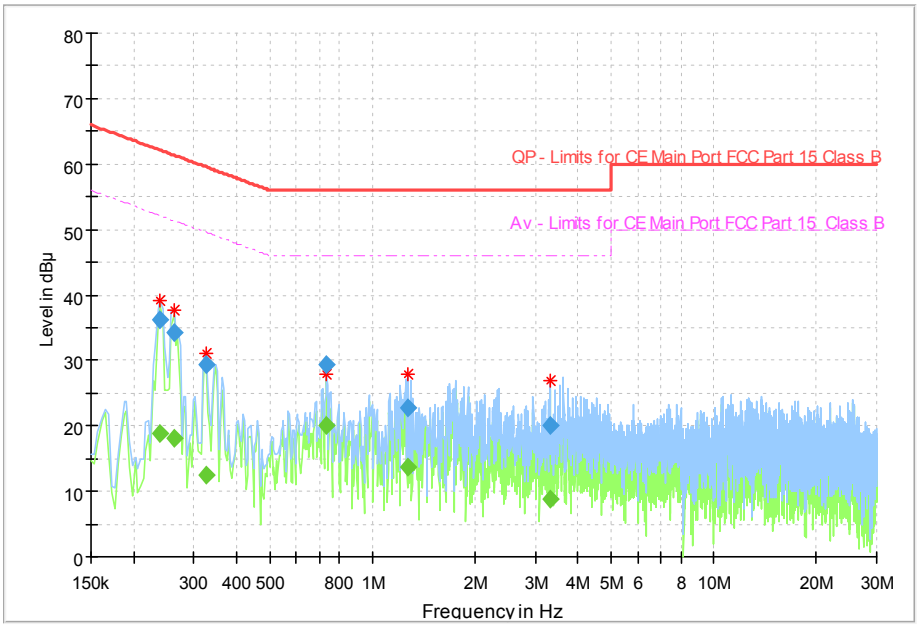

Fig 67. AC Powerline Conducted Emission

Frequency (MHz)	QuasiPeak (dB µ V)	Average (dB µ V)	Limit (dB µ	Margin (dB)	Meas. Time	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.239550	---	18.74	52.11	33.37	1000.0	9.000	L1	ON	9.7
0.239550	36.09	---	62.11	26.02	1000.0	9.000	L1	ON	9.7
0.261938	---	18.04	51.37	33.33	1000.0	9.000	L1	ON	9.7
0.261938	34.23	---	61.37	27.14	1000.0	9.000	L1	ON	9.7
0.325369	29.34	---	59.57	30.23	1000.0	9.000	N	ON	9.7
0.325369	---	12.37	49.57	37.20	1000.0	9.000	N	ON	9.7
0.735806	---	20.18	46.00	25.82	1000.0	9.000	N	ON	9.7
0.735806	29.41	---	56.00	26.59	1000.0	9.000	N	ON	9.7
1.273106	22.64	---	56.00	33.36	1000.0	9.000	L1	ON	9.7
1.273106	---	13.67	46.00	32.33	1000.0	9.000	L1	ON	9.7
3.321563	---	8.76	46.00	37.24	1000.0	9.000	N	ON	9.8
3.321563	20.07	---	56.00	35.93	1000.0	9.000	N	ON	9.8

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(Quasi-peak-average Limit)

Frequency range (MHz)	Quasi-peak Limit (dBµV)	Average Limit (dBµV)	Result (dBµV)	Conclusion
			With charger	

			802.11b	
0.15 to 0.5	67 to 56	56 to 46	Fig 68.	**P**
0.5 to 5	56	46		
5 to 30	60	50		
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.				

Conclusion: Pass

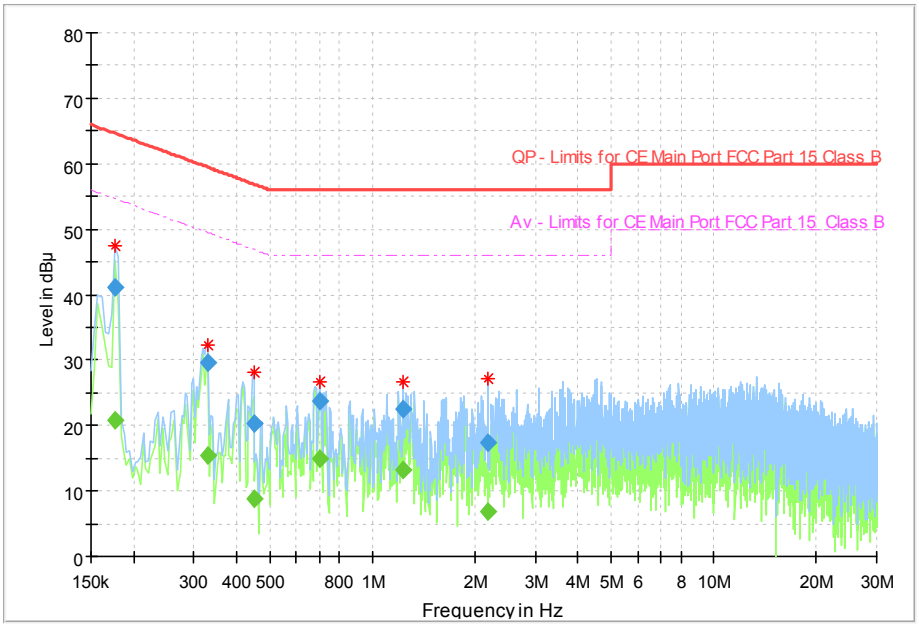

Fig 68. AC Powerline Conducted Emission

Frequency (MHz)	QuasiPeak (dB µ V)	Average (dB µ V)	Limit (dB µ	Margin (dB)	Meas. Time	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.176119	---	20.78	54.67	33.89	1000.0	9.000	N	ON	9.7
0.176119	41.12	---	64.67	23.55	1000.0	9.000	N	ON	9.7
0.329100	29.60	---	59.47	29.87	1000.0	9.000	L1	ON	9.7
0.329100	---	15.32	49.47	34.16	1000.0	9.000	L1	ON	9.7
0.448500	20.27	---	56.90	36.63	1000.0	9.000	N	ON	9.7
0.448500	---	8.91	46.90	37.99	1000.0	9.000	N	ON	9.7
0.698494	23.67	---	56.00	32.33	1000.0	9.000	L1	ON	9.7
0.698494	---	14.86	46.00	31.14	1000.0	9.000	L1	ON	9.7
1.232063	22.41	---	56.00	33.59	1000.0	9.000	L1	ON	9.7
1.232063	---	13.13	46.00	32.87	1000.0	9.000	L1	ON	9.7
2.179800	---	6.86	46.00	39.14	1000.0	9.000	N	ON	9.7
2.179800	17.35	---	56.00	38.65	1000.0	9.000	N	ON	9.7

7. Test Equipment and Ancillaries Used For Tests

The test equipment and ancillaries used are as follows.

Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration date	Cal.interval
1	Vector Signal Analyzer	FSQ26	101096	Rohde&Schwarz	2018-05-11	1 Year
2	DC Power Supply	ZUP60-14	LOC-220Z006-0007	TDL-Lambda	2018-05-11	1 Year

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration date	Cal.interval
1	Universal Radio Communication Tester	CMU200	123123	R&S	2018-05-11	1 Year
2	EMI Test Receiver	ESU40	100307	R&S	2018-05-11	1 Year
3	TRILOG Broadband Antenna	VULB9163	VULB9163-515	Schwarzbeck	2017-02-25	3 Year
4	Double-ridged Waveguide Antenna	ETS-3117	00135890	ETS	2017-01-11	3 Year
5	2-Line V-Network	ENV216	101380	R&S	2018-05-11	1 Year

Anechoic chamber

Fully anechoic chamber by Frankonia German.

8. Test Environment

Shielding Room1 (6.0 meters×3.0 meters×2.7 meters) did not exceed following limits along the conducted RF performance testing:

Temperature	Min. = 15 ℃, Max. = 35 ℃
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	> 100 dB
Ground system resistance	< 0.5

Control room did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 35 ℃
Relative humidity	Min. =25 %, Max. = 75 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 10 k
Ground system resistance	< 0.5

Fully-anechoic chamber1 (6.9 meters×10.9 meters×5.4 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 35 ℃
Relative humidity	Min. = 25 %, Max. = 75 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 10 k
Ground system resistance	< 0.5
VSWR	Between 0 and 6 dB, from 1GHz to 18GHz
Site Attenuation Deviation	Between -4 and 4 dB,30MHz to 1GHz
Uniformity of field strength	Between 0 and 6 dB, from 80MHz to 3000 MHz

ANNEX A. Deviations from Prescribed Test Methods

No deviation from Prescribed Test Methods.

ANNEX B. Accreditation Certificate

Accredited Laboratory

A2LA has accredited

EAST CHINA INSTITUTE OF TELECOMMUNICATIONS

Shanghai, People's Republic of China

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009*).

Presented this 15th day of March 2017.

President and CEO
For the Accreditation Council
Certificate Number 3682.01
Valid to February 28, 2019

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

************End The Report************