TEST REPORT

For WiFi-2.4GHz Band

Report No.:: CHTW24010103 Report Verification:

Project No..... SHT2310048501EW

FCC ID.....:: 2AN9S-ABX00083

Applicant's name.....: Arduino S.r.l.

Address....: Via Andrea Appiani, 25 Monza, MB, 20900 Italy

Product Name: Arduino Nano ESP32 with headers, Arduino Nano ESP32

Trade Mark: Arduino

Model No.: ABX00083

Listed Model(s) ABX00092

Standard: FCC CFR Title 47 Part 15 Subpart C § 15.247

Date of receipt of test sample..... Oct.23, 2023

Date of testing..... Oct.23, 2023- Jan.30, 2024

Date of issue..... Jan.31, 2024

Result....: **PASS**

Compiled by

(Position+Printed name+Signature): File administrators Kiki Kong

Supervised by

Project Engineer Kiki Kong (Position+Printed name+Signature):

Approved by

(Position+Printed name+Signature): RF Manager Xu yang

Testing Laboratory Name: Shenzhen Huatongwei International Inspection Co., Ltd.

Address.....: Building 7, Baiwang Idea Factory, No.1051, Songbai Road,

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Shenzhen, Guangdong, China

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The test report merely correspond to the test sample.

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1. TEST STANDARDS AND REPORT VERSION

1.1. Test Standards

The tests were performed according to following standards:

- FCC CFR Title 47 Part 15 Subpart C § 15.247: Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz
- ANSI C63.10:2020: American National Standard for Testing Unlicensed Wireless Devices
- KDB 558074 D01 15.247 Meas Guidance v05r02: Guidance for Compliance Measurements on Digital Transmission System, Frequency Hopping Spread Spectrum System, and Hybrid System Devices Operating under Section 15.247 of The FCC Rules

1.2. Report version

Revision No.	Date of issue	Description
N/A	2024-01-31	Original

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2. TEST DESCRIPTION

Report clause	Test Items	Standard Requirement	Result	Test Engineer
5.1	Antenna Requirement	15.203/15.247(c)	PASS	Xiangyu Wei
5.2	AC Conducted Emission	15.207	PASS	JUNMAN.WANG
5.3	Peak Output Power	15.247(b)(3)	PASS	Xiangyu Wei
5.4	Power Spectral Density	15.247(e)	PASS	Xiangyu Wei
5.5	6dB Bandwidth	15.247(a)(2)	PASS	Xiangyu Wei
5.6	99% Occupied Bandwidth	-	PASS ^{*1}	Xiangyu Wei
5.7	Duty cycle	-	PASS ^{*1}	Xiangyu Wei
5.8	Conducted Band Edge and Spurious Emission	15.247(d)/15.205	PASS	Xiangyu Wei
5.9	Radiated Band Edge Emission	15.205/15.209	PASS	Yifan Wang
5.10	Radiated Spurious Emission	15.247(d)/15.205/15.209	PASS	Yifan Wang

Note:

⁻ The measurement uncertainty is not included in the test result.

 ^{*1:} No requirement on standard, only report these test data.

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3. **SUMMARY**

3.1. Client Information

Applicant:	Arduino S.r.I.
Address:	Via Andrea Appiani, 25 Monza, MB, 20900 Italy
Manufacturer:	Arduino S.r.I.
Address:	Via Andrea Appiani, 25 Monza, MB, 20900 Italy

3.2. Product Description

Main unit information:		
Product Name:	Arduino Nano ESP32 with headers, Arduino Nano ESP32	
Trade Mark:	Arduino	
Model No.:	ABX00083	
Listed Model(s):	ABX00092	
Power supply:	DC 5V	
Hardware version:	0.3	
Software version:	2.0.13	

3.3. Radio Specification Description

Support type:	⊠ 802.11b	⊠ 802.11g	⊠ 802.11n
Support bandwidth:	⊠ 20MHz	⊠ 40MHz	
Modulation:	802.11b:	DBPSK, DQPSK, BPSK, QPSK	
Modulation.	802.11g/n:	BPSK, QPSK, 16QAM, 64QAM	
Operation frequency:	802.11b/g/n(HT20):	2412MHz~2462MHz	
Operation frequency:	802.11n(HT40)	2422MHz~2452MHz	
Channel number:	802.11b/g/n(HT20):	11	
Charmer number.	802.11n(HT40)	7	
Channel separation:	5MHz		
Antenna technology:		□ МІМО	
Antenna type: PCB Antenna			_
Antenna gain:	3.00dBi		

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3.4. Testing Laboratory Information

Laboratory Name	Shenzhen Huatongwei International Inspection Co., Ltd.		
Laboratory Location	Building 7, Baiwang Idea Factory, No.1051, Songbai Road, Yangguang Community, Xili Subdistrict, Nanshan District, Shenzhen, Guangdong, China		
Contact information:	Phone: 86-755-26715499 E-mail: cs@szhtw.com.cn http://www.szhtw.com.cn		
	Туре	Accreditation Number	
Qualifications	FCC Registration Number	762235	
	FCC Designation Number	CN1181	

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4. TEST CONFIGURATION

4.1. Test frequency list

According to section 15.31(m), regards to the operating frequency range over 10 MHz, must select three channels which were tested. The Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, please see the below blue front.

802.11b/g/n(HT20)		802.11n(HT40)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2412	03	2422
02	2417	04	2427
· :	· :	· :	. :
06	2437	06	2437
· :	· :	. :	. :
10	2457	08	2447
11	2462	09	2452

4.2. Test mode

For RF test items

The engineering test program was provided and enabled to make EUT continuous transmit.

For AC power line conducted emissions:

The EUT was set to connect with the WLAN AP under large package sizes transmission.

For Radiated spurious emissions

The engineering test program was provided and enabled to make EUT continuous transmit.

The EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data Recorded in the report.

Preliminary tests were performed in different data rates, final test modes are considering the modulation and worse data rates as below table.

Modulation	Data rate
802.11b	1Mbps
802.11g	6Mbps
802.11n(HT20)	MCS0
802.11n(HT40)	MCS0

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4.3. Test sample information

Test item	HTW sample no.	
RF Conducted test items	Please refer to the description in the appendix report	
RF Radiated test items	YPHT23100485001	
EMI test items	YPHT23100485001	

Note:

RF Conducted test items: Peak Output Power, Power Spectral Density, 6dB Bandwidth, 99% Occupied Bandwidth, Duty cycle, Conducted Band Edge and Spurious Emission

RF Radiated test items: Radiated Band Edge Emission, Radiated Spurious Emission

EMI test items: AC Conducted Emission

4.4. Support unit used in test configuration and system

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

The following peripheral devices and interface cables were connected during the measurement:

Whether support unit is used?				
✓ Yes				
Item	Equipment	Trade Name	Model No.	
1	Laptop	DELL	Inspiron 13-5378	
2				

4.5. Testing environmental condition

Туре	Requirement	Actual
Temperature:	15~35°C	25°C
Relative Humidity:	25~75%	50%
Air Pressure:	860~1060mbar	1000mbar

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4.6. Statement of the measurement uncertainty

No.	Test Items	Measurement Uncertainty
1	AC Conducted Emission	3.21dB
2	Peak Output Power	1.07
3	Power Spectral Density	1.07
4	6dB Bandwidth	0.002%
5	99% Occupied Bandwidth	0.002%
6	Duty cycle	-
7	Conducted Band Edge and Spurious Emission	1.68dB
8	Radiated Band Edge Emission	4.54dB for 30MHz-1GHz
	radiated Baria Eago Ermodori	5.10dB for above 1GHz
9	Padiated Spurious Emission	4.54dB for 30MHz-1GHz
9	Radiated Spurious Emission	5.10dB for above 1GHz

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

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4.7. Equipment Used during the Test

•	RF Conducted	test item					
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
•	Signal and spectrum Analyzer	R&S	HTWE0242	FSV40	100048	2023/08/22	2024/08/21
•	Signal & Spectrum Analyzer	R&S	HTWE0262	FSW26	103440	2023/08/22	2024/08/21
•	Vector signal generator	R&S	HTWE0244	SMBV100A	260790	2023/05/23	2024/05/22
•	Test software	Tonscend	N/A	JS1120	N/A	N/A	N/A

•	Conducted E	mission					
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
•	EMI Test Receiver	R&S	HTWE0111	ESCI	101247	2023/8/22	2024/8/21
•	Artificial Mains	SCHWARZBECK	HTWE0113	NNLK 8121	573	2023/8/18	2024/8/17
•	Protection Network	SCHWARZBECK	HTWE0567	VTSD9561FN	00899	2023/8/18	2024/8/17
•	ISN	FCC	HTWE0148	FCC-TLISN-T2- 02	20371	2023/8/18	2024/8/17
•	ISN	FCC	HTWE0150	FCC-TLISN-T8- 02	20375	2023/8/18	2024/8/17
•	Test Software	R&S	N/A	EMC32	N/A	N/A	N/A

•	Radiated Em	ission – 9kHz-	-30MHz				
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
•	Semi-Anechoic Chamber	Albatross projects	HTWE0127	SAC-3m-02	C11121	2023/4/6	2026/4/5
•	EMI Test Receiver	R&S	HTWE0099	ESCI 7	100900	2023/8/22	2024/8/21
•	Loop Antenna	R&S	HTWE0170	HFH2-Z2	100020	2021/4/6	2024/4/5
•	Test Software	R&S	N/A	EMC32	N/A	N/A	N/A

•	Radiated Em	ission - 30MHz	z~1GHz				
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
•	Semi-Anechoic Chamber	Albatross projects	HTWE0127	SAC-3m-02	C11121	2023/4/6	2026/4/5
•	EMI Test Receiver	R&S	HTWE0099	ESCI 7	100900	2023/8/22	2024/8/21
•	Ultra-Broadband Antenna	SCHWARZBEC K	HTWE0119	VULB9163	546	2023/2/22	2026/2/21
•	Pre-Amplifer	SCHWARZBEC K	HTWE0295	BBV 9742	/	2023/5/25	2024/5/24
•	Test Software	R&S	N/A	EMC32	N/A	N/A	N/A

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•	Radiated em	ission-Above	1GHz				
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
•	Semi-Anechoic Chamber	Albatross projects	HTWE0122	SAC-3m-01	C11121	2023/4/17	2026/4/16
•	Spectrum Analyzer	R&S	HTWE0098	FSP40	100597	2023/8/22	2024/8/21
•	Horn Antenna	SCHWARZBE CK	HTWE0126	BBHA 9120D	1011	2023/2/14	2026/2/13
•	Horn Antenna	SCHWARZBE CK	HTWE0103	BBHA9170	BBHA9170472	2023/2/20	2026/2/19
•	Broadband Pre- amplifier	SCHWARZBE CK	HTWE0201	BBV 9718	9718-248	2023/5/25	2024/5/24
•	Test Software	R&S	N/A	EMC32	N/A	N/A	N/A

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5. TEST CONDITIONS AND RESULTS

5.1. Antenna Requirement

REQUIREMENT

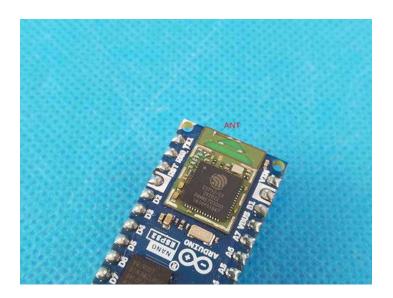
FCC CFR Title 47 Part 15 Subpart C Section 15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responseble party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

TEST RESULT

⊠ Passed	☐ Not Applicable
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The antenna type is a PCB antenna, please refer to the below antenna photo.



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5.2. AC Conducted Emission

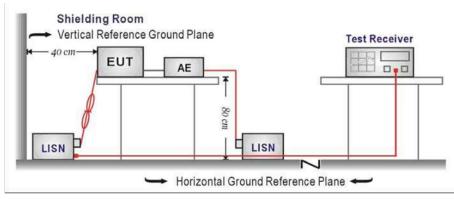
LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.207

Fraguerov von de (MILE)	Limit (dBuV)						
Frequency range (MHz)	Quasi-peak	Average					
0.15-0.5	66 to 56*	56 to 46*					
0.5-5	56	46					
5-30	60	50					

^{*} Decreases with the logarithm of the frequency.

TEST CONFIGURATION



TEST PROCEDURE

- 1. The EUT was setup according to ANSI C63.10 requirements.
- 2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface.
- 3. The EUT and simulators are connected to the main power through a line impedances stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment.
- 4. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)
- 5. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.
- 6. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
- 7. Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.
- 8. During the above scans, the emissions were maximized by cable manipulation.

TEST MODE

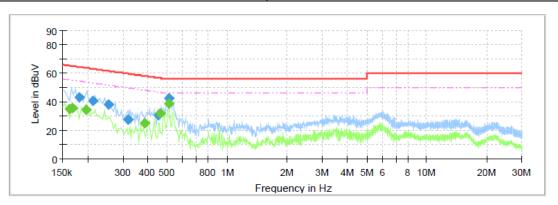
Refer to the clause 4.2

TEST RESULT

□ Passed □ Not Applicable

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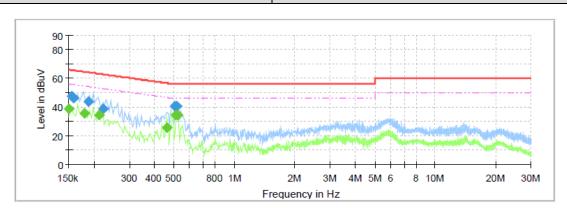
Test Line:



Final Result

i iliai_itesait											
Frequency	QuasiPeak	CAverage	Limit	Margin	Line	Corr.					
(MHz)	(dBuV)	(dBuV)	(dBuV)	(dB)		(dB)					
0.1620	!	34.73	55.36	20.63	L1	10.9					
0.1675	-	35.65	55.08	19.43	L1	10.9					
0.1820	43.27		64.39	21.12	L1	10.9					
0.1955	-	34.50	53.80	19.30	L1	10.9					
0.2115	40.83		63.15	22.32	L1	10.9					
0.2555	38.37		61.58	23.21	L1	10.9					
0.3195	27.36		59.72	32.36	L1	10.9					
0.3875	-	25.28	48.12	22.84	L1	10.9					
0.4525	30.66		56.83	26.17	L1	10.9					
0.4595	-	32.16	46.70	14.55	L1	11.0					
0.5115	-	38.66	46.00	7.35	L1	11.0					
0.5115	42.24		56.00	13.76	L1	11.0					

Test Line: N



Final_Result

Frequency	QuasiPeak	CAverage	Limit	Margin	Line	Corr.
(MHz)	(dBuV)	(dBuV)	(dBuV)	(dB)		(dB)
0.1500		38.69	56.00	17.31	N	10.7
0.1555	47.19		65.70	18.51	N	10.7
0.1580	46.00		65.57	19.56	N	10.7
0.1795		35.92	54.51	18.58	N	10.7
0.1875	43.81		64.15	20.34	N	10.7
0.2115		34.54	53.15	18.61	N	10.7
0.2235	38.79		62.69	23.89	N	10.7
0.4635		25.83	46.63	20.80	N	10.7
0.5075	40.45		56.00	15.55	N	10.7
0.5115		34.32	46.00	11.68	N	10.7
0.5155	40.60		56.00	15.40	N	10.7
0.5235		34.26	46.00	11.74	N	10.7

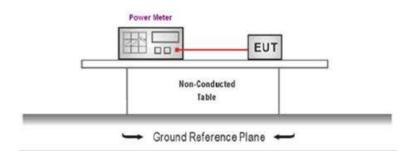
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5.3. Peak Output Power

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (b)(3): 30dBm

TEST CONFIGURATION



TEST PROCEDURE

- 1. The EUT was tested according to ANSI C63.10 and KDB 558074 D01 requirements.
- 2. The maximum peak conducted output power may be measured using a broadband peak RF power meter.
- 3. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.
- 4. Record the measurement data.

TEST MODE

Refer to the clause 4.2

TEST RESULT

TEST DATA

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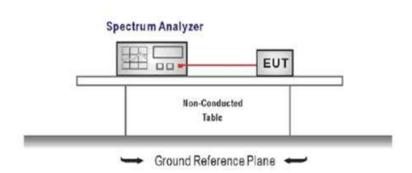
5.4. Power Spectral Density

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (e):

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

TEST CONFIGURATION



TEST PROCEDURE

- 1. Connect the antenna port(s) to the spectrum analyzer input,
- Configure the spectrum analyzer as shown below:

Center frequency=DTS channel center frequency

Span =1.5 times the DTS bandwidth

RBW = $3 \text{ kHz} \le \text{RBW} \le 100 \text{ kHz}$, VBW $\ge 3 \times \text{RBW}$

Sweep time = auto couple

Detector = peak

Trace mode = max hold

- 3. Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter wave form on the spectrum analyzer.
- 4. Use the peak marker function to determine the maximum amplitude level within the RBW.
- If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

TEST MODE

Refer to the clause 4.2

TEST RESULT

TEST DATA

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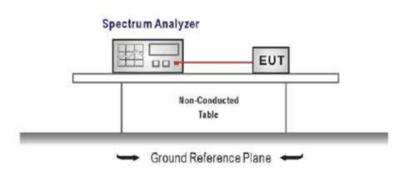
5.5. 6dB bandwidth

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(2):

For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz.

TEST CONFIGURATION



TEST PROCEDURE

- 1. Connect the antenna port(s) to the spectrum analyzer input.
- Configure the spectrum analyzer as shown below (enter all losses between the transmitter output and the spectrum analyzer).

Center Frequency =DTS channel center frequency

Span=2 x DTS bandwidth

RBW = 100 kHz, VBW ≥ 3 × RBW

Sweep time= auto couple

Detector = Peak

Trace mode = max hold

- 3. Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter waveform on the spectrum analyzer.
- 4. 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, and record the pertinent measurements.

TEST MODE

Refer to the clause 4.2

TEST RESULT

TEST DATA

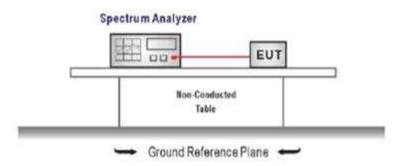
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5.6. 99% Occupied Bandwidth

<u>LIMIT</u>

N/A

TEST CONFIGURATION



TEST PROCEDURE

- 1. Connect the antenna port(s) to the spectrum analyzer input.
- 2. Configure the spectrum analyzer as shown below (enter all losses between the transmitter output andthe spectrum analyzer).

Center Frequency = channel center frequency

Span≥1.5 x OBW

RBW = 1%~5%OBW

VBW ≥ 3 × RBW

Sweep time= auto couple

Detector = Peak

Trace mode = max hold

3. Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter waveform on the spectrum analyzer.

TEST MODE

Refer to the clause 4.2

TEST RESULT

TEST DATA

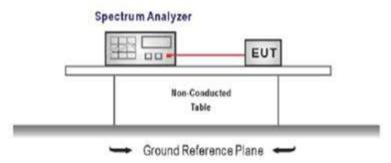
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5.7. Duty Cycle

LIMIT

N/A

TEST CONFIGURATION



TEST PROCEDURE

- 1. The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement.
- 2. Set to the maximum power setting and enable the EUT transmit continuously
- 3. Use the following spectrum analyzer settings:
 - Span=zero span, Frequency=centered channel, RBW= 1 MHz, VBW ≥ RBW
 - Sweep=as necessary to capture the entire dwell time,
 - Detector function = peak, Trigger mode
- 4. Measure and record the duty cycle data

TEST MODE

Refer to the clause 4.2

TEST DATA

Refer to the appendix report

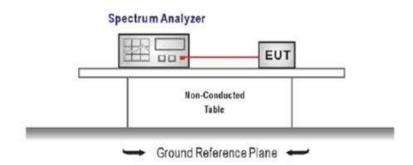
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5.8. Conducted Band edge and Spurious Emission

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section15.247 (d):In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

TEST CONFIGURATION



TEST PROCEDURE

- 1. Connect the antenna port(s) to the spectrum analyzer input.
- 2. Establish a reference level by using the following procedure

Center frequency=DTS channel center frequency

The span = 1.5 times the DTS bandwidth.

RBW = 100 kHz, VBW ≥ 3 x RBW

Detector = peak, Sweep time = auto couple, Trace mode = max hold

Allow trace to fully stabilize

Use the peak marker function to determine the maximum PSD level

Note that the channel found to contain the maximum PSD level can be used to establish the reference level.

3. Emission level measurement

Set the center frequency and span to encompass frequency range to be measured

RBW = 100 kHz, VBW \geq 3 x RBW

Detector = peak, Sweep time = auto couple, Trace mode = max hold

Allow trace to fully stabilize

Use the peak marker function to determine the maximum amplitude level.

- 4. Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter waveform on the spectrum analyzer.
- Ensure that the amplitude of all unwanted emission outside of the authorized frequency band excluding restricted frequency bands) are attenuated by at least the minimum requirements specified (at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz). Report the three highest emission relative to the limit.

TEST MODE

Refer to the clause 4.2

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TEST RESULT

 $oxed{oxed}$ Passed $oxed{oxed}$ Not Applicable

TEST DATA

Refer to the appendix report

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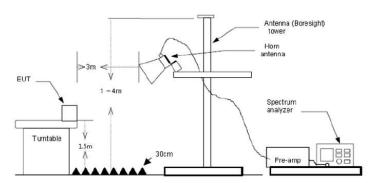
5.9. Radiated Band edge Emission

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d):

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, Radiated Emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the Radiated Emissions limits specified in §15.209(a) (see §15.205(c)).

TEST CONFIGURATION



TEST PROCEDURE

- 1. The EUT was setup and tested according to ANSI C63.10.
- 2. The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
- The EUT waspositioned such that the distance from antenna to the EUT was 3 meters.
- 4. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. Thisis repeated for both horizontal and vertical polarization of the antenna. In order to find themaximum emission, all of the interface cables were manipulated according to ANSI C63.10 on radiated measurement.
- 5. Use the following spectrum analyzer settings:
 - a) Span shall wide enough to fully capture the emission being measured
 - b) Set RBW=100kHz for <1GHz, VBW=3*RBW, Sweep time=auto, Detector=peak, Trace=max hold
 - c) Set RBW=1MHz, VBW=3MHz for >1GHz, Sweep time=auto, Detector=peak, Trace=max hold for Peak measurement

For average measurement:

- VBW=10Hz, When duty cycle is no less than 98 percent
- VBW≥1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation, so refer to this clasue 5.7 duty cycle.

TEST MODE

Refer to the clause 4.2

TEST RESULT

Note:

- 1) Level= Reading + Factor; Factor = Antenna Factor+ Cable Loss- Preamp Factor
- 2) Over Limit = Level- Limit
- Average measurement was not performed if peak level is lower than average limit(54 dBuV/m).

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уре	802.11		1b	Test c	hannel	CHO)1	Po	olarity		Horizontal
	Mark	Frequency	Reading	Antenna		Preamp		Level	Limit	0ve	
	1	MHZ 2310.00	dBuV/m 43.67	dB 27.86	dB 4.01	dB 41.80	dB 20.00	dBuV/m 53.74	dBuV/m 74.00		
	2	2390.01	44.57	27.54	4.31	41.80	20.00				38 Peak
	Mark	Frequency MHZ	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Aux dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
	1	2310.00	37.28	27.86	4.01	41.80	20.00	47.35		-6.65	Average
	2	2390.01	37.21	27.54	4.31	41.80	20.00	47.26	54.00	-6.74	Average
уре		802.1	1b	Test c	hannel	CHO)1	Po	olarity		Vertical
	Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Aux dB	Level dBuV/m	Limit dBuV/m	Ove lim	
	1	2310.00	42.67	27.86	4.01	41.80	20.00		74.00		
	2	2390.01	43.76	27.54	4.31	41.80	20.00		74.00	10055	19 Peak
	Mark	Frequency	Reading	Antenna	Cable	Preamp	Aux	Level	Limit	Over	Remark
		MHZ	dBuV/m	dB	dB	dB	dB	dBuV/m	dBuV/m	limit	
	1	2310.00	37.72	27.86	4.01	41.80	20.00	47.79	54.00	-6.21	Average
	2	2390.01	37.07	27.54	4.31	41.80	20.00	47.12	54.00	-6.88	Average

Туре		802.1	1b	Test ch	nannel	CH1	1	Po	olarity		Horizontal
	Mark	Frequency	Reading dBuV/m	Antenna dB	Cable dB	Preamp	Aux	Level dBuV/m	Limit dBuV/		
	1 2	2483.49 2500.00	43.35 43.51	27.33 27.30	4.18 4.19	41.80 41.80	20.0	0 53.06	74.0 74.0	-20.	
	Mark	Frequency MHZ	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Aux	Level dBuV/m	Limit dBuV/m	Over limi	1010100075007610
	1 2	2483.49 2500.00	34.32 34.04	27.33 27.30	4.18 4.19	41.80	20.00	44.0	3 54.00	-9.9 -10.2	7 Average
Туре	802.11b			Test ch	nannel	CH11		Po	Polarity		Vertical
	Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Aux dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
	1 2	2483.49 2500.00	43.81	27.33 27.30	4.18 4.19	41.80	20.00	53.52 52.77	74.00	20.48	Peak Peak
	Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Aux	Level dBuV/m	Limit dBuV/m	Over limit	Remark
	1 2	2483.49 2500.00	34.10 34.49	27.33 27.30	4.18 4.19	41.80	20.00	43.81 44.18		-10.19 -9.82	Average Average

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уре		802.11	g	Test ch	annel	CHO	1		Pola	arity		Horizonta
	Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Aux dB	Leve		Limit dBuV/m	Ove lim	
	1 2	2310.00	44.80	27.86 27.54	4.01	41.80	20.00			74.00		13 Peak 93 Peak
								34.07				
	Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Aux dB	Level dBuV/m		THE PARTY OF THE P	Over limit	Remark
	1	2310.00	37.27	27.86	4.01		20.00	47.			-6.66	Average
	2	2390.01	36.83	27.54	4.31	41.80	20.00	46.	88	54.00	-7.12	Average
уре		802.11	g	Test ch	annel	CHO)1		Pola	arity		Vertical
	Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Aux dB	Leve		Limit dBuV/m	Ove	Contract Con
	1	2310.00	43.78	27.86	4.01	41.80	20.00	53.8	5	74.00		15 Peak
	2	2390.01	43.50	27.54	4.31	41.80	20.00	53.5	5	74.00	-20.	45 Peak
	Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Aux dB	Level dBuV/	70	Limit dBuV/m	Over	10.
	1	2310.00	37.53	27.86	4.01	41.80	20.00		7.60		-6.4	
	2	2390.01	37.06	27.54	4.31	41.80	20.00	47	7.11	54.00	-6.8	9 Average

Туре		802.1	1g	Test ch	nannel	CH1	1	Po	larity		Horizontal
	Mark	Frequency	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Aux dB	Level dBuV/m	Limit dBuV/m	Over	
	1	2483.49	53.61	27.33	4.18	41.80	20.00	63.32	74.00		
	2			27.33	4.18	41.80	20.00		74.00		5 Peak
	3			27.30	4.19	41.80	20.00		74.00		5 Peak
	Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Aux dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
	1	2483.49		27.33	4.18	41.80	20.00		54.00	-3.33	Average
	2	2500.00		27.30	4.19	41.80		44.85		-9.15	Average
Туре		802.1	1g	Test ch	nannel	CH1	1	Po	larity	,	Vertical
	Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Aux dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
	1	2483.49		27.33	4.18	41.80	20.00	69.36		-4.64	Peak
	2	2500.00	45.38	27.30	4.19	41.80	20.00	55.07	74.00	-18.93	Peak
	Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Aux dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
	1	2483.49	43.92	27.33	4.18	41.80	20.00	53.63		-0.37	Average
	2	2500.00	37.05	27.30	4.19	41.80	20.00	46.74		-7.26	Average

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/ре			802.1	1n(HT20)	Test ch	nannel	CH0	1	Po	larity		Horizontal
	Mark	Fre	quency	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Aux	Level dBuV/m	Limit dBuV/m	Over limit	
	1	231	0.00	43.43	27.86	4.01	41.80	20.00	53.50	74.00	-20.5	Peak
	2	239	0.01	44.05	27.54	4.31	41.80	20.00	54.10	74.00	-19.9	Peak
	Mark	 Ere	quency	Reading	Antenna	Cable	Preamp	Aux	Level	Limit	Over	Remark
	PIOI K	MHZ		dBuV/m	dB	dB	dB	dB	dBuV/m	dBuV/m	limit	Kellal K
	1		0.00	37.83	27.86	4.01	41.80	20.00	47.90	54.00	-6.10	Average
	2		0.01	37.47	27.54	4.31	41.80	20.00	47.52	54.00	-6.48	Average
ре			802.1	1n(HT20)	Test ch	nannel	CH0)1	Po	larity		Vertical
	Mark	Fred	luency	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Aux dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
	1	2316	00	43.75	27.86	4.01	41.80	20.00	53.82	74.00	-20.18	
	2	2396		44.12	27.54	4.31	41.80	20.00	54.17	74.00	-19.83	
	Mark	Fred	quency	Reading	Antenna	Cable	Preamp	Aux	Level	Limit	Over	Remark
		MHZ	TO THE PARTY OF TH	dBuV/m	dB	dB	dB	dB	dBuV/m	dBuV/m	limit	
	1	2316	9.00	37.14	27.86	4.01	41.80	20.00	47.21		-6.79	
	2	2396	0.01	37.68	27.54	4.31	41.80	20.00	47.73	54.00	-6.27	Average

Гуре			802.1	1n(HT20)	Test cl	nannel	CH1	1	Po	olarity		Horizontal
	Mark	Freq	uency	Reading	Antenna	Cable	Preamp		Level	Limit	Over	
		MHZ		dBuV/m	dB	dB	dB	dB	dBuV/m	dBuV/m		
	1	2483	.49	54.30	27.33	4.18	41.80	20.00	64.01	1000		72727
	2	2500	.00	43.99	27.30	4.19	41.80	20.00	53.68	74.00	-20.3	2 Peak
	Mark	Fre	quency	Reading	Antenna	Cable	Preamp	Aux	Level	Limit	Over	Remark
		MHZ		dBuV/m	dB	dB	dB	dB	dBuV/m	dBuV/m	limit	
	1	248	3.49	40.26	27.33	4.18	41.80	20.00	49.97	54.00	-4.03	Average
	2	250	0.00	34.73	27.30	4.19	41.80	20.00	44.42	54.00	-9.58	Average
ype			802.1	1n(HT20)	Test cl	nannel	CH1	1	Po	olarity		Vertical
	Mark	Fre	quency	Reading	Antenna	Cable	Preamp	Aux	Level	Limit	Over	Remark
		MHZ		dBuV/m	dB	dB	dB	dB	dBuV/m	dBuV/m	limit	
	1	248	3.49	60.20	27.33	4.18	41.80	20.00	69.91	74.00	-4.09	Peak
	2	250	0.00	45.75	27.30	4.19	41.80	20.00	55.44	74.00	-18.56	Peak
	Mark	Frequ	uency	Reading	Antenna	Cable	Preamp	Aux	Level	Limit	Over	Remark
	The It	MHZ	achiej.	dBuV/m	dB	dB	dB	dB	dBuV/m	dBuV/m	limit	remor K
	1	2483	.49	44.10	27.33	4.18	41.80	20.00	53.81	54.00	-0.19	Average
	2	2500		36.15	27.30	4.19	41.80	20.00	45.84	54.00	-8.16	Average

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ype		802.11n(HT40)	Te	est chanr	nel (CH03	P	olarity		Horizontal
	Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Aux dB	Level dBuV/m	Limit dBuV/m	Over limi	
	1	2310.00	42.99	27.86	4.01	41.80	20.00	53.06	74.00	-20.9	4 Peak
	2	2389.99	43.44	27.54	4.31	41.80	20.00	53.49	74.00	-20.5	1 Peak
	Mark	Frequency	Reading	Antenna		Preamp		Level	Limit	Over	Remark
		MHZ	dBuV/m	dB	dB	dB	dB	dBuV/m	dBuV/m	limi	
	2	2310.00 2389.99	34.19 34.97	27.86 27.54	4.01	41.80	20.00	44.2 45.0		-9.74 -8.9	
уре		802.11n	(HT40)	Т	est chan	nel	CH03		Polarity		Vertical
	Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Aux dB	Level dBuV/m	Limit dBuV/n	Ove	
	1	2310.00	42.91	27.86	4.01	41.80		52.98			
	2	2389.99	43.30	27.54	4.31	41.80	20.00				55 Peak
									1.5711		
	Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	dB Aux	dBuV/m	127	Over limit	Remark
	1	2310.00	34.31	27.86	4.01	41.80	20.00	44.38	54.00	-9.62	Average
	2	2389.99	34.60	27.54	4.31	41.80	20.00	44.65	54.00	-9.35	Average

Туре			802.1	1n(HT40)	Test c	hannel	СН	09	P	Polarity		Horizontal
	Mark		quency	Reading	Antenna	Cable	Preamp		Level	Limit	Over	Remark
	1.5	MHZ	politica:	dBuV/m	dB	dB	dB	dB	dBuV/m	dBuV/m		
	1		3.50	46.22	27.33	4.18	41.80	20.00	55.93	74.00		
	2	2500	9.00	42.01	27.30	4.19	41.80	20.00	51.70	74.00	-22.30	Peak
	Mark	Freq	uency	Reading	Antenna	Cable	Preamp	Aux	Level	Limit	Over	Remark
	110111	MHZ		dBuV/m	dB	dB	dB	dB	dBuV/m	dBuV/m	limit	The state of the s
	1	2483	.50	36.72	27.33	4.18	41.80	20.00	46.43	54.00		Average
	2	2500	.00	34.12	27.30	4.19	41.80	20.00	43.81			Average
									_			
ype			802.1	1n(HT40)	Test c	hannel	CH	09	P	olarity		Vertical
	Mark	Freq	uency	Reading	Antenna	Cable	Preamp	Aux	Level	Limit	Over	Remark
		MHZ		dBuV/m	dB	dB	dB	dB	dBuV/m	dBuV/m	limit	t
	1	2483	.50	42.90	27.33	4.18	41.80	20.00	52.61	74.00	-21.39	9 Peak
	2	2500	.00	40.56	27.30	4.19	41.80	20.00	50.25	74.00	-23.7	5 Peak
	Mark	Freq	uency	Reading	Antenna	Cable	Preamp	Aux	Level	Limit	Over	Remark
		MHZ		dBuV/m	dB	dB	dB	dB	dBuV/m			
	1	2483	.50	34.86	27.33	4.18	41.80	20.00				
	2	2500		33.87	27.30	4.19	41.80	20.00				

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5.10. Radiated Spurious Emission

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.209

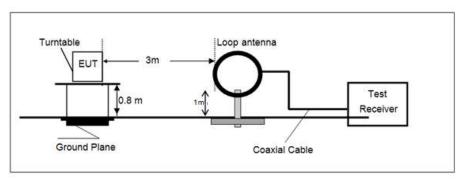
Frequency	Limit (dBuV/m)	Value
0.009 MHz ~0.49 MHz	2400/F(kHz) @300m	Quasi-peak
0.49 MHz ~ 1.705 MHz	24000/F(kHz) @30m	Quasi-peak
1.705 MHz ~30 MHz	30 @30m	Quasi-peak

Note: Limit dBuV/m @3m = Limit dBuV/m @300m + 40*log(300/3) = Limit dBuV/m @300m +80, Limit dBuV/m @3m = Limit dBuV/m @30m +40*log(30/3) = Limit dBuV/m @30m + 40.

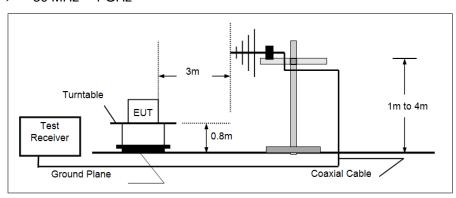
Frequency	Limit (dBuV/m @3m)	Value
30MHz~88MHz	40.00	Quasi-peak
88MHz~216MHz	43.50	Quasi-peak
216MHz~960MHz	46.00	Quasi-peak
960MHz~1GHz	54.00	Quasi-peak
Above 1GHz	54.00	Average
Above IGHZ	74.00	Peak

TEST CONFIGURATION

→ 9 kHz ~ 30 MHz

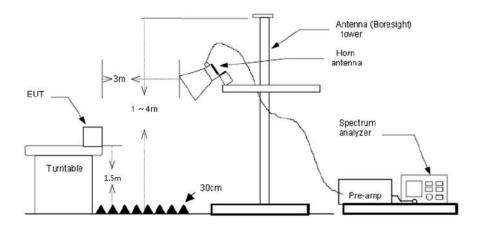


> 30 MHz ~ 1 GHz



Above 1 GHz

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TEST PROCEDURE

- 1. The EUT was setup and tested according to ANSI C63.10.
- 2. The EUT is placed on a turn table which is 0.8 meter above ground for below 1 GHz, and 1.5 m for above 1 GHz. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
- 3. The EUT was set 3 meters from the receiving antenna, which was mounted on the top of a variable height antenna tower.
- 4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
- 5. Set to the maximum power setting and enable the EUT transmit continuously.
- 6. Use the following spectrum analyzer settings
 - a) Span shall wide enough to fully capture the emission being measured;
 - b) Below 1 GHz:
 - RBW=120 kHz, VBW=300 kHz, Sweep=auto, Detector function=peak, Trace=max hold;
 - If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
 - Set RBW=1MHz, VBW=3MHz for >1GHz, Sweep time=auto, Detector=peak, Trace=max hold for Peak measurement

For average measurement:

- VBW=10Hz, When duty cycle is no less than 98 percent
- VBW≥1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation, so refer to this clasue 5.7 duty cycle.

TEST MODE

Refer to the clause 4.2

TEST RESULT

Note:

- Level= Reading + Factor/Transd; Factor/Transd = Antenna Factor+ Cable Loss- Preamp Factor
- 2) Over Limit = Level- Limit
- 3) Average measurement was not performed if peak level is lower than average limit(54 dBuV/m) for above 1GHz.

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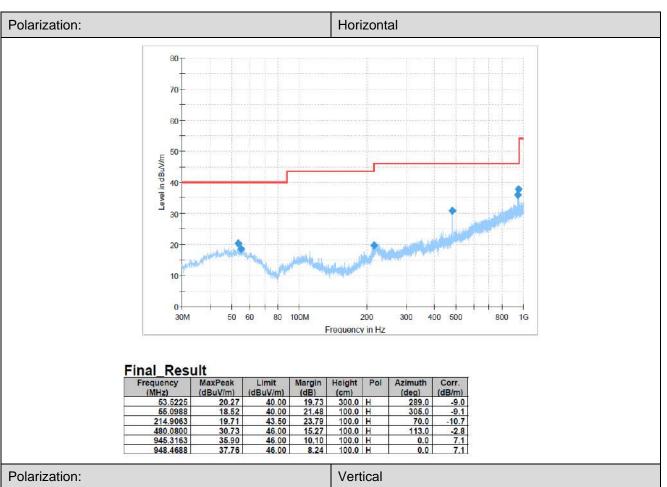
For 9 kHz ~ 30 MHz

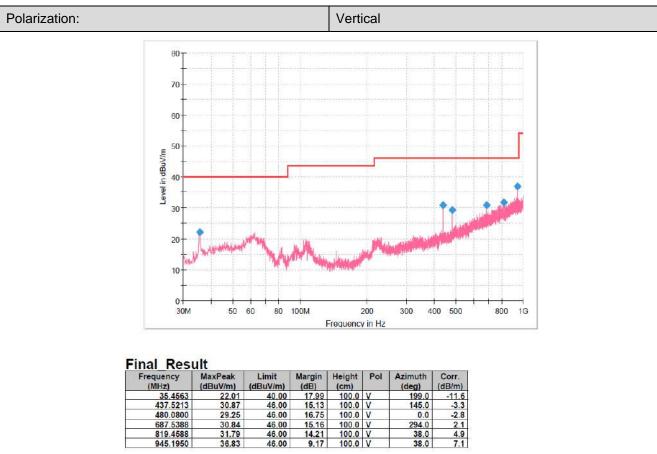
The EUT was pre-scanned this frequency band, found the radiated level 20dB lower than the limit, so don't show data on this report.

For 30 MHz ~ 1000 MHz

Have pre-scan all test channel, found CH06 of 802.11B which it was worst case, so only show the worst case's data on this report.

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16.75 15.16 14.21 9.17

100.0 V

0.0

294.0

46.00

46.00

480.0800 687.5388 819.4588 945.1950

29.25 30.84 31.79 36.83

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For 1 GHz ~ 25 GHz

Туре		802.11b		Test channe	el	CH01		Polarity		Horizontal
	Mark	Frequency MHz	Readin dBuV/		Cabl dB	le Preamp	Level		Over limit	Remark
	1	3215.56	51.28	28.81	4.88		43.37	74.00	-30.63	Peak
	2	4820.54	48.38	31.26	6.00	41.33	44.31	74.00	-29.69	Peak
	3	8006.65	42.26	37.00	8.01	40.80	46.47	74.00	-27.53	Peak
	4	10318.78	40.65	39.66	9.66	40.75	49.22	74.00	-24.78	Peak
Туре		802.11b		Test channe	el	CH01		Polarity		Vertical
	til-				c-h1					Dama ala
	Mark	Frequency MHz	Reading dBuV/m		Cable dB	Preamp dB	Level dBuV/m		Over	Remark
	1	3215.56	50.10	28.81	4.88	41.60	42.19	74.00	-31.81	Peak
	2	4820.54	48.04	31.26	6.00	41.33	43.97	74.00	-30.03	Peak
	3	5767.65	50.53	31.94	6.68	40.71	48.44	74.00	-25.56	Peak
	4	10917.22	40.64	40.50	9.96	42.29	48.81	74.00	-25.19	Peak
Туре		802.11b		Test channe	el	CH06		Polarity		Horizontal
	Mark	Frequency	Reading	g Antenna	Cable	e Preamp	Level	Limit	Over	Remark
	FIGI K	MHZ	dBuV/r		dB	dB	dBuV/m		limit	Kellidi K
	1	3215.56	48.58	28.81	4.88		40.67	74.00	-33.33	Peak
	2	4870.20	49.57	31.20	6.31		45.81	74.00	-28.19	Peak
	3	7965.72	41.18	36.93	7.98		45.21	74.00	-28.79	Peak
	4	10371.80	39.39	39.82	9.69		48.25	74.00	-25.75	Peak
Туре		802.11b		Test channe	el	CH06		Polarity		Vertical
	Mark	Frequency	Reading		Cable		Level		Over	Remark
	11.22	MHZ	dBuV/m		dB	dB	dBuV/m		limit	2000000
	1	3215.56	48.81	28.81	4.88	41.60	40.90	74.00	-33.10	Peak
	2			31.20	6.31	41.27	45.25	74.00	-28.75	Peak
	- 0	4870.20	49.01			Section Control of				
i	3	8089.14	41.48	37.00	8.12		45.97	74.00	-28.03	Peak
	3			37.00 39.82	9.69		45.97 48.76	74.00	-28.03 -25.24	Peak Peak
Туре		8089.14	41.48		9.69					
Туре	4	8089.14 10371.80 802.11b	41.48 39.90	39.82 Test channe	9.69 el	40.65 CH11	48.76	74.00 Polarity	-25.24	Peak Horizontal
Туре		8089.14 10371.80 802.11b	41.48 39.90 Reading	39.82 Test channe	9.69 el Cable	40.65 CH11 Preamp	48.76 Level	74.00 Polarity Limit	-25.24 Over	Peak
Туре	4 Mark	8089.14 10371.80 802.11b Frequency	41.48 39.90 Reading	Test channe	9.69 el Cable	40.65 CH11 Preamp	48.76 Level	Polarity Limit dBuV/m	-25.24 Over	Peak Horizontal Remark
Туре	4 Mark	8089.14 10371.80 802.11b Frequency MHz 3215.56	41.48 39.90 Reading dBuV/m 49.81	Test channe Antenna dB 28.81	9.69 el Cable dB 4.88	40.65 CH11 Preamp dB 41.60	48.76 Level dBuV/m 41.90	Polarity Limit dBuV/m 74.00	-25.24 Over limit -32.10	Peak Horizontal Remark Peak
Туре	Mark 1 2	8089.14 10371.80 802.11b Frequency MHz 3215.56 4920.38	41.48 39.90 Reading dBuV/m 49.81 46.57	Test channe Antenna dB 28.81 31.20	9.69 Cable dB 4.88 6.06	40.65 CH11 Preamp dB 41.60 41.20	Level dBuV/m 41.90 42.63	Polarity Limit dBuV/m 74.00 74.00	-25.24 Over limit -32.10 -31.37	Peak Horizontal Remark Peak Peak
Туре	4 Mark	8089.14 10371.80 802.11b Frequency MHz 3215.56	41.48 39.90 Reading dBuV/m 49.81	Test channe Antenna dB 28.81	9.69 el Cable dB 4.88	40.65 CH11 Preamp dB 41.60	48.76 Level dBuV/m 41.90	Polarity Limit dBuV/m 74.00	-25.24 Over limit -32.10	Peak Horizontal Remark Peak
Туре	Mark 1 2 3	8089.14 10371.80 802.11b Frequency MHz 3215.56 4920.38 7945.33	41.48 39.90 Reading dBuV/m 49.81 46.57 40.55	39.82 Test channe Antenna dB 28.81 31.20 36.87	9.69 Cable dB 4.88 6.06 7.97 9.73	40.65 CH11 Preamp dB 41.60 41.20 40.92	Level dBuV/m 41.90 42.63 44.47	74.00 Polarity Limit dBuV/m 74.00 74.00 74.00	-25.24 Over limit -32.10 -31.37 -29.53	Peak Horizontal Remark Peak Peak Peak Peak
	Mark 1 2 3 4	8089.14 10371.80 802.11b Frequency MHZ 3215.56 4920.38 7945.33 10451.84 802.11b	41.48 39.90 Reading dBuV/m 49.81 46.57 40.55 38.83	Antenna dB 28.81 31.20 36.87 39.95 Test channe	Cable dB 4.88 6.06 7.97 9.73	40.65 CH11 Preamp dB 41.60 41.20 40.92 40.77 CH11	Level dBuV/m 41.90 42.63 44.47 47.74	74.00 Polarity Limit dBuv/m 74.00 74.00 74.00 74.00 Polarity	-25.24 Over limit -32.10 -31.37 -29.53 -26.26	Peak Horizontal Remark Peak Peak Peak Peak Peak Vertical
	Mark 1 2 3	8089.14 10371.80 802.11b Frequency MHZ 3215.56 4920.38 7945.33 10451.84 802.11b	41.48 39.90 Reading dBuV/m 49.81 46.57 40.55 38.83	Antenna dB 28.81 31.20 36.87 39.95 Test channe	9.69 Cable dB 4.88 6.06 7.97 9.73	40.65 CH11 Preamp dB 41.60 41.20 40.92 40.77 CH11	Level dBuV/m 41.90 42.63 44.47 47.74	Polarity Limit dBuv/m 74.00 74.00 74.00 74.00 74.00 Polarity Limit	-25.24 Over limit -32.10 -31.37 -29.53 -26.26	Peak Horizontal Remark Peak Peak Peak Peak Peak
	Mark 1 2 3 4	8089.14 10371.80 802.11b Frequency MHZ 3215.56 4920.38 7945.33 10451.84 802.11b Frequency MHZ	41.48 39.90 Reading dBuV/m 49.81 46.57 40.55 38.83 Reading dBuV/m	Antenna dB 28.81 31.20 36.87 39.95 Test channe Antenna dB	9.69 Cable dB 4.88 6.06 7.97 9.73 El Cable dB	40.65 CH11 Preamp dB 41.60 41.20 40.92 40.77 CH11 Preamp dB	Level dBuV/m 41.90 42.63 44.47 47.74 Level dBuV/m	Polarity Limit dBuv/m 74.00 74.00 74.00 74.00 Polarity Limit dBuv/m	-25.24 Over limit -32.10 -31.37 -29.53 -26.26 Over limit	Peak Horizontal Remark Peak Peak Peak Peak Peak Peak Peak Remark
	Mark 1 2 3 4 Mark	8089.14 10371.80 802.11b Frequency MHZ 3215.56 4920.38 7945.33 10451.84 802.11b Frequency MHZ 3215.56	41.48 39.90 Reading dBuV/m 49.81 46.57 40.55 38.83 Reading dBuV/m 50.59	Antenna dB 28.81 31.20 36.87 39.95 Test channe Antenna dB 28.81	9.69 Cable dB 4.88 6.06 7.97 9.73 El Cable dB 4.88	40.65 CH11 Preamp dB 41.60 41.20 40.92 40.77 CH11 Preamp dB 41.60	Level dBuV/m 41.90 42.63 44.47 47.74 Level dBuV/m 42.68	74.00 Polarity Limit dBuv/m 74.00 74.00 74.00 74.00 Polarity Limit dBuv/m 74.00	-25.24 Over limit -32.10 -31.37 -29.53 -26.26 Over limit -31.32	Peak Horizontal Remark Peak Peak Peak Peak Peak Peak Peak Pea
	Mark 1 2 3 4 Mark 1 2 2 3 4	8089.14 10371.80 802.11b Frequency MHZ 3215.56 4920.38 7945.33 10451.84 802.11b Frequency MHZ 3215.56 4920.38	41.48 39.90 Reading dBuV/m 49.81 46.57 40.55 38.83 Reading dBuV/m 50.59 49.19	Antenna dB 28.81 31.20 36.87 39.95 Test channe Antenna dB 28.81 31.20	9.69 Cable dB 4.88 6.06 7.97 9.73 El Cable dB 4.88 6.06	40.65 CH11 Preamp dB 41.60 41.20 40.92 40.77 CH11 Preamp dB 41.60 41.20	Level dBuV/m 41.90 42.63 44.47 47.74 Level dBuV/m 42.68 45.25	74.00 Polarity Limit dBuv/m 74.00 74.00 74.00 74.00 Polarity Limit dBuv/m 74.00 74.00 74.00	Over limit -32.26.26 Over limit -32.10 -31.37 -29.53 -26.26 Over limit -31.32 -28.75	Peak Horizontal Remark Peak Peak Peak Peak Vertical Remark Peak Peak
	Mark 1 2 3 4 Mark	8089.14 10371.80 802.11b Frequency MHZ 3215.56 4920.38 7945.33 10451.84 802.11b Frequency MHZ 3215.56	41.48 39.90 Reading dBuV/m 49.81 46.57 40.55 38.83 Reading dBuV/m 50.59	Antenna dB 28.81 31.20 36.87 39.95 Test channe Antenna dB 28.81	9.69 Cable dB 4.88 6.06 7.97 9.73 El Cable dB 4.88	40.65 CH11 Preamp dB 41.60 41.20 40.92 40.77 CH11 Preamp dB 41.60	Level dBuV/m 41.90 42.63 44.47 47.74 Level dBuV/m 42.68	74.00 Polarity Limit dBuv/m 74.00 74.00 74.00 74.00 Polarity Limit dBuv/m 74.00	-25.24 Over limit -32.10 -31.37 -29.53 -26.26 Over limit -31.32	Peak Horizontal Remark Peak Peak Peak Peak Peak Peak Peak Pea

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Туре		802.11g		Test channe	I	CH01		Polarity		Horizontal
	Mark	Frequency	Readir		Cabl				Over	
	100	MHZ	dBuV/		dB	dB	dBuV/			
	1	4832.91	46.06	31.23	6.08		42.06	74.00	-31.94	
	2	5767.65	43.45	31.94	6.68		41.36	74.00	-32.64	
	3	7509.79	42.58	36.18	7.69		45.35	74.00	-28.65	
	4	10559.53	41.07	40.00	9.79	41.12	49.74	74.00	-24.26	5 Peak
Туре		802.11g		Test channe	I	CH01		Polarity		Vertical
	l				c-h1.					
	Mark	Frequency	Reading		Cable				Over	Remark
	Ass	MHZ	dBuV/r		dB	dB	dBuV/m		limit	
	1	3215.56	48.81	28.81	4.88	41.60	40.90	74.00	-33.10	Peak
	2	4832.91	45.32	31.23	6.08	41.31	41.32	74.00	-32.68	Peak
	3	5767.65	50.45		6.68	40.71	48.36	74.00	-25.64	Peak
	4	10371.80	40.88	39.82	9.69	40.65	49.74	74.00	-24.26	Peak
Туре		802.11g		Test channe	I	CH06		Polarity		Horizontal
	Mark	Frequency	Readin	g Antenna	Cable	Preamp	Level	Limit	Over	Remark
	riui K	MHZ	dBuV/		dB	dB	dBuV/m		limit	
	1	3215.56	45.58	28.81	4.88	41.60	37.67	74.00	-36.33	
	2	4870.20	48.78	31.20	6.31		45.02	74.00	-28.98	
	3	5767.65 10478.66	50.46 39.81	31.94	6.68 9.75	40.71	48.37	74.00	-25.63 -25.31	
Tuna	-		37.01	2,000,000			70.03		-23,31	
Туре		802.11g		Test channe	<u> </u>	CH06		Polarity		Vertical
	Mark	Frequency	Reading	Antenna	Cable	Preamp	Level	Limit	over	Remark
		MHZ	dBuV/m		dB	dB	dBuV/m	dBuV/m	limit	
	1	3215.56	49.11	28.81	4.88	41.60	41.20	74.00	-32.80	Peak
	2	4870.20	47.30	31.20	6.31		43.54	74.00	-30.46	Peak
			45.90				43.81		-30.40	Peak
	3	5767.65		31.94	6.68			74.00		
	4	9218.50	40.58	38.91	9.29	41.00	47.78	74.00	-26.22	Peak
Туре		802.11g		Test channe	I	CH11		Polarity		Horizontal
	Mark	Engagemen	Readin	g Antenna	Cabl	a Decare	Leve:	l Limit	Over	Remark
	PIDI K	Frequency								
		MHZ	dBuV/		dB	dB	dBuV/I		limit	
	1	4920.38	48.13	31.20	6.06		44.19	74.00	-29.81	
	2	5767.65	45.27	31.94	6.68		43.18	74.00	-30.82	
	3	7965.72	40.94	36.93	7.98	40.88	44.97	74.00	-29.03	Peak
	4	11316.00	40.45	40.15	10.23	42.30	48.53	74.00	-25.47	Peak
Туре		802.11g		Test channe	I	CH11		Polarity		Vertical
	Mark	Frequency	Reading		Cable	the state of the s			Over	Remark
		MHZ	dBuV/n		dB	dB	dBuV/m	dBuV/m	limit	
		3215.56	48.96	28.81	4.88	41.60	41.05	74.00	-32.95	Peak
	1									
	2	4920.38	46.97	31.20	6.06	41.20	43.03	74.00	-30.97	Peak
		4920.38 5767.65	46.97 51.01	31.20 31.94	6.68	41.20	43.03	74.00	-30.97 -25.08	

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Туре		802.11n(F	HT20)	Test channe	I	CH01		Polarity		Horizontal
	Mark	Frequency	Readin	g Antenna	Cable	Preamp	Level	Limit	Over	Remark
	PIGI K	MHZ	dBuV/		dB	dB	dBuV/n		limit	
	4					41.60				
	1	3215.56	50.84	28.81	4.88		42.93	74.00	-31.07	
	2	4832.91	44.94	31.23	6.08	41.31	40.94	74.00	-33.06	
	3		43.63	31.94	6.68		41.54	74.00	-32.46	
	4	10505.55	40.64	40.00	9.76	40.94	49.46	74.00	-24.54	1 Peak
Туре		802.11n(H	HT20)	Test channe	I	CH01		Polarity		Vertical
	Mark	Frequency	Readin	g Antenna	Cable	Preamp	Level	Limit	Over	Remark
		MHZ	dBuV/i		dB	dB	dBuV/m		limit	
	1	3215.56	48.60	28.81	4.88		40.69	74.00	-33.31	
	2		45.71		6.08		41.71	74.00	-32.29	
	3		50.04		6.68	40.71	47.95	74.00	-26.05	
	4	10318.78	40.93	39.66	9.66	40.75	49.50	74.00	-24.50	Peak
Туре		802.11n(H	HT20)	Test channe	l	CH06		Polarity		Horizontal
	Mark	Frequency	Readin	g Antenna	Cable	e Pream	p Leve	l Limit	Ove	r Remark
	The state of the s	MHZ	dBuV/		dB	dB	dBuV/i			
	1	3454.76	43.48	28.73	4.96		35.57	74.00	-38.4	TOTAL MAIN
	2	4870.20	48.47	31.20	6.31			74.00	-29.2	
	3	7376.29	40.36	36.20	7.71		43.27	74.00	-30.7	
	4	9218.50	39.80	38.91	9.29	41.00	47.00	74.00	-27.0	0 Peak
Туре		802.11n(H	HT20)	Test channe	I	CH06		Polarity		Vertical
	Mark	Frequency	Reading		Cable				Over	Remark
		MHZ	dBuV/i		dB	dB	dBuV/m		limit	
	1	2932.19	43.98	28.50	4.61		35.39	74.00	-38.61	Peak
	2	4870.20	47.44	31.20	6.31	41.27	43.68	74.00	-30.32	Peak
	3	8130.70	39.82	36.88	8.09	40.54	44.25	74.00	-29.75	Peak
	4	10398.41	38.62	39.90	9.70	40.60	47.62	74.00	-26.38	Peak
Туре		802.11n(H	HT20)	Test channe		CH11		Polarity		Horizontal
	Mark	Frequency	Readin	g Antenna	Cable	Preamp	Level	l Limit	Over	r Remark
		MHZ	dBuV/		dB		dBuV/n			
	1	3324.48	43.18	28.30	4.85		34.73	74.00	-39.2	
	2		48.50	31.20			44.56	74.00	-29.4	
		4920.38			6.06					
	3 4	8047.79 10318.78		37.00 39.66		40.75		74.00		Peak
		802.11n(H	HT20)	Test channe		CH11		Polarity		Vertical
Туре		· ·								
Туре					Cabla	Preamp	Level	Limit	over	Remark
Туре	Mark	Frequency								
Туре	Mark	Frequency MHz	dBuV/i	THE PERSON NAMED OF THE PE	dB	dB	dBuV/m	dBuV/m	limit	
Туре	Mark 1				dB		The state of the s	dBuV/m 74.00	limit -37.46	
Туре		MHZ	dBuV/1	m dB 29.26	dB 5.10	dB	36.54			Peak
Туре	1	MHZ 3580.95 4920.38	dBuV/1	m dB 29.26 31.20	dB 5.10 6.06	dB 41.60	36.54 43.68	74.00	-37.46	Peak Peak

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Туре		802.11n(H	HT40)	Test channe	el	CH03		Polarity		Horizontal
	Mark	Frequency	Reading		Cable	The state of the s	Level		over	
		MHZ	dBuV/m	dB	dB	dB	dBuV/m	dBuV/m	limit	
	1	1364.18	42.42	25.97	3.51	42.00	29.90	74.00	-44.10	Peak
	2	3266.35	43.42	28.50	4.81	41.60	35.13	74.00	-38.87	Peak
	3	7941.19	40.36	36.85	7.97	40.93	44.25	74.00	-29.75	Peak
	4	11254.86	40.24		10.18	42.30	48.17	74.00	-25.83	
Туре		802.11n(H	HT40)	Test channe	el	CH03		Polarity		Vertical
	Mark	Engaroner	Roading	Antenna	Cable	Dooren	Level	Limit	Over	Remark
	PIOLK.	Frequency	Reading dBuV/m			Preamp dB			limit	
		MHZ			dB		dBuV/m			
	1	1529.75	43.85	25.58	3.19	42.20	30.42	74.00	-43.58	
	2		44.86	28.50	4.81	41.60	36.57	74.00	-37.43	
	3	8104.56	39.25	36.98	8.11	40.59	43.75	74.00	-30.25	
	4	10400.86	38.29	39.90	9.71	40.60	47.30	74.00	-26.70	Peak
Гуре		802.11n(F	HT40)	Test channe	el	CH06		Polarity		Horizontal
	Mark	Frequency	Reading	Antenna	Cable	Preamp	Level	Limit	Over	Remark
		MHZ	dBuV/m		dB	dB	dBuV/m	dBuV/m	limit	
	1	2431.21	42.44	27.44	4.24		32.32		-41.68	Peak
	2	5762.24	43.04		6.66		40.91		-33.09	Peak
	3	8022.46	39.37		8.07		43.68		-30.32	Peak
	4		40.01							
	4	11486.41	40.01	40.49	10.35	42.30	48.55	74.00	-25.45	Peak
Туре		802.11n(H	HT40)	Test channe	el	CH06		Polarity		Vertical
	Manle				C-h1			, limit		
	Mark	Frequency							Over	
		MHZ	dBuV/		dB	dB	dBuV/i			
	1	1605.55	44.05	25.09	3.35		30.29	74.00	-43.71	
	2	5762.24	41.95	31.92	6.66		39.82	74.00	-34.18	
	3	7961.43	40.00	36.92	7.98	40.89	44.01	74.00	-29.99	Peak
	4	10374.42	39.09	39.82	9.69	40.65	47.95	74.00	-26.05	5 Peak
Гуре		802.11n(H	HT40)	Test channe	el	CH09		Polarity		Horizontal
	Mark	Frequency	Reading	Antenna	Cabl	e Preamp	Level	Limit	Over	Remark
		MHZ	dBuV/r		dB	dB	dBuV/n		limit	
						41.80	33.77	74.00	-40.23	
	1		43.83	27.47	4.21	71.00			111-127-12-10	
	1 2	2412.72	43.83	27.47			42.31	74.00	-31.69	
	2	2412.72 4883.52	46.15	31.20	6.21	41.25	42.31	74.00		
		2412.72				41.25	42.31 45.56 48.22	74.00 74.00 74.00	-31.69 -28.44 -25.78	Peak
Гуре	2	2412.72 4883.52 8104.56	46.15 41.06 39.97	31.20 36.98	6.21 8.11 9.93	41.25	45.56	74.00	-28.44	Peak
Гуре	2 3 4	2412.72 4883.52 8104.56 10860.83	46.15 41.06 39.97	31.20 36.98 40.42 Test channe	6.21 8.11 9.93	41.25 40.59 42.10 CH09	45.56 48.22	74.00 74.00 Polarity	-28.44 -25.78	Vertical
Туре	2	2412.72 4883.52 8104.56 10860.83 802.11n(F	46.15 41.06 39.97 HT40)	31.20 36.98 40.42 Test channe	6.21 8.11 9.93	41.25 40.59 42.10 CH09	45.56 48.22 Level	74.00 74.00 Polarity	-28.44 -25.78	Vertical Remark
Гуре	2 3 4 Mark	2412.72 4883.52 8104.56 10860.83 802.11n(F	46.15 41.06 39.97 HT40)	31.20 36.98 40.42 Test channe	6.21 8.11 9.93 Cable	41.25 40.59 42.10 CH09	45.56 48.22 Level	74.00 74.00 Polarity	-28.44 -25.78 Over	Peak Peak Vertical Remark
Туре	2 3 4 Mark	2412.72 4883.52 8104.56 10860.83 802.11n(F	46.15 41.06 39.97 HT40) Reading dBuV/m 43.04	31.20 36.98 40.42 Test channe Antenna dB 29.10	6.21 8.11 9.93 Cable dB 5.15	41.25 40.59 42.10 CH09 Preamp dB 41.60	45.56 48.22 Level dBuV/m 35.69	74.00 74.00 Polarity Limit dBuV/m 74.00	-28.44 -25.78 Over limit -38.31	Peak Peak Vertical Remark Peak
Туре	2 3 4 Mark	2412.72 4883.52 8104.56 10860.83 802.11n(F Frequency MHz 3525.56 4908.44	46.15 41.06 39.97 HT40) Reading dBuV/m 43.04 47.50	31.20 36.98 40.42 Test channe Antenna dB 29.10 31.20	6.21 8.11 9.93 Cable dB 5.15 6.07	41.25 40.59 42.10 CH09 Preamp dB 41.60 41.22	45.56 48.22 Level dBuV/m 35.69 43.55	74.00 74.00 Polarity Limit dBuV/m 74.00 74.00	-28.44 -25.78 Over limit -38.31 -30.45	Peak Peak Vertical Remark Peak Peak
Гуре	2 3 4 Mark	2412.72 4883.52 8104.56 10860.83 802.11n(F	46.15 41.06 39.97 HT40) Reading dBuV/m 43.04	31.20 36.98 40.42 Test channe Antenna dB 29.10	6.21 8.11 9.93 Cable dB 5.15	41.25 40.59 42.10 CH09 Preamp dB 41.60	45.56 48.22 Level dBuV/m 35.69	74.00 74.00 Polarity Limit dBuV/m 74.00	-28.44 -25.78 Over limit -38.31	Peak Peak Vertical Remark Peak Peak Peak Peak

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6. TEST SETUP PHOTOS

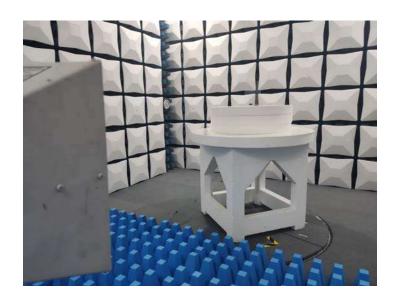
Radiated Emission

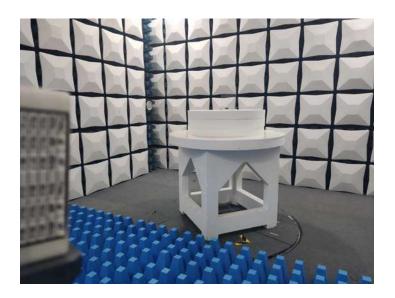


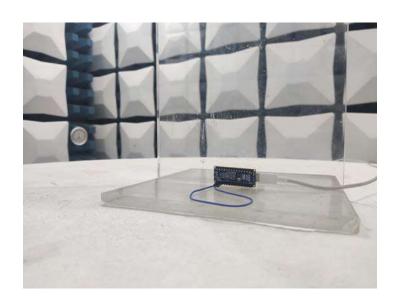




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AC Conducted Emission



7. EXTERNAL AND INTERNAL PHOTOS

Refer to the test report No. CHTW24010102

8. APPENDIX REPORT

Shenzhen Huatongwei International Inspection Co., Ltd.

APPENDIX REPORT

Project No.	SHT2310048501EW	Radio Specification	WIFI 2.4G
Test sample No.	YPHT23100485001	Model No.	ABX00083
Start test date	2024-01-24	Finish date	2024-01-25
Temperature	24.1℃	Humidity	48%
Test Engineer	Xiangyu Wei	Auditor	Xiaodong Zheo

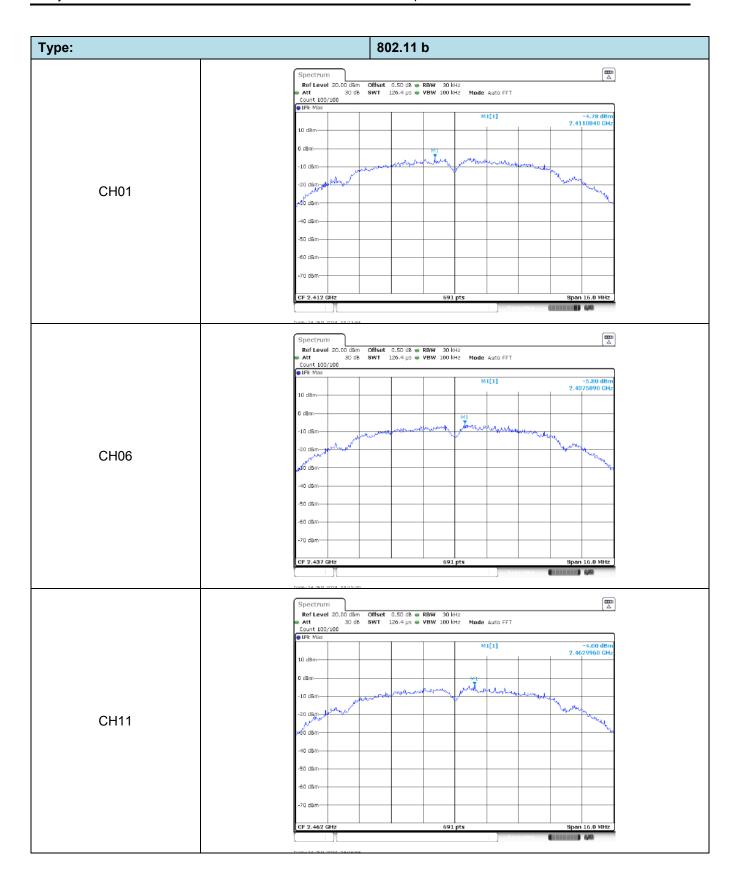
Appendix clause	Test item	Result
А	Conducted Peak Output Power	PASS
В	Power Spectral Density	PASS
С	6 dB Bandwidth	PASS
D	99% Occupied Bandwidth	PASS
E	Duty Cycle	PASS
F	Band edge and Spurious Emissions (conducted)	PASS

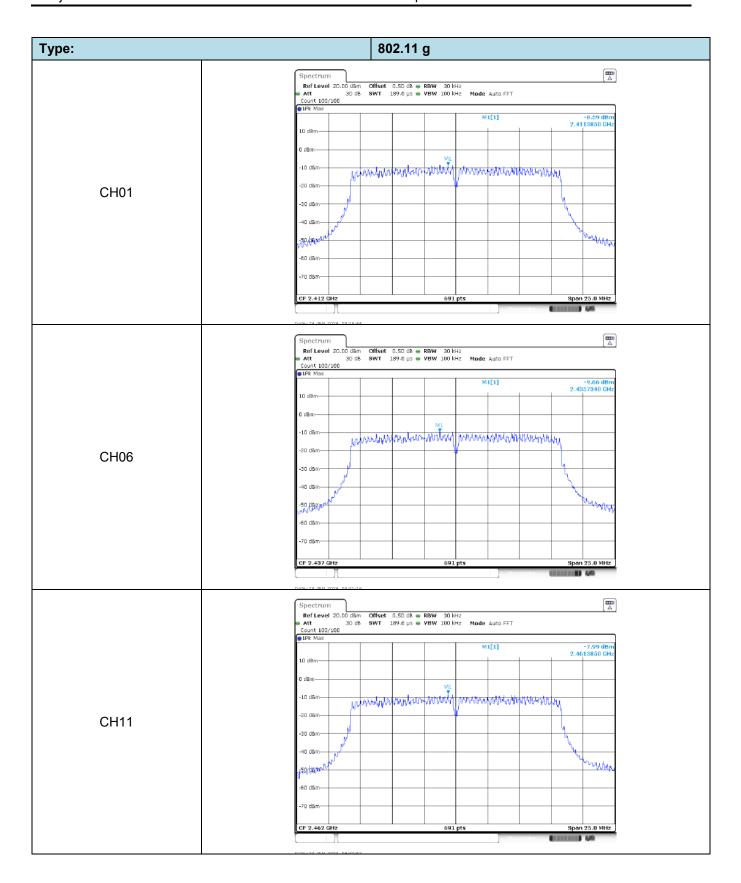
Appendix A: Conducted Peak Output Power

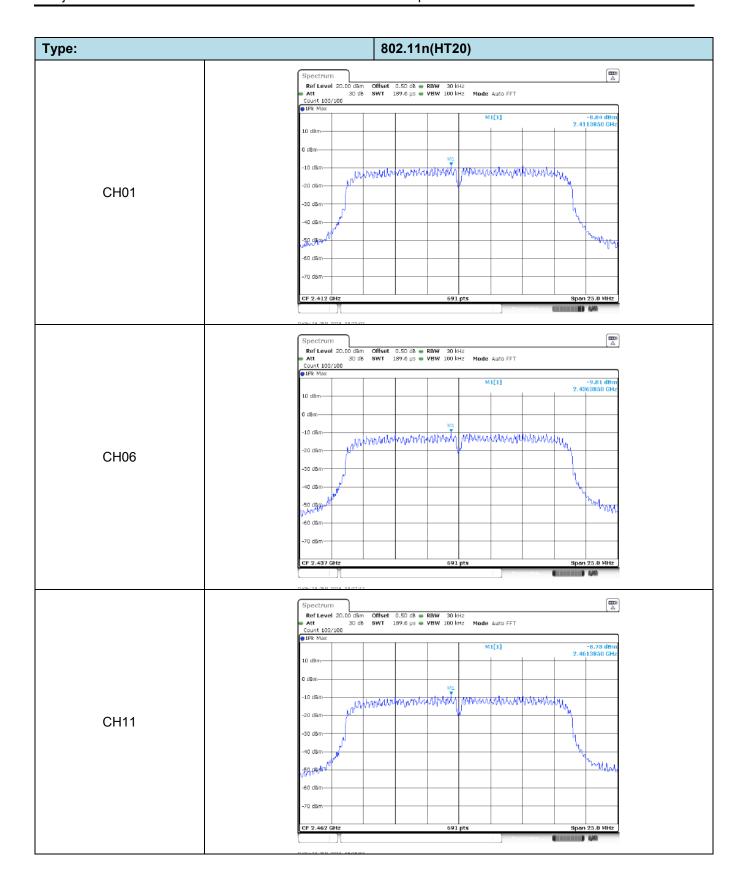
Туре	Channel	Peak Output power (dBm)	Average Output power (dBm)	Limit (dBm)	Result
	01	14.48	14.41		
802.11b	06	13.83	13.77	≤ 30.00	Pass
	11	15.11	15.06		
802.11g	01	15.23	15.17		Pass
	06	14.39	14.30	≤ 30.00	
	11	15.63	15.55		
802.11n (HT20)	01	14.79	14.72		Pass
	06	14.06	13.99	≤ 30.00	
	11	15.33	15.28		
802.11n(HT40)	03	14.22	14.18		
	06	13.81	13.74	≤ 30.00	Pass
	09	14.44	14.38		

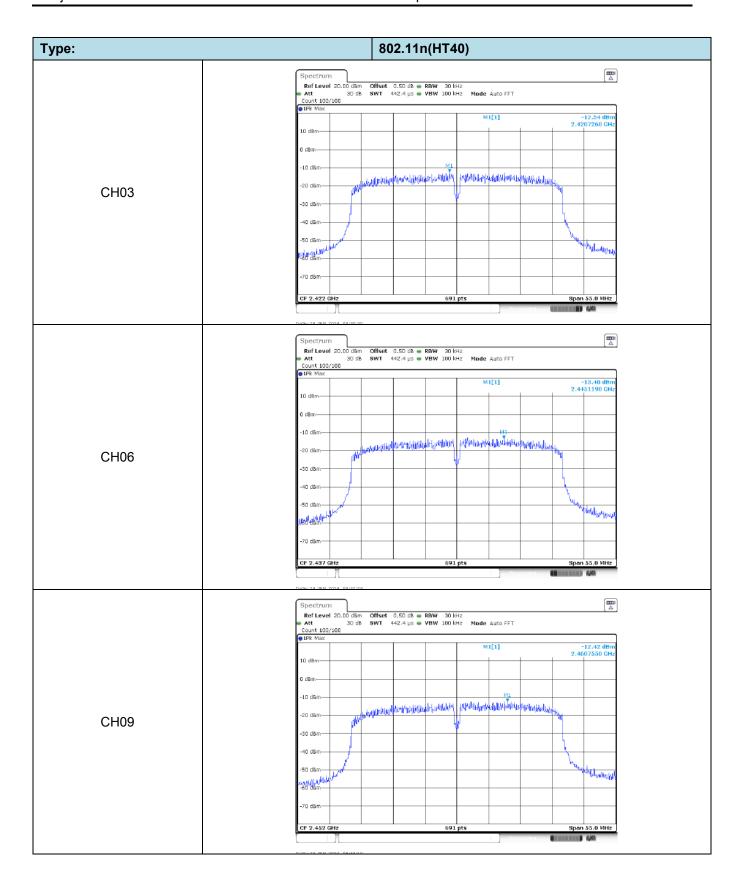
Appendix B: Power Spectral Density

Туре	Channel	Power Spectral Density (dBm/30KHz)	Limit (dBm/3KHz)	Result
	01	-4.78		
802.11b	06	-5.80	≤8.00	Pass
	11	-4.00		
	01	-8.20		
802.11g	06	-9.66	≤8.00	Pass
	11	-7.99		
802.11n(HT20)	01	-8.84		
	06	-9.81	≤8.00	Pass
	11	-8.73		
802.11n(HT40)	03	-12.54		
	06	-13.37	≤8.00	Pass
	09	-12.42		



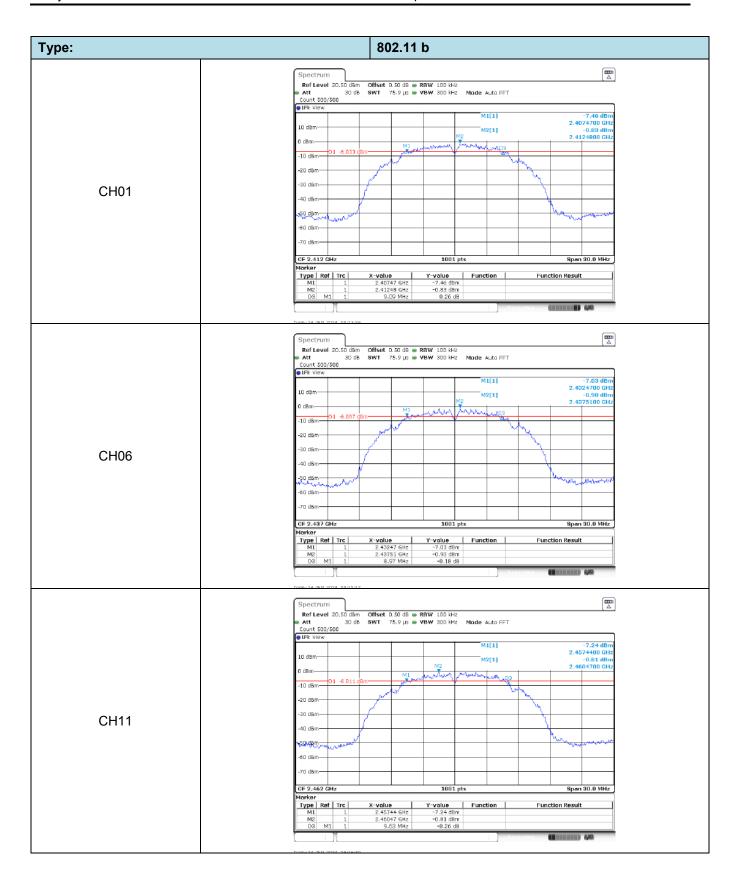


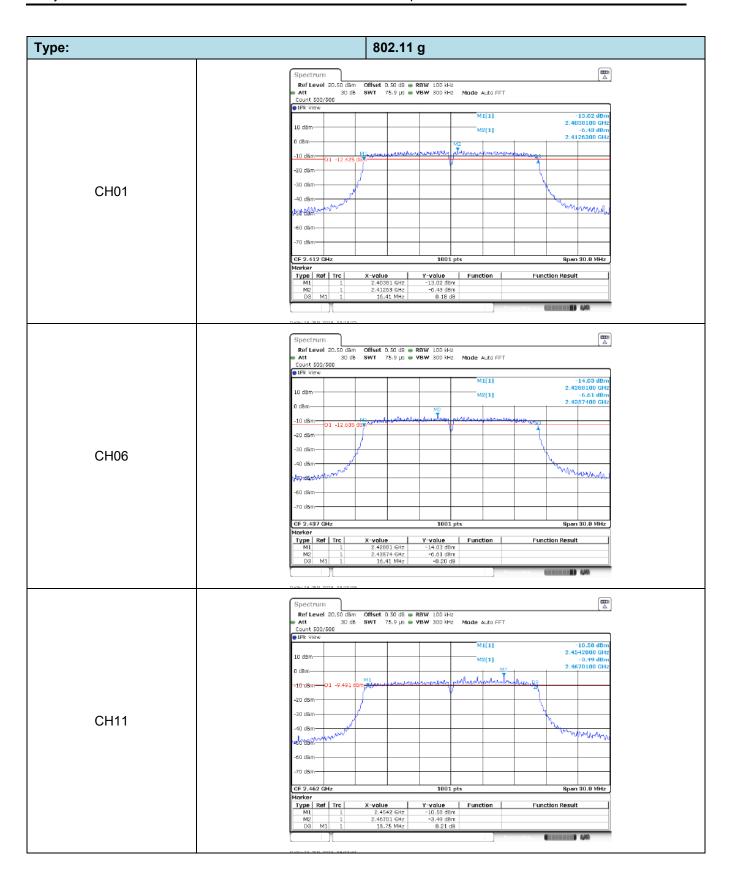


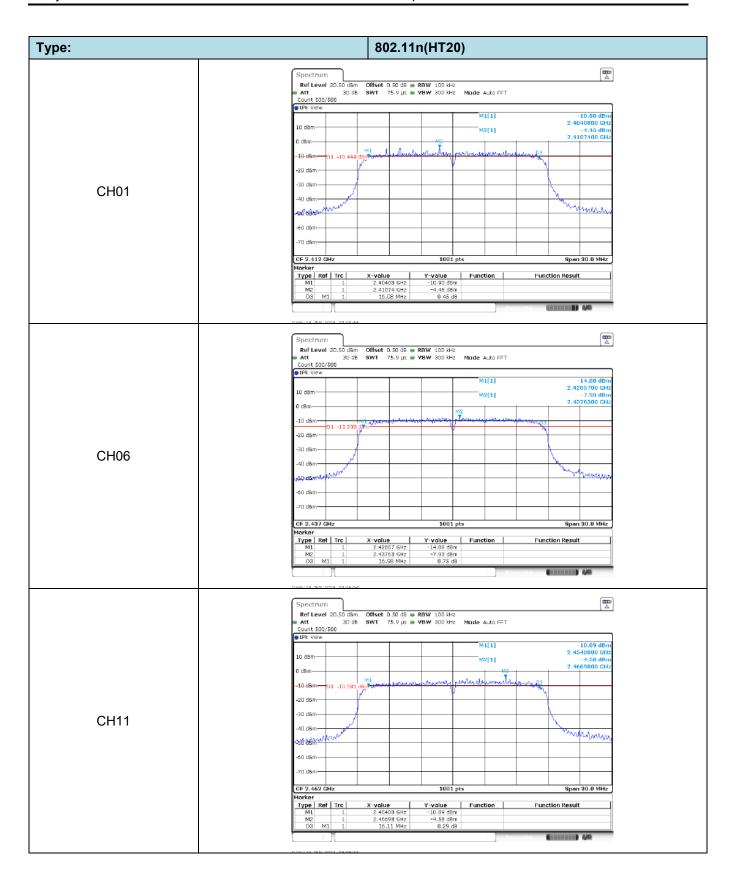


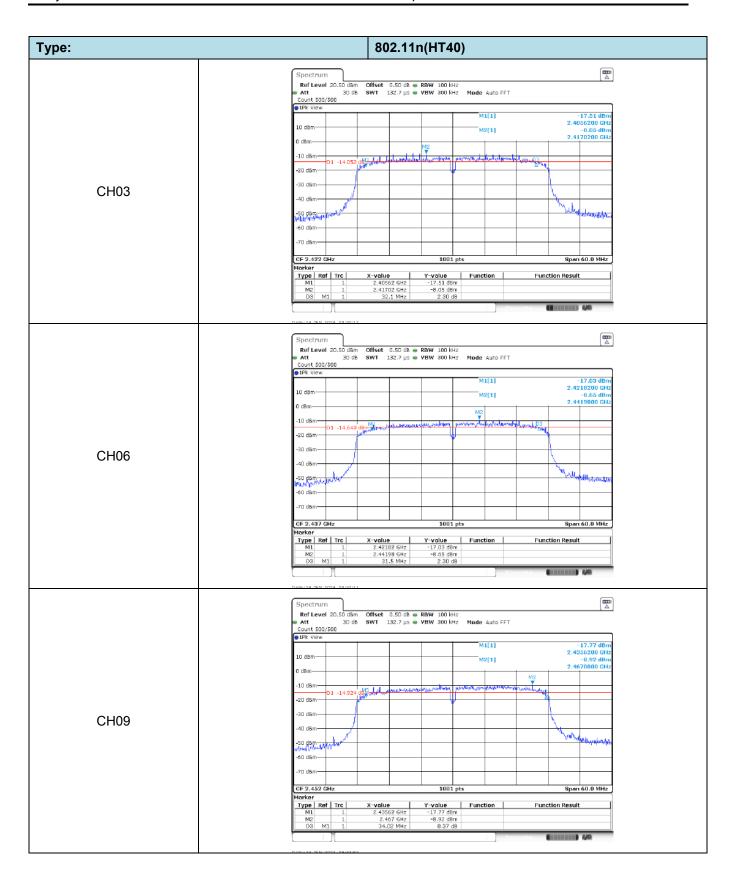
Appendix C: 6dB bandwidth

Туре	Channel	6dB Bandwidth (MHz)	Limit (MHz)	Result
	01	9.09		
802.11b	06	8.97	≥0.5	Pass
	11	9.63		
	01	16.41		
802.11g	06	16.41	≥0.5	Pass
	11	15.75		
	01	16.08		
802.11n(HT20)	06	16.98	≥0.5	Pass
	11	16.11		
	03	32.10		
802.11n(HT40)	06	31.50	≥0.5	Pass
	09	34.02		



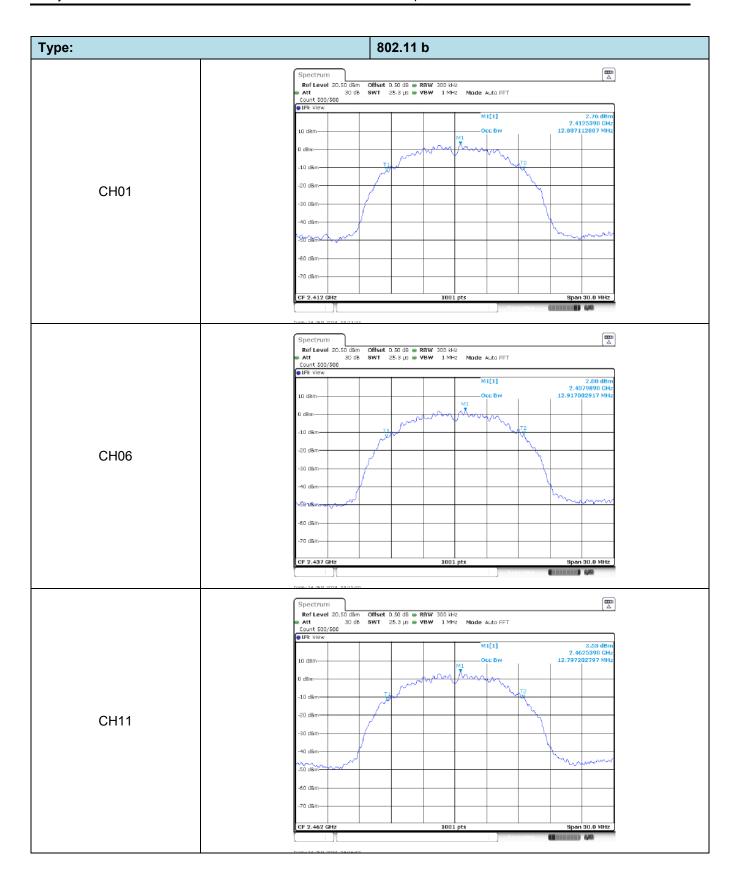


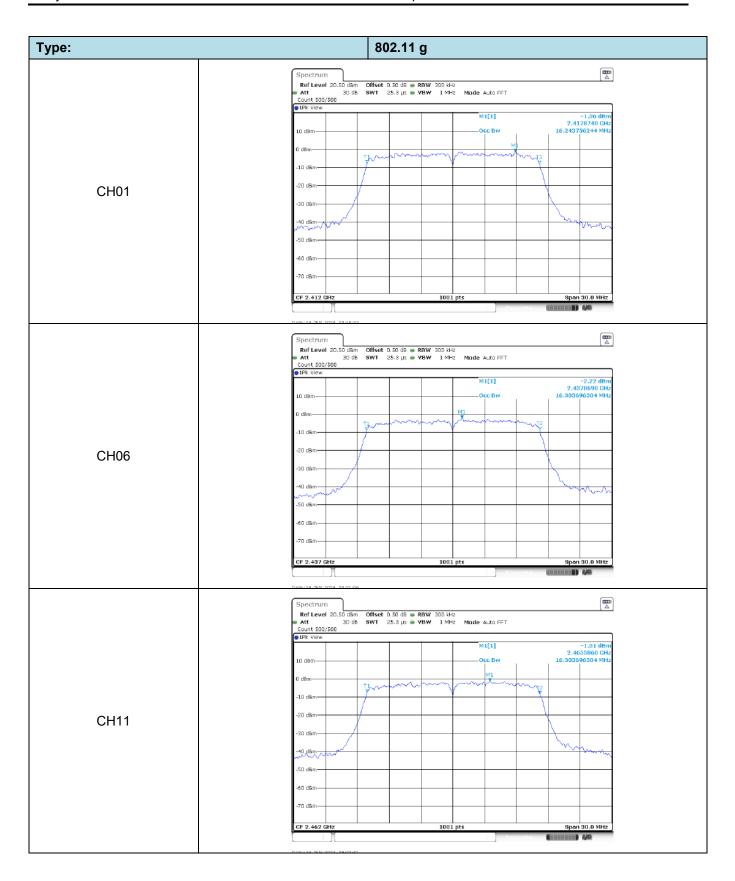


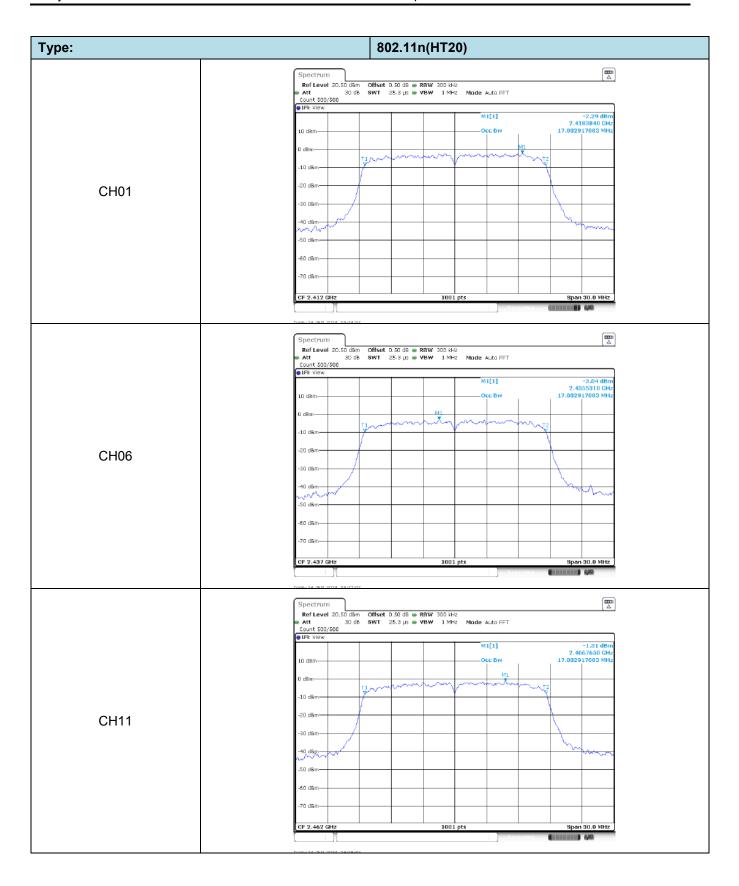


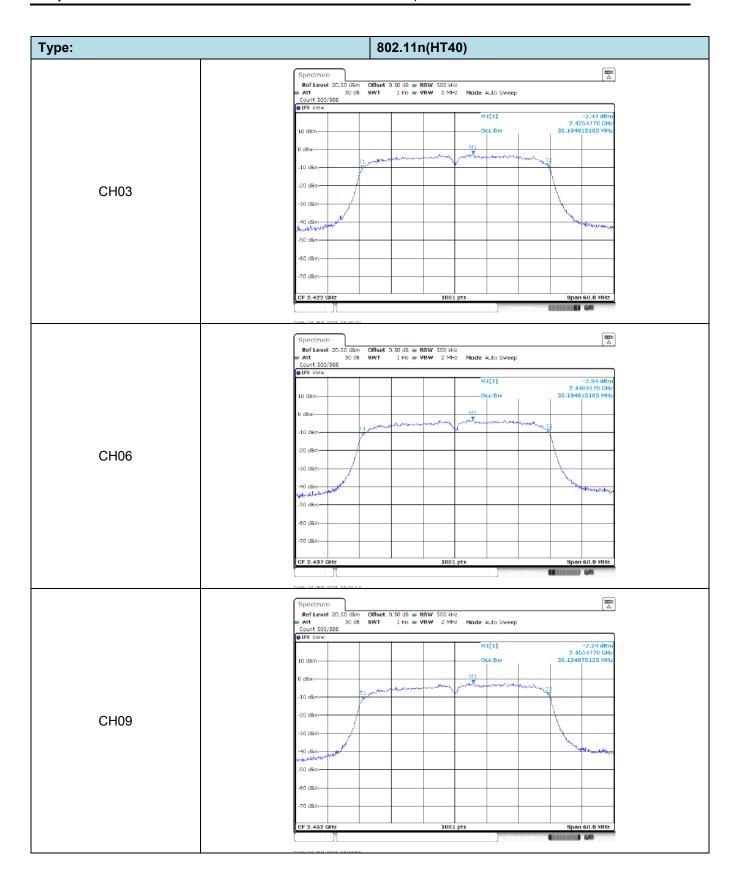
Appendix D: 99% Occupied Bandwidth

Туре	Channel	99% Bandwidth (MHz)	Limit (kHz)	Result
	01	12.89		
802.11b	06	12.92	-	Pass
	11	12.80		
	01	16.24		
802.11g	06	16.30	-	Pass
	11	16.30		
	01	17.08		
802.11n(HT20)	06	17.08	-	Pass
	11	17.08		
	03	35.19		
802.11n(HT40)	06	35.19	-	Pass
	09	35.13		



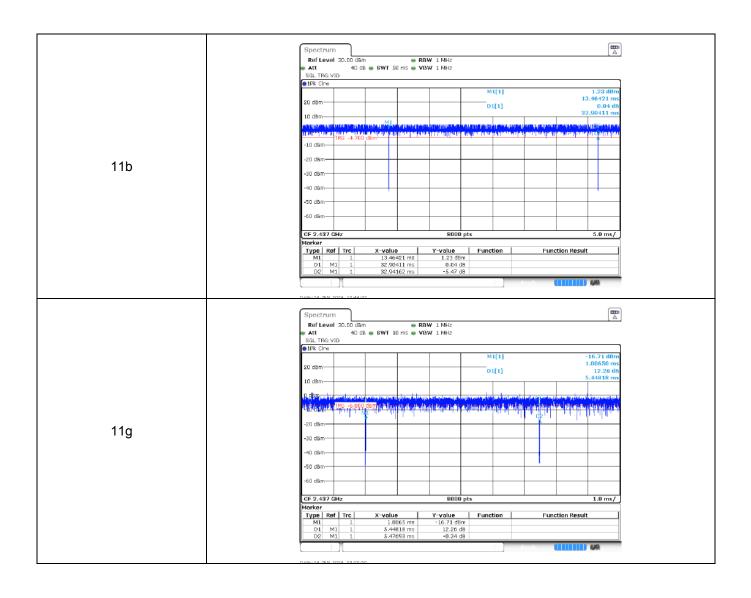


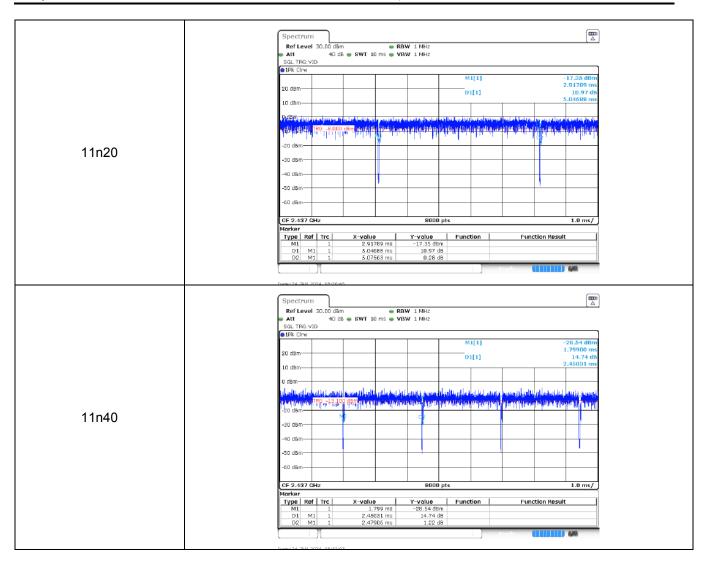




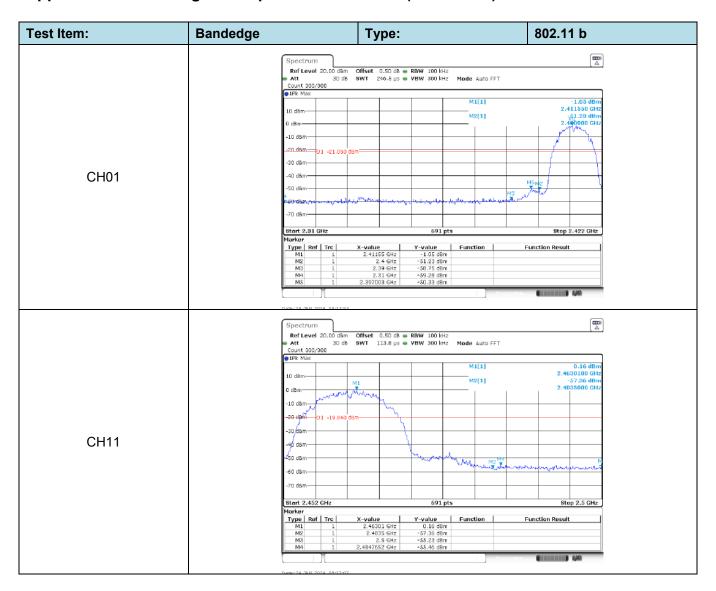
Appendix E: Duty Cycle

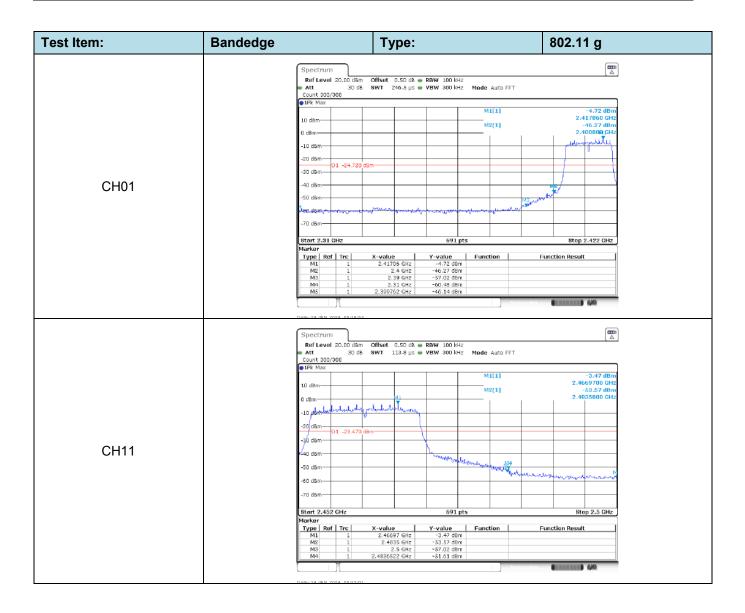
Modulation Type	Test Frequency (MHz)	T _{on time} for single burst (ms)	T _{period} (ms)	Duty cycle	1/T _{on time} (kHz)
11b	2437	32.90	32.94	99.88%	0.03
11g	2437	5.45	5.48	99.45%	0.03
11n20	2437	5.05	5.08	99.41%	0.20
11n40	2437	2.45	2.48	98.79%	0.41

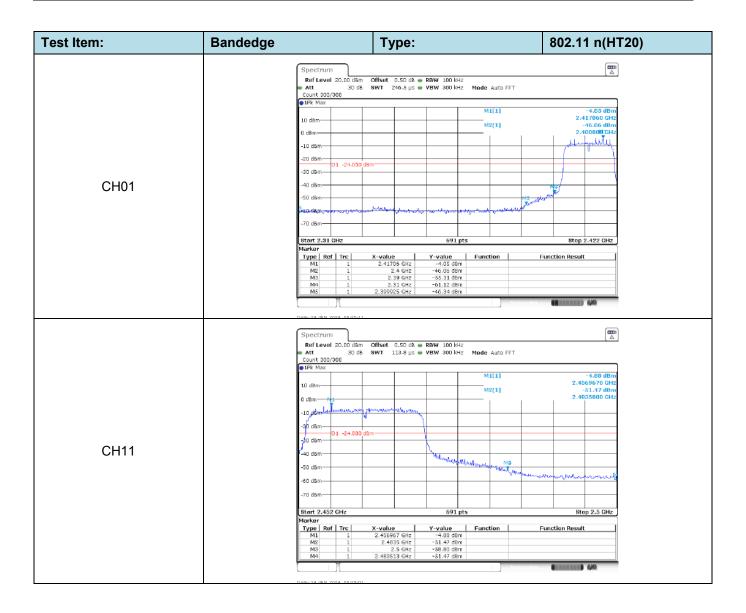


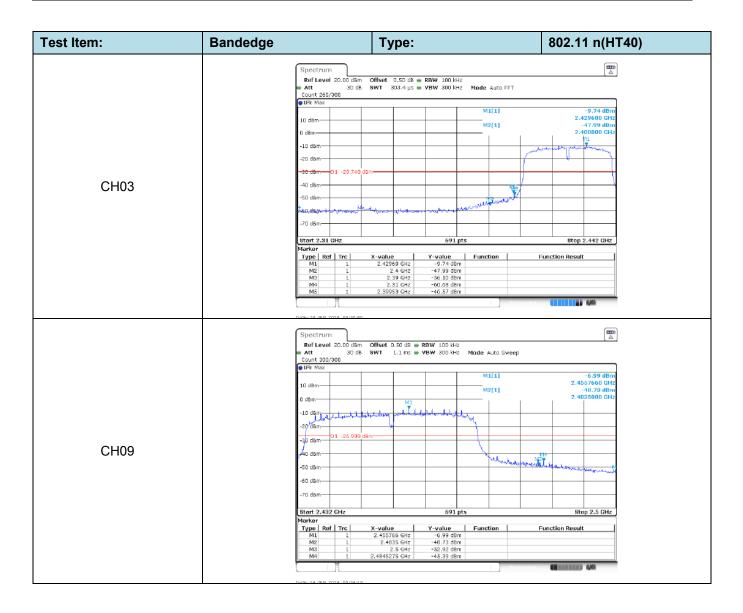


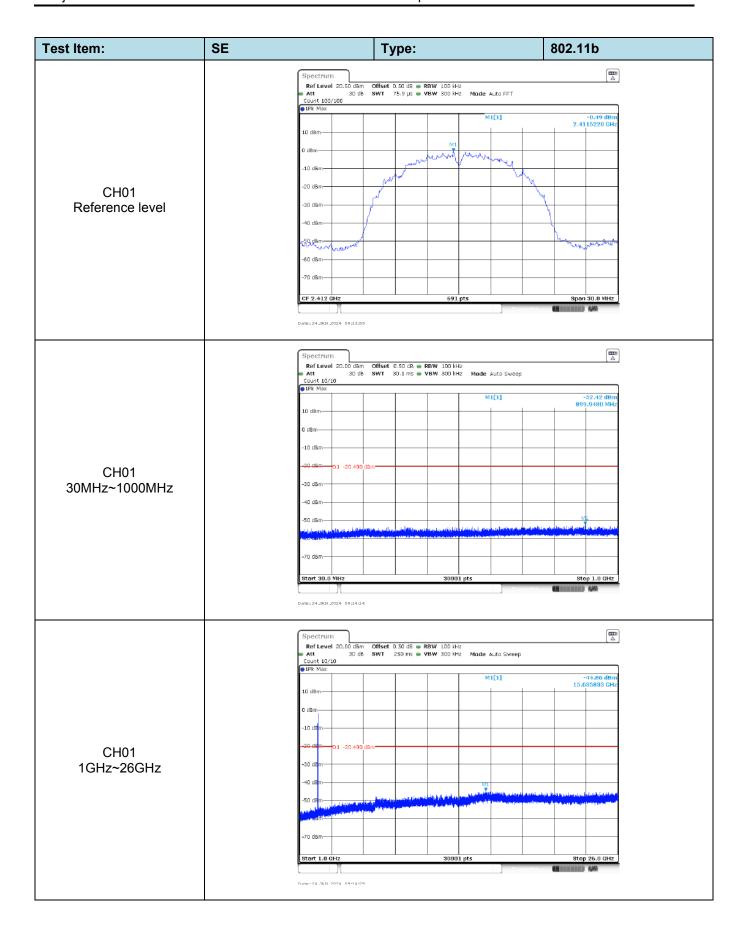
Appendix F: Band edge and Spurious Emissions (conducted)

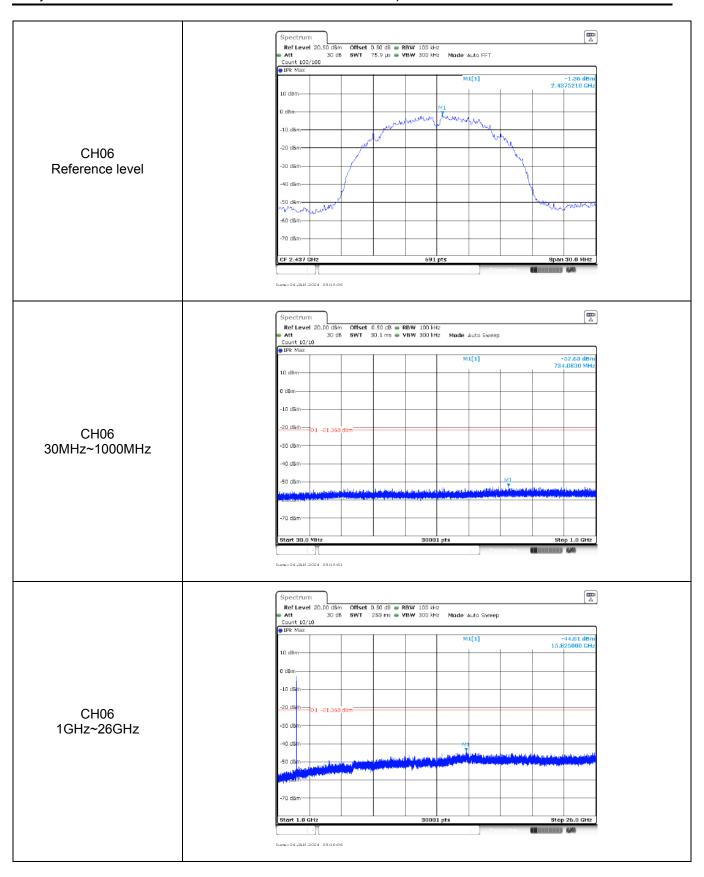


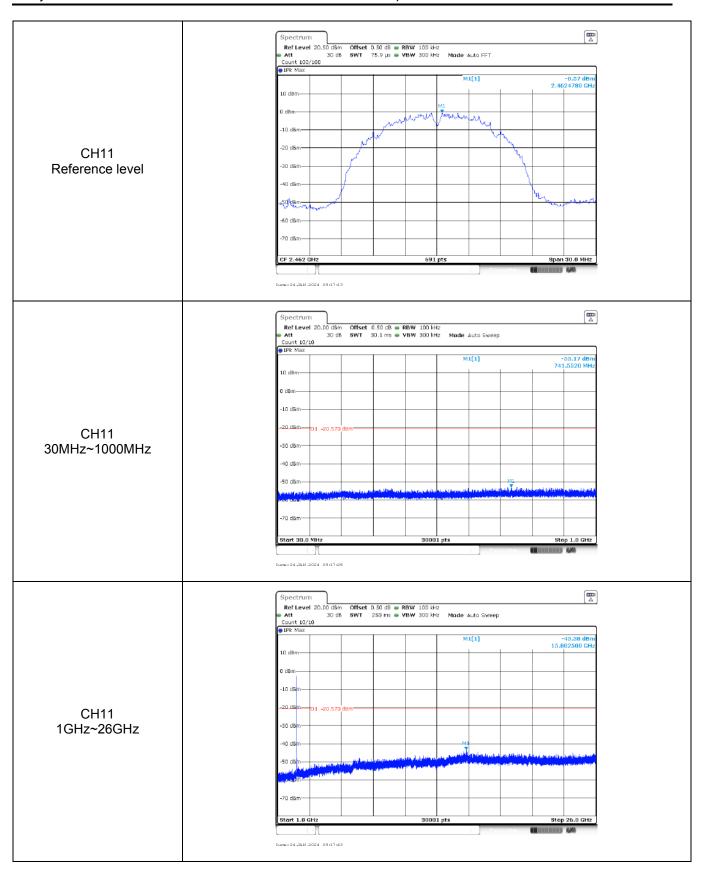


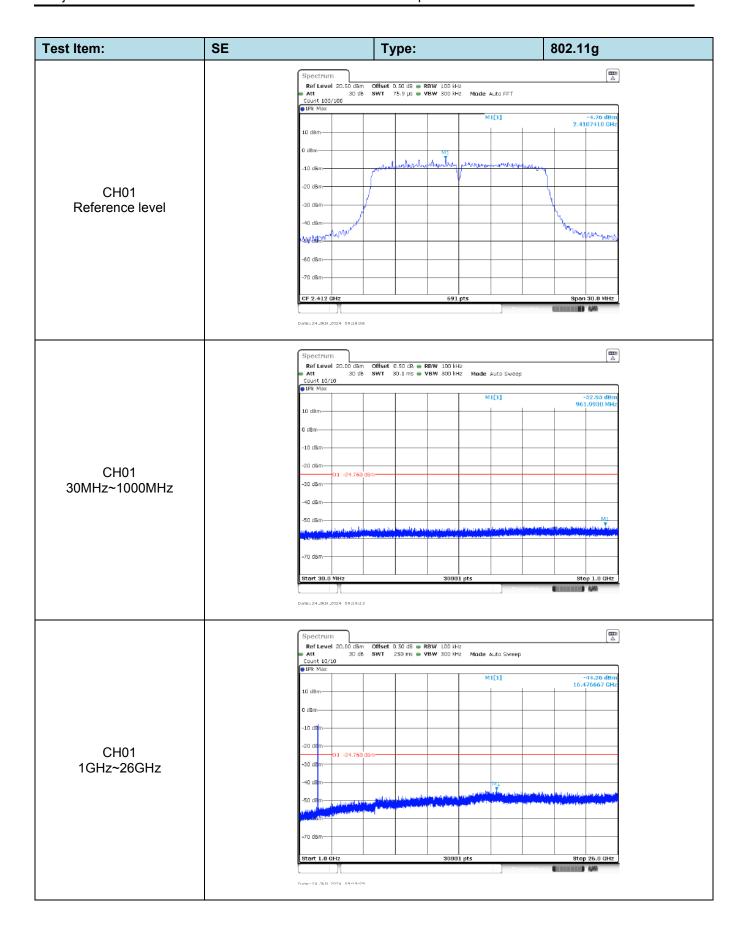


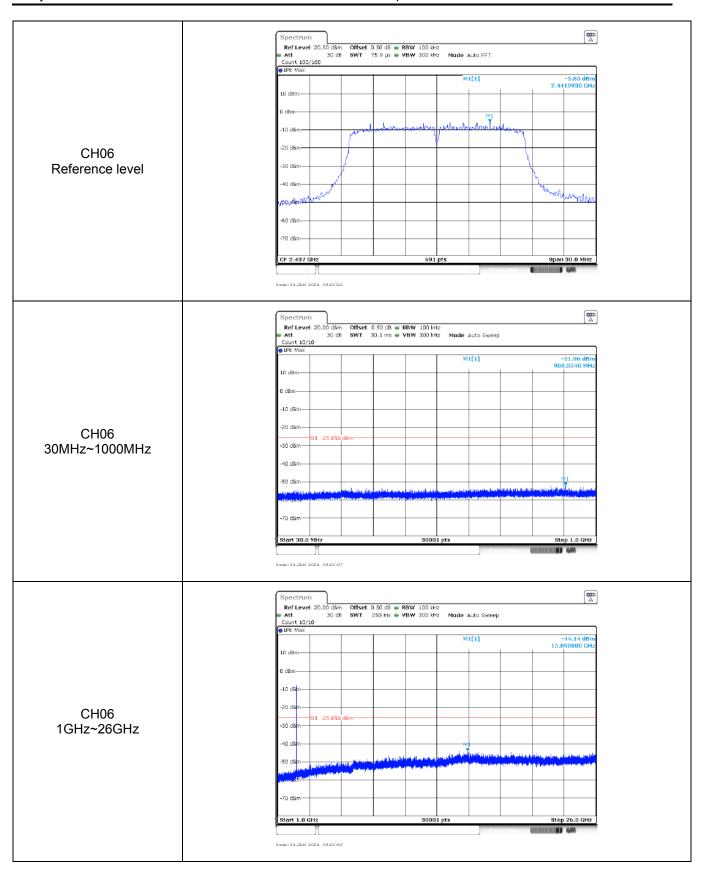


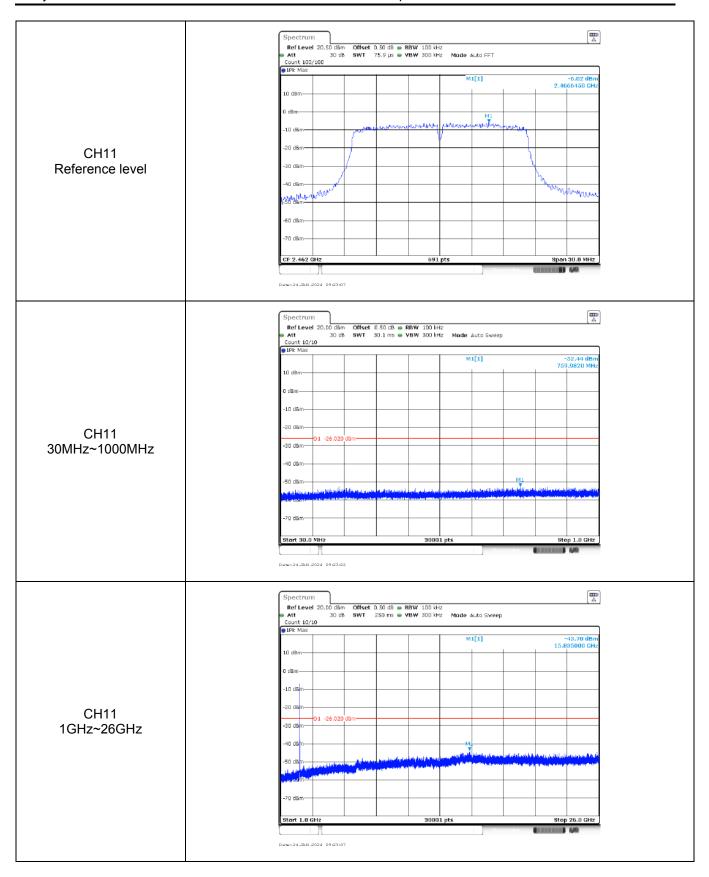


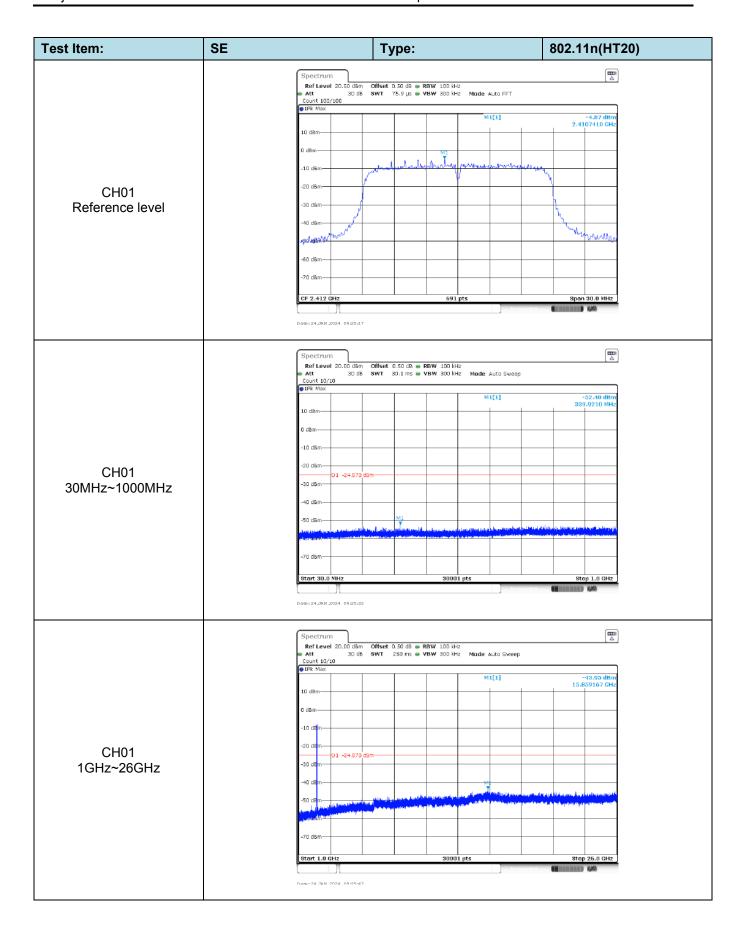


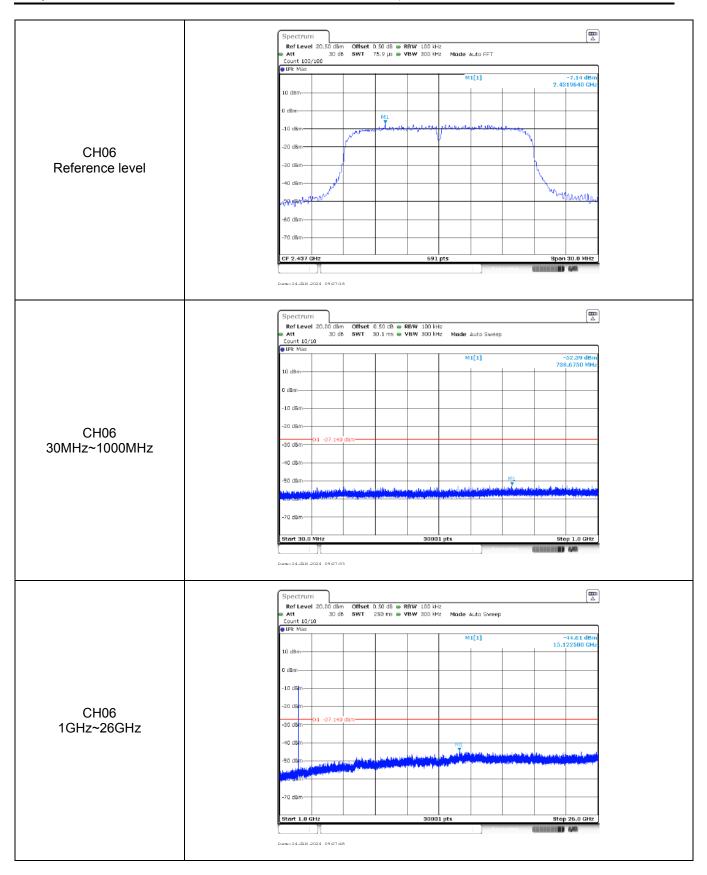


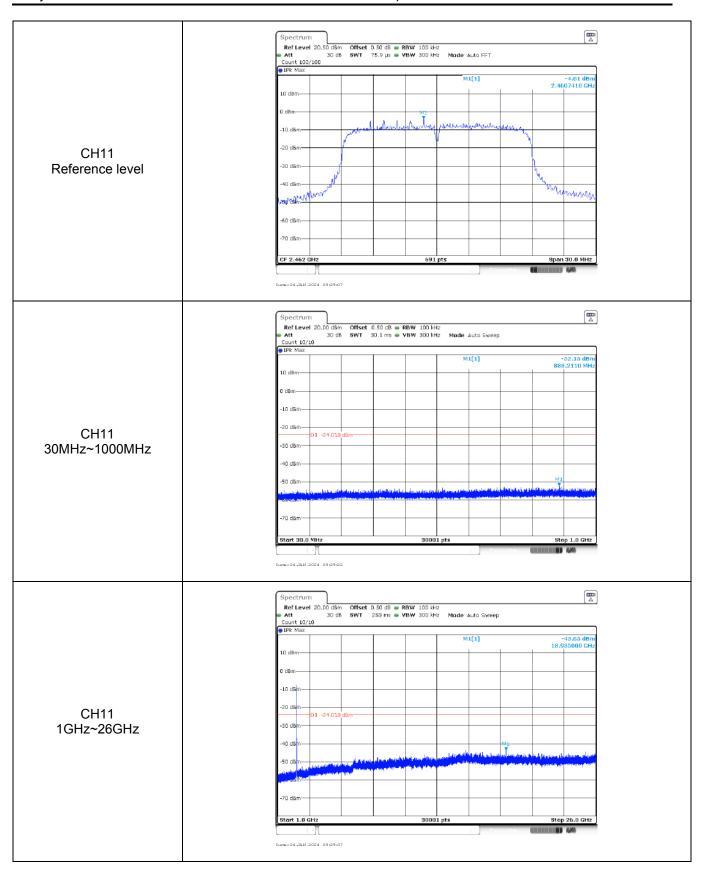


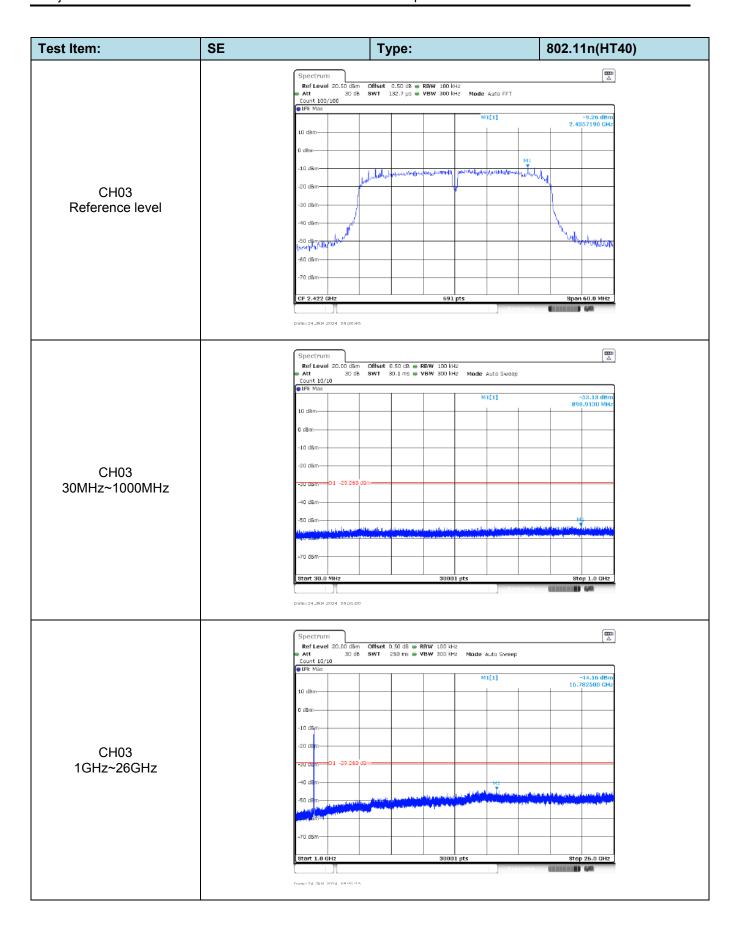


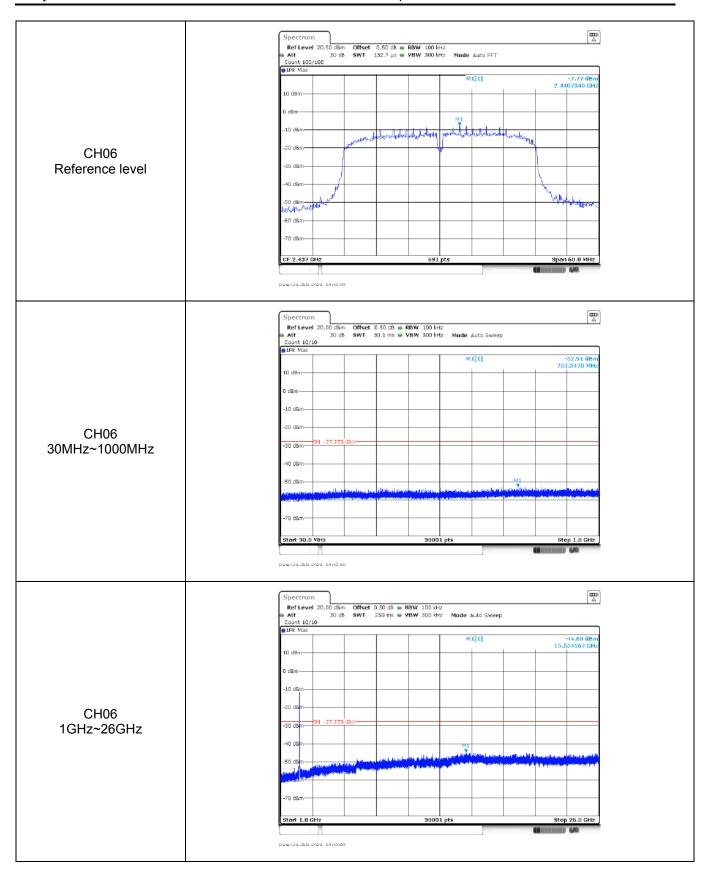


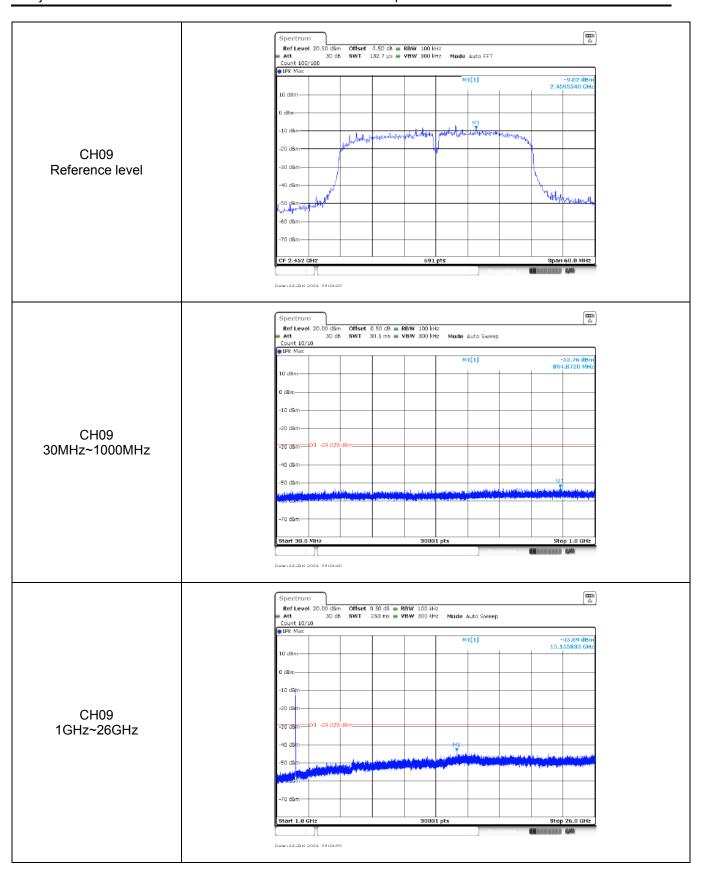












-----End of Report-----