



TEST REPORT

Report Reference No:	CHTEW19070027	Report ver	ification:	
Project No:	SHT1906060501EW			
FCC ID:	ZSW-30-089			Reportive: Children 10027
Applicant's name:	b mobile HK Limited			
Address:	Flat 18; 14/F Block 1; Golden Street; Kwai Chung; New Terr			26 Kwai Tak
Manufacturer	b mobile HK Limited			
Address	Flat 18; 14/F Block 1; Golden Street; Kwai Chung; New Terr			26 Kwai Tak
Test item description:	Mobile Phone			
Trade Mark	Bmobile			
Model/Type reference:	AX688			
Listed Model(s)				
Standard:	FCC CFR Title 47 Part 15 Su	bpart C Sec	tion 15.2	247
Date of receipt of test sample:	Jun 24, 2019			
Date of testing	Jun 25, 2019- Jul 08, 2019			
Date of issue	Jul 10, 2019			
Result:	PASS			
Compiled by			(\cdot)	
(position+printedname+signature):	File administrators Silvia Li		Silv	ja Li
Supervised by			Xiaodo	
(position+printedname+signature):	Project Engineer Xiaodong Zh	ao	/ munu	y zna
Approved by			Hom	sty
(position+printedname+signature):	RF Manager Hans Hu		1 0 -	
			_	
Testing Laboratory Name: :	Shenzhen Huatongwei Intern	national Ins	pection	Co., Ltd.
Address:				
Shenzhen Huatongwei International Inspection Co., Ltd. All rights reserved.				
This publication may be reproduced in whole or in part for non-commercial purposes as long as the Shenzhen Huatongwei International Inspection Co., Ltd. is acknowledged as copyright owner and source of the material. Shenzhen Huatongwei International Inspection Co., Ltd. takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due				

to its placement and context.

The test report merely correspond to the test sample.

Contents

<u>1.</u>	TEST STANDARDS AND REPORT VERSION	3
1.1. 1.2.	Test Standards Report version	3 3
<u>2.</u>	TEST DESCRIPTION	4
<u>3.</u>	SUMMARY	5
3.1. 3.2. 3.3. 3.4. 3.5.	Client Information Product Description Operation state EUT configuration Modifications	5 5 6 6 6
<u>4.</u>	TEST ENVIRONMENT	7
4.1. 4.2. 4.3. 4.4. 4.5.	Address of the test laboratory Test Facility Environmental conditions Statement of the measurement uncertainty Equipments Used during the Test	7 7 8 8 9
<u>5.</u>	TEST CONDITIONS AND RESULTS	11
5.1. 5.2. 5.3. 5.4. 5.5. 5.6. 5.7. 5.8.	Antenna requirement Conducted Emissions (AC Main) Conducted Peak Output Power Power Spectral Density 6dB bandwidth Restricted band Band edge and Spurious Emissions (conducted) Spurious Emissions (radiated)	11 12 15 16 20 24 28 41
<u>6.</u>	TEST SETUP PHOTOS	47
<u>7.</u>	EXTERANAL AND INTERNAL PHOTOS	48

1. TEST STANDARDS AND REPORT VERSION

1.1. Test Standards

The tests were performed according to following standards:

<u>FCC Rules Part 15.247</u>: Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.

ANSI C63.10:2013: American National Standard forTesting Unlicensed Wireless Devices

<u>KDB 558074 D01 15.247 Meas Guidance v05:</u> 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	2019-07-10	Original

2. TEST DESCRIPTION

Test Item	FCC Rule	Result	Test Engineer
Antenna requirement	15.203/15.247(c)	PASS	Jiongsheng Feng
Line Conducted Emissions (AC Main)	15.207	PASS	Jiongsheng Feng
Conducted Peak Output Power	15.247(b)(3)	PASS	Bruce Wong
Power Spectral Density	15.247(e)	PASS	Bruce Wong
6dB Bandwidth	15.247(a)(2)	PASS	Bruce Wong
Restricted band	15.247(d)/15.205	PASS	Bruce Wong
Spurious Emissions	15.247(d)/15.209	PASS	Bruce Wong

Note: The measurement uncertainty is not included in the test result.

Shenzhen Huatongwei International Inspection Co., Ltd.

3. <u>SUMMARY</u>

3.1. Client Information

Applicant:	b mobile HK Limited
Address:	Flat 18; 14/F Block 1; Golden Industrial Building;16-26 Kwai Tak Street; Kwai Chung; New Territories; Hong Kong.
Manufacturer:	b mobile HK Limited
Address:	Flat 18; 14/F Block 1; Golden Industrial Building;16-26 Kwai Tak Street; Kwai Chung; New Territories; Hong Kong.

3.2. Product Description

Name of EUT:	Mobile Phone	
Trade Mark:	Bmobile	
Model No.:	AX688	
Listed Model(s):	-	
IMEI:	Conducted: 362523432631169 Radiated: 362523432631581	
Power supply:	DC 3.7V	
Adapter information: Input:100-240Va.c., 50/60Hz, 0.15A Output:5.0Vd.c., 500mA		
Hardware version:	Bmobile_AX688_HWV1.0	
Software version:	Bmobile_AX688_OM_LTM_V001	
WIFI		
Supported type:	802.11b/802.11g/802.11n(HT20)	
Modulation: DSSS for 802.11b OFDM for 802.11g/802.11n(HT20)		
Operation frequency:	2412MHz~2462MHz	
Channel number:	11	
Channel separation:	5MHz	
Antenna type:	PIFA Antenna	
Antenna gain:	1.0dBi	

3.3. Operation state

Test frequency list

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

802.11b/g/n(HT20)			
Channel	Frequency (MHz)		
01	2412		
02	2417		
06	2437		
10	2457		
11	2462		

Test mode

For RF test items

The engineering test program was provided and enabled to make EUT continuous transmit (duty cycle>98%).

For AC power line conducted emissions:

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

For Radiated suprious emissions test item:

The engineering test program was provided and enabled to make EUT continuous transmit(duty cycle>98%). The EUT in each of three orthogonal axis emissions had been tested ,but only the worst case (X axis) data Recorded in the report.

3.4. EUT configuration

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

supplied by the manufacturer

0	- supplied by the lab	

0 /		Manufacturer:	/
	7	Model No.:	/
o /	Manufacturer:	/	
	7	Model No.:	/

3.5. Modifications

No modifications were implemented to meet testing criteria.

4. TEST ENVIRONMENT

4.1. Address of the test laboratory

Laboratory: Shenzhen Huatongwei International Inspection Co., Ltd.

Address: 1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China

4.2. Test Facility

CNAS-Lab Code: L1225

Shenzhen Huatongwei International Inspection Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA-Lab Cert. No.: 3902.01

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

FCC-Registration No.: 762235

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files.

IC-Registration No.:5377A-1

Two 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No.: 5377A-1.

ACA

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our A2LA accreditation.

4.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15~35°C
Relative Humidity:	30~60 %
Air Pressure:	950~1050mba

4.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors in calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report according to TR-100028-01 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 2" and is documented in the Shenzhen Huatongwei International Inspection Co., Ltd. quality system according to ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Here after the best measurement capability for Shenzhen Huatongwei International Inspection Co., Ltd. is reported:

Test Items	Measurement Uncertainty	Notes
Transmitter power conducted	0.51 dB	(1)
Conducted spurious emissions 9kHz~40GHz	0.51 dB	(1)
Conducted Disturbance 150kHz~30MHz	3.02 dB	(1)
Radiated Emissions below 1GHz	4.90 dB	(1)
Radiated Emissions above 1GHz	4.96 dB	(1)
Occupied Bandwidth	70 Hz	(1)

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

4.5. Equipments Used during the Test

•	Conducted Emission					
Used	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
•	Shielded Room	Albatross projects	N/A	N/A	2018/09/28	2023/09/27
•	EMI Test Receiver	R&S	ESCI	101247	2018/10/27	2019/10/26
•	Artificial Mains	SCHWARZBECK	NNLK 8121	573	2018/10/27	2019/10/26
•	Pulse Limiter	R&S	ESH3-Z2	100499	2018/10/27	2019/10/26
•	RF Connection Cable	HUBER+SUHNER	EF400	N/A	2018/11/15	2019/11/14
•	Test Software	R&S	ES-K1	N/A	N/A	N/A
0	Single Balanced Telecom Pair ISN	FCC	FCC-TLISN-T2-02	20371	2018/10/28	2019/10/27
0	Two Balanced Telecom Pairs ISN	FCC	FCC-TLISN-T4-02	20373	2018/10/28	2019/10/27
0	Four Balanced Telecom Pairs ISN	FCC	FCC-TLISN-T8-02	20375	2018/10/28	2019/10/27
0	V-Network	R&S	ESH3-Z6	100211	2018/10/27	2019/10/26
0	V-Network	R&S	ESH3-Z6	100210	2018/10/27	2019/10/26
0	2-Line V-Network	R&S	ESH3-Z5	100049	2018/10/27	2019/10/26

•	Radiated Emission-6th test site											
Used	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)						
•	Semi-Anechoic Chamber	Albatross projects	SAC-3m-02	N/A	2018/09/30	2021/09/29						
•	EMI Test Receiver	R&S	ESCI	100900	2018/10/28	2019/10/27						
•	Loop Antenna	R&S	HFH2-Z2	100020	2017/11/20	2020/11/19						
•	Ultra-Broadband Antenna	SCHWARZBECK	VULB9163	546	2017/04/05	2020/04/04						
•	Pre-Amplifer	SCHWARZBECK	BBV 9742	N/A	2018/11/15	2019/11/14						
•	RF Connection Cable	HUBER+SUHNER	N/A	N/A	2018/09/28	2019/09/27						
•	RF Connection Cable	HUBER+SUHNER	SUCOFLEX104	501184/4	2018/09/28	2019/09/27						
•	Test Software	R&S	ES-K1	N/A	N/A	N/A						
•	Turntable	Maturo Germany	TT2.0-1T	N/A	N/A	N/A						
•	Antenna Mast	Maturo Germany	CAM-4.0-P-12	N/A	N/A	N/A						

•	Radiated emission-7th test site											
Used	Test Equipment Manufacturer		Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)						
•	Semi-Anechoic Chamber	Albatross projects	SAC-3m-01	N/A	2018/09/30	2021/09/29						
•	Spectrum Analyzer	R&S	FSP40	100597	2018/10/27	2019/10/26						
•	Horn Antenna	SCHWARZBECK	9120D	1011	2017/03/27	2020/03/26						
•	Pre-amplifier	BONN	BLWA0160-2M	1811887	2018/11/14	2019/11/13						
•	Pre-amplifier	CD	PAP-0102	12004	2018/11/14	2019/11/13						
•	Broadband Pre- amplifier	SCHWARZBECK	BBV 9718	9718-248	2019/04/26	2020/04/25						
•	RF Connection Cable	HUBER+SUHNER	RE-7-FH	N/A	2018/11/15	2019/11/14						
•	RF Connection Cable	HUBER+SUHNER	RE-7-FL	N/A	2018/11/15	2019/11/14						
•	Test Software	Audix	E3	N/A	N/A	N/A						

Shenzhen Huatongwei International Inspection Co., Ltd.

Page: 10 of 48

Issued: 2019-07-10

•	Turntable	Maturo Germany	TT2.0-1T	N/A	N/A	N/A
•	Antenna Mast	Maturo Germany	CAM-4.0-P-12	N/A	N/A	N/A

•	RF Conducted Method											
Used	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)						
•	Signal and spectrum Analyzer	R&S	FSV40	100048	2018/10/28	2019/10/27						
•	Spectrum Analyzer	Agilent	N9020A	MY50510187	2018/09/29	2019/09/28						
•	OSP	R&S	OSP120	101317	N/A	N/A						
0	Radio communication tester	R&S	CMW500	137688-Lv	2018/09/29	2019/09/28						
0	Test software	Tonscend	JS1120-1(LTE)	N/A	N/A	N/A						
0	Test software	Tonscend	JS1120-2(WIFI)	N/A	N/A	N/A						
0	Test software	Tonscend	JS1120-3(WCDMA)	N/A	N/A	N/A						
0	Test software	Tonscend	JS1120-4(GSM)	N/A	N/A	N/A						

5. TEST CONDITIONS AND RESULTS

5.1. Antenna requirement <u>REQUIREMENT:</u>

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 responsible party shall be used with the device. The use of a permanently attached antenna or of anantenna 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.

FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1)(i):

(i) Systems operating in the 2400~2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

TEST RESULTS

☑ Passed □ Not Applicable

The directional gain of the antenna less than 6 dBi, please refer to the below antenna photo.



5.2. Conducted Emissions (AC Main)

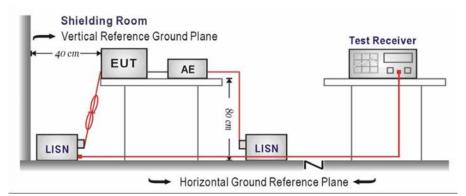
<u>LIMIT</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.207:

Fraguanay range (MHz)	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 C63.10:2013 requirements.
- 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.
- 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:

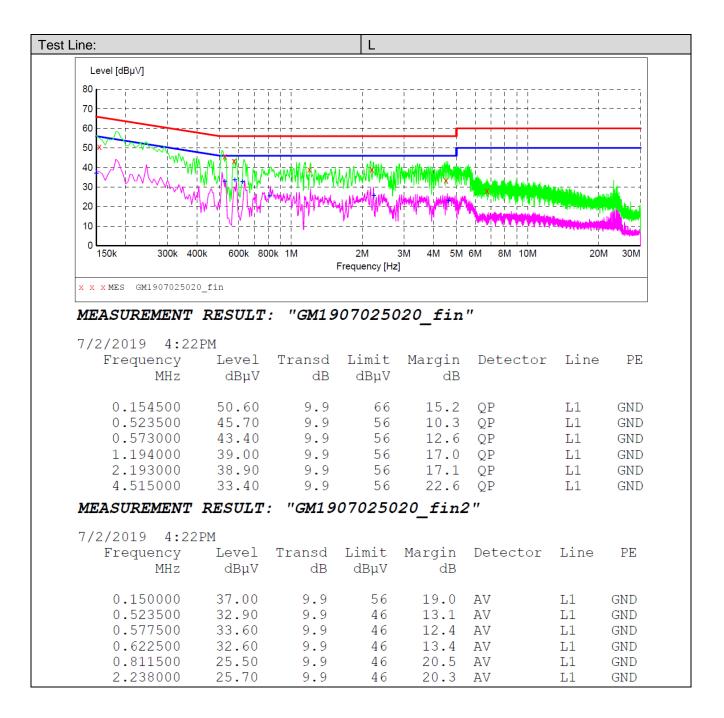
Please refer to the clause 3.3

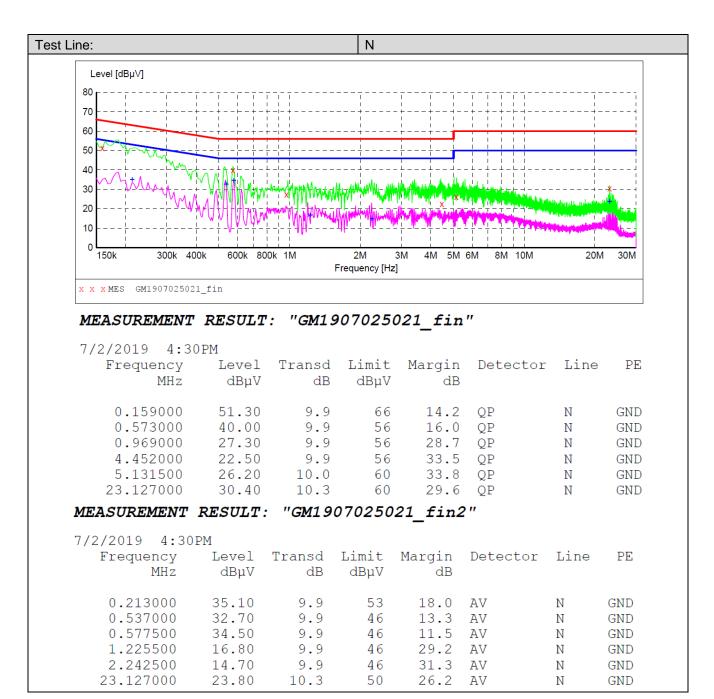
TEST RESULTS

☑ Passed □ Not Applicable

Note:

- 1) Transd=Cable lose+ Pulse Limiter Factor + Artificial Mains Factor
- 2) Margin= Limit -Level

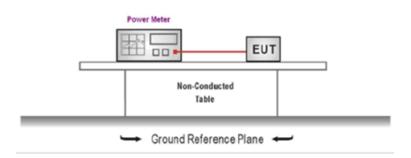




5.3. Conducted Peak Output Power LIMIT

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: 2013 and KDB 558074 D01 for compliance to FCC 47 CFR 15.247 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:

Please refer to the clause 3.3

TEST RESULTS

🛛 Passed

Not Applicable

Туре	Channel	Output power (dBm)	Average Output power (dBm)	Limit (dBm)	Result
	01	13.68	11.60		
802.11b	06	12.35	11.61	≤30.00	Pass
	11	11.96	11.42		
	01	15.35	12.78		
802.11g	06	16.17	13.69	13.69 ≤30.00	
	11	15.69	15.69 13.40		
	01	16.00	13.72		
802.11n(HT20)	06	15.87	13.76	≤30.00	Pass
	11	15.12	13.15		

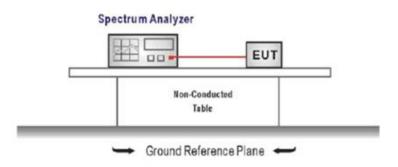
5.4. Power Spectral Density

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 8 dBm 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 kHz ≤ 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 wave form on the spectrum analyzer.
- 4. Use the peak marker function to determine the maximum amplitude level within the RBW.
- 5. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

TEST MODE:

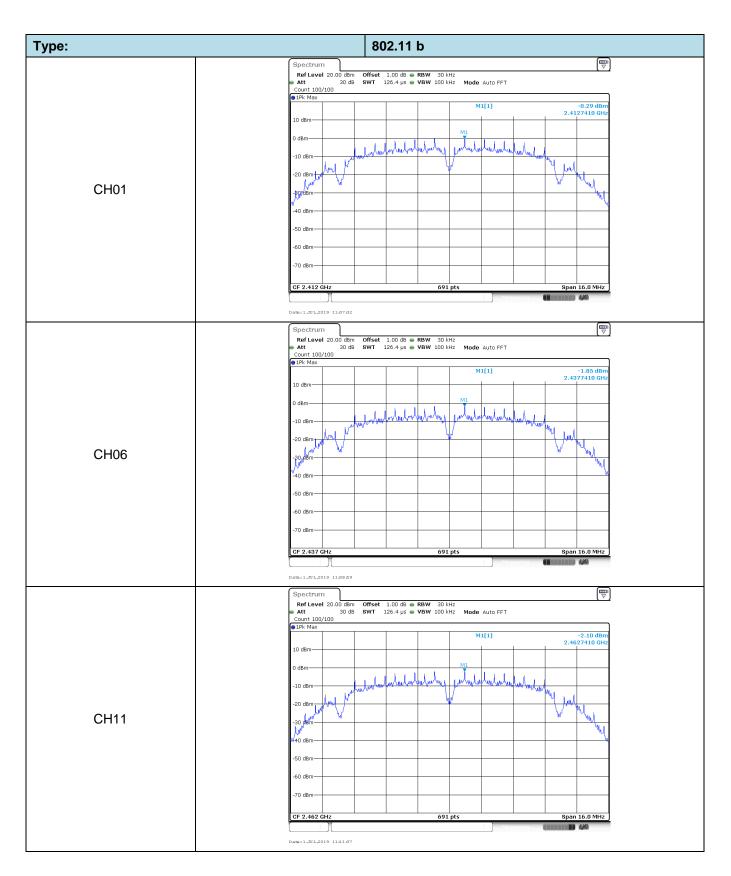
Please refer to the clause 3.3

TEST RESULTS

☑ Passed □ Not Applicable

Туре	Channel	Power Spectral Density (dBm/30KHz)	Limit (dBm/3KHz)	Result	
	01	-0.29			
802.11b	06	-1.85	≤8.00	Pass	
	11	-2.10			
	01	-8.47		Pass	
802.11g	06	-7.95	≤8.00		
	11	-8.39			
	01	-8.56			
802.11n(HT20)	06	-8.90	≤8.00	Pass	
	11	-9.59			

Test plot as follows:



Type: 802.11 g ₿ Spectrum Ref Level 20.00 dBm Att 30 dB Count 100/100 PIPk Max Offset 1.00 dB ● RBW 30 kHz SWT 189.6 µs ● VBW 100 kHz Mode Auto FFT M1[1] -8.47 df 2.4144960 G LO dBm) dBrr 10 dBmand a manufacture programme and a second and a second seco -20 dBm N CH01 30 dBm -40 dBm WW -50 dBm--60 dBm 70 dBm 691 pts CF 2.412 GH Sp 25.0 MHz **111** 44 Date:1.JUL.2019 11:15:08 ₽ Spectrum RefLevel 20.00 dBm Offset 1.00 dB ● RBW 30 kHz Att 30 dB SWT 189.6 µs ● VBW 100 kHz Mode Auto FFT Count 100/100 M1[1] -7.95 dE 2.4394960 G 10 dBm 0 dBm -10 dBm and the second NUMPON MMMMMMM -20 dBm ٩, CH06 -30 dBm -40 dBm mint -50 dBm -60 dBm 70 dBm-CF 2.437 GH 691 pts Span 25.0 MHz 1 14 Date:1.JUL.2019 11:17:06 Spectrum
 Ref Level
 20.00 dBm
 Offset
 1.00 dB
 RBW
 30 kHz

 Att
 30 dB
 SWT
 189.6 µs
 VBW
 100 kHz
 Mode
 Auto FFT
 Count 100/100 M1[1] -8.39 dB 2.4644960 GF 10 dBm-0 dBm -10 dBm and a second second second second second second 20 dBr CH11 30 dBm -40 dBmmp -50 dBm -60 dBm 70 dBm 691 pts Span 25.0 MHz CF 2.462 GH III 440 Date:1.JUL.2019 11:18:19

Type: 802.11n(HT20) ₿ Spectrum Ref Level 20.00 dBm Att 30 dB Count 100/100 Offset 1.00 dB ● RBW 30 kHz SWT 189.6 µs ● VBW 100 kHz Mode Auto FFT M1[1] -8.56 dt 2.4107340 G LO dBm) dBm Windown and the more thank 10 dBmmandanaranatanatan -20 dBm h CH01 30 dBm -49,d8p W/W 50 dBm 60 dBm 70 dBm 691 pts CF 2.412 GH Sp 25.0 MHz IIII 440 Date:1.JUL.2019 11:24:23 ₽ Spectrum RefLevel 20.00 dBm Offset 1.00 dB ● RBW 30 kHz Att 30 dB SWT 189.6 µs ● VBW 100 kHz Mode Auto FFT Count 100/100 M1[1] -8.90 dB 2.4357340 Gi 10 dBm 0 dBm undownorthologic and the state -10 dBm manyman 20 dBm h CH06 -30 dBm -40, dam MM -50 dBm -60 dBm 70 dBm-CF 2.437 GH 691 pts Span 25.0 MHz **III** 440 Date:1.JUL.2019 11:25:59 Spectrum
 Ref Level
 20.00 dBm
 Offset
 1.00 dB
 RBW
 30 kHz

 Att
 30 dB
 SWT
 189.6 µs
 VBW
 100 kHz
 Mode
 Auto FFT
 Count 100/100 M1[1] -9.59 dB 2.4669930 GF 10 dBm-0 dBm -10 dBm Manufally margal which may alway and a second which 20 dBm CH11 30 dBm -40 dBm MAN -50 dBm--60 dBm 70 dBm Span 25.0 MHz 691 pts CF 2.462 GH 111 1.446 Date:1.JUL.2019 11:30:09

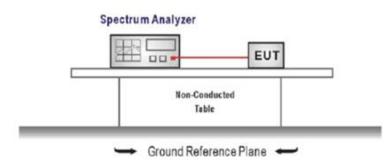
5.5. 6dB bandwidth

<u>LIMIT</u>

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.
- 2. 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

- Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter wave form 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:

Please refer to the clause 3.3

TEST RESULTS

⊠ Passed	Not Applicable				
Туре	Type Channel 6dB Bandwidth (MHz)		Limit (kHz)	Result	
	01	9.84			
802.11b	06	10.08	≥500	Pass	
	11	9.84			
	01	16.41			
802.11g	06	16.41	≥500	Pass	
	11	16.41			
	01	17.64			
802.11n(HT20)	06	17.64	≥500	Pass	
	11	17.64			

Test plot as follows:

Туре:	802.11 b
	Spectrum RefLevel 20.50 dBm Offset 1.00 dB ● RBW 100 kHz
	Att 30 dB SWT 75.9 µs ● VBW 300 kHz Mode Auto FFT Count 500/500 ●1Pk View M1[1] -6.11 dBm
	10 dBm M2[1] 2.4072000 GHz
	0 dBm 01 -5.471 dBm 2.4135000 GHz
	-20 dBm
01104	-30 dBm
CH01	-50 dBm
	-60 dBm
	-70 dBm
	CF 2.412 GHz 1001 pts Span 30.0 MHz Marker
	M1 1 2.4072 GHz -6.11 dBm M2 1 2.4135 GHz 0.53 dBm D3 M1 1 9.44 MHz 0.31 dB
	Date:1.JUL2019 11.97.17
	Spectrum Image: Constraint of the section of the sectio
	Count 500/500 P1Pk View
	10 dBm M1[1] -7-33 dBm 2.4319600 GHz -1.06 dBm
	0 dBm
	-10 dBm
	-30 dBm
CH06	-50 dBm
	-50 dBm
	-70 dBm
	CF 2.437 GHz 1001 pts Span 30.0 MHz Marker
	Type Ref Trc X-value Y-value Function Function Result M1 1 2.43196 GHz -7.33 dBm -7.33 dBm -7.33 dBm M2 1 2.4355 GHz -1.06 dBm - -
	D3 M1 1 10.09 MHz -0.14 dB </td
	Dam:1.201.2019 11.08:46
	Spectrum Ref Level 20.50 dBm Offset 1.00 dB RBW 100 kHz
	Att 30 dB SWT 75.9 µs ● VBW 300 kHz Mode Auto FFT Count 500/500 Original Subjects
	10 dBm M2[1] -8.05 dBm 2.4572000 GHz M2[1] -1.21 dBm
	0 dBm M1 M1M
	-10 dBm
	-30 dBm
CH11	Hallow when here have a first the second sec
	-50 dBm
	-70 dBm
	CF 2.462 GHz 1001 pts Span 30.0 MHz Marker
	Type Ref Trc X-value Y-value Function Function Result M1 1 2.4572 GHz -8.05 d8m M2 1 2.4635 GHz -1.21 d8m
	D3 M1 1 9.84 MHz 0.54 dB

Туре:	802.11 g
	Spectrum Image: Constraint of the sector of t
	Count 500/500
	-10 dBm - D1 -10 222 dBm
CH01	-50 dBm
	Of Ban Image: CF 2.412 GHz Image: CF 2.412 GHz Span 30.0 MHz Marker Image: CF 2.412 GHz Span 30.0 MHz Span 30.0 MHz Marker Image: CF 2.412 GHz Function Function Result M1 1 2.40381 GHz -10.30 dBm Function
	M2 1 2.40573 GHz -4.22 dBm D3 M1 1 16.41 MHz -1.07 dB
	Spectrum Image: Constraint of the sector of th
	In the second
01100	
CH06	-40 dbm
	•70 dBm Image: CF 2.437 GHz 1001 pts Span 30.0 MHz Marker Type Ref Trc X-value Function Function Result M1 1 2.42881 GHz -9.65 dBm Function Function Result
	M2 1 2.43073 GHz -3.41 dBm D3 M1 1 16.41 MHz -1.13 dB D3 M2 1 16.41 MHz -1.13 dB
	Spectrum Image: Constraint of the sector of t
	-10 dBm - 01 - 9.866 dBm ⁴ - 400 od 10 -
CH11	-50 dBm
	Type Ref Trc X-volue Function Function M1 1 2.45331 GHz -10.50 dbm -10.50 dbm -10.50 dbm
	M2 1 2.49301 d/m2 -0.50 d/m1 -0.90 d/m1 M2 1 2.4940 d/m2 -3.87 d/m1 -0.90 d/m1 D3 M1 1 16.41 MHz -0.86 d/m1 -0.90 d/m1 Dates:1.0UL2019 1117.60 M1 M1 -0.90 d/m1 M1

802.11n(HT20) Type: ₿ Spectrum Ref Level 20.50 dBm Att 30 dB Count 500/500 1Pk View Offset 1.00 dB ● RBW 100 kHz SWT 75.9 µs ● VBW 300 kHz Mode Auto FFT -10.21 dE 2.4031800 G -3.76 dE 2.4057300 G M1[1] LO dBm M2[1] dBm manth ۸. March 10 dBi 1 -9.76 -20 dBm -30 dBm Yn, CH01 HAD MEM At-wall -50 dBm 60 dBm 70 dBm CF 2.412 GHz 1001 pts Span 30.0 MHz X-value 2.40318 GHz 2.40573 GHz 17.64 MHz Type Ref Trc Function Function Result Y-value -10.21 dBr -10.21 dBm -3.76 dBm -0.52 dB M2 M1 Date:1.JUL.2019 11:23:51 ₽ Spectrum RefLevel 20.50 dBm Att 30 dB
 Offset
 1.00 dB ●
 RBW
 100 kHz

 SWT
 75.9 μs
 • VBW
 300 kHz
 Mode Auto FFT Count 500/500 -10.31 c 2.4281800 -3.82 c M1[1] 10 dBm-M2[1] .82 d 2.4394900 Gi 0 dBm T. 1 -9.81 10 dBm 20 dBm 30 dBm h CH06 40.d8mh 50 dBm 60 dBm 70 dBm CF 2.437 GH 1001 pt Span 30.0 MHz larke Type Ref Trc M1 1 X-value 2.42818 GHz 2.43949 GHz 17.64 MHz Y-value -10.31 dBm -3.82 dBm -0.56 dB Function Function Result M2 D3 М1 440 Date:1.JUL.2019 11:25.27 ♥ Spectrum
 Ref Level
 20.50 dBm
 Offset
 1.00 dB
 ■ RBW
 100 kHz

 Att
 30 dB
 SWT
 75.9 µs
 ■ VBW
 300 kHz
 Mode Auto FFT Count 500/500 M1[1] -11.18 dB 10 dBm M2[1] -4.62 dB 2.4644900 GI 0 dBm X 10 dBi 1 -10.6 -20 dBm 30 dBr CH11 -40 dBm-MM -50 dBm 60 dBm 70 dBm CF 2.46 Span 30.0 larke X-value 2.45318 GHz 2.46449 GHz 17.64 MHz
 Y-value
 Function

 -11.18 dBm
 -4.62 dBm

 -0.39 dB
 -0.39 dB
 Type Ref Trc Function Result М1 Date:1.JUL.2019 11:29:56

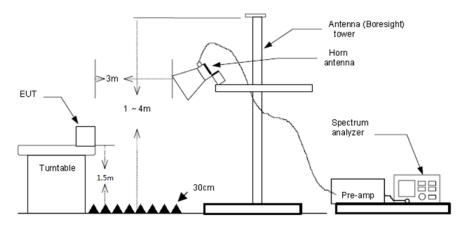
5.6. Restricted band

<u>LIMIT</u>

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 C63.10:2013 for compliance to FCC 47CFR 15.247 requirements.
- 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.
- 3) 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. This is 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 C63.10:2013 on radiated measurement.
- The receiver set as follow: RBW=1MHz, VBW=3MHz PEAK detector for Peak value. RBW=1MHz, VBW=3MHz RMS detector for Average value.

TEST MODE:

Please refer to the clause 3.3

TEST RESULTS

☑ Passed □ Not Applicable

Note:

1) Final level= Read level + Antenna Factor+ Cable Loss- Preamp Factor

802.11b					CH01	CH01			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
2310.00	15.09	28.05	7.73	0.00	50.87	74.00	-23.13	Vertical	Peak
2390.00	13.59	27.65	7.84	0.00	49.08	74.00	-24.92	Vertical	Peak
2310.00	14.17	28.05	7.73	0.00	49.95	74.00	-24.05	Horizontal	Peak
2390.00	14.26	27.65	7.84	0.00	49.75	74.00	-24.25	Horizontal	Peak
2310.00	11.08	28.05	7.73	0.00	46.86	54.00	-7.14	Vertical	Average
2390.00	10.63	27.65	7.84	0.00	46.12	54.00	-7.88	Vertical	Average
2310.00	11.05	28.05	7.73	0.00	46.83	54.00	-7.17	Horizontal	Average
2390.00	10.65	27.65	7.84	0.00	46.14	54.00	-7.86	Horizontal	Average

802.11b					CH11				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
2483.50	13.58	27.26	8.04	0.00	48.88	74.00	-25.12	Vertical	Peak
2500.00	13.38	27.20	8.08	0.00	48.66	74.00	-25.34	Vertical	Peak
2483.50	14.70	27.26	8.04	0.00	50.00	74.00	-24.00	Horizontal	Peak
2500.00	13.38	27.20	8.08	0.00	48.66	74.00	-25.34	Horizontal	Peak
2483.50	10.66	27.26	8.04	0.00	45.96	54.00	-8.04	Vertical	Average
2500.00	10.65	27.20	8.08	0.00	45.93	54.00	-8.07	Vertical	Average
2483.50	10.68	27.26	8.04	0.00	45.98	54.00	-8.02	Horizontal	Average
2500.00	10.62	27.20	8.08	0.00	45.90	54.00	-8.10	Horizontal	Average

802.11g					CH01				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
2310.00	13.43	28.05	7.73	0.00	49.21	74.00	-24.79	Vertical	Peak
2390.00	14.17	27.65	7.84	0.00	49.66	74.00	-24.34	Vertical	Peak
2310.00	14.28	28.05	7.73	0.00	50.06	74.00	-23.94	Horizontal	Peak
2390.00	13.77	27.65	7.84	0.00	49.26	74.00	-24.74	Horizontal	Peak
2310.00	11.06	28.05	7.73	0.00	46.84	54.00	-7.16	Vertical	Average
2390.00	10.72	27.65	7.84	0.00	46.21	54.00	-7.79	Vertical	Average
2310.00	11.06	28.05	7.73	0.00	46.84	54.00	-7.16	Horizontal	Average
2390.00	10.79	27.65	7.84	0.00	46.28	54.00	-7.72	Horizontal	Average

802.11g					CH11				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
2483.50	13.75	27.26	8.04	0.00	49.05	74.00	-24.95	Vertical	Peak
2500.00	13.98	27.20	8.08	0.00	49.26	74.00	-24.74	Vertical	Peak
2483.50	14.11	27.26	8.04	0.00	49.41	74.00	-24.59	Horizontal	Peak
2500.00	14.26	27.20	8.08	0.00	49.54	74.00	-24.46	Horizontal	Peak
2483.50	10.81	27.26	8.04	0.00	46.11	54.00	-7.89	Vertical	Average
2500.00	10.65	27.20	8.08	0.00	45.93	54.00	-8.07	Vertical	Average
2483.50	11.00	27.26	8.04	0.00	46.30	54.00	-7.70	Horizontal	Average
2500.00	10.69	27.20	8.08	0.00	45.97	54.00	-8.03	Horizontal	Average

802.11n(HT	20)				CH01				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
2310.00	14.54	28.05	7.73	0.00	50.32	74.00	-23.68	Vertical	Peak
2390.00	16.67	27.65	7.84	0.00	52.16	74.00	-21.84	Vertical	Peak
2310.00	13.86	28.05	7.73	0.00	49.64	74.00	-24.36	Horizontal	Peak
2390.00	17.89	27.65	7.84	0.00	53.38	74.00	-20.62	Horizontal	Peak
2310.00	11.06	28.05	7.73	0.00	46.84	54.00	-7.16	Vertical	Average
2390.00	13.88	27.65	7.84	0.00	49.37	54.00	-4.63	Vertical	Average
2310.00	11.06	28.05	7.73	0.00	46.84	54.00	-7.16	Horizontal	Average
2390.00	14.61	27.65	7.84	0.00	50.10	54.00	-3.90	Horizontal	Average

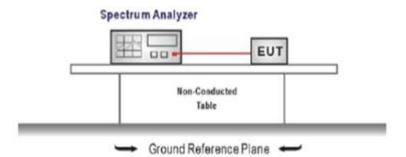
802.11n(HT	20)				CH11				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
2483.50	22.21	27.26	8.04	0.00	57.51	74.00	-16.49	Vertical	Peak
2500.00	14.42	27.20	8.08	0.00	49.70	74.00	-24.30	Vertical	Peak
2483.50	24.23	27.26	8.04	0.00	59.53	74.00	-14.47	Horizontal	Peak
2500.00	14.25	27.20	8.08	0.00	49.53	74.00	-24.47	Horizontal	Peak
2483.50	17.62	27.26	8.04	0.00	52.92	54.00	-1.08	Vertical	Average
2500.00	11.16	27.20	8.08	0.00	46.44	54.00	-7.56	Vertical	Average
2483.50	17.95	27.26	8.04	0.00	53.25	54.00	-0.75	Horizontal	Average
2500.00	11.40	27.20	8.08	0.00	46.68	54.00	-7.32	Horizontal	Average

5.7. Band edge and Spurious Emissions (conducted)

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 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 \ge 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: the channel found to contain the maximum PSD level can be used to establish the reference level. Emission level measurement

Emission level measurement
 Set the center frequency and span to encompass frequency range to be measured
 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 amplitude level.
 Place the radio in continuous transmit mode, allow the trace to stabilize view the transmit

- 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:

Please refer to the clause 3.3

TEST RESULTS

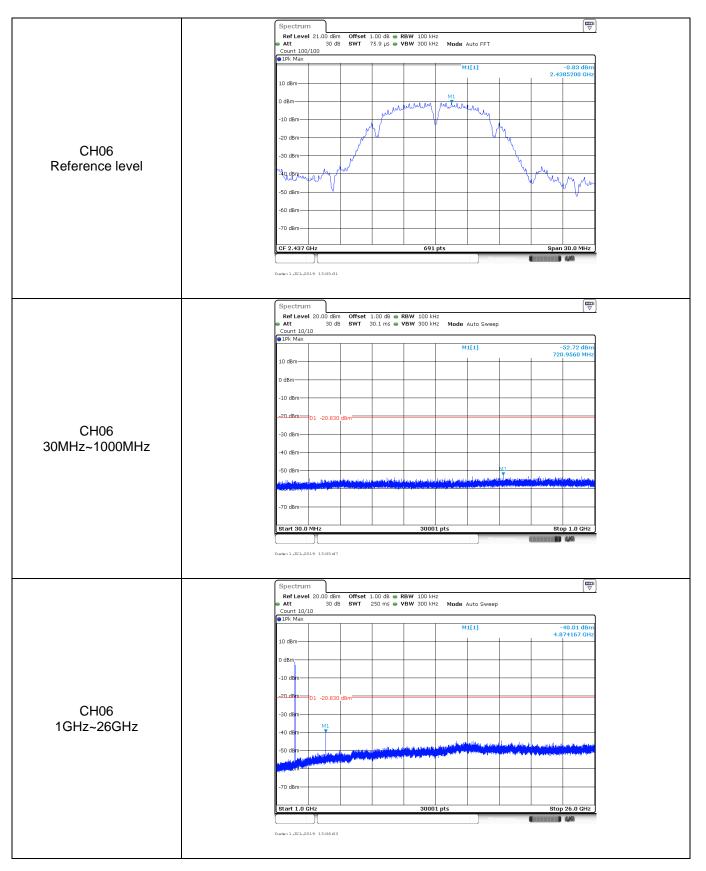
☑ Passed □ Not Applicable

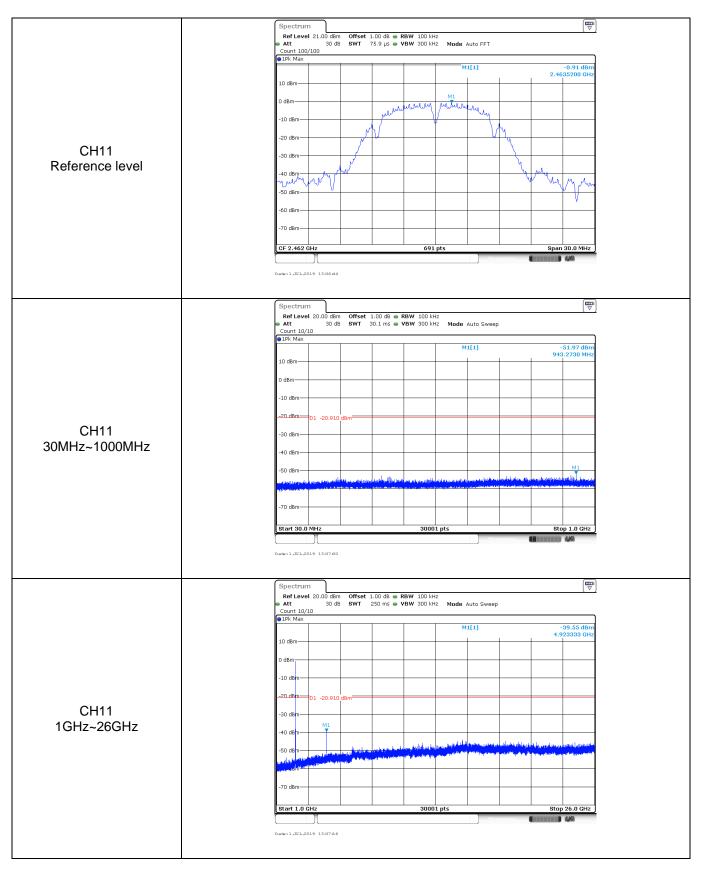
CH01	Test Item:	Bandedge	Туре:	802.11 b
CH01		RefLevel 20 Att	30 dB SWT 246.5 µs 👄 VBW 300 kHz Mode Auto FFT	
60, dem phone 60, dem phone<	CH01	PIPk Max 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm	M1[1] M2[1]	2113980 GHz 1439 dbm 24000 GHz
Ref Level 20.00 dlm Offset 1.00 dlle RBW 100 kHz Nt 30 dB SWT 113.8 µS VBW 300 kHz Mode Auto FFT Count 300/300 III -1.39 dBm 10 dBm M1[1] -1.39 dBm 10 dBm M1 M2[1] -55.43 dBm 2.4805090 GHz -10 dBm M2[1] -55.43 dBm -55.43 dBm -20.dBgm 01-21.390 dBm -10 dBm -10 dBm -30 dBm -1.21.90 dBm -1.21.90 dBm -1.21.90 dBm		4 -60,d8n -70 d8m Start 2.31 GH Marker Type Ref M1 M2 M3 M4 M5	Trc X-value Y-value Function 1 2.41398 GHz 0.45 dBm 1 1 2.4 GHz -41.63 dBm 1 1 2.39 GHz -55.11 dBm 1 2.31 GHz -57.77 dBm 1 2.399113 GHz -38.00 dBm	Stop 2.422 GHz
	CH11	Ref Level 20 ■ Att Count 300/301 ■ IPK Max 10 dBm -10 dBm -20 dBm -30 dBm	30 dB SWT 113.8 µs e VBW 300 kHz Mode Auto FFT M1113 M11 M12 -21.390 dBm -21.390 dBm	-1.39 dBm 2.4605090 GHz -55.43 dBm 2.4835000 GHz

CH01	Test Item:	Bandedge		Туре:		802	.11 g
CH01			Ref Level 20.00 dBm Of Att 30 dB SV			FT	
CH01		:	10 dBm				2.414460 GHz -36.33 dBm 2.400000 GHz
CH11			-20 dBm-D1 -24.060 dBm-			- W	war yelren y
CH11	CH01	4	-50 dBm		and water by all water	M3 WWW	
M1 1 2.4446 GHz 4.06 dBm M3 1 2.39 GHz 46.74 dBm M4 1 2.39 GHz 46.74 dBm M4 1 2.39 GHz 46.74 dBm M5 1 2.39 GHz 34.32 dBm Dete:1.0019 11805 Dete:1.00 GBm Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Attract dots motion Offset 1.00 dB RBW 100 kHz Attract dots motion Mathematication offset 1.00 dB RBW 100 kHz Attract dots motion Offset 1.00 dB RBW 100 kHz Attract dots motion Offset 1.00 dB RBW 100 kHz Attract dots motion Offset 1.00 dB RBW 100 kHz Attract dots motion Offset 1.00 dB RBW 100 kHz Attract dots motion Offset 1.00 dB RBW 100 kHz Attract dots motion RBW 100 kHz Attract dots motion RBW 10		<u>s</u>	Start 2.31 GHz Jarker				
CH11		-	M1 1 M2 1 M3 1 M4 1	2.41446 GHz 2.4 GHz 2.39 GHz 2.31 GHz	-4.06 dBm -36.33 dBm -46.74 dBm -58.29 dBm		
CH11 • IPk Max 10 dBm • IPk Max 10 dBm • dBm • dBm • dBm • 10 dBm • dBm • 10 dB			Spectrum Ref Level 20.00 dBm Of Att 30 dB SV			FT	
CH11		:	10 dBm				2.4644690 GHz -48.81 dBm
-60 dBm -70 dBm Start 2.452 GHz Marker Type [Ref Trc X-value Y-value Function Function Result	CH11		-20 dBm				
Start 2.452 GHz 691 pts Stop 2.5 GHz Marker Type Ref Trc X-value Y-value Function Function Result			-50 dBm		- VALPOD VUINNE	the standing of the standing o	handhimmed
Itppe Itc X-value Y-value Function Function Result M1 1 2.464460.01z -2.00.d0x - - - -		S	Start 2.452 GHz Jarker				
M1 1 2.449469 GH2 3.90 0 B/m M2 1 2.4493 GH2 4.81 0 B/m M3 1 2.5 GH2 57.52 0B/m M4 1 2.4936522 GH2 45.50 dB/m		-	M1 1 2 M2 1 M3 1	2.464469 GHz 2.4835 GHz 2.5 GHz	-3.90 dBm -48.81 dBm -57.52 dBm		

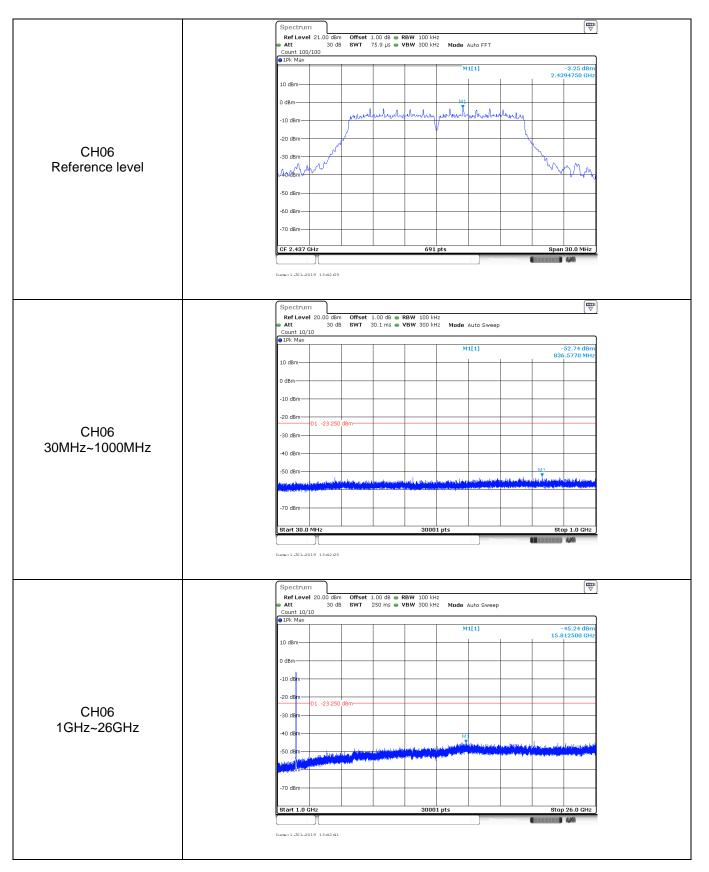
Test Item:	Bandedge	Туре:		802.11 n(HT20)
	👄 Att	evel 20.00 dBm Offset 1.00 dB - RBW 10 30 dB SWT 246.5 µs - VBW 30		
CH01	● 1Pk M 10 dBm 0 dBm- -10 dBr -20 dBr -30 dBr -40 dBr -50 dBr -50 dBr -70 dBr	D1 -23.570 dBm	M1[1] M2	-3.57 dBm 2.405710 GHz -36.86 dBm M1 2.400000 GHz
	Marker <u>Type</u> M1 M2 M3 M4 M5	Ref Trc X-value Y-valu	e Function F 7 dBm 5 dBm 5 dBm 6 dBm	
	👄 Att	evel 20.00 dBm Offset 1.00 dB ● RBW 10 30 dB SWT 113.8 μs ● VBW 30 300/300		
	10 dBm 0 dBm- -1 5rde r	halustral, dag urbahari dise bardang	M1[1] M2[1]	4-43 dBm 2-6644690 GHz -48.87 dBm 2-4835000 GHz
CH11	-20 dar -30 dar -40 dar -50 dar -60 dar	D1 -24.430 dBm	Manner with the work	Mark Mark where it
	Marker	.452 GHz (Ref Trc X-value Y-valu	591 pts	Stop 2.5 GHz
	M2 M3 M4	1 2.464469 GHz -4.4. 1 2.46335 GHz -48.6 1 2.5 GHz -57.8 1 2.4838609 GHz -46.0 1 2.4838609 GHz -46.0	7 dBm 4 dBm	Quantum 44

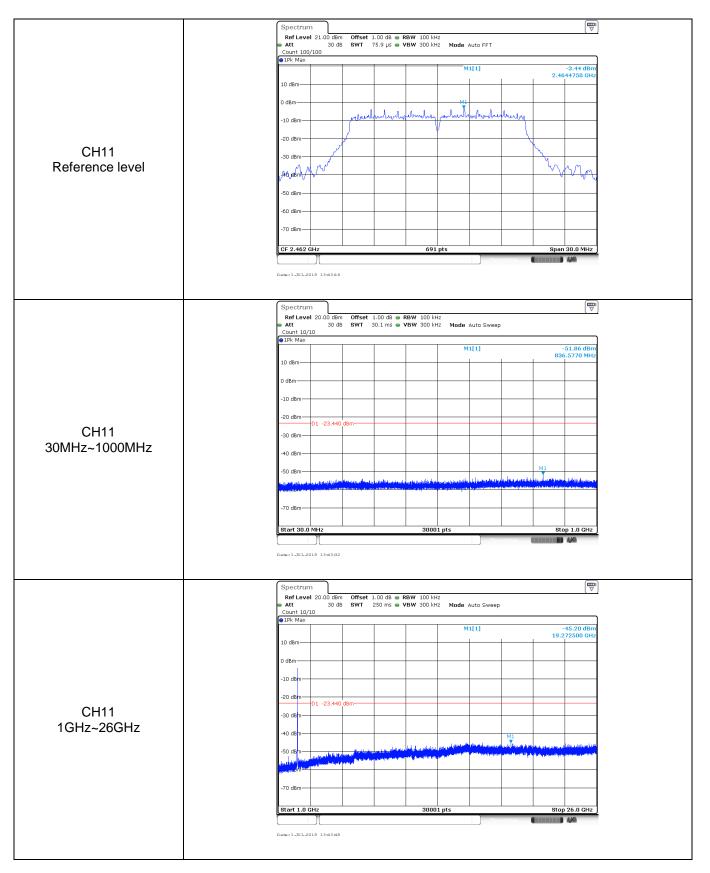
est Item:	SE	Туре:	802.11 b
		Spectrum	
		RefLevel 21.00 dB Offset 1.00 dB ■ RBW 100 kHz ■ Att 30 dB SWT 75.9 µs ■ VBW 300 kHz Mode Auto FFT Count 100/100	
		PIPk Max M1[1]	0.66 dBm
		10 dBm	2.4104800 GHz
		0 dBm	
		-10 dBm	
		-20 dBm	Щ <u>,</u>
CH01		-30 dBm	
Reference level		Mg all my high har	h my m
		-50 dBm	V my yru
		-60 dBm	
		-70 dBm	
		CF 2.412 GHz 691 pts	Span 30.0 MHz
		Date:1.JUL2019 13:33:11	
		Spectrum Ref Level 20.00 dBm Offset 1.00 dB • RBW 100 kHz	
		Att 30 dB SWT 30.1 ms VBW 300 kHz Mode Auto Sweep Count 10/10	
		Płk Max M1[1]	-53.30 dBm
		10 dBm	702.1390 MHz
		0 dBm	
		-10 dBm	
		-20 dBm-01 -19.340 dBm-	
CH01		-30 dBm	
30MHz~1000MHz		-40 dBm	
		-50 dBm	
		المانية الاستراك معارضة المتحد المتحدية المتحدرة في من مانية مناطقة علمين الارتباطية المتحدية المتحدية المتحدية و من من المحدية من المتحدية المحدية المتحدية المحدية المحدية المحدية المحدية المحدية المحدية المحدية المحدية الم و من من المحدية	ang
		-70 dBm	
		Start 30.0 MHz 30001 pts	Stop 1.0 GHz
		()	nina (111111) (j9)
		Date:1.JUL2019 13:3327	
		Spectrum	
		Ref Level 20:00 dBm Offset 1:00 dB RBW 100 kHz Att 30 dB SWT 250 ms VBW 300 kHz Mode Auto Sweep	(\)
CH01 1GHz~26GHz		Count 10/10	
		M1[1]	-40.52 dBm 4.823333 GHz
		10 dBm	
		0 dBm	
		-10 dBm	
		-20 dem 01 -19.340 dBm	
		-30 dBm	
		-40 dBm - Y	eliterite and the state of the lease of the second state of the
		-50 dBm	المروحة المروحة المروحة المروحة
		-70 dBm	
		Start 1.0 GHz 30001 pts	Stop 26.0 GHz
	1	Meas	uring
		Date:1.JUL2019 13:34:23	



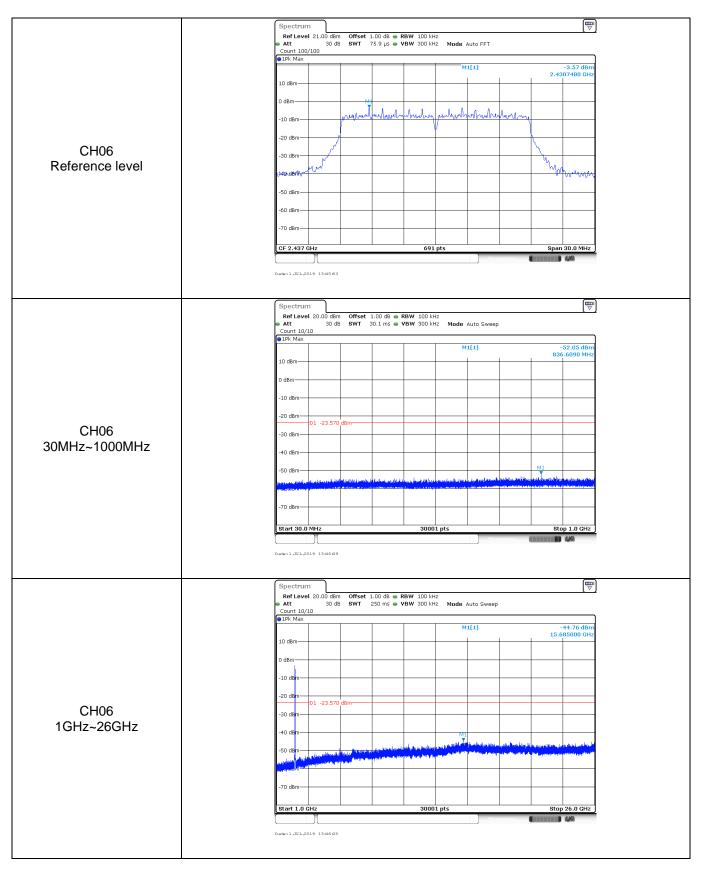


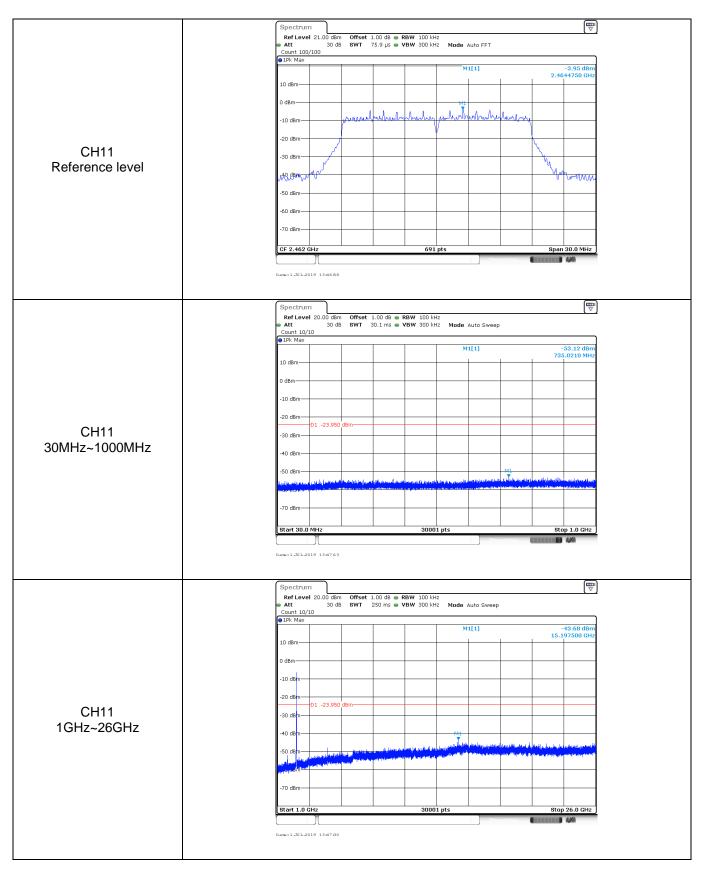
est Item:	SE	Туре: 802.11 g
		Spectrum Image: Constraint of the sector of th
		10 dBm
		-10 dam manual manua
		-20 dBm
CH01		-30 dBm
Reference level		Had the second sec
		-50 dBm-
		-60 dBm
		-70 dBm
		CF 2.412 GHz 691 pts Span 30.0 MH
		Datu:1.UL2019 133935
		Spectrum [€ Ref Level 20.00 dBm Offset 1.00 dB ● RBW 100 kHz
		Att 30 dB SWT 30.1 ms VBW 300 kHz Mode Auto Sweep Count 10/10
		PIk Max M1[1] -52.83 dE 803.0800 M
		10 dBm
		0 dBm
		-10 dBm
CH01		-20 dem 01 - 23.850 dem
30MHz~1000MHz		-30 UBIN
		-50 dBm
		-70 dBm
		Start 30.0 MHz 30001 pts Stop 1.0 GH
		Messuring
		Dam:1.JUL.2019 13:39:61
		Spectrum Image: Constraint of the section
		Count 10/10
		10 dBm 15.785000 G
		0 dBm
CH01 1GHz~26GHz		-10 dBm
		-20 dBm 01 -23 s90 dBm
		-30 dBm
		-SO dBm - A the state of the st
		Abit laour -
		-70 dBm
		Start 1.0 GHz 30001 pts Stop 26.0 GH
		Neasuring (





fest Item:	SE	Type: 802.11 n(HT20)
		Spectrum (100 kHz) Ref Level 21.00 dBm Offset 1.00 dB ● RBW 100 kHz
		 Att 30 dB SWT 75.9 μs ● VBW 300 kHz Mode Auto FFT Count 100/100 € FPK Max
		M1[1] -3.35 dBm 2.4057480 GHz
		10 dBm
		0 dem
		-10 dBm
CH01		-20 dBm
Reference level		-30 dBm - Wyman and - Wyman an
		-50 dBm-
		-60 dBm-
		-70 dBm
		CF 2.412 GHz 691 pts Span 30.0 MHz
		Dam:1.JUL2019 13:44:42
		Spectrum
		■ Att 30 dB SWT 30.1 ms ● VBW 300 kHz Mode Auto Sweep Count 10/10
		●1Pk Max
		10 dBm
		0 dBm
		-10 dBm
01104		-20 dBm
CH01 30MHz~1000MHz		-30 dBm-
301VINZ~10001VINZ		-40 dBm
		-50 dBm
		-70 dBm-
		Start 30.0 MHz 30001 pts Stop 1.0 GHz
		Data: 1.701.2019 13:44:58
		Spectrum 🕎
		RefLevel 20.00 dBm Offset 1.00 dB RBW 100 kHz att 30 dB SWT 250 ms VBW 300 kHz Mode Auto Sweep Count 10/10 Count 10/10 <td< td=""></td<>
		●1Pk Max M1[1] -45.20 dBm
		10 d8m
		0 dBm
		-10 defm
		-20 dEm
CH01		-30 dEm-
1GHz~26GHz		-40 dBm - Maintenantia and a second and a se
		-70 dBm-
		Start 1.0 GHz 30001 pts Stop 26.0 GHz
		Neasuring ((111111)) 🚧
		Date:1JUL2019 13%522





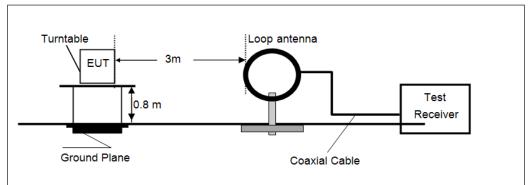
5.8. Spurious Emissions (radiated) <u>LIMIT</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.209

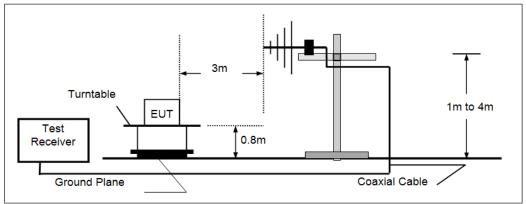
Frequency	Limit (dBuV/m @3m)	Value
30MHz-88MHz	40.00	Quasi-peak
88MHz-216MHz	43.50	Quasi-peak
216MHz-960MHz	46.00	Quasi-peak
960MHz-1GHz	54.00	Quasi-peak
Above 1GHz	54.00	Average
	74.00	Peak

TEST CONFIGURATION

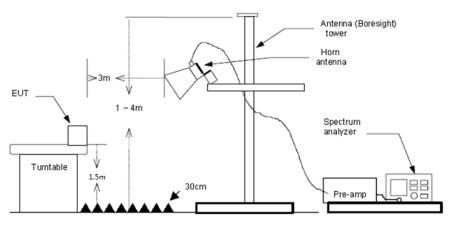
> 9kHz ~30MHz



> 30MHz ~ 1GHz



Above 1GHz



TEST PROCEDURE

- 1. The EUT was setup and tested according to ANSI C63.10:2013 for compliance to FCC 47CFR 15.247 requirements.
- 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
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) 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.
 - (3) From 1 GHz to 10th harmonic: RBW=1MHz, VBW=3MHz Peak detector for Peak value. RBW=1MHz, VBW=3MHz RMS detector for Average value.

TEST MODE:

Please refer to the clause 3.3

TEST RESULTS

☑ Passed □ Not Applicable

Note:

- 1) Final Level =Receiver Read level + Antenna Factor + Cable Loss Preamplifier Factor
- 2) The emission levels of other frequencies are very lower than the limit and not show in test report.

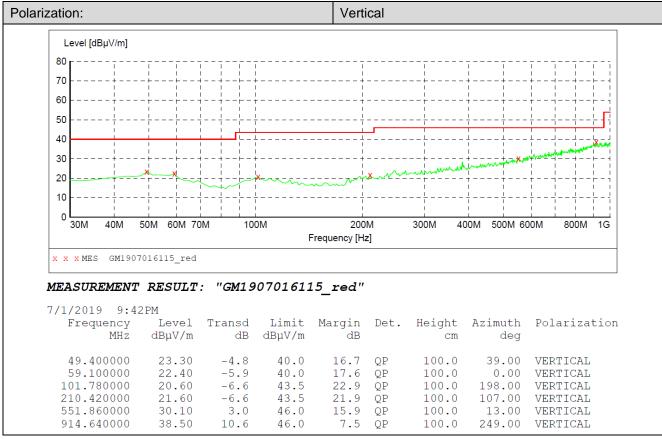
> 9kHz ~ 30MHz

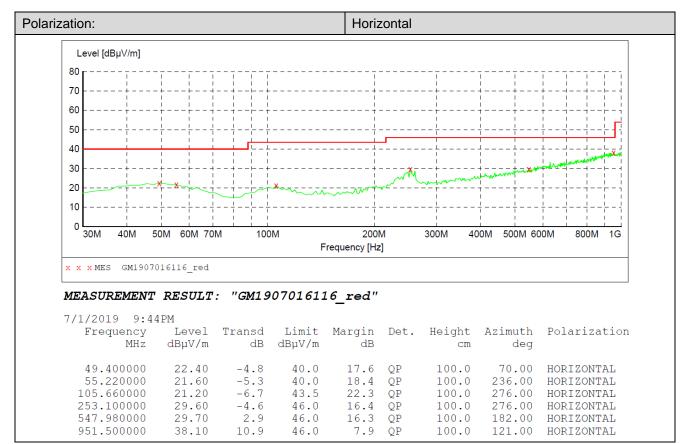
The EUT was pre-scanned the frequency band (9kHz~30MHz), found the radiated level lower than the limit, so don't show on the report.

➢ 30MHz ~1000MHz

Have pre-scan all modulation mode, found the 802.11b mode CH01 which it was worst case, so only the worst case's data on the test report.

> 30MHz ~ 1GHz





Shenzhen Huatongwei International Inspection Co., Ltd.

|--|

802.11b					CH01				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
3616.45	42.38	29.30	10.00	37.87	43.81	74.00	-30.19	Vertical	Peak
4821.76	34.49	31.56	11.73	36.25	41.53	74.00	-32.47	Vertical	Peak
7245.81	34.24	36.25	14.53	34.76	50.26	74.00	-23.74	Vertical	Peak
8703.29	31.63	37.89	15.95	34.64	50.83	74.00	-23.17	Vertical	Peak
3616.45	42.20	29.30	10.00	37.87	43.63	74.00	-30.37	Horizontal	Peak
4821.76	34.89	31.56	11.73	36.25	41.93	74.00	-32.07	Horizontal	Peak
7245.81	32.90	36.25	14.53	34.76	48.92	74.00	-25.08	Horizontal	Peak
8462.98	32.39	36.79	15.89	34.28	50.79	74.00	-23.21	Horizontal	Peak

802.11b					CH06				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
3653.46	41.17	29.30	9.99	37.93	42.53	74.00	-31.47	Vertical	Peak
4871.10	34.59	31.46	11.69	36.02	41.72	74.00	-32.28	Vertical	Peak
7319.96	33.17	36.30	14.58	34.77	49.28	74.00	-24.72	Vertical	Peak
8420.00	31.08	36.66	15.87	34.28	49.33	74.00	-24.67	Vertical	Peak
3653.46	41.58	29.30	9.99	37.93	42.94	74.00	-31.06	Horizontal	Peak
4871.10	36.42	31.46	11.69	36.02	43.55	74.00	-30.45	Horizontal	Peak
7319.96	33.40	36.30	14.58	34.77	49.51	74.00	-24.49	Horizontal	Peak
9088.19	31.72	38.16	16.00	35.47	50.41	74.00	-23.59	Horizontal	Peak

802.11b					CH11				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
3690.85	40.02	29.30	9.99	37.76	41.55	74.00	-32.45	Vertical	Peak
4920.96	34.64	31.42	11.72	35.82	41.96	74.00	-32.04	Vertical	Peak
8063.40	31.26	37.04	15.69	34.35	49.64	74.00	-24.36	Vertical	Peak
8747.72	31.57	37.80	15.97	34.72	50.62	74.00	-23.38	Vertical	Peak
3690.85	39.07	29.30	9.99	37.76	40.60	74.00	-33.40	Horizontal	Peak
4920.96	36.70	31.42	11.72	35.82	44.02	74.00	-29.98	Horizontal	Peak
7394.88	31.34	36.30	14.73	34.68	47.69	74.00	-26.31	Horizontal	Peak
8637.08	31.30	37.52	15.94	34.52	50.24	74.00	-23.76	Horizontal	Peak

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

2. The peak level is lower than average limit(54 dBuV/m), this data is the too weak instrument of signal is unable to test.

3. The emission levels of other frequencies(test frequency band is 1GHz to 25GHz) are very lower than the limit and not show in test report.

802.11g					CH01				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
1732.97	37.23	25.27	6.61	37.91	31.20	74.00	-42.80	Vertical	Peak
3616.45	39.90	29.30	10.00	37.87	41.33	74.00	-32.67	Vertical	Peak
5271.06	31.74	31.36	12.25	35.00	40.35	74.00	-33.65	Vertical	Peak
10860.83	31.25	40.46	16.38	37.03	51.06	74.00	-22.94	Vertical	Peak
3616.45	41.51	29.30	10.00	37.87	42.94	74.00	-31.06	Horizontal	Peak
5230.96	31.28	31.44	12.14	34.77	40.09	74.00	-33.91	Horizontal	Peak
7245.81	30.88	36.25	14.53	34.76	46.90	74.00	-27.10	Horizontal	Peak
8615.13	31.63	37.39	15.93	34.48	50.47	74.00	-23.53	Horizontal	Peak

802.11g					CH06				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
3653.46	39.78	29.30	9.99	37.93	41.14	74.00	-32.86	Vertical	Peak
5099.49	31.99	31.90	12.03	35.13	40.79	74.00	-33.21	Vertical	Peak
7045.74	30.89	35.44	14.50	34.65	46.18	74.00	-27.82	Vertical	Peak
8527.85	31.88	37.01	15.91	34.32	50.48	74.00	-23.52	Vertical	Peak
3216.84	34.76	28.70	9.48	37.38	35.56	74.00	-38.44	Horizontal	Peak
3653.46	40.21	29.30	9.99	37.93	41.57	74.00	-32.43	Horizontal	Peak
7227.39	31.00	36.23	14.53	34.75	47.01	74.00	-26.99	Horizontal	Peak
8104.56	31.41	36.99	15.67	34.33	49.74	74.00	-24.26	Horizontal	Peak

802.11g					CH11				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
3700.26	39.31	29.30	9.99	37.70	40.90	74.00	-33.10	Vertical	Peak
5086.52	31.67	31.85	12.03	35.19	40.36	74.00	-33.64	Vertical	Peak
8681.17	31.23	37.79	15.95	34.60	50.37	74.00	-23.63	Vertical	Peak
10888.51	30.92	40.56	16.37	37.03	50.82	74.00	-23.18	Vertical	Peak
2775.30	32.57	28.10	8.86	34.78	34.75	74.00	-39.25	Horizontal	Peak
3690.85	39.22	29.30	9.99	37.76	40.75	74.00	-33.25	Horizontal	Peak
5112.49	30.90	31.85	12.04	35.07	39.72	74.00	-34.28	Horizontal	Peak
8571.38	32.08	37.19	15.92	34.40	50.79	74.00	-23.21	Horizontal	Peak

Remark:

- 1. Final Level = Receiver Read level + Antenna Factor + Cable Loss Preamplifier Factor
- 2. The peak level is lower than average limit(54 dBuV/m), this data is the too weak instrument of signal is unable to test.
- 3. The emission levels of other frequencies(test frequency band is 1GHz to 25GHz) are very lower than the limit and not show in test report.

802.11n(HT	20)				CH01				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
3208.66	35.46	28.75	9.46	37.34	36.33	74.00	-37.67	Vertical	Peak
3616.45	40.18	29.30	10.00	37.87	41.61	74.00	-32.39	Vertical	Peak
7245.81	32.20	36.25	14.53	34.76	48.22	74.00	-25.78	Vertical	Peak
10348.05	32.00	39.47	16.44	37.17	50.74	74.00	-23.26	Vertical	Peak
3200.50	34.54	28.80	9.44	37.40	35.38	74.00	-38.62	Horizontal	Peak
3616.45	40.42	29.30	10.00	37.87	41.85	74.00	-32.15	Horizontal	Peak
7245.81	32.37	36.25	14.53	34.76	48.39	74.00	-25.61	Horizontal	Peak
9909.80	32.26	39.10	16.37	37.19	50.54	74.00	-23.46	Horizontal	Peak

802.11n(HT	20)				CH06				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
2846.85	34.65	28.29	8.90	36.09	35.75	74.00	-38.25	Vertical	Peak
3653.46	39.30	29.30	9.99	37.93	40.66	74.00	-33.34	Vertical	Peak
6833.77	31.50	34.24	13.96	34.78	44.92	74.00	-29.08	Vertical	Peak
9251.58	31.22	38.91	15.93	36.03	50.03	74.00	-23.97	Vertical	Peak
3653.46	40.13	29.30	9.99	37.93	41.49	74.00	-32.51	Horizontal	Peak
6094.14	31.82	32.50	13.48	35.28	42.52	74.00	-31.48	Horizontal	Peak
7190.69	30.91	36.14	14.52	34.73	46.84	74.00	-27.16	Horizontal	Peak
8615.13	31.89	37.39	15.93	34.48	50.73	74.00	-23.27	Horizontal	Peak

802.11n(HT	20)				CH11				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
3690.85	39.43	29.30	9.99	37.76	40.96	74.00	-33.04	Vertical	Peak
5112.49	31.61	31.85	12.04	35.07	40.43	74.00	-33.57	Vertical	Peak
7027.82	30.89	35.38	14.49	34.64	46.12	74.00	-27.88	Vertical	Peak
9784.47	32.02	39.10	16.21	37.09	50.24	74.00	-23.76	Vertical	Peak
3700.26	39.65	29.30	9.99	37.70	41.24	74.00	-32.76	Horizontal	Peak
7190.69	30.67	36.14	14.52	34.73	46.60	74.00	-27.40	Horizontal	Peak
8593.22	31.25	37.27	15.92	34.44	50.00	74.00	-24.00	Horizontal	Peak
10860.83	30.89	40.46	16.38	37.03	50.70	74.00	-23.30	Horizontal	Peak

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

2. The peak level is lower than average limit(54 dBuV/m), this data is the too weak instrument of signal is unable to test.

3. The emission levels of other frequencies(test frequency band is 1GHz to 25GHz) are very lower than the limit and not show in test report.

6. TEST SETUP PHOTOS

Conducted Emissions (AC Mains)

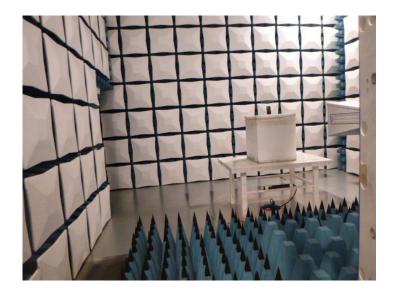


Radiated Emissions





Shenzhen Huatongwei International Inspection Co., Ltd.



7. EXTERANAL AND INTERNAL PHOTOS

Reference to the test report No. CHTEW19070023

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