

CTC Laboratories, Inc.

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Т	EST REPORT		
Report No	CTC20210133E15		
FCC ID······:	XUJPADVII		
Applicant:	LAUNCH TECH CO., LTD		
Address	Launch Industrial Park, North of Wuhe Longgang, Shenzhen, Guangdong, P.		
Manufacturer	LAUNCH TECH CO., LTD		
Address	Launch Industrial Park, North of Wuhe Longgang, Shenzhen, Guangdong, P.		
Product Name·····:	Automotive Diagnosis Tool, Automodiagnostic tools	otive intelligent	
Trade Mark······:	LAUNCH		
Model/Type reference······:	X-431 PAD VII		
Listed Model(s) ······	X-431 Throttle III		
Standard:	FCC CFR Title 47 Part 15 Subpart C Section 15.247		
Date of receipt of test sample:	Feb. 03, 2021		
Date of testing	Feb. 04, 2021 ~ Mar. 28, 2021		
Date of issue:	Mar. 29, 2021		
Result:	PASS		
Compiled by: (Printed name+signature)	Terry Su	Terry Su	
Supervised by: (Printed name+signature)	Miller Ma	Terry Su Miller Ma	
Approved by:			
(Printed name+signature)	Walter Chen Watter Chen		
Testing Laboratory Name:	: CTC Laboratories, Inc.		
Address	1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park, Shenzhen, Guangdong, China		
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1. TEST SUMMARY

1.1. Test Standards

The tests were performed according to following standards:

FCC Rules Part 15.247: Operation within the bands of 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz.

<u>RSS 247 Issue 2:</u> Standard Specifications for Frequency Hopping Systems (FHSs) and Digital Transmission Systems (DTSs) Operating in the Bands 902-928MHz, 2400-2483.5MHz and 5725-5850MHz.

ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.

1.2. Report version

Revised No.	Date of issue	Description
01	Mar. 29, 2021	Original



1.3. Test Description

FCC Part 15 Subpart C (15.247) / RSS 247 Issue 2					
Test Item	Standard Section		Result	Test	
rest nem	FCC	IC	Result	Engineer	
Antenna Requirement	15.203	/	Pass	Rod Luo	
Conducted Emission	15.207	RSS-Gen 8.8	Pass	Eva Feng	
Radiated Band Edge and Spurious Emissions	15.205&15.209& 15.247(d)	RSS 247 5.5	Pass	Rod Luo	
Conducted Band Edge and Spurious Emissions	15.247(d)	RSS 247 5.5	Pass	Rod Luo	
6dB Bandwidth	15.247(a)(2)	RSS 247 5.2 (a)	Pass	Rod Luo	
Conducted Max Output Power	15.247(b)(3)	RSS 247 5.4 (d)	Pass	Rod Luo	
Power Spectral Density	15.247(e)	RSS 247 5.2 (b)	Pass	Rod Luo	
Transmitter Radiated Spurious	15.209&15.247(d)	RSS 247 5.5& RSS-Gen 8.9	Pass	Rod Luo	

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



1.4. Test Facility

CTC Laboratories, Inc.

Add: 1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park, Shenzhen, Guangdong, China

Laboratory accreditation

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L5365

CTC Laboratories, Inc. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation. Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025:2017 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA-Lab Cert. No.: 4340.01

CTC Laboratories, Inc. 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 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

Industry Canada (Registration No.: 9783A, CAB Identifier: CN0029)

CTC Laboratories, Inc. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 9783A on Jan, 2016.

FCC (Registration No.: 951311, Designation Number CN1208)

CTC Laboratories, Inc. 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 inour files. Registration 951311, Aug 26, 2017.

1.5. Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. 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 radio equipment characteristics; Part 2" 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 CTC Laboratories, Inc. quality system acc. to DIN EN 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.

Below is the best measurement capability for CTC Laboratories, Inc.



Test Items	Measurement Uncertainty	Notes
Transmitter power conducted	0.42 dB	(1)
Transmitter power Radiated	2.14 dB	(1)
Conducted spurious emissions 9kHz~40GHz	1.60 dB	(1)
Radiated spurious emissions 9kHz~40GHz	2.20 dB	(1)
Conducted Emissions 9kHz~30MHz	3.08 dB	(1)
Radiated Emissions 30~1000MHz	4.51 dB	(1)
Radiated Emissions 1~18GHz	5.84 dB	(1)
Radiated Emissions 18~40GHz	6.12 dB	(1)
Occupied Bandwidth		(1)

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

1.6. Environmental conditions

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

Temperature:	21°C ~ 27°C
Relative Humidity:	40% ~ 60%
Air Pressure:	101kPa



2. GENERAL INFORMATION

2.1. Client Information

Applicant:	LAUNCH TECH CO., LTD
Address:	Launch Industrial Park, North of Wuhe Avenue, Banxuegang, Longgang, Shenzhen, Guangdong, P.R. China
Manufacturer:	LAUNCH TECH CO., LTD
Address:	Launch Industrial Park, North of Wuhe Avenue, Banxuegang, Longgang, Shenzhen, Guangdong, P.R. China

2.2. General Description of EUT

Product Name:	Automotive Diagnosis Tool, Automotive intelligent diagnostic tools	
Trade Mark:	LAUNCH	
Model/Type reference:	X-431 PAD VII	
Listed Model(s):	X-431 Throttle III	
Mode different:	All these models are identical in the same PCB, layout and electrical circuit, the only difference is product name and model name.	
Power supply:	12Vdc/4A from AC/DC Adapter 7.6Vdc from 9400mAh Li-ion Battery	
Adapter 1 Model:	FJ-SW20171204000D Input:100-240V~ 50/60Hz 1.5A Max Output: 12Vdc/4A	
Adapter 2 Model:	PSY1204000 Input:100-240V~ 50/60Hz 1.3A Output: 12Vdc/4A	
Hardware version:	PL280_V2.0	
Software version:	V1.0.5.20210323	
WIFI 802.11b/ g/ n(HT20)/ n(HT40)	
Modulation:	802.11b: DSSS(CCK, DQPSK, DBPSK) 802.11g/n: OFDM(BPSK, QPSK, 16QAM, 64QAM)	
Operation frequency:	802.11b/g/n(HT20): 2412MHz~2462MHz 802.11n(HT40): 2422MHz~2452MHz	
Channel number:	802.11b/g/n(HT20):11channels 802.11n(HT40):7channels	
Channel separation:	5MHz	
Antenna type:	FPC Antenna	
Antenna gain:	4.98dBi Max	



2.3. Accessory Equipment information

Equipment Information				
Name	Model	S/N	Manufacturer	
1	1	1	1	
1	1	1	1	
Cable Information				
Name	Shielded Type	Ferrite Core	Length	
1	1	1	1	
Test Software Information				
Name	1	1	1	
Engineering mode	1	1	1	



2.4. Operation state

Operation Frequency List: The EUT has been tested under typical operating condition. The Applicant provides communication tools software to control the EUT for staying in continuous transmitting and receiving mode for testing.

Operation Frequency List:

Channel	Frequency (MHz)
01	2412
02	2417
03	2422
04	2427
05	2432
06	2437
07	2442
08	2447
09	2452
10	2457
11	2462

Note: CH 01~CH 11 for 802.11b/g/n(HT20), CH 03~CH 09 for 802.11n(HT40)

Data Rated

Preliminary tests were performed in different data rate, and found which the below bit rate is worst case mode, so only show data which it is a worst case mode.

Mode	Data rate (worst mode)
802.11b	1Mbps
802.11g	6Mbps
802.11n(HT20)	HT-MCS0
802.11n(HT40)	HT-MCS0

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 test item:

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.



2.5. Measurement Instruments List

Tonsce	Tonscend JS0806-2 Test system				
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	Spectrum Analyzer	Rohde & Schwarz	FSU26	100105	Dec. 25, 2021
2	Spectrum Analyzer	Rohde & Schwarz	FUV40-N	101331	Mar. 15, 2021
3	MXG Vector Signal Generator	Agilent	N5182A	MY47420864	Dec. 25, 2021
4	Signal Generator	Agilent	E8257D	MY46521908	Dec. 25, 2021
5	Power Sensor	Agilent	U2021XA	MY5365004	Dec. 25, 2021
6	Power Sensor	Agilent	U2021XA	MY5365006	Dec. 25, 2021
7	Simultaneous Sampling DAQ	Agilent	U2531A	TW54493510	Dec. 25, 2021
8	Climate Chamber	TABAI	PR-4G	A8708055	Dec. 25, 2021
9	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	116410	Dec. 25, 2021
10	Climate Chamber	ESPEC	MT3065	/	Dec. 25, 2021
11	300328 v2.2.2 test system	TONSCEND	v2.6	1	/

Radiate	d Emission and Transmi	tter spurious emissior	IS		
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	EMI Test Receiver	Rohde & Schwarz	ESCI	100658	Dec. 25, 2021
2	High pass filter	micro-tranics	HPM50111	142	Dec. 25, 2021
3	Log-Bicon Antenna	Schwarzbeck	CBL6141A	4180	Dec. 25, 2021
4	Ultra-Broadband Antenna	ShwarzBeck	BBHA9170	25841	Dec. 25, 2021
5	Loop Antenna	LAPLAC	RF300	9138	Dec. 25, 2021
6	Spectrum Analyzer	Rohde & Schwarz	FSU26	100105	Dec. 25, 2021
7	Horn Antenna	Schwarzbeck	BBHA 9120D	647	Dec. 25, 2021
8	Pre-Amplifier	HP	8447D	1937A03050	Dec. 25, 2021
9	Pre-Amplifier	EMCI	EMC051835	980075	Dec. 25, 2021
10	Antenna Mast	UC	UC3000	N/A	N/A
11	Turn Table	UC	UC3000	N/A	N/A
12	Cable Below 1GHz	Schwarzbeck	AK9515E	33155	Dec. 25, 2021
13	Cable Above 1GHz	Hubersuhner	SUCOFLEX 102	DA1580	Dec. 25, 2021
14	Splitter	Mini-Circuit	ZAPD-4	400059	Dec. 25, 2021
15	RF Connection Cable	HUBER+SUHNER	RE-7-FL	N/A	Dec. 25, 2021
16	RF Connection Cable	Chengdu E-Microwave			Dec. 25, 2021
17	High pass filter	Compliance	BSU-6	34202	Dec. 25, 2021

CTC Laboratories, Inc.

中国国家认证认可监督管理委员会 EN

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		Direction systems			
18	Attenuator	Chengdu E-Microwave	EMCAXX-10 RNZ-3		Dec. 25, 2021
19	High and low temperature box	ESPEC	MT3065	12114019	Dec. 25, 2021

Conduc	Conducted Emission										
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until						
1	LISN	R&S	ENV216	101112	Dec. 25, 2021						
2	LISN	R&S	ENV216	101113	Dec. 25, 2021						
3	EMI Test Receiver	R&S	ESCI	100658	Dec. 25, 2021						

Note:1. The Cal. Interval was one year.

2. The cable loss has calculated in test result which connection between each test instruments.



3. TEST ITEM AND RESULTS

3.1. Conducted Emission

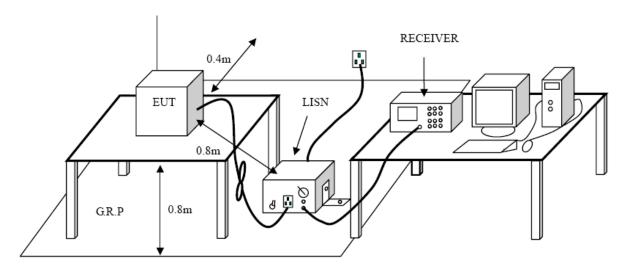
<u>Limit</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.207/ RSS - Gen 8.8:

Eroquonov rongo (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.

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.

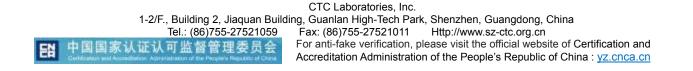
3. The EUT and simulators are connected to the main power through a line impedances stabilization network (LISN). The LISN provides a 50ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)

4. 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.

5. 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.

6. Conducted Emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.

7. During the above scans, the emissions were maximized by cable manipulation.

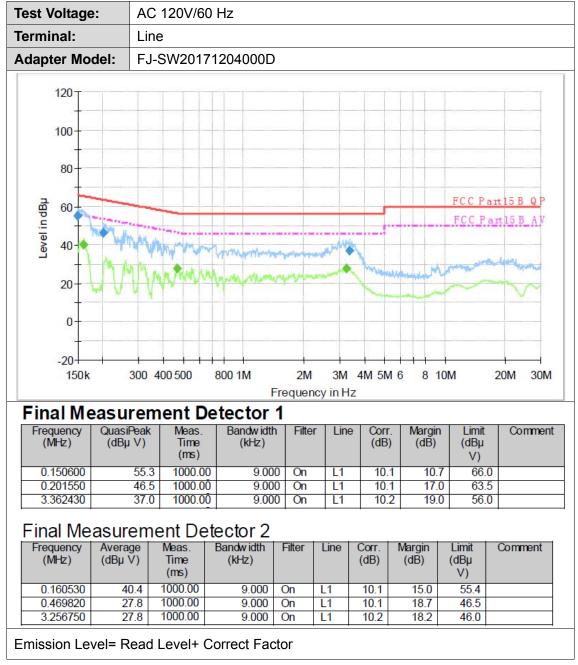




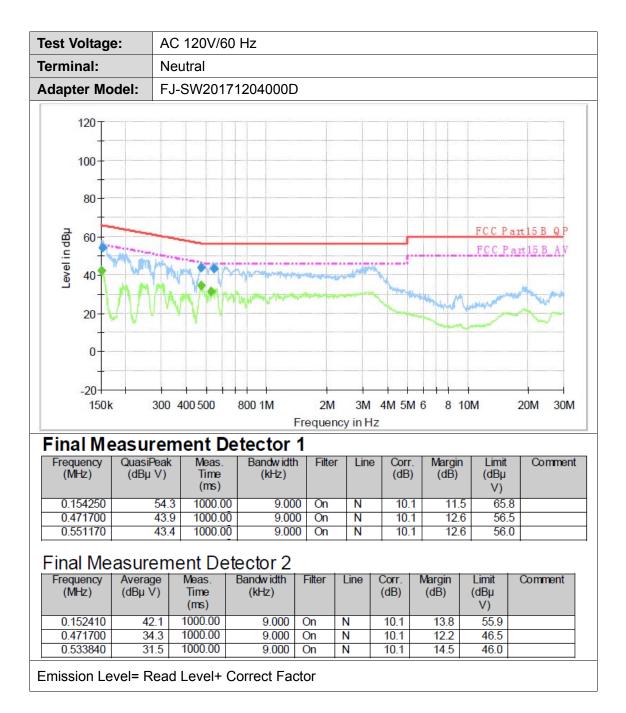
Test Mode:

Please refer to the clause 2.4.

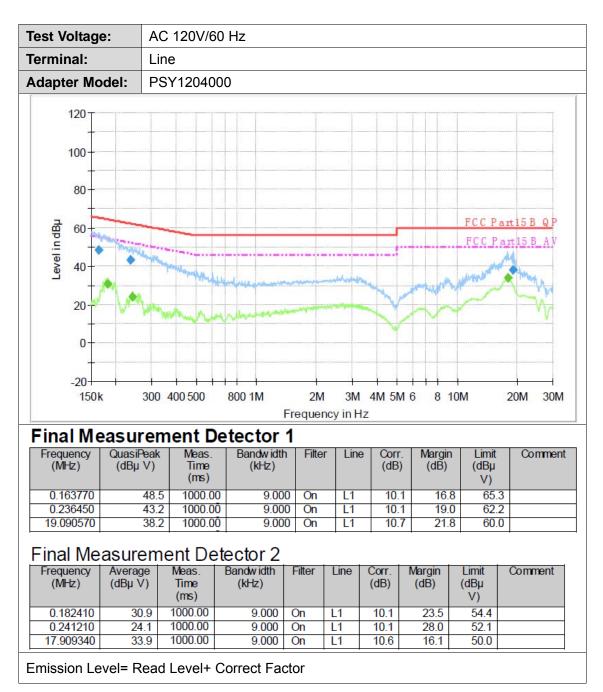
Test Results



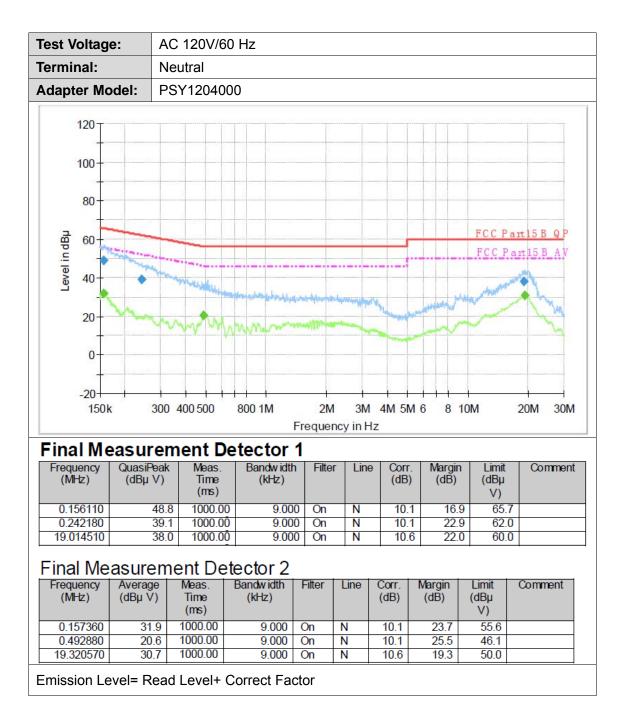














3.2. Radiated Emission

<u>Limit</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.209/ RSS – Gen 8.9:

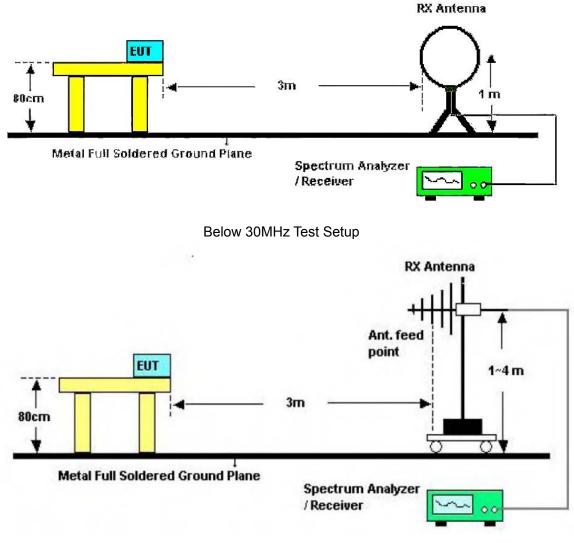
Frequency	Limit (dBuV/m @3m)	Value
30 MHz ~ 88 MHz	40.00	Quasi-peak
88 MHz ~ 216 MHz	43.50	Quasi-peak
216 MHz ~ 960 MHz	46.00	Quasi-peak
960 MHz ~ 1 GHz	54.00	Quasi-peak
Above 1 GHz	54.00	Average
Above i Grz	74.00	Peak

Note:

(1) The tighter limit applies at the band edges.

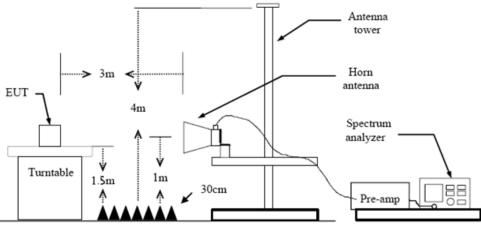
(2) Emission Level (dBuV/m)=20log Emission Level (uV/m).

Test Configuration



Below 1000MHz Test Setup





Above 1GHz Test Setup

Test Procedure

1. The EUT was setup and tested according to ANSI C63.10:2013

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.

The EUT was set 3 meters from the receiving antenna, which was mounted on the top of a variable 3. 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.

Set to the maximum power setting and enable the EUT transmit continuously. 5.

- Use the following spectrum analyzer settings 6.
- (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≥1/T Peak detector for Average value.

Note 1: For the 1/T& Duty Cycle please refer to clause 3.8 Duty Cycle.

Test Mode

Please refer to the clause 2.4.

Test Result

9 KHz~30 MHz

From 9 KHz to 30 MHz: Conclusion: PASS

Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.



Ant. Po	DI.		110	ΠZC	onta	al														
Test Mo	ode:		80	2.1′	1b I	Mo	de	241	I2M⊦	łz										
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30.000 No.	Free (N 18 23	quer //Hz 3.20	ncy) 05 85		80 Fa (dE -1	acto B/m 9.5	or n) 52 85	F (Read (dBu 36.4	ing ∨) 10	(dE 1 1	BuV/ 16.88	l m) 3	Li (dBr 4: 4	mit uV/m 3.50) M	larg (dB 26.6	jin) 62 69	De	etecto QP
30.000 No. 1 2	Free (N 18: 23: 31:	quer //Hz 3.20 0.09	ncy) 05 85 69		80 Fa (dE -1) -1)	acto 3/m 9.5 9.8	or n) 52 85 42	F (Read (dBu 36.4 39.1	ing ∨) 0 6	(dE 1 1 3	BuV/ 16.88 19.31	 m) 3 9	Li (dB) 4: 4(mit uV/m 3.50 6.00) M 	larg (dB 26.6	jin) 62 69	De	etecto QP QP
30.000 No. 1 2 3	Free (N 183 230 319 583	quer //Hz 3.20 0.09 9.93	ncy) 05 85 69 24		80 Fa (dE -1) -1) -1)	acto 3/m 9.5 9.8 7.4	or m) 52 85 42 53	F (Read (dBu 36.4 39.1 52.5	ing V) 10 16 51	(dE 1 3 3	BuV/ 16.88 19.31 35.09	 m) 3 1 9	Li (dB) 4: 4: 4: 4: 4: 4:	mit uV/m 3.50 6.00 6.00) M 	larg (dB 26.6 26.6	jin) 62 69 91 37	De	etecto QP QP QP

Remarks:



Ant. Po	Ι.	Ve	rtical						
Test Mo	de:	80	2.11b	Mode	2412MHz				
Remark		Or	ily wor	rse cas	se is reported	d			
90.0 dBu	V/m							FCC Part15 Clas	
40	40							5	
ummAU	Magaleradory	appenninged	hum	intered Vittlen	whiteman	- and her and the second		Manalur lindu de la	hand the desired
-10 30.000	аницин Мацин Али 40 50	lift for well and a	70 80	and south for the south	(MHz)	- alexandrow		500 600 700	1.000.000
-10		60 ency	70 80	actor B/m)		Level		500 600 700 Margin	Detector
-10	40 50	ency	70 80 Fa	actor	(MHz)	Level	00 400 !	500 600 700 Margin	
-10 30.000 No.	40 50 Freque (MH	ency z)	70 80 Fa (dl	actor B/m)	(MH₂) Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	500 600 700 Margin) (dB)	Detector
-10 30.000 No.	40 50 Freque (MH 166.6	60 ency z) 5514 808	70 80 Fa (dl -1 -1	actor B/m) 18.17	(мн₂) Reading (dBuV) 34.25	Level (dBuV/m) 16.08	Limit (dBuV/m) 43.50	Margin (dB) -27.42	Detector QP
-10 30.000 No. 1 2	40 50 Freque (MH 166.6 315.4	60 ency (z) (514 (808) (817)	70 80 Fa (di -1 -1 -1	actor B/m) 18.17 17.51	(мн₂) Reading (dBuV) 34.25 42.01	Level (dBuV/m) 16.08 24.50	Limit (dBuV/m) 43.50 46.00	Margin (dB) -27.42 -21.50	Detector QP QP
-10 30.000 No. 1 2 3	40 50 Freque (MH 166.6 315.4 340.7	60 ency 2) 5514 808 7817 9920	70 80 Fa (dl -1 -1 -1 -1 -1	actor B/m) 18.17 17.51 16.92	(мн ₂) Reading (dBuV) 34.25 42.01 42.45	Level (dBuV/m) 16.08 24.50 25.53	Limit (dBuV/m) 43.50 46.00 46.00	Margin (dB) -27.42 -21.50 -20.47	Detector QP QP QP

Remarks:



Ant. Pol. Horizontal									
Test Mo	ode:	TXI	3 Mode 241	2MHz					
Remark	K:		eport for the scribed limit	e emission v	vhich more t	than 10 dB t	pelow the	;	
100.0 dBu	iV/m		1						
					FCC Pa	rt15 Class C 3M Ab	ove-16 Peak		
					FCC	Part15 Class C 3M	Above-1G AV		
50	1 *								
	2								
	*								
0.0									
	3500.00	6000.00	8500.00 11	000.00 13500.0	0 16000.00 1	18500.00 21000	.00	26000.00 MH	
No.	Freque (MH	-	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	
1	4823.	472	-2.76	46.07	43.31	74.00	-30.69	peak	
2	4824.	980	-2.76	33.10	30.34	54.00	-23.66	AVG	
Remark	s:						fier Facto		



Ant. F		Ver						
est l Rema	Mode: Irk:	No	B Mode 241 report for the scribed limit	e emission v	vhich more t	han 10 dB b	elow the	:
00.0	dBu¥/m							
					FUU Par	t15 Class C 3M Ab	ove-16 Peak	
					FCC	Part15 Class C 3M /	Above-16 AV	
50								
		1 X						
		z						
		Î						
	000 3500.00	6000.00	8500.00 11	000.00 13500.0	0 16000.00 1	8500.00 21000.	00	26000.00 MH
No.		uency IHz)	Factor (dB/m)	Reading (dBu∀)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	482	3.198	-2.76	46.36	43.60	74.00	-30.40	peak
2	482	4.014	-2.76	32.91	30.15	54.00	-23.85	AVG
2	402		-2.10	02.01	50.15	04.00	-20.00	



Ant	. Po	I.	Horiz	zontal							
Tes	t Mo	de:	TX B Mode 2437MHz No report for the emission which more than 10 dB below the								
Ren	nark	:		eport for cribed lir		emission w	vhich	more t	han 10 dB t	elow the	
100.0	dBu'	V/m									
								FCC Par	t15 Class C 3M Ab	ove-16 Peak	
								FCC	Part15 Class C 3M	Above-16 AV	
50		1 X									
		2									
0.0			000.00						8500.00 21000		
		3500.00 6		8500.00		000.00 13500.0		00.00 1			26000.00 MHz
N	lo.	Freque (MHz		Facto (dB/m		Reading (dBu∀)		vel V/m)	Limit (dBuV/m)	Margin (dB)	Detector
	1	4873.8	358	-2.61		46.82	44	.21	74.00	-29.79	peak
	2	4874.1	198	-2.61		33.42	30	.81	54.00	-23.19	AVG
Ren	narks	5:									

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Ant. Po	I.	Verti	cal										
Test Mo	de:	TX B Mode 2437MHz											
Remark	:		eport for the cribed limit.	e emission v	vhich more t	han 10 dB t	elow the						
100.0 dBu	V/m	p											
					FCC Par	t15 Class C 3M Ab	ove-16 Peak						
					FCC	Part15 Class C 3M .	Above-1G AV						
50	2 X												
	1												
0.0	2500.00	00.00	8500.00 110	00.00 13500.0	D 16000.00 1	8500.00 21000	00	26000.00 MHz					
No.	Frequer (MHz		Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector					
1	4873.9	48	48 -2.61 33.26 30.65 54.00 -23.35 A										
2	4874.6	14	-2.61	47.04	44.43	74.00	-29.57	peak					
Remark	¢.												

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Remarks:



An	t. Pol		Horizo	ontal								
Tes	st Mo	de:	TX B	TX B Mode 2462MHz No report for the emission which more than 10 dB below the								
Rei	mark:			port for the ribed limit.	emission w	hich more t	han 10 dB b	elow the				
100.0) dBuV	7m										
						FCC Par	t15 Class C 3M Ab	ove-16 Peak				
-						FCC	Part15 Class C 3M	Above-1G AV				
50		2										
		X										
0.0	00.000	3500.00 60	00.00	8500.00 110	00.00 13500.0	0 16000.00 1	8500.00 21000	00	26000.00 MHz			
		-		Frater	Desdian	Laural	Limit	Manaia				
1	Vo.	Freque (MHz	:)	Factor (dB/m)	Reading (dBuV)	· /	(dBuV/m)	· · ·	Detector			
	1	4923.6	646	-2.47	32.94	30.47	54.00	-23.53	AVG			
	2	4924.7	'96	-2.47	46.04	43.57	74.00	-30.43	peak			
Rei	marks											

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									ertica	Ve		Ι.	. Po	Ant	
						Ηz	162	lode 24	KΒΝ	T		de:	t Mo	Гes	
e	elow the	10 dB b	tha	more	vhich	nission v		ort for tl bed limi				:	nark	Rer	
								1				V/m) dBu	00.0	
k	ove-1G Peak	ass C 3M Abo	art15	FCC Pa											
NV III	Above-1G AV	Class C 3M /	Part	FCC							50				
			_								i0				
											2				
														0.0	
26000.00 MH	00	<u>00 21000.</u>	1850	00.00	0 160	0 13500.0	1100	500.00	<u>U 8</u>	6000.0		3500	000.000		
n Detector	Margin (dB)	.imit uV/m)	(d	vel iV/m)		eading dBuV)		Factor (dB/m)		ency Iz)	requ (M⊦	F	lo.	Ν	
4 peak	-29.44	4.00		.56	44	47.03		-2.47	4924.136		1				
1 AVG	-23.51	64.00		.49	30	32.96		-2.47	2						
2	(dB) -29.4	uV/m) ′4.00	(d	ıV/m) .56	(dBu 44	dBuV) 47.03)	(dB/m) -2.47		lz)	(Ḿ⊢ 1924	4	1	N	

Remarks:

EN



Ant	t. Pol		Hori	zontal							
Tes	st Mo	de:	TX	G Mode	2412	MHz					
Rei	nark	:		eport fo		emission	which	more t	han 10 dB l	pelow the	!
100.0) dBu\	//m									
50									ear 15 Class C 3M At		
0.0											
10	00.000	3500.00	6000.00	8500.00	11000	0.00 1350	0.00 160	00.00 1	8500.00 21000).00	26000.00 MHz
N	l o.	Frequ (MF		Facto (dB/n		Reading (dBuV)		evel iV/m)	Limit (dBuV/m)	Margin (dB)	Detector
	1	4823	,	-2.7		32.97	•	.21	54.00	-23.79	AVG
	2	4823		-2.7		46.95		.19	74.00	-29.81	peak
					-						L

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Remarks:



nt. P	ol.		Vert	ical					
	lode:			G Mode 24					
ema	rk:			eport for th cribed limit		which more t	han 10 dB b	elow the	•
0.0 d	BuV/m								
						FCC Pa	rt15 Class C 3M Ab	ove-16 Peak	
						10011			
						FCC	Part15 Class C 3M	Above-1G AV	
50									
		×							
		Ť							
0.0									
	00 3500.0	0 60	00.00	8500.00 11	1000.00 13500.0	00 16000.00 1	18500.00 21000	.00	26000.00 M
	- Er	equei		Factor	Reading	Level	Limit	Margin	
No.		(MHz		(dB/m)	(dBuV)	(dBuV/m)			Detecto
1	4	323.3	30	-2.76	32.94	30.18	54.00	-23.82	AVG
2			-2.76	46.20	43.44	74.00	-30.56	peak	
	I			1	1	1		1	1

Remarks:

ΕN



=N

Ant. P	Pol.	Horiz	zontal					
Test N	/lode:	TX C	G Mode 243	7MHz				
Rema	rk:		eport for the cribed limit.		vhich more t	han 10 dB t	pelow the	;
100.0 d	lBuV/m							
					FCC Pa	rt15 Class C 3M At	oove-16 Peak	
					FCC	Part15 Class C 3M	Above-16 AV	
50	2							
	*							
0.0	000 3500.00	6000.00	8500.00 11	000.00 13500.0	0 16000.00 1	18500.00 21000	1.00	26000.00 MHz
No.	Freque (MH	-	Factor (dB/m)	Reading (dBu∀)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	4874.	248	-2.61	33.44	30.83	54.00	-23.17	AVG
2	4874.	4874.292 -2.61		46.81	44.20	74.00	-29.80	peak
	1.							
Rema 1.Fact		Anten	na Factor (dB/m)+Cabl	e Factor (dE	3)-Pre-ampli	fier Facto	or

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2.Margin value = Level -Limit value



Ant	. Pol			Verti											
						de 243	71/1-	-							
	t Moo nark:								which	moro t	hon		pelow the		
Rell	iai n.					ed limit.	erns	551011	VIIICITI	nore t	lan			;	
100.0	dBu	//m													
50	2×		2X										ove-1G Peak		
0.0	00.000	3500.00	60	00.00	8500).00 11	000.00	13500.	DO 160	00.00 1	8500.0	0 21000). 00	26000.00 N	4Hz
N	о.	Frequ (M				actor B/m)		ading Bu∀)		vel IV/m)		mit uV/m)	Margin (dB)	Detecto	or -
	1	4874	4.12	28	-	2.61	33	3.40	30	.79	54	4.00	-23.21	AVG	ì
	2	4874	4.4	02	-2	2.61	46	.85	44	.24	74	4.00	-29.76	peak	(
Dom															

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Remarks:



Ant.	Pol	I.	Но	izontal									
Test	t Mo	de:	TX	G Mode	246	2MHz							
Rem	nark	:		report for scribed		e emissio	on v	vhich r	nore t	han 10	dB b	pelow the	9
100.0	dBu	V/m											
-									FCC Par	rt15 Class (с зм Аб	ove-16 Peak	
-									FCC	Part15 Clas	is C 3M	Above-16 AV	,
50			*										
	2		ž										
0.0	0.000	3500.00	6000.00	8500.00	11(000.00 13	500.0	0 1600	00.00 1	8500.00	21000	00	26000.00 MHz
N	0.		uency Hz)	Fact (dB/r	I	Readir (dBu∖			vel V/m)	Lim (dBu\		Margin (dB)	Detector
· ·	1	492	3.990	-2.4	7	47.13	3	44.	.66	74.	00	-29.34	peak
	2	492	4.800	7	33.10)	30.	.63	54.	00	-23.37	AVG	
Rem 1.Fa			= Ante	nna Fac	tor (c	lB/m)+C	able	e Fact	or (dB)-Pre-a	amoli	fier Facto	or

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Ant. Po	l.	Ve	ertical									
lest Mo	de:	ТУ	(GM	ode 24	462MHz							
Remark			No report for the emission which more than 10 dB below the prescribed limit.									
00.0 dBu	V/m											
								FCC Par	t15 Class C 3M Al	bove-1G Peak		
								FCC	Part15 Class C 3M	Above-16 AV		
50												
		1 X										
		2										
		Ť.										
0.0		6000.0		0.00	11000.00	13500.00		0.00 1	8500.00 2100			
1000.000	3300.00	0000.0	, 050	10.00	11000.00	13300.00	5 1000	0.00 1	8500.00 2100	5.00	26000.00 MH	
No.	Frequ			actor				vel	Limit	Margin	Detector	
No.	(M	Hz)	(0	dB/m)	(dBi	uV)	(dBu	V/m)	(dBuV/m)	(dB)		
1	(M 4923	Hz) 3.046	(c	dB/m) -2.47	(dBu 45.	uV) 85	(dBu 43	V/m) .38	(dBuV/m) 74.00	(dB) -30.62	peak	
	(M 4923	Hz)	(c	dB/m)	(dBi	uV) 85	(dBu 43	V/m)	(dBuV/m)	(dB)		
1	(M 4923	Hz) 3.046	(c	dB/m) -2.47	(dBu 45.	uV) 85	(dBu 43	V/m) .38	(dBuV/m) 74.00	(dB) -30.62	peak	
1	(M 4923	Hz) 3.046	(c	dB/m) -2.47	(dBu 45.	uV) 85	(dBu 43	V/m) .38	(dBuV/m) 74.00	(dB) -30.62	peak	
1 2	(MI 4923 4923	Hz) 3.046	(c	dB/m) -2.47	(dBu 45.	uV) 85	(dBu 43	V/m) .38	(dBuV/m) 74.00	(dB) -30.62	peak	
1 2 Remarks	(MI 4923 4923 s:	Hz) 3.046 3.668		dB/m) -2.47 -2.47	(dB) 45. 33.	uV) 85 13	(dBu 43 30	V/m) .38 .66	(dBuV/m) 74.00	(dB) -30.62 -23.34	peak AVG	

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Ant. Po	ol.	Horiz	zontal					
Test Mo	ode:	TXN	20 Mode 2	412MHz				
Remark	k :		eport for the cribed limit.		vhich more t	han 10 dB b	pelow the	!
00.0 dB	uV/m							
					FCC Pa	rt15 Class C 3M Ab	ove-16 Peak	
					FCC	Part15 Class C 3M	Above-1G AV	
50	1 ¥							
	2×	_						
0.0								
1000.000	D 3500.00 6	00.00	8500.00 11	000.00 13500.0	0 16000.00 1	18500.00 21000	.00	26000.00 MI
No.	Frequer (MHz	-	Factor (dB/m)	Reading (dBu∀)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecto
	4823.8	12	-2.76	47.91	45.15	74.00	-28.85	peak
1	1			32.93	30.17	54.00	-23.83	AVG

Remarks:



Test Mo	Ant. Pol. Vertical											
Test Mio	de:	TXI	V20 Mode 2	412MHz								
Remark	:		eport for the cribed limit.	e emission v	vhich more t	han 10 dB b	elow the					
100.0 dBu	₩/m											
					FCC Pa	rt15 Class C 3M Ab	ove-16 Peak					
					FCC	Part15 Class C 3M	Above-1G AV					
50	2											
	×											
	*											
0.0												
1000.000	3500.00	6000.00	8500.00 11	000.00 13500.0	0 16000.00 1	8500.00 21000	.00	26000.00 MHz				
	Frequ	ency	Factor	Reading	Level	Limit	Margin					
No.	(MF		(dB/m)	(dBuV)	(dBuV/m)	(dBuV/m)		Detector				
1	4823	.486	-2.76	32.91	30.15	54.00	-23.85	AVG				
2	4824	.634	-2.76	45.60	42.84	74.00	-31.16	peak				
					•							
Remark	s:											

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Ant.	Pol.		Horizontal											
Test	Mode:		ТХТ	V20 I	Mode 2	437MF	Ηz							
Rema	ark:				t for the ed limit.		sion v	vhich ı	nore t	han 10) dB k	pelow the	e	
100.0	dBuV/m													
									FCC Par	rt15 Class	C 3M AL	pove-16 Peak		
									FCC	Part15 Cla	ass C 3M	Above-1G AV	,	
50		1 X												
	2 X									_				
0.0	.000 3500		000.00	8500	00 11	000.00	13500.0	0 100)0.00 1	8500.00	21000	0.00	26000.00 M	4 11-
No	. Fr	equei (MHz			actor B/m)	Read (dBi			vel V/m)	Lir (dBu		Margin (dB)	Detecto	r
1	4	874.3	0 6	-2	2.61	46.	66	44	.05	74	.00	-29.95	peak	(
2	4	874.8	74.816 -2.61				33	30	72	54	.00	-23.28	AVG	
Rema 1.Fac		8/m) =	Anten	na F	actor (dB/m)+	-Cable	e Fact	or (dB)-Pre-	amoli	fier Fact	or	

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nt. Po	ol.	Verti	Vertical									
est Mo	ode:	TXN	20 Mode 2	437MHz								
emarl	K:		eport for the cribed limit.	e emission v	hich more t	han 10 dB t	pelow the	ļ				
)0.0 dB	uV/m											
					FCC Pa	rt15 Class C 3M Ab	ove-16 Peak					
					FCC	Part15 Class C 3M	Above-1G AV					
50	1 X											
	2											
0.0) 3500.00 6	00.00	8500.00 11	000.00 13500.0	0 16000.00 1	18500.00 21000	00	26000.00 M				
No.	Freque (MHz		Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector				
1	4874.4	60	-2.61	46.67	44.06	74.00	-29.94	peak				
2	4874.6	644	-2.61	33.36	30.75	54.00	-23.25	AVG				
Remark												



Ant	. Pol	-	Ho	orizonta	al								
Tes	t Mo	de:	ТХ	K N20 N	/lode 24	462MHz							
Rer	nark	:		o report escribe		emissio	า พ	/hich r	nore t	han 10 d	Βb	elow the	
100.0) dBu	V/m											
									FCC Par	t15 Class C 3	м АЬ	ove-16 Peak	
									FCC I	Part15 Class (: 3M	Above-1G AV	
50			2 K										
0.0													
)00.000	3500.00	6000.00	0 8500	.00 110	000.00 135	0.00) 1600	0.00 1	8500.00 2	1000	.00	26000.00 MHz
		Frequ	IEDCV	Fa	actor	Readin	a	Lev	/el	Limit		Margin	
N	lo.	(MI			B/m)	(dBuV			V/m)	(dBuV/i		(dB)	Detector
	1	4924	.800	-2	2.47	32.95		30.	48	54.00)	-23.52	AVG
	2	4924	.886	-2	2.47	46.39		43.	92	74.00)	-30.08	peak
	mork												

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Remarks:



Ant. Po	l.	Vert	ical					
Test Mo	ode:	TXI	V20 Mode 2	462MHz				
Remark	K :		eport for the cribed limit.		vhich more t	han 10 dB t	elow the	;
00.0 dBu	IV/m							
					ECC Par	t15 Class C 3M Ab	ove 16 Peak	
		_			rtt rai	(15 CI922 C 3M AD	DVE-TO FEAK	
					FCC	Part15 Class C 3M	Above-1G AV	
50	2							
	2							
	1							
	Ť							
0.0								
	3500.00 6	00.00	8500.00 11	000.00 13500.0	0 16000.00 1	8500.00 21000.	.00	26000.00 MH
No.	Freque		Factor	Reading	Level	Limit	Margin	Detector
110.	(MHz	:)	(dB/m)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	200000
1	4924.	594	-2.47	32.95	30.48	54.00	-23.52	AVG
2	4924.6	674	-2.47	46.06	43.59	74.00	-30.41	peak



	I.	Hori	zontal					
est Mo			V40 Mode 2					
lemark	K:		eport for the cribed limit.	e emission v	which more t	han 10 dB k	pelow the	
00.0 dBu	V/m							
					FCC Par	t15 Class C 3M Ab	ove-16 Peak	
					FCC	Part15 Class C 3M	Above-1G AV	
50								
	2 X							
	1							
	Ť							
D.0								
1000.000	3500.00 6	00.00	8500.00 11	000.00 13500.0	0 16000.00 1	8500.00 21000	.00	26000.00 M
	3500.00 60	100.00	8500.00 11	000.00 13500.0	0 16000.00 1	8500.00 21000	.00	26000.00
No.	Freque (MHz		Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
No.	Freque (MHz 4843.2	:)	Factor (dB/m) -2.70	Reading (dBuV) 32.80	Level (dBuV/m) 30.10		Margin (dB) -23.90	Detector AVG

Remarks:



Ant. Po	ol.	Verti	cal					
Test M		-	40 Mode 2	422MHz				
Remar		No r			vhich more t	han 10 dB b	pelow the	:
100.0 dB	uV/m							
					FCC Par	t15 Class C 3M Ab	ove-16 Peak	
					ECC.	Part15 Class C 3M	About 16 AV	
50					1001	alti y classi ci JM	ADOVE-TO AV	
	2							
	1							
0.0								
1000.00	0 3500.00 6	000.00	8500.00 110	00.00 13500.0	D 16000.00 1	8500.00 21000	.00	26000.00 MHz
No.	Freque (MH:		Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	4843.	386	-2.70	33.09	30.39	54.00	-23.61	AVG
2	4844.	288	-2.70	46.17	43.47	74.00	-30.53	peak
Remar	ks:							

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I.	Horiz	zontal					
de:	TXN	40 Mode 2	437MHz				
				vhich more t	han 10 dB t	pelow the	!
V/m							
				FCC Pa	rt15 Class C 3M Ab	ove-16 Peak	
				FCC	Part15 Class C 3M	Above-1G AV	
2							
ž							
Į							
Î							
3500.00 6)00.00	8500.00 11	000.00 13500.0	0 16000.00 1	18500.00 21000	.00	26000.00 MH
		Factor	Reading		Limit	Margin	Detecto
Frequei (MHz		(dB/m)	(dBuV)	(dBuV/m)	(dBuV/m)		Detector
MHz 4874.5)	(dB/m) -2.61	(dBuV) 33.19	(dBuV/m) 30.58	(dBuV/m) 54.00	(dB) -23.42	AVG
	XVm XVm 2 2 2 4 3500.00 60	No r W/m 2 2 2 3500.00	X/m X/m X/m X/m X/m X/m X/m X/m	No report for the emission v prescribed limit. V/m 2 2 2 2 3500.00 6000.00 8500.00 1000.00	No report for the emission which more to prescribed limit. W/m FCC Pa FCC Pa	No report for the emission which more than 10 dB to prescribed limit. W/m FCC Part15 Class C 3M Atom FCC Part15 Class C 3M Atom X X <th< td=""><td>No report for the emission which more than 10 dB below the prescribed limit. V/m FCC Part15 Class C 3M Above-16 Peak FCC Part15 Class C 3M Above-16 AV \$</td></th<>	No report for the emission which more than 10 dB below the prescribed limit. V/m FCC Part15 Class C 3M Above-16 Peak FCC Part15 Class C 3M Above-16 AV \$

Remarks:



Ant	t. Pol		Ve	ertical										
Tes	st Mo	de:	ТХ	(N40 I	Mode 24	437MHz								
Rei	mark	:			t for the ed limit.	e emissio	n w	/hich ı	nore t	han 10	dB b	pelow the	;	
100.0) dBu¥	//m												
50			1 X									ove-16 Peak Above-16 AV		
0.0 10	00.000	3500.00	6000.00) 8500	.00 110	00.00 1350	0.00) 1600	0.00 1	8500.00	21000	.00	26000.00 M	4Hz
		Frodu			actor	Readin	~		vel	Lin		Morgin	[T
Ν	lo.		uency Hz)		B/m)	(dBuV			V/m)			Margin (dB)	Detecto	ж
	1	4873	3.242	-2	2.61	47.15		44	.54	74.	00	-29.46	peak	(
	2	4873	3.988		2.61	33.44		30	.83	54.	00	-23.17	AVG	1
	·													

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Remarks:



Ant	. Pol		Hori	zonta	ıl								
Tes	t Mo	de:	1 X T	140 N	/lode 2	452MHz	z						
Ren	nark	:			for the d limit.	e emissi	on w	hich ı	nore t	han 10 d	dB b	elow the	
100.0	dBu	//m											
									FCC Pa	t15 Class C 3	вм Аб	ove-1G Peak	
									FCC	Part15 Class	С ЗМ .	Above-1G AV	
50		2 X											
		Ň									_		
		*									_		
0.0													
10	00.000	3500.00 6	00.00	8500.	00 11	000.00 13	3500.00) 1600	0.00 1	8500.00	21000	.00	26000.00 MHz
N	lo.	Freque (MHz			actor B/m)	Readi (dBu'	-		vel V/m)	Limi (dBuV/		Margin (dB)	Detector
	1	4904.1	58	-2	2.53	33.3	0	30	.77	54.0	0	-23.23	AVG
	2	4904.2	232	-2	2.53	45.9	3	43	.40	74.0	0	-30.60	peak
1.Fa		s: (dB/m) = /					Cable	e Fact	or (dB)-Pre-ar	nplit	fier Facto	r

Page 44 of 100

2.Margin value = Level -Limit value



Ant	. Pol	-	Vert	ical								
	t Mo				/lode 24	452MHz						
Ren	nark	:			for the d limit.	e emissio	n v	vhich i	nore t	han 10 dB	below the	;
100.0	dBu\	//m										
50		2								rt15 Class C 3M / Part15 Class C 3		
0.0	00.000	3500.00	6000.00	8500.	.00 11(000.00 13	500.0	0 160(00.00 1	8500.00 210	00.00	26000.00 MHz
N	lo.	Frequ (MH		1	actor 3/m)	Readir (dBu∖		1	vel V/m)	Limit (dBuV/m	Margin) (dB)	Detector
	1	4903	.150	-2	2.53	33.26	6	30	.73	54.00	-23.27	AVG
	2	4904	.694	-2	2.53	46.16	6	43	.63	74.00	-30.37	peak

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Remarks:



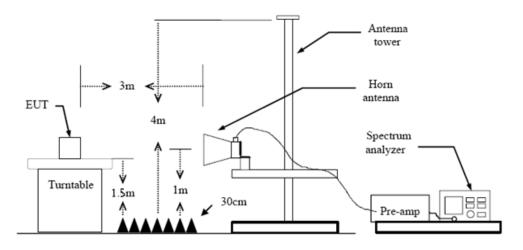
3.3. Band Edge Emissions (Radiated)

Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d)/ RSS 247 5.5:

Restricted Frequency Band	(dBuV/m	n)(at 3m)
(MHz)	Peak	Average
2310 ~2390	74	54
2483.5 ~2500	74	54

Test Configuration



Test Procedure

- 1. The EUT was setup and tested according to ANSI C63.10:2013 requirements.
- The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 2. degrees to determine the position of the maximum emission level.
- 3. The EUT was positioned 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 the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2013 on radiated measurement.
- The receiver set as follow: 5.

RBW=1MHz, VBW=3MHz Peak detector for Peak value.

RBW=1MHz, VBW see note 1 with Peak Detector for Average Value.

Note 1: For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with 1/T video bandwidth with peak detector for average measurements. For the Duty Cycle please refer to clause 3.7 Duty Cycle.

Test Mode

Please refer to the clause 2.4.



Test Results

Ant. Po	ol.	Hor	izontal								
est Mo		ΒM	ode 241	2MHz							
10.0 dB	uV/m										
										N	$\overline{\mathbf{h}}$
							FCC Pa	rt15 Class C	3M Abq	ve-1G Peak	
60							FCC	Part15 Class	C/31/1 A	bove-1G AV	
								×	٧Y		
								~*			
0.0											
2305.200	0 2317.20	2329.20	2341.20	2353.2	D 2365.	20 237	7.20 2	2389.20	2401.2	0	2425.20 MH
No.	(M	uency Hz)	Facto (dB/m	n) (eading dBuV)	dBu	evel iV/m)	•	/m)	Margin (dB)	Detector
1	2390	0.000	31.1	0	17.86	48	.96	74.0	0	-25.04	peak
2	2390	0.000	31.1	0	9.45	40	.55	54.0	0	-13.45	AVG

2.Margin value = Level -Limit value



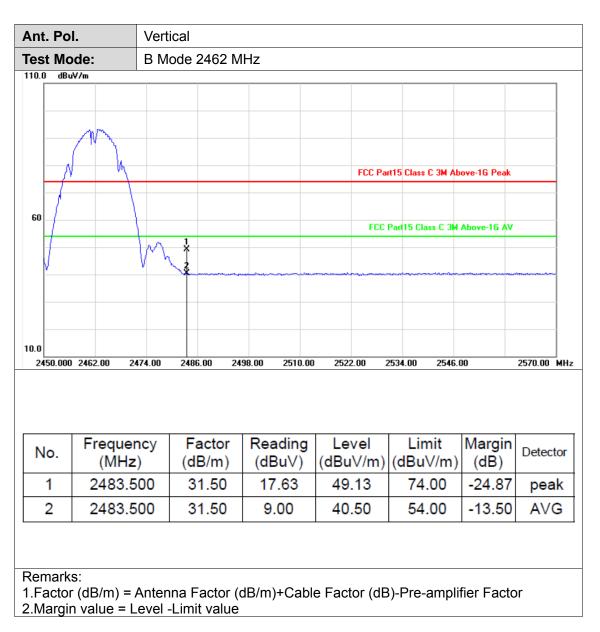
nt. Po	l.	Vert	ical					
est Mo	ode:	ВM	ode 2412M	Hz				
0.0 dB	uV/m							
							N	
					FCC Par	t15 Class C 3M Ab	ove-1G Peak	"
							1	\rightarrow
50					FCC I	Part15 Class C 3M .	1	-+
					FLL	1 . A	ADOVE-TO AV	
						Î, MV		М
.0								
	2316.00	2328.00	2340.00 23	52.00 2364.00	2376.00 2	388.00 2400.0	10	2424.00 MI
No.	Freque (MH		Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecto
1	2390		31.10	18.19	49.29	74.00	-24.71	peak
2	2390		31.10	8.56	39.66	54.00	-14.34	AVG
_								

2.Margin value = Level -Limit value



Ant. Po	ol.	Horiz	ontal							
lest M	ode:	B Mo	de 246	2 MHz	2					
10.0 dB	u¥/m									
	M									
\vdash							FCC Par	t15 Class C 3M A	oove-1G Peak	
60										
- H		M	*				FCC	Part15 Class C 3M	Above-16 AV	
V		V	\Ĵ							
			×							
10.0										
2450.00	0 2462.00 24	174.00	2486.00	2498.0	0 2510.0	0 2522	.00 2	2534.00 2546	00	2570.00 M
No.	Freque (MHz		Facto (dB/m		Reading (dBuV)	Lev (dBu)		Limit (dBuV/m)	Margin (dB)	Detecto
1	2483.5	00	31.5	0	19.43	50.	93	74.00	-23.07	peak
2	2483.5	00	31.5	0	10.43	41.	93	54.00	-12.07	AVG
Remarl										



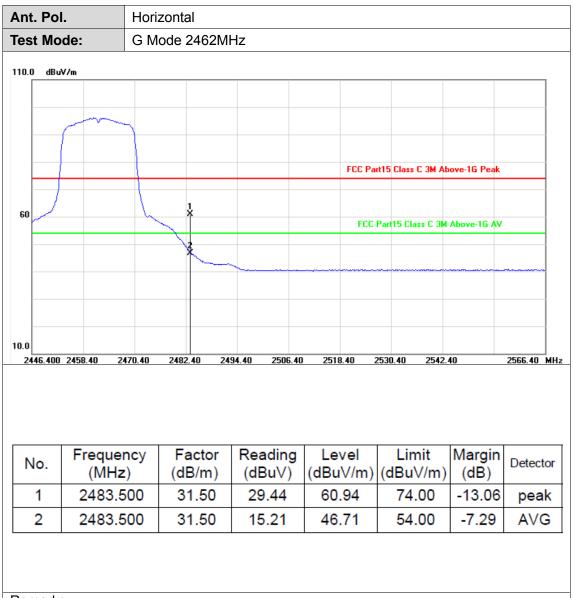




nt. Po	I.	Hori	zontal					
est Mo	ode:	GΜ	ode 2412N	IHz				
10.0 dB	uV/m							
						(
					FCC Pa	rt15 Class C 3M Al	bove-1G Peak	
60					FCC	1 Part15 Glass C 3M	Above-1G AV	\sim
						1		
						×		
			<u> </u>					
0.0								
2307.600	2319.60	2331.60	2343.60 2	355.60 2367.60) 2379.60	2391.60 2403.	.60	2427.60 M
No.	Freque (MH:	-	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2390.	000	31.10	27.98	59.08	74.00	-14.92	peak
2	2390.	000	31.10	15.14	46.24	54.00	-7.76	AVG

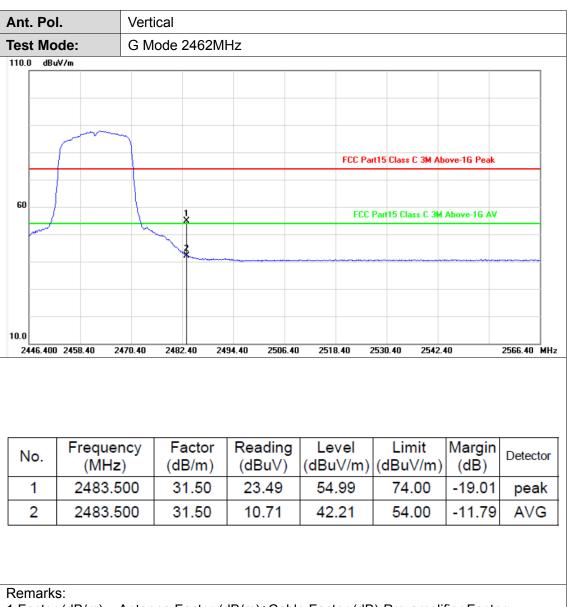


	ol.		Vert	cai										
est Mo	ode:		GΜ	ode	2412	2MF	łz							
10.0 dB	uV/m													
			_											
										FCC Pa	ut15 Cla	iss C 3M A	bove-1G Peak	
60														
										FCC	Pag15	Class C 🎜	Above-1G A	
			_									<u> </u>]
											3			
			_											
0.0														
2306.40	0 2318.4	0 23	30.40	2342	2.40	235	4.40	2366.4	0 237	8.40	2390.40	2402	.40	2426.40 Mi
No.		equer MHz			actor B/m)			ding uV)		vel iV/m)	1	imit uV/m)	Margin (dB)	Detector
1	· · ·	90.0			1.10	·		.95		.05		4.00	-18.95	peak
2	23	90.0	00	3	1.10		10	.69	41	.79	5	4.00	-12.21	AVG
	(S:													



Remarks:







Ant. Po	ol.	Hori	zontal					
est Mo	ode:	N(H	T20) Mode	2412MHz				
10.0 dB	uV/m	,	,					
						1	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	γ
					FCC Pa	t15 Class C 3M Ab	ove-16 Peak	
						J.		
60					FCC	Part15 Class C 3M	Above-16 AV	
						*		
0.0								
	2318.40	2330.40	2342.40 23	354.40 2366.40	2378.40 2	2390.40 2402.4	40	2426.40 M
No.	Freque (MH		Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2390	.000	31.10	32.54	63.64	74.00	-10.36	peak
2	2390	.000	31.10	14.99	46.09	54.00	-7.91	AVG
<u> </u>	1			1	1			



۹nt.	Pol.		· ·	Verti	cal											
est	Mod	le:		N(H7	F20)	Mode	241	12MHz	Z							
10.0	dBuV	/m														
									-					-0000		
													(~~~~	~~~~	
⊢									-		FCC Par	t15 Cla	ss C 3M A	oove-1G Pea	ak 👘	+
60											FCC	- 1 Pai 15 (lass C 3M	Above-16	w	+
																~~
												3				
		~~~~~														
0.0																
230	6.400 2	2318.40	2330	).40	2342	.40 2	354.40	) 236	6.40	237	8.40 2	390.40	2402.	40	243	26.40 MI
No	o.	Freq (M	ueno IHz)	cy		actor B/m)		eadir dBuV			vel iV/m)		imit uV/m)	Margi (dB)		)etecto
1	1	239	0.00	0	3	1.10		27.17	7	58	.27	7	4.00	-15.7	3	peak
2	2	239	0.00	0	3	1.10		10.97	,	42	.07	5	4.00	-11.9	3	AVG



Ant. Po	ol.	Horiz	zontal					
est M	ode:	N(H	20) Mode 2	2462MHz				
110.0 dB	luV/m							
		m						
					FUC Pa	t15 Class C 3M Ab	ove-16 Peak	
60			ł		FCC	Part15 Class C 3M	Above-16 AV	
			2				ADOTE TO AT	
			*	~				
10.0								
	0 2458.40	2470.40	2482.40 24	94.40 2506.40	2518.40 2	2530.40 2542.4	40	2566.40 M
No.	Frequ (Mł	Hz)	Factor (dB/m)	Reading (dBu∀)	Level (dBuV/m)		· · ·	Detecto
1	2483	3.500	31.50	28.14	59.64	74.00	-14.36	peak
2	2483	3.500	31.50	14.88	46.38	54.00	-7.62	AVG



Ant. Po	Ι.	Verti	cal										
lest Mo	de:	N(H	T20) Mo	ode 2	2462MH	Z							
110.0 dBu	iV/m												
						_							
~	~~~~~	$\sim$											
								FCC Pa	t15 Class	С ЗМ АЬ	ove-16 Peak		
					_	-							
60								FCC	David E. Cha		Above-1G AV		
		-L.	1 X					FUU		88 C 3M	ADOVE-TO AV		
		~	3										
				~~~~~					~~~~		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		
10.0													
	2460.80	2472.80	2484.80	249	96.80 250	08.80	2520	D.80 2	532.80	2544.8	80	2568.80	мн
	Frog	Jency	Fact	or	Readir			vel	Lin		Margin	1	
No.		Hz)	(dB/r		(dBu∖			Vei V/m)			(dB)	Detecto	or
1	2483	3.500	31.5	50	20.74	1	52	.24	74.	00	-21.76	peal	K
2	2483	3.500	31.5	50	10.62	2	42	.12	54.	00	-11.88	AVG)
Remarks		= Anten		or (d alue	IB/m)+C	able	e Fact	or (dB)-Pre-a	ampli	fier Fact	or	



	Ι.	Hori	zontal									
est Mo	de:	N(H	T40) N	lode 2	2422MF	Ηz						
10.0 dBu	V/m											
										m	mon	
								FCC Par	t15 Class C 3	BM Abo	ove-1G Peak	
								1		-		
60							2			C 24 /	Above-1G AV	
								2 marshow	altro class	C 3M /	ADOVE-TO AV	has
							-	F				
	***	alaan ahaa Maanaa kaa					~~~			-		
0.0												
2299.000	2314.00	2329.00	2344.00	23	59.00 2	374.00	2389	.00 2	404.00	2419.0	0	2449.00 MH
No.	Frequ (MF		Fac (dB/		Read (dBu		Le ^v (dBu	vel V/m)	Limi (dBuV		Margin (dB)	Detector
No.		lz)	1	/m)		ıV)		V/m)		/m)		Detector peak
	(M⊢	lz) .000	(dB/	/m) .10	(dBu	iV) 18	(dBu	V/m) .28	(dBuV	/m) 0	(dB)	



Ant. Po	ol.	Vert	ical					
Fest Mc	ode:	N(H	T40) Moo	de 2422MHz				
10.0 dBu	uV/m							
							Jum	
					FCC Pa	rt15 Class C 3M Ab	ove-16 Peak	
60					\$ FCC	Part 15 Class C 3M	Above-16 AV	
					2 march	www.		h

0.0								
2297.500	2312.50	2327.50	2342.50	2357.50 2372.	50 2387.50 2	2402.50 2417.5	50	2447.50 MH
	Frequ			r Reading		1::4	Morgin	
No.	(Mł	iency Hz)	Facto (dB/m	-	tevel (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
No. 1	(MI	-) (dBuV)				Detector peak
	(MI 2390	Hz)	(dB/m) (dBuV)) 25.32	(dBuV/m)	(dBuV/m)	(dB)	Detector peak AVG



nt. Po	I.	Hori	zontal							
est Mo	ode:	N(H	T40) Moc	le 245	2MHz					
0.0 dBu	W/m		,							
		m								
		1								
							FCC Pa	rt15 Class C 3M At	oove-1G Peak	
60				1 X						
ment			have	1			FCC	Part15 Class C 3M	Above-1G AV	
				*						
				~~~	and the second					
0.0	2441.50	2456.50	2471.50	2486.50	2501.50	2516		2531.50 2546.		2576.50 M
No.	Frequ (MH	-	Factor (dB/m		eading dBuV)	Lev (dBu	vel V/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2483	.500	31.50		27.33	58.	.83	74.00	-15.17	peak
2	2483	.500	31.50		17.32	48.	.82	54.00	-5.18	AVG
emark	0.									



Ant. Po	ol.	Vert	cal					
est M	ode:	N(H	T40) Mode	2452MHz				
110.0 dB	luV/m							
	munum	The	may		FCC Pa	rt15 Class C 3M Ab	ove-16 Peak	
		Y						
60								
				{	FCC	Part15 Class C 3M	Above-1G AV	
and the second			han	<u>}</u>				
			~	- man man man				
10.0								
	0 2441.50	2456.50	2471.50 24	186.50 2501.50	2516.50	2531.50 2546.	50	2576.50 M
No.		uency Hz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2483	3.500	31.50	26.56	58.06	74.00	-15.94	peak
2	2483	3.500	31.50	11.92	43.42	54.00	-10.58	AVG

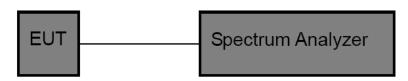


# 3.4. Band edge and Spurious Emissions (Conducted)

## <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 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. 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
- Use the following spectrum analyzer settings: RBW = 100 kHz, VBW ≥ RBW, scan up through 10th harmonic.
- Sweep = auto, Detector function = peak, Trace = max hold
- 4. Measure and record the results in the test report.

#### Test Mode

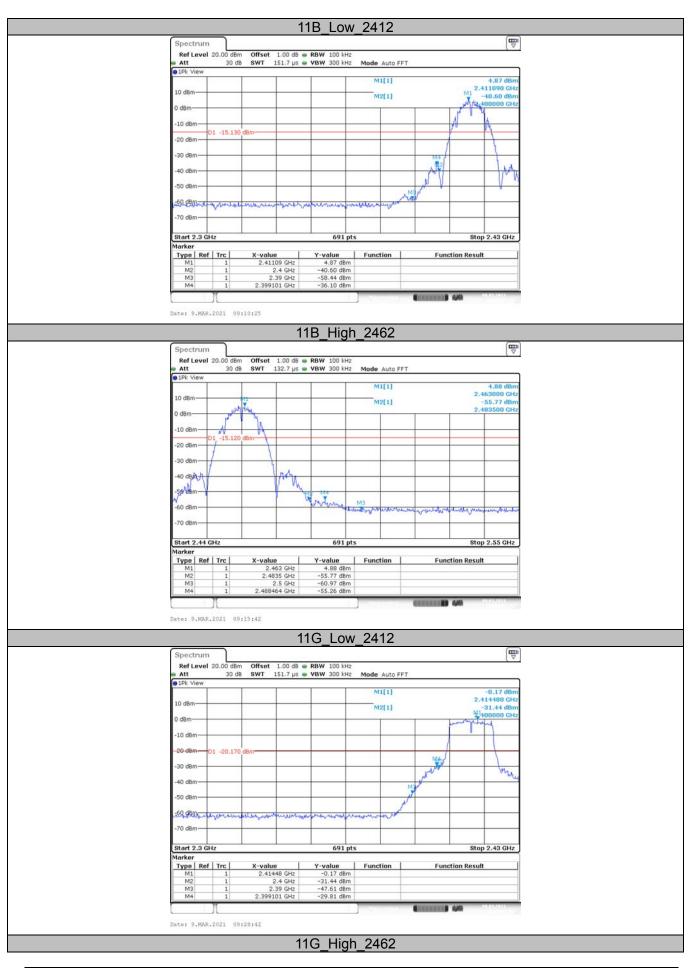
Please refer to the clause 2.4.

#### Test Results

#### (1) Band edge Conducted Test

Test Mode	Frequency[MHz]	Ref Level[dBm]	Result[dBm]	Limit[dBm]	Verdict
802.11b	2412	4.87	-36.10	<=-15.13	PASS
002.110	2462	4.88	-55.26	<=-15.12	PASS
902 11a	2412	-0.17	-29.81	<=-20.17	PASS
802.11g	2462	2.64	-43.83	<=-17.36	PASS
902 11 p(UT20)	2412	1.72	-30.81	<=-18.28	PASS
802.11n(HT20)	2462	-0.44	-45.05	<=-20.44	PASS
902 11p(UT40)	2422	-1.47	-37.94	<=-21.47	PASS
802.11n(HT40)	2452	-1.96	-43.61	<=-21.96	PASS

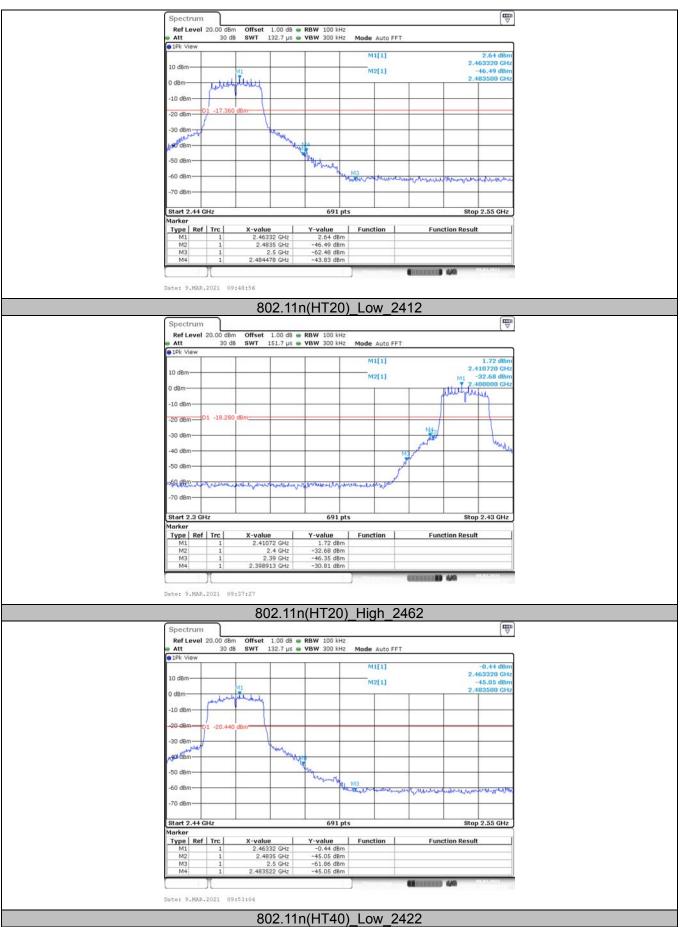




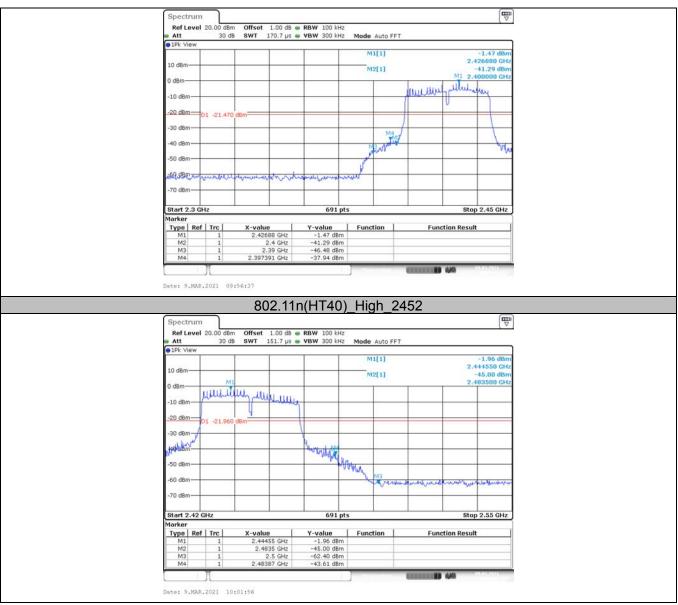


1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park, Shenzhen, Guangdong, China Http://www.sz-ctc.org.cn Fax: (86)755-27521011 For anti-fake verification, please visit the official website of Certification and Accreditation Administration of the People's Republic of China : yz.cnca.cn







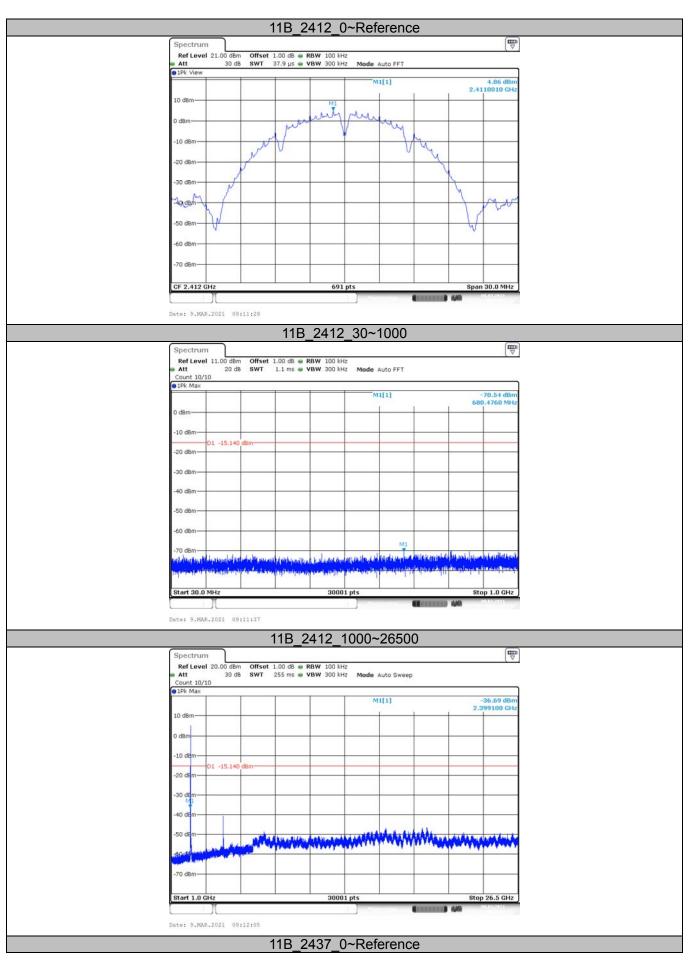




### (2) Conducted Spurious Emissions Test

Test Mode	Frequency[MHz]	Freq Range [Mhz]	Ref Level [dBm]	Result [dBm]	Limit [dBm]	Verdict
802.11b	2412	Reference	4.86	4.86		PASS
		30~1000	30~1000	-70.54	<=-15.14	PASS
		1000~26500	1000~26500	-36.69	<=-15.14	PASS
	2437	Reference	5.56	5.56		PASS
		30~1000	30~1000	-70.2	<=-14.44	PASS
		1000~26500	1000~26500	-45.29	<=-14.44	PASS
	2462	Reference	4.90	4.90		PASS
		30~1000	30~1000	-70.43	<=-15.1	PASS
		1000~26500	1000~26500	-41.55	<=-15.1	PASS
802.11g	2412	Reference	2.31	2.31		PASS
		30~1000	30~1000	-69.98	<=-17.69	PASS
		1000~26500	1000~26500	-29.14	<=-17.69	PASS
	2437	Reference	3.61	3.61		PASS
		30~1000	30~1000	-70.32	<=-16.39	PASS
		1000~26500	1000~26500	-46.2	<=-16.39	PASS
	2462	Reference	2.57	2.57		PASS
		30~1000	30~1000	-70.95	<=-17.43	PASS
		1000~26500	1000~26500	-39.01	<=-17.43	PASS
802.11n(HT20)	2412	Reference	1.42	1.42		PASS
		30~1000	30~1000	-70.57	<=-18.58	PASS
		1000~26500	1000~26500	-31.47	<=-18.58	PASS
	2437	Reference	2.44	2.44		PASS
		30~1000	30~1000	-70.97	<=-17.56	PASS
		1000~26500	1000~26500	-46.73	<=-17.56	PASS
	2462	Reference	1.25	1.25		PASS
		30~1000	30~1000	-70.02	<=-18.75	PASS
		1000~26500	1000~26500	-44.35	<=-18.75	PASS
802.11n(HT40)	2422	Reference	-1.29	-1.29		PASS
		30~1000	30~1000	-70.44	<=-21.29	PASS
		1000~26500	1000~26500	-34.55	<=-21.29	PASS
	2437	Reference	0.47	0.47		PASS
		30~1000	30~1000	-69.25	<=-19.53	PASS
		1000~26500	1000~26500	-44.17	<=-19.53	PASS
	2452	Reference	-1.73	-1.73		PASS
		30~1000	30~1000	-64.5	<=-21.73	PASS
		1000~26500	1000~26500	-47.11	<=-21.73	PASS



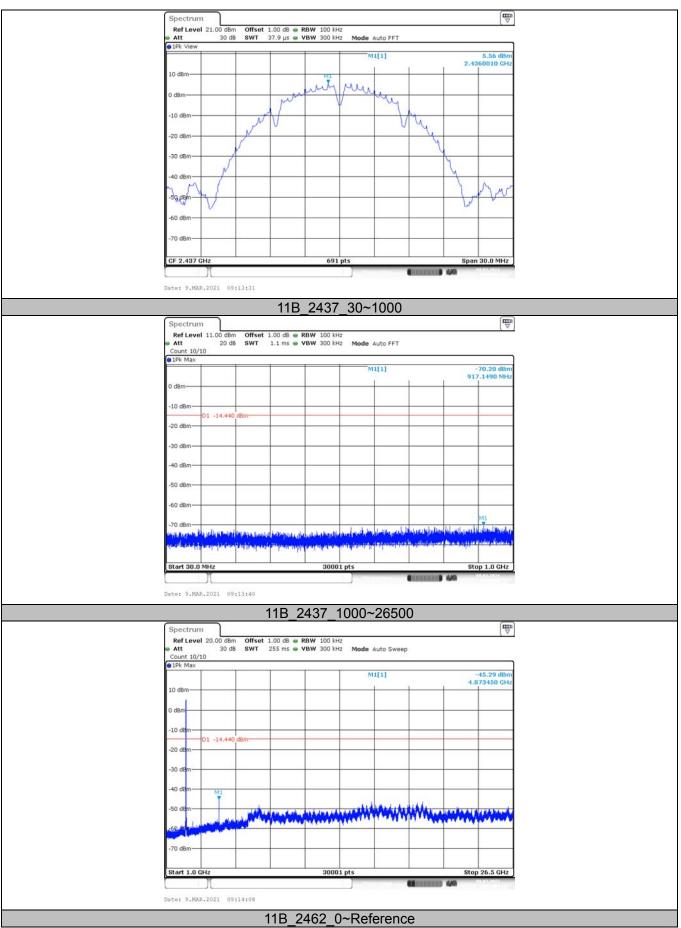




EN

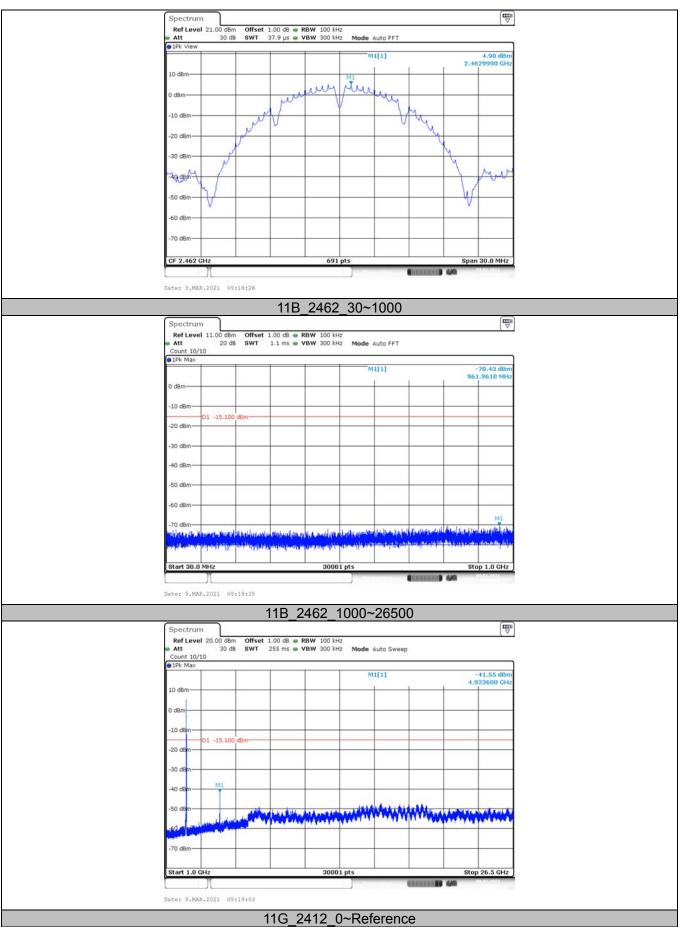
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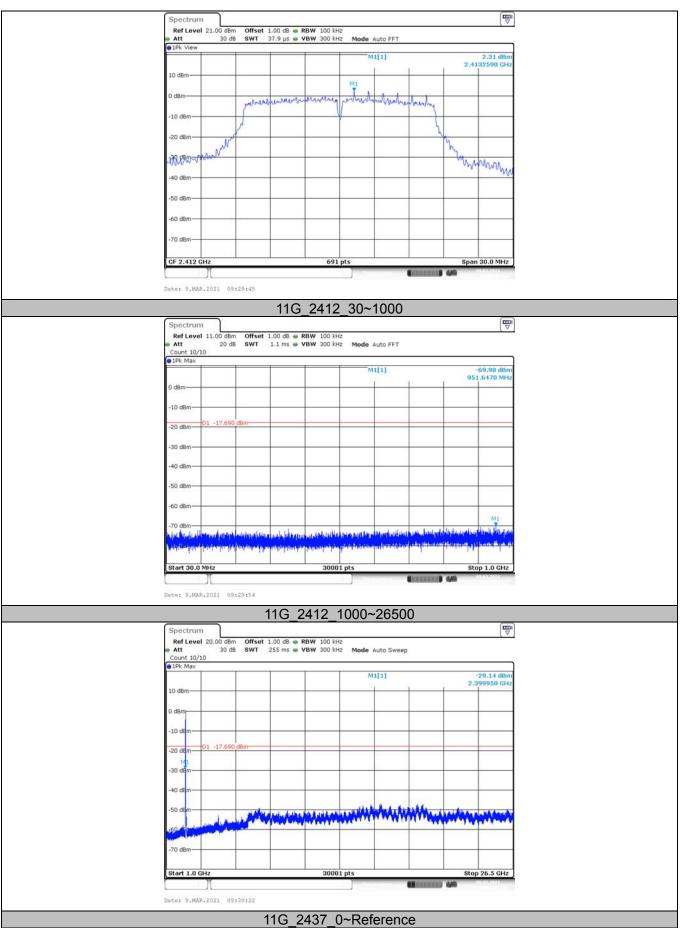




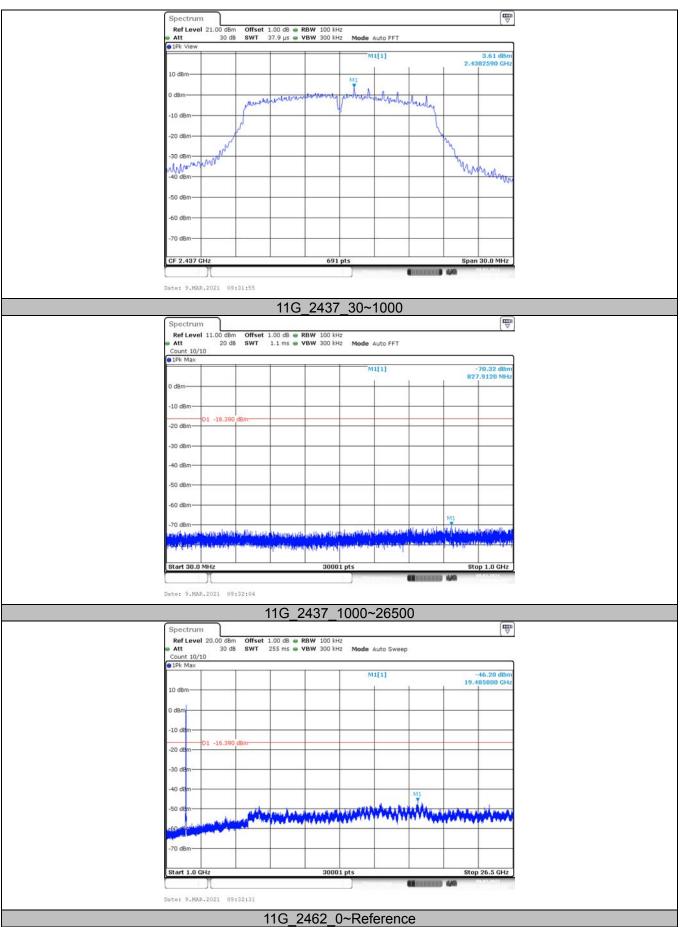






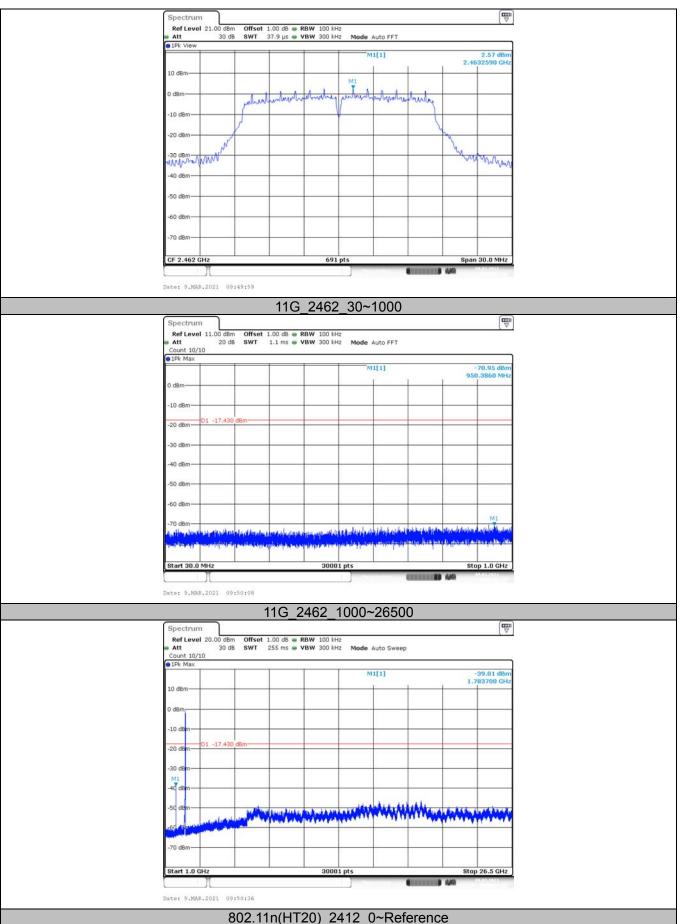






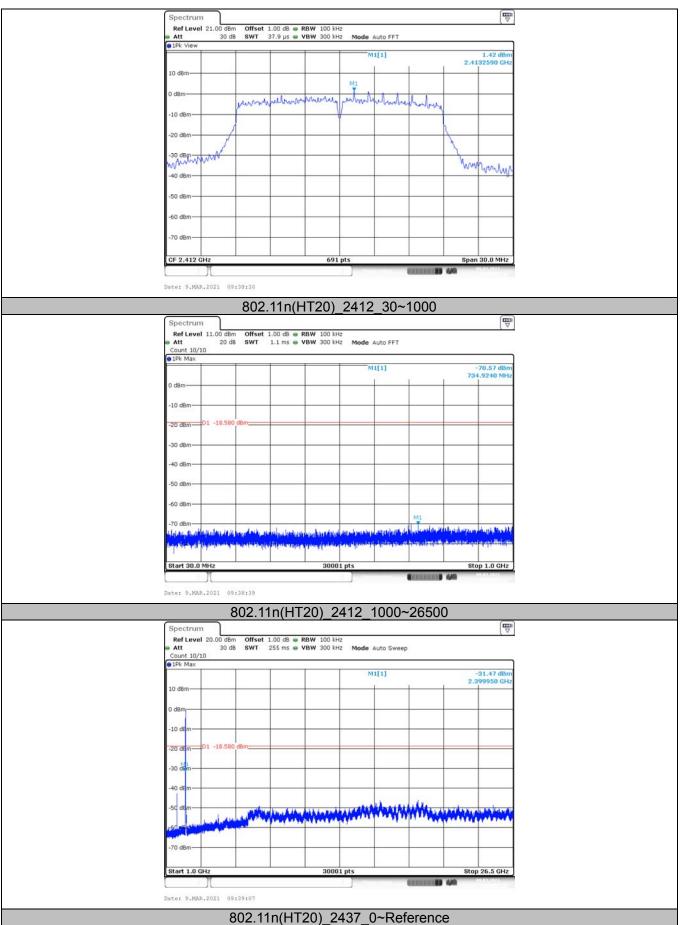






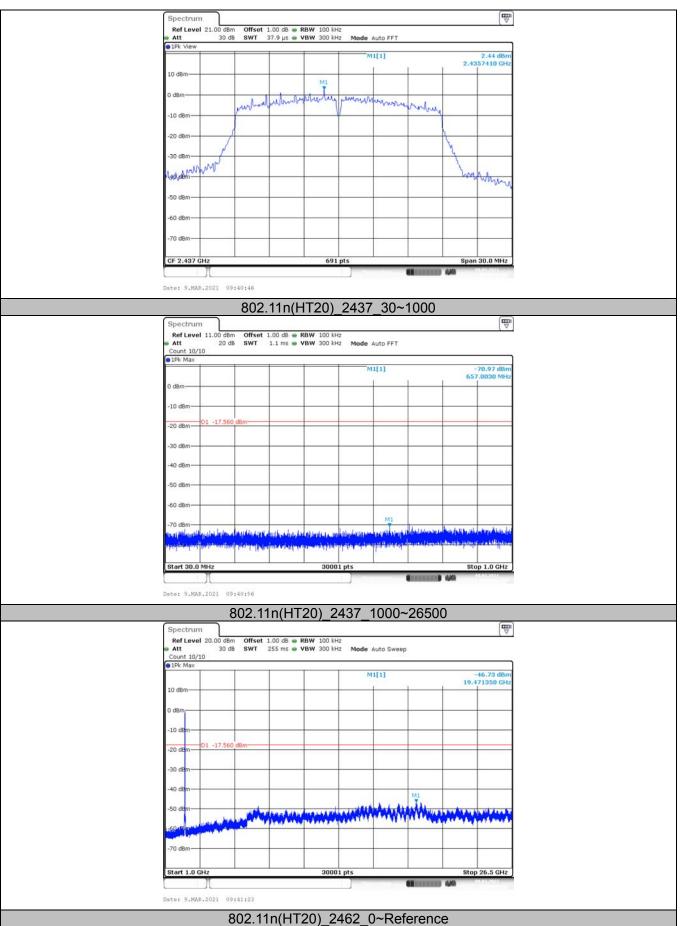
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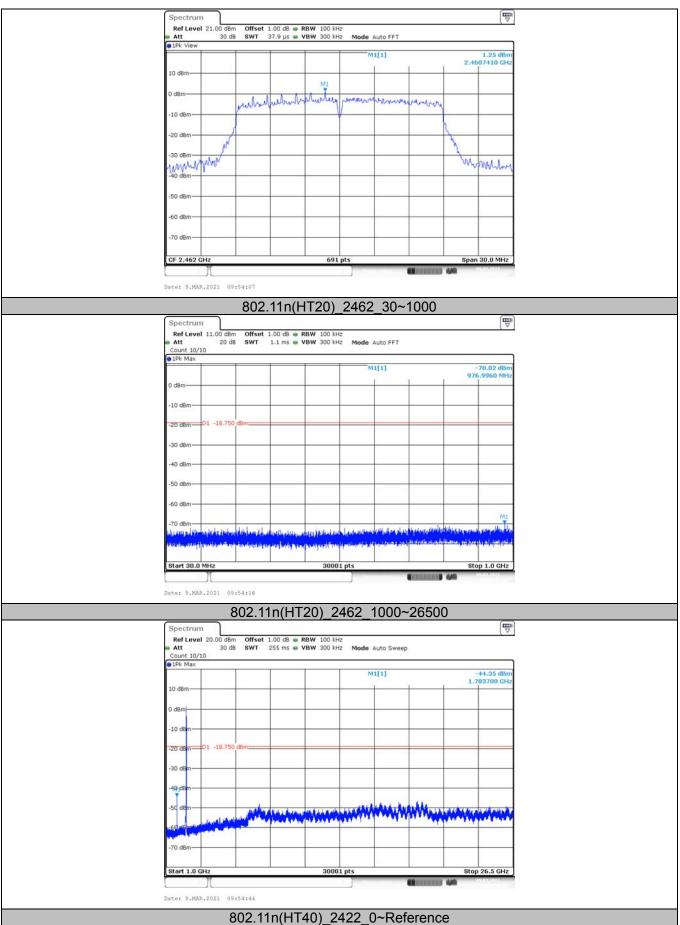


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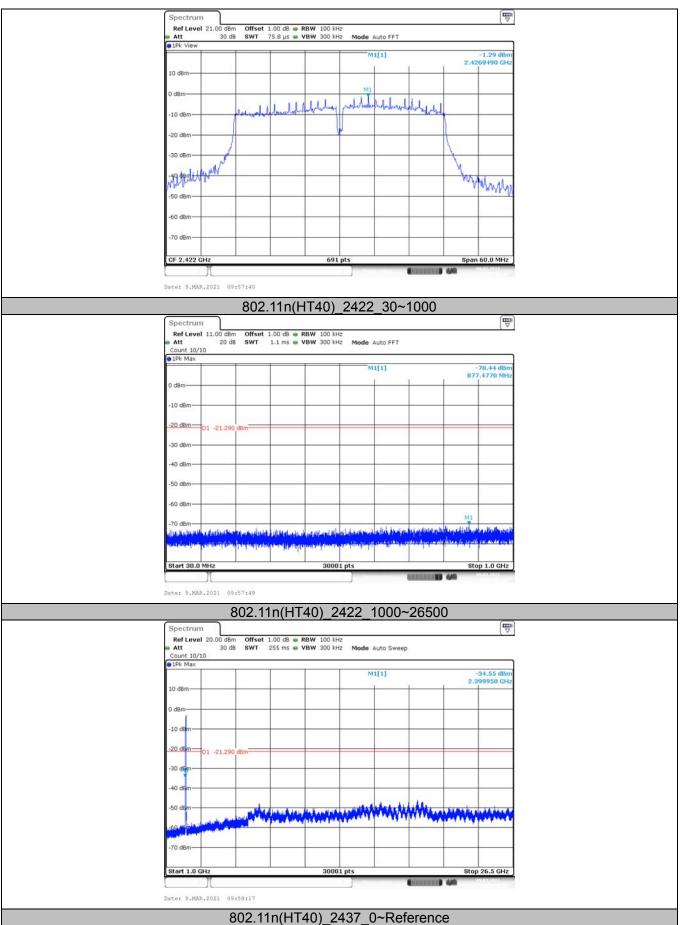




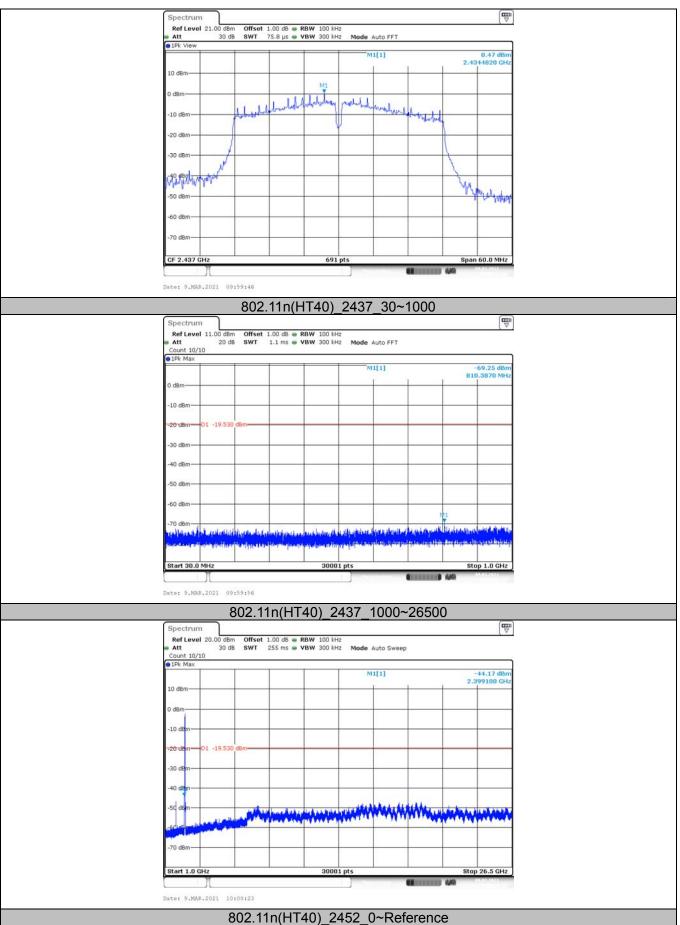




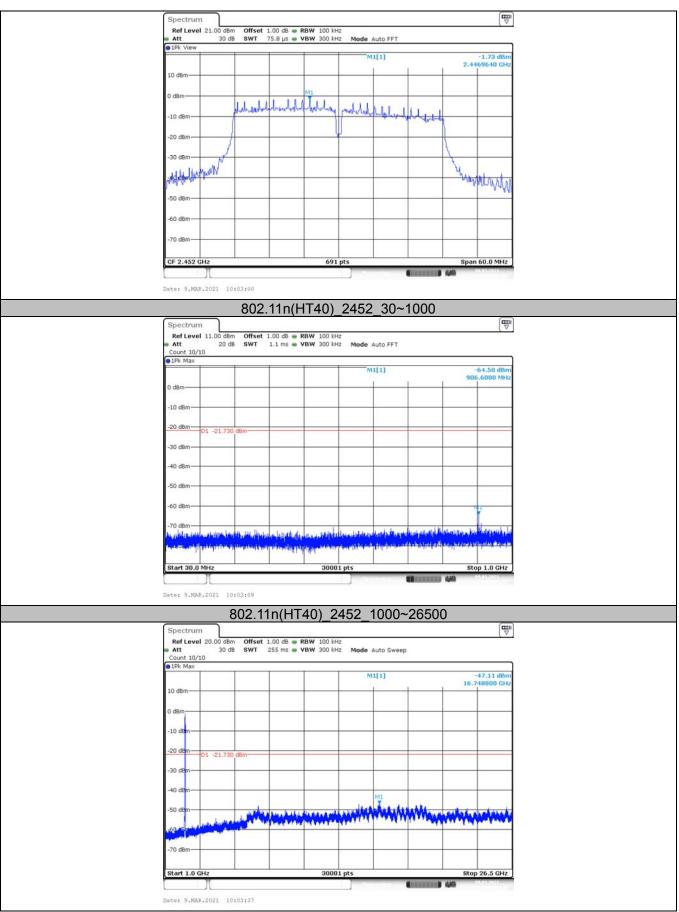














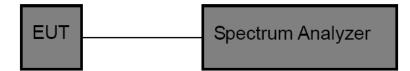
# 3.5. DTS Bandwidth

<u>Limit</u>

# FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(2)/ RSS-247 5.2 a:

Test Item	Limit	Frequency Range(MHz)
DTS Bandwidth	>=500 KHz (6dB bandwidth)	2400~2483.5

# Test Configuration



### Test Procedure

- 5. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- 6. DTS Spectrum Setting:
  - (1) Set RBW = 100 kHz.
  - (2) Set the video bandwidth (VBW)  $\geq$  3 RBW.
  - (3) Detector = Peak.
  - (4) Trace mode = Max hold.
  - (5) Sweep = Auto couple.
  - OCB Spectrum Setting:
  - (1) Set RBW =  $1\% \sim 5\%$  occupied bandwidth.
  - (2) Set the video bandwidth (VBW)  $\ge$  3 RBW.
  - (3) Detector = Peak.
  - (4) Trace mode = Max hold.
  - (5) Sweep = Auto couple.

NOTE: The EUT was set to continuously transmitting in each mode and low, Middle and high channel for the test.

### Test Mode

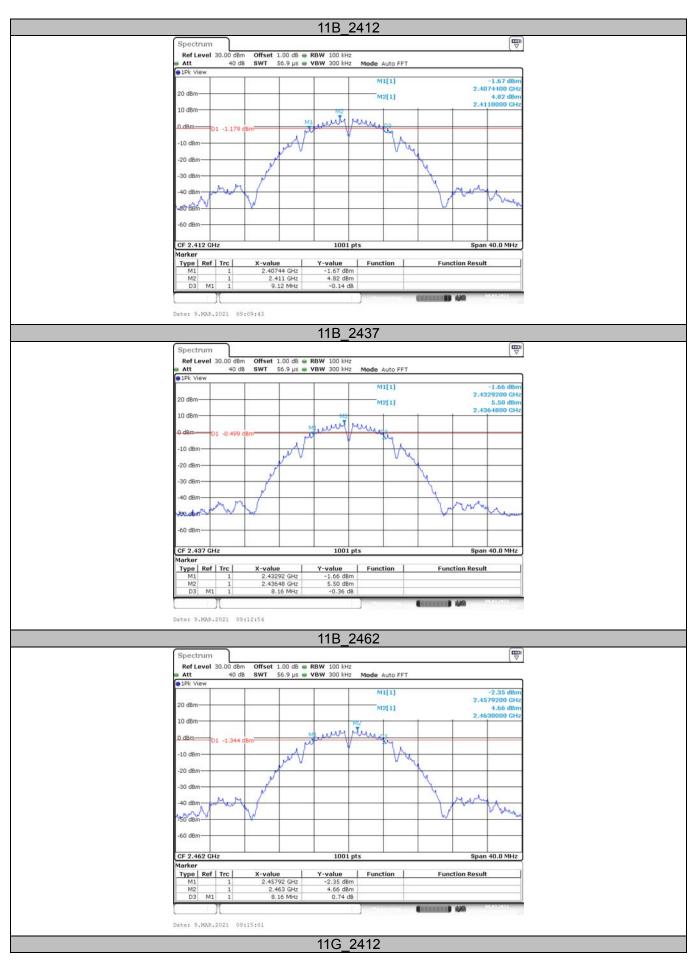
Please refer to the clause 2.4.



### **Test Results**

Test Mode	Frequency[MHz]	DTS BW [MHz]	Limit[MHz]	Verdict
	2412	9.120	>=0.5	PASS
802.11b	2437	8.160	>=0.5	PASS
	2462	8.160	>=0.5	PASS
	2412	15.800	>=0.5	PASS
802.11g	2437	15.160	>=0.5	PASS
	2462	16.000	>=0.5	PASS
802.11n(HT20)	2412	16.400	>=0.5	PASS
	2437	15.200	>=0.5	PASS
	2462	16.880	>=0.5	PASS
802.11n(HT40)	2422	35.360	>=0.5	PASS
	2437	27.760	>=0.5	PASS
	2452	35.520	>=0.5	PASS

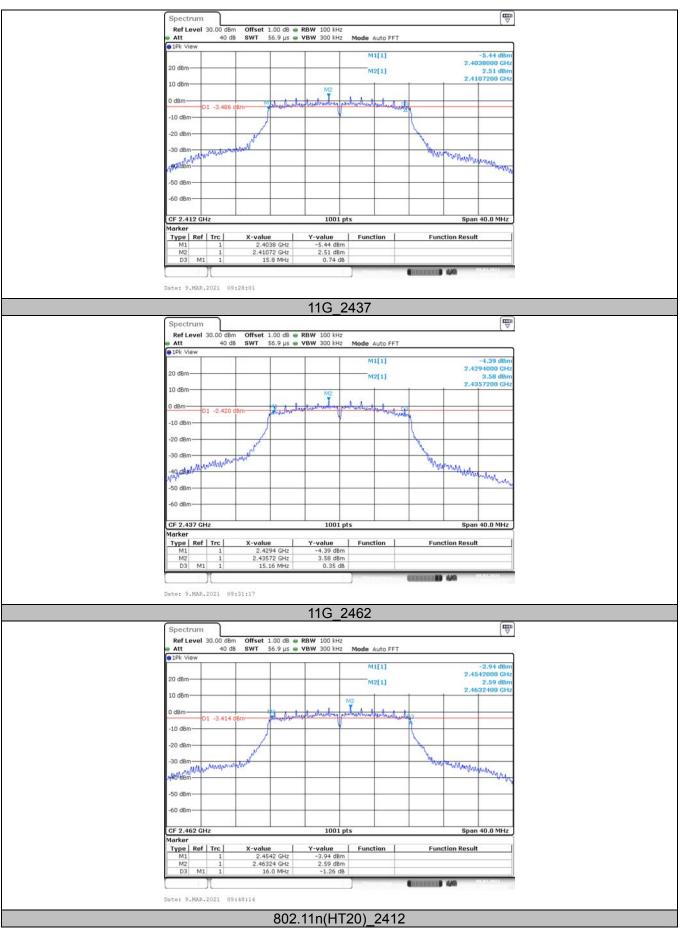




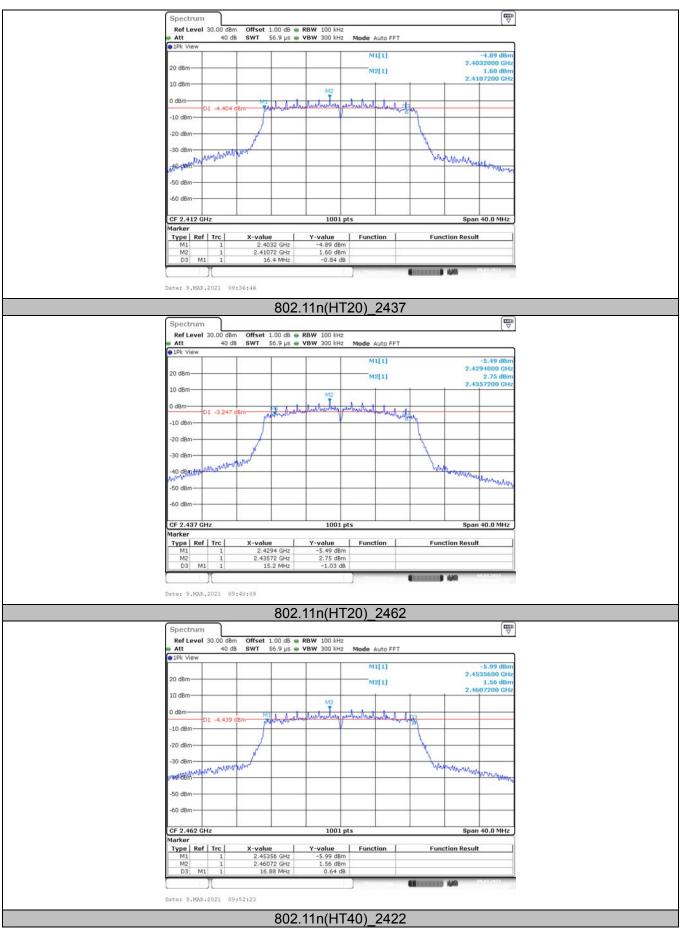
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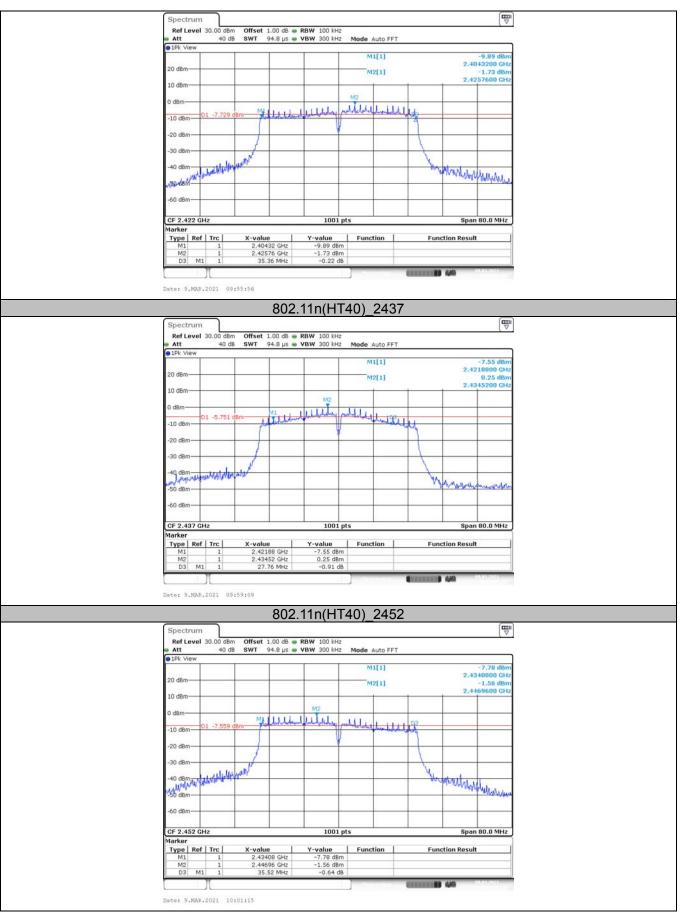














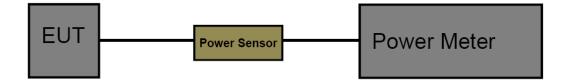
# 3.6. Peak Output Power

<u>Limit</u>

### FCC CFR Title 47 Part 15 Subpart C Section 15.247 (b)(3)/ RSS-247 5.4:

Section	Test Item	Limit	Frequency Range(MHz)
CFR 47 FCC 15.247(b)(3)	Maximum conducted output power	1 Watt or 30dBm	2400~2483.5
ISED RSS-247 5.4 d	EIRP	4 Watt or 36dBm	2400~2483.5

# Test Configuration



### Test Procedure

- 1. The maximum conducted output power may be measured using a broadband Peak RF power meter.
- 2. Peak power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor.
- 3. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter.
- 4. Record the measurement data.

### Test Mode

Please refer to the clause 2.4.

### Test Result



EN

Test Mode	Frequency[MHz]	Result[dBm]	Limit[dBm]	Verdict
	2412	17.39	<=30	PASS
802.11b	2437	17.60	<=30	PASS
	2462	17.06	<=30	PASS
	2412	20.14	<=30	PASS
802.11g	2437	20.68	<=30	PASS
	2462	20.42	<=30	PASS
802.11n(HT20)	2412	19.44	<=30	PASS
	2437	19.82	<=30	PASS
	2462	19.63	<=30	PASS
802.11n(HT40)	2422	18.61	<=30	PASS
	2437	18.63	<=30	PASS
	2452	18.56	<=30	PASS

Note: Test results increased RF cable loss by 1dB.



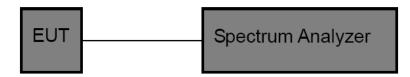
# 3.7. Power Spectral Density

## <u>Limit</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (e)/ RSS-247 5.2 b:

Test Item	Limit	Frequency Range(MHz)	
Power Spectral Density	8dBm(in any 3 kHz)	2400~2483.5	

## **Test Configuration**



### Test Procedure

- 1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- 2. The EUT was directly connected to the Spectrum Analyzer and antenna output port as show in the block diagram above. The measurement according to section 10.2 of KDB 558074 D01 DTS Meas Guidance v05r02.
- 3. Spectrum Setting:

Set analyzer center frequency to DTS channel center frequency. Set the span to 1.5 times the DTS bandwidth. Set the RBW to: 3 kHz Set the VBW to: 10 kHz Detector: PK Sweep time: Auto Allow trace to fully stabilize. Then use the peak marker function to determine the maximum amplitude level.

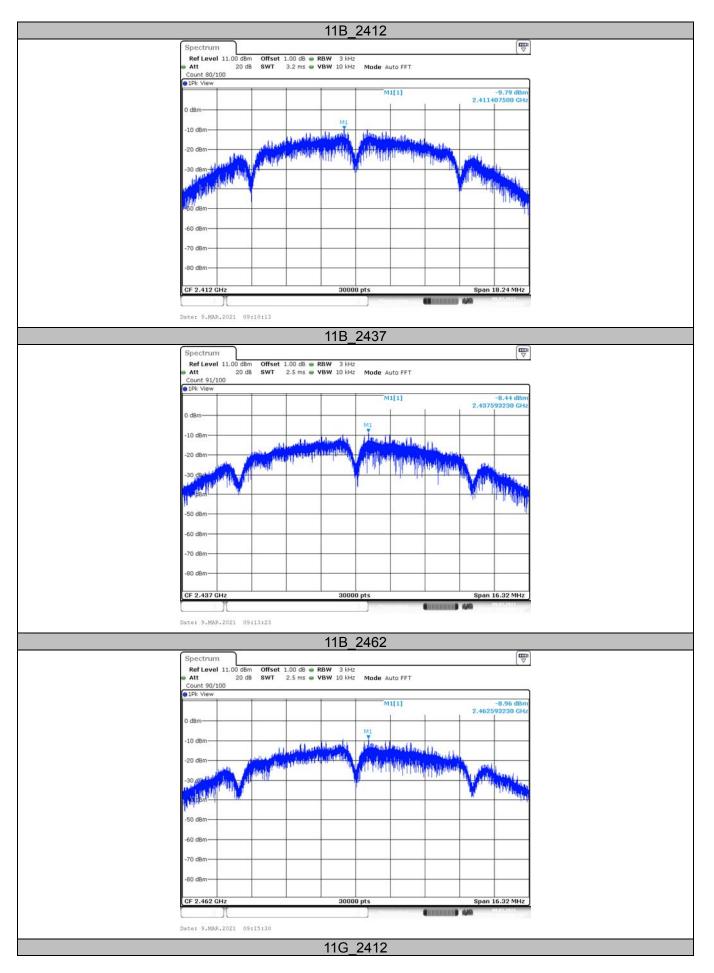
### Test Mode

Please refer to the clause 2.4.



Test Mode	Frequency[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
	2412	-9.79	<=8	PASS
802.11b	2437	-8.44	<=8	PASS
	2462	-8.96	<=8	PASS
	2412	-12.19	<=8	PASS
802.11g	2437	-12.05	<=8	PASS
	2462	-11.81	<=8	PASS
802.11n(HT20)	2412	-13.67	<=8	PASS
	2437	-12.64	<=8	PASS
	2462	-13.79	<=8	PASS
802.11n(HT40)	2422	-16.35	<=8	PASS
	2437	-15.60	<=8	PASS
	2452	-16.36	<=8	PASS



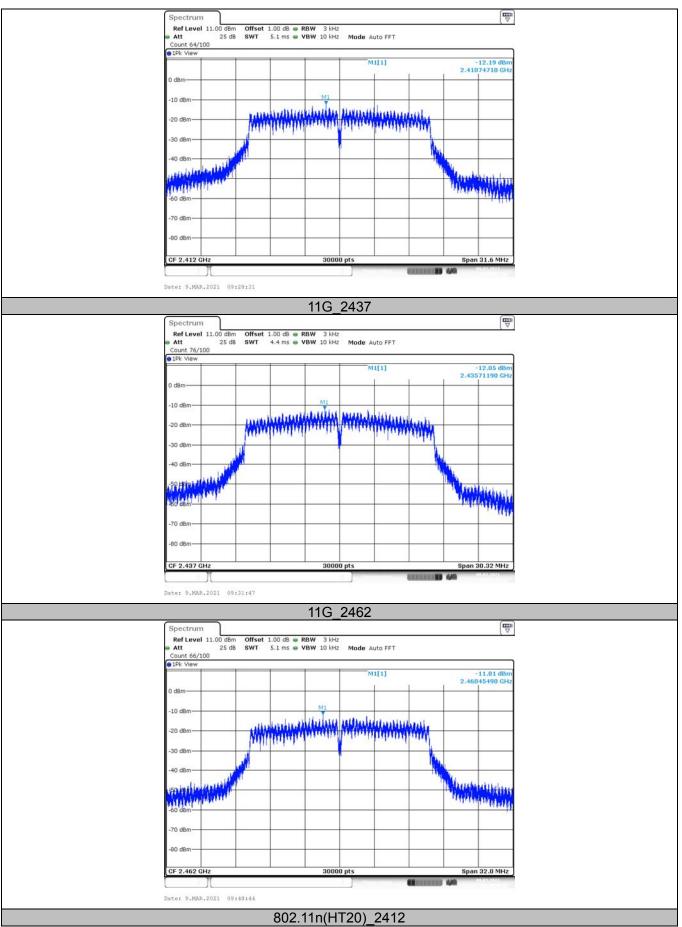


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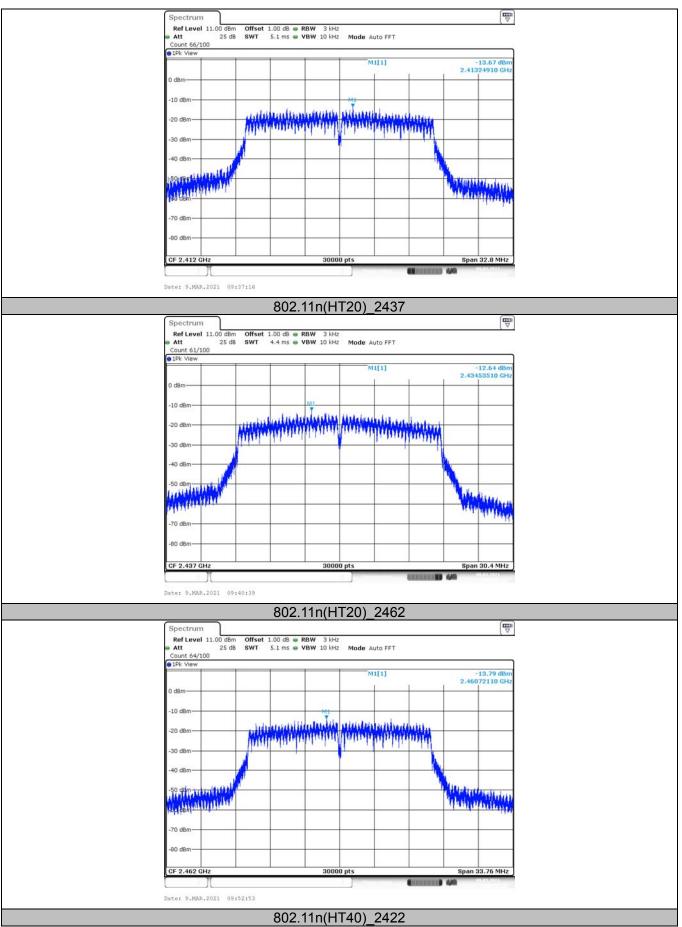


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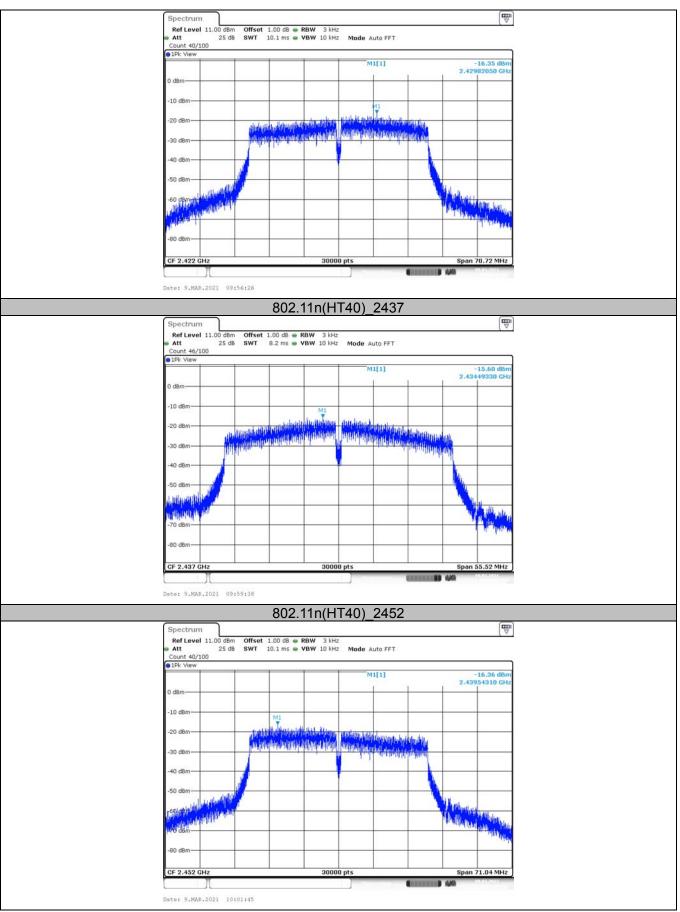








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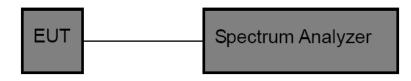


# 3.8. Duty Cycle

<u>Limit</u>

None, for report purposes only.

## Test Configuration



### Test Procedure

1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.

2. The EUT was directly connected to the Spectrum Analyzer and antenna output port as show in the block diagram above. The measurement according to section 10.2 of KDB 558074 D01 DTS Meas Guidance v05r02.

Spectrum Setting:
 Set analyzer center frequency to DTS channel center frequency.
 Set the span to 0Hz
 Set the RBW to 10MHz
 Set the VBW to 10MHz
 Detector: peak
 Sweep time: auto

Allow trace to fully stabilize. Then use the peak marker function to determine the maximum amplitude level.

### Test Mode

Please refer to the clause 2.4.

### Test Result



Test Mode	Frequency [MHz]	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	1/T Minimum VBW (kHz)	Final setting For VBW (kHz)
	2412	8.36	8.39	99.61	0.12	1
802.11b	2437	8.35	8.39	99.58	0.12	1
	2462	8.35	8.39	99.58	0.12	1
	2412	1.38	1.42	97.27	0.72	1
802.11g	2437	1.38	1.42	97.27	0.72	1
	2462	1.38	1.42	97.27	0.72	1
802.11n(HT20)	2412	1.29	1.33	97.08	0.78	1
	2437	1.29	1.33	97.08	0.78	1
	2462	1.29	1.33	97.18	0.78	1
802.11n(HT40)	2422	0.64	0.68	94.49	1.56	3
	2437	0.64	0.68	94.30	1.56	3
	2452	0.64	0.68	94.30	1.56	3



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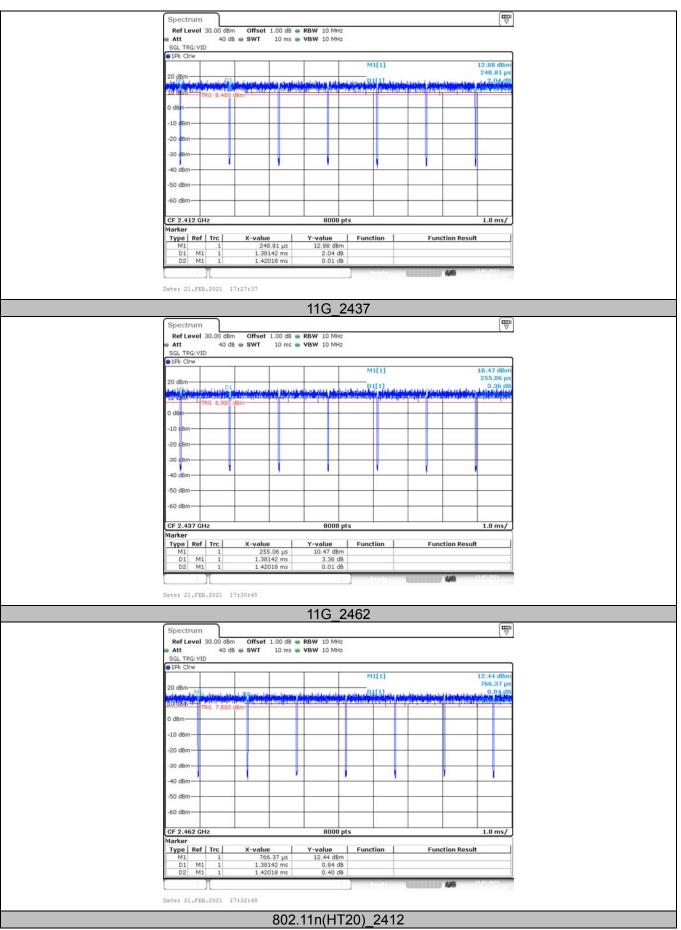


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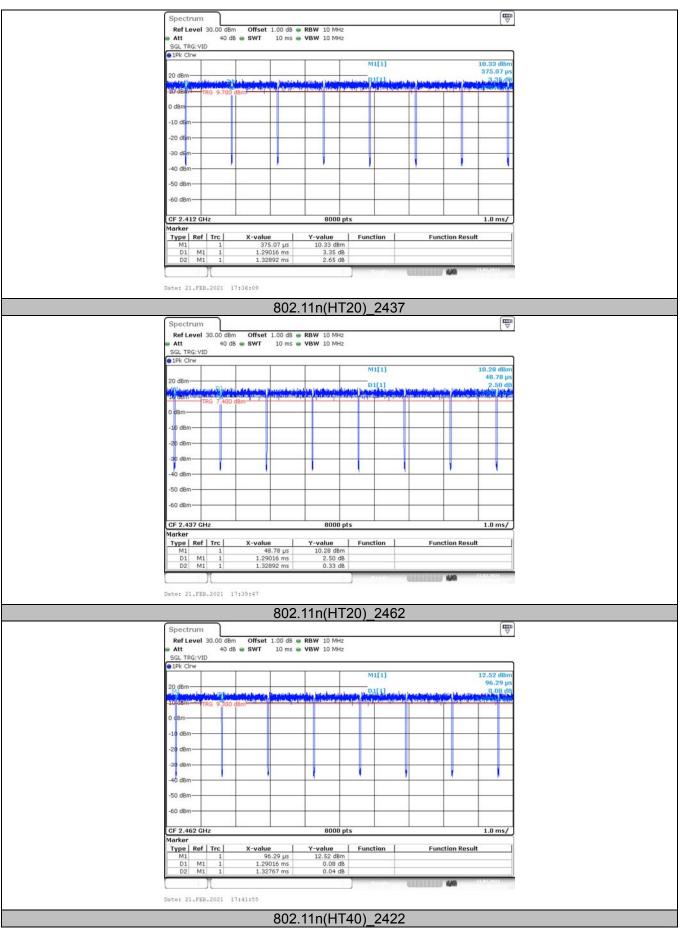


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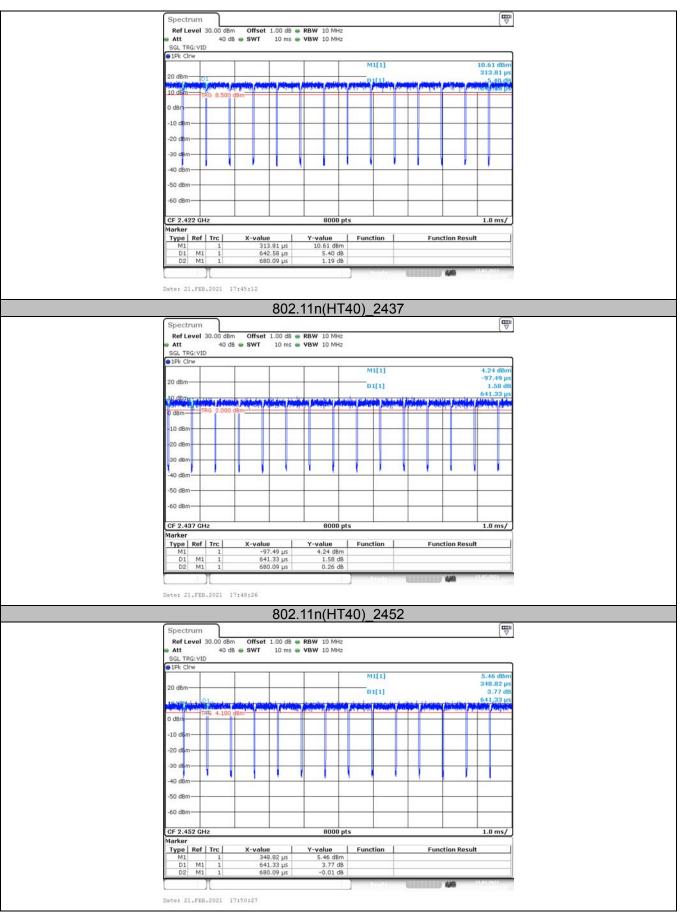


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# 3.9. Antenna requirement

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

### 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 6dBi 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 6dBi.

### Test Result

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