

CFR 47 FCC PART 15 SUBPART C ISED RSS-247 Issue 2

CERTIFICATION TEST REPORT

For

Smart Cordless Vacuum & Washer

MODEL NUMBER: FW007600US

ADDITIONAL MODEL NUMBER: FW007700US

PROJECT NUMBER: 4790446988

REPORT NUMBER: 4790446988-2

FCC ID: 2AV7A-FL3

IC: 26039-FL3

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Prepared for

Tineco Intelligent Technology Co., Ltd.

Prepared by

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Revision History

Rev.	Issue Date	Revisions	Revised By
V0	07/23/2022	Initial Issue	



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1. ATTESTATION OF TEST RESULTS

Company Name: Address:	Tineco Intelligent Technology Co., Ltd. NO 108 SHI HU RD (W) WU ZHONG ZONE SUZHOU JIANGSU 215128, CHINA.
Factory Information	
Company Name:	Tineco Intelligent Technology Co., Ltd.
Address:	NO 108 SHI HU RD (W) WU ZHONG ZONE SUZHOU JIANGSU 215128, CHINA.
EUT Description	
Product Name: Model Number:	Smart Cordless Vacuum & Washer FW007600US
Additional Model Number: Model Difference	FW007700US Model FW007700US is the same as Model FW007600US except for an extra brush roller and a bottle of cleaning solution(all of them are plastic material), no difference about electromagnetic part.
Sample Number:	5054235
Data of Receipt Sample: Date Tested:	Jun.15, 2022 Jun.15, 2022 – Jul. 22, 2022

APPLICABLE STANDARDS					
STANDARD	TEST RESULTS				
CFR 47 Part 15 Subpart C	PASS				
ISED RSS-247 Issue 2	PASS				
ISED RSS-GEN Issue 5	PASS				



Summary of Test Results					
Clause	Test Items	FCC Rules	Test Results		
1	6db DTS Bandwidth and 99% Bandwidth	FCC 15.247 (a) (2) RSS-247 Clause 5.2 (a) RSS-Gen Clause 6.7	Complied		
2	Conducted Power	FCC 15.247 (b) (3) RSS-247 Clause 5.4 (d) RSS-Gen Clause 6.12	Complied		
3	Power Spectral Density	FCC 15.247 (e) RSS-247 Clause 5.2 (b)	Complied		
4	Conducted Band edge And Spurious emission	FCC 15.247 (d) RSS-247 Clause 5.5 RSS-GEN Clause 6.13	Complied		
5	Radiated Band edges and Spurious emission	FCC 15.247 (d) FCC 15.209 FCC 15.205 RSS-247 Clause 5.5 RSS-GEN Clause 8.9 RSS-GEN Clause 6.13	Complied		
6	Conducted Emission Test For AC Power Port	FCC 15.207 RSS-GEN Clause 8.8	Complied		
7	Antenna Requirement	FCC 15.203 RSS-GEN Clause 6.8	Complied		
Remark:					

1) The measurement result for the sample received is <Pass> according to < ANSI C63.10-2013, FCC CFR 47 Part 2, FCC CFR 47 Part 15C, ISED RSS-GEN, ISED RSS-247> when <Accuracy Method> decision rule is applied.

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC KDB 558074 D01 15.247 Meas Guidance v05r02, KDB 414788 D01 Radiated Test Site v01r01, ANSI C63.10-2013, FCC CFR 47 Part 2, FCC CFR 47 Part 15, ISED RSS-GEN ISSUE5, ISED RSS-247 ISSUE2.

3. FACILITIES AND ACCREDITATION

Test Location	UL-CCIC Company Limited, EMC&RF Lab
Address	No. 2, Chengwan Road, Suzhou Industrial Park, Suzhou 215122 ,China
Accreditation Certificate	A2LA (Certificate No.: 4829.01) UL-CCIC COMPANY LIMITED has been assessed and proved to be in compliance with A2LA. FCC (FCC Designation No.: CN1247) UL-CCIC COMPANY LIMITED has been recognized to perform compliance testing on equipment subject to the Commission's Declaration of Conformity (DoC) and Certification rules. IC (IC Designation No.: 25056; CAB No.:CN0073) UL-CCIC COMPANY LIMITED has been recognized to perform compliance testing on equipment subject to the Commission's Declaration of Conformity (DoC) and Certification rules.

Note 1: All tests measurement facilities use to collect the measurement data are located at No. 2, Chengwan Road, Suzhou Industrial Park, Suzhou 215122, People's Republic of China

Note 2: For below 30MHz, lab had performed measurements at test anechoic chamber and comparing to measurements obtained on an open field site. These measurements below 30MHz had been correlated to measurements performed on an OFS.

Note 3: The test anechoic chamber in UL-CCIC COMPANY LIMITED had been calibrated and compared to the open field sites and the test anechoic chamber is shown to be equivalent to or worst case from the open field site.



4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Test Item	Uncertainty	
Conduction emission	3.1dB	
Radiation Emission test(include Fundamental emission) (9KHz-30MHz)	3.4dB	
Radiation Emission test(include Fundamental emission) (30MHz-1GHz)	3.4dB	
Radiation Emission test (1GHz to 26GHz)(include Fundamental emission)	3.7dB (1GHz-18Gz)	
	4.0dB (18GHz-26.5Gz)	
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.		



5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

Product Name:	Smart Cordless Vacuum & Washer
Model No.:	FW007600US
Operating Frequency:	IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz
Type of Modulation:	IEEE for 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE for 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE for 802.11n HT20: OFDM (64QAM, 16QAM, QPSK, BPSK)
Channels Step:	Channels with 5MHz step
Test software of EUT:	EspRFtestTool_2.0 (manufacturer declare)
Antenna Type:	PCB antenna
Antenna Gain:	2dBi
	Remark: This data is provided by customer and our lab isn't responsible for this data
Test Voltage	AC120V



5.2. MAXIMUM OUTPUT POWER

Number of Transmit Chains (NTX)	IEE Std. 802.11	Channel Number	Max AV Conducted Power (dBm)
1	IEEE 802.11B SISO	1-11[11]	8.06
1	IEEE 802.11G SISO	1-11[11]	7.60
1	IEEE 802.11nHT20	1-11[11]	7.56

5.3. CHANNEL LIST

Channel List for 802.11b/g/n (20 MHz)								
<u>Channel</u>	ChannelFrequency (MHz)Frequency (MHz)Frequency (MHz)Frequency (MHz)Frequency (MHz)Frequency (MHz)Frequency (MHz)							
<u>1</u>	<u>2412</u>	4	<u>2427</u>	<u>7</u>	<u>2442</u>	<u>10</u>	<u>2457</u>	
2	<u>2417</u>	<u>5</u>	<u>2432</u>	<u>8</u>	<u>2447</u>	<u>11</u>	<u>2462</u>	
<u>3</u>	2422	6	<u>2437</u>	9	<u>2452</u>			

5.4. TEST CHANNEL CONFIGURATION

Test Mode	Test Channel	Frequency		
WiFi TX(802.11b)	CH 1, CH 6, CH 11	2412MHz, 2437MHz, 2462MHz		
WiFi TX(802.11g)	CH 1, CH 6, CH 11	2412MHz, 2437MHz, 2462MHz		
WiFi TX(802.11n HT20)	CH 1, CH 6, CH 11	2412MHz, 2437MHz, 2462MHz		

5.5. THE WORSE CASE POWER SETTING PARAMETER

The Worse Case Power Setting Parameter under 2400 ~ 2483.5MHz Band								
Test Software			EspRFtestTool					
	Transmit		Test Channel					
Modulation Mode	On Antenna	NCB: 20MHz		NCB: 40MHz				
Mode		CH 1	CH 6	CH 11	CH 3	CH 6	CH 9	
802.11b	1	28	28	28				
802.11g	1	28	28	28	/			
802.11n HT20	1	28	28	28]			

Remark: The value list above is the setting of att in the software.



5.6. DESCRIPTION OF AVAILABLE ANTENNAS

Ant.	Frequency (MHz)	Antenna Type	Antenna Gain (dBi)
1	2400-2483.5	PCB antenna	2

Test Mode	Transmit and Receive Mode	Description
IEEE 802.11b	⊠1TX, 1RX	Antenna1 can be used as transmitting/receiving antenna independently.
IEEE 802.11g	⊠1TX, 1RX	Antenna1 can be used as transmitting/receiving antenna independently.
IEEE 802.11N (HT20)	⊠1TX, 1RX	Antenna1 can be used as transmitting/receiving antenna independently.

5.7. THE WORSE CASE CONFIGURATIONS

For the product, there two transmission antennas, and pre-testing both of them, only the worse data for the antenna is recorded in the report.

Worst-case data rates as provided by the client were:

802.11b mode: 1 Mbps 802.11b mode: 6 Mbps 802.11n HT20 mode: MCS0



5.8. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Item	Equipment	Brand Name	Model Name	Description
1	Laptop	ThinkPad	E590	N/A
2	Fixed Frequency Board	N/A	N/A	Supply by Customer
3	USB Cable	N/A	N/A	Supply by UL Lab(100cm length)

I/O PORT

Cable No	Port	Connector Type	Cable Type	Cable Length(m)	Remarks
1	N/A	N/A	N/A	N/A	N/A

ACCESSORY

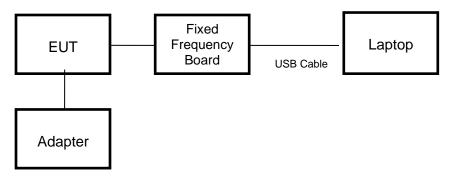
Item	Accessory	Brand Name	Model Name	Description
1	AC/DC ADAPTOR	TINECO	YLS0241A- T260080	INPUT:AC100-240V, 50/60Hz, 0.8A OUTPUT: DC26.0V, 0.8A
2	AC/DC ADAPTOR	TINECO	KL-WA260080- A3	INPUT:AC100-240V, 50/60Hz, 1.2A OUTPUT: DC26.0V, 0.8A

Remark: Pre-testing both models of the adapters, and find the model: KL-WA260080-A3 which is worse, so only the data of worse model: KL-WA260080-A3 is included in this report.

TEST SETUP

The EUT can work in an engineer mode with a software through a table PC.

SETUP DIAGRAM FOR TESTS





5.9. MEASURING INSTRUMENT AND SOFTWARE USED

	Conducted Emissions (Instrument)								
Used	Equipment	Manufacturer	Model	No.	Serial	No.	Upper Last Cal.	Last Cal.	Next Cal.
\checkmark	EMI Test Receiver	R&S	ESR3		1267	700	2020-12-05	2021-12-04	2022-12-03
V	Two-Line V- Network	R&S	ENV2		1267	701	2020-12-05	2021-12-04	2022-12-03
				Soft	ware		I		
Used	Des	cription		Ma	nufactu	irer	Name	Version	
\checkmark	Test Software for C	Conducted distu	ırbance		R&S		EMC32	Ver. 9.25	
		Ra	diated E	missi	ions (In	strum	ient)		
Used	Equipment	Manufacturer	Model	No.	Serial	No.	Upper Last Cal.	Last Cal.	Next Cal.
\checkmark	Spectrum Analyzer	Keysight	N901		1557	27	2021-05-09	2022-04-09	2023-04-08
\checkmark	EMI test receiver	R&S	ESR	26	1267	703	2020-12-05	2021-12-04	2022-12-03
	Receiver Antenna (9kHz-30MHz)	Schwarzbeck	FMZB ²	1513	1554	156	2018-06-15	2021-06-03	2024-06-02
	Receiver Antenna (30MHz-1GHz)	SunAR RF Motion	JB1		1778	821	2019-01-28	2022-01-18	2025-01-17
\checkmark	Receiver Antenna (1GHz-18GHz)	R&S	HF90)7	1267	705	2018-01-29	2022-02-28	2025-02-27
V	Receiver Antenna (18GHz-26.5GHz)	ETS	3160-	·10	1555	565	2019-01-05	2021-07-15	2024-07-14
	Pre-amplification (To 18GHz)	Compliance Direction System Inc.	PAP-10 50		1778	325	2021-03-18	2022-03-01	2023-02-28
V	Pre-amplification (To 26.5GHz)	R&S	SCU-2	26D	1353	391	2021-12-05	2022-12-04	2022-12-03
	Band Reject Filter	Wainwright	WRCJ 2350-2 2483 2533.5-4	400- .5-	1		2021-05-09	2022-04-09	2023-04-08
	Highpass Filter	Wainwright	WHKX 2700-3 18000-4	000-	2		2021-05-09	2022-04-09	2023-04-08
				Soft	ware				
Used	Descr	iption	Ma	anufac	turer		Name	Version	
\checkmark	Test Software for R	adiated disturba		onsce			36-RSE	4.0.0.1	
			Oth	er ins	trumer	nts			
Used	Equipment	Manufacturer	Model	No.	Serial	No.	Upper Last Cal.	Last Cal.	Next Cal.
\checkmark	Spectrum Analyzer	Keysight	N901	0B	1553	868	2021-05-09	2022-04-09	2023-04-08
\checkmark	Power Meter	Keysight	U2021	XA	1553	370	2021-05-09	2022-04-09	2023-04-08



6. MEASUREMENT METHODS

No.	Test Item	KDB Name	Section
1	6dB Bandwidth and 99% Bandwidth	KDB 558074 D01 15.247 Meas Guidance v05r02	8.2
2	Conducted Output Power	KDB 558074 D01 15.247 Meas Guidance v05r02	8.3.2.3 (Method AVGPM)
3	Power Spectral Density	KDB 558074 D01 15.247 Meas Guidance v05r02	8.4 (Method PKPSD)
4	Out-of-band emissions in non- restricted bands	KDB 558074 D01 15.247 Meas Guidance v05r02	8.5
5	Out-of-band emissions in restricted bands	KDB 558074 D01 15.247 Meas Guidance v05r02	8.6
6	Band-edge	KDB 558074 D01 15.247 Meas Guidance v05r02	8.7
7	Conducted Emission Test For AC Power Port	ANSI C63.10-2013	6.2



7. ANTENNA PORT TEST RESULTS

7.1. TEST ENVIRONMENT

Environment Parameter	Selected Values During Tests		
Relative Humidity	55.3%		
Atmospheric Pressure:	100.5kPa		
Temperature	24.0°C		



7.2. ON TIME AND DUTY CYCLE

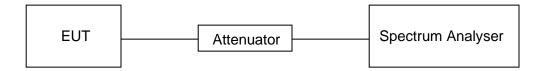
LIMITS

None; for reporting purposes only

PROCEDURE

FCC KDB 558074 Zero-Span Spectrum Analyzer Method

TEST SETUP



RESULTS

Mode	On Time (msec)	Period (msec)	Duty Cycle x (Linear)	Duty Cycle (%)	Duty Cycle Correction Factor (db)	1/T Minimum VBW (KHz)	Final Minimum VBW (KHz)
11B	4.19	4.71	0.890	89.0	0.51	0.24	1
11G	0.69	0.79	0.873	87.3	0.59	1.45	2
11N HT20	0.65	0.76	0.855	85.5	0.68	1.54	2

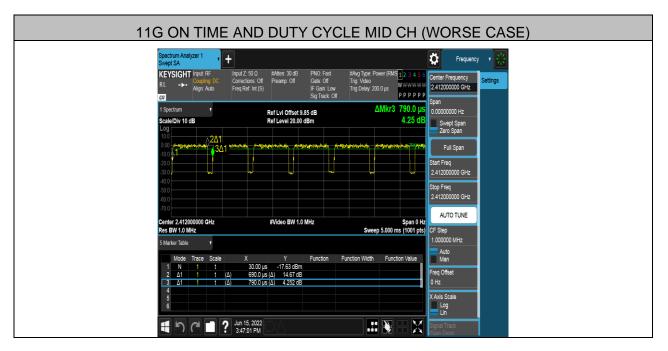
Note: 1) Duty Cycle Correction Factor= $10\log(1/x)$.

2) Where: x is Duty Cycle(Linear)

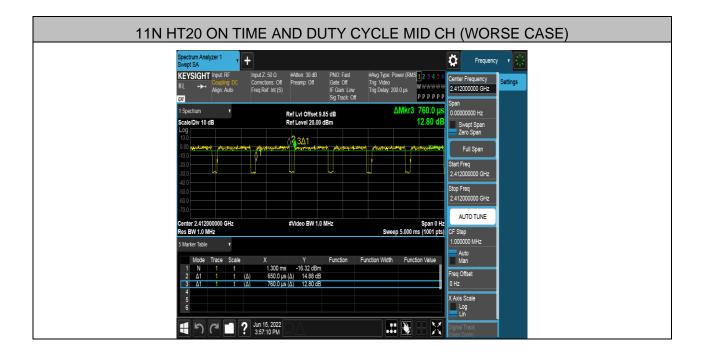
3) Where: T is On Time (transmit duration)













7.3. 6 dB BANDWIDTH AND 99% BANDWIDTH

LIMITS

FCC Part15 (15.247) Subpart C, ISED RSS-247 Issue 2						
Section Test Item Limit Frequency Range (MHz)						
FCC 15.247(a)(2)	6dB Bandwidth	>= 500KHz	2400-2483.5			
ISED RSS-Gen Clause99% Occupied BandwidthFor reporting purposes only.2400-2483.5						

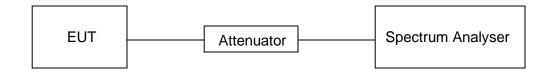
TEST PROCEDURE

Refer to FCC KDB 558074, connect the UUT to the spectrum analyzer and use the following settings:

Center Frequency	The centre frequency of the channel under test
Detector	Peak
	For 6dB Bandwidth :100K For 99% Occupied Bandwidth :1% to 5% of the occupied bandwidth
NBW	For 6dB Bandwidth : ≥3 × RBW For 99% Occupied Bandwidth : approximately 3×RBW
Trace	Max hold
Sweep	Auto couple

Allow the trace to stabilize and 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.

TEST SETUP



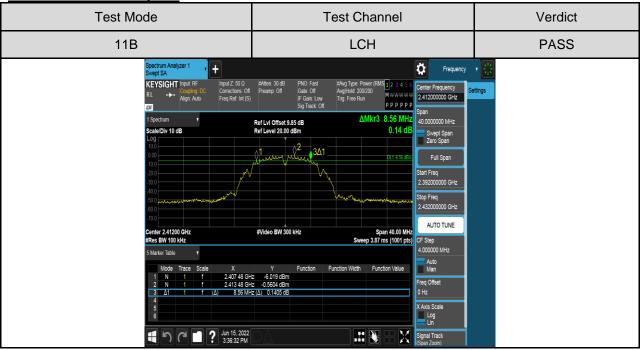


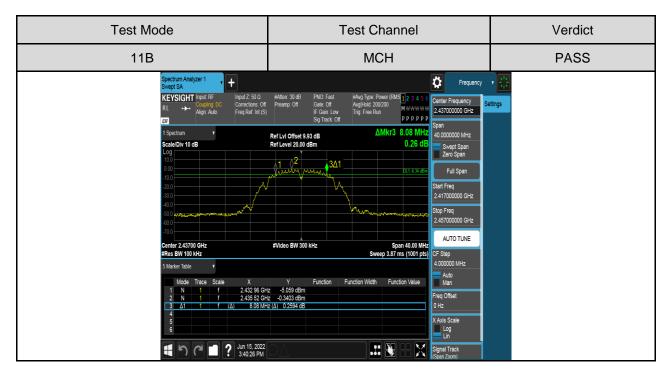
RESULTS

Test Mode	Test Channel	6dB bandwidth (MHz)	99% bandwidth (MHz)	Result
	LCH	8.560	11.054	Pass
11B	MCH	8.080	10.957	Pass
	НСН	8.560	11.039	Pass
	LCH	16.320	16.752	Pass
11G	MCH	16.280	16.735	Pass
	НСН	16.280	16.713	Pass
	LCH	16.960	17.654	Pass
11N HT20	MCH	16.600	17.584	Pass
	HCH	16.680	17.659	Pass



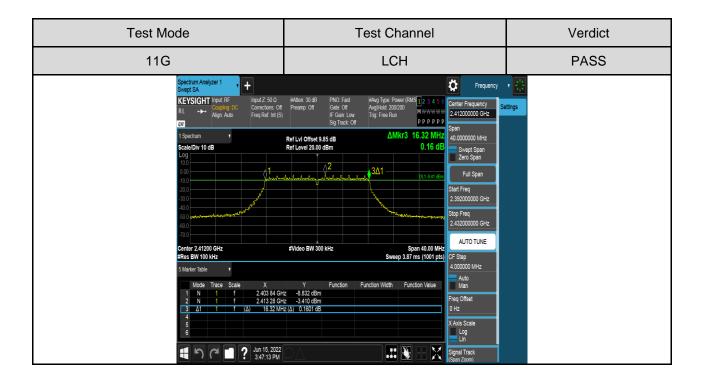
Test Graphs For 6dB Bandwidth part:





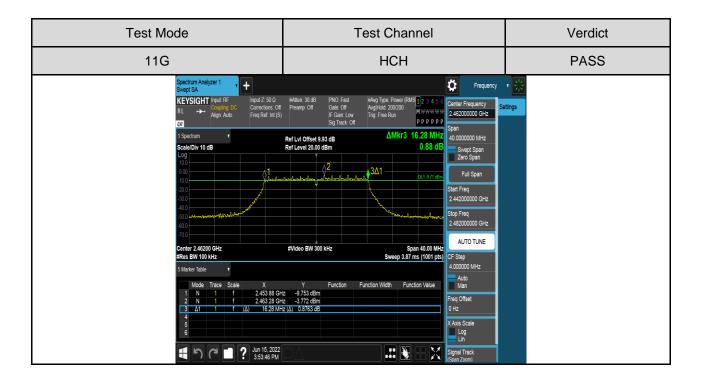


Test Mode	Test Channel	Verdict
11B	НСН	PASS
	F Cam. Low Sig Track. Off Trig: Free Run MWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW	vetings



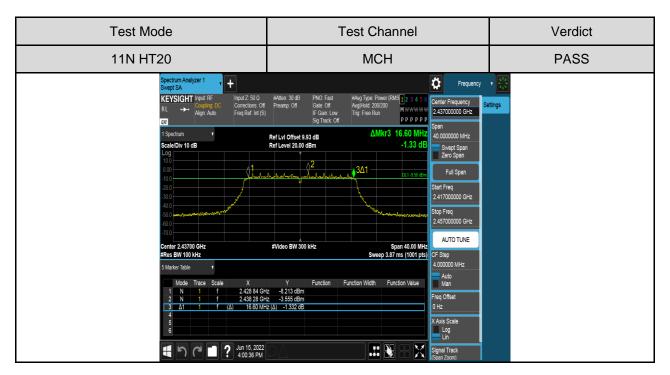


Test Mode	9	Test	Channel		Verdict
11G		Ν	ICH		PASS
Swe KE RL U Sca Sca Sca Sca Sca Sca Sca Sca Sca Sca	0	Preamp Off Gate Off Anglishi IF Gain Low Sig Track Off Tig File Ref Level 20.00 dBm 2	MWWWWW 2437 P P P P P P P Span AMKr3 16.28 MHz 4000 -0.08 dB s 21 340 cm s 21 340 cm s 21 340 cm s 21 340 cm s Span 40.00 MHz s sweep 3.87 ms (1001 pts) CF Ss Hh Function Value Freq C 0 Hz xAvis L	000000 MHz Sweyt Span Full Span Freq 7000000 GHz Freq 7000000 GHz AUTO TUNE tep 00000 MHz Auto Van Offset	93





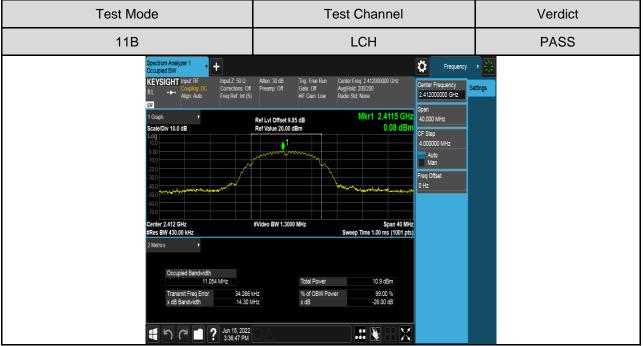
Test Mode	Test Channel	Verdict
11N HT20	LCH	PASS
100 200 200 300 400 300 400 300 500 500 700 500 600 700 700 700 Center 2.41200 GHz Ress BW 100 HHz S Marker Table 1 1 1 1 2 1 1 1 2 N 1 1 2.403 48 GH	IF Cant. Low Sig Track. Off Ting: Free Run M.W.W.W.W.W.W.W.W.W.W.W.W.W.W.W.W.W.W.W	ettings





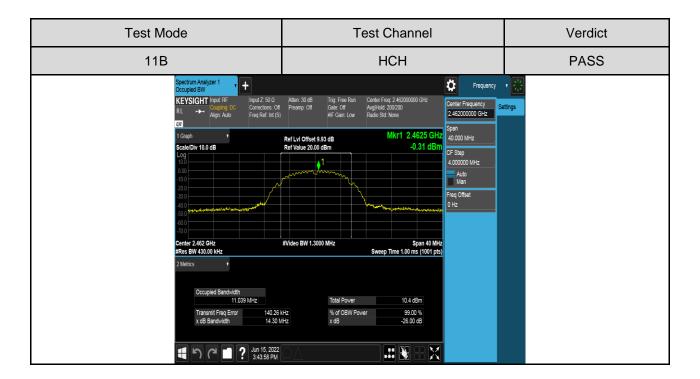
Test Mode	Test Channel	Verdict
11N HT20	НСН	PASS
100 300 300 400 400 400 400 400 400 400 400 400 400 400 400 400 400 400 400 400 400 400 400 400 700	IF Gam. Low Sig Track off Trig: Free Run MWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW	etting

For 99% Bandwidth part:

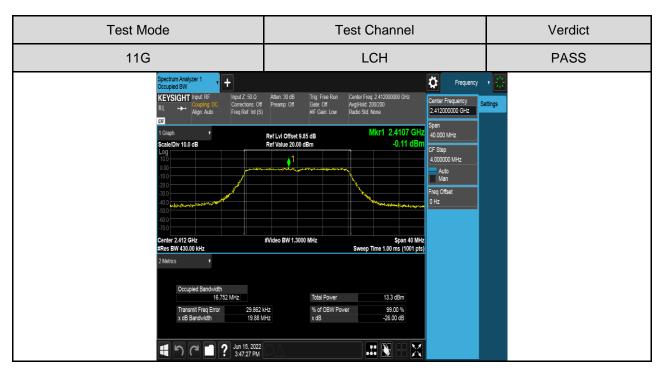


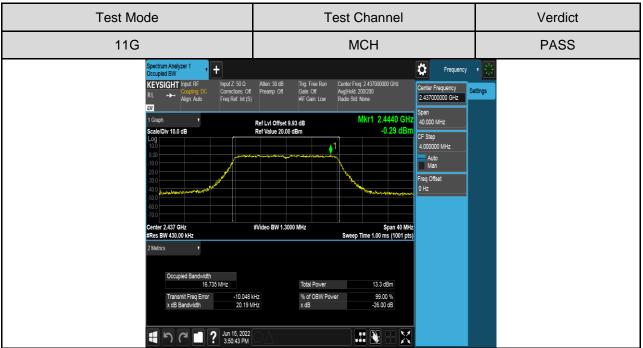


Test Mode	Test Channel	Verdict
11B	MCH	PASS
Spectrum Analyzer 1 Cecupied BW KEYSIGHT input RF RL → Congreg DC I Graph ScaleDiv 10.0 dB L0 10 20 30 40 50 10 10 10 10 10 10 10 10 10 1	Atten: 30 dB Pleamp Coff #IF Gant Low #IF Gant Low Ref Lvi Offset 9.33 dB Ref Lvi Offset 9.33 dB Nkr1 2.4375 GHZ 0.11 dBm *Video BW 1.3000 MHz Total Power 10 9 dBm	Frequency Cettings ter Frequency Settings arconocou GHz bio bio bio bio bio bio bio bio
x dB Bandwidth 14.25 M		
📢 🏷 (? 🖬 ? Jun 15,2022 34038 PM		



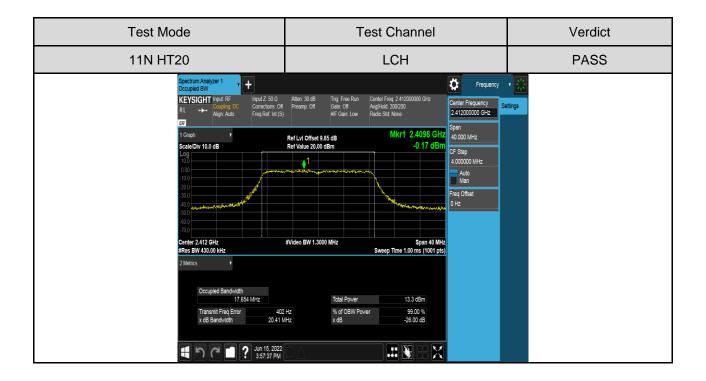




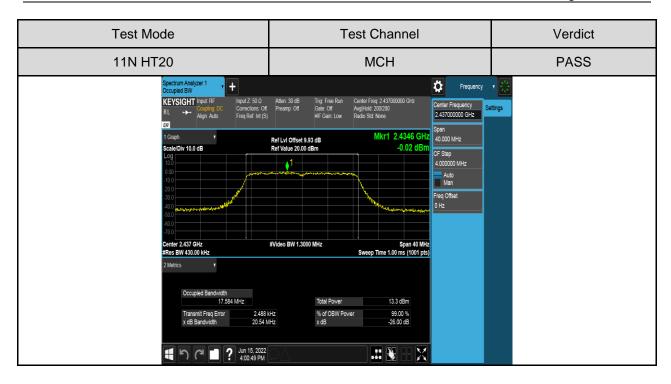


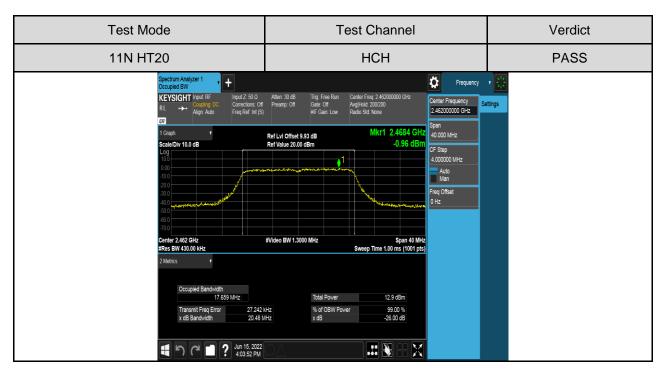


Test Mode	Test Channel	Verdict
11G	НСН	PASS
Scale/Div 10.0 dB Log 10 000	Implementation Testino Stati None 2.45200000 GHz Span Autonomic GF Stap Autonomic GF Stap Autonomic GF Stap Autonomic GF Stap Autonomic Bit Autonomic Bit Autonomic GF Stap Autonomic Bit Bit Bit Autonomic Bit Bit <td>Settings</td>	Settings
Unit, 2022		











7.4. **CONDUCTED POWER**

LIMITS

FCC Part15 (15.247) Subpart C, , ISED RSS-247 ISSUE 2			
Section Test Item Limit Frequency Range (MHz)			
FCC 15.247(b)(3) ISED RSS-247 5.4 (d) RSS-Gen Clause 6.12	Output Power	1 watt or 30dBm	2400-2483.5

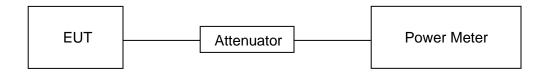
TEST PROCEDURE

Place the EUT on the table and set it in the transmitting mode.

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the Power Meter.

Measure the power of each channel. AVG Detector use for AVG result.

TEST SETUP





RESULTS

For Normal Testing Part:

Test Mode	Test Channel	Measurement Output Power (AV)	10log(1/x) Factor	Maximum Conducted Output Power (AV)	Result
		dBm	dB	dBm	
	LCH	7.55	0.51	8.06	Pass
11B	MCH	7.55	0.51	8.06	Pass
	HCH	7.14	0.51	7.65	Pass
	LCH	6.99	0.59	7.58	Pass
11G	MCH	7.01	0.59	7.60	Pass
	HCH	6.66	0.59	7.25	Pass
	LCH	6.88	0.68	7.56	Pass
11N HT20	MCH	6.87	0.68	7.55	Pass
20	HCH	6.42	0.68	7.10	Pass

Remark:

For all the test results has been adjusted the duty cycle factor.
 For Correction Factor is refer to the result in section 7.2



7.5. POWER SPECTRAL DENSITY

LIMITS

FCC Part15 (15.247) Subpart C, ISED RSS-247 ISSUE 2				
Section Test Item Limit Frequency Range (MHz)				
FCC §15.247 (e) ISED RSS-247 5.2 (b)	Power Spectral Density	8 dBm in any 3 kHz band	2400-2483.5	

TEST PROCEDURE

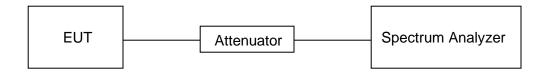
Refer to FCC KDB 558074, connect the UUT to the spectrum analyser and use the following settings:

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	3 kHz ≤ RBW ≤100 kHz
VBW	≥3 × RBW
Span	1.5 x DTS bandwidth
Trace	Max hold
Sweep time	Auto couple.

Allow trace to fully stabilize and use the peak marker function to determine the maximum amplitude level within the RBW.

If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

TEST SETUP





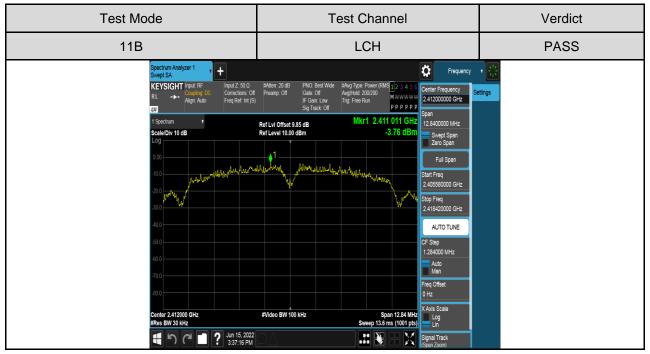
RESULTS

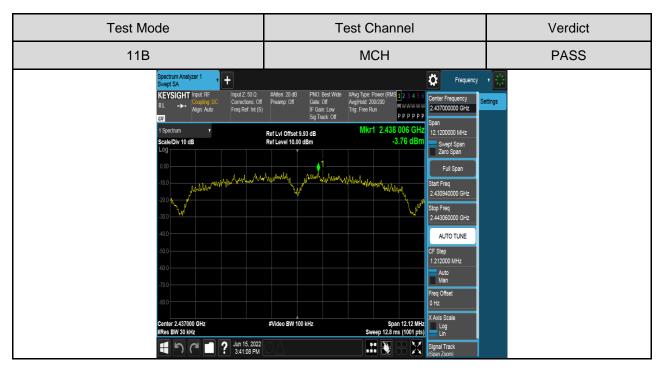
For Normal Testing Part:

Test Mode	Test Channel	Maximum Peak power spectral density (dBm/30kHz)	Result
	LCH	-3.76	Pass
11B	MCH	-3.76	Pass
	HCH	-4.07	Pass
	LCH	-8.67	Pass
11G	MCH	-8.72	Pass
	HCH	-8.89	Pass
	LCH	-8.04	Pass
11N HT20	MCH	-8.24	Pass
	НСН	-8.07	Pass



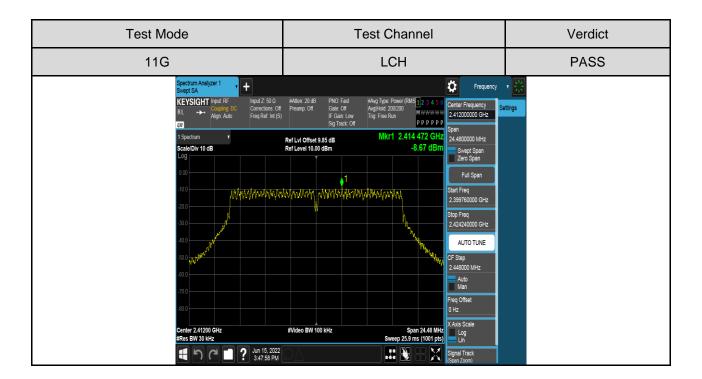
Test Graphs:





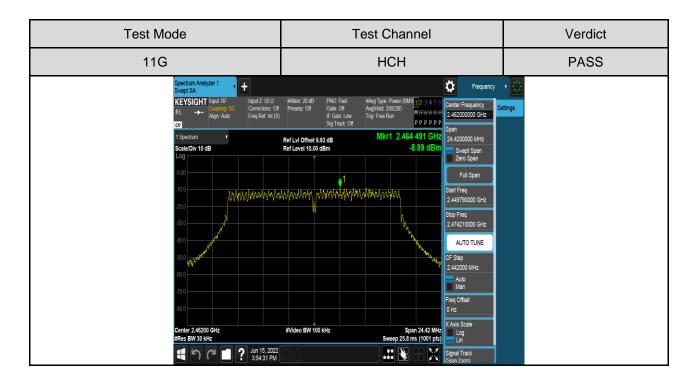


Test Mode	Test Channel	Verdict
11B	НСН	PASS
Spectrum Analyzer 1 Swept SA KEYSIGHT Input RF RL Capacity 1 0 dB Log 000 1 Spectrum * ScaleDiv 10 dB Log 000 10 0 000 10 0 000 10 0 000 10 0 000 10 0 000 10 0 000 10 0 000 10 0 000 10 0 000 10 0 10 0	IF Cam Low Sg Track 0ff Trig Free Run P P P P P P P P P P P P P P P P P P P Span Span Span Ref Lvi Offset 9.93 dB Mkr1 2.460 998 GHz Span Span Span 4.07 GBm 4.07 GBm Zero Span Full Span 4.07 GBm 4.07 GBm Zero Span Start Freq 2.455580000 GHz Start Freq 2.455580000 GHz 4.07 GBm GF Step 1.2 84000 MHz Start Freq 2.45580000 GHz Start Freq 2.45580000 GHz Start Freq 2.45580000 GHz 4.00 MHz Man Freq Offset 0 Hz Man Freq Offset 0 Hz Man Fwideo BW 100 kHz Span 12.84 MHz Log Log Log Log	Settings



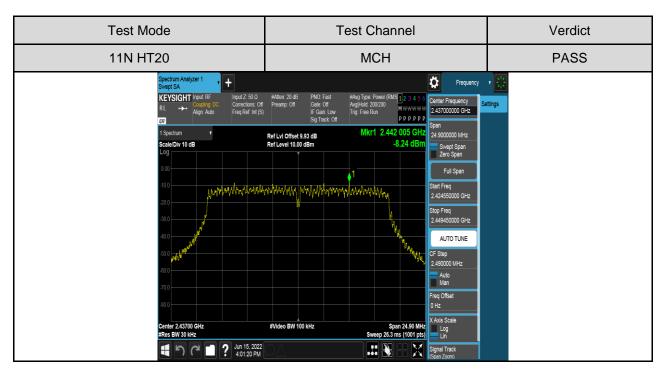


Test Mode		Test Channel			Verdict
11G			MCH		PASS
	Spectrum Analyzer 1 • •	Preamp: Off Gate: Off Avg	In our 20200 M WWWWW 2 P P P P P P P P P P P P P S M Kr1 2.430 748 GHz 2 Z -8.72 dBm S S S 4/4/WWW - S S S 1 - - S S S 1 - - - S S S 1 - - - - S	enter Frequency 437000000 GHz	fings





Test Mode	Test Channel	Verdict
11N HT20	LCH	PASS
Spectrum Analyzer 1 Swept SA KEYSIGHT Input RF RL → Caper California ScaleDiv 10 dB Log 0 00 10 0 20 0 0 00 0 0 0 0 0 0 0 0 0 0	IF Cam. Low Sig Track: Off Ting: Free Run MWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW	ettings





Test Mode	Test Channel	Verdict
11N HT20	НСН	PASS
Spectrum Analyzer 1 Swept SA KEVSIGHT Input RF RL ++ Common OC Scale Div 10 dB Log 0 00 -00 -00 -00 -00 -00 -00 -0	IF Cam. Low Sg Track: Off Trig: Free Run IP P P P P P 2.48200000 GHz Span Ref Lvi Offset 9.93 dB Mkr1 2.467 004 GHz Span 2.600000 MHz 2.807 dBm Span Ref Lvie 10.00 dBm -8.07 dBm Statt Freq 2.449490000 GHz Statt Freq 2.449490000 GHz Statt Freq 2.449490000 GHz Statt Freq 2.47510000 GHz Statt Freq 2.474510000 GHz Statt Freq 2.47451000 GHz 2.47451000 GH	Settings



7.6. CONDUCTED BANDEDGE AND SPURIOUS EMISSIONS

LIMITS

FCC Part15 (15.247) Subpart C, ISED RSS-247 ISSUE 2		
Section Test Item		Limit
FCC §15.247 (d) RSS-247 Clause 5.5 RSS-GEN Clause 6.13	Conducted Bandedge and Spurious Emissions	At least 30 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power

TEST PROCEDURE

Refer to FCC KDB 558074, connect the UUT to the spectrum analyser and use the following

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	100K
VBW	≥3 × RBW
Span	1.5 x DTS bandwidth
Trace	Max hold
Sweep time	Auto couple.

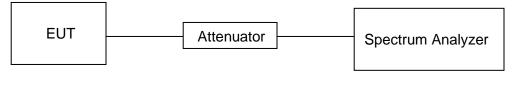
settings:

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

Span	Set the center frequency and span to encompass frequency range to be measured
Detector	Peak
RBW	100K
VBW	≥3 × RBW
measurement points	≥span/RBW
Trace	Max hold
Sweep time	Auto couple.

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

TEST SETUP



Form-ULID-008536-9 V1.0

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Part I :Conducted Bandedge

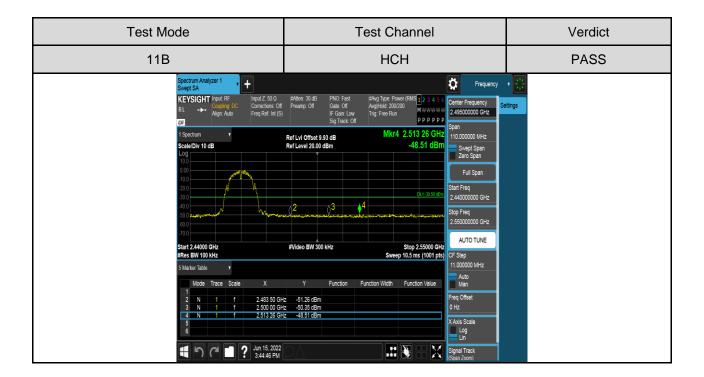
RESULTS TABLE

Test Mode	Test Antenna	Test Channel	Test Result	Verdict
11B	Antenna 1	LCH	See the test graphs	PASS
ПD	Antenna i	НСН	See the test graphs	PASS
11G	Antonno 1	LCH	See the test graphs	PASS
ПG	11G Antenna 1	HCH	See the test graphs	PASS
		LCH	See the test graphs	PASS
11N HT20	Antenna 1	НСН	See the test graphs	PASS



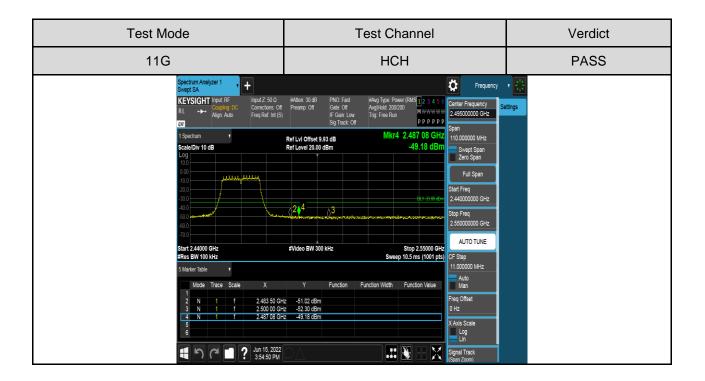
TEST GRAPHS

Test Mode	Test Channel	Verdict
11B	LCH	PASS
Spectrum Analyzer 1 + Snept SA Input Z 50 0 RL → Algor. Auto Tspectrum * ScaleDiv 10 dB 0 L00 0 100 0 200 0 <t< td=""><td>IF Cant. Low Sig Track. Off Trig: Free Run MWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW</td><td>ettings</td></t<>	IF Cant. Low Sig Track. Off Trig: Free Run MWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW	ettings



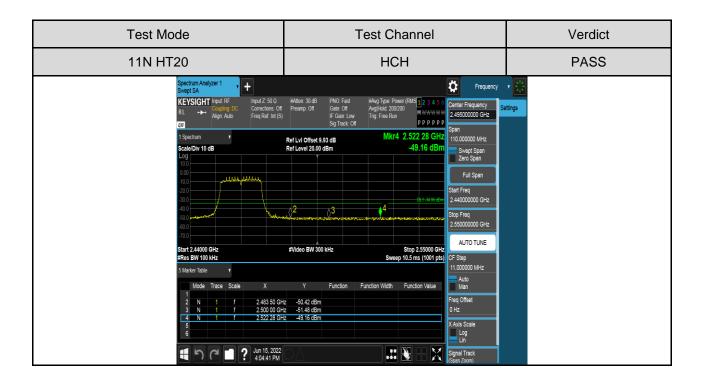


Test Mode	Test Channel	Verdict
11G	LCH	PASS
Spectrum Analyzer 1 + Snegt SA Front 7 500 KEYSIGHT Input RF Connections 00 RL + Align Audo Freq Ref Int (S) CO Scale/Div 10 dB Log 1 100 -	IF Gain Low Sig Track Off Trig Free Run MWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW	etings





Test Mode	Test Channel	Verdict
11N HT20	LCH	PASS
Spectrum Analyzer 1 + Snept SA Imput RF RL - Algor Auto Conectors O 1 Spectrum * Scale/Div 10 dB Conectors O 10 - 300 - 400 - 300 - 300 - 300 - 300 - 300 - 300 - 300 - 300 - 300 - 300 - 300 - 300 - 300 - 300 - 300 - 300 - 300 - 301 - 302 - 303 - 304 - 304 - 304 - 304 - 304<	i) iii Gan Low Sig Track Off Trigi Free Run MWWWW 2 36500000 GHz Sig Track Off Mkr5 2.399 97 GHz Span 130.000000 MHz Ref Lvi Offset 3.85 dB 44.83 dBm Sweet Span Zero Span I UI Offset 3.85 dB 44.83 dBm Sweet Span Zero Span I UI Offset 3.85 dB 100.00000 MHz Sweet Span Zero Span I UI Offset 3.85 dB 100.00000 GHz Start Freq 2.30000000 GHz I UI Offset 3.85 dB Stop 2.40000 GHz Start Freq 2.4000000 GHz I UI Offset 3.86 dBm Stop 2.40000 GHz Start Freq 2.4000000 GHz I UI Offset 3.00 MHz Stop 2.4000 GHz Start Freq 2.4000000 GHz I UI Offset 3.00 MHz Stop 2.4000 GHz Start Freq 2.4000000 GHz I UI Offset 3.00 MHz Stop 2.4000 Hz GF Step 13.00000 MHz I UI Offset 3.00 MHz Function Width Function Value Freq Offset V Function V XAvis Scale Lin I U N U N U N U N U N	ettings



Part II :Conducted Emission

Test Result Tabl	е
-------------------------	---

Test Mode	Test Antenna	Channel	Pref(dBm)	Puw(dBm)	Verdict
		LCH	See the test graphs	<limit< td=""><td>PASS</td></limit<>	PASS
11B SISO	Antenna 1	MCH	See the test graphs	<limit< td=""><td>PASS</td></limit<>	PASS
		HCH	See the test graphs	<limit< td=""><td>PASS</td></limit<>	PASS
		LCH	See the test graphs	<limit< td=""><td>PASS</td></limit<>	PASS
11G SISO	Antenna 1	MCH	See the test graphs	<limit< td=""><td>PASS</td></limit<>	PASS
		HCH	See the test graphs	<limit< td=""><td>PASS</td></limit<>	PASS
		LCH	See the test graphs	<limit< td=""><td>PASS</td></limit<>	PASS
11N HT20	Antenna 1	MCH	See the test graphs	<limit< td=""><td>PASS</td></limit<>	PASS
		HCH	See the test graphs	<limit< td=""><td>PASS</td></limit<>	PASS



Test Plots

Test Mode		Channel	Vordict
	l est Mode	Channel	Verdict
	11B	LCH	PASS

Pref test Plot





Puw test Plot LCH SPURIOUS

lest Plot					
SPURIOUS EM	IISSION_30	MHz~1GHz			
	Spectrum Analyzer 1			Frequency 🔹	
	KEYSIGHT Input: RF	Input Z: 50 Ω #Atten: 20 dB PNO: Corrections: Off Preamp: Off Gate:	Off Available 20/20	6 Center Frequency	
		Freq Ref: Int (S)	ain: Low Trig: Free Run M ₩₩₩₩₩ rack: Off PPP F	515.000000 MHz	
	1 Spectrum v	Ref LvI Offset 9.85 dB	Mkr1 887.54 M		
	Scale/Div 10 dB	Ref Level 15.00 dBm	-61.13 dB	m Swept Span Zero Span	
	5.00			Full Span	
	-5.00			Start Freq	
	-15.0			30.000000 MHz	
	-25.0			Stop Freq 1.000000000 GHz	
	-35.0		DL1-30.74 d	AUTO TUNE	
	-45.0			CF Step	
	-55.0			97.000000 MHz	
	-65.0 gyate 6 40 balate Katalia	na diterente de la constitución de		Auto Man	
	-75.0	C fel Baylin an an general an air ann an còltainn fin ainmir chanair air ainmir air ann an an an an an an an ai	in to be a state of the second se	Freq Offset	
				X Axis Scale	
	Start 0.0300 GHz #Res BW 100 kHz	#Video BW 300 kHz	Stop 1.0000 G Sweep 94.0 ms (30001 p		
	1001?	Jun 15, 2022 3:37:46 PM		Signal Track (Span Zoom)	

LCH SPURIOUS EMISSI	ON_1GHz~26GHz	
Spectrum An Swept SA		uency •
KEYSIGH RL ↔→	Coupling DC Corrections: Of Preamp. Off Gate: Off AugHaid: 30/30 WWWWWW Italian request:	
1 Spectrum Scale/Div 10 Log	5wept Spain	
500 -500 -15.0	1 Zero Span	
-25 0 -35 0 -45 0	C1 - 30 Tradie Start Freq 1.00000000 GH Stop Freq	+z
-50 0 -65 0 -75 0		
Start 1.00 GH #Res BW 10 5 Marker Table	00 kHz Sweep 2.44 s (30001 pts) CF Step	+z
Mode 1 N	1 f 2.411 85 GHz -0.6086 dBm	
2 N 3 4 5	1 f 321595 GHz -47.77 dBm 0Hz 0Hz 0Hz X Avis Scale	
6		
1	C 🖸 ? Jun 15, 2022 Signal Track (Span Zoom)	



Test Mode	Channel	Verdict
11B	MCH	PASS

Pref test Plot





Puw test Plot MCH SPURIOUS E

PURIOUS EMISSI	ION_30MHz	~1GHz			
Spectrum An Swept SA	alyzer 1 +			Frequency	· 深
KEYSIGH RL ↔-	T Input RF Input Z: 50 Ω	#Atten: 20 dB PNO: Fast Preamp: Off Gate: Off IF Gain: Low Sig Track: Off	#Avg Type: Power (RMS 1 2 3 4 5 6 Avg(Hold: 30/30 Trig: Free Run P P P P P P	Center Frequency Se 515.000000 MHz	ettings
1 Spectrum Scale/Div 10 Log		Ref Lvi Offset 9.93 dB Ref Level 15.00 dBm	Mkr1 857.83 MHz -59.75 dBm	Span 970.000000 MHz Swept Span Zero Span	
5.00				Full Span	
-5.00				Start Freq 30.000000 MHz Stop Freq	
-25.0			QL1 -30.49 dBm	1.000000000 GHz AUTO TUNE	
-45.0			1	CF Step 97.000000 MHz	
-65.0 <mark>44444 -65.0 -75.0 - -75.0 -</mark>	un til elisten til fang om en linten blet to blet som else 1995 Avgelander och gegen til kirk bestagt generation til b	y fan henne henne henne henne fan henne fan henne h Henne henne hen Henne henne hen	na tana filika ng mélasak ng Millika kana ng mélasak ng mélasak ng mélasak ng mélasak ng mélasak ng mélasak ng Ng mang baga ng mélasak ng menang menang menang ng menang menang menang menang menang menang menang menang menan	Man Freq Offset 0 Hz	
Start 0.0300 #Res BW 10		#Video BW 300 kHz	Stop 1.0000 GHz Sweep 94.0 ms (30001 pts)	X Axis Scale	
1 5	C I ? Jun 15, 2022 3:41:26 PM	PΔ		Signal Track (Span Zoom)	

MCH SPURIOUS EMISSION_1GHz~26GHz

ICH 3FURIOUS EIVII33IUN_			
Spectrum Analyzer 1 Swept SA	+		Frequency •
KEYSIGHT Input RF RL →→ Coopeng DC Align Auto	Input Z: 50 Ω #Atten: 20 dB PNO: Fast Corrections: Off Preamp: Off Gate: Off Freq Ref: Int (S) IF Gain: Low Sig Track: Off	Trig: Free Run PPPPP	
1 Spectrum v Scale/Div 10 dB	Ref LvI Offset 9.93 dB Ref Level 15.00 dBm	Mkr2 3.249 10 GHz -47.92 dBm	25.5000000 GHz
500 500			Zero Span Full Span
-15.0 -25.0 -35.0		DL1 -30.49 dBm	Start Freq 1.00000000 GHz
45.0 -55.0			Stop Freq 26 50000000 GHz
-00.0 -75.0 Start 1.00 GHz	#Video BW 300 kHz	Stop 26.50 GHz	AUTO TUNE
#Res BW 100 kHz 5 Marker Table		Sweep 2.44 s (30001 pts)	
Mode Trace Scale	2.438 20 GHz -1.417 dBm	Function Width Function Value	Auto Man
2 N 1 f 3 4	3.249 10 GHz -47.92 dBm		Freq Offset 0 Hz
5 6			X Axis Scale Log Lin
	? Jun 15, 2022 3:42:51 PM		Signal Track (Span Zoom)



Test Mode	Channel	Verdict
11B	НСН	PASS

Pref test Plot





Puw test Plot

HCH SPURIOUS EN	/ISSION_30MH	z~1GHz			
	Spectrum Analyzer 1			🗱 Frequency 🔹 🌟	
	KEYSIGHT Input: RF Input: 2:50 C RL ↔ Coupling: DC Corrections: Align: Auto Freq Ref: Int	Off Preamp: Off Gate: Off	#Avg Type: Power (RMS <mark>1</mark> 23456 Avg Hold: 30/30 Trig: Free Run PPPPPP	Center Frequency Settings	
	1 Spectrum v Scale/Div 10 dB Log	Ref LvI Offset 9.93 dB Ref Level 15.00 dBm	Mkr1 874.00 MHz -61.16 dBm	Span 970.00000 MHz Swept Span Zero Span	
	-5.00			Full Span Start Freq	
	-15.0		DL1-30.58 dBm	30.000000 MHz Stop Freq 1.00000000 GHz	
	-35.0			AUTO TUNE CF Step 97.000000 MHz	
	-55.0	u ostalistatikalmeter az eterteketer ént	1 Ale protis en plaise bistelie di Balti di Balti di Ale	Auto Man	
	-75.0			Freq Offset 0 Hz	
	Start 0.0300 GHz #Res BW 100 kHz	#Video BW 300 kHz	Stop 1.0000 GHz Sweep 94.0 ms (30001 pts)		
	Jun 15, 20 3:44:57 P	22 M		Signal Track ((Span Zoom)	

HCH SPURIOUS EMISSION_1GHz~26GHz + Ö Frequency ctrum pt SA PNO: Fast Gate: Off IF Gain: Low Sig Track: Off #Avg Type: Pow Avg|Hold: 30/30 Trig: Free Run KEYSIGHT Input R input Z: 50 C en: 20 di ımp: Off Corrections: Off Freq Ref: Int (S) nter Frequency ettings 13.750000000 GHz Align: Auto M****** PPPPP pan Mkr2 3.282 25 GH Ref LvI Offset 9.93 dB Ref Level 15.00 dBm 25.5000000 GHz -47.38 dE ale/Div 10 dB Swept Span Zero Span Start Freq 1.000000000 GHz Stop Freq 000 GHz 26.50000 AUTO TUNE Stop 26.50 GHz Sweep 2.44 s (30001 pts) #Video BW 300 kHz Start 1.00 GHz #Res BW 100 kHz CF Step 100 GHz Auto Man Trace Scale X 2.461 15 GHz Function Function Width Function Valu -1.596 dBm -47.38 dBm Freq Offset 0 Hz 82 25 GHz X Axis Scale Log Lin リーン (15, 2022) 3:46:22 PM # X Signal Track



Test Mode	Channel	Verdict	
11G	LCH	PASS	

Pref test Plot

