

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

CERTIFICATION TEST REPORT

For

Electronic Scale

MODEL NUMBER: UNI-8P

PROJECT NUMBER: 4790752179

REPORT NUMBER: 4790752179-8

FCC ID: 2BAGW-UNI8P

IC: 30176-UNI8P

HVIN: UNI-8P

ISSUE DATE: Apr. 20, 2023

Prepared for

SHANGHAI ISHIDA ELECTRONIC SCALES CO LTD

Prepared by

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Revision History

Rev.	Issue Date	Revisions	Revised By
V0	04/20/2023	Initial Issue	



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1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name: SHANGHAI ISHIDA ELECTRONIC SCALES CO LTD Address: Building 2, No. 86, Minxue Rd, Pudong, Shanghai

Manufacturer Information

Company Name: SHANGHAI ISHIDA ELECTRONIC SCALES CO LTD Address: Building 2, No. 86, Minxue Rd, Pudong, Shanghai

EUT Description

Product Name: Electronic Scale

Model Name: UNI-8P

Additional No.: //
Model Difference: //

Sample Number: 5891986
Data of Receipt Sample: Mar. 27, 2023

Test Date: Mar. 27, 2023~ Apr. 18, 2023

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



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Summary of Test Results					
Clause	Test Items	Test Results			
1	6dB Bandwidth and 99% Occupied Bandwidth	FCC 15.247 (a) (2) RSS-247 Clause 5.2 (a) RSS-Gen Clause 6.7	PASS		
2	Conducted Power	FCC 15.247 (b) (3) RSS-247 Clause 5.4 (d) RSS-Gen Clause 6.12	PASS		
3	Power Spectral Density	FCC 15.247 (e) RSS-247 Clause 5.2 (b)	PASS		
4	Conducted Band edge And Spurious emission	FCC 15.247 (d) RSS-247 Clause 5.5 RSS-GEN Clause 6.13	PASS		
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	PASS		
6	Conducted Emission Test for AC Power Port	FCC 15.207 RSS-GEN Clause 8.8	PASS		
7	Antenna Requirement	FCC 15.203 RSS-GEN Clause 6.8	PASS		

Note:

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.

RSS-GEN Clause 6.8

Prepared By:	Reviewed By:
Tom Tang	Leon Wu
Tom Tang	Leon Wu

Authorized By:

Chris Zhong

EMC&RF Lab Operations Manager



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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with KDB 558074 D01 15.247 Meas Guidance v05r02, 414788 D01 Radiated Test Site v01r01, CFR 47 FCC Part 2, CFR 47 FCC Part 15, ANSI C63.10-2013, ISED RSS-247 Issue 2 and ISED RSS-GEN Issue 5.

3. FACILITIES AND ACCREDITATION

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



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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
Maximum Conduct Output Power	± 1.3dB
DTS Bandwidth	±1.9 %
Maximum Conducted Output Power	± 0.69dB
Maximum Power Spectral Density Level	±1.5 dB
Band-edge Compliance	± 1.9%
Unwanted Emissions in Non-restricted Freq Bands	9kHz-30MHz: ±0.90dB 30MHz-1GHz: ±1.5 dB 1GHz-12.75GHz: ±1.9dB 12.75GHz-26.5GHz: ±2.1dB
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)	3.5dB (1GHz-18GHz)
Note: This uncertainty represents an expanded unc	3.9dB (18GHz-26.5GHz)

Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

Product Name:	Electronic Scale		
Model No.:	UNI-8P		
Operating Frequency:	IEEE 802.11B/G/N(HT20): 2412MHz to 2462MHz IEEE 802.11N(HT40): 2422MHz to 2452MHz		
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 and HT40): OFDM (64QAM, 16QAM, QPSK, BPSK)		
Channels Step:	Channels with 5MHz step		
Sample Type:	Fixed production		
Test software of EUT:	PowerShell (manufacturer declare)		
Antenna Type:	FPC Antenna		
	6.51 dBi		
Antenna Gain:	Note: This data is provided by customer and our lab isn't responsible for this data.		



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5.2. **MAXIMUM OUTPUT POWER**

Number of Transmit Chains (NTX)	IEE Std. 802.11	Channel Number	Max AVG Conducted Power (dBm)
1	IEEE 802.11B	1-11[11]	12.95
1	IEEE 802.11G	1-11[11]	12.21
1	IEEE 802.11N HT20	1-11[11]	12.06
1	IEEE 802.11N HT40	3-9[7]	9.53

5.3. CHANNEL LIST

Channel List for 802.11B/G/N(20 MHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	4	2427	7	2442	10	2457
2	2417	5	2432	8	2447	11	2462
3	2422	6	2437	9	2452		

Channel List for 802.11N(40 MHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
3	2422	5	2432	7	2442	9	2452
4	2427	6	2437	8	2447		



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5.4. TEST CHANNEL CONFIGURATION

Test Mode	Test Channel (MHz)
	LCH: CH01 2412
IEEE 802.11B	MCH: CH06 2437
	HCH: CH11 2462
	LCH: CH01 2412
IEEE 802.11G	MCH: CH06 2437
	HCH: CH11 2462
	LCH: CH01 2412
IEEE 802.11N HT20	MCH: CH06 2437
	HCH: CH11 2462
	LCH: CH03 2422
IEEE 802.11N HT40	MCH: CH06 2437
	HCH: CH09 2452

5.5. THE WORSE CASE POWER SETTING PARAMETER

The Worse Case Power Setting Parameter under 2400 ~ 2483.5MHz Band							
Test Softw	vare			Powe	erShell		
	Transmit			Test C	: Channel		
Modulation Mode	Antenna		NCB: 20MHz			ICB: 40MHz	7
IVIOGO	Number	CH 1	CH 6	CH 11	CH 3	CH 6	CH 9
802.11B	1	36	36	36			
802.11G	1	44	44	44	/		
802.11N HT20	1	44	44	44			
802.11N HT40	1	/ 38 38 38				38	



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5.6. DESCRIPTION OF AVAILABLE ANTENNAS

Ant.	Frequency (MHz)	Antenna Type	Antenna Gain (dBi)
1	2400-2483.5	FPC Antenna	6.51

Note: This data is provided by customer and our lab isn't responsible for this data.

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.
IEEE 802.11N HT40	⊠1TX, 1RX	Antenna1 can be used as transmitting/receiving antenna independently.

5.7. THE WORSE CASE CONFIGURATIONS

For WIFI module, the worst-case data rates as provided by the client were:

802.11B mode: 1 Mbps 802.11G mode: 6 Mbps 802.11N HT20 mode: MCS0 802.11N HT40 mode: MCS0

5.8. TEST ENVIRONMENT

Environment Parameter	Selected Values During Tests				
Relative Humidity	55 ~ 65%				
Atmospheric Pressure:	1025Pa				
Temperature	TN	23 ~ 28°C			
	VL	N/A			
Voltage:	VN	AC 120V			
	VH	N/A			

Note: VL= Lower Extreme Test Voltage

VN= Nominal Voltage

VH= Upper Extreme Test Voltage

TN= Normal Temperature



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5.9. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Item	Equipment	Brand Name	Model Name	Description
1	Laptop	ThinkPad	E590	Supplied by UL Lab

I/O PORT

Cable No	Port	Connector Type	Cable Type	Cable Length(m)	Remarks
1	LAN	LAN	LAN	100cm Length	1
2	USB	USB	USB	100cm Length	1

ACCESSORY

Item	Accessory	Brand Name	Model Name	Description
1	TF Card	SanDisk	A1	32G
2	Mouse	Lenovo	EMS-537A	Supplied by UL Lab
3	Keyboard	ASUS	PK1100U	Supplied by UL Lab
4	Headset	PHILIPS	SHE6000	Supplied by UL Lab

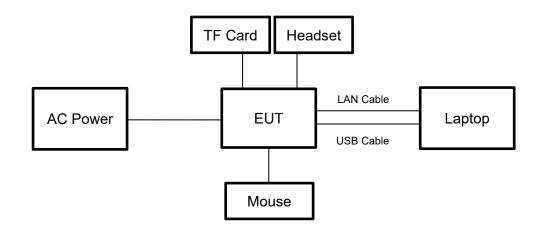


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TEST SETUP

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

SETUP DIAGRAM FOR TESTS





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5.10. MEASURING INSTRUMENT AND SOFTWARE USED

	Conducted Emissions (Instrument)								
Used	Equipment	Manufacturer	Model	No.	Seria	al No.	Upper Last Cal.	Last Cal.	Next Cal.
	EMI Test Receiver	R&S	ESR	13	126	6700	2021-12-04	2022-12-03	2023-12-02
$\overline{\checkmark}$	Two-Line V-Network	R&S	ENV2	216	126	6701	2021-12-04	2022-12-03	2023-12-02
\square	Artificial Mains Networks	R&S	ENY	81	126	6712	2021-10-12	2022-10-09	2023-10-08
				Soft	ware				
Used	Des	cription		Ма	nufac	turer	Name	Version	
$\overline{\checkmark}$	Test Software for 0	Conducted distur	bance		R&S		EMC32	Ver. 9.25	
		Ra	diated E	missi	ions (Instrum	ent)		
Used	Equipment	Manufacturer	Model		•	al No.	Upper Last Cal.	Last Cal.	Next Cal.
$\overline{\checkmark}$	EMI test receiver	R&S	ESR	27	222	2993	/	2022-05-20	2023-05-19
$\overline{\checkmark}$	EMI test receiver	R&S	ESR	26	126	6703	2021-12-04	2022-12-03	2023-12-02
	Spectrum Analyzer	R&S	FSV30	044	222	2992	/	2022-05-27	2023-05-26
	Receiver Antenna (9kHz-30MHz)	Schwarzbeck	FMZB ²	1513	15	5456	2018-06-15	2021-06-03	2024-06-02
	Receiver Antenna (30MHz-1GHz)	Schwarzbeck	VULB 9	9163	126	6704	2019-01-19	2022-01-18	2025-01-17
V	Receiver Antenna (1GHz-18GHz)	R&S	HF90	07	126	6705	2019-01-27	2022-02-28	2025-02-27
	Receiver Antenna (18GHz-26.5GHz)	Schwarzbeck	BBHA9	9170	126	6706	2019-02-29	2022-02-28	2025-02-27
V	Pre-amplification (To 18GHz)	Tonscned	TAP010 ²	18050	224	1539	/	2022-10-20	2023-10-19
V	Pre-amplification (To 18GHz)	R&S	SCU-1	18D	134	1667	2021-12-04	2022-12-03	2023-12-02
	Pre-amplification (To 26.5GHz)	R&S	SCU-2	26D	13	5391	2021-12-04	2022-12-03	2023-12-02
V	Band Reject Filter	Wainwright	WRCG' 2375-2- 2485-2- 40S	400- 510-		1	2021-05-09	2022-05-08	2023-05-07
	High Pass Filter	COM-MW	ZBF13-3 01	-18G-		2	2021-05-09	2022-05-08	2023-05-07
				Soft	ware				
Used	Descr	ription	Ma	anufac	turer		Name	Version	
$\overline{\checkmark}$	Test Software for R	adiated disturbar	nce Tonsce		nd		TS+	Ver. 2.5	
$\overline{\checkmark}$	Test Software for R	adiated disturbar				R	E_RSE	Ver. 3.03	
Other instruments									
Used	Equipment	Manufacturer	Model No.		Seria	al No.	Upper Last Cal.	Last Cal.	Next Cal.
	Spectrum Analyzer	Keysight	N901	0B	15	5368	2022-04-09	2023-04-08	2024-04-07
$\overline{\checkmark}$	Power Meter	MWT	MW100-	RFCB	22	1694	1	2022-05-23	2023-05-22
	Attenuator	PASTERNACK	PE708	37-6	16	624	/	2022-05-23	2023-05-22



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6. MEASUREMENT METHODS

No.	Test Item	KDB Name	Section
1	6dB Bandwidth and 99% Occupied Bandwidth	KDB 558074 D01 15.247 Meas Guidance v05r02	8.2
2	Output Power	KDB 558074 D01 15.247 Meas Guidance v05r02	8.3.2.3 (Method AVGSA-2)
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



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7. ANTENNA PORT TEST RESULTS

7.1. ON TIME AND DUTY CYCLE

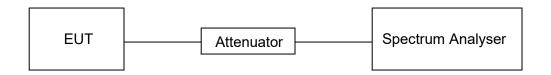
LIMITS

None; for reporting purposes only

PROCEDURE

FCC KDB 558074 Zero-Span Spectrum Analyzer Method

TEST SETUP



TEST ENVIRONMENT

Temperature	22°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	AC 120V

TEST RESULTS TABLE

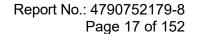
Mode	On Time (msec)	Period (msec)	Duty Cycle x (Linear)	Duty Cycle (%)	Duty Cycle Correction Factor (db)	1/T Minimum VBW (kHz)	Final VBW (kHz)
11B	12.42	12.50	0.9936	99.36%	0.03	N/A	0.01
11G	2.06	2.16	0.9450	94.50%	0.25	0.49	1
802.11N HT20	1.92	2.04	0.9412	94.12%	0.26	0.52	1
802.11N HT40	0.94	1.01	0.8868	88.68%	0.52	1.06	2

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

2) Where: x is Duty Cycle (Linear)

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

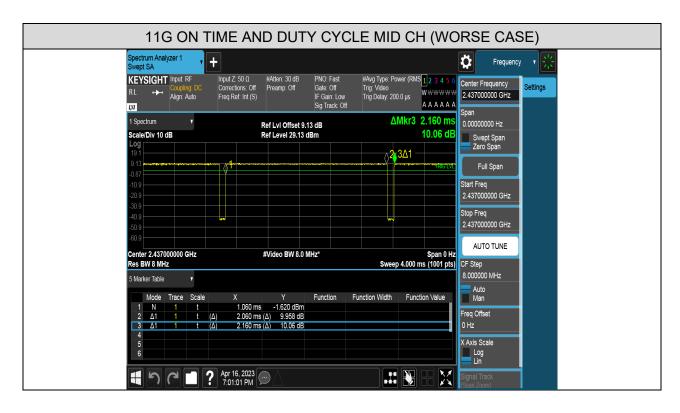
4) If the duty cycle is above 98%, the Final VBW is 10Hz.

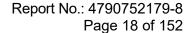




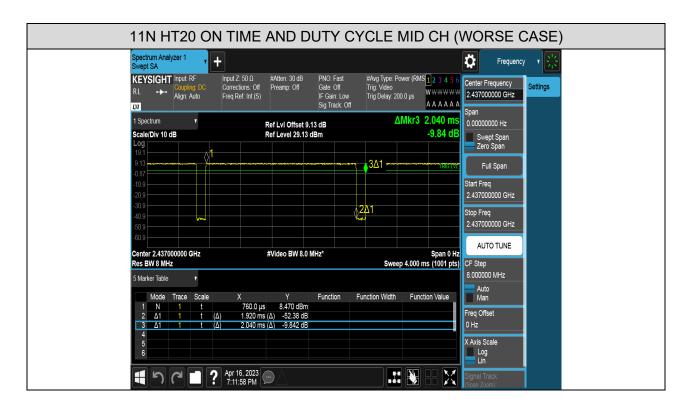
TEST GRAPHS















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7.2. 6 dB BANDWIDTH AND 99% OCCUPIED BANDWIDTH

LIMITS

FCC Part15 (15.247), Subpart C						
Section Test Item Limit Frequency Range (MHz)						
CFR 47 FCC 15.247(a)(2) ISED RSS-247 5.2 (a)	6dB Bandwidth	>= 500kHz	2400-2483.5			
ISED RSS-Gen Clause 6.7	99 % Occupied Bandwidth	For reporting purposes only	2400-2483.5			

TEST PROCEDURE

Refer to ANSI C63.10-2013 clause 11.8 for DTS bandwidth and clause 6.9 for Occupied Bandwidth.

Connect the EUT to the spectrum analyser and use the following settings:

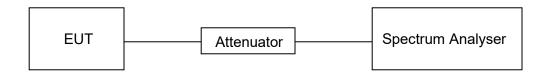
Center Frequency	The centre frequency of the channel under test
Detector	Peak
IRRW	For 6 dB Bandwidth: 100 kHz For 99 % Occupied Bandwidth: 1 % to 5 % of the occupied bandwidth
IV/RW	For 6 dB Bandwidth: ≥3 × RBW For 99 % Occupied Bandwidth: ≥3 × RBW
Trace	Max hold
Sweep	Auto couple

- a) Use the 99 % power bandwidth function of the instrument, allow the trace to stabilize and report the measured bandwidth.
- b) 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.



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TEST SETUP



TEST ENVIRONMENT

Temperature	22°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	AC 120V

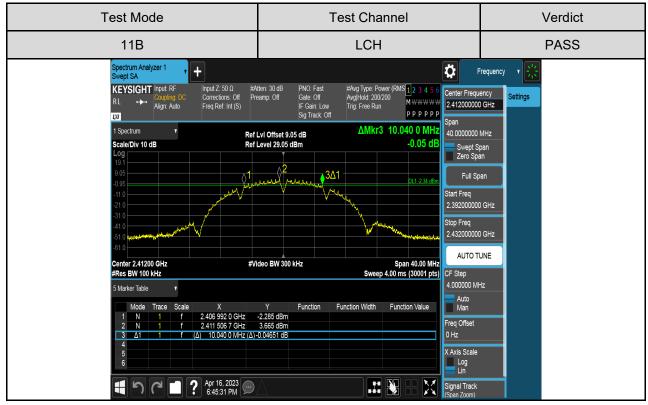
TEST RESULTS TABLE

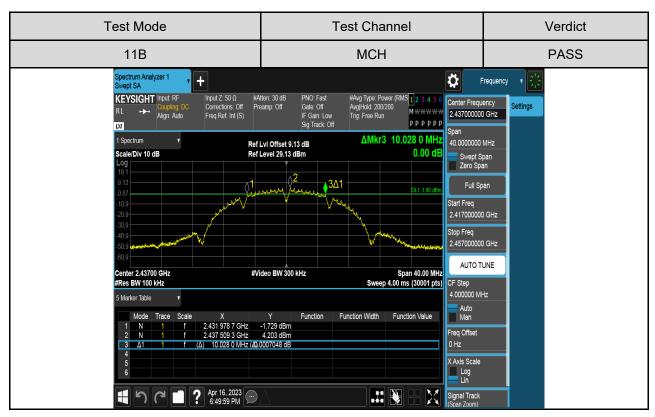
Test Mode	Test Channel	6dB bandwidth (MHz)	99% bandwidth (MHz)	Result
	LCH	10.0400	14.751	Pass
11B	MCH	10.0280	14.719	Pass
	HCH	9.5240	14.761	Pass
	LCH	16.3027	16.571	Pass
11G	MCH	16.3333	16.556	Pass
	HCH	16.3347	16.573	Pass
	LCH	17.5627	17.738	Pass
11N HT20	MCH	17.3187	17.733	Pass
	HCH	17.5280	17.738	Pass
	LCH	34.2213	36.055	Pass
11N HT40	MCH	35.3173	36.058	Pass
	HCH	35.2667	36.151	Pass

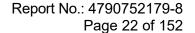


TEST GRAPHS

6dB Bandwdith

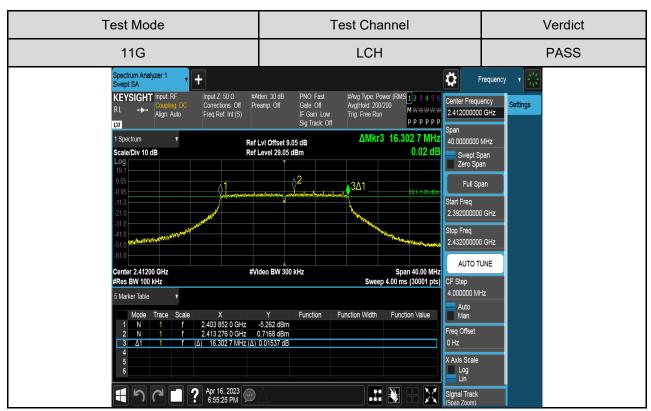


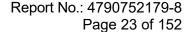






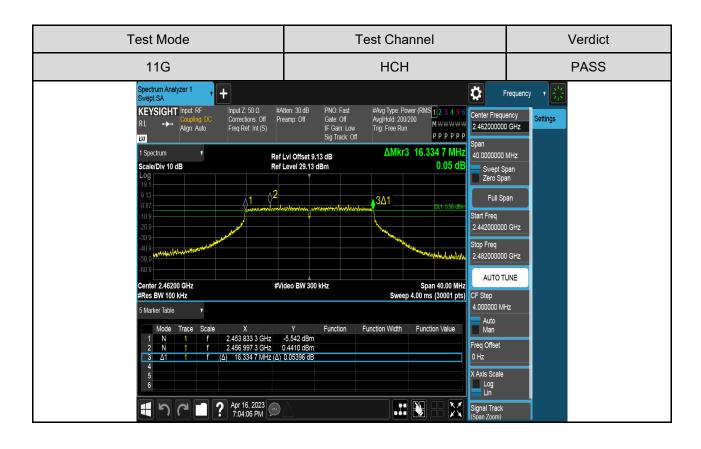






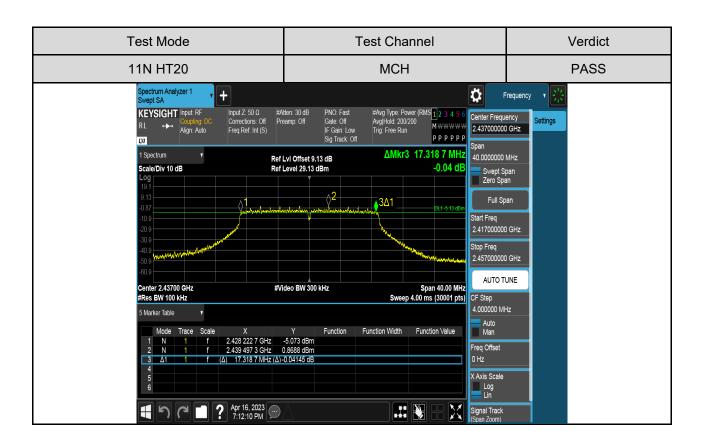


Test Mode Test Channel Verdict 11G **MCH PASS** Spectrum Analyzer 1 Swept SA Ö Frequency PNO: Fast Gate: Off IF Gain: Low Sig Track: Off Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) #Atten: 30 dB Preamp: Off #Avg Type: Power (RMS 1 2 3 4 5 Avg|Hold: 200/200 Trig: Free Run KEYSIGHT Input: RF Center Frequency Align: Auto 2.437000000 GHz PPPPPP LXI ΔMkr3 16.333 3 MHz 1 Spectrum Ref LvI Offset 9.13 dB Ref Level 29.13 dBm 40.0000000 MHz Scale/Div 10 dB -0.01 dE Swept Span Zero Span Full Span Start Freq 2.417000000 GHz Stop Freq 2.457000000 GHz AUTO TUNE Span 40.00 MHz Sweep 4.00 ms (30001 pts) Center 2.43700 GHz #Video BW 300 kHz #Res BW 100 kHz 4.000000 MHz Auto Man Function Function Width Function Value Trace Scale 2.428 825 3 GHz -5.304 dBm 2.435 737 3 GHz 0.6665 dBm (Δ) 16.333 3 MHz (Δ)0.008247 dB req Offset Λ1 X Axis Scale Log Lin Apr 16, 2023 7:01:12 PM X # N Signal Tracl (Span Zoom)



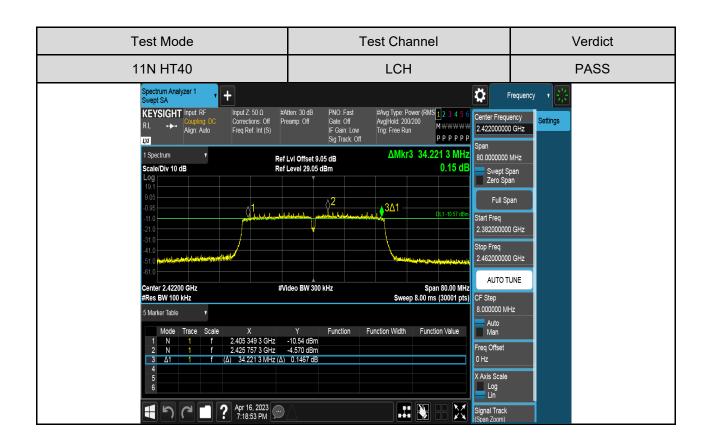


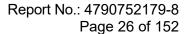
Test Channel Verdict **Test Mode** 11N HT20 LCH **PASS** Ö Frequency Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) #Avg Type: Power (RMS 1 2 3 4 5 6 Avg|Hold: 200/200 Trig: Free Run #Atten: 30 dB Preamp: Off KEYSIGHT Input: RF Align: Auto 2.412000000 GHz PPPPPP LXI ΔMkr3 17.562 7 MHz 1 Spectrum 40.0000000 MHz Ref LvI Offset 9.05 dB Ref Level 29.05 dBm -0.01 dB Scale/Div 10 dB Full Span 3∆1 2.392000000 GHz 2.432000000 GHz AUTO TUNE Center 2.41200 GHz #Video BW 300 kHz Span 40.00 MHz #Res BW 100 kHz Sweep 4.00 ms (30001 pts) CF Step 4 000000 MHz 5 Marker Table Function Function Width Function Value 2.403 230 7 GHz -6.015 dBm 2.409 510 7 GHz -0.03196 dBm req Offset (Δ) 17.562 7 MHz (Δ)-0.01086 dE X Axis Scale Log Lin ? Apr 16, 2023 # N Signal Track (Span Zoom)





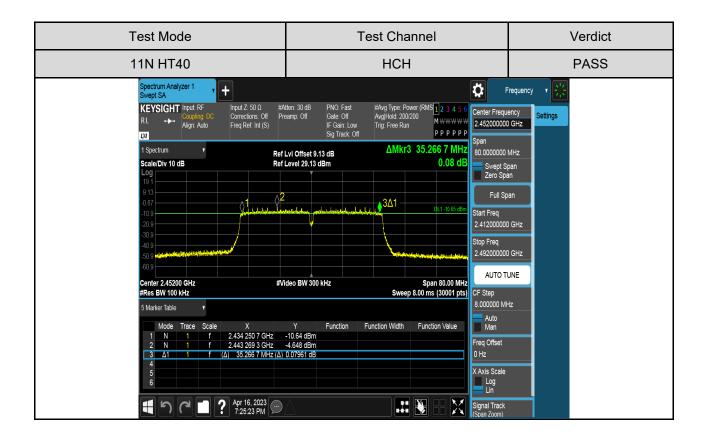
Page 25 of 152 **Test Channel** Verdict **Test Mode** 11N HT20 **HCH PASS** Ö Frequency Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) #Avg Type: Power (RMS 1 2 3 4 5 6 Avg|Hold: 200/200 Trig: Free Run #Atten: 30 dB Preamp: Off KEYSIGHT Input: RF Center Frequency RL Align: Auto 2.462000000 GHz PPPPPP LXI ΔMkr3 17.528 0 MHz 1 Spectrum 40.0000000 MHz Ref LvI Offset 9.13 dB Ref Level 29.13 dBm 0.01 dE Scale/Div 10 dB Full Span 3∆1 2.442000000 GHz 2.482000000 GHz AUTO TUNE Center 2,46200 GHz #Video BW 300 kHz Span 40.00 MHz #Res BW 100 kHz Sweep 4.00 ms (30001 pts) CF Step 4 000000 MHz 5 Marker Table Function Function Width Function Value 2.453 240 0 GHz 2.464 508 0 GHz -5.262 dBm 0.7263 dBm req Offset (Δ) 17.528 0 MHz (Δ)0.008573 dB X Axis Scale Log Lin ? Apr 16, 2023 7:15:48 PM # N Signal Track (Span Zoom)







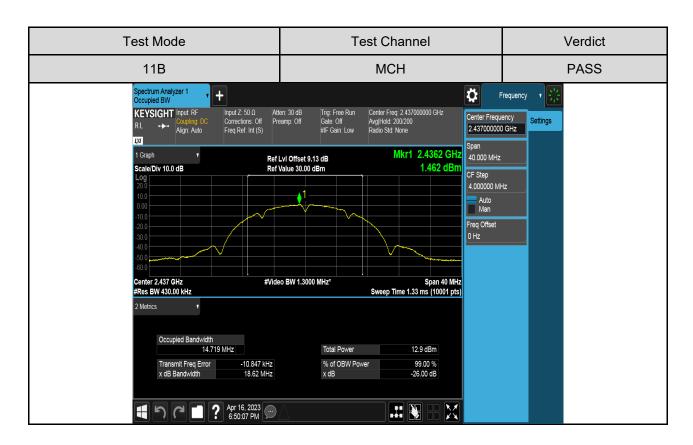
Test Channel Verdict **Test Mode** 11N HT40 **MCH PASS** Ö Frequency Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) #Avg Type: Power (RMS 1 2 3 4 5 0 Avg|Hold: 200/200 Trig: Free Run #Atten: 30 dB Preamp: Off KEYSIGHT Input: RF Align: Auto 2.437000000 GHz PPPPPP LXI ΔMkr3 35.317 3 MHz 1 Spectrum 80.0000000 MHz Ref LvI Offset 9.13 dB Ref Level 29.13 dBm 0.00 dE Scale/Div 10 dB Full Span _3Δ1 2.397000000 GHz 2.477000000 GHz AUTO TUNE #Video BW 300 kHz Center 2,43700 GHz Span 80.00 MHz Sweep 8.00 ms (30001 pts) #Res BW 100 kHz CF Step 8.000000 MHz 5 Marker Table Function Function Width Function Value 2.419 426 7 GHz 2.431 981 3 GHz -10.55 dBm -4.584 dBm req Offset (Δ) 35.317 3 MHz (Δ)0.003325 dB X Axis Scale Log Lin ? Apr 16, 2023 7:22:37 PM # N Signal Track (Span Zoom)



99% Bandwidth

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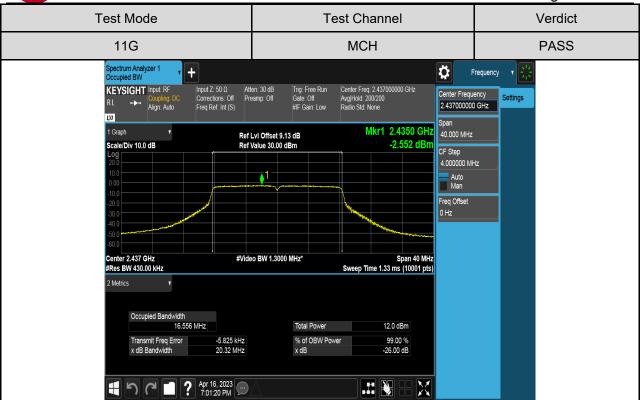


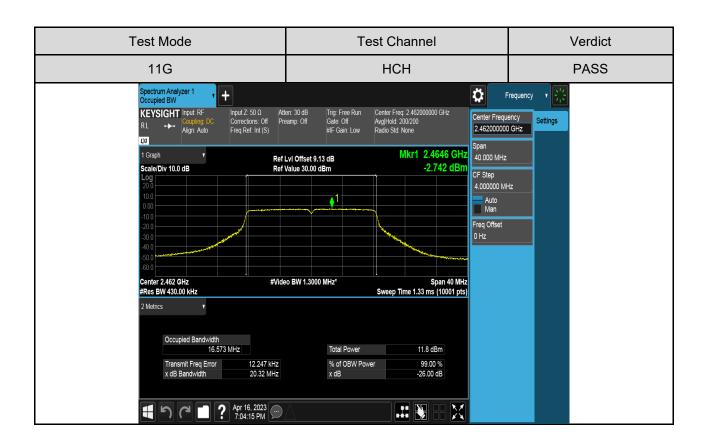








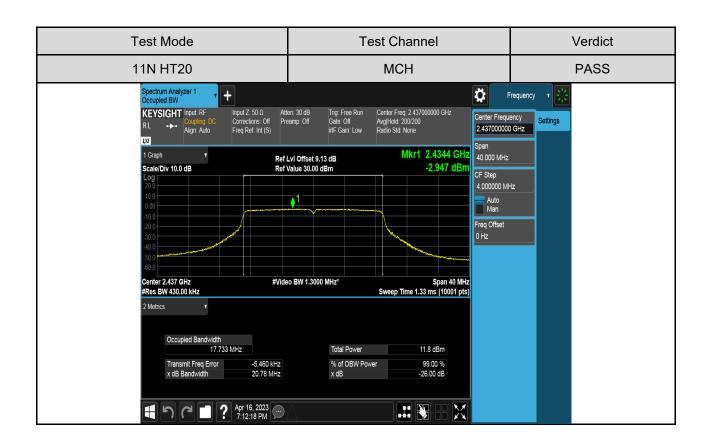


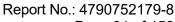






Test Channel Verdict **Test Mode** 11N HT20 LCH **PASS** Spectrum Analyzer 1 Occupied BW Ö Frequency Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) KEYSIGHT Input: RF Atten: 30 dB Preamp: Off Trig: Free Run Gate: Off Center Freq: 2.412000000 GHz Center Frequency Avg|Hold: 200/200 Radio Std: None RL Align: Auto 2.412000000 GHz #IF Gain: Low LXI 1 Graph Mkr1 2.4156 GHz 40.000 MHz Ref LvI Offset 9.05 dB Ref Value 30.00 dBm -3.439 dBi Scale/Div 10.0 dB 4.000000 MHz Auto Man Freq Offset Span 40 MHz Sweep Time 1.33 ms (10001 pts) Center 2.412 GHz #Res BW 430.00 kHz #Video BW 1.3000 MHz* 2 Metrics Occupied Bandwidth 17.738 MHz Total Power 11.3 dBm 99.00 % -26.00 dB Transmit Freq Error 18.351 kHz x dB Bandwidth 20.87 MHz x dB ? Apr 16, 2023 7:07:40 PM # N 56







x dB Bandwidth

56

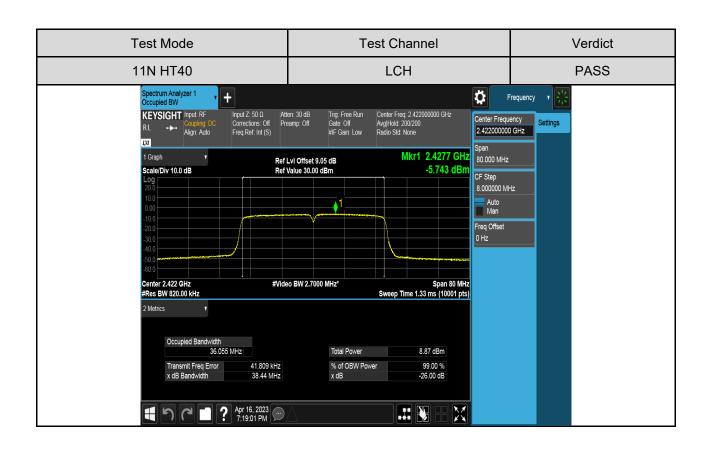
20.97 MHz

? Apr 16, 2023 7:15:57 PM

Page 31 of 152 **Test Channel** Verdict **Test Mode** 11N HT20 **HCH PASS** Ö Frequency Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) KEYSIGHT Input: RF Atten: 30 dB Preamp: Off Trig: Free Run Gate: Off Center Freq: 2.462000000 GHz Center Frequency Avg|Hold: 200/200 Radio Std: None RL Align: Auto 2.462000000 GHz #IF Gain: Low LXI 1 Graph Mkr1 2.4658 GHz 40.000 MHz Ref LvI Offset 9.13 dB Ref Value 30.00 dBm -3.127 dBi Scale/Div 10.0 dB 4.000000 MHz Auto Man Freq Offset Span 40 MHz Sweep Time 1.33 ms (10001 pts) Center 2.462 GHz #Res BW 430.00 kHz #Video BW 1.3000 MHz* 2 Metrics Occupied Bandwidth 17.738 MHz Total Power 11.7 dBm 99.00 % -26.00 dB Transmit Freq Error 11.548 kHz

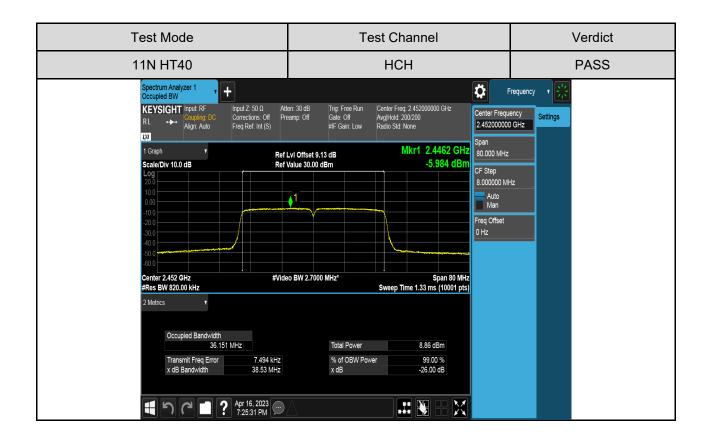
x dB

N





Test Channel Verdict **Test Mode** 11N HT40 **MCH PASS** Spectrum Analyzer 1 Occupied BW Ö Frequency Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) KEYSIGHT Input: RF Atten: 30 dB Preamp: Off Trig: Free Run Gate: Off Center Freq: 2.437000000 GHz Center Frequency Avg|Hold: 200/200 Radio Std: None RL Align: Auto 2.437000000 GHz #IF Gain: Low LXI 1 Graph Mkr1 2.4333 GHz 80.000 MHz Ref LvI Offset 9.13 dB Ref Value 30.00 dBm -5.602 dBi Scale/Div 10.0 dB 8.000000 MHz Auto Man Freq Offset Center 2.437 GHz #Res BW 820.00 kHz Span 80 MHz Sweep Time 1.33 ms (10001 pts) #Video BW 2.7000 MHz* 2 Metrics Occupied Bandwidth 36.058 MHz Total Power 8.98 dBm 99.00 % -26.00 dB Transmit Freq Error 14.915 kHz x dB Bandwidth 38.40 MHz x dB Apr 16, 2023 7:22:45 PM # N 56



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7.3. CONDUCTED OUTPUT POWER

LIMITS

FCC Part15 (15.247), Subpart C			
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

Note: As the transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

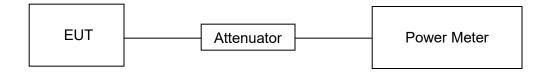
Place the EUT on the table and set it in the transmitting mode.

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

Measure the power of each channel.

AVG Detector used for AVG result.

TEST SETUP





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TEST ENVIRONMENT

Temperature	22°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	AC 120V

TEST RESULTS TABLE

Test Mode	Test Channel	Measurement Output Power (AV)	10log(1/x) Factor	Maximum Conducted Output Power (AV)	LIMIT
		dBm	dBm	dBm	dBm
	LCH	12.50	0.03	12.53	29.49
11B	MCH	12.92	0.03	12.95	29.49
	HCH	12.67	0.03	12.70	29.49
	LCH	11.42	0.25	11.67	29.49
11G	MCH	11.96	0.25	12.21	29.49
	HCH	11.77	0.25	12.02	29.49
	LCH	11.34	0.26	11.60	29.49
11N HT20	MCH	11.80	0.26	12.06	29.49
	HCH	11.71	0.26	11.97	29.49
	LCH	8.79	0.52	9.31	29.49
11N HT40	MCH	9.01	0.52	9.53	29.49
	HCH	8.89	0.52	9.41	29.49



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7.4. POWER SPECTRAL DENSITY

LIMITS

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

TEST PROCEDURE

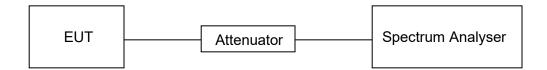
Refer to FCC KDB 558074, connect the UUT to the spectrum analyser and use the following settings:

oottii igo.	
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





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TEST ENVIRONMENT

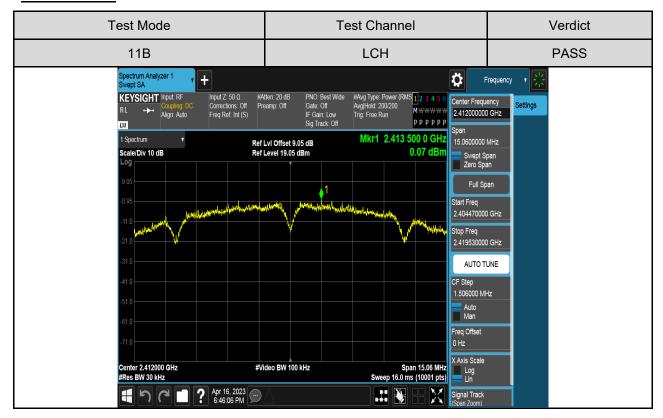
Temperature	22°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	AC 120V

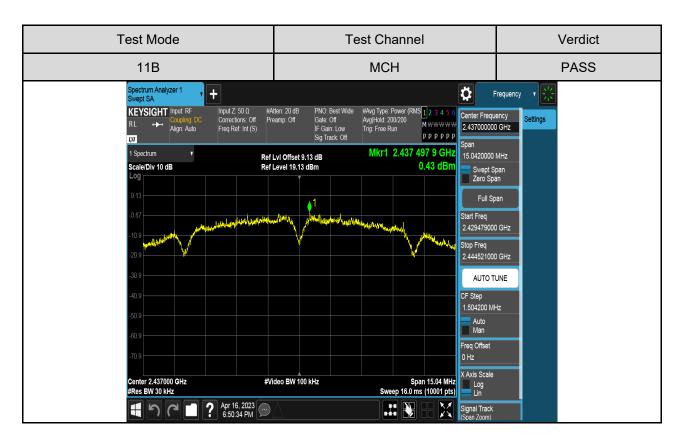
TEST RESULTS TABLE

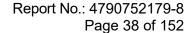
Test Mode	Test Channel	Maximum Peak power spectral density (dBm/30kHz)	Result
	LCH	0.07	Pass
11B	MCH	0.43	Pass
	HCH	0.41	Pass
	LCH	-3.75	Pass
11G	MCH	-3.67	Pass
	HCH	-3.70	Pass
	LCH	-4.86	Pass
11N HT20	MCH	-4.04	Pass
	HCH	-4.13	Pass
	LCH	-9.58	Pass
11N HT40	MCH	-9.72	Pass
	HCH	-9.75	Pass



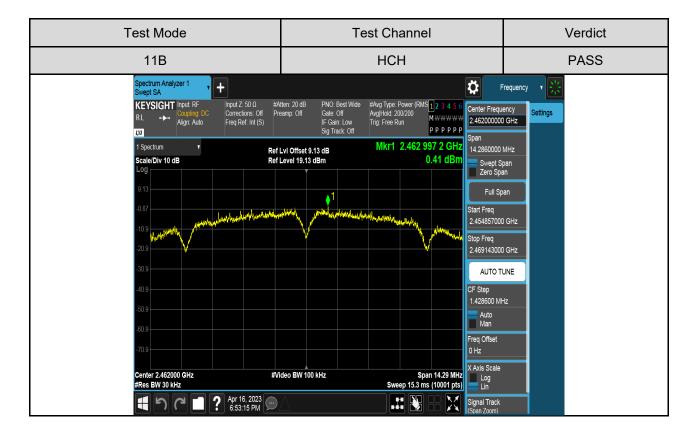
TEST GRAPHS

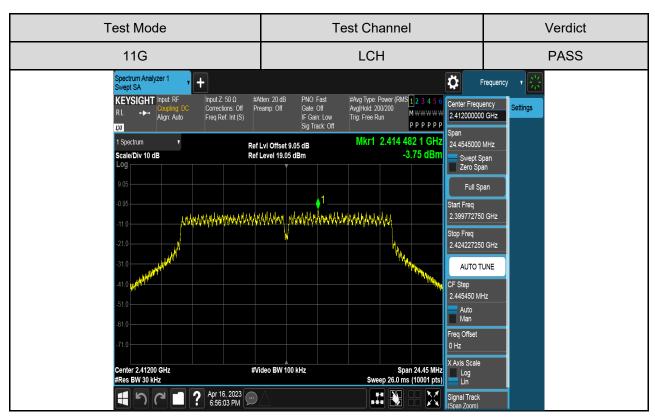


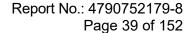




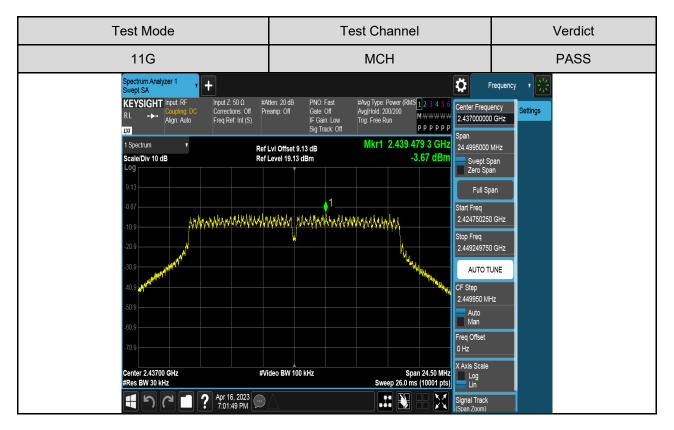


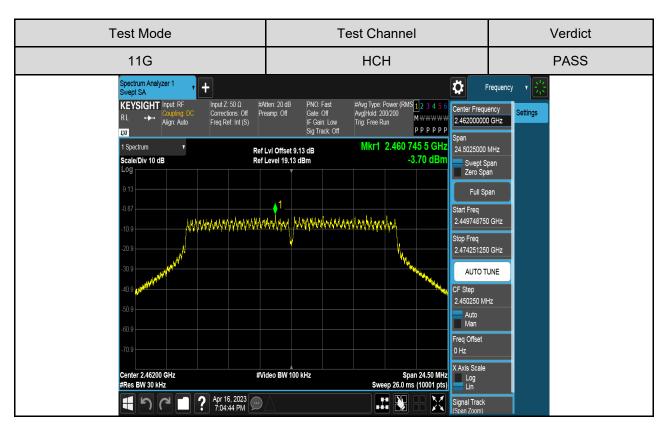






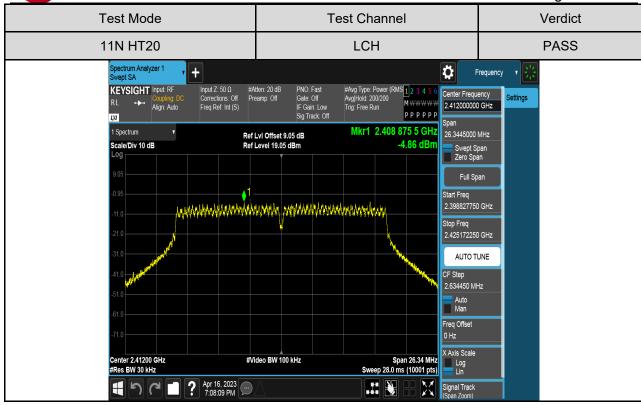


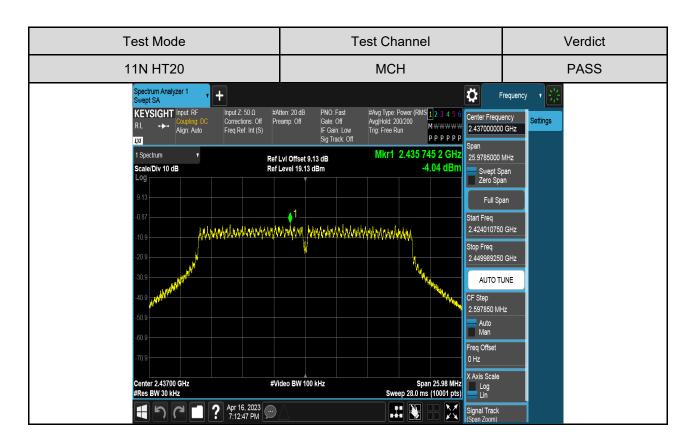






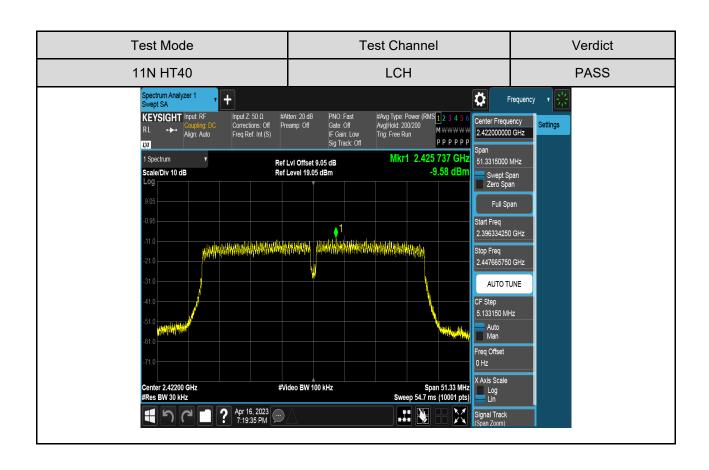
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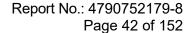




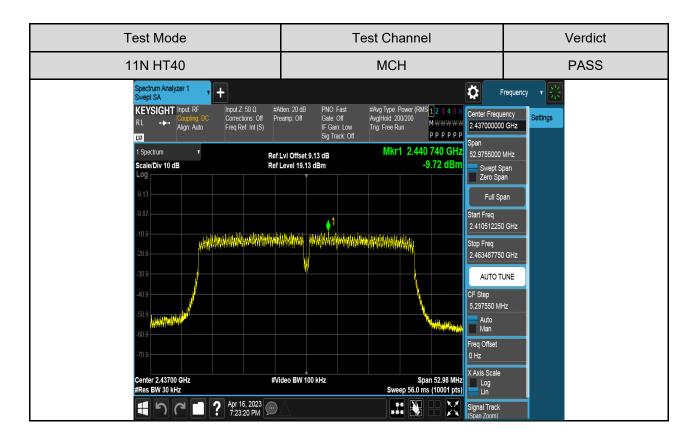


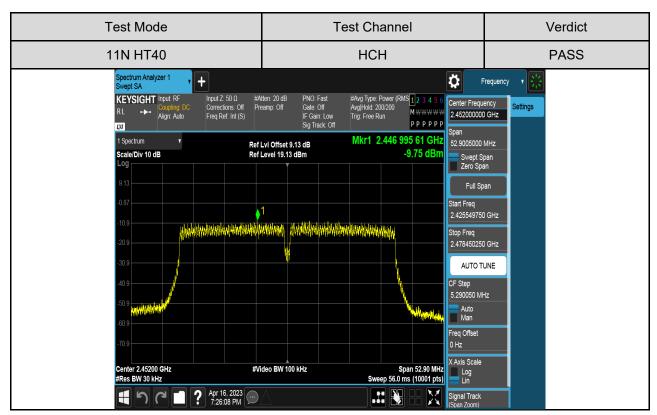
Page 41 of 152 **Test Channel** Verdict **Test Mode** 11N HT20 **HCH PASS** Ö Frequency Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) #Avg Type: Power (RMS 1 2 3 4 5 6 Avg|Hold: 200/200 Trig: Free Run #Atten: 20 dB Preamp: Off KEYSIGHT Input: RF Center Frequency RL Align: Auto 2.462000000 GHz PPPPPP LXI Mkr1 2.460 738 0 GHz 1 Spectrum 26.2920000 MHz Ref LvI Offset 9.13 dB Ref Level 19.13 dBm -4.13 dBr Scale/Div 10 dB Full Span Start Freq 2.448854000 GHz Stop Freq 2.475146000 GHz AUTO TUNE CF Step 2.629200 MHz Freq Offset 0 Hz X Axis Scale Span 26.29 MHz Sweep 28.0 ms (10001 pts) Center 2.46200 GHz #Video BW 100 kHz Log Lin #Res BW 30 kHz **?** Apr 16, 2023 7:16:27 PM .:: 🐧 Signal Track (Span Zoom)













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7.5. CONDUCTED BANDEDGE AND SPURIOUS EMISSIONS

LIMITS

FCC Part15 (15.247), Subpart C			
Section Test Item Limit			
FCC §15.247 (d) Conducted 30 dB below that in the 100 kHz bandwidth			
RSS-247 Clause 5.5 RSS-GEN Clause 6.13	Bandedge and Spurious Emissions	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 settings:

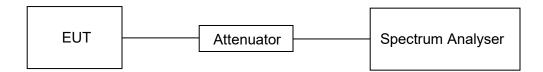
Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	100K
VBW	≥3 × RBW
Span	1.5 x DTS bandwidth
Trace	Max hold
Sweep time	Auto couple.

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





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TEST ENVIRONMENT

Temperature	22°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	AC 120V

PART 1: REFERENCE LEVEL MEASUREMENT

TEST RESULTS TABLE

Test Mode	Test Channel	Result[dBm]
11B	LCH	3.82
	MCH	4.10
	HCH	3.57
11G	LCH	0.45
	MCH	0.67
	HCH	1.00
11N HT20	LCH	0.21
	MCH	1.23
	HCH	0.30
11N HT40	LCH	-4.62
	MCH	-4.27
	HCH	-4.69