

FCC 47 CFR PART 15 SUBPART C

CERTIFICATION TEST REPORT

For

IP Indoor Monitor

MODEL NUMBER: DHI-VTH8641KMS-WP

ADDITIONAL MODEL NUMBER: VTH8641KMS-WP, DHI-VTH8641KMS-WP-USA, DH-VTH8641IMG-AP

PROJECT NUMBER: 4790254061-13

REPORT NUMBER: 4790254061-13-1

FCC ID: SVN-VTH8641KMSWP

ISSUE DATE: May. 18, 2022

Prepared for

Zhejiang Dahua Vision Technology Co., Ltd.

Prepared by

UL-CCIC COMPANY LIMITED No. 2, Chengwan Road, Suzhou Industrial Park, People's Republic of China Tel: +86 512-6808 6400 Fax: +86 512-6808 4099 Website: www.ul.com



Revision History

Rev.	Issue Date	Revisions	Revised By
V0	05/18/2022	Initial Issue	



TABLE OF CONTENTS

1.	ATT	ESTATION OF TEST RESULTS 4
2.	TES	T METHODOLOGY
3.	FAC	CILITIES AND ACCREDITATION
4.	CAL	IBRATION AND UNCERTAINTY
4	1.1.	MEASURING INSTRUMENT CALIBRATION
4	4.2.	MEASUREMENT UNCERTAINTY
5.	EQI	JIPMENT UNDER TEST
5	5.1.	DESCRIPTION OF EUT
Ę	5.2.	MAXIMUM OUTPUT POWER
5	5.3.	CHANNEL LIST
Ę	5.4.	TEST CHANNEL CONFIGURATION
5	5.5.	THE WORSE CASE POWER SETTING PARAMETER
5	5.6.	DESCRIPTION OF AVAILABLE ANTENNAS
5	5.7.	THE WORSE CASE CONFIGURATIONS11
5	5.8.	TEST ENVIRONMENT
5	5.9.	DESCRIPTION OF TEST SETUP13
5	5.10.	MEASURING INSTRUMENT AND SOFTWARE USED15
6.	ME	ASUREMENT METHODS15
7.	AN	ENNA PORT TEST RESULTS17
7	7.1.	ON TIME AND DUTY CYCLE17
7	7.2.	6 dB BANDWIDTH
7	7.3.	CONDUCTED OUTPUT POWER
7	7.4.	POWER SPECTRAL DENSITY
7	7.5.	CONDUCTED BANDEDGE AND SPURIOUS EMISSIONS
7	7.6. 7.6. 7.6. 7.6. 7.6.	 TEST ENVIRONMENT
8.	AC	POWER LINE CONDUCTED EMISSIONS143
9.		ENNA REQUIREMENTS146



1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name: Address:	Zhejiang Dahua Vision Technology Co., Ltd. No.1199, Bin'an road, Binjiang District, Hangzhou, P.R. China.
Manufacturer Information	
Company Name:	Zhejiang Dahua Vision Technology Co., Ltd.
Address:	No.1199, Bin'an road, Binjiang District, Hangzhou, P.R. China.
EUT Description	
Product Name:	IP Indoor Monitor
Model Name:	DHI-VTH8641KMS-WP
Additional No.:	VTH8641KMS-WP, DHI-VTH8641KMS-WP-USA,
	DH-VTH8641IMG-AP
Sample Number:	4839612
Data of Receipt Sample:	Apr. 26, 2022
Test Date:	Apr. 26, 2022~ May.12, 2022

APPLICABLE STANDARDS

STANDARD

TEST RESULTS

CFR 47 Part 15 Subpart C

PASS



	Summary of Test Results								
Clause	Test Items	FCC Rules	Test Results						
1	6db DTS Bandwidth	FCC 15.247 (a) (2)	PASS						
2	Conducted Power	FCC 15.247 (b) (3)	PASS						
3	Power Spectral Density	FCC 15.247 (e)	PASS						
4	Conducted Band edge And Spurious emission	FCC 15.247 (d)	PASS						
5	Radiated Band edges and Spurious emission	FCC 15.247 (d) FCC 15.209 FCC 15.205	PASS						
6	Conducted Emission Test for AC Power Port	FCC 15.207	PASS						
7	Antenna Requirement	FCC 15.203	PASS						
Remark: 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> when <accuracy method=""> decision rule is applied.</accuracy></pass>									

Prepared By:

Li

Reviewed By:

Leon Wu

Leon Wu

Senior Project Engineer

Kitty Li Engineer

Authorized By:

Chris Zhong

Chris Zhong Laboratory Leader



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.

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.
------------------------------	--

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)	3.9dB (1GHz-18GHz)				
	4.2dB (18GHz-26.5GHz)				
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:	IP Indoor Monitor
Model No.:	DHI-VTH8641KMS-WP
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 power grade:	/
Test software of EUT:	Secure CRT (manufacturer declare)
Antenna Type:	Patch Antenna
	3.75 dBi
Antenna Gain:	Note: This data is provided by customer and our lab isn't responsible for this data.



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]	16.32
1	IEEE 802.11G	1-11[11]	14.38
1	IEEE 802.11N HT20	1-11[11]	14.22
1	IEEE 802.11N HT40	3-9[7]	14.39

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				



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			Secu	reCRT			
	Transmit		Test Channel					
Modulation Mode	Antenna Number	١	NCB: 20MH	z	NCB: 40MHz			
Mode		CH 1	CH 6	CH 11	CH 3	CH 6	CH 9	
802.11B	1	default	default	default				
802.11G	1	default	default	default	/			
802.11N HT20	1	default	default	default]			
802.11N HT40	1		/		default default default			



5.6. DESCRIPTION OF AVAILABLE ANTENNAS

Ant.	Frequency (MHz)	Antenna Type	Antenna Gain (dBi)
1	2400-2483.5	Patch Antenna	3.75

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:	102.5KPa			
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



5.9. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Item	Equipment	Brand Name	Model Name	Description
1	Laptop	ThinkPad	E550c	/
2	Power Adapter	amc	EUSF+24120- 1500	INPUT: 100- 240V~50/60Hz, 0.6A OUTPUT: 12.0V1.5A
3	Fixed Frequency Board	/	/	/

<u>I/O PORT</u>

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

ACCESSORY

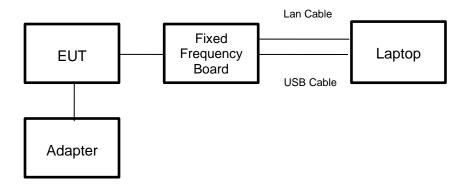
Item	Accessory	Brand Name	Model Name	Description
1	Micro SD card	Sandisk	A1	32GB



TEST SETUP

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

SETUP DIAGRAM FOR TESTS





5.10. MEASURING INSTRUMENT AND SOFTWARE USED

		Сог	nducted	Emiss	sions	(Instru	ment)		
Used	Equipment	Manufacturer	Model	No.	Seria	al No.	Upper Last Cal.	Last Cal.	Next Cal.
\checkmark	EMI Test Receiver	R&S	ESR3		126	6700	2020-12-05	2021-12-04	2022-12-03
\checkmark	Two-Line V-Network	R&S	ENV2	16	126	6701	2020-12-05	2021-12-04	2022-12-03
	Artificial Mains Networks	R&S	ENY8	81	126	6711	2020-10-13	2021-10-12	2022-10-11
				Soft	ware				
Used	Des	cription		Ma	inufac	urer	Name	Version	
\checkmark	Test Software for (Conducted distur	bance		R&S		EMC32	Ver. 9.25	
		Ra	diated E	missi	ions (Instrum	nent)		
Used	Equipment	Manufacturer	Model	No.	Seria	al No.	Upper Last Cal.	Last Cal.	Next Cal.
\checkmark	Spectrum Analyzer	Keysight	N901	0B	155	5727	2021-05-09	2022-04-09	2023-04-08
\checkmark	EMI test receiver	R&S	ESR2	26	126	6703	2020-12-05	2021-12-04	2022-12-03
	Receiver Antenna (9kHz-30MHz)	Schwarzbeck	FMZB 1	1513	155	5456	2018-06-15	2021-06-03	2024-06-02
	Receiver Antenna (30MHz-1GHz)	SunAR RF Motion	JB1		177	821	2019-01-19	2022-01-18	2025-01-17
\checkmark	Receiver Antenna (1GHz-18GHz)	R&S	HF90)7	126	6705	2019-01-27	2022-02-28	2025-02-27
	Receiver Antenna (18GHz-26.5GHz)	Schwarzbeck	BBHA9170		126	6706	2019-01-05	2022-01-04	2025-01-03
	Pre-amplification (To 18GHz)	Compliance Direction System Inc.	PAP-1G18-50		178	825	2021-03-26	2022-03-01	2023-02-28
	Pre-amplification (To 26.5GHz)	R&S	SCU-2	26D	135	5391	2020-12-05	2021-12-04	2022-12-03
	Band Reject Filter	Wainwright	WRCJ 2350-24 2483.5-29 4053	400- 533.5-		1	2021-05-09	2022-05-08	2023-05-07
V	Highpass Filter	Wainwright	WHKX 2700-30 18000-4	000-		2	2021-05-09	2022-05-08	2023-05-07
				Soft	ware				
Used	Desci	ription	Ma	anufac	turer		Name	Version	
\checkmark	Test Software for R	adiated disturbar	rbance Tons				TS+	Ver. 2.5	
			Oth	er ins	trume	ents			
Used	Equipment	Manufacturer	Model No.		Seria	al No.	Upper Last Cal.	Last Cal.	Next Cal.
	Spectrum Analyzer	Keysight	N901	0B	155	5368	2021-05-09	2022-04-09	2023-04-08
	Power Meter	Keysight	U2021	XA	155	5370	2021-05-09	2022-04-09	2023-04-08



6. MEASUREMENT METHODS

No.	Test Item	KDB Name	Section
1	6dB 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 AVGPM)
3	Power Spectral Density	Power Spectral Density KDB 558074 D01 15.247 Meas Guidance v05r02	
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. ON TIME AND DUTY CYCLE

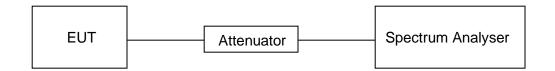
<u>LIMITS</u>

None; for reporting purposes only

PROCEDURE

FCC KDB 558074 Zero-Span Spectrum Analyzer Method

TEST SETUP



TEST ENVIRONMENT

Temperature	21.9°C	Relative Humidity	53.6%
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	20	20	1	100%	0	0.01	0.01
11G	20	20	1	100%	0	0.01	0.01
802.11N HT20	20	20	1	100%	0	0.01	0.01
802.11N HT40	20	20	1	100%	0	0.01	0.01

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) The duty cycle is above 98%, so the Final VBW is 10Hz.

UL-CCIC COMPANY LIMITED

This report shall not be reproduced except in full, without the written approval of UL-CCIC COMPANY LIMITED.



TEST GRAPHS







11N HT20 ON TIME AND DUTY CYCLE MID (CH (WORSE CASE)
Spectrum Analyzer 1 , +	🔅 Frequency 🔹 🔆
KEYSIGHT Input RF Input Z: 50 Ω #Atten: 30 dB PNO: Fast #Augr: Tip: Power (RMS 1/2 3 4 5) RL → Augr: Auto Contractions: Off Peamp: Off Gate: Off Ting Vales VI → Augr: Auto Freq Ref. Int (S) Sig Track Off Ting Delay 2000 µs W WWW W	2.412000000 GHz
1 Spectium • Ref Lvi Offset 8.15 dB Scale/Div 10 dB Ref Level 20.00 dBm	Span 0.00000000 Hz Swept Span
	Zero Span Full Span
	Start Freq 2.41200000 GHz
	Stop Freq 2.412000000 GHz
Center 2.41200000 GHz #Video BW 1.0 MHz Span 0 Res BW 1.0 MHz Sweep 20.00 ms (1001 pt	s) CF Step
5 Marker Table Mode Trace Scale X Y Function Function Width Function Value	1.00000 MHz Auto Man
	Freq Offset 0 Hz
5	Log Ln
4 5 7 1 ? May 09, 2022 🗩 🛄 👬 🔀 🕂 🔀	Signal Track (Spen Zoom)

11N HT40 ON TIME AND DUTY CYCLE MID C	H (WORSE CASE)
Spectrum Analyzer 1 v 🛨	Frequency •
	Center Frequency 2.42200000 GHz
Sig Track Off PPPPP 1 Spectrum Ref Lvi Offset 8,15 dB	Span 0.0000000 Hz
Scale/Div 10 dB Ref Level 20.00 dBm	Swept Span Zero Span
างจั การเป็น - 100	Full Span
	Start Freq 2.42200000 GHz
	Stop Freq 2.42200000 GHz
-70.0 Center 2.42200000 GHz #Video BW 1.0 MHz Span 0 Hz	
Res BW 1.0 MHz Sweep 20.00 ms (1001 pts) 5 Marker Table •	CF Step 1.000000 MHz Auto
Mode Trace Scale X Y Function Function Width Function Value	Man Freq Offset
3 4	0 Hz X Avis Scale
5	
📲 🕤 🥂 🗖 ? May 09,2022 🗩 🔤 🔛 🔛	Signal Track I(Span Zoom)



7.2. 6 dB BANDWIDTH

LIMITS

FCC Part15 (15.247), Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
FCC 15.247(a)(2)	6dB Bandwidth	>= 500KHz	2400-2483.5

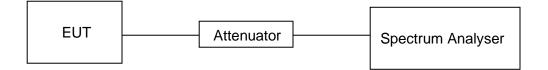
TEST PROCEDURE

Refer to ANSI C63.10-2013 clause 11.8 for DTS bandwidth.

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	For 6 dB Bandwidth :100K
VBW	For 6dB Bandwidth: ≥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





TEST ENVIRONMENT

Temperature	21.9°C	Relative Humidity	53.6%
Atmosphere Pressure	101kPa	Test Voltage	AC 120V

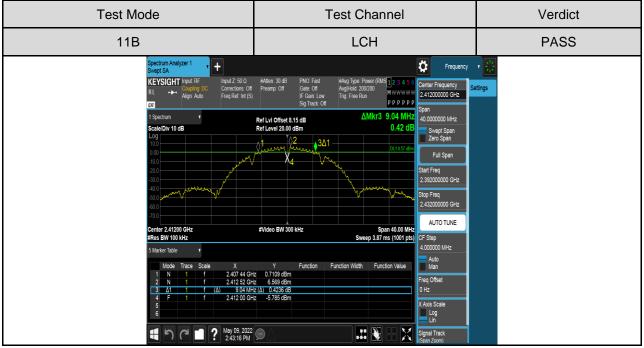
TEST RESULTS TABLE

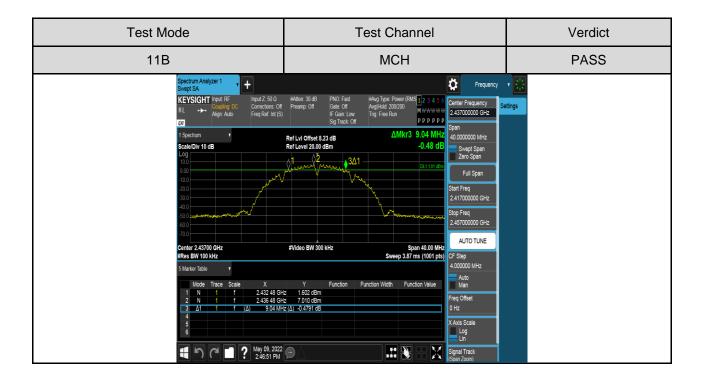
Test Mode	Test Channel	6dB bandwidth (MHz)	Result
	LCH	9.04	Pass
11B	MCH	9.04	Pass
	HCH	9.04	Pass
	LCH	16.56	Pass
11G	MCH	16.52	Pass
	HCH	16.52	Pass
	LCH	17.68	Pass
11N HT20	MCH	17.68	Pass
	HCH	17.76	Pass
	LCH	36.40	Pass
11N HT40	MCH	36.40	Pass
	HCH	36.40	Pass



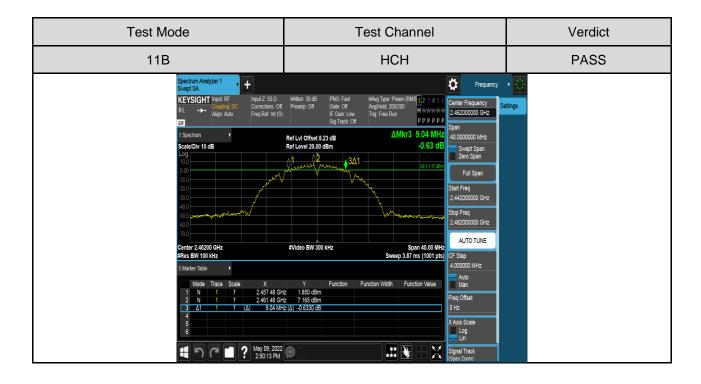
<u>TEST GRAPHS</u>

6dB Bandwdith



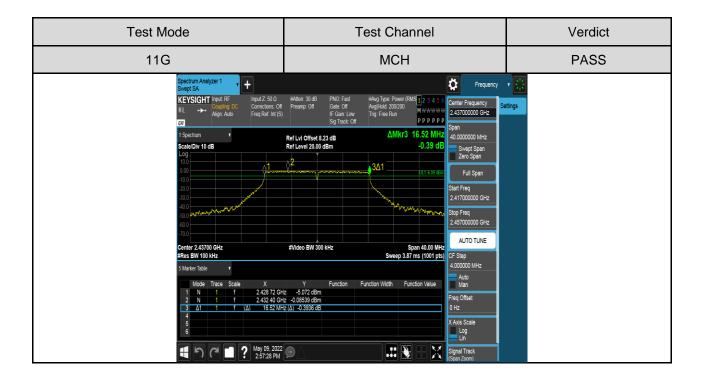


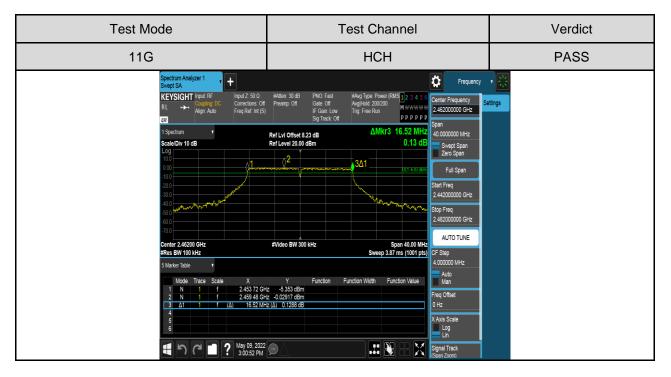






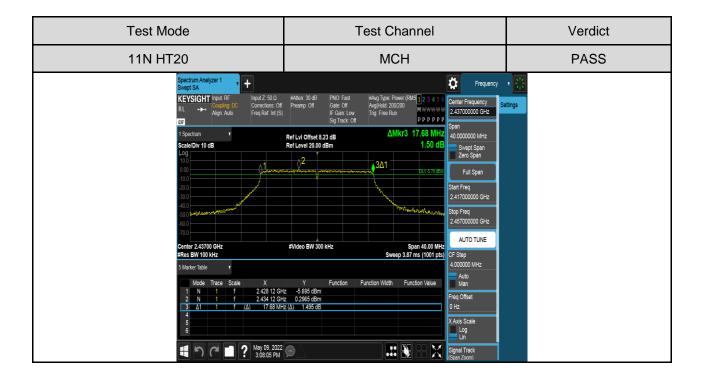




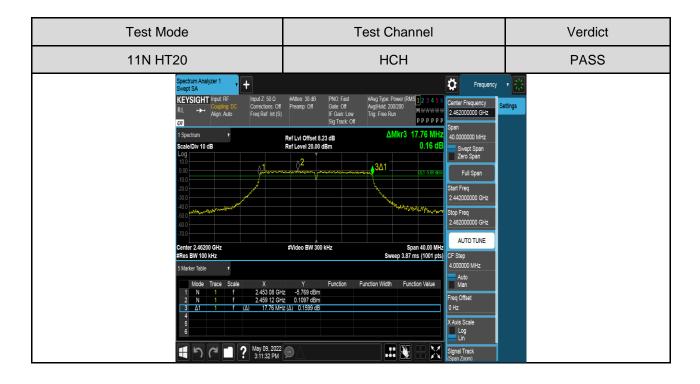




Test Mode	Test Channel	Verdict
11N HT20	LCH	PASS
RL Preq Ref. Int (S 1 Spectrum • Scale(Div 10 dB • Log • • 100 • • 0 • •	IF Gam Low Sig Track Off Trig: Free Run MWWWW 241200000 GHz Sig Track Off AMKr3 17.68 MHz Span 40000000 MHz Ref Livel 20.00 dBm 1.62 dB Sweet Span Zero Span 2 301 LVE 100 Sweet Span 2 301 LVE 100 Start Freq 2.38200000 GHz Start Freq 2.38200000 GHz FVideo BW 300 kHz Span 40.00 MHz Start Freq FVideo BW 300 kHz Span 40.00 MHz AUTO TUNE Y Function Function Vidue Freq Cristel 2 0.456 dBm Freq Cristel Auto 12 0.152 dB Freq Cristel Lun	ettings



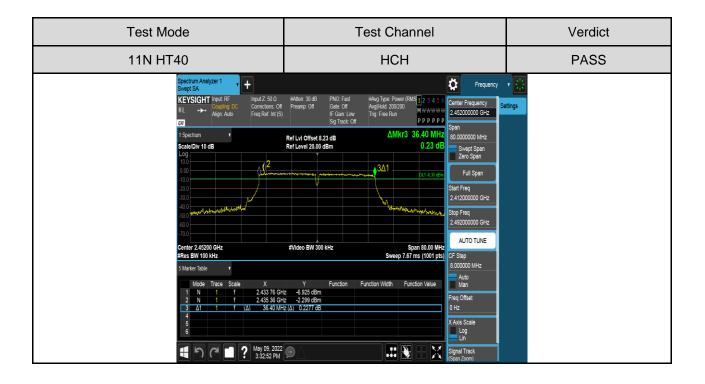








Test Mode	Test Channel	Verdict
11N HT40	MCH	PASS
Spectrum Analyzer 1 Divept SA KEYSIGHT Imput. File RL ++ Imput. 750 Mign. Auto 1 Spectrum 1 Spectrum 5 Spectrum 1 Spectrum 0 B Log 100 0 0 0 0 B Log 100 0 0 0 0 0 B Log 100 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Off Preamp: Off Gate: Off Avg Hold: 200/200 Center Frequency S	• Ettings
2 N 1 f 2.432.28	¥Video BW 300 kHz Span 80.00 HHz Sweep 7.67 ms (1001 pt) CF Step 0.000000 MHz Y Function Function Vidth Function Value GHz -7.973 dBm -4.100 Man GHz -3.306 dBm -0.00000 MHz -4.100 MHz (Δ) 0.9562 dB 0.42 -4.100 MHz (Δ) 0.9562 dB 0.42 -4.100 MHz (Δ) 0.9562 dB 0.100 -4.100 MHz (Δ) 0.9562 dB -4.100 -4.100 Signal Track Stant Track -4.100	





7.3. CONDUCTED OUTPUT POWER

<u>LIMITS</u>

FCC Part15 (15.247), Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
FCC 15.247(b)(3)	Output Power	1 watt or 30dBm	2400-2483.5

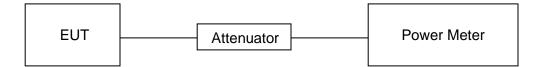
TEST PROCEDURE

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 sensor. Measure the power of each channel. AVG Detector used for AVG result.

TEST ENVIRONMENT

Temperature	21.9°C	Relative Humidity	53.6%
Atmosphere Pressure	101kPa	Test Voltage	AC 120V

TEST SETUP





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	15.71	0	15.71	30
11B	MCH	16.18	0	16.18	30
	HCH	16.32	0	16.32	30
	LCH	13.32	0	13.32	30
11G	MCH	14.22	0	14.22	30
	НСН	14.38	0	14.38	30
	LCH	13.22	0	13.22	30
11N HT20	MCH	14.10	0	14.10	30
	НСН	14.22	0	14.22	30
	LCH	13.16	0	13.16	30
11N HT40	MCH	14.18	0	14.18	30
	HCH	14.39	0	14.39	30



7.4. POWER SPECTRAL DENSITY

LIMITS

FCC Part15 (15.247), Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
FCC §15.247 (e)	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:

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.

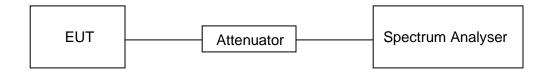
Allow trace to fully stabilize and use the peak marker function to determine the maximum amplitude level within the RBW.

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

TEST ENVIRONMENT

Temperature	21.9°C	Relative Humidity	53.6%
Atmosphere Pressure	101kPa	Test Voltage	AC 120V

TEST SETUP



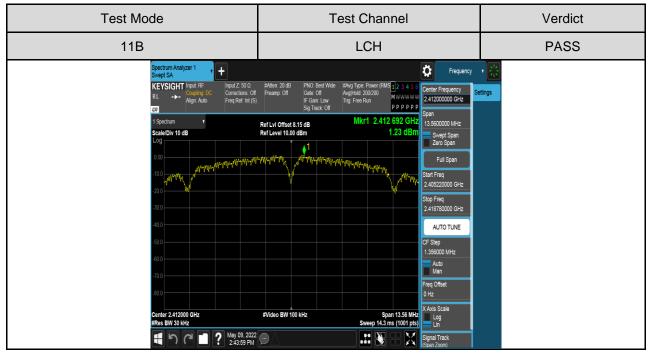


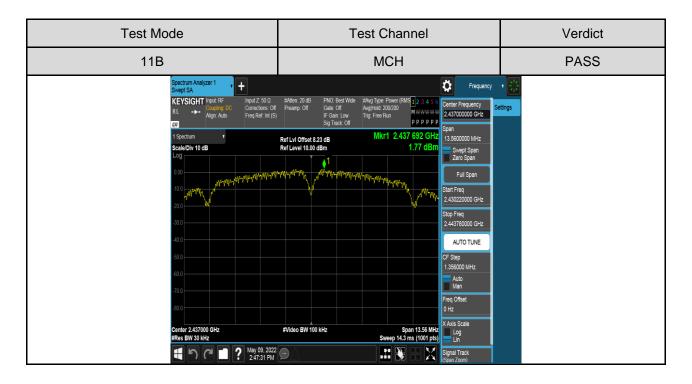
TEST RESULTS TABLE

Test Mode	Test Channel	Maximum Peak power spectral density (dBm/30kHz)	Result
11B	LCH	1.23	Pass
	MCH	1.77	Pass
	HCH	1.92	Pass
11G	LCH	-3.89	Pass
	MCH	-2.94	Pass
	HCH	-2.79	Pass
11N HT20	LCH	-3.35	Pass
	MCH	-2.41	Pass
	HCH	-2.35	Pass
11N HT40	LCH	-7.02	Pass
	MCH	-6.08	Pass
	НСН	-5.15	Pass



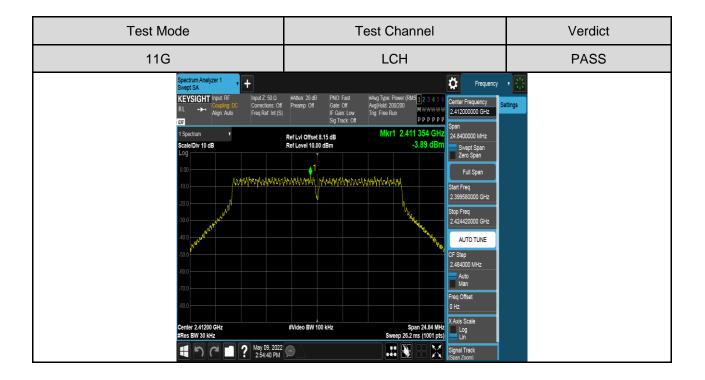
TEST GRAPHS



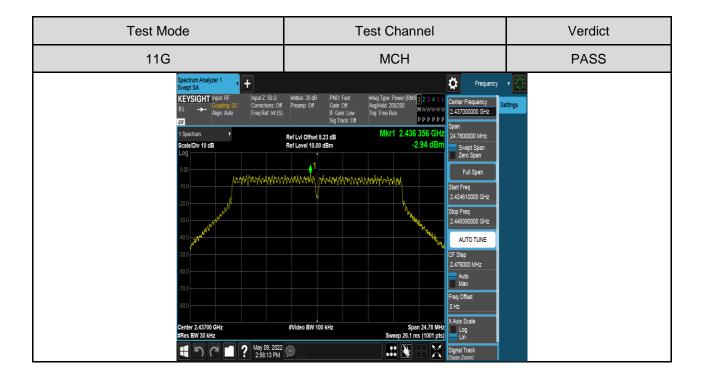


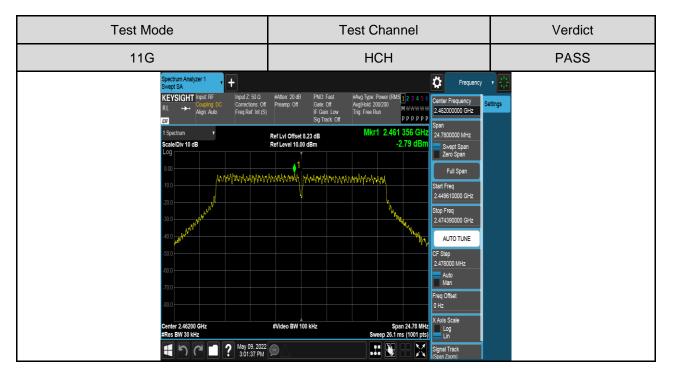


Test Mode	Test Channel	Verdict
11B	НСН	PASS
Scale/Div 10 dB Log	IF Gan: Low Sig Track Off Trig Free Run WWWWWW 245200000 GHz Ref Lvi Offset 8.23 dB Mkr1 2.462 692 GHZ 13560000 MHz Ref Level 10.00 dBm 1.92 dBm 3560000 MHz Murrit 2.462 692 GHZ 3560000 MHz Svept Span Video BW 100 kHz Span Span Span Full Span Start Freq 2.45520000 GHz Start Freq 2.4570000 GHz Start Freq 2.45720000 GHz Start Freq 2.4570000 GHz CF Step 1.356000 GHz Start Freq 2.4570000 GHz CF Step 1.356000 GHz Auto Man Freq Cffset 0 Hz Auto Freq Cffset 0 Hz Auto Freq Cffset 0 Hz \$Video BW 100 kHz Span 13.56 MHz Lig Lig Lig	etings

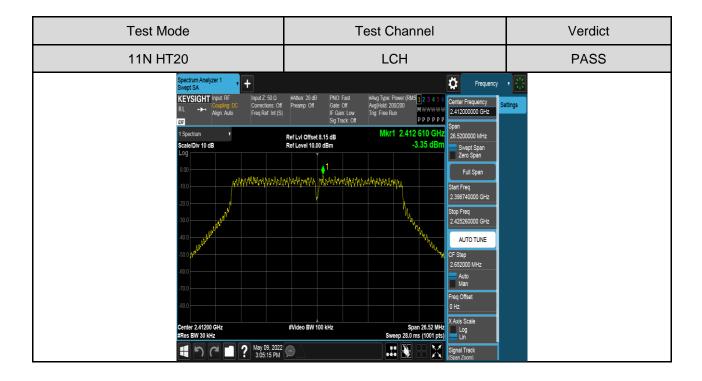


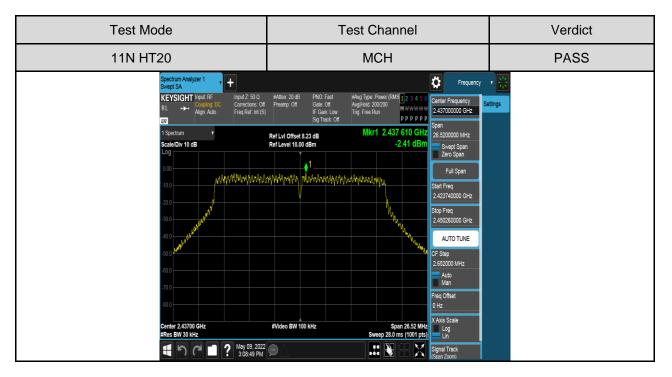






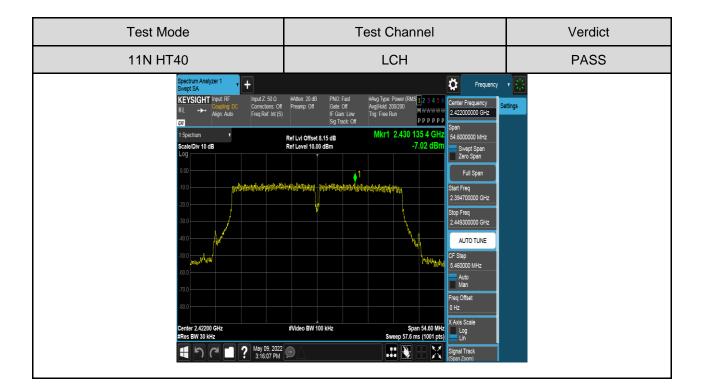






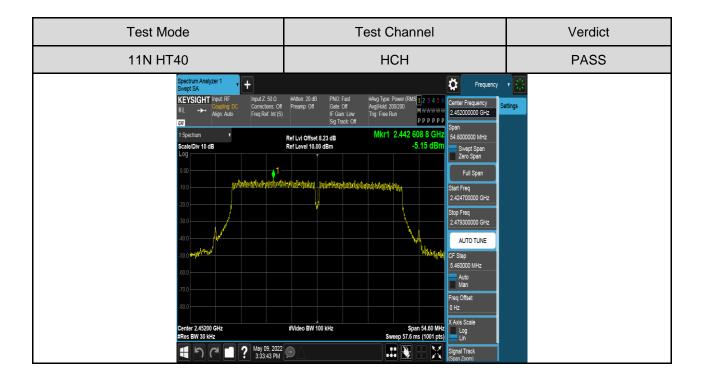


Test Mode	Test Channel	Verdict
11N HT20	НСН	PASS
Scale/Div 10 dB	IF Gam. Low Sig Track. Off Trig Free Run MMKY1 2.45200000 GHz Ref Lvi Offset 8.23 dB MKY1 2.462 613 GHZ 26 5400000 MHz Ref Level 10.00 dBm -2.35 dBm Swert Span 26 5400000 MHz MMKY1 2.462 613 GHZ Swert Span 26 5400000 MHz MMMYMM -2.35 dBm Swert Span 26 4800000 MHz MMMYMM -2.35 dBm Ster Freq 2.44860000 GHz Ster Freq 2.47520000 GHz MMM	ettings





Test Mode	Test Channel	Verdict
11N HT40	MCH	PASS
Spectrum Analyzer 1 Swept SA KEYSIGHT Input RF RL Capan Analog 1 Spectrum ScaleDiv 10 dB Log 000 	IF Gan. Low Sig Track. Off Trig: Free Run Million 243700000 GHz Ref Lvi Offset 8.23 dB Mkr1 2.427 608 8 GHZ Span 54 600000 MHz Ref Level 10.00 dBm -6.08 dBm Skett Span Zero Span Verlaght/lukat -1.04 Market	Hings





7.5. CONDUCTED BANDEDGE AND SPURIOUS EMISSIONS

LIMITS

FCC Part15 (15.247), Subpart C		
Section Test Item Limit		
FCC §15.247 (d)	Conducted Bandedge and Spurious Emissions	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 settings:

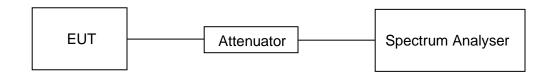
Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	100K
VBW	≥3 × RBW
Span	1.5 x DTS bandwidth
Trace	Max hold
Sweep time	Auto couple.

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



This report shall not be reproduced except in full, without the written approval of UL-CCIC COMPANY LIMITED.



TEST ENVIRONMENT

Temperature	21.9°C	Relative Humidity	53.6%
Atmosphere Pressure	101kPa	Test Voltage	AC 120V

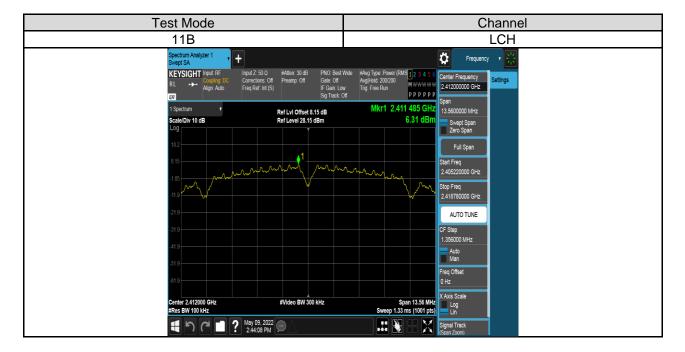
PART 1: REFERENCE LEVEL MEASUREMENT

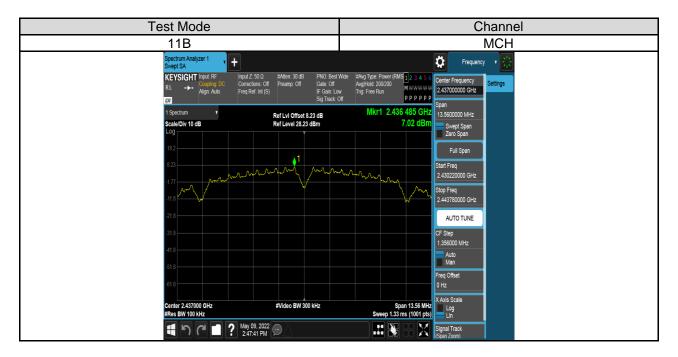
TEST RESULTS TABLE

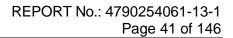
Test Mode	Test Channel	Result[dBm]	
	LCH	6.31	
11B	MCH	7.02	
	HCH	7.07	
	LCH	-1.15	
11G	MCH	-0.18	
	HCH	0.14	
	LCH	-1.09	
11N HT20	MCH	0.33	
	HCH	0.22	
	LCH	-4.35	
11N HT40	MCH	-3.17	
	НСН	-2.48	



TEST GRAPHS

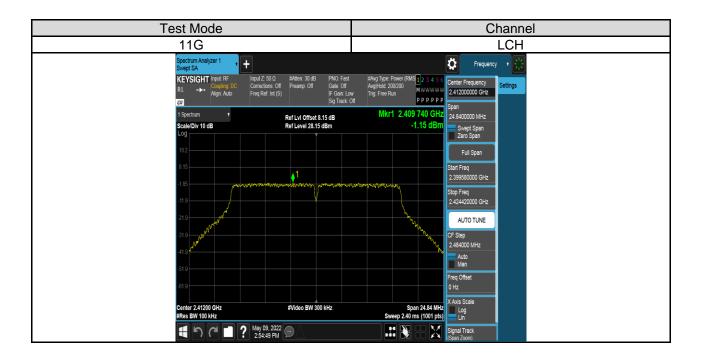


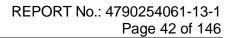






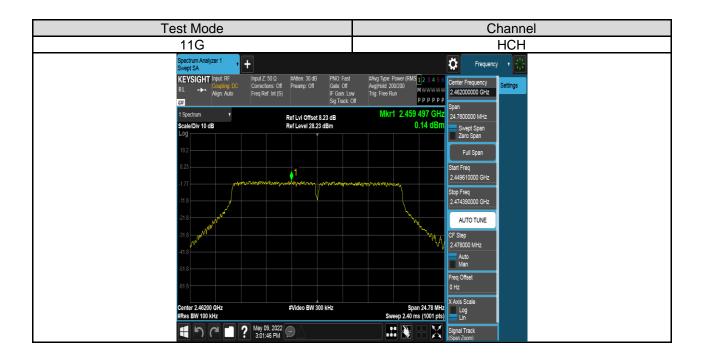
11B HCH Spectrum Analyzer 1 Swept SA + Input Z: 50.0 RL Input Z: 50.0 Concritors Off Freq Ref Int (S) #Atten 30 dB Phamp Off PNO. Best Wide Gate Off Freq Ref Int (S) #Atten 30 dB Phamp Off PNO. Best Wide Gate Off Freq Ref Int (S) Input Z: 50.0 Phamp Off #Atten 30 dB Phamp Off PNO. Best Wide Gate Off Freq Ref Int (S) PNO. Best Wide Tig Free Rum #Aug Hold 200200 W W WW Wide Tig Free Rum Center Frequency 2.45200000 GHz Settings 1 Spectrum * Ref Livi Offset 82:33 dB Ref Level 28:23 dB Mkr1 2.461 498 GHz Span T.07 dBm Span Statem Diff Span
KEYSIGHT Input Z: 50.0 Concentors: 0f RL Input Z: 50.0 Concentors: 0f Freq Ref Int (S) #Atten: 30 dB Phamp Off PNO: Best Wide Gate: 0ff #Avg Tipe: Power (RMS] 12: 3: 4:5:6 AvgHold 200000 Sig Track: 0ff Center Frequency X WWWWW Center Frequency X WWWWW Settings 1 Spectrum * Ref Lvi Offset 8:23 dB Mkr1 2:461:498 (CH2 X G 7 dH2 Span
1 Spectrum Ref Lvi Offset 8.23 dB Mkr1 2.461 498 GHZ 13.560000 MHz
Log
182 823 177 118 177 118 177 118 177 118 177 118 177 118 177 118 177 118 177 118 177 118 177 177
218 AUTO TUNE 318 CF Step 1.356000 MHz 4.18 Auto 518 Man
61.8 Freq Offset 61.8 Hz Center 2.462000 GHz #Video BW 300 kHz FRes BW 100 kHz Sweep 1.33 ms (1001 pts) Image: Sweep 1.33 pt Image: Sweep 1.33 pt





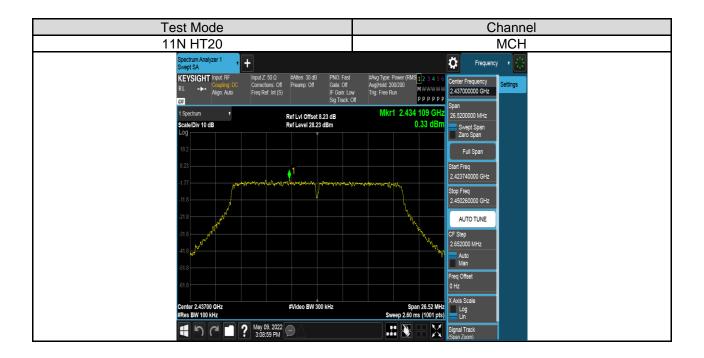


Test Mode		Channel
11G		MCH
oneprove	+	Frequency •
KEYSIGHT Input RF RL →→ Coupling: DC Align: Auto	Input Z: 50 Ω #Atten: 30 dB PNO: Fast Corrections: Off Preamp: Off Gate: Off Freq Ref: Int (S) IF Gain: Low Sig Track: Of	
Log 1 Spectrum Scale/Div 10 dB	Ref LvI Offset 8.23 dB Ref Level 28.23 dBm	Mkr1 2.432 391 GHz -0.18 dBm Sweet Span
Log 18.2		Zero Span Full Span
823		Start Freq 2.42461000 GHz
-11.8		Stop Freq 2.44930000 GHz
-21.8		
418 4 ⁷⁴⁴		2.478000 MHz Auto Man
-51.8		Freq.Offset 0 Hz
Center 2.43700 GHz #Res BW 100 kHz	#Video BW 300 kHz	Span 24.78 MHz Sweep 240 ms (1001 pts)
	? May 09, 2022 2:58:22 PM	III N III Signal Track





Test Mode		Channel	
11N HT20		LCH	
Spectrum Analyzer 1 Swept SA KEVSIGHT Input RF RL →→ Cooping Dt Align Auto		#Avg Type: Power (RMS 2 3 4 5 Center Frequency Settings AvgHidd: 2002000 M:WWWWW 2.412000000 GHz Settings	
CO 1 Spectrum Scale Div 10 dB Log	Ref Level 28,15 dBm		
8.15		Full Span	
-1.85 -11.9	angerneer the and the anti-states	2.389740000 GHz Stop Freq 2.425260000 GHz	
-21.9		AUTO TUNE CF Siep	
-31.9		2.652000 MHz Auto Man	
-51.9		Freq Offset 0 Hz	
Center 2.41200 GHz #Res BW 100 kHz	#Video BW 300 kHz	Span 26.52 MHz Sweep 2.60 ms (1001 pts)	
1 2 1	May 09, 2022 3:05:24 PM	Signal Track (Span Zoom)	





Test Mode		Channel
11N HT20		НСН
Spectrum Analyzer 1 Swept SA KEYSIGHT Input RF RL ++ Align Auto		
1 Spectrum Y Scale/Div 10 dB Log	Ref Lvi Offset 8.23 dB Ref Level 28.23 dBm	Mkr1 2.456 619 GHz 0.22 dBm Swet Span
18.2		Full Span
8.23	1	Start Freq 2.44860000 GHz
-11.8		Stop Freq 2.475320000 GHz
-21.8 -31.8		AUTO TUNE OF Step
-41.8 \$P\$ \$\$P\$		2.664000 MHz Auto Man
-51.8 -61.8		Freq Offset 0 Hz
Center 2.46200 GHz #Res BW 100 kHz	#Video BW 300 kHz	Span 26.64 MHz Sweep 2.60 ms (1001 pts)
	May 09, 2022 3:12:25 PM	III N III III III IIII IIII IIII IIIII IIIII IIII





Test Mode		Channel
11N HT40		MCH
Spectrum Analyzer 1 Swept SA	, +	Frequency •
KEYSIGHT input RF RL →→ Align Auto	C Corrections: Off Preamp: Off Gate: Off Freq Ref. Int (S) Sig Track: Off Sig Track: Off Sig Track: O	
1 Spectrum v Scale/Div 10 dB Log	Ref LvI Offset 8.23 dB Ref Level 28.23 dBm	Mkr1 2.429 246 8 GHz Skept Span -3.17 dBm Swept Span Swept Span
18.2		Full Span
8.23	1	Start Freq 2.409700000 GHz
-11.8		Stop Freq 2.464300000 GHz
-21.8		AUTO TUNE CF Siep
-41.8		5.460000 MHz 5.40000 MHz Man
-51.8 -61.8		Freq Offset 0 Hz
Center 2.43700 GHz #Res BW 100 kHz	#Video BW 300 kHz	Span 54.60 MHz Sweep 5.27 ms (1001 pts)
	? May 09, 2022 3:20:06 PM	💷 💽 🔛 Signal Track Islan Zoomi



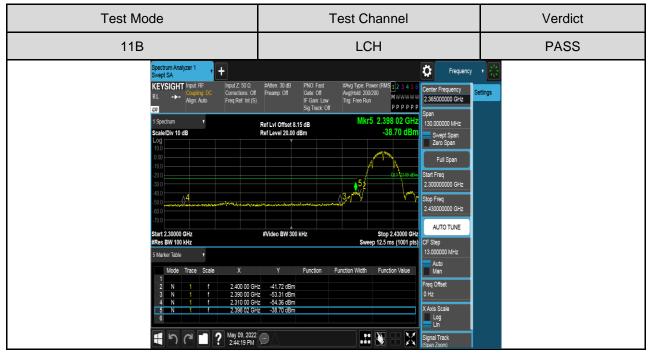
PART 2: CONDUCTED BANDEDGE

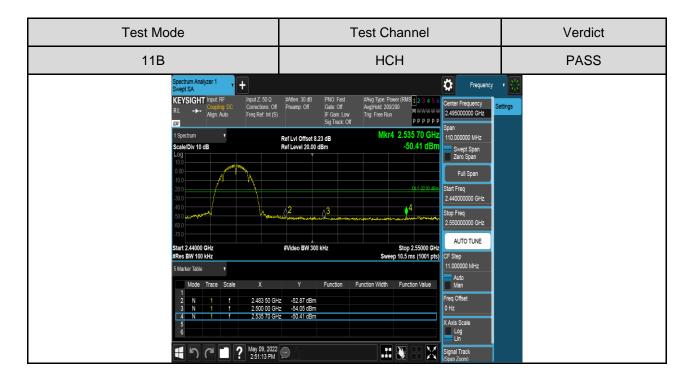
TEST RESULTS TABLE

Test Mode	Test Channel	Result	Verdict
11B	LCH	Refer to the Test Graph	PASS
ПВ	HCH	Refer to the Test Graph	PASS
11G	LCH	Refer to the Test Graph	PASS
ПG	HCH	Refer to the Test Graph	PASS
11N HT20	LCH	Refer to the Test Graph	PASS
	HCH	Refer to the Test Graph	PASS
11N HT40	LCH	Refer to the Test Graph	PASS
	HCH	Refer to the Test Graph	PASS



TEST GRAPHS







Test Mode	Test Channel	Verdict
11G	LCH	PASS
400	IF Cam Low Sg Track Off Trig: Free Run WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW	etings

