

FCC 47 CFR PART 15 SUBPART C

CERTIFICATION TEST REPORT

For

Doorbell

MODEL NUMBER: DB11

ADDITIONAL MODEL NUMBER: DH-DB11, DHI-DB11, OEM-DB11, DB11X-YZ, DH-DB11X-YZ, DHI-DB11X-YZ, OEM-DB11X-YZ (X, Y, Z can be "0-9", "A-Z" or blank)

PROJECT NUMBER: 4789480366

REPORT NUMBER: 4789480366-1

FCC ID: SVN-DB11

ISSUE DATE: Jul. 09, 2020

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



Page 2 of 126

Revision History

Rev.	Issue Date	Revisions	Revised By
V0	07/09/2020	Initial Issue	



TABLE OF CONTENTS

1.	AT	TTESTATION OF TEST RESULTS	4
2.	TE	EST METHODOLOGY	6
3.	FA	ACILITIES AND ACCREDITATION	6
4.	CA	ALIBRATION AND UNCERTAINTY	7
	4.1.	MEASURING INSTRUMENT CALIBRATION	7
	4.2.	MEASUREMENT UNCERTAINTY	7
5.	EG	QUIPMENT UNDER TEST	8
	5.1.	DESCRIPTION OF EUT	8
	5.2.	MAXIMUM OUTPUT POWER	9
	5.3.	CHANNEL LIST	9
	5.4.	TEST CHANNEL CONFIGURATION	10
	5.5.	THE WORSE CASE POWER SETTING PARAMETER	10
	5.6.	DESCRIPTION OF AVAILABLE ANTENNAS	11
	5.7.	THE WORSE CASE CONFIGURATIONS	11
	5.8.	TEST ENVIRONMENT	12
	5.9.	DESCRIPTION OF TEST SETUP	13
	5.10.	. MEASURING INSTRUMENT AND SOFTWARE USED	14
6.	ME	EASUREMENT METHODS	15
7.	A١	NTENNA PORT TEST RESULTS	16
	7.1.	ON TIME AND DUTY CYCLE	16
	7.2.	6 dB BANDWIDTH	19
	7.3.	CONDUCTED OUTPUT POWER	27
	7.4.	POWER SPECTRAL DENSITY	29
	7.5.	CONDUCTED BANDEDGE AND SPURIOUS EMISSIONS	37
		RADIATED TEST RESULTS	
		6.1. LIMITS AND PROCEDURE	
		6.3. RESTRICTED BANDEDGE	
		6.4. SPURIOUS EMISSIONS	
8.	AC	C POWER LINE CONDUCTED EMISSIONS	123
9.	A١	NTENNA REQUIREMENTS	126



Page 4 of 126

1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name: Zhejiang Dahua Vision Technology Co., Ltd. Address: 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 Doorbell Model Name DB11

Additional No. DH-DB11, DHI-DB11, OEM-DB11, DB11X-YZ, DH-DB11X-YZ,

DHI-DB11X-YZ, OEM-DB11X-YZ (X, Y, Z can be "0-9", "A-Z" or

blank)

Sample Number 3045796
Data of Receipt Sample May. 06, 2020

Date Tested May 06, 2020 ~ Jul. 06, 2020

APPLICABLE STANDARDS

STANDARD TEST RESULTS

CFR 47 Part 15 Subpart C PASS



3

4

5

REPORT No.: 4789480366-1

Complied

Complied

Complied

Complied

Summary of Test Results

Clause Test Items FCC/IC Rules Test Results

1 6db DTS Bandwidth FCC 15.247 (a) (2) Complied

2 Conducted Power FCC 15.247 (b) (3) Complied

FCC 15.247 (e)

FCC 15.247 (d)

FCC 15.247 (d)

FCC 15.209

FCC 15.203

		FCC 15.205	
6	Conducted Emission Test For AC Power Port	FCC 15.207	Complied

Power Spectral Density

Conducted Band edge And

Spurious emission

Radiated Band edges and Spurious

emission

Antenna Requirement

7 Remark:

Prepared By: Jason Yang	Reviewed By: Tom Tang
Jason Yang Engineer	Tom Tang Engineer Project Associate
Authorized By:	
Chris Zhong Laboratory Leader	

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> when <Accuracy Method> decision rule is applied.



Page 6 of 126

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) 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.



Page 7 of 126

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	3.00dB
Radiation Emission test(include Fundamental emission) (9KHz-30MHz)	3.31dB
Radiation Emission test(include Fundamental emission) (30MHz-1GHz)	3.31dB
Radiation Emission test (1GHz to 26GHz)(include Fundamental emission)	3.83dB (1GHz-18Gz)
(1.6.12 to 2661.2)(marado i directino interiori	4.13dB (18GHz-26.5Gz)

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



Page 8 of 126

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

Product Name:	Doorbell
Model No.:	DB11
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:	N/A
Test software of EUT:	Secure CRT (manufacturer declare)
Antenna Type:	IFA Antenna
Antenna Gain:	0.86 dBi

Remark:

Model No.:

Number:	Name:	Number:	Name:	Number:	Name:
1	DB11	2	DH-DB11	3	DHI-DB11
4	OEM-DB11	5	DB11X-YZ	6	DH-DB11X-YZ
7	DHI-DB11X-YZ	8	OEM-DB11X-YZ (X, Y, Z can be "0- 9", "A-Z" or blank)		

Only the main model DB11 was tested and only the data of this model is shown in this test report. Since Their electrical circuit design, layout, components used and internal wiring are identical, only the model name and selling area are different.



Page 9 of 126

5.2. MAXIMUM OUTPUT POWER

Number of Transmit Chains (NTX)	IEE Std. 802.11	Channel Number	Max Peak Conducted Power (dBm)	Max AVG Conducted Power (dBm)
1	IEEE 802.11B	1-11[11]	21.31	18.60
1	IEEE 802.11G	1-11[11]	18.75	11.04
1	IEEE 802.11nHT20	1-11[11]	16.63	8.84
1	IEEE 802.11nHT40	3-9[7]	N/A	10.11

5.3. CHANNEL LIST

	Channel List for 802.11b/g/n (20 MHz)							
Channel	Frequency (MHz)	Channel	Frequenc y(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	Frequenc y(MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
3	2422	5	2432	7	2442	9	2452
4	2427	6	2437	8	2447		



Page 10 of 126

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	Test Software Secur				ıreCRT			
	Transmit		Test C			Channel		
Modulation Mode	Antenna		NCB: 20MHz NCB: 40MHz			7		
Mode	Number	CH 1	CH 6	CH 11	CH 3	CH 6	CH 9	
802.11b	1	N/A	N/A	N/A			•	
802.11g	1	N/A	N/A	N/A	/			
802.11n HT20	1	N/A	N/A	N/A]			
802.11n HT40	1		/ N/A N/A N/A					



Page 11 of 126

5.6. DESCRIPTION OF AVAILABLE ANTENNAS

Ant.	Frequency (MHz)	Antenna Type	Antenna Gain (dBi)
1	2400-2483.5	IFA Antenna	0.86

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 the product, 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 802.11n HT40 mode: MCS0



Page 12 of 126

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	DC 12V			
	VH	N/A			

Note: VL= Lower Extreme Test Voltage

VN= Nominal Voltage

VH= Upper Extreme Test Voltage TN= Normal Temperature

Page 13 of 126

5.9. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Item	Equipment	Brand Name	Model Name	Description
1	Laptop	ThinkPad	E590	N/A

I/O PORT

Cable No	Port	Connector Type	Cable Type	Cable Length(m)	Remarks
1	USB to TTL	USB to TTL	USB to TTL	100cm Length (Supply by UL Lab)	N/A

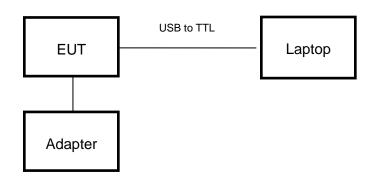
ACCESSORY

Item	Accessory	Brand Name	Model Name	Description
1	SD Card	Kingston	32GB	Supply by UL Lab
2	DC Adapter	HUAWEI	HW-059200CHQ	Supply by UL Lab

TEST SETUP

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

SETUP DIAGRAM FOR TESTS





Page 14 of 126

5.10. MEASURING INSTRUMENT AND SOFTWARE USED

	Conducted Emissions (Instrument)							
		Coi	lauctet	a Lillis		Upper Last		
Used	Equipment	Manufacturer	Mode		Serial No.	Cal.	Last Cal.	Next Cal.
$\overline{\checkmark}$	EMI Test Receiver	R&S	ESR3		126700	2018-12-13	2019-12-12	2020-12-11
$\overline{\checkmark}$	Two-Line V-Network	R&S	EN√	/216	126701	2018-12-13	2019-12-12	2020-12-11
V	Artificial Mains Networks	R&S	EN,	Y81	126711	2018-12-13	2019-12-12	2020-12-11
				Soft	ware			
Used	Des	cription		Ma	nufacturer	Name	Version	
$\overline{\checkmark}$	Test Software for 0	Conducted distur	bance		R&S	EMC32	Ver. 9.25	
		Ra	diated	Emiss	ions (Instrun	nent)		
Used	Equipment	Manufacturer	Mode	el No.	Serial No.	Upper Last Cal.	Last Cal.	Next Cal.
$\overline{\checkmark}$	Spectrum Analyzer	Keysight	N90	10B	MY57110128	2019-05-29	2020-05-28	2021-05-27
$\overline{\checkmark}$	EMI test receiver	R&S	ESI	₹26	1267603	2018-12-13	2019-12-22	2020-12-21
V	Receiver Antenna (9kHz-30MHz)	Schwarzbeck	FMZB	1513	513-265	2019-06-16	2020-06-15	2021-06-14
V	Receiver Antenna (30MHz-1GHz)	SunAR RF Motion	JB1		126704	N/A	2019-01-28	2022-01-27
V	Receiver Antenna (1GHz-18GHz)	R&S	HF907		126705	2019-01-26	2020-01-26	2021-01-25
V	Receiver Antenna (18GHz-26.5GHz)	Schwarzbeck	BBHA9170		126706	2019-02-06	2020-02-05	2021-02-04
V	Receiver Antenna (26.5GHz-40GHz)	TOYO	HAP 26-40W		00000012	2019-07-23	2020-07-22	2021-07-21
V	Pre-amplification (To 1GHz)	R&S	SCU	-03D	134666	2019-02-06	2020-02-05	2021-02-04
V	Pre-amplification (To 18GHz)	Compliance Direction System Inc.	PAP-10	G18-50	14140-13467	2019-03-18	2020-03-17	2021-03-16
V	Pre-amplification (To 26.5GHz)	R&S	SCU	-26D	134668	2019-02-06	2020-02-05	2021-02-04
V	Band Reject Filter	Wainwright	WRC 2350- 2483.5- 40	2400- 2533.5-	1	2019-05-29	2020-05-28	2021-05-27
V	Highpass Filter	Wainwright	WHKX10- 2700-3000- 18000-40SS		2	2019-05-29	2020-05-28	2021-05-27
Software								
Used Description Manufacturer Name Version								
✓ Test Software for Radiated disturbance				Tonsce	end	JS32	V1.0	
			Ot	her ins	truments			
Used	Equipment	Manufacturer	Mode	el No.	Serial No.	Upper Last Cal.	Last Cal.	Next Cal.
V	Spectrum Analyzer	Keysight	N90	10B	MY57110128	2019-05-29	2020-05-28	2021-05-27
V	Power Meter	Keysight	U202	21XA	MY57110002	2019-06-12	2020-06-11	2021-06-10



Page 15 of 126

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	8.3.1.3/8.3.2.3
3	Power Spectral Density	KDB 558074 D01 15.247 Meas Guidance v05r02	8.4
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

Page 16 of 126

7. ANTENNA PORT TEST RESULTS

7.1. ON TIME AND DUTY CYCLE

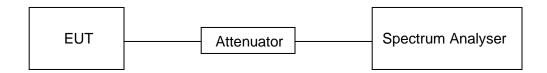
LIMITS

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	DC 5V

RESULTS

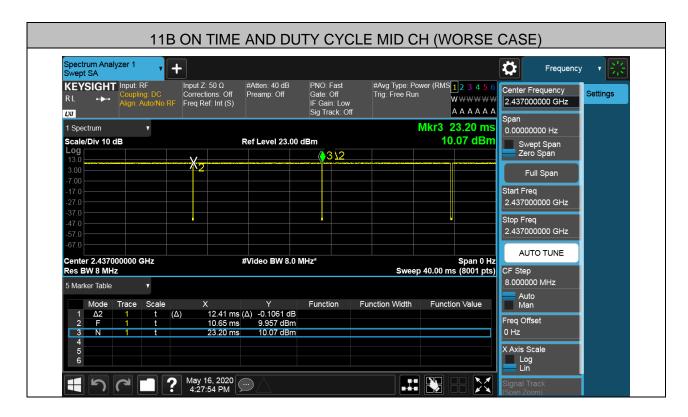
Mode	On Time (msec)	Period (msec)	Duty Cycle x (Linear)	Duty Cycle (%)	Duty Cycle Correction Factor (db)	1/T Minimum VBW (kHz)	Final VBW (kHz)
11B	12.41	12.55	0.9944	98.88%	0.05	0.08	0.1
11G	2.063	2.208	0.9699	93.43%	0.29	0.48	0.5
802.11n HT20	1.919	2.037	0.9253	94.21%	0.26	0.52	1
802.11n HT40	0.9438	1.0254	0.8593	92.04%	0.36	1.06	2

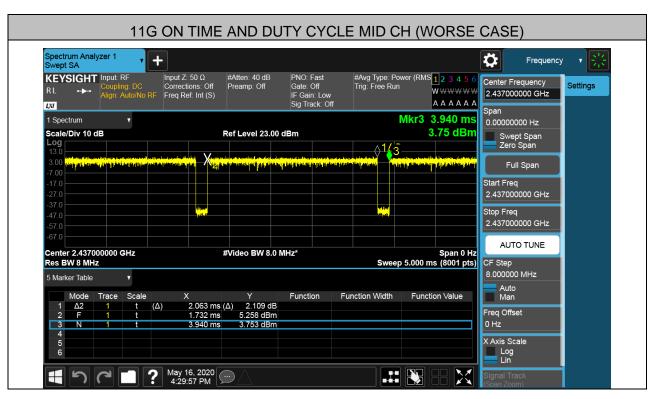
Note: 1) Duty Cycle Correction Factor=10log(1/x).

2) Where: x is Duty Cycle(Linear)

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

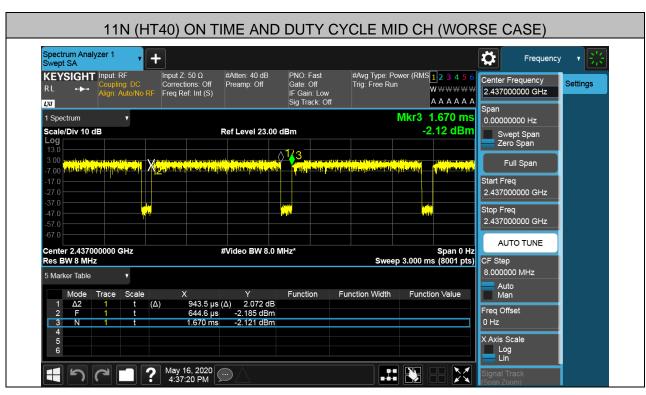














7.2. 6 dB BANDWIDTH

LIMITS

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

TEST PROCEDURE

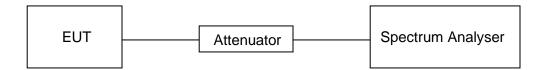
Refer to FCC KDB 558074, connect the UUT to the spectrum analyser and use the following settings:

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	For 6 dB Bandwidth :100K
VBW	For 6dB Bandwidth : ≥3 x 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



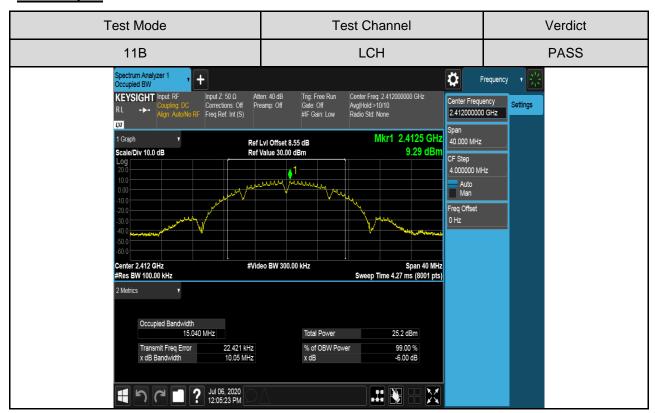


RESULTS

Test Mode	Test Channel	6dB bandwidth (MHz)	Result
	LCH	10.05	Pass
11B	MCH	10.01	Pass
	HCH	10.05	Pass
	LCH	16.36	Pass
11G	MCH	16.35	Pass
	HCH	16.38	Pass
	LCH	17.55	Pass
11N HT20	MCH	17.57	Pass
	HCH	17.57	Pass
	LCH	35.38	Pass
11N HT40	MCH	35.69	Pass
	HCH	35.65	Pass

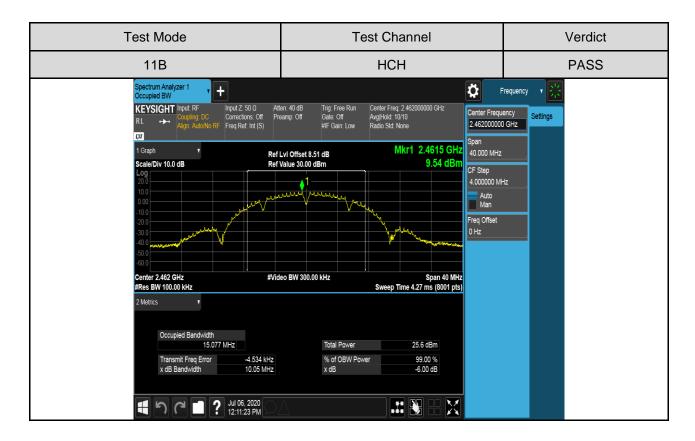


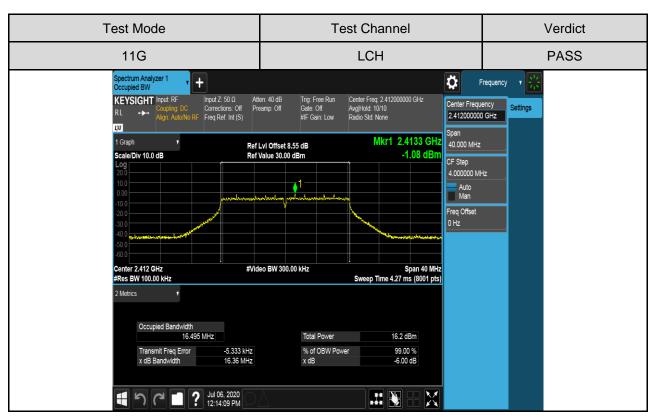
Test Graphs



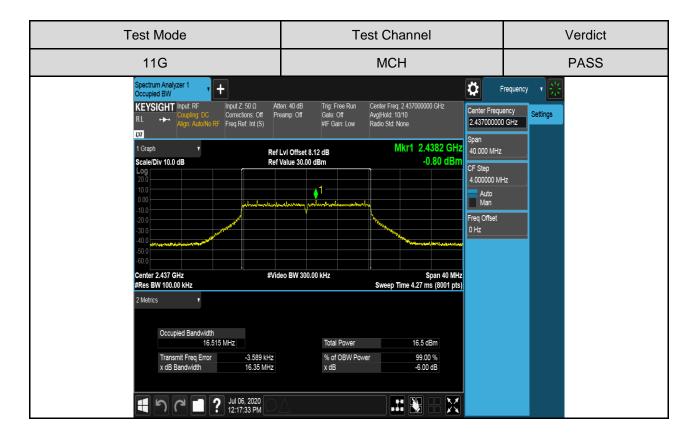


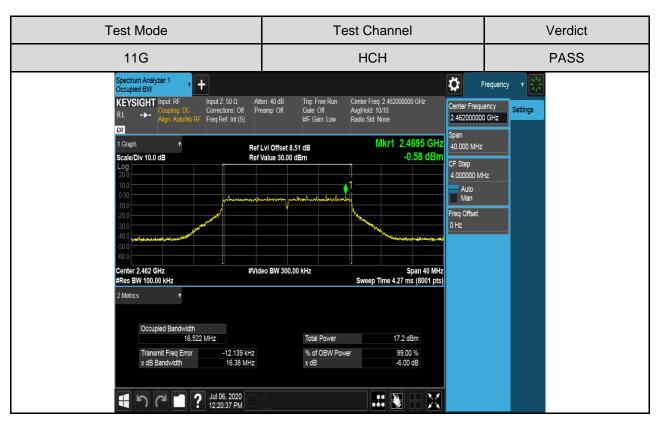




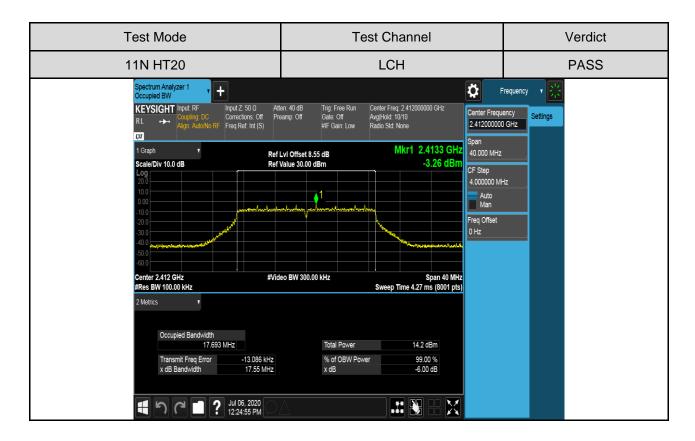


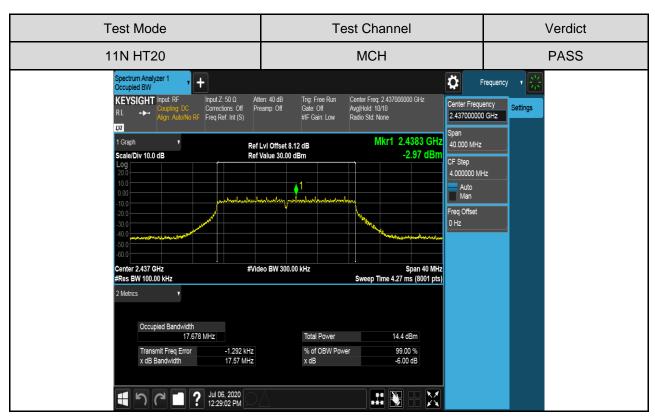




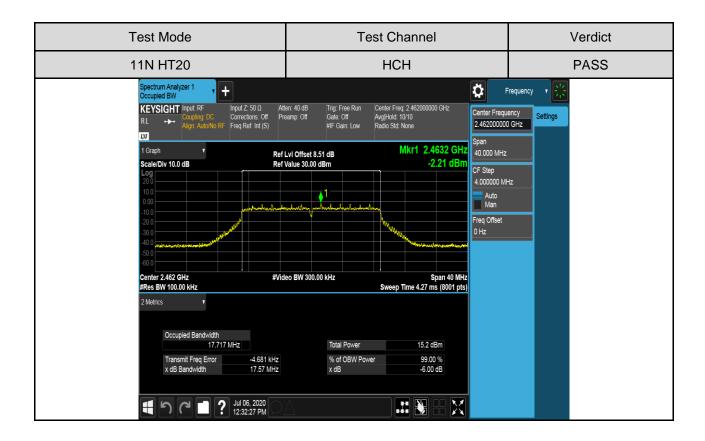


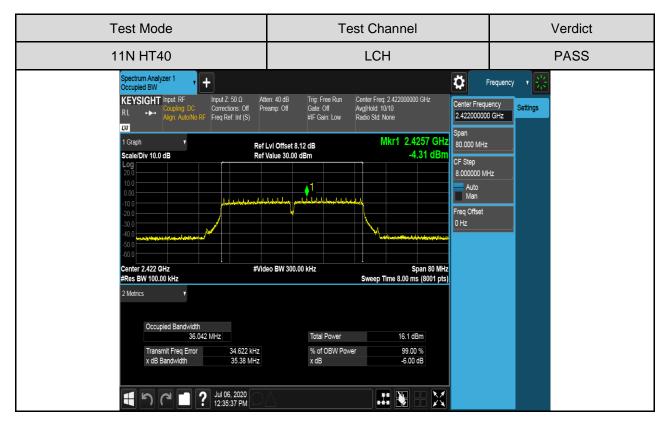




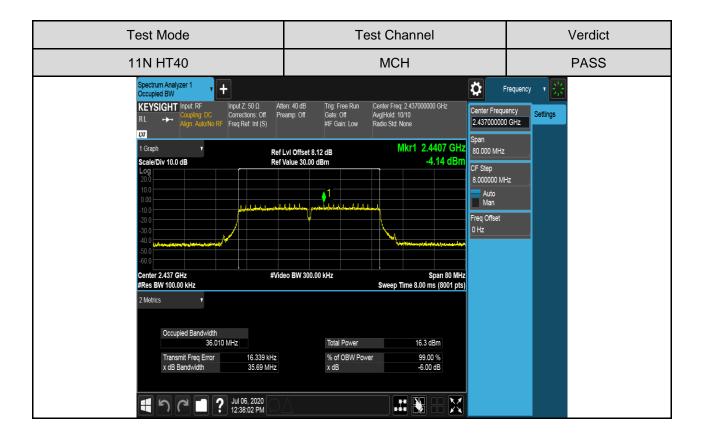


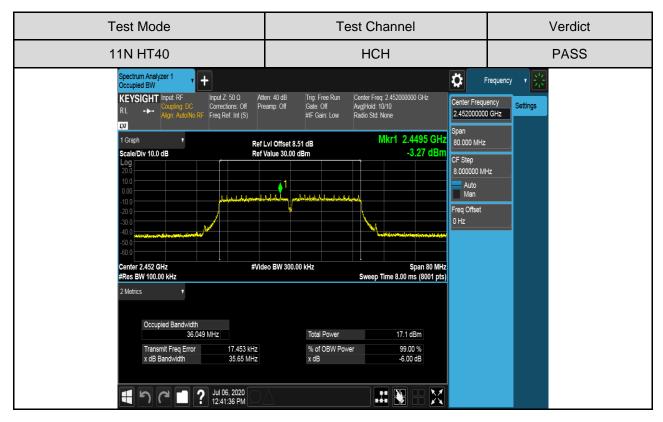












Page 27 of 126

7.3. CONDUCTED OUTPUT POWER

LIMITS

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	

Note: For b/g/n HT20 mode the average data is for reference only.

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.

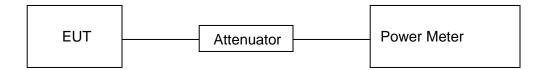
Peak Detector use for Peak result.

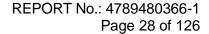
AVG Detector use for AVG result.

TEST ENVIRONMENT

Temperature	22°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	DC 12V

TEST SETUP







RESULTS

Test Mode	Test Channel	Maximum Conducted Output Power (PK)	Maximum Conducted Output Power (AV)	LIMIT
		dBm	dBm	dBm
	LCH	20.86	18.39	30
11B	MCH	20.66	17.95	30
	HCH	21.31	18.60	30
	LCH	17.76	9.76	30
11G	MCH	18.12	10.12	30
	HCH	18.75	11.04	30
	LCH	15.59	7.61	30
11n HT20	MCH	15.88	7.96	30
	HCH	16.63	8.84	30
11n HT40	LCH	N/A	9.15	30
	MCH	N/A	9.81	30
	HCH	N/A	10.11	30

Note: About the Maximum Conducted Output Power (AV), please refer to the clause 11.9.2.3.1 of C63.10-2013.



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.

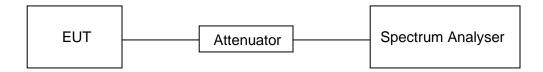
Allow trace to fully stabilize and use the peak marker function to determine the maximum amplitude level within the RBW.

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

TEST ENVIRONMENT

Temperature	22°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	DC 12V

TEST SETUP



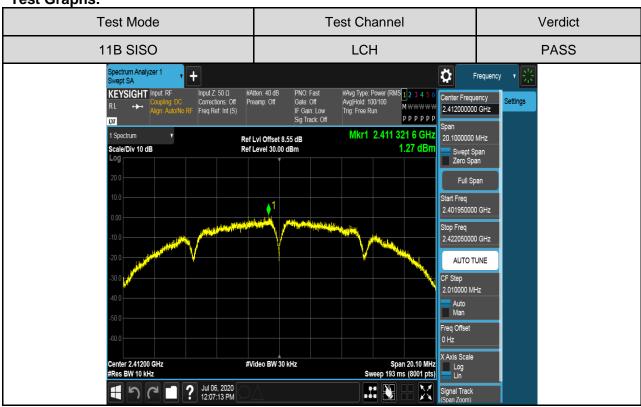


RESULTS

Test Mode	Test Channel	Maximum Peak power spectral density (dBm/10kHz)	Result
	LCH	1.27	Pass
11B	MCH	0.51	Pass
	HCH	1.57	Pass
	LCH	-9.92	Pass
11G	MCH	-9.67	Pass
	HCH	-7.97	Pass
	LCH	-12.39	Pass
11n HT20	MCH	-11.50	Pass
	HCH	-11.04	Pass
11n HT40	LCH	-12.54	Pass
	MCH	-12.94	Pass
	HCH	-12.42	Pass



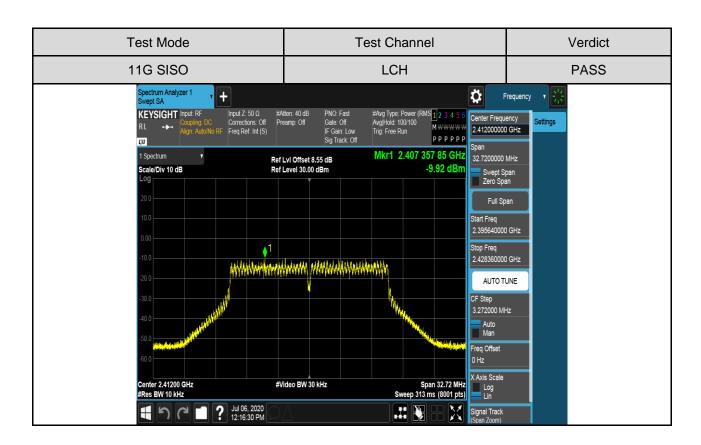
Test Graphs:



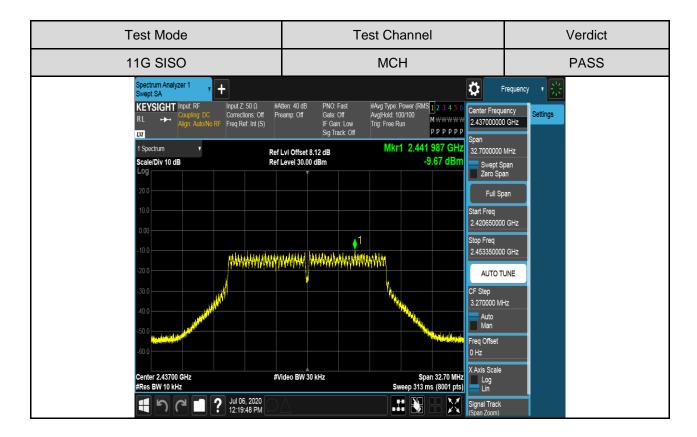


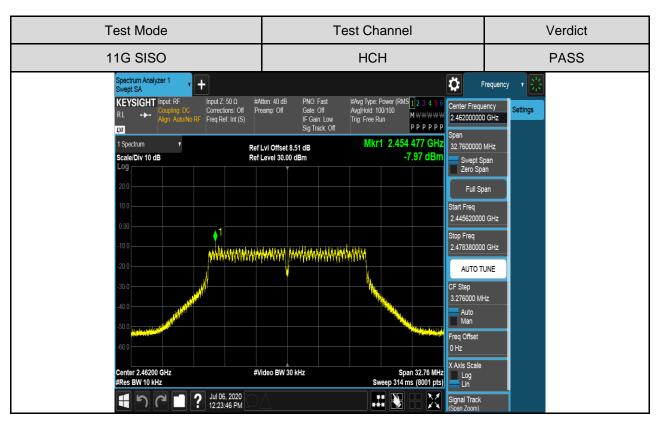


Test Mode **Test Channel** Verdict 11B SISO **HCH PASS** Spectrum Analyzer 1 Swept SA Ö Frequency Input Z: 50 Ω #Atten: 40 dB #Avg Type: Power (RMS 1 2 3 4 5 KEYSIGHT Input RF oupling: DC Corrections: Off lign: Auto/No RF Freq Ref: Int (S) Gate: Off IF Gain: Low Settings 2.462000000 GHz PPPPPP L)XI Mkr1 2.459 977 4 GHz 1 Spectrum Ref LvI Offset 8.51 dB Ref Level 30.00 dBm 20.1000000 MHz 1.57 dBm Scale/Div 10 dB Swept Span Zero Span Full Span 2.451950000 GHz Stop Freq 2.472050000 GHz AUTO TUNE 2.010000 MHz Auto Man Freq Offset X Axis Scale Center 2.46200 GHz #Video BW 30 kHz Span 20.10 MHz #Res BW 10 kHz Sweep 193 ms (8001 pts) 1961 # 1 Signal Track (Span Zoom)

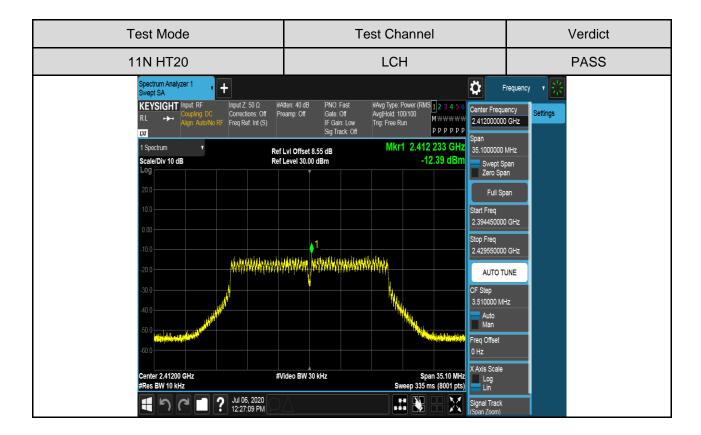


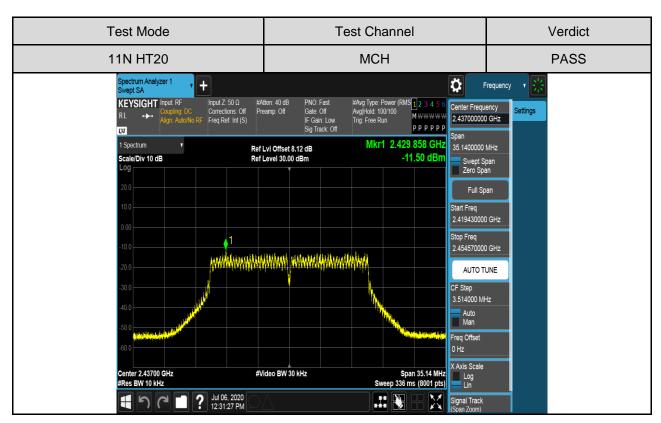






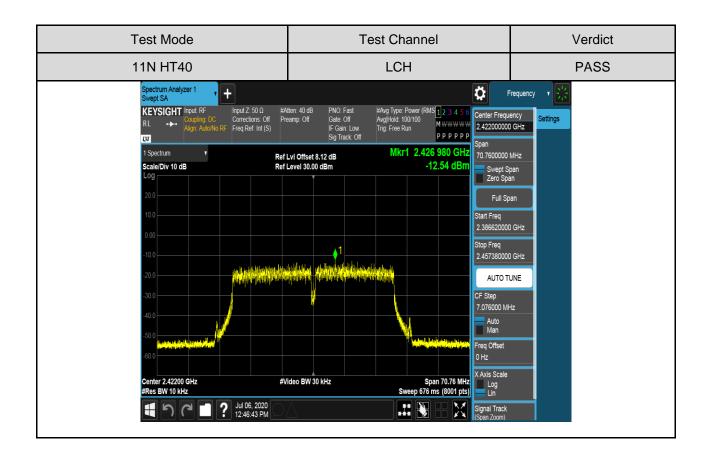




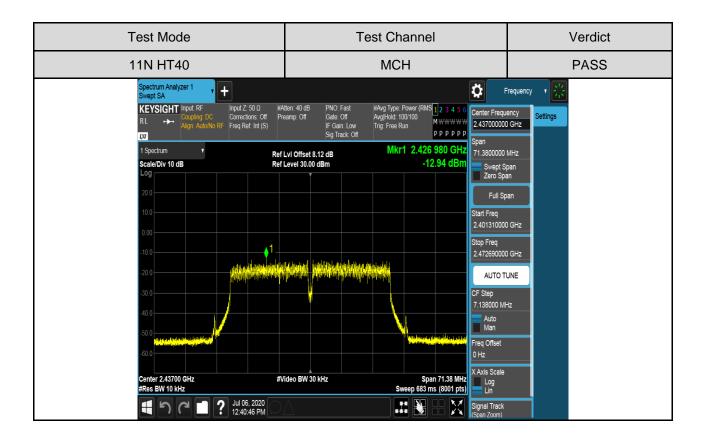


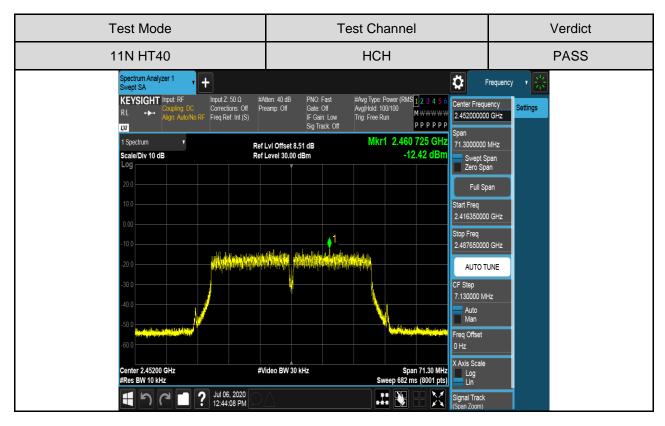


Test Mode **Test Channel** Verdict 11N HT20 **HCH PASS** Spectrum Analyzer 1 Swept SA Ö Frequency Input Z: 50 Ω #Avg Type: Power (RMS 1 2 3 4 5 KEYSIGHT Input RF #Atten: 40 dB oupling: DC Corrections: Off lign: Auto/No RF Freq Ref: Int (S) Gate: Off IF Gain: Low Settings 2.462000000 GHz PPPPPP L)XI Mkr1 2.460 731 GHz 1 Spectrum Ref LvI Offset 8.51 dB Ref Level 30.00 dBm 35.1400000 MHz -11.04 dBm Scale/Div 10 dB Swept Span Zero Span Full Span 2.444430000 GHz 2.479570000 GHz AUTO TUNE 3.514000 MHz Auto Man Freq Offset X Axis Scale enter 2.46200 GHz #Video BW 30 kHz Span 35.14 MHz Res BW 10 kHz Sweep 336 ms (8001 pts) ? Jul 06, 2020 12:34:27 PM X 1961 # 1 Signal Track (Span Zoom)











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	For b/g/n HT20 modes: at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power For HT40 mode: 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.

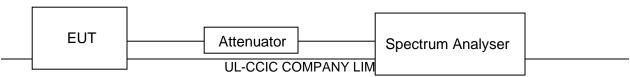
settings:

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



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



REPORT No.: 4789480366-1

Page 38 of 126

TEST ENVIRONMENT

Temperature	22°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	DC 12V

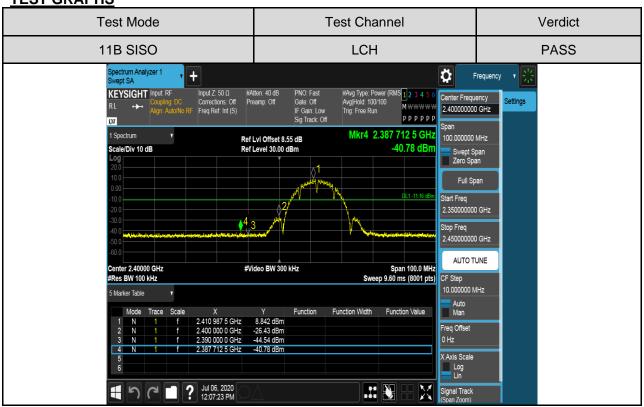
Part I : Conducted Bandedge

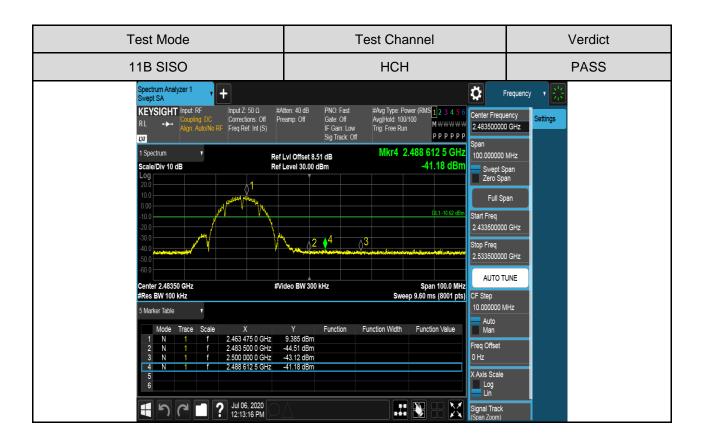
RESULTS TABLE

Test Mode	Test Channel	Carrier Power[dBm]	Max. Spurious Level [dBm]	Limit [dBm]	Verdict
11B	LCH	8.842	-40.78	-11.16	PASS
IID	HCH	9.385	-41.18	-10.62	PASS
11G	LCH	-1.408	-41.97	-21.41	PASS
	HCH	-0.04984	-41.31	-20.05	PASS
11N HT20	LCH	-3.725	-41.39	-23.73	PASS
11111 1120	HCH	-2.722	-41.09	-22.72	PASS
11N HT40	LCH	-4.472	-41.71	-34.47	PASS
	HCH	-3.490	-40.68	-33.49	PASS

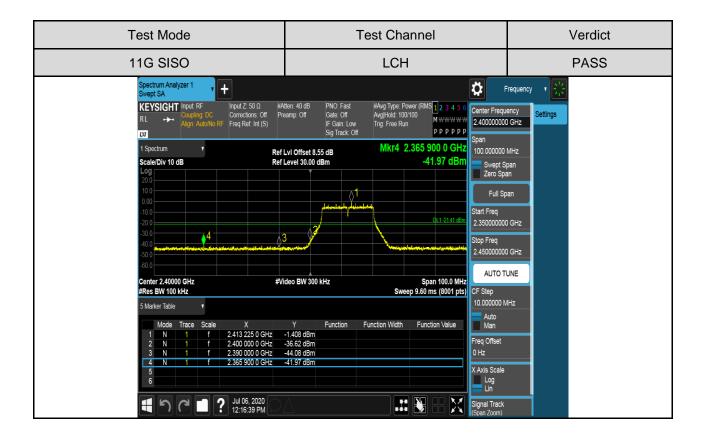


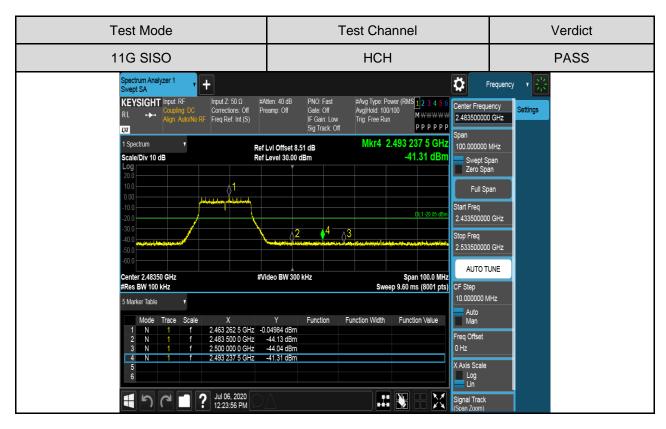
TEST GRAPHS



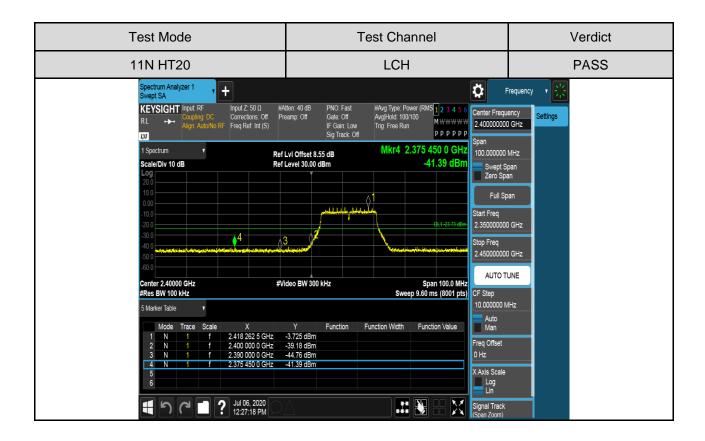


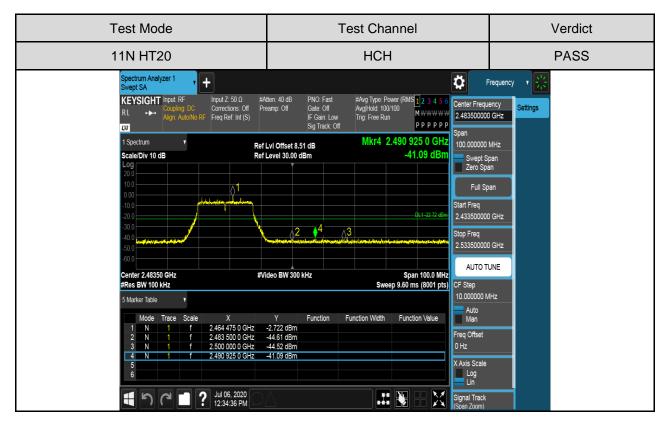














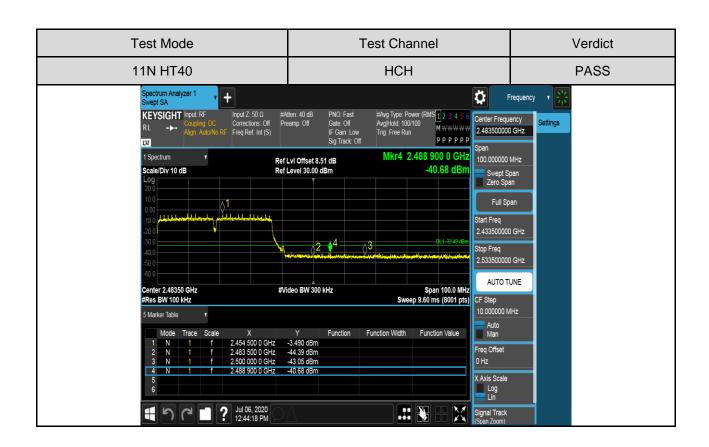
476

Test Mode **Test Channel** Verdict LCH **PASS** 11N HT40 Spectrum Analyzer 1 Swept SA Ö Frequency KEYSIGHT Input RF Input Z: 50 Ω #Atten: 40 dB #Avg Type: Power (RMS 1 2 3 4 5 upling: DC Corrections: Off Freq Ref: Int (S) Gate: Off IF Gain: Low Settings 2.400000000 GHz PPPPPP L)XI Mkr4 2.358 562 5 GHz Ref LvI Offset 8.12 dB Ref Level 30.00 dBm 100.000000 MHz -41.71 dBn Scale/Div 10 dB Swept Span Zero Span Full Span 2.350000000 GHz Stop Freq 2.450000000 GHz AUTO TUNE Span 100.0 MHz Sweep 9.60 ms (8001 pts) #Video BW 300 kHz #Res BW 100 kHz 10.000000 MHz Auto Man Function Width Function Value 2.425 750 0 GHz 2.400 000 0 GHz 2.390 000 0 GHz -4.472 dBm -38.94 dBm -45.14 dBm req Offset 0 Hz X Axis Scale

X

Signal Track (Span Zoom)

#





Part II : Conducted Emission

Test Result Table

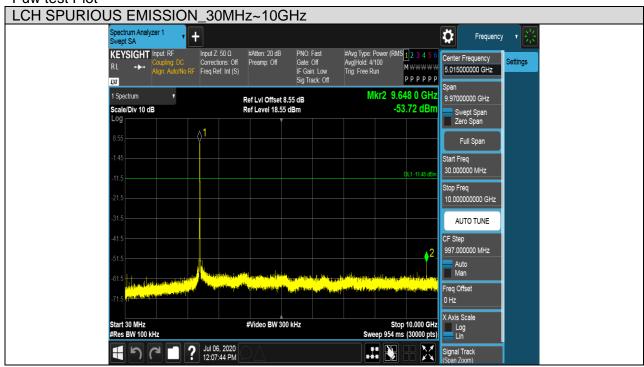
Test Mode	Channel	Pref(dBm)	Puw(dBm)	Verdict
	LCH	8.52	<limit< td=""><td>PASS</td></limit<>	PASS
11B	MCH	9.14	<limit< td=""><td>PASS</td></limit<>	PASS
	HCH	9.58	<limit< td=""><td>PASS</td></limit<>	PASS
	LCH	-1.28	<limit< td=""><td>PASS</td></limit<>	PASS
11G	MCH	-0.92	<limit< td=""><td>PASS</td></limit<>	PASS
	HCH	-0.72	<limit< td=""><td>PASS</td></limit<>	PASS
	LCH	-3.62	<limit< td=""><td>PASS</td></limit<>	PASS
11N HT20	MCH	-3.51	<limit< td=""><td>PASS</td></limit<>	PASS
	HCH	-2.17	<limit< td=""><td>PASS</td></limit<>	PASS
	LCH	-4.23	<limit< td=""><td>PASS</td></limit<>	PASS
11N HT40	MCH	-4.25	<limit< td=""><td>PASS</td></limit<>	PASS
	HCH	-3.55	<limit< td=""><td>PASS</td></limit<>	PASS

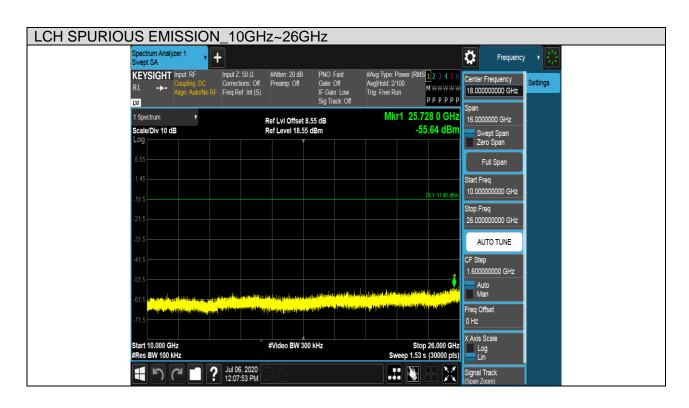
Test Plots

Test Mode	Channel	Verdict
11B	LCH	PASS











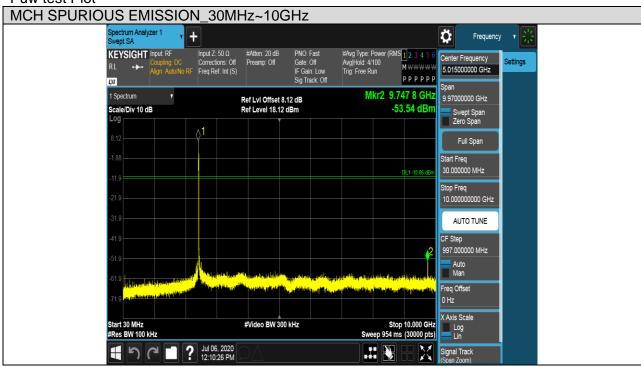
REPORT No.: 4789480366-1

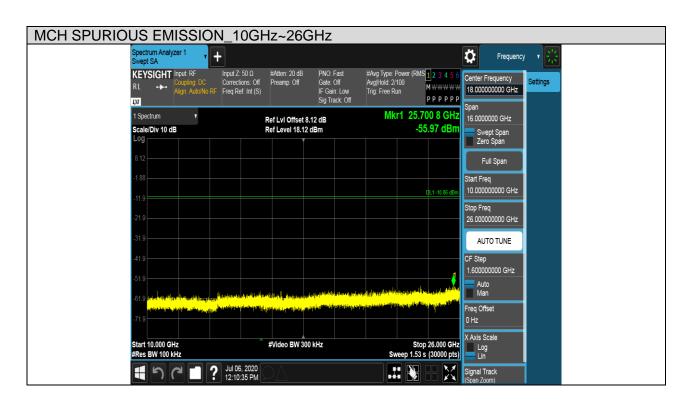
Page 45 of 126

Test Mode	Channel	Verdict
11B	MCH	PASS







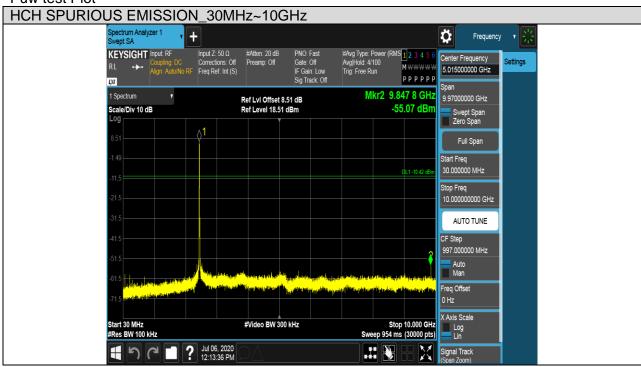


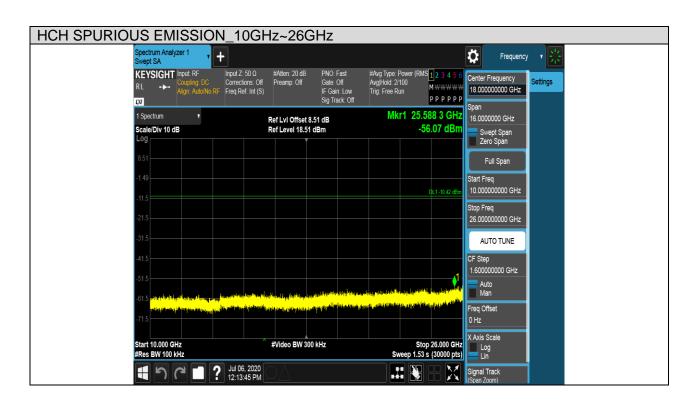


Test Mode	Channel	Verdict
11B	HCH	PASS











REPORT No.: 4789480366-1

Page 49 of 126

Test Mode	Channel	Verdict
11G	LCH	PASS

