

FCC 47 CFR PART 15 SUBPART C

CERTIFICATION TEST REPORT

For

DIGITAL IP CAMERA

MODEL NUMBER: EN-CCUZ-001a

PROJECT NUMBER: 4788671511

REPORT NUMBER: 4788671511-1

FCC ID: 2AQEO-1002

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Prepared for

Eagle Eye Networks B.V.

Prepared by

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Revision History

Rev.	Issue Date	Revisions	Revised By
	11/02/2018	Initial Issue	

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1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name: Address:	Eagle Eye Networks B.V. Hogehilweg 19, 1101 CB, Amsterdam, The Netherlands
Manufacturer Information	
Company Name:	Eagle Eye Networks B.V.
Address:	Hogehilweg 19, 1101 CB, Amsterdam, The Netherlands
EUT Description	
Product Name	DIGITAL IP CAMERA
Model Name	EN-CCUZ-001a
Sample Number	1870574
Data of Receipt Sample	Oct. 18, 2018
Date Tested	Oct. 18, 2018~ Nov. 1, 2018

APPLICABLE STANDARDS

STANDARD

TEST RESULTS

CFR 47 Part 15 Subpart C

PASS

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Summary of Test Results						
Clause	Test Items	FCCRules	Test Results			
1	6db DTS Bandwidth	FCC 15.247 (a) (2)	Complied			
2	Peak Conducted Power	FCC 15.247 (b) (3)	Complied			
3	Power Spectral Density	FCC 15.247 (e)	Complied			
4	Conducted Band edge And Spurious emission	FCC 15.247 (d)	Complied			
5	Radiated Band edges and Spurious emission	FCC 15.247 (d) FCC 15.209 FCC 15.205	Complied			
6	Conducted Emission Test For AC Power Port	FCC 15.207	Complied			
7	Antenna Requirement	FCC 15.203	Complied			

Tested By:

Such on

Denny Huang Engineer Project Associate Approved By:

Aephenbuo

Stephen Guo Laboratory Manager Check By:

Shenny les

Shawn Wen Laboratory Leader

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC KDB 558074 D01 DTS Meas Guidance v05, KDB414788 D01 Radiated Test Site v01r01, ANSI C63.10-2013, FCC CFR 47 Part 2, FCC CFR 47 Part 15.

3. FACILITIES AND ACCREDITATION

Test Location	UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch.			
Address	Building 10, Innovation Technology Park, Song Shan Lake Hi tech Development Zone, Dongguan, 523808, China			
Accreditation Certificate	UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing. The Certificate Registration Number is 4102.01. UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The Designation Number is CN1187. UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission).			

Note:

- All tests measurement facilities use to collect the measurement data are located at Building 10, Innovation Technology Park, Song Shan Lake Hi tech Development Zone, Dongguan, 523808, China
- 2. The test anechoic chamber in UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch 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.
- 3. For below 30MHz, lab had performed measurements at test anechoic chamber and comparing to measurements obtained on an open field site. And these measurements below 30MHz had been correlated to measurements performed on an OATS.

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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			
Uncertainty for Conduction emission test	2.90dB			
Uncertainty for Radiation Emission test(include Fundamental emission) (Below 30MHz)	2.2dB			
Uncertainty for Radiation Emission test(include Fundamental emission) (30MHz-1GHz)	4.52dB			
Uncertainty for Radiation Emission test	5.04dB(1-6GHz)			
(1GHz to 26GHz)(include Fundamental	5.30dB (6GHz-18Gz)			
emission)	5.23dB (18GHz-26Gz)			
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

DIGITAL IP CAMERA				
EN-CCUZ-001a				
IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz				
IEEE 802.11n(H)	Γ40): 2422MHz to 2452MHz			
IEEE for 802.11E	3 SISO: DSSS (CCK, DQPSK, DBPSK)			
IEEE for 802.110	G SISO: OFDM (64QAM, 16QAM, QPSK, BPSK)			
IEEE for 802.11n	h (HT20 and HT40): OFDM (64QAM, 16QAM, QPSK, BPSK)			
IEEE 802.11b/g/r	n(HT20): 11 Channels			
IEEE 802.11n(HT	Γ40): 7 Channels			
Channels with 5MHz step				
Fixed production				
44 (manufacturer	r declare)			
Secure CRT (ma	nufacturer declare)			
Chip Antenna				
2.3 dBi				
Adapter Model:NBS10B050200VUU				
	INPUT:100-240V~50/60Hz Max.0.3A			
	OUTPUT:5.0V 2.0A			
	EN-CCUZ-001a IEEE 802.11b/g/i IEEE 802.11n(H ⁻ IEEE for 802.11C IEEE for 802.11C IEEE for 802.11C IEEE for 802.11b/g/i IEEE 802.11b/g/i IEEE 802.11n(H ⁻ Channels with 5N Fixed production 44 (manufacture) Secure CRT (ma Chip Antenna 2.3 dBi			

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5.2. MAXIMUM OUTPUT POWER

Frequency Range (MHz)	IEE Std. 802.11	Channel Number	Max PK Conducted Power(dBm)
2412-2462	IEEE 802.11B SISO	1-11[11]	16.79
2412-2462	IEEE 802.11G SISO	1-11[11]	15.77
2412-2462	IEEE 802.11nHT20	1-11[11]	15.85
2422-2452	IEEE 802.11nHT40	3-9[7]	15.42

5.3. CHANNEL LIST

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

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		

5.4. TEST CHANNEL CONFIGURATION

Test Mode	Test Channel (MHz)
	LCH :CH01 2412
IEEE 802.11B SISO	MCH: CH06 2437
	HCH: CH11 2462
	LCH :CH01 2412
IEEE 802.11G SISO	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

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5.5. THE WORSE CASE POWER SETTING PARAMETER

Toot Antonno	Test Software Version	SecureCRT				
Test Antenna	Test Mode	Test Channel	Setting TX Power	Setting data rate (Mbps)		
		LCH	44	CCK_1Mbps		
	IEEE 802.11B SISO	MCH	44	CCK_1Mbps		
		HCH	44	CCK_1Mbps		
	IEEE 802.11G SISO	LCH	44	NO HT_6Mbps		
		MCH	44	NO HT_6Mbps		
		HCH	44	NO HT_6Mbps		
Antenna 1	IEEE 802.11n HT20	LCH	44	HT20_MCS_0_20		
		MCH	44	HT20_MCS_0_20		
		HCH	44	HT20_MCS_0_20		
		LCH	44	HT40+MCS_0_40		
	IEEE 802.11n HT40	MCH	44	HT40+MCS_0_40		
		HCH	44	HT40+MCS_0_40		

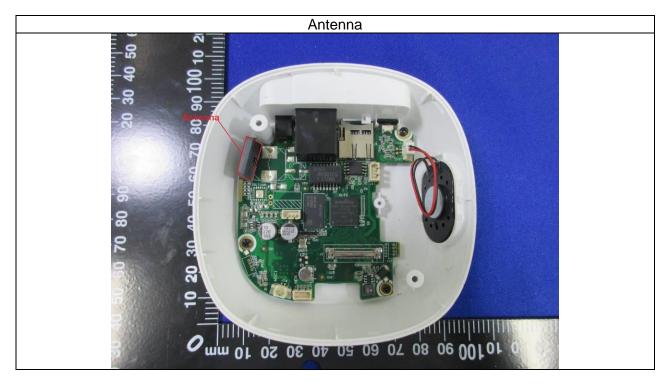
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5.6. DESCRIPTION OF AVAILABLE ANTENNAS

Ant.	Frequency (MHz)	Antenna Type	Antenna Gain (dBi)
1	2400-2483.5	Chip Antenna	2.3

Test Mode	Transmit and Receive Mode	Description
IEEE 802.11B SISO	⊠1TX, 1RX	Antenna1 can be used as transmitting/receiving antenna independently.
IEEE 802.11G SISO	⊠1TX, 1RX	Antenna1 can be used as transmitting/receiving antenna independently.
IEEE 802.11n HT20(SISO)	⊠1TX, 1RX	Antenna1 can be used as transmitting/receiving antenna independently.
IEEE 802.11n HT40(SISO)	⊠1TX, 1RX	Antenna1 can be used as transmitting/receiving antenna independently.



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5.7. 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 5.0V			
	VH	N/A			

Note: VL= Lower Extreme Test Voltage VN= Nominal Voltage VH= Upper Extreme Test Voltage

TN= Normal Temperature

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5.8. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Item	Equipment	Brand Name	Model Name	FCC ID
1	Laptop	ThinkPad	T410	N/A

I/O PORT

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

ACCESSORY

Item	Accessory	Brand Name	Model Name	Description
1	N/A	N/A	N/A	N/A

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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☑ Two-Line V- Network R&S ENV216 101983 Dec.12, 2017 Dec.11, 2018 ☑ Artificial Mains Networks Schwarzbeck NSLK 8126 8126465 Dec.12, 2017 Dec.11, 2018 ☑ Artificial Mains Networks Schwarzbeck NSLK 8126 8126465 Dec.12, 2017 Dec.11, 2018 ☑ Test Software for Conducted disturbance UL Antenna port Ver. 7.2 Radiated Emissions(Instrument) Used Equipment Manufacturer Model No. Serial No. Last Cal. Next Cal. ☑ MXE EMI Receiver KESIGHT N9038A MY56400 Dec. 12, 2017 Dec. 11, 2018 ☑ Hybrid Log Periodic Antenna TDK HLP-3003C 130960 Jan.09, 2016 Jan.06, 2016 Jan		5.9. MEASURING INSTRUMENT AND SOFTWARE USED							
☑ EMI Test Receiver R&S ESR3 101961 Dec.12, 2017 Dec.11, 2018 ☑ Artificial Mains Network Schwarzbeck NSLK 8126 8126465 Dec.12, 2017 Dec.11, 2018 ☑ Artificial Mains Networks Schwarzbeck NSLK 8126 8126465 Dec.12, 2017 Dec.11, 2018 ☑ Artificial Mains Networks Schwarzbeck NSLK 8126 B126465 Dec.12, 2017 Dec.11, 2018 ☑ Description Manufacturer Name Version ☑ Test Software for Conducted disturbance UL Antenna port Ver. 7.2 Radiated Equipment Manufacturer Model No. Serial No. Last Cal. Next Cal. ☑ MXE EMI Receiver KESIGHT N9038A MY56400 036 Jan.09, 2016 Jan.09, 2019 ☑ Hybrid Log Periodic Antenna TDK HLP-3003C 130960 Jan.09, 2016 Jan.09, 2016 ☑ Preamplifier HP 8447D 2944A090 Dec. 12, 2017 Dec. 11, 2018 ☑ Pream	Conducted Emissions(Instrument)								
Image: Constraint of the synthesis of the synthesynthesis of the synthesis of the synthesis of the sy	Used	Equipment	Manufacturer	Mod	el No.	Seria	al No.	Last Cal.	Next Cal.
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Image: Matter in the state in the		Network	R&S	EN	V216	101	983	Dec.12, 2017	Dec.11, 2018
Used Description Manufacturer Name Version ☑ Test Software for Conducted disturbance UL Antenna port Ver. 7.2 Radiated Emissons(Instrument) Used Equipment Manufacturer Model No. Serial No. Last Cal. Next Cal. ☑ MXE EMI Receiver KESIGHT N9038A MY56400 036 Dec. 12, 2017 Dec. 11, 2018 ☑ Hybrid Log Periodic Antenna TDK HLP-3003C 130960 Jan.09, 2016 Jan.09, 2019 ☑ Preamplifier HP 8447D 2944A090 Dec. 12, 2017 Dec. 11, 2018 ☑ Preamplifier HP 8447D 2944A090 Dec. 12, 2017 Dec. 11, 2018 ☑ Preamplifier HP 8447D 2944A090 Dec. 12, 2017 Dec. 11, 2018 ☑ Horn Antenna TDK HRN-0118 130939 Jan. 09, 2016 Jan.06, 2016 Jan.06, 2019 ☑ Horn Antenna TDK PA-02-0118 TRS-305- 00066 Dec. 12, 2017 Dec. 11, 2018 ☑ Preamplifier TDK PA-02-2	\checkmark		Schwarzbeck	NSLI	< 8126	8126	6465	Dec.12, 2017	Dec.11, 2018
☑ Test Software for Conducted disturbance UL Antenna port Ver. 7.2 Radiated Emissions(Instrument) Last Cal. Next Cal. Used Equipment Manufacturer Model No. Serial No. Last Cal. Next Cal. Image: MXE EMI Receiver KESIGHT N9038A MY56400 036 Dec. 12, 2017 Dec. 11, 2018 Image: MXE EMI Receiver KESIGHT N9038A MY56400 036 Dec. 12, 2017 Dec. 11, 2018 Image: MXE EMI Receiver HP 8447D 2944A090 99 Dec. 12, 2017 Dec. 11, 2018 Image: Ministrument Receiver R&S ESR26 101377 Dec. 12, 2017 Dec. 11, 2018 Image: Ministrument Receiver R&S ESR26 101377 Dec. 12, 2017 Dec. 11, 2018 Image: Ministrument Receiver R&S ESR26 101377 Dec. 12, 2017 Dec. 11, 2018 Image: Ministrument Receiver R&S ESR26 101377 Dec. 12, 2017 Dec. 11, 2018 Image: Ministrument Receiver TDK PA-02-0118 TRS-305-00006 Dec. 12, 2017				Soft	ware				
Radiated Emissions(Instrument) Used Equipment Manufacturer Model No. Serial No. Last Cal. Next Cal. Image: MXE EMI Receiver KESIGHT N9038A MY56400 036 Dec. 12, 2017 Dec. 11, 2018 Image: MXE EMI Receiver KESIGHT N9038A MY56400 036 Dec. 12, 2017 Dec. 11, 2018 Image: MXE EMI Receiver TDK HLP-3003C 130960 Jan.09, 2016 Jan.09, 2019 Image: MXE EMI Receiver R&S ESR26 101377 Dec. 12, 2017 Dec. 11, 2018 Image: Mission Mission Antenna TDK HRN-0118 130939 Jan. 09, 2016 Jan. 09, 2019 Image: Mission Mission Antenna TDK HRN-0118 130939 Jan. 06, 2016 Jan.06, 2019 Image: Mission Antenna Schwarzbeck BBHA-9170 691 Jan.06, 2016 Jan.06, 2016 Jan.06, 2016 Image: Mission Antenna Schwarzbeck 1519B 00008 Mar. 26, 2017 Dec. 11, 2018 Image: Mission Antenna Schwarzbeck 1519B 00008 Mar. 26, 2019	Used	Des	cription		Man	ufactu	urer	Name	Version
Used Equipment Manufacturer Model No. Serial No. Last Cal. Next Cal. ☑ MXE EMI Receiver KESIGHT N9038A MY56400 036 Dec. 12, 2017 Dec. 11, 2018 ☑ Hybrid Log Periodic Antenna TDK HLP-3003C 130960 Jan.09, 2016 Jan.09, 2019 ☑ Preamplifier HP 8447D 2944A090 99 Dec. 12, 2017 Dec. 11, 2018 ☑ Preamplifier HP 8447D 2944A090 99 Dec. 12, 2017 Dec. 11, 2018 ☑ Horn Antenna TDK HRN-0118 130939 Jan.09, 2016 Jan.09, 2019 ☑ Horn Antenna TDK HRN-0118 130939 Jan.06, 2016 Jan.06, 2019 ☑ High Gain Horn Antenna Schwarzbeck BBHA-9170 691 Jan.06, 2016 Jan.06, 2019 ☑ Preamplifier TDK PA-02-0118 TRS-305- 00003 Dec. 12, 2017 Dec. 11, 2018 ☑ Preamplifier TDK PA-02-2 TRS-305- 2353.5-4005 Dec.12, 2017 <	\checkmark	Test Software for C	Conducted distu	rbance	;	UL		Antenna port	Ver. 7.2
☑ MXE EMI Receiver KESIGHT N9038A MY56400 036 Dec. 12, 2017 Dec. 11, 2018 ☑ Hybrid Log Periodic Antenna TDK HLP-3003C 130960 Jan.09, 2016 Jan.09, 2019 ☑ Preamplifier HP 8447D 2944A090 99 Dec. 12, 2017 Dec. 11, 2018 ☑ Preamplifier HP 8447D 2944A090 99 Dec. 12, 2017 Dec. 11, 2018 ☑ Horn Antenna TDK HRN-0118 130939 Jan.09, 2016 Jan.09, 2019 ☑ Horn Antenna TDK HRN-0118 130939 Jan.06, 2016 Jan.09, 2019 ☑ Horn Antenna TDK PA-02-0118 TRS-305- 00003 Dec. 12, 2017 Dec. 11, 2018 ☑ Preamplifier TDK PA-02-2 TRS-307- 00003 Dec. 12, 2017 Dec. 11, 2018 ☑ Loop antenna Schwarzbeck 1519B 00008 Mar. 26, 2016 Mar. 26, 2016 ☑ Loop antenna Schwarzbeck 1519B Dec.12, 2017 Dec.11, 2018			Radiated	Emiss	ions(Ins	strume	ent)		
MXE EMI Receiver KESIGH1 N9038A 036 Dec. 12, 2017 Dec. 11, 2018 ✓ Hybrid Log Periodic Antenna TDK HLP-3003C 130960 Jan.09, 2016 Jan.09, 2019 ✓ Preamplifier HP 8447D 2944A099 99 Dec. 12, 2017 Dec. 11, 2018 ✓ Fmi Measurement Receiver R&S ESR26 101377 Dec. 12, 2017 Dec. 11, 2018 ✓ Horn Antenna TDK HRN-0118 130939 Jan. 09, 2016 Jan. 09, 2016 Jan. 09, 2016 Jan. 09, 2019 ✓ Horn Antenna TDK HRN-0118 130939 Jan. 06, 2016 Jan.06, 2016 Jan.06, 2016 Jan.06, 2019 ✓ Preamplifier TDK PA-02-0118 TRS-305- 00066 Dec. 12, 2017 Dec. 11, 2018 ✓ Preamplifier TDK PA-02-2 TRS-307- 00003 Dec. 12, 2017 Dec. 11, 2018 ✓ Preamplifier Wainwright 2350-2400- 2483.5- 2533.5-40SS 4 Dec. 12, 2017 Dec. 11, 2018 ✓ Band Reject Filter	Used	Equipment	Manufacturer	Mod	el No.	Seria	al No.	Last Cal.	Next Cal.
Image: Section of the secting of the secting of the sectin		MXE EMI Receiver	KESIGHT	N9	038A	-		Dec. 12, 2017	Dec. 11, 2018
Preampiliter HP 8447D 99 Dec. 12, 2017 Dec. 11, 2018 Image: Second S			TDK	HLP-	3003C			Jan.09, 2016	Jan.09, 2019
Image: Market for Receiver Res ESR26 101377 Dec.12, 2017 Dec.11, 2018 Image: Mean Market for Antenna TDK HRN-0118 130939 Jan. 09, 2016 Jan. 09, 2019 Image: Mean Market for Antenna Schwarzbeck BBHA-9170 691 Jan.06, 2016 Jan.06, 2019 Image: Mean Market for Antenna Schwarzbeck BBHA-9170 691 Jan.06, 2016 Jan.06, 2019 Image: Mean Market for Antenna Schwarzbeck BBHA-9170 691 Jan.06, 2016 Jan.06, 2019 Image: Mean Market for Preamplifier TDK PA-02-0118 TRS-305- 00003 Dec. 12, 2017 Dec. 11, 2018 Image: Mean Meight for Market for Receive for TDK PA-02-2 TRS-307- 00003 Dec.12, 2017 Dec.11, 2018 Image: Mean Meight for Mean Mean Merger for Receive for Mean Merger for Receive for Re	V		HP	84	47D			Dec. 12, 2017	Dec. 11, 2018
✓ High Gain Horn Antenna Schwarzbeck BBHA-9170 691 Jan.06, 2016 Jan.06, 2019 ✓ Preamplifier TDK PA-02-0118 TRS-305- 00066 Dec. 12, 2017 Dec. 11, 2018 ✓ Preamplifier TDK PA-02-2 TRS-307- 00003 Dec. 12, 2017 Dec. 11, 2018 ✓ Preamplifier TDK PA-02-2 TRS-307- 00003 Dec. 12, 2017 Dec.11, 2018 ✓ Loop antenna Schwarzbeck 1519B 00008 Mar. 26, 2016 Mar. 26, 2019 ✓ Band Reject Filter Wainwright WRCJV8- 2350-2400- 2483.5- 2533.5-40SS 4 Dec.12, 2017 Dec.11, 2018 ✓ Band Reject Filter Wainwright WRCJV8- 2350-2400- 2483.5- 2533.5-40SS 4 Dec.12, 2017 Dec.11, 2018 ✓ Description Manufacturer Manufacturer Name Version ✓ Test Software for Radiated disturbance Farad EZ-EMC Ver. UL-3A1 ✓ Spectrum Analyzer Keysight N9030A MY55440 Dec.12, 2017 Dec.11, 2018 ✓ Power Meter Keysight N9031A </td <td>V</td> <td></td> <td>R&S</td> <td>ES</td> <td>R26</td> <td>101</td> <td>377</td> <td>Dec.12, 2017</td> <td>Dec.11, 2018</td>	V		R&S	ES	R26	101	377	Dec.12, 2017	Dec.11, 2018
☑ Antenna Schwar2beck BBHA-9170 691 Jah.06, 2016 Jah.06, 2016 ☑ Preamplifier TDK PA-02-0118 TRS-305- 00003 Dec. 12, 2017 Dec. 11, 2018 ☑ Preamplifier TDK PA-02-2 TRS-307- 00003 Dec. 12, 2017 Dec. 11, 2018 ☑ Loop antenna Schwarzbeck 1519B 00008 Mar. 26, 2016 Mar. 26, 2019 ☑ Band Reject Filter Wainwright WRCJV8- 2350-2400- 2483.5- 2533.5-40SS 4 Dec.12, 2017 Dec.11, 2018 ☑ Band Reject Filter Wainwright WRCJV8- 2353.5-40SS 4 Dec.12, 2017 Dec.11, 2018 ☑ Band Reject Filter Wainwright Manufacturer Name Version ☑ Description Manufacturer Name Version ☑ Test Software for Radiated disturbance Farad EZ-EMC Ver. UL-3A1 ☑ Spectrum Analyzer Keysight N9030A MY55410 512 Dec.12, 2017 Dec.11, 2018 ☑ Power Meter Keysight N9031A MY55440 024 Dec.12, 2017 Dec.11, 2018 <td>\checkmark</td> <td>Horn Antenna</td> <td>TDK</td> <td>HRN</td> <td>I-0118</td> <td>130</td> <td>939</td> <td>Jan. 09, 2016</td> <td>Jan. 09, 2019</td>	\checkmark	Horn Antenna	TDK	HRN	I-0118	130	939	Jan. 09, 2016	Jan. 09, 2019
Image: Second		•	Schwarzbeck	BBH/	۹-9170	69	91	Jan.06, 2016	Jan.06, 2019
☑ Preamplifier TDK PA-02-2 00003 Dec.12, 2017 Dec.11, 2018 ☑ Loop antenna Schwarzbeck 1519B 00008 Mar. 26, 2016 Mar. 26, 2019 ☑ Band Reject Filter Wainwright WRCJV8- 2350-2400- 2483.5- 2533.5-40SS 4 Dec.12, 2017 Dec.11, 2018 ☑ Band Reject Filter Wainwright WRCJV8- 2350-2400- 2483.5- 2533.5-40SS 4 Dec.12, 2017 Dec.11, 2018 ☑ Description Manufacturer Name Version ☑ Test Software for Radiated disturbance Farad EZ-EMC Ver. UL-3A1 ☑ Test Software for Radiated disturbance Farad EZ-EMC Ver. UL-3A1 ☑ Spectrum Analyzer Keysight N9030A MY55410 512 Dec.12, 2017 Dec.11, 2018 ☑ Power Meter Keysight N9031A MY55416 024 Dec.12, 2017 Dec.11, 2018	\checkmark	Preamplifier	TDK	PA-0	2-0118	000	066	Dec. 12, 2017	Dec. 11, 2018
☑ Band Reject Filter Wainwright WRCJV8- 2350-2400- 2483.5- 2533.5-40SS 4 Dec.12, 2017 Dec.11, 2018 Software Used Description Manufacturer Name Version ☑ Test Software for Radiated disturbance Farad EZ-EMC Ver. UL-3A1 ☑ Spectrum Analyzer Keysight N9030A MY55410 512 Dec.12, 2017 Dec.11, 2018 ☑ Power Meter Keysight N9031A MY55416 024 Dec.12, 2017 Dec.11, 2018	V	Preamplifier	TDK	PA	-02-2			Dec.12, 2017	Dec.11, 2018
☑Band Reject FilterWainwright $2350-2400-2483.5-2533.5-40SS$ 4Dec.12, 2017Dec.11, 2018Used DescriptionManufacturerNameVersion☑Test Software for Radiated disturbanceFaradEZ-EMCVer. UL-3A1Other instrumentsUsedEquipmentManufacturerModel No.Serial No.Last Cal.Next Cal.☑Spectrum AnalyzerKeysightN9030AMY55410 512Dec.12, 2017Dec.11, 2018☑Power MeterKeysightN9031AMY55416 024Dec.12, 2017Dec.11, 2018☑Power SensorKeysightN90323AMY55440 024Dec.12, 2017Dec.11, 2018	\checkmark	Loop antenna	Schwarzbeck	15	19B	000	800	Mar. 26, 2016	Mar. 26, 2019
Used Description Manufacturer Name Version ☑ Test Software for Radiated disturbance Farad EZ-EMC Ver. UL-3A1 Other instruments Used Equipment Manufacturer Model No. Serial No. Last Cal. Next Cal. ☑ Spectrum Analyzer Keysight N9030A MY55410 512 Dec.12, 2017 Dec.11, 2018 ☑ Power Meter Keysight N9031A MY55416 024 Dec.12, 2017 Dec.11, 2018	V	Band Reject Filter	Wainwright	2350 248	-2400- 33.5-	2	4	Dec.12, 2017	Dec.11, 2018
☑ Test Software for Radiated disturbance Farad EZ-EMC Ver. UL-3A1 Other instruments Used Equipment Manufacturer Model No. Serial No. Last Cal. Next Cal. ☑ Spectrum Analyzer Keysight N9030A MY55410 512 Dec.12, 2017 Dec.11, 2018 ☑ Power Meter Keysight N9031A MY55416 024 Dec.12, 2017 Dec.11, 2018				Soft	ware				
Other instruments Used Equipment Manufacturer Model No. Serial No. Last Cal. Next Cal. Image: Spectrum Analyzer Keysight N9030A MY55410 512 Dec.12, 2017 Dec.11, 2018 Image: Spectrum Analyzer Keysight N9031A MY55416 024 Dec.12, 2017 Dec.11, 2018 Image: Spectrum Analyzer Keysight N9031A MY55440 024 Dec.12, 2017 Dec.11, 2018	Used	Descr	iption	Ν	lanufact	urer		Name	Version
Used Equipment Manufacturer Model No. Serial No. Last Cal. Next Cal. Image: Spectrum Analyzer Keysight N9030A MY55410 512 Dec.12, 2017 Dec.11, 2018 Image: Spectrum Analyzer Keysight N9031A MY55416 024 Dec.12, 2017 Dec.11, 2018 Image: Spectrum Analyzer Keysight N9031A MY55440 024 Dec.12, 2017 Dec.11, 2018	\checkmark	Test Software for Ra	adiated disturba	ince	Farac	ł		EZ-EMC	Ver. UL-3A1
Image: Spectrum Analyzer Keysight N9030A MY55410 512 Dec.12, 2017 Dec.11, 2018 Image: Spectrum Analyzer Keysight N9030A MY55410 024 Dec.12, 2017 Dec.11, 2018 Image: Spectrum Analyzer Keysight N9031A MY55416 024 Dec.12, 2017 Dec.11, 2018 Image: Spectrum Analyzer Keysight N9323A MY55440 Dec.12, 2017 Dec.11, 2018			Oth	ner ins	trumen	ts			
☑ Spectrum Analyzer Keysight N9030A 512 Dec.12, 2017 Dec.11, 2018 ☑ Power Meter Keysight N9031A MY55416 024 Dec.12, 2017 Dec.11, 2018 ☑ Power Meter Keysight N9031A MY55440 024 Dec.12, 2017 Dec.11, 2018	Used	Equipment	Manufacturer	Model No.		Seria	al No.	Last Cal.	Next Cal.
Power Meter Keysight N9031A 024 Dec.12, 2017 Dec.11, 2018 V Power Sensor Keysight N93234 MY55440 Dec.12, 2017 Dec.11, 2018	\checkmark	Spectrum Analyzer	Keysight	N9	N9030A			Dec.12, 2017	Dec.11, 2018
	V	Power Meter	Keysight	N9	N9031A MY55416		Dec.12, 2017	Dec.11, 2018	
		Power Sensor	Keysight	N9:	323A			Dec.12, 2017	Dec.11, 2018

5.9. MEASURING INSTRUMENT AND SOFTWARE USED

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6. ANTENNA PORT TEST RESULTS

6.1. ON TIME AND DUTY CYCLE

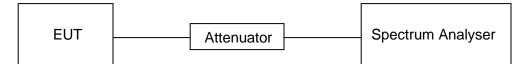
<u>LIMITS</u>

None; for reporting purposes only

PROCEDURE

FCC KDB 558074 Zero-Span Spectrum Analyzer Method

TEST SETUP



RESULTS

Mode	On Time (msec)	Period (msec)	Duty Cycle x (Linear)	Duty Cycle (%)	Duty Cycle Correction Factor (db)	1/T Minimum VBW (KHz)
11B SISO	100	100	1	100	0	0.01
11G SISO	100	100	1	100	0	0.01
11N20 SISO	100	100	1	100	0	0.01
11N40 SISO	100	100	1	100	0	0.01

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

2) Where: x is Duty Cycle(Linear)

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

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ON TIME AND DUTY CYCLE MID CH

5 3130(11	ORSE C	ASE)							
Spectrum Ana Swept SA	yzer 1 🗸	+					₽	Frequency	· ₩
KEYSIGH RL ↔→→	Input: RF Coupling: DC Align: Auto/No RI	Input Z: 50 Ω Corrections: Off Freq Ref: Int (S)	#Atten: 40 dB Preamp: Off	PNO: Fast Gate: Off IF Gain: Low Sig Track: Off	#Avg Type: Por Trig: Free Run	wer (RMS <mark>123456</mark> W W W W W A A A A A A	Center Fi 2.43700	requency 0000 GHz	Settings
1 Spectrum Scale/Div 10 Log	v iB		Ref Level 23.00) dBm			Span 0.00000 Swe	pt Span	
13.0 3.00 -7.00								o Span III Span	
-17.0 -27.0 -37.0							Start Fre 2.43700	9 0000 GHz	
-47.0 -57.0							Stop Free 2.43700	9 0000 GHz	
-67.0 Center 2.4370 Res BW 8 MH			#Video BW 8.0	MHz*	Sweep	Span 0 Hz 20.27 ms (8001 pts)	AUT CF Step	O TUNE	
5 Marker Table Mode	Trace Scale	X	Y	Function	Function Width	Function Value	8.00000 Auto Man)	
1 2 3							Freq Offs 0 Hz		
4 5 6							X Axis So Log Lin		
1		Oct 20, 2018 6:13:44 PM					Signal Tr (Span Zoo	ack om)	
SISO(N	ORSE C	ASE)							
Spectrum Ana Swept SA		+					\$	Frequency	→ 👬
KEYSIGH [™] RL ↔→→	Input: RF Coupling: DC Align: Auto/No RI	Input Z: 50 Ω Corrections: Off Freq Ref: Int (S)	#Atten: 40 dB Preamp: Off	PNO: Fast Gate: Off IF Gain: Low Sig Track: Off	#Avg Type: Po Trig: Free Run	wer (RMS 1 2 3 4 5 6 W W W W W A A A A A A		requency 0000 GHz	Settings
1 Spectrum Scale/Div 10	, ≇B		Ref Level 23.00) dBm				pt Span	
Log 13.0 3.00 -7.00								o Span III Span	
-17.0							Start Fre 2.43700	9 0000 GHz	
-37.0 -47.0 -57.0							Stop Free 2.43700	9 0000 GHz	
-67.0 Center 2.4370 Res BW 8 MH			#Video BW 8.0	MHz*	Sweep	Span 0 Hz 20.27 ms (8001 pts)		O TUNE	
5 Marker Table Mode	Trace Scale	X	Y	Function	Function Width	Function Value	8.00000 Auto Man	,	
1 2 3							Freq Offs 0 Hz		
4 5 6							X Axis So Log Lin		

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20SISO(WOR	SE CASE)						
Spectrum Analyzer 1 Swept SA	• +					Frequency	· • 😤
RL + Align: Auto	Input Z: 50 Ω DC Corrections: Off o/No RF Freq Ref: Int (S)	#Atten: 40 dB Preamp: Off	PNO: Fast Gate: Off IF Gain: Low Sig Track: Off	#Avg Type: Pov Trig: Free Run	wer (RMS <mark>1</mark> 234 5 6 W W W W W A A A A A A	Center Frequency 2.437000000 GHz	Settings
1 Spectrum Scale/Div 10 dB Log 13.0		Ref Level 23.00 d	dBm			Span 0.00000000 Hz Swept Span Zero Span	
3.00 -7.00 -17.0 -27.0					ýverije privoval svojeverije stranoval	Full Span Start Freq 2.437000000 GHz	
-37.0 -47.0 -57.0						2.407000000 GHz Stop Freq 2.437000000 GHz	
-67.0 Center 2.437000000 GH Res BW 8 MHz	z	#Video BW 8.0 N	1Hz*	Sweep	Span 0 Hz 20.27 ms (8001 pts)	CF Step	
	cale X	Y	Function	Function Width	Function Value	8.000000 MHz Auto Man	
1 2 3 4 5						Freq Offset 0 Hz X Axis Scale	
	Oct 20, 2018 6:28:27 PM					Log Lin Signal Track (Span Zoom)	
40SISO(WOR	SE CASE)						-
Spectrum Analyzer 1 Swept SA	• +					Frequency	· • 😤
KEYSIGHT Input: RF R L Imput: RF Align: Autor	Input Z: 50 Ω Corrections: Off o/No RF Freq Ref: Int (S)	#Atten: 40 dB Preamp: Off	PNO: Fast Gate: Off IF Gain: Low Sig Track: Off	#Avg Type: Pov Trig: Free Run	wer (RMS <mark>1</mark> 23456 WWWWWW A A A A A A	Center Frequency 2.437000000 GHz	Settings
1 Spectrum V Scale/Div 10 dB		Ref Level 23.00 d	dBm			Span 0.00000000 Hz Swept Span Zero Span	
13.0 3.00 -7.00						Full Span	
17.0						Start Freq 2.437000000 GHz	
-17.0 -27.0 -37.0 -47.0						Stop Freq	
-27.0						2.437000000 GHz	
-27.0 -37.0 -47.0 -57.0		#Video BW 8.0 N	1Hz*	Sweep	Span 0 Hz 20.27 ms (8001 pts)	2.437000000 GHz AUTO TUNE CF Step 8.000000 MHz	
-27.0 -37.0 -47.0 -57.0 -57.0 Center 2.437000000 GH Res BW 8 MHz 5 Marker Table Mode Trace S 1 2		#Video BW 8.0 N	IHz*	Sweep Function Width	Span 0 Hz 20.27 ms (8001 pts) Function Value	2.43700000 GHz AUTO TUNE CF Step 8.000000 MHz Auto Man Freq Offset	
-27.0 -37.0 -47.0 -57.0					20.27 ms (8001 pts)	2.43700000 GHz AUTO TUNE CF Step 8.000000 MHz Auto Man	

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6.2. 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			

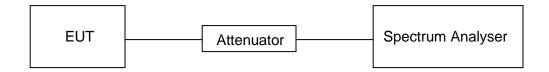
TEST PROCEDURE

Refer to 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 × 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 and 99% relative to the maximum level measured in the fundamental emission.

TEST SETUP



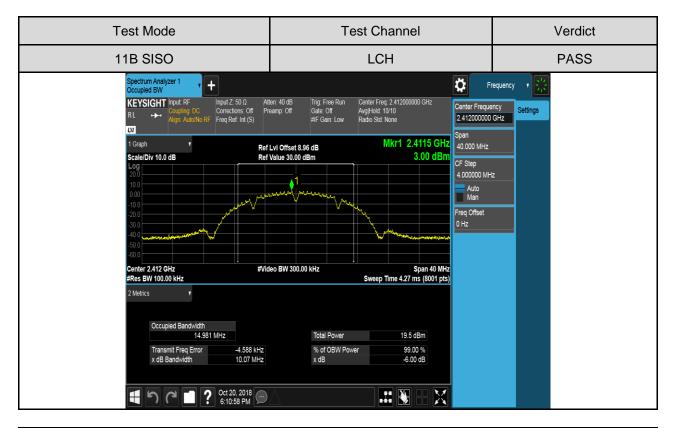
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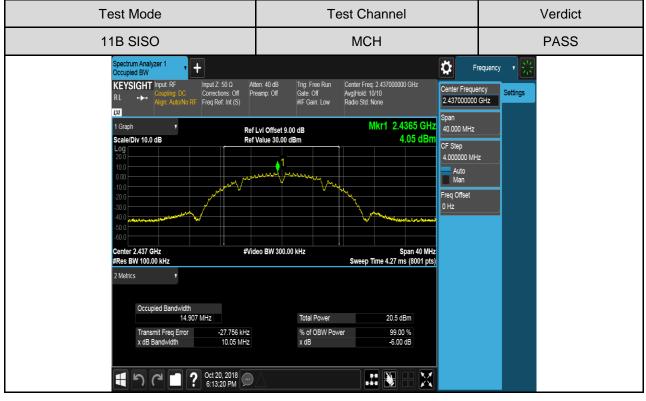
RESULTS

Test Mode	Test Antenna	Test Channel	6dB bandwidth (MHz)	Result
		LCH	10.07	Pass
11B SISO	Antenna 1	MCH	10.05	Pass
		НСН	10.06	Pass
		LCH	16.57	Pass
11G SISO	Antenna 1	MCH	16.56	Pass
		НСН	16.56	Pass
		LCH	17.80	Pass
11N20SISO	Antenna 1	MCH	17.80	Pass
		НСН	17.80	Pass
		LCH	36.32	Pass
11N40SISO	Antenna 1	MCH	36.31	Pass
		НСН	36.38	Pass

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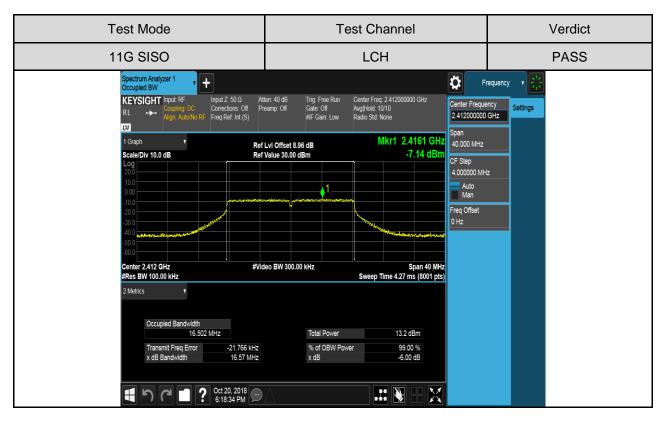
Test Graphs



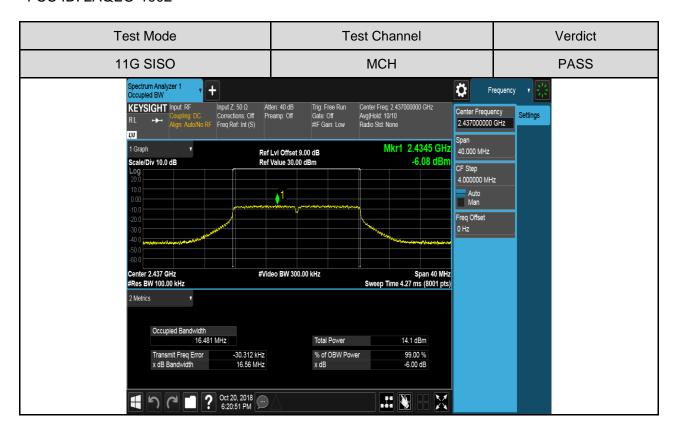


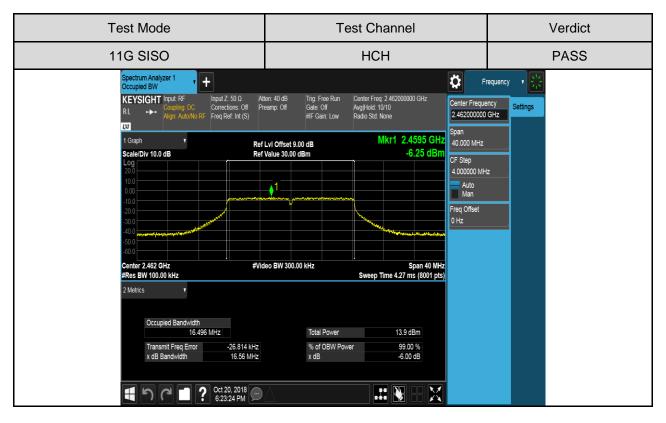
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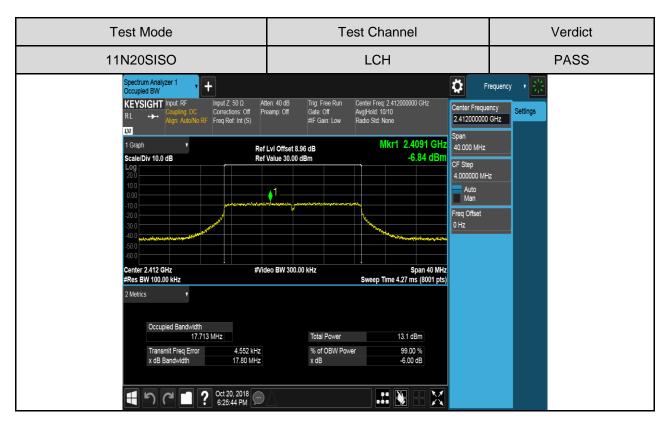


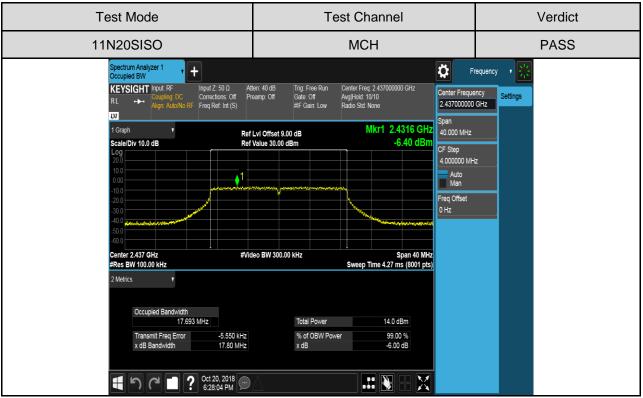
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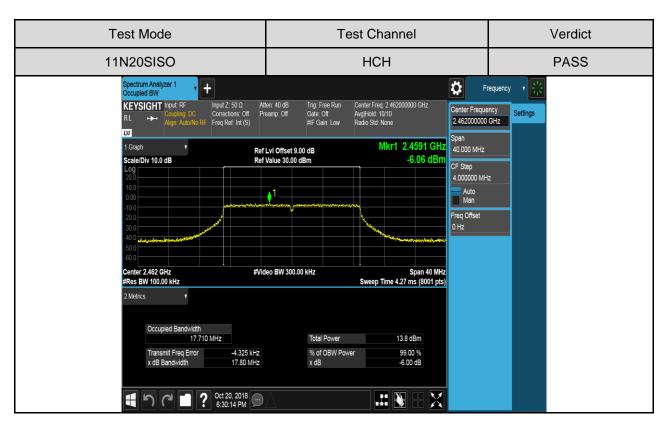


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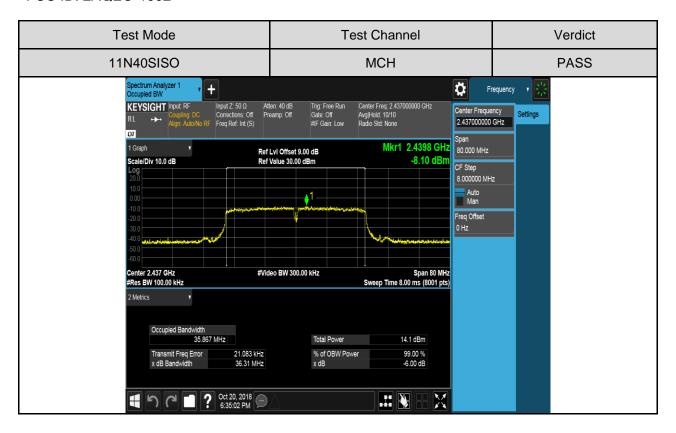


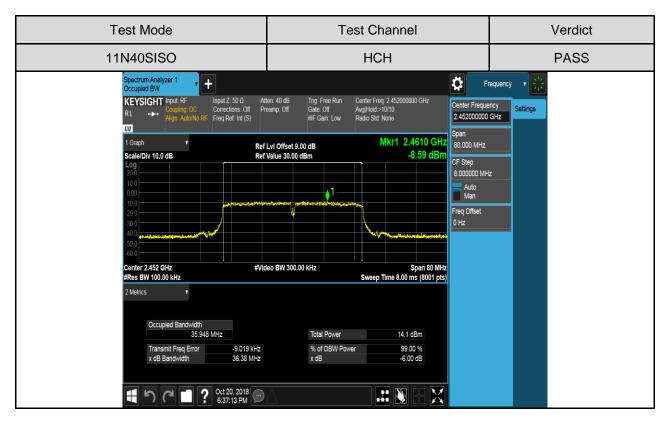
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6.3. PEAK CONDUCTED OUTPUT POWER

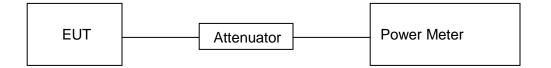
LIMITS

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

TEST PROCEDURE

Refer to FCC KDB 558074

TEST SETUP



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<u>RESULTS</u>

1) Maximum Peak Conducted Output Power

Test Mode	Test Channel	Maximum Peak Conducted Output Power(dBm)	EIRP (dBm)	Result
	LCH	15.97	18.27	Pass
11B	MCH	16.79	19.09	Pass
	HCH	16.48	18.78	Pass
	LCH	14.83	17.13	Pass
11G	MCH	15.77	18.07	Pass
	HCH	15.55	17.85	Pass
	LCH	14.92	17.22	Pass
11N20SISO	MCH	15.85	18.15	Pass
	HCH	15.64	17.94	Pass
	LCH	15.11	17.41	Pass
11N40SISO	MCH	15.41	17.71	Pass
	НСН	15.42	17.72	Pass

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1) Maximum Average Conducted Output Power

Test Mode	Test Channel	Maximum Average Conducted Output Power(dBm)	EIRP (dBm)	Result
	LCH	12.91	15.21	Pass
11B	MCH	13.70	16.00	Pass
	HCH	13.54	15.84	Pass
	LCH	7.31	9.61	Pass
11G	MCH	8.14	10.44	Pass
	HCH	7.92	10.22	Pass
	LCH	7.23	9.53	Pass
11N20SISO	MCH	8.23	10.53	Pass
	HCH	7.85	10.15	Pass
	LCH	7.10	9.40	Pass
11N40SISO	MCH	7.45	9.75	Pass
	HCH	7.44	9.74	Pass

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6.4. POWER SPECTRAL DENSITY

<u>LIMITS</u>

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

TEST PROCEDURE

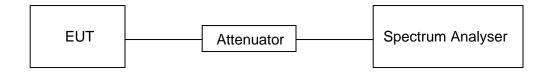
Refer to FCC KDB 558074, connect the UUT to the spectrum analyser and use the following settings:

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

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

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

TEST SETUP



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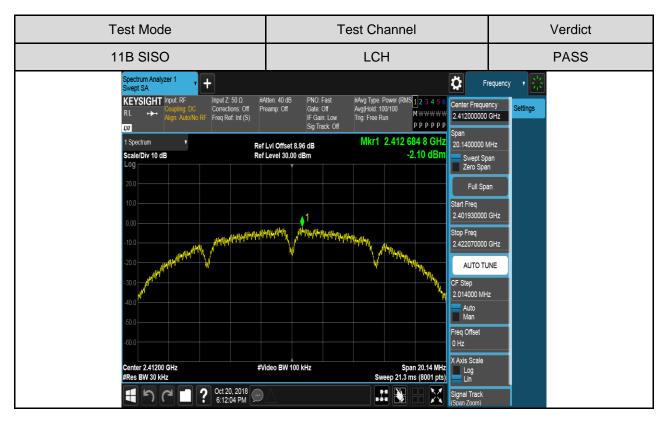
RESULTS

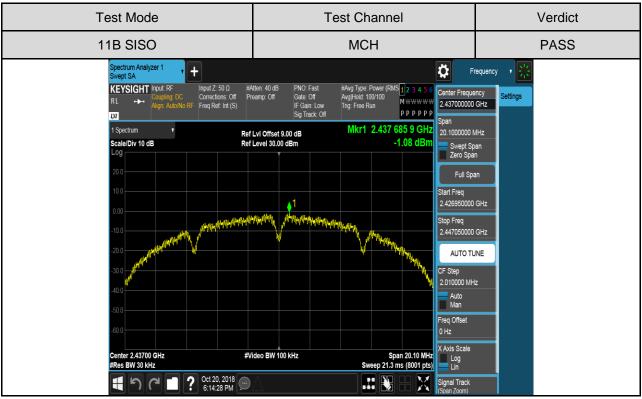
Test Mode	Test Antenna	Test Channel	Maximum Peak power spectral density (dBm)	Result
		LCH	-2.10	Pass
11B	Antenna 1	MCH	-1.08	Pass
		HCH	-1.40	Pass
		LCH	-9.84	Pass
11G	Antenna 1	MCH	-9.14	Pass
		HCH	-9.22	Pass
		LCH	-9.77	Pass
11N20SISO	Antenna 1	MCH	-8.90	Pass
		HCH	-8.91	Pass
		LCH	-11.94	Pass
11N40SISO	Antenna 1	MCH	-10.81	Pass
		НСН	-11.55	Pass

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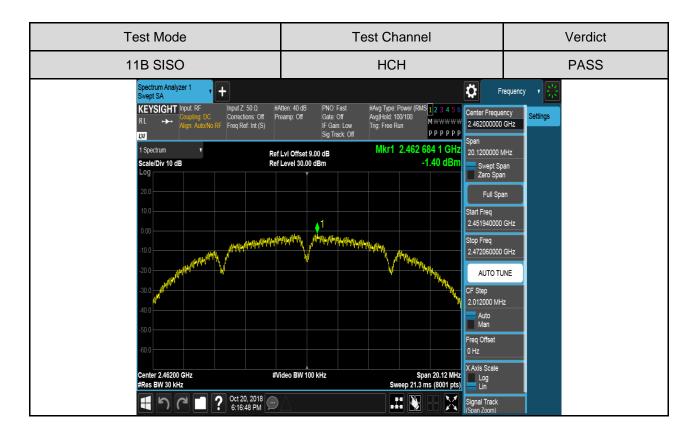
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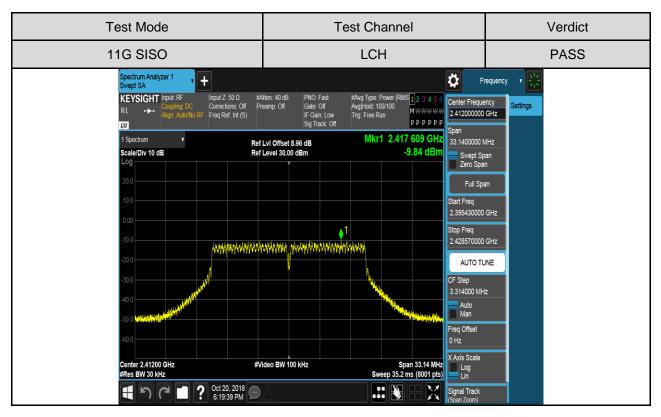
Test Graphs:



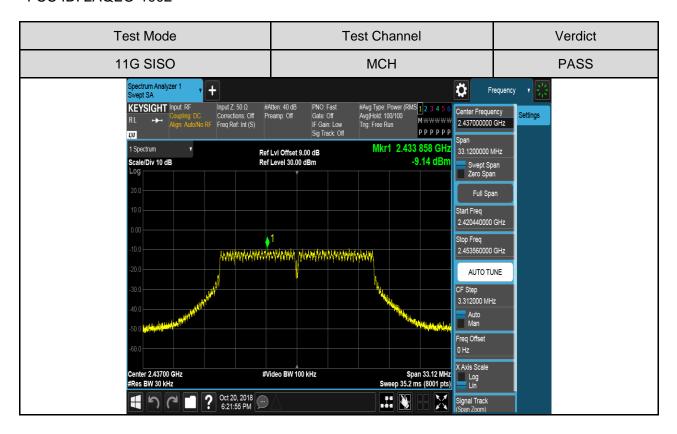


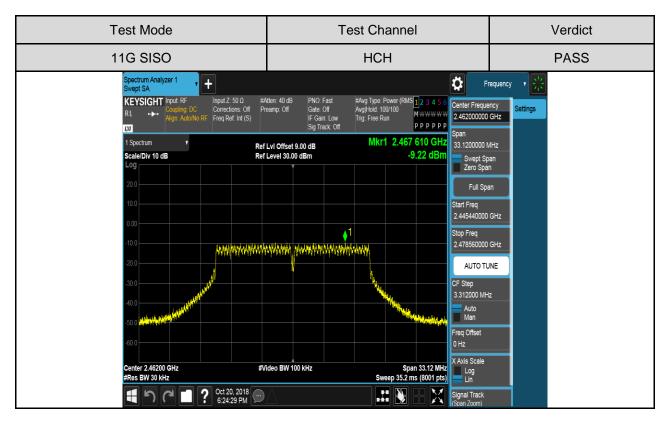
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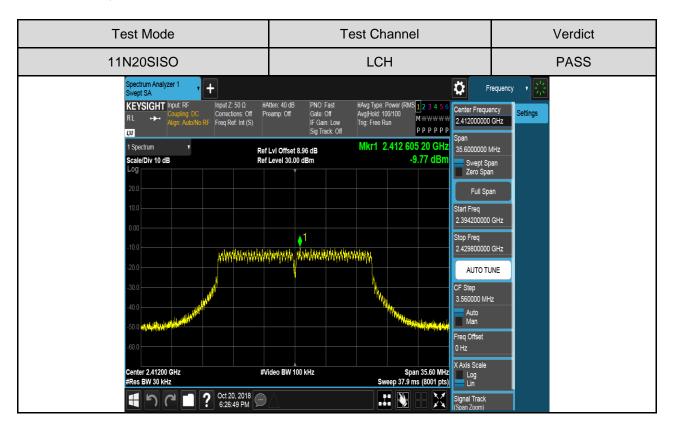


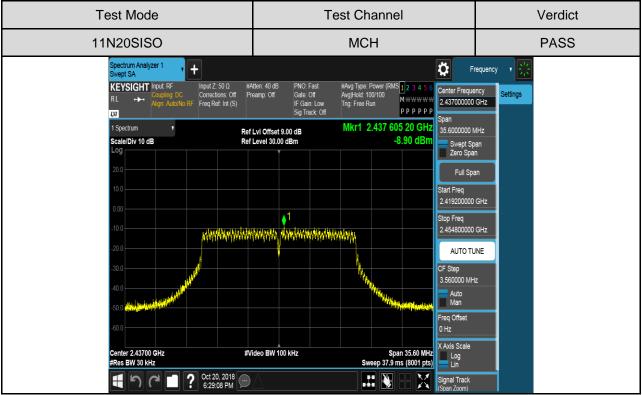
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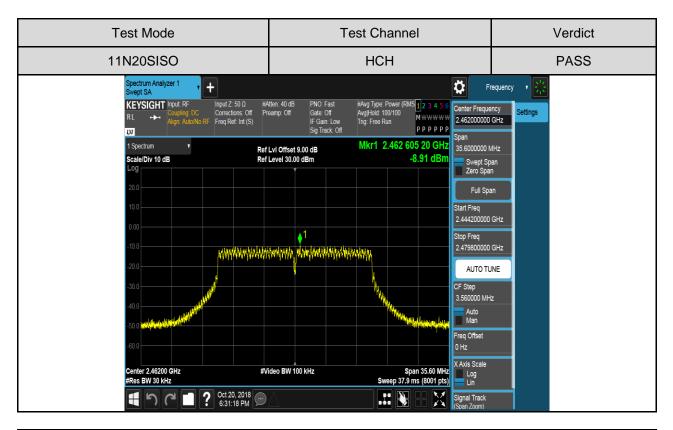


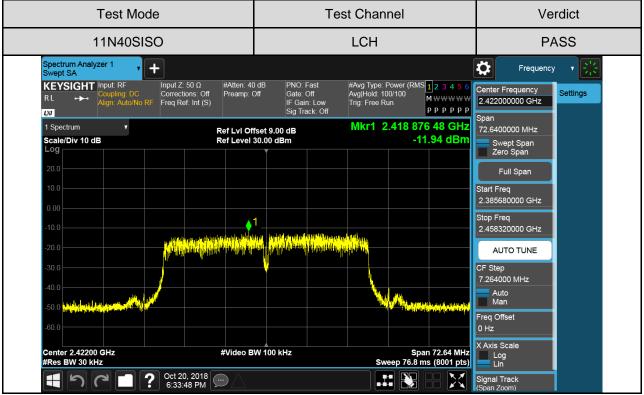
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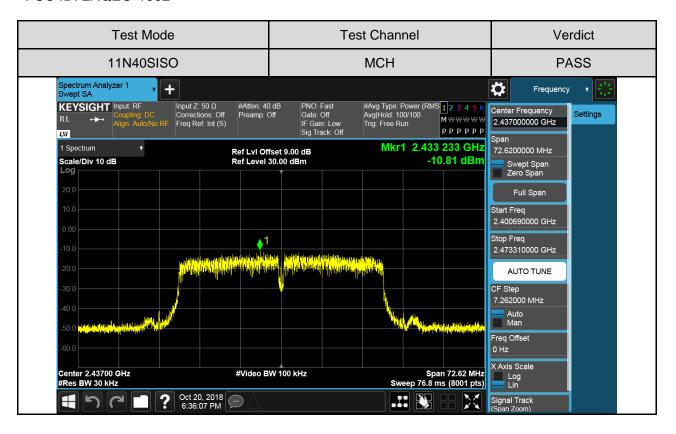


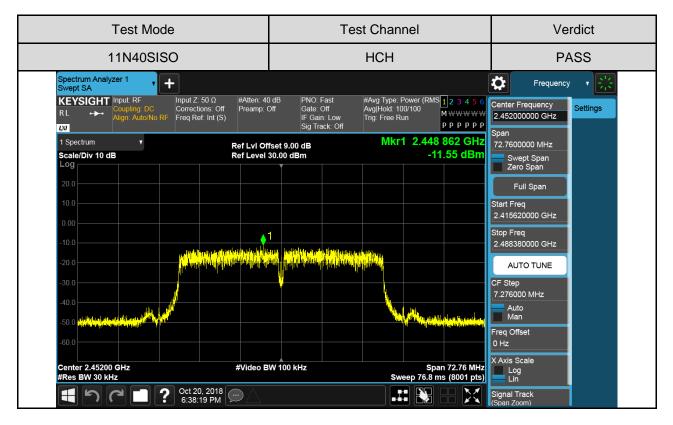
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6.5. CONDUCTED BANDEDGE AND SPURIOUS EMISSIONS

LIMITS

FCC Part15 (15.247), Subpart C						
Section Test Item Limit						
FCC §15.247 (d)	Conducted Bandedge and Spurious Emissions	at least 20 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.
sottings:	•

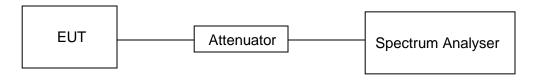
settings:

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



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Part I :Conducted Bandedge

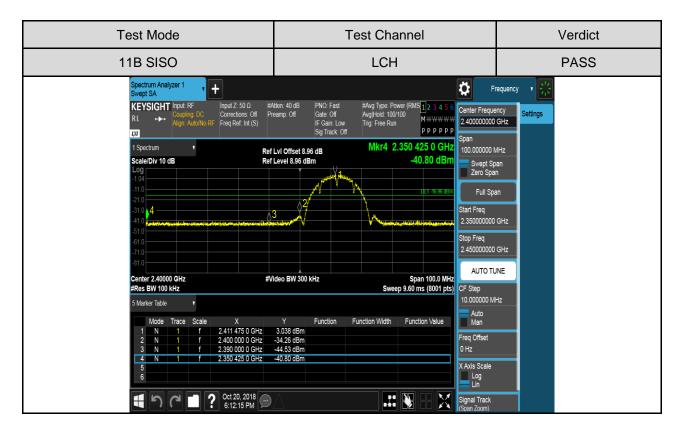
RESULTS TABLE

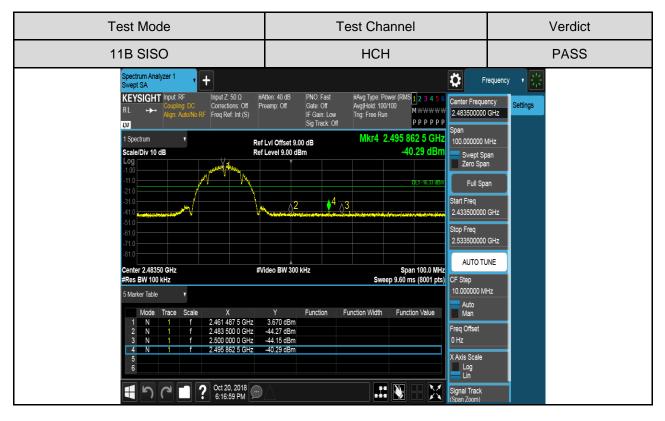
Test Mode	Test Antenna	Test Channel	Carrier Power[dBm]	Max. Spurious Level [dBm]	Limit [dBm]	Verdict
11B	Antenna 1	LCH	3.038	-40.80	-16.96	PASS
ПВ	Antenna i	НСН	3.670	-40.29	-16.33	PASS
110	Antonno 1	LCH	-7.118	-41.21	-27.12	PASS
11G	Antenna 1	НСН	-6.541	-40.78	-26.54	PASS
111208180	Antonno 1	LCH	-6.766	-40.17	-26.77	PASS
11N20SISO	Antenna 1	HCH	-5.940	-41.09	-25.94	PASS
	Antonno 1	LCH	-8.350	-40.85	-28.35	PASS
11N40SISO	Antenna 1	HCH	-8.046	-40.49	-28.05	PASS

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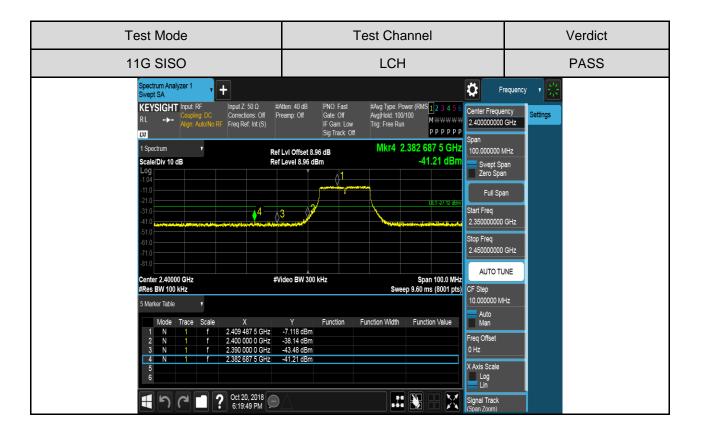
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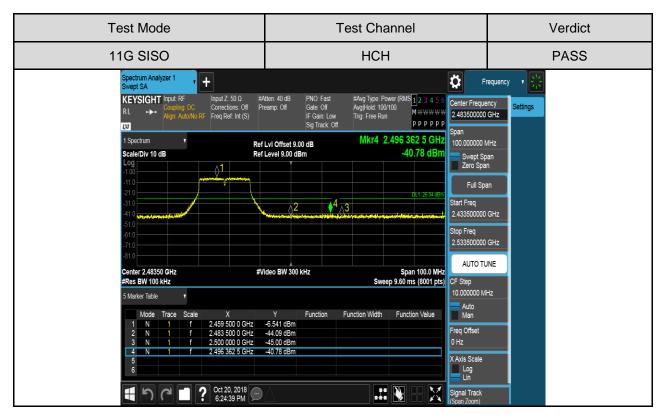
TEST GRAPHS



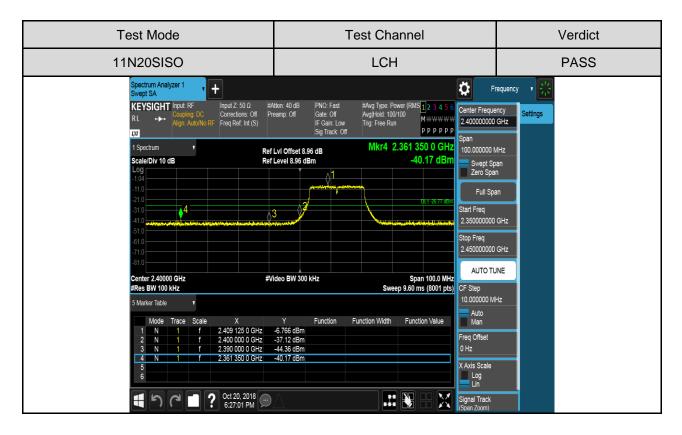


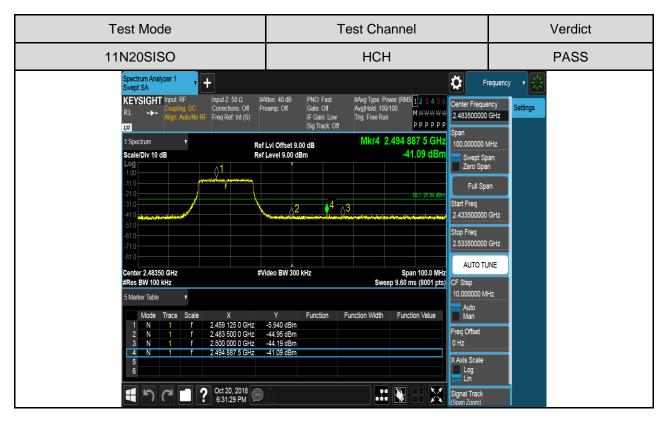
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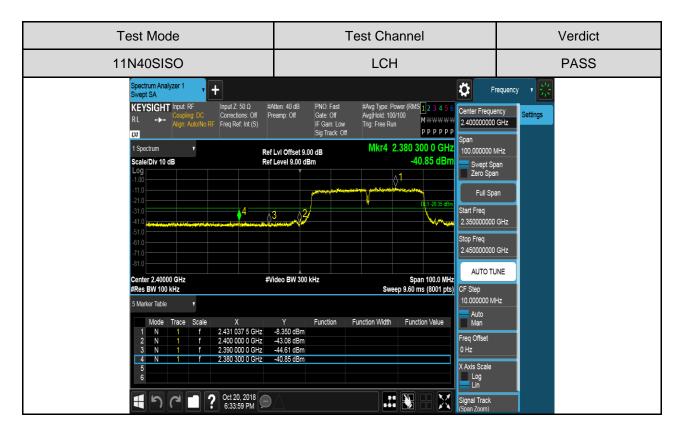


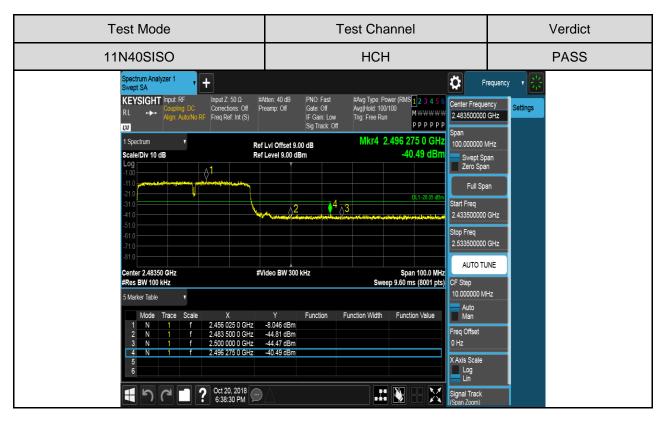
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Part II :Conducted Spurious Emissions

Test Result Table

Test Mode	Test Antenna	Channel	Pref(dBm)	Puw(dBm)	Verdict
		LCH	2.97	<limit< td=""><td>PASS</td></limit<>	PASS
11B SISO	Antenna 1	MCH	4.00	<limit< td=""><td>PASS</td></limit<>	PASS
		HCH	3.62	<limit< td=""><td>PASS</td></limit<>	PASS
		LCH	-7.15	<limit< td=""><td>PASS</td></limit<>	PASS
11G SISO	Antenna 1	MCH	-6.05	<limit< td=""><td>PASS</td></limit<>	PASS
		HCH	-6.35	<limit< td=""><td>PASS</td></limit<>	PASS
		LCH	-6.82	<limit< td=""><td>PASS</td></limit<>	PASS
11N20SISO	Antenna 1	MCH	-6.18	<limit< td=""><td>PASS</td></limit<>	PASS
		HCH	-5.94	<limit< td=""><td>PASS</td></limit<>	PASS
	SO Antenna 1	LCH	-8.31	<limit< td=""><td>PASS</td></limit<>	PASS
11N40SISO		MCH	-7.96	<limit< td=""><td>PASS</td></limit<>	PASS
		HCH	-8.54	<limit< td=""><td>PASS</td></limit<>	PASS

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Test Mode	Channel	Verdict
11B SISO	LCH	PASS

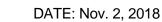
Pref test Plot

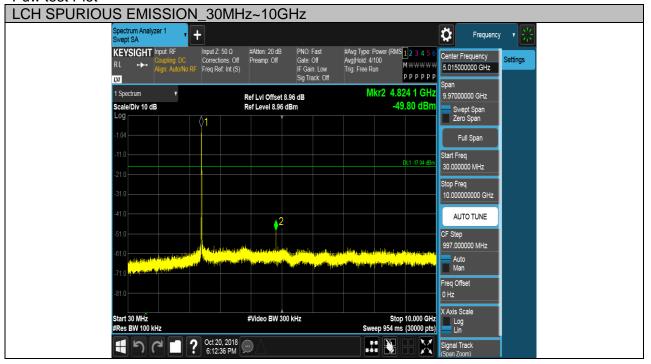


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REPORT NO: 4788671511-1 FCC ID: 2AQEO-1002 Puw test Plot





LCH SPURIOUS EMISSION_10GHz~26GHz



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Test Mode	Channel	Verdict
11B SISO	MCH	PASS

Pref test Plot

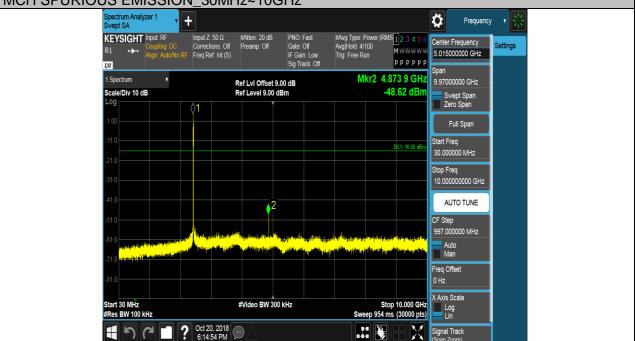


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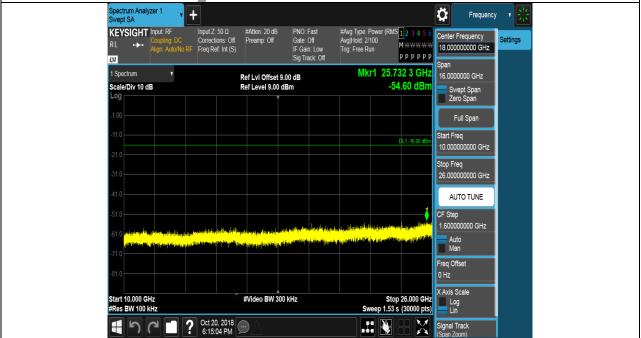
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REPORT NO: 4788671511-1 FCC ID: 2AQEO-1002 Puw test Plot

MCH SPURIOUS EMISSION_30MHz~10GHz



MCH SPURIOUS EMISSION_10GHz~26GHz



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DATE: Nov. 2, 2018

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