TEST REPORT

Applicant	:	Shenzhen UniStrong Science & Technology Co.,Ltd.
Address of Applicant	:	B,4-4Factory, Zhengcheng Road, Fuyong Baoan District, Shenzhen, China
Product Name	:	Rugged Smart Tablet
Model No.	:	UT30H
Sample No.	:	E19020010-05#02
FCC ID	:	2AOPD-UT30P
ISED Number	:	11546A-UT30P
Standards	:	FCC CFR47 Part 15, Subpart C RSS-Gen (Issue 5, March 2019) RSS-247 (Issue 2, February 2017)
Date of Receipt	:	2020-2-10
Date of Test	:	2020-2-10 ~ 2020-5-27
Date of Issue	:	2020-5-27

Remark:

This report details the results of the testing carried out on one sample, the results contained in this report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

Prepared by: Jennifer zhou (Jennifer Zhou) Reviewed by: jesse (Jesse) Approved by: Guoyou Chi (Authorized signatory: Guoyou Chi)

TEST REPORT

Revision Record			
Version	**Date**	**Revisions**	**Revised By**
1.0	2019-10-31	Original	--

Contents

1 General Information

1.1 Testing Laboratory

Company Name	ICAS Testing Technology Services (Shanghai) Co., Ltd.
Address	155 Pingbei Rd, Minhang District, Shanghai, China
Telephone	0086 21-51682999
Fax	0086 21-54711112
Homepage	www.icasiso.com

1.2 Details of Application

Company Name	Shenzhen UniStrong Science & Technology Co.,Ltd.
Address	B,4-4Factory, Zhengcheng Road, Fuyong Baoan District, Shenzhen, China
Contact Person	Lili Zheng
Telephone	+86-21-54467182
Email	ll.zheng@unistrong.com

1.3 Details of EUT

Product Name	Rugged Smart Tablet
Brand Name	Unistrong
Model No.	UT30H
FCC ID	2AOPD-UT30P
ISED Number	11546A-UT30P
Mode of Operation	WLAN 802.11b/g/n(HT20/40)
Frequency Range	2400MHz ~ 2483.5MHz
Channel Separation	5 MHz
Modulation Type	DSSS, OFDM
Antenna Type	Internal Antenna
Antenna Gain	2.8 dBi
Extreme Temperature Range	-20℃~ +55℃
Test Voltage	DC 3.8V

1.4 DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Issue
1	SHE19020010-03DE	Original Report	2020-5-15
2	SHE19020010-05DE	Amended Report	2020-5-27

They have the same electric circuit ,PCB layout ,RF chip, component.
Except : the differences description of UT30H and UT30P as below:
1 LCD screen of UT30H is different with UT30P
2 The key position of UT30H is different with UT30P
3 the antenna gain of UT30H is different with UT30P

1.5 Test Methodology

47 CFR Part 15, Subpart C (10-1-16 Edition)	Miscellaneous Wireless Communications Services
KDB Publication 558074 D01 v05r02	15.247 Meas Guidance.
KDB Publication 662911 D01 v02r01	Emissions Testing of Transmitters with Multiple Outputs in the Same Band (e.g., MIMO, Smart Antenna, etc)
RSS-Gen (Issue 5, March 2019)	General Requirements for Compliance of Radio Apparatus
RSS-247 (Issue 2, February 2017)	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices
ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

Note(s):
All test items were verified and recorded according to the standards and without any addition/deviation/exclusion during the test.

2 Test Condition

2.1 Test Facility

2.2 Environmental conditions

Temperature (°C)	18-25
Humidity (%RH)	40-65
Barometric Pressure (mbar)	960-1060

2.3 Equipment List

Name of Equipment	Manufacturer	Model	Serial No.	Cal. Due Date
Spectrum Analyzer	Keysight	N9020B	MY59260184	2020-07-28
Spectrum Analyzer	Rohde & Schwarz	FSV40N	101450	2020-06-24
EMI Test Receiver	Rohde & Schwarz	ESPI3	100173	2020-06-19
EMI Test Receiver	Rohde & Schwarz	ESR 7	101911	2020-06-19
V-network	SCHWARZBECK	NSLK 8127	8127-902	2021-02-20
Wideband Radio Communication Tester	Rohde & Schwarz	CMW 500	100687	2020-08-22
Broadband Antenna	SCHWARZBECK	VULB9163	9163-1037	2020-06-06
Horn Antenna-18G	SCHWARZBECK	BBHA9120D	9120D-1775	2020-06-06
Loop Antenna	SCHWARZBECK	FMZB 1513	N/A	2021-03-19
Horn Antenna-40G	YINGLIAN	LB-180400-KF	N/A	2020-07-26
EMC chamber 9*6*6（L*W*H)	CHANGNING	966	N/A	2020-06-26
Shielded Enclosure 8*5*4（L*W*H)	CHANGNING	854	N/A	2020-08-28
Test Software	BL	BL410_E	N/A	N/A
Power meter	Keysight	U2021XA	MY57200011	2020-07-28

2.4 Measurement Uncertainty

Parameter	Frequency	Uncertainty
Antenna Port Conducted Emission	< 1GHz	± 1.5 dB
	> 1GHz	± 1.5 dB
Radiated Emission	30 MHz – 1 GHz	± 3 dB
	> 1GHz	± 3 dB

3 Test Set-up and Operation Modes

3.1 Details of Test Mode

Using test software was control EUT work in continuous transmitter and receiver mode. Select test channel as below:

For 802.11b/g/n (HT20)

Channel	Frequency
The lowest channel(CH1)	2412MHz
The middle channel(CH6)	2437MHz
The Highest channel(CH11)	2462MHz

For 802.11n(HT40)

Channel	Frequency
The lowest channel(CH3)	2422MHz
The middle channel(CH6)	2437MHz
The Highest channel(CH9)	2452MHz

Through Pre-scan under all rate at lowest channel, the data rate as below table described is the worst case, so we choose these data rate for test.

Type	Data rate
802.11b	11Mbps
802.11g	54Mbps
802.11n(20M)	MCS7
802.11n(40M)	MCS7

The basic operation modes are:

A. On
   1. WLAN mode
      a. Transmitting
         i. Low Channel
         ii. Middle Channel
         iii. High Channel
      b. Receiving

B. Standby

C. Off

3.2 Special Accessories and Auxiliary Equipment

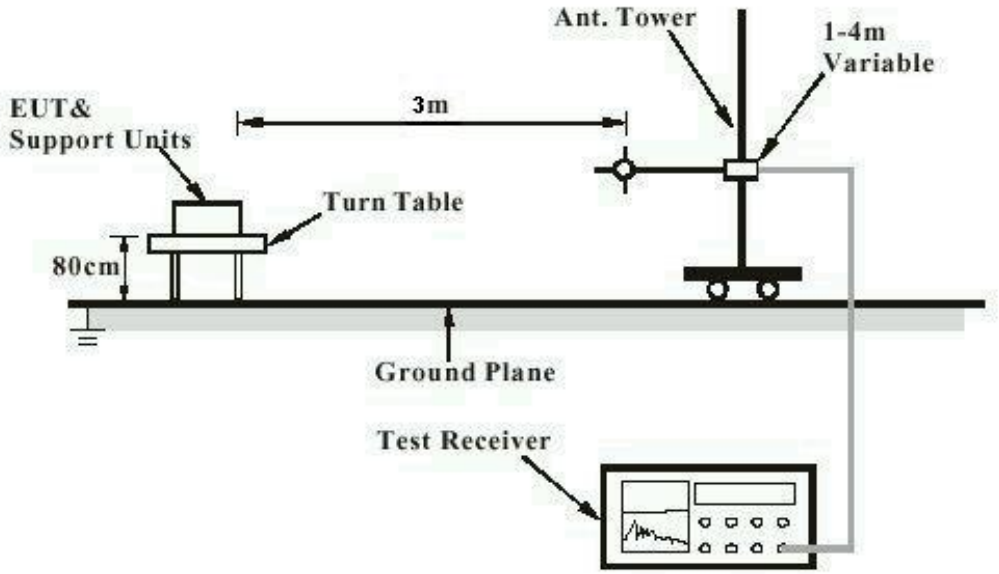
Description	Manufacturer	Model No.	Serial No.
Laptop	Lenovo	TP00083A	N/A

3.3 Support Software

Description	Manufacturer	Software Name
Software	Qualcomm	QRCT

3.4 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test



Note: Measurements above 1GHz are done with a table height of 1.5m. In addition, there is RF absorbing material on the floor of the test site for above 1GHz measurement.

Diagram of Measurement Equipment Configuration for Conduction Measurement

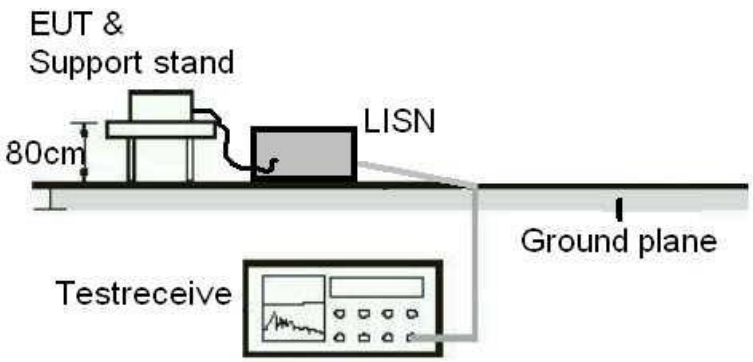
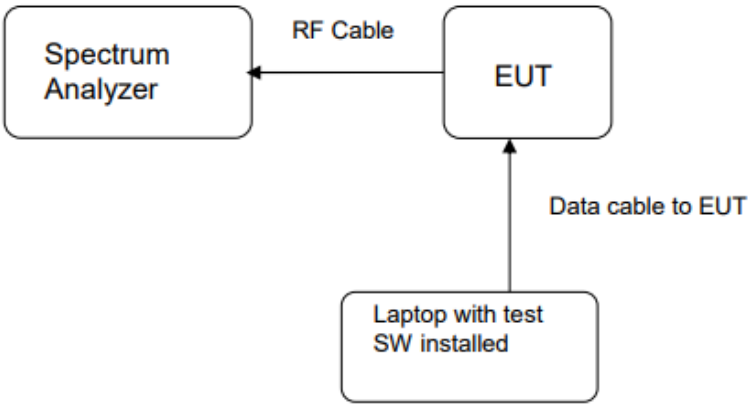
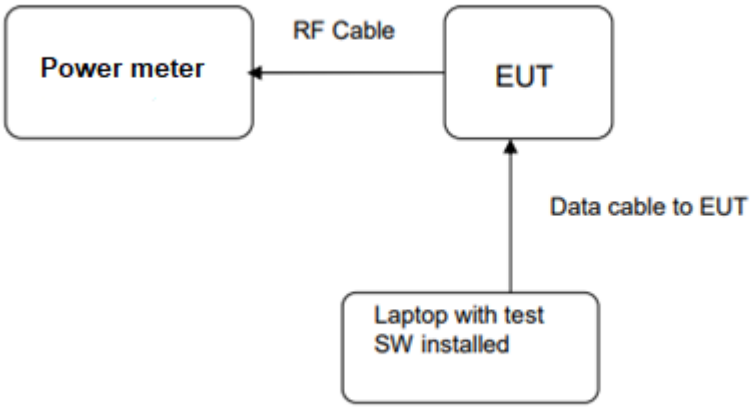


Diagram of Measurement Equipment Configuration for Transmitter Measurement





4 Test Results

4.1 Transmitter Requirement & Test Suites

4.1.1 Antenna Requirement

RESULT: **PASS**

Test standard	:	FCC Part 15.247(b)(4), Part 15.203 RSS-247 5.4(6)
Requirement	:	The use of approved antennas only with directional gains that do not exceed 6 dBi

According to the manufacturer declaration, the EUT has an antenna with a gain of 2.8 dBi. The antenna is an internal antenna with no possibility of replacement with a non-approvrd antenna by the end-user.

Therefore, the EUT is considered to comply with this provision.

4.1.2 Peak Output Power and E.I.R.P

RESULT: **PASS**

Test standard	:	FCC Part 15.247(b)(3) RSS-247 5.4(4)
Requirement	:	ANSI C63.10-2013, KDB 558074
Kind of test site	:	Shielded room

Test setup

Test Channel	:	Low/Middle/High
Operation Mode	:	A.1.a
Ambient temperature	:	25°C
Relative humidity	:	52%

Table 1: Peak Output Power

Test Mode	Test Channel (MHz)	Measured Peak Power		Limit (W)
		(dBm)	(mW)	
802.11b	2412	12.62	18.28	< 1
	2437	12.72	18.71	
	2462	12.24	16.75	
802.11g	2412	12.09	16.18	
	2437	11.84	15.28	
	2462	11.66	14.66	
802.11n(HT20)	2412	11.24	13.30	
	2437	11.25	13.34	
	2462	11.43	13.90	
802.11n(HT40)	2422	12.78	18.97	
	2437	12.86	19.32	
	2452	12.16	16.44	

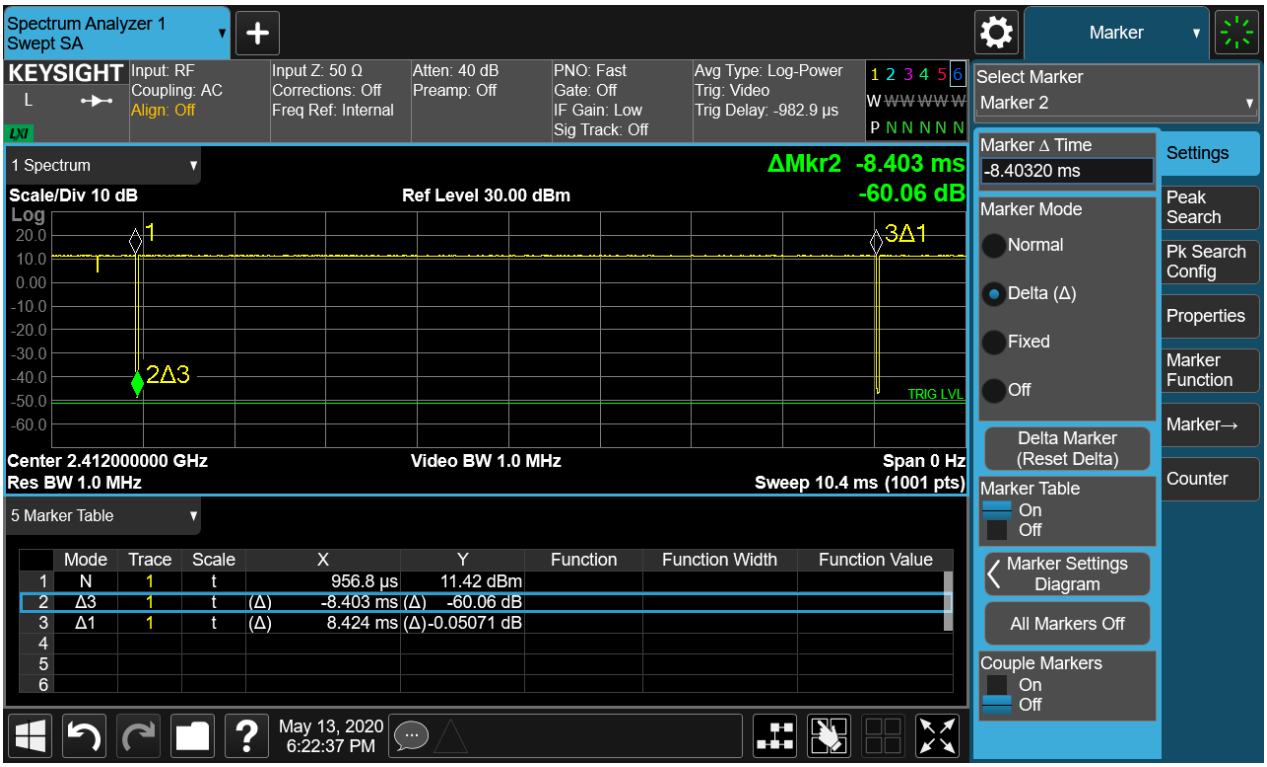
Table 2: E.I.R.P

Test Mode	Test Channel (MHz)	Measured Peak Power		Limit (W)
		(dBm)	(mW)	
802.11b	2412	15.42	34.83	< 4
	2437	15.52	35.65	
	2462	15.04	31.92	
802.11g	2412	14.89	30.83	
	2437	14.64	29.11	
	2462	14.46	27.93	
802.11n(HT20)	2412	14.04	25.35	
	2437	14.05	25.41	
	2462	14.23	26.49	
802.11n(HT40)	2422	15.58	36.14	
	2437	15.66	36.81	
	2452	14.96	31.33	

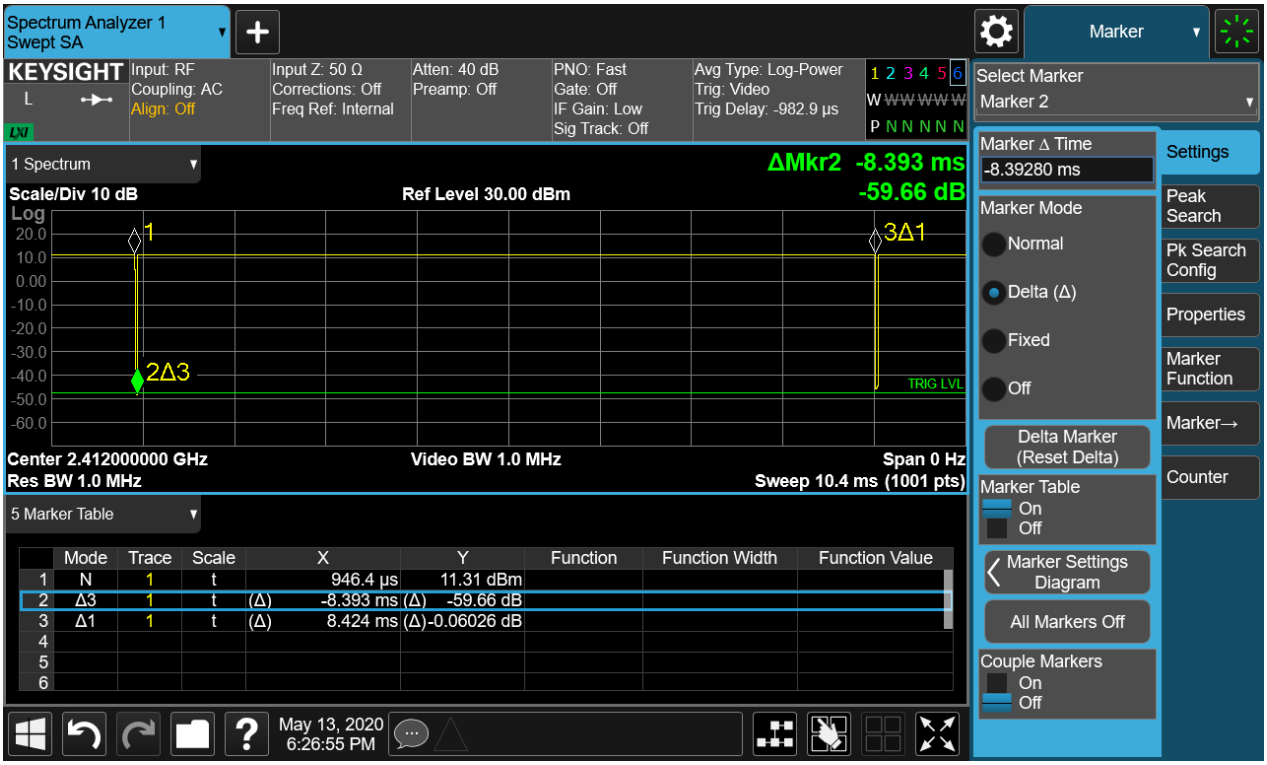
Note: 2.4G WIFI antenna paek gain is 2.8

Duty cycle factor =10*log(1/duty cycle)

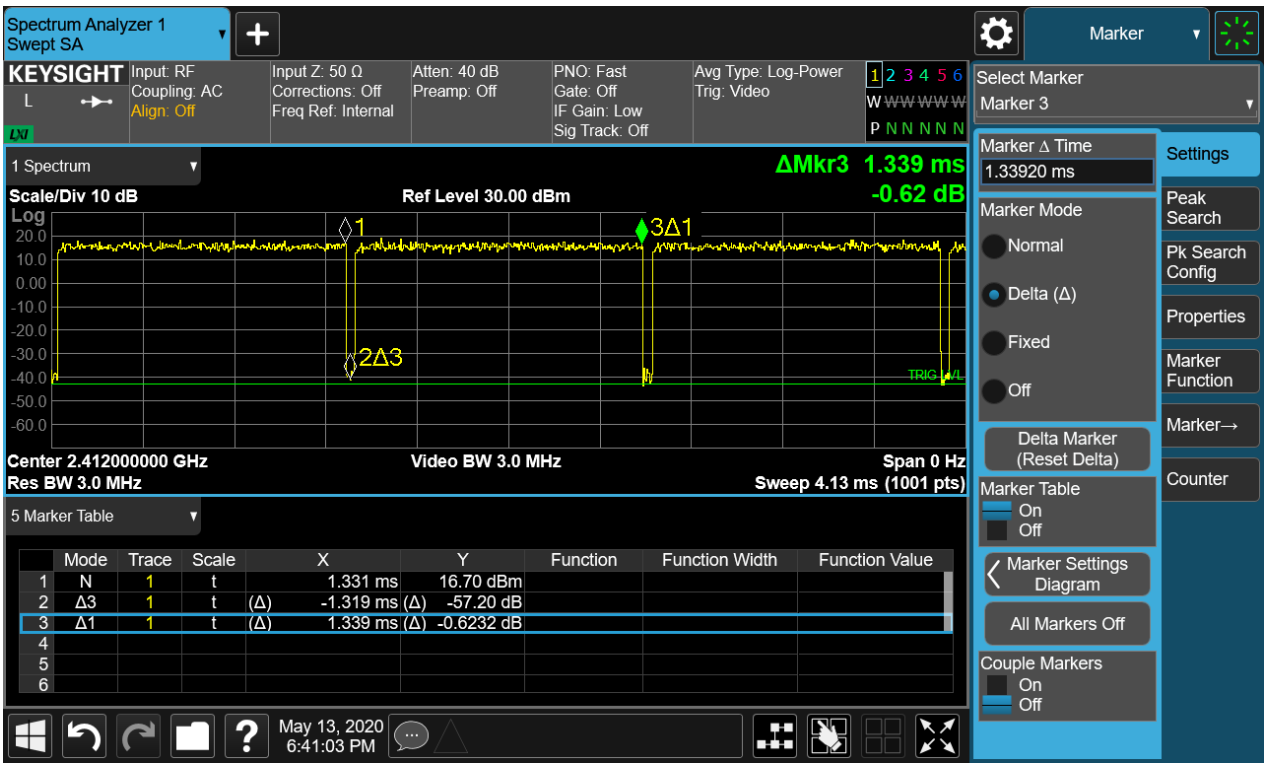
802.11b > 98%



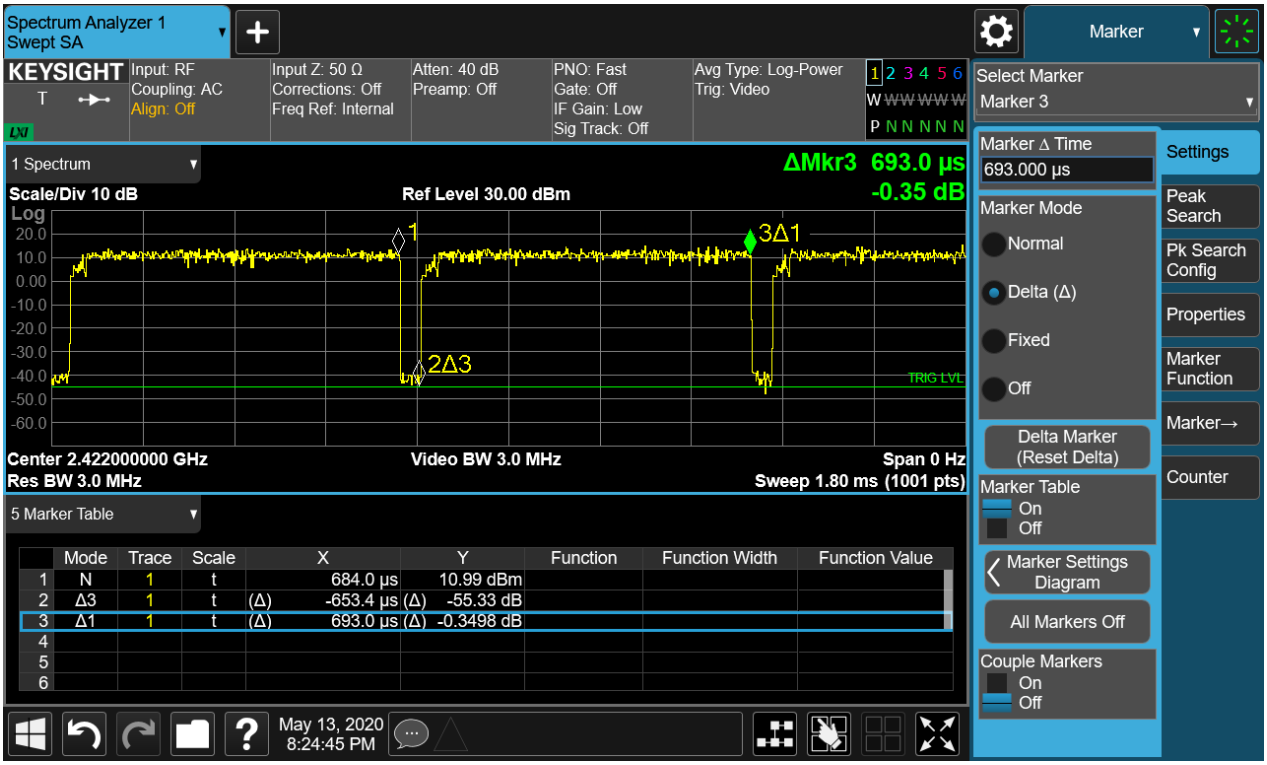
802.11g >98%



802.11n>98%



802.11n40=10*log(1/(653.4/693))=0.26



4.1.3 Spurious Emission

RESULT: **PASS**

Test standard	:	FCC Part 15.247(d), 15.205, 15.209 RSS-247 5.5
Requirement	:	ANSI C63.10-2013, KDB 558074
Kind of test site	:	3m Semi-Anechoic Chamber

Test setup

Test Channel	:	Low/Middle/High
Operation Mode	:	A
Ambient temperature	:	25°C
Relative humidity	:	52%

For details refer to following test plot.

Notes:

1. For 9 kHz ~ 30 MHz, the amplitude of spurious emissions that are attenuated by more than 20dB below the permissible. The value has no need to be reported.
2. The spurious above 18GHz is noise only and 20dB below the limit. The value has no need to be reported.
3. The EUT is working in the Normal link mode below 1 GHz.
4. Test plots please refer to the document “Annex No:EXHIBIT A ”.

4.1.4 Band Edge (Restricted-band band-edge)

RESULT: **PASS**

Test standard	:	FCC Part 15.247(d), 15.205, 15.209 RSS-247 5.5
Requirement	:	ANSI C63.10-2013, KDB 558074
Kind of test site	:	3m Semi-Anechoic Chamber

Test setup

Test Channel	:	Low/Middle/High
Operation Mode	:	A.1
Ambient temperature	:	25°C
Relative humidity	:	52%

For details refer to following test plot.

1. Test plots please refer to the document “Annex No:EXHIBIT A ”.

End of the report