KSIGN®
KSIGN (Guangdong) Testing Co., Ltd.
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TEST REPORT

Report No. ·····:	**KS2005S00105E02**
FCC ID·····:	**2AM8GVOREZA**
Applicant.....	**GUANGZHOU LIE DUN ELECTRONICS TECHNOLOGY CO., LIMITED**
Address.....:	No.4 plant of No.43 South International Trade Avenue, Hualong Town, Panyu Dstrict, Guangzhou, China, 511434
Manufacturer.....:	Guangzhou Lie Dun Electronics Technology CO.,Ltd
Address.....:	Building 4, 43 International Trade Avenue South, Hualong, Panyu, Guangzhou, China, 511434
Factory .....:	Guangzhou Lie Dun Electronics Technology CO.,Ltd
Address.....:	Building 4, 43 International Trade Avenue South, Hualong, Panyu, Guangzhou, China, 511434
Product Name·····:	**VOREZA II**
Trade Mark·····:	VOREZA
Model/Type reference·····:	VOR2-IEC2-X04
Listed Model(s) ·····:	/
Standard·····:	**FCC CFR Title 47 Part 15 Subpart C Section 15.247**
Date of receipt of test sample...:	Sep.15, 2020
Date of testing.....:	Jan.18, 2021- June.11, 2021
Date of issue.....:	June.11, 2021
Result.....:	**PASS**

Compiled by: (Printed name+signature)	Rory Huang	Rory Huang
Supervised by: (Printed name+signature)	Eder Zhan	Eder.Zhan
Approved by: (Printed name+signature)	Neil Wan	Neil Wan

KSIGN(Guangdong) Testing Co.,Ltd. KSIGN APPROVED

Testing Laboratory Name·····:	**KSIGN(Guangdong) Testing Co., Ltd.**
Address.....:	West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu,Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, People's Republic of China

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1. TEST SUMMARY

1.1. Test Standards

The tests were performed according to following standards:

FCC Rules Part 15.247: Operation within the bands of 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz.

KDB 558074 D01：The measurement guidance provided herein is applicable only to Digital Transmission System (DTS) devices operating in the 902-928 MHz. 2400-2483.5 MHz and/or 5725-5850 MHz bands under § 15.247 of the FCC rules (Title 47 of the Code of Federal Regulations)

ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.

1.2. Report version

Revised No.	Date of issue	Description
01	June.11, 2021	Original

1.3. Test Description

FCC Part 15 Subpart C(15.247)			
Test Item	Standard Section	Result	Test Engineer
	FCC		
Antenna Requirement	15.203	Pass	Emiya Lin
Conducted Emission	15.207	Pass	Emiya Lin
6dB&99% Bandwidth	15.247(a)(2)	Pass	Emiya Lin
Peak Output Power	15.247(b)	Pass	Emiya Lin
Power Spectral Density	15.247(e)	Pass	Emiya Lin
Restricted Band	15.247(d)/15.205	Pass	Emiya Lin
Band Edge and Spurious Emission(Conducted)	15.247(d)	Pass	Emiya Lin
Spurious Emission(Radiated)	15.247(d)&15.209	Pass	Emiya Lin

Note: The measurement uncertainty is not included in the test result.

1.4. Test Facility

Address of the report laboratory

KSIGN(Guangdong) Testing Co., Ltd.

West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu,Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, People's Republic of China

Laboratory accreditation

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L13261
KSIGN(Guangdong) Testing Co., Ltd. has been assessed and proved to be in Compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2017 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA-Lab Cert. No.: 5457.01
KSIGN(Guangdong) Testing Co., Ltd. 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 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

IC Registration No.: CN0096
The 3m alternate test site of KSIGN(Guangdong) Testing Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: CN0096

FCC-Registration No.: CN1272
KSIGN(Guangdong) Testing Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

1.5. Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01" Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 2 " and is documented in the KSIGN(Guangdong) Testing Co., Ltd. system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device. Below is the best measurement capability for KSIGN(Guangdong) Testing Co., Ltd.

Test Items	Measurement Uncertainty	Notes
Transmitter power conducted	0.42 dB	(1)
Transmitter power Radiated	2.14 dB	(1)
Conducted spurious emissions 9kHz~40GHz	1.60 dB	(1)
Radiated spurious emissions 9kHz~40GHz	2.20 dB	(1)
Conducted Emissions 9kHz~30MHz	3.20 dB	(1)
Radiated Emissions 30~1000MHz	4.70 dB	(1)
Radiated Emissions 1~18GHz	5.00 dB	(1)
Radiated Emissions 18~40GHz	5.54 dB	(1)
Occupied Bandwidth	2.80 dB	(1)

Note (1): This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

1.6. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15~35°C
Relative Humidity:	30~60 %
Air Pressure:	950~1050mba

2. GENERAL INFORMATION

2.1. Client Information

Applicant:	GUANGZHOU LIE DUN ELECTRONICS TECHNOLOGY CO., LIMITED
Address:	No.4 plant of No.43 South International Trade Avenue, Hualong Town, Panyu Dstrict, Guangzhou, China, 511434
Manufacturer:	GUANGZHOU LIE DUN ELECTRONICS TECHNOLOGY CO., LIMITED
Address:	No.4 plant of No.43 South International Trade Avenue, Hualong Town, Panyu Dstrict, Guangzhou, China, 511434
Factory:	GUANGZHOU LIE DUN ELECTRONICS TECHNOLOGY CO., LIMITED
Address:	No.4 plant of No.43 South International Trade Avenue, Hualong Town, Panyu Dstrict, Guangzhou, China, 511434

2.2. General Description of EUT

Test Sample Number 1:	1-1-1(Normal Sample),1-1-2(Engineering Sample）
Product Name:	VOREZA II
Model/Type reference:	VOR2-IEC2-X04
Marketing Name:	VOREZA
Listed Model(s):	/
Model Difference:	/
Adapter :	MODEL:SOY-1200300 INPUT: 100-240V~ 50/60Hz 1.2A max. OUTPUT: DC 12.0V 3.0A, 36.0W
Power supply(Battery):	DC 7.6V 13000mAh/98.8Wh
Hardware version:	ZA801 REV11
Software version:	EC: E7.CD.06 BIOS: E.ZA102_1.V10.048 Windows10 pro: 1803
2.4G WIFI	
Modulation:	802.11b: DSSS(CCK, DQPSK, DBPSK) 802.11g/n: OFDM(BPSK,QPSK,16QAM,64QAM)
Operation frequency:	802.11b/g/n(HT20): 2412MHz~2462MHz 80211n(HT40): 2422MHz~2452MHz
Max Peak Output Power:	802.11b: 13.61dBm; 802.11g: 11.46dBm 802.11n (HT20): 9.71dBm; 802.11n (HT40): 9.53dBm
Channel number:	802.11b/g/n(HT20):11 channels 80211n(HT40): 7 channels
Test frequency:	CH01/03: 2412M/2422MHz; CH06: 2437MHz; CH09/11: 2452M/2462MHz
Channel separation:	5MHz
Antenna type:	FPC Antenna
Antenna gain:	1.5dBi

2.3. Operation state

Operation Frequency List: The EUT has been tested under typical operating condition. The Applicant provides communication tools software to control the EUT for staying in continuous transmitting and receiving mode for testing.

Operation Frequency List:

Channel	Frequency (MHz)
01	2412
02	2417
03	2422
04	2427
05	2432
06	2437
07	2442
08	2447
09	2452
10	2457
11	2462

Note: 1.CH 01~CH 11 for 802.11b/g/n(HT20/HT40), CH03~CH09 for 802.11n(HT40).
2.The display in grey were the channel selected for testing.

Test mode

NO.	TEST MODE DESCRIPTION
1	Low channel TX
2	Middle channel TX
3	High channel TX
4	Normal operating

Note:
Transmit by 802.11b with Date rate (1/2/5.5/11)
Transmit by 802.11g with Date rate (6/9/12/18/24/36/48/54)
Transmit by 802.11n (20MHz) with Date rate (6.5/13/19.5/26/39/52/58.5/65)
Transmit by 802.11n (40MHz) with Date rate (13.5/27/40.5/54/81/108/121.5/135)
The engineering test program was provided and enabled to make EUT continuous transmit (duty cycle>98%).

2.4. Measurement Instruments List

Tonscend JS0806-2 Test system					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
1	Spectrum Analyzer	R&S	FSV40-N	101798	04/07/2022
2	Vector Signal Generator	Agilent	N5182A	MY50142520	04/07/2022
3	Analog Signal Generator	HP	83752A	3344A00337	04/07/2022
4	Power Sensor	Agilent	E9304A	MY50390009	04/07/2022
5	Power Sensor	Agilent	E9300A	MY41498315	04/07/2022
6	Wideband Radio Communication Tester	R&S	CMW500	157282	04/07/2022
7	Climate Chamber	Angul	AGNH80L	1903042120	04/07/2022
8	Dual Output DC Power Supply	Agilent	E3646A	MY40009992	04/07/2022
9	RF Control Unit	Tonscend	JS0806-2	/	04/07/2022

Transmitter spurious emissions & Receiver spurious emissions					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
1	EMI Test Receiver	R&S	ESR	102525	04/07/2022
2	High Pass Filter	Chengdu E-Microwave	OHF-3-18-S	0E01901038	03/27/2022
3	High Pass Filter	Chengdu E-Microwave	OHF-6.5-18-S	0E01901039	03/27/2022
4	Spectrum Analyzer	HP	8593E	3831U02087	04/07/2022
5	Ultra-Broadband logarithmic period Antenna	Schwarzbeck	VULB 9163	01230	03/29/2023
6	Loop Antenna	Beijin ZHINAN	ZN30900C	18050	03/25/2022
7	Spectrum Analyzer	R&S	FSV40-N	101798	04/07/2022
8	Horn Antenna	Schwarzbeck	BBHA 9120 D	2023	03/29/2023
9	Pre-Amplifier	Schwarzbeck	BBV 9745	9745#129	04/07/2022
10	Pre-Amplifier	EMCI	EMC051835 SE	980662	04/07/2022
11	Pre-Amplifier	Schwarzbeck	BBV-9721	57	04/07/2022
12	Horn Antenna	Schwarzbeck	BBHA 9170	00939	03/29/2022

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	LISN	R&S	ENV432	1326.6105.02	03/27/2022
2	EMI Test Receiver	R&S	ESR	102524	04/07/2022
3	Manual RF Switch	JS TOYO	/	MSW-01/002	04/07/2022

Note:
1)The Cal. Interval was one year.
2)The cable loss has calculated in test result which connection between each test instruments.

2.5. Test Software

Software name	Model	Version
Conducted emission Measurement Software	EZ-EMC	EMC-Con 3A1.1
Radiated emission Measurement Software	EZ-EMC	FA-03A.2.RE
Bluetooth and WIFI Test System	JS1120-3	2.5.77.0418

3. TEST ITEM AND RESULTS

3.1. Antenna requirement

Requirement

FCC CFR Title 47 Part 15 Subpart C Section 15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1)(i):

(i) Systems operating in the 2400~2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

Test Result

The directional gain of the antenna less than 6dBi, please refer to the EUT internal photographs antenna photo.

3.2. Conducted Emission

Limit

Conducted Emission Test Limit

Frequency	Maximum RF Line Voltage (dBμV)	
	Quasi-peak Level	Average Level
150kHz~500kHz	66 ~ 56 *	56 ~ 46 *
500kHz~5MHz	56	46
5MHz~30MHz	60	50

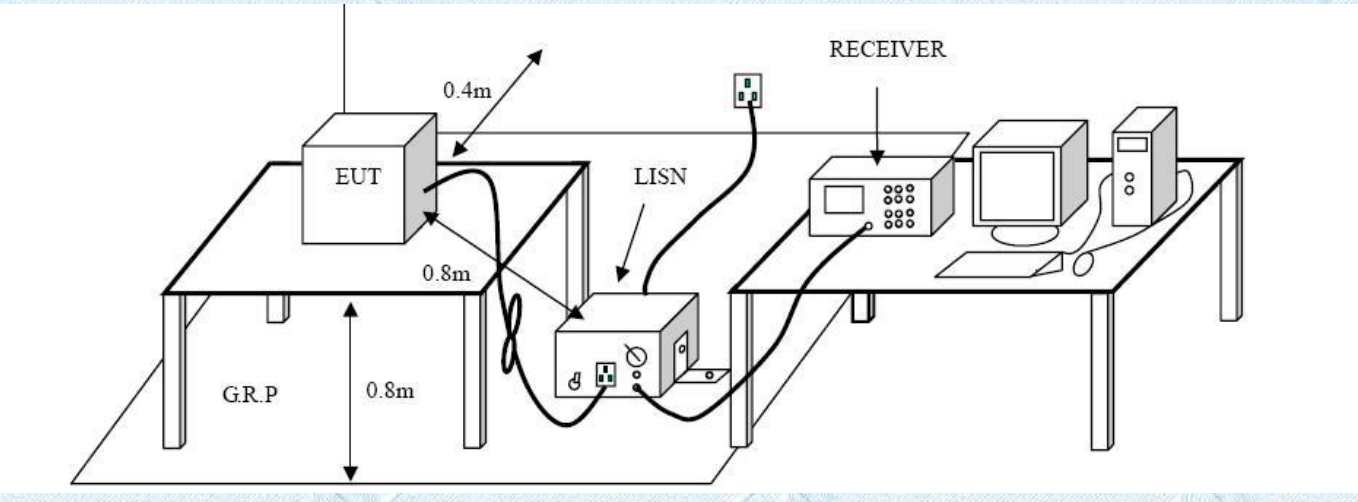
Notes:

(1) *Decreasing linearly with logarithm of the frequency.

(2) The lower limit shall apply at the transition frequencies.

(3) The limit decrease in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

Test Configuration



Test Procedure

1. The EUT was setup according to ANSI C63.10:2013 requirements.
2. The EUT was placed on a platform of nominal size, 0.8 m by 1.6 m, raised 0.8 m above the conducting ground plane. The vertical conducting plane was located 80 cm to the rear of the EUT. All other surfaces of EUT were at least 0.8m from any other grounded conducting surface.
3. The EUT and simulators are connected to the main power through a line impedances stabilization network (LISN). The LISN provides a 50ohm /50uH coupling impedance for the measuring equipment.
   The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)
4. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.
5. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
6. Conducted Emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.
7. During the above scans, the emissions were maximized by cable manipulation.

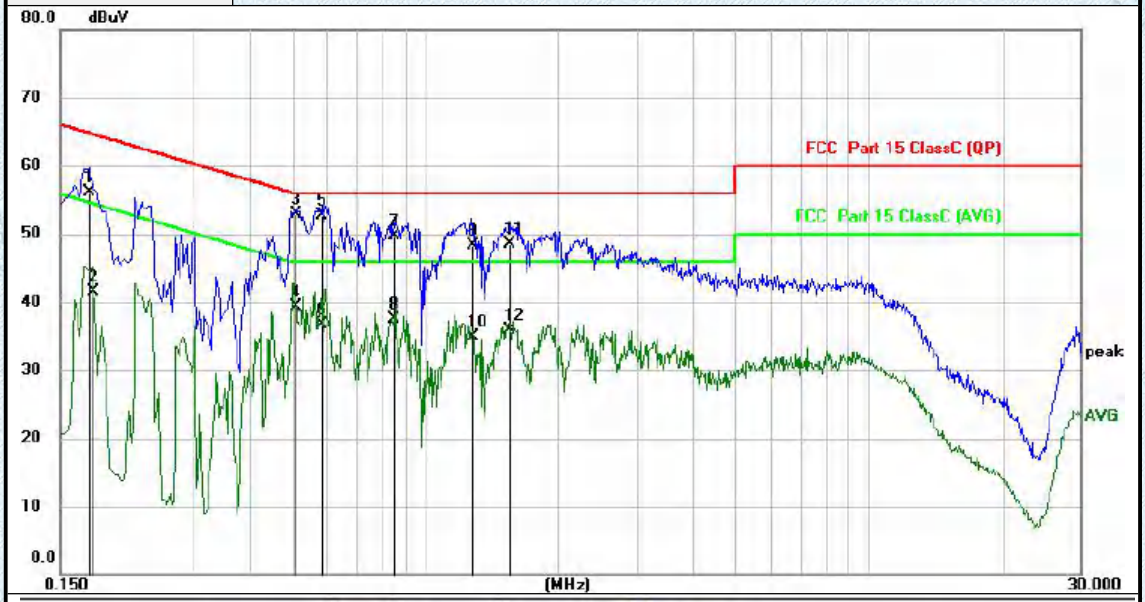
Test Mode:

Please refer to the clause 2.3.

Test Results

Pre-scan 802.11b/g/n(HT20/HT40) modulation, and found the 802.11b modulation 2412MHz which it is worse case, so only show the test data for worse case.

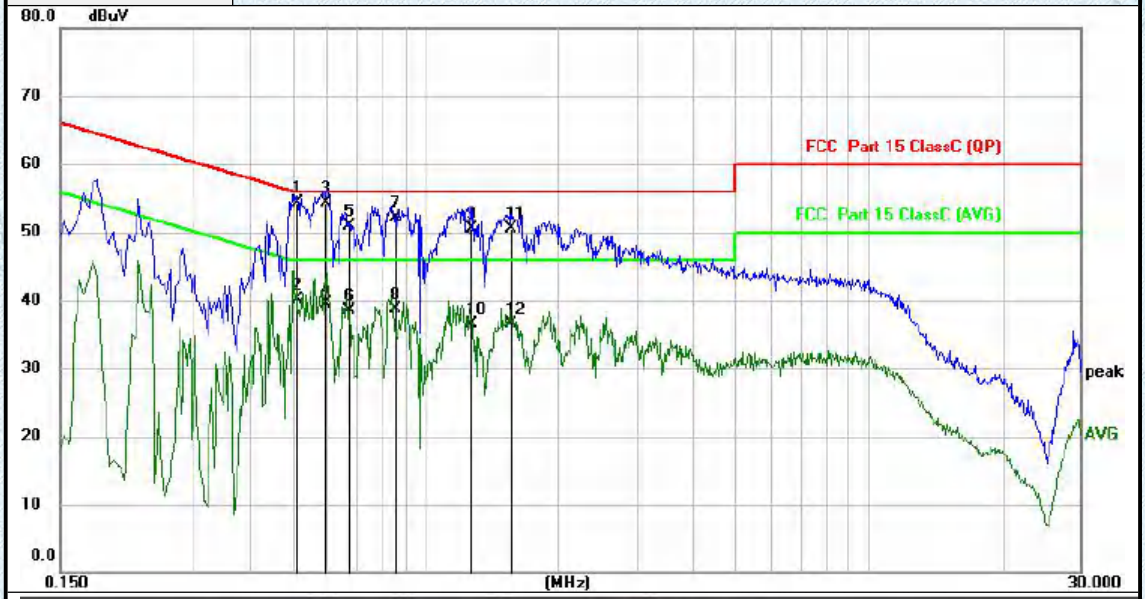
Test Voltage:	AC 120V/60 Hz
Terminal:	Line
Test Mode:	Charging+2.4G WIFI



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.1740	45.24	10.86	56.10	64.77	-8.67	QP
2		0.1780	30.72	10.86	41.58	54.58	-13.00	AVG
3	*	0.5086	42.04	10.88	52.92	56.00	-3.08	QP
4		0.5086	28.47	10.88	39.35	46.00	-6.65	AVG
5		0.5850	41.74	10.88	52.62	56.00	-3.38	QP
6		0.5850	25.92	10.88	36.80	46.00	-9.20	AVG
7		0.8464	38.85	10.88	49.73	56.00	-6.27	QP
8		0.8464	26.72	10.88	37.60	46.00	-8.40	AVG
9		1.2708	37.41	10.88	48.29	56.00	-7.71	QP
10		1.2708	24.03	10.88	34.91	46.00	-11.09	AVG
11		1.5434	37.65	10.87	48.52	56.00	-7.48	QP
12		1.5434	24.95	10.87	35.82	46.00	-10.18	AVG

Remarks:
1.Measurement = Reading Level+ Correct Factor
2.Over = Measurement -Limit

Test Voltage:	AC 120V/60 Hz
Terminal:	Neutral
Test Mode:	Charging+2.4G WIFI



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.5117	43.36	10.88	54.24	56.00	-1.76	QP
2		0.5117	29.20	10.88	40.08	46.00	-5.92	AVG
3	*	0.5918	43.49	10.88	54.37	56.00	-1.63	QP
4		0.5918	28.55	10.88	39.43	46.00	-6.57	AVG
5		0.6685	39.95	10.87	50.82	56.00	-5.18	QP
6		0.6685	27.60	10.87	38.47	46.00	-7.53	AVG
7		0.8493	41.13	10.88	52.01	56.00	-3.99	QP
8		0.8493	27.90	10.88	38.78	46.00	-7.22	AVG
9		1.2681	39.71	10.88	50.59	56.00	-5.41	QP
10		1.2681	25.58	10.88	36.46	46.00	-9.54	AVG
11		1.5598	39.55	10.87	50.42	56.00	-5.58	QP
12		1.5598	25.60	10.87	36.47	46.00	-9.53	AVG

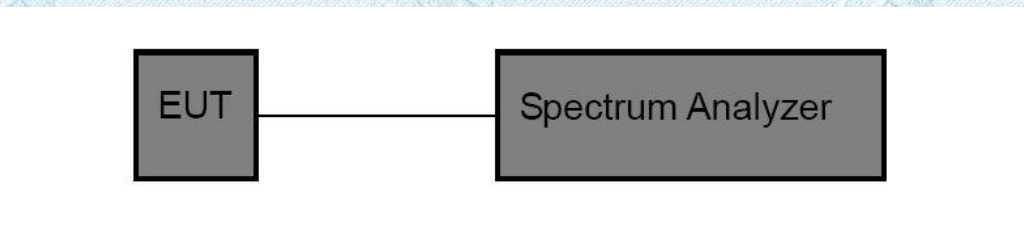
Remarks:
1.Measurement = Reading Level+ Correct Factor
2.Over = Measurement -Limit

3.3. Bandwidth

Limit

Test Item	Limit	Frequency Range(MHz)
Bandwidth	>=500 KHz (6dB bandwidth)	2400~2483.5

Test Configuration



Test Procedure

1. The Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator.
2. Spectrum Setting:
   6db Bandwidth
   (1) Set RBW = 100 kHz.
   (2) Set the video bandwidth (VBW) ≥ 3 RBW.
   (3) Detector = Peak.
   (4) Trace mode = Max hold.
   (5) Sweep = Auto couple.

   99% Bandwidth
   (1) Set RBW = 500 kHz.
   (2) Set the video bandwidth (VBW) =2MHz.
   (3) Detector = Peak.
   (4) Trace mode = Max hold.
   (5) Sweep = Auto couple.

NOTE: The EUT was set to continuously transmitting in each mode and low, Middle and high channel for the test.

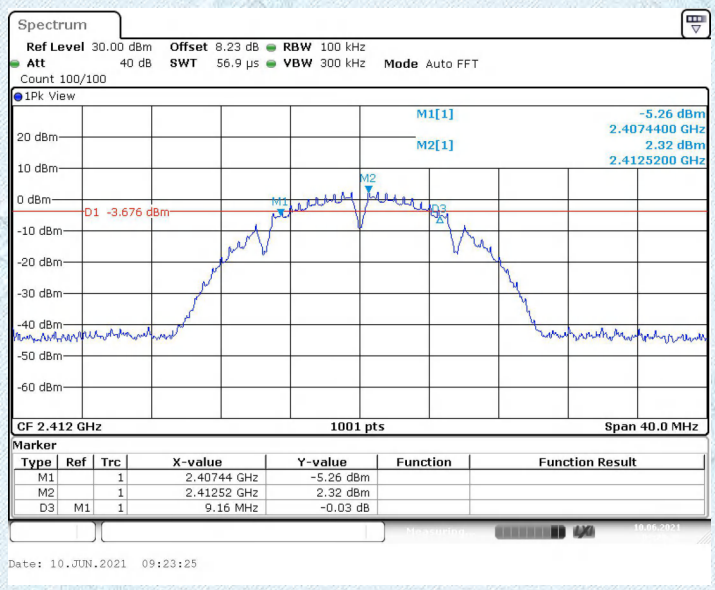
Test Mode

Please refer to the clause 2.3.

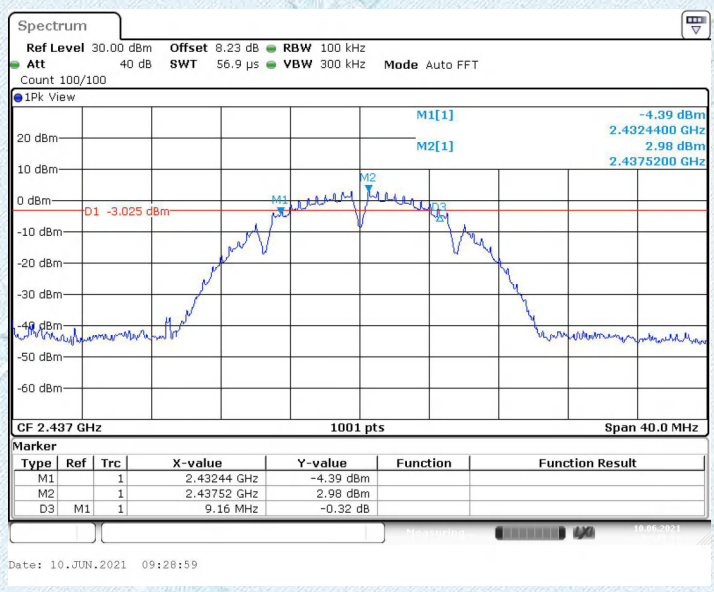
Test Results

Test Mode:	802.11b Mode	
Channel frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
2412	9.160	>=0.5
2437	9.160	
2462	9.160	

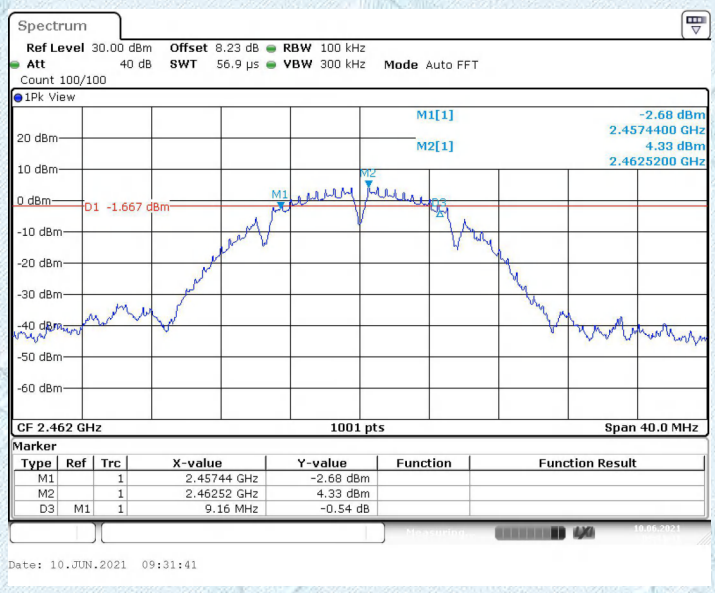
2412 MHz



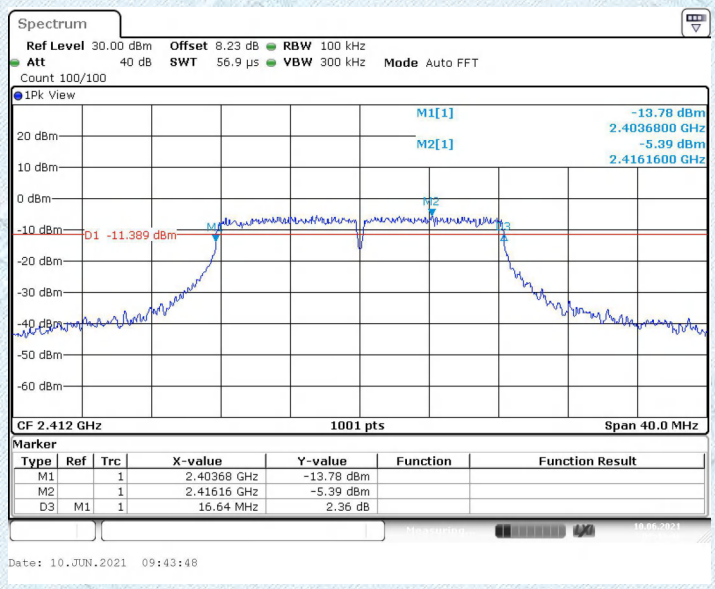
2437 MHz



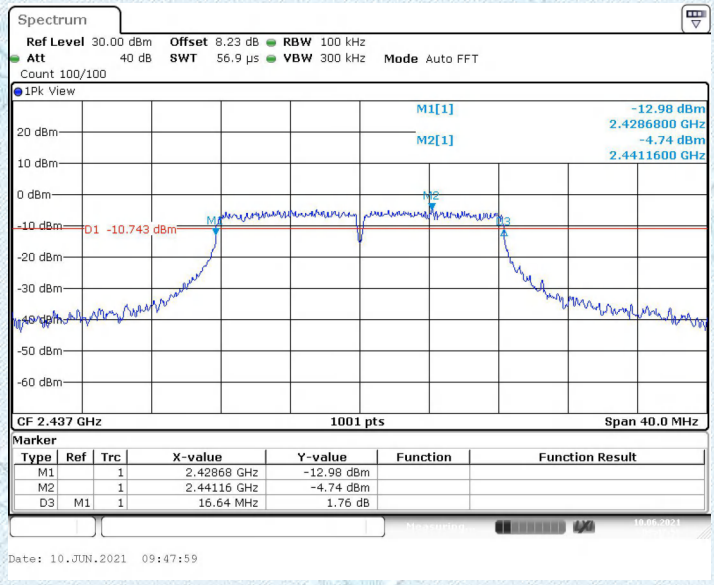
2462 MHz


Spectrum
Ref Level 30.00 dBm Offset 8.23 dB RBW 100 kHz
Att 40 dB SWT 56.9 µs VBW 300 kHz Mode Auto FFT
Count 100/100
1Pk View
M1[1] -2.68 dBm
2.4574400 GHz
M2[1] 4.33 dBm
2.4625200 GHz
D1 -1.667 dBm
CF 2.462 GHz
1001 pts
Span 40.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.45744 GHz -2.68 dBm
M2 1 2.46252 GHz 4.33 dBm
D3 M1 1 9.16 MHz -0.54 dB
Date: 10.JUN.2021 09:31:41

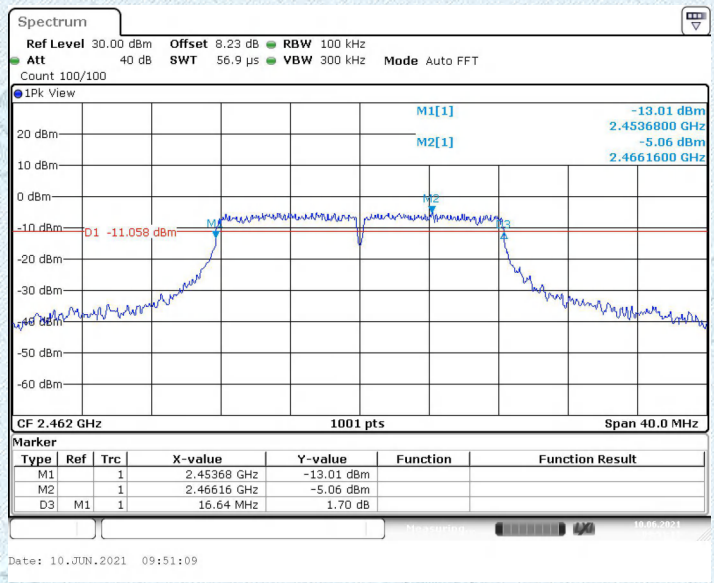
Test Mode:	802.11g Mode	
Channel frequency (MHz)	**6dB Bandwidth (MHz)**	**Limit (MHz)**
2412	16.640	>=0.5
2437	16.640	
2462	16.640	
2412 MHz		



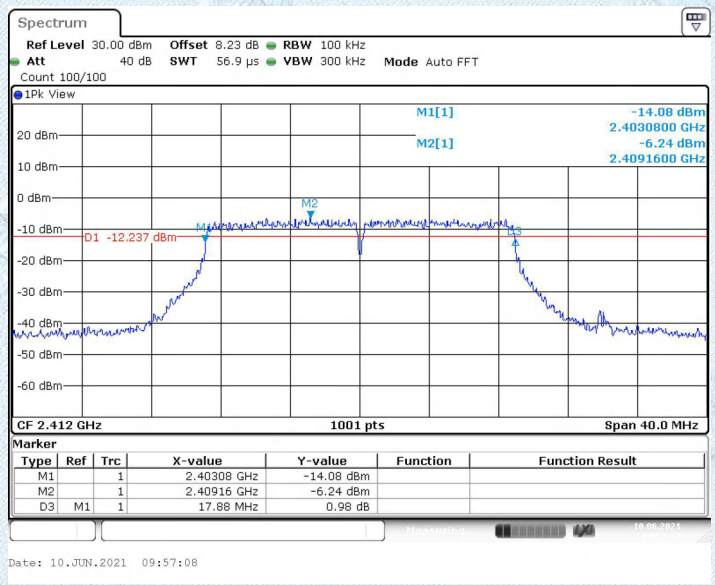
2437 MHz



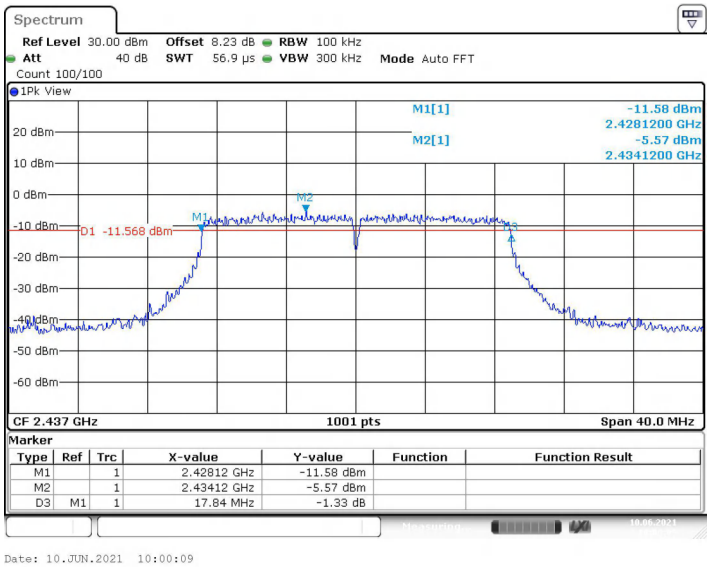
2462 MHz



Test Mode:	802.11n(HT20) Mode	
Channel frequency (MHz)	**6dB Bandwidth (MHz)**	**Limit (MHz)**
2412	17.880	>=0.5
2437	17.840	
2462	17.880	
2412 MHz		

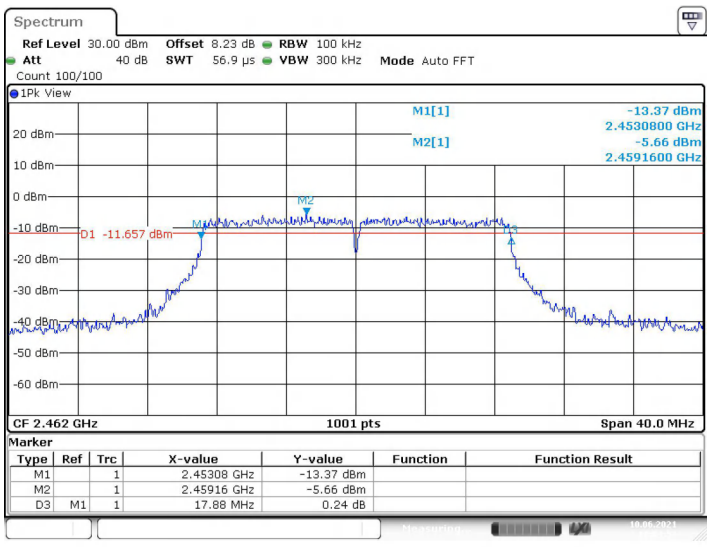


2437 MHz



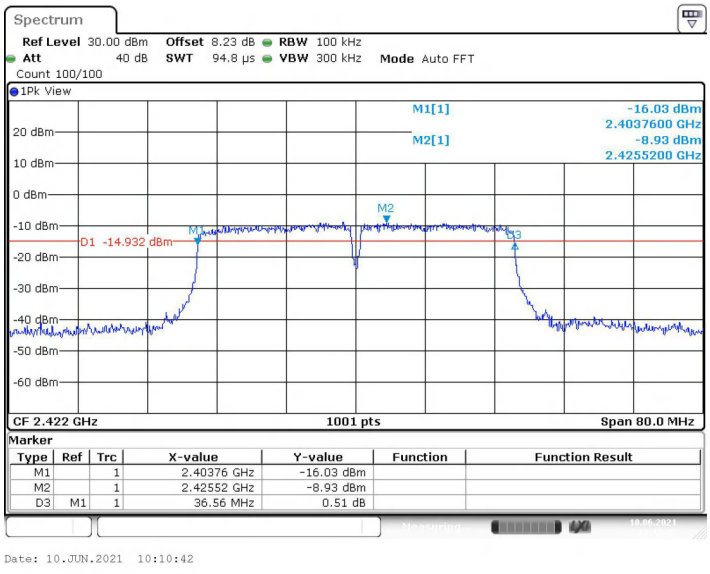
Date: 10.JUN.2021 10:00:09

2462 MHz

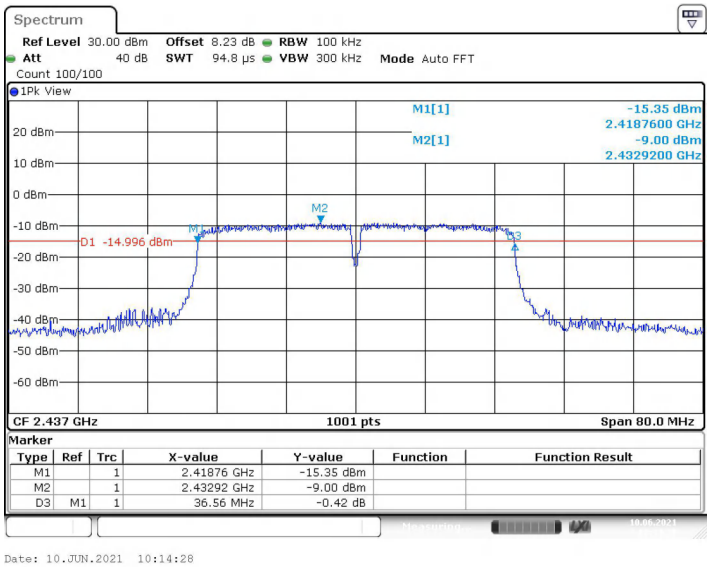


Date: 10.JUN.2021 10:03:53

Test Mode:	802.11n(HT40) Mode	
Channel frequency (MHz)	**6dB Bandwidth (MHz)**	**Limit (MHz)**
2422	36.560	>=0.5
2437	36.560	
2452	36.560	
2422 MHz		

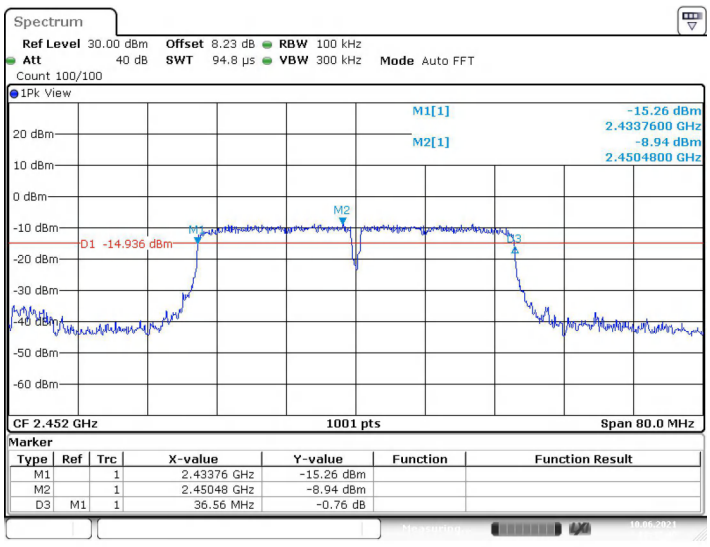


2437 MHz



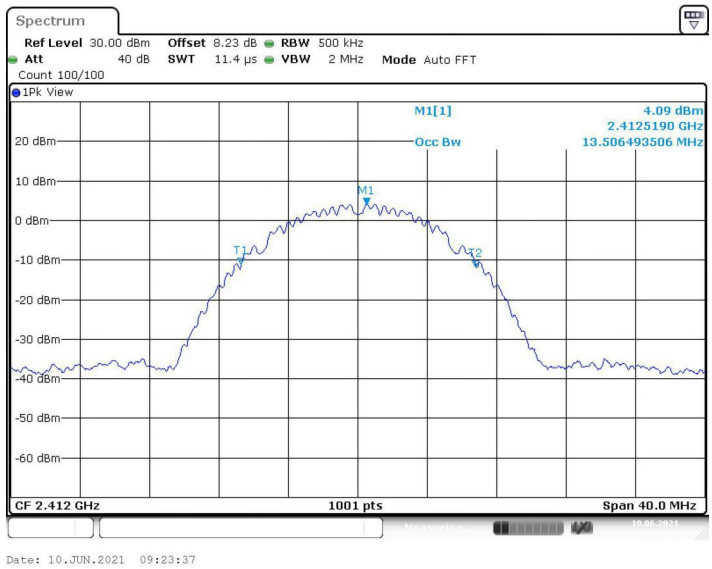
Date: 10.JUN.2021 10:14:28

2452 MHz

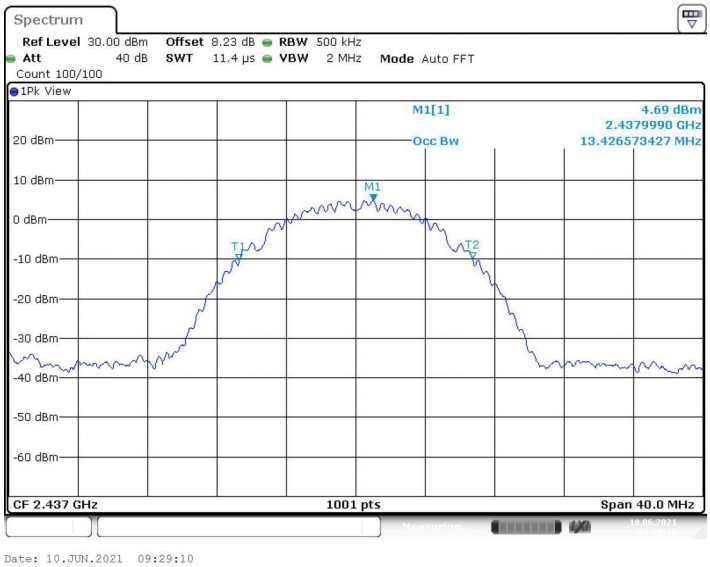


Date: 10.JUN.2021 10:17:46

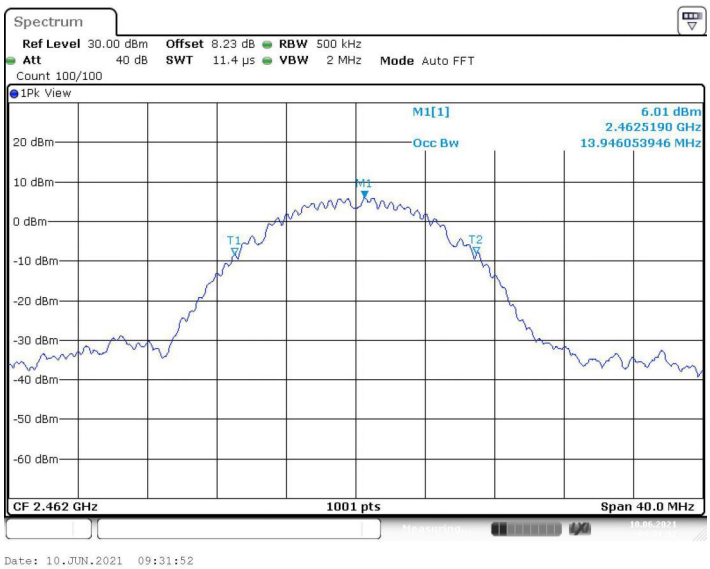
Test Mode:	802.11b Mode	
Channel frequency (MHz)	**99% Bandwidth (MHz)**	**Limit (MHz)**
2412	13.506	>=0.5
2437	13.427	
2462	13.946	
2412 MHz		



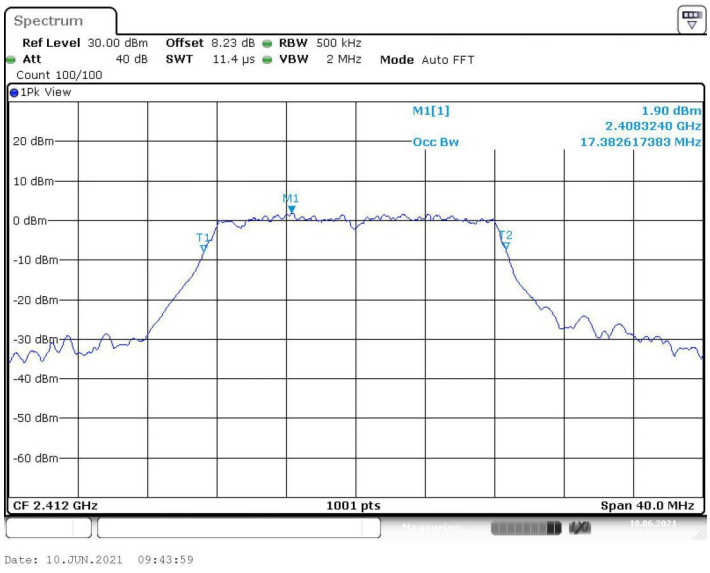
2437 MHz

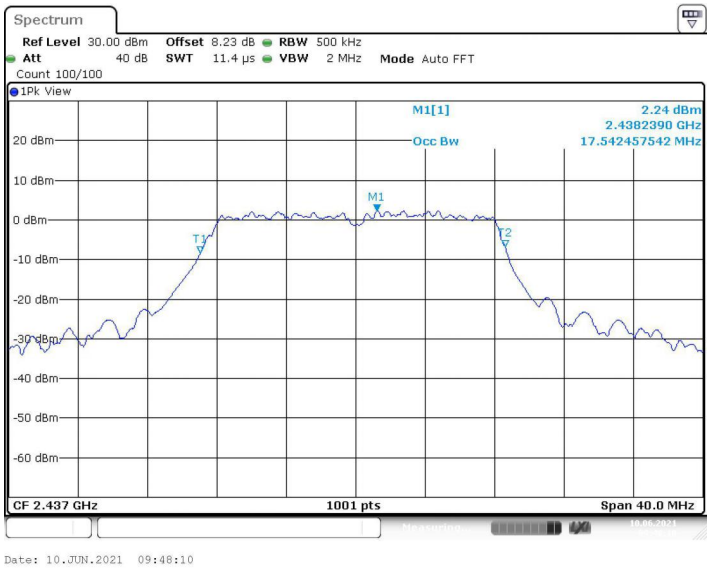
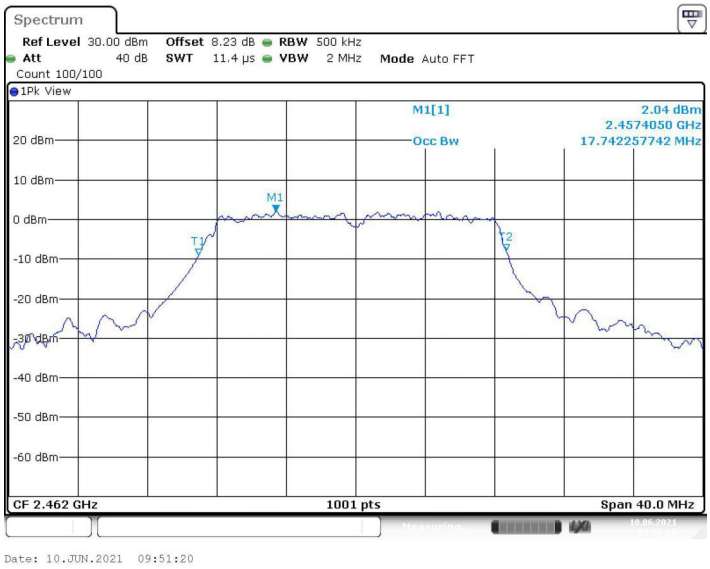


2462 MHz

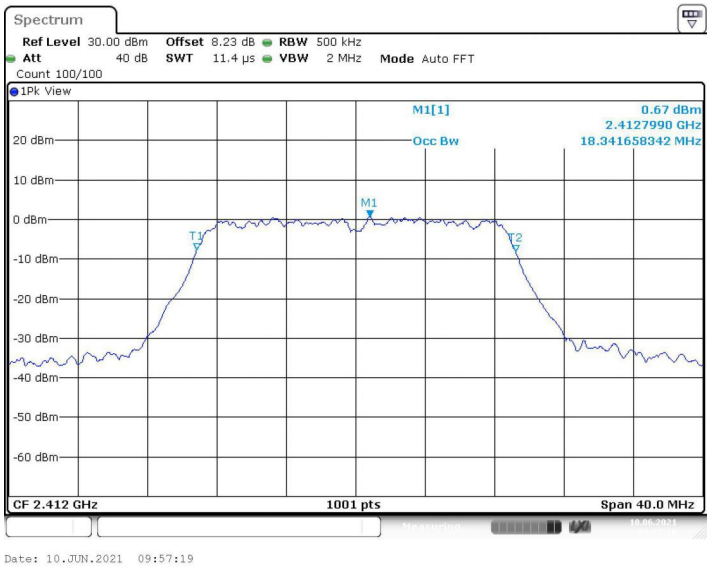


Test Mode:	802.11g Mode	
Channel frequency (MHz)	**99% Bandwidth (MHz)**	**Limit (MHz)**
2412	17.383	>=0.5
2437	17.542	
2462	17.742	
2412 MHz		

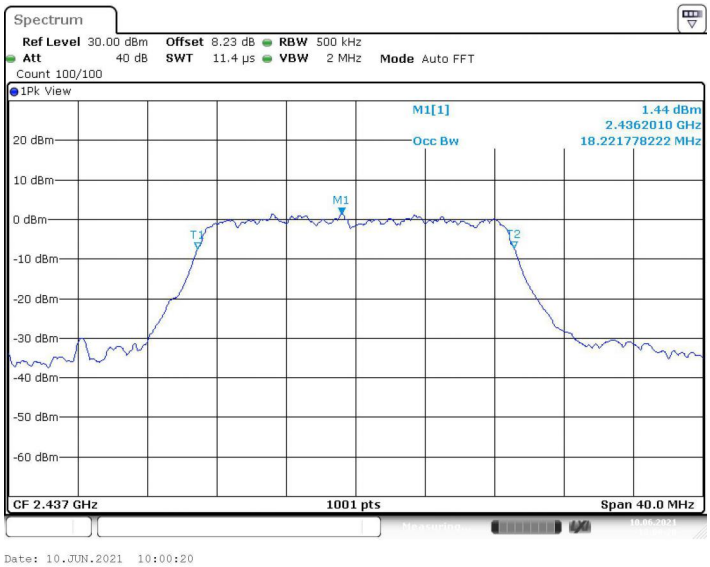


2437 MHz

2462 MHz


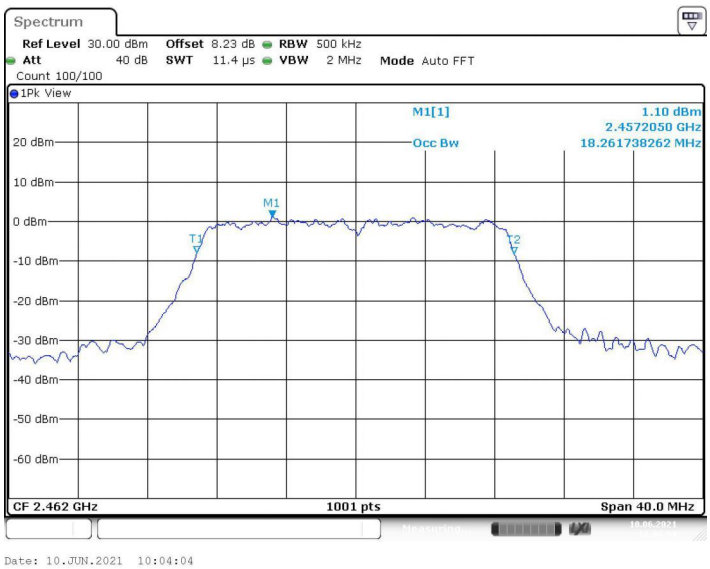
Test Mode:	802.11n(HT20) Mode	
Channel frequency (MHz)	**99% Bandwidth (MHz)**	**Limit (MHz)**
2412	18.342	>=0.5
2437	18.222	
2462	18.262	
2412 MHz		



2437 MHz



2462 MHz



Test Mode:	802.11n(HT40) Mode	
Channel frequency (MHz)	**99% Bandwidth (MHz)**	**Limit (MHz)**
2422	36.444	>=0.5
2437	36.284	
2452	37.083	
2422 MHz