



Report No.: TW2309412-01E

Applicant: Stellar Private Cable Inc.

Product: eHub

Model No.: 2.0

Trademark: Sentrics

FCC ID: 2BDDH-A3E6C

Test Standards: FCC Part 15.247

Test result: It is herewith confirmed and found to comply with the requirements set up by ANSI C63.10, FCC Part 15.247 for the evaluation of electromagnetic compatibility

Approved By

Terry Tang

Manager

Dated: Oct 20, 2023

**Results appearing herein relate only to the sample tested**

**The technical reports is issued errors and omissions exempt and is subject to withdrawal at**

### **SHENZHEN TIMEWAY TESTING LABORATORIES**

Zone C, 1st Floor, Block B, Jun Xiang Da Building, Zhongshan Park Road West, Tong Le Village, Nanshan District, Shenzhen, China

Tel (755) 83448688, Fax (755) 83442996, E-Mail:info@timeway-lab.com



### **Special Statement:**

#### **FCC-Registration No.: 744189**

The 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. Registration No.: 744189.

#### **Industry Canada (IC) —Registration No.:5205A**

The EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 5205A.

#### **A2LA (Certification Number:5013.01)**

The EMC Laboratory has been accredited by the American Association for Laboratory Accreditation (A2LA). Certification Number:5013.01

#### **CAB identifier: CN0033**

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## Test Report Conclusion

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## 1.0 General Details

### 1.1 Test Lab Details

Name: SHENZHEN TIMEWAY TESTING LABORATORIES.  
Address: Zone C, 1st Floor, Block B, Jun Xiang Da Building, Zhongshan Park Road West, Tong Le Village, Nanshan District, Shenzhen, China  
Telephone: (755) 83448688  
Fax: (755) 83442996  
Site Listed with Federal Communications commission (FCC)  
Registration Number: 744189  
For 3m Anechoic Chamber  
Site Listed with Industry Canada of Ottawa, Canada  
Registration Number: IC: 5205A  
For 3m Anechoic Chamber

### 1.2 Applicant Details

Applicant: Stellar Private Cable Inc.  
Address: 975 E. Tallmadge Ave., Akron OH 44310 USA  
Telephone: --  
Fax: --

### 1.3 Description of EUT

Product: eHub  
Manufacturer: Stellar Private Cable Inc.  
Address: 975 E. Tallmadge Ave., Akron OH 44310 USA  
Trademark: Sentrics  
Model Number: 2.0  
Additional Model Number: N/A  
Hardware Version: RKS230712\_V1.0  
Software Version: V2.x  
Serial No.: N/A  
Rating: DC12V, 1.5A  
Power Supply: Model: FJ-SW1201500N  
Input: AC100-240V~, 50/60Hz, 0.6A; Output: DC12.0V, 1.5A  
Type of Modulation IEEE 802.11b: DSSS (CCK, QPSK, DBPSK)  
Frequency range IEEE 802.11b/g/n (HT20): 2412-2462MHz;  
Channel Spacing 5MHz for IEEE 802.11b/g/n (HT20)  
Air Data Rate IEEE 802.11b: 11, 5.5, 2, 1 Mbps  
IEEE 802.11g: 54, 48, 36, 24, 18, 12, 9, 6 Mbps  
Frequency Selection By software

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Channel Number IEEE 802.11b/g/n (HT20): 11 Channels;  
Antenna: Dipole antenna: 2.95dBi, FPC antenna: 2.8dBi

1.4 Submitted Sample: 2 Samples

1.5 Test Duration

2023-09-29 to 2023-10-20

1.6 Test Uncertainty

Conducted Emissions Uncertainty =3.6dB

Radiated Emissions below 1GHz Uncertainty =4.7dB

Radiated Emissions above 1GHz Uncertainty =6.0dB

Conducted Power Uncertainty =6.0dB

Occupied Channel Bandwidth Uncertainty =5%

Note: The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.

1.7 Test Engineer

The sample tested by

A handwritten signature in black ink that reads "Andy Xing".

Print Name: Andy Xing

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## 2.0 Test Equipment

Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
ESPI Test Receiver	R&S	ESPI 3	100379	2023-07-14	2024-07-13
LISN	R&S	EZH3-Z5	100294	2023-07-14	2024-07-13
LISN	R&S	EZH3-Z5	100253	2023-07-14	2024-07-13
Impuls-Begrenzer	R&S	ESH3-Z2	100281	2023-07-14	2024-07-13
Loop Antenna	EMCO	6507	00078608	2022-07-18	2025-07-17
Spectrum	R&S	FSIQ26	100292	2023-07-14	2024-07-13
Horn Antenna	A-INFO	LB-180400-KF	J211060660	2022-07-18	2025-07-17
Horn Antenna	R&S	BBHA 9120D	9120D-631	2022-07-18	2024-07-17
Power meter	Anritsu	ML2487A	6K00003613	2023-07-14	2024-07-13
Power sensor	Anritsu	MA2491A	32263	2023-07-14	2024-07-13
Bilog Antenna	Schwarebeck	VULB9163	9163/340	2022-07-18	2025-07-17
9*6*6 Anechoic	--	--	N/A	2022-07-26	2025-07-25
EMI Test Receiver	RS	ESVB	826156/011	2023-07-14	2024-07-13
EMI Test Receiver	RS	ESCS 30	834115/006	2023-07-14	2024-07-13
Spectrum	HP/Agilent	E4407B	MY50441392	2023-07-14	2024-07-13
Spectrum	RS	FSP	1164.4391.38	2023-07-14	2024-07-13
RF Cable	Zhengdi	ZT26-NJ-NJ-8 M/FA	--	2023-07-14	2024-07-13
RF Cable	Zhengdi	7m	--	2023-07-14	2024-07-13
Pre-Amplifier	Schwarebeck	BBV9743	#218	2023-07-14	2024-07-13
Pre-Amplifier	HP/Agilent	8449B	3008A00160	2023-07-14	2024-07-13
LISN	SCHAFFNER	NNB42	00012	2023-07-14	2024-07-13

## 2.2 Automation Test Software

For Conducted Emission Test

Name	Version
EZ-EMC	Ver.EMC-CON 3A1.1

For Radiated Emissions

Name	Version
EMI Test Software BL410-EV18.91	V18.905
EMI Test Software BL410-EV18.806 High Frequency	V18.06

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### 3. DESCRIPTION OF TEST MODES

#### IEEE 802.11b, 802.11g, 802.11n (HT20) mode

The EUT had been tested under operating condition. There are three channels have been tested as following:

Channel	Frequency (MHz)
Low	2412
Middle	2437
High	2462

IEEE 802.11b mode: 1Mbps data rate (worst case) was chosen for full testing. IEEE 802.11g mode: 6Mbps data rate (worst case) was chosen for full testing. IEEE 802.11n (HT20) mode: mcs0 (worst case) were chosen for full testing;

Note: During the test, the duty cycle was set up to >98%

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### 3.0 Technical Details

#### 3.1 Summary of test results

The EUT has been tested according to the following specifications:			
Standard	Test Type	Result	Notes
<b>FCC Part 15, Paragraph15.203</b>	<b>Antenna Requirement</b>	<b>Pass</b>	<b>Complies</b>
<b>FCC Part 15, Paragraph15.207</b>	<b>Conducted Emission Test</b>	<b>Pass</b>	<b>Complies</b>
<b>FCC Part 15 Subpart C Paragraph 15.247(a)(2) Limit</b>	<b>Spectrum bandwidth of a Orthogonal Frequency Division Multiplex System Limit: 6dB bandwidth&gt;500kHz</b>	<b>Pass</b>	<b>Complies</b>
<b>FCC Part 15, Paragraph 15.247(b)</b>	<b>Maximum peak output power Limit: max. 30dBm</b>	<b>Pass</b>	<b>Complies</b>
<b>FCC Part 15, Paragraph 15.109,15.205 &amp; 15.209</b>	<b>Transmitter Radiated Emission Limit: Table 15.209</b>	<b>Pass</b>	<b>Complies</b>
<b>FCC Part 15, Paragraph 15.247(e)</b>	<b>Power Spectral Density Limit: max. 8dBm/3kHz</b>	<b>Pass</b>	<b>Complies</b>
<b>FCC Part 15, Paragraph 15.247(d)</b>	<b>Out of Band Emission and Restricted Band Radiation Limit: 20dB less than peak value of fundamental frequency Restricted band limit: Table 15.209</b>	<b>Pass</b>	<b>Complies</b>

#### 3.2 Test Standards

**FCC Part 15 Subpart & Subpart C, Paragraph 15.247**

#### 4.0 EUT Modification

**No modification by SHENZHEN TIMEWAY TESTING LABORATORIES.**

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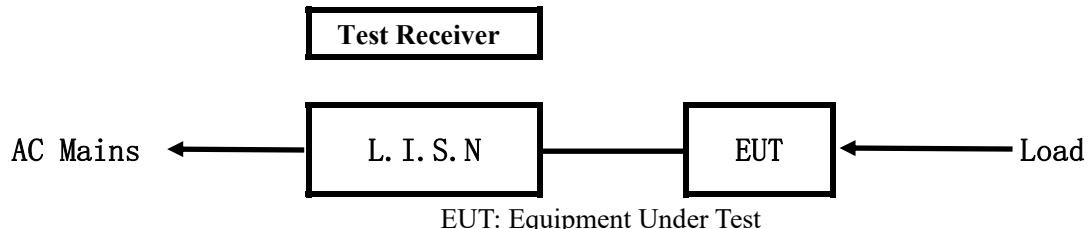
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## 5.0 Power Line Conducted Emission Test

### 5.1 Schematics of the test

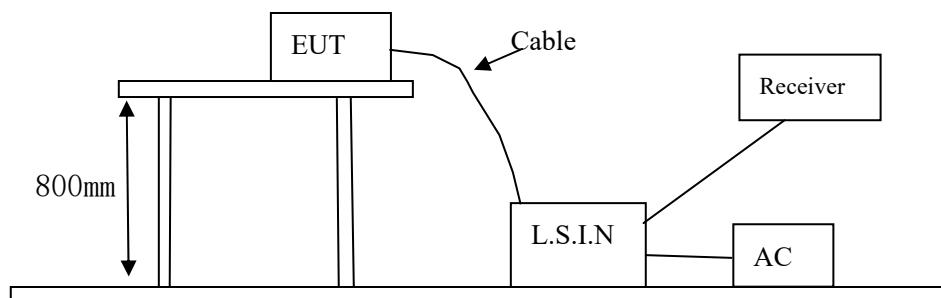


### 5.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.10-2013. The Frequency spectrum From 0.15MHz to 30MHz was investigated. The LISN used was 50ohm/50uH as specified by section 5.1 of ANSI C63.10 –2013.

Test Voltage: 120V~, 60Hz

Block diagram of Test setup



### 5.3 Configuration of the EUT

The EUT was configured according to ANSI C63.10-2013. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

#### A. EUT

Device	Manufacturer	Model	FCC ID
eHub	Stellar Private Cable Inc.	2.0	2BDDH-A3E6C

#### B. Internal Device

Device	Manufacturer	Model	FCC ID/DOC
Adapter	SHENZHEN FUJIA APPLIANCE cO. LTD	FJ-SW1201500N	DOC

#### C. Peripherals

Device	Manufacturer	Model	Rating
Flat Panel Monitor	DELL	U2720QM	100-240V~, 50/60Hz, 2.5A

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#### 5.4 EUT Operating Condition

Operating condition is according to ANSI C63.10-2013.

- A Setup the EUT and simulators as shown on follow
- B Enable AF signal and confirm EUT active to normal condition

#### 5.5 Power line conducted Emission Limit according to Paragraph 15.207

Frequency (MHz)	Limits (dB $\mu$ V)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	66.0~56.0*	56.0~46.0*
0.50 ~ 5.00	56.0	46.0
5.00 ~ 30.00	60.0	50.0

Notes: 1. \*Decreasing linearly with logarithm of frequency.  
2. The tighter limit shall apply at the transition frequencies

#### 5.6 Test Results

The frequency spectrum from 0.15MHz to 30MHz was investigated. All reading are quasi-peak values with a resolution bandwidth of 9kHz.

**Note: Only the worst case was recorded in the test report.**

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**A: Conducted Emission on Live Terminal (150kHz to 30MHz)**

**EUT Operating Environment**

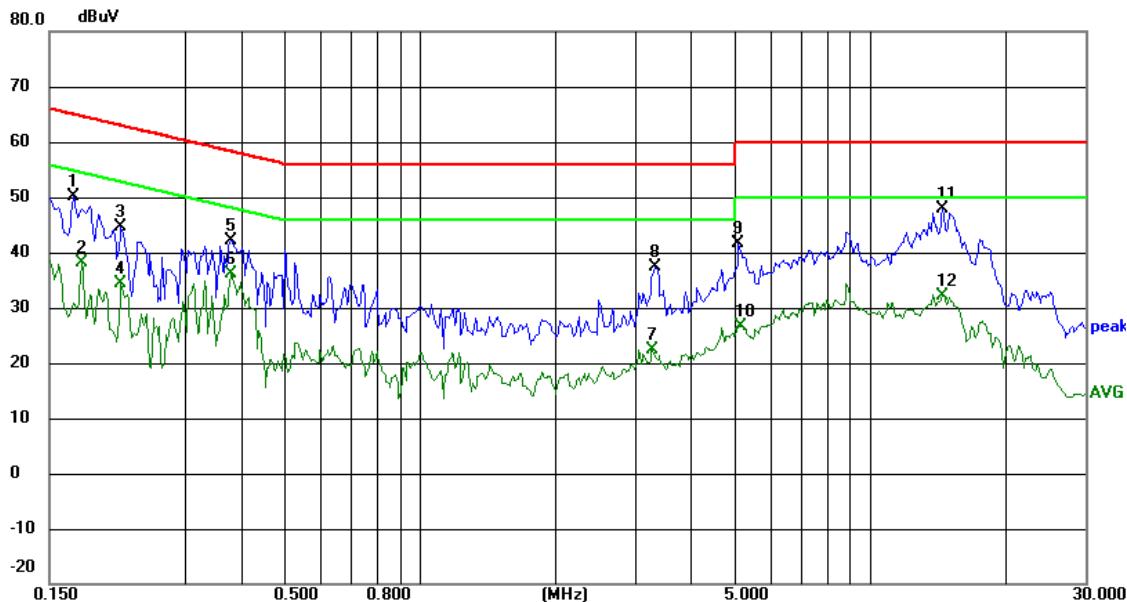
Temperature: 26°C      Humidity: 65%RH      Atmospheric Pressure: 101 kPa

**EUT set Condition: Keep WIFI Transmitting**

**Results: Pass**

**Test Power: AC120V/60Hz**

Please refer to following diagram for individual



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1695	40.45	9.77	50.22	64.98	-14.76	peak	P
2	0.1773	28.42	9.77	38.19	54.61	-16.42	AVG	P
3	0.2162	34.97	9.75	44.72	62.96	-18.24	peak	P
4	0.2162	24.51	9.75	34.26	52.96	-18.70	AVG	P
5	0.3800	32.43	9.76	42.19	58.28	-16.09	peak	P
6 *	0.3800	26.43	9.76	36.19	48.28	-12.09	AVG	P
7	3.2755	12.46	9.86	22.32	46.00	-23.68	AVG	P
8	3.3119	27.41	9.86	37.27	56.00	-18.73	peak	P
9	5.0865	31.68	9.93	41.61	60.00	-18.39	peak	P
10	5.1118	16.75	9.93	26.68	50.00	-23.32	AVG	P
11	14.4504	37.53	10.36	47.89	60.00	-12.11	peak	P
12	14.4504	21.80	10.36	32.16	50.00	-17.84	AVG	P

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**B: Conducted Emission on Neutral Terminal (150kHz to 30MHz)**

**EUT Operating Environment**

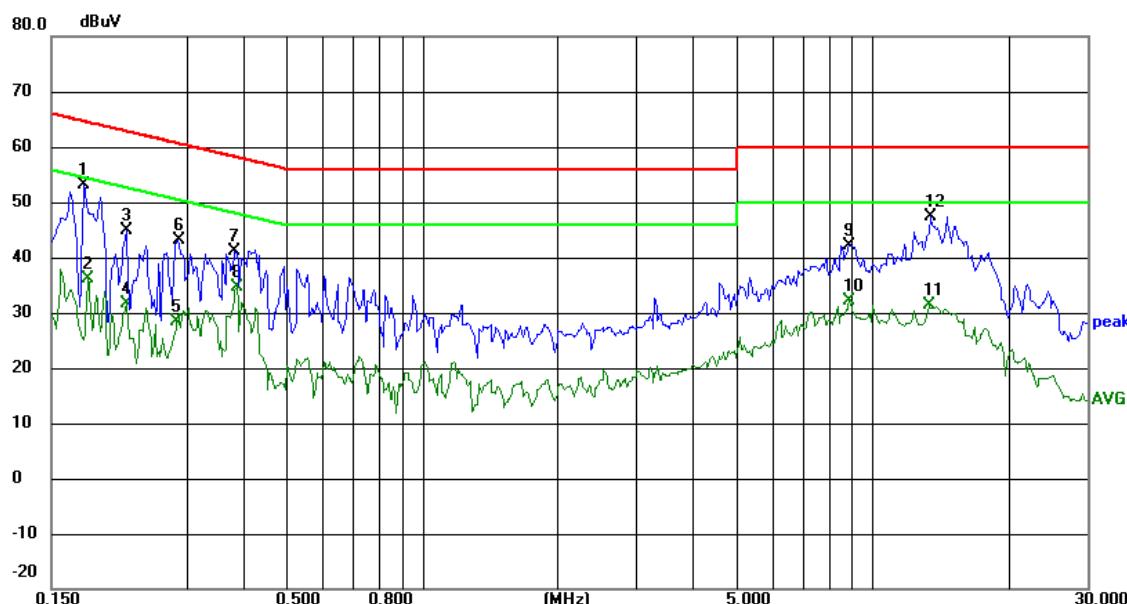
Temperature: 26°C      Humidity: 65%RH      Atmospheric Pressure: 101 kPa

**EUT set Condition: Keep WIFI Transmitting**

**Results: Pass**

**Test Power: AC120V/60Hz**

Please refer to following diagram for individual



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1 *	0.1773	43.24	9.77	53.01	64.61	-11.60	peak	P
2	0.1811	26.37	9.76	36.13	54.44	-18.31	AVG	P
3	0.2202	35.13	9.75	44.88	62.81	-17.93	peak	P
4	0.2202	21.99	9.75	31.74	52.81	-21.07	AVG	P
5	0.2847	18.51	9.76	28.27	50.68	-22.41	AVG	P
6	0.2864	33.38	9.76	43.14	60.63	-17.49	peak	P
7	0.3840	31.26	9.76	41.02	58.19	-17.17	peak	P
8	0.3879	24.88	9.76	34.64	48.11	-13.47	AVG	P
9	8.8695	23.19	18.97	42.16	60.00	-17.84	peak	P
10	8.8695	13.04	18.97	32.01	50.00	-17.99	AVG	P
11	13.3701	7.74	23.68	31.42	50.00	-18.58	AVG	P
12	13.4403	23.67	23.75	47.42	60.00	-12.58	peak	P

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Note: Both 240V and 120V voltages are tested, the data of the worst-case is shown in the report.

## 6 Radiated Emission Test

### 6.1 Test Method and test Procedure:

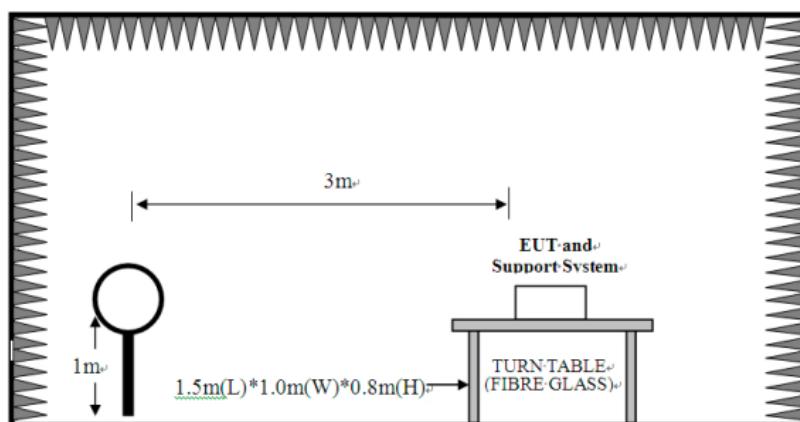
- (1) The EUT was tested according to ANSI C63.10-2013. The radiated test was performed at Timeway EMC Laboratory. This site is on file with the FCC laboratory division, Registration No. 744189
- (2) The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.10-2013.
- (3) The frequency spectrum is set as follows:

Frequency	Detector	RBW	VBW	Value
9KHz-150KHz	Quasi-peak	200Hz	600Hz	Quasi-peak
150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak
30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

- (4) The antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency.
- (5) Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limit), and are distinguished with a "QP" in the data table.
- (6) The antenna polarization: Vertical polarization and Horizontal polarization.

### Block diagram of Test setup

For radiated emissions from 9kHz to 30MHz



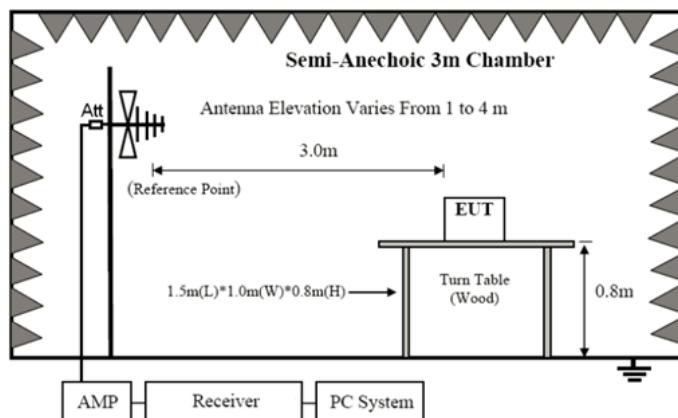
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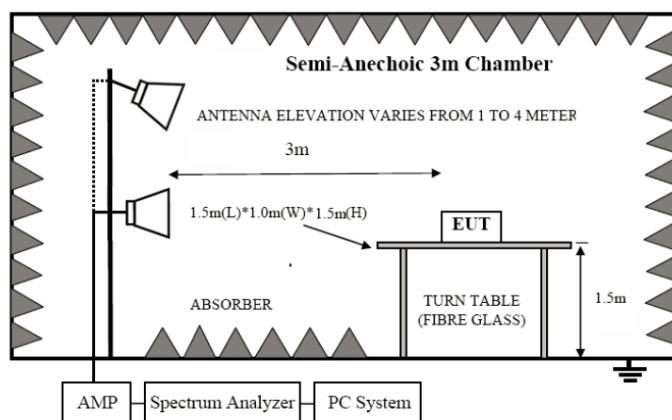
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For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



## 6.2 Configuration of The EUT

Same as section 5.3 of this report

## 6.3 EUT Operating Condition

Same as section 5.4 of this report.

## 6.4 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below:

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**Frequencies in restricted band are complied to limit on Paragraph 15.209**

Frequency Range (MHz)	Distance (m)	Field strength (dB $\mu$ V/m)
0.009-0.049	3	$20\log(2400/F(\text{kHz})) + 40\log(300/3)$
0.490-1.705	3	$20\log(24000/F(\text{kHz})) + 40\log(30/3)$
1.705-30	3	69.5
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

Note:

1. RF Voltage (dBuV) =  $20 \log \text{RF Voltage (uV)}$
2. In the Above Table, the tighter limit applies at the band edges.
3. Distance refers to the distance in meters between the measuring instrument antenna and the EUT
4. All scanning using PK detector. And the final emission level was get using QP detector for frequency range from 30-1000MHz. As to 1G-25G, the final emission level got using PK. For fundamental measurement, PK detector used.
5. For radiated emissions from 9kHz to 30MHz, the emission level is much less than the limit for more than 20dB. No necessary to take down the record.
6. Worse case were recorded in the test report. **802.11n20 MIMO mode was the worst case.**

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**Test result**

**General Radiated Emission Data and Harmonics Radiated Emission Data**

**Radiated Emission In Horizontal (9kHz----30MHz)**

EUT set Condition: **Keep Transmitting**

**Results:** **Pass**

Freq. (MHz)	Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	State
--	--	--	--	P
--	--	--	--	P

**Note:**

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $20 \log (\text{specific distance}/\text{test distance})$ (dB);

Limit line = specific limits(dBuv) + distance extrapolation factor

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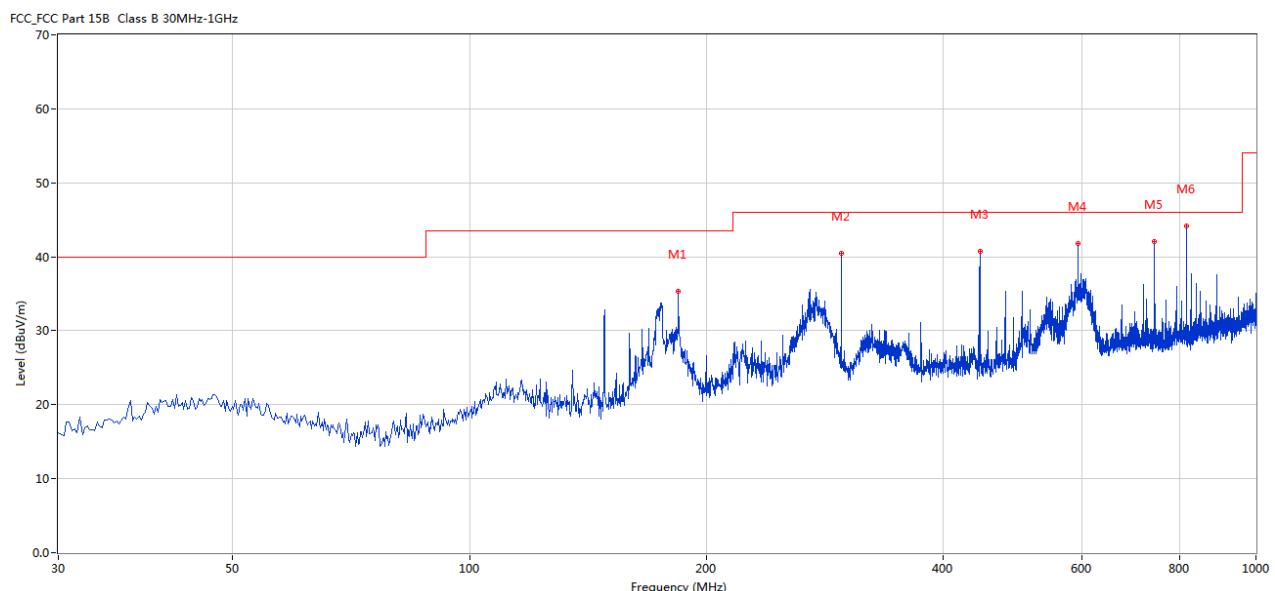
### Test result

### General Radiated Emission Data and Harmonics Radiated Emission Data

#### Radiated Emission In Horizontal (30MHz----1000MHz)

EUT set Condition: **Keep Transmitting**

**Results:** **Pass**



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	184.191	35.35	-14.98	43.5	8.15	Peak	273.00	100	Horizontal	Pass
2	296.926	40.53	-11.07	46.0	5.47	Peak	224.00	100	Horizontal	Pass
3	445.541	40.76	-8.02	46.0	5.24	Peak	183.00	100	Horizontal	Pass
4	594.156	41.77	-5.26	46.0	4.23	Peak	117.00	100	Horizontal	Pass
5	742.287	42.00	-3.44	46.0	4.00	Peak	89.00	100	Horizontal	Pass
6	815.989	44.13	-2.96	46.0	1.87	Peak	200.00	100	Horizontal	Pass

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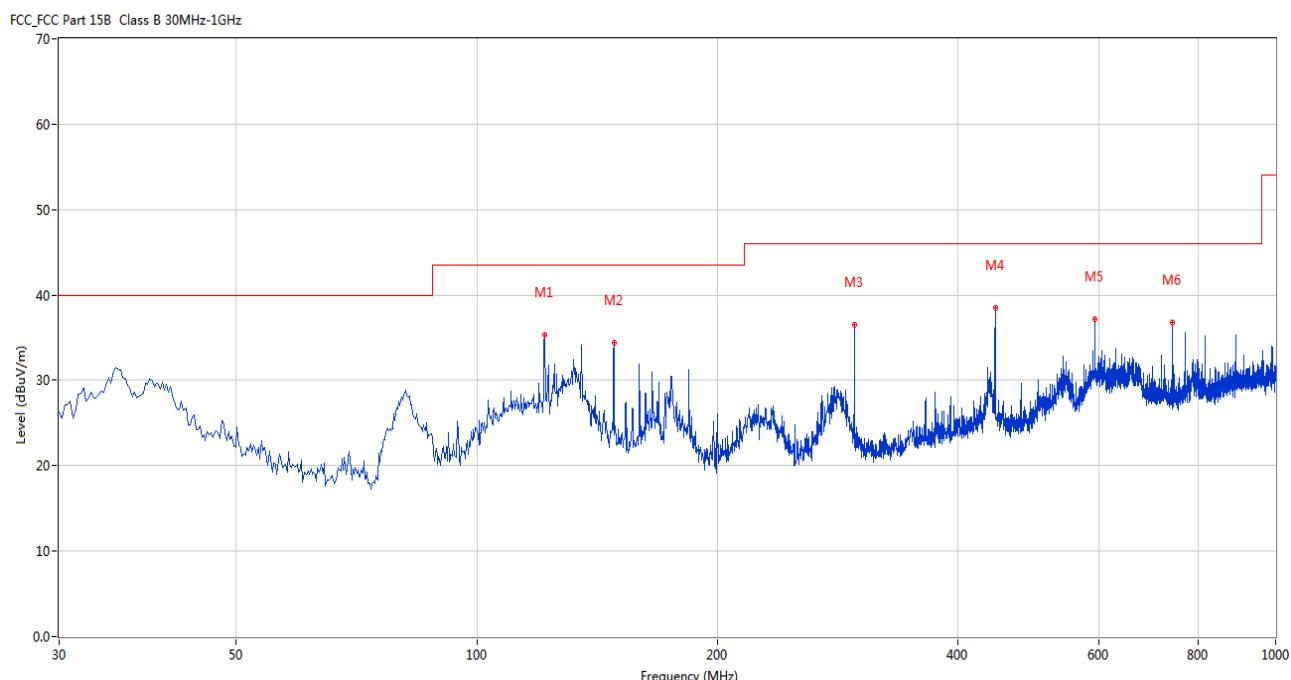
### Test result

### General Radiated Emission Data and Harmonics Radiated Emission Data

#### Radiated Emission In Vertical (30MHz----1000MHz)

EUT set Condition: **Keep Transmitting**

**Results:** **Pass**



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	121.642	35.30	-15.69	43.5	8.20	Peak	162.00	100	Vertical	Pass
2	148.553	34.42	-17.15	43.5	9.08	Peak	157.00	100	Vertical	Pass
3	296.926	36.56	-11.07	46.0	9.44	Peak	56.00	100	Vertical	Pass
4	445.541	38.52	-8.02	46.0	7.48	Peak	320.00	100	Vertical	Pass
5	593.914	37.21	-5.25	46.0	8.79	Peak	78.00	100	Vertical	Pass
6	742.287	36.76	-3.44	46.0	9.24	Peak	157.00	100	Vertical	Pass

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**Operation Mode: Transmitting under CH01 for 802.11n20 mode**

Frequency (MHz)	Level@3m (dB $\mu$ V/m)	Antenna Polarity	Limit@3m (dB $\mu$ V/m)
4824.00	47.75 (PK)	H	74(Peak)/ 54(AV)
4824.00	46.34 (PK)	V	74(Peak)/ 54(AV)
7236.00	--	H/V	74(Peak)/ 54(AV)
9648.00	--	H/V	74(Peak)/ 54(AV)
12060	--	H/V	74(Peak)/ 54(AV)
14472	--	H/V	74(Peak)/ 54(AV)
16884	--	H/V	74(Peak)/ 54(AV)
19296	--	H/V	74(Peak)/ 54(AV)
21708	--	H/V	74(Peak)/ 54(AV)
24120	--	H/V	74(Peak)/ 54(AV)

**Operation Mode: Transmitting under CH06 for 802.11n20 mode**

Frequency (MHz)	Level@3m (dB $\mu$ V/m)	Antenna Polarity	Limit@3m (dB $\mu$ V/m)
4874.00	45.57 (PK)	H	74(Peak)/ 54(AV)
4874.00	46.63 (PK)	V	74(Peak)/ 54(AV)
7311.00	--	H/V	74(Peak)/ 54(AV)
9748.00	--	H/V	74(Peak)/ 54(AV)
12185	--	H/V	74(Peak)/ 54(AV)
14622	--	H/V	74(Peak)/ 54(AV)
17059	--	H/V	74(Peak)/ 54(AV)
19496	--	H/V	74(Peak)/ 54(AV)
21933	--	H/V	74(Peak)/ 54(AV)
24370	--	H/V	74(Peak)/ 54(AV)

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**Operation Mode: Transmitting under CH11 for 802.11n20 mode**

Frequency (MHz)	Level@3m (dB $\mu$ V/m)	Antenna Polarity	Limit@3m (dB $\mu$ V/m)
4924	47.54 (PK)	H	74(Peak)/ 54(AV)
4924	44.56 (PK)	V	74(Peak)/ 54(AV)
7368	--	H/V	74(Peak)/ 54(AV)
9848	--	H/V	74(Peak)/ 54(AV)
12310	--	H/V	74(Peak)/ 54(AV)
14772	--	H/V	74(Peak)/ 54(AV)
17234	--	H/V	74(Peak)/ 54(AV)
19696	--	H/V	74(Peak)/ 54(AV)
22158	--	H/V	74(Peak)/ 54(AV)
24620	--	H/V	74(Peak)/ 54(AV)

Note: 1. Level = Reading + AF + Cable – Pre-amplifier  
2. Remark “--” means that the emissions level is too low to be measured  
3. For 802.11n20 mode at MCS0.  
4. For radiated Emissions from 18-25GHz and below 30MHz, it is only the floor noise and less than the limit for more than 20dB. No necessary to take down.  
5. Note: the final peak measurement results less than the AV limit. No necessary to take down the final AV measurement result

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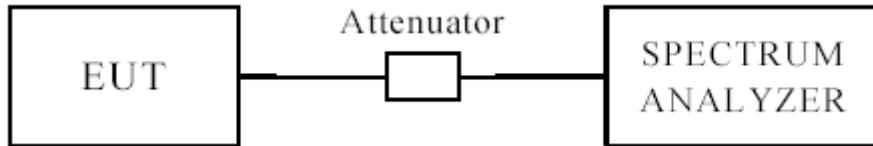
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## 7.0 6dB Bandwidth Measurement

### 7.1 Test Setup



### 7.2 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is >500 kHz

### 7.3 Test Procedure

1. Set resolution bandwidth (RBW) = 100 kHz
2. Set the video bandwidth (VBW)  $\geq 3 \times$  RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

### 7.4 Test Result

**Note: ANT 1(2) Represent the value of antenna 1 and 2, The worst data is Antenna 1, only shown Antenna 1 Plot.**

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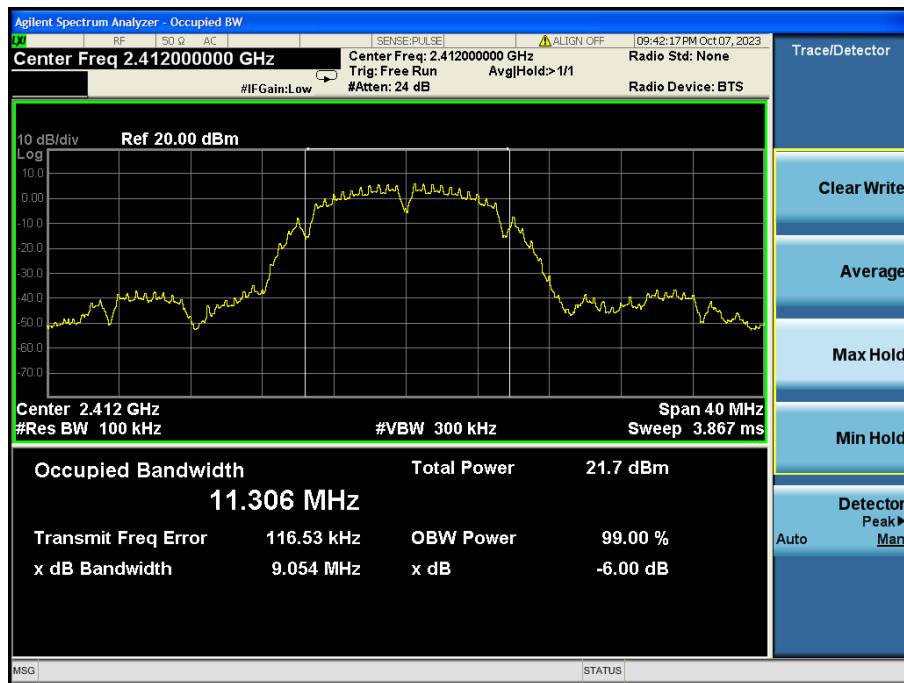
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## 802.11b Mode

Frequency	6dB Bandwidth (MHz) ANT 1	6dB Bandwidth (MHz) ANT 2	Limit (kHz)	Result
2412 MHz	9.054	9.043	≥ 500	Pass
2437 MHz	9.070	9.032	≥ 500	Pass
2462 MHz	9.065	9.035	≥ 500	Pass

CH01



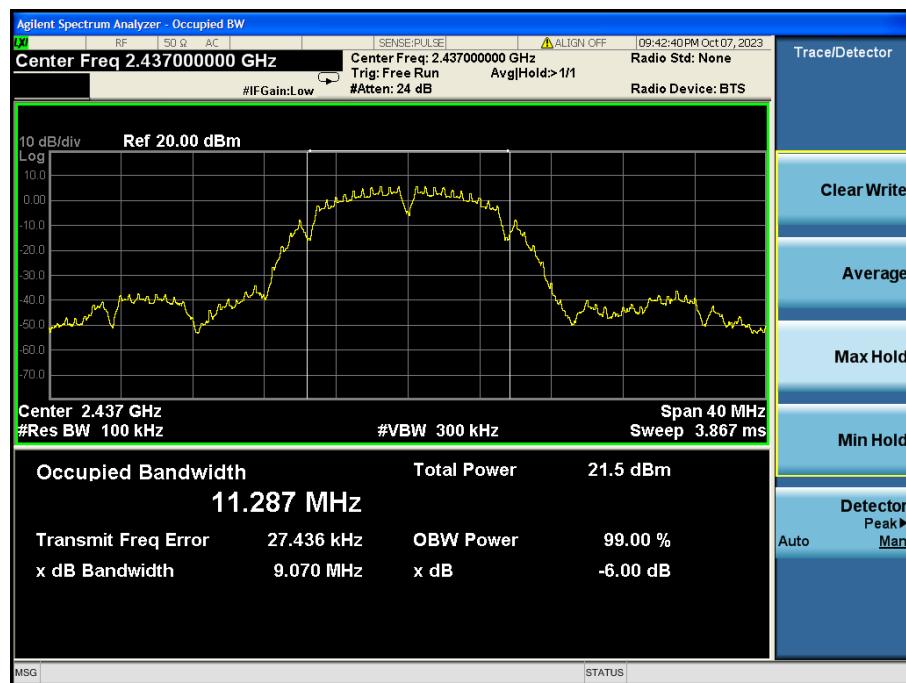
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## CH06

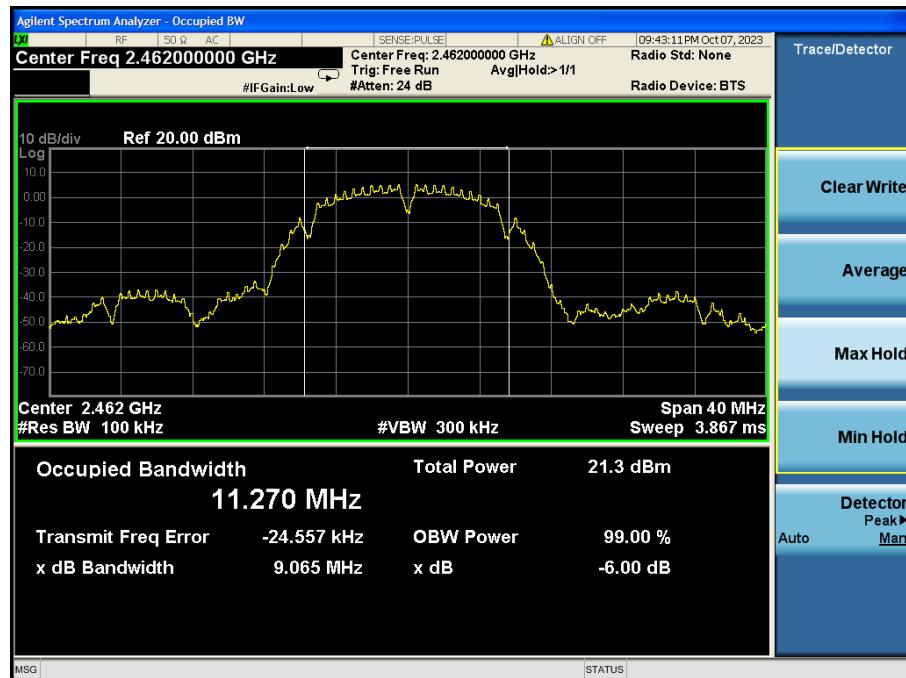


## CH11

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### 802.11g Mode

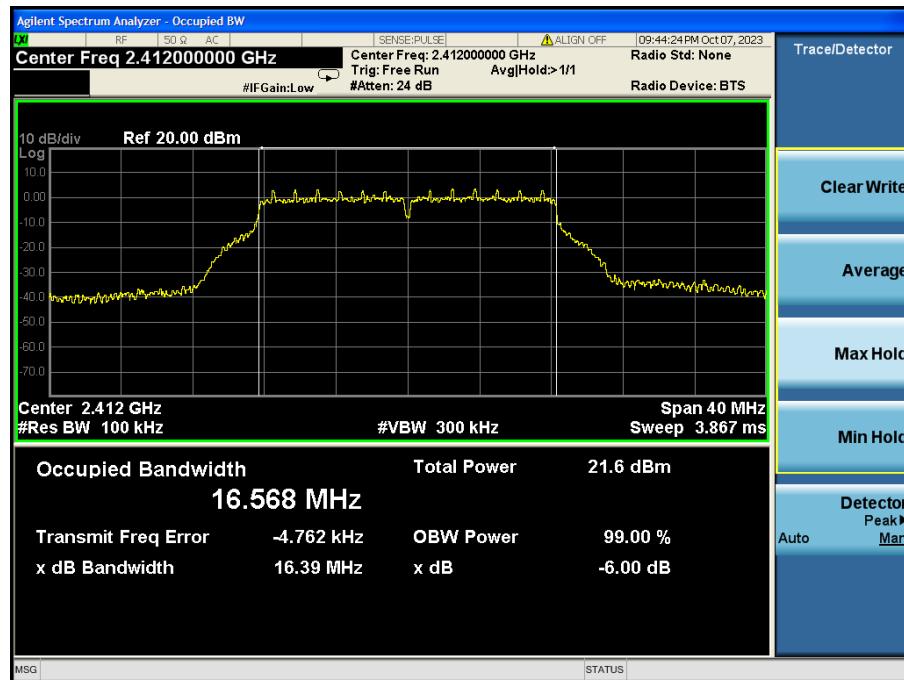
Frequency	6dB Bandwidth (MHz) ANT 1	6dB Bandwidth (MHz) ANT 2	Limit (kHz)	Result
2412 MHz	16.39	16.23	≥ 500	Pass
2437 MHz	16.38	16.26	≥ 500	Pass
2462 MHz	16.39	16.31	≥ 500	Pass

CH01

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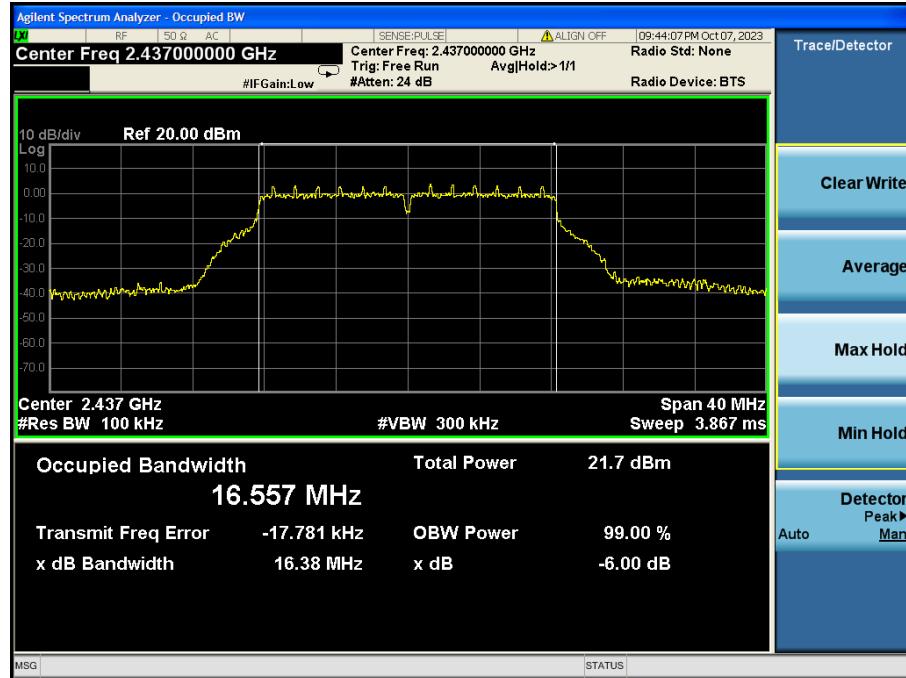


CH06

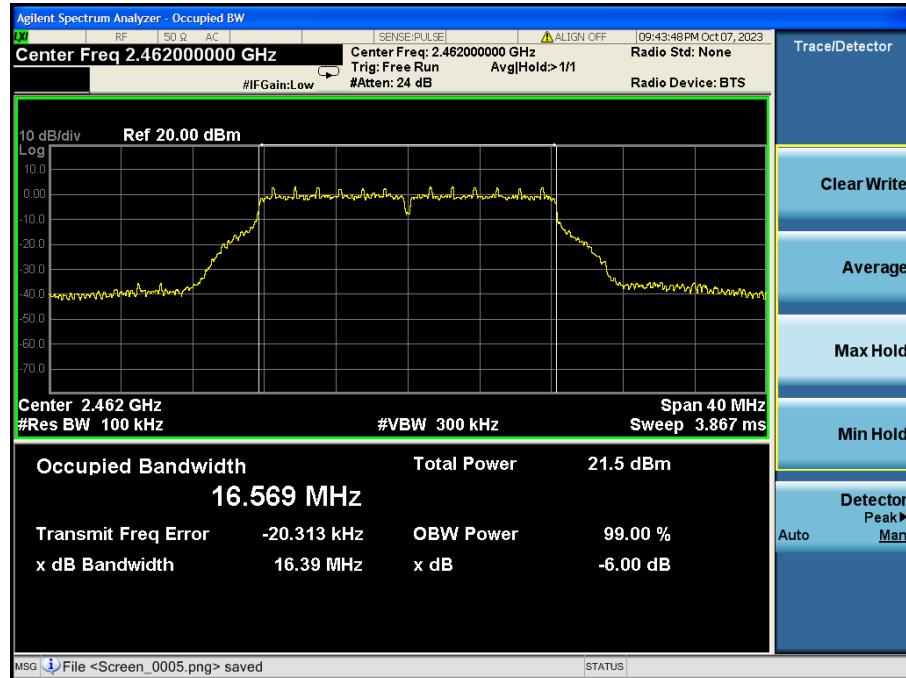
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### CH11



### 802.11n HT20 Mode

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Frequency	6dB Bandwidth (MHz)ANT 1	6dB Bandwidth (MHz)ANT 2	Limit ( kHz )	Result
2412 MHz	17.63	17.35	≥ 500	Pass
2437 MHz	17.61	17.45	≥ 500	Pass
2462 MHz	17.62	17.53	≥ 500	Pass

### CH01



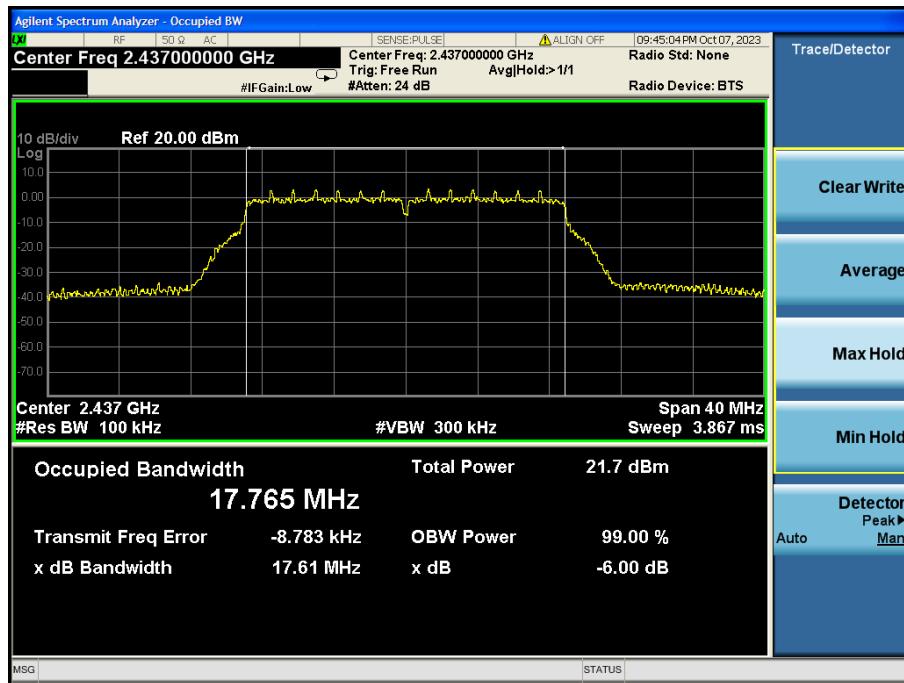
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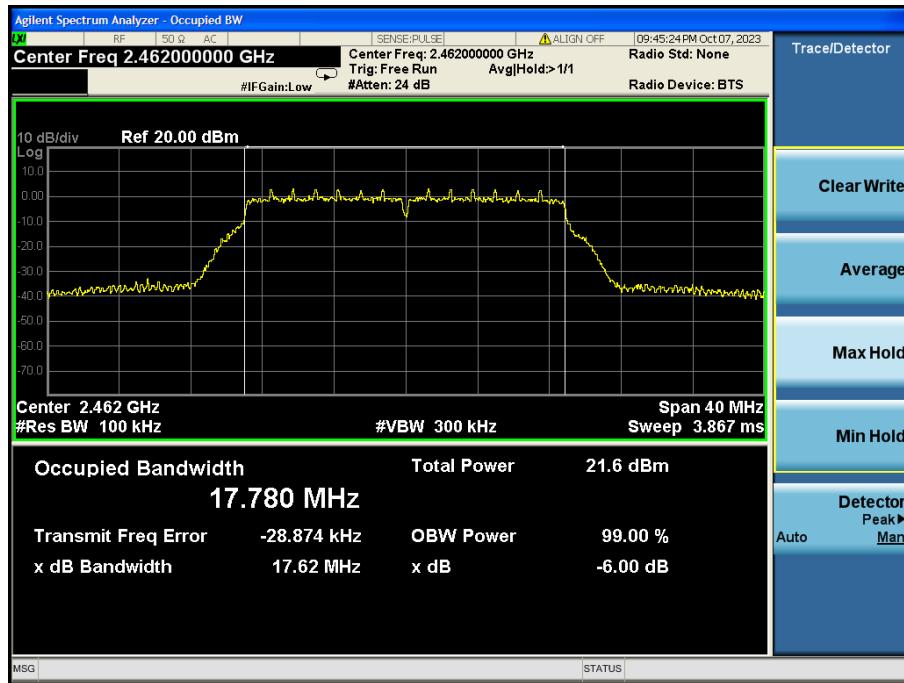
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## CH06



## CH11



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## 8. Maximum Output Power

### 8.1 Test Setup



### 8.2 Limits of Maximum Output Power

The Maximum Output Power Measurement is 30dBm.

### 8.3 Test Procedure

The RF power output was measured with a Power meter connected to the RF Antenna connector (conducted measurement) while EUT was operating in transmit mode at the appropriate centre frequency.

**Note: The PK power was measured**

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#### 8.4 Test Results

##### 802.11b Mode

Test Channel	Frequency (MHz)	Output Power (dBm)ANT 1	Output Power (dBm)ANT 2	Limit (dBm)	Limit (W)
CH01	2412 MHz	17.43	16.76	30	1
CH06	2437MHz	17.54	16.83	30	1
CH11	2462 MHz	17.62	16.73	30	1

##### 802.11g Mode

Test Channel	Frequency (MHz)	Output Power (dBm)ANT 1	Output Power (dBm)ANT 2	Limit (dBm)	Limit (W)
CH01	2412 MHz	16.52	15.67	30	1
CH06	2437MHz	16.62	15.83	30	1
CH11	2462 MHz	16.74	15.72	30	1

##### 802.11n HT20 Mode

Test Channel	Frequency (MHz)	Output Power (dBm)ANT 1	Output Power (dBm)ANT 2	Total Power (dBm)	Limit (dBm)	Limit (W)
CH01	2412 MHz	15.56	14.62	18.13	30	1
CH06	2437MHz	15.52	14.53	18.06	30	1
CH11	2462 MHz	15.64	15.61	18.64	30	1

Note: For MIMO mode: Directional gain= GANT MAX + 10 log(NANT/NSS)=5.96dB<sub>i</sub>, (Nss=1)

Limit =30 dBm.

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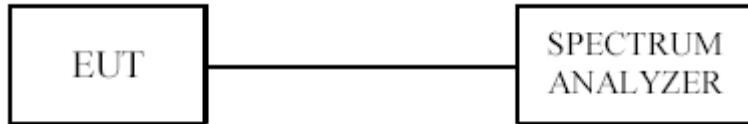
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## 9. Power Spectral Density Measurement

### 9.1 Test Setup



### 9.2 Limits of Power Spectral Density Measurement

The Maximum Power Spectral Density Measurement is 8dBm/3kHz.

### 9.3 Test Procedure

1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
2. Set the RBW = 3 kHz.
3. Set the VBW  $\geq$  10 kHz.
4. Set the span to 1.5 times the DTS channel bandwidth.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.
11. The resulting peak PSD level must be  $\leq$  8 dBm/3kHz.

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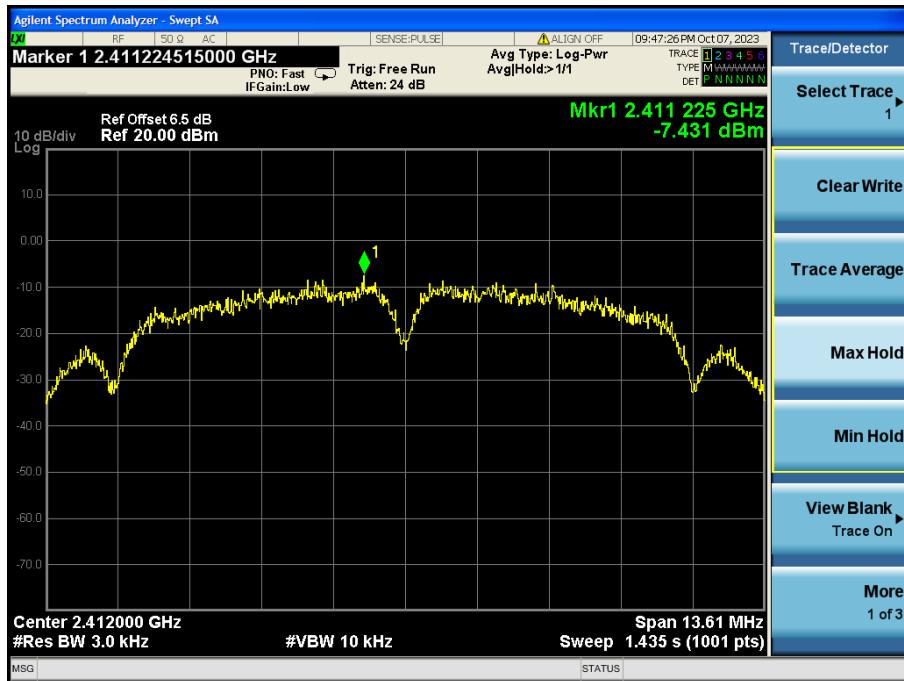
#### 9.4 Test Result

**ANT 1(2) Represent the value of antenna 1 and 2, The worst data is Antenna 1, only shown  
Antenna 1 Plot.**

#### 802.11b Mode

Test Channel	Frequency (MHz)	Power Density (dBm/3kHz) ANT 1	Power Density (dBm/3kHz) ANT 2	Total Power Density (dBm/3kHz)	Limit (dBm/3kHz)
CH01	2412 MHz	-7.431	-7.863	--	8
CH06	2437 MHz	-8.016	-8.342	--	8
CH11	2462 MHz	-7.685	-7.842	--	8

#### CH01



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## CH06



## CH11



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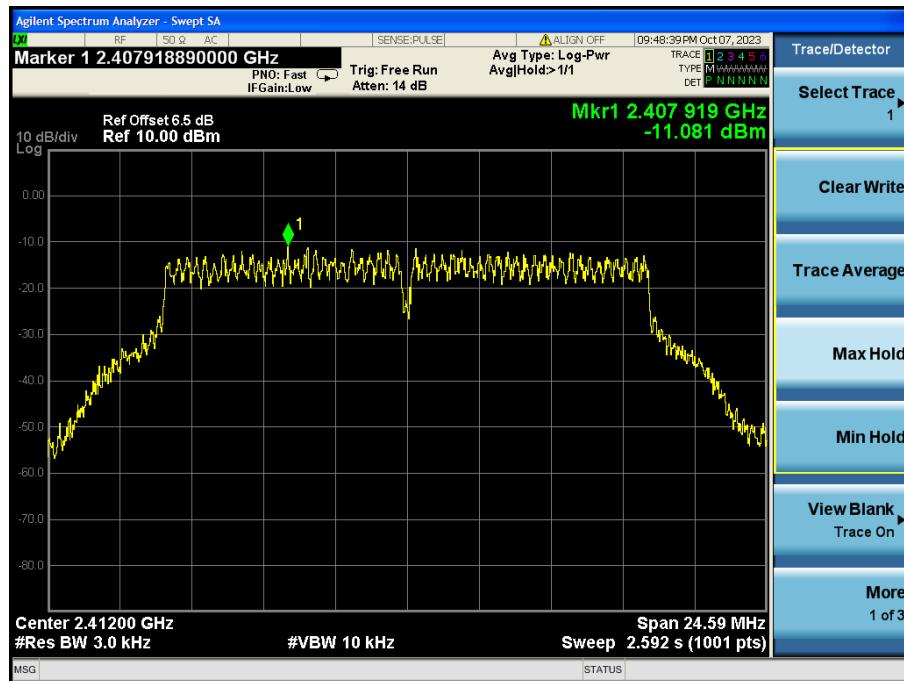
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## 802.11g Mode

Test Channel	Frequency (MHz)	Power Density (dBm/3kHz) ANT 1	Power Density (dBm/3kHz) ANT 2	Total Power Density (dBm/3kHz)	Limit (dBm/3kHz)
CH01	2412 MHz	-11.081	-11.257	--	8
CH06	2437 MHz	-10.792	-10.835	--	8
CH11	2462 MHz	-11.132	-11.237	--	8

### CH01



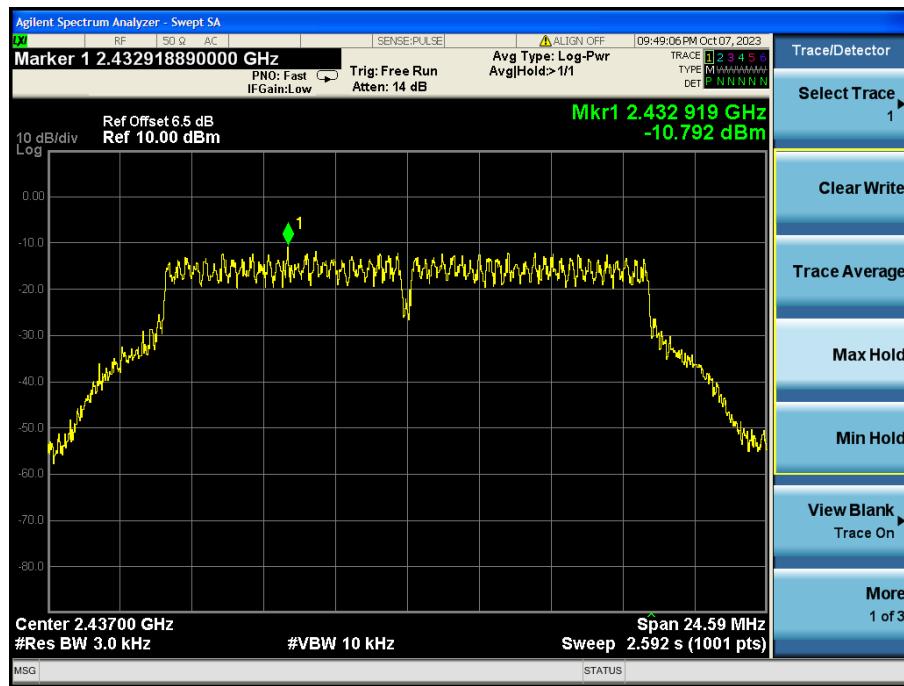
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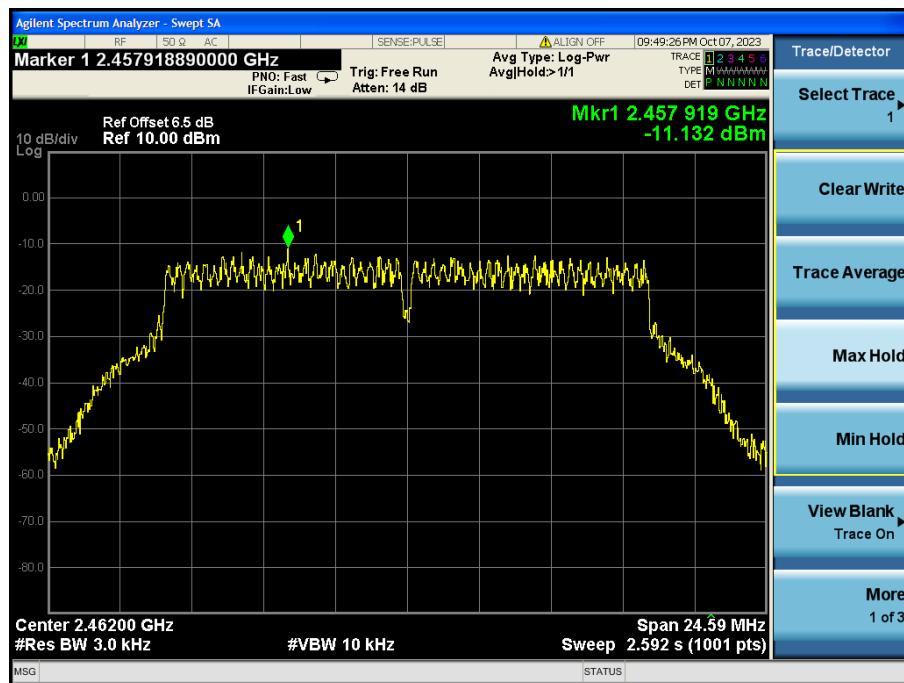
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## CH06



## CH11



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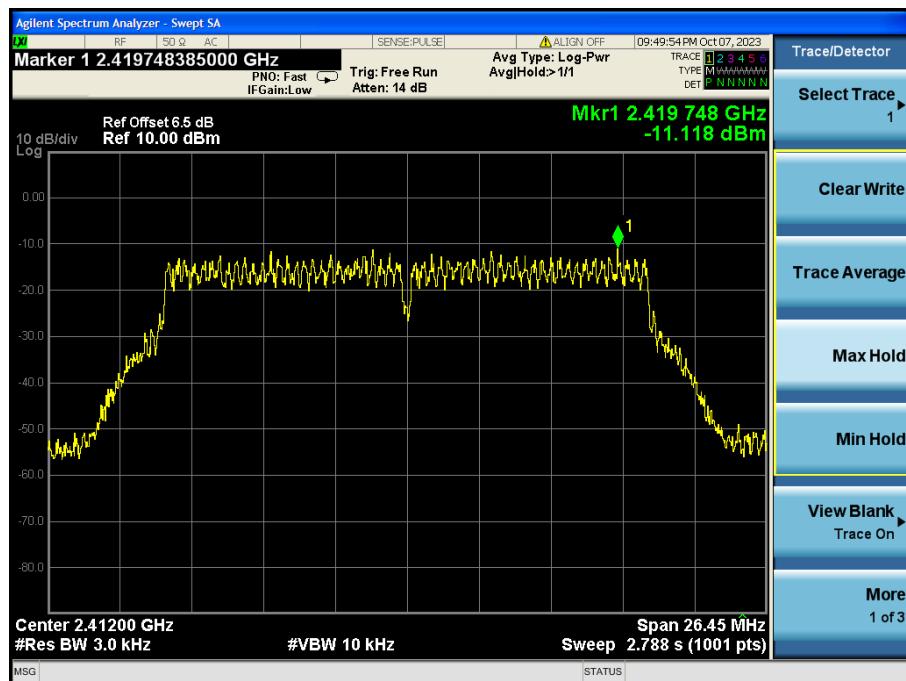


**802.11n HT20 Mode**

Test Channel	Frequency (MHz)	Power Density (dBm/3kHz) ANT 1	Power Density (dBm/3kHz) ANT 2	Total Power Density (dBm/3kHz)	Limit (dBm/3kHz)
CH01	2412 MHz	-11.118	-11.231	-8.16	8
CH06	2437 MHz	-10.926	-10.964	-7.93	8
CH11	2462 MHz	-11.037	-11.215	-8.11	8

Note: For MIMO mode: Directional gain= GANT MAX + 10 log(NANT/NSS) =5.96dBi, (Nss=1)  
 Limit =8 dBm.

**CH01**



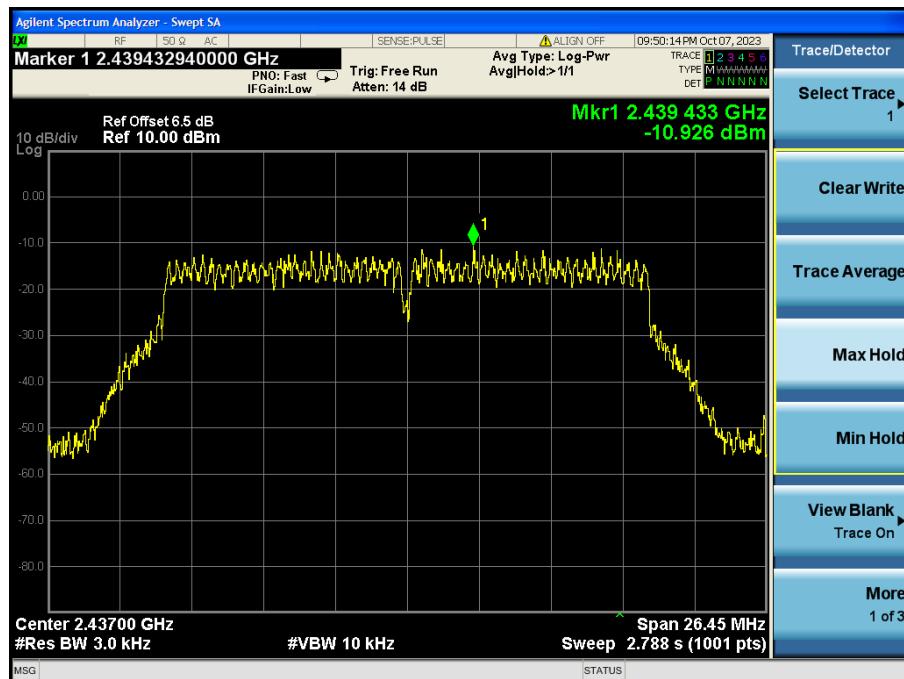
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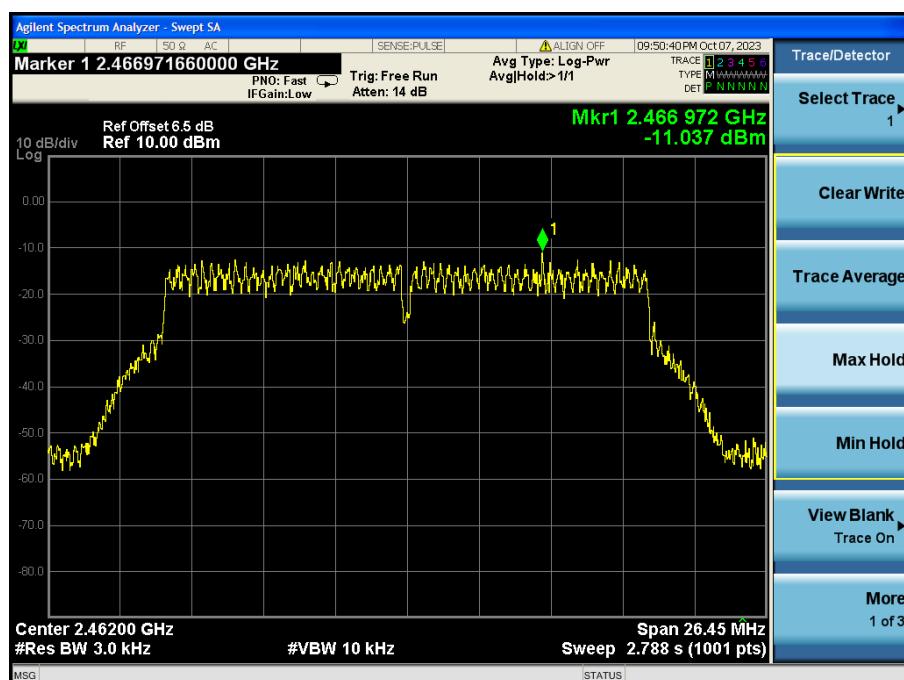
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## CH06



## CH11



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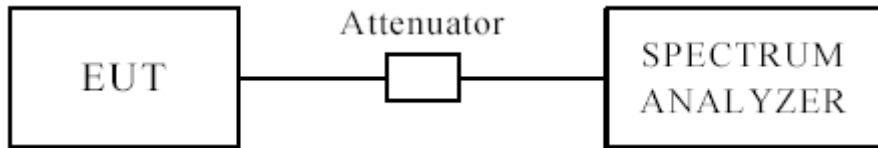
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## 10 Out of Band Measurement

### 10.1 Test Setup for band edge



**The restricted band requirement based on radiated emission test; please see the clause 6 for the test setup**

### 10.2 Limits of Out of Band Emissions Measurement

1. Below –20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).
2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.

### 10.3 Test Procedure

For signals in the restricted bands above and below the 2.4-2.483GHz allocated band a measurement was made of radiated emission test. (Peak values with RBW=VBW=1MHz and PK detector. AV value with RBW=1MHz, VBW=10Hz and PK detector)

For bandage test, the spectrum set as follows: RBW=100, VBW=300 kHz. A conducted measurement used

### 10.4 Test Result

Please see next pages

Note: 1. For band-edge measurement, the frequency from 30MHz-25GHz was tested. And It met the FCC rule.  
2. Two antennas were tested and only the worst cased was recorded in the test report. Ant 1 was the worst case.

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**Band-edge Measurement**  
**802.11b mode-ANT 1**

**CH01 (Lower)**



**CH 11(Upper)**



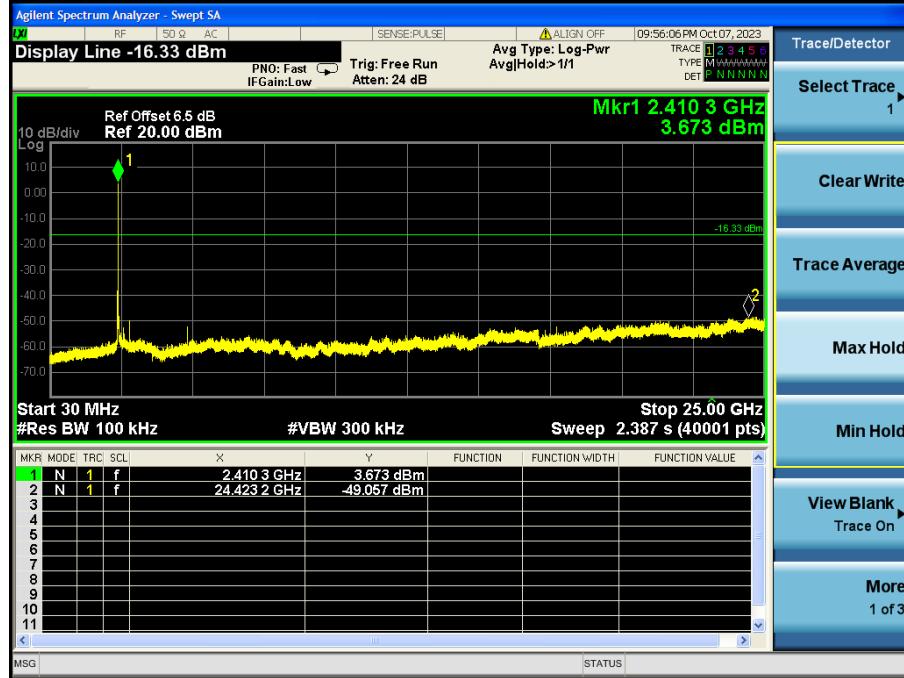
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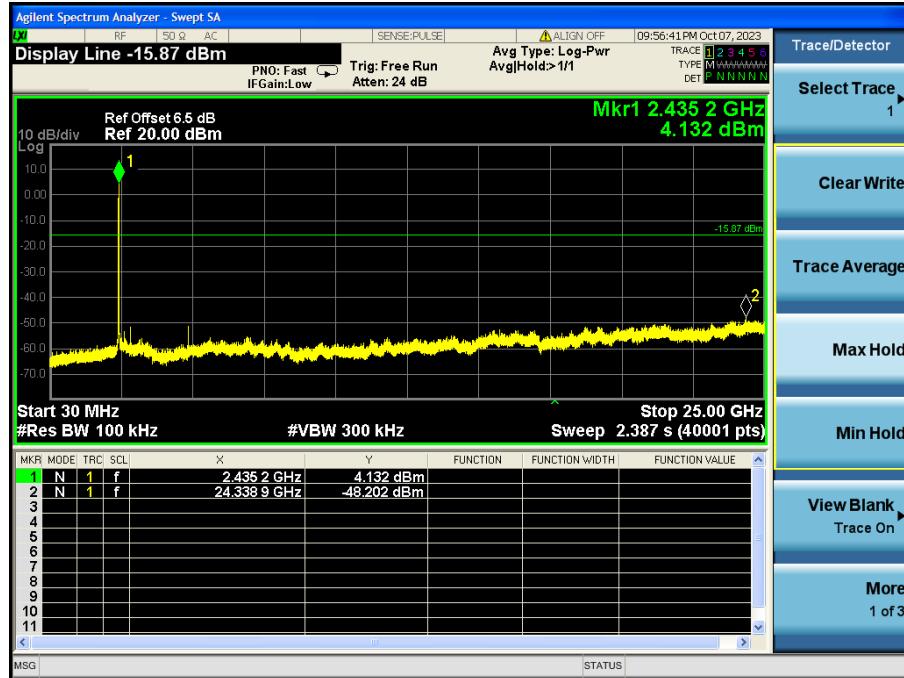
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### CH01



### CH06



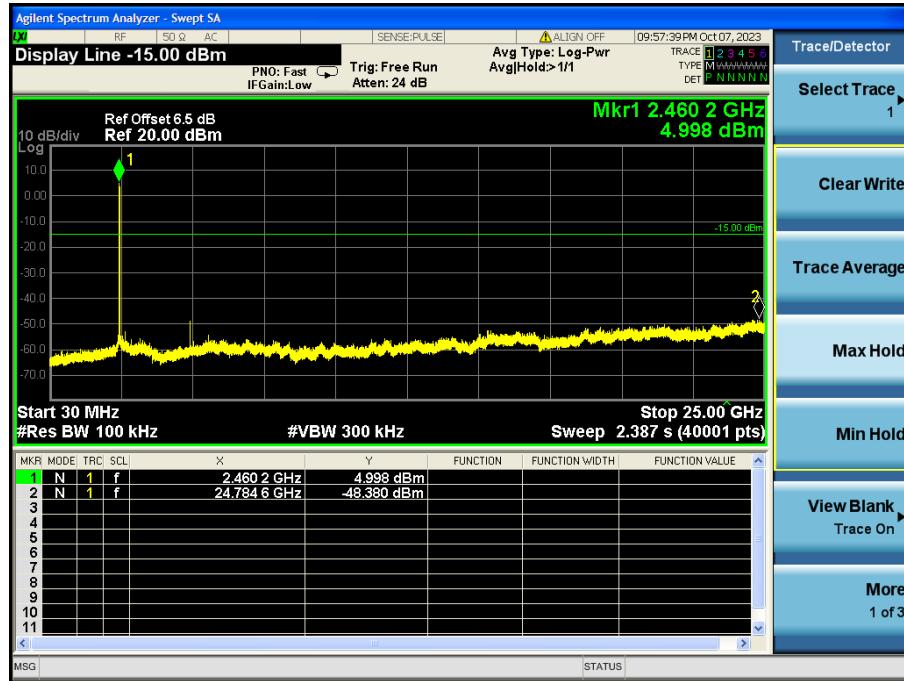
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CH11



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## 802.11g Mode-ANT 1

### CH01 (Lower)



### CH 11(Upper)



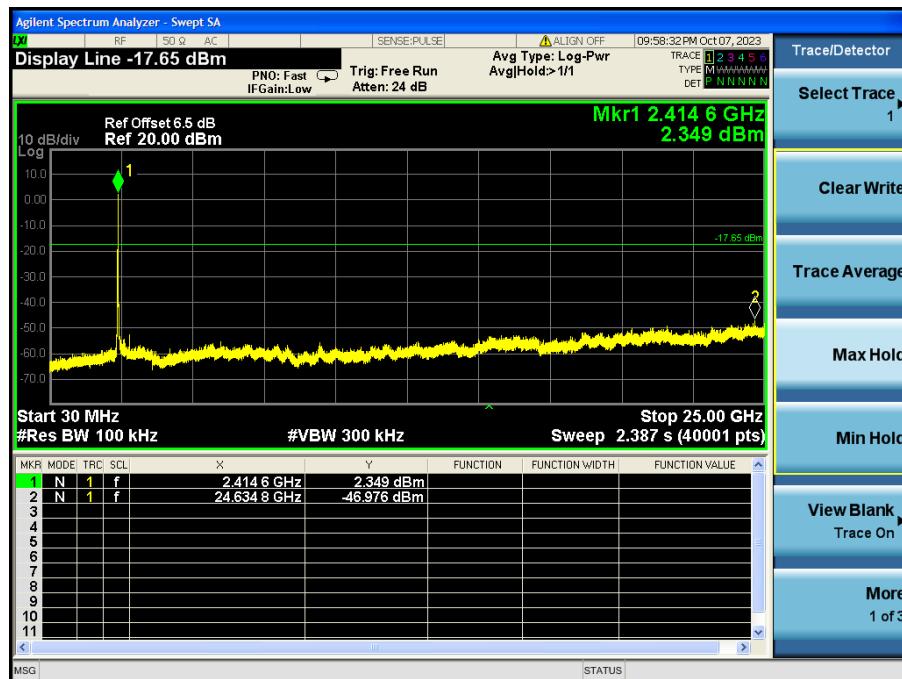
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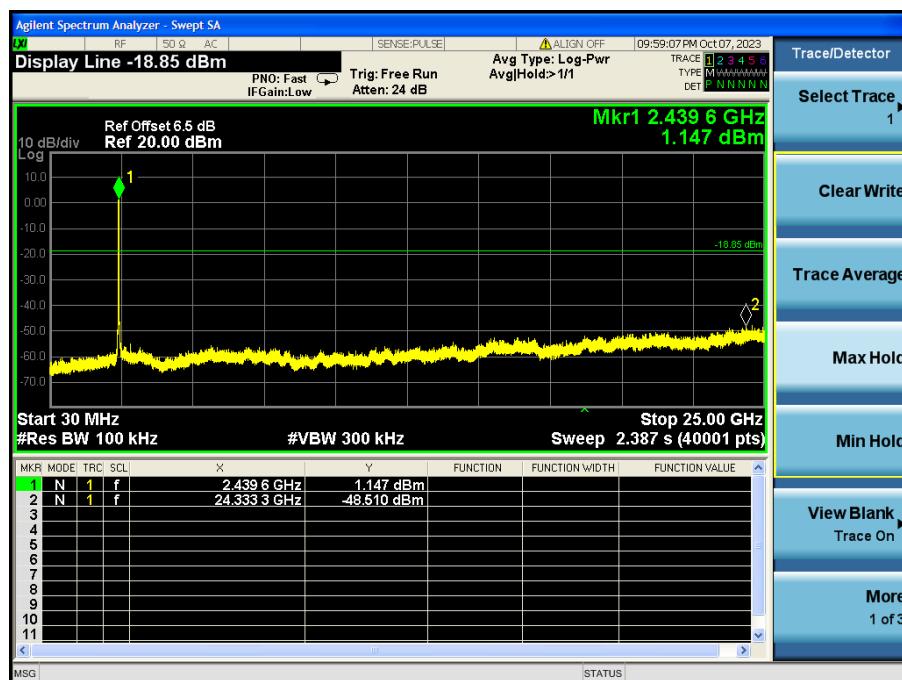
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## CH01



## CH06



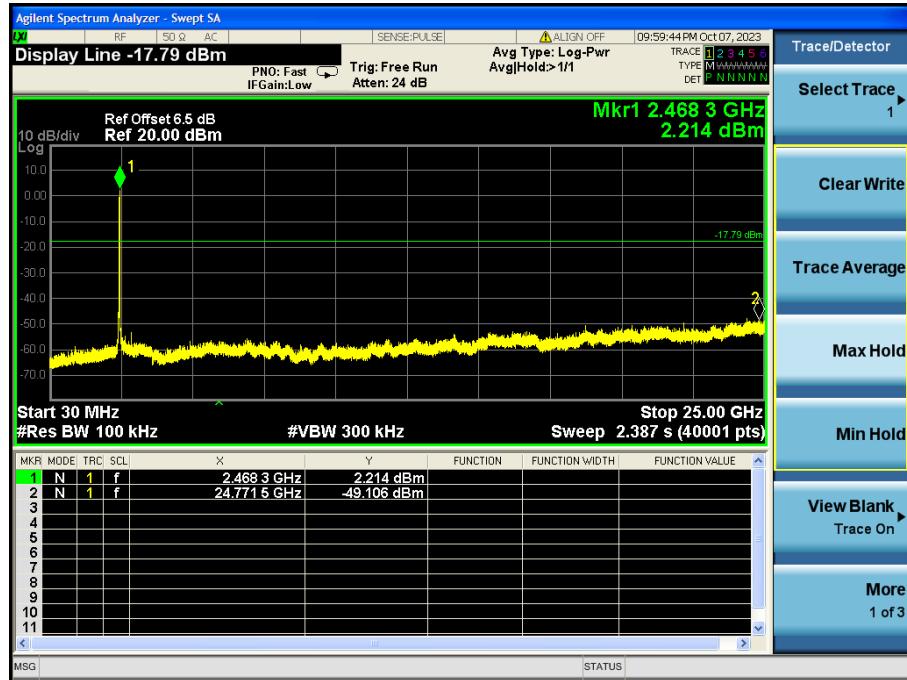
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CH11



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## 802.11n HT20 Mode-MIMO

### CH01 (Lower)



### CH 11(Upper)



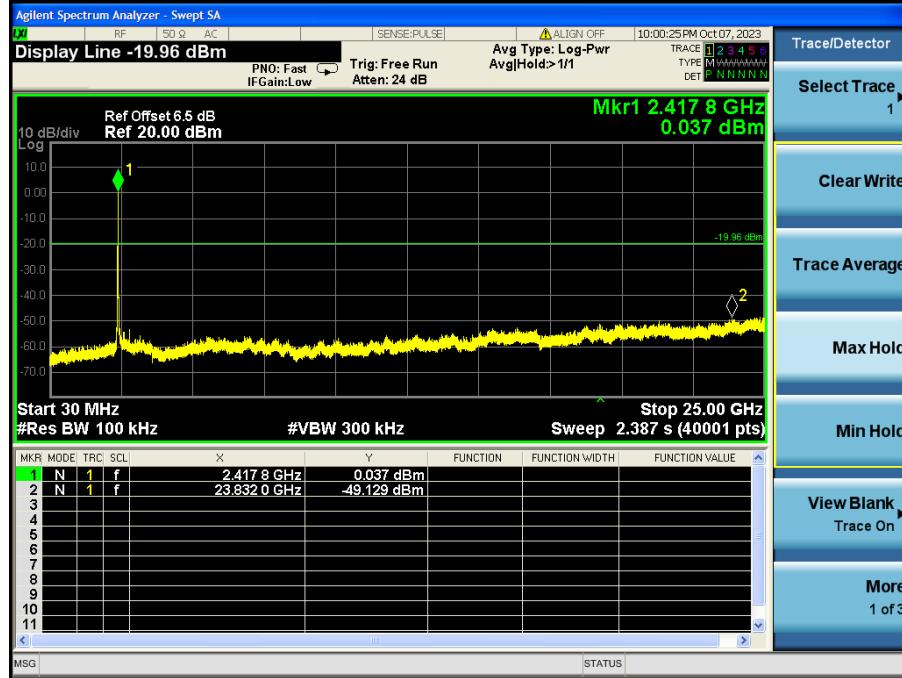
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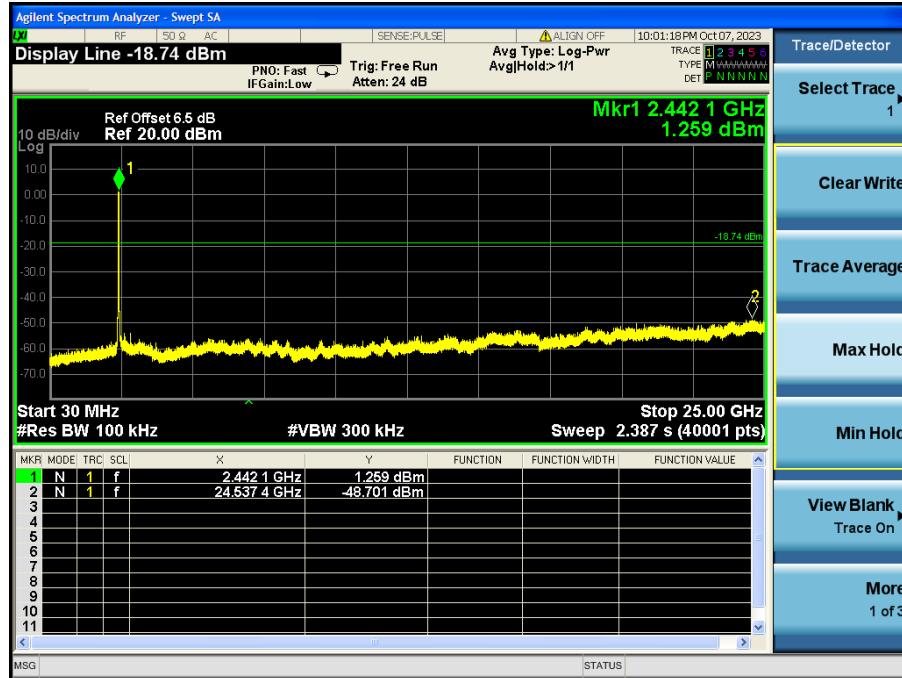
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### CH01



### CH06



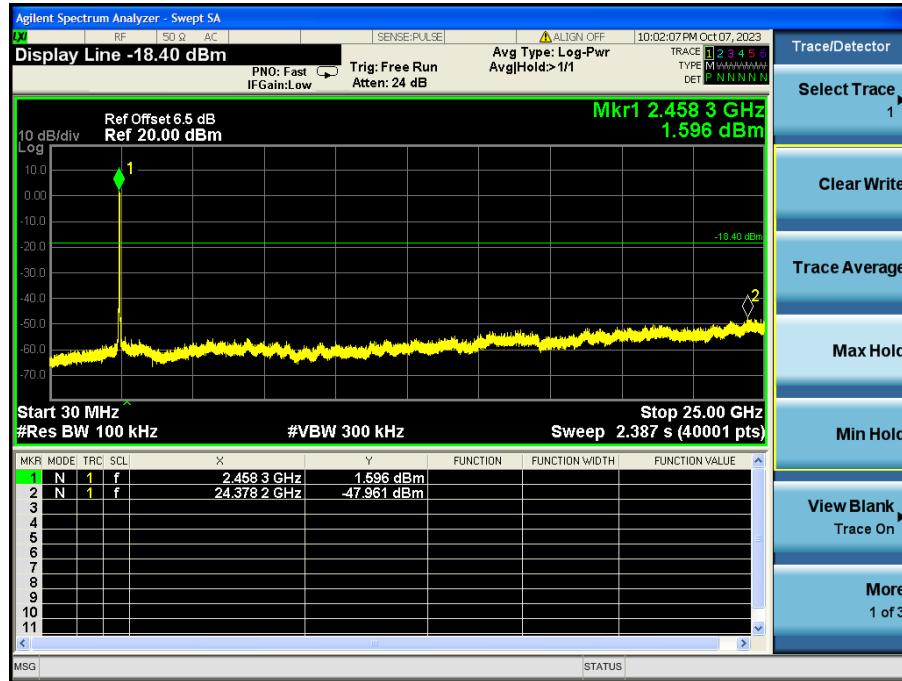
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CH11



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Restricted band Measurement

EUT	eHub			Model	2.0
Mode	Keeping Transmitting			Test Voltage	120V~
Temperature	24 deg. C,			Humidity	56% RH
Test Result:	Pass			Detector	PK
802.11b mode-ANT 1, Low Channel, Horizontal					
2390	PK (dB $\mu$ V/m)	44.23	Limit	74(dB $\mu$ V/m)	
	AV (dB $\mu$ V/m)	--		54(dB $\mu$ V/m)	
802.11b mode, Low Channel, Vertical					
2390	PK (dB $\mu$ V/m)	43.63	Limit	74(dB $\mu$ V/m)	
	AV (dB $\mu$ V/m)	--		54(dB $\mu$ V/m)	

Restricted band Measurement

EUT	eHub			Model	2.0
Mode	Keeping Transmitting			Test Voltage	120V~
Temperature	24 deg. C,			Humidity	56% RH
Test Result:	Pass			Detector	PK
802.11b mode-ANT 1, High Channel, Horizontal					
2483.5	PK (dB $\mu$ V/m)	45.52	Limit	74(dB $\mu$ V/m)	
	AV (dB $\mu$ V/m)	--		54(dB $\mu$ V/m)	
802.11b mode, High Channel, Vertical					
2483.5	PK (dB $\mu$ V/m)	46.3	Limit	74(dB $\mu$ V/m)	
	AV (dB $\mu$ V/m)	--		54(dB $\mu$ V/m)	

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Restricted band Measurement

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Mode	Keeping Transmitting			Test Voltage	120V~
Temperature	24 deg. C,			Humidity	56% RH
Test Result:	Pass			Detector	PK
802.11g mode-ANT 1, Low Channel, Horizontal					
2390	PK (dB $\mu$ V/m)	44.85	Limit	74(dB $\mu$ V/m)	
	AV (dB $\mu$ V/m)	--		54(dB $\mu$ V/m)	
802.11g mode-ANT 1, Low Channel, Vertical					
2390	PK (dB $\mu$ V/m)	47.85	Limit	74(dB $\mu$ V/m)	
	AV (dB $\mu$ V/m)	--		54(dB $\mu$ V/m)	

Restricted band Measurement

EUT	eHub			Model	2.0
Mode	Keeping Transmitting			Test Voltage	120V~
Temperature	24 deg. C,			Humidity	56% RH
Test Result:	Pass			Detector	PK
802.11g mode-ANT 1, High Channel, Horizontal					
2483.5	PK (dB $\mu$ V/m)	46.63	Limit	74(dB $\mu$ V/m)	
	AV (dB $\mu$ V/m)	--		54(dB $\mu$ V/m)	
802.11g mode, High Channel, Vertical					
2483.5	PK (dB $\mu$ V/m)	45.63	Limit	74(dB $\mu$ V/m)	
	AV (dB $\mu$ V/m)	--		54(dB $\mu$ V/m)	

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Restricted band Measurement

EUT	eHub			Model	2.0
Mode	Keeping Transmitting			Test Voltage	120V~
Temperature	24 deg. C,			Humidity	56% RH
Test Result:	Pass			Detector	PK
802.11n HT20 mode-MIMO, Low Channel, Horizontal					
2390	PK (dB $\mu$ V/m)	46.34	Limit	74(dB $\mu$ V/m)	
	AV (dB $\mu$ V/m)	--		54(dB $\mu$ V/m)	
802.11n HT20 mode-MIMO, Low Channel, Vertical					
2390	PK (dB $\mu$ V/m)	47.85	Limit	74(dB $\mu$ V/m)	
	AV (dB $\mu$ V/m)	--		54(dB $\mu$ V/m)	

Restricted band Measurement

EUT	eHub			Model	2.0
Mode	Keeping Transmitting			Test Voltage	120V~
Temperature	24 deg. C,			Humidity	56% RH
Test Result:	Pass			Detector	PK
802.11n HT20 mode-MIMO, High Channel, Horizontal					
2483.5	PK (dB $\mu$ V/m)	46.63	Limit	74(dB $\mu$ V/m)	
	AV (dB $\mu$ V/m)	--		54(dB $\mu$ V/m)	
802.11n HT20 mode, High Channel, Vertical					
2483.5	PK (dB $\mu$ V/m)	48.74	Limit	74(dB $\mu$ V/m)	
	AV (dB $\mu$ V/m)	--		54(dB $\mu$ V/m)	

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## 11.0 Antenna Requirement

### 11.1 Standard Applicable

For intentional device, according to FCC 47 CFR 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.

And according to FCC 47 CFR Section 15.247 (b), if transmitter antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the mount in dB that the directional gain of the antenna exceeds 6 dBi.

### 11.2 Antenna Connected construction

1. The antenna is a FPC Antenna and no consideration of replacement. Antenna max gain is 2.8dBi from 2.4GHz to 2.5GHz. (Get from the antenna specification)
2. The antenna is a dipole antenna and no consideration of replacement. Antenna max gain is 2.95dBi from 2.4GHz to 2.5GHz. (Get from the antenna specification)

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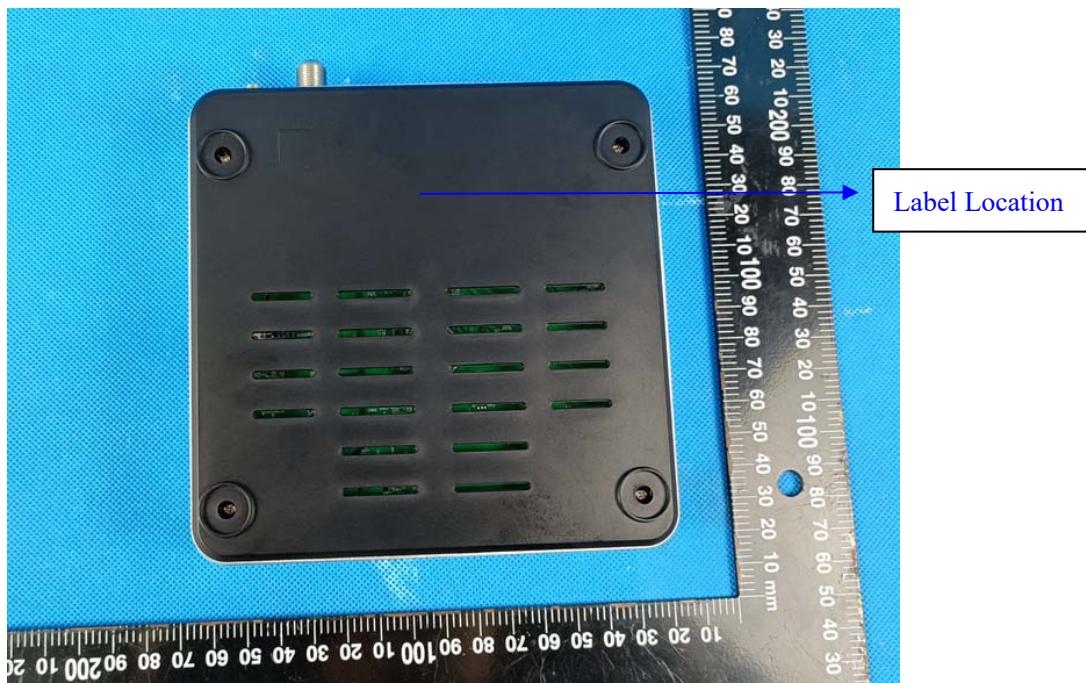


## 12.0 FCC ID Label

**FCC ID: 2BDDH-A3E6C**

The label must not be a stick-on paper label. The label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

**Mark Location:**



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### 13.0 Photo of testing

Conducted Emission Test Setup:



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Radiated Emission Test Setup:



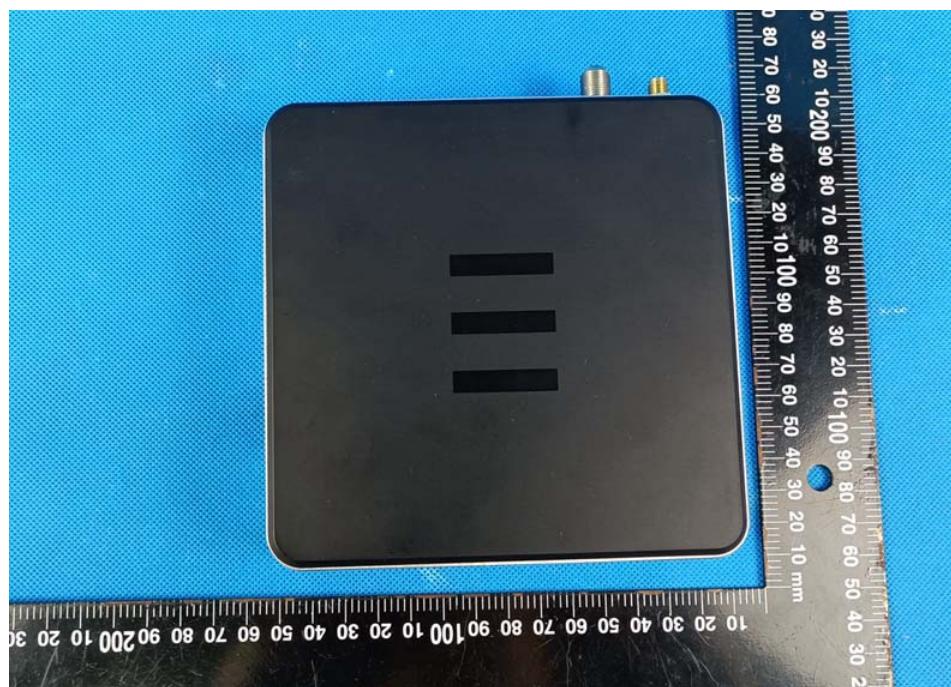
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Outside View



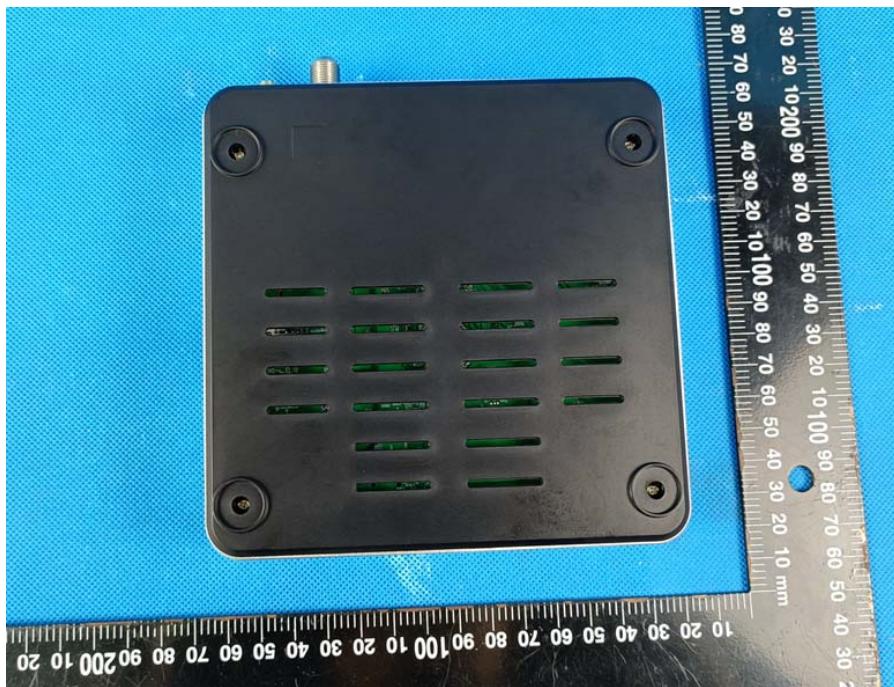
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Outside View



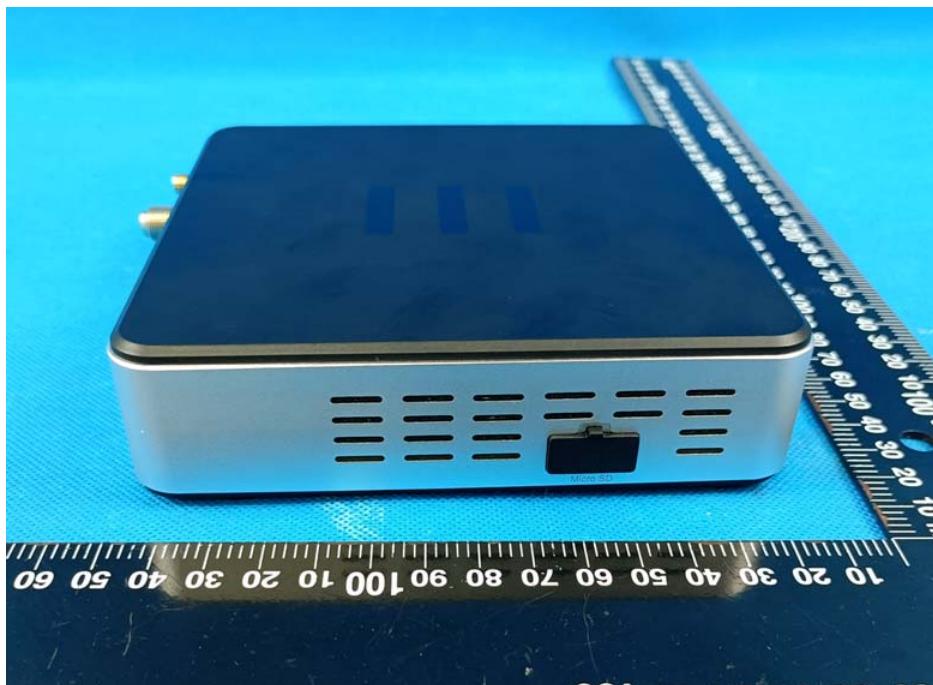
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Power Supply



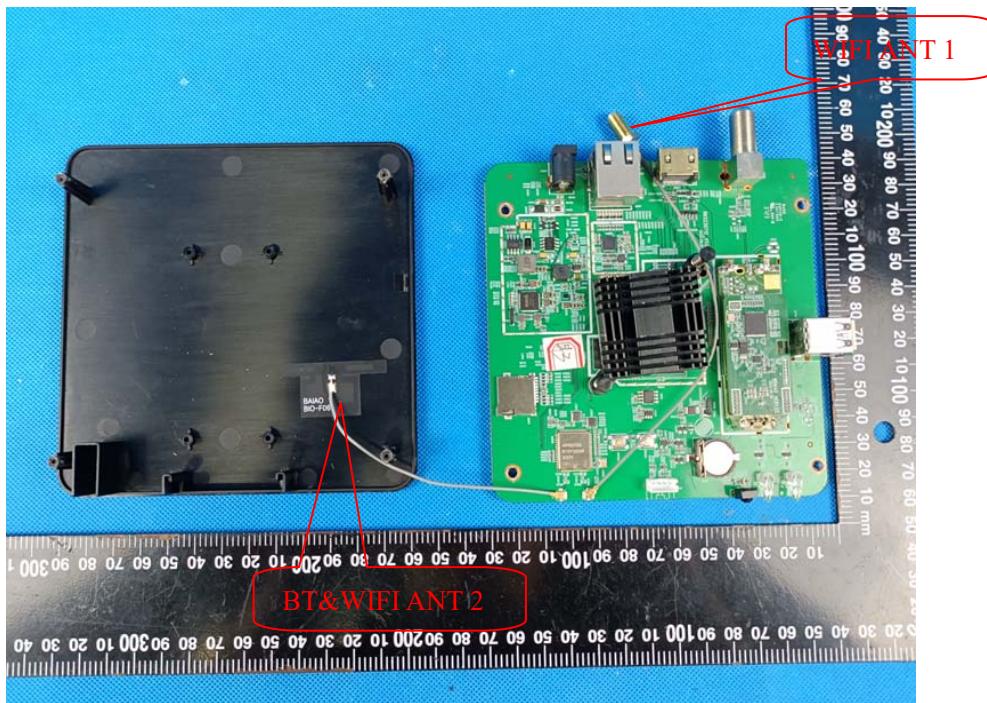
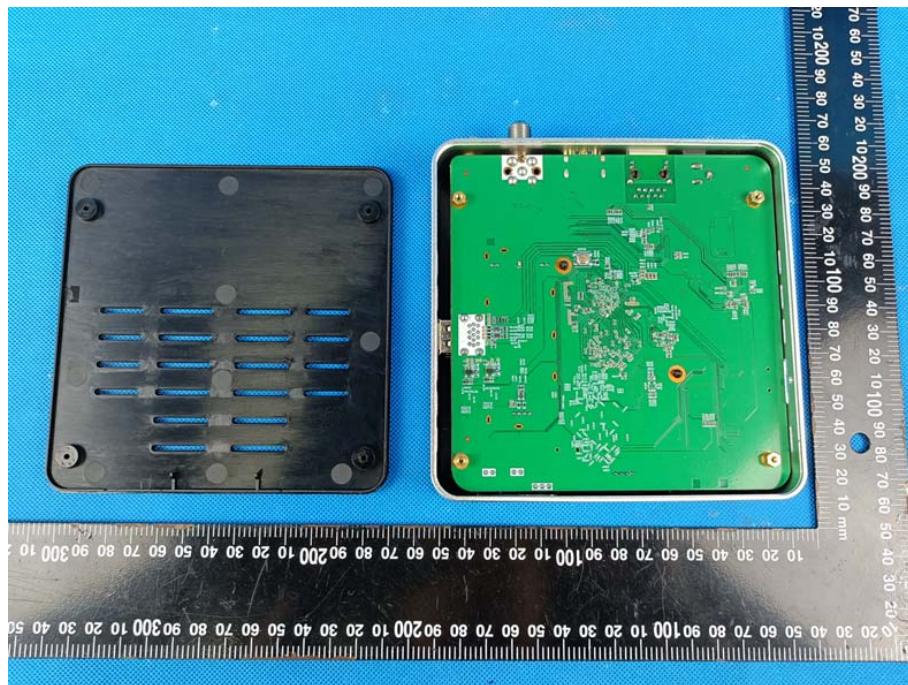
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Inside view



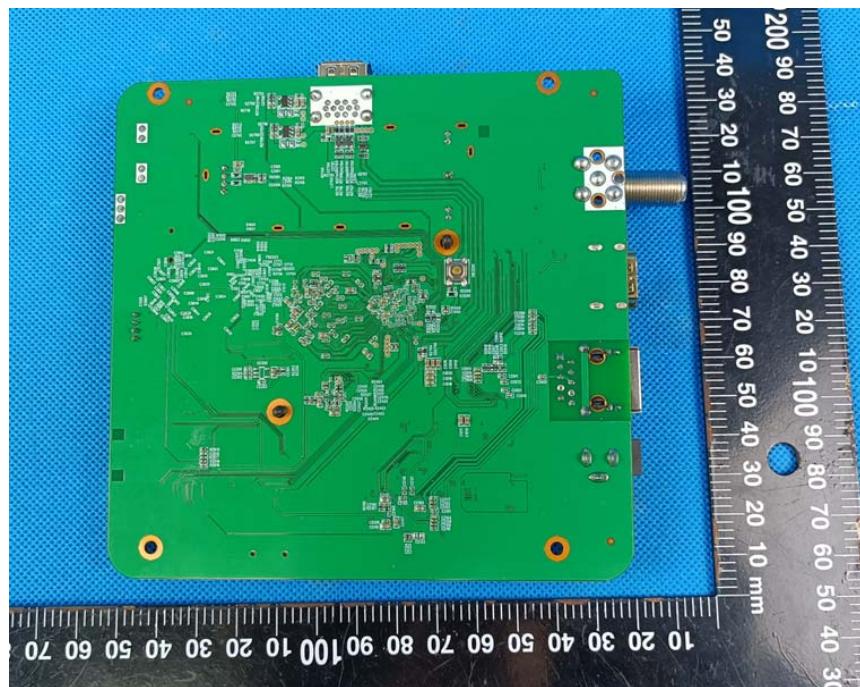
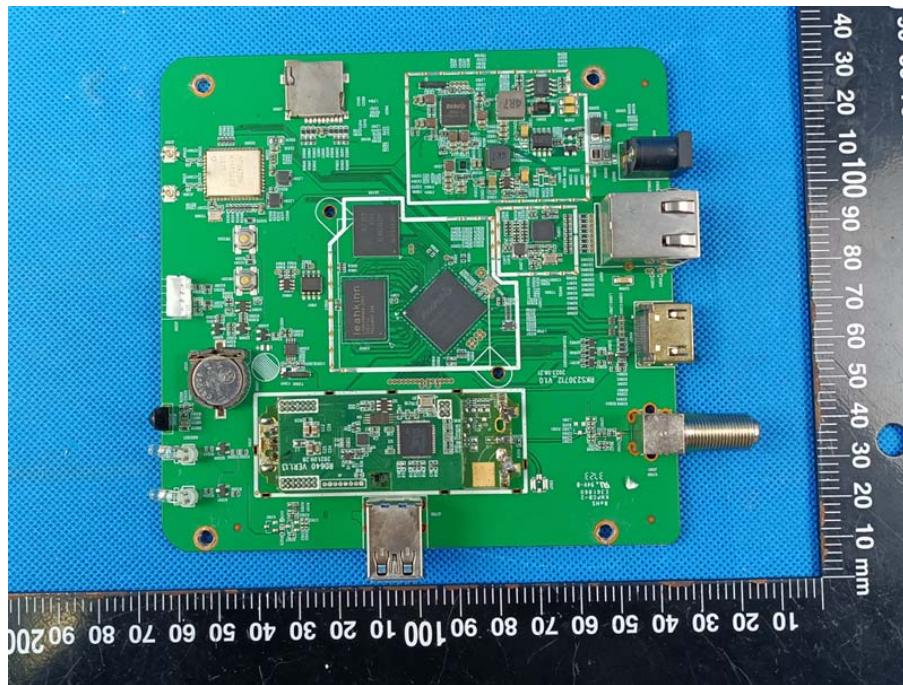
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Inside view



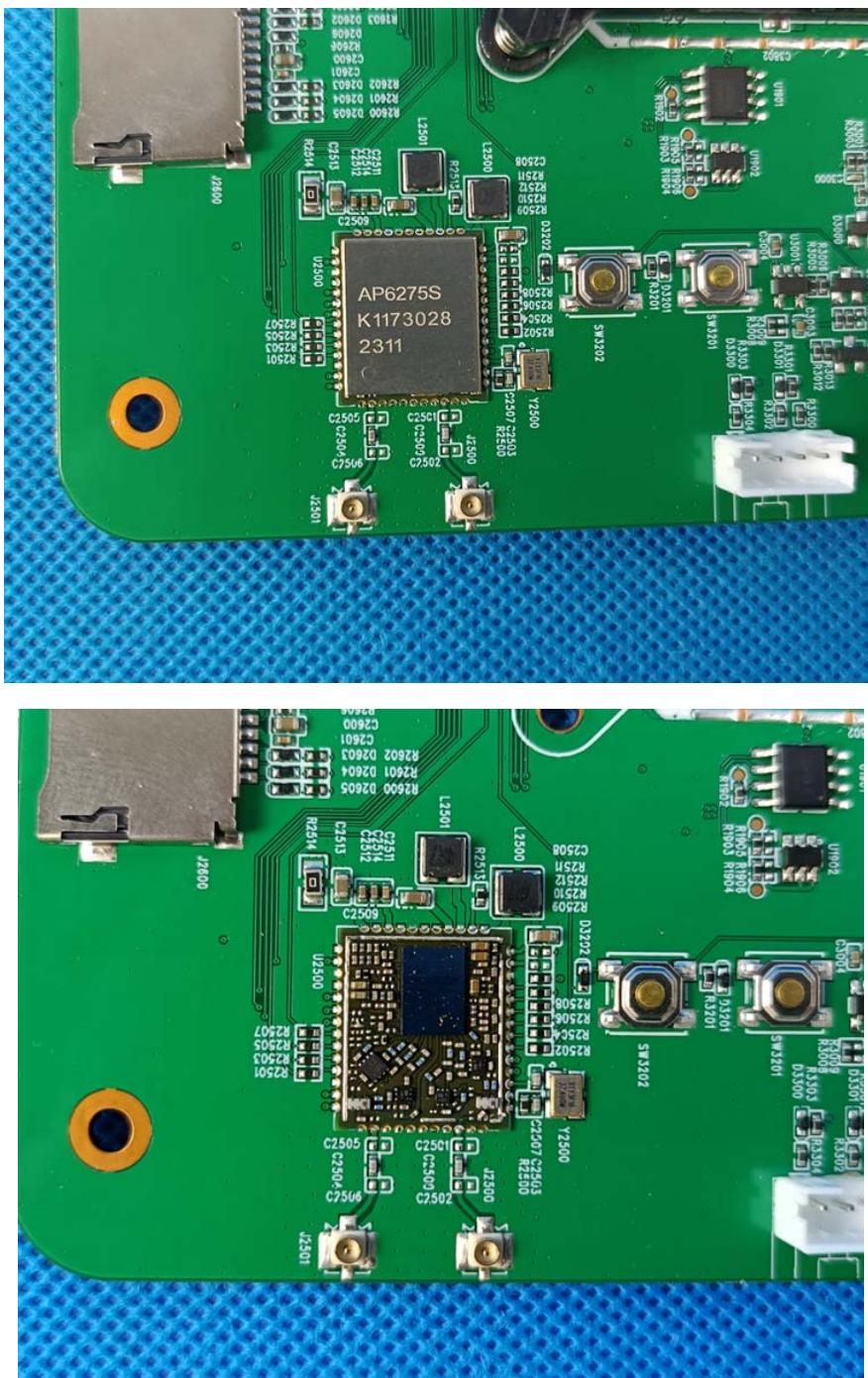
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Inside view



**-End of the report-**

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