

# FCC REPORT

**Product Name** : Set-Top Box  
**Trade mark** : Infomir  
**Model** : MAG500A  
**Extension Model** : MAG520w3, MAG522w3, MAG524w3  
**FCC ID** : 2AUIR-IM010CXXX1  
**Report Number** : BLA-EMC-202105-A0705  
**Date of sample receipt** : 2021/5/6  
**Date of Test** : 2021/5/6 to 2021/7/21  
**Date of Issue** : 2021/7/21  
**Test standard** : FCC CFR Title 47 Part 15 Subpart E Section 15.407  
**Test result** : PASS

Prepared for:

**TELECOMMUNICATION TECHNOLOGIES, LLC**  
1, Mytna Sq., Odesa, 65026, Ukraine

Prepared by:

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Date: 2021/7/21



## Version

Version No.	Date	Description
00	2021/7/21	<i>Original</i>

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## 1 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203/15.407 (g)	Pass
AC Power Line Conducted Emission	15.207	Pass
Conducted Peak Output Power	15.407 (a)	Pass
26dB Occupied Bandwidth	15.407 (a)	Pass
6dB Emission Bandwidth	15.407(e)	Pass
Power Spectral Density	15.407 (a)	Pass
Band Edge	15.407(b)	Pass
Spurious Emission	15.205/15.209	Pass
Frequency Stability	15.407(g)	Pass

Pass: The EUT complies with the essential requirements in the standard.

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## 2 General Information

### 2.1 Client Information

<b>Applicant</b>	TELECOMMUNICATION TECHNOLOGIES, LLC
<b>Address</b>	1, Mytna Sq., Odesa, 65026, Ukraine
<b>Manufacturer</b>	TELECOMMUNICATION TECHNOLOGIES, LLC
<b>Address</b>	1, Mytna Sq., Odesa, 65026, Ukraine
<b>Factory</b>	TELECOMMUNICATION TECHNOLOGIES, LLC
<b>Address</b>	1, Mytna Sq., Odesa, 65026, Ukraine
<b>Product Name</b>	Set-Top Box
<b>Test Model No.</b>	MAG500A

### 2.2 General Description of E.U.T.

<b>Operation Frequency:</b>	Band 1 : 5180MHz-5240MHz;
<b>Channel numbers:</b>	Band 1: 802.11a/802.11n(HT20)/802.11ac(HT20): 4, 802.11n(HT40)/802.11ac(HT40):2, 802.11ac(HT80): 1
<b>Channel separation:</b>	802.11a/n/ac(HT2): 20MHz, 802.11n/ac(HT40): 40MHz, 802.11ac(HT80): 80MHz
<b>Modulation technology: (IEEE 802.11a/n/ac)</b>	BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM
<b>Antenna Type:</b>	Patch antenna
<b>Antenna gain:</b>	3.11 dBi(Provided by the customer)
<b>Note:</b>	Antenna number : 2 MIMO mode : 802.11n(HT20)/ 802.11n(HT40)/ 802.11ac(HT20)/ 802.11ac(HT40)/ 802.11ac(HT80) Directional gain of MIMO mode: $2+10\log_2=5.01\text{dBi}$
Remark:The Antenna Gain is supplied by the customer	

### Operation Frequency each of channel

Band 1: 5150-5250MHz					
802.11a/802.11n20		802.11n40		802.11ac80	
Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180MHz	38	5190MHz	42	5210MHz
40	5200MHz	46	5230MHz		
44	5220MHz				
48	5240MHz				

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Band 1					
802.11a/802.11n20		802.11n40		802.11ac	
Channel	Frequency	Channel	Frequency	Channel	Frequency
The lowest channel	5180MHz	The lowest channel	5190MHz	The middle channel	5210MHz
The middle channel	5200MHz	The highest channel	5230MHz		
The highest channel	5240MHz				

## 2.3 Test environment and mode

Operating Environment:	
Temperature:	25°C
Humidity:	52 % RH
Atmospheric Pressure:	1010 mbar
Test mode:	
Continuously transmitting mode	Keep the EUT in 100% duty cycle transmitting with modulation.

We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:

**Per-scan all kind of data rate in lowest channel, and found the follow list which it was worst case.**

Mode	Data rate
802.11a	6Mbps
802.11n(HT20)	6.5Mbps
802.11n(HT40)	13Mbps
802.11ac(HT20)	6.5Mbps
802.11ac(HT40)	13.5Mbps
802.11ac(HT80)	29.3Mbps

**Final Test Mode:**

According to ANSI C63.4 standards, the test results are both the "worst case" and "worst setup" 6 Mbps for 802.11a, 6.5 Mbps for 802.11n20 and 13 Mbps for 802.11n40. All test items for 802.11a and 802.11n were performed with duty cycle above 98%, meet the requirements of KDB789033.

## 2.4 Description of Support Units

Manufacturer	Description	Model	Serial Number
Lenovo	Notebook computer	E470C	PF-10FB5C

## 2.5 Laboratory Location

All tests were performed at:

BlueAsia of Technical Services(Shenzhen) Co., Ltd.

Building C, No. 107, Shihuan Road, Shiyan Sub-District, Baoan District, Shenzhen, Guangdong Province, China

Telephone: TEL: +86-755-28682673 FAX: +86-755-28682673

No tests were sub-contracted.

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## 2.6 Test Instruments list

Test Equipment Of Power Spectrum Density					
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Spectrum	R&S	FSP40	100817	2020/10/12	2021/10/11
Spectrum	Agilent	N9020A	MY49100060	2020/10/12	2021/10/11
Signal Generator	Agilent	N5182A	MY49060650	2020/10/12	2021/10/11
Signal Generator	Agilent	E8257D	MY44320250	2020/10/12	2021/10/11

Test Equipment Of Conducted Peak Output Power					
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Spectrum	R&S	FSP40	100817	2020/10/12	2021/10/11
Spectrum	Agilent	N9020A	MY49100060	2020/10/12	2021/10/11
Signal Generator	Agilent	N5182A	MY49060650	2020/10/12	2021/10/11
Signal Generator	Agilent	E8257D	MY44320250	2020/10/12	2021/10/11

Test Equipment Of Minimum 6dB Bandwidth					
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Spectrum	R&S	FSP40	100817	2020/10/12	2021/10/11
Spectrum	Agilent	N9020A	MY49100060	2020/10/12	2021/10/11
Signal Generator	Agilent	N5182A	MY49060650	2020/10/12	2021/10/11

Signal Generator	Agilent	E8257D	MY44320250	2020/10/12	2021/10/11
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<b>Test Equipment Of Conducted Emissions at AC Power Line (150kHz-30MHz)</b>					
<b>Equipment</b>	<b>Manufacturer</b>	<b>Model</b>	<b>S/N</b>	<b>Cal.Date</b>	<b>Cal.Due</b>
Shield room	SKET	833	N/A	2020/11/25	2023/11/24
Receiver	R&S	ESPI3	101082	2020/10/12	2021/10/11
LISN	R&S	ENV216	3560.6550.15	2020/10/12	2021/10/11
LISN	AT	AT166-2	AKK1806000003	2020/10/12	2021/10/11
EMI software	EZ	EZ-EMC	EEMC-3A1	N/A	N/A

<b>Test Equipment Of Radiated Spurious Emissions and Band-edge</b>					
<b>Equipment</b>	<b>Manufacturer</b>	<b>Model</b>	<b>S/N</b>	<b>Cal.Date</b>	<b>Cal.Due</b>
Chamber	SKET	966	N/A	2020/11/10	2023/11/9
Spectrum	R&S	FSP40	100817	2020/10/12	2021/10/11
Receiver	R&S	ESR7	101199	2020/10/12	2021/10/11
broadband Antenna	Schwarzbeck	VULB9168	00836 P:00227	2020/9/26	2022/9/25
Horn Antenna	Schwarzbeck	9120D	01892 P:00331	2020/9/26	2022/9/25

Amplifier	SKET	PA-000318G-45	N/A	2020/10/16	2021/10/15
EMI software	EZ	EZ-EMC	EEMC-3A1	N/A	N/A
Loop antenna	SCHNARZBECK	FMZB1519B	00102	2020/9/26	2022/9/25
Controller	SKET	N/A	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-02	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-03	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-01	N/A	N/A	N/A

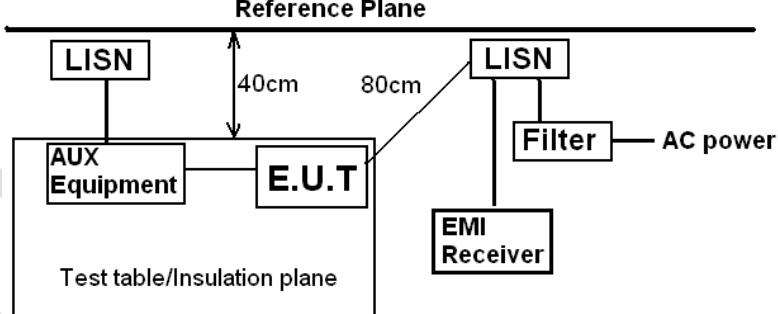
<b>Test Equipment Of Radiated Emissions which fall in the restricted bands</b>					
<b>Equipment</b>	<b>Manufacturer</b>	<b>Model</b>	<b>S/N</b>	<b>Cal.Date</b>	<b>Cal.Due</b>
Chamber	SKET	966	N/A	2020/11/10	2023/11/9
Spectrum	R&S	FSP40	100817	2020/10/12	2021/10/11
Receiver	R&S	ESR7	101199	2020/10/12	2021/10/11
broadband Antenna	Schwarzbeck	VULB9168	00836 P:00227	2020/9/26	2022/9/25
Horn Antenna	Schwarzbeck	9120D	01892 P:00331	2020/9/26	2022/9/25
Amplifier	SKET	PA-000318G-45	N/A	2020/10/16	2021/10/15
EMI software	EZ	EZ-EMC	EEMC-3A1	N/A	N/A
Loop antenna	SCHNARZBECK	FMZB1519B	00102	2020/9/26	2022/9/25
Controller	SKET	N/A	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-02	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-03	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-01	N/A	N/A	N/A

### 3 Test results and Measurement Data

#### 3.1 Antenna requirement

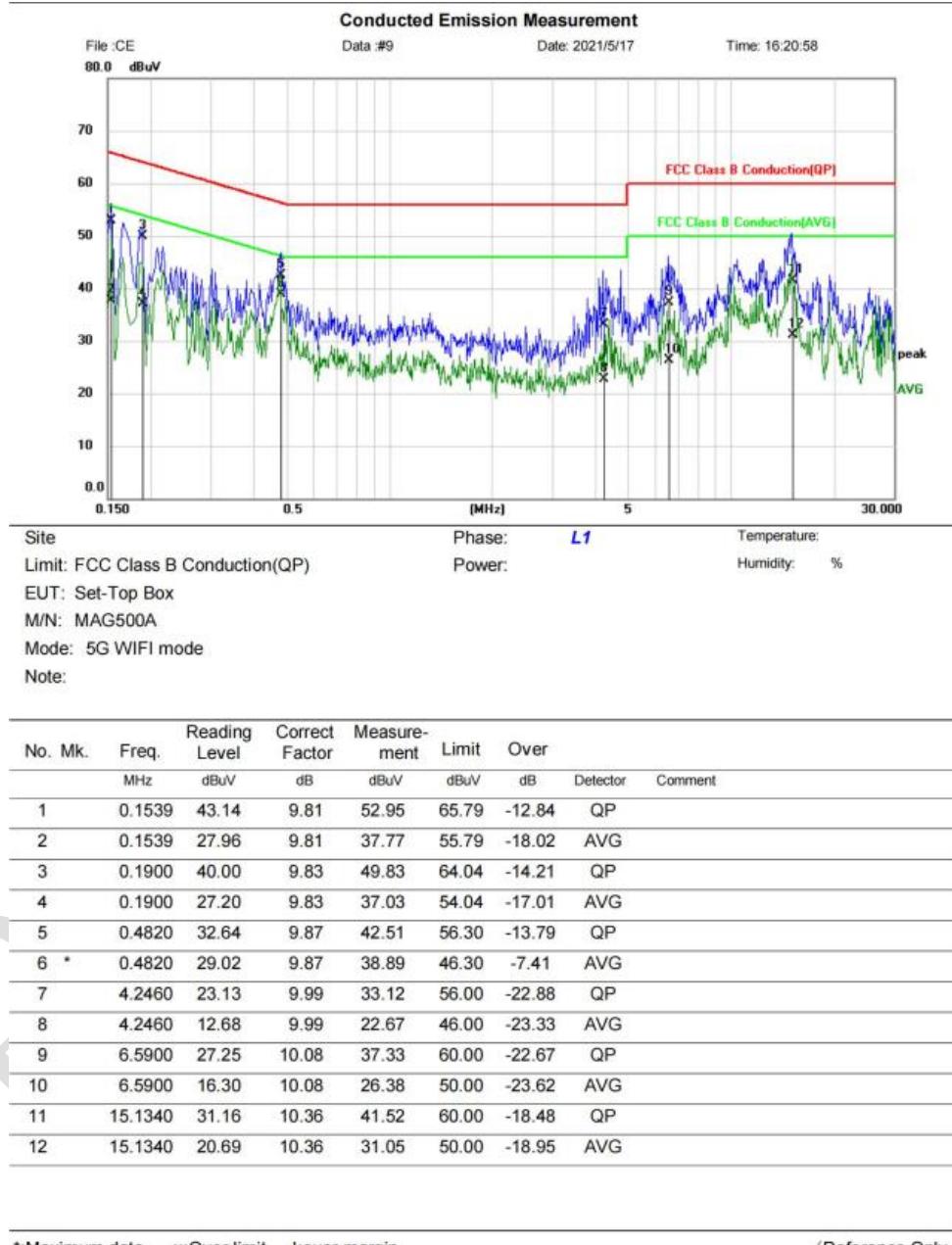
<b>Standard requirement:</b>	FCC Part15 E Section 15.203 /407(a)
15.203 requirement:	<p>An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that 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.</p> <p>This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, § 15.213, § 15.217, § 15.219, or § 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.</p>
<b>E.U.T Antenna:</b>	<p><i>The antenna is Internal Antenna, the best case gain of the antenna is 3.11dBi</i></p> 

## 4 Conducted Emission

Test Requirement:	FCC Part15 C Section 15.207																
Test Method:	ANSI C63.10: 2013																
Test Frequency Range:	150 kHz to 30MHz																
Class / Severity:	Class B																
Receiver setup:	RBW=9 kHz, VBW=30 kHz																
Limit:	<table border="1"> <thead> <tr> <th rowspan="2">Frequency range (MHz)</th> <th colspan="2">Limit (dBuV)</th> </tr> <tr> <th>Quasi-peak</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>0.15-0.5</td> <td>66 to 56*</td> <td>56 to 46*</td> </tr> <tr> <td>0.5-5</td> <td>56</td> <td>46</td> </tr> <tr> <td>5-30</td> <td>60</td> <td>50</td> </tr> </tbody> </table>			Frequency range (MHz)	Limit (dBuV)		Quasi-peak	Average	0.15-0.5	66 to 56*	56 to 46*	0.5-5	56	46	5-30	60	50
Frequency range (MHz)	Limit (dBuV)																
	Quasi-peak	Average															
0.15-0.5	66 to 56*	56 to 46*															
0.5-5	56	46															
5-30	60	50															
	* Decreases with the logarithm of the frequency.																
Test procedure	<ol style="list-style-type: none"> <li>1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). It provides a 50ohm/50uH coupling impedance for the measuring equipment.</li> <li>2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).</li> <li>3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2014 on conducted measurement.</li> </ol>																
Test setup:	<p style="text-align: center;"><b>Reference Plane</b></p>  <p><i>Remark:</i>  <i>E.U.T: Equipment Under Test</i>  <i>LISN: Line Impedance Stabilization Network</i>  <i>Test table height=0.8m</i></p>																
Test Instruments:	Refer to section 5.7 for details																
Test mode:	Refer to section 5.3 for details.																
Test results:	Pass																

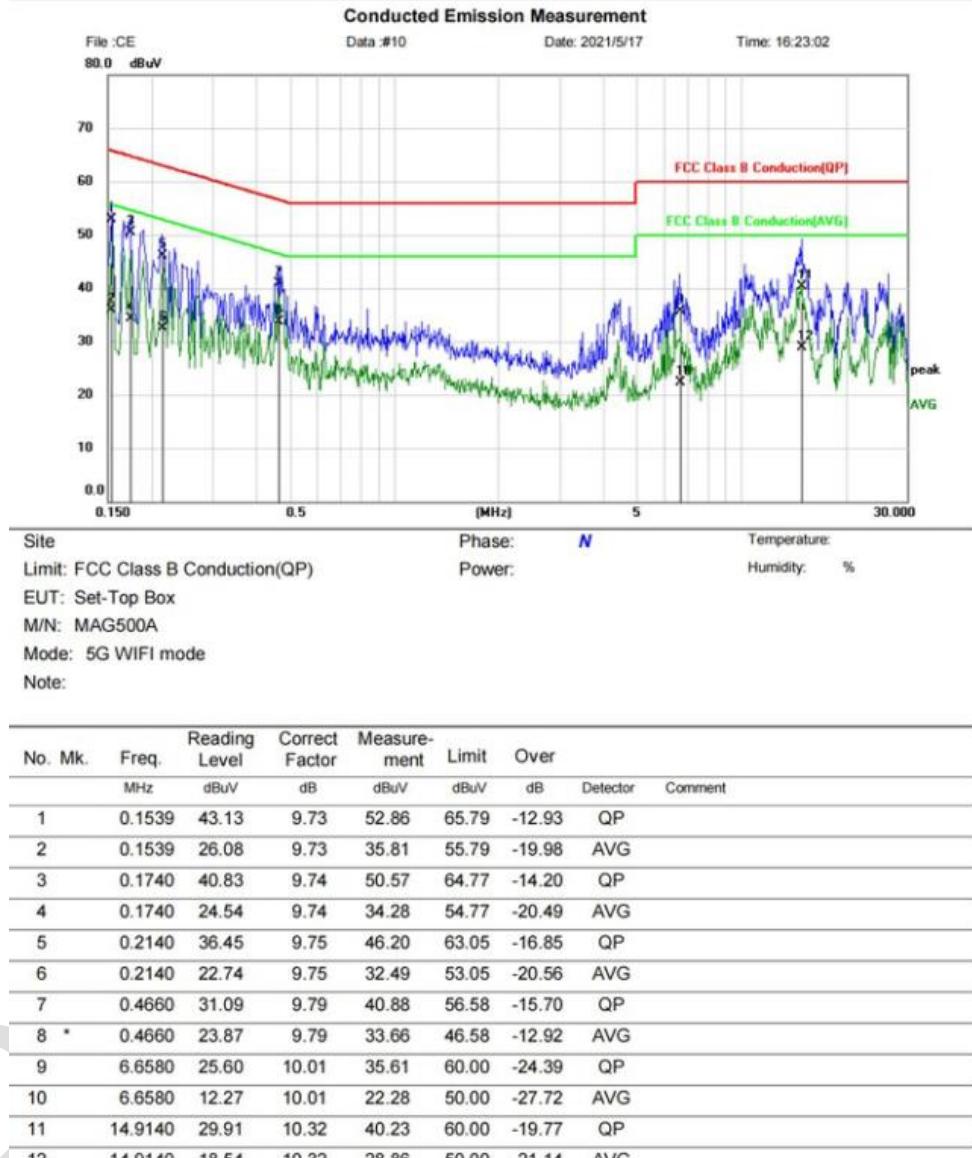
**Measurement Data:**

<b>EUT:</b>	Set-Top Box	<b>Model:</b>	MAG500A
<b>Test By:</b>	Eason	<b>Test mode:</b>	Wifi mode
<b>Power Source:</b>	AC120V/60Hz	<b>Temp./Hum.(%H):</b>	25°C/52%RH
<b>Test Frequency:</b>	150kHz to 30MHz	<b>Phase:</b>	Line


**Notes:**

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level =Receiver Read level + LISN Factor + Cable Loss.

<b>EUT:</b>	Set-Top Box	<b>Model:</b>	MAG500A
<b>Test By:</b>	Eason	<b>Test mode:</b>	Wifi mode
<b>Power Source:</b>	AC120V/60Hz	<b>Temp./Hum.(%H):</b>	25°C/52%RH
<b>Test Frequency:</b>	150kHz to 30MHz	<b>Phase:</b>	Neutral



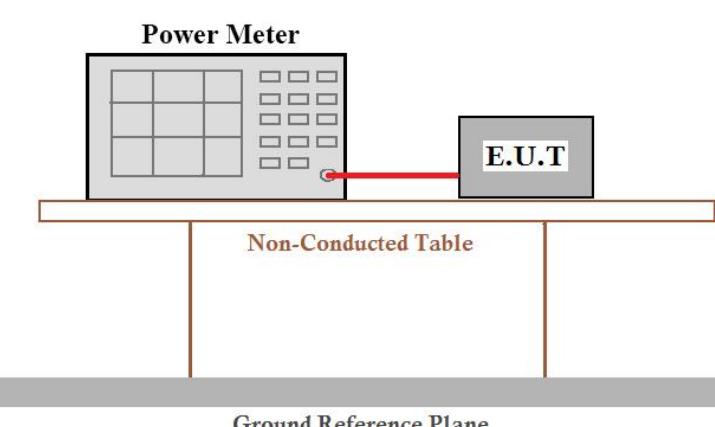
\*:Maximum data    x:Over limit    !:over margin

(Reference Only)

**Notes:**

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level =Receiver Read level + LISN Factor + Cable Loss.

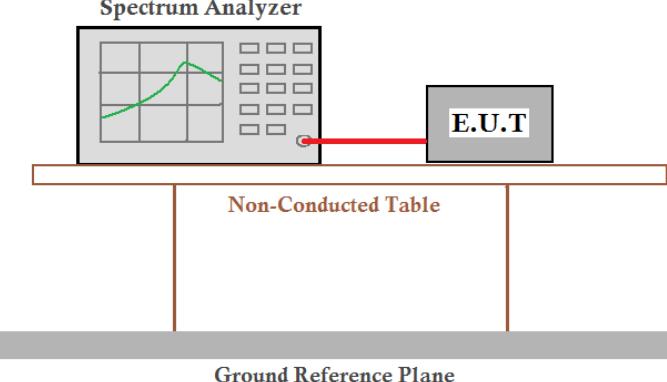
## 5 Conducted Output Power

Test Requirement:	FCC Part15 E Section 15.407 (a) (1) (ii) (2)& (a) (3)
Test Method:	ANSI C63.10: 2013, KDB 789033
Limit:	<b>Band 1: 250mW</b>
Test setup:	
Test Instruments:	Refer to section 5.7 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

### Measurement Data

Please Refer To Appendix: Appendix2

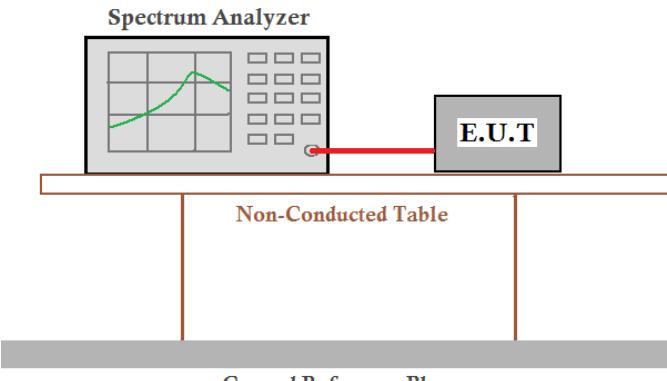
## 6 Occupy Bandwidth

Test Requirement:	FCC Part15 E Section 15.407 (a) (5) and Section 15.407 (e)
Test Method:	ANSI C63.10:2013 and KDB 789033
Limit:	Band 1: N/A(26dB Emission Bandwidth and 99% Occupy Bandwidth)
Test setup:	<p style="text-align: center;"><b>Spectrum Analyzer</b></p>  <p style="text-align: center;">Non-Conducted Table</p> <p style="text-align: center;">Ground Reference Plane</p>
Test Instruments:	Refer to section 5.7 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

### Measurement Data

Please Refer To Appendix: Appendix2

## 7 Power Spectral Density

Test Requirement:	FCC Part15 E Section 15.407 (a) (1) (ii) (2)& (a) (3)
Test Method:	ANSI C63.10:2013, KDB 789033
Limit:	<b>Band 1:11 dBm/MHz</b>
Test setup:	 <p>The diagram illustrates the test setup for Power Spectral Density. A Spectrum Analyzer is connected to the E.U.T (Equipment Under Test) via a cable. The E.U.T is placed on a Non-Conducted Table. The entire setup is positioned above a Ground Reference Plane.</p>
Test Instruments:	Refer to section 5.7 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

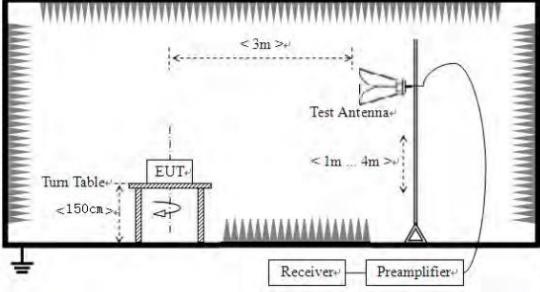
### Measurement Data

Please Refer To Appendix: Appendix2

## 8 Spurious Emission

### 8.1.1 Band Edge and Restricted Band

Test Requirement:	FCC Part15 E Section 15.407 (b)																														
Test Method:	ANSI C63.10:2013 , KDB 789033																														
Test Frequency Range:	Band 1: 4.5 GHz to 5.15 GHz and 5.25GHz to 5.46GHz																														
Receiver setup:	<b>Band Edge:</b> <table border="1"> <thead> <tr> <th>Detector</th><th>RBW</th><th>VBW</th><th>Remark</th></tr> </thead> <tbody> <tr> <td>Quasi-peak</td><td>120kHz</td><td>300kHz</td><td>Quasi-peak Value</td></tr> <tr> <td>RMS</td><td>1MHz</td><td>3MHz</td><td>Average Value</td></tr> </tbody> </table> <b>Restricted Band:</b> <table border="1"> <thead> <tr> <th>Frequency</th><th>Detector</th><th>RBW</th><th>VBW</th><th>Remark</th></tr> </thead> <tbody> <tr> <td>Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr> <tr> <td></td><td>RMS</td><td>1MHz</td><td>3MHz</td><td>Average Value</td></tr> </tbody> </table>				Detector	RBW	VBW	Remark	Quasi-peak	120kHz	300kHz	Quasi-peak Value	RMS	1MHz	3MHz	Average Value	Frequency	Detector	RBW	VBW	Remark	Above 1GHz	Peak	1MHz	3MHz	Peak Value		RMS	1MHz	3MHz	Average Value
Detector	RBW	VBW	Remark																												
Quasi-peak	120kHz	300kHz	Quasi-peak Value																												
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Frequency	Detector	RBW	VBW	Remark																											
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	RMS	1MHz	3MHz	Average Value																											
Limit:	<b>Band Edge:</b> <table border="1"> <thead> <tr> <th></th><th>Limit (dB<math>\mu</math>V/m @3m)</th><th>Remark</th></tr> </thead> <tbody> <tr> <td rowspan="4">Band 1/2/3/4</td><td>68.20</td><td>Peak Value</td></tr> <tr><td>54.00</td><td>Average Value</td></tr> <tr><td>68.20</td><td>Peak Value</td></tr> <tr><td>54.00</td><td>Average Value</td></tr> </tbody> </table> <b>Remark:</b> <ol style="list-style-type: none"> <li>1. Band 1/2/3/4 limit:  <math>E[\text{dB}\mu\text{V/m}] = \text{EIRP}[\text{dBm}] + 95.2 = 68.2 \text{ dB}\mu\text{V/m, for EIPR}[\text{dBm}] = -27 \text{ dBm.}</math></li> </ol> <b>Restricted Band:</b> <table border="1"> <thead> <tr> <th>Frequency</th><th>Limit (dB<math>\mu</math>V/m @3m)</th><th>Remark</th></tr> </thead> <tbody> <tr> <td>Above 1GHz</td><td>74.00</td><td>Peak Value</td></tr> <tr> <td></td><td>54.00</td><td>Average Value</td></tr> </tbody> </table>					Limit (dB $\mu$ V/m @3m)	Remark	Band 1/2/3/4	68.20	Peak Value	54.00	Average Value	68.20	Peak Value	54.00	Average Value	Frequency	Limit (dB $\mu$ V/m @3m)	Remark	Above 1GHz	74.00	Peak Value		54.00	Average Value						
	Limit (dB $\mu$ V/m @3m)	Remark																													
Band 1/2/3/4	68.20	Peak Value																													
	54.00	Average Value																													
	68.20	Peak Value																													
	54.00	Average Value																													
Frequency	Limit (dB $\mu$ V/m @3m)	Remark																													
Above 1GHz	74.00	Peak Value																													
	54.00	Average Value																													
Remark:	<p>The test methods for Band Edge and Restricted Band are the same. The following tests use the sideband limits as the minimum reference requirements to determine whether the results meet</p>																														
Test Procedure:	<ol style="list-style-type: none"> <li>1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</li> <li>3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.</li> <li>4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable was turned from 0 degrees to 360 degrees to find the maximum reading.</li> <li>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li> <li>6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</li> </ol>																														

Test setup:	 <p>The diagram illustrates a test setup for an EUT (Equipment Under Test). The EUT is mounted on a Turn Table, which is positioned within a rectangular boundary of 150 cm height and 3 meters width. A Test Antenna is located at the top right, and a receiver with a preamplifier is at the bottom right. The entire setup is connected to a ground symbol at the bottom left.</p>
Test Instruments:	Refer to section 5.7 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed



## Measurement Data

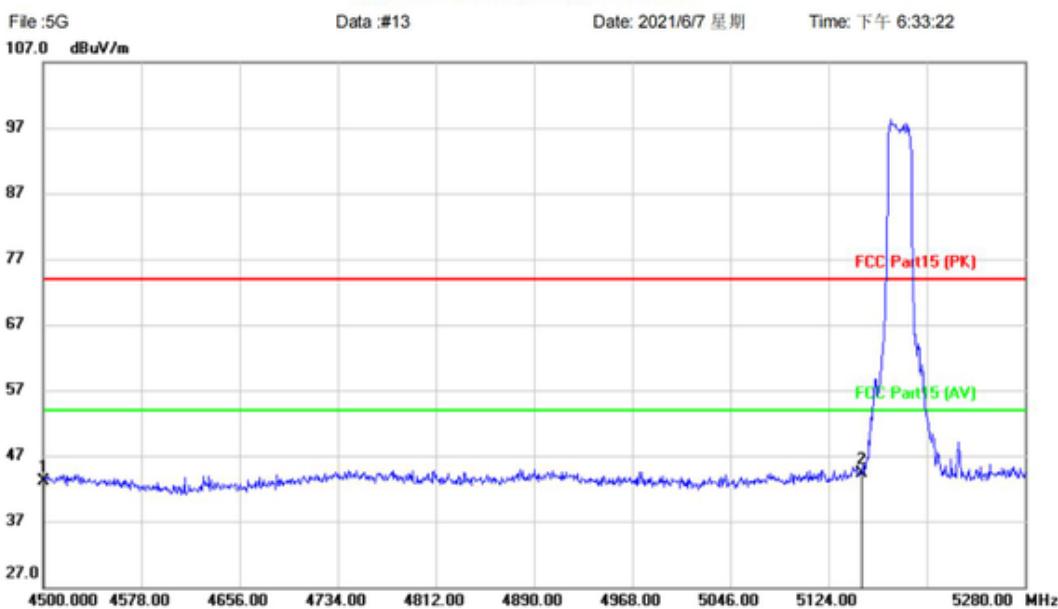
Remark: During the test, pre-scan the 802.11a/n/ac mode, and found the 802.11n20 mode which it is worse case.

### Band1:

#### 802.11n20:

##### Lowest channel

###### Radiated Emission Measurement



Site: Polarization: **Horizontal** Temperature:  
Limit: FCC Part15 (PK) Power: Humidity: %  
EUT: Set-Top Box Distance:  
M/N: MAG500A  
Mode: 802.11n20-5180  
Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1		4500.000	43.27	-0.16	43.11	74.00	-30.89	peak		
2	*	5150.000	43.93	0.36	44.29	74.00	-29.71	peak		

\*:Maximum data x:Over limit !:over margin

(Reference Only)

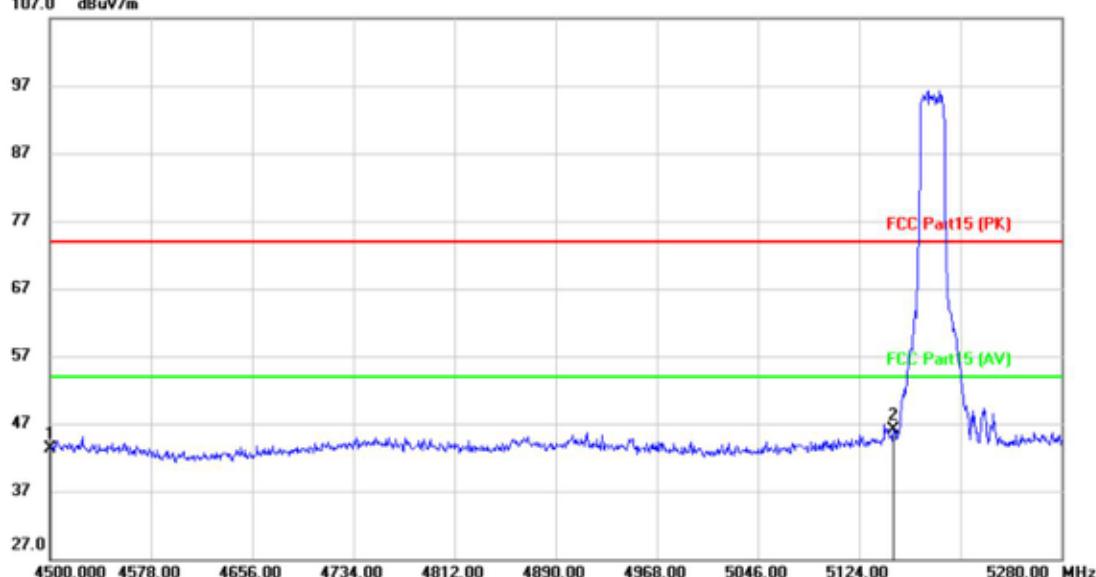
**Radiated Emission Measurement**

File :5G  
107.0 dBuV/m

Data :#14

Date: 2021/6/7 星期

Time: 下午 6:36:13



Site

Polarization: **Vertical**

Temperature:

Limit: FCC Part15 (PK)

Power:

Humidity: %

EUT: Set-Top Box

Distance:

M/N: MAG500A

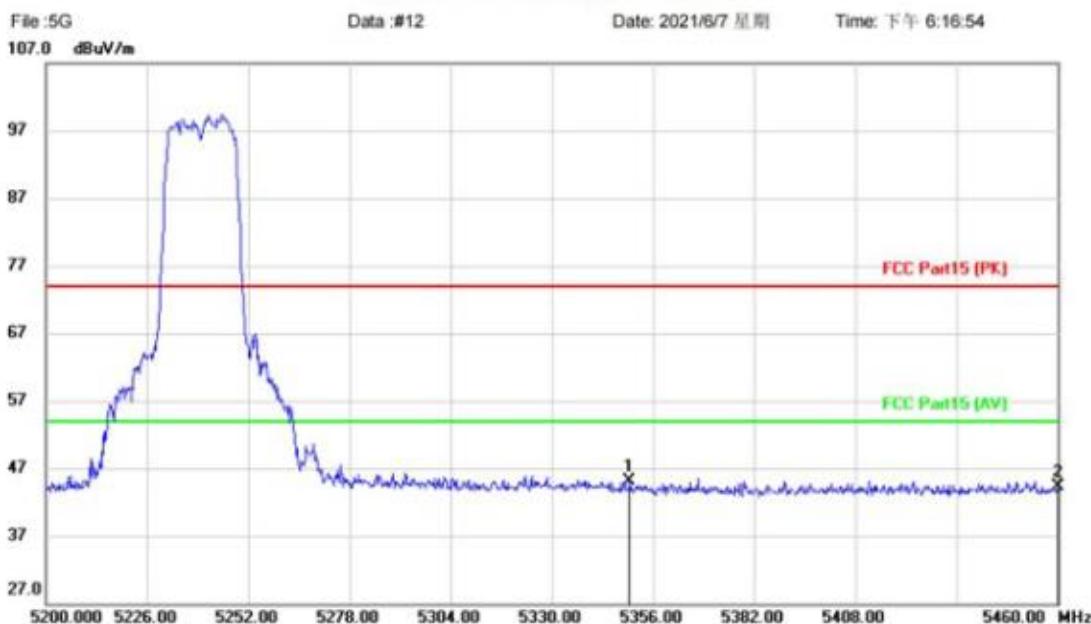
Mode: 802.11n20-5180

Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm		Table Degree
								Detector	degree	
1		4500.000	43.38	-0.16	43.22	74.00	-30.78	peak		
2 *		5150.000	45.78	0.36	46.14	74.00	-27.86	peak		

\*:Maximum data    x:Over limit    !:over margin

(Reference Only)

**Highest channel****Radiated Emission Measurement**

Site

Polarization: **Horizontal**

Temperature:

Limit: FCC Part15 (PK)

Power:

Humidity: %

EUT: Set-Top Box

Distance:

M/N: MAG500A

Mode: 802.11n20-5240

Note:

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Antenna	Table	
			Level							
		MHz	dBuV					cm	degree	Comment
1	*	5350.000	44.44	0.68	45.12	74.00	-28.88	peak		
2		5460.000	43.49	0.91	44.40	74.00	-29.60	peak		

\*:Maximum data    x:Over limit    !:over margin

(Reference Only)



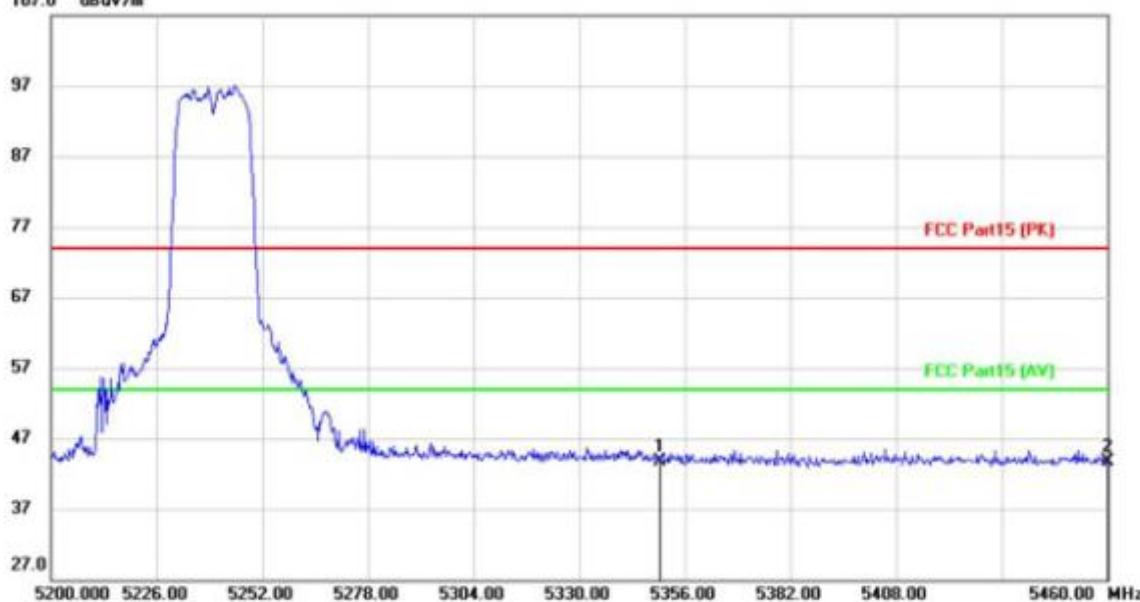
## Radiated Emission Measurement

File : 5G  
107.0 dBuV/m

Data : #11

Date: 2021/6/7 星期

Time: 下午 6:14:26



Site	Polarization: <b>Vertical</b>	Temperature:
Limit: FCC Part15 (PK)	Power:	Humidity: %
EUT: Set-Top Box	Distance:	
M/N: MAG500A		
Mode: 802.11n20-5240		
Note:		

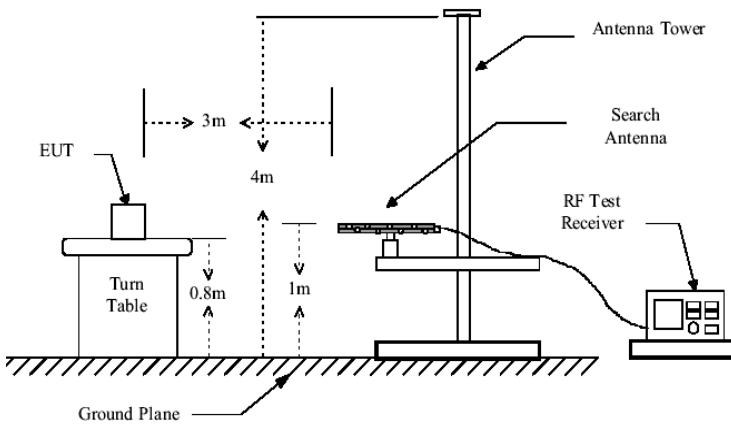
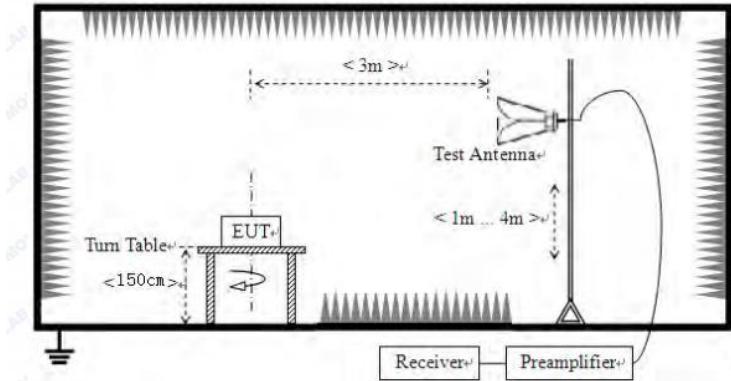
No.	Mk.	Freq. MHz	Reading Level	Correct Factor	Measure- ment	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree degree	Comment
			dBuV	dB	dBuV/m					
1	*	5350.000	43.03	0.68	43.71	74.00	-30.29	peak		
	2	5460.000	42.70	0.91	43.61	74.00	-30.39	peak		

\*:Maximum data x:Over limit !:over margin

(Reference Only)

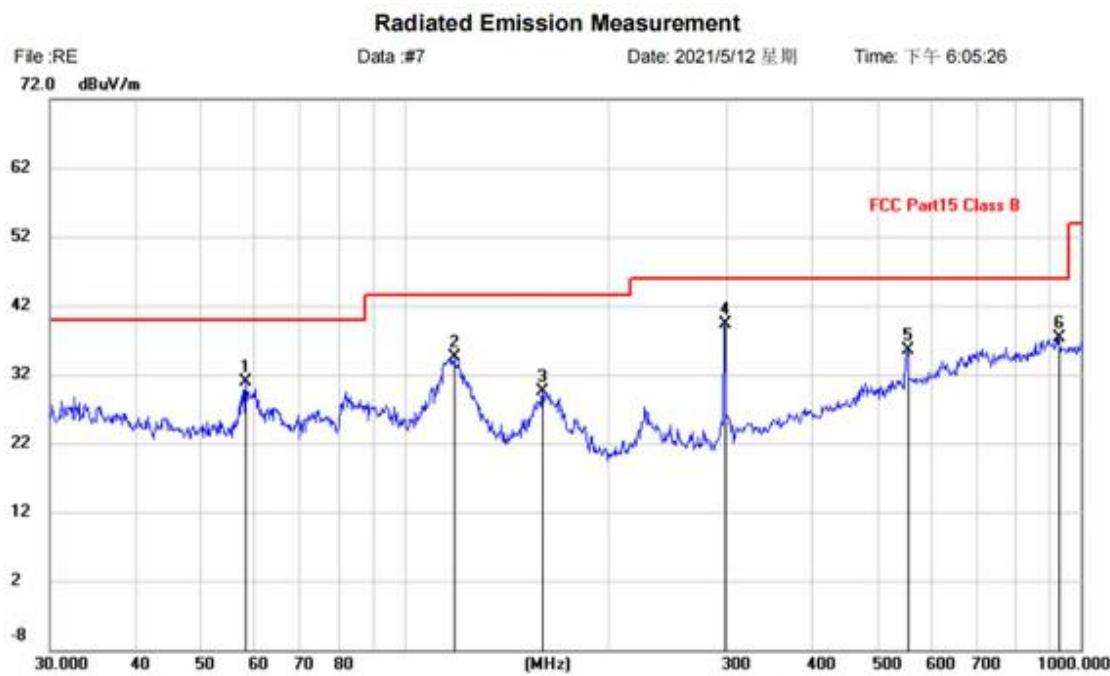
### 8.1.2 Unwanted Emissions in the Restricted Bands

Test Requirement:	FCC Part15 C Section 15.209 and 15.205																												
Test Method:	ANSI C63.10:2013																												
Test Frequency Range:	30MHz to 40GHz																												
Test site:	Measurement Distance: 3m																												
Receiver setup:	<table border="1"> <thead> <tr> <th>Frequency</th><th>Detector</th><th>RBW</th><th>VBW</th><th>Remark</th></tr> </thead> <tbody> <tr> <td>30MHz-1GHz</td><td>Quasi-peak</td><td>100kHz</td><td>300kHz</td><td>Quasi-peak Value</td></tr> <tr> <td>Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr> </tbody> </table>					Frequency	Detector	RBW	VBW	Remark	30MHz-1GHz	Quasi-peak	100kHz	300kHz	Quasi-peak Value	Above 1GHz	Peak	1MHz	3MHz	Peak Value									
Frequency	Detector	RBW	VBW	Remark																									
30MHz-1GHz	Quasi-peak	100kHz	300kHz	Quasi-peak Value																									
Above 1GHz	Peak	1MHz	3MHz	Peak Value																									
Limit:	<table border="1"> <thead> <tr> <th>Frequency</th><th>Limit (dB<sub>u</sub>V/m @3m)</th><th>Remark</th></tr> </thead> <tbody> <tr> <td>30MHz-88MHz</td><td>40.0</td><td>Quasi-peak Value</td></tr> <tr> <td>88MHz-216MHz</td><td>43.5</td><td>Quasi-peak Value</td></tr> <tr> <td>216MHz-960MHz</td><td>46.0</td><td>Quasi-peak Value</td></tr> <tr> <td>960MHz-1GHz</td><td>54.0</td><td>Quasi-peak Value</td></tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Frequency</th><th>Limit (dBm/MHz)</th><th>Remark</th></tr> </thead> <tbody> <tr> <td>Above 1GHz</td><td>68.20</td><td>Peak Value</td></tr> <tr> <td></td><td>54.00</td><td>Average Value</td></tr> </tbody> </table> <p>Remark:  1. Above 1GHz limit:  <math>E[\text{dB}\mu\text{V/m}] = \text{EIRP}[\text{dBm}] + 95.2 = 68.2 \text{ dB}\mu\text{V/m, for EIPR}[\text{dBm}] = -27 \text{ dBm.}</math></p>					Frequency	Limit (dB <sub>u</sub> V/m @3m)	Remark	30MHz-88MHz	40.0	Quasi-peak Value	88MHz-216MHz	43.5	Quasi-peak Value	216MHz-960MHz	46.0	Quasi-peak Value	960MHz-1GHz	54.0	Quasi-peak Value	Frequency	Limit (dBm/MHz)	Remark	Above 1GHz	68.20	Peak Value		54.00	Average Value
Frequency	Limit (dB <sub>u</sub> V/m @3m)	Remark																											
30MHz-88MHz	40.0	Quasi-peak Value																											
88MHz-216MHz	43.5	Quasi-peak Value																											
216MHz-960MHz	46.0	Quasi-peak Value																											
960MHz-1GHz	54.0	Quasi-peak Value																											
Frequency	Limit (dBm/MHz)	Remark																											
Above 1GHz	68.20	Peak Value																											
	54.00	Average Value																											
Test Procedure:	<ol style="list-style-type: none"> <li>1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter center. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</li> <li>3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.</li> <li>4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable was turned from 0 degrees to 360 degrees to find the maximum reading.</li> <li>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li> <li>6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</li> </ol>																												

<b>Test setup:</b>	<p><b>Below 1GHz</b></p>  <p><b>Above 1GHz</b></p> 
<b>Test Instruments:</b>	Refer to section 5.7 for details
<b>Test mode:</b>	Refer to section 5.3 for details
<b>Test results:</b>	Passed

**Below 1GHz**

Horizontal:



Site

Polarization: **Horizontal**

Temperature:

Limit: FCC Part15 Class B

Power:

Humidity: %

EUT: Set-Top Box

Distance: 3m

M/N: MAG500A

Mode: 5G WIFI mode

Note:

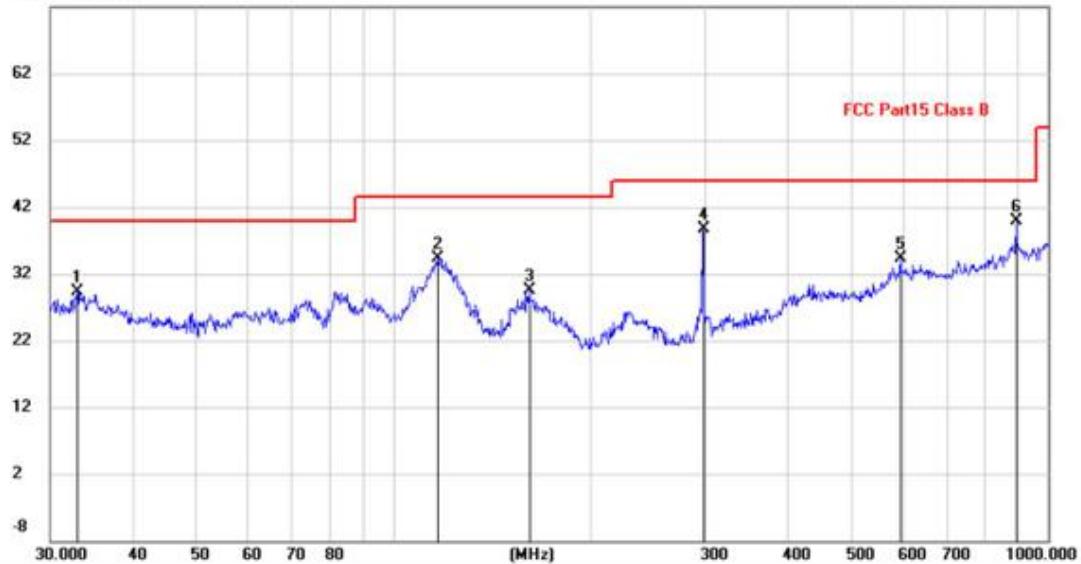
No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Antenna	Table		
			Level	Factor	ment						
			MHz	dBuV	dB	dBuV/m	dB	Detector	cm	degree	Comment
1	58.4074	7.33	23.50	30.83	40.00	-9.17	QP				
2	118.6012	12.02	22.43	34.45	43.50	-9.05	QP				
3	160.3454	6.45	23.15	29.60	43.50	-13.90	QP				
4 *	297.2241	15.37	23.85	39.22	46.00	-6.78	QP				
5	554.8251	5.37	30.06	35.43	46.00	-10.57	QP				
6	925.7563	1.55	35.68	37.23	46.00	-8.77	QP				

\*:Maximum data x:Over limit !:over margin

(Reference Only)

Vertical:

**Radiated Emission Measurement**

File :RE Data #:8 Date: 2021/5/12 星期 Time: 下午 6:08:10  
72.0 dBuV/m


FCC Part15 Class B

Site: Polarization: **Vertical** Temperature:  
Limit: FCC Part15 Class B Power: Humidity: %  
EUT: Set-Top Box Distance: 3m  
M/N: MAG500A  
Mode: 5G WIFI mode  
Note:

No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm		Table Degree	Comment
							Detector	cm		
1	32.9791	6.68	22.72	29.40	40.00	-10.60	QP			
2	116.9495	12.02	22.25	34.27	43.50	-9.23	QP			
3	161.4738	6.48	23.05	29.53	43.50	-13.97	QP			
4	297.2241	14.92	23.85	38.77	46.00	-7.23	QP			
5	595.1326	2.88	31.48	34.36	46.00	-11.64	QP			
6 *	893.8567	4.29	35.67	39.96	46.00	-6.04	QP			

\*:Maximum data x:Over limit !:over margin

(Reference Only)



Above 1GHz:

Band 1:802.11a mode(worst case)

## Lowest channel

## Radiated Emission Measurement

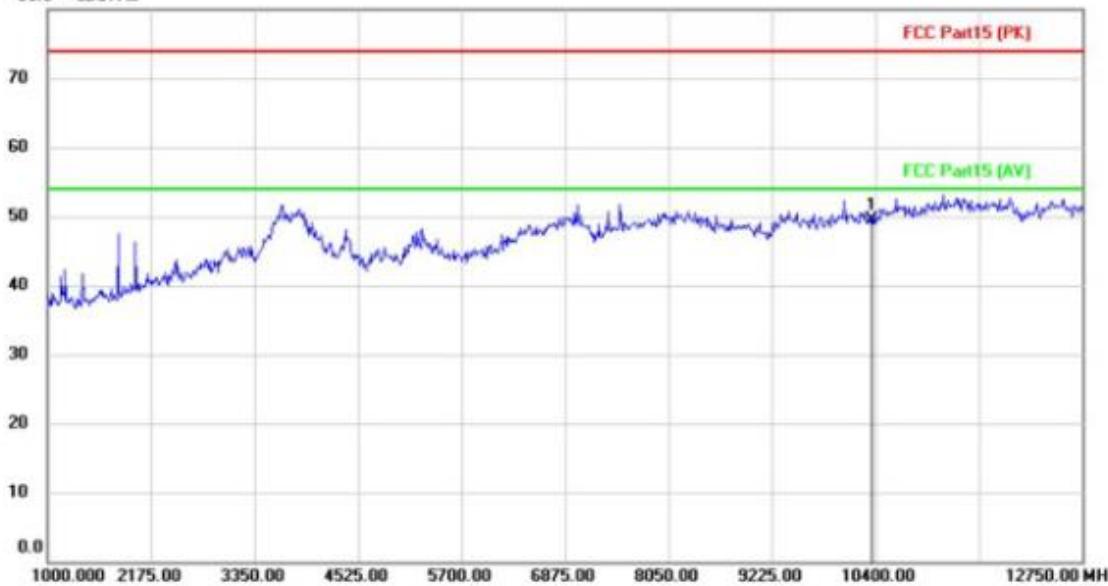
File :5G

Data :#1

Date: 2021/6/7 星期

Time: 下午 2:03:12

80.0 dBuV/m



Site

Polarization: **Horizontal**

Temperature:

Limit: FCC Part15 (PK)

Power:

Humidity: %

EUT: Set-Top Box

Distance:

M/N: MAG500A

Mode: 802.11a-5180

Note:

No.	Mk.	Reading	Correct	Measure-	Limit	Over	Antenna	Table	
	Freq.	Level	Factor	ment	dBuV/m	dB	Detector	Height	Degree
	MHz	dBuV	dB				cm	degree	Comment
1	*	10360.000	38.32	11.09	49.41	74.00	-24.59	peak	

\*:Maximum data

x:Over limit

!:over margin

(Reference Only)



## Radiated Emission Measurement

File :5G

Data :#2

Date: 2021/6/7 星期

Time: 下午 2:06:41



Site

Polarization: **Vertical**

Temperature:

Limit: FCC Part15 (PK)

Power:

Humidity: %

EUT: Set-Top Box

Distance:

M/N: MAG500A

Mode: 802.11a-5180

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	*	10360.000	38.49	11.09	49.58	74.00	-24.42	peak		

\*:Maximum data x:Over limit !:over margin

(Reference Only)



## Middle channel

## Radiated Emission Measurement



Site

Polarization: **Horizontal**

Temperature:

Limit: FCC Part15 (PK)

Power:

Humidity: %

EUT: Set-Top Box

Distance:

M/N: MAG500A

Mode: 802.11a-5200

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	*	10400.000	37.81	11.22	49.03	74.00	-24.97	peak		

\*:Maximum data   x:Over limit   !:over margin

(Reference Only)



## Radiated Emission Measurement

File :5G  
80.0 dBuV/m

Data :#3

Date: 2021/6/7 星期

Time: 下午 2:10:05



Site

Polarization: **Vertical**

Temperature:

Limit: FCC Part15 (PK)

Power:

Humidity: %

EUT: Set-Top Box

Distance:

M/N: MAG500A

Mode: 802.11a-5200

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	*	10400.000	37.26	11.22	48.48	74.00	-25.52	peak		

\*:Maximum data x:Over limit !:over margin

(Reference Only)



## Highest channel

## Radiated Emission Measurement

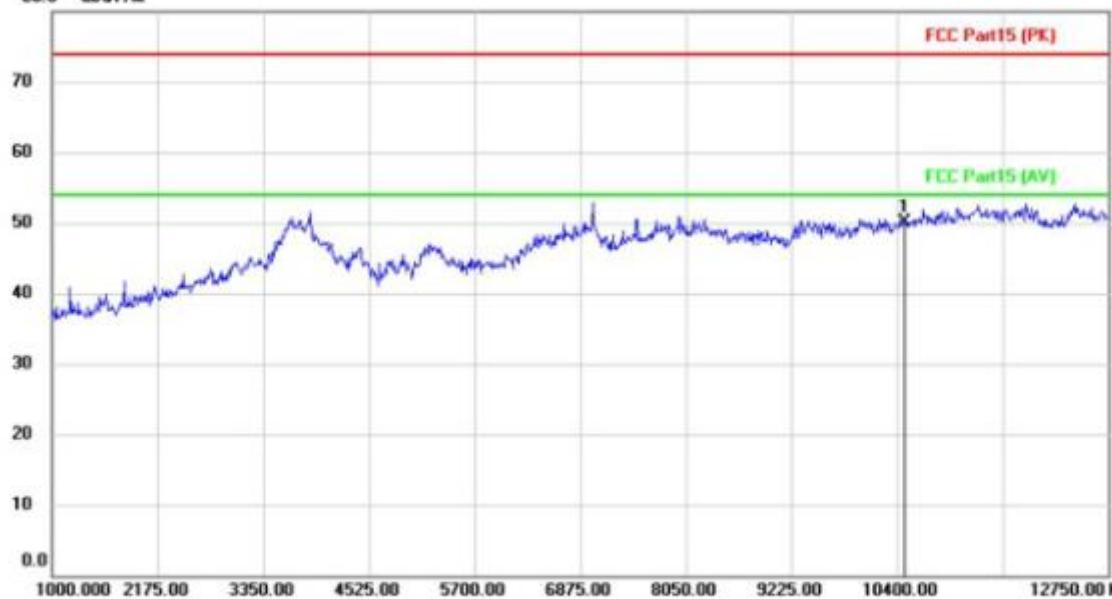
File : 5G

Data : #5

Date: 2021/6/7 星期

Time: 下午 2:13:48

80.0 dBuV/m



Site

Polarization: **Horizontal**

Temperature:

Limit: FCC Part15 (PK)

Power:

Humidity: %

EUT: Set-Top Box

Distance:

M/N: MAG500A

Mode: 802.11a-5240

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	*	10480.000	38.98	11.18	50.16	74.00	-23.84	peak		

\*:Maximum data

x:Over limit

!:Over margin

(Reference Only)



## Radiated Emission Measurement

File : 5G

Data : #6

Date: 2021/6/7 星期

Time: 下午 2:16:02



Site

Polarization: **Vertical**

Temperature:

Limit: FCC Part15 (PK)

Power:

Humidity: %

EUT: Set-Top Box

Distance:

M/N: MAG500A

Mode: 802.11a-5240

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	*	10480.000	38.95	11.18	50.13	74.00	-23.87	peak		

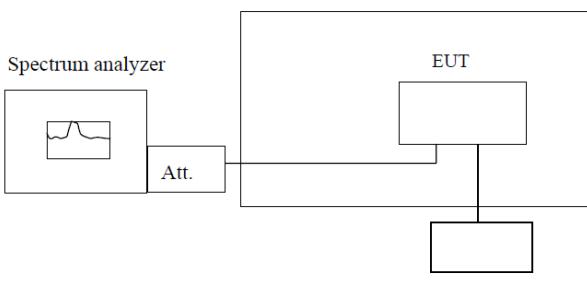
\*:Maximum data x:Over limit !:over margin

(Reference Only)

## Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. Correct factor = Antenna Factor + Cable Loss – Preamplifier Factor

## 8.2 Frequency stability

Test Requirement:	FCC Part15 E Section 15.407 (g)
Limit:	Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.
Test setup:	<p style="text-align: center;">Temperature Chamber</p>  <p style="text-align: center;">Note : Measurement setup for testing on Antenna connector</p>
Test procedure:	<ol style="list-style-type: none"> <li>1. The EUT is installed in an environment test chamber with external power source.</li> <li>2. Set the chamber to operate at 50 centigrade and external power source to output at nominal voltage of EUT.</li> <li>3. A sufficient stabilization period at each temperature is used prior to each frequency measurement.</li> <li>4. When temperature is stabled, measure the frequency stability.</li> <li>5. The test shall be performed under -30 to 50 centigrade and 85 to 115 percent of the nominal voltage. Change setting of chamber and external power source to complete all conditions.</li> </ol>
Test Instruments:	Refer to section 5.7 for details
Test mode:	Refer to section 5.3 for details, and all channels have been tested, only shows the worst channel data in this report.
Test results:	Passed

### Measurement Data

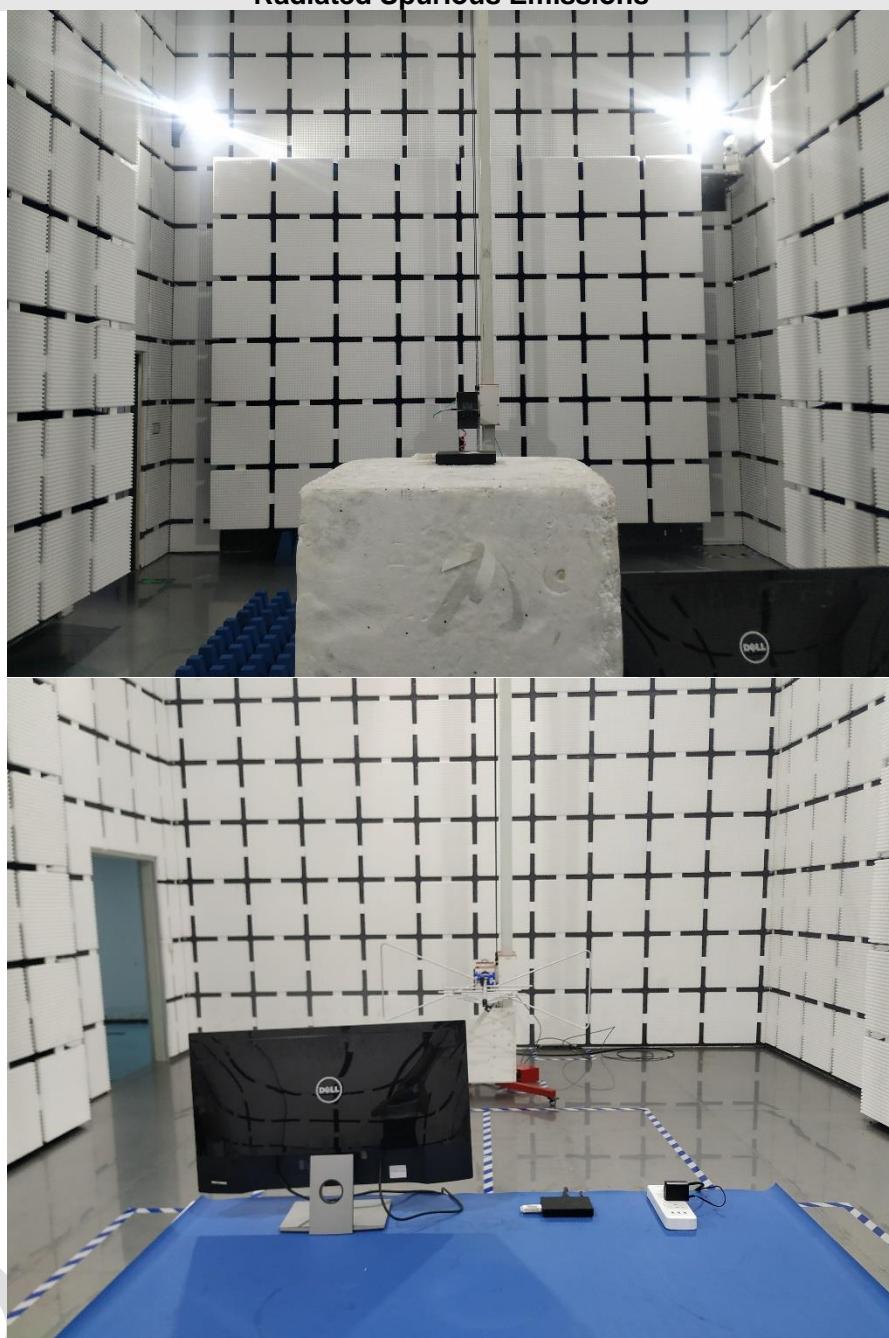
Please Refer To Appendix: Appendix2

## 9 Test Setup Photo

Conducted Emissions at AC Power Line (150kHz-30MHz)



**Radiated Spurious Emissions**



## 10 EUT Constructional Details

Reference to the test report No. BLA-EMC-202105-A0701

-----End of report-----

The test report is effective only with both signature and specialized stamp, The result(s) shown in this report refer only to the sample(s) tested. Without written approval of BlueAsia, this report can't be reproduced except in full.

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