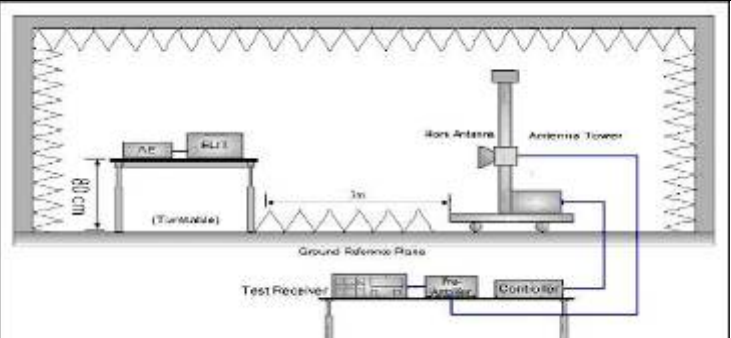


## 6.7. Band edge

### 6.7.1. Test Specification

<b>Test Requirement:</b>	FCC CFR47 Part 15E Section 15.407
<b>Test Method:</b>	ANSI C63.10 2013
<b>Limit:</b>	For band I&II&III: $E[\text{dB}\mu\text{V}/\text{m}] = \text{EIRP}[\text{dBm}] + 95.2 = 68.2$ dB $\mu\text{V}/\text{m}$ , for EIRP(dBm)= <b>-27dBm</b> For band IV(5715-5725MHz&5850-5860MHz): $E[\text{dB}\mu\text{V}/\text{m}] = \text{EIRP}[\text{dBm}] + 95.2 = 78.2$ dB $\mu\text{V}/\text{m}$ , for EIRP(dBm)= <b>-17dBm</b> ; For band IV(other un-restricted band): $E[\text{dB}\mu\text{V}/\text{m}] = \text{EIRP}[\text{dBm}] + 95.2 = 68.2$ dB $\mu\text{V}/\text{m}$ , for EIRP(dBm)= <b>-27dBm</b>
<b>Test Setup:</b>	
<b>Test Mode:</b>	Transmitting mode with modulation
<b>Test Procedure:</b>	<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 rota table 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</li> </ol>

	10dB margin would be re-tested one by one using peak, quasipeak or average method as specified and then reported in a data sheet.
<b>Test Result:</b>	PASS

6.7.2. Test Instruments

Radiated Emission Test Site (966)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Test Receiver	ROHDE&SCHW ARZ	ESVD	100008	Oct. 13, 2017
Spectrum Analyzer	ROHDE&SCHW ARZ	FSQ	200061	Oct. 13, 2017
Spectrum Analyzer	ROHDE&SCHW ARZ	FSP40	100056	Oct. 13, 2017
Spectrum Analyzer	Agilent	N9020A	MY49100060	Oct. 13, 2017
Pre-amplifier	EM Electronics Corporation CO.,LTD	EM30265	07032613	Oct. 13, 2017
Pre-amplifier	HP	8447D	2727A05017	Oct. 13, 2017
Loop antenna	ZHINAN	ZN30900A	12024	Oct. 13, 2017
Broadband Antenna	Schwarzbeck	VULB9163	340	Oct. 13, 2017
Horn Antenna	Schwarzbeck	BBHA 9120D	631	Oct. 13, 2017
Horn Antenna	Schwarzbeck	BBH 9170	582	Jun. 07, 2018
Coax cable (9KHz-1GHz)	TCT	RE-low-01	N/A	Oct. 13, 2017
Coax cable (9KHz-40GHz)	TCT	RE-high-02	N/A	Oct. 13, 2017
Coax cable (9KHz-1GHz)	TCT	RE-low-03	N/A	Oct. 13, 2017
Coax cable (9KHz-40GHz)	TCT	RE-high-04	N/A	Oct. 13, 2017
Antenna Mast	Keleto	CC-A-4M	N/A	N/A
EMI Test Software	Shurple Technology	EZ-EMC	N/A	N/A

**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

**6.7.3. Test Data**

802.11n HT20	CH	Freq. (MHz)	Read_level (dBuV/m)	Factor (dB)	Peak (dBuV/m)	Limit (dBuV/m) (Peak)	Limit (dBuV/m) (Avg)	Over	Ant. Pol. H/V
Band I	Lowest	5150	43.36	5.82	49.18	68.2	54	-4.82	H
		5150	38.36	5.82	44.18	68.2	54	-9.82	V
	Highest	5250	42.16	6.17	48.33	68.2	54	-5.67	H
		5250	39.51	6.17	45.68	68.2	54	-8.32	V
Band IV	Lowest	5725	43.57	8.21	51.78	78.2	54	-2.22	H
		5725	43.57	8.21	51.78	78.2	54	-2.22	V
	Highest	5850	42.59	8.87	51.46	78.2	54	-2.54	H
		5850	40.61	8.87	49.48	78.2	54	-4.52	V

Remark: Factor(dB)=Ant. Factor+Cable Loss-Amp. Factor

802.11n HT40	CH	Freq. (MHz)	Read_level (dBuV/m)	Factor (dB)	Peak (dBuV/m)	Limit (dBuV/m) (Peak)	Limit (dBuV/m) (Avg)	Over	Ant. Pol. H/V
Band I	Lowest	5150	43.78	5.82	49.6	68.2	54	-4.4	H
		5150	38.68	5.82	44.5	68.2	54	-9.5	V
	Highest	5250	42.46	6.17	48.63	68.2	54	-5.37	H
		5250	39.77	6.17	45.94	68.2	54	-8.06	V
Band IV	Lowest	5725	43.81	8.21	52.02	78.2	54	-1.98	H
		5725	43.81	8.21	52.02	78.2	54	-1.98	V
	Highest	5850	42.83	8.87	51.7	78.2	54	-2.3	H
		5850	40.85	8.87	49.72	78.2	54	-4.28	V

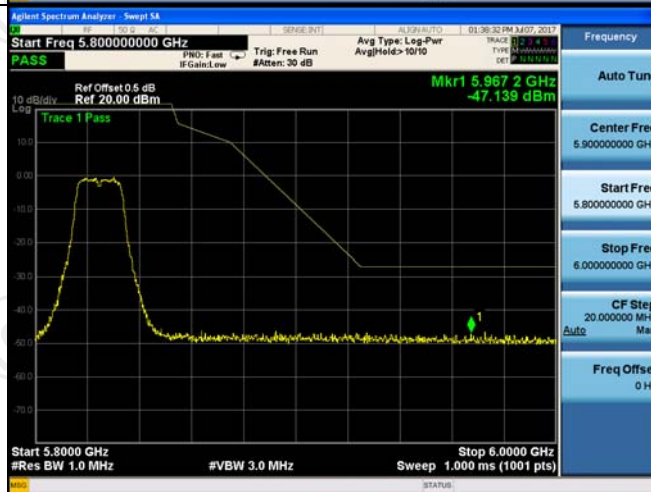
Remark: Factor(dB)=Ant. Factor+Cable Loss-Amp. Factor

Band IV Band-edge for RF Conducted Emissions

802.11n  
HT20 / LCH

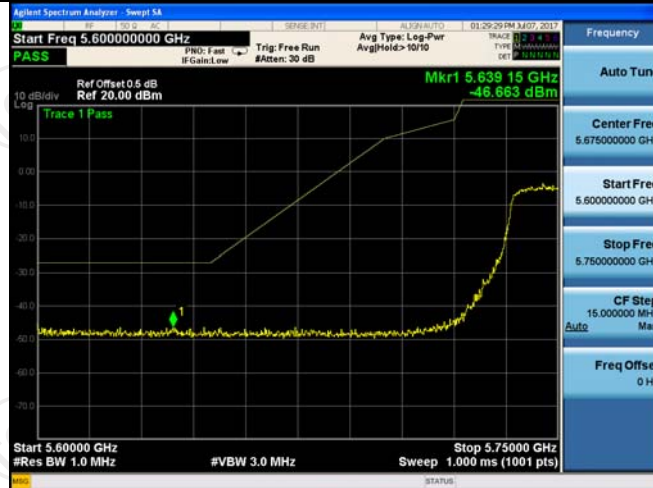


802.11n  
HT20 / HCH

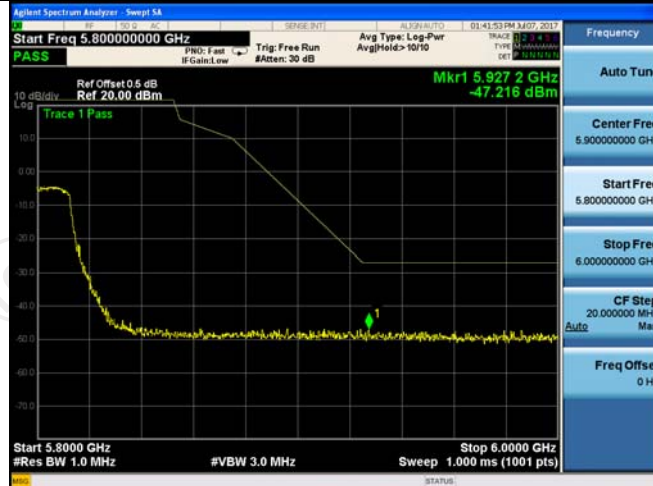


Band IV Band-edge for RF Conducted Emissions

802.11n  
HT40 / LCH



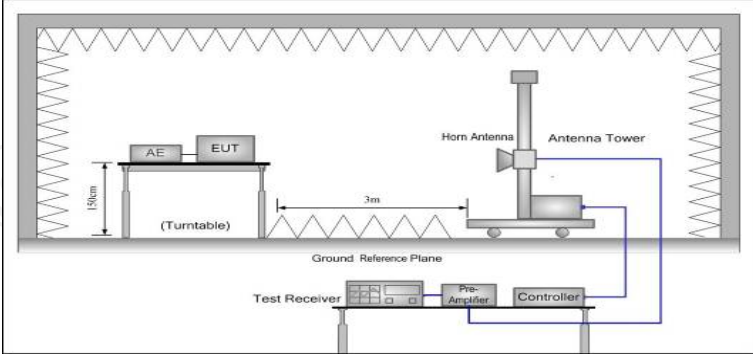
802.11n  
HT40 / HCH



## 6.8. Spurious Emission

### 6.8.1. Restrict Bands Measurement

#### 6.8.1.1. Test Specification

<b>Test Requirement:</b>	FCC CFR47 Part 15 Section 15.407 & 15.209 & 15.205				
<b>Test Method:</b>	KDB 789033 D02 v01r04				
<b>Frequency Range:</b>	Band I & II: 4.5 GHz to 5.15 GHz and 5.35GHz to 5.46GHz Band III & IV: 5.35 GHz to 5.46 GHz				
<b>Measurement Distance:</b>	3 m				
<b>Antenna Polarization:</b>	Horizontal & Vertical				
<b>Operation mode:</b>	Transmitting mode with modulation				
<b>Receiver Setup:</b>	Frequency	Detector	RBW	VBW	Remark
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		RMS	1MHz	3MHz	Average Value
<b>Limit:</b>	Frequency	Limit (dBuV/m @3m)	Remark		
	Above 1GHz	74	Peak Value		
		54	Average Value		
<b>Test setup:</b>	<p>Above 1GHz</p> 				
<b>Test Procedure:</b>	<ol style="list-style-type: none"> <li>The testing follows FCC KDB Publication No. 789033 D02 General UNII Test Procedures New Rules v01r04. Section G) Unwanted emissions measurement.</li> <li>For the radiated emission test below 1GHz: The EUT was placed on a turntable with 0.8 meter above ground. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower. The EUT was arranged to its worst case and then tune</li> </ol>				

	<p>the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high PASS filter are used for the test in order to get better signal level.</p> <p>For the radiated emission test above 1GHz: Place the measurement antenna on a turntable with 1.5 meter above ground, which is away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.</p> <p>3. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level</p> <p>4. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.</p> <p>5. Use the following spectrum analyzer settings:</p> <ul style="list-style-type: none"> <li>(1) Span shall wide enough to fully capture the emission being measured;</li> <li>(2) Set RBW=100 kHz for <math>f &lt; 1</math> GHz; <math>VBW \geq RBW</math>; Sweep = auto; Detector function = peak; Trace = max hold;</li> <li>(3) Set RBW = 1 MHz, <math>VBW = 3</math> MHz for <math>f &gt; 1</math> GHz for peak measurement.</li> </ul> <p>For average measurement: <math>VBW = 10</math> Hz, when duty cycle is no less than 98 percent. <math>VBW \geq 1/T</math>, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.</p> <p>(4) A 5.8GHz high -PASS filter is used during radiated emissions above 1GHz measurement.</p>
<p><b>Test results:</b></p>	<p>PASS</p>



6.8.1.1 Test Instruments

Radiated Emission Test Site (966)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Test Receiver	ROHDE&SCHW ARZ	ESVD	100008	Oct. 13, 2017
Spectrum Analyzer	ROHDE&SCHW ARZ	FSQ	200061	Oct. 13, 2017
Spectrum Analyzer	ROHDE&SCHW ARZ	FSP40	100056	Oct. 13, 2017
Spectrum Analyzer	Agilent	N9020A	MY49100060	Oct. 13, 2017
Pre-amplifier	EM Electronics Corporation CO.,LTD	EM30265	07032613	Oct. 13, 2017
Pre-amplifier	HP	8447D	2727A05017	Oct. 13, 2017
Loop antenna	ZHINAN	ZN30900A	12024	Oct. 13, 2017
Broadband Antenna	Schwarzbeck	VULB9163	340	Oct. 13, 2017
Horn Antenna	Schwarzbeck	BBHA 9120D	631	Oct. 13, 2017
Horn Antenna	Schwarzbeck	BBH 9170	582	Jun. 07, 2018
Coax cable (9KHz-1GHz)	TCT	RE-low-01	N/A	Oct. 13, 2017
Coax cable (9KHz-40GHz)	TCT	RE-high-02	N/A	Oct. 13, 2017
Coax cable (9KHz-1GHz)	TCT	RE-low-03	N/A	Oct. 13, 2017
Coax cable (9KHz-40GHz)	TCT	RE-high-04	N/A	Oct. 13, 2017
Antenna Mast	Keleto	CC-A-4M	N/A	N/A
EMI Test Software	Shurple Technology	EZ-EMC	N/A	N/A

**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

**6.8.1.2 Test Data**

**Restrict band around fundamental**

**Band I**

11n (HT20) CH36: 5180MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (Db $\mu$ V)	AV reading (dBuV)	Correction Factor (Db/m)	Emission Level		Peak limit (Db $\mu$ V/m)	AV limit (Db $\mu$ V/m)	Margin (Db)
					Peak (Db $\mu$ V/m)	AV (Db $\mu$ V/m)			
5142.20	H	42.51	---	5.79	48.30	---	74	54	-5.70
5150.00	H	43.68	---	5.82	49.50	---	74	54	-4.50
5142.20	V	40.85	---	5.79	46.64	---	74	54	-7.36
5150.00	V	41.66	---	5.82	47.48	---	74	54	-6.52
11n (HT20) CH40: 5200MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (Db $\mu$ V)	AV reading (Db $\mu$ V)	Correction Factor (Db/m)	Emission Level		Peak limit (Db $\mu$ V/m)	AV limit (Db $\mu$ V/m)	Margin (Db)
					Peak (Db $\mu$ V/m)	AV (Db $\mu$ V/m)			
5135.50	H	42.67	---	5.78	48.45	---	74	54	-5.55
5150.00	H	44.03	---	5.82	49.85	---	74	54	-4.15
5135.50	V	41.34	---	5.78	47.12	---	74	54	-6.88
5150.00	V	42.21	---	5.82	48.03	---	74	54	-5.97
11n(HT20) CH48: 5240MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (Db $\mu$ V)	AV reading (dBuV)	Correction Factor (dB/m)	Emission Level		Peak limit (dB $\mu$ V/m)	AV limit (dB $\mu$ V/m)	Margin (dB)
					Peak (dB $\mu$ V/m)	AV (dB $\mu$ V/m)			
5128.60	H	42.57	---	5.75	48.32	---	74	54	-5.68
5150.00	H	44.17	---	5.82	49.99	---	74	54	-4.01
5128.60	V	41.35	---	5.75	47.10	---	74	54	-6.90
5150.00	V	42.34	---	5.82	48.16	---	74	54	-5.84
11n(HT40) CH38: 5190MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (Db $\mu$ V)	AV reading (dBuV)	Correction Factor (Db/m)	Emission Level		Peak limit (dB $\mu$ V/m)	AV limit (dB $\mu$ V/m)	Margin (dB)
					Peak (dB $\mu$ V/m)	AV (dB $\mu$ V/m)			
5135.98	H	42.38	---	5.78	48.16	---	74	54	-5.84
5150.00	H	43.86	---	5.82	49.50	---	74	54	-4.50
5135.98	V	40.57	---	5.78	46.35	---	74	54	-7.65
5150.00	V	41.62	---	5.82	47.44	---	74	54	-6.56
11n(HT40) CH46: 5230MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (Db $\mu$ V)	AV reading (dBuV)	Correction Factor (dB/m)	Emission Level		Peak limit (dB $\mu$ V/m)	AV limit (dB $\mu$ V/m)	Margin (dB)
					Peak (dB $\mu$ V/m)	AV (dB $\mu$ V/m)			
5136.41	H	42.43	---	5.78	48.21	---	74	54	-5.79
5150.00	H	43.59	---	5.82	49.41	---	74	54	-4.59
5306.66	V	40.62	---	5.78	46.40	---	74	54	-7.60
5136.41	V	41.28	---	5.82	47.10	---	74	54	-6.90

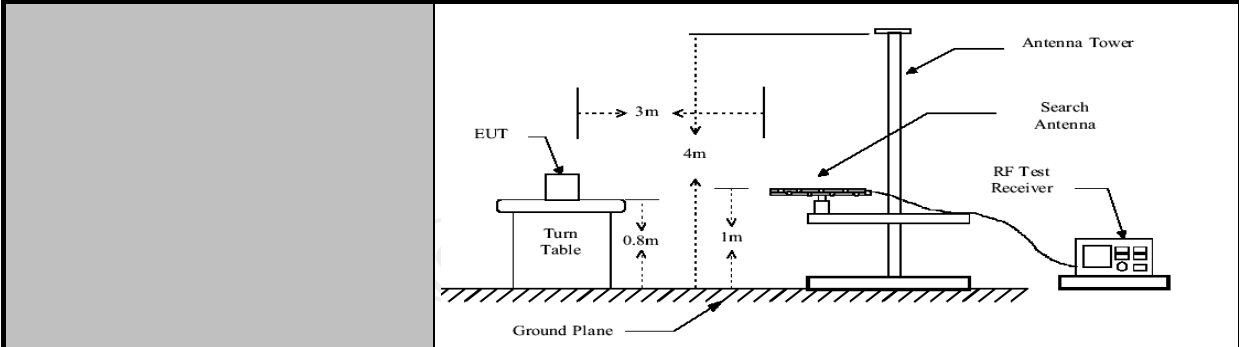
**Band IV**

11n (HT20) CH149: 5745MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB $\mu$ V)	AV reading (dB $\mu$ V)	Correction Factor (Db/m)	Emission Level		Peak limit (dB $\mu$ V/m)	AV limit (dB $\mu$ V/m)	Margin (Db)
					Peak (dB $\mu$ V/m)	AV (dB $\mu$ V/m)			
5448.15	H	41.65	---	6.87	48.52	---	74	54	-5.48
5460.00	H	42.75	---	6.90	49.65	---	74	54	-4.35
5448.15	V	40.37	---	6.87	47.24	---	74	54	-6.76
5460.00	V	41.68	---	6.90	48.58	---	74	54	-5.42
11n (HT20) CH157: 5785MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB $\mu$ V)	AV reading (dB $\mu$ V)	Correction Factor (Db/m)	Emission Level		Peak limit (dB $\mu$ V/m)	AV limit (dB $\mu$ V/m)	Margin (Db)
					Peak (dB $\mu$ V/m)	AV (dB $\mu$ V/m)			
5439.61	H	41.81	---	6.83	48.64	---	74	54	-5.36
5460.00	H	43.06	---	6.90	49.96	---	74	54	-4.04
5439.61	V	41.25	---	6.83	48.08	---	74	54	-5.92
5460.00	V	42.32	---	6.90	49.22	---	74	54	-4.78
11n(HT20) CH165: 5825MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB $\mu$ V)	AV reading (dB $\mu$ V)	Correction Factor (Db/m)	Emission Level		Peak limit (dB $\mu$ V/m)	AV limit (dB $\mu$ V/m)	Margin (dB)
					Peak (dB $\mu$ V/m)	AV (dB $\mu$ V/m)			
5446.24	H	41.77	---	6.85	48.62	---	74	54	-5.38
5460.00	H	42.82	---	6.90	49.72	---	74	54	-4.28
5446.24	V	40.36	---	6.85	47.21	---	74	54	-6.79
5460.00	V	41.81	---	6.90	48.71	---	74	54	-5.29
11n(HT40) CH151: 5755MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB $\mu$ V)	AV reading (dB $\mu$ V)	Correction Factor (dB/m)	Emission Level		Peak limit (dB $\mu$ V/m)	AV limit (dB $\mu$ V/m)	Margin (dB)
					Peak (dB $\mu$ V/m)	AV (dB $\mu$ V/m)			
5442.37	H	41.34	---	6.83	48.17	---	74	54	-5.83
5460.00	H	42.37	---	6.90	49.27	---	74	54	-4.73
5442.37	V	40.17	---	6.83	47.00	---	74	54	-7.00
5460.00	V	42.03	---	6.90	48.93	---	74	54	-5.07
11n(HT40) CH159: 5795MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dB $\mu$ V)	AV reading (dB $\mu$ V)	Correction Factor (dB/m)	Emission Level		Peak limit (dB $\mu$ V/m)	AV limit (dB $\mu$ V/m)	Margin (dB)
					Peak (dB $\mu$ V/m)	AV (dB $\mu$ V/m)			
5452.47	H	41.57	---	6.88	48.45	---	74	54	-5.55
5460.00	H	42.64	---	6.90	49.54	---	74	54	-4.46
5452.47	V	40.35	---	6.88	47.23	---	74	54	-6.77
5460.00	V	41.72	---	6.90	48.62	---	74	54	-5.38

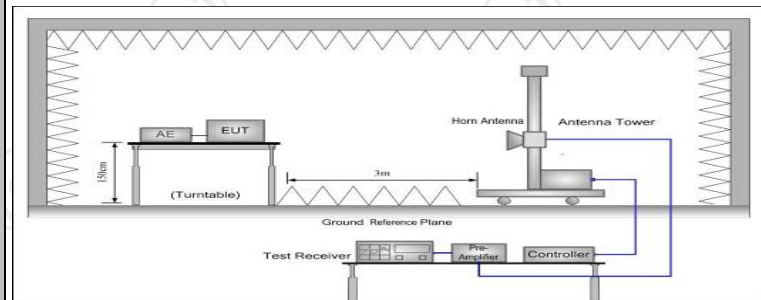
**6.8.2. Unwanted Emissions out of the Restricted Bands**

**6.8.2.1. Test Specification**

<b>Test Requirement:</b>	FCC CFR47 Part 15 Section 15.407 & 15.209 & 15.205				
<b>Test Method:</b>	KDB 789033 D02 v01r04				
<b>Frequency Range:</b>	9kHz to 40GHz				
<b>Measurement Distance:</b>	3 m				
<b>Antenna Polarization:</b>	Horizontal & Vertical				
<b>Operation mode:</b>	Transmitting mode with modulation				
<b>Receiver Setup:</b>	Frequency	Detector	RBW	VBW	Remark
	9kHz- 150kHz	Quasi-peak	200Hz	1kHz	Quasi-peak Value
	150kHz- 30MHz	Quasi-peak	9kHz	30kHz	Quasi-peak Value
	30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		Peak	1MHz	10Hz	Average Value
<b>Limit:</b>	Unwanted spurious emissions fallen in restricted bands per FCC Part15.205 shall comply with the general field strength limits set forth in § 15.209 as below table,				
	Frequency	Field Strength (microvolts/meter)	Measurement Distance (meters)		
	0.009-0.490	2400/F(KHz)	300		
	0.490-1.705	24000/F(KHz)	30		
	1.705-30	30	30		
	30-88	100	3		
	88-216	150	3		
	216-960	200	3		
	Above 960	500	3		
	Frequency	Limit (dBuV/m @3m)	Detector		
Above 1G	74.0	Peak			
	54.0	Average			
<b>Test setup:</b>	For radiated emissions below 30MHz				
	<p>The diagram illustrates the test setup for radiated emissions below 30MHz. It shows an Equipment Under Test (EUT) placed on a turn table. A distance of 3m is maintained between the EUT and the antenna. The antenna is positioned above a ground plane. The antenna is connected to a receiver, which is also connected to a pre-amplifier and a computer. The computer is used to process the data received from the receiver.</p>				
	30MHz to 1GHz				



Above 1GHz



**Test Procedure:**

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.
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.
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.
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.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
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.

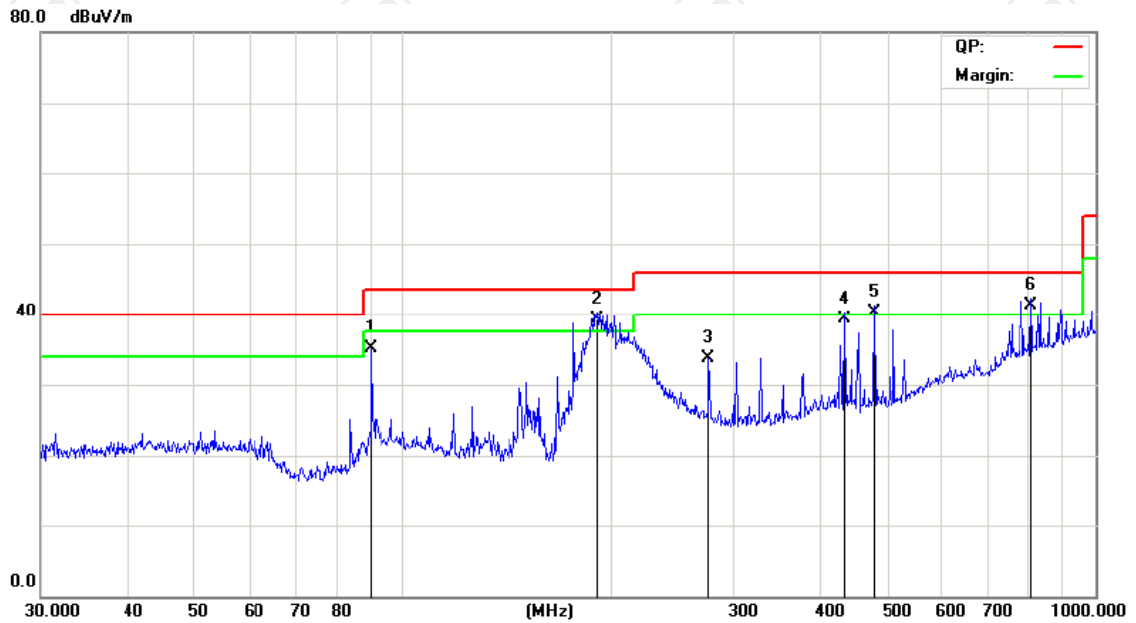
**Test results:**

PASS

## 6.8.3. Test Data

Please refer to following diagram for individual  
Below 1GHz

Horizontal:



Site Chamber #2

Polarization: **Horizontal**

Temperature: 25 (C)

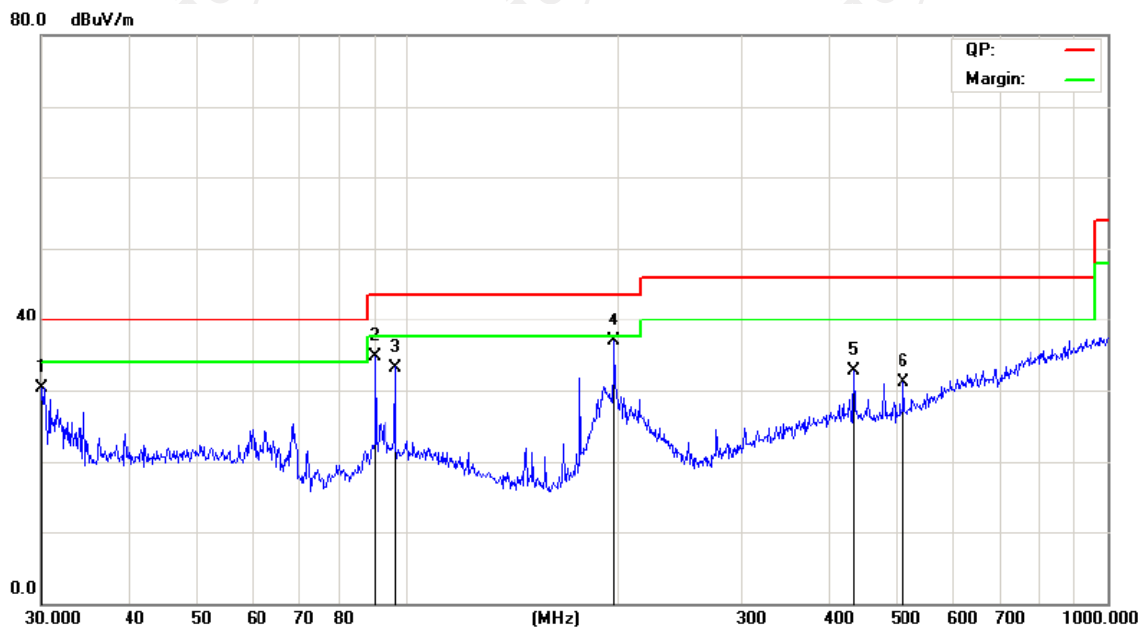
Limit: FCC Part 15B Class B 3M Radiation

Power: DC 7.4V

Humidity: 55 %

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		89.9047	43.05	-7.88	35.17	43.50	-8.33	QP	
2	*	190.4050	48.75	-9.52	39.23	43.50	-4.27	QP	
3		276.1235	40.76	-7.05	33.71	46.00	-12.29	QP	
4		434.0649	40.91	-1.68	39.23	46.00	-6.77	QP	
5	!	478.8455	41.66	-1.39	40.27	46.00	-5.73	QP	
6	!	807.4288	35.09	6.26	41.35	46.00	-4.65	QP	

Vertical:



Site Chamber #2

Polarization: **Vertical**

Temperature: 25 (C)

Limit: FCC Part 15B Class B 3M Radiation

Power: DC 7.4V

Humidity: 55 %

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		30.1052	38.41	-8.01	30.40	40.00	-9.60	QP	
2		89.9047	42.63	-7.88	34.75	43.50	-8.75	QP	
3		96.0986	40.18	-6.98	33.20	43.50	-10.30	QP	
4	*	197.1999	46.20	-9.20	37.00	43.50	-6.50	QP	
5		434.0649	34.35	-1.68	32.67	46.00	-13.33	QP	
6		511.8351	31.84	-0.79	31.05	46.00	-14.95	QP	

**Note:** 1. The low frequency, which started from 9KHz~30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported

2. Measurements were conducted in all three channels (high, middle, low) and all modulation (802.11n), and the worst case Mode (Highest channel and 11n(HT20)) was submitted only.

Modulation Type: Band I									
11n(HT20) CH36: 5180MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBµV)	AV reading (dBµV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBµV/m)	AV limit (dBµV/m)	Margin (dB)
					Peak (dBµV/m)	AV (dBµV/m)			
10360	H	42.68	---	8.02	50.70	---	74	54	-3.30
15540	H	41.37	---	9.87	51.24	---	74	54	-2.76
---	H	---	---	---	---	---	---	---	---
10360	V	41.41	---	8.02	49.43	---	74	54	-4.57
15540	V	39.27	---	9.87	49.14	---	74	54	-4.86
---	V	---	---	---	---	---	---	---	---
11n(HT20) CH40: 5200MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBµV)	AV reading (dBµV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBµV/m)	AV limit (dBµV/m)	Margin (dB)
					Peak (dBµV/m)	AV (dBµV/m)			
10400	H	42.42	---	7.97	50.65	---	74	54	-3.35
15660	H	40.34	---	9.83	51.20	---	74	54	-2.80
---	H	---	---	---	---	---	---	---	---
10400	V	41.27	---	7.97	49.24	---	74	54	-4.76
15660	V	39.14	---	9.83	48.97	---	74	54	-5.03
---	V	---	---	---	---	---	---	---	---
11n(HT20) CH48: 5240MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBµV)	AV reading (dBµV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBµV/m)	AV limit (dBµV/m)	Margin (dB)
					Peak (dBµV/m)	AV (dBµV/m)			
10480	H	41.67	---	9.18	50.85	---	74	54	-3.15
15720	H	39.25	---	10.07	49.32	---	74	54	-4.68
---	H	---	---	---	---	---	---	---	---
10480	V	40.34	---	9.18	49.52	---	74	54	-4.48
15720	V	38.51	---	10.07	48.58	---	74	54	-5.42
---	V	---	---	---	---	---	---	---	---
11n(HT40) CH38: 5190MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBµV)	AV reading (dBµV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBµV/m)	AV limit (dBµV/m)	Margin (dB)
					Peak (dBµV/m)	AV (dBµV/m)			
10380	H	42.17	---	7.75	49.92	---	74	54	-4.08
15570	H	40.24	---	9.87	50.11	---	74	54	-3.89
---	H	---	---	---	---	---	---	---	---
10380	V	40.64	---	7.75	48.39	---	74	54	-5.61
15570	V	39.48	---	9.87	49.35	---	74	54	-4.65
---	V	---	---	---	---	---	---	---	---
11n(HT40) CH46: 5230MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBµV)	AV reading (dBµV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBµV/m)	AV limit (dBµV/m)	Margin (dB)
					Peak (dBµV/m)	AV (dBµV/m)			
10460	H	42.15	---	7.97	50.12	---	74	54	-3.88
15690	H	40.24	---	9.83	50.07	---	74	54	-3.93
---	H	---	---	---	---	---	---	---	---
10460	V	40.97	---	7.97	48.94	---	74	54	-5.06
15690	V	39.26	---	9.83	49.09	---	74	54	-4.91
---	V	---	---	---	---	---	---	---	---



**Note:**

1. *Emission Level=Peak Reading + Correction Factor; Correction Factor= Antenna Factor + Cable loss – Pre-amplifier*
2. *Margin (dB) = Emission Level (Peak) (dB $\mu$ V/m)-Average limit (dB $\mu$ V/m)*
3. *The emission levels of other frequencies are very lower than the limit and not show in test report.*
4. *Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency. The highest test frequency is 40GHz.*
5. *Data of measurement shown “---“in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.*

Modulation Type: Band IV									
11n(HT20) CH149: 5745MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
11490	H	41.67	---	7.66	49.33	---	74	54	-4.67
17235	H	38.38	---	9.5	47.88	---	74	54	-6.12
---	H	---	---	---	---	---	---	---	---
11490	V	40.56	---	7.66	48.22	---	74	54	-5.78
17235	V	36.27	---	9.5	45.77	---	74	54	-8.23
---	V	---	---	---	---	---	---	---	---

11n(HT20) CH157: 5785MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
11570	H	41.37	---	7.99	49.36	---	74	54	-4.64
17355	H	36.75	---	9.85	46.60	---	74	54	-7.40
---	H	---	---	---	---	---	---	---	---
11570	V	40.29	---	7.99	48.28	---	74	54	-5.72
17355	V	35.18	---	9.85	45.03	---	74	54	-8.97
---	V	---	---	---	---	---	---	---	---

11n(HT20) CH161: 5825MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
11650	H	41.83	---	8.12	49.95	---	74	54	-4.05
17475	H	36.57	---	9.5	46.07	---	74	54	-7.93
---	H	---	---	---	---	---	---	---	---
11650	V	40.89	---	8.12	49.01	---	74	54	-4.99
17475	V	34.69	---	9.5	44.19	---	74	54	-9.81
---	V	---	---	---	---	---	---	---	---

11n(HT40) CH151: 5755MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
11510	H	41.39	---	7.72	49.11	---	74	54	-4.89
17265	H	36.54	---	10.22	46.76	---	74	54	-7.24
---	H	---	---	---	---	---	---	---	---
11510	V	40.27	---	7.72	47.99	---	74	54	-6.01
17265	V	35.08	---	10.22	45.3	---	74	54	-8.7
---	V	---	---	---	---	---	---	---	---

11n(HT40) CH159: 5795MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
11590	H	41.05	---	8.06	49.11	---	74	54	-4.89
17385	H	35.83	---	9.5	45.33	---	74	54	-8.67
---	H	---	---	---	---	---	---	---	---
11590	V	39.67	---	8.06	47.73	---	74	54	-6.27
17385	V	34.26	---	9.5	43.76	---	74	54	-10.24
---	V	---	---	---	---	---	---	---	---

**Note:**

1. Emission Level=Peak Reading + Correction Factor; Correction Factor= Antenna Factor + Cable loss – Pre-amplifier
2. Margin (dB) = Emission Level (Peak) (dBμV/m)-Average limit (dBμV/m)
3. The emission levels of other frequencies are very lower than the limit and not show in test report.
4. Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency. The highest test frequency is 40GHz.
5. Data of measurement shown “---“in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.

## 6.9. Frequency Stability Measurement

### 6.9.1. Test Specification

<b>Test Requirement:</b>	FCC Part15 Section 15.407(g) &Part2 J Section 2.1055
<b>Test Method:</b>	ANSI C63.10: 2013
<b>Limit:</b>	The frequency tolerance shall be maintained within the band of operation frequency over a temperature variation of 0 degrees to 35 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.
<b>Test Setup:</b>	<pre> graph LR     SA[Spectrum Analyzer] --- EUT[EUT]     subgraph TC [Temperature Chamber]         EUT     end     P[AC/DC Power supply] --- EUT             </pre>
<b>Test Procedure:</b>	The EUT was placed inside the environmental test chamber and powered by nominal AC/DC voltage. b. Turn the EUT on and couple its output to a spectrum analyzer. c. Turn the EUT off and set the chamber to the highest temperature specified. d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize. e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature. f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.
<b>Test Result:</b>	PASS
<b>Remark:</b>	Pre-scan was performed at Antenna 0 and Antenna 1, the worst case was found. Only the test data of Antenna 0 was shown in this report.

Test plots as follows:

Test mode:		802.11n(HT20)	Frequency(MHz):	5180
Temperature (°C)	Voltage(VAC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	7.4	5180.0054	5400	PASS
35		5180.0016	1600	PASS
25		5179.9967	-3300	PASS
15		5179.9965	-3500	PASS
5		5180.0035	3500	PASS
0		5180.0052	5200	PASS
20	8.4	5180.0033	3300	PASS
	7.4	5179.9957	-4300	PASS
	6.4	5179.9969	-3100	PASS

Test mode:		802.11n(HT20)	Frequency(MHz):	5200
Temperature (°C)	Voltage(VAC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	7.4	5200.0048	4800	PASS
35		5200.0048	4800	PASS
25		5200.0053	5300	PASS
15		5200.0030	3000	PASS
5		5199.9957	-4300	PASS
0		5199.9921	-7900	PASS
20	8.4	5199.9970	-3000	PASS
	7.4	5200.0017	1700	PASS
	6.4	5200.0060	6000	PASS

Test mode:		802.11n(HT20)	Frequency(MHz):	5240
Temperature (°C)	Voltage(VAC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	7.4	5240.0074	7400	PASS
35		5240.0052	5200	PASS
25		5240.0047	4700	PASS
15		5239.9983	-1700	PASS
5		5239.9988	-1200	PASS
0		5239.9982	-1800	PASS
20	8.4	5240.0054	5400	PASS
	7.4	5240.0021	2100	PASS
	6.4	5240.0021	2100	PASS

Test mode:		802.11n(HT20)	Frequency(MHz):	5745
Temperature (°C)	Voltage(VAC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	7.4	5745.0067	6700	PASS
35		5745.0028	2800	PASS
25		5745.0031	3100	PASS
15		5745.0019	1900	PASS
5		5745.0013	1300	PASS
0		5745.0074	7400	PASS
20		8.4	5745.0042	4200
	7.4	5744.9940	-6000	PASS
	6.4	5745.0028	2800	PASS

Test mode:		802.11n(HT20)	Frequency(MHz):	5785
Temperature (°C)	Voltage(VAC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	7.4	5785.0101	10100	PASS
35		5785.0045	4500	PASS
25		5785.0029	2900	PASS
15		5784.9987	-1300	PASS
5		5784.9932	-6800	PASS
0		5785.0021	2100	PASS
20		8.4	5785.0038	3800
	7.4	5785.0033	3300	PASS
	6.4	5785.0050	5000	PASS

Test mode:		802.11n(HT20)	Frequency(MHz):	5825
Temperature (°C)	Voltage(VAC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	7.4	5824.9815	-18500	PASS
35		5824.9935	-6500	PASS
25		5824.9959	-4100	PASS
15		5824.9973	-2700	PASS
5		5825.0016	1600	PASS
0		5825.0046	4600	PASS
20		8.4	5825.0042	4200
	7.4	5824.9987	-1300	PASS
	6.4	5825.0026	2600	PASS

Test mode:		802.11n(HT40)	Frequency(MHz):	5190
Temperature (°C)	Voltage(VAC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	7.4	5190.0081	8100	PASS
35		5190.0077	7700	PASS
25		5190.0088	8800	PASS
15		5190.0023	2300	PASS
5		5190.0075	7500	PASS
0		5190.0052	5200	PASS
20	8.4	5189.993	-7000	PASS
	7.4	5189.9952	-4800	PASS
	6.4	5190.0062	6200	PASS

Test mode:		802.11n(HT40)	Frequency(MHz):	5230
Temperature (°C)	Voltage(VAC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	7.4	5230.0074	7400	PASS
35		5230.0072	7200	PASS
25		5230.0082	8200	PASS
15		5229.9944	-5600	PASS
5		5229.9926	-7400	PASS
0		5229.9956	-4400	PASS
20	8.4	5230.0037	3700	PASS
	7.4	5230.0061	6100	PASS
	6.4	5230.0043	4300	PASS

Test mode:		802.11n(HT40)	Frequency(MHz):	5755
Temperature (°C)	Voltage(VAC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	7.4	5755.0211	21100	PASS
35		5755.0122	12200	PASS
25		5755.0104	10400	PASS
15		5755.0059	5900	PASS
5		5755.0035	3500	PASS
0		5755.0075	7500	PASS
20	8.4	5755.0046	4600	PASS
	7.4	5755.0032	3200	PASS
	6.4	5755.0065	6500	PASS

Test mode:		802.11n(HT40)	Frequency(MHz):	5795
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Temperature (°C)	Voltage(VAC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	7.4	5794.9866	-13400	PASS
35		5794.9849	-15100	PASS
25		5795.0046	4600	PASS
15		5795.0021	2100	PASS
5		5795.0060	6000	PASS
0		5795.0081	8100	PASS
20	8.4	5795.0092	9200	PASS
	7.4	5794.9955	-4500	PASS
	6.4	5795.0068	6800	PASS

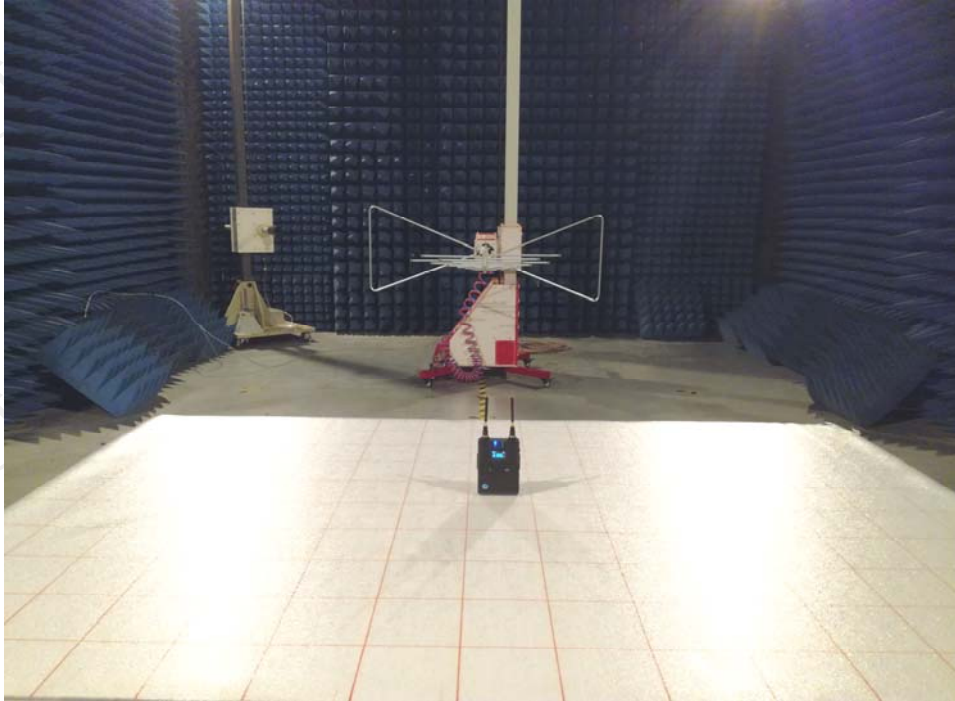


### Appendix A: Photographs of Test Setup

Product: FREESTREAM Transmitter

Model: CP7039

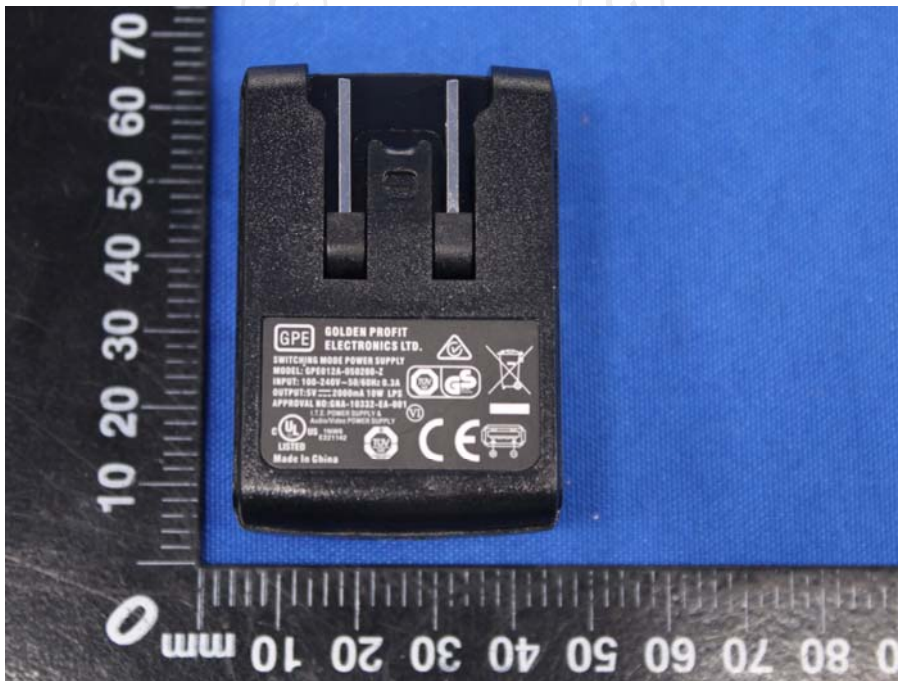
Radiated Emission

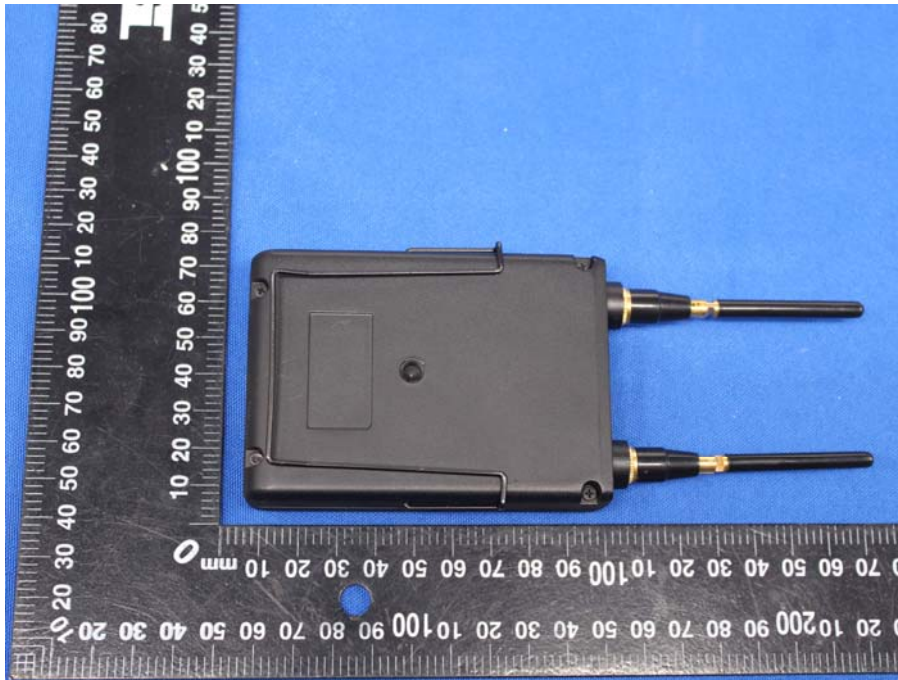
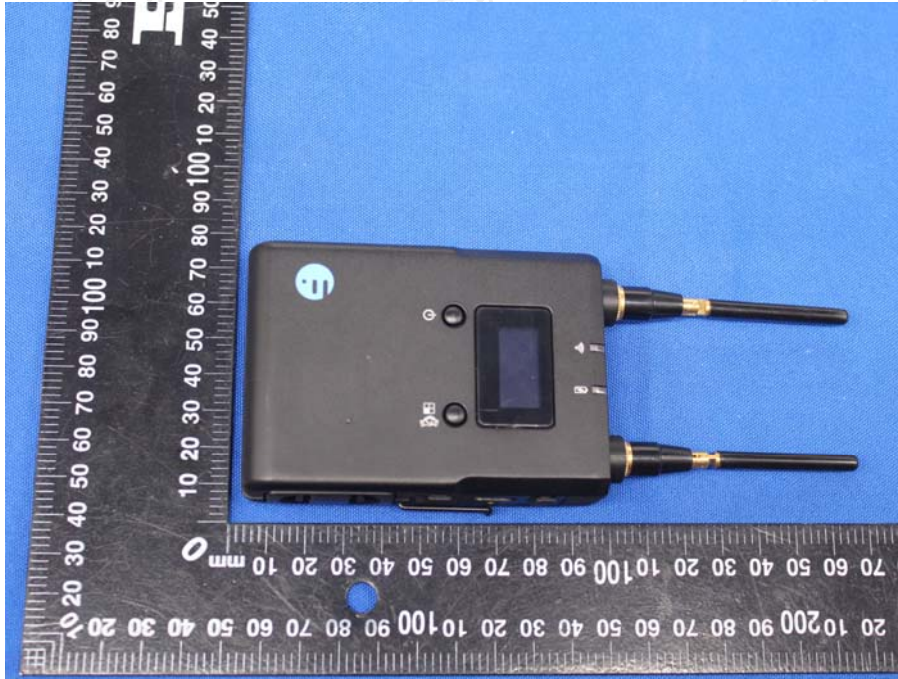


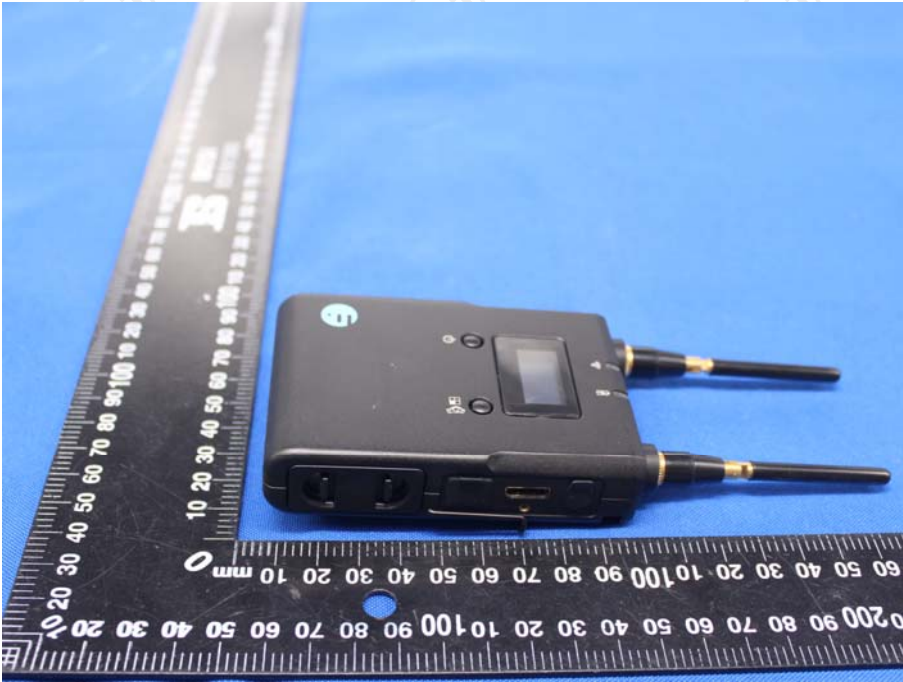
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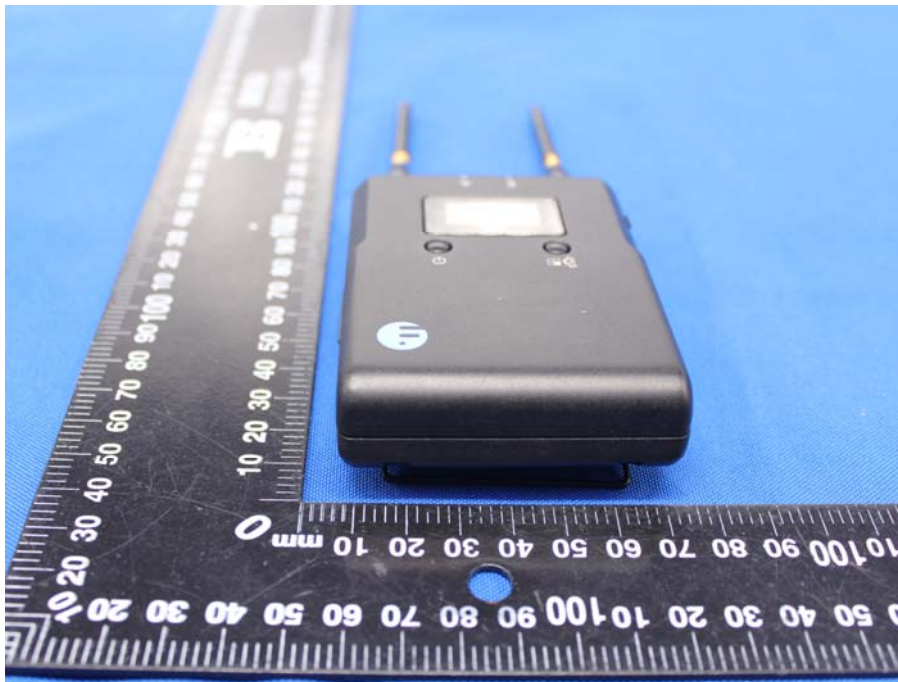
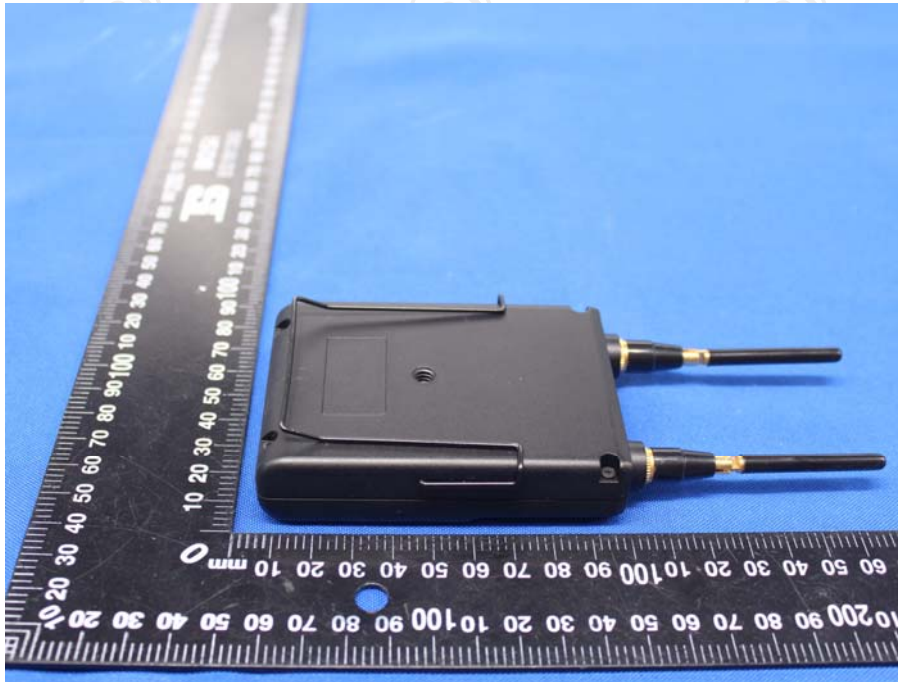


**Appendix B: Photographs of EUT**  
**Product: FREESTREAM Transmitter**  
**Model: CP7039**  
**External Photos**

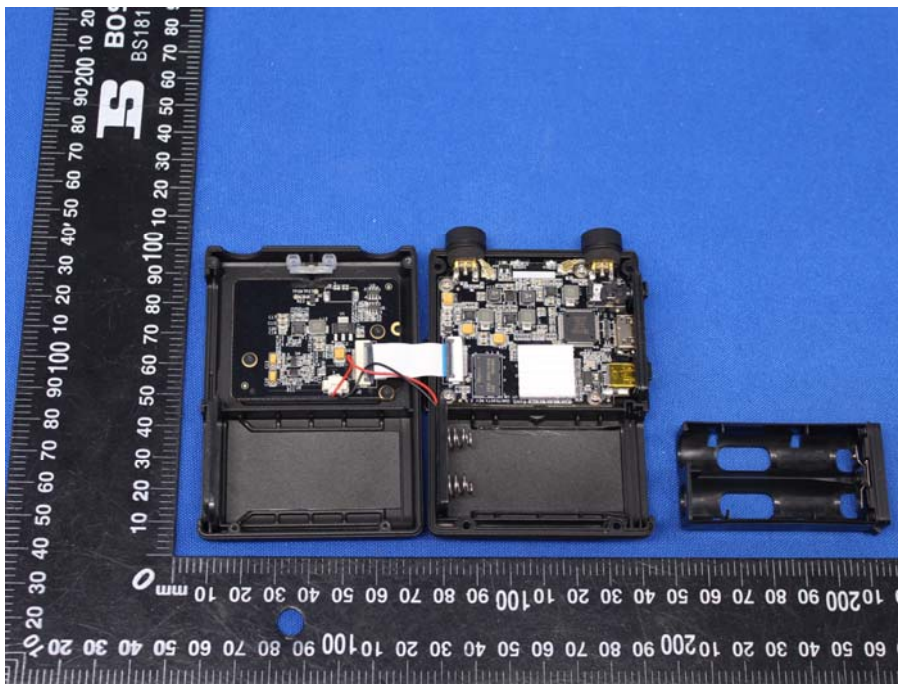
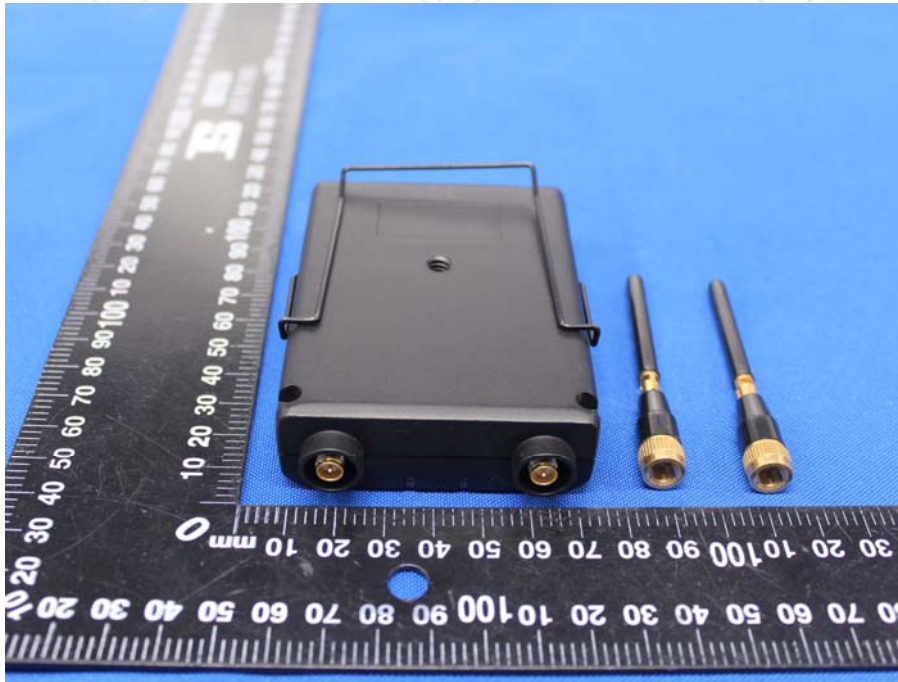


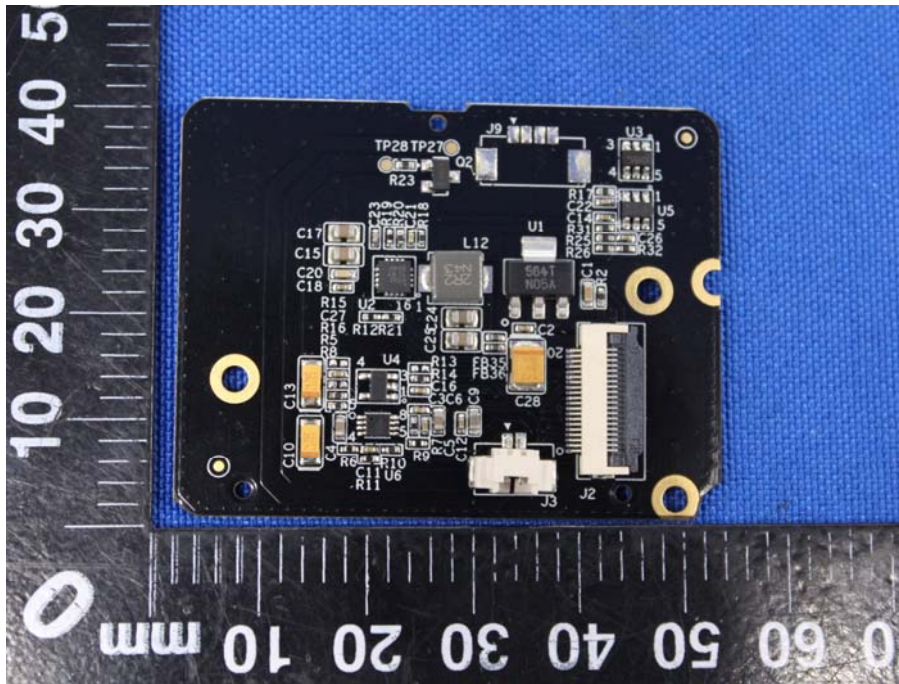
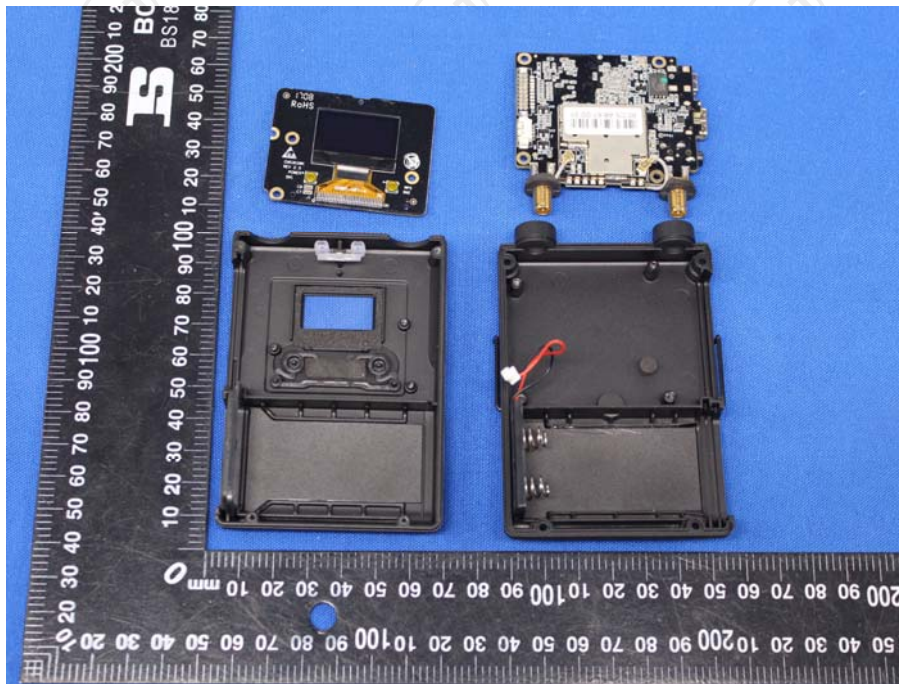




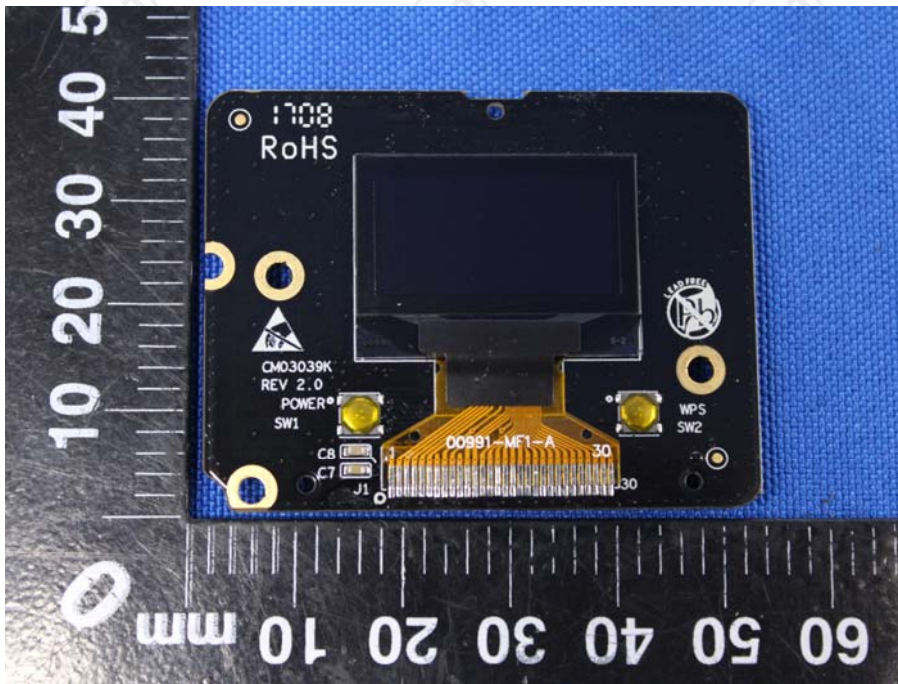


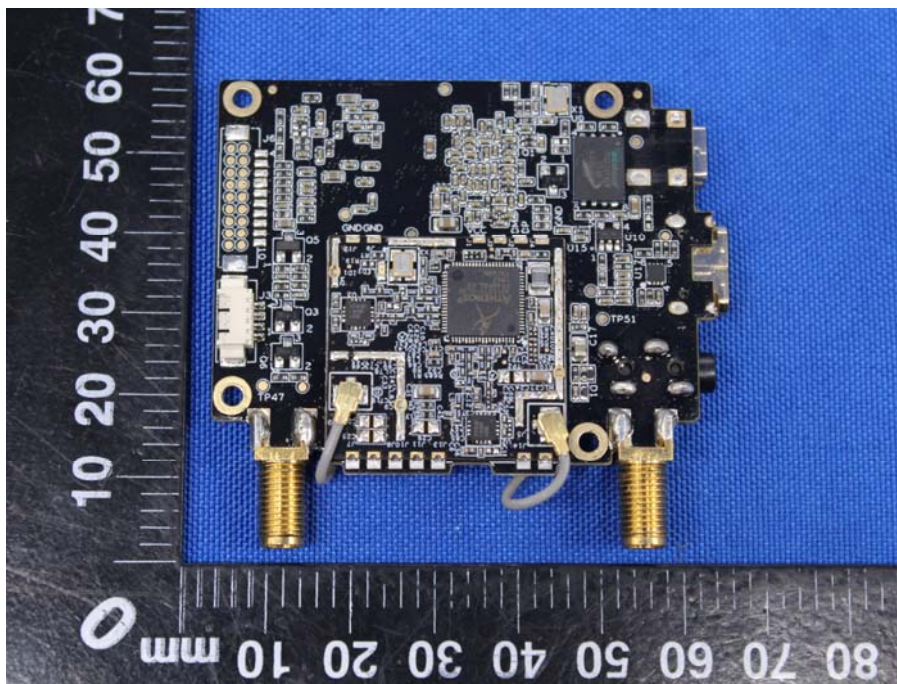
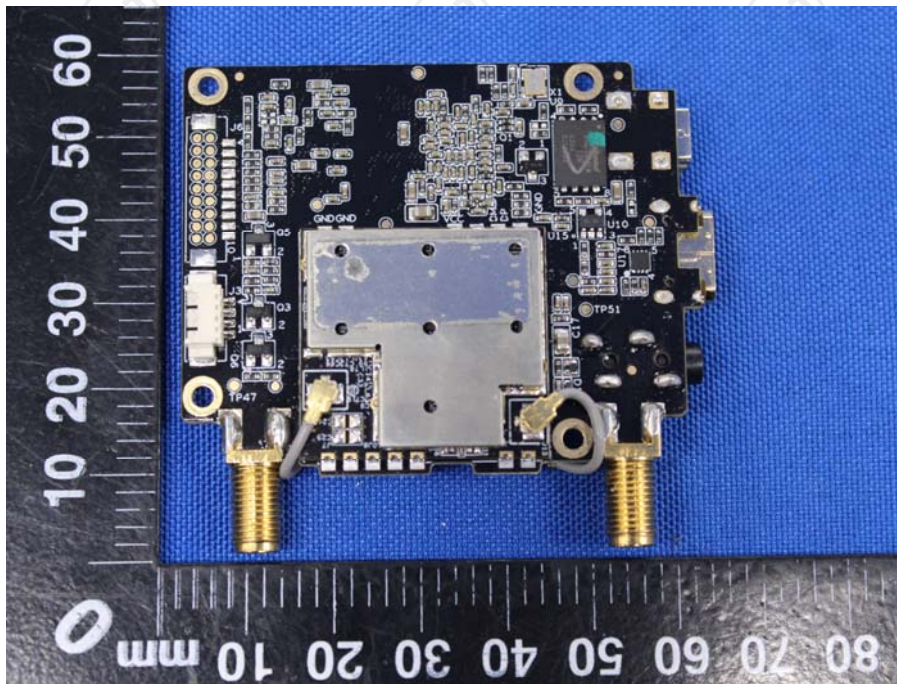
**Product: FREESTREAM Transmitter**  
**Model: CP7039**  
**Internal Photos**











**\*\*\*\*\*END OF REPORT\*\*\*\*\***