

### 8. BAND EDGE EMISSION

#### 8.1. MEASUREMENT PROCEDURE

Radiated restricted band edge measurements

The radiated restricted band edge measurements are measured with an EMI test receiver connected to the receive antenna while the EUT is transmitting

#### 8.2. TEST SET-UP

same as 7.2

#### Note:

1. Factor=Antenna Factor + Cable loss - Amplifier gain. Field Strength=Factor + Reading level

2. The factor had been edited in the "Input Correction" of the Spectrum Analyzer. So the Amplitude of test plots is equal to Reading level plus the Factor in dB. Use the A dB( $\mu$ V) to represent the Amplitude. Use the F dB( $\mu$ V/m) to represent the Field Strength. So A=F.



### 8.3. TEST RESULT

EUT	WIFI BLE Module	Model Name	C-3031U
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with data rate 1 2412MHZ	Antenna	Horizontal

ΡK



Next Pea Ref 106.00 dBµV Next Pk Right Next Pk Lef Marker Delta Start 2.37000 GHz #Res BW 1.0 MHz Mkr→CF 2.411 965 GHz 103.407 dBµV 2.390 000 GHz 50.435 dBµV N 1 f N 1 f Mkr→RefLvl More 1 of 2 STATUS



larker 1		0 Ω AC 000000 G	Hz PNO: Fast FGain:Low			Avg Type Avg Hold		TYPE A W	3 4 5 0	Peak Search
0 dB/div	Ref 106.	00 dBµV					Mkr1	2.413 065 97.085 d	GHz BµV	Next Pea
96.0 86.0										Next Pk Righ
76.0 66.0 56.0				>	~/					Next Pk Le
46.0 36.0 26.0			<u>\</u>							Marker Del
Res BW	'000 GHz 1.0 MHz		#VB	W 3.0 MHz			Sweep 1.	Stop 2.42500 000 ms (1001	pts)	Mkr→C
MKR MODE TF   1 N 1   2 N 1   3 1 1   4 1 1	f	× 2.413 0 2.390 0	65 GHz 00 GHz	Y 97.081 dB 40.581 dB	μV	CTION FUI	VCTION WIDTH	FUNCTION VAL		Mkr→RefL
6 7 8 9										<b>Mo</b> 1 o
0										1.01



EUT	WIFI BLE Module	Model Name	C-3031U
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with data rate 1 2412MHZ	Antenna	Vertical



#### AV





EUT	WIFI BLE Module	Model Name	C-3031U
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with data rate 1 2462MHZ	Antenna	Horizontal









EUT	WIFI BLE Module	Model Name	C-3031U
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with data rate 1 2462MHZ	Antenna	Vertical









EUT	WIFI BLE Module	Model Name	C-3031U
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11g with data rate 6 2412MHZ	Antenna	Horizontal



#### AV





EUT	WIFI BLE Module	Model Name	C-3031U
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11g with data rate 6 2412MHZ	Antenna	Vertical



#### AV





EUT	WIFI BLE Module	Model Name	C-3031U
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11g with data rate 6 2462MHZ	Antenna	Horizontal









EUT	WIFI BLE Module	Model Name	C-3031U
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11g with data rate 6 2462MHZ	Antenna	Vertical



#### AV





EUT	WIFI BLE Module	Model Name	C-3031U
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11n 20 with data rate 6.5 2412MHZ	Antenna	Horizontal









EUT	WIFI BLE Module	Model Name	C-3031U
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11n 20 with data rate 6.5 2412MHZ	Antenna	Vertical

ght Spectrum Analyzer - Swept S Marker 1 2.41345000000 GHz PN0: Fast IFGaint.ow #Atten: 20 dB Aug Type: Log-Pwr Avg Hold:>100/100 Peak Search TYPE NNNN NextPeal Mkr1 2.413 450 GHz 100.170 dBµ\ Ref 106.00 dBµV dBidi Next Pk Right Next Pk Left Marker Delta Stop 2.42500 GHz Sweep 1.000 ms (1001 pts) Start 2.37000 GHz #Res BW 1.0 MHz #VBW 3.0 MHz Mkr→CF 2.413 450 GHz 2.390 000 GHz 100.170 dBµV 56.228 dBµV Mkr→RefLv More 1 of 2 STATUS

ΡK







EUT	WIFI BLE Module	Model Name	C-3031U
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11n 20 with data rate 6.5 2462MHZ	Antenna	Horizontal









EUT	WIFI BLE Module	Model Name	C-3031U
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11n 20 with data rate 6.5 2462MHZ	Antenna	Vertical

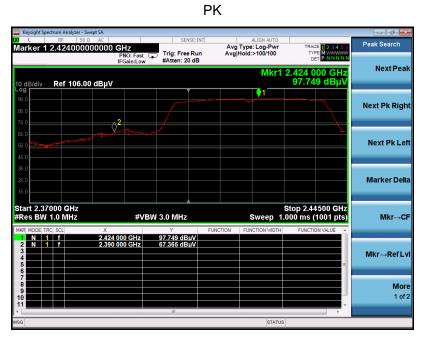








EUT	WIFI BLE Module	Model Name	C-3031U
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11n 40with data rate 13.5 2422MHZ	Antenna	Horizontal





⊾ RF larker 1 2.42	28800000000	GHz PNO: Fast G IFGain:Low	Trig: Free Run #Atten: 20 dB	Avg	ALIGN AUTO Type: RMS Hold:>100/100	TRACE 1 2 TYPE A W DET A N	NNNN
0 dB/div Re	f 106.00 dBµV				Mkr1	2.428 800 ( 89.259 d	
og 96.0 36.0						1	Next Pk Righ
6.0 6.0 6.0		2					Next Pk Le
6.0 6.0							Marker Del
tart 2.37000 Res BW 1.0 I	MHz	#VB\	N 3.0 MHz*	FUNCTION	Sweep 1	Stop 2.44500 .000 ms (1001	pts) Mkr→C
N 1 f   2 N 1 f   3 - - -   4 - - -   5 - - -	2.428	B00 GHz D00 GHz	89.226 dBµV 52.364 dBµV	Pononion		Pononion with	Mkr→RefL
6 7 8 9 0							Mo 1 of



EUT	WIFI BLE Module	Model Name	C-3031U
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11n 40 with data rate 13.5 2422MHZ	Antenna	Vertical

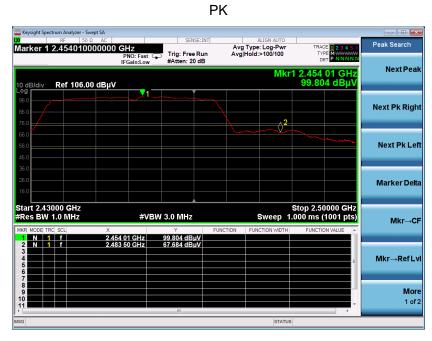


AV





EUT	WIFI BLE Module	Model Name	C-3031U
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11n 40with data rate 13.5 2452MHZ	Antenna	Horizontal



larker 1 2.	<sup>RF</sup> 50 Ω A/ 4585600000		Trig: Free Run #Atten: 20 dB	Avg	ALIGN AUTO Type: RMS Hold:>100/100	TRACE 1 2 3 4 5 6 TYPE A WWWW DET A N N N N N	Peak Search
0 dB/div	Ref 106.00 dE	βµV			Mkr1	2.458 56 GHz 91.049 dBμV	Next Pea
96.0			<b>↓</b> 1				Next Pk Rigi
86.0							next r krug
66.0							
56.0 <b>4</b>						and the state of t	Next Pk Le
36.0							
26.0							Marker Del
start 2.4300						top 2.50000 GHz	
Res BW 1.		#VE	3W 3.0 MHz*			000 ms (1001 pts)	Mkr→C
		Х	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	
IKR MODE TRC S	f	2.458 56 GHz	91.031 dBuV				
IKR MODE TRC S		2.458 56 GHz 2.483 50 GHz	91.031 dBµV 52.432 dBµV				
IKR MODE TRC 5			91.031 dBµV 52.432 dBµV			=	Mkr→RefL
IKR MODE TRC S   1 N 1 2 N 1   2 N 1 3 4 5 5 5 5 6 6 6 7 7 1<			91.031 dBµV 52.432 dBµV			E	Mkr→RefL
MKR MODE TRC 5 1 N 1 2 N 1 3 4 5 6			91.031 dBµV 52.432 dBµV			E	Mkr→RefL Mo 1 ol



EUT	WIFI BLE Module	Model Name	C-3031U
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11n 40 with data rate 13.5 2452MHZ	Antenna	Vertical



AV

Peak Search	123456 A WWWWW A N N N N N	TYP	ALIGN AUTO De: RMS d:>100/100		un	SENSE Trig: Free R #Atten: 20 d	GHz PNO: Fast O IFGain:Low	Swept SA 0 Ω AC 0000000		R	L	Ĺ
NextPea	14 GHz 7 dBµV	1 2.458 89.06	Mkr					00 dBµV	f 106.	Re	B/div	) dE og I
Next Pk Rig						1						96.0 86.0 76.0
Next Pk Le		tand an inclusion and a second	~~~^2								Ż	6.0 6.0 6.0
Marker De												36.0 26.0 16.0
Mkr→0	001 pts)	Stop 2.50 .000 ms (* FUNCTIC	Sweep 1			3.0 MHz*		X		I 1.0	s BV	Res
Mkr→RefL	=					89.066 dBµV 49.900 dBµV	58 14 GHz 33 50 GHz			1 f 1 f	N	1 2 3 4 5 6
<b>Мо</b> 1 о												7 8 9 0
	,		STATUS	_	_	m				_		_



## 9. LINE CONDUCTED EMISSION TEST

#### 9.1. LIMITS OF LINE CONDUCTED EMISSION TEST

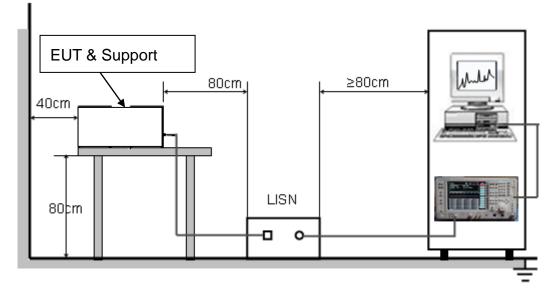
Frequency	Maximum RF Line Voltage				
Frequency	Q.P.( dBuV)	Average( dBuV)			
150kHz~500kHz	66-56	56-46			
500kHz~5MHz	56	46			
5MHz~30MHz	60	50			

Note:

1. The lower limit shall apply at the transition frequency.

2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50MHz.

#### 9.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST





### 9.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

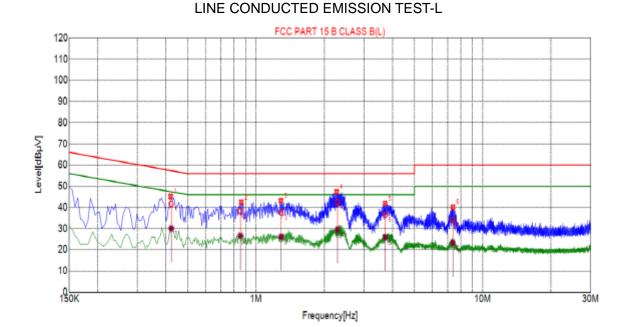
- 1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- 2. Support equipment, if needed, was placed as per ANSI C63.10.
- 3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
- 4. All support equipments received AC120V/60Hz power from a LISN, if any.
- 5. The EUT received charging voltage by adapter which received 120V/60Hzpower by a LISN..
- 6. The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
- 8. During the above scans, the emissions were maximized by cable manipulation.
- 9. The test mode(s) were scanned during the preliminary test.

Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

#### 9.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

- 1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
- A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less –2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
- 3. The test data of the worst case condition(s) was reported on the Summary Data page.



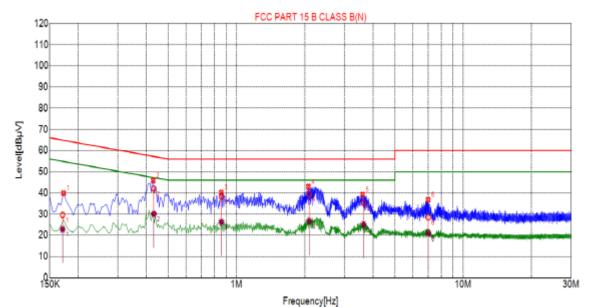


#### 9.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

Susp	Suspected List									
NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Detector				
1	0.4200	45.17	10.04	57.45	12.28	PK				
2	0.8610	42.48	10.06	56.00	13.52	PK				
3	1.2885	43.14	10.09	56.00	12.86	PK				
4	2.2695	47.35	10.18	56.00	8.65	PK				
5	3.7140	41.92	10.25	56.00	14.08	PK				
6	7.3950	40.12	10.18	60.00	19.88	PK				

Final Data List QP QP QP AV AV AV Freq. Factor NO. Value Limit Margin Value Limit Margin [MHz] [dB] 1 0.4225 10.04 41.67 57.40 15.73 30.05 47.40 17.35 2 0.8527 10.06 38.33 56.00 17.67 26.70 46.00 19.30 10.09 46.00 19.77 3 1.2903 37.69 56.00 18.31 26.23 4 2.2855 10.18 42.51 56.00 13.49 29.52 46.00 16.48 5 3.7223 10.25 36.63 56.00 19.37 26.01 46.00 19.99 23.29 6 7.3875 10.18 34.11 60.00 25.89 50.00 26.71





#### LINE CONDUCTED EMISSION TEST-N

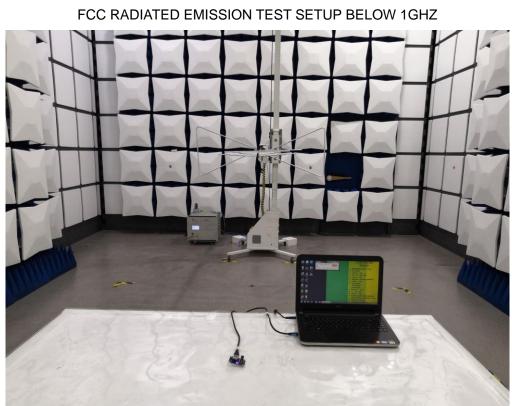
Suspected List									
NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Detector			
1	0.1725	39.95	10.04	64.84	24.89	PK			
2	0.4290	45.86	10.05	57.27	11.41	PK			
3	0.8565	40.18	10.06	56.00	15.82	PK			
4	2.0760	42.95	10.15	56.00	13.05	PK			
5	3.6015	39.20	10.25	56.00	16.80	PK			
6	7.0080	36.71	10.20	60.00	23.29	РК			

Final Data List								
NO.	Freq. (MHz)	Factor (dB)	QP Value [d8µV]	QP Limit (dBµV)	QP Margin (dB)	AV Value [dBµV]	AV Limit [d8µV]	AV Margin (dB)
1	0.1708	10.03	29.61	64.92	35.31	22.88	54.92	32.04
2	0.4317	10.05	42.12	57.22	15.10	30.09	47.22	17.13
3	0.8575	10.06	38.35	56.00	17.65	26.37	46.00	19.63
4	2.0967	10.15	39.56	56.00	16.44	26.67	46.00	19.33
5	3.6375	10.25	35.42	56.00	20.58	25.09	46.00	20.91
6	7.0218	10.20	28.51	60.00	31.49	20.87	50.00	29.13

#### **RESULT: PASS**

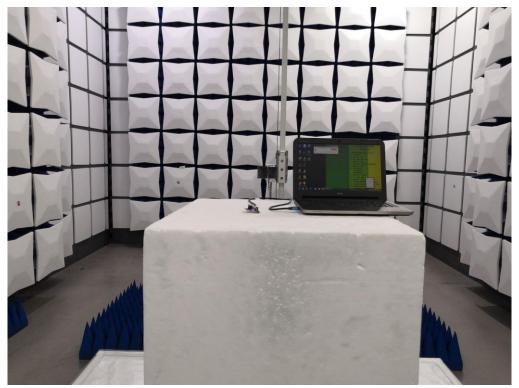
Note: All the test modes had been tested, the mode 1 was the worst case. Only the data of the worst case would be record in this test report.





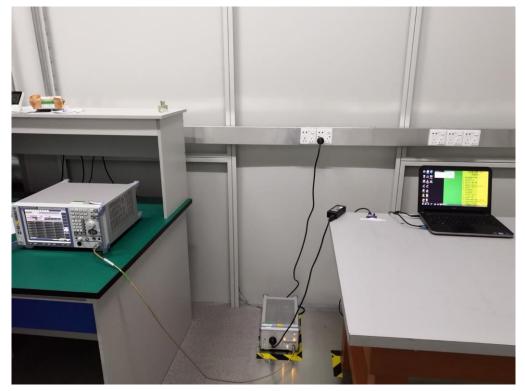
APPENDIX A: PHOTOGRAPHS OF TEST SETUP

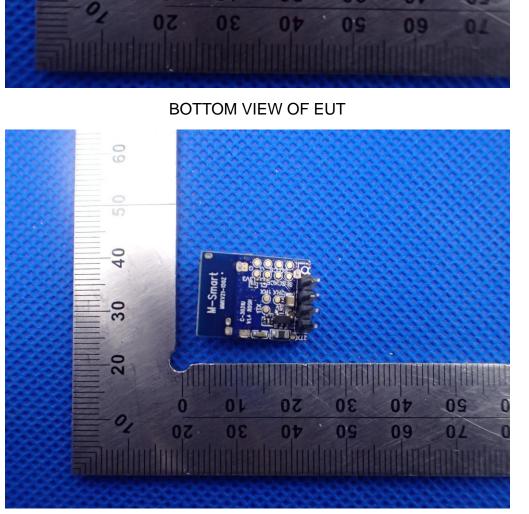
FCC RADIATED EMISSION TEST SETUP ABOVE 1GHZ

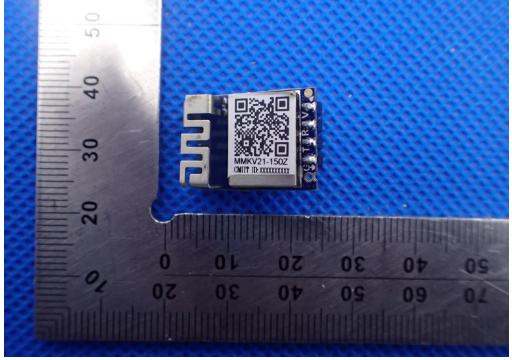




## Conducted Emission







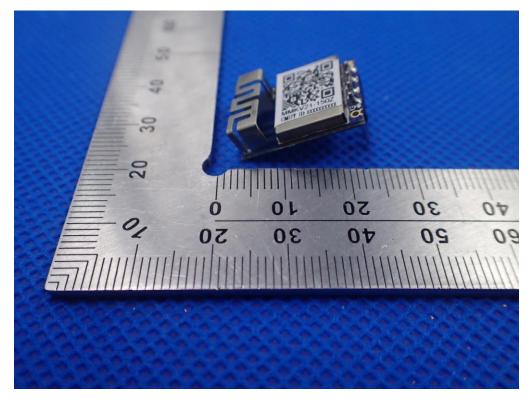
APPENDIX B: PHOTOGRAPHS OF EUT TOP VIEW OF EUT



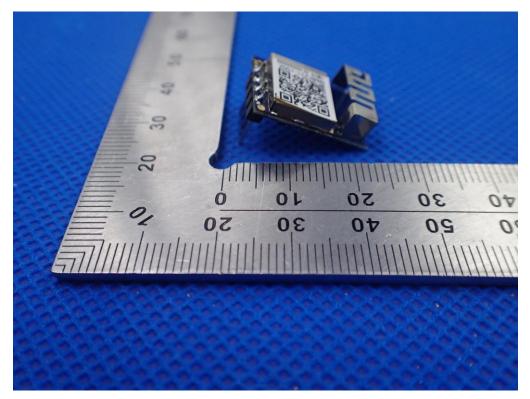


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# FRONT VIEW OF EUT



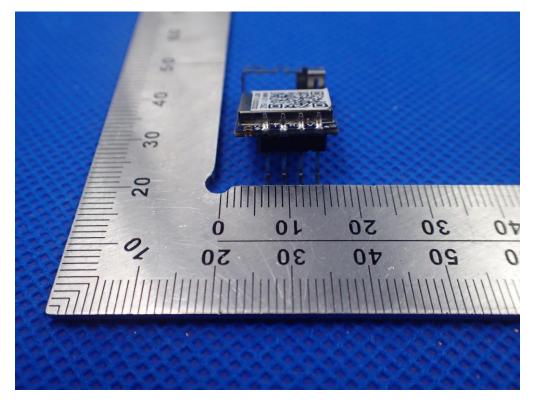
# BACK VIEW OF EUT



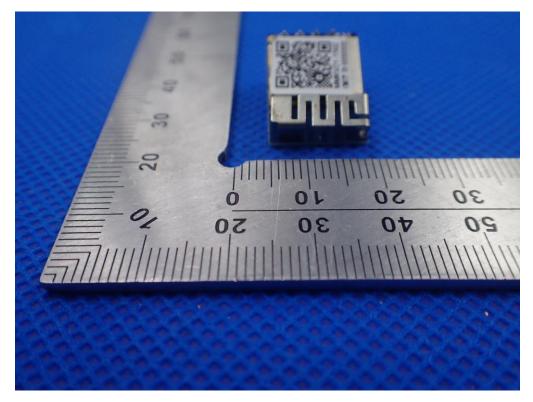


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# LEFT VIEW OF EUT

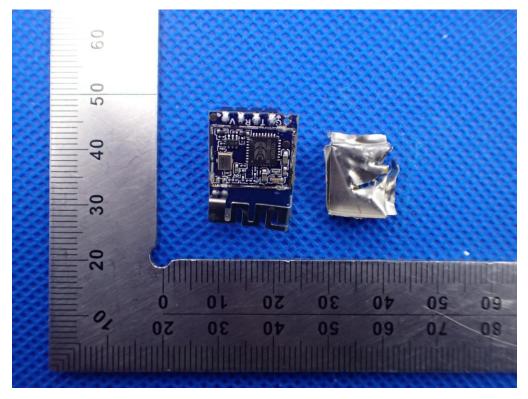


## **RIGHT VIEW OF EUT**

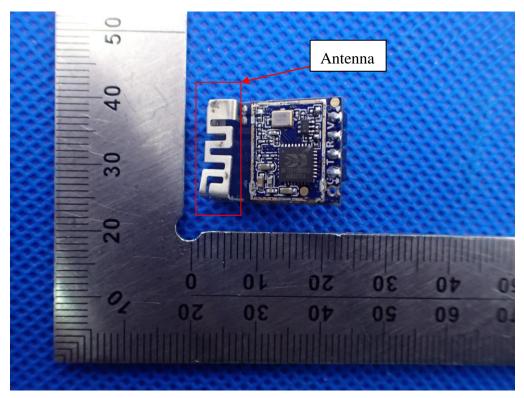




OPEN VIEW OF EUT



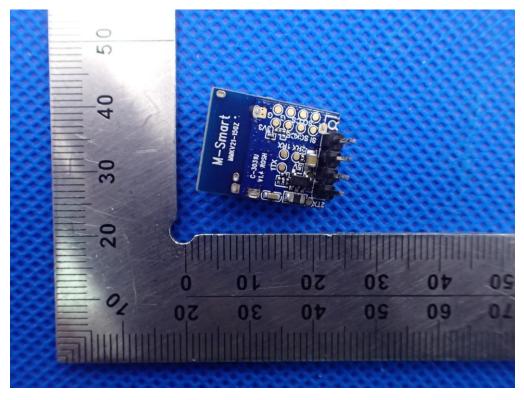
**INTERNAL VIEW OF EUT-1** 



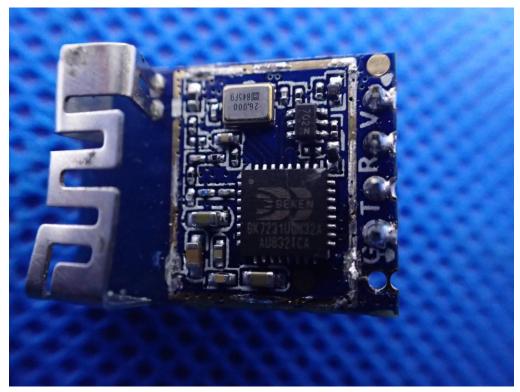


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## INTERNAL VIEW OF EUT-2



## **INTERNAL VIEW OF EUT-3**



----END OF REPORT----