



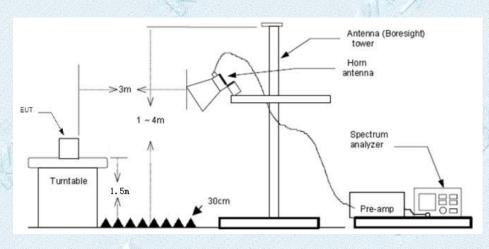
# 3.7. Band Edge Emissions(Radiated)

# Limit

Restricted Frequency Band	(dBuV/m)(at 3m)					
(MHz)	Peak	Average				
2310 ~2390	74	54				
2483.5 ~2500	74	54				

Note: All restriction bands have been tested, only the worst case is reported.

# **Test Configuration**



#### Test Procedure

- 1. The EUT was setup and tested according to ANSI C63.10:2013 requirements.
- 2. The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
- 3. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
- 4. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2013 on radiated measurement.
- The receiver set as follow:
  RBW=1MHz, VBW=3MHz Peak detector for Peak value.
  RBW=1MHz, VBW=10Hz with Peak Detector for Average Value.

#### Test Mode

Please refer to the clause 2.2.

## Test Results

Note:

1)Measurement = Reading level + Correct Factor

(2)Correct Factor=Antenna Factor + Cable Loss -Preamplifier Factor

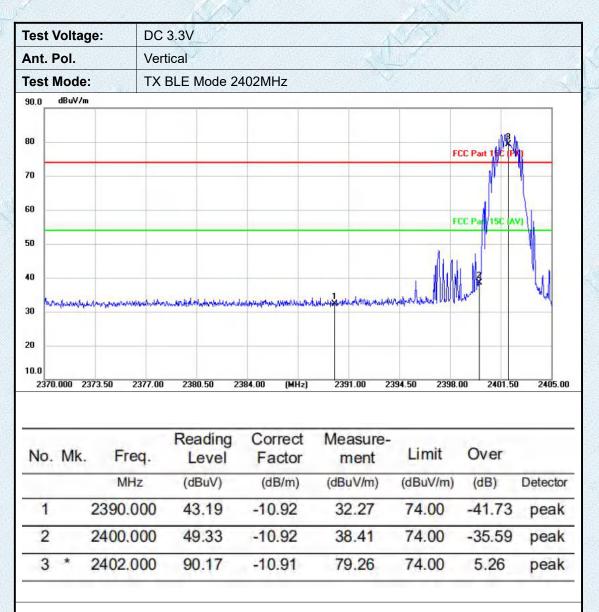
(3)All modulation modes were tested, and only the worst data of GFSK\_1M was recorded in the report.



Test model:MK07A

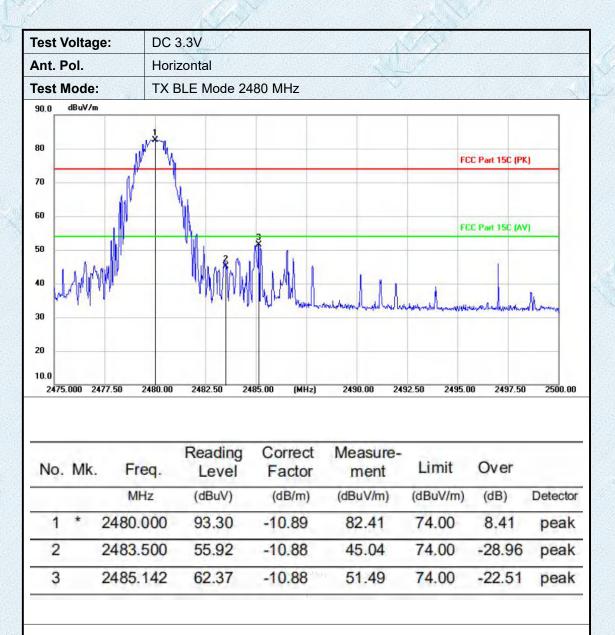
Test	Voltage:	DC 3	.3V								
Ant.	Pol.:	Horiz	contal								
Test	Mode:	ТХ В	LE Mode	e 2402M	Ηz						
90.0	dBu¥/m							1	1		
80									FCC	Part 15C	<b>\$</b> (PK)
60									FCC	Par 150	
50									. 1.	× 3	
40	mounterplusour	unutually	- Martin Martin	nulliphiener	filmanation	mightenter	utensimalismus	wheneve	hull		M
30											
20											
10.0	70.000 2373.50 23	377.00	2380.50	2384.00	(MHz)	2391.00	0 23	34.50	2398.00	2401	1.50 2405.0
10.0 237(	. Mk. Free		2380.50 Readin Leve	g Cor	(MHz) rrect	2391.00 Meas me	sure-	94.50 Lim		2401 Over	
10.0 2370	Sec. 1	q.	Readin	g Cor I Fa	rrect	Meas	sure- ent		nit	5.4	
10.0 237(	. Mk. Free	q. z	Readin Leve	g Cor I Fa (di	rrect	Meas me	sure- ent //m)	Lim	nit //m)	Over	Detecto
10.0 2370 NO.	Mk. Free MH2 2390.0	q. z 00	Readin Leve (dBuV)	g Cor I Fa (di	rrect ictor B/m) 0.92	Meas me (dBuV/	ent //m)	Lim (dBu)	nit //m) 00	Over (dB)	Detecto
No.	Mk. Free MH2 2390.0	q. z 00 40	Readin Leve (dBuV) 43.92	g Cor I Fa (di -10 -10	rrect ictor B/m) 0.92	Meas me (dBuV/ 33.0	sure- ent //m) 00 94	Lim (dBu\ 74.(	nit //m) 00	Over (dB) -41.0	Detecto 00 peal 06 peal

# Emission Level= Read Level+ Correct Factor

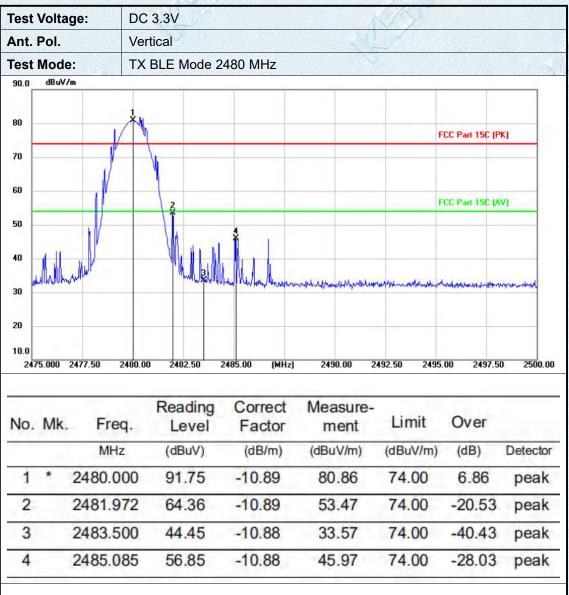


Emission Level= Read Level+ Correct Factor



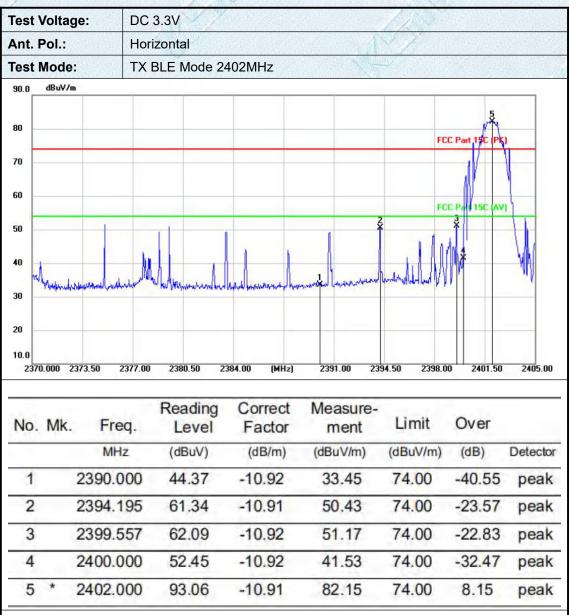




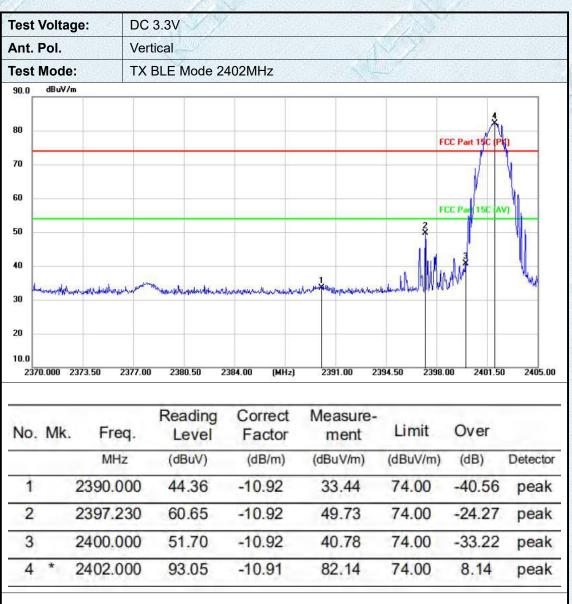




Test model:MK07B

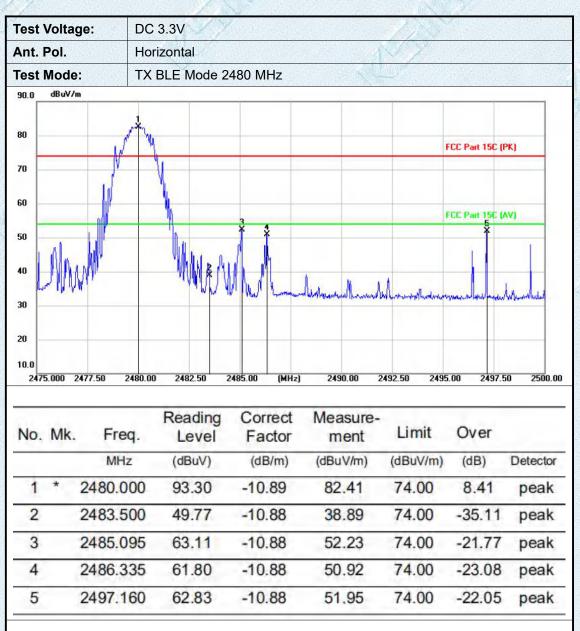


Emission Level= Read Level+ Correct Factor

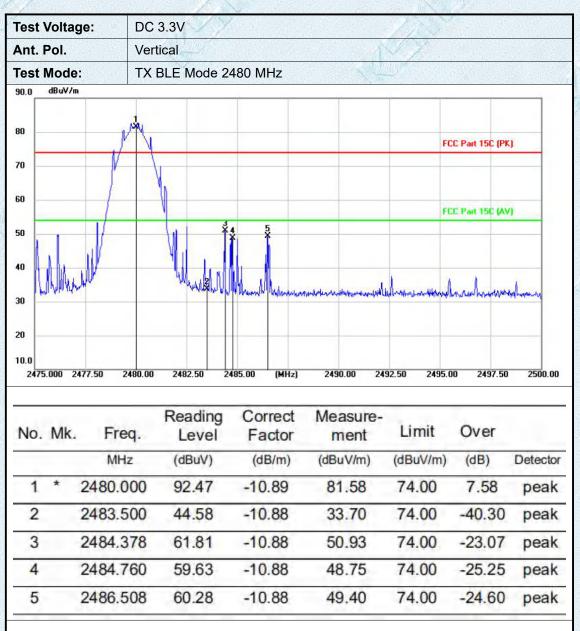


Emission Level= Read Level+ Correct Factor









# 3.8. Spurious Emission (Radiated)

# Limit

#### Radiated Emission Limits (9 kHz~1000 MHz)

Frequency (MHz)	Field Strength (microvolt/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

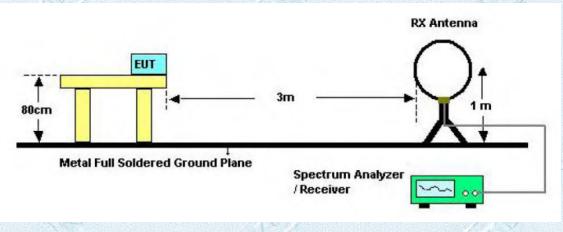
#### Radiated Emission Limit (Above 1000MHz)

Frequency	Distance Meters(at 3m)					
(MHz)	Peak	Average				
Above 1000	74	54				

## Note:

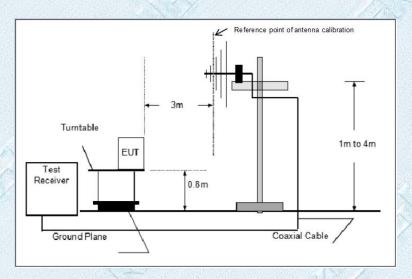
- (1) The tighter limit applies at the band edges.
- (2) Emission Level (dBuV/m)=20log Emission Level (uV/m).

## **Test Configuration**

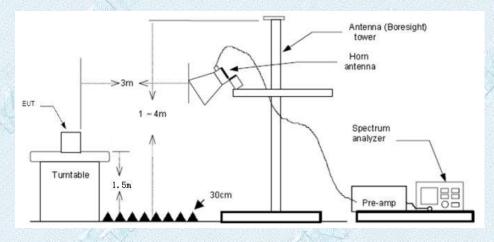


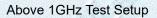
Below 30MHz Test Setup





Below 1000MHz Test Setup





#### Test Procedure

- 1. The EUT was setup and tested according to ANSI C63.10:2013
- 2. The EUT is placed on a turn table which is 0.8 meter above ground for below 1 GHz, and 1.5 m for above 1 GHz. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
- 3. The EUT was set 3 meters from the receiving antenna, which was mounted on the top of a variable height antenna tower.
- 4. For each suspected emission, the EUT was arranged to its worst case and then tune 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 to comply with the guidelines.
- 5. Set to the maximum power setting and enable the EUT transmit continuously.
- 6. Use the following spectrum analyzer settings
  - (1) Span shall wide enough to fully capture the emission being measured;
  - (2) Below 1 GHz:
  - RBW=120 kHz, VBW=300 kHz, Sweep=auto, Detector function=peak, Trace=max hold;

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.

(3) From 1 GHz to 10<sup>th</sup> harmonic:

RBW=1MHz, VBW=3MHz Peak detector for Peak value.

RBW=1MHz, VBW=10Hz Peak detector for Average value.



#### Test Mode

Please refer to the clause 2.3.

#### Test Result

#### 9 KHz~30 MHz and 18GHz~25GHz

From 9 KHz~30 MHz and 18GHz~25GHz: Conclusion: PASS

#### Note:

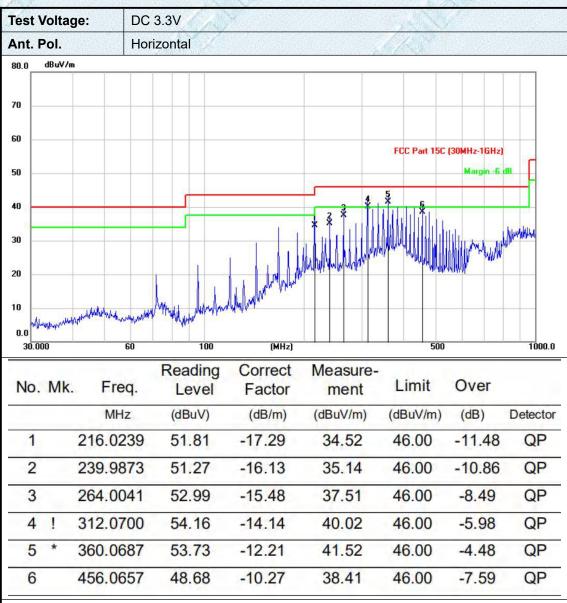
- Measurement = Reading level + Correct Factor Correct Factor=Antenna Factor + Cable Loss -Preamplifier Factor
- The peak level is lower than average limit(54 dBuV/m), this data is the too weak instrument of signal is unable to test.
- 3) The emission levels of other frequencies are very lower than the limit and not show in test report.
- 4) The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
- 5) Pre-scan CH00, CH19 and CH39 modulation, and found the GFSK\_1M\_CH00 which it is worse case for 30MHz-1GHz, so only show the test data for worse case.

#### **BELOW 30MHZ**

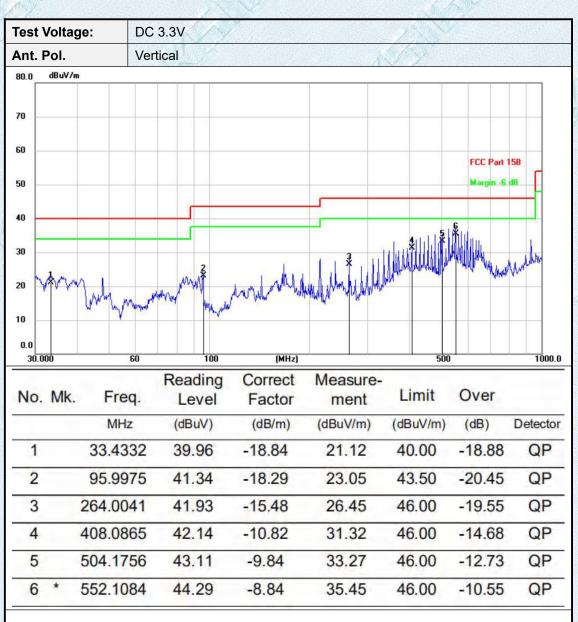
No emission found between lowest internal used/generated frequencies to 30MHz.



30MHz-1GHz



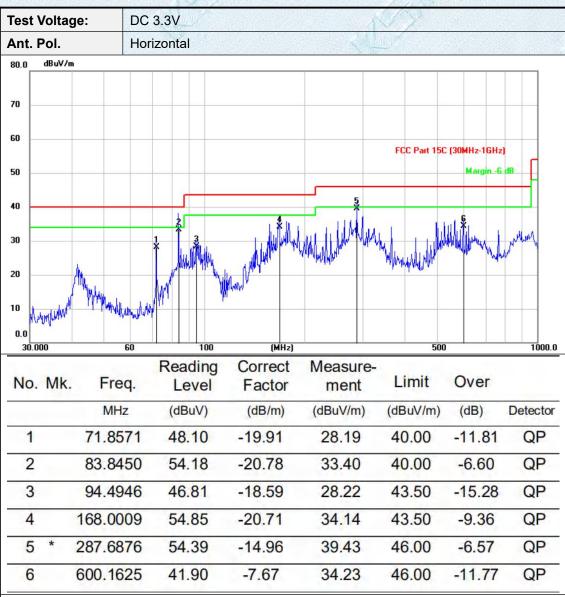
Emission Level= Read Level+ Correct Factor



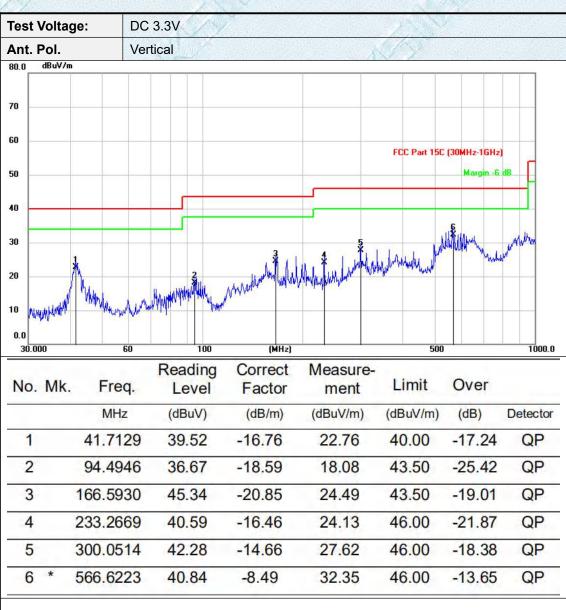
Emission Level= Read Level+ Correct Factor



Test model:MK07B



Emission Level= Read Level+ Correct Factor



Emission Level= Read Level+ Correct Factor

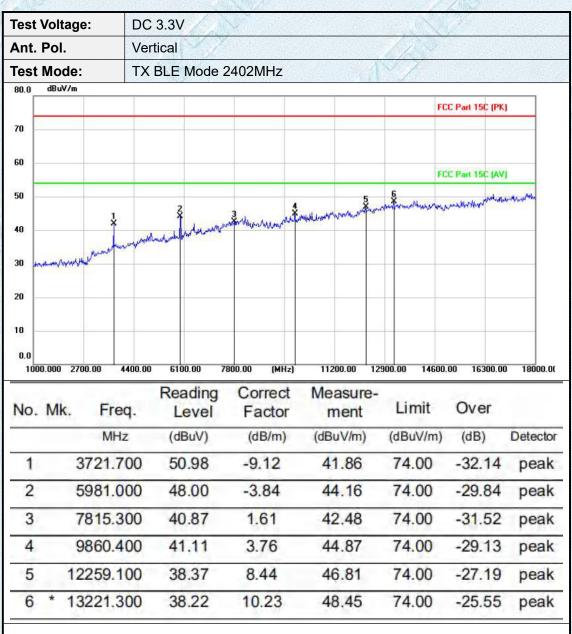


## Test model:MK07A

# Adobe 1GHz

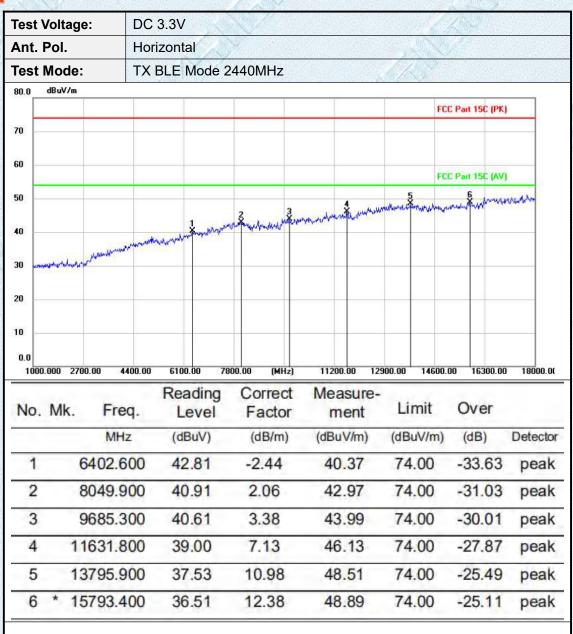
lest	t Volta	age:		DC 3	3.3V		X	1.211	Light -			
٩nt	. Pol.			Hori	zontal							
ſes	t Mod	le:		TX F	3LE Mode	2402MHz						
80.0	dBu∀	/m										
70		_								FCC F	Part 15C (PK)	
60												
50		_		_				4	ţ	FCC F	Part 15C (AV)	khan
40					1 malant marghite	yern Mar not when the	non sundal	X.a.r	wypow in spinis	Loss they day	medan	
30	moun	MANANA	whenever	Atrantin		ward the new ward war						
20		_										
10		_		_								
0.0 10	000.000	2700.	00	4400.00	6100.00	7800.00 (MHz)	11200.00	129	00.00	14600.00	16300.00	18000.0
No	. Mł	<.	Fre	eq.	Reading Level	·	Measur ment		Lin	nit (	Over	
-		_	MH	łz	(dBuV)	(dB/m)	(dBuV/m)	,	(dBu	V/m)	(dB)	Detecto
1	1	59	987.8	800	44.80	-3.83	40.97		74.	00 ·	-33.03	peak
1	2	8	197.8	800	41.47	2.02	43.49		74.	00 ·	-30.51	peak
:	3	109	960.3	300	39.31	5.64	44.95		74.	00 -	-29.05	peak
4	4	124	420.6	600	38.89	8.79	47.68		74.	00 -	-26.32	peak
5	5	139	989.7	700	37.22	11.22	48.44		74.	00 -	-25.56	peak

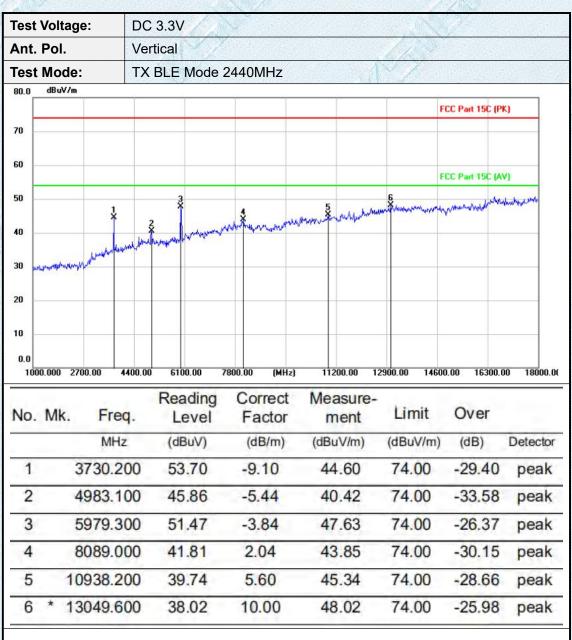
Emission Level= Read Level+ Correct Factor



Emission Level= Read Level+ Correct Factor

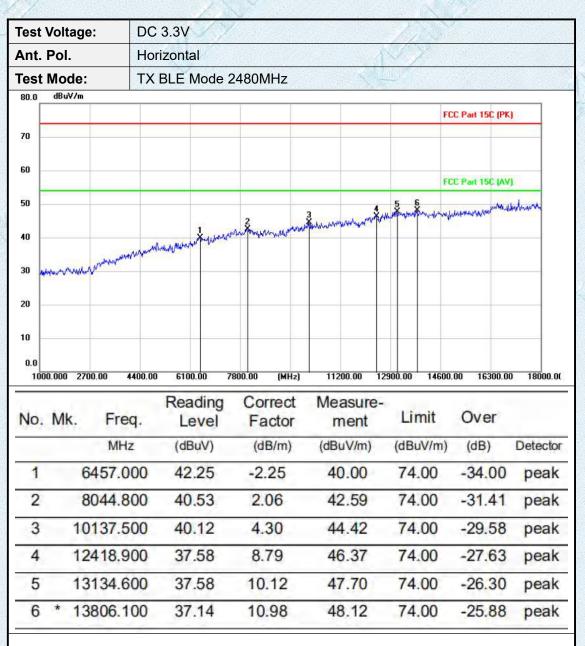


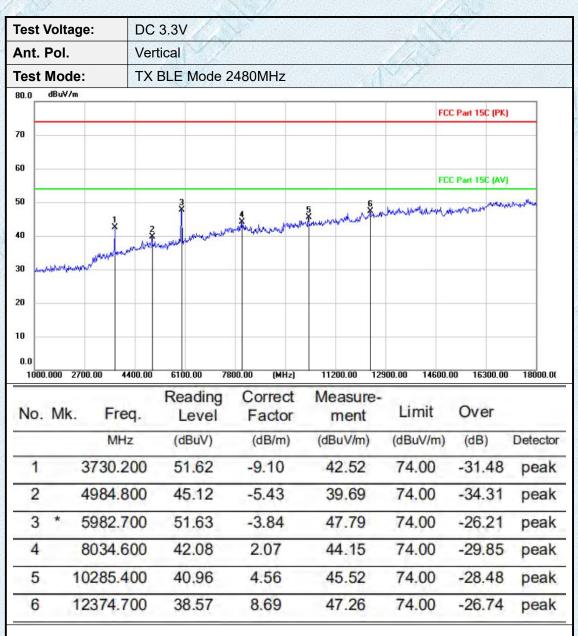




Emission Level= Read Level+ Correct Factor







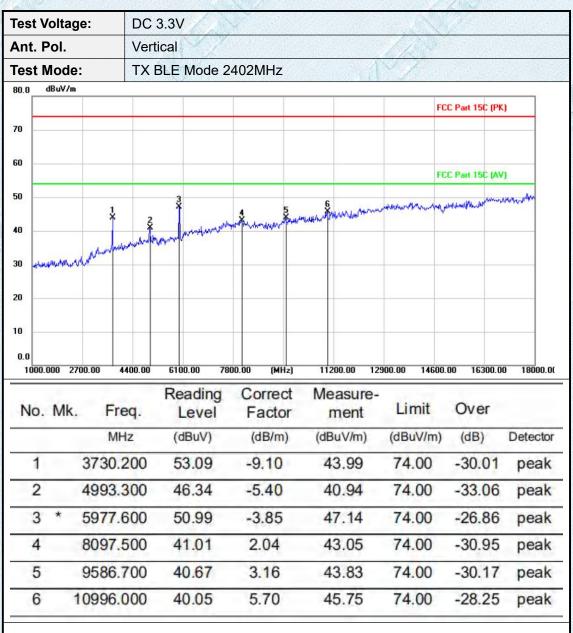
Emission Level= Read Level+ Correct Factor



Test model:MK07B

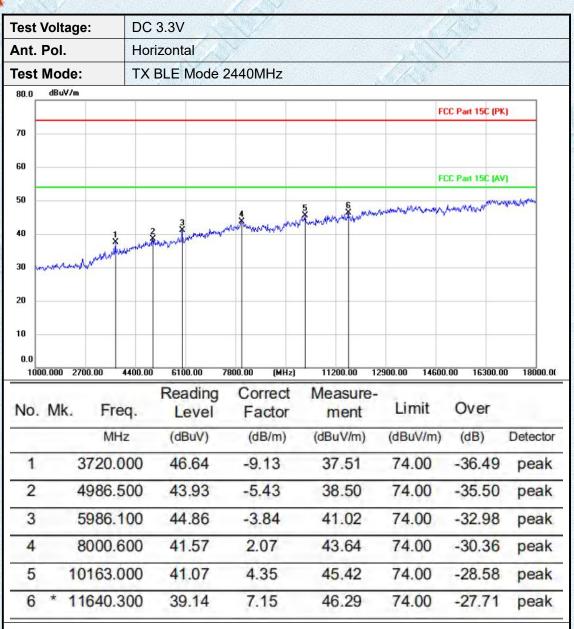
Fest V	/olta	ge:		DC 3	3.3V									
Ant. F	Pol.			Hori	zontal									
Fest N	Mode	e:		TX E	BLE Mod	de 2402M	IHz		Y.					
30.0	dBuV/m													
											FC	C Part 1	5C (PK	J
ro 🗕									_				_	
i0											FC	C Part 1	SC (AV	
50									5				hhh	marken
						3	M	un un hour long anythis	win	Auropen	man	methy	ell <sup>an a</sup> gua	NIT TOTAL T
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	attend to the	Ma	And any mile	Manne										
10 <b></b>	addan Adallan	Wyn, "												
10 -														
0.0														
	000 2	700.00	440	0.00	6100.00	7800.00	(MHz)	11200.00	1290	00.00	14600.	00 10	6300.00	) 18000.
0.0			440	0.00	6100.00 Readir	State Interests	(MHz)	11200.00 Measur	189.081.0					) 18000.
0.0			Free		and the second second	ng Co			e-	00.00 Lir		00 10 OV		) 18000.
0.0				<b>q</b> .	Readir	ng Cor el Fa	rrect	Measur	e-	Lir			er	0 18000. Detect
0.0		•	Free	<b>4</b> .	Readir Leve	ng Cor el Fa ) (d	rrect	Measur ment	)	Lir	nit IV/m)	Ov	er 3)	
0.0 1000.0 No.		37	Free	q. : :	Readin Leve (dBuV	ng Cor el Fa ) (di e) -9.	rrect ictor B/m)	Measur ment (dBuV/m)	)	Lir (dBu	nit IV/m) 00	Ov (dE -35	er 3)	Detect
0.0 1000.0 No.		37 64	Free MHz 30.20	4. 00 00	Readin Leve (dBuV 47.69	ng Cor el Fa ) (d ) -9. 2 -2.	rrect actor B/m) 10	Measur ment (dBuV/m) 38.59	)	Lir (dBu 74.	nit IV/m) 00	Ov (dE -35 -33	er 3) 5.41	Detect
0.0 1000.0 No. 1 2	Mk	37 64 82	Free MHz 30.20	4. 00 00	Readir Leve (dBuV 47.69 42.62	ng Cor el Fa ) (d 2 -9. 2 -2. 5 2.	rrect actor B/m) 10 41	Measur ment (dBuV/m) 38.59 40.21	)	Lir (dBu 74. 74.	mit IV/m) 00 00	Ov (dE -35 -33 -30	er 3) 6.41	Detecto peal peal
0.0 1000.0 No. 1 2 3	Mk	37 64 82 116	Fred MHz 30.20 09.40 59.00	1. 00 00 00 00	Readir Leve (dBuV 47.69 42.62 41.56	ng Cor el Fa ) (d 2 -9. 2 -2. 5 2. 5 7.	rrect actor B/m) 10 41 00	Measur ment (dBuV/m) 38.59 40.21 43.56	)	Lir (dBu 74. 74. 74.	nit IV/m) 00 00 00	Ov (dE -35 -33 -30 -28	er 3) 6.41 6.79 6.44	Detecto peal peal peal

Emission Level= Read Level+ Correct Factor

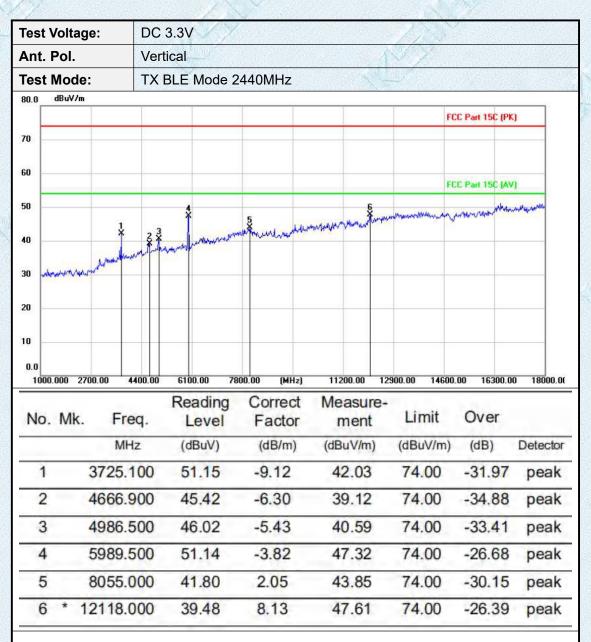


Emission Level= Read Level+ Correct Factor



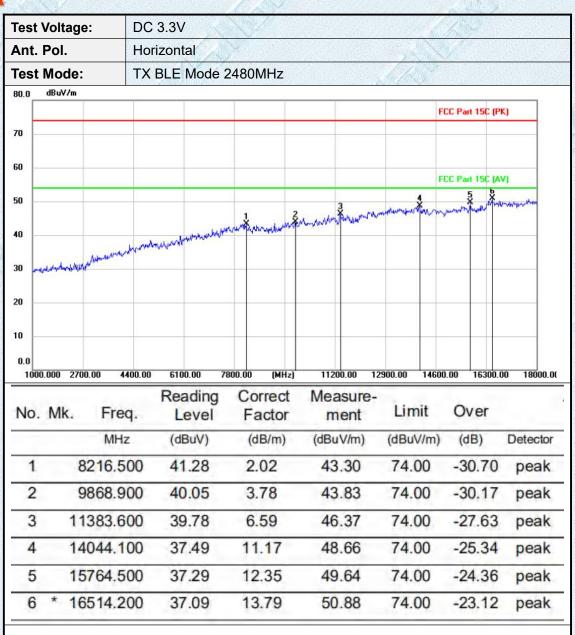




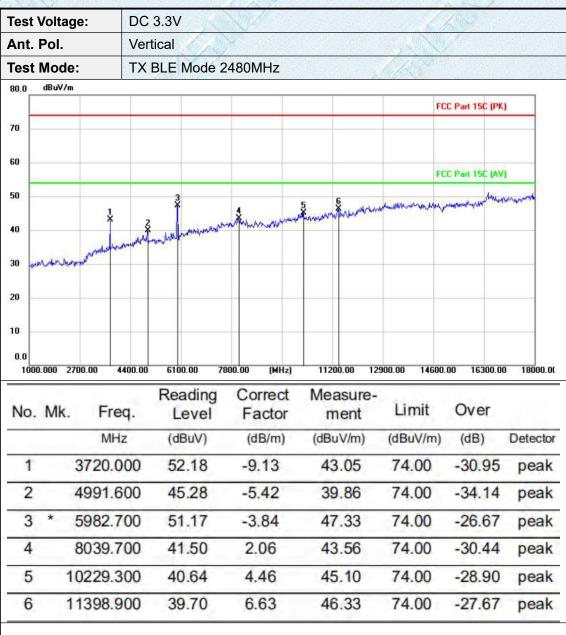


Emission Level= Read Level+ Correct Factor









Note:All modulation modes were tested, and only the worst data of GFSK\_1M was recorded in the report.

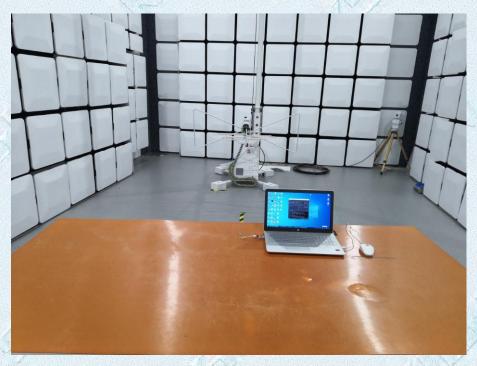


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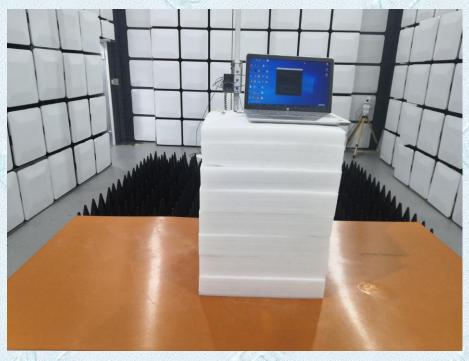
# **4.EUT TEST PHOTOS**

KSIGN

Radiated Measurement (Below 1GHz)



Radiated Measurement (Above 1GHz)

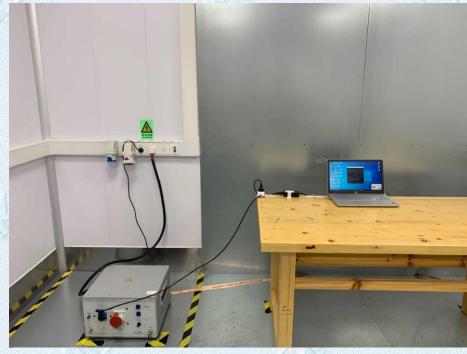








CONDUCTED EMISSION TEST SETUP

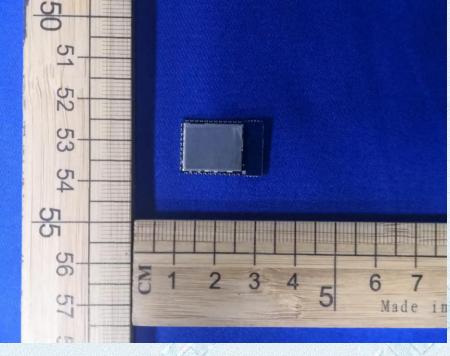


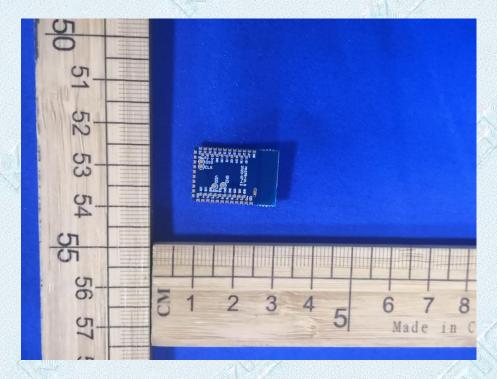


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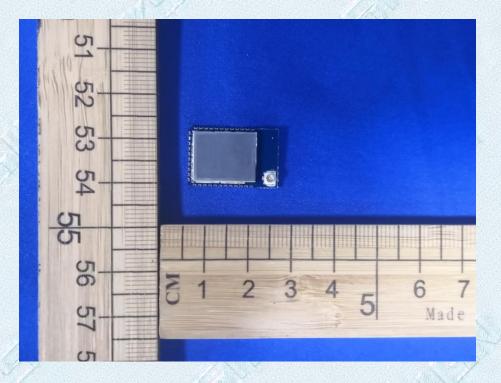
# **5.PHOTOGRAPHS OF EUT CONSTRUCTIONAL**

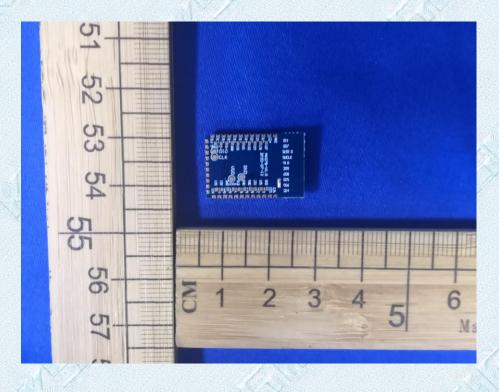
# **External Photographs**



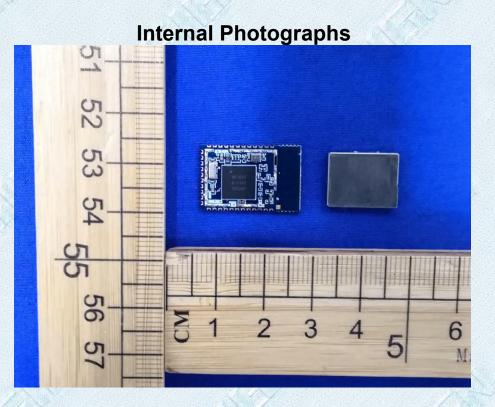


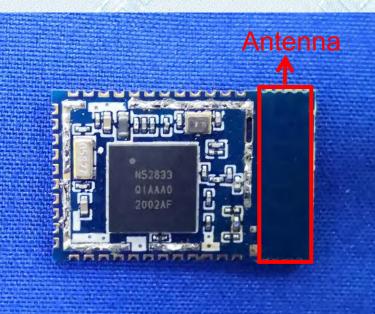




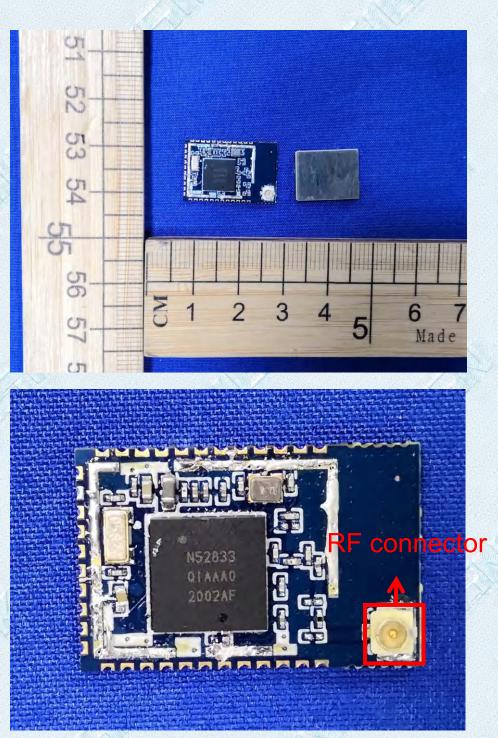












\*\*\*\*\*\*THE END\*\*\*\*\*