# KSIGN (Guangdong) Testing Co., Ltd.

**K**5IGN<sup>®</sup>

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# **TEST REPORT**

Report No:	KS2011S02121E		
FCC ID······	2AO94-MK08		
Applicant:	MOKO TECHNOLOGY LIMITED		
Address	2F, Building1,No.37 Xiaxintang Xintang village,Fucheng Street, Longhua District,Shenzhen,Guangdong Province,China		
Manufacturer	MOKO TECHNOLOHY Ltd		
Address	2F, Building1, No. 37 Xiaxintang Xintang village, Fucheng Street, Longhua District, Shenzhen, Guangdong Province, China		
Factory	MOKO TECHNOLOHY Ltd		
Address	2F, Building1, No. 37 Xiaxintang Xintang village, Fucheng Street, Longhua District, Shenzhen, Guangdong Province, China		
Product Name:	Bluetooth Low Energy Module		
Trade Mark:	1		
Model/Type reference:	MK08A		
Listed Model(s):	MK08B		
Standard:	FCC CFR Title 47 Part 15 Subpart C Section 15.247		
Date of Receipt:	Nov. 26, 2020		
Date of Test Date:	Nov. 26, 2020-Dec. 21, 2020		
Date of issue:	Dec. 21, 2020		
Test result:	Pass		
Compiled by: (Printed name+signature)	Rory Huang		
Supervised by: ( Printed name+signature)	Eder Zhan		
Approved by: ( Printed name+signature)	Cary Luo		
Testing Laboratory Name:	KSIGN(Guangdong) Testing Co., Ltd.		
Address	West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu,Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, People's Republic of China		

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# 1. TEST SUMMARY

# 1.1. Test Standards

The tests were performed according to following standards:

FCC Rules Part 15.247: Operation within the bands of 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz.

**KDB 558074 D01** : The measurement guidance provided herein is applicable only to Digital Transmission System (DTS) devices operating in the 902-928 MHz. 2400-2483.5 MHz and/or 5725-5850 MHz bands under § 15.247 of the FCC rules (Title 47 of the Code of Federal Regulations).

ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.

# 1.2. Report version

Revised No.	Date of issue	Description
01	Dec. 21, 2020	Original



# **1.3. Test Description**

FCC Part 15 Subpart C(15.247)					
Test House	Standard Section	Desett	Test Engineer		
Test Item	FCC	Result			
Antenna Requirement	15.203	Pass	Rory Huang		
Conducted Emission	15.207	Pass	Rory Huang		
Restricted Bands	15.205	Pass	Rory Huang		
Peak Output Power	15.247(b)	Pass	Rory Huang		
Band Edge Emissions	15.247(d)	Pass	Rory Huang		
Power Spectral Density	15.247(e)	Pass	Rory Huang		
Radiated Emission	15.205&15.209	Pass	Rory Huang		
6dB Bandwidth	15.247(a)(2)	Pass	Rory Huang		
Spurious RF Conducted Emission	15.247(d)	Pass	Rory Huang		

# Note:

- 1. The measurement uncertainty is not included in the test result.
- 2. The Two models have been tested, only the worst test model MK08A data is recorded in the report.



# 1.4. Test Facility

## Address of the report laboratory

## KSIGN(Guangdong) Testing Co., Ltd.

West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, People's Republic of China

## Laboratory accreditation

The test facility is recognized, certified, or accredited by the following organizations:

## CNAS-Lab Code: L13261

KSIGN(Guangdong) Testing Co., Ltd. has been assessed and proved to be in Compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2017 General Requirements) for the Competence of Testing and Calibration Laboratories.

### A2LA-Lab Cert. No.: 5457.01

KSIGN(Guangdong) Testing Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

### IC Registration No.: CN0096

The 3m alternate test site of KSIGN(Guangdong) Testing Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: CN0096

## FCC-Registration No.: CN1272

KSIGN(Guangdong) Testing Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.



# 1.5. Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01" Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 2 " and is documented in the KSIGN(Guangdong) Testing Co., Ltd. system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device. Below is the best measurement capability for KSIGN(Guangdong) Testing Co., Ltd.

Test Items	Measurement Uncertainty	Notes
Transmitter power conducted	0.42 dB	(1)
Transmitter power Radiated	2.14 dB	(1)
Conducted spurious emissions 9kHz~40GHz	1.60 dB	(1)
Radiated spurious emissions 9kHz~40GHz	2.20 dB	(1)
Conducted Emissions 9kHz~30MHz	3.20 dB	(1)
Radiated Emissions 30~1000MHz	4.70 dB	(1)
Radiated Emissions 1~18GHz	5.00 dB	(1)
Radiated Emissions 18~40GHz	5.54 dB	(1)
Occupied Bandwidth	2.80 dB	(1)

**Note (1):** This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

# 1.6. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15~35°C
Relative Humidity:	30~60 %
Air Pressure:	950~1050mba



# 2. GENERAL INFORMATION

# 2.1. General Description of EUT

Test Sample Number 1:	1-1-1(Normal Sample),1-1-2(Engineering Sample) For MK08A
Test Sample Number 2:	1-1-3(Normal Sample),1-1-4(Engineering Sample) For MK08B
Product Name:	Bluetooth Low Energy Module
Model/Type reference:	MK08A
Marketing Name:	
Listed Model(s):	MK08B
Model Difference:	The difference between product models only depends and the model naming,Type of antenna is different. Other power supply methods, safety structure and key components are the same, which do not affect the safety and electromagnetic compatibility performance.
Power supply(Work)	Input:DC 3.3V
Hardware version:	V1.0
Software version:	V1.0.0
Bluetooth V5.0	
Modulation:	GFSK
Operation frequency:	2402MHz~2480MHz
Max Peak Output Power:	-0.43dBm
Channel number:	40
Channel separation:	2MHz
Antenna type:	PCB Antenna for MK08A External FPC Antenna for MK08B
Antenna gain:	0.7dBi for MK08A Max.2.0dBi for MK08B



# 2.2. Operation state

Operation Frequency List: The EUT has been tested under typical operating condition. The Applicant provides communication tools software to control the EUT for staying in continuous transmitting and receiving mode for testing. BT BLE, 40 channels are provided to the EUT. Channels 00/19/39 were selected for testing. Operation Frequency List:

Channel	Frequency (MHz)
00	2402
01	2404
19	2440
20	2442
21	2444
38	2478
39	2480

Note: The display in grey were the channel selected for testing. Test mode

For RF test items:

The engineering test program was provided and enabled to make EUT continuous transmit.

For AC power line conducted emissions:

The EUT was set to connect with the Bluetooth instrument under large package sizes transmission.

For Radiated spurious emissions test item:

The engineering test program was provided and enabled to make EUT continuous transmit. The EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data recorded in the report.



# 2.3. Measurement Instruments List

	Tonscend JS0806-2 Test system						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Until		
1	Spectrum Analyzer	R&S	FSV40-N	101798	04/07/2021		
2	Vector Signal Generator	Agilent	N5182A	MY50142520	04/07/2021		
3	Analog Signal Generator	HP	83752A	3344A00337	04/07/2021		
4	Power Sensor	Agilent	E9304A	MY50390009	04/07/2021		
5	Power Sensor	Agilent	E9300A	MY41498315	04/07/2021		
6	Wideband Radio Communication Tester	R&S	CMW500	157282	04/07/2021		
7	Climate Chamber	Angul	AGNH80L	1903042120	04/07/2021		
8	Dual Output DC Power Supply	Agilent	E3646A	MY40009992	04/07/2021		
9	RF Control Unit	Tonscend	JS0806-2	/	04/07/2021		

	Transmitter spurious emissions & Receiver spurious emissions					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Until	
1	EMI Test Receiver	R&S	ESR	102525	04/07/2021	
2	High Pass Filter	Chengdu E-Microwave	OHF-3-18-S	0E01901038	03/27/2021	
3	High Pass Filter	Chengdu E-Microwave	OHF-6.5-18-S	0E01901039	03/27/2021	
4	Spectrum Analyzer	HP	8593E	3831U02087	04/07/2021	
5	Ultra-Broadband logarithmic period Antenna	Schwarzbeck	VULB 9163	01230	03/29/2023	
6	Loop Antenna	Beijin ZHINAN	ZN30900C	18050	03/25/2021	
7	Spectrum Analyzer	R&S	FSV40-N	101798	04/07/2021	
8	Horn Antenna	Schwarzbeck	BBHA 9120 D	2023	03/29/2023	
9	Pre-Amplifier	Schwarzbeck	BBV 9745	9745#129	04/07/2021	
10	Pre-Amplifier	EMCI	EMC051835SE	980662	04/07/2021	

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
1	LISN	R&S	ENV432	1326.6105.02	03/27/2021
2	EMI Test Receiver	R&S	ESR	102524	04/07/2021
3	Manual RF Switch	JS TOYO		MSW-01/002	04/07/2021

Note:

The Cal. Interval was one year.
 The cable loss has calculated in test result which connection between each test instruments.

# 2.5. Test Software

Software name	Model	Version
Conducted emission Measurement Software	EZ-EMC	EMC-Con 3A1.1
Radiated emission Measurement Software	EZ-EMC	FA-03A.2.RE
Bluetooth and WIFI Test System	JS1120-3	2.5.77.0418



# 3. TEST ITEM AND RESULTS

# 3.1. Antenna requirement

# Requirement

# FCC CFR Title 47 Part 15 Subpart C Section 15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. 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.

# FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1)(i):

(i) Systems operating in the 2400~2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

# Test Result

The directional gain of the antenna less than 6dBi, please refer to the EUT internal photographs antenna photo.

Note: The antenna is permanently fixed to the EUT



# 3.2. 6dB Bandwidth

Limit

Test Item	Limit	Frequency Range(MHz)
Bandwidth	>=500 KHz (6dB bandwidth)	2400~2483.5

**Test Configuration** 

EUT Spectrum Analyzer
-----------------------

### **Test Procedure**

- 1. Connect EUT RF Output port to the Spectrum Analyzer through an RF attenuator.
- 2. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.
- 3. The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission.

## 4. Spectrum Setting:

6dB bandwidth:

- (1) Set RBW = 100 kHz.
- (2) Set the video bandwidth (VBW) =3 RBW.
- (3) Detector = Peak.
- (4) Trace mode = Max hold.
- (5) Sweep = Auto couple.
- (6) Allow the trace to stabilize.

(7) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

NOTE: The EUT was set to continuously transmitting in each mode and low, Middle and high channel for the test.

### Test Mode

Please refer to the clause 2.3.

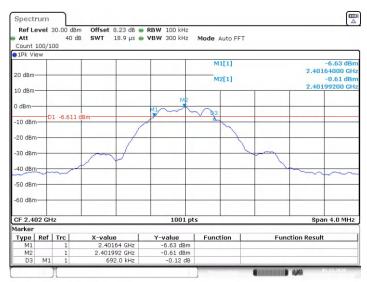
## **Test Results**

# GFSK\_1M

Test Mode:	BLE Mode		
Channel frequ	uency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)
240	)2	692	
2440		696	≧500
248	80	696	
		BI E Modo	

BLE Mode





Date: 1.DEC.2020 09:17:29



**BLE Mode** 

#### 2440 MHz Spectrum Ref Level 30.00 dBm Att 40 dB Offset 8.23 dB ● RBW 100 kHz SWT 18.9 µs ● VBW 300 kHz Mode Auto FFT Count 100/100 ●1Pk Vie M1[1] 2.4 20 dBm M2[1] 0.82 10 dBr 0 dBr $\sqrt{\mathbf{k}}$ -6.81 -10 dBm -20 dBr -30 dBm 40 dBm--50 dBm -60 dBm 1001 pts CF 2.44 G Span 4.0 MHz arke Y-value -6.95 dBm -0.82 dBm -0.31 dB Type Ref Trc X-value 2.439636 GHz 2.439992 GHz 696.0 kHz Function **Function Result** M2 D3 M: 44 Date: 1.DEC.2020 09:24:53 **BLE Mode** 2480 MHz Spectrum Ref Level 30.00 dBm Offset 8.23 dB RBW 100 kHz Att 40 dB SWT 18.9 µs VBW 300 kHz Mode Auto FFT Count 100/100 ●1Pk \ M1[1] 2.479 G 20 dBm -1.56 dE M2[1] 2.47 DO GI 10 dBm

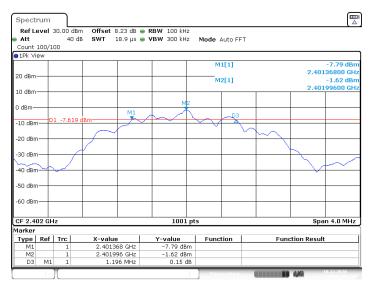
0 dB -7.557 -10 dBm -20 dBr -30 dBm 40 dBm -50 dBm -60 dBm CF 2.48 100 4.0 MHz 1arke -value 2.479636 GHz 2.479992 GHz 696.0 kHz Y-value -7.58 dBm -1.56 dBm -0.51 dB Type Ref Trc Function Function Result M2 D3 M1 B 43

Date: 1.DEC.2020 09:45:52

# GFSK\_2M

Test Mode:	BLE Mode	1 Sector	
Channel frequ	iency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)
240	2	1.196	
244	0	1.192	≧500
248	0	1.196	
	l	BLE Mode	





Date: 18.DEC.2020 19:50:36

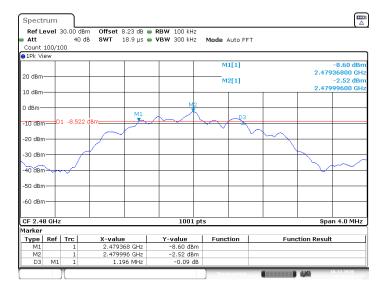


2440 MHz

Ref L Att	evel	30.00 d 40		• RBW 100 kHz	Mode A				
Count	100/1		as <b>swi</b> 1919 hz 🕯	VBW 300 KHZ	Mode A	uto FFT			
∋1Pk Vi	ew								
					M1	.[1]		0.400	-7.94 dB 37200 GF
20 dBm				-	M9	<b>[1]</b>		2.43	-1.84 dB
10 dBm								2.439	99600 GF
TO UDIII									
0 dBm-	_		M1	- MP					
-10 dBn	D	1 -7.84				<u></u>			
-10 UBI	'					$\sim$			
-20 dBn	n						$\sim$ $\setminus$		
-30 dBn								~	
-30 UBN	-							1	$\sim$
-40 dBn	<u>~</u> +.	$\checkmark$						$\rightarrow$	· ·
50 Jp-									
-50 dBn									
-60 dBn	n- -								
CF 2.4	4 GHz			1001 p	s		1	Spa	in 4.0 MH:
4arker									
Type M1	Ref	Trc 1	2.439372 GHz	Y-value -7.94 dBm	Funct	ion	Func	tion Resul	t
M2		1	2.439996 GHz	-1.84 dBm					
D3	M1	1	1.192 MHz	-0.00 dB					

Date: 18.DEC.2020 19:54:10

2480 MHz



Date: 18.DEC.2020 19:57:12

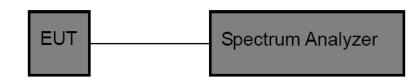


# 3.3. Peak Output Power

Limit

Test Item	Limit	Frequency Range(MHz)
Peak Output Power	1 Watt or 30 dBm	2400~2483.5

**Test Configuration** 



# Test Procedure

1. Connect EUT RF Output port to the Spectrum Analyzer through an RF attenuator..

2. Spectrum Setting:

Peak Detector: RBW≥DTS Bandwidth, VBW≥3\*RBW.

Sweep time=Auto.

Detector= Peak.

Trace mode= Maxhold.

Allow trace to fully stabilize. Then use the peak marker function to determine the maximum amplitude level.

## Test Mode

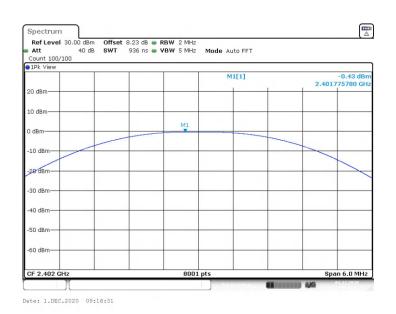
Please refer to the clause 2.3.

# Test Result



# GFSK\_1M

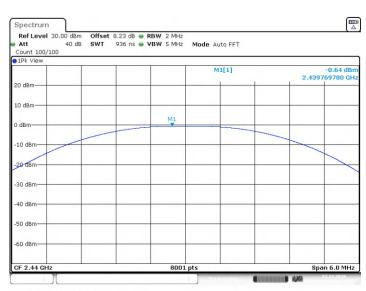
Test Mode:	BLE Mode		6/23
Channel freque	200200000000000000000000000000000000000	Test Result (dBm)	Limit (dBm)
2402		-0.43	
2440		-0.64	30
2480		-1.42	
		BLE Mode	
		2402 MHz	





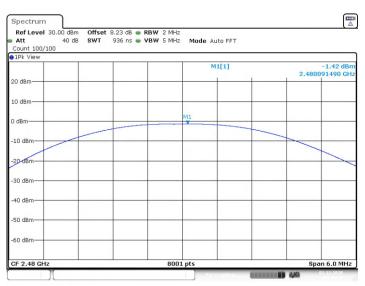
BLE Mode

### 2440 MHz



Date: 1.DEC.2020 09:25:11

BLE Mode 2480 MHz

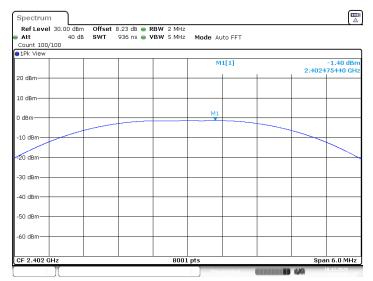


Date: 1.DEC.2020 09:46:10



GFSK\_2M

Test Mode:	BLE Mode		
Channel freque	ency (MHz)	Test Result (dBm)	Limit (dBm)
2402		-1.40	
2440 2480		-1.49	30
		-2.34	
		BLE Mode	
		2402 MHz	

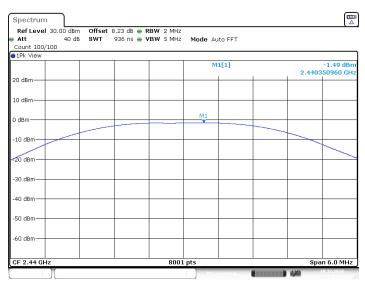


Date: 18.DEC.2020 19:51:01



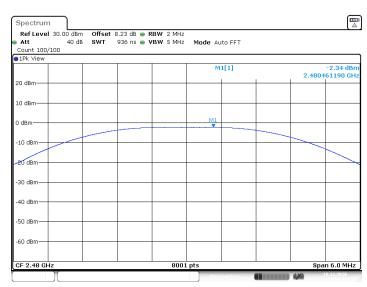
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Date: 18.DEC.2020 19:54:36

### 2480 MHz



Date: 18.DEC.2020 19:57:37



# 3.4. Power Spectral Density

## Limit

FCC Part 15 Subpart C(15.247)				
Test Item	Limit	Frequency Range(MHz)		
Power Spectral Density	8dBm(in any 3 kHz)	2400~2483.5		

# **Test Configuration**

EUT	Spectrum Analyzer

## **Test Procedure**

- 1. Connect EUT RF Output port to the Spectrum Analyzer through an RF attenuator.
- 2. The EUT was directly connected to the Spectrum Analyzer and antenna output port as show in the block diagram above. The measurement according to section 10.2 of KDB 558074 D01 DTS Meas Guidance v04.
- 3. Spectrum Setting:

Set analyser center frequency to DTS channel center frequency. Set the span to 1.5 times the DTS bandwidth. Set the RBW to: 10 kHz Set the VBW to: 30 kHz Detector: peak Sweep time: auto Allow trace to fully stabilize. Then use the peak marker function to determine the maximum amplitude level.

### Test Mode

Please refer to the clause 2.3.

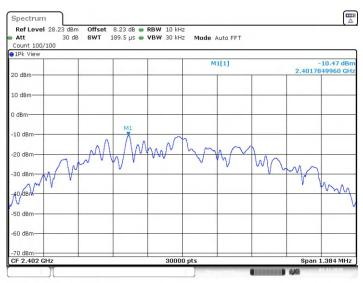
### **Test Result**

Note:

Power Density(dBm/3kHz)=Power Density(dBm/10kHz)-10\*Log(10/3)

# GFSK\_1M

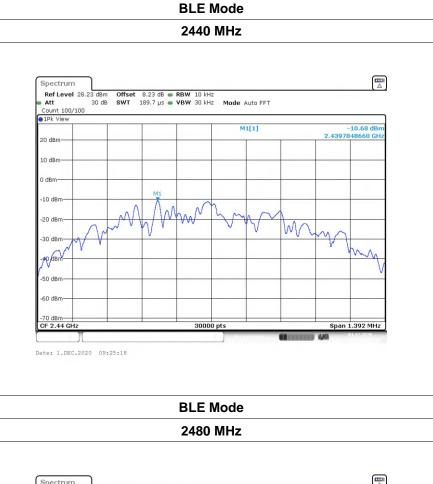
Test Mode:	BLE Mode	e	Call States	
Channel Fre (MHz	• •	Power Density (dBm/10kHz)	Power Density (dBm/3kHz)	Limit (dBm)
2402	2	-10.47	-15.70	
2440		-10.68	-15.91	8dBm/3kHz
2480	)	-11.46	-16.69	
		BLE Mode		
		2402 MHz		

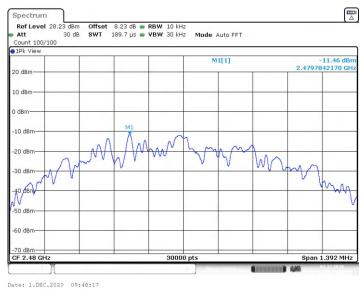


Date: 1.DEC.2020 09:17:47



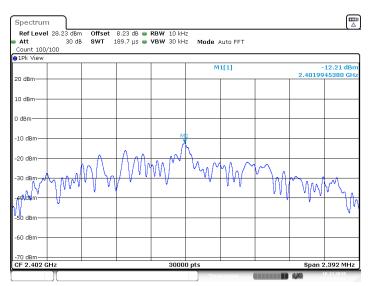
Report No.:KS201130





GFSK\_2M

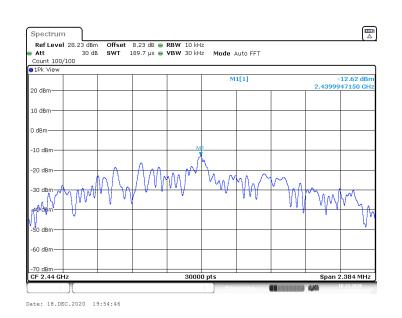
Test Mode:	BLE Mod	e	648	
Channel Fro (MH2		Power Density (dBm/10kHz)	Power Density (dBm/3kHz)	Limit (dBm)
2402	2	-12.21	-17.44	
2440	C	-12.62	-17.85	8dBm/3kHz
2480	0	-13.24	-18.47	
		BLE Mode		-
		2402 MHz		



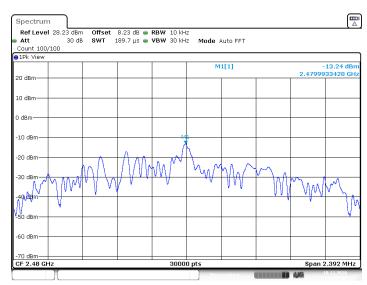
Date: 18.DEC.2020 19:51:11



2440 MHz



2480 MHz



Date: 18.DEC.2020 19:57:47



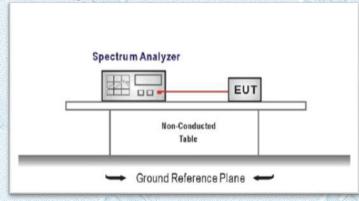
# 3.5. Band edge and Spurious Emission (conducted)

# Limit

# FCC CFR Title 47 Part 15 Subpart C Section15.247 (d):

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

# **Test Configuration**



# Test Procedure

- 1. Connect EUT RF Output port to the Spectrum Analyzer through an RF attenuator.
- 2. Spectrum Setting: RBW=100KHz VBW=300KHz.

Detector function: Peak. Trace: Max hold. Sweep = Auto couple.

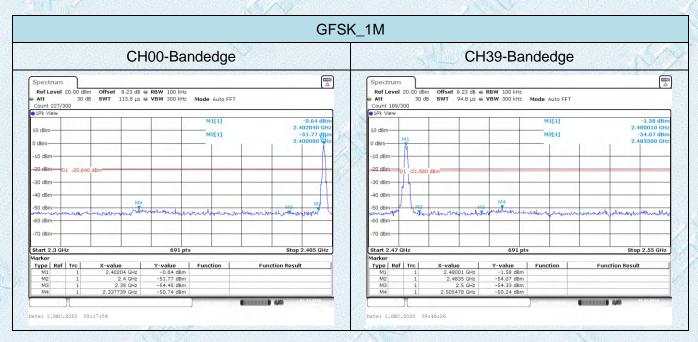
Allow the trace to stabilize.

# Test Mode

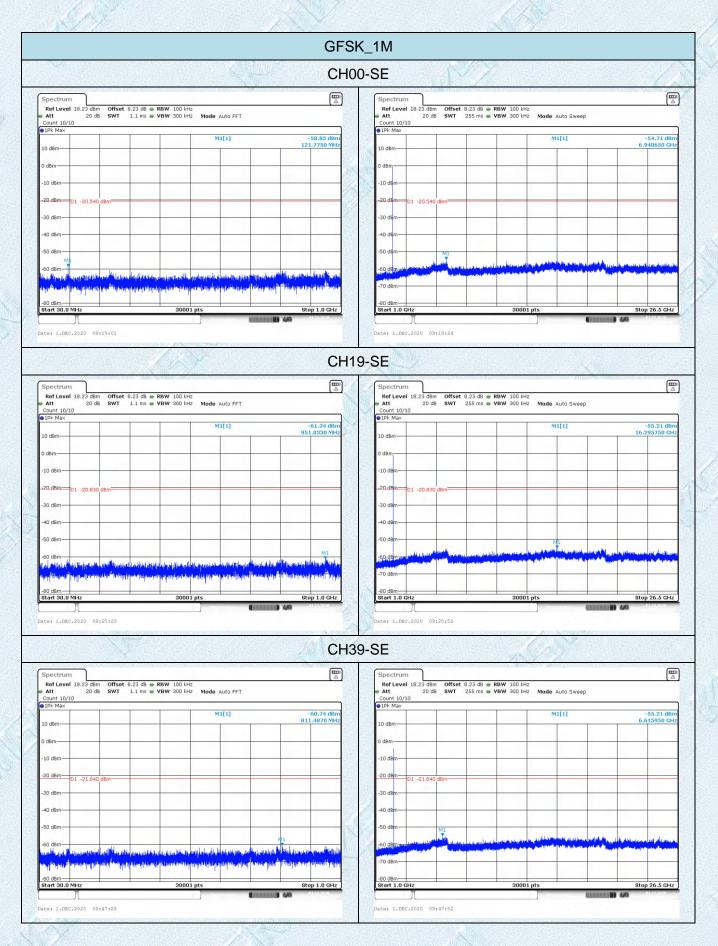
Please refer to the clause 2.3.



**Test Results** 





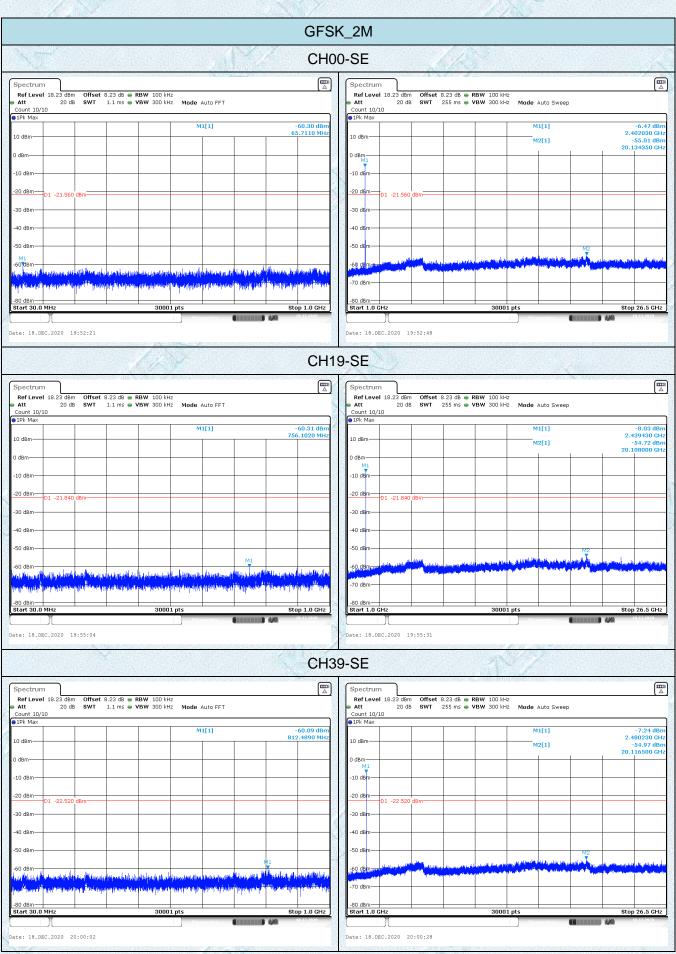




		GFS	K_2M		
CI	H00-Bandedge		1	CH39-Bande	dge
Spectrum Ref Level 20.00 dbm Offset 8.23 dB Att 30 dB SWT 75.8 µs of Count 291/300 PJR View	• VBW 300 kHz Mode Auto FFT			idB ● RBW 100 kHz 8 µs ● VBW 300 kHz Mode 4	
10 dBm		-1.47 dBm 2.4020150 GHz -34.63 dBm 2.4000000 GHz 	10 dBm M1 0 dBm M1 -10 dBm M1 -20 dBm D1 -22.520 dBm -30 dBm M -40 dBm M -50 dBm M -50 dBm M -50 dBm - -60 dBm	M4	[1]2.52 dB 2.480010 cF 2[1]54.04 dB 2.480500 cF 2.480500 cF 2.4805000 cF 2.480500 cF 2.4805000 cF 2.480500 cF 2.4805000 cF 2.480500000000000000000000000000000000000
Start 2.35 GHz Marker	691 pts	Stop 2.405 GHz	Start 2.47 GHz Marker	691 pts	Stop 2.55 GH:
Type      Ref      Trc      X-value        M1      1      2.402015 GHz      2.402015 GHz        M2      1      2.402015 GHz      2.402015 GHz        M3      1      2.396Hz      3.3999783 GHz	Y-volue      Function        -1.47 dBm	Function Result	Type      Ref      Trc      X-value        M1      1      2.48001 (      0.48001 (        M2      1      2.4835 (      0.4815 (        M3      1      2.50 (      0.4815 (        M4      1      2.506174 (	GHz -54.04 dBm GHz -55.07 dBm	ion Function Result

18.DEC.2020 19:51:24







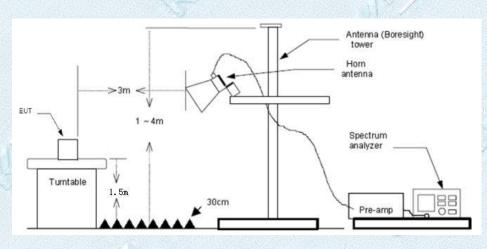
# 3.6. Band Edge Emissions(Radiated)

# Limit

Restricted Frequency Band	(dBuV/i	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:

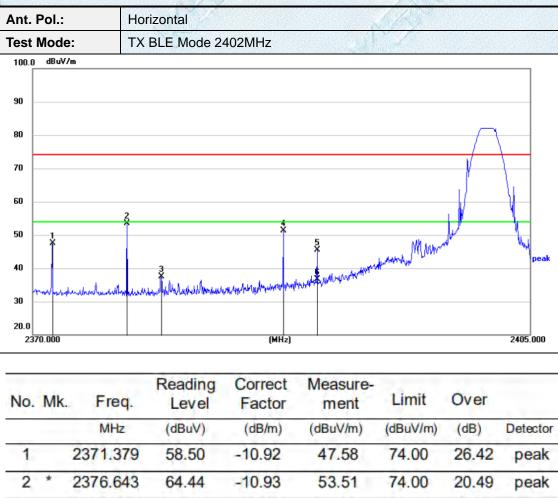
(1)Measurement = Reading level + Correct Factor

(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:MK08A



1		2371.379	58.50	-10.92	47.58	74.00	26.42	peak
2	*	2376.643	64.44	-10.93	53.51	74.00	20.49	peak
3		2378.985	48.37	-10.92	37.45	74.00	36.55	peak
4	1	2387.602	62.27	-10.92	51.35	74.00	22.65	peak
5		2389.971	56.50	-10.92	45.58	74.00	28.42	peak
6		2390.000	47.64	-10.92	36.72	74.00	37.28	peak

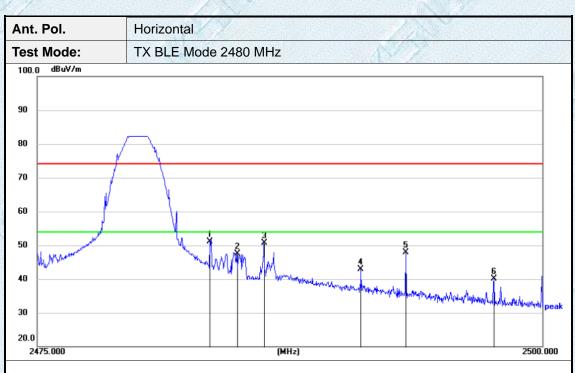
Emission Level= Read Level+ Correct Factor



No.	Mk.	Freq.	Level	Factor	ment	Limit	Over	
	-	MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		2377.186	45.65	-10.93	34.72	74.00	39.28	peak
2		2378.620	46.93	-10.92	36.01	74.00	37.99	peak
3	*	2380.948	47.90	-10.93	36.97	74.00	37.03	peak
4		2385.022	47.16	-10.92	36.24	74.00	37.76	peak
5		2385.750	47.63	-10.92	36.71	74.00	37.29	peak
6		2390.000	46.83	-10.92	35.91	74.00	38.09	peak
_								

Emission Level= Read Level+ Correct Factor

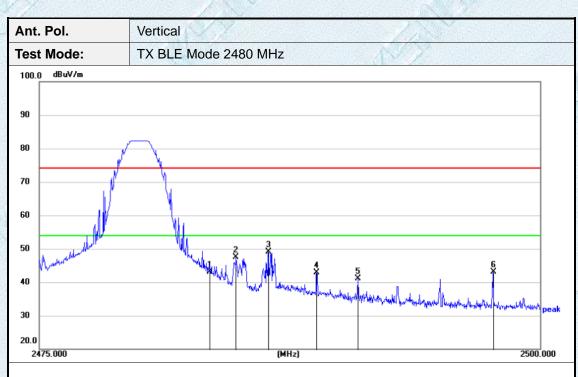




No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1	*	2483.500	62.06	-10.88	51.18	74.00	22.82	peak
2		2484.858	58.42	-10.88	47.54	74.00	26.46	peak
3		2486.198	61.59	-10.88	50.71	74.00	23.29	peak
4		2490.997	53.82	-10.89	42.93	74.00	31.07	peak
5		2493.250	58.70	-10.89	47.81	74.00	26.19	peak
6		2497.622	50.96	-10.88	40.08	74.00	33.92	peak

Emission Level= Read Level+ Correct Factor



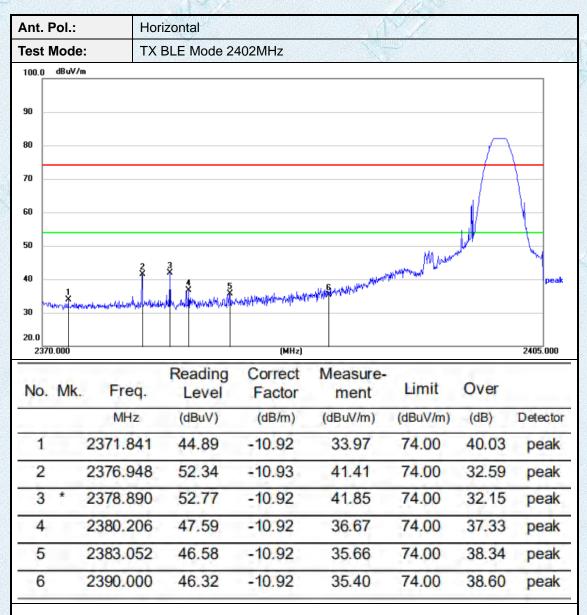


Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
	MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
	2483.500	54.06	-10.88	43.18	74.00	30.82	peak
	2484.815	58.39	-10.88	47.51	74.00	26.49	peak
*	2486.415	60.04	-10.88	49,16	74.00	24.84	peak
	2488.813	53.82	-10.89	42.93	74.00	31.07	peak
	2490.900	51.92	-10.89	41.03	74.00	32.97	peak
	2497.648	54.05	-10.88	43.17	74.00	30.83	peak
	Mk.	MHz 2483.500 2484.815 * 2486.415 2488.813 2490.900	Mk.      Freq.      Level        MHz      (dBuV)        2483.500      54.06        2484.815      58.39        *      2486.415      60.04        2488.813      53.82        2490.900      51.92	Mk.      Freq.      Level      Factor        MHz      (dBuV)      (dB/m)        2483.500      54.06      -10.88        2484.815      58.39      -10.88        *      2486.415      60.04      -10.88        2488.813      53.82      -10.89        2490.900      51.92      -10.89	Mk.      Freq.      Level      Factor      ment        MHz      (dBuV)      (dB/m)      (dBuV/m)        2483.500      54.06      -10.88      43.18        2484.815      58.39      -10.88      47.51        *      2486.415      60.04      -10.88      49.16        2488.813      53.82      -10.89      42.93        2490.900      51.92      -10.89      41.03	Mk.      Freq.      Level      Factor      ment      Limit        MHz      (dBuV)      (dB/m)      (dBuV/m)      (dBuV/m)        2483.500      54.06      -10.88      43.18      74.00        2484.815      58.39      -10.88      47.51      74.00        *      2486.415      60.04      -10.88      49.16      74.00        2488.813      53.82      -10.89      42.93      74.00        2490.900      51.92      -10.89      41.03      74.00	Mk.      Freq.      Level      Factor      ment      Limit      Over        MHz      (dBuV)      (dB/m)      (dBuV/m)      (dBuV/m)      (dB)        2483.500      54.06      -10.88      43.18      74.00      30.82        2484.815      58.39      -10.88      47.51      74.00      26.49        *      2486.415      60.04      -10.88      49.16      74.00      24.84        2488.813      53.82      -10.89      42.93      74.00      31.07        2490.900      51.92      -10.89      41.03      74.00      32.97

Emission Level= Read Level+ Correct Factor

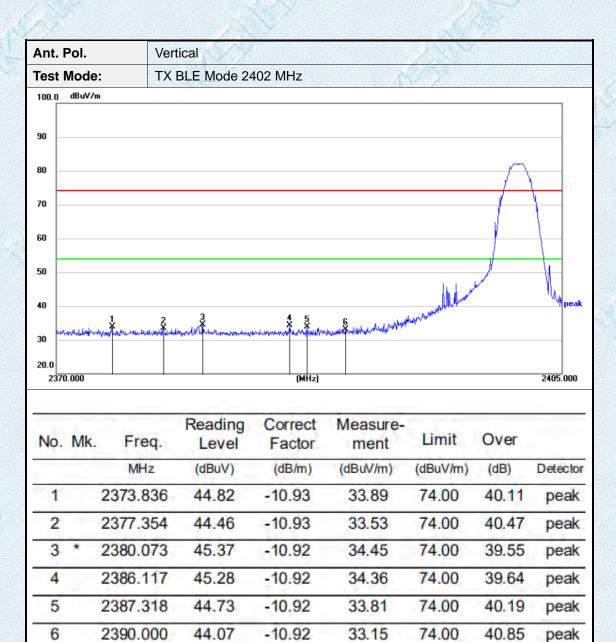


Test model:MK08B

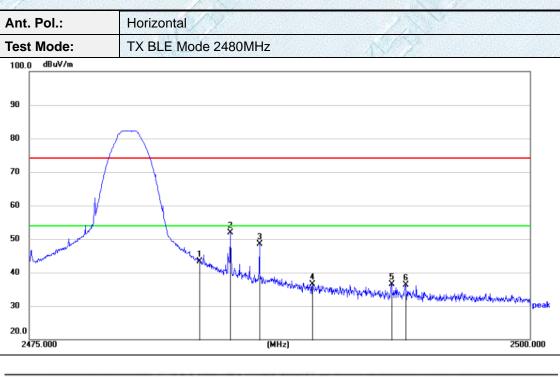


Emission Level= Read Level+ Correct Factor



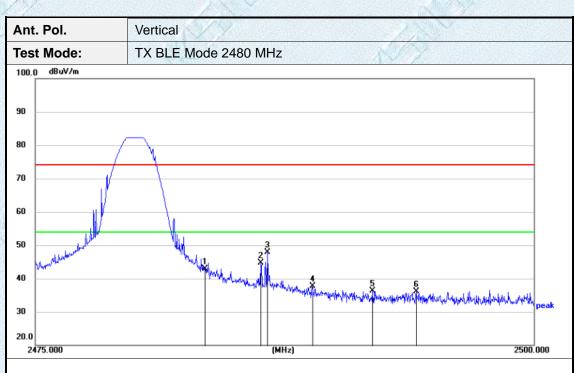






No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		2483.500	54.17	-10.88	43.29	74.00	30.71	peak
2	*	2485.020	62.69	-10.88	51.81	74.00	22.19	peak
3	1	2486.480	59.39	-10.88	48.51	74.00	25.49	peak
4		2489.140	47.38	-10.89	36.49	74.00	37.51	peak
5		2493.093	47.49	-10.89	36.60	74.00	37.40	peak
6	-	2493.793	47.28	-10.89	36.39	74.00	37.61	peak





No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1	2	2483.500	53.79	-10.88	42.91	74.00	31.09	peak
2		2486.287	55.63	-10.88	44.75	74.00	29.25	peak
3	*	2486.637	58.73	-10.88	47.85	74.00	26.15	peak
4		2488.863	48.63	-10.89	37.74	74.00	36.26	peak
5	1.1	2491.898	47.18	-10.89	36.29	74.00	37.71	peak
6		2494.080	47.03	-10.88	36.15	74.00	37.85	peak

### 3.7. 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

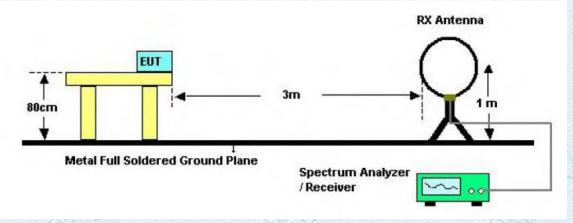
#### Radiated Emission Limit (Above 1000MHz)

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

#### Note:

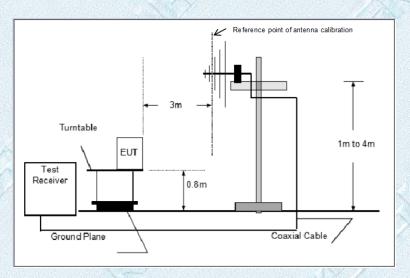
- (1) The tighter limit applies at the band edges.
- (2) Emission Level (dBuV/m)=20log Emission Level (uV/m).

#### **Test Configuration**

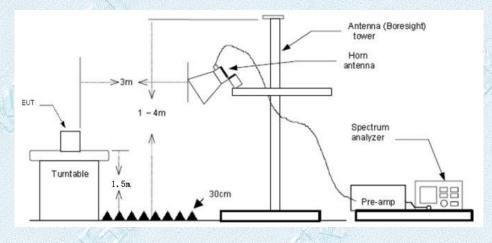


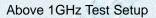
Below 30MHz Test Setup











#### 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.

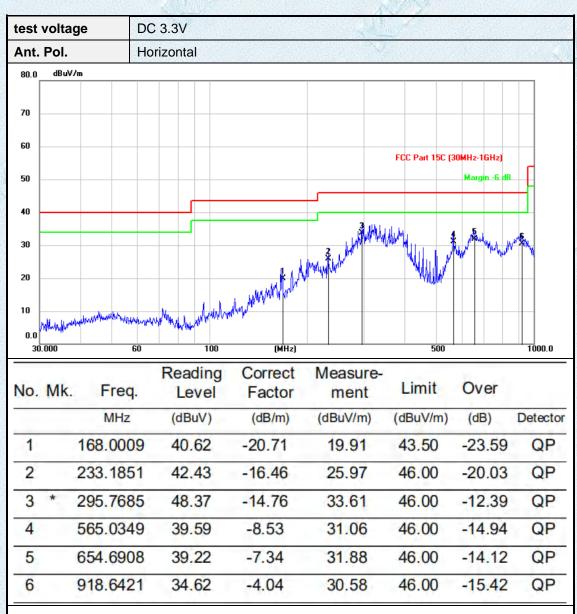
#### **BELOW 30MHZ**

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



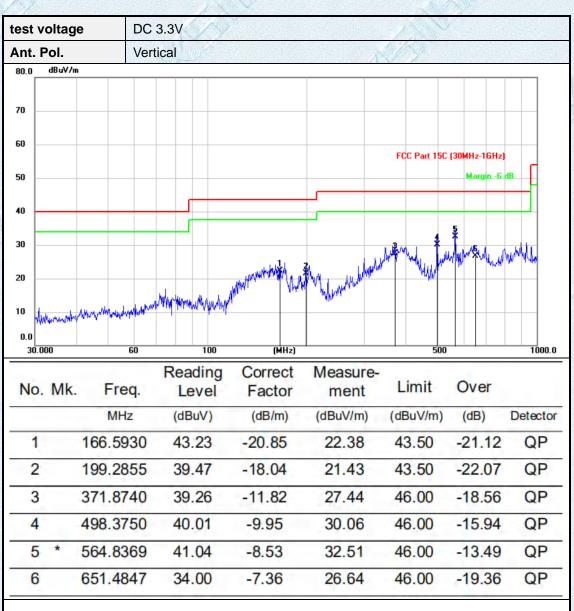
#### 30MHz-1GHz

Test model:MK08A



Emission Level= Read Level+ Correct Factor

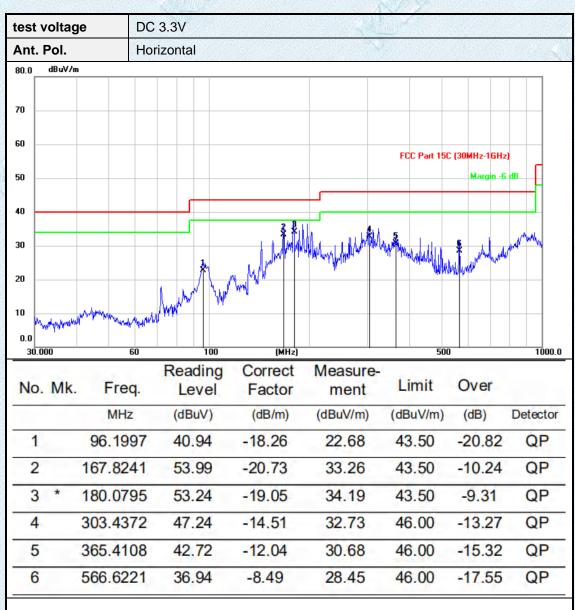
KSIGN



Emission Level= Read Level+ Correct Factor



Test model:MK08B



Emission Level= Read Level+ Correct Factor



4

5

6

366.5658

498.3750

566.6223

Emission Level= Read Level+ Correct Factor

39.54

41.66

39.85

-12.00

-9.95 -8.49 27.54

31.71

31.36

46.00

46.00

46.00

-18.46

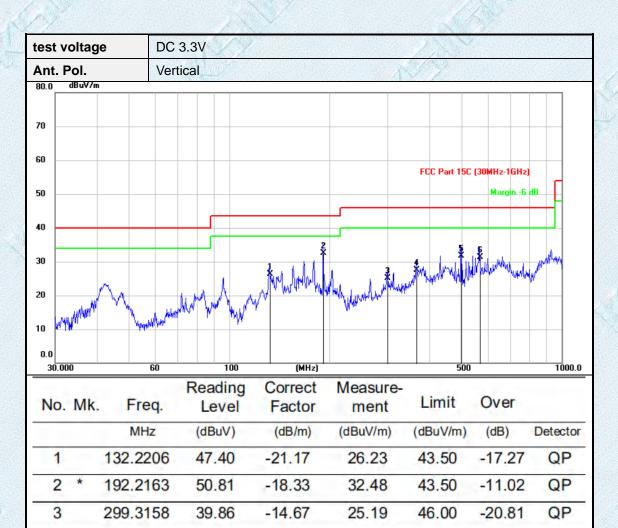
-14.29

-14.64

QP

QP

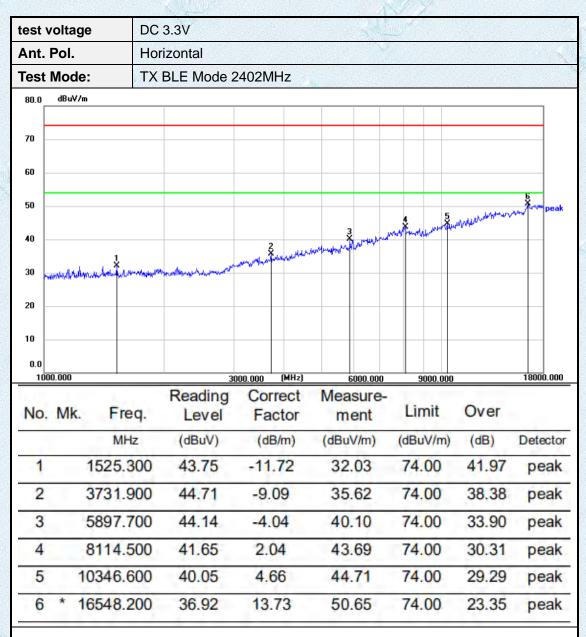
QP





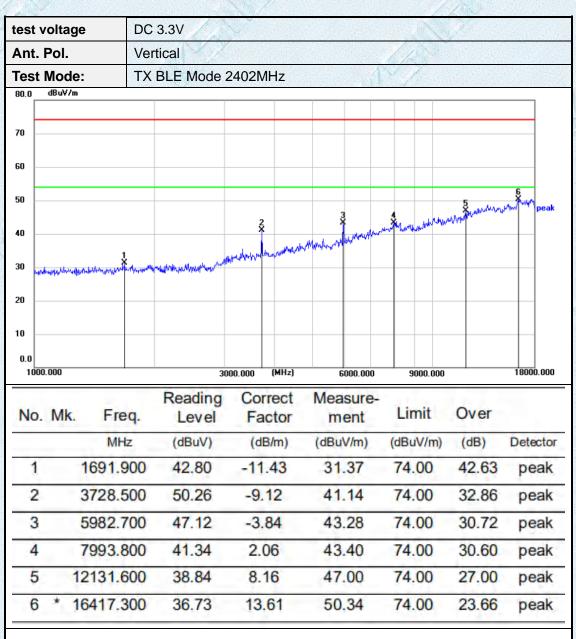
#### Adobe 1GHz

Test model:MK08A



Emission Level= Read Level+ Correct Factor







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Test	Mode		TXI	BLE Mode	e 2440N	1Hz				
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60 -										
50									5	6 Jug/Mit/Miteration peak
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20 -										
20 10										
10 0.0	0.000				3000.000	(MHz)	6000.000	9000.000		18000.000
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10 0.0 100	00.000 Mk.	Fre	q.	Reading	g Co			9000.000	Over	18000.000
10 0.0 100		Fre	•		g Cor I Fa	rrect	Measure-		Over (dB)	18000.000 Detector
10 0.0 100			z	Level	g Cor I Fa (d	rrect actor	Measure- ment	Limit	1.0	
10 0.0 100 No.		MH	z 00	Level (dBuV)	g Cor I Fa (dl -12	rrect actor B/m)	Measure- ment (dBuV/m)	Limit (dBuV/m)	(dB)	Detector
10 0.0 100 No.		мна 1170.0	z 00 00	Level (dBuV) 43.22	g Cor I Fa (dl -12 -10	rrect actor B/m) 2.10	Measure- ment (dBuV/m) 31.12	Limit (dBuV/m) 74.00	(dB) 42.88	Detector peak
10 0.0 100 No. 1 2		мн: 1170.0 2642.2	z 00 00 00	Level (dBuV) 43.22 43.19	g Cor I Fa (dl -12 -10 -9.	rrect actor B/m) 2.10 0.79	Measure- ment (dBuV/m) 31.12 32.40	Limit (dBuV/m) 74.00 74.00	(dB) 42.88 41.60	Detector peak peak
10 0.0 100 No. 1 2 3	Mk.	MH2 1170.0 2642.2 3723.4	z 00 00 00 00	Level (dBuV) 43.22 43.19 44.69	g Con I Fa (d) -12 -10 -9. 2.1	rrect actor B/m) 2.10 0.79 .12	Measure- ment (dBuV/m) 31.12 32.40 35.57	Limit (dBuV/m) 74.00 74.00 74.00	(dB) 42.88 41.60 38.43	Detector peak peak peak



test	voltage	e	DC :	3.3V				Story		
Ant.	Pol.		Vert	ical				Carl Carl		
Test	Mode	:	TX E	BLE Mode	24401	ЛНz				
80.0	dBu¥/m									
70										
60										
50							*	5	- Werthat	AMM peak
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20										
20 10										
10 0.0	00.000				3000.000	(MHz)	6000.000	9000.000		18000.000
10 0.0	0.000							9000.000		18000.000
10 0.0 100	. Mk.	Free	ą.	Reading	Co	(MH2) rrect actor	6000.000 Measure- ment	3000.000	Over	18000.000
10 0.0 100		Free		Reading	Cor Fa	rrect	Measure-		Over (dB)	18000.000 Detector
10 0.0 100	. Mk.	100 C		Reading Level	Fa	rrect actor	Measure- ment	Limit		
10 0.0 100	. Mk.	MHz	00	Reading Level (dBuV)	Con Fa (d -10	rrect actor B/m)	Measure- ment (dBuV/m)	Limit (dBuV/m)	(dB)	Detector
10 0.0 100 NO.	. Mk.	MHz 3325.6	00	Reading Level (dBuV) 48.26	Con Fa (d -10 -9.	rrect actor B/m) 0.00	Measure- ment (dBuV/m) 38.26	Limit (dBuV/m) 74.00	(dB) 35.74	Detector peak
10 0.0 100 No.	. Mk.	MHz 3325.6 3731.9	00 00 00	Reading Level (dBuV) 48.26 46.78	(d) -10 -5.	rrect actor B/m) 0.00	Measure- ment (dBuV/m) 38.26 37.69	Limit (dBuV/m) 74.00 74.00	(dB) 35.74 36.31	Detector peak peak
10 0.0 100 No. 1 2 3	. Mk.	MHz 3325.6 3731.9 4988.2	00 00 00 00 00	Reading Level (dBuV) 48.26 46.78 45.11	(d) -10 -9. -3.	rrect actor B/m) 0.00 .09 .43	Measure- ment (dBuV/m) 38.26 37.69 39.68	Limit (dBuV/m) 74.00 74.00 74.00	(dB) 35.74 36.31 34.32	Detector peak peak peak



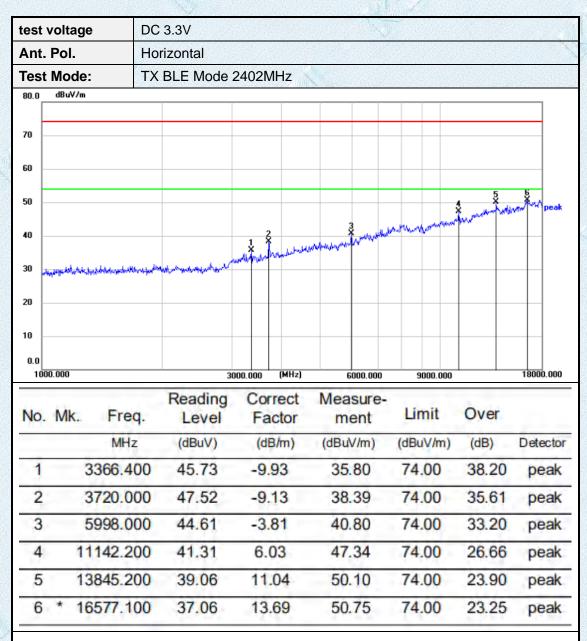
test v	/oltage	DC	3.3V		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			1
Ant.	Pol.	Hor	izontal					
Test	Mode:	TX	BLE Mode 2	2480MHz	S			
80.0	dBu¥/m							
70								
60								
50						4 5	apple to apple the second	hun with peak
40				2 Anna Maria	3 manufactoriant	when The market wat and the way	999 <b>**</b>	
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0.0	0.000			00.000 (MHz)				18000.000
1000	0.000		Reading	Correct	6000.000 Measure-	9000.000		10000.000
No.	Mk.	Freq.	Level	Factor	ment	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1	1	945.200	42.40	-11.10	31.30	74.00	42.70	peak
2	3	728.500	46.03	-9.12	36.91	74.00	37.09	peak
3	5	981.000	44.21	-3.84	40.37	74.00	33.63	peak
4	8	119.600	41.24	2.03	43.27	74.00	30.73	peak
5	10	093.300	41.29	4.23	45.52	74.00	28.48	peak
6	* 17	248.600	37.53	13.21	50.74	74.00	23.26	peak



test	voltag	е	DC	3.3V				~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				
Ant	. Pol.		Ver	tical								N
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80.0	dBuV/n	ı										
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N	o. <mark>M</mark> k	Fre	eq.	Level		actor		ent	Lim	nit	Over	
		MH	łz	(dBuV)	(d	B/m)	(dBu	V/m)	(dBu\	//m)	(dB)	Detector
	1	2994.	100	47.42	-10	.60	36	.82	74.(	00	37.18	peak
	2	3323.	900	48.12	-10	0.01	38	.11	74.(	00	35.89	peak
	3	3726.	800	51.73	-9	12	42	.61	74.(	00	31.39	peak
	4	4996.	700	45.36	-5	40	39	.96	74.(	00	34.04	peak
1	5	5316.	300	44.62	-5	10	39	.52	74.(	00	34.48	peak
1	6 *	5982.	700	47.09	-3	.84	43	.25	74.(	00	30.75	peak



Test model:MK08B



Emission Level= Read Level+ Correct Factor



est vo	oltage	DC	3.3V			6 ASS		
Ant. P	ol.	Ver	tical			Section 1		
Test N	lode:	TX	BLE Mode 24	102MHz	1			
80.0 d 70	18uV/m			*	2 3 Martin Martin	Le Program and marken	5 Marine Waha	S S Aug-MAN Peak
30 <mark>4p4/n</mark>	with many my marked	souther and	and a strategy and a	aber all and a second stand	Anyte Protect			
20 10 0.0 1000.0	00		3000	1.000 (MHz)	6000.000	9000.000		18000.000
10 0.0 1000.0	Mk.	Freq.	3000 Reading Level	Correct Factor	6000.000 Measure- ment	9000.000	Over	18000.000
10 0.0 1000.0		Freq. MHz	Reading	Correct	Measure-		Over (dB)	18000.000 Detector
10 0.0 1000.0	Mk.		Reading Level	Correct Factor	Measure- ment	Limit	1.1.1	
10 0.0 1000.0 NO.	Mk. 4	MHz	Reading Level (dBuV)	Correct Factor (dB/m)	Measure- ment (dBuV/m)	Limit (dBuV/m)	(dB)	Detecto
10 0.0 1000.0 No.	Mk. 4	MHz 663.500	Reading Level (dBuV) 45.30	Correct Factor (dB/m) -6.31	Measure- ment (dBuV/m) 38.99	Limit (dBuV/m) 74.00	(dB) 35.01	Detecto peak
10 0.0 1000.0 No.	Mk. 4	MHz 663.500 328.200	Reading Level (dBuV) 45.30 45.02	Correct Factor (dB/m) -6.31 -5.09	Measure- ment (dBuV/m) 38.99 39.93	Limit (dBuV/m) 74.00 74.00	(dB) 35.01 34.07	Detecto peak peak
10 0.0 1000.0 No. 1 2 3	Mk. 4 5 5 8	MHz 663.500 328.200 977.600	Reading Level (dBuV) 45.30 45.02 45.04	Correct Factor (dB/m) -6.31 -5.09 -3.85	Measure- ment (dBuV/m) 38.99 39.93 41.19	Limit (dBuV/m) 74.00 74.00 74.00	(dB) 35.01 34.07 32.81	Detecto peak peak peak



test v	voltage	DC 3.3V					1	1 Star		
Ant.	Pol.	Horizont	al				1	A.		
Test	Mode:	TX BLE	Mode 2	2440M	Hz		ST.			
80.0	dBuV/m									
70										
60										
50									M. Anna Martha	w/Mu <sup>rt</sup> whith peak
40						Andre parter and	- Alexandra	mund for any his we	~/WJ	
30 😽	unsur manufacture	Mary and and a start and	way wat	green th	which the second					
20										
10										
0.0										
	0.000		30	00.000	(MHz)	6000.0	00	9000.000		18000.000
100	Mk. Fre		ading evel	Corr		6000.0 Measure ment	e-	9000.000 Limit	Over	18000.000
100		q. L	ading	Corr Fac	rect	Measur	e-		Over (dB)	18000.000 Detector
100	Mk. Fre	q. La z (de	ading evel	Corr Fac	rect ctor	Measur ment	e-	Limit	1.1.22	
No.	Mk. Fre	q. Lo z (di 00 43	ading evel <sup>BuV)</sup>	Corr Fac (dB	rect ctor /m) 81	Measur ment (dBuV/m)	e-	Limit dBuV/m)	(dB)	Detector
100 No.	Mk. Fre MH: 2616.7	q. Li z (di 00 43 00 42	ading evel <sup>BuV)</sup> 3.07	Corr Fac (dB -10.	rect ctor /m) 81 40	Measur ment (dBuV/m) 32.26	e-	Limit dBuV/m) 74.00	(dB) 41.74	Detector peak
1000 No.	Mk. Free MH: 2616.7 3108.0	q.      La        z      (db        00      43        00      42        00      43	ading evel BuV) 3.07 2.96	Corr Fac (dB -10.	rect ctor /m) 81 40 34	Measur ment (dBuV/m) 32.26 32.56	e-	Limit dBuV/m) 74.00 74.00	(dB) 41.74 41.44	Detector peak peak
1000 No. 1 2 3	Mk. Free MH: 2616.7 3108.0 5984.4	q.      La        z      (db        00      43        00      42        00      43        00      43        00      43        00      43	ading evel BuV) 3.07 2.96 3.96	Corr Fac (dB -10. -10. -3.8	rect ctor /m) 81 40 34 95	Measur ment (dBuV/m) 32.26 32.56 40.12	e-	Limit dBuV/m) 74.00 74.00 74.00	(dB) 41.74 41.44 33.88	Detector peak peak peak

KSIGN

test v	voltage	<del>)</del>	DC	3.3V				$\nabla T$		
Ant.	Pol.		Ver	tical			S.			
Test	Mode	:	ТΧ	BLE Mode	2440N	lHz				
80.0 Г	dBuV/m									
70										
60										
50							4		5	6 what we peak
40					2	3	WWW MAN AN HAN ON MARRY MAN	water the standard	r4174Y	
30	aharanatingta	kranter bergland	لمستواج والمتعلقه	mean when a south on the	2 Marthandre	pher de la construcción de la co				
20										
10										
0.0 100	00.000				3000.000	(MHz)	6000.000	9000.000		18000.000
No.	Mk.	Fr	eq.	Reading Level		rect ctor	Measure- ment	Limit	Over	
		М	Hz	(dBuV)	(dE	3/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		1416	500	43.77	-11	.89	31.88	74.00	42.12	peak
2	- 3	3167	.500	46.10	-10	.29	35.81	74.00	38.19	peak
3		4661	800	47.44	- <mark>6</mark> .	31	41.13	74.00	32.87	peak
4		5986	100	47.31	-3.	84	43.47	74.00	30.53	peak
5	1	3923	.400	37.96	11.	13	49.09	74.00	24.91	peak
6	* 1	7748	400	37.08	13.	51	50.59	74.00	23.41	peak
	-		-							_

Emission Level= Read Level+ Correct Factor

test vo	oltage	DC 3	3.3V						
Ant. P	ol.	Hori	zontal						
Test M	lode:	TX E	BLE Mode 2	480MH	Ηz				
80.0 di	BuV/m								
70									
60									
50							ut man	5	www.turka
40				2		manan	AN MARMANNA	Up the dawn	
30 Vn/m/r	norman adjution to	windowserver	A second to the second second and a second	ununutin	N. W. Wryeller	Augustual a			
20									
20									
10 0.0									
10	00				(MHz)	6000.000	9000.000		18000.000
10 0.0		eq.	300 Reading Level	Corr Fac	ect	6000.000 Measure- ment		Over	18000.000
10 0.0 1000.00	Mk. Fr	eq. Hz	Reading	Corr	ect tor	Measure-	-	Over (dB)	18000.000 Detector
10 0.0 1000.00	Mk. Fr	Hz	Reading Level	Corr	rect stor /m)	Measure- ment	Limit	2.29	
10 0.0 1000.00 No.	Mk. Fr	Hz 600	Reading Level (dBuV)	Corr Fac	rect stor /m) 01	Measure- ment (dBuV/m)	Limit (dBuV/m)	(dB)	Detector
10 0.0 1000.00 No.	Mk. Fr M 2152.	Hz 600 900	Reading Level (dBuV) 42.52	Corr Fac (dB) -11.0	rect stor /m) 01 09	Measure- ment (dBuV/m) 31.51	Limit (dBuV/m) 74.00	(dB) 42.49	Detector peak
10 0.0 1000.00 No. 1 2	Mk. Fr Mi 2152. 3731.	Hz 600 900 200	Reading Level (dBuV) 42.52 47.20	Corr Fac (dB/ -11.0	rect ctor /m) 01 09 31	Measure- ment (dBuV/m) 31.51 38.11	Limit (dBuV/m) 74.00 74.00	(dB) 42.49 35.89	Detector peak peak
10 0.0 1000.00 No. 1 2 3	Mk. Fr Mi 2152. 3731. 5991.	Hz 600 900 200 400	Reading Level (dBuV) 42.52 47.20 44.49	Corr Fac (dB) -11.0 -9.0 -3.8	rect ctor /m) 01 09 31 5	Measure- ment (dBuV/m) 31.51 38.11 40.68	Limit (dBuV/m) 74.00 74.00 74.00	(dB) 42.49 35.89 33.32	Detector peak peak peak



test voltage			DC	3.3V							
Ant. Pol.		Ver	Vertical								
Test Mode:			ТХ	TX BLE Mode 2480MHz							
80.0 Г	dBuV	/m									
70											
60											
50						5 X		manufacture			
40					1 2	3 4 martine	man and a share with the statest	Avr.			
30	naturation	unnahinn <sup>en</sup> nahin	al planter prover the	unother other and failed	www.www.www.www.www.						
20											
20											
10 0.0	00.000			3	1000.000 (MHz)	6000.000	9000.000		18000.000		
10 0.0 10	00.000 Mk.	. F	req.	Reading Level	Correct Factor	6000.000 Measure- ment		Over	18000.000		
10 0.0 10		-	req. MHz	Reading	Correct	Measure-		Over (dB)	18000.000 Detector		
10 0.0 10		N	1 · · ·	Reading Level	Correct Factor	Measure- ment	Limit	100.5			
10 0.0 10 NO.		M 3329	/Hz	Reading Level (dBuV)	Correct Factor (dB/m)	Measure- ment (dBuV/m)	Limit (dBuV/m)	(dB)	Detector		
10 0.0 10 No.		M 3329 3720	MHz 9.000	Reading Level (dBuV) 47.59	Correct Factor (dB/m) -9.99	Measure- ment (dBuV/m) 37.60	Limit (dBuV/m) 74.00	(dB) 36.40	Detector peak		
10 0.0 10 No.		3329 3720 4986	MHz 0.000 0.000	Reading Level (dBuV) 47.59 46.96	Correct Factor (dB/m) -9.99 -9.13	Measure- ment (dBuV/m) 37.60 37.83	Limit (dBuV/m) 74.00 74.00	(dB) 36.40 36.17	Detector peak peak		
10 0.0 10 No. 1 2 3	Mk	3329 3720 4986 5321	MHz 0.000 0.000 0.500	Reading Level (dBuV) 47.59 46.96 45.10	Correct Factor (dB/m) -9.99 -9.13 -5.43	Measure- ment (dBuV/m) 37.60 37.83 39.67	Limit (dBuV/m) 74.00 74.00 74.00	(dB) 36.40 36.17 34.33	Detector peak peak peak		

#### Note:

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



### 3.8. Conducted Emission

#### Limit

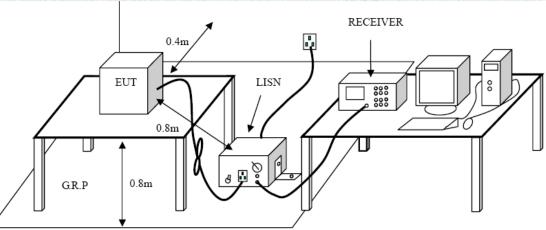
#### **Conducted Emission Test Limit**

Fromuonov	Maximum RF Line Voltage (dBµV)				
Frequency	Quasi-peak Level	Average Level 56 ~ 46 *			
150kHz~500kHz	66 ~ 56 *				
500kHz~5MHz	56	46			
5MHz~30MHz	60	50			

#### Notes:

- (1) \*Decreasing linearly with logarithm of the frequency.
- (2) The lower limit shall apply at the transition frequencies.
- (3) The limit decrease in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

#### Test Configuration



#### Test Procedure

- 1. The EUT was setup according to ANSI C63.10:2013 requirements.
- 2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface.
- The EUT and simulators are connected to the main power through a line impedances stabilization network (LISN). The LISN provides a 50ohm /50uH coupling impedance for the measuring equipment.
  The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)
- 4. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.
- 5. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
- 6. Conducted Emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.
- 7. During the above scans, the emissions were maximized by cable manipulation.

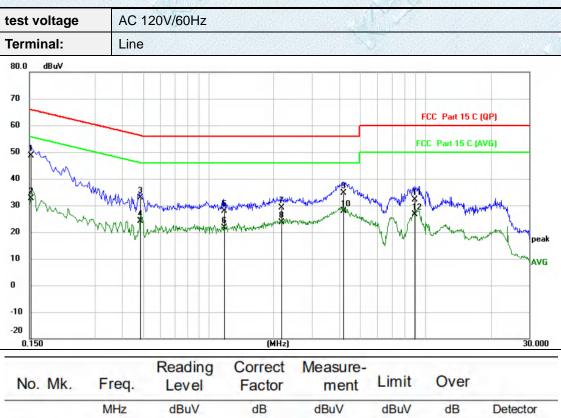
#### Test Mode:

Please refer to the clause 2.3.

#### **Test Results**



Test model: MK08A



No. Mk.	Freq.	Level	Factor	ment	Limit	Over	
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1 *	0.1524	37.75	10.82	48.57	65.87	-17.30	QP
2	0.1524	21.69	10.82	32.51	55.87	-23.36	AVG
3	0.4860	22.02	10.91	32.93	56.24	-23.31	QP
4	0.4860	<mark>1</mark> 3.30	10.91	24.21	46.24	-22.03	AVG
5	1.1820	16.93	10.87	27.80	56.00	-28.20	QP
6	1.1820	10.69	10.87	21.56	46.00	-24.44	AVG
7	2.1660	18.14	10.89	29.03	56.00	-26.97	QP
8	2.1660	12.68	10.89	23.57	46.00	-22.43	AVG
9	4.1779	23.64	10.96	34.60	56.00	-21.40	QP
10	4.1779	17.04	10.96	28.00	46.00	-18.00	AVG
11	8.9100	21.18	10.97	32.15	60.00	-27.85	QP
12	8.9100	15.73	10.97	26.70	50.00	-23.30	AVG

#### Remarks:

1.Measurement = Reading Level+ Correct Factor

2.Over = Measurement -Limit

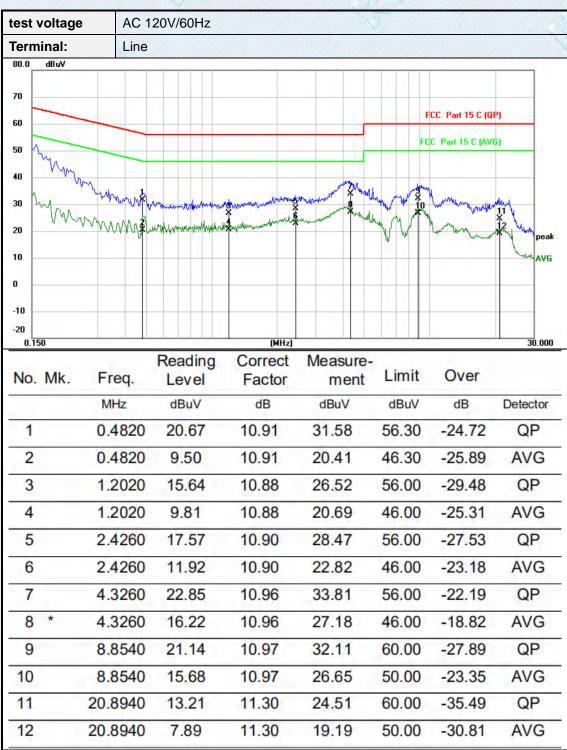


est voltage	AC 12	AC 120V/60Hz						
erminal:	Neutr	Neutral						
80.0 dBuV								
70								
60					FC	C Part 15 C (QP)		
50					FCC	Part 15 C (AVG)		
Xu								
	MANA 3		and the law	marine	. Mar			
9 Y 44 A	MWWWWW SAL	Marmannen	wanter and	A CONTRACT OF A	10	Street and the street and the street	1	
	www.N*h	WWwwwwwwwww	prestantin	More want	WW Y	-	peak	
0					u		AVG	
10								
0.150			(MHz)				30.000	
1. 5. 6. 1		Reading	Correct	Measure-				
No. Mk.	Freq.	Level	Factor	ment	Limit	Over		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	
1 *	0.1740	34.00	10.86	44.86	64.77	-19.91	QP	
2	0.1740	17.35	10.86	28.21	54.77	-26.56	AVG	
3	0.4780	18.69	10.88	29.57	56.37	-26.80	QP	
4	0.4780	9.64	10.88	20.52	46.37	-25.85	AVG	
5	2.0740	17.69	10.89	28.58	56.00	-27.42	QP	
6	2.0740	12.11	10.89	23.00	46.00	-23.00	AVG	
7	4.1220	18.87	10.95	29.82	56.00	-26.18	QP	
8	4.1220	12.41	10.95	23.36	46.00	-22.64	AVG	
9	9.4740	18.49	10.91	29.40	60.00	-30.60	QP	
10	9.4740	13.08	10.91	23.99	50.00	-26.01	AVG	
		13.67	11.16	24.83	60.00	-35.17	QP	
11	20.5419	13.07	11.10	21.00	00.00			

Remarks: 1.Measurement = Reading Level+ Correct Factor 2.Over = Measurement -Limit



Test model: MK08B



Remarks:

1.Measurement = Reading Level+ Correct Factor

2.Over = Measurement -Limit

test	voltage	AC 12	:0V/60Hz					il.
Terminal: Neutral								No.
80.0	dBu∀							
70								
60						FCI	C Part 15 C (QP)	
50						FCC	Part 15 C (AVG)	
40	Marine Walk							
30	1 Marine	montan		a Jacomina Stranger	- Anna	M & M	magninet	<u>K</u>
20	N& Manager	M M	North March March March	program & meters	man Swamp		monthing of	12 A peak
10		WWW W	The Speckberger and Spectra			"V "W "		AVG
0								
-10								
-20	150			(MHz)				30.000
	50	_	Reading	Correct	Measure-		74.8	30.000
No	. Mk. F	req.	Level	Factor	ment	Limit	Over	
	ſ	MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1	* 0	.1819	31.97	10.87	42.84	64.40	-21.56	QP
2	2 0	.1819	14.60	10.87	25.47	54.40	-28.93	AVG
3	3 0	.4780	19.14	10.88	30.02	56.37	-26.35	QP
4	0	.4780	10.62	10.88	21.50	46.37	-24.87	AVG
5	i 2	.0500	17.49	10.89	28.38	56.00	-27.62	QP
6	; 2	.0500	11.84	10.89	22.73	46.00	-23.27	AVG
7	4	.2860	19.74	10.95	30.69	56.00	-25.31	QP
8	3 4	.2860	11.25	10.95	22.20	46.00	-23.80	AVG
9	) 8	.9860	18.59	10.93	29.52	60.00	-30.48	QP
10	) 8	.9860	12.83	10.93	23.76	50.00	-26.24	AVG
11	21	.8100	16.00	11.14	27.14	60.00	-32.86	QP
12	2 21	.8100	9.02	11.14	20.16	50.00	-29.84	AVG
							X	

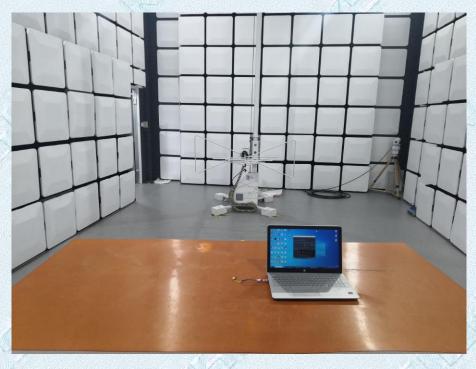
Remarks: 1.Measurement = Reading Level+ Correct Factor 2.Over = Measurement -Limit



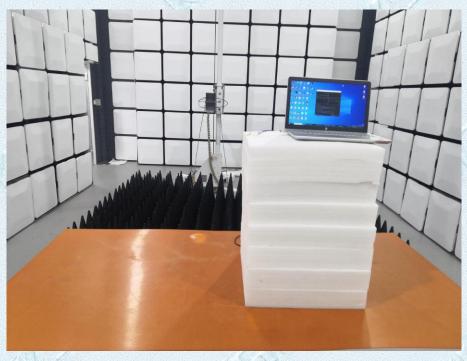
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**4.EUT TEST PHOTOS** 

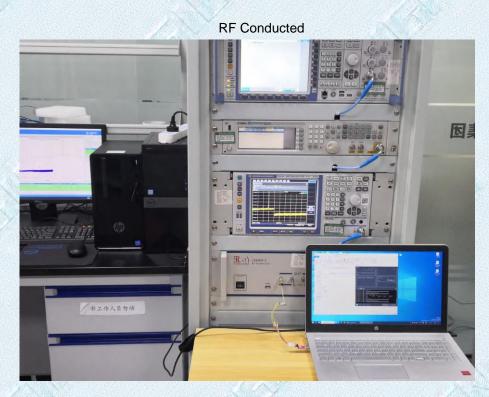
Radiated Measurement (Below 1GHz)



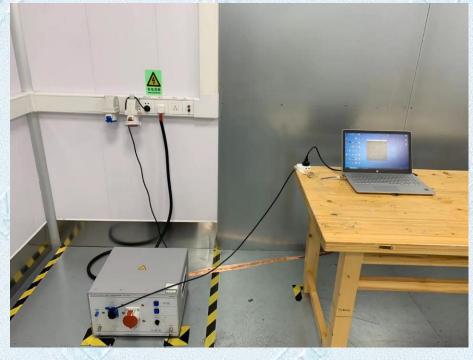
Radiated Measurement (Above 1GHz)







#### CONDUCTED EMISSION TEST SETUP

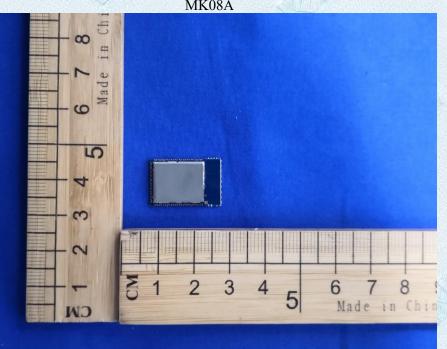


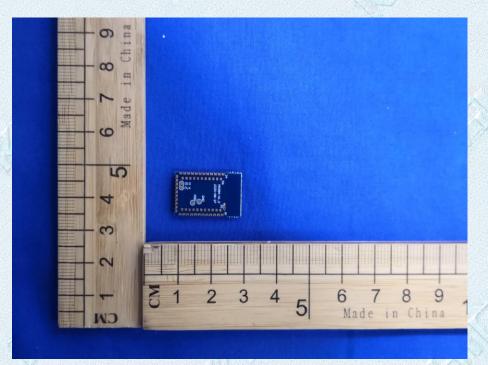


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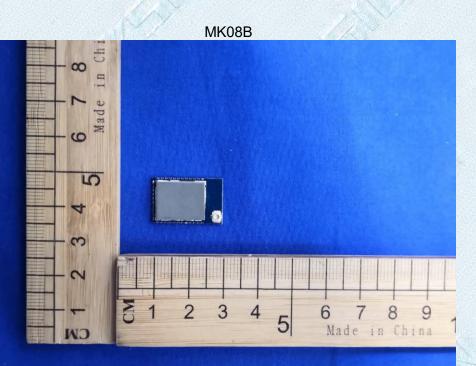
## **5.PHOTOGRAPHS OF EUT CONSTRUCTIONAL**

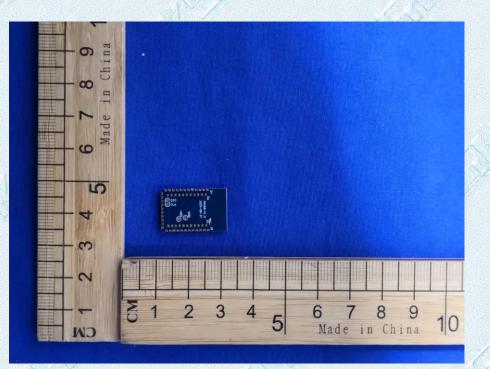








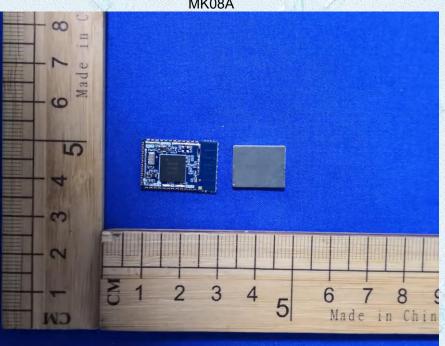


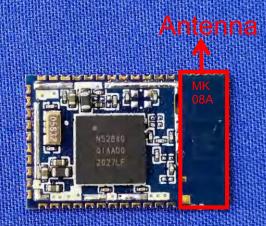




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### Internal Photographs MK08A

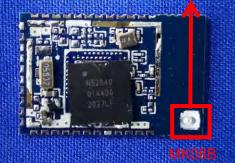






MK08B Chin. 0 00 -Made 9 5 4 3 S 3 6 7 8 9 Made in China 2 4 5 ND

# RF connector



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