

## TEST REPORT

**Applicant:** Leete Technology(ShenZhen) Co., Ltd.  
**Address of Applicant:** Room 605, Building B, Bantian International Center, Longgang, Shenzhen, China  
**Manufacturer:** Leete Technology(ShenZhen) Co., Ltd.  
**Address of Manufacturer:** Room 605, Building B, Bantian International Center, Longgang, Shenzhen, China  
**Equipment Under Test (EUT)**  
**Product Name:** smart watch  
**Model No.:** C20Pro, C26, C26Pro, C1, C1Pro, C20, C28, C28Pro, C3, C30  
**Trade Mark:** Leete  
**FCC ID:** 2A69O-C20PRO  
**Applicable standards:** FCC CFR Title 47 Part 15 Subpart C Section 15.247  
ANSI C63.10:2013  
**Date of sample receipt:** May 29, 2023  
**Date of Test:** June 2~5, 2023  
**Date of report issued:** June 5, 2023  
**Test Result:** PASS \*

\* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



**Robinson Luo**

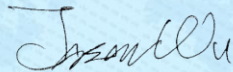
**Laboratory Manager**

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

## 2 Version

Version No.	Date	Description
00	2023-6-5	Original

Prepared By:



Date:

2023-6-5

Project Engineer

Check By:



Reviewer

Date:

2023-6-5

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## 4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203/15.247 (b)(4)	Pass
AC Power Line Conducted Emission	15.207	Pass
Conducted Peak Output Power	15.247 (b)(3)	Pass
Channel Bandwidth	15.247 (a)(2)	Pass
Power Spectral Density	15.247 (e)	Pass
Band Edge	15.247(d)	Pass
Spurious Emission	15.205/15.209	Pass

### Remarks:

1. Pass: The EUT complies with the essential requirements in the standard.
2. Test according to ANSI C63.10:2013.

### Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	$1 \times 10^{-7}$
2	Duty cycle	0.37%
3	Occupied Bandwidth	3%
4	RF conducted power	0.75dB
5	RF power density	3dB
6	Conducted Spurious emissions	2.58dB
7	AC Power Line Conducted Emission	3.44dB (0.15MHz ~ 30MHz)
8	Radiated Spurious emission test	3.1dB (9kHz-30MHz)
		3.8039dB (30MHz-200MHz)
		3.9679dB (200MHz-1GHz)
		4.29dB (1GHz-18GHz)
		3.30dB (18GHz-40GHz)

Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.

## 5 General Information

### 5.1 General Description of EUT

Product Name:	smart watch
Model No.:	C20Pro, C26, C26Pro, C1, C1Pro, C20, C28, C28Pro, C3, C30
Test Model No.:	C20Pro
Test sample(s) ID:	GTSL2023060037-1
Sample(s) Status:	Engineer sample
Serial No.:	N/A
Hardware Version:	M81006.02
Software Version:	MOY-DGG5-2.0.3
Operation Frequency:	2402MHz~2480MHz
Channel Numbers:	40
Channel Separation:	2MHz
Modulation Type:	GFSK
Antenna Type:	Internal antenna
Antenna Gain:	0.17dBi
Power Supply:	DC 5V (Powered by adapter) DC 3.7V(Powered by battery)

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2402 MHz	11	2422 MHz	21	2442 MHz	31	2462 MHz
2	2404 MHz	12	2424 MHz	22	2444 MHz	32	2464 MHz
3	2406 MHz	13	2426 MHz	23	2446 MHz	33	2466 MHz
4	2408 MHz	14	2428 MHz	24	2448 MHz	34	2468 MHz
5	2410 MHz	15	2430 MHz	25	2450 MHz	35	2470 MHz
6	2412 MHz	16	2432 MHz	26	2452 MHz	36	2472 MHz
7	2414 MHz	17	2434 MHz	27	2454 MHz	37	2474 MHz
8	2416 MHz	18	2436 MHz	28	2456 MHz	38	2476 MHz
9	2418 MHz	19	2438 MHz	29	2458 MHz	39	2478 MHz
10	2420 MHz	20	2440 MHz	30	2460 MHz	40	2480 MHz

**Note:**

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

Channel	Frequency
The lowest channel	2402MHz
The middle channel	2440MHz
The Highest channel	2480MHz

Test Item	Software	Description
Conducted RF Testing and Radiated testing	RTLBTAPP	Set the EUT to different modulation and channel

**Output power setting table:**

Test Mode	Set Tx Output Power	Data Rate
BLE	0x3b	1Mbps
BLE	0x3b	2Mbps

## Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode
<p><i>Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.</i></p>	

## 5.2 Description of Support Units

<p>Adapter: Input: AC 100-240V~, 50/60Hz Output: 5V <math>\overline{\text{---}}</math>, 1A</p>
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## 5.3 Deviation from Standards

None.
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## 5.4 Abnormalities from Standard Conditions

None.
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## 5.5 Test Facility

<p>The test facility is recognized, certified, or accredited by the following organizations:</p> <ul style="list-style-type: none"> <li>● <b>FCC—Registration No.: 381383</b> Designation Number: CN5029 Global United Technology Services Co., Ltd., Shenzhen 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 files.</li> <li>● <b>IC —Registration No.: 9079A</b> CAB identifier: CN0091 The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing</li> <li>● <b>NVLAP (LAB CODE:600179-0)</b> Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).</li> </ul>
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## 5.6 Test Location

All tests were performed at:
<p>Global United Technology Services Co., Ltd. Address: No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102 Tel: 0755-27798480 Fax: 0755-27798960</p>

## 6 Test Instruments list

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	June 23, 2021	June 22, 2024
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	April 14, 2023	April 13, 2024
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9168	GTS640	March 19, 2023	March 18, 2025
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	April 17, 2023	April 16, 2025
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
7	Coaxial Cable	GTS	N/A	GTS213	April 21, 2023	April 20, 2024
8	Coaxial Cable	GTS	N/A	GTS211	April 21, 2023	April 20, 2024
9	Coaxial cable	GTS	N/A	GTS210	April 21, 2023	April 20, 2024
10	Coaxial Cable	GTS	N/A	GTS212	April 21, 2023	April 20, 2024
11	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	April 14, 2023	April 13, 2024
12	Loop Antenna	ZHINAN	ZN30900A	GTS534	Nov. 29, 2022	Nov. 28, 2023
13	Broadband Preamplifier	SCHWARZBECK	BBV9718	GTS535	April 14, 2023	April 13, 2024
14	Amplifier(1GHz-26.5GHz)	HP	8449B	GTS601	April 14, 2023	April 13, 2024
15	Horn Antenna (18-26.5GHz)	/	UG-598A/U	GTS664	Oct. 30, 2022	Oct. 29, 2023
16	Horn Antenna (26.5-40GHz)	A.H Systems	SAS-573	GTS665	Oct. 30, 2022	Oct. 29, 2023
17	FSV·Signal Analyzer (10Hz-40GHz)	Keysight	FSV-40-N	GTS666	March 13, 2023	March 12, 2024
18	Amplifier	/	LNA-1000-30S	GTS650	April 14, 2023	April 13, 2024
19	CDNE M2+M3-16A	HCT	30MHz-300MHz	GTS668	Dec. 20,2022	Dec.19,2023



Conducted Emission						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	July 12, 2022	July 11, 2027
2	EMI Test Receiver	R&S	ESCI 7	GTS552	April 14, 2023	April 13, 2024
3	LISN	ROHDE & SCHWARZ	ENV216	GTS226	April 14, 2023	April 13, 2024
4	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
5	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
6	Thermo meter	JINCHUANG	GSP-8A	GTS639	April 18, 2023	April 17, 2024
7	Absorbing clamp	Elektronik-Feinmechanik	MDS21	GTS229	April 14, 2023	April 13, 2024
8	ISN	SCHWARZBECK	NTFM 8158	GTS565	April 14, 2023	April 13, 2024
9	High voltage probe	SCHWARZBECK	TK9420	GTS537	April 14, 2023	April 13, 2024
10	Antenna end assembly	Weinschel	1870A	GTS560	April 14, 2023	April 13, 2024

RF Conducted Test:						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	MXA Signal Analyzer	Agilent	N9020A	GTS566	April 14, 2023	April 13, 2024
2	EMI Test Receiver	R&S	ESCI 7	GTS552	April 14, 2023	April 13, 2024
3	PSA Series Spectrum Analyzer	Agilent	E4440A	GTS536	April 14, 2023	April 13, 2024
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	April 14, 2023	April 13, 2024
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	April 14, 2023	April 13, 2024
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	April 14, 2023	April 13, 2024
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	April 14, 2023	April 13, 2024
8	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	April 14, 2023	April 13, 2024

General used equipment:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	April 18, 2023	April 17, 2024
2	Barometer	KUMAO	SF132	GTS647	April 19, 2023	April 18, 2024

## 7 Test results and Measurement Data

### 7.1 Antenna requirement

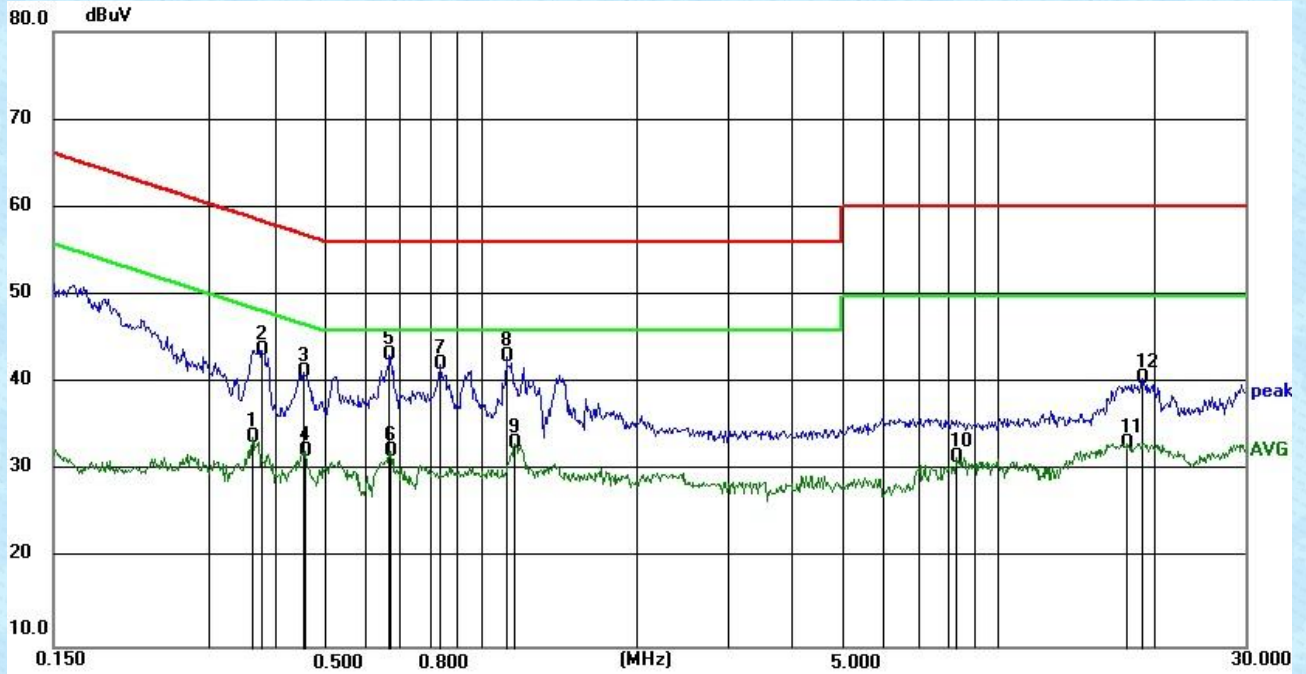
<b>Standard requirement:</b>	FCC Part15 C Section 15.203 /247(b)(4)
<p><b>15.203 requirement:</b></p> <p>An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.</p> <p><b>15.247(b)(4) requirement:</b></p> <p>(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.</p>	
<p><b>E.U.T Antenna:</b></p> <p><i>The antenna is Internal antenna, the best case gain of the is 0.17dBi, reference to the appendix II for details</i></p>	

## 7.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207					
Test Method:	ANSI C63.10:2013					
Test Frequency Range:	150kHz to 30MHz					
Class / Severity:	Class B					
Receiver setup:	RBW=9kHz, VBW=30kHz, Sweep time=auto					
Limit:	Frequency range (MHz)		Limit (dBuV)			
			Quasi-peak		Average	
	0.15-0.5		66 to 56*		56 to 46*	
	0.5-5		56		46	
	5-30		60		50	
* Decreases with the logarithm of the frequency.						
Test setup:						
	<p><i>Remark</i>  <i>E.U.T: Equipment Under Test</i>  <i>LISN: Line Impedance Stabilization Network</i>  <i>Test table height=0.1m</i></p>					
Test procedure:	<ol style="list-style-type: none"> <li>1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.</li> <li>2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).</li> <li>3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2009 on conducted measurement.</li> </ol>					
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar
Test voltage:	AC 120V, 60Hz					
Test results:	Pass					

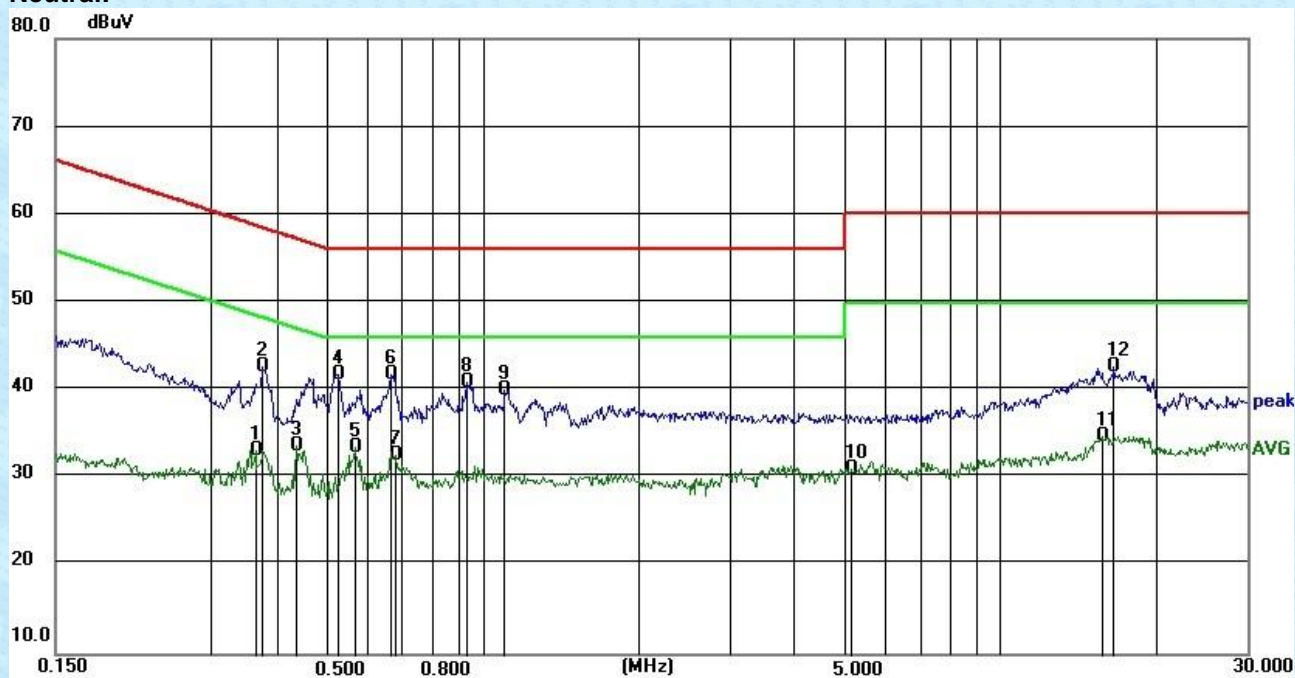
Pre-scan all test modes, found worst case at GFSK 1M 2402MHz, and so only show the test result of GFSK 1M 2402MHz

Line:



Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Remark
0.3633	23.93	10.01	33.94	48.65	14.71	AVG
0.379	33.84	10.01	43.85	58.3	14.45	QP
0.4561	31.25	10.01	41.26	56.76	15.5	QP
0.4586	22.24	10.01	32.25	46.72	14.47	AVG
0.6683	33.21	10.02	43.23	56	12.77	QP
0.6713	22.28	10.02	32.3	46	13.7	AVG
0.8393	32.11	10.02	42.13	56	13.87	QP
1.1229	33.03	10.03	43.06	56	12.94	QP
1.1653	23.1	10.03	33.13	46	12.87	AVG
8.3228	21.34	10.25	31.59	50	18.41	AVG
17.7545	22.81	10.44	33.25	50	16.75	AVG
18.9204	30.09	10.46	40.55	60	19.45	QP
0.3633	23.93	10.01	33.94	48.65	14.71	AVG
0.379	33.84	10.01	43.85	58.3	14.45	QP

**Neutral:**

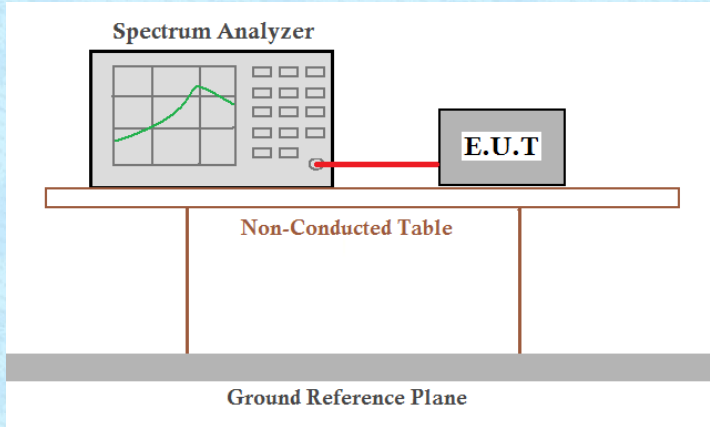


Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Remark
0.3653	23.23	10.01	33.24	48.61	15.37	AVG
0.375	32.74	10.01	42.75	58.39	15.64	QP
0.4374	23.74	10.01	33.75	47.11	13.36	AVG
0.5262	31.8	10.02	41.82	56	14.18	QP
0.5664	23.45	10.02	33.47	46	12.53	AVG
0.6643	31.81	10.02	41.83	56	14.17	QP
0.6824	22.68	10.02	32.7	46	13.3	AVG
0.9331	30.91	10.03	40.94	56	15.06	QP
1.1048	30.05	10.03	40.08	56	15.92	QP
5.166	20.99	10.15	31.14	50	18.86	AVG
15.7179	24.33	10.4	34.73	50	15.27	AVG
16.5731	32.31	10.41	42.72	60	17.28	QP
0.3653	23.23	10.01	33.24	48.61	15.37	AVG

**Notes:**

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Receiver Read level + LISN Factor + Cable Loss  
If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

## 7.3 Conducted Peak Output Power

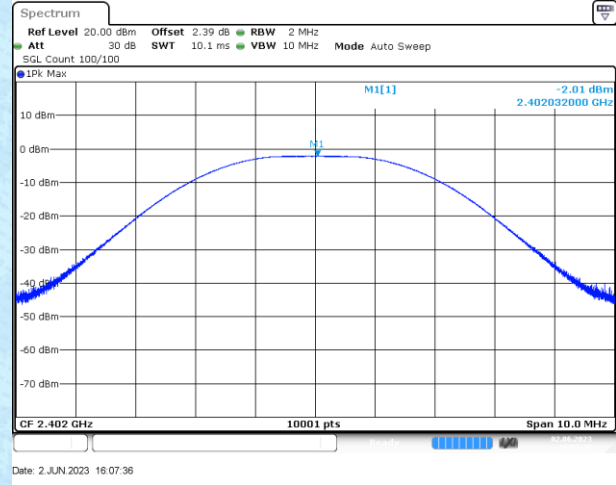
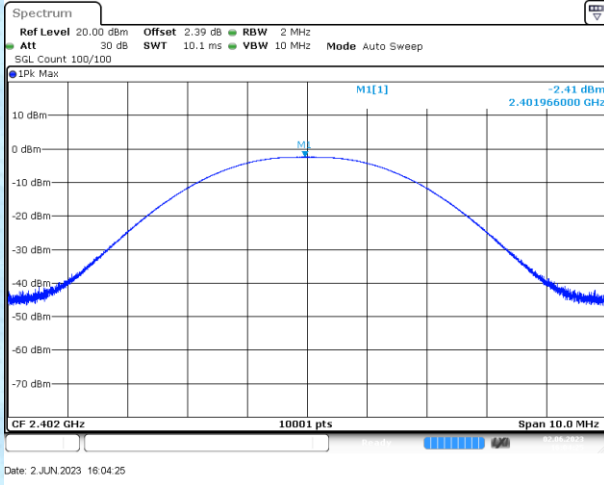
Test Requirement:	FCC Part15 C Section 15.247 (b)(3)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 15.247 Meas Guidance v05r02
Limit:	30dBm
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

### Measurement Data

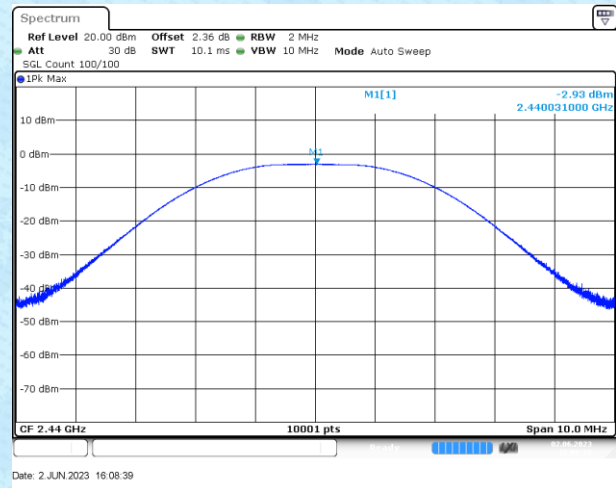
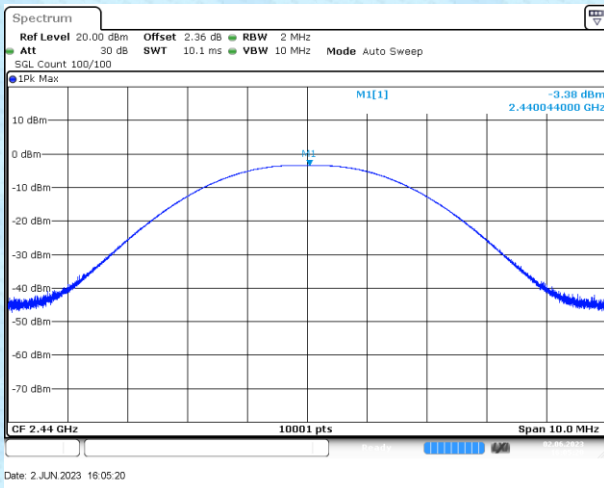
Modulation mode	Test channel	Peak Output Power (dBm)	EIRP (dBm)	Output Power Limit(dBm)	EIRP Limit(dBm)	Result
GFSK (1M)	Lowest	-2.41	-2.24	30.00	36.00	Pass
	Middle	-3.38	-3.21	30.00	36.00	Pass
	Highest	-3.84	-3.67	30.00	36.00	Pass
GFSK (2M)	Lowest	-2.01	-1.84	30.00	36.00	Pass
	Middle	-2.93	-2.76	30.00	36.00	Pass
	Highest	-3.66	-3.49	30.00	36.00	Pass

Test plot as follows:

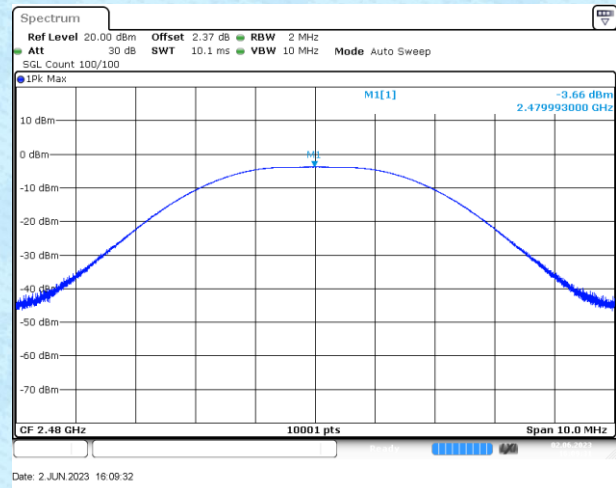
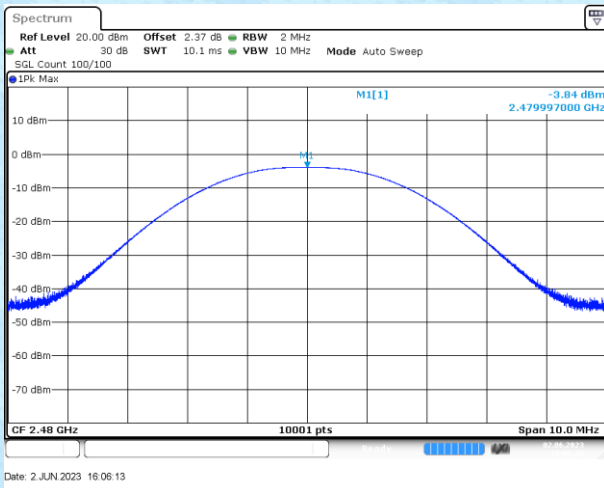
<b>GFSK (1M)</b>	<b>GFSK (2M)</b>
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Lowest channel

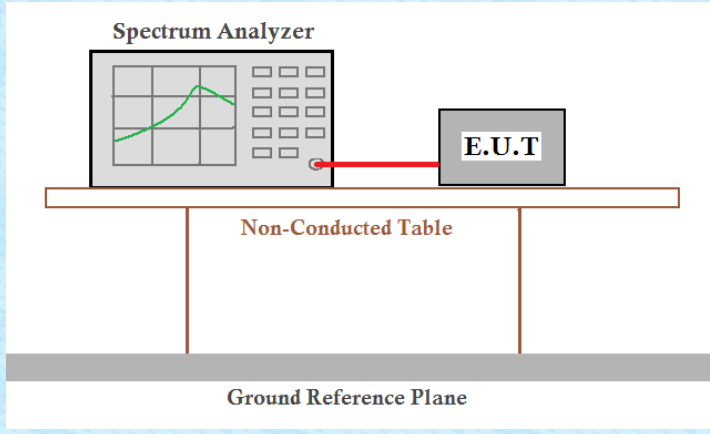


Middle channel



Highest channel

## 7.4 Channel Bandwidth & 99% Occupancy Bandwidth

Test Requirement:	FCC Part15 C Section 15.247 (a)(2)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 15.247 Meas Guidance v05r02
Limit:	>500KHz
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

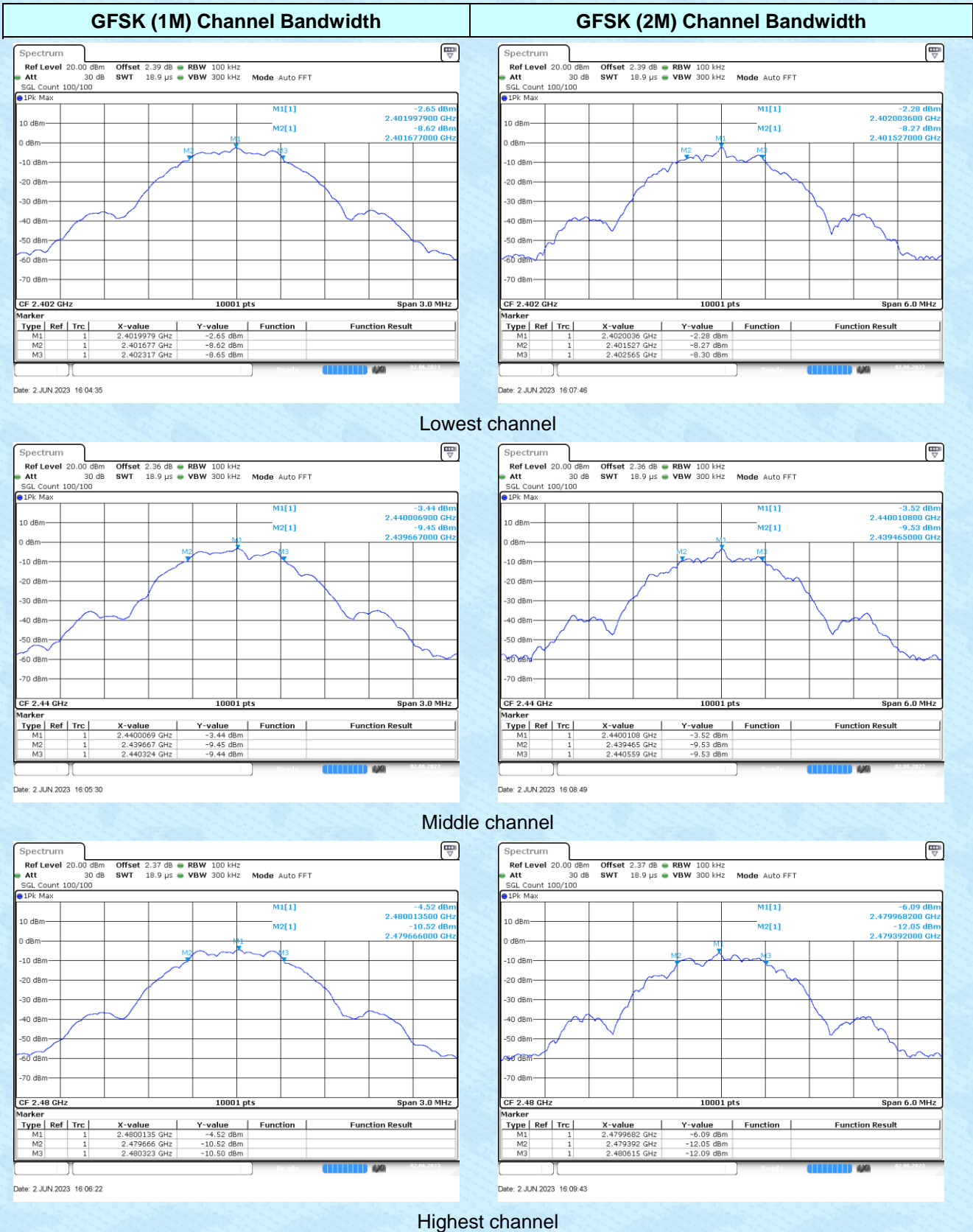
### Measurement Data

Modulation mode	Test channel	Channel Bandwidth (MHz)	Limit(KHz)	Result
GFSK (1M)	Lowest	0.64	>500	Pass
	Middle	0.657		
	Highest	0.657		
GFSK (2M)	Lowest	1.038	>500	Pass
	Middle	1.093		
	Highest	1.223		

Modulation mode	Test channel	99% Bandwidth (MHz)	Result
GFSK (1M)	Lowest	1.02	Pass
	Middle	1.023	
	Highest	1.033	
GFSK (2M)	Lowest	2.025	Pass
	Middle	2.036	
	Highest	2.067	

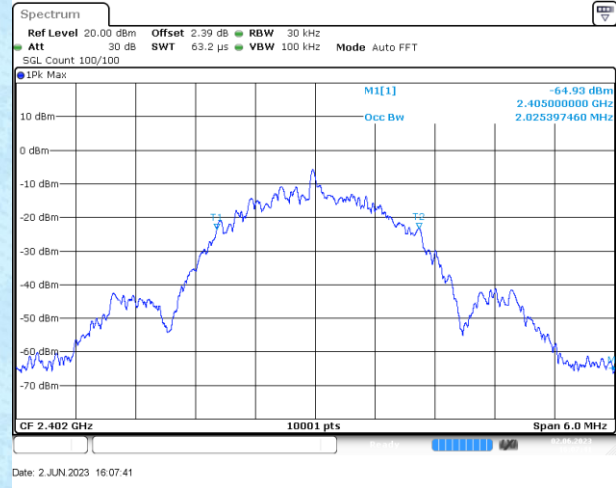
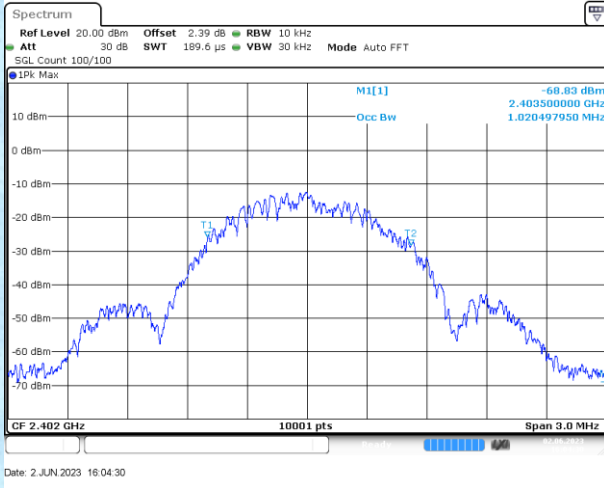


Test plot as follows:

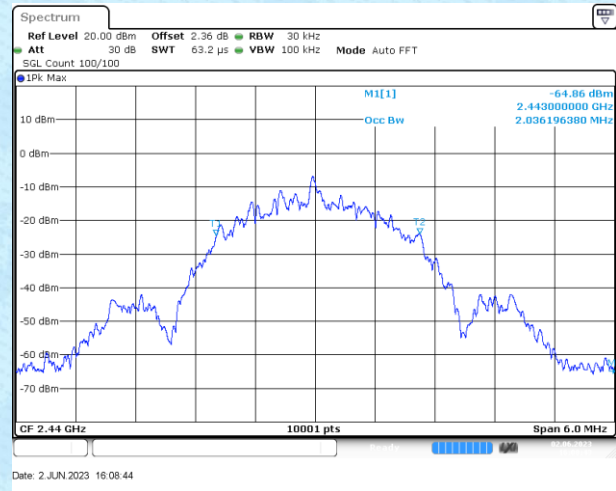
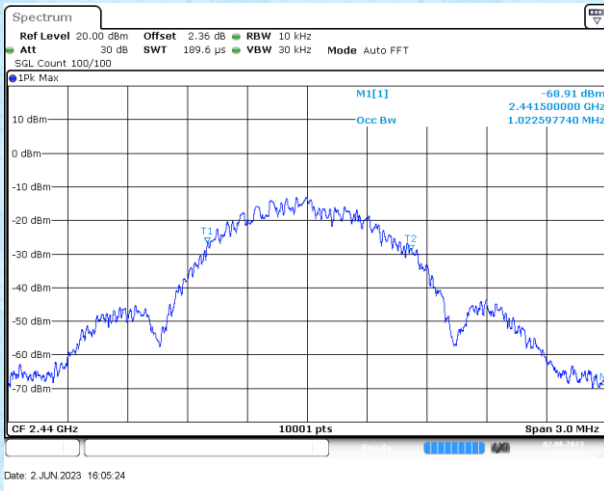


## GFSK (1M) 99% Bandwidth

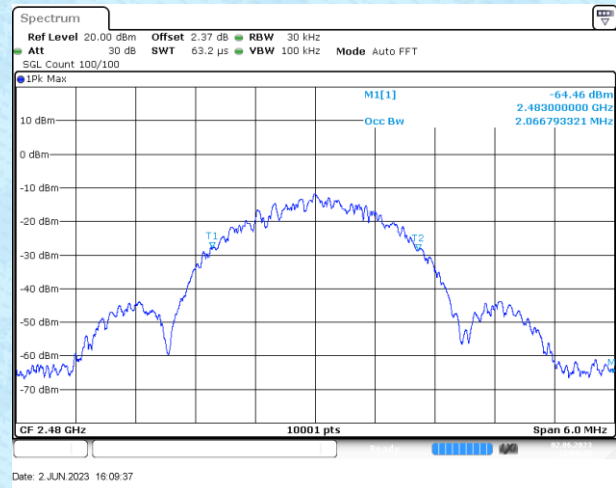
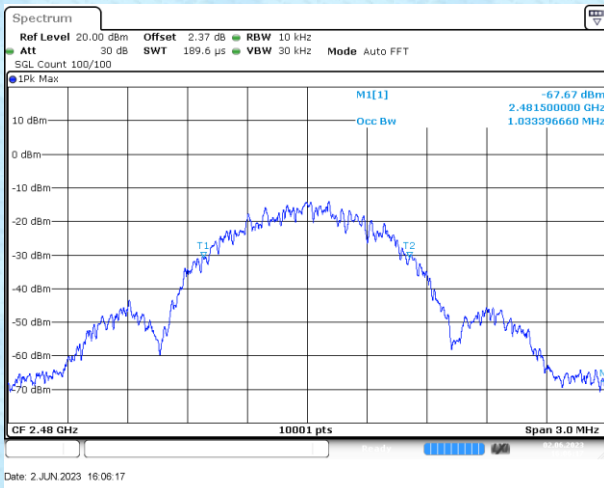
## GFSK (2M) 99% Bandwidth



### Lowest channel

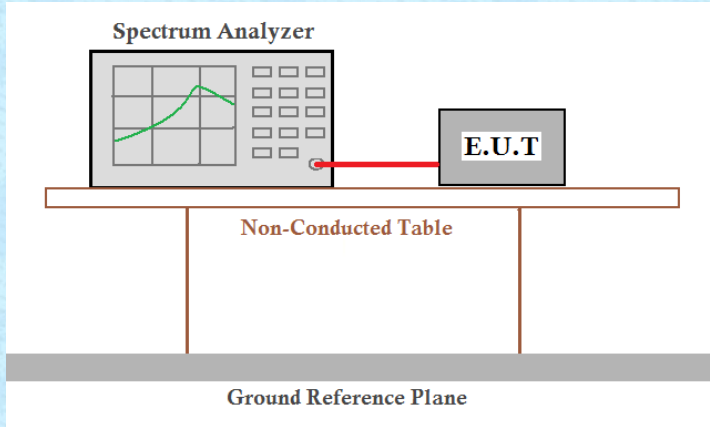


### Middle channel



### Highest channel

## 7.5 Power Spectral Density

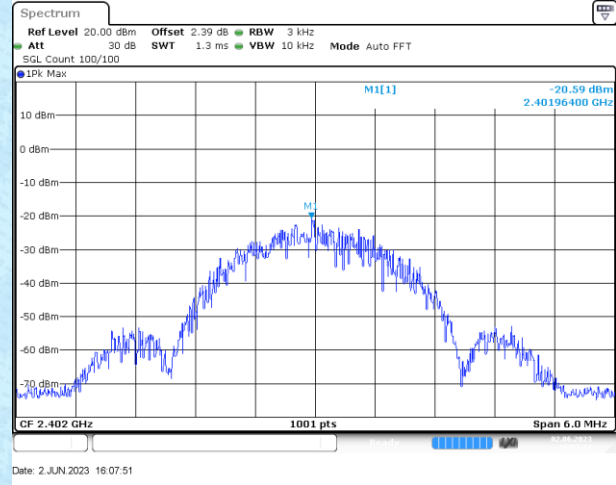
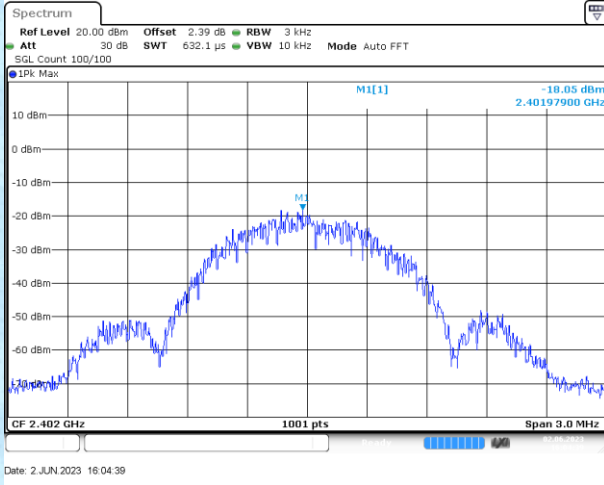
Test Requirement:	FCC Part15 C Section 15.247 (e)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 15.247 Meas Guidance v05r02
Limit:	8dBm/3kHz
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both are placed on a Non-Conducted Table, which is supported by a Ground Reference Plane.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

### Measurement Data

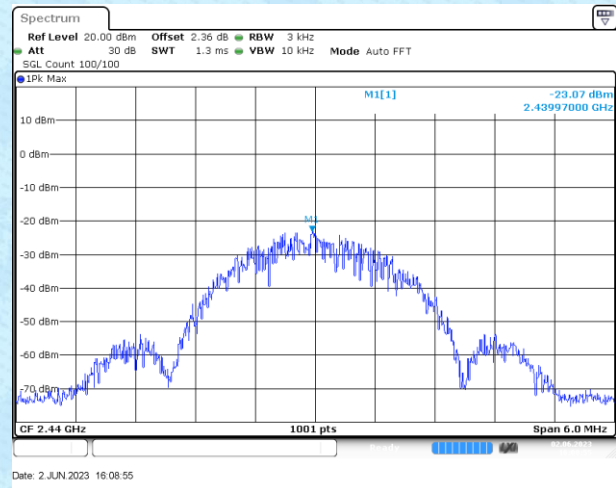
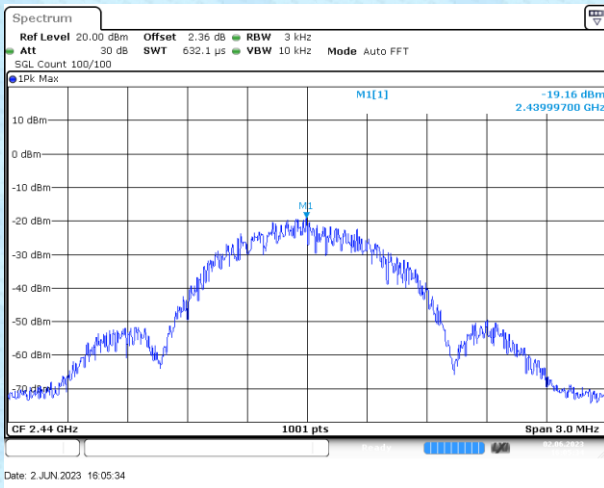
Modulation mode	Test channel	Power Spectral Density (dBm/3kHz)	Limit(dBm/3kHz)	Result
GFSK(1M)	Lowest	-18.05	8.00	Pass
	Middle	-19.16		
	Highest	-19.15		
GFSK(2M)	Lowest	-20.59	8.00	Pass
	Middle	-23.07		
	Highest	-22.64		

Test plot as follows:

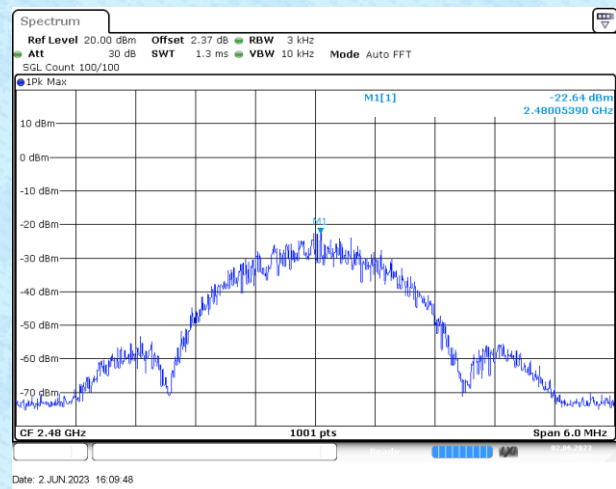
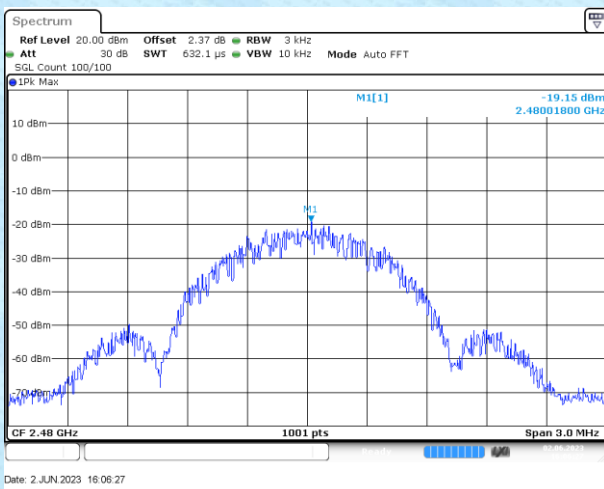
<b>GFSK (1M)</b>	<b>GFSK (2M)</b>
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Lowest channel



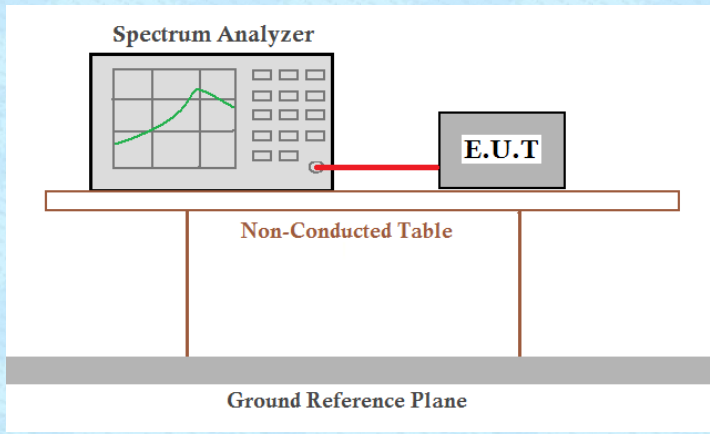
Middle channel



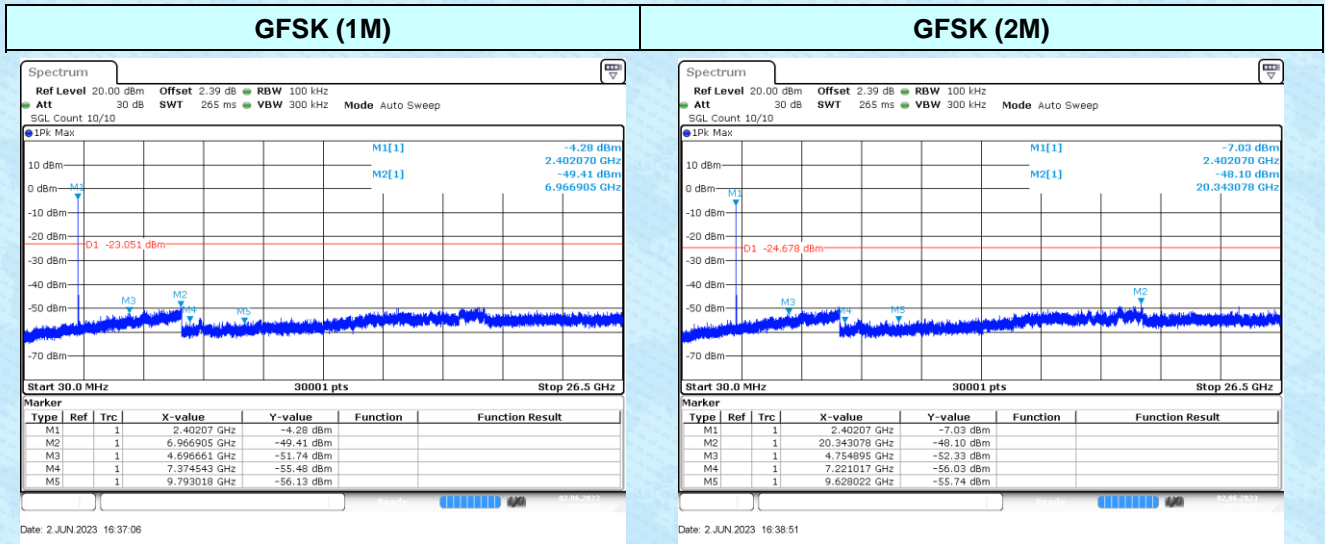
Highest channel

## 7.6 Spurious Emission in Non-restricted & restricted Bands

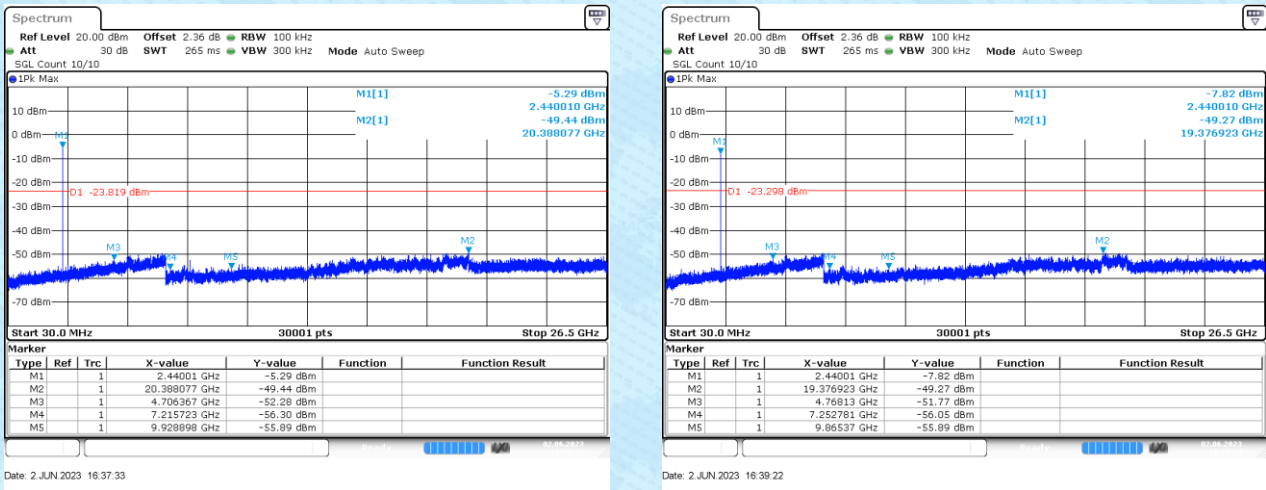
### 7.6.1 Conducted Emission Method

Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 15.247 Meas Guidance v05r02
Limit:	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 setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both are placed on a Non-Conducted Table, which is supported by a Ground Reference Plane.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

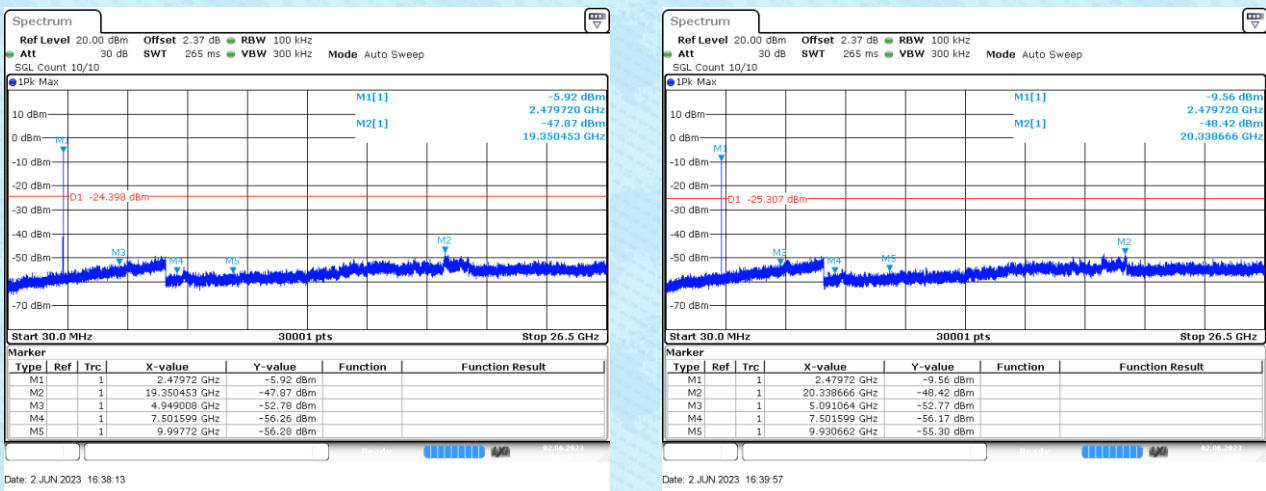
Test plot as follows:



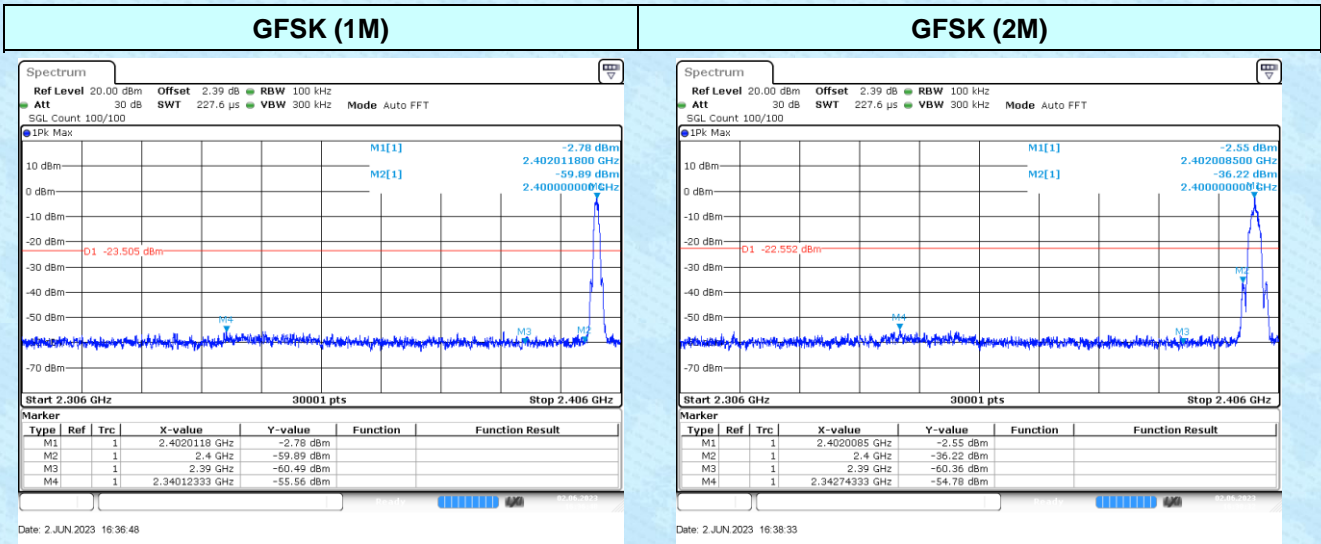
### Lowest channel



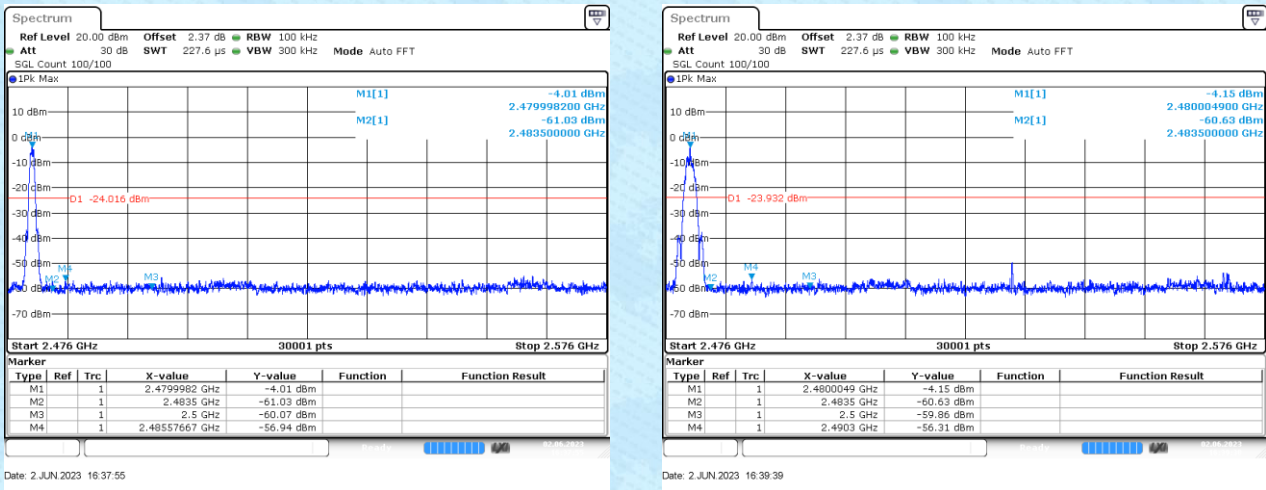
### Middle channel



### Highest channel

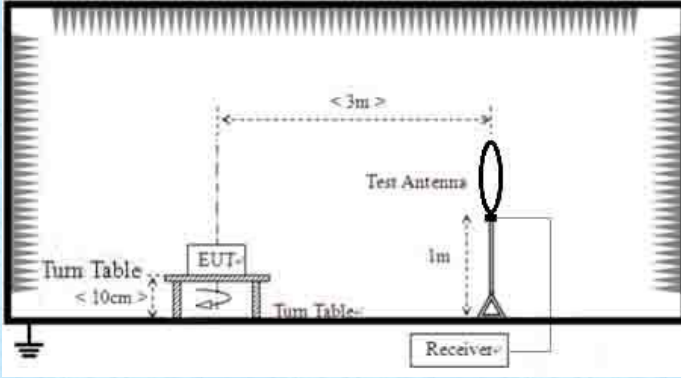


### Lowest channel

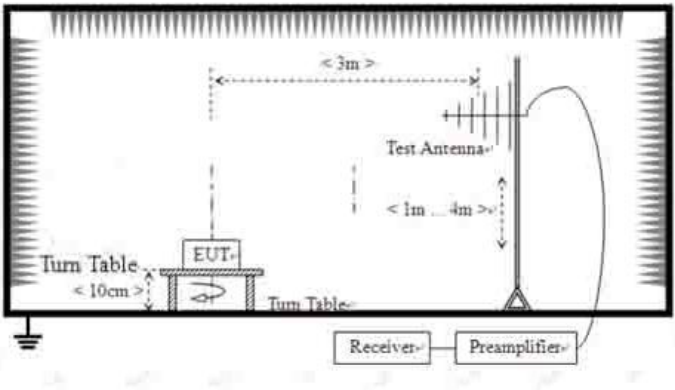
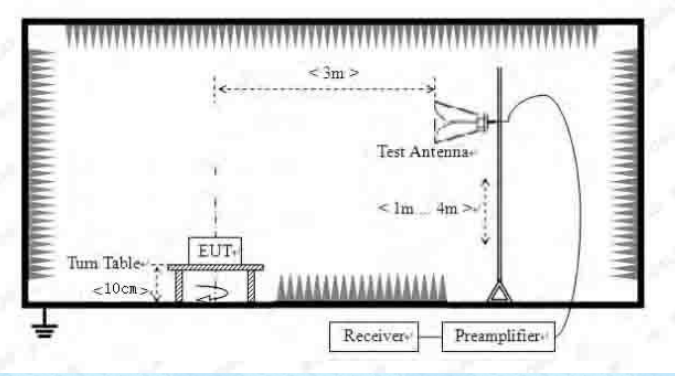


### Highest channel

## 7.6.2 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209 and 15.205				
Test Method:	ANSI C63.10:2013 & RSS-Gen				
Test Frequency Range:	9kHz to 26.5GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Value
	9KHz-150KHz	Quasi-peak	200Hz	600Hz	Quasi-peak
	150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak
	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
Peak		1MHz	10Hz	Average	
Limit:	Frequency	Limit (uV/m)	Value	Measurement Distance	
	0.009MHz-0.490MHz	2400/F(KHz)	QP	300m	
	0.490MHz-1.705MHz	24000/F(KHz)	QP	30m	
	1.705MHz-30MHz	30	QP	30m	
	30MHz-88MHz	100	QP	3m	
	88MHz-216MHz	150	QP		
	216MHz-960MHz	200	QP		
	960MHz-1GHz	500	QP		
	Above 1GHz	500	Average		
		5000	Peak		
Test setup:	For radiated emissions from 9kHz to 30MHz				
	 <p>The diagram illustrates the test setup for radiated emissions. An Equipment Under Test (EUT) is placed on a turn table, which is positioned on a ground plane. The EUT is connected to a Receiver. A Test Antenna is positioned at a distance of 3m from the EUT. The antenna is also connected to the Receiver. The turn table is labeled with a distance of &lt;math&gt;&lt; 10\text{cm} &gt;&lt;/math&gt; from the EUT. The antenna is labeled with a distance of &lt;math&gt;1\text{m}&lt;/math&gt; from the ground plane. The receiver is labeled with a distance of &lt;math&gt;3\text{m}&lt;/math&gt; from the EUT.</p>				



	<p>For radiated emissions from 30MHz to1GHz</p>  <p>For radiated emissions above 1GHz</p> 
<p>Test Procedure:</p>	<ol style="list-style-type: none"> <li>1. The EUT was placed on the top of a rotating table (0.1m) 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 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</li> </ol>
<p>Test Instruments:</p>	<p>Refer to section 6.0 for details</p>

Test mode:	Refer to section 5.2 for details					
Test environment:	Temp.:	26 °C	Humid.:	54%	Press.:	1012mbar
Test voltage:	DC 3.7V					
Test results:	Pass					

**Measurement data:***Remark:*

1. Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.

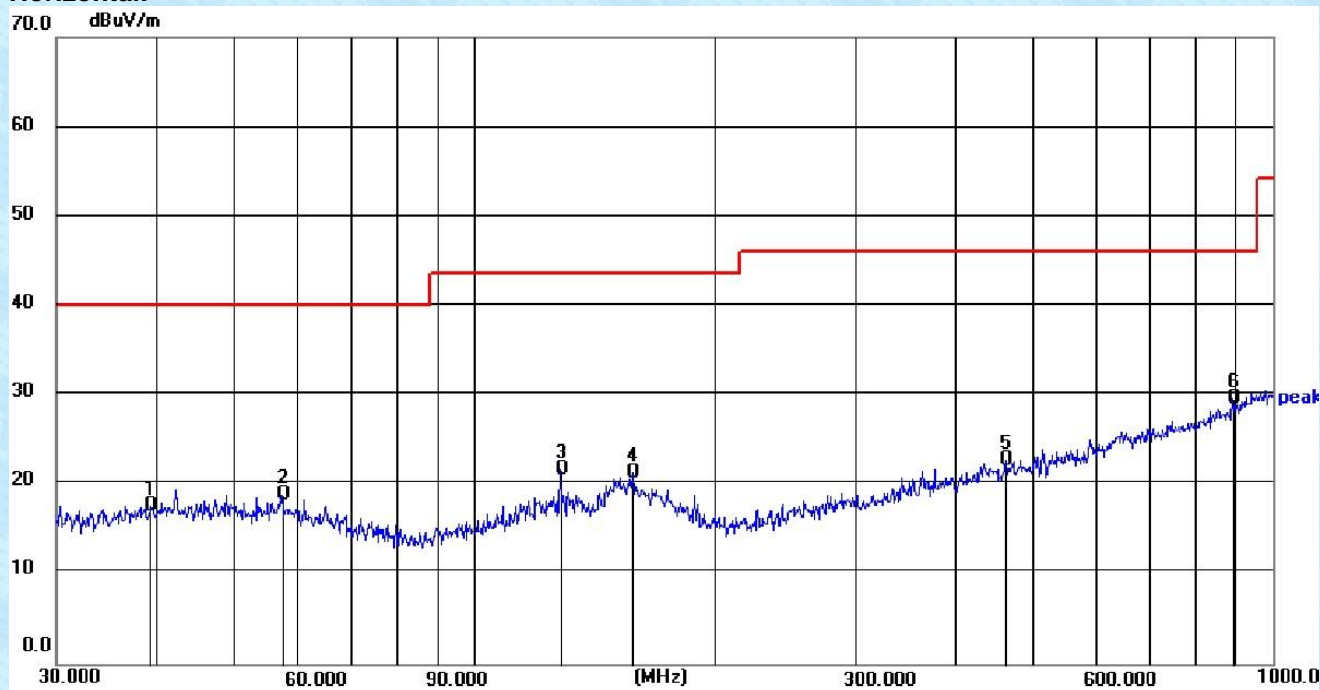
**■ 9kHz~30MHz**

The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

■ Below 1GHz

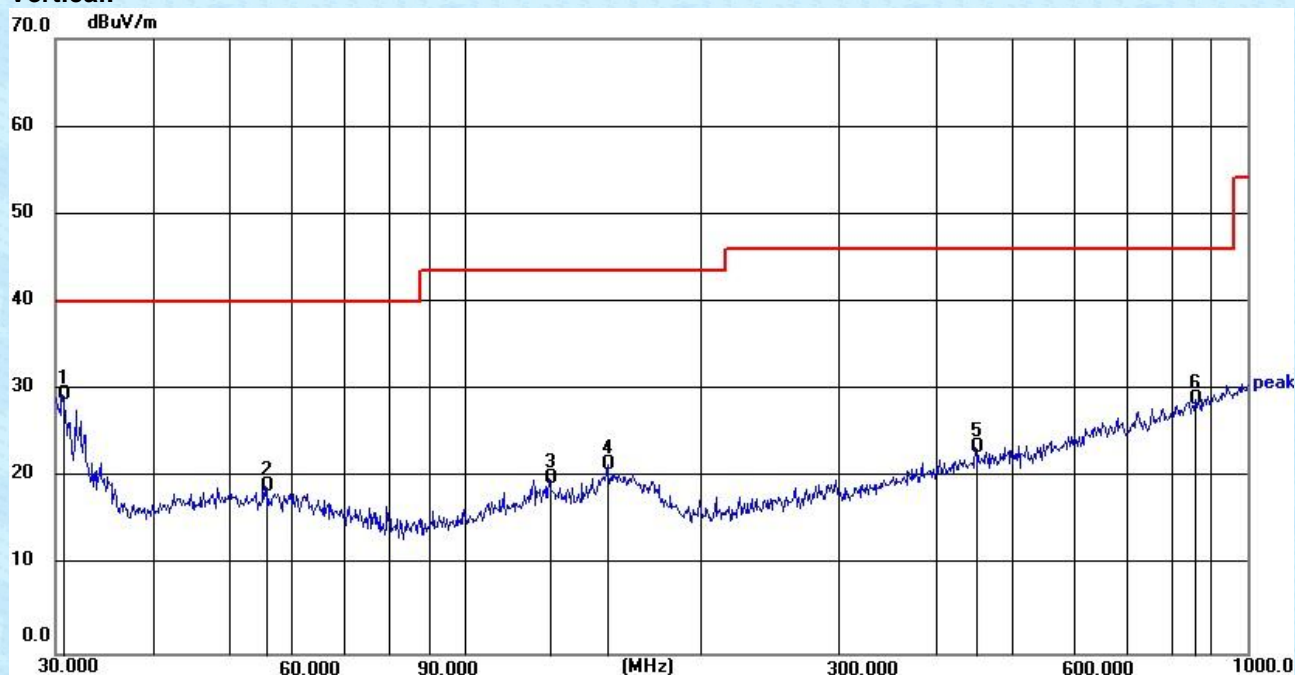
Pre-scan all test modes, found worst case at GFSK(1M) 2402MHz, and so only show the test result of GFSK(1M) 2402MHz

Horizontal:



Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
39.4371	2.81	14.87	17.68	40.00	22.32	QP
57.3923	4.87	14.11	18.98	40.00	21.02	QP
128.1130	7.27	14.50	21.77	43.50	21.73	QP
158.1123	5.50	15.96	21.46	43.50	22.04	QP
463.9696	4.89	18.03	22.92	46.00	23.08	QP
890.7278	5.79	23.84	29.63	46.00	16.37	QP

**Vertical:**



Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
30.6379	16.49	12.99	29.48	40.00	10.52	QP
55.6094	4.84	14.23	19.07	40.00	20.93	QP
128.1130	5.44	14.50	19.94	43.50	23.56	QP
152.1297	5.59	15.98	21.57	43.50	21.93	QP
449.5558	5.59	17.89	23.48	46.00	22.52	QP
857.0247	5.59	23.38	28.97	46.00	17.03	QP

*Remark:*

1. An initial pre-scan was performed on the Horizontal and Vertical with peak detector.
2. Quasi-Peak measurement were performed at the frequencies with maximized peak emission.
3.  $Level = Reading + Factor$
4.  $Factor = Antenna Gain + Cable Loss - Amplifier Gain$

## ■ Unwanted Emissions in non-restricted Frequency Bands

### Above 1GHz

Test mode:	BLE 1M	Test channel:	Lowest
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#### Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4804	37.85	31.62	8.58	32.11	45.94	74	-28.06	Vertical
4804	36.75	31.62	8.58	32.11	44.84	74	-29.16	Horizontal

Test mode:	BLE 1M	Test channel:	Middle
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#### Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4880	35.92	31.92	8.71	32.11	44.44	74	-29.56	Vertical
4880	35.16	31.92	8.71	32.11	43.68	74	-30.32	Horizontal

Test mode:	BLE 1M	Test channel:	Highest
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#### Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4960	37.23	31.96	8.75	32.3	45.64	74	-28.36	Vertical
4960	36.05	31.96	8.75	32.3	44.46	74	-29.54	Horizontal

Test mode:	BLE 2M	Test channel:	Lowest
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#### Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4804	37.16	31.62	8.58	32.11	45.25	74	-28.75	Vertical
4804	36.47	31.62	8.58	32.11	44.56	74	-29.44	Horizontal

Test mode:	BLE 2M	Test channel:	Middle
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#### Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4880	36.36	31.92	8.71	32.11	44.88	74	-29.12	Vertical
4880	35.76	31.92	8.71	32.11	44.28	74	-29.72	Horizontal

Test mode:	BLE 2M	Test channel:	Highest
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**Peak value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4960	36.48	31.96	8.75	32.3	44.89	74	-29.11	Vertical
4960	35.69	31.96	8.75	32.3	44.1	74	-29.9	Horizontal

Test mode:	BLE 1M	Test channel:	Lowest
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**Peak value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2310	47.16	27.14	6.19	42.04	38.45	74	-35.55	Horizontal
2390	48.64	27.37	6.31	42.11	40.21	74	-33.79	Horizontal
2310	48.56	27.14	6.19	42.04	39.85	74	-34.15	Vertical
2390	48.9	27.37	6.31	42.11	40.47	74	-33.53	Vertical

Test mode:	BLE 1M	Test channel:	Highest
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**Peak value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2483.5	51.85	27.66	6.45	42.01	43.95	74	-30.05	Horizontal
2500	46.51	27.7	6.47	42	38.68	74	-35.32	Horizontal
2483.5	48.75	27.66	6.45	42.01	40.85	74	-33.15	Vertical
2500	46.75	27.7	6.47	42	38.92	74	-35.08	Vertical

Test mode:	BLE 2M	Test channel:	Lowest
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**Peak value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2310	47.94	27.14	6.19	42.04	39.23	74	-34.77	Horizontal
2390	49.55	27.37	6.31	42.11	41.12	74	-32.88	Horizontal
2310	49.31	27.14	6.19	42.04	40.6	74	-33.4	Vertical
2390	49.1	27.37	6.31	42.11	40.67	74	-33.33	Vertical

Test mode:	BLE 2M	Test channel:	Highest
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**Peak value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2483.5	52.42	27.66	6.45	42.01	44.52	74	-29.48	Horizontal
2500	46.78	27.7	6.47	42	38.95	74	-35.05	Horizontal
2483.5	48.95	27.66	6.45	42.01	41.05	74	-32.95	Vertical
2500	47.56	27.7	6.47	42	39.73	74	-34.27	Vertical

*Remark.*

1. *Level = Reading Level + Antenna factor + Cable Loss – Amplifier factor*
2. *other emissions are attenuated 20dB below the limits, so it does not reported.*

## **8 Test Setup Photo**

Reference to the **appendix I** for details.

## **9 EUT Constructional Details**

Reference to the **appendix II** for details.

-----End-----