

TEST REPORT

Reference No...... : WTD21D04031086W001
FCC ID : GU6WTB4010
Applicant..... : Avery Dennison Retail Information Services, LLC
Address..... : 170 Monarch Lane Miamisburg, OH 45342
Manufacturer : CME Electronics Technology Co., LTD
Address..... : Suite B, 18th Floor, Jingwange No. 303, Qinglv Road South,
Gongbei, Zhuhai 519020, Guangdong Province, China
Product..... : ZippyYum Thermometer
Model(s) : WTB4010, WTB4010-M
Standards..... : FCC CFR47 Part 15.247
Date of Receipt sample : 2021-04-13
Date of Test : 2021-04-13 to 2021-04-25
Date of Issue..... : 2021-08-25
Test Result..... : **Pass**

Remarks:

The 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.

Prepared By:

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3 Revision History

Test report No.	Date of Receipt sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTD21D04031086 W001	2021-04-13	2021-04-13 to 2021-04-25	2021-08-25	Original	-	Valid

4 General Information

4.1 General Description of E.U.T.

Product:	ZippyYum Thermometer
Model(s):	WTB4010, WTB4010-M
Model Description:	All same except for model WTB4010-M the IR Temperature sensor is replaced by a medical grade sensor of the same series. The test sample's model is WTB4010
Bluetooth Version:	V4.0
Hardware Version:	V6.20
Software Version:	V0.56

4.2 Details of E.U.T.

Operation Frequency:	2402~2480MHz
Max. RF output power:	-2.22dBm
Type of Modulation:	GFSK
Antenna installation:	PCB printed antenna
Antenna Gain:	0dBi
Ratings:	Input: DC 5V, 0.2A Max
Battery:	3.7V 400mAh

4.3 Test Facility

The test facility has a test site registered with the following organizations:

ISED CAB identifier: CN0013. Test Firm Registration No.: 7760A.

Waltek Testing Group Co., Ltd. Has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files.

Registration number 7760A, October 15, 2016.

FCC Designation No.: CN1201. Test Firm Registration No.: 523476.

Waltek Testing Group 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. Registration number 523476, September 10, 2019.

4.4 Channel List

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
0	2402	1	2404	2	2406	3	2408
4	2410	5	2412	6	2414	7	2416
8	2418	9	2420	10	2422	11	2424
12	2426	13	2428	14	2430	15	2432
16	2434	17	2436	18	2438	19	2440
20	2442	21	2444	22	2446	23	2448
24	2450	25	2452	26	2454	27	2456
28	2458	29	2460	30	2462	31	2464
32	2466	33	2468	34	2470	35	2472
36	2474	37	2476	38	2478	39	2480

4.5 Test Mode

Table 2 Tests Carried Out Under FCC part 15.247

Test Items	Mode	Data Rate	Channel	TX/RX
Maximum Peak Output Power	BT BLE	1 Mbps	0/19/39	TX
Power Spectral Density	BT BLE	1 Mbps	0/19/39	TX
6dB Bandwidth	BT BLE	1 Mbps	0/19/39	TX
Band Edge	BT BLE	1 Mbps	0/19/39	TX
Transmitter Spurious Emissions	BT BLE	1 Mbps	0/19/39	TX

Note: Parameters set by test software during channel & power tests, the software provided by the customer was used to set the operating channels as well as the output power level. The RF output power set is the power expected by the manufacturer and is going to be fixed on the firmware of the final product.

5 Test Summary

Test Items	Test Requirement	Result
Radiated Spurious Emissions	15.247(d) 15.205(a) 15.209(a)	PASS
Conducted Spurious Emissions	15.247(d)	PASS
Conducted Emissions	15.207(a)	PASS
6dB Bandwidth	15.247(a)(2)	PASS
Maximum Peak Output Power	15.247(b)(3),(4)	PASS
Power Spectral Density	15.247(e)	PASS
Band Edge	15.247(d)	PASS
Antenna Requirement	15.203	PASS

6 Equipment Used during Test

6.1 Equipments List

Conducted Emissions Test Site 1#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMI Test Receiver	R&S	ESCI	100947	2020-07-30	2021-07-29
2.	LISN	R&S	ENV216	100115	2020-07-30	2021-07-29
3.	Cable	Top	TYPE16(3.5M)	-	2020-07-30	2021-07-29
Conducted Emissions Test Site 2#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMI Test Receiver	R&S	ESCI	101155	2020-07-30	2021-07-29
2.	LISN	SCHWARZBECK	NSLK 8128	8128-259	2020-07-30	2021-07-29
3.	Limiter	CYBERTEK	EM5010	261115-001-0024	2020-07-30	2021-07-29
4.	Cable	Laplace	RF300	-	2020-07-30	2021-07-29
3m Semi-anechoic Chamber for Radiation Emissions Test site 1#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	Spectrum Analyzer	R&S	FSP30	100091	2020-04-20 2021-04-19	2021-04-19 2022-04-18
2	Amplifier	Agilent	8447D	2944A10178	2020-04-20 2021-04-19	2021-04-19 2022-04-18
3	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	2020-08-22	2021-08-21
4	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	2020-04-20 2021-04-19	2021-04-19 2022-04-18
5	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	2020-04-19 2021-04-18	2021-04-18 2022-04-17
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	2020-04-20 2021-04-19	2021-04-19 2022-04-18
7	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	2020-04-20 2021-04-19	2021-04-19 2022-04-18
8	Coaxial Cable (above 1GHz)	ZT26-NJ-NJ-8M/FA	1GHz-18GHz	NA	2020-04-20 2021-04-19	2021-04-19 2022-04-18
3m Semi-anechoic Chamber for Radiation Emissions Test site 2#						
Item	Equipment	Manufacturer	Model No.	Serial No	Last Calibration Date	Calibration Due Date
1	Test Receiver	R&S	ESCI	101296	2020-04-20 2021-04-19	2021-04-19 2021-04-18
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	2020-04-25 2021-04-24	2021-04-24 2022-04-23
3	Active Loop Antenna	Com-Power Corp.	AL-130R	10160007	2020-05-06	2021-05-05

4	Amplifier	ANRITSU	MH648A	M43381	2020-04-20 2021-04-19	2021-04-19 2021-04-18
5	Cable	HUBER+SUHNER	CBL2	525178	2020-04-20 2021-04-19	2021-04-19 2021-04-18
RF Conducted Testing						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMC Analyzer (9k~26.5GHz)	Agilent	E7405A	MY45114943	2020-04-20 2021-04-19	2021-04-19 2021-04-18
2.	Spectrum Analyzer	R&S	FSP30	100091	2020-04-20 2021-04-19	2021-04-19 2021-04-18
3.	EXA Signal Analyzer	Malaysia Keysight	N9010A	MY50520207	2020-04-20 2021-04-19	2021-04-19 2021-04-18

6.2 Description of Support Units

Equipment	Manufacturer	Model No.	Series No.
Adapter	Shenzhen Hangjia Chiyuan Electric Co., Ltd.	HW-050100C01	/
Input: 100-240V ~ 50/60Hz Output: DC 5V/2A			

6.3 Measurement Uncertainty

Parameter	Uncertainty
Conducted Emission	± 3.64 dB(AC mains 150KHz~30MHz)
Radiated Spurious Emissions	± 5.08 dB (Bilog antenna 30M~1000MHz)
	± 5.47 dB (Horn antenna 1000M~25000MHz)
Radio Frequency	± 1 x 10 ⁻⁷ Hz
RF Power	± 0.42 dB
RF Power Density	± 0.7dB
Conducted Spurious Emissions	± 2.76 dB (9kHz~26500MHz)
Confidence interval: 95%. Confidence factor:k=2	

6.4 Test Equipment Calibration

All the test equipments used are valid and calibrated by CEPREI Certification Body that address is No.110 Dongguan Zhuang RD. Guangzhou, P.R.China.

7 Conducted Emission

Test Requirement: FCC CFR 47 Part 15 Section 15.207
 Test Method: ANSI C63.10:2013
 Test Result: PASS
 Frequency Range: 150kHz to 30MHz

Limit:

Frequency (MHz)	Conducted Limit (dB μ V)	
	Quasi-peak	Average
0.15 to 0.5	66 to 56*	56 to 46*
0.5 to 5.0	56	46
5.0 to 30	60	50

*Decreases with the logarithm of the frequency.

7.1 E.U.T. Operation

Operating Environment:

Temperature: 22.4 °C
 Humidity: 53.7 % RH
 Atmospheric Pressure: 101.8kPa
 Test Voltage: AC 120V, 60Hz

EUT Operation:

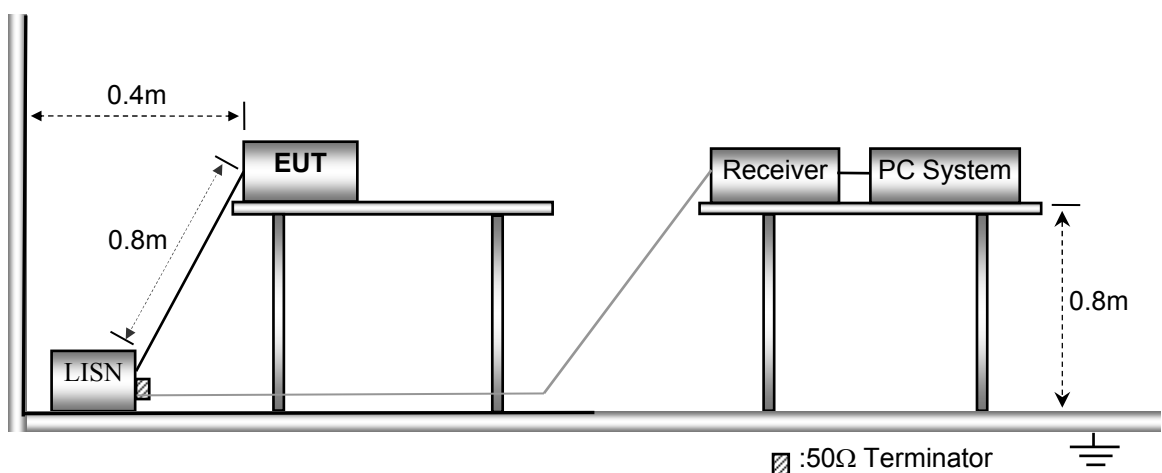
The test was performed in Transmitting mode, the worst test data (low channel) were shown in the report.

7.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.10:2013.

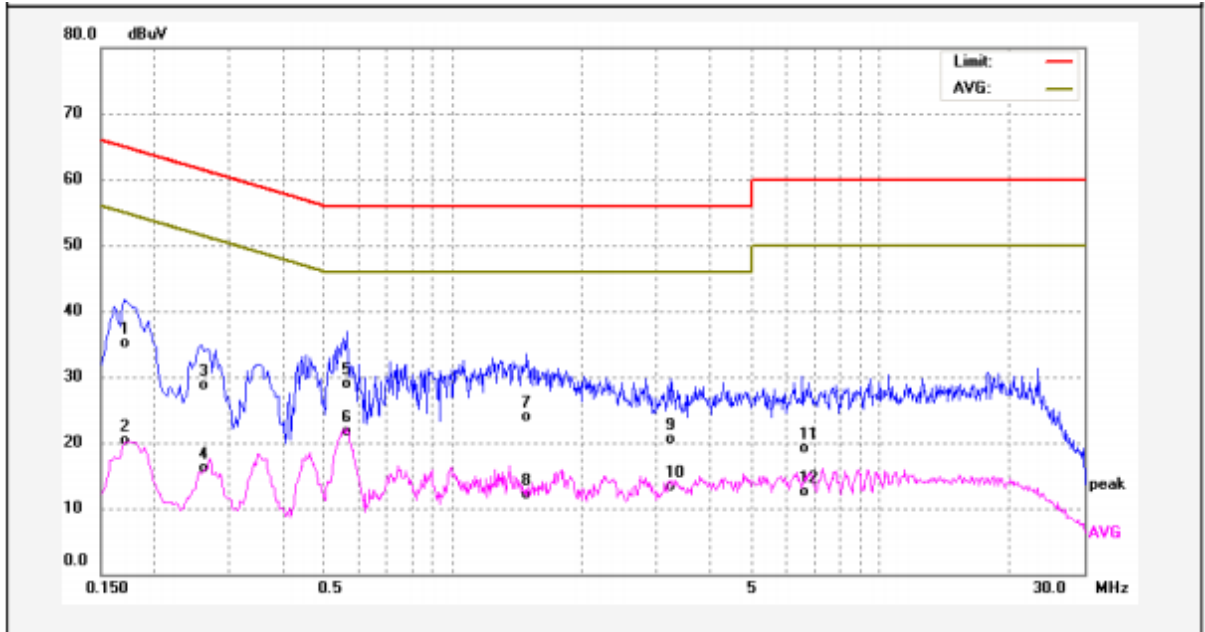
7.3 Measurement Description

The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.



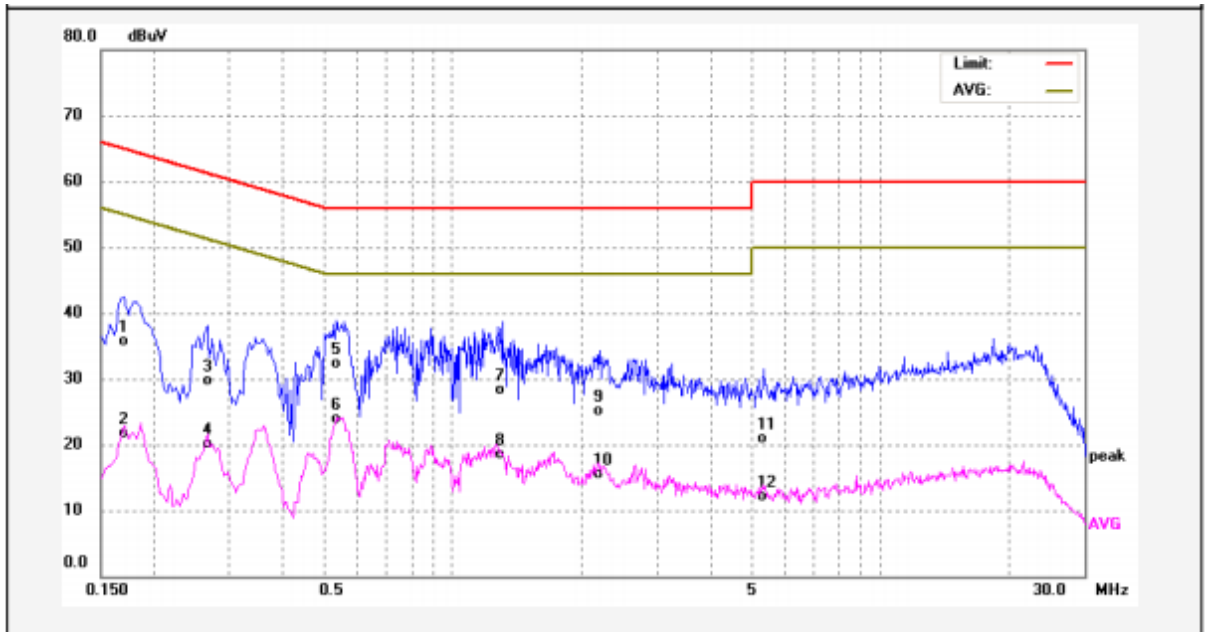
7.4 Conducted Emission Test Result

Live line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1700	24.32	10.76	35.08	64.96	-29.88	QP	
2	0.1700	9.46	10.76	20.22	54.96	-34.74	AVG	
3	0.2580	18.02	10.64	28.66	61.49	-32.83	QP	
4	0.2580	5.47	10.64	16.11	51.49	-35.38	AVG	
5	0.5660	18.36	10.55	28.91	56.00	-27.09	QP	
6	0.5660	11.12	10.55	21.67	46.00	-24.33	AVG	
7	1.4900	13.28	10.60	23.88	56.00	-32.12	QP	
8	1.4900	1.49	10.60	12.09	46.00	-33.91	AVG	
9	3.2300	9.70	10.71	20.41	56.00	-35.59	QP	
10	3.2300	2.65	10.71	13.36	46.00	-32.64	AVG	
11	6.5580	8.39	10.68	19.07	60.00	-40.93	QP	
12	6.5580	1.82	10.68	12.50	50.00	-37.50	AVG	

Neutral line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1700	24.97	10.76	35.73	64.96	-29.23	QP	
2	0.1700	10.91	10.76	21.67	54.96	-33.29	AVG	
3	0.2660	19.00	10.64	29.64	61.24	-31.60	QP	
4	0.2660	9.56	10.64	20.20	51.24	-31.04	AVG	
5	0.5340	21.76	10.53	32.29	56.00	-23.71	QP	
6	0.5340	13.44	10.53	23.97	46.00	-22.03	AVG	
7	1.3060	17.68	10.60	28.28	56.00	-27.72	QP	
8	1.3060	7.91	10.60	18.51	46.00	-27.49	AVG	
9	2.2100	14.55	10.62	25.17	56.00	-30.83	QP	
10	2.2100	4.96	10.62	15.58	46.00	-30.42	AVG	
11	5.3340	10.21	10.77	20.98	60.00	-39.02	QP	
12	5.3340	1.34	10.77	12.11	50.00	-37.89	AVG	

8 Radiated Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.209 & 15.247

Test Method: ANSI C63.10:2013

Test Result: PASS

Measurement Distance: 3m

Limit:

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	$2400/F(\text{kHz})$	300	$10000 * 2400/F(\text{kHz})$	$20\log^{(2400/F(\text{kHz}))} + 80$
0.490 ~ 1.705	$24000/F(\text{kHz})$	30	$100 * 24000/F(\text{kHz})$	$20\log^{(24000/F(\text{kHz}))} + 40$
1.705 ~ 30	30	30	$100 * 30$	$20\log^{(30)} + 40$
30 ~ 88	100	3	100	$20\log^{(100)}$
88 ~ 216	150	3	150	$20\log^{(150)}$
216 ~ 960	200	3	200	$20\log^{(200)}$
Above 960	500	3	500	$20\log^{(500)}$

8.1 EUT Operation

Operating Environment:

Temperature: 23.5 °C

Humidity: 52.1 % RH

Atmospheric Pressure: 101.2kPa

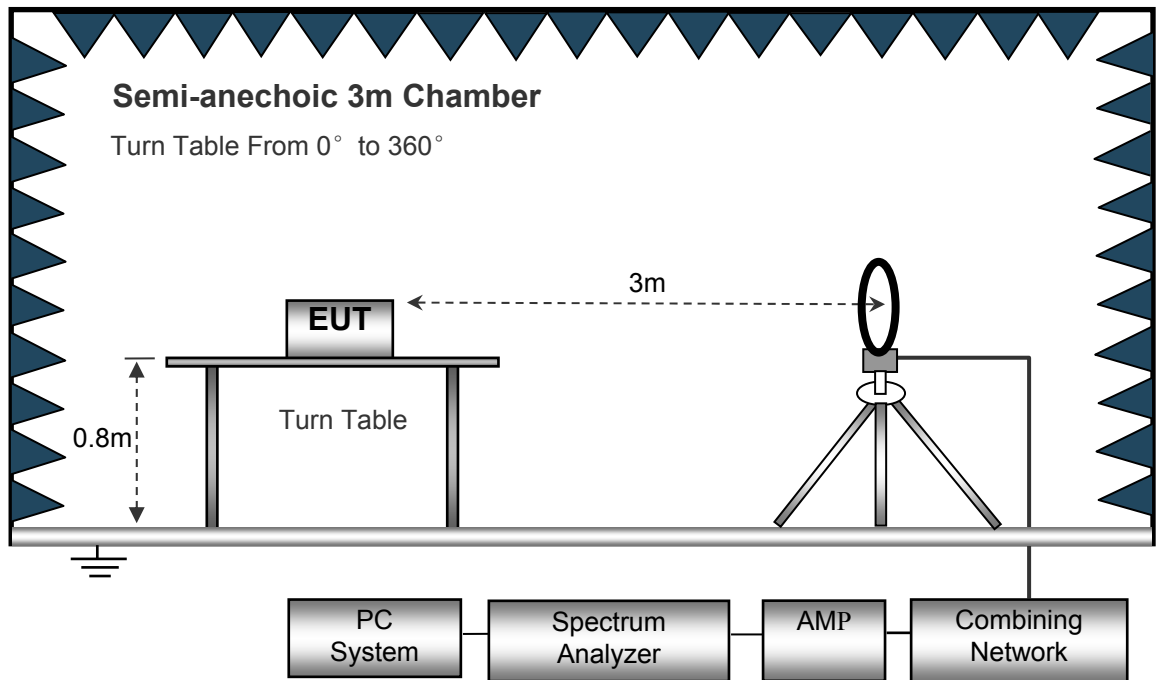
EUT Operation:

The test was performed in TX transmitting mode, the test data were shown in the report.

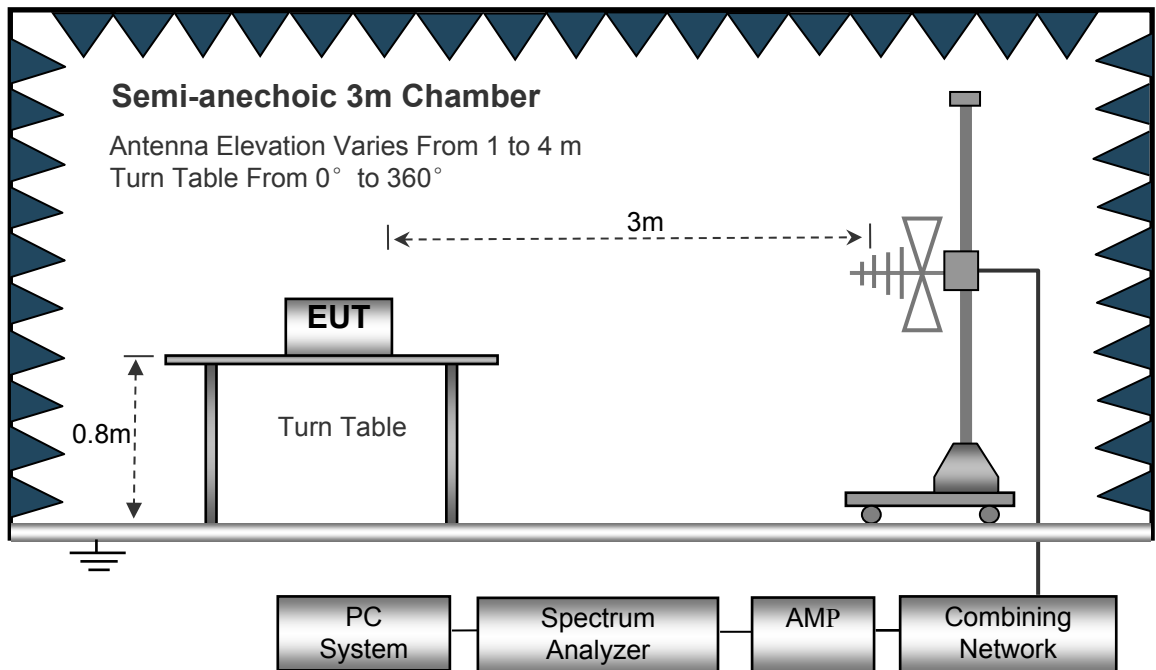
8.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.10.

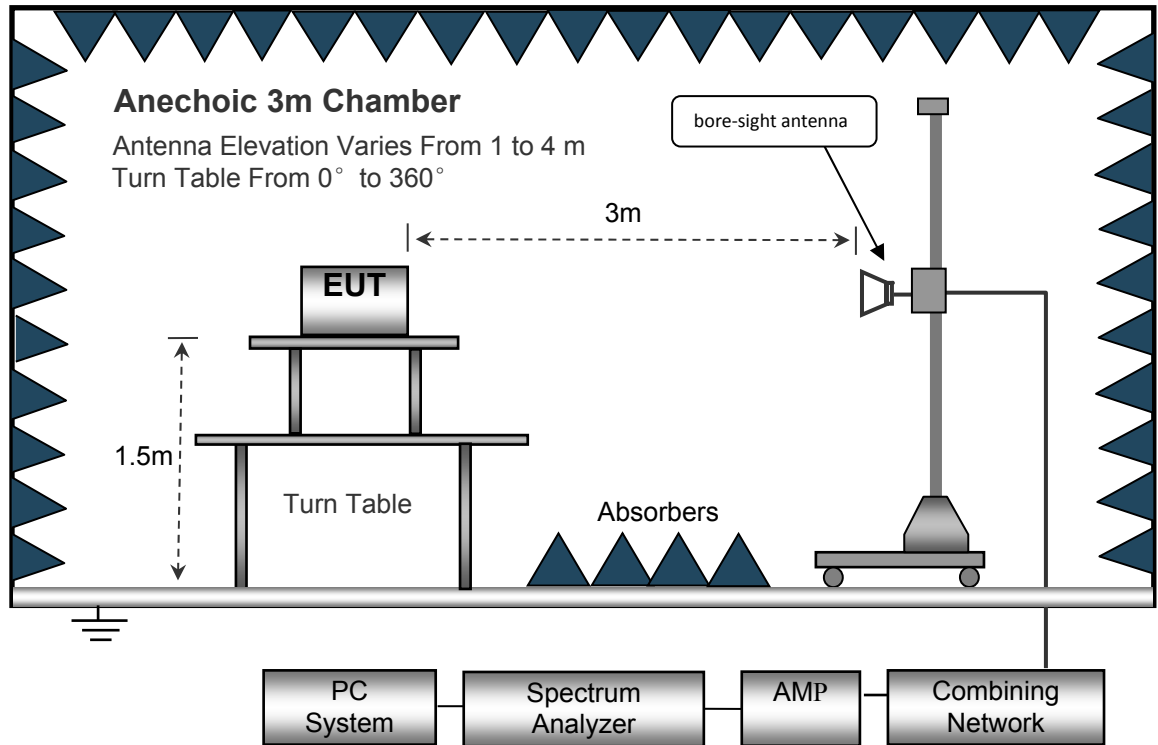
The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz.



8.3 Spectrum Analyzer Setup

Below 30MHz

- Sweep Speed Auto
- IF Bandwidth..... 10kHz
- Video Bandwidth..... 10kHz
- Resolution Bandwidth..... 10kHz

30MHz ~ 1GHz

- Sweep Speed Auto
- Detector PK
- Resolution Bandwidth..... 100kHz
- Video Bandwidth..... 300kHz

Above 1GHz

- Sweep Speed Auto
- Detector PK
- Resolution Bandwidth..... 1MHz
- Video Bandwidth..... 3MHz
- Detector Ave.
- Resolution Bandwidth..... 1MHz
- Video Bandwidth..... 10Hz

8.4 Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above ground plane for below 1GHz and 1.5m for above 1GHz.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The radiation measurements are performed in X,Y and Z axis positioning(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand),the worst condition was tested putting the eut in Z axis,so the worst data were shown as follow.
8. A 2.4GHz high –pass filter is used druing radiated emissions above 1GHz measurement.

8.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Limit}$$

8.6 Summary of Test Results

Test Frequency: 9KHz~30MHz

The measurements were more than 20 dB below the limit and not reported.

Test Frequency: 30MHz ~ 18GHz

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
GFSK Low Channel 2402MHz									
269.33	32.76	QP	228	1.1	H	-13.35	19.41	46.00	-26.59
269.33	40.35	QP	259	1.8	V	-13.35	27.00	46.00	-19.00
4804.00	44.46	PK	28	1.6	V	-1.06	43.40	74.00	-30.60
4804.00	43.59	Ave	28	1.6	V	-1.06	42.53	54.00	-11.47
7206.00	44.04	PK	172	1.7	H	1.33	45.37	74.00	-28.63
7206.00	38.22	Ave	172	1.7	H	1.33	39.55	54.00	-14.45
2321.68	46.37	PK	63	1.9	V	-13.19	33.18	74.00	-40.82
2321.68	39.77	Ave	63	1.9	V	-13.19	26.58	54.00	-27.42
2376.38	42.07	PK	158	1.8	H	-13.14	28.93	74.00	-45.07
2376.38	36.61	Ave	158	1.8	H	-13.14	23.47	54.00	-30.53
2497.64	42.46	PK	342	1.3	V	-13.08	29.38	74.00	-44.62
2497.64	37.65	Ave	342	1.3	V	-13.08	24.57	54.00	-29.43

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
GFSK Middle Channel 2440MHz									
269.33	32.40	QP	324	1.6	H	-13.35	19.05	46.00	-26.95
269.33	38.46	QP	249	1.3	V	-13.35	25.11	46.00	-20.89
4880.00	43.27	PK	74	1.7	V	-0.62	42.65	74.00	-31.35
4880.00	42.05	Ave	74	1.7	V	-0.62	41.43	54.00	-12.57
7320.00	43.38	PK	8	1.1	H	2.21	45.59	74.00	-28.41
7320.00	36.29	Ave	8	1.1	H	2.21	38.50	54.00	-15.50
2319.81	46.82	PK	263	1.3	V	-13.19	33.63	74.00	-40.37
2319.81	38.51	Ave	263	1.3	V	-13.19	25.32	54.00	-28.68
2362.46	42.41	PK	209	1.4	H	-13.14	29.27	74.00	-44.73
2362.46	37.59	Ave	209	1.4	H	-13.14	24.45	54.00	-29.55
2497.05	44.37	PK	97	1.5	V	-13.08	31.29	74.00	-42.71
2497.05	37.85	Ave	97	1.5	V	-13.08	24.77	54.00	-29.23

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
GFSK High Channel 2480MHz									
269.33	33.86	QP	100	1.9	H	-13.35	20.51	46.00	-25.49
269.33	38.46	QP	9	1.5	V	-13.35	25.11	46.00	-20.89
4960.00	43.37	PK	232	1.7	V	-0.24	43.13	74.00	-30.87
4960.00	41.52	Ave	232	1.7	V	-0.24	41.28	54.00	-12.72
7440.00	43.60	PK	123	1.5	H	2.84	46.44	74.00	-27.56
7440.00	36.29	Ave	123	1.5	H	2.84	39.13	54.00	-14.87
2344.39	46.28	PK	262	1.1	V	-13.19	33.09	74.00	-40.91
2344.39	39.54	Ave	262	1.1	V	-13.19	26.35	54.00	-27.65
2382.09	44.66	PK	73	1.3	H	-13.14	31.52	74.00	-42.48
2382.09	36.17	Ave	73	1.3	H	-13.14	23.03	54.00	-30.97
2486.19	44.70	PK	159	1.1	V	-13.08	31.62	74.00	-42.38
2486.19	38.03	Ave	159	1.1	V	-13.08	24.95	54.00	-29.05

Test Frequency: 18GHz~25GHz

The measurements were more than 20 dB below the limit and not reported.

9 Duty Cycle

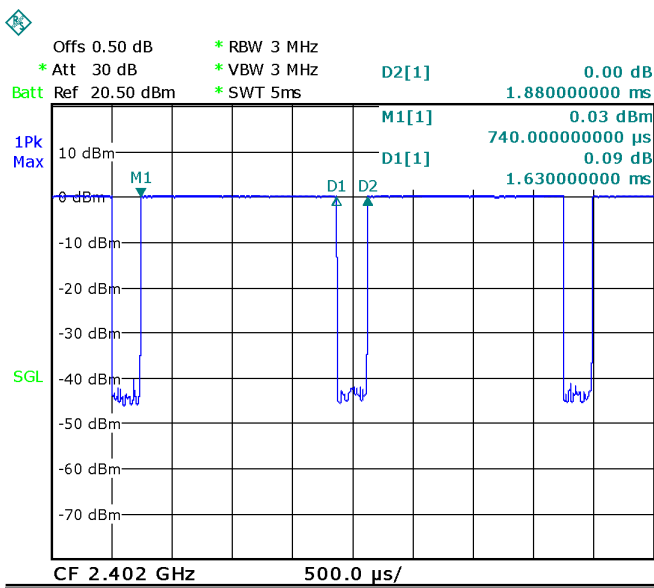
Type of Modulation	On time ms	Period ms	Duty Cycle linear	Duty Cycle %	Duty Cycle Factor(dB)	Average Factor(dB)
GFSK	1.6300	1.8800	0.87	86.70	0.62	-1.24

Remark:

Duty cycle=On Time/period;

Duty cycle factor= $10 \cdot \log(1/\text{Duty cycle})$;

Average factor= $20 \log_{10} \text{Duty cycle}$



10 Band Edge Measurement

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: KDB 558074 D01 15.247 Meas Guidance v05r02, April 2, 2019

Regulation 15.247 (d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Test Mode: Transmitting

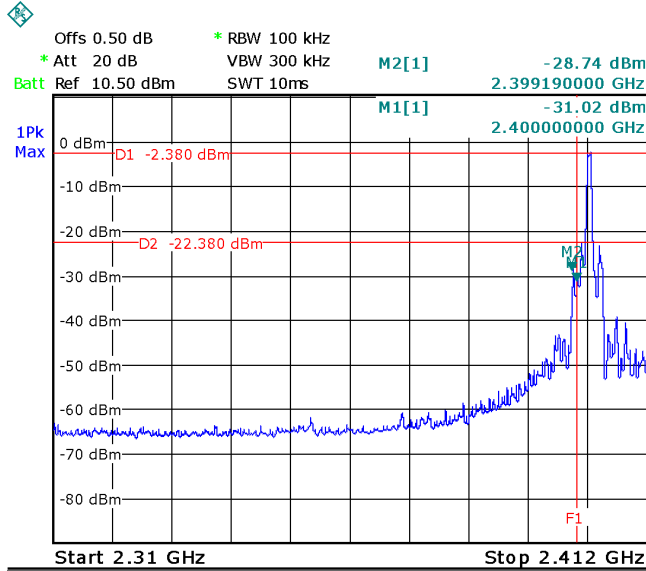
10.1 Test Produce

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

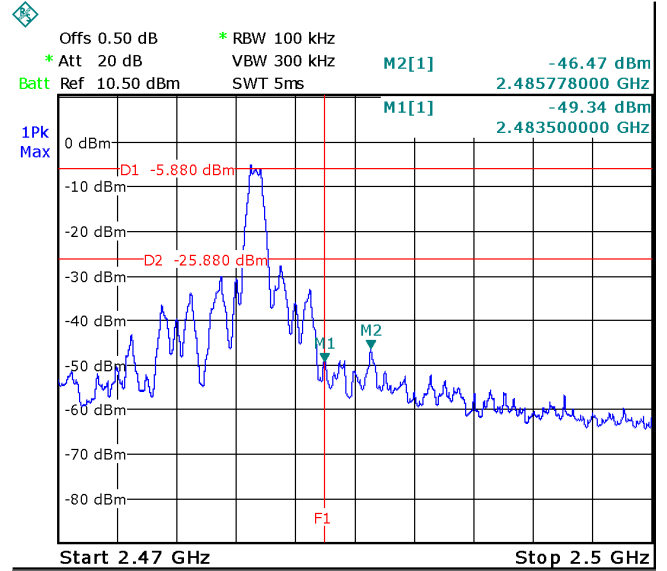
10.2 Test Result

Test result plots shown as follows:

BLE: Band edge-left side



BLE: Band edge-right side



11 6 dB Bandwidth Measurement

Test Requirement:

FCC CFR47 Part 15 Section 15.247

Test Method:

KDB 558074 D01 15.247 Meas Guidance v05r02, April 2, 2019

11.1 Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz

11.2 Test Result:

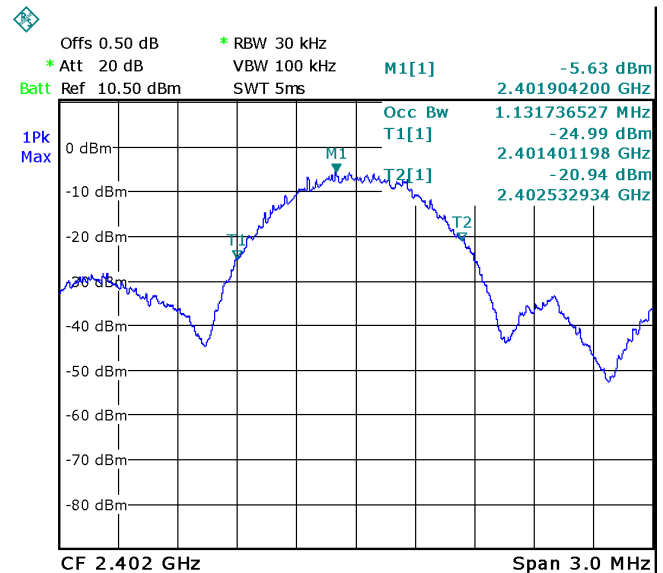
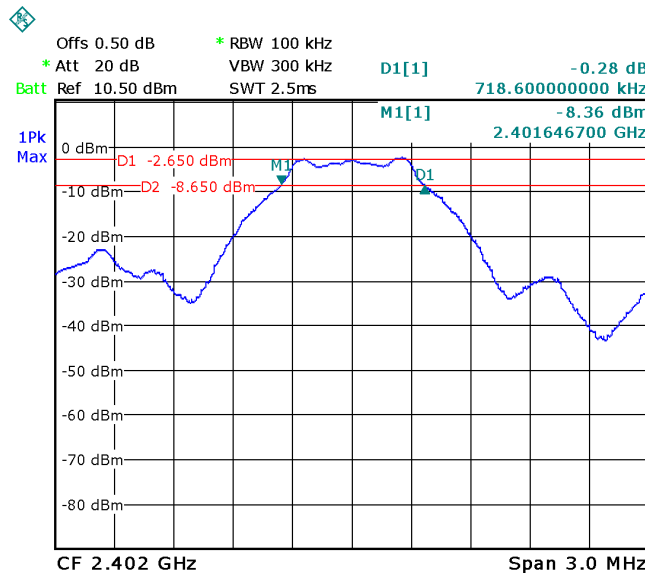
Operation mode	Test Channel	Bandwidth (MHz)	99% Bandwidth (MHz)
BLE	Channel 0	0.719	1.132
	Channel 19	0.683	1.162
	Channel 39	0.731	1.096

Test result plot:

6 dB Bandwidth

99% Bandwidth

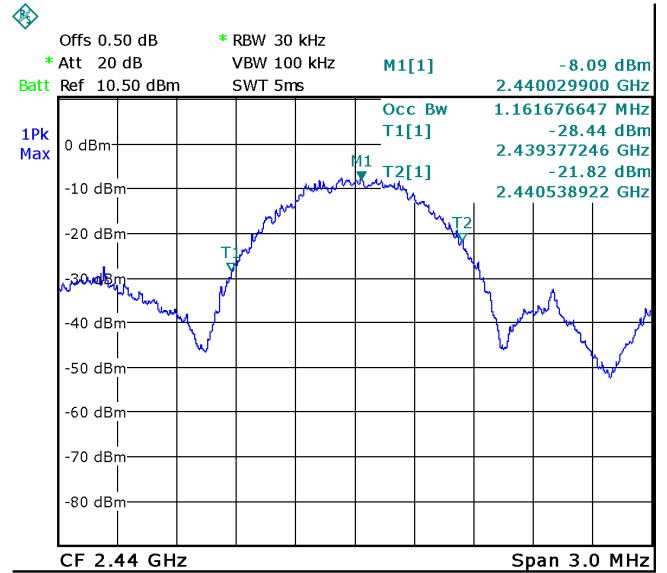
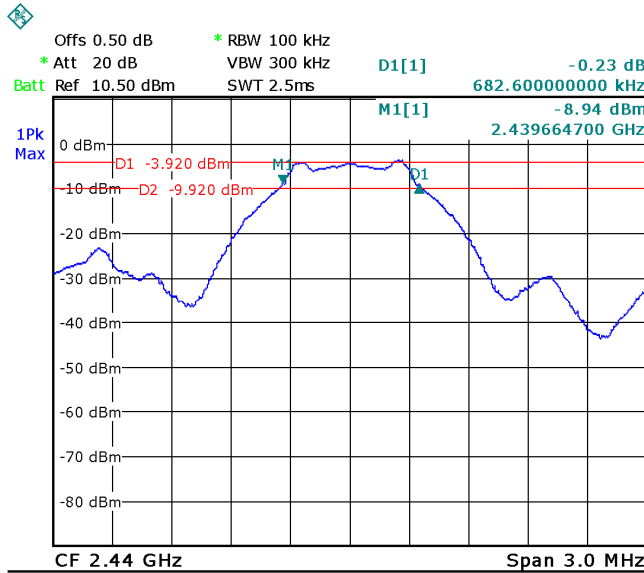
Mode: TX GFSK channel 0



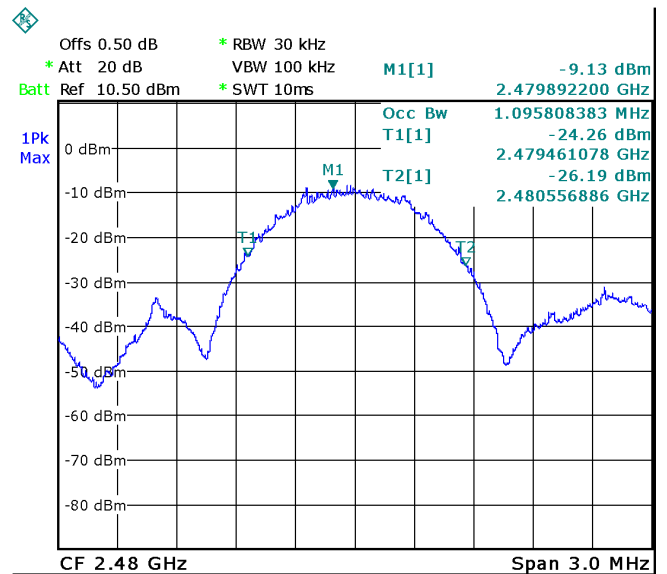
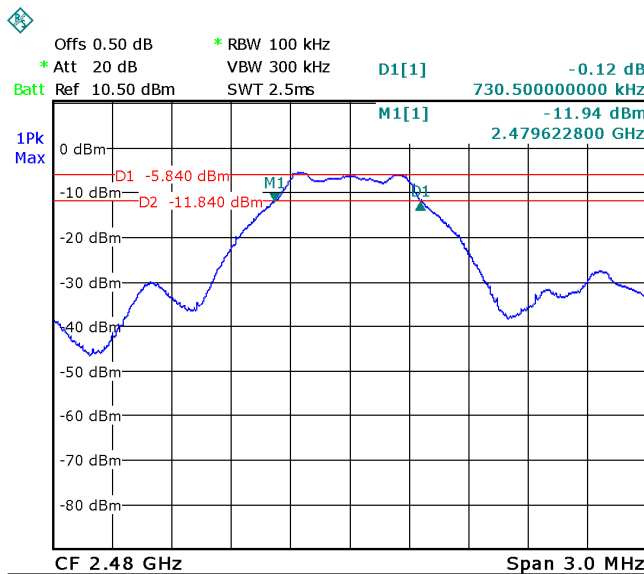
6 dB Bandwidth

99% Bandwidth

Mode: TX GFSK channel 19



Mode: TX GFSK channel 39



12 Maximum Peak Output Power

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: KDB 558074 D01 15.247 Meas Guidance v05r02, April 2, 2019

12.1 Test Procedure:

KDB 558074 D01 15.247 Meas Guidance v05r02, April 2, 2019

section 9.1.1 (For BLE)

This procedure shall be used when the measurement instrument has available a resolution bandwidth that is greater than the DTS bandwidth.

- a) Set the $RBW \geq DTS$ bandwidth.
- b) Set $VBW \geq 3 \times RBW$
- c) Set $span \geq 3 \times RBW$
- d) Sweep time = auto couple.
- e) Detector = peak.
- f) Trace mode = max hold.
- g) Allow trace to fully stabilize.
- h) Use peak marker function to determine the peak amplitude level.

section 9.1.2 (For WIFI)

This procedure may be used when the maximum available RBW of the measurement instrument is less than the DTS bandwidth.

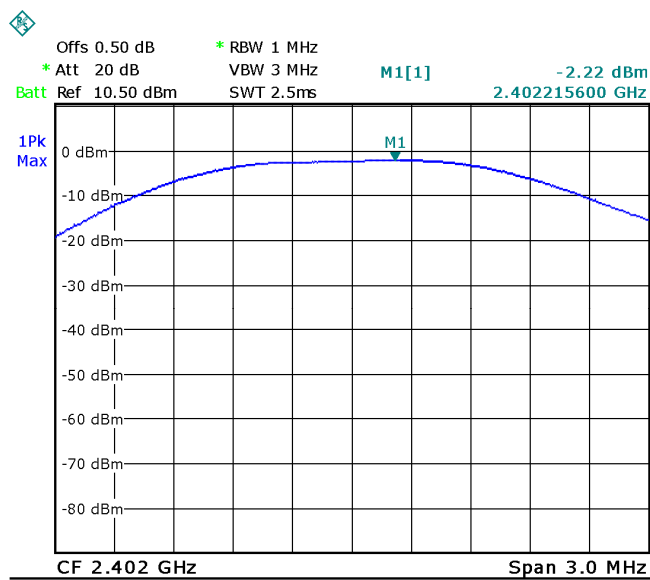
- a) Set the $RBW = 1 \text{ MHz}$
- b) Set the $VBW \geq 3 \times RBW$
- c) Set the $span \geq 1.5 \times DTS$ bandwidth.
- d) Detector = peak.
- e) Sweep time = auto couple.
- f) Trace mode = max hold.
- g) Allow trace to fully stabilize.
- h) Use the instrument's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges (for some instruments, this may require a manual override to select peak detector). If the instrument does not have a band power function, sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the DTS bandwidth.

12.2 Test Result:

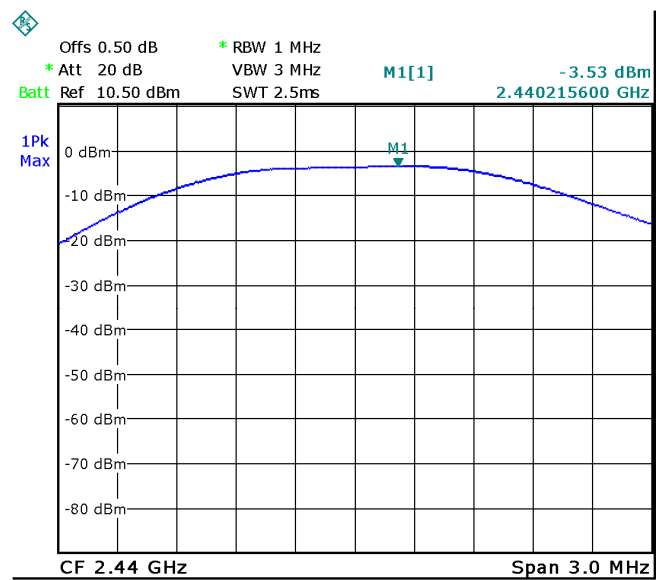
Operation mode	Channel Frequency (MHz)	Maximum Peak Output Power (dBm)	Limit
BLE	Low-2402	-2.22	1W/30dBm
	Middle-2440	-3.53	1W/30dBm
	High-2480	-5.36	1W/30dBm

Test Plot

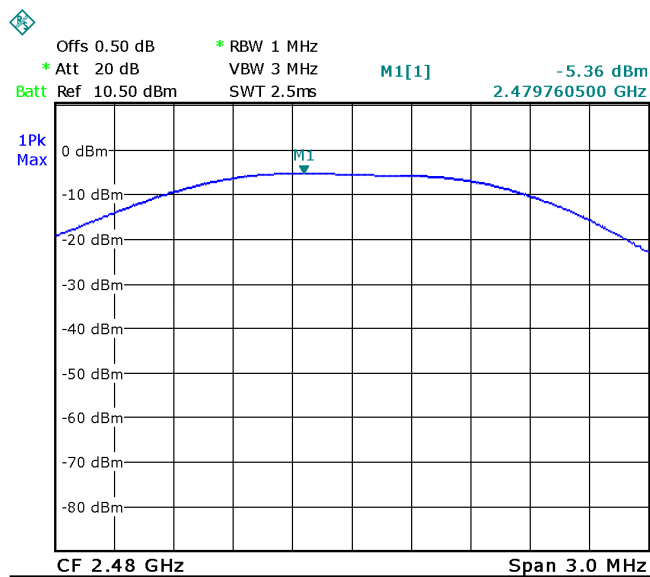
Mode: TX GFSK channel 0



Mode: TX GFSK channel 19



Mode: TX GFSK channel 39



13 Power Spectral density

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: KDB 558074 D01 15.247 Meas Guidance v05r02, April 2, 2019

13.1 Test Procedure:

KDB 558074 D01 15.247 Meas Guidance v05r02, April 2, 2019 section 10.2

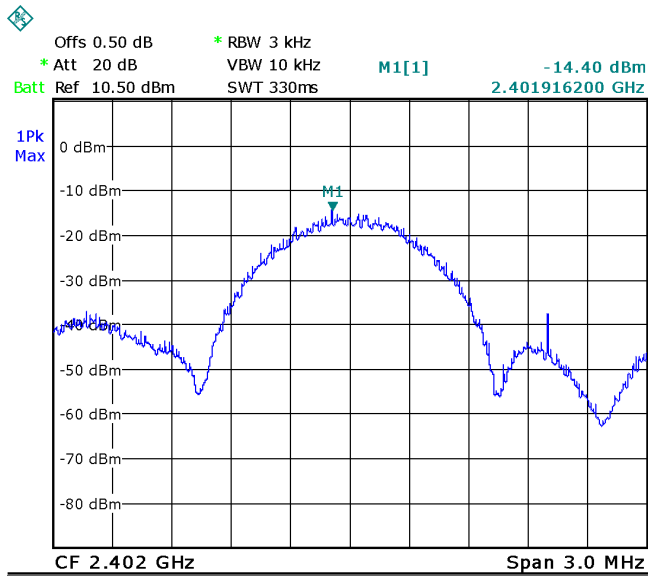
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 3kHz. VBW = 10kHz, Span = 1.5 times the DTS channel bandwidth(6 dB bandwidth). Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section
Submit this plot.

13.2 Test Result:

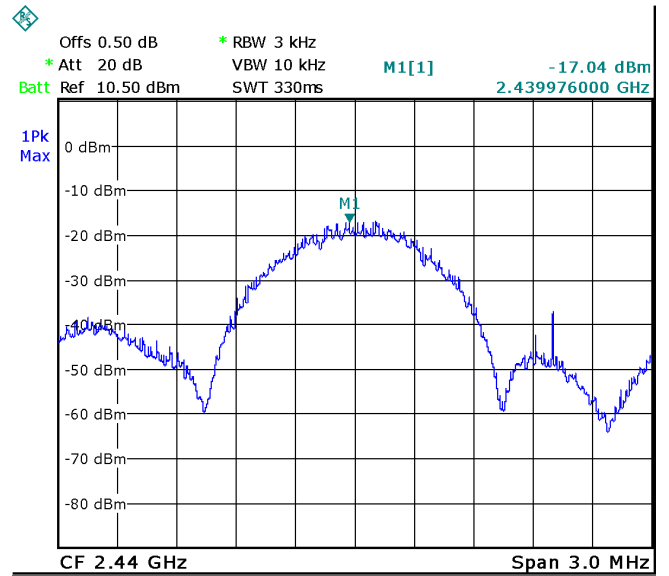
Operation mode	Channel Frequency (MHz)	Power Spectral (dBm per 3kHz)	Limit
BLE	Low-2402	-14.40	8dBm per 3kHz
	Middle-2440	-17.04	8dBm per 3kHz
	High-2480	-18.34	8dBm per 3kHz

Test Plot

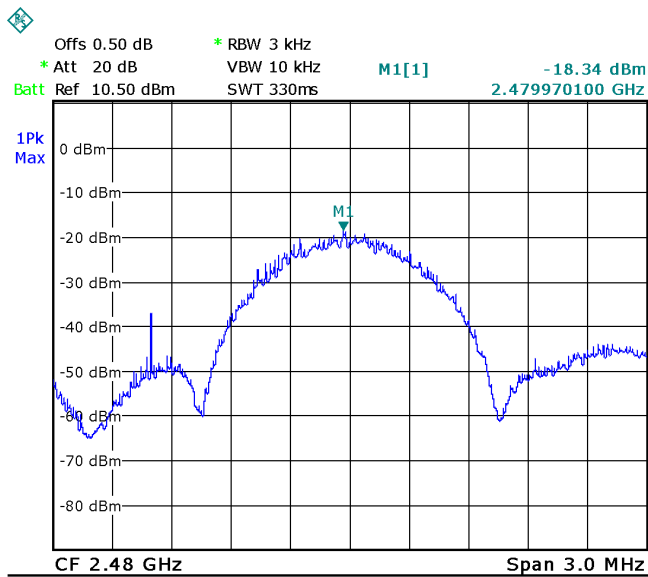
Mode: TX GFSK channel 0



Mode: TX GFSK channel 19



Mode: TX GFSK channel 39



14 Antenna Requirement

According to the FCC Part 15 Paragraph 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. This product has an integrated antenna fulfill the requirement of this section.

Note: Please refer to EUT photos for more details.

15 RF Exposure

Remark: refer to MPE test report: WTD21D04031086W002.

16 Photographs of test setup and EUT.

Note: Please refer to appendix: Appendix-WTB4010-Photos.

=====**End of Report**=====