TEST REPORT

Applicant	:	Shenzhen Lockman Lock Co., Ltd.
Address	:	201, Building 5, Yingtai Industrial Road, Langkou Community, Dalang Street, Longhua District, Shenzhen City, Guangdong Province, China
Manufacturer	:	Shenzhen Lockman Lock Co., Ltd.
Address	:	201, Building 5, Yingtai Industrial Road, Langkou Community, Dalang Street, Longhua District, Shenzhen City, Guangdong Province, China
Product Name	:	Smart lock
Model Number	:	CTS30, CTS30-W, CTS30-B, CTS10, CTS40
Trademark	:	N/A
FCC ID	:	2BYDD-CTS30
Test Date	:	Jul. 22, 2026 to Sep. 15, 2026
Date of Report	:	Sep. 15, 2026
Test Result	:	This device described above has been tested by NTT, and the test results show that the equipment under test (EUT) is in compliance with the Standard requirements. And it is applicable only to the tested sample identified in the report.

Test Procedure Used:

Standards	:	FCC CFR Title 47 Part 15 Subpart C Section 15.247 ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 KDB 558074 D01 15.247 Meas Guidance v05r02

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Shenzhen NTT Testing Technology Co., Ltd. Special Seal for Inspection and Testing

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Revision History of This Test Report		
Report Number	Description	Issued Date
SZNTT26037108E1-2	Initial Issue	Sep. 15, 2026

1. General Information

1.1.Description of Device (EUT)

EUT Name	:	Smart lock
Model No.	:	CTS30, CTS30-W, CTS30-B, CTS10, CTS40
Model Difference	:	All the model are the same circuit and RF module, only the names and appearance colors are different. Test sample model: CTS30
Power supply	:	DC 4.5V by battery
Operation frequency	:	2402-2480MHz
Modulation	:	GFSK
Antenna Type	:	PCB antenna, Maximum Gain is -0.76dBi
Intend use environment	:	Residential, commercial and light industrial environment

1.2.Channel List

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	**2402**	14	2430	28	2458
01	2404	15	2432	29	2460
02	2406	16	2434	30	2462
03	2408	17	2436	31	2464
04	2410	18	2438	32	2466
05	2412	**19**	**2440**	33	2468
06	2414	20	2442	34	2470
07	2416	21	2444	35	2472
08	2418	22	2446	36	2474
09	2420	23	2448	37	2476
10	2422	24	2450	38	2478
11	2424	25	2452	39	**2480**
12	2426	26	2454		
13	2428	27	2456		

1.3.Summary of test result

RF PART		
Test Items	**Test Requirement**	**Result**
Antenna requirement	FCC part 15.203/15.247 (b)(4)	PASS
AC Power Line Conducted Emission	FCC part 15.207	N/A
Conducted Peak Output Power	FCC part 15.247 (b)(3)	PASS
Channel Bandwidth& 99% OCB	FCC part 15.247 (a)(2)	PASS
Power Spectral Density	FCC part 15.247 (e)	PASS
Band Edge	FCC part 15.247(d)	PASS
Spurious Emission	FCC part 15.205/15.209	PASS
Remark: N/A is an abbreviation for Not Applicable. Measurement Uncertainty is not taken into account for conformity statement		

1.4.Special Accessories and Auxiliary Equipment

Description	Manufacturer	Model No.	Hardware Version	Software Version
Laptop	DELL	Vostro 5490	/	/

1.5.Test mode

The special RF test software was used to control EUT work in Continuous BLE TX mode, and select test channel, wireless mode.

Test mode	Low channel	Middle channel	High channel
GFSK	2402MHz	2440MHz	2480MHz
Note：Only the worst Data Record in the report			

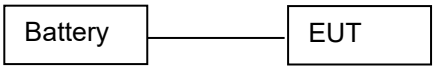
1.6. Test configuration

Transmitting mode	Keep the EUT in continuously transmitting mode.
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.	

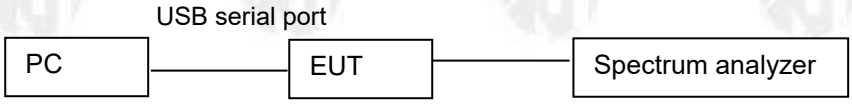
Test Software	BT_Test_Tool_V1.7.9
Power level setup	4 dBm

1.7.Block Diagram

Conducted Emission
N/A
Radiated Emission



RF Conducted Test



1.8.Test Conditions

Category	Normal Conditions	Extreme Conditions
Temperature range	15-35℃	N/A
Humidity range	20-75%	N/A
Pressure range	86-106kPa	N/A
Power supply	DC 4.5V by battery	N/A
Note: N/A is an abbreviation for Not Applicable.		

1.9.Measurement Uncertainty (95% confidence levels, k=2)

Parameter	**Uncertainty**
RF output power, conducted	±1.0dB
Power Spectral Density, conducted	±2.2dB
Radio Frequency	± 1 x 10-6
Bandwidth	± 1.5 x 10-6
Time	±2%
Duty Cycle	±2%
Temperature	±1°C
Humidity	±5%
DC and low frequency voltages	±3%
Conducted Emissions (150kHz~30MHz)	±3.64dB
Radiated Emission(9KHz~30MHz)	±4.51dB
Radiated Emission(30MHz~1GHz)	±5.03dB
Radiated Emission(1GHz~25GHz)	±4.74dB
Remark:When making a conformity declaration based on test results for regulations/standards or specifications,the default is to use Clause 4.2.1of ILAC-G8:09/2019 and the guidelines on decision rules and conformity declaration in IEC Guide 115:2023.	

1.10.Test Facility

Site Description		
Name of Firm	:	Shenzhen NTT Testing Technology Co.,Ltd.
Site Location	:	1B, Building 2, Factory Building & 103, Building 3, Factory Building, Dayang Industrial Park, No.4, Industrial Avenue, Tangwei Community, Fuhai Sub-district, Bao 'an District, Shenzhen City, Guangdong, China
FCC Designation Number	:	CN3446
FCC Test Firm Registration Number	:	129414

1.11.Test Equipment

Conducted Test Site

Name	Model No.	Serial No.	Manufacturer	Date of Cal.	Due Date
944 Shielded Room	HSRCE944	/	HTEC	2025/4/30	2028/4/29
EMI Test Receiver	ESPI	/	RS	2025/9/8	2026/9/7
LISN	NNLK 8129	00603	Schwarzbeck	2025/9/8	2026/9/7
LISN	NNHV 8123-400	00694	Schwarzbeck	2025/9/8	2026/9/7
LISN	NNHV 8123-400	00680	Schwarzbeck	2025/9/8	2026/9/7
Cable	RG223-1500MM	NA	RG	2025/9/8	2026/9/7

Radiated Test Site(Below 1G and Above 1G)&RF Test Site

Name	Model No.	Serial No.	Manufacturer	Date of Cal.	Due Date
966 Shielded Room	966 Room	/	EMToni	2025/7/24	2028/7/23
EMI Test Receiver	ESCI	101018	RS	2025/9/8	2026/9/7
Amplifi（30MHz-1GHz）	BBV 9718D	00042	SCHWARZBECK	2025/9/8	2026/9/7
Bilog Antenna（30MHz-1GHz）	VULB9168	1858	SCHWARZBECK	2025/9/9	2026/9/8
Horn antenna（1GHz-18GHz）	BBHA 9120 D	02622	SCHWARZBECK	2025/9/9	2026/9/8
Pream plifier（1GHz-18GHz）	BBV 9718D	0024	SCHWARZBECK	2025/9/8	2026/9/7
Spectrum Analyze（10Hz-40GHz）	FSV 40	100952	Rohde & Schwarz	2025/9/8	2026/9/7
Pream plifier（18GHz-40GHz）	BBV 9721	0056	SCHWARZBECK	2025/9/8	2026/9/7
Double Ridge Guide Horn Antenna（18GHz-40GHz）	SAS-574	588	A.H.System	2025/9/8	2026/9/7
Loop Antenna (9KHz-30MHz)	FMZB1519B	014	SCHWARZBECK	2025/9/8	2026/9/7
Amplifier (9KHz-30MHz)	CVP 9222 C	00109	SCHWARZBECK	2025/9/8	2026/9/7
MXG Signal Analyzer	N9020A	MY50510202	Agilent	2025/9/8	2026/9/7
MXG Vector Signal Generator	N5182A	MY50140020	Agilent	2025/9/8	2026/9/7

MXG Analog Signal Generator	N5181A	MY47420919	Agilent	2025/9/8	2026/9/7
Power Sensor	TR1029-2	512364	Techoy	2025/9/8	2026/9/7
RF Swith	TR1029-1	512364	Techoy	2025/9/8	2026/9/7
Cable	DA800-4000MM	NA	DA	2025/9/8	2026/9/7
Cable	DA800-11000MM	NA	DA	2025/9/8	2026/9/7

Test software

Item	Name	Manufacturer	Model	Software version
1	EMC Conduction Test System	FALA	EZ-EMC	Ver.EMC-CON 3A1.1+
2	EMC radiation test system	FALA	EZ-EMC	Ver.FA-03A2 RE+
3	RF test system	TACHOY	RFTest	V1.0.0
4	RF communication test system	TACHOY	RFTest	V1.0.0

Conducted Test Site

Name	Model No.	Serial No.	Manufacturer	Date of Cal.	Due Date
944 Shielded Room	HSRCE944	/	HTEC	2025/04/30	2028/04/29
EMI Test Receiver	ESCI	100881/003	ROHDE&SCHWARZ	2026/09/04	2027/09/03
LISN	AMN6500	101185	ROHDE&SCHWARZ	2026/09/04	2027/09/03
LISN	NNLK 8129	00603	SCHWARZBECK	2026/09/04	2027/09/03
Cable	RG223-2M	/	RG	2026/09/04	2027/09/03

Radiated Test Site(Below 1G and Above 1G)&RF Test Site

Name	Model No.	Serial No.	Manufacturer	Date of Cal.	Due Date
966 Shielded Room	966 Room	/	EMToni	2025/07/24	2028/07/23
EMI Test Receiver	ESPI	101018	ROHDE&SCHWARZ	2026/09/04	2027/09/03
Amplifi（30MHz-1GHz）	BBV 9745	00431	SCHWARZBECK	2026/09/04	2027/09/03

Bilog Antenna（30MHz-1GHz）	VULB9168	1858	SCHWARZBECK	2026/09/05	2027/09/04
Horn antenna（1GHz-18GHz）	BBHA 9120 D	02622	SCHWARZBECK	2026/09/05	2027/09/04
Pream plifier（1GHz-18GHz）	BBV 9718D	0024	SCHWARZBECK	2026/09/04	2027/09/03
Spectrum Analyze（10Hz-40GHz）	FSV 40	100952	ROHDE&SCHWARZ	2026/09/04	2027/09/03
Pream plifier（18GHz-40GHz）	BBV 9721	0056	SCHWARZBECK	2026/09/04	2027/09/03
Double Ridge Guide Horn Antenna（18GHz-40GHz）	SAS-574	588	A.H.System	2026/09/05	2027/09/04
Loop Antenna (9KHz-30MHz)	FMZB 1513-60	00115	SCHWARZBECK	2026/09/04	2027/09/03
MXG Signal Analyzer	N9020A	MY49100730	Agilent	2026/09/04	2027/09/03
MXG Vector Signal Generator	N5182A	MY50144920	Agilent	2026/09/04	2027/09/03
WIDEBAND RADIO COMMUNICATION TESTER	CMW500	/	ROHDE&SCHWARZ	2026/09/07	2027/09/06
Power Sensor	MW100-RFCB-2	MW260105NTT-64	MWRFtest	2026/09/04	2027/09/03
RF Swith	MW100-RFCB-1	MW260105NTT-64	MWRFtest	2026/09/04	2027/09/03
Cable	RG223-3M	/	DA	2026/09/04	2027/09/03
Cable	RG223-12M	/	DA	2026/09/04	2027/09/03
Cable	SFT205-NMNMSW-2.5M	/	DA	2026/09/04	2027/09/03
Cable	SFT205-NMNM-12M	/	DA	2026/09/04	2027/09/03
Cable	UCA500-NJWSM-1.5M	017	MWRFtest	2026/09/04	2027/09/03

2. Conducted emission at the mains terminals test

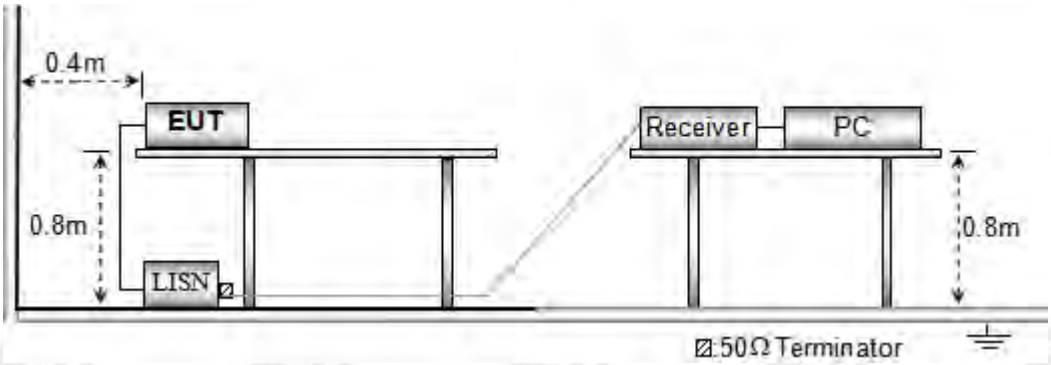
2.1.Limit

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024
Test Frequency Range:	150KHz to 30MHz
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto

Frequency MHz	Limits dB(μV)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	66 ~ 56*	56 ~ 46*
0.50 ~ 5.00	56	46
5.00 ~ 30.00	60	50

Notes: 1. *Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

2.2.Test Setup



2.3.Test Procedure

1. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
2. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
3. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
4. LISN at least 80 cm from nearest part of EUT chassis.
5.For the actual test configuration, please refer to the related Item – EUT Test Photos.

2.4.Test Result

N/A

NOTE: This EUT is powered by DC power only, this test item is not applicable.

3. Radiated Spurious Emissions

3.1.Limit

Test Requirement: FCC CFR47 Part 15 Section 15.209 & 15.247

Test Method: KDB 558074 D01 15.247 Meas Guidance v05r02April 2,2019; ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024

Test Result: PASS

Measurement Distance: 3m

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	100KHz	300KHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

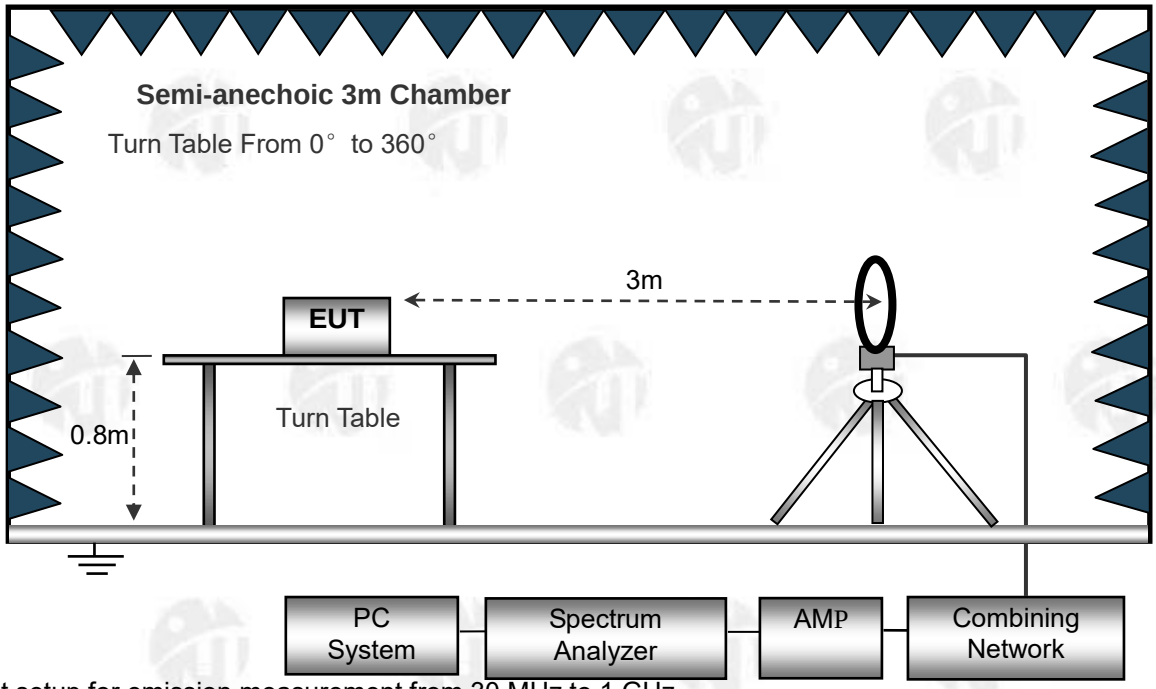
Limit:

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(kHz)	300	10000 * 2400/F(kHz)	20log(2400/F(kHz)) + 80
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	20log(24000/F(kHz)) + 40
1.705 ~ 30	30	30	100 * 30	20log(30) + 40
30 ~ 88	100	3	100	20log(100)
88 ~ 216	150	3	150	20log(150)
216 ~ 960	200	3	200	20log(200)
Above 960	500	3	500	20log(500)

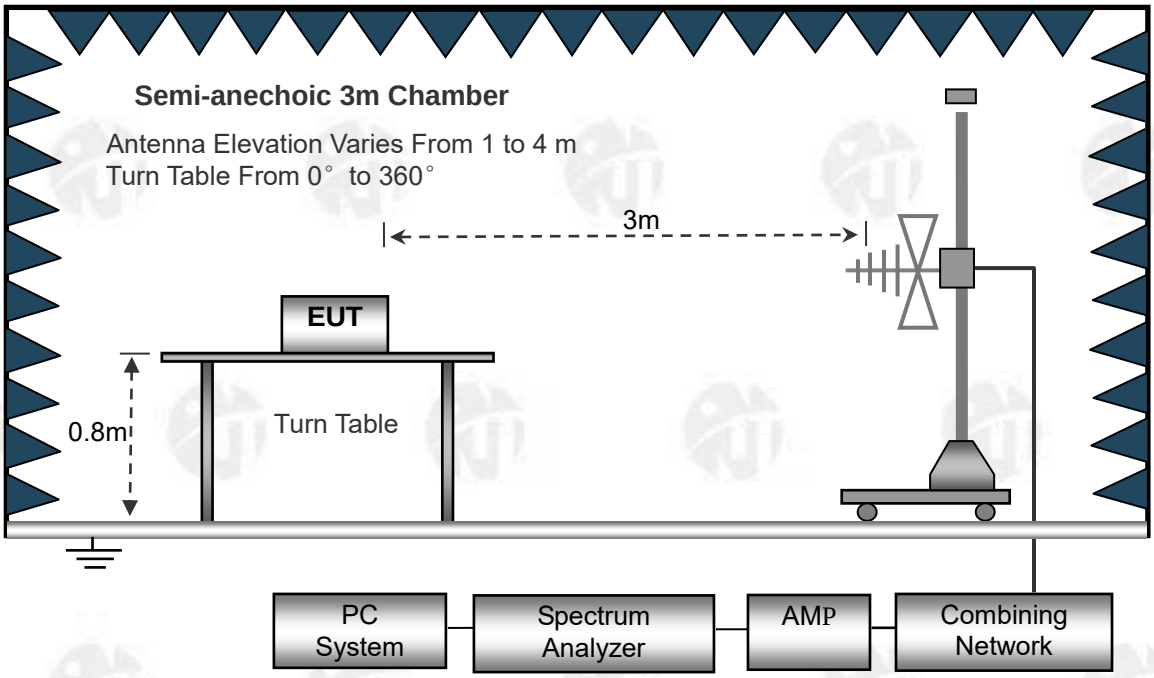
3.2.Test Setup

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

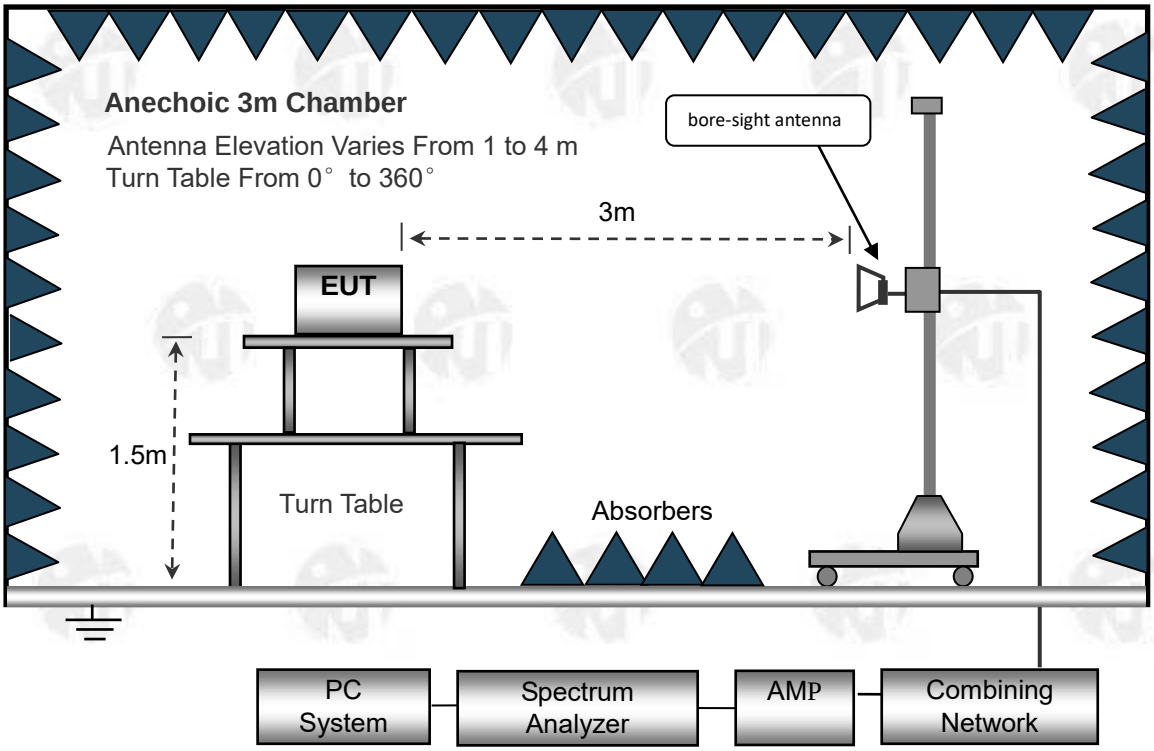
The test setup for emission measurement below 30MHz.

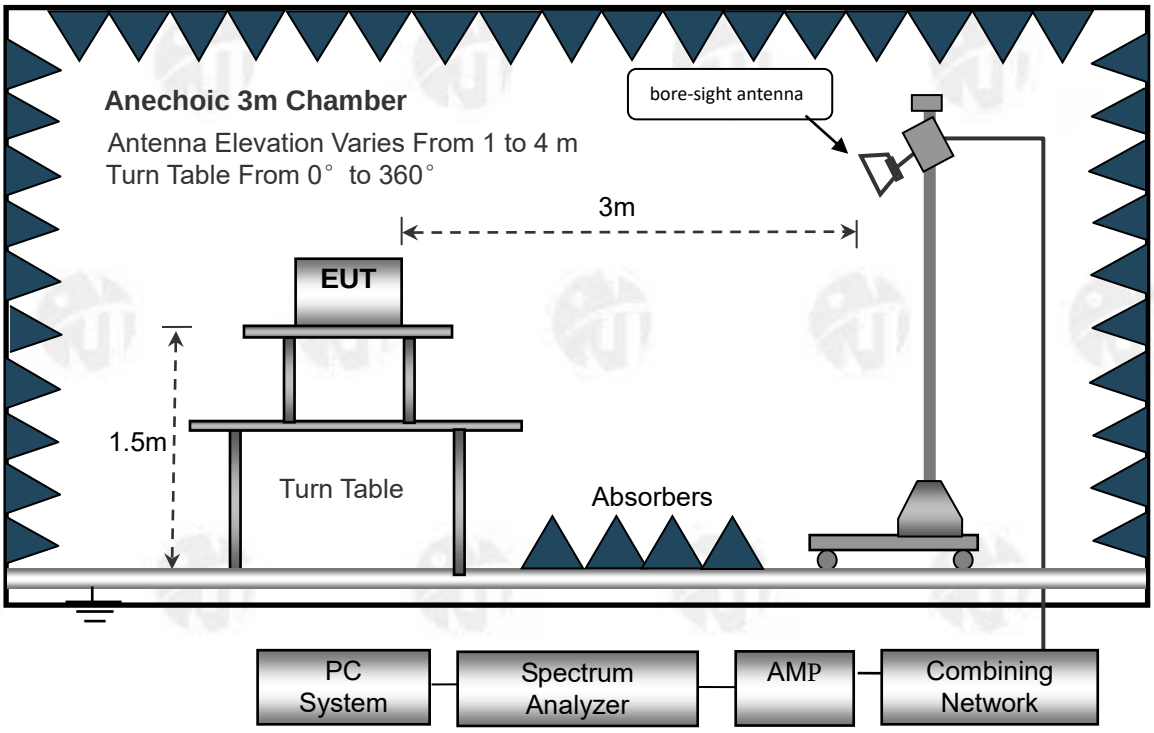


The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz.





3.3.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.

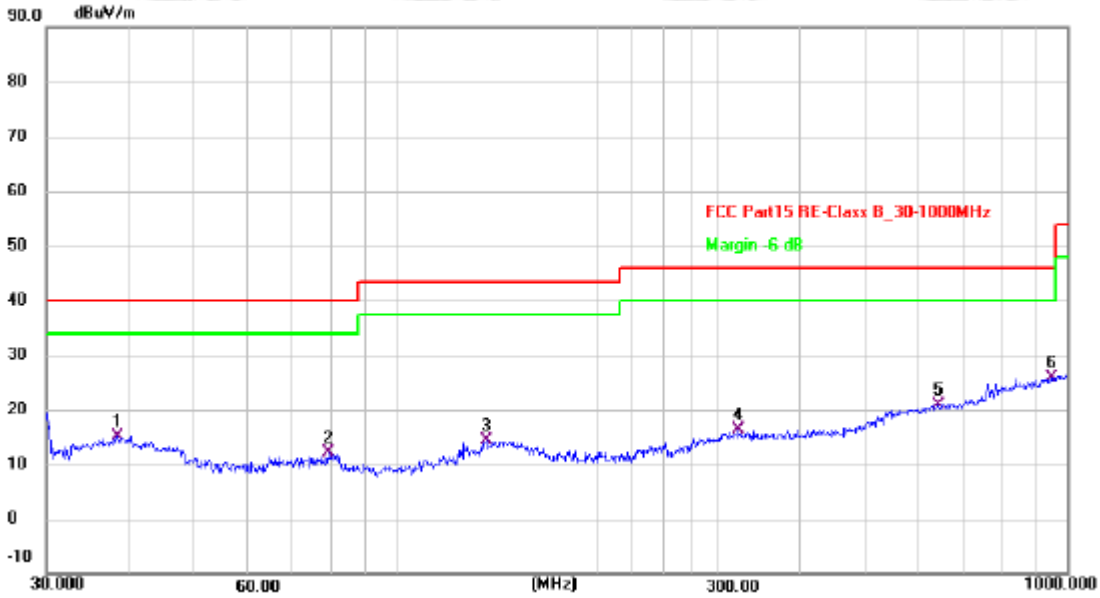
3.4.Test Result

Test Frequency: 9KHz~30MHz

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

Test Frequency : 30MHz ~ 1GHz

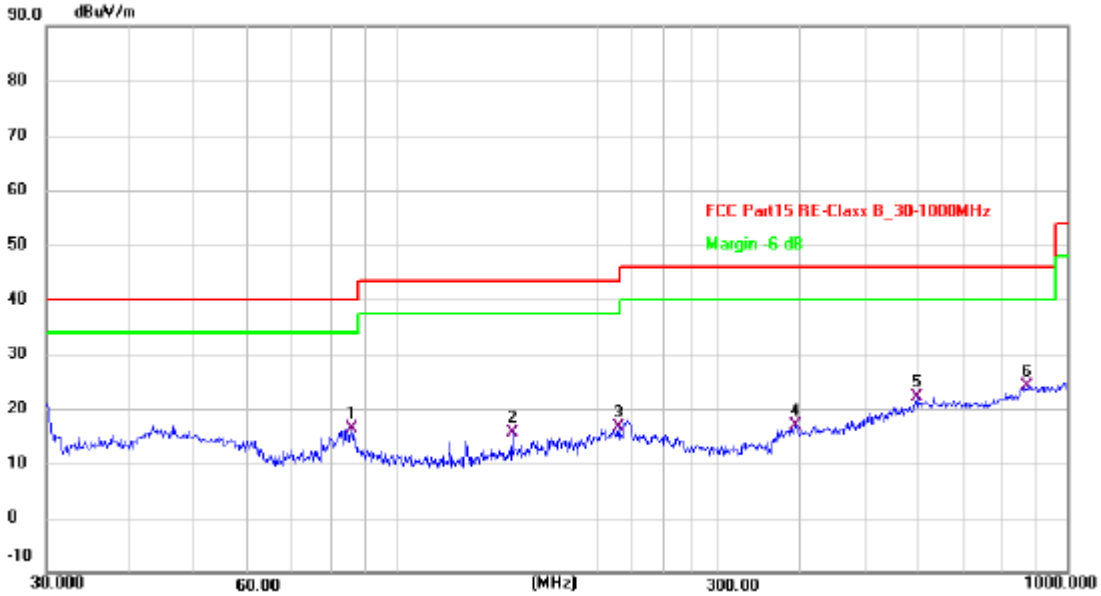
Radiation Emission Test Data			
Temperature:	25.1˚C	Relative Humidity:	56%
Pressure:	1008hPa	Phase :	Horizontal
Test Voltage :	DC 4.5V by battery	Test Mode:	GFSK(CH00)



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	38.3462	28.37	-13.18	15.19	40.00	-24.81	QP
2	78.9651	28.80	-16.66	12.14	40.00	-27.86	QP
3	135.9821	28.36	-13.86	14.50	43.50	-29.00	QP
4	323.3201	28.19	-11.72	16.47	46.00	-29.53	QP
5	642.8612	25.60	-4.72	20.88	46.00	-25.12	QP
6 *	945.4400	26.00	-0.16	25.84	46.00	-20.16	QP

Note:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.
Emission Level = Reading + Factor
Margin=Emission Level-Limit
2. All the modes have tested and recorded the worst mode(GFSK) in the report

Radiation Emission Test Data			
Temperature:	25.1˚C	Relative Humidity:	56%
Pressure:	1008hPa	Phase :	Vertical
Test Voltage :	DC 4.5V by battery	Test Mode:	GFSK(CH00)



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	85.5974	33.59	-17.32	16.27	40.00	-23.73	QP
2	148.4410	27.97	-12.41	15.56	43.50	-27.94	QP
3	214.5141	31.78	-15.24	16.54	43.50	-26.96	QP
4	393.4723	27.31	-10.43	16.88	46.00	-29.12	QP
5	595.1326	27.75	-5.63	22.12	46.00	-23.88	QP
6 *	869.1300	25.24	-1.22	24.02	46.00	-21.98	QP

Note:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.
Emission Level = Reading + Factor
Margin=Emission Level-Limit
2. All the modes have tested and recorded the worst mode(GFSK) in the report

1GHz~25GHz

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Low Channel:2402MHz									
V	4804.00	52.00	34.12	5.03	32.39	55.30	74	-18.70	Pk
V	4804.00	40.39	34.12	5.03	32.39	43.69	54	-10.31	AV
V	7206.00	49.14	32.54	6.29	35.86	58.75	74	-15.25	Pk
V	7206.00	34.87	32.54	6.29	35.86	44.48	54	-9.52	AV
V	9608.00	47.25	32.98	7.55	38.4	60.22	74	-13.78	Pk
V	9608.00	34.42	32.98	7.55	38.4	47.39	54	-6.61	AV
V	12010.00	43.94	32.09	8.93	39	59.78	74	-14.22	Pk
V	12010.00	27.84	32.09	8.93	39	43.68	54	-10.32	AV
H	4804.00	49.04	34.12	5.03	32.39	52.34	74	-21.66	Pk
H	4804.00	39.50	34.12	5.03	32.39	42.80	54	-11.20	AV
H	7206.00	48.48	32.54	6.29	35.86	58.09	74	-15.91	Pk
H	7206.00	32.53	32.54	6.29	35.86	42.14	54	-11.86	AV
H	9608.00	48.59	32.98	7.55	38.4	61.56	74	-12.44	Pk
H	9608.00	30.79	32.98	7.55	38.4	43.76	54	-10.24	AV
H	12010.00	38.24	32.09	8.93	39	54.08	74	-19.92	Pk
H	12010.00	26.68	32.09	8.93	39	42.52	54	-11.48	AV

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Middle Channel:2440MHz									
V	4880.00	50.47	34.07	5.09	32.59	54.08	74	-19.92	Pk
V	4880.00	38.35	34.07	5.09	32.59	41.96	54	-12.04	AV
V	7320.00	45.75	32.63	6.34	35.96	55.42	74	-18.58	Pk
V	7320.00	35.79	32.63	6.34	35.96	45.46	54	-8.54	AV
V	9760.00	43.90	32.92	7.59	38.4	56.97	74	-17.03	Pk
V	9760.00	30.45	32.92	7.59	38.4	43.52	54	-10.48	AV
V	12200.00	41.64	31.96	8.88	39.04	57.60	74	-16.40	Pk
V	12200.00	29.63	31.96	8.88	39.04	45.59	54	-8.41	AV
H	4880.00	48.50	34.07	5.09	32.59	52.11	74	-21.89	Pk
H	4880.00	39.79	34.07	5.09	32.59	43.40	54	-10.60	AV
H	7320.00	47.65	32.63	6.34	35.96	57.32	74	-16.68	Pk
H	7320.00	35.55	32.63	6.34	35.96	45.22	54	-8.78	AV
H	9760.00	42.75	32.92	7.59	38.4	55.82	74	-18.18	Pk
H	9760.00	30.95	32.92	7.59	38.4	44.02	54	-9.98	AV
H	12200.00	39.72	31.96	8.88	39.04	55.68	74	-18.32	Pk
H	12200.00	30.32	31.96	8.88	39.04	46.28	54	-7.72	AV

Polar (H/V)	Frequency	Meter Reading	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
High Channel:2480MHz									
V	4960.00	48.51	34.02	5.15	32.8	52.44	74	-21.56	Pk
V	4960.00	36.43	34.02	5.15	32.8	40.36	54	-13.64	AV
V	7440.00	44.29	32.71	6.4	36.05	54.03	74	-19.97	Pk
V	7440.00	34.46	32.71	6.4	36.05	44.20	54	-9.80	AV
V	9920.00	41.02	32.86	7.62	38.4	54.18	74	-19.82	Pk
V	9920.00	30.71	32.86	7.62	38.4	43.87	54	-10.13	AV
V	12400.00	37.79	31.82	8.84	39.08	53.89	74	-20.11	Pk
V	12400.00	26.90	31.82	8.84	39.08	43.00	54	-11.00	AV
H	4960.00	48.18	34.02	5.15	32.8	52.11	74	-21.89	Pk
H	4960.00	37.94	34.02	5.15	32.8	41.87	54	-12.13	AV
H	7440.00	44.28	32.71	6.4	36.05	54.02	74	-19.98	Pk
H	7440.00	30.93	32.71	6.4	36.05	40.67	54	-13.33	AV
H	9920.00	40.72	32.86	7.62	38.4	53.88	74	-20.12	Pk
H	9920.00	27.11	32.86	7.62	38.4	40.27	54	-13.73	AV
H	12400.00	41.53	31.82	8.84	39.08	57.63	74	-16.37	Pk
H	12400.00	30.80	31.82	8.84	39.08	46.90	54	-7.10	AV

Note: 1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,
Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
All the modes have tested and recorded the worst mode(GFSK) in the report.
The 1-25GHz range has been tested, and the report only records the worst performance of the 1-18G range.

Spurious Emission in Restricted Band 2310-2390MHz and 2483.5-2500MHz

	Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type
GFSK	Low Channel: 2402MHz									
	H	2390.00	57.42	35.17	3.48	27.49	53.22	74	-20.78	PK
	H	2390.00	50.89	35.17	3.48	27.49	46.69	54	-7.31	AV
	H	2400.00	61.76	35.16	3.49	27.52	57.61	74	-16.39	PK
	H	2400.00	51.51	35.16	3.49	27.52	47.36	54	-6.64	AV
	V	2390.00	57.41	35.17	3.48	27.49	53.21	74	-20.79	PK
	V	2390.00	52.00	35.17	3.48	27.49	47.80	54	-6.20	AV
	V	2400.00	61.35	35.16	3.49	27.52	57.20	74	-16.80	PK
	V	2400.00	48.70	35.16	3.49	27.52	44.55	54	-9.45	AV
	High Channel: 2480MHz									
	H	2483.50	57.09	35.11	3.56	27.75	53.29	74	-20.71	PK
	H	2483.50	49.35	35.11	3.56	27.75	45.55	54	-8.45	AV
	H	2500.00	59.79	35.1	3.57	27.8	56.06	74	-17.94	PK
	H	2500.00	51.47	35.1	3.57	27.8	47.74	54	-6.26	AV
	V	2483.50	59.84	35.11	3.56	27.75	56.04	74	-17.96	PK
	V	2483.50	50.47	35.11	3.56	27.75	46.67	54	-7.33	AV
	V	2500.00	59.24	35.1	3.57	27.8	55.51	74	-18.49	PK
	V	2500.00	51.43	35.1	3.57	27.8	47.70	54	-6.30	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss − Pre-amplifier, Margin= Emission Level - Limit

4. Conducted Spurious Emissions

4.1.Limit

Test Requirement:	FCC CFR47 Part 15 Section 15.247
Test Method:	KDB 558074 D01 15.247 Meas Guidance v05r02April 2,2019; ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63. 10a-2024
Test Result:	PASS

Limit:

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 Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

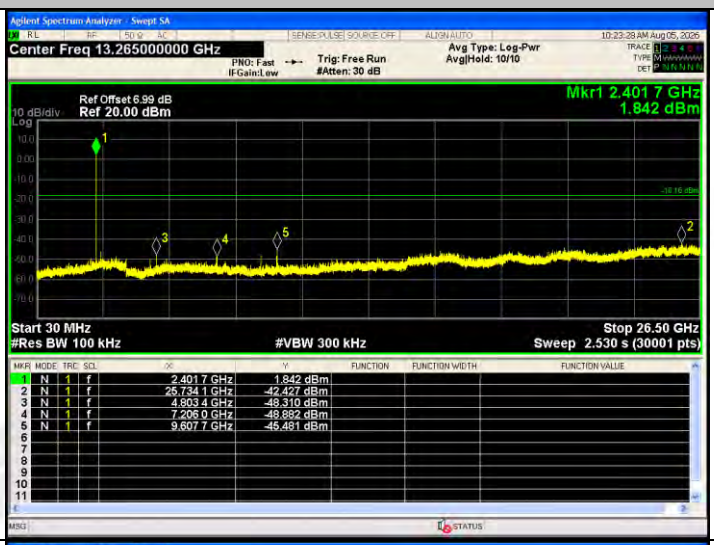
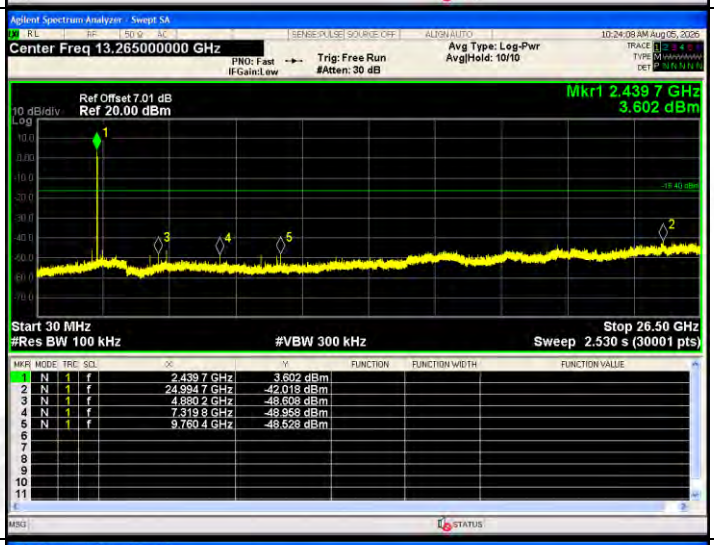
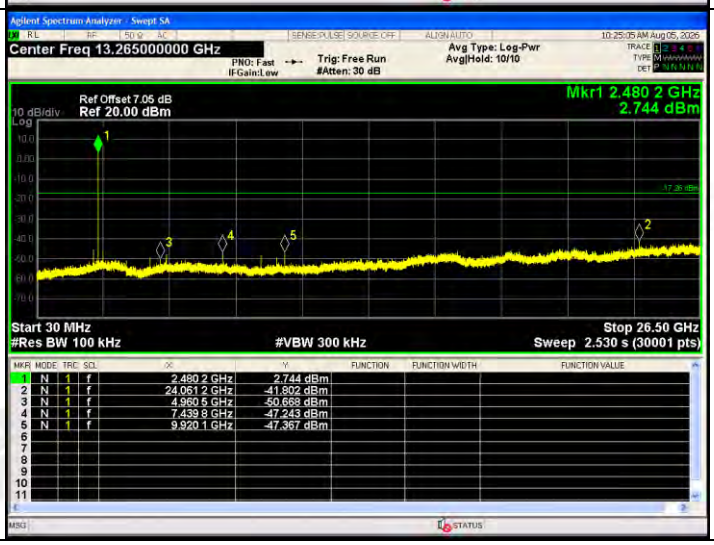
4.2.Test Setup

4.3.Test Procedure

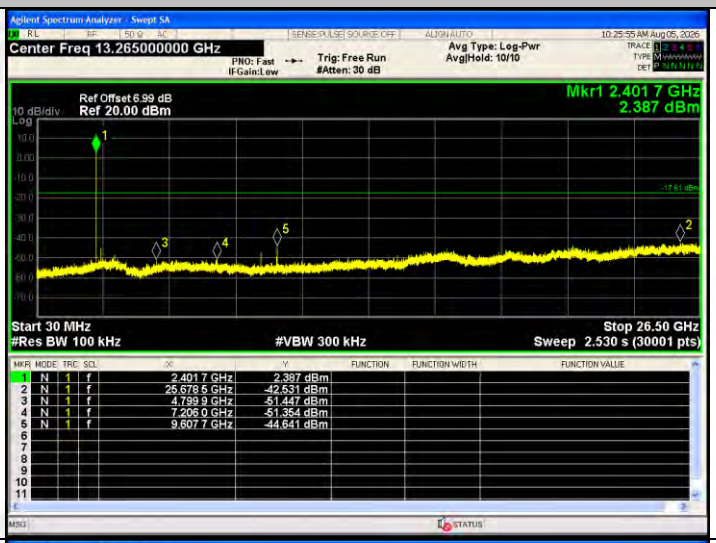
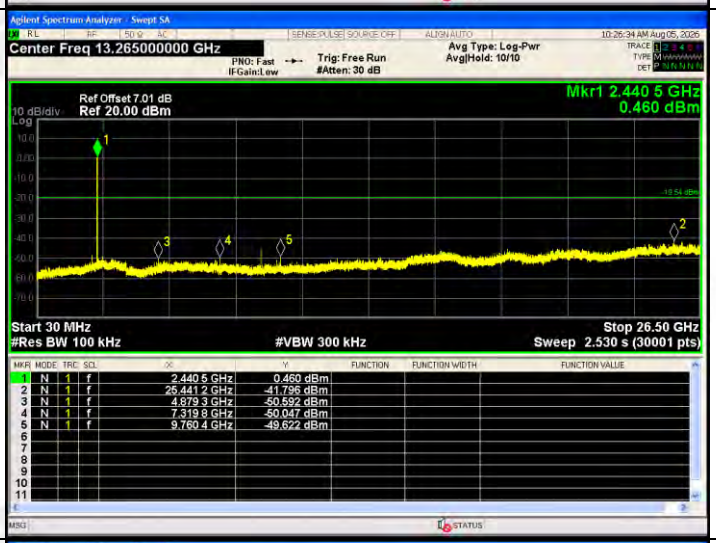
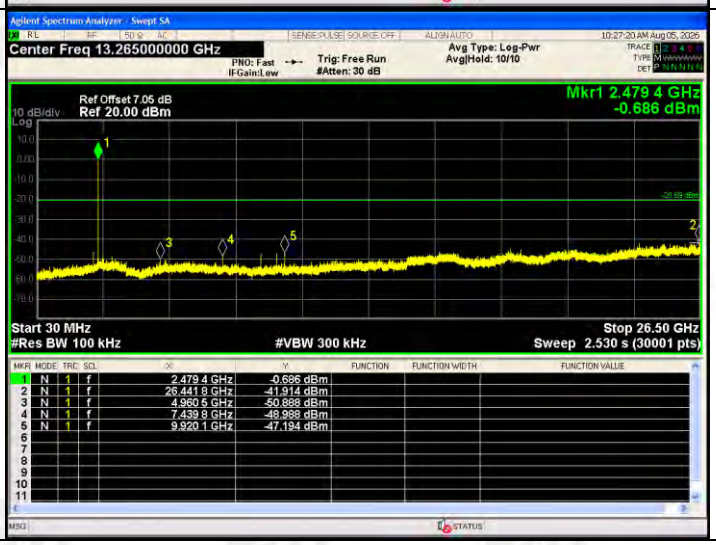
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer:
a) Set instrument center frequency to DTS channel center frequency.
b) Set the span to _ 1.5 times the DTS bandwidth.
c) Set the RBW = 100 kHz.
d) Set the VBW _ [3 × RBW].
e) Detector = peak.
f) Sweep time = auto couple.
g) Trace mode = max hold.
h) Allow trace to fully stabilize.
i) Use the peak marker function to determine the maximum PSD level.
Note that the channel found to contain the maximum PSD level can be used to establish the reference level.
Establish an emission level by using the following procedure:
a) Set the center frequency and span to encompass frequency range to be measured. Note that the frequency range might need to be divided into multiple frequency ranges to retain frequency resolution.
NOTE—the number of points can also be increased for large spans to retain frequency resolution
b) Set the RBW = 100 kHz.
c) Set the VBW ≥ [3 × RBW].
d) Detector = peak.
e) Sweep time = No faster than coupled (auto) time.
f) Trace mode = max-hold.
g) Allow trace to fully stabilize.
h) Use the peak marker function to determine the maximum amplitude level.
Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements specified in 11.1 a) or 11.1 b).
Report the three highest emissions relative to the limit.

4.4.Test Result

1M:

RF Conducted Spurious Emissions Graphs			
GFSK/LCH			
GFSK/MCH			
GFSK/HCH			

2M:

RF Conducted Spurious Emissions Graphs			
GFSK/LCH			
GFSK/MCH			
GFSK/HCH			

5. Band Edge Measurement

5.1.Limit

Test Requirement: FCC CFR47 Part 15 Section 15.247
Test Method: KDB 558074 D01 15.247 Meas Guidance v05r02April 2,2019;
ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024
Test Limit: Regulation 15.247 (d),In any 100 kHz bandwidth outside the frequency band 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

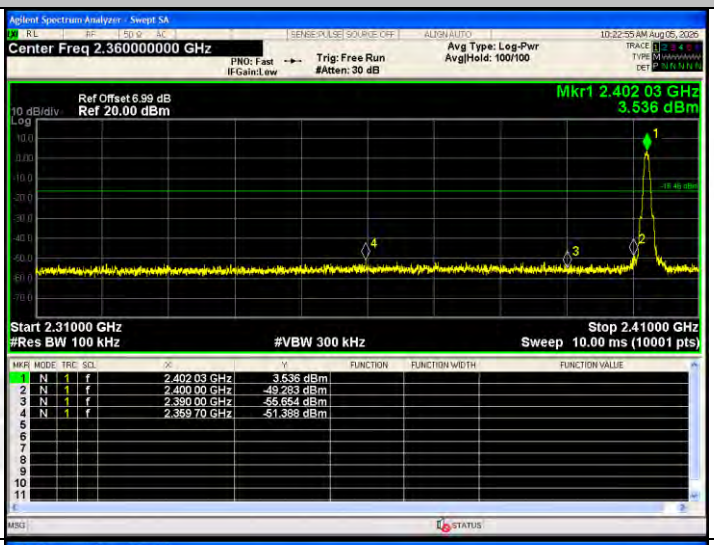
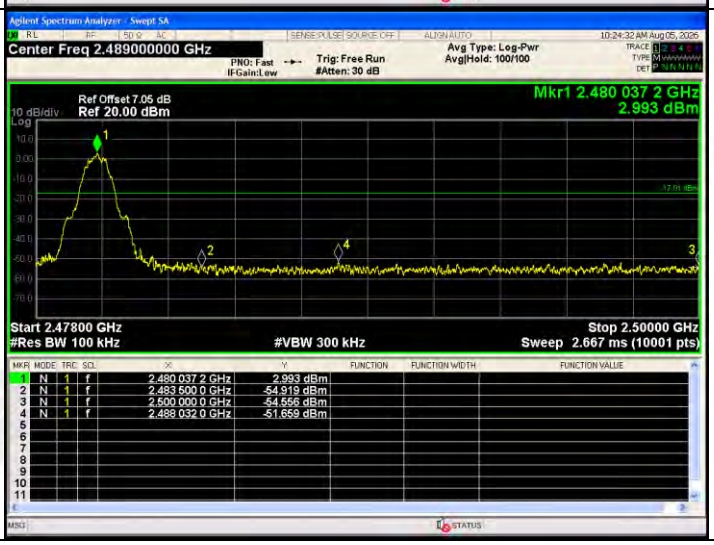
5.2.Test setup

5.3.Test Procedure

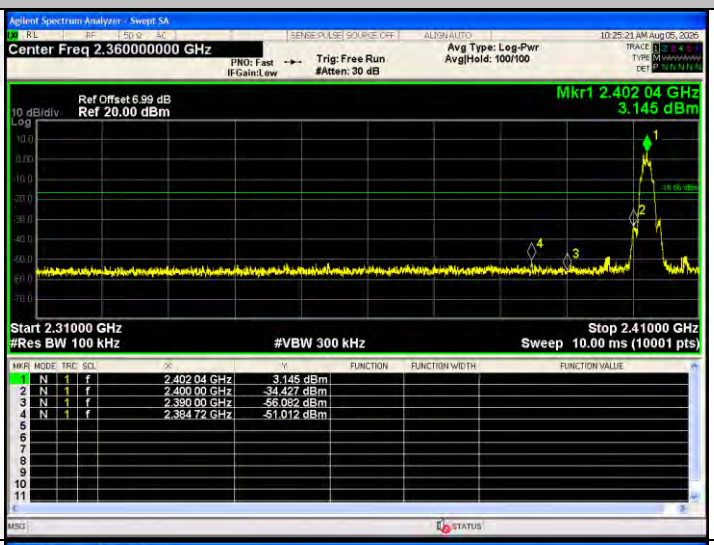
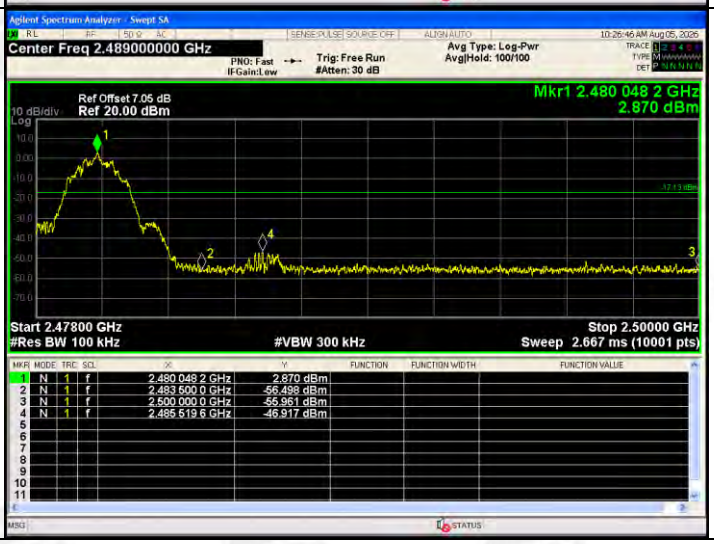
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then 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.

5.4.Test Result

1M:

BAND EDGE Graphs			
GFSK/LCH			
GFSK/HCH			

2M:

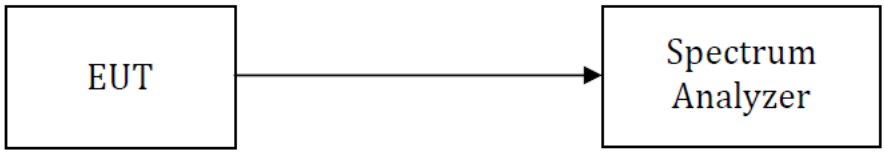
BAND EDGE Graphs			
GFSK/LCH			
GFSK/HCH			

6. -6 dB Bandwidth and 99% Bandwidth Measurement

6.1.Limit

Test Requirement: FCC CFR47 Part 15 Section 15.247
Test Method: KDB 558074 D01 15.247 Meas Guidance v05r02April 2,2019;
ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024

6.2.Test Setup



6.3.Test Procedure

For 6dB Bandwidth Measurement

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2.The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described in 11.8.1(i.e, RBW= 100 kHz VBW>3 x RBW,and peak detector with maximum hold) is implemented by the instrumentation function.When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ⩾6 dB.
3. The steps for the first option are as follows:
a.Set RBW= shall be in the range of 1% to 5% of the OBW but not less than 100 kHz.
b.Set the VBW[3 x RBW].
c.Detector = peak
d.Trace mode = max-hold.
e.Sweep = No faster than coupled (auto) time.
f.Allow the trace to stabilize.
g.Measure the maximum width of the emission by placing two markers, one at the lowest frequencyand the other at the highest frequency of the envelope of the spectral display, such that each markeris at or slightly below the "-6 dB down amplitude". If a marker is below this "-6 dB down amplitude?' value, then it shalil be as close as possible to this value.

For 99% Bandwidth Measurement

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 = 1%-5% OBW, VBW ⩾ 3RBW

6.4.Test Result

1M:

Test Mode	Frequency	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	Result
GFSK	Low channel	0.66	1.0279	PASS
	Mid channel	0.661	1.0317	PASS
	High channel	0.67	1.0294	PASS

2M:

Test Mode	Frequency	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	Result
GFSK	Low channel	1.088	2.0309	PASS
	Mid channel	1.093	2.0328	PASS
	High channel	1.106	2.0333	PASS

Note: All modes of operation were Pre-scan and the worst-case emissions are reported.

1M:
Test Graph:
6dB

GFSK Low channel			
GFSK Mid channel			
GFSK High channel			

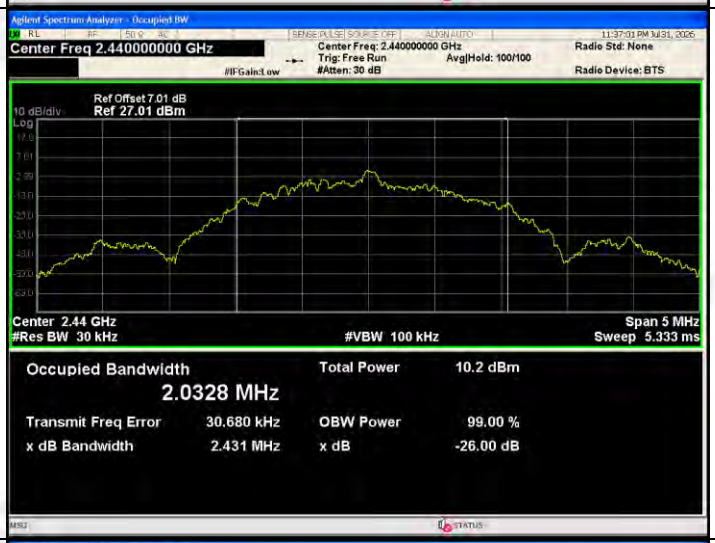
99%

GFSK Low channel			
GFSK Mid channel			
GFSK High channel			

2M:
Test Graph:
6dB

GFSK Low channel			
GFSK Mid channel			
GFSK High channel			

99%

GFSK Low channel			
GFSK Mid channel			
GFSK High channel			

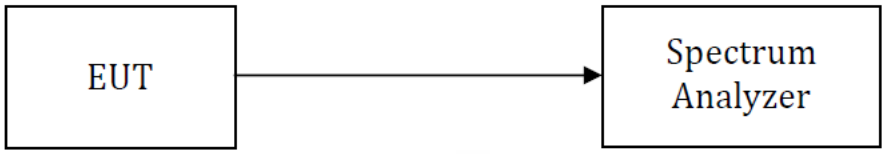
7. Maximum Peak Output Power

7.1.Limit

Test Requirement: FCC CFR47 Part 15 Section 15.247
Test Method: KDB 558074 D01 15.247 Meas Guidance v05r02April 2,2019;
ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(3)	Peak Output Power	1 watt or 30dBm	2400-2483.5	PASS

7.2.Test Setup



7.3.Test Procedure

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 ≥ DTS bandwidth.
b)Set VBW ≥ 3 x RBW.
c)Set span ≥ 3 x 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.

7.4.Test Result

1M:

Mode	Channel.	Maximum Output Power [dBm]	Limit[dBm]	Verdict
GFSK	LCH	3.886	30	PASS
	MCH	3.628	30	PASS
	HCH	2.965	30	PASS

Duty Cycle

Mode	Channel.	Duty Cycle(%)	Correction Factor (dB)
GFSK	LCH	56.69	2.46
	MCH	58.54	2.33
	HCH	53.60	2.71

2M:

Mode	Channel.	Maximum Output Power [dBm]	Limit[dBm]	Verdict
GFSK	LCH	3.879	30	PASS
	MCH	3.616	30	PASS
	HCH	2.969	30	PASS

Duty Cycle

Mode	Channel.	Duty Cycle(%)	Correction Factor (dB)
GFSK	LCH	29.37	5.32
	MCH	28.80	5.41
	HCH	31.40	5.03

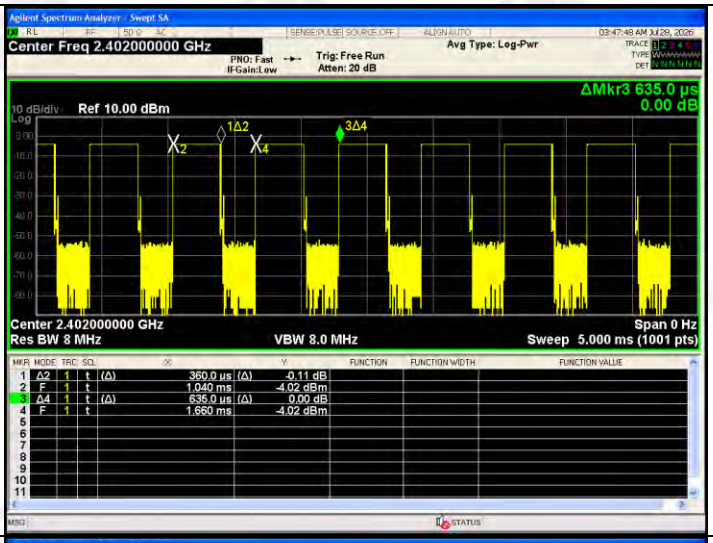
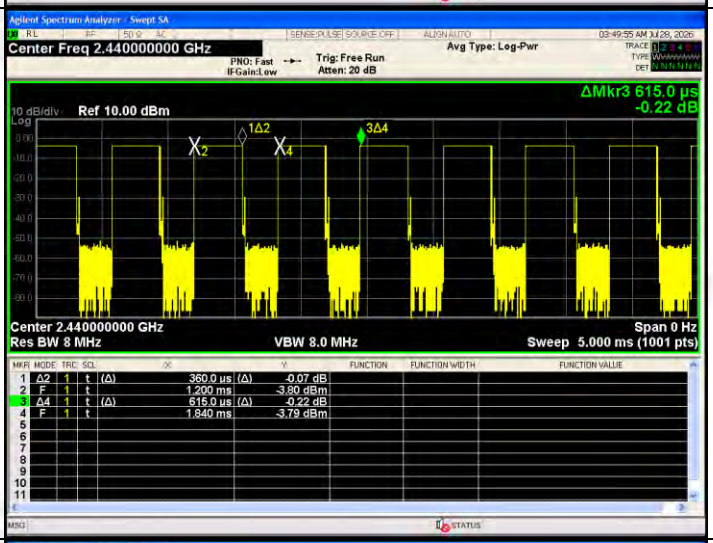
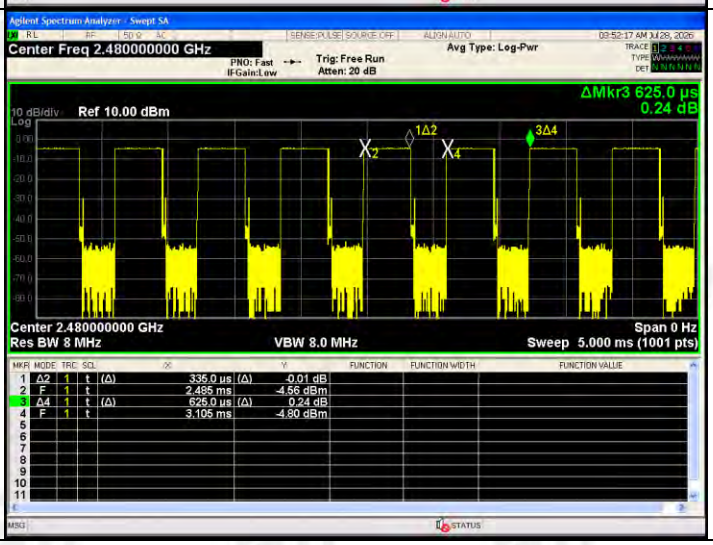
Note: Duty Cycle Factor= 10 log (1/x), x is Duty Cycle.

1M:

Test Graph:

GFSK Low channel			
GFSK Mid channel			
GFSK High channel			

Duty Cycle
1M:
Test Graph:

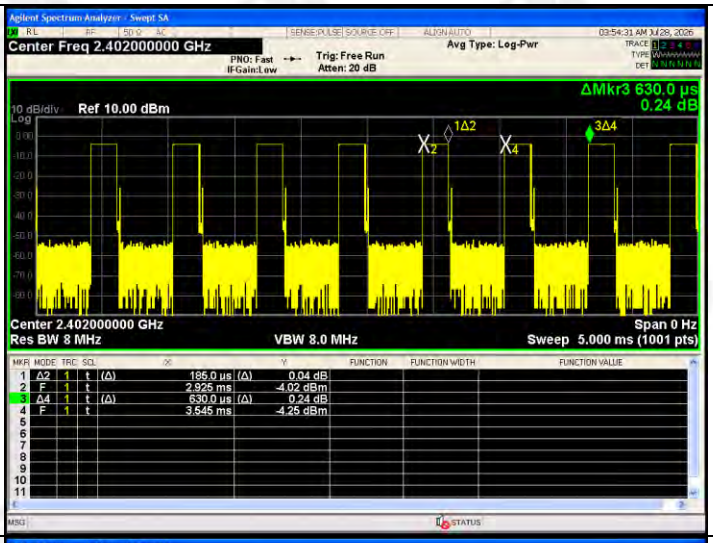
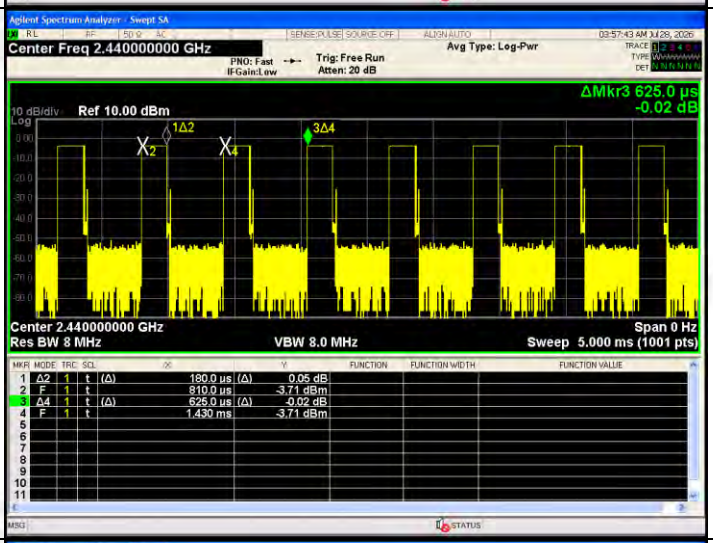
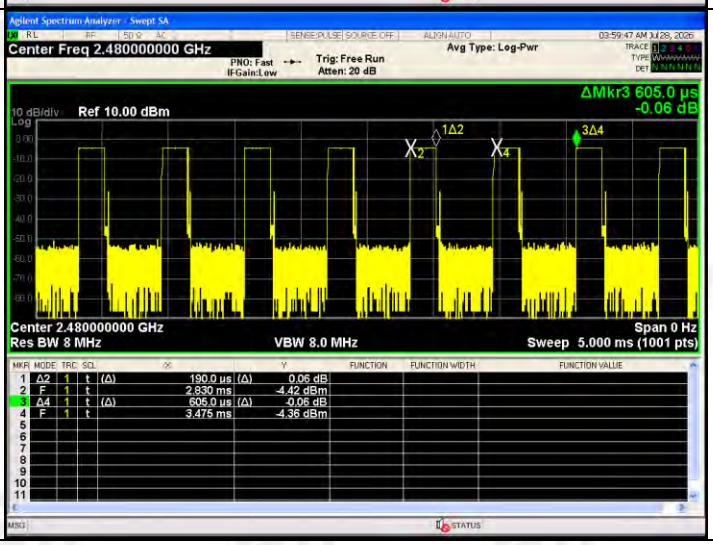
GFSK Low channel			
GFSK Mid channel			
GFSK High channel			

2M:

Test Graph:

GFSK Low channel			
GFSK Mid channel			
GFSK High channel			

Duty Cycle
2M:
Test Graph:

GFSK Low channel			
GFSK Mid channel			
GFSK High channel			

8. Power Spectral density

8.1.Limit

Test Requirement: FCC CFR47 Part 15 Section 15.247
Test Method: KDB 558074 D01 15.247 Meas Guidance v05r02April 2,2019;
ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247	Power Spectral Density	8dBm/3kHz	2400-2483.5	PASS

8.2.Test Setup

8.3.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 = 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.

8.4.Test Result

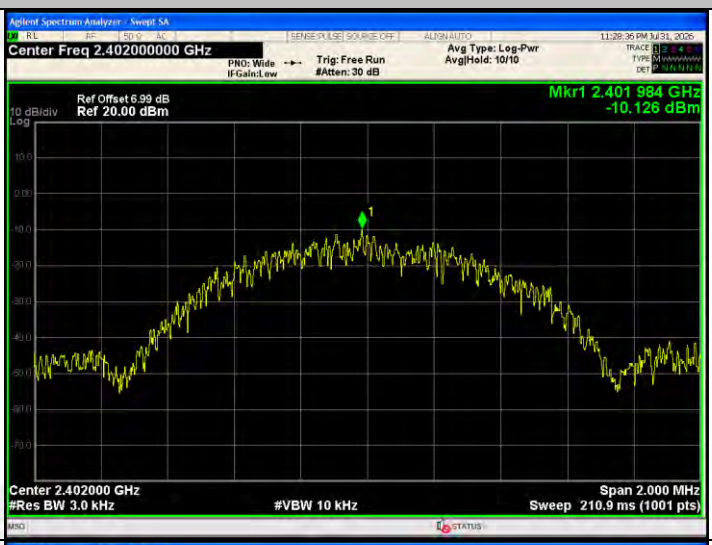
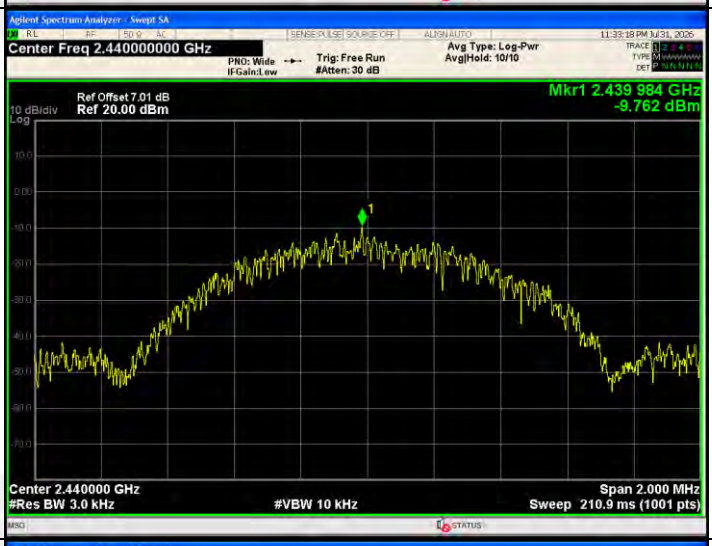
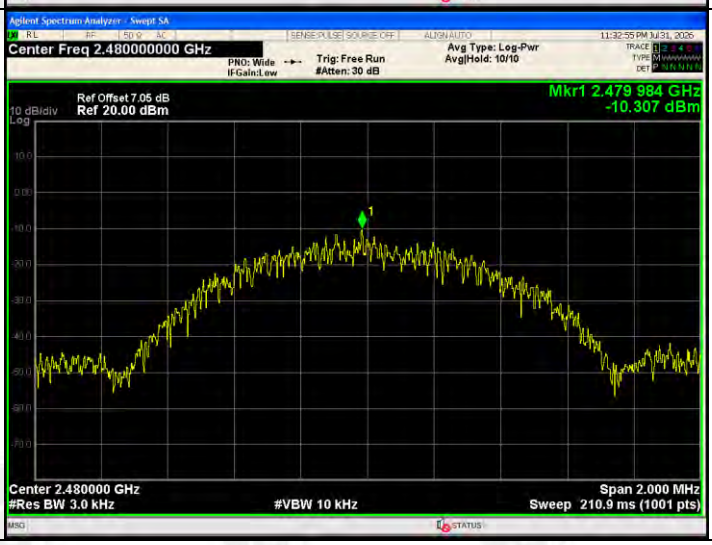
1M:

Mode	Channel.	Power Spectral Density (dBm/3KHz)	Limit(dBm/3KHz)	Verdict
GFSK	LCH	-10.126	8	PASS
GFSK	MCH	-9.762	8	PASS
GFSK	HCH	-10.307	8	PASS

2M:

Mode	Channel.	Power Spectral Density (dBm/3KHz)	Limit(dBm/3KHz)	Verdict
GFSK	LCH	-13.226	8	PASS
GFSK	MCH	-13.449	8	PASS
GFSK	HCH	-14.287	8	PASS

1M:
Test Graph

Graphs			
9. GFSK/LCH			
GFSK/MCH			
GFSK/HCH			

2M:
Test Graph

Graphs			
GFSK/LCH			
GFSK/MCH			
GFSK/HCH			

10. 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.

This product has a PCB antenna, and the maximum antenna gain is -0.76dBi, fulfill the requirement of this section.

11. TEST SETUP & EUT PHOTOGRAPH

Reference to EUT photo attachment for details.

---------- End of Report ----------