

TEST REPORT

Applicant : SHANTOU WEISHENGDA TOYS CO.,LTD
Address : NO. 8TH, QIANXI INDUSTRIA AREA, LIANXIA TOWN, CHENGHAI,
SHANTOU CITY, GUANGDONG PROVINCE, CHINA
Manufacturer : WEI SHENG DA TOYS FACTORY
Address : NO. 8TH, QIANXI INDUSTRIA AREA, LIANXIA TOWN, CHENGHAI,
SHANTOU CITY, GUANGDONG PROVINCE, CHINA
Product Name : TWISTED AUTOBOTS
Model Number : CV8818-102A, CV8818-102AC, CV8818-102AB, CV8818-109A
Trademark : N/A
FCC ID : 2BWME-CV8818102A
Test Date : Aug. 05, 2026 to Sep. 04, 2026
Date of Report : Sep. 04, 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

Prepared by(Test Engineer):
Gary Lu



Approved(Manager):
Cindy Qin



Approved(Manager):
Abel Yu



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Revision History of This Test Report

Report Number	Description	Issued Date
SZNTT26035986E1-1	Initial Issue	2026-09-04

1. General Information

1.1. Description of Device (EUT)

EUT Name : TWISTED AUTOBOTS

Model No. : CV8818-102A, CV8818-102AC, CV8818-102AB, CV8818-109A

Model Difference : All the model are the same circuit and RF module, only the model names and appearances are different. Test sample model: CV8818-102A

Power supply : DC 3V by battery

Operation frequency : 2410-2473MHz

Modulation : GFSK

Antenna Type : Internal antenna, Maximum Gain is 0.12dBi

Intend use environment : Residential, commercial and light industrial environment

1.2. Channel List

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2410	11	2429	21	2450	31	2469
2	2414	12	2430	22	2452	32	2473
3	2415	13	2431	23	2454		
4	2416	14	2433	24	2456		
5	2417	15	2434	25	2458		
6	2418	16	2439	26	2462		
7	2419	17	2441	27	2464		
8	2421	18	2442	28	2465		
9	2426	19	2444	29	2466		
10	2428	20	2446	30	2467		

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	/	/
Adapter	/	/	/	/

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	2410MHz	2441MHz	2473MHz
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	Moca_configuratorOUT
Power level setup	default

1.7.Block Diagram

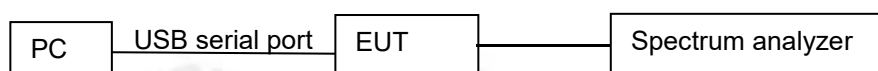
Conducted Emission

N/A

Radiated Emission



RF Conducted Test



1.8.Test Conditions

Category	Normal Conditions	Extreme Conditions
Temperature range	15-35°C	N/A
Humidity range	20-75%	N/A
Pressure range	86-106kPa	N/A
Power supply	DC 3V	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, China
FCC Designation Number	:	CN3446
FCC Test Firm Registration Number	:	129414

1.11.Test Equipment

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
Amplifier (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
Preamplifier (1GHz-18GHz)	BBV 9718D	0024	SCHWARZBECK	2025/9/8	2026/9/7
Spectrum Analyzer (10Hz-40GHz)	FSV 40	100952	Rohde & Schwarz	2025/9/8	2026/9/7
Preamplifier (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	MY505102 02	Agilent	2025/9/8	2026/9/7
MXG Vector Signal Generator	N5182A	MY501400 20	Agilent	2025/9/8	2026/9/7
MXG Analog Signal Generator	N5181A	MY474209 19	Agilent	2025/9/8	2026/9/7
Power Sensor	TR1029-2	512364	Techoy	2025/9/8	2026/9/7
RF Switch	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

2. Conducted emission at the mains terminals test

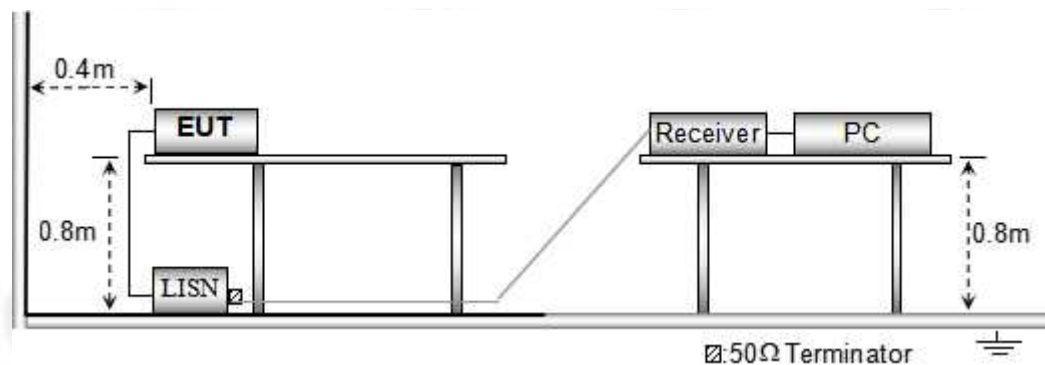
2.1.Limit

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 v05r02 April 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

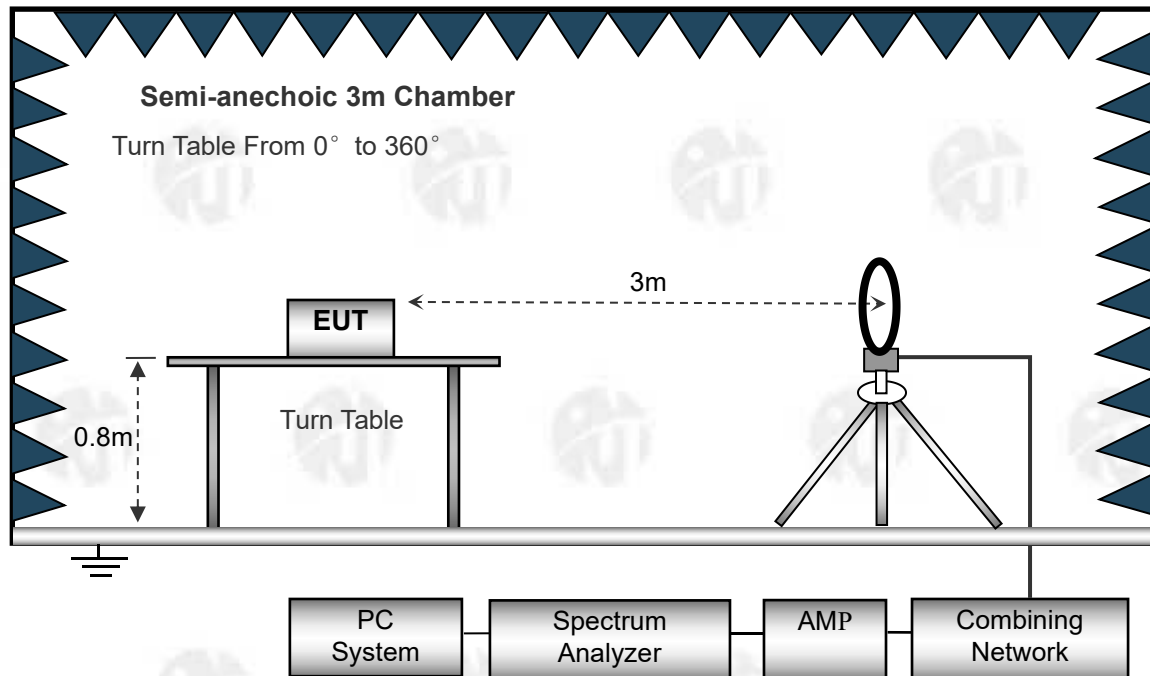
Limit:

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	$2400/F(\text{kHz})$	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	$20\log(500)$

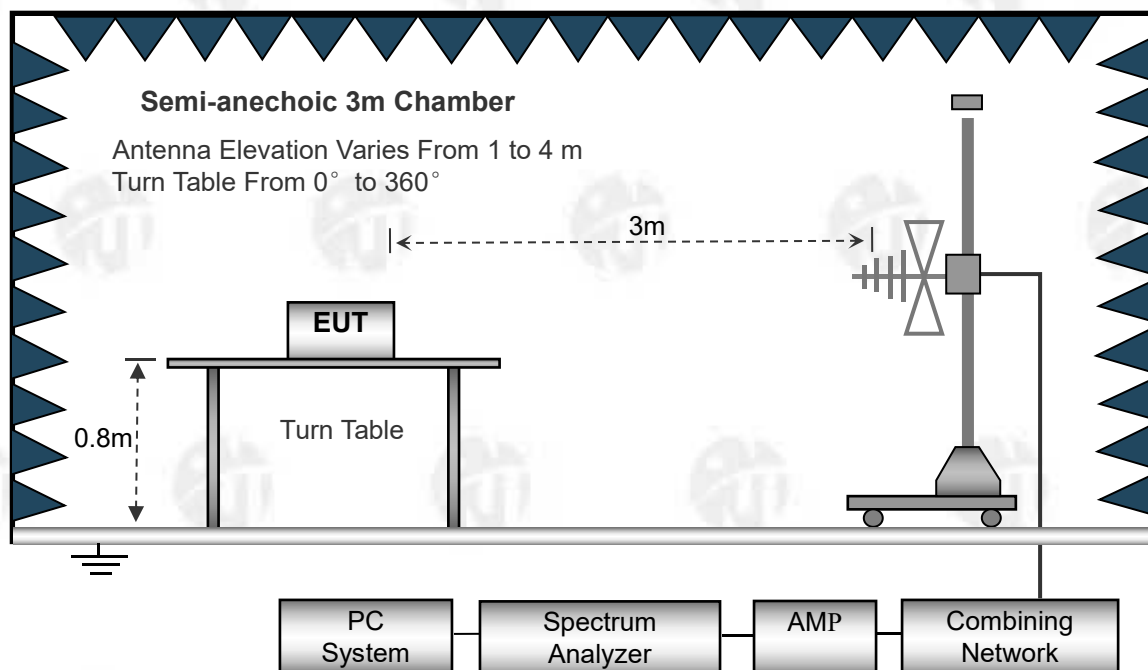
3.2.Test Setup

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

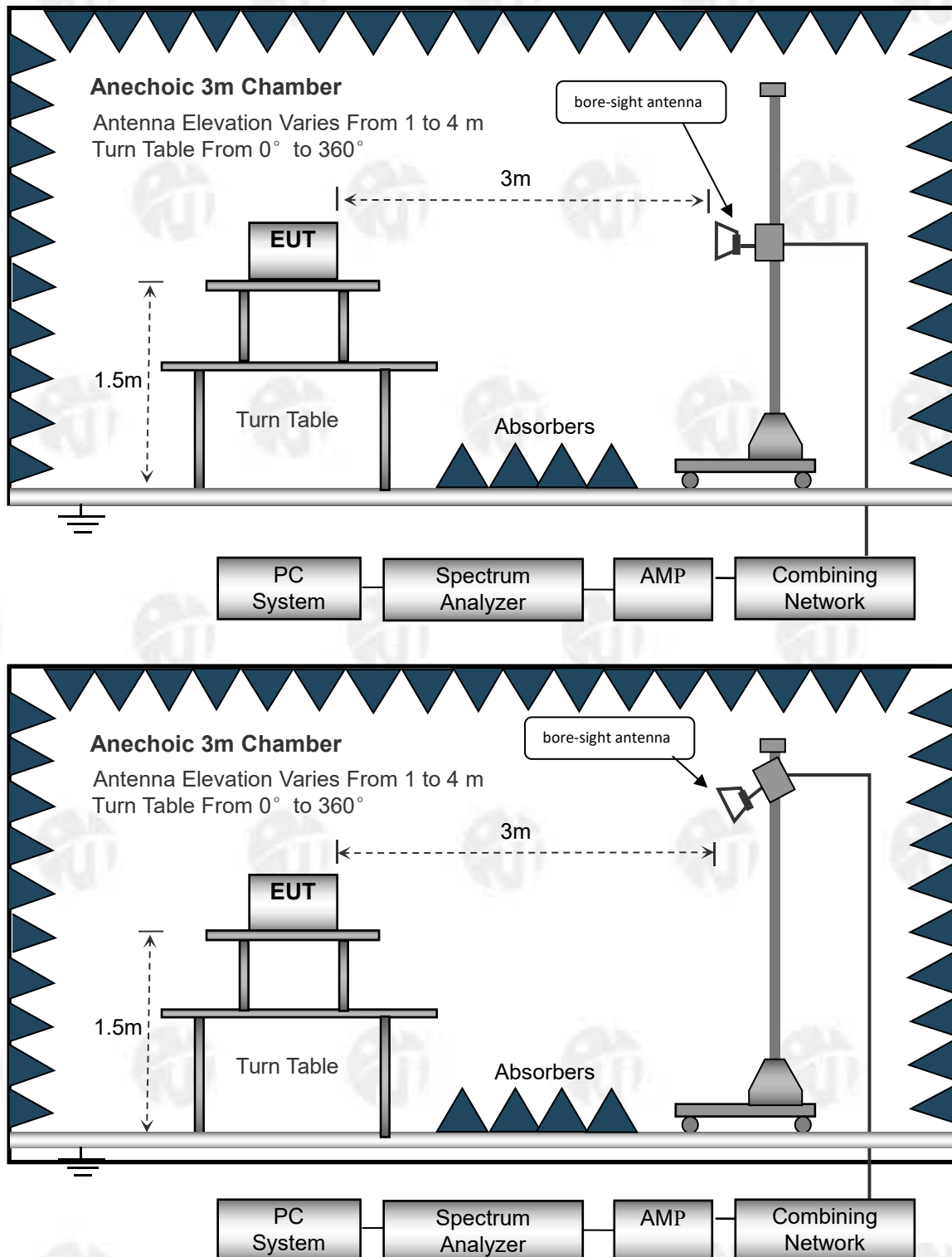
The test setup for emission measurement below 30MHz.



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 during radiated emissions above 1GHz measurement.

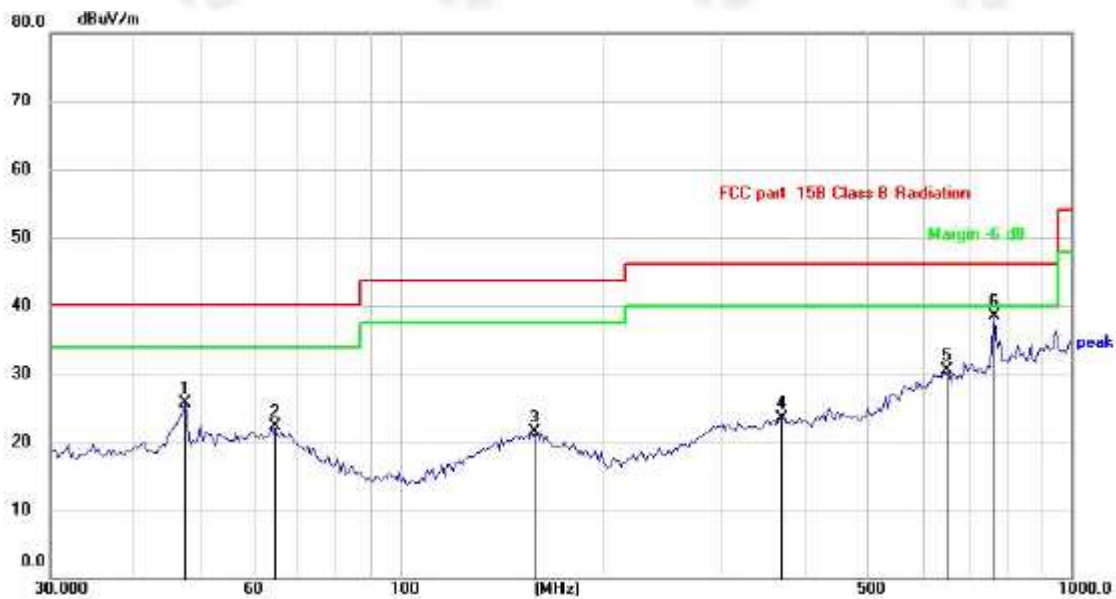
3.4.Test Result

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℃	Relative Humidity:	56%
Pressure:	1008hPa	Phase :	Horizontal
Test Voltage :	DC 3V	Test Mode:	GFSK(CH1)



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Detector
1		47.7422	31.16	-5.50	25.66	40.00	-14.34	QP
2		64.3202	27.25	-4.89	22.36	40.00	-17.64	QP
3		157.2829	25.88	-4.30	21.58	43.50	-21.92	QP
4		371.3528	25.81	-2.25	23.56	46.00	-22.44	QP
5		645.1195	25.94	4.65	30.59	46.00	-15.41	QP
6	*	768.7481	31.22	7.29	38.51	46.00	-7.49	QP

Note:

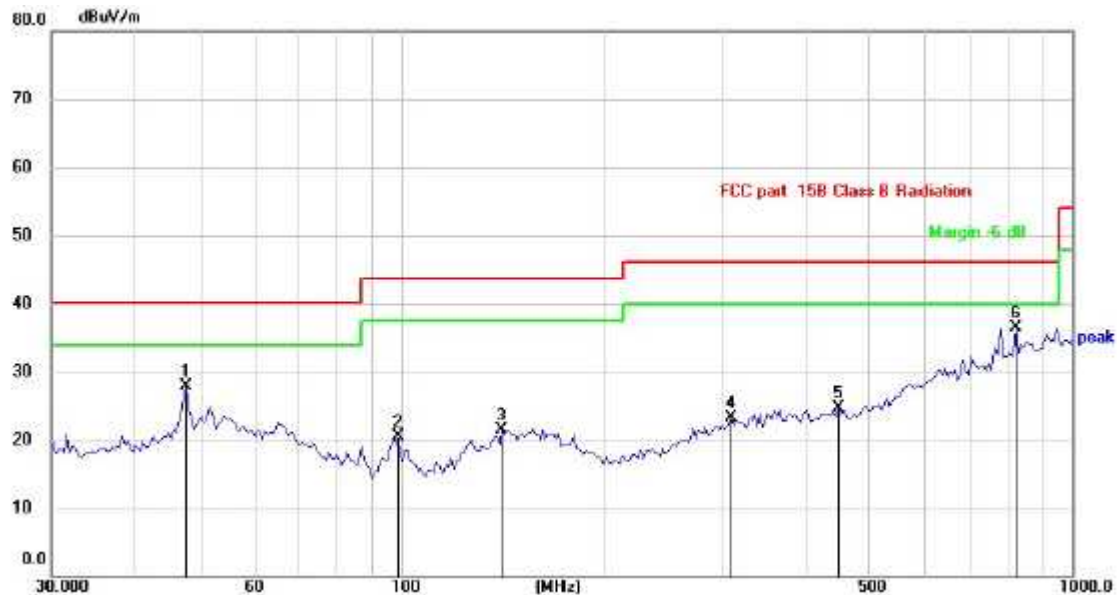
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

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℃	Relative Humidity:	56%
Pressure:	1008hPa	Phase :	Vertical
Test Voltage :	DC 3V	Test Mode:	GFSK(CH1)



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Detector
1		47.7422	33.31	-5.50	27.81	40.00	-12.19	QP
2		97.9700	30.94	-10.41	20.53	43.50	-22.97	QP
3		141.5777	26.56	-5.10	21.46	43.50	-22.04	QP
4		311.6325	26.36	-3.13	23.23	46.00	-22.77	QP
5		450.3447	26.08	-1.42	24.66	46.00	-21.34	QP
6	*	824.5968	28.40	8.06	36.46	46.00	-9.54	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	Meter Reading	Pre-ampli fier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel: 2410MHz									
V	4820	52.96	50.3	34.07	5.09	41.82	74	-32.18	Pk
V	4820	39.25	38.38	34.07	5.09	40.03	54	-13.97	AV
V	7230	50.18	46.62	32.63	6.34	42.53	74	-31.47	Pk
V	7230	35.02	36.22	32.63	6.34	37.77	54	-16.23	AV
V	9640	48.93	44.04	32.92	7.59	45.40	74	-28.60	Pk
V	9640	32.91	30.94	32.92	7.59	42.48	54	-11.52	AV
V	12050	43.95	41.52	31.96	8.88	43.27	74	-30.73	Pk
V	12050	28.41	30.68	31.96	8.88	38.57	54	-15.43	AV
H	4820	49.06	50.25	34.07	5.09	37.97	74	-36.03	Pk
H	4820	39.80	38.65	34.07	5.09	40.31	54	-13.69	AV
H	7230	48.90	46.69	32.63	6.34	41.18	74	-32.82	Pk
H	7230	33.16	33.84	32.63	6.34	38.29	54	-15.71	AV
H	9640	48.24	43.62	32.92	7.59	45.13	74	-28.87	Pk
H	9640	29.98	30.78	32.92	7.59	39.71	54	-14.29	AV
H	12050	39.89	39.71	31.96	8.88	41.02	74	-32.98	Pk
H	12050	25.81	28.87	31.96	8.88	37.78	54	-16.22	AV

Polar (H/V)	Frequency	Meter Reading	Pre-ampli fier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Middle Channel: 2441MHz									
V	4882	49.06	34.05	5.11	32.61	52.73	74	-21.27	Pk
V	4882	38.01	34.05	5.11	32.61	41.68	54	-12.32	AV
V	7323	46.65	32.67	6.37	35.98	56.33	74	-17.67	Pk
V	7323	35.97	32.67	6.37	35.98	45.65	54	-8.35	AV
V	9764	43.94	32.89	7.6	38.4	57.05	74	-16.95	Pk
V	9764	30.64	32.89	7.6	38.4	43.75	54	-10.25	AV
V	12205	41.24	31.89	8.86	39.06	57.27	74	-16.73	Pk
V	12205	30.49	31.89	8.86	39.06	46.52	54	-7.48	AV
H	4882	49.47	34.05	5.11	32.61	53.14	74	-20.86	Pk
H	4882	40.22	34.05	5.11	32.61	43.89	54	-10.11	AV
H	7323	46.79	32.67	6.37	35.98	56.47	74	-17.53	Pk
H	7323	33.68	32.67	6.37	35.98	43.36	54	-10.64	AV
H	9764	42.61	32.89	7.6	38.4	55.72	74	-18.28	Pk
H	9764	29.96	32.89	7.6	38.4	43.07	54	-10.93	AV
H	12205	39.55	31.89	8.86	39.06	55.58	74	-18.42	Pk
H	12205	30.65	31.89	8.86	39.06	46.68	54	-7.32	AV

Polar (H/V)	Frequency	Meter Reading	Pre-ampli fier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
High Channel: 2473MHz									
V	4946	49.18	34.02	5.15	32.8	53.11	74	-20.89	Pk
V	4946	36.13	34.02	5.15	32.8	40.06	54	-13.94	AV
V	7419	43.97	32.71	6.4	36.05	53.71	74	-20.29	Pk
V	7419	35.10	32.71	6.4	36.05	44.84	54	-9.16	AV
V	9892	41.21	32.86	7.62	38.4	54.37	74	-19.63	Pk
V	9892	30.15	32.86	7.62	38.4	43.31	54	-10.69	AV
V	12365	38.98	31.82	8.84	39.08	55.08	74	-18.92	Pk
V	12365	28.61	31.82	8.84	39.08	44.71	54	-9.29	AV
H	4946	47.85	34.02	5.15	32.8	51.78	74	-22.22	Pk
H	4946	39.50	34.02	5.15	32.8	43.43	54	-10.57	AV
H	7419	44.89	32.71	6.4	36.05	54.63	74	-19.37	Pk
H	7419	31.87	32.71	6.4	36.05	41.61	54	-12.39	AV
H	9892	41.12	32.86	7.62	38.4	54.28	74	-19.72	Pk
H	9892	27.65	32.86	7.62	38.4	40.81	54	-13.19	AV
H	12365	40.82	31.82	8.84	39.08	56.92	74	-17.08	Pk
H	12365	28.92	31.82	8.84	39.08	45.02	54	-8.98	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.

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

	Polar (H/V)	Frequenc y (MHz)	Meter Reading (dBuV)	Pre- amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission level (dBuV/m)	Limit (dBuV /m)	Margi n (dB)	Detec tor Type
High Channel: 2482MHz										
	H	2483.5	58.43	35.11	3.56	27.75	54.63	74	-19.37	PK
	H	2483.5	49.54	35.11	3.56	27.75	45.74	54	-8.26	AV
	H	2500	61.41	35.1	3.57	27.8	57.68	74	-16.32	PK
	H	2500	50.04	35.1	3.57	27.8	46.31	54	-7.69	AV
	V	2483.5	58.31	35.11	3.56	27.75	54.51	74	-19.49	PK
	V	2483.5	51.34	35.11	3.56	27.75	47.54	54	-6.46	AV
	V	2500	61.79	35.1	3.57	27.8	58.06	74	-15.94	PK
	V	2500	49.12	35.1	3.57	27.8	45.39	54	-8.61	AV
Remark: 1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit										

4. Conducted Spurious Emissions

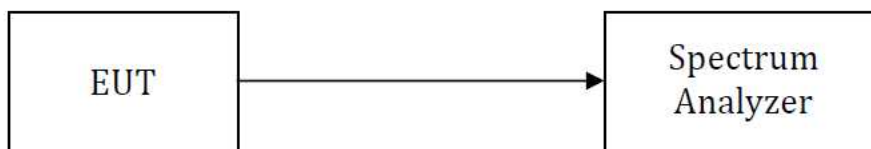
4.1.Limit

Test Requirement: FCC CFR47 Part 15 Section 15.247
Test Method: KDB 558074 D01 15.247 Meas Guidance v05r02 April 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



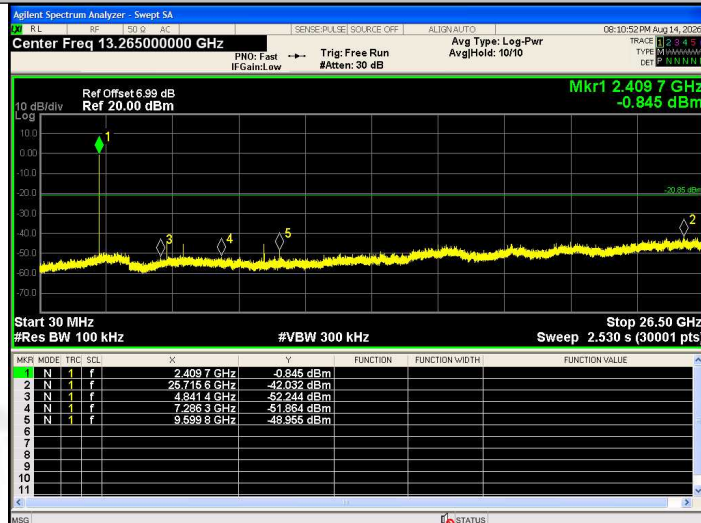
4.3.Test Procedure

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.

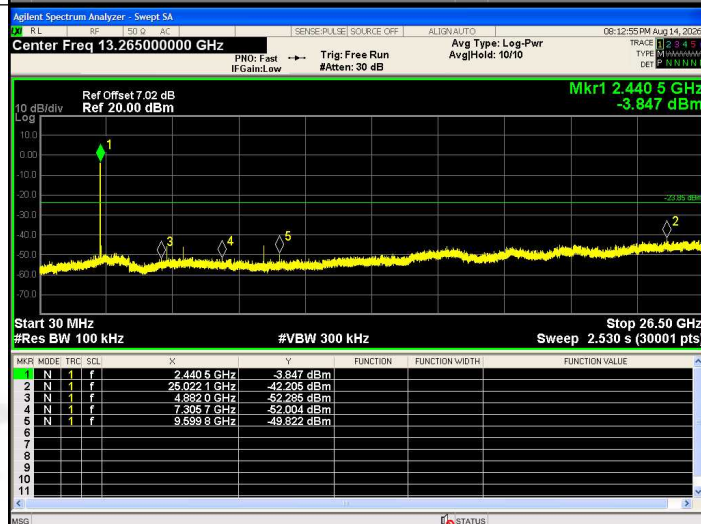
4.4.Test Result

RF Conducted Spurious Emissions Graphs

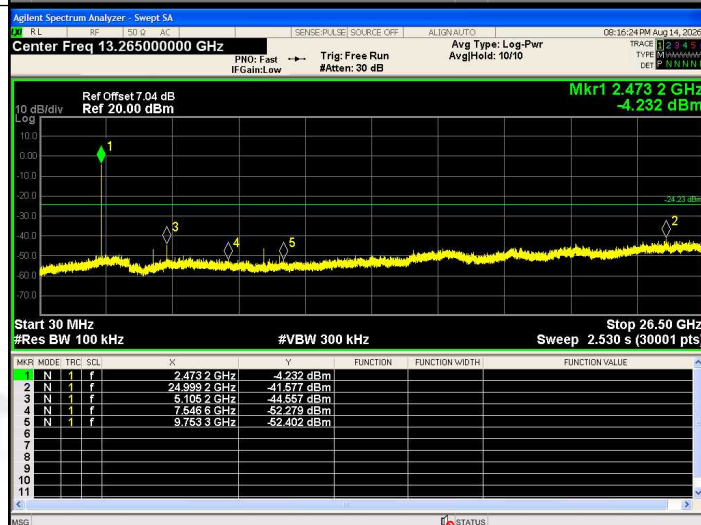
GFSK/LCH



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 v05r02 April 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

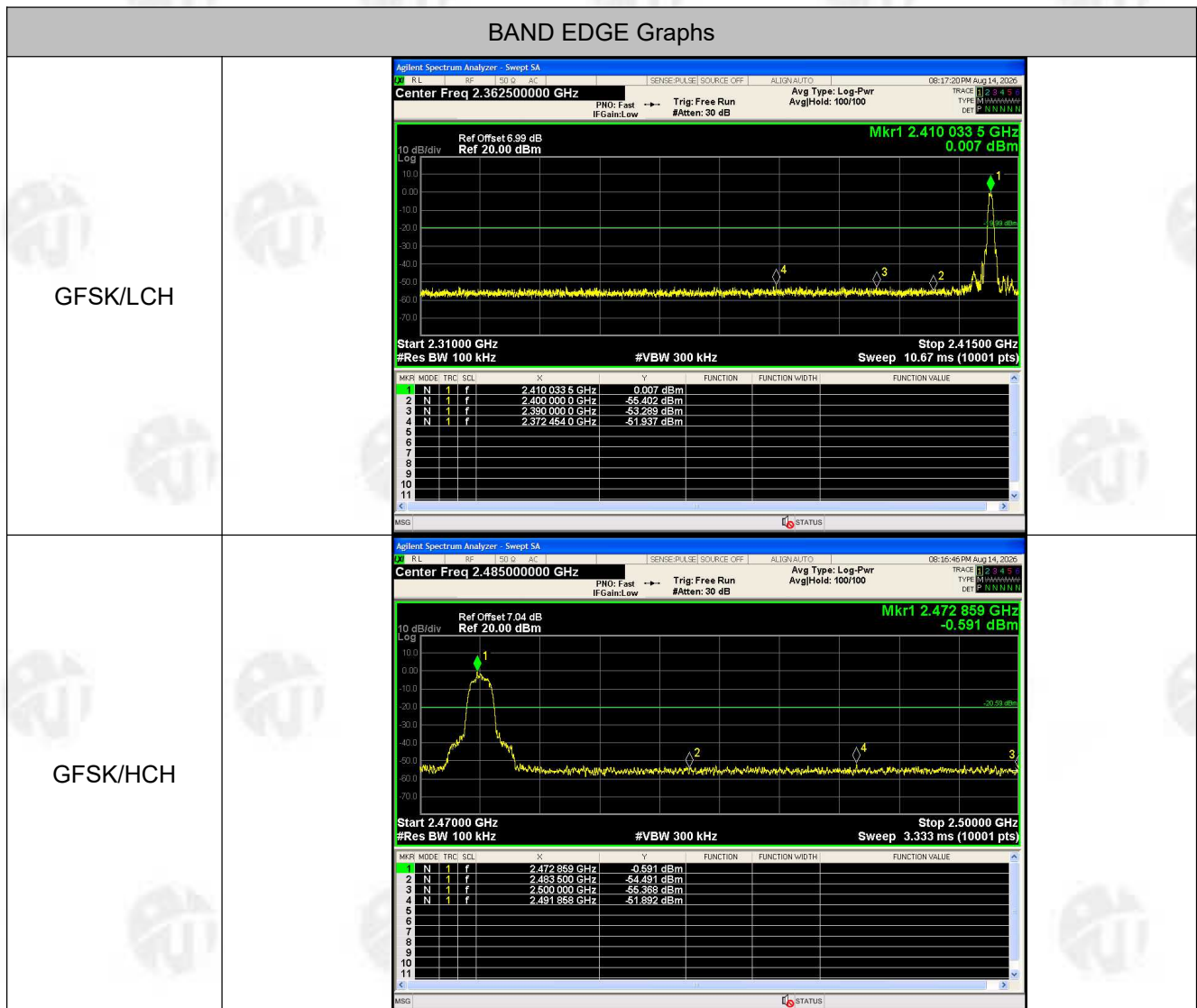
5.2.Test setup



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



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

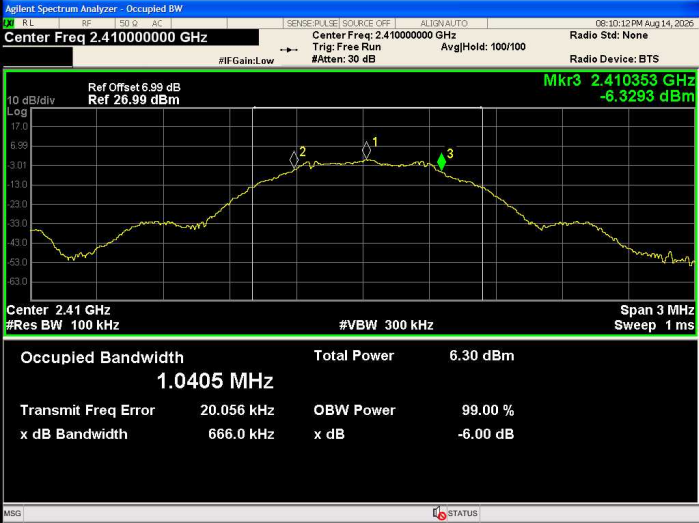
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz

6.4.Test Result

Test Mode	Frequency	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (kHz)	Result
GFSK	Low channel	0.666	1.0293	≥ 500	PASS
	Mid channel	0.863	1.1840	≥ 500	PASS
	High channel	0.859	1.2078	≥ 500	PASS

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

Test Graph:
6dB Bandwidth

GFSK Low channel	 Agilent Spectrum Analyzer - Occupied BW Center Freq 2.41000000 GHz Center Freq: 2.41000000 GHz Trig: Free Run Avg/Hold: 100/100 Radio Std: None Radio Device: BTS Ref Offset 6.99 dB Ref 26.99 dBm Mkr3 2.410353 GHz -6.3293 dBm Center 2.41 GHz #Res BW 100 kHz #VBW 300 kHz Span 3 MHz Sweep 1 ms Occupied Bandwidth 1.0405 MHz Total Power 6.30 dBm Transmit Freq Error 20.056 kHz OBW Power 99.00 % x dB Bandwidth 666.0 kHz x dB -6.00 dB
GFSK Mid channel	 Agilent Spectrum Analyzer - Occupied BW Center Freq 2.44100000 GHz Center Freq: 2.44100000 GHz Trig: Free Run Avg/Hold: 100/100 Radio Std: None Radio Device: BTS Ref Offset 7.02 dB Ref 27.02 dBm Mkr3 2.44145 GHz -6.3078 dBm Center 2.44 GHz #Res BW 100 kHz #VBW 300 kHz Span 3 MHz Sweep 1 ms Occupied Bandwidth 1.2117 MHz Total Power 6.40 dBm Transmit Freq Error 18.589 kHz OBW Power 99.00 % x dB Bandwidth 862.8 kHz x dB -6.00 dB
GFSK High channel	 Agilent Spectrum Analyzer - Occupied BW Center Freq 2.47300000 GHz Center Freq: 2.47300000 GHz Trig: Free Run Avg/Hold: 100/100 Radio Std: None Radio Device: BTS Ref Offset 7.04 dB Ref 27.04 dBm Mkr3 2.473447 GHz -7.2438 dBm Center 2.473 GHz #Res BW 100 kHz #VBW 300 kHz Span 3 MHz Sweep 1 ms Occupied Bandwidth 1.2164 MHz Total Power 5.76 dBm Transmit Freq Error 17.644 kHz OBW Power 99.00 % x dB Bandwidth 859.1 kHz x dB -6.00 dB

99% Bandwidth

GFSK Low channel	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 2.41000000 GHz Ref Offset: 6.99 dB Ref: 26.99 dBm Occupied Bandwidth: 1.0293 MHz Total Power: 6.41 dBm Transmit Freq Error: 21.586 kHz x dB Bandwidth: 1.124 MHz
GFSK Mid channel	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 2.44100000 GHz Ref Offset: 7.02 dB Ref: 27.02 dBm Occupied Bandwidth: 1.1840 MHz Total Power: 6.97 dBm Transmit Freq Error: 15.735 kHz x dB Bandwidth: 1.284 MHz
GFSK High channel	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 2.47300000 GHz Ref Offset: 7.04 dB Ref: 27.04 dBm Occupied Bandwidth: 1.2078 MHz Total Power: 5.81 dBm Transmit Freq Error: 16.939 kHz x dB Bandwidth: 1.332 MHz

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

KDB 558074 D01 15.247 Meas Guidance v05r02April 2,2019

section 8.3.1.1 (For BLE)

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

- Set the RBW $\geq$ DTS bandwidth.
- Set VBW ≥ 3 RBW.
- Set span $\geq 3 \times$ RBW
- Sweep time = auto couple.
- Detector = peak.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use peak marker function to determine the peak amplitude level.

section 8.3.1.2 (For WIFI)

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

- Set the RBW = 1% to 5% of the OBW, not to exceed 1 MHz..
- Set the VBW $\geq 3 \times$ RBW
- Set the span $\geq 1.5 \times$ OBW.
- Detector = RMS.
- Sweep time = auto couple.
- trigger = free run..
- Number of points in sweep $\geq [2 \times \text{span} / \text{RBW}]$. (This gives bin-to-bin spacing $\geq \text{RBW} / 2$, so that narrowband signals are not lost between frequency bins.)
- Trace average at least 100 traces in power averaging (rms) mode.
- Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function, with band limits set equal to the OBW band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

7.4.Test Result

Mode	Channel.	Maximum Output Power [dBm]	Limit[dBm]	Verdict
GFSK	LCH	0.282	30	PASS
	MCH	1.367	30	PASS
	HCH	0.916	30	PASS

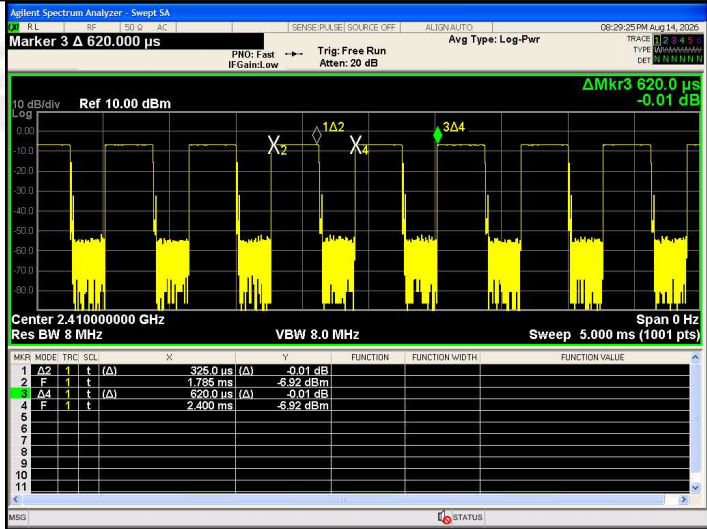
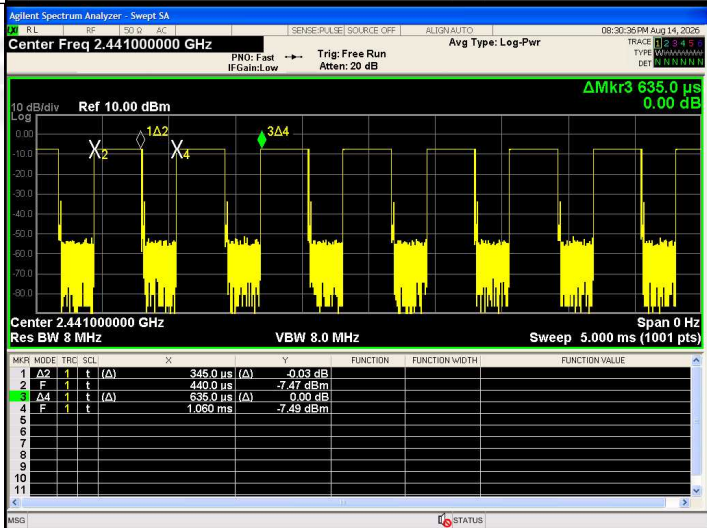
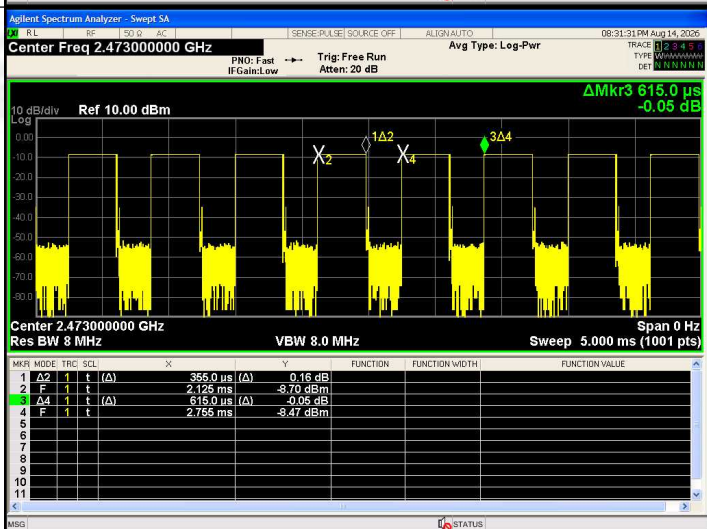
Duty Cycle

Mode	Channel.	Duty Cycle(%)	Correction Factor (dB)
GFSK	LCH	52.42	2.81
	MCH	54.33	2.65
	HCH	57.72	2.39

Test Graph:

GFSK Low channel	 Agilent Spectrum Analyzer - Sweep SA Center Freq 2.41000000 GHz Ref Offset 6.99 dB Ref 20.00 dBm Mkr1 2.409 76 GHz 0.282 dBm #Res BW 2.0 MHz #VBW 6.0 MHz Span 10.00 MHz Sweep 1.000 ms (1001 pts)
GFSK Mid channel	 Agilent Spectrum Analyzer - Sweep SA Center Freq 2.44100000 GHz Ref Offset 7.02 dB Ref 20.00 dBm Mkr1 2.440 96 GHz 1.367 dBm #Res BW 2.0 MHz #VBW 6.0 MHz Span 10.00 MHz Sweep 1.000 ms (1001 pts)
GFSK High channel	 Agilent Spectrum Analyzer - Sweep SA Center Freq 2.47300000 GHz Ref Offset 7.04 dB Ref 20.00 dBm Mkr1 2.472 97 GHz 0.916 dBm #Res BW 2.0 MHz #VBW 6.0 MHz Span 10.00 MHz Sweep 1.000 ms (1001 pts)

Duty Cycle:

GFSK Low channel	 Agilent Spectrum Analyzer - Sweep SA Marker 3 Δ 620.000 μs PNO: Fast IF Gain: Low Trig: Free Run Atten: 20 dB Avg Type: Log-Pwr Ref 10.00 dBm Center 2.410000000 GHz Res BW 8 MHz VBW 8.0 MHz Sweep 5.000 ms (1001 pts) Span 0 Hz ΔMkr3 620.0 μs -0.01 dB <table><tr><th>MKR</th><th>MODE</th><th>TRIG</th><th>SCL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>ΔA2</td><td>1</td><td>t</td><td>(Δ)</td><td>326.0 μs</td><td>(Δ)</td><td></td><td>-0.01 dB</td></tr><tr><td>2</td><td>F</td><td>1</td><td>t</td><td></td><td>1.785 ms</td><td></td><td></td><td>-6.92 dBm</td></tr><tr><td>3</td><td>ΔA4</td><td>1</td><td>t</td><td>(Δ)</td><td>620.0 μs</td><td>(Δ)</td><td></td><td>-0.01 dB</td></tr><tr><td>4</td><td>F</td><td>1</td><td>t</td><td></td><td>2.400 ms</td><td></td><td></td><td>-6.92 dBm</td></tr></table>	MKR	MODE	TRIG	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	ΔA2	1	t	(Δ)	326.0 μs	(Δ)		-0.01 dB	2	F	1	t		1.785 ms			-6.92 dBm	3	ΔA4	1	t	(Δ)	620.0 μs	(Δ)		-0.01 dB	4	F	1	t		2.400 ms			-6.92 dBm
MKR	MODE	TRIG	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																																						
1	ΔA2	1	t	(Δ)	326.0 μs	(Δ)		-0.01 dB																																						
2	F	1	t		1.785 ms			-6.92 dBm																																						
3	ΔA4	1	t	(Δ)	620.0 μs	(Δ)		-0.01 dB																																						
4	F	1	t		2.400 ms			-6.92 dBm																																						
GFSK Mid channel	 Agilent Spectrum Analyzer - Sweep SA Center Freq 2.441000000 GHz PNO: Fast IF Gain: Low Trig: Free Run Atten: 20 dB Avg Type: Log-Pwr Ref 10.00 dBm Center 2.441000000 GHz Res BW 8 MHz VBW 8.0 MHz Sweep 5.000 ms (1001 pts) Span 0 Hz ΔMkr3 635.0 μs 0.00 dB <table><tr><th>MKR</th><th>MODE</th><th>TRIG</th><th>SCL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>ΔA2</td><td>1</td><td>t</td><td>(Δ)</td><td>345.0 μs</td><td>(Δ)</td><td></td><td>-0.03 dB</td></tr><tr><td>2</td><td>F</td><td>1</td><td>t</td><td></td><td>440.0 μs</td><td></td><td></td><td>-7.47 dBm</td></tr><tr><td>3</td><td>ΔA4</td><td>1</td><td>t</td><td>(Δ)</td><td>635.0 μs</td><td>(Δ)</td><td></td><td>0.00 dB</td></tr><tr><td>4</td><td>F</td><td>1</td><td>t</td><td></td><td>1.060 ms</td><td></td><td></td><td>-7.49 dBm</td></tr></table>	MKR	MODE	TRIG	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	ΔA2	1	t	(Δ)	345.0 μs	(Δ)		-0.03 dB	2	F	1	t		440.0 μs			-7.47 dBm	3	ΔA4	1	t	(Δ)	635.0 μs	(Δ)		0.00 dB	4	F	1	t		1.060 ms			-7.49 dBm
MKR	MODE	TRIG	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																																						
1	ΔA2	1	t	(Δ)	345.0 μs	(Δ)		-0.03 dB																																						
2	F	1	t		440.0 μs			-7.47 dBm																																						
3	ΔA4	1	t	(Δ)	635.0 μs	(Δ)		0.00 dB																																						
4	F	1	t		1.060 ms			-7.49 dBm																																						
GFSK High channel	 Agilent Spectrum Analyzer - Sweep SA Center Freq 2.473000000 GHz PNO: Fast IF Gain: Low Trig: Free Run Atten: 20 dB Avg Type: Log-Pwr Ref 10.00 dBm Center 2.473000000 GHz Res BW 8 MHz VBW 8.0 MHz Sweep 5.000 ms (1001 pts) Span 0 Hz ΔMkr3 615.0 μs -0.05 dB <table><tr><th>MKR</th><th>MODE</th><th>TRIG</th><th>SCL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>ΔA2</td><td>1</td><td>t</td><td>(Δ)</td><td>355.0 μs</td><td>(Δ)</td><td></td><td>0.16 dB</td></tr><tr><td>2</td><td>F</td><td>1</td><td>t</td><td></td><td>2.125 ms</td><td></td><td></td><td>-9.70 dBm</td></tr><tr><td>3</td><td>ΔA4</td><td>1</td><td>t</td><td>(Δ)</td><td>615.0 μs</td><td>(Δ)</td><td></td><td>-0.05 dB</td></tr><tr><td>4</td><td>F</td><td>1</td><td>t</td><td></td><td>2.755 ms</td><td></td><td></td><td>-9.47 dBm</td></tr></table>	MKR	MODE	TRIG	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	ΔA2	1	t	(Δ)	355.0 μs	(Δ)		0.16 dB	2	F	1	t		2.125 ms			-9.70 dBm	3	ΔA4	1	t	(Δ)	615.0 μs	(Δ)		-0.05 dB	4	F	1	t		2.755 ms			-9.47 dBm
MKR	MODE	TRIG	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																																						
1	ΔA2	1	t	(Δ)	355.0 μs	(Δ)		0.16 dB																																						
2	F	1	t		2.125 ms			-9.70 dBm																																						
3	ΔA4	1	t	(Δ)	615.0 μs	(Δ)		-0.05 dB																																						
4	F	1	t		2.755 ms			-9.47 dBm																																						

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

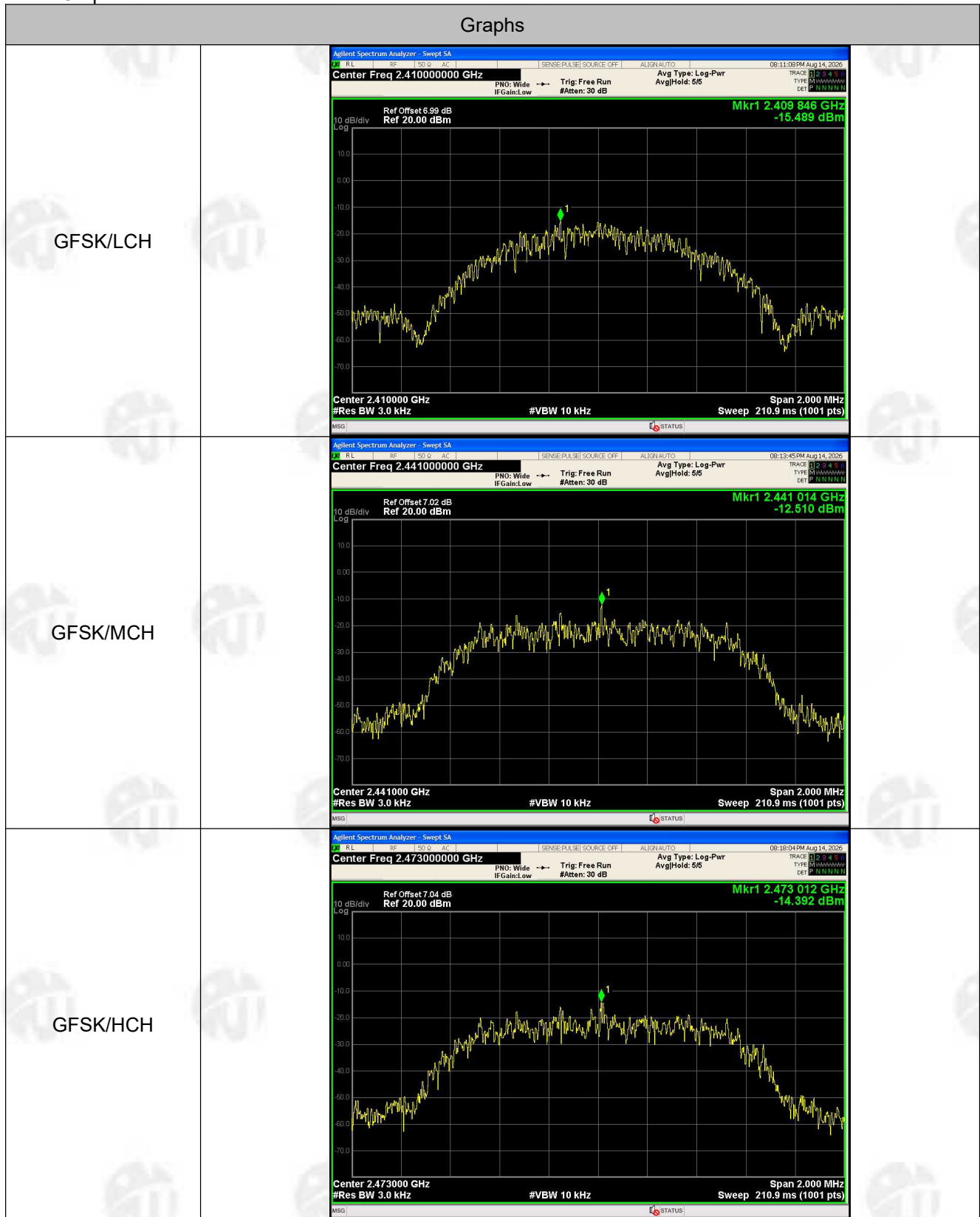
KDB 558074 D01 15.247 Meas Guidance v05r02April 2,2019

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

Mode	Channel.	Power Spectral Density (dBm/3kHz)	Limit(dBm/3kHz)	Verdict
GFSK	LCH	-15.489	8	PASS
	MCH	-12.51	8	PASS
	HCH	-14.392	8	PASS

Test Graph:





9. 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 an internal antenna, and the maximum antenna gain is 0.12dBi, fulfill the requirement of this section.



10. TEST SETUP & EUT PHOTOGRAPH

Reference to EUT photo attachment for details.

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