

CTC Laboratories, Inc.

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	TEST REPORT			
Report No. ·····:	CTC20231520E04			
FCC ID······:	XUJITPMS			
Applicant:	Launch Tech Co., Ltd.			
Address······	Launch Industrial Park, North of Wuhe Rd, Banxuegang, Lo Shenzhen, Guangdong, P.R. China	onggang,		
Manufacturer	Launch Tech Co., Ltd.			
Address······	Launch Industrial Park, North of Wuhe Rd, Banxuegang, Lo Shenzhen, Guangdong, P.R. China	onggang,		
Product Name:	Modular activation programming tool			
Trade Mark······	LAUNCH			
Model/Type reference······:	i-TPMS			
Listed Model(s) ······	1			
Standard:	FCC CFR Title 47 Part 15 Subpart C Section 15.247			
Date of receipt of test sample:	Jul. 11, 2023			
Date of testing	Jul. 12, 2023 ~ Jul. 26, 2023			
Date of issue	Jul. 27, 2023			
Result:	PASS			
Compiled by:	-/- (^		
(Printed name+signature)	Terry SuTerry GEric ZhangZinc Zhang	H		
Supervised by:	7-i, that	29		
(Printed name+signature)	Eric Zhang	\bigvee		
Approved by:	Totti Zhao	0		
(Printed name+signature)	Totti Zhao			
Testing Laboratory Name:	CTC Laboratories, Inc.			
Address	1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park, Shenzhen, Guangdong, China			

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Table of Contents

Page

1. TE	ST SUMMARY	
1.1.	Test Standards	3
1.2.	Report version	3
1.3.	TEST DESCRIPTION	4
1.4.	TEST FACILITY	5
1.5.	MEASUREMENT UNCERTAINTY	5
1.6.	ENVIRONMENTAL CONDITIONS	6
2. GE	ENERAL INFORMATION	7
2.1.	CLIENT INFORMATION	7
2.2.	GENERAL DESCRIPTION OF EUT	7
2.3.	Accessory Equipment information	8
2.4.	OPERATION STATE	9
2.5.	Measurement Instruments List	
3. TE	ST ITEM AND RESULTS	12
3.1.	Conducted Emission	
3.2.	Radiated Emission	
3.3.	BAND EDGE EMISSIONS (RADIATED)	
3.4.	Band edge and Spurious Emissions (Conducted)	
3.5.	20DB Bandwidth	65
3.6.	CHANNEL SEPARATION	69
3.7.	NUMBER OF HOPPING CHANNEL	71
3.8.	Dwell Time	73
3.9.	PEAK OUTPUT POWER	
3.10.	. DUTY CYCLE	82
3.11.	. ANTENNA REQUIREMENT	



1. TEST SUMMARY

1.1. Test Standards

The tests were performed according to following standards:

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

<u>RSS 247 Issue 2:</u> Standard Specifications for Frequency Hopping Systems (FHSs) and Digital Transmission Systems (DTSs) Operating in the Bands 902-928MHz, 2400-2483.5MHz and 5725-5850MHz. <u>ANSI C63.10-2013</u>: American National Standard for Testing Unlicensed Wireless Devices. <u>RSS-Gen Issue 5</u>: General Requirements for Compliance of Radio Apparatus.

1.2. Report version

Revised No.	Date of issue	Description
01	Jul. 27, 2023	Original

1.3. Test Description

FCC Part 15 Subpart C (15.247)/ RSS 247 Issue 2					
Test liter	Standard	I Section	Decult		
Test Item	FCC	IC	Result	Test Engineer	
Antenna Requirement	15.203	/	Pass	Alicia Liu	
Conducted Emission	15.207	RSS-Gen 8.8	Pass	Eva Feng	
Restricted Bands	15.205	RSS-Gen 8.10	Pass	Alicia Liu	
Hopping Channel Separation	15.247(a)(1)	RSS 247 5.1 (b)	Pass	Alicia Liu	
Dwell Time	15.247(a)(iii)	RSS 247 5.1 (d)	Pass	Alicia Liu	
Peak Output Power	15.247(b)(1)	RSS 247 5.4 (b)	Pass	Alicia Liu	
Number of Hopping Frequency	15.247(a)(iii)	RSS 247 5.1 (d)	Pass	Alicia Liu	
Conducted Band Edge and Spu- rious Emissions	15.247(d)	RSS 247 5.5	Pass	Alicia Liu	
Radiated Band Edge and Spurious Emissions	15.205&15.209& 15.247(d)	RSS 247 5.5	Pass	Alicia Liu	
Radiated Spurious Emission	15.247(d)&15.20 9	RSS 247 5.5& RSS-Gen 8.9	Pass	Alicia Liu	
20dB Bandwidth	15.247(a)	RSS 247 5.1 (b)	Pass	Alicia Liu	

Note: The measurement uncertainty is not included in the test result.





CTC Laboratories, Inc.

Add: 1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park, Shenzhen, Guangdong, China

Laboratory accreditation

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

A2LA-Lab Cert. No.: 4340.01

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

Industry Canada (Registration No.: 9783A, CAB Identifier: CN0029)

CTC Laboratories, Inc. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 9783A on Jan, 2016.

FCC (Registration No.: 951311, Designation Number CN1208)

CTC Laboratories, Inc. 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 inour files. Registration 951311, Aug 26, 2017.

1.5. Measurement Uncertainty

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

Below is the best measurement capability for CTC Laboratories, Inc.



Test Items	Measurement Uncertainty	Notes
20dB Emission Bandwidth	±0.0196%	(1)
Carrier Frequency Separation	±1.9%	(1)
Number of Hopping Channel	±1.9%	(1)
Time of Occupancy	±0.028%	(1)
Max Peak Conducted Output Power	±0.743 dB	(1)
Band-edge Spurious Emission	±1.328 dB	(1)
Conducted RF Spurious Emission	9kHz-1GHz: ±0.746dB 1GHz-26GHz: ±1.328dB	(1)
Conducted Emissions 9kHz~30MHz	±3.08 dB	(1)
Radiated Emissions 30~1000MHz	±4.51 dB	(1)
Radiated Emissions 1~18GHz	±5.84 dB	(1)
Radiated Emissions 18~40GHz	±6.12 dB	(1)

Note (1): This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

1.6. Environmental conditions

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

Temperature:	21°C ~ 27°C
Relative Humidity:	40% ~ 60%
Air Pressure:	101kPa



2. GENERAL INFORMATION

2.1. Client Information

Applicant:	Launch Tech Co., Ltd.
Address:	Launch Industrial Park, North of Wuhe Rd, Banxuegang, Longgang, Shenzhen, Guangdong, P.R. China
Manufacturer:	Launch Tech Co., Ltd.
Address:	Launch Industrial Park, North of Wuhe Rd, Banxuegang, Longgang, Shenzhen, Guangdong, P.R. China

2.2. General Description of EUT

Product Name:	Modular activation programming tool	
Trade Mark:	LAUNCH	
Model/Type reference:	i-TPMS	
Listed Model(s):	1	
Power supply:	5Vdc from USB Cable 3.7Vdc from 2000mAh Li-ion Battery	
Hardware version:	1	
Software version:	/	
Bluetooth 4.2/ BR, EDR		
Modulation:	GFSK, π/4-DQPSK, 8-DPSK	
Operation frequency:	2402MHz~2480MHz	
Channel number:	79	
Channel separation:	1MHz	
Antenna type:	PCB Antenna	
Antenna gain:	-1.36dBi Max	



2.3. Accessory Equipment information

Equipment Information				
Name	Model	S/N	Manufacturer	
Notebook	ThinkBook 14G3 ACL	MP246QDR	Lenovo	
1	1	1	1	
Cable Information				
Name	Shielded Type	Ferrite Core	Length	
1	1	1	1	
Test Software Information				
Name	Versions	1	1	
RTLBTAPP	V2017.10.20	1	1	



2.4. Operation state

Operation Frequency List: The EUT has been tested under typical operating condition. The Applicant provides communication tools software to control the EUT for staying in continuous transmitting and receiving mode for testing. BT EDR, 79 channels are provided to the EUT. Channels 00/39/78 were selected for testing.

Operation Frequency List:

Channel	Frequency (MHz)
00	2402
01	2403
:	÷
38	2440
39	2441
40	2442
:	:
77	2479
78	2480

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

Test mode

For RF test items:

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

For AC power line conducted emissions:

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

For Radiated spurious emissions test item:

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



2.5. Measurement Instruments List

Tonsce	Tonscend JS0806-2 Test system					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until	
1	MXA Signal Analyzer	Keysight	N9020A	MY46471737	Dec. 16, 2023	
2	Spectrum Analyzer	R&S	FSU26	100105	Dec. 16, 2023	
3	Spectrum Analyzer	R&S	FSV40-N	101331	Mar. 14, 2024	
4	MXG Vector Signal Generator	Agilent	N5182A	MY47420864	Dec. 16, 2023	
5	PSG Analog Signal Generator	Agilent	E8257D	MY46521908	Dec. 16, 2023	
6	Power Sensor	Keysight	U2021XA	MY55130004	Mar. 14, 2024	
7	Power Sensor	Keysight	U2021XA	MY55130006	Mar. 14, 2024	
8	Wideband Radio Com- munication Tester	R&S	CMW500	102414	Dec. 16, 2023	
9	High and low tempera- ture box	ESPEC	MT3035	/	Mar. 24, 2024	
10	JS1120 RF Test system	TONSCEND	v2.6	/	1	

Radiate	Radiated emission(3m chamber 2)					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated Until	
1	Trilog-Broadband Antenna	Schwarzbeck	VULB 9168	9168-1013	Dec. 07, 2024	
2	Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-647	Dec. 07, 2024	
3	Loop Antenna	LAPLAC	RF300	9138	Dec. 16, 2023	
4	Spectrum Analyzer	R&S	FSU26	100105	Dec. 16, 2023	
5	Spectrum Analyzer	R&S	FSV40-N	101331	Mar. 14, 2024	
6	Pre-Amplifier	SONOMA	310	186194	Dec. 16, 2023	
7	Low Noise Pre-Amplifier	EMCI	EMC051835	980075	Dec. 16, 2023	
8	Test Receiver	R&S	ESCI7	100967	Dec. 16, 2023	
9	3m chamber 2	Frankonia	EE025	/	Oct. 23, 2024	

Radiate	d emission(3m chamber 3))			
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated Until
1	Trilog-Broadband Anten- na	Schwarzbeck	VULB 9163	01026	Dec. 18, 2024
2	Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-647	Dec. 01, 2024
3	Test Receiver	Keysight	N9038A	MY56400071	Dec. 16, 2023
4	Broadband Premplifier	SCHWARZBECK	BBV9743B	259	Dec. 16, 2023
5	Mirowave Broadband Amplifier	SCHWARZBECK	BBV9718C	111	Dec. 16, 2023
6	Pre-Amplifier	R&S	SCU-26	10033	Dec. 16, 2023
7	Pre-Amplifier	R&S	SCU-40	10030	Dec. 16, 2023
8	Board-Band Horn Anten- na	Schwarzbeck	BBHA 9170	BBHA 9170-497	Dec. 16, 2023
9	3m chamber 3	YIHENG	EE106	/	Sep. 09, 2023



Condu	cted Emission				
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	LISN	R&S	ENV216	101112	Dec. 16, 2023
2	LISN	R&S	ENV216	101113	Dec. 16, 2023
3	EMI Test Receiver	R&S	ESCS30	100353	Dec. 16, 2023

Note: 1. The Cal. Interval was one year.

2. The Cal. Interval was three year of the chamber

3. The cable loss has calculated in test result which connection between each test instruments.



3.1. Conducted Emission

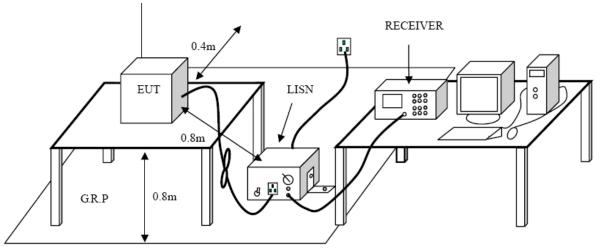
<u>Limit</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.207/ RSS - Gen 8.8

	Limit (dBuV)					
Frequency range (MHz)	Quasi-peak	Average				
0.15-0.5	66 to 56*	56 to 46*				
0.5-5	56	46				
5-30	60	50				

* Decreases with the logarithm of the frequency.

Test Configuration



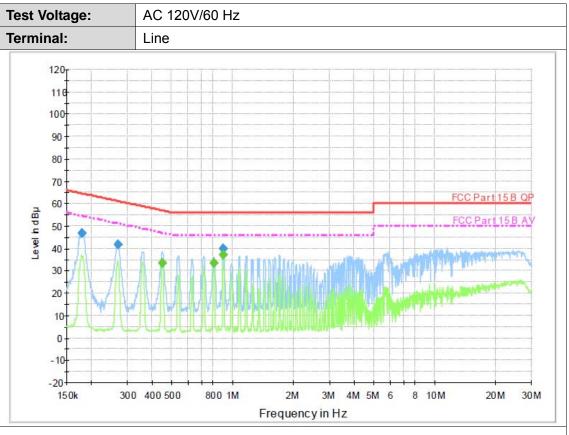
Test Procedure

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

Test Mode

Please refer to the clause 2.4.





Final Measurement Detector 1

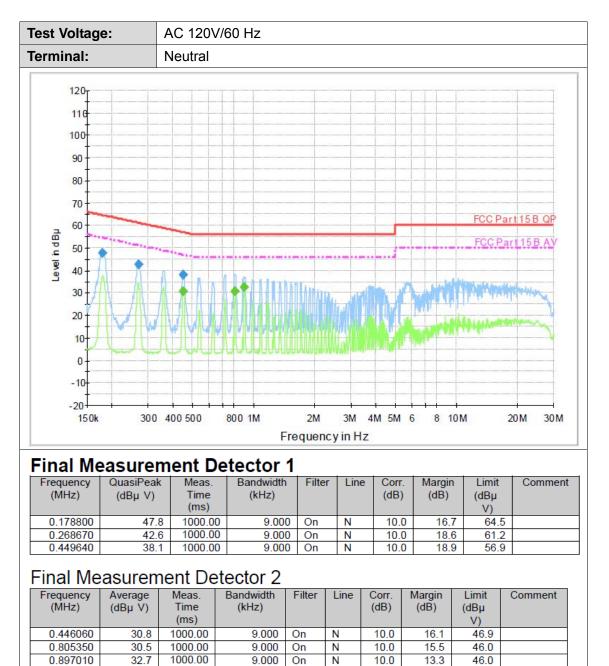
	Frequency (MHz)	QuasiPeak (dBµ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµ V)	Comment
Γ	0.179520	46.8	1000.00	9.000	On	L1	9.7	17.7	64.5	
	0.268670	41.7	1000.00	9.000	On	L1	9.7	19.6	61.2	
	0.893430	39.7	1000.00	9.000	On	L1	9.7	16.3	56.0	

Final Measurement Detector 2

Frequency (MHz)	Average (dBµ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµ V)	Comment
0.447850	33.4	1000.00	9.000	On	L1	9.7	13.5	46.9	
0.805350	33.2	1000.00	9.000	On	L1	9.7	12.8	46.0	
0.893430	37.2	1000.00	9.000	On	L1	9.7	8.8	46.0	

Emission Level= Read Level+ Correct Factor





Emission Level= Read Level+ Correct Factor



3.2. Radiated Emission

<u>Limit</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.209/ RSS – Gen 8.9

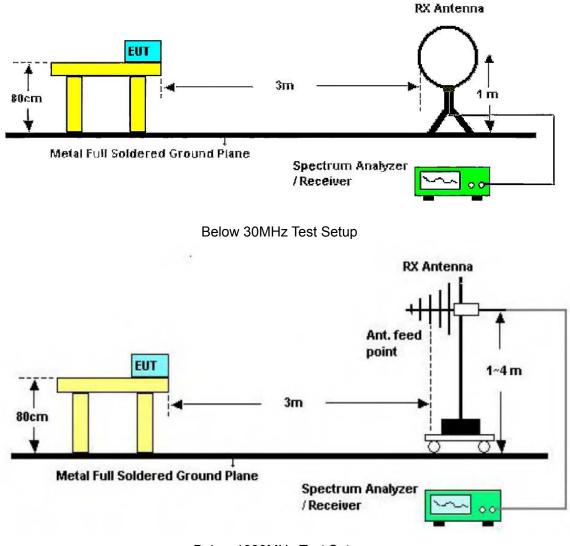
Frequency	Limit (dBuV/m @3m)	Value
30 MHz ~ 88 MHz	40.00	Quasi-peak
88 MHz ~ 216 MHz	43.50	Quasi-peak
216 MHz ~ 960 MHz	46.00	Quasi-peak
960 MHz ~ 1 GHz	54.00	Quasi-peak
Above 1 GHz	54.00	Average
	74.00	Peak

Note:

(1) The tighter limit applies at the band edges.

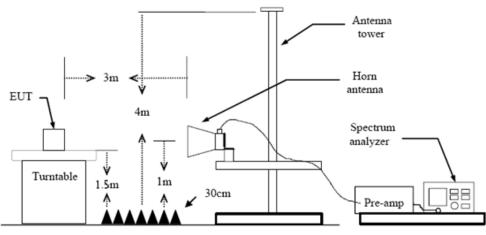
(2) Emission Level (dBuV/m)=20log Emission Level (uV/m).

Test Configuration



Below 1000MHz Test Setup





Above 1GHz Test Setup

Test Procedure

- 1. The EUT was setup and tested according to ANSI C63.10:2013
- 2. The EUT is placed on a turn table which is 0.8 meter above ground for below 1 GHz, and 1.5 m for above 1 GHz. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
- 3. The EUT was set 3 meters from the receiving antenna, which was mounted on the top of a variable height antenna tower.
- 4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
- 5. Set to the maximum power setting and enable the EUT transmit continuously.
- 6. Use the following spectrum analyzer settings
 - Span shall wide enough to fully capture the emission being measured; (1)
 - (2) Below 30 MHz:

9kHz – 150kHz, RBW=200Hz, VBW≥RBW, Sweep=auto, Detector function=peak, Trace=max hold; 150kHz – 30MHz, RBW=9kHz, VBW≥RBW, Sweep=auto, Detector function=peak, Trace=max hold; If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

(3) 30 MHz - 1 GHz:

RBW=120 kHz, VBW=300 kHz, Sweep=auto, Detector function=peak, Trace=max hold;

If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

(4) From 1 GHz to 10th harmonic:

RBW=1MHz, VBW=3MHz Peak detector for Peak value.

RBW=1MHz, VBW≥1/T Peak detector for Average value.

Note 1: For the 1/T& Duty Cycle please refer to clause 3.10 Duty Cycle.

Test Mode

Please refer to the clause 2.4.

Test Result

9 KHz~30 MHz

From 9 KHz to 30 MHz: Conclusion: PASS

Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

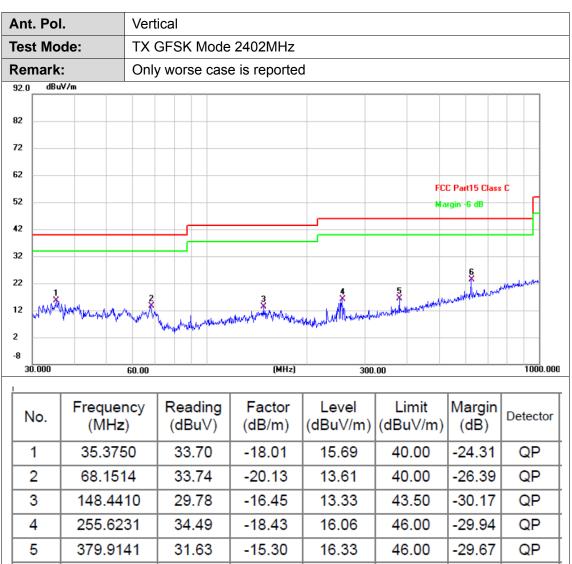
CTC Laboratories, Inc.



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8 3	No. 1	Frequer (MHz 216.02	ncy) 39 95	(dE 43 40	ading BuV) 3.83	(MHz) Factor (dB/m) -19.83	Level (dBuV/m 24.00) (dB 4)	uV/m) 6.00	(dB) -22.00	Detector QP
8 3	No. 1 2	Frequer (MHz 216.02 326.73	ncy) 39 95 02	(dE 43 40 40	ading BuV) 3.83 0.61	(MHz) Factor (dB/m) -19.83 -16.55	Level (dBuV/m 24.00 24.06) (dB 4) 4) 4) 4)	uV/m) 6.00 6.00	(dB) -22.00 -21.94	Detector QP QP
Ĺ	No. 1 2 3	Frequer (MHz 216.02 326.73 423.54	ncy) 39 95 02 91	(dE 43 40 40 40 42	ading BuV) 3.83 0.61 0.90	(MH ₂) Factor (dB/m) -19.83 -16.55 -14.17	Level (dBuV/m 24.00 24.06 26.73) (dB 4) 4) 4) 4) 4) 4) 4)	uV/m) 6.00 6.00 6.00	(dB) -22.00 -21.94 -19.27	Detector QP QP QP

2.Margin value = Level -Limit value





6 *

625.0780

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor 2.Margin value = Level -Limit value

-10.25

23.40

46.00

-22.60

QP

33.65



Above	1GHz

nt. P				ontal								
	lode:		TX GFSK Mode 2402MHz									
ema	rk:		No report for the emission which more than 10 dB below the pre- scribed limit.									
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1	4	4804.7	732	40.3	3	2.16		42.4	9	74.00	-31.51	peak
2	* 4	4804.7	783	25.72	2	2.16		27.8	8	54.00	-26.12	AVG





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		(dBuV)	(dB/m)				Detector
803.2	33	25.84	2.16	28.00	54.00	-26.00	AVG
803.6	13	41.31	2.16	43.47	74.00	-30.53	peak
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No. Frequency (MHz) Reading (dBuV) Factor (dB/m) Level (dBuV/m) Limit (dBuV/m) Margin (dB) Detector 1 4881.381 41.81 2.31 44.12 74.00 -29.88 peak		Ja.							
No. Frequency (MHz) Reading (dBuV) Factor (dBuV) Level (dBuV) Limit (dBuV) Margin (dBuV) Detector	emark:	ie:	TX G	FSK Mod	e 2441MHz				
No. Frequency (MHz) Reading (dBuV) Factor (dBm) Level (dBuV/m) Limit (dBuV/m) Margin (dBuV/m) Detector (dBuV/m) 1 4881.381 41.81 2.31 44.12 74.00 -29.88 peak					ne emission	which more t	han 10 dB b	pelow the	e pre-
No. Frequency (MHz) Reading (dBuV) Factor (dB/m) Level (dBuV/m) Limit (dBuV/m) Margin (dB) Detector (dB) 1 4881.381 41.81 2.31 44.12 74.00 -29.88 peak	00.0 dBu\	√/m							
No. Frequency (MHz) Reading (dBuV) Factor (dBuV) Level (dBuV/m) Limit (dBuV/m) Margin (dB) Detector (dB) 1 4881.381 41.81 2.31 44.12 74.00 -29.88 peak	ı								
No. Frequency (MHz) Reading (dBuV) Factor (dB/m) Level (dBuV/m) Limit (dBuV/m) Margin (dB) Detector 1 4881.381 41.81 2.31 44.12 74.00 -29.88 peak	, 📃								
No. Frequency (MHz) Reading (dBuV) Factor (dB/m) Level (dBuV/m) Limit (dBuV/m) Margin (dB) Detector 1 4881.381 41.81 2.31 44.12 74.00 -29.88 peak							FCC Part15	C - Above 1	G PK
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No. Frequency (MHz) Reading (dBuV) Factor (dB/m) Level (dBuV/m) Limit (dBuV/m) Margin (dB) Detector 1 4881.381 41.81 2.31 44.12 74.00 -29.88 peak)	^							
No. Frequency (MHz) Reading (dBuV) Factor (dB/m) Level (dBuV/m) Limit (dBuV/m) Margin (dB) Detector 1 4881.381 41.81 2.31 44.12 74.00 -29.88 peak	I	Ę							
No. Frequency (MHz) Reading (dBuV) Factor (dB/m) Level (dBuV/m) Limit (dBuV/m) Margin (dB) Detector (dB) 1 4881.381 41.81 2.31 44.12 74.00 -29.88 peak	,								
Ide00.000 3400.00 5800.00 8200.00 10600.00 (MHz) 15400.00 17800.00 20200.00 22600.00 2500 No. Frequency (MHz) Reading (dBuV) Factor (dB/m) Level (dBuV/m) Limit (dBuV/m) Margin (dB) Detector 1 4881.381 41.81 2.31 44.12 74.00 -29.88 peak	, 📖								
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NO. (MHz) (dBuV) (dB/m) (dBuV/m) (dBuV/m) (dB) Detector 1 4881.381 41.81 2.31 44.12 74.00 -29.88 peak	1000.000	3400.00 5	800.00	8200.00	10600.00 (MHz)	15400.00	7800.00 20200	0.00 22600	.00 25000
NO. (MHz) (dBuV) (dB/m) (dBuV/m) (dBuV/m) (dB) Detector 1 4881.381 41.81 2.31 44.12 74.00 -29.88 peak									
NO. (MHz) (dBuV) (dB/m) (dBuV/m) (dBuV/m) (dB) Detector 1 4881.381 41.81 2.31 44.12 74.00 -29.88 peak									
	No.							-	Detector
2 * 4882.813 25.08 2.32 27.40 54.00 -26.60 AVG	1	4881.3	81	41.81	2.31	44.12	74.00	-29.88	peak
	2 *	4882.8	13	25.08	2.32	27.40	54.00	-26.60	AVG
					1		1		1





nt. Po	ol.	Vertic	cal									
est Mo	ode:	TX G	FSK Mode	2441MHz								
emarl	K :		No report for the emission which more than 10 dB below the pre- scribed limit.									
0.0 dB	uV/m											
						FCC Part15	C - Above 1	G PK				
						FCC Part15	C - Above 1	GAV				
	ş											
	1											
	×											
.0 1000.00	0 3400.00 5	800.00	8200.00 10	600.00 (MHz)	15400.00	17800.00 2020	0.00 22600	.00 2500				
No.	Frequer (MHz		Reading (dBu∀)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector				
1 *	4882.2	75	25.02	2.31	27.33	54.00	-26.67	AVG				
2	4882.7	76	40.84	2.32	43.16	74.00	-30.84	peak				





nt. Po	ol.	Horiz	zontal					
est Mo	ode:	TX C	SFSK Mode	2480MHz				
Remarl			eport for the ed limit.	emission v	which more t	than 10 dB l	below the	e pre-
00.0 dB	uV/m							
o								
o						FCC Part15	C About 1	C. DK
o ⊨						FCC Partis	C-ADUVE I	
o								
0						FCC Part15	C - Above 1	
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o	×							
0								
0.0								
	0 3400.00 5	800.00 NCV	Reading	^{600.00} (мн _г) Factor	15400.00	Limit	0.00 22600 Margin	
No.	(MHz		(dBuV)	(dB/m)		(dBuV/m)		Detector
		86	40.79	2.48	43.27	74.00	-30.73	peak
1	4960.5	00						-



Ant. Po	I.	Vert	ical					
est Mo	ode:	тх (GFSK Mode	2480MHz				
Remark	(:		eport for the	e emission v	which more t	han 10 dB t	pelow the	pre-
00.0 dB	uV/m							
0								
o						FCC Part15	C - Above 1	G PK
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o	ş							
0								
0								
0.0	0 3400.00 5	800.00	8200.00 1	0600.00 (MHz)	15400.00	7800.00 2020	0.00 22600	.00 25000
	Frequer	-	Reading (dBu∀)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
No.	(MHz)	(abav)	((,	· · · ·		
No. 1	(MHz 4959.6	<i>,</i>	40.29	2.48	42.77	74.00	-31.23	peak





Ant.	Pol.		Horiz	zont	al									
Test	Мос	le:	TX 1	τ/4-I	DQPSK	Mode 2	402	2MHz						
Rem			No re scrib			e emissic	n v	hich	more t	han 10 d	Βb	elow the	e pre-	
100.0	dBu\	//m												
90 -			_								_			
80														
70										FCC Par	15	C - Above 1	G PK	
60										FCC Par	15 (C - Above 1	G AV	
50 -		ş												
40 -		8					-				-			
30		1									_			
20		^												
10														
0.0														
	0.000	3400.00 5	800.00	820	0.00 10	600.00 (M	Hz)	154	00.00 1	7800.00 2	0200	0.00 22600	.00 250	00.0
				De	a din a	Facto			vel	Limit		Mauria		
N	o.	Frequer (MHz			ading BuV)	(dB/m				(dBuV/r	n)	Margin (dB)	Detect	or
1	*	4803.2	76	2	5.78	2.16		27	.94	54.00		-26.06	AVG)
2	2	4803.8	99	4	0.33	2.16		42	.49	74.00		-31.51	peal	k





nt. Po	I.	Vert	ical							
est Mo	de:	ТХ	π/4-D0	QPSK	Mode 24	02MHz				
emark	:		eport f		e emissio	n which	more t	han 10 dB	below the	e pre-
)0.0 dBu	uV/m									
								FCC Part15	C - Above 1	g PK
I								ECC Part15	C - Above 10	GAV
ı	ş									
	1.									
	×									
)										
ı										
1000.000	0 3400.00 5	800.00	8200.0)0 10	600.00 (MI	lz) 15	400.00 1	7800.00 2020	0.00 22600	.00 25000
	Frequer		Read	dina	Facto	r Le	evel	Limit	Margin	
No.	Frequer (MHz		Read (dBi	-	Factor (dB/m)		evel uV/m)	Limit (dBuV/m)	Margin (dB)	Detector
No. 1 *)		uV)		(dB				Detector AVG





nt. Po	ol.	Horiz	ontal									
est Mo	ode:	ТХ т	t/4-DQ	PSK	Mode 2	441	MHz					
emarl			eport fo ed limi		emissio	on v	vhich	more t	han 10	dB I	below the	e pre-
00.0 dB	luV/m											
ı												
									FCC P	art15	C - Above 1	G PK
)									FCC P	art15	C - Above 1	G AV
)												
ı	Å.									_		
ı	ş	_										
	^											
0.0												
1000.00	0 3400.00 5	800.00	8200.00	10	600.00 (N	(Hz)	154	00.00 1	7800.00	2020	D.00 22600	0.00 25000
No.	Frequer (MHz		Read (dBu		Facto (dB/m			vel iV/m)	Lim (dBu∖∕		Margin (dB)	Detector
1	4881.2	85	39.0	0	2.31		41	.31	74.0	0	-32.69	peak
2 *	4881.4	18	24.6	3	2.31		26	.94	54.0	0	-27.06	AVG





nt. Po	l. –	Verti	ical					
est Mo	de:	TX	π/4-DQPSI	K Mode 244	1MHz			
emark	(:		eport for th	e emission v	which more	than 10 dB	below the	e pre-
00.0 dB	uV/m							
ı								
,								
, –						FCC Part15	C - Above 1	G PK
						FCC Part15	C - Above 1	G AV
)	1							
)								
ı	ş							
)								
ı								
1000.00	0 3400.00	5800.00	8200.00 1	10600.00 (MHz)	15400.00	17800.00 2020	0.00 22600	.00 25000
No.	Frequer (MHz		Reading	Factor	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	,	·						peak
2 *	4882.4		25.18	2.31	27.49	54.00	-26.51	AVG
1	(MHz 4881.8 4882.4	23	(dBuV) 41.04 25.18	(dB/m) 2.31 2.31	43.35	(dBuV/m) 74.00 54.00	-30.65	pea





nt. Po	ol.	Hori	zontal					
est M	ode:	TX	π/4-DQPSK	Mode 2480)MHz			
emar	k:		eport for the	emission v	vhich more t	han 10 dB t	pelow the	e pre-
00.0 d	BuV/m				1			
)						FCC Part15	C - Above 1	g PK
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- נ						FCC Part15	C - Above 1	GAV
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0 D. 0								
	00 3400.00	5800.00	8200.00 10)600.00 (MHz)	15400.00	17800.00 2020	0.00 22600	.00 25000
No.	Frequer (MHz	-	Reading (dBu∀)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	4960.4	05	40.72	2.48	43.20	74.00	-30.80	peak
2 *	4960.8	66	25.07	2.48	27.55	54.00	-26.45	AVG



nt. Po	Ι.	Verti	ical					
est Mo	de:	TX	π/4-DQPSK	Mode 248	OMHz			
emark	:		eport for the	e emission v	which more t	han 10 dB b	elow the	pre-
)0. <u>0</u> dBu	uV/m							
)								
ı						FCC Part15 (C - Above 10	G PK
, 🚞								
' <u> </u>						FCC Part15 (C-Above 10	G AV
)	1							
ı	×							
ı 📖	ž.							
	8							
)								
)								
1000.00	0 3400.00 5	800.00	8200.00 10)600.00 (MHz)	15400.00 1	7800.00 20200	0.00 22600.	.00 25000
1000.000	0 3400.00 3	000.00	0200.00 11	1000.00 (MI12)	15400.00	1000.00 20200	1.00 22000.	.00 23000
No.	Frequer (MHz		Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
NO.					10.11	74.00	-30.89	peak
1 1	4959.7	75	40.63	2.48	43.11	74.00	-30.83	peak
No				(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	





		Horizo	ntal					
est Mod	le:	TX 8-D	PSK Mod	le 2402MHz	Z			
Remark:		No rep scribed		emission v	which more t	han 10 dB b	elow the	pre-
00.0 dBu\	//m							
0								
0						500 D . 115 (
0						FCC Part15 C	C-Above IU	іРК
0								
0						FCC Part15 0	- Above 10	AV .
0	$\overset{1}{\times}$							
0	2							
	ş							
0								
0								
1000.000	3400.00 5	800.00	3200.00 10	600.00 (MHz)	15400.00 1	7800.00 20200	.00 22600.	00 25000.0
No.	Frequer (MHz	•	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	4804.2	72	40.52	2.16	42.68	74.00	-31.32	peak
2 *	4804.9	14	25.79	2.16	27.95	54.00	-26.05	AVG



nt. Po	ol.	Verti	cal					
est M	ode:	ТХ 8	B-DPSK Moo	de 2402MH	Z			
emar	k:		eport for the	e emission v	which more	than 10 dB I	pelow the	e pre-
0.0 dE	Bu∀/m							
						500 D	.	
-						FCC Part15	C-Above I	GPK
-						FCC Part15	C - Ahove 1	GAV
	1×							
	ş							
.0	00 3400.00 5	800.00	8200.00 10	600.00 (MHz)	15400.00 1	7800.00 20200	0.00 22600	.00 25000
No.	Frequer (MHz		Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	4803.3	98	41.02	2.16	43.18	74.00	-30.82	peak
2 *	4803.8	28	25.56	2.16	27.72	54.00	-26.28	AVG



Ant. F	Pol.	Horizor	ntal					
Test N	Mode:	TX 8-D	PSK Moo	de 2441MH	Z			
Rema		No repo		emission v	which more f	than 10 dB l	below the	; pre-
100.0	dBuV/m							
90								
80						FCC Part15	C - Above 1	G PK
70								
60								
50						FCC Part15	C - Above 1	<u>G AV</u>
	ş							
40								
30	<u>k</u>							
20								
10								
0.0	.000 3400.00 5	800.00 83	200.00 10	600.00 (MHz)	15400.00	17800.00 2020	0.00 22600	.00 25000.0
					1			
No.	Frequer (MHz		eading dBu∀)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 '	* 4882.4	29	24.79	2.31	27.10	54.00	-26.90	AVG
2	4882.9	86 3	39.72	2.32	42.04	74.00	-31.96	peak



nt. Po	l.	Verti	ical					
est Mo		TX 8	B-DPSK Mo	ode 2441MH	Z			
emark	:		eport for th	e emission v	which more t	than 10 dB l	below the	e pre-
0.0 dB	uV/m							
						FCC Part15	C About 1	C.DK
						FUC Partis	C-ADOVE I	GPK
						FCC Part15	C - Above 1	GAV
	$\frac{1}{2}$							
	ş							
.0 1000.00	0 3400.00 5	800.00	8200.00	10600.00 (MHz)	15400.00	17800.00 2020	0.00 2260	0.00 25000
					1			
No.	Frequer (MHz		Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	4881.0	97	39.87	2.31	42.18	74.00	-31.82	peak
2 *	4882.7	81	25.10	2.32	27.42	54.00	-26.58	AVG



Ant	t. Pol		Horizontal											
	st Mo		TX 8-DPSK Mode 2480MHz											
Rer	nark		No report for the emission which more than 10 dB below the pre- scribed limit.											
100.	100.0 dBuV/m													
90														
80										500.0				
70										FCC Part15 C - Above 1G PK		GPK		
60														
50										FCC Pa	rt15 (C - Above 1	GAV	
		ş												
40														
30		×												
20														
10											_			
0.0 10))00.000	3400.00 5	800.00	820	0.00 10	600.00 (N	(Hz)	154	00.00 1	7800.00	20200	0.00 22600	.00 25000	0.0
N	lo.	Frequer (MHz		•		Factor (dB/m)		Level (dBuV/m)		Limi (dBuV		Margin (dB)	Detecto	r
1	1 *	4959.6	37	25.05		2.48		27.53		54.0	0	-26.47	AVG	
	2	4960.191		40.07		2.48		42.55		74.00		-31.45	peak	



Ant. Pol.			Vertical									
Test Mode:			TX 8-DPSK Mode 2480MHz									
Remark:			No report for the emission which more than 10 dB below the pre- scribed limit.									
100.0 dBuV/m												
90												
80							FCC Part15 (- Above 10) PK			
70												
60							FCC Part15 (- Abovo 10				
50												
40		X										
30		ş										
20												
10												
0.0 10		3400.00 5	800.00	8200.00 10	600.00 (MHz)	15400.00 1	7800.00 20200	.00 22600.	00 25000.0			
1	No.	Frequency (MHz)		Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector			
	1	4959.6	12 39.59		2.48	42.07	74.00	-31.93	peak			
	2 *	4960.676		24.81	2.48	27.29	54.00	-26.71	AVG			

Page 36 of 86

Remarks:



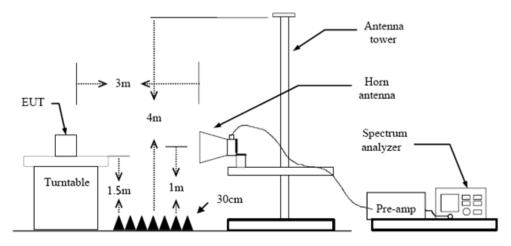
3.3. Band Edge Emissions (Radiated)

<u>Limit</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d):

Restricted Frequency Band	(dBuV/m	n)(at 3m)
(MHz)	Peak	Average
2310 ~ 2390	74	54
2483.5 ~ 2500	74	54

Test Configuration



Test Procedure

- 1. The EUT was setup and tested according to ANSI C63.10:2013 requirements.
- 2. The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
- 3. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
- 4. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2013 on radiated measurement.
- 5. The receiver set as follow:

RBW=1MHz, VBW=3MHz Peak detector for Peak value.

RBW=1MHz, VBW see note 1 with Peak Detector for Average Value.

Note 1: For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with 1/T video bandwidth with peak detector for average measurements. For the Duty Cycle please refer to clause 3.10 Duty Cycle.

Test Mode

Please refer to the clause 2.4.

国家认

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 Fax: (86)755-27521011
 Http://www.sz-ctc.org.cn

 可监督管理委员会
 For anti-fake verification, please visit the official website of Certification and Accreditation Administration of the People's Republic of China : yz.cnca.cn



Test Results

	ol.	Hori	zontal					
est Mo	ode:	GFS	SK Mode 2	402MHz				
00.0 dB	luV/m							
D								A
o						FCC Part15	0.411	
						FUL Partis	C - ADOVE I	
						FCC Part15	C - Above 1	GAV
	1							
	1						\$ ∧	
	A				al human	hannen	- <u>6</u>	<u> </u>
0								
D								
).0	0 0210 00 0	200.00	0226.00	0240.00 (441)	0000.00		00 0000	
	0 2316.00 2	326.00	2336.00	2346.00 (MHz	2366.00	2376.00 2386	.00 2396.1	00 2406.
	00 2316.00 2 Frequer (MHz	псу	2336.00 Reading (dBuV)	g Factor	Level	2376.00 2386 Limit (dBuV/m)	00 2396.0 Margin (dB)	00 2406. Detecto
2306.00	Freque	ncy)	Reading	g Factor	Level	Limit	Margin	
2306.00 No.	Frequer (MHz	ncy) 67	Reading (dBuV)	g Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecto
2306.00 No.	Frequer (MHz 2321.9	ncy) 67 00	Reading (dBuV) 44.08	Factor (dB/m) -4.03	Level (dBuV/m) 40.05	Limit (dBuV/m) 74.00	Margin (dB) -33.95	Detector peak
2306.00 No. 1 2	Frequer (MHz 2321.9 2322.0	ncy) 67 00 33	Reading (dBuV) 44.08 39.39	Factor (dB/m) -4.03 -4.03	Level (dBuV/m) 40.05 35.36	Limit (dBuV/m) 74.00 54.00	Margin (dB) -33.95 -18.64	Detector peak AVG
2306.00 No. 1 2 3	Frequer (MHz 2321.9 2322.0 2361.9	ncy) 67 00 33 33	Reading (dBuV) 44.08 39.39 50.76	Factor (dB/m) -4.03 -4.03 -3.84	Level (dBuV/m) 40.05 35.36 46.92	Limit (dBuV/m) 74.00 54.00 74.00	Margin (dB) -33.95 -18.64 -27.08	Detector peak AVG peak

Remarks:



	l	Ver	tical								
est Mo	de:	GFS	SK M	ode 240	02MHz						
)0.0 dB	uV/m				1						
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'											Λ
)		_						FCC	Part15	C - Above 1	G PK
)											
								FCC	Part15	C - Above 1	GAV
)						3 X					
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2305.50	0 2315.50 2	325.50	233	5.50 23	845.50 (M	Hz) 2	2365.50	2375.50	2385	.50 2395.	50 2405.
2305.50	0 2315.50 2	325.50	233	5.50 23	345.50 (M	Hz) 2	2365.50	2375.50	2385	.50 2395.	50 2405.
	1				^{345.50} (м Facto	,	2365.50	2375.50 Lin		1	
2305.50 No.	0 2315.50 2 Frequer (MHz	псу	Rea	ading BuV)		r L		Lin	nit	Margin	1
	Frequer	ncy)	Rea (di	ading	Facto	r L) (dE	evel	Lin	nit √/m)	Margin	
No.	Frequer (MHz	ncy) 00	Rea (dl	ading BuV)	Facto (dB/m	r L) (dE	.evel BuV/m)	Lin (dBu	nit √/m) 00	Margin (dB)	Detector
No. 1	Frequer (MHz 2321.9	ncy) 00 33	Rea (di 39	ading BuV) 9.67	Facto (dB/m -4.03	r L) (dE 3	.evel BuV/m) 85.64	Lin (dBu) 74.	nit √/m) 00 00	Margin (dB) -38.36	Detector peak
No. 1 2	Frequer (MHz 2321.9 2321.9	ncy) 00 33 00	Rea (df 39 30 30 40	ading BuV) 9.67 3.69	Facto (dB/m -4.03 -4.03	r L) (dE 3 2 4	evel 3uV/m) 35.64 29.66	Lin (dBu) 74. 54.	nit V/m) 00 00	Margin (dB) -38.36 -24.34	Detector peak AVG
No. 1 2 3	Frequer (MHz 2321.9 2321.9 2362.0	ncy) 00 33 00 00	Rea (dl 39 30 40 40	ading BuV) 9.67 3.69 6.60	Facto (dB/m -4.03 -4.03 -3.84	r L) (dE 2 2 4 4	evel 3uV/m) 35.64 29.66 42.76	Lin (dBu) 74. 54. 74.	nit √/m) 00 00 00	Margin (dB) -38.36 -24.34 -31.24	Detector peak AVG peak

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	Mod		GFS	SK Mode 24	80 MHz				
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.0 2476	6.500	2486.50	2496.50	2506.50 25	516.50 (MHz)	2536.50 2	546.50 2556.	50 2566.9	50 2576.
		Erecut		Deeding	Factor	Level	Limit	Margin	
No	b .	Freque (MH		Reading (dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	Margin (dB)	Detector
		`	·	· · ·	· · ·	· · ·	. ,		
1		2483.	500	38.48	-3.31	35.17	74.00	-38.83	peak
2		2483.	500	30.66	-3.31	27.35	54.00	-26.65	AVG
2 3		2483. 2520.		30.66 44.29	-3.31 -3.20	27.35 41.09	54.00 74.00	-26.65 -32.91	AVG peak
			033						
3		2520.	033 033	44.29	-3.20	41.09	74.00	-32.91	peak

Remarks:



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24	76.50	0 2486.50	2496.50	2506.50 25	16.50 (MHz)	2536.50 2	2546.50 2556.	50 2566.	50 2576.
Ν	lo.	Frequ (Mł		Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
	1	2483	.500	38.02	-3.31	34.71	74.00	-39.29	peak
	2	2483	.500	28.66	-3.31	25.35	54.00	-28.65	AVG
3	3 *	2519	.967	35.44	-3.20	32.24	54.00	-21.76	AVG
	4	2520	022	41.75	-3.20	38.55	74.00	-35.45	peak





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236	06.000	2316.00 2	326.00	2336.0	00 23	46.00 (1	MHz)	23	66.00	2376.00	2386.	00 2396.0)0 2406.0
231	06.000	2316.00 2	326.00	2336.0	00 23	46.00 (1	MHz)	23	56.00	2376.00	2386.	00 2396.0	0 2406.0
N		2316.00 2 Frequer (MHz	ncy	Rea	^{00 23} ding uV)	46.00 (i Fact (dB/r	or	Le	evel	2376.00 Lir (dBu	nit	00 2396.0 Margin (dB)	Detector
	0.	Freque	ncy)	Rea	ding uV)	Fact	or n)	Le (dB	evel	Lir	nit V/m)	Margin	
N	o. I	Frequer (MHz	ncy :) 67	Rea (dB 43.	ding uV)	Fact (dB/r	or n) 3	Le (dB	evel uV/m)	Lir (dBu	nit V/m) .00	Margin (dB)	Detector
N 1	0. 2	Frequer (MHz 2321.9	ncy) 67 00	Rea (dB 43. 37.	ding uV) .31	Fact (dB/r -4.0	or n) 3 2	Le (dB 39	evel uV/m) 9.28	Lir (dBu 74	nit V/m) .00	Margin (dB) -34.72	Detector peak
N 1 2	0. 2 }	Frequer (MHz 2321.9 2322.1	ncy) 67 00	Rea (dB 43. 37.	ding u∨) .31 .48 .77	Fact (dB/r -4.0 -4.0	or n) 3 2 4	Le (dB) 39 30 40	evel uV/m) 9.28 3.46	Lir (dBu 74	nit V/m) 00 .00	Margin (dB) -34.72 -20.54	Detector peak AVG
N 1 2 3	0. 2 3	Frequer (MHz 2321.9 2322.1 2361.8	ncy)) 67 00 00 00	Rea (dB 43. 37. 50.	ding u∨) .31 .48 .77 .06	Fact (dB/r -4.0 -4.0 -3.8	or n) 3 2 4 4	Le (dB) 33 33 46 43	evel uV/m) 9.28 3.46 3.93	Lir (dBu 74 54 74	nit V/m) 00 00 00	Margin (dB) -34.72 -20.54 -27.07	Detector peak AVG peak





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).0 2306 0	00 2316.00	2326.00	2336.00	2346.00 (MHz)	2366.00	2376.00 2386.	00 2396.0	10 2406.0
NI-	Freque	ency	Reading	Factor	Level	Limit	Margin	Detector
No.	(MH	-	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1	2322.0	122	31.79	-4.03	27.76	54.00	-26.24	AVG
	LULL	133	51.75	-4.00	21.10	54.00		
2	2322.2		42.35	-4.02	38.33	74.00	-35.67	peak
		200						peak peak
2	2322.2	200	42.35	-4.02	38.33	74.00	-35.67	· ·
2	2322.2 2362.0	200 000 000	42.35 46.37	-4.02 -3.84	38.33 42.53	74.00 74.00	-35.67 -31.47	peak

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).0 24	76 500	2486.50	2496.50	2506.50 25	16.50 (MHz)	2536.50 2	2546.50 2556	50 2566.	50 2576.
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		Frequ	lency	Reading	Factor	Level	Limit	Margin	
Ν	lo.	•	Hz)	(dBuV)	(dB/m)	(dBuV/m)		(dB)	Detector
	1	2483	8.500	43.73	-3.31	40.42	74.00	-33.58	peak
1	2	2483	3.500	30.24	-3.31	26.93	54.00	-27.07	AVG
3	3 *	2520	000.	38.41	-3.20	35.21	54.00	-18.79	AVG
4	4	2520	.067	44.17	-3.20	40.97	74.00	-33.03	peak
ļ	5	2559	.833	40.04	-3.11	36.93	74.00	-37.07	peak
(6	2559	.867	30.61	-3.11	27.50	54.00	-26.50	AVG
(6	2559	.867	30.61	-3.11	27.50	54.00	-26.50	AV





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	6.500	2486.50	2496.50	2506.50 25	16.50 (MHz)	2536.50 2	546.50 2556.	50 2566.5	0 2576.9
N	lo.	Frequ (Mł	-	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	1	2483	.500	37.24	-3.31	33.93	74.00	-40.07	peak
2	2	2483	.500	28.54	-3.31	25.23	54.00	-28.77	AVG
3	*	2520	.100	33.66	-3.20	30.46	54.00	-23.54	AVG
	1	2520	.197	41.63	-3.20	38.43	74.00	-35.57	peak

Remarks:



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	.000 2	316.00 2	326.00	2336.00	2346.00 (M	Hz)	2366.00	2376.0	0 2386.	00 2396.0	JO 2406.I
										1	
No		316.00 2 Frequer (MHz	псу	2336.00 a Reading (dBuV)		or	2366.00 Level dBuV/m	L	.imit	Margin	Detector
		Freque	ncy)	Reading	Facto	or) ((Level	l) (dB	.imit	Margin	
No		Frequer (MHz	ncy) 33	Reading (dBuV)	Facto (dB/m	or) (0	Level dBuV/m	L (dB 5	.imit uV/m)	Margin (dB)	Detecto
No 1		Frequer (MHz 2322.0	ncy) 33 67	Reading (dBuV) 37.55	Facto (dB/m -4.03	or) ((Level dBuV/m 33.52) (dB 5	.imit uV/m) 4.00	Margin (dB) -20.48	Detector AVG
No 1 2).	Frequer (MHz 2322.0 2322.2	ncy) 33 67 00	Reading (dBuV) 37.55 45.24	Facto (dB/m -4.03 -4.02) ((Level dBuV/m 33.52 41.22) (dB 5 7 7	.imit uV/m) 4.00 4.00	Margin (dB) -20.48 -32.78	Detector AVG peak
No 1 2 3).	Frequer (MHz 2322.0 2322.2 2361.8	ncy) 33 67 00 67	Reading (dBuV) 37.55 45.24 51.34	Facto (dB/m -4.03 -4.02 -3.84) ((Level dBuV/m 33.52 41.22 47.50) (dB 5 7 7 5	.imit uV/m) 4.00 4.00 4.00	Margin (dB) -20.48 -32.78 -26.50	Detector AVG peak peak





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est I	Mode:		8-DI	PSK Mode	2402MHz				
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	F	requer	ncv	Reading	Factor	Level	Limit	Margin	
No	• • •	(MHz		(dBuV)	(dB/m)		i) (dBuV/m)	(dB)	Detector
1	2	321.7	00	40.80	-4.03	36.77	74.00	-37.23	peak
		322.0		31.94	-4.03	27.91	54.00	-26.09	AVG
2		522.0	00				74.00	-30.26	peak
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3		361.9		47.58	-3.84	43.74			•
3		361.9 362.0		47.58 41.94	-3.84 -3.84	43.74 38.10	54.00	-15.90	AVG
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2.Margin value = Level -Limit value



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2476.50	0 2486.50	2496.50	2506.50 2	516.50 (MHz)	2536.50	2546.50 2556	.50 2566.	50 2576
No.	Freque	-	Reading	Factor	Level	Limit	Margin	Detecto
	(MH	z)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2483.	500	39.54	-3.31	36.23	74.00	-37.77	peak
2	2483.	500	29.65	-3.31	26.34	54.00	-27.66	AVG
	2520.	000	38.44	-3.20	35.24	54.00	-18.76	AVG
	2520	113	44.67	-3.20	41.47	74.00	-32.53	peak
	2520.		40.00	-3.11	37.51	74.00	-36.49	peak
3 *	2520.	833	40.62	-3.11	01.01		1	
3 * 4			40.62 30.46	-3.11	27.35	54.00	-26.65	AVG

2.Margin value = Level -Limit value





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N	lo.		uency Hz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecto
	1	2483	3.500	37.94	-3.31	34.63	74.00	-39.37	peak
1	2	2483	3.500	28.27	-3.31	24.96	54.00	-29.04	AVG
_	3 *	2519	9.900	33.62	-3.20	30.42	54.00	-23.58	AVG
3					-3.20	37.32	74.00	-36.68	peak

Remarks:

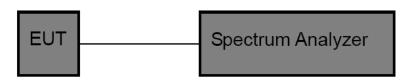


3.4. Band edge and Spurious Emissions (Conducted)

<u>Limit</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d):In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

Test Configuration



Test Procedure

- 1. The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement.
- 2. Set to the maximum power setting and enable the EUT transmit continuously
- Use the following spectrum analyzer settings: RBW = 100 kHz, VBW ≥ RBW, scan up through 10th harmonic. Sweep = auto, Detector function = peak, Trace = max hold
- Measure and record the results in the test report.
- 4. Measure and record the results in the test re

Test Mode

Please refer to the clause 2.4.

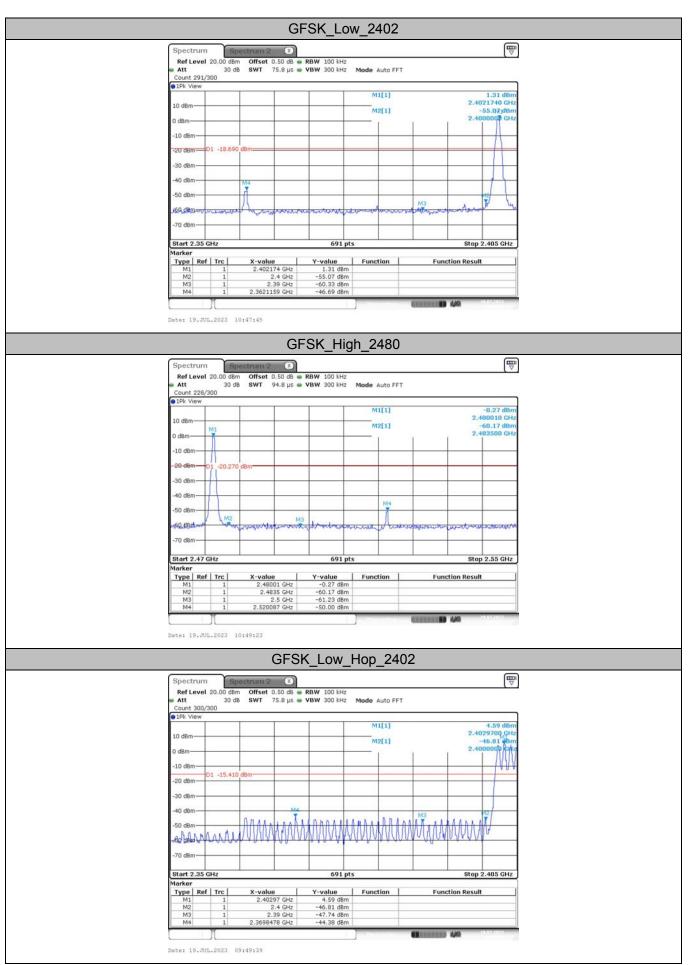
Test Results

(1) Band edge Conducted Test

Test Mode	Frequency[MHz]	Ref Level[dBm]	Result[dBm]	Limit[dBm]	Verdict
	2402	1.31	-46.69	≤-18.69	PASS
GFSK	2480	-0.27	-50.00	≤-20.27	PASS
Gran	Hop_2402	4.59	-44.38	≤-15.41	PASS
	Hop_2480	4.41	-47.32	≤-15.59	PASS
	2402	1.29	-48.09	≤-18.71	PASS
	2480	-0.82	-50.71	≤-20.82	PASS
π/4-DQPSK	Hop_2402	4.55	-45.13	≤-15.45	PASS
	Hop_2480	3.26	-48.36	≤-16.74	PASS
	2402	0.98	-49.37	≤-19.02	PASS
8-DPSK	2480	0.31	-50.99	≤-19.69	PASS
0-DH2K	Hop_2402	3.74	-43.98	≤-16.26	PASS
	Hop_2480	4.05	-46.74	≤-15.95	PASS



Page 51 of 86

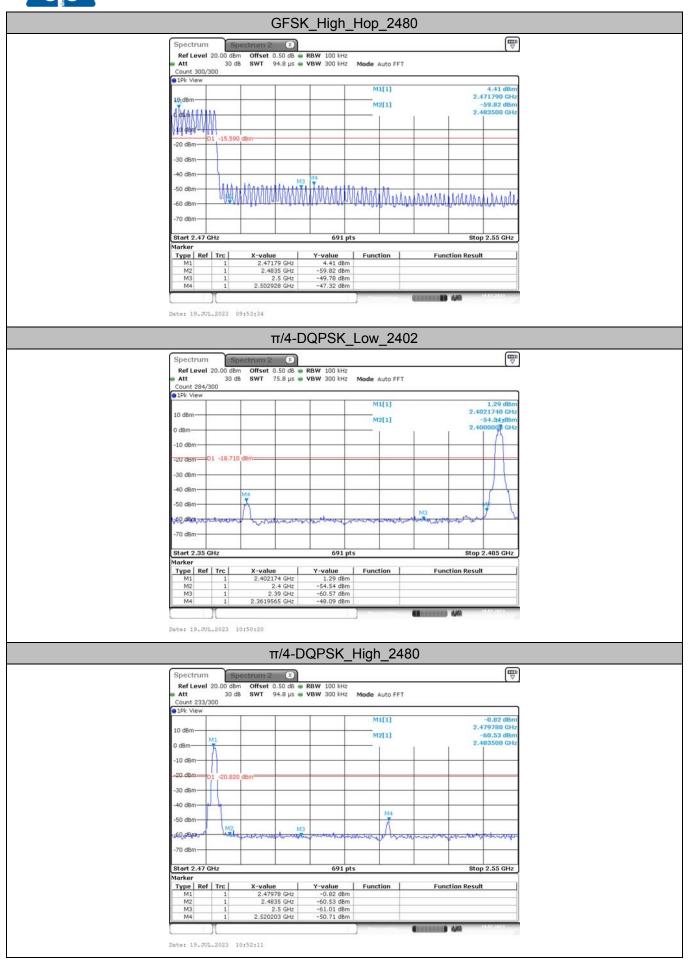


CTC Laboratories, Inc.

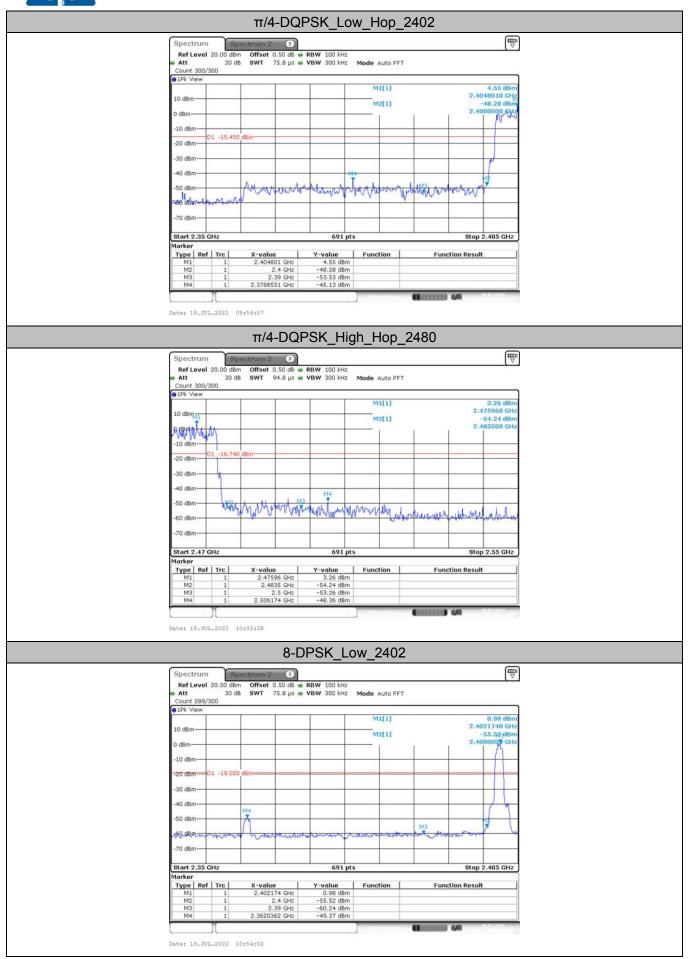


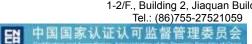
1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park, Shenzhen, Guangdong, China Fax: (86)755-27521011 Http://www.sz-ctc.org.cn For anti-fake verification, please visit the official website of Certification and Accreditation Administration of the People's Republic of China : yz.cnca.cn



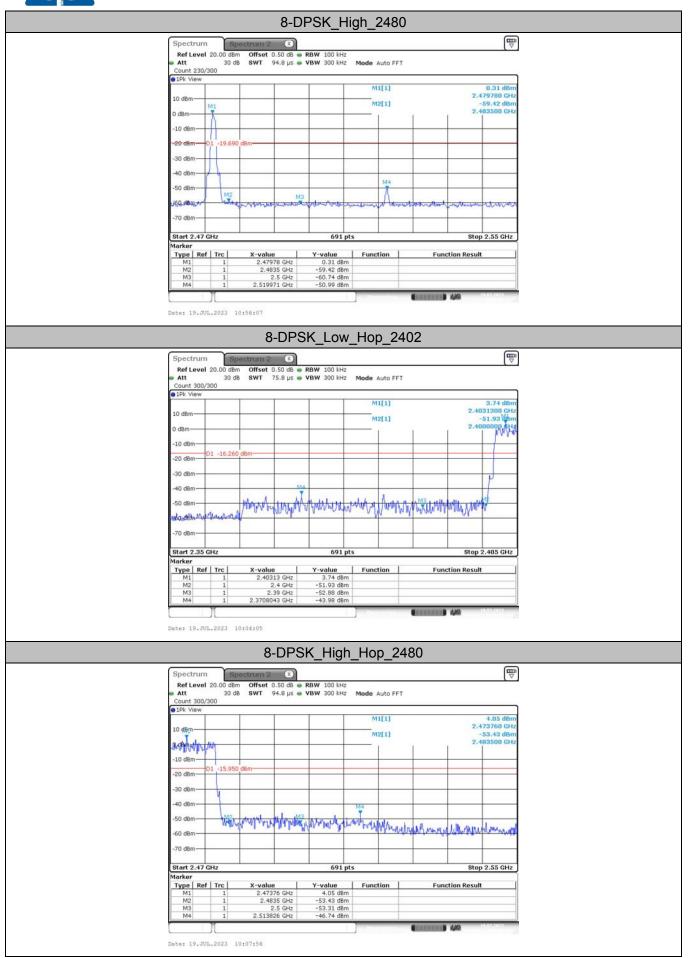












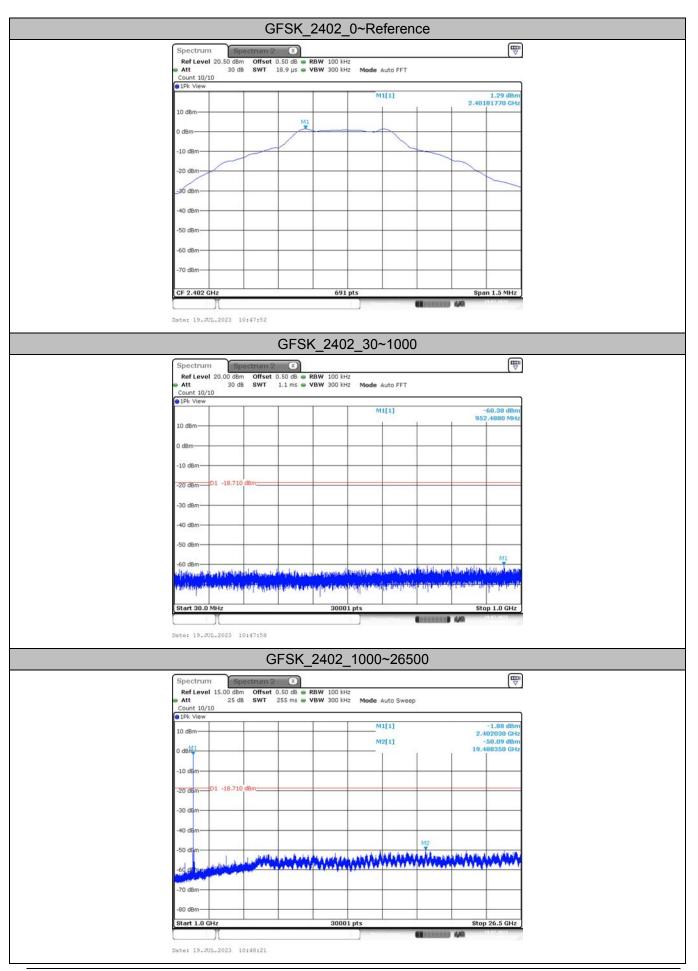


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(2) Conducted Spurious Emissions Test

Test Mode	Frequency[MHz]	Freq Range [MHz]	Ref Level [dBm]	Result [dBm]	Limit [dBm]	Verdict
		Reference	1.29	1.29		PASS
	2402	30~1000	1.29	-60.38	≤-18.71	PASS
		1000~26500	1.29	-50.09	≤-18.71	PASS
		Reference	1.09	1.09		PASS
GFSK	2441	30~1000	1.09	-60.66	≤-18.91	PASS
		1000~26500	1.09	-49.87	≤-18.91	PASS
		Reference	0.29	0.29		PASS
	2480	30~1000	0.29	-59.73	≤-19.71	PASS
		1000~26500	0.29	-49.65	≤-19.71	PASS
		Reference	1.25	1.25		PASS
	2402	30~1000	1.25	-60.71	≤-18.75	PASS
		1000~26500	1.25	-50.61	≤-18.75	PASS
	2441 2480	Reference	1.05	1.05		PASS
π/4-DQPSK		30~1000	1.05	-59.19	≤-18.95	PASS
		1000~26500	1.05	-49.77	≤-18.95	PASS
		Reference	0.26	0.26		PASS
		30~1000	0.26	-60.57	≤-19.74	PASS
		1000~26500	0.26	-50.27	≤-19.74	PASS
		Reference	1.31	1.31		PASS
	2402	30~1000	1.31	-59.92	≤-18.69	PASS
		1000~26500	1.31	-49.6	≤-18.69	PASS
		Reference	1.06	1.06		PASS
8-DPSK	2441	30~1000	1.06	-60.06	≤-18.94	PASS
		1000~26500	1.06	-50.68	≤-18.94	PASS
		Reference	0.33	0.33		PASS
	2480	30~1000	0.33	-59.87	≤-19.67	PASS
		1000~26500	0.33	-50.08	≤-19.67	PASS

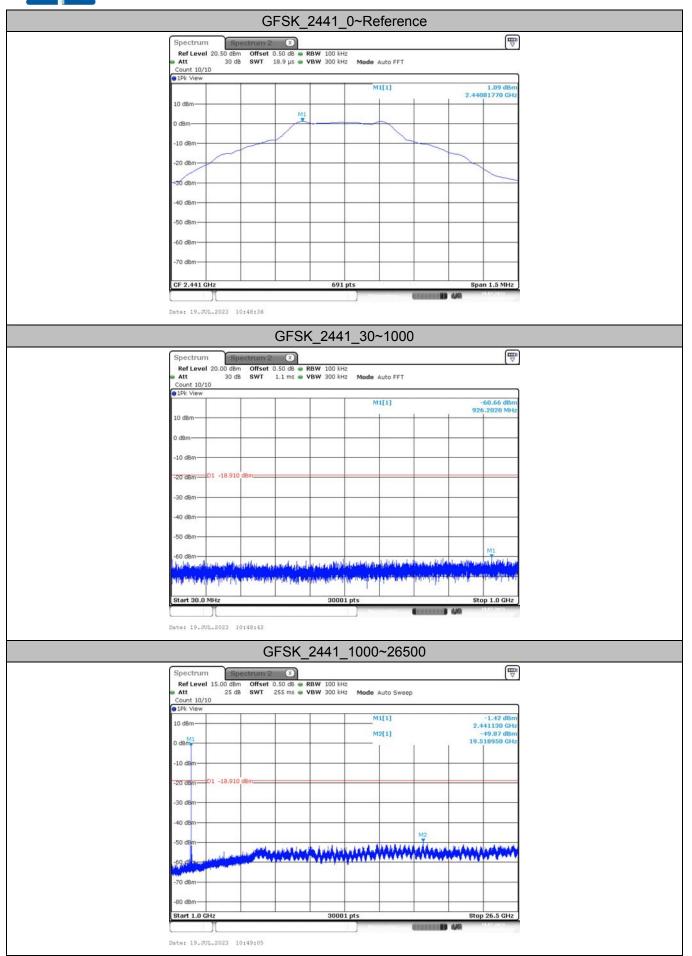






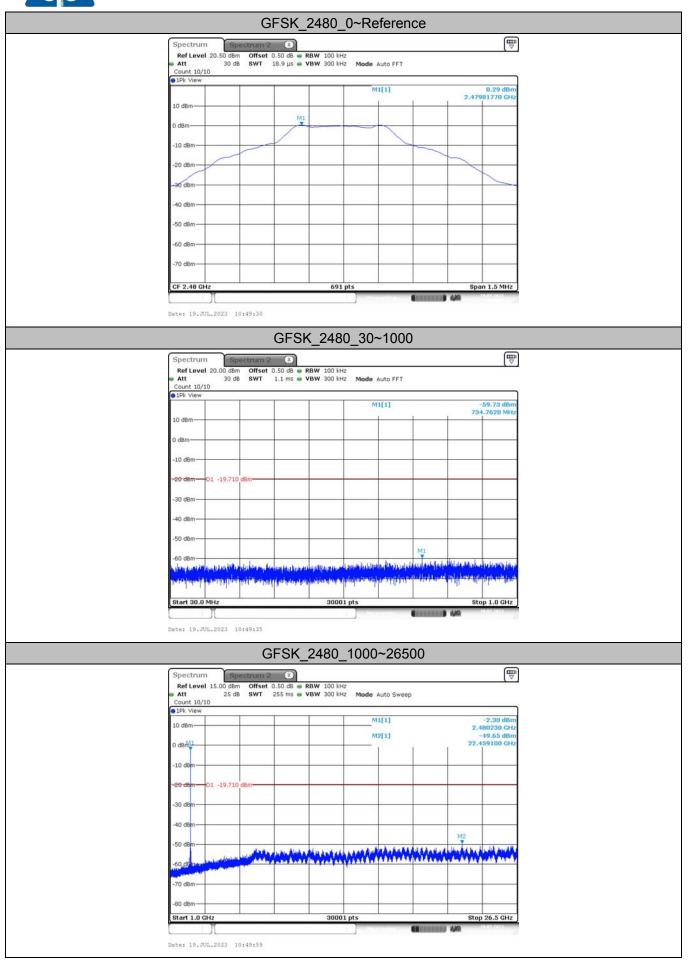
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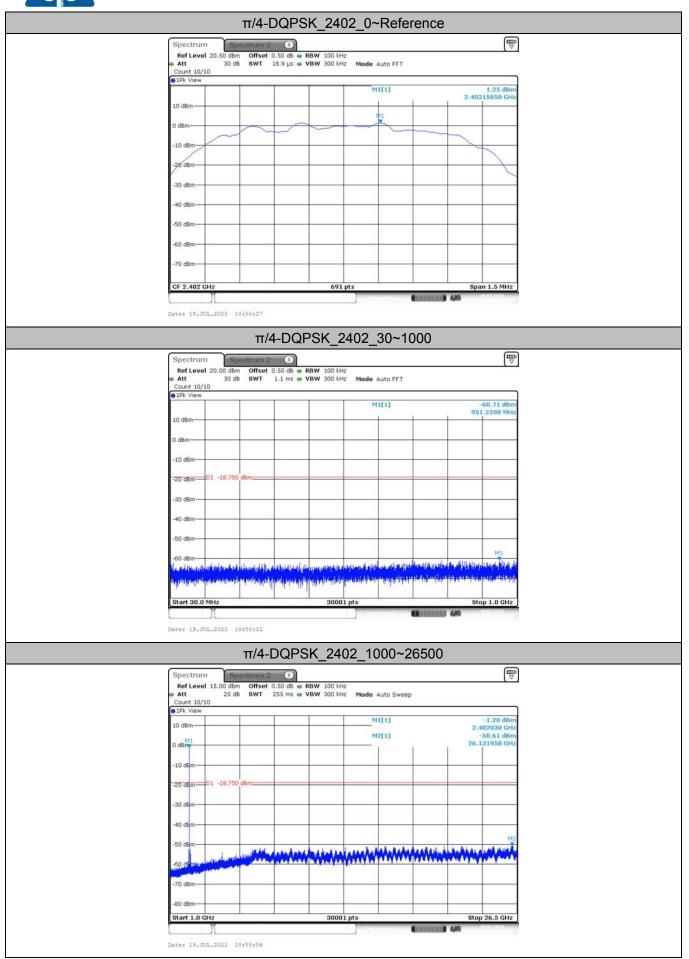




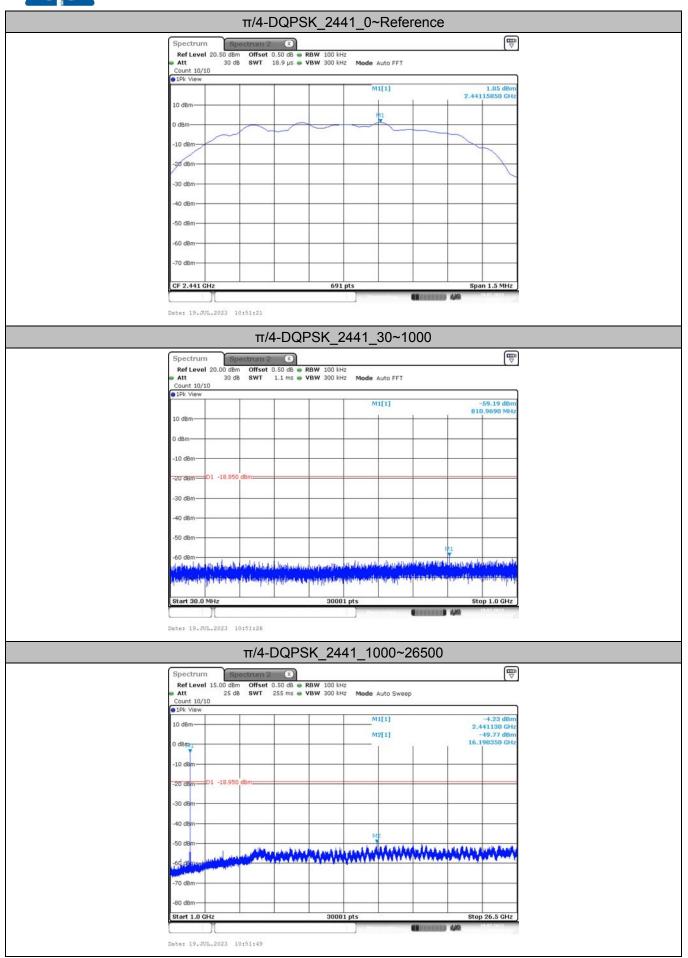






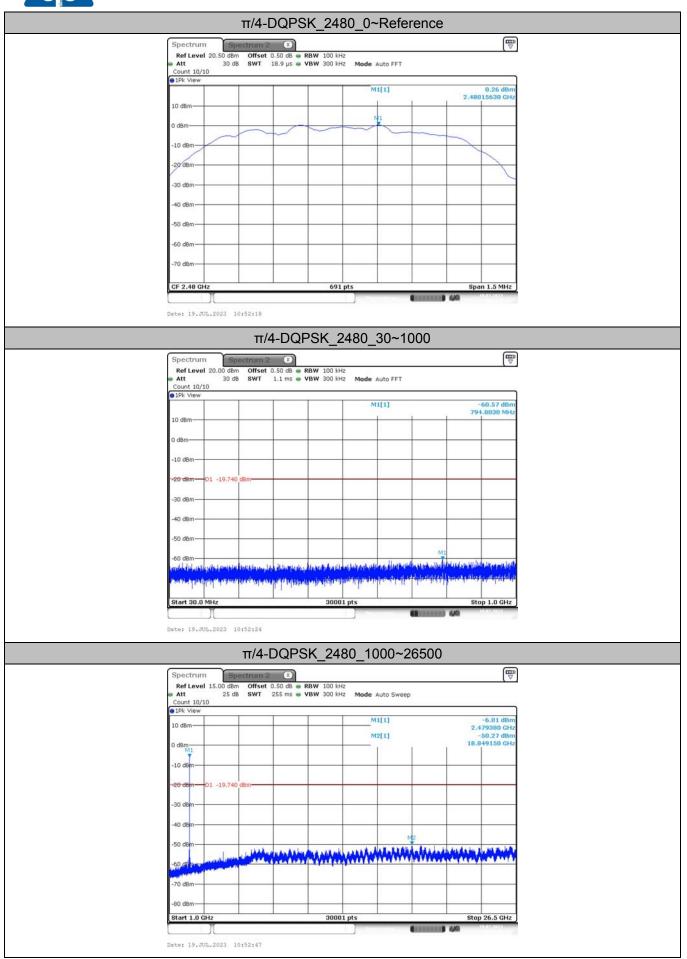






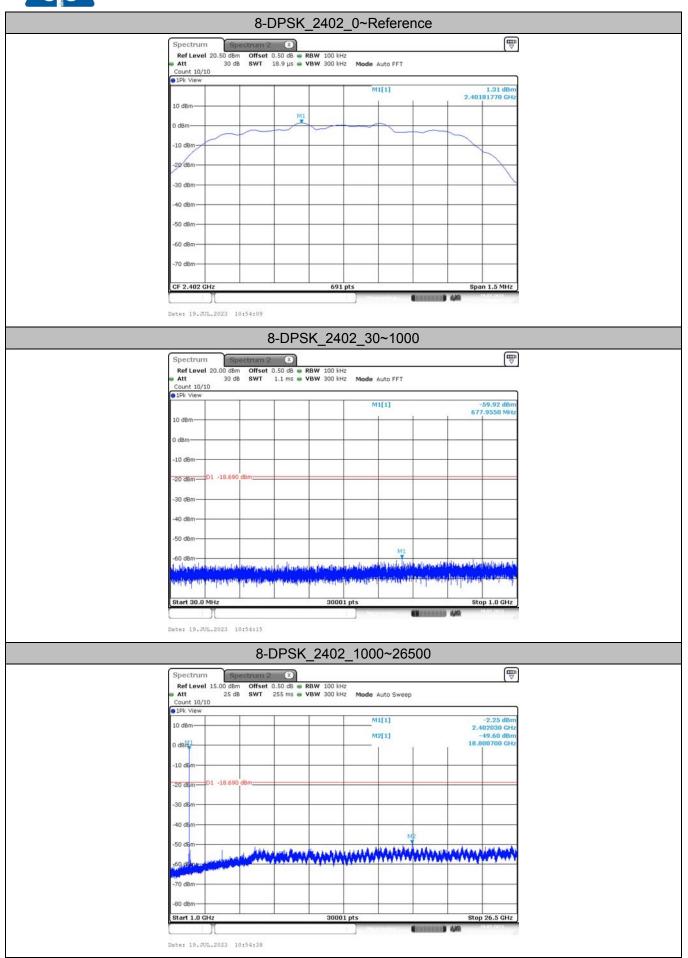




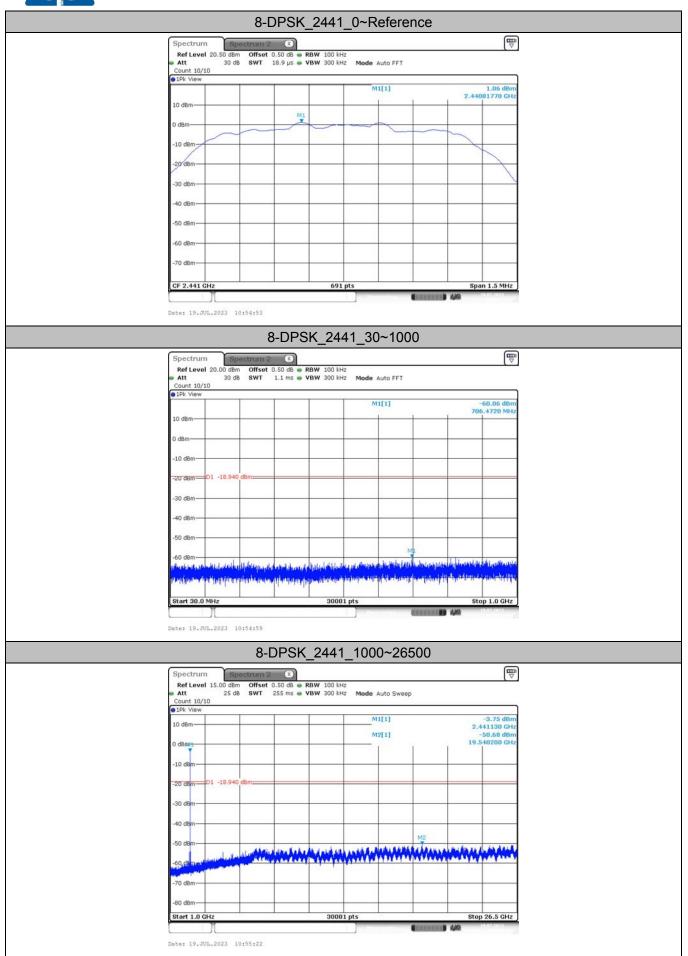




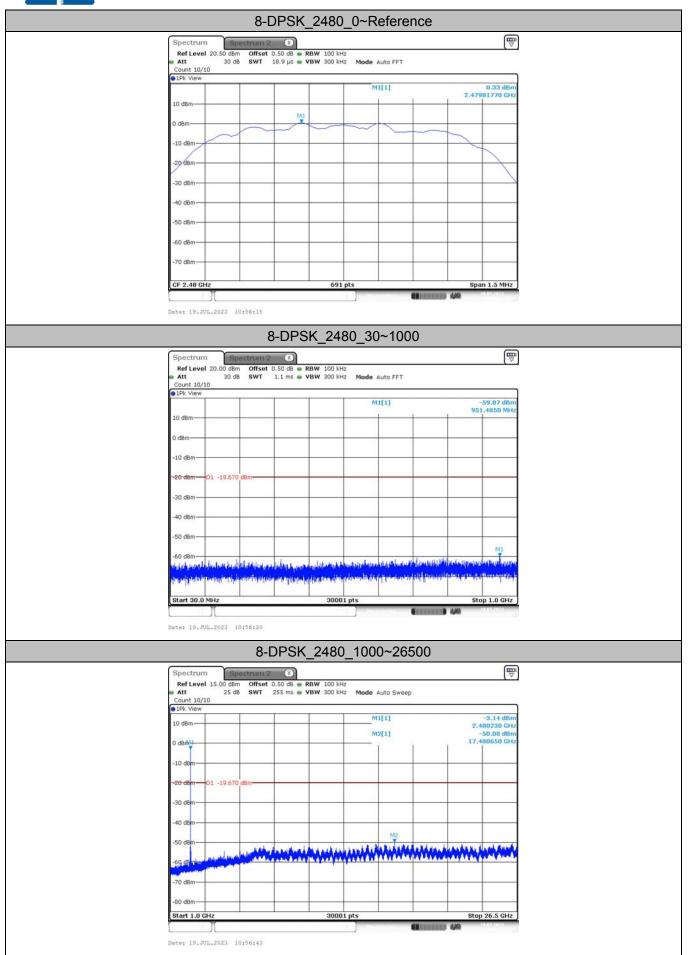












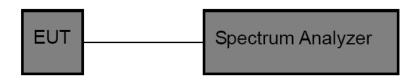


3.5. 20DB Bandwidth

<u>Limit</u>

N/A

Test Configuration



Test Procedure

- 5. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- 6. OCB and 20dB Spectrum Setting:
 - (1) Set RBW = $1\% \sim 5\%$ occupied bandwidth.
 - (2) Set the video bandwidth (VBW) \geq 3 RBW.
 - (3) Detector = Peak.
 - (4) Trace mode = Max hold.
 - (5) Sweep = Auto couple.

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

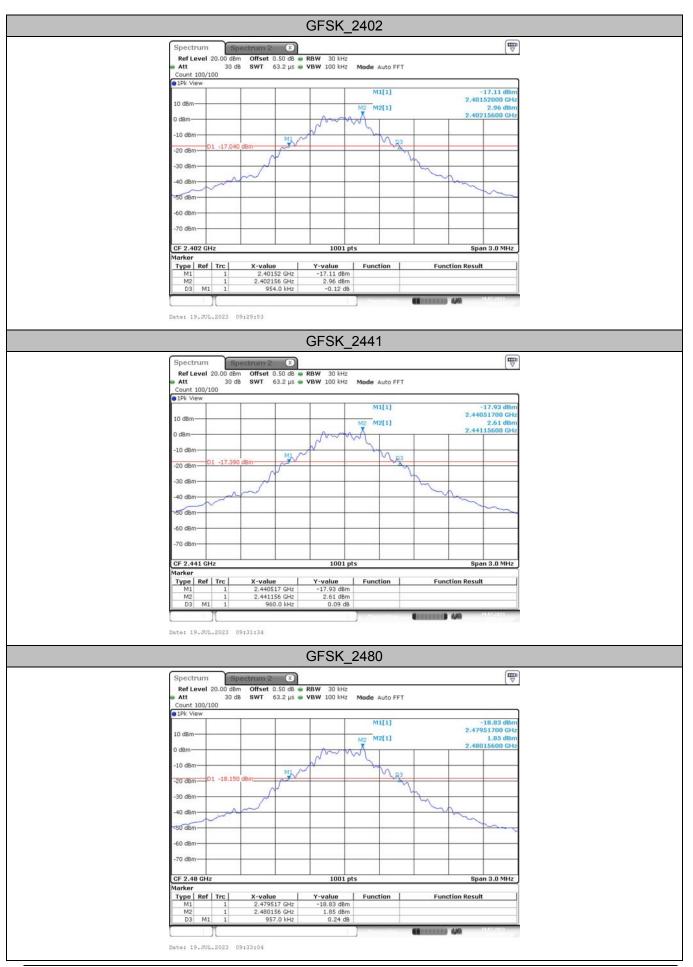
Test Mode

Please refer to the clause 2.4.

Test Results

Test Mode	Frequency[MHz]	20db EBW[MHz]	20dB Bandwidth *2/3 (kHz)	Verdict
	2402	0.954	636	PASS
GFSK	2441	0.960	640	PASS
	2480	0.957	638	PASS
	2402	1.290	860	PASS
π/4-DQPSK	2441	1.317	878	PASS
	2480	1.311	874	PASS
	2402	1.284	856	PASS
8-DPSK	2441	1.284	856	PASS
	2480	1.290	860	PASS

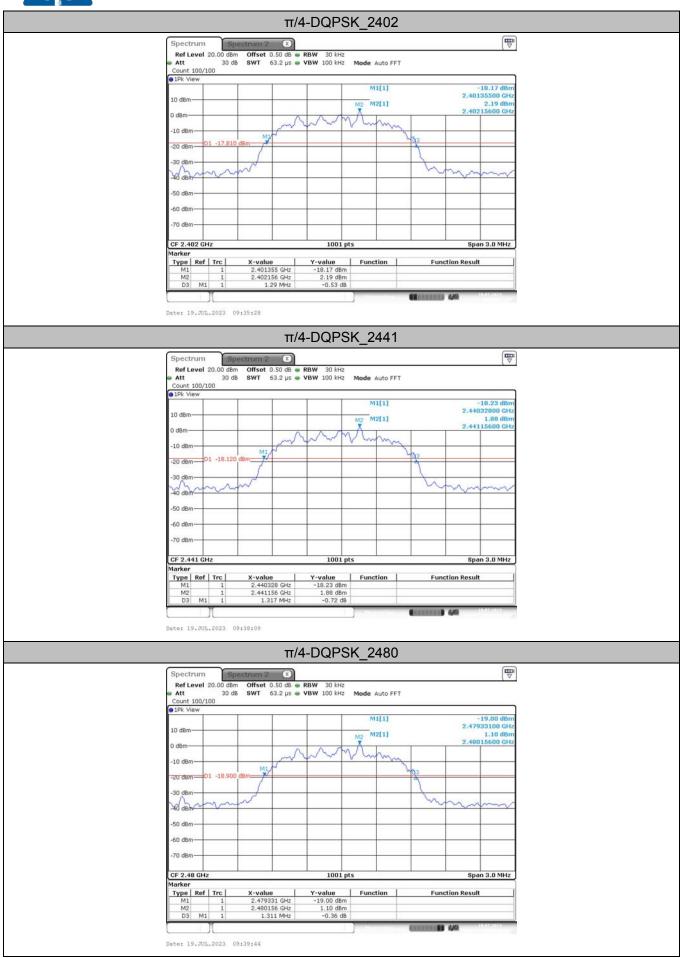






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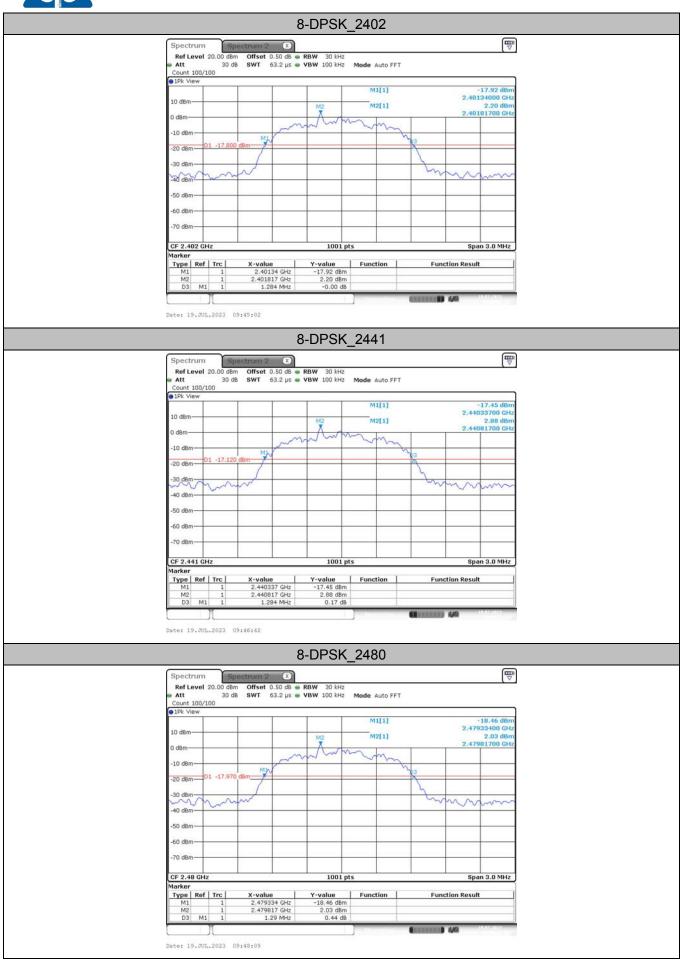








Page 68 of 86







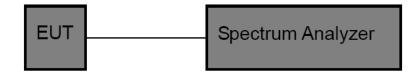
3.6. Channel Separation

<u>Limit</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(1)/ RSS-247 5.1 b :

Test Item	Limit	Frequency Range(MHz)	
Channel Separation	>25KHz or >two-thirds of the 20 dB bandwidth Which is greater	2400~2483.5	

Test Configuration



Test Procedure

- 7. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- 8. Spectrum Setting:
 - (1) Set RBW = 100 kHz.
 - (2) Set the video bandwidth (VBW) \geq 3 RBW.
 - (3) Detector = Peak.
 - (4) Trace mode = Max hold.
 - (5) Sweep = Auto couple.

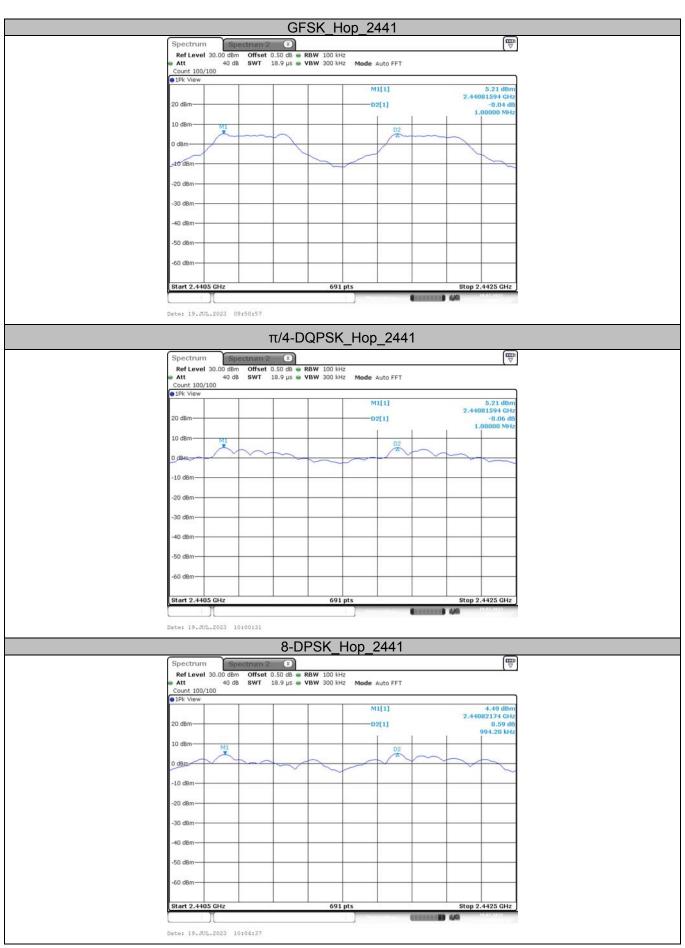
Test Mode

Please refer to the clause 2.4.

Test Results

Test Mode	Frequency[MHz]	Result[MHz]	Limit[kHz]	Verdict
GFSK	Hop_2441	1.000	>640	PASS
π/4-DQPSK	Hop_2441	1.000	>878	PASS
8-DPSK	Hop_2441	0.994	>856	PASS







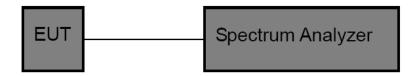
3.7. Number of Hopping Channel

<u>Limit</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(iii)/ RSS-247 5.1 d:

Section	Test Item	Limit
15.247 (a)(iii)/ RSS-247 5.1 d:	Number of Hopping Channel	>15

Test Configuration



Test Procedure

1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.

- 2. Spectrum Setting:
 - (1) Peak Detector: RBW=100 kHz, VBW≥RBW, Sweep time= Auto.

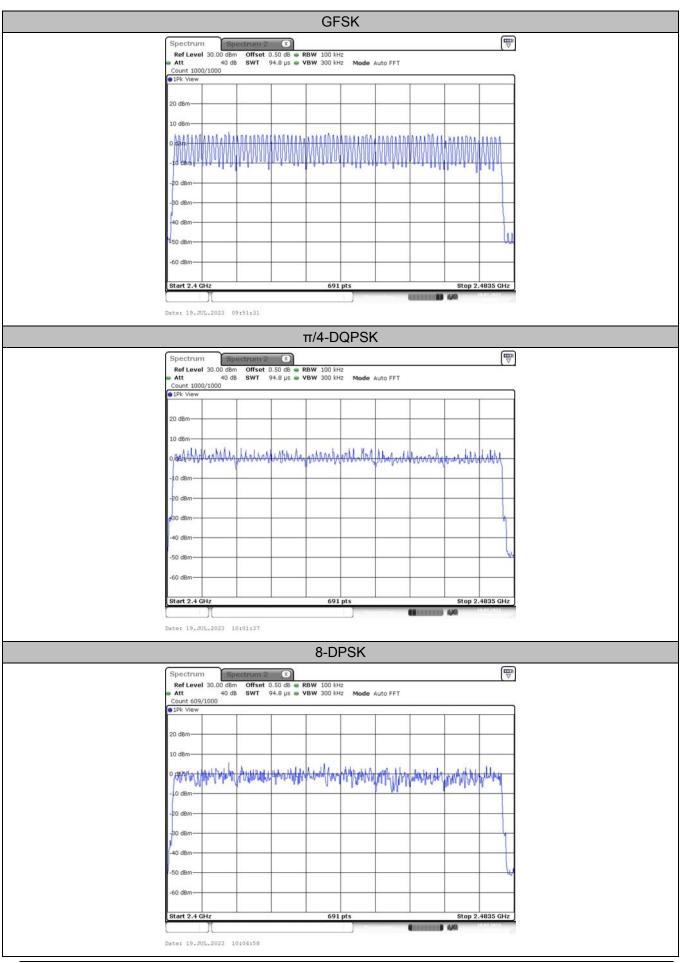
Test Mode

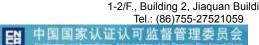
Please refer to the clause 2.4.

Test Result

Modulation type	Channel number	Limit	Result	
GFSK	79			
π/4-DQPSK	79	≥15.00	Pass	
8DPSK	79			







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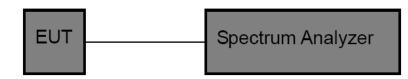


3.8. Dwell Time

<u>Limit</u>

Section	Test Item	Limit
15.247(a)(iii)/ RSS-247 5.1 d	Average Time of Occupancy	0.4 sec

Test Configuration



Test Procedure

- 1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- 2. Spectrum Setting:
 - (1) Spectrum Setting: RBW=1MHz, VBW≥RBW.
 - (2) Use video trigger with the trigger level set to enable triggering only on full pulses.
 - (3) Sweep Time is more than once pulse time.
- (4) Set the center frequency on any frequency would be measure and set the frequency span to zero.
 - (5) Measure the maximum time duration of one single pulse.
 - (6) Set the EUT for packet transmitting.

Test Mode

Please refer to the clause 2.4.

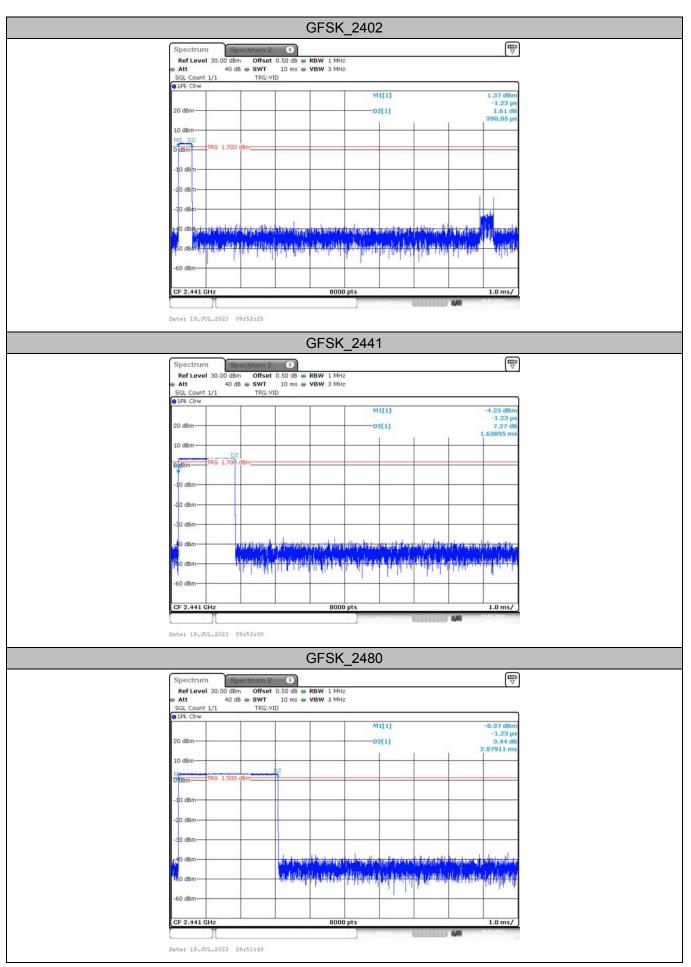


Test Result

Modulation type	Channel	Frequency [MHz]	Pulse Time (ms)	Total of Dwell (ms)	Period Time (ms)	Limit (Second)	Result
	DH1	2441	0.39	124.80	31.60		
GFSK	DH3	2441	1.64	262.40	31.60	≤ 0.40	Pass
	DH5	2441	2.88	307.20	31.60		
	2DH1	2441	0.40	128.00	31.60		
π/4-DQPSK	2DH3	2441	1.64	262.40	31.60	≤ 0.40	Pass
	2DH5	2441	2.89	308.27	31.60		
	3DH1	2441	0.40	128.00	31.60		
8-DPSK	3DH3	2441	1.64	262.40	31.60	≤ 0.40	Pass
	3DH5	2441	2.89	308.27	31.60		

Note: 1DH1/2DH1/3DH1Total of Dwell= Pulse Time*(1600/2)*31.6/79 1DH3/2DH3/3DH3 Total of Dwell= Pulse Time*(1600/4)*31.6/79 1DH5/2DH5/3DH5 Total of Dwell= Pulse Time*(1600/6)*31.6/79

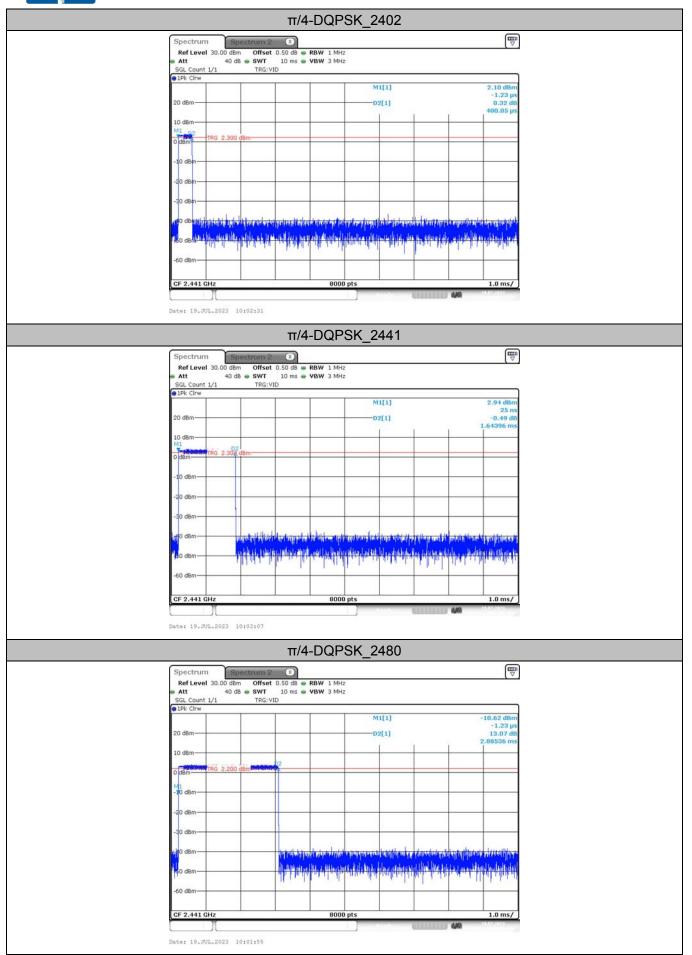






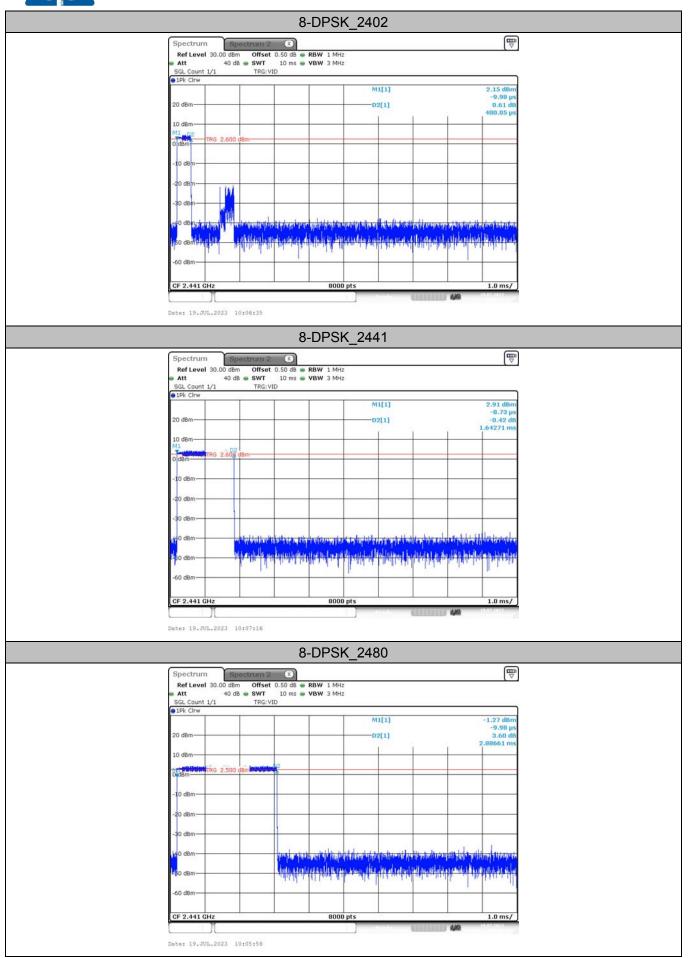
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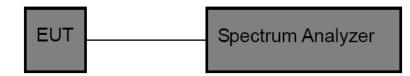
3.9. Peak Output Power

<u>Limit</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (b)(1) / RSS-247 5.4 b:

Test Item	Limit	Frequency Range(MHz)
Maximum Conducted Peak Output Power	Hopping Channels>75 Pow- er<1W(30dBm) Other <125mW(21dBm)	2400~2483.5
E.I.R.P	4 Watt or 36dBm	2400~2483.5

Test Configuration



Test Procedure

1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.

- 2. Spectrum Setting:
 - (1) Set RBW> 20DB Bandwidth.
 - (2) Set the video bandwidth (VBW) \ge RBW.
 - (3) Detector = Peak.
 - (4) Trace mode = Max hold.
 - (5) Sweep = Auto couple.

Test Mode

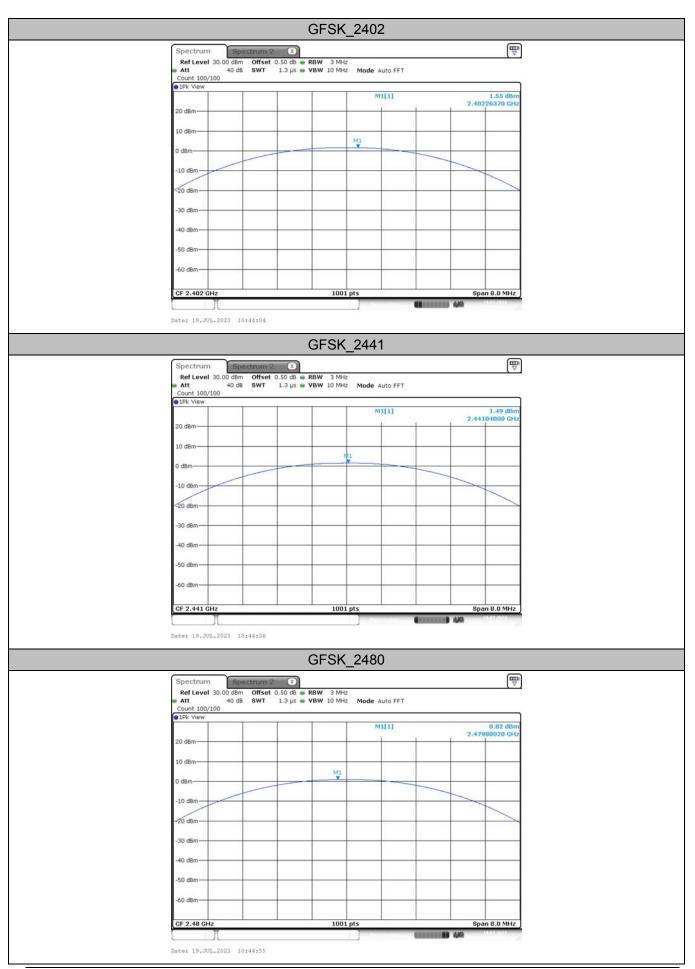
Please refer to the clause 2.4.

Test Result

Test Mode	Frequency[MHz]	Result[dBm]	Limit[dBm]	Verdict
GFSK	2402	1.55	<=30	PASS
	2441	1.49	<=30	PASS
	2480	0.82	<=30	PASS
π/4-DQPSK	2402	2.64	<=30	PASS
	2441	2.70	<=30	PASS
	2480	1.99	<=30	PASS
8-DPSK	2402	3.07	<=30	PASS
	2441	2.89	<=30	PASS
	2480	2.17	<=30	PASS



Page 79 of 86

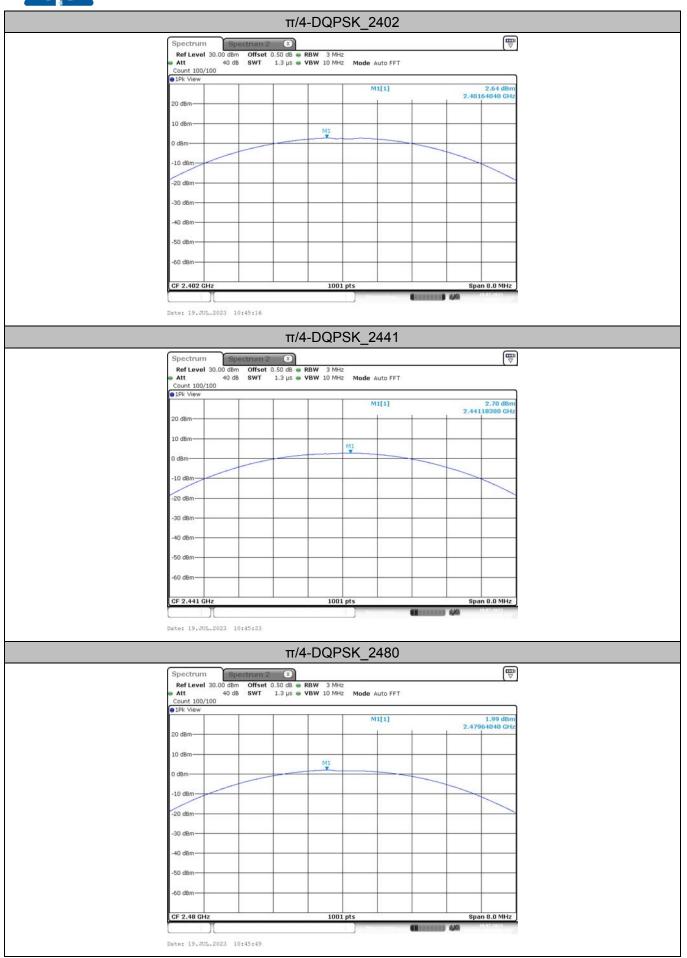


CTC Laboratories, Inc.



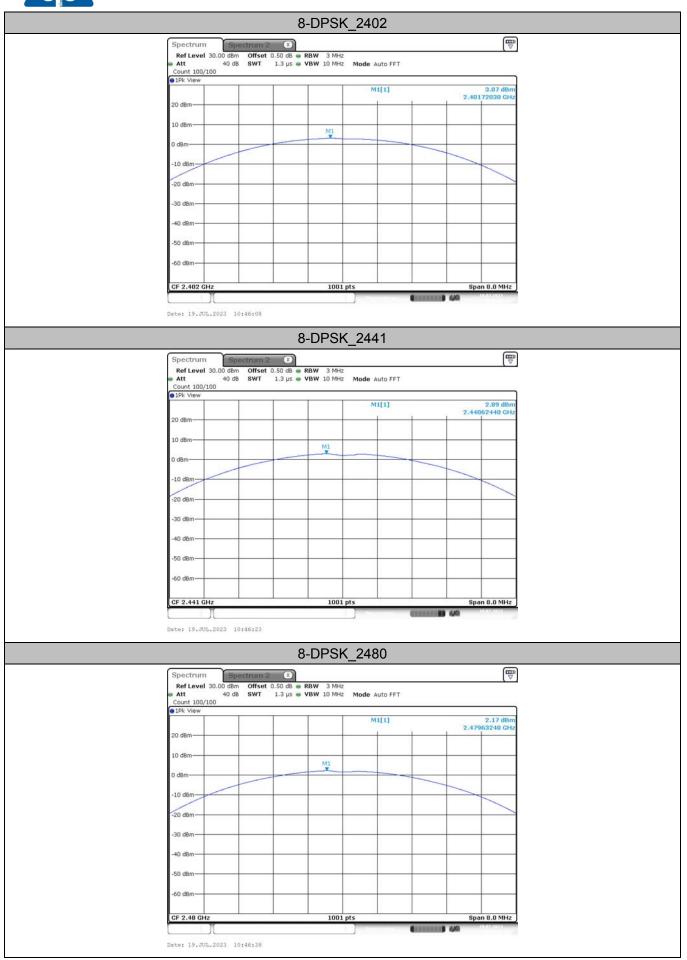
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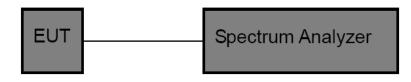


3.10. Duty Cycle

Limit

None, for report purposes only.

Test Configuration



Test Procedure

- 1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- 2. The EUT was directly connected to the Spectrum Analyzer and antenna output port as show in the block diagram above. The measurement according to section 10.2 of KDB 558074 D01 DTS Meas Guidance v05r02.

Spectrum Setting: 3.

Set analyzer center frequency to test channel center frequency. Set the span to 0Hz Set the RBW to 10MHz Set the VBW to 10MHz Detector: Peak Sweep time: Auto

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

Test Mode

Please refer to the clause 2.4.

Test Result

Test Mode	Frequency [MHz]	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	1/T Minimum VBW (kHz)	Final setting For VBW (kHz)
GFSK	2402	2.86	3.76	76.06	0.35	1
	2441	2.86	3.75	76.27	0.35	1
	2480	2.86	3.75	76.27	0.35	1
π/4-DQPSK	2402	2.87	3.77	76.13	0.35	1
	2441	2.88	3.78	76.19	0.35	1
	2480	2.87	3.77	76.13	0.35	1
8-DPSK	2402	2.87	3.77	76.13	0.35	1
	2441	2.88	3.78	76.19	0.35	1
	2480	2.88	3.78	76.19	0.35	1

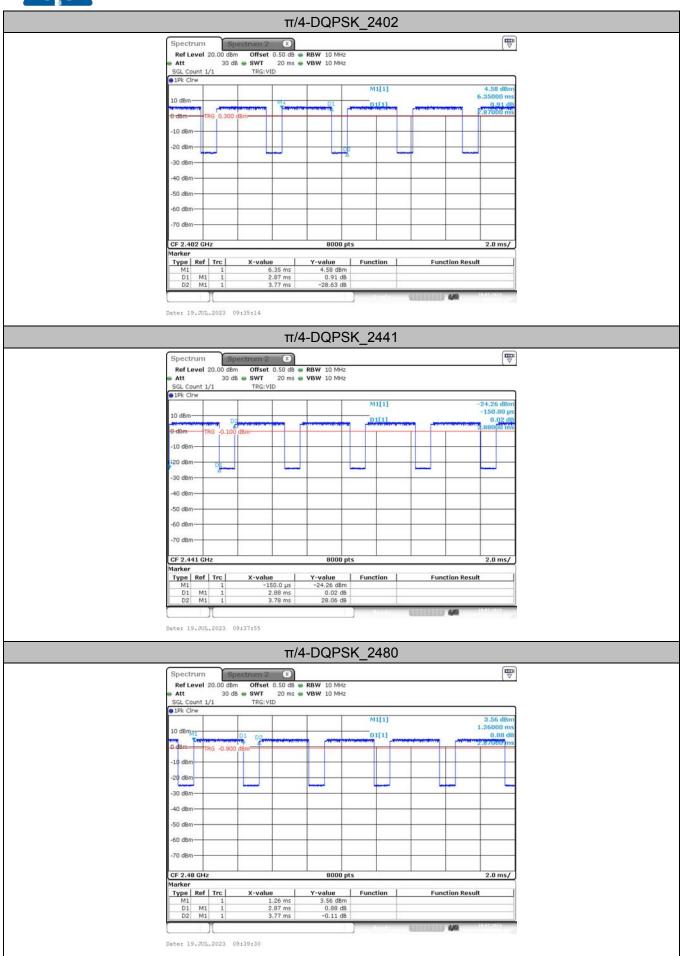






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3.11. Antenna requirement

Requirement

FCC CFR Title 47 Part 15 Subpart C Section 15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

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

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

Test Result

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