

CTC Laboratories, Inc.

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Т	EST REPORT				
Report No	CTC20221184E01				
FCC ID······:	2APPZ-X210V2				
Applicant:	Fanvil Technology Co., LTD.				
Address	10/F Block A, Dualshine Global Science Innovation Center, Honglang North 2nd Road, Bao'an District, Shenzhen, China				
Manufacturer:	Fanvil Technology Co., LTD.				
Address:	10/F Block A, Dualshine Global Scient Honglang North 2nd Road, Bao'an Dis				
Product Name·····:	IP Phone				
Trade Mark·····:	Fanvil				
Model/Type reference······:	X210 V2				
Listed Model(s) ······	X210i V2, X210i, X210				
Standard:	FCC CFR Title 47 Part 15 Subpart C	Section 15.247			
Date of receipt of test sample:	Jun. 07, 2022				
Date of testing:	Jun. 08, 2022 ~ Jun. 24, 2022				
Date of issue:	Jun. 25, 2022				
Result:	PASS				
Compiled by: (Printed name+signature)	Terry Su	Tenny Su Zic zhang			
Supervised by: (Printed name+signature)	Eric Zhang	Zric zhang			
Approved by:		Johnas			
(Printed name+signature)	Totti Zhao				
Testing Laboratory Name:	oratory Name: CTC Laboratories, Inc.				
Address	.: 1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park, Shenzhen, Guangdong, China				
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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.

1.2. Report version

Revised No.	Date of issue	Description
01	Jun. 25, 2022	Original



1.3. Test Description

FCC Part 15 Subpart C (15.247)/ RSS 247 Issue 2					
Test liter	Standard	I Section	Decult	T	
Test Item	FCC IC		Result	Test Engineer	
Antenna Requirement	15.203	/	Pass	Alicia Liu	
Conducted Emission	15.207	RSS-Gen 8.8	Pass	Ice Lu	
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 TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile 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
Transmitter power conducted	0.42 dB	(1)
Transmitter power Radiated	2.14 dB	(1)
Conducted spurious emissions 9kHz~40GHz	1.60 dB	(1)
Radiated spurious emissions 9kHz~40GHz	2.20 dB	(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)
Occupied Bandwidth		(1)

Note (1): This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

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:	Fanvil Technology Co., LTD.	
Address:	10/F Block A, Dualshine Global Science Innovation Center, Honglang North 2nd Road, Bao'an District, Shenzhen, China	
Manufacturer:	Fanvil Technology Co., LTD.	
Address:	10/F Block A, Dualshine Global Science Innovation Center, Honglang North 2nd Road, Bao'an District, Shenzhen, China	

2.2. General Description of EUT

Product Name:	IP Phone
Trade Mark:	Fanvil
Model/Type reference:	X210 V2
Listed Model(s):	X210i V2, X210i, X210
Model Difference:	All these models are identical in the same PCB, Layout and electrical circuit, The only difference is screen size and model name.
Power supply:	5Vdc/2A from external power supply 48Vdc/0.3A from POE
Hardware version:	2.0
Software version:	2.12.1.3
Test sample NO .:	CTC220422-070
Bluetooth 5.0/EDR	
Modulation:	GFSK, π/4-DQPSK, 8-DPSK
Operation frequency:	2402MHz~2480MHz
Channel number:	79
Channel separation:	1MHz
Antenna type:	FPC Antenna
Antenna gain:	2.6dBi



2.3. Accessory Equipment information

Equipment Information						
Name	Model	S/N	Manufacturer			
Notebook	ThinkBook 14G3 ACL	MP246QDR	Lenovo			
AC/DC Adapter	F12W8-050200SPAU	/	FRECOM			
Cable Information	Cable Information					
Name	Shielded Type	Ferrite Core	Length			
DC Out Cable	Without	Without	1.5M			
Test Software Information						
Name	/	/	/			
SecureCRT.exe	8.7.1	/	/			



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	Spectrum Analyzer	Rohde & Schwarz	FSU26	100105	Dec. 23, 2022	
2	Spectrum Analyzer	Rohde & Schwarz	FUV40-N	101331	Mar. 15, 2023	
3	MXG Vector Signal Generator	Agilent	N5182A	MY47420864	Dec. 23, 2022	
4	Signal Generator	Agilent	E8257D	MY46521908	Dec. 23, 2022	
5	Power Sensor	Agilent	U2021XA	MY5365004	Mar. 15, 2023	
6	Power Sensor	Agilent	U2021XA	MY5365006	Mar. 15, 2023	
7	High and low tempera- ture box	ESPEC	MT3035	N/A	Mar. 15, 2023	
8	Wideband Radio Com- munication Tester	Rohde & Schwarz	CMW500	102414	Dec. 23, 2022	
9	300328 v2.2.2 test sys- tem	TONSCEND	v2.6	/	/	

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	Jan. 12, 2023	
2	Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-647	Dec. 23, 2022	
3	Loop Antenna	LAPLAC	RF300	9138	Dec. 23, 2022	
4	Spectrum Analyzer	R&S	FSU26	100105	Dec. 23, 2022	
5	Spectrum Analyzer	R&S	FSV40-N	101331	Mar. 15, 2023	
6	Pre-Amplifier	SONOMA	310	186194	Dec. 23, 2022	
7	Low Noise Pre-Amplifier	EMCI	EMC051835	980075	Dec. 23, 2022	
8	Test Receiver	R&S	ESCI7	100967	Dec. 23, 2022	
9	3m chamber 2	Frankonia	EE025	/	Oct. 23, 2024	

Radiate	d emission(3m chamber 3)	1			
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated Until
1	Trilog-Broadband Anten- na	Schwarzbeck	VULB 9168	9168-759	Nov. 09, 2022
2	Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-647	Dec. 23, 2022
3	Test Receiver	Keysight	N9038A	MY56400071	Dec. 23, 2022
4	Broadband Premplifier	SCHWARZBECK	BBV9743B	259	Dec. 23, 2022
5	Mirowave Broadband Amplifier	SCHWARZBECK	BBV9718C	111	Dec. 23, 2022
6	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. 23, 2022
2	LISN	R&S	ENV216	101113	Dec. 23, 2022
3	EMI Test Receiver	R&S	ESCS30	100353	Dec. 23, 2022

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

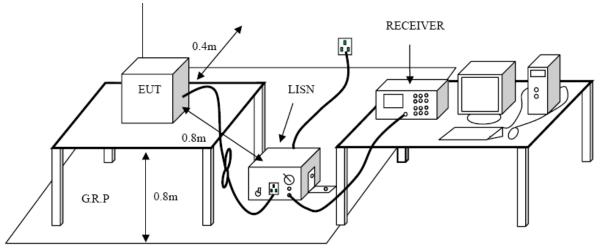
<u>Limit</u>

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

	Limit (d	BuV)
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



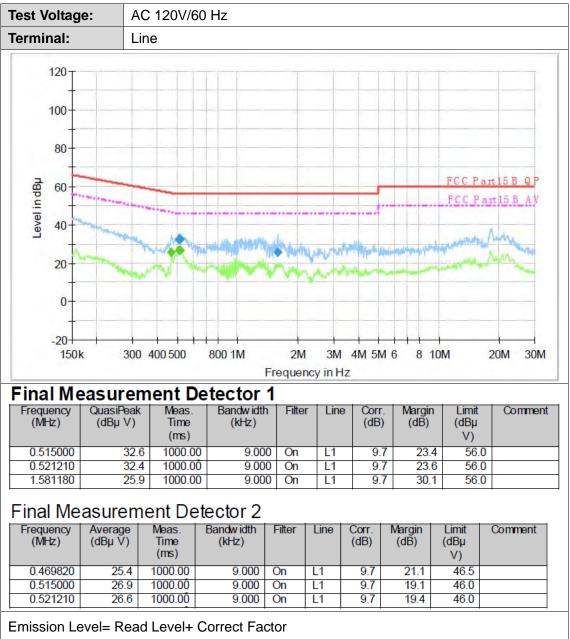
Test Procedure

- 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.







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Frequ	iency	Quas	iPeak	Meas.	Bandw idth		r Line			Limit	Comment
(M	Hz)	(dB	µV)	Time (ms)	(kHz)			(dB)	(dB)	(dBµ V)	
	51200		39.8	1000.00			N	10.0			
0.5	19130		31.2	1000.00			N	10.0			
			30.9	1000.00	9.00	0 On	N	10.0	25.1	56.0	ļ
0.5	21210	-									
0.5 Fina	I Me	easu	reme	ent De	tector 2						
0.5 Fina Frequ		easu Avera (dBµ	age V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµ V)	Comment
0.5 Fina Frequ (M	IM Jency Hz) 71700	Avera (dBµ	age V) 25.0	Meas. Time (ms) 1000.00	Bandwidth (kHz) 9.000	On	N	(dB) 10.0	(dB) 21.5	(dBµ V) 46.5	Comment
0.5 Fina Frequ (M 0.4 0.5	IM Jency Hz)	Avera (dBµ	age V) 25.0 24.4	Meas. Time (ms)	Bandwidth (kHz)			(dB)	(dB)	(dBµ V)	Comment

Emission Level= Read Level+ Correct Factor



3.2. Radiated Emission

<u>Limit</u>

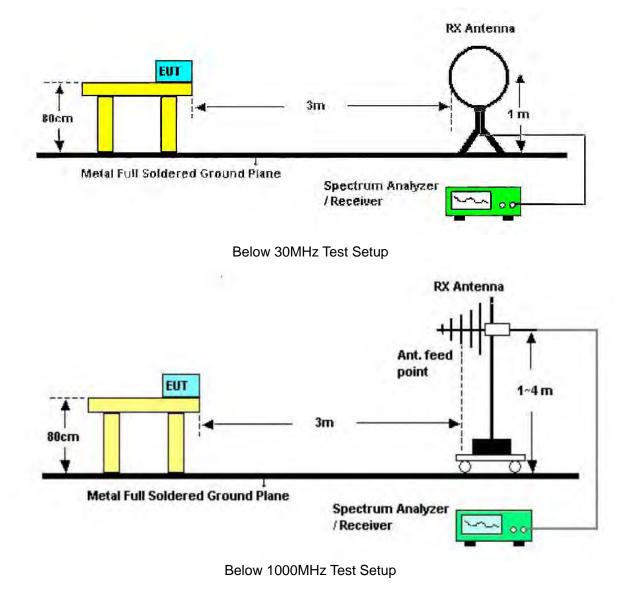
FCC CFR Title 47 Part 15 Subpart C Section 15.209/ RSS – Gen 8.9

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
Above i GHz	74.00	Peak

Note:

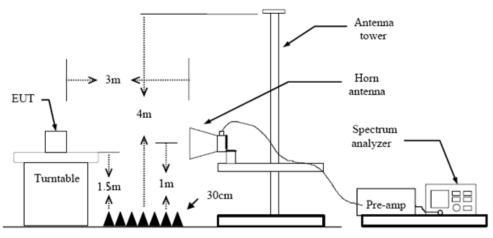
- (1) The tighter limit applies at the band edges.
- (2) Emission Level (dBuV/m)=20log Emission Level (uV/m).

Test Configuration



CTC Laboratories, Inc. 1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park, Shenzhen, Guangdong, China Tel.: (86)755-27521059 下a:: (86)755-27521011 Http://www.sz-ctc.org.cn 下or anti-fake verification, please visit the official website of Certification and Accreditation Administration of the People's Republic of China : <u>vz.cnca.cn</u>





Above 1GHz Test Setup

Test Procedure

- 1. The EUT was setup and tested according to ANSI C63.10:2013
- The EUT is placed on a turn table which is 0.8 meter above ground for below 1 GHz, and 1.5 m for 2. 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
 - (1) Span shall wide enough to fully capture the emission being measured;
 - Below 1 GHz: (2)

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.

(3) 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.

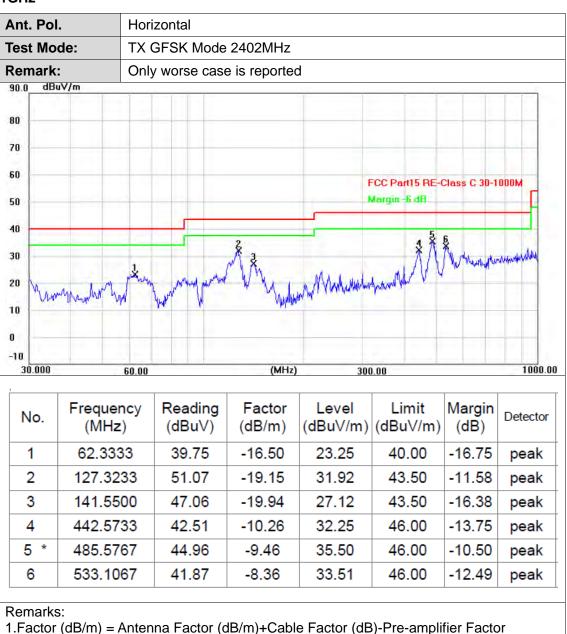
Test Result

9 KHz~30 MHz

From 9 KHz to 30 MHz: Conclusion: PASS

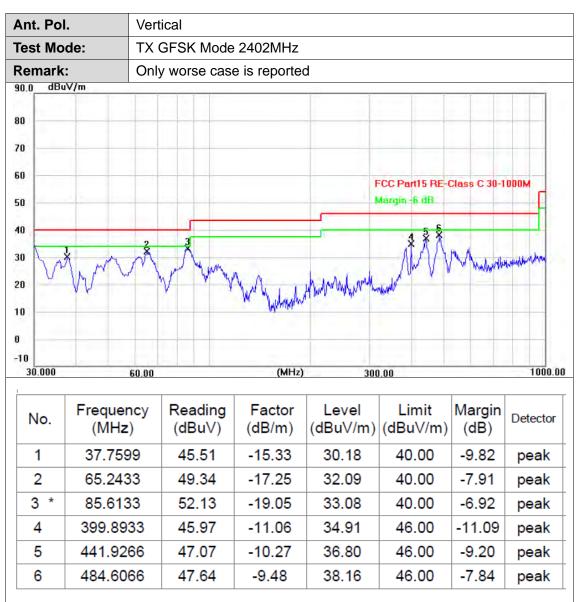
Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.





2.Margin value = Level -Limit value







Ant. Po	Ι.	Horiz	Horizontal									
Test Mo	de:	TX C	GFSK Mode	2402MHz								
Remark		No report for the emission which more than 10 dB below the pre- scribed limit.										
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No.	Freque (MH	-	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector				
1	4804.	031	2.56	28.88	31.44	54.00	-22.56	AVG				
2	4804.	062	2.56	41.71	44.27	74.00	-29.73	peak				
	⁻ (dB/m) =		na Factor (c Limit value	dB/m)+Cabl	e Factor (dE	3)-Pre-ampli	fier Facto	or				



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No.	Freque (MH		Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector					
NO.		<u> </u>											
1	4804.		2.56	26.95	29.51	54.00	-24.49	AVG					



Ant. Pol.				Hori	zontal									
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Rem	ark:			No report for the emission which more than 10 dB below the pre- scribed limit.									
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N	0.	(MH	- /										
	o. 1	4881.		2.79	27.36	30.15	54.00	-23.85	AVG				



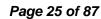


•	Hori	zontal								
de:	тх с	GFSK Mode	2480MHz							
:	No report for the emission which more than 10 dB below the pre- scribed limit.									
/m										
					FCC Part15 C	- Above 16 P	ĸ			
					FCC Part15 C	- Above 16 A	v			
×										
ŝ.										
	-	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector			
4959.7	<i>,</i>	3.04	42.63	45.67	74.00	-28.33	peak			
4960.0	222	3.04	28.70	31.74	54.00	-22.26	AVG			
	7/m 7/m 3500.00 60 Frequen (MHz	No r scrib	No report for the scribed limit.	No report for the emission v scribed limit.	No report for the emission which more t scribed limit.	No report for the emission which more than 10 dB to scribed limit. //m FCC Part15 C FCC Part15 C FCC Part15 C ***********************************	No report for the emission which more than 10 dB below the scribed limit. //m FCC Part15 C - Above 16 P FCC Part15 C - Above 16 P FCC Part15 C - Above 16 P * 3500.00 6000.00 18500.00 Frequency (dB/m) Factor (dB/M) Level Limit (dBuV/m) Margin (dB)			

2.Margin value = Level -Limit value



nt. Pol. est Mode:			Vert											
		le:					e 2480M							
emark:				No report for the emission which more than 10 dB below th scribed limit.								elow the	pre-	
0.0	dBu∀	/m		- 1		1	- 1			-	-17	_		
		_						-			FCC Part	15 C	- Above 1G P	ĸ
														-
											FEC Part	16 C	- Above TG A	V.
50	-		ŝ	-			-		-	-	-			
		_	Î	-		_		4				4		
			×											
								÷				+		
				_	_							_		
0.0										-	_			_
1000	0.000	3500.00	60	00.00	850	0.00 1	1000.00 13	8500.0	0 1600	00.00	18500.00 2	1000	.00	26000.00 M
							1							
No	b .		quer MHz			actor B/m)	Readi (dBu\	-	Le (dBu	vel V/m)	Limit (dBuV/r		Margin (dB)	Detecto
1		49	59.9	37		3.04	28.1	8	31.	.22	54.00)	-22.78	AVG
2	2	49	60.0	57	;	3.04	42.2	9	45	.33	74.00)	-28.67	peak





Ant. P	ol.	Horiz	zontal										
est M	ode:	TX 1	τ/4-DQPSK	Mode 2402	2MHz								
Remar	'k:		No report for the emission which more than 10 dB below the pre- scribed limit.										
00.0 dl	Bu¥/m	-	1	-	-	1							
						FCC Part15 C	Above TG PI	¢.					
							-						
-		_				FEC Partis C	Ahove 15 A						
50	1	_		-		-							
	×												
	3							-					
	Ĩ												
							_						
0.0	0 3500.00	6000.00	8500.00 110	00.00 13500.0	0 16000.00 1	8500.00 21000.	00	26000.00 MH					
No.	Frequ (Mł		Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecto					
1		773	2.56	43.05	45.61	74.00	-28.39	peak					
2	4803	.881	2.56	27.95	30.51	54.00	-23.49	AVG					
Remar	ke												

2.Margin value = Level -Limit value



nt. Po		Verti						
est Mo emark		No re	-	Mode 2402 emission w	MHz hich more t	han 10 dB t	pelow the	e pre-
10.0 dBu	₩/m							-
						FCC Part15 C	- Above 16 P	ĸ
						FEC Part15 C	- Above 16 A	v
50	2×							
	×	-						
.0								
<u>1000.000</u>	3500.00 6	000.00	8500.00 110	00.00 13500.00	0 16000.00 1	8500.00 21000	.00	26000.00 M
	Freque (MH		Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecto
No.		000	2.56	27.71	30.27	54.00	-23.73	AVG
No. 1	4803.	889	2.00					





Ant. Po	1	Hori	zontal					
Test Mo				Mode 2441				
Remark		No r			which more t	han 10 dB t	pelow the	e pre-
100.0 dBu	W/m							
						FCC Part15 C	- Above 1G P	к.
50	×					FCC Parts C	- Above 16 A	v
1	ž							
0.0	3500.00 60	100.00	8500.00 11	000.00 13500.0	0 16000.00 1	18500.00 21000	.00	26000.00 MHz
[Freque		Factor	Reading	Level	Limit	Margin	
No.	(MHz		(dB/m)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1	4882.1	<i>,</i>	2.79	43.31	46.10	74.00	-27.90	peak
2	4882.1	30	2.79	26.76	29.55	54.00	-24.45	AVG
	r (dB/m) = /			dB/m)+Cabl	e Factor (dB	8)-Pre-ampli	fier Facto	or
2.Margi	n value = L	evel -	Limit value					





nt. Po	Ι.	Verti	cal										
est Mo	de:	TX 1	π/4-DQPSK	Mode 2441	MHz								
emark	:	No r scrib	No report for the emission which more than 10 dB below the pre- scribed limit.										
0.0 dBu	V/m												
						-							
_						FCC Part15 C	- Above 1G F	ч к					
						FEC Partis C	- Alwye 1G A	W					
50	2×												
-		_		_									
-	*												
.0					-								
1000.000	3500.00 (6000.00	8500.00 11	000.00 13500.0	0 16000.00 1	18500.00 21000	0.00	26000.00 M					
No.	Freque (MH		Factor (dB/m)	Reading (dBu∀)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector					
1	4882.	063	2.79	27.62	30.41	54.00	-23.59	AVG					
-	4882.	405	2.79	42.24	45.03	74.00	-28.97	peak					
2						-							

2.Margin value = Level -Limit value

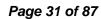




	I.	Hori	zontal					
Test Mo	de:	TX 1	π/4-DQPSK	Mode 2480)MHz			
Remark	:		eport for the ed limit.	emission w	vhich more t	han 10 dB t	pelow the	e pre-
100.0 dBu	V/m							
						FCC Part15 C	- Above 1G P	ĸ
						FCC Parts C	- Abuye 1G A	v
50	*		1					
	×							
0.0								
1000.000	Freque	ncy	Factor	Reading	0 16000.00 1	8500.00 21000 Limit	Margin	26000.00 MH
No.		-	(dB/m)	(dBuV)	(dBuV/m)	(dBu)/m	(dR)	
No. 1	(MHz 4959.8	2)	(dB/m) 3.04	(dBuV) 42.29	(dBuV/m) 45.33	(dBuV/m) 74.00	(dB) -28.67	
	(MHz	z) 388	· · · ·		× /	· · · ·	× /	peak AVG



	Verti	cal					
e:	TX 1	π/4-DQPSk	K Mode 2480)MHz			
			e emission w	vhich more t	han 10 dB t	pelow the	e pre-
n							-
					FCC Part15 C	- Above 16 P	ĸ
1					FEC Part15 C	- Above 16 A	v
*							
500.00 6	000.00	8500.00 11	000.00 13500.0	0 16000.00 1	8500.00 21000	.00	26000.00 MH
	-	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
`	/	3.04	42.32	45.36	74.00	-28.64	peak
4960.1	141	3.04	28.38	31.42	54.00	-22.58	AVG
	n 1 1 1 1 1 1 1 1 1 1 1 1 1	No re scrib	No report for the scribed limit.	No report for the emission v scribed limit. *	No report for the emission which more t scribed limit. Image: Control of the emission which more t scribed limit. Image: Control of the emission which more t scribed limit. Image: Control of the emission which more t scribed limit. Image: Control of the emission which more t scribed limit. Image: Control of the emission which more t scribed limit. Image: Control of the emission which more t scribed limit. Image: Control of the emission which more t scribed limit. Image: Control of the emission which more t scribed limit. Image: Control of the emission which more t scribed limit. Image: Control of the emission which more t scribed limit. Image: Control of the emission which more t scribed limit. Image: Control of the emission which more t scribed limit. Image: Control of the emission which more t scribed limit. Image: Control of the emission which more t scribed limit. Image: Control of the emission which more t scribed limit. Image: Control of the emission which more t scribed limit. Image: Control of the emission which more t scribed limit. Image: Control of the emission which more t scribed limit. Image: Control of the emission which more t scribed limit. Image: Control of the emission which more t scribed limit. Image: Contro of the emission wh	No report for the emission which more than 10 dB to scribed limit. Image: Control of the emission which more than 10 dB to scribed limit. Image: Control of the emission which more than 10 dB to scribed limit. Image: Control of the emission which more than 10 dB to scribed limit. Image: Control of the emission which more than 10 dB to scribed limit. Image: Control of the emission which more than 10 dB to scribed limit. Image: Control of the emission which more than 10 dB to scribe limit. Image: Control of the emission which more than 10 dB to scribe limit. Image: Control of the emission which more than 10 dB to scribe limit. Image: Control of the emission which more than 10 dB to scribe limit. Image: Control of the emission which more than 10 dB to scribe limit. Image: Control of the emission which more than 10 dB to scribe limit. Image: Control of the emission which more than 10 dB to scribe limit. Image: Control of the emission which more than 10 dB to scribe limit. Image: Control of the emission which more than 10 dB to scribe limit. Image: Control of the emission which more than 10 dB to scribe limit. Image: Control of the emission which more than 10 dB to scribe limit. Image: Control of the emission which more than 10 dB to scribe limit. Image: Control of the emission which more than 10 dB to scrible limit. Image:	No report for the emission which more than 10 dB below the scribed limit. Image: Control of the emission which more than 10 dB below the scribed limit. Image: Control of the emission which more than 10 dB below the scribed limit. Image: Control of the emission which more than 10 dB below the scribed limit. Image: Control of the emission which more than 10 dB below the scribed limit. Image: Control of the emission which more than 10 dB below the scribed limit. Image: Control of the emission which more than 10 dB below the scribed limit. Image: Control of the emission which more than 10 dB below the scribed limit. Image: Control of the emission which more than 10 dB below the scribed limit. Image: Control of the emission which more than 10 dB below the scribed limit. Image: Control of the emission which more than 10 dB below the scribed limit. Image: Control of the emission which more than 10 dB below the scribed limit. Image: Control of the emission which more than 10 dB below the scribed limit. Image: Control of the emission which more than 10 dB below the scribed limit. Image: Control of the emission which more than 10 dB below the scribed limit. Image: Control of the emission which more than 10 dB below the scribed limit. Image: Control of the emission which more than 10 dB below the scribed limit. Image: Control of the emission which more than 10 dB below the scribed limit. </td

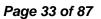




	I.	Hori	zontal					
est Mo	ode:	TX 8	3-DPSK Mo	de 2402MH	Z			
emark	K:	No r scrit	eport for the	e emission v	vhich more t	than 10 dB l	below the	e pre-
00.0 dBu	₩/m							
						FCC Part15 0	- Above 1G I	РК.
						FCE Part15 C	- Above 16	W
50	2 X	-						
	*							
	3500.00	6000.00	8500.00 11	1000.00 13500.0	0 16000.00	18500.00 21000	0.00	26000.00
0.0	3500.00	6000.00	8500.00 11	1000.00 13500.0	0 16000.00	18500.00 21000	0.00	2600
	Freque	ency	Factor	Reading	Level	Limit	Margin	Detect
No.	(MH		(dB/m)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	Deletel
No. 1		z)	(dB/m) 2.56	(dBuV) 26.69	(dBuV/m) 29.25	(dBuV/m) 54.00	(dB) -24.75	AVG



Ant. Pol.		Vert	ical					
est	Mode:	TX 8	B-DPSK Mod	de 2402MHz	2			
Rem	ark:		eport for the	emission w	hich more t	han 10 dB b	elow the	pre-
00.0	dBuV/m	1		1	1			
						FCC Part15 C	Above 1G P	ĸ
		_				FCC Partis C	Alere 10 A	
50		2					-	
	,	2						
0.0	.000 3500.00	6000.00	8500.00 110	00.00 13500.0) 16000.00 1	8500.00 21000.	00	26000.00 MHz
No		uency Hz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	1 480	3.881	2.56	27.85	30.41	54.00	-23.59	AVG
2	2 480	4.032	2.56	41.80	44.36	74.00	-29.64	peak
	-							





nt.	Pol.		Hori	zontal										
est	Mode	e :	ТХ 8	B-DPSK Mo	de 2441MH	Z								
em	ark:			No report for the emission which more than 10 dB below the pre- scribed limit.										
50	dBuV/m	×					FCC Part15 C							
1000	.000 35	00.00 6	000.00	8500.00 11	000.00 13500.0	D 16000.00 1	8500.00 21000	.00	26000.00 MH					
No	o.	Freque (MH:		Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector					
	1	4881.	605	2.79	26.72	29.51	54.00	-24.49	AVG					
1		4881.		2.79	42.24	45.03	74.00	-28.97	peak					



nt. Pol.		Vert	ical					
est Mo	ode:	TX 8	B-DPSK Mo	de 2441MH	Z			
emarl	K:		eport for th bed limit.	e emission v	vhich more t	than 10 dB t	pelow the	e pre-
00.0 dB	uV/m							
						FCC Part15 C	- Above 1G P	ĸ
						FCC Partis C	- Atowe 16 A	v
50	X							
	*							
.0) 3500.00	6000.00	8500.00 1	1000.00 13500.0	0 16000.00	18500.00 21000		26000.00 M
No.	Freque (MH		Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	4881	.698	2.79	26.62	29.41	54.00	-24.59	AVG
2	4881	.859	2.79	42.48	45.27	74.00	-28.73	peak
-	4881	.859	2.79	42.48	45.27	74.00	-28.73	pea





nt.	Pol.		Horiz	zontal					
est	Mode	: :	TX 8	DPSK Mo	de 2480MHz	2			
em	ark:			eport for the ed limit.	emission w	hich more t	han 10 dB t	elow the	e pre-
00.0	dBu∀/m	<u> </u>							
							FCC Part15 C	- Above 1G P	ĸ
50		2 X					FCE Part15 C	- Above 16 A	v
		*							
0.0	0.000 35	00.00 6	000.00	8500.00 11	000.00 13500.0	0 16000.00 1	8500.00 21000	.00	26000.00 M
N	0.	Freque		Factor	Reading	Level	Limit	Margin	Detecto
		(MH	,	(dB/m)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
	1	4960.	287	3.04	26.32	29.36	54.00	-24.64	AVG
		4960.	044	3.04	40.98	44.02	74.00	-29.98	peak



nt.	Pol	•		Vert	ical									
est	t Mo	de:		TX 8	B-DPS	SK Mo	de 2480	MH:	Z					
en	hark	:			eport		e emissi	ion v	vhich r	nore t	han 10	dB b	pelow the	e pre-
0.0	dBul	//m						-						
											FCC Pa	art15 C	- Above 16 P	⁹ K
50			_								FCC PA	a(15 C	- Above 1G A	v
50			×											
			XX											
0.0														
	0.000	Freq	uer			ctor	Read		Lev	/el	18500.00 Limi		Margin	26000.00 M
Ν	INO. (MI			,		3/m)	(dBu	,	(dBu	,	(dBuV		(dB)	
Ν		4959.893 3.04					42.3		45.		74.0		-28.64	peak
	1 2			48	-	.04	26.4			44	54.0	-	-24.56	AVG



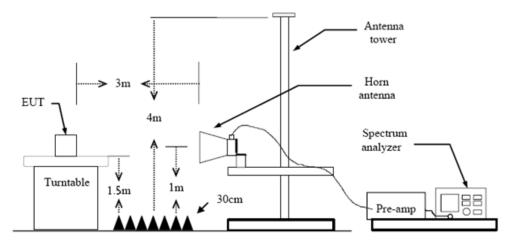
3.3. Band Edge Emissions (Radiated)

<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.



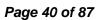
Test Results

	ol.	Hori	zontal					
est M	ode:	GFS	SK Mode 24	02MHz				
110.0 dB	lu¥/m				-			
_								
_						FCC Part15 C	- Above 1G P	ĸ
60							*	
00				1		FCC Part15 C	- Above 1G A	Y
0.0 2306.50	0 2316.50	2326.50	2336.50 23	146.50 2356.50) 2366.50 2	2376.50 2386.	50	2406.50 M
No.	Frequ (MH	-	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
			00 01	31.61	62.45	74.00	-11.55	peak
1	2390	.000	30.84	51.01	02.40			
	2390 2390		30.84 30.84	16.38	47.22	54.00	-6.78	AVG





Ant. Po	Ι.	Verti	cal					
lest Mo	de:	GFS	K Mode 24	02MHz				
10.0 dBu	V/m							
				1 2 1 1				
-								
1.0			- 4					
-		-				FCC Part15 C	- Above 1G P	ĸ
						0.000.000		
1.1							1	
60						FCC Part15 C	Ahove 15 A	v
		-	1.1.1.1.1.1			1	2	
napathetere	monuna	stransformething the	moundationstand	warman warman and the	an and a second second	managlassination	a for the second second	and prese
	_	_						
-								
0.0						1		
2307.500	2317.50	2327.50	2337.50 23	47.50 2357.50	2367.50 2	2377.50 2387.	50	2407.50 MI
	Freq	uency	Factor	Reading	Level	Limit	Margin	
No.		Hz)	(dB/m)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1	· ·	0.000	30.84	31.60	62.44	74.00	-11.56	peak
2	239	0.000	30.84	16.85	47.69	54.00	-6.31	AVG
				•				
Remark	s:							
Remark		= Anten	na Factor (dB/m)+Cabl	e Factor (dE	8)-Pre-ampli	fier Facto	or





Ant. Pol.	Hori	zontal					
est Mode:	GFS	K Mode 24	80 MHz				
10.0 dBu¥/m							
A				_			-
		_			Treater treater		
.0		_			FCC Part15 C	- Above 1G Pl	¢
60 1 *							
60					FCC Part15 C	Above 16 AV	v
and strong	and a state of the	a a with the stand and a st	and the second states and states a	Marine Marine and Marine	elmannena	mannum	municipal
			1		1		
0.0							
2475.500 2485.	50 2495.50	2505.50 25	15.50 2525.50	2535.50 2	545.50 2555.5	U	2575.50 MI
Fr	equency	Factor	Reading	Level	Limit	Margin	
	(MHz)	(dB/m)	(dBuV)	(dBuV/m)		(dB)	Detecto
	483.500	31.24	30.92	62.16	74.00	-11.84	peak
2 2	483.500	31.24	16.74	47.98	54.00	-6.02	AVG

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



Ant. Po	ol.		V	ertio	cal														
Test M	ode:		G	FSI	< Mo	de 2	248	30 M	Hz										
110.0 dB	uV/m							_				_					-		-
P																			
					-			-		1		-		-			1		
-			_		_					-				FCC	Part15 C	- Above	16 PI	ĸ	
																	T	_	
60	1														-				
							_	-						FCC	Pair15 C	- Aboye	16 A	r	
me		white	minute	mingh-ray	name	winter	mine	ingens	an an International	m	man	memory	man	e shipson	nursenan	realization	warmer of	unpertained	~
	-		-									-			-		+		
	_														_				
10.0																			
2475.50	0 248	5.50	2495.	50	2505.	50	251	5.50	252	5.50	25	35.50	25	45.50	2555.	50	-	2575.50	MH
No.	F		uenc Hz)	У		ictor 3/m)			adir Bu∀	-		evel uV/n	1)		nit V/m)	Març (dE		Deteo	ctor
1		× .	3.500)	× .	1.24		· ·	0.23	<i>'</i>	`	1.47		`	.00	-12.	<i>'</i>	pea	ak
2		248	3.500)	31	1.24		1	6.58	}	4	7.82	1	54	.00	-6.1	18	AV	'G
																-			
Remarl	<u> </u>																		

2.Margin value = Level -Limit value



	I.	Hori	zontal					
lest Mo	ode:	π/4-	DQPSK Mo	de 2402MH	Z			
10.0 dB	i¥∕m							
-		_						_A
						FCC Part15 C	- Above 1G P	K-
-							2	
60							×	
-	-		_	_	_	FCC Part15 C	- Ahnve TG A	× 1
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0.0	-				1			
2307.000	2317.00	2327.00	2337.00 23	47.00 2357.00	2367.00 2	377.00 2387.0	00	2407.00 M
No.		Jency	Factor	Reading		Limit	Margin	Detecto
	`	Hz)	(dB/m)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1		0.000	30.84	31.57	62.41	74.00	-11.59	peak
2	2390	0.000	30.84	17.68	48.52	54.00	-5.48	AVG



Ant. Pol	-	Verti	ical					
Test Mo	de:	π/4-	DQPSK Mo	de 2402MH	z			
10.0 dBuV	//m	_	1	-				
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		_						
-	_	-				FLL Part15 L	- Above 1G P	K
60							¥	
-				-		FEC Part15 C	- Aboye TG A	Y
0.0 2307.000	2317.00	2327.00	2337.00 23	47.00 2357.00	1 2367.00 2	2377.00 2387.	00	2407.00 MH
No.	Frequ (MH		Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
	``	· ·	30.84	31.60	62.44	74.00	-11.56	peak
1	2390	.000	30.64	01.00				
1 2	2390 2390		30.84	16.67	47.51	54.00	-6.49	AVG
-								





nt. Po	I.	Horiz	zontal					
est Mo	ode:	π/4-	DQPSK Mo	de 2480MH	Z			
	iV/m							
-								
A								
						FCC Part15 C	- Above 1G Pl	C I
	2	_						
60	X							
-						FCC Part15 C	- Above 1G A	·
4 6	Furnam	an a	Munhammena	phinese	and the second second second	where where the second	And amount of the	
0.0	2403 50	2407 50	2507.50 25	17 50 0507 50	2527 50 0	F 13 F0 0FF3 I		0577 F0 . H4
2477.500	2487.50	2497.50	2507.50 25	17.50 2527.50	2537.50 2	547.50 2557.5	bu .	2577.50 MI
No.		uency Hz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecto
1	248	3.500	31.24	31.25	62.49	74.00	-11.51	peak
2	248	3.500	31.24	17.06	48.30	54.00	-5.70	AVG
	1							1

Remarks:

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





Ant. Po	I.	Vert	ical					
Test Mo	ode:	π/4-	DQPSK Mo	de 2480MH	Z			
110.0 dB	uV/m							
٨								
1								
Н	_					FCC Part15 C	- Above 1G F	к
60	*					FCC Part15 C	- Ahove 16 A	W
-	Summe	Madament Mar	and a second	warman and	hismonecessed and and the	the second and the second s	- and the state of the	and and a second
							-	
10.0								
	0 2487.00	2497.00	2507.00 25	517.00 2527.00	0 2537.00	2547.00 2557.	00	2577.00 MH
No.		uency Hz)	Factor (dB/m)	Reading	Level	Limit (dBu\//m)	Margin	Detector
No.	(M	uency Hz) 3.500	Factor (dB/m) 31.24	Reading (dBu∀) 30.16	Level (dBuV/m) 61.40		Margin (dB) -12.60	Detector peak
	(M 248	Hz)	(dB/m)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	(M 248	Hz) 3.500	(dB/m) 31.24	(dBuV) 30.16	(dBuV/m) 61.40	(dBuV/m) 74.00	(dB) -12.60	peak



	Ι.	Horiz	zontal					
est Mo	de:	8-DF	SK Mode	2402MHz				
10.0 dBu	V/m							
-								
-								
								A
						FCC Part15 C	- Above 1G Pl	ĸ
-							-	
60							1	
00						FEC Part15 C	Aboye TG A	1
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	al comparison de la comp							
-								
0.0						1.000		
2307.000	2317.00	2327.00	2337.00 23	47.00 2357.00	2367.00 2	377.00 2387.0)0	2407.00 MH
Ne	Frequ	lency	Factor	Reading	Level	Limit	Margin	Detector
No.	Frequ (Mł		Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)		Margin (dB)	Detector
No.	(MI							Detector peak
	(MI 2390	Hz)	(dB/m)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	(MI 2390	Hz) 0.000	(dB/m) 30.84	(dBuV) 30.68	(dBuV/m) 61.52	(dBuV/m) 74.00	(dB) -12.48	
1 2 Remarks	(Mi 2390 2390 s:	Hz) 0.000 0.000	(dB/m) 30.84 30.84	(dBuV) 30.68	(dBuV/m) 61.52 47.72	(dBuV/m) 74.00 54.00	(dB) -12.48 -6.28	peak AVG



nt. Po	ol.	Verti	cal					
est M	ode:	8-DF	SK Mode 2	402MHz				
10.0 dB	uV/m							
						FCC Part15 C	- Above 16 PK	
60						ETT Part15 C	Above 1G AN	
-						i ce i otto e	2	
0.0	0 2317,50	2327.50	2337.50 234	17.50 2357.50	2367.50 2	377.50 2387.5	50	2407.50 MH
No.		uency Hz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2390	0.000	30.84	31.31	62.15	74.00	-11.85	peak
2	239	0.000	30.84	16.67	47.51	54.00	-6.49	AVG
Remark	-	= Anten	na Factor (c	B/m)+Cable	e Factor (dB)-Pre-amoli	fier Facto	Dr

2.Margin value = Level -Limit value





	l .	Horiz	zontal					
est Mo	de:	8-DF	SK Mode 2	2480MHz				
10.0 dBu	V/m							
	*	(udu-an-graphy)	manhomen		mmentanne		- Above 1G P - Above 1G A	
0.0 2477.000 No.	2487.00 Frequ (MH		2507.00 25 Factor (dB/m)	17.00 2527.00 Reading (dBuV)	2537.00 2	2547.00 2557. Limit (dBuV/m)	Margin (dB)	2577.00 M
2477.000	Frequ	ency łz)	Factor	Reading	Level	Limit	Margin	Detecto

Remarks:

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



	I .	Ve										
est Mo		8-[DPSK	Mode	2480M	Hz						
10.0 dB	₩/m			-		1				_		
0												-
14										_	-	
									FCC Pa	ut15 C	- Above 1G F	РК
		-			_	_						
60	×		_			_		_		_		
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24/7.00	2487.00	2497.00	200	7.00 2	2517.00	2527.00	2537	.00	2547.00	2557.	UU	2577.00 M
No	Frequ	lency	F	actor	Read		Lev		Limi		Margin	Dotocto
No.	Frequ (MI			actor B/m)	Read (dBu				Limi (dBuV/		Margin (dB)	Detector
No.	(M		(d			uV)		√/m)		/m)		Detector peak
	(M) 2483	Hz)	(d 3	B/m)	(dBu	uV) 35	(dBu	√/m) 59	(dBuV/	/m) 0	(dB)	

2.Margin value = Level -Limit value

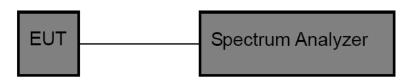


3.4. Band edge and Spurious Emissions (Conducted)

<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
- 4. Measure and record the results in the test report.

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	7.22	-54.26	<=-12.79	PASS
GFSK	2480	8.01	-55.64	<=-11.99	PASS
Gran	Hop_2402	6.96	-58.96	<=-13.04	PASS
	Hop_2480	7.73	-58.64	<=-12.27	PASS
	2402	8.24	-50.60	<=-11.76	PASS
	2480	9.27	-55.98	<=-10.73	PASS
π/4-DQPSK	Hop_2402	4.68	-58.49	<=-15.32	PASS
	Hop_2480	5.83	-58.39	<=-14.17	PASS
	2402	8.09	-51.01	<=-11.91	PASS
8-DPSK	2480	8.15	-56.88	<=-11.85	PASS
0-DP3K	Hop_2402	8.04	-58.69	<=-11.96	PASS
	Hop_2480	8.44	-58.25	<=-11.56	PASS







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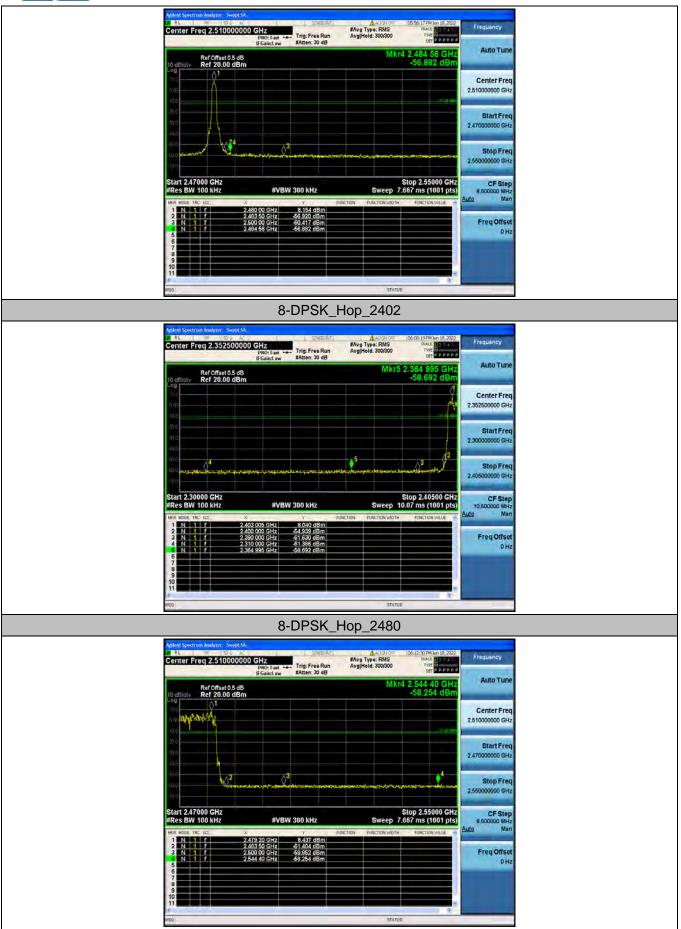
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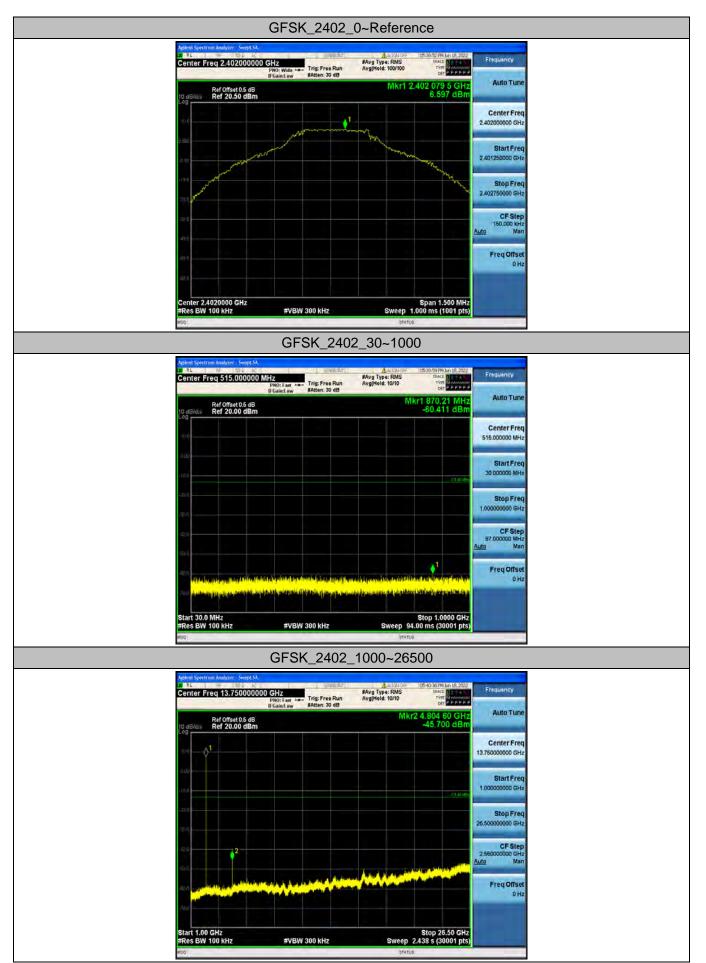


EN

(2) Conducted Spurious Emissions Test

Test Mode	Frequency[MHz]	Freq Range [MHz]	Ref Level [dBm]	Result [dBm]	Limit [dBm]	Verdict
		Reference	6.60	6.60		PASS
	2402	30~1000	6.60	-60.41	<=-13.4	PASS
		1000~26500	6.60	-45.70	<=-13.4	PASS
		Reference	7.49	7.49		PASS
GFSK	2441	30~1000	7.49	-60.19	<=-12.51	PASS
		1000~26500	7.49	-46.09	<=-12.51	PASS
		Reference	8.18	8.18		PASS
	2480	30~1000	8.18	-59.24	<=-11.82	PASS
		1000~26500	8.18	-46.90	<=-11.82	PASS
		Reference	8.07	8.07		PASS
	2402	30~1000	8.07	-60.33	<=-11.93	PASS
		1000~26500	8.07	-45.44	<=-11.93	PASS
	2441	Reference	8.42	8.42		PASS
π/4-DQPSK		30~1000	8.42	-60.29	<=-11.58	PASS
		1000~26500	8.42	-46.45	<=-11.58	PASS
		Reference	9.13	9.13		PASS
	2480	30~1000	9.13	-59.98	<=-10.87	PASS
		1000~26500	9.13	-45.87	<=-10.87	PASS
		Reference	7.85	7.85		PASS
	2402	30~1000	7.85	-60.16	<=-12.15	PASS
		1000~26500	7.85	-46.65	<=-12.15	PASS
	2441	Reference	8.28	8.28		PASS
8-DPSK		30~1000	8.28	-60.42	<=-11.73	PASS
		1000~26500	8.28	-45.91	<=-11.73	PASS
		Reference	9.01	9.01		PASS
	2480	30~1000	9.01	-59.44	<=-10.99	PASS
		1000~26500	9.01	-43.85	<=-10.99	PASS

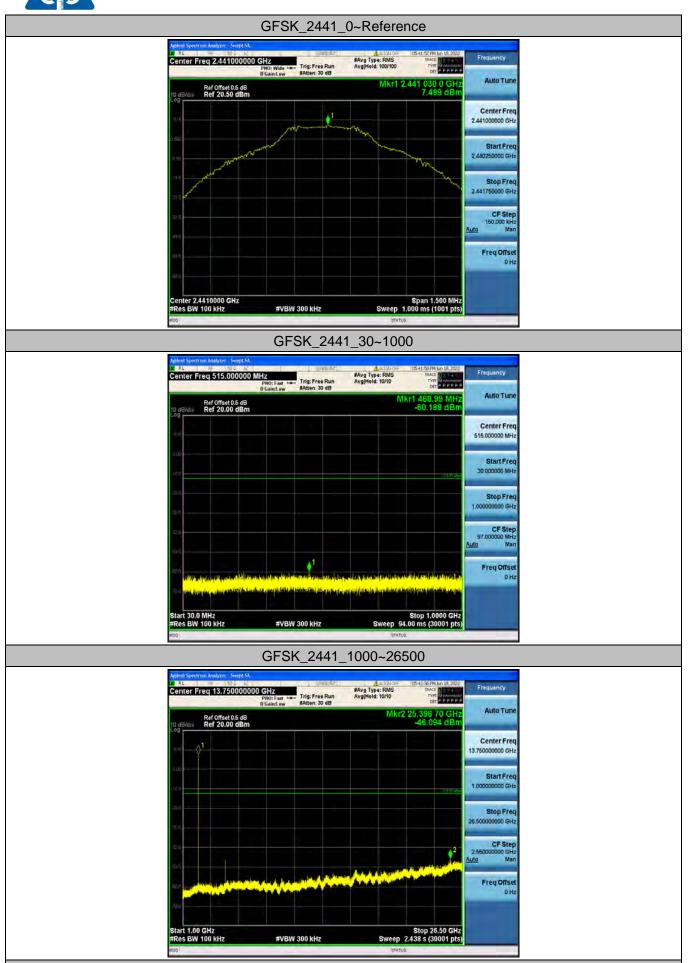






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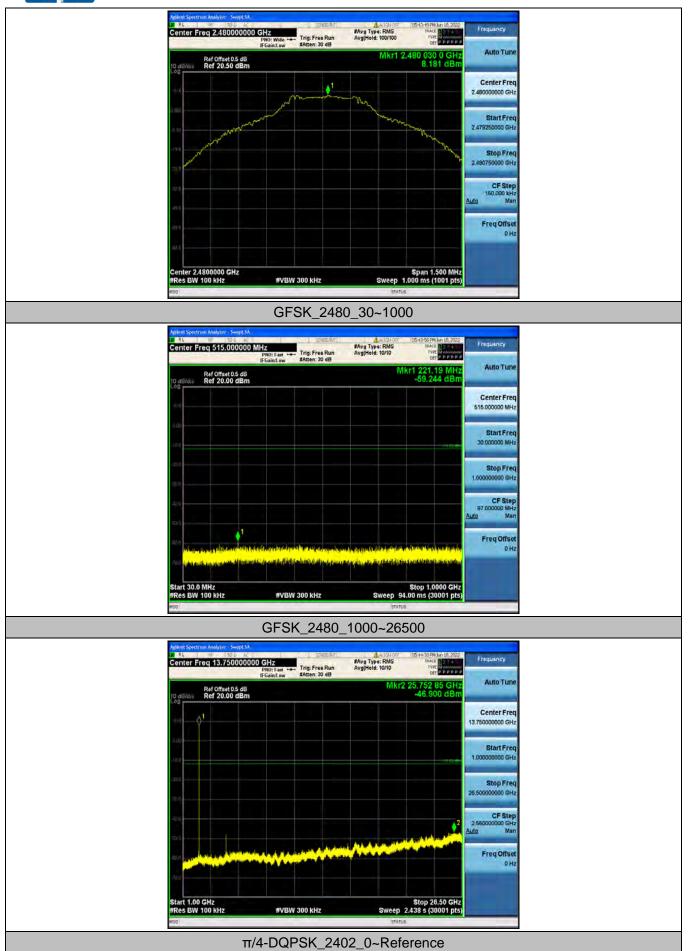
GFSK_2480_0~Reference



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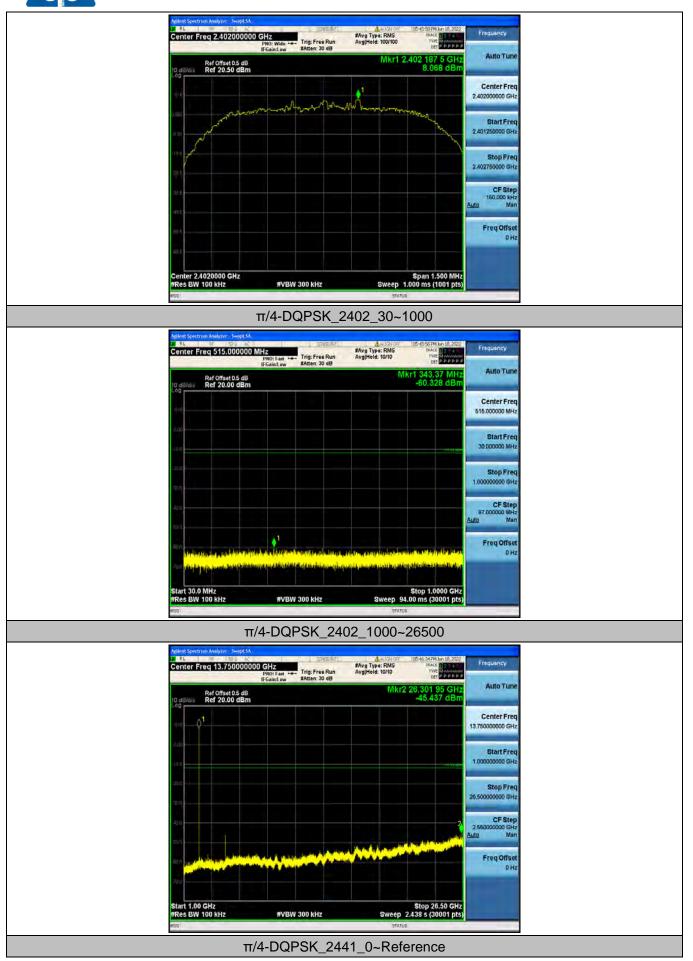
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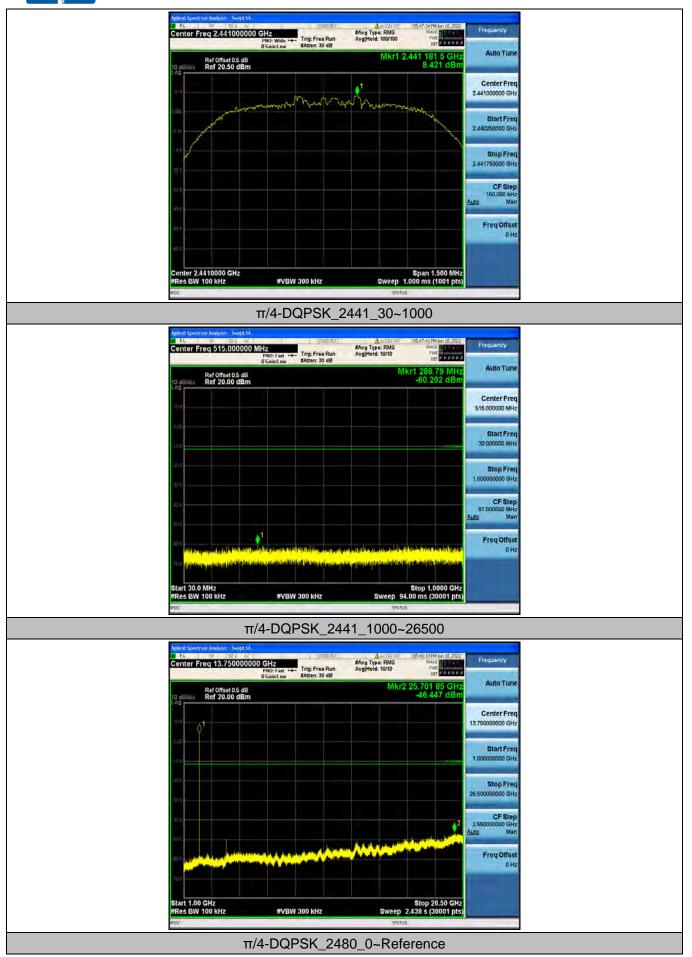










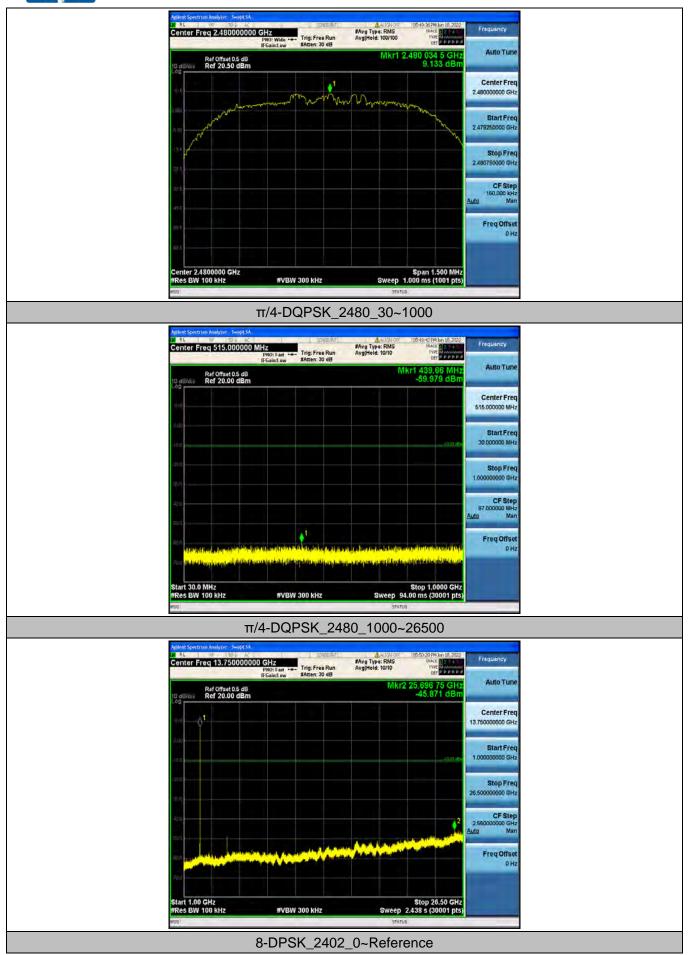


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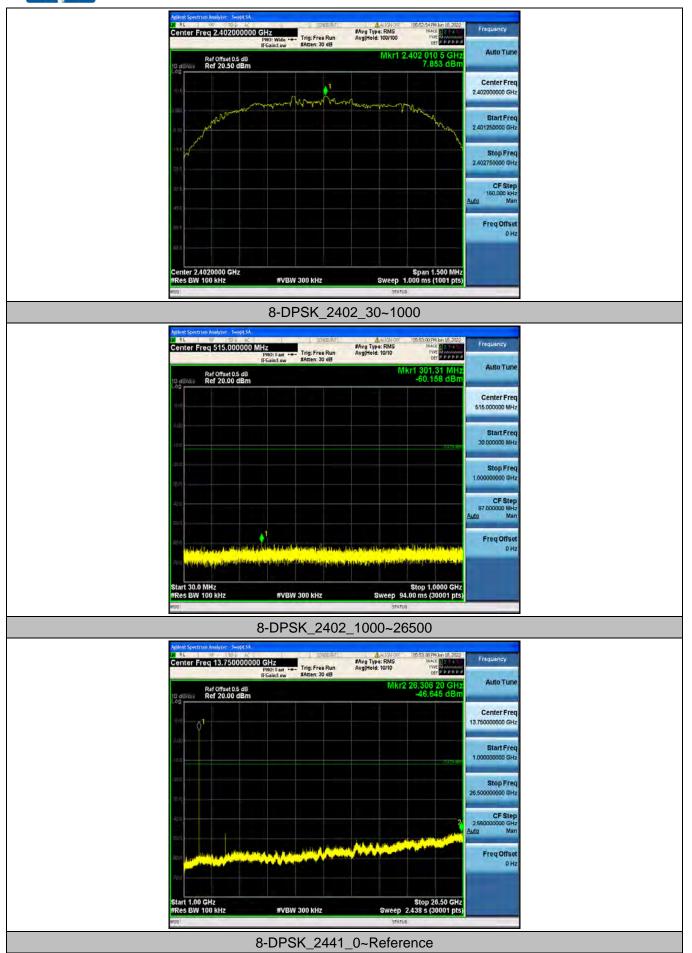








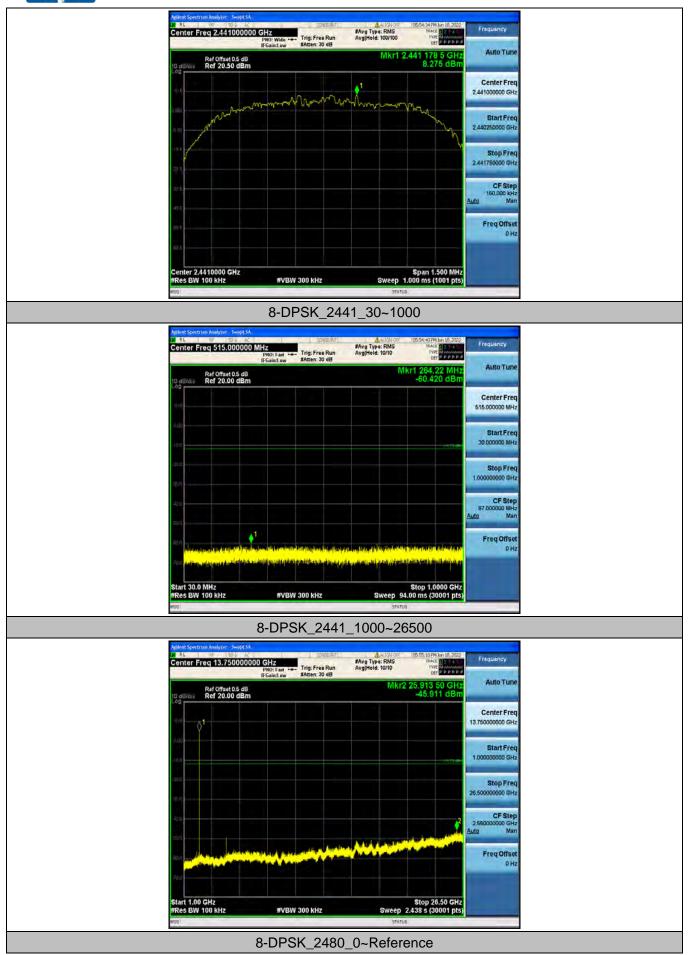








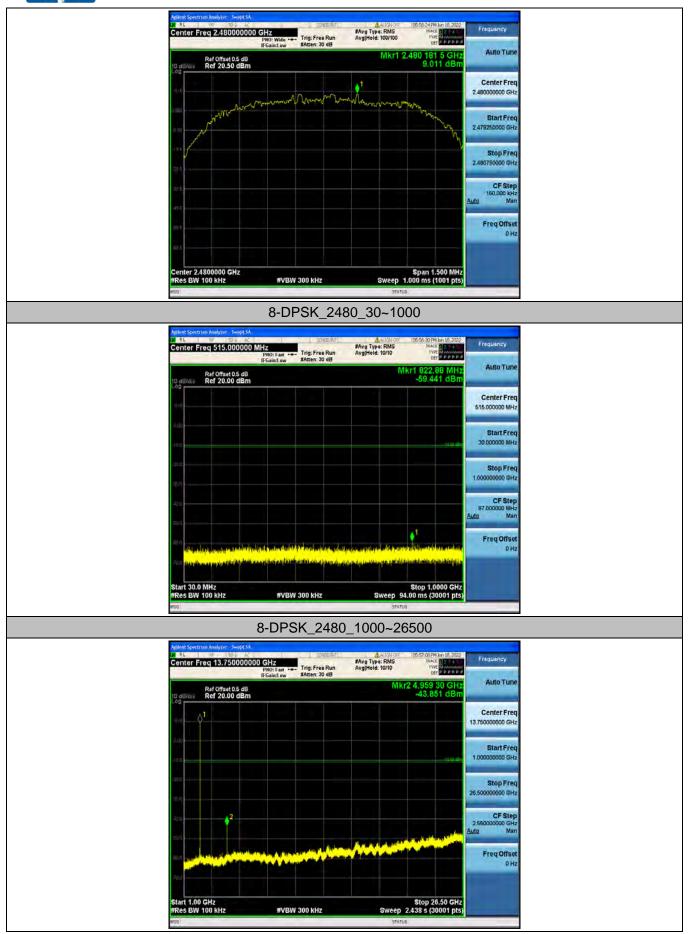












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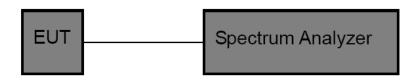


3.5. 20DB Bandwidth

<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

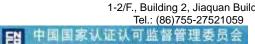
Please refer to the clause 2.4.

Test Results

Test Mode	Frequency[MHz]	20db EBW[MHz]	20dB Bandwidth *2/3 (kHz)	Verdict
	2402	0.948	632.00	PASS
GFSK	2441	0.945	630.00	PASS
	2480	0.948	632.00	PASS
	2402	1.317	878.00	PASS
π/4-DQPSK	2441	1.320	880.00	PASS
	2480	1.317	878.00	PASS
	2402	1.266	844.00	PASS
8-DPSK	2441	1.266	844.00	PASS
	2480	1.266	844.00	PASS







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8-DPSK_2402

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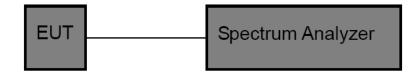
3.6. Channel Separation

<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	1.006	>630.00	PASS
π/4-DQPSK	Hop_2441	1.018	>880.00	PASS
8-DPSK	Hop_2441	0.992	>844.00	PASS









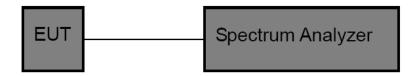
3.7. Number of Hopping Channel

<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.

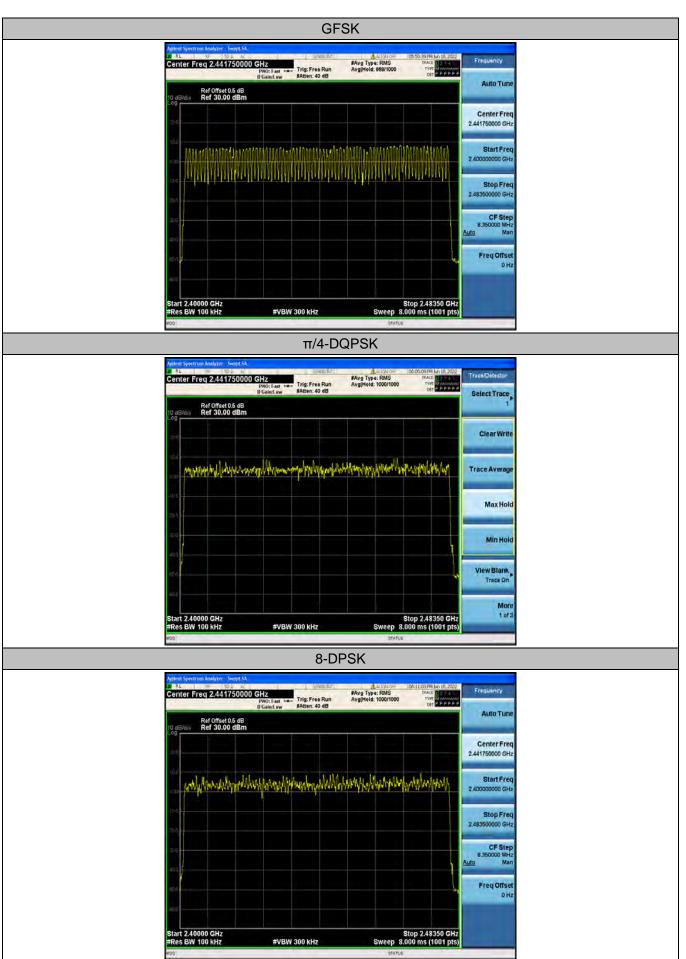
Test Mode

Please refer to the clause 2.4.

Test Result

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





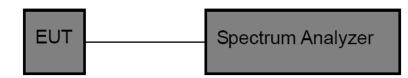


3.8. Dwell Time

<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.

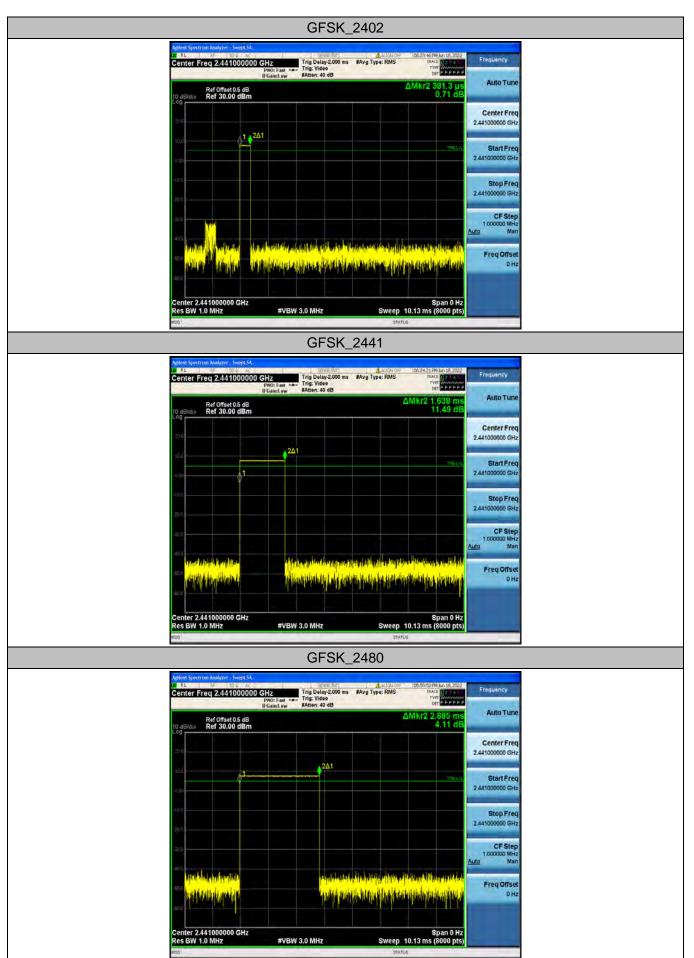


Test Result

Modulation type	Channel	Frequency [MHz]	Pulse Time (ms)	Total of Dwell (ms)	Period Time (ms)	Limit (Second)	Result
	DH1	2441	0.38	121.60	31.60		
GFSK	DH3	2441	1.64	262.40	31.60	≤ 0.40	Pass
	DH5	2441	2.89	308.27	31.60		
	2DH1	2441	0.39	124.80	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	0.39	124.80	31.60		
8-DPSK	3DH3	2441	1.64	262.40	31.60	≤ 0.40	Pass
	3DH5	2441	2.89	308.27	31.60		

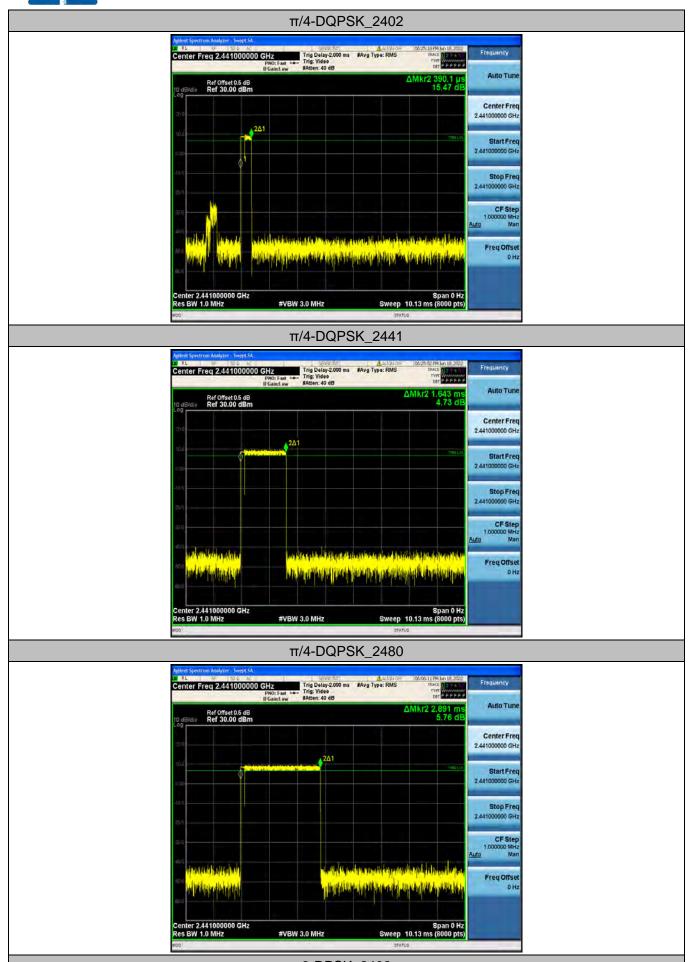
Note: 1DH1/2DH1/3DH1Total of Dwell= Pulse Time*(1600/2)*31.6/79 1DH3/2DH3/3DH3 Total of Dwell= Pulse Time*(1600/4)*31.6/79 1DH5/2DH5/3DH5 Total of Dwell= Pulse Time*(1600/6)*31.6/79











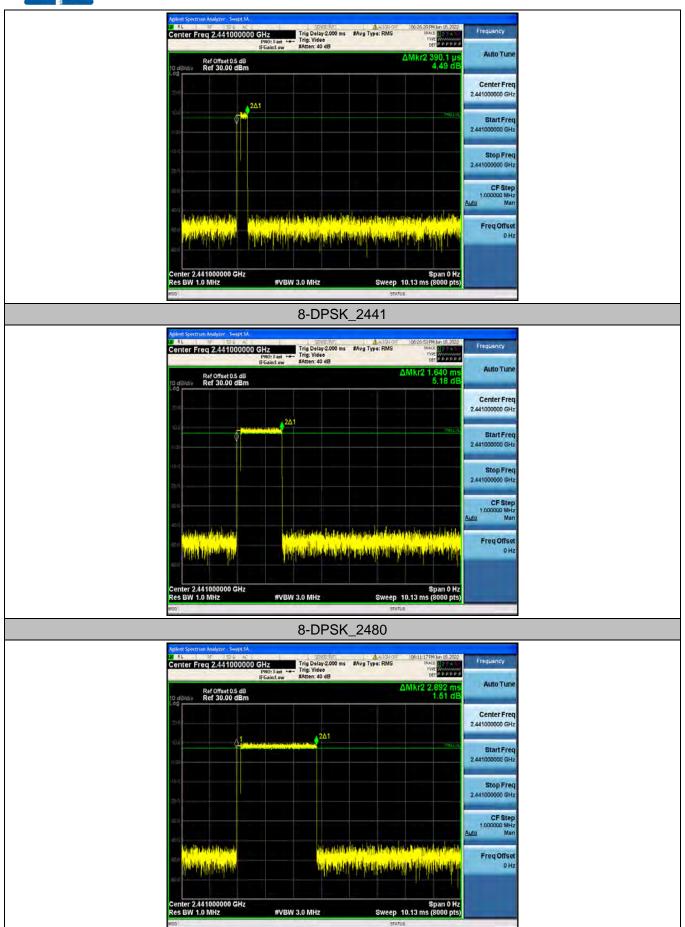
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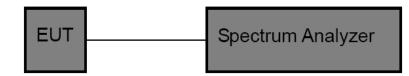
3.9. Peak Output Power

<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) \geq RBW.
 - (3) Detector = Peak.
 - (4) Trace mode = Max hold.
 - (5) Sweep = Auto couple.

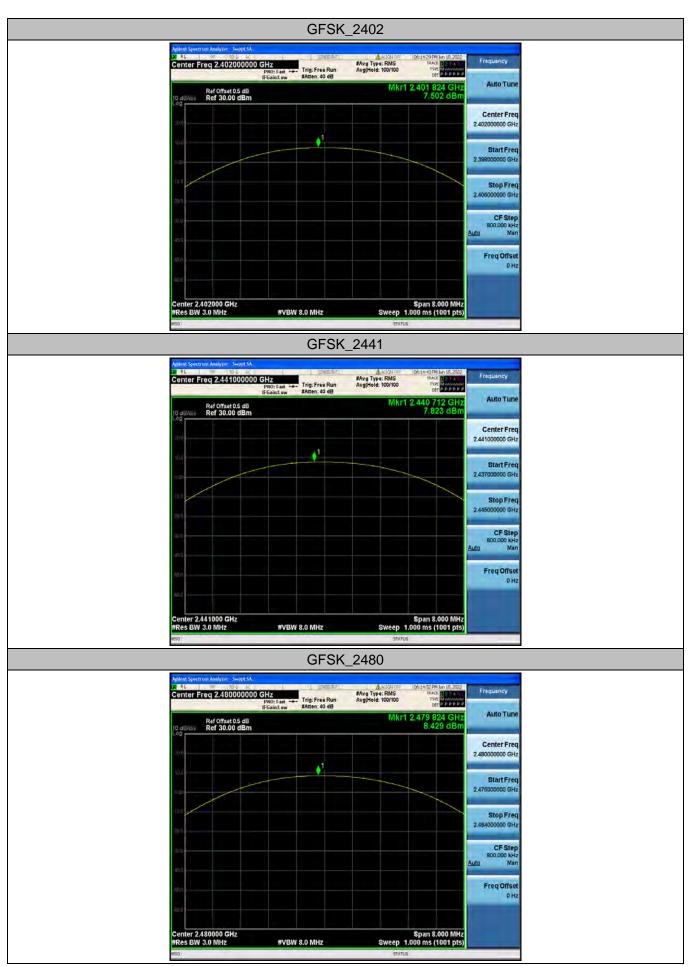
Test Mode

Please refer to the clause 2.4.

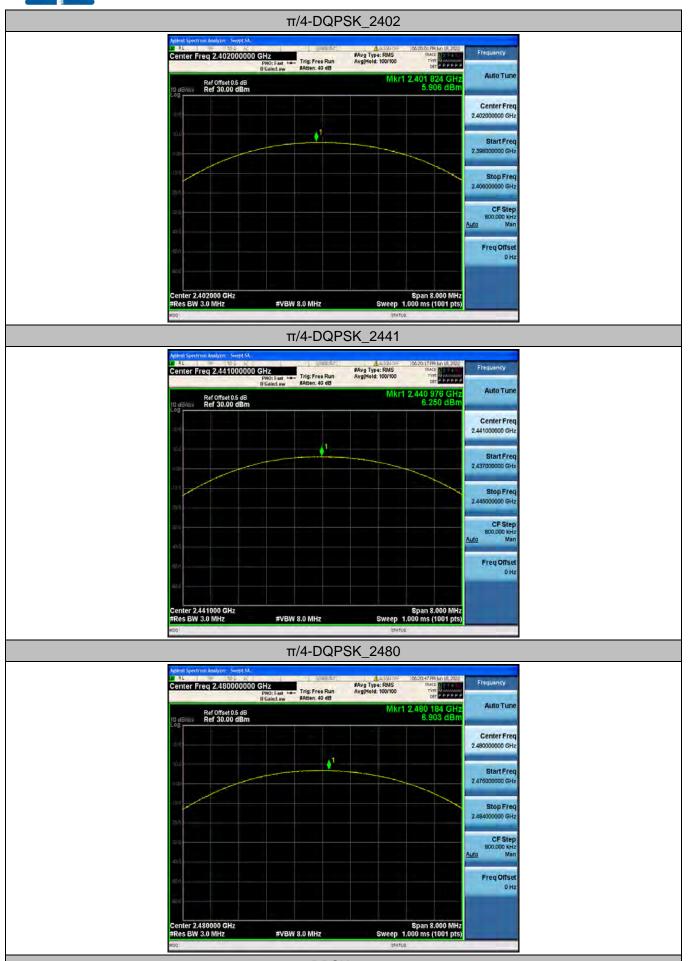
Test Result

Test Mode	Frequency[MHz]	Conducted Result[dBm]	Limit[dBm]	Verdict
GFSK	2402	7.50	<=30	PASS
	2441	7.82	<=30	PASS
	2480	8.43	<=30	PASS
π/4-DQPSK	2402	5.91	<=30	PASS
	2441	6.25	<=30	PASS
	2480	6.90	<=30	PASS
8-DPSK	2402	6.43	<=30	PASS
	2441	6.91	<=30	PASS
	2480	7.41	<=30	PASS







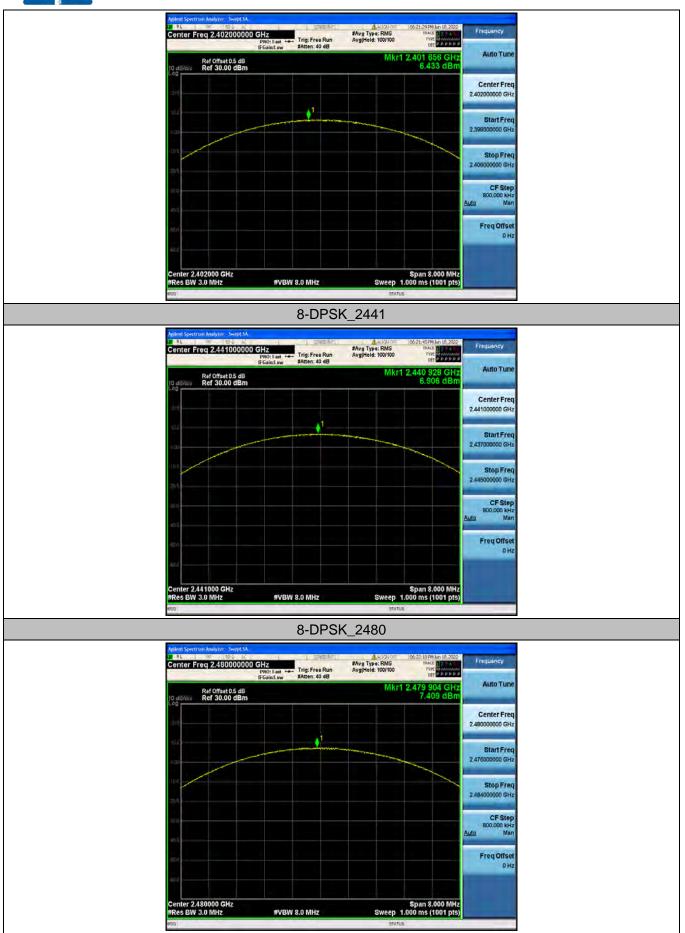


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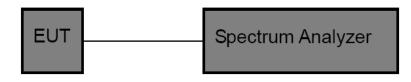


3.10. Duty Cycle

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	2.88	3.73	77.21	0.35	1
	2441	2.88	3.73	77.21	0.35	1
	2480	2.88	3.73	77.21	0.35	1
π/4-DQPSK	2402	2.89	3.73	77.48	0.35	1
	2441	2.89	3.73	77.48	0.35	1
	2480	2.89	3.73	77.48	0.35	1
8-DPSK	2402	2.89	3.74	77.27	0.35	1
	2441	2.89	3.74	77.27	0.35	1
	2480	2.89	3.74	77.27	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.

<u>Test Result</u>

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