

## **CTC** Laboratories, Inc.

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Т	EST REPORT			
Report No	CTC20231384E02			
FCC ID······:	XUJX431PROV5			
Applicant:	Launch Tech Co., Ltd.			
Address	Launch Industrial Park, North of Wuhe Avenue Longgang, Shenzhen, Guangdong, P.R. China			
Manufacturer	Launch Tech Co., Ltd.			
Address	Launch Industrial Park, North of Wuhe Avenue Longgang, Shenzhen, Guangdong, P.R. China			
Product Name·····:	AUTO Smart Diagnostic Tool			
Trade Mark······:	LAUNCH			
Model/Type reference······:	OADD-PO1005V, OADD-PO0805V			
Listed Model(s) ······	/			
Standard:	FCC CFR Title 47 Part 15 Subpart C Section	n 15.247		
Date of receipt of test sample:	Jun. 21, 2023			
Date of testing	Jun. 22, 2023 ~ Aug. 06, 2023			
Date of issue	Aug. 07, 2023			
Result:	PASS			
Compiled by: (Printed name+signature)	Terry Su 7e	nny Su Bric shang		
Supervised by: (Printed name+signature)	Eric Zhang	Enc shang		
Approved by:		Jenas		
(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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# 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	Aug. 07, 2023	Original

Note: Replace the leather case, the prototype becomes thinner, and the RF part remains unchanged, Add radiation part testing, This report is based on the report of NO.: CTC20210728E12.

# **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	N/A	N/A	
Restricted Bands	15.205	RSS-Gen 8.10	N/A	N/A	
Hopping Channel Separation	15.247(a)(1)	RSS 247 5.1 (b)	N/A	N/A	
Dwell Time	15.247(a)(iii)	RSS 247 5.1 (d)	N/A	N/A	
Peak Output Power	15.247(b)(1)	5.247(b)(1) RSS 247 5.4 (b)		N/A	
Number of Hopping Frequency	15.247(a)(iii)	RSS 247 5.1 (d)	N/A	N/A	
Conducted Band Edge and Spu- rious Emissions	15.247(d)	RSS 247 5.5	N/A	N/A	
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			Alicia Liu	
20dB Bandwidth	15.247(a)	RSS 247 5.1 (b)	N/A	N/A	

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

"N/A" is no application.





#### 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
DTS Bandwidth	±0.0196%	(1)
Maximum Conducted Output Power	±0.686 dB	(1)
Maximum Power Spectral Density Level	±0.743 dB	(1)
Band-edge Compliance	±1.328 dB	(1)
Unwanted Emissions In Non-restricted Freq Bands	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 Avenue, Banxuegang, Long- gang, Shenzhen, Guangdong, P.R. China
Manufacturer:	Launch Tech Co., Ltd.
Address:	Launch Industrial Park, North of Wuhe Avenue, Banxuegang, Long- gang, Shenzhen, Guangdong, P.R. China



# 2.2. General Description of EUT

Product Name:	AUTO Smart Diagnostic Tool
Trade Mark:	LAUNCH
Model/Type reference:	OADD-PO1005V, OADD-PO0805V
Listed Model(s):	1
Model Difference:	All these models are identical in the same PCB, Layout and electrical circuit, The only difference is screen size, antenna and antenna position.
Power supply:	5Vdc/5A from AC/DC Adapter 7.6Vdc from 6300mAh Li-ion Battery
Adapter model: PSYC0505000US Input: 100-240V~ 50/60Hz 0.6A Max Output: 5Vdc/5A	
Hardware version:	/
Software version:	1
Bluetooth 5.1/EDR	
Modulation:	GFSK, π/4-DQPSK, 8-DPSK
Operation frequency:	2402MHz~2480MHz
Channel number:	79
Channel separation:	1MHz
Antenna type:	FPC Antenna
OADD-PO1005V Antenna gain:	3.42dBi Max
OADD-PO0805V Antenna gain:	2.96dBi Max

Note: OADD-PO1005V, OADD-PO0805V has been testes, Just the worst case recorded in report.



# 2.3. Accessory Equipment information

Equipment Information						
Name	Model	S/N	Manufacturer			
1	1	1	1			
1	1	1	/			
Cable Information	Cable Information					
Name	Shielded Type	Ferrite Core	Length			
1	1	1	1			
Test Software Information						
Name	1	1	1			
Engineering mode	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	1	Oct. 23, 2024	

Radiate	d emission(3m chamber 3)	I			
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

EN



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

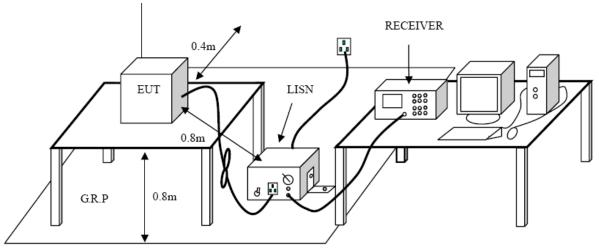
## <u>Limit</u>

## 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.



Note: This test item not applicable.

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# 3.2. Radiated Emission

<u>Limit</u>

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

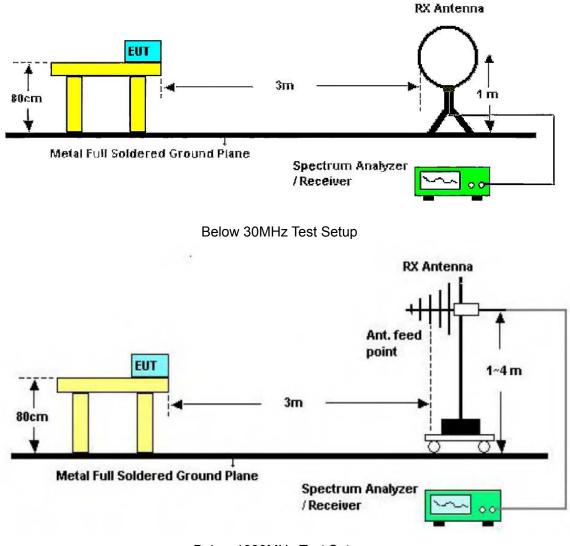
Frequency	Limit (dBuV/m @3m)	Value
30 MHz ~ 88 MHz	40.00	Quasi-peak
88 MHz ~ 216 MHz	43.50	Quasi-peak
216 MHz ~ 960 MHz	46.00	Quasi-peak
960 MHz ~ 1 GHz	54.00	Quasi-peak
Above 1 GHz	54.00	Average
	74.00	Peak

#### Note:

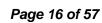
(1) The tighter limit applies at the band edges.

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

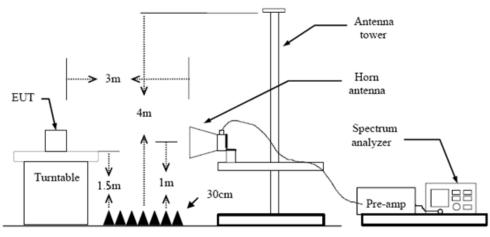
## Test Configuration



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)
  - 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 10<sup>th</sup> 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.



nt. Po	I.	Hori	izontal									
est Mo	de:	TX (	TX GFSK Mode 2402MHz									
emarl	K:	Only	y worse	case	e is reported	d						
7.0 dB	iV/m											
7												
7												
7								FCC-Par	115 C			
7								Margin -	6 dB			
7 📃												
7							×	2	3 456			
, 📃							Austranium	White was	and a second difference			
ware was	hours and the second states and the second	1. h. how a house of the second	trangahyphian	ynyradid	and And Marine	dry And have	N <sup>r</sup>					
30.000					(MHz)				1000.0			
30.000		60.00			(MI12)	300	.00		1000.0			
	Freque	encv	Readi	ng	Factor	Level	Limit	Margin	_			
No.	(MH	-	(dBu	V)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector			
No.	(MH) 349.2	z)			(dB/m) -15.99	(dBuV/m) 30.18	(dBuV/m) 46.00	(dB) -15.82	QP			
		z) 500	(dBu	7	. ,	· · · ·	· · · ·	· · ·				
1 *	349.2	z) 500 634	(dBu) 46.1	7 8	-15.99	30.18	46.00	-15.82	QP			
1 * 2	349.25 531.96	z) 500 634 797	(dBu\ 46.1 39.6	7 8 7	-15.99 -12.04	30.18 27.64	46.00 46.00	-15.82 -18.36	QP QP			
1 * 2 3	349.28 531.90 798.9	z) 500 634 797 277	(dBu) 46.1 39.6 36.9	7 8 7 4	-15.99 -12.04 -7.33	30.18 27.64 29.64	46.00 46.00 46.00	-15.82 -18.36 -16.36	QP QP QP			

2.Margin value = Level -Limit value



nt. Pol	•	Verti	cal								
est Mo	de:	тх с	TX GFSK Mode 2402MHz								
emark		Only	worse case	e is reported	ł						
.0 dBu\	//m										
·											
							FCC-Part				
·							Margin -6	dB			
						1 2		34 5 6 X 3 5			
						Langelowner and	unduranter	al a strange and a strange and			
havenand	Munaminia	n m		mound	drow hardburnson	a second s					
			Non the second sec								
3											
30.000		60.00		(MHz)	300.	00		1000.0			
No.	Freque		Reading	Factor	Level	Limit	Margin	Detecto			
NO.	(MHz	:)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Delecto			
1	349.25	00	39.77	-15.99	23.78	46.00	-22.22	QP			
2	531.96	35	36.22	-12.04	24.18	46.00	-21.82	QP			
-	798.97	97	32.94	-7.33	25.61	46.00	-20.39	QP			
3		71	30.91	-6.83	24.08	46.00	-21.92	QP			
3 4	833.31	<u> </u>									
-	833.31 884.50		30.42	-6.11	24.31	46.00	-21.69	QP			



A	
Above	1GHz

Ant. Pol.		Horiz	Horizontal									
Test Mod	le:	TX G	TX GFSK Mode 2402MHz No report for the emission which more than 10 dB below the pre-									
Remark:			eport for ed limit.	the emi	ssion wł	nich mor	e than	10 dB	below	/ the pi	re-	
100.0 dBuV.	/m											
90												
80							FCC P	art 15C 3N	Above-1	G Peak		
70												
60							FCC P	art 15C 3k	Above-1	G AV		
50	2 X											
40	1 ×											
30	×											
20											_	
10												
0.0	3400.00 5	800.00	8200.00	10600.00	(MHz)	15400.00	17800.	00 202	00.00 2	22600.00	25000.0	
Remarks												
1.Factor (	: (dB/m) = / value = L	Antenr .evel -l	na Facto ₋imit val	or (dB/m) ue	)+Cable	Factor (	(dB)-Pr	e-amp	lifier F	actor		



Ant. Pol. Test Mode:		Vertio						
				e 2402MHz				
Remark			eport for the ed limit.	e emission v	which more	than 10 dB I	below the	e pre-
100.0 dBu	V/m							
90								
						FCC Part 15C 3M A	hove-16 Peak	
70							DOVE-TO T Cak	<u> </u>
0						FCC Part 15C 3M A	bove-16 AV	
50								
40	2 X							
10	1 X							
30	×							
20								
0.0	3400.00 5	800.00	8200.00 10	)600.00 (MHz)	15400.00 1	7800.00 20200	.00 22600.0	00 25000.0
No.	Frequer (MHz		Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
No.		:)						Detector AVG



Ant	. Pol		Horiz	zontal					
	t Moo				e 2441MHz				
Rer	nark:			eport for th ed limit.	e emission v	which more t	han 10 dB b	pelow the	e pre-
100.0	) dBuV	/m							
90									
80							FCC Part 15C 3M A	bove-16 Peak	
70									<u> </u>
60									
50		2 X					FCC Part 15C 3M A	bove-16 AV	
40									
30		1 X							
20									
10									
0.0	00.000	3400.00 5	800.00	8200.00 1	0600.00 (MHz)	15400.00 1	7800.00 20200.	.00 22600.1	00 25000.00
		5155.00 5							
1	No.	Freque (MHz	-	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
	1 *	4882.3	07	35.08	-2.11	32.97	54.00	-21.03	AVG
	2	4882.3	41	47.76	-2.11	45.65	74.00	-28.35	peak

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Remarks:



Ant. Pol.		Verti	ical									
Test Mod	de:		GFSK M									
Remark:		No r scrib	eport for bed limit.	the e	emissic	n w	/hich mo	re tl	han 1	0 dB b	elow the	e pre-
100.0 dBuV	7m		1									
90												
30								F	CC Part 1	5C 3M AL	oove-16 Peal	k internet
70												
:0												
50								F	CC Part 1	5C 3M AL	ove-16 AV	
	2 X											
40	1×								_			
30	×	_										
20												
10												
0.0												
1000.000	3400.00 5	800.00	8200.00	1060	0.00 (MI	Hz)	15400.00	17	7800.00	20200.0	00 22600.	00 25000.0
	Freque (MHz		Readi (dBu\		Facto (dB/m		Leve (dBuV/r			nit V/m)	Margin (dB)	Detecto
No.	·····						32.84			.00	-21.16	AVG
No. 1 *	4882.1	94	34.9	5	-2.11		32.84	1	54	.00	-21.10	



	ol.		Horizontal								
	lode:		GFSK Mode								
ema			report for the bed limit.	e emission w	hich more t	han 10 dB b	elow the	pre-			
00.0	lBu¥/m										
'											
<u>ו</u>						FCC Part 15C 3M At	ove-16 Peak				
					I	FCC Part 15C 3M At	ove-16 AV				
		1 X									
		2 X									
·											
,											
0.0											
1000.0	000 3400.00	5800.00	8200.00 10	600.00 (MHz)	15400.00 1	7800.00 20200.0	00 22600.0	0 25000.0			
No.		uency IHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detecto			
1	495	9.306	47.98	-1.78	46.20	74.00	-27.80	peak			
2 '	496	0.518	34.88	-1.77	33.11	54.00	-20.89	AVG			



Ant. I	Pol.	Ver	tical					
Test I	Mode:	ТХ	GFSK Mode	2480MHz				
Rema	ark:		report for the	e emission v	which more	than 10 dB	below the	e pre-
100.0	dBu¥/m							
90								
80						FCC Part 15C 3M /	Above-1G Pea	
70								
60								
50		ł				FCC Part 15C 3M /	ADOVE-TO AV	
40								
30		2 X						
20								
10								
0.0								
1000.	.000 3400.00	5800.00	8200.00 10	0600.00 (MHz)	15400.00	17800.00 20200	0.00 22600.	00 25000.00
<u> </u>			I	I				
No		uency IHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	496	0.171	47.66	-1.77	45.89	74.00	-28.11	peak
2	* 496	0.178	34.86	-1.77	33.09	54.00	-20.91	AVG
Domo								

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Remarks:





Ant	<b>t Mode:</b> TX π/4-DQPSK Mode 2402MHz												
Tes	t Moo	de:	TX 1	τ/4-[	DQPSK	Mode 24	102	MHz					
Rer	nark:		No re scrib			emissio	n w	/hich	more t	han 10 c	lB b	elow the	e pre-
100.0	) gBnA	/m											
90			_										
80													
70										FCC Part 15C	3M A	bove-1G Pea	k .
60										FCC Part 15C	ЗМ А	bove-1G AV	
50		2 X											
40											_		
30		X	_								_		
20													
10													
0.0													
10	00.000	3400.00 5	800.00	8200	).00 10	500.00 (MI	lz)	154	00.00 1	7800.00 2	20200.	00 22600.	00 25000.00
Ĺ.		Freque	ncy	Re	ading	Facto	or	Le	evel	Limit	t	Margin	
	۷o.	(MHz	:)	(d	BuV)	(dB/m	·		· · ·	(dBuV/		(dB)	Detector
	1 *	4804.0			4.87	-2.44			.43	54.00		-21.57	AVG
	2	4804.0	70	4	8.02	-2.44		45	.58	74.00	)	-28.42	peak





	I.	Vertio	cal					
est Mo	ode:	ΤΧ τ	τ/4-DQPSk	K Mode 2402	2MHz			
emark	<b>(:</b>		eport for the	e emission v	vhich more	than 10 dB	below the	e pre-
00.0 dBu	lV/m							
,								
						FCC Part 15C 3M A	bove-1G Peal	k internet
						FCC Part 15C 3M A	Dove-1G AV	
	2 X							
	1×							
×								
I								
·								
1000.000	3400.00 5	800.00	8200.00 10	)600.00 (MHz)	15400.00 1	17800.00 20200	.00 22600.	00 25000.0
	Freque	ncy	Reading	Factor	Level	Limit	Margin	Detector
No.				(dR/m)	(dBu)//m)	(dBu\//m)		
	(MHz	:)	(dBuV)	(dB/m)		(dBuV/m)		A1/0
No. 1 * 2		:) 99	(dBuV) 34.75 47.76	(dB/m) -2.44 -2.44	(dBuV/m) 32.31 45.32	(dBuV/m) 54.00 74.00	(dB) -21.69 -28.68	AVG peak





nt. Pol	l. 🗌	Horiz	zontal					
est Mo	de:	TX 1	τ/4-DQPSK	Mode 2441	MHz			
emark	:		eport for the ed limit.	emission v	vhich more t	han 10 dB b	pelow the	e pre-
0.0 dBu	V/m							
ı								
						FCC Part 15C 3M A	bove-1G Peak	:
						FCC Part 15C 3M A	bove-1G AV	
I	1×							
	2 X	_						
.0								
1000.000	3400.00	5800.00	8200.00 10	600.00 (MHz)	15400.00 1	7800.00 20200	.00 22600.	00 25000.0
No.	Freque (MHz		Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	4881.1	89	48.22	-2.11	46.11	74.00	-27.89	peak
2 *	4881.5	90	35.00	-2.11	32.89	54.00	-21.11	AVG
1	(MHz 4881.1	z) 89	(dBuV) 48.22	(dB/m) -2.11	(dBuV/m) 46.11	(dBuV/m) 74.00	(dB) -27.89	pe





nt. Pol	I.	Vertio	cal					
est Mo	de:	ТΧ п	t/4-DQPSK	Mode 244	1MHz			
emark	:		eport for the	e emission v	which more	than 10 dB	below the	e pre-
0.0 dBu\	V/m							
						FCC Part 15C 3M	Above-16 Pea	k
								<u> </u>
						FCC Part 15C 3M /	Above-16 AV	
	×							
	2 X							
.0								
1000.000	3400.00 5	5800.00	8200.00 10	600.00 (MHz)	15400.00		0.00 22600	.00 25000.
No.	Frequer (MHz	•	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	4881.3	97	48.08	-2.11	45.97	74.00	-28.03	peak
2 *	4882.7	15	35.00	-2.09	32.91	54.00	-21.09	AVG
1	(MHz 4881.3	:) 97	(dBuV) 48.08	(dB/m) -2.11	(dBuV/m) 45.97	(dBuV/m) 74.00	(dB) -28.03	р





Ant	. Pol	•	Hori	zonta	al										
Tes	t Mo	de:	ТХ	π/4-D	DQPSK	Mod	e 248	0MHz							
Rer	nark	:		epor bed li	t for the mit.	e emis	ssion	which	more	than 1	0 dB	below	the	pre-	
100.0	) dBu <sup>v</sup>	//m													
90															
80										ECC Dat	150 24 4	Above-1G	Deek		
70										FLL Part	TOU 3M F	ADOVE-1G	Реак		
60															
50										FCC Part	15C 3M /	Above-1G	AV		
40		2 X													
30		1 ×													
20															
10															
0.0															
10	00.000	3400.00	5800.00	8200	).00 10	600.00	(MHz)	154	00.00	7800.00	20200	).00 22	600.0	) 2500	0.00
	lo.	Freque (MH			ading BuV)		ctor 3/m)		evel ıV/m)	Lir (dBu		Marg (dB		Detecto	or
	*	4960.	062	34	4.91	-1	.77	33	.14	54.	00	-20.8	86	AVG	7
	2	4960.9	942	47	7.77	-1	.77	46	.00	74.	00	-28.0	0	peak	;
				-		-		-		-		-			



Ant	t. Pol.		Verti	cal								
Tes	st Moo	de:	TX 1	τ/4-[	DQPSK	Mode 24	480	MHz				
Rer	nark:		No ro scrib			e emissio	n w	/hich r	nore t	han 10 dB l	pelow the	e pre-
100.0 	) dBuV	/m										
90												
80										FCC Part 15C 3M /	Above-1G Peal	k l
70												
60										FCC Part 15C 3M /	bove-16 AV	
50		1										
40												
30		2 X										
20												
10												
0.0	00.000	3400.00 5	800.00	8200		600.00 (MI		1540		7800.00 20200	.00 22600.	00 25000.00
				0200		500.00 (M			0.00	1000.00 20200		23000.00
N	۷o.	Frequer (MHz			ading BuV)	Facto (dB/m		Le (dBu		Limit (dBuV/m)	Margin (dB)	Detector
	1	4959.3	44	4	8.22	-1.78		46.	44	74.00	-27.56	peak
2	2 *	4960.0	18	3	5.02	-1.77		33.	25	54.00	-20.75	AVG

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Remarks:



	Pol. Horizontal   t Mode: TX 8-DPSK Mode 2402MHz											
est Moo	de:	TX 8	-DPSK M	ode 2402	ЛНz							
emark:			eport for t ed limit.	he emissio	on wh	ich more t	han 10 dB l	below the	e pre-			
00.0 dBuV	//m											
)												
ı							FCC Part 15C 3M /	bove-16 Peal	k			
,												
							FCC Part 15C 3M /	bove-1G AV				
)	1 X											
)												
,	2×											
)												
0.0	3400.00 5	800.00	8200.00	10600.00 (M	Hz)	15400.00 1	17800.00 20200	.00 22600.	00 25000.0			
No.	Freque (MHz		Reading (dBuV)			Level dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector			
1	4803.6	34	48.03	-2.44		45.59	74.00	-28.41	peak			
2 *	4804.5	89	34.83	-2.44	1	32.39	54.00	-21.61	AVG			



Ant	. Pol		Vert	ical								
Tes	t Mo	de:	TX 8	B-DP	SK Moo	de 240	2MH	z				
Rer	nark:			epor bed li		e emis	sion v	vhich	more t	than 10 dB	below the	e pre-
100.0	) dBu¥	//m		1		Î						
90												
80										FCC Part 15C 3M	Above-16 Pea	k
70												
60										500 D 150 OM		
50		1								FCC Part 15C 3M	Above-16 AV	
40		X										
30		2 X										
20												
10												
0.0												
10	00.000	3400.00	5800.00	8200	).00 10	600.00	(MHz)	154	00.00	17800.00 2020	0.00 22600	.00 25000.00
										I		
N	lo.	Freque (MH			ading BuV)	Fa (dB	ctor /m)	I	vel iV/m)	Limit (dBuV/m)	Margin (dB)	Detector
	1	4803.0	010	47	7.30	-2.	44	44	.86	74.00	-29.14	peak
2	2 *	4803.9	917	34	4.77	-2.	44	32	.33	54.00	-21.67	AVG
Ror	narks											

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Remarks:



	Pol. Horizontal   t Mode: TX 8-DPSK Mode 2441MHz											
est Mo	de:	TX 8	-DPSK Mod	de 2441MH	Z							
emark	:		eport for the ed limit.	emission v	which more f	than 10 dB l	below the	e pre-				
10.0 dBu	V/m											
						FCC Part 15C 3M A	bove-IG Peak	<				
							1 10 44					
						FCC Part 15C 3M A	DOVE-TO AV					
	×											
	2											
2×												
.0 1000.000	3400.00 5	800.00	8200.00 10	600.00 (MHz)	15400.00 1	7800.00 20200	.00 22600.0	00 25000.				
No.	Freque (MHz		Reading (dBuV)	Factor (dB/m)	Level	Limit (dBuV/m)	Margin (dB)	Detector				
		·/	(abav)		· · ·	. ,	-27.90	neek				
	1001 1	88	10 21	2 1 1	/610	7/ 00						
1 2 *	4881.1 4882.1		48.21 35.02	-2.11 -2.11	46.10 32.91	74.00 54.00	-27.90	peak AVG				



	<u> </u>	Vert	ical					
est Moo	de:	TX 8	3-DPSK Mo	de 2441MH	Z			
emark:			eport for th	e emission v	vhich more f	han 10 dB l	pelow the	e pre-
)0.0 dBuV	7m							
)		-						
						FCC Part 15C 3M A	bove-1G Peak	
						FCC Part 15C 3M A	bove-1G AV	
	1							
	2 X							
·								
1000.000	3400.00 5	800.00	8200.00 10	)600.00 (MHz)	15400.00 1	7800.00 20200	.00 22600.0	00 25000.0
	Freque		Reading	Factor	Level	Limit	Margin	
No.	(MHz		(dBuV)	(dB/m)		(dBuV/m)	(dB)	Detector
1	4881.2	05	47.92	-2.11	45.81	74.00	-28.19	peak
2 *	4882.7	68	34.95	-2.09	32.86	54.00	-21.14	AVG



Ant. P	ol.	Horizo	ntal										
Test M	lode:	TX 8-DPSK Mode 2480MHz No report for the emission which more than 10 dB below the pre-											
Remai	rk:	No rep		emission w	hich more t	han 10 dB b	elow the	pre-					
100.0 d	lBu¥/m												
90													
80						FCC Part 15C 3M A	bove-16 Peak						
70													
60						FCC Part 15C 3M A	hove-16 AV						
50	1 X												
40	2 X												
30	×												
20													
10													
0.0	00 3400.00 5	800.00	8200.00 100	500.00 (MHz)	15400.00 1	7800.00 20200	00 22600.	0 25000.00					
No.	Frequer (MHz		Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)		Margin (dB)	Detector					
1	4959.5	26	48.33	-1.78	46.55	74.00	-27.45	peak					
2 *	4960.3	84	34.77	-1.77	33.00	54.00	-21.00	AVG					
Domor													

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Remarks:



nt. Pol. est Mode: emark:		Vertical TX 8-DPSK Mode 2480MHz							
									No report for the emission which more than 10 dB below the pre- scribed limit.
		00.0 dBu	V/m						
)						FCC Part 15C 3M Above-1G Peak			
, ⊨							bore ru i cuk	<u> </u>	
						FCC Part 15C 3M Above-1G AV			
	2 X								
	1 X								
)									
)									
).0 1000.000	3400.00 5	800.00	8200.00 106	600.00 (MHz)	15400.00 1	7800.00 20200	.00 22600.0	0 25000.0	
No.	Freque (MHz		Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	
No.		)						Detector AVG	



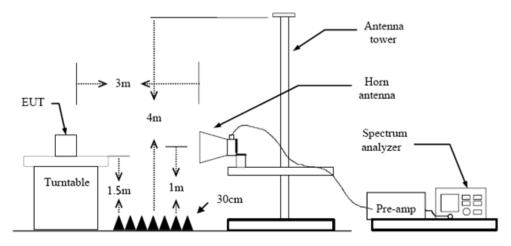
# 3.3. Band Edge Emissions (Radiated)

<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 3.9 Duty Cycle.

#### Test Mode

Please refer to the clause 2.4.

国家认证



#### Test Results

nt. Po			zontal					
est Mo	de:	GFS	K Mode 240	)2MHz				
0.0 dBu/	//m							
								+
						FCC Part 15C 3M #	bove-16 Pea	
ı							L	
						FCC Part 15C 3M 4	X	
							3	<u> </u>
2288.000	2300.00 2	312.00	2324.00 23	36.00 (MHz)	2360.00 2	2372.00 2384.	00 2396.0	0 2408.0
No.	Freque (MHz		Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2390.0	00	20.17	32.08	52.25	74.00	-21.75	peak
2 *	2390.0	00	8.92	32.08	41.00	54.00	-13.00	AVG

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										
lest Mo	de:	GFS	K Mode	240	)2MHz								
Ant. Pol.     Vertical       Test Mode:     GFSK Mode 2402MHz       110.0     d8uV/m       90     90       90     230.80       90     230.80       90     230.80       90     2													
Test Mode:     GFSK Mode 2402MHz       110.0     d8uW/m       100     90       90     90       80     FCC Part 15C 3M Above-1       70     FCC Part 15C 3M Above-1       60     FCC Part 15C 3M Above-1       50     FCC Part 15C 3M Above-1       40     FCC Part 15C 3M Above-1       30     FCC Part 15C 3M Above-1       20     FCC Part 15C 3M Above-1       10.0     FCC Part 15C 3M Above-1       20     FCC Part 15C 3M Above-1       10.0     FCC Part 15C 3M Above-1       20     FCC Part 15C 3M Above-1       10.0     FCC Part 15C 3M Above-1       20     FCC Part 15C 3M Above-1													
00													Λ
io													
n													
									FCC Part 1	5C 3M	Above-1G P	eak	
0												-	+
o													++
n									FCC Part 1	DC 3M		<u> </u>	+
0											¥	~	$\neg$
0													
n													
	2298.80 2	2310.80	2322.80	23	34.80 (M	Hz)	235	8.80	2370.80	2382	.80 239	4.80	2406
No.									1		(dB)	De	tecto
1	2390.0	00	17.82	:	32.08		49.	90	74.0	0	-24.10	p	eak
2 *	2390.0	00	8.52		32.08		40.	60	54.0	0	-13.40	A	VG
												-	





Ant. Pol	•	Horiz	zontal					_
		GFS	K Mode 248	30 MHz				
Ant. Pol.     Horizontal       Test Mode:     GFSK Mode 2480 MHz       100     dBuV/m       11     2483.500       12.72     32.52       15.09     32.52       15.09     32.52       15.00     -6.39       2*     2483.500       15.09     32.52       47.61     54.00								
Test Mode:     GFSK Mode 2480 MHz       110.0     dBoV/m       100								
0								
:0						FCC Part 15C 3M	Above-16 Pe	ak
υ 🕂						T CC T alt 13C 3M	ADOTE-TO TE	
io	1							
						FCC Part 15C 3M	Above-1G AV	
	×.							
10 /	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				·····		•	
0	Image: St Mode:     GFSK Mode 2480 MHz       0.0     dBuV/m       0     FCC Part 1       1     FCC Part 20       1     2483.500       22.72     32.52       55.24     74.0							
20								
		2.122.22						
No.								Detector
1	2483	.500	22.72	32.52	55.24	74.00	-18.76	peak
2 *	2483	.500	15.09	32.52	47.61	54.00	-6.39	AVG

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



nt. Pol	•	Vert	ical					
st Mo		GFS	SK Mode 248	30 MHz				
0.0 dBu\	//m							
o								
· (								
	$\left\{ - \right\}$					FCC Part 15C 3M	Above-1G Pe	ak
$\vdash$						FCC Part 15C 3M	AL	
	1 X					FLU Part TOU 3M	ADOVE-TO AV	
	ş							
							~~~~~	
o								
2472.800	2484.80	2496.80	2508.80 25	20.80 (MHz)	2544.80	2556.80 2568	8.80 2580.	.80 2592
No.	Frequ		Reading	Factor		Limit	Margin	Detector
	(MI	HZ)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2483	.500	20.12	32.52	52.64	74.00	-21.36	peak
2 *	2483	.500	10.35	32.52	42.87	54.00	-11.13	AVG
emarks								
Factor	(dB/m)		na Factor (c Limit value	lB/m)+Cabl	e Factor (dE	3)-Pre-ampl	ifier Fact	or



nt. Pol	•	Hori	zontal					
est Mo	de:	π/4-	DQPSK Mo	de 2402MH	Z			
10.0 dBu	¥/m							
00								-
0								
No.     Frequency (MHz)     Reading (dBuV)     Factor (dB/m)     Level (dBuV/m)     Limit (dBuV/m)     Margin (dB)     Detec       1     2390.000     18.31     32.08     50.39     74.00     -23.61     pea								
D								
0						FCC D-4 150 2M	AL	
0						FUL Part TOU 3M		
0							2 X	
D								
o								
	2300.00	2312.00	2324.00 23	336.00 (MHz)	2360.00	2372.00 2384	.00 2396.	00 2408.
No.								Detecto
1	2390	0.000	18.31	32.08	50.39	74.00	-23.61	peak
2 *	2390	0.000	8.39	32.08	40.47	54.00	-13.53	AVG

2.Margin value = Level -Limit value



Ant	t. Pol		Verti	cal											
Tes	t Mo	de:	π/4-I	DQPS	K Mo	de 24	02MH	z							
110.0	) dBuV	7m													
100															
90														٨	
80										ECC Part		bove-1G P	lask		
70												DOVE-TO F	eak		
60															
50										FCC Part	15C 3M A	bove-16 A X			
40												ş	J	l	
30															
20															
10.0	86.800	2298.80 2	310.80	2322.8		34.80	(MHz)	225	8.80 2	2370.80	2382.8	20 220	4.80	240	6.80
1	No.	Freque (MHz	-	Rea (dB			ictor 3/m)		evel ıV/m)		nit V/m)	Margi (dB)		)etec	tor
	1	2390.0	00	19.	10	32	.08	51	.18	74	.00	-22.8	2	pea	k
	2 *	2390.0	00	8.3	36	32	.08	40	.44	54	.00	-13.5	6	AV	G
	narks actor	: (dB/m) = /	Anten	na Fao	ctor (c	lB/m) <sup>.</sup>	+Cable	e Fac	tor (dB	)-Pre-	ampli	fier Fac	ctor		

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2.Margin value = Level -Limit value





A 1	Del	1		Llard		-1									
	. Pol			Hori											
<b>Tes</b>	t Mo	de:		π/4-	DQP	SK Mo	de 24	80MH	Z						
110.1		I¥7111													
100	<u>ہ</u>														
90	'														
90															
80	$\vdash$										FCC P	Part 15C 3M	Above-1G Pe	ak	
70															
60															
00		1									FCC P	art 15C 3M	Above-1G AV	,	
50	$\vdash$	2 X													
40	۲_	~							~						
30															
20															
10.0 24	474.000	248	6.00 2	2498.00	251	0.00 2	2522.00	(MHz)	254	6.00	2558.0	0 2570	.00 2582	.00 2594	.00
		_													
N	lo.	Fr	requei (MHz	-		ading BuV)		ctor /m)	Lev (dBu			imit uV/m)	Margin (dB)	Detector	
	1	2	483.5	00	2'	1.65	32	.52	54.	17	74	4.00	-19.83	peak	T
2	2 *	2	483.5	00	1:	3.81	32	.52	46.	33	54	4.00	-7.67	AVG	Ι
1.Fa		(dB				actor ( t value		+Cabl	e Fact	or (dE	3)-Pr	e-ampl	ifier Fact	or	





Δnt	. Pol.			Verti	cal											
	t Mod						100	de 2480		7						
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110.0	) 0007	/														
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70		++							_							
60																
		1										FCC P	art 15C 3M	Above-1G A	v	
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40	~	X		·····						~~~				~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		
30									_							
20																
10.0																
24	72.800	2484.8	0 24	96.80	250	8.80	252	20.80 (	MHz)	254	4.80	2556.8	0 2568	3.80 258	0.80 2592	.80
										_				-		
1	No.		quen MHz)			ading BuV)		Facto (dB/n			vel V/m)		imit uV/m)	Margin (dB)	Detector	r
	1	24	83.50	0	2	0.70		32.5	2	53	.22	7	4.00	-20.78	peak	Τ
1	2 *	24	83.50	0	9	9.96		32.5	2	42	.48	5	4.00	-11.52	AVG	Τ
1.Fa		(dB/r	n) = A e = Le					B/m)+C	abl	e Fac	tor (dE	3)-Pr	e-ampl	ifier Fac	tor	





Ant	. Pol		Horiz	zontal												
Гes	t Moo	de:	8-DF	PSK Mo	de 2	402MH	z									
10.0	dBuV	/m													_	
100														Λ		
90							_						_	H		
30										FCC Part	150 24	About 10	Deak	Н		
70											IDC 3M	ADOVE-TO	I FEAK			
50																
										FCC Part	15C 3M		i AV			
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40									~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			2	~		4	
30													_			
20																
10.0																
	88.000	2300.00	2312.00	2324.00		36.00 (I	Hz)		0.00	2372.00	2384		396.0	<u></u>	2408.	
N	۹o.	Freque (MH	-	Read (dBu		Fact (dB/n			vel IV/m)	Lin (dBu\		Marg (dB	•	Det	ecto	r
	1	2390.0	000	18.6	1	32.0	8	50	.69	74.	00	-23.3	31	pe	eak	
1	2 *	2390.0	000	8.5	7	32.0	8	40	.65	54.	00	-13.3	35	A	٧G	
								-				-				
1.Fa		: (dB/m) = value = I			•	lB/m)+C	able	e Fact	tor (dE	3)-Pre-a	ampli	fier Fa	acto	r		



An	t. Pol.		Vertic	al					
Tes	st Mod	e:	8-DPS	SK Mode 24	02MHz				
110	.0 dBuV/r	m	Î						
100									
90									Λ
80						F	C Part 15C 3M Ab	ove-1G Peak	<u> </u>
70									
60						FI	C Part 15C 3M Ab	ove-16 AV	[ + ]
50								×	
40								2 X	
30									
20									
10.0 2		2298.80 2	310.80	2322.80 233	4.80 (MHz)	2358.80 23	70.80 2382.80	2394.80	2406.80
ŕ		_							
	No.	Frequ (MF		Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
	1	2390.	000	18.59	32.08	50.67	74.00	-23.33	peak
	2 *	2390.	000	8.49	32.08	40.57	54.00	-13.43	AVG
1.F				a Factor (dl imit value	3/m)+Cable	Factor (dB)	Pre-amplifie	er Factor	





nt	. Pol	•	H	orizon	tal												
es	t Mo	de:	8-	DPSK	( Moc	le 2	480N	/Hz									
0.0	dBu¥	/m															_
00	٨																
	-																
	-											FCC P	art 15C 3	M Abov	e-1G Pea	ak	
		1										FCC P	art 15C 3	M Abov	e-16 AV		
	1	2X															
	J			****									rtur hum		******		
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	74.000	2486.00	2498.	00 25	10.00	25	22.00	(MHz		2546.0	0	2558.0	0 25	70.00	2582.	00 25	94.
Ν	<b>1</b> 0.		uency IHz)		əadir dBu√			ictor 3/m)		Leve			imit uV/m		argin dB)	Detect	tor
	1	248	3.500	2	21.77	'	32	.52	!	54.2	9	74	4.00	-1	9.71	pea	k
2	2 *	248	3.500		13.09	)	32	.52	4	45.6	1	54	4.00	-8	3.39	AVG	3

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor

2.Margin value = Level -Limit value





Ant. Pol.		\ \	Verti	cal															
Test Mode: 8-			B-DPSK Mode 2480MHz																
10.0	dBu	V/m		_															
00																			
0	Λ																		
0														FCC Par	t 15C 3M	Above	1G Peak		
0																			
0		1												FCC Par	t 15C 3N	Above	16 AV		
•	-	×												_					
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)																			
0																			
0.0 247	74.000	248	6.00	249	8.00	251	0.00	25	22.00	(MH	zÌ	254	6.00	2558.00	257	0.00	2582.0	0 259	4.0
N	0.	F	requ (Mł		су		eadir BuV			actor B/m)			evel iV/m)		imit uV/m		argin dB)	Detec	to
1	1	2	483	.50	0	2	0.40	)	32	2.52		52	.92	74	1.00	-2	1.08	pea	k
2	*	2	483	.50	0	9	9.71		32	2.52		42	.23	54	1.00	-1	1.77	AVG	3
		S:																	

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

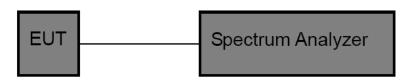


# 3.4. Band edge and Spurious Emissions (Conducted)

## <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 10<sup>th</sup> 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

Note: This test item not applicable.

#### (2) Conducted Spurious Emissions Test

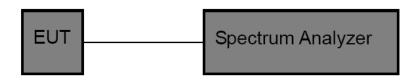


# 3.5. 20DB Bandwidth

<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



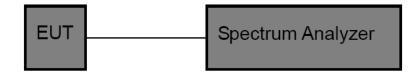
# 3.6. Channel Separation

<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



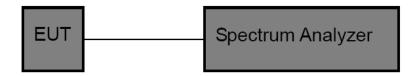
# 3.7. Number of Hopping Channel

## <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.

## <u>Test Result</u>

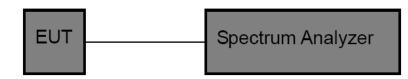


## 3.8. Dwell Time

<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



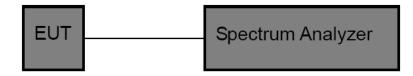
# 3.9. Peak Output Power

## <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)			
Peak Output Power	Hopping Channels>75 Pow- er<1W(30dBm) Other <125mW(21dBm)	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

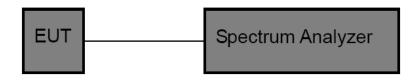


# 3.10. Duty Cycle

## <u>Limit</u>

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.

3. Spectrum Setting:

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



## 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.