# **10. BAND EDGE COMPLIANCE TEST**

# 10.1. Limits

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see §15.205(c)).

# 10.2. Test setup



# 10.3. TEST Procedure

a) Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

b) Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.

c) Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.

d) Measure the highest amplitude appearing on spectral display and set it as a reference level.Plot the graph with marking the highest point and edge frequency.

e) Repeat above procedures until all measured frequencies were complete

For conducted Band edge test:



BDR mode (GFSK): Band Edge-Left Side









🔤 Keysight	Spectrum An	alyzer - Swe	pt SA										
Start Fr	RF req 2.31	50 Ω 100000	AC IOO GH	Z PNO: Feet		SENSE:I	nt n	Avg T AvalH	ALIGN AUTO ype: Log-Pwr old:>100/100	TRA TY	CE 123456 PE MWWWW	F	requency
10 dB/div	/ Ref	10.00 d	Bm	IFGain:Lov	v Att	en: 20 dB			M	kr1 2.40 -2.9	2 0 GHz 87 dBm		Auto Tune
-10.0											1 DU1-23.00 dDm	2.36	<b>Center Freq</b> 50000000 GHz
-30.0 -40.0 -50.0											<u>}</u> 2 ₩	2.31	Start Freq 10000000 GHz
-60.0 -70.0	mrnd	V	hanness Aspen	nd and your		-thortown th	-	Luko	MurrenAn	anter and and and	h	2.41	Stop Freq 10000000 GHz
Start 2.3 #Res Bi	31000 G W 100 k	iHz Hz	X	#V	/BW 300	kHz	FUNC	CTION	Sweep	Stop 2.4 9.600 ms	1000 GHz (1001 pts) ON VALUE	1 <u>Auto</u>	<b>CF Step</b> 0.000000 MHz Man
2 N 3 4 5 6			2.40	00 0 GHZ	-53.6	24 dBm					=		Freq Offset 0 Hz
7 8 9													Scale Type
11											-	Log	Lin
MSG									STATU	JS			

### EDR mode ( $\pi$ /4-DQPSK): Band Edge-Left Side





## EDR mode ( $\pi$ /4-DQPSK): Band Edge-Left Side



🧱 Keysight Spectrum Analyzer - Swept SA				
X RL RF 50 Ω AC	SENSE:IN	T ALIGN AUTO Ava Type: Loa-Pwr	TRACE 123456	Frequency
PNO: IFGai	: Fast 🕞 Trig: Free Run in:Low Atten: 20 dB	Avg Hold:>100/100		Auto Tune
10 dB/div Ref 10.00 dBm			-2.981 dBm	
-10.0			De1 -22.90 dDm	Center Freq 2.360000000 GHz
-30.0 -40.0 -50.0			¢2 ₩	Start Freq 2.310000000 GHz
-60.0 -70.0 -80.0	A fancinal Assertance and and a	ana Ana Andreanna Angel	walked at her	<b>Stop Freq</b> 2.410000000 GHz
Start 2.31000 GHz #Res BW 100 kHz	#VBW 300 kHz	Sweep 9.	Stop 2.41000 GHz 600 ms (1001 pts) FUNCTION VALUE	<b>CF Step</b> 10.000000 MHz <u>Auto</u> Man
1 1 f 2.402.2 (2)   2 N 1 f 2.400.0 (2)   3 - - - -   4 - - - -   5 - - - - -   6 - - - - - -	GHz -2.981 dBm GHz -53.201 dBm		= =	<b>Freq Offset</b> 0 Hz
7 8 9				Scale Type
11				Log <u>Lin</u>
MSG	m	STATUS	4	

#### EDR mode(8DPSK): Band Edge-Left Side





## EDR mode(8DPSK): Band Edge-Right Side



NOTE: Hopping enabled and disabled have evaluated, and the wortest data was reported

## For radiated Band edge test:

1M-2402

Horizontal



1 2390.00 29.66 26.32 28.72 7.34 39.40 74.00 -34.60 Peak





		Reau	FreampAncenna		Capte		TTUTC	OVEL		
	Freq	Level	Factor	Factor	Loss	Level	Line	Limit	Remark	
	MHz	dBuV	dB	dB/m	dB	dBuV/m	dBuV/m	dB		
1	2483.50	33.72	26.34	28.79	7.57	43.74	74.00	-30.26	Peak	





		Read	PreampAntenna		Cable		Limit	Over	
	Freq	Level	Factor	Factor	Loss	Level	Line	Limit	Remark
	MHz	dBuV	dB	dB/m	dB	dBuV/m	dBuV/m	dB	
1	2390.00	25.85	26.32	28.72	7.34	35.59	74.00	-38.41	Peak



	MHz	dBuV	dB	dB/m	dB	dBuV/m	dBuV/m	dB	-
1	2390.00	25.28	26.32	28.72	7.34	35.02	74.00	-38.98	Peak



		Read	PreampAntenna		Cable		Limit	Over	
	Freq	Level	Factor	Factor	Loss	Level	Line	Limit	Remark
	MHz	dBuV	dB	dB/m	dB	dBuV/m	dBuV/m	dB	
1	2483.50	33.20	26.34	28.79	7.57	43.22	74.00	-30.78	Peak

Vertical



		Read	PreampAntenna		Cable		Limit	Over	
	Freq	Level	Factor	Factor	Loss	Level	Line	Limit	Remark
	MHz	dBuV	dB	dB/m	dB	dBuV/m	dBuV/m	dB	
1	2483.50	33.72	26.34	28.79	7.57	43.74	74.00	-30.26	Peak



2390.00 28.68 26.32 28.72 7.34 38.42 74.00 -35.58 Peak



		Read	PreampAntenna		Cable		Limit	Over	
	Freq	Level	Factor	Factor	Loss	Level	Line	Limit	Remark
	MHz	dBuV	dB	dB/m	dB	dBuV/m	dBuV/m	dB	
1	2390.00	25.21	26.32	28.72	7.34	34.95	74.00	-39.05	Peak



1	2483.50	36.47	26.34	28.79	7.57	46.49	74.00	-27.51	Peak



1



If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.

# **11. ANTENNA REQUIREMENTS**

## 11.1.Limits

For intentional device, according to FCC 47 CFR 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. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

## 11.2. Result

The antennas used for this product is PCB antenna and that no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is only 4.01dBi.

---END----