

FCC Test Report

Report No.: AGC00593200701FE03

FCC ID	: 2AUIUWNCH1
APPLICATION PURPOSE	: Original Equipment
PRODUCT DESIGNATION	: Wyze Headphones
BRAND NAME	: WYZE
MODEL NAME	: WNCH1
APPLICANT	: Wyze Labs, Inc.
DATE OF ISSUE	: Aug. 13, 2020
STANDARD(S)	: FCC Part 15.247
REPORT VERSION	: V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd



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REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	. /	Aug. 13, 2020	Valid	Initial Release

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1. VERIFICATION OF CONFORMITY

Applicant	Wyze Labs, Inc.	
Address	3933 Lake Washington Blvd NE Suite 350, Kirkland, Washington 98033 United States	
Manufacturer	Andon Health Co., Ltd.	
Address	No.3 Jinping Street, YaAn Road, Nankai District, Tianjin, 300190, China	
Product Designation	Wyze Headphones	
Brand Name	WYZE	
Test Model	WNCH1	
Date of test	Aug. 06, 2020 to Aug. 13, 2020	
Deviation	No any deviation from the test method	
Condition of Test Sample	Normal	
Test Result	Pass	
Report Template	AGCRT-US-BR/RF	

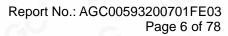
We hereby certify that:

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with radiated emission limits of FCC PART 15.247.

well chang Prepared By **Cool Cheng** Aug. 13, 2020 (Project Engineer) Max 2hom **Reviewed By** Max Zhang Aug. 13, 2020 (Reviewer) Approved By owe Forrest Lei Aug. 13, 2020 (Authorized Officer)

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2. GENERAL INFORMATION

2.1. PRODUCT DESCRIPTION

The EUT is designed as "Wyze Headphones". It is designed by way of utilizing the GFSK, Pi/4 DQPSK and 8DPSK technology to achieve the system operation.

A major technical description of EUT is described as following

Operation Frequency	2.402 GHz to 2.480 GHz	
RF Output Power	3.729dBm (Max)	
Bluetooth Version	V 5.0	
Modulation	BR ⊠GFSK, EDR ⊠π /4-DQPSK, ⊠8DPSK BLE □GFSK 1Mbps □GFSK 2Mbps	
Number of channels	79	
Hardware Version	1.1.6	
Software Version	2.1.35	
Antenna Designation	PCB Antenna (Comply with requirements of the FCC part 15.203)	
Antenna Gain	2dBi	
Power Supply	DC 3.7V by battery	

2.2. TABLE OF CARRIER FREQUENCYS

Frequency Band	Channel Number	Frequency
	0	2402 MHz
		2403 MHz
SC C	38	2440 MHz
2402~2480MHz	39	2441 MHz
	40	2442 MHz
		C is F
	77	2479 MHz
	78	2480 MHz

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2.3. RECEIVER INPUT BANDWIDTH

The input bandwidth of the receiver is 1.3MHz, in every connection one Bluetooth device is the master and the other one is slave. The master determines the hopping sequence. The slave follows this sequence. Both devices shift between RX and TX time slot according to the clock of the master. Additionally, the type of connection (e.g. single of multi slot packet) is set up at the beginning of the connection. The master adapts its hopping frequency and its TX/RX timing according to the packet type of the connection. Also, the slave of the connection will use these settings. Repeating of a packet has no influence on the hopping sequence. The hopping sequence generated by the master of the connection will be followed in any case. That means, a repeated packet will not be send on the same frequency, it is send on the next frequency of the hopping sequence.

2.4. EXAMPLE OF A HOPPING SEQUENCY IN DATA MODE

Example of a hopping sequence in data mode: 40,21,44,23,42,53,46,55,48,33,52,35,50,65,54,67 56,37,60,39,58,69,62,71,64,25,68,27,66,57,70,59 72,29,76,31,74,61,78,63,01,41,05,43,03,73,07,75 09,45,13,47,11,77,15,00,64,49,66,53,68,02,70,06 01, 51, 03, 55, 05, 04

2.5. EQUALLY AVERAGE USE OF FREQUENCIES AND BEHAVIOUR

The generation of the hopping sequence in connection mode depends essentially on two input values:

1. LAP/UAP of the master of the connection.

2. Internal master clock.

The LAP (lower address part) are the 24 LSB's of the 48 BD_ADDRESS. The BD_ADDRESS is an unambiguous number of every Bluetooth unit. The UAP (upper address part) are the 24MSB's of the 48BD_ADDRESS

The internal clock of a Bluetooth unit is derived from a free running clock which is never adjusted and is never turned off. For behavior action with other units only offset is used. It has no relation to the time of the day. Its resolution is at least half the RX/TX slot length of 312.5us. The clock has a cycle of about one day(23h30). In most case it is implemented as 28 bits counter. For the deriving of the hopping sequence the entire. LAP (24 bits),4LSB's(4bits) (Input 1) and the 27MSB's of the clock (Input 2) are used. With this input values different mathematical procedures (permutations, additions, XOR-operations) are performed to generate the Sequence. This will be done at the beginning of every new transmission.

Regarding short transmissions the Bluetooth system has the following behavior:

The first connection between the two devices is established, a hopping sequence was generated. For Transmitting the wanted data the complete hopping sequence was not used. The connection ended. The second connection will be established. A new hopping sequence is generated. Due to the fact the

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Bluetooth clock has a different value, because the period between the two transmission is longer (and it Cannot be shorter) than the minimum resolution of the clock(312.5us). The hopping sequence will always differ from the first one.

2.6. RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: 2AUIUWNCH1** filing to comply with the FCC PART 15.247 requirements.

2.7. TEST METHODOLOGY

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10 (2013). Radiated testing was performed at an antenna to EUT distance 3 meters.

2.8. SPECIAL ACCESSORIES

Refer to section 5.2.

2.9. EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

2.10. ANTENNA REQUIREMENT

This intentional radiator is designed with a permanently attached antenna of an antenna to ensure that no antenna other than that furnished by the responsible party shall be used with the device. For more information of the antenna, please refer to the APPENDIX B: PHOTOGRAPHS OF EUT.

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3. MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard

uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

- Uncertainty of Conducted Emission, Uc = ±3.1 dB
- Uncertainty of Radiated Emission below 1GHz, Uc = ±4.0 dB
- Uncertainty of Radiated Emission above 1GHz, Uc = ±4.8 dB
- Uncertainty of total RF power, conducted, $Uc = \pm 0.8$ dB
- Uncertainty of spurious emissions, conducted, Uc = ±2.7dB
- Uncertainty of Occupied Channel Bandwidth: Uc = ±2 %
- Uncertainty of Dwell Time: $Uc = \pm 2\%$
- Uncertainty of Frequency: $Uc = \pm 2 \%$

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4. DESCRIPTION OF TEST MODES

NO.	TEST MODE DESCRIPTION
1	Low channel GFSK
2	Middle channel GFSK
3	High channel GFSK
4	Low channel π/4-DQPSK
5	Middle channel π/4-DQPSK
6	High channel π/4-DQPSK
7	Low channel 8DPSK
8	Middle channel 8DPSK
9	High channel 8DPSK
10	Hopping mode GFSK
11	Hopping mode π/4-DQPSK
12	Hopping mode 8DPSK

Note:

1. Only the result of the worst case was recorded in the report, if no other cases.

2. For Radiated Emission, 3axis were chosen for testing for each applicable mode.

3. For Conducted Test method, a temporary antenna connector is provided by the manufacture.

Software Setting

BlueTest3				-
Test Commands TXSTART TXDATA1 TXDATA2 TXDATA2 TXDATA3 TXDATA4 RXSTART2 RXSTART2 RXSTART2 RXDATA1 RXDATA2 BIT ERR1	-	-Test Arguments - LO Freq. (MHz) Power (Atn. Mag. Exp)	2480	Close Help Ezecute Reset
BLE TEST TX feiled BLE TEST TX success BLE TEST TX success Chip reset : success Chip reset : success Chip reset : Success Addo Test TXDATAI Fullt Report: Code 0x30	trator\App sful sful sful sful ss successfu nternal er	Data\Local\QTIL\B1	lay : © Standard ueTest3\testapplog.t watchdog triggered	C BER

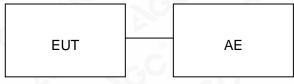
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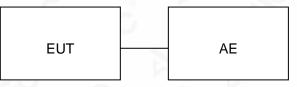
5. SYSTEM TEST CONFIGURATION

5.1. CONFIGURATION OF EUT SYSTEM

Radiated Emission Configure:



Conducted Emission Configure:



5.2. EQUIPMENT USED IN TESTED SYSTEM

ltem	Equipment	Model No.	ID or Specification	Remark
1	Wyze Headphones	WNCH1	2AUIUWNCH1	EUT
2	Adapter	TY0500100E1MN	N/A	AE
3	USB Cable	N/A	0.6m unshielded	Accessory
4	AUX in Cable	N/A	1.25m unshielded	Accessory
5	control board	N/A	USB-TTL	AE

5.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
15.247 (b)(1)	Peak Output Power	Compliant
15.247 (a)(1)	20 dB Bandwidth	Compliant
15.247 (d)	Conducted Spurious Emission	Compliant
15.209	Radiated Emission	Compliant
15.247 (a)(1)(iii)	Number of Hopping Frequency	Compliant
15.247 (a)(1)(iii)	Time of Occupancy	Compliant
15.247 (a)(1)	Frequency Separation	Compliant
15.207	Conducted Emission	Compliant

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6. TEST FACILITY

Test Site	Attestation of Global Compliance (Shenzhen) Co., Ltd	
Location	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China	
Designation Number	CN1259	
FCC Test Firm Registration Number	975832	
A2LA Cert. No.	5054.02	
Description	Attestation of Global Compliance (Shenzhen) Co., Ltd is accredited by A2LA	

TEST EQUIPMENT OF CONDUCTED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESPI	101206	May 15, 2020	May 14, 2021
LISN	R&S	ESH2-Z5	100086	Aug. 26, 2019	Aug. 25, 2020
Test software	R&S	ES-K1(Ver.V1.71)	N/A	N/A	N/A

TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	May 15, 2020	May 14, 2021
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Dec. 12, 2019	Dec. 11, 2020
2.4GHz Filter	EM Electronics	2400-2500MHz	N/A	Mar. 23, 2020	Mar. 22, 2022
Attenuator	ZHINAN	E-002	N/A	Sep. 09, 2019	Sep. 08, 2020
Horn antenna	SCHWARZBECK	BBHA 9170	#768	Sep. 21, 2019	Sep. 20, 2021
Active loop antenna (9K-30MHz)	ZHINAN	ZN30900C	18051	May 22, 2020	May 21, 2022
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	Oct. 25, 2019	Oct. 26, 2021
Broadband Preamplifier	ETS LINDGREN	3117PA	00225134	Oct. 15, 2019	Oct. 16, 2020
ANTENNA	SCHWARZBECK	VULB9168	494	Sep. 20, 2019	Sep. 19, 2021
Test software	Tonscend	JS32-RE (Ver.2.5)	N/A	N/A	N/A

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7. PEAK OUTPUT POWER

7.1. MEASUREMENT PROCEDURE

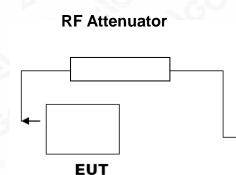
For peak power test:

- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2. Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel.
- 3. RBW > 20 dB bandwidth of the emission being measured.
- 4. VBW \geq RBW.
- 5. Sweep: Auto.
- 6. Detector function: Peak.
- 7. Trace: Max hold.

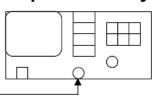
Allow trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power, after any corrections for external attenuators and cables.

7.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

PEAK POWER TEST SETUP



Spectrum Analyzer



RF Cable

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7.3. LIMITS AND MEASUREMENT RESULT

	FOR GFSK MOU	DULATION	
Frequency (GHz)	Peak Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.402	1.437	21	Pass
2.441	0.967	21	Pass
2.480	0.108	21	Pass

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Agilent Spectrum Analyzer - Swept SA					
Center Freq 2.480000000		SENSE (INT	ALIGNAUTO Avg Type: Log-Pwr	11:40:18 AM Aug 07, 2020 TRACE 1 2 3 4 5 6	Frequency
Contor Freq 2.40000000	PNO: Fast +++	Trig: Free Run Atten: 30 dB	Avg Held: 100/100	DET PININNN	
	IFGain:Low	Atten: 30 dB	Miked	2.479 815 GHz	Auto Tune
10 dB/div Ref 20.00 dBm			IVIKE	0.108 dBm	
Log				0.100 0.011	
					Center Free
10.0					2.480000000 GH
		▲1			
0.00					Start Free
					2.477500000 GH:
-10.0					2.477000000 011
-20.0					Stop Free
30.0					2.482500000 GH:
50.0					
-40.0					CF Step
					500.000 kH Auto Mar
-50.0					- Server Million
					Eron Office
-60.0					Freq Offse
					UN
-70.0					
Center 2.480000 GHz				Span 5.000 MHz	
#Res BW 1.5 MHz	#VBW	5.0 MHz	Sweep 1	1.000 ms (1001 pts)	
MSG			STATU		

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	PEAK OUTPUT POWER MEASUR FOR Π/4-DQPSK MODUL		
Frequency (GHz)	Peak Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.402	3.645	21	Pass
2.441	2.960	21	Pass
2.480	2.206	21	Pass



CH0

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CH78

R № 50 R AC Center Freq 2.48000000	CORREC	SENSE (INT	ALIGNAUTO Avg Type: Log-Pwr	11:41:59 AM Aug 07, 2020 TRACE 1 2 3 4 5 6	Frequency
senter Freq 2.4000000	PNO: Fast +++ IFGain:Low	Trig: Free Run Atten: 30 dB	Avg Held: 100/100	DET PINNNNN	
0 dB/div Ref 20.00 dBm			Mkr1	2.480 035 GHz 2.206 dBm	Auto Tu
10.0		↓ ¹			Center Fr 2.480000000 G
					Start Fr 2.477500000 G
					Stop Fr 2.482500000 G
					CF St 500.000 (Auto
					Freq Off 0
enter 2.480000 GHz		£ 0.581-		Span 5.000 MHz	
Res BW 1.5 MHz	#VBW	5.0 MHz	Sweep 1	.000 ms (1001 pts)	

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	PEAK OUTPUT POWER MEASURE	EMENT RESULT	
	FOR 8-DPSK MODULA	TION	
Frequency (GHz)	Peak Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.402	3.729	21	Pass
2.441	3.515	21	Pass
2.480	2.615	21	Pass



CH0

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CH78

Agilent Spectrum Analyzer - Swept SA					
R RF 50 Ω AC Center Freq 2.480000000		SENSE (INT	ALIGNAUTO Avg Type: Log-Pwr	11:44:23 AM Aug 07, 2020 TRACE 2 3 4 5 6	Frequency
Center Freq 2.48000000	PNO: Fast +++	Trig: Free Run	Avg Held>100/100	TYPE MINIMUM	
	IFGain:Low	Atten: 30 dB			6. de 7
			Mkr1	2.479 990 GHz	Auto Tune
10 dB/div Ref 20.00 dBm				2.615 dBm	
Log					
					Center Free
10.0		1			2.48000000 GH
0.00			and an and an		Start Free
					2.477500000 GH
-10.0					2.477000000 011
-20.0					Stop Free
					2.482500000 GH
-30.0					
					CF Ster
-40.0					500.000 kH
					Auto Mar
-50.0					
					Freq Offse
-60.0					он
-70.0					
Contor 2 490000 CH				Snop 5 000 Mile	
Center 2.480000 GHz #Res BW 1.5 MHz	#VBW	5.0 MHz	Sween 1	Span 5.000 MHz .000 ms (1001 pts)	
	# 0 B 00 3				
45G			STATUS	9	

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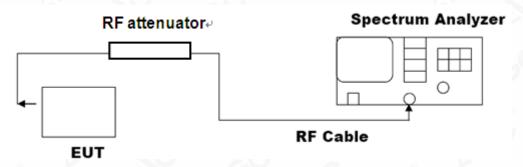


8. 20DB BANDWIDTH

8.1. MEASUREMENT PROCEDURE

- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2, Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- 3. Set Span = approximately 2 to 5 times the 20 dB bandwidth, centered on a hoping channel The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be approximately three times RBW; Sweep = auto; Detector function = peak
- 4. Set SPA Trace 1 Max hold, then View.

8.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)



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8.3. LIMITS AND MEASUREMENT RESULTS

MEASUREMENT RESULT FOR GFSK MOUDULATION					
Applicable Limite		Measurement Result			
Applicable Limits	Test Data (MHz)		Criteria		
N/A	Low Channel	0.962	PASS		
	Middle Channel	0.960	PASS		
	High Channel	0.957	PASS		

11:37:24 AM Aug 07, 2020 Radio Std: None Frequency Center Freq: 2.402000000 GHz Trig: Free Run Avg|Hold>100/100 02000000 GH Trig:Free Run #Atten:30 dB Radio Device: BTS Ref 20.00 dBm Center Freq 2.402000000 GHz Center 2.402 GHz #Res BW 30 kHz Span 3 MHz Sweep 3.2 ms CF Step #VBW 100 kHz 300.000 Auto Ma Occupied Bandwidth Total Power 8.94 dBm 869.33 kHz Freq Offset 0 H -2.475 kHz Transmit Freq Error OBW Power 99.00 % x dB Bandwidth 961.5 kHz x dB -20.00 dB

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL

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TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL

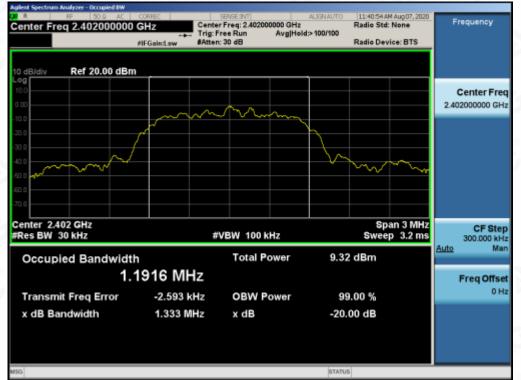


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MEASUREMENT RESULT FOR II /4-DQPSK MODULATION					
Angliaghta Limita		Measurement Result			
Applicable Limits	Test Data	Test Data (MHz)			
N/A	Low Channel	1.333	PASS		
	Middle Channel	1.337	PASS		
	High Channel	1.333	PASS		

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL







TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL

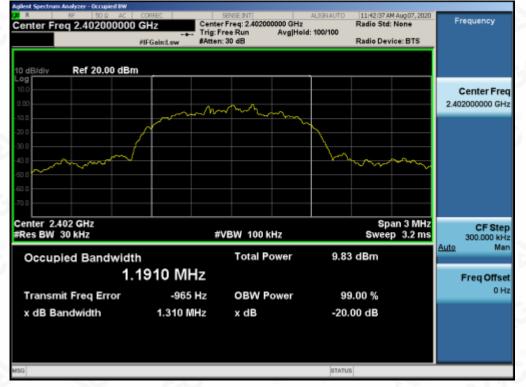


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MEASUREMENT RESULT FOR 8-DPSK MODULATION					
Applicable Limits Measurement Result					
Applicable Limits	Test Data	Test Data (MHz)			
N/A	Low Channel	1.310	PASS		
	Middle Channel	1.309	PASS		
	High Channel	1.310	PASS		

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



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TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



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9. CONDUCTED SPURIOUS EMISSION

9.1. MEASUREMENT PROCEDURE

- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2. Set the EUT Work on the top, the Middle and the bottom operation frequency individually.
- Set the Span = wide enough to capture the peak level of the in-band emission and all spurious emissions from the lowest frequency generated in the EUT up through the 10th harmonic.
 RBW = 100 kHz; VBW= 300 kHz; Sweep = auto; Detector function = peak.
- 4. Set SPA Trace 1 Max hold, then View.

9.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

The same as described in section 8.2

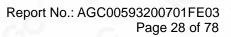
9.3. MEASUREMENT EQUIPMENT USED

The same as described in section 6

9.4. LIMITS AND MEASUREMENT RESULT

LIMITS AND MEASUREMENT RESULT					
	Measurement Result				
Applicable Limits	Test Data	Criteria			
In any 100 kHz Bandwidth Outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency	At least -20dBc than the limit Specified on the BOTTOM Channel	PASS			
power that is produce by the intentional radiator shall be at least 20 dB below that in 100KHz bandwidth within the band that contains the highest level of the desired power. In addition, radiation 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))	At least -20dBc than the limit Specified on the TOP Channel	PASS			

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TEST RESULT FOR ENTIRE FREQUENCY RANGE TEST PLOT OF OUT OF BAND EMISSIONS WITH THE WORST CASE OF 8DPSK MODULATION IN LOW CHANNEL

Agilent Spectrum Analyzer - Swep		SENSE (INT	ALIGNAUTO	11:45:06 AM Aug 07, 2020	_
Center Freq 2.4020	PNO: Wide	Trig: Free Run Atten: 30 dB	Avg Type: Log-Pwr Avg Hold: 10/10	TRACE 2345 C TYPE NUMBER	Frequency
10 dB/div Ref 20.00	dBm		Mkr1 2	402 162 9 GHz 1.431 dBm	Auto Tune
Log 10.0 -10.0					Center Freq 2.402000000 GHz
-20 0 -30 0 -40 0					Start Freq 2.400500000 GHz
-70.0					Stop Freq 2.403500000 GHz
Center 2.402000 GH2 #Res BW 100 kHz		300 kHz	Sweep 2.0	Span 3.000 MHz 100 ms (30000 pts) FUNCTION VALUE	CF Step 300.000 kHz Auto Man
1 N 1 f 2 3 4 6	2.402 162 9 GHz	1.431 dBm			Freq Offset 0 Hz
7 8 9 10					
MSG			STATUS	•	
Agilent Spectrum Analyzer - Swep	t SA				_
Center Freq 1.2100	PN0: Fast ++- IFGain:Low	SENSE (NT) Trig: Free Run Atten: 30 dB	AUGNAUTO Avg Type: Log-Pwr Avg Hold: 10/10	11:45:15 AM Aug07, 2020 TRACE 1 2 3 4 5 6 TYPE MINISTRA DET P N N N N N	Frequency
10 dB/div Ref 20.00			Mkr	1 2.359 87 GHz -56.819 dBm	Auto Tune
10.0 -10.0				-18.57 dBm	Center Freq 1.210000000 GHz
-20.0				-15.5' dor	Start Freq 30.000000 MHz
50.0				4	
-50.0 -60.0 -70.0					Stop Freq 2.39000000 GHz
50 0 70 0 Start 30 MHz #Res BW 100 kHz		300 kHz		Stop 2.390 GHz 5.0 ms (30000 pts)	
-50 0 -70 0 Start 30 MHz	#VBW 2,359 87 GHz		Sweep 22		2.390000000 GHz CF Step 236.000000 MHz

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Agilent Spectru	m Analyzer - Swej									
Center F	req 13.741	1750000 (SENSE	1		Log-Pwr 10/10	TRAC	M Aug 07, 2020 26 1 2 3 4 5 6 Re Mullion	Frequency
10 dB/div	Ref 20.00	B.	FGain:Low	Atten: 30 d				1 24.851	4 GHz 65 dBm	Auto Tune
10.0										Center Freq 13.741750000 GHz
-20.0 -30.0 -40.0									-15.57 dBe	Start Freq 2.483500000 GHz
-50.0 -60.0 -70.0		****	****	-		A	*****			Stop Freq 25.00000000 GHz
Start 2.48 #Res BW	100 kHz	×		/ 300 kHz	FUNCTION		Sweep 2	2.152 s (3	5.00 GHz 0000 pts) WVALUE	CF Step 2.251650000 GHz <u>Auto</u> Man
1 2 3 4 5 6 7 8 9 9 9		24.851	1 4 GHz	-49.465 dBn						Freq Offset 0 Hz
10 11							STATUS		• •	

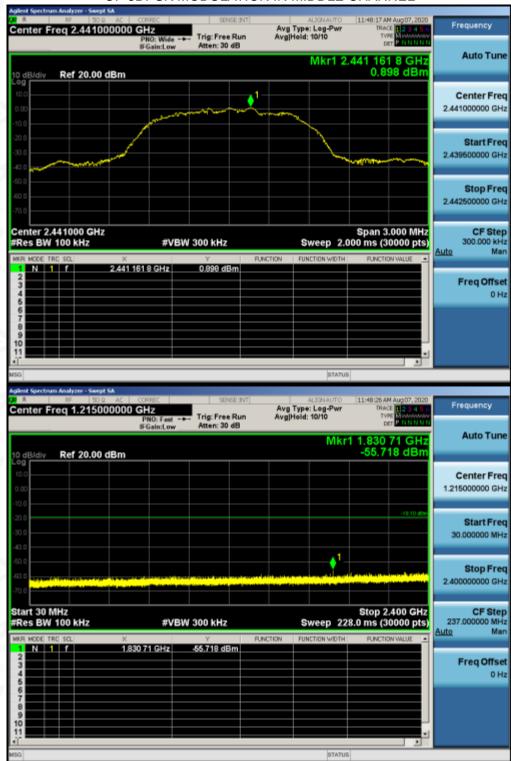
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 Attestation of Global Compliance(Shenzhen)Co., Ltd

 Attestation of Global Compliance(Shenzhen)Std & Tech Co., Ltd

 Tel: +86-755 2523 4088
 E-mail: agc@agc-cert.com





TEST PLOT OF OUT OF BAND EMISSIONS OF 8DPSK MODULATION IN MIDDLE CHANNEL

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Agilent Spectrum	Analyzer - Swep									
Center Fre	r≓ so a 8q 13.741	750000 G			Run		ALIGNAUTO : Log-Pwr : 10/10	TRACE	Aug 07, 2020	Frequency
	Ref 20.00	1Ê	Gain:Low	Atten: 30 d				1 24.491	1 GHz 76 dBm	Auto Tune
10.0 0.00										Center Freq 13.741750000 GHz
-20.0 -30.0 -40.0									-19.10 dBe	Start Freq 2.483500000 GHz
-50.0 -60.0 -70.0		a de tractica	^_							Stop Freq 25.000000000 GHz
Start 2.48 (#Res BW 1	SOL	×		V 300 kHz	FUNCT		Sweep 2	Stop 25 2.152 s (30 FUNCTIO	_	CF Step 2.251650000 GHz Auto Man
1 N 1 2 3 4 5 6 7 8 9		24.491	1 GHz	-49.176 dBr						Freq Offset 0 Hz
10 11							STATUS			

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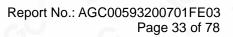
 Tel: +86-755 2523 4088
 E-mail: agc@agc-cert.com



Center Freq 2.480	DOOOOOO GHZ	SENSE (INT)	AUGNAUTO Avg Type: Log-Pwr Avg[Held: 10/10	11:50:09 AM Aug 07, 2020 TRACE 1 2 3 4 5 6 TYPE MUSIC	Frequency
	IFGain:Lo			480 160 5 GHz	Auto Tu
O dBidiv Ref 20.0	00 dBm			-0.145 dBm	
Log					
10.0			1		Center Fr
0.00		and and and a second	harmon and the		2.48000000 G
20.0	5				
30.0					Start Fr
40.0	and the second s		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		2.478500000 G
50.0				- MAR	
60.0					Stop Fr
70.0					2.481500000 G
10.0					
Center 2.480000 G		(BW) 200 1-11-	0	Span 3.000 MHz	CF St 300.000 k
Res BW 100 kHz	#1	/BW 300 kHz		00 ms (30000 pts)	Auto M
MKR MODE TRC SOL	× 2.490 160 5 GHz		PUNCTION FUNCTION WIDTH	FUNCTION VALUE	_
2					Freq Offs
4					0
6					
8					
9					
11					
•					
60			STATUS		
ISG	- 1.61		STATUS		
gilent Spectrum Analyzer - Sw A RF 5	50 Q AC CORREC	SENSE (INT	OTUARELA	11:50:18 AM Aug/07, 2020	Fraguation
	50 & AC CORREC 5000000 GHz	Toles Free Dure		11:50:18 AM Aug 07, 2020 TRACE 12345 5 TYPE MUSIC	Frequency
gilent Spectrum Analyzer - Sw A RF 5	50 Q AC CORREC	Trig: Free Run	ALIGNAUTO Avg Type: Leg-Pwr Avg Heid: 10/10	11:50:18 AM Aug 07, 2020 TRACE 22:34 5 6 TYPE MINIMUM	
glest Spectrum Analyzes - Sr R R R R Center Freq 1.215	50 B AC CORREC 50000000 GHz PNO: Fast IFGain:Lot	Trig: Free Run	ALIGNAUTO Avg Type: Leg-Pwr Avg Heid: 10/10	11:50:18 AM Aug 07, 2020 TRACE 2 3 4 5 6 TYPE M CONTRACE DET DET DET DET DET DET DET DET DET DET	
glest Spectrum Analyzes - Sr R R R R Center Freq 1.215	50 B AC CORREC 50000000 GHz PNO: Fast IFGain:Lot	Trig: Free Run	ALIGNAUTO Avg Type: Leg-Pwr Avg Heid: 10/10	11:50:18 AM Aug 07, 2020 TRACE 22:34 5 6 TYPE MINIMUM	
glest Spectrum Analyzes - Sr A RE RE Center Freq 1.215	50 B AC CORREC 50000000 GHz PNO: Fast IFGain:Lot	Trig: Free Run	ALIGNAUTO Avg Type: Leg-Pwr Avg Heid: 10/10	11:50:18 AM Aug 07, 2020 TRACE 2 3 4 5 6 TYPE M CONTRACE DET DET DET DET DET DET DET DET DET DET	Auto Tu
A PF 3 Center Freq 1.215	50 B AC CORREC 50000000 GHz PNO: Fast IFGain:Lot	Trig: Free Run	ALIGNAUTO Avg Type: Leg-Pwr Avg Heid: 10/10	11:50:18 AM Aug 07, 2020 TRACE 2 3 4 5 6 TYPE M CONTRACE DET DET DET DET DET DET DET DET DET DET	Auto Tu Center Fr
glest Spectrum Analyzer - Si A BF S Center Freq 1.215 Center Freq 20.0 Center Ref 20.0	50 B AC CORREC 50000000 GHz PNO: Fast IFGain:Lot	Trig: Free Run	ALIGNAUTO Avg Type: Leg-Pwr Avg Heid: 10/10	11:50:18 AM Aug 07, 2020 TRACE 2 3 4 5 6 TYPE M CONTRACE DET DET DET DET DET DET DET DET DET DET	Auto Tu Center Fr
glest Spectrum Analyzer - Sin R FF 12 Center Freq 1.215 10 dB/div Ref 20.0 10 0 10 0	50 B AC CORREC 50000000 GHz PNO: Fast IFGain:Lot	Trig: Free Run	ALIGNAUTO Avg Type: Leg-Pwr Avg Heid: 10/10	11:50:18 AM Aug 07, 2020 TRACE 2 3 4 5 6 TYPE M CONTRACE DET DET DET DET DET DET DET DET DET DET	Auto Tu Center Fr 1.215000000 G
glest Spectrum Analyzer Sin A FF Sin Center Freq 1.215 Sin Sin 10 dB/div Ref 20.0 Sin 10 0 Sin Sin Sin 10 0 Sin Sin Sin Sin 10 0 Sin	50 B AC CORREC 50000000 GHz PNO: Fast IFGain:Lor	Trig: Free Run	ALIGNAUTO Avg Type: Leg-Pwr Avg Heid: 10/10	11:50:18 AM Aug 07, 2020 TRACE 12 2 4 5 6 Two ort 11:19:19 AM Aug 07, 2020 TRACE 12 4 5 6 TRACE 12 5 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	Auto Tu Center Fr 1.21500000 G Start Fr
glest Spectrum Analyzer Sin A BF Sin Center Freq 1.215 Sin Sin 10 dB/div Ref 20.0 Sin 00 00 Sin Sin Sin 10 0.00 Sin Sin Sin Sin 10 0.00 Sin Sin<	50 B AC CORREC 50000000 GHz PNO: Fast IFGain:Lor	Trig: Free Run	AUGHAUTO Avg Type: Log-Pwr Avg Hold: 10/10	11:50:18 AM Aug 07, 2020 TRACE 12 2 4 5 6 Two ort 11:19:19 AM Aug 07, 2020 TRACE 12 4 5 6 TRACE 12 5 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	Auto Tu Center Fr 1.21500000 G Start Fr
Bits Spectrum Analyzer Sin A BF S Center Freq 1.215 S IO dB/dlv Ref 20.0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	50 B AC CORREC 50000000 GHz PNO: Fast IFGain:Lor	Trig: Free Run	ALIGNAUTO Avg Type: Leg-Pwr Avg Heid: 10/10	11:50:18 AM Aug 07, 2020 TRACE 12 2 4 5 6 Two ort 11:19:19 AM Aug 07, 2020 TRACE 12 4 5 6 TRACE 12 5 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	Auto Tu Center Fr 1.21500000 G Start Fr 30.000000 M
glest Spectrum Analyzer Sin R RF S Center Freq 1.215 S 10 dB/dlv Ref 20.0 00 0 00 0 00 0 00 0 00 0 00 0 00 0 00 0 00 0 00 0 00 0 00 0 00 0 00 0 00 0 00 0 00 0 00 0	50 B AC CORREC 50000000 GHz PNO: Fast IFGain:Lor	Trig: Free Run	AUGHAUTO Avg Type: Log-Pwr Avg Hold: 10/10	11:50:18 AM Aug 07, 2020 TRACE 12 2 4 5 6 Two ort 11:19:19:19 ort 11:19:19:19 1 1.860 02 GHz -53.675 dBm	Auto Tu Center Fr 1.21500000 G Start Fr 30.000000 M Stop Fr
glest Spectrum Analyzer Sin A BF Sin Center Freq 1.215 Sin Sin 10 dB/dlv Ref 20.0 00 0.00 Sin Sin 00 0.00 Sin Sin Sin 00 0.00 Sin Sin Sin Sin 00 0.00 Sin Sin<	50 B AC CORREC 50000000 GHz PNO: Fast IFGain:Lor	Trig: Free Run	AUGHAUTO Avg Type: Log-Pwr Avg Hold: 10/10	11:50:18 AM Aug 07, 2020 TRACE 12 2 4 5 6 Two ort 11:19:19:19 ort 11:19:19:19 1 1.860 02 GHz -53.675 dBm	Auto Tu Center Fr 1.21500000 G Start Fr 30.000000 M Stop Fr
Old Bildiv Ref 20.0 10 Bildiv Bildiv 10	50 B AC CORREC 50000000 GHz PNO: Fast IFGain:Lor	Trig: Free Run	AUGHAUTO Avg Type: Log-Pwr Avg Hold: 10/10	11:50:18 AM Aug 07, 2020 TRACE 12 2 4 5 6 Twe Provide 12 4 5 6 Twe Provide 12 1 5 6 Twe Provide 12 1 5 6 1 1.860 02 GHz -53.675 dBm -53.675 dBm	Auto Tu Center Fr 1.215000000 G Start Fr 30.000000 M Stop Fr 2.400000000 G
Old Bidly Ref 20.0 0 Bidly Bidly	200 AC CORREC 50000000 GHZ PN0: Fast IFGain:Los 00 dBm	Trig: Free Run	AUGHAUTO Avg Type: Log-Pwr Avg Hold: 10/10 Mkr	11:50:18 AM Aug 07, 2020 TRACE 12 2 4 5 6 Two ort 11:19:19:19 ort 11:19:19:19 1 1.860 02 GHz -53.675 dBm	Auto Tu Center Fr 1.215000000 G Start Fr 30.000000 M Stop Fr 2.400000000 G
Old Bildiv Ref 20.0 0 Bildiv Bildiv 0 Bildiv	x	Trig: Free Run Atten: 30 dB	AUGHAUTO Avg Type: Log-Pwr Avg Hold: 10/10 Mkr	11:50:18 AM Aug 07, 2020 TRACE 12 2 4 5 6 Two or 11:00:000 Trace 12 2 4 5 6 Trace 12 2 4 5 6 Trace 12 4 5	Auto Tu Center Fr 1.215000000 G Start Fr 30.000000 M Stop Fr 2.400000000 G
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TEST PLOT OF OUT OF BAND EMISSIONS OF 8DPSK MODULATION IN HIGH CHANNEL

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Agilent Spectrur	n Analyzer -	Swept SA									
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Note: The 8DPSK modulation is the worst case and only those data recorded in the report.

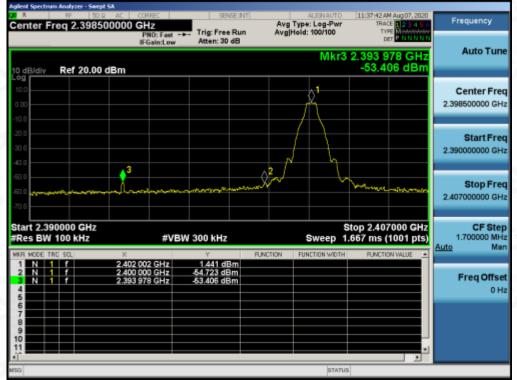
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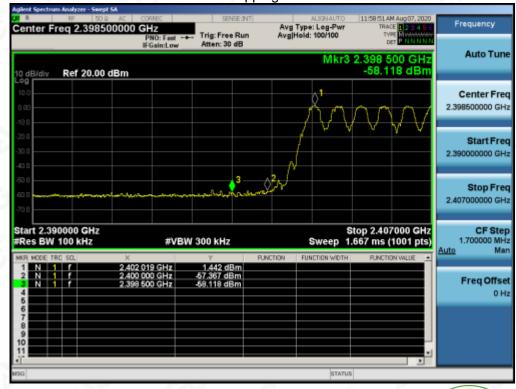
TEST RESULT FOR BAND EDGE

GFSK MODULATION IN LOW CHANNEL

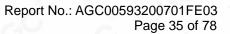
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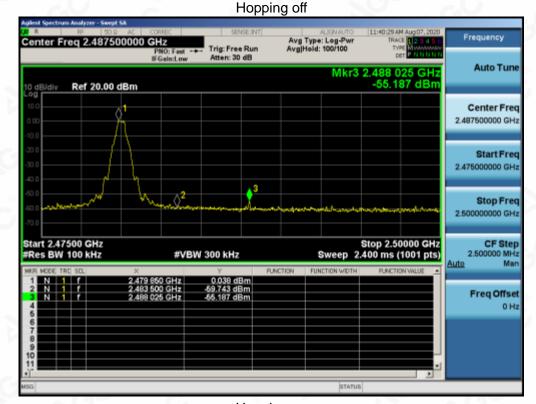
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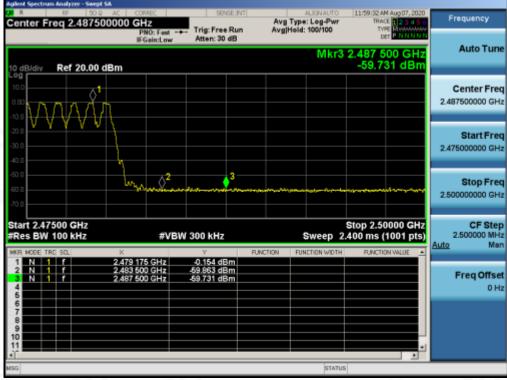






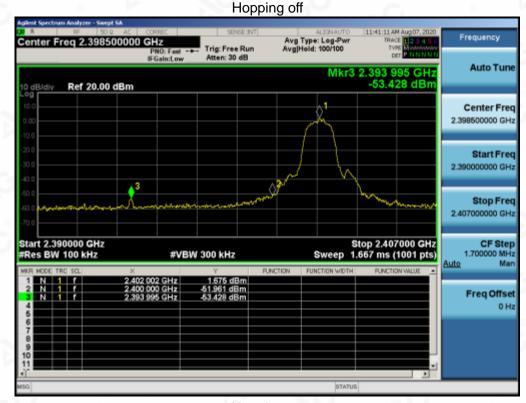
GFSK MODULATION IN HIGH CHANNEL

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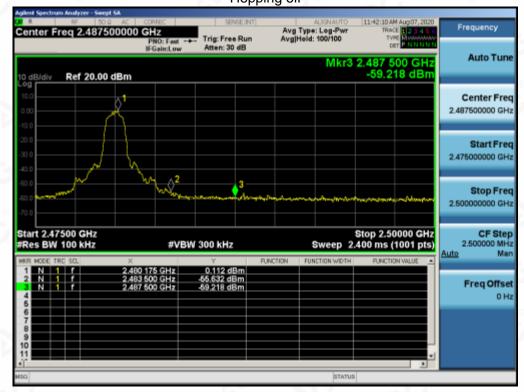
π /4-DQPSK MODULATION IN LOW CHANNEL

Hopping on



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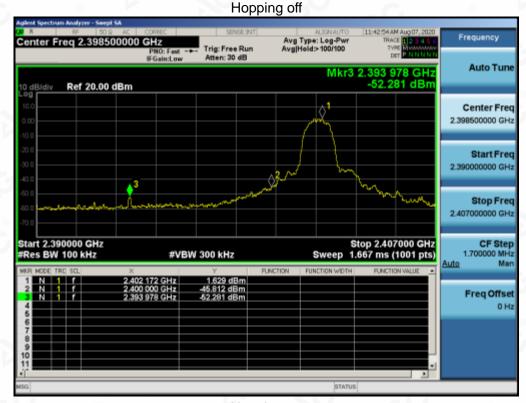
π /4-DQPSK MODULATION IN HIGH CHANNEL Hopping off

Hopping on



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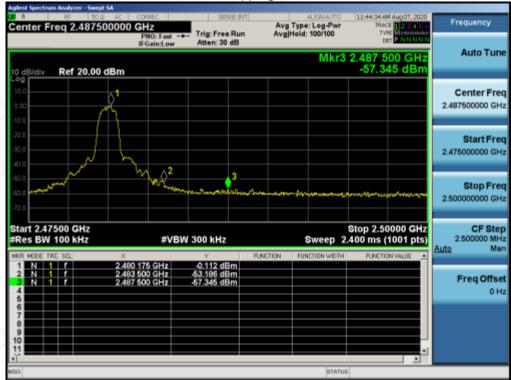
8-DPSK MODULATION IN LOW CHANNEL

Hopping on



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8-DPSK MODULATION IN HIGH CHANNEL

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10. RADIATED EMISSION

10.1. MEASUREMENT PROCEDURE

- 1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
- 2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
- 3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
- 4. For each suspected emission, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
- 5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
- 6. For emissions above 1GHz, use 1MHz RBW and 3MHz VBW for peak reading. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
- 7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
- 8.If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
- 9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
- 10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High Low scan is not required in this case.

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