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FCC TEST REPORT

Manufacturer:	Honor Device Co., Ltd. Suite 3401 Unit A Building 6 Shum Yip Sky Park No 8089 Hongli West Road
Address of Manufacturer	Suite 3401,Unit A, Building 6, Shum Yip Sky Park, No.8089,Hongli West Road, Xiangmihu Street, Futian District, Shenzhen, , Guangdong 518040, People's
EUT Description:	Republic of China Smart Phone
Model No.:	NTN-LX3
Trade Mark:	HONOR
FCC ID:	2AYGCNTN-LX3
Standards:	47 CFR FCC Part 2, Subpart J
	47 CFR Part 15, Subpart C
Date of Receipt:	2021/1/28
Date of Test:	2021/1/28 to 2021/2/19
Date of Issue:	2021/2/19
Test Result :	PASS *

In the configuration tested, the EUT detailed in this report complied with the standards specified above.

Authorized Signature:

Derele young

Derek Yang Wireless Laboratory Manager

中国·深圳·科技园中区M-10栋一号厂房



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1 Version

Revision Record						
Version Chapter Date Modifier Ren						
01		2021-02-19		Original		

Authorized for issue by:		
Tested By	Dee.Zheng	
	(Dee Zheng) /Project Engineer	
Checked By	David Chen	
	(David Chen) /Reviewer	



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2 Test Summary

Test Item	Test Requirement	Test Method	Test Result	Result	Test Lab*
AC Power Line Conducted Emission	15.207	ANSI C63.10 (2013)	Clause 4.3	PASS	В
Conducted Peak Output Power	15.247 (b)(1)	ANSI C63.10 (2013)	Clause 4.4	PASS	А
20dB Emission Bandwidth	15.247 (a)(1)	ANSI C63.10 (2013)	Clause 4.5	PASS	А
Carrier Frequencies Separation	15.247 (a)(1)	ANSI C63.10 (2013)	Clause 4.6	PASS	А
Hopping Channel Number	15.247 (a)(1)	ANSI C63.10 (2013)	Clause 4.7	PASS	А
Dwell Time	15.247 (a)(1)	ANSI C63.10 (2013)	Clause 4.8	PASS	А
Band-edge for RF Conducted Emissions	15.247(d)	ANSI C63.10 (2013)	Clause 4.9	PASS	А
RF Conducted Spurious Emissions	15.247(d)	ANSI C63.10 (2013)	Clause 4.10	PASS	А
Radiated Spurious emissions	15.247(d); 15.205/15.209	ANSI C63.10 (2013)	Clause 4.11	PASS	В
Restricted bands around fundamental frequency (Radiated Emission)	15.247(d); 15.205/15.209	ANSI C63.10 (2013)	Clause 4.12	PASS	В



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SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

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3 General Information

3.1 Details of Client

Applicant:	Honor Device Co., Ltd.
Address of Applicant	Suite 3401,Unit A, Building 6, Shum Yip Sky Park, No.8089,Hongli West Road, Xiangmihu Street, Futian District, Shenzhen, , Guangdong 518040, People's Republic of China
Manufacturer:	Honor Device Co., Ltd.
Address of Manufacturer	Suite 3401,Unit A, Building 6, Shum Yip Sky Park, No.8089,Hongli West Road, Xiangmihu Street, Futian District, Shenzhen, , Guangdong 518040, People's Republic of China

3.2 Test Location

Lab A:

Company:	SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch
Address:	No. 1 Workshop, M-10, Middle section, Science & Technology Park, Shenzhen, Guangdong, China
Post code:	518057

Lab B:

Company:	SGS-CSTC STANDARDS TECHNICAL SERVICES (XI 'AN) CO., LTD.
Address:	1/F, Unit D, Building 1, Kanghong Orange Technology Park, No.137, Keyuan 3rd Road, Fengdong New City, Xi'an, Shaanxi China
Post code:	710086



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3.3 Test Facility

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

Lab A:

• A2LA (Certificate No. 3816.01)

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

• VCCI

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

• FCC – Designation Number: CN1178

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

Innovation, Science and Economic Development Canada

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

Lab B:

A2LA (Certificate No. 4854.01)

SGS-CSTC STANDARDS TECHNICAL SERVICES (XI 'AN) CO., LTD. is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 4854.01. Designation Number: CN1271.



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3.4 General Description of EUT

EUT Description:	Smart Phone
Model No.:	NTN-LX3
Trade Mark:	HONOR
Hardware Version:	HL1NTNM
Software Version:	5.0.0.74(C900E74R1P2)
Operation Frequency:	2400MHz~2483.5MHz fc = 2402 MHz + N * 2 MHz, where: -fc = "Operating Frequency" in MHz, -N = "Channel Number" with the range from 0 to 39.
Bluetooth version:	Bluetooth V5.0
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)
Modulation Type:	GFSK, π/4DQPSK, 8DPSK
Number of Channel:	79
Hopping Channel Type:	Adaptive Frequency Hopping systems
Sample Type:	⊠ Portable Device, □Module
Antenna Type:	External, 🛛 Integrated
Antenna Gain:	-2.2dBi

Operation Frequency of each channel								
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency	
0	2402MHz	20	2422MHz	40	2442MHz	60	2462MHz	
1	2403MHz	21	2423MHz	41	2443MHz	61	2463MHz	
2	2404MHz	22	2424MHz	42	2444MHz	62	2464MHz	
3	2405MHz	23	2425MHz	43	2445MHz	63	2465MHz	
4	2406MHz	24	2426MHz	44	2446MHz	64	2466MHz	
5	2407MHz	25	2427MHz	45	2447MHz	65	2467MHz	
6	2408MHz	26	2428MHz	46	2448MHz	66	2468MHz	
7	2409MHz	27	2429MHz	47	2449MHz	67	2469MHz	
8	2410MHz	28	2430MHz	48	2450MHz	68	2470MHz	
9	2411MHz	29	2431MHz	49	2451MHz	69	2471MHz	
10	2412MHz	30	2432MHz	50	2452MHz	70	2472MHz	
11	2413MHz	31	2433MHz	51	2453MHz	71	2473MHz	
12	2414MHz	32	2434MHz	52	2454MHz	72	2474MHz	
13	2415MHz	33	2435MHz	53	2455MHz	73	2475MHz	
14	2416MHz	34	2436MHz	54	2456MHz	74	2476MHz	
15	2417MHz	35	2437MHz	55	2457MHz	75	2477MHz	
16	2418MHz	36	2438MHz	56	2458MHz	76	2478MHz	



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17	2419MHz	37	2439MHz	57	2459MHz	77	2479MHz
18	2420MHz	38	2440MHz	58	2460MHz	78	2480MHz
19	2421MHz	39	2441MHz	59	2461MHz		

Remark:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The Lowest channel(CH0)	2402MHz
The Middle channel(CH39)	2441MHz
The Highest channel(CH78)	2480MHz

3.5 Test Environment

Operating Environment:			
Temperature:	25.0 °C		
Humidity:	50 % RH		
Atmospheric Pressure:	101.30 KPa		

3.6 Description of Support Units

The EUT has been tested independent unit.



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4 Test results and Measurement Data

4.1 Antenna Requirement

Standard requirement: 47 CFR Part 15C Section 15.203 /247(c)

15.203 requirement: 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 an 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.

15.247(b) (4) requirement: The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is -2.2dBi.



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4.2 Other requirements Frequency Hopping Spread Spectrum System Hopping Sequence

4.2.1 Test Requirement:

47 CFR Part 15, Subpart C 15.247(a)(1),(g),(h)

4.2.2 Conclusion

Standard Requirement:

The system shall hop to channel frequencies that are selected at the system hopping rate from a Pseudorandom ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

Frequency hopping spread spectrum systems are not required to employ all available hopping channels during each transmission. However, the system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this section should the transmitter be presented with a continuous data (or information) stream. In addition, a system employing short transmission bursts must comply with the definition of a frequency hopping system and must distribute its transmissions over the minimum number of hopping channels specified in this section.

The incorporation of intelligence within a frequency hopping spread spectrum system that permits the system to recognize other users within the spectrum band so that it individually and independently chooses and adapts its hopsets to avoid hopping on occupied channels is permitted. The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

Compliance for section 15.247(a)(1):

According to Technical Specification, the pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first ONE of 9 consecutive ONEs; i.e. the shift register is initialized with nine ones.

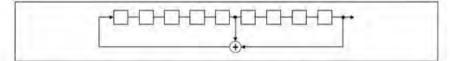
> Number of shift register stages: 9

> Length of pseudo-random sequence: 29 -1 = 511 bits

> Longest sequence of zeros: 8 (non-inverted signal)

Linear Feedback Shift Register for Generation of the PRBS sequence

An example of Pseudorandom Frequency Hopping Sequence as follow:



Linear Feedback Shift Register for Generation of the PRBS sequence

An example of Pseudorandom Frequency Hopping Sequence as follow:

20 62 46 77	7 64 8 73	16 75 1



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Each frequency used equally on the average by each transmitter.

According to Technical Specification, the receivers are designed to have input and IF bandwidths that match the hopping channel bandwidths of any transmitters and shift frequencies in synchronization with the transmitted signals.

Compliance for section 15.247(g):

According to Technical Specification, the system transmits the packet with the pseudorandom hopping frequency with a continuous data and the short burst transmission from the RF system is also transmitted under the frequency hopping system with the pseudorandom hopping frequency system. Compliance for section 15.247(h):

According to Technical specification, the system incorporates with an adaptive system to detect other user within the spectrum band so that it individually and independently to avoid hopping on the occupied channels. The system is designed not have the ability to coordinated with other FHSS System in an effort to avoid the simultaneous occupancy of individual hopping frequencies by multiple transmitter.



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4.3 AC Power Line Conducted Emissions

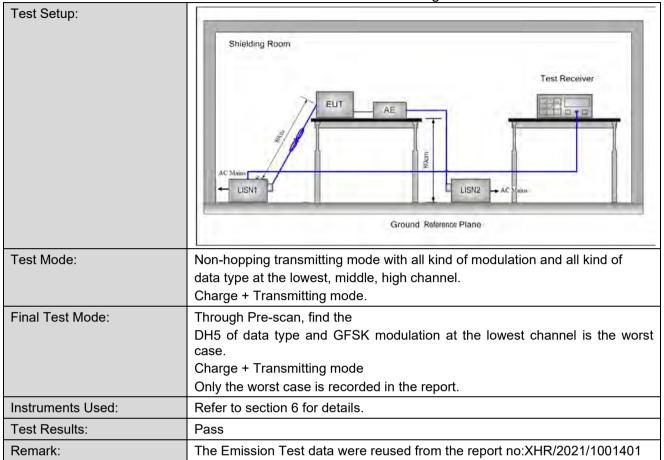
Test Requirement:	47 CFR Part 15C Section 15.207				
Test Method:	ANSI C63.10: 2013				
Test Frequency Range:	150kHz to 30MHz				
Limit:		Limit (d	BuV)		
	Frequency range (MHz)	Quasi-peak	Average		
	0.15-0.5	66 to 56*	56 to 46*		
	0.5-5	56	46		
	5-30	60	50		
	* Decreases with the log	arithm of the frequency.			
Test Procedure:	 room. 2) The EUT was connected impedance Stabilization impedance. The process connected to a second plane in the same of multiple socket outlet single LISN provided 3) The tabletop EUT was ground reference plane placed on the horizor 4) The test was performed the EUT shall be 0. vertical ground reference plane. The unit under test and mounted on top of the the closest points of and associated equip 5) In order to find the mand all of the interface 	listurbance voltage test was ected to AC power source to ion Network) which provides ower cables of all other und LISN 2, which was bonded way as the LISN 1 for the und the rating of the LISN was not as placed upon a non-metalling ne. And for floor-standing arrent that ground reference plane. ed with a vertical ground reference plane was bonded to a ground reference plane. LISN 1 was placed 0.8 m fr bonded to a ground reference plane. LISN 1 was placed 0.8 m fr bonded to a ground reference plane. The LISN 1 and the EUT. All coment was at least 0.8 m from aximum emission, the relative con conducted measurement.	through a LISN 1 (Line a $50\Omega/50\mu$ H + 5Ω linear nits of the EUT were to the ground reference unit being measured. A ultiple power cables to a bit exceeded. ic table 0.8m above the angement, the EUT was rence plane. The rear of d reference plane. The bothe horizontal ground from the boundary of the rence plane for LISNs is distance was between I other units of the EUT on the LISN 2.		



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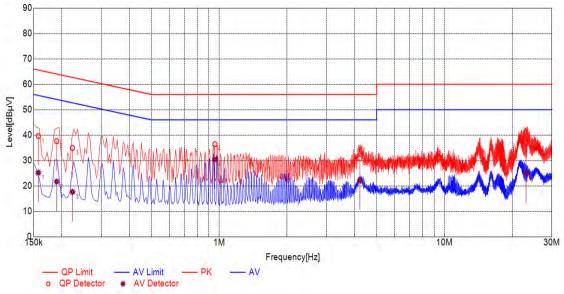


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Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

Live Line:



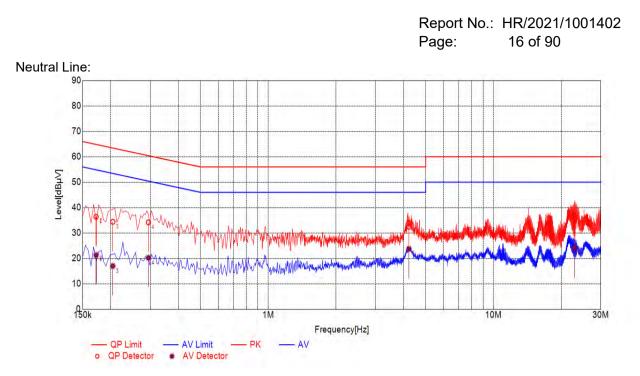
Test Graph

Final	Final Data List							
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]
1	0.1575	10.10	39.63	65.60	25.97	25.22	55.60	30.38
2	0.1901	10.10	37.63	64.03	26.40	21.66	54.03	32.37
3	0.2234	10.10	34.96	62.69	27.73	17.62	52.69	35.07
4	0.9574	10.10	36.43	56.00	19.57	30.44	46.00	15.56
5	4.2125	10.10	30.84	56.00	25.16	22.17	46.00	23.83
6	23.0784	10.11	36.84	60.00	23.16	24.92	50.00	25.08



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Test Graph

Final Data List								
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]
1	0.1722	10.10	36.36	64.85	28.49	21.26	54.85	33.59
2	0.1726	10.10	36.73	64.84	28.11	21.84	54.84	33.00
3	0.2044	10.10	34.41	63.43	29.02	16.97	53.43	36.46
4	0.2940	10.10	34.16	60.41	26.25	20.23	50.41	30.18
5	4.2144	10.10	32.43	56.00	23.57	23.75	46.00	22.25
6	22.9557	10.11	35.59	60.00	24.41	24.01	50.00	25.99

Remarks:

- 1. The following Quasi-Peak and Average measurements were performed on the EUT:
- 2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.



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4.4 Conducted Output Power

Test Requirement:	47 CFR Part 15C Section 15.247 (b)(1)		
Test Method:	ANSI C63.10:2013 Section 7.8.5		
Test Setup:	Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane		
Test Instruments:	Refer to section 6 for details		
Exploratory Test Mode:	Non-hopping transmitting with all kind of modulation and all kind of data type.		
Final Test Mode:	 Through Pre-scan, find the DH5 of data type is the worst case of GFSK modulation type, 2-DH5 of data type is the worst case of π/4DQPSK modulation type, 3-DH5 of data type is the worst case of 8DPSK modulation type. 		
Limit:	(20.97dBm) 125mW		
Test Results:	Pass		



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4.4.1 Test Results

Measurement Data of Peak Power:

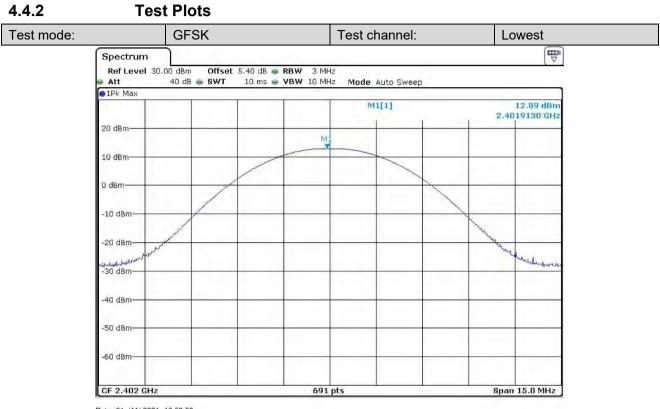
GFSK mode					
Test Channel	Peak Output Power (dBm)	Limit (dBm)	Result		
Lowest	12.89	20.97	Pass		
Middle	14.37	20.97	Pass		
Highest	13.34	20.97	Pass		
	π/4DQP	SK mode			
Test Channel	Peak Output Power (dBm)	Limit (dBm)	Result		
Lowest	12.43	20.97	Pass		
Middle	13.98	20.97	Pass		
Highest	13.01	20.97	Pass		
8DPSK mode					
Test Channel	Peak Output Power (dBm)	Limit (dBm)	Result		
Lowest	12.65	20.97	Pass		
Middle	14.17	20.97	Pass		
Highest	13.20	20.97	Pass		



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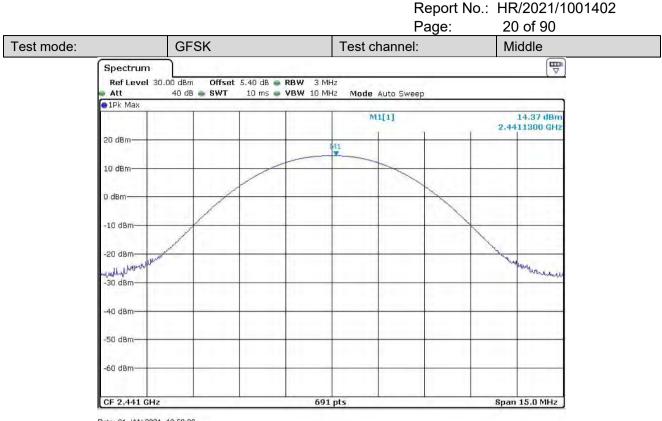


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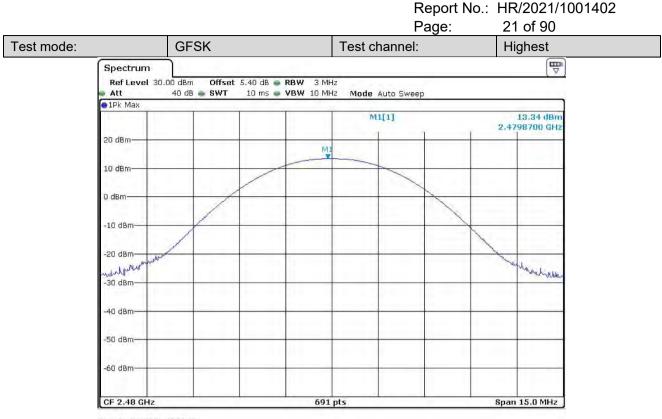


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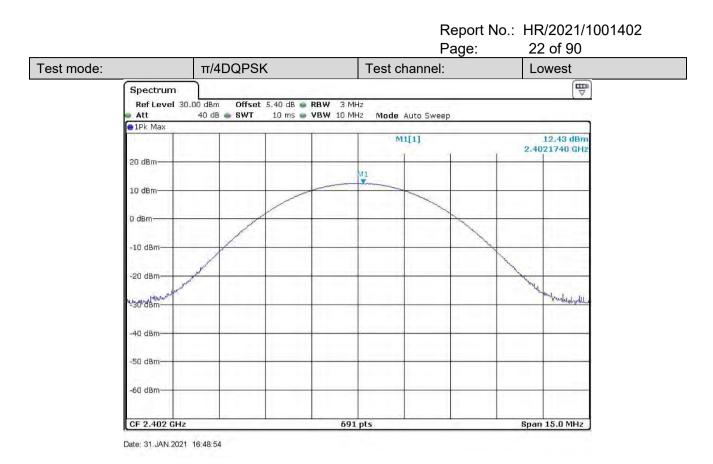


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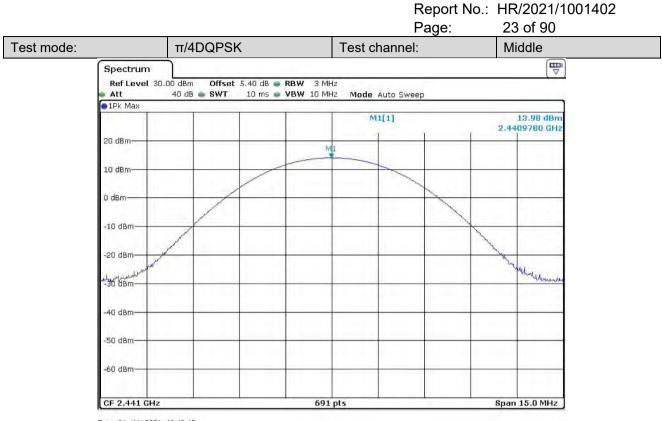


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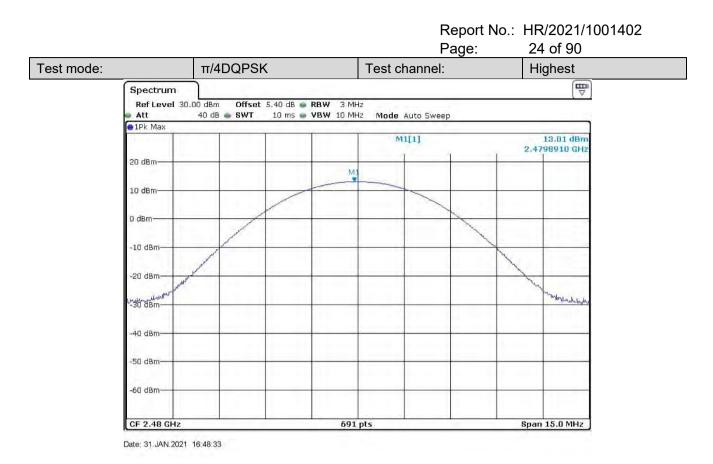


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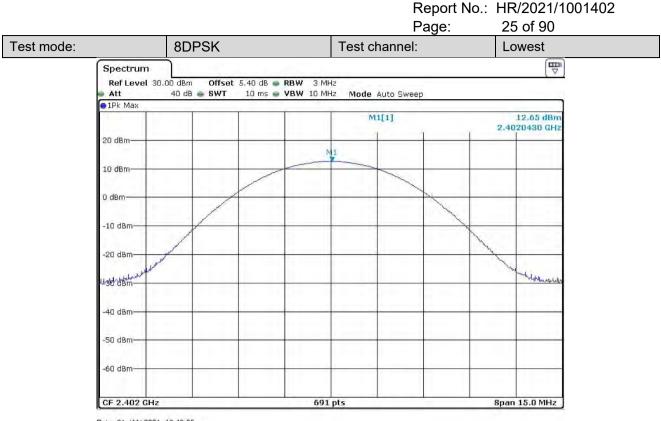


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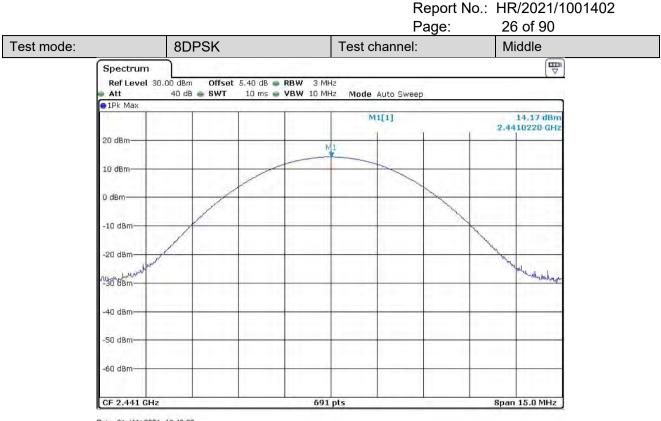


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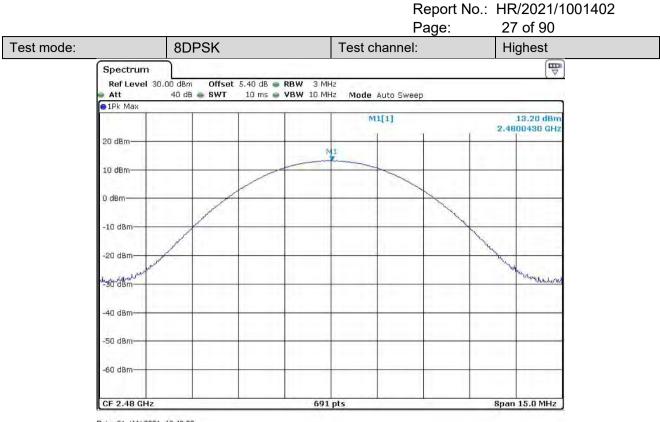


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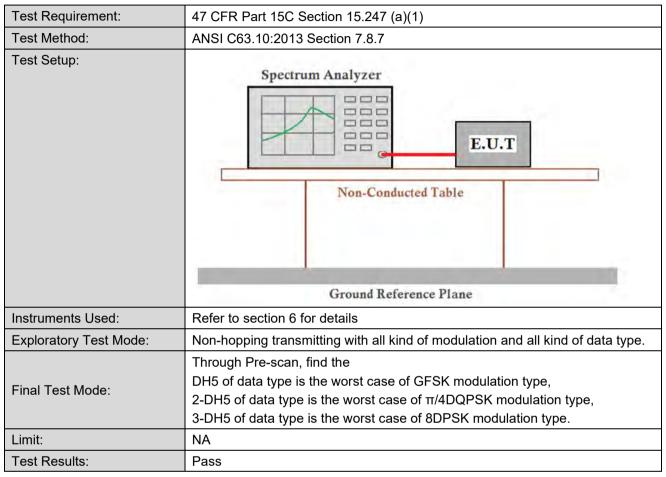


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4.5 20dB Emission Bandwidth





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4.5.1 Test Results				
Mode	Test Channel	20dB Emission Bandwidth (KHz)	Result	
	Lowest	950.8	Pass	
GFSK	Middle	950.8	Pass	
	Highest	950.8	Pass	
π/4DQPSK	Lowest	1302.5	Pass	
	Middle	1315.5	Pass	
	Highest	1311.1	Pass	
8DPSK	Lowest	1298.1	Pass	
	Middle	1298.1	Pass	
	Highest	1302.5	Pass	

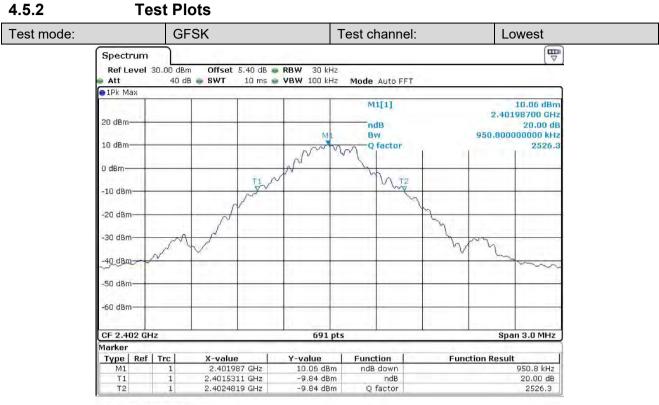
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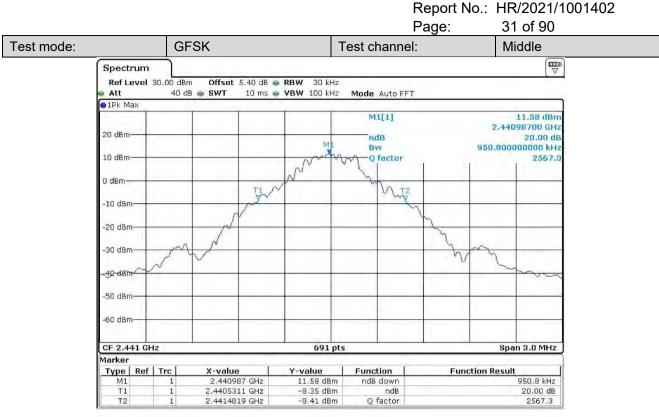


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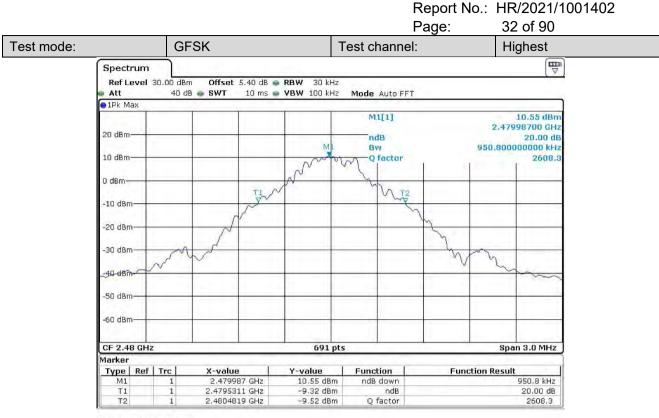


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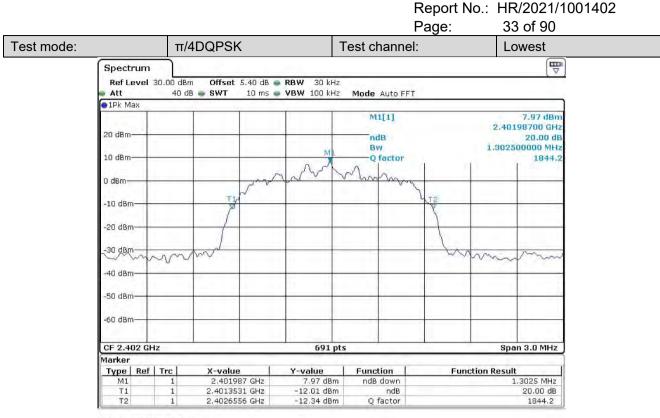


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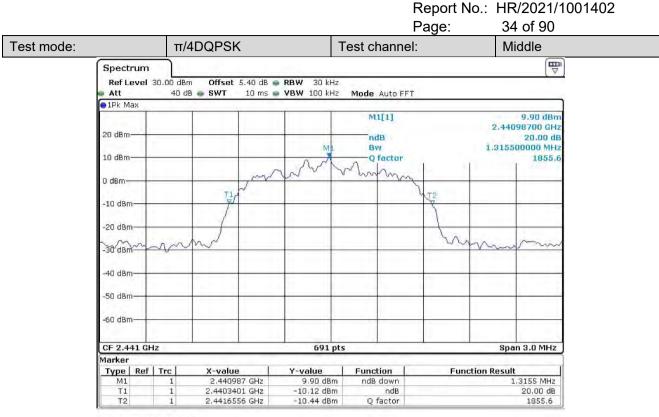


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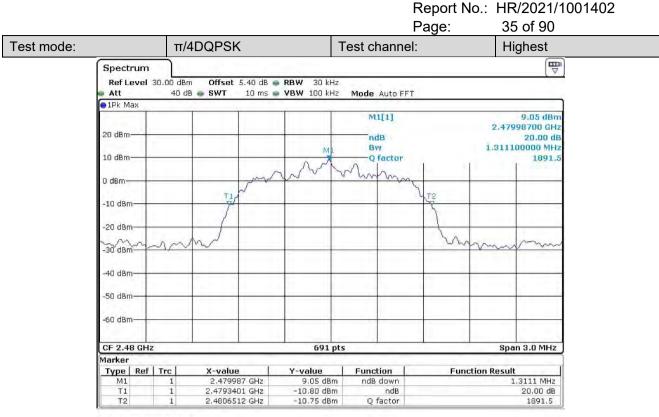


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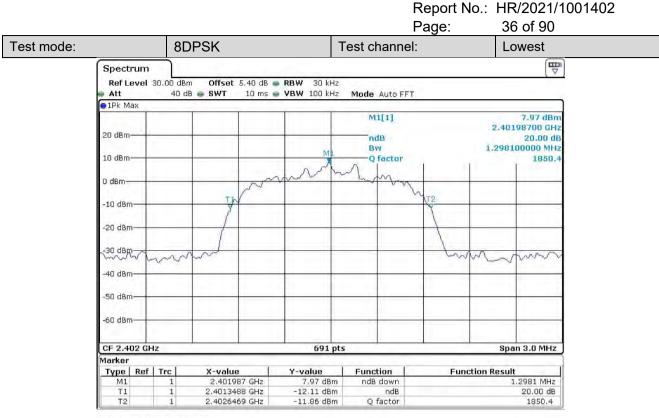


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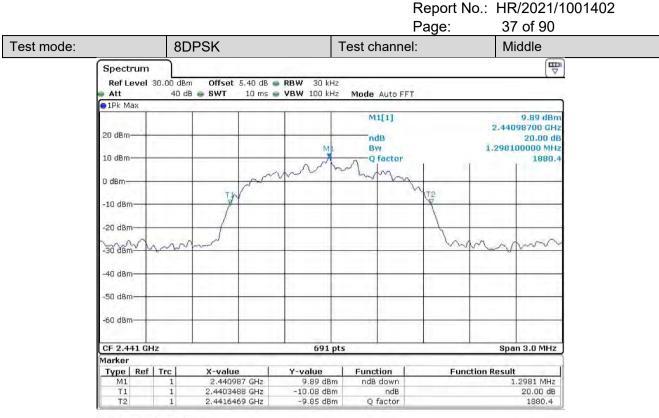


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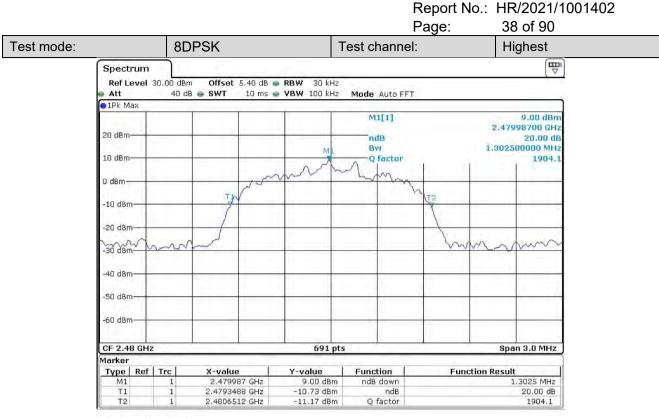


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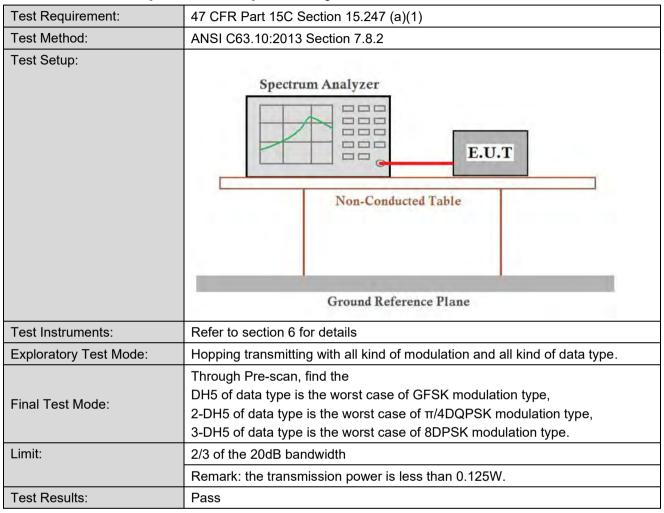


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4.6 Carrier Frequencies Separationy





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4.6.1 Test Results

GFSK mode							
Test channel	Carrier Frequencies Separation (kHz)	Limit (kHz)	Result				
Middle	1003	633.9	PASS				
	π/4DQPSK mode						
Test channel	Carrier Frequencies Separation (kHz)	Limit (kHz)	Result				
Middle	1120	877.0	PASS				
	8DPSH	(mode					
Test channel	Carrier Frequencies Separation (kHz)	Limit (kHz)	Result				
Middle	1003	868.3	PASS				

Remark: According to section 4.5,

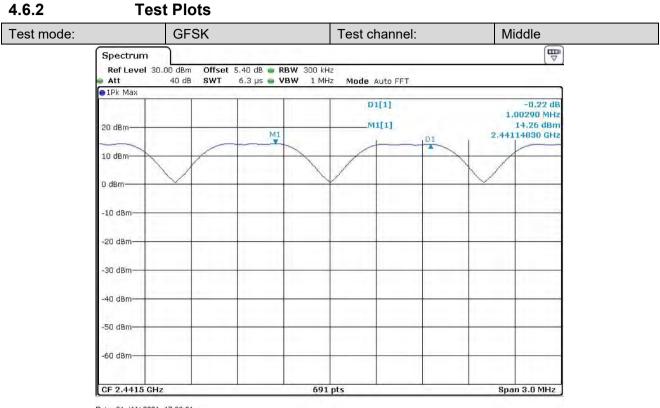
Mode	20dB bandwidth (kHz) (worse case)	Limit (kHz) (Carrier Frequencies Separation)
GFSK	950.8	633.9
π/4DQPSK	1315.5	877.0
8DPSK	1302.5	868.3



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					Page:	42 (of 90
Fest mode:		π/4DQPSK	K	Test chan		Mid	
	Spectrum						
	Ref Level 3		5.40 dB 👜 RBW 30 6.3 μs 🥌 VBW		FT		
	●1Pk Max		<u> </u>	D1[1]			-0.42 dB
						1.12	2.53 dBm
	20 dBm	M1		M1[1]	01 1		4440 GHz
	10 dBm	~					
	0 dBm						
	-10 dBm						
	-20 dBm						
	-30 dBm						
	So abili						
	-40 dBm	-					
	-50 dBm						
	-60 dBm						
	CF 2.4415 GF	Hz		691 pts		Span 3	3.0 MHz
	Date: 31.JAN.202	1 17:04:47					
Test mode:				Test chan	nel:	Mid	dle
Fest mode:	Spectrum	8DPSK		Test chan	nel:	Mid	
「est mode:	Ref Level 3	8DPSK	5,40 dB ● RBW 30	0 kHz		Mid	dle
Fest mode:	1. 2.9 and the state of the state	8DPSK	5,40 dB ● RBW 30 6.3 μs ● VBW	0 kHz L MHz Mode Auto F			
Fest mode:	Ref Level 3 Att	8DPSK		0 kHz L MHz Mode Auto F D1[1]		1.00	-0.47 dB 1290 MHz
Test mode:	Ref Level 3 Att	8DPSK	6.3 µs 🖷 VBW	0 kHz L MHz Mode Auto F	FT	1.00	(₩) マ
Test mode:	Ref Level 3 Att 1Pk Max	8DPSK		0 kHz L MHz Mode Auto F D1[1]		1.00	-0.47 dB 1290 MHz 2.56 dBm
Test mode:	Ref Level 3 Att 1Pk Max 20 dBm 10 dBm	8DPSK	6.3 µs 🖷 VBW	0 kHz L MHz Mode Auto F D1[1]	FT	1.00	-0.47 dB 1290 MHz 2.56 dBm
Test mode:	Ref Level 3 Att 1Pk Max 20 dBm	8DPSK	6.3 µs 🖷 VBW	0 kHz L MHz Mode Auto F D1[1]	FT	1.00	-0.47 dB 1290 MHz 2.56 dBm
Test mode:	Ref Level 3 Att 1Pk Max 20 dBm 10 dBm	8DPSK	6.3 µs 🖷 VBW	0 kHz L MHz Mode Auto F D1[1]	FT	1.00	-0.47 dB 1290 MHz 2.56 dBm
Test mode:	Ref Level 3 Att 1Pk Max 20 dBm 10 dBm 0 dBm	8DPSK	6.3 µs 🖷 VBW	0 kHz L MHz Mode Auto F D1[1]	FT	1.00	-0.47 dB 1290 MHz 2.56 dBm
Test mode:	Ref Level 3 Att 1Pk Max 20 dBm 10 dBm 0 dBm -10 dBm -20 dBm	8DPSK	6.3 µs 🖷 VBW	0 kHz L MHz Mode Auto F D1[1]	FT	1.00	-0.47 dB 1290 MHz 2.56 dBm
Test mode:	Ref Level 3 Att 1Pk Max 20 dBm 10 dBm 0 dBm	8DPSK	6.3 µs 🖷 VBW	0 kHz L MHz Mode Auto F D1[1]	FT	1.00	-0.47 dB 1290 MHz 2.56 dBm
Test mode:	Ref Level 3 Att 1Pk Max 20 dBm 10 dBm 0 dBm -10 dBm -20 dBm	8DPSK	6.3 µs 🖷 VBW	0 kHz L MHz Mode Auto F D1[1]	FT	1.00	-0.47 dB 1290 MHz 2.56 dBm
Test mode:	Ref Level 3 Att 1Pk Max 20 dBm 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm	8DPSK	6.3 µs 🖷 VBW	0 kHz L MHz Mode Auto F D1[1]	FT	1.00	-0.47 dB 1290 MHz 2.56 dBm
Test mode:	Ref Level 3 Att 1Pk Max 20 dBm 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm	8DPSK	6.3 µs 🖷 VBW	0 kHz L MHz Mode Auto F D1[1]	FT	1.00	-0.47 dB 1290 MHz 2.56 dBm
Test mode:	Ref Level 3 Att 1Pk Max 20 dBm 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm	8DPSK	6.3 µs 🖷 VBW	0 kHz L MHz Mode Auto F D1[1]	FT	1.00	-0.47 dB 1290 MHz 2.56 dBm
Test mode:	Ref Level 3 Att 1Pk Max 20 dBm 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm	8DPSK	6.3 µs 🖷 VBW	0 kHz L MHz Mode Auto F D1[1]	FT	1.00	-0.47 dB 1290 MHz 2.56 dBm

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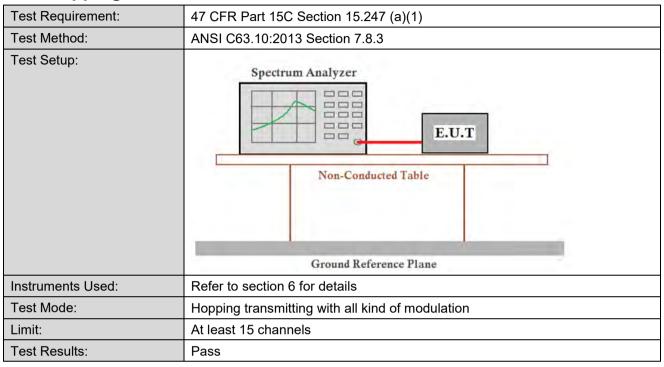
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4.7 Hopping Channel Number



4.7.1 Test Results

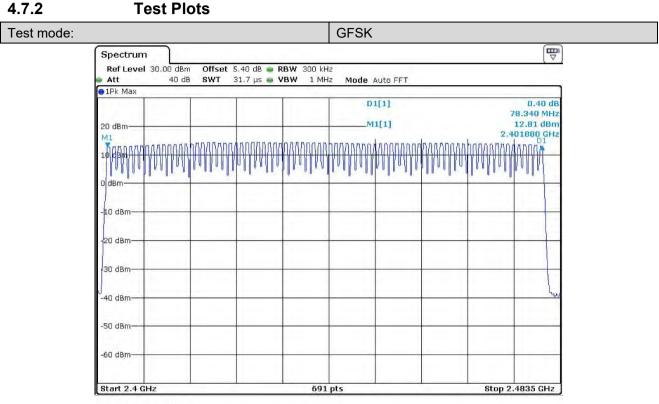
Mode	Hopping channel numbers	Limit
GFSK	79	≥15
π/4DQPSK	79	≥15
8DPSK	79	≥15



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					Page:	4 5	of 90
mode:				π/4DQ	•		
	Spectrum	ר					
	Ref Level 30.0	00 dBm Offse 40 dB SWT	t 5.40 dB 👄 RBW 31.7 μs 👄 VBW		uto EET		
	• 1Pk Max		31.7 55 • 101				
		11		D1	[1]	7	0.78 dB 8.220 MHz
	20 dBm			MI	[1]	2,4	10.68 dBm 01880 GHz
	M1 10 dpm +	ANALANA	manny	many	mannan		D1
	C dBm						
	-10 dBm						
	-20 dBm				-		
	-30 dBm						
			·				
	-40 dBm						<u> </u>
	-50 dBm						
	-60 dBm						
	Start 2.4 GHz			691 pts		Stop 2.	4835 GHz
	Date: 31.JAN.2021	17:09:43					
mode:				8DPSK			
	Spectrum	1					
			t 5.40 dB 💿 RBW				
	Ref Level 30.0	TUP9 OF ON	31.7 µs 🖷 VBW	1 MHz Mode A			
	Ref Level 30.0 Att 1Pk Max	40 dB SWT					
	Att	40 dB SWT		D1	[1]	-	1.63 dB 7.980 MHz
	Att	40 dB SWT			[1] [1]		7.980 MHz 10.12 dBm
	Att IPk Max 20 dBm M1			.M.	.[1]	2,4	7.980 MHz 10.12 dBm 01880 GHz
	● Att ● 1Pk Max 20 dBm		annana	.M.	.[1]	2,4	7.980 MHz 10.12 dBm 01880 GHz
	Att IPk Max 20 dBm M1			.M.	.[1]	2,4	7.980 MHz 10.12 dBm 01880 GHz
	Att PIPk Max 20 dBm M1 المريكة المحمد المحم المحمد المحمد المحم المحمد المحمد ال			.M.	.[1]	2,4	7.980 MHz 10.12 dBm 01880 GHz
	Att IPk Max 20 dBm M1 Journey Att			.M.	.[1]	2,4	7.980 MHz 10.12 dBm 01880 GHz
	Att PIPk Max 20 dBm M1 المريكة المحمد المحم المحمد المحمد المحم المحمد المحمد ال			.M.	.[1]	2,4	7.980 MHz 10.12 dBm 01880 GHz
	Att • 1Pk Max 20 dBm • 1B, dBm, dBm, dBm, dBm • 10 dBm • 20 dBm, dBm, dBm			.M.	.[1]	2,4	7.980 MHz 10.12 dBm 01880 GHz
	 Att ● 1Pk Max 20 dBm M1 M1 M3 M1 M2 M2			.M.	.[1]	2,4	7.980 MHz 10.12 dBm 01880 GHz
	Att • 1Pk Max 20 dBm • 1B, dBm, dBm, dBm, dBm • 10 dBm • 20 dBm, dBm, dBm			.M.	.[1]	2,4	7.980 MHz 10.12 dBm 01880 GHz
	Att IPk Max 20 dBm M1 10 dBm -10 dBm -20 dBm -30 dBm -40 dBm			.M.	.[1]	2,4	7.980 MHz 10.12 dBm 01880 GHz
	Att IPk Max 20 dBm M1 16,dBm 10 dBm -10 dBm -20 dBm -30 dBm			.M.	.[1]	2,4	7.980 MHz 10.12 dBm 01880 GHz
	Att IPk Max 20 dBm M1 10 dBm -10 dBm -20 dBm -30 dBm -40 dBm			.M.	.[1]	2,4	7.980 MHz 10.12 dBm 01880 GHz
	Att IPk Max 20 dBm M1 I®,dBm dBm -10 dBm -20 dBm -30 dBm -50 dBm			.M.	.[1]	2,4	7.980 MHz 10.12 dBm 01880 GHz

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4.8 Dwell Time

Test Requirement:	47 CFR Part 15C Section 15.247 (a)(1)				
Test Method:	ANSI C63.10:2013 Section 7.8.4				
Test Setup:	Spectrum Analyzer E.U.T Non-Conducted Table				
	Ground Reference Plane				
Instruments Used:	Refer to section 6 for details				
Test Mode:	Hopping transmitting with all kind of modulation and all kind of data type.				
Limit:	0.4 Second				
Test Results:	Pass				



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4.8.1 Test Results	
Operation Modes	On time (ms) on one channel
DH1	0.402
DH3	1.675
DH5	2.949
2-DH1	0.418
2-DH3	1.688
2-DH5	2.928
3-DH1	0.414
3-DH2	1.688
3-DH5	2.935

Bluetooth Time of Occupancy Calculation

Typically, Bluetooth 1x/EDR mode has a channel hopping rate of 1600 hops/s, since 1x/EDR modes use 5 transmit and 1 receive slot, for a total of 6 slots, the Bluetooth transmitter is actually hopping at a rate of 1600/6=266.67 hops/slot

400ms x 79 Channel = 31.6 s (Time of Occupancy Limit)

Worst case BT has 266.67 hops/second (for 1x/EDR modes with 1-DH5 operation)

266.67 hops/second/79 channels=3.38 hops/second (# of hops/second on one channel)

3.38 hops/second/channel*31.6seconds=106.67 hops (#hops over a 31.6 second period)

106.67 hops *2.949 ms/channel =314.57 ms(worst case dwell time for one channel in 1x/EDR

modes)

With AFH, the number of channels is reduced to a minimum of 20 channels and the channel hopping rate is reduced by 50% to 800hops/s, AFH mode also uses 6 slots so the Bluetooth transmitter hops at a rate of 800/6=133.3 hops/s/slot

400ms x 20 Channel = 8 s (Time of Occupancy Limit)

Worst case BT has 133.3 hops/second/slot (for AFH mode with 1-DH5 operation)

133.3 hops/second/20 channels=6.67 hops/second (#hops/second on one channel)

6.67 hops/second *8seconds=53.34 hops (#hops over a 8 seconds period)

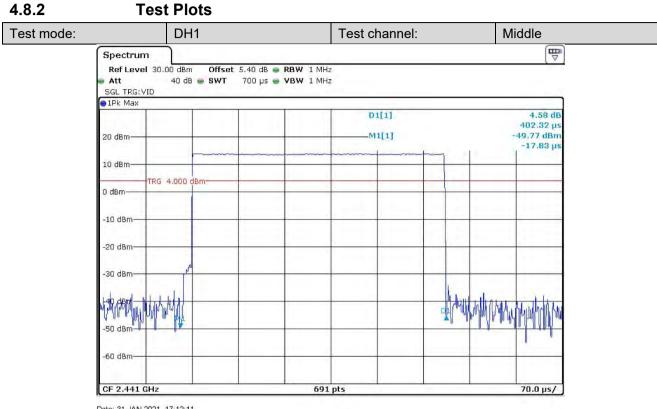
53.34 hops x2.949 ms/channel=157.30 ms(worst case dwell time for one channel in AFH mode)



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		Repor Page:	t No.: HR/2021/1001402 49 of 90
Test mode:	DH3	Test channel:	Middle
SGL TRG:	el 30.00 dBm Offset 5.40 dB 👄 40 dB 👄 SWT 3 ms 👄	RBW 1 MHz VBW 1 MHz	
● 1Pk Max 20 dBm		D1[1] M1[1]	0.14 dB 1.67536 ms -42.85 dBm -16.81 μs
10 dBm	TRG 4.000 dBm		
-20 dBm			
the dem			for fille she with the she
	1.2021 17;18:57	691 pts	300.0 μs/
Test mode:	DH5	Test channel:	Middle
Spectrur Ref Leve Att SGL TRG:\ 1Pk Max	el 30.00 dBm Offset 5.40 dB 40 dB es SWT 5 ms es	RBW 1 MHz VBW 1 MHz	
20 dBm		D1[1] M1[1]	-2.59 dB 2.94928 ms -39.69 dBm -28.99 μs
0 dBm	TRG 4.000 dBm		
-20 dBm			
-50 dBm	hill and how at		- Josh ward to have a strate and the second second
-60 dBm		691 pts	500.0 μs/

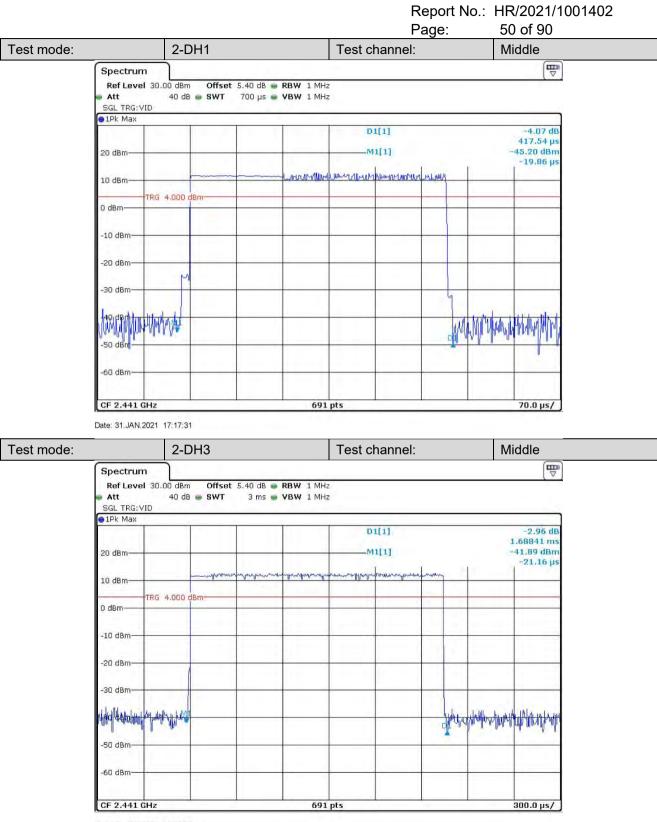
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								eport N age:		2021/1 of 90	001402
Test mode:		2.	-DH5			Test channel:				Middle	
root modo.	Spectrun	_	Brio			100101					
	Ref Leve Att SGL TRG:V	1 30.00 di 40	Bm Offset dB 🖷 SWT	5.40 dB 👄 F 5 ms 💣 V	RBW 1 MHz VBW 1 MHz						
	● 1Pk Max 20 dBm					D1 M1				0.58 dB 2.92754 ms 41.06 dBm ~21.74 μs	
	10 dBm	TRG 4.00	0 dBm	returnermanultig	noonation of the	, and a second	ana	Looderon Progr			
	-10 dBm										
	-20 dBm										
	-50 dBm	tografildallida							www. <mark>ww</mark> .	here and the state of the state	
	-60 dBm										
	CF 2.441 C	1000):35		691	pts				500.0 µs/	
Test mode:		3-	-DH1			Test ch	annel:		Mi	iddle	
	Spectrum Ref Leve Att SGL TRG:V	1 30.00 di 40	Bm Offset dB e SWT	5.40 dB 🖷 F 700 μs 🖷 🕅							
	20 dBm					D1 M1	[1]		-	-1.36 dB 414.49 μs 44.90 dBm -16.81 μs	
	10 dBm	TRG 4.00	0 dBm		L. AND AND AND	Julinet antho	MawaAphOlM	1 when			
	-10 dBm										
	-30 dBm		1						MARYLILAUN	Mishiki	
	-50 dBm	ar l M L								no ho Pl. Nation	

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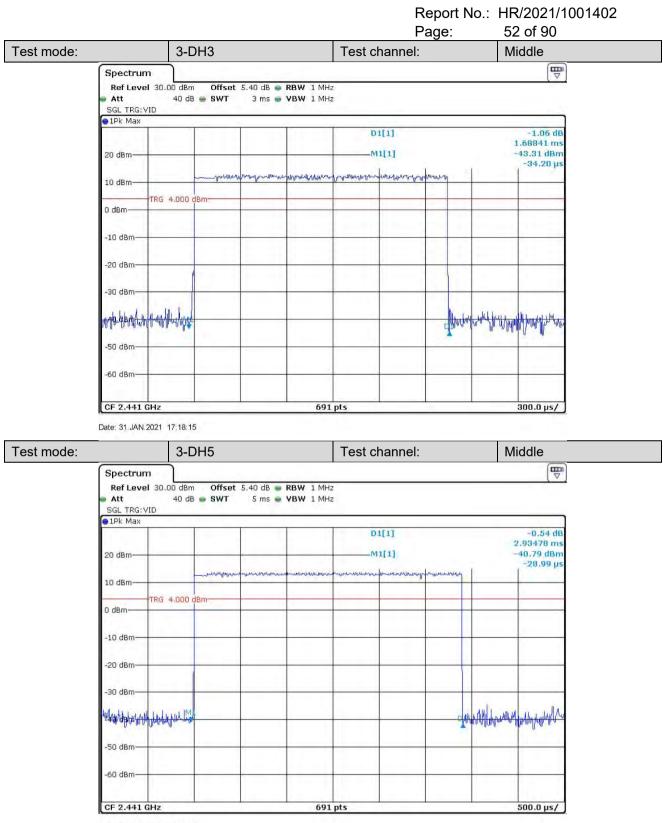


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4.9 Band-edge for RF Conducted Emissions

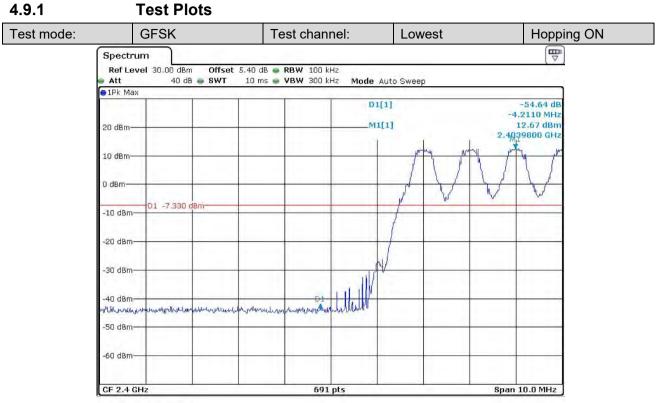
Test Requirement:	47 CFR Part 15C Section 15.247 (d)			
Test Method:	ANSI C63.10:2013 Section 7.8.6			
Test Setup:	Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane			
Instruments Used:	Refer to section 6 for details			
Exploratory Test Mode:	Hopping and Non-hopping transmitting with all kind of modulation and all kind of data type.			
Final Test Mode:	Through Pre-scan, find the DH5 of data type is the worst case of GFSK modulation type, 2-DH5 of data type is the worst case of π /4DQPSK modulation type, 3-DH5 of data type is the worst case of 8DPSK modulation type.			
Limit:	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 Results:	Pass			



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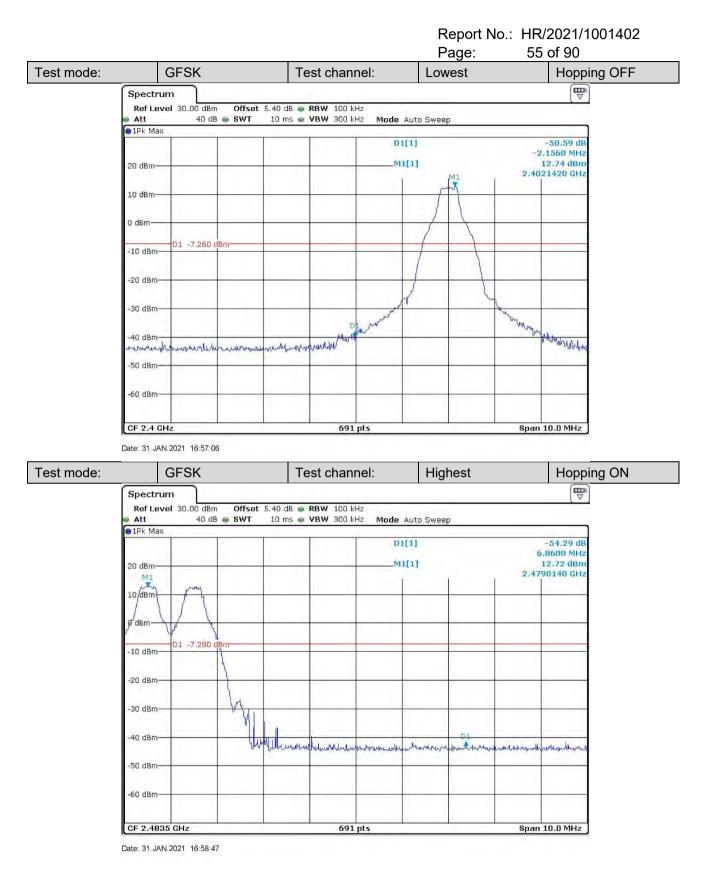


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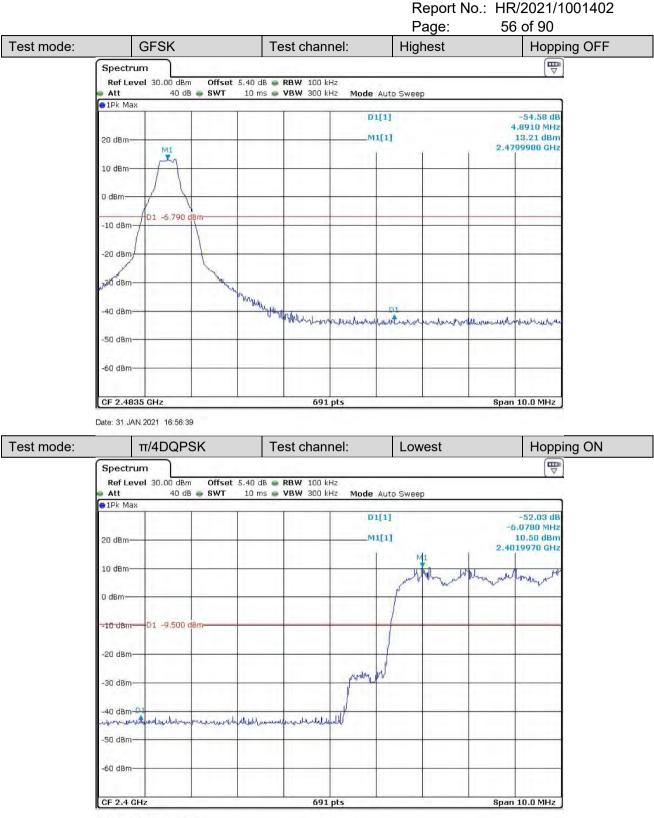




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	Report No.: HR/2021/10 Page: 57 of 90								
st mode:	π/4DQPSK	Test channel:	Lowest	Hopping OFF					
•	Spectrum Ref Level 30.00 dBm Offset	5.40 dB 💿 RBW 100 kHz							
•	Att 40 dB 🧼 SWT		Auto Sweep						
2	20 dBm	D1		-51.02 dB -2.0980 MHz 10.45 dBm 2.4019830 GHz					
	.0 dBm		many						
	10 dBm-01 -9,550 dBm								
-	20 dBm	Δ		2					
	30 dBm	DI							
-tu	40 dBm warentywalanen der allen an allen 50 dBm	A NUMBER OF THE OWNER		allow when the second					
-	60 dBm								
-	CF 2.4 GHz	691 pts		Span 10.0 MHz					
Da est mode:	te: 31.JAN.2021 16:55:28 π/4DQPSK	Test channel:	Highest	Hopping ON					
	Spectrum Ref Level 30.00 dBm Offset Att 40 dB sw T	5.40 dB • RBW 100 kHz 10 ms • VBW 300 kHz Mode /	Auto Sweep						
	1Pk Max	D1	[1]	-52.22 dB					
2	20 dBm	MI		8.3940 MHz 10.61 dBm					
1	M1			2,4789990 GHz					
	L. L								
) dBm								
-	10 dBm-01 -9.390 dBm								
-	10 dBm-01 -9.390 dBm								
-	10 dBm 01 -9.390 dBm 20 dBm 30 dBm 40 dBm		-interded the design of the product	D3 www.million.com					
	10 dBm 01 -9.390 dBm		-instandillate das de segeraportes das l	and and the second					
-	10 dBm 01 -9.390 dBm 20 dBm 30 dBm 40 dBm 50 dBm		-instantable and have many location of the	Span 10.0 MHz					

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	Report No.: HR/2021/10014 Page: 58 of 90							
Test mode:	π/4DQPSK	Test channel:	Highest	Hopping OFF				
	Spectrum							
	Ref Level 30.00 dBm Offset	5.40 dB 🖷 RBW 100 kHz	1.467.75					
	Att 40 dB SWT	10 ms 🖷 VBW 300 kHz Mode .	Auto Sweep					
		D1	[1]	-53.21 dB 8.1190 MHz				
	20 dBm	MI	[1]	11.64 dBm				
		1	1 1	2,4799980 GHz				
	10 dBm							
	0 dBm-							
	-10 dBm D1 -8,360 dBm							
	12Q dBro							
	adam Am							
	-30 dBm							
	-40 dBm	here a		D1				
		When We was here when the mark when here	unor an	hourshowen tout				
	-50 dBm							
	-60 dBm							
	CF 2.4835 GHz	691 pts		Span 10.0 MHz				
	Date: 31.JAN.2021 16:55:07	01100		opan iola onic				
Test mode:	8DPSK	Test channel:	Lowest	Hopping ON				
	Spectrum							
	Ref Level 30.00 dBmOffsetAtt40 dBSWT	5.40 dB • RBW 100 kHz 10 ms • VBW 300 kHz Mode	Auto Sweep					
	● 1Pk Max		[1]	-52.06 dB				
				-4.9780 MHz				
	20 dBm	MI	41	10.39 dBm 2.4049780 GHz				
	10 dBm-		1.45	M				
			Marthana Samana Martin	man and Marian				
	0 dBm		1					
	-10 dBm-D1 -9.610 dBm-							
	-20 dBm							
	20 d8m	Markow	Jun					
	-30 dBm		1					
	-40 dBm-	02/						
	disconcertanticontent descente	wither with a second of the sec						
	-50 dBm-							
	-60 dBm							
	CF 2.4 GHz	691 pts		Span 10.0 MHz				

Date: 31.JAN.2021 17:01:10



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	Report No.: HR/2021/1001402 Page: 59 of 90						
Test mode:	8DPSK	Test channel:	Lowest	Hopping OFF			
	Spectrum Ref Level 30.00 dBm Offset Att 40 dB SWT	5.40 dB • RBW 100 kHz 10 ms • VBW 300 kHz Mode A	uto Sweep				
	●1Pk Max	D1[-50.20 dB			
	20 dBm	M1[-2.1270 MHz 10.51 dBm 2.4019830 GHz			
	10 dBm		marting				
	-10 dBm-01 -9,490 dBm		+				
	-20 dBm	m	1 hr				
	-40 dBm-	DI DI		Law warman			
	-50 dBm						
	CF 2.4 GHz	691 pts		Span 10.0 MHz			
Test mode:	Date: 31.JAN.2021 16:55:50	Test channel:	Highest	Hopping ON			
	Spectrum Image: Spectrum Ref Level 30.00 dBm Offset 5.40 dB • RBW 100 kHz • Att 40 dB • SWT 10 ms • VBW 300 kHz						
	0 1Pk Max	D1[M1]	1]	-53.24 dB 6.1790 MHz 11.46 dBm			
	19 get my worthal			2.4801430 GHz			
	0 dBm						
	-20 dBm						
	-30 dBm						
	-50 dBm-	Million Mandon wellow when and	which the work the move				
	-60 dBm						
	CF 2.4835 GHz	691 pts		Span 10.0 MHz			

Date: 31.JAN.2021 17:00:14



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			Page:	60 of 90			
st mode:	8DPSK	Test channel:	Highest	Hopping OFF			
s	pectrum						
		5.40 dB 🖷 RBW 100 kHz	t sleres	(<i>x</i> _)			
	Att 40 dB SWT 10 ms VBW 300 kHz Mode Auto Sweep						
•			[1]	-53.51 dB			
				4.3560 MHz			
2) dBm	M	L[1]	11.61 dBm 2.4799830 GHz			
			1 1	2,4799030 002			
1	D dBm						
	A N						
0	dBm /	+ + + + + + + + + + + + + + + + + + + +					
	A Deserved A						
-1	0 dBm - D1 -8,390 dBm						
C.	Adam hur						
1		1					
-3	0 dBm						
-4	0 dBm	Mula Di					
		We When we down when she ad	metruballanon-metrubar	unistralization Marchard			
-5	0 dBm						
-6	0 dBm						
	F 2.4835 GHz	691 pts	·	Span 10.0 MHz			

e: 31.JAN.2021 16:56:14

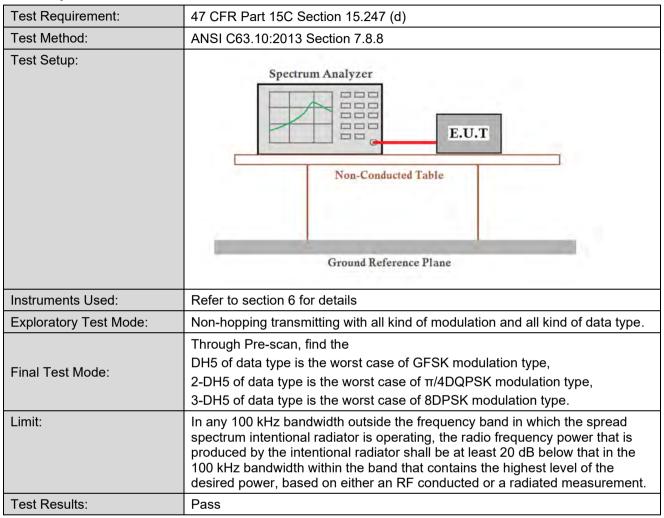


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4.10 Spurious RF Conducted Emissions

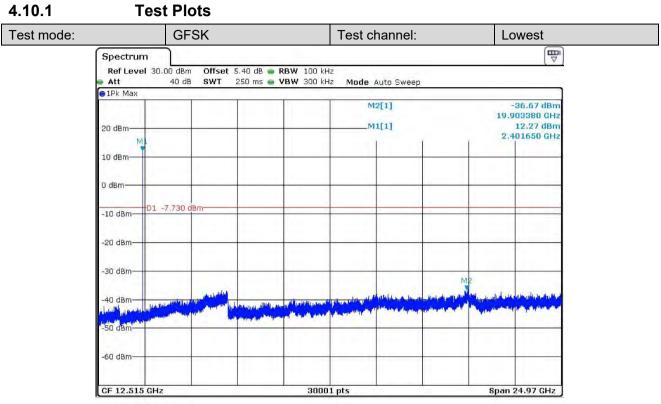




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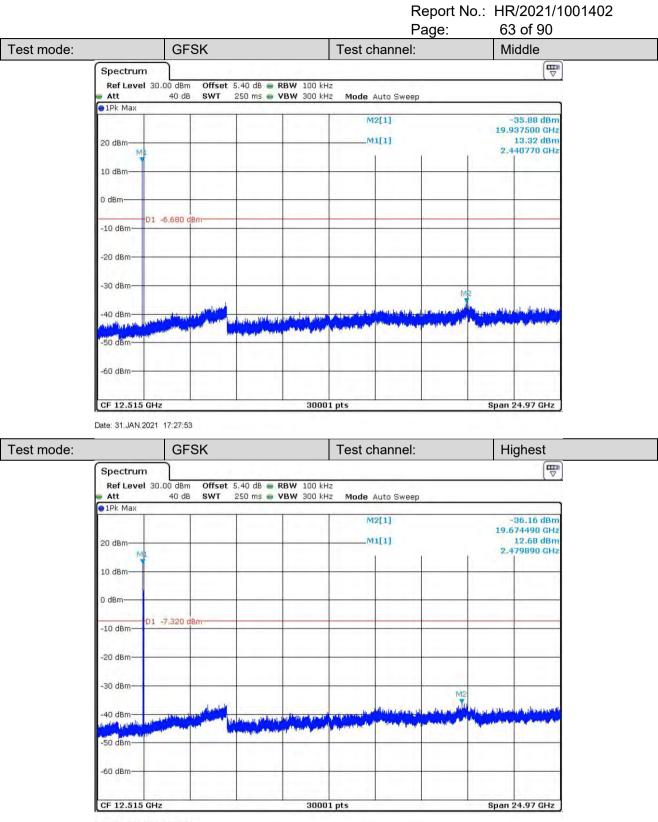


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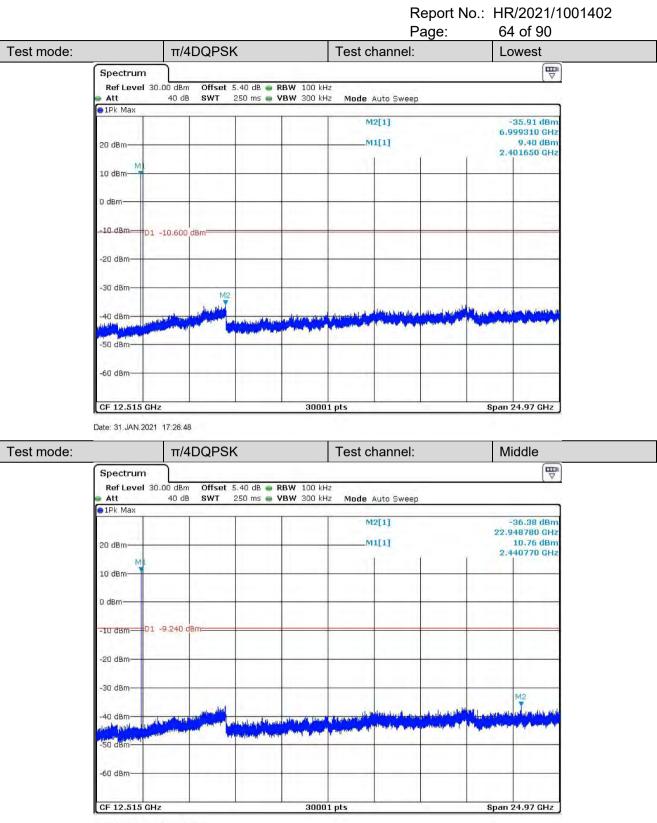
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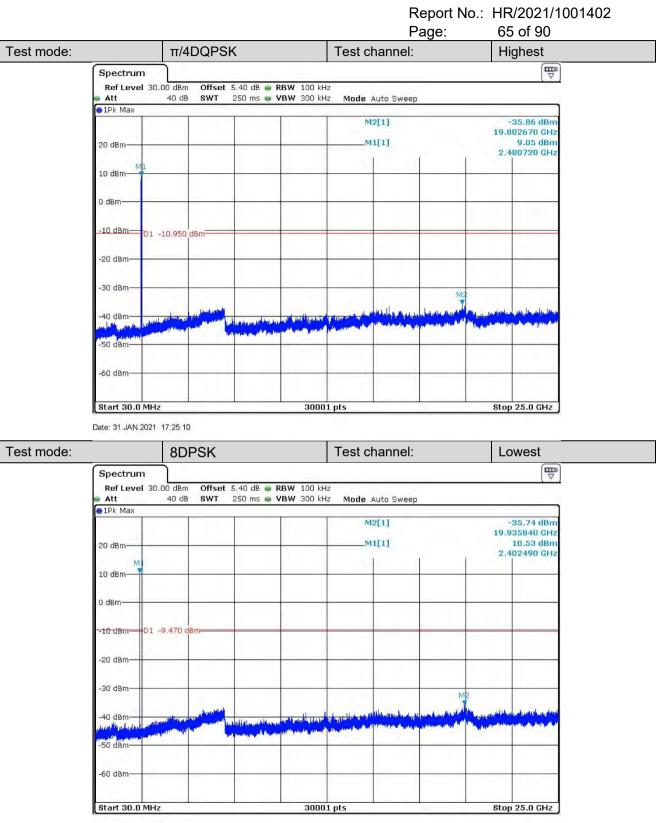
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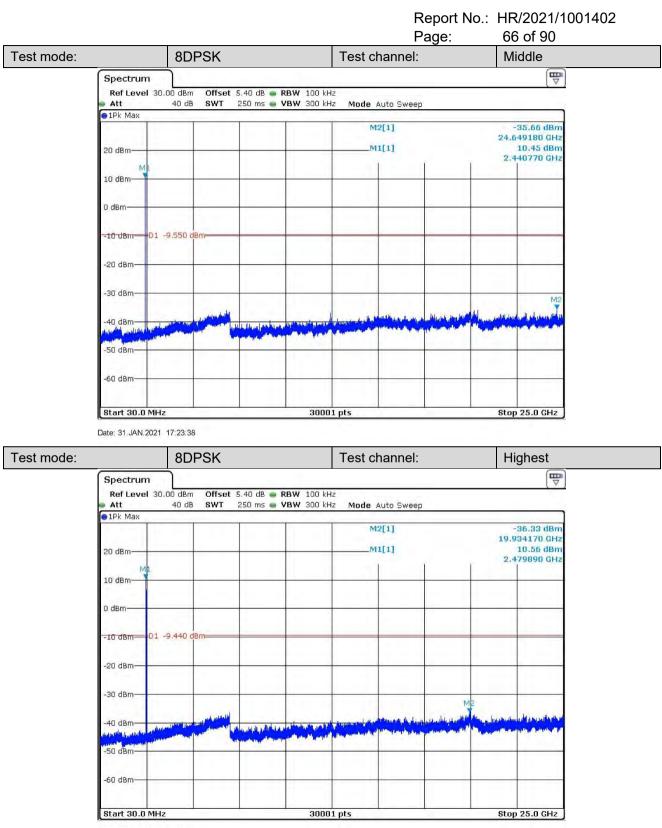
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Remark:

Scan from 9kHz to 25GHz, the disturbance between 9KHz to 30MHz was very low, and the above harmonics were the highest point could be found when testing, The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.



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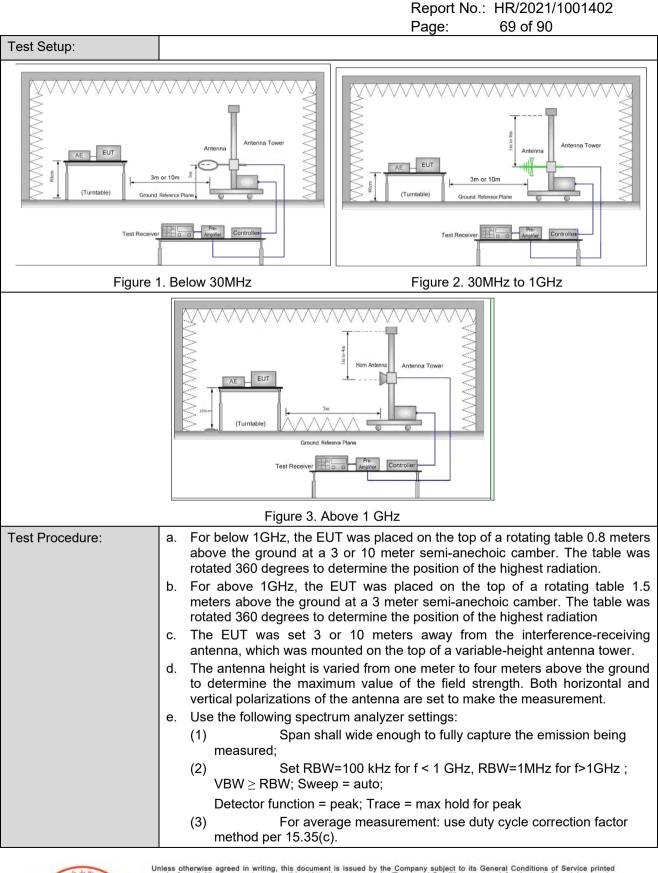
4.11 Radiated Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205						
Test Method:	ANSI C63.10 :2013 Section 11.12						
Test Site:	Measurement Distance: 3m (Semi-Anechoic Chamber)						
Receiver Setup:	Frequency	Detector	RBW	VBW	Remark		
	0.009MHz-0.090MHz	Peak	10kHz	30kHz	Peak		
	0.009MHz-0.090MHz	Average	10kHz	30kHz	Average		
	0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz	Quasi-peak		
	0.110MHz-0.490MHz	Peak	10kHz	30kHz	Peak		
	0.110MHz-0.490MHz	Average	10kHz	30kHz	Average		
	0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak		
	30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak		
	Above 1GHz	Peak	1MHz	3MHz	Peak		
	Above IGHZ	Peak	1MHz	10Hz	Average		
Limit:	Frequency	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)		
	0.009MHz-0.490MHz	2400/F(kHz)	-	-	300		
	0.490MHz-1.705MHz	24000/F(kHz)	-	-	30		
	1.705MHz-30MHz	30	-	-	30		
	30MHz-88MHz	100	40.0	Quasi-peak	3		
	88MHz-216MHz	150	43.5	Quasi-peak	3		
	216MHz-960MHz	200	46.0	Quasi-peak	3		
	960MHz-1GHz	500	54.0	Quasi-peak	3		
	Above 1GHz	500	54.0	Average	3		
	Remark: 15.35(b),Unless	s otherwise specifie	ed, the limit o	on peak radio fr	requency		



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	Duty cycle = On time/100 milliseconds				
	On time = N 1 *L 1 +N 2 *L 2 ++N n-1 *LN n-1 +N n *L n				
	Where N 1 is number of type 1 pulses, L 1 is length of type 1 pulses, etc.				
	Average Emission Level = Peak Emission Level + 20*log(Duty cycle)				
	f. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters(for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.				
	 g. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 				
	h. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.				
	i. Test the EUT in the lowest channel, the middle channel ,the Highest channel.				
	j. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case.				
	k. Repeat above procedures until all frequencies measured was complete.				
	Non-hopping transmitting mode with all kind of modulation and all kind of				
Exploratory Test Mode:	data type				
	Charge + Transmitting mode.				
	Through Pre-scan, find the				
	DH5 of data type and GFSK modulation is the worst case.				
Final Test Mode:	Pretest the EUT at Charge + Transmitting mode				
	For below 1GHz part, through pre-scan, the worst case is the lowest channel.				
	Only the worst case is recorded in the report.				
Test Configuration:	Measurements Below 1000MHz RBW = 120 kHz 				
	• VBW = 300 kHz				
	 Detector = Peak 				
	 Trace mode = max hold 				
	Peak Measurements Above 1000 MHz				
	• RBW = 1 MHz				
	• VBW \geq 3 MHz				
	 Detector = Peak 				
	 Sweep time = auto 				
	 Trace mode = max hold 				
	Average Measurements Above 1000MHz				
	RBW = 1 MHz				
	 VBW = 10 Hz, when duty cycle is no less than 98 percent. 				
	• VBW \ge 1/T, when duty cycle is less than 98 percent where T is the minimum				
	transmission duration over which the transmitter is on and is transmitting at its				
U.					
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age. 710190

maximum power control level for the tested mode of operation.		
Instruments Used:	Refer to section 6 for details	
Test Results:	Pass	
Remark:	The Emission Test data were reused from the report no:XHR/2021/1001401	



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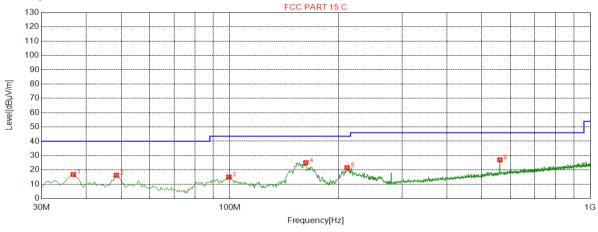


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4.11.1 Radiated emission below 1GHz

4.11.1.1 Charge + Transmitting

Test Graph





Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	36.7934	16.76	-32.19	40.00	23.24	100	252	Horizontal
2	48.4392	16.25	-30.19	40.00	23.75	200	277	Horizontal
3	99.3897	15.01	-31.79	43.50	28.49	100	118	Horizontal
4	162.471	25.05	-34.13	43.50	18.45	300	108	Horizontal
5	211.480	21.56	-30.58	43.50	21.94	200	62	Horizontal
6	561.340	27.02	-21.14	46.00	18.98	200	50	Horizontal
	Final Data List							

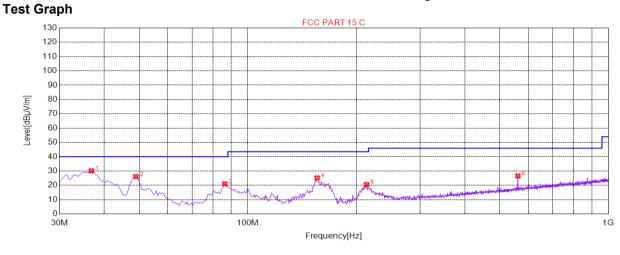
Final Data List



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QP Limit
 Vertical PK
 QP Detector

Suspected List

Suspe	Suspected List									
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity		
1	36.7934	30.16	-32.19	40.00	9.84	300	291	Vertical		
2	48.9245	26.15	-30.19	40.00	13.85	100	282	Vertical		
3	86.2881	21.03	-34.32	40.00	18.97	100	85	Vertical		
4	155.677	25.26	-34.51	43.50	18.24	400	188	Vertical		
5	213.421	20.59	-30.52	43.50	22.91	200	304	Vertical		
6	561.340	26.61	-21.14	46.00	19.39	100	126	Vertical		

Final Data List



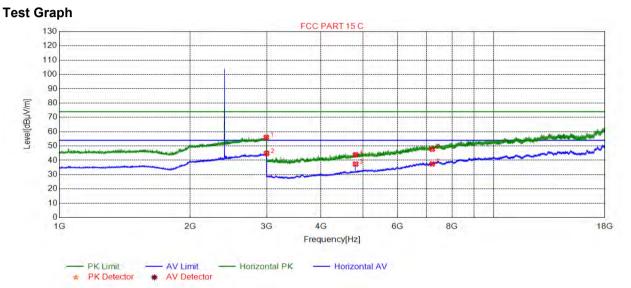
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4.11.2 Transmitter Emission above 1GHz

4.11.2.1 GFSK_Channel 0



Suspected List

Suspe	Suspected List									
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity		
1	2992.99	56.04	10.64	74.00	17.96	100	348	Horizontal		
2	2998.49	44.86	10.75	54.00	9.14	100	225	Horizontal		
3	4804.00	37.41	-17.18	54.00	16.59	200	208	Horizontal		
4	4804.00	43.89	-17.18	74.00	30.11	300	78	Horizontal		
5	7206.00	47.73	-9.48	74.00	26.27	200	242	Horizontal		
6	7206.00	37.48	-9.48	54.00	16.52	100	78	Horizontal		

Final Data List

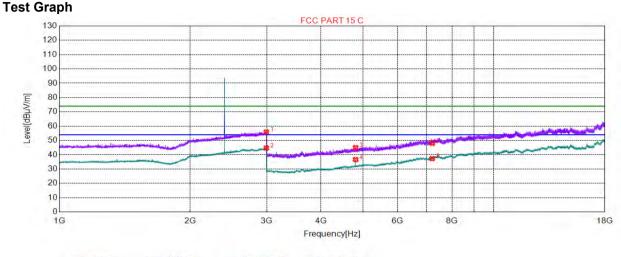


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4.11.2.2 GFSK_Channel 0





Suspected List

Suspe	Suspected List										
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	2992.49	55.87	10.63	74.00	18.13	100	331	Vertical			
2	2992.49	44.68	10.63	54.00	9.32	200	53	Vertical			
3	4804.00	44.99	-17.18	74.00	29.01	300	35	Vertical			
4	4804.00	36.62	-17.18	54.00	17.38	100	210	Vertical			
5	7206.00	37.31	-9.48	54.00	16.69	400	300	Vertical			
6	7206.00	48.05	-9.48	74.00	25.95	100	317	Vertical			

Final Data List

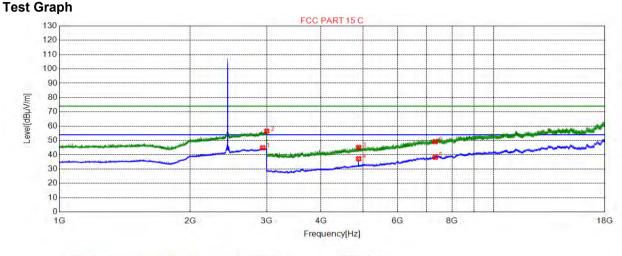


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4.11.2.3 GFSK_Channel 39



PK Limit AV Limit Horizontal PK Horizontal AV
 PK Detector AV Detector

Suspected List

Suspe	Suspected List										
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	2935.98	44.90	10.60	54.00	9.10	100	229	Horizontal			
2	2999.49	56.45	10.77	74.00	17.55	300	182	Horizontal			
3	4882.00	45.11	-16.80	74.00	28.89	200	272	Horizontal			
4	4882.00	37.24	-16.80	54.00	16.76	100	230	Horizontal			
5	7323.00	38.23	-9.27	54.00	15.77	300	30	Horizontal			
6	7323.00	49.15	-9.27	74.00	24.85	200	119	Horizontal			

Final Data List

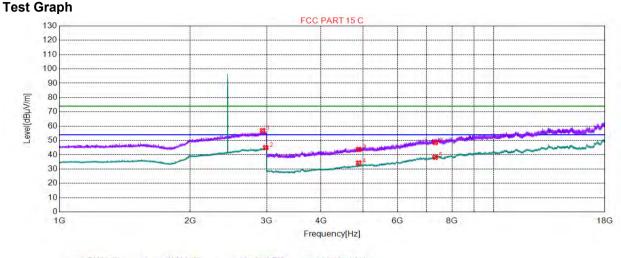


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4.11.2.4 GFSK_Channel 39





Suspected List

Suspe	Suspected List										
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	2934.98	56.95	10.62	74.00	17.05	200	359	Vertical			
2	2983.49	44.99	10.61	54.00	9.01	300	86	Vertical			
3	4882.00	43.77	-16.80	74.00	30.23	100	240	Vertical			
4	4882.59	34.31	-16.80	54.00	19.69	200	194	Vertical			
5	7323.00	38.26	-9.27	54.00	15.74	200	175	Vertical			
6	7323.00	48.61	-9.27	74.00	25.39	100	223	Vertical			

Final Data List

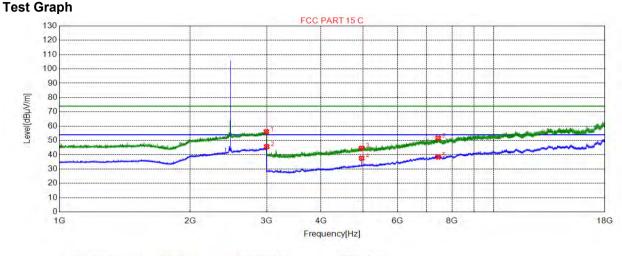


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4.11.2.5 GFSK_Channel 78



PK Limit AV Limit Horizontal PK Horizontal AV
 PK Detector X AV Detector

Suspected List

Suspe	Suspected List										
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	2993.49	56.14	10.66	74.00	17.86	100	314	Horizontal			
2	2998.49	45.68	10.75	54.00	8.32	200	244	Horizontal			
3	4960.00	44.61	-16.28	74.00	29.39	200	202	Horizontal			
4	4960.00	37.58	-16.28	54.00	16.42	300	221	Horizontal			
5	7440.00	38.46	-8.83	54.00	15.54	100	342	Horizontal			
6	7440.00	51.67	-8.83	74.00	22.33	200	22	Horizontal			

Final Data List



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Test Graph FCC PART 15 C 130 120 110 100 90 80 Level[dBµV/m] 70 60 50 40 30 20 10 0 1G 2G 3G 4G 6G 8G 18G Frequency[Hz] **PK Limit** AV Limit Vertical PK - Vertical AV

4.11.2.6 GFSK_Channel 78



Suspected List

Suspe	Suspected List									
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity		
1	2956.48	45.15	10.68	54.00	8.85	100	110	Vertical		
2	2981.99	55.64	10.62	74.00	18.36	200	80	Vertical		
3	4960.00	44.43	-16.28	74.00	29.57	300	164	Vertical		
4	4960.00	33.98	-16.28	54.00	20.02	400	228	Vertical		
5	7440.00	38.55	-8.83	54.00	15.45	100	86	Vertical		
6	7440.00	51.59	-8.83	74.00	22.41	200	304	Vertical		

Final Data List

Remark:

1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

2) Scan from 9kHz to 25GHz, the disturbance between 9KHz to 30MHz and 18GHz to 25GHz was very low, and the above harmonics were the highest point could be found when testing, The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

3) As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the peak measurements were shown in the report.

4) All Modes have been tested, but only the worst case data displayed in this report.



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4.12Restricted bands around fundamental frequency

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205							
Test Method:	ANSI C63.10: 2013							
Test Site:	Measurement Distance: 3m	(Semi-Anechoic Cham	ber)					
Limit:	Frequency	Limit (dBuV/m)	Remark					
	30MHz-88MHz	40.0	Quasi-peak					
	88MHz-216MHz	43.5	Quasi-peak					
	216MHz-960MHz	46.0	Quasi-peak					
	960MHz-1GHz	54.0	Quasi-peak					
	Above 1GHz	54.0	Average Value					
	Above TGHZ	74.0	Peak Value					
Test Setup:								
(Turntable) Ground	Antenna Tower Antenna Tower Reference Plane Controlles 1. 30MHz to 1GHz	Test Receiv	Antenna Tower au au au au au au au au au au					

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	Fage. 010190
Test Procedure:	a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
	 b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic camber. The table was
	rotated 360 degrees to determine the position of the highest radiation.
	c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
	d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
	e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
	f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
	g. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel
	h. Test the EUT in the lowest channel , the Highest channel
	i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode,And found the X axis positioning which it is worse case.
	j. Repeat above procedures until all frequencies measured was complete.
	Non-hopping transmitting mode with all kind of modulation and all kind of
Exploratory Test Mode:	data type
	Charge + Transmitting mode.
	Through Pre-scan, find the DH5 of data type and GFSK modulation is the worst
Final Test Mode:	case.
i indi i oot modo.	Pretest the EUT at Charge + Transmitting mode,
	Only the worst case is recorded in the report.
Test Configuration:	Measurements Below 1000MHz
	• RBW = 120 kHz
	• VBW = 300 kHz
	Detector = Peak
	Trace mode = max hold
	 Peak Measurements Above 1000 MHz RBW = 1 MHz
	• VBW \geq 3 MHz
	 Detector = Peak
	Sweep time = auto Trace mode = max hold
	Trace mode = max hold
	 Average Measurements Above 1000MHz RBW = 1 MHz
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	 VBW = 10 Hz, when duty cycle is no less than 98 percent.
	• VBW \ge 1/T, when duty cycle is less than 98 percent where T is the minimum
	transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
Instruments Used:	Refer to section 6 for details
Test Results:	Pass
Remark:	The Emission Test data were reused from the report no:XHR/2021/1001401



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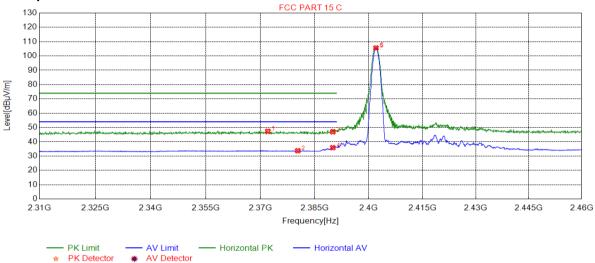
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4.12.1 Test Plots

4.12.1.1 Worst Case Mode (GFSK(DH5))

4.12.1.2 GFSK_Channel 0

Test Graph



Suspected List

Suspe	Suspected List										
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	2372.05	47.36	8.03	74.00	26.64	100	79	Horizontal			
2	2380.31	33.77	7.99	54.00	20.23	200	192	Horizontal			
3	2390.00	46.96	7.98	74.00	27.04	100	265	Horizontal			
4	2390.00	35.90	7.98	54.00	18.10	100	260	Horizontal			
5	2402.00	105.57	8.06	0.00	-105.57	300	268	Horizontal			
6	2402.00	105.97	8.06	0.00	-105.97	100	311	Horizontal			

Final Data List

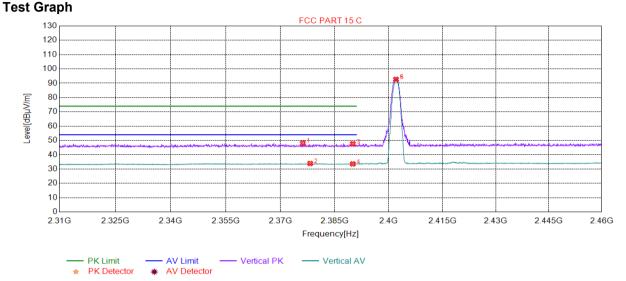


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4.12.1.3 GFSK_Channel 0



Suspected List

Suspe	Suspected List										
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	2376.18	48.07	7.96	74.00	25.93	100	5	Vertical			
2	2378.20	33.91	7.98	54.00	20.09	100	199	Vertical			
3	2390.00	47.66	7.98	74.00	26.34	300	110	Vertical			
4	2390.00	33.62	7.98	54.00	20.38	200	188	Vertical			
5	2402.00	92.71	8.06	0.00	-92.71	100	265	Vertical			
6	2402.00	92.84	8.06	0.00	-92.84	200	265	Vertical			

Final Data List

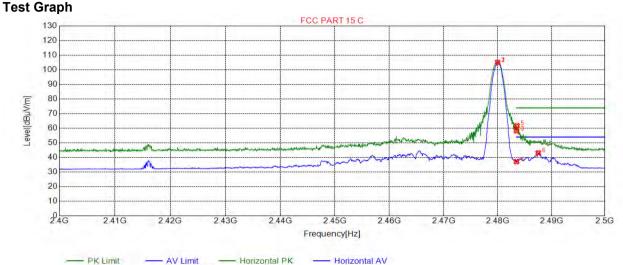


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4.12.1.4 GFSK_Channel 78



* PK Detector * AV Detector

Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2480.00	105.05	8.54	0.00	-105.05	100	258	Horizontal
2	2480.00	104.94	8.54	0.00	-104.94	300	258	Horizontal
3	2483.50	58.16	8.50	74.00	15.84	100	273	Horizontal
4	2483.50	37.17	8.50	54.00	16.83	200	273	Horizontal
5	2483.59	61.78	8.50	74.00	12.22	100	273	Horizontal
6	2487.54	43.20	8.56	54.00	10.80	200	273	Horizontal

Final Data List

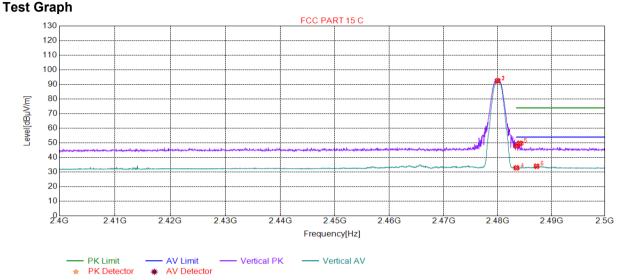


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4.12.1.5 GFSK_Channel 78



Suspected List

Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2480.00	92.53	8.54	0.00	-92.53	100	231	Vertical
2	2480.00	92.39	8.54	0.00	-92.39	200	231	Vertical
3	2483.50	47.78	8.50	74.00	26.22	300	345	Vertical
4	2483.50	32.94	8.50	54.00	21.06	100	301	Vertical
5	2484.09	49.76	8.50	74.00	24.24	200	231	Vertical
6	2487.24	34.03	8.55	54.00	19.97	100	301	Vertical

Final Data List

Remark:

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor All Modes have been tested, but only the worst case data displayed in this report.



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5 Measurement Uncertainty (95% confidence levels, k=2)

Lab A:		
No.	ltem	Measurement Uncertainty
1	Total RF power, conducted	±0.75dB
2	RF power density, conducted	±2.84dB
3	Spurious emissions, conducted	±0.75dB
4	Temperature test	±1°C
5	Humidity test	±3%
6	DC and low frequency voltages	±0.5%

Lab B:

No.	Item	Measurement Uncertainty		
		±4.8dB (30MHz-1GHz)		
1	Radiated Spurious emission test	±5.2dB (1GHz-6GHz)		
1		±5.5dB (6GHz-18GHz)		
		±5.02dB (18GHz-40GHz)		
2	Conduct emission test	±3.4 dB (9KHz- 30MHz)		



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6 Equipment List

RF conducted test								
Toot Equipmont	Manufacturer	Model No.	Inventory No	Cal. date	Cal.Duedate			
Test Equipment	Manufacturer		Inventory No	(yyyy-mm-dd)	(yyyy-mm-dd)			
DC Power Supply	Agilent Technologie Inc	66311B	W009-09	2020/7/15	2021/7/15			
	Rohde & Schwarz	FSV	W025-05	2021/1/3	2022/1/2			
Signal Analyzer				2020/1/4	2021/1/3			
Coaxial Cable	SGS	N/A	SEM031-01	2020/6/12	2021/6/11			
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A			
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2020/7/14	2021/7/14			
Temperature Chamber	GIANT FORCE	ICT-150-40-CP AR	W027-03	2020/10/27	2021/10/27			
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2020/7/14	2021/7/14			



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			Faye.	09 01 90				
RSE&RE&CE Test System								
Equipment	Manufacturer	Model No.	Cal Date	Cal Due Date	Inventory No.			
Semi-Anechoic Chamber	Brilliant-emc	966	NCR	NCR	XAW03-35-01			
MXA signal analyzer	Keysight	N9020A	2020-04-02	2021-04-02	XAW01-06-01			
Radio communication analyzer	ROHDE&SCHWARZ	CMW 500	2020-04-02	2021-04-02	XAW01-03-02			
Test receiver	ROHDE&SCHWARZ	ESR	2020-09-11	2021-09-10	XAW01-08-01			
Receiving antenna	Rosenberger	VULB 9163	2019-10-13	2021-10-12	XAW01-09-01			
Receiving antenna	Rosenberger	BBHA 9120D	2019-10-13	2021-10-12	XAW01-09-02			
Receiving antenna	Rosenberger	BBHA 9170	2019-10-13	2021-10-12	XAW01-09-03			
Directional antenna rack controller	Max-Full	MF-7802BS	NCR	NCR	XAW03-03-01			
High-speed antenna rack controller	Max-Full	MF-7802	NCR	NCR	XAW03-04-01			
Filter bank	Tonscend	JS0806-F	NCR	NCR	XAW03-05-01			
Filter bank	Tonscend	JS0806s	NCR	NCR	XAW03-05-02			
Amplifier	Tonscend	TAP00903040	2020-10-26	2021-10-25	XAW01-41-01			
Amplifier	Tonscend	TAP01018048	2020-10-26	2021-10-25	XAW01-41-02			
Amplifier	Tonscend	TAP18040048	2020-10-26	2021-10-25	XAW01-41-03			
Amplifier	Shanghai Steed	YX28980930	2020-10-26	2021-10-25	XAW01-41-06			
Artificial network	ROHDE&SCHWARZ	ENV216	2020-08-04	2021-08-03	XAW01-19-02			
Temperature and humidity meter	MingGao	TH101B	2020-06-11	2021-05-11	XAW01-01-01			
Measurement Software	Tonscend	TS+ RSE&RE	NCR	NCR	XAW02-05-01			
Measurement Software	Tonscend	TS+ CE	NCR	NCR	XAW02-05-02			



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7 Photographs - EUT Constructional Details

Refer to Appendix A PCE Setup Photos.

The End



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