

Report No.: FR230411001



FCC RADIO TEST REPORT

FCC ID : 2A8UX -2892

Equipment : Digital Media Receiver

Model Name : G6A87E

Applicant : Persimmon Kaki LLC

6975 Union Park Avenue, Suite 600, Cottonwood Heights, Utah 84047

Standard : FCC Part 15 Subpart C §15.247

The product was received on Apr. 21, 2023 and testing was performed from Apr. 21, 2023 to May 12, 2023. We, Sporton International (USA) Inc., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this partial report apply exclusively to the tested model / sample. Without written approval of Sporton International (USA) Inc., the test report shall not be reproduced except in full.

Approved by: Abi Lin

Sporton International (USA) Inc.

1175 Montague Expressway, Milpitas, CA 95035

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History of this test report

Report No.	Version	Description	Issue Date
FR230411001	01	Initial issue of report	Aug. 07, 2023

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Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.247(a)(1)	Number of Channels	Pass	-
3.2	15.247(a)(1)	Hopping Channel Separation	Pass	-
3.3	15.247(a)(1)	Dwell Time of Each Channel	Pass	-
3.4	15.247(a)(1)	20dB Bandwidth	Pass	-
3.4	2.1049	99% Occupied Bandwidth	Reporting only	-
3.5	15.247(d)	Conducted Band Edges	Pass	-
3.6	15.203 & 15.247(b)	Antenna Requirement	Pass	-

Note: This test report contains the results of partial test items required per FCC rules, including channel number, channel separation, band edge (in hopping mode), 20dB BW, OBW and dwell time while the rest of test items will be covered in another report.

Conformity Assessment Condition:

The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.

Disclaimer:

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

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1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature					
Equipment	Digital Media Receiver				
Model Name	G6A87E				
FCC ID	2A8UX -2892				
	WLAN 11b/g/n HT20				
	WLAN 11a/n HT20/HT40				
FUT aumnorta Badica application	Digital Media Receiver G6A87E 2A8UX -2892 WLAN 11b/g/n HT20				
EUT supports Radios application	Bluetooth BR/EDR/LE				
	LoRa				
	Zigbee				

1.2 Product Specification of Equipment Under Test

Product Specification is subject to this standard					
Tx/Rx Frequency Range	902 MHz ~ 928 MHz				
99% Occupied Bandwidth	<pre><lora 125khz="" data="" fhss="" rate:="" sf7="">: 0.131 MHz <lora 125khz="" data="" fhss="" rate:="" sf11="">: 0.127 MHz <fsk 50kbps="">: 0.085 MHz <fsk 150kbps="">: 0.156 MHz <fsk 250kbps="">: 0.259 MHz</fsk></fsk></fsk></lora></lora></pre>				
Antenna Gain	FPC IFA Antenna with gain 4.00 dBi				
Type of Modulation	LoRa: LoRa FSK: FSK				

1.3 Modification of EUT

No modifications are made to the EUT during all test items.

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1.4 Testing Location

Test Site	Sporton International (USA) Inc.
Test Site Location	1175 Montague Expressway, Milpitas, CA 95035 TEL : 408 9043300
Test Site No.	Sporton Site No.
Test Site NO.	TH01-CA

Report No.: FR230411001

FCC Designation No.: US1250

1.5 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15 Subpart C §15.247
- FCC KDB Publication No. 558074 D01 15.247 Meas Guidance v05r02
- ANSI C63.10-2013

Remark: All the test items were validated and recorded in accordance with the standards without any modification during the testing.

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2 Test Configuration of Equipment Under Test

2.1 Carrier Frequency Channel

LoRa 125KHz FHSS

Frequency Band	Channel	Freq. (MHz)								
	-	-	28	907.6	55	913.0	82	918.4	109	923.8
	2	902.4	29	907.8	56	913.2	83	918.6	110	924.0
	3	902.6	30	908.0	57	913.4	84	918.8	111	924.2
	4	902.8	31	908.2	58	913.6	85	919.0	112	924.4
	5	903.0	32	908.4	59	913.8	86	919.2	113	924.6
	6	903.2	33	908.6	60	914.0	87	919.4	114	924.8
	7	903.4	34	908.8	61	914.2	88	919.6	115	925.0
	8	903.6	35	909.0	62	914.4	89	919.8	116	925.2
	9	903.8	36	909.2	63	914.6	90	920.0	117	925.4
	10	904.0	37	909.4	64	914.8	91	920.2	118	925.6
	11	904.2	38	909.6	65	915.0	92	920.4	119	925.8
	12	904.4	39	909.8	66	915.2	93	920.6	120	926.0
	13	904.6	40	910.0	67	915.4	94	920.8	121	926.2
902 – 928 MHz	14	904.8	41	910.2	68	915.6	95	921.0	122	926.4
141112	15	905.0	42	910.4	69	915.8	96	921.2	123	926.6
	16	905.2	43	910.6	70	916.0	97	921.4	124	926.8
	17	905.4	44	910.8	71	916.2	98	921.6	125	927.0
	18	905.6	45	911.0	72	916.4	99	921.8	126	927.2
	19	905.8	46	911.2	73	916.6	100	922.0	127	927.4
	20	906.0	47	911.4	74	916.8	101	922.2	128	927.6
	21	906.2	48	911.6	75	917.0	102	922.4	-	-
	22	906.4	49	911.8	76	917.2	103	922.6	-	-
	23	906.6	50	912.0	77	917.4	104	922.8	-	=
	24	906.8	51	912.2	78	917.6	105	923.0	-	-
	25	907.0	52	912.4	79	917.8	106	923.2	-	-
	26	907.2	53	912.6	80	918.0	107	923.4	-	
	27	907.4	54	912.8	81	918.2	108	923.6	-	-

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FSK 50 Kbps

Frequency Band	Channel	Freq. (MHz)								
	1	902.2	28	907.6	55	913.0	82	918.4	109	923.8
	2	902.4	29	907.8	56	913.2	83	918.6	110	924.0
	3	902.6	30	908.0	57	913.4	84	918.8	111	924.2
	4	902.8	31	908.2	58	913.6	85	919.0	112	924.4
	5	903.0	32	908.4	59	913.8	86	919.2	113	924.6
	6	903.2	33	908.6	60	914.0	87	919.4	114	924.8
	7	903.4	34	908.8	61	914.2	88	919.6	115	925.0
	8	903.6	35	909.0	62	914.4	89	919.8	116	925.2
	9	903.8	36	909.2	63	914.6	90	920.0	117	925.4
	10	904.0	37	909.4	64	914.8	91	920.2	118	925.6
	11	904.2	38	909.6	65	915.0	92	920.4	119	925.8
	12	904.4	39	909.8	66	915.2	93	920.6	120	926.0
	13	904.6	40	910.0	67	915.4	94	920.8	121	926.2
902 – 928 MHz	14	904.8	41	910.2	68	915.6	95	921.0	122	926.4
	15	905.0	42	910.4	69	915.8	96	921.2	123	926.6
	16	905.2	43	910.6	70	916.0	97	921.4	124	926.8
	17	905.4	44	910.8	71	916.2	98	921.6	125	927.0
	18	905.6	45	911.0	72	916.4	99	921.8	126	927.2
	19	905.8	46	911.2	73	916.6	100	922.0	127	927.4
	20	906.0	47	911.4	74	916.8	101	922.2	128	927.6
	21	906.2	48	911.6	75	917.0	102	922.4	129	927.8
	22	906.4	49	911.8	76	917.2	103	922.6	-	-
	23	906.6	50	912.0	77	917.4	104	922.8	-	-
	24	906.8	51	912.2	78	917.6	105	923.0	-	-
	25	907.0	52	912.4	79	917.8	106	923.2	=	-
	26	907.2	53	912.6	80	918.0	107	923.4	-	-
	27	907.4	54	912.8	81	918.2	108	923.6	-	-

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FSK 150 Kbps

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
	1	902.4	33	915.2
	2	902.8	34	915.6
	3	903.2	35	916.0
	4	903.6	36	916.4
	5	904.0	37	916.8
	6	904.4	38	917.2
	7	904.8	39	917.6
	8	905.2	40	918.0
	9	905.6	41	918.4
	10	906.0	42	918.8
	11	906.4	43	919.2
	12	906.8	44	919.6
	13	907.2	45	920.0
	14	907.6	46	920.4
	15	908.0	47	920.8
	16	908.4	48	921.2
902 – 928 MHz	17	908.8	49 92	921.6
	18	909.2	50	922.0
	19	909.6	51	922.4
	20	910.0	52	922.8
	21	910.4	53	923.2
	22	910.8	54	923.6
	23	911.2	55	924.0
	24	911.6	56	924.4
	25	912.0	57	924.8
	26	912.4	58	925.2
	27	912.8	59	925.6
	28	913.2	60	926.0
	29	913.6	61	926.4
	30	914.0	62	926.8
	31	914.4	63	927.2
	32	914.8	64	927.6

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FSK 250 Kbps

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
	1	902.5	28	916.0
	2	903.0	29	916.5
	3	903.5	30	917.0
	4	904.0	31	917.5
	5	904.5	32	918.0
	6	905.0	33	918.5
	7	905.5	34	919.0
	8	906.0	35	919.5
	9	906.5	36	920.0
	10	907.0	37	920.5
	11	907.5	38	921.0
	12	908.0	39	921.5
	13	908.5	40	922.0
902 – 928 MHz	14	909.0	41	922.5
002 020 WH 12	15	909.5	42	923.0
	16	910.0	43	923.5
	17	910.5	44	924.0
	18	911.0	45	924.5
	19	911.5	46	925.0
	20	912.0	47	925.5
	21	912.5	48	926.0
	22	913.0	49	926.5
	23	913.5	50	927.0
	24	914.0	51	927.5
	25	914.5		
	26	915.0		
	27	915.5		

2.2 EUT Operation Test Setup

The RF test items, utility "Android Debug Bridge version 1.0.32" was installed in Notebook which was programmed in order to make the EUT get into the engineering modes to provide channel selection, power level, data rate and the application type and for continuous transmitting signals.

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3 Test Result

3.1 Number of Channel Measurement

3.1.1 Limits of Number of Hopping Frequency

For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies.

3.1.2 Measuring Instruments

See list of measuring equipment of this test report.

3.1.3 Test Procedure

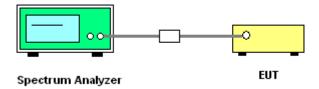
- 1. The testing follows ANSI C63.10-2013 clause 7.8.3.
- 2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
- 3. Set to the maximum power setting and enable the EUT transmit continuously.
- 4. Enable the EUT hopping function.
- 5. Use the following spectrum analyzer settings: Span = the frequency band of operation;

RBW = 50kHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold for LoRa 125kHz FHSS \ FSK 50Kbps FHSS and FSK 150Kbps FHSS

RBW = 100kHz; VBW \geq RBW; Sweep = auto; Detector function = peak; Trace = max hold for FSK 250Kbps FHSS.

- 6. The number of hopping frequency used is defined as the number of total channel.
- 7. Record the measurement data derived from spectrum analyzer.

3.1.4 Test Setup



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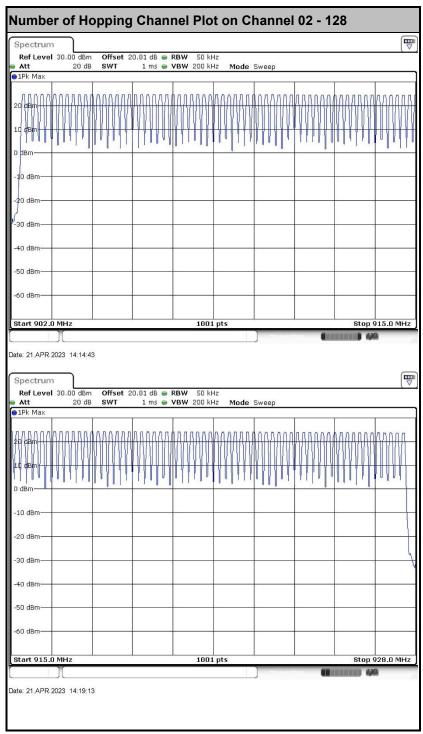
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3.1.5 Test Result of Number of Hopping Frequency

Please refer to Appendix A.

<LoRa 125kHz FHSS>

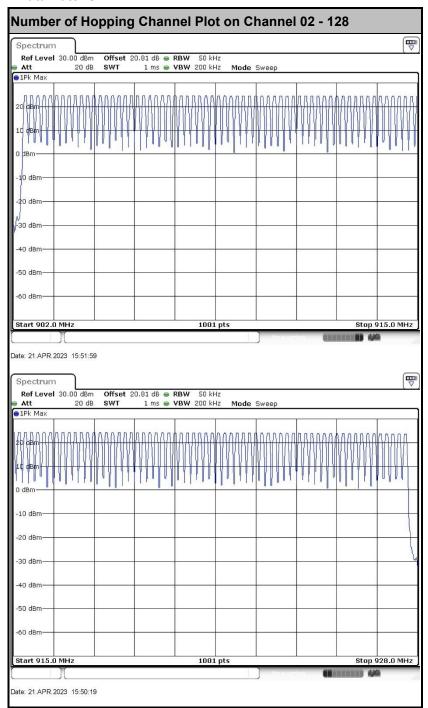
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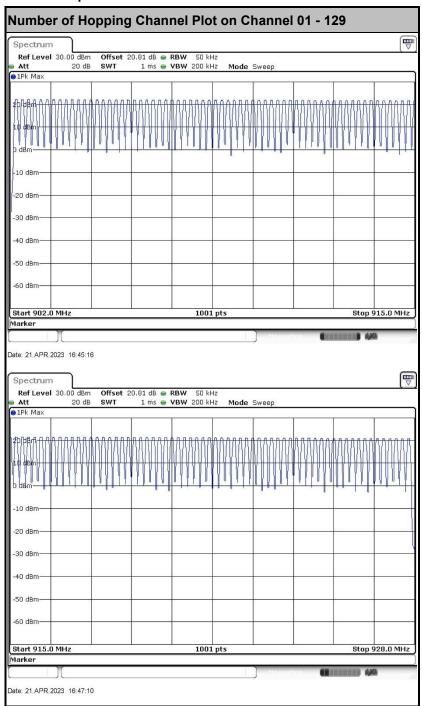
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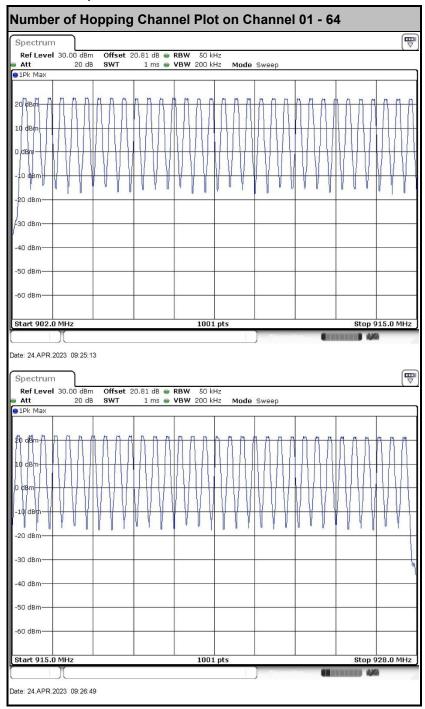
<FSK 50Kbps FHSS>



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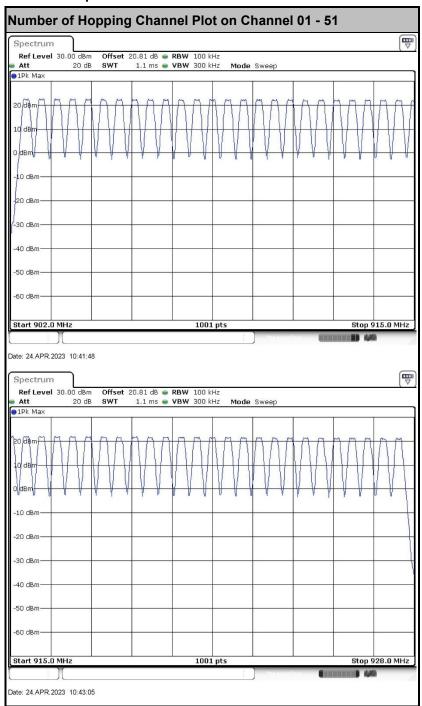
<FSK 150Kbps FHSS>



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<FSK 250Kbps FHSS>



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3.2 Hopping Channel Separation Measurement

3.2.1 Limit of Hopping Channel Separation

Frequency hopping systems operating in the 902 - 928 MHz band shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

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3.2.2 Measuring Instruments

See list of measuring equipment of this test report.

3.2.3 Test Procedures

- 1. The testing follows ANSI C63.10-2013 clause 7.8.2.
- 2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
- 3. Set to the maximum power setting and enable the EUT transmit continuously.
- 4. Enable the EUT hopping function.
- 5. Use the following spectrum analyzer settings:

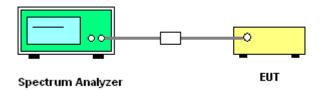
Span = wide enough to capture the peaks of two adjacent channels;

RBW = 50kHz for; VBW \geq RBW; Sweep = auto; Detector function = peak; Trace = max hold for LoRa 125KHz FHSS and FSK 50Kbps FHSS.

RBW = 100kHz for; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold for FSK 150Kbps FHSS and FSK 250Kbps FHSS.

6. Measure and record the results in the test report.

3.2.4 Test Setup



3.2.5 Test Result of Hopping Channel Separation

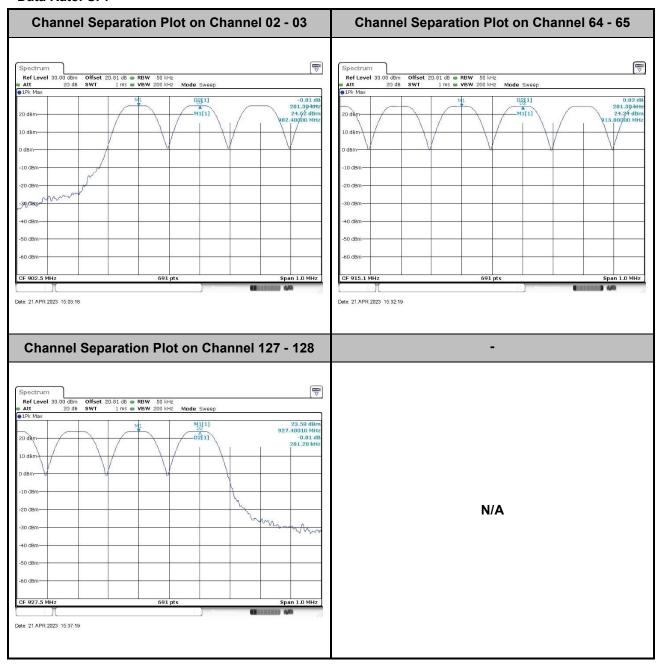
Please refer to Appendix A.

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<LoRa 125KHz FHSS>

<Data Rate: SF7>

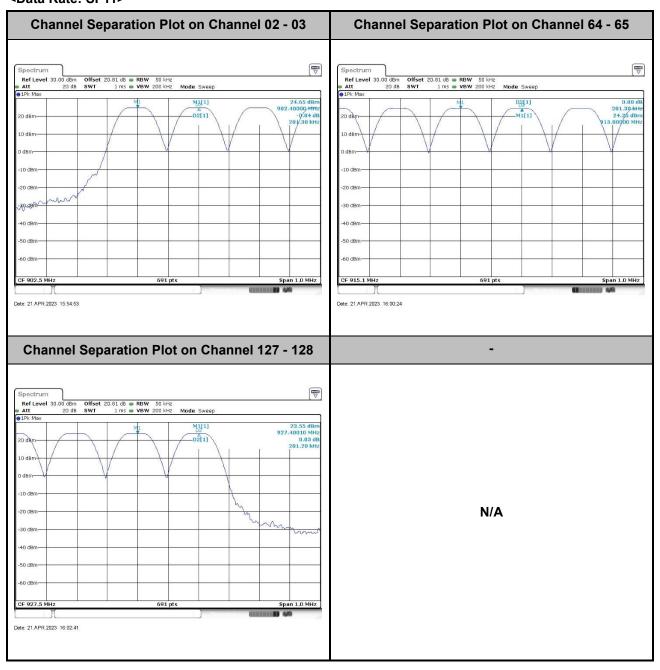


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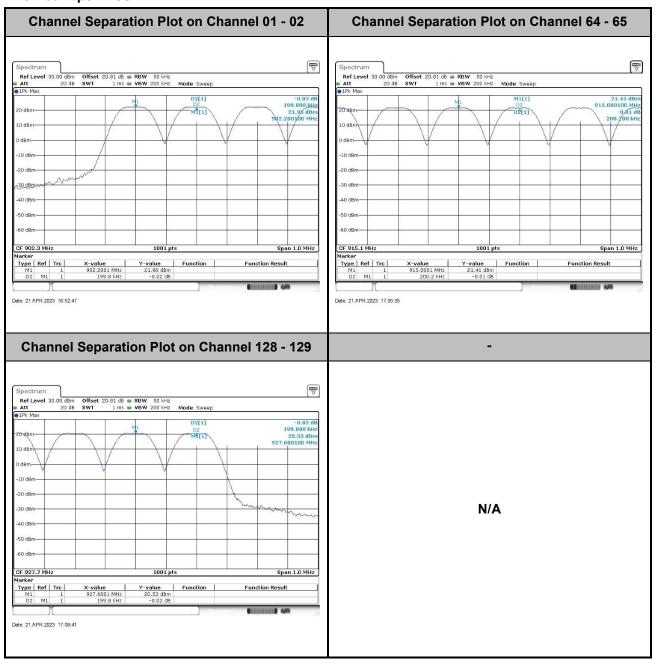
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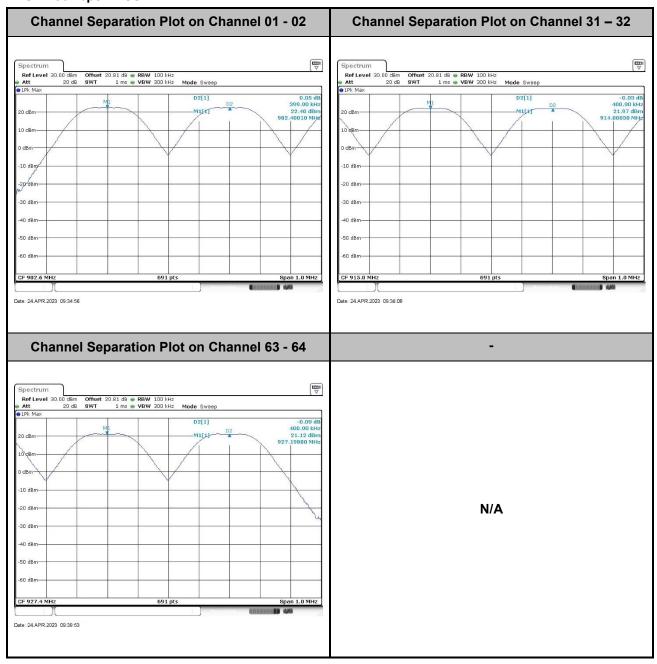
<FSK 50Kbps FHSS>



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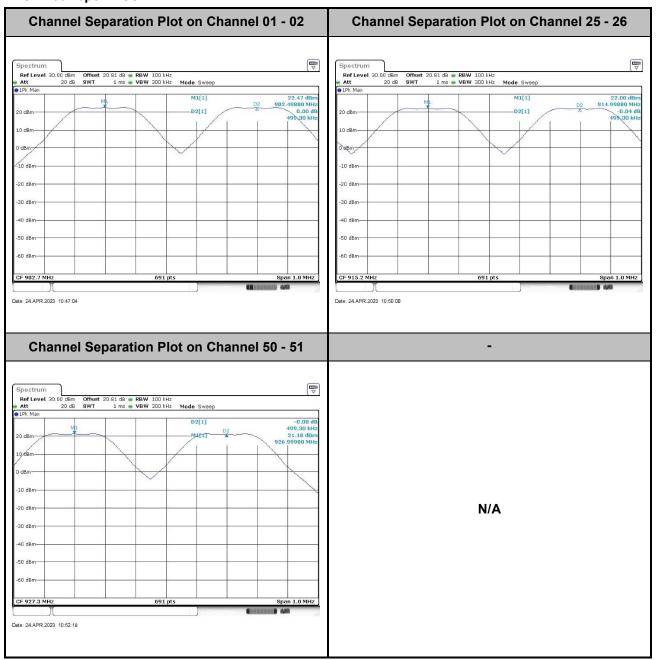
<FSK 150Kbps FHSS>



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<FSK 250Kbps FHSS>



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3.3 Dwell Time Measurement

3.3.1 Limit of Dwell Time

If the 20 dB bandwidth of the hopping channel is less than 250 kHz, the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period.

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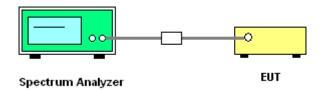
3.3.2 Measuring Instruments

See list of measuring equipment of this test report.

3.3.3 Test Procedures

- 1. The testing follows ANSI C63.10-2013 clause 7.8.4.
- The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.
 The path loss was compensated to the results for each measurement.
- 3. Set to the maximum power setting and enable the EUT transmit continuously.
- 4. Enable the EUT hopping function.
- 5. Use the following spectrum analyzer settings: Span = zero span, centered on a hopping channel; RBW = 100 kHz; VBW ≥ RBW; Sweep = as necessary to capture the entire dwell time per hopping channel; Detector function = peak; Trace = max hold.
- 6. Measure and record the results in the test report.

3.3.4 Test Setup



3.3.5 Test Result of Dwell Time

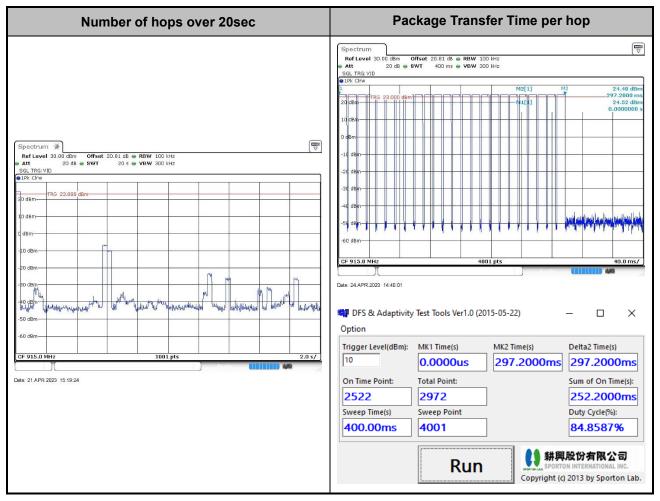
Please refer to Appendix A.

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<LoRa 125KHz FHSS>

<Data Rate: SF7>



Remark: Dwell Time(s) = Hops Over Occupancy Time (hops) x Package Transfer Time

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<LoRa 125KHz FHSS>

<Data Rate: SF11>



Remark: Dwell Time(s) = Hops Over Occupancy Time (hops) x Package Transfer Time

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<FSK 50Kbps FHSS>

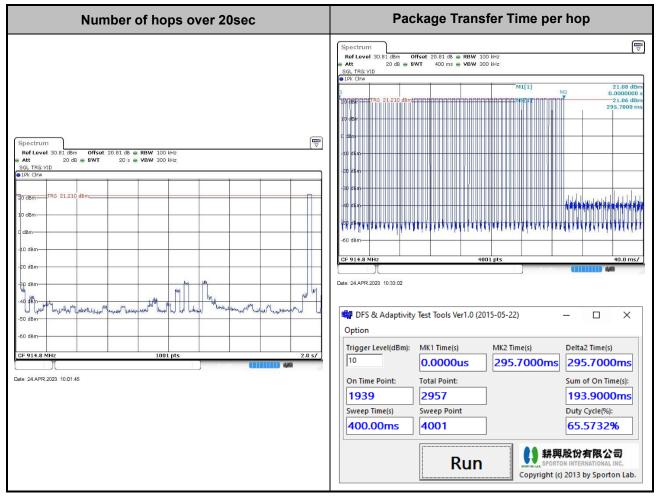


Remark: Dwell Time(s) = Hops Over Occupancy Time (hops) x Package Transfer Time

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<FSK 150Kbps FHSS>

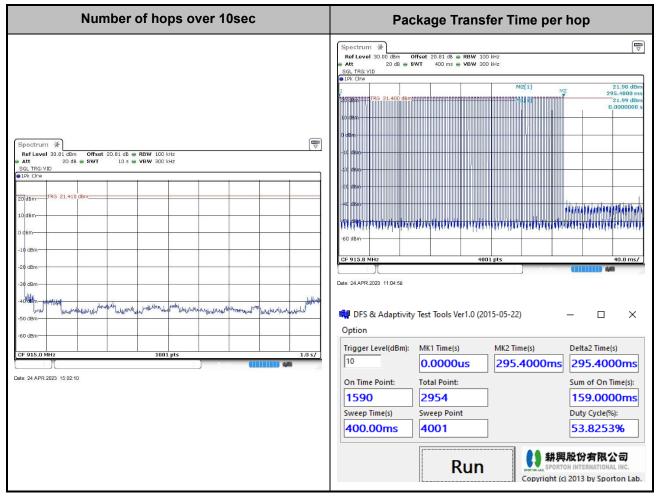


Remark: Dwell Time(s) = Hops Over Occupancy Time (hops) x Package Transfer Time

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<FSK 250Kbps FHSS>



Remark: Dwell Time(s) = Hops Over Occupancy Time (hops) x Package Transfer Time

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3.4 20dB and 99% Bandwidth Measurement

3.4.1 Limit of 20dB and 99% Bandwidth

The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz. 99% Bandwidth is reporting only.

3.4.2 Measuring Instruments

See list of measuring equipment of this test report.

3.4.3 Test Procedures

- 1. The testing follows ANSI C63.10-2013 clause 6.9.2 and 6.9.3.
- 2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
- 3. Set to the maximum power setting and enable the EUT transmit continuously.
- Use the following spectrum analyzer settings for 20dB Bandwidth measurement.
 Span = approximately 2 to 5 times the 20 dB bandwidth, centered on a hopping channel;

 $RBW \geq 1\% \ of \ the \ 20 \ dB \ bandwidth; \ VBW \geq RBW; \ Sweep = auto; \ Detector \ function = peak;$

Trace = max hold.

5. Use the following spectrum analyzer settings for 99 % Bandwidth measurement.

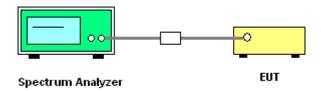
Span = approximately 1.5 to 5 times the 99% bandwidth, centered on a hopping channel;

RBW \geq 1-5% of the 99% bandwidth; VBW \geq 3 * RBW; Sweep = auto; Detector function = peak;

Trace = \max hold.

6. Measure and record the results in the test report.

3.4.4 Test Setup



3.4.5 Test Result of 20dB Bandwidth

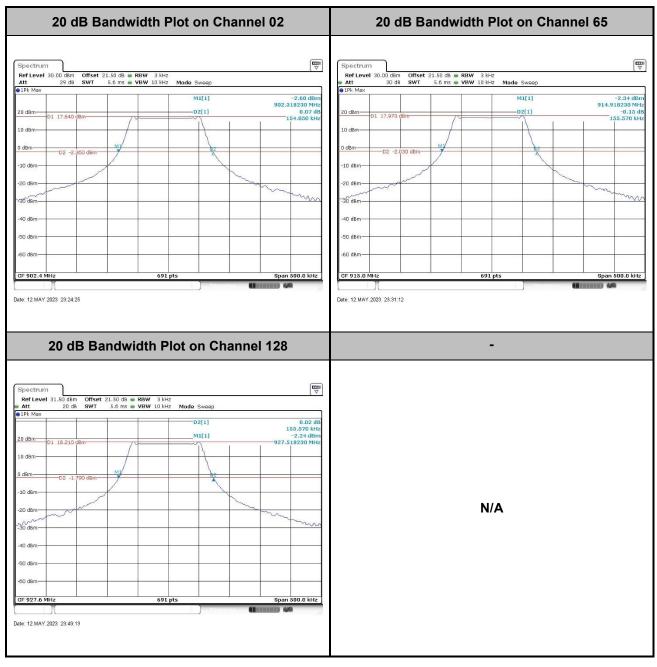
Please refer to Appendix A.

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<LoRa 125KHz FHSS>

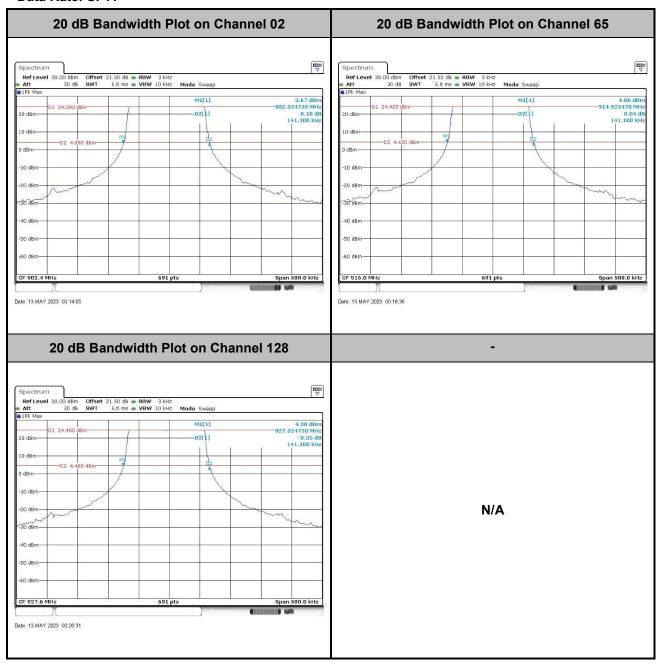
<Data Rate: SF7>



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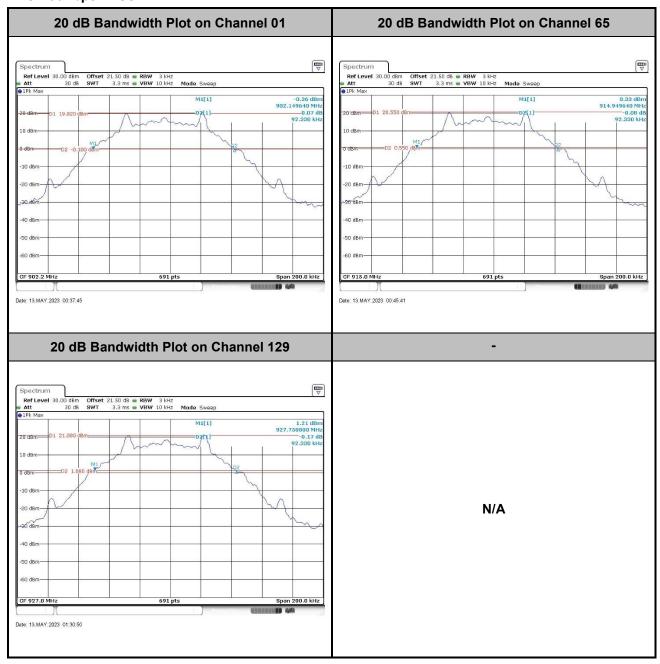
<Data Rate: SF11>



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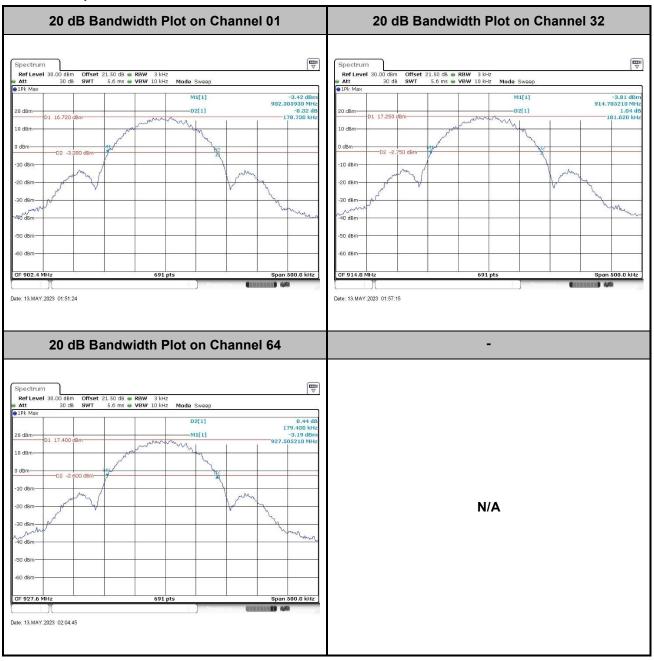
<FSK 50Kbps FHSS>



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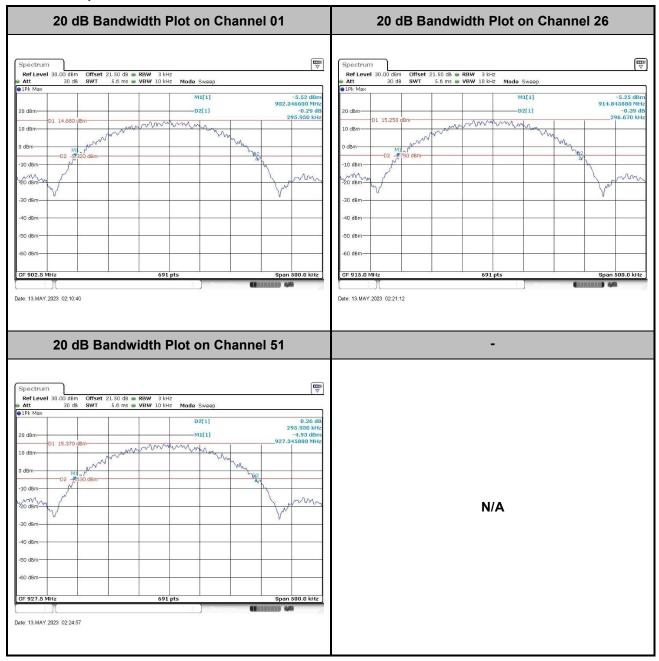
<FSK 150Kbps FHSS>



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<FSK 250Kbps FHSS>



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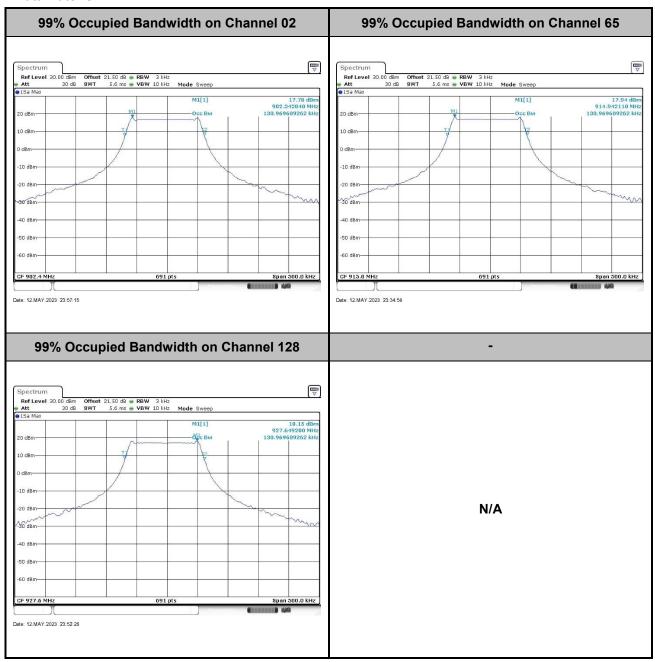
Report Version : 01

3.4.6 Test Result of 99% Occupied Bandwidth

Please refer to Appendix A.

<LoRa 125KHz FHSS>

<Data Rate: SF7>

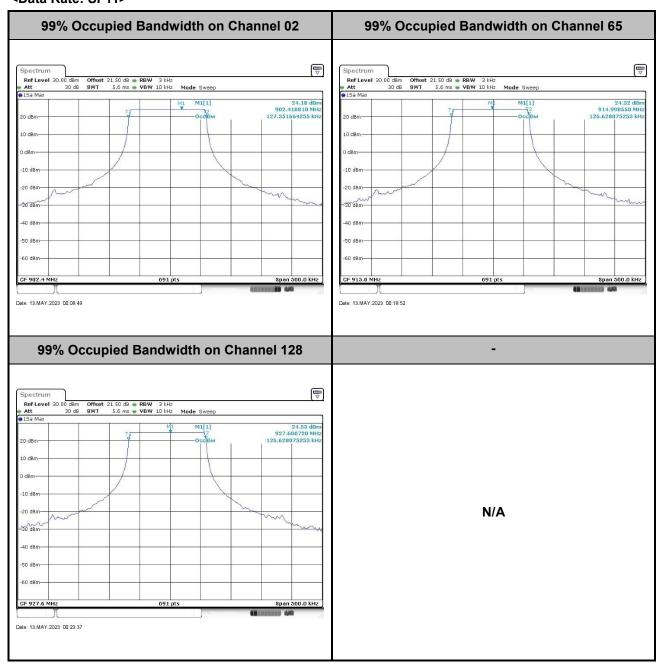


Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

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<Data Rate: SF11>

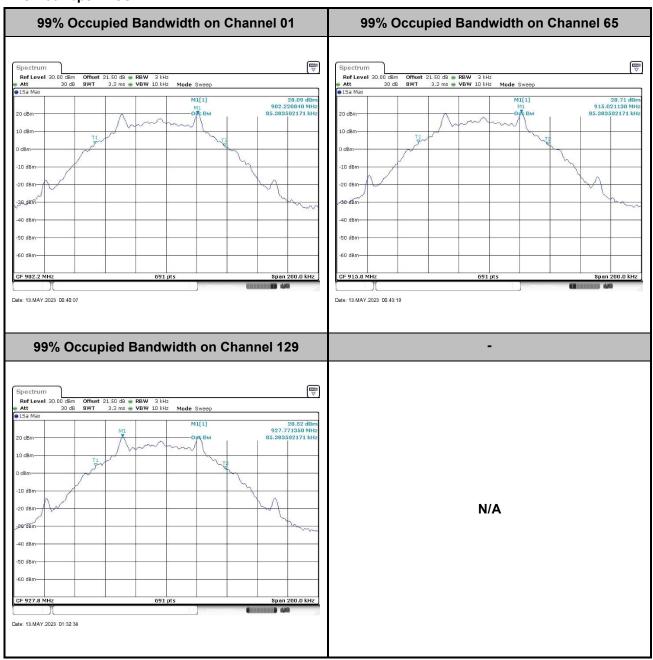


Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

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<FSK 50Kbps FHSS>

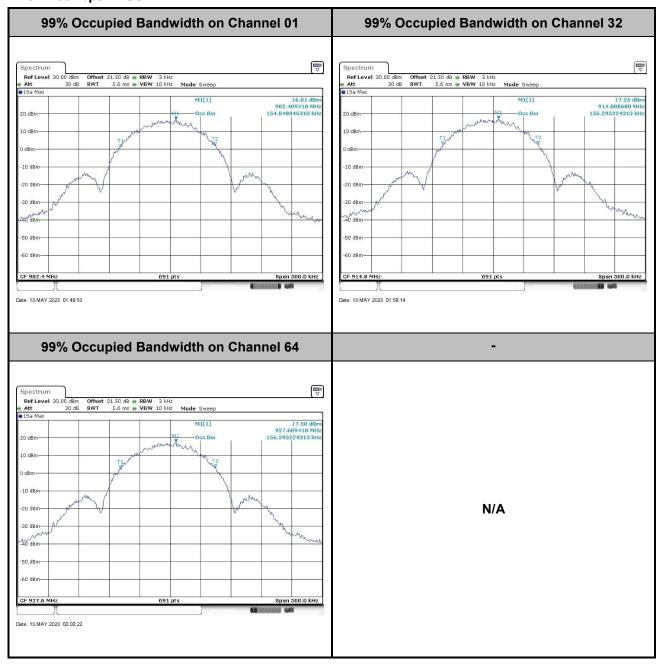


Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

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<FSK 150Kbps FHSS>

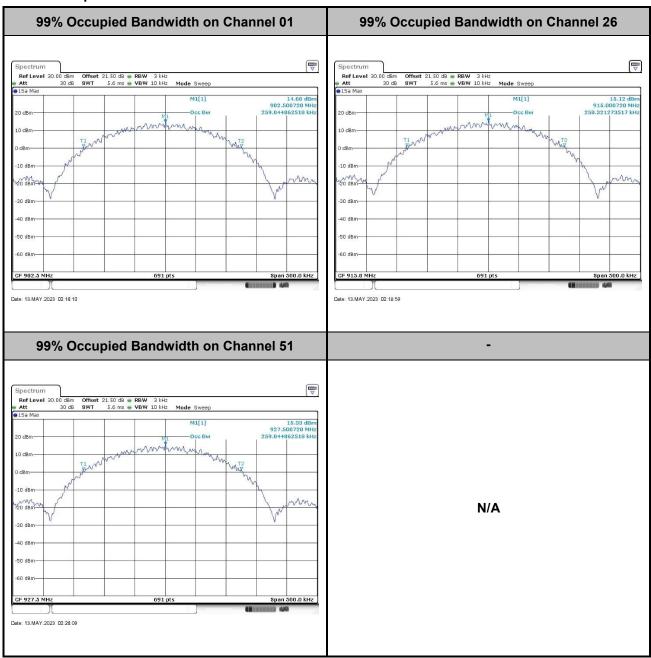


Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

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<FSK 250Kbps FHSS>



Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

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3.5 Conducted Band Edges Measurement

3.5.1 Limit of Band Edges

In any 100 kHz bandwidth outside the intentional radiation frequency band, the radio frequency power shall be at least 20 dB below the highest level of the radiated power. In addition, radiated emissions which fall in the restricted bands must also comply with the radiated emission limits.

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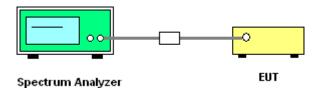
3.5.2 Measuring Instruments

See list of measuring equipment of this test report.

3.5.3 Test Procedures

- 1. The testing follows ANSI C63.10-2013 clause 7.8.6.
- 2. Set to the maximum power setting and enable the EUT transmit continuously.
- 3. Set RBW = 100kHz, VBW = 300kHz. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100kHz RBW. The attenuation shall be 30 dB instead of 20 dB when RMS conducted output power procedure is used.
- 4. Enable hopping function of the EUT and then repeat step 2. and 3.
- 5. Measure and record the results in the test report.

3.5.4 Test Setup



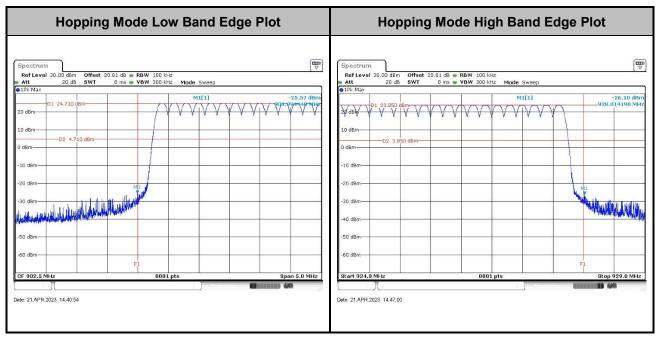
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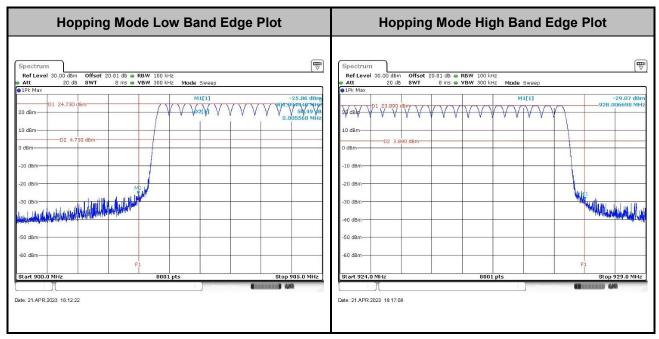
3.5.5 Test Result of Conducted Hopping Mode Band Edges

<LoRa 125KHz FHSS>

<Data Rate: SF7>



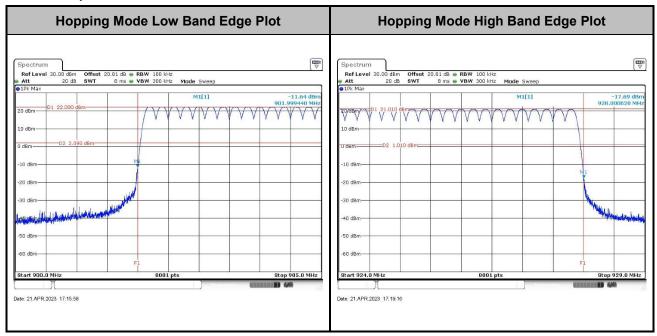
<Data Rate: SF11>



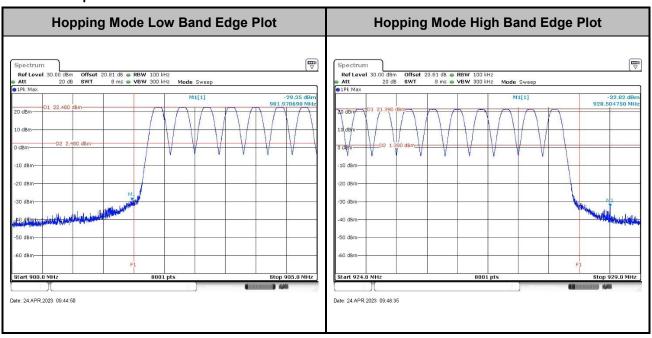
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<FSK 50Kbps FHSS>



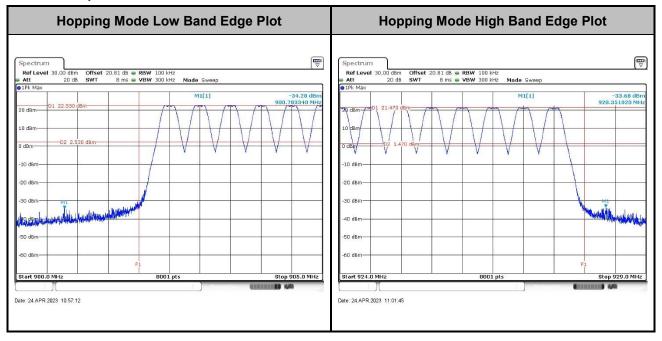
<FSK 150Kbps FHSS>



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3.6 Antenna Requirements

3.6.1 Standard Applicable

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the rule.

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3.6.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.6.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

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4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Hygrometer	Testo	608-H1	45141354	N/A	Jul. 27, 2022	Apr. 21, 2023~ May 12, 2023	Jul. 26, 2023	Conducted (TH01-CA)
Spectrum Analyzer	Rohde & Schwarz	FSV13	101559	10Hz-13.6GHz	Jul. 05, 2022	Apr. 21, 2023~ May 12, 2023	Jul. 04, 2023	Conducted (TH01-CA)

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