FCC RADIO TEST REPORT

FCC ID	**:**	**2AEUPBHART001**
Equipment	**:**	**Intercom**
Brand Name	**:**	**ring**
Model Name	**:**	**5F34E9**
Applicant	**:**	**Ring LLC** **12515 Cerise Ave, Hawthorne, CA 90250, USA**
Manufacturer	**:**	**Ring LLC** **12515 Cerise Ave, Hawthorne, CA 90250, USA**
Standard	**:**	**FCC Part 15 Subpart C §15.247**

The product was received on May 17, 2022 and testing was started from May 18, 2022 to Jun. 01, 2022. 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 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.

Neil Kao

Approved by: Neil Kao

Sporton International (USA) Inc.
1175 Montague Expressway, Milpitas, CA 95035

Table of Contents

History of this test report

Report No.	Version	Description	Issued Date
FR220509002C	01	Initial issue of report	Jul. 27, 2022
FR220509002C	02	Revise Test Result of Dwell Time and Uncertainty of Evaluation	Aug. 10, 2022

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(b)(2)	Output Power	Pass	-
3.6	15.247(d)	Conducted Band Edges	Pass	-
3.7	15.247(d)	Conducted Spurious Emission	Pass	-
3.8	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	Pass	Under limit 6.11 dB at 742.950 MHz
-	15.207	AC Conducted Emission	Not Required	-
3.9	15.203 & 15.247(b)	Antenna Requirement	Pass	-

Note:

1. Not required means after assessing, test items are not necessary to carry out.

2. The EUT is powered by batteries which is deemed DC power source, it does not operate from the AC power lines or contain provisions for operation while connected to the AC power lines, according to 47 CFR §15.207(c), the conducted emission limits are not applicable to the device hence the test is not performed.

Conformity Assessment Condition:
1. 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. 2. Please refer to the section ”Uncertainty of Evaluation” for measurement uncertainty.
Comments and Explanations:
The product specifications of the EUT presented in the report are declared by the manufacturer who shall take full responsibility for the authenticity.

1 General Description

1.1 Product Feature of Equipment Under Test

Bluetooth-LE, Wi-Fi 2.4GHz 802.11b/g/n and LoRa/FSK.

Product Feature	
Antenna Type	WLAN: PCB-ILA Antenna Bluetooth-LE: PCB-ILA Antenna LoRa/FSK: PCB-ILA Antenna

Antenna information		
902 MHz ~ 928 MHz	Peak Gain (dBi)	2.5

Remark: The above EUT's information was declared by manufacturer. Please refer to Comments and Explanations in report summary.

1.2 Modification of EUT

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

1.3 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.**
	03CH02-CA, TH01-CA

Note: The test site complies with ANSI C63.4 2014 requirement.

1.4 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 DTS Meas. Guidance v05r02
- FCC KDB 414788 D01 Radiated Test Site v01r01
- ANSI C63.10-2013

Remark:

1. All the test items were validated and recorded in accordance with the standards without any modification during the testing.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

2.1 Carrier Frequency Channel

LoRa 125KHz FHSS / FSK 50 Kbps

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
902 – 928 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
	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	-	-

FSK 150 Kbps

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
902 – 928 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
	17	908.8	49	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

FSK 250 Kbps

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
902 – 928 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
	14	909.0	41	922.5
	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 Test Mode

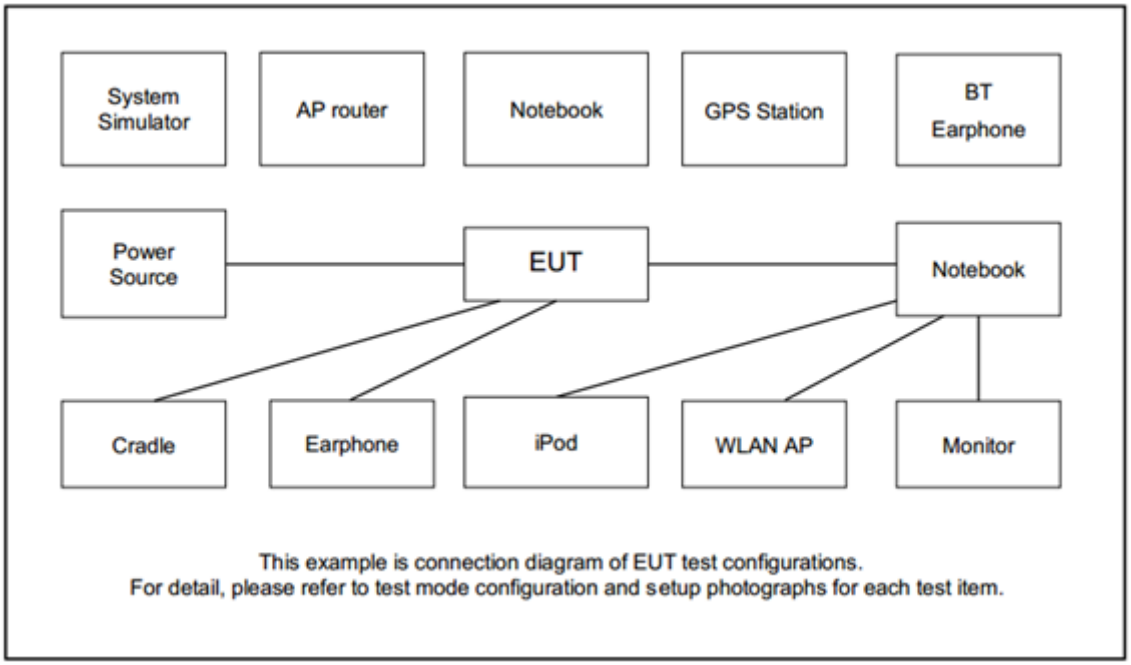
a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: For radiated measurement, the measured emission level of the EUT was maximized by rotating the EUT on a turntable, adjusting the orientation of the EUT and EUT antenna in three orthogonal axis (X: flat, Y: portrait, Z: landscape), and adjusting the measurement antenna orientation, following C63.10 exploratory test procedures and find Y plane as worst plane.

The following summary table is showing all test modes to demonstrate in compliance with the standard.

Summary table of Test Cases		
Test Item	**Feature**	**LoRa/FSK**
Conducted Test Cases	**LoRa 125 KHz FHSS_SF7**	Mode 1: CH01 Tx_902.20 MHz Mode 2: CH65 Tx_915.00 MHz Mode 3: CH129 Tx_927.80 MHz
	FSK 50 Kbps FHSS	Mode 4: CH01 Tx_902.20 MHz Mode 5: CH65 Tx_915.00 MHz Mode 6: CH129 Tx_927.80 MHz
	FSK 150 Kbps FHSS	Mode 7: CH01 Tx_902.40 MHz Mode 8: CH32 Tx_914.80 MHz Mode 9: CH64 Tx_927.60 MHz
	FSK 250 Kbps FHSS	Mode 7: CH01 Tx_902.50 MHz Mode 8: CH26 Tx_915.00 MHz Mode 9: CH51 Tx_927.50 MHz
Radiated Test Cases	**LoRa 125 KHz FHSS_SF7**	Mode 1: CH01 Tx_902.20 MHz Mode 2: CH65 Tx_915.00 MHz Mode 3: CH129 Tx_927.80 MHz
	FSK 50 Kbps FHSS	Mode 4: CH01 Tx_902.20 MHz Mode 5: CH65 Tx_915.00 MHz Mode 6: CH129 Tx_927.80 MHz
	FSK 150 Kbps FHSS	Mode 7: CH01 Tx_902.40 MHz Mode 8: CH33 Tx_915.20 MHz Mode 9: CH64 Tx_927.60 MHz
	FSK 250 Kbps FHSS	Mode 7: CH01 Tx_902.50 MHz Mode 8: CH26 Tx_915.00 MHz Mode 9: CH51 Tx_927.50 MHz

Remark: After pretest, the spread factor (SF) which has maximum conducted power was selected as final test mode.

2.3 Connection Diagram of Test System



2.4 Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Laptop	ACER	Altos PS548-G1	N/A	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m

2.5 EUT Operation Test Setup

The RF test items, utility “Spyder v5.1.5” 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.

2.6 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example:
The spectrum analyzer offset is derived from RF cable loss and attenuator factor.
Offset = RF cable loss + attenuator factor.
Following shows an offset computation example with cable loss 4.2 dB and 10dB attenuator.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).
= 4.2 + 10 = 14.2 (dB)

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 and FSK 50Kbps FHSS.
   RBW = 100kHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold for FSK 150Kbps FHSS and 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

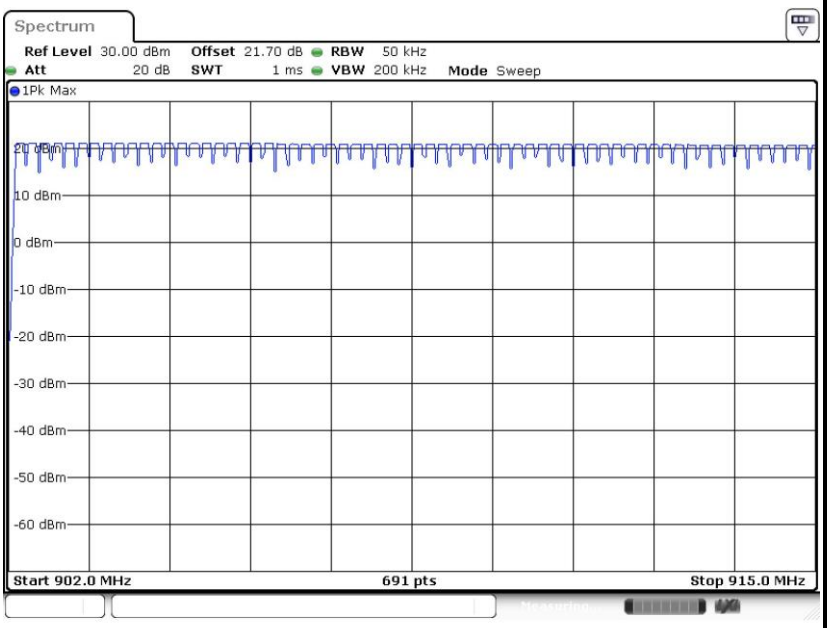
3.1.5 Test Result of Number of Hopping Frequency

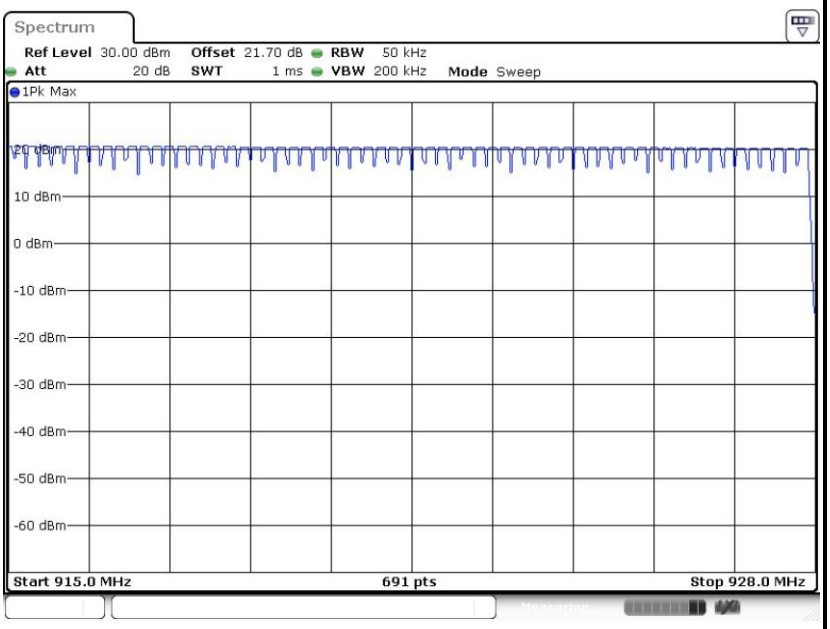
Please refer to Appendix A.

<LoRa 125kHz FHSS>

<Data Rate: SF7>

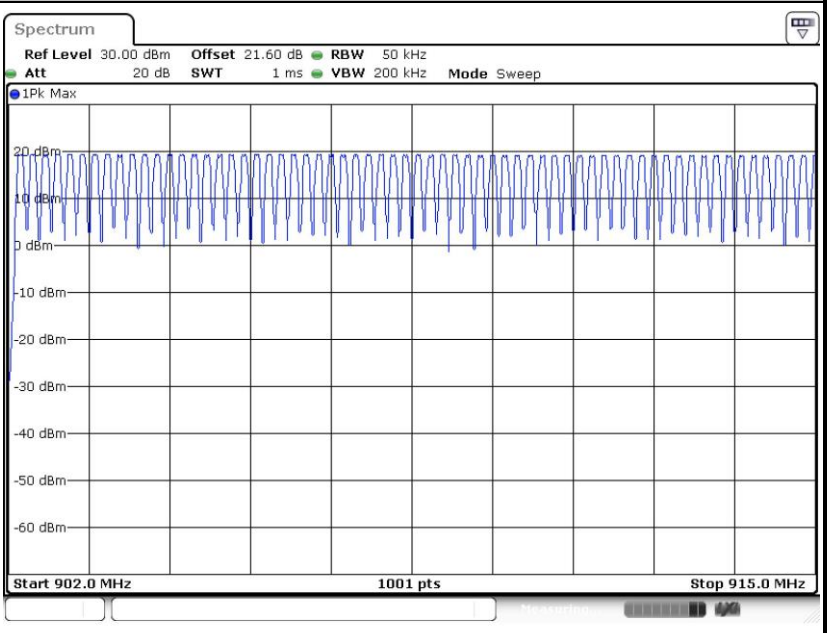
Number of Hopping Channel Plot on Channel 01 - 129





<FSK 50Kbps FHSS>

Number of Hopping Channel Plot on Channel 01 - 129



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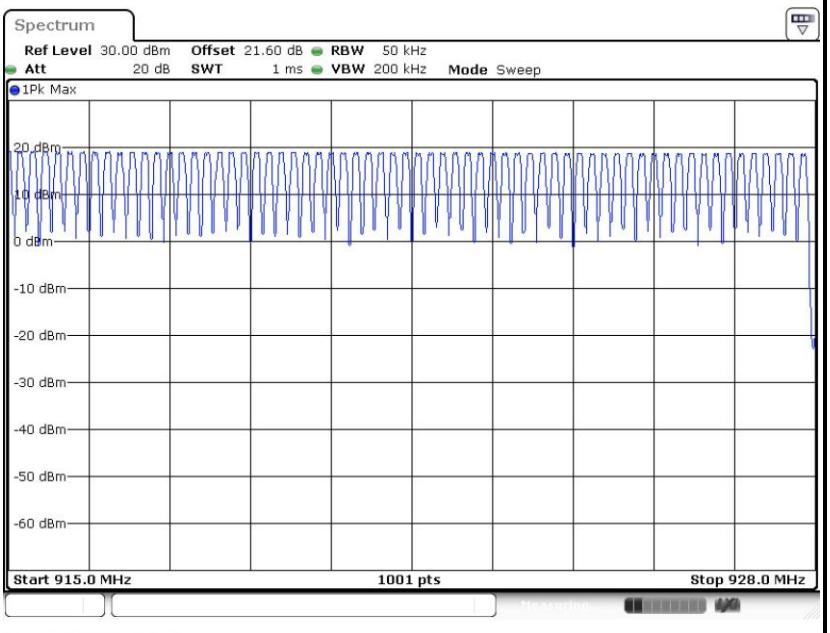
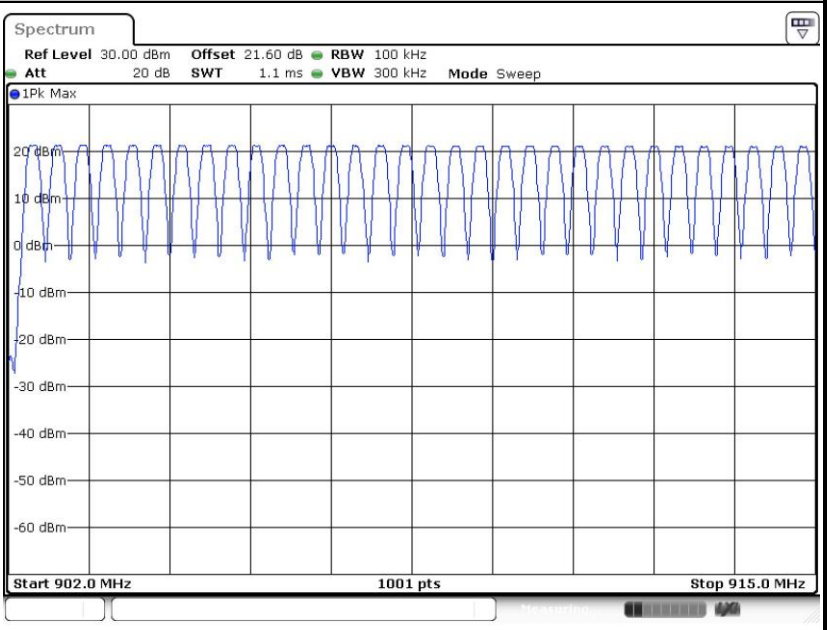


Date: 19.MAY.2022 19:21:28

<FSK 150Kbps FHSS>

Number of Hopping Channel Plot on Channel 01 - 64

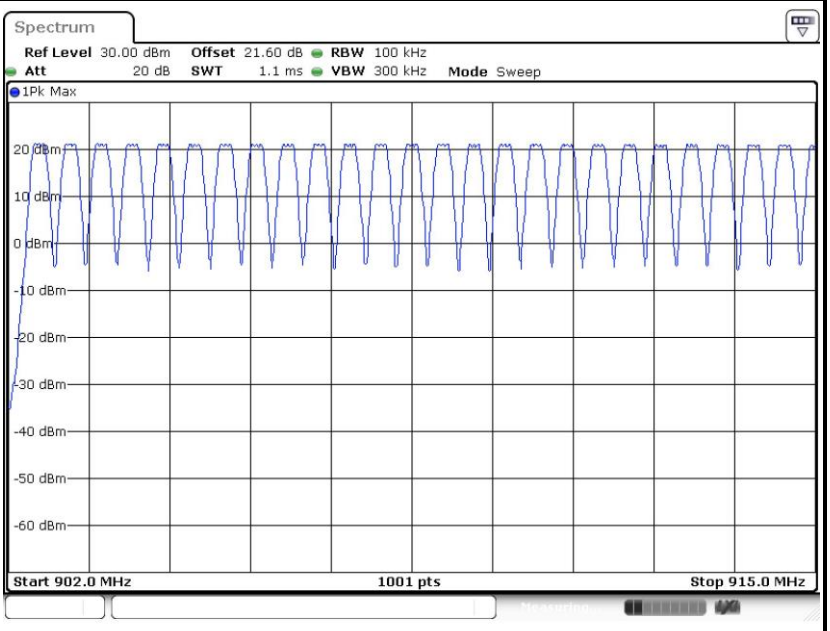


Date: 19.MAY.2022 23:39:51

Date: 19.MAY.2022 23:42:00

<FSK 250Kbps FHSS>

Number of Hopping Channel Plot on Channel 01 - 51



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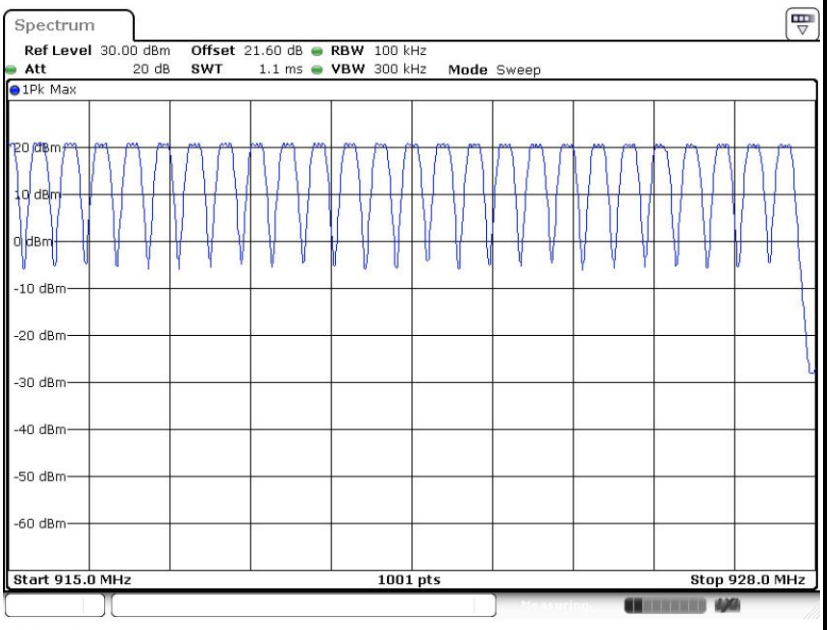


Date: 20.MAY.2022 20:37:53

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.

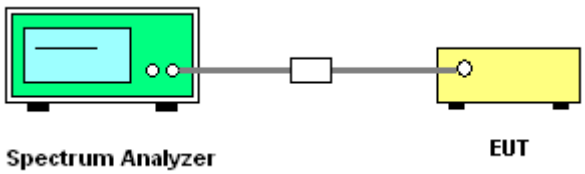
3.2.2 Measuring Instruments

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 ≥ 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

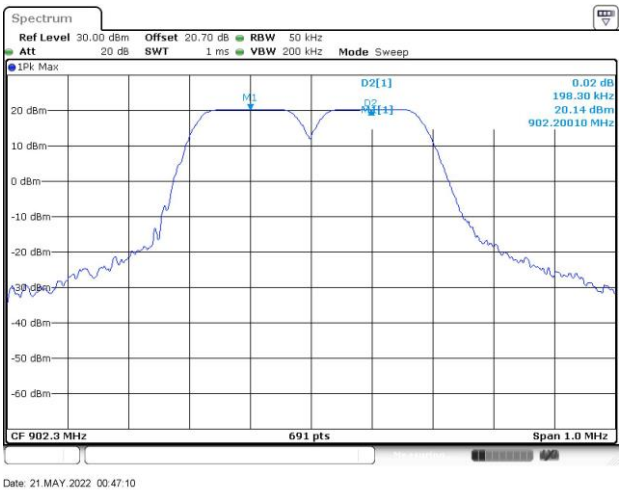
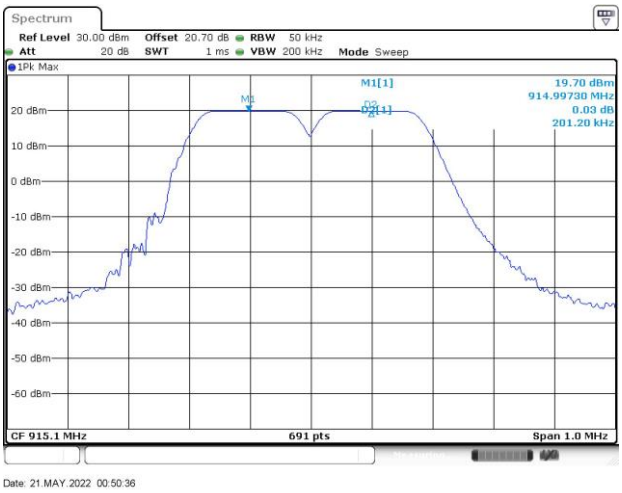


3.2.5 Test Result of Hopping Channel Separation

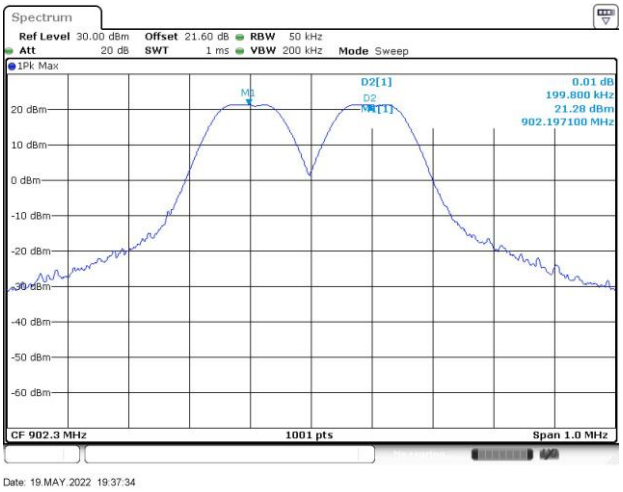
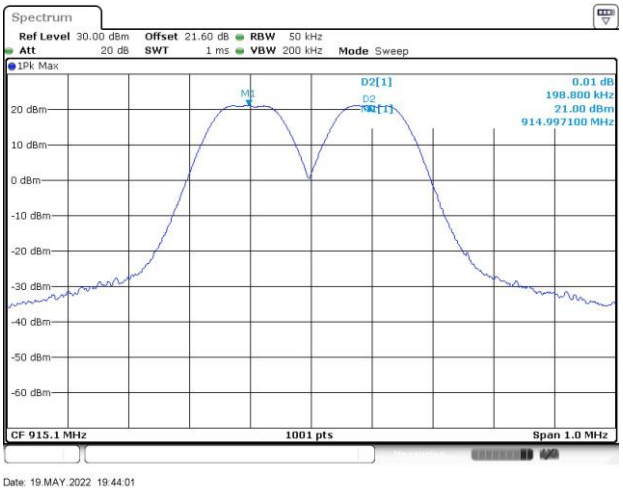
Please refer to Appendix A.

<LoRa 125KHz FHSS>

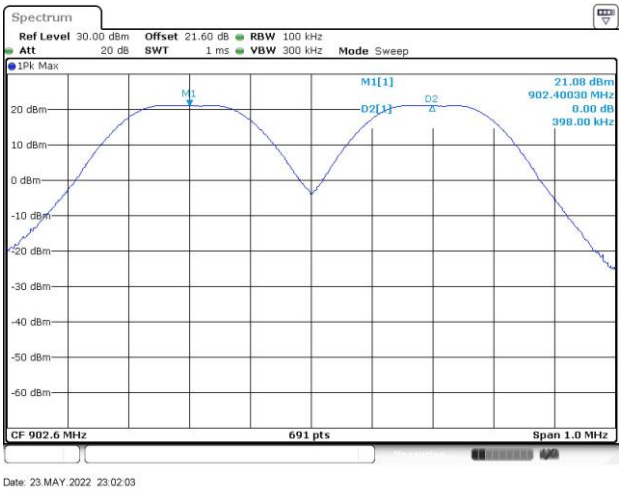
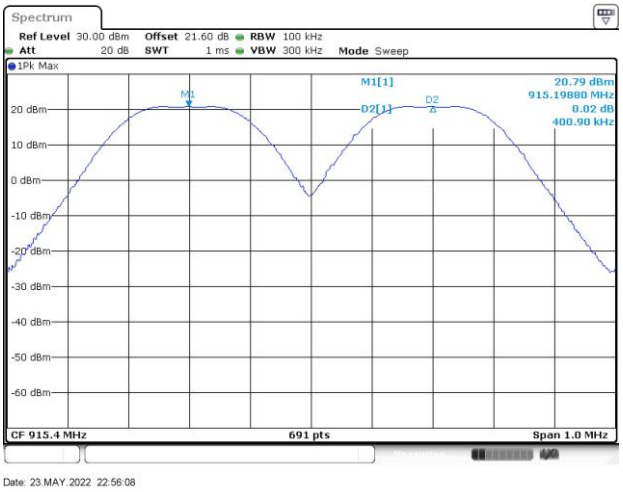
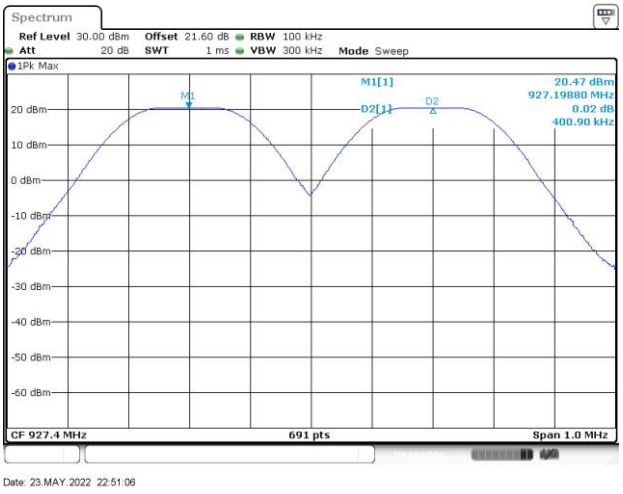
<Data Rate: SF7>

Channel Separation Plot on Channel 01 - 02	Channel Separation Plot on Channel 64 - 65
	
Channel Separation Plot on Channel 128 - 129	**-**
	**N/A**

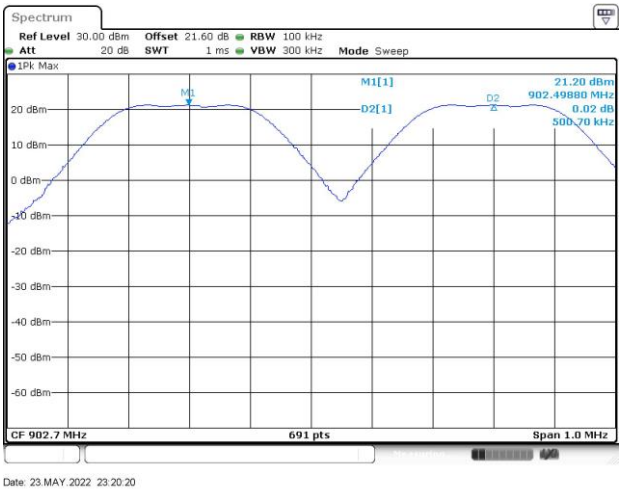
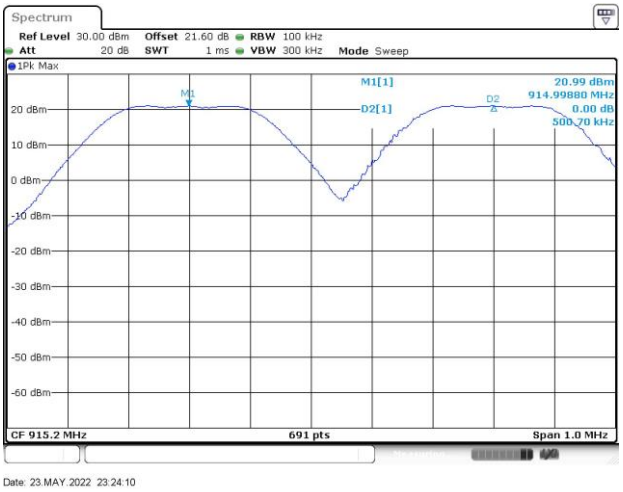
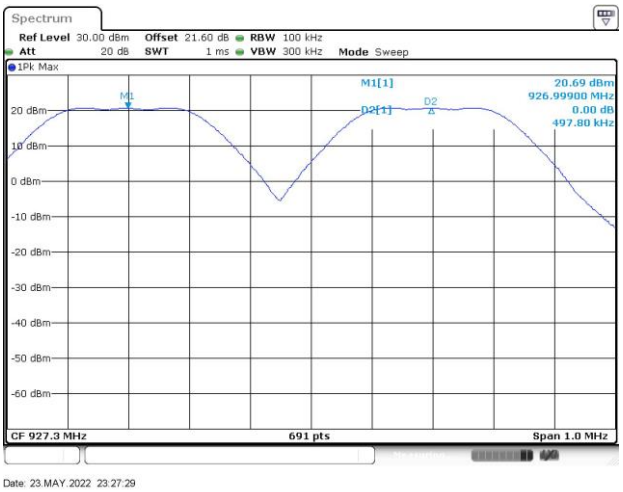
<FSK 50Kbps FHSS>

Channel Separation Plot on Channel 01 - 02	Channel Separation Plot on Channel 64 - 65
	
Channel Separation Plot on Channel 128 - 129	**-**
	**N/A**

<FSK 150Kbps FHSS>

Channel Separation Plot on Channel 01 - 02	Channel Separation Plot on Channel 31 – 32
	
Channel Separation Plot on Channel 63 - 64	**-**
	**N/A**

<FSK 250Kbps FHSS>

Channel Separation Plot on Channel 01 - 02	Channel Separation Plot on Channel 25 - 26
	
Channel Separation Plot on Channel 50 - 51	**-**
	**N/A**

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.

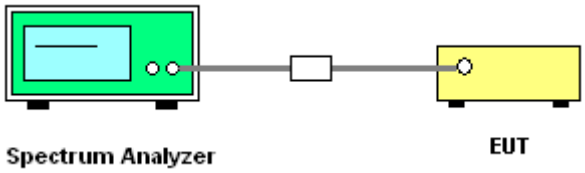
3.3.2 Measuring Instruments

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.
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 = 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

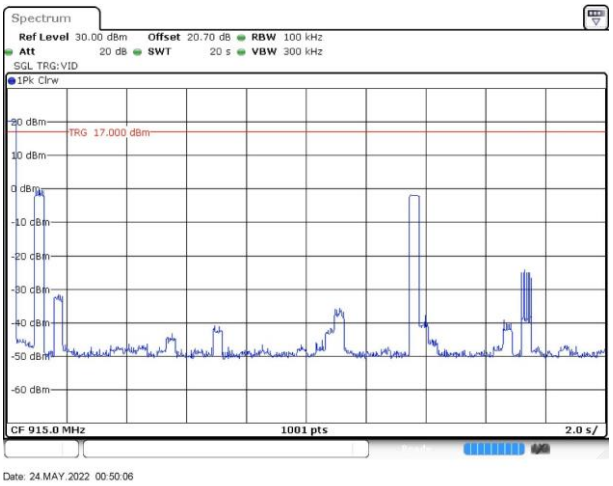
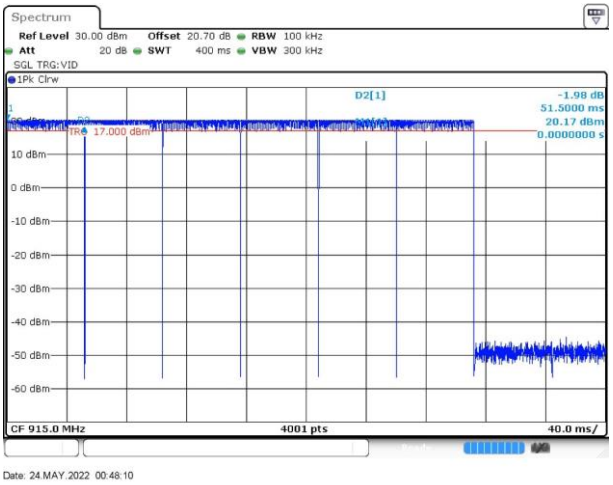


3.3.5 Test Result of Dwell Time

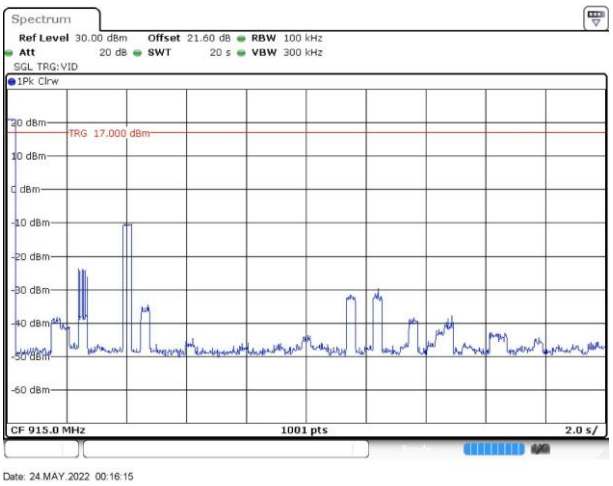
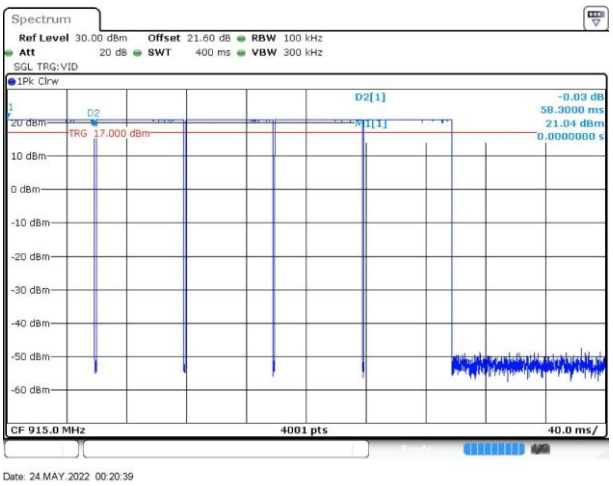
Please refer to Appendix A.

<LoRa 125KHz FHSS>

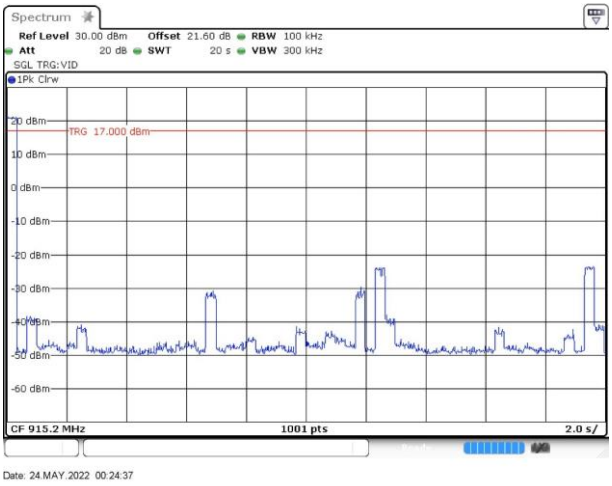
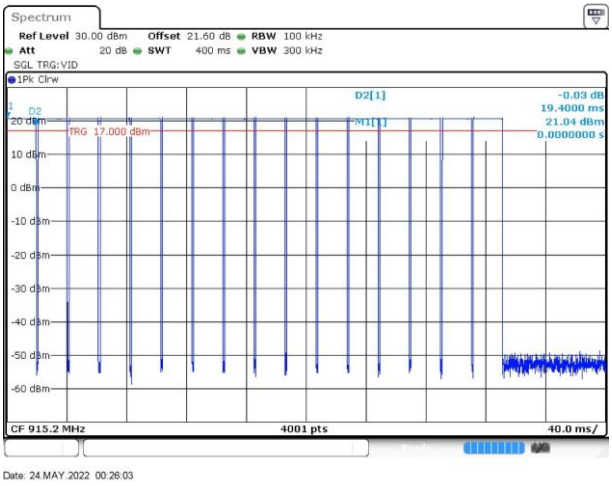
<Data Rate: SF7>

Number of hops over 20sec	Package Transfer Time per hop
	

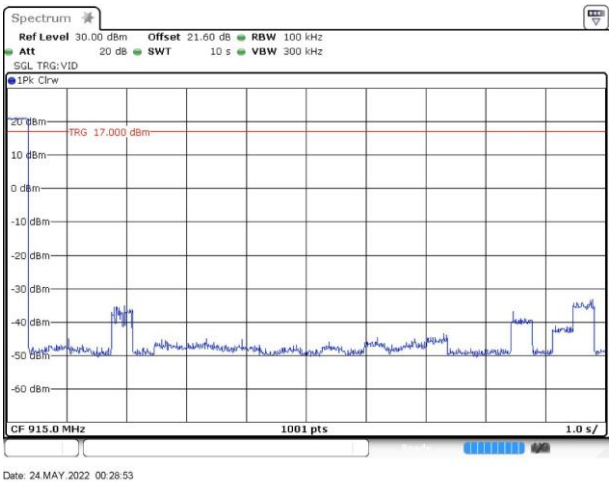
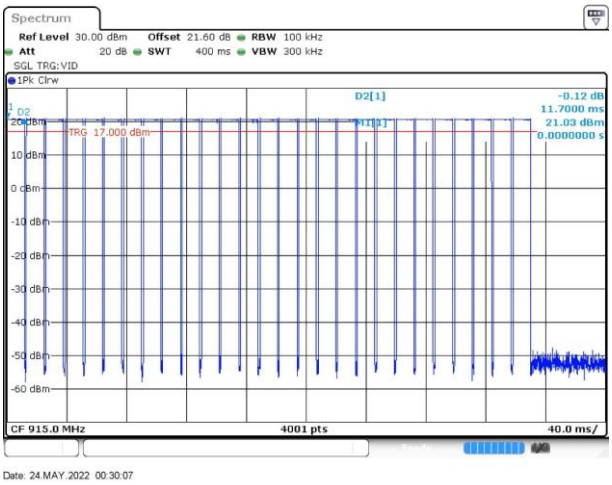
<FSK 50Kbps FHSS>

Number of hops over 20sec	Package Transfer Time per hop
	

<FSK 150Kbps FHSS>

Number of hops over 20sec	Package Transfer Time per hop
	

<FSK 250Kbps FHSS>

Number of hops over 10sec	Package Transfer Time per hop
	

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.
4. 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 ≥ 1% of the 20 dB bandwidth; VBW ≥ 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 ≥ 1-5% of the 99% bandwidth; VBW ≥ 3 * RBW; Sweep = auto; Detector function = peak;
   Trace = max hold.
6. Measure and record the results in the test report.

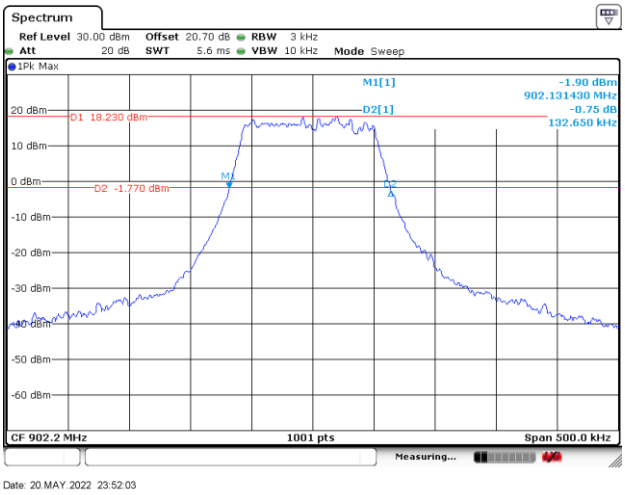
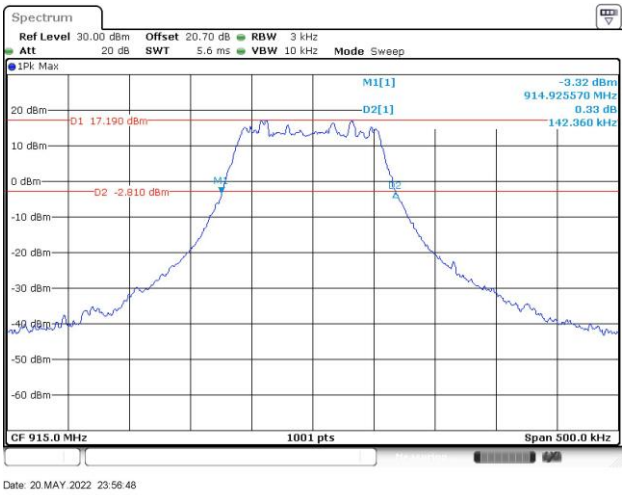
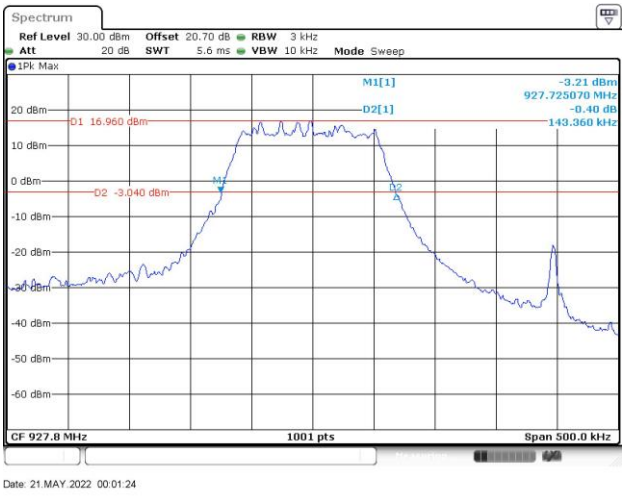
3.4.4 Test Setup

3.4.5 Test Result of 20dB Bandwidth

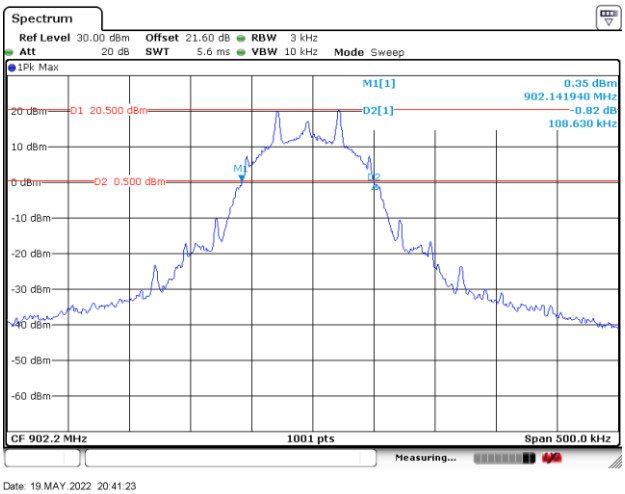
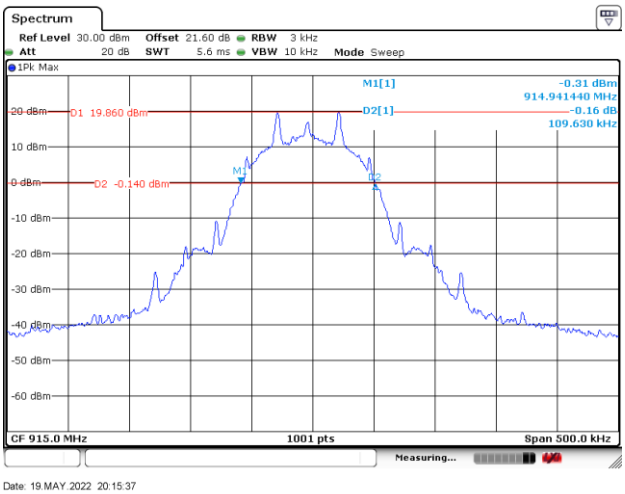
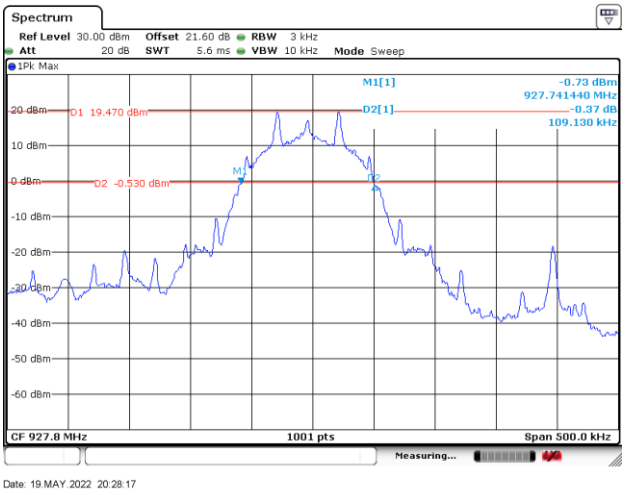
Please refer to Appendix A.

<LoRa 125KHz FHSS>

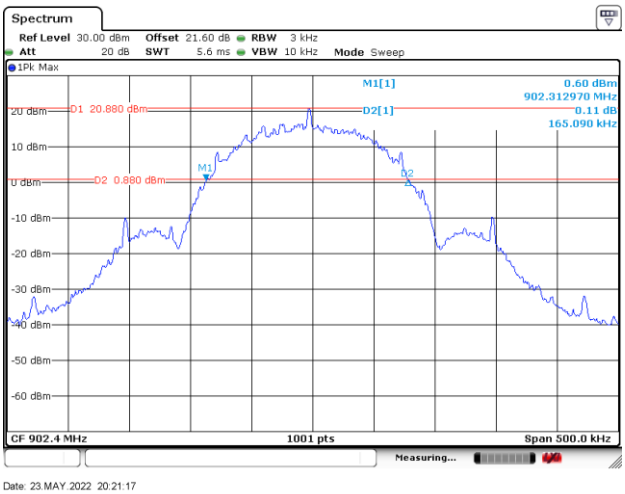
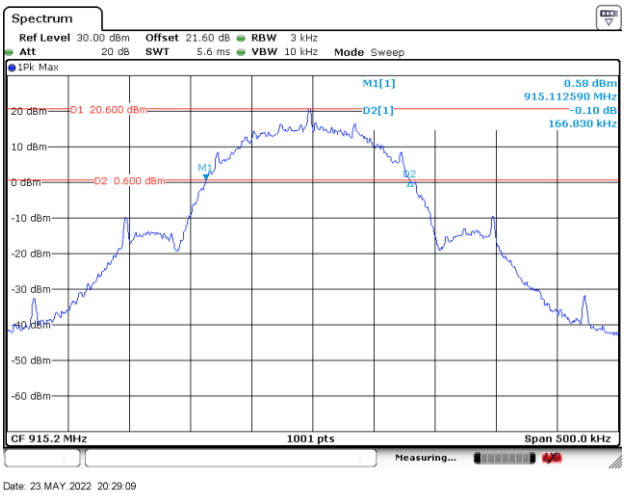
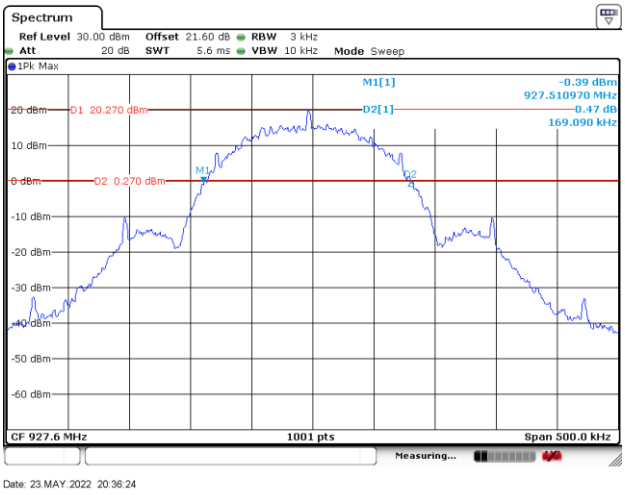
<Data Rate: SF7>

20 dB Bandwidth Plot on Channel 01	20 dB Bandwidth Plot on Channel 65
	
20 dB Bandwidth Plot on Channel 129	**-**
	**N/A**

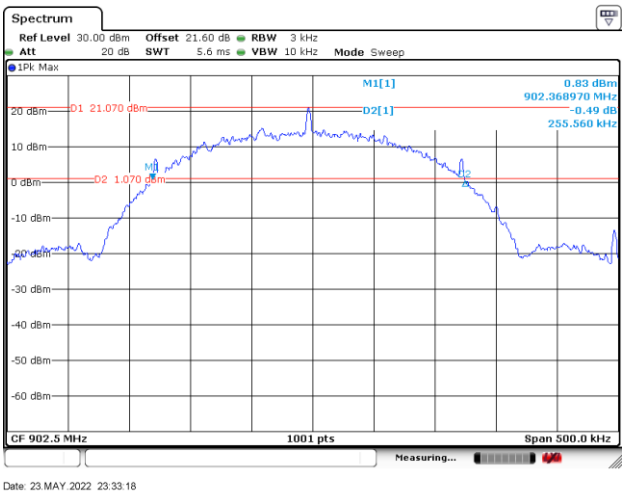
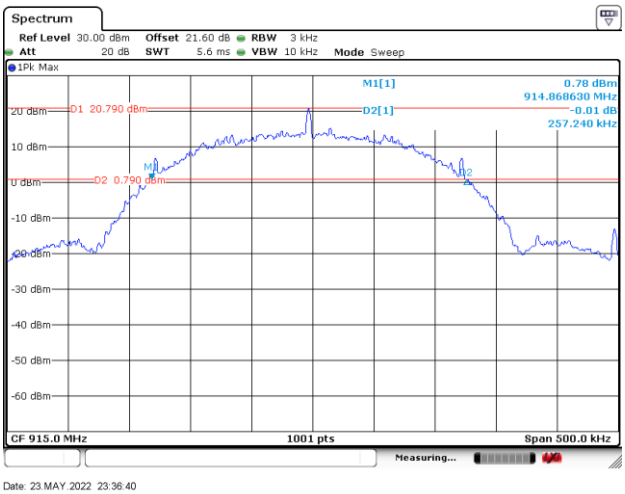
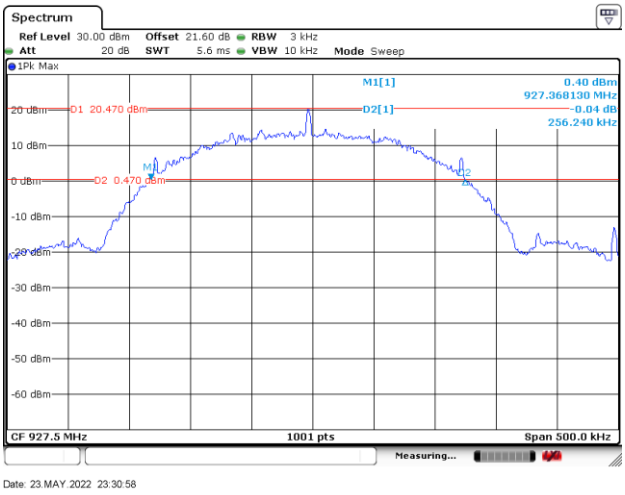
<FSK 50Kbps FHSS>

20 dB Bandwidth Plot on Channel 01	20 dB Bandwidth Plot on Channel 65
	
20 dB Bandwidth Plot on Channel 129	**-**
	**N/A**

<FSK 150Kbps FHSS>

20 dB Bandwidth Plot on Channel 01	20 dB Bandwidth Plot on Channel 32
	
20 dB Bandwidth Plot on Channel 64	**-**
	**N/A**

<FSK 250Kbps FHSS>

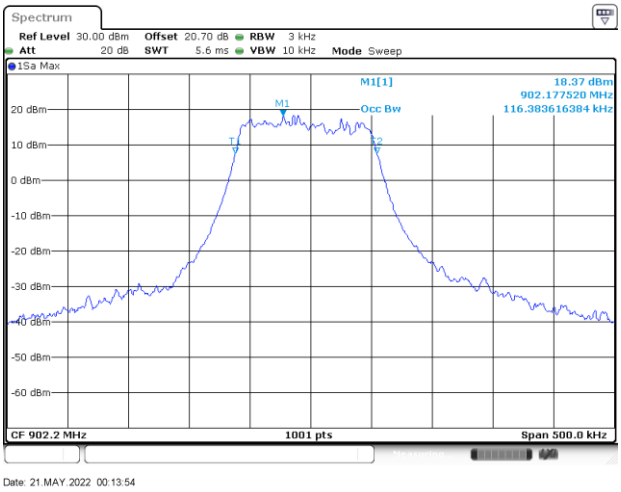
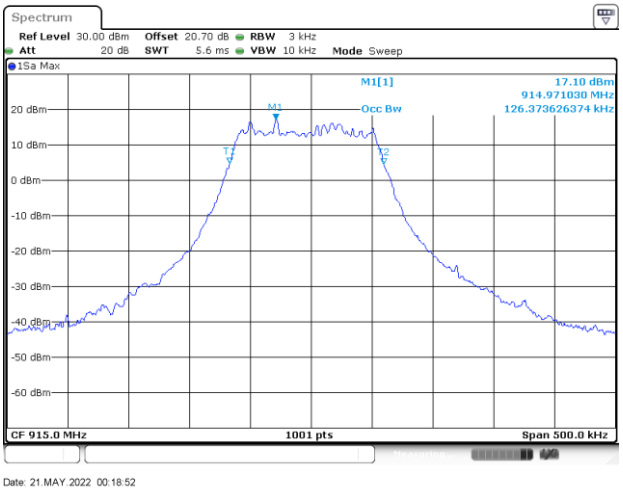
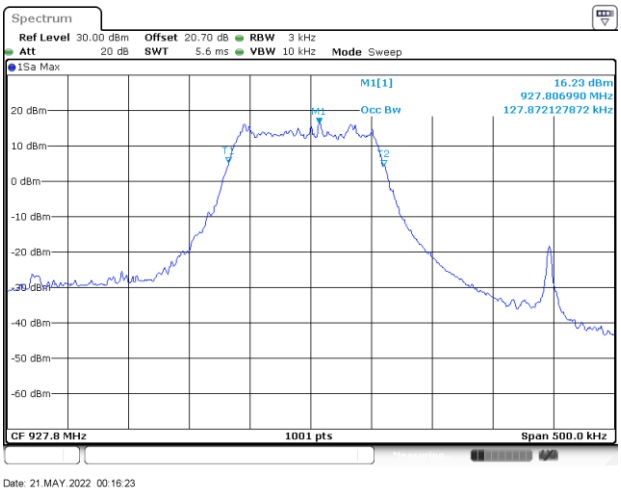
20 dB Bandwidth Plot on Channel 01	20 dB Bandwidth Plot on Channel 26
	
20 dB Bandwidth Plot on Channel 51	**-**
	**N/A**

3.4.6 Test Result of 99% Occupied Bandwidth

Please refer to Appendix A.

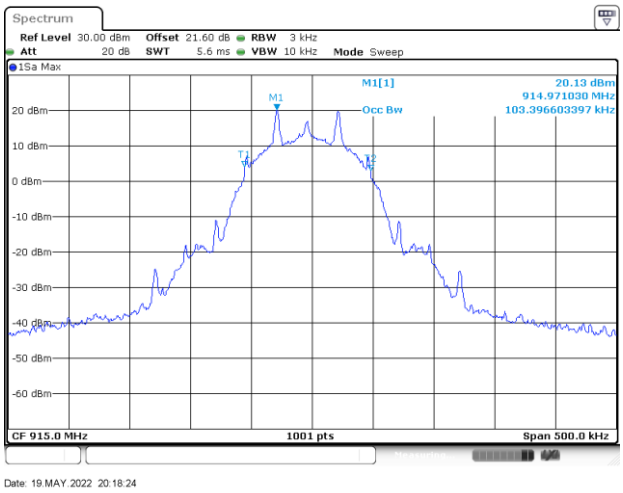
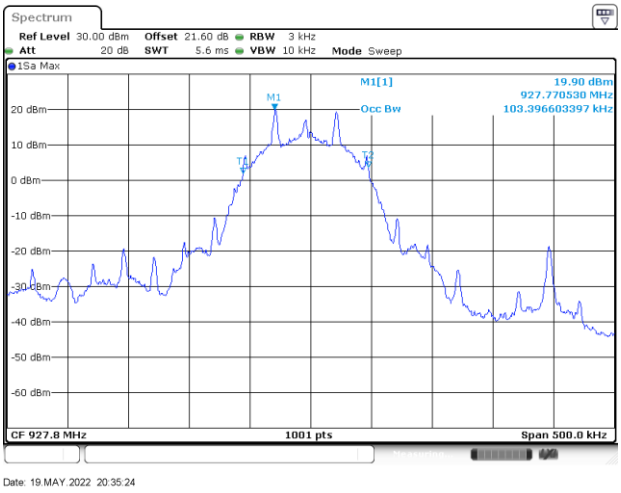
<LoRa 125KHz FHSS>

<Data Rate: SF7>

99% Occupied Bandwidth on Channel 01	99% Occupied Bandwidth on Channel 65
	
99% Occupied Bandwidth on Channel 129	**-**
	**N/A**

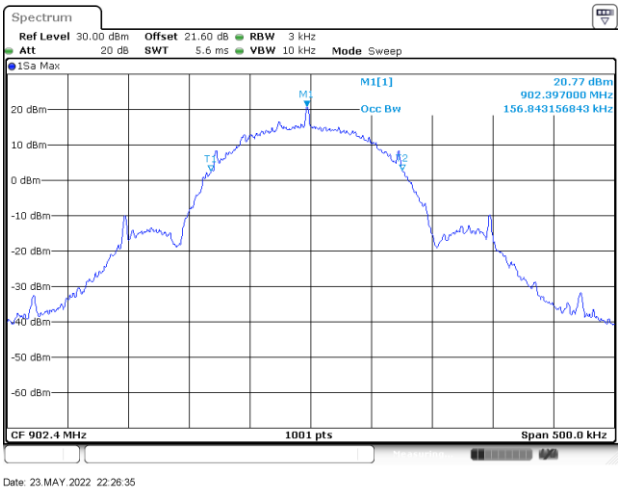
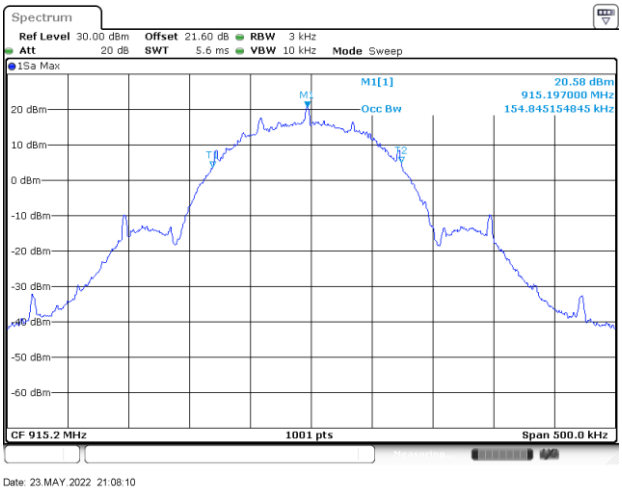
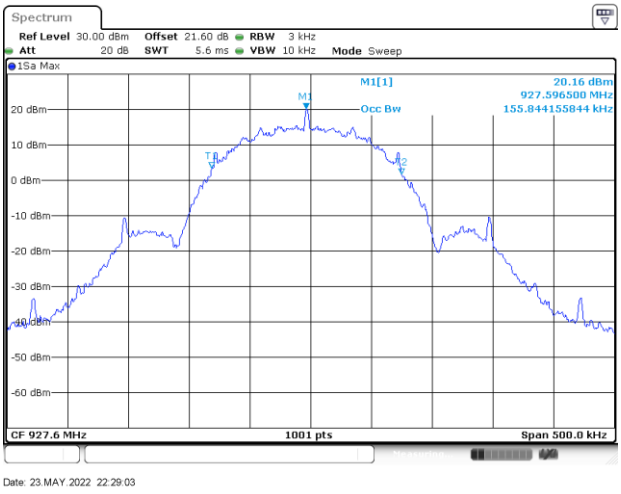
Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

<FSK 50Kbps FHSS>

99% Occupied Bandwidth on Channel 01	99% Occupied Bandwidth on Channel 65
	
99% Occupied Bandwidth on Channel 129	**-**
	**N/A**

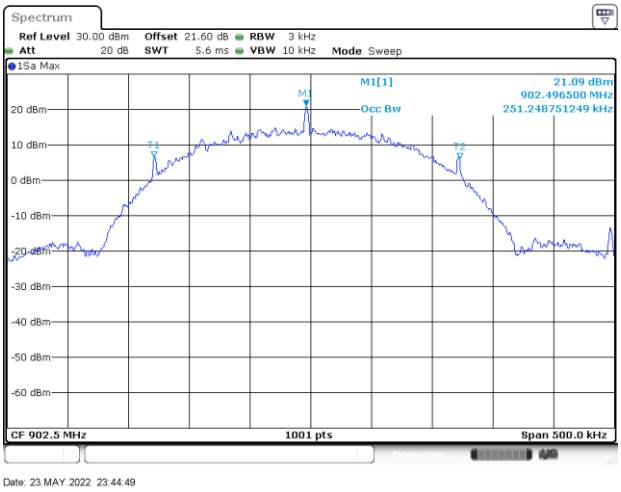
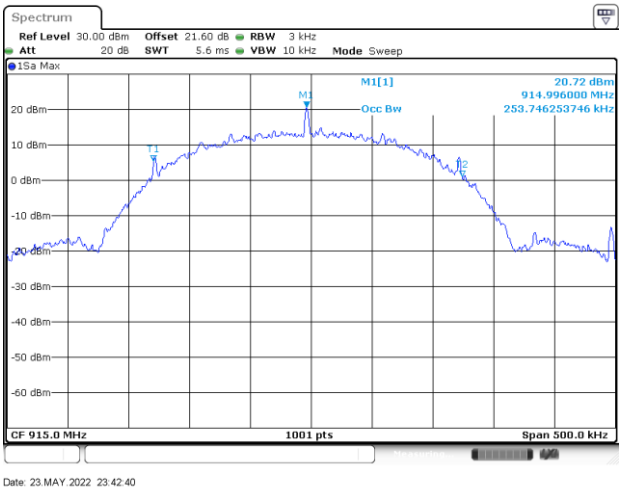
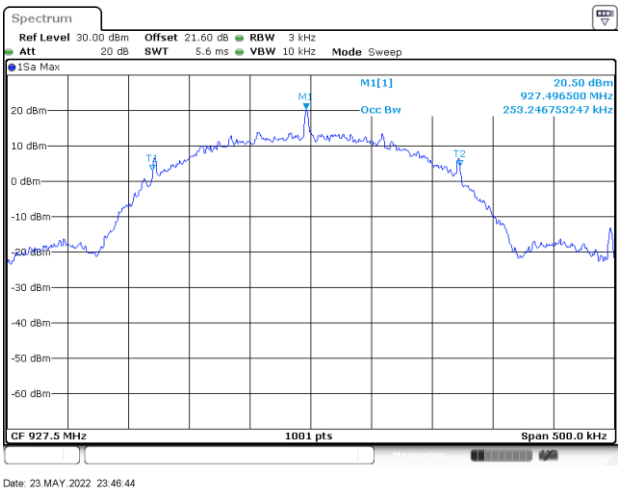
Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

<FSK 150Kbps FHSS>

99% Occupied Bandwidth on Channel 01	99% Occupied Bandwidth on Channel 32
	
99% Occupied Bandwidth on Channel 64	**-**
	**N/A**

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

<FSK 250Kbps FHSS>

99% Occupied Bandwidth on Channel 01	99% Occupied Bandwidth on Channel 26
	
99% Occupied Bandwidth on Channel 51	**-**
	**N/A**

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

3.5 Output Power Measurement

3.5.1 Limit of Output Power

For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section.

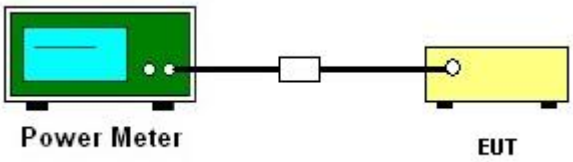
3.5.2 Measuring Instruments

See list of measuring equipment of this test report.

3.5.3 Test Procedures

1. The testing follows ANSI C63.10-2013 clause 7.8.5.
2. The RF output of EUT was connected to the power meter 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. Measure the conducted output power with cable loss and record the results in the test report.
5. Measure and record the results in the test report.

3.5.4 Test Setup



3.5.5 Test Result of Peak Output Power

Please refer to Appendix A.

3.6 Conducted Band Edges Measurement

3.6.1 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.

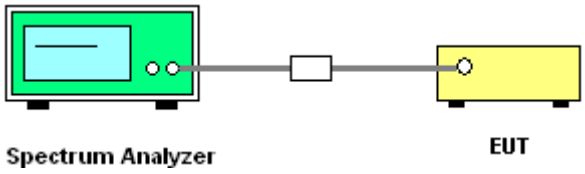
3.6.2 Measuring Instruments

See list of measuring equipment of this test report.

3.6.3 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.

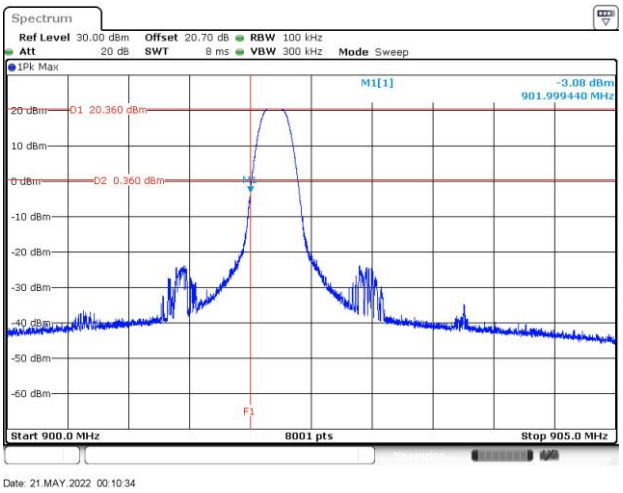
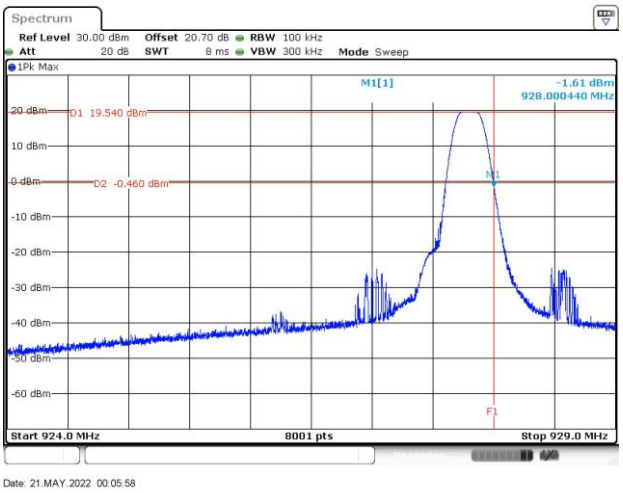
3.6.4 Test Setup



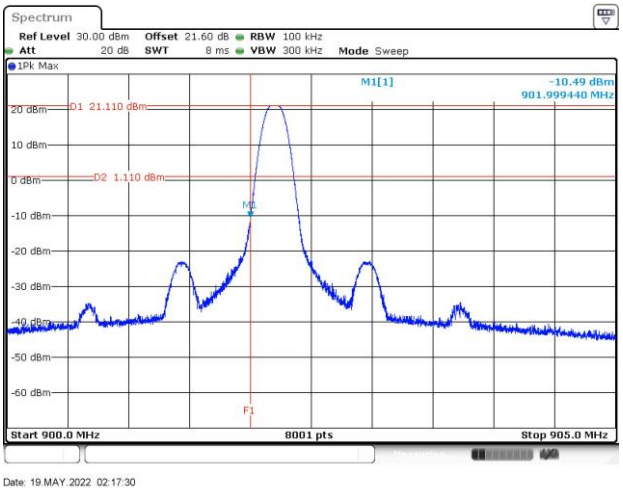
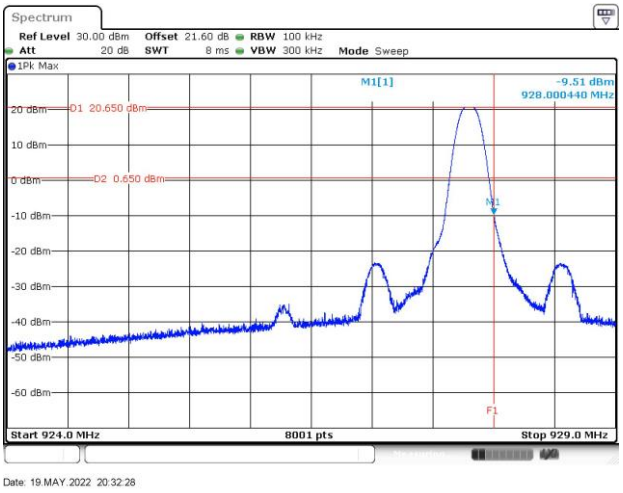
3.6.5 Test Result of Conducted Band Edges

<LoRa 125KHz FHSS>

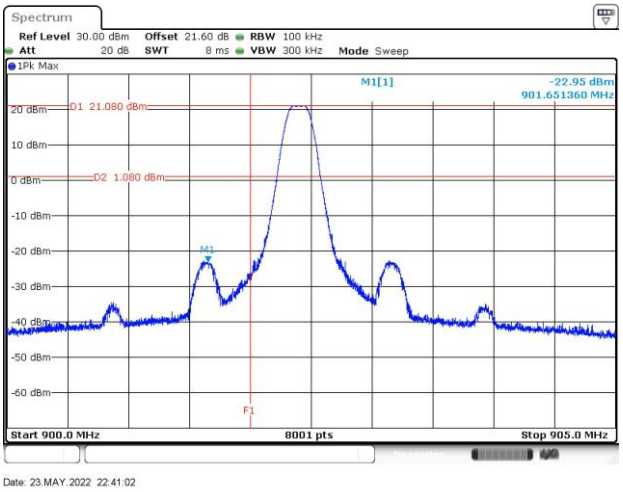
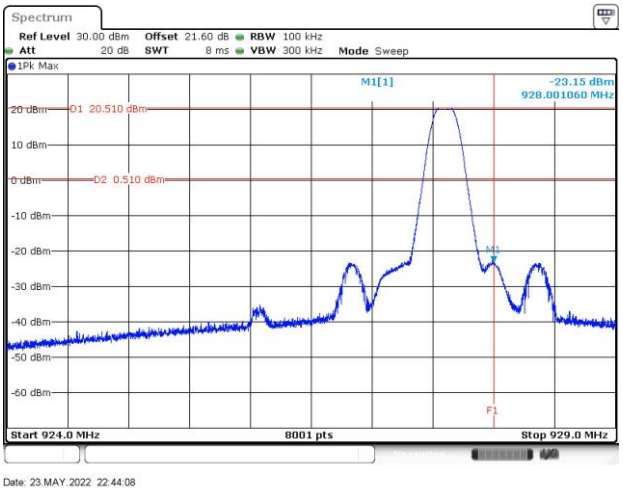
<Data Rate: SF7>

Low Band Edge Plot on Channel 01	High Band Edge Plot on Channel 129
	

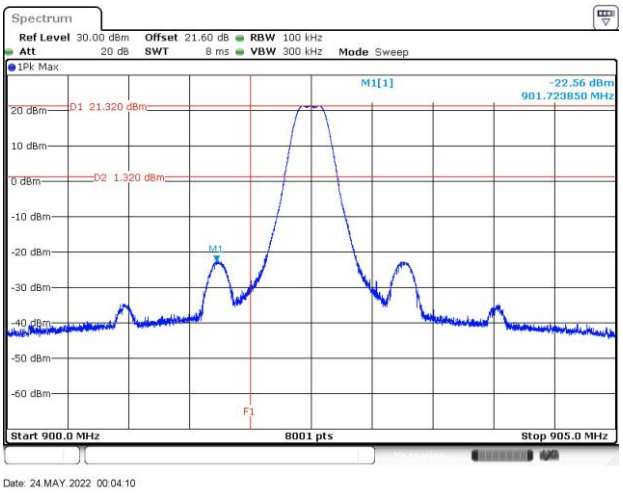
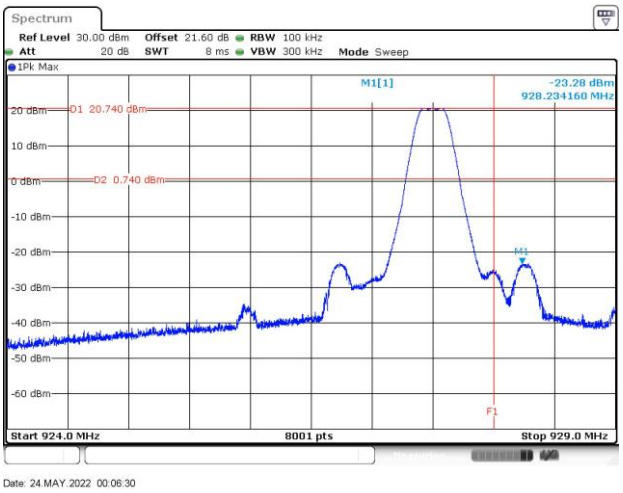
<FSK 50Kbps FHSS>

Low Band Edge Plot on Channel 01	High Band Edge Plot on Channel 129
	

<FSK 150Kbps FHSS>

Low Band Edge Plot on Channel 01	High Band Edge Plot on Channel 64
	

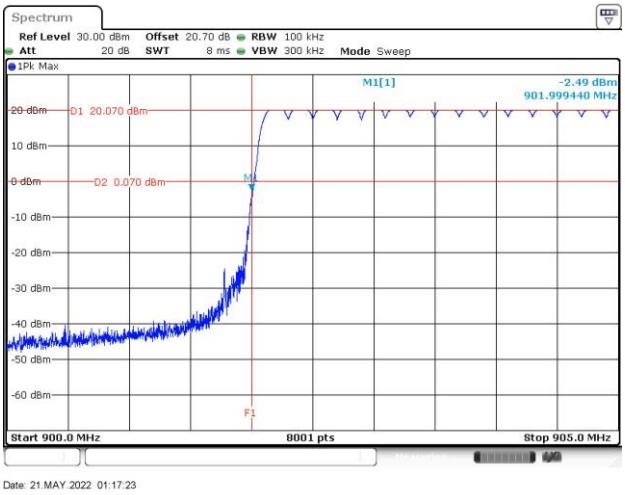
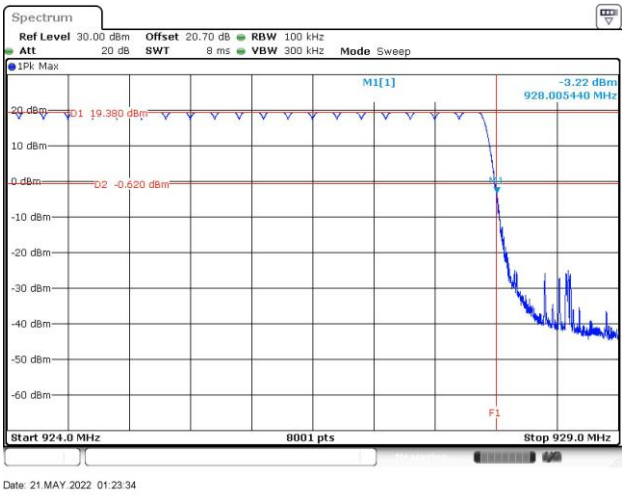
<FSK 250Kbps FHSS>

Low Band Edge Plot on Channel 01	High Band Edge Plot on Channel 51
	

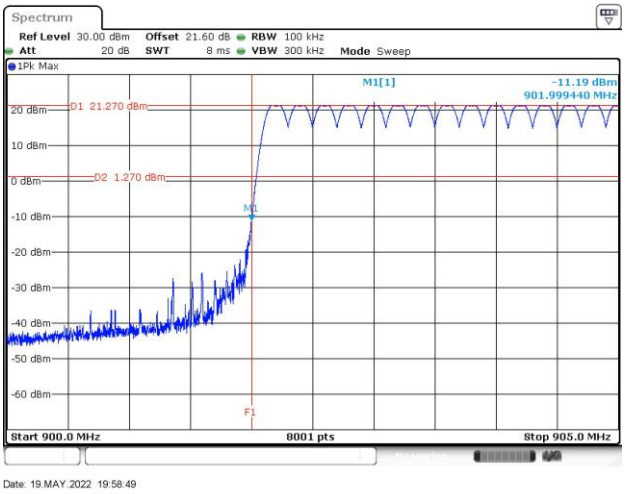
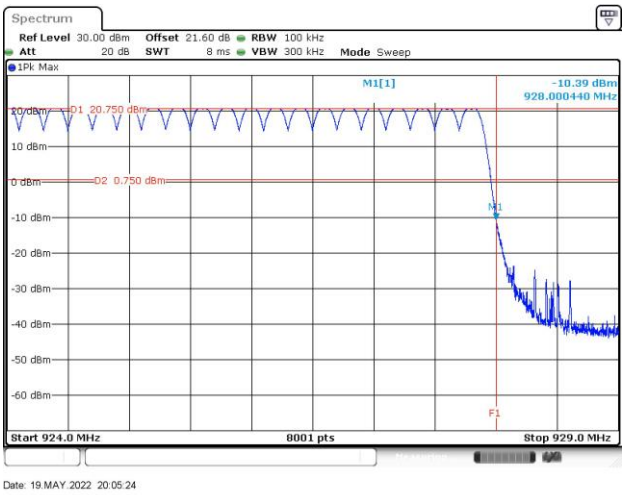
3.6.6 Test Result of Conducted Hopping Mode Band Edges

<LoRa 125KHz FHSS>

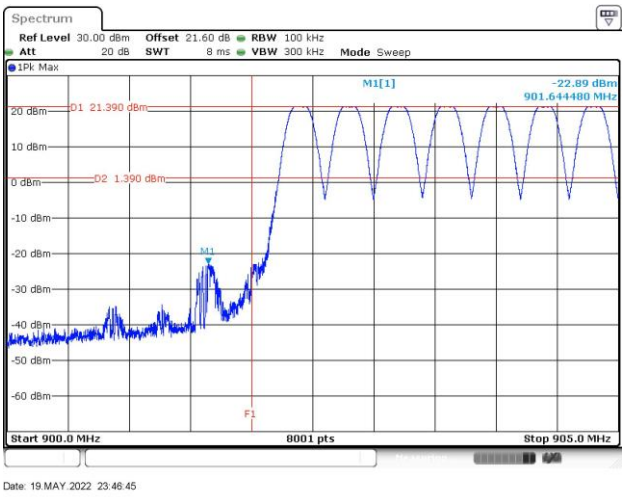
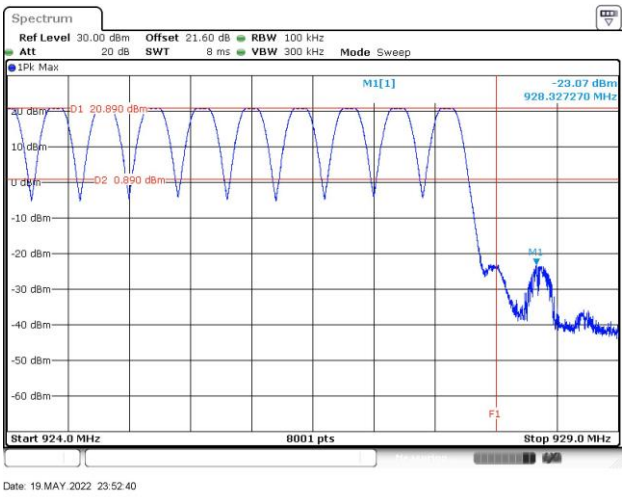
<Data Rate: SF7>

Hopping Mode Low Band Edge Plot	Hopping Mode High Band Edge Plot
	

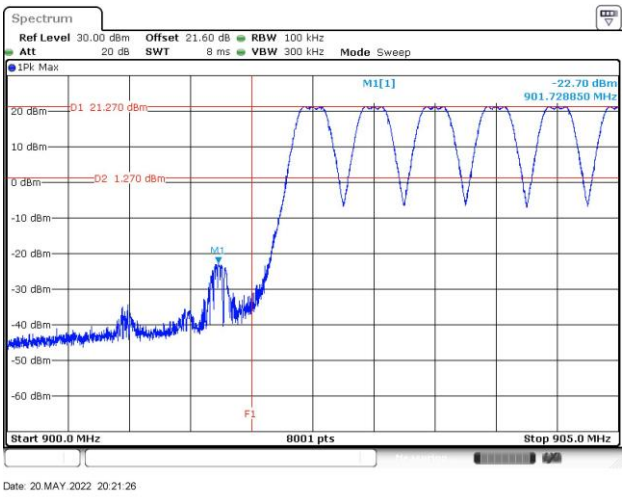
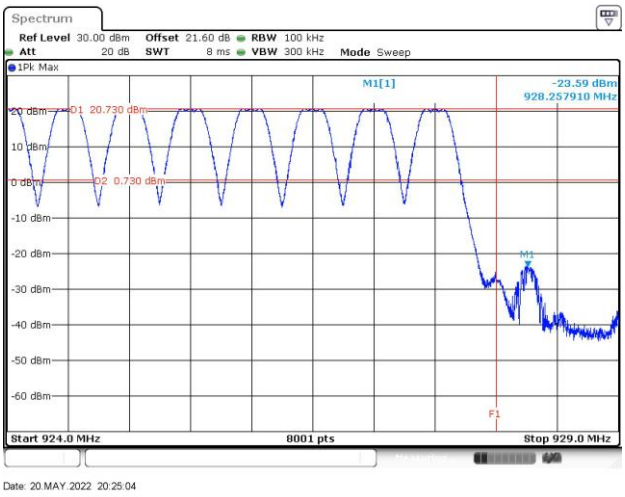
<FSK 50Kbps FHSS>

Hopping Mode Low Band Edge Plot	Hopping Mode High Band Edge Plot
	

<FSK 150Kbps FHSS>

Hopping Mode Low Band Edge Plot	Hopping Mode High Band Edge Plot
	

<FSK 250Kbps FHSS>

Hopping Mode Low Band Edge Plot	Hopping Mode High Band Edge Plot
	

3.7 Conducted Spurious Emission Measurement

3.7.1 Limit of Spurious Emission Measurement

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.

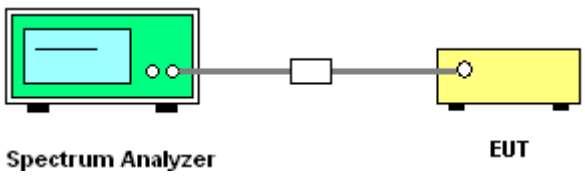
3.7.2 Measuring Instruments

See list of measuring equipment of this test report.

3.7.3 Test Procedure

1. The testing follows ANSI C63.10-2013 clause 7.8.8.
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. Set RBW = 100 kHz, VBW = 300kHz, scan up through 10th harmonic. All harmonics / spurs must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

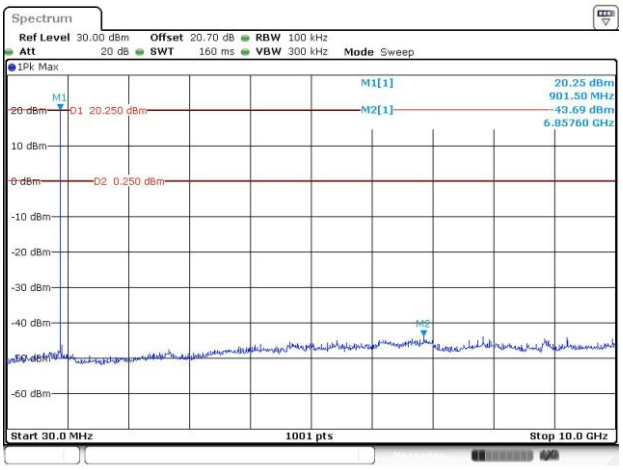
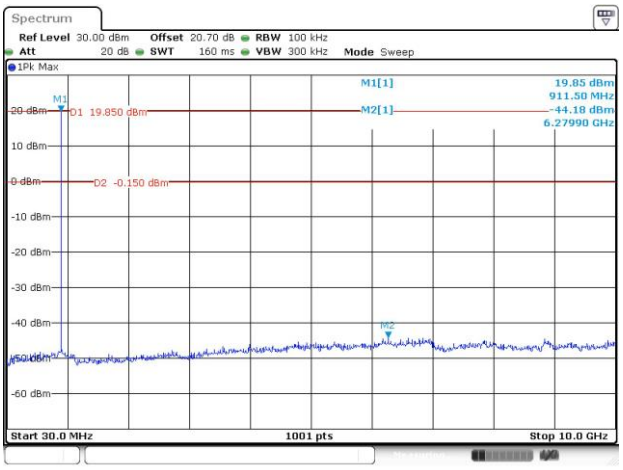
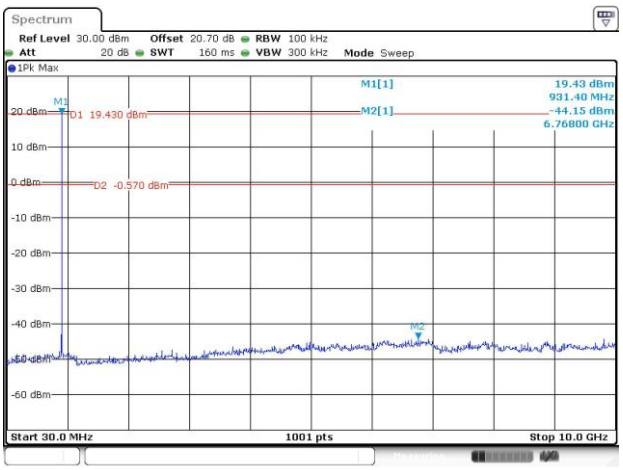
3.7.4 Test Setup



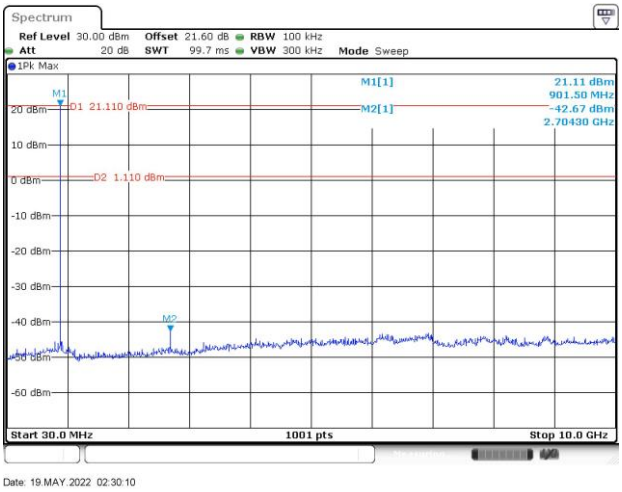
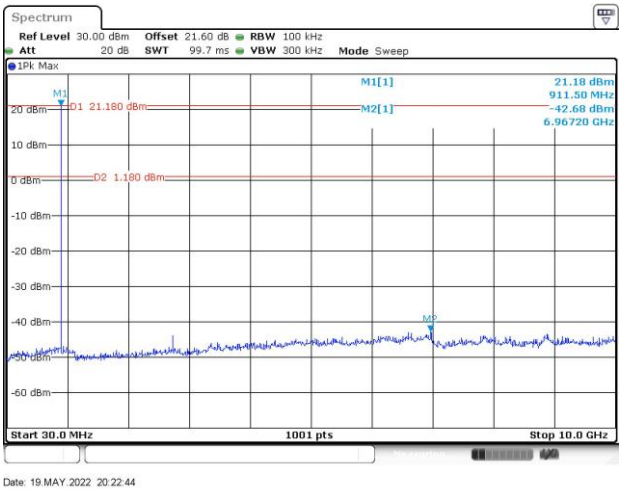
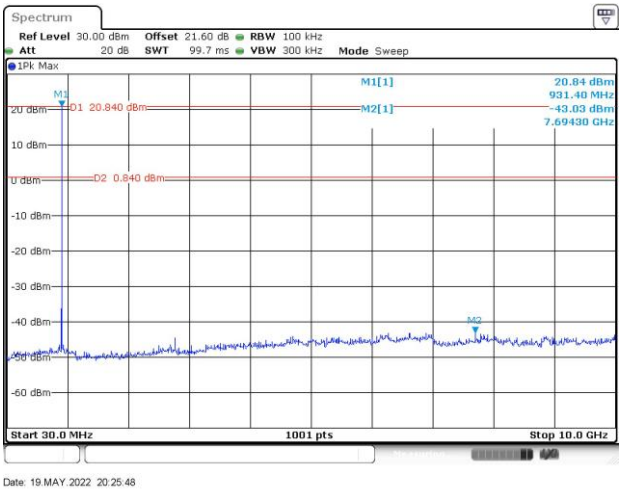
3.7.5 Test Result of Conducted Spurious Emission

<LoRa 125KHz FHSS>

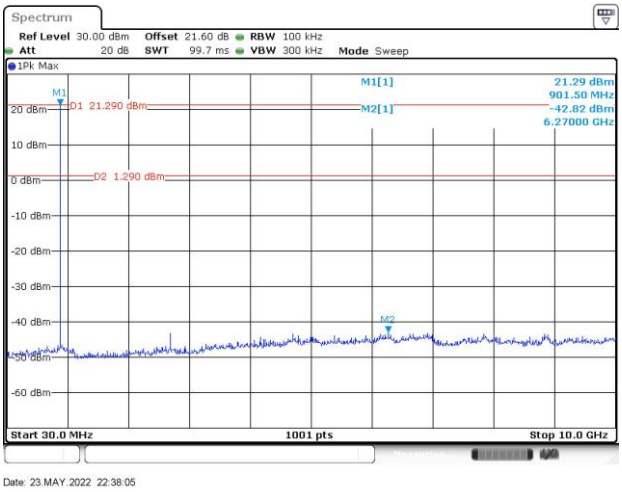
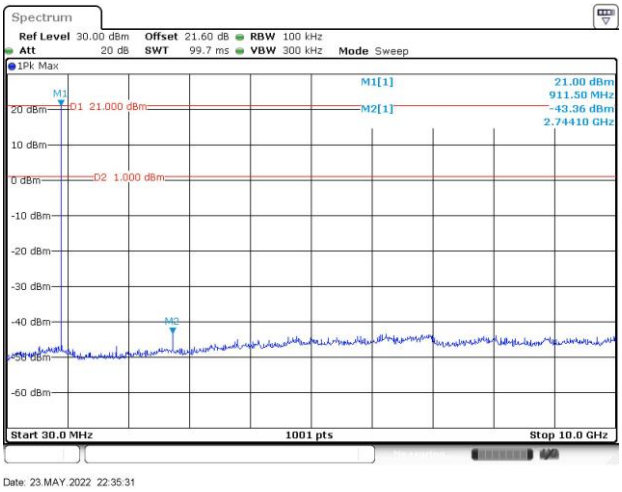
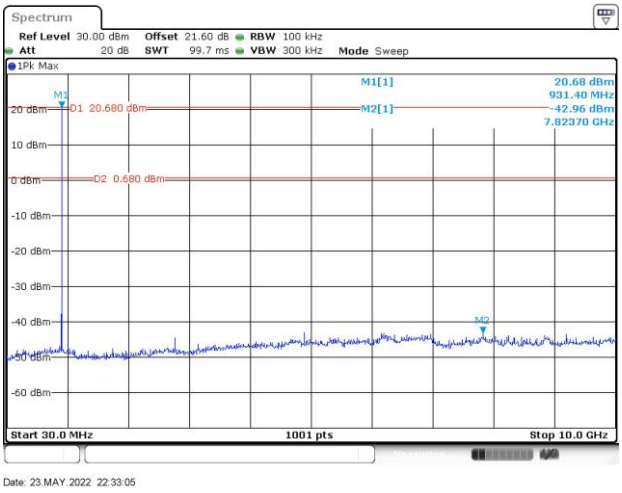
<Data Rate: SF7>

CSE Plot on Ch 01 between 30MHz ~ 10 GHz	CSE Plot on Ch 65 between 30MHz ~ 10 GHz
	
CSE Plot on Ch 129 between 30MHz ~ 10 GHz	**-**
	**N/A**

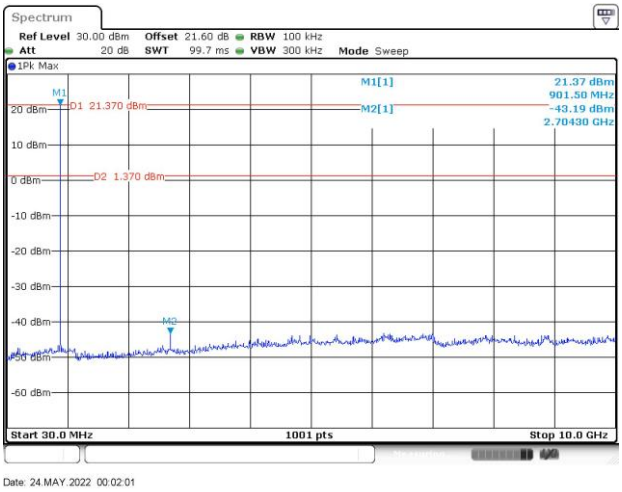
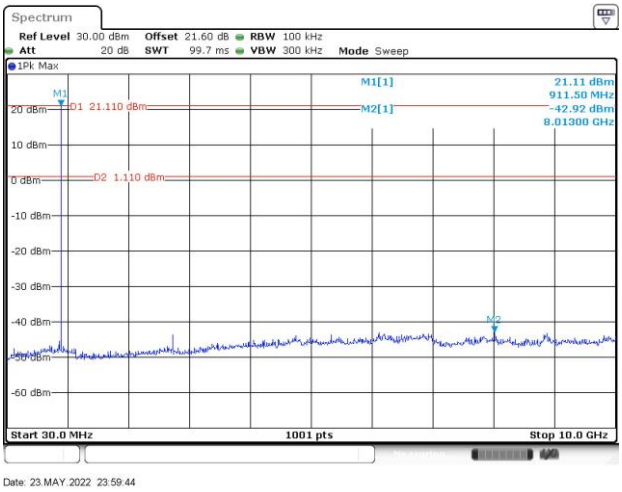
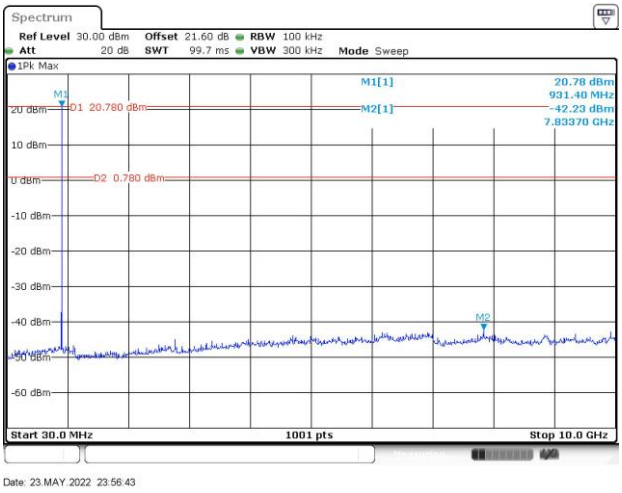
<FSK 50Kbps FHSS>

CSE Plot on Ch 01 between 30MHz ~ 10 GHz	CSE Plot on Ch 65 between 30MHz ~ 10 GHz
	
CSE Plot on Ch 129 between 30MHz ~ 10 GHz	**-**
	**N/A**

<FSK 150Kbps FHSS>

CSE Plot on Ch 01 between 30MHz ~ 10 GHz	CSE Plot on Ch 32 between 30MHz ~ 10 GHz
	
CSE Plot on Ch 64 between 30MHz ~ 10 GHz	**-**
	**N/A**

<FSK 250Kbps FHSS>

CSE Plot on Ch 01 between 30MHz ~ 10 GHz	CSE Plot on Ch 26 between 30MHz ~ 10 GHz
	
CSE Plot on Ch 51 between 30MHz ~ 10 GHz	**-**
	**N/A**

3.8 Radiated Band Edges and Spurious Emission Measurement

3.8.1 Limit of Radiated Band Edges and Spurious Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. In addition, radiated emissions which fall in the restricted bands must also comply with the limits as below.

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

3.8.2 Measuring Instruments

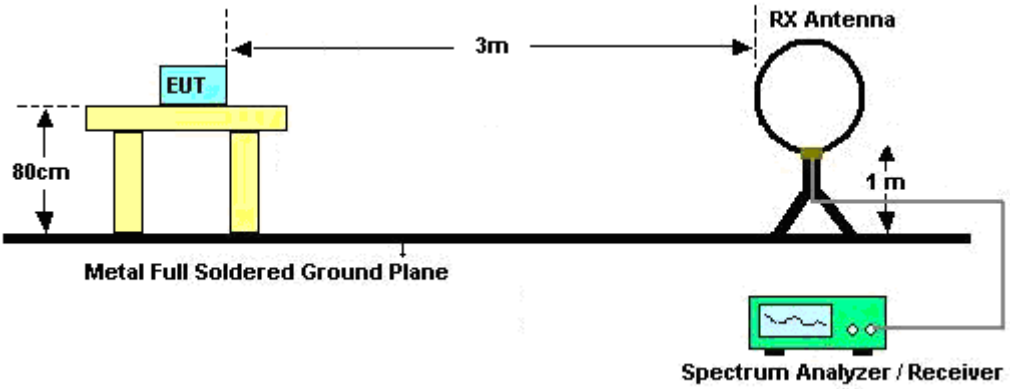
See list of measuring equipment of this test report.

3.8.3 Test Procedures

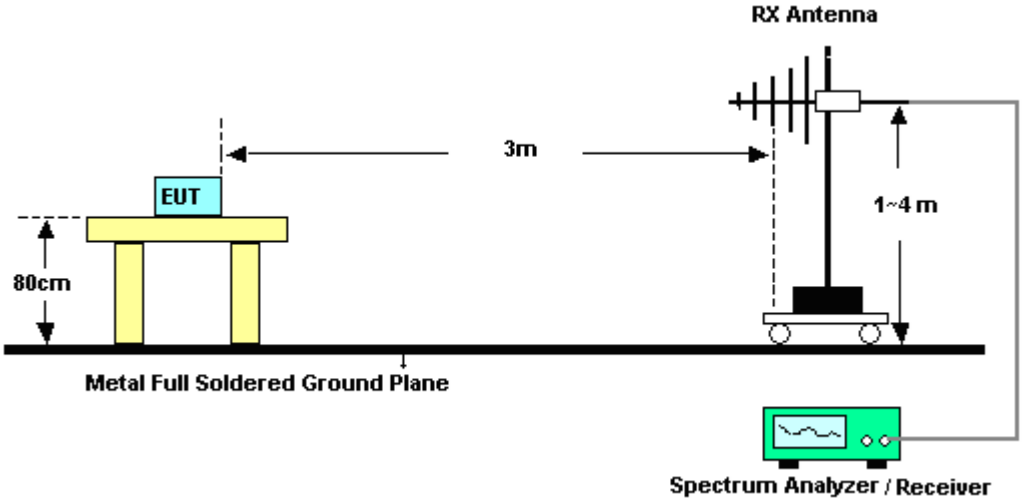
1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
4. Set to the maximum power setting and enable the EUT transmit continuously.
5. Use the following spectrum analyzer settings:
   (1) Span shall wide enough to fully capture the emission being measured;
   (2) Set RBW=100 kHz for f < 1 GHz, RBW=1MHz for f>1GHz ; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold for peak
   (3) For average measurement: use duty cycle correction factor method per 15.35(c).
   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)
6. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
7. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
8. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

3.8.4 Test Setup

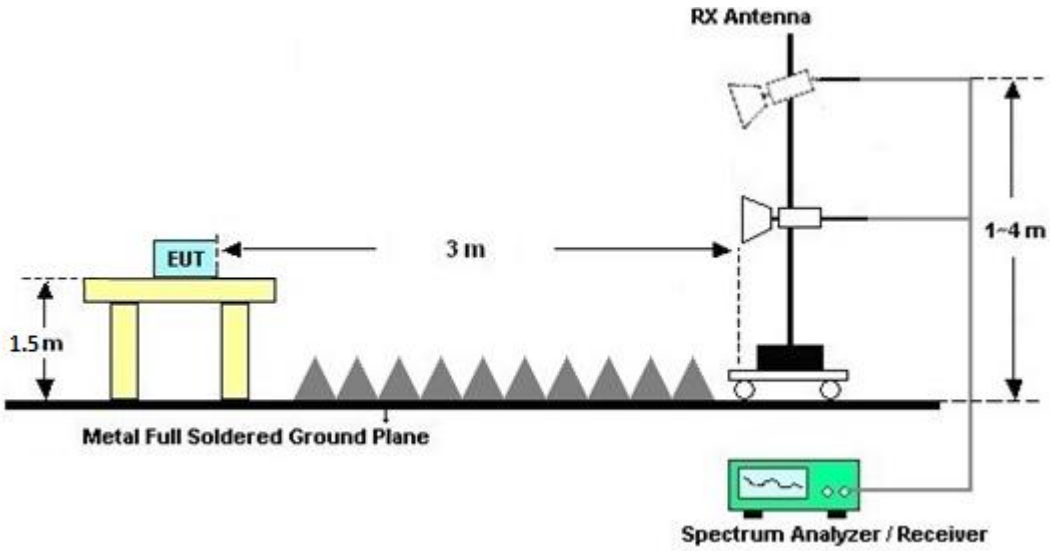
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.8.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is a comparison data of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.

3.8.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix B and C.

3.8.7 Test Result of Radiated Spurious Emission (30MHz ~ 10th Harmonic)

Please refer to Appendix B and C.

3.9 Antenna Requirements

3.9.1 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.

3.9.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.9.3 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.

4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Loop Antenna	R&S	HFH2-Z2E	100840	9kHz~30MHz	Jun. 21, 2021	May 20, 2022~ Jun. 01, 2022	Jun. 20, 2022	Radiation (03CH02-CA)
Bilog Antenna	TESEQ	6111D	54683	30MHz~1GHz	Oct. 15, 2021	May 20, 2022~ Jun. 01, 2022	Oct. 14, 2022	Radiation (03CH02-CA)
Horn Antenna	SCHWARZBECK	BBHA 9120D	01895	1GHz~18GHz	Aug. 25, 2021	May 20, 2022~ Jun. 01, 2022	Aug. 24, 2022	Radiation (03CH02-CA)
Amplifier	SONOMA	310N	372240	N/A	Aug. 09, 2021	May 20, 2022~ Jun. 01, 2022	Aug. 08, 2022	Radiation (03CH02-CA)
Preamplifier	E-instrument	ERA-100M-18G-56-01-A70	EC1900251	1GHz~18GHz	May 10, 2022	May 20, 2022~ Jun. 01, 2022	May 09, 2023	Radiation (03CH02-CA)
Spectrum Analyzer	Keysight	N9010A	MY57420221	10Hz~44GHz	Sep. 22, 2021	May 20, 2022~ Jun. 01, 2022	Sep. 21, 2022	Radiation (03CH02-CA)
Filter	Wainwright	WLK12-1200-1272-11000-40SS	SN1	1.2G Low Pass	Jul. 23, 2021	May 20, 2022~ Jun. 01, 2022	Jul. 22, 2022	Radiation (03CH02-CA)
Hygrometer	TESEO	608-H1	45142602	N/A	Aug. 04, 2021	May 20, 2022~ Jun. 01, 2022	Aug. 03, 2022	Radiation (03CH02-CA)
Controller	ChainTek	EM-1000	060876	NA	N/A	May 20, 2022~ Jun. 01, 2022	N/A	Radiation (03CH02-CA)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	May 20, 2022~ Jun. 01, 2022	N/A	Radiation (03CH02-CA)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	May 20, 2022~ Jun. 01, 2022	N/A	Radiation (03CH02-CA)
Software	Audix	E3	N/A	N/A	N/A	May 20, 2022~ Jun. 01, 2022	N/A	Radiation (03CH02-CA)
Hygrometer	Testo	608-H1	45142595	N/A	Aug. 30, 2021	May 18, 2022~ May 25, 2022	Aug. 29, 2022	Conducted (TH01-CA)
Power Sensor	EM Electronics Corporation	RPR3006W	RPR6W-1901026	10MHz-6GHz	May 10, 2022	May 20, 2022~ May 25, 2022	May 09, 2023	Conducted (TH01-CA)
Power Meter	Anritsu	ML2495A	1804004	N/A	May 10, 2022	May 18, 2022~ May 25, 2022	May 09, 2023	Conducted (TH01-CA)
Power Sensor	Anritsu	MA2411B	1726149	300MHz-40GHz	May 10, 2022	May 18, 2022~ May 25, 2022	May 09, 2023	Conducted (TH01-CA)
Switch Box & RF Cable	EM Electronics	EMSW26	1090304	N/A	Mar. 30, 2022	May 18, 2022~ May 25, 2022	Mar. 29, 2023	Conducted (TH01-CA)
Spectrum Analyzer	Rohde & Schwarz	FSV40	101089	10Hz-40GHz	Jun. 02, 2021	May 18, 2022~ May 25, 2022	Jun. 01, 2022	Conducted (TH01-CA)

5 Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.7 dB

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	6.2 dB

Uncertainty of 20dB Bandwidth Measurement

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	0.1 MHz

Uncertainty of 99% Occupied Bandwidth Measurement

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	$3.3*10^{-7}$ MHz

Uncertainty of Maximum Conducted Output Power Measurement

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	±0.7 dB

Uncertainty of Power Spectral Density Measurement

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	±0.61 dB

Uncertainty of Conducted Band Edges and Spurious Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	±0.69 dB

Uncertainty of Conducted Band Edges and Spurious Emission Measurement (Above 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	±0.63 dB

Appendix A. Test Result of Conducted Test Items

Test Engineer:	Liliana Gonzalez	Temperature:	19.8~24.8	°C
Test Date:	2022/05/18~2022/05/25	Relative Humidity:	36.7~41.7	%

<Lora 125KHz>

TEST RESULTS DATA
20dB and 99% Occupied Bandwidth and Hopping Channel Separation

Mod.	NTX	CH.	Freq. (MHz)	20db BW (MHz)	99% Bandwidth (MHz)	Hopping Channel Separation Measurement (MHz)	Hopping Channel Separation Measurement Limit (MHz)	Pass/Fail
Lora	1	1	902.2	0.133	0.116	0.198	0.1327	Pass
Lora	1	65	915	0.142	0.126	0.201	0.1424	Pass
Lora	1	129	927.8	0.143	0.128	0.201	0.1434	Pass

TEST RESULTS DATA
Dwell Time

Mod.	Hopping Channel Number Rate	Hops Over Occupancy Time(hops)	Package Transfer Time (msec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
Lora	129	1	309.00	0.31	0.4	Pass

TEST RESULTS DATA
Peak Power Table

Mod.	NTX	Peak Power (dBm)	Power Limit (dBm)	Test Result
Lora	1	**20.50**	30.00	Pass
	1	20.24	30.00	Pass
	1	19.91	30.00	Pass

TEST RESULTS DATA
Number of Hopping Frequency

Number of Hopping (Channel)	Limits (Channel)	Pass/Fail
129	> 50	Pass

<FSK 50Kbps>

TEST RESULTS DATA
20dB and 99% Occupied Bandwidth and Hopping Channel Separation

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	20db BW (MHz)	99% Bandwidth (MHz)	Hopping Channel Separation Measurement (MHz)	Hopping Channel Separation Measurement Limit (MHz)	Pass/Fail
FSK	50Kbps	1	1	902.2	0.109	0.103	0.200	0.1086	Pass
FSK	50Kbps	1	65	915	0.110	0.103	0.199	0.1096	Pass
FSK	50Kbps	1	129	927.8	0.109	0.103	0.200	0.1091	Pass

TEST RESULTS DATA
Dwell Time

Mod.	Hopping Channel Number Rate	Hops Over Occupancy Time(hops)	Package Transfer Time (msec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
FSK	129	1.00	291.50	0.29	0.4	Pass

TEST RESULTS DATA
Peak Power Table

Mod.	CH.	NTX	Peak Power (dBm)	Power Limit (dBm)	Test Result
FSK	1	1	**21.57**	30.00	Pass
	65	1	21.35	30.00	Pass
	129	1	20.99	30.00	Pass

TEST RESULTS DATA
Number of Hopping Frequency

Number of Hopping (Channel)	Limits (Channel)	Pass/Fail
129	> 50	Pass

<FSK 150Kbps>

TEST RESULTS DATA
20dB and 99% Occupied Bandwidth and Hopping Channel Separation

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	20db BW (MHz)	99% Bandwidth (MHz)	Hopping Channel Separation Measurement (MHz)	Hopping Channel Separation Measurement Limit (MHz)	Pass/Fail
FSK	150Kbps	1	1	902.4	0.165	0.157	0.398	0.1651	Pass
FSK	150Kbps	1	32	914.8	0.167	0.155	0.401	0.1668	Pass
FSK	150Kbps	1	64	927.6	0.169	0.156	0.401	0.1691	Pass

TEST RESULTS DATA
Dwell Time

Mod.	Hopping Channel Number Rate	Hops Over Occupancy Time(hops)	Package Transfer Time (msec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
FSK	64	1.00	310.40	0.31	0.4	Pass

TEST RESULTS DATA
Peak Power Table

Mod.	CH.	NTX	Peak Power (dBm)	Power Limit (dBm)	Test Result
FSK	1	1	**21.34**	30.00	Pass
	32	1	21.06	30.00	Pass
	64	1	20.74	30.00	Pass

TEST RESULTS DATA
Number of Hopping Frequency

Number of Hopping (Channel)	Limits (Channel)	Pass/Fail
64	> 50	Pass

<FSK 250Kbps>

TEST RESULTS DATA
20dB and 99% Occupied Bandwidth and Hopping Channel Separation

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	20db BW (MHz)	99% Bandwidth (MHz)	Hopping Channel Separation Measurement (MHz)	Hopping Channel Separation Measurement Limit (MHz)	Pass/Fail
FSK	250Kbps	1	1	902.5	0.256	0.251	0.501	0.2556	Pass
FSK	250Kbps	1	26	915	0.257	0.254	0.501	0.2572	Pass
FSK	250Kbps	1	51	927.5	0.256	0.253	0.498	0.2562	Pass

TEST RESULTS DATA
Dwell Time

Mod.	Hopping Channel Number Rate	Hops Over Occupancy Time(hops)	Package Transfer Time (msec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
FSK	51	1.00	315.90	0.32	0.4	Pass

TEST RESULTS DATA
Peak Power Table

Mod.	CH.	NTX	Peak Power (dBm)	Power Limit (dBm)	Test Result
FSK	1	1	**21.29**	30.00	Pass
	26	1	21.06	30.00	Pass
	51	1	20.71	30.00	Pass

TEST RESULTS DATA
Number of Hopping Frequency

Number of Hopping (Channel)	Limits (Channel)	Pass/Fail
51	≧ 25	Pass

Appendix B. Radiated Spurious Emission

Test Engineer :	Michael Bui, Daniel Lee	Temperature :	22 ~ 24.5°C
		Relative Humidity :	43 ~ 46.1%

Lora 902~928MHz

Lora 125KHz FHSS (Band Edge @ 3m)

Lora	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
Lora 125KHz FHSS CH 01 902.2MHz		30.97	32.67	-7.33	40	29.54	24.71	10.85	32.43	-	-	P	H
		122.15	26.65	-16.85	43.5	29.87	17.5	11.68	32.4	-	-	P	H
		342.34	30.47	-15.53	46	29.66	20.39	12.88	32.46	-	-	P	H
		504.33	35.73	-10.27	46	30.65	24.1	13.57	32.59	-	-	P	H
		608.12	36.6	-9.4	46	29.42	25.94	13.86	32.62	-	-	P	H
		657.59	38.6	-7.4	46	30.59	26.6	13.99	32.58	-	-	P	H
		870.02	46.9	-50.04	96.94	34.71	29.3	14.72	31.83	-	-	P	H
	*	902.2	116.94	-	-	104.39	29.34	14.81	31.6	-	-	P	H
		934.04	46.21	-50.73	96.94	32.23	30.44	14.89	31.35	-	-	P	H
													H
		30	31.58	-8.42	40	28.07	25.1	10.84	32.43	-	-	P	V
		110.51	26.93	-16.57	43.5	30.48	17.2	11.66	32.41	-	-	P	V
		410.24	32.78	-13.22	46	29.63	22.5	13.16	32.51	-	-	P	V
		571.26	36.62	-9.38	46	29.41	26.07	13.75	32.61	-	-	P	V
		712.88	39.37	-6.63	46	30.66	26.96	14.24	32.49	-	-	P	V
		742.95	39.89	-6.11	46	29.91	28.06	14.34	32.42	-	-	P	V
		870.02	44.41	-52.53	96.94	32.22	29.3	14.72	31.83	-	-	P	V
	*	902.2	115.04	-	-	102.49	29.34	14.81	31.6	-	-	P	V
		934.04	45.91	-51.03	96.94	31.93	30.44	14.89	31.35	-	-	P	V

Remark

1. No other spurious found.
2. All results are PASS against limit line.
3. Emission in non-restricted band should be 20dB lower than fundamental emission level
4. The emission position marked as “-” means no suspected emission found and emission level has at least 6dB margin against limit or emission is noise floor only

Lora	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		30	31.74	-8.26	40	28.23	25.1	10.84	32.43	-	-	P	H
		147.37	26.59	-16.91	43.5	29.64	17.5	11.85	32.4	-	-	P	H
		261.83	28.81	-17.19	46	28.49	20.2	12.53	32.41	-	-	P	H
		385.02	31.68	-14.32	46	29.61	21.5	13.06	32.49	-	-	P	H
		563.5	36.88	-9.12	46	29.61	26.17	13.72	32.62	-	-	P	H
		642.07	38.45	-7.55	46	30.51	26.6	13.94	32.6	-	-	P	H
		882.63	45.68	-51.08	96.76	33.46	29.2	14.76	31.74	-	-	P	H
	*	915	116.76	-	-	103.83	29.6	14.84	31.51	-	-	P	H
		946.65	45.47	-51.29	96.76	30.73	31.07	14.92	31.25	-	-	P	H
													H
Lora 125KHz FHSS CH 65 915MHz													H
													H
		31.94	33.11	-6.89	40	30.45	24.23	10.86	32.43	-	-	P	V
		126.03	26.44	-17.06	43.5	29.65	17.5	11.7	32.41	-	-	P	V
		385.02	32.36	-13.64	46	30.29	21.5	13.06	32.49	-	-	P	V
		475.23	33.81	-12.19	46	29.34	23.6	13.44	32.57	-	-	P	V
		604.24	37.35	-8.65	46	30.11	26	13.86	32.62	-	-	P	V
		726.46	39.04	-6.96	46	29.66	27.56	14.29	32.47	-	-	P	V
		882.63	44.36	-52.4	96.76	32.14	29.2	14.76	31.74	-	-	P	V
	*	915	114.92	-	-	101.99	29.6	14.84	31.51	-	-	P	V
		946.65	45.2	-51.56	96.76	30.46	31.07	14.92	31.25	-	-	P	V
													V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against limit line.
3. Emission in non-restricted band should be 20dB lower than fundamental emission level
4. The emission position marked as “-” means no suspected emission found and emission level has at least 6dB margin against limit or emission is noise floor only

Lora	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
Lora 125KHz FHSS CH 129 927.8MHz		30.97	32.51	-7.49	40	29.38	24.71	10.85	32.43	-	-	P	H
		126.03	26.66	-16.84	43.5	29.87	17.5	11.7	32.41	-	-	P	H
		256.98	29.73	-16.27	46	29.97	19.66	12.51	32.41	-	-	P	H
		438.37	33.3	-12.7	46	29.59	22.97	13.28	32.54	-	-	P	H
		592.6	36.57	-9.43	46	29.36	26	13.83	32.62	-	-	P	H
		678.93	38.67	-7.33	46	30.61	26.5	14.1	32.54	-	-	P	H
		895.24	44.86	-50.84	95.7	32.43	29.3	14.78	31.65	-	-	P	H
	*	927.8	115.7	-	-	102.08	30.16	14.87	31.41	-	-	P	H
													H
													H
													H
													H
		30	33.12	-6.88	40	29.61	25.1	10.84	32.43	-	-	P	V
		136.7	26.67	-16.83	43.5	29.71	17.6	11.76	32.4	-	-	P	V
		264.74	29.35	-16.65	46	29.03	20.2	12.54	32.42	-	-	P	V
		419.94	32.93	-13.07	46	29.44	22.8	13.2	32.51	-	-	P	V
		568.35	36.6	-9.4	46	29.34	26.13	13.74	32.61	-	-	P	V
		678.93	37.76	-8.24	46	29.7	26.5	14.1	32.54	-	-	P	V
		896.21	44.65	-51.05	95.7	32.2	29.3	14.79	31.64	-	-	P	V
	*	927.8	114.77	-	-	101.15	30.16	14.87	31.41	-	-	P	V
													V
													V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against limit line.
3. Emission in non-restricted band should be 20dB lower than fundamental emission level
4. The emission position marked as “-” means no suspected emission found and emission level has at least 6dB margin against limit or emission is noise floor only

Lora 125KHz FHSS (Harmonic @ 3m)

Lora	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
Lora 125KHz FHSS CH 01 902.2MHz		1804	42.1	-54.84	96.94	78.37	25.39	7.09	68.75	-	-	P	H
		2707	45.88	-28.12	74	77.96	27.94	8.23	68.25	-	-	P	H
		3609	38.37	-35.63	74	67.54	29.19	9.69	68.05	-	-	P	H
		4511	39.86	-34.14	74	67.03	30.81	10.53	68.51	-	-	P	H
		5413	40.75	-33.25	74	64.68	31.75	11.78	67.46	-	-	P	H
		6315	44.93	-52.01	96.94	64.28	33.34	12.53	65.22	-	-	P	H
		1804	42.23	-54.71	96.94	78.3	25.59	7.09	68.75	-	-	P	V
		2707	38.84	-35.16	74	71.08	27.78	8.23	68.25	-	-	P	V
		3609	37.39	-36.61	74	66.54	29.21	9.69	68.05	-	-	P	V
		4511	39.58	-34.42	74	66.83	30.73	10.53	68.51	-	-	P	V
		5413	44.62	-29.38	74	68.59	31.71	11.78	67.46	-	-	P	V
		6315	46.55	-50.39	96.94	65.82	33.42	12.53	65.22	-	-	P	V
Lora 125KHz FHSS CH 65 915MHz		1830	41.05	-55.71	96.76	77.02	25.53	7.11	68.61	-	-	P	H
		2745	42.8	-31.2	74	74.52	28.1	8.27	68.09	-	-	P	H
		3660	38.06	-35.94	74	67.16	29.22	9.69	68.01	-	-	P	H
		4575	38.82	-35.18	74	65.79	30.92	10.6	68.49	-	-	P	H
		5490	40.64	-56.12	96.76	64.35	31.91	11.85	67.47	-	-	P	H
		6405	43.77	-52.99	96.76	63.21	33.73	12.64	65.81	-	-	P	H
		1830	41.61	-55.15	96.76	77.49	25.62	7.11	68.61	-	-	P	V
		2745	38.94	-35.06	74	70.79	27.97	8.27	68.09	-	-	P	V
		3660	38.41	-35.59	74	67.43	29.3	9.69	68.01	-	-	P	V
		4575	39.81	-34.19	74	66.76	30.94	10.6	68.49	-	-	P	V
		5490	42.83	-53.93	96.76	66.52	31.93	11.85	67.47	-	-	P	V
		6405	44.93	-51.83	96.76	64.39	33.71	12.64	65.81	-	-	P	V

Lora 125KHz FHSS CH 129 927.8MHz		1855.6	38.01	-57.69	95.7	73.73	25.65	7.12	68.49	-	-	P	H
		2783.4	44.27	-29.73	74	75.68	28.2	8.31	67.92	-	-	P	H
		3711.2	37.5	-36.5	74	66.31	29.4	9.69	67.9	-	-	P	H
		4639	39.59	-34.41	74	66.21	31.08	10.66	68.36	-	-	P	H
		5566.8	40.95	-54.75	95.7	64.37	31.94	11.92	67.28	-	-	P	H
		6494.6	43.67	-52.03	95.7	62.94	34.16	12.78	66.21	-	-	P	H
		1855.6	38.26	-57.44	95.7	73.97	25.66	7.12	68.49	-	-	P	V
		2783.4	38.5	-35.5	74	69.91	28.2	8.31	67.92	-	-	P	V
		3711.2	38.06	-35.94	74	66.88	29.39	9.69	67.9	-	-	P	V
		4639	42.58	-31.42	74	69.22	31.06	10.66	68.36	-	-	P	V
		5566.8	43.41	-52.29	95.7	66.84	31.93	11.92	67.28	-	-	P	V
		6494.6	44.1	-51.6	95.7	63.34	34.19	12.78	66.21	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line. 3. Emission in non-restricted band should be 20dB lower than fundamental emission level 4. The emission position marked as “-” means no suspected emission found and emission level has at least 6dB margin against limit or emission is noise floor only												

FSK 902~928MHz

FSK 50Kbps FHSS (LF @ 3m)

FSK	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
		30	32.03	-7.97	40	28.52	25.1	10.84	32.43	-	-	P	H
		130.88	26.28	-17.22	43.5	29.35	17.6	11.73	32.4	-	-	P	H
		262.8	29.07	-16.93	46	28.76	20.2	12.53	32.42	-	-	P	H
		413.15	33.1	-12.9	46	29.88	22.56	13.18	32.52	-	-	P	H
		561.56	36.55	-9.45	46	29.31	26.13	13.72	32.61	-	-	P	H
		729.37	38.74	-7.26	46	29.23	27.67	14.3	32.46	-	-	P	H
		870.02	46.24	-50.64	96.88	34.05	29.3	14.72	31.83	-	-	P	H
	*	902.2	116.88	-	-	104.33	29.34	14.81	31.6	-	-	P	H
		934.04	46.35	-50.53	96.88	32.37	30.44	14.89	31.35	-	-	P	H
FSK													H
50Kbps													H
FHSS													H
CH 01		30.97	32.79	-7.21	40	29.66	24.71	10.85	32.43	-	-	P	V
902.2MHz		145.43	26.78	-16.72	43.5	29.79	17.56	11.83	32.4	-	-	P	V
		299.66	28.94	-17.06	46	29.27	19.39	12.7	32.42	-	-	P	V
		437.4	33.58	-12.42	46	29.9	22.95	13.26	32.53	-	-	P	V
		584.84	36.42	-9.58	46	29.24	26	13.8	32.62	-	-	P	V
		735.19	38.88	-7.12	46	29.1	27.9	14.32	32.44	-	-	P	V
		870.02	43.99	-52.89	96.88	31.8	29.3	14.72	31.83	-	-	P	V
	*	902.2	114.93	-	-	102.38	29.34	14.81	31.6	-	-	P	V
		934.04	46.11	-50.77	96.88	32.13	30.44	14.89	31.35	-	-	P	V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against limit line.
3. Emission in non-restricted band should be 20dB lower than fundamental emission level
4. The emission position marked as “-” means no suspected emission found and emission level has at least 6dB margin against limit or emission is noise floor only

FSK	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		30	32.1	-7.9	40	28.67	25.1	10.76	32.43	-	-	P	H
		144.46	26.67	-16.83	43.5	29.73	17.6	11.74	32.4	-	-	P	H
		265.71	29.49	-16.51	46	29.43	20.06	12.42	32.42	-	-	P	H
		473.29	33.79	-12.21	46	29.51	23.6	13.25	32.57	-	-	P	H
		564.47	36.9	-9.1	46	29.78	26.19	13.55	32.62	-	-	P	H
		665.35	38.07	-7.93	46	30.31	26.49	13.85	32.58	-	-	P	H
		882.63	44.72	-52.2	96.92	32.81	29.2	14.45	31.74	-	-	P	H
	*	915	116.92	-	-	104.32	29.6	14.51	31.51	-	-	P	H
		946.65	44.99	-51.93	96.92	30.57	31.07	14.6	31.25	-	-	P	H
													H
FSK													H
50Kbps													H
FHSS		30	32.04	-7.96	40	28.61	25.1	10.76	32.43	-	-	P	V
CH 65		148.34	26.41	-17.09	43.5	29.57	17.47	11.77	32.4	-	-	P	V
915MHz		370.47	31.44	-14.56	46	29.95	21.11	12.86	32.48	-	-	P	V
		505.3	34.81	-11.19	46	29.91	24.1	13.39	32.59	-	-	P	V
		646.92	38.08	-7.92	46	30.28	26.6	13.8	32.6	-	-	P	V
		732.28	39.05	-6.95	46	29.65	27.79	14.06	32.45	-	-	P	V
		882.63	43.53	-53.39	96.92	31.62	29.2	14.45	31.74	-	-	P	V
	*	915	114.74	-	-	102.14	29.6	14.51	31.51	-	-	P	V
		946.65	45.36	-51.56	96.92	30.94	31.07	14.6	31.25	-	-	P	V
													V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against limit line.
3. Emission in non-restricted band should be 20dB lower than fundamental emission level
4. The emission position marked as “-” means no suspected emission found and emission level has at least 6dB margin against limit or emission is noise floor only

FSK	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		32.91	31.77	-8.23	40	29.67	23.75	10.79	32.44	-	-	P	H
		140.58	26.5	-17	43.5	29.6	17.6	11.71	32.41	-	-	P	H
		260.86	29.14	-16.86	46	28.95	20.2	12.4	32.41	-	-	P	H
		421.88	33.21	-12.79	46	29.83	22.84	13.05	32.51	-	-	P	H
		547.01	34.86	-11.14	46	29.04	24.94	13.49	32.61	-	-	P	H
		655.65	37.94	-8.06	46	30.1	26.6	13.83	32.59	-	-	P	H
		896.21	45.28	-50.26	95.54	33.16	29.3	14.46	31.64	-	-	P	H
	*	927.8	115.54	-	-	102.24	30.16	14.55	31.41	-	-	P	H
										-	-	P	H
													H
													H
													H
FSK 50Kbps FHSS CH 129 927.8MHz		30	31.51	-8.49	40	28.08	25.1	10.76	32.43	-	-	P	V
		134.76	26.17	-17.33	43.5	29.29	17.6	11.68	32.4	-	-	P	V
		324.88	30.26	-15.74	46	30.14	19.9	12.67	32.45	-	-	P	V
		490.75	33.97	-12.03	46	29.29	23.91	13.34	32.57	-	-	P	V
		566.41	37.42	-8.58	46	30.32	26.17	13.55	32.62	-	-	P	V
		642.07	38.05	-7.95	46	30.26	26.6	13.79	32.6	-	-	P	V
		895.24	43.62	-51.92	95.54	31.51	29.3	14.46	31.65	-	-	P	V
	*	927.8	114.59	-	-	101.29	30.16	14.55	31.41	-	-	P	V
										-	-	P	V
													V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against limit line.
3. Emission in non-restricted band should be 20dB lower than fundamental emission level
4. The emission position marked as “-” means no suspected emission found and emission level has at least 6dB margin against limit or emission is noise floor only

FSK 50Kbps FHSS (Harmonic @ 3m)

FSK	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
FSK 50Kbps FHSS CH 01 902.2MHz		1804.4	42.81	-54.07	96.88	79.07	25.4	7.09	68.75	-	-	P	H
		2706.6	45.86	-28.14	74	77.94	27.94	8.23	68.25	-	-	P	H
		3608.8	38.33	-35.67	74	67.5	29.19	9.69	68.05	-	-	P	H
		4511	38.41	-35.59	74	65.58	30.81	10.53	68.51	-	-	P	H
		5413.2	41.37	-32.63	74	65.3	31.75	11.78	67.46	-	-	P	H
		6315.4	45.57	-51.31	96.88	64.92	33.34	12.53	65.22	-	-	P	H
		1804.4	41.25	-55.63	96.88	77.32	25.59	7.09	68.75	-	-	P	V
		2706.6	39.57	-34.43	74	71.81	27.78	8.23	68.25	-	-	P	V
		3608.8	37.91	-36.09	74	67.06	29.21	9.69	68.05	-	-	P	V
		4511	38.83	-35.17	74	66.08	30.73	10.53	68.51	-	-	P	V
		5413.2	45.14	-28.86	74	69.11	31.71	11.78	67.46	-	-	P	V
		6315.4	46.04	-50.84	96.88	65.31	33.42	12.53	65.22	-	-	P	V
FSK 50Kbps FHSS CH 65 915MHz		1830	40.54	-56.38	96.92	76.44	25.53	7.11	68.54	-	-	P	H
		2745	45.41	-28.59	74	77.01	28.1	8.27	67.97	-	-	P	H
		3660	37.49	-36.51	74	66.5	29.22	9.69	67.92	-	-	P	H
		4575	39.53	-34.47	74	66.47	30.92	10.6	68.46	-	-	P	H
		5490	40.6	-56.32	96.92	64.26	31.91	11.85	67.42	-	-	P	H
		6405	44.06	-52.86	96.92	63.27	33.73	12.64	65.58	-	-	P	H
		1830	40.23	-56.69	96.92	76.04	25.62	7.11	68.54	-	-	P	V
		2745	40.38	-33.62	74	72.11	27.97	8.27	67.97	-	-	P	V
		3660	37.96	-36.04	74	66.89	29.3	9.69	67.92	-	-	P	V
		4575	39.74	-34.26	74	66.66	30.94	10.6	68.46	-	-	P	V
		5490	43.2	-53.72	96.92	66.84	31.93	11.85	67.42	-	-	P	V
		6405	44.92	-52	96.92	64.15	33.71	12.64	65.58	-	-	P	V

FSK 50Kbps FHSS CH 129 927.8MHz		1855.6	39.53	-56.01	95.54	75.25	25.65	7.12	68.49	-	-	P	H
		2783.4	44.69	-29.31	74	76.1	28.2	8.31	67.92	-	-	P	H
		3711.2	34.3	-39.7	74	63.11	29.4	9.69	67.9	-	-	P	H
		4639	37.25	-36.75	74	63.87	31.08	10.66	68.36	-	-	P	H
		5566.8	39.96	-55.58	95.54	63.38	31.94	11.92	67.28	-	-	P	H
		6494.6	42.85	-52.69	95.54	62.12	34.16	12.78	66.21	-	-	P	H
		1855.6	35.3	-60.24	95.54	71.01	25.66	7.12	68.49	-	-	P	V
		2783.4	37.18	-36.82	74	68.59	28.2	8.31	67.92	-	-	P	V
		3711.2	34.53	-39.47	74	63.35	29.39	9.69	67.9	-	-	P	V
		4639	40.49	-33.51	74	67.13	31.06	10.66	68.36	-	-	P	V
		5566.8	42.06	-53.48	95.54	65.49	31.93	11.92	67.28	-	-	P	V
		6494.6	42.59	-52.95	95.54	61.83	34.19	12.78	66.21	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line. 3. Emission in non-restricted band should be 20dB lower than fundamental emission level 4. The emission position marked as “-” means no suspected emission found and emission level has at least 6dB margin against limit or emission is noise floor only												

FSK 902~928MHz

FSK 150Kbps FHSS (LF @ 3m)

FSK	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
FSK 150Kbps FHSS CH 01 902.4MHz		30.97	31.59	-8.41	40	28.54	24.71	10.77	32.43	-	-	P	H
		135.73	26.29	-17.21	43.5	29.41	17.6	11.68	32.4	-	-	P	H
		365.62	30.44	-15.56	46	29.08	21.01	12.83	32.48	-	-	P	H
		463.59	33.81	-12.19	46	29.7	23.47	13.2	32.56	-	-	P	H
		567.38	37.09	-8.91	46	30	26.15	13.56	32.62	-	-	P	H
		748.77	39.39	-6.61	46	29.58	28.1	14.11	32.4	-	-	P	H
		870.02	47.17	-49.59	96.76	35.28	29.3	14.42	31.83	-	-	P	H
	*	902.4	116.76	-	-	104.53	29.35	14.48	31.6	-	-	P	H
		934.04	46.32	-50.44	96.76	32.66	30.44	14.57	31.35	-	-	P	H
													H
													H
													H
		30.97	31.54	-8.46	40	28.49	24.71	10.77	32.43	-	-	P	V
		131.85	25.63	-17.87	43.5	28.77	17.6	11.66	32.4	-	-	P	V
		283.17	28.85	-17.15	46	29.72	19.06	12.5	32.43	-	-	P	V
		482.02	33.6	-12.4	46	29.14	23.74	13.29	32.57	-	-	P	V
		574.17	36.3	-9.7	46	29.32	26.02	13.58	32.62	-	-	P	V
		732.28	38.92	-7.08	46	29.52	27.79	14.06	32.45	-	-	P	V
		870.02	44.58	-52.18	96.76	32.69	29.3	14.42	31.83	-	-	P	V
	*	902.4	114.91	-	-	102.68	29.35	14.48	31.6	-	-	P	V
		934.04	45.54	-51.22	96.76	31.88	30.44	14.57	31.35	-	-	P	V
													V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against limit line.
3. Emission in non-restricted band should be 20dB lower than fundamental emission level
4. The emission position marked as “-” means no suspected emission found and emission level has at least 6dB margin against limit or emission is noise floor only

FSK	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		30	31.93	-8.07	40	28.5	25.1	10.76	32.43	-	-	P	H
		121.18	26.24	-17.26	43.5	29.55	17.5	11.59	32.4	-	-	P	H
		337.49	30.4	-15.6	46	29.88	20.25	12.72	32.45	-	-	P	H
		419.94	33.04	-12.96	46	29.71	22.8	13.04	32.51	-	-	P	H
		571.26	36.48	-9.52	46	29.45	26.07	13.57	32.61	-	-	P	H
		751.68	39.09	-6.91	46	29.25	28.13	14.11	32.4	-	-	P	H
		882.63	46.32	-50.51	96.83	34.41	29.2	14.45	31.74	-	-	P	H
	*	915.2	116.83	-	-	104.22	29.61	14.51	31.51	-	-	P	H
		946.65	44.76	-52.07	96.83	30.34	31.07	14.6	31.25	-	-	P	H
													H
FSK													H
150Kbps													H
FHSS		30.97	31.49	-8.51	40	28.44	24.71	10.77	32.43	-	-	P	V
CH 33		120.21	26.43	-17.07	43.5	29.75	17.5	11.58	32.4	-	-	P	V
915.2MHz		349.13	29.76	-16.24	46	28.88	20.58	12.77	32.47	-	-	P	V
		465.53	33.35	-12.65	46	29.19	23.51	13.21	32.56	-	-	P	V
		575.14	36.13	-9.87	46	29.17	26	13.58	32.62	-	-	P	V
		690.57	38.41	-7.59	46	30.53	26.5	13.92	32.54	-	-	P	V
		882.63	43.65	-53.18	96.83	31.74	29.2	14.45	31.74	-	-	P	V
	*	915.2	114.66	-	-	102.05	29.61	14.51	31.51	-	-	P	V
		946.65	44.62	-52.21	96.83	30.2	31.07	14.6	31.25	-	-	P	V
													V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against limit line.
3. Emission in non-restricted band should be 20dB lower than fundamental emission level
4. The emission position marked as “-” means no suspected emission found and emission level has at least 6dB margin against limit or emission is noise floor only

FSK	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		30	31.74	-8.26	40	28.31	25.1	10.76	32.43	-	-	P	H
		123.12	26.09	-17.41	43.5	29.4	17.5	11.6	32.41	-	-	P	H
		338.46	29.11	-16.89	46	28.57	20.27	12.73	32.46	-	-	P	H
		476.2	34.53	-11.47	46	30.21	23.62	13.27	32.57	-	-	P	H
		604.24	36.39	-9.61	46	29.34	26	13.67	32.62	-	-	P	H
		796.3	39.88	-6.12	46	29.53	28.35	14.23	32.23	-	-	P	H
		895.24	44.14	-51.43	95.57	32.03	29.3	14.46	31.65	-	-	P	H
	*	927.6	115.57	-	-	102.28	30.15	14.55	31.41	-	-	P	H
		959.26	45.38	-50.19	95.57	30.39	31.49	14.63	31.13	-	-	P	H
													H
FSK													H
150Kbps													H
FHSS		30	31.69	-8.31	40	28.26	25.1	10.76	32.43	-	-	P	V
CH 64		130.88	26.38	-17.12	43.5	29.53	17.6	11.65	32.4	-	-	P	V
927.6MHz		336.52	29.6	-16.4	46	29.1	20.23	12.72	32.45	-	-	P	V
		478.14	34.64	-11.36	46	30.28	23.66	13.27	32.57	-	-	P	V
		650.8	37.91	-8.09	46	30.09	26.6	13.81	32.59	-	-	P	V
		749.74	39.72	-6.28	46	29.91	28.1	14.11	32.4	-	-	P	V
		895.24	44.4	-51.17	95.57	32.29	29.3	14.46	31.65	-	-	P	V
	*	927.6	114.59	-	-	101.3	30.15	14.55	31.41	-	-	P	V
		959.26	45.19	-50.38	95.57	30.2	31.49	14.63	31.13	-	-	P	V
													V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against limit line.
3. Emission in non-restricted band should be 20dB lower than fundamental emission level
4. The emission position marked as “-” means no suspected emission found and emission level has at least 6dB margin against limit or emission is noise floor only

FSK 150Kbps FHSS (Harmonic @ 3m)

FSK	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
FSK 150Kbps FHSS CH 01 902.4MHz		1804.8	41.73	-55.03	96.76	77.92	25.4	7.09	68.68	-	-	P	H
		2707.2	45.19	-28.81	74	77.17	27.94	8.23	68.15	-	-	P	H
		3609.6	35.04	-38.96	74	64.1	29.19	9.69	67.94	-	-	P	H
		4512	36.6	-37.4	74	63.69	30.81	10.53	68.43	-	-	P	H
		5414.4	41.78	-32.22	74	65.67	31.75	11.78	67.42	-	-	P	H
		6316.8	44.13	-52.63	96.76	63.34	33.35	12.53	65.09	-	-	P	H
		1804.8	40.69	-56.07	96.76	76.69	25.59	7.09	68.68	-	-	P	V
		2707.2	41.07	-32.93	74	73.21	27.78	8.23	68.15	-	-	P	V
		3609.6	33.99	-40.01	74	63.03	29.21	9.69	67.94	-	-	P	V
		4512	37.42	-36.58	74	64.59	30.73	10.53	68.43	-	-	P	V
		5414.4	44.28	-29.72	74	68.21	31.71	11.78	67.42	-	-	P	V
		6316.8	45.72	-51.04	96.76	64.85	33.43	12.53	65.09	-	-	P	V
FSK 150Kbps FHSS CH 33 915.2MHz		1830.4	40.7	-56.13	96.83	76.67	25.53	7.11	68.61	-	-	P	H
		2745.6	44.9	-29.1	74	76.6	28.11	8.28	68.09	-	-	P	H
		3660.8	37.76	-36.24	74	66.86	29.22	9.69	68.01	-	-	P	H
		4576	37.52	-36.48	74	64.49	30.92	10.6	68.49	-	-	P	H
		5491.2	40.51	-56.32	96.83	64.22	31.91	11.85	67.47	-	-	P	H
		6406.4	44.96	-51.87	96.83	64.39	33.74	12.65	65.82	-	-	P	H
		1830.4	39.57	-57.26	96.83	75.45	25.62	7.11	68.61	-	-	P	V
		2745.6	40.57	-33.43	74	72.41	27.97	8.28	68.09	-	-	P	V
		3660.8	38.03	-35.97	74	67.05	29.3	9.69	68.01	-	-	P	V
		4576	39.95	-34.05	74	66.9	30.94	10.6	68.49	-	-	P	V
		5491.2	42.89	-53.94	96.83	66.57	31.94	11.85	67.47	-	-	P	V
		6406.4	44.12	-52.71	96.83	63.57	33.72	12.65	65.82	-	-	P	V

FSK 150Kbps FHSS CH 64 927.6MHz		1855.2	40.3	-55.27	95.57	76.01	25.65	7.13	68.49	-	-	P	H
		2782.8	42.67	-31.33	74	74.09	28.2	8.31	67.93	-	-	P	H
		3710.4	36.97	-37.03	74	65.78	29.4	9.69	67.9	-	-	P	H
		4638	39.91	-34.09	74	66.54	31.08	10.65	68.36	-	-	P	H
		5565.6	40.43	-55.14	95.57	63.87	31.94	11.91	67.29	-	-	P	H
		6493.2	43.53	-52.04	95.57	62.8	34.15	12.78	66.2	-	-	P	H
		1855.2	39.58	-55.99	95.57	75.28	25.66	7.13	68.49	-	-	P	V
		2782.8	37.24	-36.76	74	68.67	28.19	8.31	67.93	-	-	P	V
		3710.4	36.92	-37.08	74	65.74	29.39	9.69	67.9	-	-	P	V
		4638	42.27	-31.73	74	68.92	31.06	10.65	68.36	-	-	P	V
		5565.6	43.97	-51.6	95.57	67.42	31.93	11.91	67.29	-	-	P	V
		6493.2	44.83	-50.74	95.57	64.07	34.18	12.78	66.2	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line. 3. Emission in non-restricted band should be 20dB lower than fundamental emission level 4. The emission position marked as “-” means no suspected emission found and emission level has at least 6dB margin against limit or emission is noise floor only												

FSK 915~928MHz

FSK 250Kbps FHSS (LF @ 3m)

FSK	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
FSK 250Kbps FHSS CH 01 902.5MHz		30	31.04	-8.96	40	27.61	25.1	10.76	32.43	-	-	P	H
		143.49	26.84	-16.66	43.5	29.91	17.6	11.73	32.4	-	-	P	H
		258.92	28.88	-17.12	46	28.88	20.01	12.4	32.41	-	-	P	H
		433.52	32.96	-13.04	46	29.51	22.9	13.08	32.53	-	-	P	H
		568.35	36.3	-9.7	46	29.22	26.13	13.56	32.61	-	-	P	H
		732.28	38.56	-7.44	46	29.16	27.79	14.06	32.45	-	-	P	H
		870.02	46.87	-49.96	96.83	34.98	29.3	14.42	31.83	-	-	P	H
	*	902.5	116.83	-	-	104.6	29.35	14.48	31.6	-	-	P	H
		934.04	48.03	-48.8	96.83	34.37	30.44	14.57	31.35	-	-	P	H
													H
													H
													H
		30	32.31	-7.69	40	28.88	25.1	10.76	32.43	-	-	P	V
		146.4	26	-17.5	43.5	29.15	17.5	11.75	32.4	-	-	P	V
		325.85	29.5	-16.5	46	29.36	19.92	12.67	32.45	-	-	P	V
		483.96	34.52	-11.48	46	30.01	23.78	13.3	32.57	-	-	P	V
		638.19	37.3	-8.7	46	29.6	26.53	13.77	32.6	-	-	P	V
		735.19	39.07	-6.93	46	29.54	27.9	14.07	32.44	-	-	P	V
		870.02	44.77	-52.06	96.83	32.88	29.3	14.42	31.83	-	-	P	V
	*	902.5	114.92	-	-	102.69	29.35	14.48	31.6	-	-	P	V
		934.04	45.55	-51.28	96.83	31.89	30.44	14.57	31.35	-	-	P	V
													V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against limit line.
3. Emission in non-restricted band should be 20dB lower than fundamental emission level
4. The emission position marked as “-” means no suspected emission found and emission level has at least 6dB margin against limit or emission is noise floor only

FSK	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		30	31.26	-8.74	40	27.83	25.1	10.76	32.43	-	-	P	H
		127.97	26.72	-16.78	43.5	29.99	17.5	11.63	32.4	-	-	P	H
		313.24	29.12	-16.88	46	29.3	19.63	12.63	32.44	-	-	P	H
		465.53	34.02	-11.98	46	29.86	23.51	13.21	32.56	-	-	P	H
		582.9	36.49	-9.51	46	29.5	26	13.61	32.62	-	-	P	H
		750.71	39.3	-6.7	46	29.48	28.11	14.11	32.4	-	-	P	H
		882.63	45.02	-51.8	96.82	33.11	29.2	14.45	31.74	-	-	P	H
	*	915	116.82	-	-	104.22	29.6	14.51	31.51	-	-	P	H
										-	-	P	H
													H
													H
													H
FSK 250Kbps FHSS CH 26 915MHz		30	31.39	-8.61	40	27.96	25.1	10.76	32.43	-	-	P	V
		138.64	26.29	-17.21	43.5	29.4	17.6	11.7	32.41	-	-	P	V
		265.71	29.48	-16.52	46	29.42	20.06	12.42	32.42	-	-	P	V
		429.64	32.83	-13.17	46	29.39	22.9	13.07	32.53	-	-	P	V
		553.8	35.43	-10.57	46	28.78	25.76	13.51	32.62	-	-	P	V
		746.83	39.7	-6.3	46	29.91	28.1	14.1	32.41	-	-	P	V
		882.63	43.92	-52.9	96.82	32.01	29.2	14.45	31.74	-	-	P	V
	*	915	114.75	-	-	102.15	29.6	14.51	31.51	-	-	P	V
		946.65	45.22	-51.6	96.82	30.8	31.07	14.6	31.25	-	-	P	V
													V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against limit line.
3. Emission in non-restricted band should be 20dB lower than fundamental emission level
4. The emission position marked as “-” means no suspected emission found and emission level has at least 6dB margin against limit or emission is noise floor only

FSK	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		30	31.72	-8.28	40	28.29	25.1	10.76	32.43	-	-	P	H
		143.49	26.28	-17.22	43.5	29.35	17.6	11.73	32.4	-	-	P	H
		261.83	30.58	-15.42	46	30.38	20.2	12.41	32.41	-	-	P	H
		462.62	33.06	-12.94	46	28.97	23.45	13.2	32.56	-	-	P	H
		564.47	36.58	-9.42	46	29.46	26.19	13.55	32.62	-	-	P	H
		746.83	39.33	-6.67	46	29.54	28.1	14.1	32.41	-	-	P	H
		895.24	45.21	-50.41	95.62	33.1	29.3	14.46	31.65	-	-	P	H
	*	927.5	115.62	-	-	102.33	30.15	14.55	31.41	-	-	P	H
		952.47	43.83	-51.79	95.62	29.11	31.3	14.62	31.2	-	-	P	H
													H
FSK													H
250Kbps													H
FHSS		31.94	32.11	-7.89	40	29.53	24.23	10.78	32.43	-	-	P	V
CH 51		135.73	26.56	-16.94	43.5	29.68	17.6	11.68	32.4	-	-	P	V
927.5MHz		260.86	29.1	-16.9	46	28.91	20.2	12.4	32.41	-	-	P	V
		405.39	31.95	-14.05	46	29.13	22.32	13	32.5	-	-	P	V
		550.89	36.17	-9.83	46	29.88	25.41	13.5	32.62	-	-	P	V
		675.05	37.15	-8.85	46	29.33	26.5	13.88	32.56	-	-	P	V
		895.24	43.92	-51.7	95.62	31.81	29.3	14.46	31.65	-	-	P	V
	*	927.5	114.5	-	-	101.21	30.15	14.55	31.41	-	-	P	V
		959.26	45.57	-50.05	95.62	30.58	31.49	14.63	31.13	-	-	P	V
													V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against limit line.
3. Emission in non-restricted band should be 20dB lower than fundamental emission level
4. The emission position marked as “-” means no suspected emission found and emission level has at least 6dB margin against limit or emission is noise floor only

FSK 250KBps FHSS (Harmonic @ 3m)

FSK	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
FSK 250Kbps FHSS CH 01 902.5MHz		1805	41.65	-55.18	96.83	77.9	25.4	7.09	68.74	-	-	P	H
		2707.5	46.06	-27.94	74	78.12	27.95	8.23	68.24	-	-	P	H
		3610	39.34	-34.66	74	68.51	29.19	9.69	68.05	-	-	P	H
		4512.5	38.64	-35.36	74	65.81	30.81	10.53	68.51	-	-	P	H
		5415	40.85	-33.15	74	64.77	31.76	11.78	67.46	-	-	P	H
		6317.5	44.46	-52.37	96.83	63.82	33.35	12.53	65.24	-	-	P	H
		1805	41.53	-55.3	96.83	77.59	25.59	7.09	68.74	-	-	P	V
		2707.5	39.64	-34.36	74	71.87	27.78	8.23	68.24	-	-	P	V
		3610	38.78	-35.22	74	67.93	29.21	9.69	68.05	-	-	P	V
		4512.5	38.87	-35.13	74	66.12	30.73	10.53	68.51	-	-	P	V
		5415	44.98	-29.02	74	68.95	31.71	11.78	67.46	-	-	P	V
		6317.5	47	-49.83	96.83	66.28	33.43	12.53	65.24	-	-	P	V
FSK 250Kbps FHSS CH 26 915MHz		1830	41.18	-55.64	96.82	77.15	25.53	7.11	68.61	-	-	P	H
		2745	45.65	-28.35	74	77.37	28.1	8.27	68.09	-	-	P	H
		3660	38.91	-35.09	74	68.01	29.22	9.69	68.01	-	-	P	H
		4575	38.31	-35.69	74	65.28	30.92	10.6	68.49	-	-	P	H
		5490	39.99	-56.83	96.82	63.7	31.91	11.85	67.47	-	-	P	H
		6405	43.83	-52.99	96.82	63.27	33.73	12.64	65.81	-	-	P	H
		1830	39.61	-57.21	96.82	75.49	25.62	7.11	68.61	-	-	P	V
		2745	40.38	-33.62	74	72.23	27.97	8.27	68.09	-	-	P	V
		3660	38.53	-35.47	74	67.55	29.3	9.69	68.01	-	-	P	V
		4575	39.82	-34.18	74	66.77	30.94	10.6	68.49	-	-	P	V
		5490	43.01	-53.81	96.82	66.7	31.93	11.85	67.47	-	-	P	V
		6405	44.01	-52.81	96.82	63.47	33.71	12.64	65.81	-	-	P	V

FSK 250Kbps FHSS CH 51 927.5MHz		1855	40.28	-55.34	95.62	75.99	25.65	7.13	68.49	-	-	P	H
		2782.5	44.56	-29.44	74	75.98	28.2	8.31	67.93	-	-	P	H
		3710	37.66	-36.34	74	66.47	29.4	9.69	67.9	-	-	P	H
		4637.5	39.04	-34.96	74	65.67	31.08	10.65	68.36	-	-	P	H
		5565	40.51	-55.11	95.62	63.96	31.93	11.91	67.29	-	-	P	H
		6492.5	44.68	-50.94	95.62	63.95	34.15	12.78	66.2	-	-	P	H
		1855	40.49	-55.13	95.62	76.19	25.66	7.13	68.49	-	-	P	V
		2782.5	38.13	-35.87	74	69.56	28.19	8.31	67.93	-	-	P	V
		3710	37.22	-36.78	74	66.04	29.39	9.69	67.9	-	-	P	V
		4637.5	41.96	-32.04	74	68.61	31.06	10.65	68.36	-	-	P	V
		5565	43.5	-52.12	95.62	66.95	31.93	11.91	67.29	-	-	P	V
		6492.5	43.72	-51.9	95.62	62.96	34.18	12.78	66.2	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line. 3. Emission in non-restricted band should be 20dB lower than fundamental emission level 4. The emission position marked as “-” means no suspected emission found and emission level has at least 6dB margin against limit or emission is noise floor only												

Note symbol

*	**Fundamental Frequency** which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is **over limit** line.
P/A	**P**eak or **A**verage
H/V	**H**orizontal or **V**ertical

A calculation example for radiated spurious emission is shown as below:

LoRa	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
LoRa CH 01 902.2MHz		910	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
		910	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)
2. Level(dBμV/m) =

Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

3. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 910MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 910MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)

= 43.54 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

= -10.46(dB)

Both peak and average measured complies with the limit line, so test result is “PASS”.

Appendix C. Radiated Spurious Emission Plots

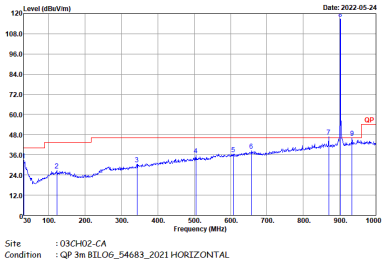
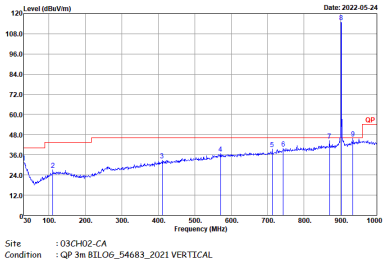
Test Engineer :	Michael Bui, Daniel Lee	**Temperature :**	22 ~ 24.5°C
		Relative Humidity :	43 ~ 46.1%

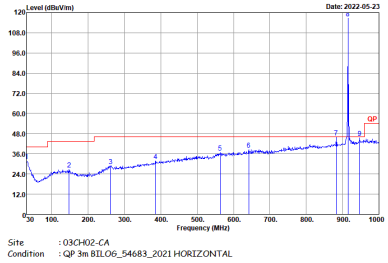
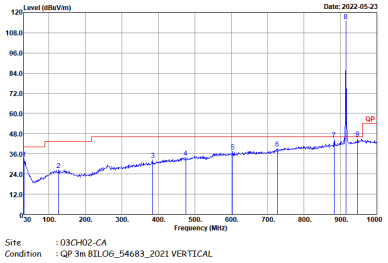
Note symbol

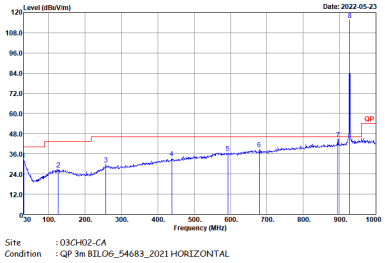
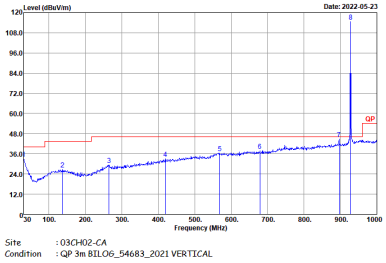
-L	**Low channel location**
-R	**High channel location**

Lora 902~928MHz

Lora 125KHz FHSS (LF @ 3m)

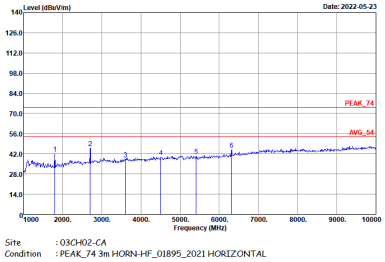
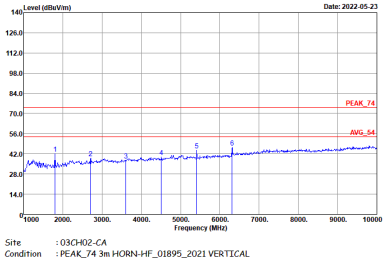
Lora	Lora 902~928MHz	
	Lora 125KHz FHSS Ch01 902.2MHz	
	Horizontal	Vertical
QP / Peak		

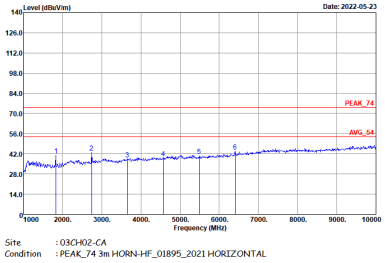
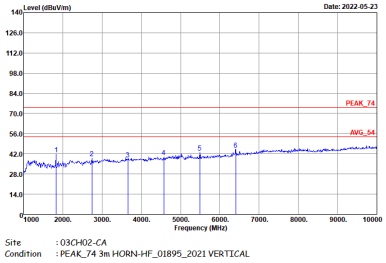
Lora	Lora 902~928MHz	
	Lora 125KHz FHSS Ch65 915 MHz	
	Horizontal	Vertical
QP / Peak		

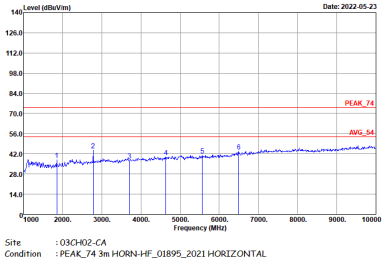
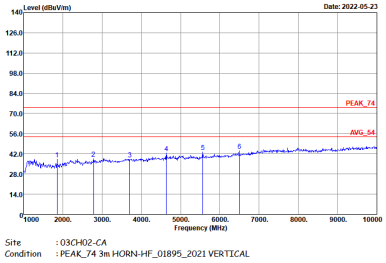
Lora	Lora 902~928MHz	
	Lora 125KHz FHSS Ch129 927.8 MHz	
	Horizontal	Vertical
Peak Avg.	 Site : 03CH02-CA Condition : QP 3m BILOG_54683_2021 HORIZONTAL	 Site : 03CH02-CA Condition : QP 3m BILOG_54683_2021 VERTICAL

Lora 902~928MHz

Lora 125KHz FHSS (Harmonic @ 3m)

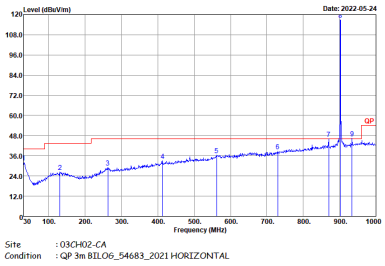
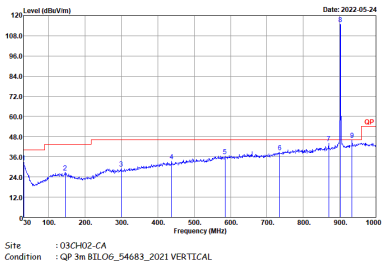
Lora	Lora 902~928MHz	
	Lora 125KHz FHSS Ch01 902.2Mhz	
	Horizontal	Vertical
Peak Avg.		

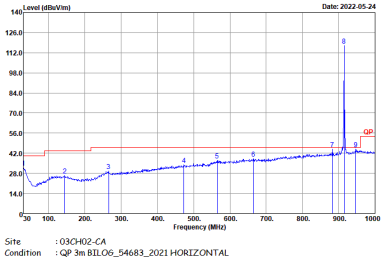
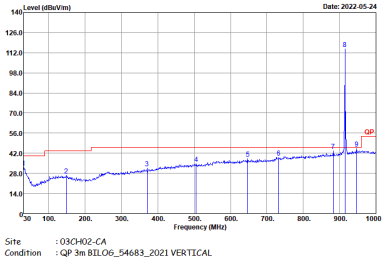
Lora	Lora 902~928MHz	
	Lora 125KHz FHSS Ch65 915Mhz	
	Horizontal	Vertical
Peak Avg.		

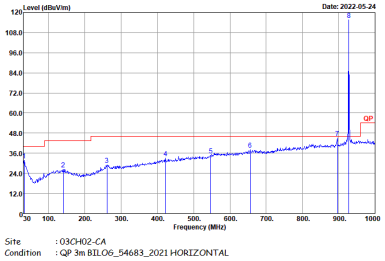
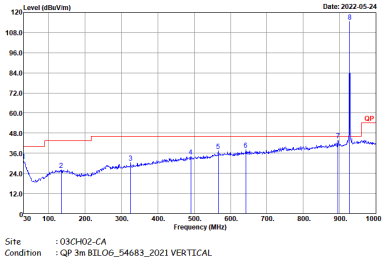
Lora	Lora 902~928MHz	
	Lora 125KHz FHSS Ch129 927.8Mhz	
	Horizontal	Vertical
Peak Avg.		

FSK 902~928MHz

FSK 50Kbps FHSS (LF @ 3m)

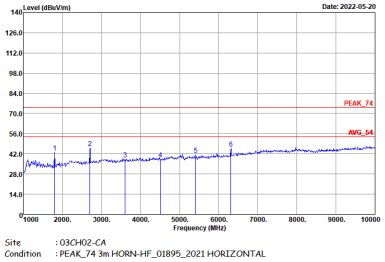
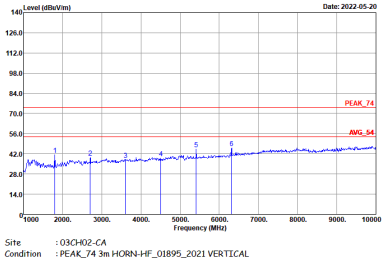
FSK	FSK 902~928MHz	
	FSK 50Kbps FHSS Ch01 902.2MHz	
	Horizontal	Vertical
QP / Peak		

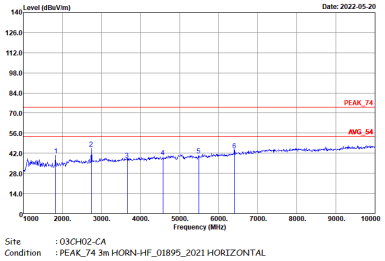
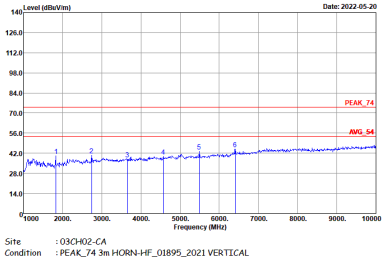
FSK	FSK 902~928MHz	
	FSK 50Kbps FHSS Ch65 915MHz	
	Horizontal	Vertical
QP / Peak		

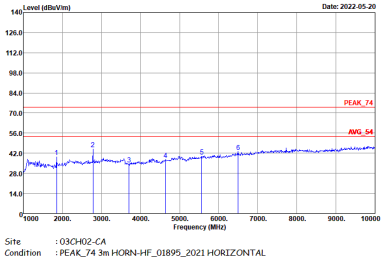
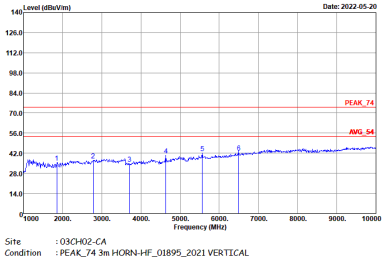
FSK	FSK 902~928MHz	
	FSK 50Kbps FHSS Ch129 927.8MHz	
	Horizontal	Vertical
Peak Avg.		

FSK 902~928MHz

FSK 50Kbps FHSS (Harmonic @ 3m)

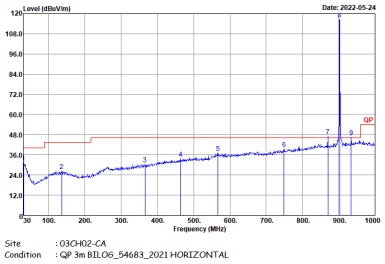
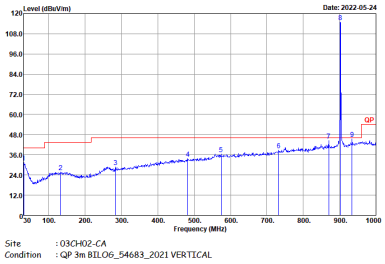
FSK	FSK 902~928MHz	
	FSK 50Kbps FHSS Ch01 902.2MHz	
	Horizontal	Vertical
Peak Avg.		

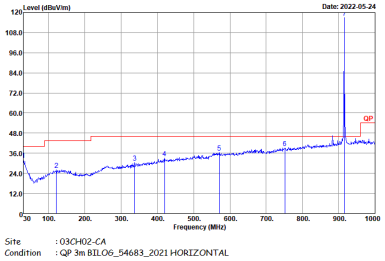
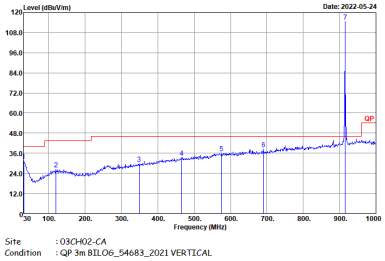
FSK	FSK 902~928MHz	
	FSK 50Kbps FHSS Ch65 915MHz	
	Horizontal	Vertical
Peak Avg.	 Site : 03CH02-CA Condition : PEAK_74 3m HORN-HF_01895_2021 HORIZONTAL	 Site : 03CH02-CA Condition : PEAK_74 3m HORN-HF_01895_2021 VERTICAL

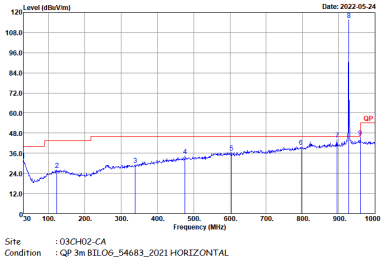
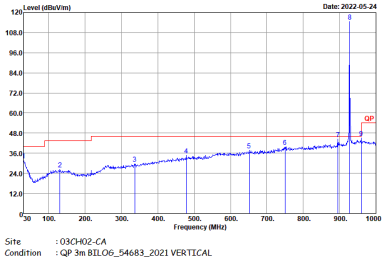
FSK	FSK 902~928MHz	
	FSK 50Kbps FHSS Ch129 927.8MHz	
	Horizontal	Vertical
Peak Avg.	 Site : 03CH02-CA Condition : PEAK_74 3m HORN-HF_01895_2021 HORIZONTAL	 Site : 03CH02-CA Condition : PEAK_74 3m HORN-HF_01895_2021 VERTICAL

FSK 902~928MHz

FSK 150Kbps FHSS (LF @ 3m)

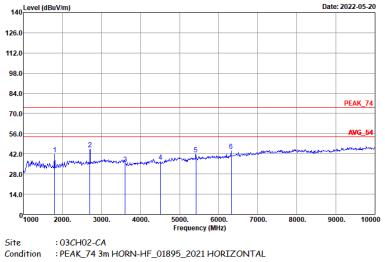
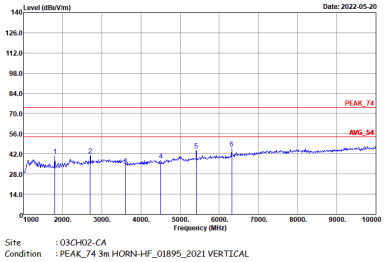
FSK	FSK 902~928MHz	
	FSK 150Kbps FHSS Ch01 902.4MHz	
	Horizontal	Vertical
QP / Peak		

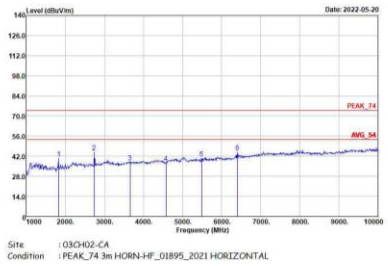
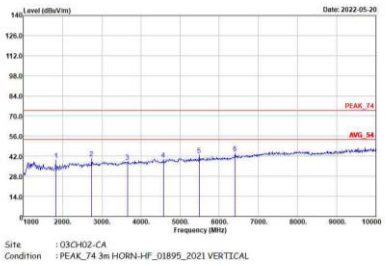
FSK	FSK 902~928MHz	
	FSK 150Kbps FHSS Ch33 915.2MHz	
	Horizontal	Vertical
QP / Peak		

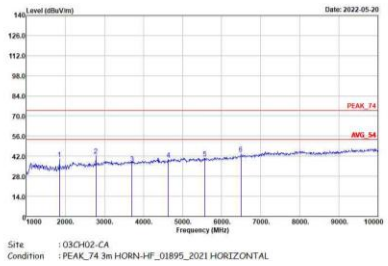
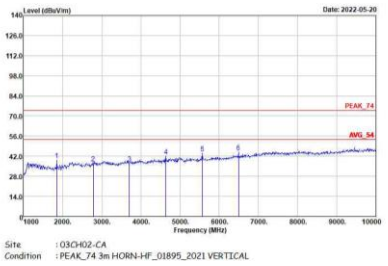
FSK	FSK 902~928MHz	
	FSK 150Kbps FHSS Ch64 927.6MHz	
	Horizontal	Vertical
Peak Avg.		

FSK 902~928MHz

FSK 150Kbps FHSS (Harmonic @ 3m)

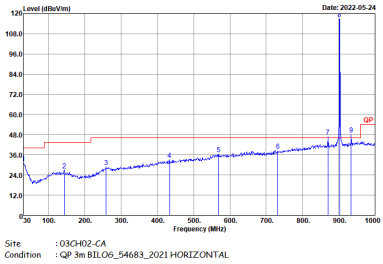
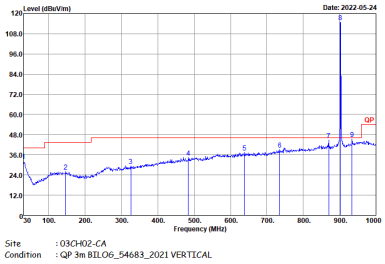
FSK	FSK 902~928MHz	
	FSK 150Kbps FHSS Ch01 902.4MHz	
	Horizontal	Vertical
Peak Avg.		

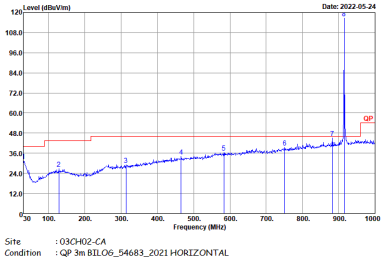
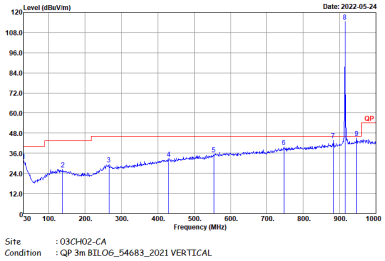
FSK	FSK 902~928MHz	
	FSK 150Kbps FHSS Ch33 915.2MHz	
	Horizontal	Vertical
Peak Avg.		

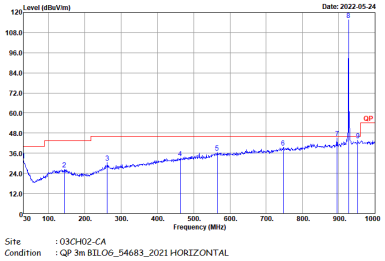
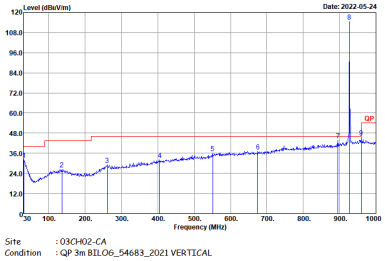
FSK	FSK 902~928MHz	
	FSK 150Kbps FHSS Ch64 927.6MHz	
	Horizontal	Vertical
Peak Avg.		

FSK 902~928MHz

FSK 250Kbps FHSS (LF @ 3m)

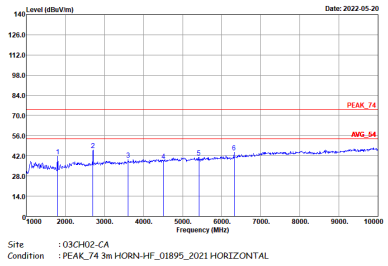
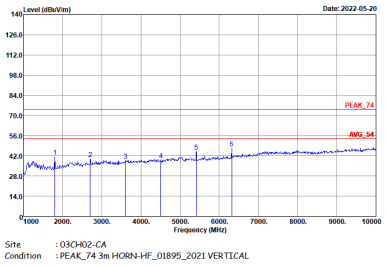
FSK	FSK 902~928MHz	
	FSK 250Kbps FHSS Ch01 902.5MHz	
	Horizontal	Vertical
QP / Peak		

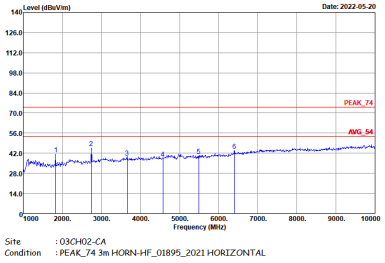
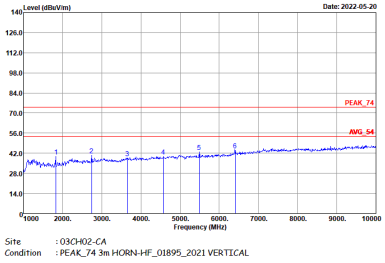
FSK	FSK 902~928MHz	
	FSK 250Kbps FHSS Ch26 915MHz	
	Horizontal	Vertical
QP / Peak		

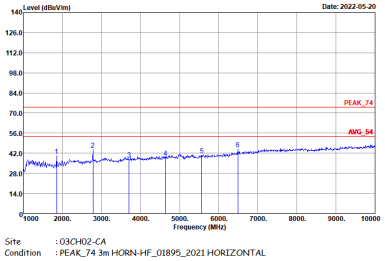
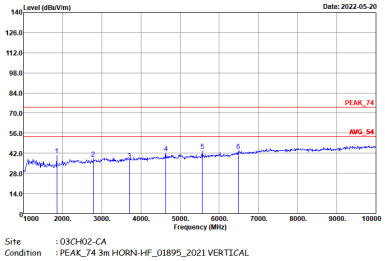
FSK	FSK 902~928MHz	
	FSK 250Kbps FHSS Ch51 927.5MHz	
	Horizontal	Vertical
Peak Avg.		

FSK 902~928MHz

FSK 250Kbps FHSS (Harmonic @ 3m)

FSK	FSK 902~928MHz	
	FSK 250Kbps FHSS Ch01 902.5MHz	
	Horizontal	Vertical
Peak Avg.		

FSK	FSK 902~928MHz	
	FSK 250Kbps FHSS Ch26 915MHz	
	Horizontal	Vertical
Peak Avg.	 Site : 03CH02-CA Condition : PEAK_74 3m HORN-HF_01895_2021 HORIZONTAL	 Site : 03CH02-CA Condition : PEAK_74 3m HORN-HF_01895_2021 VERTICAL

FSK	FSK 902~928MHz	
	FSK 250Kbps FHSS Ch51 927.5MHz	
	Horizontal	Vertical
Peak Avg.	 Site : 03CH02-CA Condition : PEAK_74 3m HORN-HF_01895_2021 HORIZONTAL	 Site : 03CH02-CA Condition : PEAK_74 3m HORN-HF_01895_2021 VERTICAL