

**ELECTROMAGNETIC EMISSIONS
COMPLIANCE REPORT**

Applicant: Ring LLC
12515 Cerise Ave, Hawthorne, CA90250 United States

Manufacturer: Ring LLC
12515 Cerise Ave, Hawthorne, CA90250 United States

Product Name: Mailbox Sensor

Brand Name: ring

Model No.: 5D22E3

ISED HVIN: MB004

Report Number: TERF2406001611E2

FCC ID 2AEUPRBMB004

IC: 20271-RBMB004

Date of EUT Received: May 17, 2024

Date of Test: June 11, 2024~July 26, 2024

Issue Date: July 31, 2024

Approved By _____

Jay Lin

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Central RF Lab The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10:2013 and the energy emitted by the sample EUT comply with FCC rule part §15.247, ISED RSS-Gen and RSS-247.

The results of this report relate only to the sample identified in this report.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.
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Revision History					
Report Number	Revision	Description	Issue Date	Revised By	Remark
TERF2406001611E2	00	Original	Jul. 31, 2024	Candice Li	

Note:

- 1、The remark "*" indicates modification of the report upon requests from certification body.

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Table of Contents

1	GENERAL INFORMATION	4
2	SYSTEM TEST CONFIGURATION	6
3	SUMMARY OF TEST RESULTS.....	8
4	DESCRIPTION OF TEST MODES	9
5	MEASUREMENT UNCERTAINTY	11
6	MEASUREMENT EQUIPMENT USED.....	12
7	CONDUCTED EMISSION TEST	13
8	EMISSION BANDWIDTH	14
9	NUMBER OF HOPPING FREQUENCY	17
10	FREQUENCY SEPARATION	19
11	PEAK OUTPUT POWER MEASUREMENT.....	21
12	TIME OF OCCUPANCY (DWELL TIME).....	23
13	CONDUCTED BAND EDGES AND SPURIOUS EMISSION MEASUREMENT	26
14	SPURIOUS RADIATED EMISSION TEST	30
15	ANTENNA REQUIREMENT	70

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1 GENERAL INFORMATION

1.1 Product description

Product Name:	Mailbox Sensor
Brand Name:	ring
Model No.:	5D22E3
ISED HVIN:	MB004
Hardware Version:	PVT
Firmware Version:	N/A
EUT Series No.:	3000158 (Conducted) 3000036 (Radiated)
Power Supply:	4.5Vdc from AAA Battery*3
Test Software (Name/Version)	J-Link Commander V7.96i

1.2 RF Specification

Radio Technology:	FSK 50Kbps FHSS
Frequency Range:	902 – 928MHz
Channel number:	129 channels
Modulation type:	FSK FHSS
Transmit Power:	21.53 dBm (Peak)
Dwell Time:	<= 0.4s
Operating Mode:	Point-to-Point

1.3 Antenna Designation

Internal / External	Antenna Type	Freq. (MHz)	Peak Antenna Gain (dBi)
Internal	LTCC	902~928	-2.88
External	PIFA	902~928	0.37

Note:

1. Antenna information is provided by the applicant.
2. This block has two antennas, not operating simultaneously.

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1.4 Test Methodology of Applied Standards

FCC Part 15, Subpart C §15.247
 FCC KDB 558074 D01 15.247 Meas Guidance v05r02
 RSS-247 issue 3 Aug. 2023
 RSS-Gen, Issue 5 April 2018, Amendment 2 (February 2021)
 ANSI C63.10:2013

1.5 Test Facility

Laboratory	Test Site Address	Test Site Name	FCC Designation number	IC CAB identifier
SGS Taiwan Ltd. Central RF Lab. (TAF code 3702)	No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan.	SAC 1	TW0027	TW3702
		SAC 2		
		SAC 3		
		Conduction 1		
		Conducted 1		
		Conducted 2		
		Conducted 3		
		Conducted 4		
		Conducted 5		
		Conducted 6		
	No.2, Keji 1st Rd., Guishan District, Taoyuan City, Taiwan 333	Conduction C	TW0028	
		SAC C		
		SAC D		
		SAC G		
		Conducted A		
		Conducted B		
		Conducted C		
		Conducted D		
		Conducted E		
		Conducted F		
Conducted G				

Note: Test site name is remarked on the equipment list in each section of this report as an indication where measurements occurred in specific test site and address.

1.6 Special Accessories

There are no special accessories used while test was conducted.

1.7 Equipment Modifications

There was no modification incorporated into the EUT.

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2 SYSTEM TEST CONFIGURATION

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

An engineering test mode (software/firmware) that applicant provided was utilized to manipulate the EUT into transmit, selection of the test channel, and modulation scheme.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is placed on a table which is 0.8 m above ground plane. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz. The CISPR Quasi-Peak and Average detector mode is employed. The two LISNs provide 50uH/50 ohm of coupling impedance for the measuring instrument. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

2.3.2 Conducted Test (RF)

The active antenna port of the unlicensed wireless device is connected to the spectrum analyzer with attenuator to protect the instrumentation. If a second antenna port is available, it is tested at one operating frequency, with other port(s) appropriately terminated, to verify it has similar output characteristics as the fully tested port.

2.3.3 Radiated Emissions

The EUT is placed on a turn table. For emissions testing at or below 1 GHz, the table height shall be 0.8 m above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.

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2.4 Measurement Results Explanation Example

2.4.1 Radiated Emission Test Sites For Measurements From 9 kHz To 30 MHz

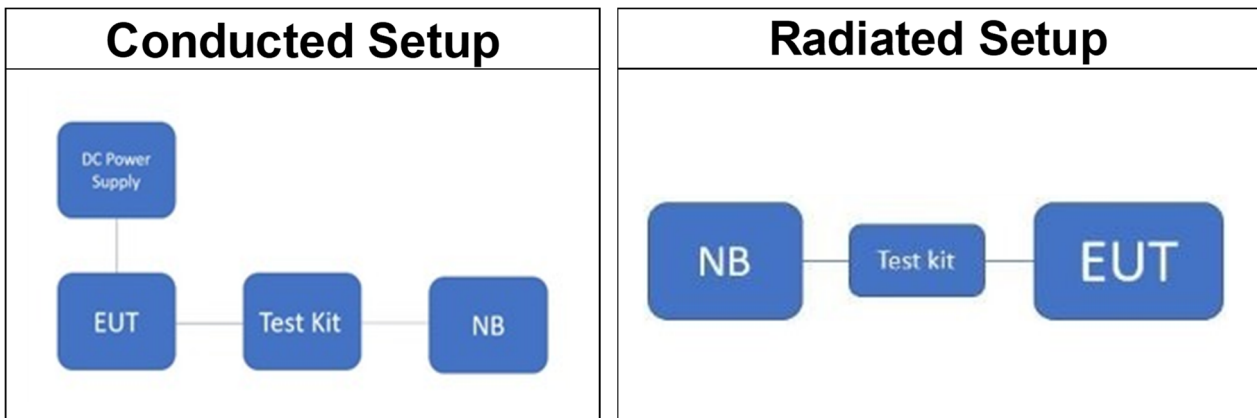
Radiated emission below 30MHz is measured in a 9m*6m*6m semi-anechoic chamber, the measurements correspond to those obtained at an open-field test site.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

2.4.2 For all conducted test items:

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

2.5 Test Configuration



2.6 Control Unit(s)

Conducted Emission Test Site: Conducted F					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Notebook	HP	HSN-Q35C-4	P0003860	N/A	N/A
Testkit	N/A	N/A	N/A	N/A	N/A
Radiated Emission Test Site: SAC D					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Testkit	N/A	N/A	N/A	N/A	N/A
Notebook	Lenovo	L480	P0002332	N/A	N/A

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3 SUMMARY OF TEST RESULTS

FCC Rules	IC Rules	Description Of Test	Result
§15.207(a)	RSS-Gen §8.8	AC Power Line Conducted Emission	Non applicable
§15.247(a)(1)(i)	RSS-247 §5.2 a RSS-Gen §6.7	Emission Bandwidth	Compliant
§15.247(a)(1)(i)	RSS-247 §5.1 c	Number of Hopping Frequency	Compliant
§15.247(a)(1)	RSS-247 §5.1 b	Frequency Separation	Compliant
§15.247(b)(2)	RSS-247 §5.4 a	Peak Output Power	Compliant
§15.247(a)(1)(i)	RSS-247 §5.1 c	Time of Occupancy	Compliant
§15.205 §15.209 §15.247(d)	RSS-247 §5.5 RSS-Gen §8.9 RSS-Gen §8.10	Conducted & Radiated Band Edge and Spurious Emission	Compliant
§15.203	N/A	Antenna Requirement	Compliant

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4 DESCRIPTION OF TEST MODES

4.1 Operating Frequencies

902~928 MHz							
CH	Freq. (MHz)	CH	Freq. (MHz)	CH	Freq. (MHz)	CH	Freq. (MHz)
1	902.2	21	910.4	41	918.4	61	926.4
2	902.8	22	910.8	42	918.8	62	926.8
3	903.2	23	911.2	43	919.2	63	927.2
4	903.6	24	911.6	44	919.6	64	927.8
5	904.0	25	912.0	45	920.0		
6	904.4	26	912.4	46	920.4		
7	904.8	27	912.8	47	920.8		
8	905.2	28	913.2	48	921.2		
9	905.6	29	913.6	49	921.6		
10	906.0	30	914.0	50	922.0		
11	906.4	31	914.4	51	922.4		
12	906.8	32	914.8	52	922.8		
13	907.2	33	915.2	53	923.2		
14	907.6	34	915.6	54	923.6		
15	908.0	35	916.0	55	924.0		
16	908.4	36	916.4	56	924.4		
17	908.8	37	916.8	57	924.8		
18	909.2	38	917.2	58	925.2		
19	909.6	39	917.6	59	925.6		
20	910.0	40	918.0	60	926.0		

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4.2 The Worst Test Modes and Channel Details

- 1 The EUT has been tested under operating condition.
- 2 Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.
- 3 Investigation has been done on all the possible configurations for searching the worst case.

ANTNNA PORT CONDUCTED TEST				
MODE	AVAILABLE FREQUENCY (MHz)	TESTED FREQUENCY (MHz)	MODULATION	DATA RATE (Kbps)
Peak Output Power, 20dB Band Width, Spurious Emission				
FSK 50Kbps FHSS	902 to 928	902.2,915,927.8	FSK FHSS	50
Band Edge				
FSK 50Kbps FHSS	902 to 928	902.2,915,927.8	FSK FHSS	50
Number of Hopping Frequency, Hopping Band edge				
FSK 50Kbps FHSS	902 to 928	902.2,915,927.8	FSK FHSS	50
Time of Occupancy(Dwell time)				
FSK 50Kbps FHSS	902 to 928	902.2,915,927.8	FSK FHSS	50

RADIATED EMISSION TEST (BELOW 1 GHz)				
MODE	AVAILABLE FREQUENCY(MHz)	TESTED FREQUENCY (MHz)	MODULATION	DATA RATE (kbps)
FSK 50kbps FHSS	902 to 928	915.0	FSK FHSS	50

RADIATED EMISSION TEST (ABOVE 1 GHz)				
MODE	AVAILABLE FREQUENCY	TESTED FREQUENCY	MODULATION	DATA RATE (kbps)
FSK 50kbps FHSS	902 to 928	902.2,915,927.8	FSK FHSS	50

Note: The field strength of radiated emission was measured as the EUT positioned in different orthogonal planes (E1/E2/H) based on actual usage of the EUT to pre-scan the emissions for determining the worst case scenario.

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5 MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
AC Power Line Conducted Emission	+/- 1.54 dB
Output Power measurement	+/- 0.97 dB
Emission Bandwidth	+/- 1.38 Hz
Conducted emission measurement	+/- 0.77 dB
Frequency Separation	+/- 1.48 Hz
Number of hopping frequency	+/- 1.48 Hz
Time of Occupancy	+/- 1.48 Hz
Temperature	+/- 0.6 °C
Humidity	+/- 3 %
DC / AC Power Source	+/- 1 %

Radiated Spurious Emission Measurement Uncertainty				
Polarization: Vertical	+/-	1.89	dB	9kHz~30MHz
	+/-	4.15	dB	30MHz - 1000MHz
	+/-	3.43	dB	1GHz - 18GHz
	+/-	3.86	dB	18GHz - 40GHz
Polarization: Horizontal	+/-	1.89	dB	9kHz~30MHz
	+/-	4.02	dB	30MHz - 1000MHz
	+/-	3.43	dB	1GHz - 18GHz
	+/-	3.86	dB	18GHz - 40GHz
Radiated Spurious Emission	+/-	2	dB	33GHz-50GHz
	+/-	1.59	dB	50GHz-60GHz
	+/-	1.7	dB	60GHz-90GHz
	+/-	1.64	dB	90GHz-140GHz
	+/-	3.83	dB	140GHz-220GHz

Note:

1. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. The conformity assessment statement in this report is based solely on the test results, measurement uncertainty is excluded.

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6 MEASUREMENT EQUIPMENT USED

6.1 Conducted Measurement

Conducted Emission Test Site: Conducted F					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Attenuator	Woken	WATT-218FS-10	RF25	11/15/2023	11/14/2024
DC Block	PASTERNAK	PE8210	RF153	11/15/2023	11/14/2024
DC Power Supply	Gwinstek	SPS-3610	GEV856769	08/04/2023	08/03/2024
Power Meter	Anritsu	ML2496A	1326001	08/22/2023	08/21/2024
Power Sensor	Anritsu	MA2411B	1315048	08/22/2023	08/21/2024
Power Sensor	Anritsu	MA2411B	1315049	08/22/2023	08/21/2024
Spectrum Analyzer	KEYSIGHT	N9010B	MY60240506	06/17/2024	06/16/2025
Test Software	SGS Taiwan	Radio Test Software	Ver.21	N.C.R	N.C.R

6.2 Radiated Measurement

Radiated Emission Test Site: SAC D					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
3m Site NSA	SGS	966 chamber D	N/A	04/30/2024	04/29/2025
Active Loop Antenna	COM-POWER	AL-130R	10160105	12/04/2023	12/03/2024
Broadband Antenna	SCHWARZBECK	VULB 9168	9168-617	12/14/2023	12/13/2024
Coaxial Cable	Huber+Suhner	EMC106-SM-SM-7200	150703	11/15/2023	11/14/2024
Coaxial Cable	Huber+Suhner	RG 214/U	W21.01	11/15/2023	11/14/2024
Horn Antenna	Schwarzbeck	BBHA9120D	1341	05/30/2024	05/29/2025
Pre-Amplifier	EMC Instruments	EMC12630SE	980273	11/15/2023	11/14/2024
Pre-Amplifier	EMC Instruments	EMC18405SEE	980881	11/15/2023	11/14/2024
Pre-Amplifier	EMC Instruments	EMC9135	980234	11/15/2023	11/14/2024
Spectrum Analyzer	KEYSIGHT	N9010A	MY57120200	04/03/2024	04/02/2025
Test Software	audix	e3	E3 20923 SGS Ver.9 (C)	N.C.R	N.C.R

NOTE: N.C.R refers to Not Calibrated Required.

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7 CONDUCTED EMISSION TEST

7.1 Standard Applicable

Frequency within 150 kHz to 30MHz shall not exceed the limit table as below.

Frequency range MHz	Limits (dBuV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

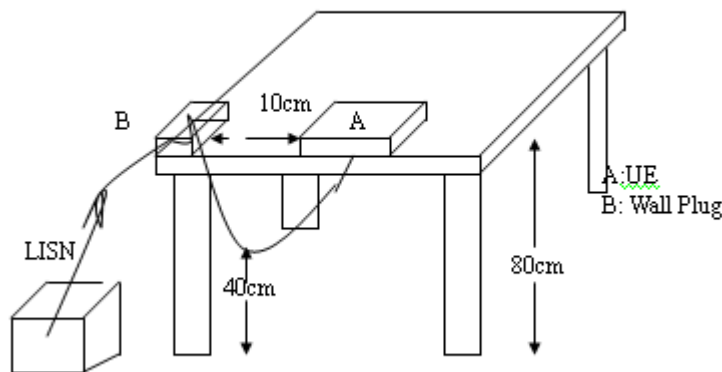
Note

- The lower limit shall apply at the transition frequencies
- The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

7.2 EUT Setup:

- The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.10:2013.
- The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
- The LISN was connected with 120Vac/60Hz power source.

7.3 Test Set-up:



7.4 Measurement Procedure

- The EUT was placed on a table which is 0.8m above ground plane.
- Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- Repeat above procedures until all frequency measured were complete.

7.5 Measurement Result

N/A; Powered from AAA battery.

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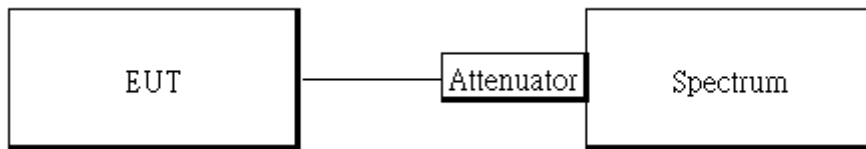
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8 EMISSION BANDWIDTH

8.1 Standard Applicable

The minimum 6 dB bandwidth shall be 500 kHz.

8.2 Test Setup



8.3 Measurement Procedure:

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW=1% to 5% OBW, VBW = 3 x RBW, Span= large enough to capture all products of the modulation process, Sweep=auto, Detector = Peak, and Max hold for 20dB Bandwidth test.
4. Mark the peak frequency and -20dB (upper and lower) frequency and Turn on the 99% bandwidth function, max reading.
5. Repeat above procedures until all test default channel is completed

8.4 20dB Bandwidth

Internal antenna

FSK

CH	20 dB BW (MHz)	2/3 BW (MHz)
Low	0.1066	0.07
Mid	0.1072	0.07
High	0.1109	0.07

External antenna

FSK

CH	20 dB BW (MHz)	2/3 BW (MHz)
Low	0.1061	0.07
Mid	0.109	0.07
High	0.1099	0.07

8.5 99% Bandwidth

Internal antenna

FSK

CH	99% BW (MHz)
Low	0.10328
Mid	0.10338
High	0.10366

External antenna

FSK

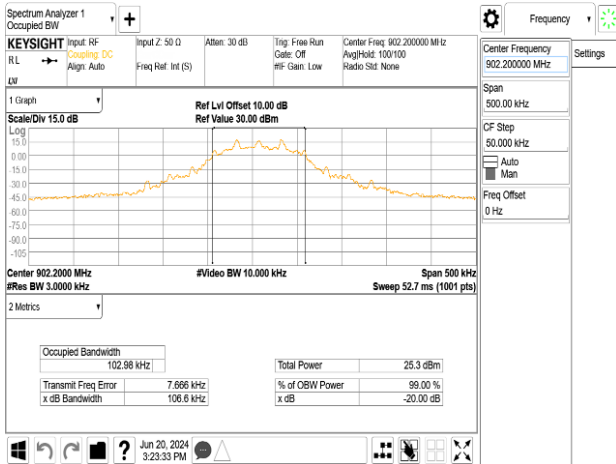
CH	99% BW (MHz)
Low	0.10369
Mid	0.1033
High	0.10374

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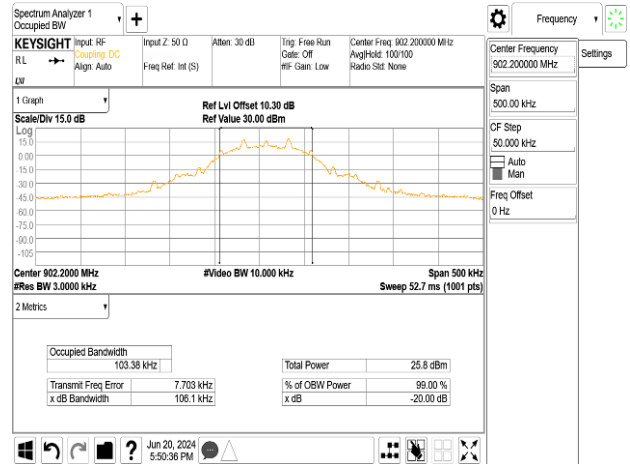
Internal antenna

OBW 20dB_FSK_LowCH-902.2MHz

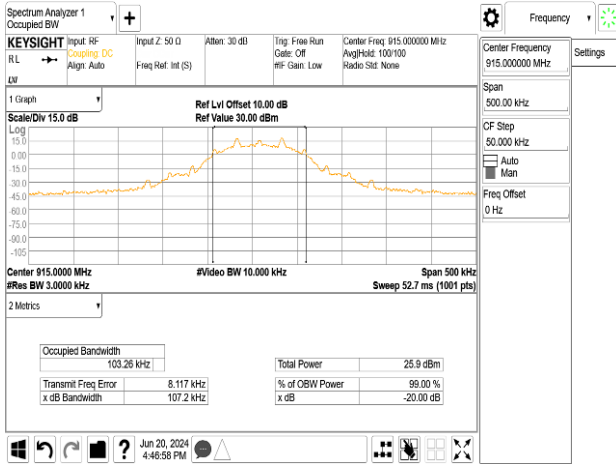


External antenna

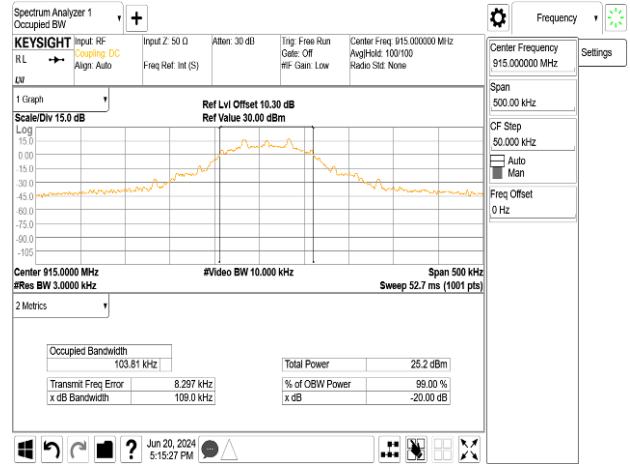
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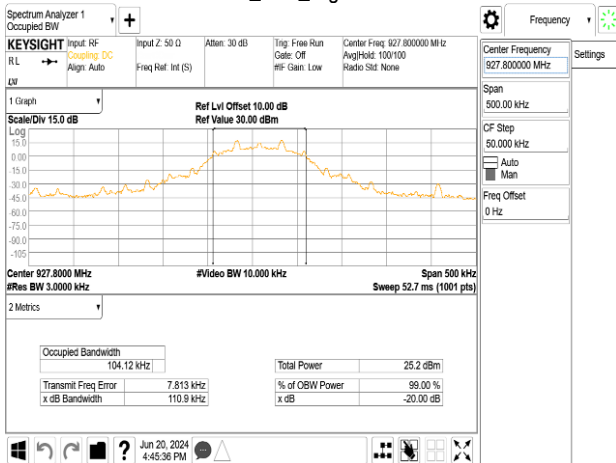
OBW 20dB_FSK_MidCH-915MHz



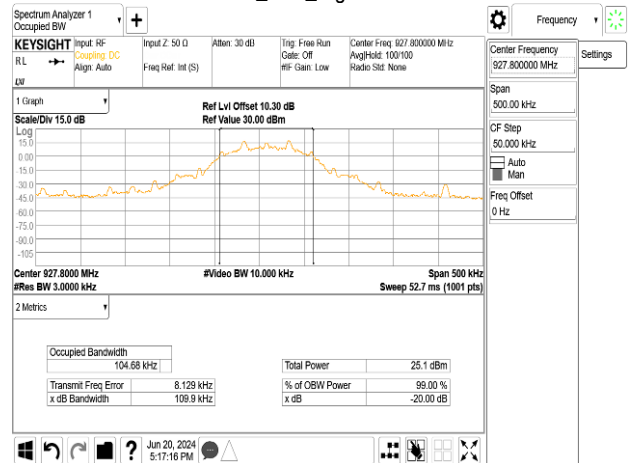
OBW 20dB_FSK_MidCH-915MHz



OBW 20dB_FSK_HighCH-927.8MHz



OBW 20dB_FSK_HighCH-927.8MHz



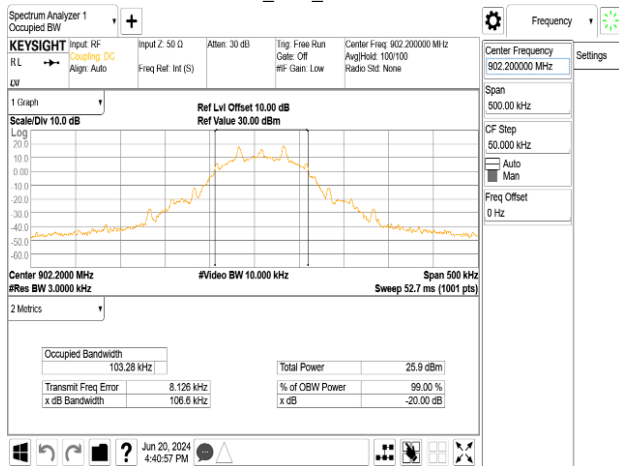
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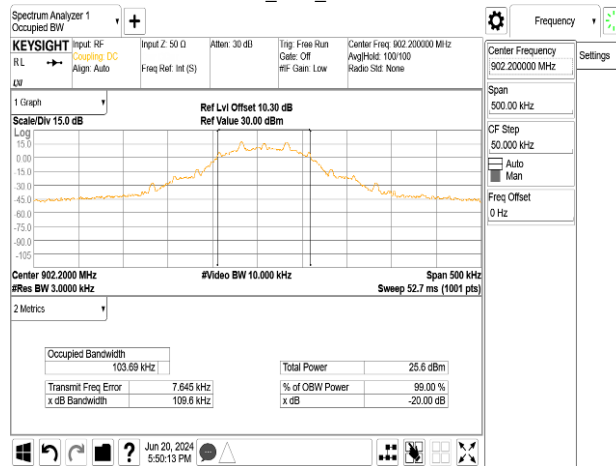
Internal antenna

IC OBW 99%_FSK_LowCH-902.2MHz

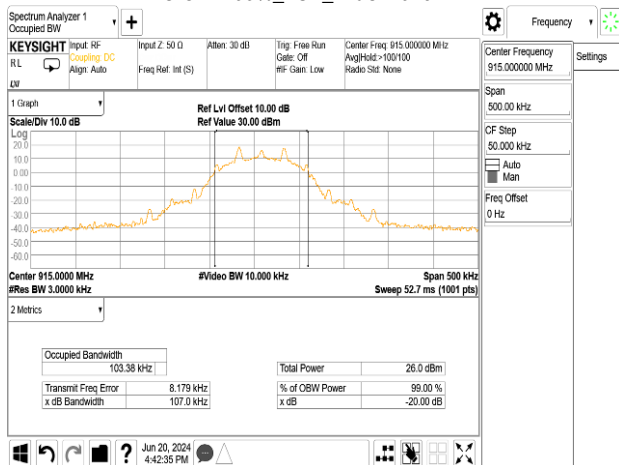


External antenna

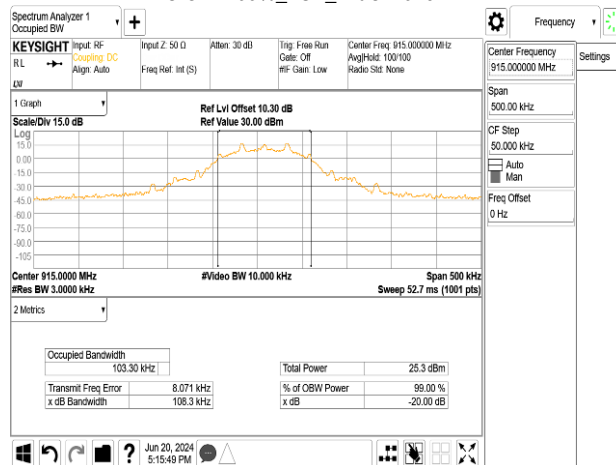
IC OBW 99%_FSK_LowCH-902.2MHz



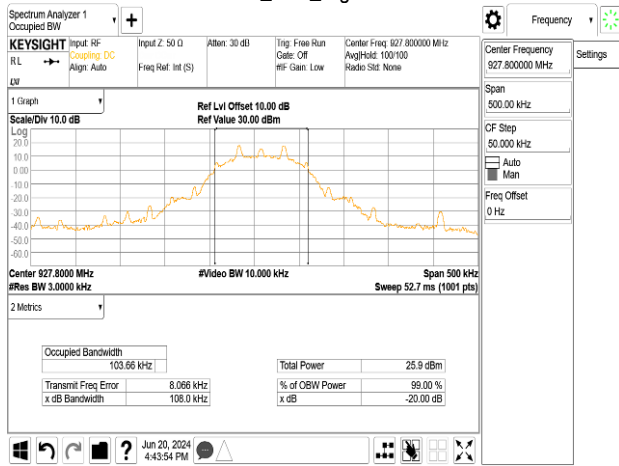
IC OBW 99%_FSK_MidCH-915MHz



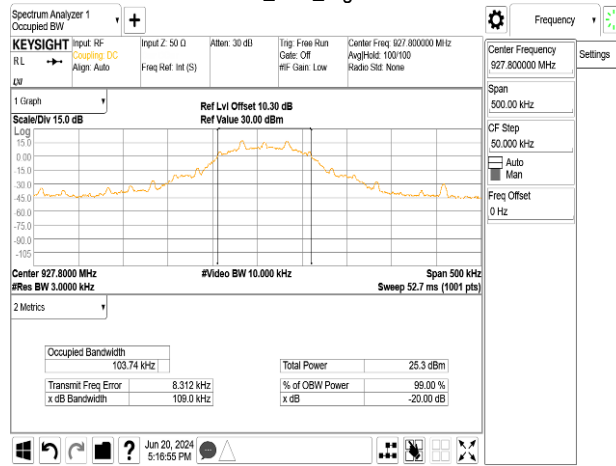
IC OBW 99%_FSK_MidCH-915MHz



IC OBW 99%_FSK_HighCH-927.8MHz



IC OBW 99%_FSK_HighCH-927.8MHz



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9 NUMBER OF HOPPING FREQUENCY

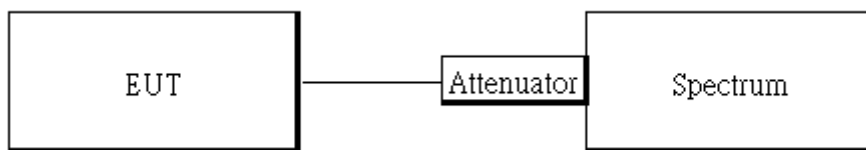
9.1 Standard Applicable

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.

The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

9.2 Test Setup



9.3 Measurement Procedure:

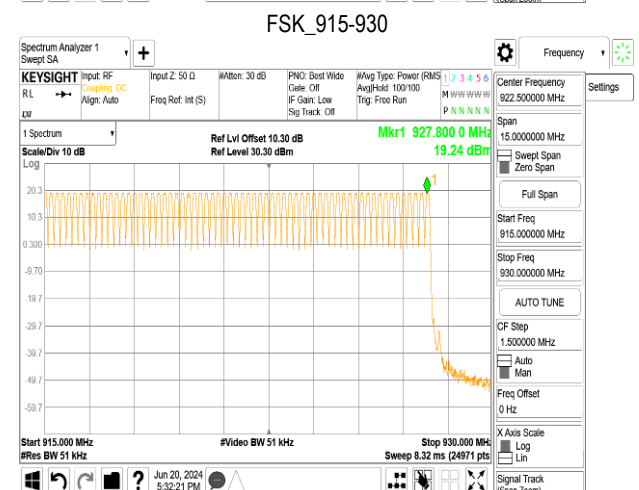
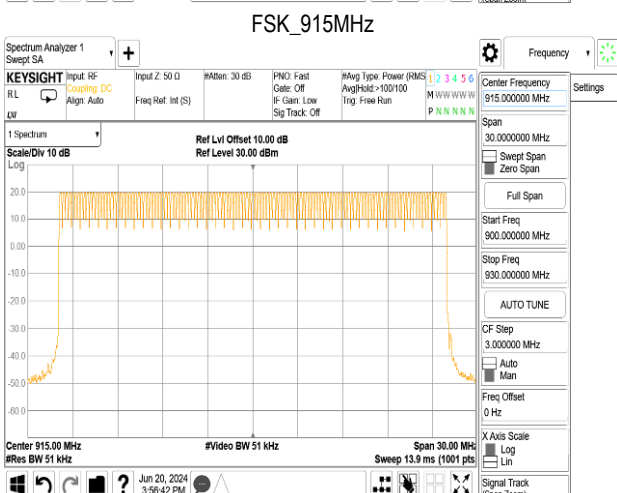
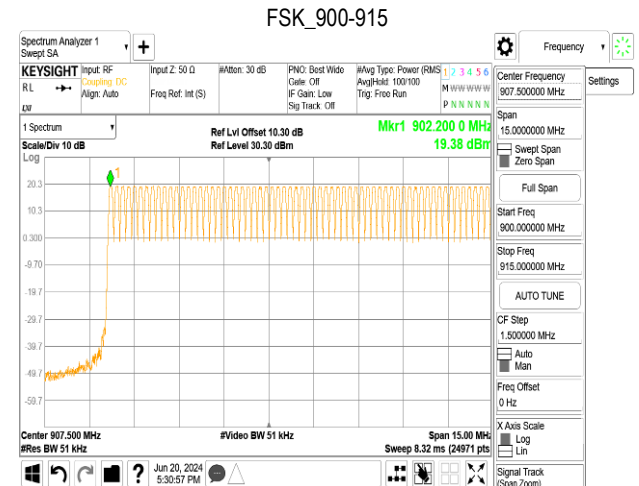
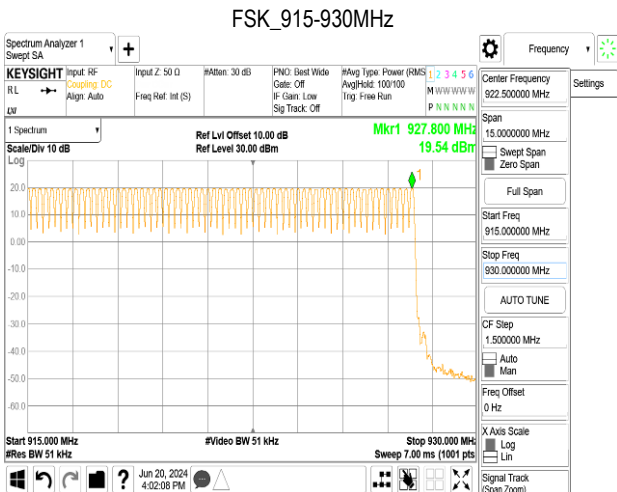
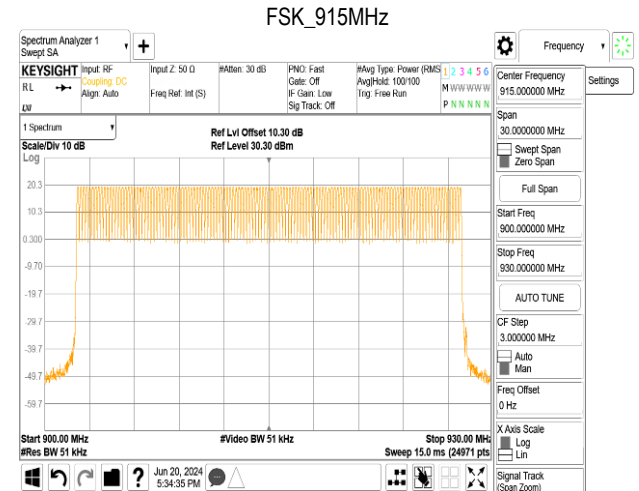
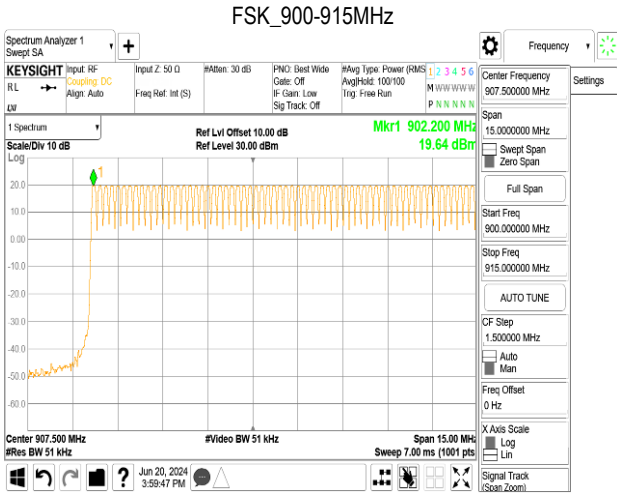
1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows ANSI C63.10:2013.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
4. Set spectrum analyzer Start= 900MHz, Stop = 930MHz, Sweep = auto.
5. Set the spectrum analyzer as RBW< 30% Freq. spacing or the 20 dB bandwidth, whichever is smaller, VBW ≥ RBW, Detector = Peak
6. Max hold, view and count how many channel in the band.

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9.4 Measurement Result: Internal antenna

External antenna



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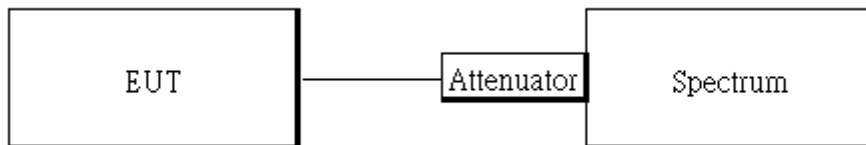
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10 FREQUENCY SEPARATION

10.1 Standard Applicable

Frequency hopping systems shall have hopping channel carrier frequencies separated by minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

10.2 Test Setup



10.3 Measurement Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows ANSI C63.10:2013.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
4. Set center frequency of spectrum analyzer = middle of hopping channel.
5. Set the RBW approximately 30% of the channel spacing, $VBW \geq RBW$.
6. Adjust Span to Wide enough to capture the peaks of two adjacent channels.
7. Sweep = auto.
8. Max hold. Mark 3 Peaks of hopping channel and record the 3 peaks frequency.

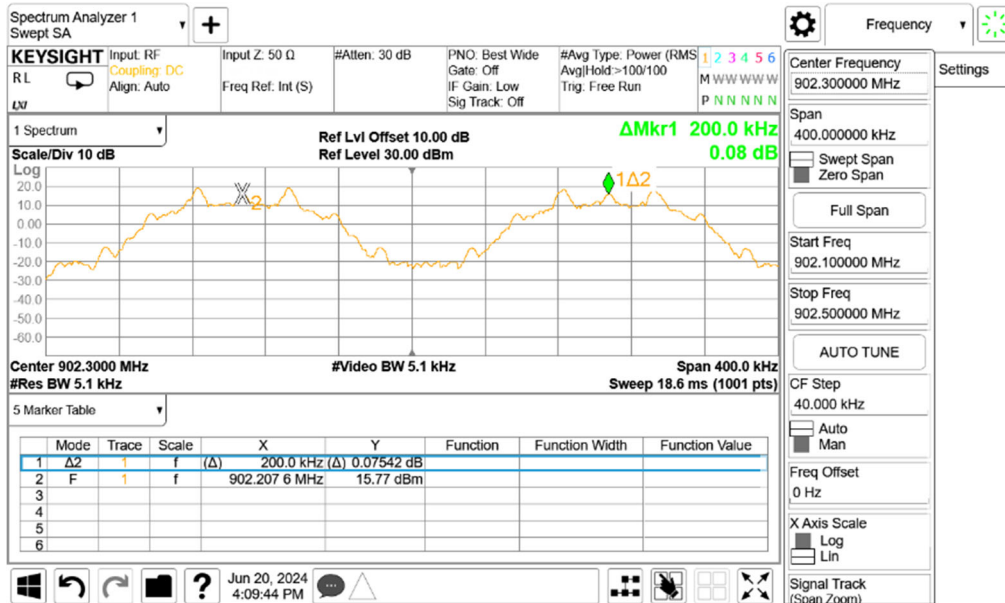
10.4 Measurement Result

Channel separation (kHz)	Limit	Result
200	≥ 25 kHz or 2/3 times 20dB bandwidth	PASS

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LowCH-902.2MHz



External antenna

LowCH-902.2MHz



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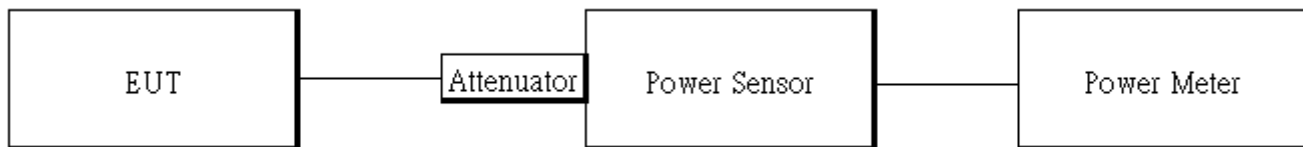
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11 PEAK OUTPUT POWER MEASUREMENT

11.1 Standard Applicable

For frequency hopping systems operating in the 902-928 MHz band employing at least 50 hopping channels, conducted output power shall not exceed 1Watt and EIRP shall not exceed 4W. For systems employing less than 50 hopping channels, conducted output power shall not exceed 0.25Watt and EIRP shall not exceed 1W.

11.2 Test Setup



11.3 Measurement Procedure:

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows ANSI C63.10.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter or spectrum. (Max Hold, Detector = Peak, RBW \geq 20dB bandwidth)
4. Record the max. reading.
5. Repeat above procedures until all default test channel is completed.

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11.4 Measurement Result

Internal antenna

FSK mode (Peak):

CH	Freq. (MHz)	Power Setting	Peak Output Power (dBm)	Output Power (mW)	Limit (mW)
Low	902.2	20	21.53	142.233	1000
Mid	915.0	20	21.45	139.637	1000
High	927.8	20	21.41	138.357	1000

FSK mode (Average):

CH	Freq. (MHz)	Power Setting	Avg. Output Power (dBm)	Output Power (mW)	Limit (mW)
Low	902.2	20	21.20	131.970	1000
Mid	915.0	20	21.11	129.264	1000
High	927.8	20	21.04	127.197	1000

FSK mode EIRP

Channel	Frequency (MHz)	Power Setting	Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (mW)	Limit (mW)
Low	902.2	20	21.20	-2.88	67.995	4000
Mid	915.0	20	21.11	-2.88	66.600	4000
High	927.8	20	21.04	-2.88	65.535	4000

* **Note:** EIRP = Average Power + Gain

External antenna

FSK mode (Peak):

CH	Freq. (MHz)	Power Setting	Peak Output Power (dBm)	Output Power (mW)	Limit (mW)
Low	902.2	20	21.31	135.207	1000
Mid	915.0	20	21.27	133.968	1000
High	927.8	20	21.22	132.434	1000

FSK mode (Average):

CH	Freq. (MHz)	Power Setting	Avg. Output Power (dBm)	Output Power (mW)	Limit (mW)
Low	902.2	20	20.93	124.016	1000
Mid	915.0	20	20.88	122.596	1000
High	927.8	20	20.83	121.193	1000

FSK mode EIRP

Channel	Frequency (MHz)	Power Setting	Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (mW)	Limit (mW)
Low	902.2	20	20.93	0.37	135.044	4000
Mid	915.0	20	20.88	0.37	133.498	4000
High	927.8	20	20.83	0.37	131.970	4000

* **Note:** EIRP = Average Power + Gain

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12 TIME OF OCCUPANCY (DWELL TIME)

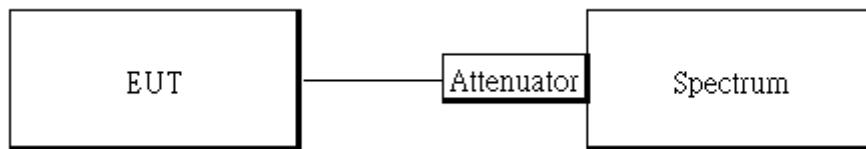
12.1 Standard Applicable

For FHSs in the band 902-928 MHz:

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

12.2 Test Setup



12.3 Measurement Procedure:

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows ANSI C63.10:2013.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
4. Set center frequency of spectrum analyzer = operating frequency.
5. Set the spectrum analyzer as RBW, VBW=100kHz, 300kHz, Span = 0Hz, Detector = Peak, Adjust Sweep = 50ms.
6. Repeat above procedures until all frequency of the interest measured were complete.

12.4 Tabular Result of the Measurement:

Internal antenna

FSK (0.05Mbps)

Number of transmission in a 25.6s	Length of transmission time (ms)	Measurement Result (ms)	Limit (ms)
5	73	365.00	400

External antenna

FSK (0.05Mbps)

Number of transmission in a 25.6s	Length of transmission time (ms)	Measurement Result (ms)	Limit (ms)
5	73	365.00	400

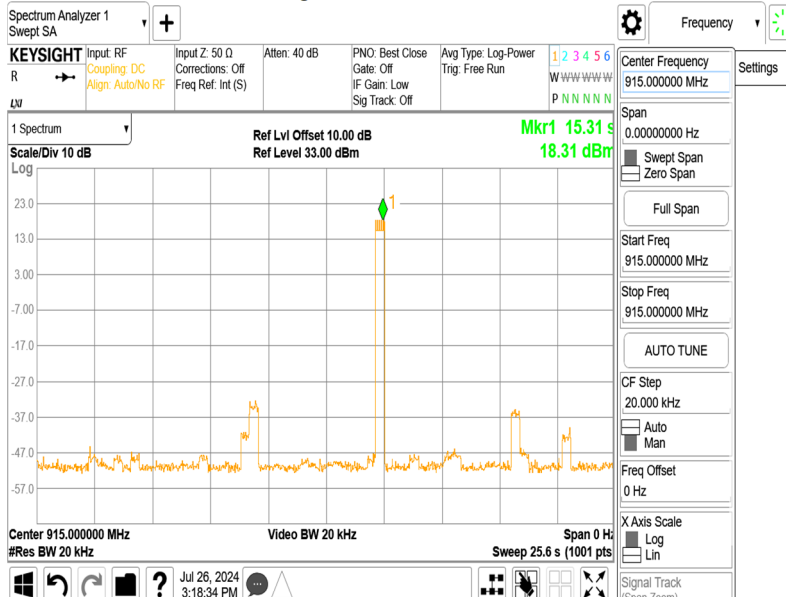
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12.5 Measurement Result:

Internal antenna

Length of transmission



Number of transmission time

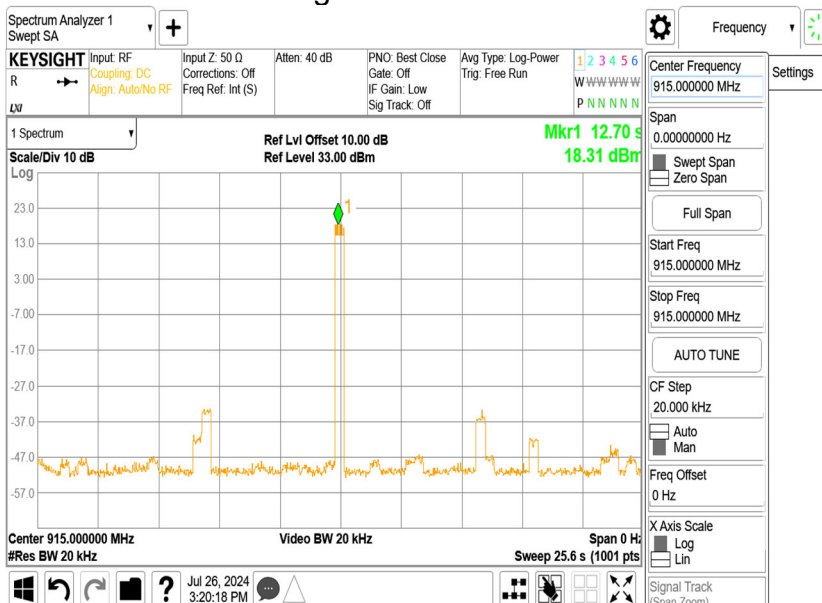


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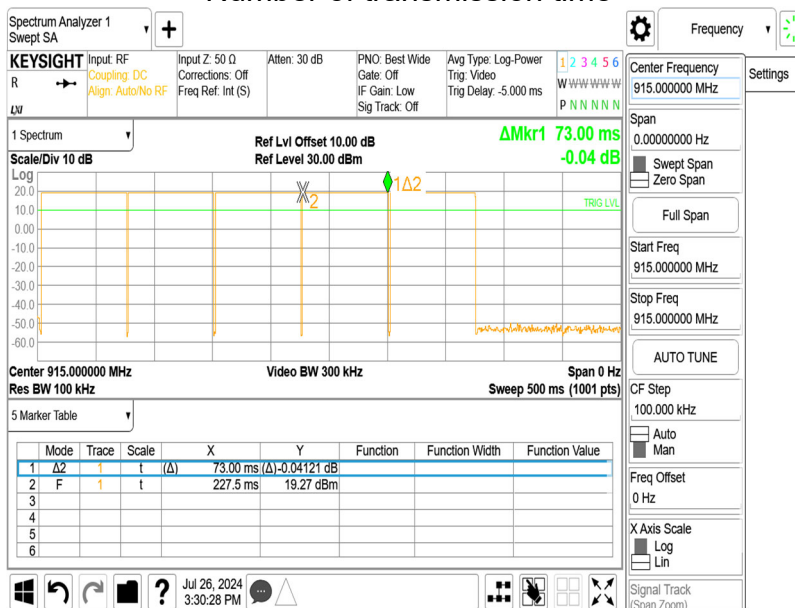
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Length of transmission



Number of transmission time



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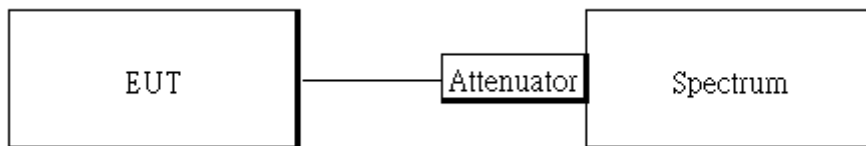
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13 CONDUCTED BAND EDGES AND SPURIOUS EMISSION MEASUREMENT

13.1 Standard Applicable

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a) and RSS-Gen §8.10, must also comply with the radiated emission limits specified in §15.209(a) and RSS-Gen §8.9.

13.2 Test Setup



13.3 Measurement Procedure

Conducted Band Edge:

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows ANSI C63.10:2013.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
4. Set center frequency of spectrum analyzer = operating frequency.
5. Set the spectrum analyzer as RBW=100 kHz, VBW=300 kHz, Sweep = auto
6. Mark Peak and record the max. level.
7. Repeat above procedures until all frequency measured were complete.

Conducted Spurious Emission:

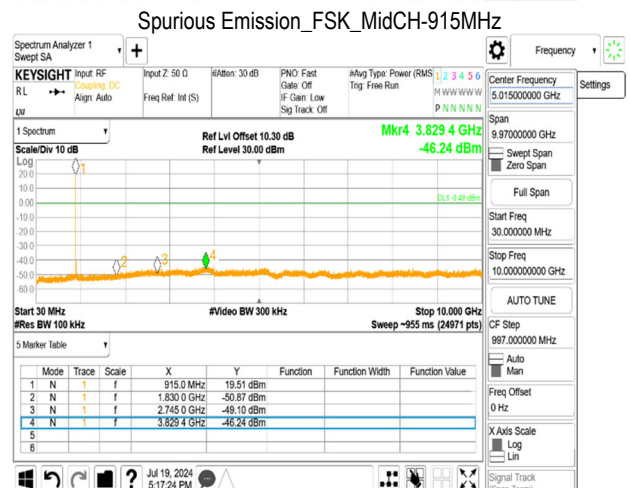
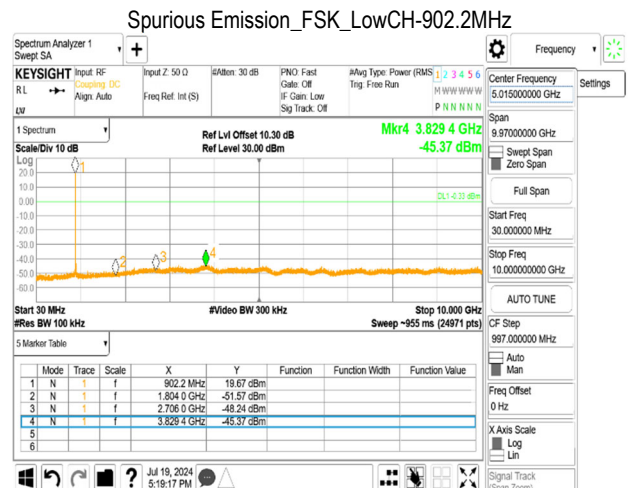
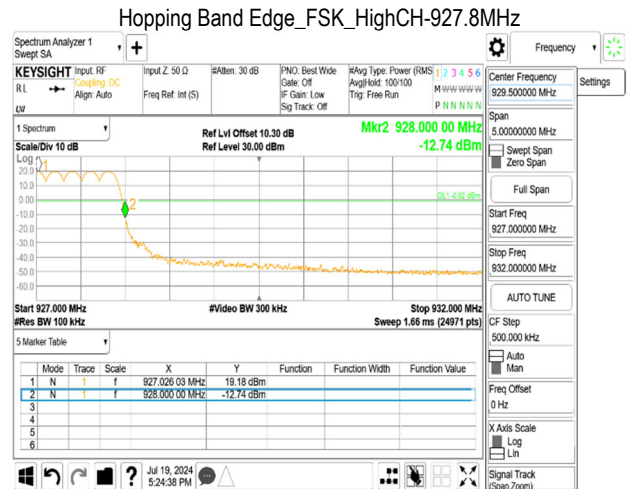
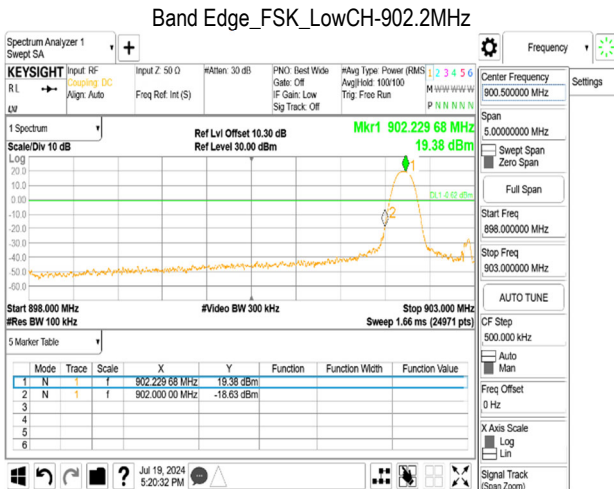
1. To connect Antenna Port of EUT to Spectrum.
2. The testing follows ANSI C63.10:2013.
3. Set RBW = 100 kHz & VBW = 300 kHz, Detector =Peak, Sweep = Auto
4. Allow trace to fully stabilize.
5. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
6. Repeat above procedures until all default test channel measured were complete.

NOTE: cable loss as 10dB that offsets in the spectrum

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13.4 Measurement Result Internal antenna



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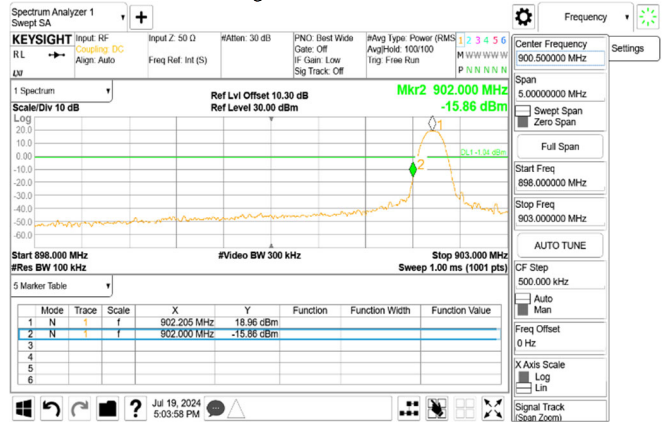
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External antenna

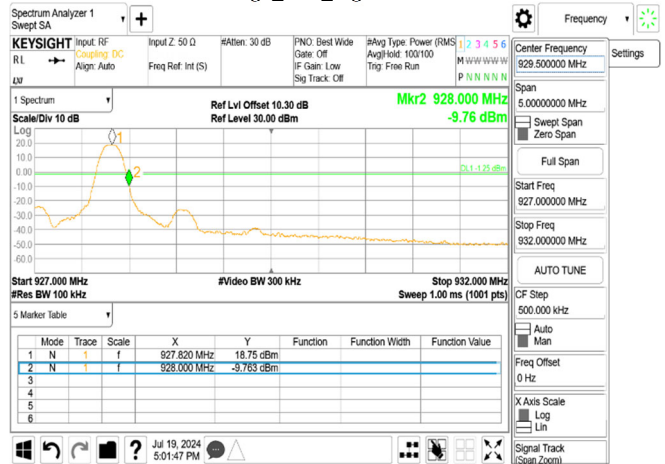
Spurious Emission_FSK_HighCH-927.8MHz



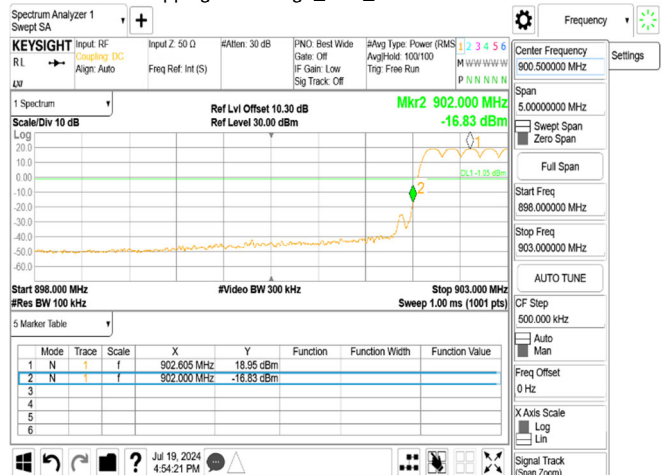
Band Edge_FSK_LowCH-902.2MHz



Band Edge_FSK_HighCH-927.8MHz



Hopping Band Edge_FSK_LowCH-902.2MHz



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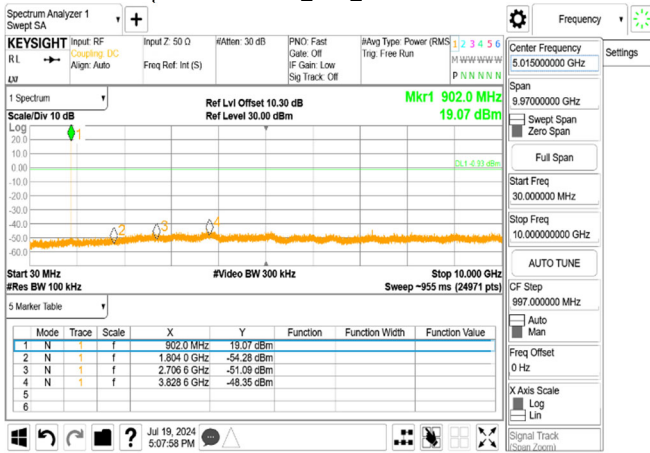
Hopping Band Edge_FSK_HighCH-927.8MHz



Spurious Emission_FSK_HighCH-927.8MHz



Spurious Emission_FSK_LowCH-902.2MHz



Spurious Emission_FSK_MidCH-915MHz



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