



FCC RADIO TEST REPORT

FCC ID : 2AEUPBHARC021
Equipment : Security Camera
Brand Name : ring
Model Name : 5CCEA4
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 Aug. 01, 2025 and testing was performed from Aug. 19, 2025 to Sep. 04, 2025. We, Sporton International Inc. Wensan Laboratory, 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 from Sporton International Inc. Wensan Laboratory, the test report shall not be reproduced except in full.

Approved by: Louis Wu

Sporton International Inc. Wensan Laboratory

No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.)



Table of Contents

History of this test report.....	3
Summary of Test Result.....	4
1 General Description.....	5
1.1 Product Feature of Equipment Under Test.....	5
1.2 Modification of EUT	5
1.3 Testing Location	6
1.4 Applicable Standards.....	6
2 Test Configuration of Equipment Under Test.....	7
2.1 Carrier Frequency Channel	7
2.2 Test Mode.....	10
2.3 Connection Diagram of Test System.....	11
2.4 EUT Operation Test Setup	12
2.5 Measurement Results Explanation Example.....	12
3 Test Result.....	13
3.1 Number of Channel Measurement	13
3.2 Hopping Channel Separation Measurement	14
3.3 Dwell Time Measurement.....	15
3.4 20dB and 99% Bandwidth Measurement	16
3.5 Output Power Measurement.....	18
3.6 Conducted Band Edges Measurement.....	19
3.7 Conducted Spurious Emission Measurement	20
3.8 Radiated Band Edges and Spurious Emission Measurement	21
3.9 AC Conducted Emission Measurement.....	25
3.10 Antenna Requirements.....	27
4 List of Measuring Equipment	28
5 Measurement Uncertainty	30
Appendix A. Conducted Test Results	
Appendix B. AC Conducted Emission Test Result	
Appendix C. Radiated Spurious Emission Test Result	
Appendix D. Duty Cycle Plots	
Appendix E. Setup Photographs	



History of this test report

Report No.	Version	Description	Issue Date
FR561807-01G	01	Initial issue of report	Sep. 22, 2025
FR561807-01G	02	Updated antenna and frequency band information in Appendix C. This report is an updated version, replacing the report issued on Sep. 22, 2025.	Sep. 25, 2025

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	Pass	-
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	
3.9	15.207	AC Conducted Emission	Pass	
3.10	15.203 15.247(b)	Antenna Requirement	Pass	-

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/manufacture who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the section "Measurement Uncertainty".

Disclaimer:

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

Reviewed by: Keven Cheng

Report Producer: Shannon Huang



1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature		
General Specs Bluetooth-LE, LoRa, Wi-Fi 2.4GHz 802.11b/g/n/ac/ax, Wi-Fi 5GHz 802.11a/n/ac/ax and 24GHz Radar.		
Antenna Type LoRa: PIFA Antenna		
Antenna information		
902 MHz ~ 928 MHz	Peak Gain (dBi)	1.7

Remark: The EUT's information above is declared by manufacturer. Please refer to Disclaimer in report summary.

1.2 Modification of EUT

No modifications made to the EUT during the testing.

1.3 Testing Location

Test Site	Sporton International Inc. Wensan Laboratory
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	Sporton Site No. TH05-HY, CO07-HY, 03CH22-HY

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

FCC designation No.: TW3786

1.4 Applicable Standards

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

- ♦ FCC KDB Publication No. 558074 D01 15.247 Meas Guidance v05r02
- ♦ FCC KDB 414788 D01 Radiated Test Site v01r01
- ♦ FCC Part 15 Subpart C §15.247
- ♦ ANSI C63.10-2020

Remark:

1. All the test items were validated and recorded in accordance with the standards without any modification during the testing.
2. The TAF code is not including all the FCC KDB listed without accreditation.
3. 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	0	902.2	27	907.6	54	913.0	81	918.4	108	923.8
	1	902.4	28	907.8	55	913.2	82	918.6	109	924.0
	2	902.6	29	908.0	56	913.4	83	918.8	110	924.2
	3	902.8	30	908.2	57	913.6	84	919.0	111	924.4
	4	903.0	31	908.4	58	913.8	85	919.2	112	924.6
	5	903.2	32	908.6	59	914.0	86	919.4	113	924.8
	6	903.4	33	908.8	60	914.2	87	919.6	114	925.0
	7	903.6	34	909.0	61	914.4	88	919.8	115	925.2
	8	903.8	35	909.2	62	914.6	89	920.0	116	925.4
	9	904.0	36	909.4	63	914.8	90	920.2	117	925.6
	10	904.2	37	909.6	64	915.0	91	920.4	118	925.8
	11	904.4	38	909.8	65	915.2	92	920.6	119	926.0
	12	904.6	39	910.0	66	915.4	93	920.8	120	926.2
	13	904.8	40	910.2	67	915.6	94	921.0	121	926.4
	14	905.0	41	910.4	68	915.8	95	921.2	122	926.6
	15	905.2	42	910.6	69	916.0	96	921.4	123	926.8
	16	905.4	43	910.8	70	916.2	97	921.6	124	927.0
	17	905.6	44	911.0	71	916.4	98	921.8	125	927.2
	18	905.8	45	911.2	72	916.6	99	922.0	126	927.4
	19	906.0	46	911.4	73	916.8	100	922.2	127	927.6
	20	906.2	47	911.6	74	917.0	101	922.4	128	927.8
	21	906.4	48	911.8	75	917.2	102	922.6	-	-
	22	906.6	49	912.0	76	917.4	103	922.8	-	-
	23	906.8	50	912.2	77	917.6	104	923.0	-	-
	24	907.0	51	912.4	78	917.8	105	923.2	-	-
	25	907.2	52	912.6	79	918.0	106	923.4	-	-
	26	907.4	53	912.8	80	918.2	107	923.6	-	-

**FSK 150 Kbps**

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
902 – 928 MHz	0	902.4	32	915.2
	1	902.8	33	915.6
	2	903.2	34	916.0
	3	903.6	35	916.4
	4	904.0	36	916.8
	5	904.4	37	917.2
	6	904.8	38	917.6
	7	905.2	39	918.0
	8	905.6	40	918.4
	9	906.0	41	918.8
	10	906.4	42	919.2
	11	906.8	43	919.6
	12	907.2	44	920.0
	13	907.6	45	920.4
	14	908.0	46	920.8
	15	908.4	47	921.2
	16	908.8	48	921.6
	17	909.2	49	922.0
	18	909.6	50	922.4
	19	910.0	51	922.8
	20	910.4	52	923.2
	21	910.8	53	923.6
	22	911.2	54	924.0
	23	911.6	55	924.4
	24	912.0	56	924.8
	25	912.4	57	925.2
	26	912.8	58	925.6
	27	913.2	59	926.0
	28	913.6	60	926.4
	29	914.0	61	926.8
	30	914.4	62	927.2
	31	914.8	63	927.6

**FSK 250 Kbps**

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
902 – 928 MHz	0	902.5	27	916.0
	1	903.0	28	916.5
	2	903.5	29	917.0
	3	904.0	30	917.5
	4	904.5	31	918.0
	5	905.0	32	918.5
	6	905.5	33	919.0
	7	906.0	34	919.5
	8	906.5	35	920.0
	9	907.0	36	920.5
	10	907.5	37	921.0
	11	908.0	38	921.5
	12	908.5	39	922.0
	13	909.0	40	922.5
	14	909.5	41	923.0
	15	910.0	42	923.5
	16	910.5	43	924.0
	17	911.0	44	924.5
	18	911.5	45	925.0
	19	912.0	46	925.5
	20	912.5	47	926.0
	21	913.0	48	926.5
	22	913.5	49	927.0
	23	914.0	50	927.5
	24	914.5		
	25	915.0		
	26	915.5		

2.2 Test Mode

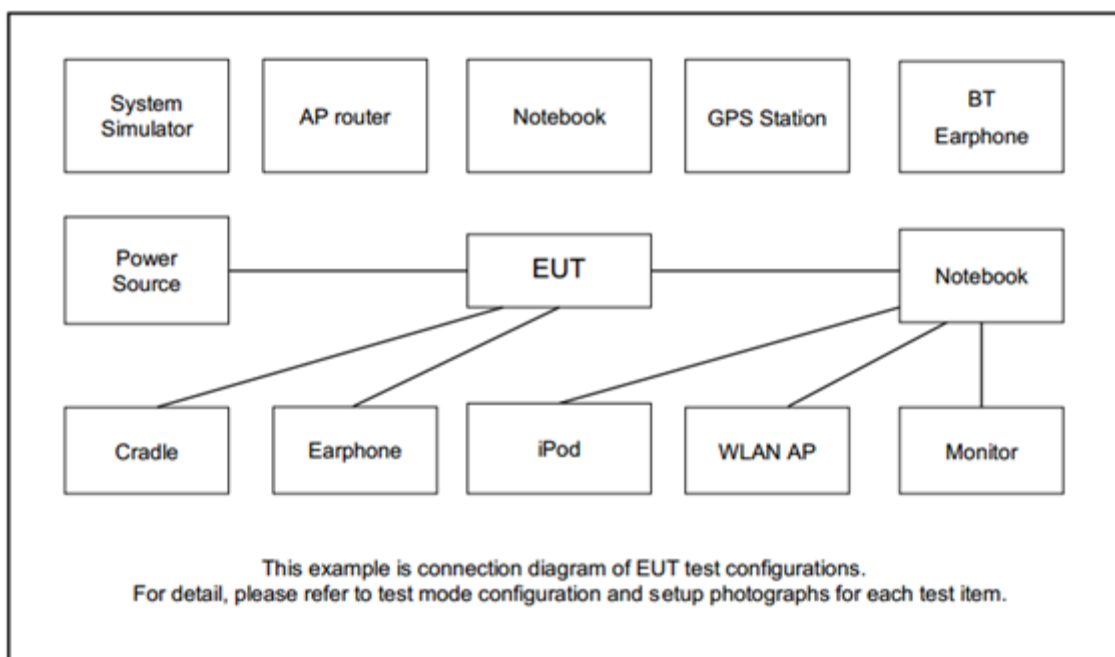
- a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). 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 only the worst case emissions were reported in this report.
- b. AC power line Conducted Emission was tested under maximum output power.

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: CH00 Tx_902.20 MHz Mode 2: CH64 Tx_915.00 MHz Mode 3: CH128 Tx_927.80 MHz
	LoRa 125 KHz FHSS_SF8	Mode 1: CH00 Tx_902.20 MHz Mode 2: CH64 Tx_915.00 MHz Mode 3: CH128 Tx_927.80 MHz
	LoRa 125 KHz FHSS_SF9	Mode 1: CH00 Tx_902.20 MHz Mode 2: CH64 Tx_915.00 MHz Mode 3: CH128 Tx_927.80 MHz
	FSK 50 Kbps FHSS	Mode 1: CH00 Tx_902.20 MHz Mode 2: CH64 Tx_915.00 MHz Mode 3: CH128 Tx_927.80 MHz
	FSK 150 Kbps FHSS	Mode 7: CH00 Tx_902.40 MHz Mode 8: CH32 Tx_915.20 MHz Mode 9: CH63 Tx_927.60 MHz
	FSK 250 Kbps FHSS	Mode 10: CH00 Tx_902.50 MHz Mode 11: CH25 Tx_915.00 MHz Mode 12: CH50 Tx_927.50 MHz

Summary table of Test Cases		
Radiated Test Cases	LoRa 125 KHz FHSS	Mode 1: CH00 Tx_902.20 MHz Mode 2: CH64 Tx_915.00 MHz Mode 3: CH128 Tx_927.80 MHz
	FSK 50 Kbps FHSS	Mode 1: CH00 Tx_902.20 MHz Mode 2: CH64 Tx_915.00 MHz Mode 3: CH128 Tx_927.80 MHz
	FSK 150 Kbps FHSS	Mode 7: CH00 Tx_902.40 MHz Mode 8: CH32 Tx_915.20 MHz Mode 9: CH63 Tx_927.60 MHz
	FSK 250 Kbps FHSS	Mode 10: CH00 Tx_902.50 MHz Mode 11: CH25 Tx_915.00 MHz Mode 12: CH50 Tx_927.50 MHz
AC Conducted Emission	Mode 1: Lora TX + adapter	

2.3 Connection Diagram of Test System





2.4 EUT Operation Test Setup

The RF test items, utility “Tera Term Version 4.89” 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.

2.5 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 10 dB attenuator.

$$\begin{aligned}\text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)} \\ &= 4.2 + 10 = 14.2 \text{ (dB)}\end{aligned}$$

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.

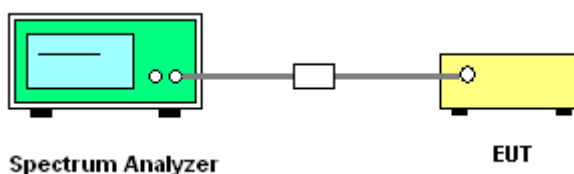
3.1.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.1.3 Test Procedure

1. The testing follows ANSI C63.10 clause 7.8.3.
2. The RF output of EUT is connected to the spectrum analyzer by RF cable and attenuator. The path loss is compensated to the results for each measurement.
3. Set the maximum power setting and enable the EUT to transmit continuously.
4. Enable the EUT hopping function.
5. Use the following spectrum analyzer settings: Span = the frequency band of operation;
RBW = 100kHz; VBW $\geq$ RBW; Sweep = No faster than coupled (auto) time.; Detector function = peak; Trace = max hold for LoRa 125kHz FHSS, FSK 50Kbps FHSS and FSK 150Kbps FHSS.
RBW = 200kHz; VBW $\geq$ RBW; Sweep = No faster than coupled (auto) time.; Detector function = peak; Trace = max hold for FSK 250Kbps FHSS.
6. The number of hopping frequency used is defined as the number of total channel.
7. Record the measurement data derived from spectrum analyzer.

3.1.4 Test Setup



3.1.5 Test Result of Number of Hopping Frequency

Please refer to Appendix A.

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.

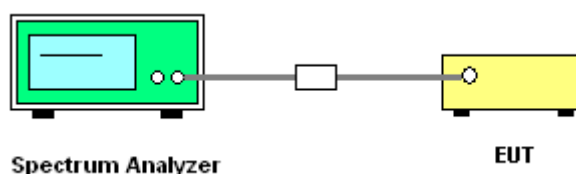
3.2.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.2.3 Test Procedures

1. The testing follows ANSI C63.10 clause 7.8.2.
2. The RF output of EUT is connected to the spectrum analyzer by RF cable and attenuator. The path loss is compensated to the results for each measurement.
3. Set the maximum power setting and enable the EUT to transmit continuously.
4. Enable the EUT hopping function.
5. Use the following spectrum analyzer settings:
Span = wide enough to capture the peaks of two adjacent channels;
RBW = 50kHz for; VBW $\geq$ RBW; Sweep = No faster than coupled (auto) time.; Detector function = peak; Trace = max hold for FSK 50Kbps FHSS.
RBW = 100kHz for; VBW $\geq$ RBW; Sweep = No faster than coupled (auto) time.; Detector function = peak; Trace = max hold for LoRa 125KHz FHSS and FSK 150Kbps FHSS.
RBW = 200kHz for; VBW $\geq$ RBW; Sweep = No faster than coupled (auto) time.; Detector function = peak; Trace = max hold for 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.

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.

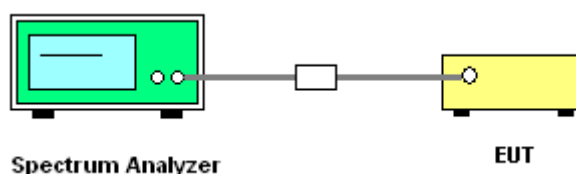
3.3.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.3.3 Test Procedures

1. The testing follows ANSI C63.10 clause 7.8.4.
2. The RF output of EUT is connected to the spectrum analyzer by RF cable and attenuator. The path loss is compensated to the results for each measurement.
3. Set the maximum power setting and enable the EUT to transmit continuously.
4. Enable the EUT hopping function.
5. Use the following spectrum analyzer settings: Span = zero span, centered on a hopping channel; RBW = 1 MHz; VBW $\geq$ 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.

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.

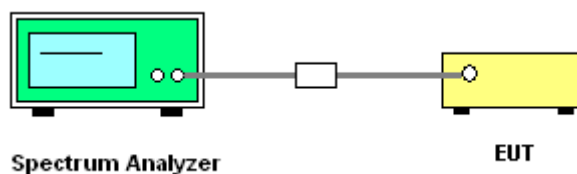
3.4.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.4.3 Test Procedures

1. The testing follows ANSI C63.10 clause 6.9.2 and 6.9.3.
2. The RF output of EUT is connected to the spectrum analyzer by RF cable and attenuator. The path loss is compensated to the results for each measurement.
3. Set the maximum power setting and enable the EUT to transmit continuously.
4. Use the following spectrum analyzer settings for 20 dB Bandwidth measurement.
Span = approximately 2 to 5 times the 20 dB bandwidth, centered on a hopping channel;
RBW $\geq$ 1% of the 20 dB bandwidth; VBW $\geq$ 3 * RBW; Sweep = auto; Detector function = peak;
Trace = max hold.
5. Use the following spectrum analyzer settings for 99 % Bandwidth measurement.
Span = approximately 1.5 to 5 times the 99% bandwidth, centered on a hopping channel;
RBW $\geq$ 1-5% of the 99% bandwidth; VBW $\geq$ 3 * RBW; Sweep = auto; Detector function = peak;
Trace = max hold.
6. Measure and record the results in the test report.

3.4.4 Test Setup



3.4.5 Test Result of 20dB Bandwidth

Please refer to Appendix A.

3.4.6 Test Result of 99% Occupied Bandwidth

Please refer to Appendix A.

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.

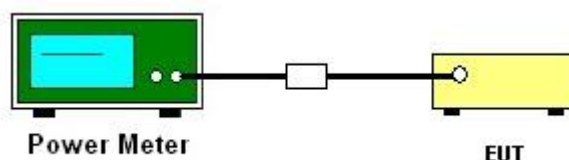
3.5.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.5.3 Test Procedures

1. The testing follows ANSI C63.10 clause 7.8.5.
2. The RF output of EUT is connected to the power meter by RF cable and attenuator. The path loss is compensated to the results for each measurement.
3. Set the maximum power setting and enable the EUT to 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.

3.5.6 Test Result of Average Output Power (Reporting Only)

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.

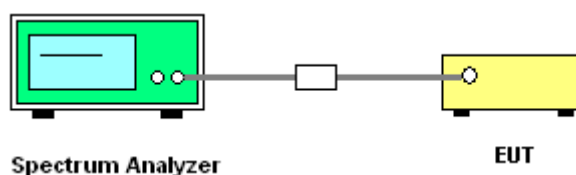
3.6.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.6.3 Test Procedures

1. The testing follows ANSI C63.10 clause 6.10.
2. Set the maximum power setting and enable the EUT to transmit continuously.
3. Set RBW = 100 kHz, VBW = 300 kHz. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz 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

Please refer to Appendix A.

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.

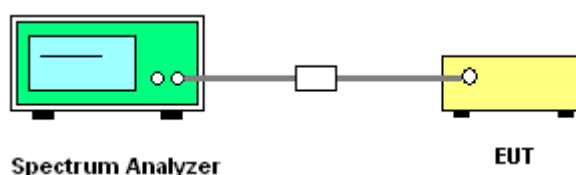
3.7.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.7.3 Test Procedure

1. The testing follows ANSI C63.10 clause 7.8.7.
2. The RF output of EUT is connected to the spectrum analyzer by RF cable and attenuator. The path loss is compensated to the results for each measurement.
3. Set the maximum power setting and enable the EUT to transmit continuously.
4. Set RBW = 100 kHz, VBW = 300 kHz, scan up through 10th harmonic. All harmonics / spurious 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

Please refer to Appendix 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

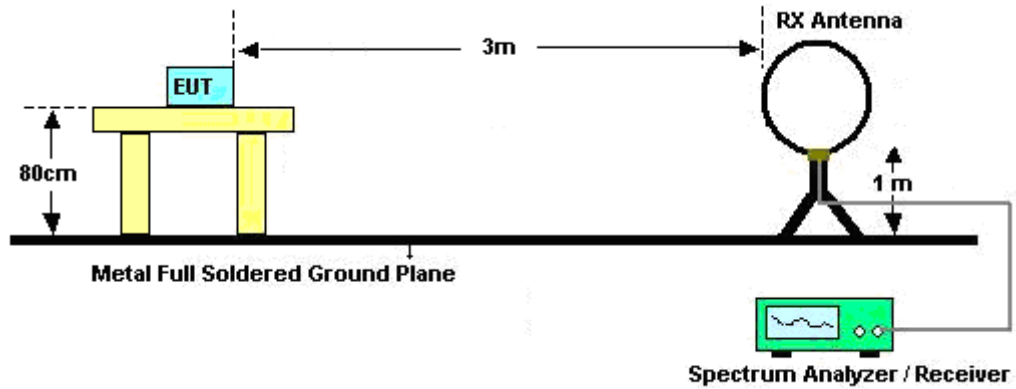
Please refer to the measuring equipment list in this test report.

3.8.3 Test Procedures

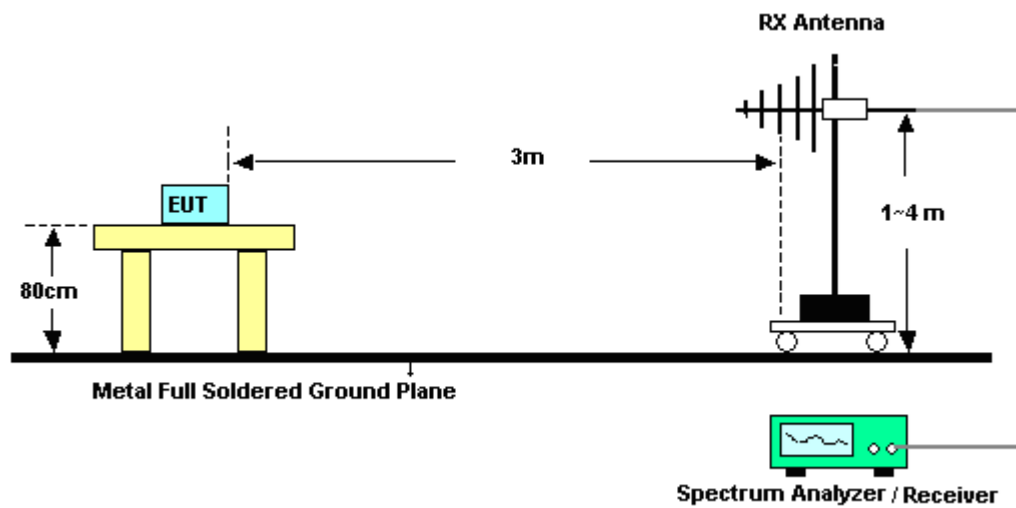
1. The EUT is placed on a turntable with 0.8 meter for frequency below 1 GHz and 1.5 meter for frequency above 1 GHz respectively above ground.
2. The EUT is set 3 meters away from the receiving antenna, which is mounted on the top of a variable height antenna tower.
3. For each suspected emission, the EUT is 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 the maximum power setting and enable the EUT to 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 = 1 MHz for $f > 1$ GHz ; VBW $\geq$ 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
 $\text{On time} = N_1 \cdot L_1 + N_2 \cdot L_2 + \dots + N_{n-1} \cdot L_{n-1} + N_n \cdot L_n$
Where N_1 is number of type 1 pulses, L_1 is length of type 1 pulses, etc.
Average Emission Level = Peak Emission Level + $20 \cdot \log(\text{Duty cycle})$
6. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
7. Radiated testing below 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading. When there is no suspected emission found and the emission level is with at least 6 dB margin against QP limit line, the position is marked as “-”.
8. Radiated testing above 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading for scanning all frequencies. When there is no suspected emission found and the harmonic emission level is with at least 6 dB margin against average limit line, the position is marked as “-”.

3.8.4 Test Setup

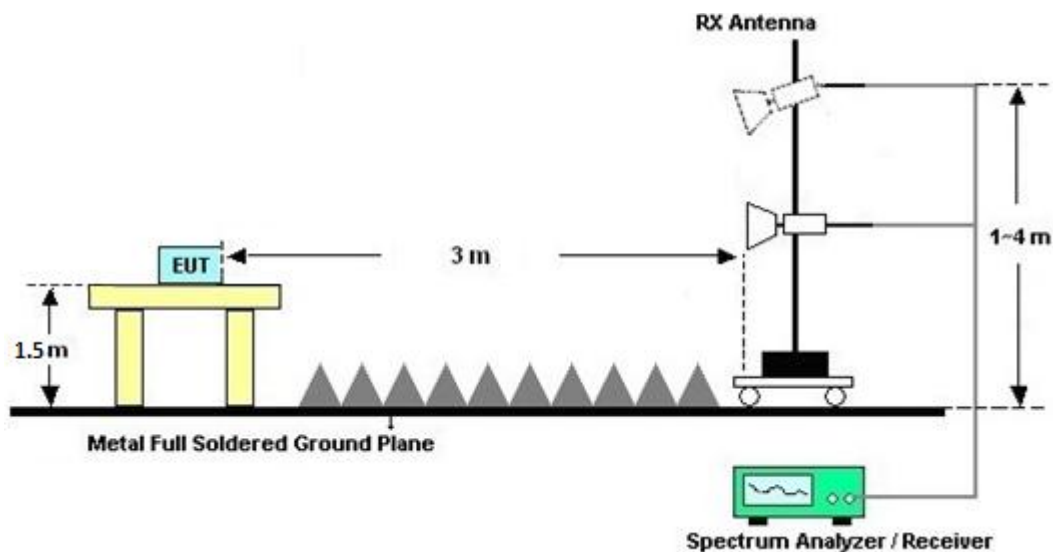
For radiated test below 30MHz



For radiated test from 30MHz to 1GHz



For radiated test above 1GHz



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

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

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

3.8.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C.

3.8.7 Duty Cycle

Please refer to Appendix D.

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

Please refer to Appendix C.

3.9 AC Conducted Emission Measurement

3.9.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

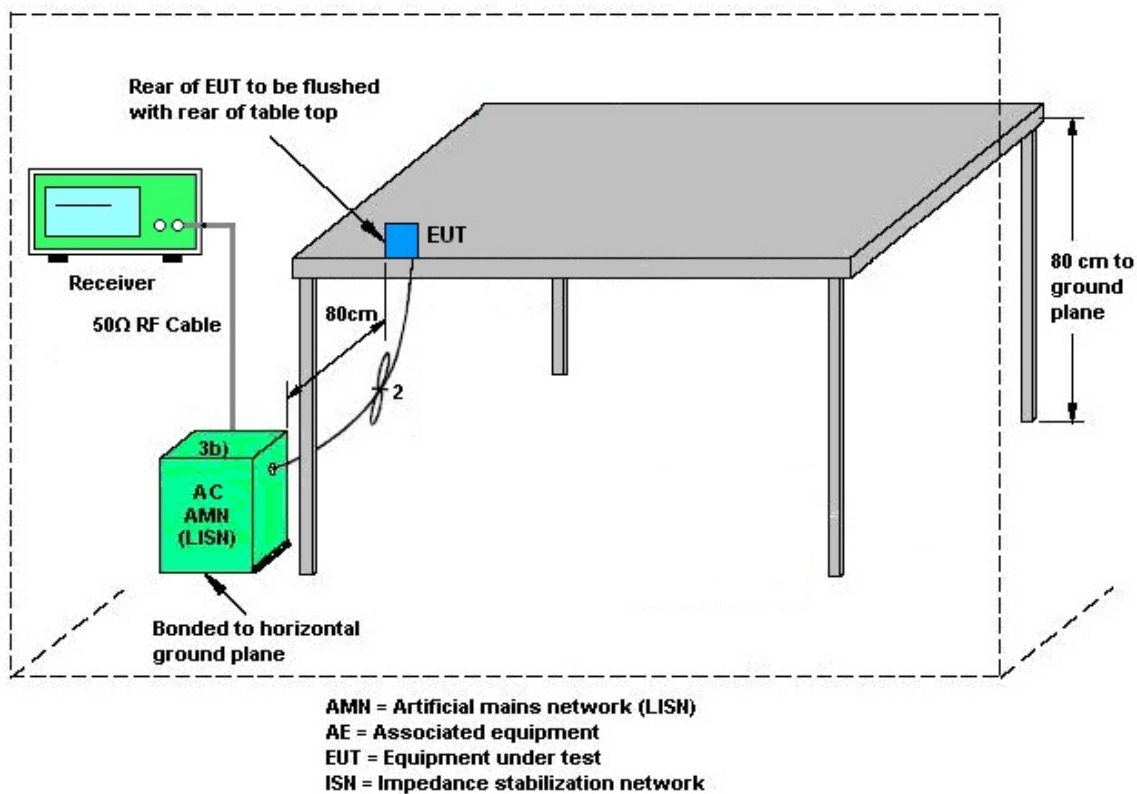
3.9.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.9.3 Test Procedures

1. The EUT is placed 0.4 meter away from the conducting wall of the shielding room, and is kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN shall be used.
6. Both Line and Neutral shall be tested in order to find out the maximum conducted emission.
7. The frequency range from 150 kHz to 30 MHz is scanned.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9 kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

3.9.4 Test Setup



3.9.5 Test Result of AC Conducted Emission

Please refer to Appendix B.



3.10 Antenna Requirements

3.10.1 Standard Applicable

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of § 15.211, 15.213, 15.217, 15.219, 15.221, or § 15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

3.10.2 Antenna Anti-Replacement Construction

Antenna permanently attached.



4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
AC Power Source	ACPOWER	AFC-11003G	F317040033	N/A	N/A	Aug. 29, 2025	N/A	Conduction (CO07-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	Aug. 29, 2025	N/A	Conduction (CO07-HY)
Pulse Limiter	SCHWARZBECK	VTSD 9561-FN	9561-FN00373	9kHz~200MHz	Oct. 23, 2024	Aug. 29, 2025	Oct. 22, 2025	Conduction (CO07-HY)
RF Cable	HUBER + SUHNER	RG 214/U	1358175	9kHz~30MHz	Mar. 03, 2025	Aug. 29, 2025	Mar. 02, 2026	Conduction (CO07-HY)
Two-Line V-Network	TESEQ	NNB 51	45051	N/A	Mar. 24, 2025	Aug. 29, 2025	Mar. 23, 2026	Conduction (CO07-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102317	9kHz~3.6GHz	Sep. 23, 2024	Aug. 29, 2025	Sep. 22, 2025	Conduction (CO07-HY)
<Lora/FSK>								
Hygrometer	TECPEL	DTM-303A	TP201996	N/A	Nov. 01, 2024	Aug. 25, 2025~ Aug. 28, 2025	Oct. 31, 2025	Conducted (TH05-HY)
Power Meter	Anritsu	ML2495A	1036004	N/A	Jul. 01, 2025	Aug. 25, 2025~ Aug. 28, 2025	Jun. 30, 2026	Conducted (TH05-HY)
Power Sensor	Anritsu	MA2411B	1027253	300MHz~40GHz	Jul. 01, 2025	Aug. 25, 2025~ Aug. 28, 2025	Jun. 30, 2026	Conducted (TH05-HY)
Signal Analyzer	Rohde & Schwarz	FSV3044	101467	10Hz~44GHz	Jan. 14, 2025	Aug. 25, 2025~ Aug. 28, 2025	Jan. 13, 2026	Conducted (TH05-HY)
Switch Control Mainframe	E-Instument	ETF-1405-0	EC1900157 (BOX6)	N/A	Feb. 10, 2025	Aug. 25, 2025~ Aug. 28, 2025	Feb. 09, 2026	Conducted (TH05-HY)
Software	Sporton	BTWIFI_Final version_240513	N/A	Conducted Other Test Item	N/A	Aug. 25, 2025~ Aug. 28, 2025	N/A	Conducted (TH05-HY)
<Lora/FSK>								
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9kHz~30MHz	Mar. 06, 2025	Aug. 19, 2025~ Sep. 04, 2025	Mar. 05, 2026	Radiation (03CH22-HY)
Bilog Antenna with 6dB	TESEQ & WOKEN	CBL 6111D & 00802N1D-06	63304 & 002	30MHz~1GHz	Dec. 17, 2024	Aug. 19, 2025~ Sep. 04, 2025	Dec. 16, 2025	Radiation (03CH22-HY)
Amplifier	SONOMA	310N	421581	N/A	Jul. 13, 2025	Aug. 19, 2025~ Sep. 04, 2025	Jul. 12, 2026	Radiation (03CH22-HY)
Double Ridged Guide Horn Antenna	RFSPIN	DRH18-E	LE2C04A18EN	1GHz~18GHz	May 20, 2025	Aug. 19, 2025~ Sep. 04, 2025	May 19, 2026	Radiation (03CH22-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	1230	18GHz~40GHz	Oct. 25, 2024	Aug. 19, 2025~ Sep. 04, 2025	Oct. 24, 2025	Radiation (03CH22-HY)
Amplifier	EMEC	EM01G18GA	060877	N/A	Sep. 27, 2024	Aug. 19, 2025~ Sep. 04, 2025	Sep. 26, 2025	Radiation (03CH22-HY)
Preamplifier	EMEC	EM18G40G	060872	18-40GHz	Nov. 29, 2024	Aug. 19, 2025~ Sep. 04, 2025	Nov. 28, 2025	Radiation (03CH22-HY)
Signal Analyzer	Keysight	N9010B	MY62170278	10Hz~44GHz	Sep. 24, 2024	Aug. 19, 2025~ Sep. 04, 2025	Sep. 23, 2025	Radiation (03CH22-HY)
EMI Test Receiver	Agilent	N9038A(MXE)	MY53290045	20Hz~8.4GHz	Apr. 21, 2025	Aug. 19, 2025~ Sep. 04, 2025	Apr. 20, 2026	Radiation (03CH22-HY)



						04, 2025		
Hygrometer	TECPEL	DTM-303A	TP211469	N/A	Dec. 24, 2024	Aug. 19, 2025~ Sep. 04, 2025	Dec. 23, 2025	Radiation (03CH22-HY)
Controller	EMEC	EM1000	N/A	Control Turn table & Ant Mast	N/A	Aug. 19, 2025~ Sep. 04, 2025	N/A	Radiation (03CH22-HY)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	Aug. 19, 2025~ Sep. 04, 2025	N/A	Radiation (03CH22-HY)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	Aug. 19, 2025~ Sep. 04, 2025	N/A	Radiation (03CH22-HY)
Software	Audix	E3	RK-002347	N/A	N/A	Aug. 19, 2025~ Sep. 04, 2025	N/A	Radiation (03CH22-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	803951/2	9kHz~30MHz	Mar. 05, 2025	Aug. 19, 2025~ Sep. 04, 2025	Mar. 04, 2026	Radiation (03CH22-HY)
RF Cable javascript: void(0)	HUBER + SUHNER/EMCI	SUCOFLEX 102/EMCI01Y-KM-KM-500/EMCI01Y-KM-KM-9000	804611/2,240 914, 25043351,25 043350	30MHz~40GHz	May 19, 2025	Aug. 19, 2025~ Sep. 04, 2025	May 18, 2026	Radiation (03CH22-HY)

5 Measurement Uncertainty

Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	3.7 dB
--	--------

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	6.6 dB
--	--------

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.2 dB
--	--------

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.7 dB
--	--------

Appendix A. Test Result of Conducted Test Items

Test Engineer:	Derek Hsu	Temperature:	23~25	°C
Test Date:	2025/8/25~2025/8/28	Relative Humidity:	54~58	%

<SF7>

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 125KHz	1	0	902.2	0.124	0.112	0.213	0.1243	Pass
Lora 125KHz	1	64	915	0.148	0.126	0.227	0.1481	Pass
Lora 125KHz	1	128	927.8	0.141	0.126	0.226	0.1405	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 125KHz	129	1	386.37	0.39	0.4	Pass

TEST RESULTS DATA**Peak Power Table**

Mod.	NTX	Peak Power (dBm)	Power Limit (dBm)	Test Result
Lora 125KHz	1	25.73	30.00	Pass
	1	25.75	30.00	Pass
	1	25.16	30.00	Pass

TEST RESULTS DATA**Average Power Table****(Reporting Only)**

Mod.	NTX	Average Power (dBm)	Duty Factor (dB)
Lora 125KHz	1	25.57	0.04
	1	25.60	0.04
	1	24.99	0.04

TEST RESULTS DATA**Number of Hopping Frequency**

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

<SF8>

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 125KHz	1	0	902.2	0.128	0.118	0.242	0.1282	Pass
Lora 125KHz	1	64	915	0.145	0.126	0.213	0.1449	Pass
Lora 125KHz	1	128	927.8	0.140	0.126	0.207	0.1397	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 125KHz	129	1	383.57	0.38	0.4	Pass

TEST RESULTS DATA**Peak Power Table**

Mod.	NTX	Peak Power (dBm)	Power Limit (dBm)	Test Result
Lora 125KHz	1	25.84	30.00	Pass
	1	25.72	30.00	Pass
	1	25.12	30.00	Pass

TEST RESULTS DATA**Average Power Table**
(Reporting Only)

Mod.	NTX	Average Power (dBm)	Duty Factor (dB)
Lora 125KHz	1	25.70	0.03
	1	25.62	0.03
	1	24.97	0.03

TEST RESULTS DATA**Number of Hopping Frequency**

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

<SF9>

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 125KHz	1	0	902.2	0.133	0.121	0.204	0.1328	Pass
Lora 125KHz	1	64	915	0.139	0.126	0.215	0.1390	Pass
Lora 125KHz	1	128	927.8	0.140	0.125	0.211	0.1398	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 125KHz	129	1	377.90	0.38	0.4	Pass

TEST RESULTS DATA**Peak Power Table**

Mod.	NTX	Peak Power (dBm)	Power Limit (dBm)	Test Result
Lora 125KHz	1	25.73	30.00	Pass
	1	25.67	30.00	Pass
	1	25.12	30.00	Pass

TEST RESULTS DATA**Average Power Table**
(Reporting Only)

Mod.	NTX	Average Power (dBm)	Duty Factor (dB)
Lora 125KHz	1	25.47	0.02
	1	25.45	0.02
	1	24.96	0.02

TEST RESULTS DATA**Number of Hopping Frequency**

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

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	0	902.2	0.105	0.103	0.201	0.1048	Pass
FSK	50Kbps	1	64	915	0.106	0.104	0.201	0.1063	Pass
FSK	50Kbps	1	128	927.8	0.105	0.103	0.201	0.1050	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	386.34	0.39	0.4	Pass

TEST RESULTS DATA**Peak Power Table**

Mod.	CH.	NTX	Peak Power (dBm)	Power Limit (dBm)	Test Result
FSK	0	1	25.61	30.00	Pass
	64	1	25.75	30.00	Pass
	128	1	25.29	30.00	Pass

TEST RESULTS DATA**Average Power Table****(Reporting Only)**

Mod.	CH.	NTX	Average Power (dBm)	Duty Factor (dB)
FSK	0	1	25.48	0.31
	64	1	25.64	0.31
	128	1	25.12	0.31

TEST RESULTS DATA**Number of Hopping Frequency**

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

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	0	902.4	0.155	0.155	0.401	0.1549	Pass
FSK	150Kbps	1	32	915.2	0.155	0.155	0.401	0.1550	Pass
FSK	150Kbps	1	63	927.6	0.157	0.154	0.398	0.1573	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	381.50	0.38	0.4	Pass

TEST RESULTS DATA**Peak Power Table**

Mod.	CH.	NTX	Peak Power (dBm)	Power Limit (dBm)	Test Result
FSK	0	1	25.75	30.00	Pass
	32	1	25.68	30.00	Pass
	63	1	25.16	30.00	Pass

TEST RESULTS DATA**Average Power Table
(Reporting Only)**

Mod.	CH.	NTX	Average Power (dBm)	Duty Factor (dB)
FSK	0	1	25.42	0.86
	32	1	25.38	0.86
	63	1	25.06	0.86

TEST RESULTS DATA**Number of Hopping Frequency**

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

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	0	902.5	0.254	0.252	0.508	0.2542	Pass
FSK	250Kbps	1	25	915	0.254	0.252	0.508	0.2543	Pass
FSK	250Kbps	1	50	927.5	0.254	0.251	0.504	0.2544	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	375.50	0.38	0.4	Pass

TEST RESULTS DATA**Peak Power Table**

Mod.	CH.	NTX	Peak Power (dBm)	Power Limit (dBm)	Test Result
FSK	0	1	25.65	30.00	Pass
	25	1	25.60	30.00	Pass
	50	1	25.09	30.00	Pass

TEST RESULTS DATA**Average Power Table****(Reporting Only)**

Mod.	CH.	NTX	Average Power (dBm)	Duty Factor (dB)
FSK	0	1	25.48	1.35
	25	1	25.26	1.35
	50	1	24.85	1.35

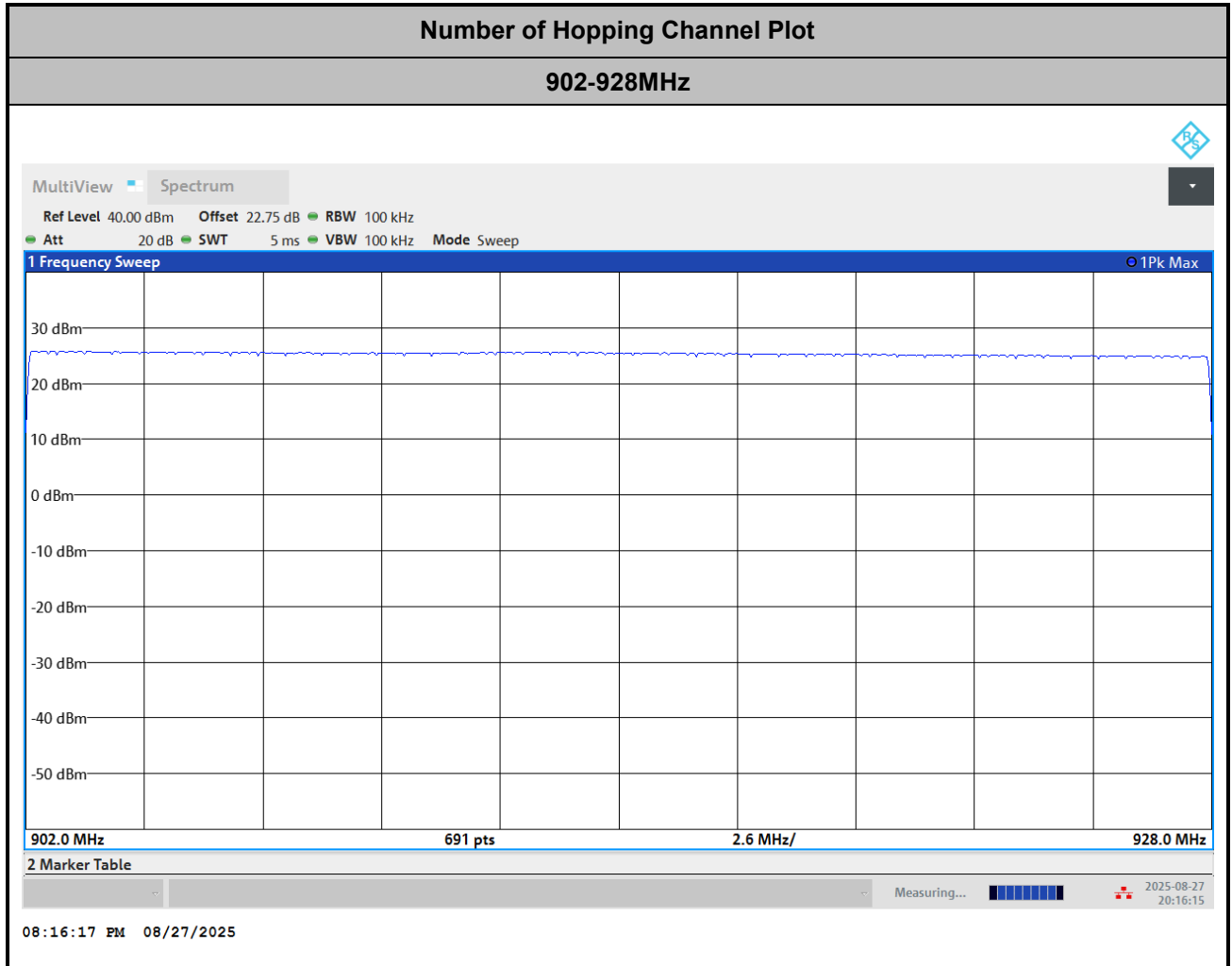
TEST RESULTS DATA**Number of Hopping Frequency**

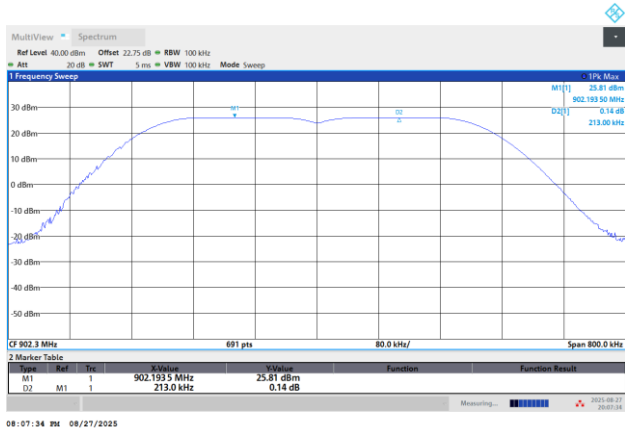
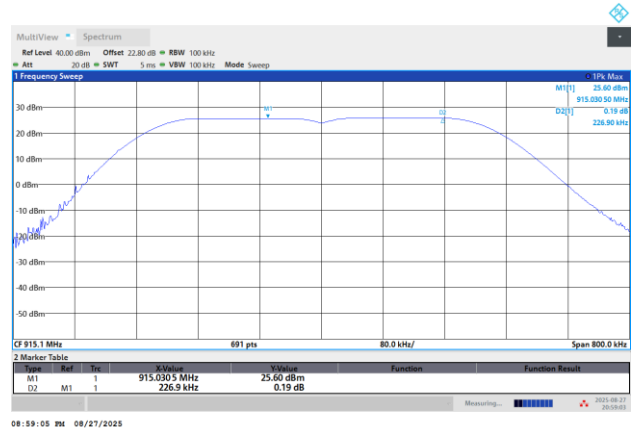
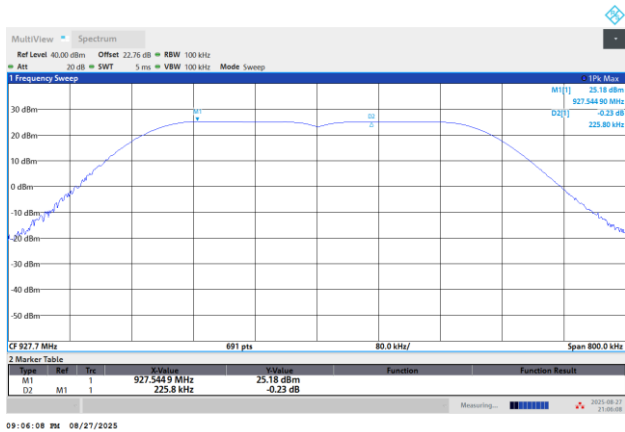
Number of Hopping (Channel)	Limits (Channel)	Pass/Fail
51	25	Pass



<SF7>

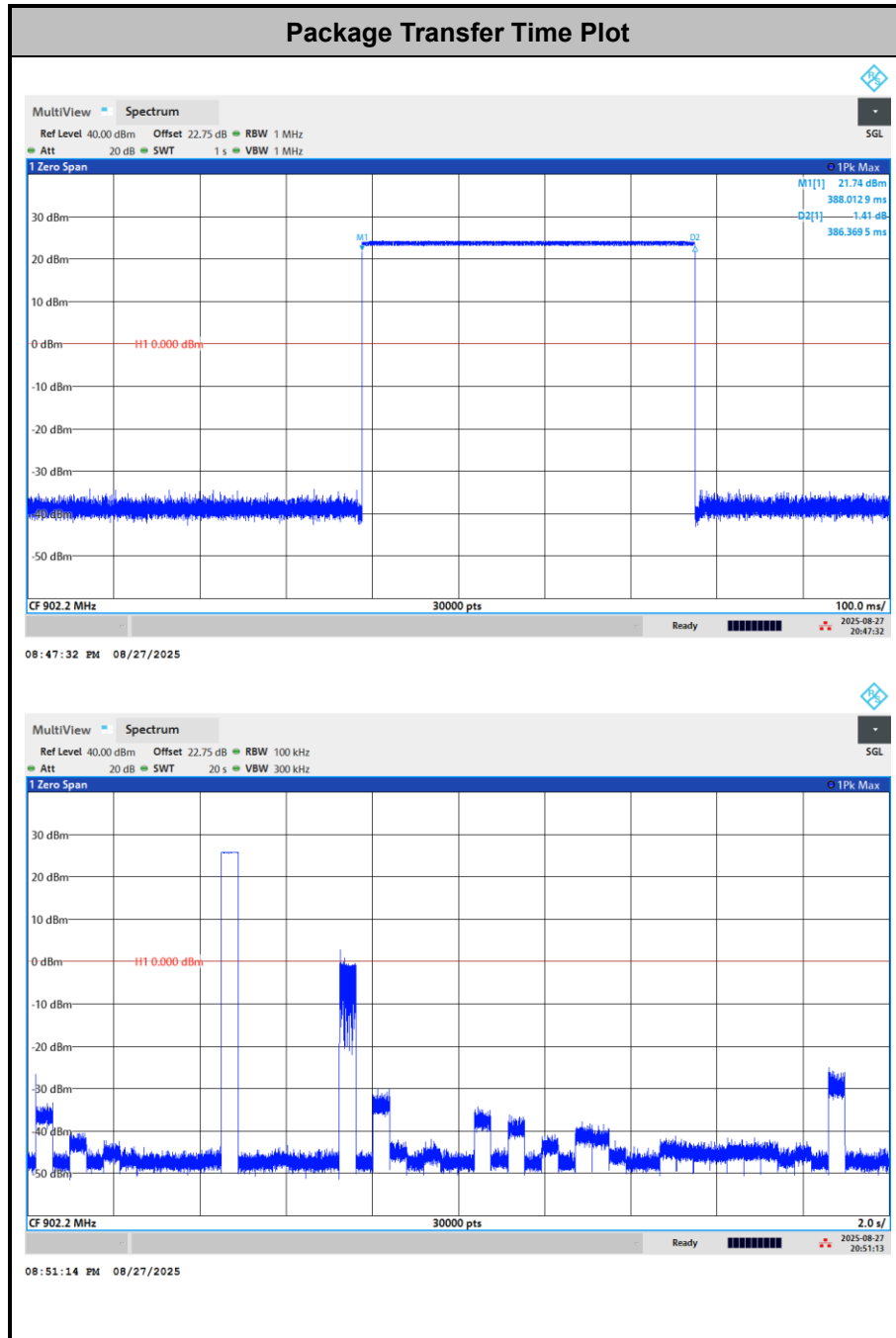
Number of Hopping Frequency



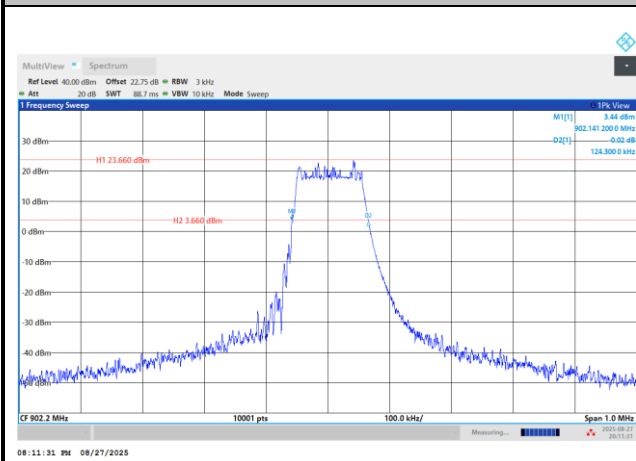
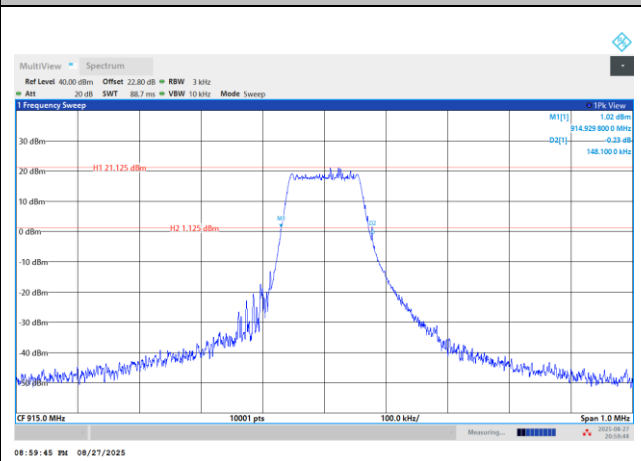
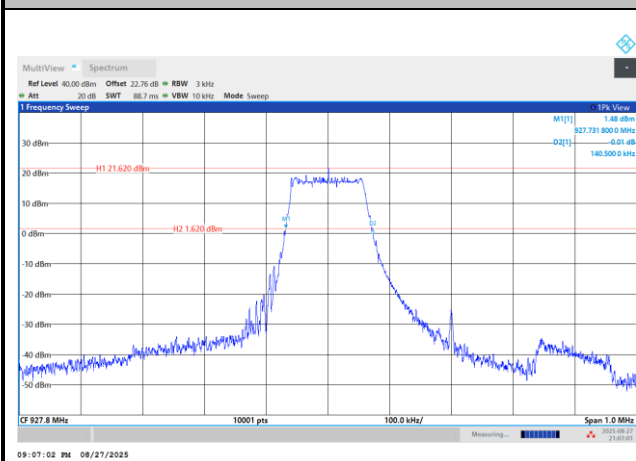
**Hopping Channel Separation****Channel Separation Plot on 902.2MHz****Channel Separation Plot on Channel 915MHz****Channel Separation Plot on Channel 927.8MHz**

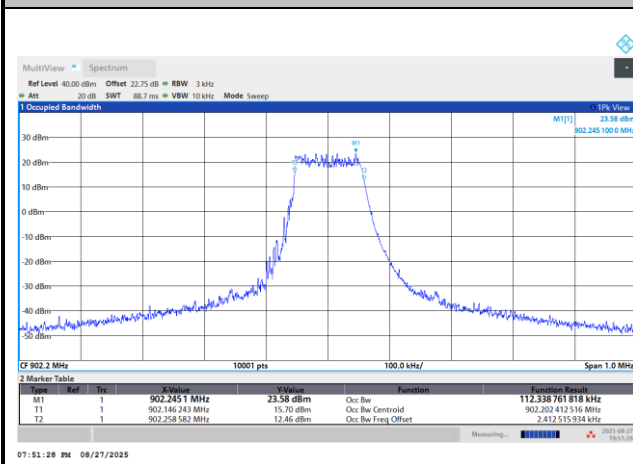
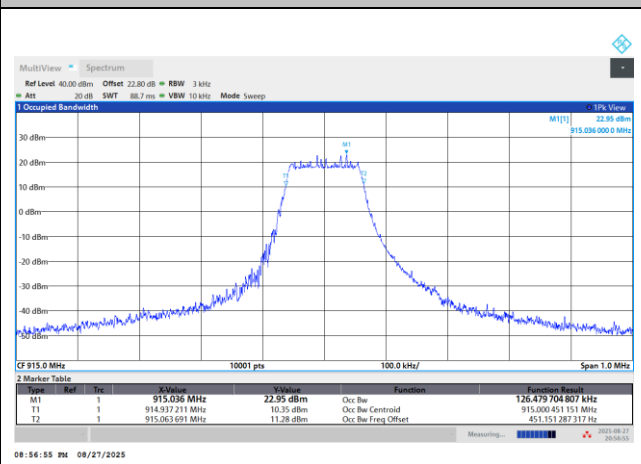
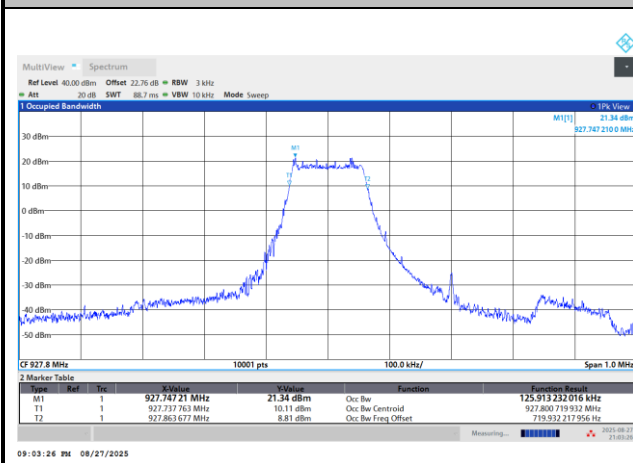


Dwell Time



Remark: Dwell Time(s) = Hops Over Occupancy Time (hops) x Package Transfer Time
= 1 x 0.3864s = 0.3864s

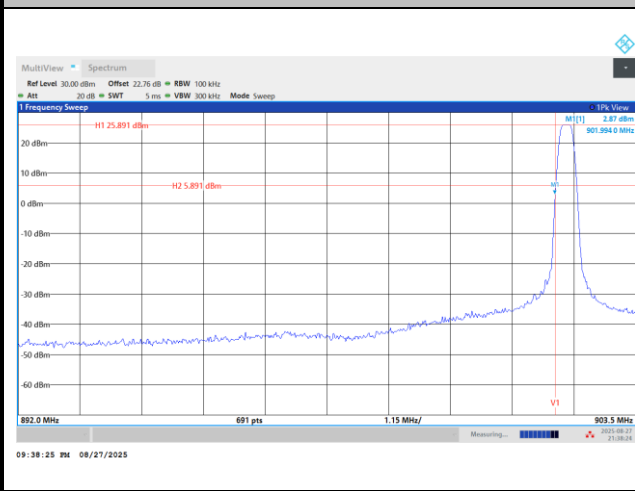
**20dB Bandwidth****20 dB Bandwidth Plot in 902.2MHz****20 dB Bandwidth Plot in 915MHz****20 dB Bandwidth Plot in 927.8MHz**

**99% Occupied Bandwidth****99% Occupied Bandwidth on 902.2MHz****99% Occupied Bandwidth on 915MHz****99% Occupied Bandwidth on 927.8MHz**

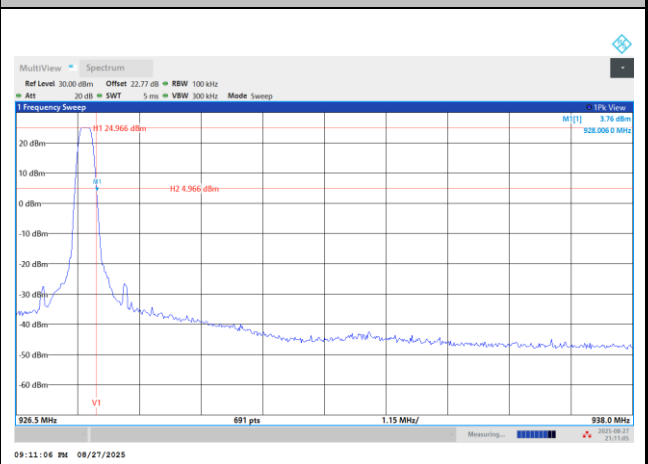


Band Edges

Low Band Edge Plot on 902.2MHz



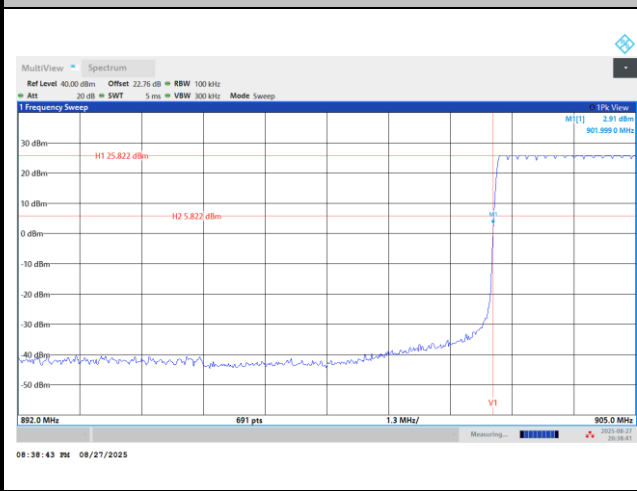
High Band Edge Plot on 927.8MHz



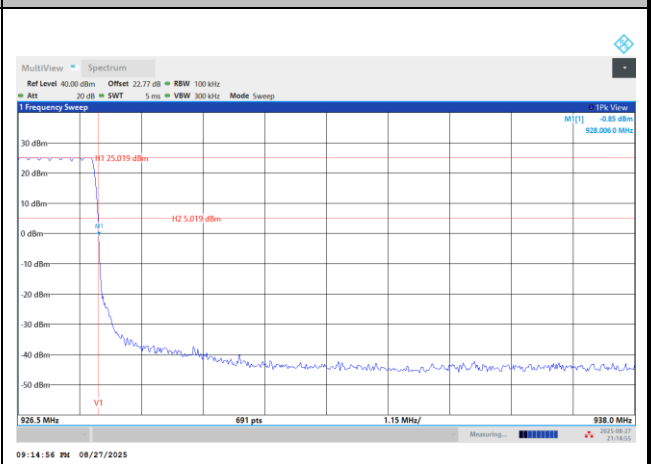


Hopping Mode Band Edges

Hopping Mode Low Band Edge Plot



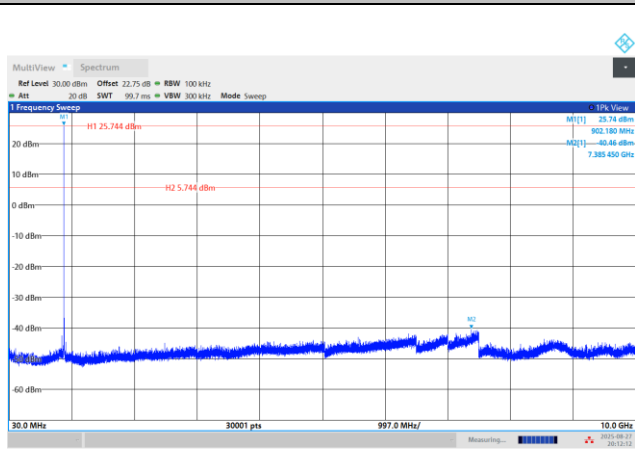
Hopping Mode High Band Edge Plot



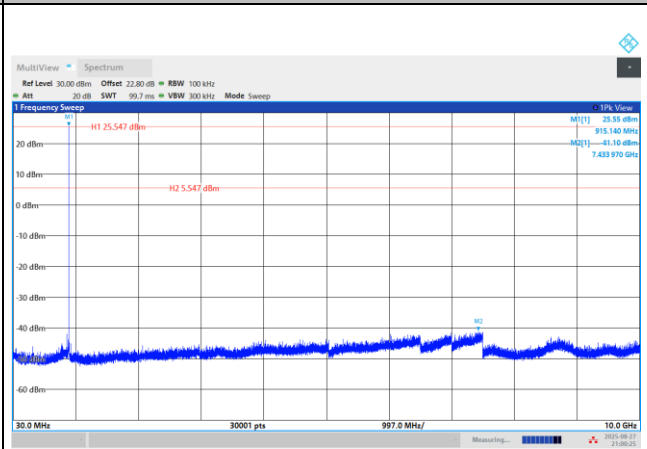


Conducted Spurious Emission

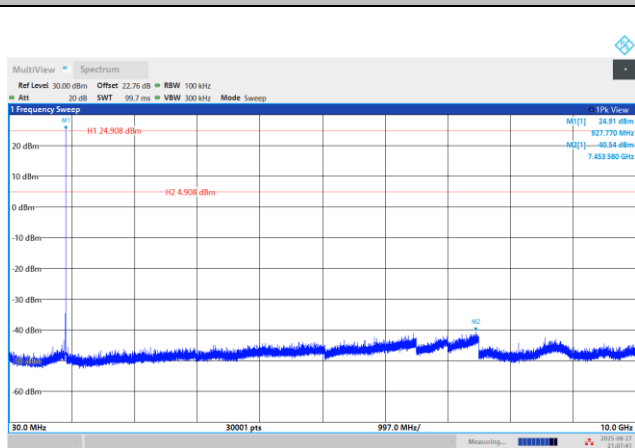
CSE Plot on Low Ch between 902.2MHz



CSE Plot on Mid Ch between 915MHz



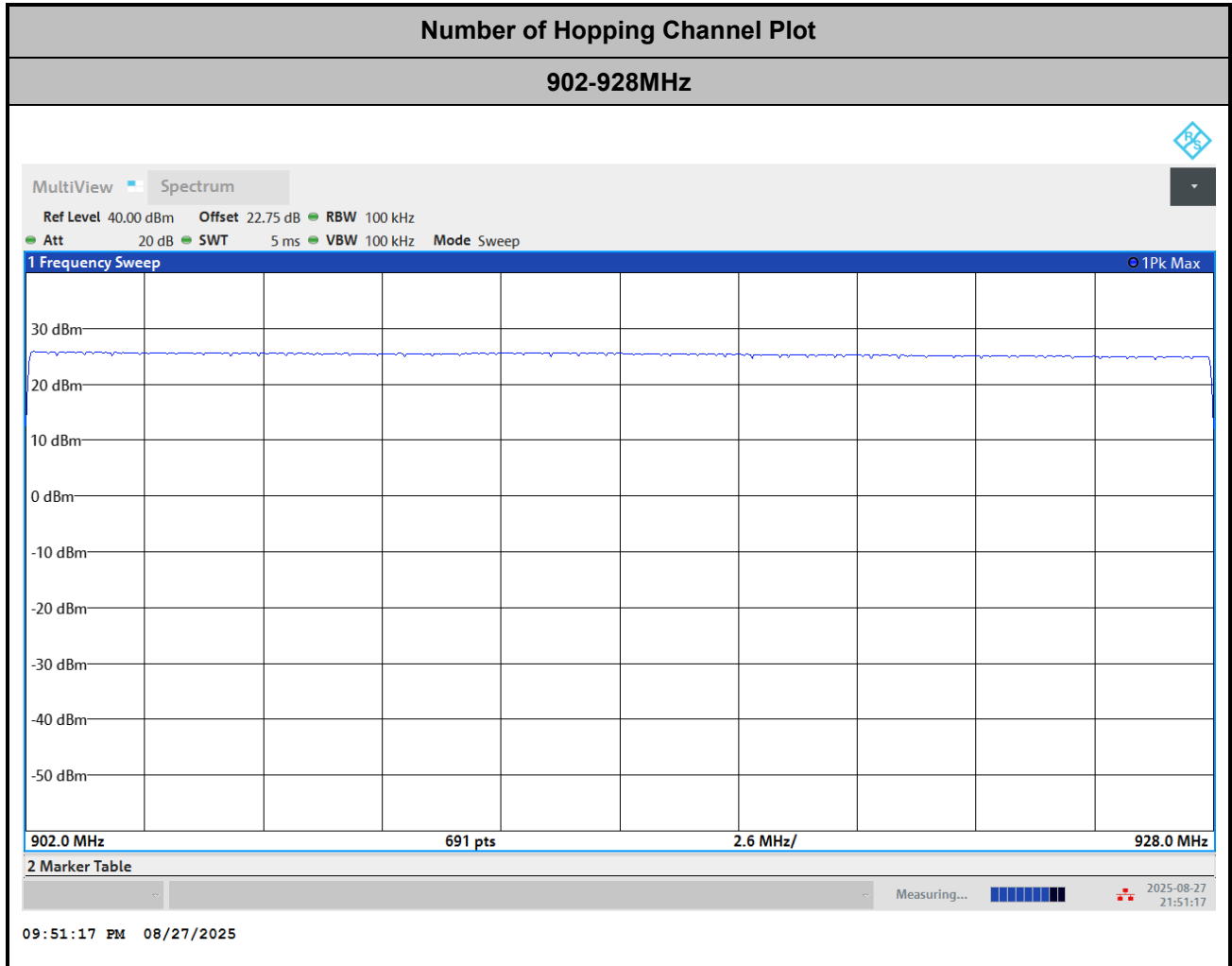
CSE Plot on High Ch between 927.8MHz

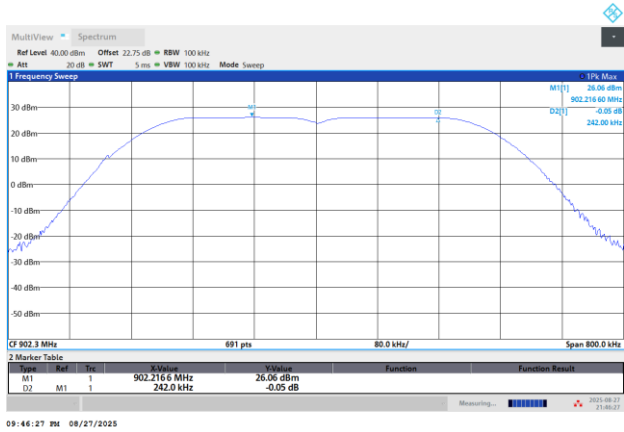
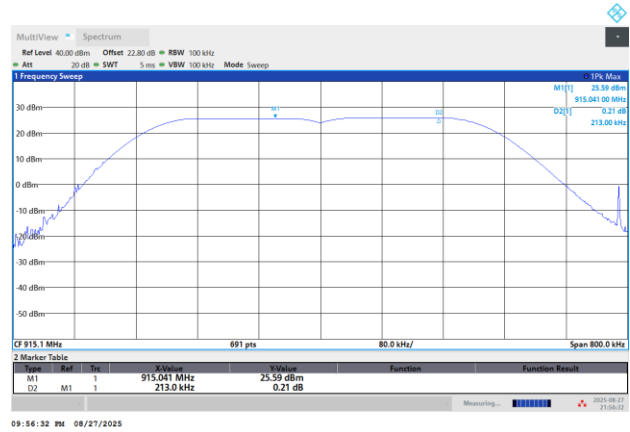
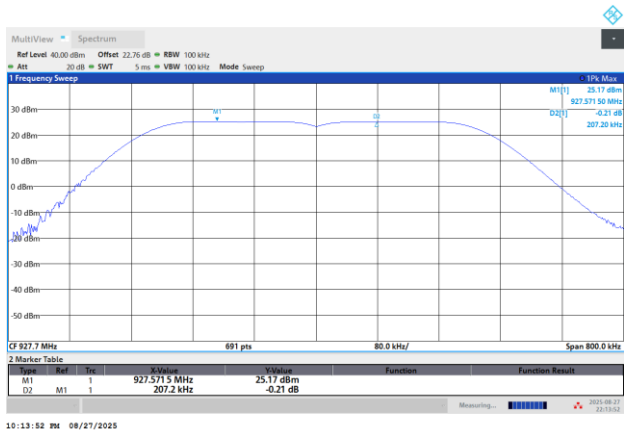




<SF8>

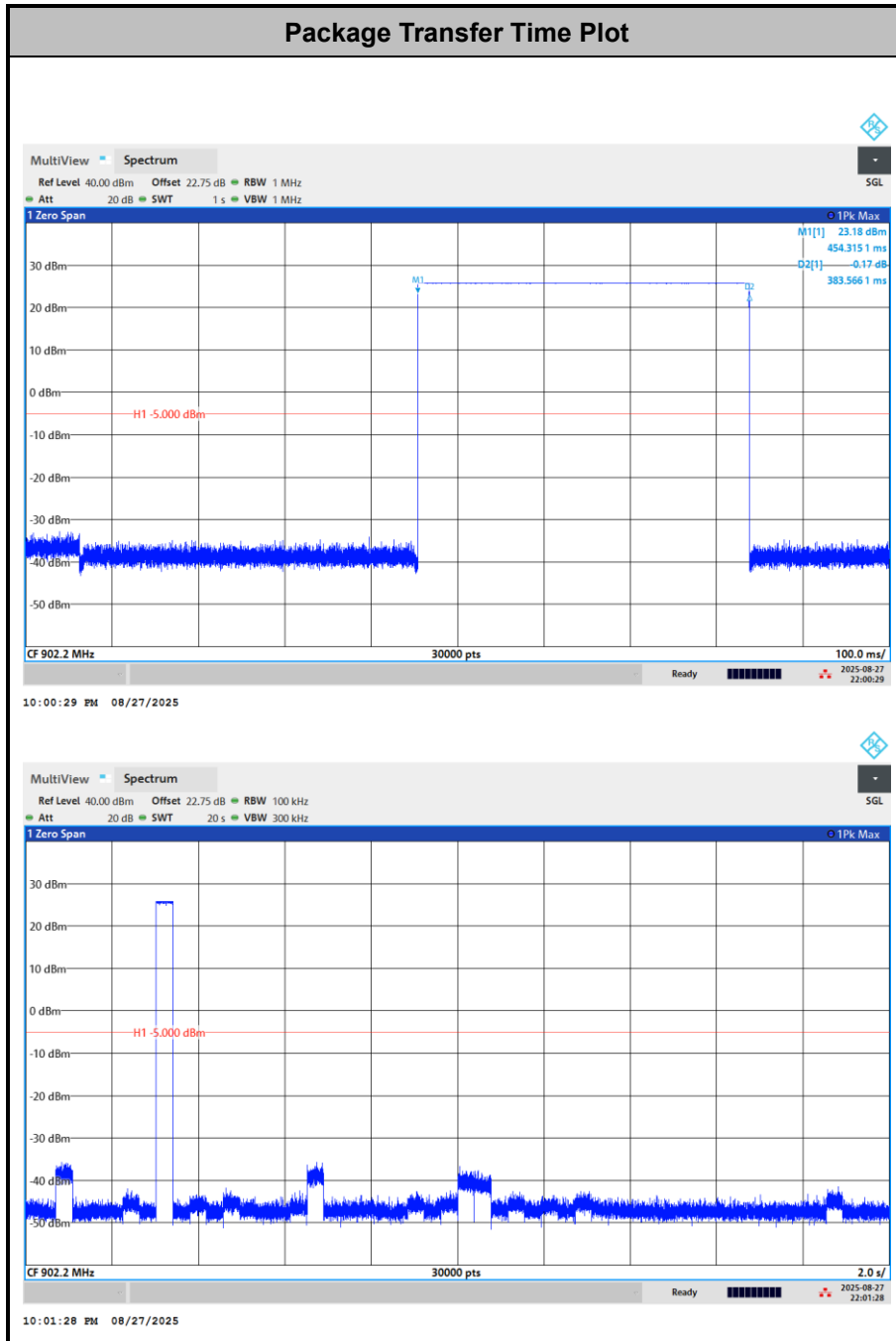
Number of Hopping Frequency



**Hopping Channel Separation****Channel Separation Plot on 902.2MHz****Channel Separation Plot on Channel 915MHz****Channel Separation Plot on Channel 927.8MHz**



Dwell Time

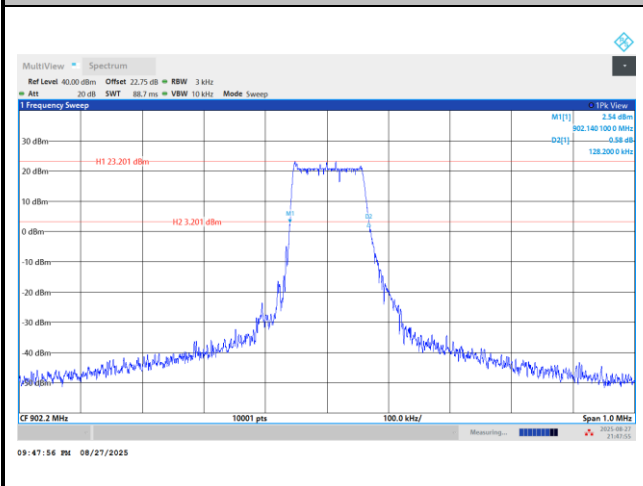


Remark: Dwell Time(s) = Hops Over Occupancy Time (hops) x Package Transfer Time
= 1 x 0.3836s = 0.3836s

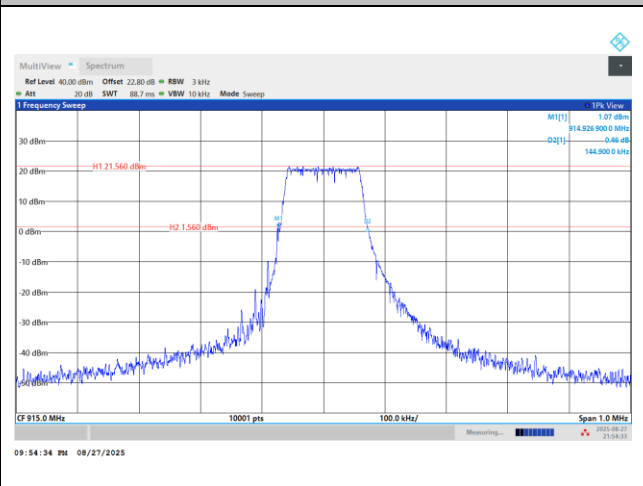


20dB Bandwidth

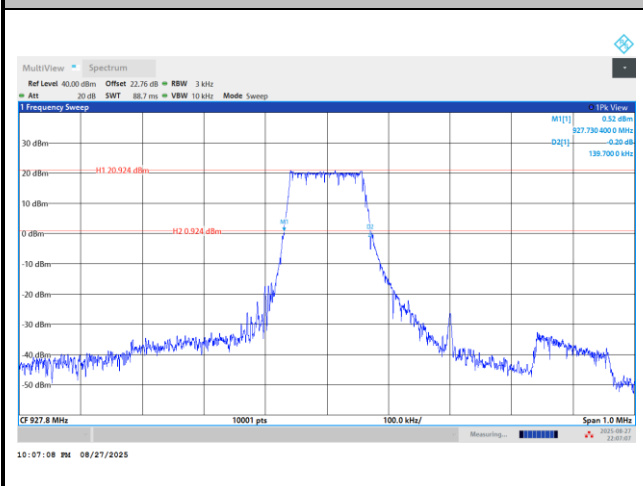
20 dB Bandwidth Plot in 902.2MHz

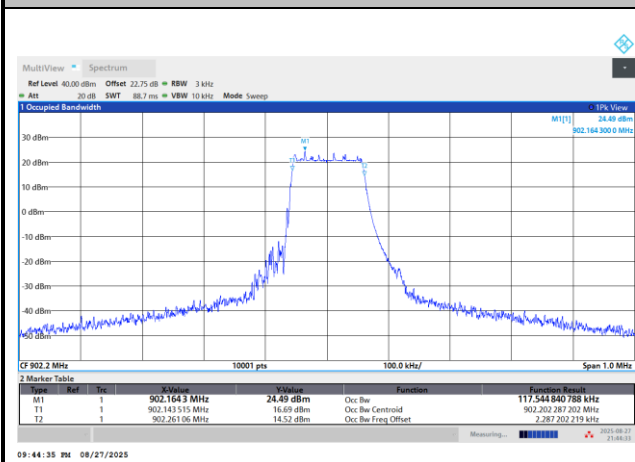
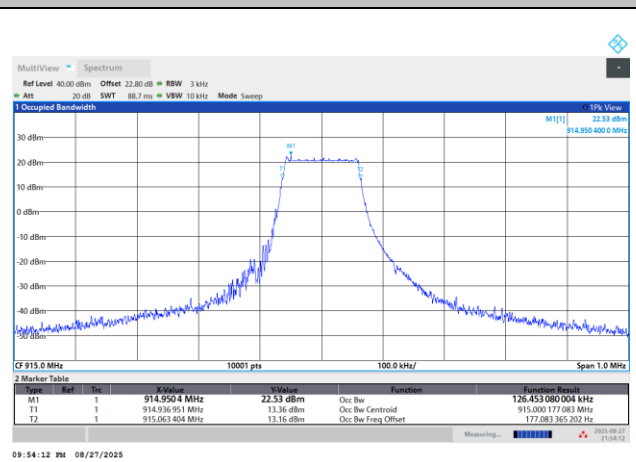
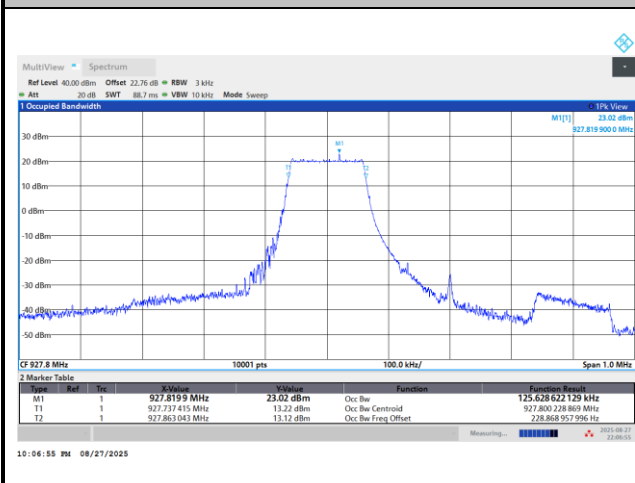


20 dB Bandwidth Plot in 915MHz



20 dB Bandwidth Plot in 927.8MHz

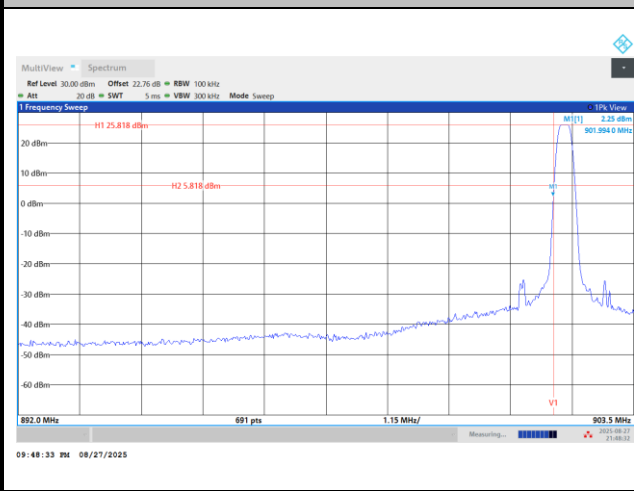


**99% Occupied Bandwidth****99% Occupied Bandwidth on 902.2MHz****99% Occupied Bandwidth on 915MHz****99% Occupied Bandwidth on 927.8MHz**

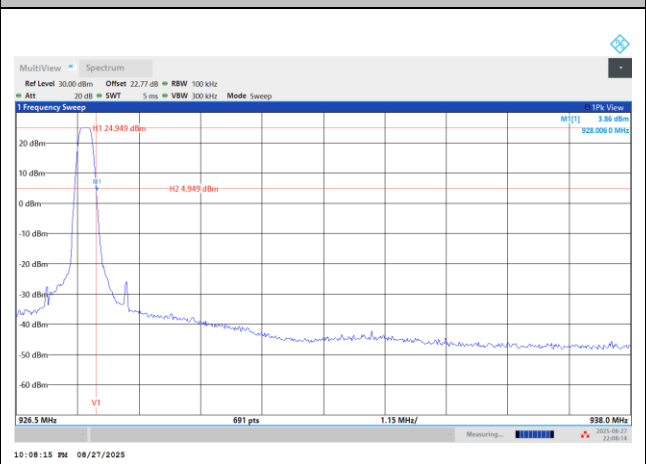


Band Edges

Low Band Edge Plot on 902.2MHz



High Band Edge Plot on 927.8MHz





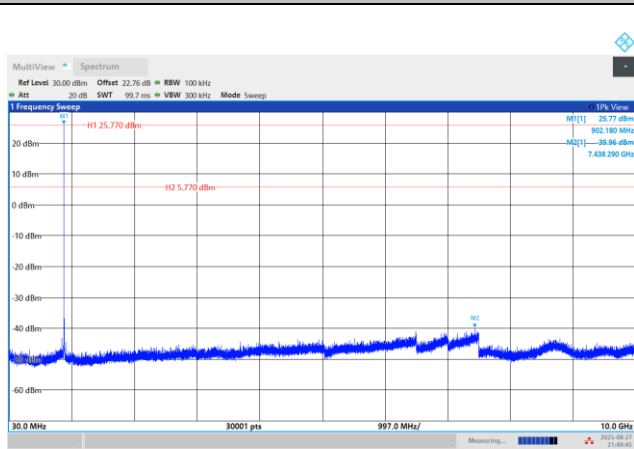
Hopping Mode Band Edges



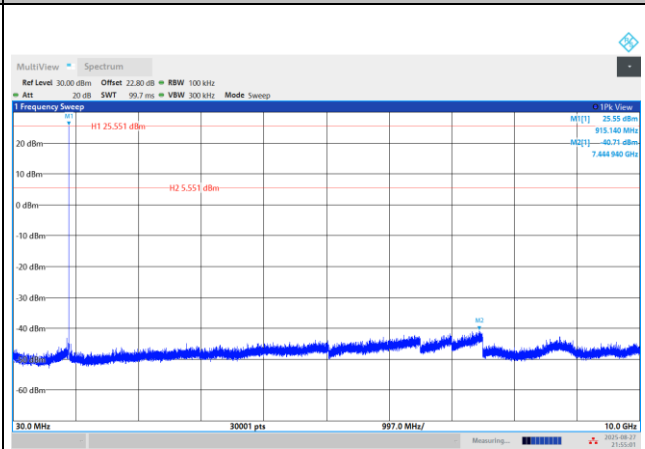


Conducted Spurious Emission

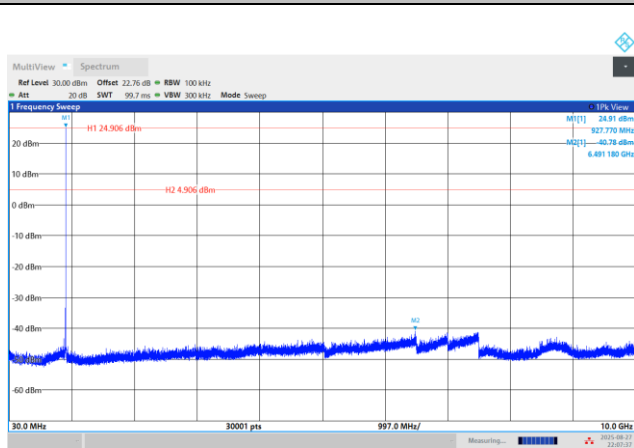
CSE Plot on Low Ch between 902.2MHz



CSE Plot on Mid Ch between 915MHz



CSE Plot on High Ch between 927.8MHz

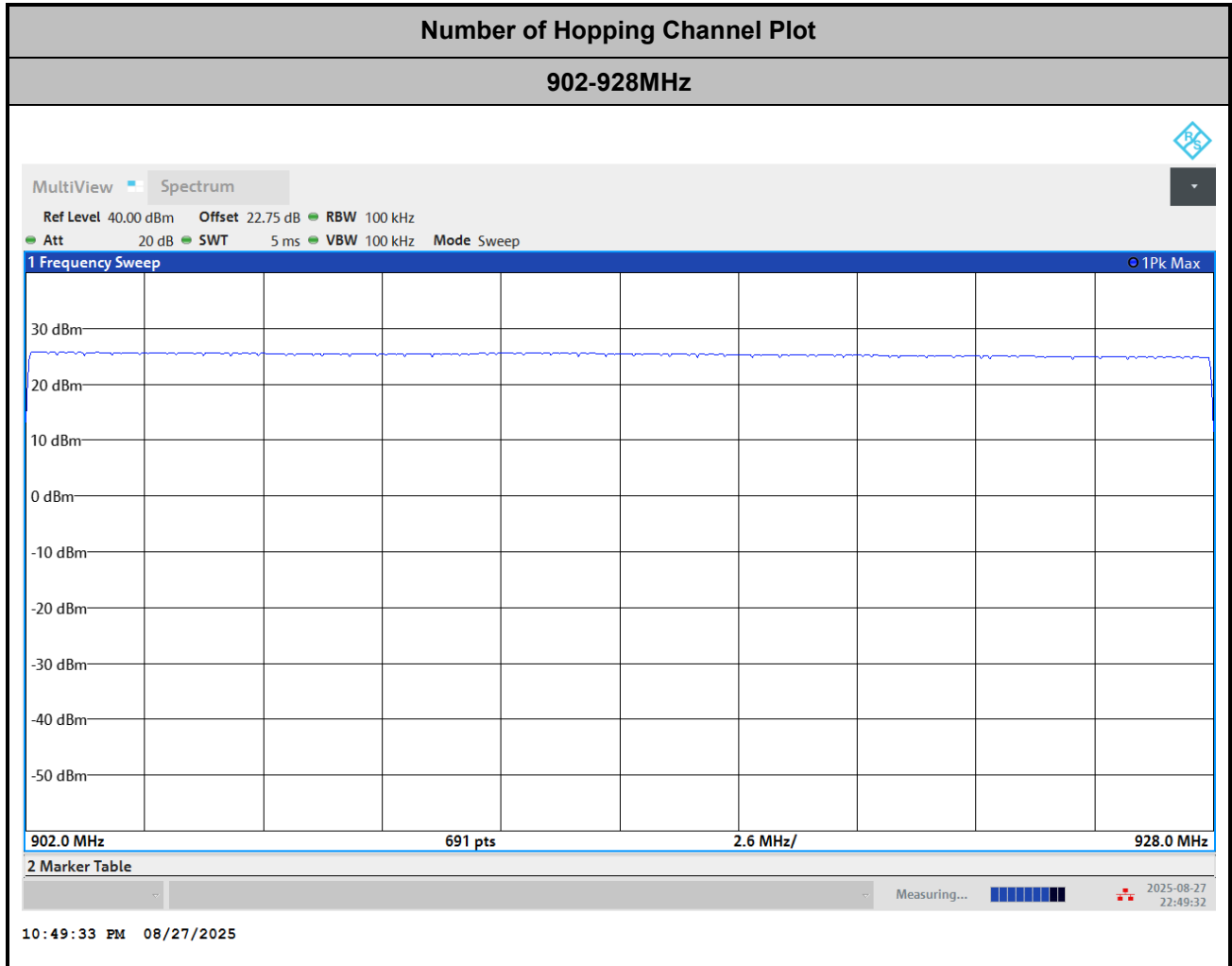


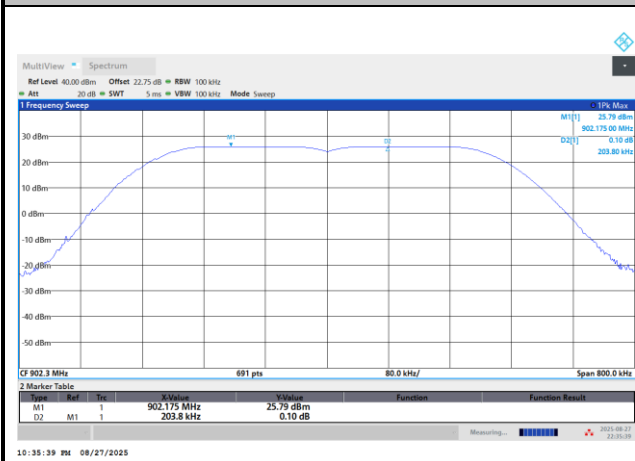
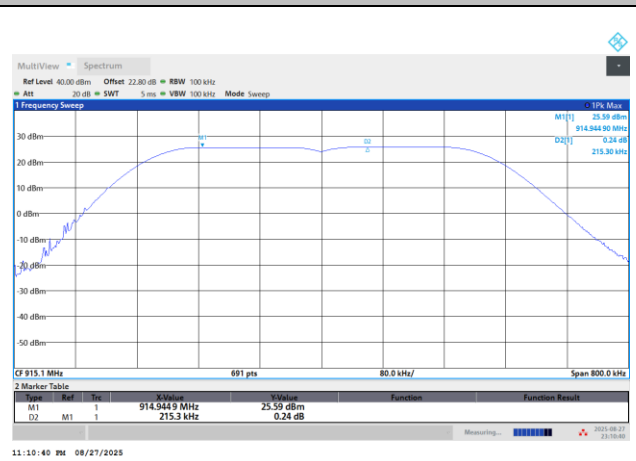
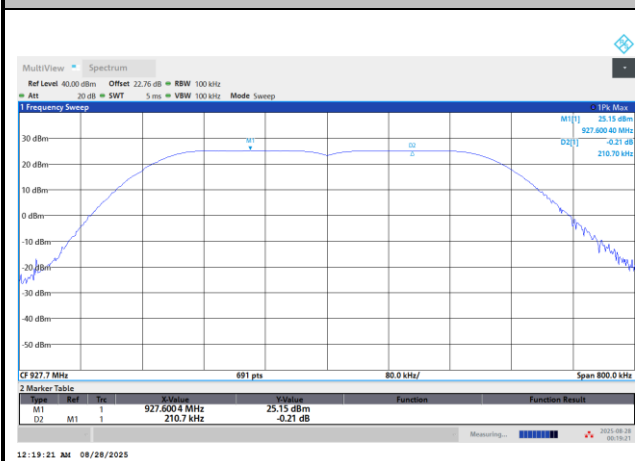
10:07:38 AM 08/27/2025



<SF9>

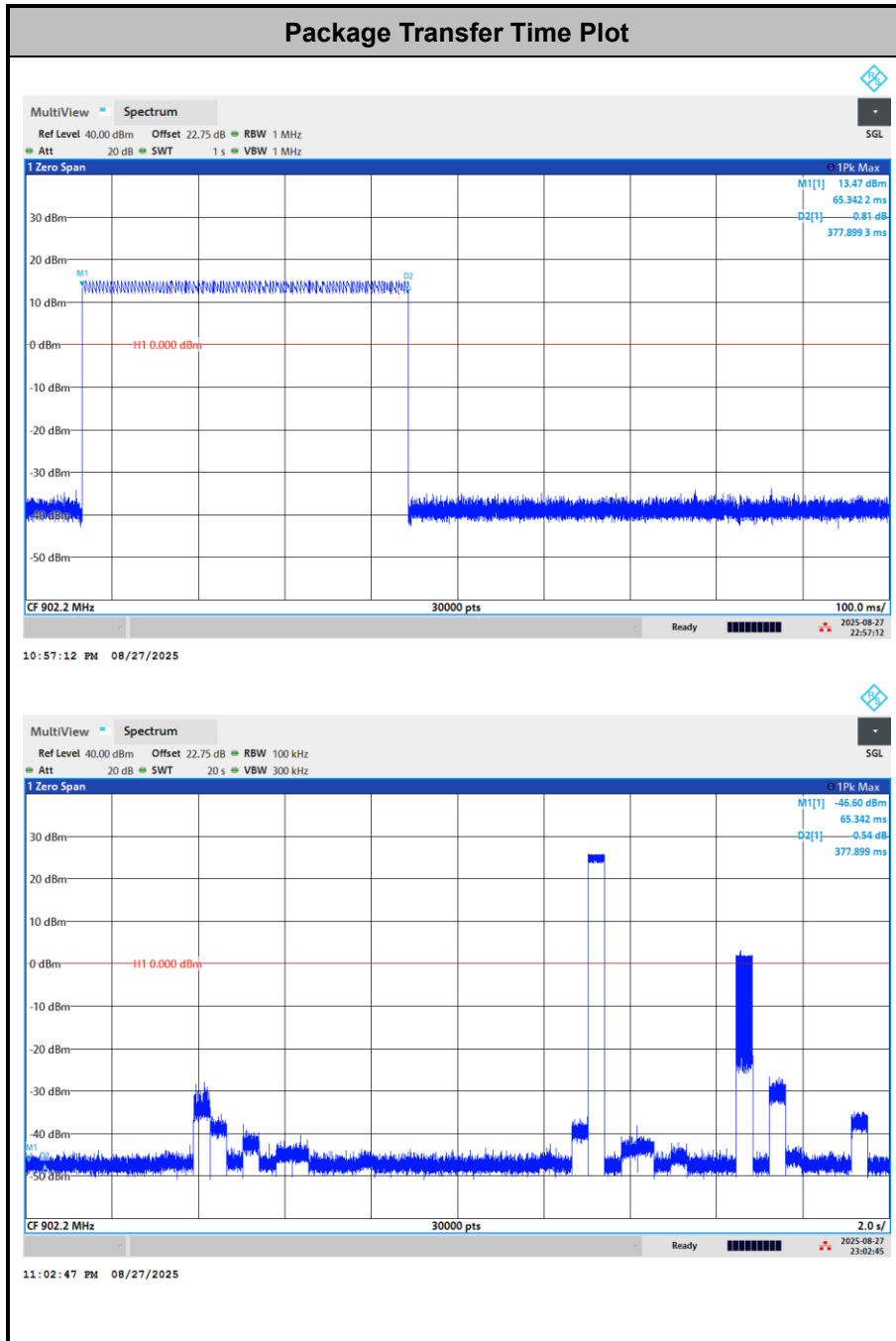
Number of Hopping Frequency



**Hopping Channel Separation****Channel Separation Plot on 902.2MHz****Channel Separation Plot on Channel 915MHz****Channel Separation Plot on Channel 927.8MHz**



Dwell Time

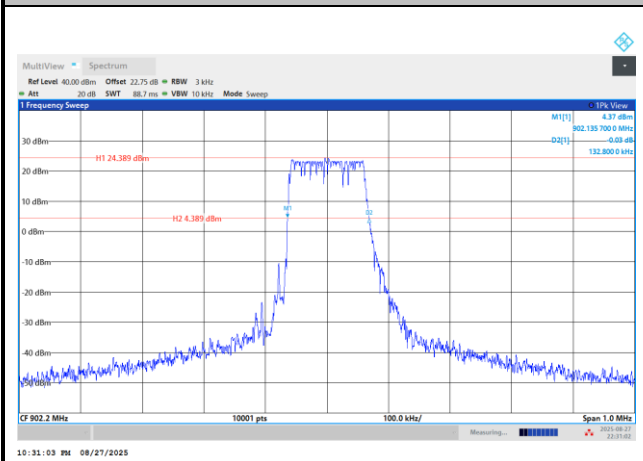


Remark: Dwell Time(s) = Hops Over Occupancy Time (hops) x Package Transfer Time
= 1 x 0.3779s = 0.3779s

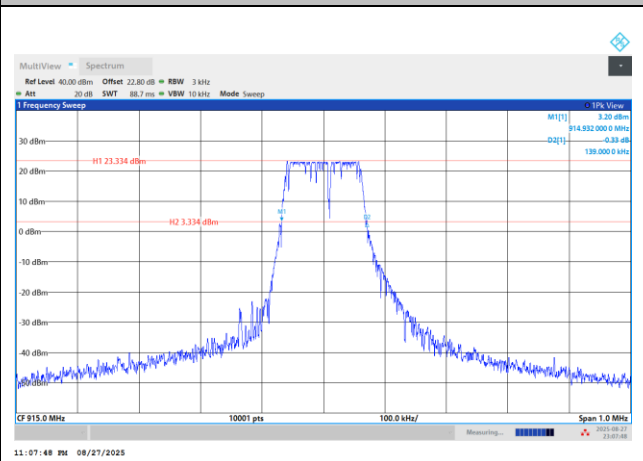


20dB Bandwidth

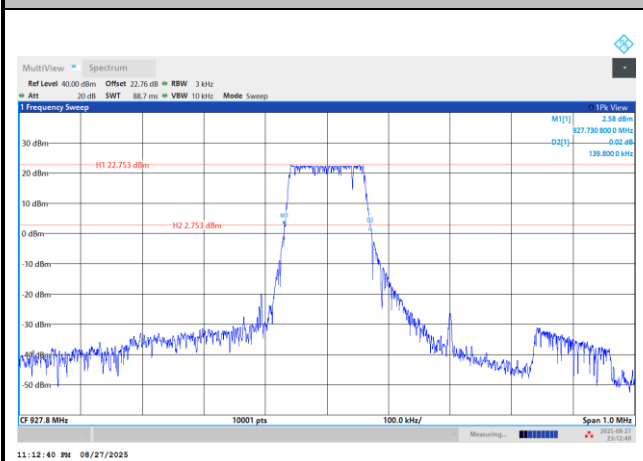
20 dB Bandwidth Plot in 902.2MHz

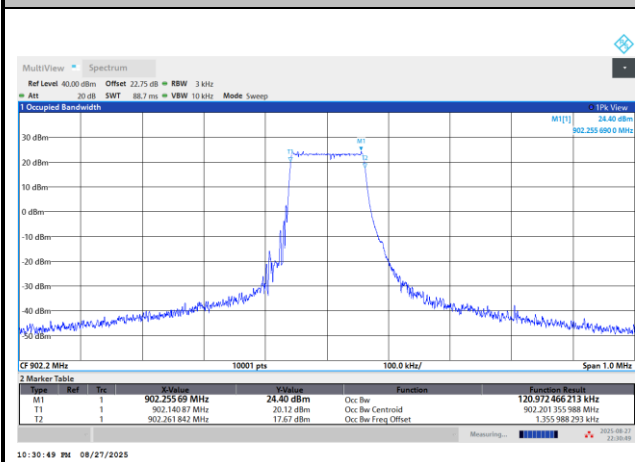
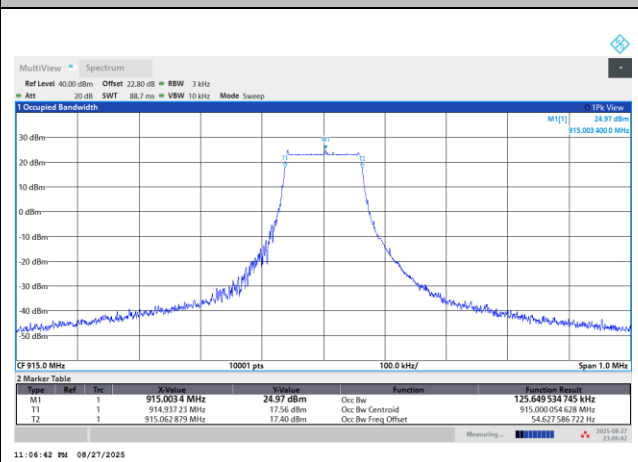
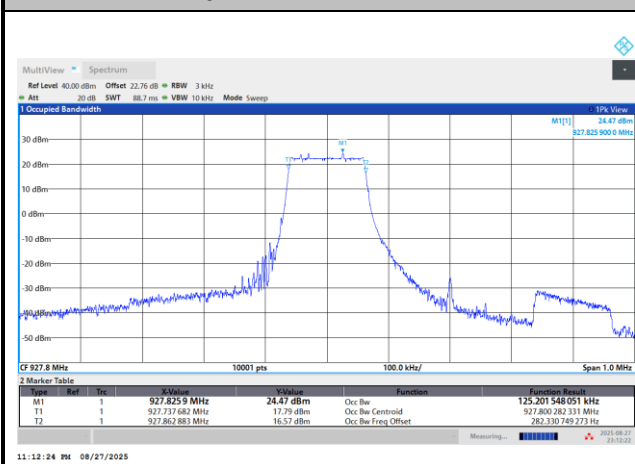


20 dB Bandwidth Plot in 915MHz



20 dB Bandwidth Plot in 927.8MHz

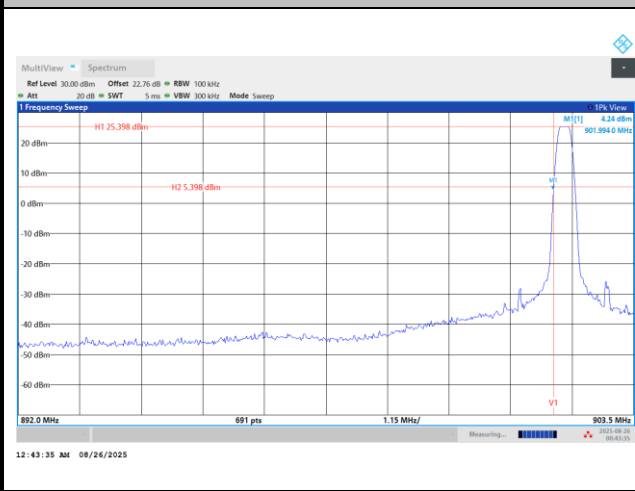


**99% Occupied Bandwidth****99% Occupied Bandwidth on 902.2MHz****99% Occupied Bandwidth on 915MHz****99% Occupied Bandwidth on 927.8MHz**

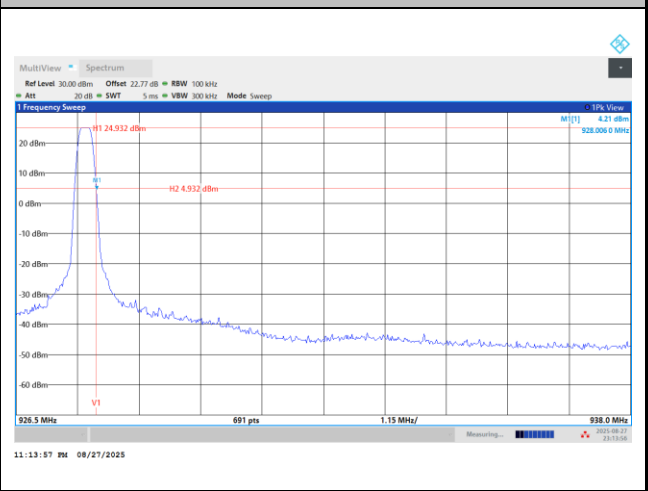


Band Edges

Low Band Edge Plot on 902.2MHz



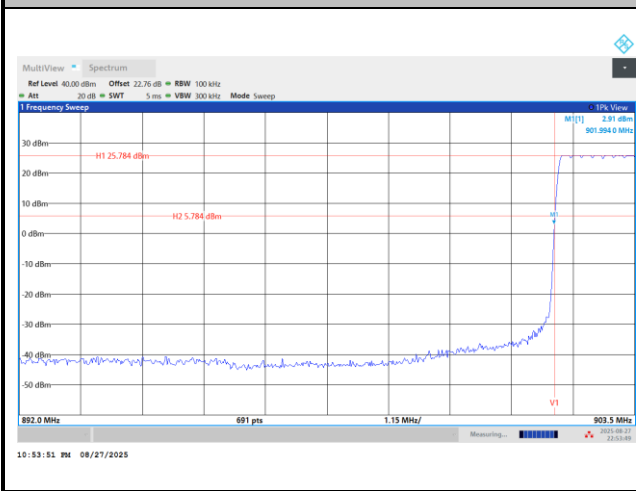
High Band Edge Plot on 927.8MHz



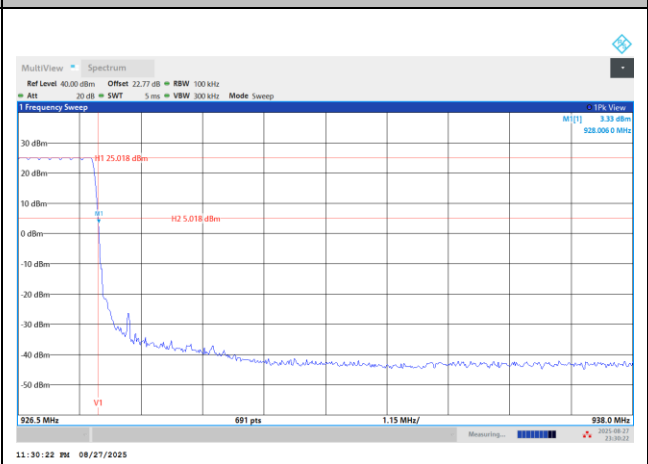


Hopping Mode Band Edges

Hopping Mode Low Band Edge Plot



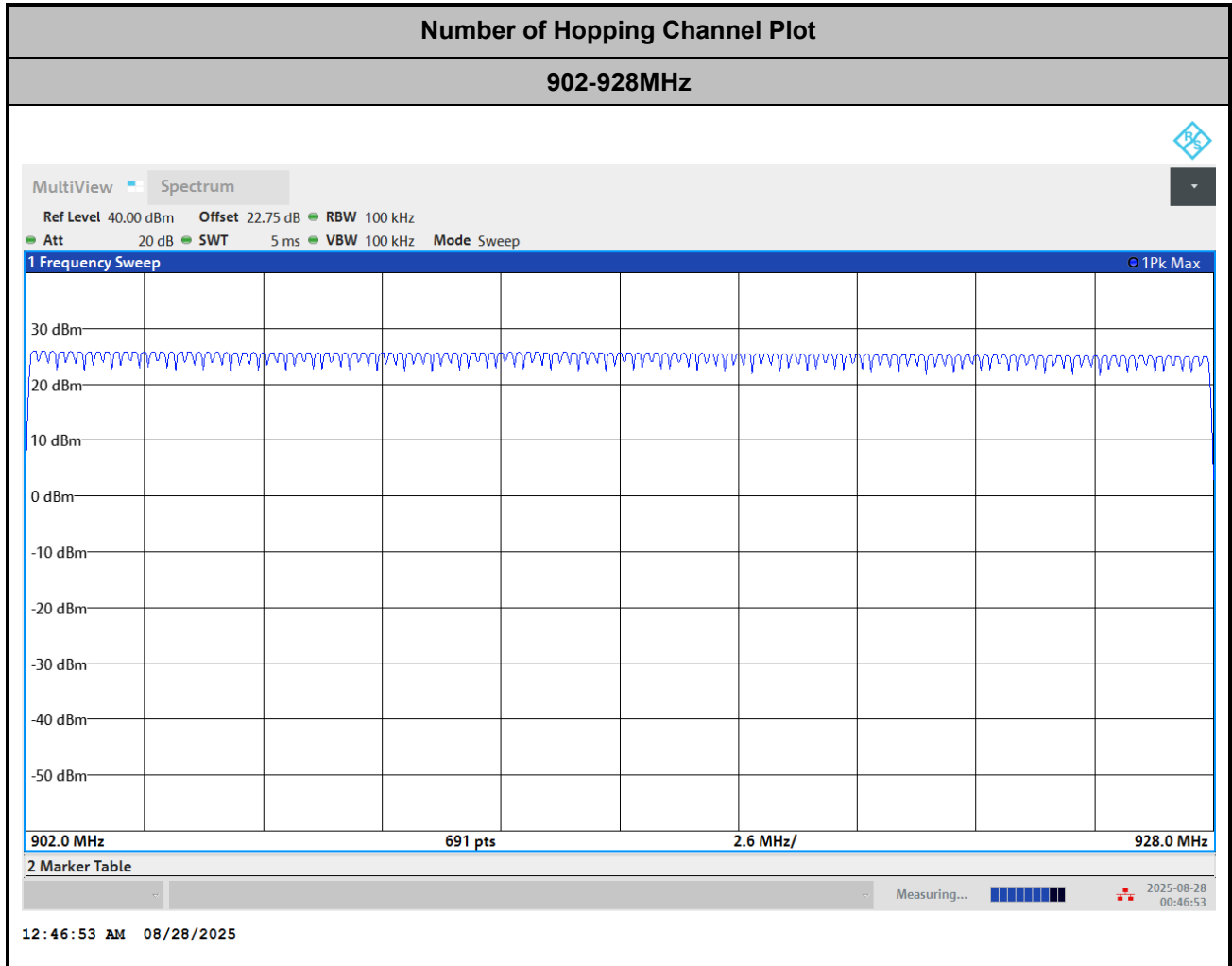
Hopping Mode High Band Edge Plot

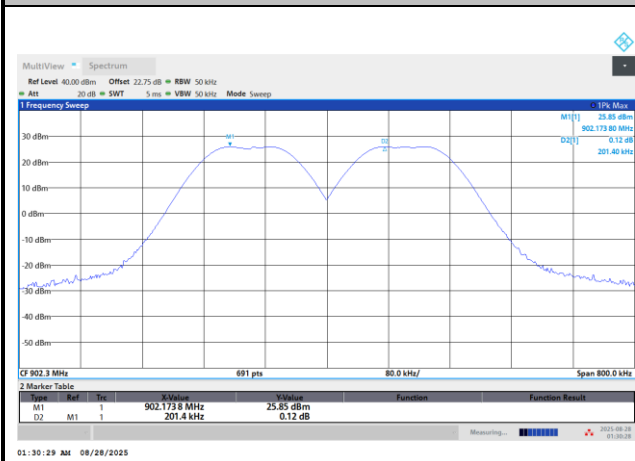
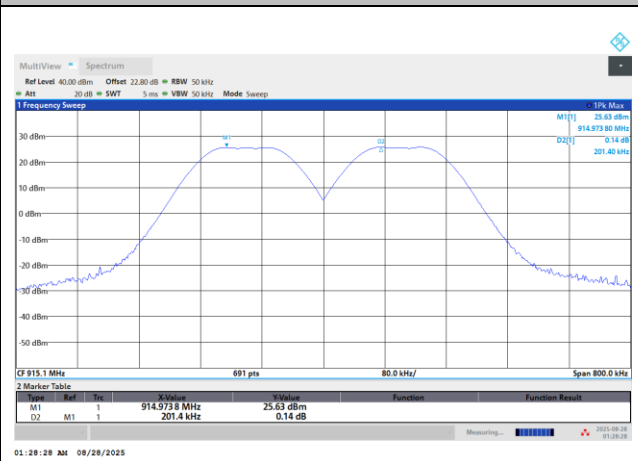
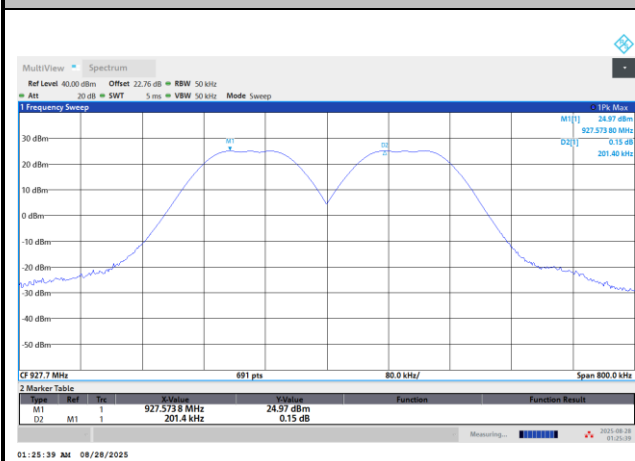




<50Kbps>

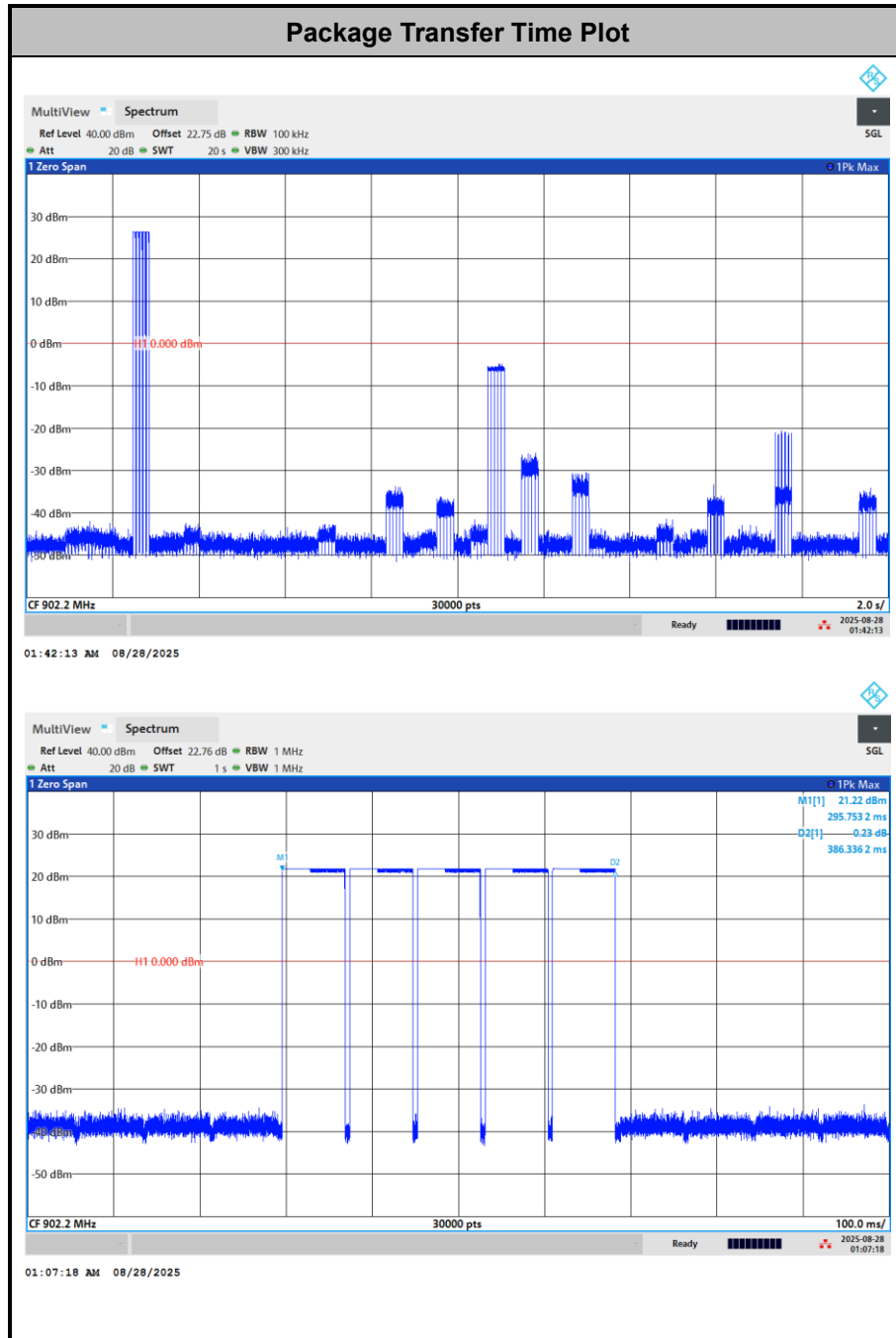
Number of Hopping Frequency



**Hopping Channel Separation****Channel Separation Plot on 902.2MHz****Channel Separation Plot on Channel 915MHz****Channel Separation Plot on Channel 927.8MHz**



Dwell Time

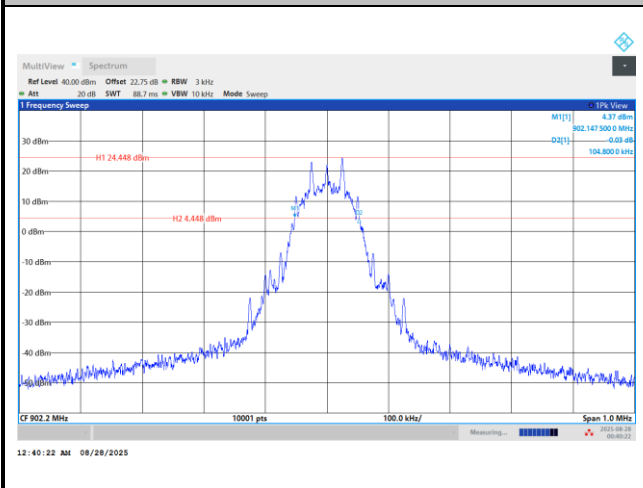


Remark: Dwell Time(s) = Hops Over Occupancy Time (hops) x Package Transfer Time
= 1 x 0.3863s = 0.3863s

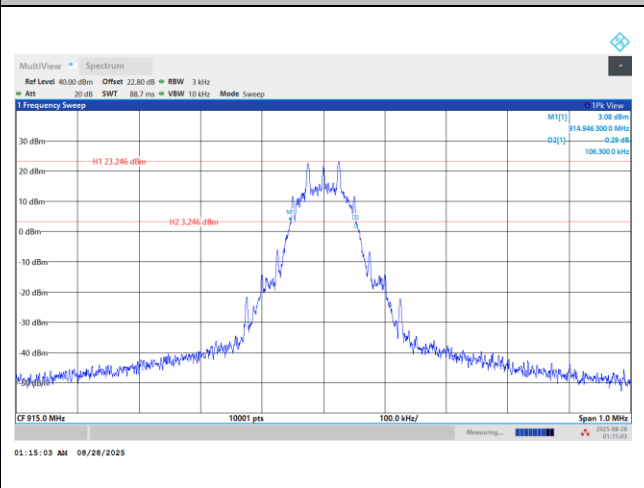


20dB Bandwidth

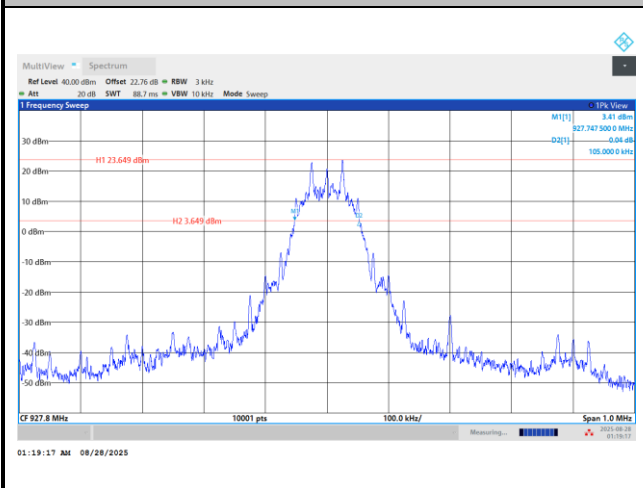
20 dB Bandwidth Plot in 902.2MHz

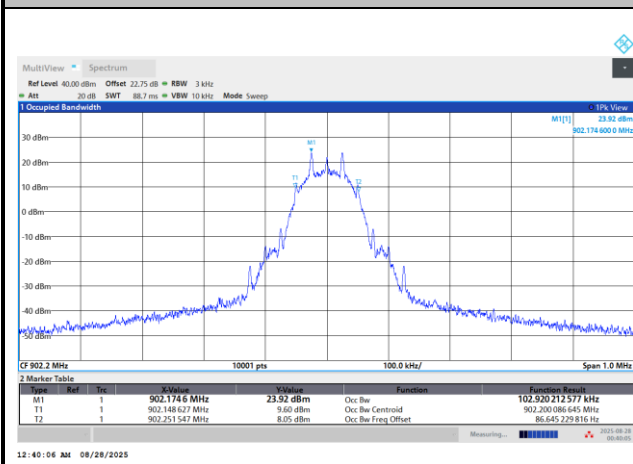
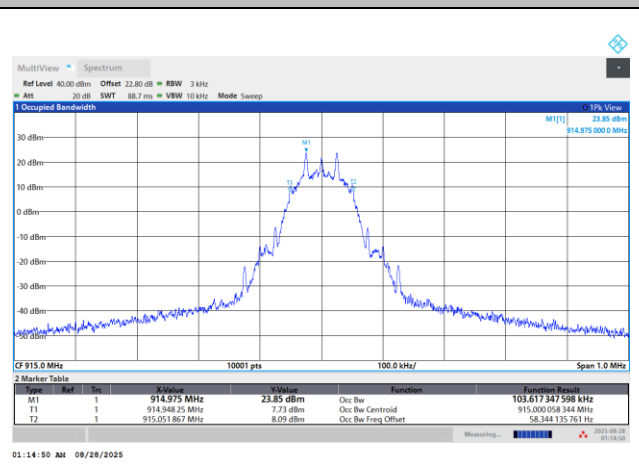
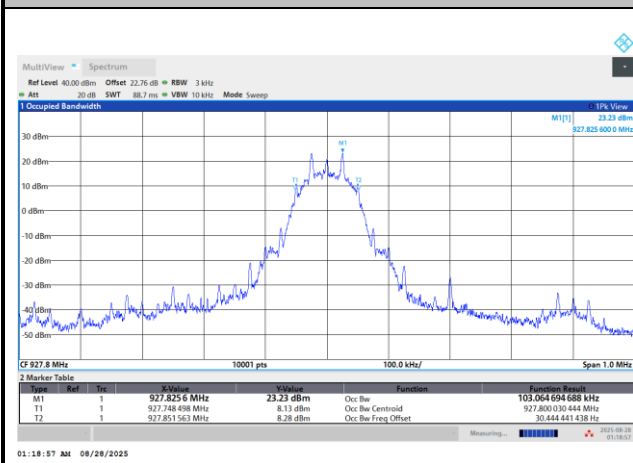


20 dB Bandwidth Plot in 915MHz



20 dB Bandwidth Plot in 927.8MHz

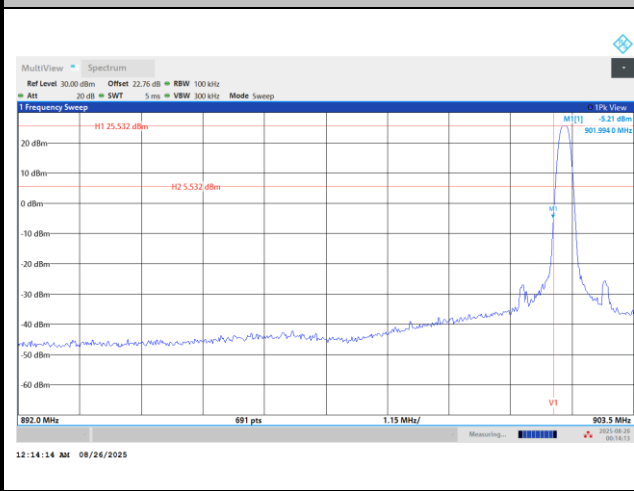


**99% Occupied Bandwidth****99% Occupied Bandwidth on 902.2MHz****99% Occupied Bandwidth on 915MHz****99% Occupied Bandwidth on 927.8MHz**

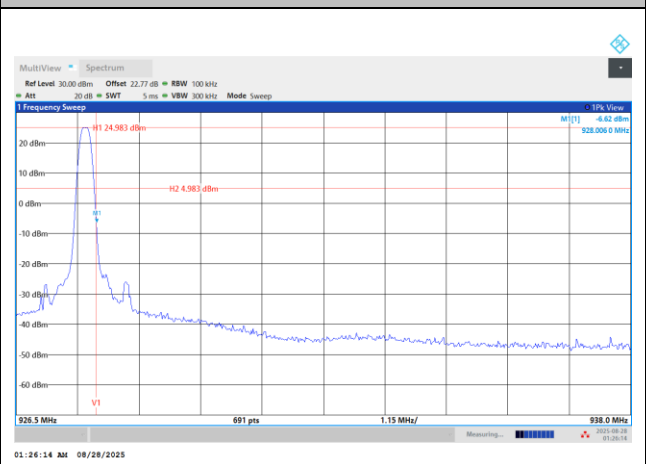


Band Edges

Low Band Edge Plot on 902.2MHz



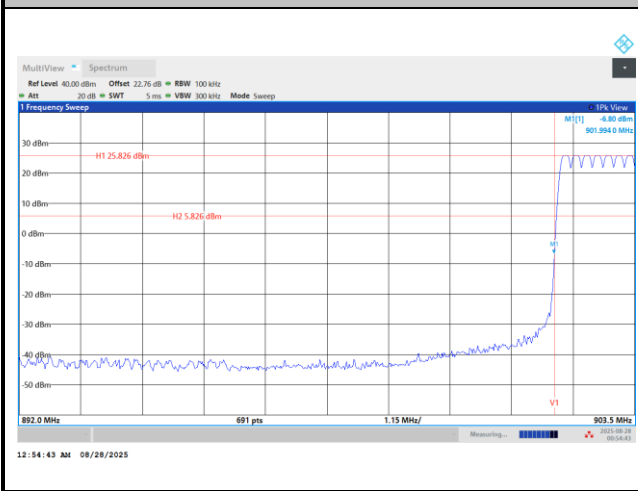
High Band Edge Plot on 927.8MHz



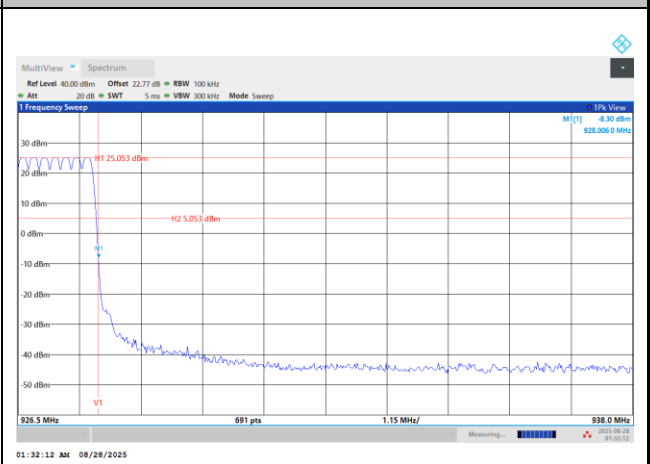


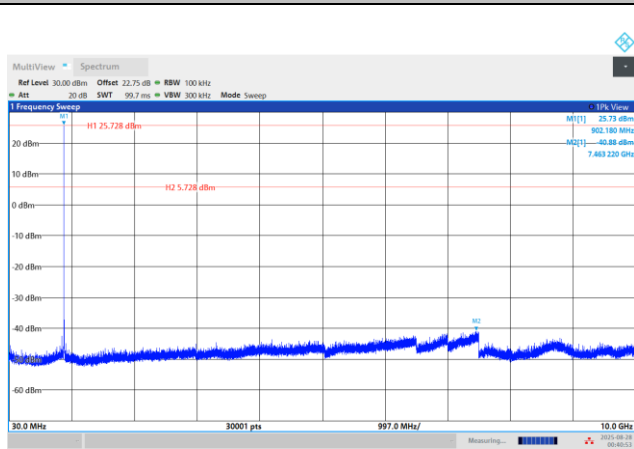
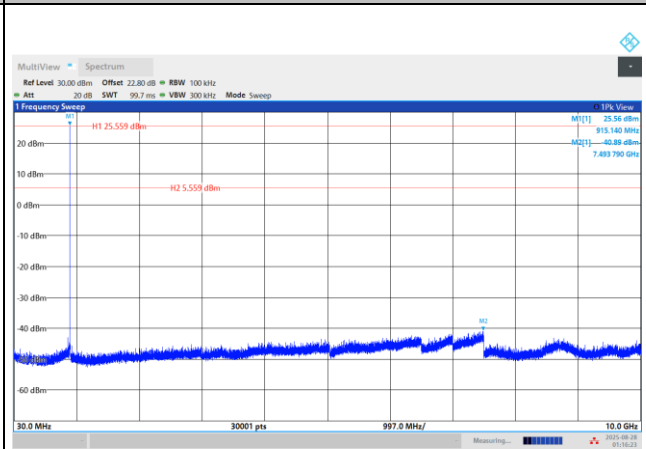
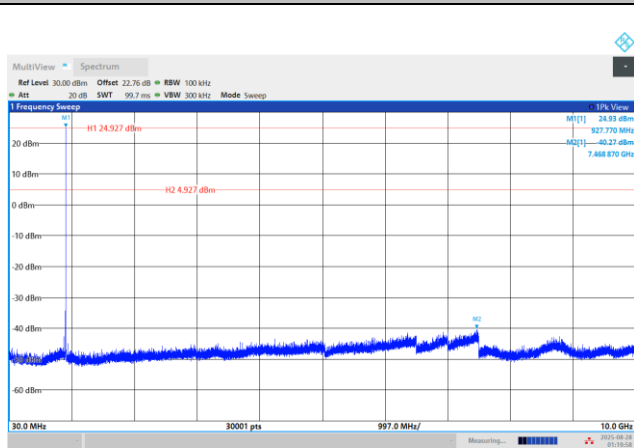
Hopping Mode Band Edges

Hopping Mode Low Band Edge Plot



Hopping Mode High Band Edge Plot



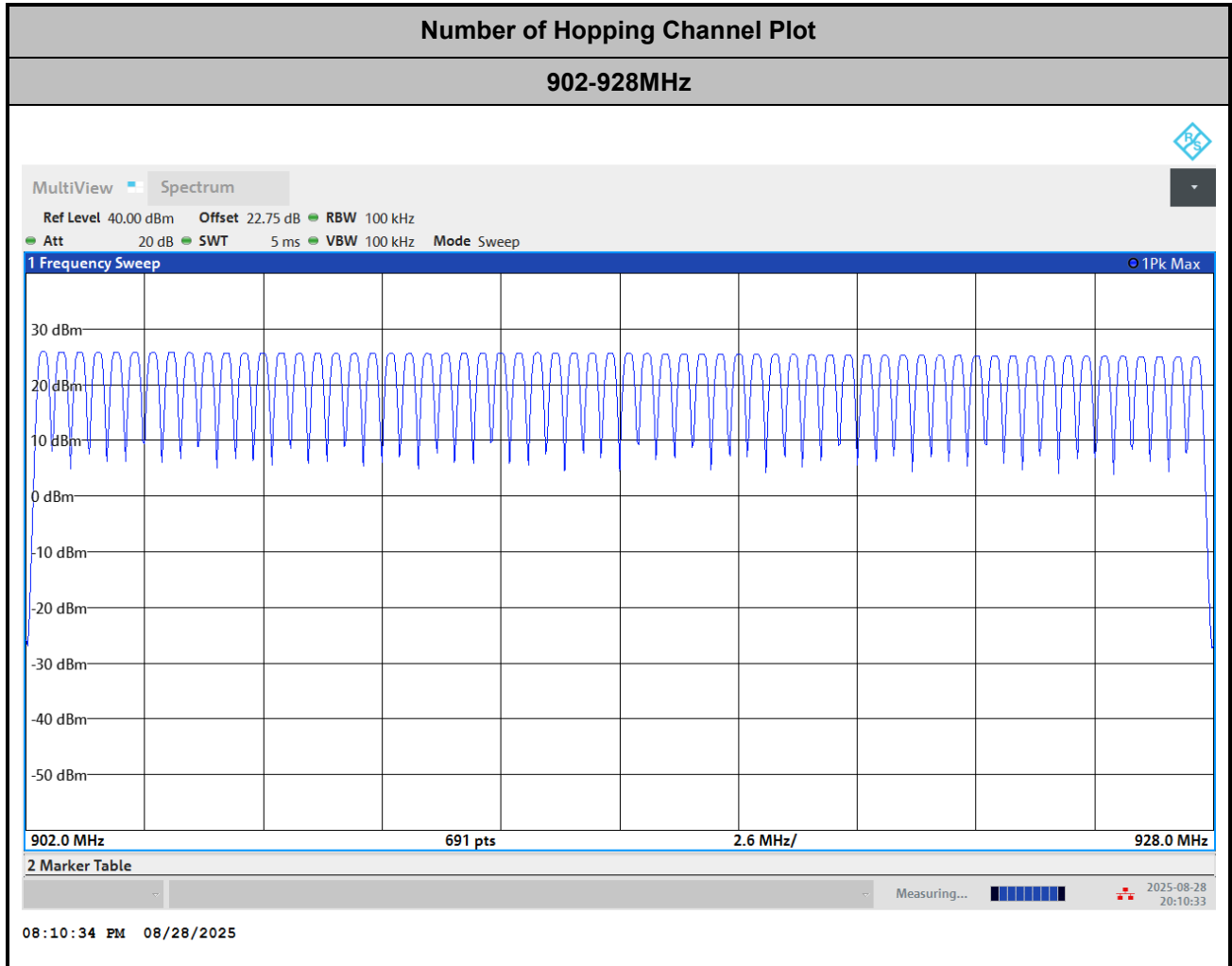
**Conducted Spurious Emission****CSE Plot on Low Ch between 902.2MHz****CSE Plot on Mid Ch between 915MHz****CSE Plot on High Ch between 927.8MHz**

04:19:08 AM 08/28/2025



<150Kbps>

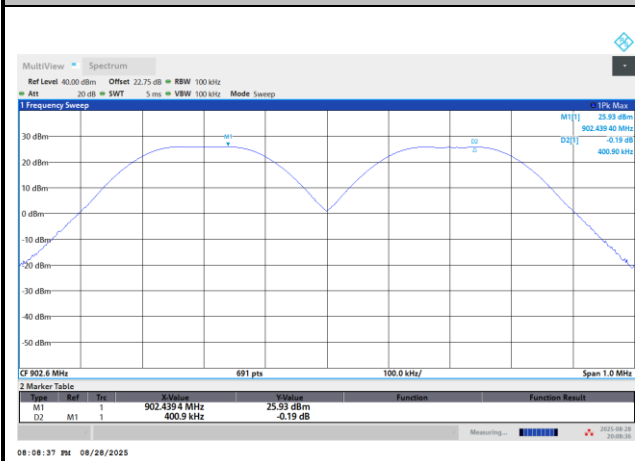
Number of Hopping Frequency



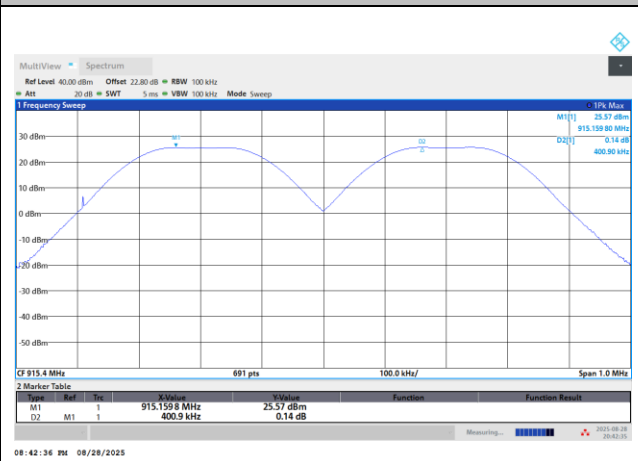


Hopping Channel Separation

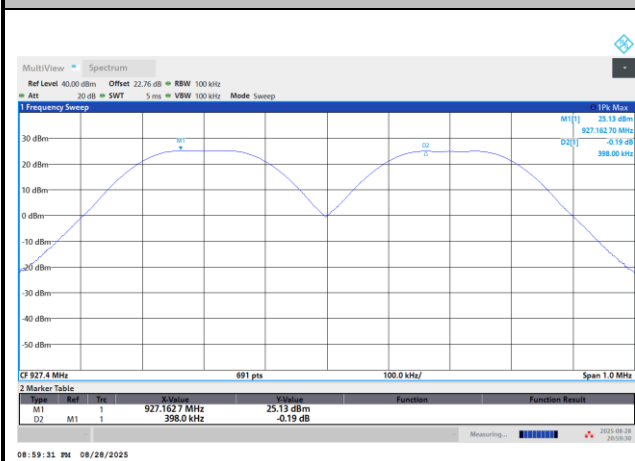
Channel Separation Plot on 902.4MHz



Channel Separation Plot on Channel 915.2MHz

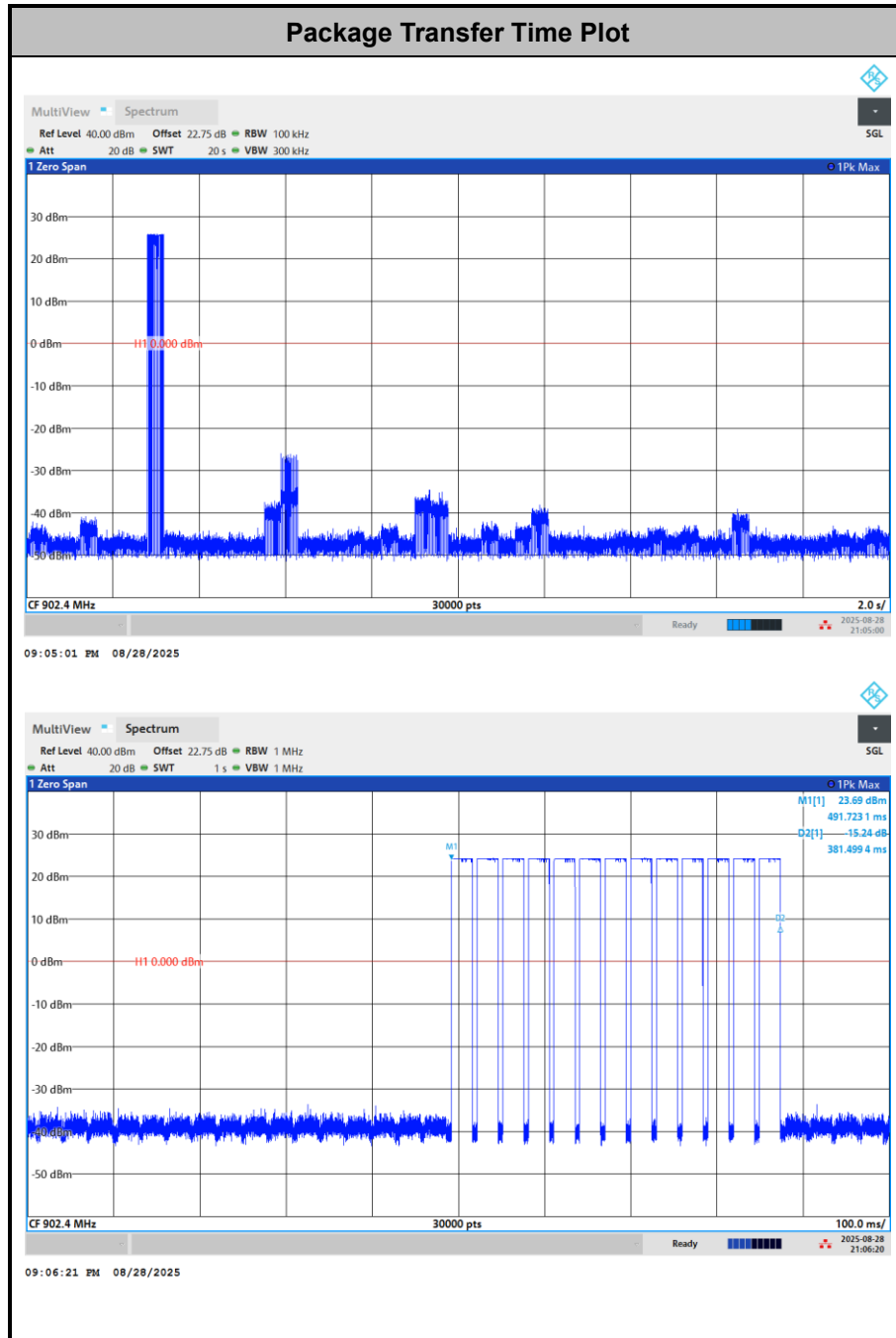


Channel Separation Plot on Channel 927.6MHz





Dwell Time

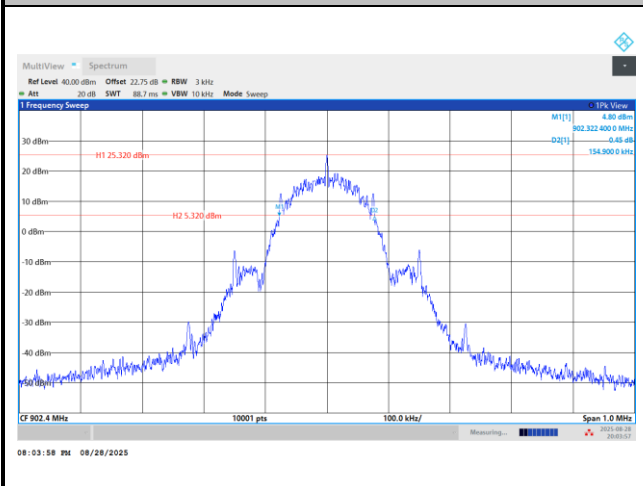


Remark: Dwell Time(s) = Hops Over Occupancy Time (hops) x Package Transfer Time
= 1 x 0.3815s = 0.3815s

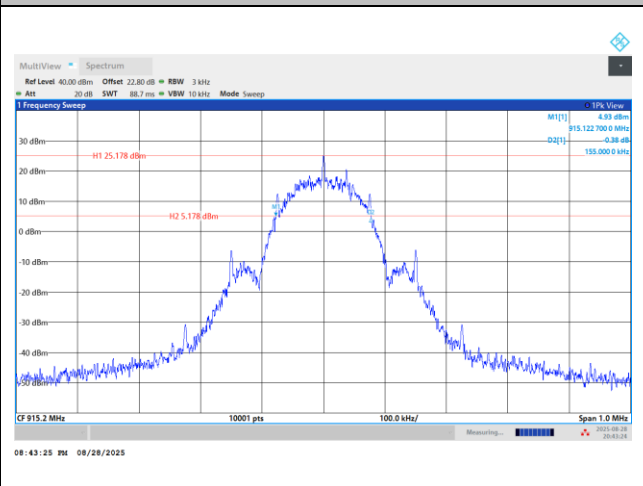


20dB Bandwidth

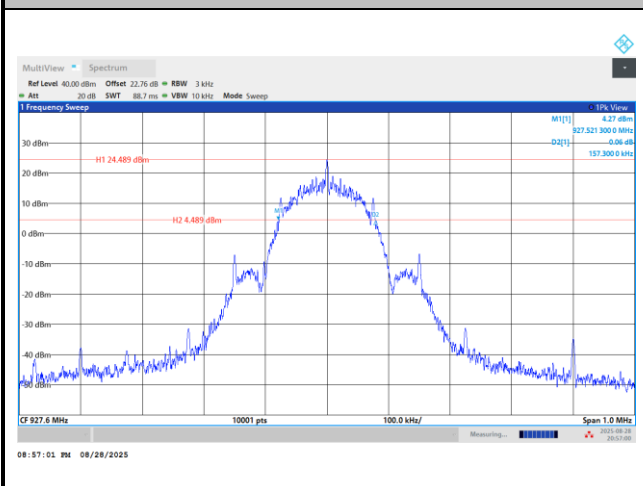
20 dB Bandwidth Plot in 902.4MHz

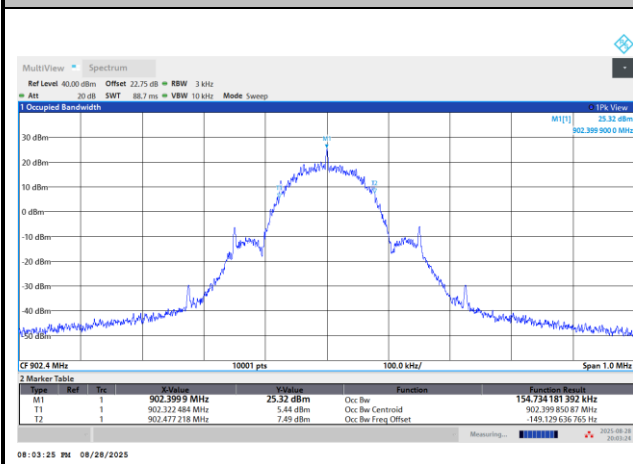
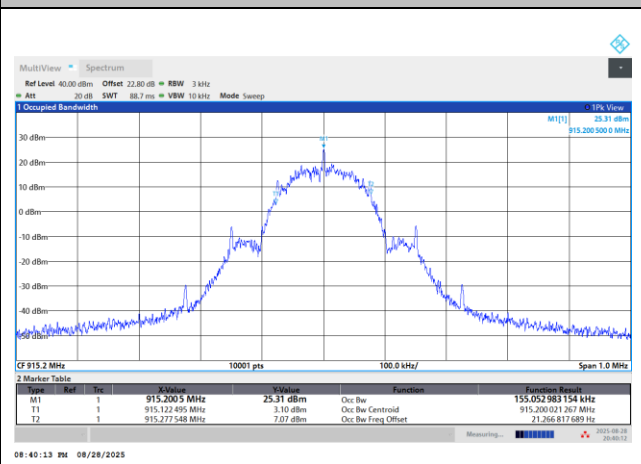
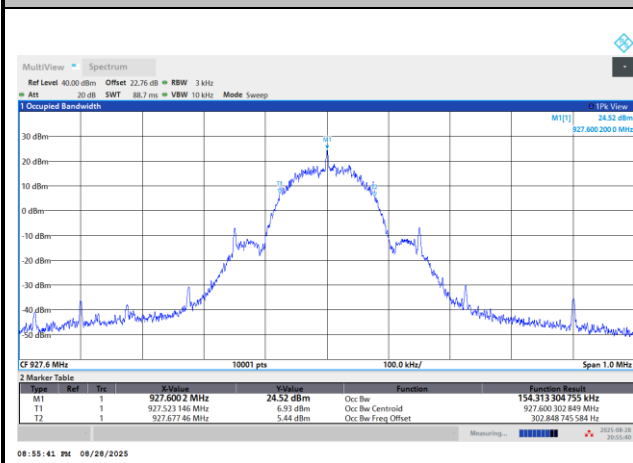


20 dB Bandwidth Plot in 915.2MHz



20 dB Bandwidth Plot in 927.6MHz

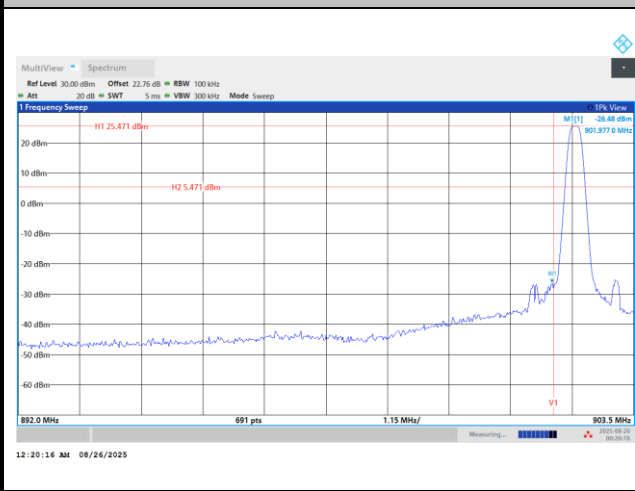


**99% Occupied Bandwidth****99% Occupied Bandwidth on 902.4MHz****99% Occupied Bandwidth on 915.2MHz****99% Occupied Bandwidth on 927.6MHz**

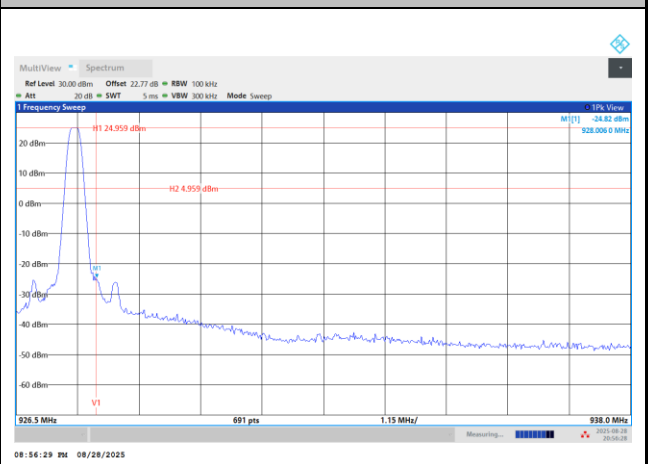


Band Edges

Low Band Edge Plot on 902.4MHz



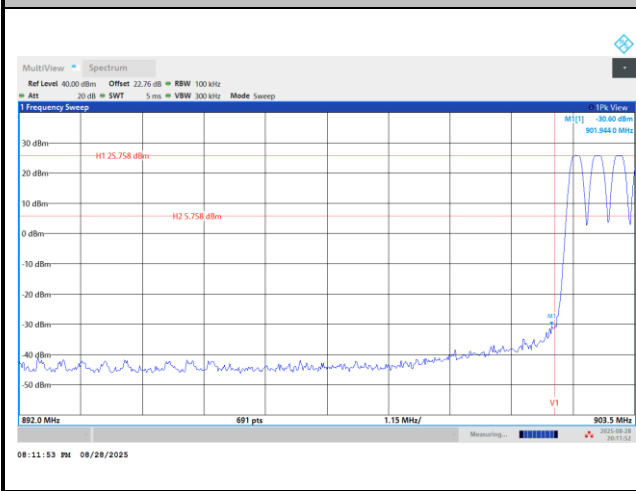
High Band Edge Plot on 927.6MHz



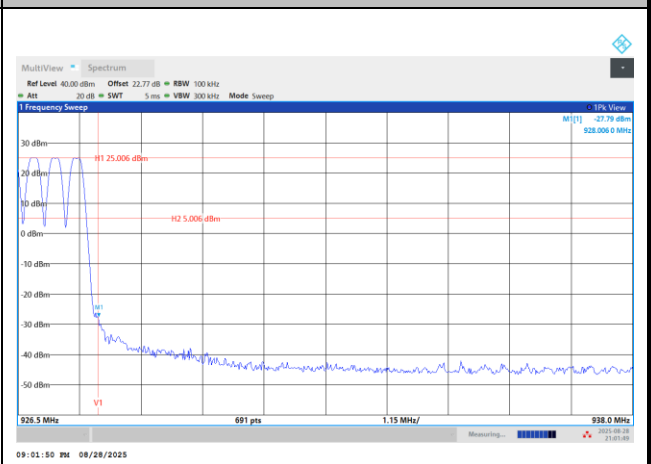


Hopping Mode Band Edges

Hopping Mode Low Band Edge Plot



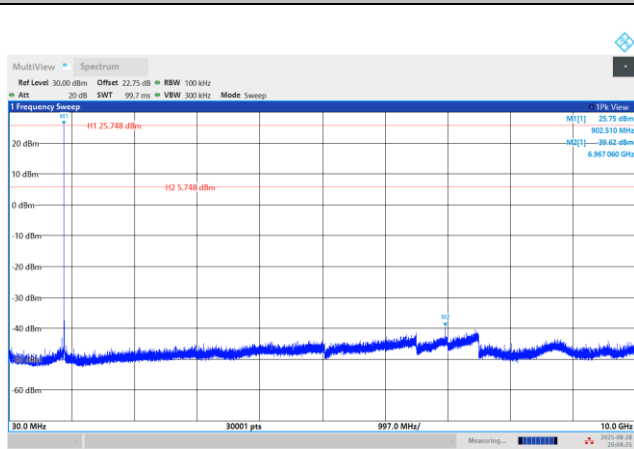
Hopping Mode High Band Edge Plot



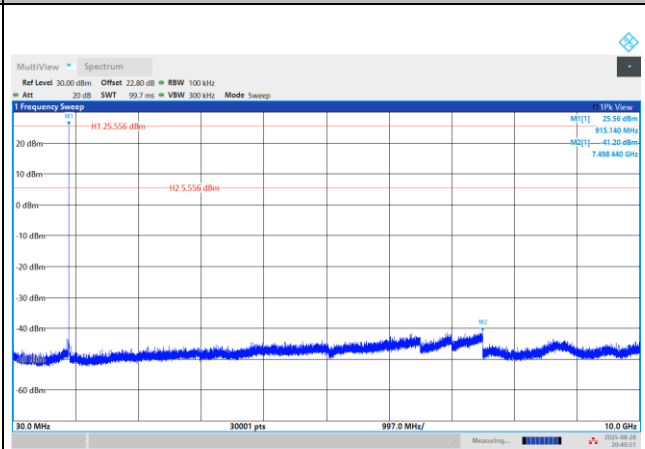


Conducted Spurious Emission

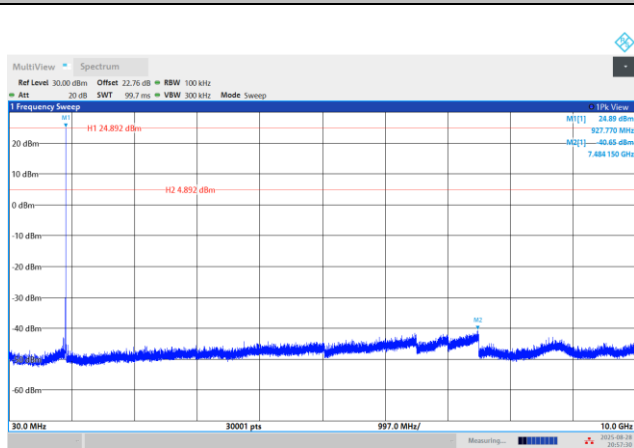
CSE Plot on Low Ch between 902.4MHz



CSE Plot on Mid Ch between 915.2MHz



CSE Plot on High Ch between 927.6MHz



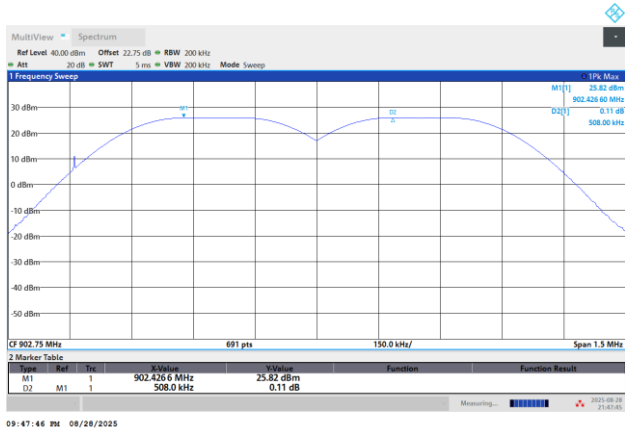
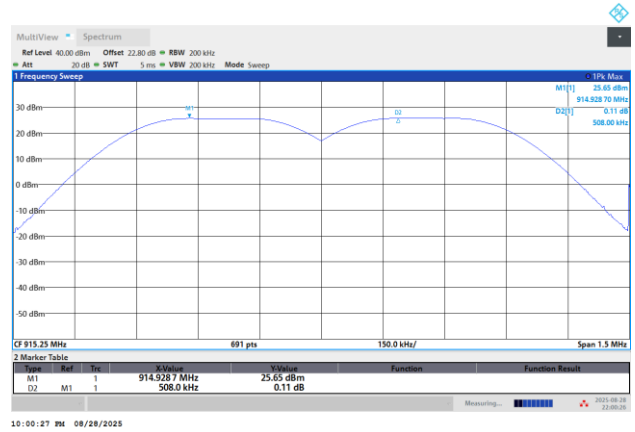
06:57:31 BW 06/28/2025



<250Kbps>

Number of Hopping Frequency



**Hopping Channel Separation****Channel Separation Plot on 902.5MHz****Channel Separation Plot on Channel 915MHz****Channel Separation Plot on Channel 927.5MHz**