FCC RADIO TEST REPORT

FCC ID	:	**ZAT-1312PSIP-3**
Equipment	:	**CC1312PSIP**
Brand Name	:	**Texas Instruments**
Model Name	:	**CC1312PSIPMOT3**
Applicant	:	**Texas Instruments Incorporated 12500 TI BLVD., Dallas, Texas, 75243**
Manufacturer	:	**Texas Instruments Incorporated 12500 TI BLVD., Dallas, Texas, 75243**
Standard	:	**FCC Part 15 Subpart C §15.247**

The product was received on Sep. 27, 2023 and testing was performed from Oct. 19, 2023 to Jan. 17, 2024. 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.

Louis Wu

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.)

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History of this test report

Report No.	Version	Description	Issue Date
FR341305-02B	01	Initial issue of report	Feb. 02, 2024
FR341305-02B	02	Revise FCC ID and Model Name This report is an updated version, replacing the report issued on Feb. 02, 2024.	May 06, 2024
FR341305-02B	03	Revise List of Measuring Equipment, Appendix A and Appendix C~G This report is an updated version, replacing the report issued on May 06, 2024.	May 08, 2024

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.247(a)(1)	Number of Channels	Pass	-
3.2	15.247(a)(1)	Hopping Channel Separation	Pass	-
3.3	15.247(a)(1)	Dwell Time of Each Channel	Pass	-
3.4	15.247(a)(1)	20dB Bandwidth	Pass	-
3.4	2.1049	99% Occupied Bandwidth	Reporting only	-
3.5	15.247(b)(2)	Output Power	Pass	-
3.6	15.247(d)	Conducted Band Edges	Pass	-
3.7	15.247(d)	Conducted Spurious Emission	Pass	-
3.8	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	Pass	0.05 dB under the limit at 2706.60 MHz
3.9	15.207	AC Conducted Emission	Pass	4.13 dB under the limit at 0.16 MHz
3.10	15.203 15.247(b)	Antenna Requirement	Pass	-

Note: After assessing, since the HW of the module is the same but with high power, the FR341305-02B report reuses all the test data except AC Conducted Emission from the report FR341305-01B.

Conformity Assessment Condition:

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

1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature
General Specs TI 15.4 50 kbps, 25 kHz Deviation, 2-GFSK, 98 kHz RX Bandwidth

Antenna Information				
	Brand	**Antenna Type**	**Model**	**915MHz Gain**
1	TI	Integrated PCB antenna	LP-EM-CC1312PSIP antenna	+2.69 dBi
2	Kaadas	Flexi PCB antenna	K1	-5.82 dBi
3	Leederson	Integrated PCB antenna	L1	-4.51 dBi
4	Leederson	Integrated PCB antenna	L2	-1.83 dBi
5	Leederson	Stanced antenna	L3	-9.48 dBi
6	Leederson	Stanced antenna	L4	+0.37 dBi
7	Leederson	Integrated PCB antenna	L5	-1.74 dBi
8	Pulse	External whip antenna	W5017	+0.90 dBi
9	Johanson Technology	Chip antenna	0900AT43A0070	-0.50 dBi
10	Johanson Technology	Chip antenna	0915AT43A0026	+1.0 dBi
11	Pulse	Wire antenna	W3113	+0.80 dBi

Remark:

1. The EUT uses the Integrated PCB antenna from Texas Instruments (Antenna #1)
2. 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. EMC & Wireless Communications Laboratory
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978
Test Site No.	**Sporton Site No.**
	CO05-HY (TAF Code: 1190)
Remark	The AC Conducted Emission test item subcontracted to Sporton International Inc. EMC & Wireless Communications Laboratory.

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

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, 03CH13-HY

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

FCC designation No.: TW1190 and 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 Part 15 Subpart C §15.247
- FCC KDB Publication No. 558074 D01 15.247 Meas Guidance v05r02
- FCC KDB 414788 D01 Radiated Test Site v01r01
- ANSI C63.10-2013

Remark:

1. All the test items were validated and recorded in accordance with the standards without any modification during the testing.
2. 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

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

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	**Data Rate / Modulation**
	TI 15.4 50 kbps / 2-GFSK
Conducted Test Cases	Mode 1: CH01 Tx_902.20 MHz Mode 2: CH31 Tx_908.20 MHz Mode 3: CH65 Tx_915.00 MHz Mode 4: CH129 Tx_927.80 MHz
Radiated Test Cases	Mode 1: CH01 Tx_902.20 MHz Mode 2: CH31 Tx_908.20 MHz Mode 3: CH65 Tx_915.00 MHz Mode 4: CH129 Tx_927.80 MHz
AC Conducted Emission	Mode 1: TI 15.4 TX + USB Cable (Charging from Notebook)

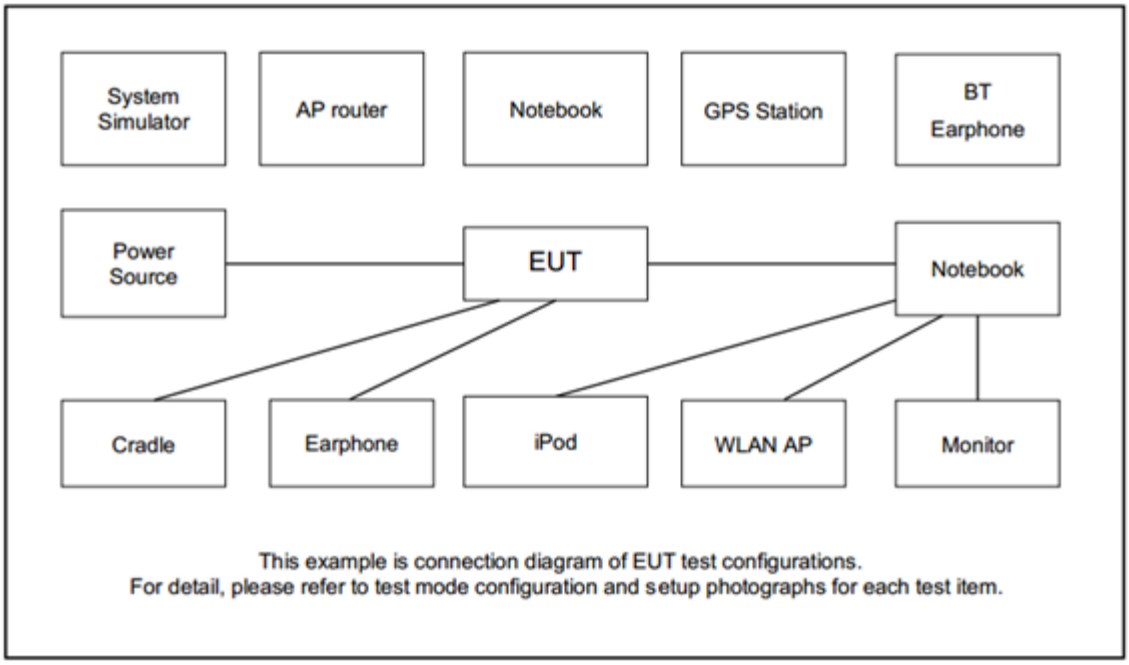
Remark:

1. The test mode is configured by test software with the following configurations:.

   For the 14 dBm port:
   - Max power 12.5 dBm without duty cycling (with 100% duty cycle), and tested with antenna gain 2.0 dBi.
   - Max power 12.0 dBm without duty cycling (with 100% duty cycle), and tested with antenna gain 2.69 dBi.
   - Max power 14.0 dBm with duty cycling of 60ms_max (with 60% duty cycle), and tested with antenna gain 2.69 dBi.
   - Max power 14.0 dBm without duty cycling (with 100% duty cycle), and tested with antenna gain 2.69 dBi.

   For the 20 dBm port:
   - Max power 16.0 dBm without duty cycling (with 100% duty cycle), and tested with antenna gain 2.69 dBi.
   - Max power 19.0 dBm with duty cycling of 60ms_max (with 60% duty cycle), and tested with antenna gain 2.69 dBi.
   - Max power 19.0 dBm without duty cycling (with 100% duty cycle), and tested with antenna gain 2.69 dBi.
2. For the CSE measurement, the worst case data 19 dBm without duty cycling (with 100% duty cycle) was recorded in this report.
   For the RSE measurements CH31, CH65, and CH129, the worst case data 19 dBm without duty cycling (with 100% duty cycle) was recorded in this report.
3. For the RSE measurement CH01, 14 dBm without duty cycling (with 100% duty cycle), 16.0 dBm without duty cycling (with 100% duty cycle), and 19.0 dBm with duty cycling of 60ms_max (with 60% duty cycle) are recorded in this report.

2.3 Connection Diagram of Test System



2.4 Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
1.	WLAN AP	ASUS	RT-AC55U	FCC DoC	N/A	Unshielded, 1.8 m
2.	Notebook	DELL	Latitude E3400	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
3.	Notebook	Acer	N18Q13	PD9AX201NG	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
4.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	N/A
5.	Fixture 1	Texas Instruments	LP-XDS110	N/A	N/A	N/A
6.	Fixture 2	Texas Instruments	LP-EM-CC1312PSIP	N/A	N/A	N/A

2.5 EUT Operation Test Setup

The RF test items, utility “SmartRF_Studio_7 V2.29.4” was installed in Notebook which was programmed in order to make the EUT get into the engineering modes to provide channel selection, power level, data rate and the application type and for continuous transmitting signals.

2.6 Measurement Results Explanation Example

For all conducted test items:

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

Example:

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 4.2 dB and 10 dB attenuator.

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

= 4.2 + 10 = 14.2 (dB)

3 Test Result

3.1 Number of Channel Measurement

3.1.1 Limits of Number of Hopping Frequency

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

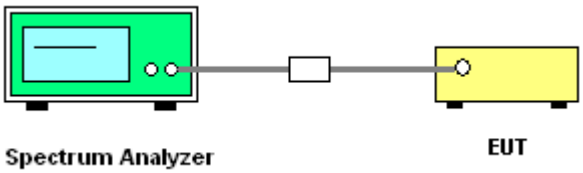
3.1.2 Measuring Instruments

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

3.1.3 Test Procedure

1. The testing follows ANSI C63.10-2013 clause 7.8.3.
2. The RF output of EUT 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 = 30kHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold. The number of hopping frequency used is defined as the number of total channel.
6. 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.

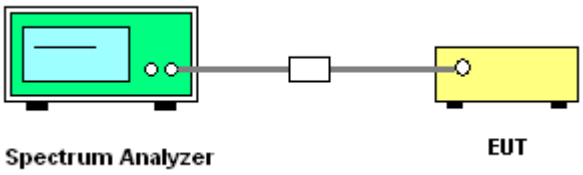
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

1. The testing follows ANSI C63.10-2013 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 = 100kHz for; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
   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.

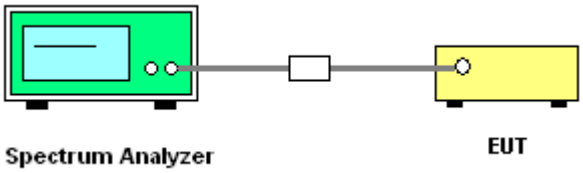
3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

1. The testing follows ANSI C63.10-2013 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 = 100 kHz; VBW ≥ RBW; Sweep = as necessary to capture the entire dwell time per hopping channel; Detector function = peak; Trace = max hold.
6. Measure and record the results in the test report.

3.3.4 Test Setup



3.3.5 Test Result of Dwell Time

Please refer to Appendix A.

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.

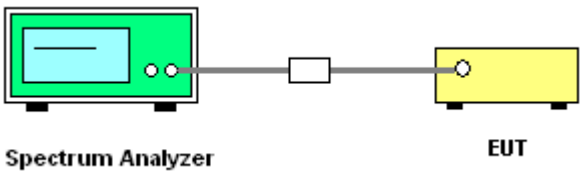
3.4.2 Measuring Instruments

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

3.4.3 Test Procedures

1. The testing follows ANSI C63.10-2013 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 ≥ 1% of the 20 dB bandwidth; VBW ≥ RBW; Sweep = auto; Detector function = peak;
   Trace = max hold.
5. Use the following spectrum analyzer settings for 99 % Bandwidth measurement.
   Span = approximately 1.5 to 5 times the 99% bandwidth, centered on a hopping channel;
   RBW ≥ 1-5% of the 99% bandwidth; VBW ≥ 3 * RBW; Sweep = auto; Detector function = peak;
   Trace = max hold.
6. Measure and record the results in the test report.

3.4.4 Test Setup



3.4.5 Test Result of 20dB Bandwidth

Please refer to Appendix A.

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.

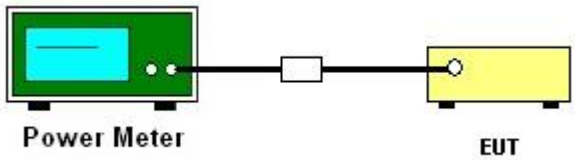
3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

1. The testing follows ANSI C63.10-2013 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.

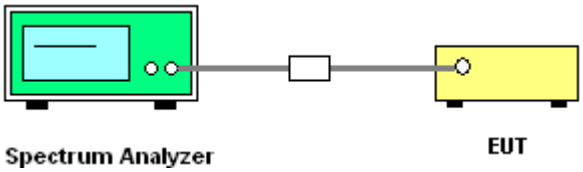
3.6.2 Measuring Instruments

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

3.6.3 Test Procedures

1. The testing follows ANSI C63.10-2013 clause 7.8.6.
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.

3.6.6 Test Result of Conducted Hopping Mode 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.

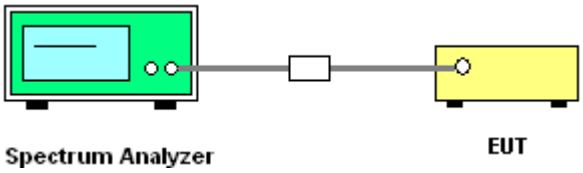
3.7.2 Measuring Instruments

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

3.7.3 Test Procedure

1. The testing follows ANSI C63.10-2013 clause 7.8.8.
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 testing follows the ANSI C63.10 Section 11.12.2 Antenna-port conducted measurements.
2. Measure the conducted output power (in dBm) using the peak detector.
3. Add the maximum transmit antenna gain (in dBi) to the measured output power level to determine the EIRP.
4. Add the appropriate maximum ground reflection factor to the EIRP (6 dB for frequencies ≤ 30 MHz; 4.7 dB for frequencies between 30 MHz and 1000 MHz, inclusive; and 0 dB for frequencies > 1000 MHz).
5. Convert the resultant EIRP to an equivalent electric field strength using the following relationship:

   E = EIRP − 20 log d + 104.8,

   where

   E is the electric field strength in dBμV/m

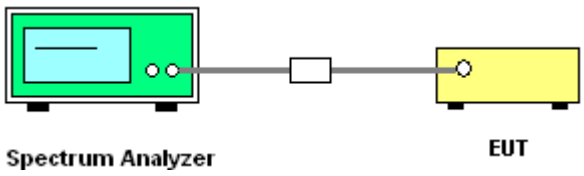
   EIRP is the equivalent isotropically radiated power in dBm

   d is the specified measurement distance in 3m
6. Compare the resultant electric field strength level with the applicable regulatory limit.
7. Corrected Reading for conducted spurious emission: Antenna Factor + Cable Loss + Read Level = Level
8. Perform the cabinet radiated spurious emission test.
9. 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.
10. 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.
11. The EUT is set 3 meters away from the receiving antenna, which is mounted on the top of a variable height antenna tower.
12. Corrected Reading for cabinet radiated spurious emission: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
13. 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 "-".
14. 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 "-".

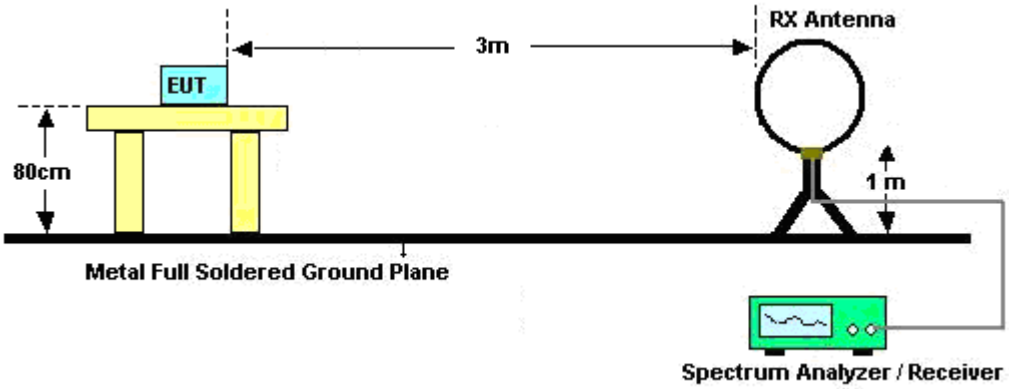
15. Use the following spectrum analyzer settings:
    (1) Span shall wide enough to fully capture the emission being measured;
    (2) Set RBW = 100 kHz for f < 1 GHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
    (3) Set RBW = 1 MHz, VBW = 3 MHz for f ≥ 1 GHz for peak measurement.
    (4) For RMS average measurement when 60 ms max TX_on time duty cycling mode:
    use duty cycle correction factor method per 15.35(c).
    Duty cycle = On time/100 milliseconds
    On time = $N_1*L_1+N_2*L_2+\ldots+N_{n-1}*LN_{n-1}+N_n*L_n$
    Where N1 is number of type 1 pulses, L1 is length of type 1 pulses, etc.
    RMS Average Emission Level = Average Emission Level (reduced VBW) + 20*log (Duty cycle)
    The maximum on time is 60 ms in the 100 ms period please refer to manufacture's Operational Description.
    The RMS average levels are calculated from the average level (reduced VBW) corrected with duty cycle correction factor (-4.44 dB) derived from 20log (dwell time/100ms). This correction is only for signals that hop with the fundamental signal, such as band-edge and harmonic. Other spurious signals that are independent of the hopping signal would not use this correction.
    (5) For average measurement when no duty cycling mode:
    • VBW = 10 Hz, when duty cycle is no less than 98 percent.
    • VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

3.8.4 Test Setup

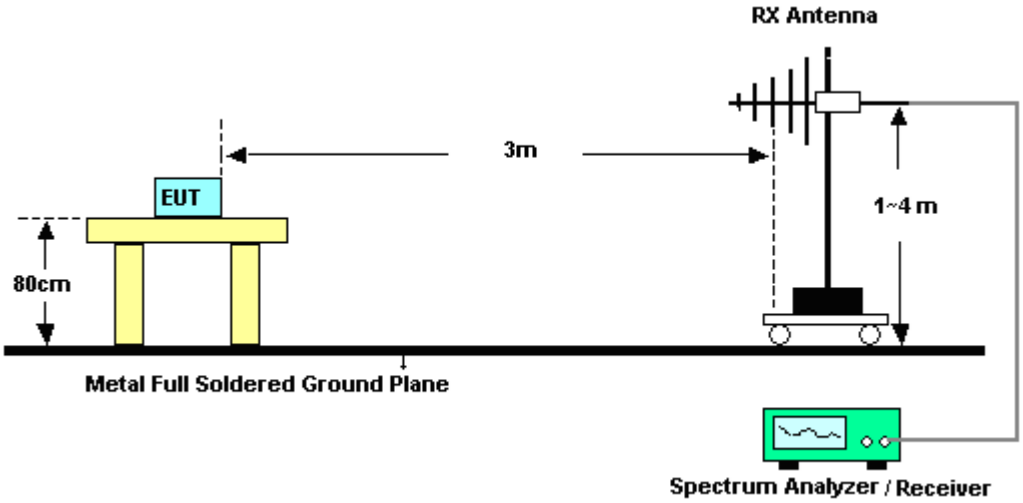
For antenna-port conducted measurement setup:



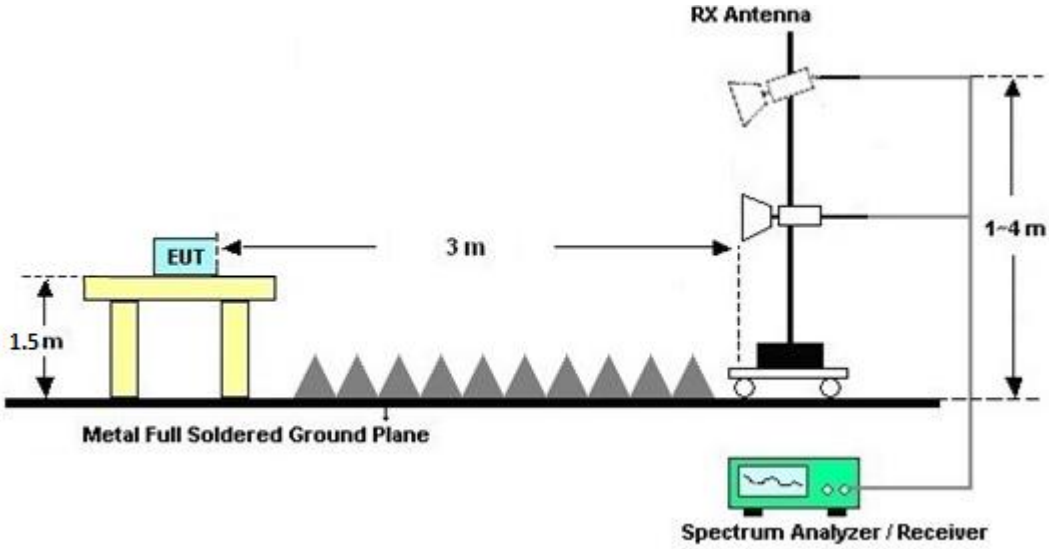
For radiated test below 30MHz



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 Conduced Spurious Emission in the Restricted Band (30 MHz ~ 10th Harmonic)

Please refer to Appendix C and D.

3.8.7 Test Result of Cabinet Radiated Spurious Emission in the Restricted Band (30 MHz ~ 10th Harmonic)

Please refer to Appendix E and F.

3.8.8 Duty Cycle

Please refer to Appendix G.

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 (dBμV)	
	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.

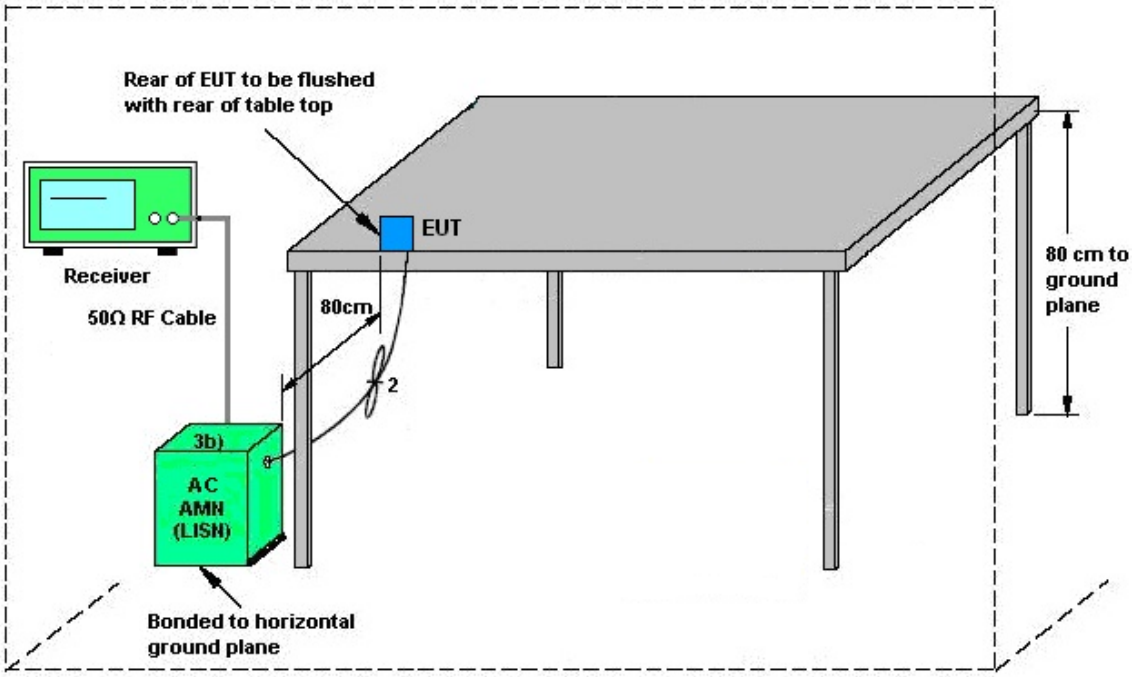
3.9.2 Measuring Instruments

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



AMN = Artificial mains network (LISN)
AE = Associated equipment
EUT = Equipment under test
ISN = Impedance stabilization network

3.9.5 Test Result of AC Conducted Emission

Please refer to Appendix B.

3.10 Antenna Requirements

3.10.1 Standard Applicable

The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the rule.

3.10.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Feb. 28, 2023	Oct. 30, 2023~ Dec. 08, 2023	Feb. 27, 2024	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	803951/2	9k~30M	Mar. 07, 2023	Oct. 30, 2023~ Dec. 08, 2023	Mar. 06, 2024	Radiation (03CH13-HY)
Amplifier	SONOMA	310N	187282	9kHz~1GHz	Dec. 14, 2022	Oct. 30, 2023~ Dec. 08, 2023	Dec. 13, 2023	Radiation (03CH13-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00800N1D01N-06	40103 & 07	30MHz~1GHz	Apr. 23, 2023	Oct. 30, 2023~ Dec. 08, 2023	Apr. 22, 2024	Radiation (03CH13-HY)
EMI Test Receiver	Agilent	N9038A(MXE)	MY53290045	20MHz~8.4GHz	Apr. 25, 2023	Oct. 30, 2023~ Dec. 08, 2023	Apr. 24, 2024	Radiation (03CH13-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1326	1GHz~18GHz	Aug. 17, 2023	Oct. 30, 2023~ Dec. 08, 2023	Aug. 16, 2024	Radiation (03CH13-HY)
Preamplifier	MITEQ	AMF-7D-00101800-30-10P	1590074	1GHz~18GHz	May 16, 2023	Oct. 30, 2023~ Dec. 08, 2023	May 15, 2024	Radiation (03CH13-HY)
Preamplifier	EM Electronics	EM01G18G	060803	1GHz~18GHz	Jan. 10, 2023	Oct. 30, 2023~ Dec. 08, 2023	Jan. 09, 2024	Radiation (03CH13-HY)
Spectrum Analyzer	Keysight	N9010A	MY55370526	10Hz~44GHz	Mar. 23, 2023	Oct. 30, 2023~ Dec. 08, 2023	Mar. 22, 2024	Radiation (03CH13-HY)
Filter	Wainwright	WLK4-1000-1530-8000-40SS	SN4	1.53GHz Low Pass Filter	Jun. 14, 2023	Oct. 30, 2023~ Dec. 08, 2023	Jun. 13, 2024	Radiation (03CH13-HY)
Filter	Wainwright	WHKX12-935-1000-15000-40ST	SN1	1GHz High Pass Filter	Apr. 27, 2023	Oct. 30, 2023~ Dec. 08, 2023	Apr. 26, 2024	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 126E	0030/126E	30MHz~18GHz	Feb. 08, 2023	Oct. 30, 2023~ Dec. 08, 2023	Feb. 07, 2024	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	804793/4	30MHz~18GHz	Feb. 08, 2023	Oct. 30, 2023~ Dec. 08, 2023	Feb. 07, 2024	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY24961/4	30MHz~18GHz	Feb. 08, 2023	Oct. 30, 2023~ Dec. 08, 2023	Feb. 07, 2024	Radiation (03CH13-HY)
Hygrometer	TECPEL	DTM-303B	TP140325	N/A	Nov. 07, 2022	Oct. 30, 2023~ Oct. 31, 2023	Nov. 06, 2023	Radiation (03CH13-HY)
Controller	EMEC	EM1000	N/A	Control Turn table & Ant Mast	N/A	Oct. 30, 2023~ Oct. 31, 2023	N/A	Radiation (03CH13-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1m~4m	N/A	Oct. 30, 2023~ Dec. 08, 2023	N/A	Radiation (03CH13-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	Oct. 30, 2023~ Dec. 08, 2023	N/A	Radiation (03CH13-HY)
Software	Audix	N/A	RK-001124	N/A	N/A	Oct. 30, 2023~ Dec. 08, 2023	N/A	Radiation (03CH13-HY)
Power Meter	Anritsu	ML2495A	1036004	N/A	Jul. 27, 2023	Oct. 19, 2023~ Oct. 31, 2023	Jul. 26, 2024	Conducted (TH05-HY)
Power Meter	Anritsu	ML2495A	0932001	N/A	Sep. 08, 2023	Nov. 21, 2023~ Dec. 20, 2023	Sep. 07, 2024	Conducted (TH05-HY)
Power Sensor	Anritsu	MA2411B	1027253	300MHz~40GHz	Jul. 27, 2023	Oct. 19, 2023~ Oct. 31, 2023	Jul. 26, 2024	Conducted (TH05-HY)
Power Sensor	Anritsu	MA2411B	0846202	300MHz~40GHz	Sep. 08, 2023	Nov. 21, 2023~ Dec. 20, 2023	Sep. 07, 2024	Conducted (TH05-HY)
Signal Analyzer	Rohde & Schwarz	FSV40	101566	10Hz~40GHz	Aug. 23, 2023	Oct. 19, 2023~ Dec. 20, 2023	Aug. 22, 2024	Conducted (TH05-HY)

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	ROHDE & SCHWARZ	FSV40	101565	10Hz~40GHz	Dec. 26, 2022	Oct. 24, 2023~ Dec. 02, 2023	Dec. 25, 2023	CSE (TH05-HY)
Spectrum Analyzer	ROHDE & SCHWARZ	FSV40	101408	10Hz~40GHz	Aug. 04, 2023	Jan. 17, 2024	Aug. 03, 2024	CSE (TH05-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 126E	0058/126E	30MHz~18GHz	Feb. 08, 2023	Oct. 24, 2023~ Jan. 17, 2024	Feb. 07, 2024	CSE (TH05-HY)
Filter	Wainwright	WHKX12-1080-1200-15000-60ST	SN5	1.2GHz High Pass Filter	Jun. 14, 2023	Oct. 24, 2023~ Jan. 17, 2024	Jun. 13, 2024	CSE (TH05-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Nov. 29, 2023	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	9kHz~3.6GHz	Dec. 01, 2022	Nov. 29, 2023	Nov. 30, 2023	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Dec. 01, 2022	Nov. 29, 2023	Nov. 30, 2023	Conduction (CO05-HY)
Four-Line V-Network	TESEQ	NNB52	36122	N/A	Mar. 13, 2023	Nov. 29, 2023	Mar. 12, 2024	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32	N/A	N/A	N/A	Nov. 29, 2023	N/A	Conduction (CO05-HY)
Pulse Limiter	SCHWARZBECK	VTSD 9561-F N	00691	9kHz-200MHz	Jul. 28, 2023	Nov. 29, 2023	Jul. 27, 2024	Conduction (CO05-HY)
LISN Cable	MVE	RG-400	260260	N/A	Dec. 29, 2022	Nov. 29, 2023	Dec. 28, 2023	Conduction (CO05-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))	3.5 dB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	6.5 dB

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 6000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.2 dB

Uncertainty of Radiated Emission Measurement (6000 MHz ~ 180000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.6 dB

Appendix A. Test Result of Conducted Test Items

Test Engineer:	Mina Liu	Temperature:	21~25	°C
Test Date:	2023/10/19~2023/12/20	Relative Humidity:	50-56	%

<60 ms max Tx_on time duty cycling, 14 dBm and antenna gain 2.69 dBi>

TEST RESULTS DATA
20dB and 99% Occupied Bandwidth

Operation Band	NTX	CH.	Freq. (MHz)	99% Bandwidth (kHz)	20dB BW (kHz)	20dB BW Limit (kHz)	Pass/Fail
902-928 MHz	1	1	902.2	95.305	103.123	< 500	Pass
902-928 MHz	1	65	915.0	95.604	104.300	< 500	Pass
902-928 MHz	1	129	927.8	94.106	101.670	< 500	Pass

TEST RESULTS DATA
Hopping Channel Separation

Operation Band	NTX	CH.	Hopping Channel Separation (kHz)	Hopping Channel Separation Limit (kHz)	Pass/Fail
902-928 MHz	1	1~2	200.580	> 103.123	Pass
902-928 MHz	1	65~66	248.340	> 104.300	Pass
902-928 MHz	1	128~129	200.580	> 101.670	Pass

TEST RESULTS DATA
Dwell Time

Operation Band	Hops Over Occupancy Time(hops)	Package Transfer Time (msec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
Hopping	1	160.00	0.16	0.40	Pass

TEST RESULTS DATA
Peak Power Table

Operation Band	NTX	CH.	Freq. (MHz)	Peak Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
902-928 MHz	1	1	902.2	**13.89**	30.00	2.69	16.58	36.00	Pass
902-928 MHz	1	65	915.0	13.82	30.00	2.69	16.51	36.00	Pass
902-928 MHz	1	129	927.8	13.69	30.00	2.69	16.38	36.00	Pass

TEST RESULTS DATA
Average Power Table
(Reporting Only)

Operation Band	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)	Duty Factor (dB)
902-928 MHz	1	1	902.2	**13.67**	0.00
902-928 MHz	1	65	915.0	13.56	0.00
902-928 MHz	1	129	927.8	13.44	0.00

TEST RESULTS DATA
Number of Hopping Frequency

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

<No duty cycling, 12 dBm and antenna gain 2.69 dBi>

TEST RESULTS DATA
Peak Power Table

Operation Band	NTX	CH.	Freq. (MHz)	Peak Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
902-928 MHz	1	1	902.2	**11.90**	30.00	2.69	14.59	36.00	Pass
902-928 MHz	1	65	915.0	11.80	30.00	2.69	14.49	36.00	Pass
902-928 MHz	1	129	927.8	11.75	30.00	2.69	14.44	36.00	Pass

TEST RESULTS DATA
Average Power Table
(Reporting Only)

Operation Band	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)	Duty Factor (dB)
902-928 MHz	1	1	902.2	**11.63**	0.00
902-928 MHz	1	65	915.0	11.50	0.00
902-928 MHz	1	129	927.8	11.50	0.00

<No duty cycling, 12.5 dBm and antenna gain 2 dBi>

TEST RESULTS DATA
Peak Power Table

Operation Band	NTX	CH.	Freq. (MHz)	Peak Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
902-928 MHz	1	1	902.2	**12.29**	30.00	2.00	14.29	36.00	Pass
902-928 MHz	1	65	915.0	12.18	30.00	2.00	14.18	36.00	Pass
902-928 MHz	1	129	927.8	12.17	30.00	2.00	14.17	36.00	Pass

TEST RESULTS DATA
Average Power Table
(Reporting Only)

Operation Band	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)	Duty Factor (dB)
902-928 MHz	1	1	902.2	**12.10**	0.00
902-928 MHz	1	65	915.0	11.94	0.00
902-928 MHz	1	129	927.8	11.93	0.00

<For full frequency range: 60 ms max Tx_on time duty cycling, 19 dBm>
<For Ch. 31~Ch. 129: No duty cycling, 19 dBm>

TEST RESULTS DATA
20dB and 99% Occupied Bandwidth

Operation Band	NTX	CH.	Freq. (MHz)	99% Bandwidth (kHz)	20dB BW (kHz)	20dB BW Limit (kHz)	Pass/Fail
902-928 MHz	1	1	902.2	95.005	104.200	< 500	Pass
902-928 MHz	1	31	908.2	97.702	103.400	< 500	Pass
902-928 MHz	1	65	915.0	94.406	103.760	< 500	Pass
902-928 MHz	1	129	927.8	98.901	104.630	< 500	Pass

TEST RESULTS DATA
Hopping Channel Separation

Operation Band	NTX	CH.	Hopping Channel Separation (kHz)	Hopping Channel Separation Limit (kHz)	Pass/Fail
902-928 MHz	1	1~2	200.580	> 104.200	Pass
902-928 MHz	1	31~32	200.580	> 103.400	Pass
902-928 MHz	1	65~66	250.070	> 103.760	Pass
902-928 MHz	1	128~129	200.580	> 104.630	Pass

TEST RESULTS DATA
Dwell Time

Operation Band	Hops Over Occupancy Time(hops)	Package Transfer Time (msec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
Hopping	5	9.50	0.05	0.40	Pass

TEST RESULTS DATA
Peak Power Table

Operation Band	NTX	CH.	Freq. (MHz)	Peak Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
902-928 MHz	1	1	902.2	**18.66**	30.00	2.69	21.35	36.00	Pass
902-928 MHz	1	31	908.2	18.65	30.00	2.69	21.34	36.00	Pass
902-928 MHz	1	65	915.0	**18.66**	30.00	2.69	21.35	36.00	Pass
902-928 MHz	1	129	927.8	18.57	30.00	2.69	21.26	36.00	Pass

TEST RESULTS DATA
Average Power Table
(Reporting Only)

Operation Band	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)	Duty Factor (dB)
902-928 MHz	1	1	902.2	18.52	0.00
902-928 MHz	1	31	908.2	18.50	0.00
902-928 MHz	1	65	915.0	**18.54**	0.00
902-928 MHz	1	129	927.8	18.42	0.00

TEST RESULTS DATA
Number of Hopping Frequency

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

<For full frequency range: No duty cycling, 16 dBm>

TEST RESULTS DATA
Peak Power Table

Operation Band	NTX	CH.	Freq. (MHz)	Peak Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
902-928 MHz	1	1	902.2	**16.13**	30.00	2.69	18.82	36.00	Pass
902-928 MHz	1	65	915.0	15.80	30.00	2.69	18.49	36.00	Pass
902-928 MHz	1	129	927.8	15.50	30.00	2.69	18.19	36.00	Pass

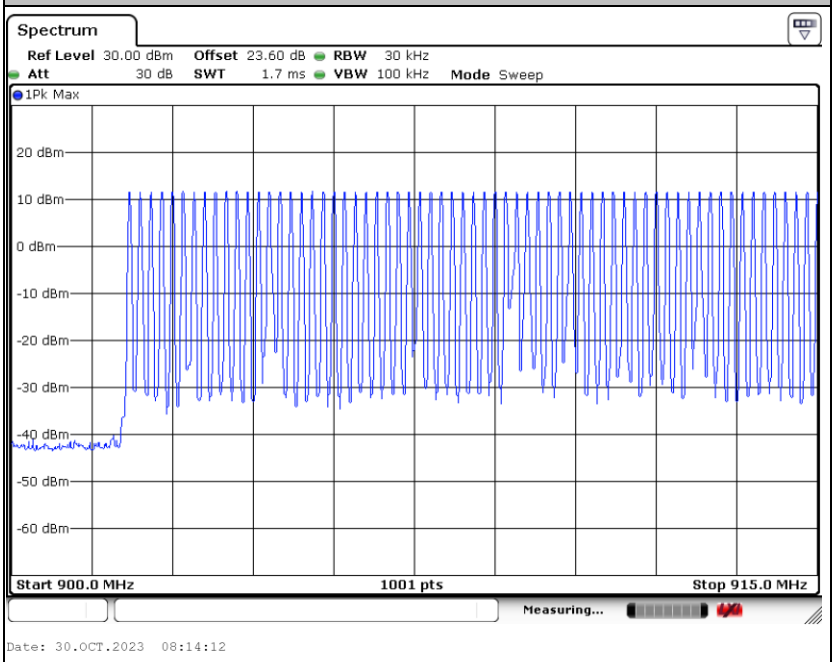
TEST RESULTS DATA
Average Power Table
(Reporting Only)

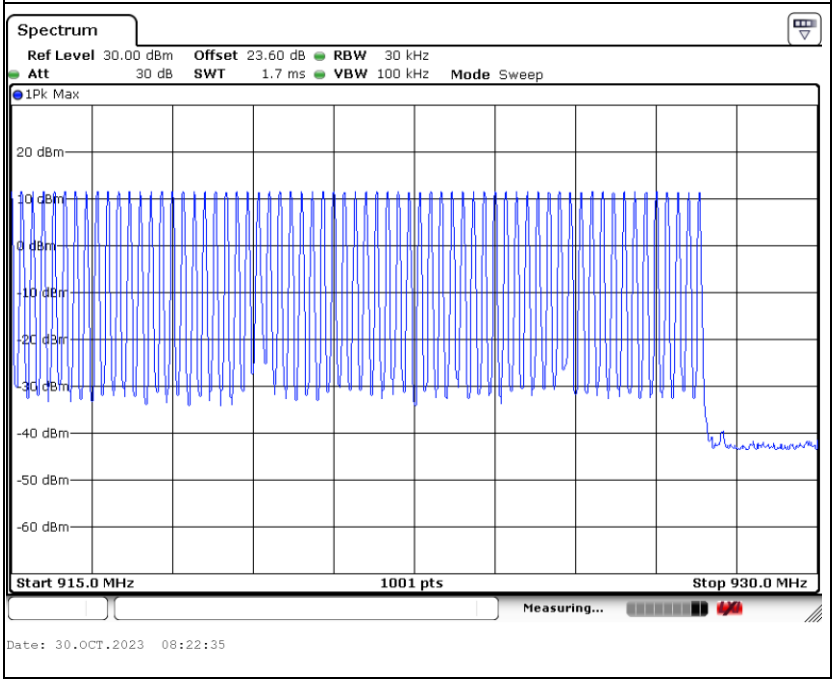
Operation Band	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)	Duty Factor (dB)
902-928 MHz	1	1	902.2	**15.97**	0.00
902-928 MHz	1	65	915.0	15.65	0.00
902-928 MHz	1	129	927.8	15.33	0.00

<60 ms max Tx_on time duty cycling, 14 dBm and antenna gain 2.69 dBi>

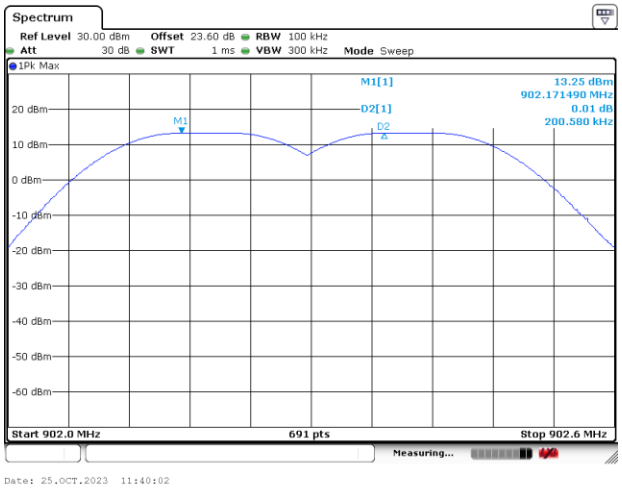
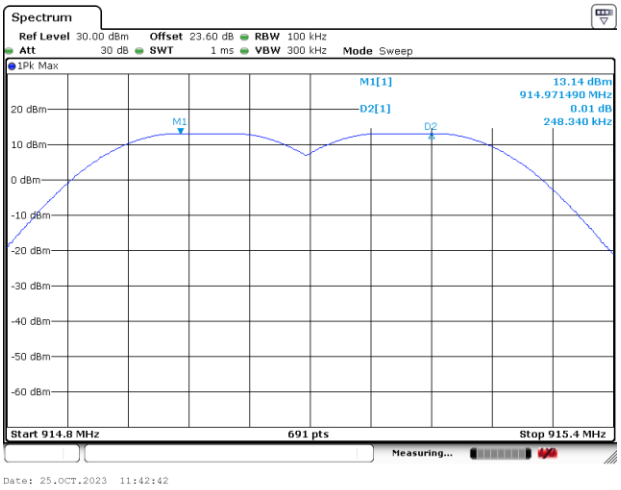
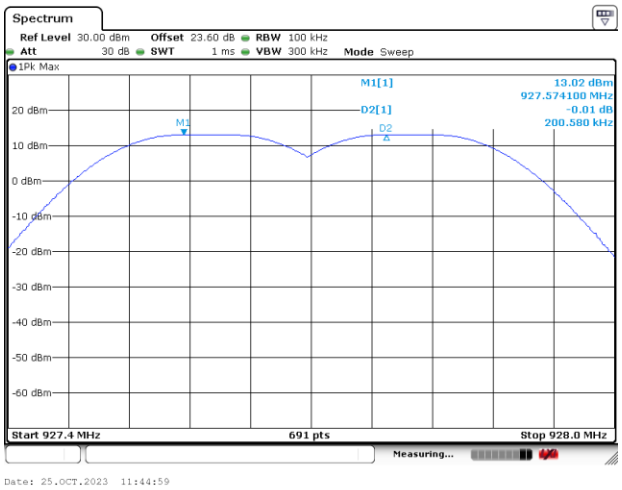
Number of Hopping Frequency

Number of Hopping Channel Plot on Channel 01 -129



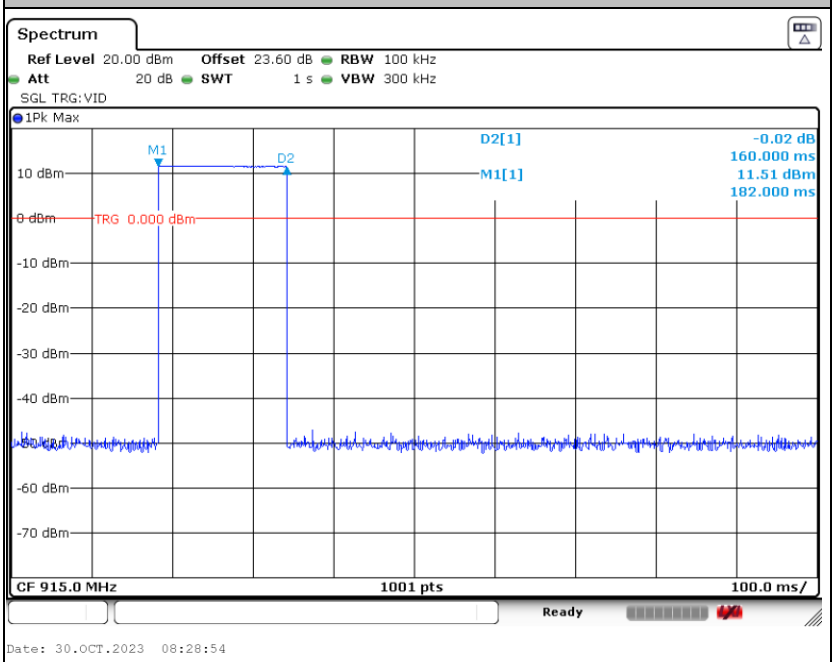


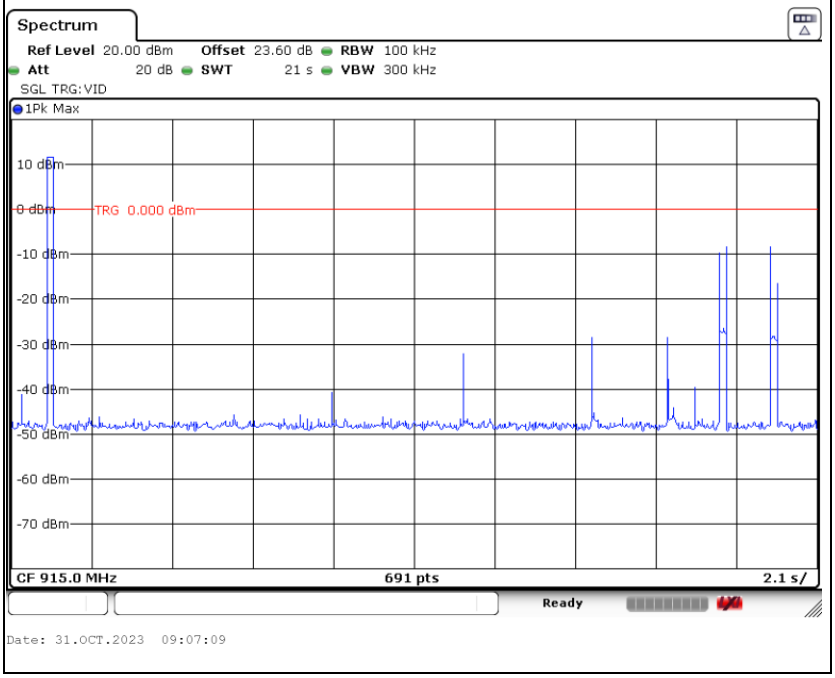
Hopping Channel Separation

Channel Separation Plot on Channel 01 - 02	Channel Separation Plot on Channel 64 - 65
	
Channel Separation Plot on Channel 128 - 129	
	

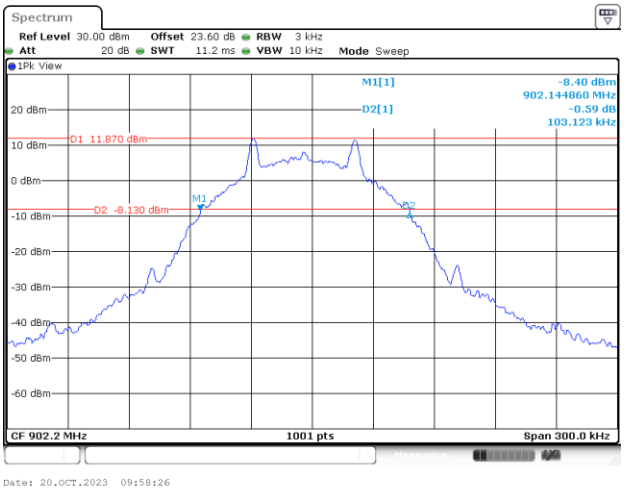
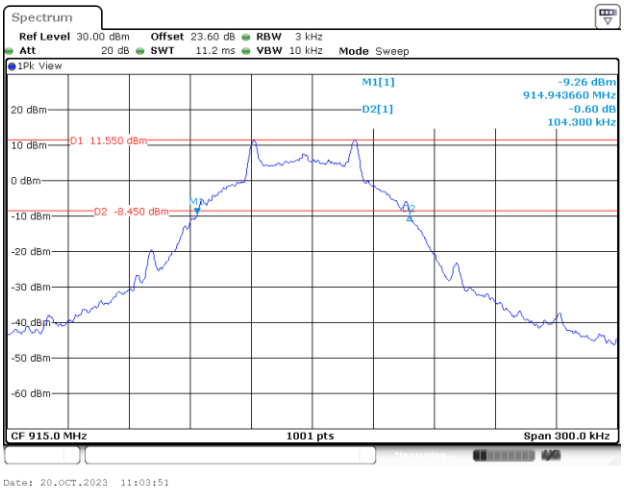
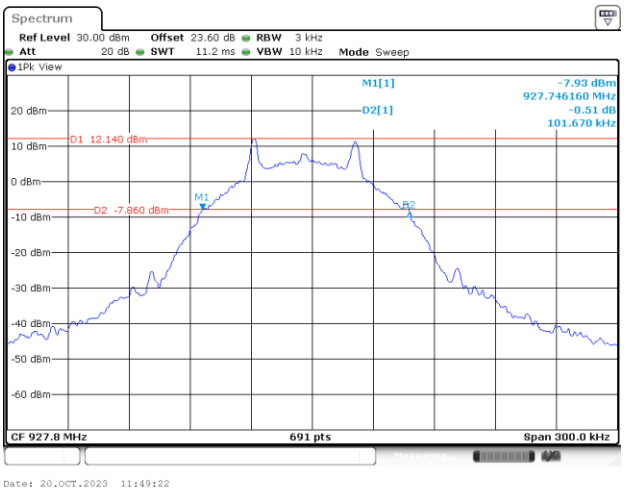
Dwell Time

Package Transfer Time Plot



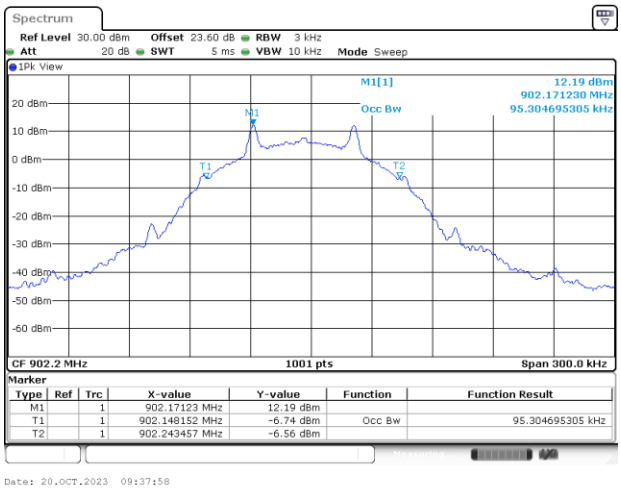


20dB Bandwidth

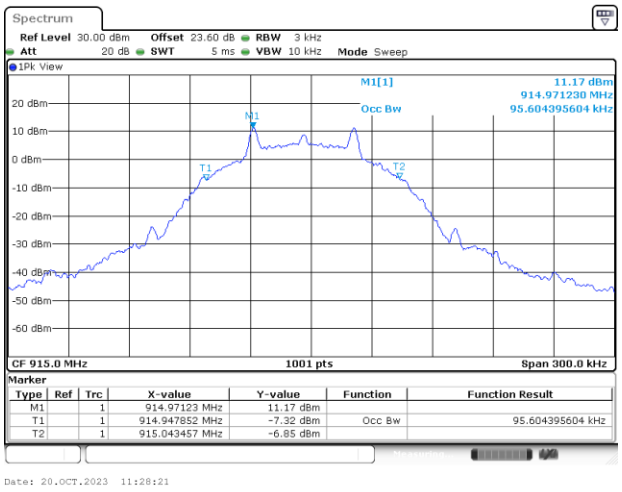
20 dB Bandwidth Plot on Channel 01	20 dB Bandwidth Plot on Channel 65
	
20 dB Bandwidth Plot on Channel 129	
	

99% Occupied Bandwidth

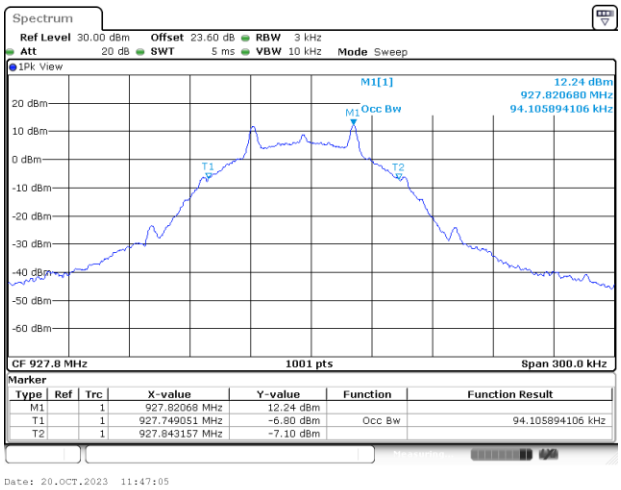
99% Occupied Bandwidth on Channel 01



99% Occupied Bandwidth on Channel 65

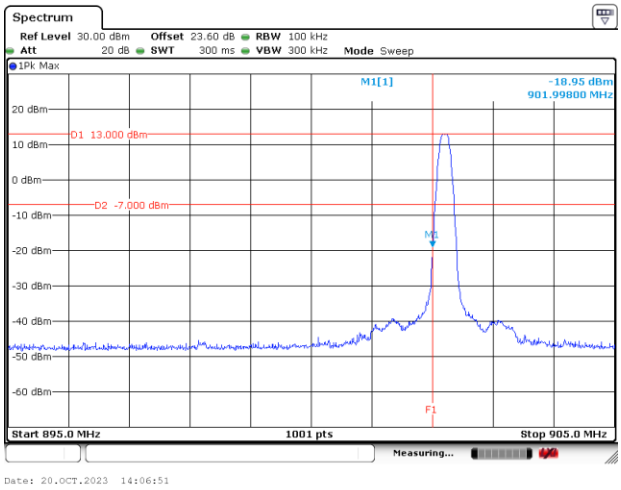
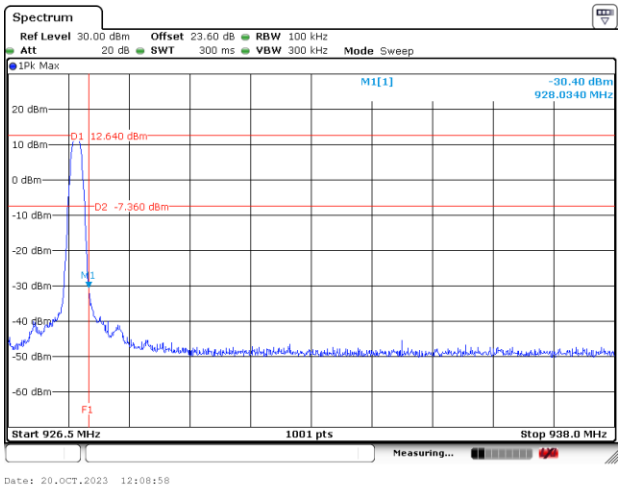


99% Occupied Bandwidth on Channel 129

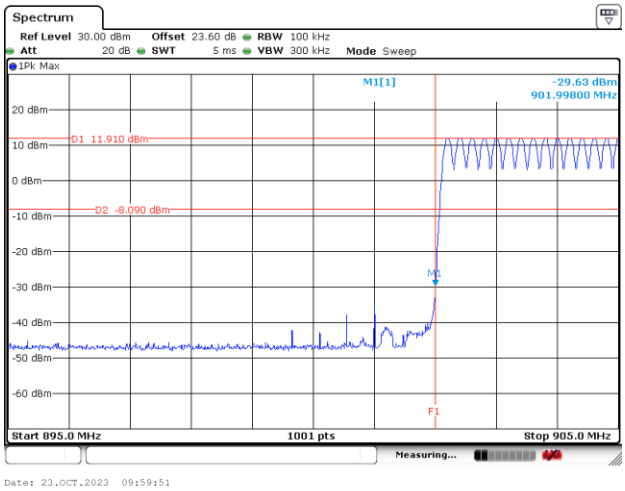
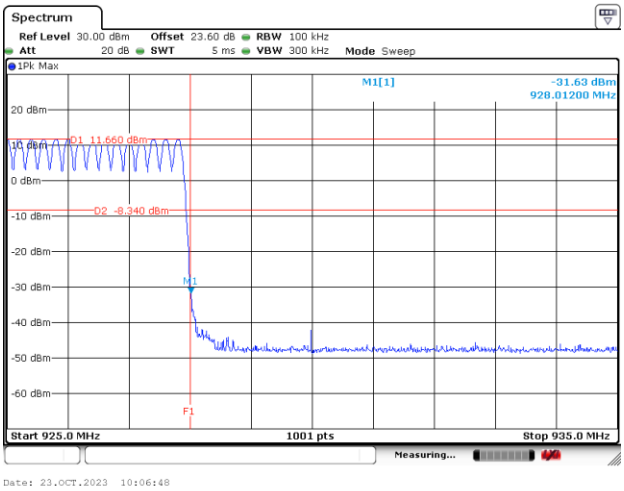


Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

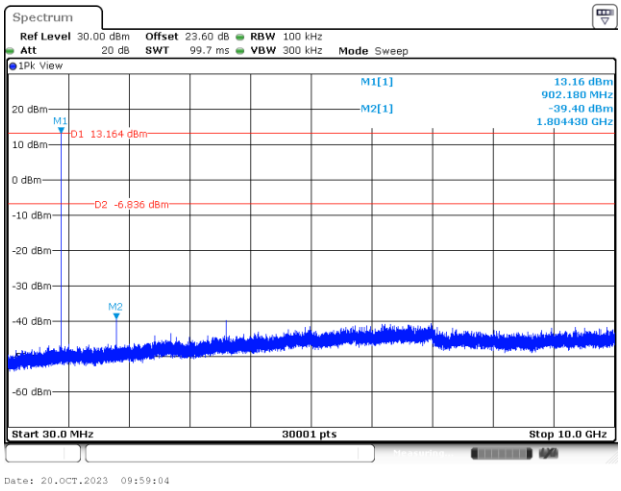
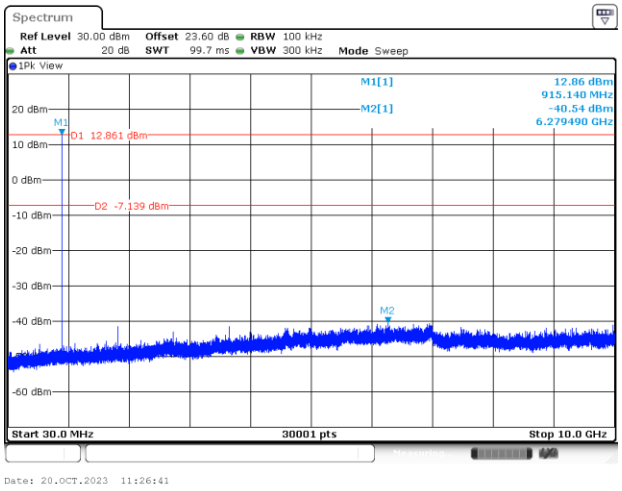
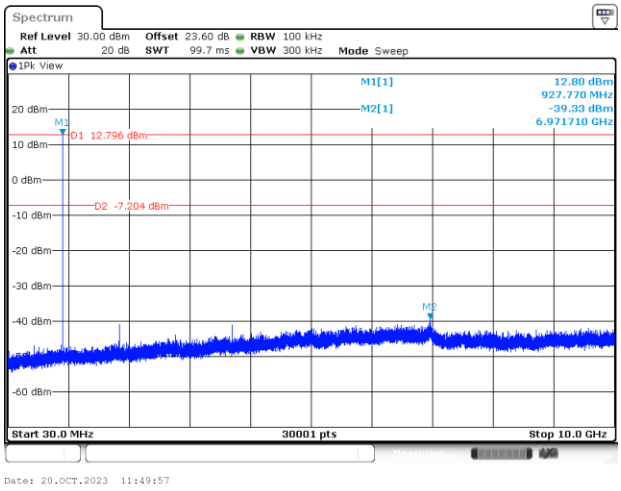
Band Edges

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

Hopping Mode Band Edges

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

Spurious Emission

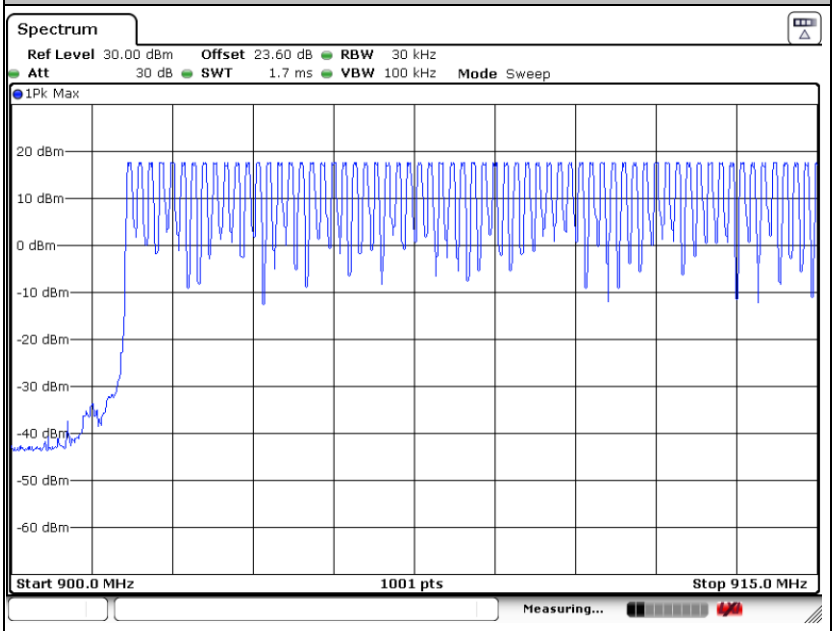
CSE Plot on Ch 01 between 30MHz ~ 10 GHz	CSE Plot on Ch 65 between 30MHz ~ 10 GHz
	
CSE Plot on Ch 129 between 30MHz ~ 10 GHz	
	

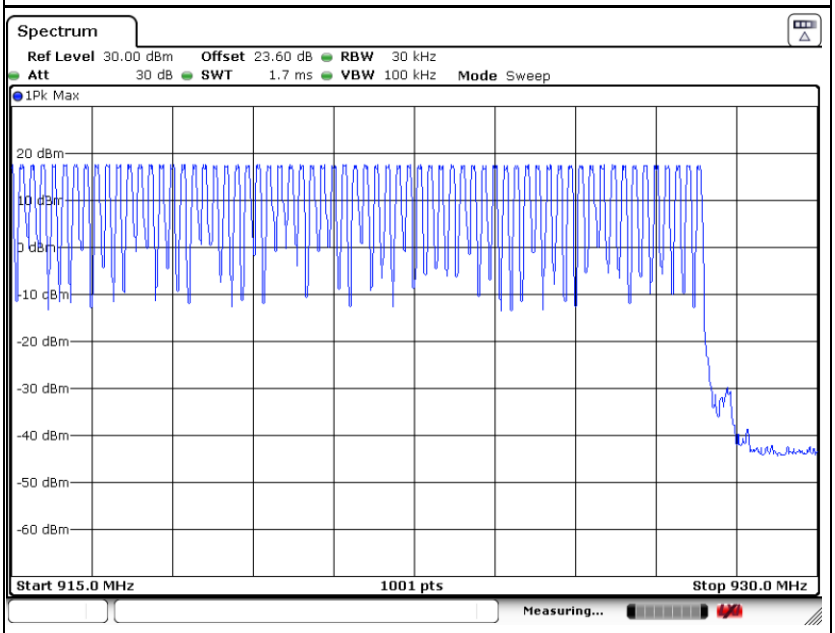
<For full frequency range: 60 ms max Tx_on time duty cycling, 19 dBm>

<For Ch. 31~Ch. 129: No duty cycling, 19 dBm>

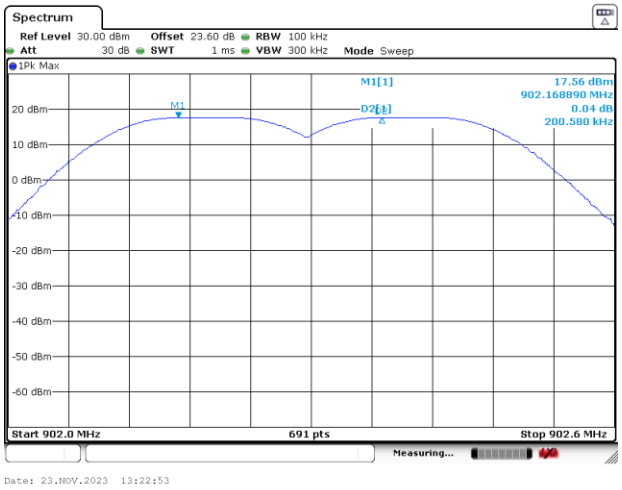
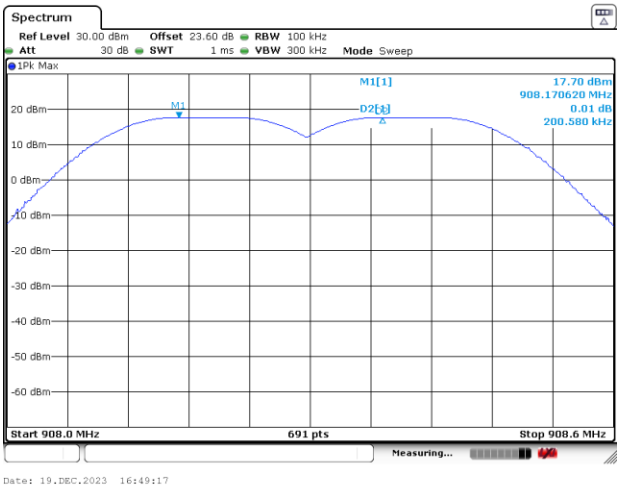
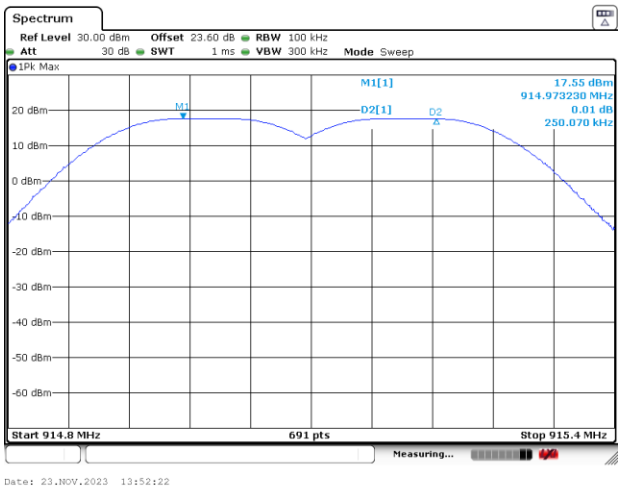
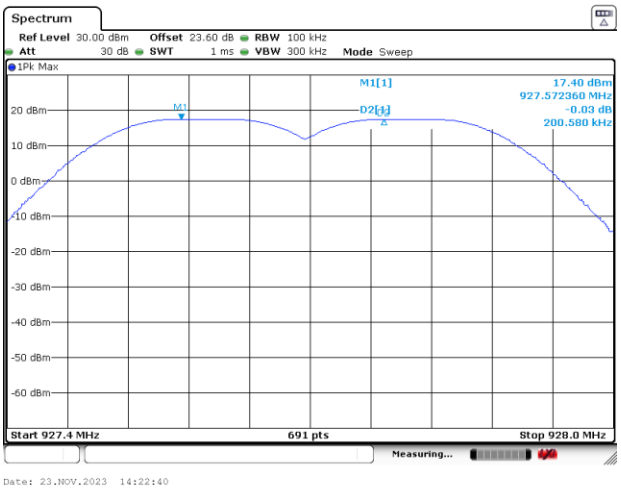
Number of Hopping Frequency

Number of Hopping Channel Plot on Channel 01 -129



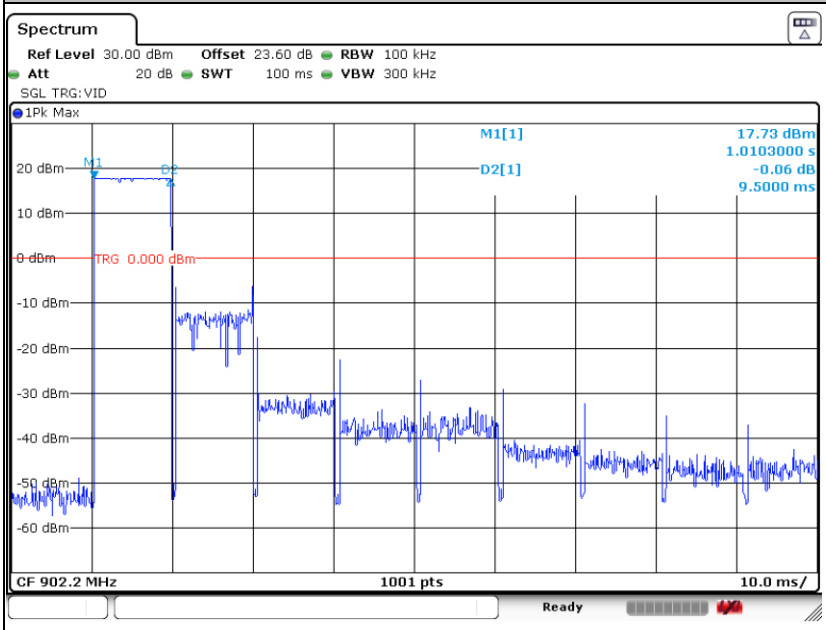


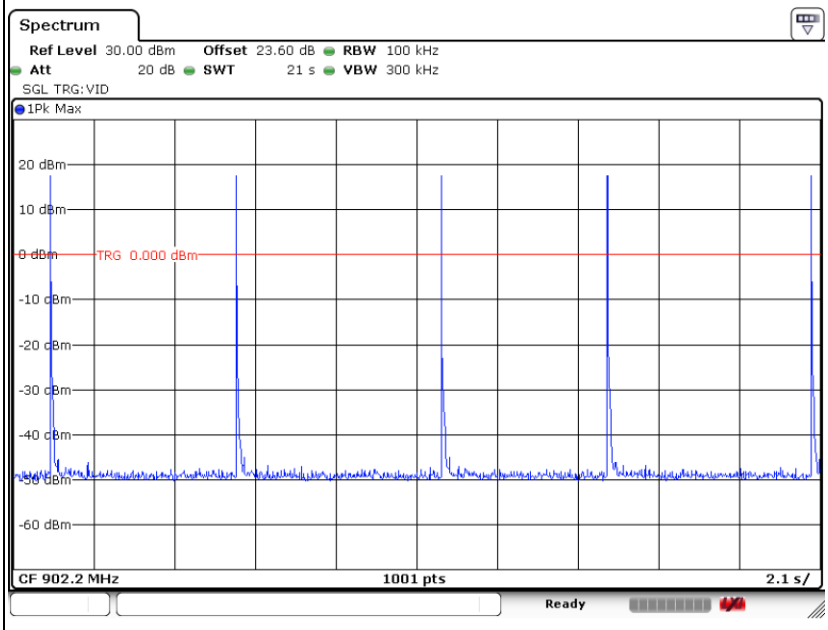
Hopping Channel Separation

Channel Separation Plot on Channel 01 - 02	Channel Separation Plot on Channel 31 - 32
	
Channel Separation Plot on Channel 65 - 66	**Channel Separation Plot on Channel 128 - 129**
	

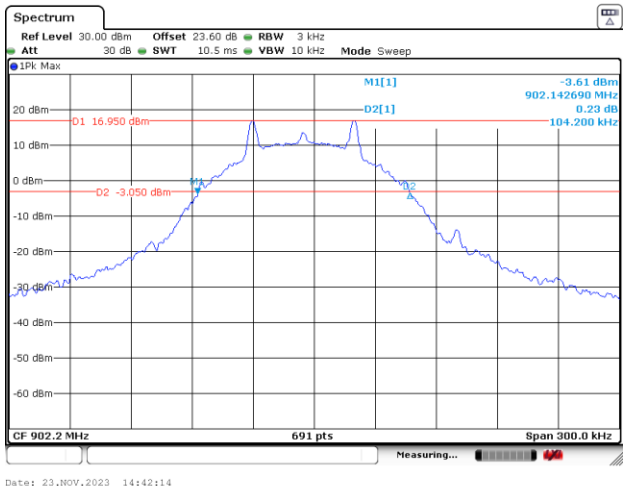
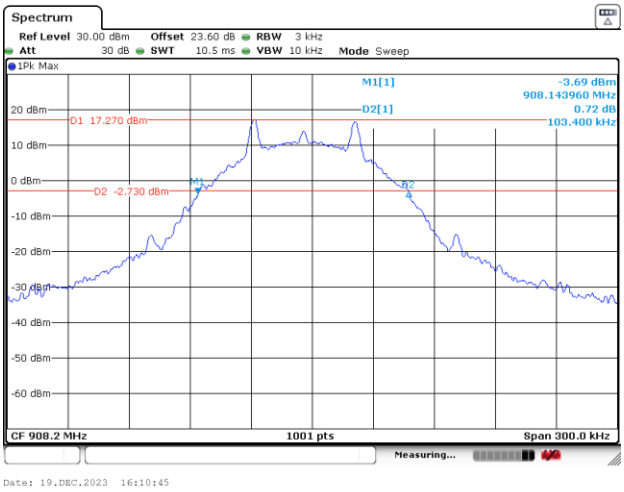
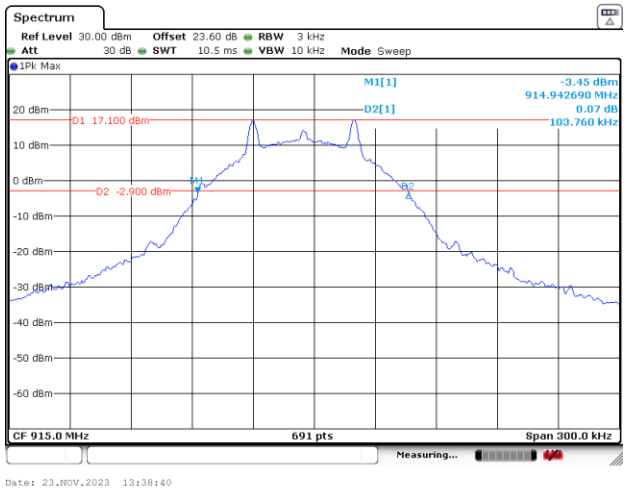
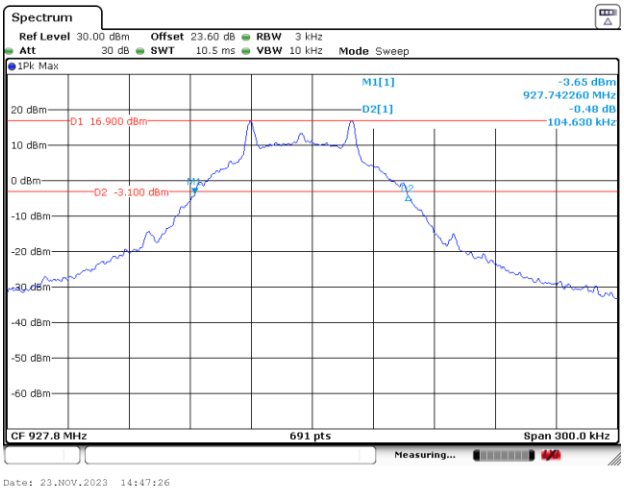
Dwell Time

Package Transfer Time Plot



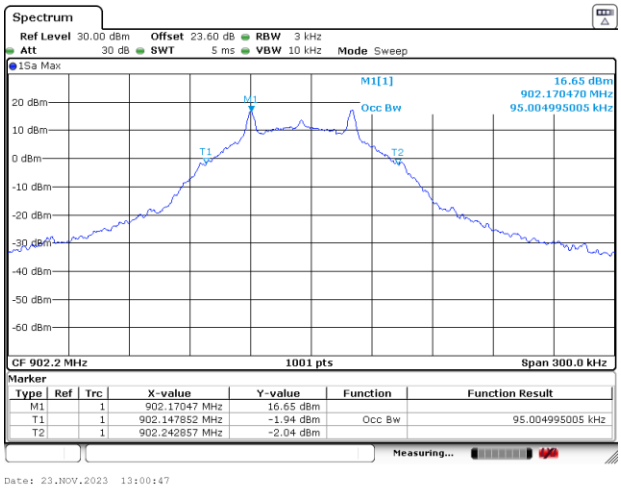


20dB Bandwidth

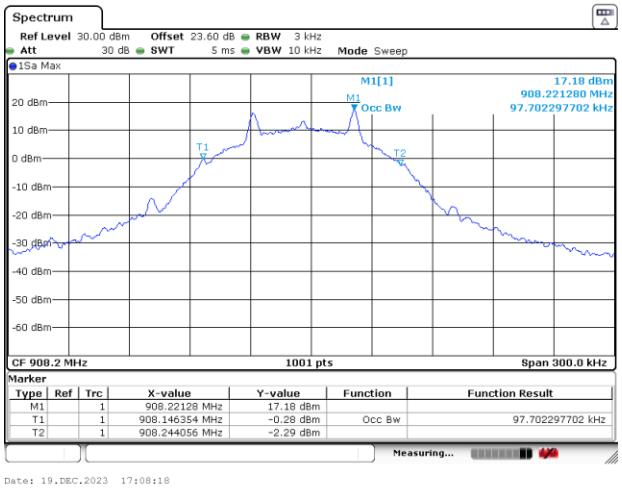
20 dB Bandwidth Plot on Channel 01	20 dB Bandwidth Plot on Channel 31
	
20 dB Bandwidth Plot on Channel 65	**20 dB Bandwidth Plot on Channel 129**
	

99% Occupied Bandwidth

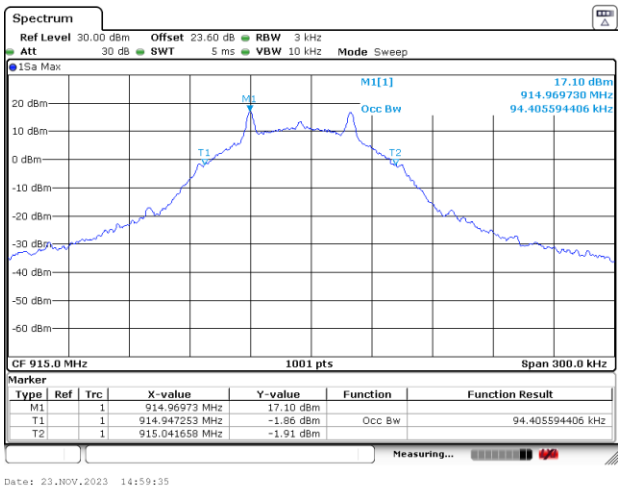
99% Occupied Bandwidth on Channel 01



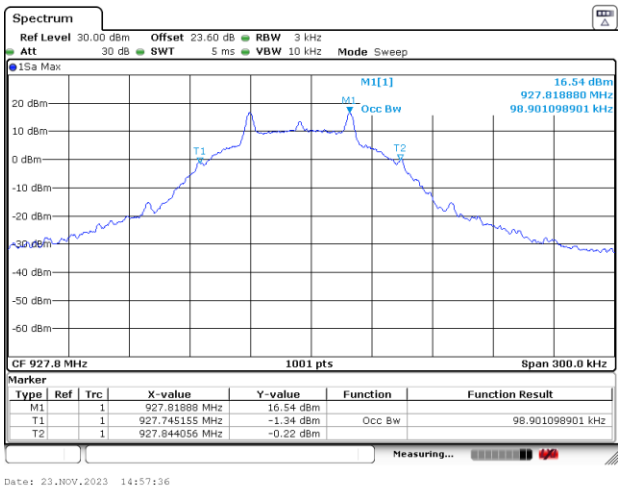
99% Occupied Bandwidth on Channel 31



99% Occupied Bandwidth on Channel 65

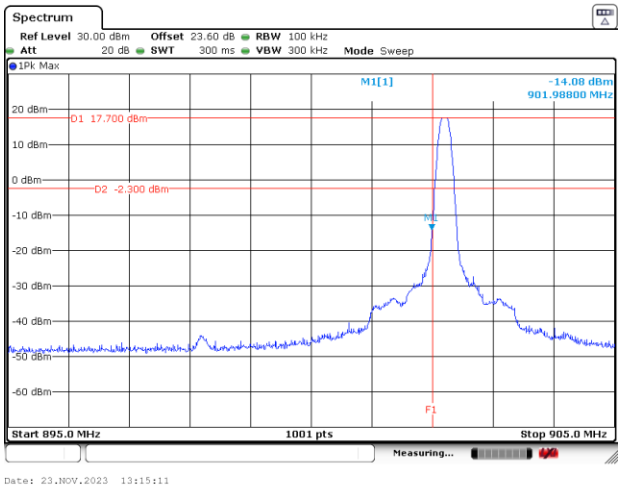
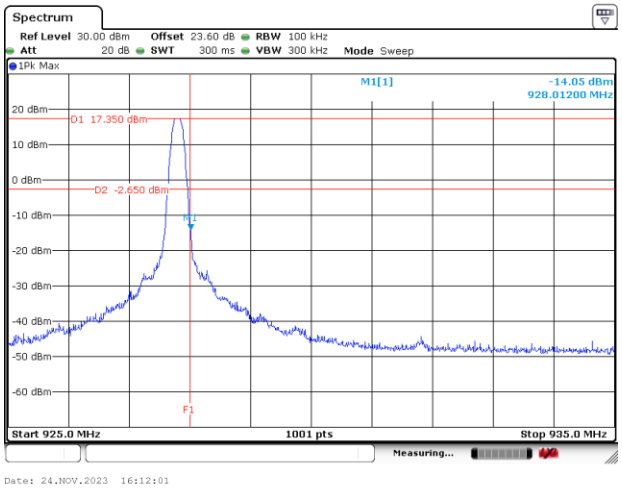


99% Occupied Bandwidth on Channel 129

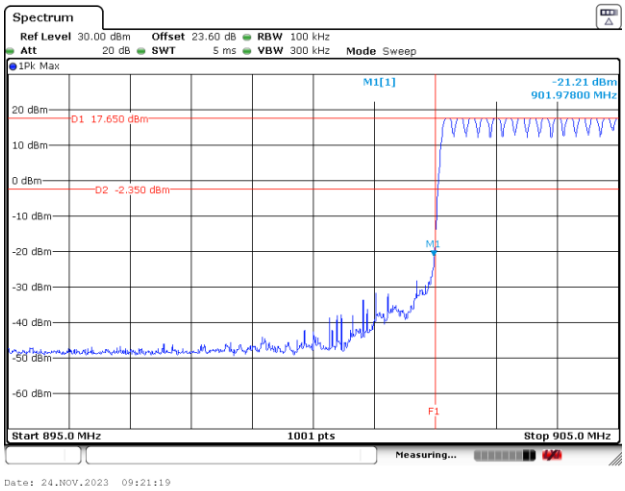
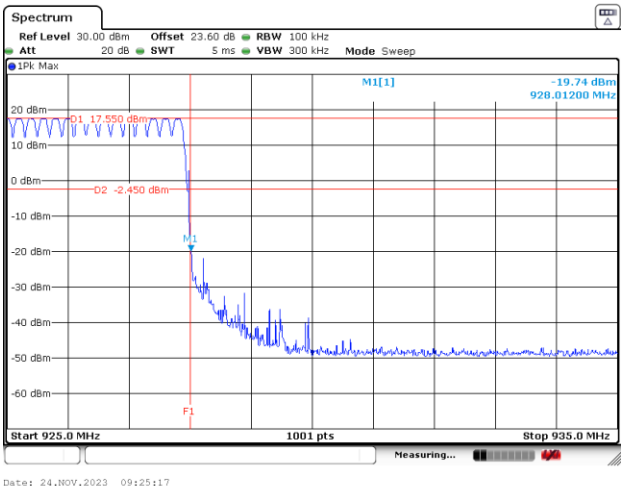


Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

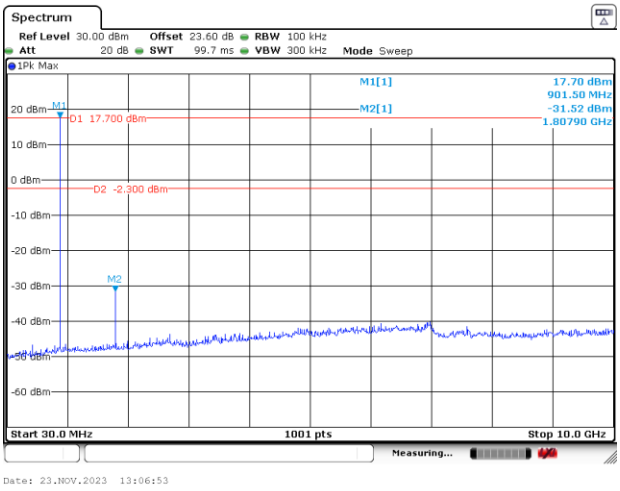
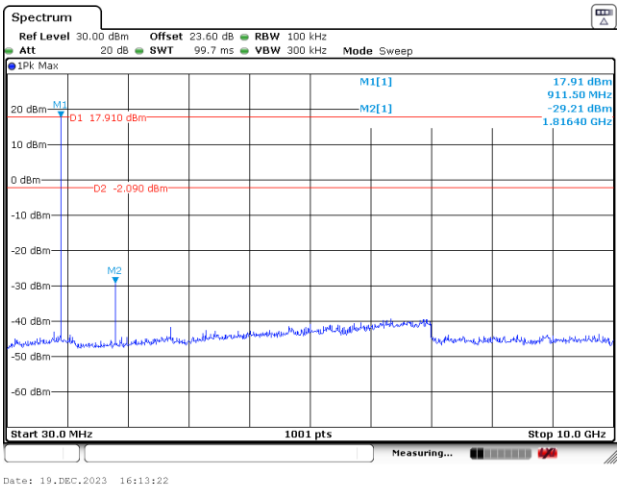
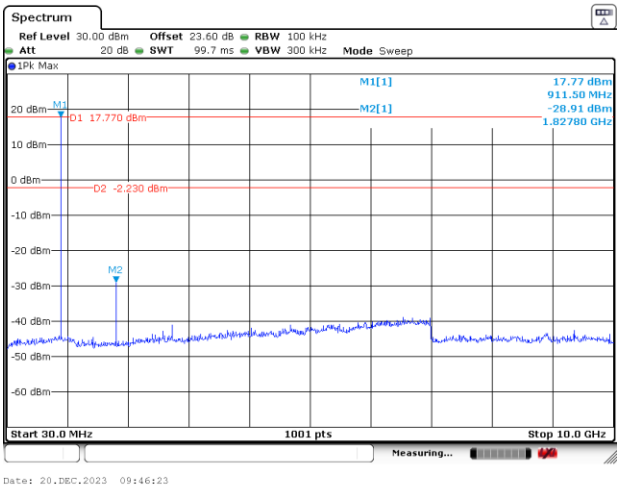
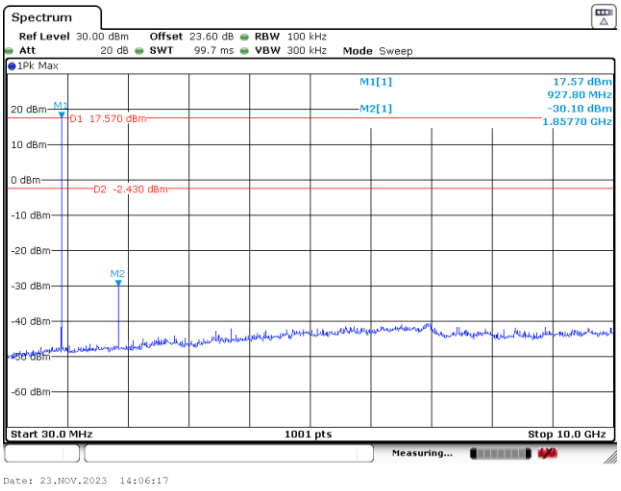
Band Edges

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

Hopping Mode Band Edges

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

Spurious Emission

CSE Plot on Ch 01 between 30MHz ~ 10 GHz	CSE Plot on Ch 31 between 30MHz ~ 10 GHz
	
CSE Plot on Ch 65 between 30MHz ~ 10 GHz	**CSE Plot on Ch 129 between 30MHz ~ 10 GHz**
	

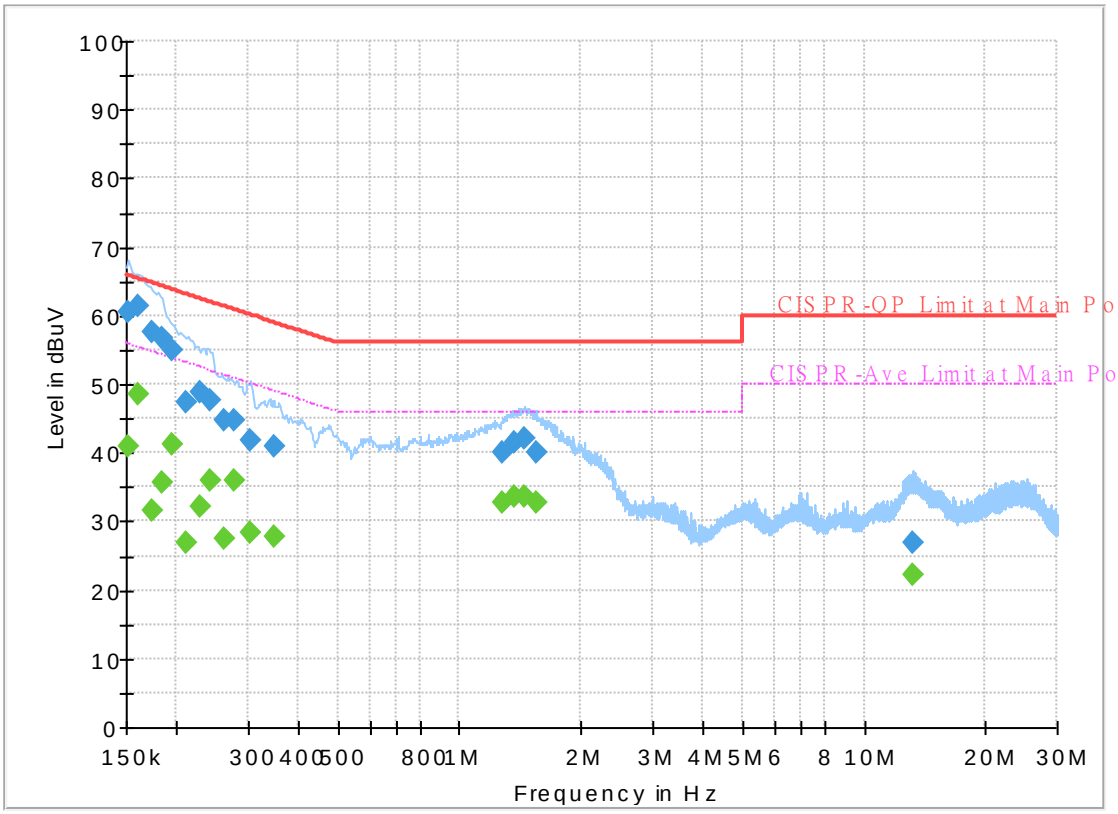
Appendix B. AC Conducted Emission Test Results

Test Engineer :	Tom Lee	**Temperature :**	23~26℃
		Relative Humidity :	45~55%

EUT Information

Report NO :	341305-02
Test Mode :	Mode 1
Test Voltage :	Power From System
Phase :	Line

Full Spectrum



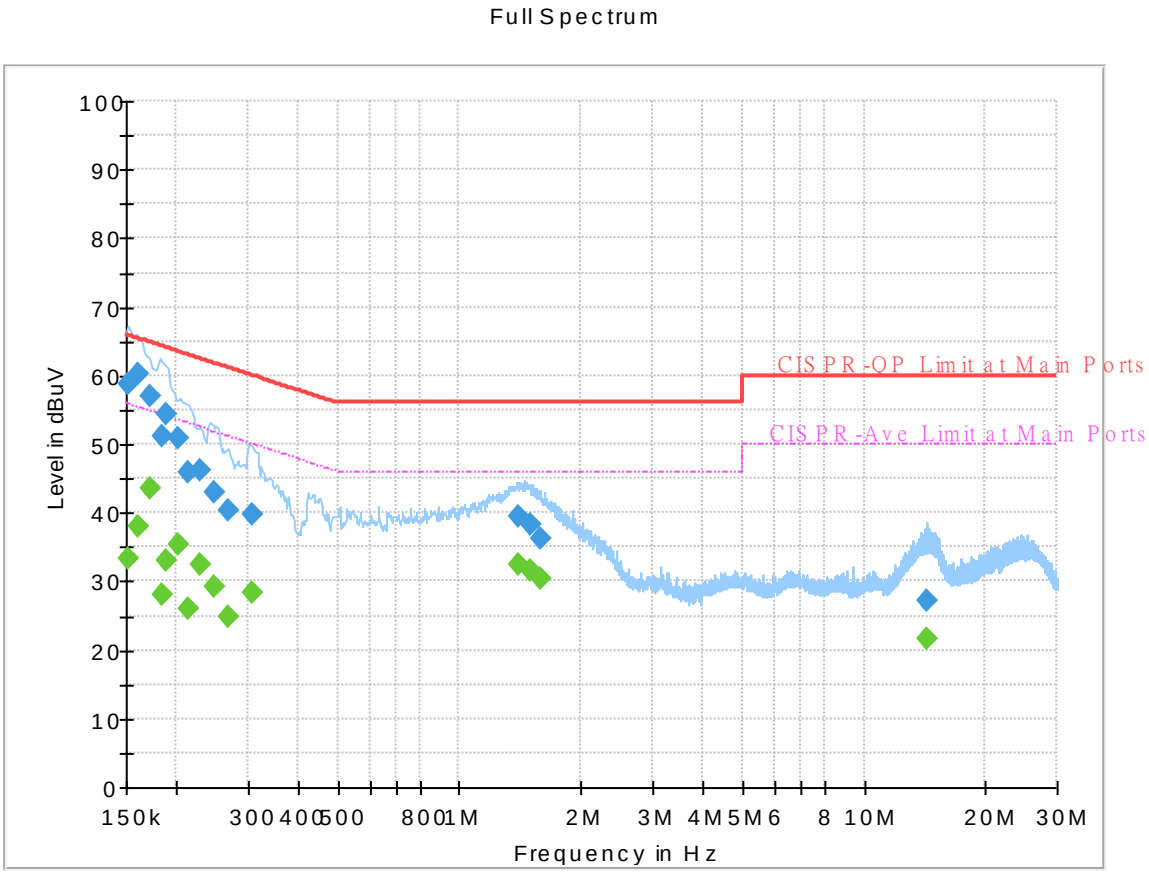
Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152250	---	40.82	55.88	15.06	L1	OFF	19.9
0.152250	60.52	---	65.88	5.36	L1	OFF	19.9
0.161250	---	48.53	55.40	6.87	L1	OFF	19.9
0.161250	61.27	---	65.40	4.13	L1	OFF	19.9
0.174750	---	31.69	54.73	23.04	L1	OFF	19.9
0.174750	57.51	---	64.73	7.22	L1	OFF	19.9
0.183750	---	35.80	54.31	18.51	L1	OFF	19.9
0.183750	56.65	---	64.31	7.66	L1	OFF	19.9
0.195000	---	41.09	53.82	12.73	L1	OFF	19.9
0.195000	55.10	---	63.82	8.72	L1	OFF	19.9
0.210750	---	26.80	53.18	26.38	L1	OFF	19.9
0.210750	47.49	---	63.18	15.69	L1	OFF	19.9
0.228750	---	32.06	52.50	20.44	L1	OFF	19.9
0.228750	48.83	---	62.50	13.67	L1	OFF	19.9
0.242250	---	36.07	52.02	15.95	L1	OFF	19.9
0.242250	47.58	---	62.02	14.44	L1	OFF	19.9
0.262500	---	27.35	51.35	24.00	L1	OFF	19.9
0.262500	44.66	---	61.35	16.69	L1	OFF	19.9
0.278250	---	36.08	50.87	14.79	L1	OFF	19.9
0.278250	44.88	---	60.87	15.99	L1	OFF	19.9
0.305250	---	28.33	50.10	21.77	L1	OFF	19.9

0.305250	41.81	---	60.10	18.29	L1	OFF	19.9
0.348000	---	27.89	49.01	21.12	L1	OFF	19.9
0.348000	41.06	---	59.01	17.95	L1	OFF	19.9
1.272750	---	32.61	46.00	13.39	L1	OFF	20.0
1.272750	40.01	---	56.00	15.99	L1	OFF	20.0
1.367250	---	33.68	46.00	12.32	L1	OFF	20.0
1.367250	41.53	---	56.00	14.47	L1	OFF	20.0
1.443750	---	33.63	46.00	12.37	L1	OFF	20.0
1.443750	42.14	---	56.00	13.86	L1	OFF	20.0
1.554000	---	32.84	46.00	13.16	L1	OFF	20.0
1.554000	40.07	---	56.00	15.93	L1	OFF	20.0
13.146000	---	22.30	50.00	27.70	L1	OFF	20.3
13.146000	26.92	---	60.00	33.08	L1	OFF	20.3

EUT Information

Report NO :	341305-02
Test Mode :	Mode 1
Test Voltage :	Power From System
Phase :	Neutral



Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152250	---	33.33	55.88	22.55	N	OFF	19.9
0.152250	58.67	---	65.88	7.21	N	OFF	19.9
0.161250	---	38.10	55.40	17.30	N	OFF	19.9
0.161250	60.31	---	65.40	5.09	N	OFF	19.9
0.172500	---	43.55	54.84	11.29	N	OFF	19.9
0.172500	56.99	---	64.84	7.85	N	OFF	19.9
0.183750	---	28.21	54.31	26.10	N	OFF	19.9
0.183750	51.29	---	64.31	13.02	N	OFF	19.9
0.188250	---	32.99	54.11	21.12	N	OFF	19.9
0.188250	54.34	---	64.11	9.77	N	OFF	19.9
0.201750	---	35.40	53.54	18.14	N	OFF	19.9
0.201750	50.83	---	63.54	12.71	N	OFF	19.9
0.213000	---	26.16	53.09	26.93	N	OFF	19.9
0.213000	45.83	---	63.09	17.26	N	OFF	19.9
0.228750	---	32.37	52.50	20.13	N	OFF	19.9
0.228750	46.20	---	62.50	16.30	N	OFF	19.9
0.246750	---	29.13	51.87	22.74	N	OFF	19.9
0.246750	42.91	---	61.87	18.96	N	OFF	19.9
0.269250	---	24.76	51.14	26.38	N	OFF	19.9
0.269250	40.45	---	61.14	20.69	N	OFF	19.9
0.307500	---	28.46	50.04	21.58	N	OFF	19.9

0.307500	39.80	---	60.04	20.24	N	OFF	19.9
1.392000	---	32.43	46.00	13.57	N	OFF	20.0
1.392000	39.61	---	56.00	16.39	N	OFF	20.0
1.493250	---	31.59	46.00	14.41	N	OFF	20.0
1.493250	38.16	---	56.00	17.84	N	OFF	20.0
1.578750	---	30.42	46.00	15.58	N	OFF	20.0
1.578750	36.40	---	56.00	19.60	N	OFF	20.0
14.228250	---	21.55	50.00	28.45	N	OFF	20.4
14.228250	27.11	---	60.00	32.89	N	OFF	20.4

Appendix C. Conducted Spurious Emission

Test Engineer :	Ken Wu and Kai Liao	Temperature :	21.1~24°C
		Relative Humidity :	59.7~67.4%

<60 ms max Tx_on time duty cycling, 14 dBm and antenna gain 2.69 dBi>

902 MHz ~ 928 MHz

(30 MHz ~ 1 GHz)

Mode	Note	Frequency	Level	Margin	Limit Line	Read Level	Antenna Factor	Path Loss	MIMO Factor	Grounding Factor	Peak QP.
		(MHz)	(dBm)	(dB)	(dBm)	(dBm)	(dBi)	(dB)	(dB)	(dB)	(P/Q)
CH 01 902.2 MHz		451.1	-50.29	-1.09	-49.2	-58.2	2.69	0.52	0	4.7	Q
		761.3	-53.69	-4.49	-49.2	-61.86	2.69	0.78	0	4.7	P
		854.4	-51.67	-2.47	-49.2	-59.92	2.69	0.86	0	4.7	P
		867.7	-55.53	-6.33	-49.2	-63.73	2.69	0.81	0	4.7	P
	*	902.2	22	-	-	13.72	2.69	0.89	0	4.7	P
		935.6	-54.65	-5.45	-49.2	-62.98	2.69	0.94	0	4.7	P
		950.3	-51.12	-1.92	-49.2	-59.43	2.69	0.92	0	4.7	P
CH 65 915 MHz		457.5	-50.19	-0.99	-49.2	-58.1	2.69	0.52	0	4.7	Q
		772.5	-53.29	-4.09	-49.2	-61.46	2.69	0.78	0	4.7	P
		867	-52.44	-3.24	-49.2	-60.64	2.69	0.81	0	4.7	P
		900.6	-52.11	-2.91	-49.2	-60.39	2.69	0.89	0	4.7	P
	*	915	21.95	-	-	13.67	2.69	0.89	0	4.7	P
		930	-50.78	-1.58	-49.2	-59.11	2.69	0.94	0	4.7	P
		963.6	-50.96	-9.76	-41.2	-59.29	2.69	0.94	0	4.7	P

CH 129 927.8 MHz		463.8	-49.96	-0.76	-49.2	-57.86	2.69	0.51	0	4.7	Q
		783	-54.58	-5.38	-49.2	-62.7	2.69	0.73	0	4.7	P
		880.3	-52.13	-2.93	-49.2	-60.35	2.69	0.83	0	4.7	P
		897.1	-54.68	-5.48	-49.2	-62.9	2.69	0.83	0	4.7	P
	*	927.8	21.4	-	-	13.07	2.69	0.94	0	4.7	P
		944.7	-51.82	-2.62	-49.2	-60.13	2.69	0.92	0	4.7	P
		976.2	-51.68	-10.48	-41.2	-60.01	2.69	0.94	0	4.7	P
Remark	1. No other spurious found. 2. All results are PASS against limit line.										

902 MHz ~ 928 MHz

(1 GHz ~ 10 GHz)

Mode	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	MIMO	Grounding	Peak
					Line	Level	Gain	Loss	Factor	Factor	Avg.
		(MHz)	(dBm)	(dB)	(dBm)	(dBm)	(dBi)	(dB)	(dB)	(dB)	(P/A)
CH 01 902.2 MHz		1353.3	-56.85	-35.65	-21.2	-61.33	2.69	1.79	0	0	P
	#	1804.4	-30.75	-	-	-34.63	2.69	1.19	0	0	P
		2706.6	-47.27	-26.07	-21.2	-51.11	2.69	1.15	0	0	P
		3608.8	-39.24	-18.04	-21.2	-43.15	2.69	1.22	0	0	P
		3608.8	-43.88	-2.68	-41.2	-47.79	2.69	1.22	0	0	A
		4511	-52.26	-31.06	-21.2	-56.16	2.69	1.21	0	0	P
		5413.2	-60.45	-39.25	-21.2	-64.35	2.69	1.21	0	0	P
		8119.8	-71.44	-50.24	-21.2	-75.71	2.69	1.58	0	0	P
		9022	-70.61	-49.41	-21.2	-74.89	2.69	1.59	0	0	P
CH 65 915 MHz		1372.5	-56.06	-34.86	-21.2	-60.42	2.69	1.67	0	0	P
	#	1830	-38	-	-	-41.86	2.69	1.17	0	0	P
		2745	-46.92	-25.72	-21.2	-50.75	2.69	1.14	0	0	P
		3660	-38.73	-17.53	-21.2	-42.65	2.69	1.23	0	0	P
		3660	-43.41	-2.21	-41.2	-47.33	2.69	1.23	0	0	A
		4575	-51.41	-30.21	-21.2	-55.18	2.69	1.08	0	0	P
		7320	-58.29	-37.09	-21.2	-62.37	2.69	1.39	0	0	P
		8235	-68.46	-47.26	-21.2	-72.72	2.69	1.57	0	0	P
		9150	-64.84	-43.64	-21.2	-69.23	2.69	1.7	0	0	P
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.										

CH 129 927.8 MHz		1391.7	-53.45	-32.25	-21.2	-57.69	2.69	1.55	0	0	P
	#	1855.6	-39.96	-	-	-43.79	2.69	1.14	0	0	P
		2783.4	-47.76	-26.56	-21.2	-51.58	2.69	1.13	0	0	P
		3711.2	-39.96	-18.76	-21.2	-44.51	2.69	1.86	0	0	P
		3711.2	-44.64	-3.44	-45.64	-49.19	2.69	1.86	0	0	A
		4639	-54.07	-32.87	-21.2	-58.06	2.69	1.3	0	0	P
		7422.4	-64.29	-43.09	-21.2	-68.75	2.69	1.77	0	0	P
		8350.2	-70.41	-49.21	-21.2	-74.92	2.69	1.82	0	0	P
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.										

<No duty cycling, 12.5 dBm and antenna gain 2.69 dBi>

902 MHz ~ 928 MHz

(30 MHz ~ 1 GHz)

Mode	Note	Frequency	Level	Margin	Limit Line	Read Level	Antenna Factor	Path Loss	MIMO Factor	Grounding Factor	Peak QP.
		(MHz)	(dBm)	(dB)	(dBm)	(dBm)	(dBi)	(dB)	(dB)	(dB)	(P/Q)
CH 01 902.2 MHz		451.1	-50.29	-1.09	-49.2	-58.2	2.69	0.52	0	4.7	Q
		761.3	-54.92	-5.72	-49.2	-63.09	2.69	0.78	0	4.7	P
		854.4	-53.75	-4.55	-49.2	-62	2.69	0.86	0	4.7	P
		874.7	-56.05	-6.85	-49.2	-64.25	2.69	0.81	0	4.7	P
	*	902.2	20.43	-	-	12.15	2.69	0.89	0	4.7	P
		930.7	-56.44	-7.24	-49.2	-64.77	2.69	0.94	0	4.7	P
		950.3	-52.99	-3.79	-49.2	-61.3	2.69	0.92	0	4.7	P
CH 129 927.8 MHz		463.9	-49.43	-0.23	-49.2	-57.33	2.69	0.51	0	4.7	Q
		783	-56.74	-7.54	-49.2	-64.86	2.69	0.73	0	4.7	P
		880.3	-53.15	-3.95	-49.2	-61.37	2.69	0.83	0	4.7	P
		897.1	-58.4	-9.2	-49.2	-66.62	2.69	0.83	0	4.7	P
	*	927.8	19.86	-	-	11.53	2.69	0.94	0	4.7	P
		936.3	-52.99	-3.79	-49.2	-61.32	2.69	0.94	0	4.7	P
		976.2	-52.65	-11.45	-41.2	-60.98	2.69	0.94	0	4.7	P
Remark	1. No other spurious found. 2. All results are PASS against limit line.										

902 MHz ~ 928 MHz

(1 GHz ~ 10 GHz)

Mode	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	MIMO	Grounding	Peak
					Line	Level	Gain	Loss	Factor	Factor	Avg.
		(MHz)	(dBm)	(dB)	(dBm)	(dBm)	(dBi)	(dB)	(dB)	(dB)	(P/A)
CH 01 902.2 MHz		1353.3	-61.93	-40.73	-21.2	-66.41	2.69	1.79	0	0	P
	#	1804.4	-34.16	-	-	-38.04	2.69	1.19	0	0	P
		2706.6	-49.79	-28.59	-21.2	-53.63	2.69	1.15	0	0	P
		3608.8	-41.48	-20.28	-21.2	-45.39	2.69	1.22	0	0	P
		3608.8	-41.79	-0.59	-41.2	-45.7	2.69	1.22	0	0	A
		4511	-59.83	-38.63	-21.2	-63.73	2.69	1.21	0	0	P
		5413.2	-64.28	-43.08	-21.2	-68.18	2.69	1.21	0	0	P
		8119.8	-74.16	-52.96	-21.2	-78.43	2.69	1.58	0	0	P
		9022	-70.33	-49.13	-21.2	-74.61	2.69	1.59	0	0	P
CH 129 927.8 MHz		1391.7	-53.2	-32	-21.2	-57.44	2.69	1.55	0	0	P
	#	1855.6	-39.06	-	-	-42.89	2.69	1.14	0	0	P
		2783.4	-50.72	-29.52	-21.2	-54.54	2.69	1.13	0	0	P
		3711.2	-42	-20.8	-21.2	-46.55	2.69	1.86	0	0	A
		3711.2	-42.24	-1.04	-41.2	-46.79	2.69	1.86	0	0	P
		4639	-62.91	-41.71	-21.2	-66.9	2.69	1.3	0	0	P
		7422.4	-65.59	-44.39	-21.2	-70.05	2.69	1.77	0	0	P
		8350.2	-73.44	-52.24	-21.2	-77.95	2.69	1.82	0	0	P
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.										

<No duty cycling, 12 dBm and antenna gain 2.69 dBi>

902 MHz ~ 928 MHz

(30 MHz ~ 1 GHz)

Mode	Note	Frequency	Level	Margin	Limit Line	Read Level	Antenna Factor	Path Loss	MIMO Factor	Grounding Factor	Peak QP.
		(MHz)	(dBm)	(dB)	(dBm)	(dBm)	(dBi)	(dB)	(dB)	(dB)	(P/Q)
CH 65 915 MHz		457.5	-49.42	-0.22	-49.2	-57.33	2.69	0.52	0	4.7	Q
		772.5	-55.94	-6.74	-49.2	-64.11	2.69	0.78	0	4.7	P
		867	-54.95	-5.75	-49.2	-63.15	2.69	0.81	0	4.7	P
		899.9	-52.65	-3.45	-49.2	-60.93	2.69	0.89	0	4.7	P
	*	915	19.93	-	-	11.65	2.69	0.89	0	4.7	P
		930	-53.37	-4.17	-49.2	-61.7	2.69	0.94	0	4.7	P
		963.6	-52.77	-11.57	-41.2	-61.1	2.69	0.94	0	4.7	P
Remark	1. No other spurious found. 2. All results are PASS against limit line.										

902 MHz ~ 928 MHz

(1 GHz ~ 10 GHz)

Mode	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	MIMO	Grounding	Peak
					Line	Level	Gain	Loss	Factor	Factor	Avg.
		(MHz)	(dBm)	(dB)	(dBm)	(dBm)	(dBi)	(dB)	(dB)	(dB)	(P/A)
CH 65 915 MHz		1372.5	-59.7	-38.5	-21.2	-64.06	2.69	1.67	0	0	P
	#	1830	-41.2	-	-	-45.06	2.69	1.17	0	0	P
		2745	-55.84	-34.64	-21.2	-59.67	2.69	1.14	0	0	P
		3660	-42.89	-21.69	-21.2	-46.81	2.69	1.23	0	0	P
		3660	-43.26	-2.06	-41.2	-47.18	2.69	1.23	0	0	A
		4575	-59.56	-38.36	-21.2	-63.33	2.69	1.08	0	0	P
		7320	-61.15	-39.95	-21.2	-65.23	2.69	1.39	0	0	P
		8235	-68.37	-47.17	-21.2	-72.63	2.69	1.57	0	0	P
		9150	-67.74	-46.54	-21.2	-72.13	2.69	1.7	0	0	P
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.										

<No duty cycling, 12.5 dBm and antenna gain 2 dBi>

902 MHz ~ 928 MHz

(30 MHz ~ 1 GHz)

Mode	Note	Frequency	Level	Margin	Limit Line	Read Level	Antenna Factor	Path Loss	MIMO Factor	Grounding Factor	Peak QP.
		(MHz)	(dBm)	(dB)	(dBm)	(dBm)	(dBi)	(dB)	(dB)	(dB)	(P/Q)
CH 65 915 MHz		457.5	-50.54	-1.34	-49.2	-57.76	2	0.52	0	4.7	Q
		772.5	-55.91	-6.71	-49.2	-63.39	2	0.78	0	4.7	P
		867	-54.88	-5.68	-49.2	-62.39	2	0.81	0	4.7	P
		900.6	-53.39	-4.19	-49.2	-60.98	2	0.89	0	4.7	P
	*	915	19.68	-	-	12.09	2	0.89	0	4.7	P
		930.7	-53.6	-4.4	-49.2	-61.24	2	0.94	0	4.7	P
		963.6	-53.93	-12.73	-41.2	-61.57	2	0.94	0	4.7	P
Remark	1. No other spurious found. 2. All results are PASS against limit line.										

902 MHz ~ 928 MHz

(1 GHz ~ 10 GHz)

Mode	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	MIMO	Grounding	Peak
					Line	Level	Gain	Loss	Factor	Factor	Avg.
		(MHz)	(dBm)	(dB)	(dBm)	(dBm)	(dBi)	(dB)	(dB)	(dB)	(P/A)
CH 65 915 MHz		1372.5	-59.47	-38.27	-21.2	-63.14	2	1.67	0	0	P
	#	1830	-42.51	-	-	-45.68	2	1.17	0	0	P
		2745	-53.72	-32.52	-21.2	-56.86	2	1.14	0	0	P
		3660	-41.09	-19.89	-21.2	-44.32	2	1.23	0	0	P
		3660	-41.41	-0.21	-41.2	-44.64	2	1.23	0	0	A
		4575	-61.34	-40.14	-21.2	-64.42	2	1.08	0	0	P
		7320	-59.13	-37.93	-21.2	-62.52	2	1.39	0	0	P
		8235	-68.77	-47.57	-21.2	-72.34	2	1.57	0	0	P
		9150	-67.03	-45.83	-21.2	-70.73	2	1.7	0	0	P
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.										

<No duty cycling, 19 dBm and antenna gain 2.69 dBi>

902 MHz ~ 928 MHz

(30 MHz ~ 1 GHz)

Mode	Note	Frequency	Level	Margin	Limit Line	Read Level	Antenna Factor	Path Loss	MIMO Factor	Grounding Factor	Peak QP.
		(MHz)	(dBm)	(dB)	(dBm)	(dBm)	(dBi)	(dB)	(dB)	(dB)	(P/Q)
CH 01 902.2 MHz	#	451.1	-50.43	-	-	-58.34	2.69	0.52	0	4.7	P
		761.3	-50.98	-1.78	-49.2	-59.15	2.69	0.78	0	4.7	P
		854.2	-51.25	-2.05	-49.2	-59.5	2.69	0.86	0	4.7	Q
		890.2	-52.94	-3.74	-49.2	-61.16	2.69	0.83	0	4.7	Q
	*	902.2	25.82	-	-	17.54	2.69	0.89	0	4.7	P
		929.3	-50.29	-1.09	-49.2	-58.62	2.69	0.94	0	4.7	P
		950.2	-51.87	-2.67	-49.2	-60.18	2.69	0.92	0	4.7	Q
CH 31 908.2 MHz	#	454.1	-47.19	-	-	-55.1	2.69	0.52	0	4.7	P
		766.2	-50.96	-1.76	-49.2	-59.13	2.69	0.78	0	4.7	P
		812.4	-56.6	-7.4	-49.2	-64.74	2.69	0.75	0	4.7	P
		860.7	-51.23	-2.03	-49.2	-59.43	2.69	0.81	0	4.7	Q
	*	908.2	26.19	-	-	17.91	2.69	0.89	0	4.7	P
		926.5	-50.77	-1.57	-49.2	-59.1	2.69	0.94	0	4.7	P
		956.6	-52.79	-3.59	-49.2	-61.1	2.69	0.92	0	4.7	Q

Mode	Note	Frequency	Level	Margin	Limit Line	Read Level	Antenna Factor	Path Loss	MIMO Factor	Grounding Factor	Peak QP.
		(MHz)	(dBm)	(dB)	(dBm)	(dBm)	(dBi)	(dB)	(dB)	(dB)	(P/Q)
CH 65 915 MHz	#	457.5	-49.29	-	-	-57.2	2.69	0.52	0	4.7	P
		771.8	-50.7	-1.5	-49.2	-58.87	2.69	0.78	0	4.7	P
		867	-50.1	-0.9	-49.2	-58.3	2.69	0.81	0	4.7	Q
		892.9	-52.84	-3.64	-49.2	-61.06	2.69	0.83	0	4.7	P
	*	915	25.86	-	-	17.58	2.69	0.89	0	4.7	P
		934.9	-51.24	-2.04	-49.2	-59.57	2.69	0.94	0	4.7	P
		963.6	-47.86	-6.66	-41.2	-56.19	2.69	0.94	0	4.7	P
CH 129 927.8 MHz	#	463.9	-47.16	-	-	-55.06	2.69	0.51	0	4.7	P
		783	-51.09	-1.89	-49.2	-59.21	2.69	0.73	0	4.7	P
		832	-53.66	-4.46	-49.2	-61.81	2.69	0.76	0	4.7	P
		879.8	-51.58	-2.38	-49.2	-59.8	2.69	0.83	0	4.7	Q
	*	927.8	25.88	-	-	17.55	2.69	0.94	0	4.7	P
		953.1	-50.35	-1.15	-49.2	-58.66	2.69	0.92	0	4.7	P
		976.2	-48.77	-7.57	-41.2	-57.1	2.69	0.94	0	4.7	P
Remark	1. No other spurious found. 2. All results are PASS against limit line.										

902 MHz ~ 928 MHz

(1 GHz ~ 10 GHz)

Mode	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	MIMO	Grounding	Peak
					Line	Level	Gain	Loss	Factor	Factor	Avg.
		(MHz)	(dBm)	(dB)	(dBm)	(dBm)	(dBi)	(dB)	(dB)	(dB)	(P/A)
CH 01 902.2 MHz		1353.3	-62.56	-41.36	-21.2	-67.04	2.69	1.79	0	0	P
	#	1804.4	-20.43	-	-	-24.31	2.69	1.19	0	0	P
		2706.6	-40.85	-19.65	-21.2	-44.69	2.69	1.15	0	0	P
		2706.6	-41.25	-0.05	-41.2	-45.09	2.69	1.15	0	0	A
		3608.8	-43.25	-22.05	-21.2	-47.16	2.69	1.22	0	0	P
		3608.8	-44.64	-3.44	-41.2	-48.55	2.69	1.22	0	0	A
		4511	-41.67	-20.47	-21.2	-45.57	2.69	1.21	0	0	P
		4511	-42	-0.8	-41.2	-45.9	2.69	1.21	0	0	A
		5413.2	-56.25	-35.05	-21.2	-60.15	2.69	1.21	0	0	P
		8119.8	-61.53	-40.33	-21.2	-65.8	2.69	1.58	0	0	P
		9022	-52.28	-31.08	-21.2	-56.56	2.69	1.59	0	0	P
CH 31 908.2 MHz		1363.3	-54.19	-32.99	-21.2	-58.61	2.69	1.73	0	0	P
	#	1816.4	-21.37	-	-	-25.24	2.69	1.18	0	0	P
		2724.6	-45.59	-24.39	-21.2	-49.42	2.69	1.14	0	0	P
		3632.8	-43.14	-21.94	-21.2	-47.06	2.69	1.23	0	0	P
		4541	-44.8	-23.6	-21.2	-48.65	2.69	1.16	0	0	P
		7265.6	-66.64	-45.44	-21.2	-70.74	2.69	1.41	0	0	P
		8173.8	-61.9	-40.7	-21.2	-66.15	2.69	1.56	0	0	P
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.										

Mode	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	MIMO	Grounding	Peak
					Line	Level	Gain	Loss	Factor	Factor	Avg.
		(MHz)	(dBm)	(dB)	(dBm)	(dBm)	(dBi)	(dB)	(dB)	(dB)	(P/A)
CH 65 915 MHz		1372.5	-53.06	-31.86	-21.2	-57.42	2.69	1.67	0	0	P
	#	1830	-22.23	-	-	-26.09	2.69	1.17	0	0	P
		2745	-52.77	-31.57	-21.2	-56.6	2.69	1.14	0	0	P
		3660	-44.27	-23.07	-21.2	-48.19	2.69	1.23	0	0	P
		4575	-49.18	-27.98	-21.2	-52.95	2.69	1.08	0	0	P
		7320	-67.49	-46.29	-21.2	-71.57	2.69	1.39	0	0	P
		8235	-74.38	-53.18	-21.2	-78.64	2.69	1.57	0	0	P
		9150	-55.62	-34.42	-21.2	-60.01	2.69	1.7	0	0	P
CH 129 927.8 MHz		1391.7	-54.67	-33.47	-21.2	-58.91	2.69	1.55	0	0	P
	#	1855.6	-20.23	-	-	-24.06	2.69	1.14	0	0	P
		2783.4	-49.31	-28.11	-21.2	-53.13	2.69	1.13	0	0	P
		3711.2	-45.03	-23.83	-21.2	-48.97	2.69	1.25	0	0	P
		4639	-55.7	-34.5	-21.2	-59.44	2.69	1.05	0	0	P
		7422.4	-72.18	-50.98	-21.2	-76.2	2.69	1.33	0	0	P
		8350.2	-69.6	-48.4	-21.2	-73.88	2.69	1.59	0	0	P
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.										

Note symbol

*	**Fundamental Frequency** which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is **Margin** line.
#	The unwanted signal can be ignored since it falls within the non-restricted band and meet the requirements of 15.247 (d).
P/A/Q	**P**eak or **A**verage or **Q**uasi-Peak
H/V	**H**orizontal or **V**ertical

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

	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	MIMO	Grounding	Peak
					Line	Level	Factor	Loss	Factor	Factor	Avg.
		(MHz)	(dBm)	(dB)	(dBm)	(dBm)	(dBi)	(dB)	(dB)	(dB)	(P/A)
CH 01 912.75 MHz		1825.5	-38.76	-17.56	-21.2	-42.5	2.69	1.05	0	0	P
		1825.5	-42.33	-1.13	-41.2	-46.07	2.69	1.05	0	0	A

1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)
2. Level(dBm) =

Antenna Factor(dBi) + Path Loss(dB) + Read Level(dBm)

3. Margin (dB) = Level(dBm) – Limit Line(dBm)

For Peak Limit @ 1825.5 MHz:

1. Level(dBm)

= Antenna Factor(dBi) + Path Loss(dB) + Read Level(dBm)

= 2.69(dBi) + 1.05(dB) – 42.5(dBm)

= -38.76 (dBm)

2. Margin (dB)

= Level(dBm) – Limit Line(dBm)

= -38.76(dBm) +21.2(dBm)

= -17.56(dB)

For Average Limit @ 1825.5MHz:

1. Level(dBm)

= Antenna Factor(dBi) + Path Loss(dB) + Read Level(dBm)

= 2.69(dBi) + 1.05(dB) – 46.07(dBm)

= -42.33 (dBm)

2. Margin (dB)

= Level(dBm) – Limit Line(dBm)

= -42.33(dBm) + 41.2(dBm)

= -1.13(dB)

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

Appendix D. Conducted Spurious Emission Plots

Test Engineer :	Ken Wu and Kai Liao	**Temperature :**	21.1~24°C
		Relative Humidity :	59.7~67.4%

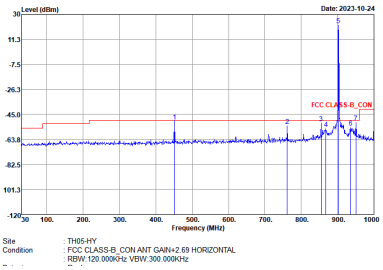
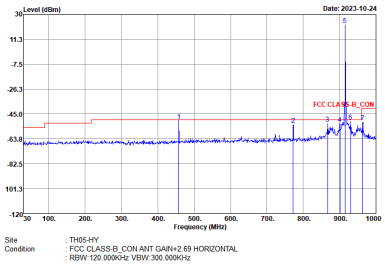
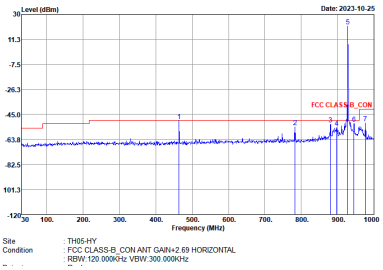
Note symbol

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

<60 ms max Tx_on time duty cycling, 14 dBm and antenna gain 2.69 dBi>

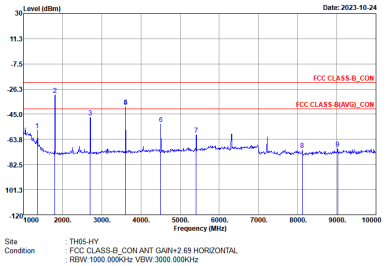
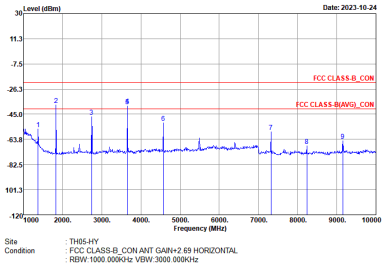
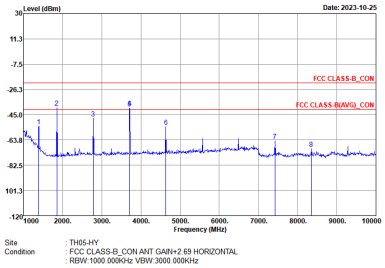
902 MHz ~ 928 MHz

(30 MHz ~ 1 GHz)

	902 MHz ~ 928 MHz	
	CH01 902.2 MHz	**CH65 915 MHz**
Peak/ QP		
	CH129 927.8 MHz	
Peak/ QP		Left Blank

902 MHz ~ 928 MHz

(1 GHz ~ 10 GHz)

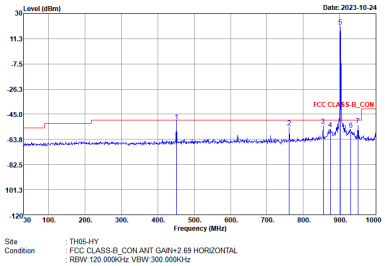
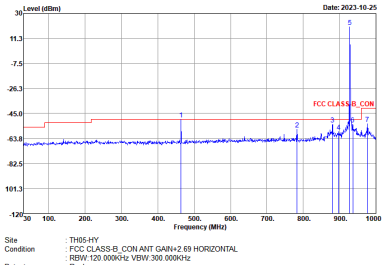
	902 MHz ~ 928 MHz	
	CH01 902.2 MHz	CH65 915 MHz
Peak/ QP		
	CH129 927.8 MHz	
Peak/ QP		Left Blank

Remark: The unwanted signal of 2nd Harmonic in plot falls within the non-restricted band and meet the requirements of 15.247 (d).

<No duty cycling, 12.5 dBm and antenna gain 2.69 dBi>

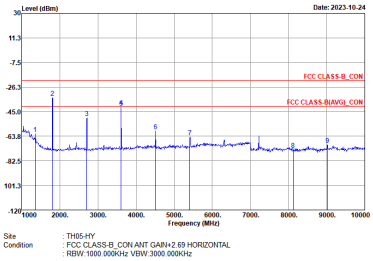
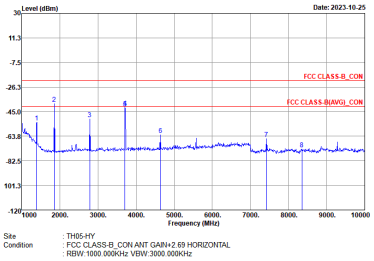
902 MHz ~ 928 MHz

(30 MHz ~ 1 GHz)

	902 MHz ~ 928 MHz	
	CH01 902.2 MHz	CH129 927.8 MHz
Peak/ QP		

902 MHz ~ 928 MHz

(1 GHz ~ 10 GHz)

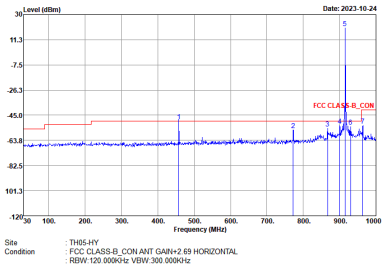
	902 MHz ~ 928 MHz	
	CH01 902.2 MHz	CH129 927.8 MHz
Peak Avg.		

Remark: The unwanted signal of 2nd Harmonic in plot falls within the non-restricted band and meet the requirements of 15.247 (d).

<No duty cycling, 12 dBm and antenna gain 2.69 dBi>

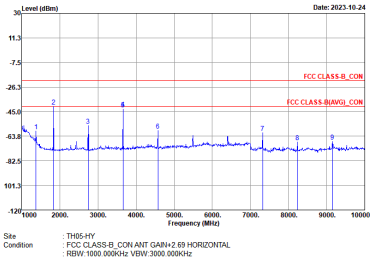
902 MHz ~ 928 MHz

(30 MHz ~ 1 GHz)

	902 MHz ~ 928 MHz	
	CH65 915 MHz	
Peak/ QP		Left Blank

902 MHz ~ 928 MHz

(1 GHz ~ 10 GHz)

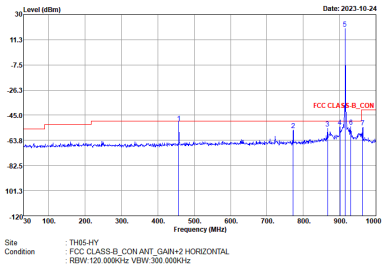
	902 MHz ~ 928 MHz	
	CH65 915 MHz	
Peak Avg.		Left Blank

Remark: The unwanted signal of 2nd Harmonic in plot falls within the non-restricted band and meet the requirements of 15.247 (d).

<No duty cycling, 12.5 dBm and antenna gain 2 dBi>

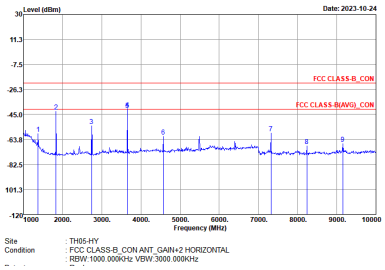
902 MHz ~ 928 MHz

(30 MHz ~ 1 GHz)

	902 MHz ~ 928 MHz	
	CH65 915 MHz	
Peak/ QP		Left Blank

902 MHz ~ 928 MHz

(1 GHz ~ 10 GHz)

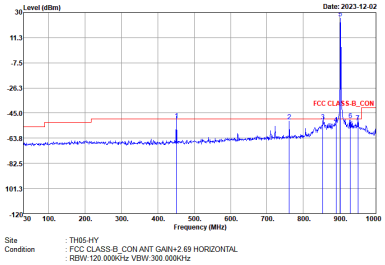
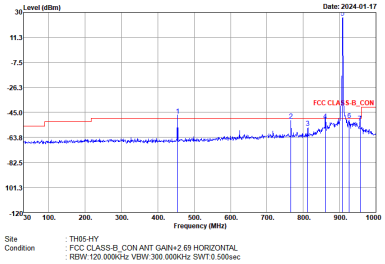
	902 MHz ~ 928 MHz	
	CH65 915 MHz	
Peak/ QP		Left Blank

Remark: The unwanted signal of 2nd Harmonic in plot falls within the non-restricted band and meet the requirements of 15.247 (d).

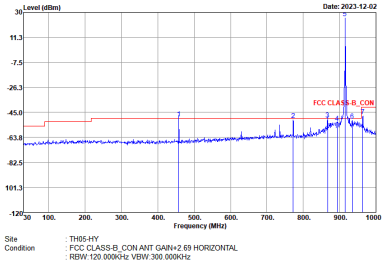
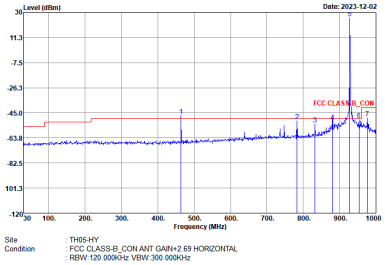
<No duty cycling, 19 dBm and antenna gain 2.69 dBi>

902 MHz ~ 928 MHz

(30 MHz ~ 1 GHz)

	902 MHz ~ 928 MHz	
	CH01 902.2 MHz	CH 31 908.2 MHz
Peak/ QP		

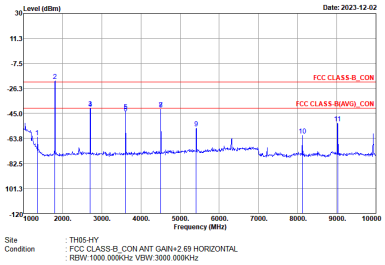
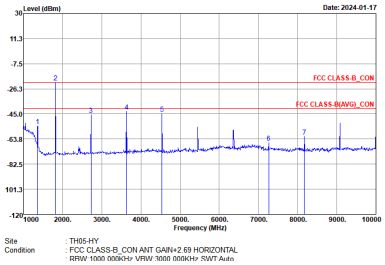
Remark: The unwanted signal #1 can be ignored since it falls within the non-restricted band and meet the requirements of 15.247 (d).

	902 MHz ~ 928 MHz	
	CH65 915 MHz	CH129 927.8 MHz
Peak/ QP		

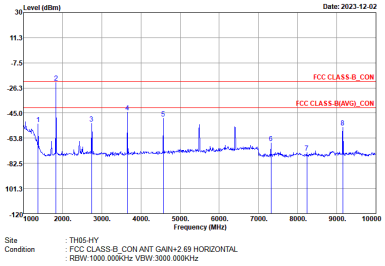
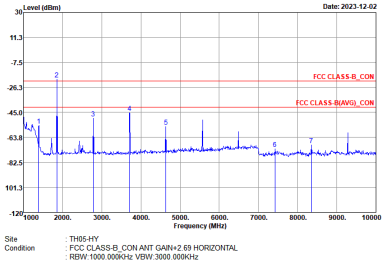
Remark: The unwanted signal #1 can be ignored since it falls within the non-restricted band and meet the requirements of 15.247 (d).

902 MHz ~ 928 MHz

(1 GHz ~ 10 GHz)

	902 MHz ~ 928 MHz	
	CH01 902.2 MHz	CH 31 908.2 MHz
Peak/ Avg.		

Remark: The unwanted signal of 2nd Harmonic in plot falls within the non-restricted band and meet the requirements of 15.247 (d).

	902 MHz ~ 928 MHz	
	CH65 915 MHz	CH129 927.8 MHz
Peak/ Avg.		

Remark: The unwanted signal of 2nd Harmonic in plot falls within the non-restricted band and meet the requirements of 15.247 (d).

Appendix E. Cabinet Radiated Spurious Emission

Test Engineer :	Jacky Hung, Mancy Chou and Rain Lee	Temperature :	20~26°C
		Relative Humidity :	40~65%

<No duty cycling, 14 dBm>

902 MHz ~ 928 MHz

(30 MHz ~ 1 GHz @ 3m)

Mode	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
CH01 902.2MHz		59.7	26.43	-13.57	40	45.44	12.11	1.05	32.17	-	-	P	H
		97.5	33.03	-10.47	43.5	47.92	16.05	1.2	32.14	-	-	P	H
		216.03	27.82	-18.18	46	43.3	15.01	1.58	32.07	-	-	P	H
		379.1	27.68	-18.32	46	36.45	21.19	2	31.96	-	-	P	H
		552	34.23	-11.77	46	38.32	25.66	2.35	32.1	-	-	P	H
		831.3	31.14	-14.86	46	31.57	28.35	2.9	31.68	-	-	P	H
	*	902.5	63.62	-	-	63	28.97	3.01	31.36	150	52	P	H
													H
													H
		30.54	32.54	-7.46	40	39.11	24.77	0.82	32.16	-	-	P	V
		61.32	29.98	-10.02	40	48.95	12.14	1.06	32.17	-	-	P	V
		116.13	29.65	-13.85	43.5	43.1	17.43	1.27	32.15	-	-	P	V
		552	32.7	-13.3	46	36.79	25.66	2.35	32.1	-	-	P	V
		717.2	33.2	-12.8	46	35.59	27.02	2.67	32.08	-	-	P	V
		879.6	31.32	-14.68	46	30.9	28.92	2.99	31.49	-	-	P	V
	*	902.5	57.9	-	-	57.28	28.97	3.01	31.36	100	41	P	V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against limit line.
3. The emission position marked as "-" means no suspected emission found and emission level has at least 6dB margin against limit or emission is noise floor only.

Mode	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
CH65 915.0MHz		30.54	24.07	-15.93	40	30.64	24.77	0.82	32.16	-	-	P	H
		103.44	31.93	-11.57	43.5	46.13	16.71	1.23	32.14	-	-	P	H
		264.09	26.28	-19.72	46	36.22	20.37	1.75	32.06	-	-	P	H
		552	30.85	-15.15	46	34.94	25.66	2.35	32.1	-	-	P	H
		742.4	31.65	-14.35	46	32.85	28.1	2.73	32.03	-	-	P	H
	*	915	62.48	-	-	61.56	29.14	3.04	31.26	150	39	P	H
		962.2	33.16	-20.84	54	29.81	31.09	3.11	30.85			P	H
													H
													H
		61.59	28.36	-11.64	40	47.34	12.13	1.06	32.17	-	-	P	V
		95.61	29.19	-14.31	43.5	44.35	15.81	1.17	32.14	-	-	P	V
		264.09	20.8	-25.2	46	30.74	20.37	1.75	32.06	-	-	P	V
		552	31.61	-14.39	46	35.7	25.66	2.35	32.1	-	-	P	V
		843.2	31.38	-14.62	46	31.19	28.91	2.93	31.65	-	-	P	V
	*	915	55.44	-	-	54.52	29.14	3.04	31.26	150	99	P	V
		964.3	33.8	-20.2	54	30.4	31.11	3.11	30.82			P	V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against limit line.
3. The emission position marked as "-" means no suspected emission found and emission level has at least 6dB margin against limit or emission is noise floor only.

Mode	Note	Frequency	Level	Margin	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
CH129 927.8MHz		100.2	34.93	-8.57	43.5	49.5	16.36	1.21	32.14	-	-	P	H
		213.06	28.88	-14.62	43.5	44.29	15.09	1.57	32.07	-	-	P	H
		264.09	27.45	-18.55	46	37.39	20.37	1.75	32.06	-	-	P	H
		437.9	27.32	-18.68	46	34.02	23.1	2.13	31.93	-	-	P	H
		552	34.48	-11.52	46	38.57	25.66	2.35	32.1	-	-	P	H
		713.7	32.24	-13.76	46	34.8	26.85	2.67	32.08	-	-	P	H
	*	927.8	63.33	-	-	61.88	29.55	3.05	31.15	152	56	P	H
													H
													H
		59.16	25.06	-14.94	40	44.08	12.12	1.03	32.17	-	-	P	V
		127.47	24.15	-19.35	43.5	37.23	17.75	1.3	32.13	-	-	P	V
		264.09	20.23	-25.77	46	30.17	20.37	1.75	32.06	-	-	P	V
		552	30.42	-15.58	46	34.51	25.66	2.35	32.1	-	-	P	V
		719.3	35.58	-10.42	46	37.87	27.1	2.68	32.07	-	-	P	V
		880.3	31.14	-14.86	46	30.73	28.9	2.99	31.48	-	-	P	V
	*	927.8	57.63	-	-	56.18	29.55	3.05	31.15	108	37	P	V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against limit line.
3. The emission position marked as "-" means no suspected emission found and emission level has at least 6dB margin against limit or emission is noise floor only.

902 MHz ~ 928 MHz
(1 GHz ~ 10 GHz @ 3m)

Mode	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
CH01 902.2MHz		2706.6	36.28	-37.72	74	59.94	28.27	5.43	57.36	-	-	P	H
		3608.8	37.16	-36.84	74	59.43	29.62	6.37	58.26	-	-	P	H
													H
													H
													H
													H
													H
													H
		2706.6	35.99	-38.01	74	59.65	28.27	5.43	57.36	-	-	P	V
		3608.8	36.64	-37.36	74	58.91	29.62	6.37	58.26	-	-	P	V
													V
													V
													V
													V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against Peak and Average limit line.
3. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.

Mode	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
CH65 915.0MHz		2745	37.52	-36.48	74	61.38	28.1	5.47	57.43	-	-	P	H
		3660	39.46	-34.54	74	61.64	29.74	6.39	58.31	-	-	P	H
													H
													H
													H
													H
													H
													H
		2745	35	-39	74	58.86	28.1	5.47	57.43	-	-	P	V
		3660	39.1	-34.9	74	61.28	29.74	6.39	58.31	-	-	P	V
													V
													V
													V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line. 3. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.												

Mode	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
CH129 927.8MHz		2783.4	35.69	-38.31	74	59.47	28.2	5.51	57.49	-	-	P	H
		3711.2	38.13	-35.87	74	60.11	29.97	6.41	58.36	-	-	P	H
													H
													H
													H
													H
													H
													H
		2783.4	35.07	-38.93	74	58.85	28.2	5.51	57.49	-	-	P	V
		3711.2	37.85	-36.15	74	59.83	29.97	6.41	58.36	-	-	P	V
													V
													V
													V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line. 3. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.												

<60 ms max Tx_on time duty cycling, 19 dBm>

902 MHz ~ 928 MHz

(30 MHz ~ 1 GHz @ 3m)

Mode	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
CH01 902.2MHz		30.27	23.16	-16.84	40	29.65	24.85	0.82	32.16	-	-	P	H
		240.06	20.08	-25.92	46	33.14	17.33	1.67	32.06	-	-	P	H
		264.09	24.5	-21.5	46	34.44	20.37	1.75	32.06	-	-	P	H
		552	32.29	-13.71	46	36.38	25.66	2.35	32.1	-	-	P	H
		720	31.5	-14.5	46	33.77	27.12	2.68	32.07	-	-	P	H
	*	902.2	67.82	-	-	67.21	28.96	3.01	31.36	100	169	P	H
		951	32.9	-13.1	46	30.15	30.62	3.09	30.96	-	-	P	H
													H
													H
		31.08	22.44	-17.56	40	29.19	24.58	0.83	32.16	-	-	P	V
		118.29	19.42	-24.08	43.5	32.82	17.47	1.28	32.15	-	-	P	V
		263.28	20.31	-25.69	46	30.29	20.33	1.75	32.06	-	-	P	V
		663.3	28.21	-17.79	46	31.23	26.44	2.56	32.02	-	-	P	V
		727	31.8	-14.2	46	33.67	27.49	2.7	32.06	-	-	P	V
	*	902.2	61.33	-	-	60.72	28.96	3.01	31.36	100	109	P	V
		957.3	33.23	-12.77	46	30.02	31.01	3.1	30.9	-	-	P	V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against limit line.
3. The emission position marked as "-" means no suspected emission found and emission level has at least 6dB margin against limit or emission is noise floor only.

902 MHz ~ 928 MHz
(1 GHz ~ 10 GHz @ 3m)

Mode	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
CH01 902.2MHz		2706.6	55.42	-18.58	74	79.08	28.27	5.43	57.36	100	12	P	H
		2706.6	49.77	-4.23	54	73.43	28.27	5.43	57.36	100	12	A	H
		3608.8	51.37	-22.63	74	73.64	29.62	6.37	58.26	396	279	P	H
		3608.8	45.08	-8.92	54	67.35	29.62	6.37	58.26	396	279	A	H
		4511	47.5	-26.5	74	67.06	31.62	7.06	58.24	383	295	P	H
		4511	41.06	-12.94	54	60.62	31.62	7.06	58.24	383	295	A	H
		5413.2	42.04	-31.96	74	57.51	33.03	7.66	56.16	-	-	P	H
		8119.8	45.18	-28.82	74	55.5	36.94	9.23	56.49	-	-	P	H
		9022	47.78	-26.22	74	57.02	37.9	9.75	56.89	100	347	P	H
		9022	34.54	-19.46	54	43.78	37.9	9.75	56.89	100	347	A	H
		2706.6	53.68	-20.32	74	77.34	28.27	5.43	57.36	208	89	P	V
		2706.6	48.02	-5.98	54	71.68	28.27	5.43	57.36	208	89	A	V
		3608.8	55.2	-18.8	74	77.47	29.62	6.37	58.26	331	174	P	V
		3608.8	49.68	-4.32	54	71.95	29.62	6.37	58.26	331	174	A	V
		4511	48.27	-25.73	74	67.83	31.62	7.06	58.24	400	21	P	V
		4511	40.38	-13.62	54	59.94	31.62	7.06	58.24	400	21	A	V
		5413.2	41.86	-32.14	74	57.33	33.03	7.66	56.16	-	-	P	V
		8119.8	44.78	-29.22	74	55.1	36.94	9.23	56.49	-	-	P	V
		9022	49.61	-24.39	74	58.85	37.9	9.75	56.89	100	360	P	V
		9022	39.09	-14.91	54	48.33	37.9	9.75	56.89	100	360	A	V

Remark

1. No other spurious found.
2. All results are PASS against Peak and Average limit line.
3. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.

<No duty cycling, 19 dBm>

902 MHz ~ 928 MHz

(30 MHz ~ 1 GHz @ 3m)

Mode	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
CH31 908.2MHz		30.81	23.25	-16.75	40	29.89	24.69	0.88	32.16	-	-	P	H
		136.38	17.15	-26.35	43.5	30.19	17.74	1.37	32.1	-	-	P	H
		300	24.66	-21.34	46	35.51	19.36	1.98	32.06	-	-	P	H
		540.1	29.65	-16.35	46	35.05	24.37	2.46	32.11	-	-	P	H
		720	30.36	-15.64	46	32.63	27.12	2.82	32.07	-	-	P	H
	*	908.2	71.58	-	-	70.71	29.16	3.21	31.31	149	178	P	H
		963.6	33.28	-20.72	54	29.89	31.11	3.33	30.83	-	-	P	H
													H
													H
		30	23.45	-16.55	40	29.87	24.93	0.84	32.16	-	-	P	V
		100.74	20.8	-22.7	43.5	35.3	16.43	1.29	32.14	-	-	P	V
		264.63	19.56	-26.44	46	29.61	20.25	1.88	32.06	-	-	P	V
		540.1	27.5	-18.5	46	32.9	24.37	2.46	32.11	-	-	P	V
		703.9	35.37	-10.63	46	38.2	26.62	2.79	32.1	-	-	P	V
	*	908.2	65.57	-	-	64.7	29.16	3.21	31.31	147	95	P	V
		994.4	33.6	-20.4	54	30.44	30.52	3.4	30.52	-	-	P	V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against limit line.
3. The emission position marked as "-" means no suspected emission found and emission level has at least 6dB margin against limit or emission is noise floor only.

Mode	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
CH65 915MHz		31.08	22.43	-17.57	40	29.18	24.58	0.83	32.16	-	-	P	H
		131.79	19.62	-23.88	43.5	32.74	17.68	1.31	32.11	-	-	P	H
		264.09	25.2	-20.8	46	35.14	20.37	1.75	32.06	-	-	P	H
		419.7	30.21	-15.79	46	37.2	22.83	2.09	31.91	-	-	P	H
		552	31.05	-14.95	46	35.14	25.66	2.35	32.1	-	-	P	H
		734	34.96	-11.04	46	36.4	27.88	2.72	32.04	-	-	P	H
	*	915	70.71	-	-	69.79	29.14	3.04	31.26	150	55	P	H
													H
													H
		30.81	23.2	-16.8	40	29.84	24.69	0.83	32.16	-	-	P	V
		118.02	19.35	-24.15	43.5	32.76	17.46	1.28	32.15	-	-	P	V
		257.07	20.44	-25.56	46	31.2	19.57	1.73	32.06	-	-	P	V
		419.7	26.23	-19.77	46	33.22	22.83	2.09	31.91	-	-	P	V
		643.7	28.55	-17.45	46	31.54	26.52	2.47	31.98	-	-	P	V
		867.7	31.2	-14.8	46	30.71	29.07	2.97	31.55	-	-	P	V
	*	915	63.91	-	-	62.99	29.14	3.04	31.26	157	335	P	V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against limit line.
3. The emission position marked as "-" means no suspected emission found and emission level has at least 6dB margin against limit or emission is noise floor only.

Mode	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
CH129 927.8MHz		31.08	22.91	-17.09	40	29.66	24.58	0.83	32.16	-	-	P	H
		136.65	18.99	-24.51	43.5	32.02	17.75	1.32	32.1	-	-	P	H
		264.09	23.56	-22.44	46	33.5	20.37	1.75	32.06	-	-	P	H
		419.7	30.38	-15.62	46	37.37	22.83	2.09	31.91	-	-	P	H
		843.2	31.57	-14.43	46	31.38	28.91	2.93	31.65	-	-	P	H
	*	927.8	72.53	-	-	71.08	29.55	3.05	31.15	152	52	P	H
		990.9	33.48	-20.52	54	30.28	30.61	3.14	30.55	-	-	P	H
													H
													H
		31.35	23.12	-16.88	40	30.04	24.4	0.84	32.16	-	-	P	V
		115.05	20.05	-23.45	43.5	33.54	17.39	1.27	32.15	-	-	P	V
		261.39	20.49	-25.51	46	30.65	20.16	1.74	32.06	-	-	P	V
		419.7	26.21	-19.79	46	33.2	22.83	2.09	31.91	-	-	P	V
		556.9	26.56	-19.44	46	30.13	26.21	2.31	32.09	-	-	P	V
		851.6	31.09	-14.91	46	30.72	29.05	2.95	31.63	-	-	P	V
	*	927.8	66.02	-	-	64.57	29.55	3.05	31.15	157	336	P	V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against limit line.
3. The emission position marked as "-" means no suspected emission found and emission level has at least 6dB margin against limit or emission is noise floor only.

902 MHz ~ 928 MHz
(1 GHz ~ 10 GHz @ 3m)

Mode	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
CH31 908.2MHz		2724.6	55.6	-18.4	74	79.29	28.25	5.45	57.39	100	118	P	H
		2724.6	53.73	-0.27	54	77.42	28.25	5.45	57.39	100	118	A	H
		3632.8	50.32	-23.68	74	72.55	29.67	6.38	58.28	100	109	P	H
		3632.8	48.15	-5.85	54	70.38	29.67	6.38	58.28	100	109	A	H
		4541	47.49	-26.51	74	66.86	31.68	7.1	58.15	346	296	P	H
		4541	42.73	-11.27	54	62.1	31.68	7.1	58.15	346	296	A	H
		5449.2	41.58	-32.42	74	56.93	33.1	7.65	56.1	-	-	P	H
		7265.6	46.05	-27.95	74	57.07	37	8.73	56.75	-	-	P	H
		8173.8	46.01	-27.99	74	56.06	37	9.42	56.47	-	-	P	H
		9082	48.67	-25.33	74	57.85	37.9	9.75	56.83	400	104	P	H
		9082	40.08	-13.92	54	49.26	37.9	9.75	56.83	400	104	A	H
		2724.6	53.5	-20.5	74	77.19	28.25	5.45	57.39	313	127	P	V
		2724.6	51.14	-2.86	54	74.83	28.25	5.45	57.39	313	127	A	V
		3632.8	54.61	-19.39	74	76.84	29.67	6.38	58.28	253	175	P	V
		3632.8	53.36	-0.64	54	75.59	29.67	6.38	58.28	253	175	A	V
		4541	49.68	-24.32	74	69.05	31.68	7.1	58.15	346	28	P	V
		4541	46.07	-7.93	54	65.44	31.68	7.1	58.15	346	28	A	V
		5449.2	44.62	-29.38	74	59.97	33.1	7.65	56.1	400	322	P	V
		5449.2	37.35	-16.65	54	52.7	33.1	7.65	56.1	400	322	A	V
		7265.6	45.7	-28.3	74	56.72	37	8.73	56.75			P	V
		8173.8	45.61	-28.39	74	55.66	37	9.42	56.47			P	V
		9082	50.53	-23.47	74	59.71	37.9	9.75	56.83	250	62	P	V
		9082	44.31	-9.69	54	53.49	37.9	9.75	56.83	250	62	A	V

Remark

1. No other spurious found.
2. All results are PASS against Peak and Average limit line.
3. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.

Mode	Note	Frequency	Level	Margin	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
CH65 915MHz		2745	53.37	-20.63	74	77.23	28.1	5.47	57.43	100	12	P	H
		2745	51.76	-2.24	54	75.62	28.1	5.47	57.43	100	12	A	H
		3660	50.65	-23.35	74	72.83	29.74	6.39	58.31	383	284	P	H
		3660	48.33	-5.67	54	70.51	29.74	6.39	58.31	383	284	A	H
		4575	46.51	-27.49	74	65.67	31.75	7.15	58.06	109	330	P	H
		4575	42.19	-11.81	54	61.35	31.75	7.15	58.06	109	330	A	H
		7320	45.06	-28.94	74	56.23	36.92	8.75	56.84	-	-	P	H
		8235	44.66	-29.34	74	54.63	37	9.49	56.46	-	-	P	H
		9150	45.51	-28.49	74	54.41	38.1	9.76	56.76	-	-	P	H
		2745	53.16	-20.84	74	77.02	28.1	5.47	57.43	216	88	P	V
		2745	52	-2	54	75.86	28.1	5.47	57.43	216	88	A	V
		3660	54.52	-19.48	74	76.7	29.74	6.39	58.31	301	174	P	V
		3660	53.09	-0.91	54	75.27	29.74	6.39	58.31	301	174	A	V
		4575	49.21	-24.79	74	68.37	31.75	7.15	58.06	301	45	P	V
		4575	45.34	-8.66	54	64.5	31.75	7.15	58.06	301	45	A	V
		7320	45.3	-28.7	74	56.47	36.92	8.75	56.84	-	-	P	V
		8235	44.6	-29.4	74	54.57	37	9.49	56.46	-	-	P	V
		9150	45.6	-28.4	74	54.5	38.1	9.76	56.76	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line. 3. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.												

Mode	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
CH129 927.8MHz		2783.4	52.34	-21.66	74	76.12	28.2	5.2	57.49	280	58	P	H
		2783.4	50.49	-3.51	54	74.27	28.2	5.2	57.49	280	58	A	H
		3711.2	48.39	-25.61	74	70.37	29.97	6.02	58.36	373	299	P	H
		3711.2	45.33	-8.67	54	67.31	29.97	6.02	58.36	373	299	A	H
		4639	46.1	-27.9	74	64.86	31.96	6.81	57.87	100	333	P	H
		4639	40.65	-13.35	54	59.41	31.96	6.81	57.87	100	333	A	H
		7422.4	43.99	-30.01	74	55.75	36.46	8.38	57.02	-	-	P	H
		8350.2	45.04	-28.96	74	54.92	37.1	9.09	56.43	-	-	P	H
													H
		2783.4	50.85	-23.15	74	74.63	28.2	5.2	57.49	400	6	P	V
		2783.4	48.66	-5.34	54	72.44	28.2	5.2	57.49	400	6	A	V
		3711.2	51.55	-22.45	74	73.53	29.97	6.02	58.36	317	171	P	V
		3711.2	49.58	-4.42	54	71.56	29.97	6.02	58.36	317	171	A	V
		4639	47.82	-26.18	74	66.58	31.96	6.81	57.87	382	343	P	V
		4639	43.41	-10.59	54	62.17	31.96	6.81	57.87	382	343	A	V
		7422.4	44.32	-29.68	74	56.08	36.46	8.38	57.02	-	-	P	V
		8350.2	45.31	-28.69	74	55.19	37.1	9.09	56.43	-	-	P	V
													V

Remark

1. No other spurious found.
2. All results are PASS against Peak and Average limit line.
3. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.

<No duty cycling, 16 dBm>

902 MHz ~ 928 MHz

(30 MHz ~ 1 GHz @ 3m)

Mode	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
CH01 902.2MHz		31.08	22.85	-17.15	40	29.6	24.58	0.83	32.16	-	-	P	H
		111.81	17.71	-25.79	43.5	31.4	17.21	1.25	32.15	-	-	P	H
		264.09	22.5	-23.5	46	32.44	20.37	1.75	32.06	-	-	P	H
		332.2	23.47	-22.53	46	33.78	19.86	1.9	32.07	-	-	P	H
		723.5	30.8	-15.2	46	32.91	27.26	2.69	32.06	-	-	P	H
		871.2	32.29	-13.71	46	31.8	29.05	2.97	31.53	-	-	P	H
	*	902.2	65.55	-	-	64.94	28.96	3.01	31.36	100	169	P	H
													H
													H
		31.08	22.46	-17.54	40	29.21	24.58	0.83	32.16	-	-	P	V
		125.04	17.3	-26.2	43.5	30.46	17.67	1.3	32.13	-	-	P	V
		260.04	19.98	-26.02	46	30.28	20.03	1.73	32.06	-	-	P	V
		332.9	22.39	-23.61	46	32.67	19.88	1.91	32.07	-	-	P	V
		727	32.75	-13.25	46	34.62	27.49	2.7	32.06	-	-	P	V
		834.1	30.52	-15.48	46	30.78	28.51	2.9	31.67	-	-	P	V
	*	902.2	62.75	-	-	62.14	28.96	3.01	31.36	100	109	P	V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against limit line.
3. The emission position marked as "-" means no suspected emission found and emission level has at least 6dB margin against limit or emission is noise floor only.

902 MHz ~ 928 MHz
(1 GHz ~ 10 GHz @ 3m)

Mode	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
CH01 902.2MHz		2706.6	52.14	-21.86	74	75.8	28.27	5.11	57.36	100	12	P	H
		2706.6	50.24	-3.76	54	73.9	28.27	5.11	57.36	100	12	A	H
		3608.8	46.98	-27.02	74	69.25	29.62	6.02	58.26	396	279	P	H
		3608.8	43.72	-10.28	54	65.99	29.62	6.02	58.26	396	279	A	H
		4511	40.2	-33.8	74	59.76	31.62	6.71	58.24	-	-	P	H
		5413.2	40.79	-33.21	74	56.26	33.03	7.41	56.16	-	-	P	H
		8119.8	44.53	-29.47	74	54.85	36.94	8.93	56.49	-	-	P	H
		9022	45.34	-28.66	74	54.58	37.9	9.38	56.89	-	-	P	H
													H
													H
		2706.6	50.85	-23.15	74	74.51	28.27	5.11	57.36	208	89	P	V
		2706.6	48.91	-5.09	54	72.57	28.27	5.11	57.36	208	89	A	V
		3608.8	50.58	-23.42	74	72.85	29.62	6.02	58.26	331	174	P	V
		3608.8	48.47	-5.53	54	70.74	29.62	6.02	58.26	331	174	A	V
		4511	41.18	-32.82	74	60.74	31.62	6.71	58.24	-	-	P	V
		5413.2	41.62	-32.38	74	57.09	33.03	7.41	56.16	-	-	P	V
		8119.8	44.26	-29.74	74	54.58	36.94	8.93	56.49	-	-	P	V
		9022	44.53	-29.47	74	53.77	37.9	9.38	56.89	-	-	P	V
													V
													V

Remark

1. No other spurious found.
2. All results are PASS against Peak and Average limit line.
3. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.

Note symbol

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

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

Mode	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
CH 01 2402MHz		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

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

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

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

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

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

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

= 55.45 (dBμV/m)

2. Margin(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

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

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

= 43.54 (dBμV/m)

2. Margin(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

= -10.46(dB)

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

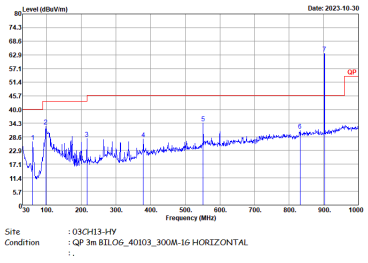
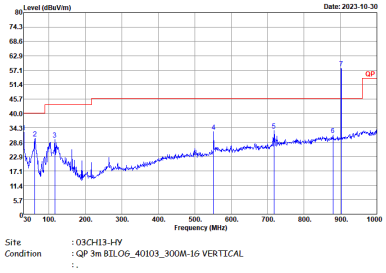
Appendix F. Cabinet Radiated Spurious Emission Plots

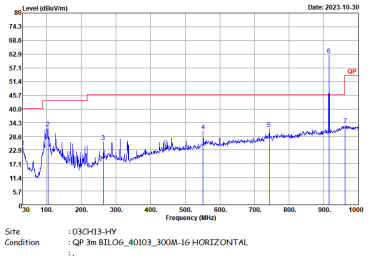
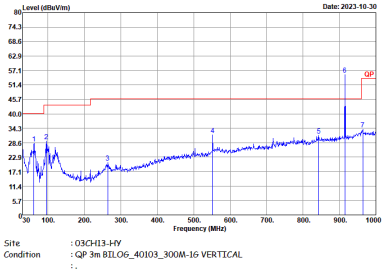
Test Engineer :	Jacky Hung, Mancy Chou and Rain Lee	Temperature :	20~26°C
		Relative Humidity :	40~65%

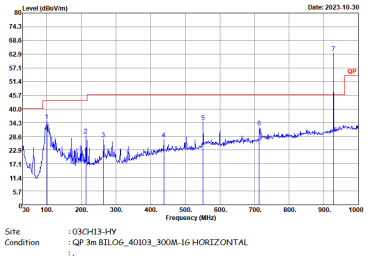
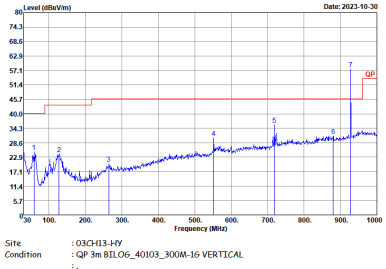
<No duty cycling, 14 dBm>

902 MHz ~ 928 MHz

(30 MHz ~ 1 GHz @ 3m)

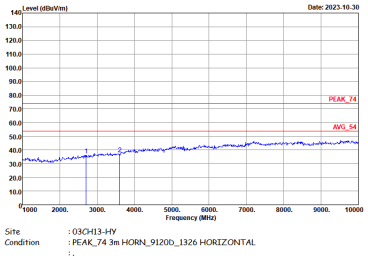
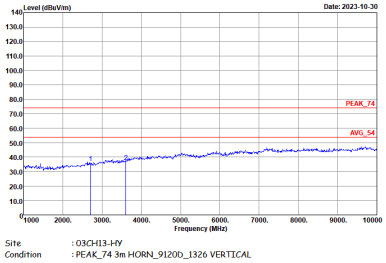
	CH01 902.2 MHz	
	Horizontal	Vertical
Peak / QP		

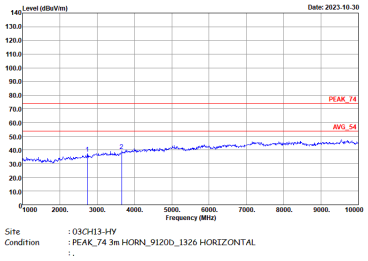
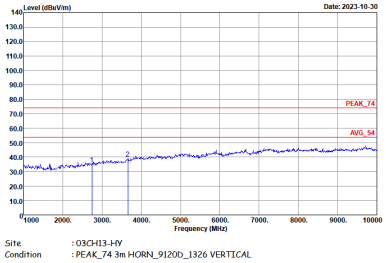
	CH65 915 MHz	
	Horizontal	Vertical
Peak / QP		

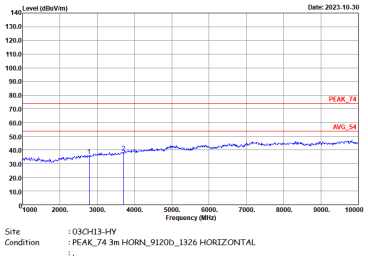
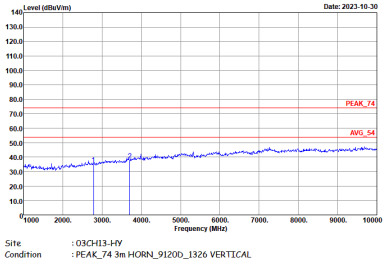
	CH129 927.8 MHz	
	Horizontal	Vertical
Peak / QP		

902 MHz ~ 928 MHz

(1 GHz ~ 10 GHz @ 3m)

	CH01 902.2 MHz	
	Horizontal	Vertical
Peak Avg.		

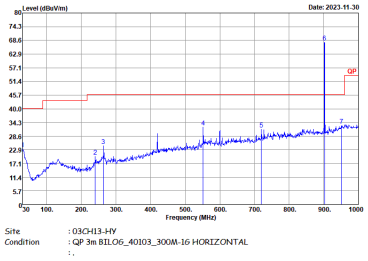
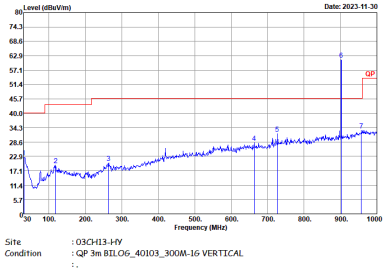
	CH65 915 MHz	
	Horizontal	Vertical
Peak Avg.		

	CH129 927.8 MHz	
	Horizontal	Vertical
Peak Avg.		

<60 ms max Tx_on time duty cycling, 19 dBm>

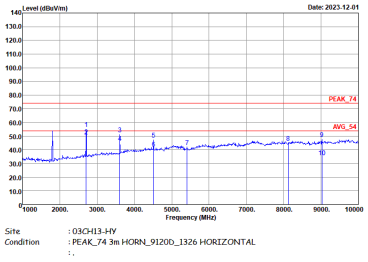
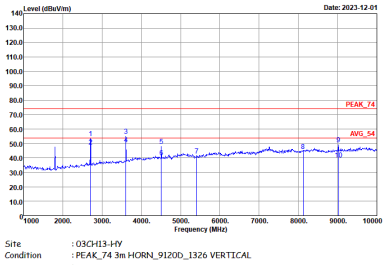
902 MHz ~ 928 MHz

(30 MHz ~ 1 GHz @ 3m)

	CH01 902.2 MHz	
	Horizontal	**Vertical**
Peak / QP		

902 MHz ~ 928 MHz

(1 GHz ~ 10 GHz @ 3m)

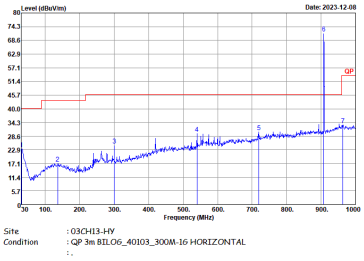
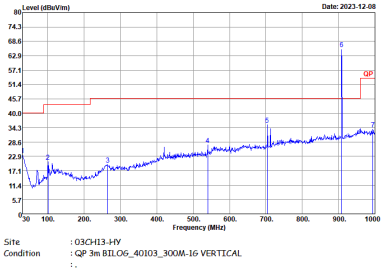
	CH01 902.2 MHz	
	Horizontal	Vertical
Peak Avg.		

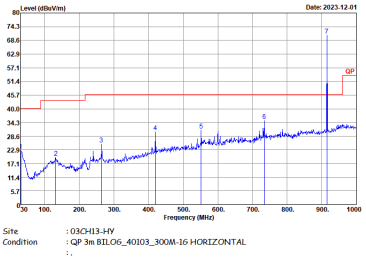
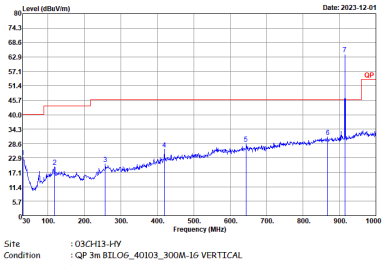
Remark: The unwanted signal of 2nd Harmonic in plot falls within the non-restricted band and meet the requirements of 15.247 (d).

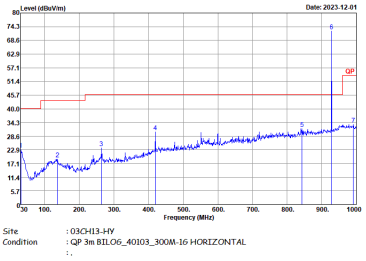
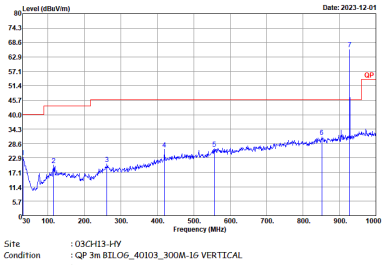
<No duty cycling, 19 dBm>

902 MHz ~ 928 MHz

(30 MHz ~ 1 GHz @ 3m)

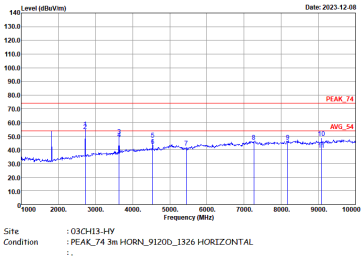
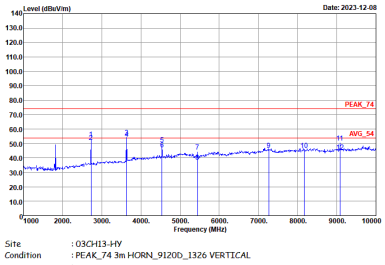
	CH31 908.2 MHz	
	Horizontal	**Vertical**
Peak / QP		

	CH65 915 MHz	
	Horizontal	Vertical
Peak / QP		

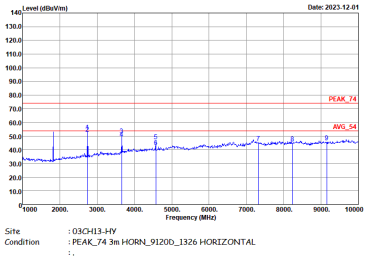
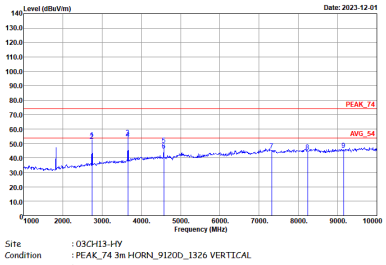
	CH129 927.8 MHz	
	Horizontal	Vertical
Peak / QP		

902 MHz ~ 928 MHz

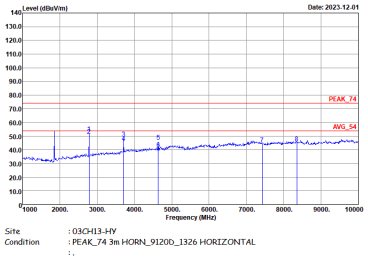
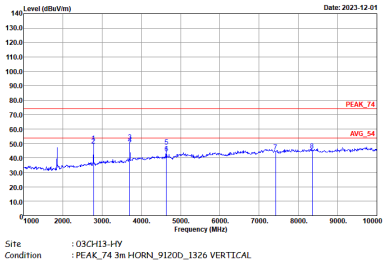
(1 GHz ~ 10 GHz @ 3m)

	CH31 908.2 MHz	
	Horizontal	Vertical
Peak Avg.		

Remark: The unwanted signal of 2nd Harmonic in plot falls within the non-restricted band and meet the requirements of 15.247 (d).

	CH65 915 MHz	
	Horizontal	**Vertical**
Peak **Avg.**		

Remark: The unwanted signal of 2nd Harmonic in plot falls within the non-restricted band and meet the requirements of 15.247 (d).

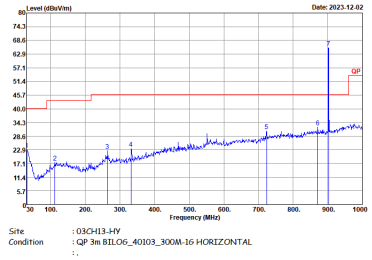
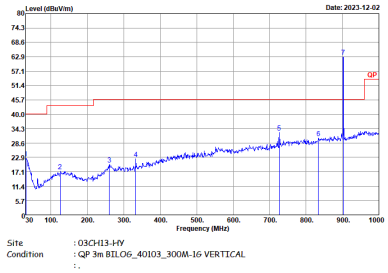
	CH129 927.8 MHz	
	Horizontal	**Vertical**
Peak **Avg.**		

Remark: The unwanted signal of 2nd Harmonic in plot falls within the non-restricted band and meet the requirements of 15.247 (d).

< No duty cycling, 16 dBm>

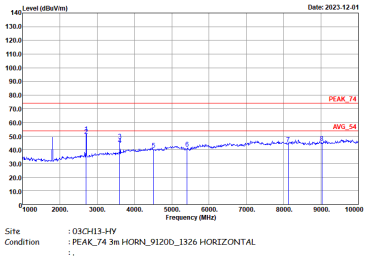
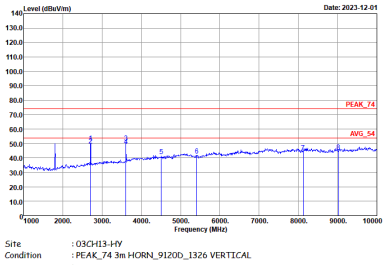
902 MHz ~ 928 MHz

(30 MHz ~ 1 GHz @ 3m)

	CH01 902.2 MHz	
	Horizontal	Vertical
Peak / QP		

902 MHz ~ 928 MHz

(1 GHz ~ 10 GHz @ 3m)

	CH01 902.2 MHz	
	Horizontal	Vertical
Peak Avg.		

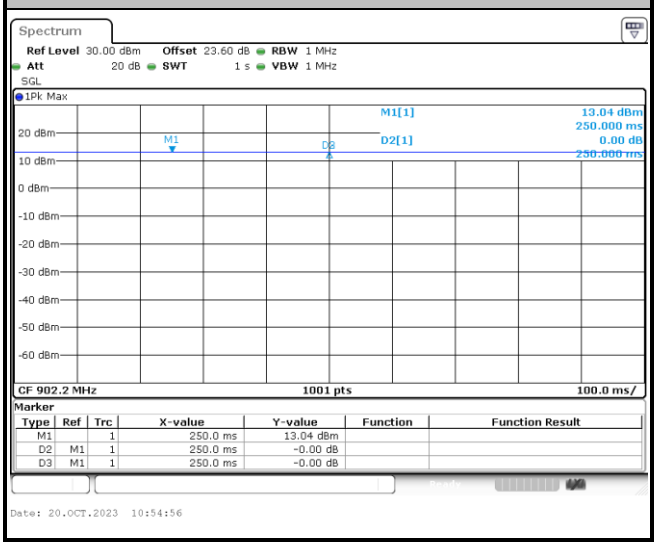
Remark: The unwanted signal of 2nd Harmonic in plot falls within the non-restricted band and meet the requirements of 15.247 (d).

Appendix G. Duty Cycle Plots

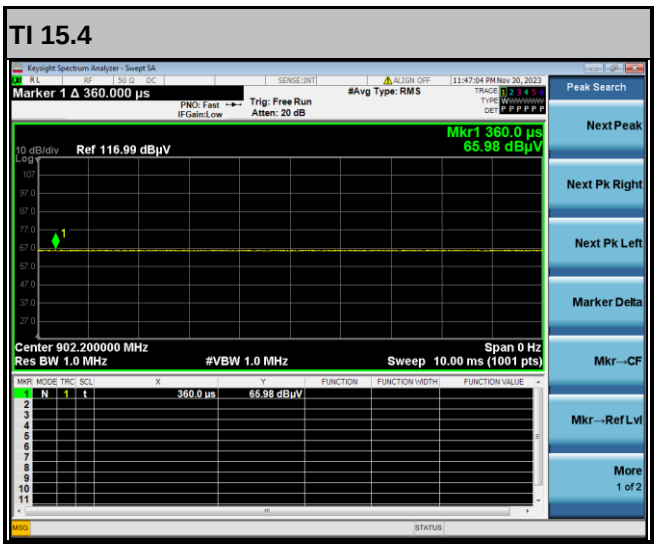
<14dBm>

Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
TI 15.4	100.00	-	-	10Hz

TI 15.4



<19dBm and 16dBm>

Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
TI 15.4	100.00	-	-	10Hz

TI 15.4