Testing Laboratory
3024

Test Report No:
2480630R-RFUSV24S-A

TEST REPORT
FCC Rules&Regulations

Product Name	700MHz TornadoX Transceiver
Brand Name	Ubiik Mimomax
Model No.	MWL-TORNADOX-BHCD
FCC ID	XMK-MMXTRNXB010
Applicant´s Name / Address	MiMOMax Wireless Limited 540 Wairakei Road, Christchurch 8053, New Zealand
Manufacturer's Name / Address	MiMOMax Wireless Limited 540 Wairakei Road, Christchurch 8053, New Zealand
Test Method Requested, Standard	FCC CFR Title 47 Part 27 ANSI/TIA-603-E-2016 ANSI C63.26-2015
Verdict Summary	IN COMPLIANCE
Documented By	Vera Hsu Vera Hsu
Approved By	Allen Lin Allen Lin
Date of Receipt	Aug. 20, 2024
Date of Issue	Jan. 21, 2025
Report Version	V1.0

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Competences and Guarantees

DEKRA is a testing laboratory competent to carry out the tests described in this report.
In order to assure the traceability to other national and international laboratories, DEKRA has a calibration and maintenance program for its measurement equipment.

DEKRA guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated in the report and it is based on the knowledge and technical facilities available at DEKRA at the time of performance of the test.

DEKRA is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

General Conditions

1. The test results relate only to the samples tested.
2. The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.
3. This report must not be used to claim product endorsement by TAF or any agency of the government.
4. The test report shall not be reproduced without the written approval of DEKRA Testing and Certification Co., Ltd.
5. Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Revision History

Version	Description	Issued Date
V1.0	Initial issue of report	Jan. 21, 2025

Summary of Test Result

Report Clause	Test Items	Operating Frequency (MHz)	Ref Std. Clause	Limit	Result (PASS/FAIL)	Remark
3	RF Output Power	757.05, 787.95	§2.1046 §27.50	< 1000 Watts	PASS	-
4	Occupied Bandwidth	757.05, 787.95	§2.1049	N/A	PASS	-
5	Spurious Emission	757.05	§27.53(c)(1)(5)	< -13 dBm	PASS	-
			§27.53(c)(3)(6)	< -46 dBm		
		787.95	§27.53(c)(2)(5)	< -13 dBm		
			§27.53(c)(3)(6)	< -46 dBm		
6	Conducted Band Edge	757.05	§27.53(c)(1)(5)	< -13 dBm	PASS	-
			§27.53(c)(3)(6)	< -46 dBm		
		787.95	§27.53(c)(2)(5)	< -13 dBm		
			§27.53(c)(3)(6)	< -46 dBm		
7	Frequency Stability	757.05, 787.95	§2.1055 §27.54	± 2.5 ppm	PASS	-

Comments and Explanations
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Comments and Remarks

The product specification and testing instructions for the EUT declared in the report are provided by the manufacturer who will take all responsibilities for the accuracy.

1. General Information

1.1. EUT Description

Frequency Range (MHz)	757~758
	787~788
Operating Frequency (MHz)	757.5
	787.5
Bandwidth (kHz)	12.5 / 25 / 50
Type of Modulation	QPSK / 16QAM / 64QAM / 256QAM

Antenna Information				
Ant.	Brand Name	Model No.	Type	Gain (dBi)
1	Mimomax	ANT-698-960-008-OD00	Omni	8
2	Mimomax	ANT-757-788-008-PD00	Panel	8
3	Mimomax	ANT-750-800-009-PD0H	Panel	9
4	Mimomax	ANT-750-800-011-PD0H	Panel	11
5	Mimomax	ANT-757-788-012-PD0H	Panel	12
6	Mimomax	ANT-750-800-016-PD0H	Panel	16
7	Mimomax	ANT-757-788-012-YD00	Yagi	12

Note:

1. The device has 2 antenna ports, and both port 1 and port 2 can transmit/receive signal simultaneously.
2. The device has 7 sets of antenna and there are 2 antennas for each set.

1.2. EUT Information

EUT Power Type	From DC power supply	
Hardware Version	003	
Software Version	torn_software_04.08.05	
MIMO mode	☐ Correlated	☒ Uncorrelated: SM-MIMO

1.3. Testing Applied Standards

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

- FCC CFR Title 47 Part 27
- ANSI/TIA-603-E (2016)
- ANSI C63.26-2015
- FCC KDB 971168 D01 v03r01

The following reference test guidance is not within the scope of accreditation of TAF.

- FCC KDB 412172 D01 v01r01
- FCC KDB 414788 D01 v01r01

Remark: All test items were verified and recorded according to the standards and without any deviation during the test.

1.4. Testing Location Information

Testing Location Information		
Test Laboratory：DEKRA Testing and Certification Co., Ltd.		
	1 (TAF: 3024)	ADD: No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan, R.O.C. TEL: +886-3-582-8001 FAX: +886-3-582-8958 Test site Designation No. TW3024 with FCC. Conformity Assessment Body Identifier (CABID) TW3024 with ISED.
	2 (TAF: 3024)	ADD: No.372, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan, R.O.C. TEL: +886-3-582-8001 FAX: +886-3-582-8958 Test site Designation No. TW3024 with FCC. Conformity Assessment Body Identifier (CABID) TW3024 with ISED.
Test site number for address 1 includes HC-SR02. Test site number for address 2 includes HC-CB02, HC-CB03, HC-CB04, HC-SR10 and HC-SR12.		

Test Condition	Test Site No.	Test Engineer	Test Environment (°C / %)	Test Date
RF Conducted Emission	HC-SR12	Max Chang	22~24 / 63~65	2024/09/24~2024/11/01
Radiated Emission	HC-CB02	Scott Chang	23.5~24.5 / 55~61	2024/09/18~2024/10/30

1.5. Measurement Uncertainty

Uncertainties have been calculated according to the DEKRA internal document with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2).

Test Item	Uncertainty
RF Output Power	± 1.16 dB
Occupied Bandwidth	± 217.9 Hz
Spurious Emissions	± 3.52 dB below 1 GHz ± 3.56 dB above 1 GHz
Conducted Band Edge	± 2.47 dB
Frequency Stability	± 217.9 Hz

1.6. List of Test Equipment

HC-SR12

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Cal. Date	Next Cal. Date
EXA Signal Analyzer	Keysight	N9010A	MY51440132	10 Hz-44 GHz	2023/12/11	2024/12/10
Spectrum Analyzer	Keysight	N9010B	MY57110159	10 Hz-7 GHz	2024/03/01	2025/02/28
Signal & Spectrum Analyzer	R&S	FSV40	101869	10Hz-40GHz	2024/06/20	2025/06/19
USB Peak Power Sensor	Anritsu	MA24408A	11840	50 MHz to 8 GHz, High VBW(165 MHz / 350 kHz)	2024/08/02	2025/08/01
Wireless Conn. Tester	R&S	CMW500	157118	Simulator	2024/06/27	2025/06/26

HC-CB02

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Cal. Date	Next Cal. Date
Signal Analyzer	R&S	FSVA40	101455	10 Hz-40 GHz	2023/10/03	2024/10/02
Signal and Spectrum Analyzer	R&S	FSVA40	101435	10 Hz-40 GHz	2024/05/17	2025/05/16
EXA Signal Analyzer	Keysight	N9010A	MY51440132	10 Hz-44 GHz	2023/12/11	2024/12/10
Trilog Broadband Antenna	Schwarzbeck	VULB 9168	1272	30 MHz-2 GHz	2024/04/29	2025/04/28
Double Ridged Horn Antenna	RF SPIN	DRH18-E	211211A18EN	1G-18GHz	2023/11/09	2024/11/08
Horn Antenna	Schwarzbeck	BBHA 9170	203	18G-40GHz	2024/02/02	2025/02/01
Pre-Amplifier	EMCI	EMC01820I	980365	30M-8 GHz,20 dB	2024/04/02	2025/04/01
Pre-Amplifier	EMEC	EM01G18GA	060741	1G-18 GHz,50 dB	2024/04/23	2025/04/22
Pre-Amplifier	DEKRA	AP-400C	201801231	18G-40 GHz,48 dB	2023/10/03	2024/10/02
Pre-Amplifier	SGH	SGH184	20230411-2	18G-40 GHz,54 dB	2024/04/23	2025/04/22
Coaxial Cable(13m)	Suhner	SF104	HC-CB02	30M-18 GHz	2024/08/13	2025/08/12
Coaxial Cable(3m)	Suhner,Rosnol	SF102_UP0264	HC-CB02-1	18G-40 GHz 3 m	2024/08/13	2025/08/12
Radiated Software	Audix	e3 V9	HC-CB02_1	N/A	N/A	N/A

Note: All equipment upon which need to calibrated are with calibration period of 1 year.

2. Test Configuration of EUT

2.1. Test Condition

EUT Operational Condition			
Testing Voltage	Vnom (DC 24V)	Vmax (DC 60V)	Vmin (DC 10.5V)
Operational Climatic	Tnom (25℃)	Tmax (60℃)	Tmin (-40℃)

2.2. The Worst Case Measurement Configuration

Test Mode	Mode 1: Transmit Mode (Cabinet emissions)

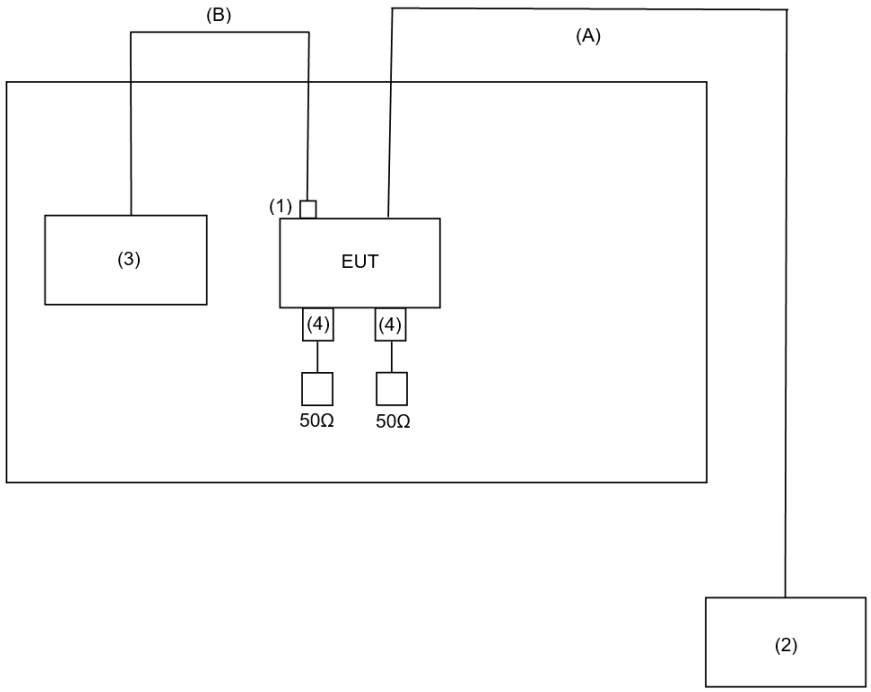
Note:
1. Determining compliance shall be based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. The device was tested under all bandwidths and modulations.
   The worst case was found in “QPSK” and show in “Conducted Band Edge” and “Spurious Emission”.

2.3. Tested System Details

No.	Equipment	Brand Name	Model No.	Serial No.
1	Green power supply connector	N/A	N/A	N/A
2	Notebook	DELL	Latitude E6320	8611271467
3	DC Power Supply	Chroma	62024P-80-60	A02146
4	attenuator	Woken	00800A1K01H-10	N/A

2.4. Configuration of Tested System

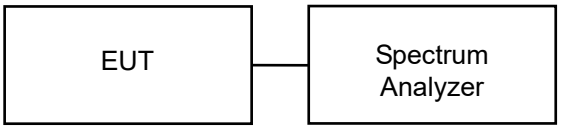
Connection Diagram (EUT + 50Ω termination matching)



Signal Cable Type		Signal cable Description
A	Ethernet Cable	Non-Shielded, 10m
B	DC Cable	Non-Shielded, 2.55 m

3. RF Output Power

3.1. Test Setup



3.2. Test Procedure

The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum conducted RF output power under transmission mode and specific channel frequency. The relevant equation for determining the ERP or EIRP from the conducted RF output power measured using the guidance provided above is:

$$ERP \text{ or } EIRP = P_{Meas} + G_T - L_C$$

where:

ERP or EIRP = effective radiated power or equivalent isotropically radiated power, respectively (expressed in the same units as PMeas, typically dBW or dBm);

P_{Meas} = measured transmitter output power or PSD, in dBm or dBW;

G_T = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);

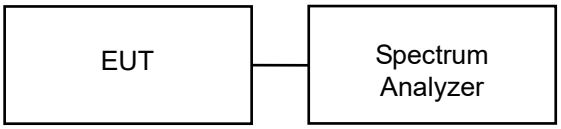
L_C = signal attenuation in the connecting cable between the transmitter and antenna, in dB

3.3. Test Result of RF Output Power

Refer as Appendix A

4. Occupied Bandwidth

4.1. Test Setup



4.2. Test Procedures

The EUT makes a call to the communication simulator. The 26dB bandwidth and 99% occupied bandwidth measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. The path loss was compensated to the results for each measurement.

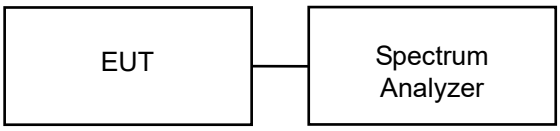
4.3. Test Result of Occupied Bandwidth

Refer as Appendix B

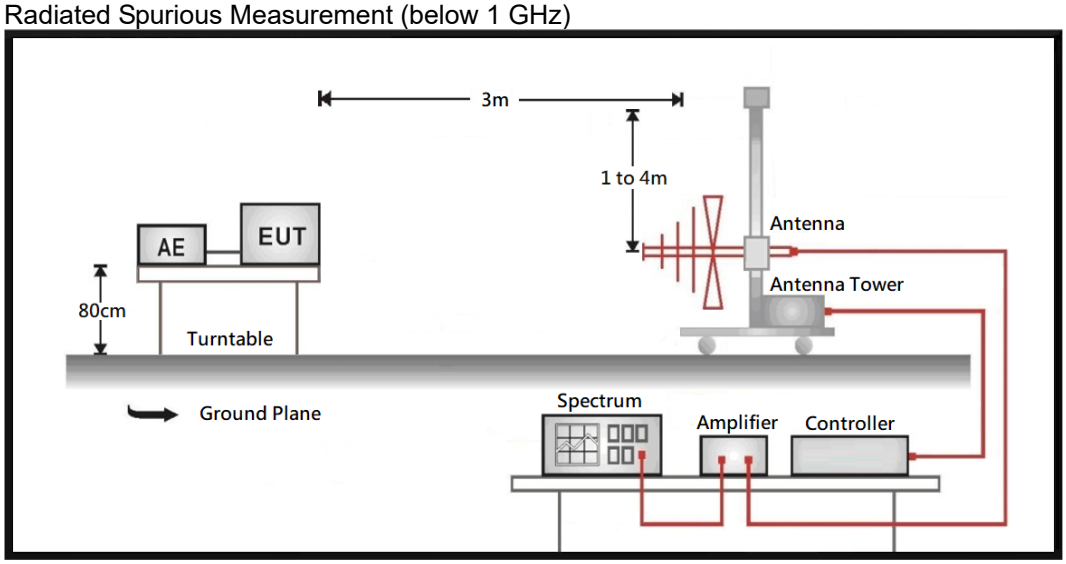
5. Spurious Emission

5.1. Test Setup

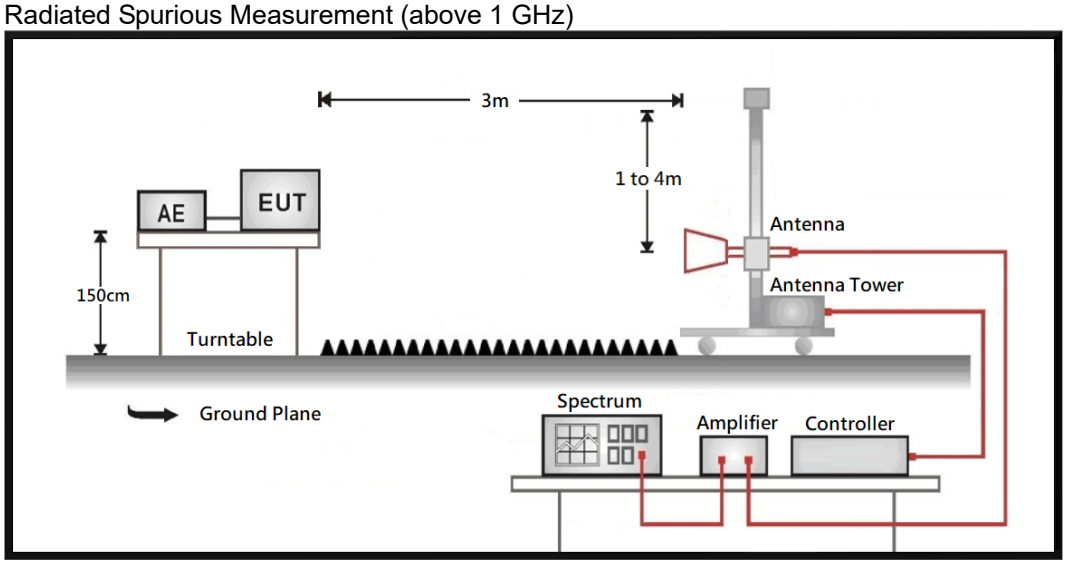
Conducted Spurious Measurement



Radiated Spurious Measurement (below 1 GHz)



Radiated Spurious Measurement (above 1 GHz)



5.2. Test Procedure

Conducted Spurious Measurement:

The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. The path loss was compensated to the results for each measurement. The resolution bandwidth of the spectrum analyzer was set at 1 MHz, sufficient scans were taken to show the out of band Emission if any up to 10^{th} harmonic.

Radiated Spurious Measurement:

The EUT and its simulators are placed on a turn table which is 0.8 or 1.5 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations. The resolution bandwidth of the spectrum analyzer was set at 1 MHz, sufficient scans were taken to show the out of band Emission if any up to 10th harmonic. Taking the record of maximum spurious emission.

Cabinet emissions measurements

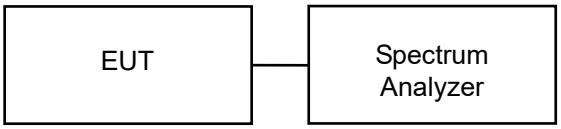
Due to antenna length or other restrictions, alternative solutions are permitted; antenna-port conducted measurements in conjunction with cabinet emissions tests are permitted to determine compliance provided

5.3. Test Result of Spurious Emission

Refer as Appendix C

6. Conducted Band Edge

6.1. Test Setup



6.2. Test Procedure

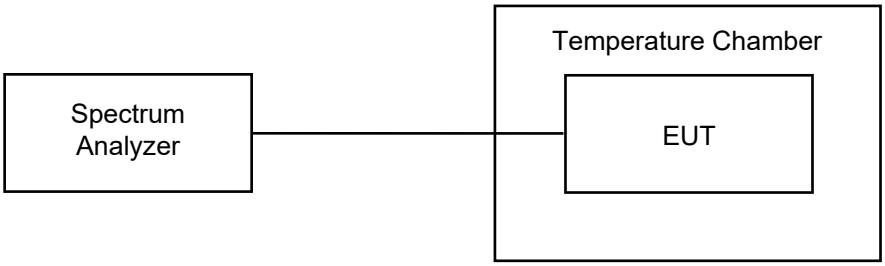
1. The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. The path loss was compensated to the results for each measurement.
2. In the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions.

6.3. Test Result of Conducted Band Edge

Refer as Appendix D

7. Frequency Stability

7.1. Test Setup



7.2. Test Procedures

Frequency Stability under Temperature Variations:

The EUT under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a communication simulator. The EUT was placed inside the temperature chamber. Set the EUT 20℃ operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -30℃. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10℃ increased per stage until the highest temperature of +50℃ reached.

Frequency Stability under Voltage Variations:

Set chamber temperature to 20℃. Use a variable AC or DC power supply to power the EUT and set the voltage to rated voltage. Reduce the input voltage to specify extreme voltage variation (±15%) and endpoint, record the maximum frequency change.

7.3. Test Result of Frequency Stability

Refer as Appendix E

Appendix A. Test Result of RF Output Power

Frequency (MHz)	Modulation	SCS (kHz)	RB No.	RB offset	Conducted Power		ERP Power				ERP Limit (W)
					Port 1 (dBm)	Port 2 (dBm)	Port 1 (dBm)	Port 2 (dBm)	Port 1 (W)	Port 2 (W)	
757.5	QPSK	12.5	1	0	33.41	33.65	47.26	47.50	53.211	56.234	1000
		25	1	0	33.44	33.58	47.29	47.43	53.580	55.335	1000
		50	1	0	33.30	33.55	47.15	47.40	51.880	54.954	1000
	16QAM	12.5	1	0	33.31	33.64	47.16	47.49	52.000	56.105	1000
		25	1	0	33.31	33.55	47.16	47.40	52.000	54.954	1000
		50	1	0	33.24	33.54	47.09	47.39	51.168	54.828	1000
	64QAM	12.5	1	0	33.52	33.81	47.37	47.66	54.576	58.345	1000
		25	1	0	33.55	33.76	47.40	47.61	54.954	57.677	1000
		50	1	0	33.44	33.83	47.29	47.68	53.580	58.614	1000
	256QAM	12.5	1	0	33.62	33.79	47.47	47.64	55.847	58.076	1000
		25	1	0	33.58	33.79	47.43	47.64	55.335	58.076	1000
		50	1	0	33.59	33.83	47.44	47.68	55.463	58.614	1000
787.5	QPSK	12.5	1	0	33.21	33.44	47.06	47.29	50.816	53.580	1000
		25	1	0	33.22	33.47	47.07	47.32	50.933	53.951	1000
		50	1	0	33.20	33.34	47.05	47.19	50.699	52.360	1000
	16QAM	12.5	1	0	33.11	33.27	46.96	47.12	49.659	51.523	1000
		25	1	0	33.10	33.41	46.95	47.26	49.545	53.211	1000
		50	1	0	33.11	33.27	46.96	47.12	49.659	51.523	1000
	64QAM	12.5	1	0	33.03	33.47	46.88	47.32	48.753	53.951	1000
		25	1	0	33.29	33.76	47.14	47.61	51.761	57.677	1000
		50	1	0	33.16	33.59	47.01	47.44	50.234	55.463	1000
	256QAM	12.5	1	0	33.04	33.59	46.89	47.44	48.865	55.463	1000
		25	1	0	33.37	33.76	47.22	47.61	52.723	57.677	1000
		50	1	0	33.18	33.53	47.03	47.38	50.466	54.702	1000

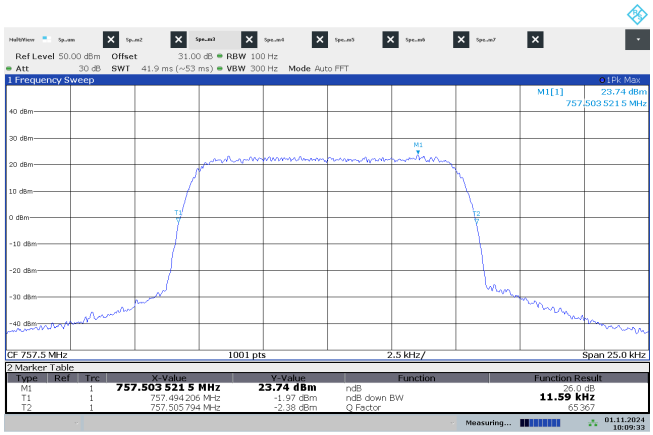
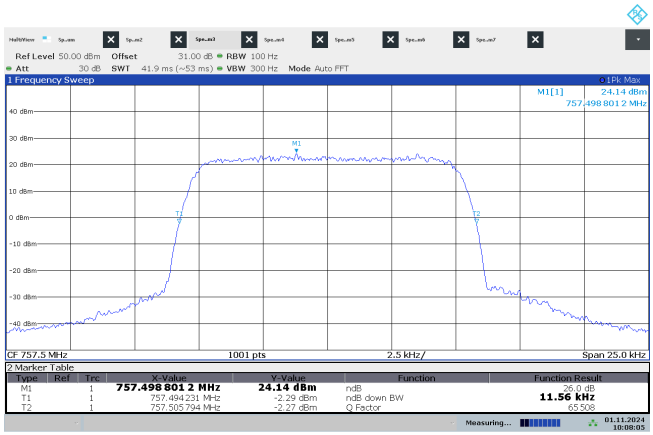
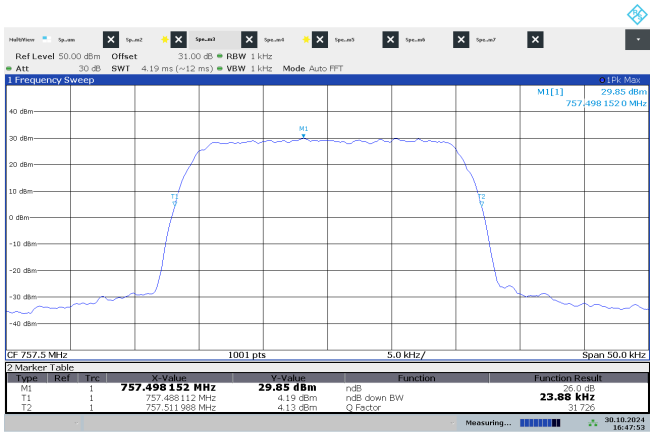
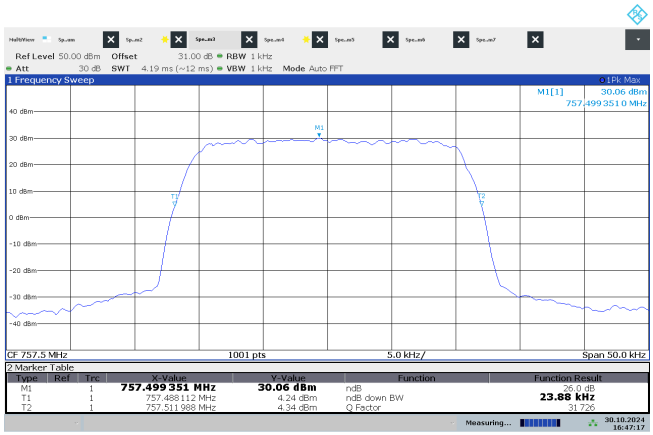
Note:

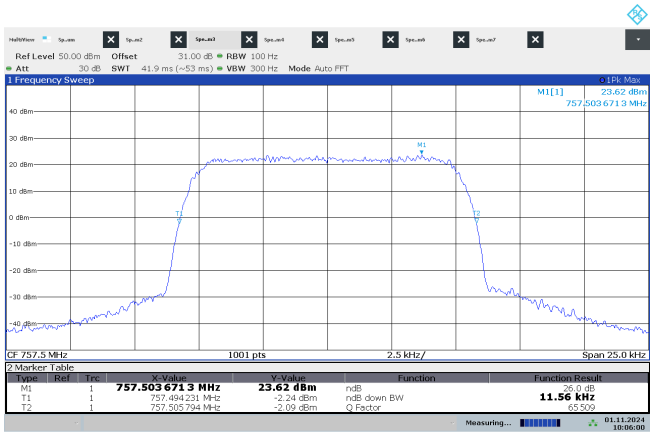
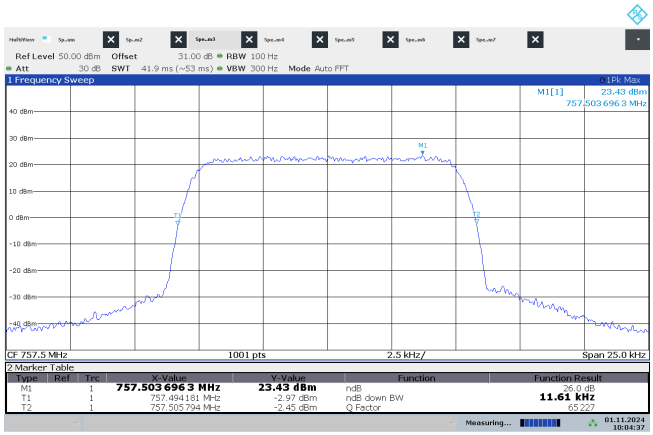
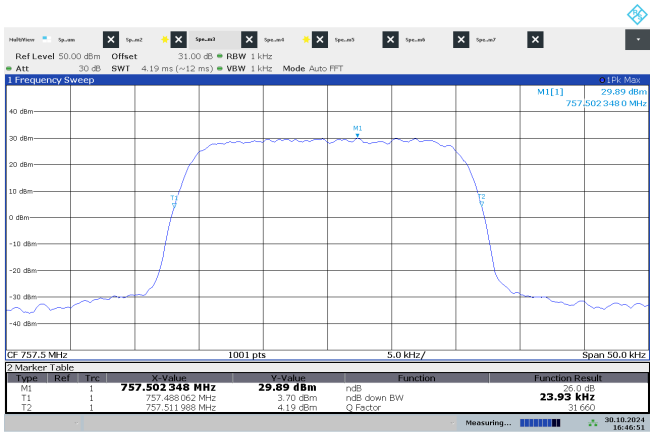
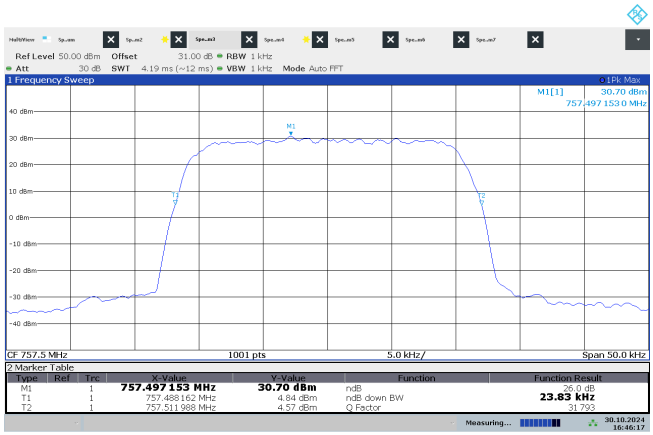
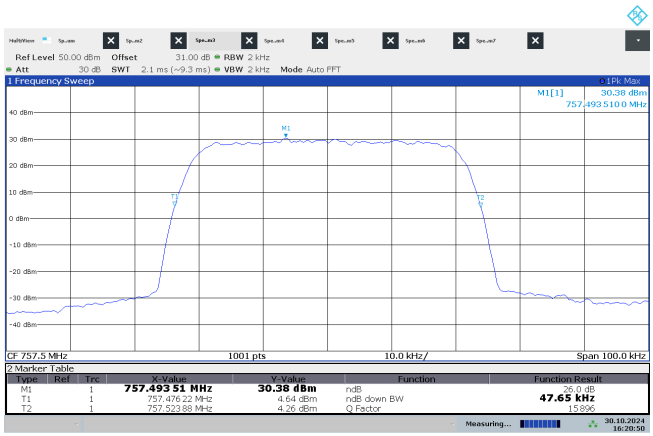
1. ERP (W) = Conducted Output Power (dBm) + Antenna Gain (dBi) - 2.15
2. ERP (W) = $(10^{(Power(dBm)/10)})*10^{-3}$

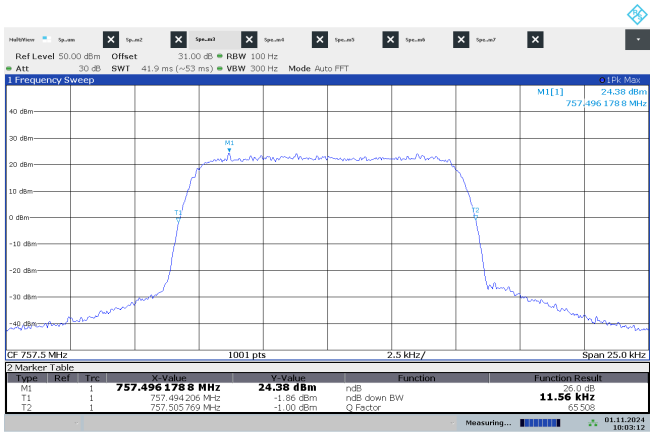
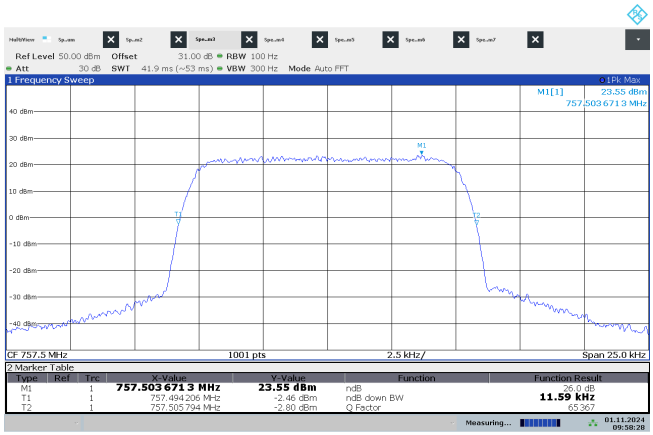
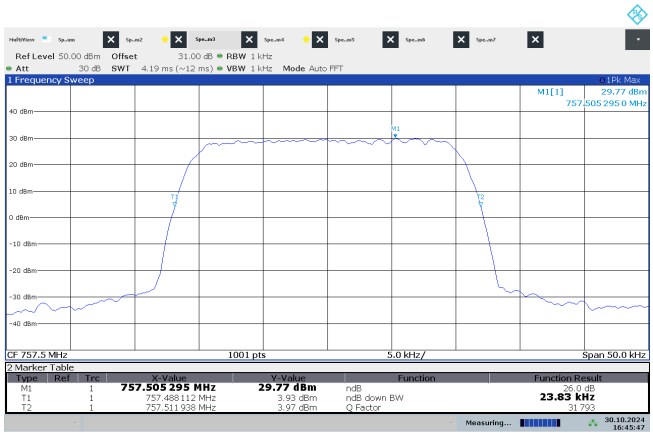
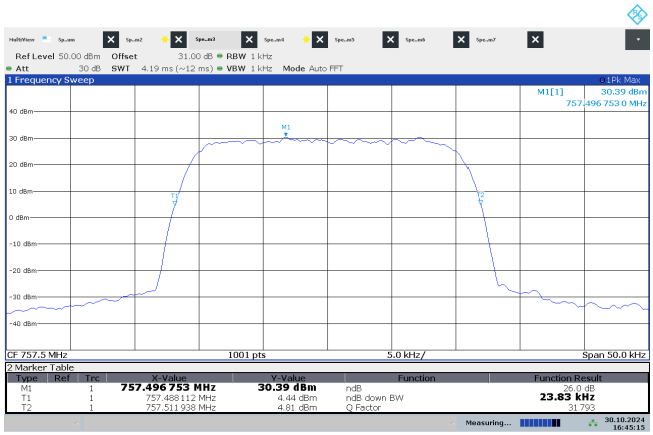
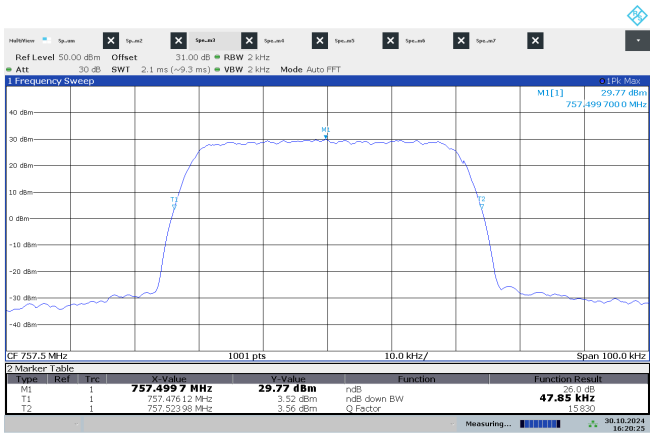
Appendix B. Test Result of Occupied Bandwidth

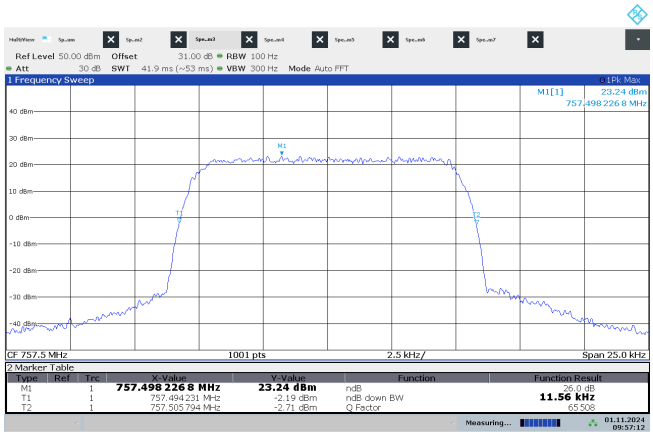
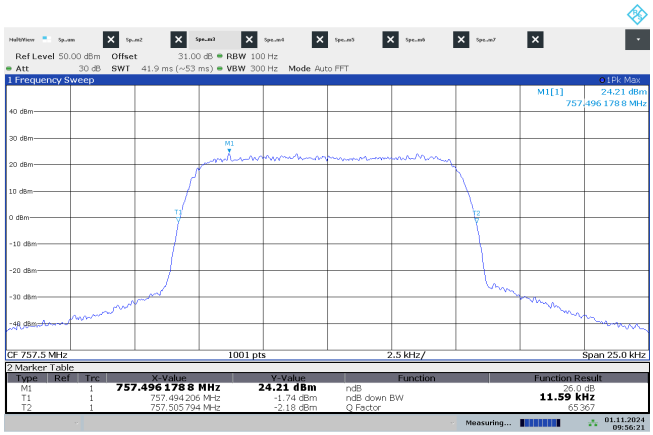
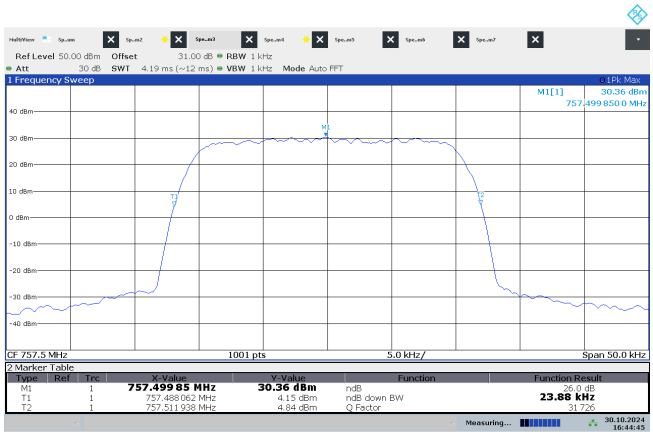
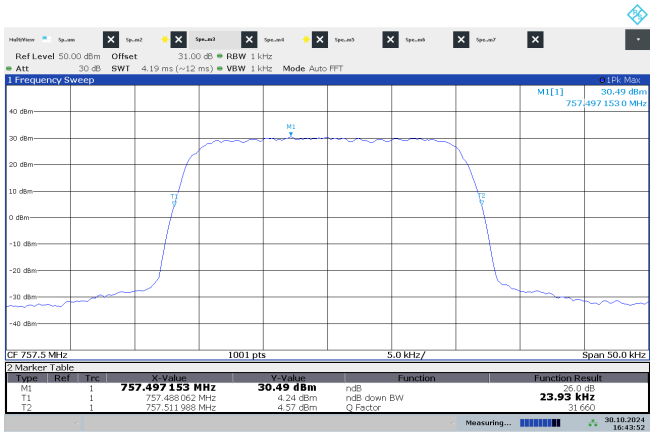
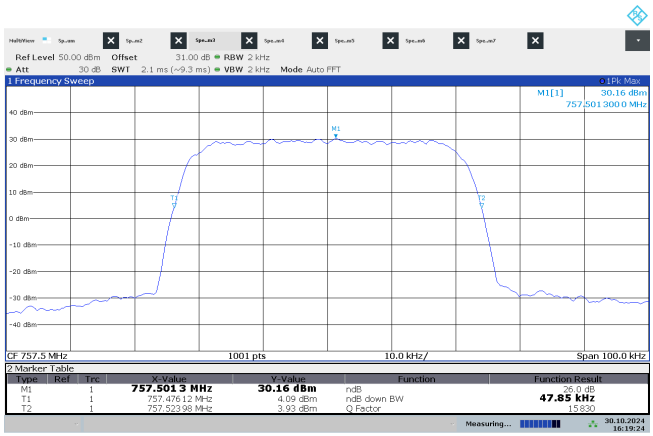
Frequency (MHz)	Modulation	Bandwidth (kHz)	Measure Level (kHz)				Limit (MHz)
			26dB BW		99% BW		
			Port 1	Port 2	Port 1	Port 2	
757.5	QPSK	12.5	11.590	11.560	10.287	10.289	NA
		25	23.880	23.880	20.944	20.878	NA
		50	47.750	47.750	41.810	42.001	NA
	16QAM	12.5	11.560	11.610	10.297	10.267	NA
		25	23.930	23.830	21.089	21.008	NA
		50	47.650	47.650	42.366	42.133	NA
	64QAM	12.5	11.560	11.590	10.322	10.290	NA
		25	23.830	23.830	20.932	20.006	NA
		50	47.850	47.650	41.882	41.825	NA
	256QAM	12.5	11.560	11.590	10.305	10.291	NA
		25	23.880	23.930	20.855	20.939	NA
		50	47.850	47.750	42.131	42.184	NA
787.5	QPSK	12.5	11.510	11.560	10.293	10.312	NA
		25	23.880	23.880	20.875	21.033	NA
		50	47.950	47.750	41.967	41.895	NA
	16QAM	12.5	11.560	11.560	10.288	10.310	NA
		25	23.830	23.780	21.018	21.046	NA
		50	47.850	47.850	42.274	41.921	NA
	64QAM	12.5	11.590	11.560	10.275	10.304	NA
		25	23.880	23.880	21.134	20.922	NA
		50	47.850	47.550	41.715	41.864	NA
	256QAM	12.5	11.590	11.510	10.288	10.286	NA
		25	23.930	23.930	21.027	20.895	NA
		50	47.550	47.750	41.816	41.744	NA

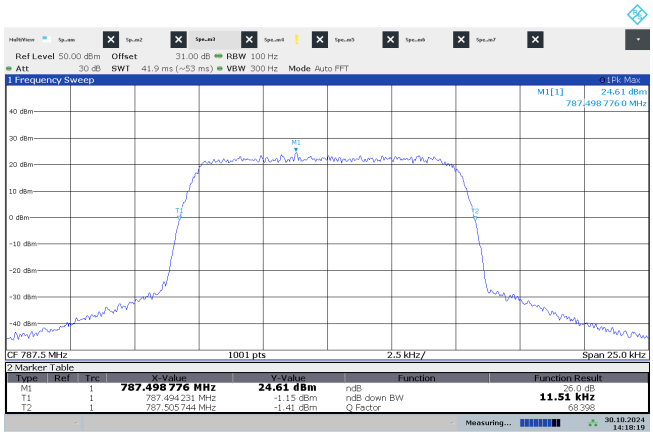
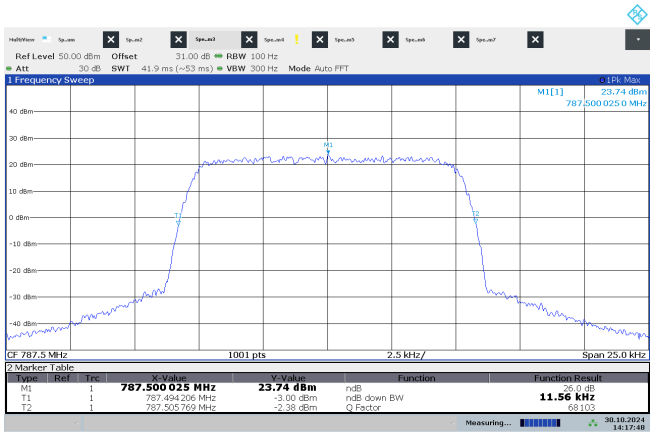
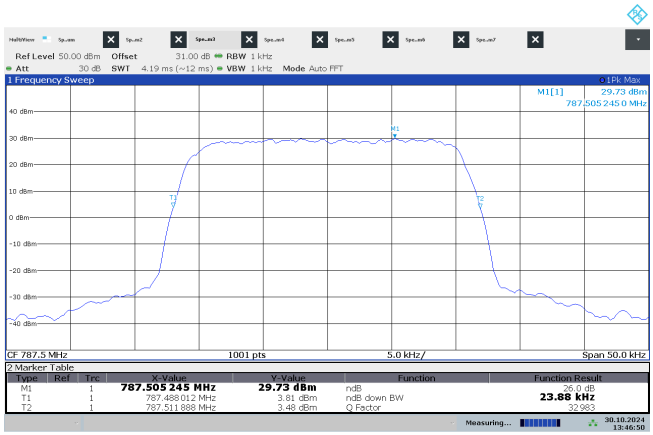
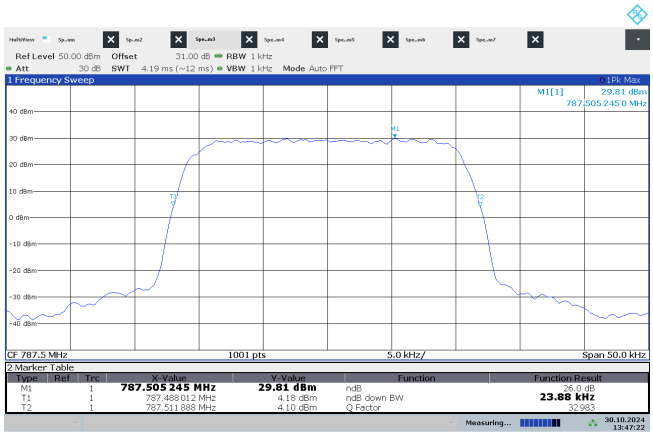
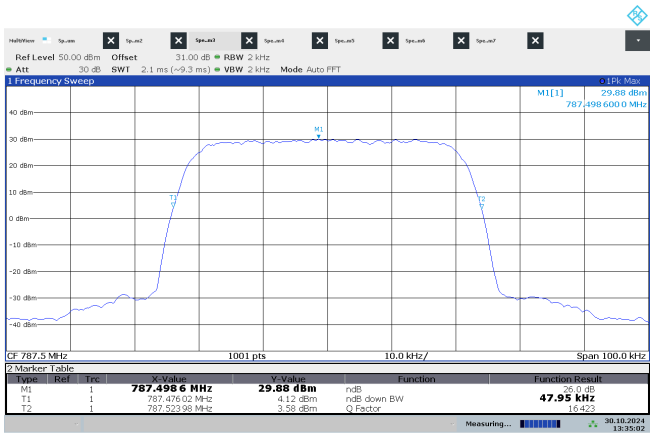
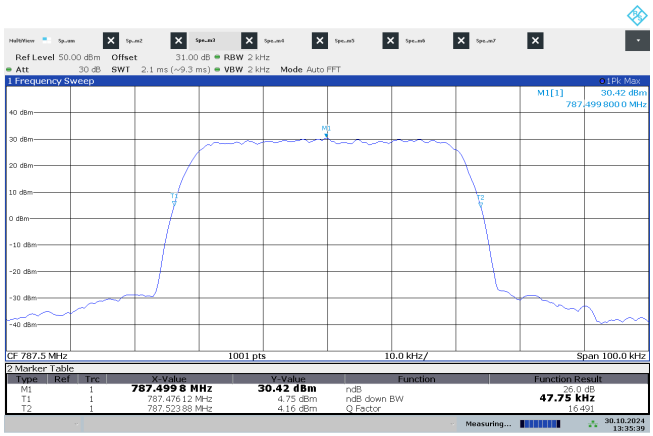
For 26dB bandwidth:

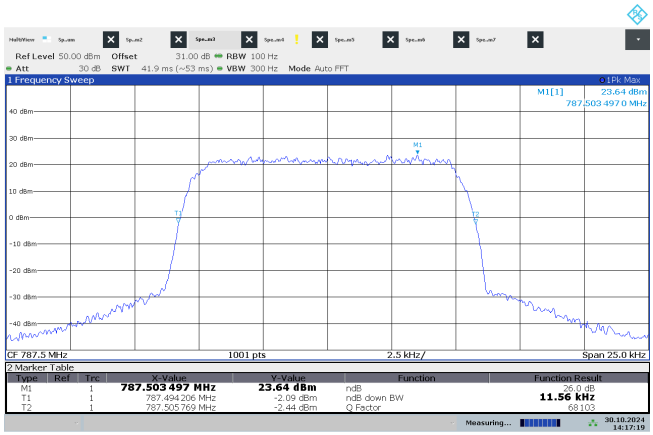
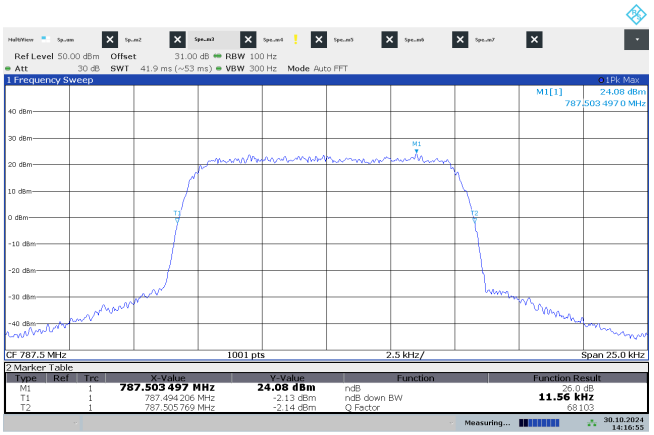
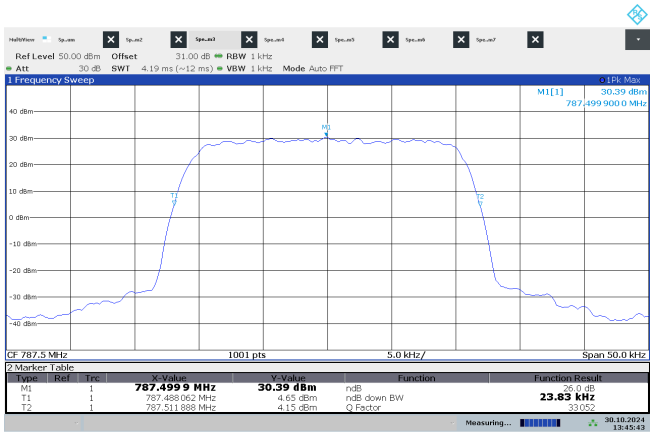
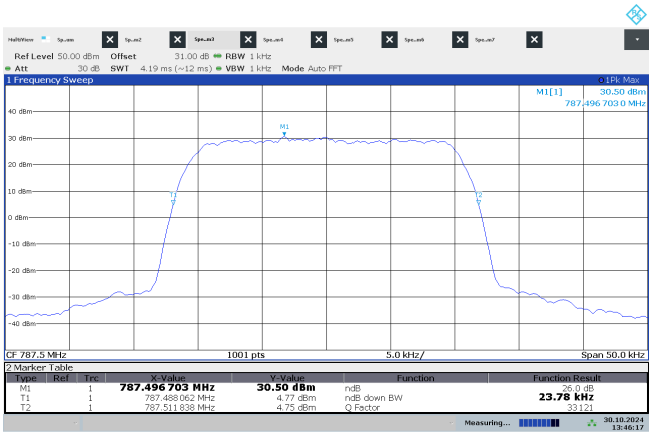
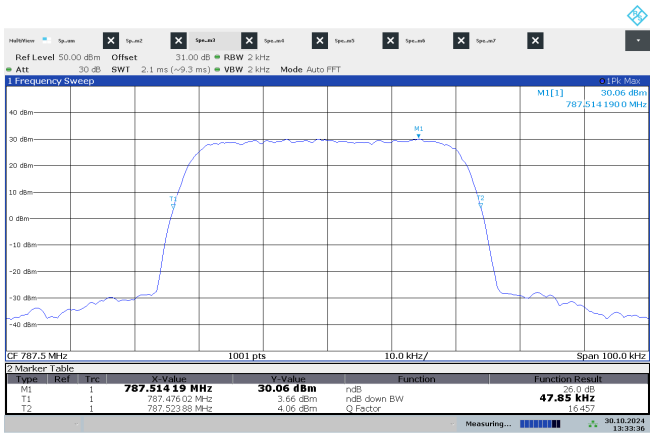
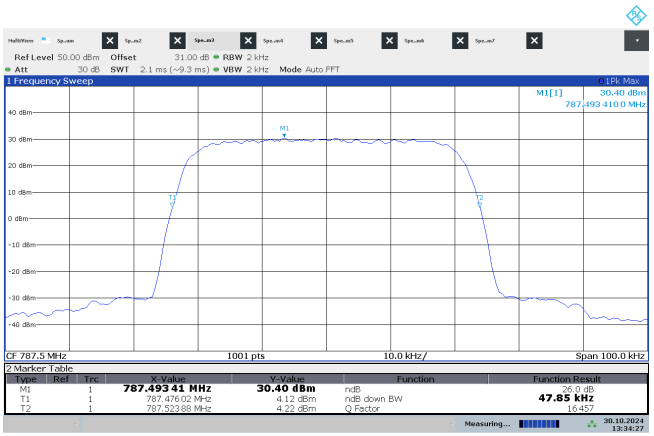
757.5 MHz_QPSK_12.5k_Port 1	757.5 MHz_QPSK_12.5k_Port 2
	
757.5 MHz_QPSK_25k_Port 1	757.5 MHz_QPSK_25k_Port 2
	
757.5 MHz_QPSK_50k_Port 1	757.5 MHz_QPSK_50k_Port 2
	

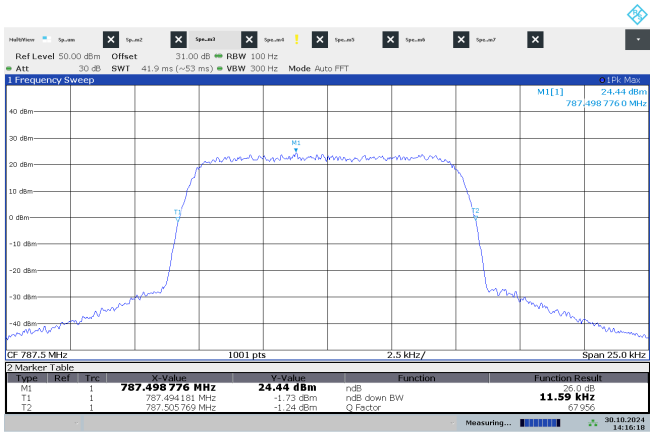
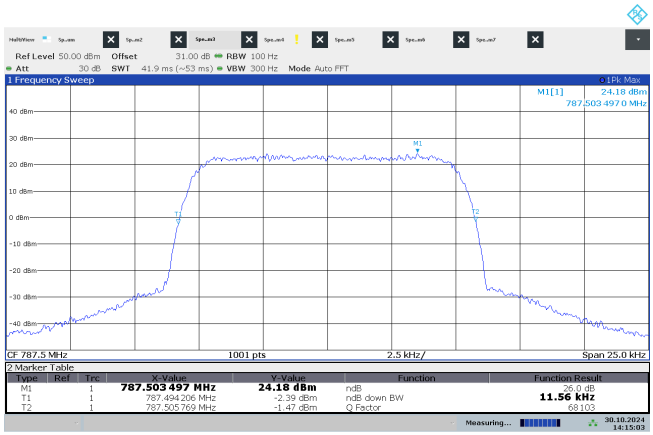
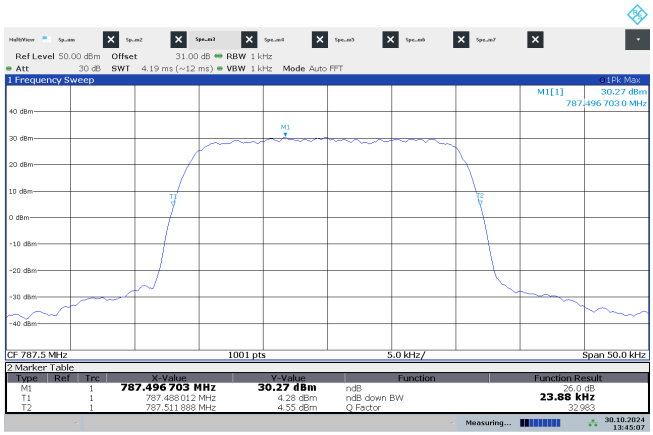
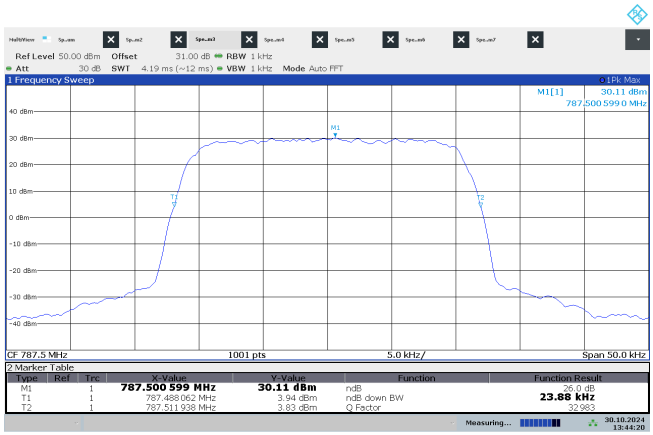
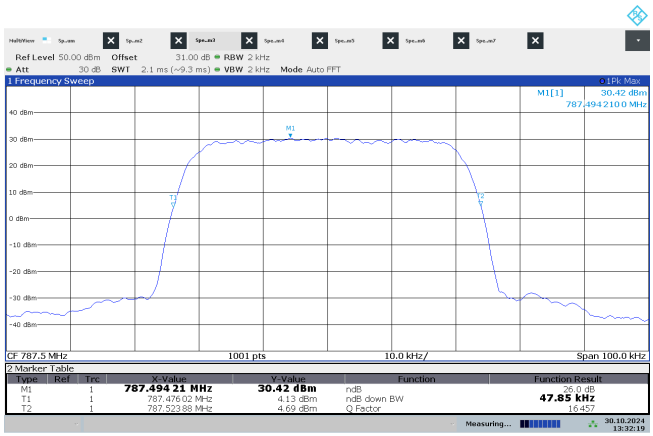
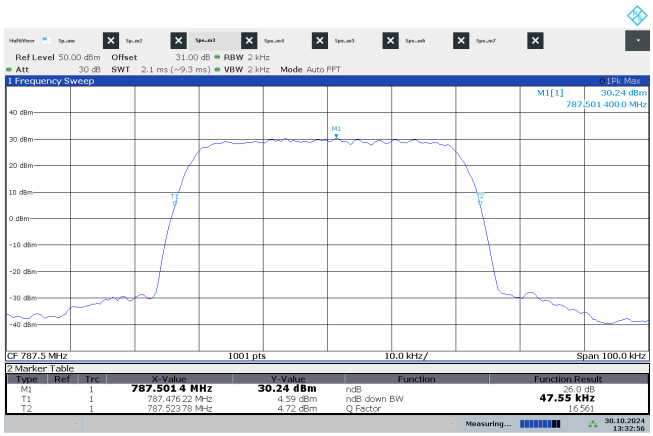
757.5 MHz_16QAM_12.5k_Port 1	757.5 MHz_16QAM_12.5k_Port 2
	
757.5 MHz_16QAM_25k_Port 1	757.5 MHz_16QAM_25k_Port 2
	
757.5 MHz_16QAM_50k_Port 1	757.5 MHz_16QAM_50k_Port 2
	

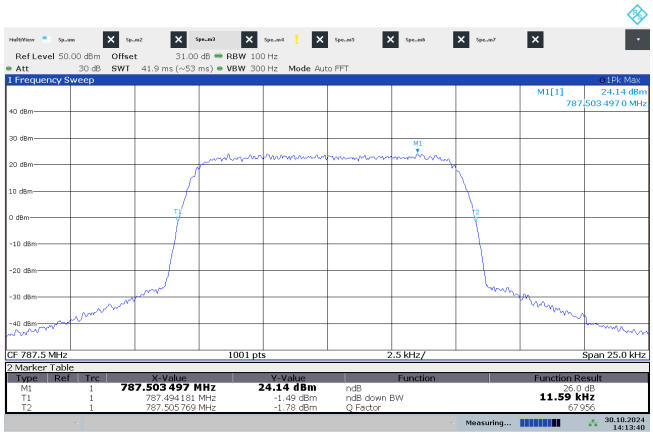
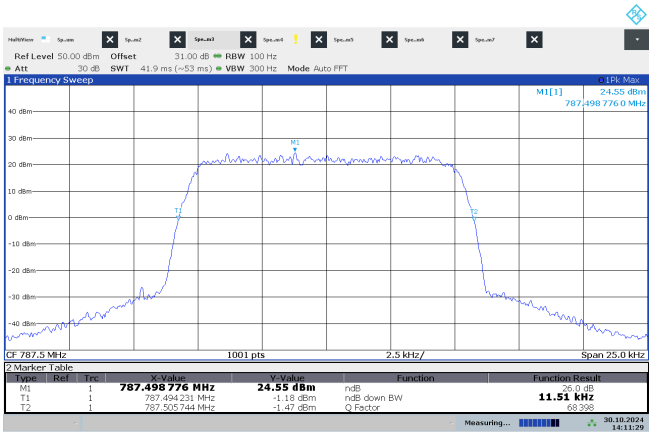
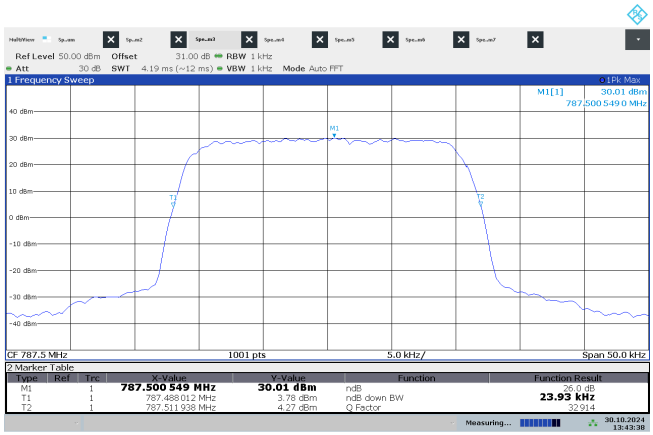
757.5 MHz_64QAM_12.5k_Port 1	757.5 MHz_64QAM_12.5k_Port 2
	
757.5 MHz_64QAM_25k_Port 1	757.5 MHz_64QAM_25k_Port 2
	
757.5 MHz_64QAM_50k_Port 1	757.5 MHz_64QAM_50k_Port 2
	

757.5 MHz_256QAM_12.5k_Port 1	757.5 MHz_256QAM_12.5k_Port 2
	
09:57:12 01.11.2024	09:56:22 01.11.2024
757.5 MHz_256QAM_25k_Port 1	**757.5 MHz_256QAM_25k_Port 2**
	
16:44:46 30.10.2024	16:43:53 30.10.2024
757.5 MHz_256QAM_50k_Port 1	**757.5 MHz_256QAM_50k_Port 2**
	
16:19:25 30.10.2024	16:18:47 30.10.2024

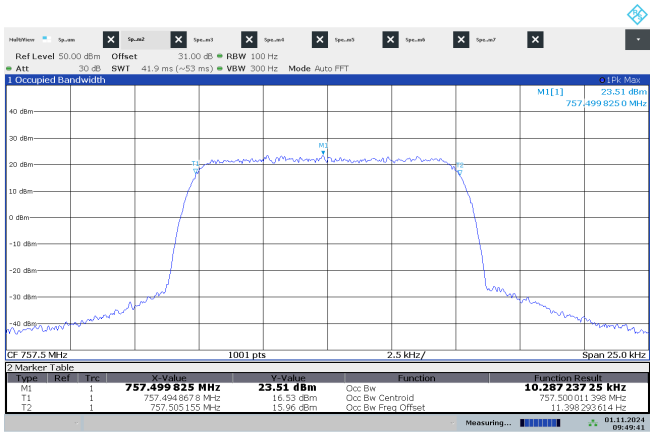
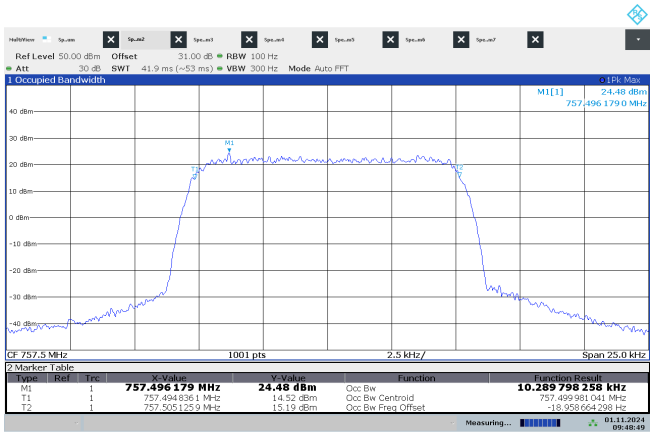
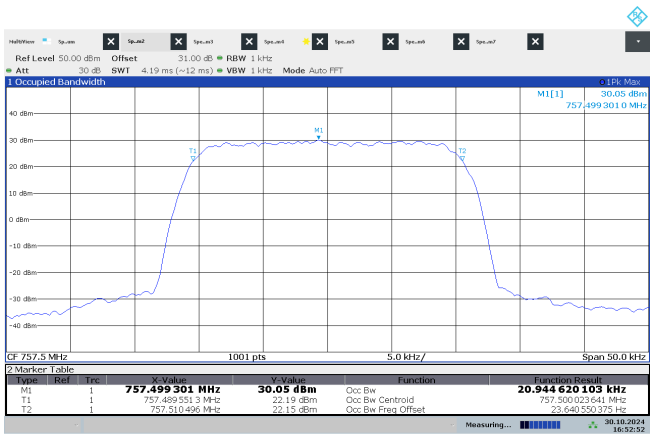
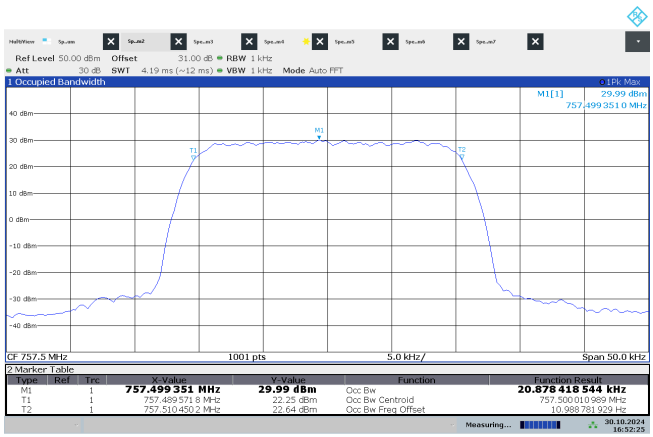
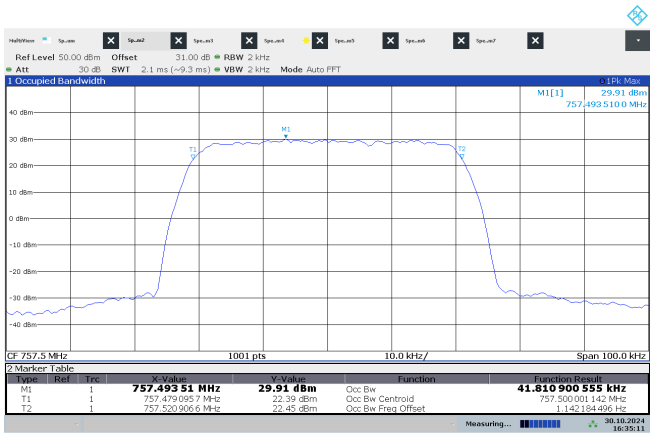
787.5 MHz_QPSK_12.5k_Port 1	787.5 MHz_QPSK_12.5k_Port 2
	
14:18:19 30.10.2024	14:17:49 30.10.2024
787.5 MHz_QPSK_25k_Port 1	**787.5 MHz_QPSK_25k_Port 2**
	
13:46:51 30.10.2024	13:47:23 30.10.2024
787.5 MHz_QPSK_50k_Port 1	**787.5 MHz_QPSK_50k_Port 2**
	
13:35:03 30.10.2024	13:35:40 30.10.2024

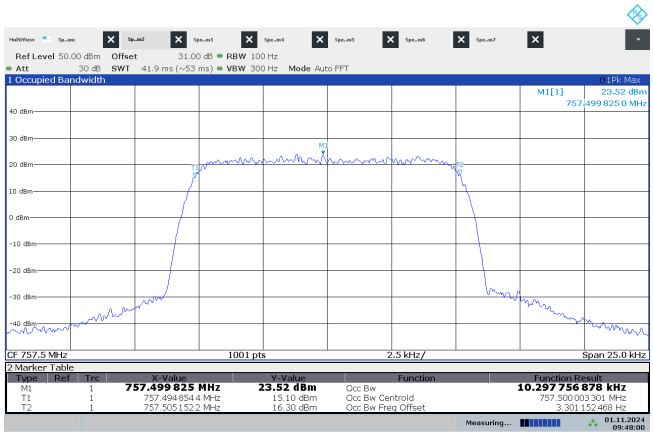
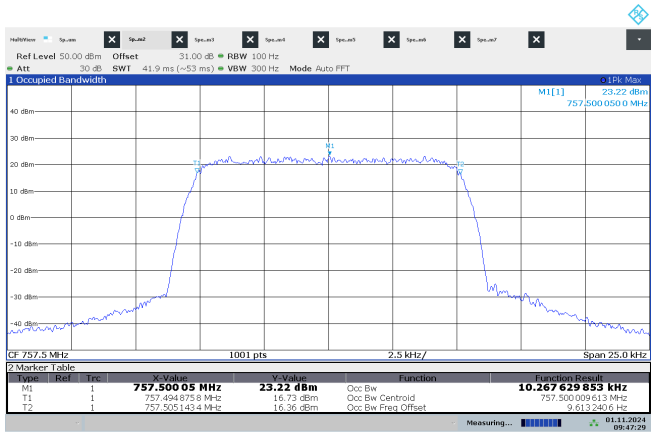
787.5 MHz_16QAM_12.5k_Port 1	787.5 MHz_16QAM_12.5k_Port 2
 14:17:19 30.10.2024	 14:16:56 30.10.2024
787.5 MHz_16QAM_25k_Port 1	**787.5 MHz_16QAM_25k_Port 2**
 13:45:43 30.10.2024	 13:46:18 30.10.2024
787.5 MHz_16QAM_50k_Port 1	**787.5 MHz_16QAM_50k_Port 2**
 13:33:37 30.10.2024	 13:34:28 30.10.2024

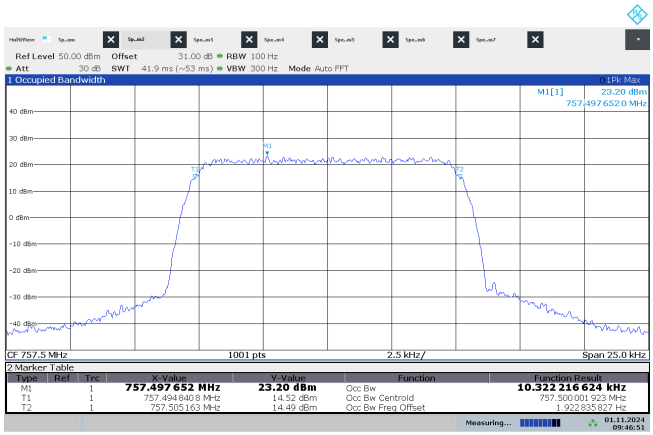
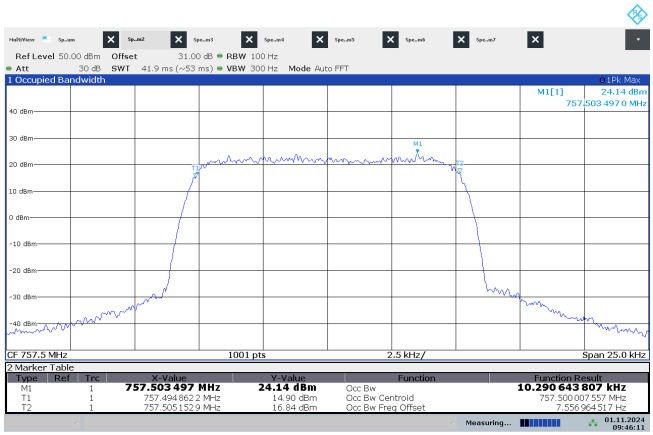
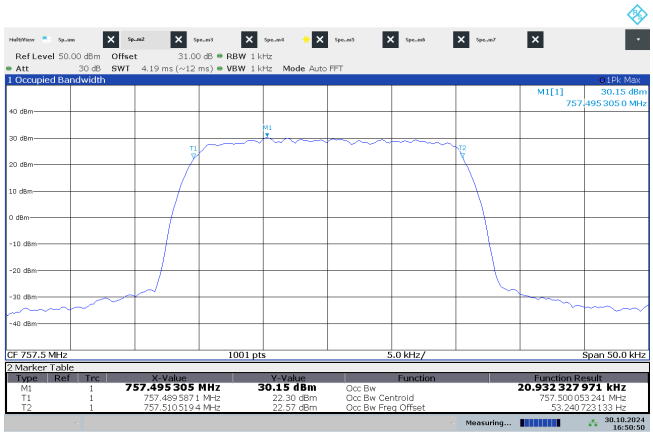
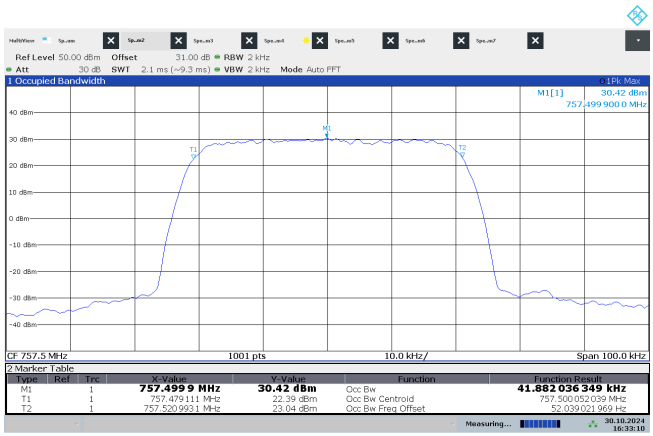
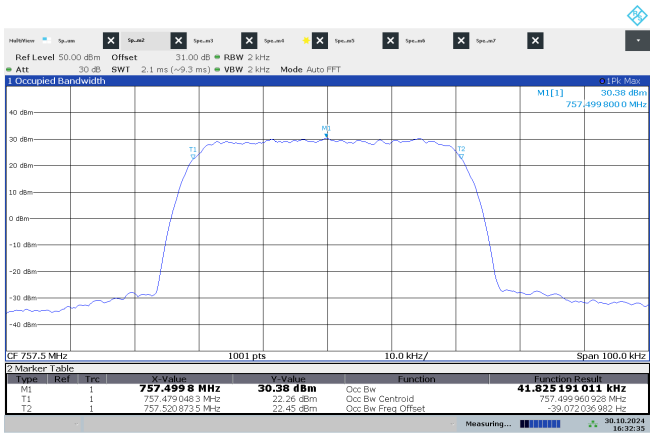
787.5 MHz_64QAM_12.5k_Port 1	787.5 MHz_64QAM_12.5k_Port 2
	
787.5 MHz_64QAM_25k_Port 1	787.5 MHz_64QAM_25k_Port 2
	
787.5 MHz_64QAM_50k_Port 1	787.5 MHz_64QAM_50k_Port 2
	

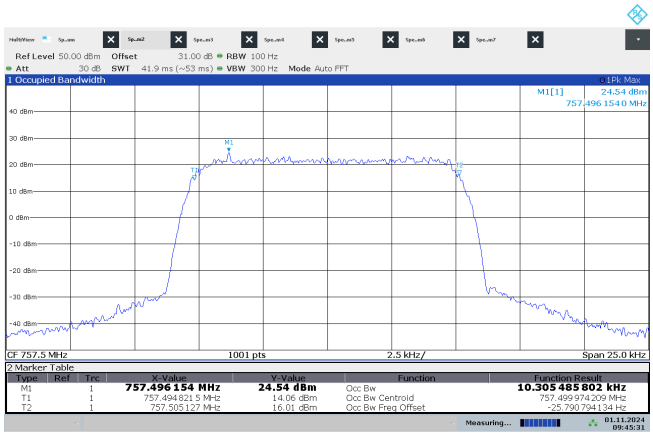
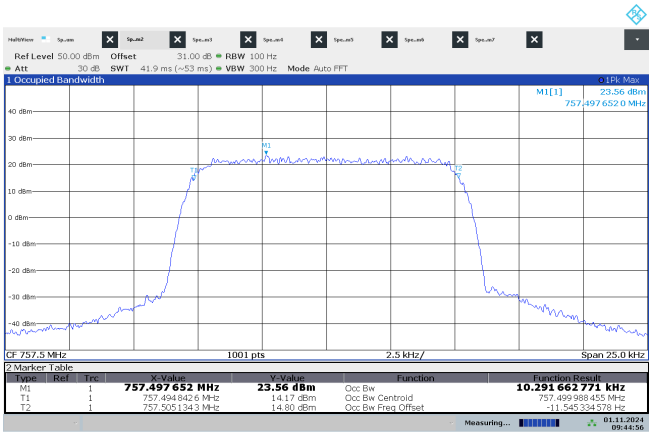
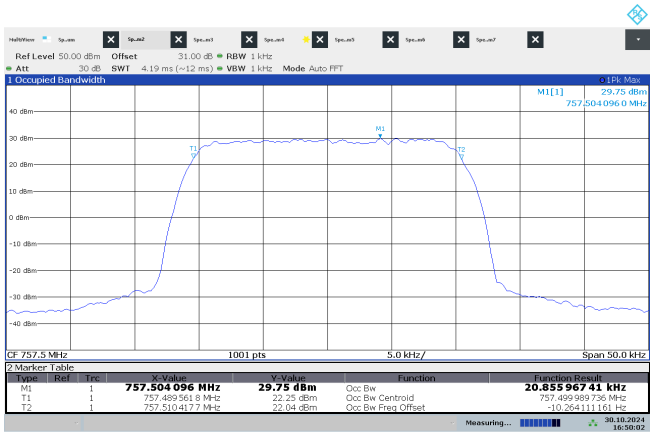
787.5 MHz_256QAM_12.5k_Port 1	787.5 MHz_256QAM_12.5k_Port 2
	
14:13:40 30.10.2024	14:11:29 30.10.2024
787.5 MHz_256QAM_25k_Port 1	**787.5 MHz_256QAM_25k_Port 2**
	
13:43:38 30.10.2024	13:42:51 30.10.2024
787.5 MHz_256QAM_50k_Port 1	**787.5 MHz_256QAM_50k_Port 2**
	
13:25:25 30.10.2024	13:24:42 30.10.2024

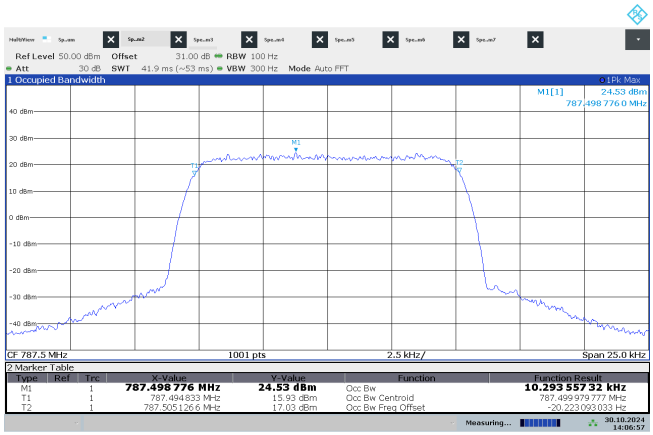
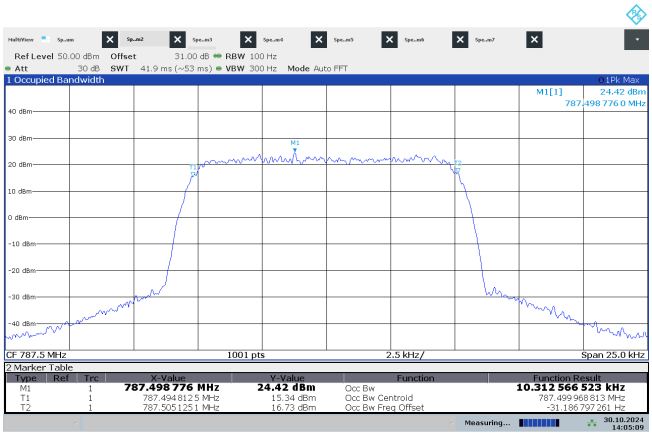
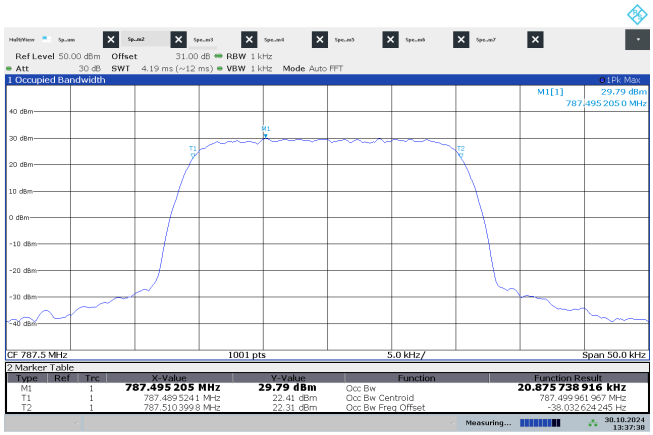
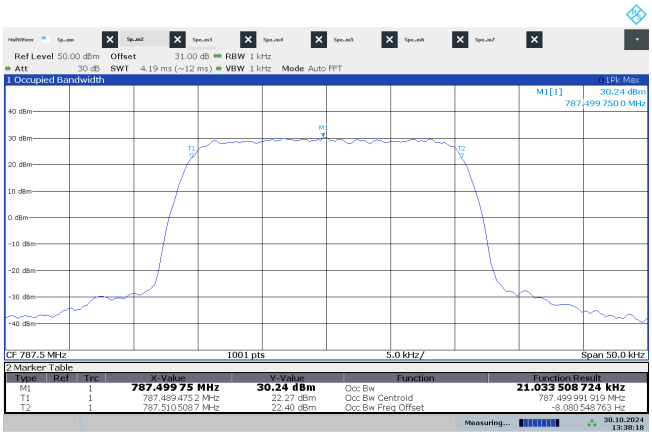
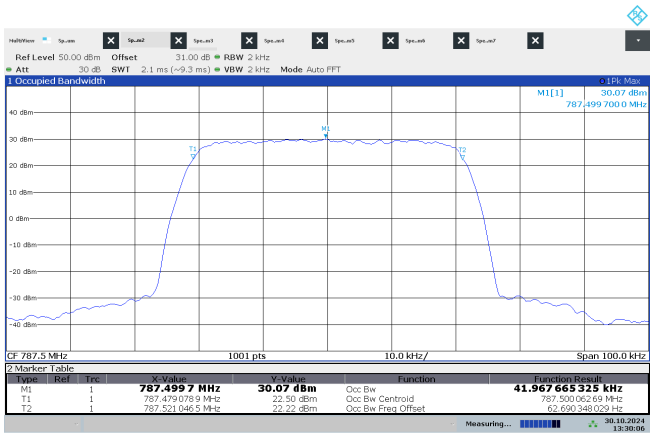
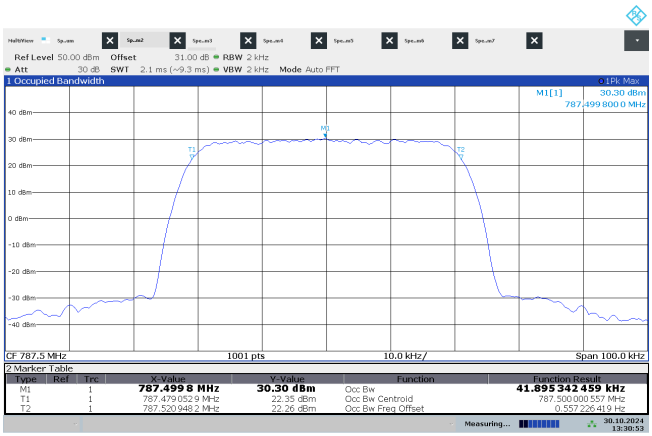
For 99% bandwidth:

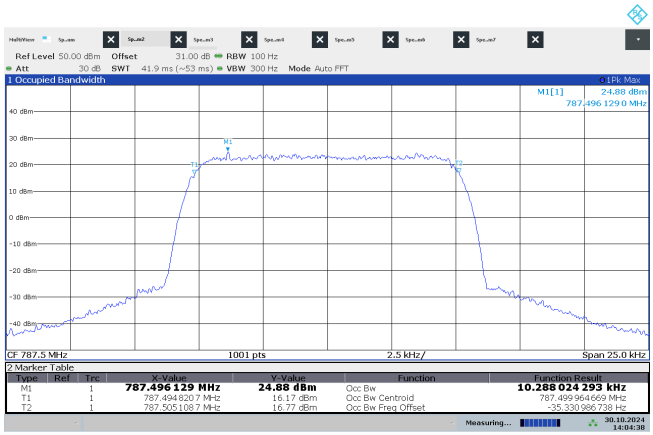
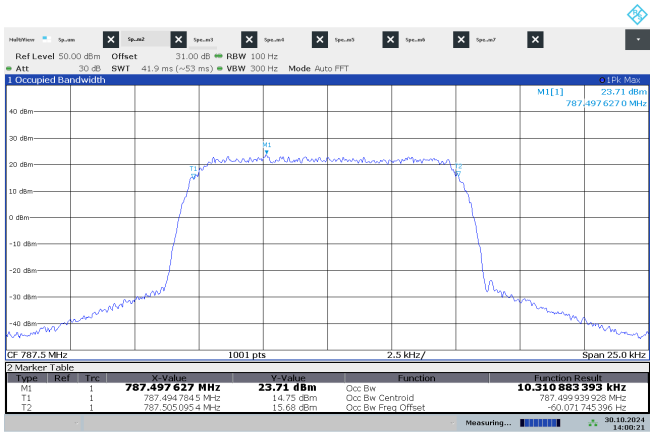
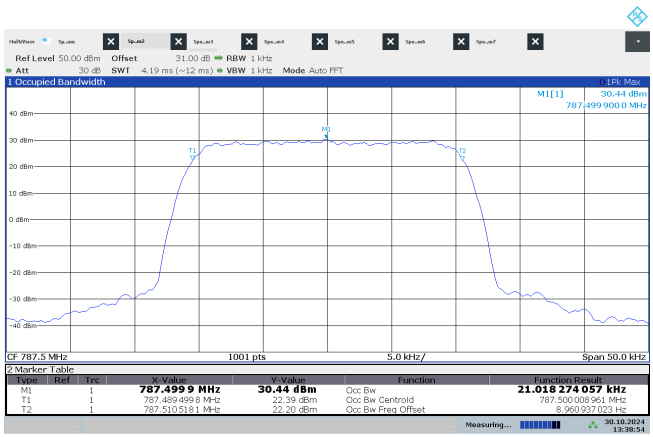
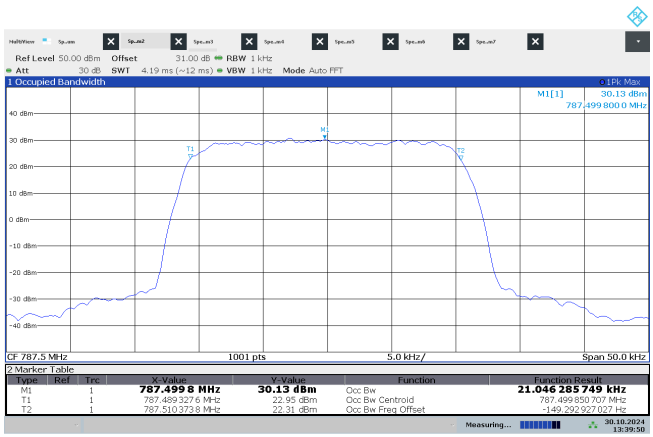
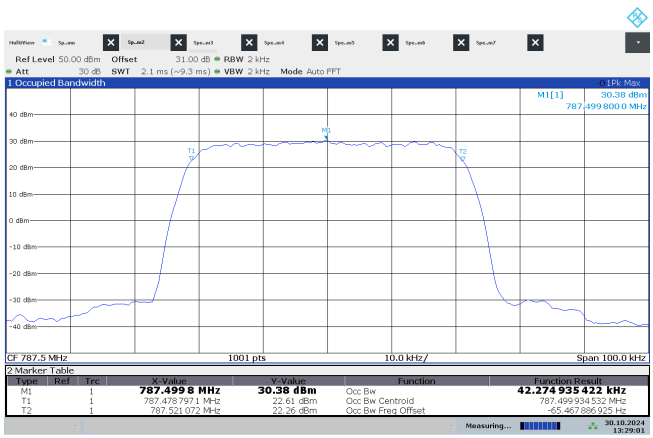
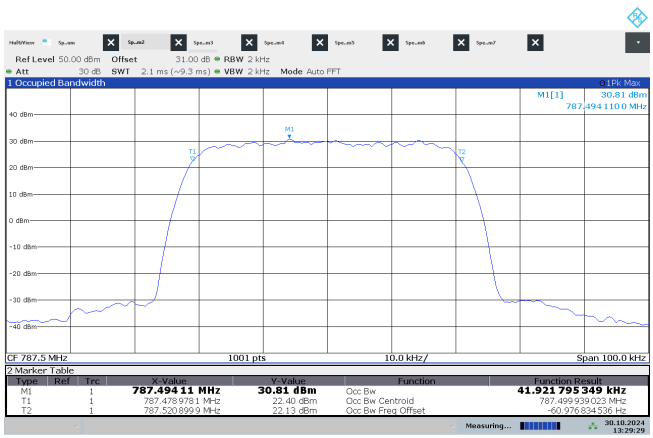
757.5 MHz_QPSK_12.5k_Port 1	757.5 MHz_QPSK_12.5k_Port 2
 09:49:42 01.11.2024	 09:48:49 01.11.2024
757.5 MHz_QPSK_25k_Port 1	757.5 MHz_QPSK_25k_Port 2
 16:52:53 30.10.2024	 16:52:26 30.10.2024
757.5 MHz_QPSK_50k_Port 1	757.5 MHz_QPSK_50k_Port 2
 16:35:11 30.10.2024	 16:34:47 30.10.2024

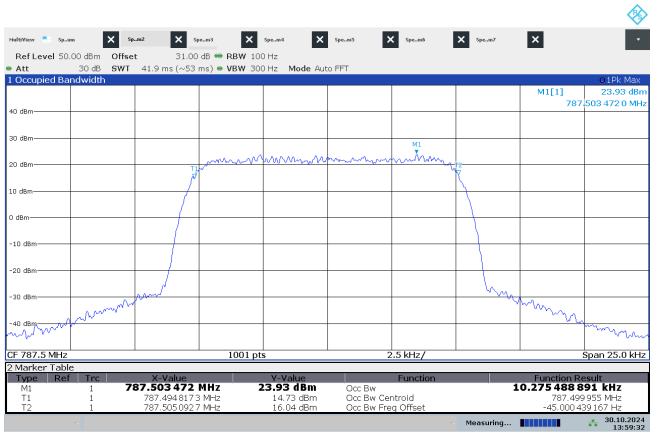
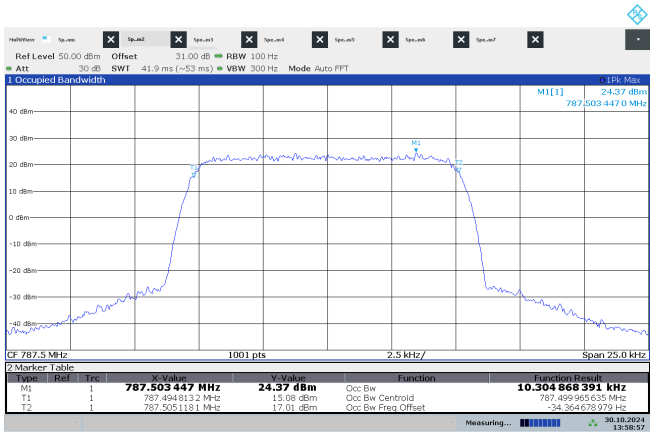
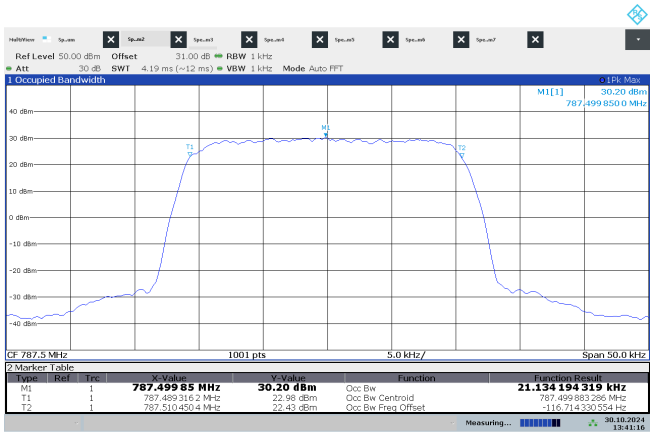
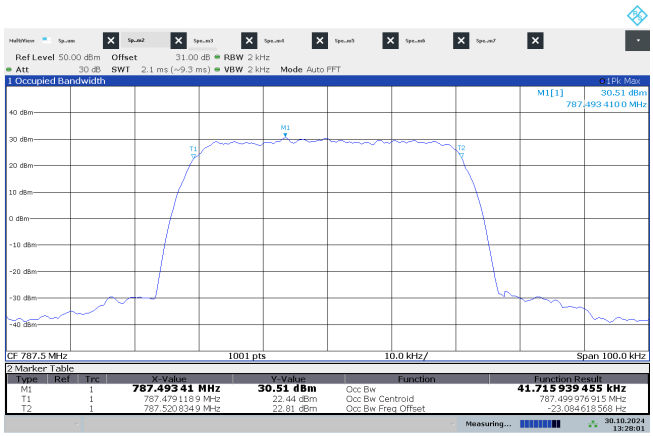
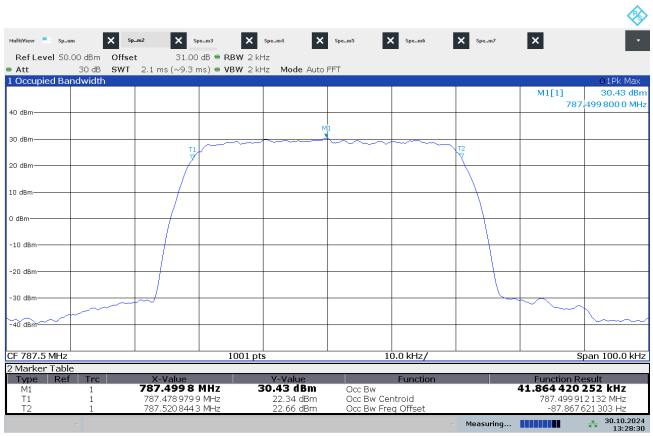
757.5 MHz_16QAM_12.5k_Port 1	757.5 MHz_16QAM_12.5k_Port 2
	
757.5 MHz_16QAM_25k_Port 1	757.5 MHz_16QAM_25k_Port 2
	
757.5 MHz_16QAM_50k_Port 1	757.5 MHz_16QAM_50k_Port 2
	

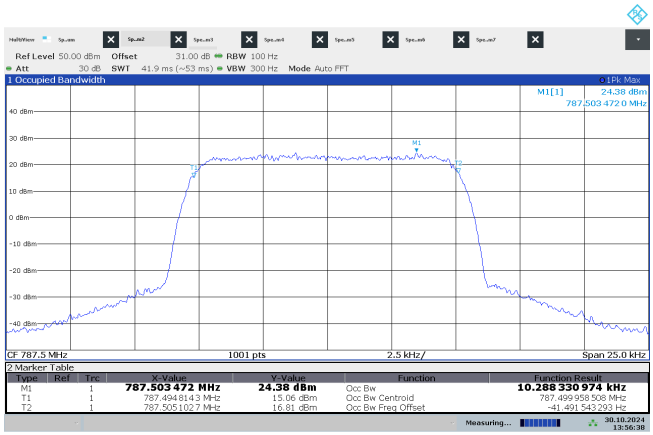
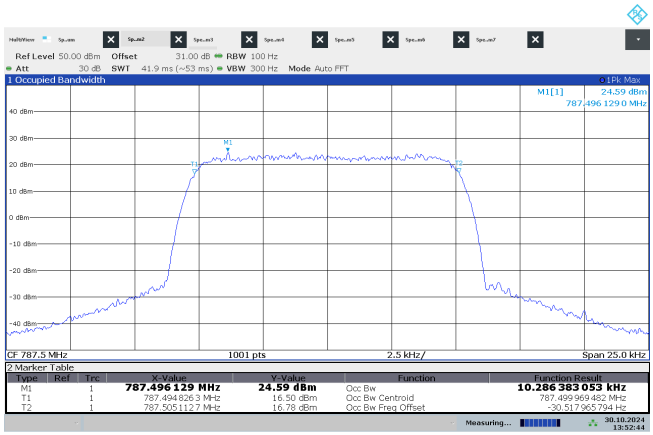
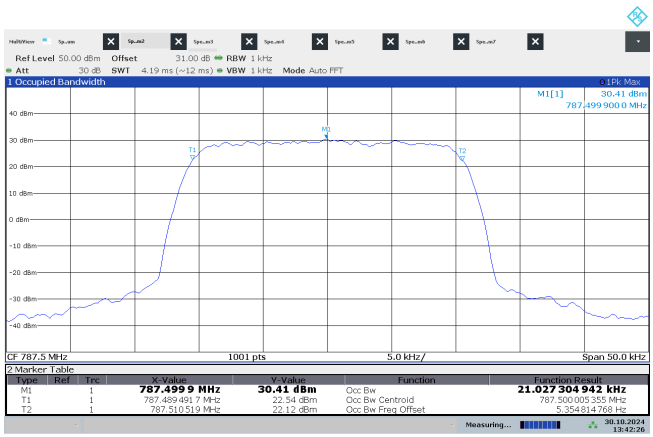
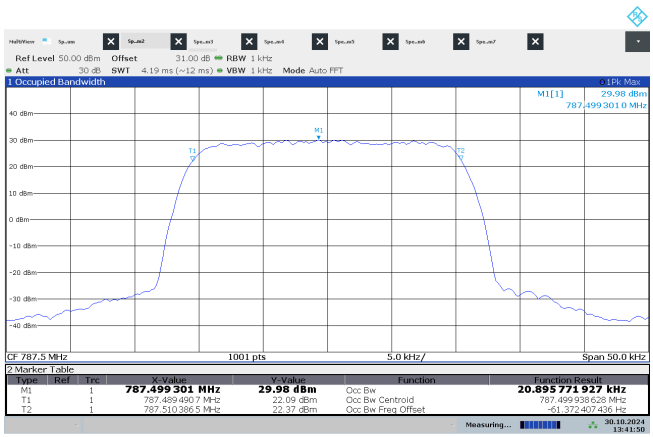
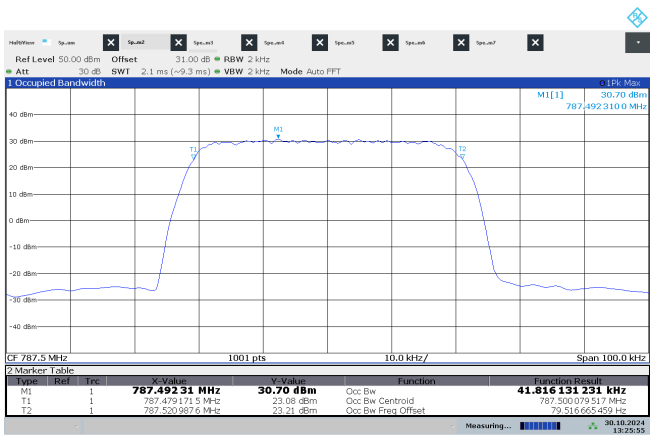
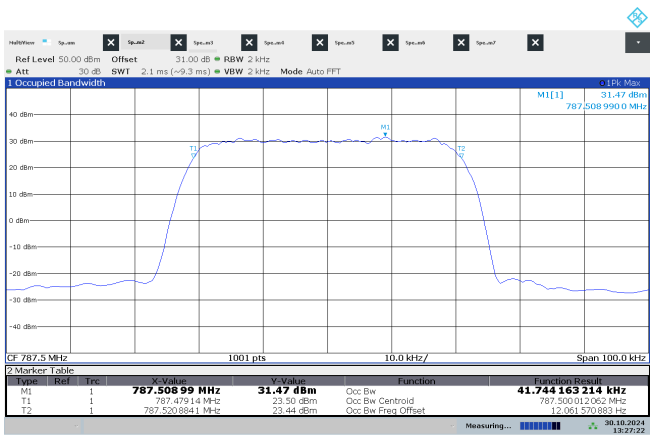
757.5 MHz_64QAM_12.5k_Port 1	757.5 MHz_64QAM_12.5k_Port 2
	
757.5 MHz_64QAM_25k_Port 1	757.5 MHz_64QAM_25k_Port 2
	
757.5 MHz_64QAM_50k_Port 1	757.5 MHz_64QAM_50k_Port 2
	

757.5 MHz_256QAM_12.5k_Port 1	757.5 MHz_256QAM_12.5k_Port 2
 09:45:31 01.11.2024	 09:44:56 01.11.2024
757.5 MHz_256QAM_25k_Port 1	757.5 MHz_256QAM_25k_Port 2
 16:50:03 30.10.2024	 16:49:30 30.10.2024
757.5 MHz_256QAM_50k_Port 1	757.5 MHz_256QAM_50k_Port 2
 16:32:03 30.10.2024	 16:31:29 30.10.2024

787.5 MHz_QPSK_12.5k_Port 1	787.5 MHz_QPSK_12.5k_Port 2
	
787.5 MHz_QPSK_25k_Port 1	787.5 MHz_QPSK_25k_Port 2
	
787.5 MHz_QPSK_50k_Port 1	787.5 MHz_QPSK_50k_Port 2
	

787.5 MHz_16QAM_12.5k_Port 1	787.5 MHz_16QAM_12.5k_Port 2
	
787.5 MHz_16QAM_25k_Port 1	787.5 MHz_16QAM_25k_Port 2
	
787.5 MHz_16QAM_50k_Port 1	787.5 MHz_16QAM_50k_Port 2
	

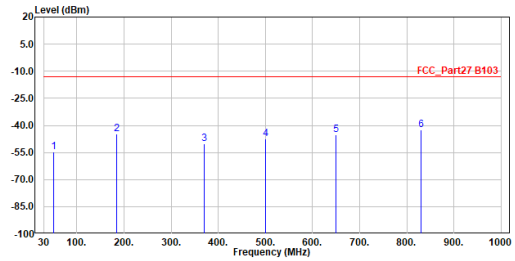
787.5 MHz_64QAM_12.5k_Port 1	787.5 MHz_64QAM_12.5k_Port 2
	
787.5 MHz_64QAM_25k_Port 1	787.5 MHz_64QAM_25k_Port 2
	
787.5 MHz_64QAM_50k_Port 1	787.5 MHz_64QAM_50k_Port 2
	

787.5 MHz_256QAM_12.5k_Port 1	787.5 MHz_256QAM_12.5k_Port 2
	
787.5 MHz_256QAM_25k_Port 1	787.5 MHz_256QAM_25k_Port 2
	
787.5 MHz_256QAM_50k_Port 1	787.5 MHz_256QAM_50k_Port 2
	

Appendix C. Test Result of Radiated Spurious Emission

30 MHz ~ 1 GHz:

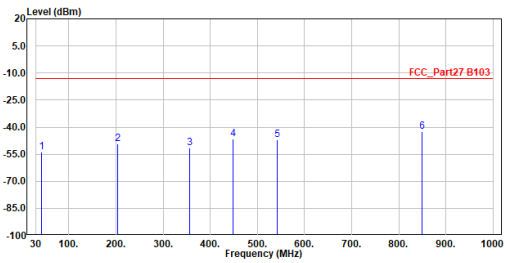
Site :HC-CB02
Condition :3m Horizontal
Mode :LF_LTE_B103_757.5MHz
Test by :Scott Chang



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	51.146	-54.57	-13.00	-41.57	-66.65	12.08	Peak
2	183.454	-44.72	-13.00	-31.72	-54.54	9.82	Peak
3	370.470	-50.18	-13.00	-37.18	-64.19	14.01	Peak
4	499.480	-47.28	-13.00	-34.28	-64.43	17.15	Peak
5	649.345	-45.16	-13.00	-32.16	-65.57	20.41	Peak
6	829.862	-42.35	-13.00	-29.35	-65.24	22.89	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Convert E (dBuVm) to EIRP (dBm)
= 107 + 20log(3) - 104.8 = 11.8 dB
5. The other emission levels were very low against the limit.
6. The emission under 1GHz was not included since the emission levels are very low against the limit.

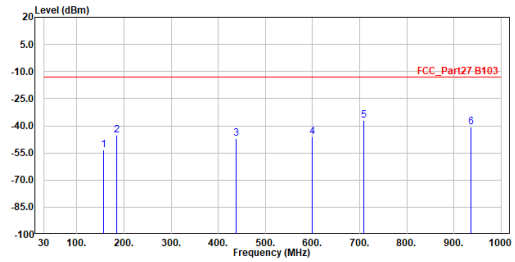
Site :HC-CB02
Condition :3m Vertical
Mode :LF_LTE_B103_757.5MHz
Test by :Scott Chang



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	41.640	-53.81	-13.00	-40.81	-66.15	12.34	Peak
2	203.727	-49.43	-13.00	-36.43	-57.63	8.20	Peak
3	355.823	-51.53	-13.00	-38.53	-65.00	13.47	Peak
4	448.458	-46.49	-13.00	-33.49	-62.71	16.22	Peak
5	542.257	-46.80	-13.00	-33.80	-64.78	17.98	Peak
6	850.038	-42.33	-13.00	-29.33	-65.30	22.97	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Convert E (dBuVm) to EIRP (dBm)
= 107 + 20log(3) - 104.8 = 11.8 dB
5. The other emission levels were very low against the limit.
6. The emission under 1GHz was not included since the emission levels are very low against the limit.

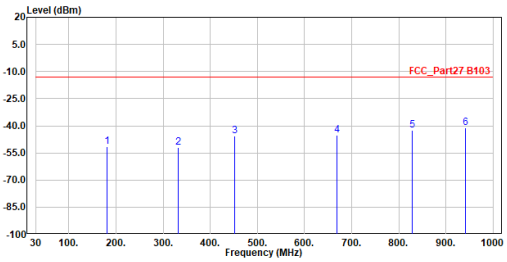
Site :HC-CB02
Condition :3m Horizontal
Mode :LF_LTE_B103_787.5MHz
Test by :Scott Chang



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	156.682	-53.40	-13.00	-40.40	-65.18	11.78	Peak
2	183.454	-45.23	-13.00	-32.23	-55.05	9.82	Peak
3	438.370	-46.81	-13.00	-33.81	-62.79	15.98	Peak
4	599.681	-45.93	-13.00	-32.93	-65.57	19.64	Peak
5	709.388	-36.89	-13.00	-23.89	-58.09	21.20	Peak
6	936.659	-40.84	-13.00	-27.84	-64.99	24.15	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Convert E (dBuVm) to EIRP (dBm)
= 107 + 20log(3) - 104.8 = 11.8 dB
5. The other emission levels were very low against the limit.
6. The emission under 1GHz was not included since the emission levels are very low against the limit.

Site :HC-CB02
Condition :3m Vertical
Mode :LF_LTE_B103_787.5MHz
Test by :Scott Chang

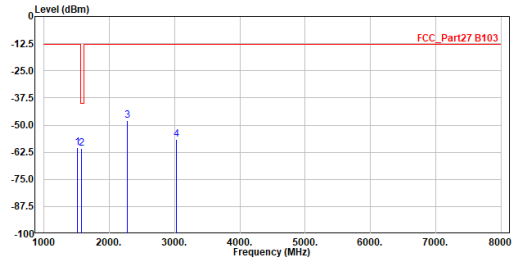


No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	180.447	-51.38	-13.00	-38.38	-61.60	10.22	Peak
2	331.282	-52.14	-13.00	-39.14	-65.23	13.09	Peak
3	451.756	-45.61	-13.00	-32.61	-61.94	16.33	Peak
4	669.036	-44.99	-13.00	-31.99	-65.44	20.45	Peak
5	827.922	-42.38	-13.00	-29.38	-65.20	22.82	Peak
6	940.636	-40.95	-13.00	-27.95	-65.20	24.25	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Convert E (dBuVm) to EIRP (dBm)
= 107 + 20log(3) - 104.8 = 11.8 dB
5. The other emission levels were very low against the limit.
6. The emission under 1GHz was not included since the emission levels are very low against the limit.

Above 1GHz:

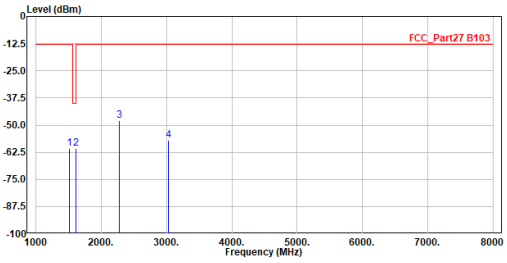
Site :HC-CB02
Condition :3m Horizontal
Mode :LTE_B103_757.5MHz
Test by :Scott Chang



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	1515.000	-60.53	-13.00	-47.53	-45.31	-15.22	Peak
2	1574.600	-60.79	-40.00	-20.79	-45.83	-14.96	Peak
3	2272.500	-48.02	-13.00	-35.02	-35.82	-12.20	Peak
4	3030.000	-56.46	-13.00	-43.46	-46.95	-9.51	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Convert E (dBuVm) to EIRP (dBm)
= 107 + 20log(3) - 104.8 = 11.8 dB
5. The other emission levels were very low against the limit.
6. The emission under 1GHz was not included since the emission levels are very low against the limit.

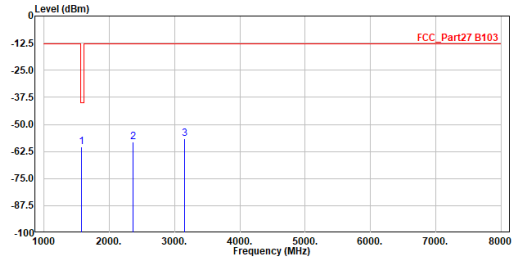
Site :HC-CB02
Condition :3m Vertical
Mode :LTE_B103_757.5MHz
Test by :Scott Chang



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	1515.000	-60.64	-13.00	-47.64	-45.42	-15.22	Peak
2	1606.900	-60.72	-40.00	-20.72	-45.90	-14.82	Peak
3	2272.500	-47.85	-13.00	-34.85	-35.65	-12.20	Peak
4	3030.000	-57.06	-13.00	-44.06	-47.55	-9.51	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Convert E (dBuVm) to EIRP (dBm)
= 107 + 20log(3) - 104.8 = 11.8 dB
5. The other emission levels were very low against the limit.
6. The emission under 1GHz was not included since the emission levels are very low against the limit.

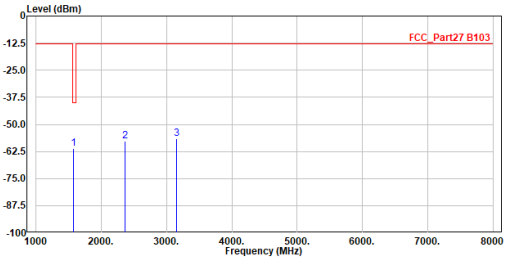
Site :HC-CB02
Condition :3m Horizontal
Mode :LTE_B103_787.5MHz
Test by :Scott Chang



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	1575.000	-60.28	-40.00	-20.28	-45.33	-14.95	Peak
2	2362.500	-58.21	-13.00	-45.21	-46.30	-11.91	Peak
3	3150.000	-56.49	-13.00	-43.49	-47.31	-9.18	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Convert E (dBuVm) to EIRP (dBm)
= 107 + 20log(3) - 104.8 = 11.8 dB
5. The other emission levels were very low against the limit.
6. The emission under 1GHz was not included since the emission levels are very low against the limit.

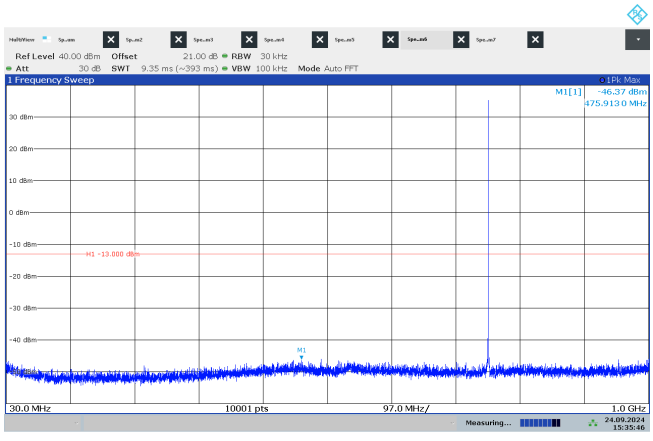
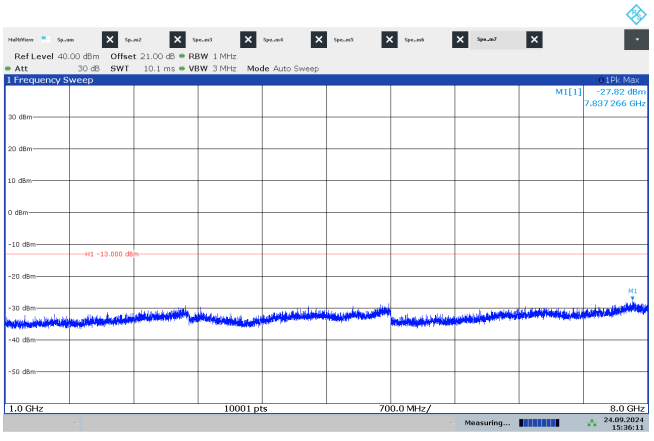
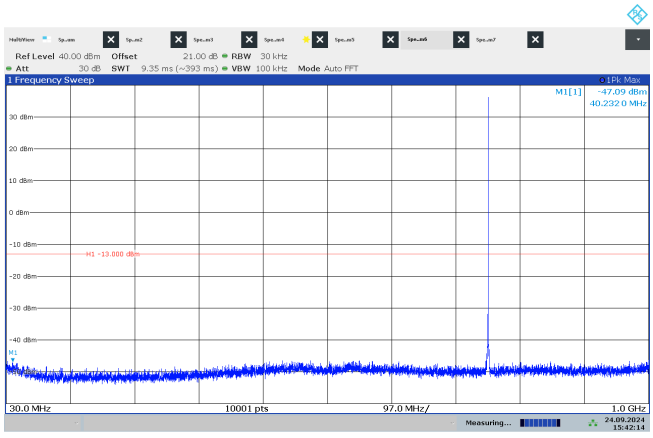
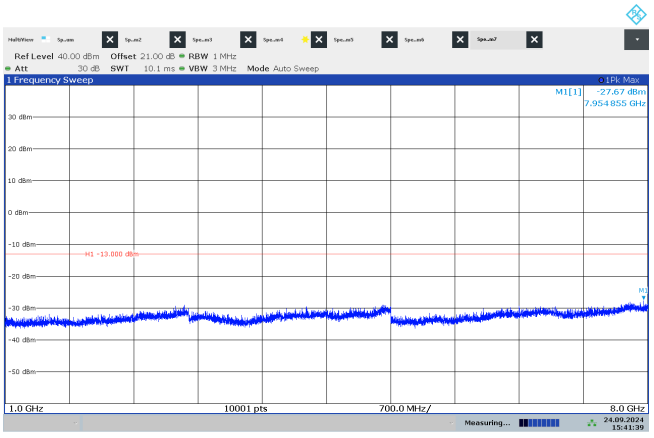
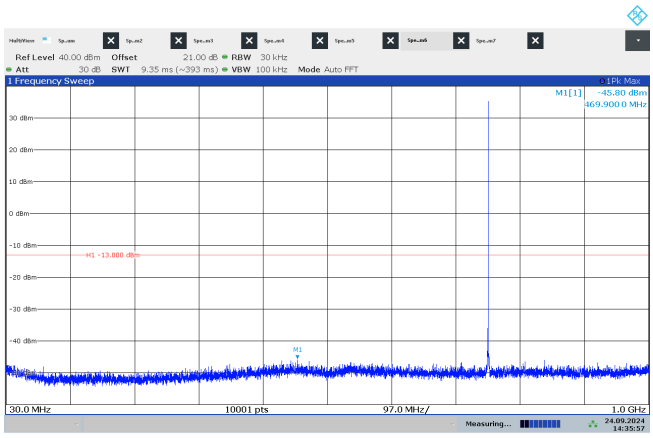
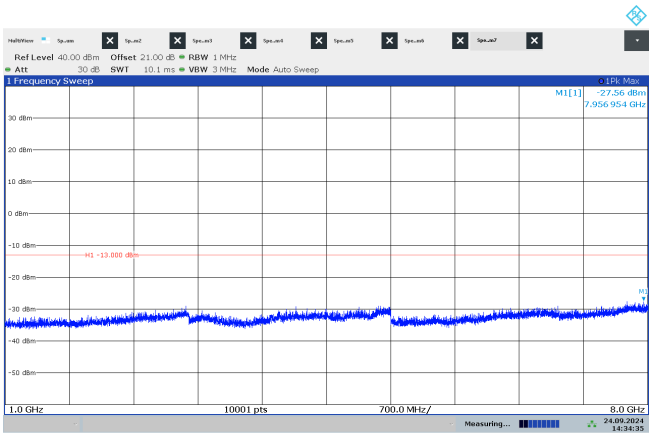
Site :HC-CB02
Condition :3m Vertical
Mode :LTE_B103_787.5MHz
Test by :Scott Chang

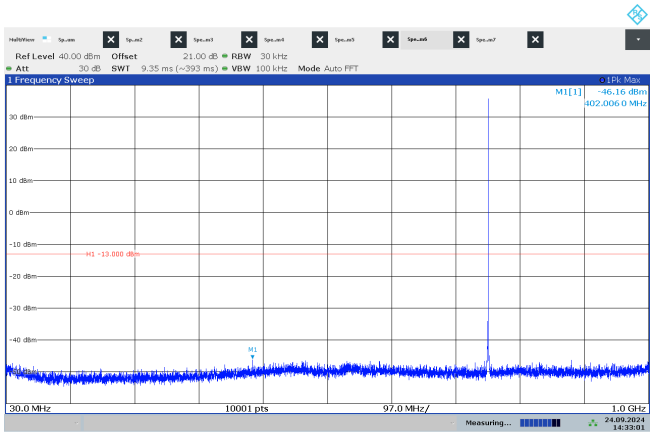
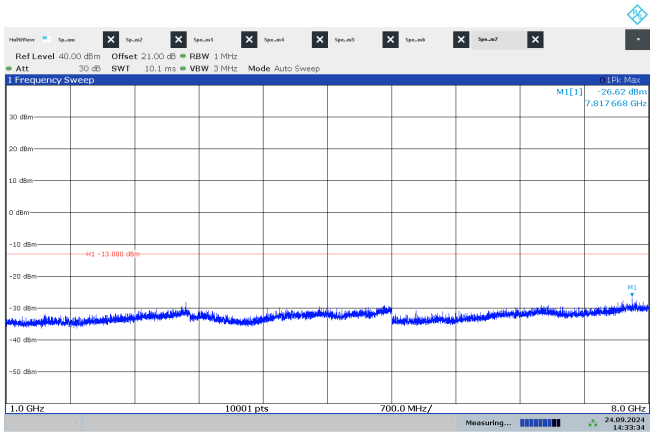
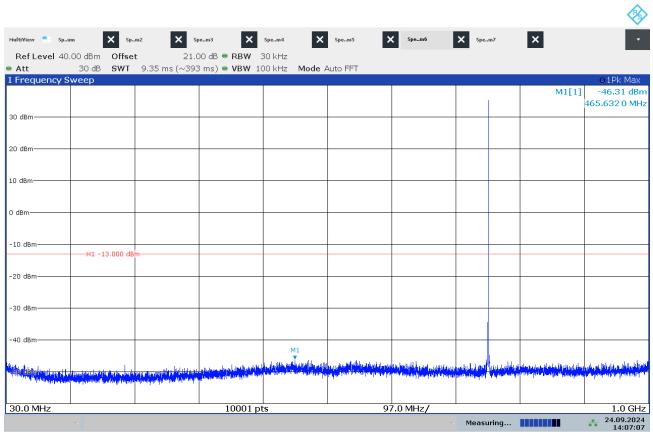
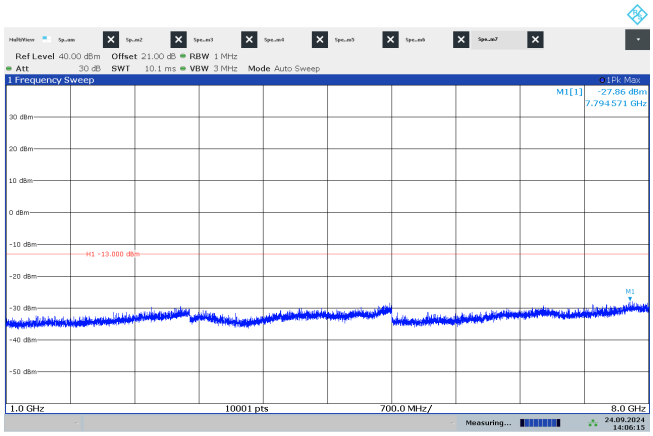
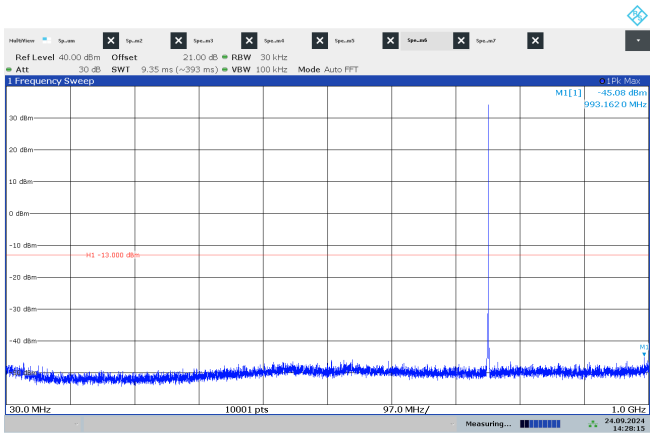
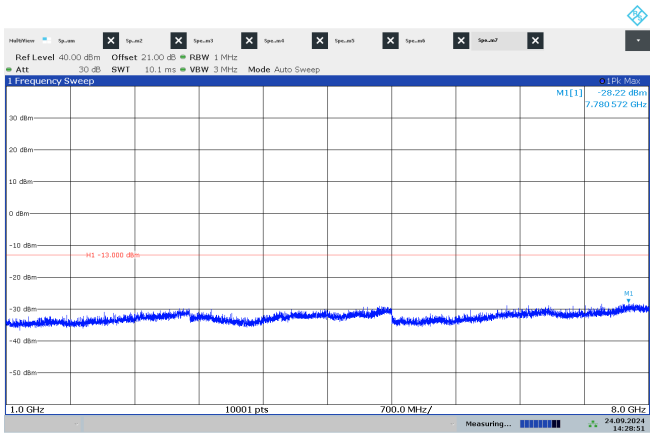


No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	1575.000	-61.01	-40.00	-21.01	-46.06	-14.95	Peak
2	2362.500	-57.87	-13.00	-44.87	-45.96	-11.91	Peak
3	3150.000	-56.55	-13.00	-43.55	-47.37	-9.18	Peak

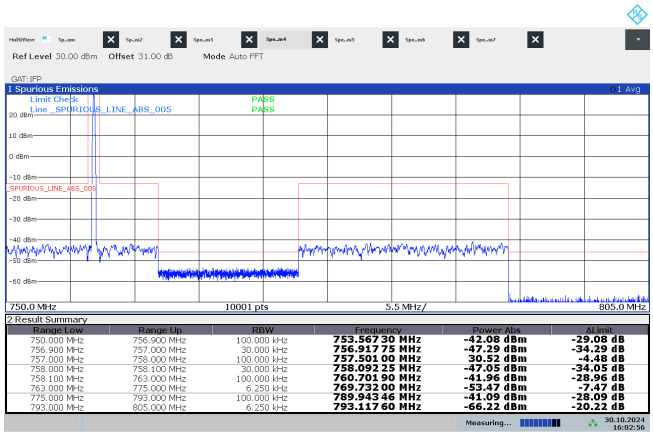
Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Convert E (dBuVm) to EIRP (dBm)
= 107 + 20log(3) - 104.8 = 11.8 dB
5. The other emission levels were very low against the limit.
6. The emission under 1GHz was not included since the emission levels are very low against the limit.

Appendix D. Test Result of Conducted Band Edge

757.5 MHz_QPSK_12.5k_Port 1 (Low Frequency)	757.5 MHz_QPSK_12.5k_Port 1 (High Frequency)
	
757.5 MHz_QPSK_12.5k_Port 2 (Low Frequency)	757.5 MHz_QPSK_12.5k_Port 2 (High Frequency)
	
757.5 MHz_QPSK_25k_Port 1 (Low Frequency)	757.5 MHz_QPSK_25k_Port 1 (High Frequency)
	

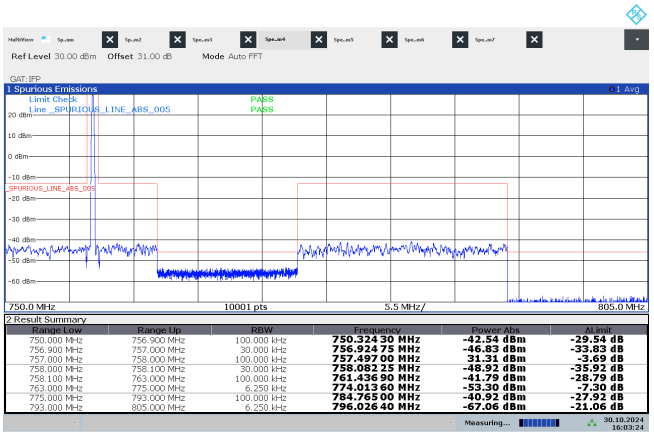
757.5 MHz_QPSK_25k_Port 2 (Low Frequency)	757.5 MHz_QPSK_25k_Port 2 (High Frequency)
	
14:33:02 24.09.2024	14:33:35 24.09.2024
757.5 MHz_QPSK_50k_Port 1 (Low Frequency)	757.5 MHz_QPSK_50k_Port 1 (High Frequency)
	
14:07:08 24.09.2024	14:06:15 24.09.2024
757.5 MHz_QPSK_50k_Port 2 (Low Frequency)	757.5 MHz_QPSK_50k_Port 2 (High Frequency)
	
14:28:16 24.09.2024	14:28:51 24.09.2024

757.5 MHz_QPSK_12.5k_Port 1 (Bandedge)



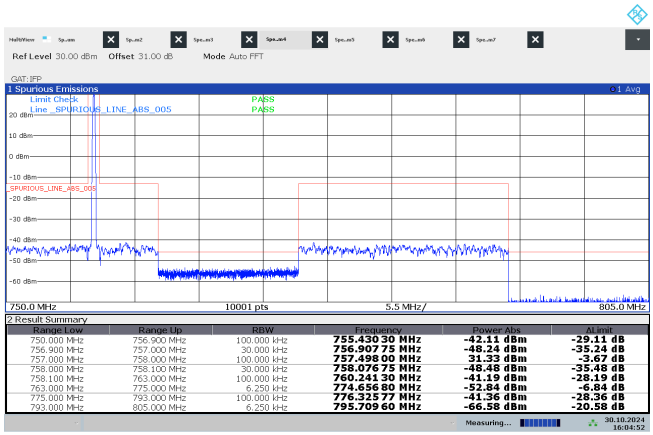
16:02:57 30.10.2024

757.5 MHz_QPSK_12.5k_Port 2 (Bandedge)



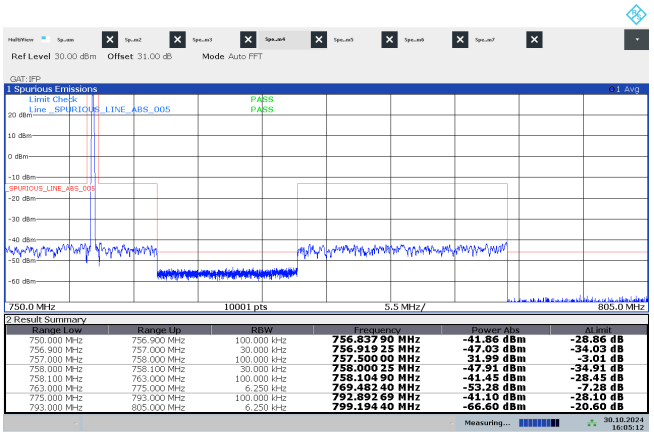
16:03:25 30.10.2024

757.5 MHz_QPSK_25k_Port 1 (Bandedge)



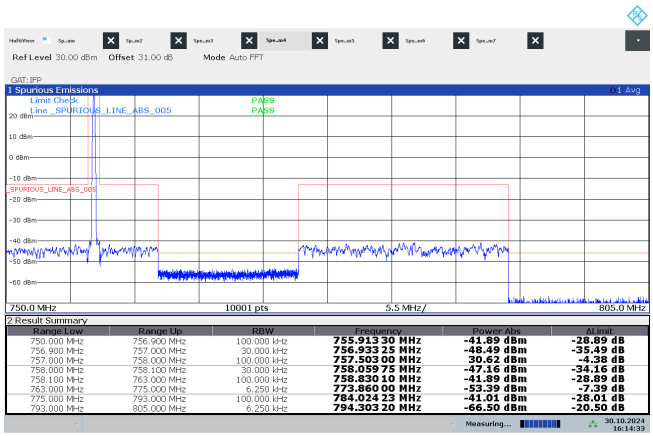
16:04:53 30.10.2024

757.5 MHz_QPSK_25k_Port 2 (Bandedge)



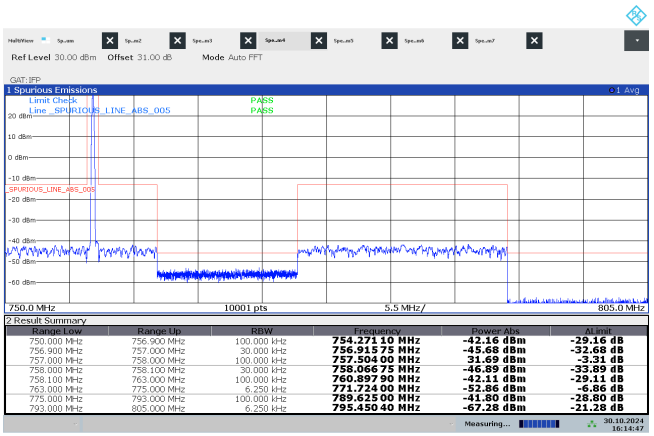
16:05:13 30.10.2024

757.5 MHz_QPSK_50k_Port 1 (Bandedge)

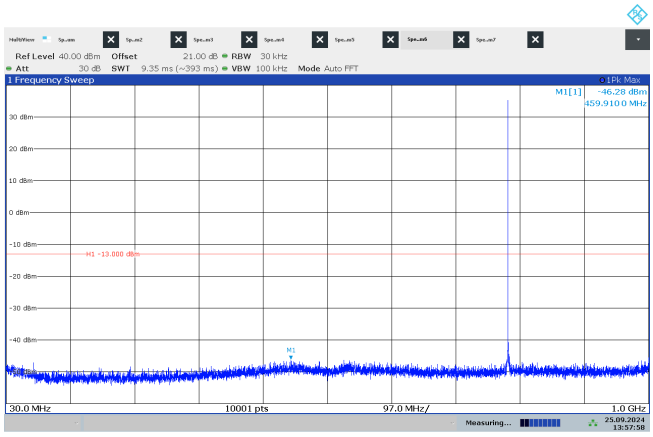
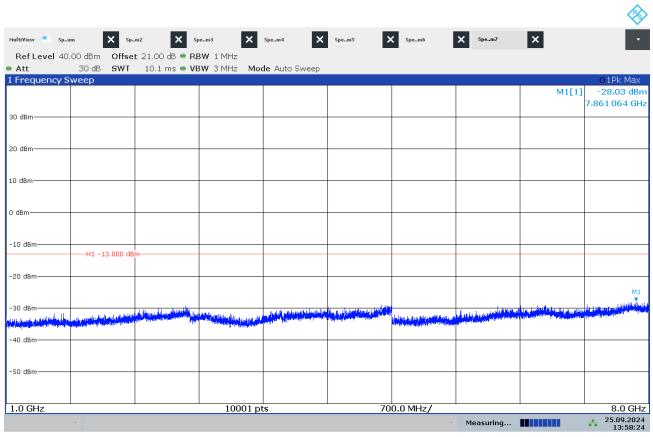
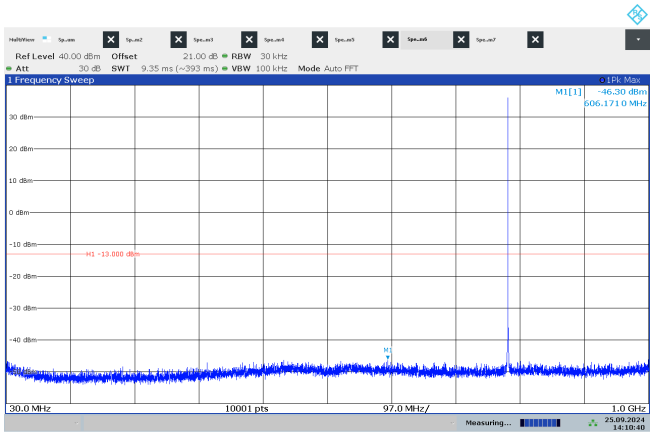
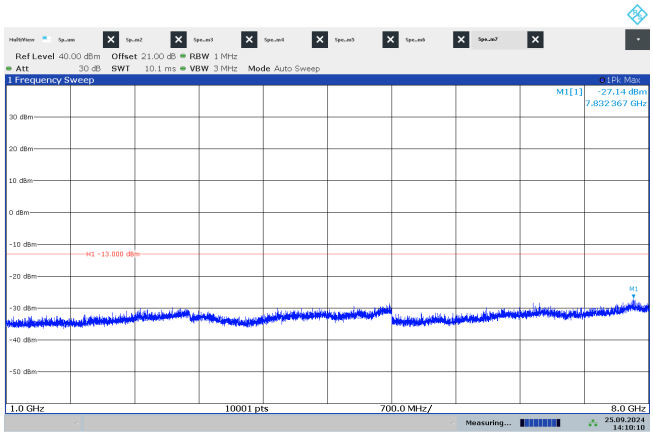


16:14:34 30.10.2024

757.5 MHz_QPSK_50k_Port 2 (Bandedge)



16:14:48 30.10.2024

787.5 MHz_QPSK_12.5k_Port 1 (Low Frequency)	787.5 MHz_QPSK_12.5k_Port 1 (High Frequency)
	
787.5 MHz_QPSK_12.5k_Port 2 (Low Frequency)	787.5 MHz_QPSK_12.5k_Port 2 (High Frequency)
	
787.5 MHz_QPSK_25k_Port 1 (Low Frequency)	787.5 MHz_QPSK_25k_Port 1 (High Frequency)