Test Report

Report No.: E202212127731-01-1

Customer:	TowerlQ,Inc.
Address:	13723 Riverport Drive C/O Potter Electric Signal Company Saint Louis, MO 63043
Sample Name:	Public safety signal booster
Sample Model:	Guardian B 2.0-2W
Receive Sample Date:	October 20, 2022
Test Date:	December 20,2022 ~ January 7, 2023
Reference Document:	FCC PART 90-- PRIVATE LAND MOBILE RADIO SERVICES
Test Result:	PASS
FCC ID:	2AXVJGUARD-B2UL

Prepared by: zheng Qin Reviewed by: Chen Yuxia Approved by: Wang Hui

GUANGZHOU GRG METROLOGY & TEST CO., LTD.

Issued Date: February 20, 2023

GUANGZHOU GRG METROLOGY & TEST CO., LTD. APPROVED(14)

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TABLE OF CONTENTS

1. Applicant information

1.1 Client information

Name:	TowerlQ,Inc.
Address:	13723 Riverport Drive C/O Potter Electric Signal Company Saint Louis, MO 63043

1.2 Manufacturer and Factory

Manufacture Name:	TowerlQ,Inc.(Shenzhen Office)
Address:	NO 8403A 4th floor, Xixiang Innovation Park Commercial Building, Qianmu Property, Guxing Community, Xixiang Street, Bao'an District, Shenzhen
Factory:	TowerlQ,Inc.
Address:	13723 Riverport Drive C/O Potter Electric Signal Company Saint Louis, MO 63043

2. General description of EUT

2.1 Basic description of EUT

Product Name:	Public safety signal booster
Product Model:	Guardian B 2.0-2W
Adding Model:	/
Trade Name:	TowerIQ
Power Supply:	AC 100~240V, 50/60Hz Typical working voltage: AC 110V, 50/60Hz
Power cord:	AC power cord
Frequency Band①:	700MHz Band: Downlink: 758MHz ~ 775MHz, Uplink: 788MHz ~805MHz 800MHz Band: Downlink: 851MHz ~861MHz, Uplink: 806MHz ~ 816MHz
Output Power:	Downlink: 2W degree:33±1dBm; 0.5W degree: 27±1dBm Uplink: 27±1dBm
System Gain:	Downlink: 80dB Uplink: 80dB
EUT Operating Temperature:	-20°C to +50°C
Operating Humidity:	5% to 95%
Antenna Type:	N/A②

NOTE 1: This EUT is a broadband device, which belongs to Class B signal booster.

NOTE 2: ①PS GuardBand : Downlink 768MHz~769MHz and Uplink 798MHz ~ 799MHz.

NOTE 3: ② It's an indoor device, the EUT does not provide antenna by manufacturer's statement, but it requires 2W equipment that the sum of antenna gain and cable loss should not exceed 3dBi (where antenna gain is 6dBi and cable loss is at least 3dB, so the total gain is 3dBi) for Downlink and the sum of antenna gain and cable loss should not exceed 9dBi for Uplink, when the project is used by manufacturer's statement.

NOTE 4: According to the requirements of the manufacturer, 2W and 0.5W grade equipment can be provided. Except for the different output power of Downlink, all other technical parameters and components are the same. At the same time, the output power of the equipment can be adjusted from 0.5W to 2W through debugging software. the basic test will be conducted with the maximum output power of 2W, and the output power test data of 0.5W Downlink will be supplemented.

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2.2 Test signal modulation description

According to FCC PART 2.202 (g), Table of necessary bandwidths follow:

2.2.1 Analog signals

Emission Designator	Description	Modulation type	M (modulaition Freq, kHz)	R (Rate, baud)	D (Deviation, kHz)	K (numeric constant)	S (Symbols)	Bandwidth Calculation	Necessary Bandwidth
11K2F3E	Narrowband Analog FM Voice	FM	3.0	--	2.5	1.0	--	Bn=2M+2DK	11.0
16K0F3E	Wideband Analog FM Voice	FM	3.0	--	5.0	1.0	--	Bn=2M+2DK	16.0

2.2.2 Digital signals

Emission Designator	Description	Modulation type	M (modulaition Freq, kHz)	R (Rate, baud)	D (Deviation, kHz)	K (numeric constant)	S (Symbols)	Bandwidth Calculation	Necessary Bandwidth
8K10F1E	P25 Phase I C4FM Voice	4FSK	--	9600	1.8	0.916	4	$Bn=(R/\log_2 S)+2DK$	8.1
8K10F1D	P25 Phase I C4FM Data	4FSK	--	9600	1.8	0.916	4	$Bn=(R/\log_2 S)+2DK$	8.1
8K10F1W	P25 Phase II H-CPM Voice/Data	4FSK	--	9600	1.8	0.916	4	$Bn=(R/\log_2 S)+2DK$	8.1
9K80F1E	P25 Phase II H-DQPSK Voice	QPSK	--	12000	--	0.817	4	$Bn=2RK/\log_2 S$	9.8
9K80F1D	P25 Phase II H-DQPSK Data	QPSK	--	12000	--	0.817	4	$Bn=2RK/\log_2 S$	9.8
21K0F1E	Tetra Voice	$\pi/4$DQPSK	--	9600	--	0.817	4	$Bn=2RK/\log_2 S$	21.0
21K0F1D	Tetra Data	$\pi/4$DQPSK	--	9600	--	0.817	4	$Bn=2RK/\log_2 S$	21.0
5M00G7D	Public Safety LTE	8PSK	--	5000	--	1	4	$Bn=2RK/\log_2 S$	5000
10M0G7D	Public Safety LTE	8PSK	--	10000	--	1	4	$Bn=2RK/\log_2 S$	10000
5M00G7W	Public Safety LTE	QAM	--	5000	--	--	4	$Bn=2R/\log_2 S$	5000
10M0G7W	Public Safety LTE	QAM	--	10000	--	--	4	$Bn=2R/\log_2 S$	10000
5M00W7D	Public Safety LTE	OFDM	--	-	--	16	--	Bn=312.5*K	5000
10M0W7D	Public Safety LTE	OFDM	--	-	--	32	--	Bn=312.5*K	10000
5M00F9W	Public Safety LTE	QPSK	--	5000	--	1	4	$Bn=2RK/\log_2 S$	5000
10M0F9W	Public Safety LTE	QPSK	--	10000	--	1	4	$Bn=2RK/\log_2 S$	10000

NOTE: In the above test signal modes, the typical signal and the worst mode signal are used as representatives in this test. The specific test signal types are as follows:

Emission Designator	Description	Modulation type	M (modulaition Freq, kHz)	R (Rate, baud)	D (Deviation, kHz)	K (numeric constant)	S (Symbols)	Bandwidth Calculation	Necessary Bandwidth
16K0F3E	Wideband Analog FM Voice	FM	3.0	--	5.0	1.0	--	Bn=2M+2DK	16.0
8K10F1D	P25 Phase I C4FM Data	4FSK	--	9600	1.8	0.916	4	$Bn=(R/\log_2 S)+2DK$	8.1
9K80F1D	P25 Phase II H-DQPSK Data	QPSK	--	12000	--	0.817	4	$Bn=2RK/\log_2 S$	9.8
21K0F1W	Tetra Voice/Data	$\pi/4$DQPSK	--	28.8kbit/s	--		4		21.0
5M00F9W	Public Safety LTE	QPSK	--	5000	--	1	4	$Bn=2RK/\log_2 S$	5000
10M0F9W	Public Safety LTE	QPSK	--	10000	--	1	4	$Bn=2RK/\log_2 S$	10000

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2.3 Signal Booster control process

2.3.1 System block

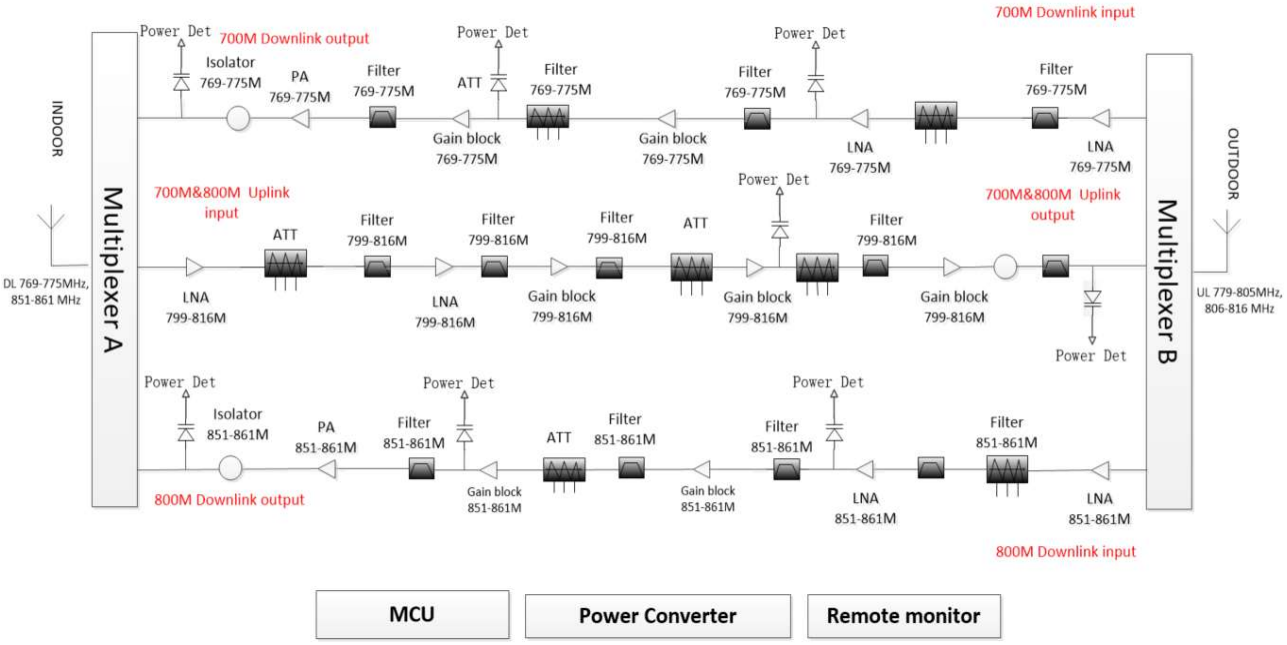

Figure 2-1 System block diagram

The block diagram is composed of the following units:

Uplink input Power detector;

Uplink output Power detector;

Uplink PA switch integrated in PA;

Downlink input Power detector;

Downlink PA switch integrated in PA, and so on

2.3.2 Signal control process

Above is the system block diagram, this system can enhance mobile communication signal. In the downlink, the BTS signals are received by donor antenna of the repeater. After the duplexer, the signals are sent to the LNA module for pre-amplification and digital RF integrated module for digitalfitering and frequency conversion.

Then the DL signals will be sent to downlink PA to amplify power and filter via duplexer. After amplification, the signals are transmitted via the MT port to the service antenna.

In the uplink, the mobile signals are received by the service antenna. After the MT port integrated duplexer, the signals are sent to the LNA, integrated module for digital filtering, then to PA for power amplification and to duplexer.

After that, the uplink signals are sent to the donor antenna for transmission back to the BTS.

3. Related documents

FCC PART 2(11/25/2022)
FCC PART 90(6/22/2022)
KDB 935210 D05 Indus Booster Basic Meas v01r04
KDB 935210 D02 Signal Boosters Certification v04r02
KDB 971168 D01 Power Meas License Digital Systems v03r01
ANSI/TIA 603-E-2016
ANSI/TIA-102.CAAA-E-2016
ANSI C63.26-2015

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4. Test result summary

Test Item	Test Requirements	Test Method	Reported	N/A
Test Frequency	KDB 935210 D02 APPENDIX D/Table D.3, ANSI C63.26-2015 Clause 5.1.2	/	Reported only	
Input Signals	KDB 935210 D05 clause 4.1	/	Reported only	
AGC Threshold	KDB 935210 D05 clause 4.2	/	Reported only	
Out of Band Rejection	FCC PART 90.219 (a) FCC PART 90.219 (d)((7)	KDB 935210 D05 clause 4.3	☒	
Input VS output Comparison	KDB 935210 D05 clause 4.4 FCC PART 2.1049(c) FCC PART 90.210 FCC PART 90.219 (e)(4)(ii) FCC PART 90.219 (e)(4)(iii)	KDB 935210 D05 clause 4.4	☒	
Mean power and amplifier/booster gain	KDB 935210 D05 clause 4.5 FCC PART 90.219 (e)(1)	KDB 935210 D05 clause 4.5	☒	
Noise Figure	KDB 935210 D05 clause 4.6 FCC PART 90.219 (e)(2)	KDB 935210 D05 clause 4.6	☒	
Out-of-band/out-of-block emissions	KDB 935210 D05 clause 4.7.2 FCC PART 90.219 (d)(6)(i) FCC PART 90.219 (e)(3)	KDB 935210 D05 clause 4.7.2	☒	
Conducted spurious emissions	KDB 935210 D05 clause 4.7.3 FCC PART 2.1051 FCC PART 90.219 (e)(3)	KDB 935210 D05 clause 4.7.3	☒	
Frequency stability	KDB 935210 D05 clause 4.8 FCC PART 2 1055(a)(2) FCC PART 90.213 and 90.539 FCC PART 90.219 (e)(4)(i)	KDB 935210 D05/4.8 FCC PART 2 1055(b)	☒	
Radiated spurious emissions	KDB 935210 D05 clause 4.9 FCC PART 2.1053 FCC PART 90.219 (e)(3)	KDB 935210 D05 clause 4.9 ANSIC63.26-2015/5.5 ANSI/TIA 603-E-2016 ANSI/TIA-102.CAAA-E-2016	☒	

NOTE: ☒ mean that test needs to be performed.

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5. About Signal Booster

According to the basic information of EUT, FCC part 90.219 (a) and KDB 935210 D02 APPENDIX A3.1 rules, this EUT belongs to PART 90 class B Industrial signal booster and it is a non SMR

5.1 KDB 935210 D02 APPENDIX A3.1

A.3.1 Signal Booster (Section 90.219)

A **Signal Booster (Section 90.219)** is a device or system that automatically receives, amplifies, and retransmits signals from wireless stations into and out of building interiors, tunnels, shielded outdoor areas and other locations where these signals would otherwise be too weak for reliable communications. Signal booster systems may contain both Class A and Class B signal boosters as components. [Section 90.219(a)]

All **Section 90.219 boosters** are a type of Industrial Signal Booster, and are classified as either **Class A boosters** (narrowband) or **Class B boosters** (wideband).[R11] [*Order*, ¶ 15]

Note also that Consumer Signal Boosters are not defined for PLMRS or PSRS because licensees are considered to operate private services. Part 90 PLMR licensees typically obtain authorizations for individual narrowband channels or groups of channels to satisfy their own communication needs. Moreover, many Part 90 channels are interleaved and a licensee's channels may not be adjacent to one another, which presents unique considerations for signal boosters used with Part 90 PLMR services. [*Order*, ¶ 144]

a) Class A signal booster: A signal booster designed to retransmit signals on one or more specific channels. A signal booster is deemed to be a Class A signal booster if none of its passbands exceed 75 kHz. [Section 90.219(a)]

b) Class B signal booster: A signal booster designed to retransmit any signals within a wide frequency band. A signal booster is deemed to be a Class B signal booster if it has a passband that exceeds 75 kHz. [Section 90.219(a)]

Class B signal boosters may be deployed only at fixed locations; mobile operation of Class B signal boosters is prohibited (after November 1, 2014). [Section 90.219(d)(4)]

Except for signal boosters incorporating distributed antenna systems (DAS) and installed in buildings, the passband of a Class B booster shall not encompass both commercial services (such as ESMR and Cellular Radiotelephone) and Part 90 Land Mobile and Public Safety Services. [Section 90.219(d)(7)]

5.2 FCC part 90.219 (a) Definitions

§90.219 Use of signal boosters.

This section contains technical and operational rules allowing the use of signal boosters in the Private Land Mobile Radio Services (PLMRS). Rules for signal booster operation in the Commercial Mobile Radio Services under part 90 are found in §20.21 of this chapter.

https://www.ecfr.gov/cgi-bin/text-idx?SID=2097cbedce8abb94d012e95530a44e05&mc=true&node=pt47.5.90&rgn=div5

2020/6/15 Electronic Code of Federal Regulations (eCFR)

(a) *Definitions.* The definitions in this paragraph apply only to the rules in this section.

Class A signal booster. A signal booster designed to retransmit signals on one or more specific channels. A signal booster is deemed to be a Class A signal booster if none of its passbands exceed 75 kHz.

Class B signal booster. A signal booster designed to retransmit any signals within a wide frequency band. A signal booster is deemed to be a Class B signal booster if it has a passband that exceeds 75 kHz.

6. Test modes

Test modes	TX mode: "OUTSIDE" port of the EUT is connected to the signal generator, "INSIDE" port is connected to the spectrum analyzer through attenuator, and the power of the EUT is turned on and signal is sent. RX mode: "INSIDE" port of the EUT is connected to the signal generator, "OUTSIDE" port is connected to the spectrum analyzer through attenuator, and the power of the EUT is turned on and signal is sent.

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7. Laboratory

The tests & measurements refer to this report were performed by GUANGZHOU GRG METROLOGY & TEST CO., LTD

Add. : Park No.9,Wu Ke East 3rd Road,WuHou District,ChengDu,610045,People's Republic of China

P.C. : 610045

Tel : 028-86496437

Fax : 028-86496423

8. Measurements uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement		Frequency	Uncertainty
Radiated Emission	Horizontal	30MHz～1000MHz	4.8dB
	Horizontal	1GHz～18GHz	5.1dB
	Vertical	30MHz～1000MHz	4.9dB
	Vertical	1GHz～18GHz	5.0dB

Measurement	Uncertainty
RF frequency	6.0×10^{-6}
RF power conducted	0.60dB
Occupied channel bandwidth	0.40%
Unwanted emission, conducted	0.66dB
Humidity	6.0%
Temperature	2.0℃

Note: This uncertainty represents an expanded uncertainty factor of *k*=2.

9. Equipments used during test

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Vector Signal Generator	R&S	SMW200A	110473	2023-08-15
Vector Signal Generator	R&S	SMBV 100B	101162	2023-01-05
Vector Signal Generator	R&S	SMBV 100A	260996	2023-11-17
Signal Generator	R&S	SMB 100A	109290	2023-11-17
Spectrum analyzer	R&S	FSV30	104381	2023-11-17
Spectrum analyzer	R&S	FSW	101420	2023-01-06
Spectrum analyzer	R&S	FSW43	102249	2023-07-17
Spectrum analyzer	Keysight	N9010B-503	MY56460128	2023-11-11
SNS Series Noise Source	Agilent	346B	MY45272551	2023-11-22
SNS Series Noise Source	Agilent	346B	MY53232432	2023-04-12
Frequency meter	Suin	SS7300	6E5042029	2023-09-19
Voltage regulator	Qingdaoqingzhi	TDGC2J-5	GRGTAG2013022	/
Digital multimeter	Fluke	F15B+	44750292WS	2023-12-04
Isolator	China guangshun	TG101A 700~800	121003889	/
Attenuation	Shanghaihua xiang	DTS10-40-4BNCJK	18112301	2023-09-13
Radiated Spurious emissions				
Receiver	R&S	ESU40	100106	2023-09-20
Receiver	R&S	ESU40	100515	2023-09-15
Bi-log Antenna	SCHWARZBECK	VULB 9160	9160-3402	2023-10-23
Bi-Log Antenna	SCHWARZBECK	VULB 9163	01175	2023-08-18
Horn antenna	SCHWARZBECK	BBHA 9120D	01668	2023-12-06
Horn Antenna	SCHWARZBECK	BBHA9120D	286	2023-09-11
Horn Antenna	ETS	3117 C	00075824	2023-12-30
Broadband Amplifiers	SCHWARZBECK	BBV9718	00246	2023-09-16
Broadband Amplifiers	SCHWARZBECK	BBV9745	9745#76	2023-03-09
Preamplifier	KEYSIGHT	HLWLNA-10180	15128009	2023-03-13
Semi-anechoic chamber	ETS-lindgren	966(RFD-F/A-100)	3730	2023-09-11

10. Radio technical requirement specification

10.1 Test Frequencies

Test requirement: KDB 935210 D02 APPENDIX D/Table D.3
FCC PART 2.1057
ANSI C63.26-2015 Clause 5.1.2

10.1.1 Requirements

According to FCC regulations, FCC part 2.1057, ANSI c63.26-2015 clause 5.1.2 and KDB 935210 D02 Appendix D / table D.3 have relevant frequency band requirements.

10.1.1.1 FCC PART 2.1057

§2.1057 Frequency spectrum to be investigated.

(a) In all of the measurements set forth in §§2.1051 and 2.1053, the spectrum shall be investigated from the lowest radio frequency signal generated in the equipment, without going below 9 kHz, up to at least the frequency shown below:

(1) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

(2) If the equipment operates at or above 10 GHz and below 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.

(3) If the equipment operates at or above 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 200 GHz, whichever is lower.

(b) Particular attention should be paid to harmonics and subharmonics of the carrier frequency as well as to those frequencies removed from the carrier by multiples of the oscillator frequency. Radiation at the frequencies of multiplier stages should also be checked.

(c) The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be reported.

(d) Unless otherwise specified, measurements above 40 GHz shall be performed using a minimum resolution bandwidth of 1 MHz.

10.1.1.2 ANSI C63.26-2015 Clause 5.1.2

5.1.2 Number of fundamental frequencies to be tested in EUT transmit band

5.1.2.1 General requirement

Measurements of transmitters shall be performed and, if required, reported for each frequency band in which the EUT can be operated with the device transmitting at the number of frequencies in each band specified in Table 2.

[24] See 47 CFR 2.1057.

Table 2—Number of frequencies to be tested

Frequency range over which EUT operates	Number of frequencies	Location in frequency range of operation
1 MHz or less	1	Middle
1 MHz to 10 MHz	2	1 near top and 1 near bottom
More than 10 MHz	3	1 near top, 1 near middle, and 1 near bottom

10.1.1.3 KDB 935210 D02 APPENDIX D/Table D.3

Section 90.219 purposes (for info only – see rules for details, also KDB Publication 634817 [R14])

F_L (MHz)	–	F_L (MHz)	Rule(s)	Misc. Notes
150	–	150.05	Federal (non-FCC)	
150.05	–	150.8	90.265	
150.8	–	162.0125	90	
162.0125	–	173.2	90.265	
173.2	–	173.4	90	
173.4	–	174	Federal (non-FCC)	
406.1	–	420	90.265	
420	–	421	ULS presently shows no licensees for 420-420.9 MHz	
421	–	430	90	
430	–	450	Not available under 90 Subparts B, C land mobile service	
450	–	470	90 (selected bands)	
470	–	512	90	
746	–	757	27.5(b)(3) Block C; 90 not available	
757	–	758	27.5(b)(1) Block A; 90 not available	
758	–	768	90-R, Public Safety (PS) Broadband (FirstNet)	B9B (LTE)
768	–	769	PS Guardband	
769	–	775	PS Narrowband	
775	–	776	27.5(b)(2) Block B; 90 not available	
776	–	787	27.5(b)(3) Block C; 90 not available	
787	–	788	27.5(b)(1) Block A; 90 not available	
788	–	798	90-R, Public Safety (PS) Broadband (FirstNet)	B9B (LTE)
798	–	799	PS Guardband	
799	–	805	PS Narrowband	
805	–	806	27.5(b)(2) Block B; 90 not available	
806	–	809	90 NPSPAC (PS) [90.617(a)(1)]	B9B/B9A
809	–	815	90 Interleaved PS; B/ILT; SMR [90.614(a); 90.613 ch. nos. 1-470][a]	B9B/B9A
815	–	816	90 Expansion B/ILT; SMR [90.614(a); 90.613 ch. nos. 470-550][a]	B9B/B9A
816	–	817	90 Guardband	B9B/B9A
817	–	824	CMRS 90 ESMR [90.614(b); 90.613 ch. nos. 551-830]	B2I 90-S
824	–	849	22 H; 90 not available	B2I
849	–	851	22 G; 90 not available	BOS
851	–	854	90 NPSPAC (PS) [90.617(a)(1)]	B9B/B9A
854	–	860	90 Interleaved PS; B/ILT; SMR [90.614(a); 90.613 ch. nos. 1-470][a]	B9B/B9A
860	–	861	90 Expansion B/ILT; SMR [90.614(a); 90.613 ch. nos. 470-550][a]	B9B/B9A
861	–	862	90 Guardband	B9B/B9A
862	–	869	CMRS 90 ESMR [90.614(b); 90.613 ch. nos. 551-830]	B2I 90-S
869	–	894	22-H; 90 not available	B2I
894	–	896	22-G; 90 not available	BOS
896	–	901	90 Interleaved B/ILT [90.617(c)] and SMR [90.617(f)]; UL (donor)	B2I 90-S& B9B/B9A 90-S
901	–	902	24-D; 90 not available	B2I
928	–	929	101; 90 not available[b,c]	BOS
929	–	930	90[b,c]	B9B/B9A
930	–	931	24-D; 90 not available	B2I
931	–	932	22-E; 90 not available	B2I
932	–	935	101; 90 not available	BOS
935	–	940	90 Interleaved B/ILT [90.617(c)] and SMR [90.617(f)]; DL (server)	B2I 90-S& B9B/B9A 90-S

The EUT will utilize bands:

700MHz Band: Downlink: 758MHz ~ 775MHz, Uplink: 788MHz ~805MHz
800MHz Band: Downlink: 851MHz ~861MHz, Uplink: 806MHz ~ 816MHz

10.1.2 Result

This project is only reported and checked, the frequency range of this EUT meets the above regulatory requirements.

10.2 Input Signals

Test requirement: KDB 935210 D05 clause 4.1

10.2.1 Requirements

KDB 935210 D05 clause 4.1

The procedures in this clause are specific to EUTs intended for operating in the Private Land Mobile Radio Services (PLMRS) and Public Safety Radio Services (PSRS)[5], which are governed under the provisions and requirements of the Part 90 rules (i.e., Section 90.219 applies).

Table 1 depicts signal types associated with PLMRS operations, which are to be considered as test signals to be used in performing compliance testing on PLMRS amplifiers, repeaters, and industrial boosters. Not all of the procedures in this clause will require using each of the signals listed in Table 1, because for

[5] As explained in § 90.16, Public Safety Radio Services is part of the Public Safety Radio Pool, also known as the Public Safety Pool.

many EUTs a CW tone can adequately model the narrowband signals typically encountered within these services. For EUTs supporting digitally modulated signals, the intended operating signal types should be tested (e.g., P25 Phase 1, P25 Phase 2, TETRA, etc.), especially for PSRS devices. Devices intended for use in 700 MHz Public Safety Broadband spectrum shall be tested using a representative band-limited AWGN signal (99 % OBW of 4.1 MHz) or the applicable signal type (e.g., LTE).

Table 1—Test signals for PLMRS devices

Emission Designator	Modulation	Occupied Bandwidth	Channel Bandwidth	Audio Frequency
16K0F3E	FM	16 kHz	25 kHz	1 kHz
11K3F3E	FM	11.3 kHz	12.5 kHz	1 kHz
4K00F1E	FM	4 kHz	6.25 kHz	1 kHz
N/A	CW	N/A	N/A	N/A

10.2.2 Result

This project is only reported and checked.

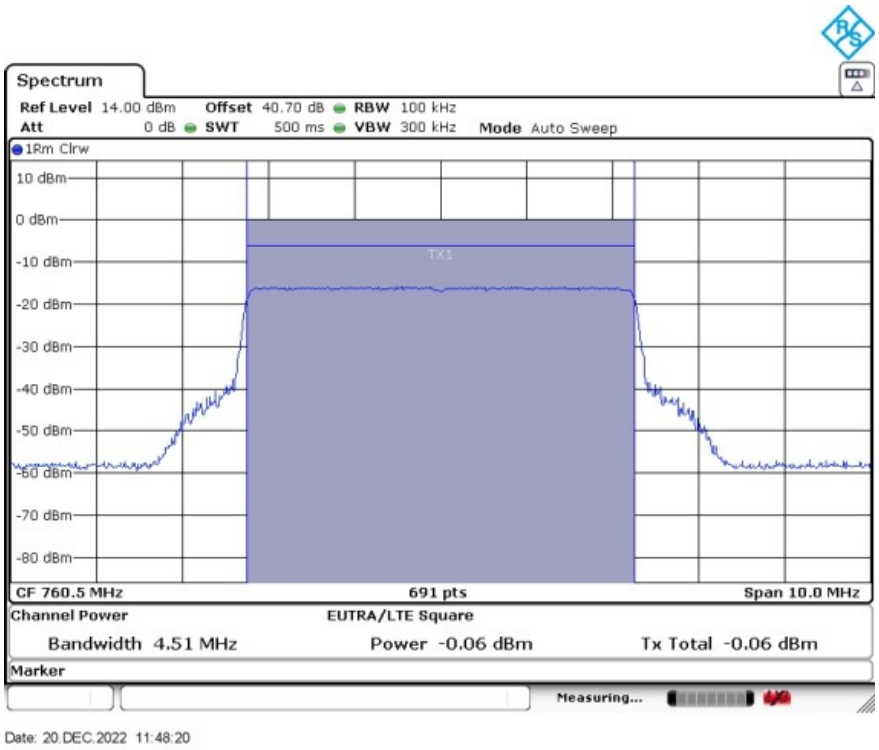
Input Signals screenshot

10.2.2.1 700MHz Band

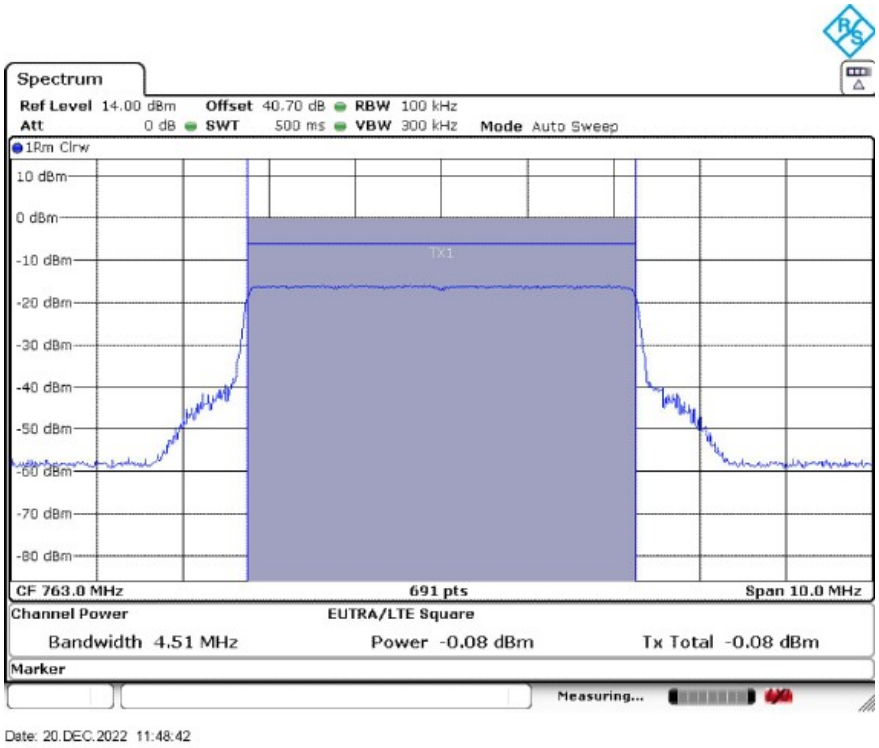
10.2.2.1.1 LTE

10.2.2.1.1.1 Channel Bandwidth: 5MHz

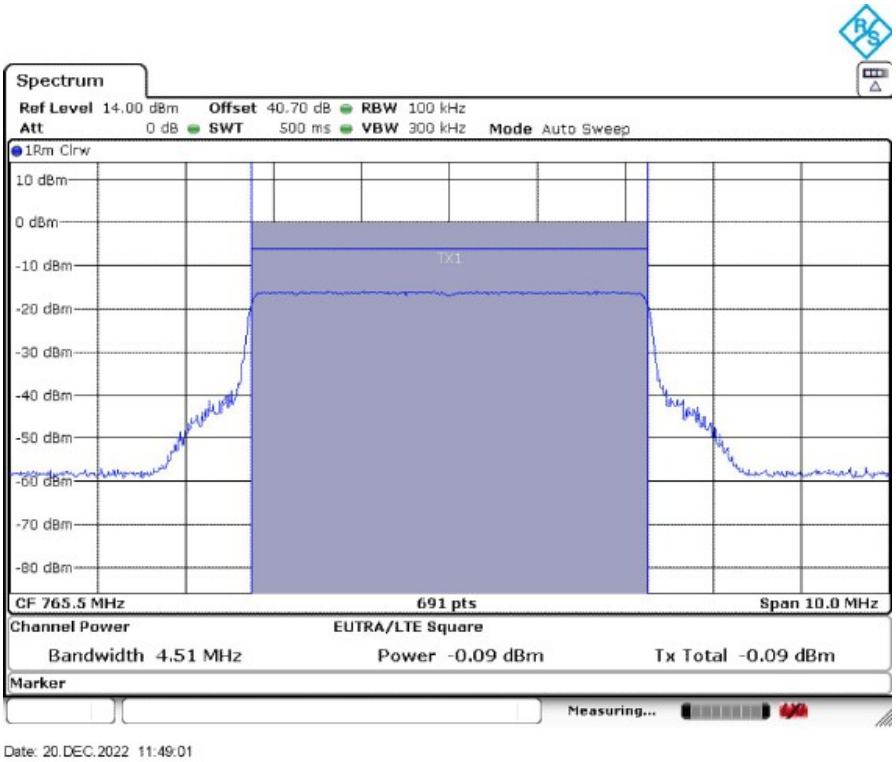
10.2.2.1.1.1.1 Downlink



Low Frequency: 760.5MHz

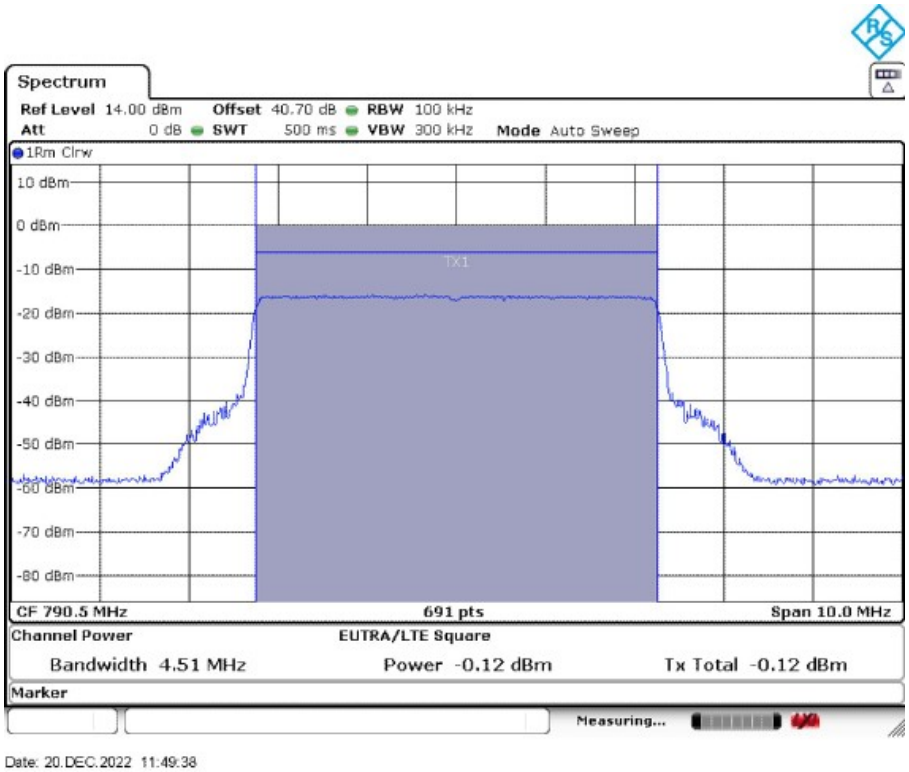


Middle Frequency: 763MHz

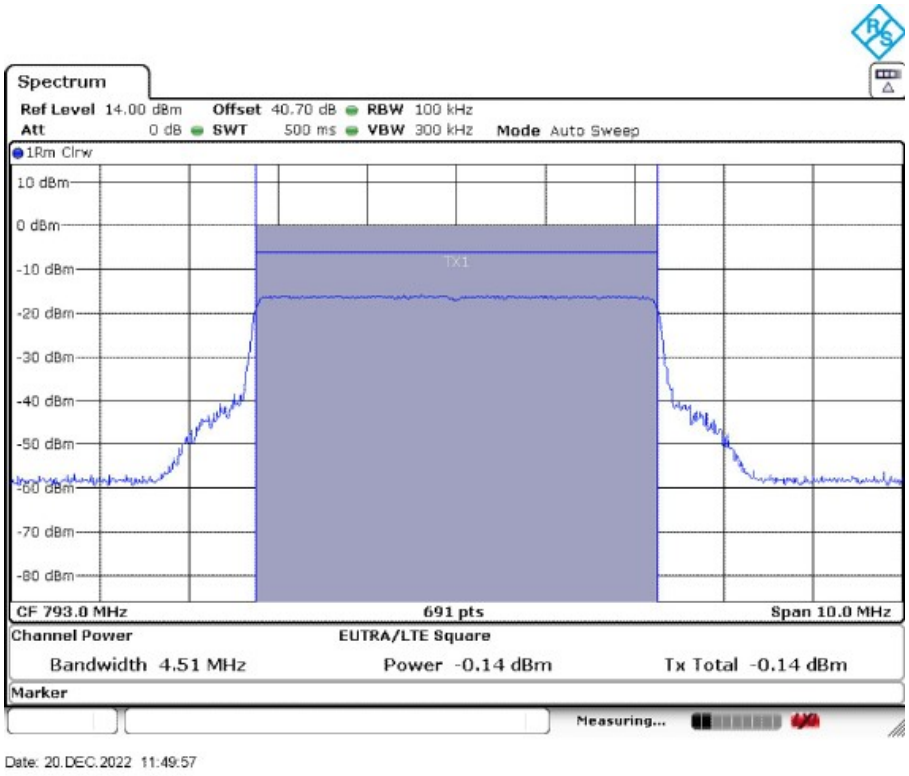


High Frequency: 765.5MHz

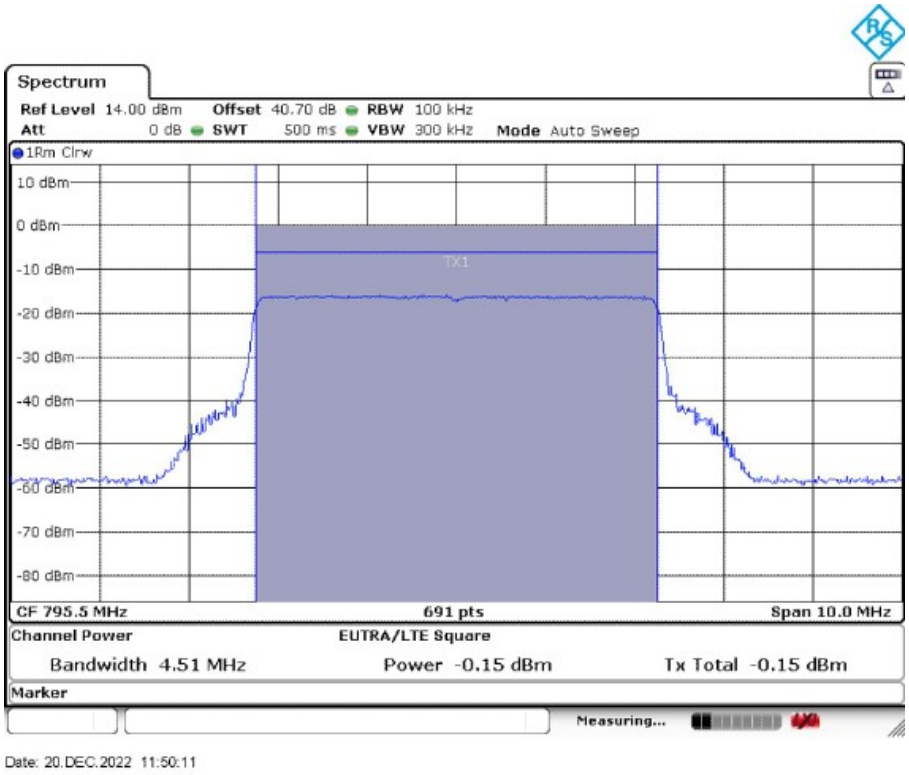
10.2.2.1.1.1.2 Uplink



Low Frequency: 790.5MHz



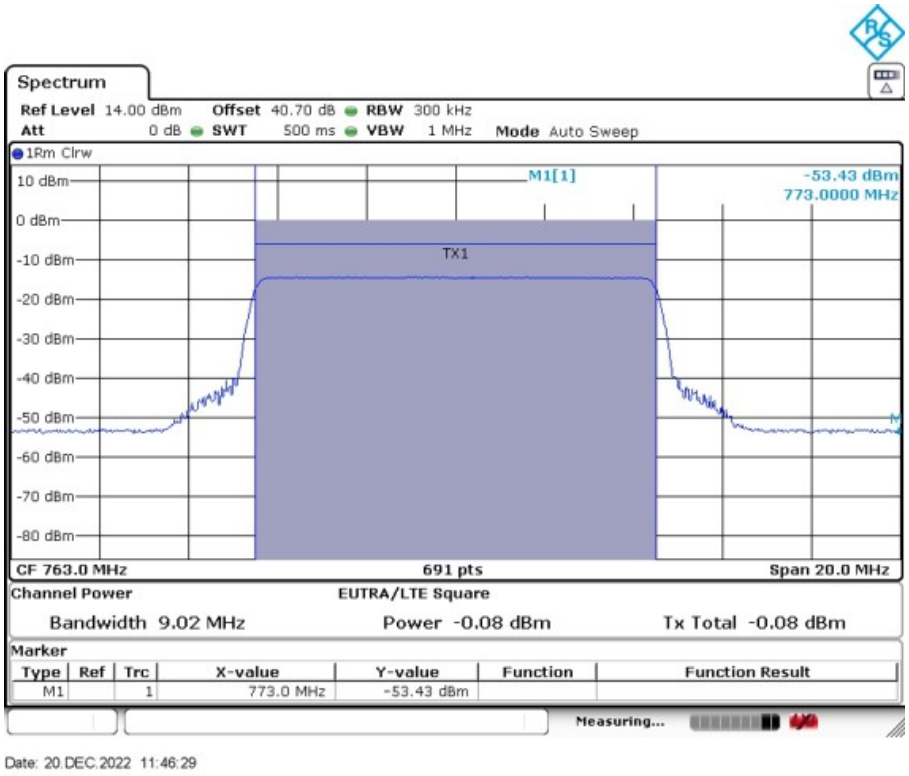
Middle Frequency: 793MHz



High Frequency: 795.5MHz

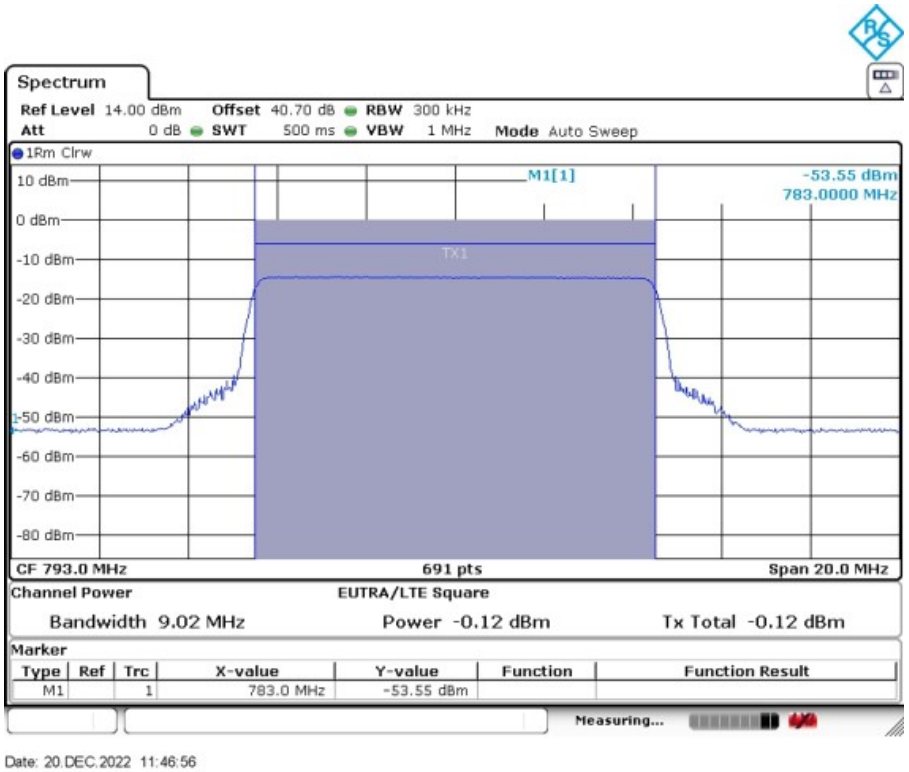
10.2.2.1.1.2 Channel Bandwidth: 10MHz

10.2.2.1.1.2.1 Downlink



Middle Frequency: 763MHz

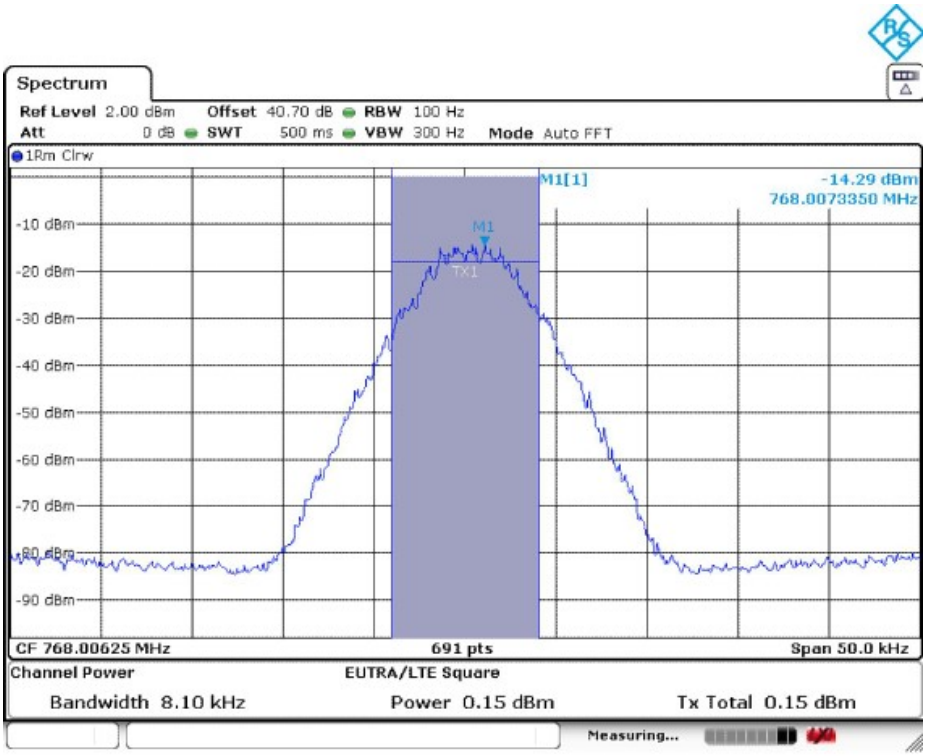
10.2.2.1.1.2.2 Uplink



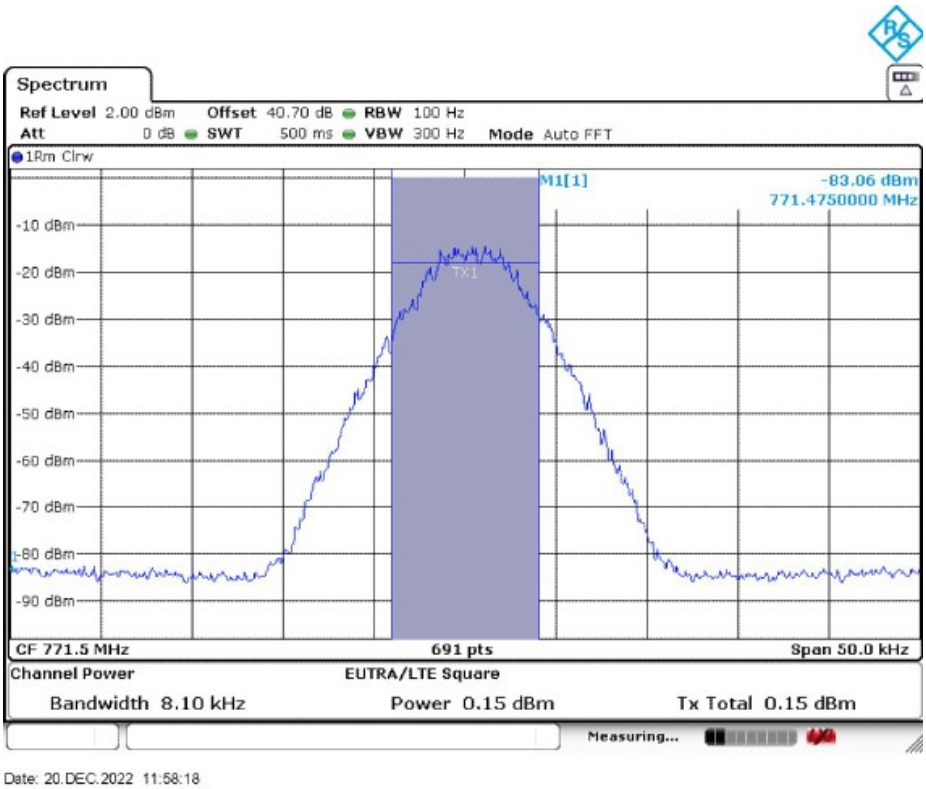
Low Middle Frequency: 793MHz

10.2.2.1.2 P25 Phase I(C4FM)

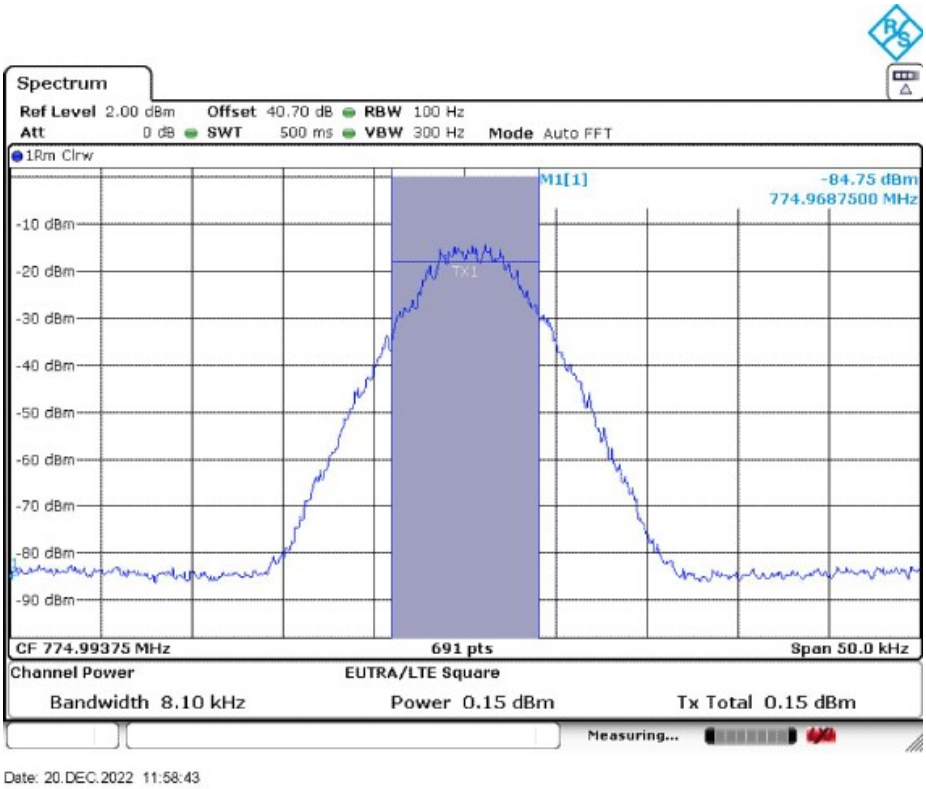
10.2.2.1.2.1.1 Downlink



Low Frequency: 768.00625MHz

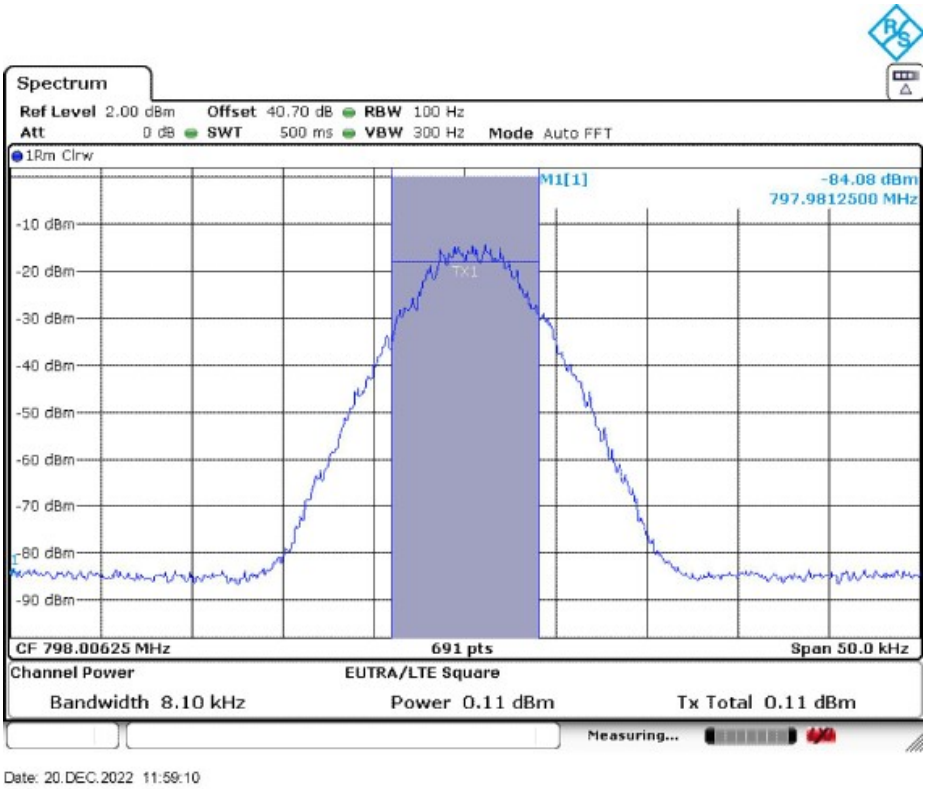


Middle Frequency: 771.5MHz

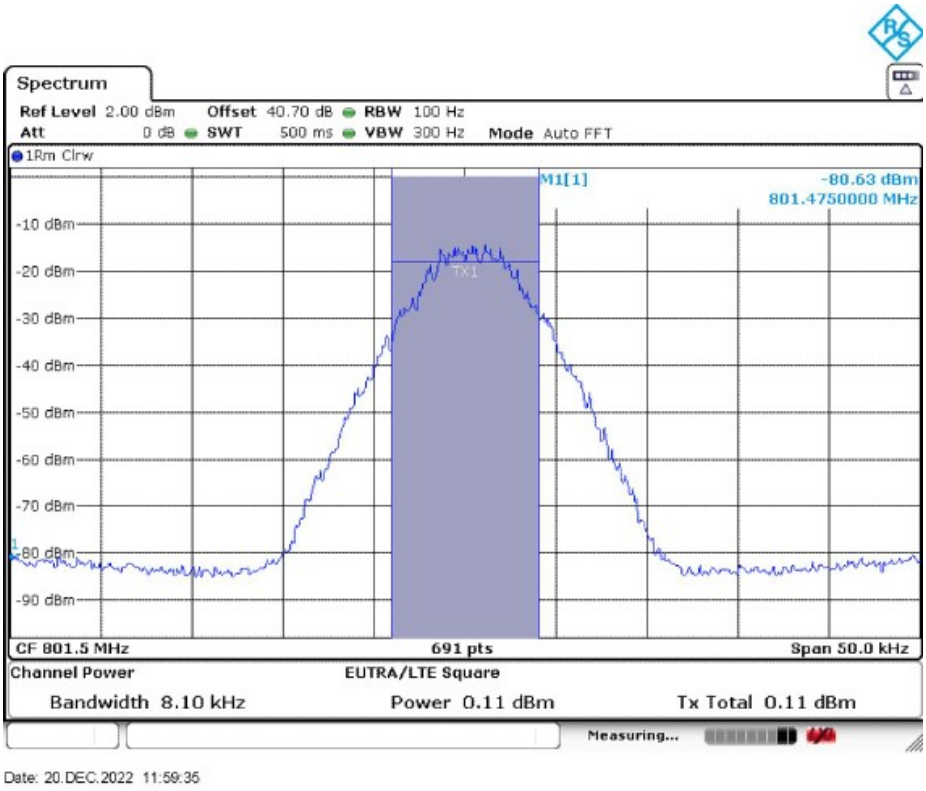


High Frequency: 774.99375MHz

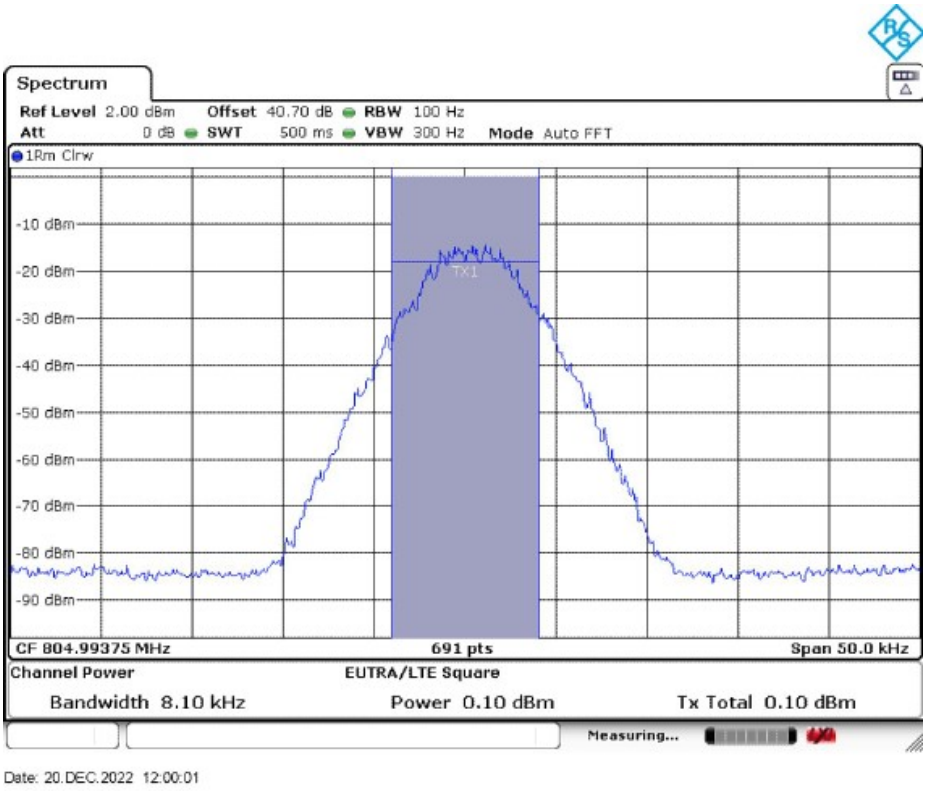
10.2.2.1.2.1.2 Uplink



Low Frequency: 798.00625MHz



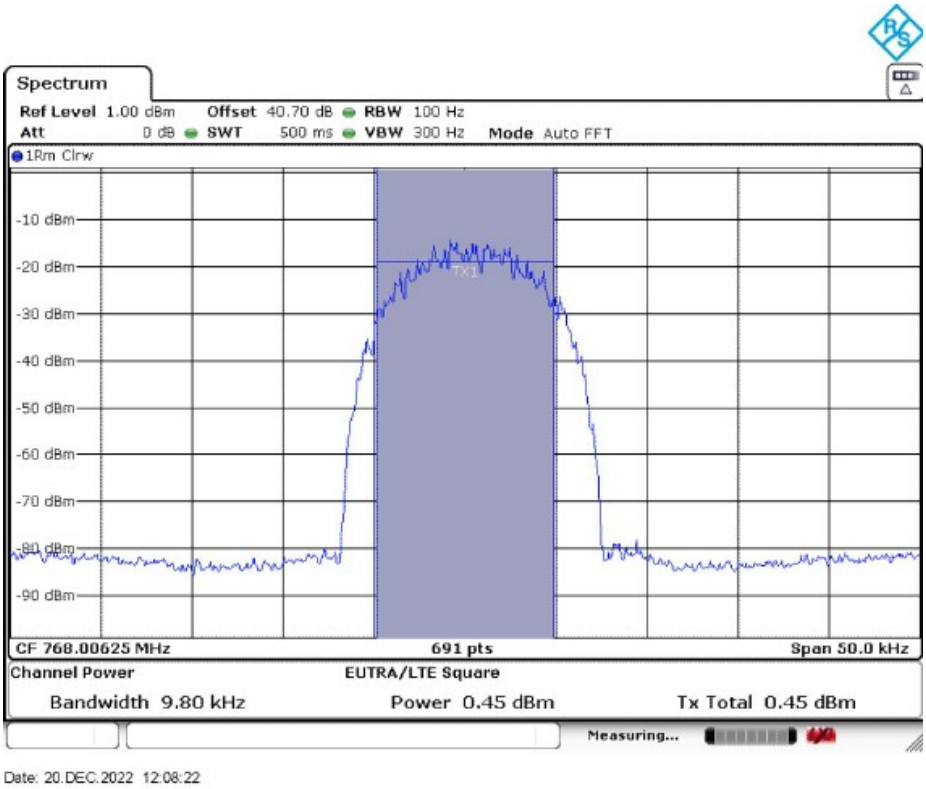
Middle Frequency: 801.5MHz



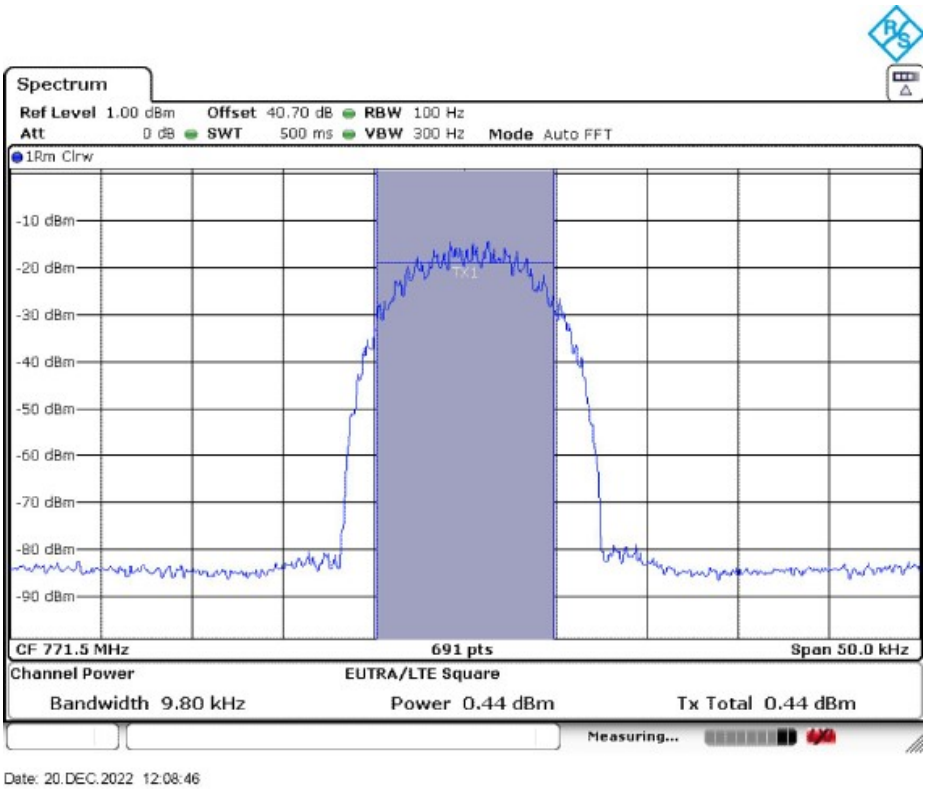
High Frequency: 804.99375MHz

10.2.2.1.3 P25 Phase II(H-DQPSK)

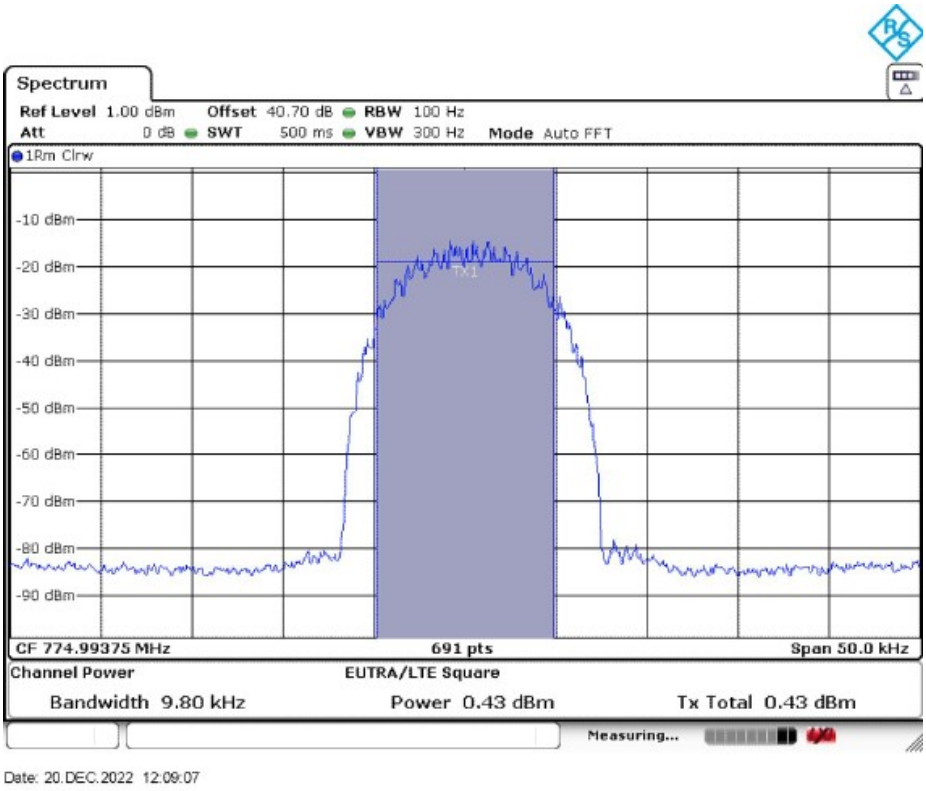
10.2.2.1.3.1.1 Downlink



Low Frequency: 768.00625MHz

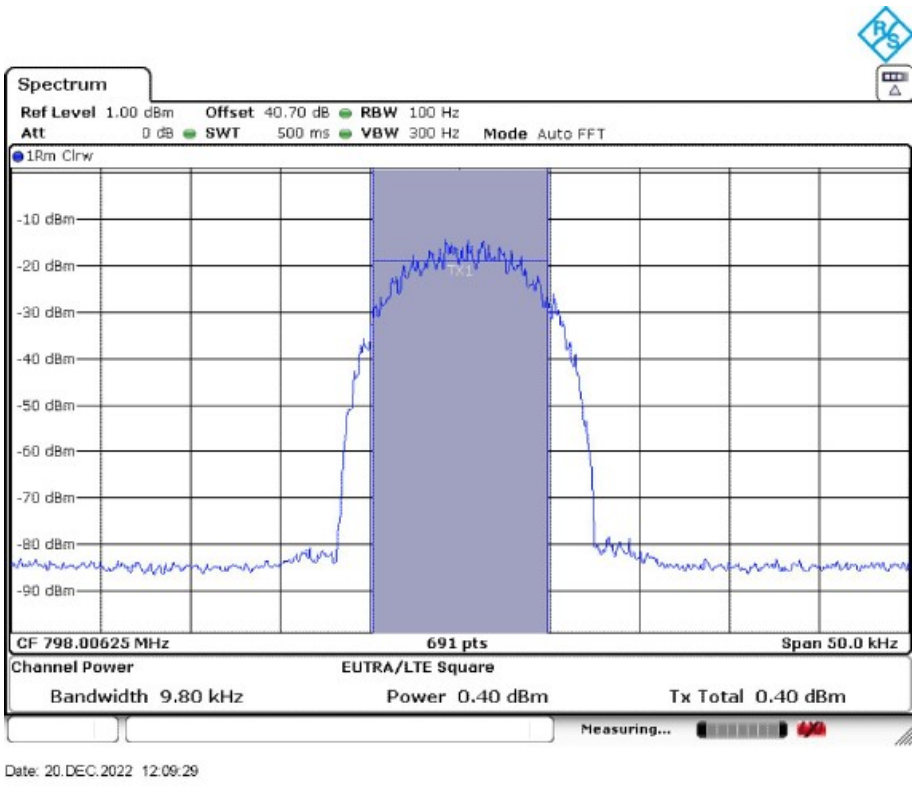


Middle Frequency: 771.5MHz

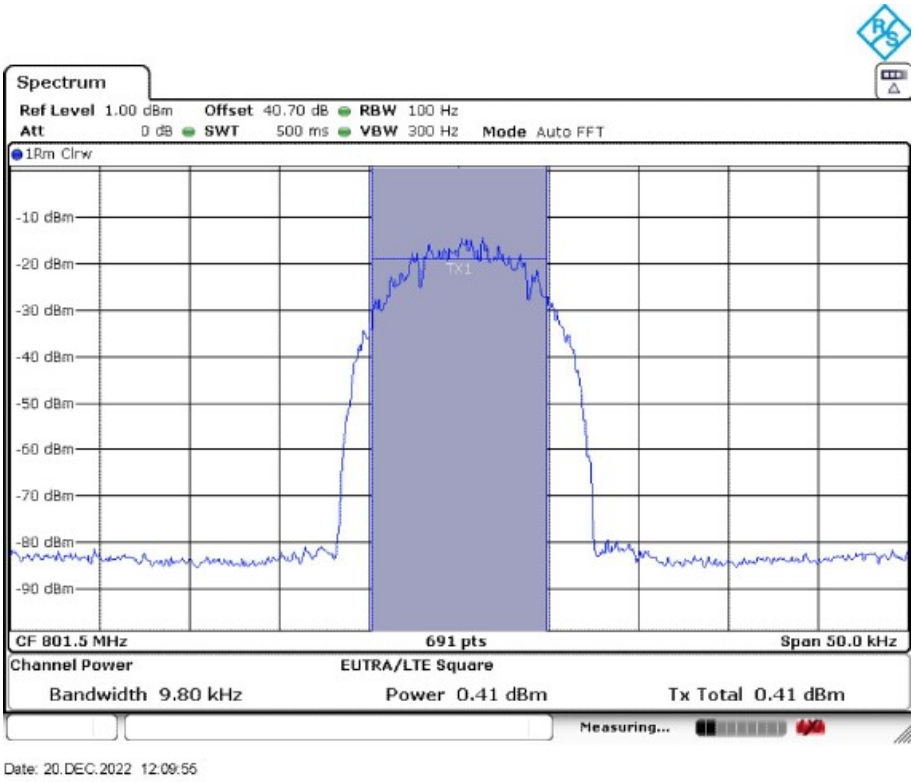


High Frequency: 774.99375MHz

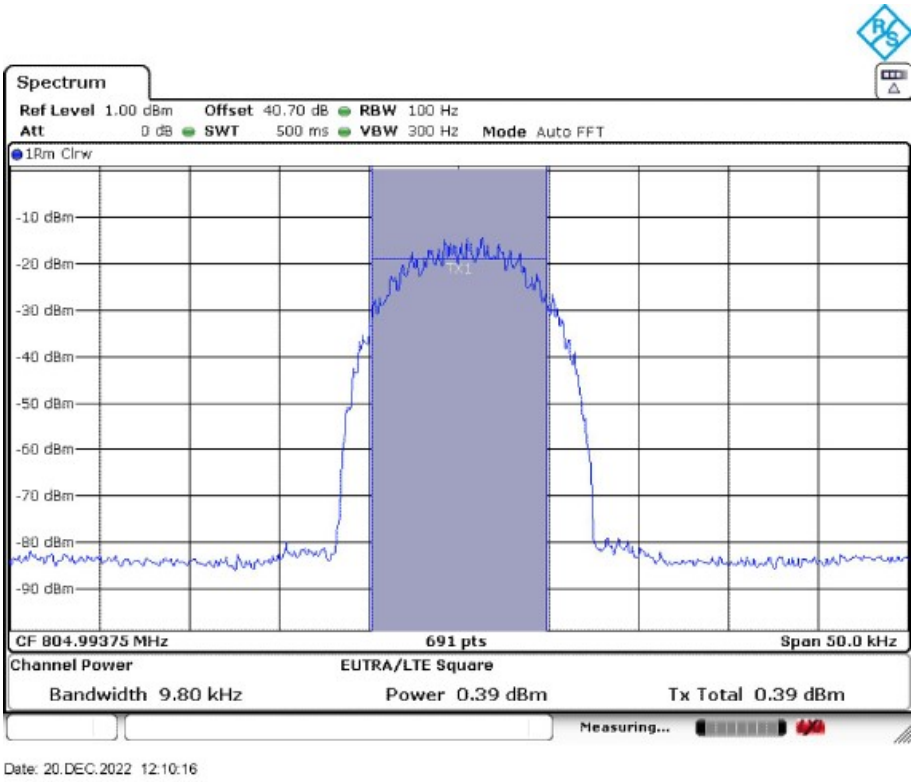
10.2.2.1.3.1.2 Uplink



Low Frequency: 798.00625MHz



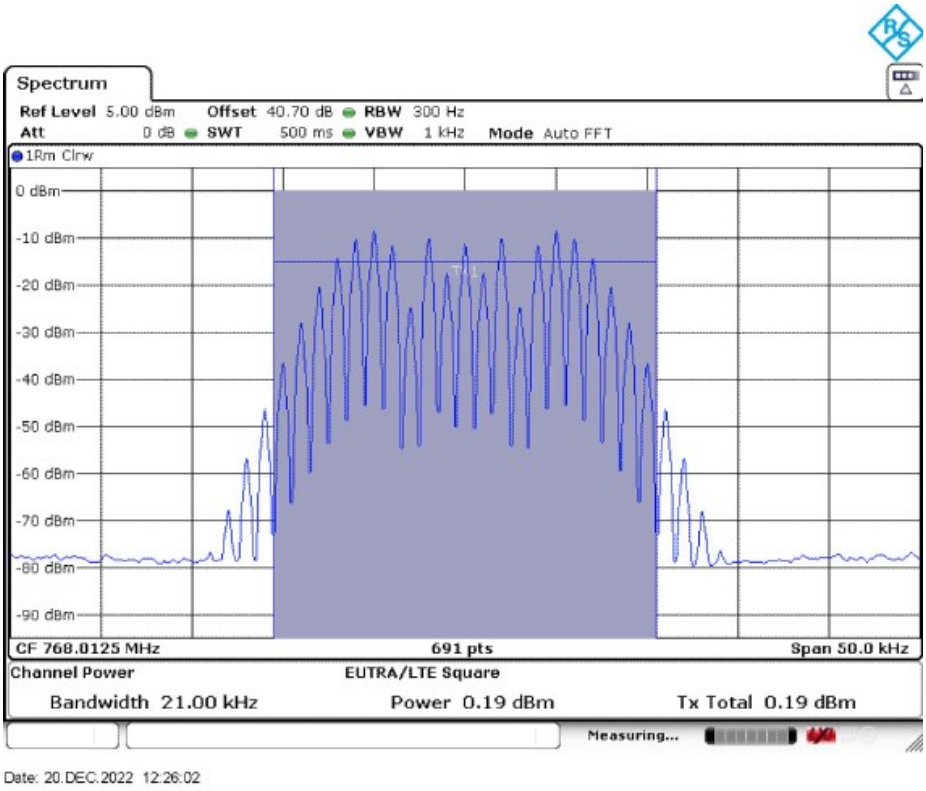
Middle Frequency: 801.5MHz



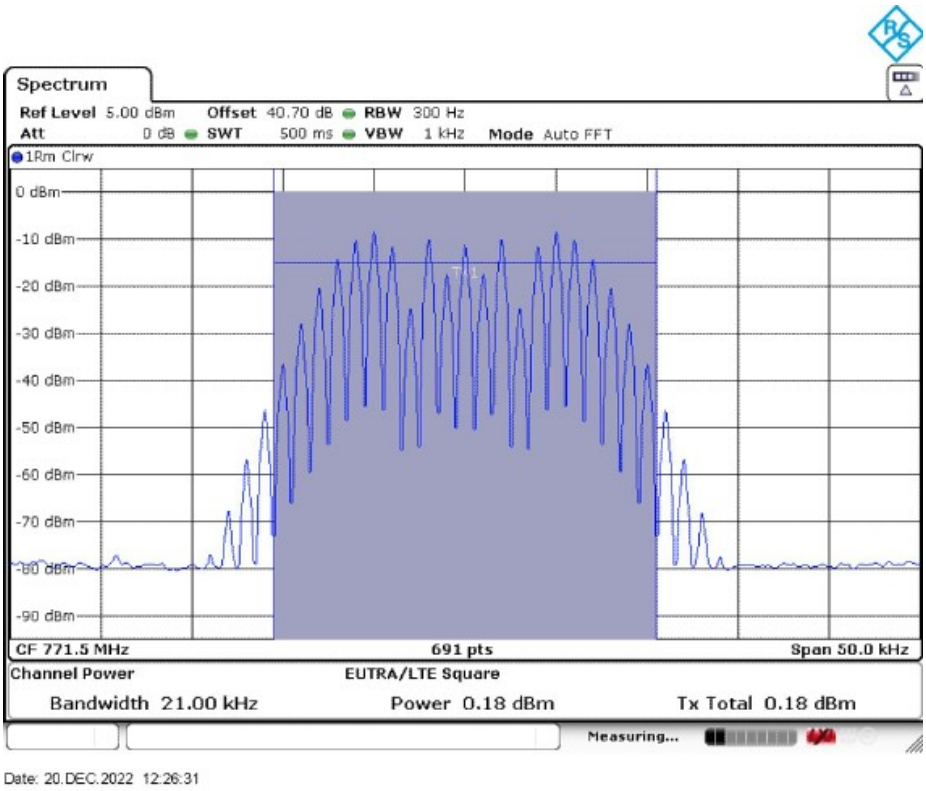
High Frequency: 804.99375MHz

10.2.2.1.4 Analog FM

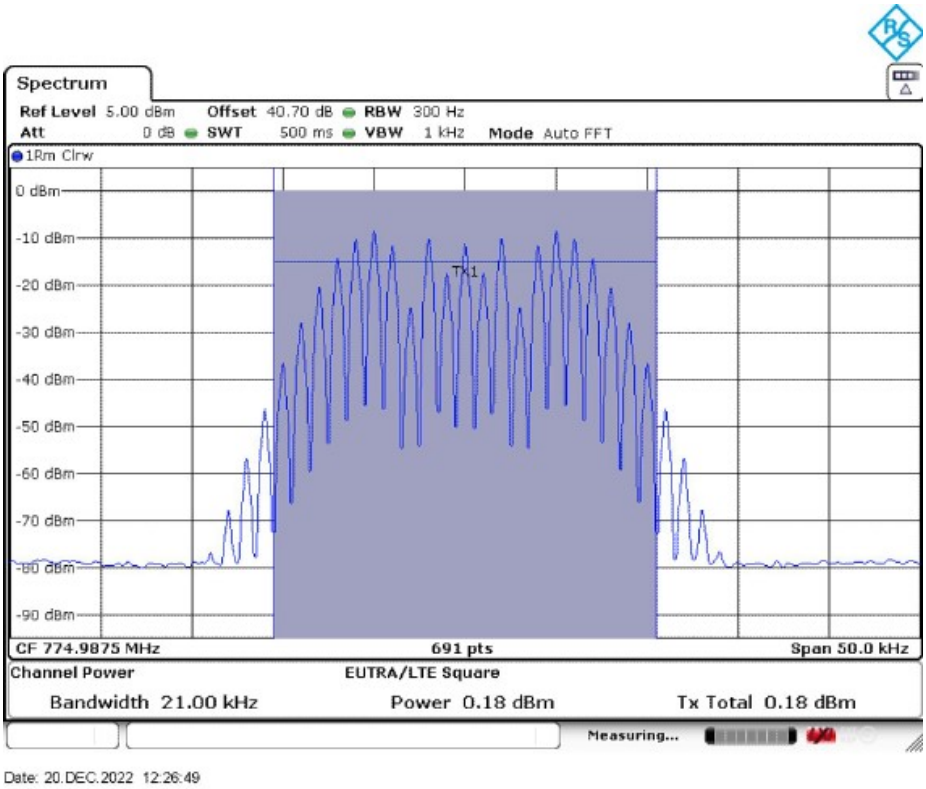
10.2.2.1.4.1.1 Downlink



Low Frequency: 768.0125MHz

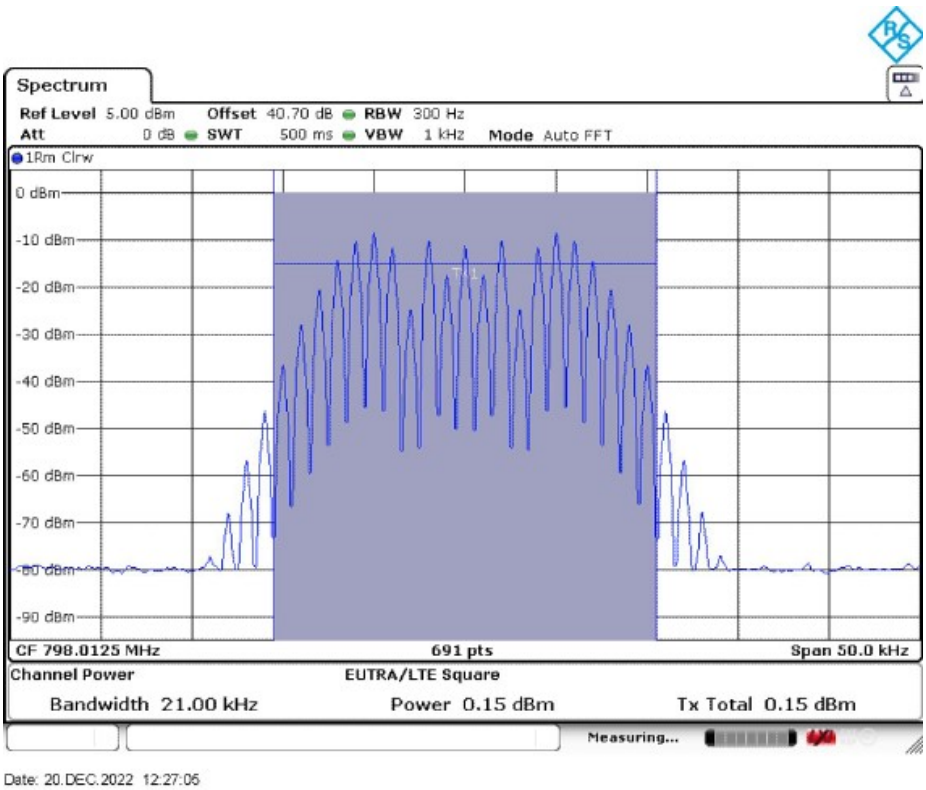


Middle Frequency: 771.5MHz

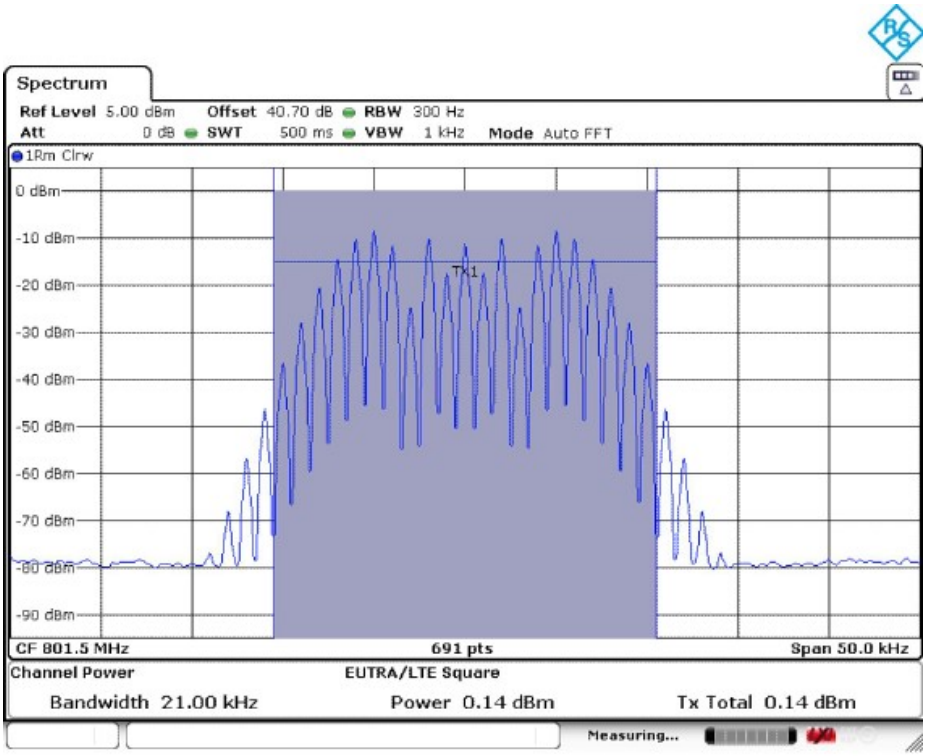


High Frequency: 774.9875MHz

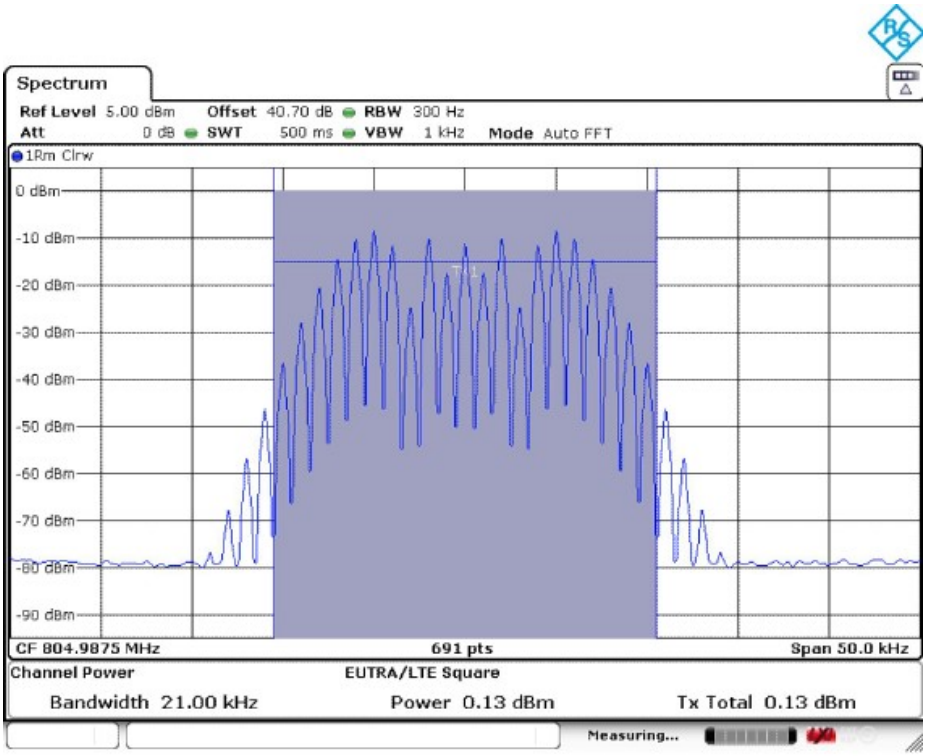
10.2.2.1.4.1.2 Uplink



Low Frequency: 798.0125MHz



Middle Frequency: 801.5MHz

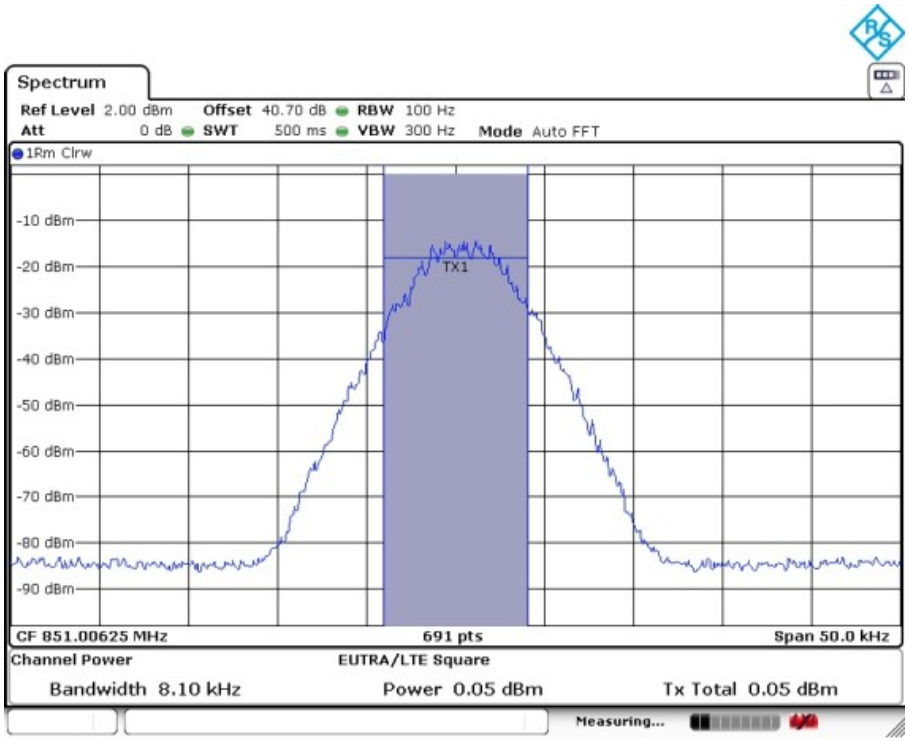


High Frequency: 804.9875MHz

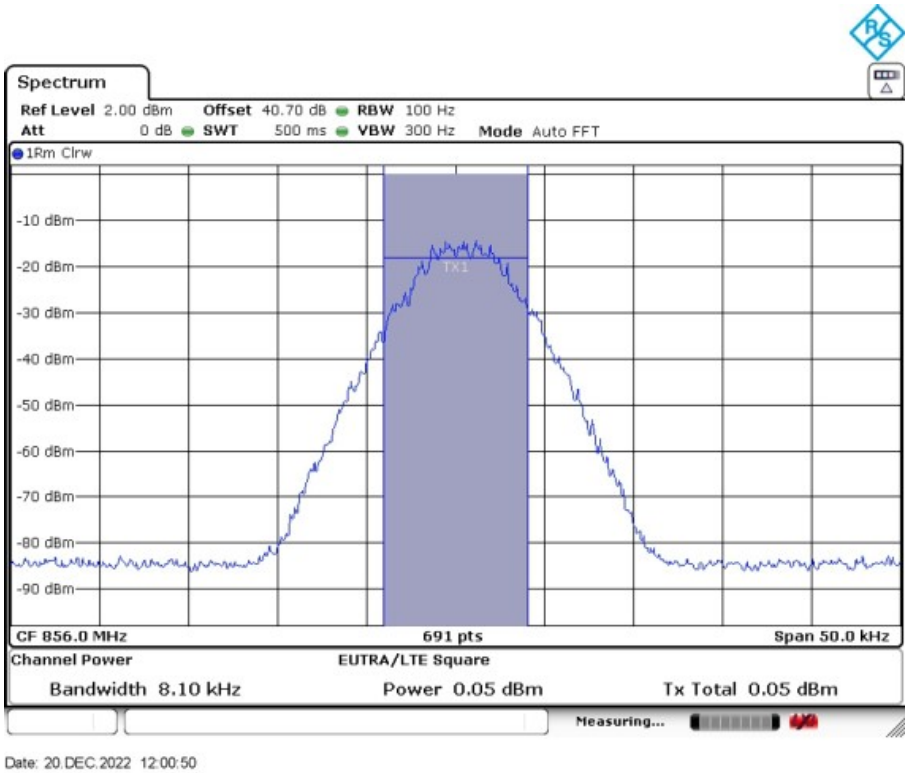
10.2.2.2 800MHz Band

10.2.2.2.1 P25 phase I

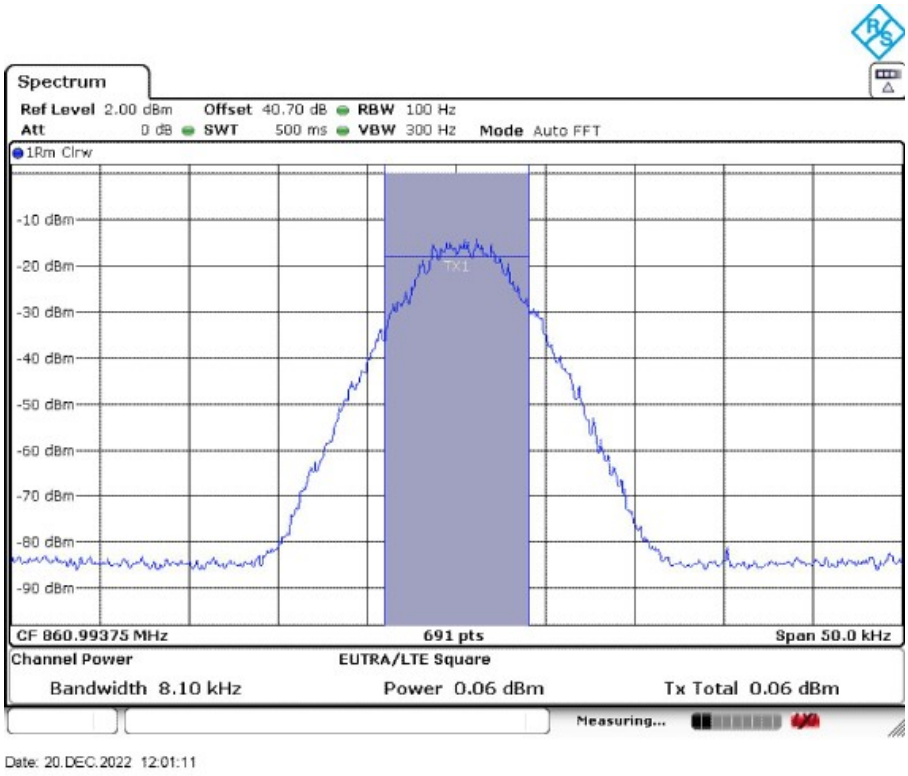
10.2.2.2.1.1.1 Downlink



Low Frequency: 851.00625MHz

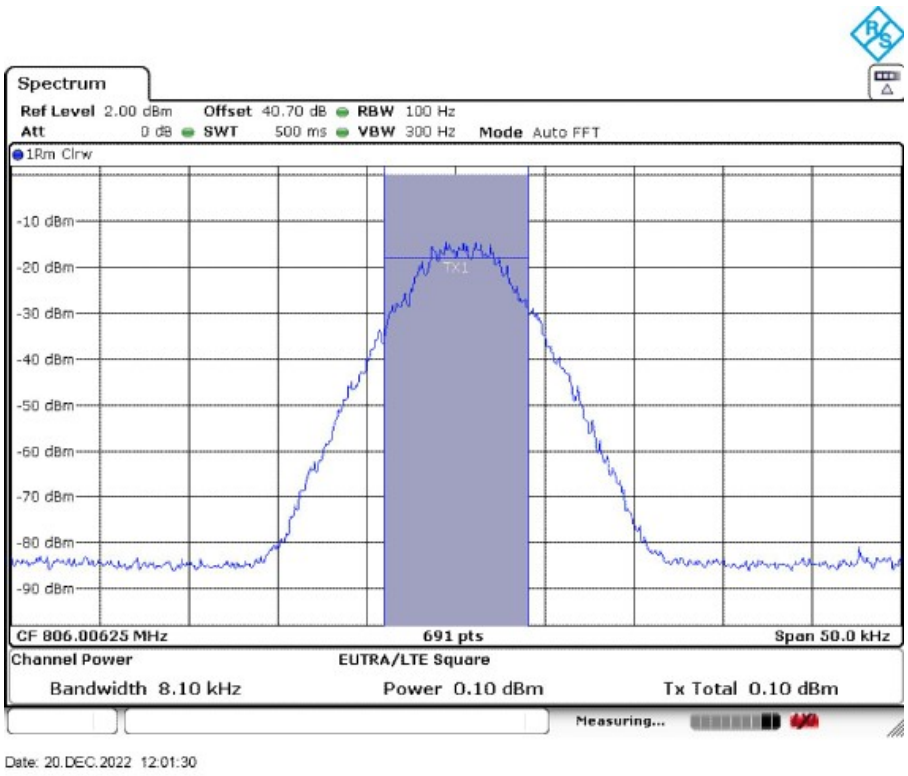


Middle Frequency: 856.0MHz

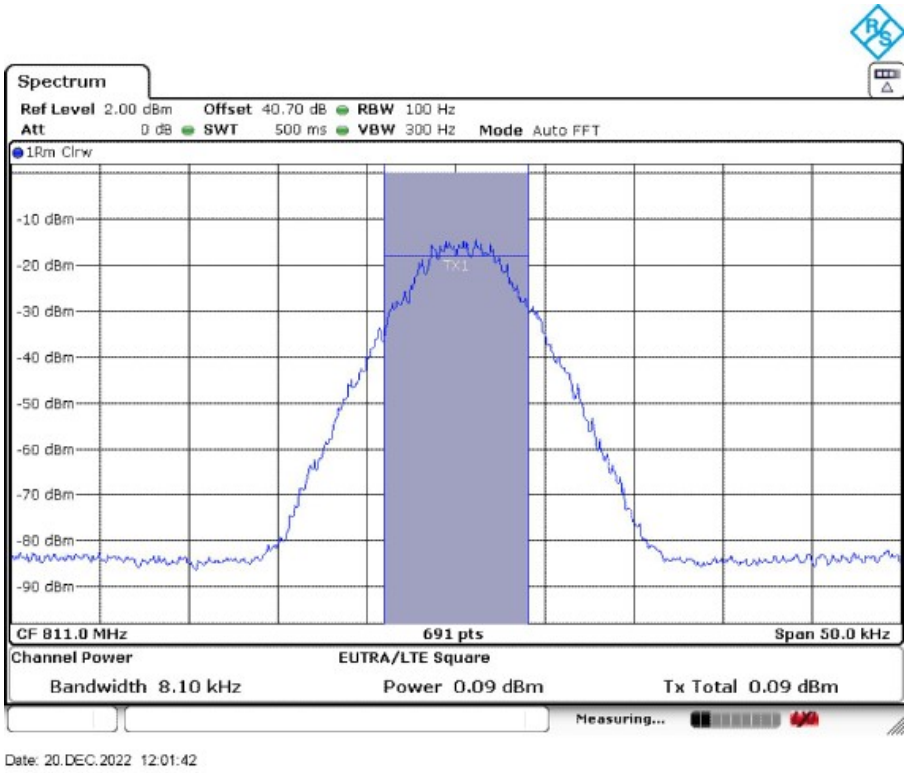


High Frequency: 860.99375MHz

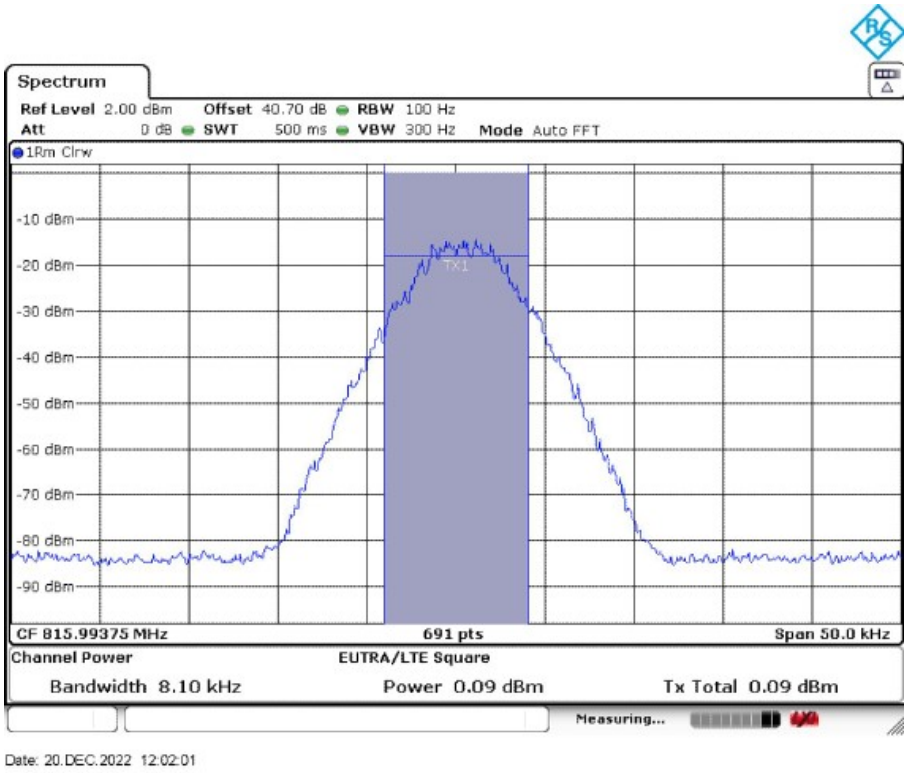
10.2.2.2.1.1.2 Uplink



Low Frequency: 806.00625MHz



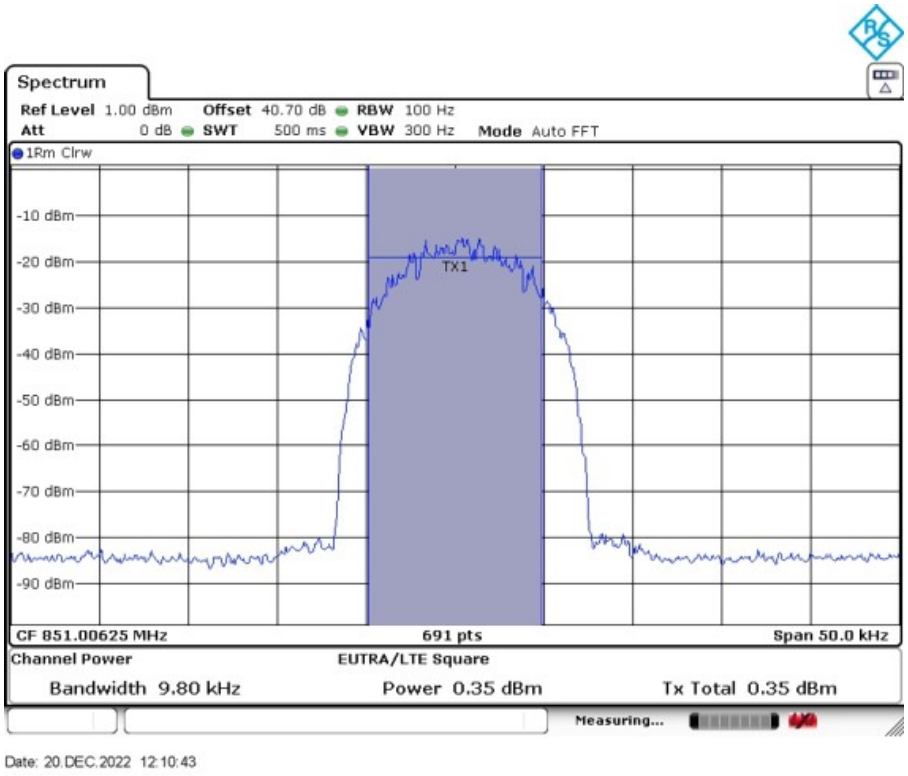
Middle Frequency: 811.0MHz



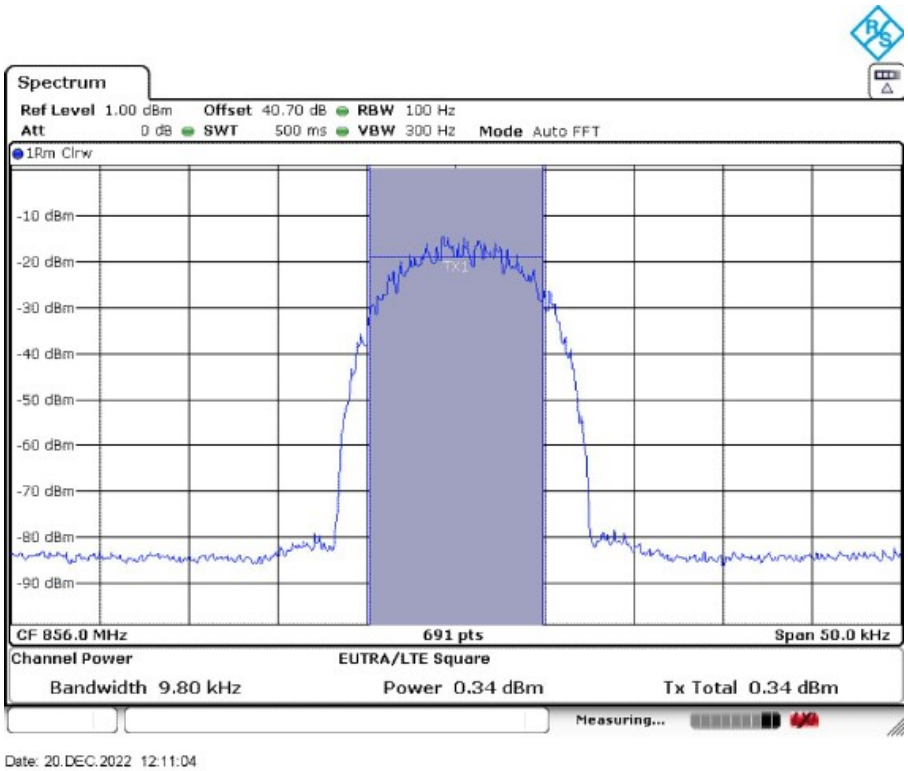
High Frequency: 815.99375MHz

10.2.2.2.2 P25 phase II

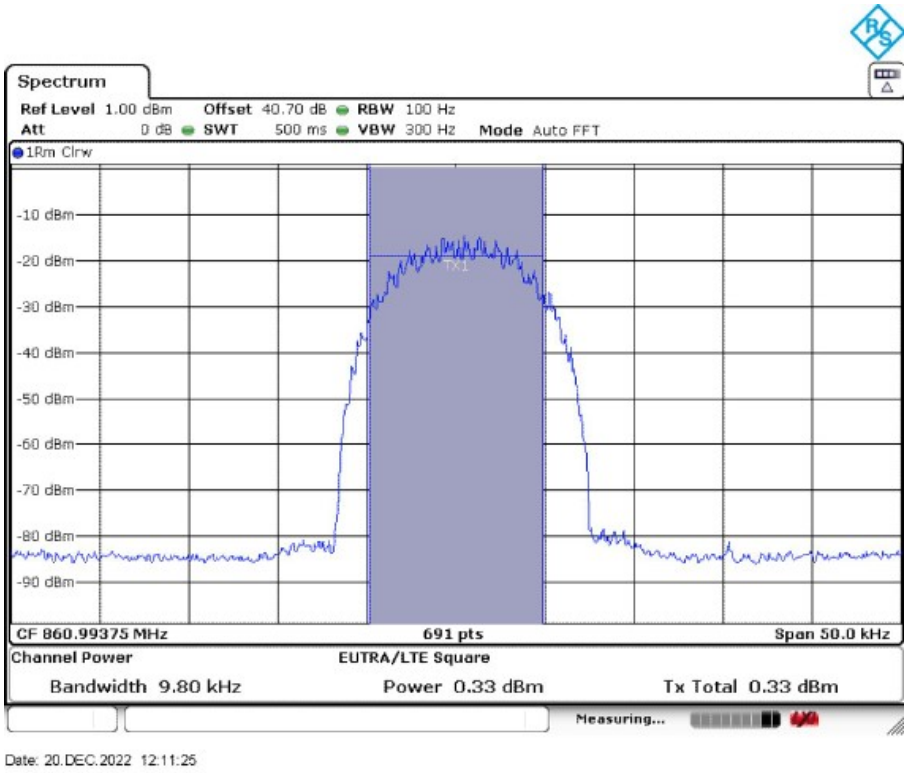
10.2.2.2.2.1.1 Downlink



Low Frequency: 851.00625MHz

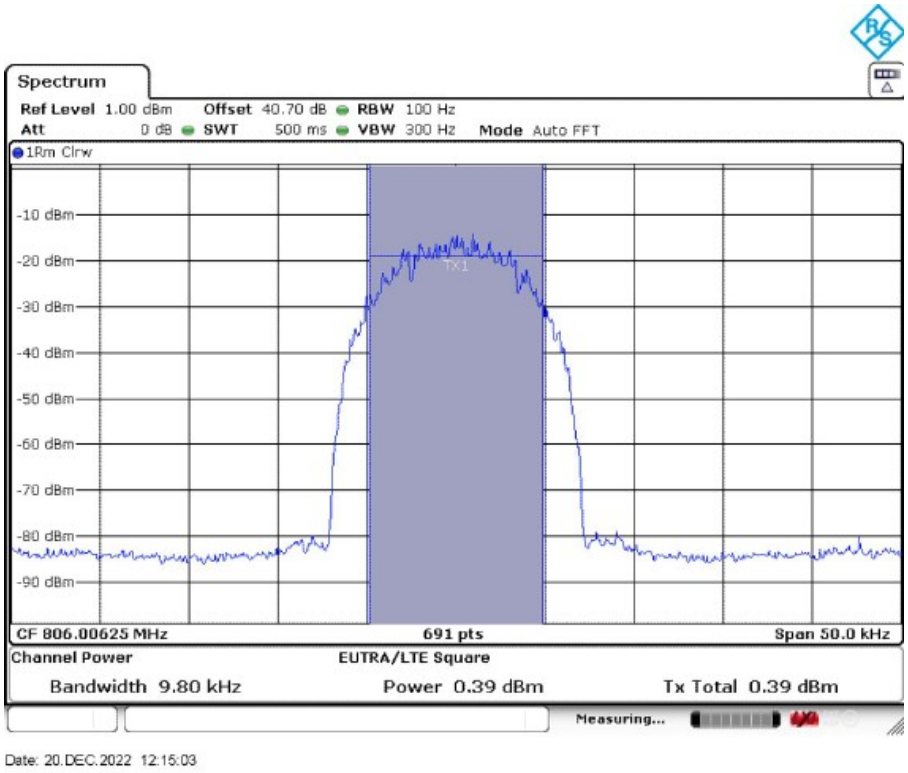


Middle Frequency: 856.0MHz

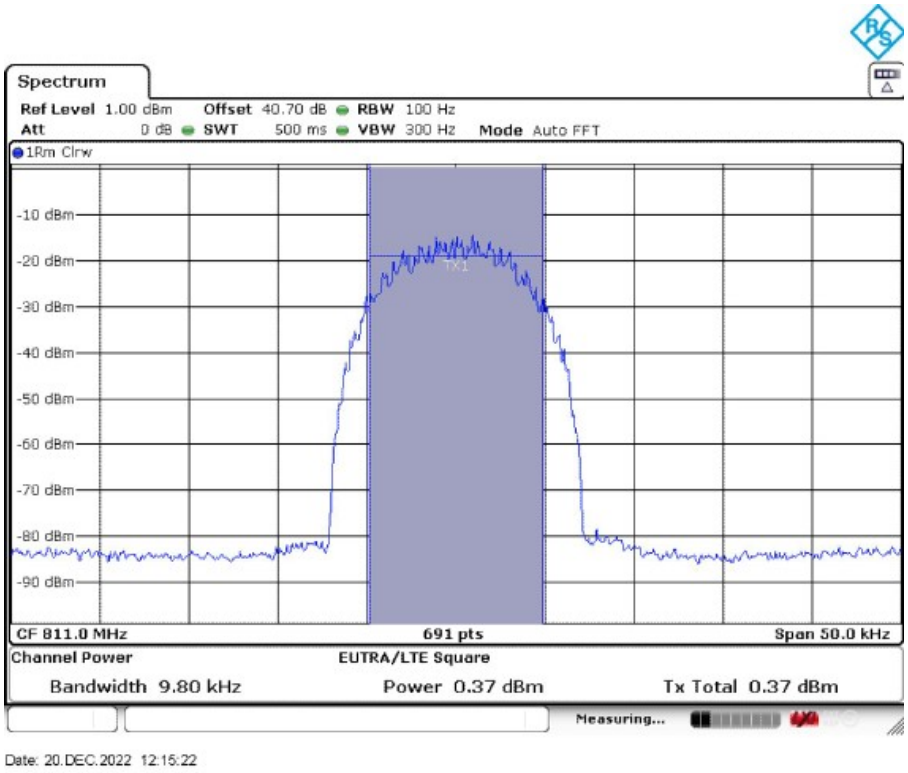


High Frequency: 860.99375MHz

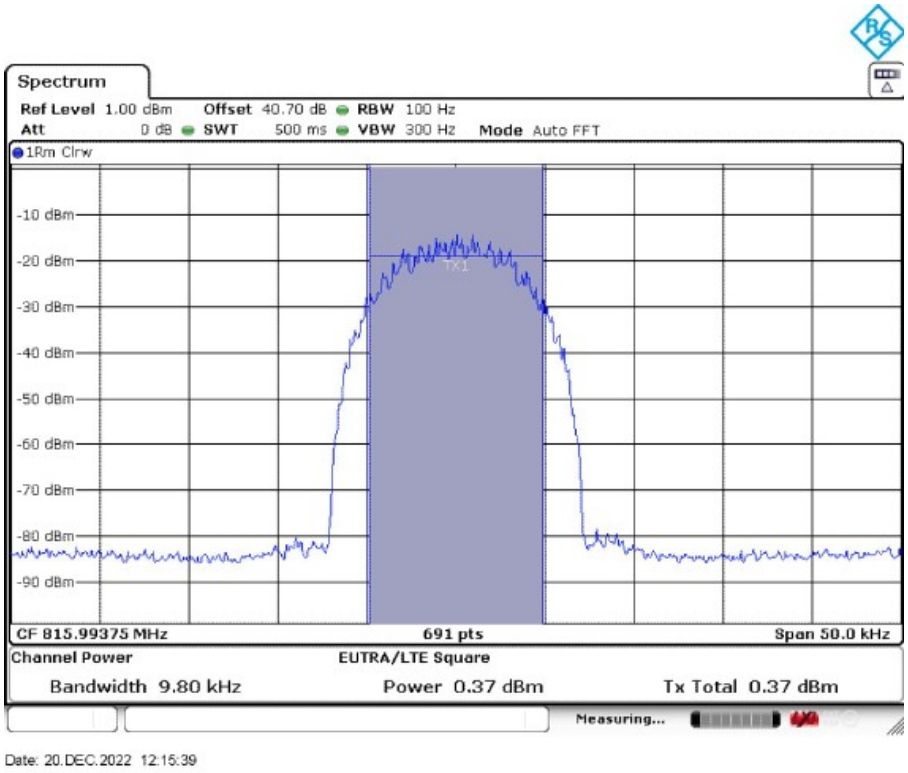
10.2.2.2.2.1.2 Uplink



Low Frequency: 806.00625MHz



Middle Frequency: 811.0MHz



High Frequency: 815.99375MHz