

Prüfbericht-Nr.: Test Report No.:	CN24XVTP 001	Auftrags-Nr.: Order No.:	158290456	Seite 1 von 26 Page 1 of 26
Kunden-Referenz-Nr.: Client Reference No.:	N/A	Auftragsdatum: Order date:	23.07.2024	
Auftraggeber: Client:	Sound Devices, LLC E7556 State Road 23 and 33, P.O. BOX 576 Reedsburg, Wisconsin, WI 53959, USA			
Prüfgegenstand: Test item:	A20-Outpost-NL			
Bezeichnung / Typ-Nr.: Identification / Type No.:	28450			
Auftrags-Inhalt: Order content:	FCC and ISCED Certification			
Prüfgrundlage: Test specification:	FCC Part 15 Subpart C, ANSI C63.10-2013 RSS-247 Issue 3, RSS-Gen Issue 5+Amendment 1+Amendment 2			
Wareneingangsdatum: Date of receipt:	23.07.2024			
Prüfmuster-Nr.: Test sample No.:	A003436743-001			
Prüfzeitraum: Testing period:	23.07.2024 - 14.08.2024			
Ort der Prüfung: Place of testing:	Hong Kong			
Prüflaboratorium: Testing laboratory:	TÜV Rheinland Hong Kong Ltd.			
Prüfergebnis*: Test result*:	Pass			
geprüft von / tested by:		kontrolliert von / reviewed by:		
 04.10.2024 Wooga Wu / Assistant Test Engineer		 04.10.2024 Billy Yip / Laboratory Manager		
Datum Date	Name / Stellung Name / Position	Unterschrift Signature	Datum Date	Name / Stellung Name / Position
Sonstiges / Other: FCC ID: 2AKLX-28450 IC ID: 22225-28450 HVIN : 28450 "Decision Rule" document announced in our website (https://www.tuv.com/landingpage/en/qm-gcn/) describes the statement of conformity and its rule of enforcement for test results are applicable throughout this test report.				
Zustand des Prüfgegenstandes bei Anlieferung: Condition of the test item at delivery:		Prüfmuster vollständig und unbeschädigt Test item complete and undamaged		
* Legende: P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet * Legend: P(ass) = passed a.m. test specification(s) F(ail) = failed a.m. test specification(s) N/A = not applicable N/T = not tested				
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4	Die Entscheidungsregel für Konformitätserklärungen basierend auf numerischen Messergebnissen in diesem Prüfbericht basiert auf der "Null-Grenzwert-Regel" und der "Einfachen Akzeptanz" gemäß ILAC G8:2019 und IEC Guide 115:2021, es sei denn, in der auf Seite 1 dieses Berichts genannten angewandten Norm ist etwas anderes festgelegt oder vom Kunden gewünscht. Dies bedeutet, dass die Messunsicherheit nicht berücksichtigt wird und daher auch nicht im Prüfbericht angegeben wird. Zu weiteren Informationen bezüglich des Risikos durch diese Entscheidungsregel siehe ILAC G8:2019. <i>The decision rule for statements of conformity, based on numerical measurement results, in this test report is based on the "Zero Guard Band Rule" and "Simple Acceptance" in accordance with ILAC G8:2019 and IEC Guide 115:2021, unless otherwise specified in the applied standard mentioned on Page 1 of this report or requested by the customer. This means that measurement uncertainty is not taken in account and hence also not declared in the test report. For additional information to the resulting risk based of this decision rule please refer to ILAC G8:2019.</i>

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Product information

The equipment under test (EUT) is a 2.4GHz remote NexLink antenna box with Bluetooth Low Energy (BLE) and NexLink (LoRa) radio.

PMN: A20-Outpost-NL	HVIN: 28450
FVIN: N/A	HMN: N/A

Manufacturers declarations

NexLink Radio	Transceiver
Operating frequency range	2400.8 - 2481.6 MHz
Type of modulation	GFSK
Number of channels	203
Channel separation	400 kHz
Type of antenna	External
Antenna gain (dBi)	2.0 dBi
Power level	fix
General	
Type of equipment	Stand-alone Radio Device
Connection to public utility power line	No
Nominal voltage	5 VDC(USB-C), 48 VDC(PoE)
Independent Operation Modes	Transceiver

Product function and intended use

The equipment under test (EUT) is a 2.4GHz remote NexLink antenna box with Bluetooth low energy and NexLink (LoRa) radio. Power is supplied from either a PoE (Ethernet 1) or USB-C 15W power supply.

There are two (supplied) external 2.4 GHz swivel-type dipole antennas that connect directly to SMA female connectors on the front panel. The antenna-switching diversity for transmission and reception and shares the external antennas between BLE and NexLink radios. Only one radio may be connected to one antenna at any one time.

FCC ID: 2AKLX-28450

IC ID: 22225-28450

HVIN : 28450

Models	Product description
28450	A20-Outpost-NL

Submitted documents

Circuit Diagram, Block Diagram, Technical Description, User manual, Label

Independent Operation Modes

The basic operation modes are:

- Transmitting mode.

For further information refer to User Manual

Related Submittal(s) Grants

This is a single application for certification of the transmitter.

Remark

The test results in this test report are only relevant to the tested sample and does not involve any assessment in the production.

The EUT is a remote NexLink antenna box which incorporates BLE and NexLink (LoRa) radio. This report is for reporting on NexLink radio only. Refer to test report CN24S2LB 001 issued by TÜV Rheinland Hong Kong Ltd for BLE radio.

Test Set-up and Operation Mode

Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

Test Operation and Test Software

Test operation should refer to test methodology.

- Test mode samples with maximum RF output power and duty cycle and capable to transmit continuously at the lowest, middle and highest frequency channels is provided by the applicant for the testing.

Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessories:

- None

Countermeasures to achieve EMC Compliance

- None

Test Methodology

Radiated Emission

The radiated emission measurements of the transmitter part were performed according to the procedures in ANSI C63.10-2013.

For measurement below 1GHz - the equipment under test (EUT) was placed at the middle of the 80 cm height turntable. For measurement above 1GHz - the EUT was placed at the middle of the 1.5 m height turntable and RF absorbing material was placed on ground plane between turntable and measuring antenna. During the testing, the EUT was operated standalone and arranged for maximum emissions. The EUT was tested in three orthogonal planes.

The investigation is performed with the EUT rotated 360°, the antenna height scanned between 1m and 4m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained.

All radiated tests were performed at an antenna to EUT with 3 meters distance, unless stated otherwise in particular parts of this test report.

Field Strength Calculation

The field strength at 3 m was established by adding the meter reading of the spectrum analyzer to the factors associated with antenna correction factor, cable loss, preamplifiers and filter attenuation.

The equation is expressed as follow:

$$FS = R + AF + CF + FA - PA$$

Where FS = Field Strength in dBuV/m at 3 meters.
 R = Reading of Spectrum Analyzer in dBuV.
 AF = Antenna Factor in dB.
 CF = Cable Attenuation Factor in dB.
 FA = Filter Attenuation Factor in dB.
 PA = Preamplifier Factor in dB.

FA and PA are only be used for the measuring frequency above 1 GHz.

Conducted Emission Calculation

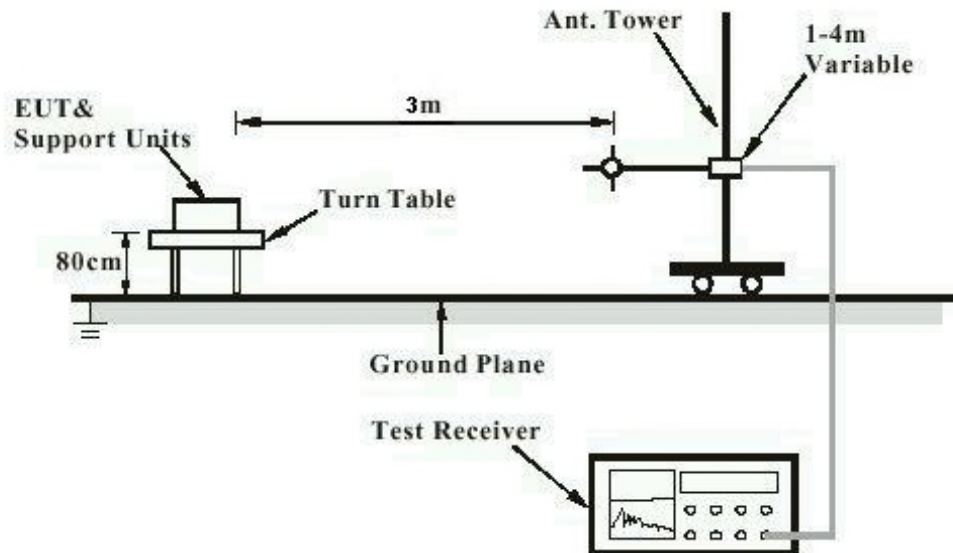
Receiver reading R_r (dBμV)
 LISN insertion loss L_l (dB)
 Cable loss C_l (dB)

Final result (dBμV) = $R_r + L_l + C_l$
 Sample:
 R_r = 40.2 dBμV
 L_l = 10.2 dB
 C_l = 0.3 dB

Final result = 40.2 + 10.2 + 0.3 = 50.7 dBμV

Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test



Note: Measurements above 1 GHz are done with a table height of 1.5m. In addition, there is RF absorbing material on the floor of the test site for above 1GHz measurement.

Diagram of Measurement Equipment Configuration for Mains Conduction Measurement (if applicable)

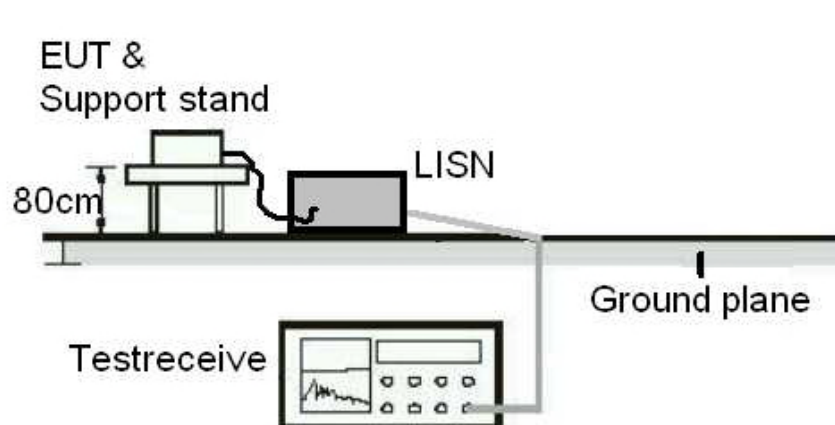
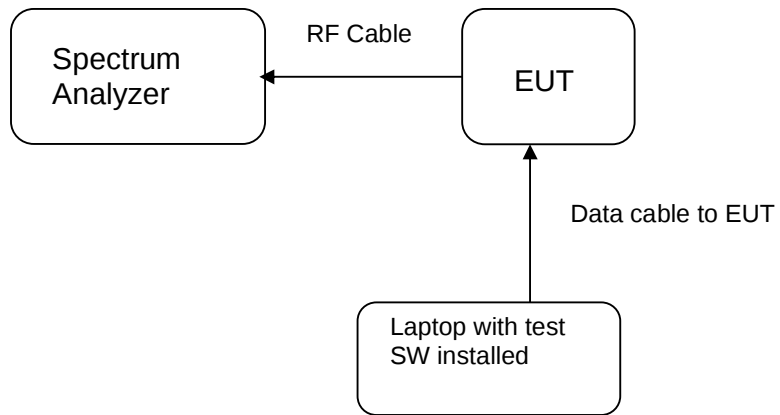


Diagram of Equipment Configuration for Antenna-port Conducted Measurement (if applicable)

Test Facility

Test Laboratory Information

TÜV Rheinland Hong Kong Ltd.

Address: 3-4/F, Fou Wah Industrial Building, 10-16 Pun Shan Street, Tsuen Wan, N.T., Hong Kong

Tel.: +852 2192 1000

Fax: +852 2192 1001

Email service-gc@tuv.com

The test facility is recognized or accredited by the following organizations:

FCC

Designation Number : HK0013

ISED/IC

Company Number : 26152

Hong Kong Productivity Council

Address: LG 1/F., HKPC Building, 78 Tat Chee Road

Tel.: +852 2788 6396

Fax: +852 2788 5405

Email: emc@hkpc.org

The test facility is recognized or accredited by the following organizations:

FCC

Designation Number : HK0012

ISED/IC

Company Number : 4780A

List of Test and Measurement Instruments

Hong Kong Productivity Council

Radiated Emission

Equipment	Manufacturer	Type	Cal. Date	Due Date
Multi-functional Anechoic Chamber (NSA)	Albatross	---	06-Jan-24	06-Jan-25
Multi-functional Anechoic Chamber (VSWR)	Albatross	---	04-Jan-24	04-Jan-25
Test Receiver	Rohde & Schwarz	ESU40	09-Mar-24	09-Mar-25
Double-Ridged Waveguide Horn	EMCO	3117	21-Nov-23	21-Nov-24
Bi-conical Antenna	Rohde & Schwarz	HK116	24-Oct-22	24-Oct-24
Log Periodic Antenna	Rohde & Schwarz	HL223	25-Oct-22	25-Oct-24
Cable	SF118/11N/11 N/12000MM	Huber+Suhner	06-Jan-24	06-Jan-25
Microwave amplifier	COM-POWER Corporation	PAM-118A	03-Mar-24	03-Mar-25
High Pass Filter	Trilithic	23042	29-Oct-23	29-Oct-25

TÜV Rheinland Hong Kong Ltd.

Conducted Emission on AC mains port

Equipment	Manufacturer	Type	Cal. Date	Due Date
EMI Test Receiver	R & S	ESR 3	07-Aug-24	06-Aug-25
LISN	R & S	ENV216	18-Oct-23	18-Oct-24
RF Coaxial Cable	R & S	N/A	23-Aug-23	23-Aug-24
Measurement software	R & S	EMC32	N/A	N/A

Radio Test

Equipment	Manufacturer	Type	Cal. Date	Due Date
Spectrum Analyzer	R & S	FSV40	07-Aug-24	06-Aug-25

Measurement Uncertainty

The estimated combined standard uncertainty for power-line conducted emissions measurements is $\pm 3.36\text{dB}$.

The estimated combined standard uncertainty for radiated emissions measurements is $\pm 2.70\text{dB}$ (9kHz to 30MHz) and $\pm 4.98\text{dB}$ (30MHz to 200MHz) and $\pm 5.74\text{dB}$ (200MHz to 1000MHz) and is $\pm 4.90\text{dB}$ (1GHz to 8.2GHz) and $\pm 4.90\text{dB}$ (8.2GHz to 12.4GHz) and $\pm 4.98\text{dB}$ (12.4GHz to 18GHz)

The estimated combined standard uncertainty for antenna conducted emission is $\pm 1.94\text{dB}$

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor of $k=2$, which for the level of confidence is approximately 95%.

Results FCC Part 15 – Subpart C/ RSS-247 Issue 3

FCC 15.203 – Antenna Requirement 1		Pass
FCC Requirement: No antenna other than that furnished by the responsible party shall be used with the device		
Results:	a) Antenna type:	External
	b) Manufacturer and model no:	Pulse-Larson W1010
	c) Peak Gain:	2.0 dBi
Verdict:	Pass	

FCC 15.204 – Antenna Requirement 2		Pass
FCC Requirement: An intentional radiator may be operated only with the antenna with which it is authorized. If an antenna is marketed with the intentional radiator, it shall be of a type which is authorized with the intentional radiator.		
Results:	Two authorized external antennas are marketed together with the intentional radiator.	
Verdict:	Pass	

RSS-Gen 6.3 – External Control		Pass
IC Requirement: The device shall not have any external controls accessible to the user that enable it to be adjusted, selected or programmed to operate in violation of the limits prescribed in the applicable RSS.		
Results:	The device does not have any transmitter external controls accessible to the user that can be adjusted and operated in violation of the limits of this standard.	
Verdict:	Pass	

RSS-Gen 8.3 – Antenna Requirement		Pass
IC Requirement: When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on measurement or on data from the antenna manufacturer.		
Results:	a) Antenna type:	External
	b) Manufacturer	Pulse-Larson
	c) model no	W1010
	d) Gain with reference to an isotropic radiator:	2.0 dBi
Verdict:	Pass	

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PoE supply - Left antenna					
Mode: 2440.8 MHz Live measurement					
Frequency (MHz)	Quasi-peak (dBµV)	Average (dBµV)	Limit QP (dBµV)	Limit AV (dBµV)	Verdict
0.157	38.9	11.2	65.6	55.6	Pass
7.528	43.0	42.6	60.0	50.0	Pass
10.793	41.6	38.0	60.0	50.0	Pass
Mode: 2440.8 MHz Neutral measurement					
Frequency (MHz)	Quasi-peak (dBµV)	Average (dBµV)	Limit QP (dBµV)	Limit AV (dBµV)	Verdict
0.157	39.0	11.3	65.6	55.6	Pass
7.528	43.0	42.5	60.0	50.0	Pass
10.793	41.0	37.4	60.0	50.0	Pass
PoE supply - Right antenna					
Mode: 2440.8 MHz Live measurement					
Frequency (MHz)	Quasi-peak (dBµV)	Average (dBµV)	Limit QP (dBµV)	Limit AV (dBµV)	Verdict
0.157	39.2	11.5	65.6	55.6	Pass
7.528	43.0	42.6	60.0	50.0	Pass
10.793	41.6	38.0	60.0	50.0	Pass
Mode: 2440.8 MHz Neutral measurement					
Frequency (MHz)	Quasi-peak (dBµV)	Average (dBµV)	Limit QP (dBµV)	Limit AV (dBµV)	Verdict
0.157	39.3	11.6	65.6	55.6	Pass
7.528	42.8	42.3	60.0	50.0	Pass
10.793	41.0	37.4	60.0	50.0	Pass
Remarks: Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and data rate. The radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150kHz to 30MHz does not exceed the limits. For test Results plots refer to Appendix 1, page 2.					

FCC 15.215(c) / RSS-247 5.1(a) – 20dB Bandwidth				Pass
Test Specification : ANSI C63.10 – 2013 Test date : 14.08.2024 Mode of operation : Tx mode Port of testing : 1. Left antenna port 2. Right antenna port Supply voltage : 1. 5 VDC (USB-C), 2. 48 VDC (PoE) Temperature : 23°C Humidity : 65%				
Requirement:		The intentional radiators must be designed to ensure that the 20dB bandwidth of the emission, is contained within the frequency band designated in the rule section under which the equipment is operated.		
Results:		Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and packet types. For test protocols refer to Appendix 1.		
USB-C supply - Left antenna				
Frequency (MHz)	20 dB left (MHz)	Limit (MHz)	20 dB right (MHz)	Limit (MHz)
2400.8	2400.716	> 2400	2400.988	< 2483.5
2440.8	2440.718	> 2400	2440.991	< 2483.5
2481.6	2481.515	> 2400	2481.798	< 2483.5
USB-C supply - Right antenna				
Frequency (MHz)	20 dB left (MHz)	Limit (MHz)	20 dB right (MHz)	Limit (MHz)
2400.8	2400.710	> 2400	2400.985	< 2483.5
2440.8	2440.720	> 2400	2440.987	< 2483.5
2481.6	2481.513	> 2400	2481.793	< 2483.5
PoE supply - Left antenna				
Frequency (MHz)	20 dB left (MHz)	Limit (MHz)	20 dB right (MHz)	Limit (MHz)
2400.8	2400.665	> 2400	2400.940	< 2483.5
2440.8	2440.668	> 2400	2440.939	< 2483.5
2481.6	2481.465	> 2400	2481.740	< 2483.5
PoE supply - Right antenna				
Frequency (MHz)	20 dB left (MHz)	Limit (MHz)	20 dB right (MHz)	Limit (MHz)
2400.8	2400.719	> 2400	2400.993	< 2483.5
2440.8	2440.722	> 2400	2440.991	< 2483.5
2481.6	2481.523	> 2400	2481.794	< 2483.5

FCC 15.247 (a)(1) / RSS-247 5.1(b) – Carrier Frequency Separation		Pass
FCC/ IC Requirement: Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25kHz or the 2/3*20dB bandwidth of the hopping channel, whichever is greater.		
Test Specification : ANSI C63.10 – 2013 Test date : 14.08.2024 Mode of operation : Tx mode Port of testing : 1. Left antenna port 2. Right antenna port Supply voltage : 1. 5 VDC (USB-C), 2. 48 VDC (PoE) Temperature : 23°C Humidity : 65%		
Results:		The centre frequencies of the hopping channels are separated by more than the 2/3*20dB bandwidth. For test protocols please refer to Appendix 1.
Note: The limit is maximum 2/3 of the 20dB bandwidth: 183.3 kHz		

FCC 15.247 (a)(1)(iii) / RSS-247 5.1(d) – Number of Hopping Frequency		Pass
FCC/ IC Requirement: Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.		
Test Specification : ANSI C63.10 – 2013 Test date : 14.08.2024 Mode of operation : Tx mode Port of testing : 1. Left antenna port 2. Right antenna port Supply voltage : 1. 5 VDC (USB-C), 2. 48 VDC (PoE) Temperature : 23°C Humidity : 65%		
Results:		Measured quantity of hopping channel is greater than 15 channels. For test protocols please refer to Appendix 1.

FCC 15.247 (a)(1)(iii) / RSS-247 5.1(d) – Time of Occupancy				Pass
FCC/ IC Requirement: The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.				
Test Specification : ANSI C63.10 – 2013 Test date : 12.08.2024 - 14.08.2024 Mode of operation : Tx mode Port of testing : 1. Left antenna port 2. Right antenna port Supply voltage : 1. 5 VDC (USB-C), 2. 48 VDC (PoE) Temperature : 23°C Humidity : 65%				
Results: Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and packet types. For test protocols please refer to Appendix 1.				
USB-C supply - Left antenna				
Frequency (MHz)	Pulse width (ms)	Measured dwell time (s)	Limit (s)	Verdict
2400.8	28.087	0.084	< 0.4	Pass
2440.8	28.087	0.084	< 0.4	Pass
2481.6	28.087	0.056	< 0.4	Pass
Note: Dwell Time = Pulse width x (Hopping rate / Number of channels) x Period Period = 0.4 x 198 (channel) = 79.2 seconds				
USB-C supply - Right antenna				
Frequency (MHz)	Pulse width (ms)	Measured dwell time (s)	Limit (s)	Verdict
2400.8	27.826	0.028	< 0.4	Pass
2440.8	27.826	0.083	< 0.4	Pass
2481.6	27.826	0.083	< 0.4	Pass
Note: Dwell Time = Pulse width x (Hopping rate / Number of channels) x Period Period = 0.4 x 200 (channel) = 80.0 seconds				
PoE supply - Left antenna				
Frequency (MHz)	Pulse width (ms)	Measured dwell time (s)	Limit (s)	Verdict
2400.8	27.913	0.112	< 0.4	Pass
2440.8	27.913	0.054	< 0.4	Pass
2481.6	27.913	0.084	< 0.4	Pass
Note: Dwell Time = Pulse width x (Hopping rate / Number of channels) x Period Period = 0.4 x 198 (channel) = 79.2 seconds				
PoE supply - Right antenna				
Frequency (MHz)	Pulse width (ms)	Measured dwell time (s)	Limit (s)	Verdict
2400.8	27.826	0.056	< 0.4	Pass
2440.8	27.826	0.056	< 0.4	Pass
2481.6	27.826	0.083	< 0.4	Pass
Note: Dwell Time = Pulse width x (Hopping rate / Number of channels) x Period Period = 0.4 x 199 (channel) = 79.6 seconds				

RSS-Gen 6.7 – Occupied Bandwidth			Pass
FCC/ IC Requirement: N/A			
Test Specification : RSS-Gen Test date : 13.08.2024 - 14.08.2024 Mode of operation : Tx mode Port of testing : 1. Left antenna port 2. Right antenna port Supply voltage : 1. 5 VDC (USB-C), 2. 48 VDC (PoE) Temperature : 23°C Humidity : 65%			
Results: Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and packet types. For test protocols refer to Appendix 1.			
USB-C supply - Left antenna			
Frequency (MHz)	Left (MHz)	Right (MHz)	99% bandwidth (MHz)
2400.800	2400.738	2400.966	0.229
2440.800	2440.739	2440.966	0.227
2481.600	2481.541	2481.768	0.227
USB-C supply - Right antenna			
Frequency (MHz)	Left (MHz)	Right (MHz)	99% bandwidth (MHz)
2400.800	2400.736	2400.964	0.227
2440.800	2440.736	2440.965	0.229
2481.600	2481.536	2481.768	0.232
PoE supply - Left antenna			
Frequency (MHz)	Left (MHz)	Right (MHz)	99% bandwidth (MHz)
2400.800	2400.689	2400.919	0.230
2440.800	2440.690	2400.919	0.229
2481.600	2481.491	2481.717	0.226
PoE supply - Right antenna			
Frequency (MHz)	Left (MHz)	Right (MHz)	99% bandwidth (MHz)
2400.800	2400.739	2400.966	0.227
2440.800	2400.741	2440.968	0.227
2481.600	2481.539	2481.769	0.230

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FCC 15.247(d) / RSS-247 5.5 – Spurious Conducted Emissions		Pass
Test Specification	: ANSI C63.10 – 2013	
Test date	: 14.08.2024	
Mode of operation	: Tx mode	
Port of testing	: 1. Left antenna port 2. Right antenna port	
Supply voltage	: 1. 5 VDC (USB-C), 2. 48 VDC (PoE)	
Temperature	: 23°C	
Humidity	: 50%	
FCC/ IC Requirement: In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.		
Results:	Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and data rate. Test results of 100kHz Bandwidth of Frequency Band Edge by Conducted method is compliance with the requirement. For test protocols refer to Appendix 1.	

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Mode: 2440.8 MHz TX			Horizontal Polarization		
Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m	Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m
4881.600	43.0	74.0 / PK	4881.600	30.7	54.0 / AV
7322.400	47.4	74.0 / PK	7322.400	38.8	54.0 / AV
Mode: 2481.6 MHz TX			Vertical Polarization		
Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m	Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m
2483.500	67.0	74.0 / PK	2483.500	41.8	54.0 / AV
4963.200	46.2	74.0 / PK	4963.200	40.3	54.0 / AV
7444.800	50.6	74.0 / PK	7444.800	46.0	54.0 / AV
Mode: 2481.6 MHz TX			Horizontal Polarization		
Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m	Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m
2483.500	65.2	74.0 / PK	2483.500	40.1	54.0 / AV
4963.200	42.6	74.0 / PK	4963.200	30.0	54.0 / AV
7444.800	46.4	74.0 / PK	7444.800	38.6	54.0 / AV
USB-C supply - Right antenna					
Mode: 2400.8 MHz TX			Vertical Polarization		
Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m	Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m
2390.000	42.6	74.0 / PK	2390.000	28.3	54.0 / AV
4801.600	45.2	74.0 / PK	4801.600	36.2	54.0 / AV
7202.400	45.7	74.0 / PK	7202.400	33.1	54.0 / AV
Mode: 2400.8 MHz TX			Horizontal Polarization		
Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m	Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m
2390.000	39.9	74.0 / PK	2390.000	26.7	54.0 / AV
4801.600	44.2	74.0 / PK	4801.600	33.8	54.0 / AV
7202.400	47.8	74.0 / PK	7202.400	39.7	54.0 / AV
Mode: 2440.8 MHz TX			Vertical Polarization		
Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m	Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m
4881.600	48.0	74.0 / PK	4881.600	38.6	54.0 / AV
7322.400	51.8	74.0 / PK	7322.400	48.6	54.0 / AV

Mode: 2440.8 MHz TX			Horizontal Polarization		
Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m	Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m
4881.600	43.3	74.0 / PK	4881.600	34.0	54.0 / AV
7322.400	46.8	74.0 / PK	7322.400	38.5	54.0 / AV
Mode: 2481.6 MHz TX			Vertical Polarization		
Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m	Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m
2483.500	68.5	74.0 / PK	2483.500	43.2	54.0 / AV
4963.200	45.8	74.0 / PK	4963.200	37.5	54.0 / AV
7444.800	51.5	74.0 / PK	7444.800	47.0	54.0 / AV
Mode: 2481.6 MHz TX			Horizontal Polarization		
Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m	Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m
2483.500	65.4	74.0 / PK	2483.500	40.0	54.0 / AV
4963.200	42.4	74.0 / PK	4963.200	30.0	54.0 / AV
7444.800	46.4	74.0 / PK	7444.800	38.4	54.0 / AV
PoE supply - Left antenna					
Mode: 2400.8 MHz TX			Vertical Polarization		
Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m	Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m
2390.000	42.6	74.0 / PK	2390.000	28.4	54.0 / AV
4801.600	46.9	74.0 / PK	4801.600	39.5	54.0 / AV
7202.400	46.1	74.0 / PK	7202.400	34.0	54.0 / AV
Mode: 2400.8 MHz TX			Horizontal Polarization		
Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m	Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m
2390.000	40.2	74.0 / PK	2390.000	26.8	54.0 / AV
4801.600	43.6	74.0 / PK	4801.600	32.0	54.0 / AV
7202.400	47.8	74.0 / PK	7202.400	40.1	54.0 / AV
Mode: 2440.8 MHz TX			Vertical Polarization		
Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m	Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m
4881.600	46.2	74.0 / PK	4881.600	38.4	54.0 / AV
7322.400	46.7	74.0 / PK	7322.400	39.1	54.0 / AV

Mode: 2440.8 MHz TX			Horizontal Polarization		
Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m	Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m
4881.600	43.3	74.0 / PK	4881.600	31.1	54.0 / AV
7322.400	48.0	74.0 / PK	7322.400	41.2	54.0 / AV
Mode: 2481.6 MHz TX			Vertical Polarization		
Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m	Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m
2483.500	66.6	74.0 / PK	2483.500	43.5	54.0 / AV
4963.200	46.6	74.0 / PK	4963.200	39.9	54.0 / AV
7444.800	49.0	74.0 / PK	7444.800	44.0	54.0 / AV
Mode: 2481.6 MHz TX			Horizontal Polarization		
Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m	Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m
2483.500	66.0	74.0 / PK	2483.500	39.4	54.0 / AV
4963.200	43.1	74.0 / PK	4963.200	31.5	54.0 / AV
7444.800	47.5	74.0 / PK	7444.800	40.7	54.0 / AV
PoE supply - Right antenna					
Mode: 2400.8 MHz TX			Vertical Polarization		
Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m	Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m
2390.000	39.8	74.0 / PK	2390.000	26.8	54.0 / AV
4801.600	46.1	74.0 / PK	4801.600	37.0	54.0 / AV
7202.400	45.1	74.0 / PK	7202.400	31.6	54.0 / AV
Mode: 2400.8 MHz TX			Horizontal Polarization		
Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m	Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m
2390.000	39.6	74.0 / PK	2390.000	26.2	54.0 / AV
4801.600	43.3	74.0 / PK	4801.600	30.4	54.0 / AV
7202.400	44.7	74.0 / PK	7202.400	33.2	54.0 / AV
Mode: 2440.8 MHz TX			Vertical Polarization		
Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m	Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m
4881.600	45.2	74.0 / PK	4881.600	36.5	54.0 / AV
7322.400	49.5	74.0 / PK	7322.400	44.2	54.0 / AV

Mode: 2440.8 MHz TX			Horizontal Polarization		
Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m	Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m
4881.600	43.0	74.0 / PK	4881.600	31.5	54.0 / AV
7322.400	45.4	74.0 / PK	7322.400	34.2	54.0 / AV
Mode: 2481.6 MHz TX			Vertical Polarization		
Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m	Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m
2483.500	69.1	74.0 / PK	2483.500	45.0	54.0 / AV
4963.200	45.6	74.0 / PK	4963.200	37.5	54.0 / AV
7444.800	51.9	74.0 / PK	7444.800	48.1	54.0 / AV
Mode: 2481.6 MHz TX			Horizontal Polarization		
Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m	Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m
2483.500	64.7	74.0 / PK	2483.500	39.1	54.0 / AV
4963.200	42.4	74.0 / PK	4963.200	30.0	54.0 / AV
7444.800	46.0	74.0 / PK	7444.800	37.2	54.0 / AV

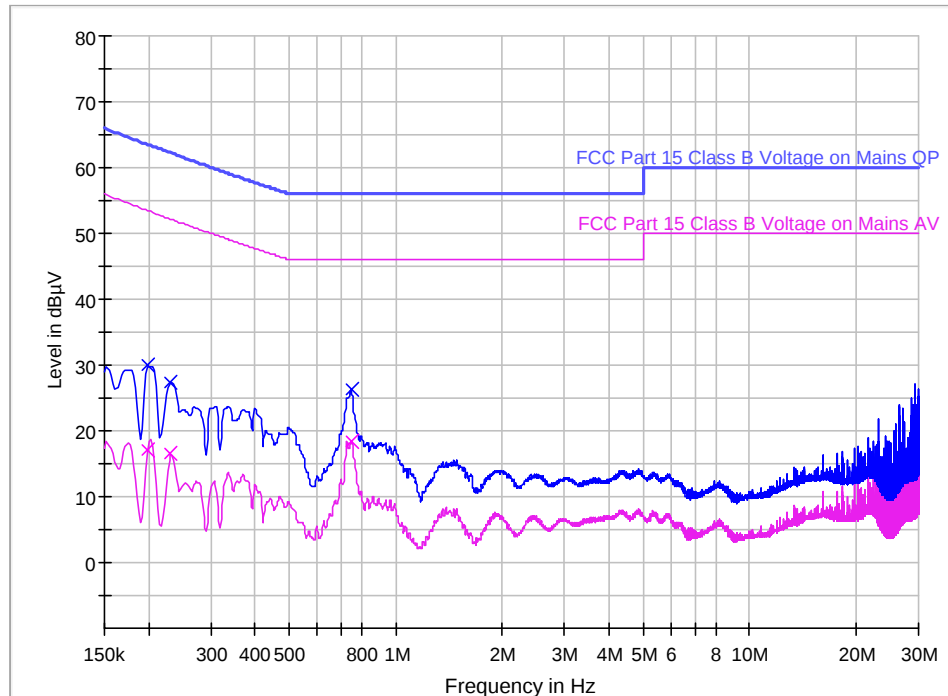
Appendix 1

Test Results

Conducted Emission on AC Mains

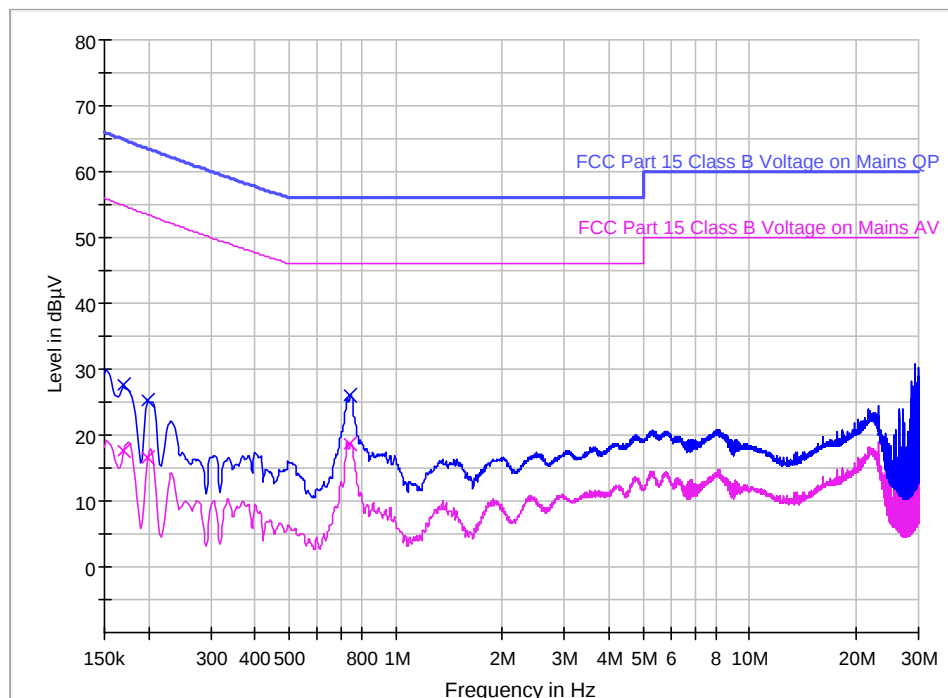
USB-C supply, Left antenna, TX Frequency 2440.8MHz, Line: L1

Conducted Emission (150 kHz - 30 MHz) - Cont TDS (QP+AV)



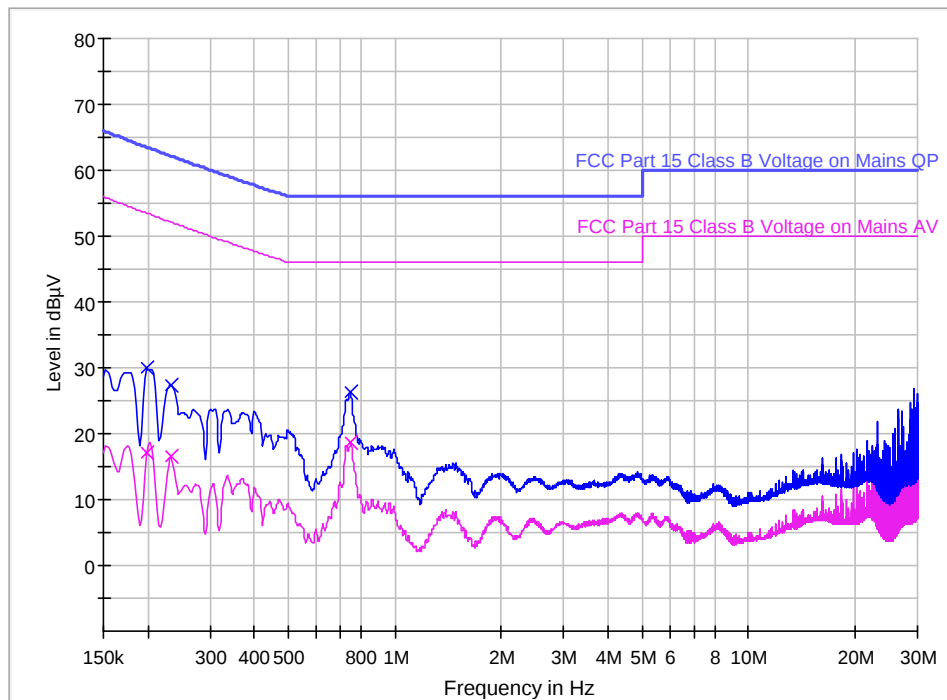
USB-C supply, Left antenna, TX Frequency 2440.8MHz, Line: N

Conducted Emission (150 kHz - 30 MHz) - Cont TDS (QP+AV)



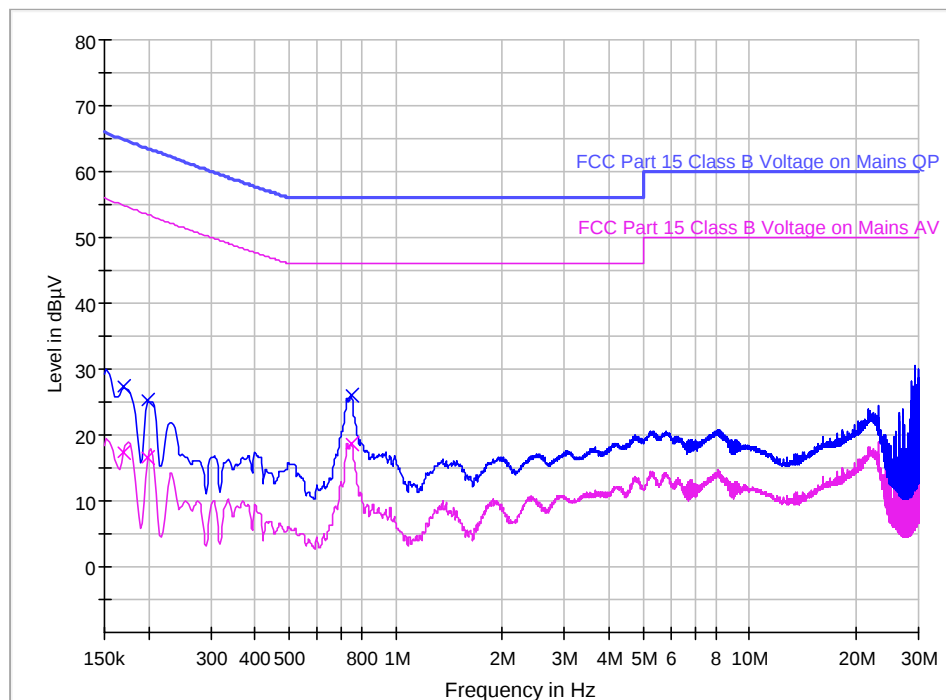
USB-C supply, Right antenna, TX Frequency 2440.8MHz, Line: L1

Conducted Emission (150 kHz - 30 MHz) - Cont TDS (QP+AV)



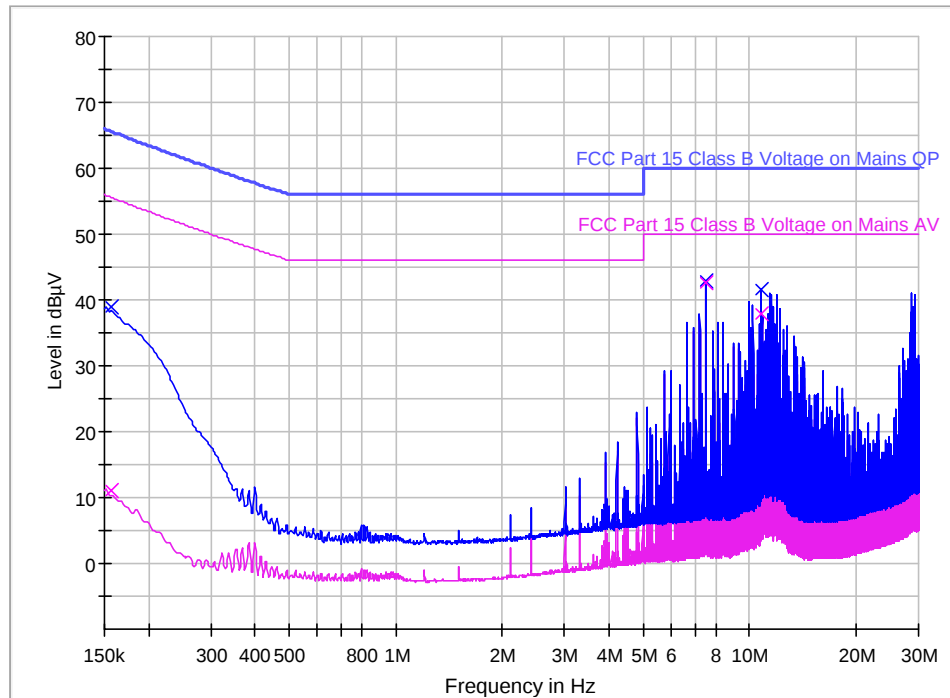
USB-C supply, Right antenna, TX Frequency 2440.8MHz, Line: N

Conducted Emission (150 kHz - 30 MHz) - Cont TDS (QP+AV)



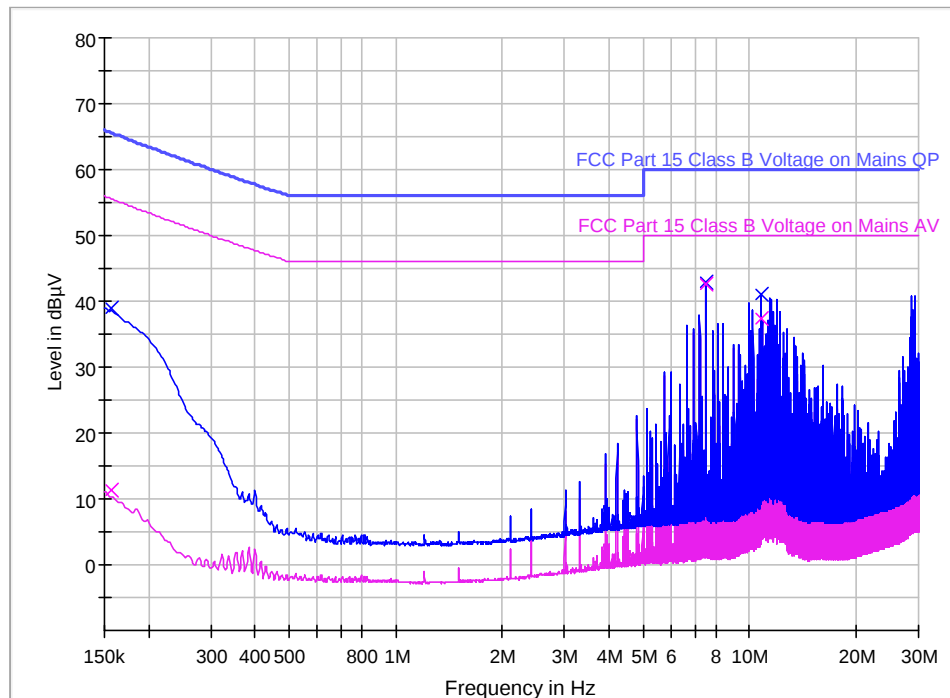
PoE supply, Left antenna, TX Frequency 2440.8MHz, Line: L1

Conducted Emission (150 kHz - 30 MHz) - Cont TDS (QP+AV)



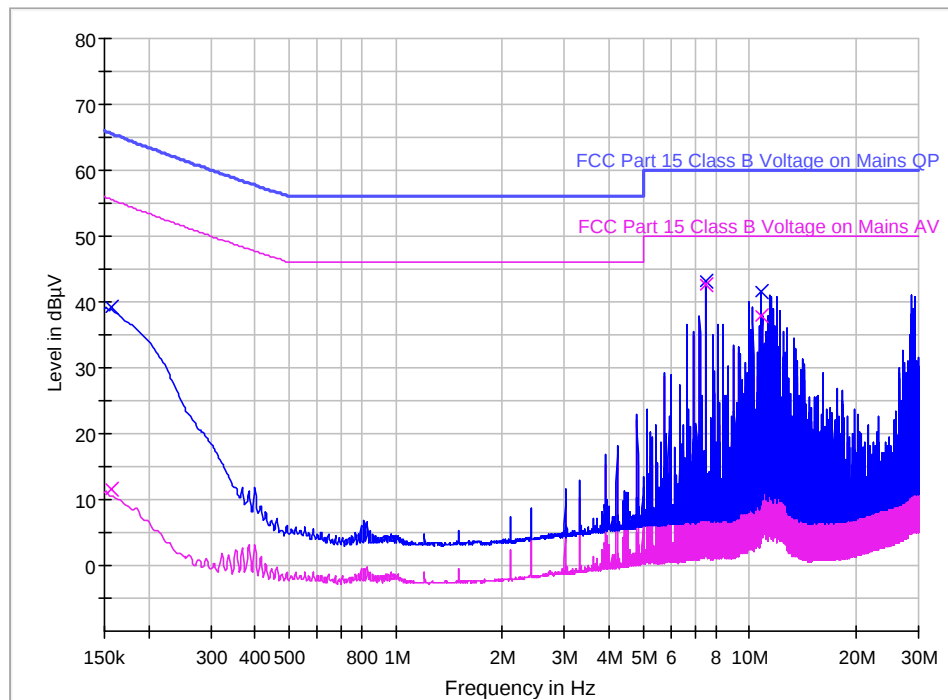
PoE supply, Left antenna, TX Frequency 2440.8MHz, Line: N

Conducted Emission (150 kHz - 30 MHz) - Cont TDS (QP+AV)



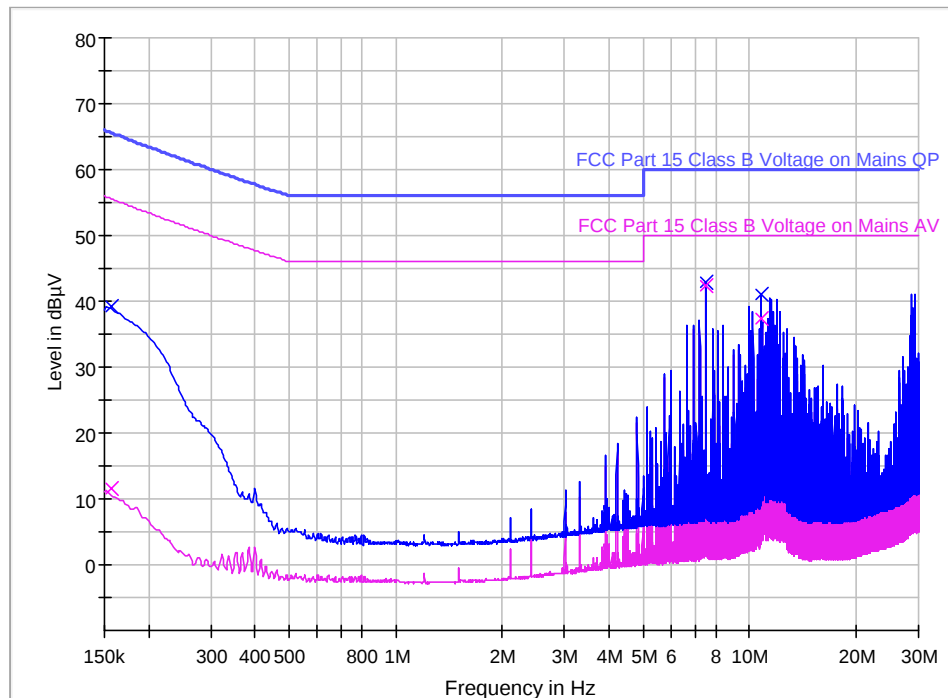
USB-C supply, Left antenna, TX Frequency 2440.8MHz, Line: L1

Conducted Emission (150 kHz - 30 MHz) - Cont TDS (QP+AV)



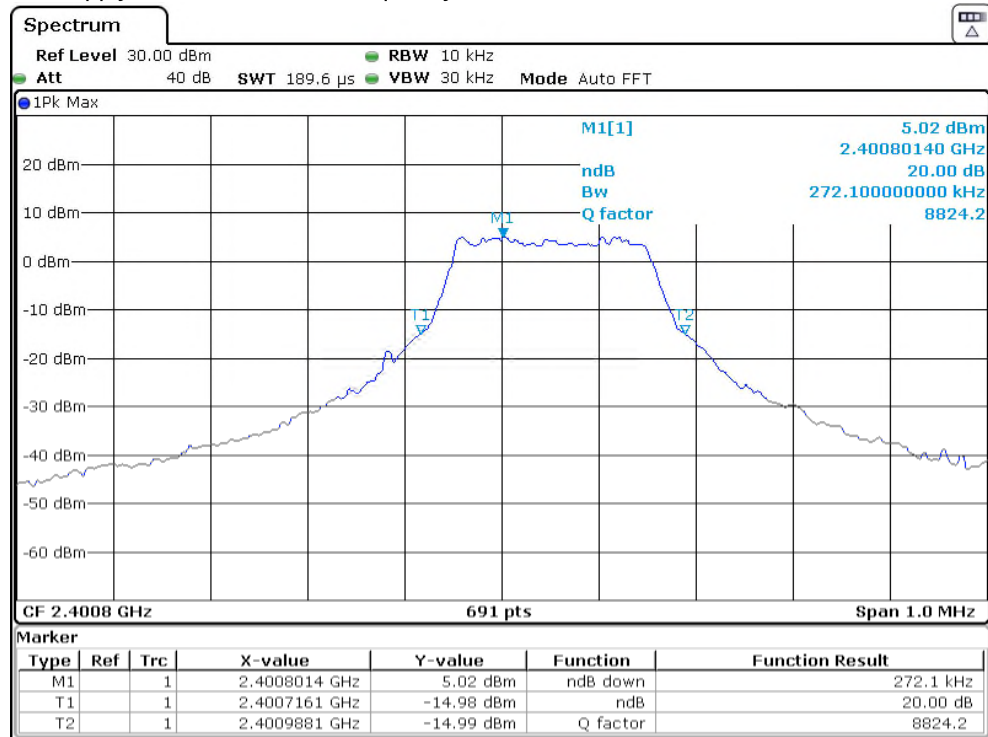
USB-C supply, Left antenna, TX Frequency 2440.8MHz, Line: N

Conducted Emission (150 kHz - 30 MHz) - Cont TDS (QP+AV)



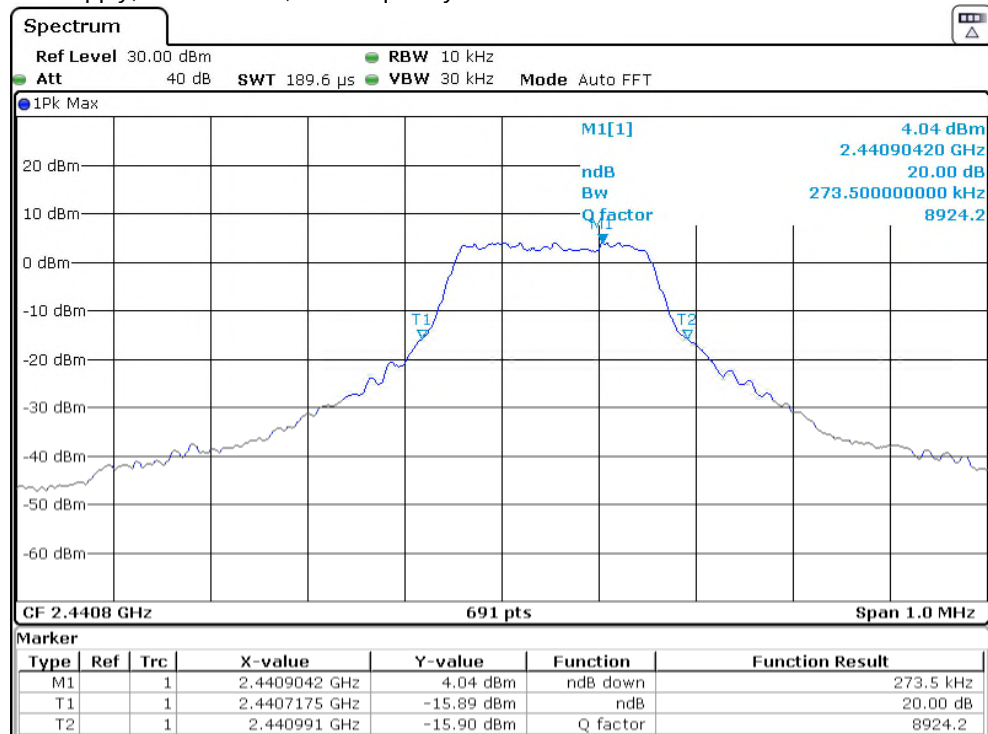
20dB Bandwidth

USB-C supply, Left antenna, TX Frequency 2400.8MHz



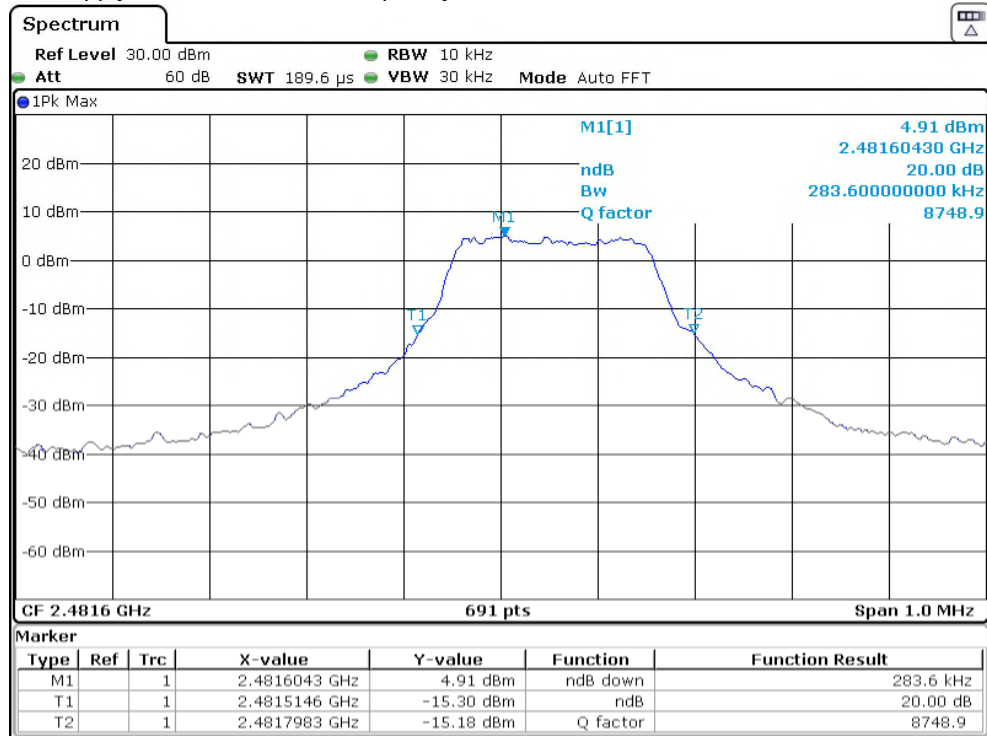
Date: 13.AUG.2024 10:59:40

USB-C supply, Left antenna, TX Frequency 2440.8MHz



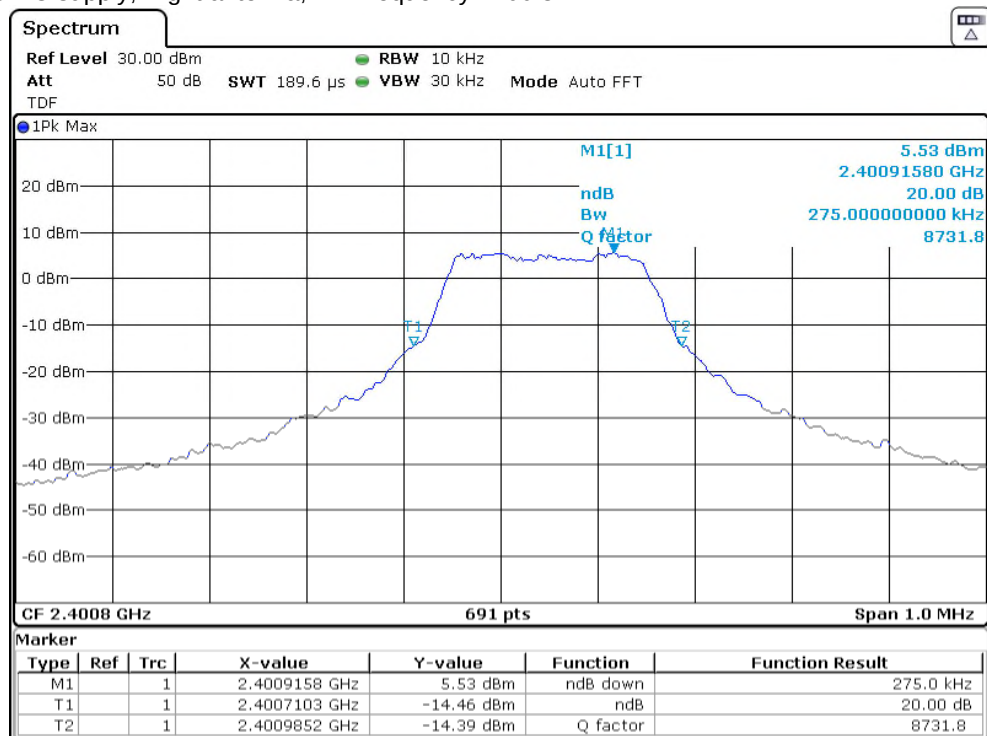
Date: 13.AUG.2024 10:58:15

USB-C supply, Left antenna, TX Frequency 2481.6MHz



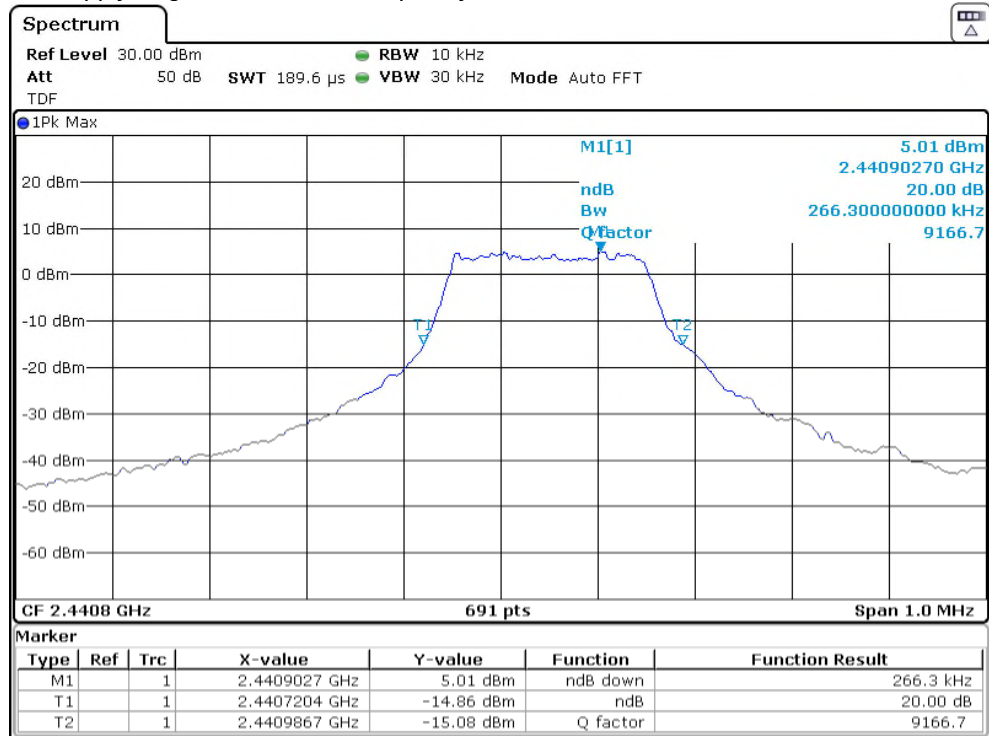
Date: 13.AUG.2024 11:01:38

USB-C supply, Right antenna, TX Frequency 2400.8MHz



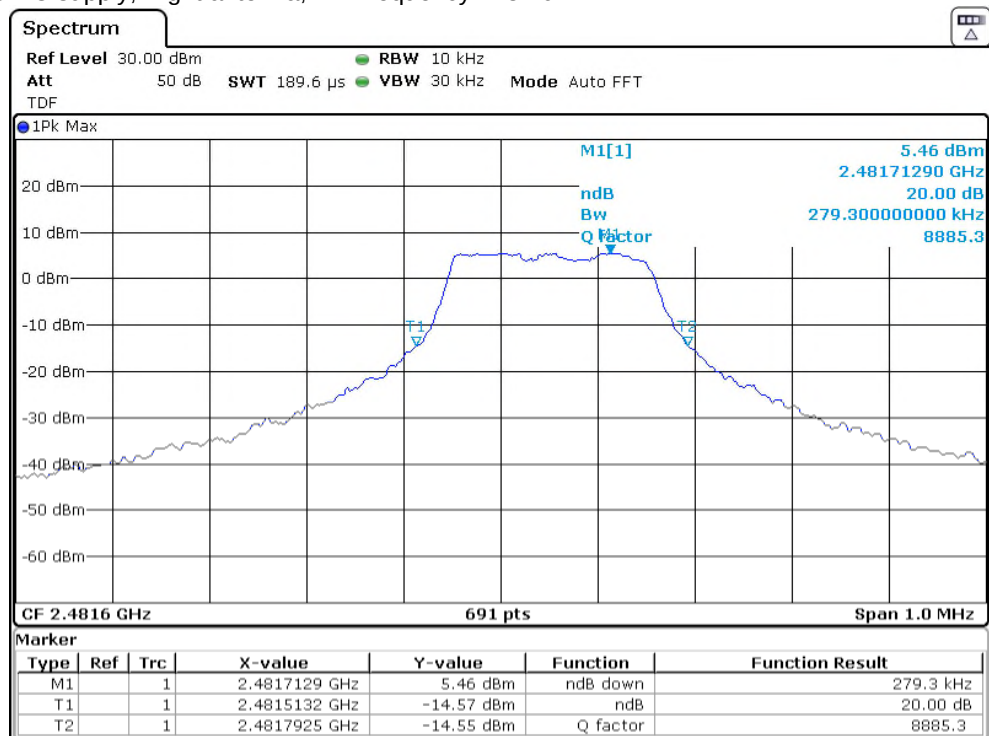
Date: 8.AUG.2024 11:14:27

USB-C supply, Right antenna, TX Frequency 2440.8MHz



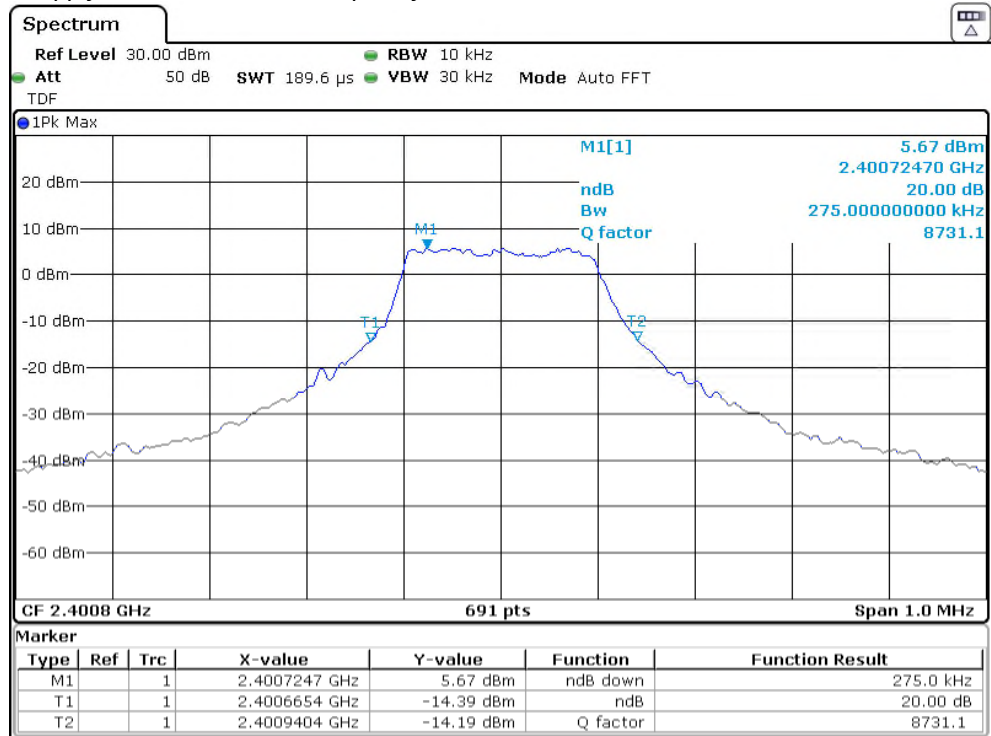
Date: 8.AUG.2024 11:13:45

USB-C supply, Right antenna, TX Frequency 2481.6MHz



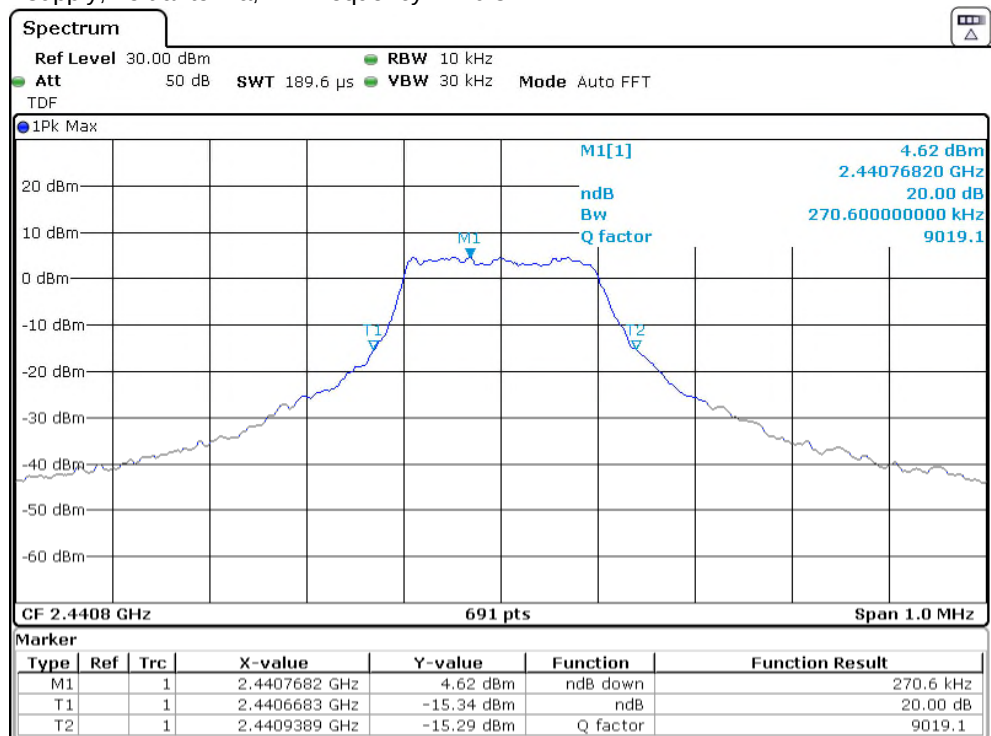
Date: 8.AUG.2024 11:10:44

PoE supply, Left antenna, TX Frequency 2400.8MHz



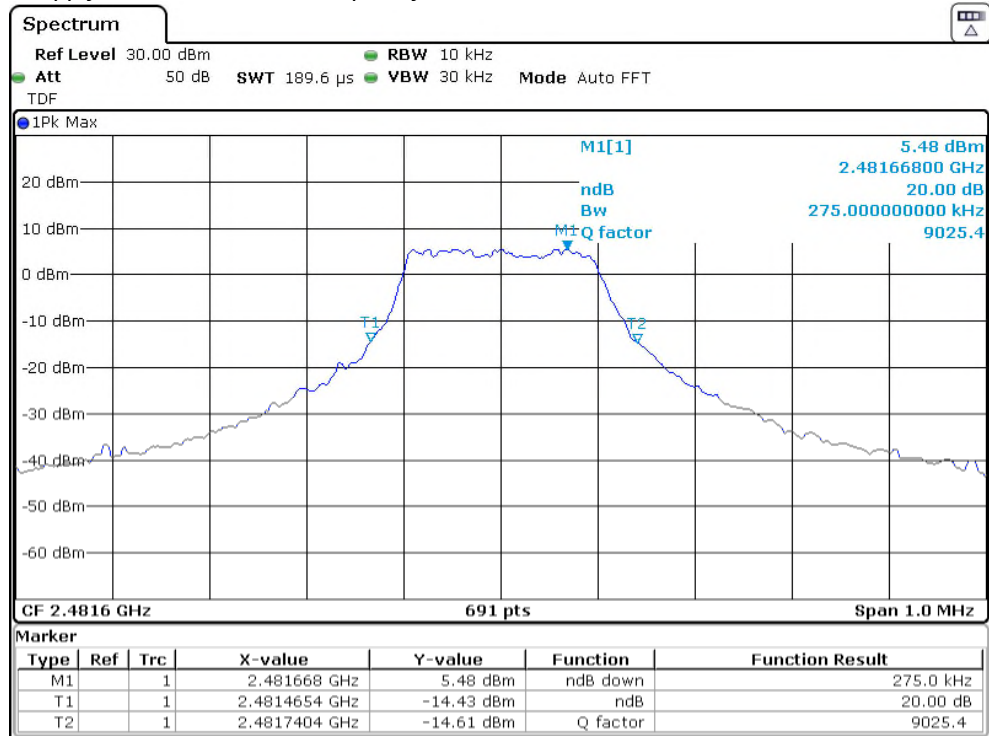
Date: 14.AUG.2024 13:10:44

PoE supply, Left antenna, TX Frequency 2440.8MHz



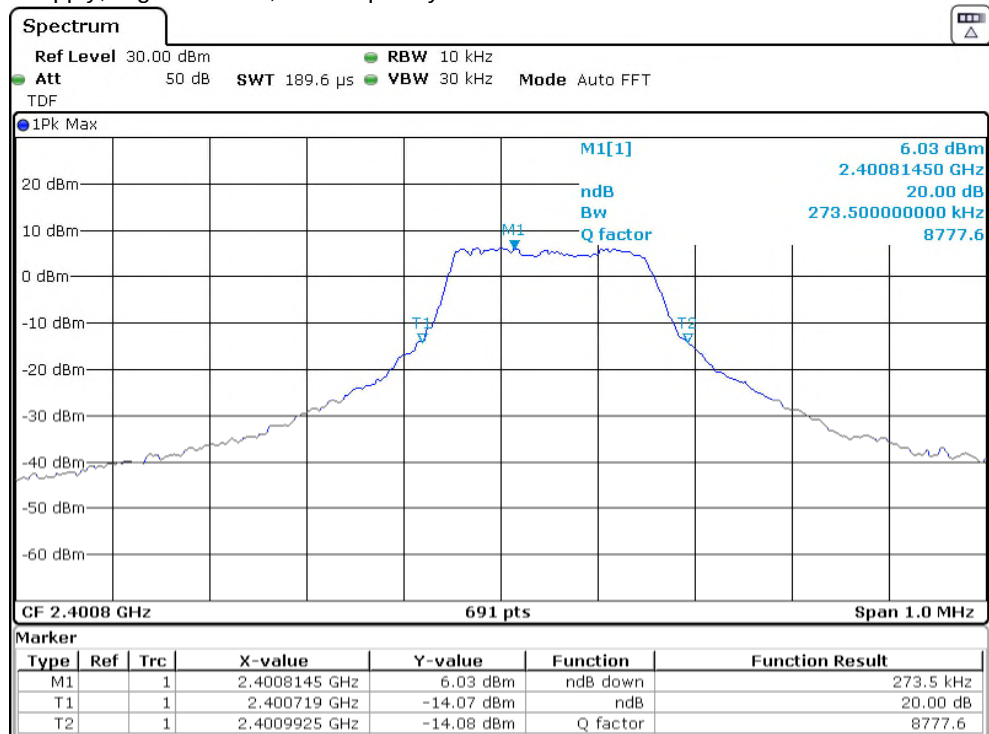
Date: 14.AUG.2024 13:12:34

PoE supply, Left antenna, TX Frequency 2481.6MHz



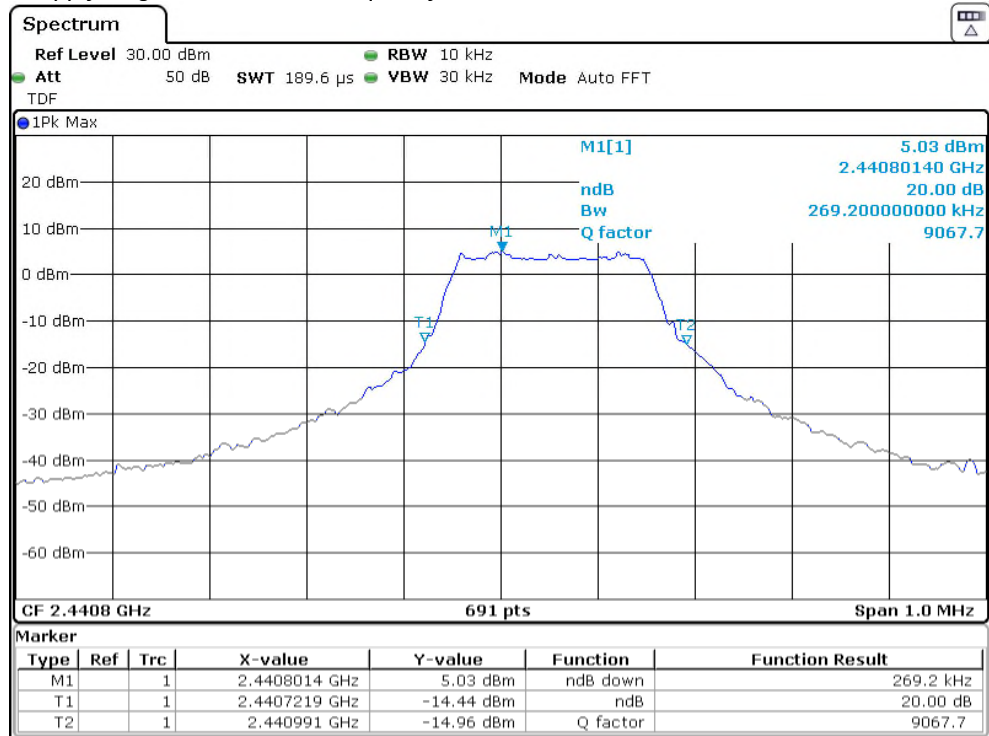
Date: 14.AUG.2024 13:14:12

PoE supply, Right antenna, TX Frequency 2400.8MHz



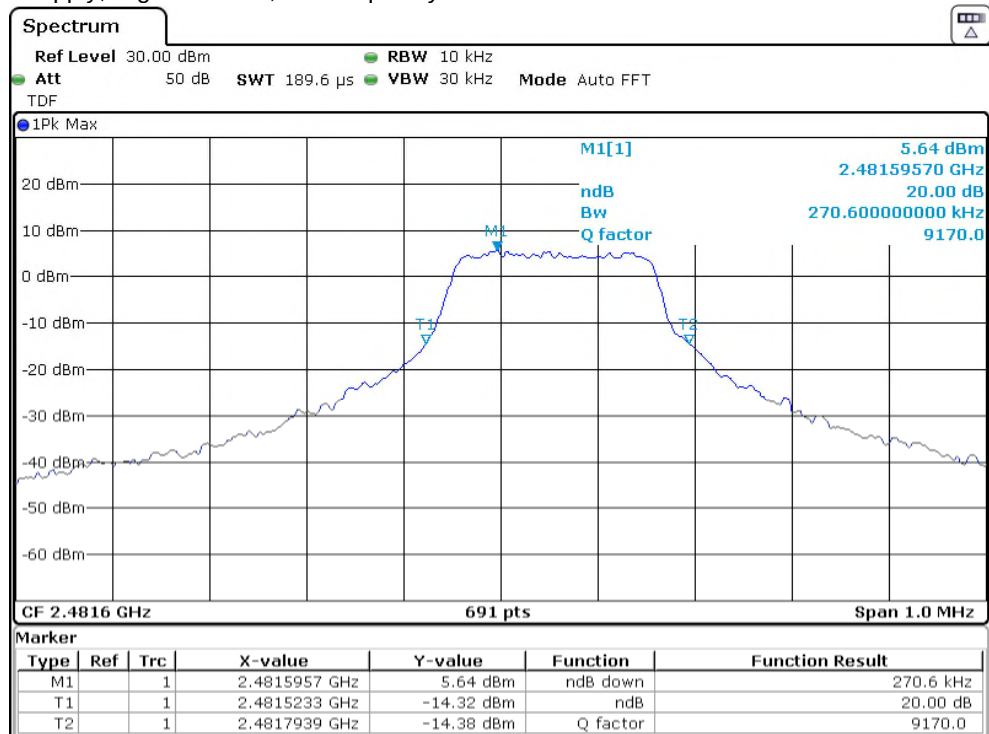
Date: 13.AUG.2024 15:11:19

PoE supply, Right antenna, TX Frequency 2440.8MHz



Date: 13.AUG.2024 15:14:07

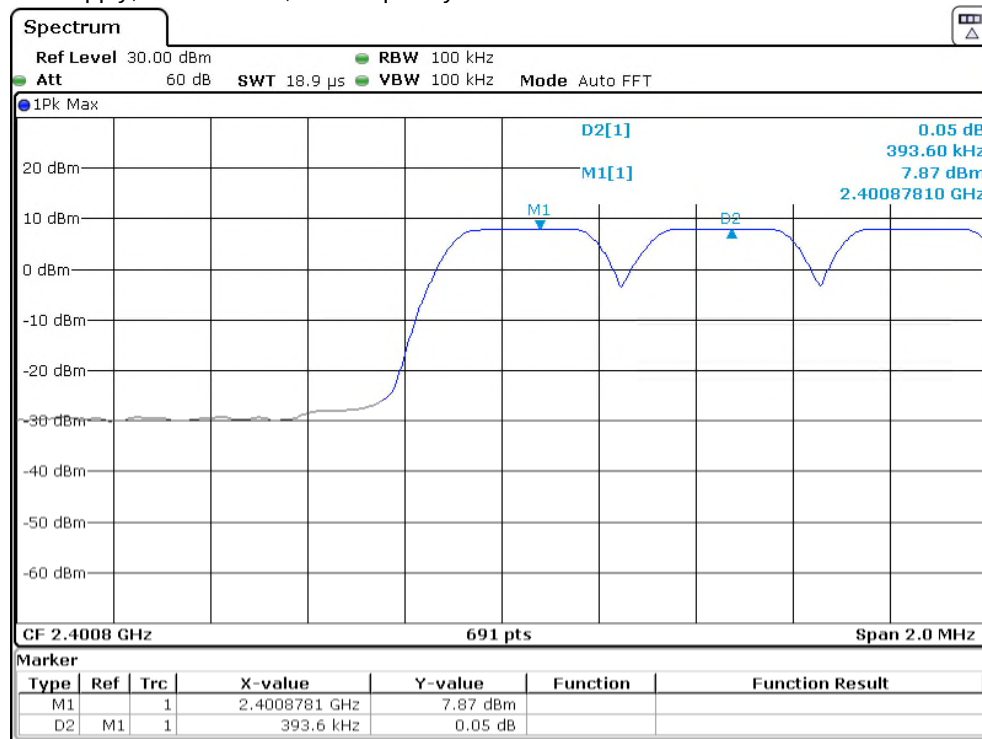
PoE supply, Right antenna, TX Frequency 2481.6MHz



Date: 13.AUG.2024 15:15:54

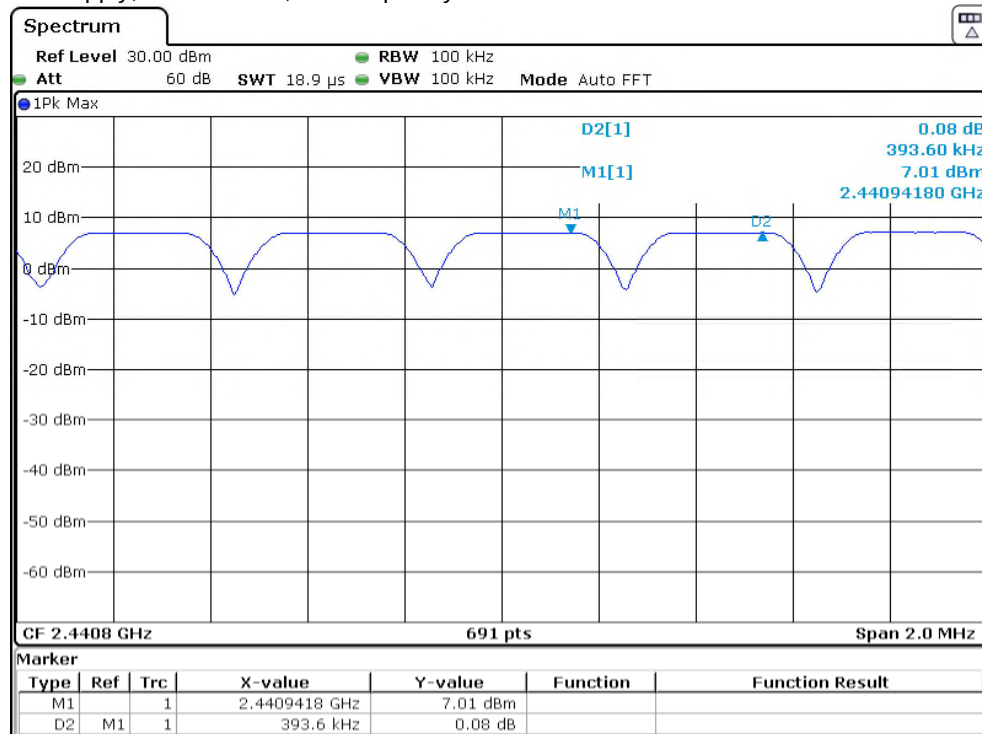
Carrier Frequency Separation

USB-C supply, Left antenna, TX Frequency 2400.8MHz



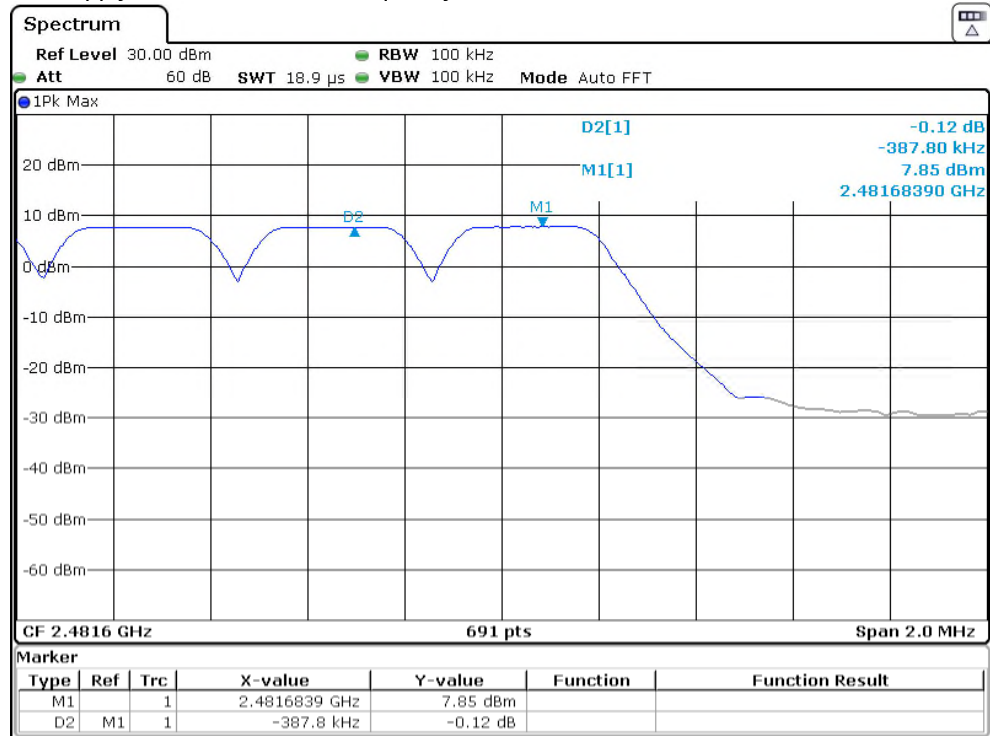
Date: 13.AUG.2024 11:37:13

USB-C supply, Left antenna, TX Frequency 2440.8MHz



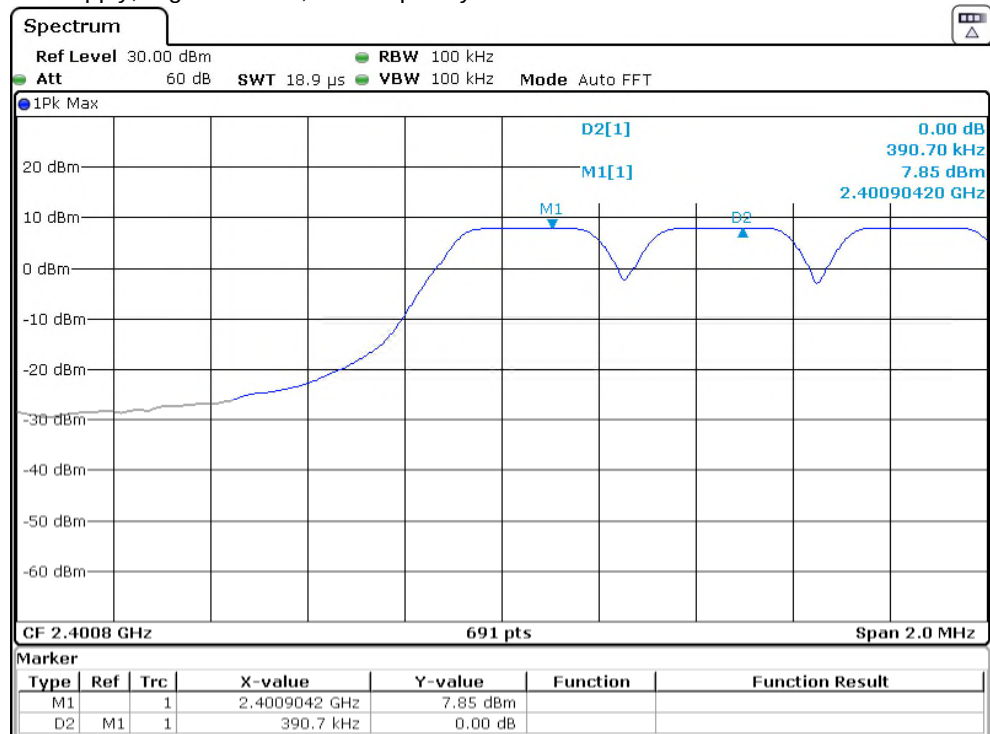
Date: 13.AUG.2024 11:39:57

USB-C supply, Left antenna, TX Frequency 2481.6MHz



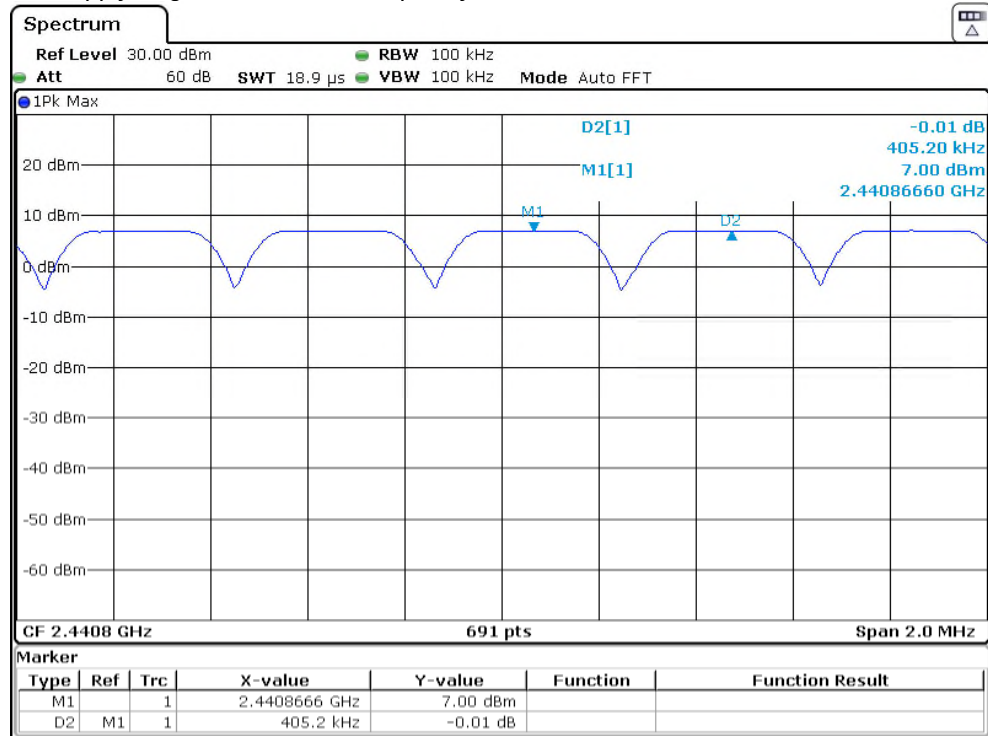
Date: 13.AUG.2024 11:50:18

USB-C supply, Right antenna, TX Frequency 2400.8MHz



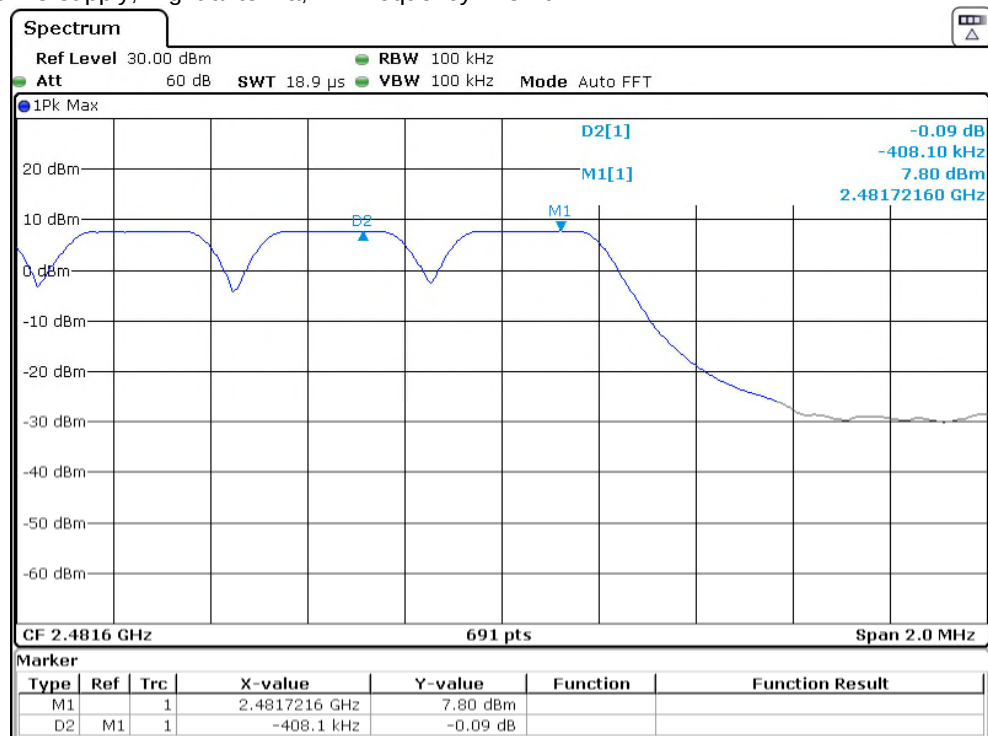
Date: 13.AUG.2024 14:04:27

USB-C supply, Right antenna, TX Frequency 2440.8MHz



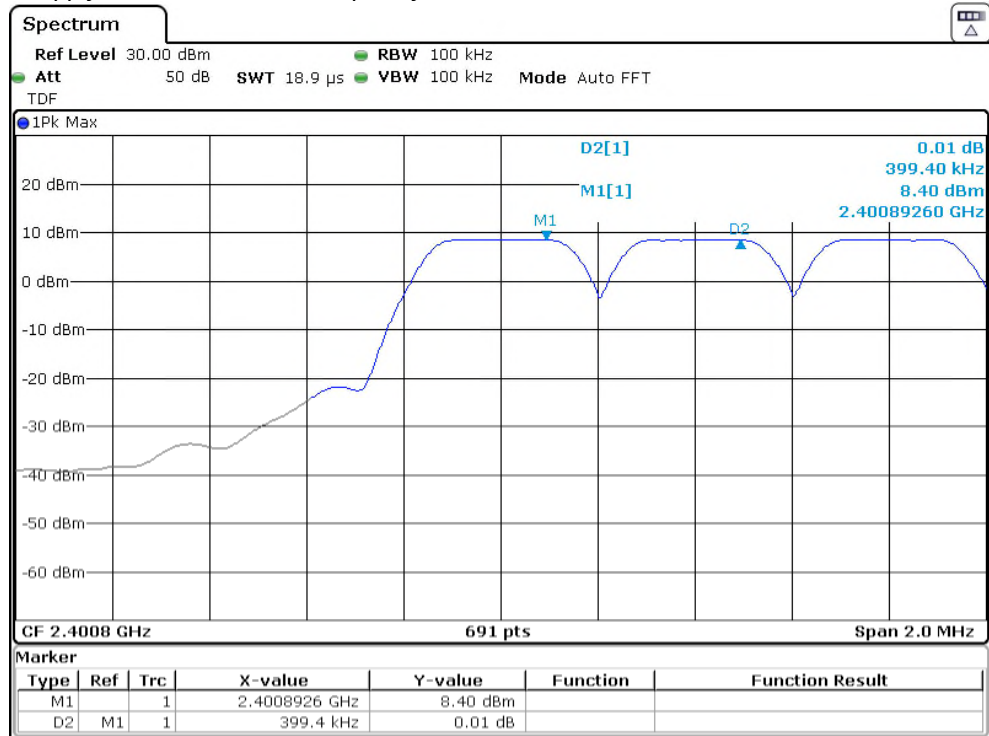
Date: 13.AUG.2024 14:08:31

USB-C supply, Right antenna, TX Frequency 2481.6MHz



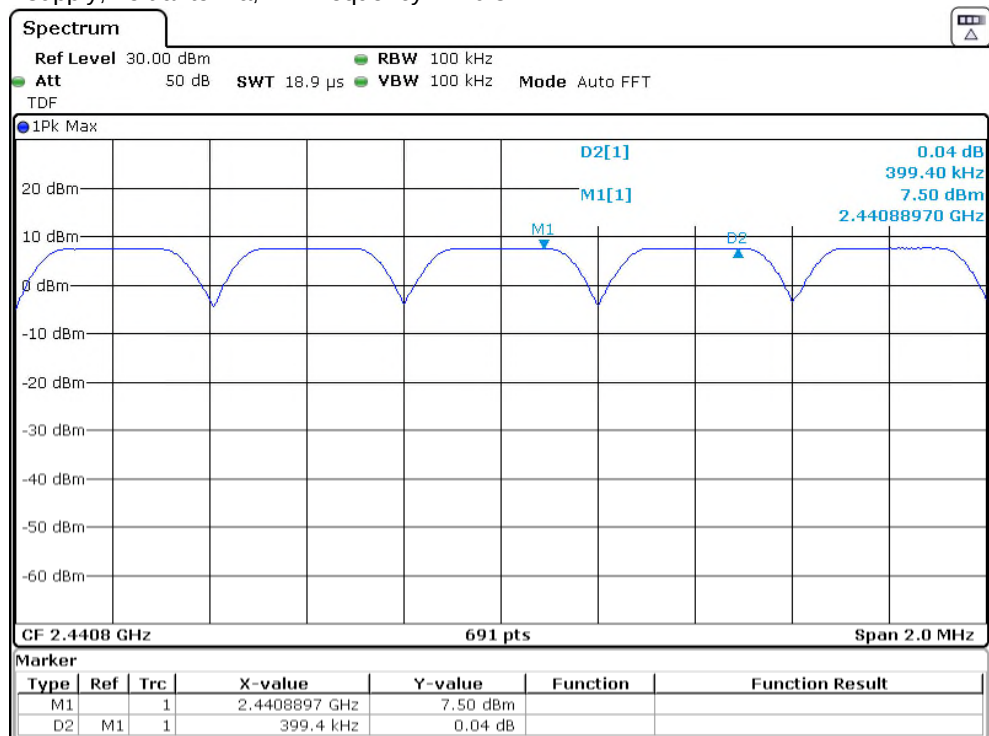
Date: 13.AUG.2024 14:12:47

PoE supply, Left antenna, TX Frequency 2400.8MHz



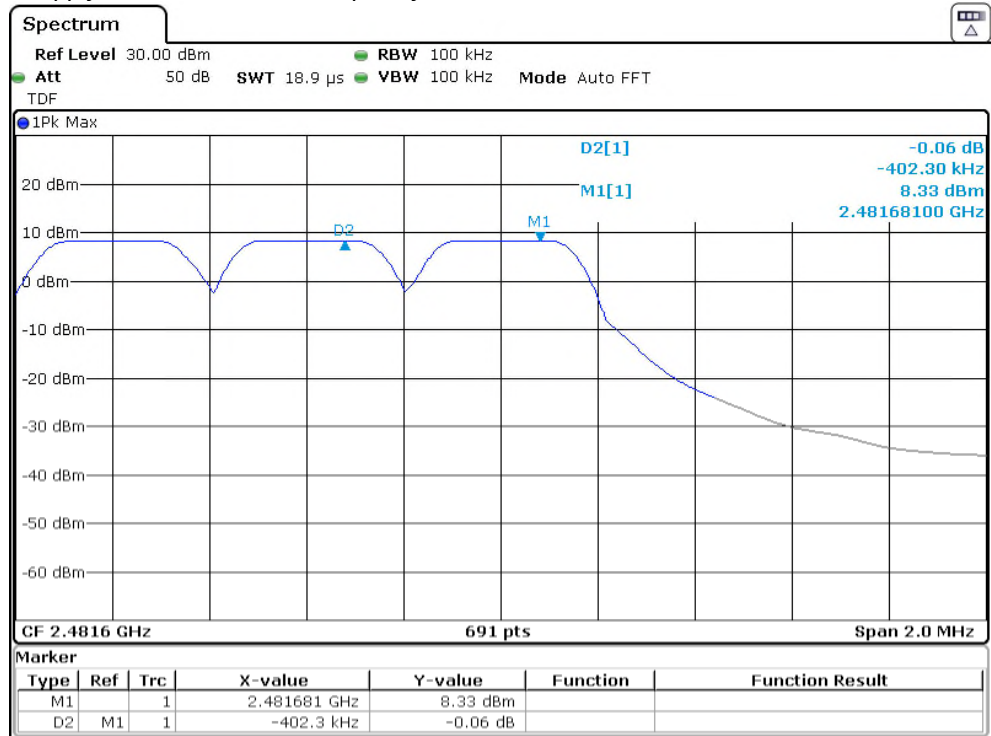
Date: 14.AUG.2024 14:33:49

PoE supply, Left antenna, TX Frequency 2440.8MHz



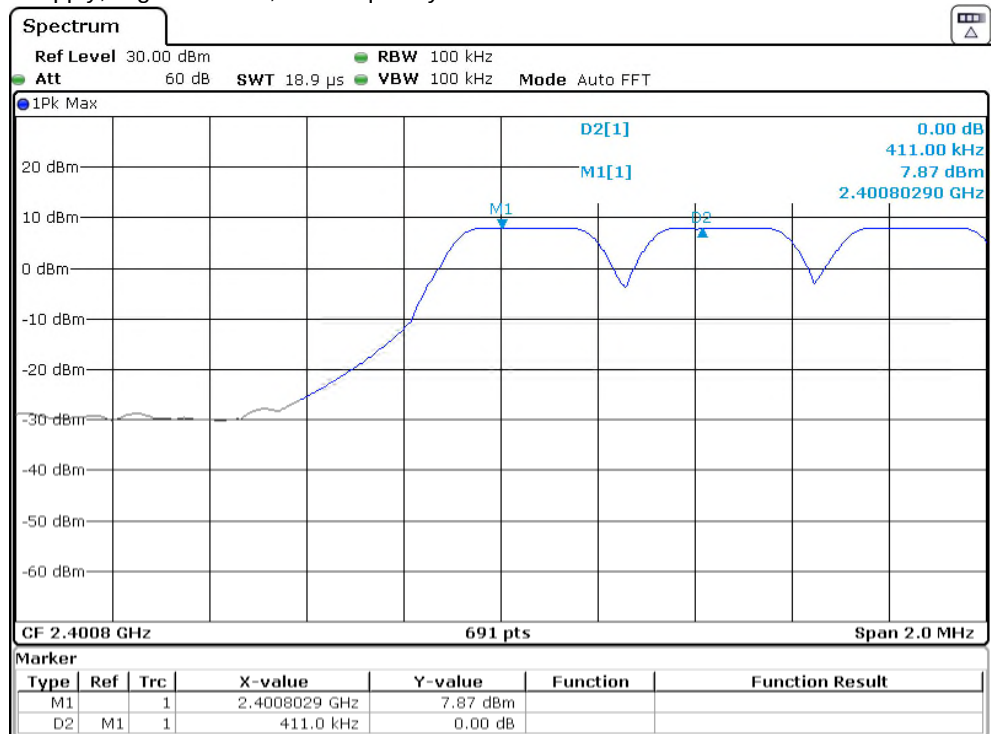
Date: 14.AUG.2024 14:38:14

PoE supply, Left antenna, TX Frequency 2481.6MHz



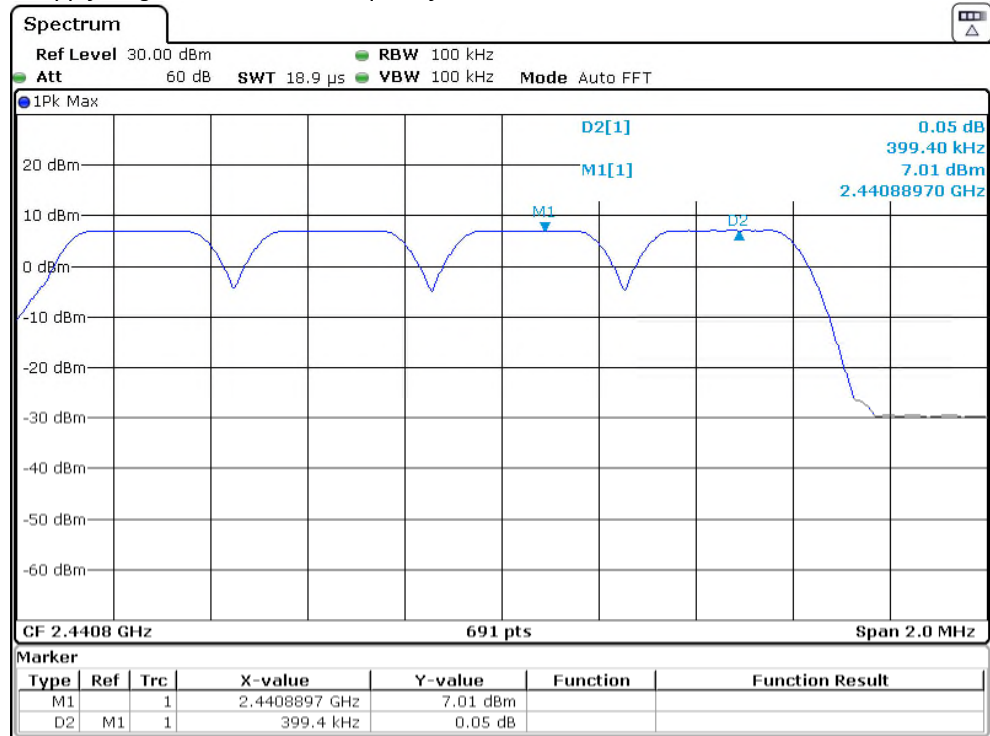
Date: 14.AUG.2024 14:42:32

PoE supply, Right antenna, TX Frequency 2400.8MHz



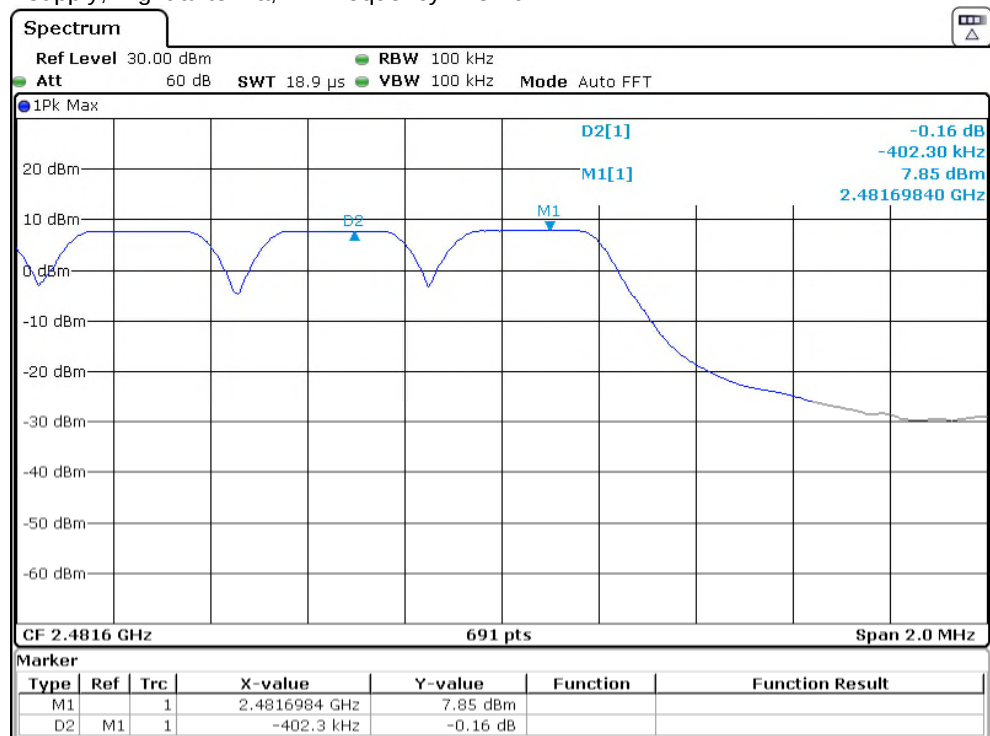
Date: 13.AUG.2024 17:15:06

PoE supply, Right antenna, TX Frequency 2440.8MHz



Date: 13.AUG.2024 17:17:28

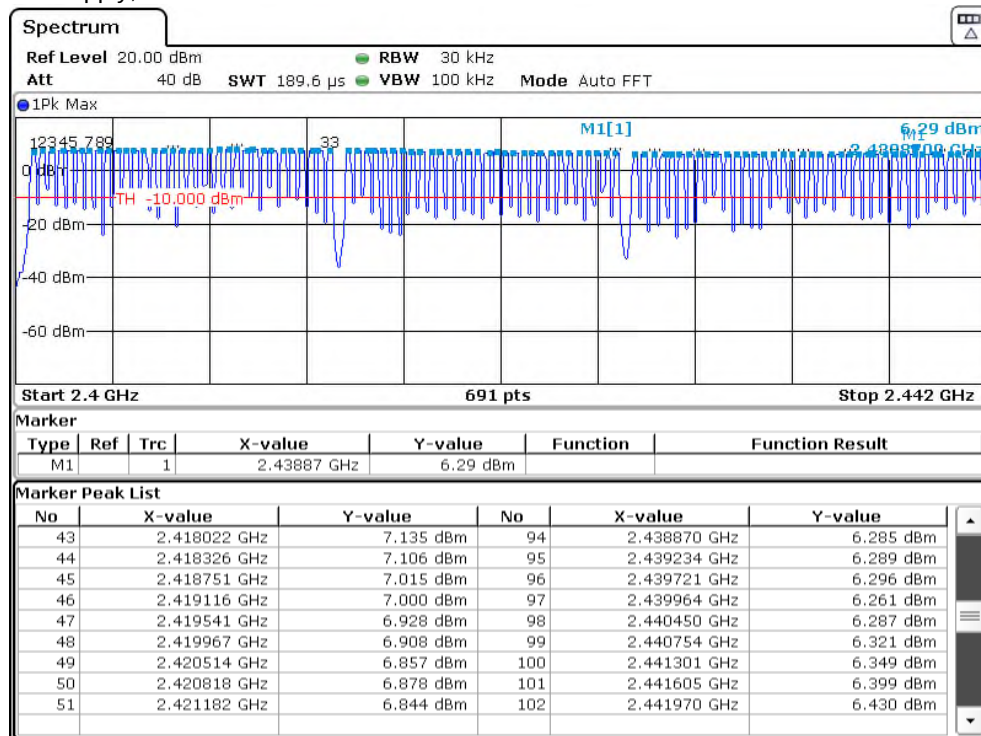
PoE supply, Right antenna, TX Frequency 2481.6MHz



Date: 13.AUG.2024 17:20:57

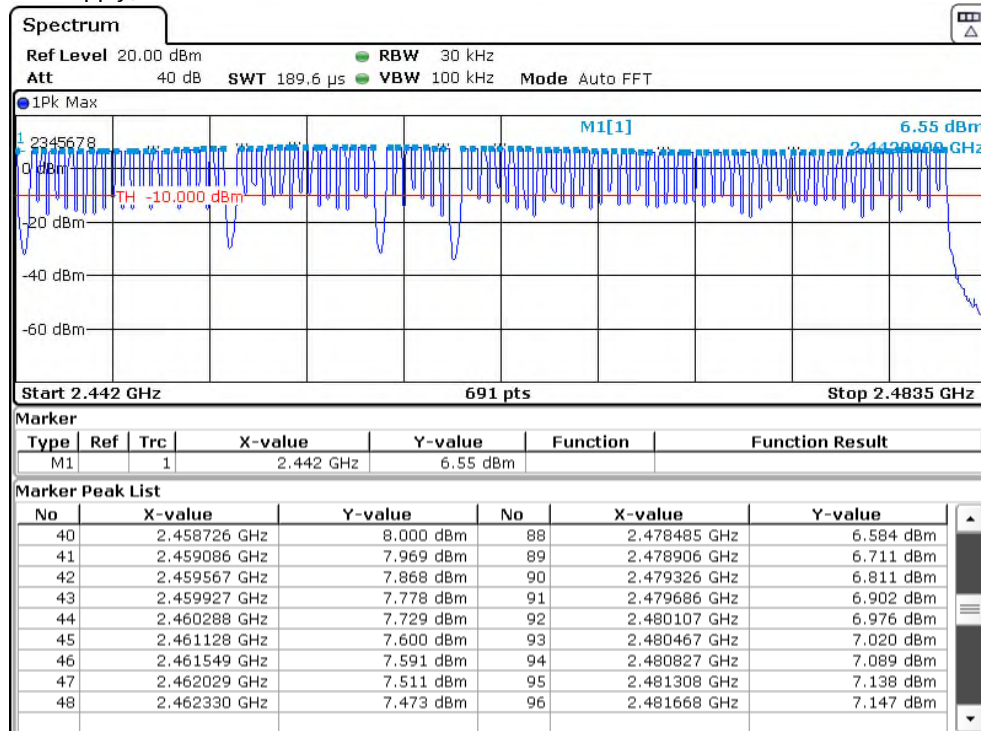
Number of Hopping Frequency

USB-C supply, Left antenna



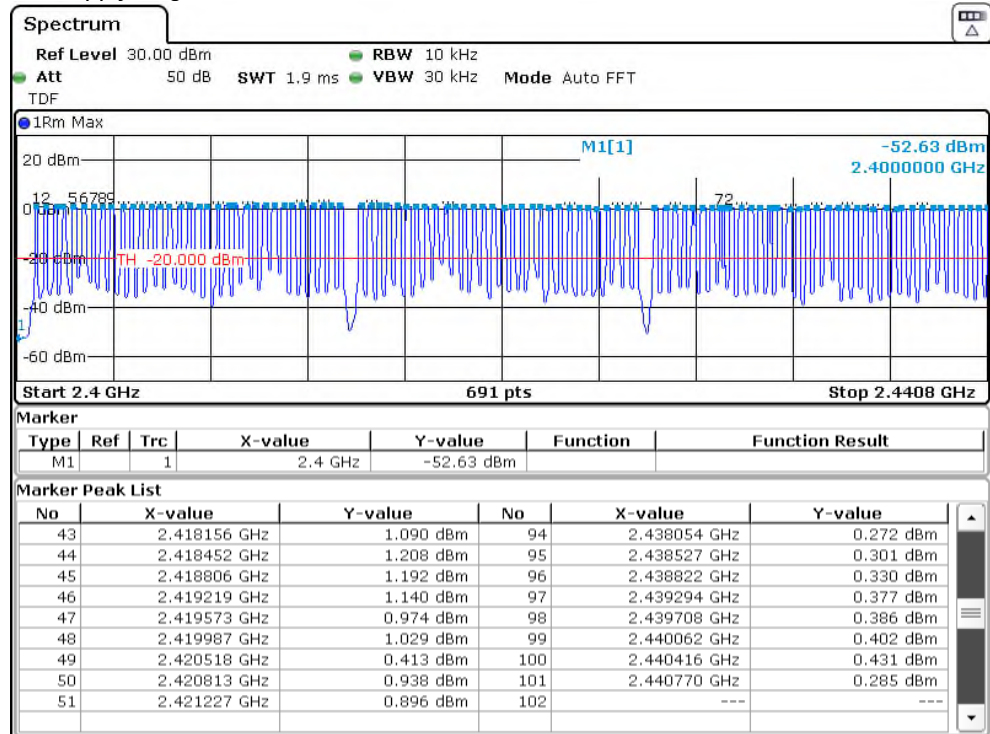
Date: 12.AUG.2024 17:19:09

USB-C supply, Left antenna



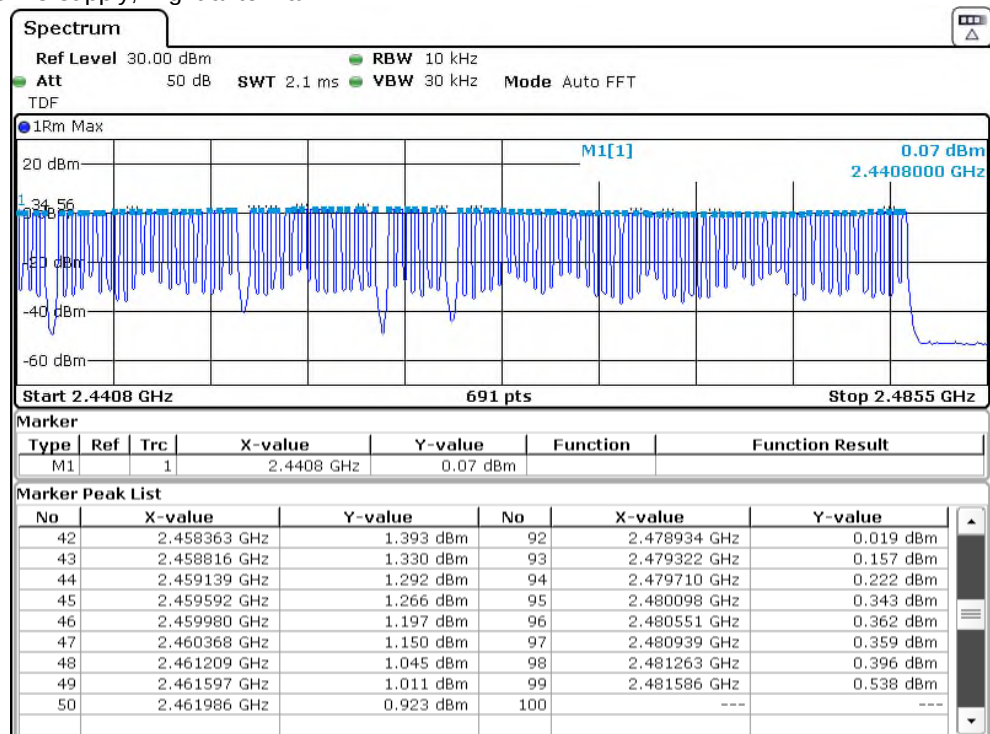
Date: 12.AUG.2024 17:39:46

USB-C supply, Right antenna



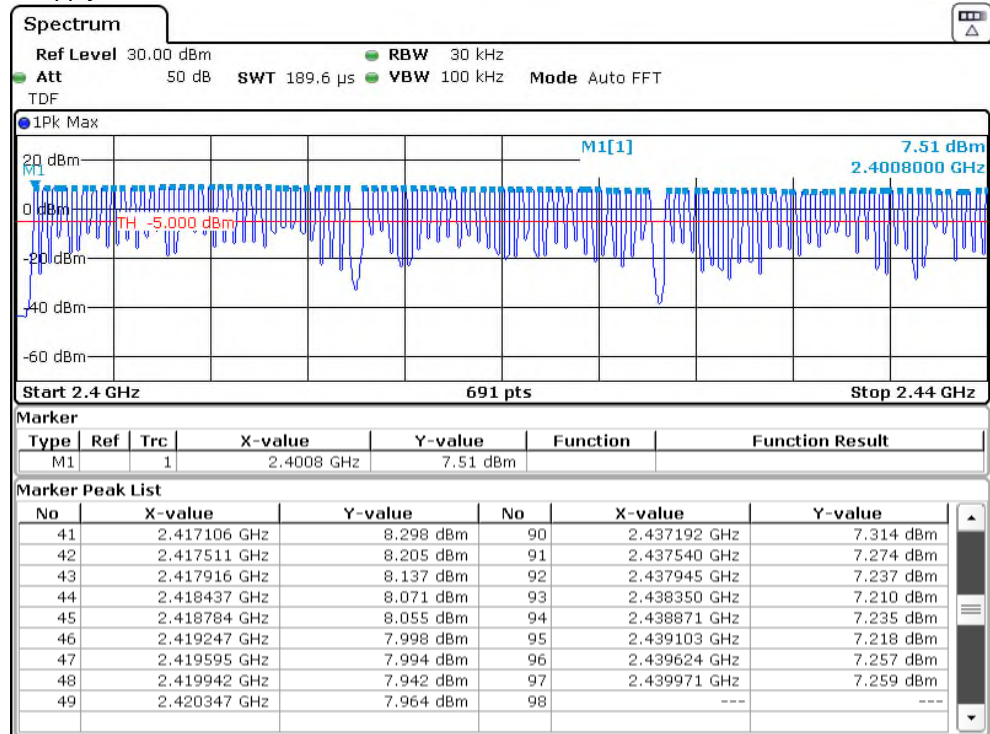
Date: 8.AUG.2024 13:35:26

USB-C supply, Right antenna



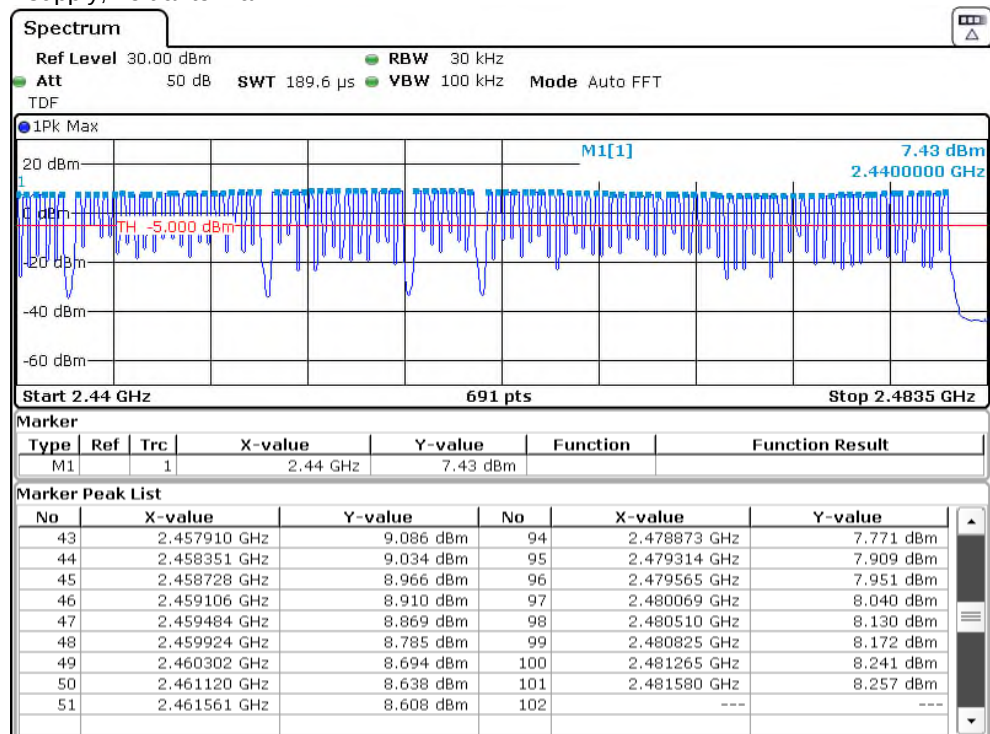
Date: 8.AUG.2024 17:11:56

PoE supply, Left antenna



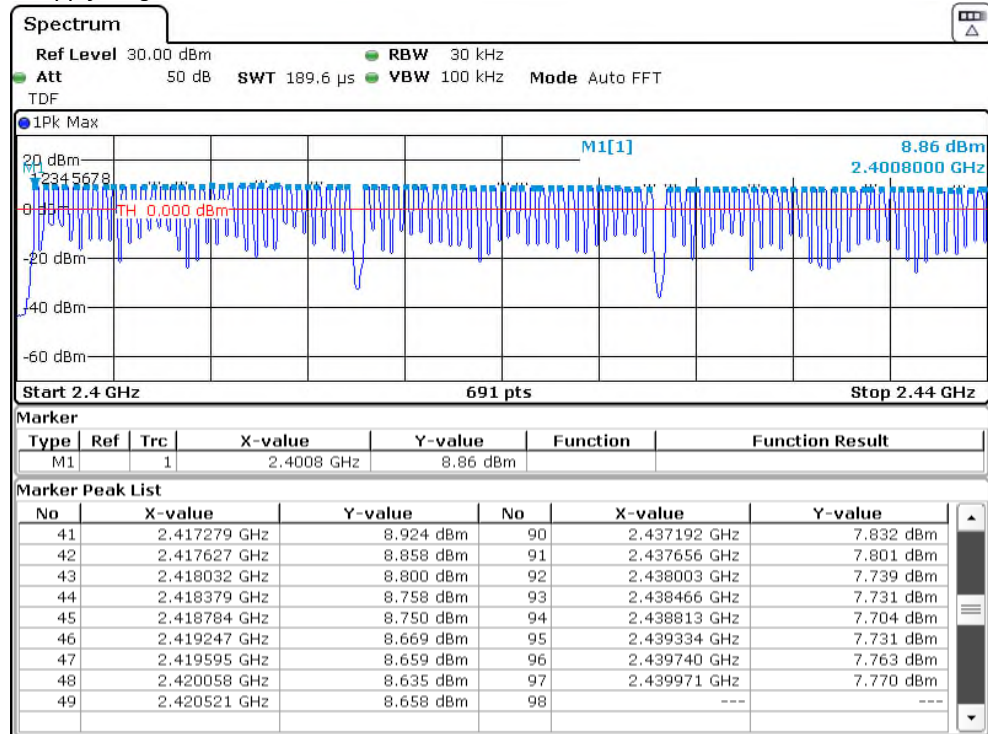
Date: 14.AUG.2024 14:24:24

PoE supply, Left antenna



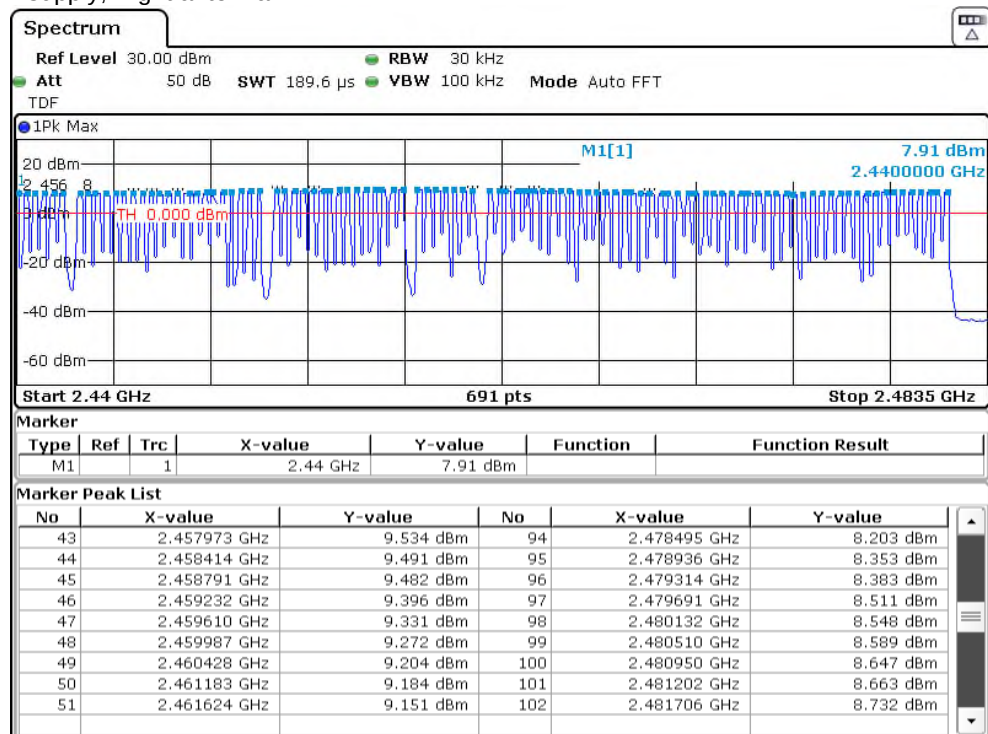
Date: 14.AUG.2024 14:30:18

PoE supply, Right antenna



Date: 13.AUG.2024 16:57:27

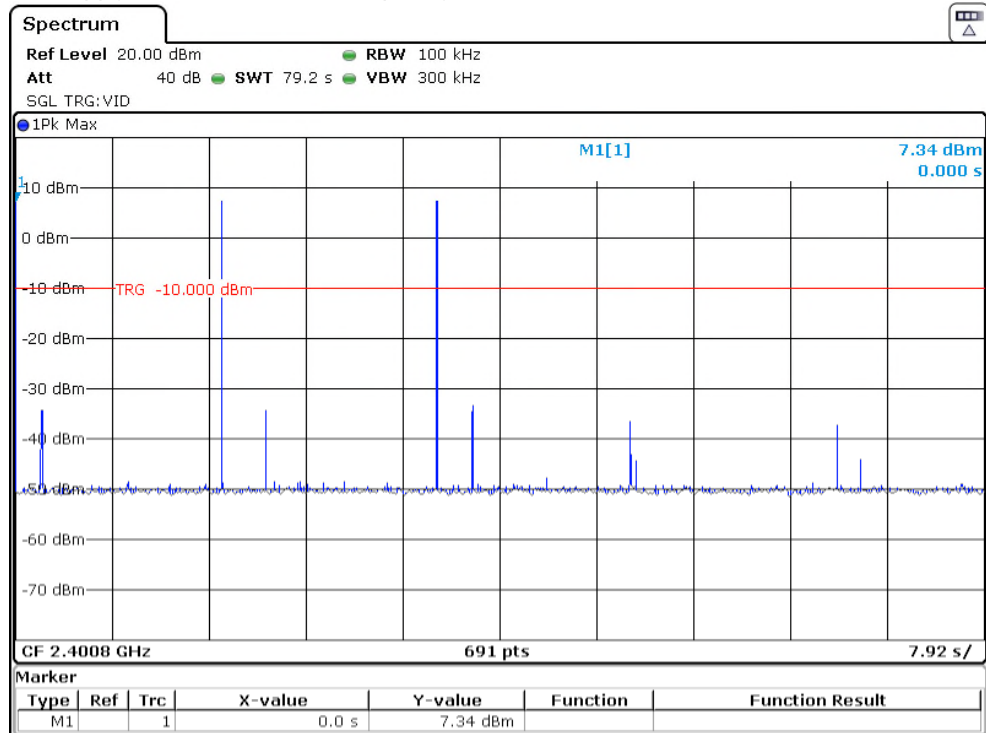
PoE supply, Right antenna



Date: 13.AUG.2024 17:05:26

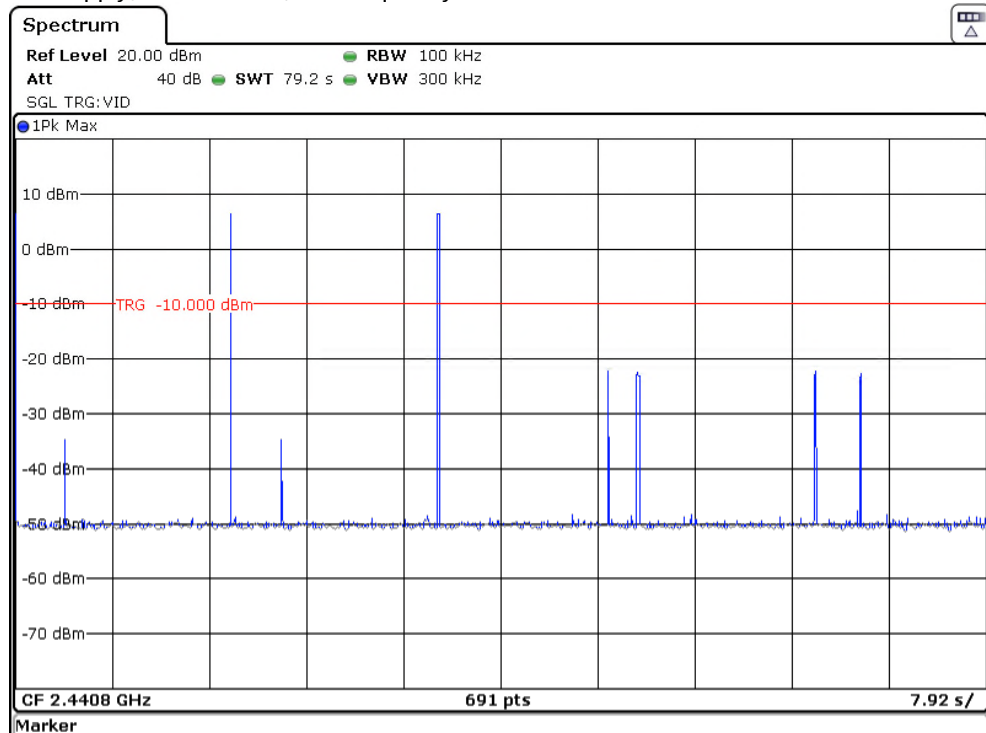
Time of Occupancy

USB-C supply, Left antenna, TX Frequency 2400.8MHz



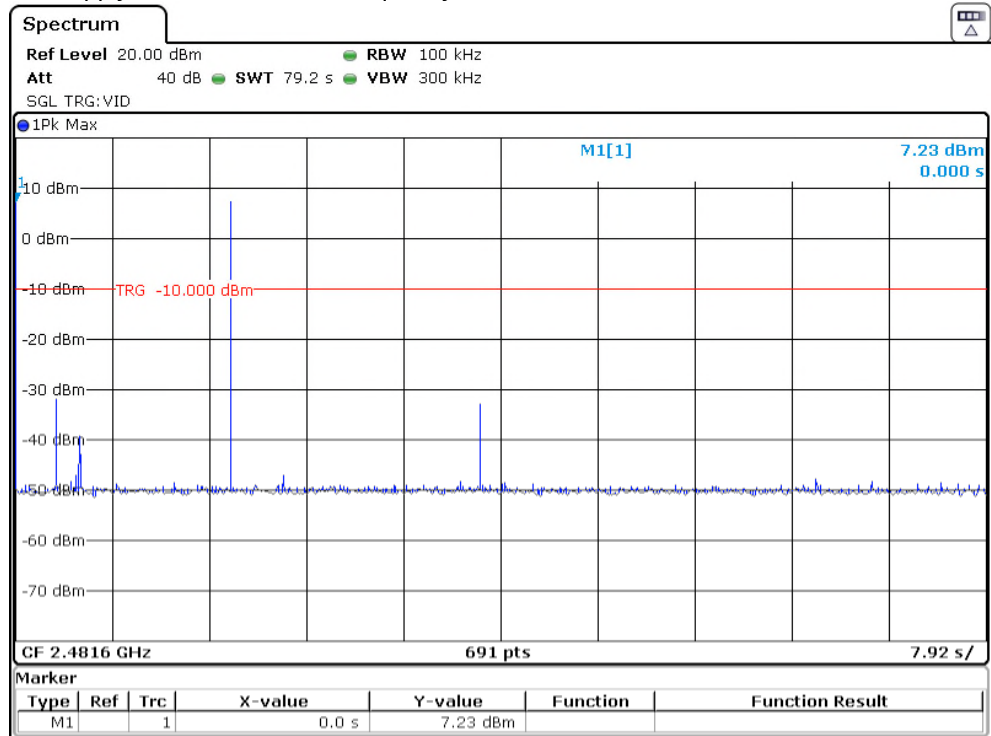
Date: 12.AUG.2024 17:56:25

USB-C supply, Left antenna, TX Frequency 2440.8MHz



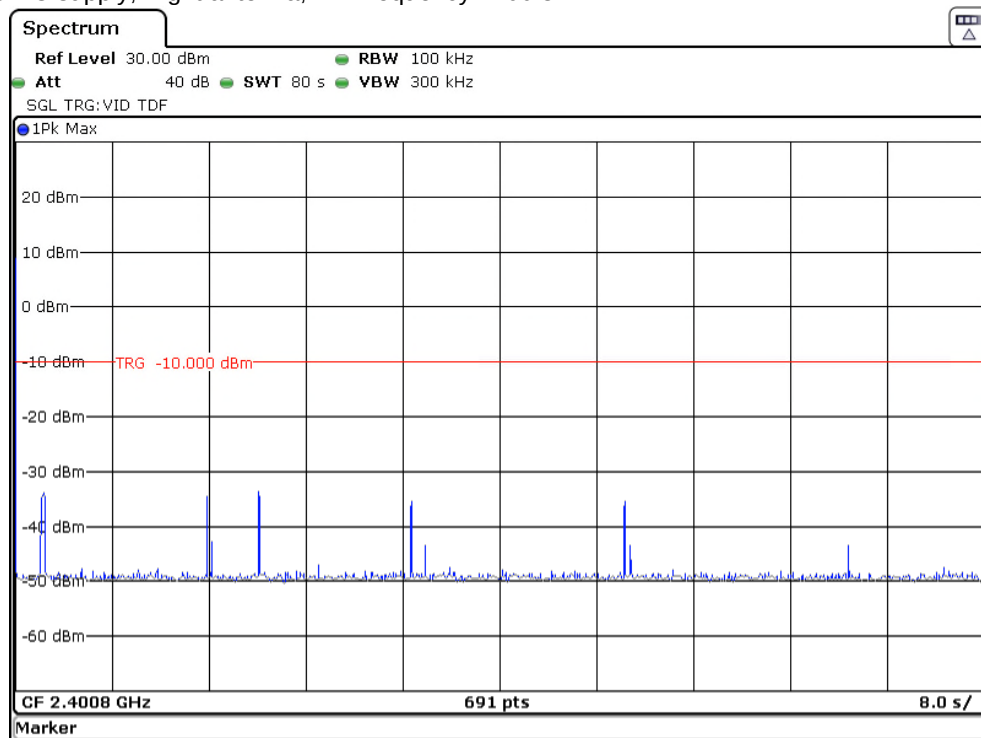
Date: 12.AUG.2024 17:49:41

USB-C supply, Left antenna, TX Frequency 2481.6MHz



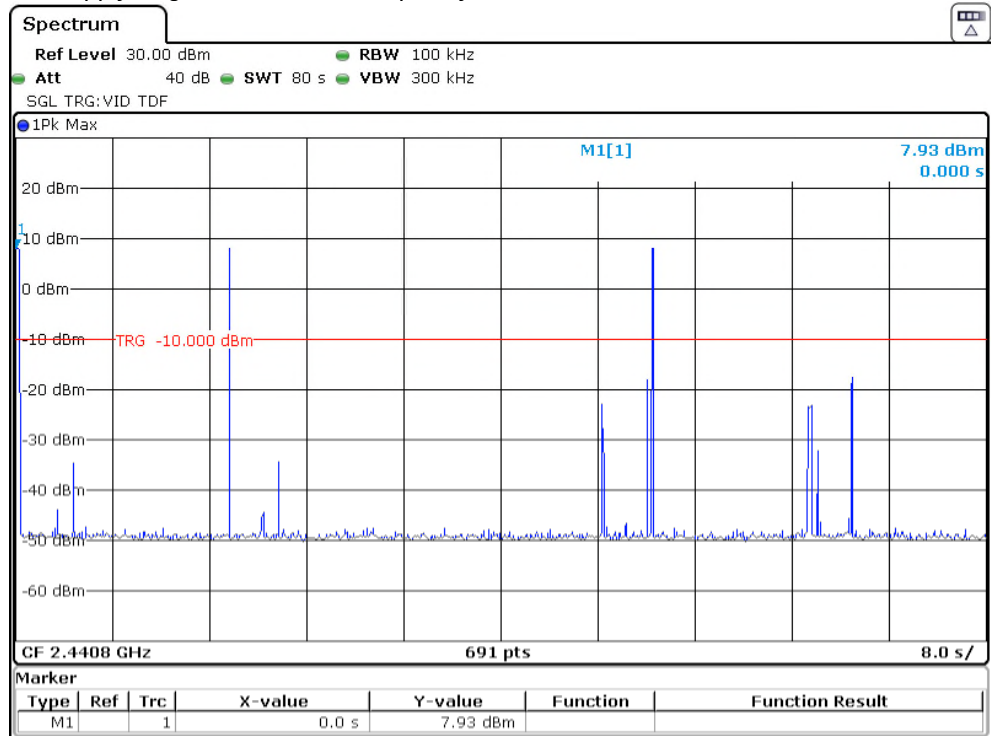
Date: 12.AUG.2024 18:02:03

USB-C supply, Right antenna, TX Frequency 2400.8MHz



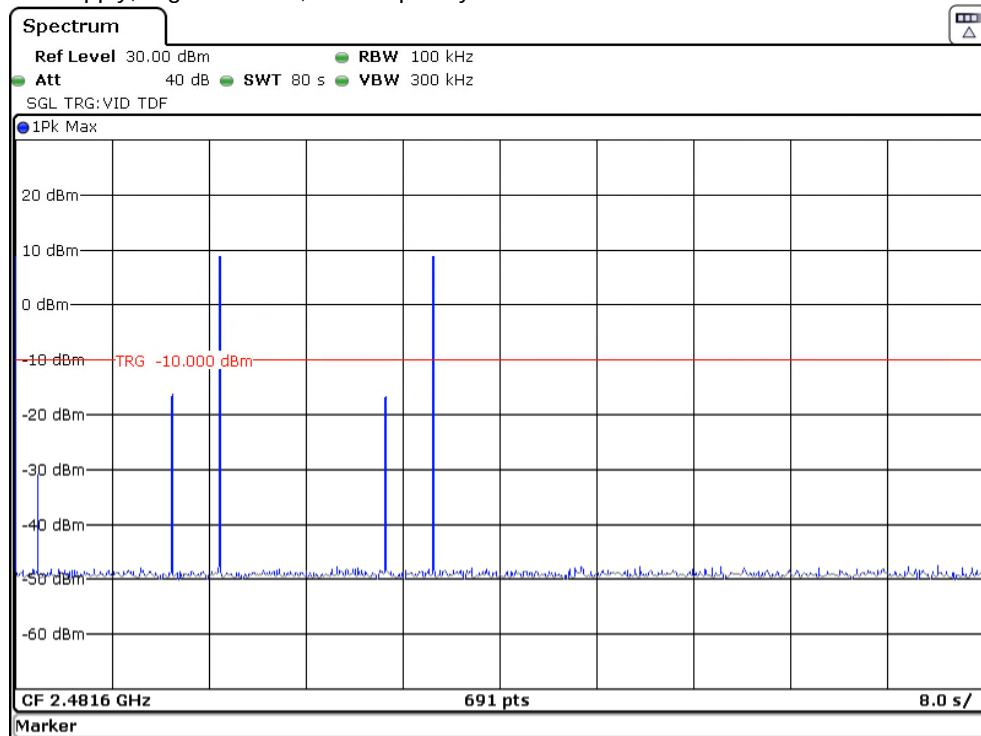
Date: 13.AUG.2024 14:39:36

USB-C supply, Right antenna, TX Frequency 2440.8MHz



Date: 13.AUG.2024 14:51:16

USB-C supply, Right antenna, TX Frequency 2481.6MHz



Date: 13.AUG.2024 15:00:49