Excellence in Compliance Testing

Certification Test Report

FCC ID: VEYCN3200R1

FCC Rule Part: 15.247

ACS Report Number: 14-2096.W03.1A

Manufacturer: xG Technology, Inc
Model: CN3200

Test Begin Date: **January 17, 2014**
Test End Date: **September 24, 2014**

Report Issue Date: September, 24 2014

ACCREDITED TESTING

FOR THE SCOPE OF ACCREDITATION UNDER CERTIFICATE NUMBER AT-1533

This report must not be used by the client to claim product certification, approval, or endorsement by ACLASS, ANSI, or any agency of the Federal Government.

Reviewed by:

Thierry Jean-Charles
EMC Engineer
Advanced Compliance Solutions, Inc.

This report contains 113 pages

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1 GENERAL

1.1 Purpose

The purpose of this report is to demonstrate compliance with Part 15 Subpart C of the FCC's Code of Federal Regulations

1.2 Product Description

The CN3200 Dual Band Routing Modem is an all-IP, high-capacity and high-performance wireless access point. It is waterproof and made to handle wide temperature ranges. The CN3200 Modem is designed for installation in fixed locations such as towers and buildings. The EUT is a 2 TX x 4 RX transceiver which operates in the ISM band of 902 MHz - 928 MHz and also includes a 2.4 GHz WLAN module model CN3200W1 (FCC ID: VEYCN3200W1).

Technical Information:

Band of Operation:	904.2 MHz - 925.8 MHz
Number of Channels:	16
Modulation Format:	BPSK, QPSK, 16-QAM, 64-QAM
Antenna Type/Gain:	Panel Antenna, 11.3 dBi
Operating Voltage:	48 VDC through POE Injector

Manufacturer Information:
xG Technology, Inc
7771 West Oakland Park Blvd, Suite 231
Sunrise, FL 33351

Test Sample Serial Number(s): VMTRP19140034

Test Sample Condition: The unit was in good operating condition with no physical damages.

1.3 Test Methodology and Considerations

The EUT was evaluated for radiated and RF conducted and power line conducted emissions for all modulation formats. The CN3200 uses the exact RF board as the xG Technology model xAP (FCC ID: VEYXAPR1). Therefore, RF conducted data from the evaluation of the FCC ID: VEYXAPR1 that is representative of the CN3200 is reused in this document from the test report 14-2006.W04.1B.

The radiated emissions measurements were performed on the EUT cabinet with 50 Ohm terminations at the TX antenna ports. Compliance within the restricted bands was also investigated via the RF conducted method per the KDB Publication No. 558074 D01 DTS Meas Guidance v03r02. The EUT was also evaluated for radiated emissions for inter-modulation products generated by the co-located 900 MHz and 2.4 GHz radios when they are transmitting at the same time. All intermodulation products were found compliant to the limits of Section 15.209.

The RF output power and spurious emissions measurements were collected with a test software power setting of 21. The RF conducted measurements were performed directly at each of the TX antenna ports through suitable attenuation. The maximum RF output power was calculated using the methodologies described in KDB Publication No. 662911 D01 Multiple Transmitter Output v02r01. The TX antennas are cross-polarized in the panel antenna. Therefore, the directional gain was determined to be equal to the gain at each antenna port = 11.3 dBi.

The CN3200 was also evaluated for unintentional radiated emissions with the panel antenna. The results are documented separately in a verification report.

2 TEST FACILITIES

2.1 Location

The radiated and conducted emissions test sites are located at the following address:

Advanced Compliance Solutions, Inc.
3998 FAU Blvd, Suite 310
Boca Raton, Florida 33431
Phone: (561) 961-5585
Fax: (561) 961-5587
www.acstestlab.com

FCC Test Firm Registration #: 475089
Industry Canada Lab Code: 4175C

2.2 Laboratory Accreditations/Recognitions/Certifications

ACS is accredited to ISO/IEC 17025 by ANSI-ASQ National Accreditation Board under their ACLASS program and has been issued certificate number AT-1533 in recognition of this accreditation. Unless otherwise specified, all test methods described within this report are covered under the ISO/IEC 17025 scope of accreditation.

2.3 Radiated & Conducted Emissions Test Site Description

2.3.1 Semi-Anechoic Chamber Test Site

The EMC radiated test facility consists of an RF-shielded enclosure. The interior dimensions of the indoor semi-anechoic chamber are approximately 48 feet (14.6 m) long by 36 feet (10.8 m) wide by 24 feet (7.3 m) high and consist of rigid, 1/8 inch (0.32 cm) steel-clad, wood core modular panels with steel framing. In the shielded enclosure, the faces of the panels are galvanized and the chamber is self-supporting. 8-foot RF absorbing cones are installed on 4 walls and the ceiling. The steel-clad ground plane is covered with vinyl floor.

The turntable is driven by pneumatic motor, which is capable of supporting a 2000 lb. load. The turntable is flushed with the chamber floor which it is connected to, around its circumference, with a continuous metallic loaded spring. An EMCO Model 1050 Multi-device Controller controls the turntable position.

A pneumatic motor is used to control antenna polarizations and height relative to the ground. The height information is displayed on the control unit EMCO Model 1050.

The control room is an RF shielded enclosure attached to the semi-anechoic chamber with two bulkhead panels for connecting RF, and control cables. The dimension of the room is 7.3 m x 4.9 m x 3 m high and the entrance doors of both control and conducted rooms are 3 feet (0.91 m) by 7 feet (2.13 m).

A diagram of the Semi-Anechoic Chamber Test Site is shown in Figure 2.3.1-1 below:

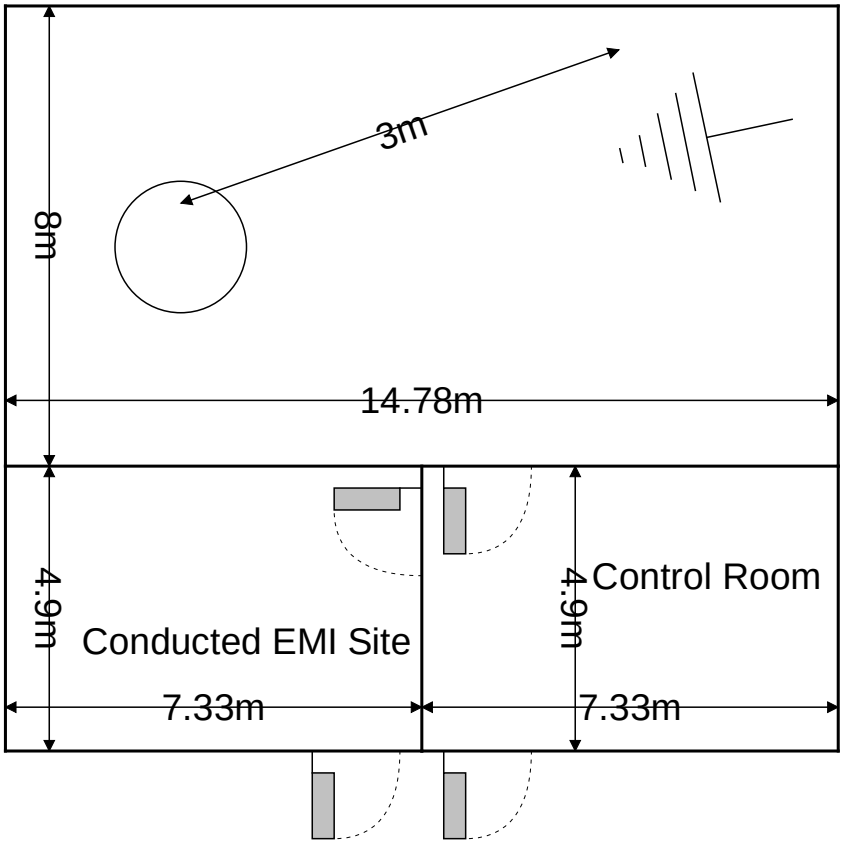


Figure 2.3.1-1: Semi-Anechoic Chamber Test Site

2.3.2 Conducted Emissions Test Site Description

The dimensions of the shielded conducted room are 7.3 x 4.9 x 3 m^3. As per ANSI C63.4 2003 requirements, the data were taken using two LISNs; a Solar Model 8028-50 50 Ω/50 µH and an EMCO Model 3825, which are installed as shown in Photograph 3. For 220 V, 50 Hz, a Polarad LISN (S/N 879341/048) is used in conjunction with a 1 kVA, 50 Hz/220 V EDGAR variable frequency generator, Model 1001B, to filter conducted noise from the generator.

A diagram of the room is shown below in figure 2.3.2-1:

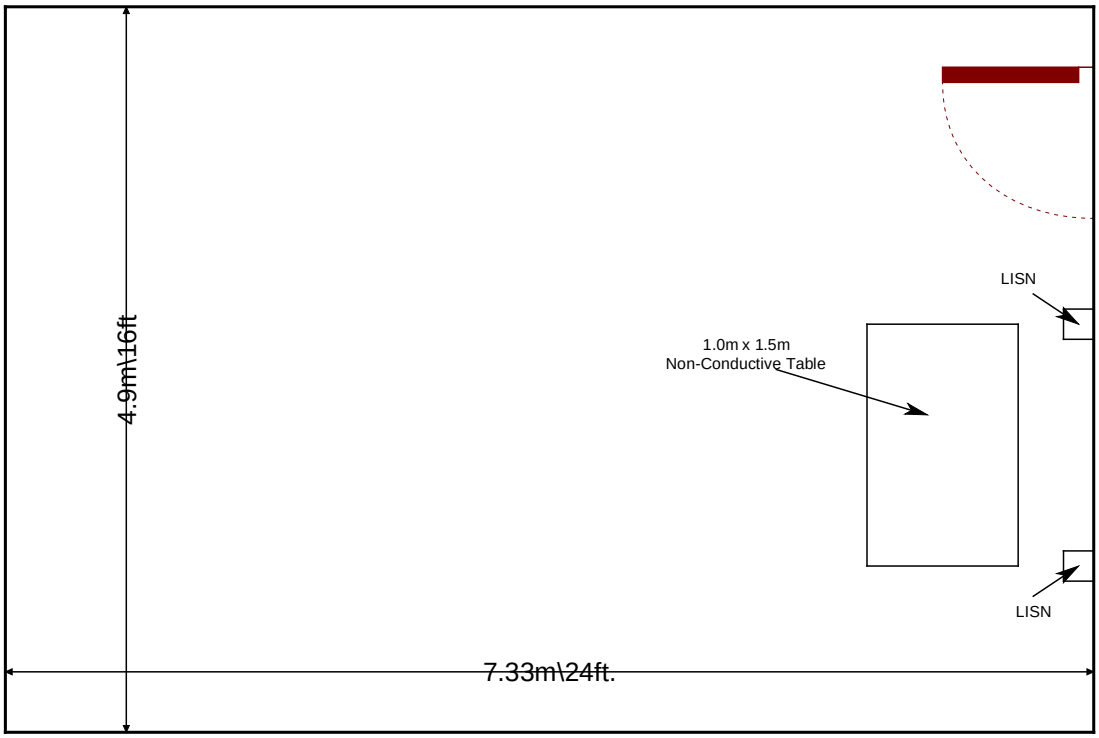


Figure 2.3.2-1: AC Mains Conducted EMI Site

3 APPLICABLE STANDARD REFERENCES

The following standards were used:

- ANSI C63.4-2003: Method of Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the 9KHz to 40GHz
- ANSI C63.10-2009: American National Standard for Testing Unlicensed Wireless Devices.
- US Code of Federal Regulations (CFR): Title 47, Part 2, Subpart J: Equipment Authorization Procedures, 2014
- US Code of Federal Regulations (CFR): Title 47, Part 15, Subpart C: Radio Frequency Devices, Intentional Radiators, 2014
- KDB Publication No. 558074 D01 Meas Guidance v03r02 – Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247, June 5, 2014.
- KDB Publication No. 662911 D01 Multiple Transmitter Output v02r01 – Emissions Testing of Transmitters with Multiple Outputs in the Same Band (*e.g.,* MIMO, Smart Antenna, etc), October 31, 2013.
- KDB Publication No. 662911 D02 MIMO with Cross-Polarized Antennas v01 – Mimo with Cross-Polarized Antenna, October 25, 2011.

4 LIST OF TEST EQUIPMENT

The calibration interval of test equipment is annually or the manufacturer's recommendations. Where the calibration interval deviates from the annual cycle based on the instrument manufacturer's recommendations, it shall be stated below.

Table 4-1: Test Equipment

AssetID	Manufacturer	Model #	Equipment Type	Serial #	Last Calibration Date	Calibration Due Date
2069	Trilithic, Inc.	7NM867/122-X1-AA	Notch Filter	200315126	3/26/2013	3/26/2014
2069	Trilithic, Inc.	7NM867/122-X1-AA	Notch Filter	200315126	4/4/2014	4/4/2015
2071	Trilithic, Inc.	4HC1400-1-KK	Filter	9643263	1/1/2014	1/1/2015
2075	Hewlett Packard	8495B	Attenuators	2626A11012	1/2/2014	1/2/2015
2082	Teledyne Storm Products	90-010-048	Cables	2082	5/31/2013	5/31/2014
2082	Teledyne Storm Products	90-010-048	Cables	2082	5/8/2014	5/8/2015
2086	Merrimac	FAN-6-10K	Attenuators	23148-83-1	12/31/2013	12/31/2014
2093	Merrimac	FAN-6-10K	Attenuators	23148-83-18	12/31/2013	12/31/2014
3002	Rohde & Schwarz	ESU40	Receiver	100346	11/5/2013	11/5/2014
RE561	Rhode & Schwarz	NRP-Z55	Sensors	100028	11/25/2013	11/25/2014
283	Rohde & Schwarz	FSP40	Spectrum Analyzers	1000033	9/18/2013	9/18/2015
523	Agilent	E7405	Spectrum Analyzers	MY45103293	1/8/2013	1/8/2015
2002	EMCO	3108	Antennas	2147	11/22/2013	11/22/2015
2004	EMCO	3146	Antennas	1385	11/22/2013	11/22/2015
2006	EMCO	3115	Antennas	2573	4/24/2013	4/24/2015
2011	Hewlett-Packard	HP 8447D	Amplifiers	2443A03952	12/31/2013	12/31/2014
2037	ACS Boca	Chamber EMI Cable Set	Cable Set	2037	1/1/2014	1/1/2015
2037	ACS Boca	Chamber EMI Cable Set	Cable Set	2037	2/27/2014	2/27/2015
2044	QMI	N/A	Cables	2044	12/31/2013	12/31/2014
2076	Hewlett Packard	HP5061-5458	Cables	2076	12/31/2013	12/31/2014
2089	Agilent Technologies, Inc.	83017A	Amplifiers	3123A00214	12/16/2013	12/16/2014
2095	ETS Lindgren	TILE4! - Version 4.2.A	Software	85242	NCR	NCR
2022	EMCO	LISN3825/2R	LISN	1095	9/9/2013	9/9/2015
2045	ACS Boca	Conducted Cable Set	Cable Set	2045	1/1/2014	1/1/2015
3004	Teseq	CFL 9206A	Attenuators	34720	10/21/2013	10/21/2015

Notes:

- **NCR=No Calibration Required**
- **The calibration cycle information for assets 2069 and 2037 is provided to cover the entire test period.**
- **Asset 2069 was used during the active period of the calibration cycle only.**

5 SUPPORT EQUIPMENT

Table 5-1: EUT and Support Equipment

Item #	Type Device	Manufacturer	Model/Part #	Serial #
1	POE Adaptor	Tycon Power Systems	TP-POE-HP-48	116011421D
2	4x Ferrites	FAIR-RITE	0443164251	N/A
3	4x Ferrites	FAIR-RITE	0443164251	N/A
4	Laptop	Dell	Latitude D620	CN-0TD761-12961-68G-3106
5	Power Supply	Dell	PA-1650-05D2	CN-0F7970-71615-54P-C958
6	WLAN Antenna	Antenna World	COM-24015PN	ACS#5
7	900 MHz Antenna	KP Performance Antennas	KPPA-900MHZ4P90S	201404-153

Table 5-2: Cable Description

Cable #	Cable Type	Length	Shield	Termination
A	Ethernet	1.08 m	Yes	EUT to POE adapter
B	Power Cord	1.83 m	No	Power Supply to AC Mains
C	Ethernet	1.2 m	No	POE to Laptop
D	Dell Power Supply Cable	1.83 m	No	Laptop to Power Supply
E	Dell Power Supply Cord	0.90 m	No	Power Supply to AC Mains
F	Coaxial model AMP1996-0048	1.2m	Yes	EUT to WLAN antenna
G	Coaxial	0.32m	Yes	EUT to 900 MHz Panel Antenna
H	Coaxial	0.32m	Yes	EUT to Panel 900 MHz Antenna

6 EQUIPMENT UNDER TEST SETUP BLOCK DIAGRAM

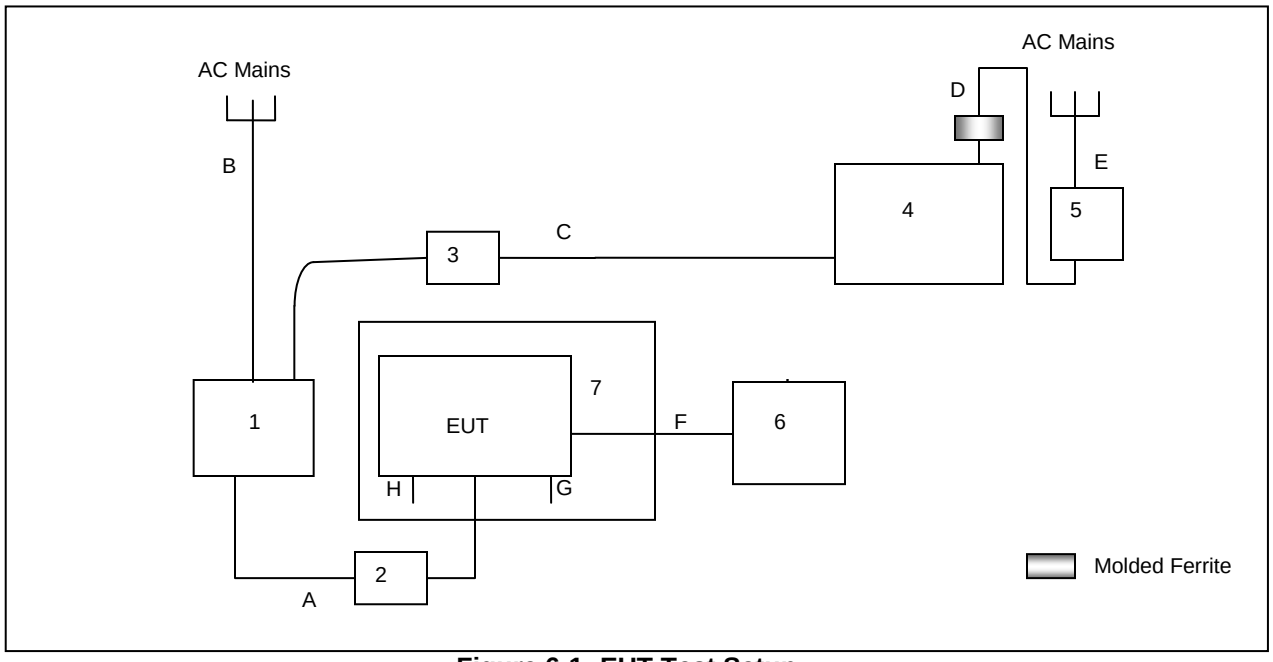


Figure 6-1: EUT Test Setup

7 SUMMARY OF TESTS

Along with the tabular data shown below, plots were taken of all signals deemed important enough to document.

7.1 Antenna Requirement – FCC: Section 15.203

The EUT uses standard Type N connectors at the antenna ports. However, the unit is professionally installed by an xG Technology personnel or subcontractor. Thus the equipment meets the requirements of FCC Section 15.203 based on professional installation.

For the 4 RX x 2 TX panel antenna configuration, the directional gain is calculated per FCC KDB Publication No. 662911 D01 Multiple Transmitter Output v02r01.

Directional Gain = GANT + Array Gain
Array Gain = 10*log(NANT/NSS) dB

Where,
GANT = Antenna Gain
NANT = number of transmit antennas and
NSS = number of spatial streams. (Assume NSS = 1 unless you have specific information to the contrary.)

For the panel antenna configuration, the TX antennas are cross-polarized. Therefore, the directional gain is the individual gain of the antenna:
Directional Gain = 11.3 dBi

Considering that the unit is professionally installed, the output power is adjusted so that the maximum EIRP does not exceed 36 dBm.

7.2 6 dB Bandwidth - FCC: Section 15.247(a)(2) / Occupied Bandwidth (OBW)

7.2.1 Measurement Procedure

The 6dB bandwidth was measured in accordance with the FCC KDB Publication No. 558074 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (47 CFR 15.247)” DTS 6-dB Signal Bandwidth Option 1. The RBW of the spectrum analyzer was set to 100 kHz and VBW 300 kHz. Span was set large enough to capture the entire emissions and >> RBW.

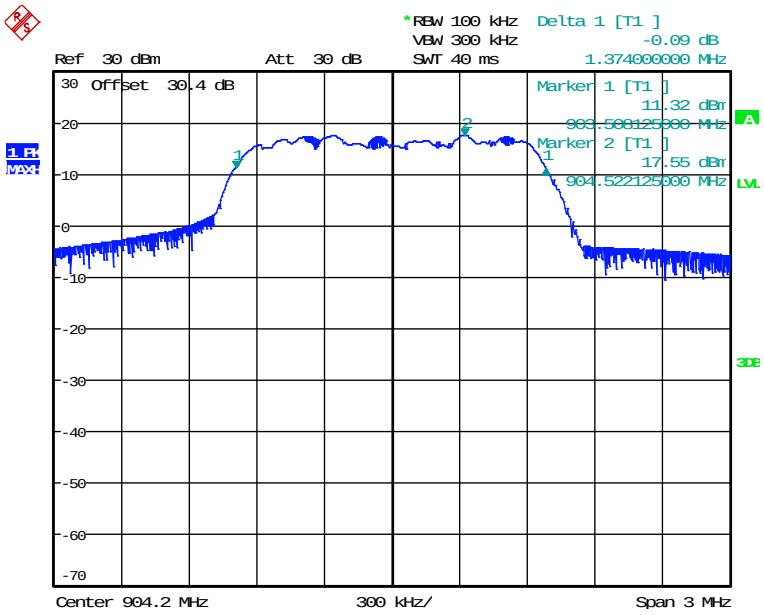
The occupied bandwidth (OBW) as defined in the FCC KDB Publication No. 558074 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (47 CFR 15.247)” was measured in accordance with ANSI C63.10. The Span of the Spectrum Analyzer was configured between two to five times the OBW. The RBW of the SA was set to 1% to 5% of the OBW. The reference level was set to the highest amplitude signal observed. The occupied OBW was measured 20 dB down from the reference level.

7.2.2 Measurement Results

Results are shown below.

Table 7.2.2-1: 6dB / OBW (BPSK, Antenna Path 1)

Frequency [MHz]	6dB Bandwidth [kHz]	Bandwidth (OBW) (kHz)
904.2	1374.000	1530.625
915.72	1369.250	1535.625
925.8	1368.750	1541.875



Date: 22.SEP.2014 20:53:08

Figure 7.2.2-1: 6dB BW - Low Channel (BPSK, Antenna Path 1)

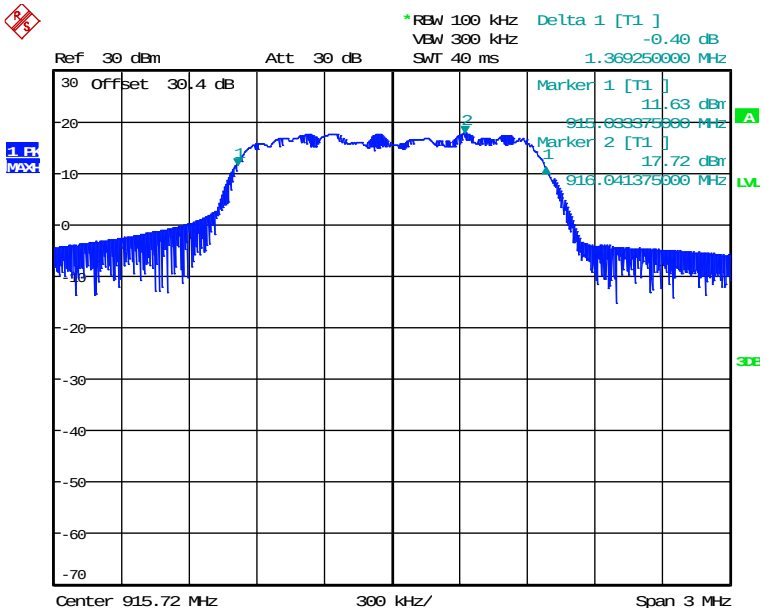


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Figure 7.2.2-2: 6dB BW - Middle Channel (BPSK, Antenna Path 1)

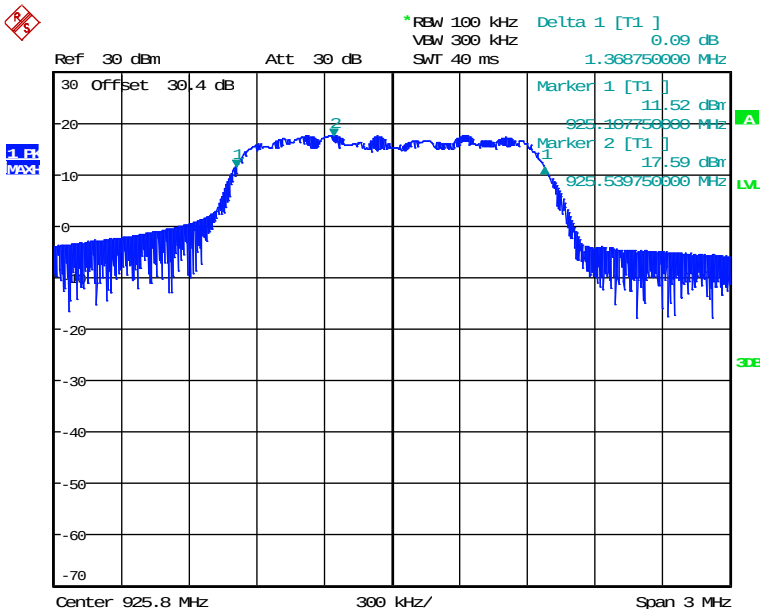

Figure 7.2.2-3: 6dB BW - High Channel (BPSK, Antenna Path 1)

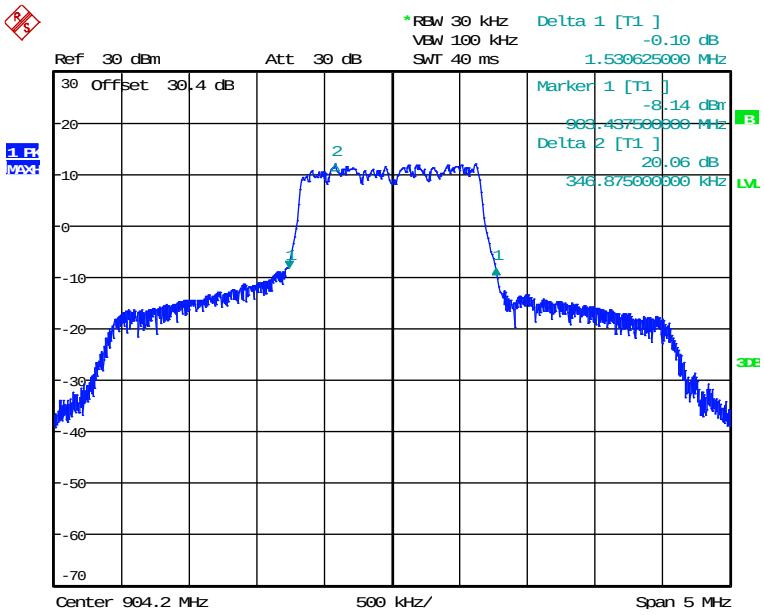

Figure 7.2.2-4: 20 dB OBW - Low Channel (BPSK, Antenna Path 1)

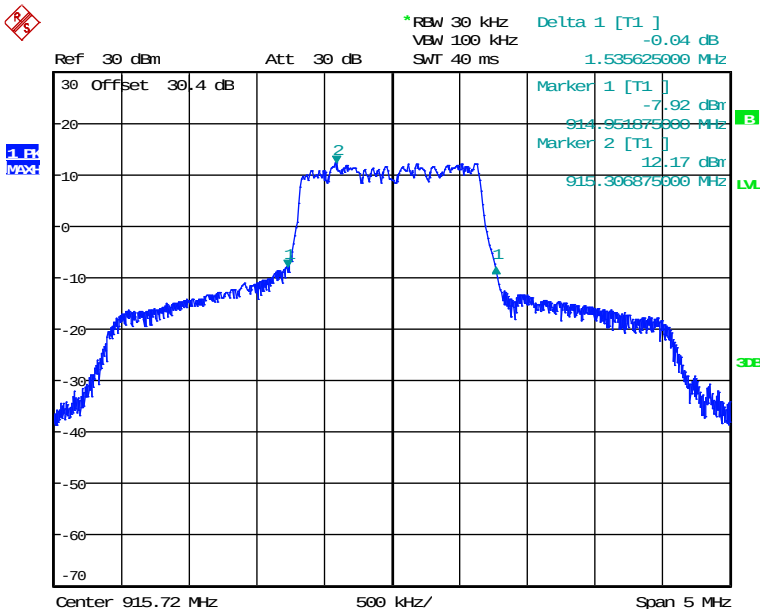

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Figure 7.2.2-5: 20 dB OBW - Middle Channel (BPSK, Antenna Path 1)

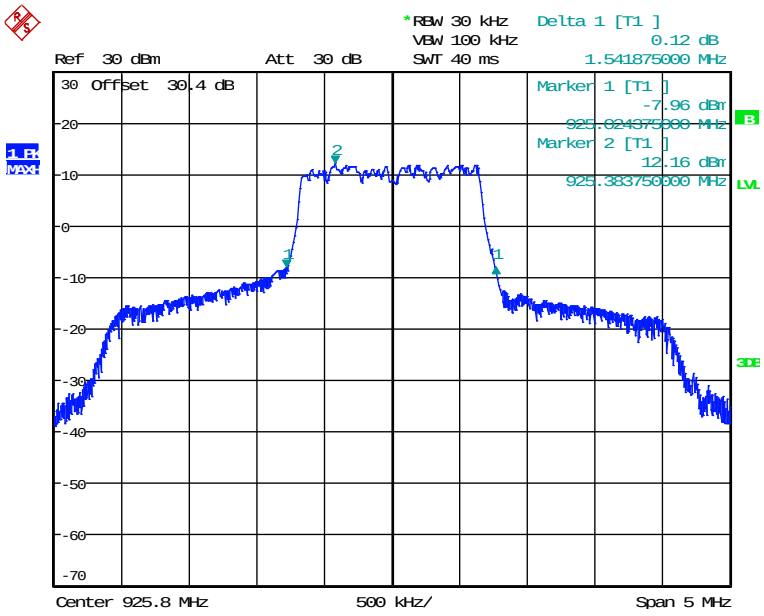

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Figure 7.2.2-6: 20 dB OBW - High Channel (BPSK, Antenna Path 1)

Table 7.2.2-2: 6dB / OBW (BPSK, Antenna Path 2)

Frequency [MHz]	6dB Bandwidth [kHz]	OBW (kHz)
904.2	1370.250	1485.625
915.72	1368.000	1489.085
925.8	1370.625	1488.750

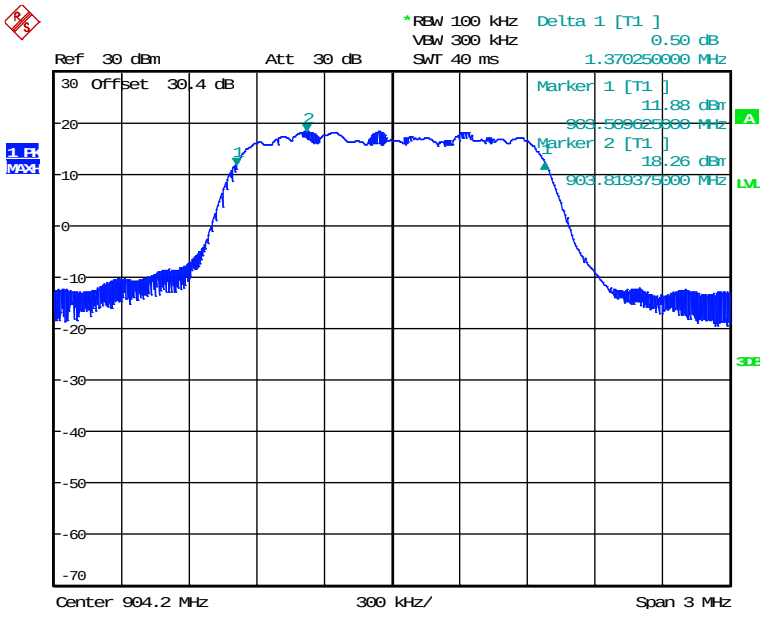

Figure 7.2.2-7: 6dB BW - Low Channel (BPSK, Antenna Path 2)

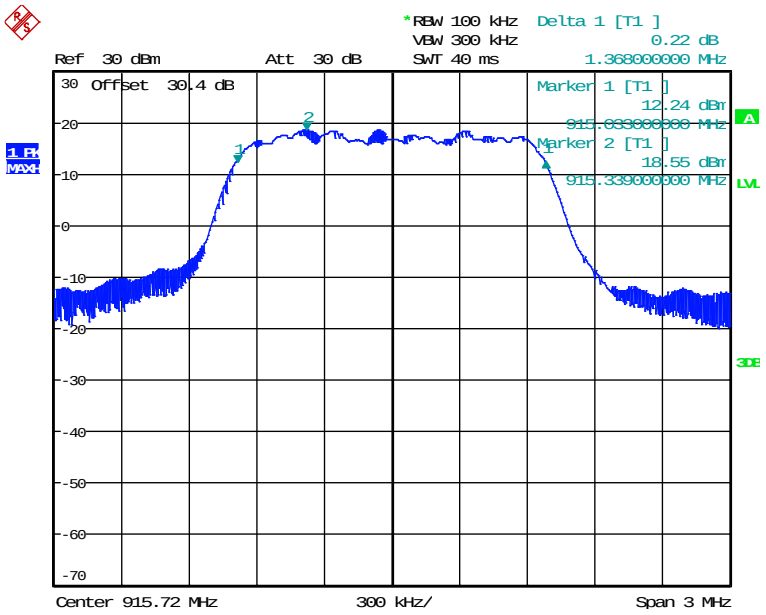

Figure 7.2.2-8: 6dB BW - Middle Channel (BPSK, Antenna Path 2)

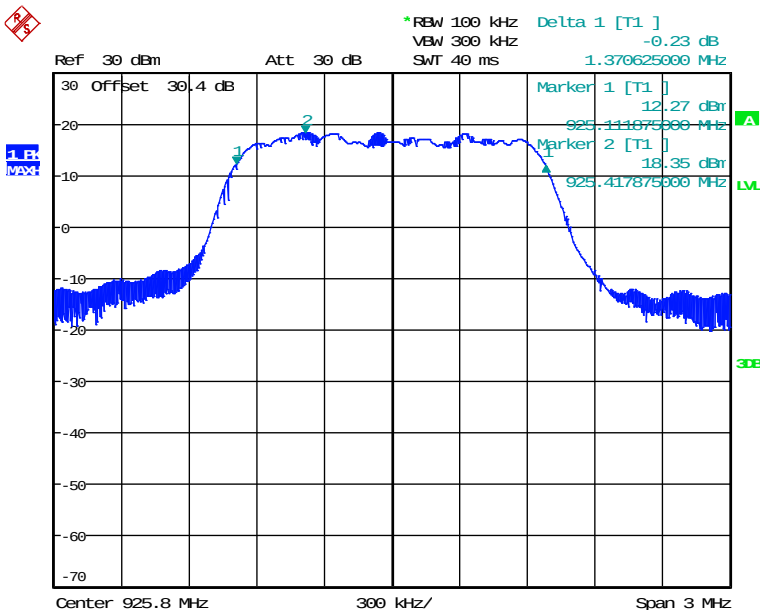

Figure 7.2.2-9: 6dB BW - High Channel (BPSK, Antenna Path 2)

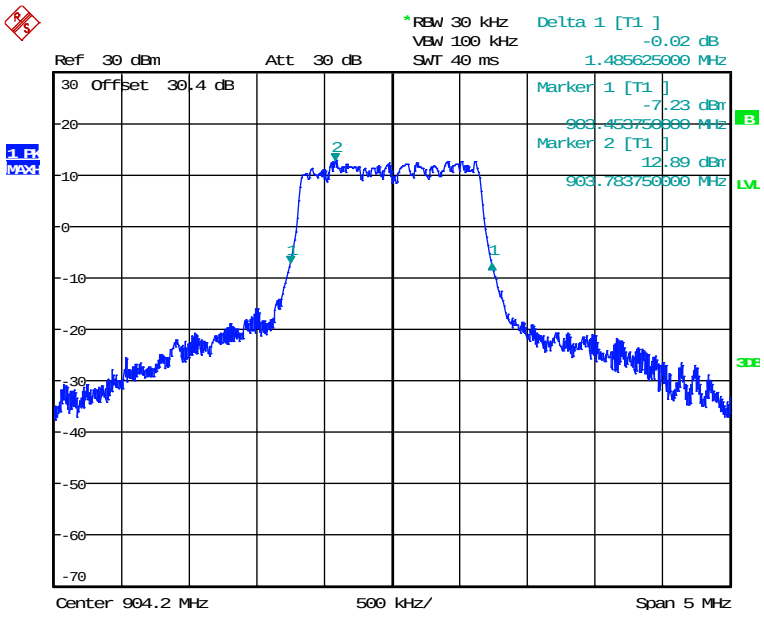

Figure 7.2.2-10: 20 dB OBW - Low Channel (BPSK, Antenna Path 2)

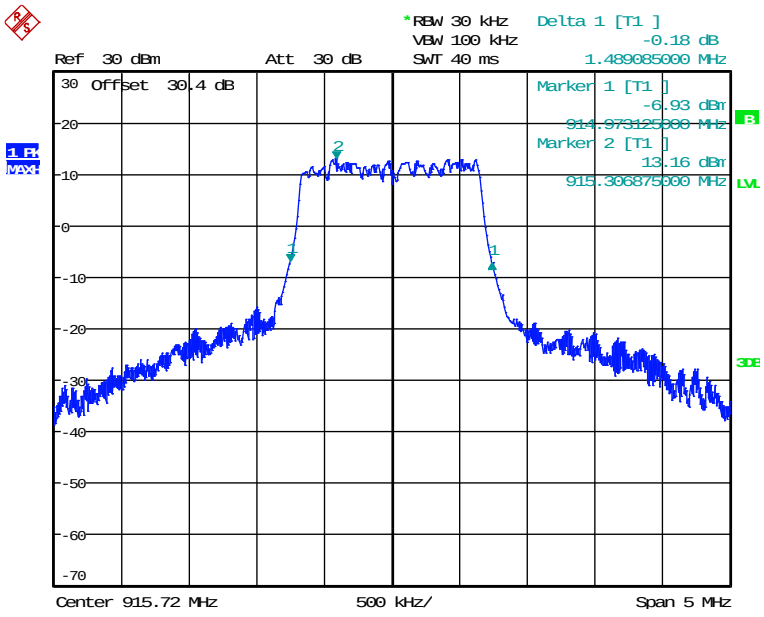

Figure 7.2.2-11: 20 dB OBW - Middle Channel (BPSK, Antenna Path 2)

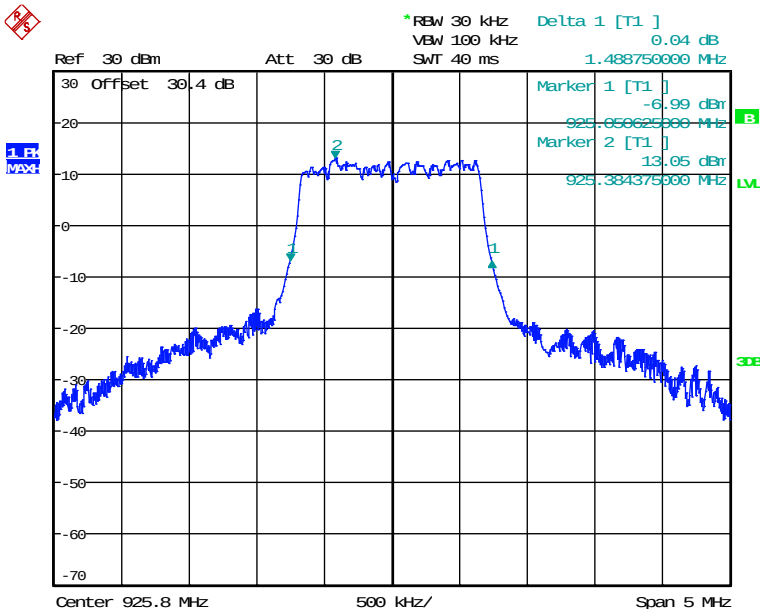

Figure 7.2.2-12: 20 dB OBW - High Channel (BPSK, Antenna Path 2)

Table 7.2.2-3: 6dB / OBW (QPSK, Antenna Path 1)

Frequency [MHz]	6dB Bandwidth [kHz]	OBW (kHz)
904.2	1348.250	1485.625
915.72	1350.875	1486.875
925.8	1352.375	1483.125

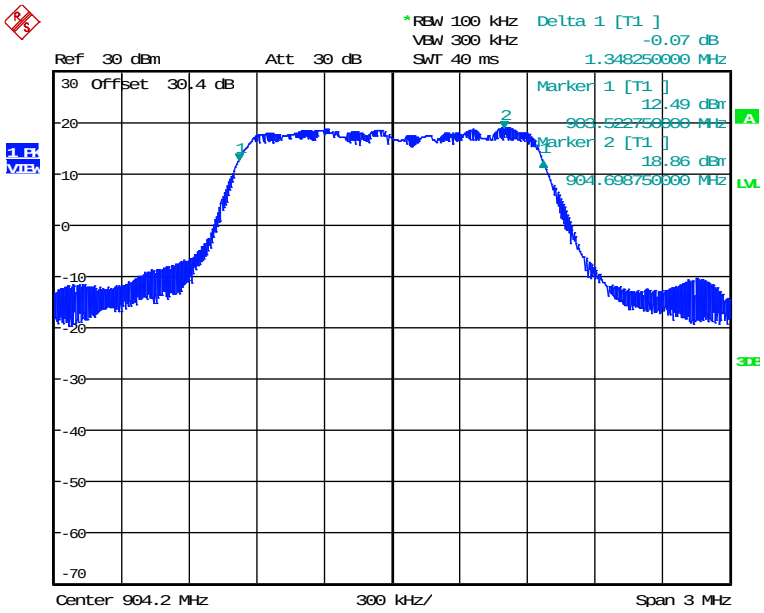

Figure 7.2.2-13: 6dB BW - Low Channel (QPSK, Antenna Path 1)

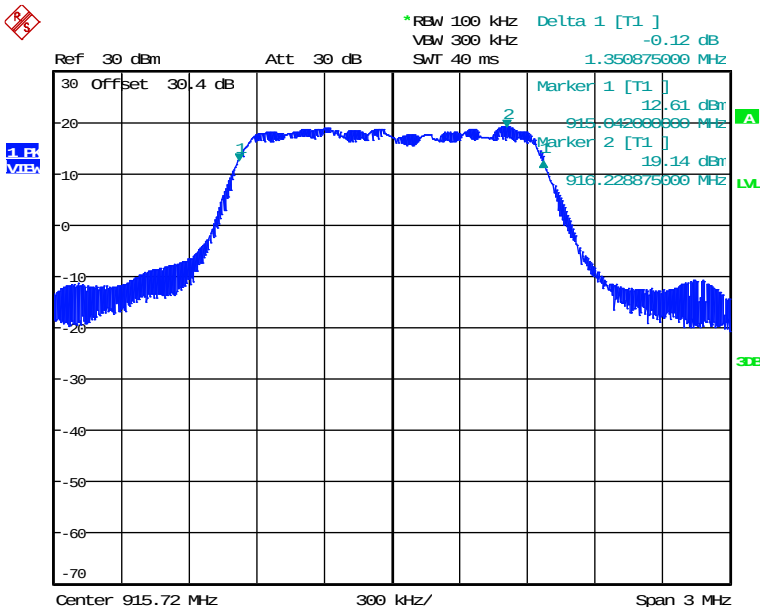

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Figure 7.2.2-14: 6dB BW - Middle Channel (QPSK, Antenna Path 1)

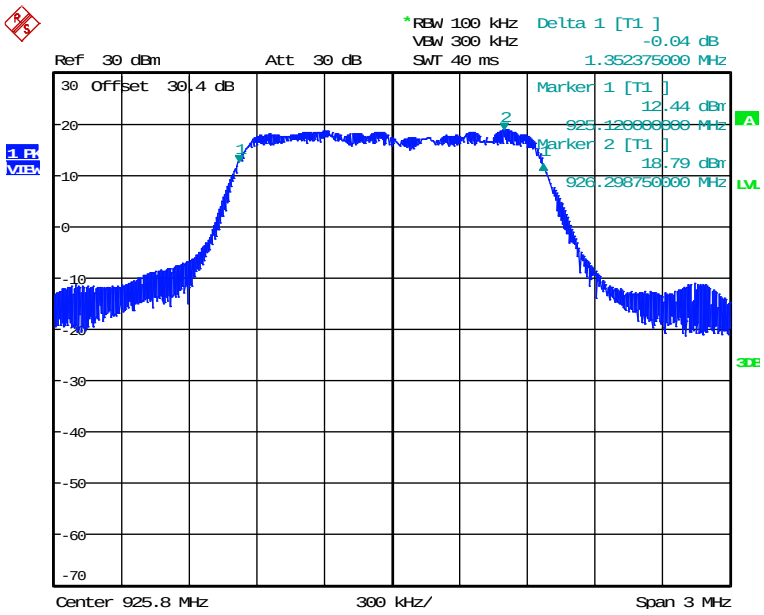

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Figure 7.2.2-15: 6dB BW - High Channel (QPSK, Antenna Path 1)

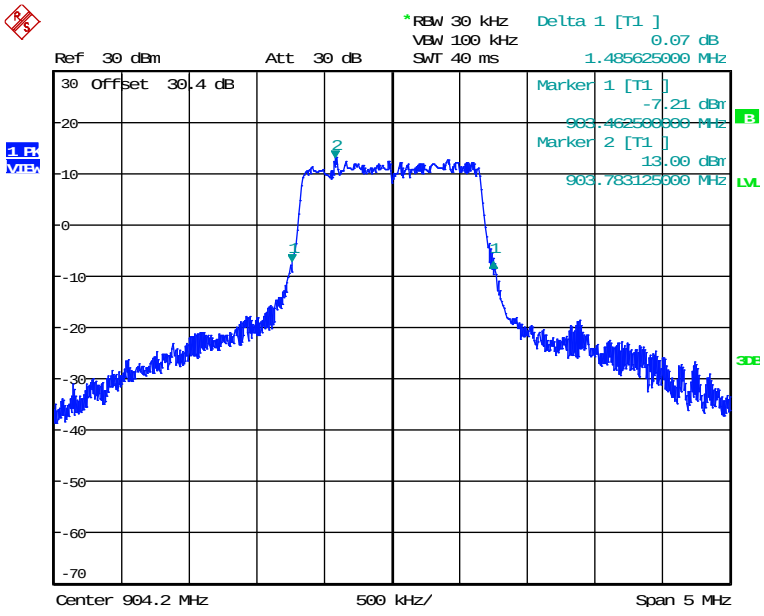

Figure 7.2.2-16: 20 dB OBW - Low Channel (QPSK, Antenna Path 1)

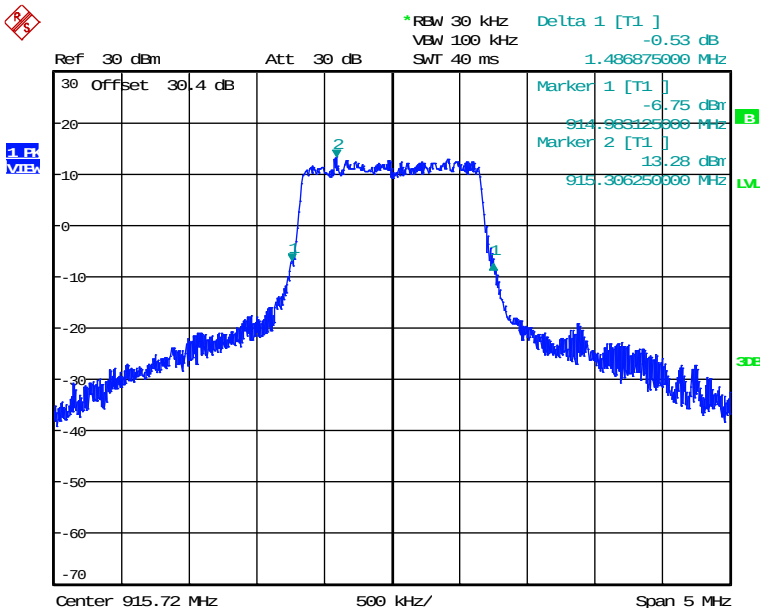

Figure 7.2.2-17: 20 dB OBW - Middle Channel (QPSK, Antenna Path 1)

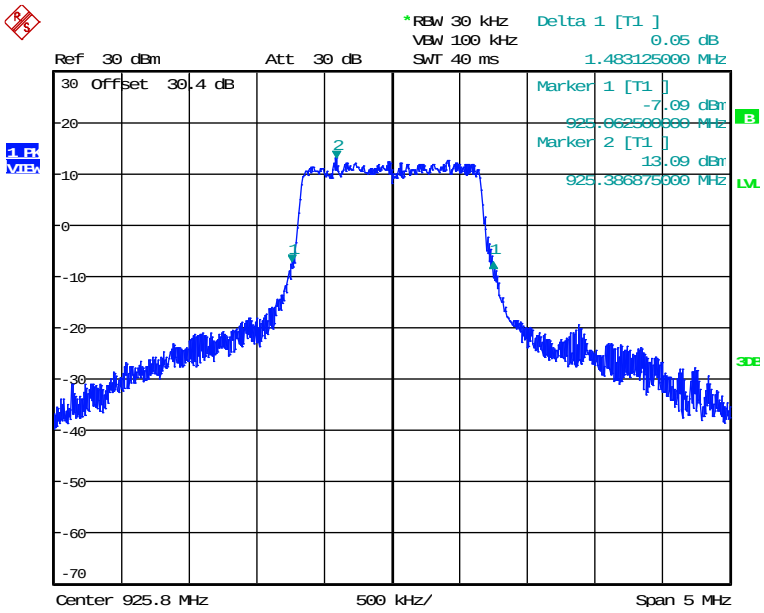

Figure 7.2.2-18: 20 dB OBW - High Channel (QPSK, Antenna Path 1)

Table 7.2.2-4: 6dB / OBW (QPSK, Antenna Path 2)

Frequency [MHz]	6dB Bandwidth [kHz]	OBW (kHz)
904.2	1348.875	1609.375
915.72	1351.250	1616.250
925.8	1348.500	1586.875

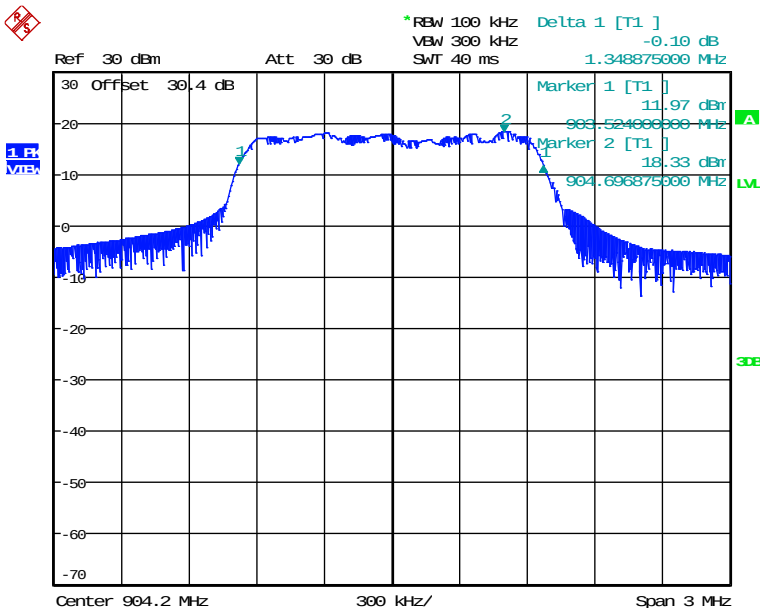

Figure 7.2.2-19: 6dB BW - Low Channel (QPSK, Antenna Path 2)

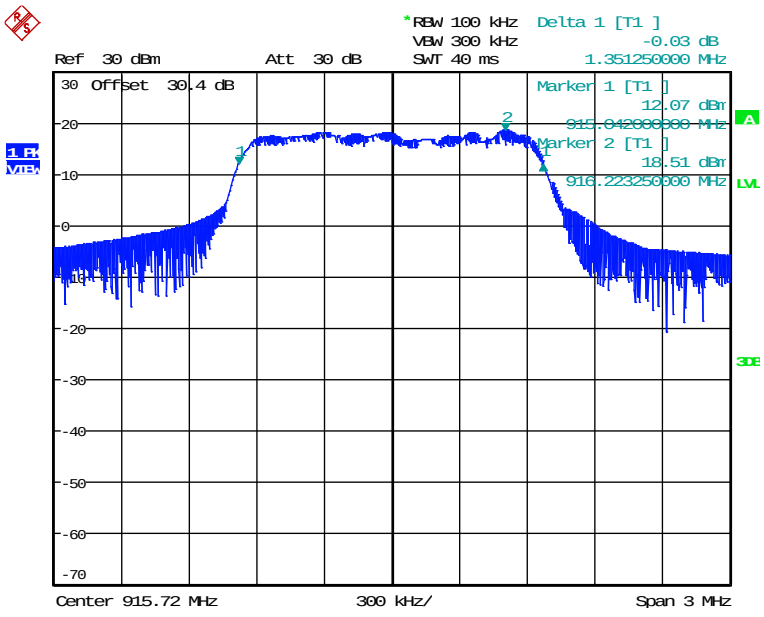

Figure 7.2.2-20: 6dB BW - Middle Channel (QPSK, Antenna Path 2)

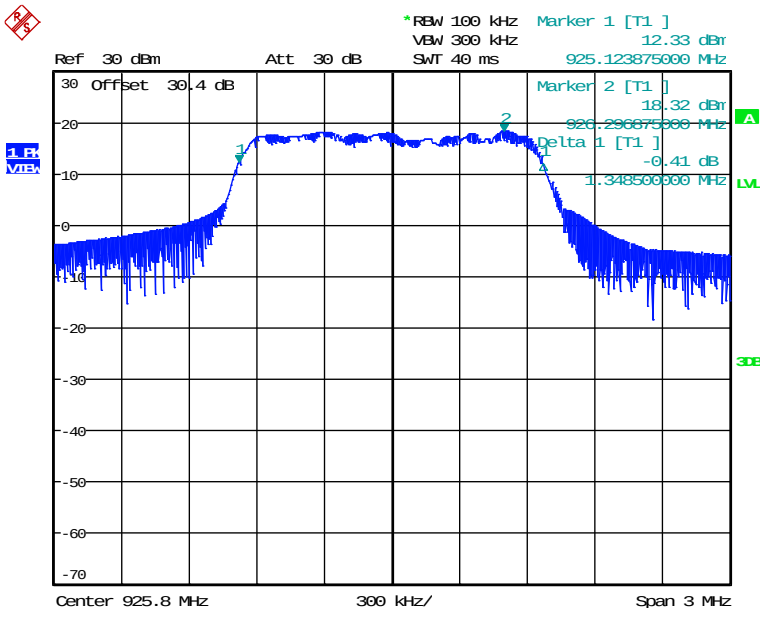

Figure 7.2.2-21: 6dB BW - High Channel (QPSK, Antenna Path 2)

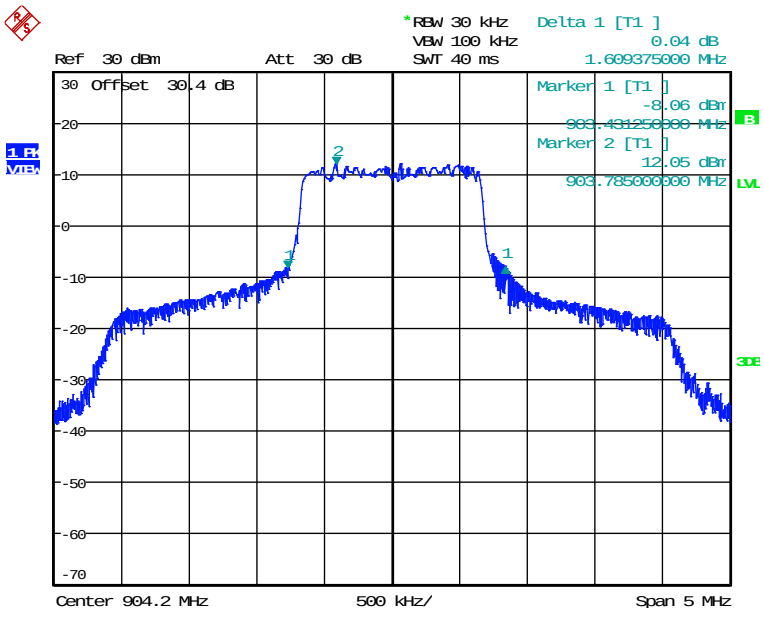

Figure 7.2.2-22: 20 dB OBW - Low Channel (QPSK, Antenna Path 2)

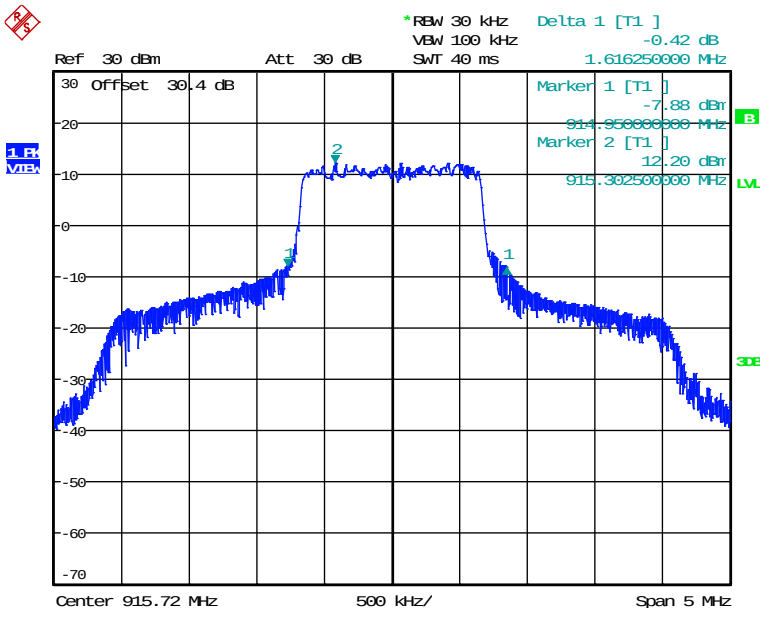

Figure 7.2.2-23: 20 dB OBW - Middle Channel (QPSK, Antenna Path 2)

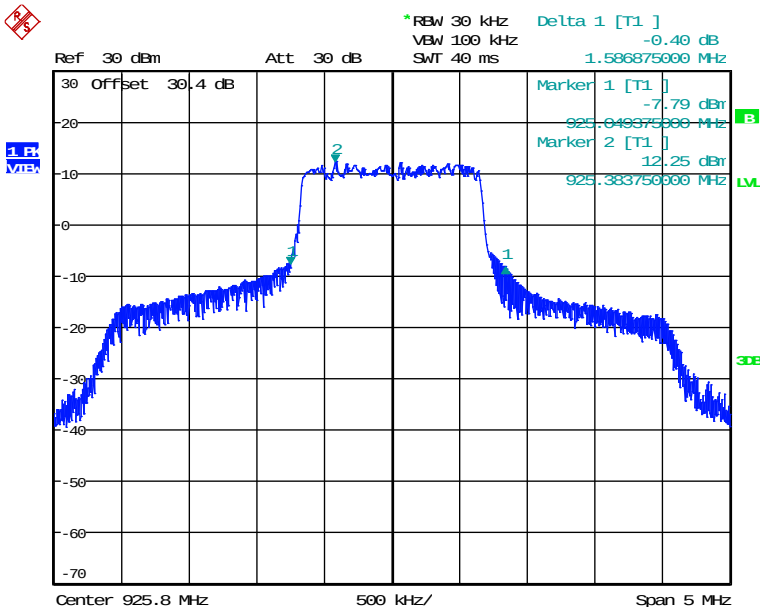

Figure 7.2.2-24: 20 dB OBW - High Channel (QPSK, Antenna Path 2)

Table 7.2.2-5: 6dB / OBW (16-QAM, Antenna Path 1)

Frequency [MHz]	6dB Bandwidth [kHz]	OBW (kHz)
904.2	1358.000	1465.625
915.72	1362.000	1465.000
925.8	1357.875	1463.750

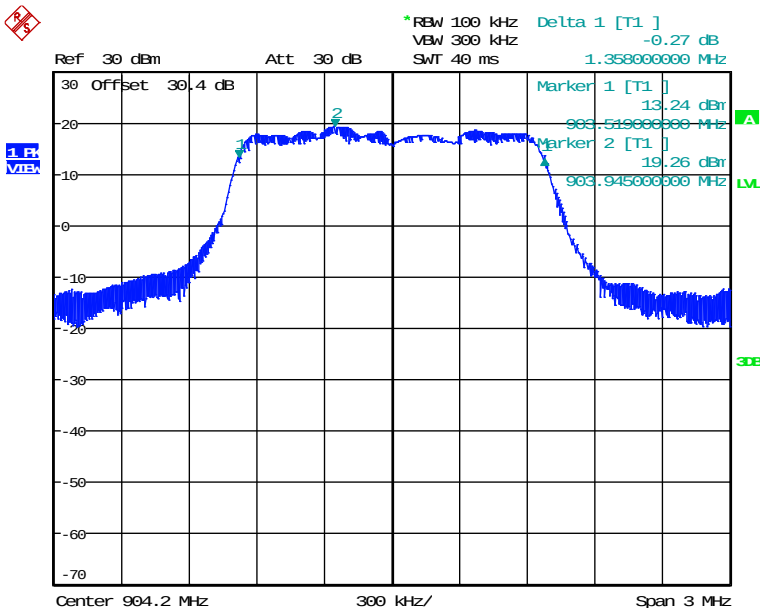

Figure 7.2.2-25: 6dB BW - Low Channel (16-QAM, Antenna Path 1)

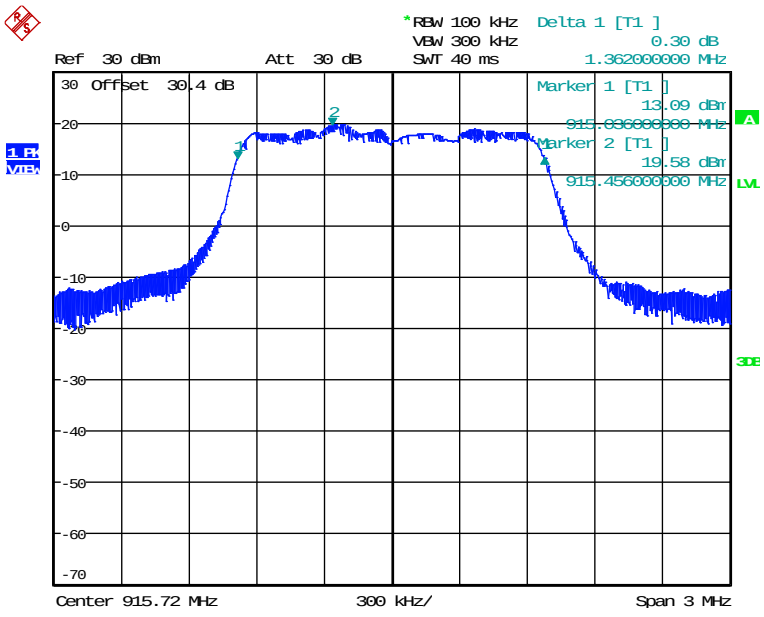

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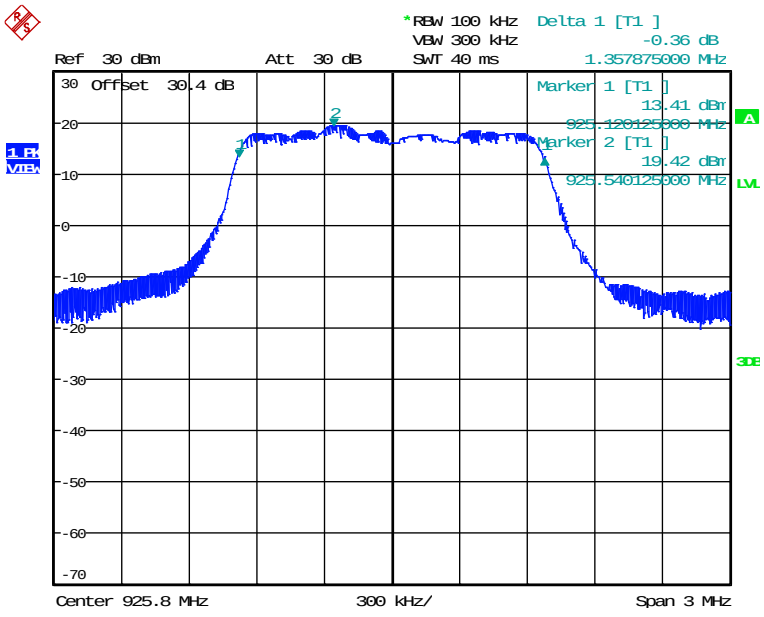
Figure 7.2.2-26: 6dB BW - Middle Channel (16-QAM, Antenna Path 1)



Date: 23.SEP.2014 02:14:32

Figure 7.2.2-27: 6dB BW - High Channel (16-QAM, Antenna Path 1)

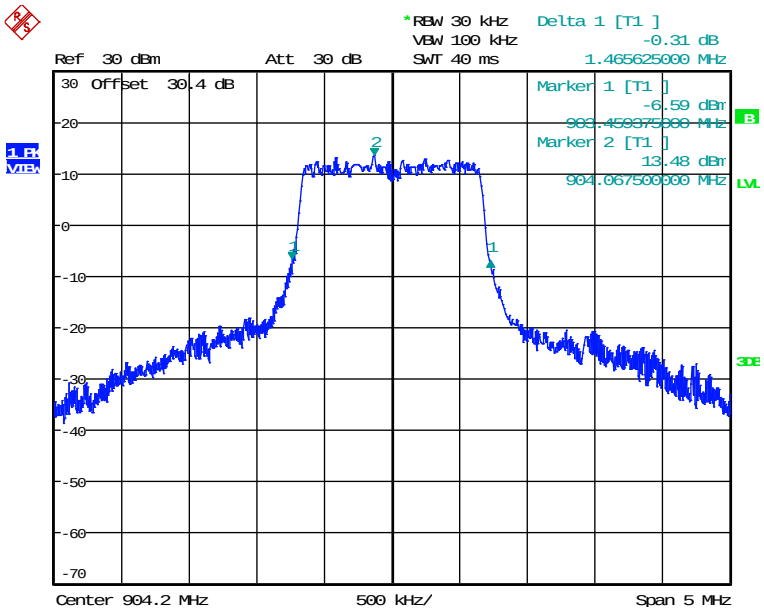


Figure 7.2.2-28: 20 dB OBW - Low Channel (16-QAM, Antenna Path 1)

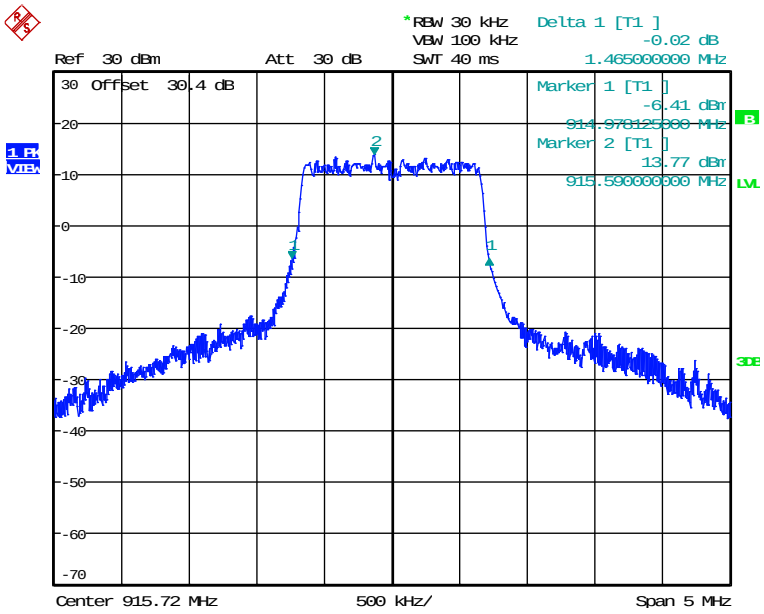


Figure 7.2.2-29: 20 dB OBW - Middle Channel (16-QAM, Antenna Path 1)

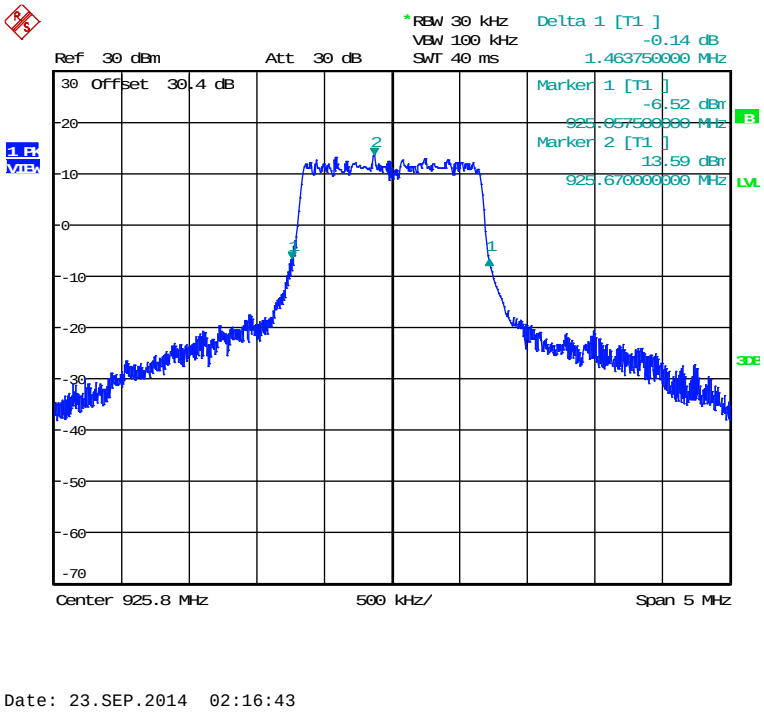


Figure 7.2.2-30: 20 dB OBW - High Channel (16-QAM, Antenna Path 1)

Table 7.2.2-6: 6dB / OBW (16-QAM, Antenna Path 2)

Frequency [MHz]	6dB Bandwidth [kHz]	OBW (kHz)
904.2	1362.000	1478.750
915.72	1362.000	1485.000
925.8	1362.375	1487.500

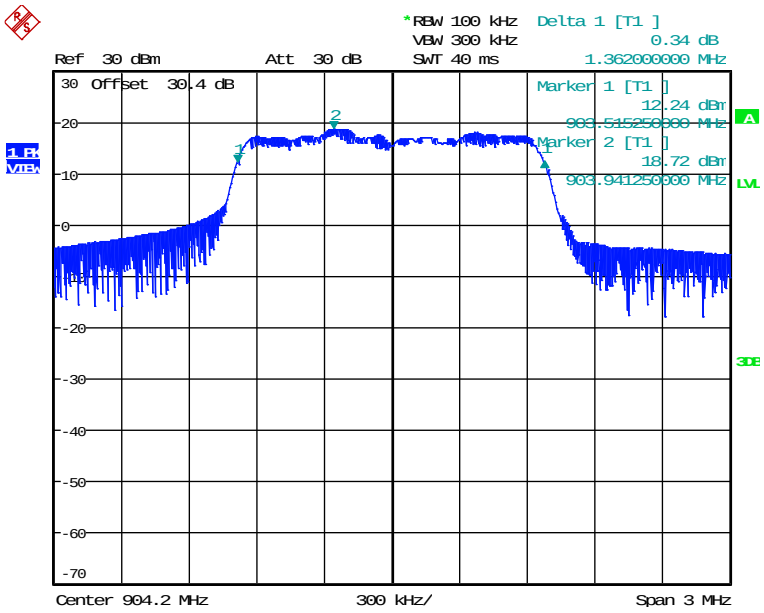


Figure 7.2.2-31: 6dB BW - Low Channel (16-QAM, Antenna Path 2)

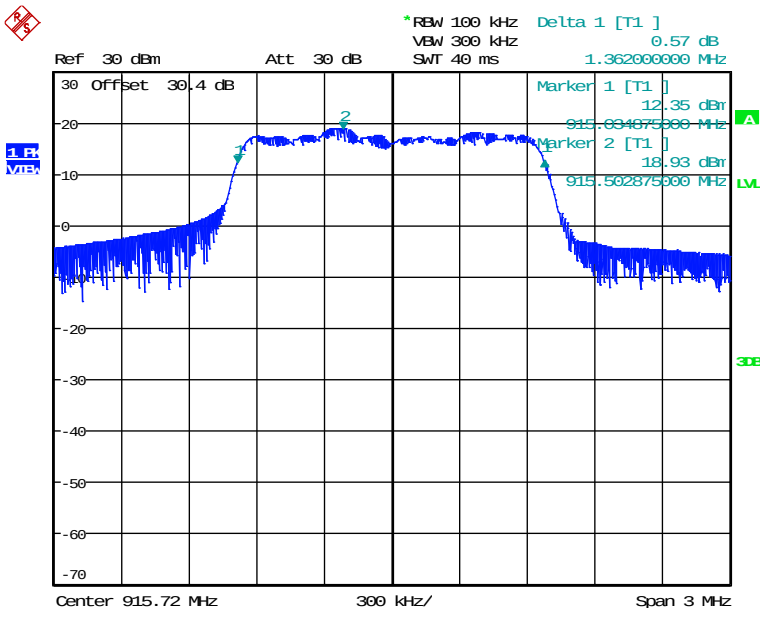


Figure 7.2.2-32: 6dB BW - Middle Channel (16-QAM, Antenna Path 2)

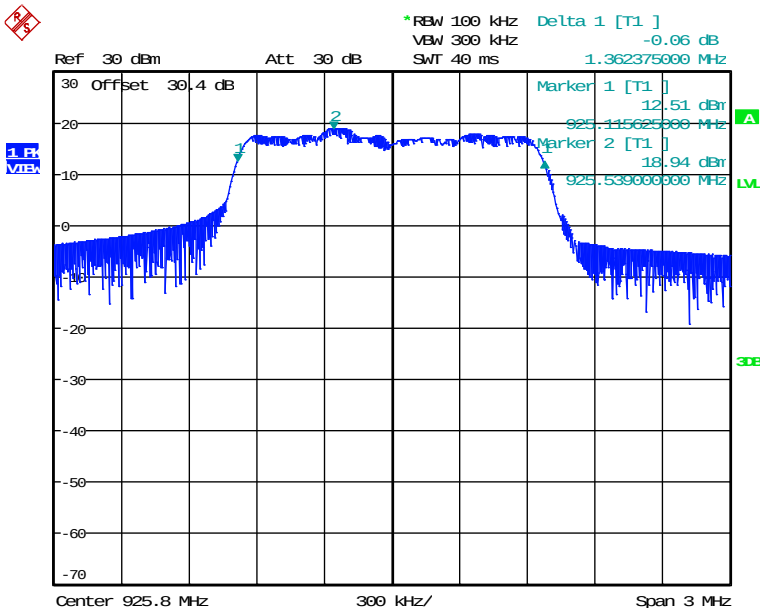


Figure 7.2.2-33: 6dB BW - High Channel (16-QAM, Antenna Path 2)

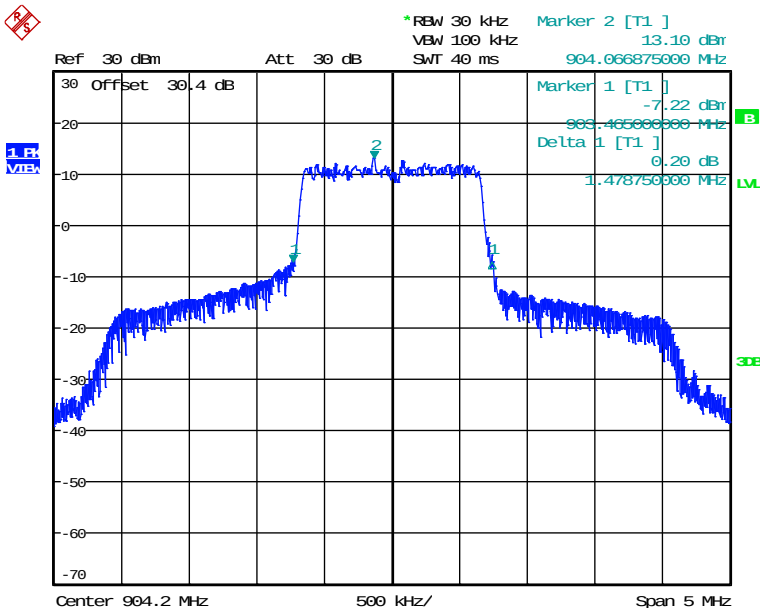


Figure 7.2.2-34: 20 dB OBW - Low Channel (16-QAM, Antenna Path 2)

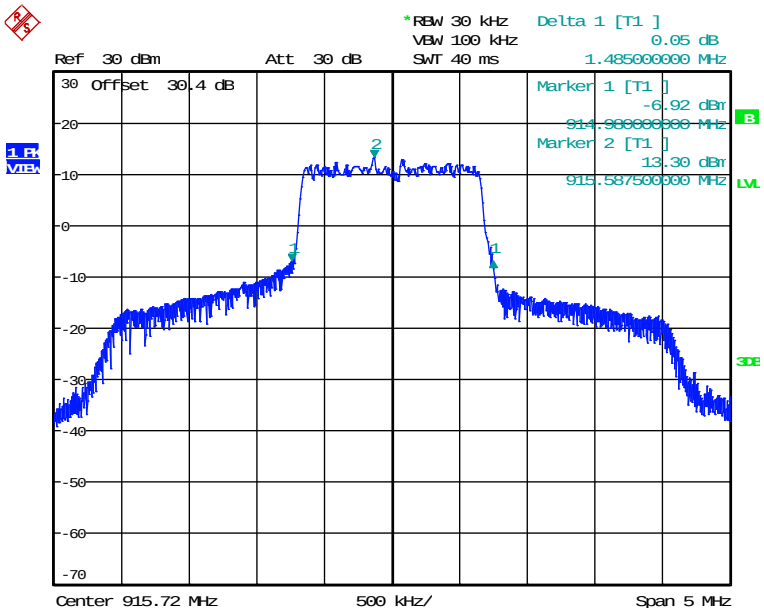


Figure 7.2.2-35: 20 dB OBW - Middle Channel (16-QAM, Antenna Path 2)

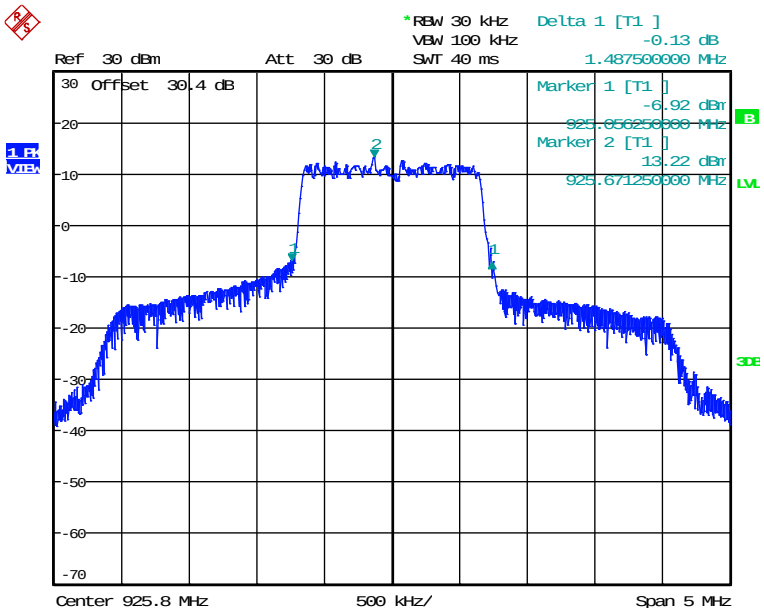


Figure 7.2.2-36: 20 dB OBW - High Channel (16-QAM, Antenna Path 2)

Table 7.2.2-7: 6dB / OBW (64-QAM, Antenna Path 1)

Frequency [MHz]	6dB Bandwidth [kHz]	OBW (kHz)
904.2	1355.525	1495.000
915.72	1359.000	1498.750
925.8	1356.000	1491.875

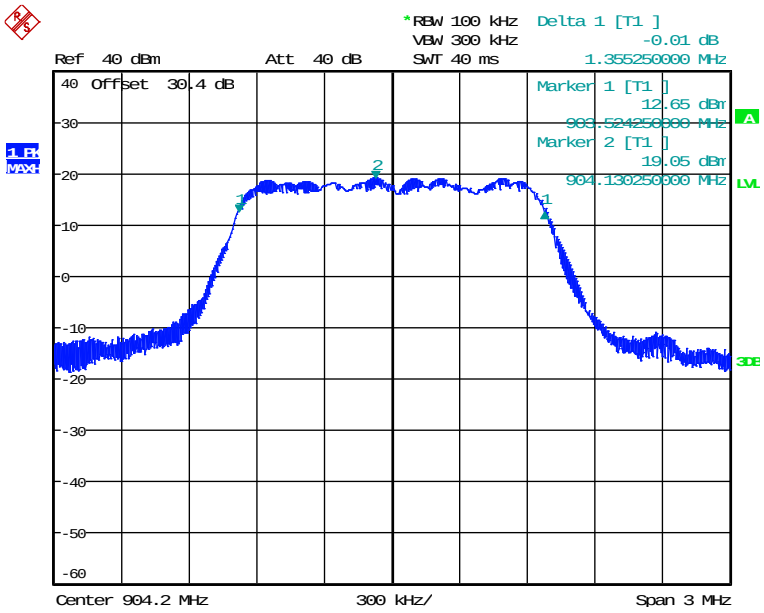


Figure 7.2.2-37: 6dB BW - Low Channel (64-QAM, Antenna Path 1)

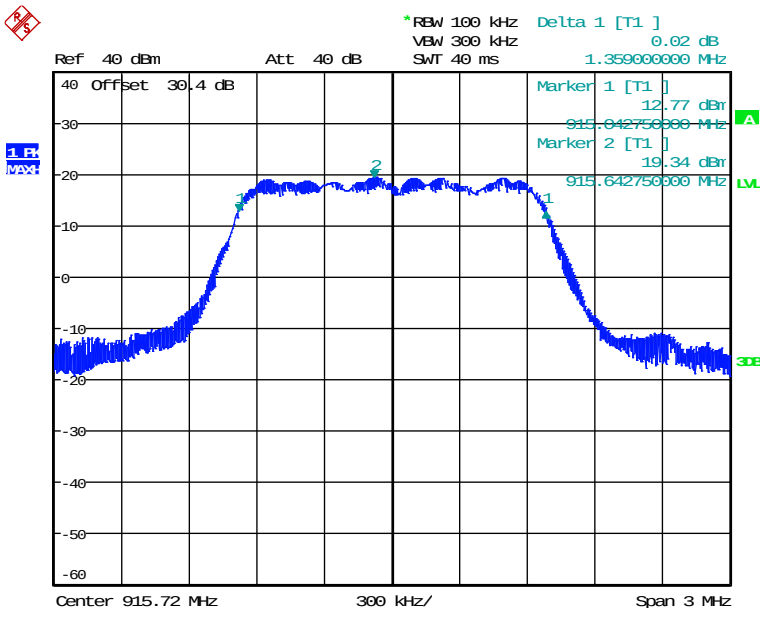


Figure 7.2.2-38: 6dB BW - Middle Channel (64-QAM, Antenna Path 1)

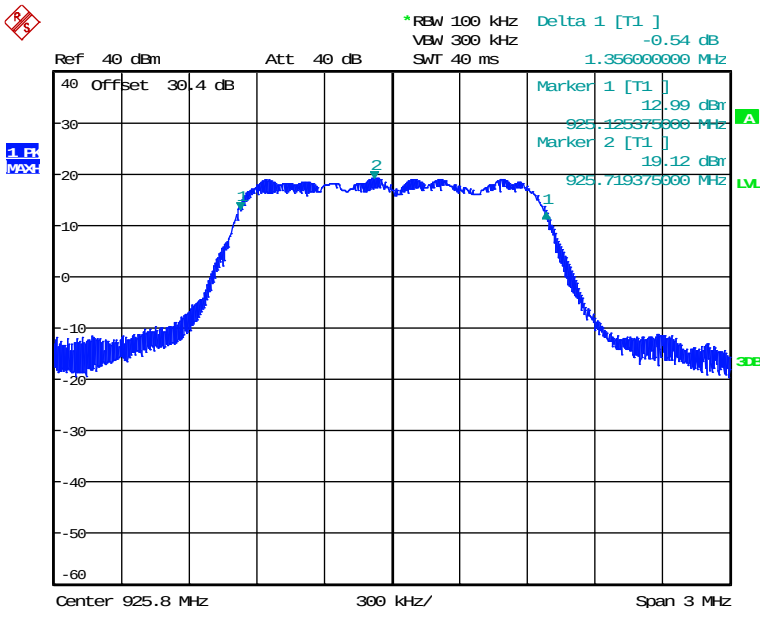


Figure 7.2.2-39: 6dB BW - High Channel (64-QAM, Antenna Path 1)

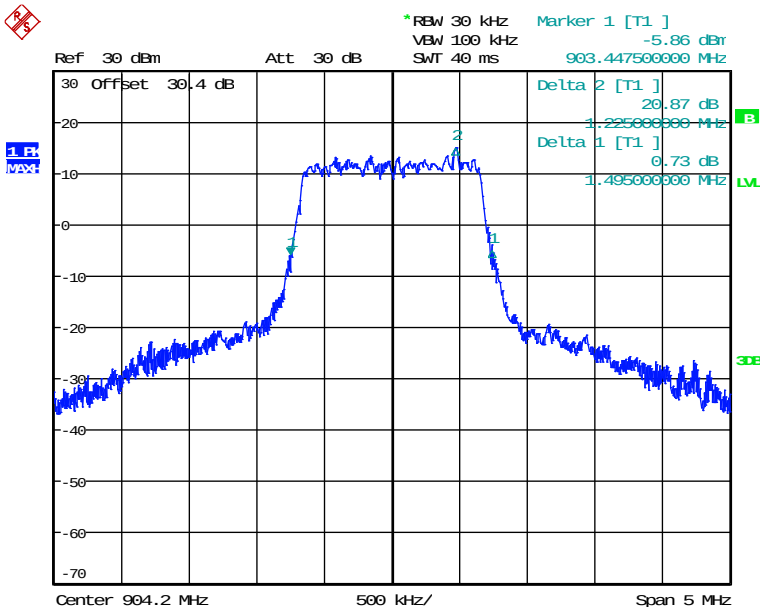


Figure 7.2.2-40: 20 dB OBW - Low Channel (64-QAM, Antenna Path 1)

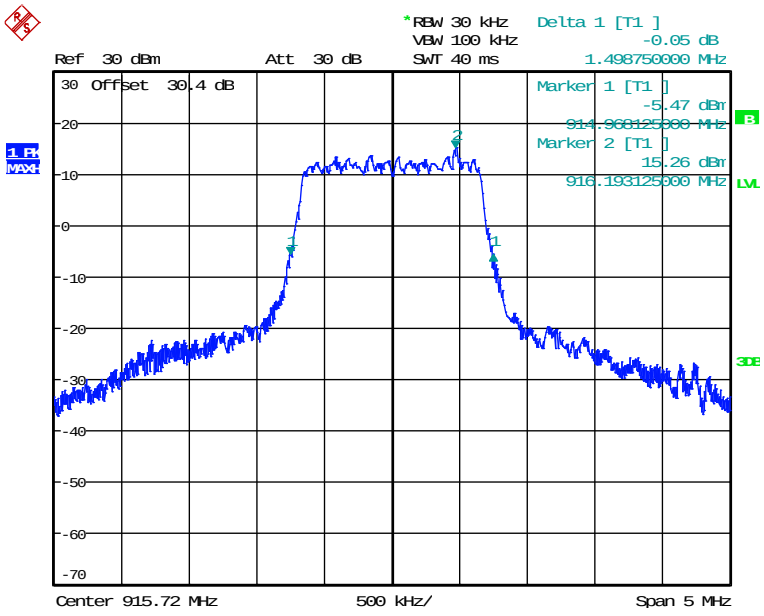


Figure 7.2.2-41: 20 dB OBW - Middle Channel (64-QAM, Antenna Path 1)

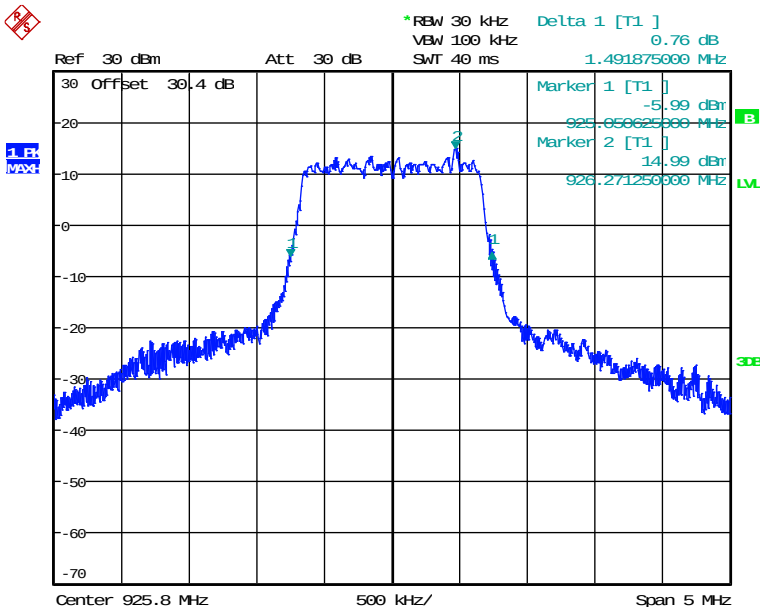


Figure 7.2.2-42: 20 dB OBW - High Channel (64-QAM, Antenna Path 1)

Table 7.2.2-8: 6dB / OBW (64-QAM, Antenna Path 2)

Frequency [MHz]	6dB Bandwidth [kHz]	OBW (kHz)
904.2	1350.750	1468.125
915.72	1349.625	1467.500
925.8	1350.000	1467.500

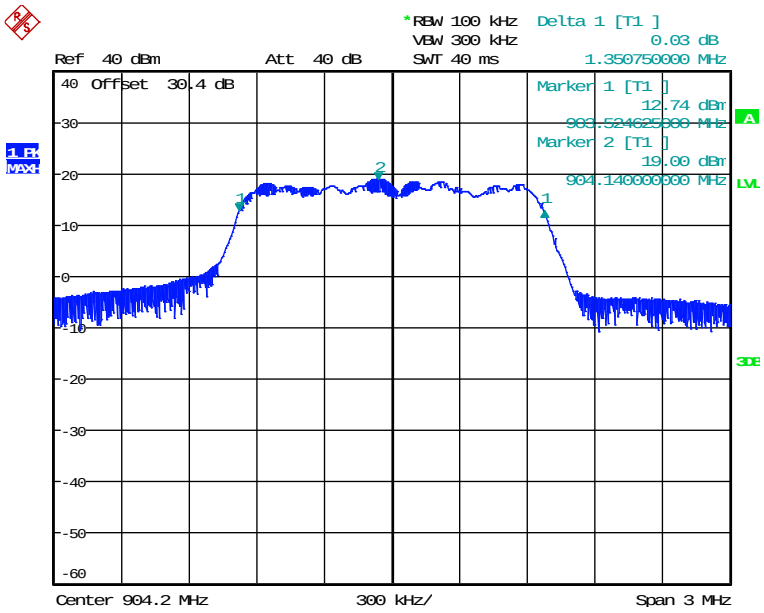


Figure 7.2.2-43: 6dB BW - Low Channel (64-QAM, Antenna Path 2)

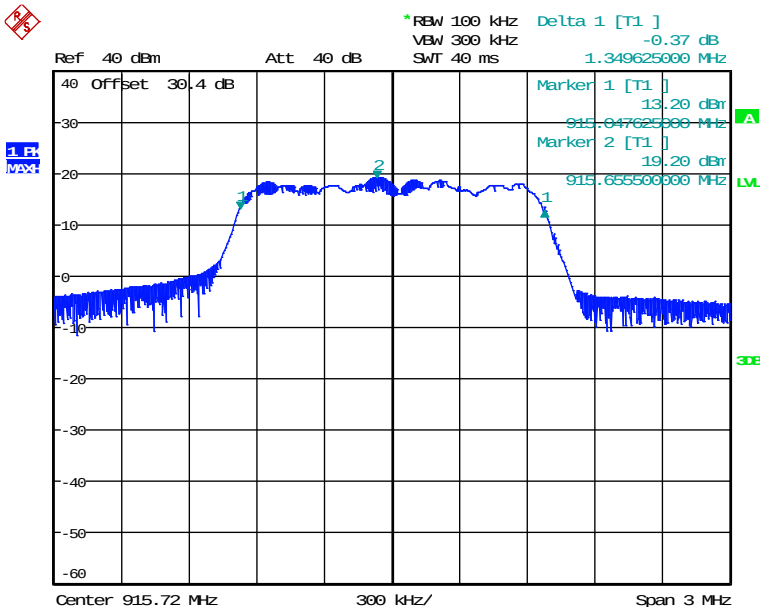


Figure 7.2.2-44: 6dB BW - Middle Channel (64-QAM, Antenna Path 2)

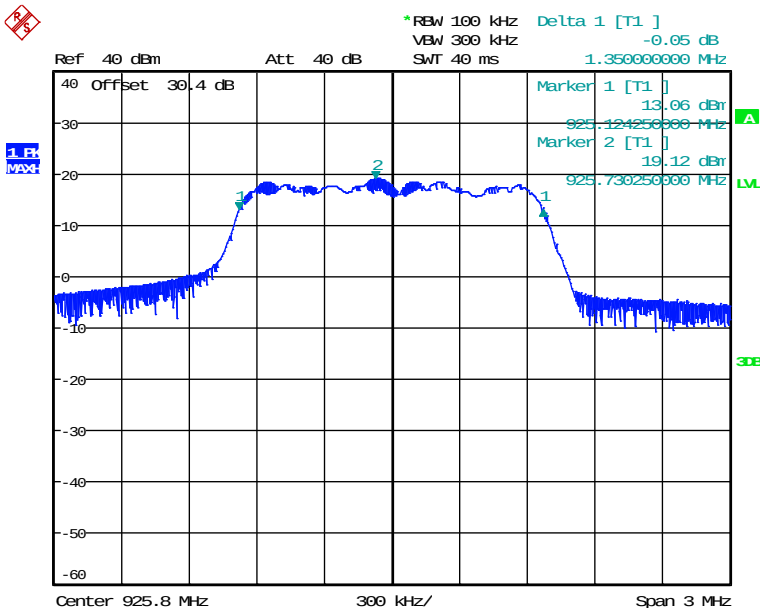


Figure 7.2.2-45: 6dB BW - High Channel (64-QAM, Antenna Path 2)

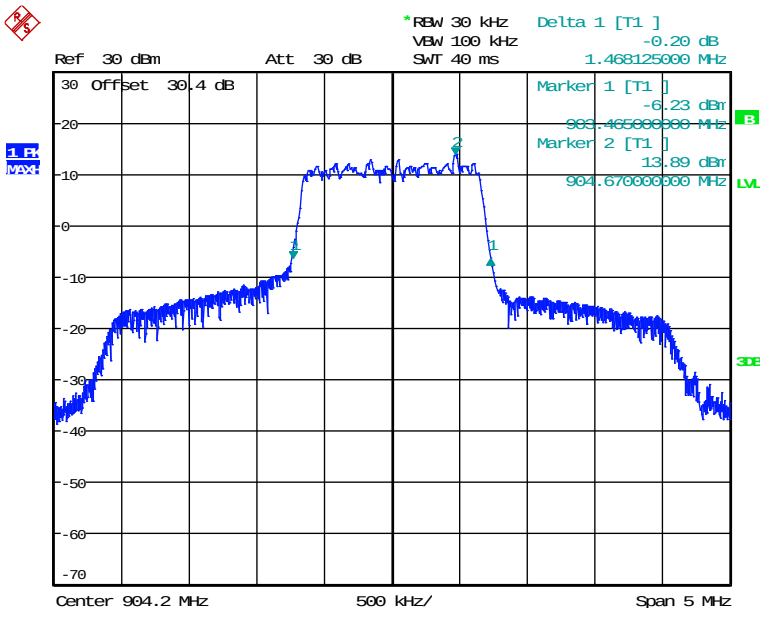


Figure 7.2.2-46: 20 dB OBW - Low Channel (64-QAM, Antenna Path 2)

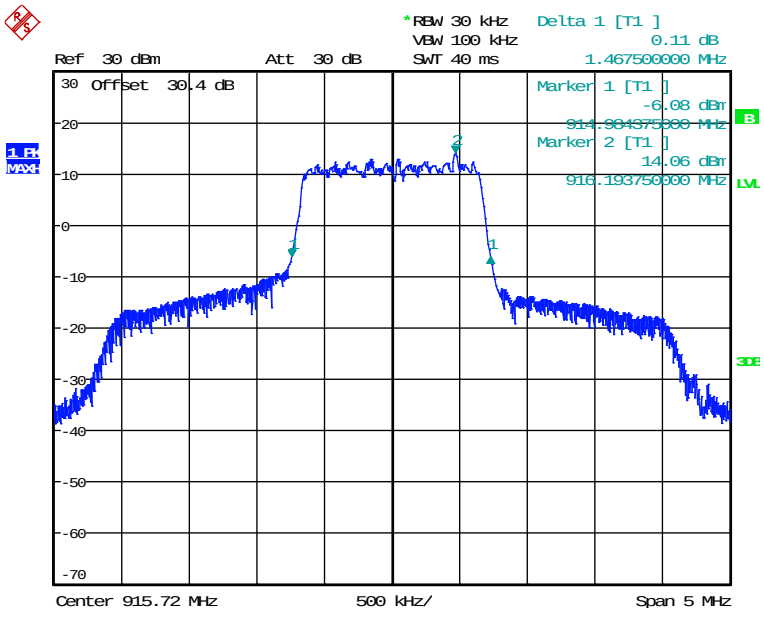


Figure 7.2.2-47: 20 dB OBW - Middle Channel (64-QAM, Antenna Path 2)

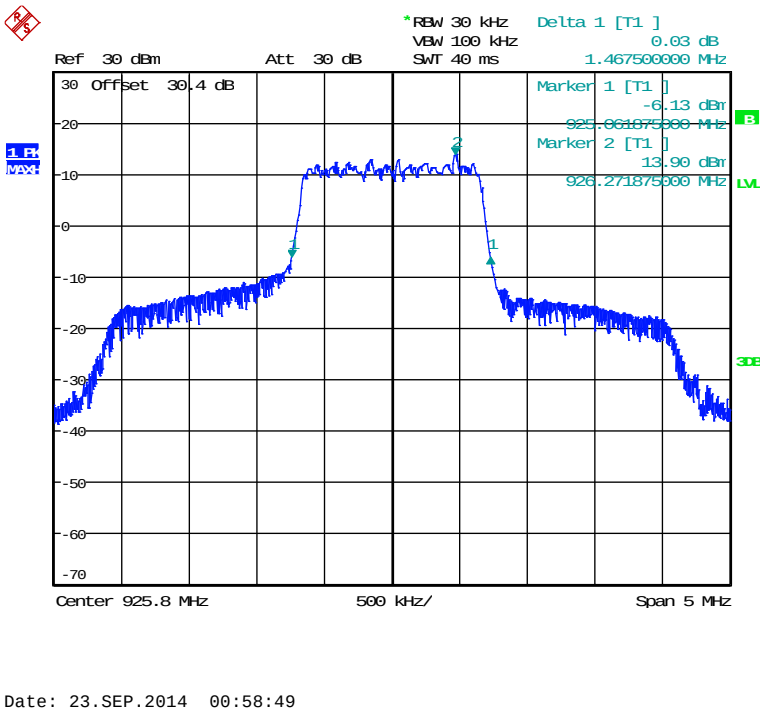


Figure 7.2.2-48: 20 dB OBW - High Channel (64-QAM, Antenna Path 2)

7.3 Maximum Conducted Output Power - FCC Section 15.247(b)(3)

7.3.1 Measurement Procedure (Conducted Method)

The unit was configured to transmit at the maximum duty cycle. The Output Power was measured in accordance with the FCC KDB Publication No. 558074 "Guidance for Performing Compliance Measurements on Digital Transmission Systems (47 CFR 15.247)" Section 9.2.3.1 Method AVGPM (Measurement using an RF average power meter). The RF output of the equipment under test was directly connected to the input of the power meter through suitable attenuation. The duty cycle correction was calculated as 10*log(1/0.49) = 3.1 dB.

The total output power was calculated in accordance with FCC KDB Publication No. 662911 "Emissions Testing of Transmitters with Multiple Outputs in the Same Band" in order to account for the two TX antenna paths by summing the output power across all transmitter outputs.

7.3.2 Measurement Results

Results are shown below.

RF Output Power for 11.3 dBi Antenna (Power Level 21)

Table 7.3.2-1: RF Output Power (BPSK)

Frequency [MHz]	TX Path 1 Level [dBm]	TX Path 2 Level [dBm]	Duty Cycle Correction %	Total Output Power [dBm]
904.2	17.83	17.75	49	23.90
915.72	17.77	17.92	49	23.95
925.8	17.88	18.23	49	24.17

Table 7.3.2-2: RF Output Power (QPSK)

Frequency [MHz]	TX Path 1 Level [dBm]	TX Path 2 Level [dBm]	Duty Cycle Correction %	Total Output Power [dBm]
904.2	18.64	17.54	49	24.23
915.72	17.9	17.94	49	24.03
925.8	17.89	18.14	49	24.13

Table 7.3.2-3: RF Output Power (16-QAM)

Frequency [MHz]	TX Path 1 Level [dBm]	TX Path 2 Level [dBm]	Duty Cycle Correction %	Total Output Power [dBm]
904.2	17.86	17.8	49	23.94
915.72	17.8	17.95	49	23.98
925.8	17.92	18.23	49	24.19

Table 7.3.2-4: RF Output Power (64-QAM)

Frequency [MHz]	TX Path 1 Level [dBm]	TX Path 2 Level [dBm]	Duty Cycle Correction %	Total Output Power [dBm]
904.2	17.73	17.66	49	23.80
915.72	17.92	18.02	49	24.08
925.8	17.75	18.1	49	24.04

7.4 Band-Edge Compliance and Spurious Emissions-FCC 15.247(d)

7.4.1 Band-Edge Compliance of RF Conducted Emissions

7.4.1.1 Measurement Procedure

The RF output port of the EUT was directly connected to the input of the spectrum analyzer via suitable attenuation. The EUT was investigated at the lowest and highest channel available to determine band-edge compliance. For each measurement the spectrum analyzer's RBW was set to 100 kHz, and the VBW was set to 300 kHz. The reference level was determined by measuring the Peak PSD level in any 100 kHz bandwidth within the DTS channel bandwidth. Considering that the RF output power showed compliance based on average power measurements, the band edge emissions were compared with a limit of -30 dBc relative to the reference level.

7.4.1.2 Measurement Results

Results are shown below.

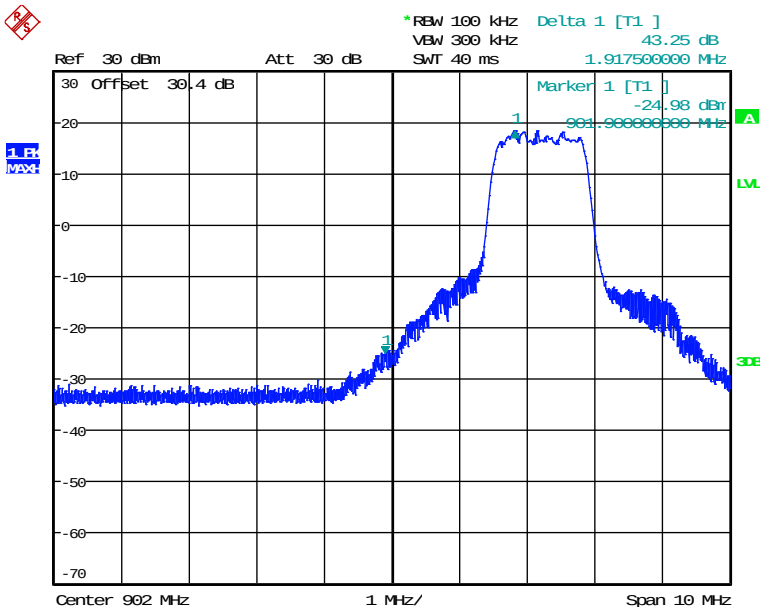


Figure 7.4.1.2-1: Lower Band-edge (BPSK, Antenna Path 1)

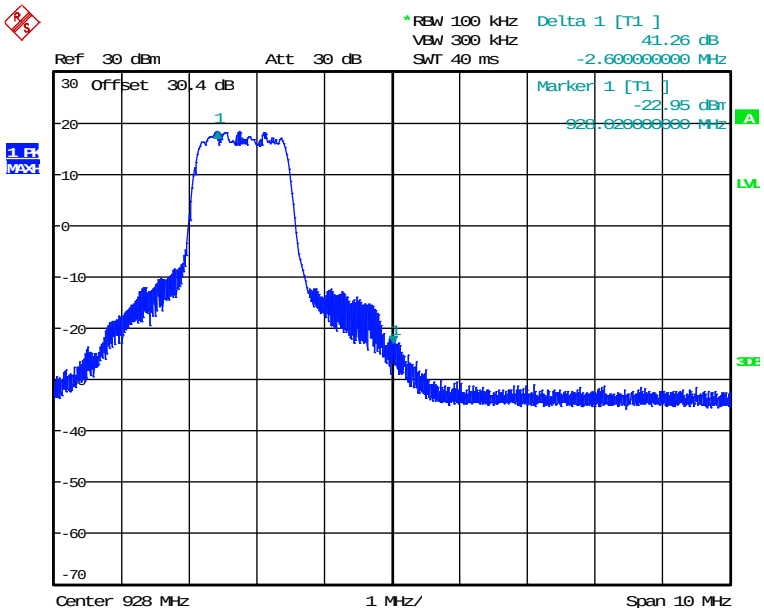


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Figure 7.4.1.2-2: Upper Band-edge (BPSK, Antenna Path 1)

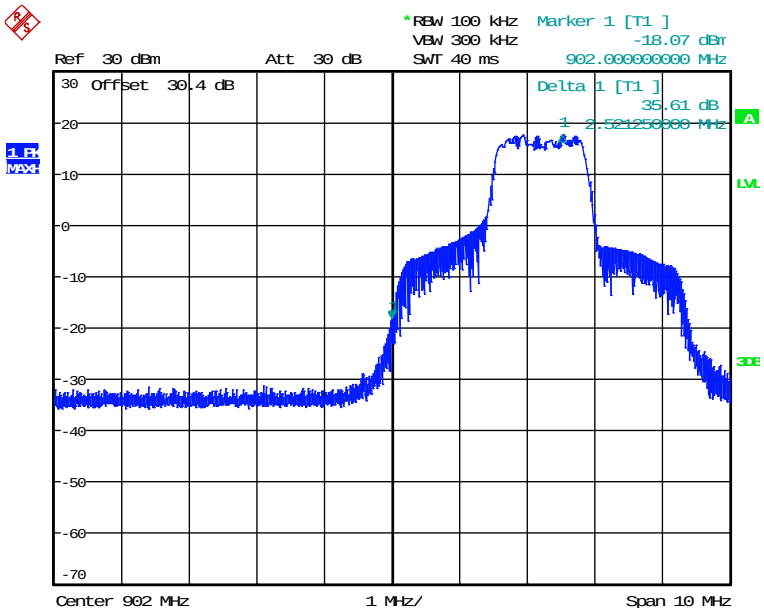

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Figure 7.4.1.2-3: Lower Band-edge (BPSK, Antenna Path 2)

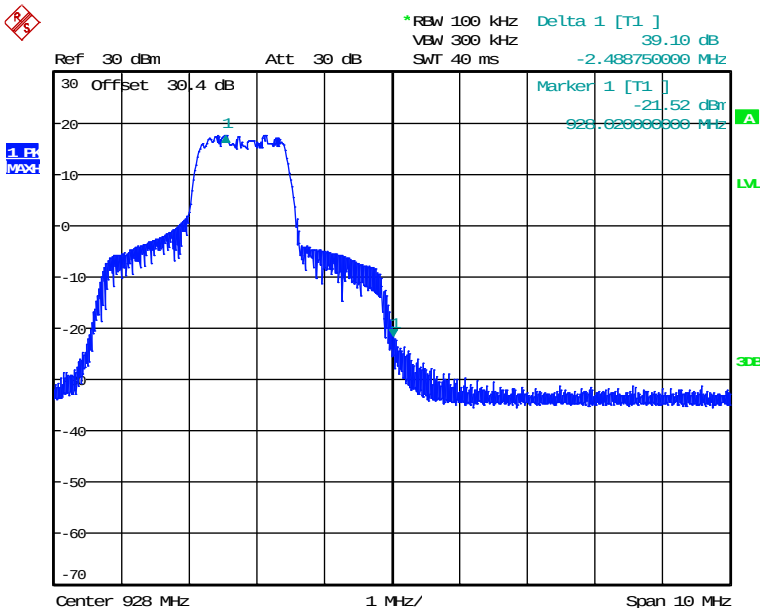

Figure 7.4.1.2-4: Upper Band-edge (BPSK, Antenna Path 2)

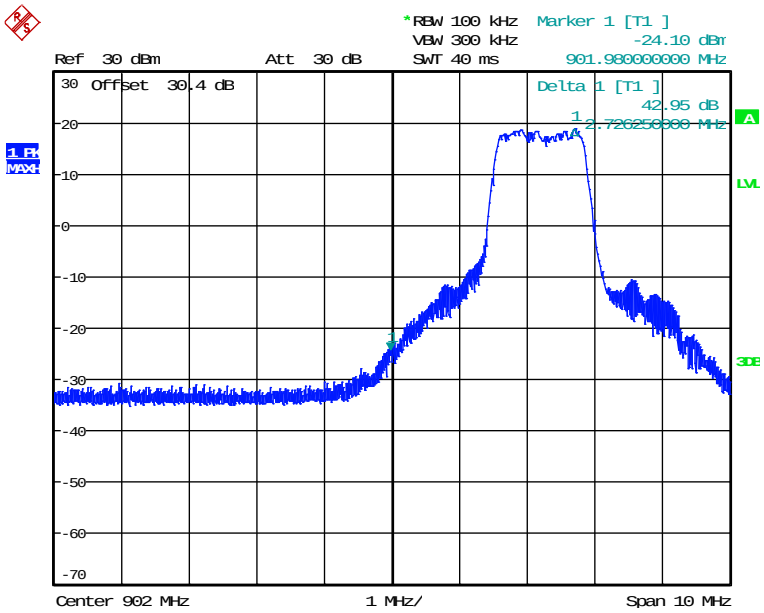

Figure 7.4.1.2-5: Lower Band-edge (QPSK, Antenna Path 1)

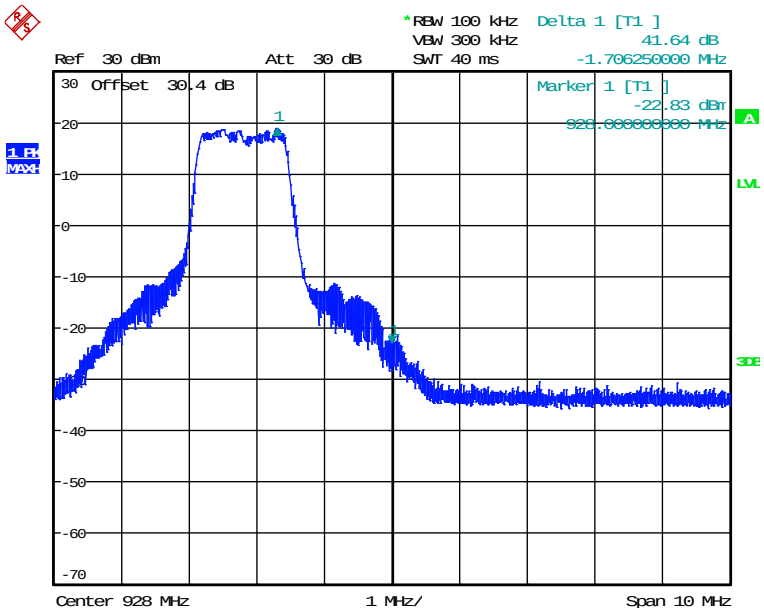

Figure 7.4.1.2-6: Upper Band-edge (QPSK, Antenna Path 1)

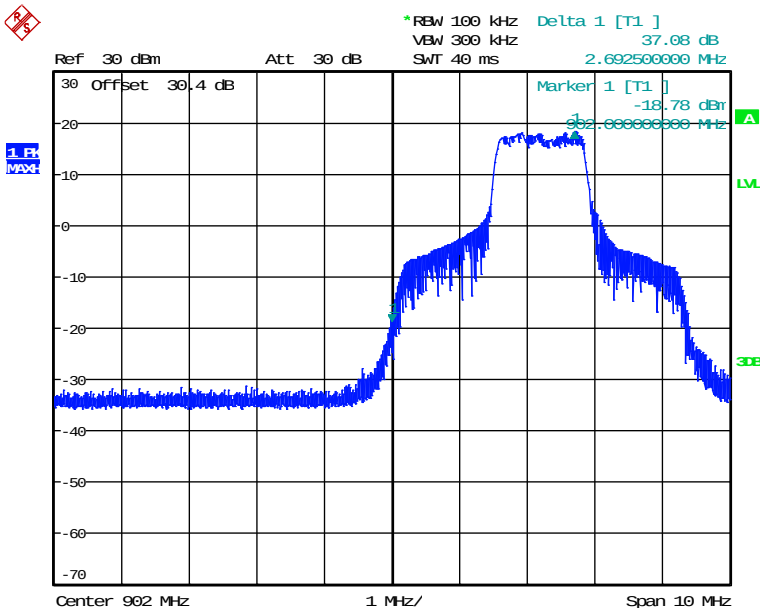

Figure 7.4.1.2-7: Lower Band-edge (QPSK, Antenna Path 2)

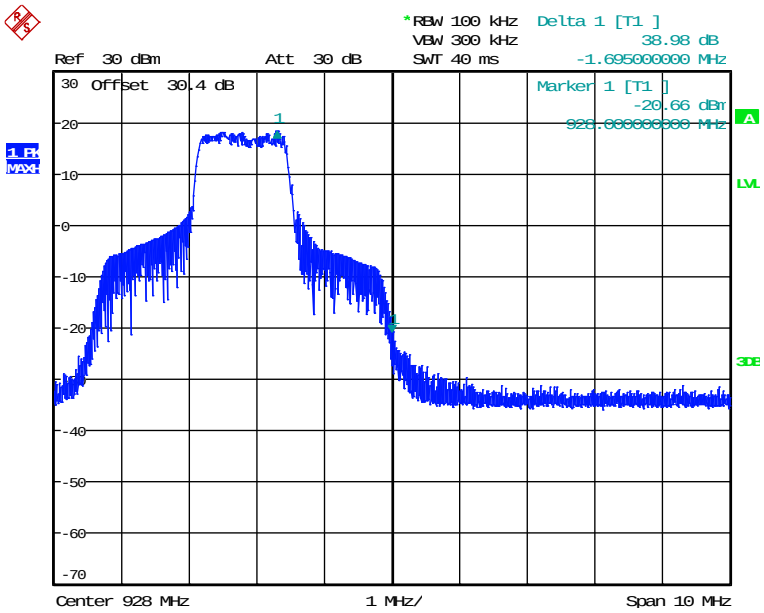

Figure 7.4.1.2-8: Upper Band-edge (QPSK, Antenna Path 2)

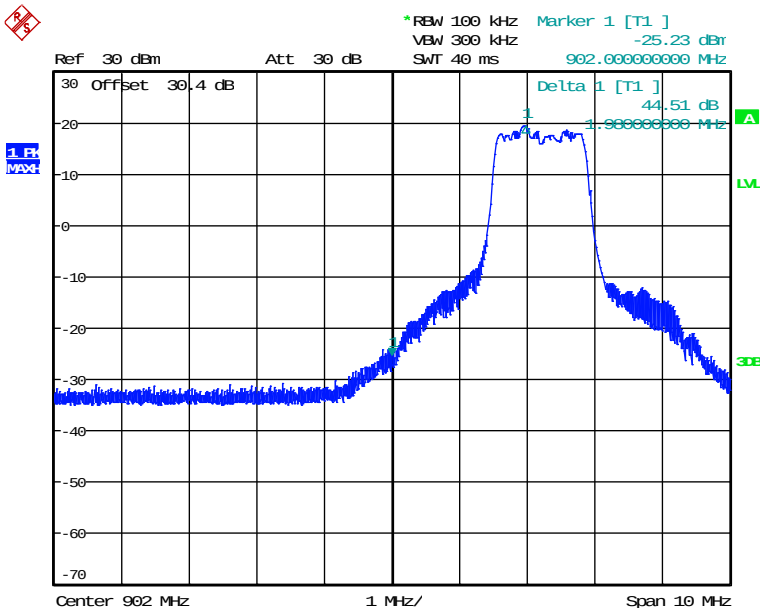

Figure 7.4.1.2-9: Lower Band-edge (16-QAM, Antenna Path 1)

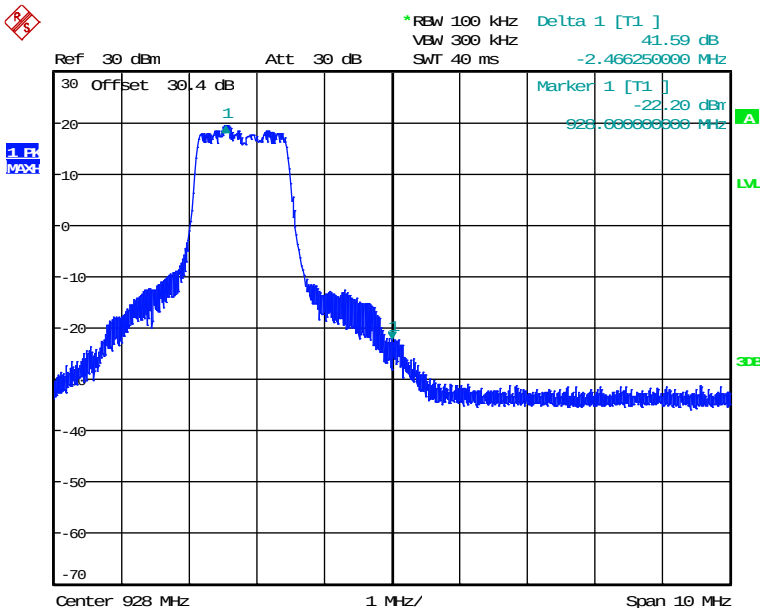

Figure 7.4.1.2-10: Upper Band-edge (16-QAM, Antenna Path 1)

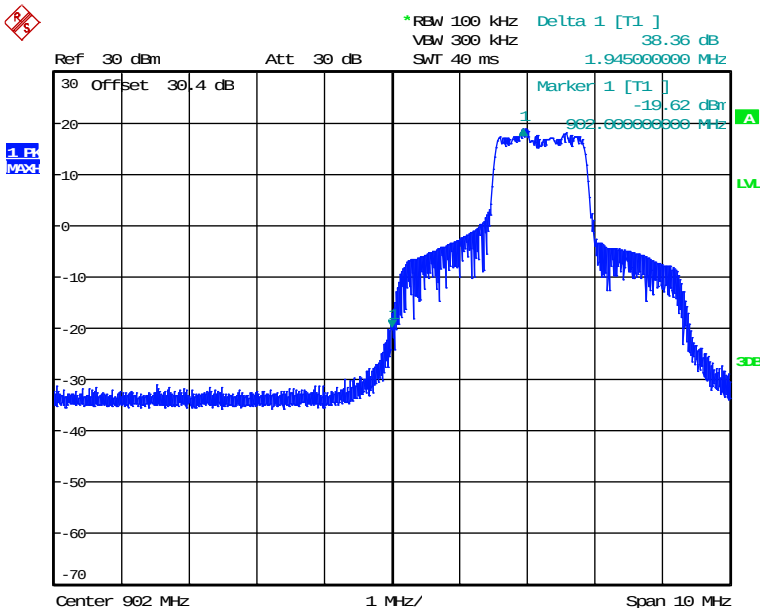

Figure 7.4.1.2-11: Lower Band-edge (16-QAM, Antenna Path 2)

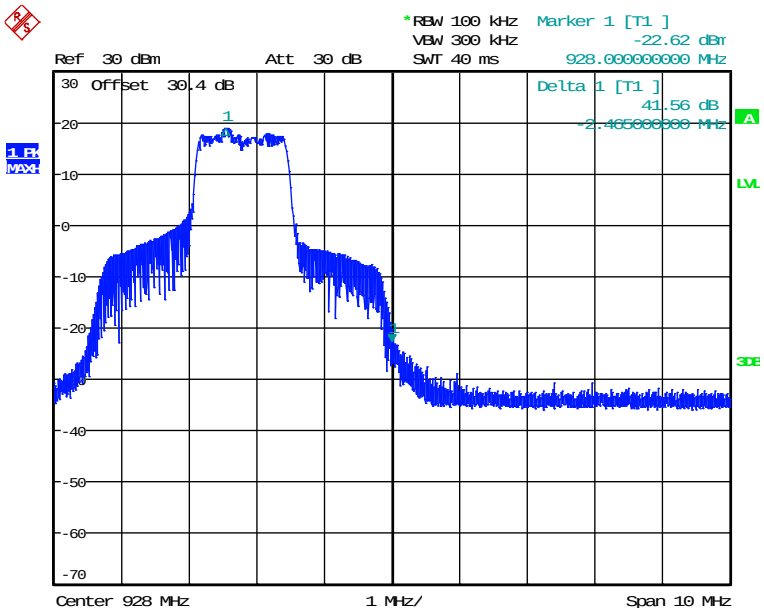

Figure 7.4.1.2-12: Upper Band-edge (16-QAM, Antenna Path 2)

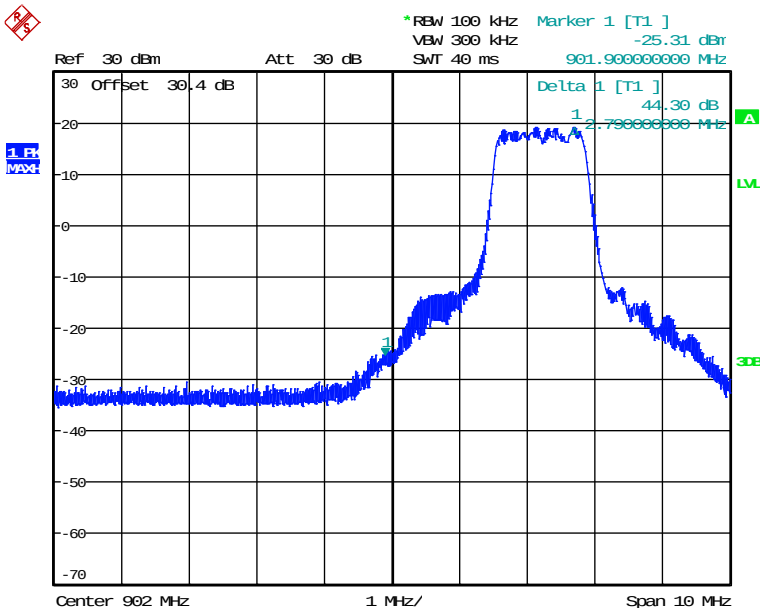

Figure 7.4.1.2-13: Lower Band-edge (64-QAM, Antenna Path 1)

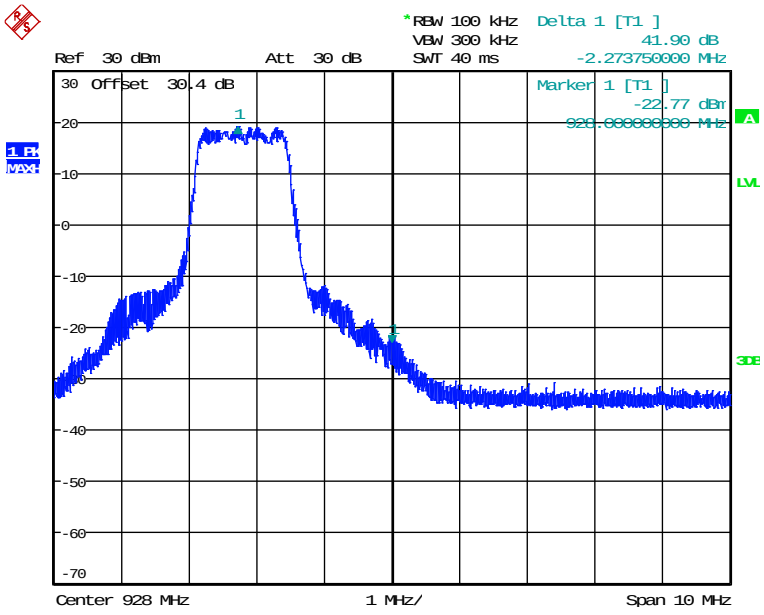

Figure 7.4.1.2-14: Upper Band-edge (64-QAM, Antenna Path 1)

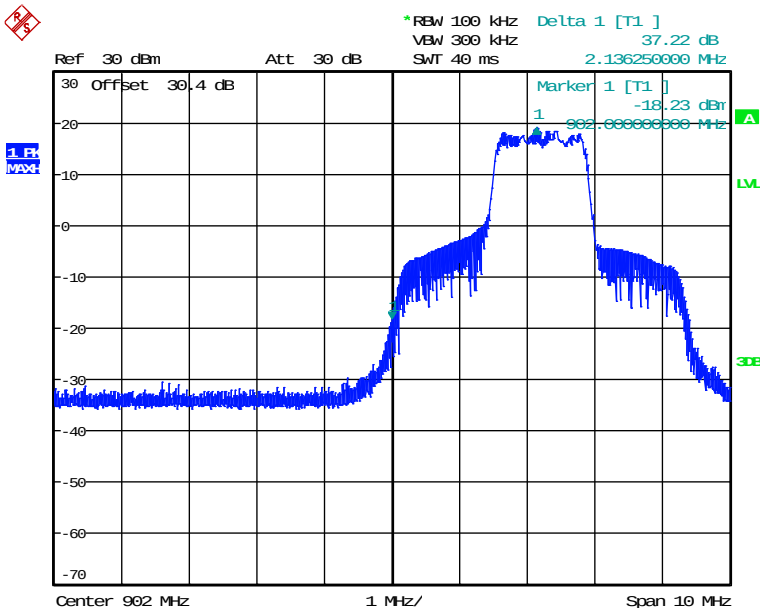

Figure 7.4.1.2-15: Lower Band-edge (64-QAM, Antenna Path 2)

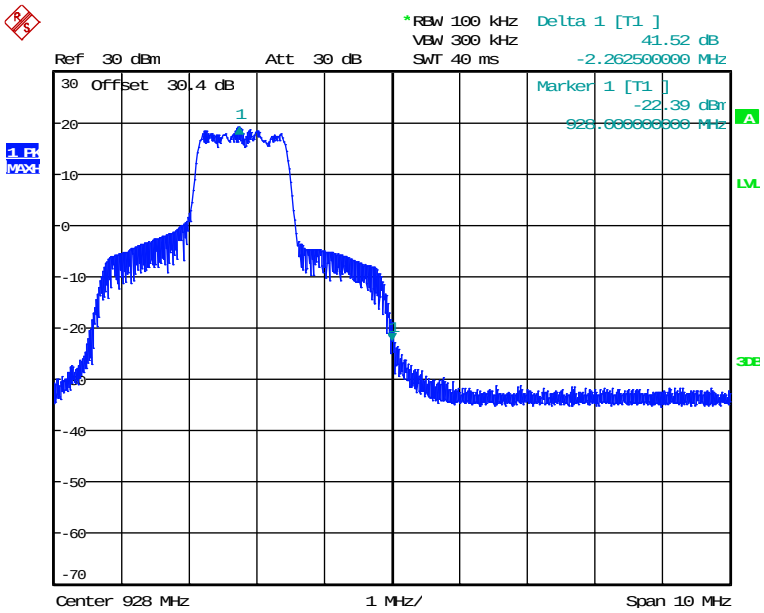

Figure 7.4.1.2-16: Upper Band-edge (64-QAM, Antenna Path 2)

7.4.2 RF Conducted Spurious Emissions

7.4.2.1 Measurement Procedure

The RF Conducted Spurious Emissions were measured in accordance with the FCC KDB Publication No. 558074 "Guidance for Performing Compliance Measurements on Digital Transmission Systems (47 CFR 15.247)". The RF output port of the equipment under test was directly connected to the input of the spectrum analyzer. The EUT was investigated for conducted spurious emissions from 30MHz to 10 GHz, 10 times the highest fundamental frequency. Measurements were made at the low, center and high channels of the EUT. For each measurement, the spectrum analyzer's RBW was set to 100 kHz and the VBW was set to 300 kHz. The peak Max Hold function of the analyzer was utilized. The reference level was determined by measuring the PSD level in any 100 kHz bandwidth within the DTS channel bandwidth. Considering that the RF output power showed compliance based on average power measurements, the spurious emissions were compared with a limit of -30 dBc relative to the reference level.

7.4.2.2 Measurement Results

Results are shown below.

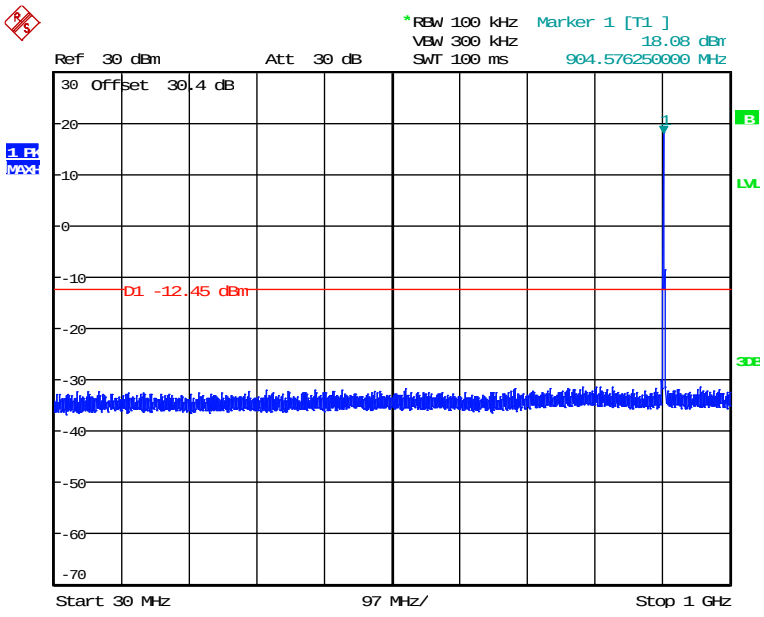

Figure 7.4.2.2-1: 30 MHz – 1 GHz – Low Channel (BPSK, Antenna Path 1)

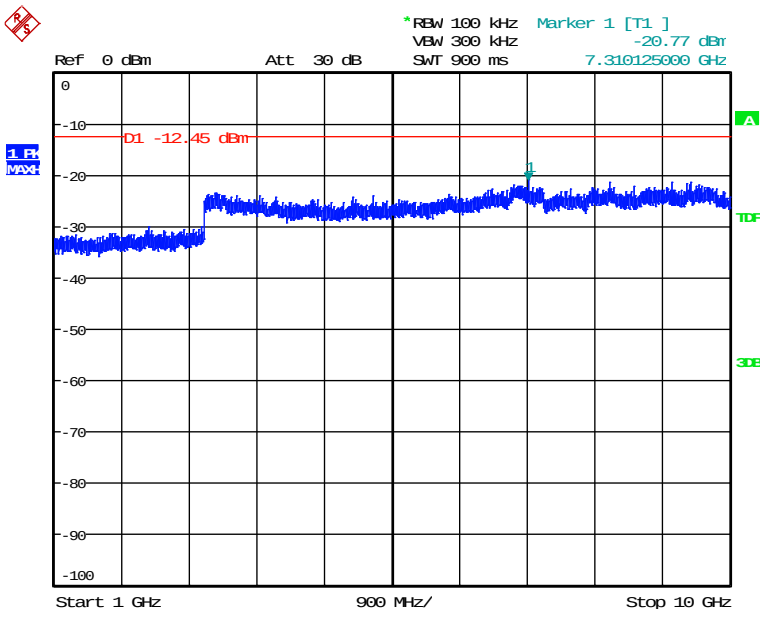

Figure 7.4.2.2-2: 1 GHz – 10 GHz – Low Channel (BPSK, Antenna Path 1)

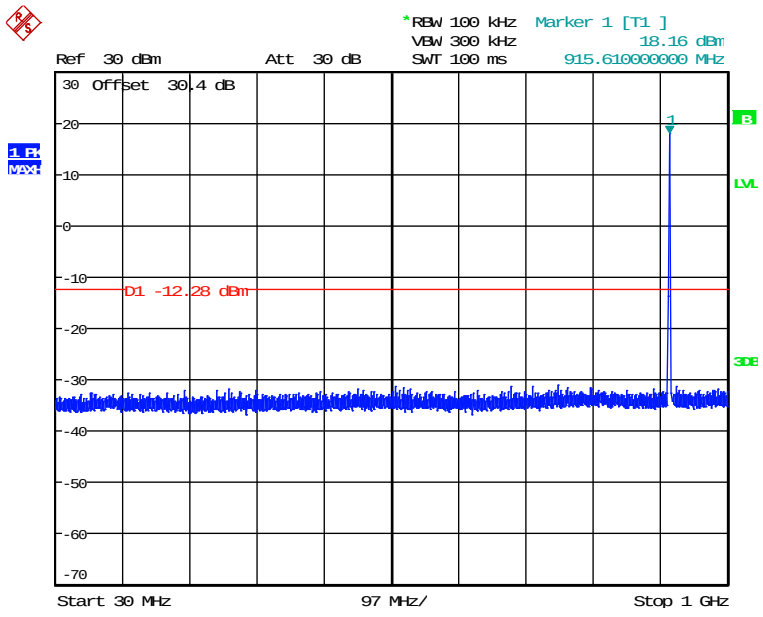

Figure 7.4.2.2-3: 30 MHz – 1 GHz – Middle Channel (BPSK, Antenna Path 1)

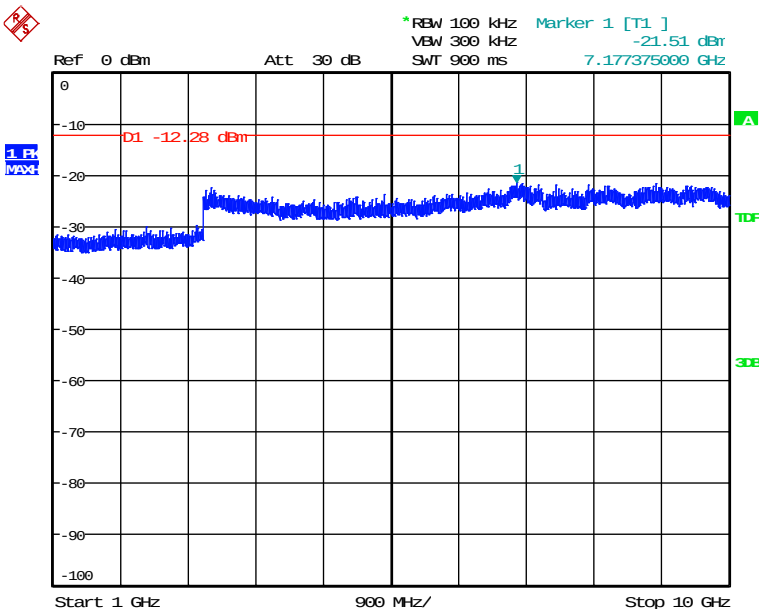

Figure 7.4.2.2-4: 1 GHz – 10 GHz – Middle Channel (BPSK, Antenna Path 1)

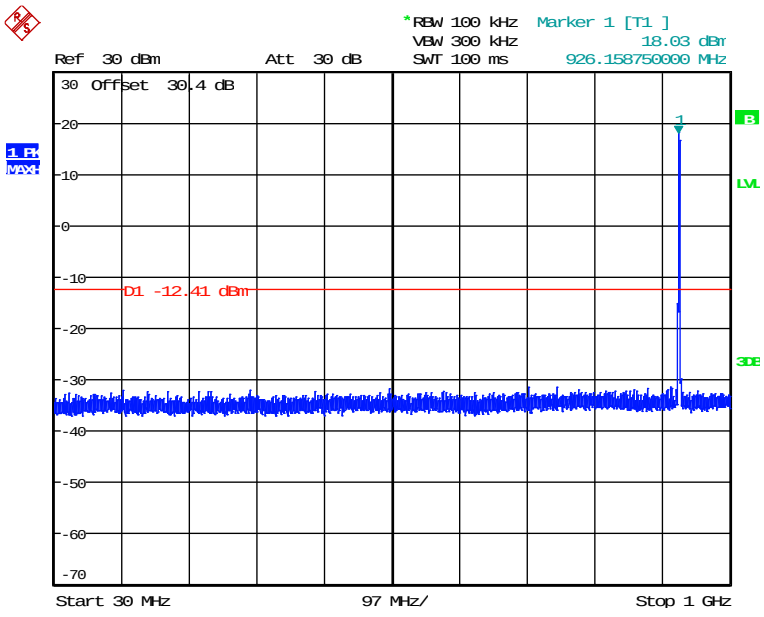

Figure 7.4.2.2-5: 30 MHz – 1 GHz – High Channel (BPSK, Antenna Path 1)

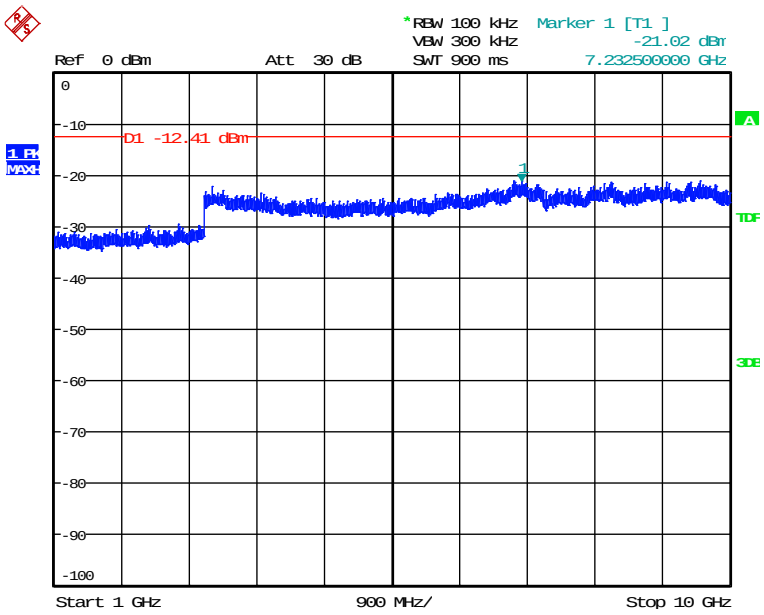

Figure 7.4.2.2-6: 1 GHz – 10 GHz – High Channel (BPSK, Antenna Path 1)

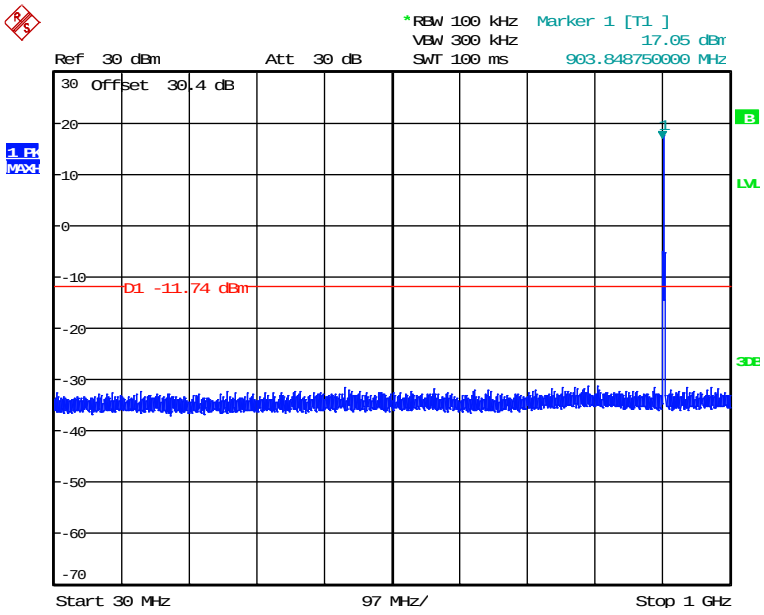

Figure 7.4.2.2-7: 30 MHz – 1 GHz – Low Channel (BPSK, Antenna Path 2)

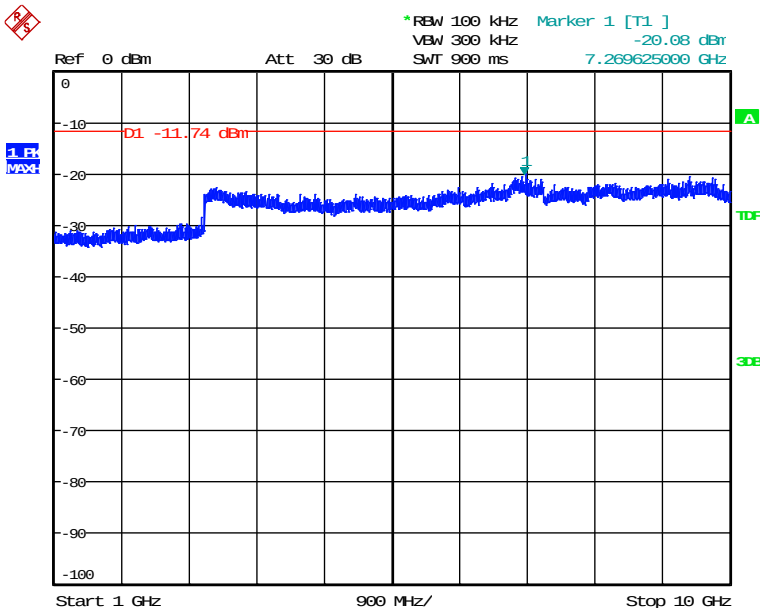

Figure 7.4.2.2-8: 1 GHz – 10 GHz – Low Channel (BPSK, Antenna Path 2)

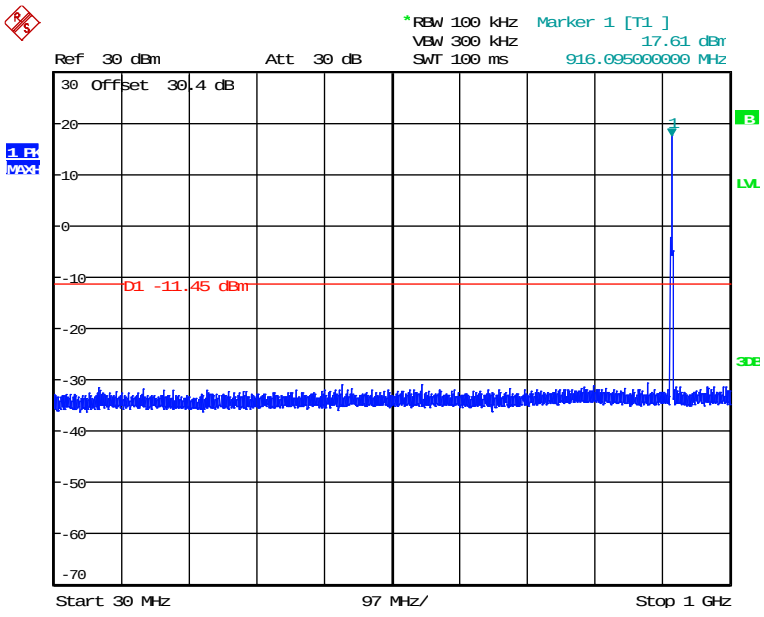

Figure 7.4.2.2-9: 30 MHz – 1 GHz – Middle Channel (BPSK, Antenna Path 2)

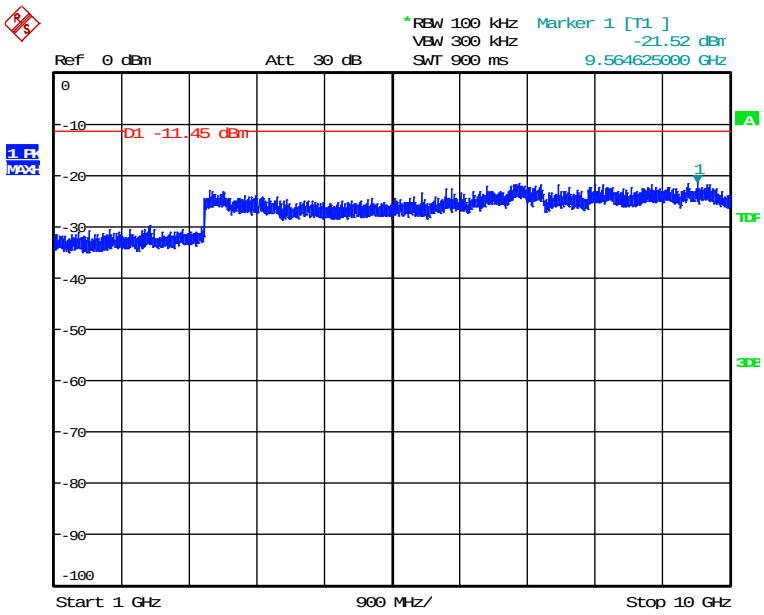

Figure 7.4.2.2-10: 1 GHz – 10 GHz – Middle Channel (BPSK, Antenna Path 2)

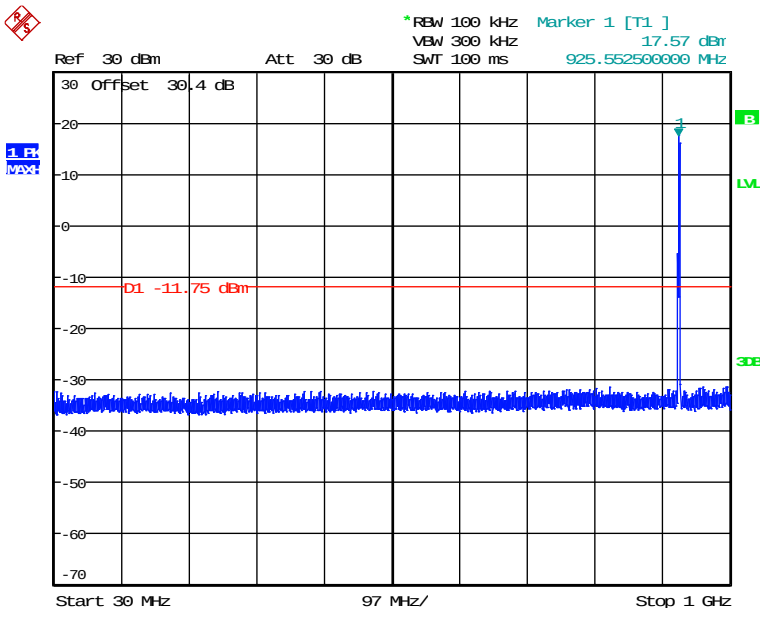

Figure 7.4.2.2-11: 30 MHz – 1 GHz – High Channel (BPSK, Antenna Path 2)

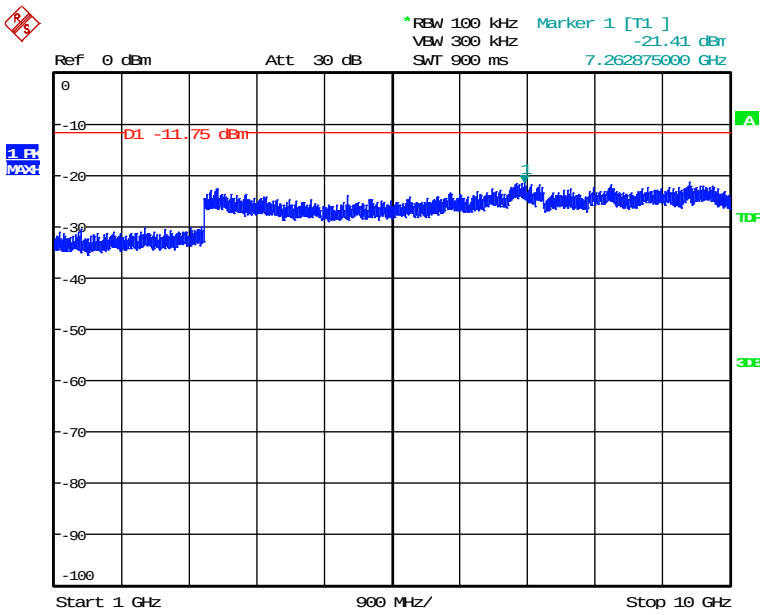

Figure 7.4.2.2-12: 1 GHz – 10 GHz – High Channel (BPSK, Antenna Path 2)

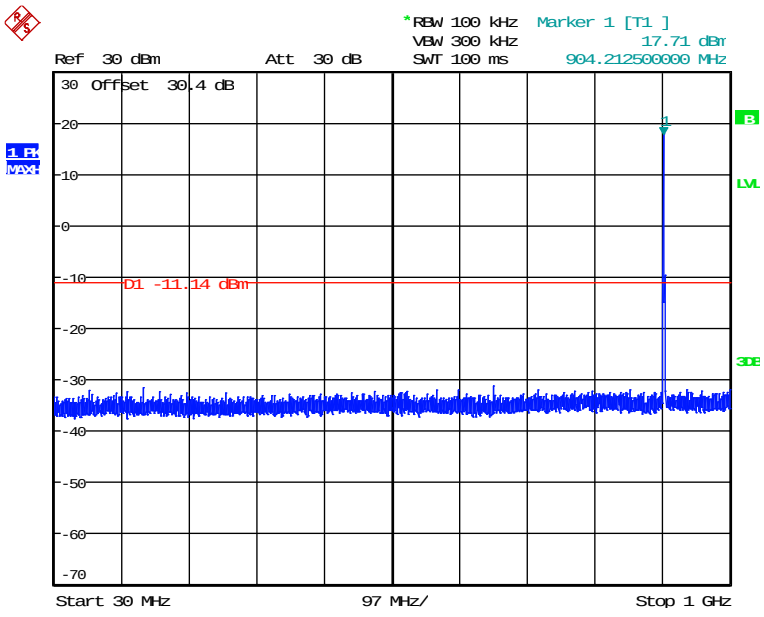

Figure 7.4.2.2-13: 30 MHz – 1 GHz – Low Channel (QPSK, Antenna Path 1)

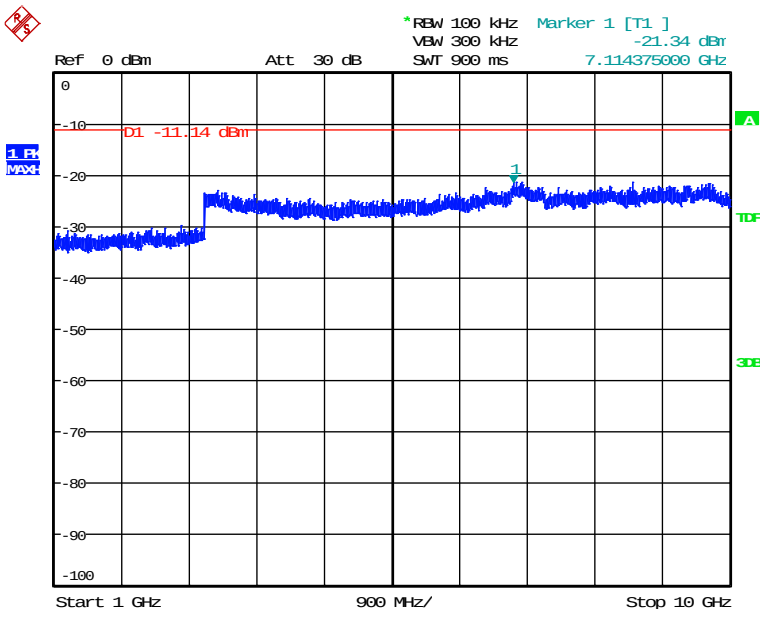

Figure 7.4.2.2-14: 1 GHz – 10 GHz – Low Channel (QPSK, Antenna Path 1)

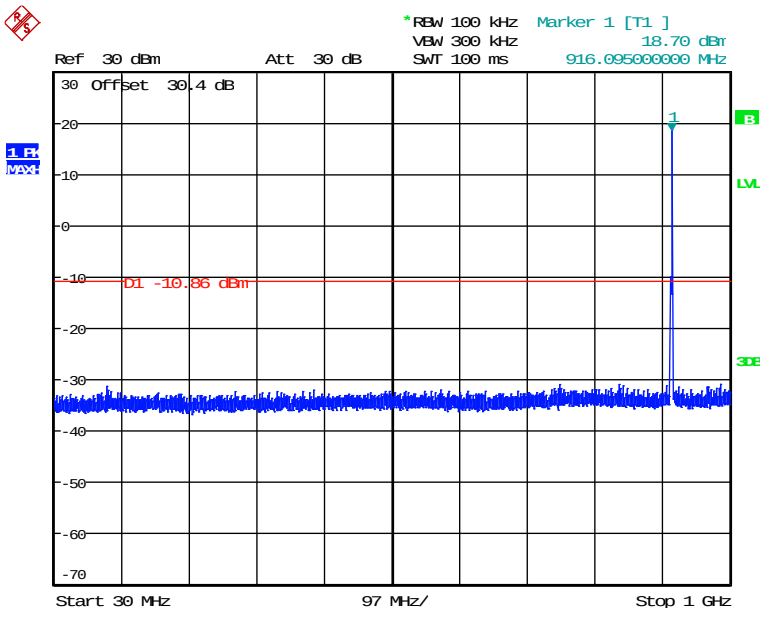

Figure 7.4.2.2-15: 30 MHz – 1 GHz – Middle Channel (QPSK, Antenna Path 1)

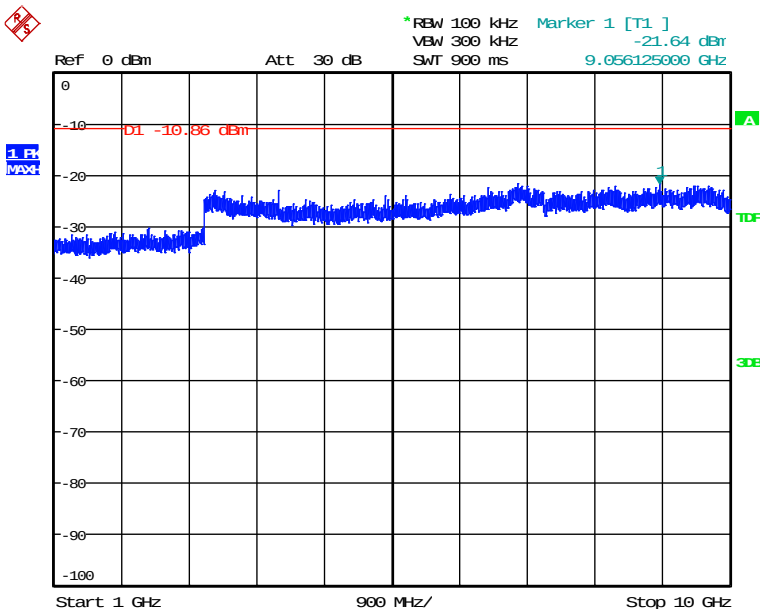

Figure 7.4.2.2-16: 1 GHz – 10 GHz – Middle Channel (QPSK, Antenna Path 1)

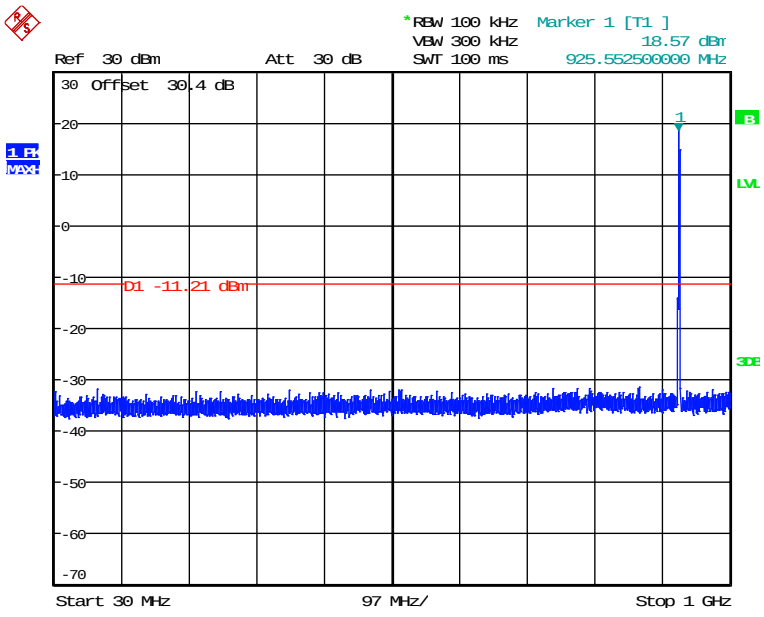

Figure 7.4.2.2-17: 30 MHz – 1 GHz – High Channel (QPSK, Antenna Path 1)

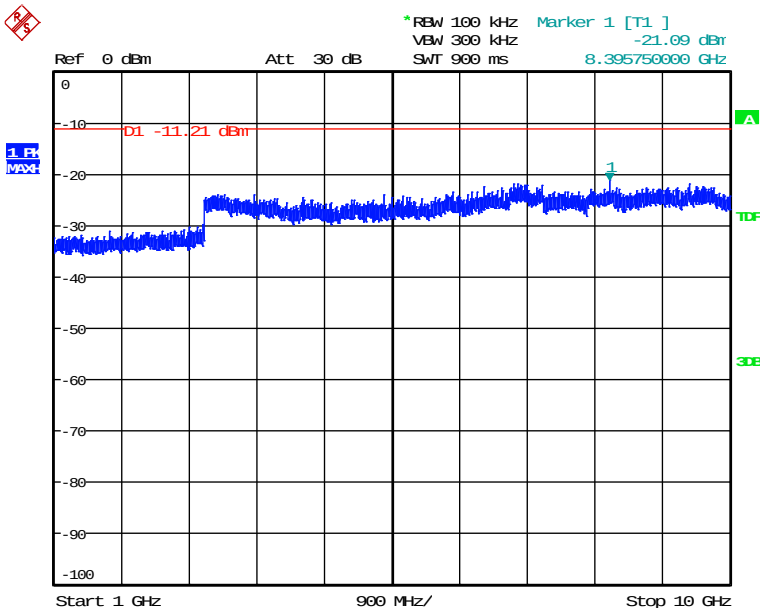

Figure 7.4.2.2-18: 1 GHz – 10 GHz – High Channel (QPSK, Antenna Path 1)

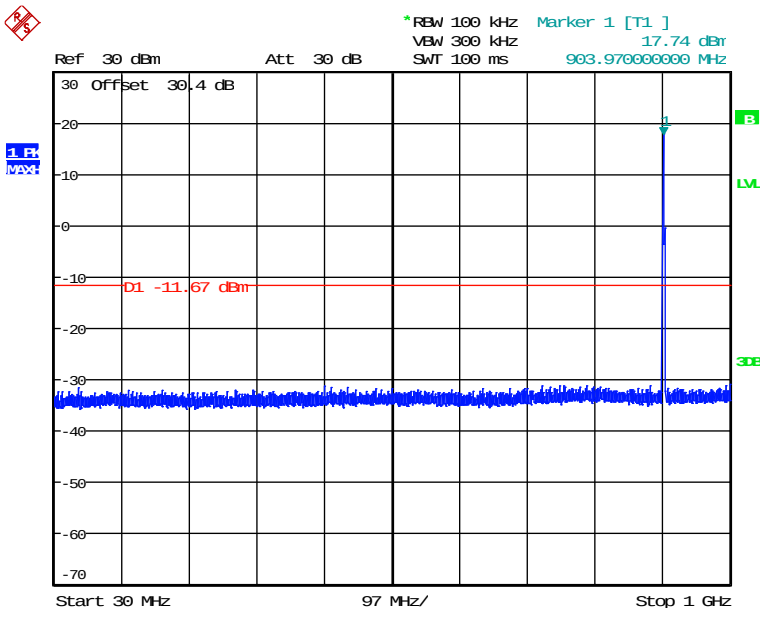

Figure 7.4.2.2-19: 30 MHz – 1 GHz – Low Channel (QPSK, Antenna Path 2)

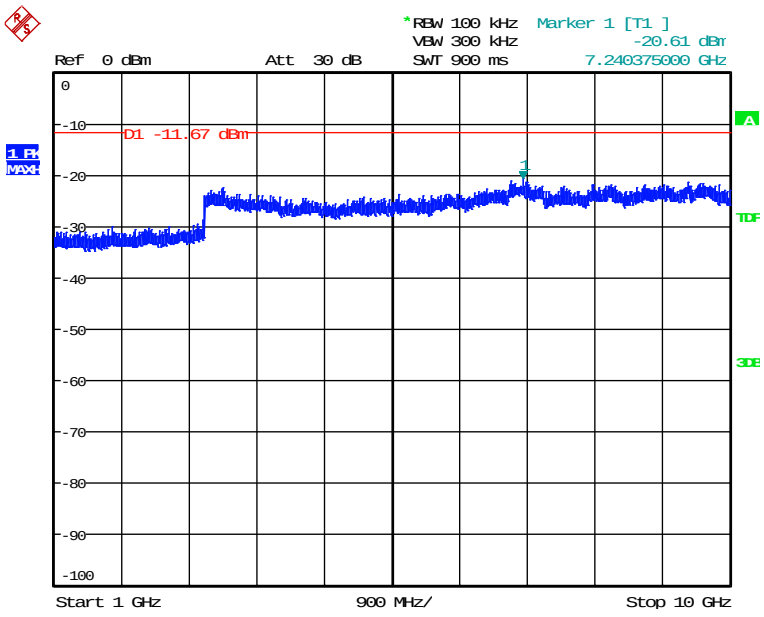

Figure 7.4.2.2-20: 1 GHz – 10 GHz – Low Channel (QPSK, Antenna Path 2)

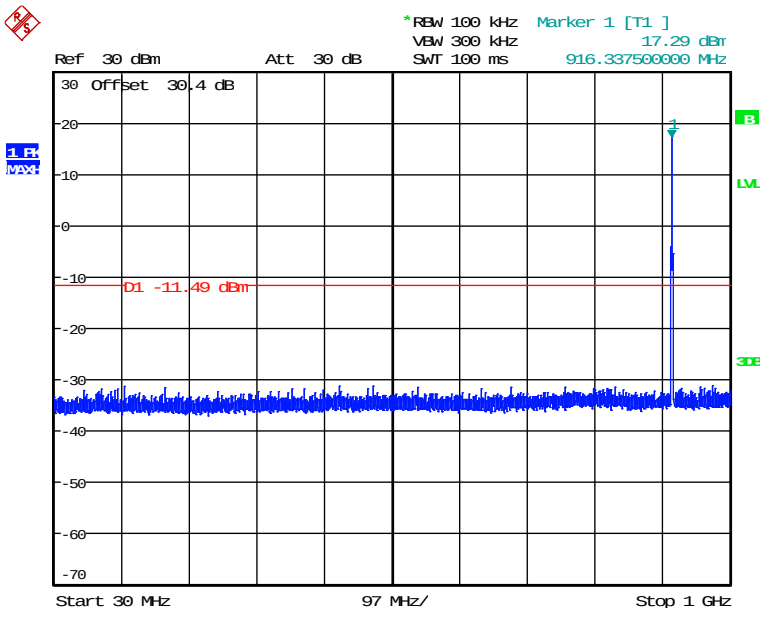

Figure 7.4.2.2-21: 30 MHz – 1 GHz – Middle Channel (QPSK, Antenna Path 2)

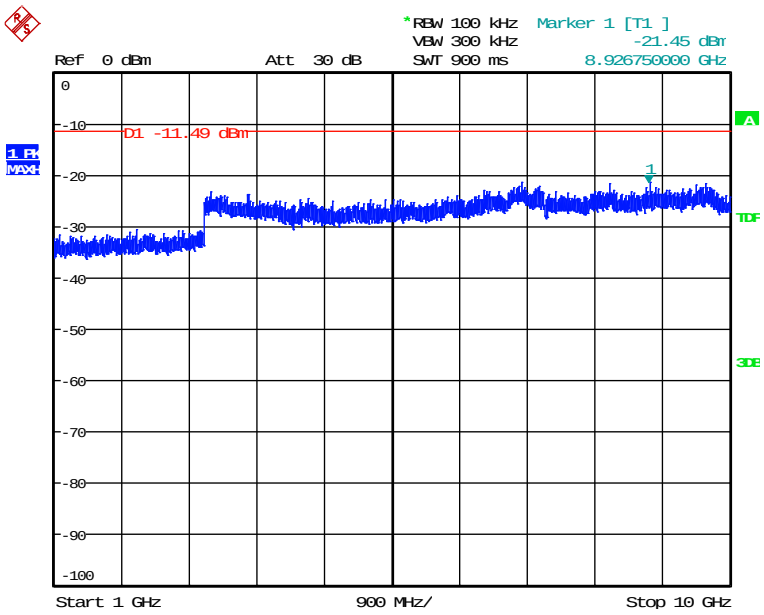

Figure 7.4.2.2-22: 1 GHz – 10 GHz – Middle Channel (QPSK, Antenna Path 2)

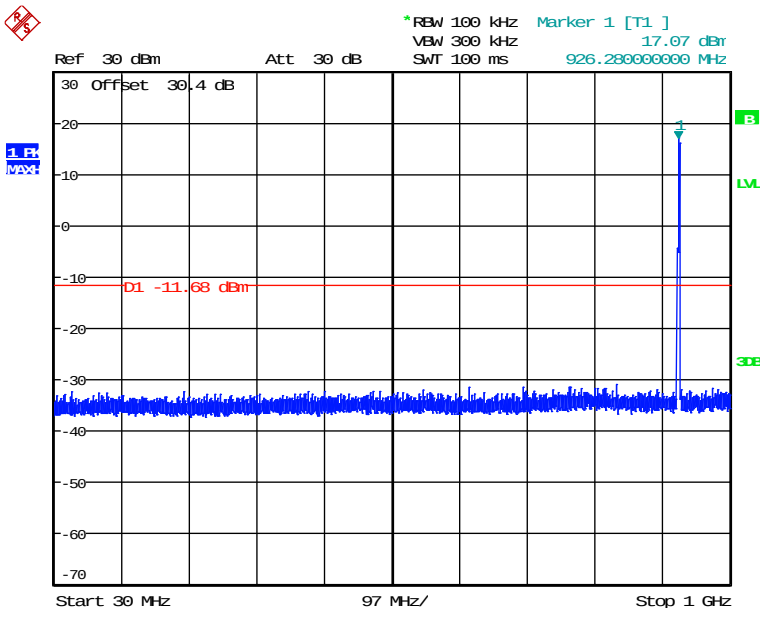

Figure 7.4.2.2-23: 30 MHz – 1 GHz – High Channel (QPSK, Antenna Path 2)

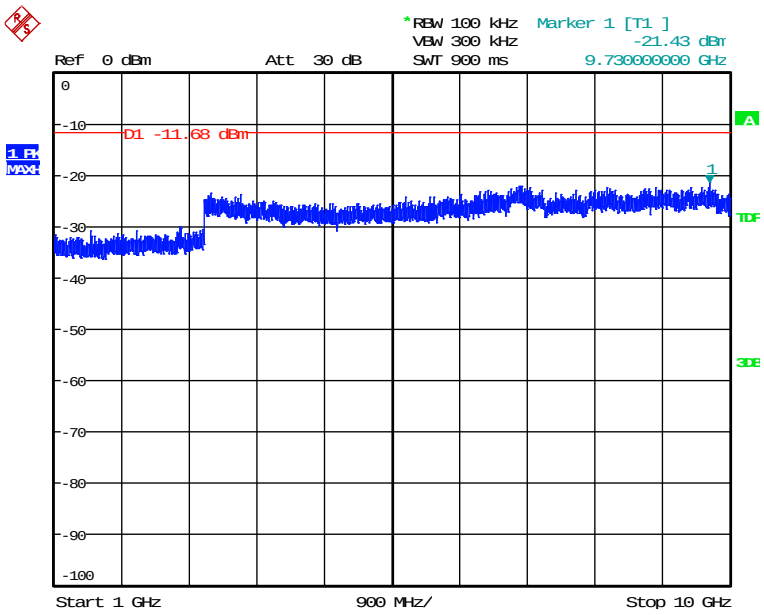

Figure 7.4.2.2-24: 1 GHz – 10 GHz – High Channel (QPSK, Antenna Path 2)

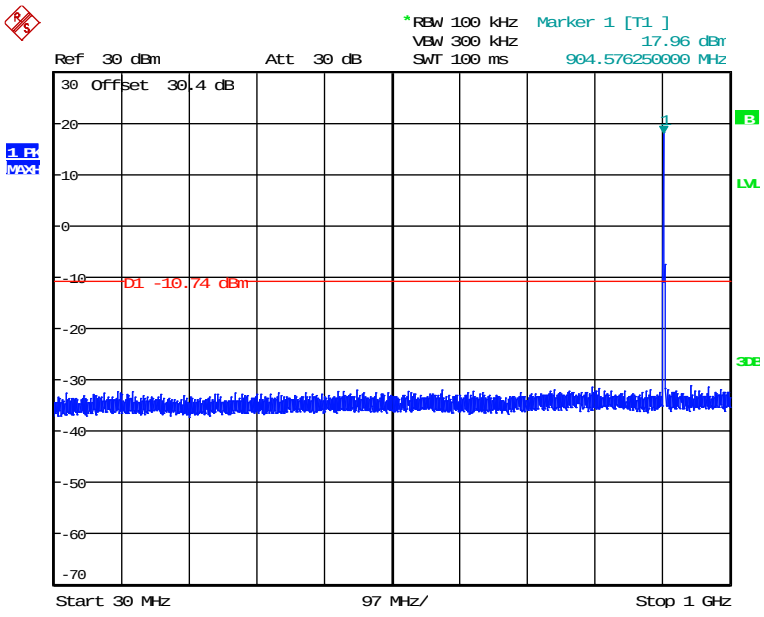

Figure 7.4.2.2-25: 30 MHz – 1 GHz – Low Channel (16-QAM, Antenna Path 1)

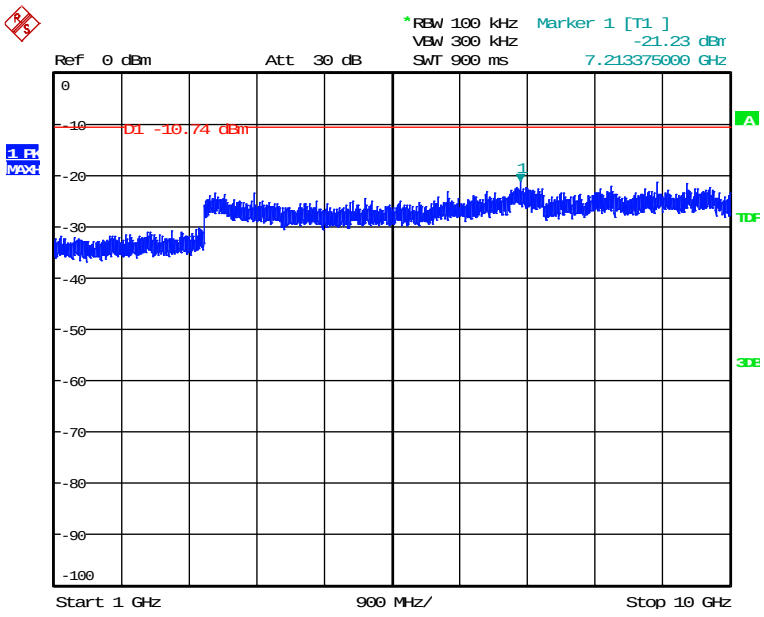

Figure 7.4.2.2-26: 1 GHz – 10 GHz – Low Channel (16-QAM, Antenna Path 1)

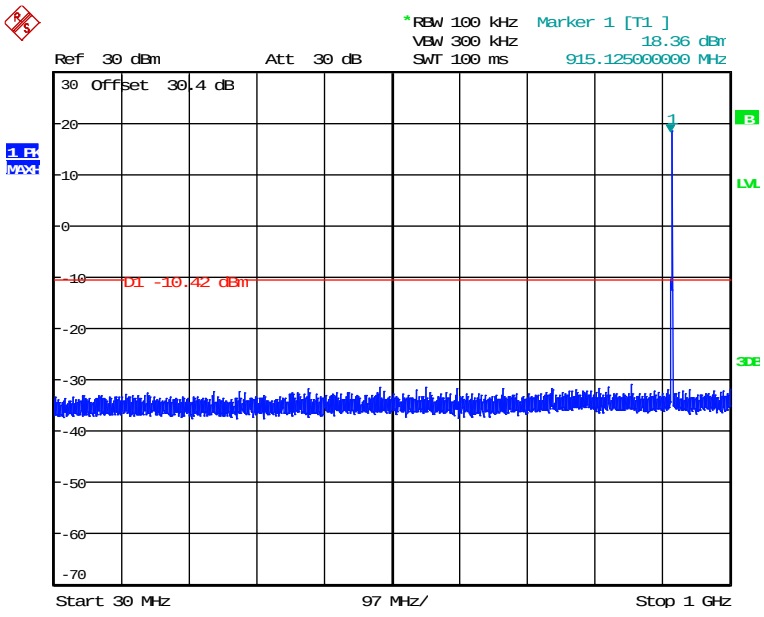

Figure 7.4.2.2-27: 30 MHz – 1 GHz – Middle Channel (16-QAM, Antenna Path 1)

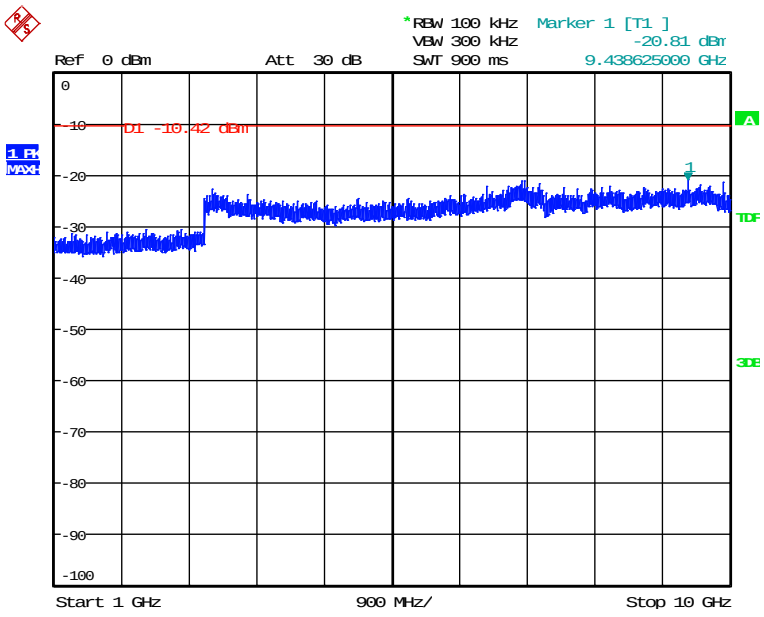

Figure 7.4.2.2-28: 1 GHz – 10 GHz – Middle Channel (16-QAM, Antenna Path 1)

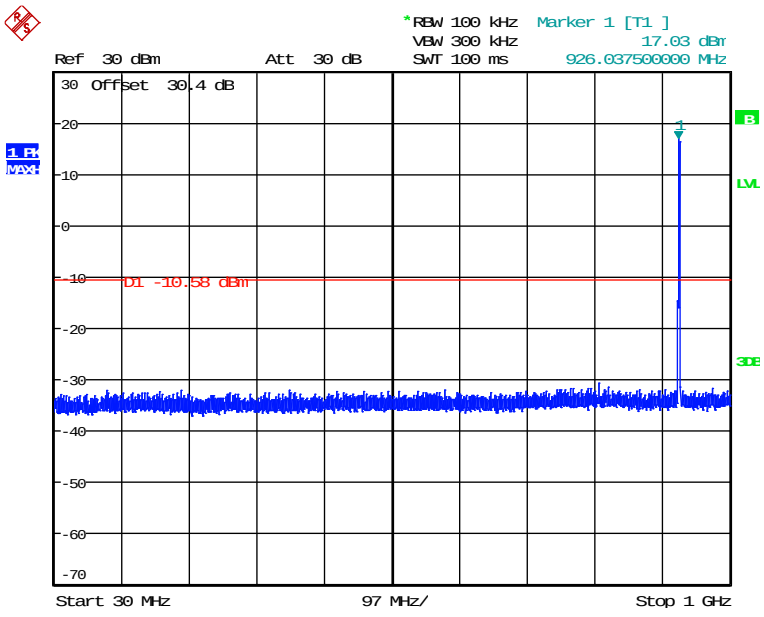

Figure 7.4.2.2-29: 30 MHz – 1 GHz – High Channel (16-QAM, Antenna Path 1)

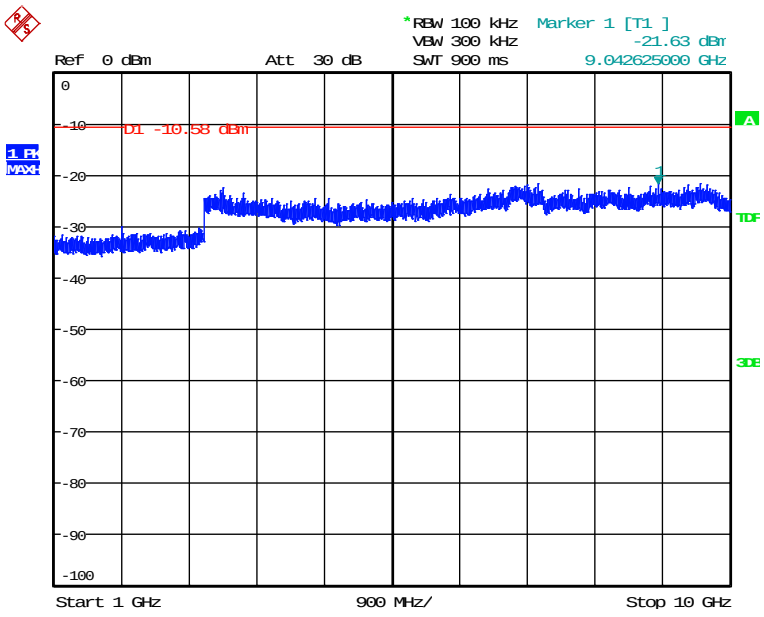

Figure 7.4.2.2-30: 1 GHz – 10 GHz – High Channel (16-QAM, Antenna Path 1)

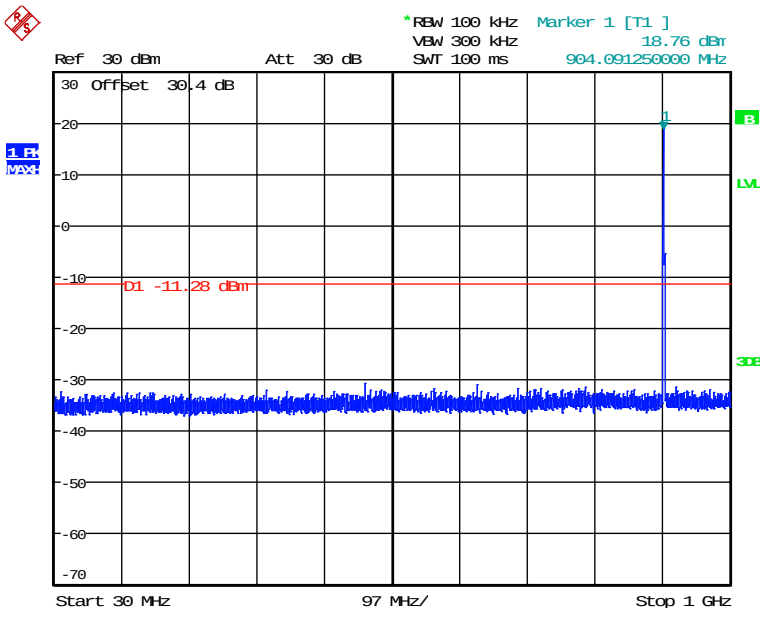

Figure 7.4.2.2-31: 30 MHz – 1 GHz – Low Channel (16-QAM, Antenna Path 2)

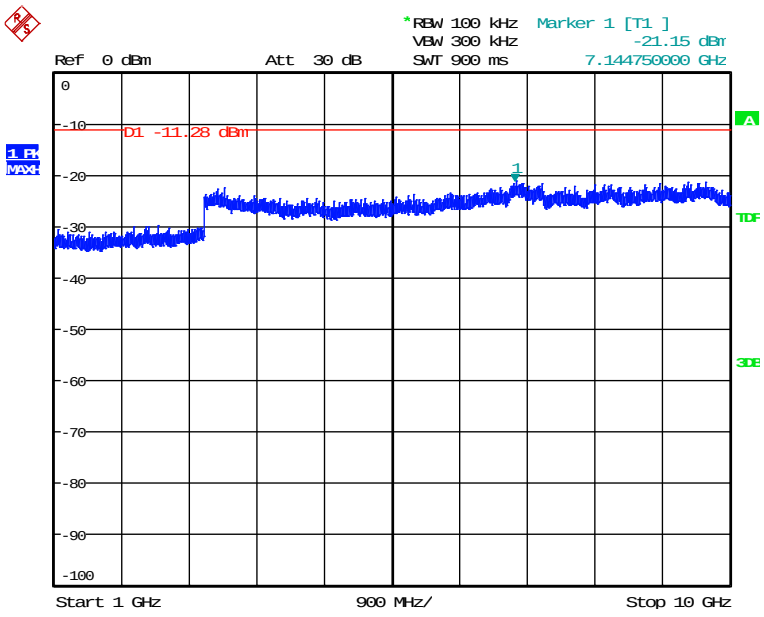

Figure 7.4.2.2-32: 1 GHz – 10 GHz – Low Channel (16-QAM, Antenna Path 2)

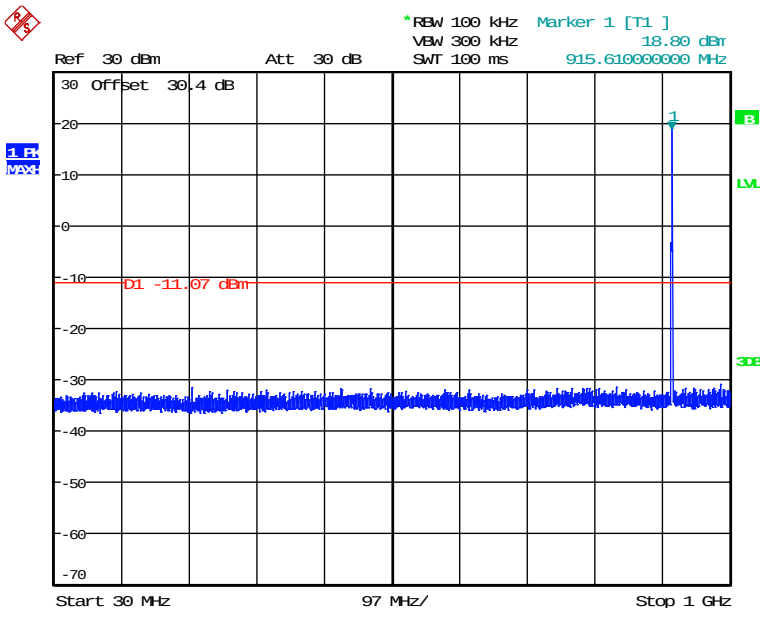

Figure 7.4.2.2-33: 30 MHz – 1 GHz – Middle Channel (16-QAM, Antenna Path 2)

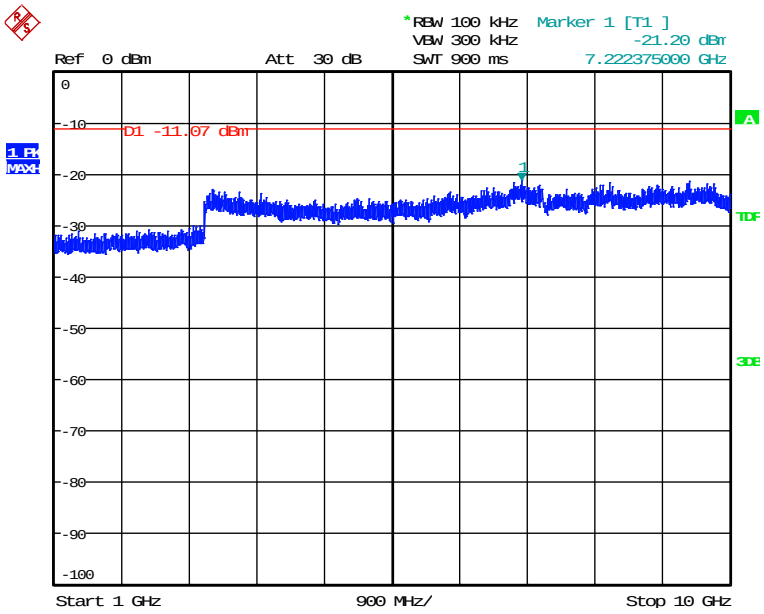

Figure 7.4.2.2-34: 1 GHz – 10 GHz – Middle Channel (16-QAM, Antenna Path 2)

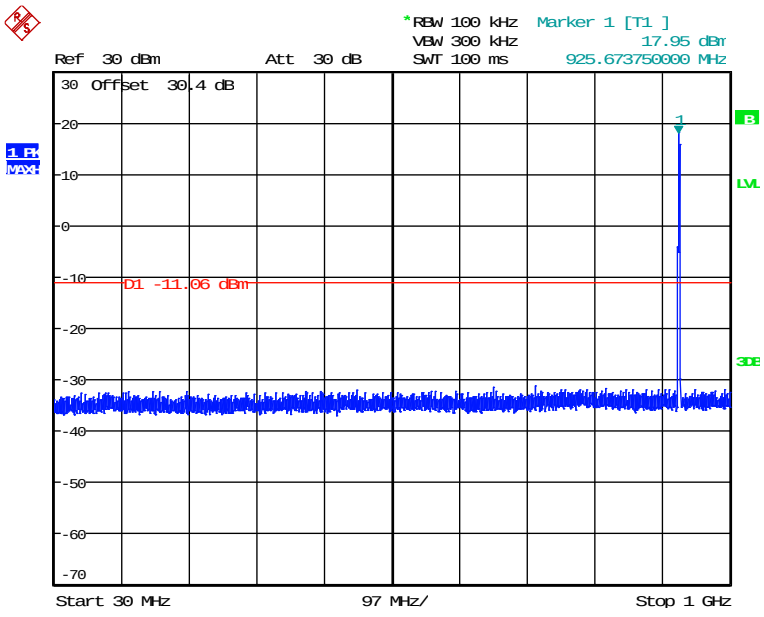

Figure 7.4.2.2-35: 30 MHz – 1 GHz – High Channel (16-QAM, Antenna Path 2)

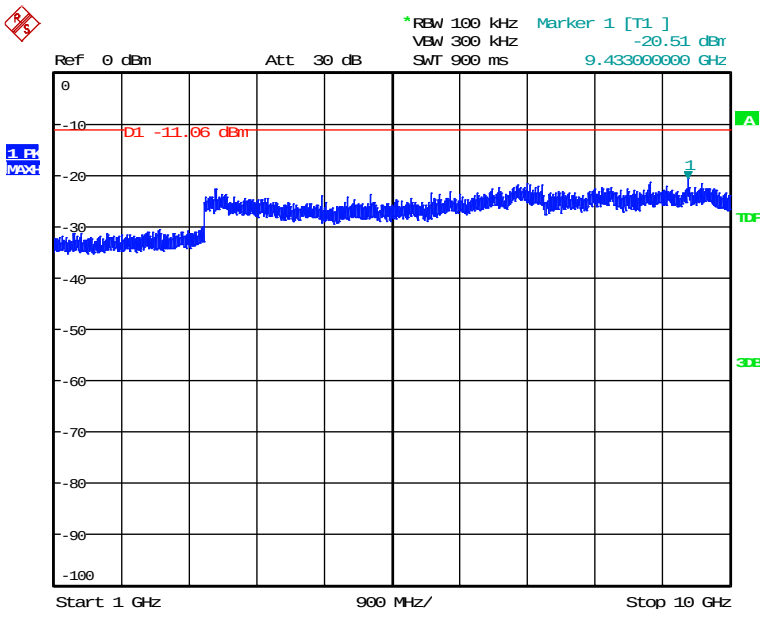

Figure 7.4.2.2-36: 1 GHz – 10 GHz – High Channel (16-QAM, Antenna Path 2)

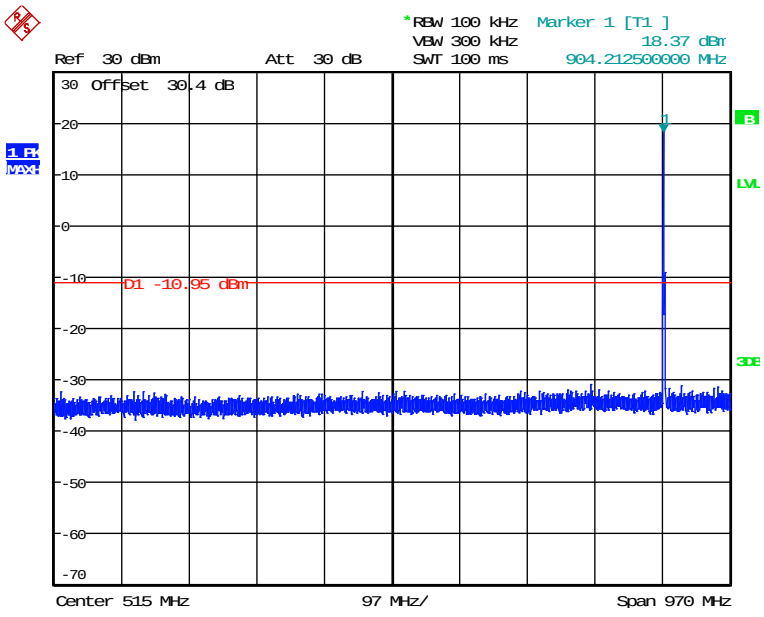

Figure 7.4.2.2-37: 30 MHz – 1 GHz – Low Channel (64-QAM, Antenna Path 1)

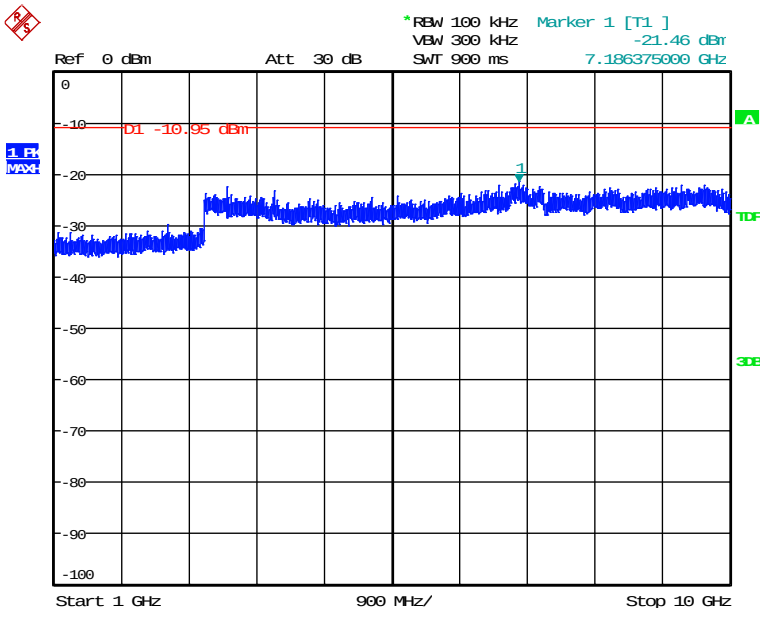

Figure 7.4.2.2-38: 1 GHz – 10 GHz – Low Channel (64-QAM, Antenna Path 1)

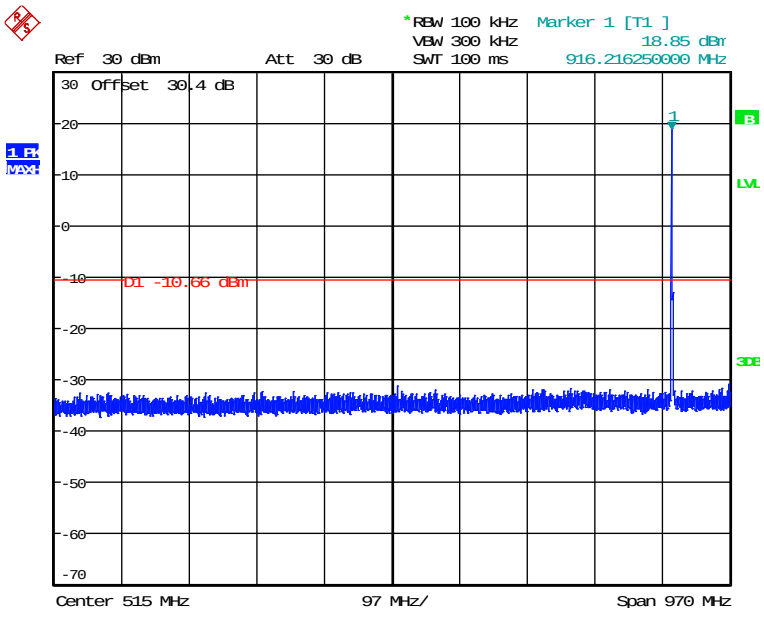

Figure 7.4.2.2-39: 30 MHz – 1 GHz – Middle Channel (64-QAM, Antenna Path 1)

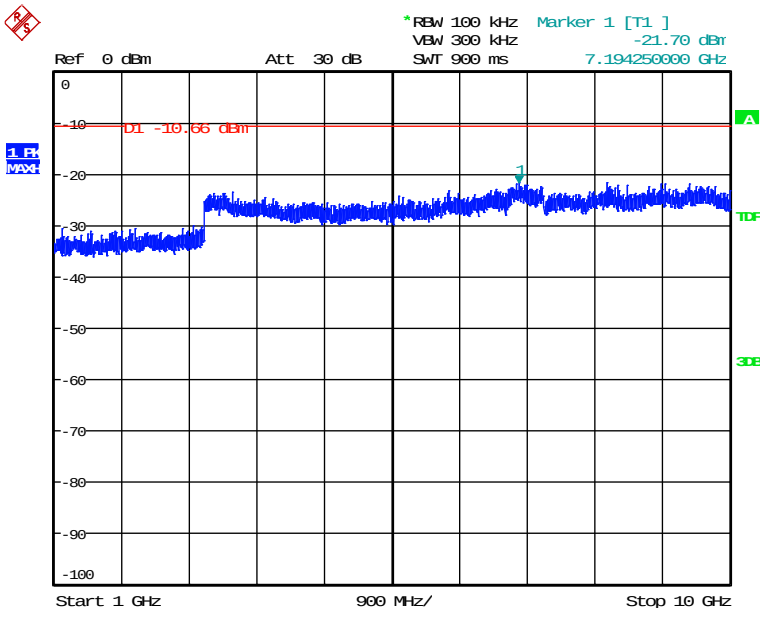

Figure 7.4.2.2-40: 1 GHz – 10 GHz – Middle Channel (64-QAM, Antenna Path 1)

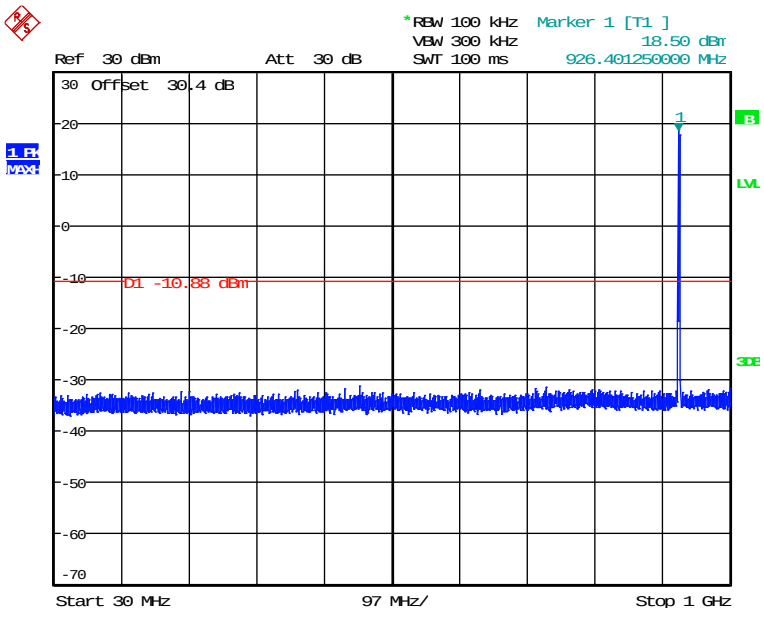

Figure 7.4.2.2-41: 30 MHz – 1 GHz – High Channel (64-QAM, Antenna Path 1)

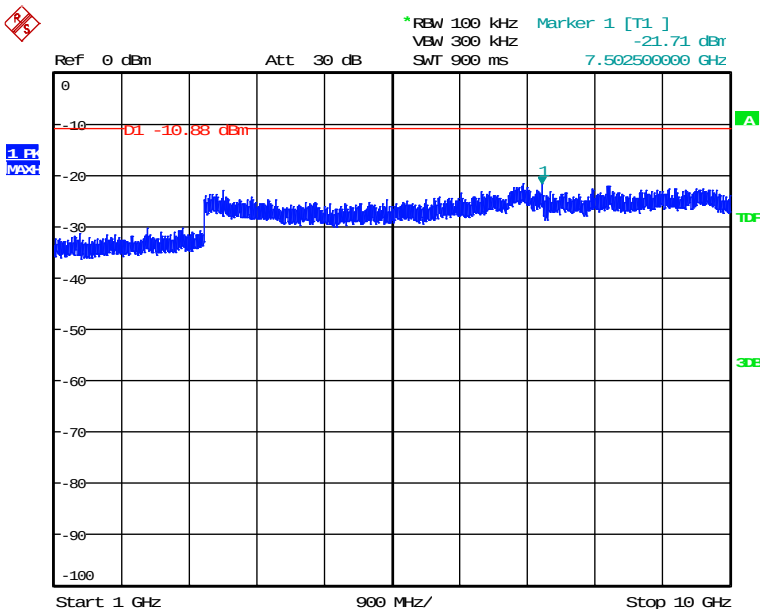

Figure 7.4.2.2-42: 1 GHz – 10 GHz – High Channel (64-QAM, Antenna Path 1)

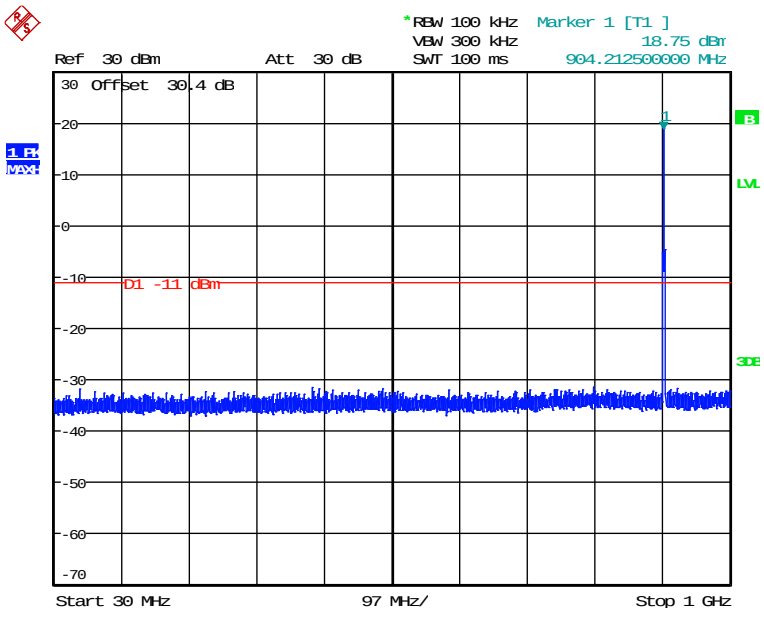

Figure 7.4.2.2-43: 30 MHz – 1 GHz – Low Channel (64-QAM, Antenna Path 2)

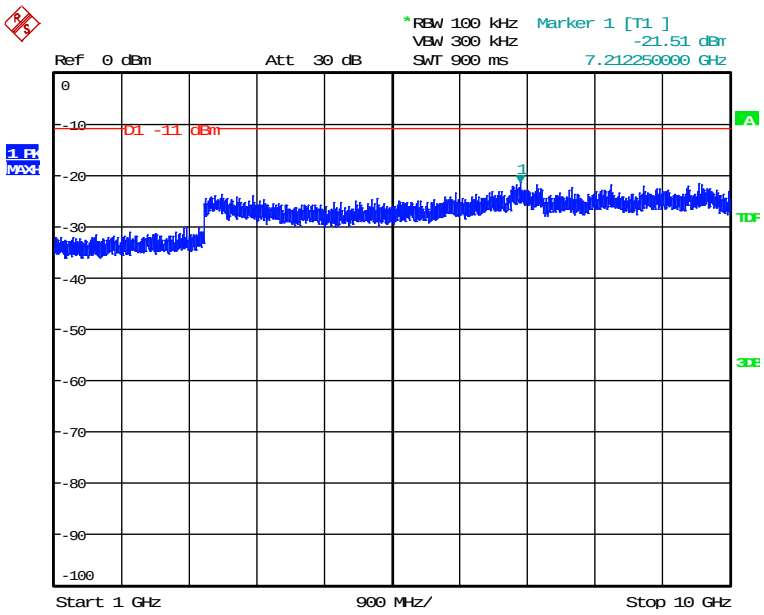

Figure 7.4.2.2-44: 1 GHz – 10 GHz – Low Channel (64-QAM, Antenna Path 2)

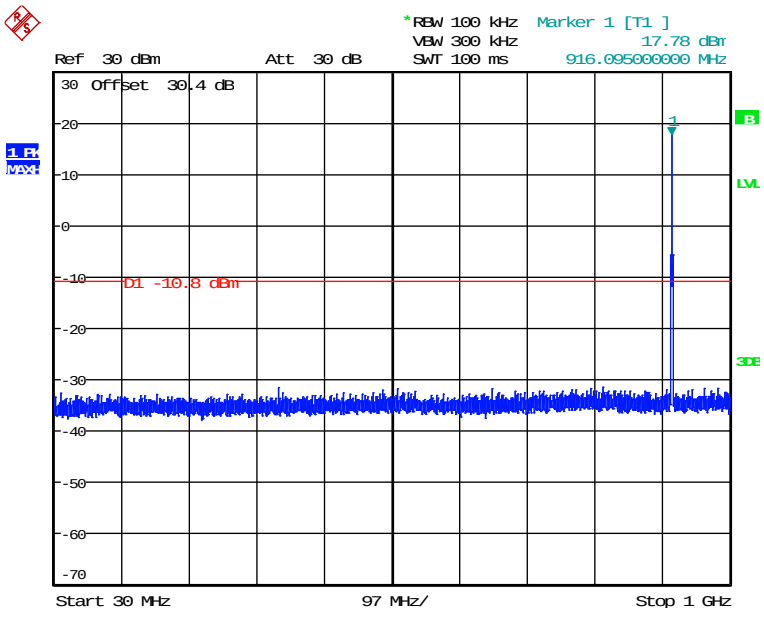

Figure 7.4.2.2-45: 30 MHz – 1 GHz – Middle Channel (64-QAM, Antenna Path 2)

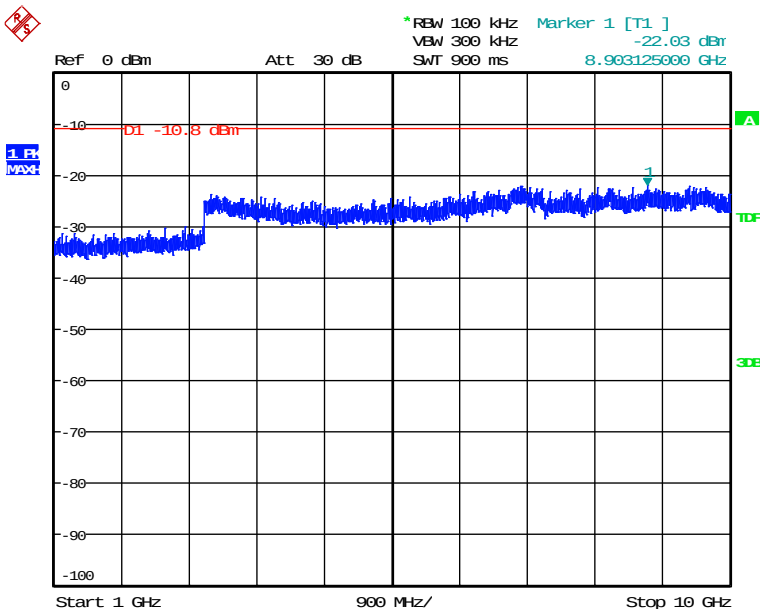

Figure 7.4.2.2-46: 1 GHz – 10 GHz – Middle Channel (64-QAM, Antenna Path 2)

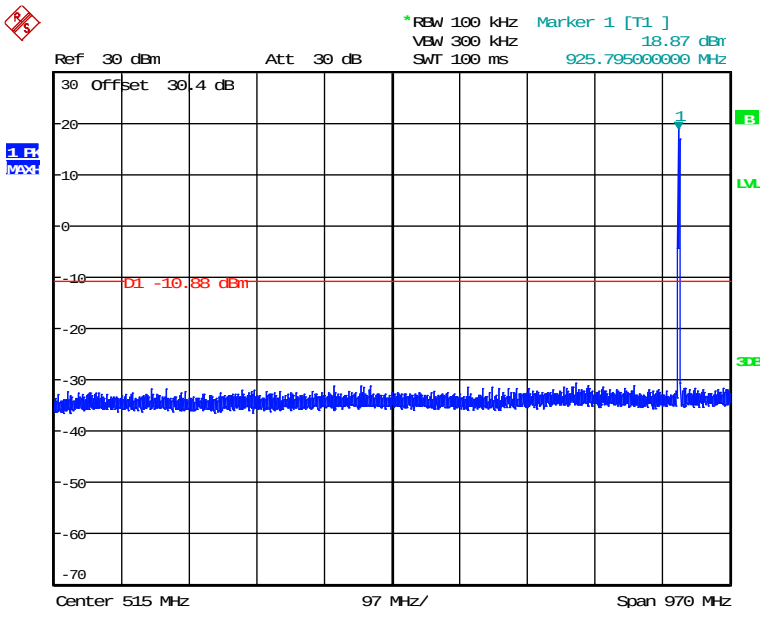

Figure 7.4.2.2-47: 30 MHz – 1 GHz – High Channel (64-QAM, Antenna Path 2)

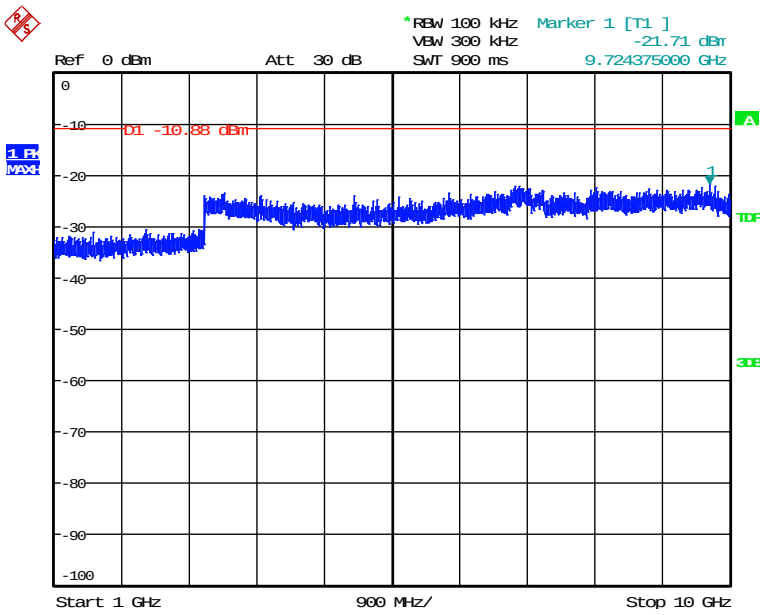

Figure 7.4.2.2-48: 1 GHz – 10 GHz – High Channel (64-QAM, Antenna Path 2)

7.4.3 Spurious Emissions - FCC Section 15.205

7.4.3.1 Conducted Spurious Emissions - FCC Section 15.205

7.4.3.1.1 Measurement Procedure

The conducted spurious emissions tests were made over the frequency range of 30 MHz to 10 GHz, 10 times the highest fundamental frequency. For emissions below 1000 MHz, Quasi-Peak measurements were made with RBW = 120 kHz and VBW = 300 kHz. Above 1000 MHz, Peak and average measurements were made with RBW of 1 MHz and VBW of 3MHz. The average measurements were performed per Section 12.2.5.2 of the FCC KDB Publication No. 558074 "Guidance for Performing Compliance Measurements on Digital Transmission Systems (47 CFR 15.247)". The measurements were performed at each antenna ports and the total EIRP was calculated per the FCC KDB Publication No. 662911 "Emissions Testing of Transmitters with Multiple Outputs in the Same Band" in order to account for the two TX antenna paths. The results were converted from EIRP to E-Field per the FCC KDB Publication No. 558074 "Guidance for Performing Compliance Measurements on Digital Transmission Systems (47 CFR 15.247)".

7.4.3.1.2 Measurement Results

Emissions found in the restricted bands of the frequency range of evaluation are reported below.

11.3 dBi Panel Antenna Array (Cross-Polarized)

Table 7.4.3.1.2-1: RF Conducted Spurious Emissions Tabulated Data (BPSK)

Frequency (MHz)	Measured Power (dBm)				Total Corrected EIRP (dBm)		Corrected Levels (dBuV/m)		Limits (dBuV/m)		Margin (dBuV/m)	
	RF Port 1		RF Port 2									
	Peak	QPk/Avg	Peak	QPk/Avg	Peak	QPk/Avg	Peak	QPk/Avg	Peak	QPk/Avg	Peak	QPk/Avg
TX = 904.2 MHz												
1010	-47.51	-64.22	-56.13	-70.95	-35.65	-48.99	59.61	46.27	74.00	54.00	14.39	7.73
2712.6	-52.21	-65.90	-52.50	-67.44	-38.04	-49.19	57.22	46.06	74.00	54.00	16.78	7.94
3616.8	-55.44	-68.42	-55.40	-68.30	-41.11	-50.95	54.15	44.31	74.00	54.00	19.85	9.69
4521	-56.87	-68.88	-56.76	-68.82	-42.50	-51.44	52.75	43.82	74.00	54.00	21.25	10.18
5425.2	-56.71	-69.30	-56.75	-69.35	-42.42	-51.92	52.84	43.34	74.00	54.00	21.16	10.66
8137.8	-51.66	-68.72	-50.68	-68.98	-36.83	-51.44	58.43	43.82	74.00	54.00	15.57	10.18
9042	-53.23	-69.18	-55.51	-69.44	-39.91	-51.90	55.35	43.36	74.00	54.00	18.65	10.64
TX = 915.72 MHz												
1030.4	-50.65	-65.36	-57.24	-72.20	-38.49	-50.14	56.77	45.11	74.00	54.00	17.23	8.89
2747.16	-54.11	-69.36	-52.34	-69.19	-38.83	-51.87	56.43	43.39	74.00	54.00	17.57	10.61
3662.88	-56.37	-68.53	-56.09	-69.45	-41.92	-51.56	53.34	43.70	74.00	54.00	20.66	10.30
4578.6	-56.78	-69.30	-56.40	-69.21	-42.28	-51.85	52.98	43.41	74.00	54.00	21.02	10.59
7325.76	-57.49	-69.75	-57.57	-69.70	-43.22	-52.32	52.04	42.94	74.00	54.00	21.96	11.06
8241.48	-51.77	-69.36	-49.84	-69.35	-36.39	-51.95	58.87	43.31	74.00	54.00	15.13	10.69
9157.2	-49.49	-69.38	-48.97	-68.50	-34.91	-51.51	60.35	43.75	74.00	54.00	13.65	10.25
TX = 925.8 MHz												
1049.8	-51.30	-61.47	-55.97	-67.52	-38.73	-46.11	56.53	49.15	74.00	54.00	17.47	4.85
2777.4	-51.33	-63.31	-50.52	-62.88	-36.60	-45.68	58.66	49.58	74.00	54.00	15.34	4.42
3703.2	-56.42	-68.42	-54.65	-68.45	-41.14	-51.03	54.12	44.23	74.00	54.00	19.88	9.77
4629	-56.03	-69.14	-55.36	-69.05	-41.37	-51.69	53.89	43.57	74.00	54.00	20.11	10.43
7406.4	-56.94	-69.42	-56.65	-69.44	-42.48	-52.02	52.78	43.24	74.00	54.00	21.22	10.76
8332.2	-54.90	-69.65	-56.53	-69.76	-41.33	-52.30	53.93	42.96	74.00	54.00	20.07	11.04

Notes:

- **All emissions above 9.157 GHz were attenuated below the limits and the noise floor of the measurement equipment.**
- **The total EIRP is calculated using the summation of the power output at each antenna port, the directional antenna gain of 11.3 dBi and the duty cycle factor of 10log(1/0.49).**

Table 7.4.3.1.2-2: RF Conducted Spurious Emissions Tabulated Data (QPSK)

Frequency (MHz)	Measured Power (dBm)				Total Corrected EIRP (dBm)		Corrected Levels (dBuV/m)		Limits (dBuV/m)		Margin (dBuV/m)	
	RF Port 1		RF Port 2									
	Peak	QPk/Avg	Peak	QPk/Avg	Peak	QPk/Avg	Peak	QPk/Avg	Peak	QPk/Avg	Peak	QPk/Avg
TX = 904.2 MHz												
1015	-47.29	-64.19	-56.75	-71.50	-35.52	-49.05	59.73	46.21	74.00	54.00	14.27	7.79
2712.6	-54.00	-70.74	-54.70	-70.54	-40.03	-53.23	55.23	42.03	74.00	54.00	18.77	11.97
3616.8	-56.03	-69.03	-55.00	-68.93	-41.17	-51.57	54.08	43.69	74.00	54.00	19.92	10.31
8137.8	-54.02	-69.31	-53.97	-69.38	-39.68	-51.94	55.57	43.32	74.00	54.00	18.43	10.68
9042	-55.00	-69.06	-56.10	-69.06	-41.20	-51.65	54.05	43.61	74.00	54.00	19.95	10.39
TX = 915.72 MHz												
1026.28	-49.62	-65.91	-57.63	-72.11	-37.68	-50.58	57.58	44.68	74.00	54.00	16.42	9.32
2747.16	-49.43	-63.66	-50.06	-63.54	-35.42	-46.19	59.83	49.07	74.00	54.00	14.17	4.93
3662.88	-55.62	-68.52	-55.64	-68.46	-41.32	-51.08	53.94	44.18	74.00	54.00	20.06	9.82
4578.6	-55.95	-69.25	-56.37	-69.20	-41.84	-51.82	53.41	43.44	74.00	54.00	20.59	10.56
7325.76	-57.47	-69.73	-57.25	-69.67	-43.05	-52.29	52.21	42.97	74.00	54.00	21.79	11.03
8241.48	-49.68	-69.31	-47.99	-69.20	-34.44	-51.85	60.81	43.41	74.00	54.00	13.19	10.59
9157.2	-49.94	-69.34	-47.03	-68.27	-33.94	-51.36	61.32	43.89	74.00	54.00	12.68	10.11
TX = 925.8 MHz												
1031.9	-51.29	-61.38	-58.00	-71.92	-39.15	-46.61	56.11	48.64	74.00	54.00	17.89	5.36
2777.4	-55.48	-69.24	-53.17	-67.53	-39.86	-50.89	55.39	44.36	74.00	54.00	18.61	9.64
3703.2	-55.71	-68.40	-56.60	-68.41	-41.82	-51.00	53.44	44.26	74.00	54.00	20.56	9.74
4629	-57.03	-69.11	-56.43	-69.00	-42.41	-51.65	52.85	43.61	74.00	54.00	21.15	10.39
7406.4	-57.05	-69.39	-56.81	-69.36	-42.62	-51.97	52.64	43.29	74.00	54.00	21.36	10.71
8332.2	-55.25	-69.52	-54.34	-69.97	-40.46	-52.33	54.80	42.93	74.00	54.00	19.20	11.07

Notes:

- **All emissions above 9.157 GHz were attenuated below the limits and the noise floor of the measurement equipment.**
- **The total EIRP is calculated using the summation of the power output at each antenna port, the directional antenna gain of 11.3 dBi and the duty cycle factor of 10log(1/0.49).**

Table 7.4.3.1.2-3: RF Conducted Spurious Emissions Tabulated Data (16-QAM)

Frequency (MHz)	Measured Power (dBm)				Total Corrected EIRP (dBm)		Corrected Levels (dBuV/m)		Limits (dBuV/m)		Margin (dBuV/m)	
	RF Port 1		RF Port 2									
	Peak	QPk/Avg	Peak	QPk/Avg	Peak	QPk/Avg	Peak	QPk/Avg	Peak	QPk/Avg	Peak	QPk/Avg
TX = 904.2 MHz												
1022.5	-48.69	-63.83	-56.04	-70.84	-36.66	-48.64	58.60	46.61	74.00	54.00	15.40	7.39
2712.6	-51.94	-65.01	-52.48	-67.13	-37.89	-48.53	57.37	46.72	74.00	54.00	16.63	7.28
3616.8	-56.02	-68.38	-55.08	-68.26	-41.21	-50.91	54.04	44.35	74.00	54.00	19.96	9.65
4521	-56.54	-68.84	-56.11	-68.76	-42.01	-51.39	53.25	43.87	74.00	54.00	20.75	10.13
5425.2	-56.41	-69.30	-56.20	-69.28	-41.99	-51.88	53.26	43.38	74.00	54.00	20.74	10.62
8137.8	-51.42	-68.60	-50.18	-68.68	-36.45	-51.23	58.81	44.03	74.00	54.00	15.19	9.97
9042	-53.14	-69.12	-54.77	-69.40	-39.57	-51.85	55.69	43.41	74.00	54.00	18.31	10.59
TX = 915.72 MHz												
1028.4	-50.06	-64.22	-58.02	-71.74	-38.12	-49.11	57.14	46.14	74.00	54.00	16.86	7.86
2747.16	-54.43	-67.67	-50.94	-66.80	-38.03	-49.80	57.22	45.45	74.00	54.00	16.78	8.55
3662.88	-56.10	-68.42	-56.07	-68.42	-41.77	-51.01	53.48	44.25	74.00	54.00	20.52	9.75
4578.6	-56.80	-69.17	-56.74	-69.16	-42.46	-51.76	52.80	43.50	74.00	54.00	21.20	10.50
7325.76	-57.44	-69.60	-56.89	-69.71	-42.85	-52.25	52.41	43.01	74.00	54.00	21.59	10.99
8241.48	-49.21	-69.07	-48.17	-69.24	-34.35	-51.75	60.91	43.51	74.00	54.00	13.09	10.49
9157.2	-52.48	-69.14	-48.03	-67.97	-35.40	-51.11	59.86	44.15	74.00	54.00	14.14	9.85
TX = 925.8 MHz												
1026.63	-49.83	-62.69	-55.47	-67.43	-37.48	-47.03	57.78	48.22	74.00	54.00	16.22	5.78
2777.4	-51.23	-63.26	-51.13	-62.79	-36.87	-45.61	58.39	49.65	74.00	54.00	15.61	4.35
3703.2	-55.90	-68.43	-55.68	-68.42	-41.48	-51.02	53.78	44.24	74.00	54.00	20.22	9.76
4629	-57.07	-69.20	-55.94	-69.01	-42.16	-51.70	53.10	43.56	74.00	54.00	20.90	10.44
7406.4	-56.43	-69.44	-56.97	-69.39	-42.38	-52.01	52.88	43.25	74.00	54.00	21.12	10.75
8332.2	-55.77	-69.61	-56.38	-69.68	-41.75	-52.24	53.50	43.02	74.00	54.00	20.50	10.98

Notes:

- **All emissions above 9.157 GHz were attenuated below the limits and the noise floor of the measurement equipment.**
- **The total EIRP is calculated using the summation of the power output at each antenna port, the directional antenna gain of 11.3 dBi and the duty cycle factor of 10log(1/0.49).**

Table 7.4.3.1.2-4: RF Conducted Spurious Emissions Tabulated Data (64-QAM)

Frequency (MHz)	Measured Power (dBm)				Total Corrected EIRP (dBm)		Corrected Levels (dBuV/m)		Limits (dBuV/m)		Margin (dBuV/m)	
	RF Port 1		RF Port 2									
	Peak	QPk/Avg	Peak	QPk/Avg	Peak	QPk/Avg	Peak	QPk/Avg	Peak	QPk/Avg	Peak	QPk/Avg
TX = 904.2 MHz												
1018.16	-48.36	-63.98	-56.31	-71.23	-36.41	-48.83	58.84	46.43	74.00	54.00	15.16	7.57
2712.6	-51.50	-65.72	-51.55	-67.24	-37.21	-49.01	58.04	46.25	74.00	54.00	15.96	7.75
3616.8	-55.20	-68.41	-55.51	-68.25	-41.04	-50.92	54.22	44.34	74.00	54.00	19.78	9.66
4521	-56.72	-68.81	-56.95	-69.81	-42.52	-51.87	52.73	43.38	74.00	54.00	21.27	10.62
5425.2	-56.93	-69.29	-56.57	-69.33	-42.44	-51.90	52.82	43.36	74.00	54.00	21.18	10.64
8137.8	-51.84	-68.68	-50.47	-68.87	-36.79	-51.37	58.47	43.89	74.00	54.00	15.53	10.11
9042	-52.79	-69.11	-55.63	-69.47	-39.67	-51.88	55.59	43.38	74.00	54.00	18.41	10.62
TX = 915.72 MHz												
1038.5	-50.32	-64.38	-58.41	-72.04	-38.39	-49.29	56.86	45.96	74.00	54.00	17.14	8.04
2747.16	-54.25	-67.92	-51.50	-66.92	-38.35	-49.98	56.91	45.27	74.00	54.00	17.09	8.73
3662.88	-55.85	-68.40	-55.04	-68.30	-41.12	-50.94	54.14	44.32	74.00	54.00	19.86	9.68
4578.6	-57.23	-69.22	-55.56	-69.02	-42.00	-51.71	53.25	43.55	74.00	54.00	20.75	10.45
7325.76	-57.54	-69.66	-56.82	-69.52	-42.85	-52.18	52.40	43.08	74.00	54.00	21.60	10.92
8241.48	-50.32	-69.15	-47.02	-68.90	-34.05	-51.61	61.20	43.64	74.00	54.00	12.80	10.36
9157.2	-50.34	-69.17	-49.72	-68.32	-35.71	-51.32	59.55	43.94	74.00	54.00	14.45	10.06
TX = 925.8 MHz												
1002.4	-50.12	-63.11	-55.82	-67.47	-37.78	-47.36	57.47	47.90	74.00	54.00	16.53	6.10
2777.4	-50.98	-63.27	-50.08	-62.94	-36.20	-45.69	59.06	49.56	74.00	54.00	14.94	4.44
3703.2	-55.61	-68.43	-55.84	-68.41	-41.41	-51.01	53.84	44.25	74.00	54.00	20.16	9.75
4629	-57.33	-69.13	-56.51	-69.01	-42.59	-51.66	52.67	43.60	74.00	54.00	21.33	10.40
7406.4	-56.67	-69.41	-56.47	-69.43	-42.26	-52.01	53.00	43.25	74.00	54.00	21.00	10.75
8332.2	-55.14	-69.59	-55.36	-69.66	-40.94	-52.22	54.32	43.04	74.00	54.00	19.68	10.96

Notes:

- **All emissions above 9.157 GHz were attenuated below the limits and the noise floor of the measurement equipment.**
- **The total EIRP is calculated using the summation of the power output at each antenna port, the directional antenna gain of 11.3 dBi and the duty cycle factor of 10log(1/0.49).**

7.4.3.2 Sample Calculation:

E = EIRP – 20log D + 104.8 - DC (Average measurements only)

E = Electric Field Strength in dBµV/m
EIRP = Equivalent Isotropic Radiated Power in dBm
D = Specified Distance in meters.

Duty Cycle Correction Factor = 10*log(49/100) = -3.098 dB

Example Calculation: Peak
Summation of Output 10^(-47.51/10) + 10^(-56.13/10) = 2.018 * 10^(-5) mW
Corrected EIRP: 10*log(2.018 * 10^(-5)) dBm + 11.3 dBi = -35.65 dBm
Corrected Level: -35.65 dBm + 104.8 dB - 20*log(3) dB/m = 59.61 dBµV/m
Margin: 74 dBµV/m – 59.61 dBµV/m = 14.39 dB

Example Calculation: Average
Summation of Output 10^(-64.22/10) + 10^(-70.95/10) = 4.588 * 10^(-7) mW
Corrected EIRP: 10*log(4.588 * 10^(-7)) dBm + 11.3 dBi + 3.098 dB = -48.99 dBm
Corrected Level: -48.99 dBm + 104.8 dB - 20*log(3) dB/m = 46.27 dBµV/m
Margin: 54 dBµV/m – 46.27 dBµV/m = 7.73 dB

7.4.3.3 Radiated Spurious Emissions into Restricted Frequency Bands - FCC 15.205, 15.209

7.4.3.3.1 Measurement Procedure

Radiated emissions tests were made over the frequency range of 30MHz to 10 GHz, 10 times the highest fundamental frequency. Each emission found to be in a restricted band as defined by section 15.205, including any emission at the operational band-edge, was compared to the radiated emission limits as defined in section 15.209.

The EUT was rotated through 360° and the receive antenna height was varied from 1m to 4m so that the maximum radiated emissions level would be detected. For frequencies below 1000MHz, quasi-peak measurements were made using a resolution bandwidth RBW of 120 kHz and a video bandwidth VBW of 300 kHz. For frequencies above 1000MHz, peak measurements were made with RBW of 1 MHz and VBW of 3MHz. Average measurements were performed in the linear scale, using RBW = 1 MHz and VBW = 30 Hz.

Since the unit was operating at the maximum duty cycle of 49% for all available modulations, the emissions presenting the same pulsing characteristics as the fundamental, were further corrected using a duty cycle correction factor consisting of 20*log(49/100) dB ≈ -6.2 dB.

The evaluation was performed on the EUT cabinet with a termination at the TX antenna ports.

7.4.3.3.2 Measurement Results

Radiated spurious and band-edge emissions found in the band of 30MHz to 10 GHz are reported below.

Table 7.4.3.3.2-1: Radiated Spurious Emissions Tabulated Data (BPSK)

Frequency (MHz)	Level (dBuV)		Antenna Polarity	Correction Factors	Corrected Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
	pk	Qpk/Avg	(H/V)	(dB)	pk	Qpk/Avg	pk	Qpk/Avg	pk	Qpk/Avg
Low Channel										
2712.6	52.29	39.04	H	-6.66	45.63	26.18	74.0	54.0	28.4	27.8
2712.6	52.54	38.84	V	-6.66	45.88	25.98	74.0	54.0	28.1	28.0
3616.8	50.99	35.26	H	-3.30	47.69	25.76	74.0	54.0	26.3	28.2
3616.8	50.82	35.22	V	-3.30	47.52	25.72	74.0	54.0	26.5	28.3
4521	46.59	33.02	H	-1.50	45.09	25.33	74.0	54.0	28.9	28.7
4521	46.78	32.78	V	-1.50	45.28	25.09	74.0	54.0	28.7	28.9
Middle Channel										
2747.16	50.94	38.19	H	-6.52	44.42	25.47	74.0	54.0	29.6	28.5
2747.16	52.52	39.30	V	-6.52	46.00	26.58	74.0	54.0	28.0	27.4
3662.88	50.51	35.74	H	-3.13	47.38	26.42	74.0	54.0	26.6	27.6
3662.88	49.81	35.30	V	-3.13	46.68	25.98	74.0	54.0	27.3	28.0
4578.6	46.74	33.25	H	-1.33	45.41	25.73	74.0	54.0	28.6	28.3
4578.6	45.22	32.70	V	-1.33	43.89	25.18	74.0	54.0	30.1	28.8
High Channel										
2777.4	51.88	38.56	H	-6.39	45.49	25.97	74.0	54.0	28.5	28.0
2777.4	50.53	38.01	V	-6.39	44.14	25.42	74.0	54.0	29.9	28.6
3703.2	50.79	35.88	H	-2.97	47.82	26.71	74.0	54.0	26.2	27.3
3703.2	49.42	34.52	V	-2.97	46.45	25.35	74.0	54.0	27.6	28.6
4629	46.64	33.36	H	-1.18	45.46	25.99	74.0	54.0	28.5	28.0
4629	45.69	32.65	V	-1.18	44.51	25.28	74.0	54.0	29.5	28.7

Notes:

- **All emissions above 4629 MHz were attenuated below the limits and the noise floor of the measurement equipment.**
- **The harmonics in the restricted bands showed pulsing characteristics similar to the fundamental. A duty cycle corresponding to 20*log(49/100) dB ≈ -6.2 dB was applied to the average values for the corrected levels.**

Table 7.4.3.3.2-2: Radiated Spurious Emissions Tabulated Data (QPSK)

Frequency (MHz)	Level (dBuV)		Antenna Polarity	Correction Factors	Corrected Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
	pk	Qpk/Avg	(H/V)	(dB)	pk	Qpk/Avg	pk	Qpk/Avg	pk	Qpk/Avg
Low Channel										
2712.6	52.45	38.05	H	-6.66	45.79	25.19	74.0	54.0	28.2	28.8
2712.6	51.21	38.56	V	-6.66	44.55	25.70	74.0	54.0	29.5	28.3
3616.8	50.45	35.44	H	-3.30	47.15	25.94	74.0	54.0	26.9	28.1
3616.8	50.53	35.47	V	-3.30	47.23	25.97	74.0	54.0	26.8	28.0
4521	46.40	33.02	H	-1.50	44.90	25.33	74.0	54.0	29.1	28.7
4521	45.30	32.42	V	-1.50	43.80	24.73	74.0	54.0	30.2	29.3
Middle Channel										
2747.16	51.14	38.59	H	-6.52	44.62	25.87	74.0	54.0	29.4	28.1
2747.16	52.24	38.33	V	-6.52	45.72	25.61	74.0	54.0	28.3	28.4
3662.88	51.73	36.70	H	-3.13	48.60	27.38	74.0	54.0	25.4	26.6
3662.88	50.00	35.55	V	-3.13	46.87	26.23	74.0	54.0	27.1	27.8
4578.6	47.30	33.36	H	-1.33	45.97	25.84	74.0	54.0	28.0	28.2
4578.6	46.09	33.12	V	-1.33	44.76	25.60	74.0	54.0	29.2	28.4
High Channel										
2777.4	49.50	37.64	H	-6.39	43.11	25.05	74.0	54.0	30.9	29.0
2777.4	51.01	38.03	V	-6.39	44.62	25.44	74.0	54.0	29.4	28.6
3703.2	52.37	37.21	H	-2.97	49.40	28.04	74.0	54.0	24.6	26.0
3703.2	52.56	36.74	V	-2.97	49.59	27.57	74.0	54.0	24.4	26.4
4629	47.18	33.45	H	-1.18	46.00	26.08	74.0	54.0	28.0	27.9
4629	45.71	33.13	V	-1.18	44.53	25.76	74.0	54.0	29.5	28.2

Notes:

- **All emissions above 4629 MHz were attenuated below the limits and the noise floor of the measurement equipment.**
- **The harmonics in the restricted bands showed pulsing characteristics similar to the fundamental. A duty cycle corresponding to 20*log(49/100) dB ≈ -6.2 dB was applied to the average values for the corrected levels.**

Table 7.4.3.3.2-3: Radiated Spurious Emissions Tabulated Data (16-QAM)

Frequency (MHz)	Level (dBuV)		Antenna Polarity	Correction Factors	Corrected Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
	pk	Qpk/Avg	(H/V)	(dB)	pk	Qpk/Avg	pk	Qpk/Avg	pk	Qpk/Avg
Low Channel										
2712.6	50.82	37.93	H	-6.66	44.16	25.07	74.0	54.0	29.8	28.9
2712.6	52.39	38.74	V	-6.66	45.73	25.88	74.0	54.0	28.3	28.1
3616.8	49.99	35.11	H	-3.30	46.69	25.61	74.0	54.0	27.3	28.4
3616.8	50.58	35.32	V	-3.30	47.28	25.82	74.0	54.0	26.7	28.2
4521	46.24	33.05	H	-1.50	44.74	25.36	74.0	54.0	29.3	28.6
4521	45.43	32.73	V	-1.50	43.93	25.04	74.0	54.0	30.1	29.0
Middle Channel										
2747.16	51.97	38.60	H	-6.52	45.45	25.88	74.0	54.0	28.5	28.1
2747.16	52.50	38.32	V	-6.52	45.98	25.60	74.0	54.0	28.0	28.4
3662.88	52.38	36.71	H	-3.13	49.25	27.39	74.0	54.0	24.7	26.6
3662.88	51.10	35.69	V	-3.13	47.97	26.37	74.0	54.0	26.0	27.6
4578.6	46.90	33.22	H	-1.33	45.57	25.70	74.0	54.0	28.4	28.3
4578.6	46.12	32.72	V	-1.33	44.79	25.20	74.0	54.0	29.2	28.8
7325.76	45.96	32.66	H	4.92	50.88	31.39	74.0	54.0	23.1	22.6
High Channel										
2777.4	50.40	36.95	H	-6.39	44.01	24.36	74.0	54.0	30.0	29.6
2777.4	50.39	37.64	V	-6.39	44.00	25.05	74.0	54.0	30.0	29.0
3703.2	51.90	36.47	H	-2.97	48.93	27.30	74.0	54.0	25.1	26.7
3703.2	51.95	35.86	V	-2.97	48.98	26.69	74.0	54.0	25.0	27.3
4629	46.15	33.06	H	-1.18	44.97	25.69	74.0	54.0	29.0	28.3
4629	46.39	32.88	V	-1.18	45.21	25.51	74.0	54.0	28.8	28.5

Notes:

- **All emissions above 7325.76 MHz were attenuated below the limits and the noise floor of the measurement equipment.**
- **The harmonics in the restricted bands showed pulsing characteristics similar to the fundamental. A duty cycle corresponding to 20*log(49/100) dB ≈ -6.2 dB was applied to the average values for the corrected levels.**

Table 7.4.3.3.2-4: Radiated Spurious Emissions Tabulated Data (64-QAM)

Frequency (MHz)	Level (dBuV)		Antenna Polarity	Correction Factors	Corrected Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
	pk	Qpk/Avg	(H/V)	(dB)	pk	Qpk/Avg	pk	Qpk/Avg	pk	Qpk/Avg
Low Channel										
2712.6	52.28	37.91	H	-6.66	45.62	25.05	74.0	54.0	28.4	28.9
2712.6	51.99	38.42	V	-6.66	45.33	25.56	74.0	54.0	28.7	28.4
3616.8	49.95	35.04	H	-3.30	46.65	25.54	74.0	54.0	27.4	28.5
3616.8	51.44	35.26	V	-3.30	48.14	25.76	74.0	54.0	25.9	28.2
4521	46.68	32.71	H	-1.50	45.18	25.02	74.0	54.0	28.8	29.0
Middle Channel										
2747.16	51.27	37.80	H	-6.52	44.75	25.08	74.0	54.0	29.2	28.9
2747.16	51.14	38.05	V	-6.52	44.62	25.33	74.0	54.0	29.4	28.7
3662.88	51.35	36.35	H	-3.13	48.22	27.03	74.0	54.0	25.8	27.0
3662.88	49.34	34.89	V	-3.13	46.21	25.57	74.0	54.0	27.8	28.4
4578.6	48.23	33.40	H	-1.33	46.90	25.88	74.0	54.0	27.1	28.1
4578.6	46.31	32.68	V	-1.33	44.98	25.16	74.0	54.0	29.0	28.8
High Channel										
2777.4	49.51	36.94	H	-6.39	43.12	24.35	74.0	54.0	30.9	29.7
2777.4	51.13	37.39	V	-6.39	44.74	24.80	74.0	54.0	29.3	29.2
3703.2	52.48	36.65	H	-2.97	49.51	27.48	74.0	54.0	24.5	26.5
3703.2	51.48	36.08	V	-2.97	48.51	26.91	74.0	54.0	25.5	27.1
4629	47.80	33.12	H	-1.18	46.62	25.75	74.0	54.0	27.4	28.3
4629	45.67	32.88	V	-1.18	44.49	25.51	74.0	54.0	29.5	28.5

Notes:

- **All emissions above 4629 MHz were attenuated below the limits and the noise floor of the measurement equipment.**
- **The harmonics in the restricted bands showed pulsing characteristics similar to the fundamental. A duty cycle corresponding to 20*log(49/100) dB ≈ -6.2 dB was applied to the average values for the corrected levels.**

7.4.3.4 Sample Calculation:

$R_C = R_U + CF_T$

Where:

CF_T	=	Total Correction Factor (AF+CA+AG)-DC (Average Measurements Only)
R_U	=	Uncorrected Reading
R_C	=	Corrected Level
AF	=	Antenna Factor
CA	=	Cable Attenuation
AG	=	Amplifier Gain
DC	=	Duty Cycle Correction Factor

Duty Cycle Correction Factor = 20*log(49/100) = -6.2 dB.

Example Calculation: Peak
Corrected Level: 52.29 - 6.66 = 45.63 dBµV/m
Margin: 74 dBµV/m – 45.63 dBµV/m = 28.4dB

Example Calculation: Average
Corrected Level: 39.04 - 6.66 - 6.2= 26.18 dBµV/m
Margin: 54 dBµV/m – 26.18 dBµV/m = 27.8 dB

7.5 Power Spectral Density - FCC Section 15.247(e)

7.5.1 PSD Measurement Procedure (Conducted Method)

The power spectral density was measured in accordance with the FCC KDB Publication No. 558074 "Guidance for Performing Compliance Measurements on Digital Transmission Systems (47 CFR 15.247)" Measurement Section 10.5 Method AVGPSD-2. The RF output port of the EUT was directly connected to the input of the spectrum analyzer. Offset values were input for cable and external attenuation. The spectrum analyzer RBW was set to 3 kHz and VBW 10 kHz. Span was adjusted to at least 1.5 times the OBW bandwidth and the sweep time was set to auto. The PSD was measured with trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction.

The output PSD was corrected in accordance with FCC KDB Publication No. 662911 "Emissions Testing of Transmitters with Multiple Outputs in the Same Band" in order to account for the multiple outputs by applying the correction factor of 10*log(N) dB to the measured level, where N corresponds to the number of transmitter outputs.

7.5.2 Measurement Results

Results are shown below.

Table 7.5.2-1: Power Spectral Density (BPSK, Antenna Path 1)

Frequency (MHz)	PSD/3kHz (dBm)	Duty Cycle	10*log(2) (dB)	Total PSD/3kHz (dBm)	Limit (dBm)	Margin (dB)
904.2	-4.04	49%	3.01	2.07	8.00	5.93
915.72	-3.76	49%	3.01	2.35	8.00	5.65
925.8	-4.07	49%	3.01	2.04	8.00	5.96

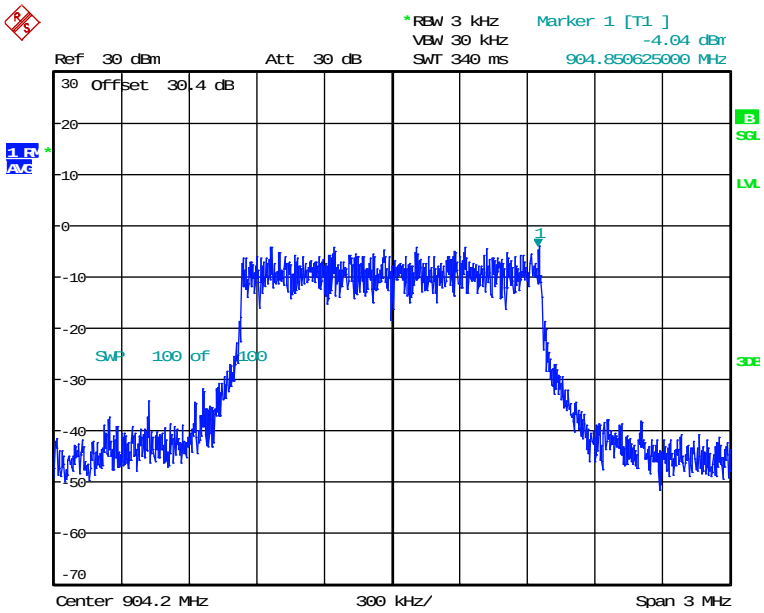

Figure 7.5.2-1: Power Spectral Density - Low Channel (BPSK, Antenna Path 1)

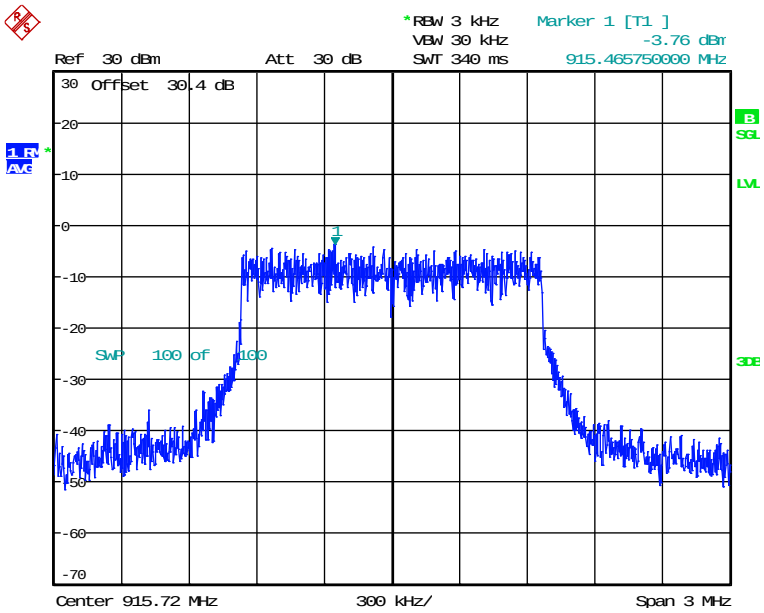

Figure 7.5.2-2: Power Spectral Density - Middle Channel (BPSK, Antenna Path 1)

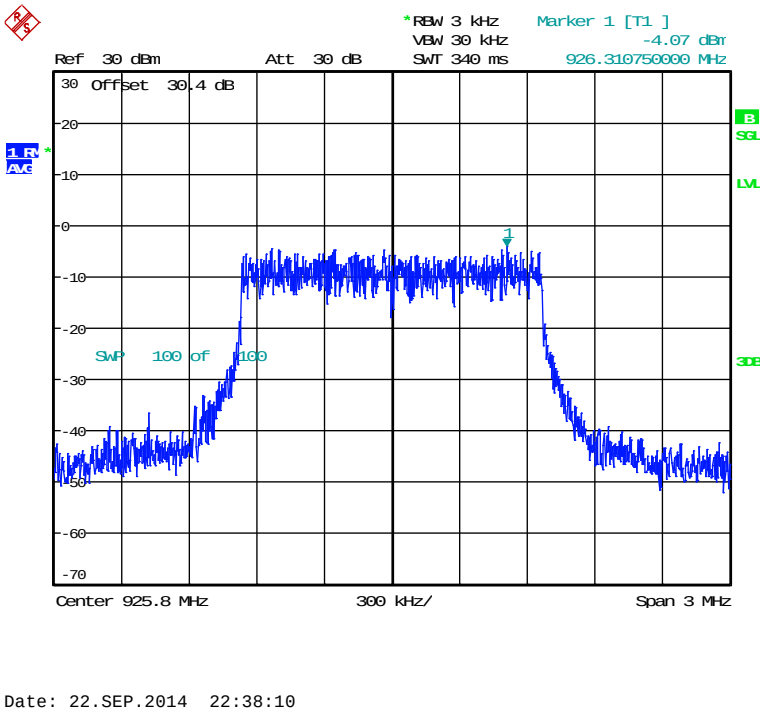

Figure 7.5.2-3: Power Spectral Density – High Channel (BPSK, Antenna Path 1)

Table 7.5.2-2: Power Spectral Density (BPSK, Antenna Path 2)

Frequency (MHz)	PSD/3kHz (dBm)	Duty Cycle	10*log(2) (dB)	Total PSD/3kHz (dBm)	Limit (dBm)	Margin (dB)
904.2	-5.13	49%	3.01	0.98	8.00	7.02
915.72	-4.17	49%	3.01	1.94	8.00	6.06
925.8	-4.61	49%	3.01	1.50	8.00	6.50

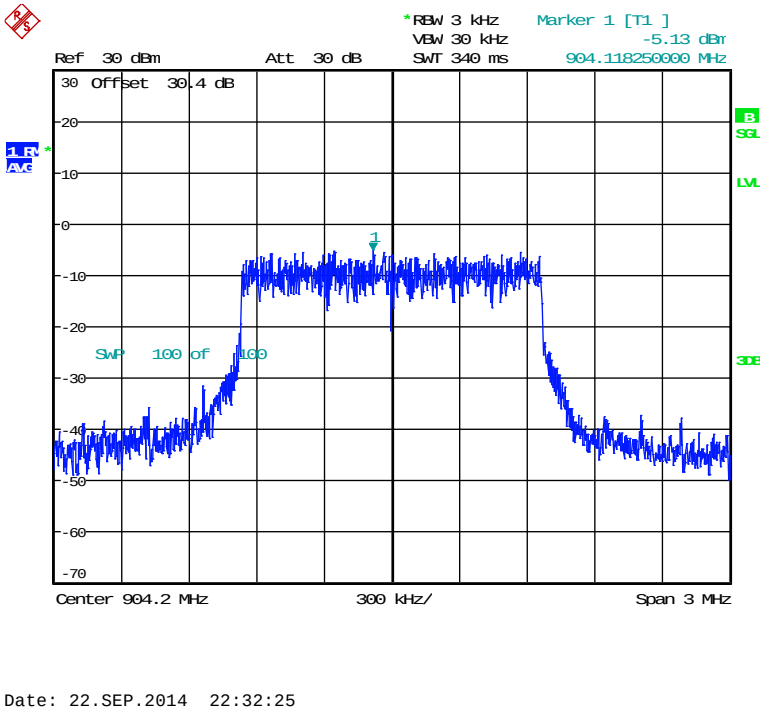

Figure 7.5.2-4: Power Spectral Density - Low Channel (BPSK, Antenna Path 2)

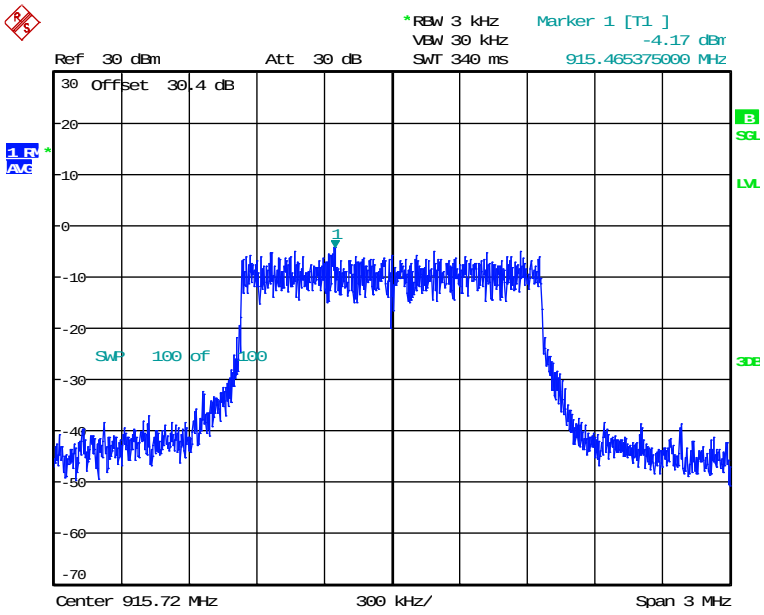

Figure 7.5.2-5: Power Spectral Density - Middle Channel (BPSK, Antenna Path 2)

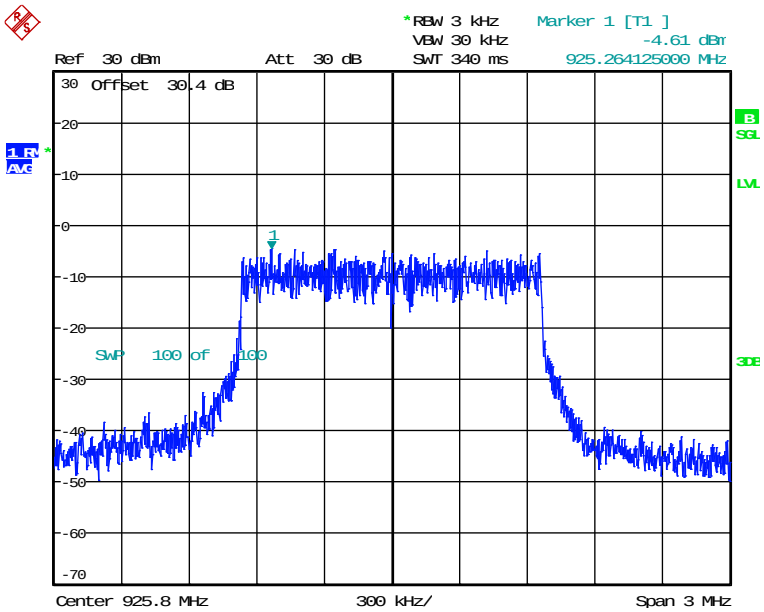

Figure 7.5.2-6: Power Spectral Density – High Channel (BPSK, Antenna Path 2)

Table 7.5.2-3: Power Spectral Density (QPSK, Antenna Path 1)

Frequency (MHz)	PSD/3kHz (dBm)	Duty Cycle	10*log(2) (dB)	Total PSD/3kHz (dBm)	Limit (dBm)	Margin (dB)
904.2	-3.43	49%	3.01	2.68	8.00	5.32
915.72	-4.03	49%	3.01	2.08	8.00	5.92
925.8	-3.17	49%	3.01	2.94	8.00	5.06

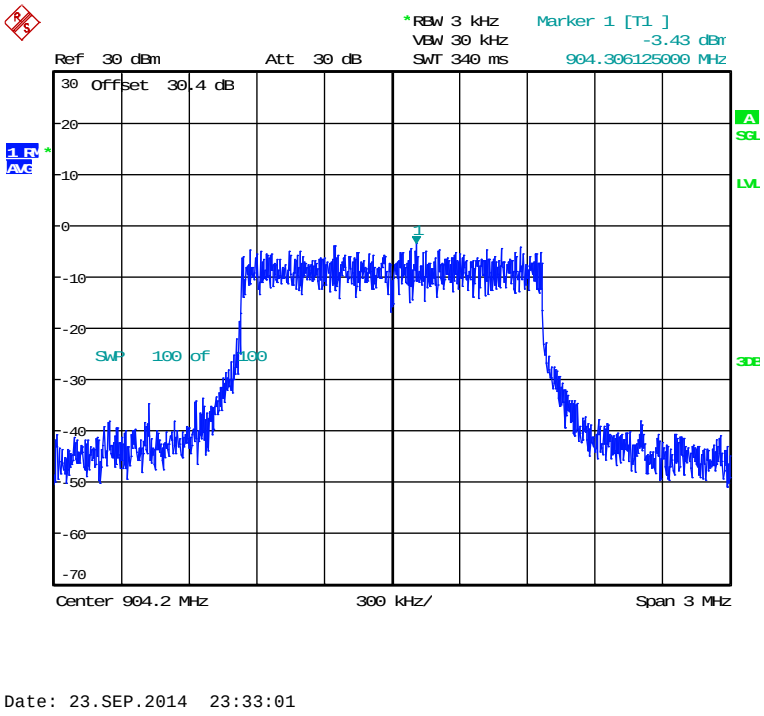

Figure 7.5.2-7: Power Spectral Density - Low Channel (QPSK, Antenna Path 1)

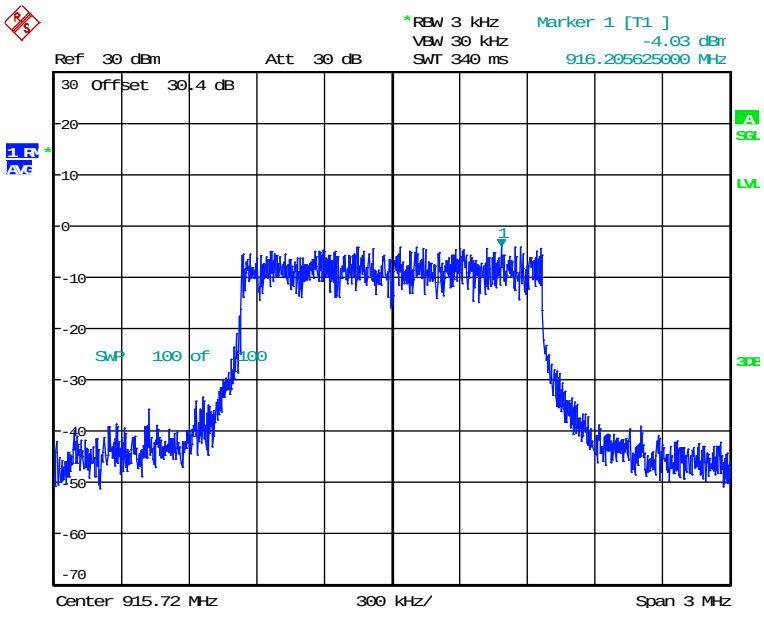

Figure 7.5.2-8: Power Spectral Density - Middle Channel (QPSK, Antenna Path 1)

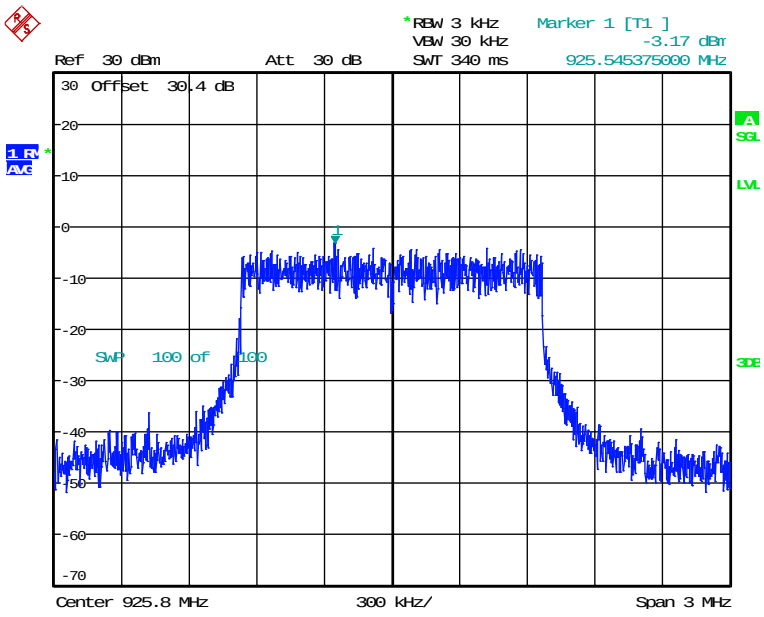

Figure 7.5.2-9: Power Spectral Density – High Channel (QPSK, Antenna Path 1)

Table 7.5.2-4: Power Spectral Density (QPSK, Antenna Path 2)

Frequency (MHz)	PSD/3kHz (dBm)	Duty Cycle	10*log(2) (dB)	Total PSD/3kHz (dBm)	Limit (dBm)	Margin (dB)
904.2	-4.37	49%	3.01	1.74	8.00	6.26
915.72	-3.90	49%	3.01	2.21	8.00	5.79
925.8	-4.29	49%	3.01	1.82	8.00	6.18

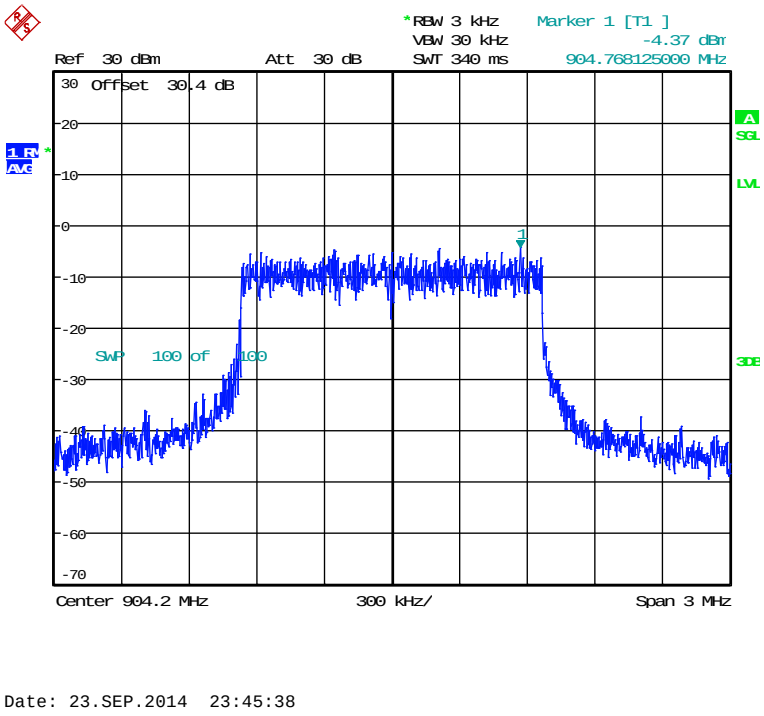

Figure 7.5.2-10: Power Spectral Density - Low Channel (QPSK, Antenna Path 2)

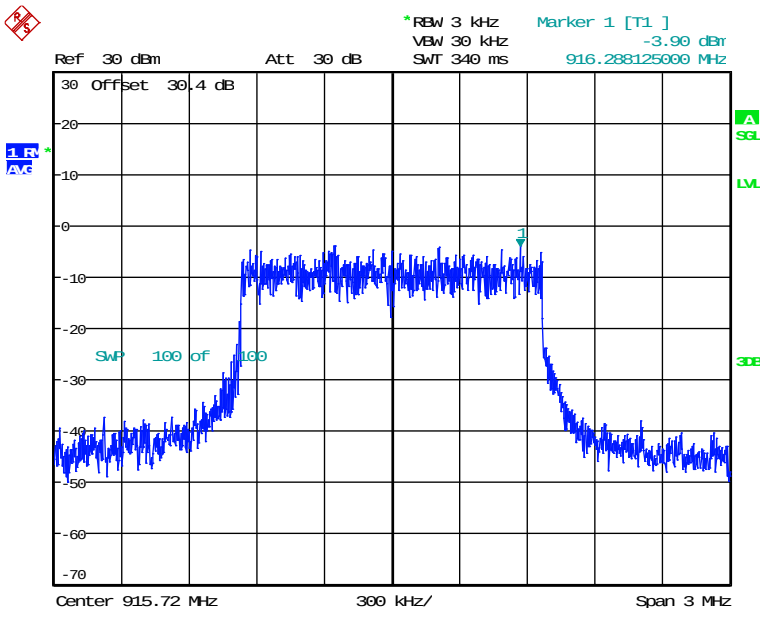

Figure 7.5.2-11: Power Spectral Density - Middle Channel (QPSK, Antenna Path 2)

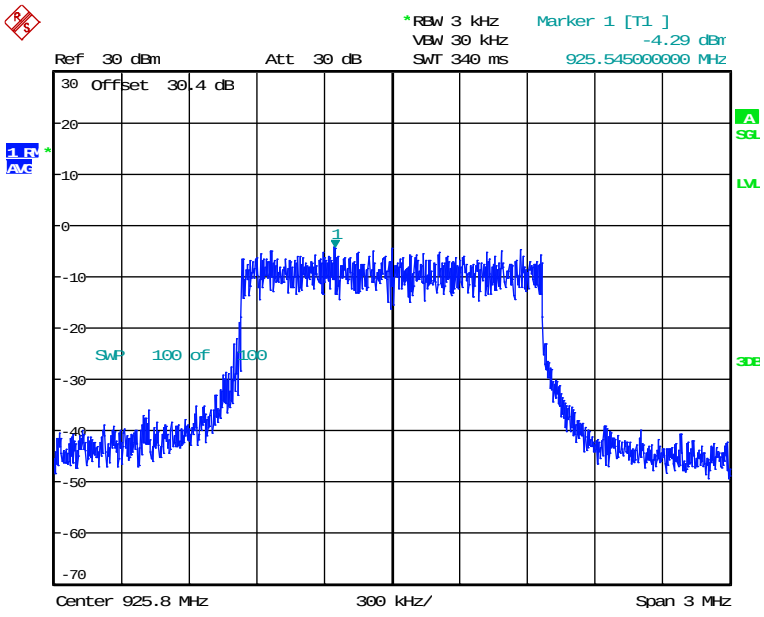

Figure 7.5.2-12: Power Spectral Density – High Channel (QPSK, Antenna Path 2)

Table 7.5.2-5: Power Spectral Density (16-QAM, Antenna Path 1)

Frequency (MHz)	PSD/3kHz (dBm)	Duty Cycle	10*log(2) (dB)	Total PSD/3kHz (dBm)	Limit (dBm)	Margin (dB)
904.2	-3.77	49%	3.01	2.34	8.00	5.66
915.72	-2.83	49%	3.01	3.28	8.00	4.72
925.8	-3.44	49%	3.01	2.67	8.00	5.33

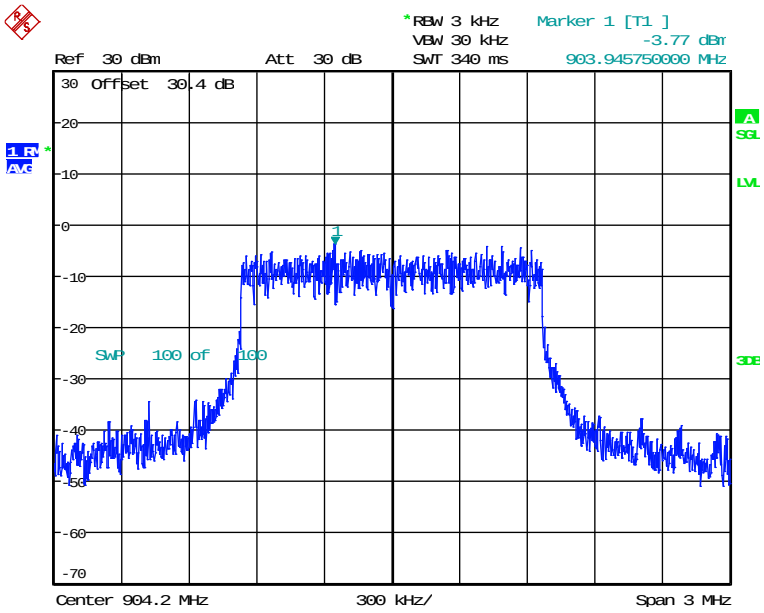

Figure 7.5.2-13: Power Spectral Density - Low Channel (16-QAM, Antenna Path 1)

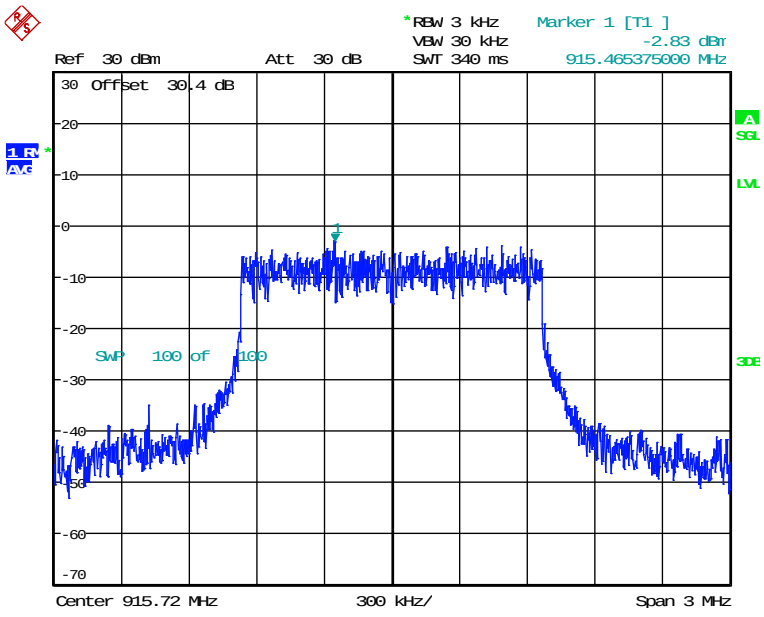

Figure 7.5.2-14: Power Spectral Density - Middle Channel (16-QAM, Antenna Path 1)

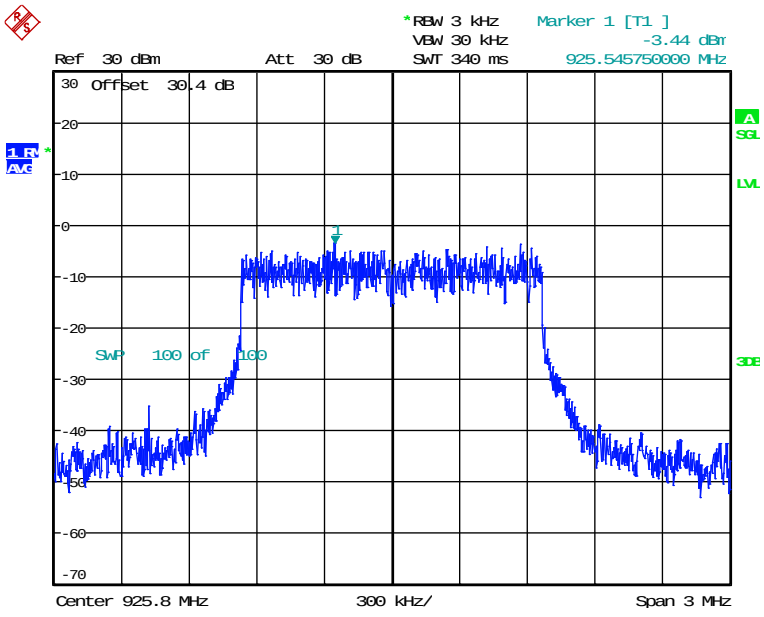

Figure 7.5.2-15: Power Spectral Density – High Channel (16-QAM, Antenna Path 1)

Table 7.5.2-6: Power Spectral Density (16-QAM, Antenna Path 2)

Frequency (MHz)	PSD/3kHz (dBm)	Duty Cycle	10*log(2) (dB)	Total PSD/3kHz (dBm)	Limit (dBm)	Margin (dB)
904.2	-4.63	49%	3.01	1.48	8.00	6.52
915.72	-3.59	49%	3.01	2.52	8.00	5.48
925.8	-4.50	49%	3.01	1.61	8.00	6.39

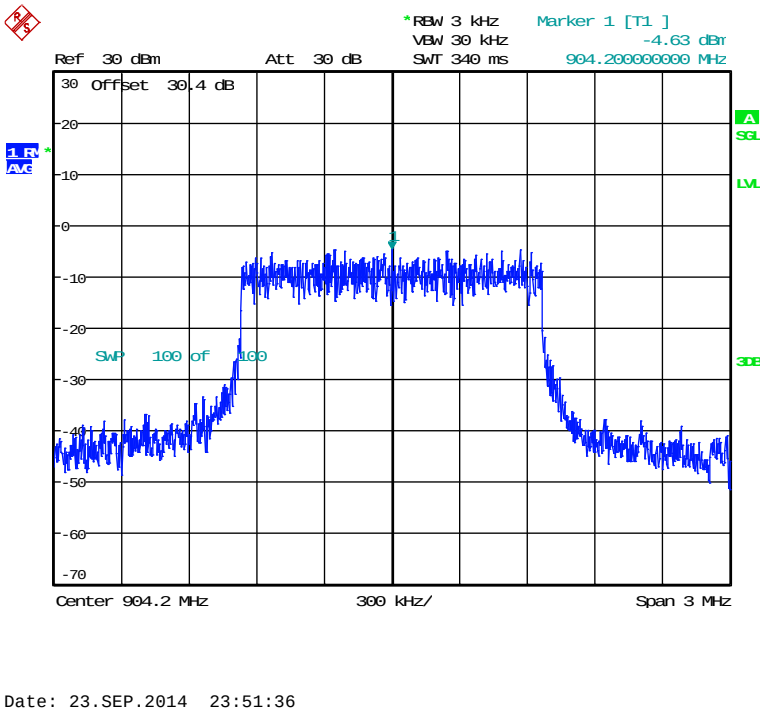

Figure 7.5.2-16: Power Spectral Density - Low Channel (16-QAM, Antenna Path 2)

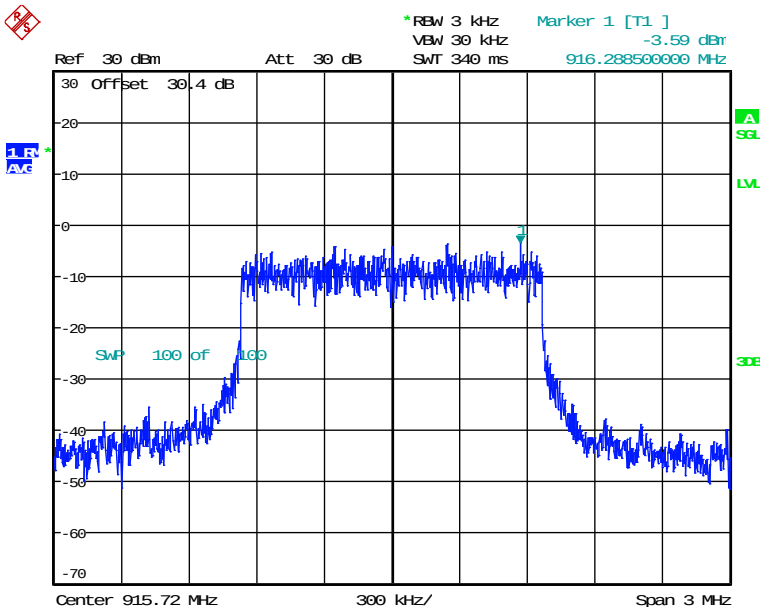

Figure 7.5.2-17: Power Spectral Density - Middle Channel (16-QAM, Antenna Path 2)

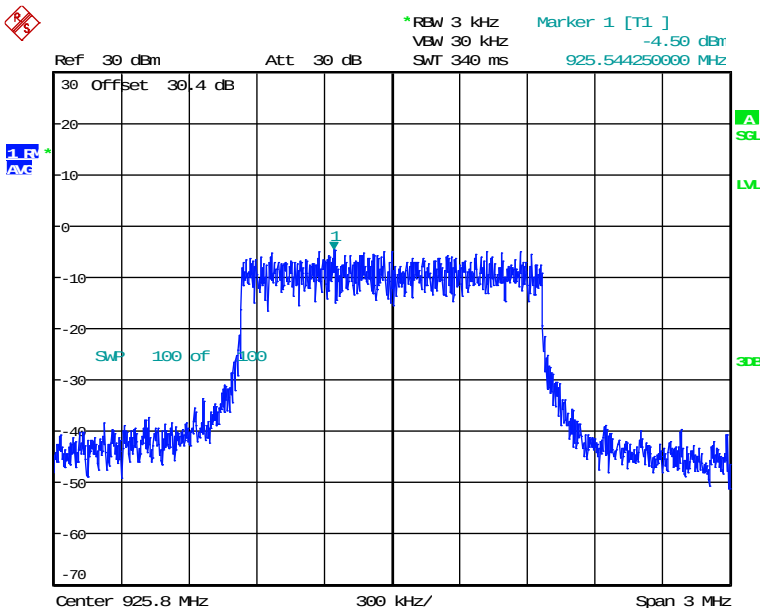

Figure 7.5.2-18: Power Spectral Density – High Channel (16-QAM, Antenna Path 2)

Table 7.5.2-7: Power Spectral Density (64-QAM, Antenna Path 1)

Frequency (MHz)	PSD/3kHz (dBm)	Duty Cycle	10*log(2) (dB)	Total PSD/3kHz (dBm)	Limit (dBm)	Margin (dB)
904.2	-4.47	49%	3.01	1.64	8.00	6.36
915.72	-3.92	49%	3.01	2.19	8.00	5.81
925.8	-4.26	49%	3.01	1.85	8.00	6.15

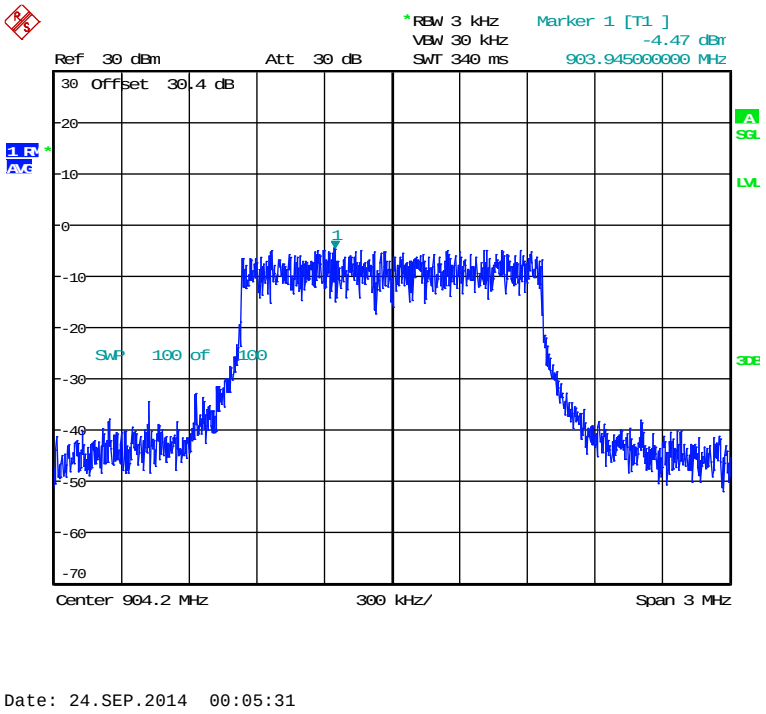

Figure 7.5.2-19: Power Spectral Density - Low Channel (64-QAM, Antenna Path 1)

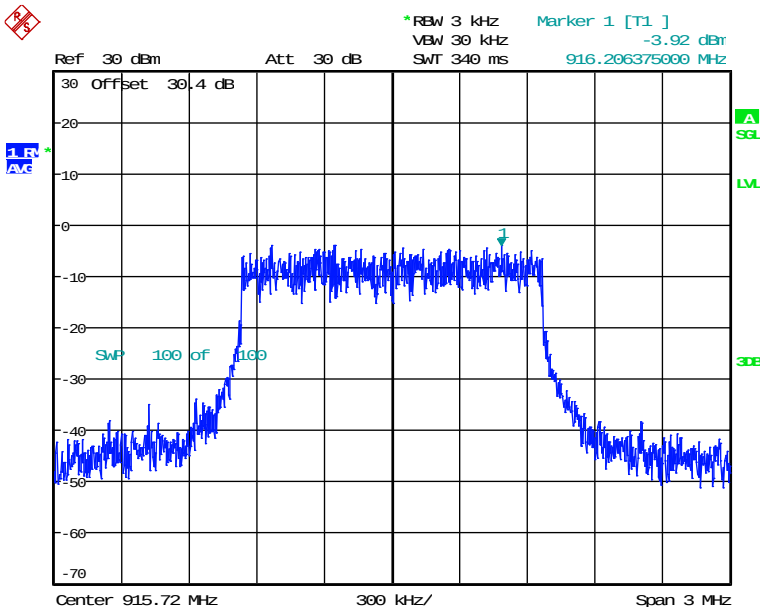

Figure 7.5.2-20: Power Spectral Density - Middle Channel (64-QAM, Antenna Path 1)

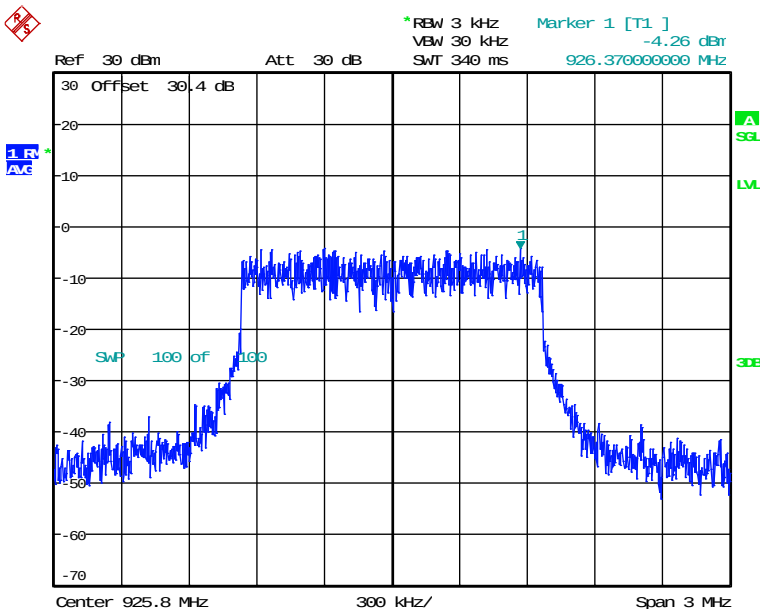

Figure 7.5.2-21: Power Spectral Density – High Channel (64-QAM, Antenna Path 1)

Table 7.5.2-8: Power Spectral Density (64-QAM, Antenna Path 2)

Frequency (MHz)	PSD/3kHz (dBm)	Duty Cycle	10*log(2) (dB)	Total PSD/3kHz (dBm)	Limit (dBm)	Margin (dB)
904.2	-4.34	49%	3.01	1.77	8.00	6.23
915.72	-4.41	49%	3.01	1.70	8.00	6.30
925.8	-4.67	49%	3.01	1.44	8.00	6.56

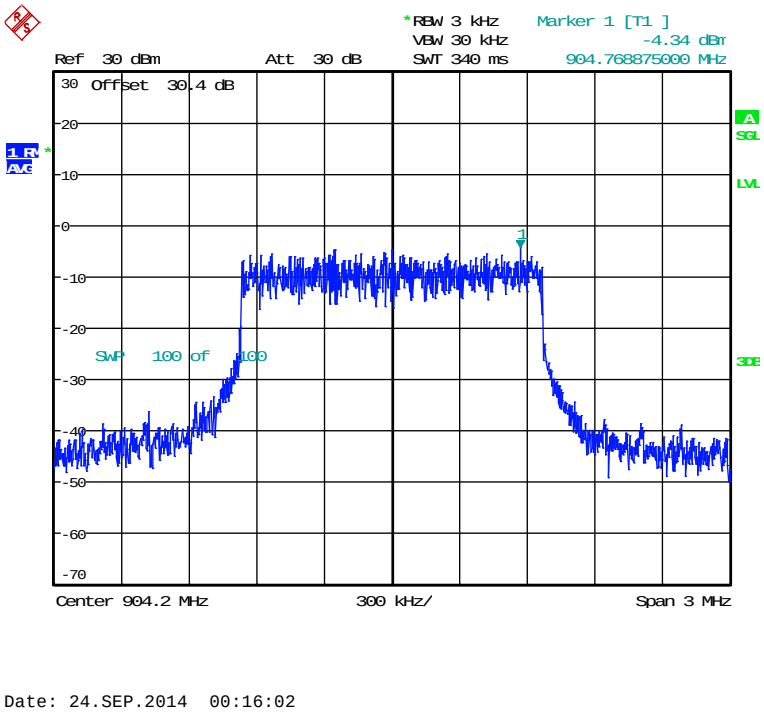

Figure 7.5.2-22: Power Spectral Density - Low Channel (64-QAM, Antenna Path 2)

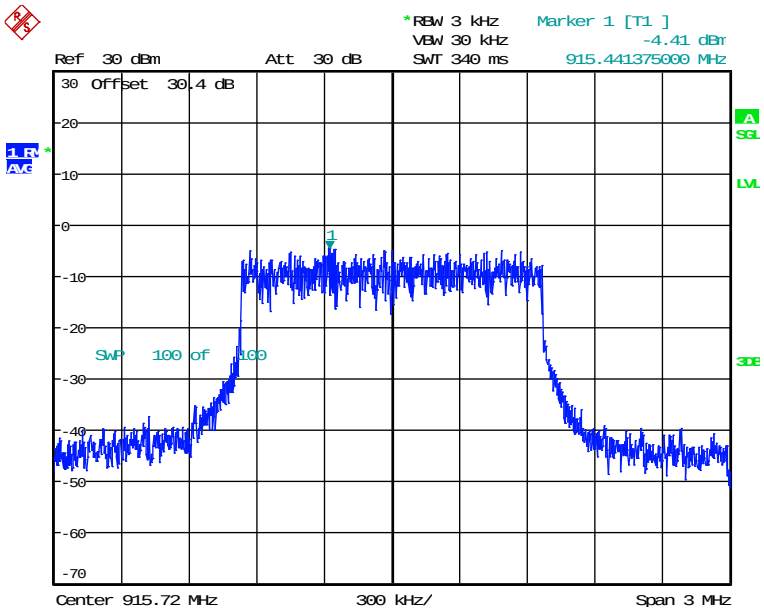

Figure 7.5.2-23: Power Spectral Density - Middle Channel (64-QAM, Antenna Path 2)

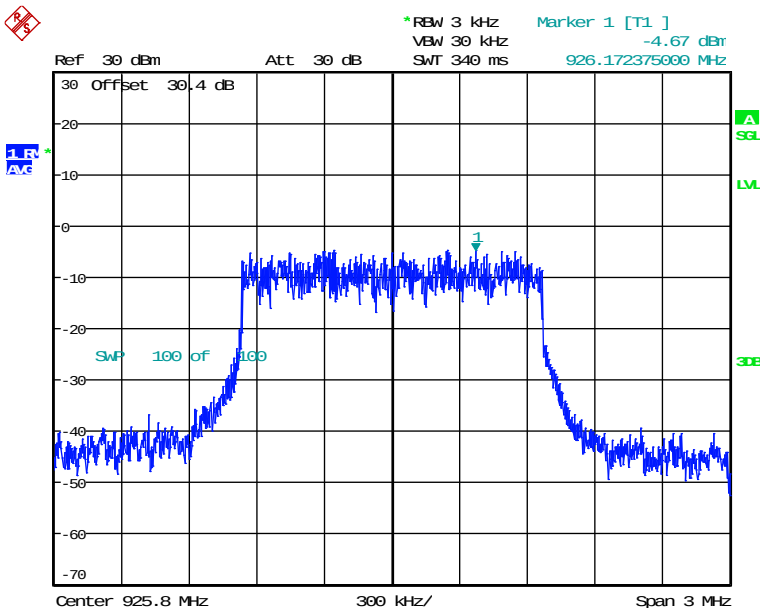

Figure 7.5.2-24: Power Spectral Density – High Channel (64-QAM, Antenna Path 2)

7.6 Duty Cycle

7.6.1 Measurement Procedure

The duty cycle was measured in accordance with the FCC KDB Publication No. 558074 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (47 CFR 15.247)” Section 6.0 b). The unit was connected directly to the input of the spectrum analyzer via suitable attenuation. The RBW and VBW were set to 3 MHz and 10 MHz, respectively, and the number of sweep points across the minimum transmission duration (T) exceeded 100.

7.6.2 Measurement Results

The results area provided below:

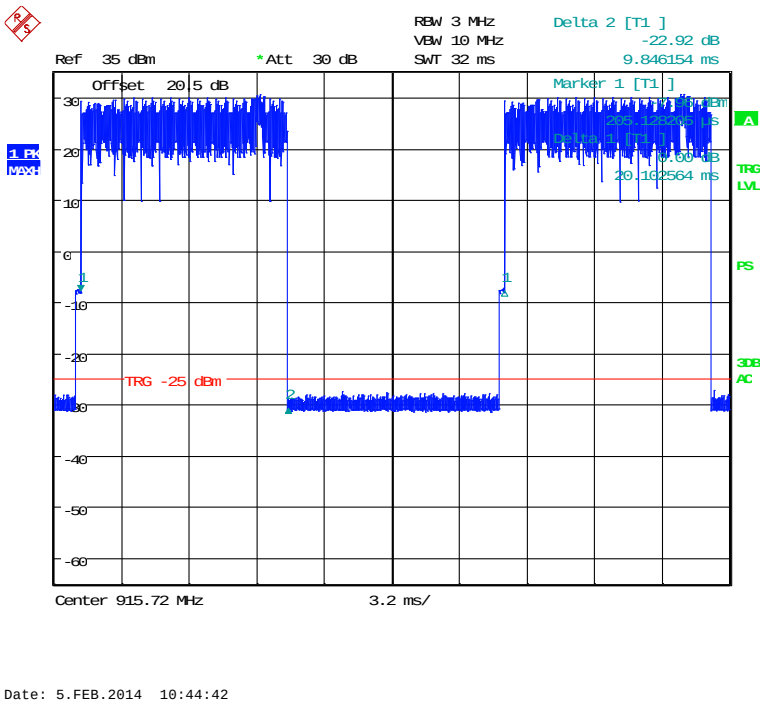

Figure 7.3.2-1: Duty Cycle

Note: The duty cycle is calculated to be (9.8462 / 20.1026) ≈ 0.49

7.7 Power Line Conducted Emissions – FCC: Section 15.207

7.7.1 Measurement Procedure

ANSI C63.4 sections 6 and 7 were the guiding documents for this evaluation. Conducted emissions were performed from 150 kHz to 30 MHz with the spectrum analyzer's resolution bandwidth set to 9 kHz and the video bandwidth set to 30 kHz. The calculation for the conducted emissions is as follows:

Corrected Reading = Analyzer Reading + LISN Loss + Cable Loss
Margin = Applicable Limit - Corrected Reading

7.7.2 Measurement Results

Results are shown below.

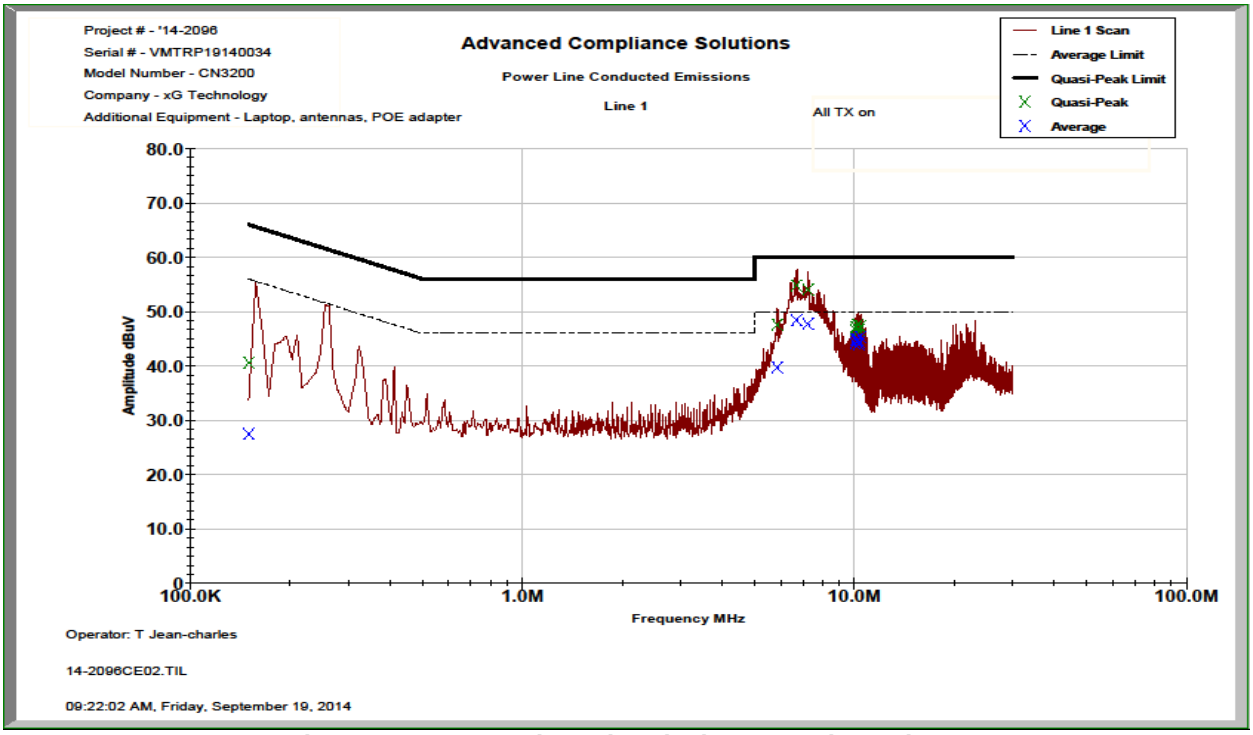

Figure 7.7.2-1: Conducted Emissions Results – Line 1

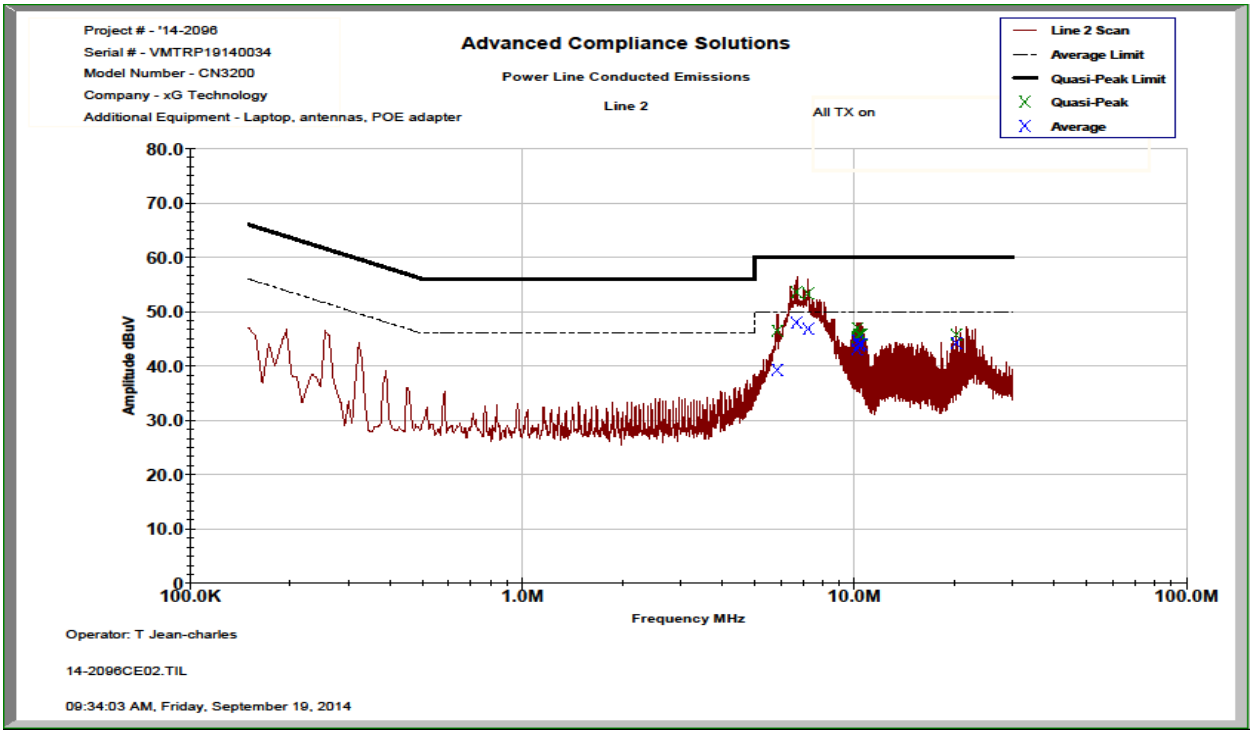

Figure 7.7.2-2: Conducted Emissions Results – Line 2

Table 7.7.2-1: Conducted EMI Results

☒ Line 1 ☒ Line 2 ☐ Line 3 ☐ Line 4
☒ To Ground ☐ Floating
☐ Telecom Port _____
☒ dBµV ☐ dBµA

Plot Number: 14-2096CE02
Power Supply Description: 48V POE

Frequency (MHz)	Uncorrected Reading		Total Correction Factor (dB)	Corrected Level		Limit		Margin (dB)	
	Quasi-Peak	Average		Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
Line 1									
0.150505	30.492	17.361	10.10	40.59	27.46	65.97	55.97	25.4	28.5
5.86476	37.188	29.341	10.37	47.56	39.71	60.00	50.00	12.4	10.3
6.70472	44.409	38.003	10.41	54.82	48.41	60.00	50.00	5.2	1.6
7.25125	43.53	37.226	10.41	53.94	47.63	60.00	50.00	6.1	2.4
10.0576	36.081	33.55	10.59	46.67	44.14	60.00	50.00	13.3	5.9
10.1198	36.606	34.282	10.59	47.20	44.87	60.00	50.00	12.8	5.1
10.2434	37.055	34.204	10.59	47.65	44.80	60.00	50.00	12.4	5.2
10.3148	36.086	33.44	10.60	46.68	44.04	60.00	50.00	13.3	6.0
10.3728	36.033	33.78	10.60	46.63	44.38	60.00	50.00	13.4	5.6
10.4404	36.653	34.724	10.60	47.25	45.33	60.00	50.00	12.7	4.7
Line 2									
5.86481	36.142	28.908	10.33	46.47	39.24	60.00	50.00	13.5	10.8
6.70147	43.22	37.56	10.37	53.59	47.93	60.00	50.00	6.4	2.1
7.26267	42.862	36.406	10.36	53.22	46.76	60.00	50.00	6.8	3.2
10.1838	34.799	32.536	10.55	45.35	43.08	60.00	50.00	14.7	6.9
10.2437	36.403	34.031	10.55	46.95	44.58	60.00	50.00	13.0	5.4
10.3114	35.215	33.344	10.55	45.77	43.90	60.00	50.00	14.2	6.1
10.3761	35.235	33.157	10.55	45.79	43.71	60.00	50.00	14.2	6.3
10.4404	35.322	33.507	10.56	45.88	44.06	60.00	50.00	14.1	5.9
10.504	35.214	33.483	10.56	45.77	44.04	60.00	50.00	14.2	6.0
20.2579	34.909	33.383	10.85	45.76	44.23	60.00	50.00	14.2	5.8

8 CONCLUSION

In the opinion of ACS, Inc. the CN3200, manufactured by xG Technology, Inc meets the requirements of FCC Part 15 subpart C for the tests reported in this document.

END REPORT