PCTEST
7185 Oakland Mills Road, Columbia, MD 21046 USA
Tel. 410.290.6652 / Fax 410.290.6654
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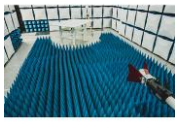

MEASUREMENT REPORT
FCC Part 30 5G mmWave

Applicant Name:
Wistron Neweb Corporation
20 Park Avenue II, Hsinchu Science Park,
Hsinchu 308,
Taiwan

Date of Testing:
7/12/2021-08/16/2021
Test Site/Location:
PCTEST Lab. Columbia, MD, USA
Test Report Serial No.:
1M2106230069-02-R3.NKR

FCC ID:	**NKR-TR2V1-IDU**
APPLICANT:	**Wistron Neweb Corporation**

Application Type:	Certification
Model:	TR2V1
EUT Type:	5G Extender Gen 2
FCC Classification:	Part 30 Transportable Transmitter (5GT)
FCC Rule Part(s):	2, 30
Test Procedure(s):	ANSI C63.26-2015, KDB 842590 D01 v01r02

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in §2.947. Test results reported herein relate only to the item(s) tested.

This revised Test Report (S/N: 1M2106230069-02-R3.NKR) supersedes and replaces the previously issued test report (S/N: 1M2106230069-02-R2.NKR) on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Randy Ortanez
President

ACCREDITED
CERT #2041.01

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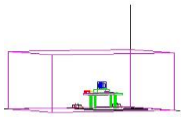
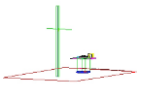


MEASUREMENT REPORT
FCC Part 30



Band	Antenna	Bandwidth [MHz]	Tx Frequency [MHz]	CCs Active	Modulation	EIRP		Emission Designator
						Max Power [W]	Max Power [dBm]	
n261	Donor-H Beam	50	27525 - 28325	1	π/2 BPSK	12.417	40.94	45M9G7D
					QPSK	12.359	40.92	46M0G7D
					16QAM	11.995	40.79	45M9W7D
					64QAM	11.830	40.73	45M8W7D
		100	27550 - 28300	4	π/2 BPSK	12.162	40.85	400MG7D
					QPSK	12.106	40.83	397MG7D
					16QAM	11.995	40.79	395MW7D
					64QAM	11.858	40.74	395MW7D
n261	Donor-V Beam	50	27525 - 28325	1	π/2 BPSK	12.474	40.96	46M0G7D
					QPSK	12.134	40.84	46M0G7D
					16QAM	12.303	40.90	46M0W7D
					64QAM	11.912	40.76	46M0W7D
		100	27550 - 28300	4	π/2 BPSK	11.668	40.67	400MG7D
					QPSK	11.535	40.62	402MG7D
					16QAM	11.350	40.55	397MW7D
					64QAM	11.376	40.56	397MW7D
n261	Relay-H Beam	50	27525 - 28325	1	π/2 BPSK	0.249	23.97	46M2G7D
					QPSK	0.250	23.98	46M3G7D
					16QAM	0.244	23.87	46M5W7D
					64QAM	0.245	23.89	46M4W7D
		100	27550 - 28300	4	π/2 BPSK	0.232	23.66	399MG7D
					QPSK	0.229	23.60	396MG7D
					16QAM	0.228	23.58	395MW7D
					64QAM	0.222	23.47	395MW7D
n261	Relay-V Beam	50	27525 - 28325	1	π/2 BPSK	0.247	23.93	45M9G7D
					QPSK	0.246	23.91	46M0G7D
					16QAM	0.240	23.80	45M9W7D
					64QAM	0.239	23.79	45M8W7D
		100	27550 - 28300	4	π/2 BPSK	0.244	23.87	399MG7D
					QPSK	0.248	23.95	397MG7D
					16QAM	0.245	23.89	397MW7D
					64QAM	0.244	23.88	398MW7D

EUT Overview (n261)

Band	Antenna	Bandwidth [MHz]	Tx Frequency [MHz]	CCs Active	Modulation	EIRP		Emission Designator
						Max Power [W]	Max Power [dBm]	
n260	Donor-H Beam	50	37025 - 39975	1	π/2 BPSK	12.388	40.93	46M1G7D
					QPSK	12.274	40.89	46M3G7D
					16QAM	12.134	40.84	46M3W7D
					64QAM	11.940	40.77	46M4W7D
		100	37050 - 39950	4	π/2 BPSK	11.776	40.71	400MG7D
					QPSK	11.614	40.65	398MG7D
					16QAM	11.220	40.50	396MW7D
					64QAM	11.169	40.48	396MW7D
n260	Donor-V Beam	50	37025 - 39975	1	π/2 BPSK	10.351	40.15	46M4G7D
					QPSK	10.399	40.17	46M2G7D
					16QAM	10.209	40.09	46M5W7D
					64QAM	10.162	40.07	46M4W7D
		100	37050 - 39950	4	π/2 BPSK	12.190	40.86	402MG7D
					QPSK	12.246	40.88	399MG7D
					16QAM	12.050	40.81	399MW7D
					64QAM	12.162	40.85	400MW7D
n260	Relay-H Beam	50	37025 - 39975	1	π/2 BPSK	0.247	23.93	45M9G7D
					QPSK	0.248	23.94	46M0G7D
					16QAM	0.245	23.89	46M0W7D
					64QAM	0.240	23.81	46M0W7D
		100	37050 - 39950	4	π/2 BPSK	0.216	23.35	397MG7D
					QPSK	0.219	23.40	395MG7D
					16QAM	0.217	23.37	395MW7D
					64QAM	0.215	23.32	394MW7D
n260	Realy-V Beam	50	37025 - 39975	1	π/2 BPSK	0.249	23.96	45M8G7D
					QPSK	0.248	23.95	45M9G7D
					16QAM	0.240	23.80	45M8W7D
					64QAM	0.247	23.92	46M0W7D
		100	37050 - 39950	4	π/2 BPSK	0.248	23.94	397MG7D
					QPSK	0.247	23.93	395MG7D
					16QAM	0.243	23.85	395MW7D
					64QAM	0.240	23.80	394MW7D

EUT Overview (n260)

1.0 INTRODUCTION

1.1 Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Innovation, Science and Economic Development Canada.

1.2 PCTEST Test Location

These measurement tests were conducted at the PCTEST facility located at 7185 Oakland Mills Road, Columbia, MD 21046. The measurement facility is compliant with the test site requirements specified in ANSI C63.4-2014.

1.3 Test Facility / Accreditations

Measurements were performed at PCTEST located in Columbia, MD 21046, U.S.A.

- PCTEST is an ISO/IEC 17025:2017 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.01 for Specific Absorption Rate (SAR), Hearing Aid Compatibility (HAC) testing, where applicable, and Electromagnetic Compatibility (EMC) testing for FCC and Innovation, Science, and Economic Development Canada rules.

- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC 17065-2012 by A2LA (Certificate number 2041.03) in all scopes of FCC Rules and ISED Standards (RSS).

- PCTEST facility is a registered (2451B) test laboratory with the site description on file with ISED.

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **5G Extender Gen 2 FCC ID: NKR-TR2V1-IDU**. The test data contained in this report pertains only to the emissions due to the EUT's 5G mmWave function.

The EUT contains two modules for mmWave: Donor and Relay modules. The EUT supports any combination of bandwidths, number of carriers, and modulations as input signals in the n261 (28GHz) band and n260 (39GHz) band. It will transmit all signals within the 5G n261 band and n260 band that are received.

Test Device Serial No.: 4711-2075, 4011-2078

2.2 Software and Firmware

The test was conducted with firmware version 1.0 installed on the EUT.

2.3 Test Configuration

The EUT was tested per the guidance of ANSI C63.26-2015. See Section 7.0 of this test report for a description of the radiated tests.

All testing was performed using a signal generator connected to a horn antenna, the input signal sends to EUT via horn antenna. The signal generator was set to transmit a representative 5G mmWave NR signal in various sized bandwidths and modulations. All testing was performed on both the relay and the donor sides, and the worst case was included in this report.

2.4 EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and no modifications were made during testing.

3.0 DESCRIPTION OF TESTS

3.1 Measurement Procedure

The measurement procedures described in the document titled "American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services" (ANSI C63.26-2015) was used in the measurement of the EUT. KDB 842590 D01 v01r02 was referenced for testing the EUT as well.

3.2 Radiated Power and Radiated Spurious Emissions

The radiated test facilities consisted of an indoor 3 meter anechoic chamber used for final measurements and exploratory measurements, when necessary for radiated emissions measurements in the spurious domain. The test site conforms to the site validation requirements of CISPR 16-1-4. The measurement area is contained within the anechoic chamber which is shielded from any ambient interference. Absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections for measurements above 1GHz. For measurements below 1GHz, the absorbers are removed. A raised turntable is used for radiated measurement. The turn table is a continuously rotatable, remote-controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane.

A positioner was used to manipulate the EUT through several positions in space by rotating about the roll axis as shown in the figure below. The positioner was mounted on top of a turntable bringing the total EUT height to 1.5m.

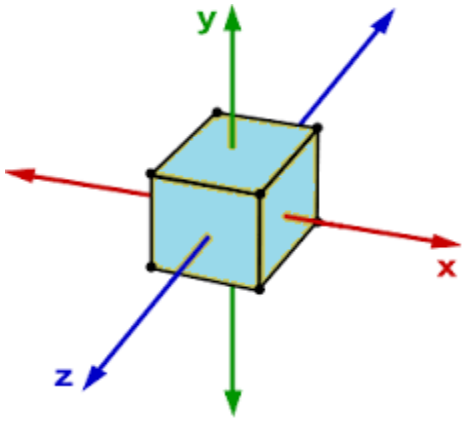


Figure 3-1. Rotation of the EUT Through Three Orthogonal Planes

The equipment under test was transmitting while connected to its patch or HBF antenna and is placed on a positioner. The measurement antenna is in the far field of the EUT per formula $2D^2/\lambda$ where D is the larger between the dimension of the measurement antenna and the transmitting antenna of the EUT. For radiated power and radiated spurious emission measurements, "D" is the largest dimension of the measurement antenna per KDB 842590 D01. The EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer.

Radiated power levels are investigated while the receive antenna was rotated through all angles to determine the worst case polarization/positioning. It was determined that H=0 degree and V=90 degree are the worst case positions when the EUT was transmitting horizontally and vertically polarized beams, respectively.

The maximized power level is recorded using the spectrum analyzer's "Channel Power" function with the integration bandwidth set to the emissions' occupied bandwidth. The EIRP is calculated from the raw power level measured with the spectrum analyzer using the formulas shown below.

Effective Isotropic Radiated Power Sample Calculation

The measured e.i.r.p is converted to E-field in V/m. Then, the distance correction is applied before converting back to calculated e.i.r.p, as explained in KDB 971168 D01.

Field Strength [dBμV/m] = Measured Value [dBm] + AFCL [dB/m] + 107

= - 34.06 dBm + (40.6dB/m + 8.49dB) + 107 = 122.03dBuV/m

= 10^(122.03/20)/1000000 = 1.26 V/m

e.i.r.p. [dBm] = 10 * log((E-Field*D_m)^2/30) + 30dB

= 10*log((1.26V/m * 1.00m)^2/30) + 30dB

= **17.24 dBm e.i.r.p.**

4.0 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4-2014. All measurement uncertainty values are shown with a coverage factor of k = 2 to indicate a 95% level of confidence. The measurement uncertainty shown below meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Contribution	Expanded Uncertainty (±dB)
Conducted Bench Top Measurements	1.13
Radiated Disturbance (<1GHz)	4.98
Radiated Disturbance (>1GHz)	5.07
Radiated Disturbance (>18GHz)	5.09

5.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to an accredited ISO/IEC 17025 calibration facility. Measurements antennas used during testing were calibrated in accordance to the requirements of ANSI C63.5-2017.

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	4/20/2021	Biennial	4/20/2023	125518
Megaphase	FAC mmWave	AP FAC mmWave 10ft 40GHz	3/3/2021	Annual	3/3/2022	20033008-002
Megaphase	FAC mmWave	AP FAC mmWave 18ft 40GHz	3/3/2021	Annual	3/3/2022	20033003
Narda	180-442-KF	Wide Band Horn Antenna 18.0 - 40.0 GHz	9/14/2020	Annual	9/14/2021	2172481
Narda	180-442-KF	Wide Band Horn Antenna 18.0 - 40.0 GHz	11/5/2020	Biennial	11/5/2022	U157403-01
OML Inc.	M05RH	WR-05 Horn Antenna, 24dBi, 140 to 220 GHz	10/31/2019	Biennial	10/31/2021	18073001
OML Inc.	M08RH	WR-08 Horn Antenna, 24dBi, 90 to 140 GHz	10/31/2019	Biennial	10/31/2021	18073001
OML Inc.	M12RH	WR-12 Horn Antenna, 24dBi, 60 to 90 GHz	10/31/2019	Biennial	10/31/2021	18073001
OML Inc.	M19RH	WR-19 Horn Antenna, 24dBi, 40 to 60 GHz	10/31/2019	Biennial	10/31/2021	18073001
Rohde & Schwarz	FSW67	Signal / Spectrum Analyzer	8/10/2020	Annual	9/10/2021	103200
Rohde & Schwarz	SMW200A	Signal Generator	N/A			190456
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	5/25/2021	Annual	5/25/2022	100348
Sunol Science	JB5	Bi-Log Antenna (30M - 5GHz)	7/27/2020	Biennial	7/27/2022	A051107
Virginia Diodes Inc	SAX679	SAX Module (40 - 60GHz)	8/28/2020	Biennial	8/28/2022	SAX679
Virginia Diodes Inc	SAX680	SAX Module (60 - 90GHz)	8/14/2020	Biennial	8/14/2022	SAX680
Virginia Diodes Inc	SAX681	SAX Module (90 - 140GHz)	10/22/2020	Biennial	10/22/2022	SAX681
Virginia Diodes Inc	SAX682	SAX Module (140 - 220GHz)	9/24/2020	Biennial	9/24/2022	SAX682

Table 5-1. Test Equipment

Notes:

1. For equipment listed above that has a calibration date or calibration due date that falls within the test date range, care was taken to ensure that this equipment was used after the calibration date and before the calibration due date.

2. The calibration due date for the FSW67 was extended by one month to accommodate the required testing. The equipment has since returned from calibration within specification.

6.0 SAMPLE CALCULATIONS

Emission Designator

QPSK Modulation

Emission Designator = 800MG7D

BW = 800 MHz
G = Phase Modulation
7 = Quantized/Digital Info
D = Data transmission, telemetry, telecommand

QAM Modulation

Emission Designator = 802MW7D

BW = 802 MHz
W = Amplitude/Angle Modulated
7 = Quantized/Digital Info
D = Data transmission, telemetry, telecommand

7.0 TEST RESULTS

7.1 Summary

Company Name: Wistron Neweb Corporation

FCC ID: NKR-TR2V1-IDU

FCC Classification: Part 30 Transportable Transmitter (5GT)

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
2.1049	Occupied Bandwidth	N/A	RADIATED	PASS	Section 7.2
2.1051, 30.203	Out-of-Band Emissions at the Band Edge	-13dBm/MHz for all out-of-band emissions, -5dBm/MHz from the band edge up to 10% of the channel BW		PASS	Section 7.5
30.202(c)	Equivalent Isotropic Radiated Power	55dBm	RADIATED	PASS	Section 7.3
2.1051, 30.203	Spurious Emissions	-13dBm/MHz for all out-of-band emissions		PASS	Section 7.4
2.1055	Frequency Stability	Fundamental emissions stay within authorized frequency block		PASS	Section 7.6

Table 7-1. Summary of Radiated Test Results

Notes:

1) Per 2.1057(a)(2), spurious emissions were investigated up to 100GHz for n261 band and 200GHz for n260 band.
2) Testing was completed with a signal generator creating a representative mmWave 5G NR signal, using DFT-s-OFDM scheme, various modulations including π/2 BPSK, QPSK, and QAM, 120kHz subcarrier spacing, with one and four carrier configurations using 50MHz and 100MHz bandwidths, full and single resource block allocations.
3) The input signal to the EUT was set in order to produce the max power of the AGC range.
4) Based upon investigations of all possible modulations, testing was mainly performed with QPSK modulation.
5) Triggering from the signal generator was used in order to more accurately gate on the TDD signal with the analyzer.

7.2 Occupied Bandwidth

§2.1049

Test Overview

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured. All modes of operation were investigated and the worst case configuration results are reported in this section.

Test Procedure Used

ANSI C63.26-2015 Section 5.4.3

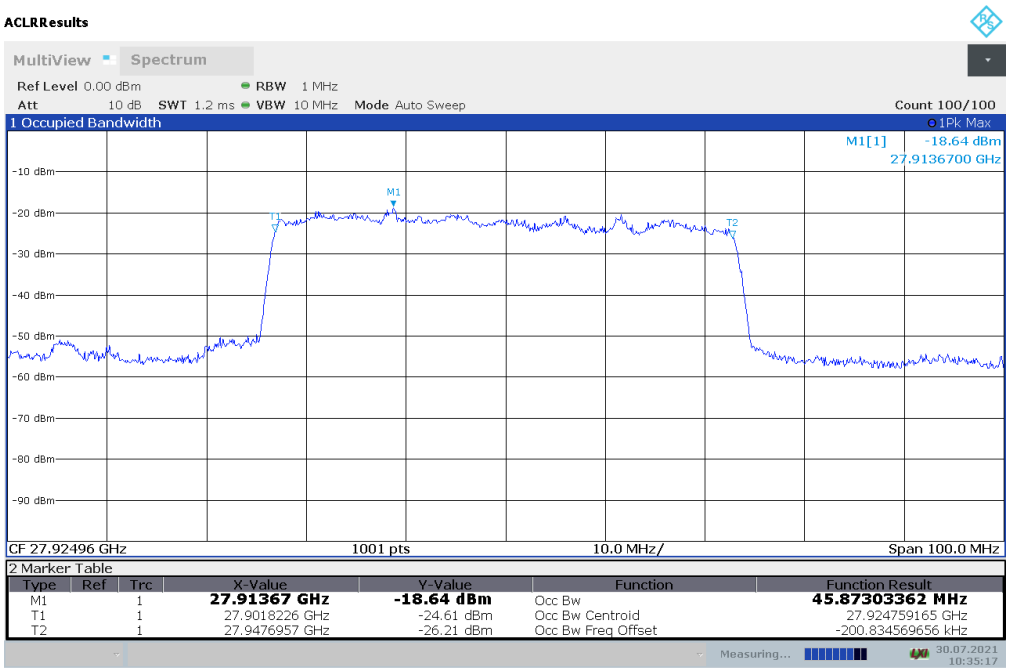
Test Settings

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 – 5% of the expected OBW
3. VBW ≥ 3 x RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5% of the 99% occupied bandwidth observed in Step 7

n261 Donor Side and Relay Side

Band	Antenna	Channel	Bandwidth	CCs Active	Modulation	OBW [MHz]
n261	Donor-H Beam	Mid	50	1	π/2 BPSK	45.87
					QPSK	45.95
					16QAM	45.94
					64QAM	45.84
			100	4	π/2 BPSK	400.32
					QPSK	396.62
					16QAM	395.07
					64QAM	395.00
n261	Donor-V Beam	Mid	50	1	π/2 BPSK	45.95
					QPSK	45.97
					16QAM	45.96
					64QAM	45.97
			100	4	π/2 BPSK	399.57
					QPSK	401.75
					16QAM	396.75
					64QAM	397.08
n261	Relay-H Beam	Mid	50	1	π/2 BPSK	46.24
					QPSK	46.30
					16QAM	46.47
					64QAM	46.38
			100	4	pi/2-BPSK	398.72
					QPSK	396.16
					16QAM	395.27
					64QAM	395.16
n261	Relay-V Beam	Mid	50	1	π/2 BPSK	45.87
					QPSK	45.95
					16QAM	45.86
					64QAM	45.78
			100	4	π/2 BPSK	399.34
					QPSK	397.44
					16QAM	397.23
					64QAM	397.73

Table 7-2. Summary of Occupied Bandwidths – n261



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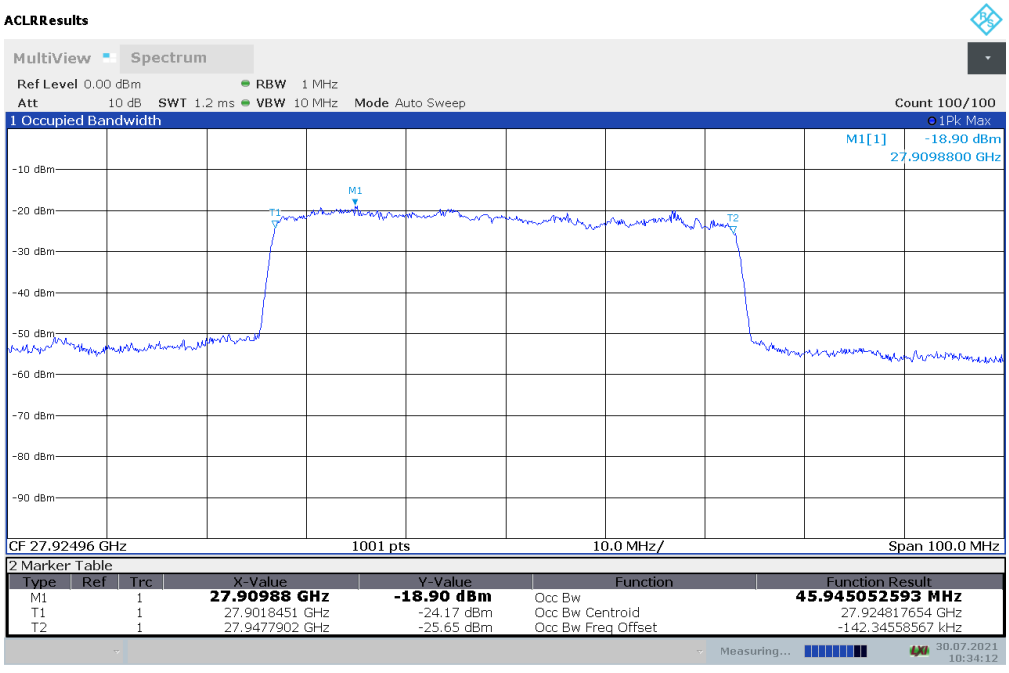
Plot 7-1. Occupied Bandwidth Plot - (n261 50MHz - π/2 BPSK - Mid Channel) – Donor Side – H Beam



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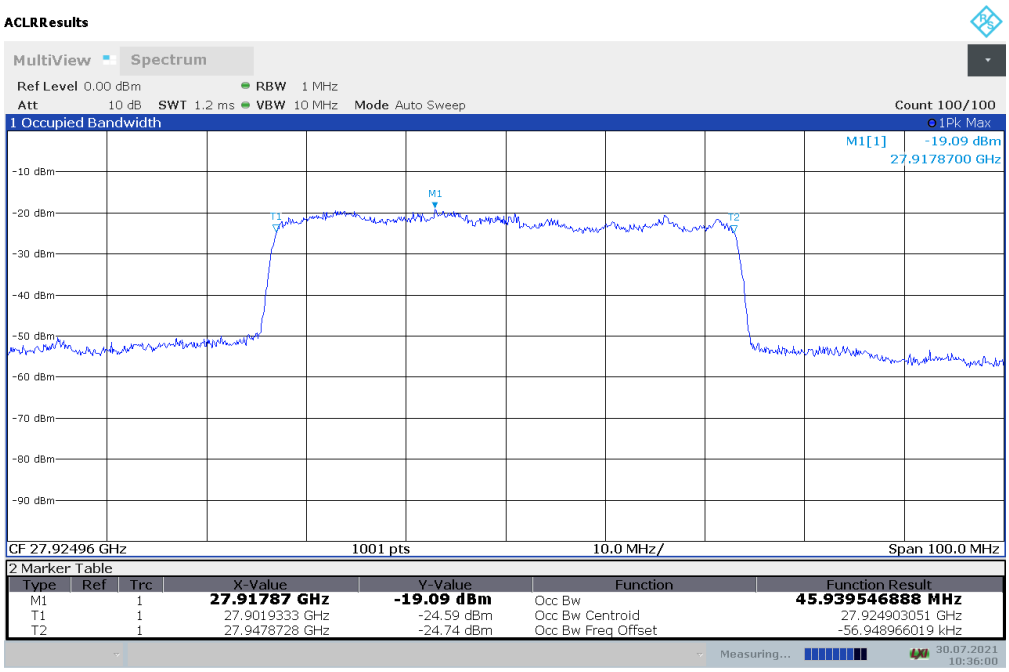
Plot 7-2. Occupied Bandwidth Plot - (n261 50MHz - QPSK - Mid Channel) – Donor Side – H Beam



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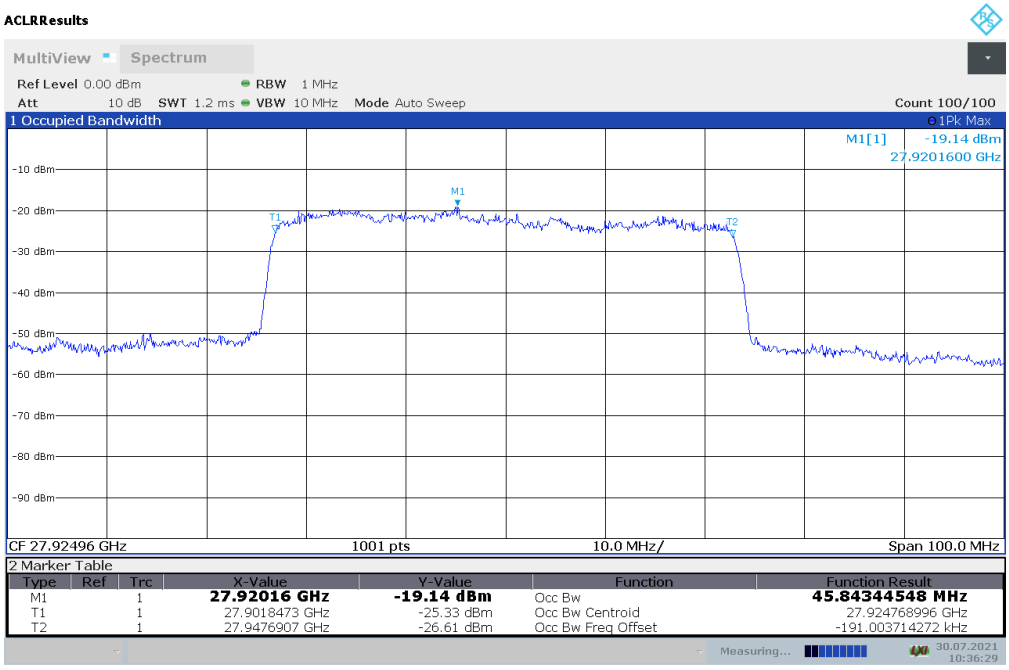
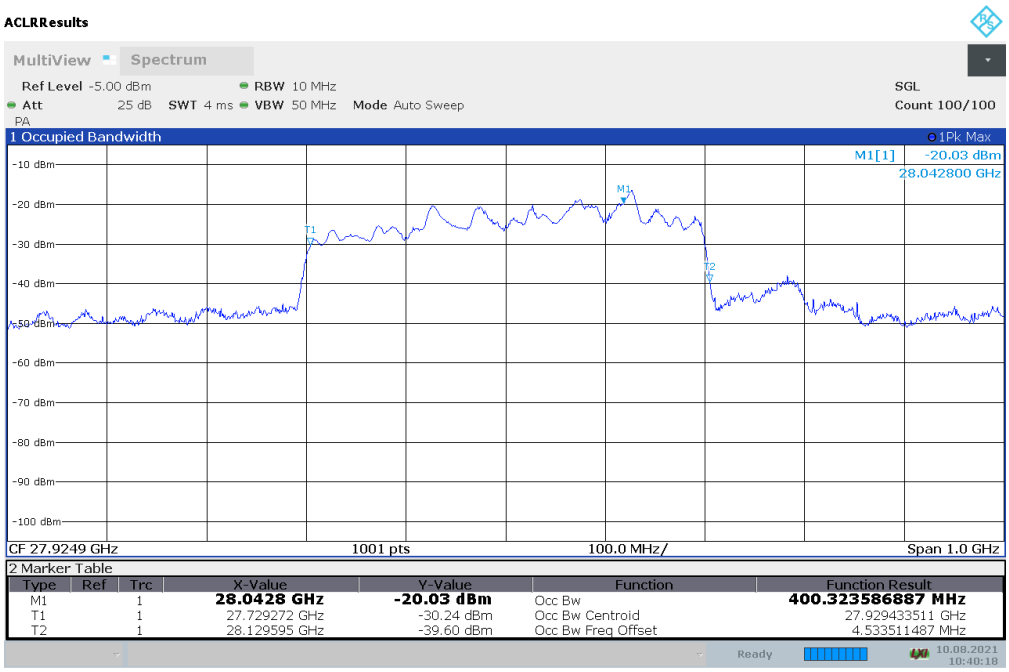
Plot 7-3. Occupied Bandwidth Plot - (n261 50MHz - 16QAM - Mid Channel) – Donor Side – H Beam



10:36:30 30.07.2021

Plot 7-4. Occupied Bandwidth Plot - (n261 50MHz - 64QAM - Mid Channel) – Donor Side – H Beam



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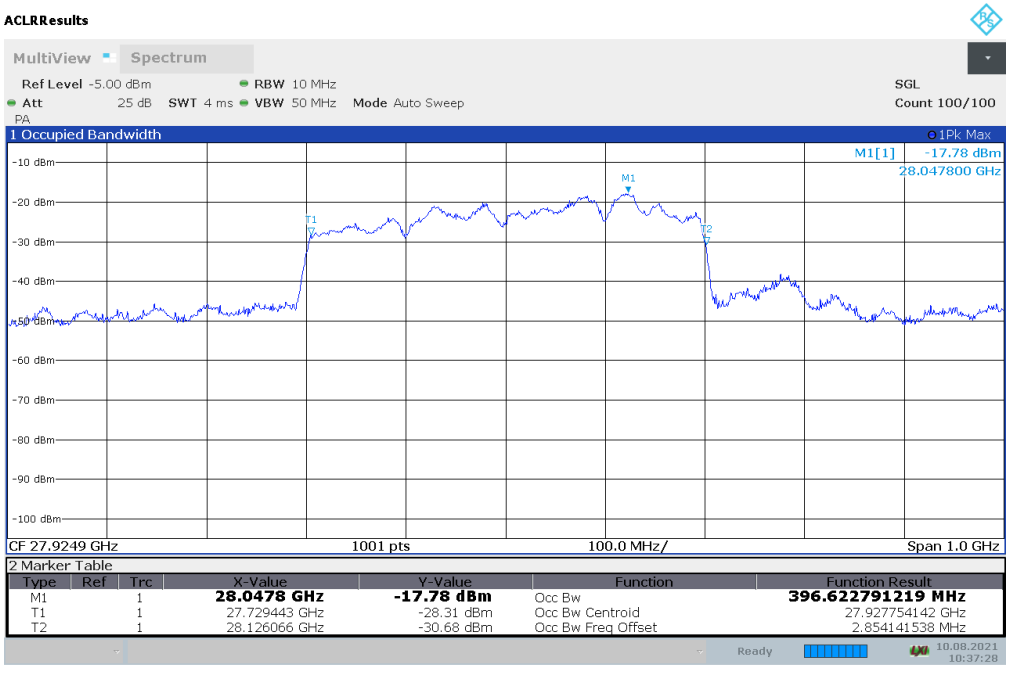
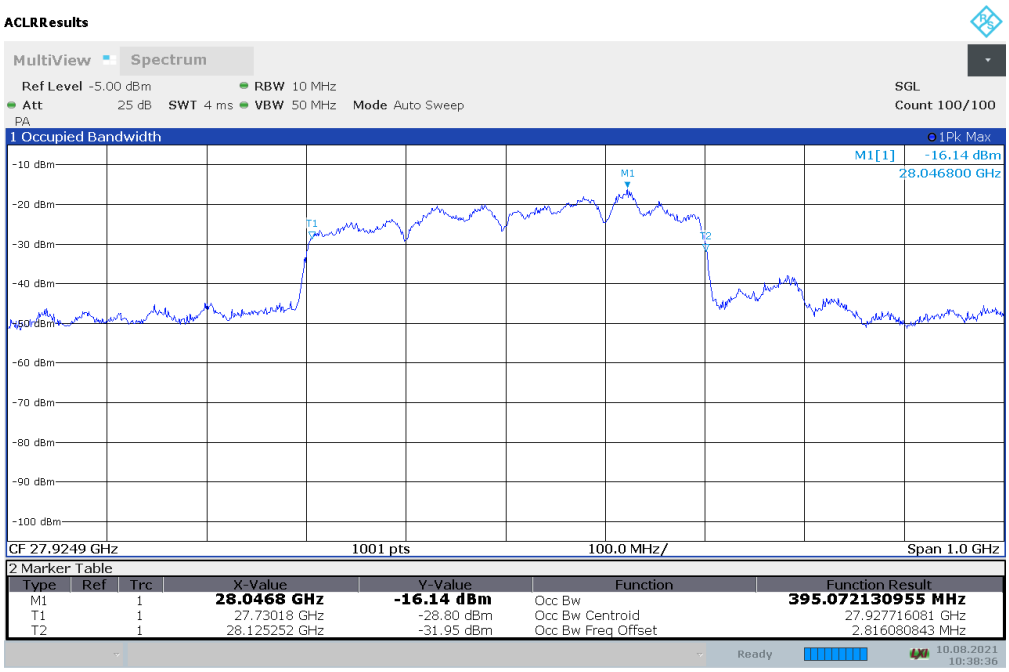
Plot 7-5. Occupied Bandwidth Plot - (n261 100MHz - π/2 BPSK - Mid Channel) – Donor Side – H Beam



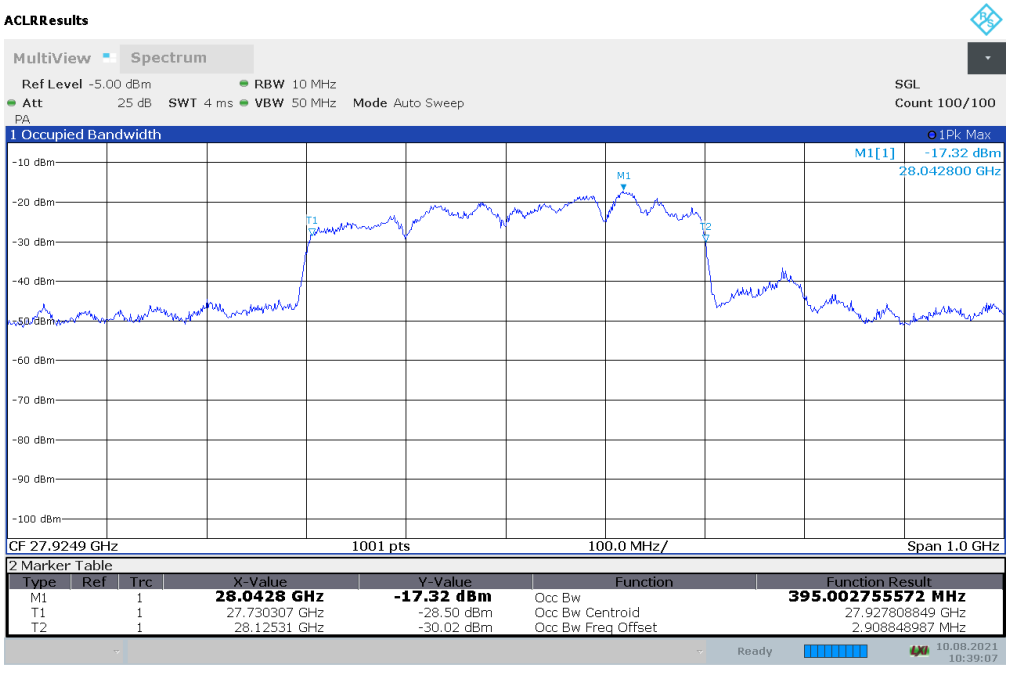
10:37:28 10.08.2021

Plot 7-6. Occupied Bandwidth Plot - (n261 100MHz - QPSK - Mid Channel) – Donor Side – H Beam



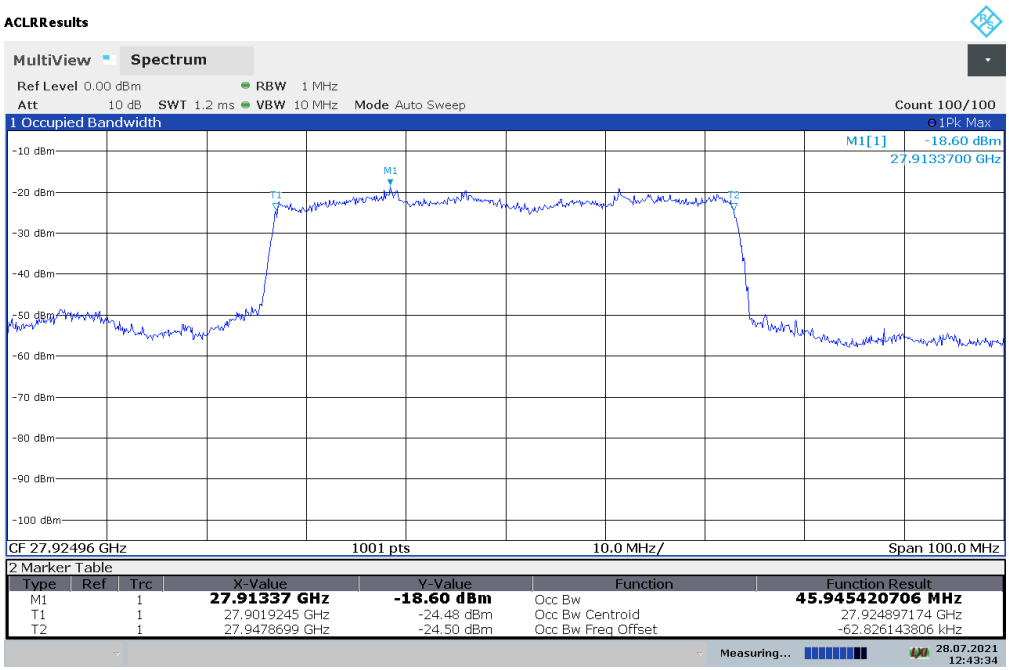
10:38:36 10.08.2021

Plot 7-7. Occupied Bandwidth Plot - (n261 100MHz - 16QAM - Mid Channel) – Donor Side – H Beam



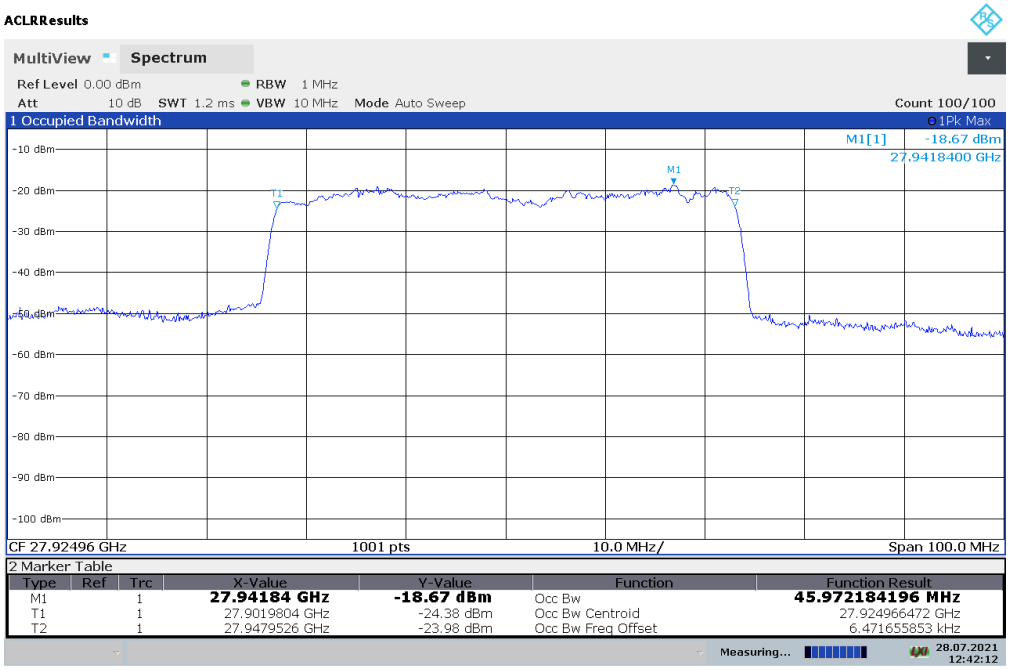
10:39:08 10.08.2021

Plot 7-8. Occupied Bandwidth Plot - (n261 100MHz - 64QAM - Mid Channel) – Donor Side – H Beam



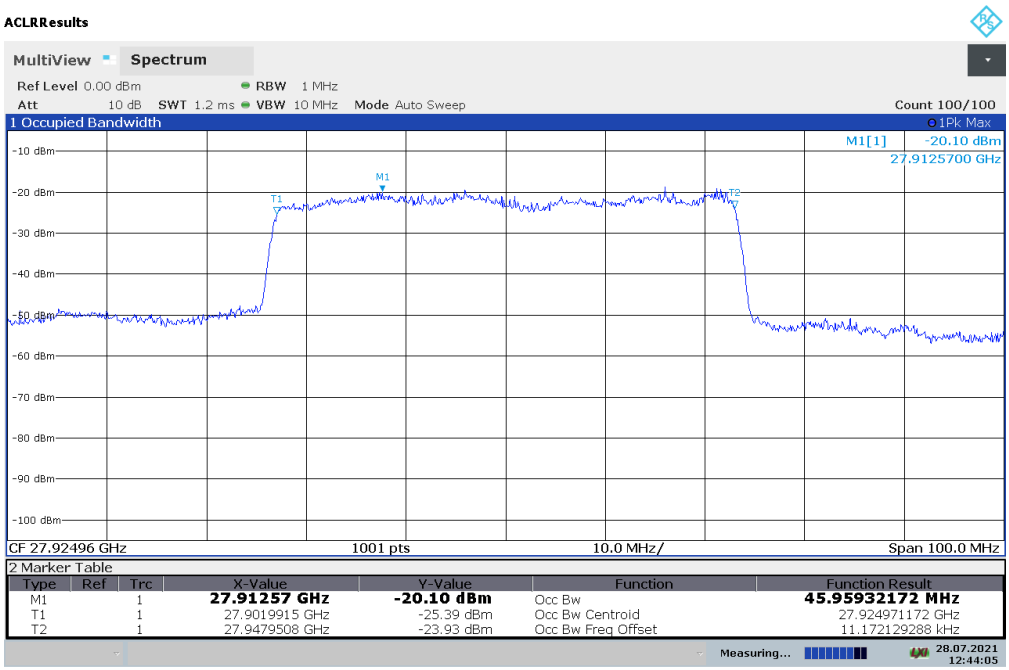
12:43:35 28.07.2021

Plot 7-9. Occupied Bandwidth Plot - (n261 50MHz - π/2 BPSK - Mid Channel) – Donor Side – V Beam

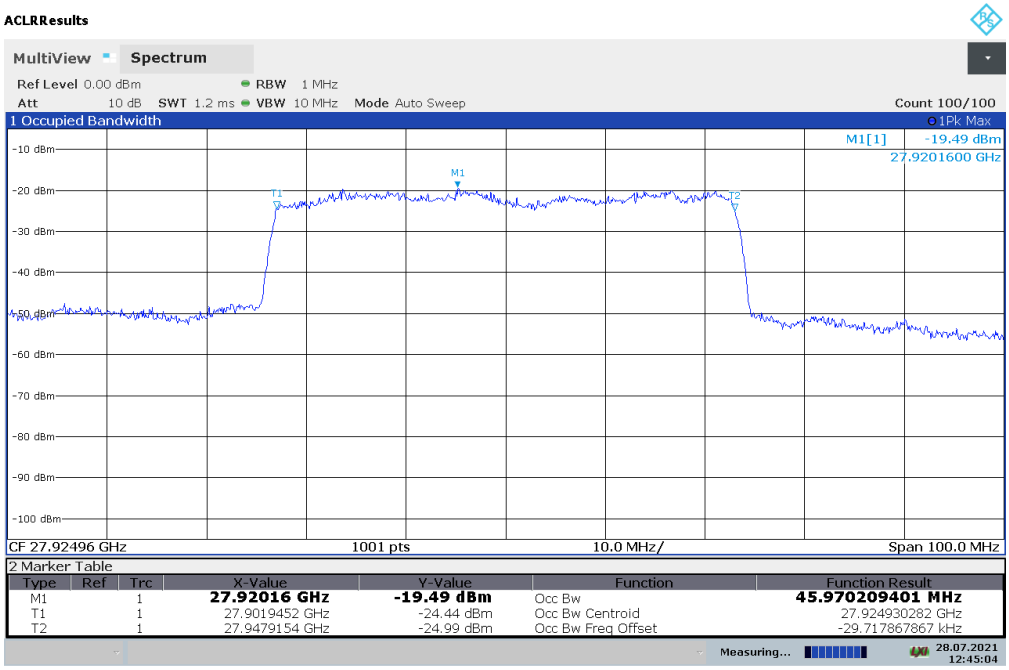


12:42:12 28.07.2021

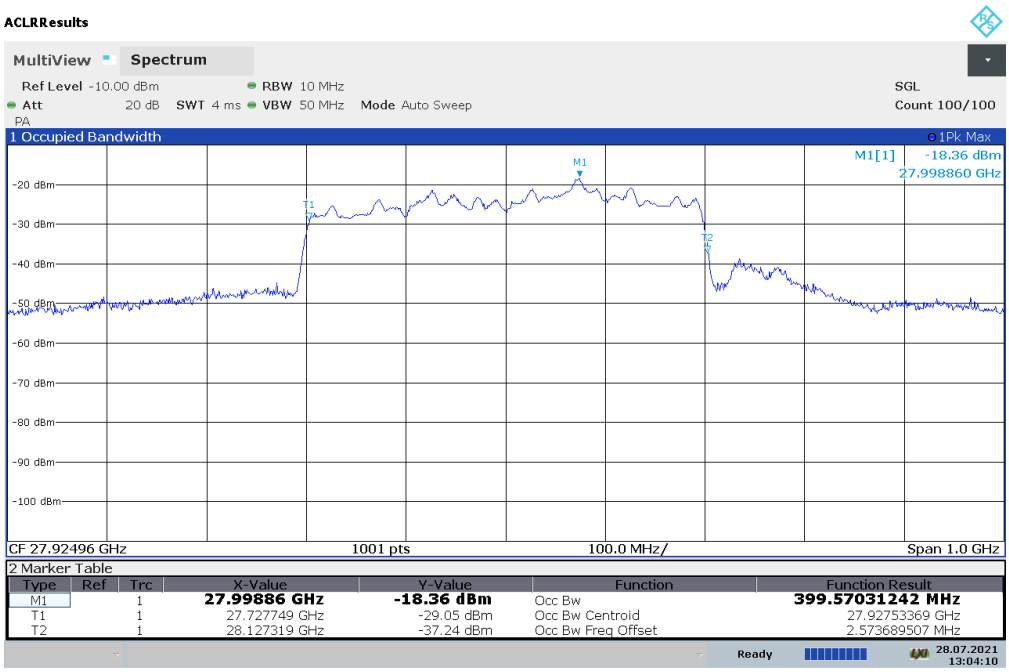
Plot 7-10. Occupied Bandwidth Plot - (n261 50MHz - QPSK - Mid Channel) – Donor Side – V Beam



Plot 7-11. Occupied Bandwidth Plot - (n261 50MHz - 16QAM - Mid Channel) – Donor Side – V Beam

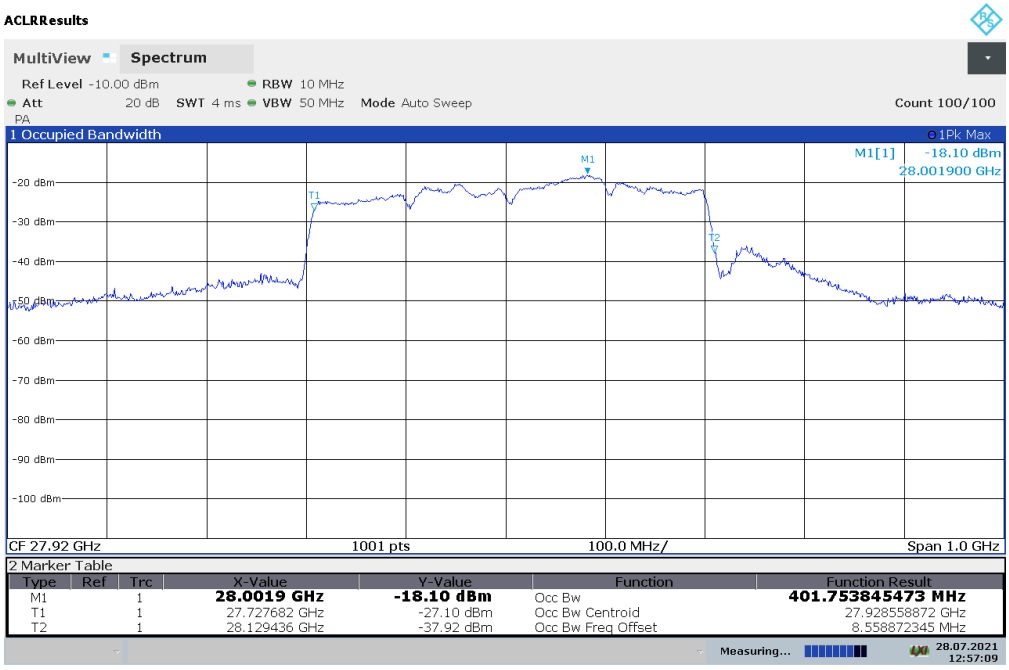


Plot 7-12. Occupied Bandwidth Plot - (n261 50MHz - 64QAM - Mid Channel) – Donor Side – V Beam



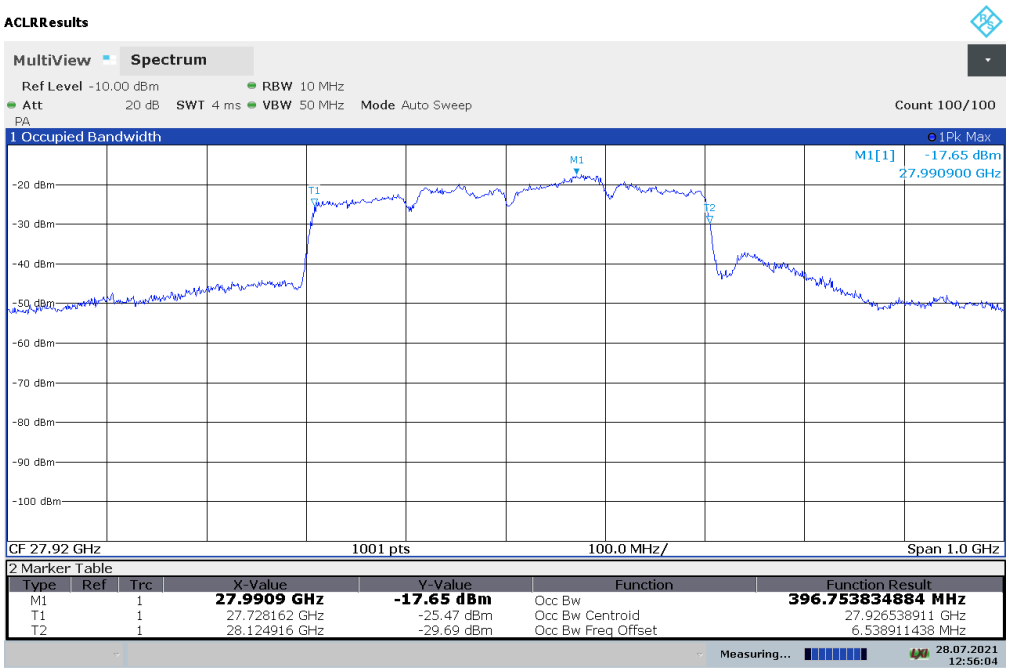
13:04:11 28.07.2021

Plot 7-13. Occupied Bandwidth Plot - (n261 100MHz - π/2 BPSK - Mid Channel) – Donor Side – V Beam



12:57:10 28.07.2021

Plot 7-14. Occupied Bandwidth Plot - (n261 100MHz - QPSK - Mid Channel) – Donor Side – V Beam

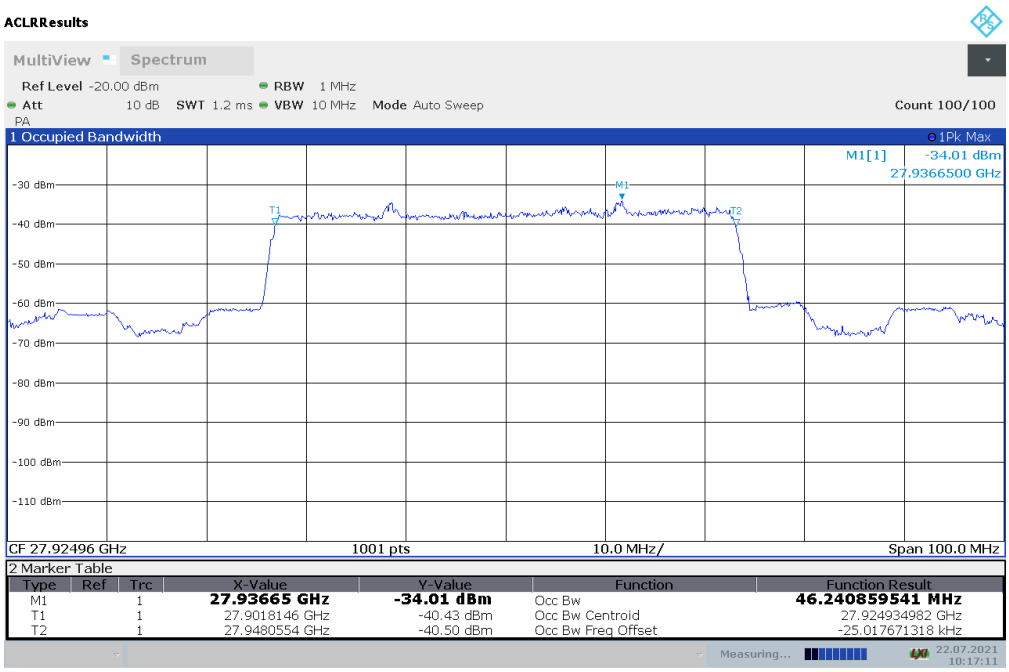


12:56:05 28.07.2021

Plot 7-15. Occupied Bandwidth Plot - (n261 100MHz - 16QAM - Mid Channel) – Donor Side – V Beam

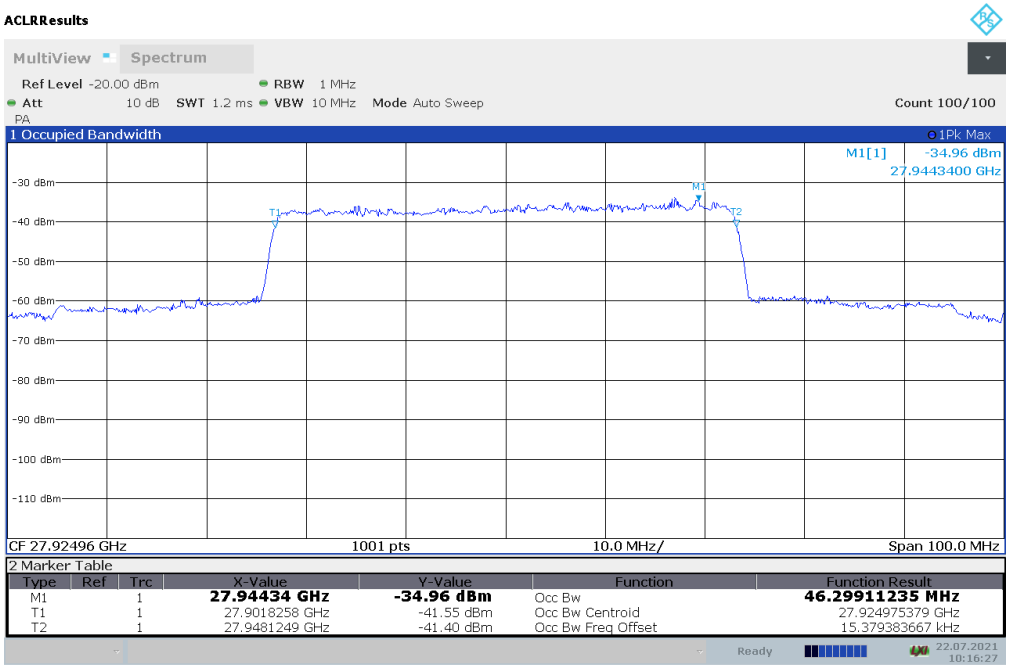
12:54:56 28.07.2021

Plot 7-16. Occupied Bandwidth Plot - (n261 100MHz - 64QAM - Mid Channel) – Donor Side – V Beam



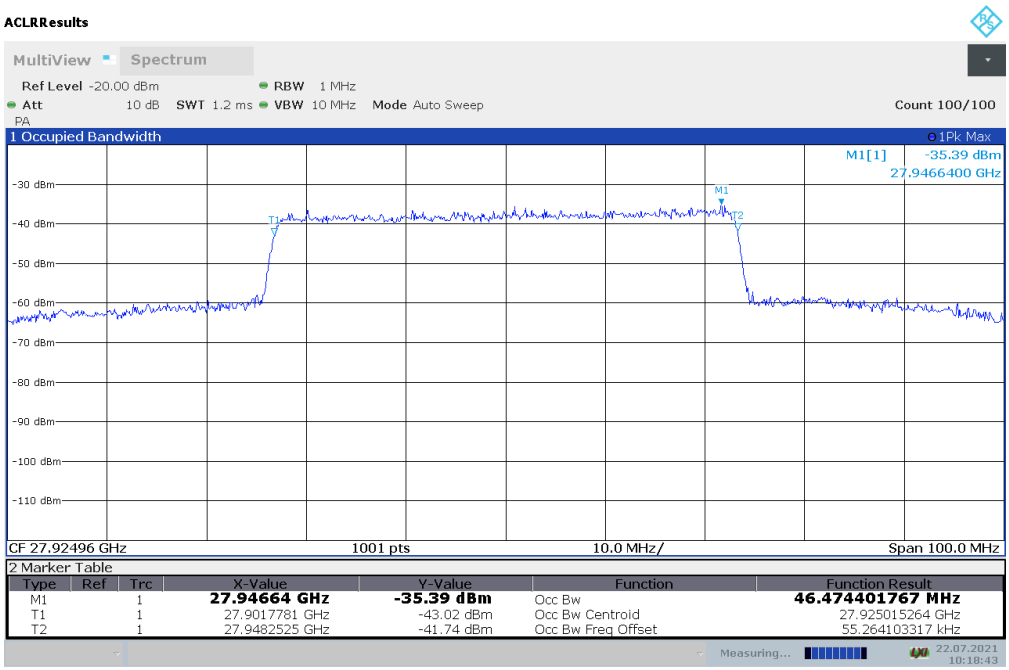
10:17:12 22.07.2021

Plot 7-17. Occupied Bandwidth Plot - (n261 50MHz - π/2 BPSK - Mid Channel) – Relay Side – H Beam



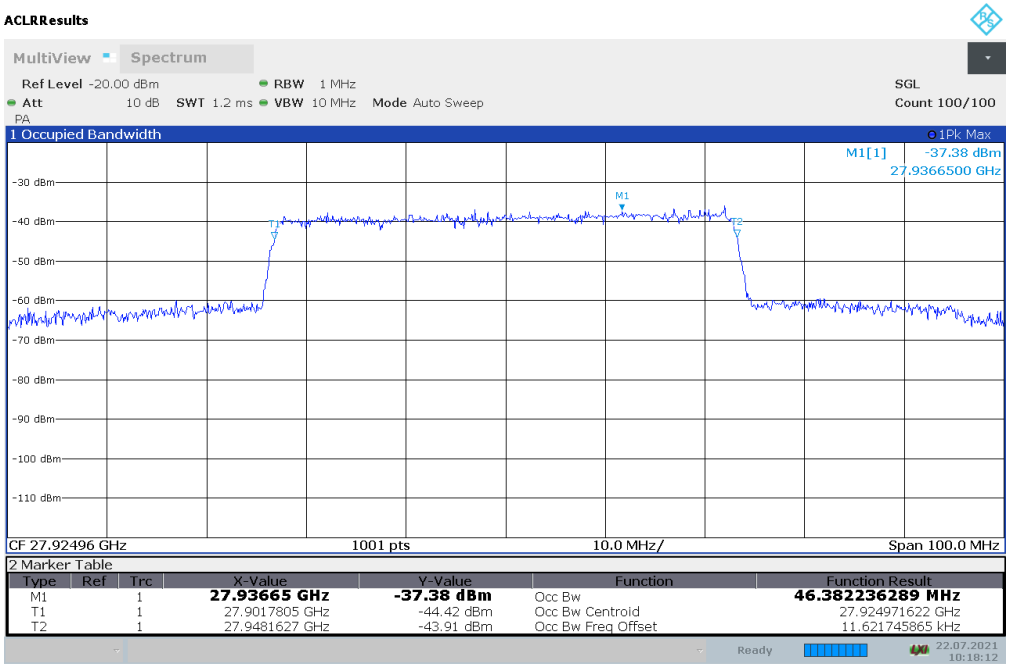
10:16:28 22.07.2021

Plot 7-18. Occupied Bandwidth Plot - (n261 50MHz - QPSK - Mid Channel) – Relay Side – H Beam



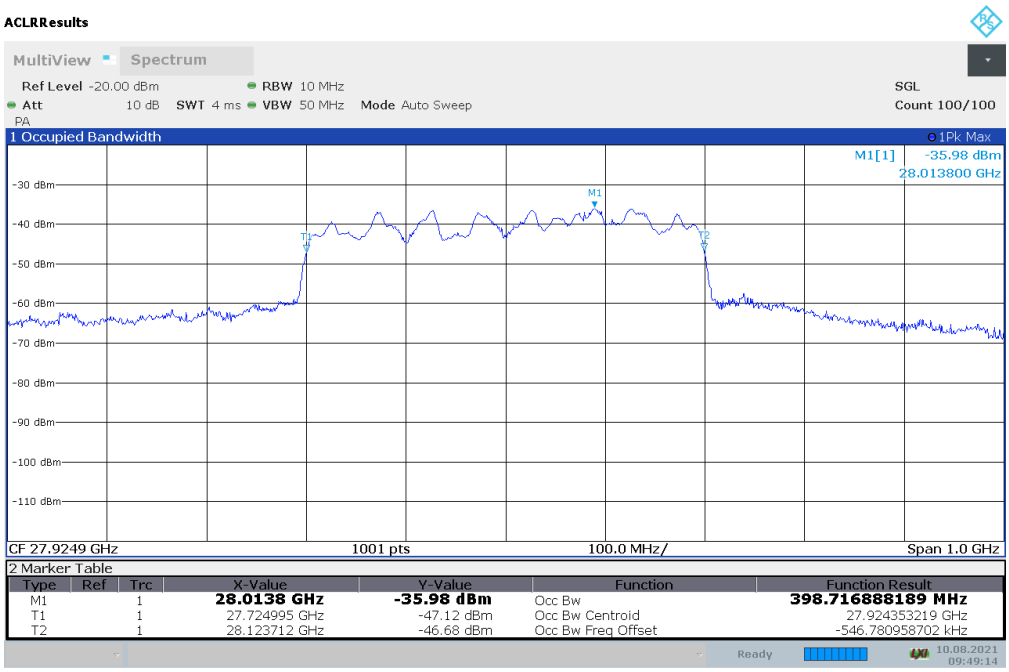
10:18:43 22.07.2021

Plot 7-19. Occupied Bandwidth Plot - (n261 50MHz - 16QAM - Mid Channel) – Relay Side – H Beam



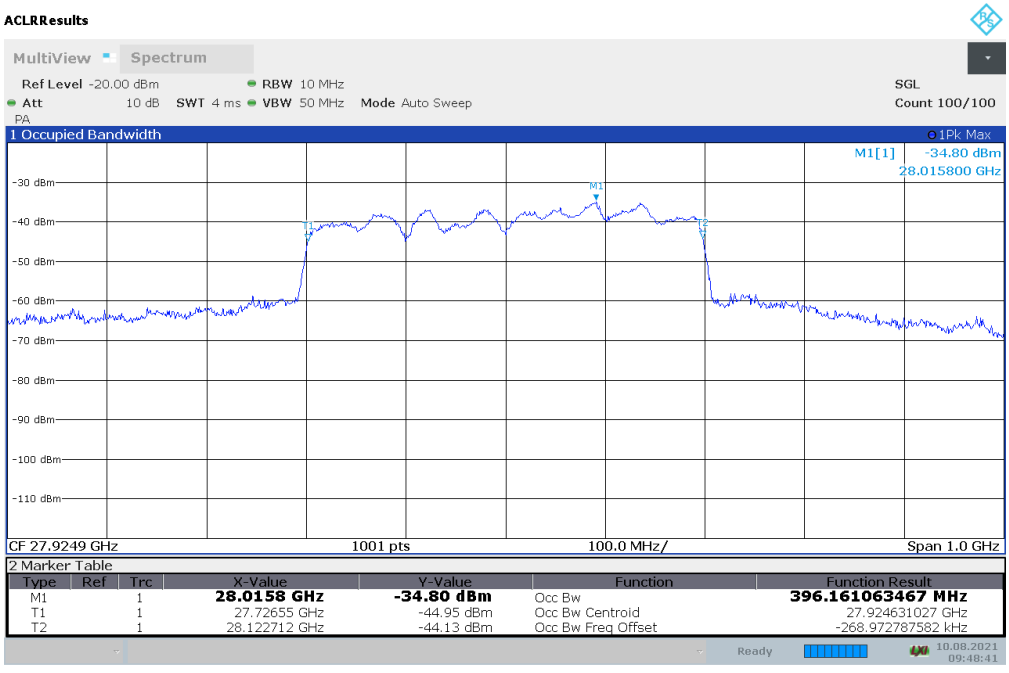
10:18:13 22.07.2021

Plot 7-20. Occupied Bandwidth Plot - (n261 50MHz - 64QAM - Mid Channel) – Relay Side – H Beam



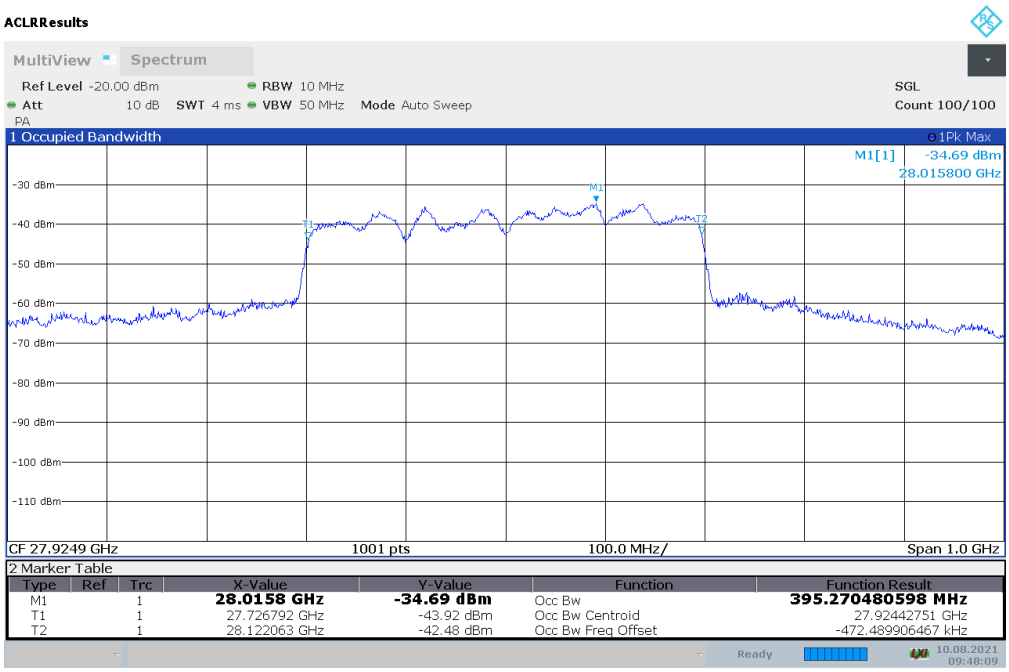
09:49:14 10.08.2021

Plot 7-21. Occupied Bandwidth Plot - (n261 100MHz - π/2 BPSK - Mid Channel) – Relay Side – H Beam



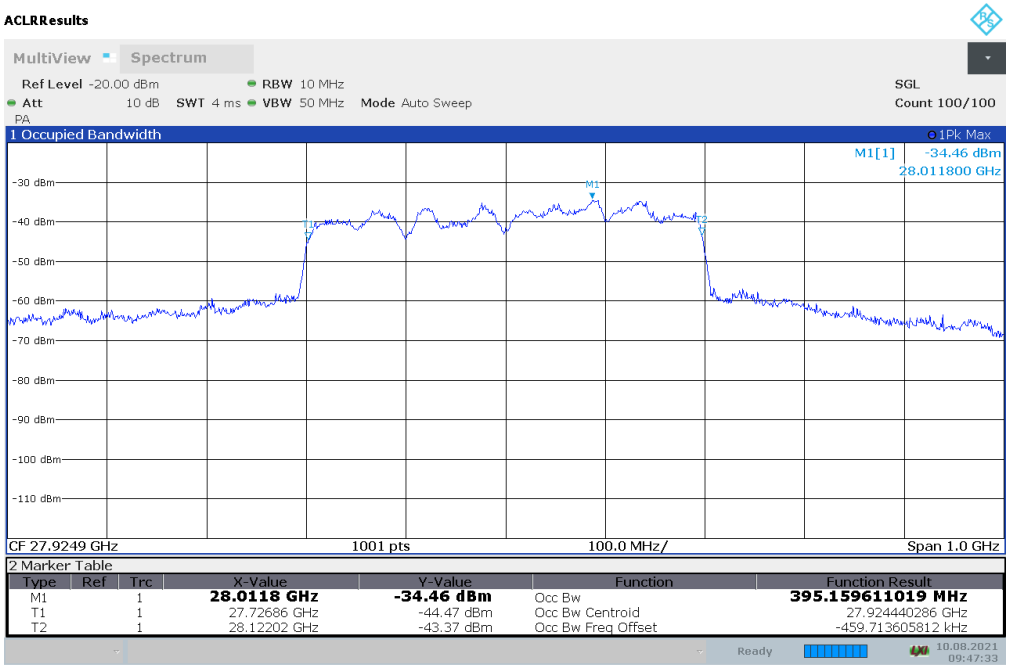
09:48:41 10.08.2021

Plot 7-22. Occupied Bandwidth Plot - (n261 100MHz - QPSK - Mid Channel) – Relay Side – H Beam



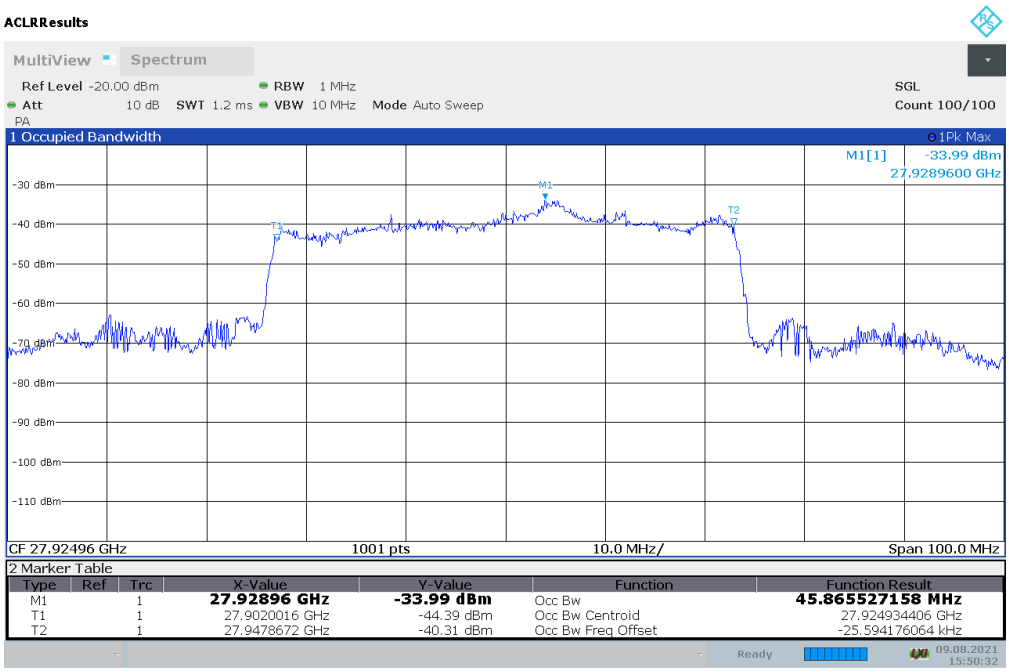
09:48:09 10.08.2021

Plot 7-23. Occupied Bandwidth Plot - (n261 100MHz - 16QAM - Mid Channel) – Relay Side – H Beam



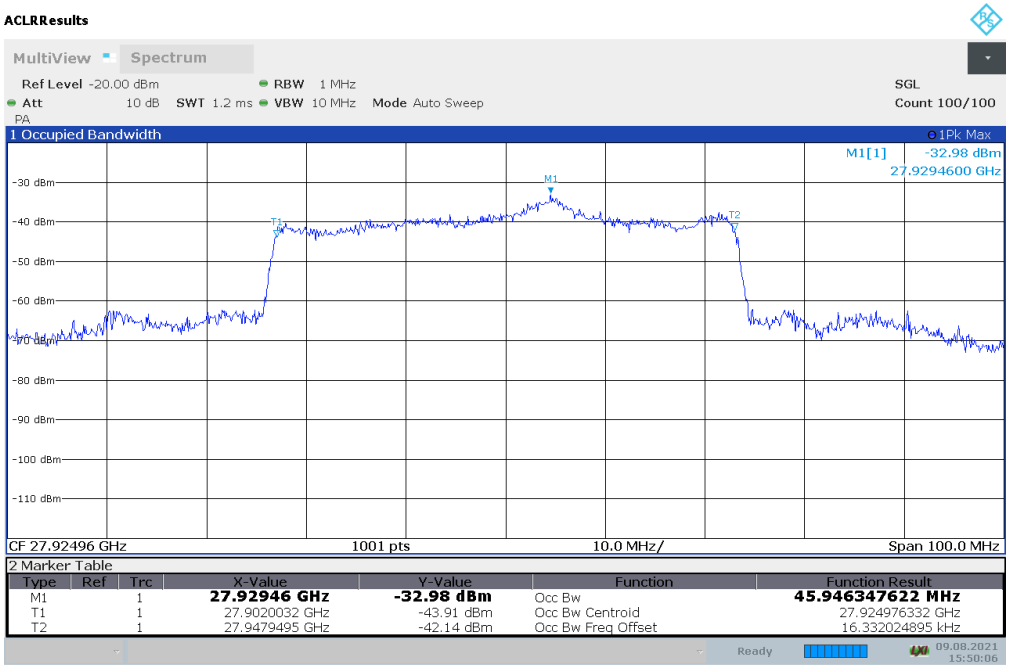
09:47:34 10.08.2021

Plot 7-24. Occupied Bandwidth Plot - (n261 100MHz - 64QAM - Mid Channel) – Relay Side – H Beam



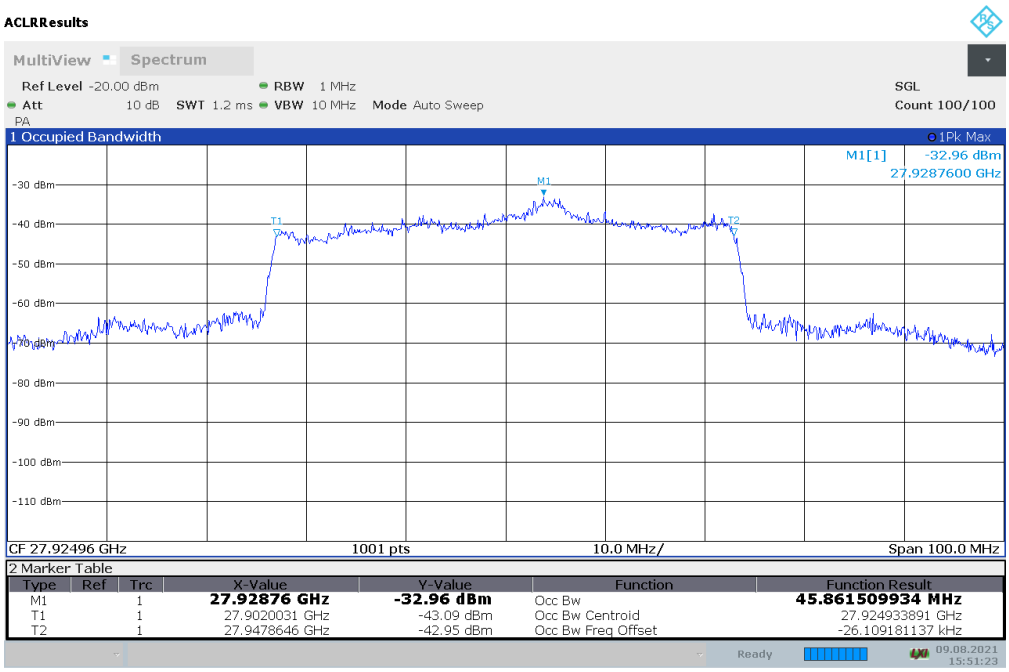
15:50:33 09.08.2021

Plot 7-25. Occupied Bandwidth Plot - (n261 50MHz - π/2 BPSK - Mid Channel) – Relay Side – V Beam



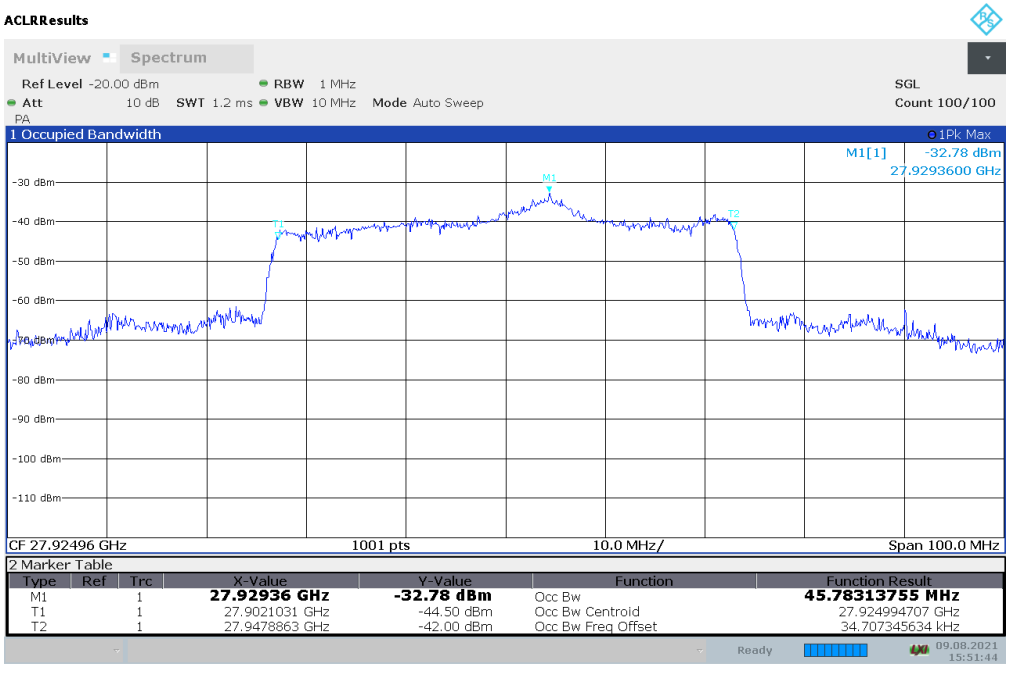
15:50:06 09.08.2021

Plot 7-26. Occupied Bandwidth Plot - (n261 50MHz - QPSK - Mid Channel) – Relay Side – V Beam



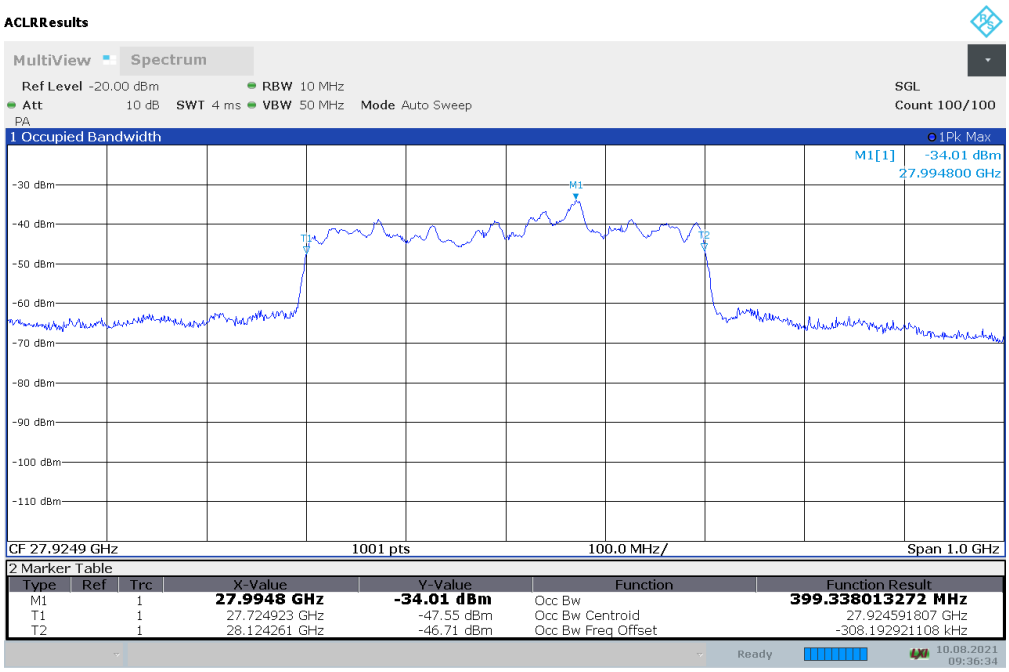
15:51:23 09.08.2021

Plot 7-27. Occupied Bandwidth Plot - (n261 50MHz - 16QAM - Mid Channel) – Relay Side – V Beam



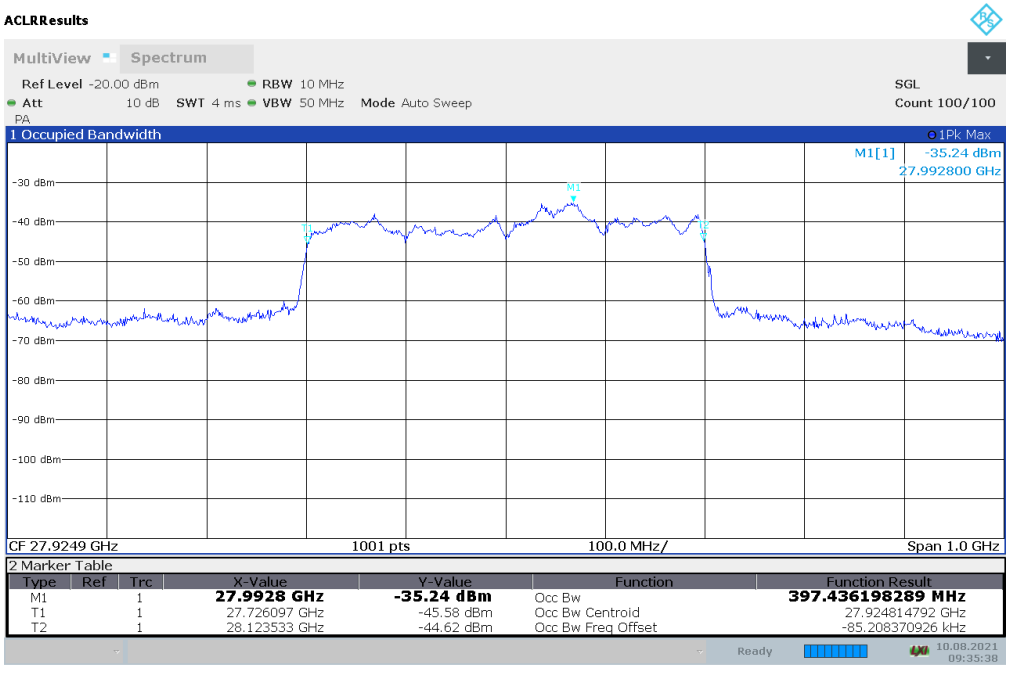
15:51:44 09.08.2021

Plot 7-28. Occupied Bandwidth Plot - (n261 50MHz - 64QAM - Mid Channel) – Relay Side – V Beam



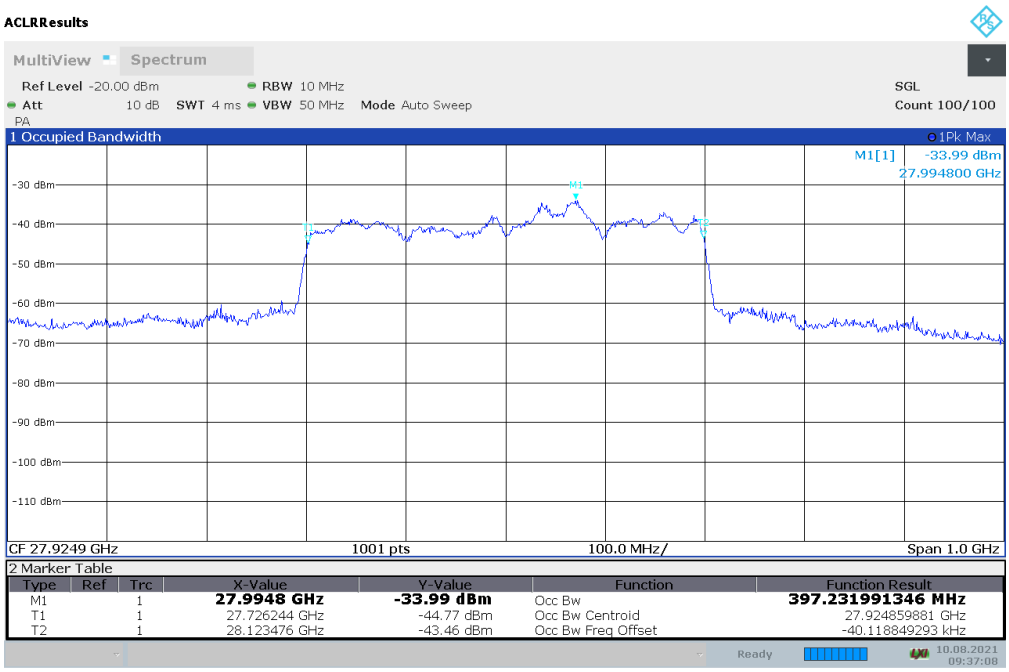
09:36:35 10.08.2021

Plot 7-29. Occupied Bandwidth Plot - (n261 100MHz - π/2 BPSK - Mid Channel) – Relay Side – V Beam



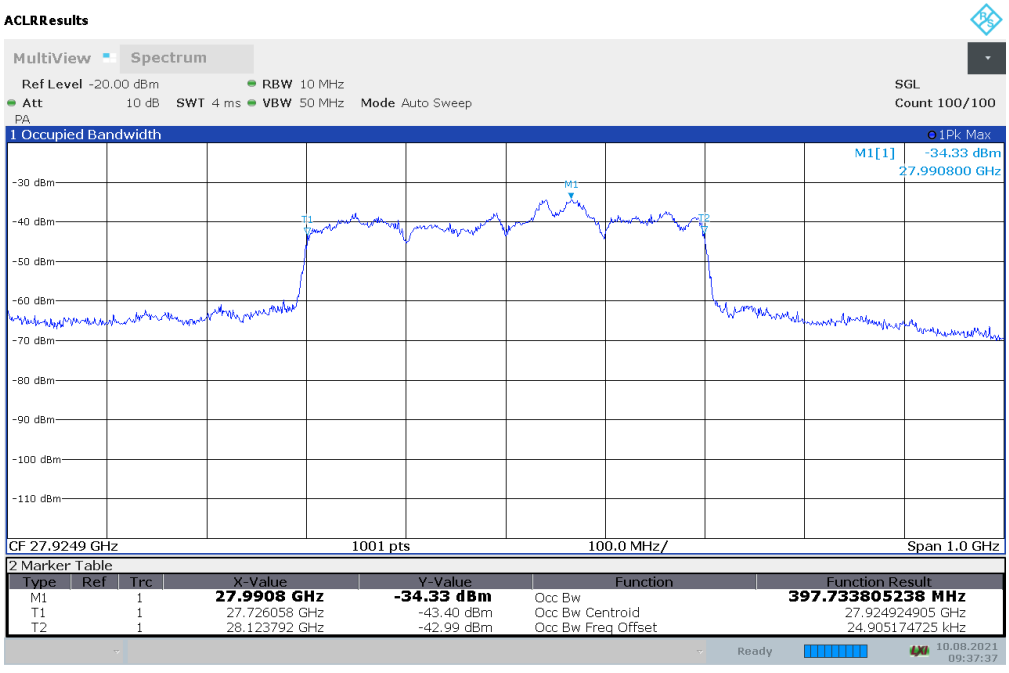
09:35:39 10.08.2021

Plot 7-30. Occupied Bandwidth Plot - (n261 100MHz - QPSK - Mid Channel) – Relay Side – V Beam



09:37:08 10.08.2021

Plot 7-31. Occupied Bandwidth Plot - (n261 100MHz - 16QAM - Mid Channel) – Relay Side – V Beam



09:37:38 10.08.2021

Plot 7-32. Occupied Bandwidth Plot - (n261 100MHz - 64QAM - Mid Channel) – Relay Side – V Beam

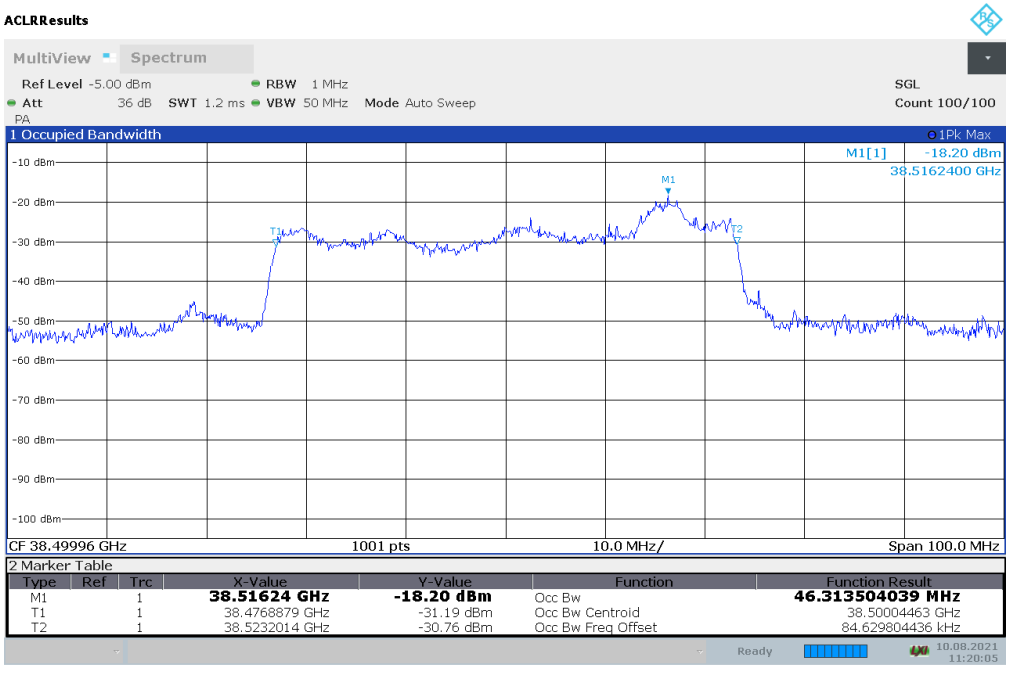
n260 Donor Side and Relay Side

Band	Antenna	Channel	Bandwidth	CCs Active	Modulation	OBW [MHz]
n260	Donor-H Beam	Mid	50	1	π/2 BPSK	46.13
					QPSK	46.31
					16QAM	46.34
					64QAM	46.35
			100	4	π/2 BPSK	399.61
					QPSK	397.94
					16QAM	396.11
					64QAM	396.23
n260	Donor-V Beam	Mid	50	1	π/2 BPSK	46.42
					QPSK	46.18
					16QAM	46.52
					64QAM	46.42
			100	4	π/2 BPSK	401.73
					QPSK	399.28
					16QAM	398.55
					64QAM	399.52
n260	Relay-H Beam	Mid	50	1	π/2 BPSK	45.89
					QPSK	45.99
					16QAM	46.01
					64QAM	45.95
			100	4	pi/2-BPSK	397.19
					QPSK	394.64
					16QAM	394.66
					64QAM	394.34
n260	Relay-V Beam	Mid	50	1	π/2 BPSK	45.84
					QPSK	45.90
					16QAM	45.84
					64QAM	45.89
			100	4	π/2 BPSK	396.99
					QPSK	394.66
					16QAM	394.93
					64QAM	394.37

Table 7-3. Summary of Occupied Bandwidths – n260

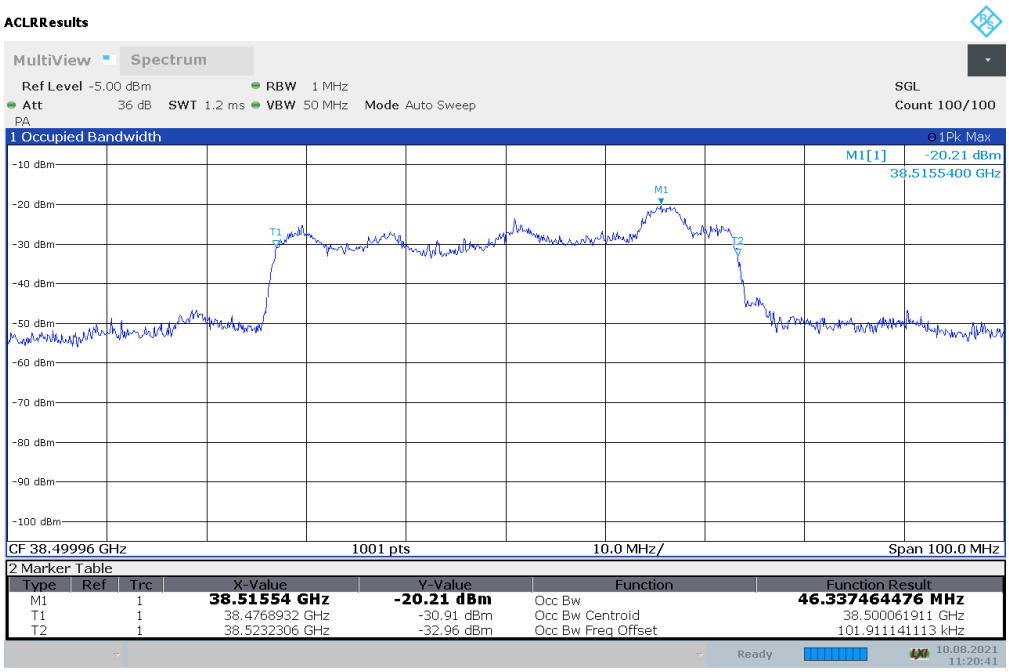
11:19:15 10.08.2021

Plot 7-33. Occupied Bandwidth Plot - (n260 50MHz - π/2 BPSK - Mid Channel) – Donor Side – H Beam



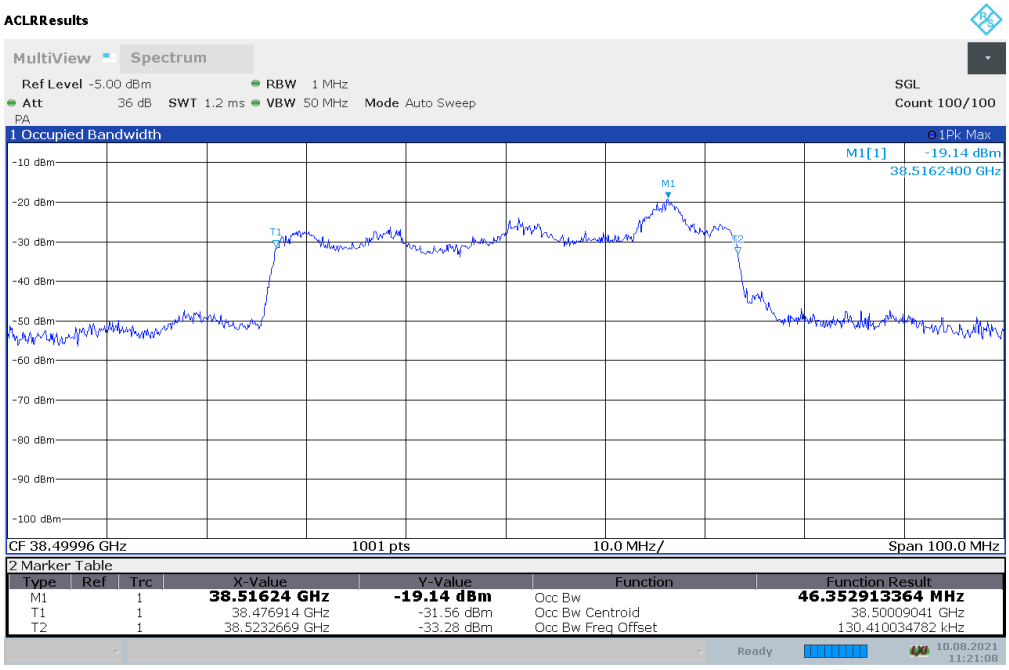
11:20:06 10.08.2021

Plot 7-34. Occupied Bandwidth Plot - (n260 50MHz - QPSK - Mid Channel) – Donor Side – H Beam



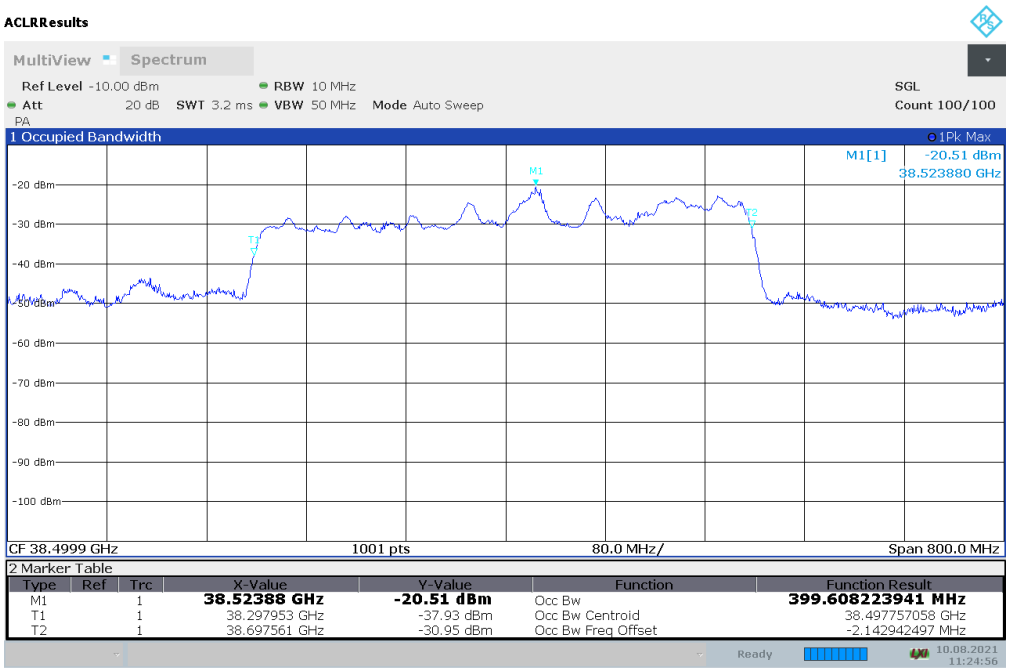
11:20:42 10.08.2021

Plot 7-35. Occupied Bandwidth Plot - (n260 50MHz - 16QAM - Mid Channel) – Donor Side – H Beam



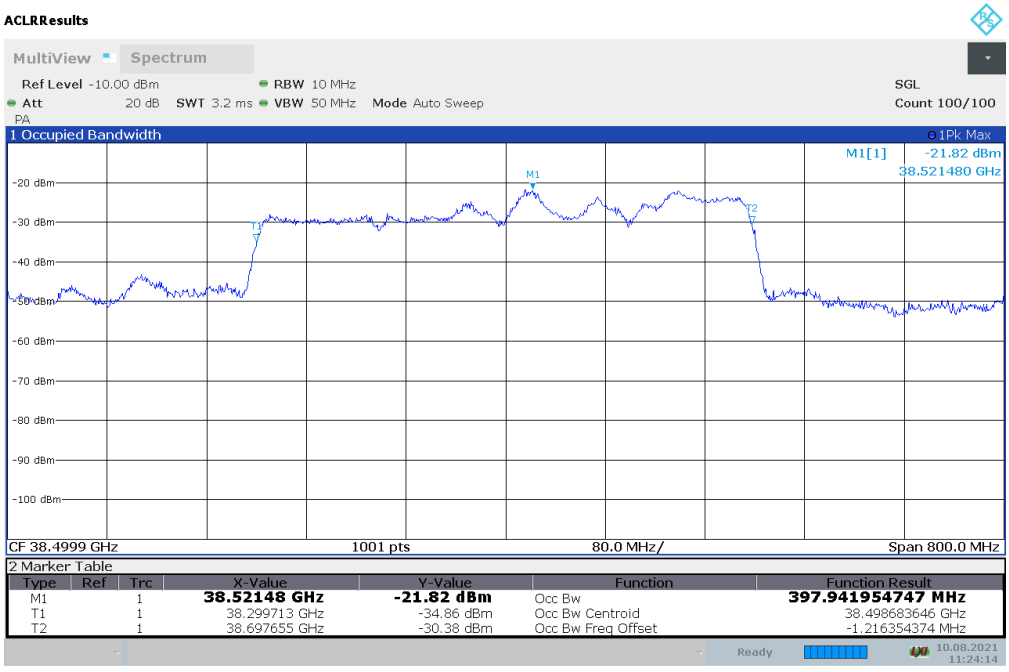
11:21:08 10.08.2021

Plot 7-36. Occupied Bandwidth Plot - (n260 50MHz - 64QAM - Mid Channel) – Donor Side – H Beam



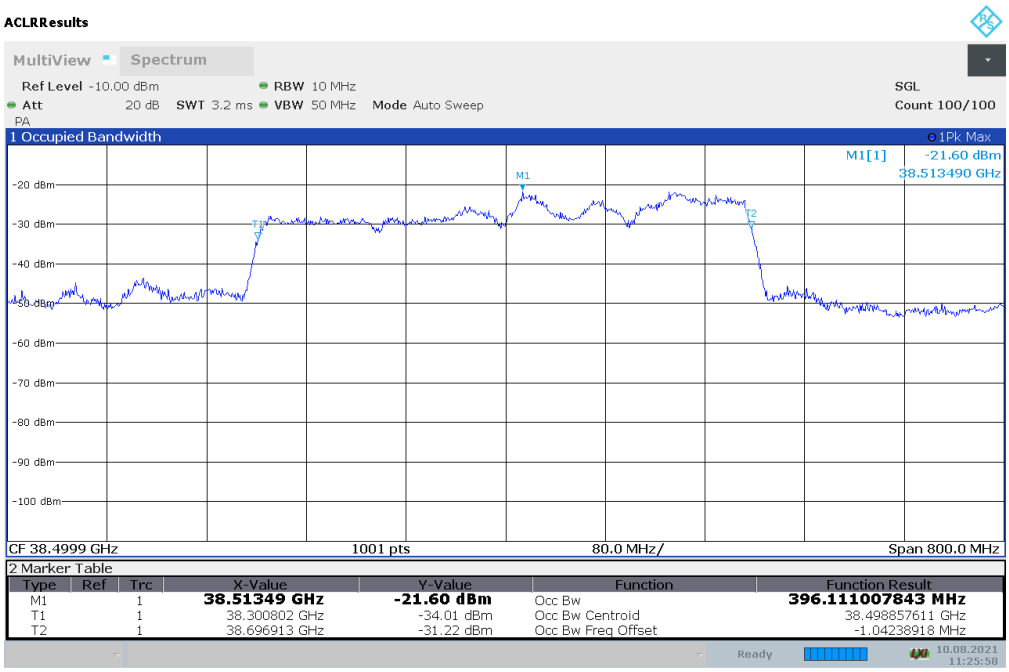
11:24:57 10.08.2021

Plot 7-37. Occupied Bandwidth Plot - (n260 100MHz - π/2 BPSK - Mid Channel) – Donor Side – H Beam



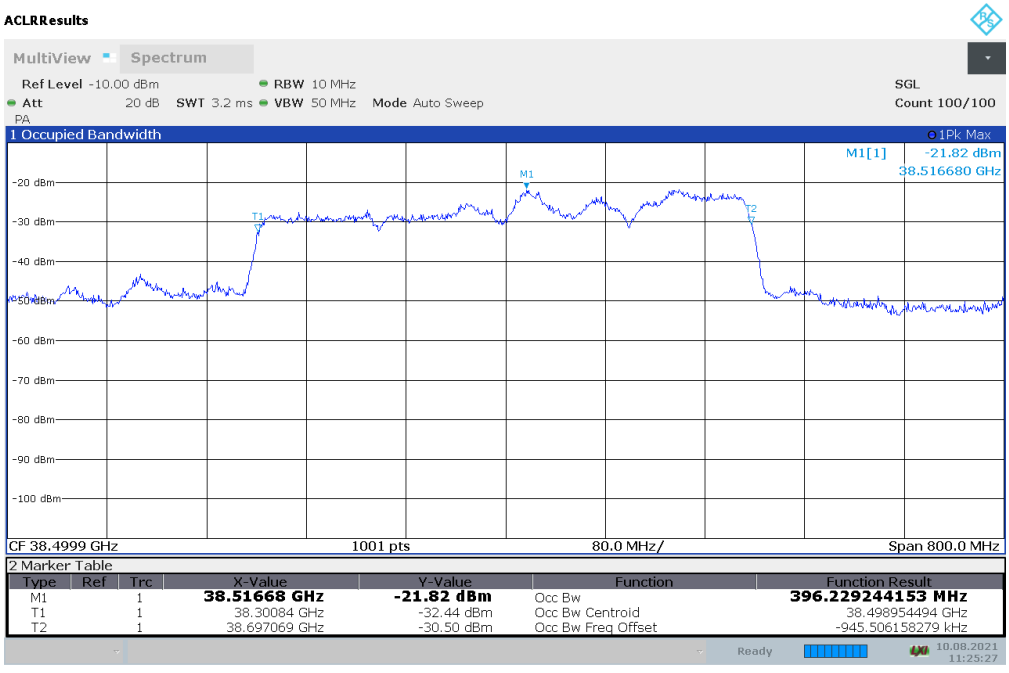
11:24:14 10.08.2021

Plot 7-38. Occupied Bandwidth Plot - (n260 100MHz - QPSK - Mid Channel) – Donor Side – H Beam



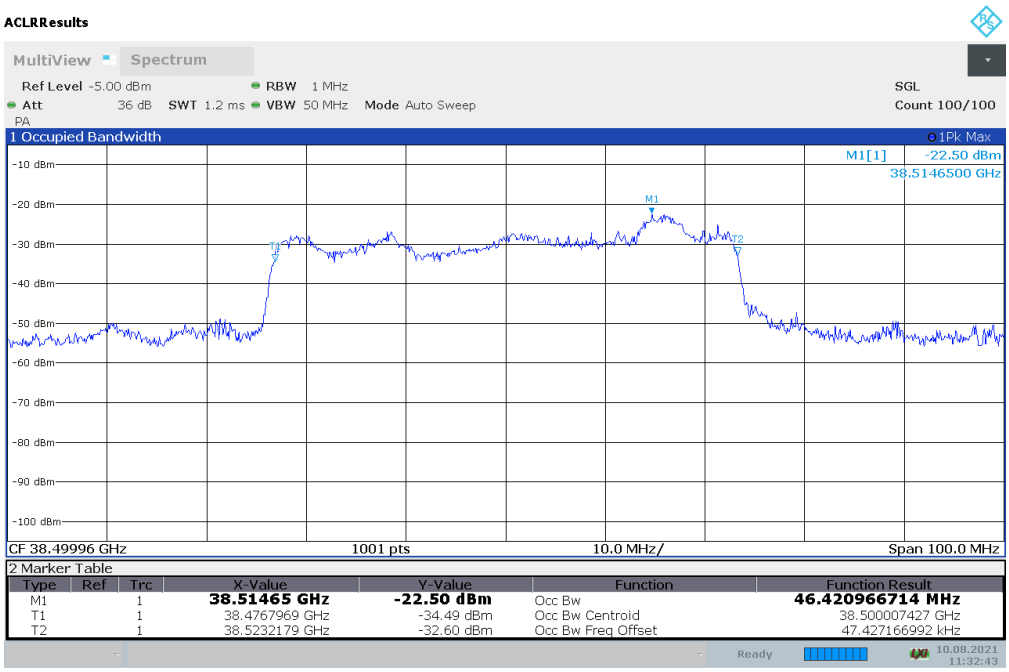
11:25:58 10.08.2021

Plot 7-39. Occupied Bandwidth Plot - (n260 100MHz - 16QAM - Mid Channel) – Donor Side – H Beam



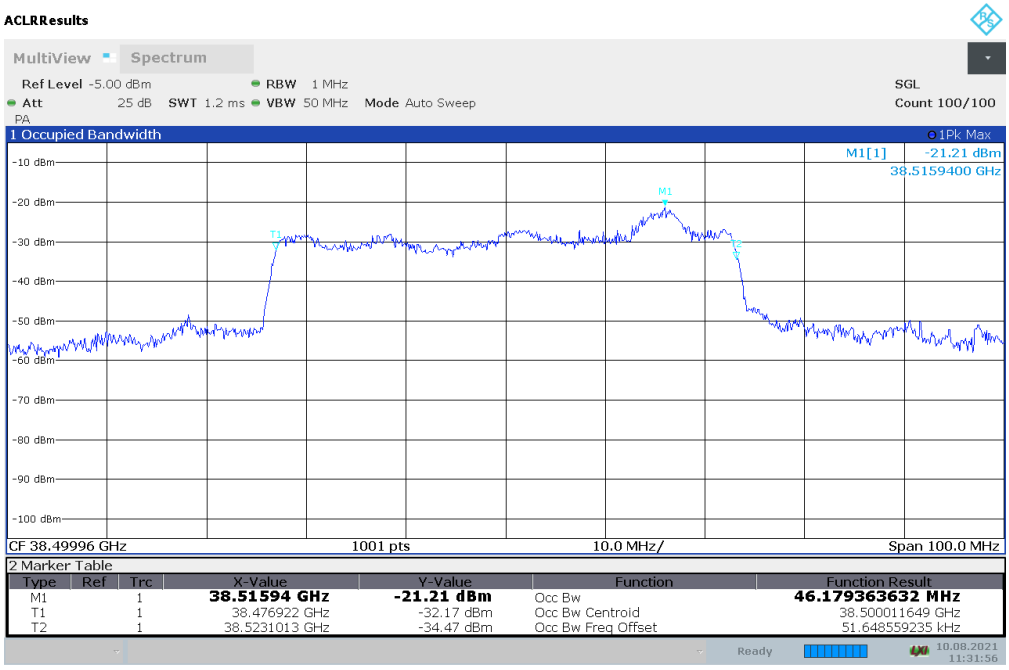
11:25:28 10.08.2021

Plot 7-40. Occupied Bandwidth Plot - (n260 100MHz - 64QAM - Mid Channel) – Donor Side – H Beam



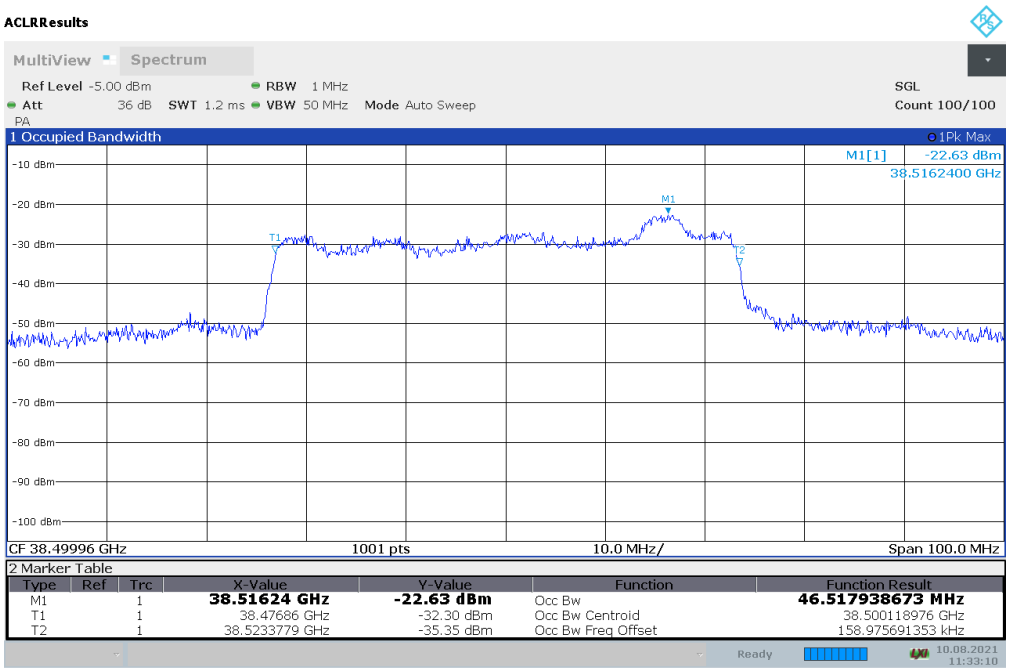
11:32:44 10.08.2021

Plot 7-41. Occupied Bandwidth Plot - (n260 50MHz - π/2 BPSK - Mid Channel) – Donor Side – V Beam



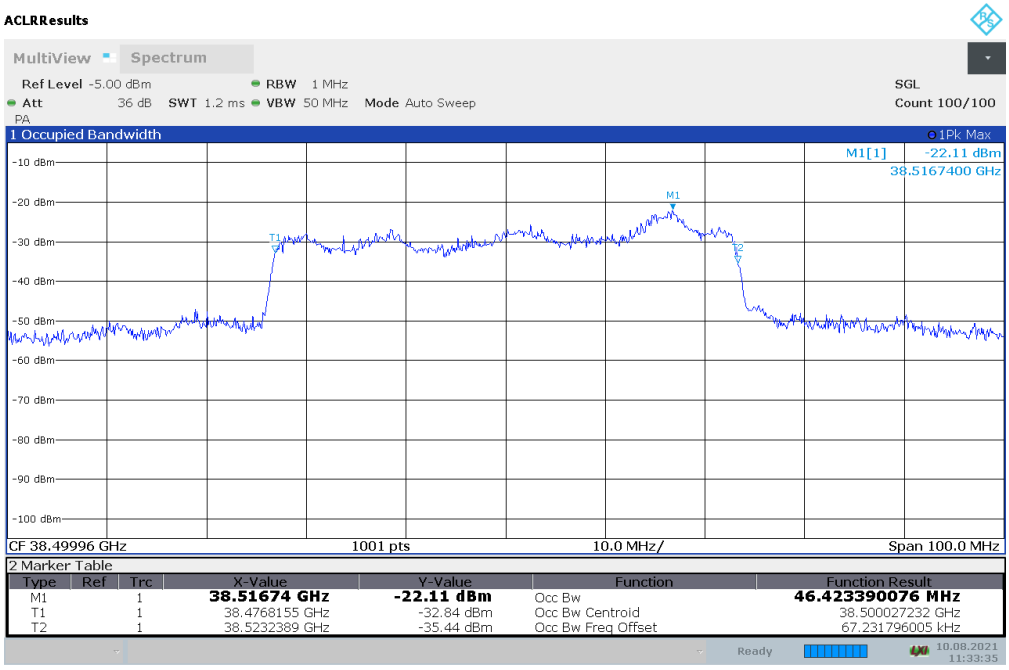
11:31:57 10.08.2021

Plot 7-42. Occupied Bandwidth Plot - (n260 50MHz - QPSK - Mid Channel) – Donor Side – V Beam



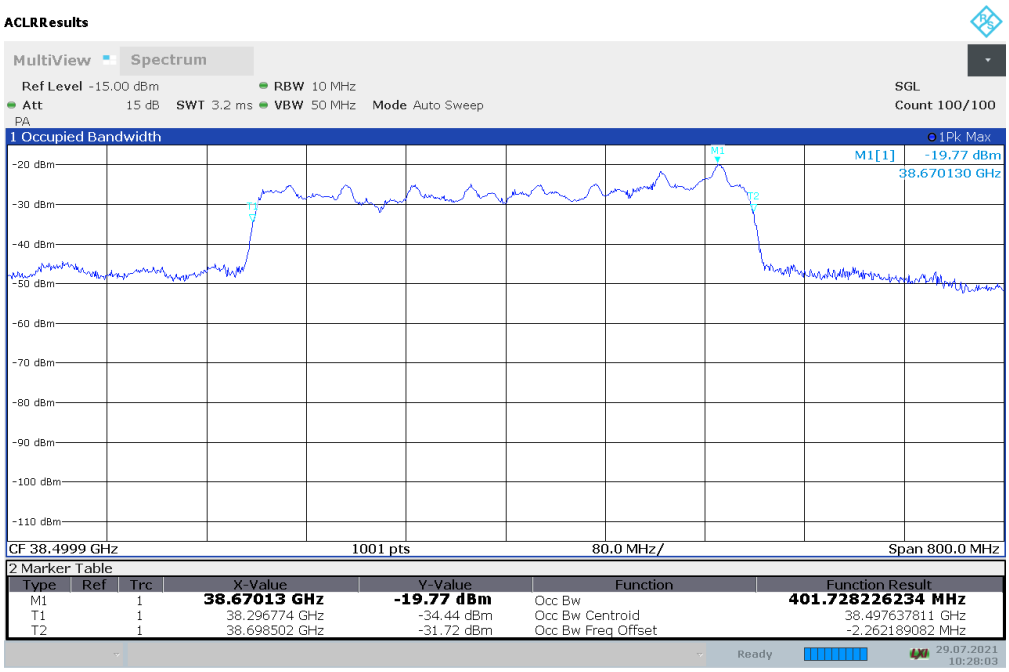
11:33:10 10.08.2021

Plot 7-43. Occupied Bandwidth Plot - (n260 50MHz - 16QAM - Mid Channel) – Donor Side – V Beam



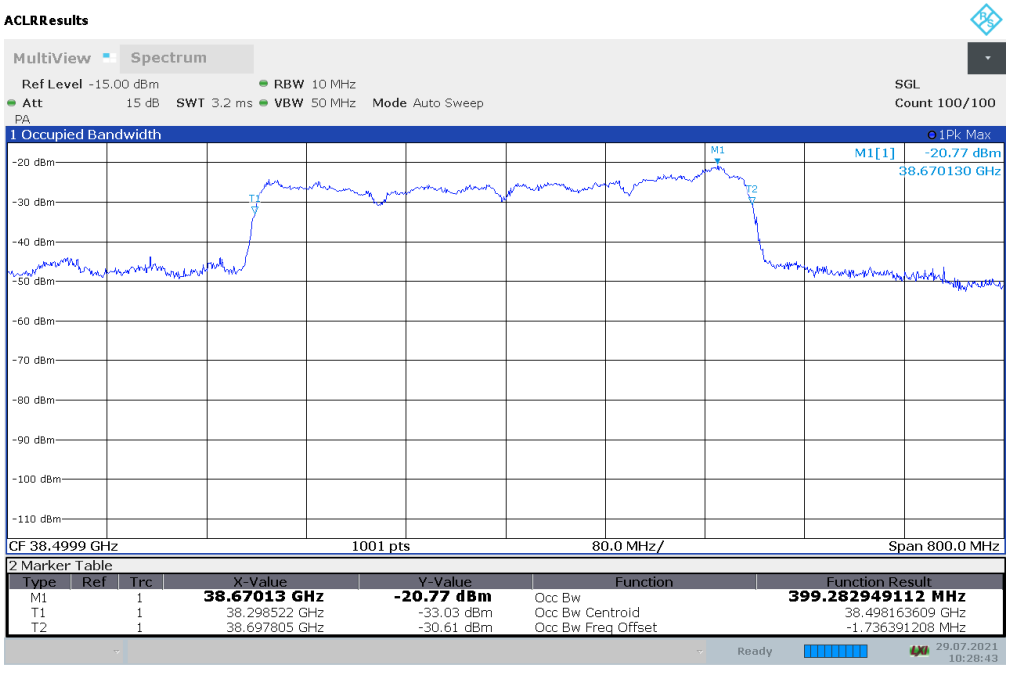
11:33:35 10.08.2021

Plot 7-44. Occupied Bandwidth Plot - (n260 50MHz - 64QAM - Mid Channel) – Donor Side – V Beam



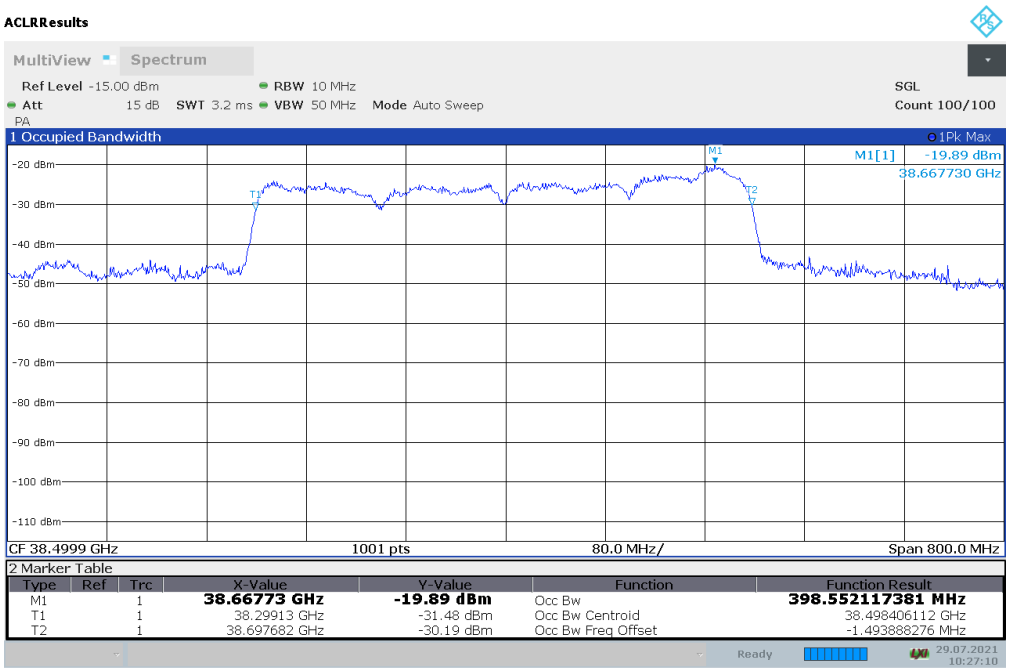
10:28:04 29.07.2021

Plot 7-45. Occupied Bandwidth Plot - (n260 100MHz - π/2 BPSK - Mid Channel) – Donor Side – V Beam



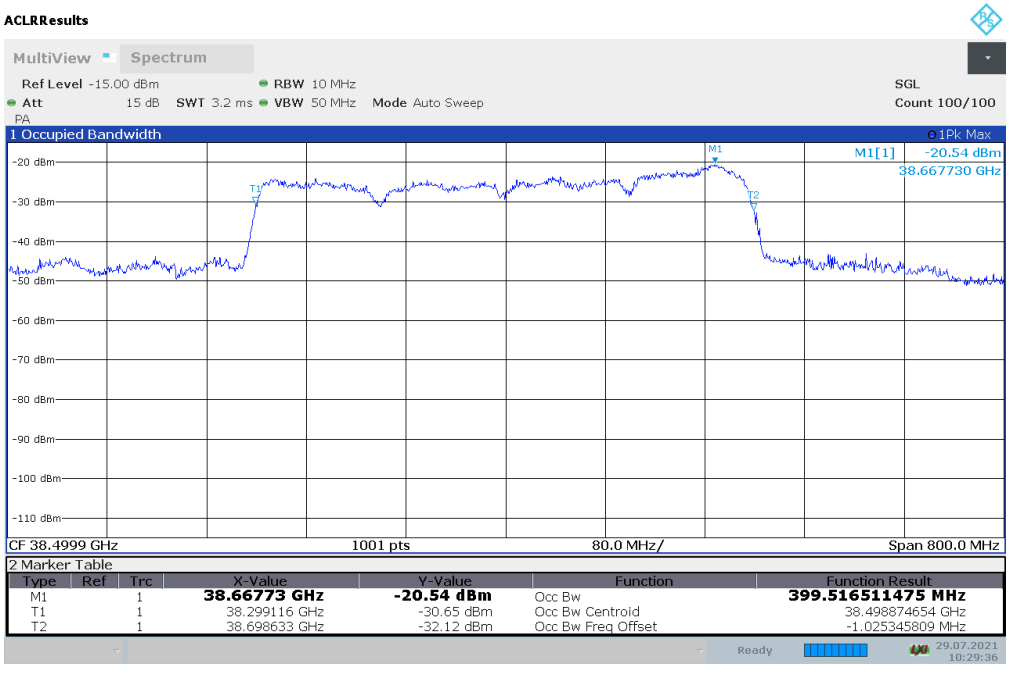
10:28:44 29.07.2021

Plot 7-46. Occupied Bandwidth Plot - (n260 100MHz - QPSK - Mid Channel) – Donor Side – V Beam



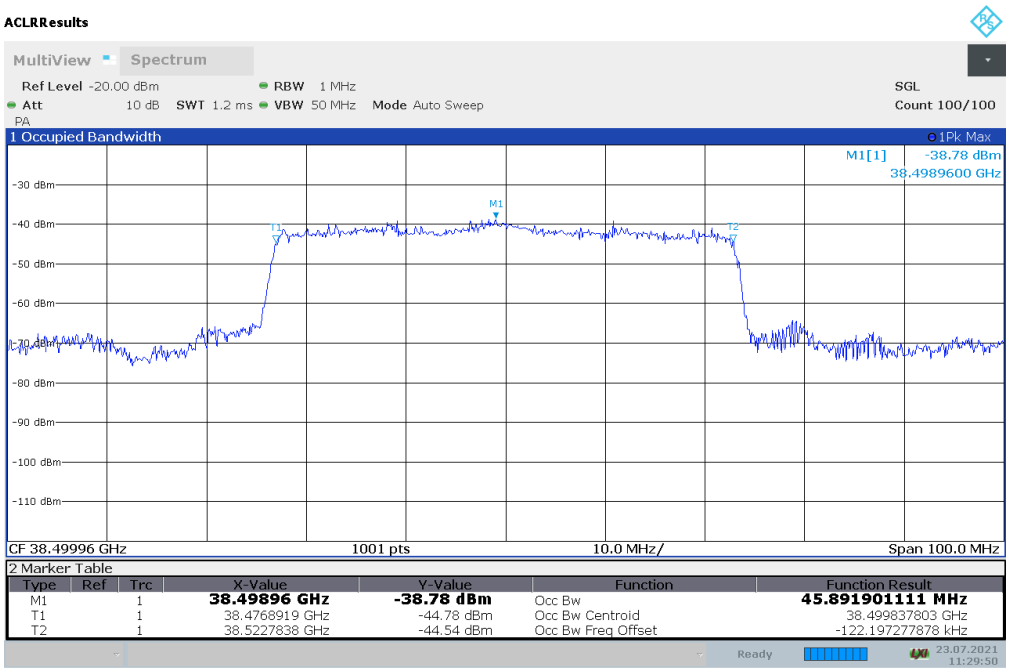
10:27:11 29.07.2021

Plot 7-47. Occupied Bandwidth Plot - (n260 100MHz - 16QAM - Mid Channel) – Donor Side – V Beam



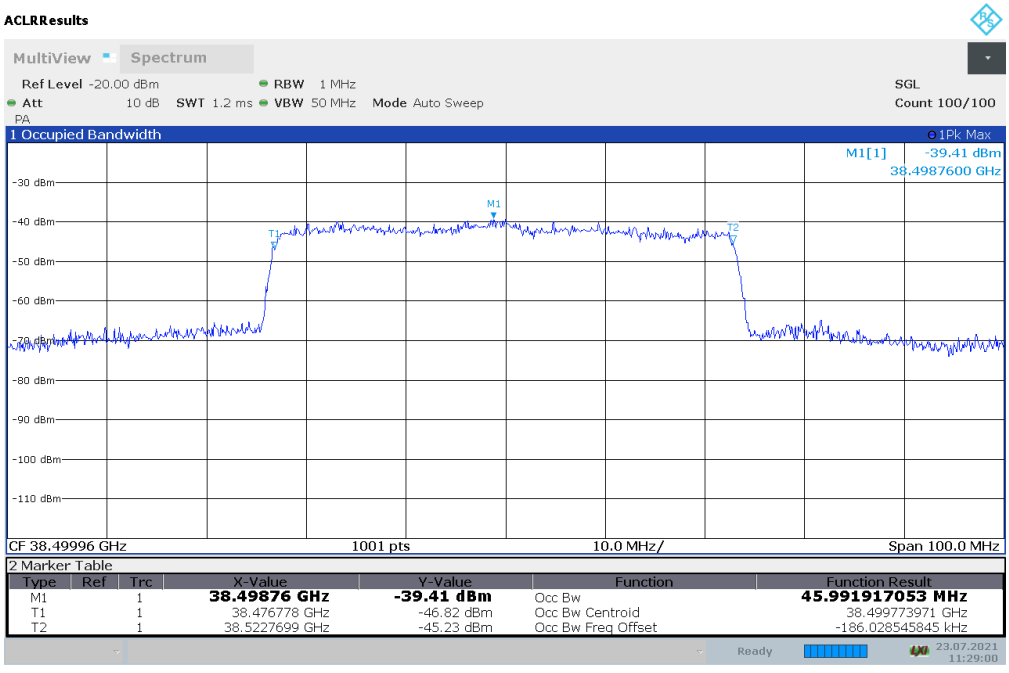
10:29:37 29.07.2021

Plot 7-48. Occupied Bandwidth Plot - (n260 100MHz - 64QAM - Mid Channel) – Donor Side – V Beam



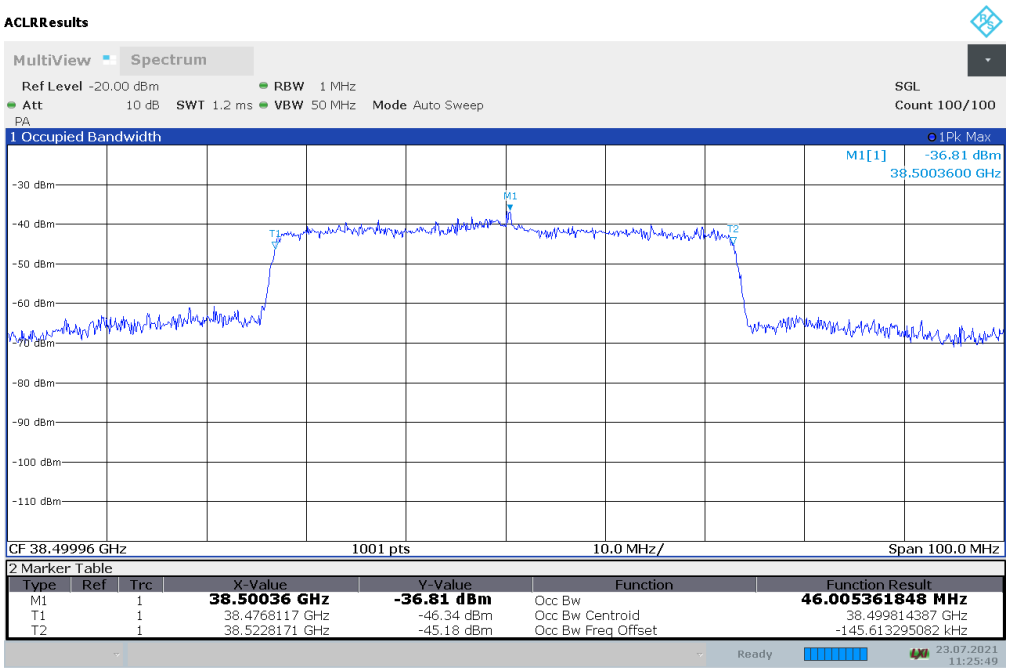
11:29:50 23.07.2021

Plot 7-49. Occupied Bandwidth Plot - (n260 50MHz - π/2 BPSK - Mid Channel) – Relay Side – H Beam



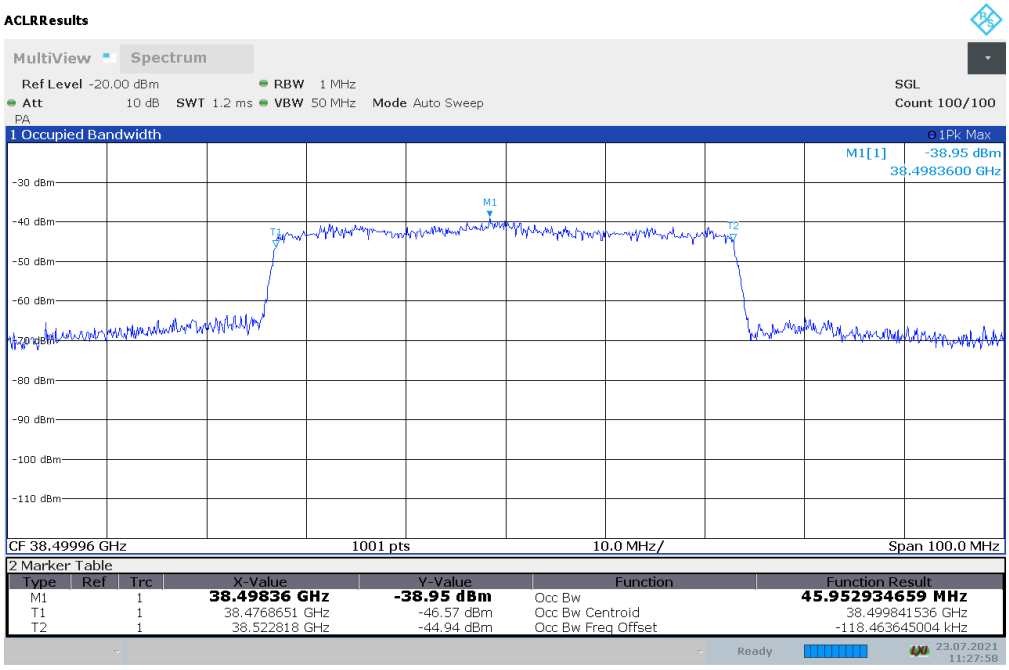
11:29:01 23.07.2021

Plot 7-50. Occupied Bandwidth Plot - (n260 50MHz - QPSK - Mid Channel) – Relay Side – H Beam



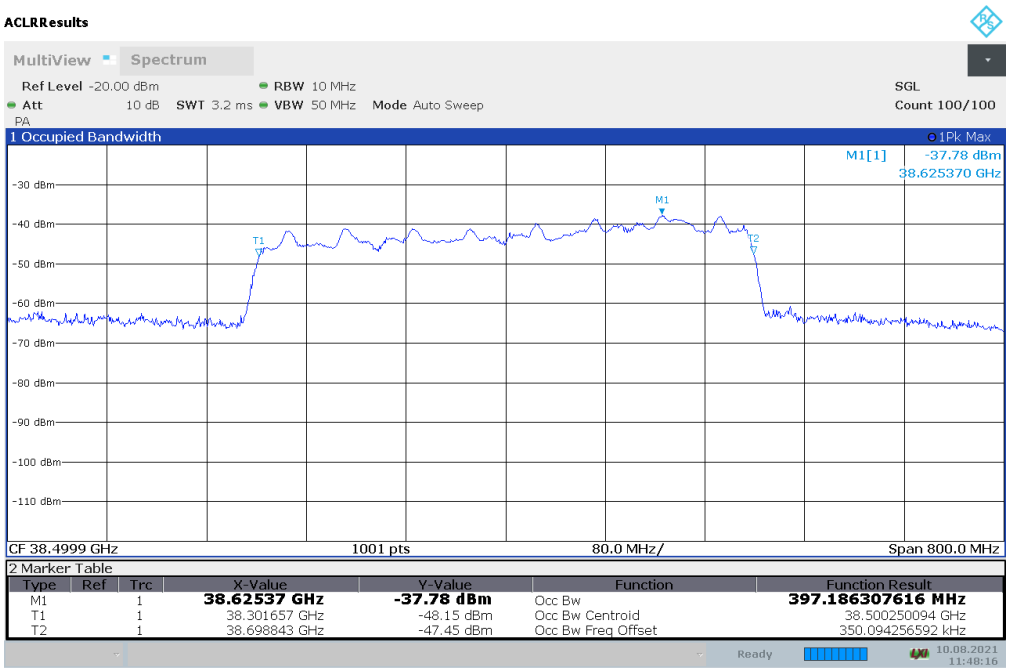
11:25:50 23.07.2021

Plot 7-51. Occupied Bandwidth Plot - (n260 50MHz - 16QAM - Mid Channel) – Relay Side – H Beam



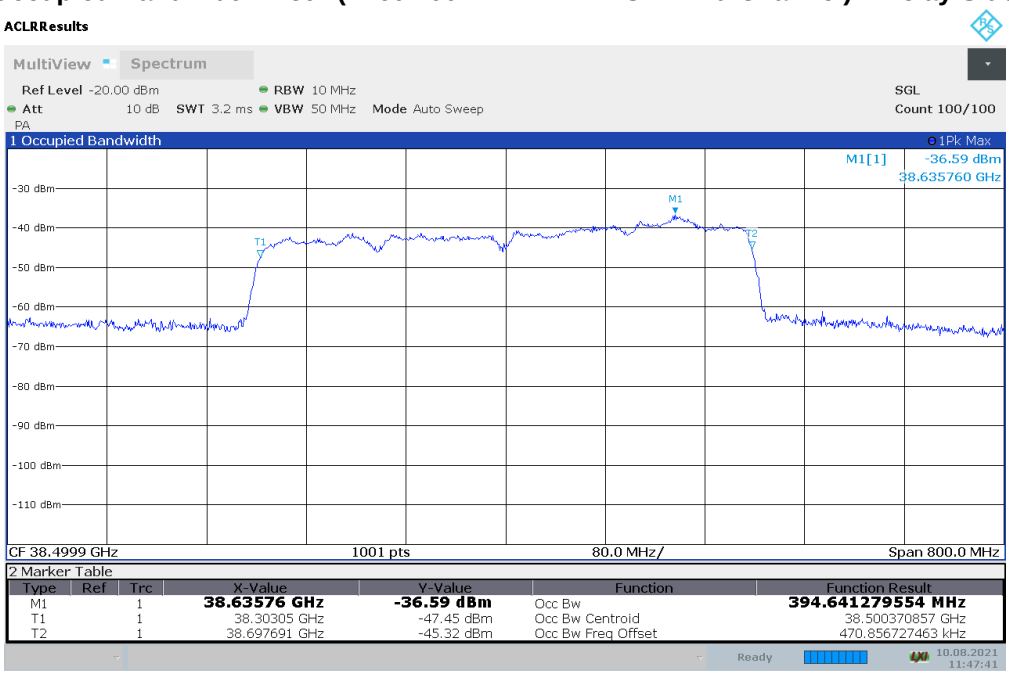
11:27:58 23.07.2021

Plot 7-52. Occupied Bandwidth Plot - (n260 50MHz - 64QAM - Mid Channel) – Relay Side – H Beam



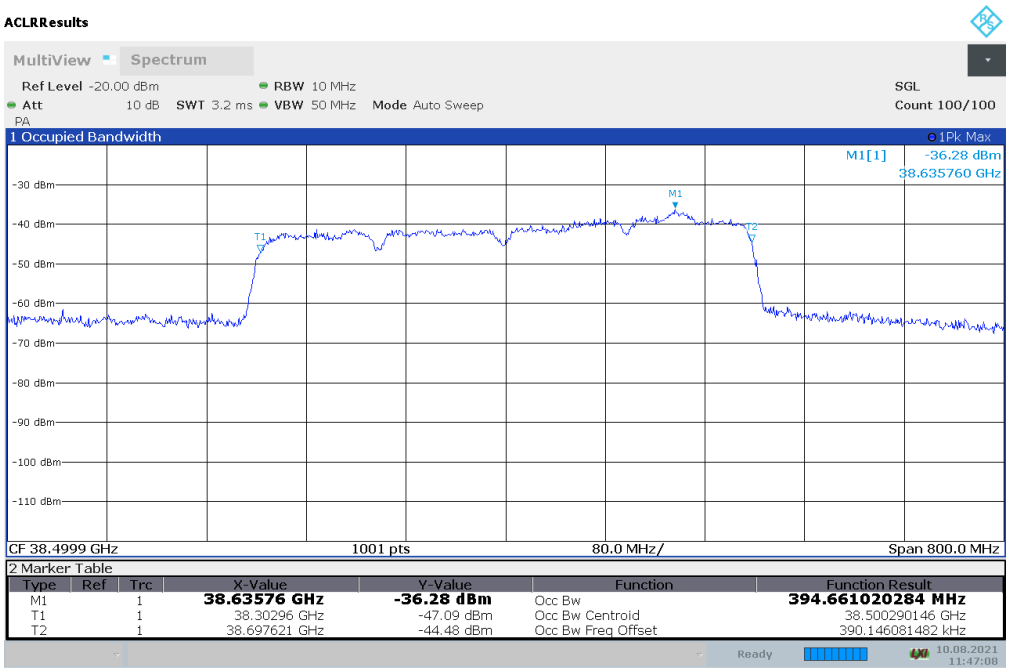
11:48:17 10.08.2021

Plot 7-53. Occupied Bandwidth Plot - (n260 100MHz - π/2 BPSK - Mid Channel) – Relay Side – H Beam



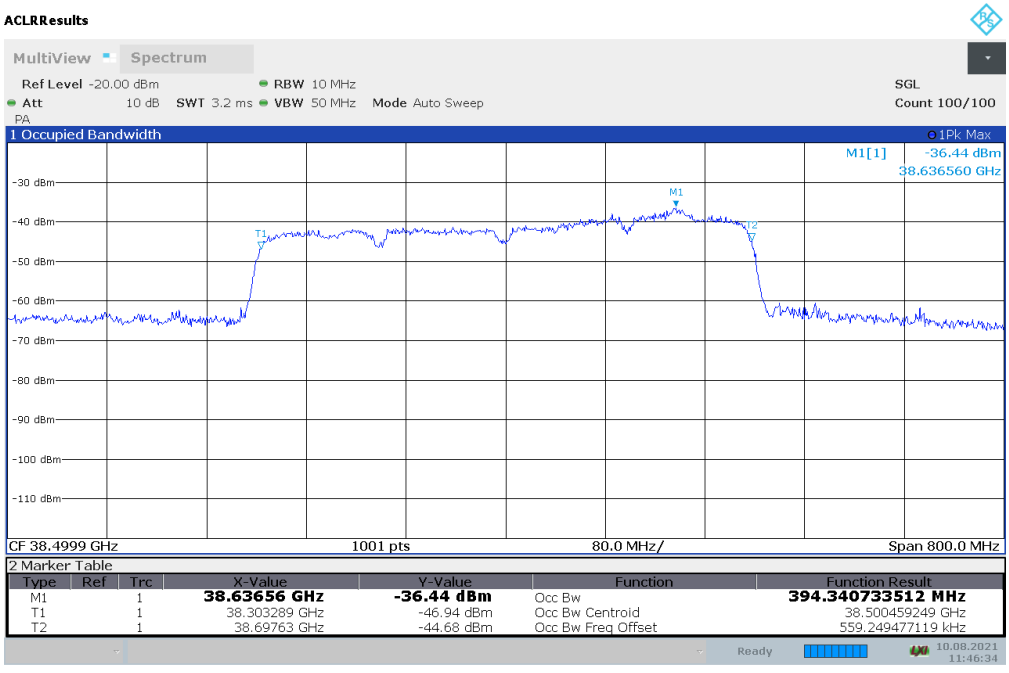
11:47:41 10.08.2021

Plot 7-54. Occupied Bandwidth Plot - (n260 100MHz - QPSK - Mid Channel) – Relay Side – H Beam



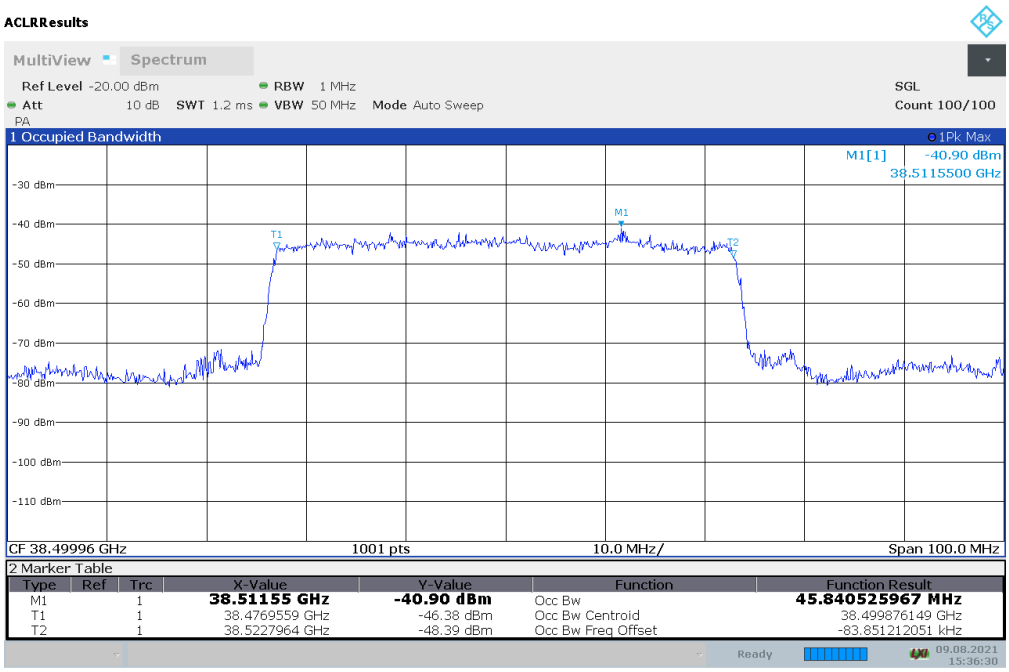
11:47:09 10.08.2021

Plot 7-55. Occupied Bandwidth Plot - (n260 100MHz - 16QAM - Mid Channel) – Relay Side – H Beam



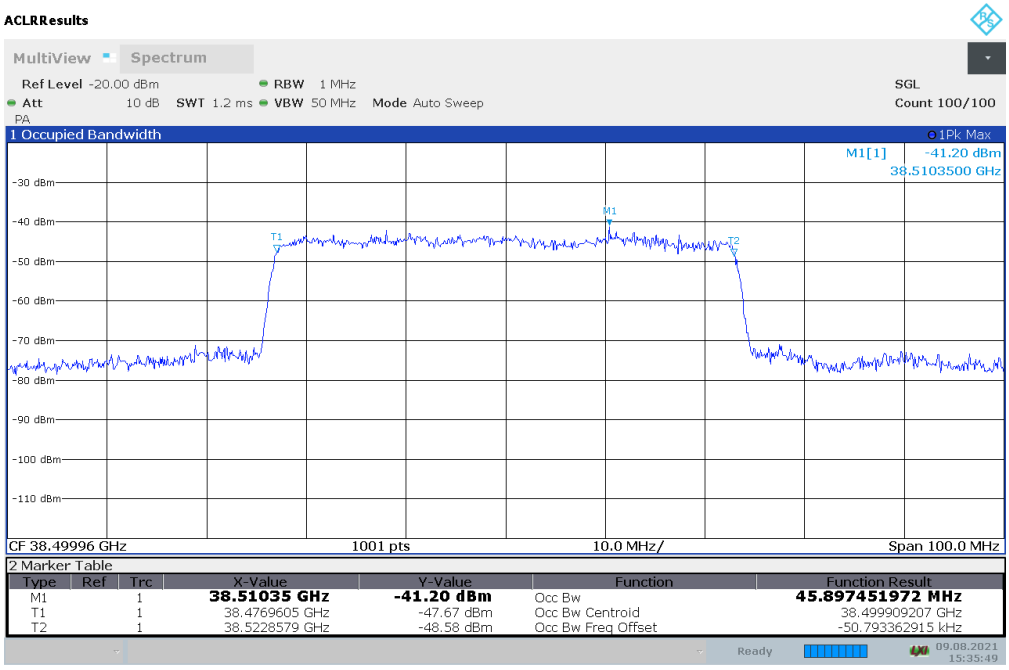
11:46:34 10.08.2021

Plot 7-56. Occupied Bandwidth Plot - (n260 100MHz - 64QAM - Mid Channel) – Relay Side – H Beam



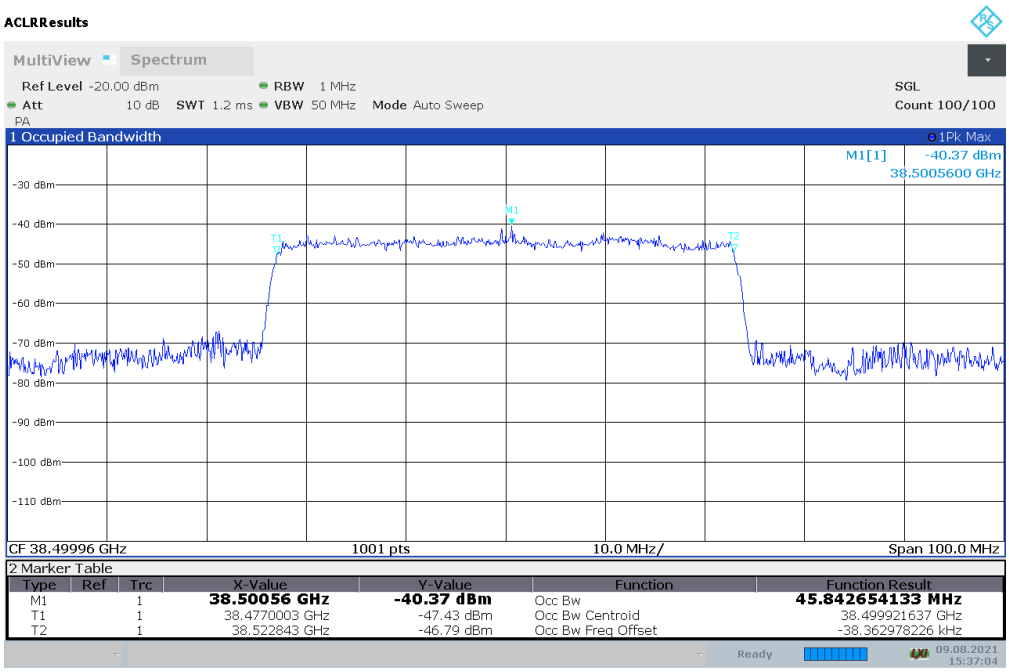
15:36:31 09.08.2021

Plot 7-57. Occupied Bandwidth Plot - (n260 50MHz - π/2 BPSK - Mid Channel) – Relay Side – V Beam



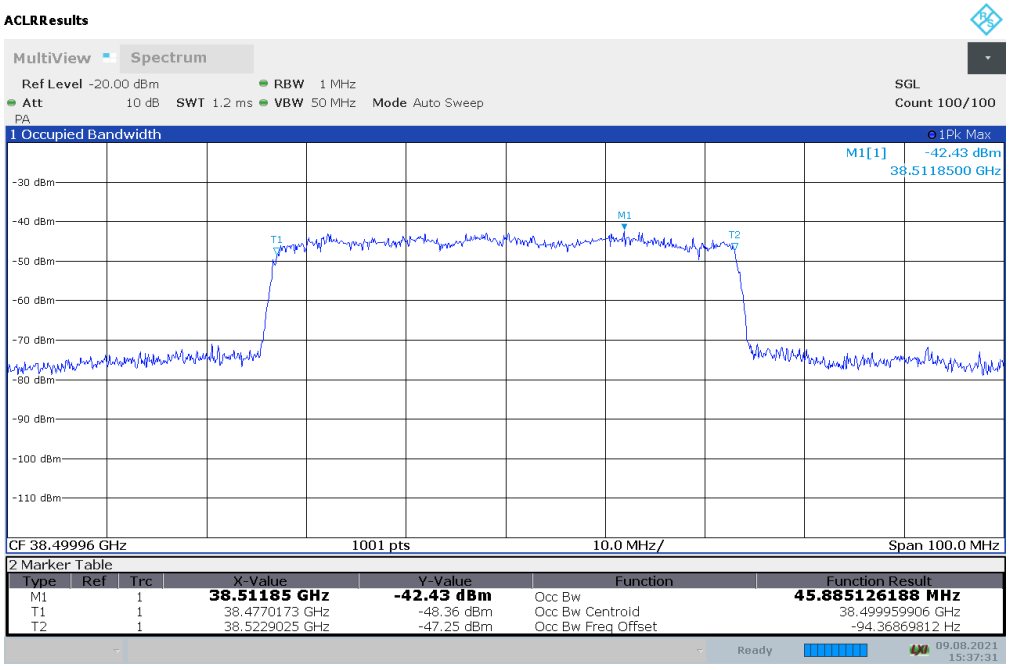
15:35:49 09.08.2021

Plot 7-58. Occupied Bandwidth Plot - (n260 50MHz - QPSK - Mid Channel) – Relay Side – V Beam



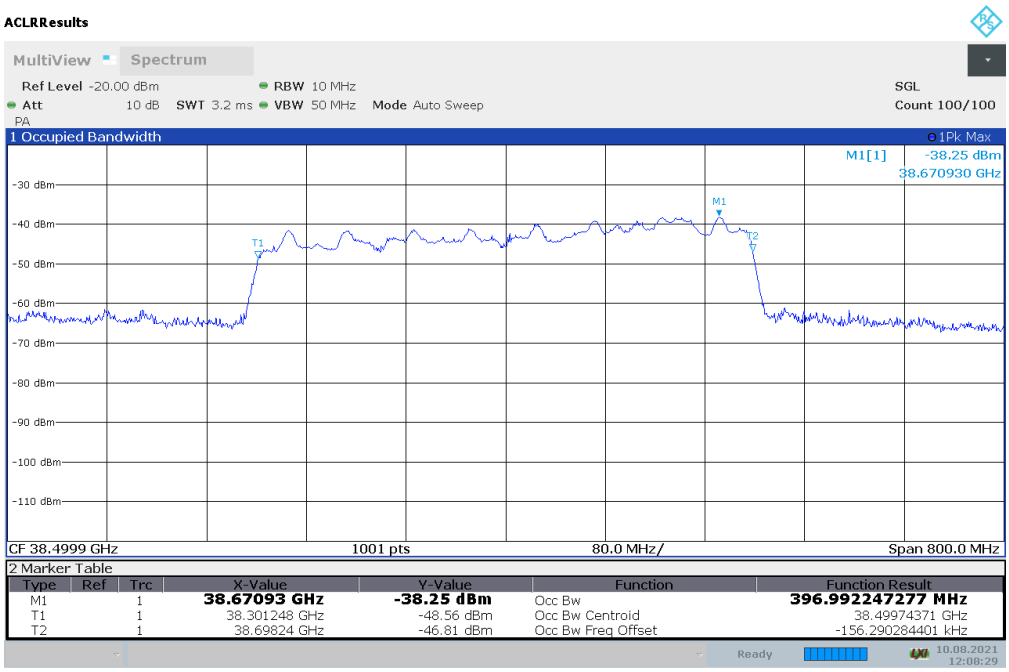
15:37:04 09.08.2021

Plot 7-59. Occupied Bandwidth Plot - (n260 50MHz - 16QAM - Mid Channel) – Relay Side – V Beam



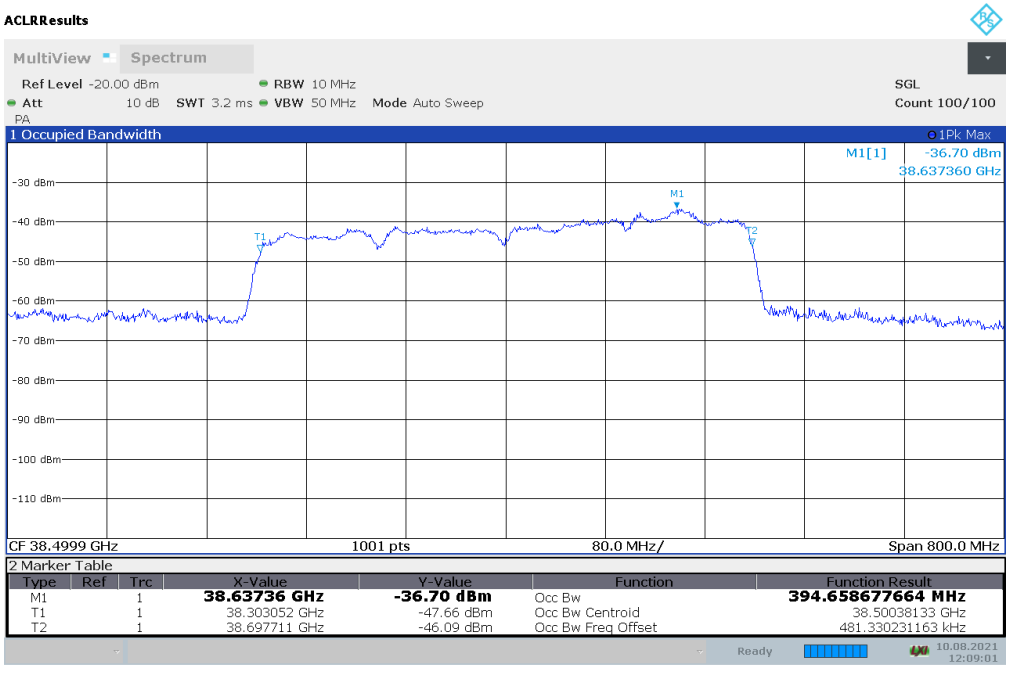
15:37:31 09.08.2021

Plot 7-60. Occupied Bandwidth Plot - (n260 50MHz - 64QAM - Mid Channel) – Relay Side – V Beam



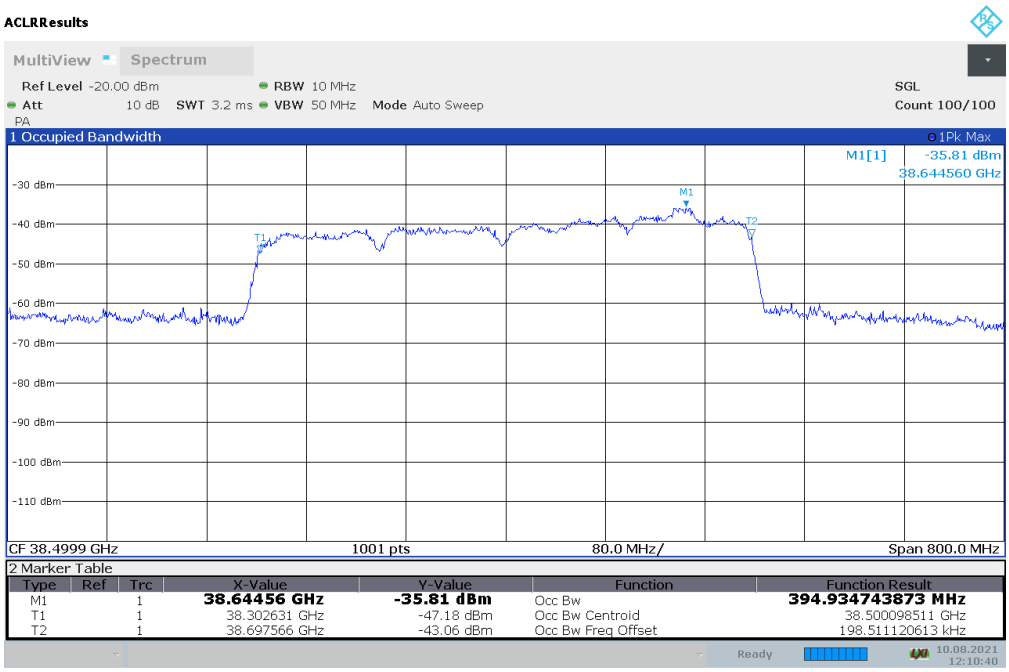
12:08:29 10.08.2021

Plot 7-61. Occupied Bandwidth Plot - (n260 100MHz - π/2 BPSK - Mid Channel) – Relay Side – V Beam



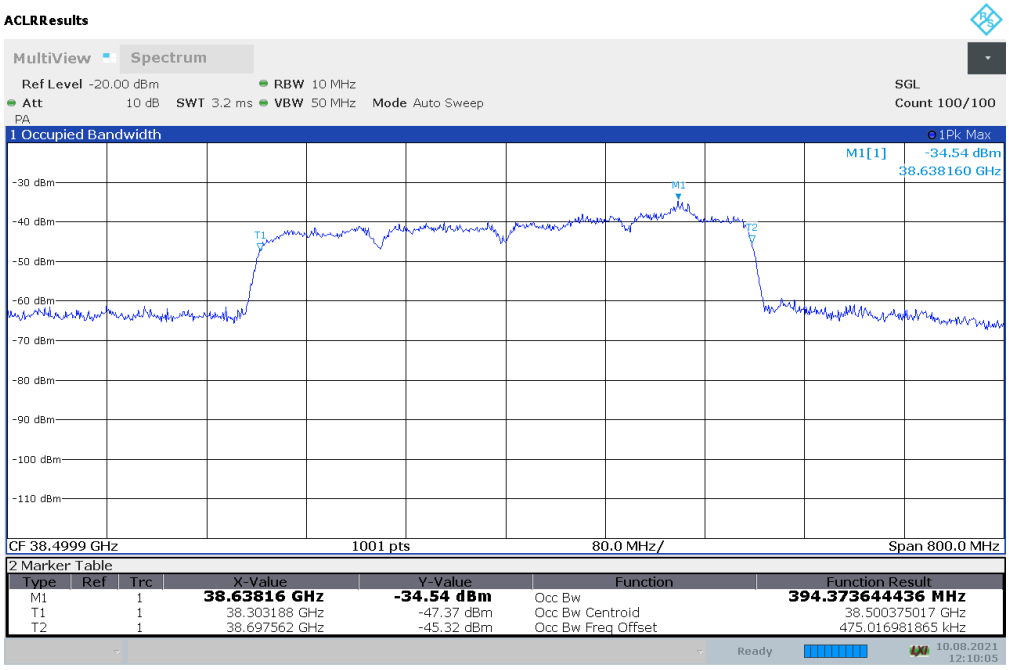
12:09:01 10.08.2021

Plot 7-62. Occupied Bandwidth Plot - (n260 100MHz - QPSK - Mid Channel) – Relay Side – V Beam



12:10:40 10.08.2021

Plot 7-63. Occupied Bandwidth Plot - (n260 100MHz - 16QAM - Mid Channel) – Relay Side – V Beam



12:10:05 10.08.2021

Plot 7-64. Occupied Bandwidth Plot - (n260 100MHz - 64QAM - Mid Channel) – Relay Side – V Beam

7.3 Equivalent Isotropic Radiated Power

§30.202(c)

Test Overview

Equivalent Isotropic Radiated Power (EIRP) measurements are performed using broadband horn antennas. All measurements are performed as RMS average measurements while the EUT is operating at the appropriate frequencies with the max power condition as specified by the AGC software of the EUT.
The average power of the sum of all antenna elements is limited to a maximum EIRP of +55 dBm.

Test Procedures Used

ANSI C63.26-2015 Section 5.2.4.4.1

Test Settings

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
2. RBW = 1 – 5% of the expected OBW, not to exceed 1MHz
3. VBW ≥ 3 x RBW
4. Span = 2x to 3x the OBW
5. No. of sweep points ≥ 2 x span / RBW
6. Detector = RMS
7. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
8. Trace mode = trace averaging (RMS) over 100 sweeps
9. The trace was allowed to stabilize

Test Notes

1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
2) The input signal to the EUT was set in order to produce the max power allowed by the AGC software of the EUT.
3) EIRP measurements were taken in the far field.
4) A signal generator fed a 5G NR mmWave signal into the EUT.
5) The average EIRP reported below is calculated per section 5.2.7 of ANSI C63.26-2015 which states: EIRP (dBm) = E (dBμV/m) + 20log(D) − 104.8; where D is the measurement distance (in the far field region) in m. The field strength E is calculated E (dBμV/m) = Spectrum Analyzer Channel Power Level (dBm) + Antenna Factor (dB/m) + Cable Loss (dB) + 107.

n261 Donor Side

Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
50	1	Low	27525.00	DFT-s-OFDM	π/2 BPSK	2	H	SISO	H	2	1	1 / 0	**40.94**
		Low	27525.00	DFT-s-OFDM	QPSK	2	H	SISO	H	2	1	1 / 0	40.92
		Low	27525.00	DFT-s-OFDM	16QAM	2	H	SISO	H	2	1	1 / 0	40.79
		Low	27525.00	DFT-s-OFDM	64QAM	2	H	SISO	H	2	1	1 / 0	40.73
		Mid	27924.96	DFT-s-OFDM	π/2 BPSK	2	H	SISO	H	2	1	1 / 0	40.59
		Mid	27924.96	DFT-s-OFDM	QPSK	2	H	SISO	H	2	1	1 / 0	40.60
		Mid	27924.96	DFT-s-OFDM	16QAM	2	H	SISO	H	2	1	1 / 0	40.55
		Mid	27924.96	DFT-s-OFDM	64QAM	2	H	SISO	H	2	1	1 / 0	40.45
		High	28324.92	DFT-s-OFDM	π/2 BPSK	2	H	SISO	H	2	1	1 / 16	40.45
		High	28324.92	DFT-s-OFDM	QPSK	2	H	SISO	H	2	1	1 / 16	40.57
		High	28324.92	DFT-s-OFDM	16QAM	2	H	SISO	H	2	1	1 / 16	40.47
		High	28324.92	DFT-s-OFDM	64QAM	2	H	SISO	H	2	1	1 / 16	40.40
100	4	Low	27700.02	DFT-s-OFDM	π/2 BPSK	2	H	SISO	H	2	0	1 / 0	40.19
		Low	27700.02	DFT-s-OFDM	QPSK	2	H	SISO	H	2	0	1 / 0	40.17
		Low	27700.02	DFT-s-OFDM	16QAM	2	H	SISO	H	2	0	1 / 0	40.16
		Low	27700.02	DFT-s-OFDM	64QAM	2	H	SISO	H	2	0	1 / 0	40.11
		Mid	27924.96	DFT-s-OFDM	π/2 BPSK	2	H	SISO	H	2	0	1 / 65	**40.85**
		Mid	27924.96	DFT-s-OFDM	QPSK	2	H	SISO	H	2	0	1 / 65	40.83
		Mid	27924.96	DFT-s-OFDM	16QAM	2	H	SISO	H	2	0	1 / 65	40.79
		Mid	27924.96	DFT-s-OFDM	64QAM	2	H	SISO	H	2	0	1 / 65	40.74
		High	28150.02	DFT-s-OFDM	π/2 BPSK	2	H	SISO	H	2	0	1 / 65	40.72
		High	28150.02	DFT-s-OFDM	QPSK	2	H	SISO	H	2	0	1 / 65	40.65
		High	28150.02	DFT-s-OFDM	16QAM	2	H	SISO	H	2	0	1 / 65	40.60
		High	28150.02	DFT-s-OFDM	64QAM	2	H	SISO	H	2	0	1 / 65	40.59

Table 7-4. n261 EIRP – Donor Side – H Beam

Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
50	1	Low	27525.00	DFT-s-OFDM	π/2 BPSK	0	V	SISO	V	1	0	1 / 0	40.79
		Low	27525.00	DFT-s-OFDM	QPSK	0	V	SISO	V	1	0	1 / 0	40.75
		Low	27525.00	DFT-s-OFDM	16QAM	0	V	SISO	V	1	0	1 / 0	40.73
		Low	27525.00	DFT-s-OFDM	64QAM	0	V	SISO	V	1	0	1 / 0	40.45
		Mid	27924.96	DFT-s-OFDM	π/2 BPSK	0	V	SISO	V	0	0	1 / 31	40.62
		Mid	27924.96	DFT-s-OFDM	QPSK	0	V	SISO	V	0	0	1 / 31	40.45
		Mid	27924.96	DFT-s-OFDM	16QAM	0	V	SISO	V	0	0	1 / 31	40.38
		Mid	27924.96	DFT-s-OFDM	64QAM	0	V	SISO	V	0	0	1 / 31	40.52
		High	28324.92	DFT-s-OFDM	π/2 BPSK	0	V	SISO	V	1	0	1 / 16	**40.96**
		High	28324.92	DFT-s-OFDM	QPSK	0	V	SISO	V	1	0	1 / 16	40.84
		High	28324.92	DFT-s-OFDM	16QAM	0	V	SISO	V	1	0	1 / 16	40.90
		High	28324.92	DFT-s-OFDM	64QAM	0	V	SISO	V	1	0	1 / 16	40.76
100	4	Low	27700.02	DFT-s-OFDM	π/2 BPSK	0	V	SISO	V	1	0	1 / 33	40.09
		Low	27700.02	DFT-s-OFDM	QPSK	0	V	SISO	V	1	0	1 / 33	40.14
		Low	27700.02	DFT-s-OFDM	16QAM	0	V	SISO	V	1	0	1 / 33	40.04
		Low	27700.02	DFT-s-OFDM	64QAM	0	V	SISO	V	1	0	1 / 33	40.02
		Mid	27924.96	DFT-s-OFDM	π/2 BPSK	0	V	SISO	V	1	0	1 / 65	**40.67**
		Mid	27924.96	DFT-s-OFDM	QPSK	0	V	SISO	V	1	0	1 / 65	40.62
		Mid	27924.96	DFT-s-OFDM	16QAM	0	V	SISO	V	1	0	1 / 65	40.55
		Mid	27924.96	DFT-s-OFDM	64QAM	0	V	SISO	V	1	0	1 / 65	40.56
		High	28150.02	DFT-s-OFDM	π/2 BPSK	0	V	SISO	V	1	0	1 / 33	40.63
		High	28150.02	DFT-s-OFDM	QPSK	0	V	SISO	V	1	0	1 / 33	40.62
		High	28150.02	DFT-s-OFDM	16QAM	0	V	SISO	V	1	0	1 / 33	40.52
		High	28150.02	DFT-s-OFDM	64QAM	0	V	SISO	V	1	0	1 / 33	40.32

Table 7-5. n261 EIRP – Donor Side – V Beam

n261 Relay Side

Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
50	1	Low	27525.00	DFT-s-OFDM	π/2 BPSK	0	H	SISO	H	1	0	1 / 31	23.50
		Low	27525.00	DFT-s-OFDM	QPSK	0	H	SISO	H	1	0	1 / 16	23.44
		Low	27525.00	DFT-s-OFDM	16QAM	0	H	SISO	H	1	0	1 / 16	23.31
		Low	27525.00	DFT-s-OFDM	64QAM	0	H	SISO	H	1	0	1 / 16	23.27
		Mid	27924.96	DFT-s-OFDM	π/2 BPSK	0	H	SISO	H	1	0	1 / 31	23.55
		Mid	27924.96	DFT-s-OFDM	QPSK	0	H	SISO	H	1	0	1 / 31	23.29
		Mid	27924.96	DFT-s-OFDM	16QAM	0	H	SISO	H	1	0	1 / 31	23.27
		Mid	27924.96	DFT-s-OFDM	64QAM	0	H	SISO	H	1	0	1 / 31	23.45
		High	28324.92	DFT-s-OFDM	π/2 BPSK	0	H	SISO	H	1	0	1 / 16	23.97
		High	28324.92	DFT-s-OFDM	QPSK	0	H	SISO	H	1	0	1 / 16	**23.98**
		High	28324.92	DFT-s-OFDM	16QAM	0	H	SISO	H	1	0	1 / 16	23.87
		High	28324.92	DFT-s-OFDM	64QAM	0	H	SISO	H	1	0	1 / 16	23.89
100	4	Low	27700.02	DFT-s-OFDM	π/2 BPSK	0	H	SISO	H	1	1	1 / 65	**23.66**
		Low	27700.02	DFT-s-OFDM	QPSK	0	H	SISO	H	1	1	1 / 65	23.60
		Low	27700.02	DFT-s-OFDM	16QAM	0	H	SISO	H	1	1	1 / 65	23.58
		Low	27700.02	DFT-s-OFDM	64QAM	0	H	SISO	H	1	1	1 / 65	23.47
		Mid	27924.96	DFT-s-OFDM	π/2 BPSK	0	H	SISO	H	2	1	1 / 65	23.50
		Mid	27924.96	DFT-s-OFDM	QPSK	0	H	SISO	H	2	1	1 / 65	23.55
		Mid	27924.96	DFT-s-OFDM	16QAM	0	H	SISO	H	2	1	1 / 65	23.48
		Mid	27924.96	DFT-s-OFDM	64QAM	0	H	SISO	H	2	1	1 / 65	23.39
		High	28150.02	DFT-s-OFDM	π/2 BPSK	0	H	SISO	H	1	1	1 / 33	23.48
		High	28150.02	DFT-s-OFDM	QPSK	0	H	SISO	H	1	1	1 / 33	23.37
		High	28150.02	DFT-s-OFDM	16QAM	0	H	SISO	H	1	1	1 / 33	23.35
		High	28150.02	DFT-s-OFDM	64QAM	0	H	SISO	H	1	1	1 / 33	23.31

Table 7-6. n261 EIRP – Relay Side – H Beam

Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
50	1	Low	27525.00	DFT-s-OFDM	π/2 BPSK	0	V	SISO	V	1	0	1 / 16	**23.93**
		Low	27525.00	DFT-s-OFDM	QPSK	0	V	SISO	V	1	0	1 / 16	23.91
		Low	27525.00	DFT-s-OFDM	16QAM	0	V	SISO	V	1	0	1 / 16	23.80
		Low	27525.00	DFT-s-OFDM	64QAM	0	V	SISO	V	1	0	1 / 16	23.79
		Mid	27924.96	DFT-s-OFDM	π/2 BPSK	0	V	SISO	V	1	0	1 / 16	23.63
		Mid	27924.96	DFT-s-OFDM	QPSK	0	V	SISO	V	1	0	1 / 16	23.60
		Mid	27924.96	DFT-s-OFDM	16QAM	0	V	SISO	V	1	0	1 / 16	23.59
		Mid	27924.96	DFT-s-OFDM	64QAM	0	V	SISO	V	1	0	1 / 16	23.44
		High	28324.92	DFT-s-OFDM	π/2 BPSK	0	V	SISO	V	1	0	1 / 0	23.87
		High	28324.92	DFT-s-OFDM	QPSK	0	V	SISO	V	1	0	1 / 0	23.73
		High	28324.92	DFT-s-OFDM	16QAM	0	V	SISO	V	1	0	1 / 0	23.71
		High	28324.92	DFT-s-OFDM	64QAM	0	V	SISO	V	1	0	1 / 0	23.77
100	4	Low	27700.02	DFT-s-OFDM	π/2 BPSK	0	V	SISO	V	1	0	1 / 33	23.56
		Low	27700.02	DFT-s-OFDM	QPSK	0	V	SISO	V	1	0	1 / 33	23.55
		Low	27700.02	DFT-s-OFDM	16QAM	0	V	SISO	V	1	0	1 / 33	23.52
		Low	27700.02	DFT-s-OFDM	64QAM	0	V	SISO	V	1	0	1 / 33	23.45
		Mid	27924.96	DFT-s-OFDM	π/2 BPSK	0	V	SISO	V	1	0	1 / 65	23.87
		Mid	27924.96	DFT-s-OFDM	QPSK	0	V	SISO	V	1	0	1 / 65	**23.95**
		Mid	27924.96	DFT-s-OFDM	16QAM	0	V	SISO	V	1	0	1 / 65	23.89
		Mid	27924.96	DFT-s-OFDM	64QAM	0	V	SISO	V	1	0	1 / 65	23.88
		High	28150.02	DFT-s-OFDM	π/2 BPSK	0	V	SISO	V	1	0	1 / 0	23.64
		High	28150.02	DFT-s-OFDM	QPSK	0	V	SISO	V	1	0	1 / 0	23.67
		High	28150.02	DFT-s-OFDM	16QAM	0	V	SISO	V	1	0	1 / 0	23.65
		High	28150.02	DFT-s-OFDM	64QAM	0	V	SISO	V	1	0	1 / 0	23.63

Table 7-7. n261 EIRP – Relay Side – V Beam

n260 Donor Side

Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
50	1	Low	37025.04	DFT-s-OFDM	π/2 BPSK	12	H	SISO	H	1	0	1 / 16	40.07
		Low	37025.04	DFT-s-OFDM	QPSK	12	H	SISO	H	1	0	1 / 16	40.09
		Low	37025.04	DFT-s-OFDM	16QAM	12	H	SISO	H	1	0	1 / 16	40.05
		Low	37025.04	DFT-s-OFDM	64QAM	12	H	SISO	H	1	0	1 / 16	40.04
		Mid	38499.96	DFT-s-OFDM	π/2 BPSK	12	H	SISO	H	1	0	1 / 16	40.83
		Mid	38499.96	DFT-s-OFDM	QPSK	12	H	SISO	H	1	0	1 / 16	40.87
		Mid	38499.96	DFT-s-OFDM	16QAM	12	H	SISO	H	1	0	1 / 16	40.68
		Mid	38499.96	DFT-s-OFDM	64QAM	12	H	SISO	H	1	0	1 / 16	40.14
		High	39975.00	DFT-s-OFDM	π/2 BPSK	12	H	SISO	H	1	0	1 / 16	**40.93**
		High	39975.00	DFT-s-OFDM	QPSK	12	H	SISO	H	1	0	1 / 16	40.89
		High	39975.00	DFT-s-OFDM	16QAM	12	H	SISO	H	1	0	1 / 16	40.84
		High	39975.00	DFT-s-OFDM	64QAM	12	H	SISO	H	1	0	1 / 16	40.77
100	4	Low	37199.94	DFT-s-OFDM	π/2 BPSK	12	H	SISO	H	1	0	1 / 65	40.12
		Low	37199.94	DFT-s-OFDM	QPSK	12	H	SISO	H	1	0	1 / 65	40.06
		Low	37199.94	DFT-s-OFDM	16QAM	12	H	SISO	H	1	0	1 / 65	40.04
		Low	37199.94	DFT-s-OFDM	64QAM	12	H	SISO	H	1	0	1 / 65	40.01
		Mid	38499.96	DFT-s-OFDM	π/2 BPSK	12	H	SISO	H	1	0	1 / 0	**40.71**
		Mid	38499.96	DFT-s-OFDM	QPSK	12	H	SISO	H	1	0	1 / 0	40.65
		Mid	38499.96	DFT-s-OFDM	16QAM	12	H	SISO	H	1	0	1 / 0	40.50
		Mid	38499.96	DFT-s-OFDM	64QAM	12	H	SISO	H	1	0	1 / 0	40.48
		High	39799.98	DFT-s-OFDM	π/2 BPSK	12	H	SISO	H	1	0	1 / 0	40.32
		High	39799.98	DFT-s-OFDM	QPSK	12	H	SISO	H	1	0	1 / 0	40.29
		High	39799.98	DFT-s-OFDM	16QAM	12	H	SISO	H	1	0	1 / 0	40.23
		High	39799.98	DFT-s-OFDM	64QAM	12	H	SISO	H	1	0	1 / 0	40.25

Table 7-8. n260 EIRP – Donor Side – H Beam

Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
50	1	Low	37025.04	DFT-s-OFDM	π/2 BPSK	0	V	SISO	V	0	0	1 / 31	40.13
		Low	37025.04	DFT-s-OFDM	QPSK	0	V	SISO	V	0	0	1 / 31	**40.17**
		Low	37025.04	DFT-s-OFDM	16QAM	0	V	SISO	V	0	0	1 / 31	40.06
		Low	37025.04	DFT-s-OFDM	64QAM	0	V	SISO	V	0	0	1 / 31	40.01
		Mid	38499.96	DFT-s-OFDM	π/2 BPSK	0	V	SISO	V	1	0	1 / 16	40.15
		Mid	38499.96	DFT-s-OFDM	QPSK	0	V	SISO	V	1	0	1 / 16	40.16
		Mid	38499.96	DFT-s-OFDM	16QAM	0	V	SISO	V	1	0	1 / 16	40.09
		Mid	38499.96	DFT-s-OFDM	64QAM	0	V	SISO	V	1	0	1 / 16	40.07
		High	39975.00	DFT-s-OFDM	π/2 BPSK	0	V	SISO	V	0	0	1 / 0	40.06
		High	39975.00	DFT-s-OFDM	QPSK	0	V	SISO	V	0	0	1 / 0	40.10
		High	39975.00	DFT-s-OFDM	16QAM	0	V	SISO	V	0	0	1 / 0	40.04
		High	39975.00	DFT-s-OFDM	64QAM	0	V	SISO	V	0	0	1 / 0	40.01
100	4	Low	37199.94	DFT-s-OFDM	π/2 BPSK	0	V	SISO	V	0	0	1 / 65	40.24
		Low	37199.94	DFT-s-OFDM	QPSK	0	V	SISO	V	0	0	1 / 65	40.25
		Low	37199.94	DFT-s-OFDM	16QAM	0	V	SISO	V	0	0	1 / 65	40.19
		Low	37199.94	DFT-s-OFDM	64QAM	0	V	SISO	V	0	0	1 / 65	40.12
		Mid	38499.96	DFT-s-OFDM	π/2 BPSK	0	V	SISO	V	1	0	1 / 65	40.86
		Mid	38499.96	DFT-s-OFDM	QPSK	0	V	SISO	V	1	0	1 / 65	**40.88**
		Mid	38499.96	DFT-s-OFDM	16QAM	0	V	SISO	V	1	0	1 / 65	40.81
		Mid	38499.96	DFT-s-OFDM	64QAM	0	V	SISO	V	1	0	1 / 65	40.85
		High	39799.98	DFT-s-OFDM	π/2 BPSK	0	V	SISO	V	1	0	1 / 0	40.51
		High	39799.98	DFT-s-OFDM	QPSK	0	V	SISO	V	1	0	1 / 0	40.38
		High	39799.98	DFT-s-OFDM	16QAM	0	V	SISO	V	1	0	1 / 0	40.34
		High	39799.98	DFT-s-OFDM	64QAM	0	V	SISO	V	1	0	1 / 0	40.24

Table 7-9. n260 EIRP – Donor Side – V Beam

n260 Relay Side

Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
50	1	Low	37025.04	DFT-s-OFDM	π/2 BPSK	0	H	SISO	H	1	1	1 / 16	23.93
		Low	37025.04	DFT-s-OFDM	QPSK	0	H	SISO	H	1	1	1 / 16	23.90
		Low	37025.04	DFT-s-OFDM	16QAM	0	H	SISO	H	1	1	1 / 16	23.89
		Low	37025.04	DFT-s-OFDM	64QAM	0	H	SISO	H	1	1	1 / 16	23.77
		Mid	38499.96	DFT-s-OFDM	π/2 BPSK	0	H	SISO	H	1	0	1 / 16	23.92
		Mid	38499.96	DFT-s-OFDM	QPSK	0	H	SISO	H	1	0	1 / 16	**23.94**
		Mid	38499.96	DFT-s-OFDM	16QAM	0	H	SISO	H	1	0	1 / 16	23.89
		Mid	38499.96	DFT-s-OFDM	64QAM	0	H	SISO	H	1	0	1 / 16	23.81
		High	39975.00	DFT-s-OFDM	π/2 BPSK	0	H	SISO	H	1	0	1 / 31	23.79
		High	39975.00	DFT-s-OFDM	QPSK	0	H	SISO	H	1	0	1 / 31	23.81
		High	39975.00	DFT-s-OFDM	16QAM	0	H	SISO	H	1	0	1 / 31	23.78
		High	39975.00	DFT-s-OFDM	64QAM	0	H	SISO	H	1	0	1 / 31	23.41
100	4	Low	37199.94	DFT-s-OFDM	π/2 BPSK	0	H	SISO	H	1	1	1 / 33	23.35
		Low	37199.94	DFT-s-OFDM	QPSK	0	H	SISO	H	1	1	1 / 33	**23.40**
		Low	37199.94	DFT-s-OFDM	16QAM	0	H	SISO	H	1	1	1 / 33	23.37
		Low	37199.94	DFT-s-OFDM	64QAM	0	H	SISO	H	1	1	1 / 33	23.32
		Mid	38499.96	DFT-s-OFDM	π/2 BPSK	0	H	SISO	H	1	0	1 / 0	23.13
		Mid	38499.96	DFT-s-OFDM	QPSK	0	H	SISO	H	1	0	1 / 0	23.24
		Mid	38499.96	DFT-s-OFDM	16QAM	0	H	SISO	H	1	0	1 / 0	23.20
		Mid	38499.96	DFT-s-OFDM	64QAM	0	H	SISO	H	1	0	1 / 0	23.16
		High	39799.98	DFT-s-OFDM	π/2 BPSK	0	H	SISO	H	2	0	1 / 65	23.16
		High	39799.98	DFT-s-OFDM	QPSK	0	H	SISO	H	2	0	1 / 65	23.23
		High	39799.98	DFT-s-OFDM	16QAM	0	H	SISO	H	2	0	1 / 65	23.18
		High	39799.98	DFT-s-OFDM	64QAM	0	H	SISO	H	2	0	1 / 65	23.06

Table 7-10. n260 EIRP – Relay Side – H Beam

Bandwidth (MHz)	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	BeamI D	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
50	1	Low	37025.04	DFT-s-OFDM	π/2 BPSK	0	V	SISO	V	1	0	1 / 16	**23.96**
		Low	37025.04	DFT-s-OFDM	QPSK	0	V	SISO	V	1	0	1 / 16	23.95
		Low	37025.04	DFT-s-OFDM	16QAM	0	V	SISO	V	1	0	1 / 16	23.80
		Low	37025.04	DFT-s-OFDM	64QAM	0	V	SISO	V	1	0	1 / 16	23.92
		Mid	38499.96	DFT-s-OFDM	π/2 BPSK	0	V	SISO	V	1	0	1 / 0	23.76
		Mid	38499.96	DFT-s-OFDM	QPSK	0	V	SISO	V	1	0	1 / 0	23.68
		Mid	38499.96	DFT-s-OFDM	16QAM	0	V	SISO	V	1	0	1 / 0	23.66
		Mid	38499.96	DFT-s-OFDM	64QAM	0	V	SISO	V	1	0	1 / 0	23.72
		High	39975.00	DFT-s-OFDM	π/2 BPSK	0	V	SISO	V	0	0	1 / 31	23.87
		High	39975.00	DFT-s-OFDM	QPSK	0	V	SISO	V	0	0	1 / 31	23.69
		High	39975.00	DFT-s-OFDM	16QAM	0	V	SISO	V	1	0	1 / 31	23.63
		High	39975.00	DFT-s-OFDM	64QAM	0	V	SISO	V	1	0	1 / 31	23.61
100	4	Low	37199.94	DFT-s-OFDM	π/2 BPSK	0	V	SISO	V	1	0	1 / 33	**23.94**
		Low	37199.94	DFT-s-OFDM	QPSK	0	V	SISO	V	1	0	1 / 33	23.87
		Low	37199.94	DFT-s-OFDM	16QAM	0	V	SISO	V	1	0	1 / 33	23.85
		Low	37199.94	DFT-s-OFDM	64QAM	0	V	SISO	V	1	0	1 / 33	23.79
		Mid	38499.96	DFT-s-OFDM	π/2 BPSK	0	V	SISO	V	1	0	1 / 0	23.51
		Mid	38499.96	DFT-s-OFDM	QPSK	0	V	SISO	V	1	0	1 / 0	23.53
		Mid	38499.96	DFT-s-OFDM	16QAM	0	V	SISO	V	1	0	1 / 0	23.50
		Mid	38499.96	DFT-s-OFDM	64QAM	0	V	SISO	V	1	0	1 / 0	23.49
		High	39799.98	DFT-s-OFDM	π/2 BPSK	0	V	SISO	V	1	0	1 / 65	23.92
		High	39799.98	DFT-s-OFDM	QPSK	0	V	SISO	V	1	0	1 / 65	23.93
		High	39799.98	DFT-s-OFDM	16QAM	0	V	SISO	V	1	0	1 / 65	23.84
		High	39799.98	DFT-s-OFDM	64QAM	0	V	SISO	V	1	0	1 / 65	23.80

Table 7-11. n260 EIRP – Relay Side – V Beam

7.4 Radiated Spurious and Harmonic Emissions

§2.1051, §30.203

Test Overview

The spectrum is scanned from 30MHz to 100GHz for n261 band, and 30MHz to 200MHz for n260 band. All out of band emissions are measured in a radiated test setup while the EUT is operating at the appropriate frequencies with the max power condition as specified by the AGC software of the EUT. All modulations were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

The conductive power or total radiated power of any emissions outside a licensee's frequency block shall be -13dBm/1MHz.

Test Procedure Used

ANSI C63.26-2015 Section 5.7.4

Test Settings

1. Start frequency was set to 30MHz and stop frequency was set to 100 GHz. Several plots are used to show investigations in this entire span.
2. Detector = RMS
3. Trace mode = Max Hold
4. Sweep time = auto couple
5. Number of sweep points ≥ 2 x Span/RBW
6. The trace was allowed to stabilize
7. RBW = 1MHz, VBW = 3MHz

Test Notes

1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below. The worst case found was QPSK, 1RB and was tested as such. All configurations of EUT on Donor side and Relay side were investigated and the worst case was included in this report.

2) All radiated spurious emissions were measured as EIRP to compare with the §30.203 TRP limits.

3) The plots from 1-200GHz show corrected EIRP levels. Plots below 1GHz are corrected field strength levels. The EIRP reported below is calculated per section 5.2.7 of ANSI C63.26-2015 which states:

   EIRP (dBm) = E (dBμV/m) + 20log(D) − 104.8; where D is the measurement distance (in the far field region) in m.

   The field strength E is calculated E (dBμV/m) = Spectrum Analyzer Level (dBm) + Antenna Factor (dB/m) + Cable Loss (dB) + Harmonic Mixer Conversion Loss (dB) + 107.

All appropriate Antenna Factor and Cable Loss have been applied in the spectrum analyzer for each measurement. For measurements > 40GHz, Harmonic Mixer Conversion Loss was also applied to the spectrum analyzer.

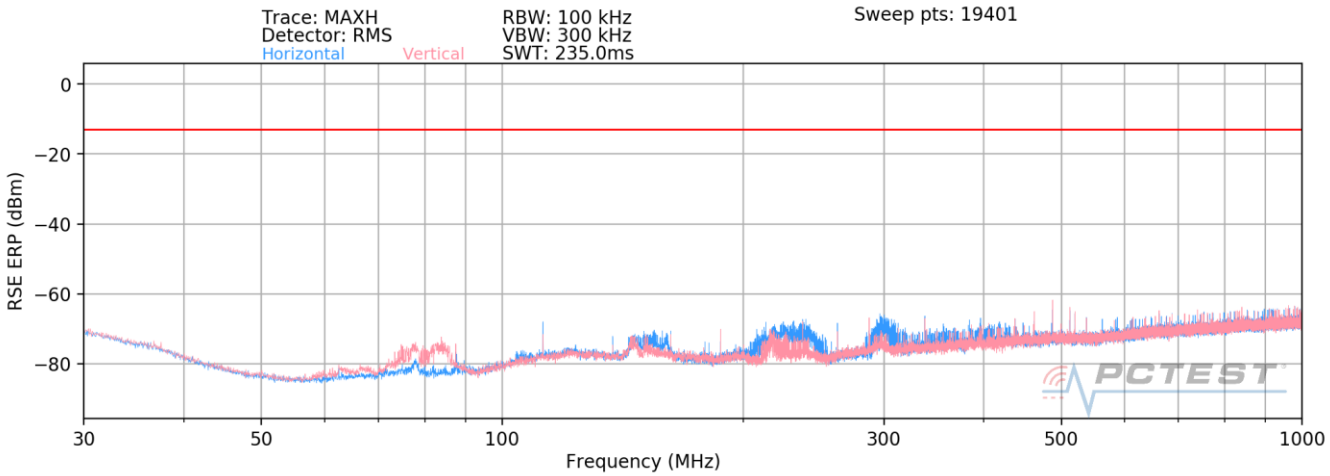
4) Emissions below 18GHz were measured at a 3 meter test distance, while emissions above 18GHz were measured at the appropriate far field distance. The far field of the mmWave signal is based on formula: R > 2D^2/wavelength, where D is the larger between the dimension of the measurement antenna and the transmitting antenna of the EUT.

5) All emissions from 30MHz - 40GHz were measured using a spectrum analyzer with an internal preamplifier. Emissions >40GHz were measured using a harmonic mixer with the spectrum analyzer.

6) The "-" shown in the following RSE tables are used to denote a noise floor measurement.

n261 Donor Side RSE

30MHz – 1GHz



Plot 7-65. Radiated Spurious Plot 30 MHz - 1 GHz (1CC QPSK Mid Channel)

Spurious Emissions ERP Sample Calculation

The raw radiated spurious level is converted to field strength in dBµV/m. Then, the RSE ERP level is calculated by applying the additional factors shown below for a test distance of 3 meter.

RSE ERP [dBm] = Analyzer Level [dBm] + 107 + AFCL [dB/m] + 20Log(Dm) – 104.8 – 2.15dB

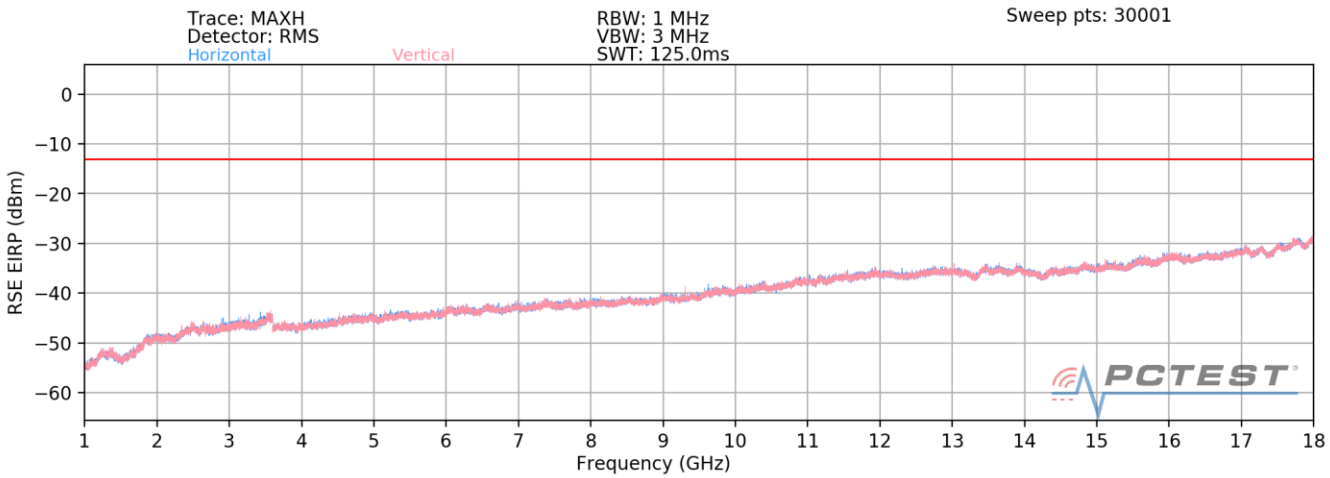
Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Antenna Height [cm]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
137.37	Low	50	H	QPSK	H	132	230	-69.20	-13.00	-56.20
225.19	Low	50	H	QPSK	H	134	138	-68.82	-13.00	-55.82
187.51	Mid	50	H	QPSK	H	104	151	-62.63	-13.00	-49.63
223.80	Mid	50	H	QPSK	H	126	122	-71.98	-13.00	-58.98
162.55	High	50	H	QPSK	H	239	166	-72.82	-13.00	-59.82
225.87	High	50	H	QPSK	H	133	127	-68.88	-13.00	-55.88

Table 7-12. Spurious Emissions Table (30MHz-1GHz)

Notes

The RSE ERP level is taken directly from the spectrum analyzer which includes the appropriate antenna factors, cable losses. Measurements were performed at a distance of 3 meter.

1 – 18GHz



Plot 7-66. Radiated Spurious Plot 1-18 GHz (1CC QPSK Mid Channel)

Spurious Emissions EIRP Sample Calculation

The raw radiated spurious level is converted to field strength in dBµV/m. Then, the RSE EIRP level is calculated by applying the additional factors shown below for a test distance of 3 meter.

RSE EIRP [dBm] = Analyzer Level [dBm] + 107 + AFCL [dB/m] + 20Log(Dm) – 104.8

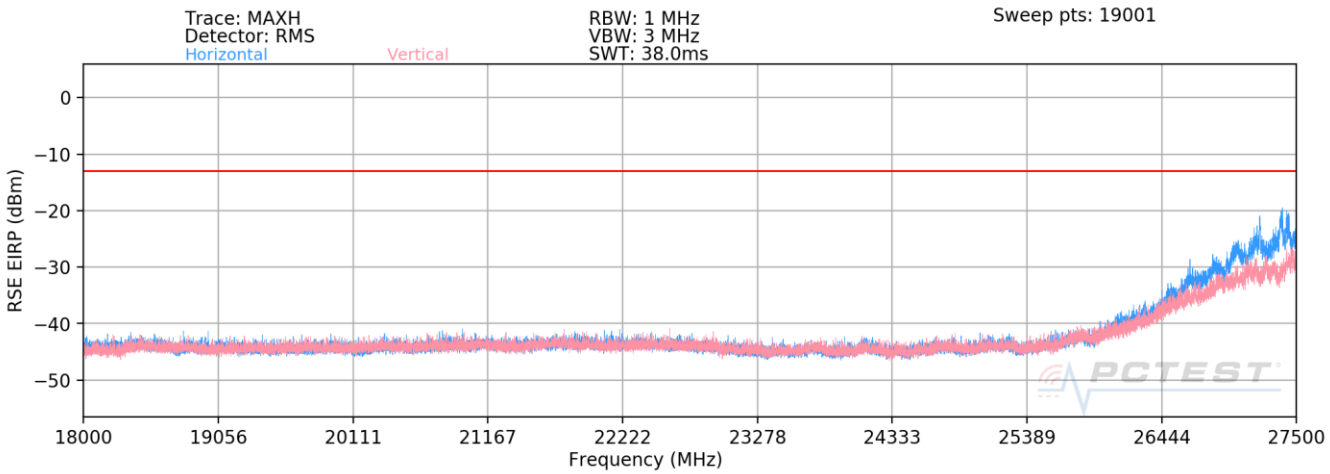
Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Antenna Height [cm]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
17682.53	Low	50	H	QPSK	H	-	-	-29.43	-13.00	-16.43
17718.43	Mid	50	H	QPSK	H	-	-	-29.22	-13.00	-16.22
17800.64	High	50	H	QPSK	H	-	-	-29.53	-13.00	-16.53

Table 7-13. Spurious Emissions Table (1GHz-18GHz)

Notes

The RSE EIRP level is taken directly from the spectrum analyzer which includes the appropriate antenna factors, cable losses. Measurements were performed at a distance of 3 meter.

18 – 27.5GHz



Plot 7-67. Radiated Spurious Plot 18-27.5 GHz (1CC QPSK Mid Channel)

Spurious Emissions EIRP Sample Calculation

The raw radiated spurious level is converted to field strength in dBµV/m. Then, the RSE EIRP level is calculated by applying the additional factors shown below for a test distance of 1 meter.

RSE EIRP [dBm] = Analyzer Level [dBm] + 107 + AFCL [dB/m] + 20Log(Dm) – 104.8

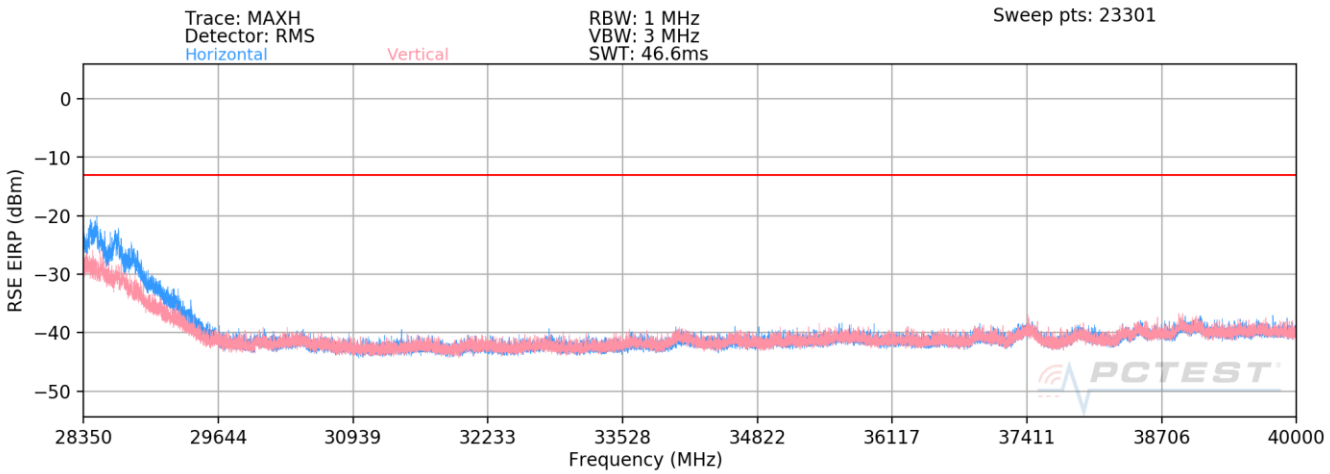
Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
27380.05	Low	50	H	QPSK	H	1	0	-20.85	-13.00	-7.85
27381.46	Mid	50	H	QPSK	H	1	0	-20.95	-13.00	-7.95
27374.86	High	50	H	QPSK	H	1	0	-20.61	-13.00	-7.61

Table 7-14. Spurious Emissions Table (18-27.5GHz)

Notes

The RSE EIRP level is taken directly from the spectrum analyzer which includes the appropriate antenna factors, cable losses. Measurements were performed at a distance of 1 meter.

28.35 – 40GHz



Plot 7-68. Radiated Spurious Plot 28.35-40 GHz (1CC QPSK Mid Channel)

Spurious Emissions EIRP Sample Calculation

The raw radiated spurious level is converted to field strength in dBµV/m. Then, the RSE EIRP level is calculated by applying the additional factors shown below for a test distance of 1 meter.

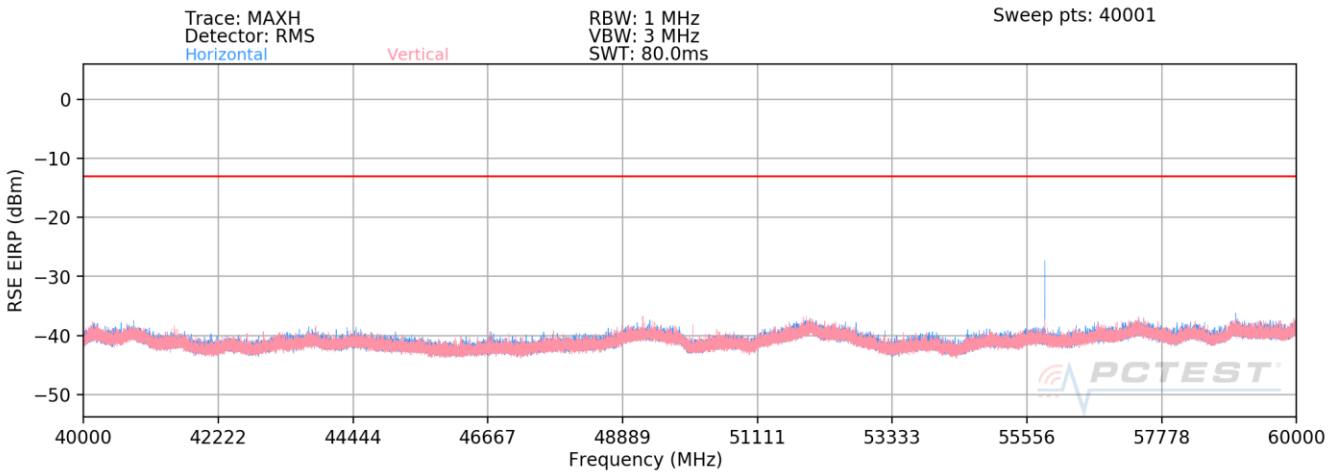
RSE EIRP [dBm] = Analyzer Level [dBm] + 107 + AFCL [dB/m] + 20Log(Dm) – 104.8

Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
28463.61	Low	50	H	QPSK	H	1	0	-21.99	-13.00	-8.99
28476.65	Mid	50	H	QPSK	H	1	0	-22.35	-13.00	-9.35
28462.60	High	50	H	QPSK	H	1	0	-22.04	-13.00	-9.04

Table 7-15. Spurious Emissions Table (28.35-40 GHz)

Notes

The RSE EIRP level is taken directly from the spectrum analyzer which includes the appropriate antenna factors, cable losses. Measurements were performed at a distance of 1 meter.



Plot 7-69. Radiated Spurious Plot 40-60 GHz (1CC QPSK Mid Channel)

Spurious Emissions EIRP Sample Calculation

The raw radiated spurious level is converted to field strength in dBµV/m. Then, the RSE EIRP level is calculated by applying the additional factors shown below for a test distance of 1.5 meter.

RSE EIRP [dBm] = Analyzer Level [dBm] + 107 + AFCL [dB/m] + 20Log(Dm) + Harmonic Mixer Loss (dB) – 104.8

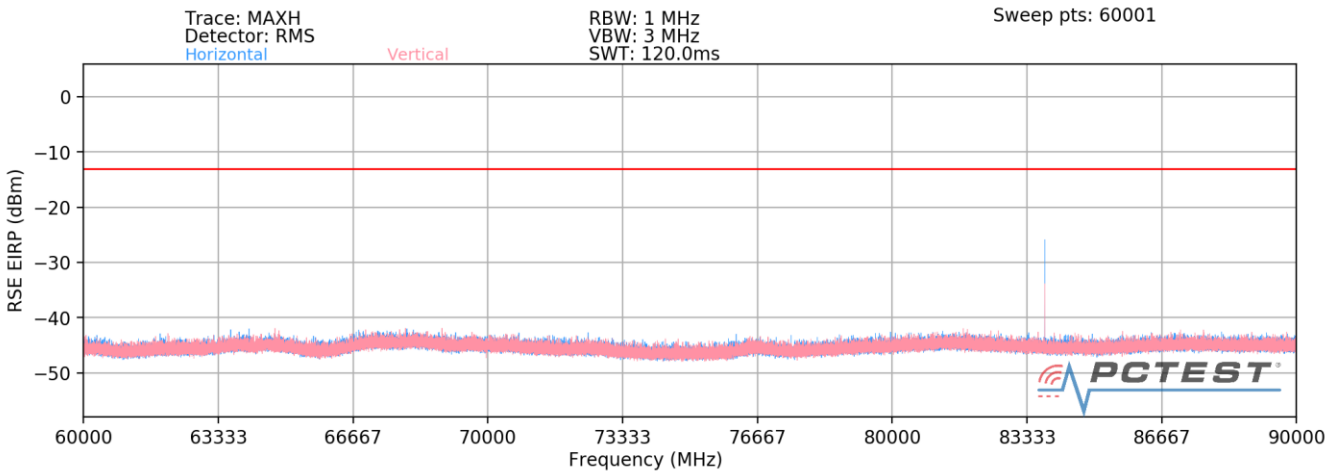
Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
55051.20	Low	50	H	QPSK	H	1	0	-29.41	-13.00	-16.41
55851.21	Mid	50	H	QPSK	H	2	0	-28.08	-13.00	-15.08
56650.43	High	50	H	QPSK	H	2	0	-30.69	-13.00	-17.69

Table 7-16. Spurious Emissions Table (40 - 60GHz)

Notes

The RSE EIRP level is taken directly from the spectrum analyzer which includes the appropriate antenna factors, cable losses, and harmonic mixer conversion losses. Measurements were performed at a distance of 1.5 meter.

60 – 90GHz



Plot 7-70. Radiated Spurious Plot 60-90 GHz (1CC QPSK Mid Channel)

Spurious Emissions EIRP Sample Calculation

The raw radiated spurious level is converted to field strength in dBµV/m. Then, the RSE EIRP level is calculated by applying the additional factors shown below for a test distance of 1 meter.

RSE EIRP [dBm] = Analyzer Level [dBm] + 107 + AFCL [dB/m] + 20Log(Dm) + Harmonic Mixer Loss (dB) – 104.8

Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
82576.95	Low	50	H	QPSK	H	2	0	-29.05	-13.00	-16.05
83777.07	Mid	50	H	QPSK	H	1	0	-27.97	-13.00	-14.97
84976.98	High	50	H	QPSK	H	1	0	-27.84	-13.00	-14.84

Table 7-17. Spurious Emissions Table (60-90GHz)

Notes

The RSE EIRP level is taken directly from the spectrum analyzer which includes the appropriate antenna factors, cable losses, and harmonic mixer conversion losses. Measurements were performed at a distance of 1 meter.