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MEASUREMENT REPORT FCC Part 30 5G mmWave

Applicant Name:

LG Electronics USA, Inc.
1000 Sylvan Avenue
Englewood Cliffs, NJ 07632
United States

Date of Testing:

11/25/2019-1/17/2020

Test Site/Location:

PCTEST Lab. Columbia, MD, USA

Test Report Serial No.:

1M1911250199-06.ZNF

FCC ID:

ZNFV600VM

APPLICANT:

LG Electronics USA, Inc.

Application Type:

Certification

Model:

LM-V600VM

Additional Model(s):

LMV600VM, V600VM, LM-V600QM5, LMV600QM5, V600QM5,
LM-V600QM6, LMV600QM6, V600QM6

EUT Type:

Portable Handset

FCC Classification:

Part 30 Mobile Transmitter (5GM)

FCC Rule Part(s):

30

Test Procedure(s):

ANSI C63.26-2015, KDB 971168 D01 v03r01, KDB 842590 D01 v01

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.

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



FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset		Page 1 of 210

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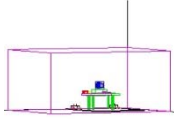
V1.0

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T A B L E O F C O N T E N T S

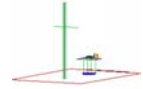
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FCC Part 30



Band	FCC Rule Part	Mode	Antenna	Bandwidth (MHz)	CCs Active	Tx Frequency (MHz)	EIRP		Emission Designator	Modulation
							Max. Power (W)	Max. Power (dBm)		
n261	30	SISO	Ant1	50	1	27500 - 28350	0.288	24.59	45M6G7D	QPSK
n261	30	SISO	Ant1	50	1	27500 - 28350	0.176	22.46	45M8W7D	16QAM
n261	30	SISO	Ant1	50	1	27500 - 28350	0.104	20.18	46M3W7D	64QAM
n261	30	MIMO	Ant1	50	1	27500 - 28350	0.495	26.94	45M6G7D	QPSK
n261	30	MIMO	Ant1	50	1	27500 - 28350	0.303	24.81	45M8W7D	16QAM
n261	30	MIMO	Ant1	50	1	27500 - 28350	0.181	22.58	46M3W7D	64QAM
n261	30	SISO	Ant1	50	4	27500 - 28350	0.131	21.18	194MG7D	QPSK
n261	30	SISO	Ant1	50	4	27500 - 28350	0.095	19.79	194MW7D	16QAM
n261	30	SISO	Ant1	50	4	27500 - 28350	0.053	17.22	196MW7D	64QAM
n261	30	MIMO	Ant1	50	4	27500 - 28350	0.210	23.23	194MG7D	QPSK
n261	30	MIMO	Ant1	50	4	27500 - 28350	0.149	21.73	194MW7D	16QAM
n261	30	MIMO	Ant1	50	4	27500 - 28350	0.087	19.41	196MW7D	64QAM
n261	30	SISO	Ant1	100	1	27500 - 28350	0.315	24.98	92M8G7D	QPSK
n261	30	SISO	Ant1	100	1	27500 - 28350	0.185	22.68	92M6W7D	16QAM
n261	30	SISO	Ant1	100	1	27500 - 28350	0.166	22.21	92M9W7D	64QAM
n261	30	MIMO	Ant1	100	1	27500 - 28350	0.538	27.30	92M8G7D	QPSK
n261	30	MIMO	Ant1	100	1	27500 - 28350	0.326	25.13	92M6W7D	16QAM
n261	30	MIMO	Ant1	100	1	27500 - 28350	0.199	22.98	92M9W7D	64QAM
n261	30	SISO	Ant1	100	4	27500 - 28350	0.095	19.79	390MG7D	QPSK
n261	30	SISO	Ant1	100	4	27500 - 28350	0.063	17.98	390MW7D	16QAM
n261	30	SISO	Ant1	100	4	27500 - 28350	0.037	15.70	391MW7D	64QAM
n261	30	MIMO	Ant1	100	4	27500 - 28350	0.159	22.00	390MG7D	QPSK
n261	30	MIMO	Ant1	100	4	27500 - 28350	0.106	20.27	390MW7D	16QAM
n261	30	MIMO	Ant1	100	4	27500 - 28350	0.065	18.13	391MW7D	64QAM

EUT Overview (QTM0 - Band n261)

Band	FCC Rule Part	Mode	Antenna	Bandwidth (MHz)	CCs Active	Tx Frequency (MHz)	EIRP		Emission Designator	Modulation
							Max. Power (W)	Max. Power (dBm)		
n261	30	SISO	Ant2	50	1	27500 - 28350	0.333	25.23	45M3G7D	QPSK
n261	30	SISO	Ant2	50	1	27500 - 28350	0.254	24.05	45M5W7D	16QAM
n261	30	SISO	Ant2	50	1	27500 - 28350	0.164	22.14	45M5W7D	64QAM
n261	30	MIMO	Ant2	50	1	27500 - 28350	0.554	27.44	45M3G7D	QPSK
n261	30	MIMO	Ant2	50	1	27500 - 28350	0.416	26.19	45M5W7D	16QAM
n261	30	MIMO	Ant2	50	1	27500 - 28350	0.268	24.28	45M5W7D	64QAM
n261	30	SISO	Ant2	50	4	27500 - 28350	0.145	21.61	194MG7D	QPSK
n261	30	SISO	Ant2	50	4	27500 - 28350	0.097	19.89	194MW7D	16QAM
n261	30	SISO	Ant2	50	4	27500 - 28350	0.055	17.38	194MW7D	64QAM
n261	30	MIMO	Ant2	50	4	27500 - 28350	0.257	24.11	194MG7D	QPSK
n261	30	MIMO	Ant2	50	4	27500 - 28350	0.176	22.45	194MW7D	16QAM
n261	30	MIMO	Ant2	50	4	27500 - 28350	0.102	20.07	194MW7D	64QAM
n261	30	SISO	Ant2	100	1	27500 - 28350	0.353	25.48	90M4G7D	QPSK
n261	30	SISO	Ant2	100	1	27500 - 28350	0.224	23.51	90M6W7D	16QAM
n261	30	SISO	Ant2	100	1	27500 - 28350	0.128	21.07	90M7W7D	64QAM
n261	30	MIMO	Ant2	100	1	27500 - 28350	0.606	27.82	90M4G7D	QPSK
n261	30	MIMO	Ant2	100	1	27500 - 28350	0.377	25.76	90M6W7D	16QAM
n261	30	MIMO	Ant2	100	1	27500 - 28350	0.221	23.44	90M7W7D	64QAM
n261	30	SISO	Ant2	100	4	27500 - 28350	0.113	20.54	387MG7D	QPSK
n261	30	SISO	Ant2	100	4	27500 - 28350	0.076	18.82	387MW7D	16QAM
n261	30	SISO	Ant2	100	4	27500 - 28350	0.044	16.39	389MW7D	64QAM
n261	30	MIMO	Ant2	100	4	27500 - 28350	0.206	23.13	387MG7D	QPSK
n261	30	MIMO	Ant2	100	4	27500 - 28350	0.139	21.43	387MW7D	16QAM
n261	30	MIMO	Ant2	100	4	27500 - 28350	0.082	19.16	389MW7D	64QAM

EUT Overview (QTM1 - Band n261)

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Band	FCC Rule Part	Mode	Antenna	Bandwidth (MHz)	CCs Active	Tx Frequency (MHz)	EIRP		Emission Designator	Modulation
							Max. Power (W)	Max. Power (dBm)		
n261	30	SISO	Ant3	50	1	27500 - 28350	0.166	22.21	45M4G7D	QPSK
n261	30	SISO	Ant3	50	1	27500 - 28350	0.095	19.77	45M6W7D	16QAM
n261	30	SISO	Ant3	50	1	27500 - 28350	0.060	17.80	45M7W7D	64QAM
n261	30	MIMO	Ant3	50	1	27500 - 28350	0.320	25.05	45M4G7D	QPSK
n261	30	MIMO	Ant3	50	1	27500 - 28350	0.187	22.71	45M6W7D	16QAM
n261	30	MIMO	Ant3	50	1	27500 - 28350	0.120	20.78	45M7W7D	64QAM
n261	30	SISO	Ant3	50	4	27500 - 28350	0.067	18.28	194MG7D	QPSK
n261	30	SISO	Ant3	50	4	27500 - 28350	0.046	16.65	194MW7D	16QAM
n261	30	SISO	Ant3	50	4	27500 - 28350	0.028	14.48	197MW7D	64QAM
n261	30	MIMO	Ant3	50	4	27500 - 28350	0.113	20.54	194MG7D	QPSK
n261	30	MIMO	Ant3	50	4	27500 - 28350	0.074	18.72	194MW7D	16QAM
n261	30	MIMO	Ant3	50	4	27500 - 28350	0.047	16.68	197MW7D	64QAM
n261	30	SISO	Ant3	100	1	27500 - 28350	0.177	22.48	90M6G7D	QPSK
n261	30	SISO	Ant3	100	1	27500 - 28350	0.103	20.13	91M0W7D	16QAM
n261	30	SISO	Ant3	100	1	27500 - 28350	0.067	18.23	91M2W7D	64QAM
n261	30	MIMO	Ant3	100	1	27500 - 28350	0.335	25.25	90M6G7D	QPSK
n261	30	MIMO	Ant3	100	1	27500 - 28350	0.201	23.04	91M0W7D	16QAM
n261	30	MIMO	Ant3	100	1	27500 - 28350	0.127	21.03	91M2W7D	64QAM
n261	30	SISO	Ant3	100	4	27500 - 28350	0.049	16.90	383MG7D	QPSK
n261	30	SISO	Ant3	100	4	27500 - 28350	0.032	15.09	384MW7D	16QAM
n261	30	SISO	Ant3	100	4	27500 - 28350	0.022	13.39	386MW7D	64QAM
n261	30	MIMO	Ant3	100	4	27500 - 28350	0.085	19.31	383MG7D	QPSK
n261	30	MIMO	Ant3	100	4	27500 - 28350	0.057	17.55	384MW7D	16QAM
n261	30	MIMO	Ant3	100	4	27500 - 28350	0.037	15.70	386MW7D	64QAM

EUT Overview (QTM2 - Band n261)

Band	FCC Rule Part	Mode	Antenna	Bandwidth (MHz)	CCs Active	Tx Frequency (MHz)	EIRP		Emission Designator	Modulation
							Max. Power (W)	Max. Power (dBm)		
n260	30	SISO	Ant1	50	1	37000 - 40000	0.376	25.75	45M4G7D	QPSK
n260	30	SISO	Ant1	50	1	37000 - 40000	0.288	24.59	48M2W7D	16QAM
n260	30	SISO	Ant1	50	1	37000 - 40000	0.141	21.49	45M8W7D	64QAM
n260	30	MIMO	Ant1	50	1	37000 - 40000	0.646	28.10	45M4G7D	QPSK
n260	30	MIMO	Ant1	50	1	37000 - 40000	0.456	26.59	48M2W7D	16QAM
n260	30	MIMO	Ant1	50	1	37000 - 40000	0.248	23.94	45M8W7D	64QAM
n260	30	SISO	Ant1	50	4	37000 - 40000	0.085	19.32	194MG7D	QPSK
n260	30	SISO	Ant1	50	4	37000 - 40000	0.056	17.50	195MW7D	16QAM
n260	30	SISO	Ant1	50	4	37000 - 40000	0.034	15.37	195MW7D	64QAM
n260	30	MIMO	Ant1	50	4	37000 - 40000	0.141	21.50	194MG7D	QPSK
n260	30	MIMO	Ant1	50	4	37000 - 40000	0.094	19.73	195MW7D	16QAM
n260	30	MIMO	Ant1	50	4	37000 - 40000	0.058	17.61	195MW7D	64QAM
n260	30	SISO	Ant1	100	1	37000 - 40000	0.350	25.45	90M8G7D	QPSK
n260	30	SISO	Ant1	100	1	37000 - 40000	0.206	23.15	90M2W7D	16QAM
n260	30	SISO	Ant1	100	1	37000 - 40000	0.130	21.13	90M9W7D	64QAM
n260	30	MIMO	Ant1	100	1	37000 - 40000	0.597	27.76	90M8G7D	QPSK
n260	30	MIMO	Ant1	100	1	37000 - 40000	0.366	25.63	90M2W7D	16QAM
n260	30	MIMO	Ant1	100	1	37000 - 40000	0.232	23.66	90M9W7D	64QAM
n260	30	SISO	Ant1	100	4	37000 - 40000	0.056	17.51	390MG7D	QPSK
n260	30	SISO	Ant1	100	4	37000 - 40000	0.040	16.01	392MW7D	16QAM
n260	30	SISO	Ant1	100	4	37000 - 40000	0.024	13.87	399MW7D	64QAM
n260	30	MIMO	Ant1	100	4	37000 - 40000	0.095	19.79	390MG7D	QPSK
n260	30	MIMO	Ant1	100	4	37000 - 40000	0.067	18.29	392MW7D	16QAM
n260	30	MIMO	Ant1	100	4	37000 - 40000	0.043	16.35	399MW7D	64QAM

EUT Overview (QTM0 - Band n260)

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Band	FCC Rule Part	Mode	Antenna	Bandwidth (MHz)	CCs Active	Tx Frequency (MHz)	EIRP		Emission Designator	Modulation
							Max. Power (W)	Max. Power (dBm)		
n260	30	SISO	Ant2	50	1	37000 - 40000	0.330	25.19	45M4G7D	QPSK
n260	30	SISO	Ant2	50	1	37000 - 40000	0.226	23.55	45M3W7D	16QAM
n260	30	SISO	Ant2	50	1	37000 - 40000	0.137	21.36	45M4W7D	64QAM
n260	30	MIMO	Ant2	50	1	37000 - 40000	0.624	27.95	45M4G7D	QPSK
n260	30	MIMO	Ant2	50	1	37000 - 40000	0.414	26.17	45M3W7D	16QAM
n260	30	MIMO	Ant2	50	1	37000 - 40000	0.254	24.05	45M4W7D	64QAM
n260	30	SISO	Ant2	50	4	37000 - 40000	0.119	20.76	195MG7D	QPSK
n260	30	SISO	Ant2	50	4	37000 - 40000	0.073	18.65	198MW7D	16QAM
n260	30	SISO	Ant2	50	4	37000 - 40000	0.043	16.38	197MW7D	64QAM
n260	30	MIMO	Ant2	50	4	37000 - 40000	0.224	23.51	195MG7D	QPSK
n260	30	MIMO	Ant2	50	4	37000 - 40000	0.138	21.41	198MW7D	16QAM
n260	30	MIMO	Ant2	50	4	37000 - 40000	0.083	19.17	197MW7D	64QAM
n260	30	SISO	Ant2	100	1	37000 - 40000	0.290	24.63	90M3G7D	QPSK
n260	30	SISO	Ant2	100	1	37000 - 40000	0.199	23.00	90M6W7D	16QAM
n260	30	SISO	Ant2	100	1	37000 - 40000	0.116	20.63	91M0W7D	64QAM
n260	30	MIMO	Ant2	100	1	37000 - 40000	0.577	27.61	90M3G7D	QPSK
n260	30	MIMO	Ant2	100	1	37000 - 40000	0.384	25.84	90M6W7D	16QAM
n260	30	MIMO	Ant2	100	1	37000 - 40000	0.227	23.57	91M0W7D	64QAM
n260	30	SISO	Ant2	100	4	37000 - 40000	0.120	20.80	391MG7D	QPSK
n260	30	SISO	Ant2	100	4	37000 - 40000	0.087	19.41	388MW7D	16QAM
n260	30	SISO	Ant2	100	4	37000 - 40000	0.054	17.35	395MW7D	64QAM
n260	30	MIMO	Ant2	100	4	37000 - 40000	0.227	23.55	391MG7D	QPSK
n260	30	MIMO	Ant2	100	4	37000 - 40000	0.160	22.05	388MW7D	16QAM
n260	30	MIMO	Ant2	100	4	37000 - 40000	0.104	20.16	395MW7D	64QAM

EUT Overview (QTM1 - Band n260)

Band	FCC Rule Part	Mode	Antenna	Bandwidth (MHz)	CCs Active	Tx Frequency (MHz)	EIRP		Emission Designator	Modulation
							Max. Power (W)	Max. Power (dBm)		
n260	30	SISO	Ant3	50	1	37000 - 40000	0.202	23.06	45M7G7D	QPSK
n260	30	SISO	Ant3	50	1	37000 - 40000	0.119	20.77	45M5W7D	16QAM
n260	30	SISO	Ant3	50	1	37000 - 40000	0.071	18.54	45M3W7D	64QAM
n260	30	MIMO	Ant3	50	1	37000 - 40000	0.402	26.04	45M7G7D	QPSK
n260	30	MIMO	Ant3	50	1	37000 - 40000	0.237	23.74	45M5W7D	16QAM
n260	30	MIMO	Ant3	50	1	37000 - 40000	0.141	21.49	45M3W7D	64QAM
n260	30	SISO	Ant3	50	4	37000 - 40000	0.085	19.30	195MG7D	QPSK
n260	30	SISO	Ant3	50	4	37000 - 40000	0.052	17.20	197MW7D	16QAM
n260	30	SISO	Ant3	50	4	37000 - 40000	0.033	15.15	196MW7D	64QAM
n260	30	MIMO	Ant3	50	4	37000 - 40000	0.166	22.19	195MG7D	QPSK
n260	30	MIMO	Ant3	50	4	37000 - 40000	0.103	20.12	197MW7D	16QAM
n260	30	MIMO	Ant3	50	4	37000 - 40000	0.063	17.98	196MW7D	64QAM
n260	30	SISO	Ant3	100	1	37000 - 40000	0.194	22.88	90M6G7D	QPSK
n260	30	SISO	Ant3	100	1	37000 - 40000	0.129	21.12	90M3W7D	16QAM
n260	30	SISO	Ant3	100	1	37000 - 40000	0.089	19.49	91M3W7D	64QAM
n260	30	MIMO	Ant3	100	1	37000 - 40000	0.372	25.70	90M6G7D	QPSK
n260	30	MIMO	Ant3	100	1	37000 - 40000	0.238	23.76	90M3W7D	16QAM
n260	30	MIMO	Ant3	100	1	37000 - 40000	0.154	21.87	91M3W7D	64QAM
n260	30	SISO	Ant3	100	4	37000 - 40000	0.083	19.20	389MG7D	QPSK
n260	30	SISO	Ant3	100	4	37000 - 40000	0.062	17.92	393MW7D	16QAM
n260	30	SISO	Ant3	100	4	37000 - 40000	0.040	16.00	395MW7D	64QAM
n260	30	MIMO	Ant3	100	4	37000 - 40000	0.164	22.15	389MG7D	QPSK
n260	30	MIMO	Ant3	100	4	37000 - 40000	0.115	20.61	393MW7D	16QAM
n260	30	MIMO	Ant3	100	4	37000 - 40000	0.077	18.84	395MW7D	64QAM

EUT Overview (QTM2 - Band n260)

FCC ID: ZNFV600VM	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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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 Engineering Laboratory, Inc. 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 Engineering Lab located in Columbia, MD 21046, U.S.A.

- PCTEST is an ISO 17025-2005 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 ISSED Standards (RSS).
- PCTEST facility is a registered (2451B) test laboratory with the site description on file with ISSED.

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **LG Portable Handset FCC ID: ZNFV600VM**. The test data contained in this report pertains only to the emissions due to the EUT's 5G mmWave function.

The EUT has 3 dual pole patch arrays (Denoted as QTM#0, QTM#1 and QTM#2). The dual pole patch array each consists of 4 radiating elements. Each of the patch antennas is comprised of two separate antenna feeds – one for horizontal and one for vertical polarization.

The EUT supports up to 8CC for DL, and 4CC for UL. For each CC, the EUT supports both 50MHz bandwidth and 100MHz bandwidth. For modulation, the EUT supports a subcarrier spacing (SCS) of 120kHz with two transmission schemes, CP-OFDM and DFT-s-OFDM, with QPSK, 16QAM and 64QAM. Different Beam IDs are supported, each corresponding to a different position in space for each antenna. During testing, FTM (Factory Test Mode) was used to operate the transmitter. MIMO operation was achieved by enabling two Beam IDs at the same time: one is from the list of H Beam IDs and other is from the list of V Beam IDs.

Name	Antenna
QTM #0	Ant1
QTM #1	Ant2
QTM #2	Ant3

Test Device Serial No.: 00163, 00239, 00247, 00189

2.2 Device Capabilities

This device contains the following capabilities:

850/1900 CDMA/EvDO Rev0/A, 1x Advanced (BC0, BC1), 850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, 5G NR (n5, n66, n2, n260, n261), 802.11b/g/n/ax WLAN, 802.11a/n/ac/ax UNII, Bluetooth (1x, EDR, LE), NFC, ANT+

2.3 Test Configuration

The EUT was tested per the guidance of KDB 842590 D01 v01 and ANSI C63.26-2015. See Section 7.0 of this test report for a description of the radiated tests.

EIRP Simulation data for all Beam IDs was used to determine the worst case Beam ID for SISO operation and Beam ID pair for MIMO operation. These Beam ID's were used for final measurements.

All testing was performed using FTM (Factory Test Mode) software at continuous Tx operation. When implemented out in the field, the EUT will operate with a maximum uplink configuration (i.e., a maximum uplink duty cycle of 100%). The FTM software was also used for the EUT operation in the ENDC mode.

2.4 EMI Suppression Device(s)/Modifications

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

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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) and the guidance provided in KDB 842590 D01 v01 were used in the measurement of the EUT.

3.2 Radiated Power and Radiated Spurious Emissions

§30.202, §30.203

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary for radiated emissions measurements in the spurious domain. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. The test site inside the chamber is a 6m x 5.2m elliptical, obstruction-free area in accordance with Figure 5.7 of Clause 5 in ANSI C63.4-2014. 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. An 80cm tall test table made of Styrodur is placed on top of the turn table. A Styrodur pedestal is placed on top of the test table to bring the total table height to 1.5m for measurements above 1GHz.

Radiated power (EIRP) measurements were performed in a full anechoic chamber (FAC) conforming to the site validation requirements of CISPR 16-1-4. Radiated spurious emission measurements from 30MHz – 18GHz were performed in a semi anechoic chamber (SAC) conforming to the site validation requirements of CISPR 16-1-4. 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.

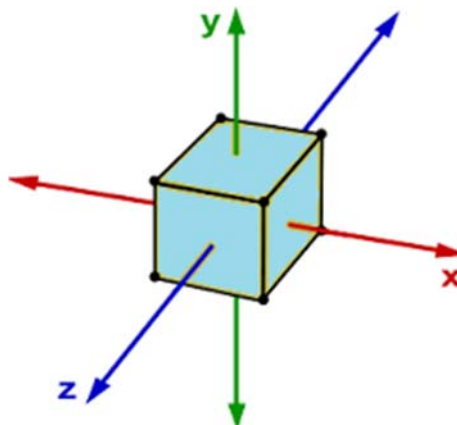


Figure 3-1. Rotation of the EUT Through Three Orthogonal Planes

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The equipment under test was transmitting while connected to its integral antenna and is placed on a turntable. 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. In this case, "D" is equal to 6.0cm and is the largest dimension of the measurement antenna. The EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer.

Frequency Range (GHz)	Wavelength(cm)	Far Field Distance (m)	Measurement Distance (m)
18-40	0.749	0.54	1.00
40-60	0.500	1.39	1.50
60-90	0.333	0.91	1.00
90-140	0.214	0.58	1.00
140-200	0.150	0.39	1.00

Table 3-1. Far-Field Distance & Measurement Distance per Frequency Range

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 "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.

$$\begin{aligned}
 \text{Field Strength [dB}\mu\text{V/m]} &= \text{Measured Value [dBm]} + \text{AFCL [dB/m]} + 107 \\
 &= -32.74 \text{ dBm} + (40.7 \text{ dB/m} + 8.78 \text{ dB}) + 107 = 123.74 \text{ dB}\mu\text{V/m} \\
 &= 10^{(123.74/20)/1000000} = 1.54 \text{ V/m} \\
 \text{e.i.r.p. [dBm]} &= 10 * \log((\text{E-Field} * D_m)^2/30) + 30 \text{ dB} \\
 &= 10 * \log((1.54 \text{ V/m} * 1.00 \text{ m})^2/30) + 30 \text{ dB} \\
 &= 18.98 \text{ dBm e.i.r.p.}
 \end{aligned}$$

Sample MIMO e.i.r.p. Calculation:

The e.i.r.p of the H Beam and V Beam were first measured individually. The measured values were then summed in linear power units then converted back to dBm per the guidance of KDB 662911 D01.

$$\begin{aligned}
 \text{Conversion to linear value} &= 10^{(\text{e.i.r.p}/10)} = 10^{(17.45/10)} = 55.59 \text{ mW} \\
 \text{MIMO e.i.r.p.} &= \text{e.i.r.p.}_H + \text{e.i.r.p.}_V \\
 &= 55.59 \text{ mW} + 20.04 \text{ mW} \\
 &= 10 * \log(75.63 \text{ mW}) \\
 &= 18.79 \text{ dBm}
 \end{aligned}$$

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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 ($\pm$ dB)
Conducted Bench Top Measurements	1.13
Radiated Disturbance (<1GHz)	4.98
Radiated Disturbance (>1GHz)	5.07
Radiated Disturbance (>18GHz)	5.09

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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
Agilent	N9030A	PXA Signal Analyzer (44GHz)	6/12/2019	Annual	6/12/2020	MY52350166
Agilent	N9030A	50GHz PXA Signal Analyzer	11/22/2019	Annual	11/22/2020	US51350301
COM-Power	AL-130R	Active Loop Antenna	8/22/2019	Annual	8/22/2020	121085
Com-Power	PAM-103	Pre-Amplifier (1-1000MHz)	5/10/2019	Annual	5/10/2020	441112
Emco	3115	Horn Antenna (1-18GHz)	3/28/2018	Biennial	3/28/2020	9704-5182
Espec	ESX-2CA	Environmental Chamber	6/13/2019	Annual	6/13/2020	17620
ETS-Lindgren	3116C	DRG Horn Antenna	3/11/2019	Annual	3/11/2020	218893
Keysight Technologies	N9030A	3Hz-44GHz PXA Signal Analyzer	5/2/2019	Annual	5/2/2020	MY49430494
OML Inc.	M05RH	WR-05 Horn antenna, 24 dBi, 140 to 200GHz	10/31/2019	Annual	10/31/2020	18073001
OML Inc.	M08RH	WR-08 Horn Antenna, 24dBi, 90 to 140 GHz	7/30/2018	Biennial	7/30/2020	18073001
OML Inc.	M12RH	WR-12 Horn Antenna, 24dBi, 60 to 90 GHz	10/31/2019	Annual	10/31/2020	18073001
OML Inc.	M19RH	WR-19 Horn Antenna, 24dBi, 40 to 60 GHz	10/31/2019	Annual	10/31/2020	18073001
Rohde & Schwarz	180-442-KF	Horn (Small)	8/21/2018	Biennial	8/21/2020	U157403-01
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	6/5/2019	Annual	6/5/2020	100342
Rohde & Schwarz	ESW44	EMI Test Receiver 2Hz to 44 GHz	10/16/2019	Annual	10/16/2020	101716
Rohde & Schwarz	FSW67	Signal / Spectrum Analyzer	5/6/2019	Annual	5/6/2020	103200
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	7/8/2019	Annual	7/8/2020	102133
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	4/19/2018	Biennial	4/19/2020	A051107
Virginia Diodes Inc	SAX252	SAX Module (60 - 90GHz)	9/30/2019	Annual	9/30/2020	SAX252
Virginia Diodes Inc	SAX253	SAX Module (90 - 140GHz)	9/30/2019	Annual	9/30/2020	SAX253
Virginia Diodes Inc	SAX254	SAX Module (140 - 220GHz)	9/30/2019	Annual	9/30/2020	SAX254
Virginia Diodes Inc	SAX411	SAX Module (40 - 60GHz)	10/2/2019	Annual	10/2/2020	SAX411

Table 5-1. Test Equipment

Notes:

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.

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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

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7.0 TEST RESULTS

7.1 Summary

Company Name: LG Electronics USA, Inc.
 FCC ID: ZNFV600VM
 FCC Classification: Part 30 Mobile Transmitter (5GM)
 Mode(s): TDD

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
2.1049	Occupied Bandwidth	N/A	RADIATED	PASS	Section 7.2
2.1046, 30.202	Equivalent Isotropic Radiated Power	43dBm		PASS	Section 7.3
2.1051, 30.203	Spurious Emissions	-13dBm/MHz for all out-of-band emissions		PASS	Section 7.4
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
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) All modes of operation and modulations were investigated. The test results shown in the following sections represent the worst case emissions.
- 2) Per 2.1057(a)(2), spurious emissions were investigated up to 100GHz for n261 and up to 200GHz for n260.
- 3) All radiated emission measurements at the band edge are converted to an equivalent conductive power by subtracting the known antenna gain from the EIRP measured at each frequency of interest. These emissions are compared to the 30.203 spurious emission limits as conductive power levels.
- 4) The radiated RF output power and all out-of-band emissions in the spurious domain are evaluated to the EIRP limits.
- 5) "CC" refers to "Component Carriers".
- 6) Beam IDs were chosen based on which Beam ID produces the highest EIRP during EIRP simulation.
- 7) All testing was performed using FTM (Factory Test Mode) software at continuous Tx operation (100% duty cycle).
- 8) The CP-OFDM and DFT-s-OFDM QPSK transmission schemes were investigated fully for each test type and only the worst case data is included.

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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
KDB 842590 D01 v01 Section 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 $\geq 3 \times$ 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

Test Notes

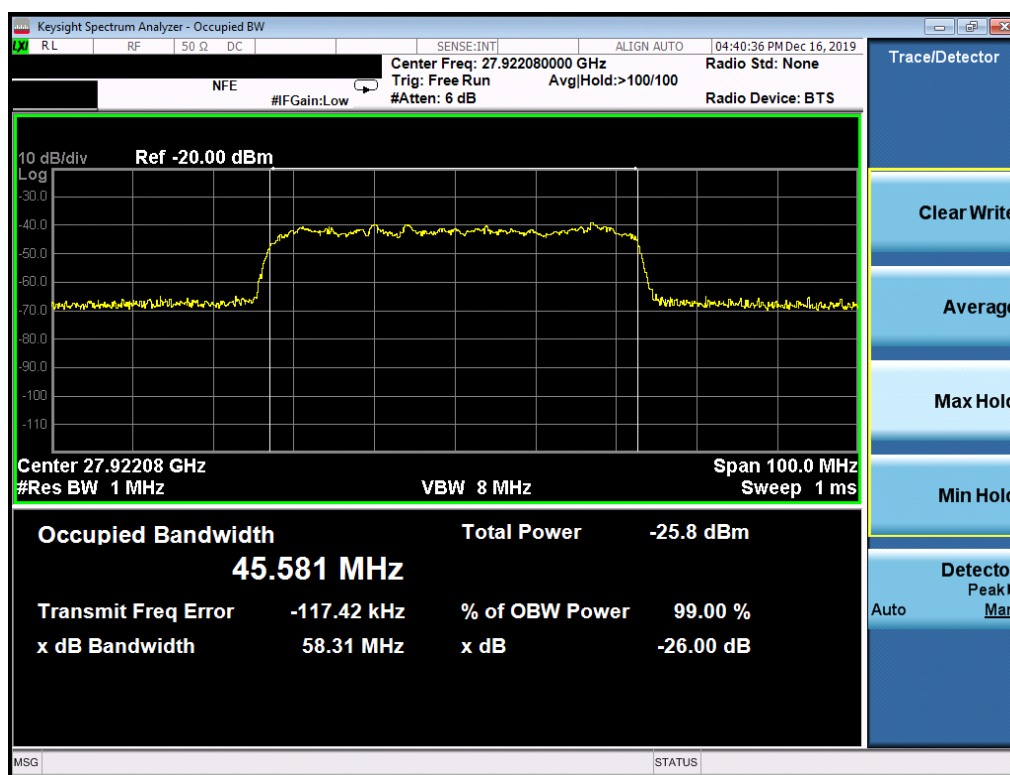
None.

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Band n261

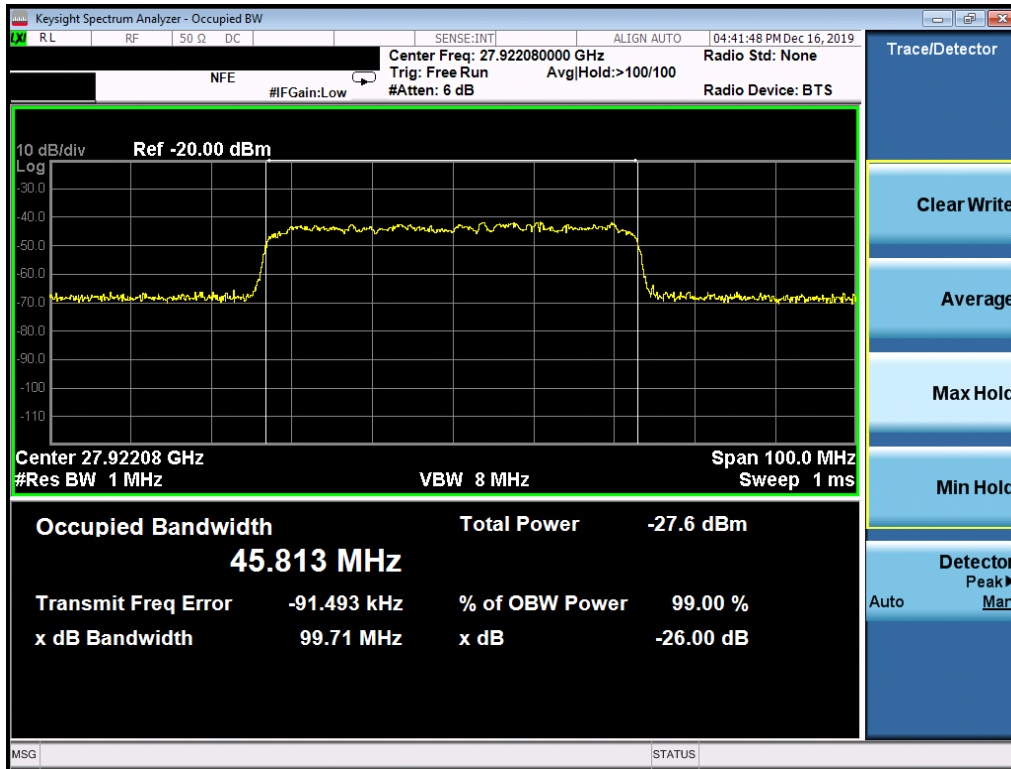
Channel	Bandwidth	CCs Active	Modulation	OBW [MHz]
Mid	50	1	QPSK	45.58
			16QAM	45.81
			64QAM	46.26
		4	QPSK	194.19
			16QAM	194.32
			64QAM	195.51
	100	1	QPSK	92.79
			16QAM	92.61
			64QAM	92.88
		4	QPSK	389.90
			16QAM	389.95
			64QAM	391.01

Table 7-2. Summary of Ant1 Occupied Bandwidths (n261)

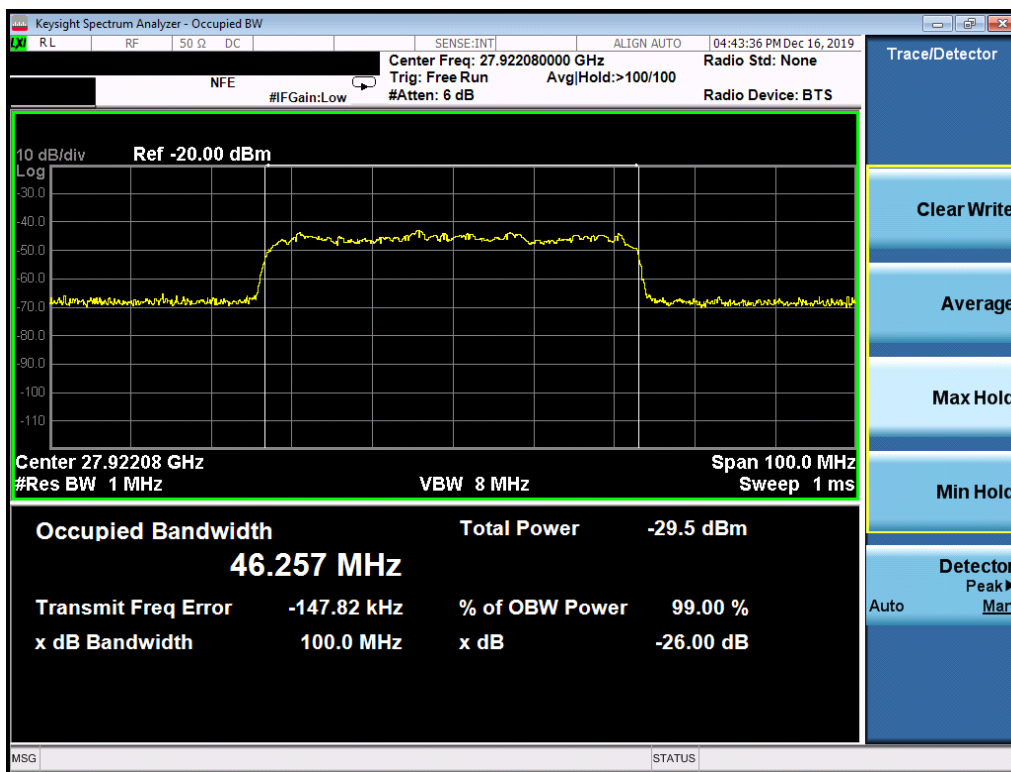


Plot 7-1. Ant1 Occupied Bandwidth Plot (50MHz-1CC – QPSK – Mid Channel)

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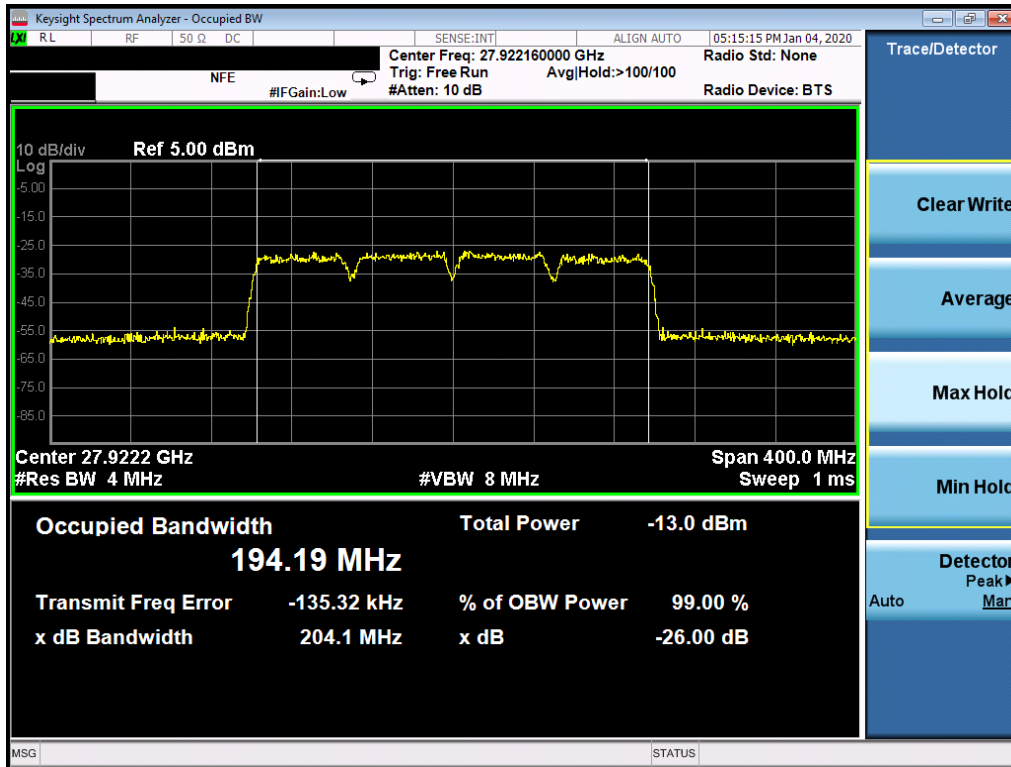


Plot 7-2. Ant1 Occupied Bandwidth Plot (50MHz-1CC – 16QAM – Mid Channel)

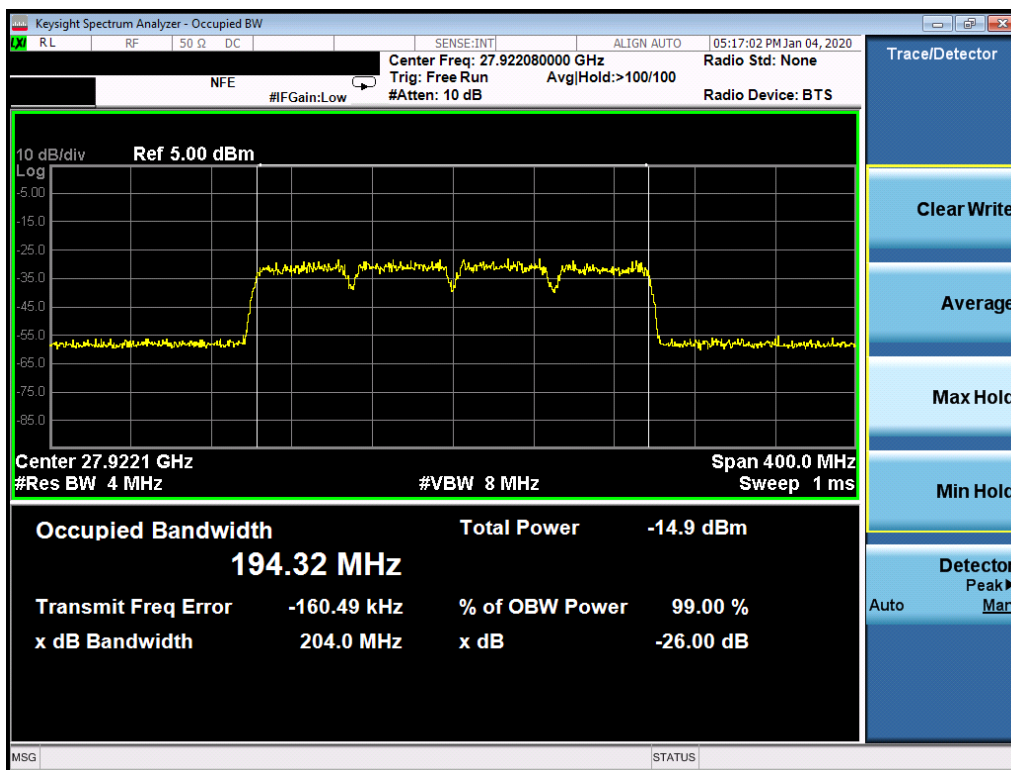


Plot 7-3. Ant1 Occupied Bandwidth Plot (50MHz-1CC – 64QAM – Mid Channel)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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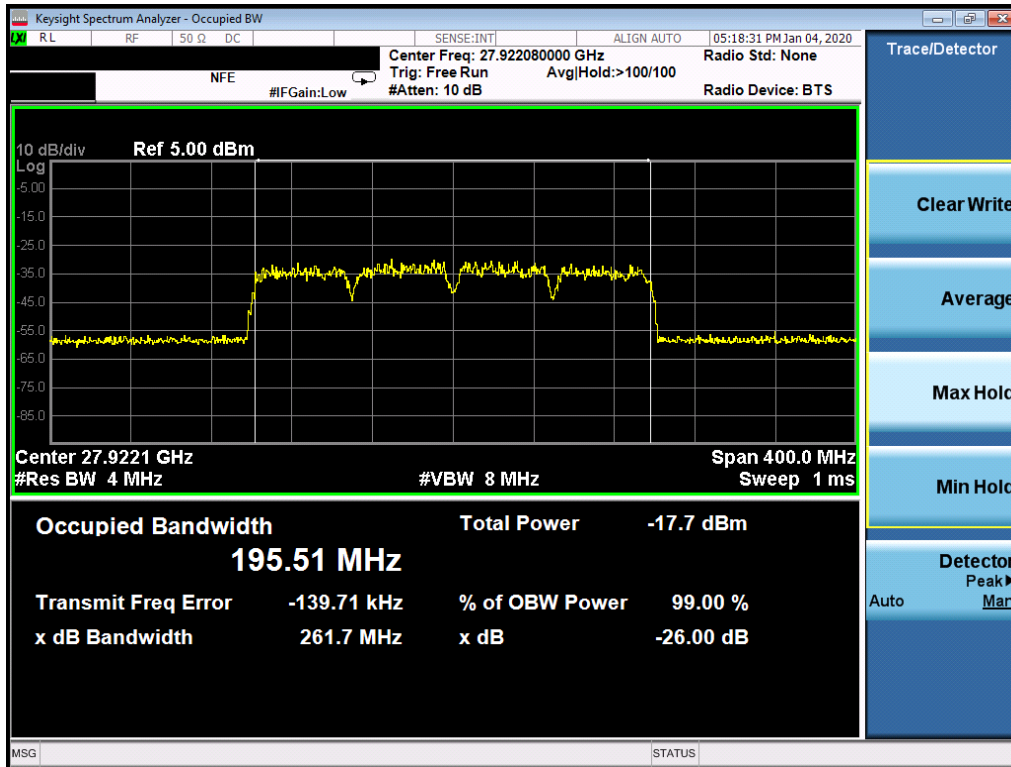


Plot 7-4. Ant1 Occupied Bandwidth Plot (50MHz-4CC – QPSK – Mid Channel)

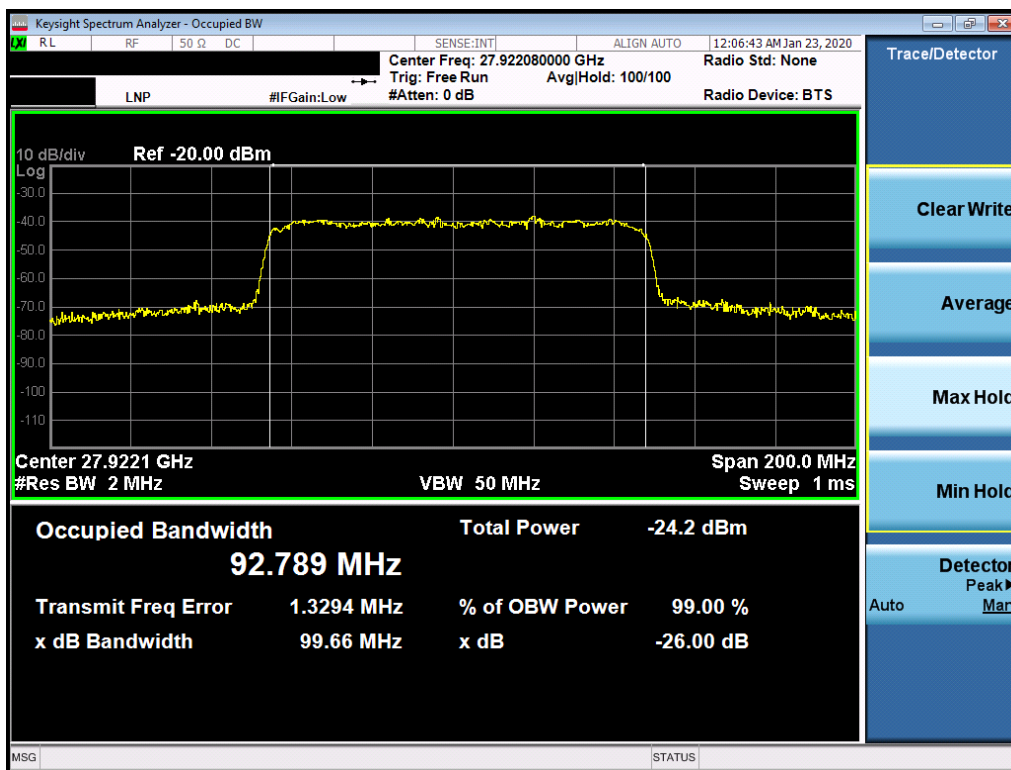


Plot 7-5. Ant1 Occupied Bandwidth Plot (50MHz-4CC – 16QAM – Mid Channel)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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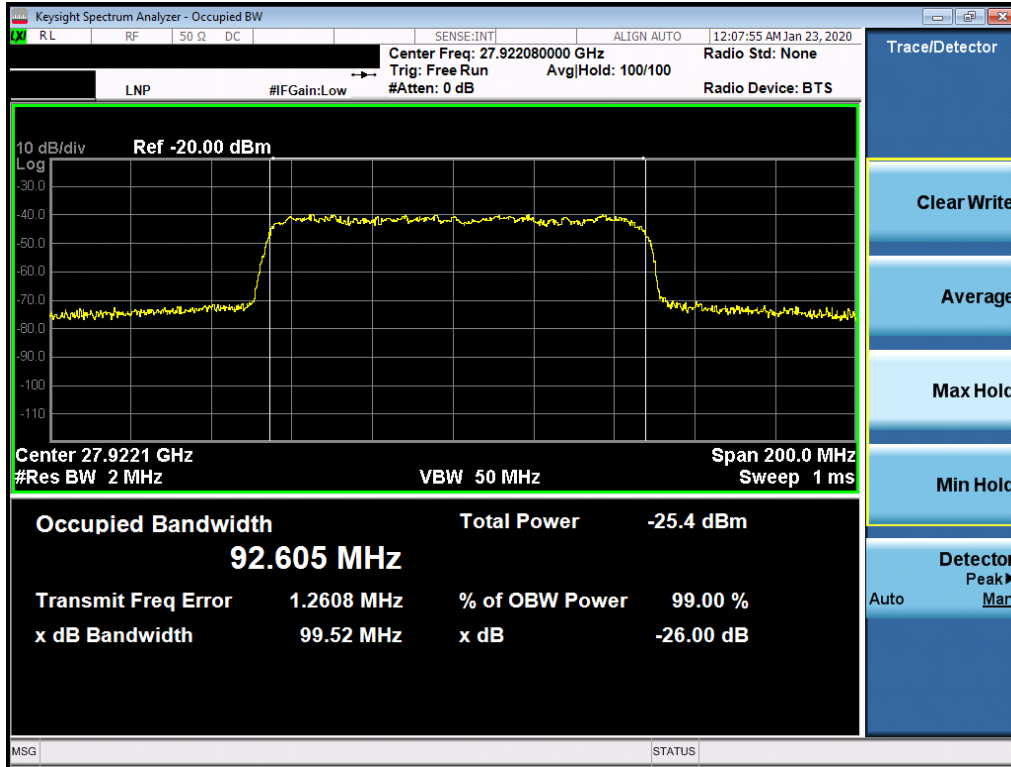


Plot 7-6. Ant1 Occupied Bandwidth Plot (50MHz-4CC – 64QAM – Mid Channel)

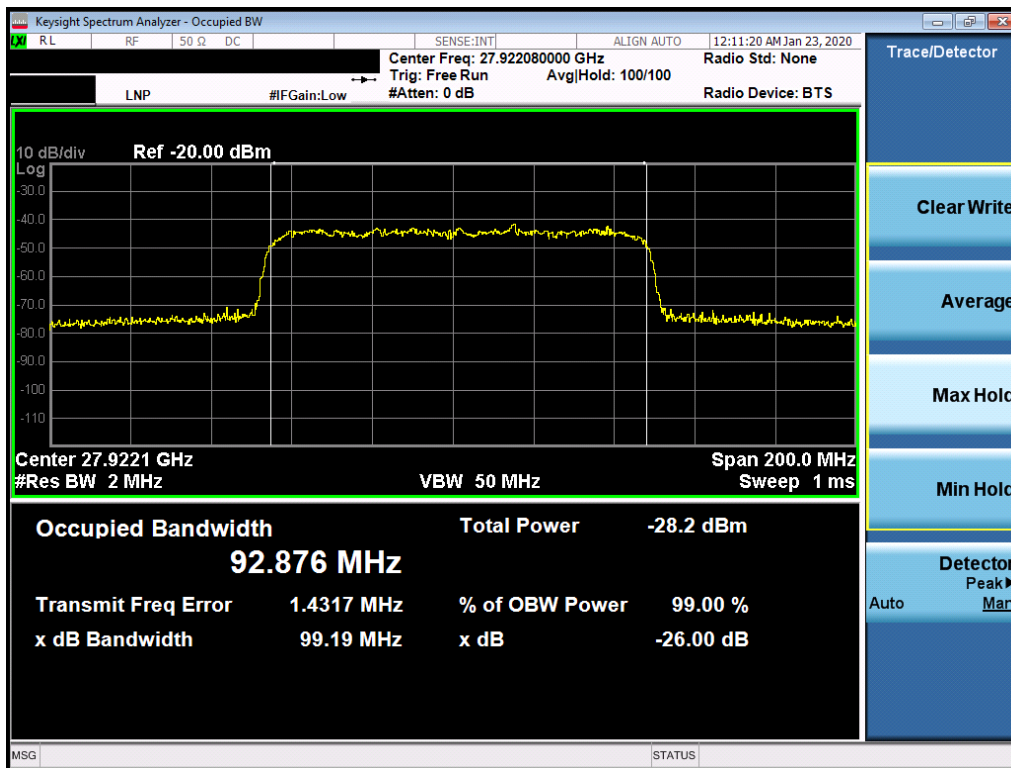


Plot 7-7. Ant1 Occupied Bandwidth Plot (100MHz-1CC – QPSK – Mid Channel)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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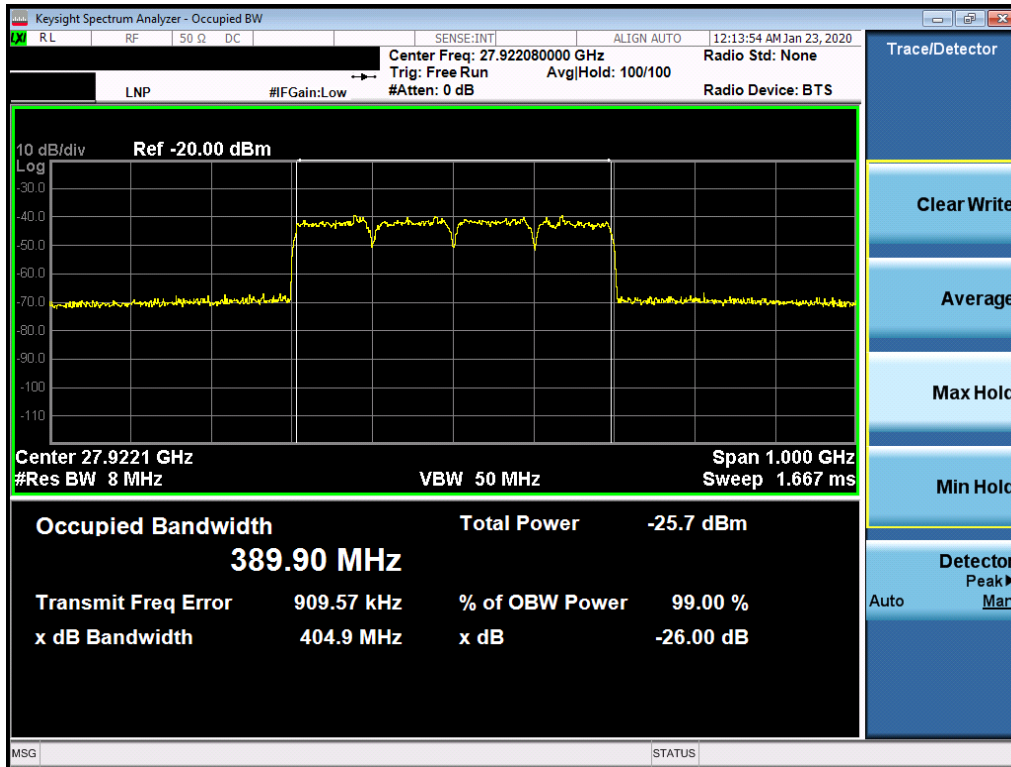


Plot 7-8. Ant1 Occupied Bandwidth Plot (100MHz-1CC – 16QAM – Mid Channel)

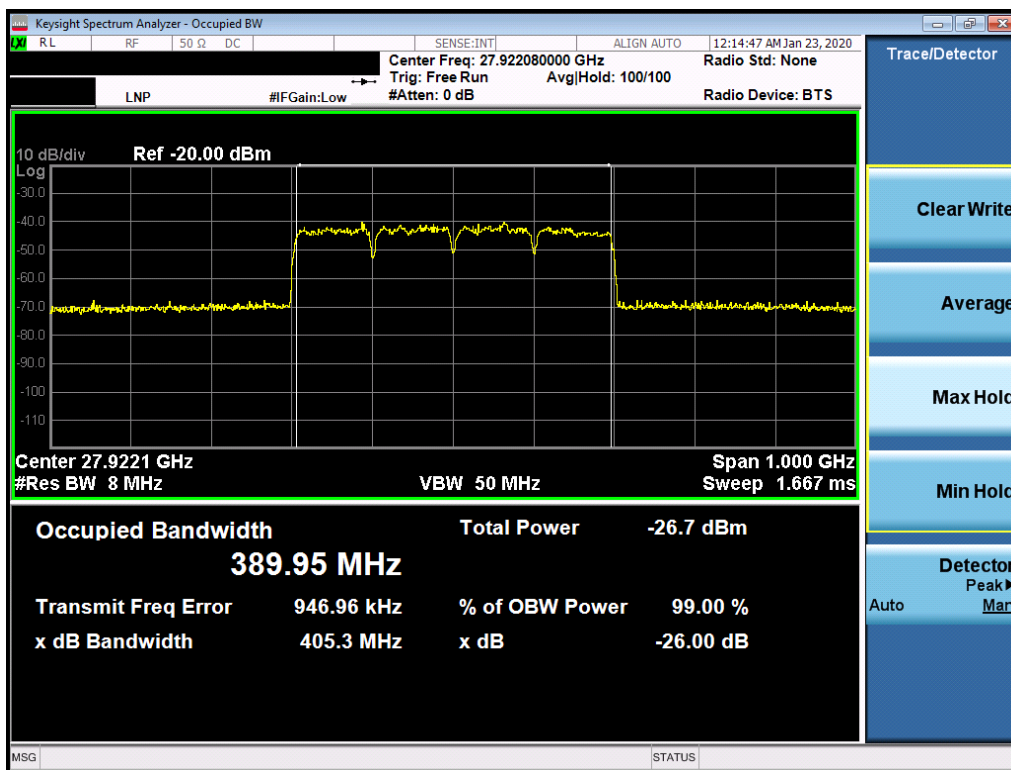


Plot 7-9. Ant1 Occupied Bandwidth Plot (100MHz-1CC – 64QAM – Mid Channel)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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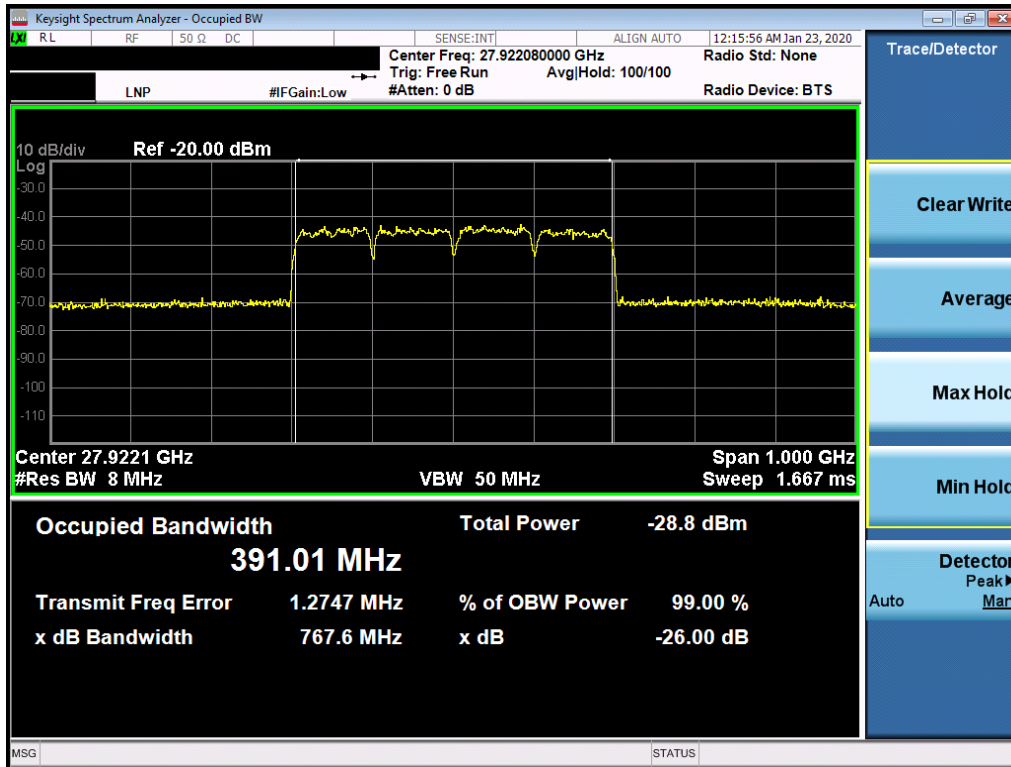


Plot 7-10. Ant1 Occupied Bandwidth Plot (100MHz-4CC – QPSK – Mid Channel)



Plot 7-11. Ant1 Occupied Bandwidth Plot (100MHz-4CC – 16QAM – Mid Channel)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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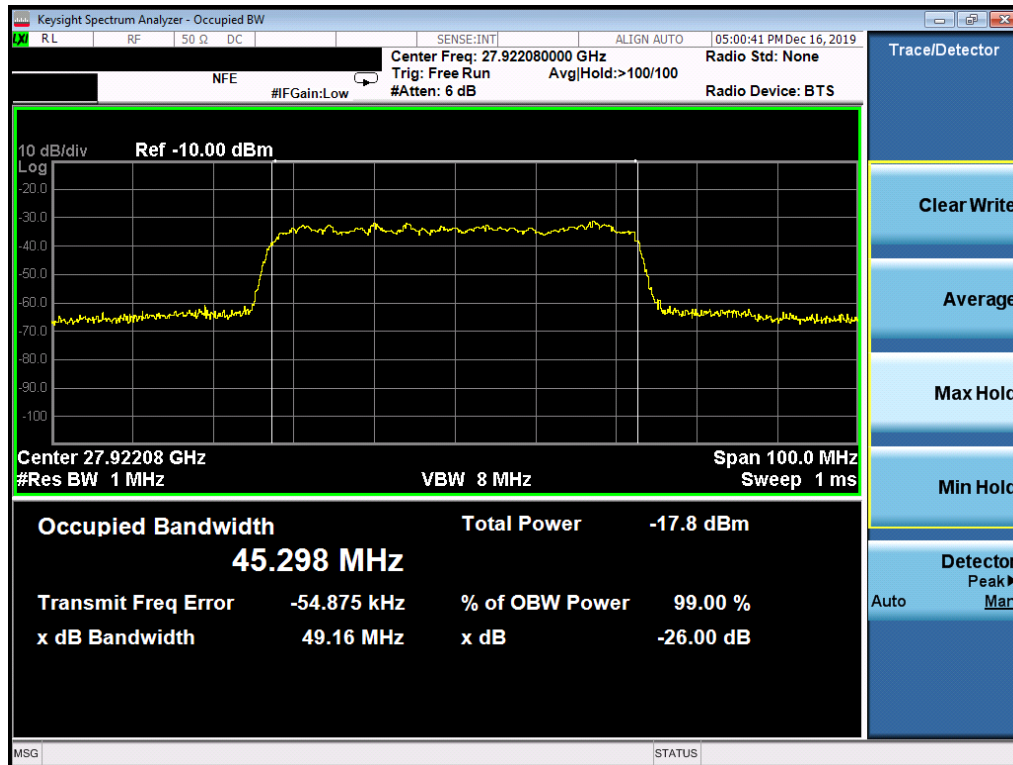


Plot 7-12. Ant1 Occupied Bandwidth Plot (100MHz-4CC – 64QAM – Mid Channel)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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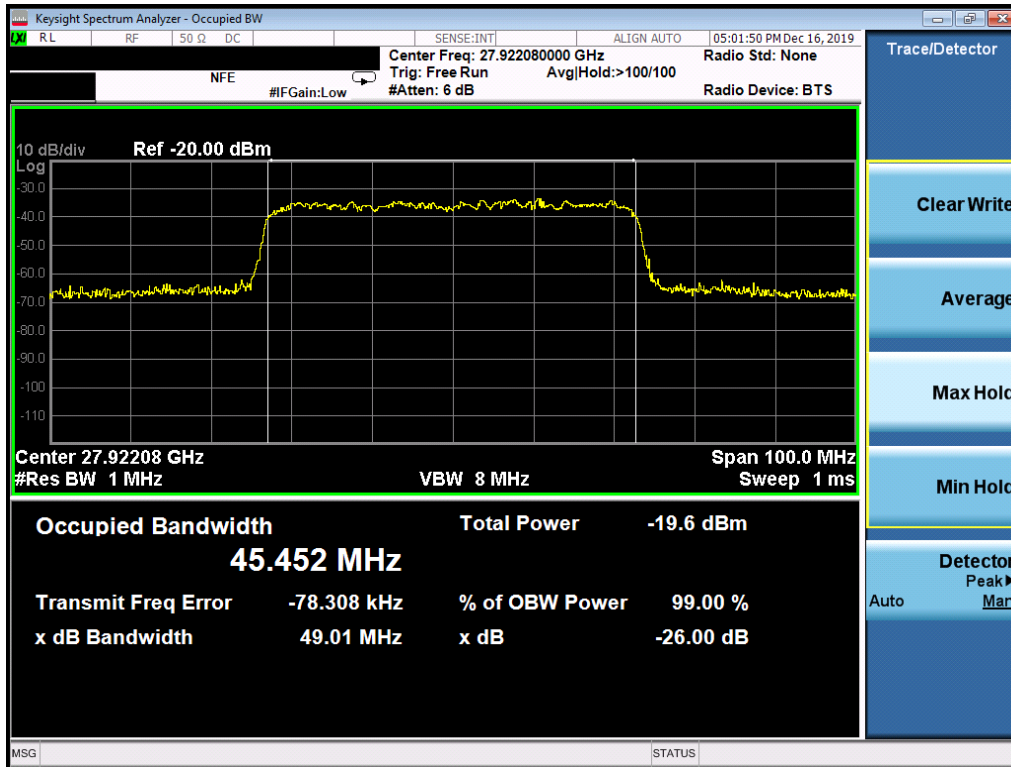
Channel	Bandwidth	CCs Active	Modulation	OBW [MHz]
Mid	50	1	QPSK	45.30
			16QAM	45.45
			64QAM	45.50
		4	QPSK	193.99
			16QAM	193.52
			64QAM	193.63
	100	1	QPSK	90.40
			16QAM	90.59
			64QAM	90.74
		4	QPSK	387.33
			16QAM	387.21
			64QAM	388.88

Table 7-3. Summary of Ant2 Occupied Bandwidths (n261)

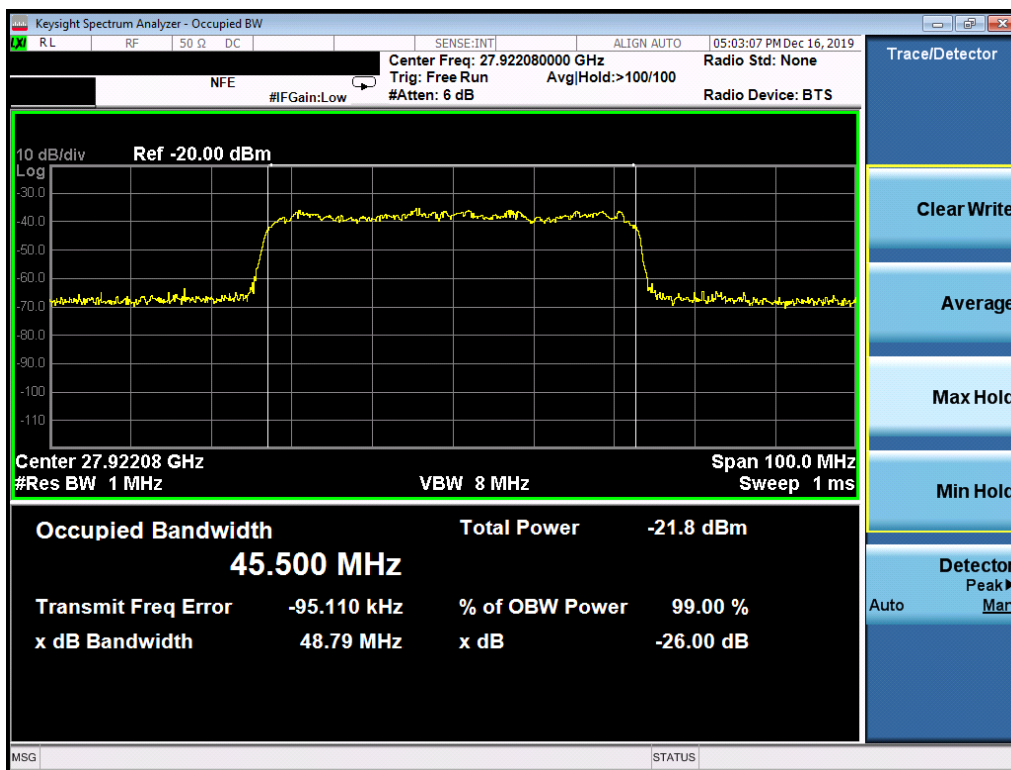


Plot 7-13. Ant2 Occupied Bandwidth Plot (50MHz-1CC – QPSK – Mid Channel)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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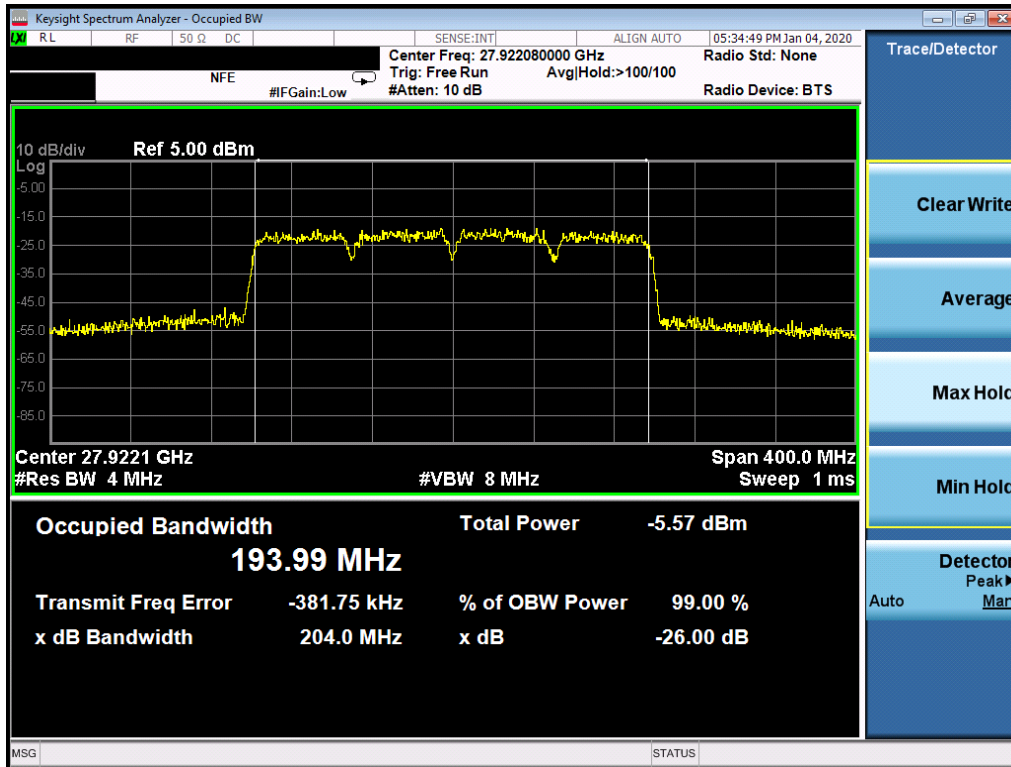


Plot 7-14. Ant2 Occupied Bandwidth Plot (50MHz-1CC – 16QAM – Mid Channel)

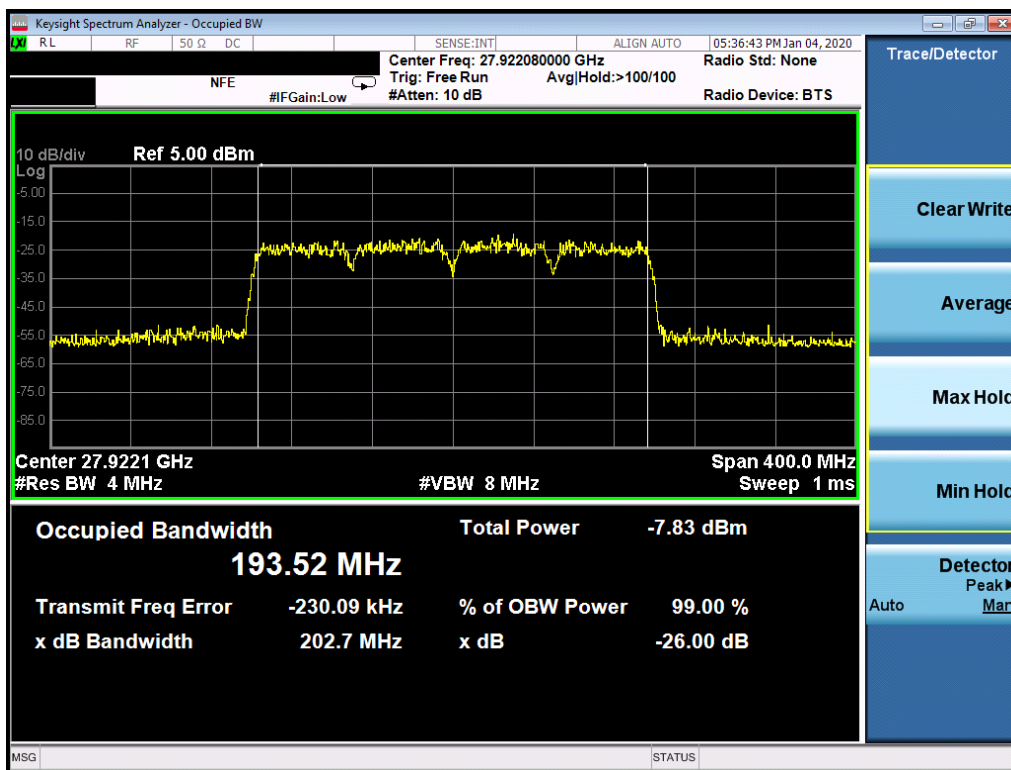


Plot 7-15. Ant2 Occupied Bandwidth Plot (50MHz-1CC – 64QAM – Mid Channel)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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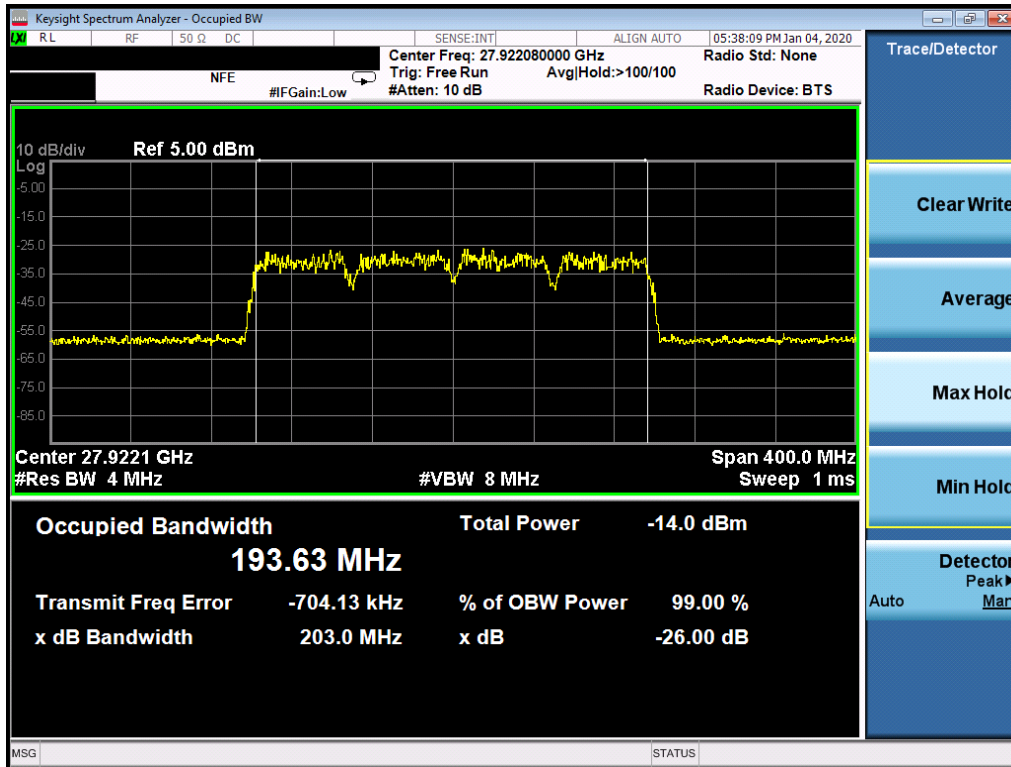


Plot 7-16. Ant2 Occupied Bandwidth Plot (50MHz-4CC – QPSK – Mid Channel)

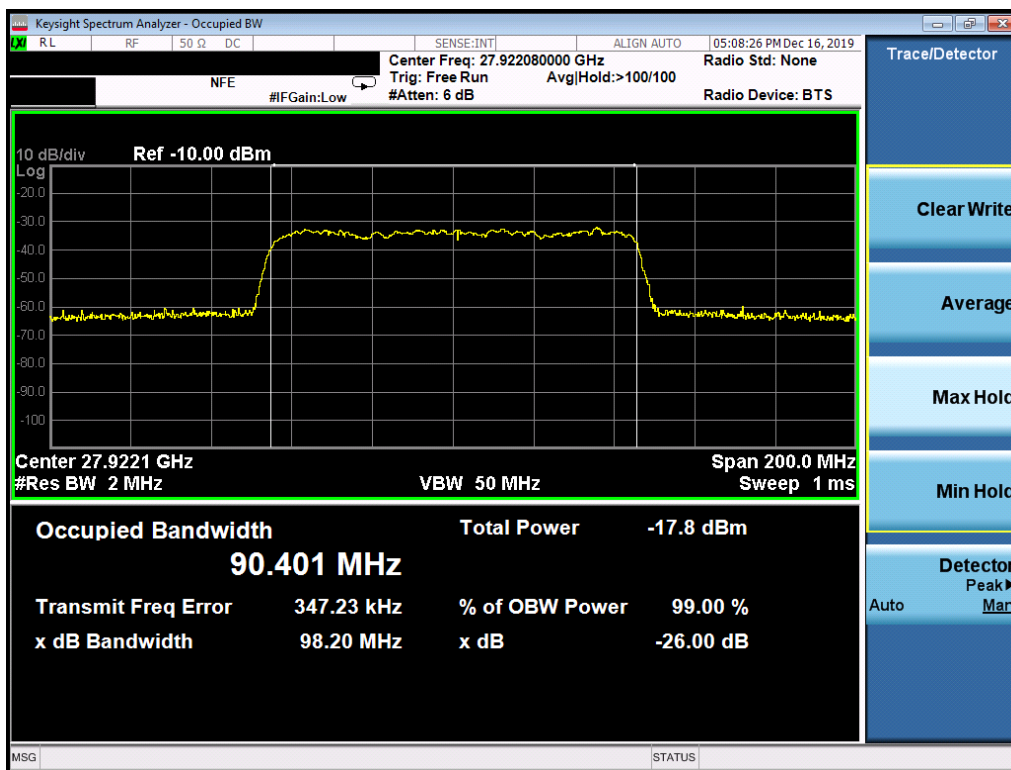


Plot 7-17. Ant2 Occupied Bandwidth Plot (50MHz-4CC – 16QAM – Mid Channel)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset		Page 24 of 210

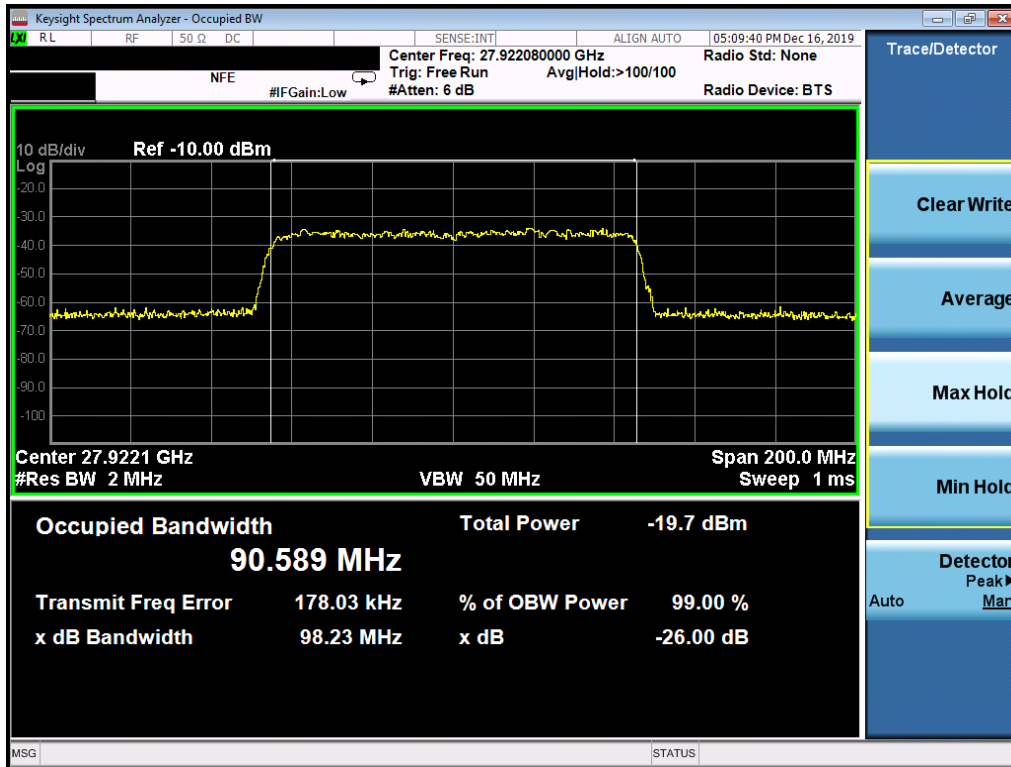


Plot 7-18. Ant2 Occupied Bandwidth Plot (50MHz-4CC – 64QAM – Mid Channel)

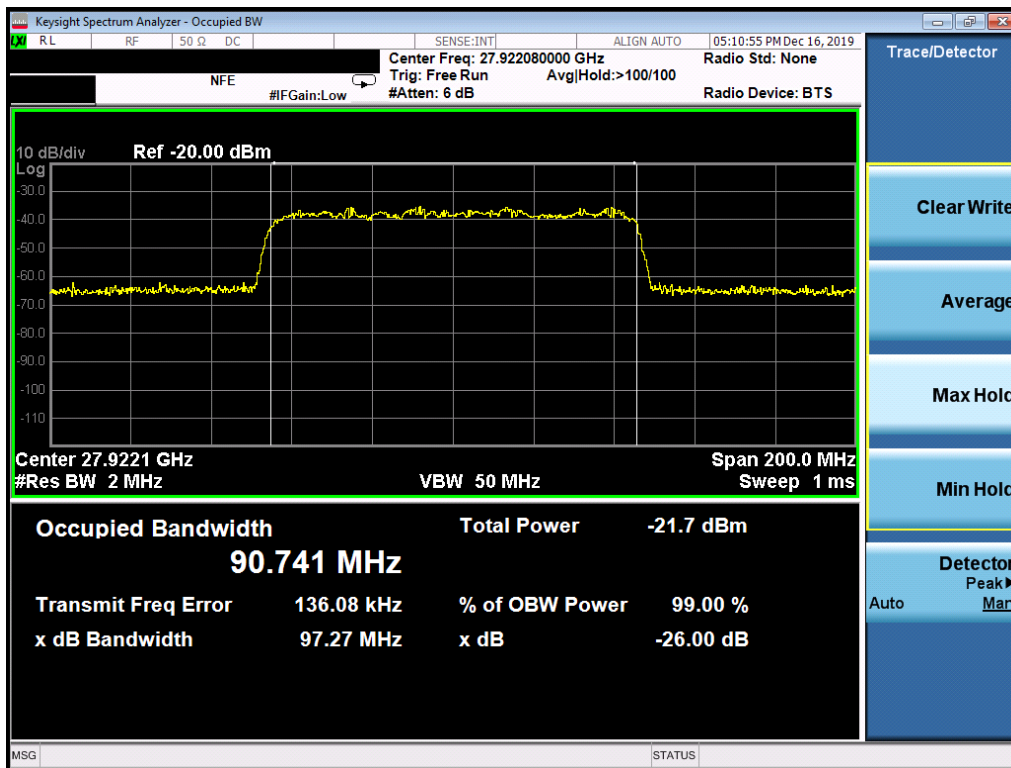


Plot 7-19. Ant2 Occupied Bandwidth Plot (100MHz-1CC – QPSK – Mid Channel)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset		Page 25 of 210

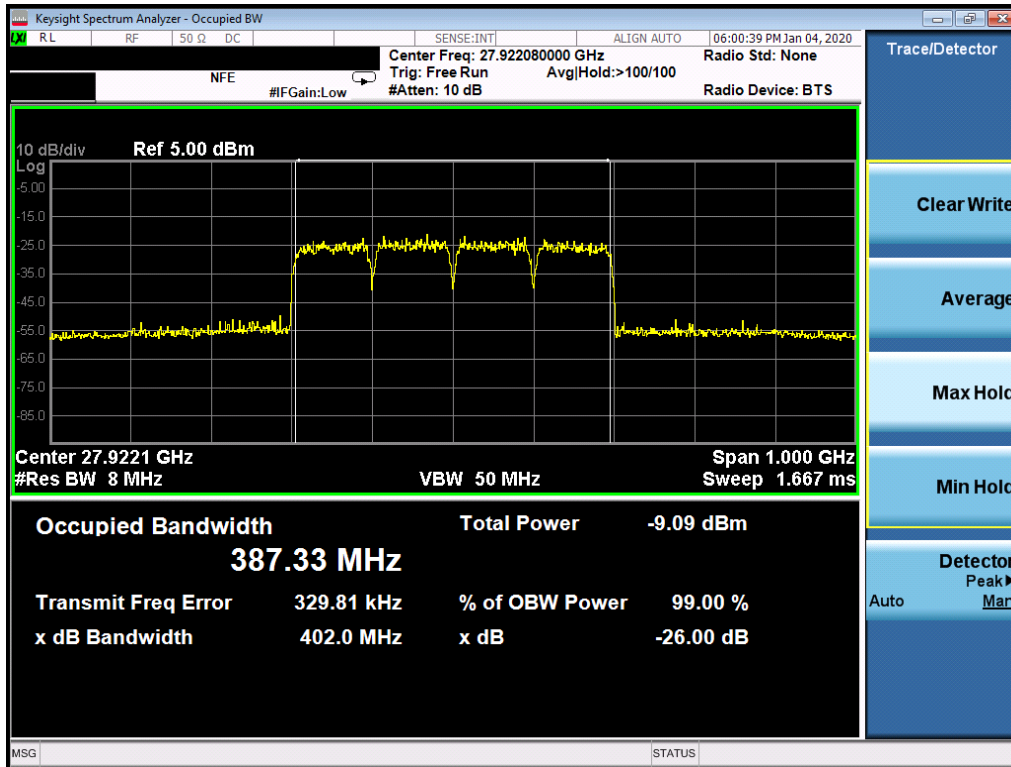


Plot 7-20. Ant2 Occupied Bandwidth Plot (100MHz-1CC – 16QAM – Mid Channel)

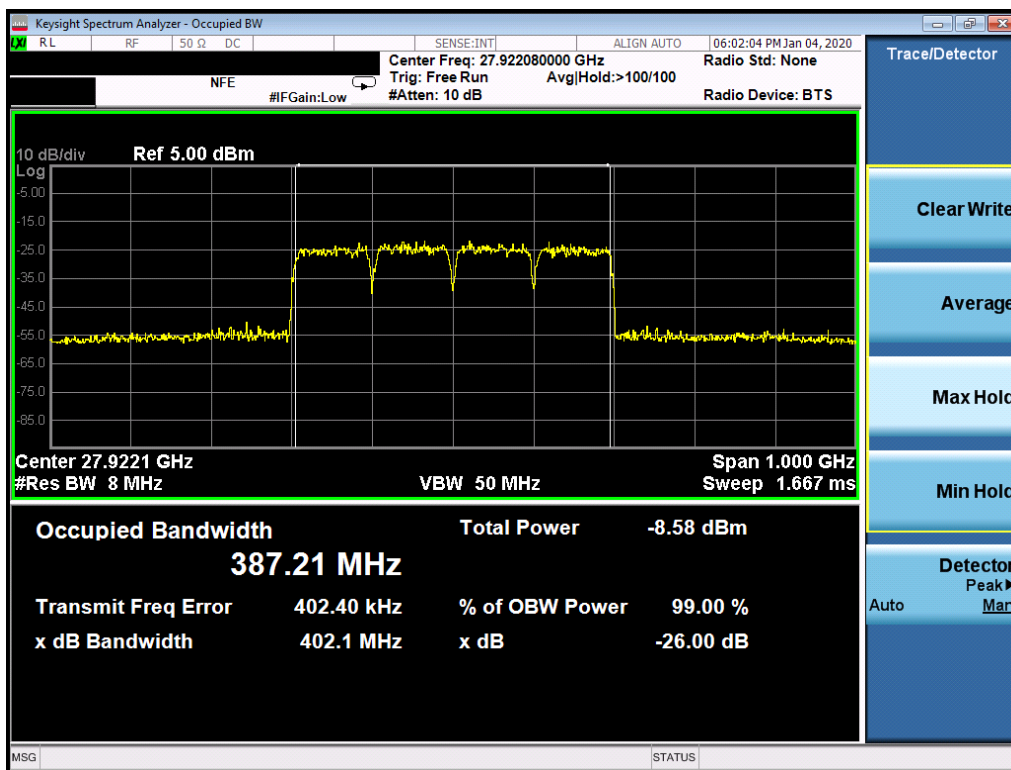


Plot 7-21. Ant2 Occupied Bandwidth Plot (100MHz-1CC – 64QAM – Mid Channel)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset		Page 26 of 210

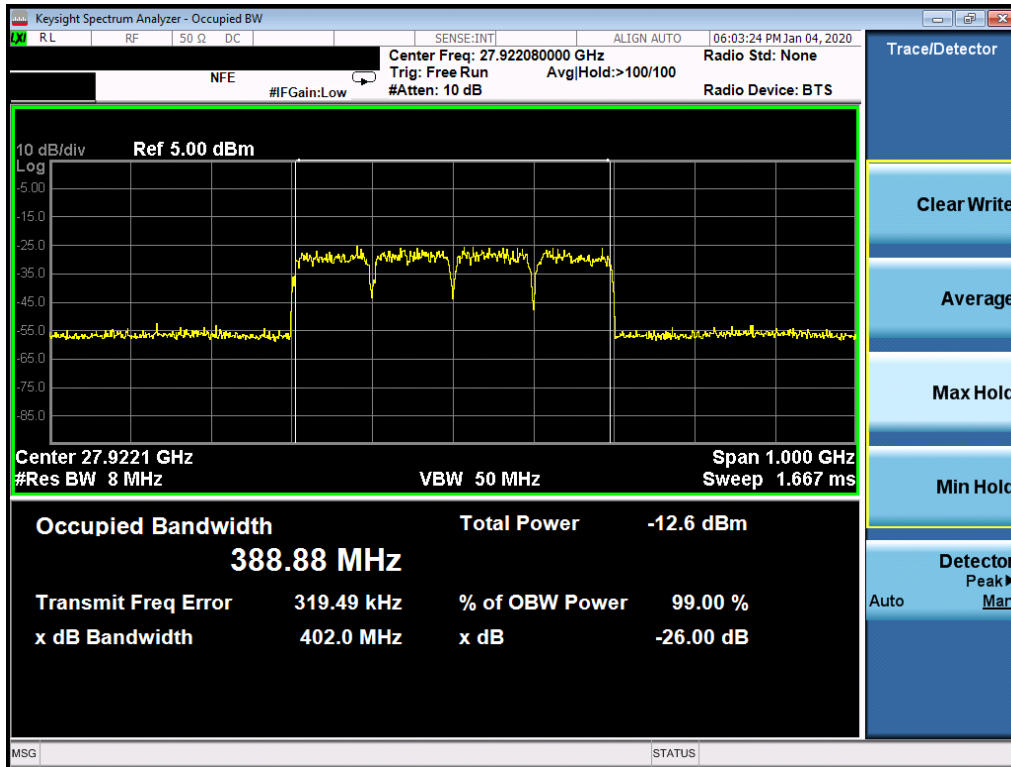


Plot 7-22. Ant2 Occupied Bandwidth Plot (100MHz-4CC – QPSK – Mid Channel)



Plot 7-23. Ant2 Occupied Bandwidth Plot (100MHz-4CC – 16QAM – Mid Channel)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset		Page 27 of 210

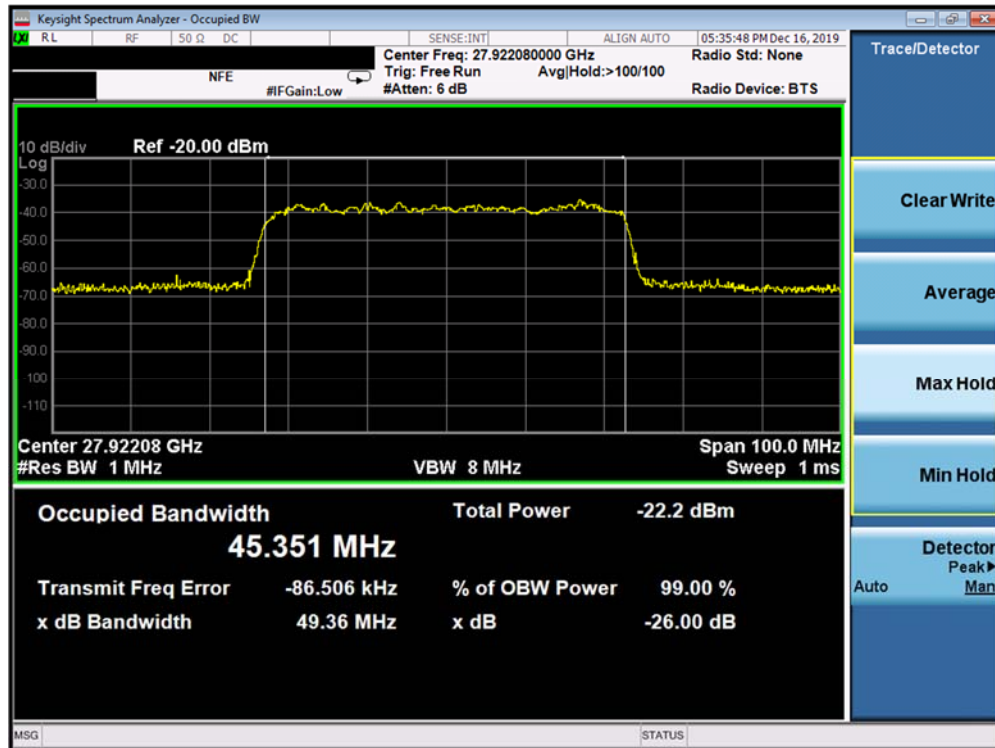


Plot 7-24. Ant2 Occupied Bandwidth Plot (100MHz-4CC – 64QAM – Mid Channel)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset		Page 28 of 210

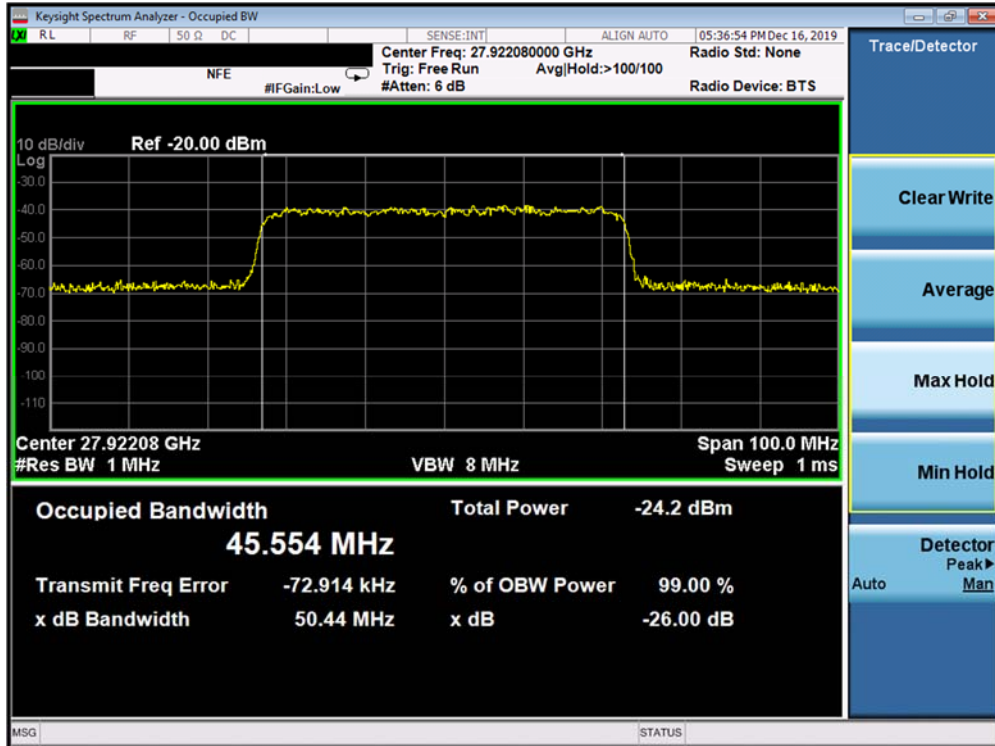
Channel	Bandwidth	CCs Active	Modulation	OBW [MHz]
Mid	50	1	QPSK	45.35
			16QAM	45.55
			64QAM	45.67
		4	QPSK	193.89
			16QAM	193.55
			64QAM	197.18
	100	1	QPSK	90.59
			16QAM	91.04
			64QAM	91.16
		4	QPSK	382.53
			16QAM	384.15
			64QAM	386.04

Table 7-4. Summary of Ant3 Occupied Bandwidths (n261)

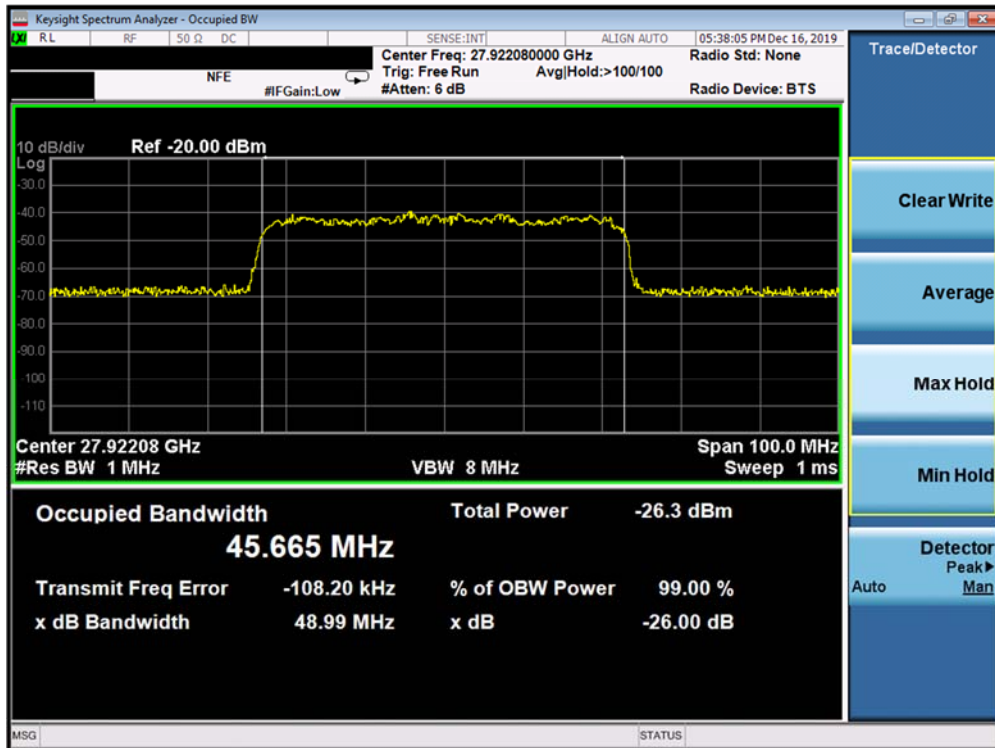


Plot 7-25. Ant3 Occupied Bandwidth Plot (50MHz-1CC – QPSK – Mid Channel)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset		Page 29 of 210

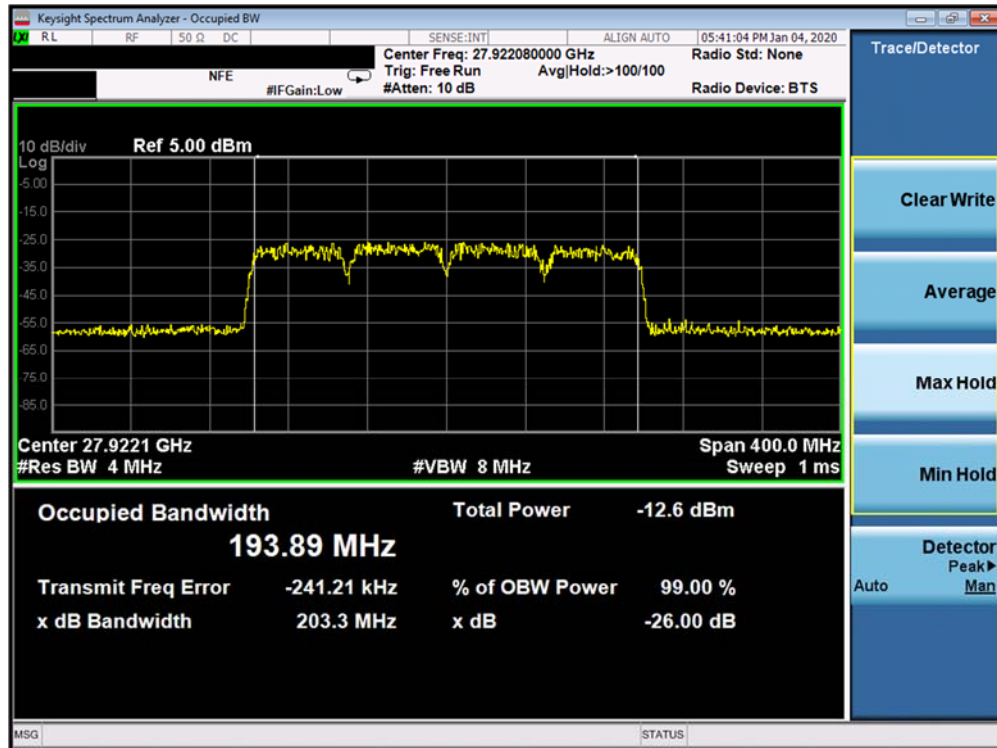


Plot 7-26. Ant3 Occupied Bandwidth Plot (50MHz-1CC – 16QAM – Mid Channel)

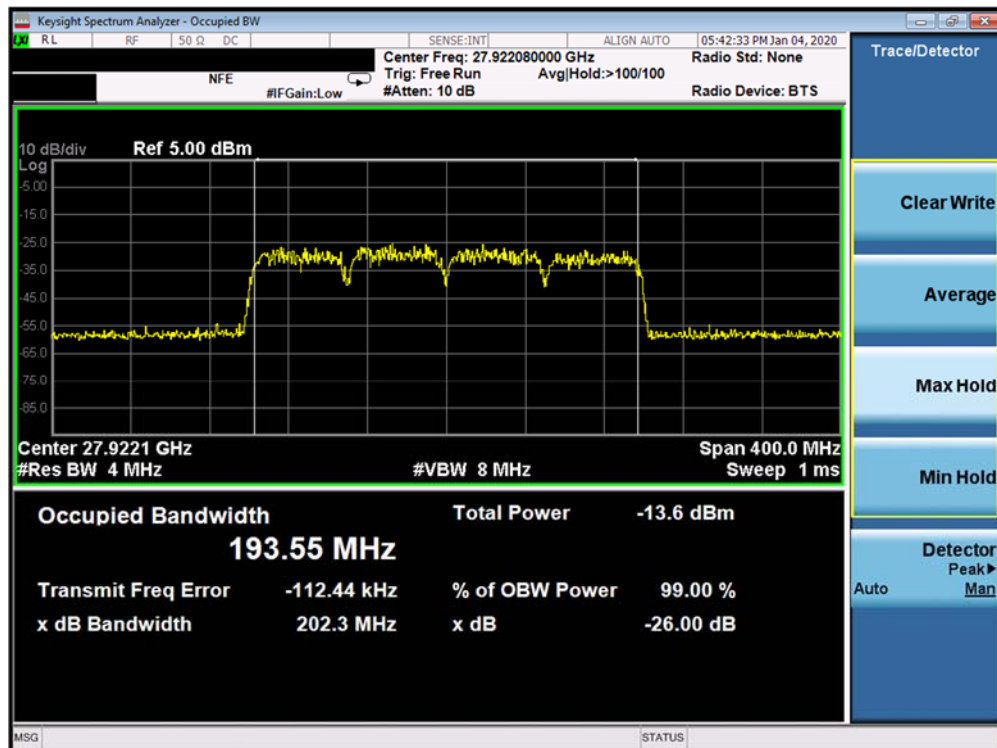


Plot 7-27. Ant3 Occupied Bandwidth Plot (50MHz-1CC – 64QAM – Mid Channel)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset		Page 30 of 210

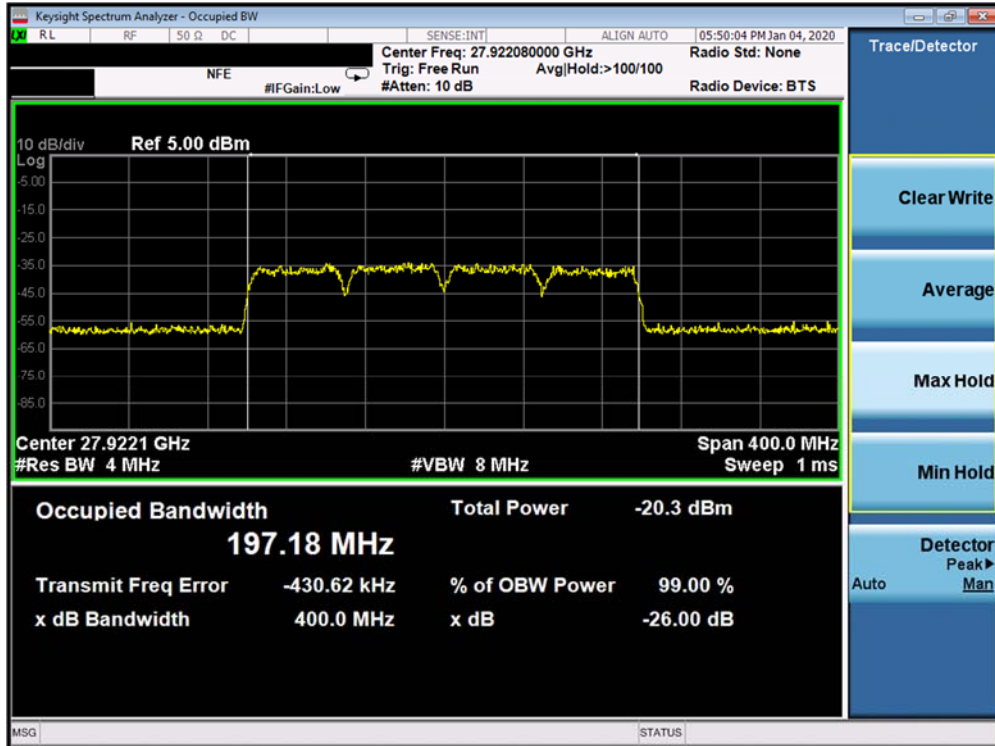


Plot 7-28. Ant3 Occupied Bandwidth Plot (50MHz-4CC – QPSK – Mid Channel)

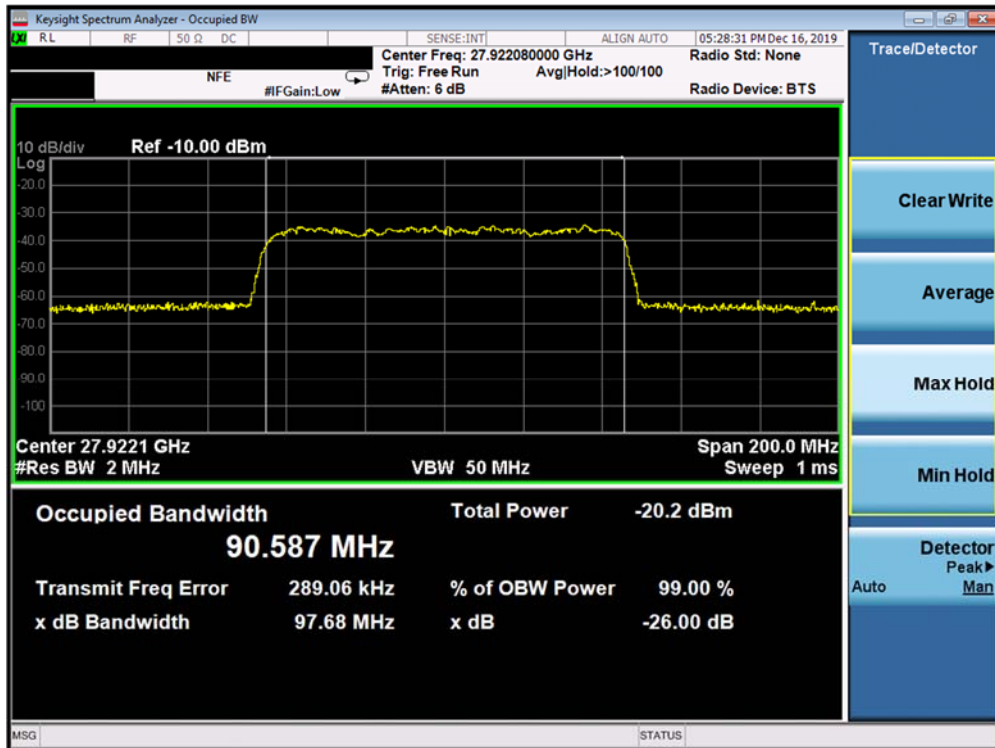


Plot 7-29. Ant3 Occupied Bandwidth Plot (50MHz-4CC – 16QAM – Mid Channel)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset		Page 31 of 210

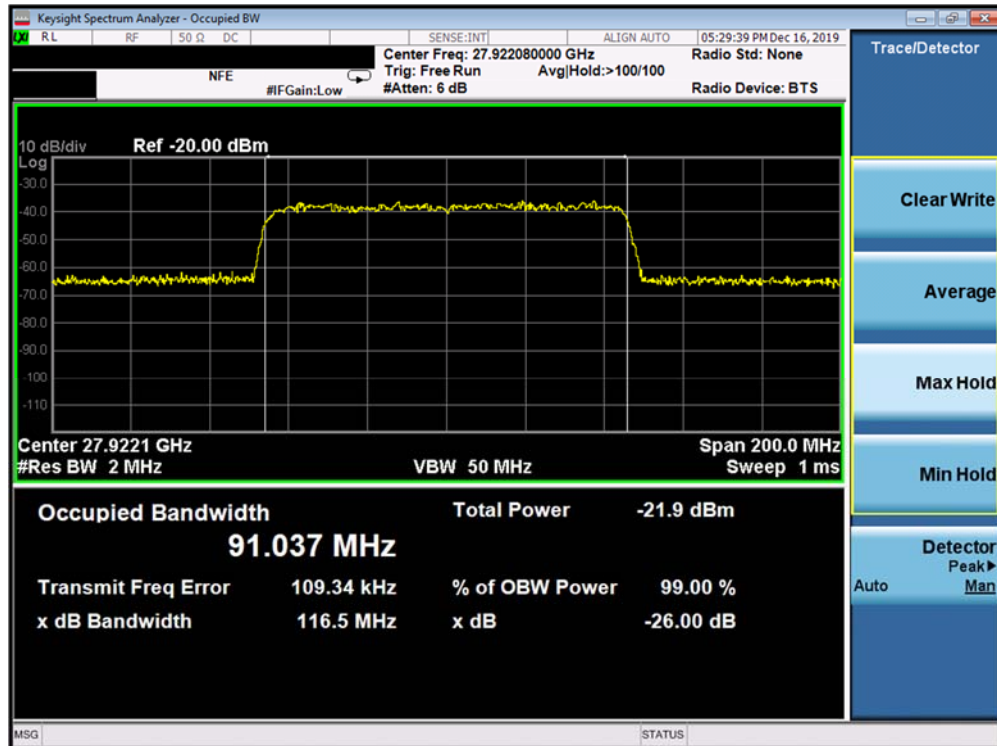


Plot 7-30. Ant3 Occupied Bandwidth Plot (50MHz-4CC – 64QAM – Mid Channel)

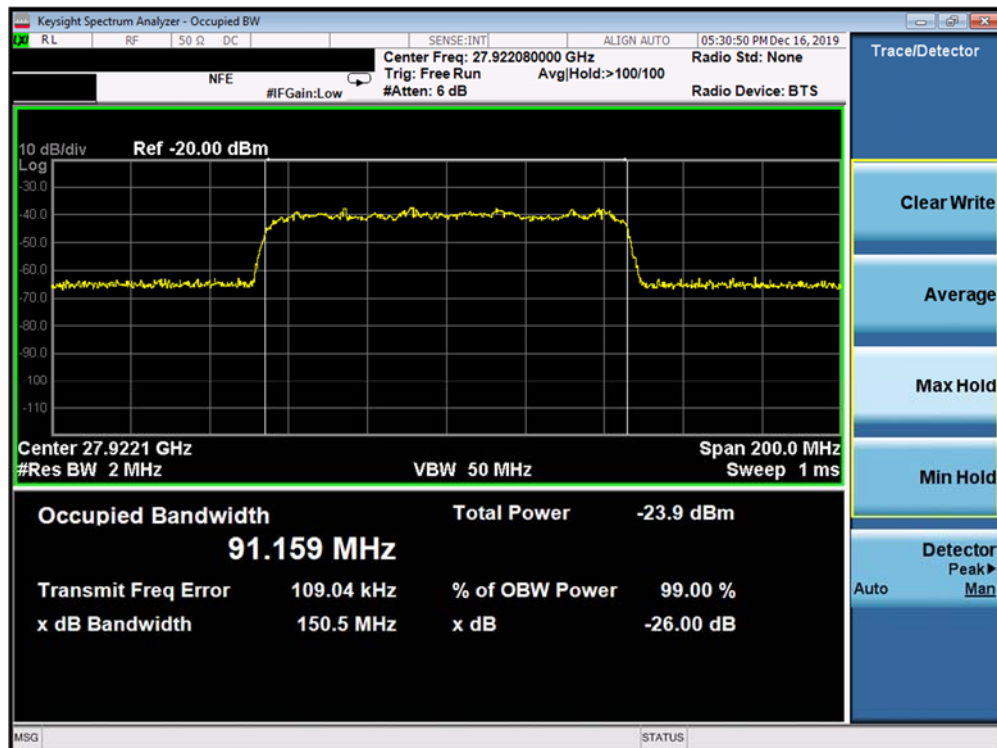


Plot 7-31. Ant3 Occupied Bandwidth Plot (100MHz-1CC – QPSK – Mid Channel)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset		Page 32 of 210

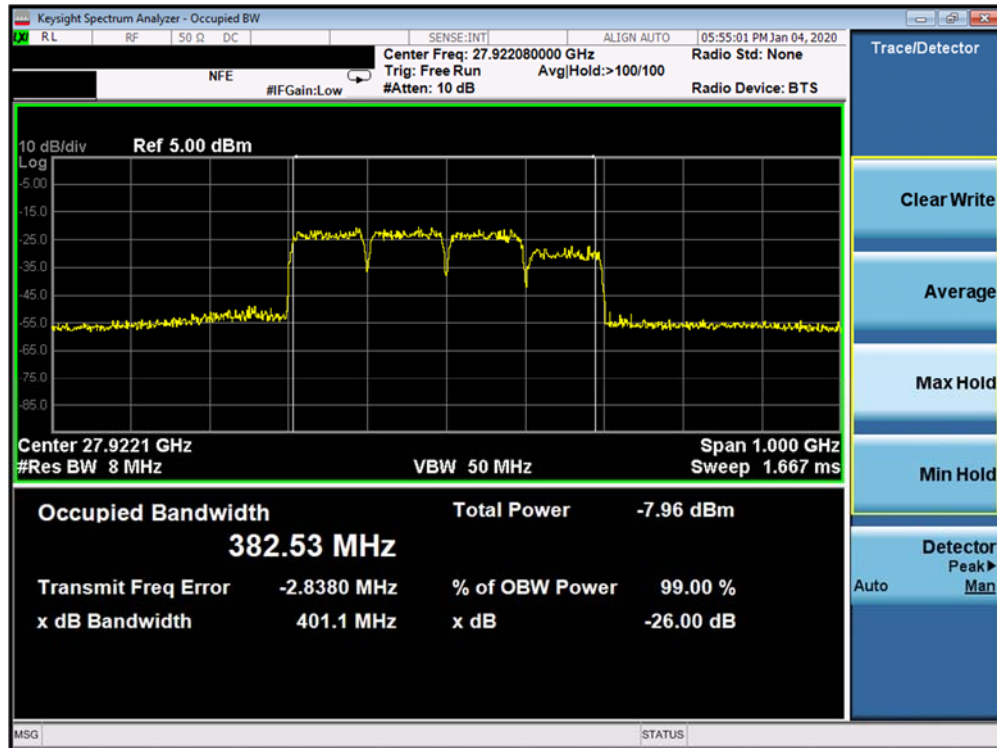


Plot 7-32. Ant3 Occupied Bandwidth Plot (100MHz-1CC – 16QAM – Mid Channel)

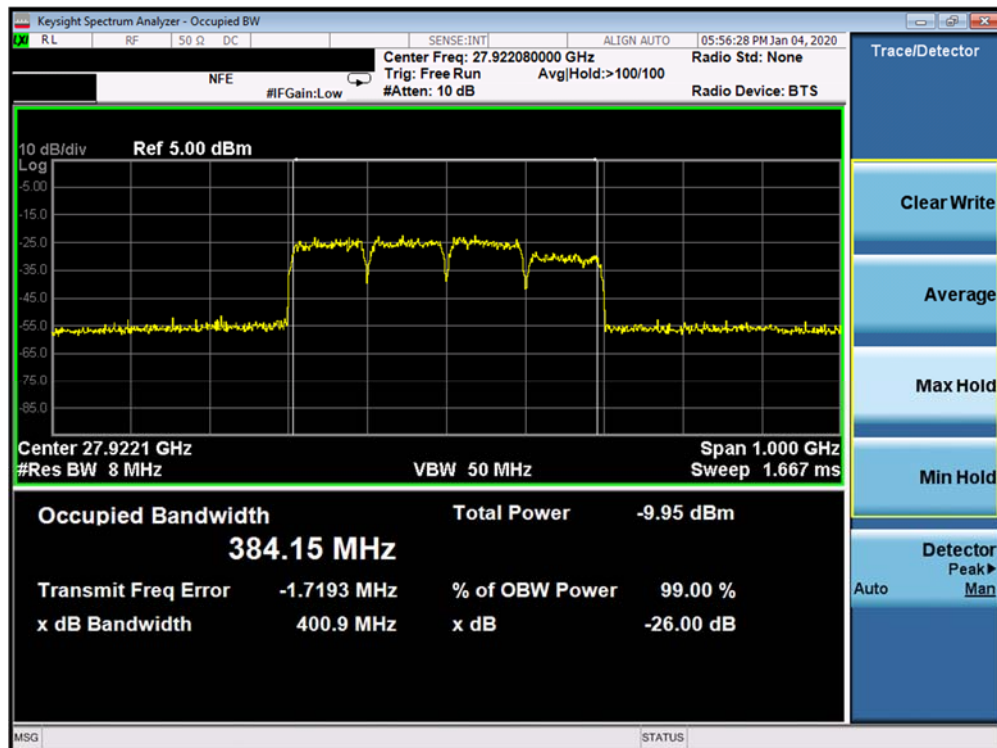


Plot 7-33. Ant3 Occupied Bandwidth Plot (100MHz-1CC – 64QAM – Mid Channel)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset		Page 33 of 210

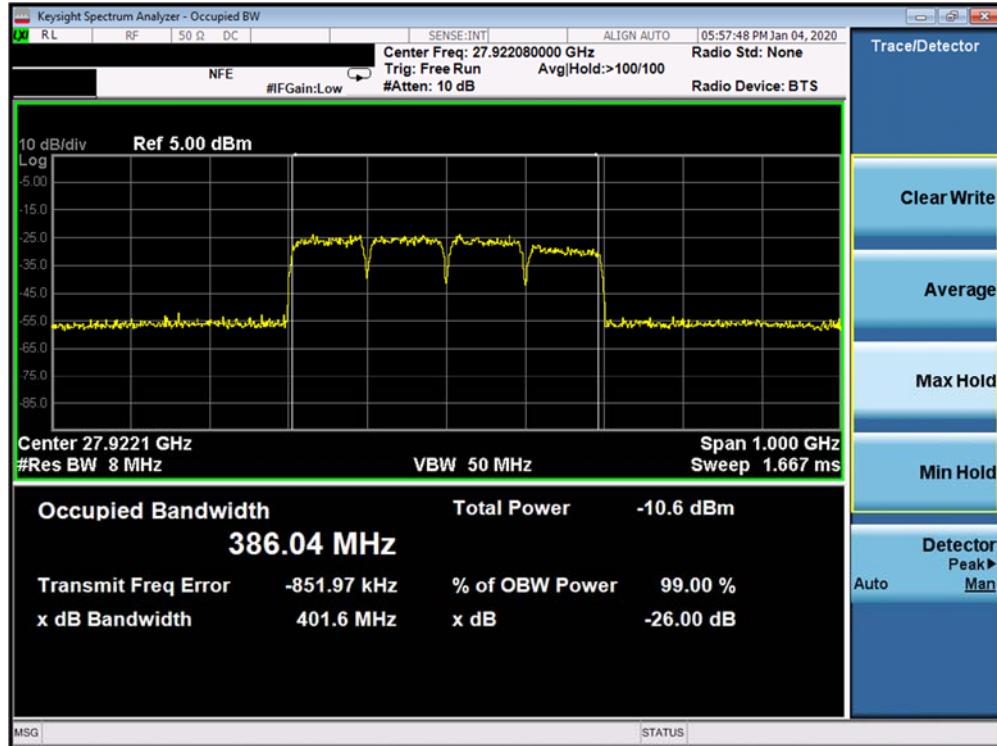


Plot 7-34. Ant3 Occupied Bandwidth Plot (100MHz-4CC – QPSK – Mid Channel)



Plot 7-35. Ant3 Occupied Bandwidth Plot (100MHz-4CC – 16QAM – Mid Channel)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset		Page 34 of 210

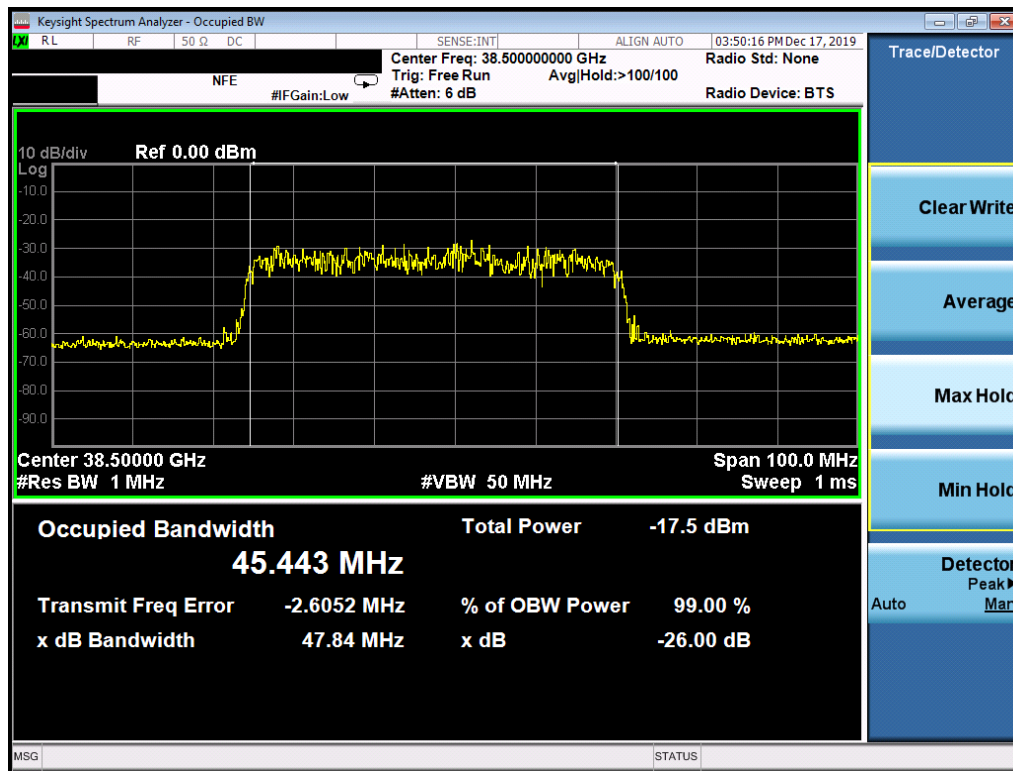


Plot 7-36. Ant3 Occupied Bandwidth Plot (100MHz-4CC – 64QAM – Mid Channel)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset		Page 35 of 210

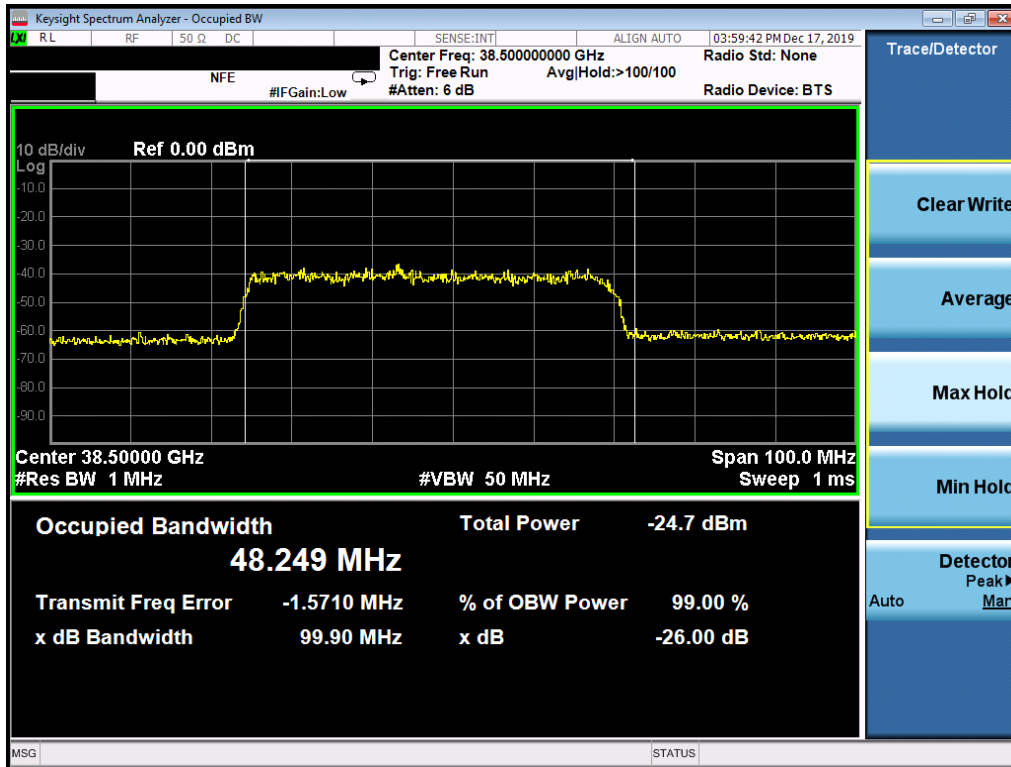
Channel	Bandwidth	CCs Active	Modulation	OBW [MHz]
Mid	50	1	QPSK	45.44
			16QAM	48.25
			64QAM	45.78
		4	QPSK	194.41
			16QAM	194.70
			64QAM	194.80
	100	1	QPSK	90.76
			16QAM	90.19
			64QAM	90.85
		4	QPSK	390.47
			16QAM	392.00
			64QAM	398.60

Table 7-5. Summary of Ant1 Occupied Bandwidths (n260)

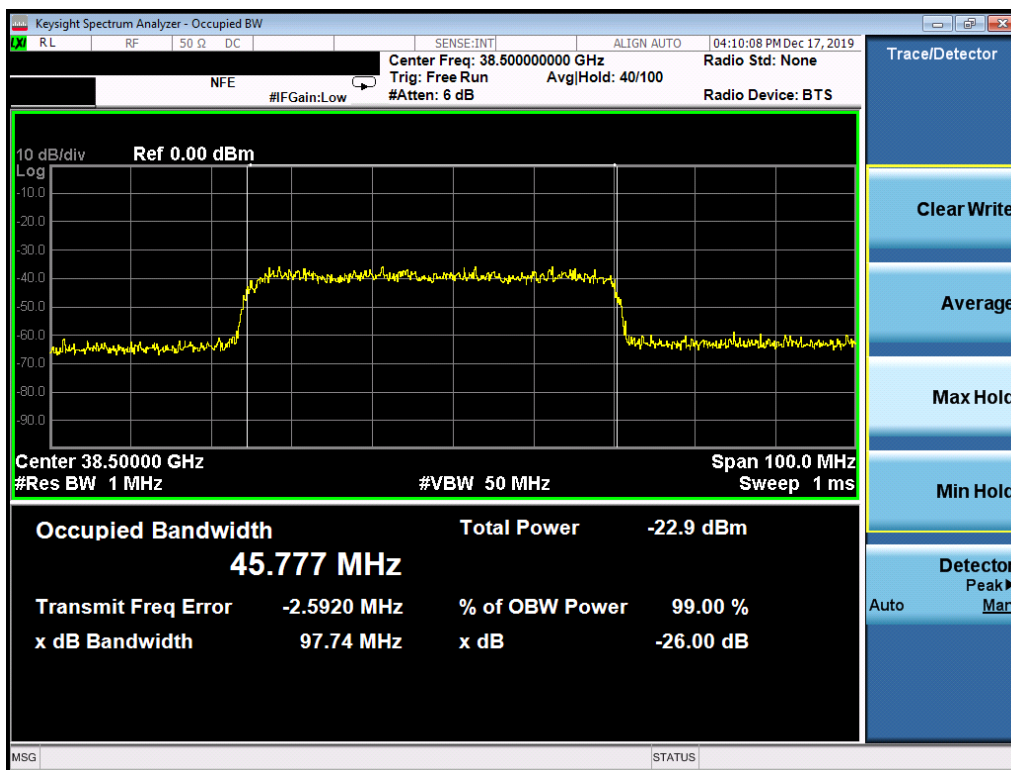


Plot 7-37. Ant1 Occupied Bandwidth Plot (50MHz-1CC – QPSK – Mid Channel)

FCC ID: ZNFV600VM	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset		Page 36 of 210

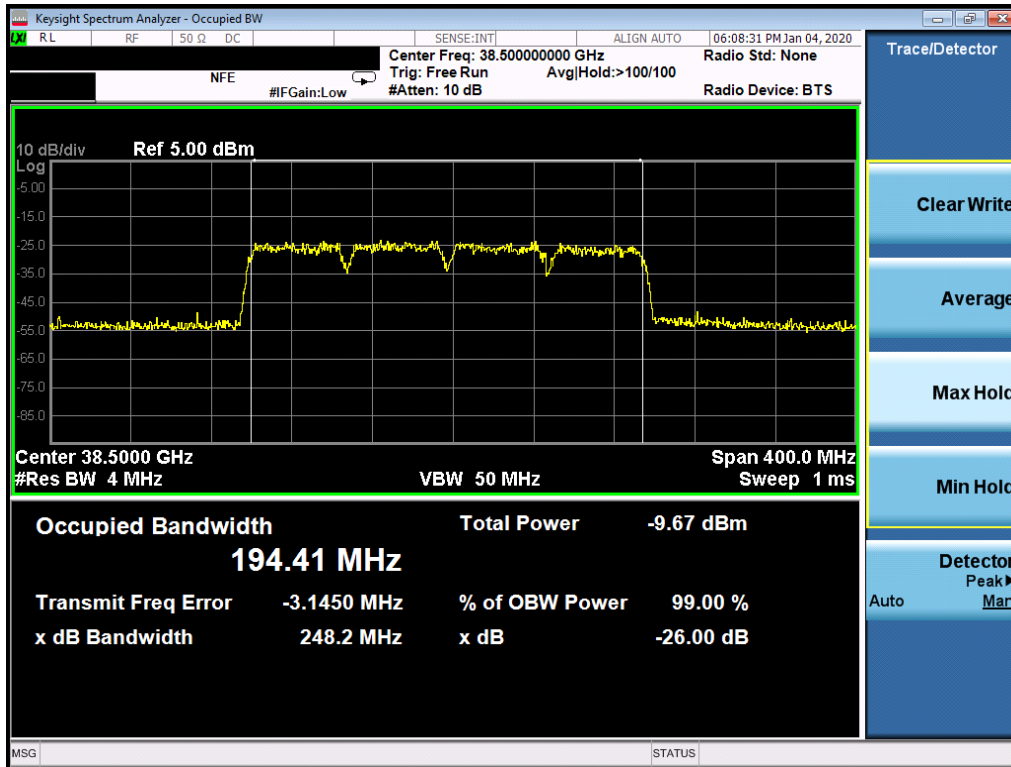


Plot 7-38. Ant1 Occupied Bandwidth Plot (50MHz-1CC – 16QAM – Mid Channel)

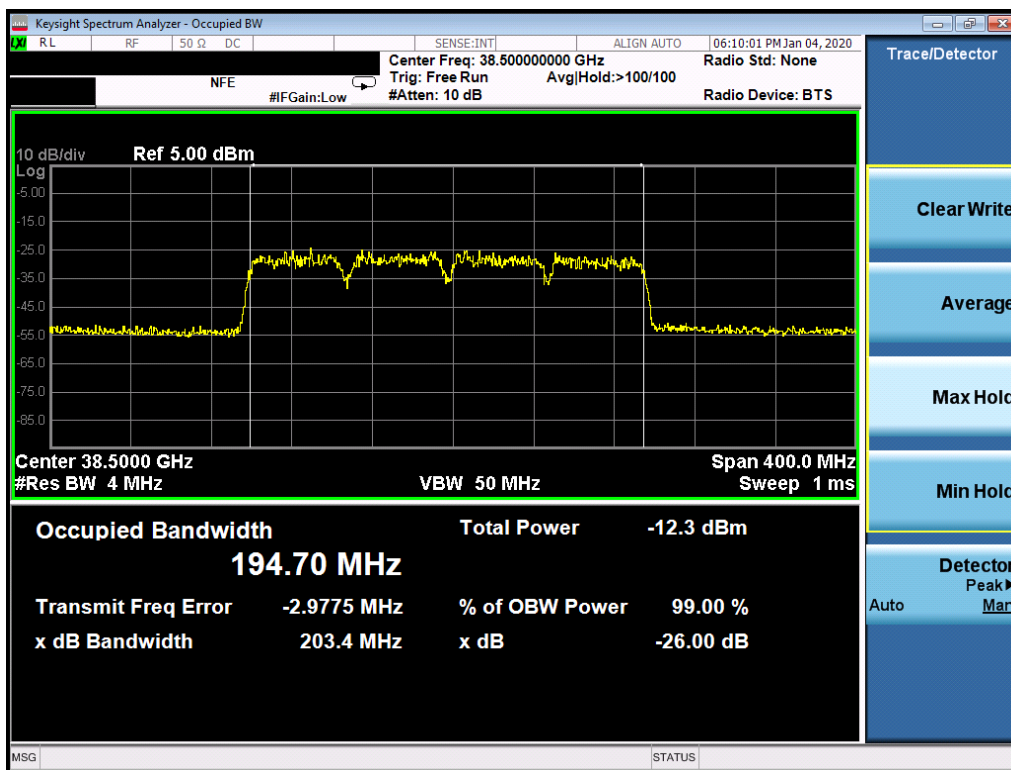


Plot 7-39. Ant1 Occupied Bandwidth Plot (50MHz-1CC – 64QAM – Mid Channel)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset		Page 37 of 210

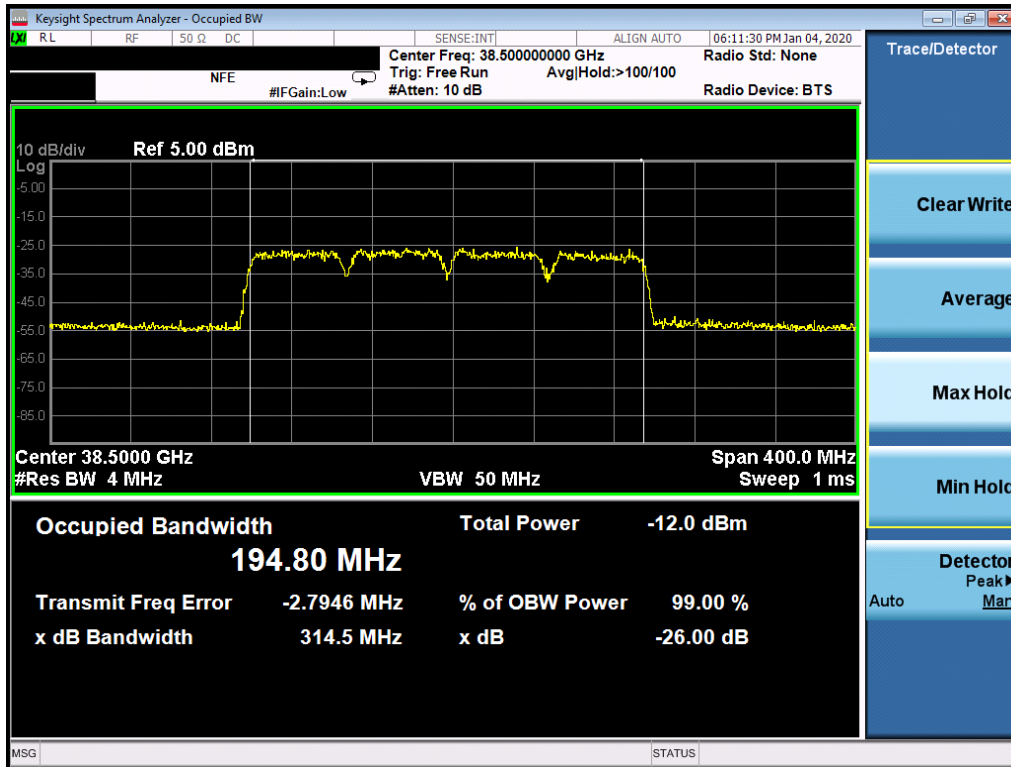


Plot 7-40. Ant1 Occupied Bandwidth Plot (50MHz-4CC – QPSK – Mid Channel)

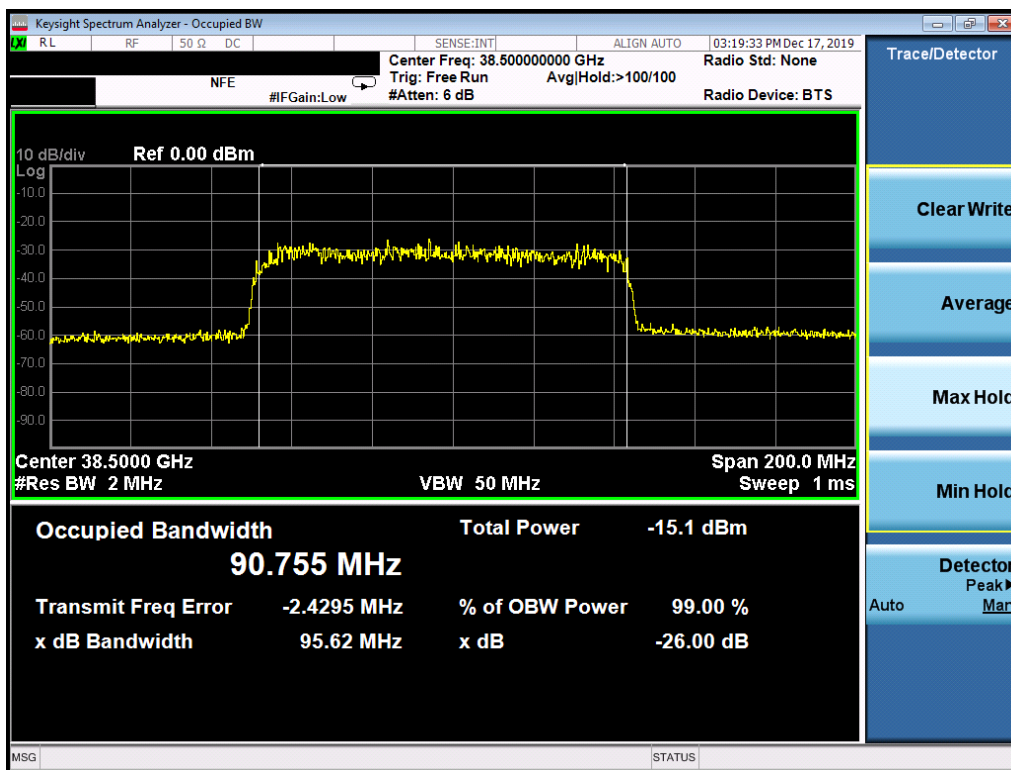


Plot 7-41. Ant1 Occupied Bandwidth Plot (50MHz-4CC – 16QAM – Mid Channel)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset		Page 38 of 210

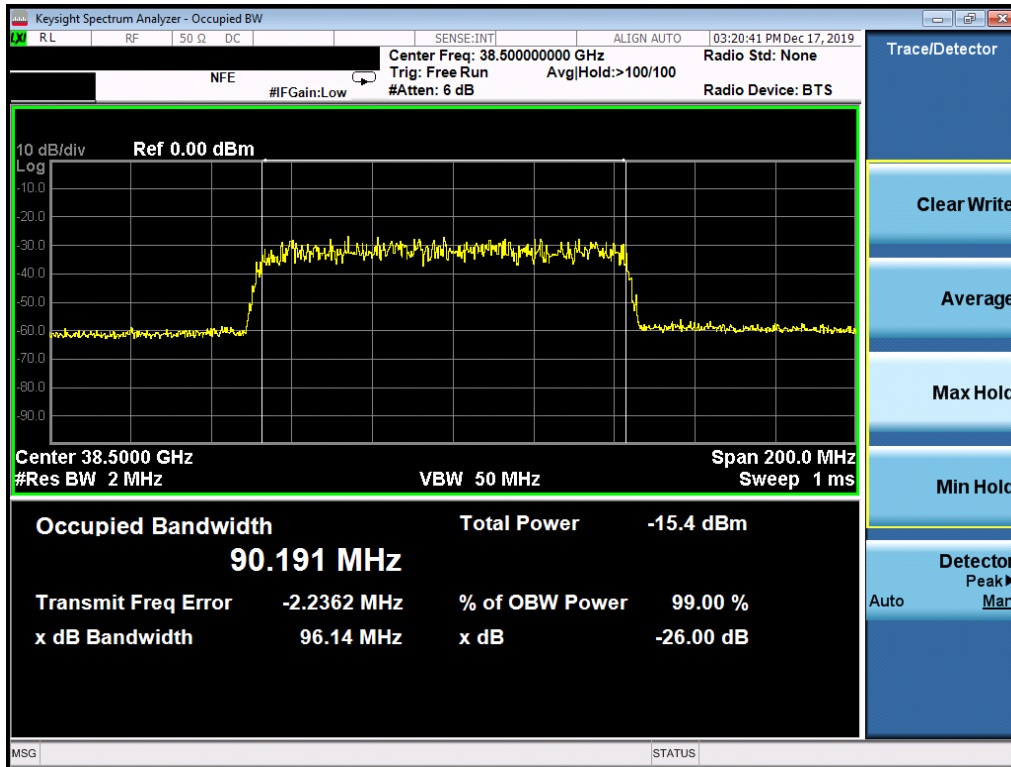


Plot 7-42. Ant1 Occupied Bandwidth Plot (50MHz-4CC – 64QAM – Mid Channel)

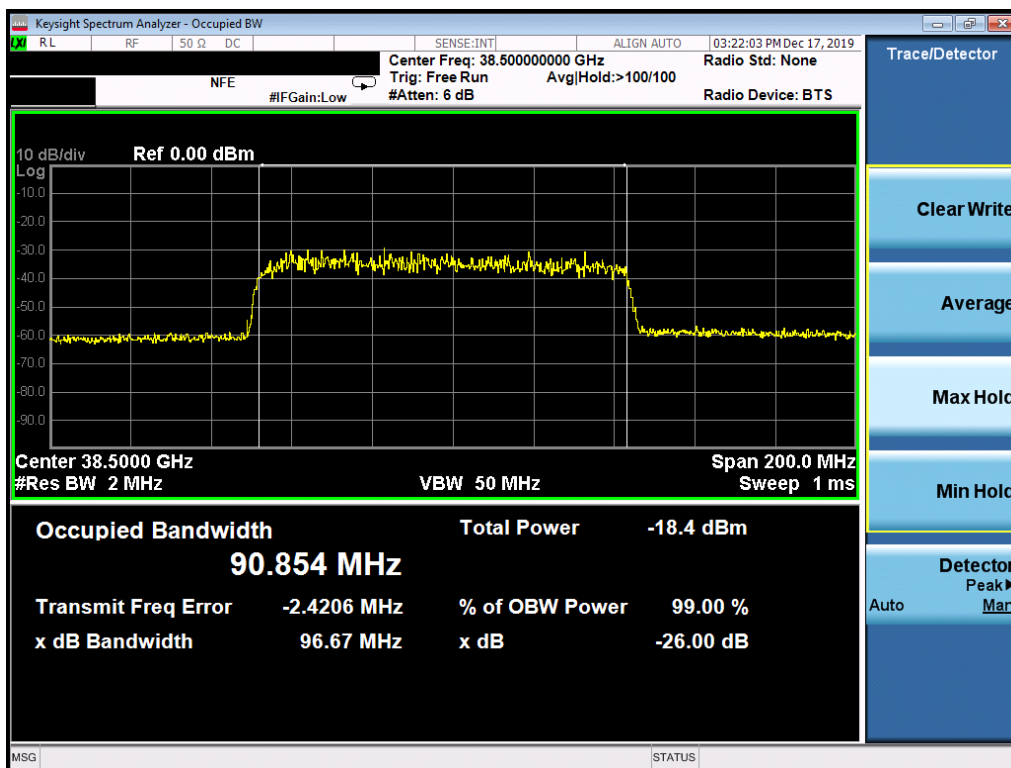


Plot 7-43. Ant1 Occupied Bandwidth Plot (100MHz-1CC – QPSK – Mid Channel)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset		Page 39 of 210

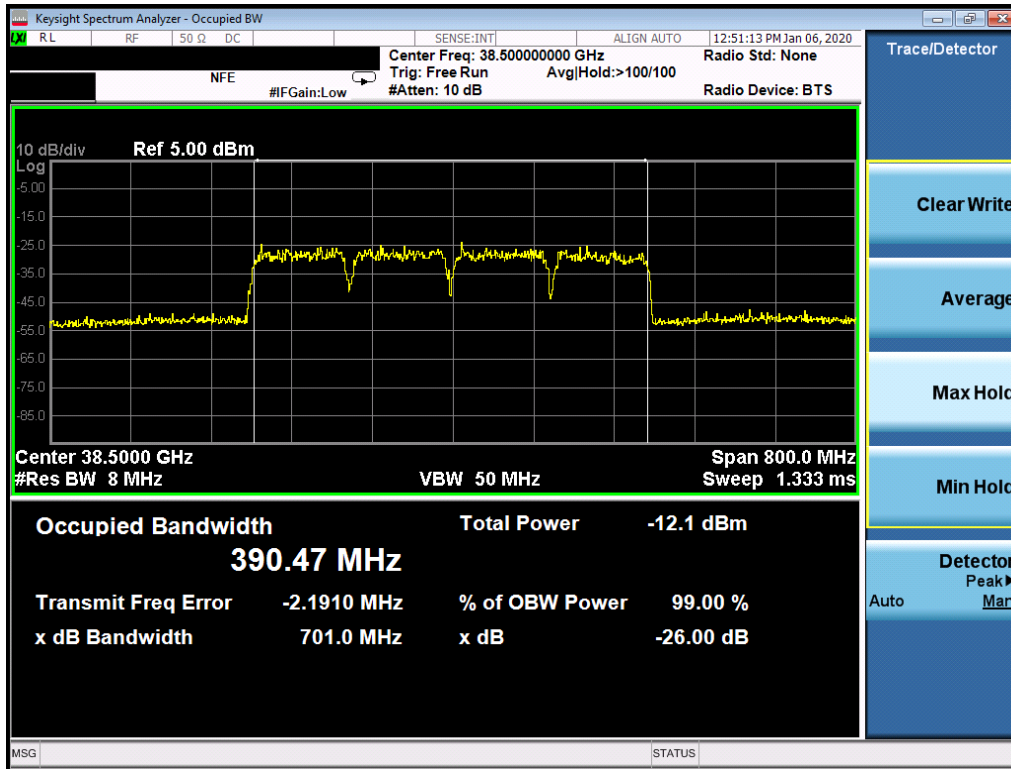


Plot 7-44. Ant1 Occupied Bandwidth Plot (100MHz-1CC – 16QAM – Mid Channel)

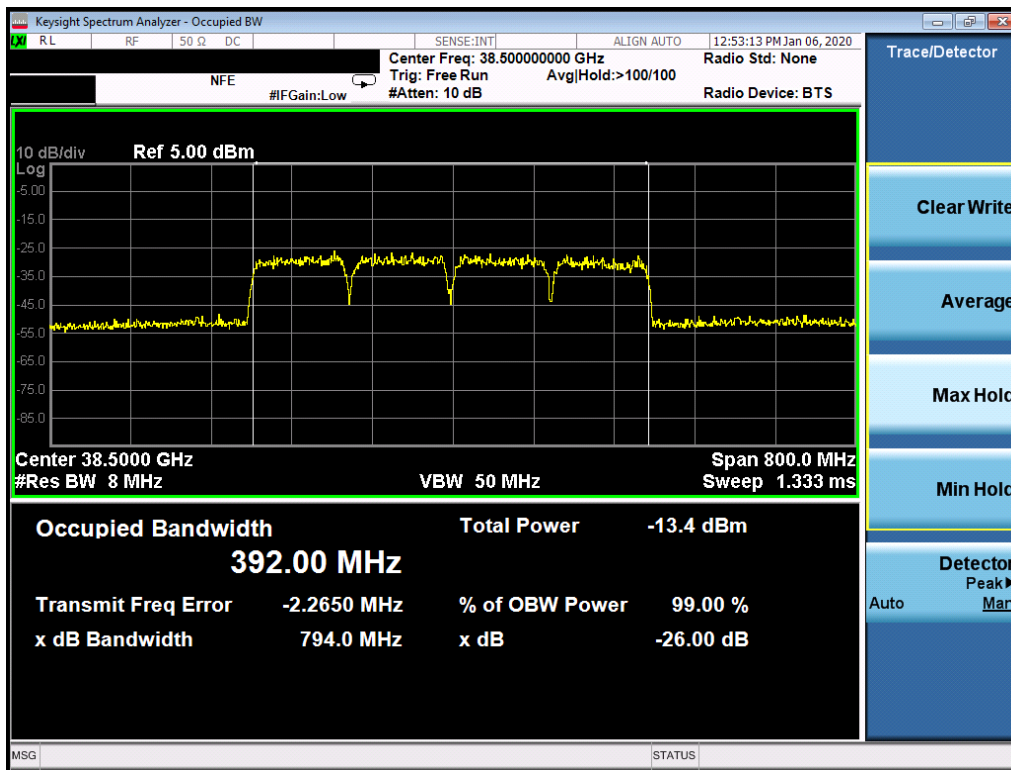


Plot 7-45. Ant1 Occupied Bandwidth Plot (100MHz-1CC – 64QAM – Mid Channel)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset		Page 40 of 210

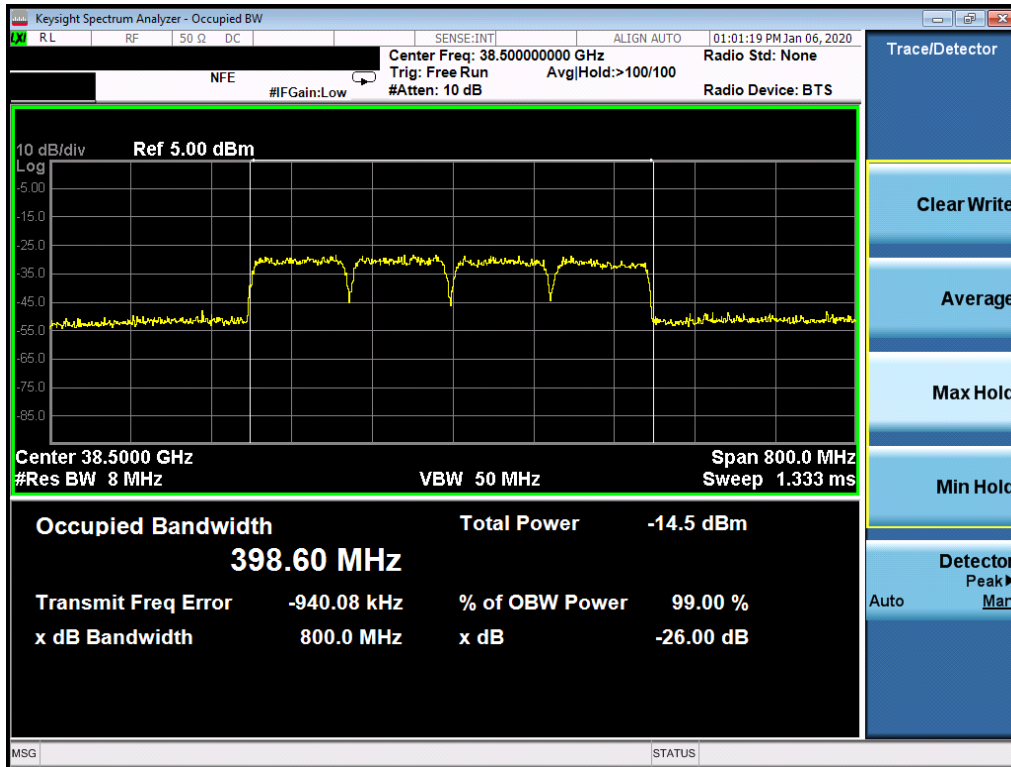


Plot 7-46. Ant1 Occupied Bandwidth Plot (100MHz-4CC – QPSK – Mid Channel)



Plot 7-47. Ant1 Occupied Bandwidth Plot (100MHz-4CC – 16QAM – Mid Channel)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset		Page 41 of 210

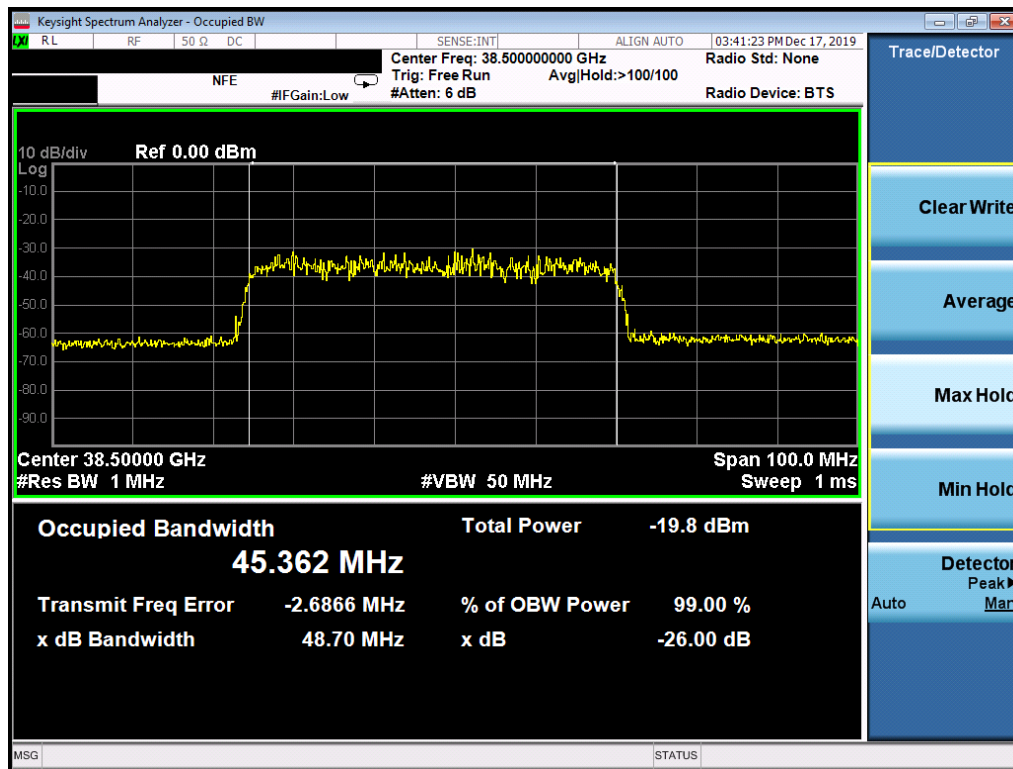


Plot 7-48. Ant1 Occupied Bandwidth Plot (100MHz-4CC – 64QAM – Mid Channel)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset		Page 42 of 210

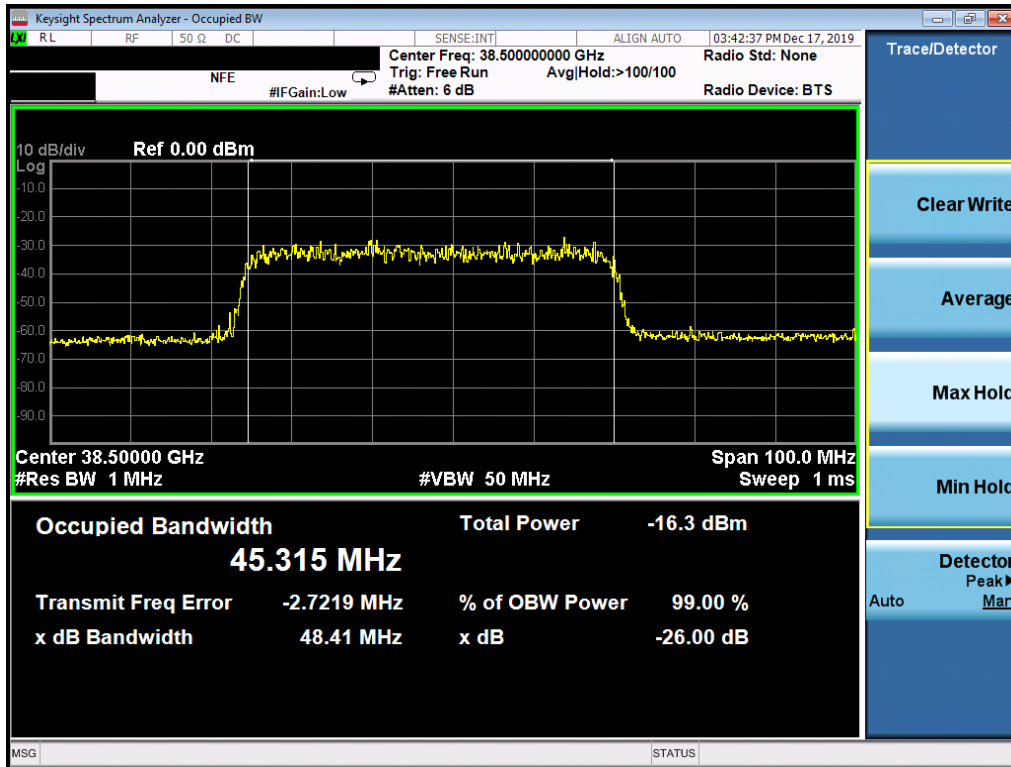
Channel	Bandwidth	CCs Active	Modulation	OBW [MHz]
Mid	50	1	QPSK	45.36
			16QAM	45.32
			64QAM	45.42
		4	QPSK	195.14
			16QAM	197.87
			64QAM	196.77
	100	1	QPSK	90.31
			16QAM	90.59
			64QAM	91.04
		4	QPSK	391.26
			16QAM	388.04
			64QAM	395.08

Table 7-6. Summary of Ant2 Occupied Bandwidths (n260)

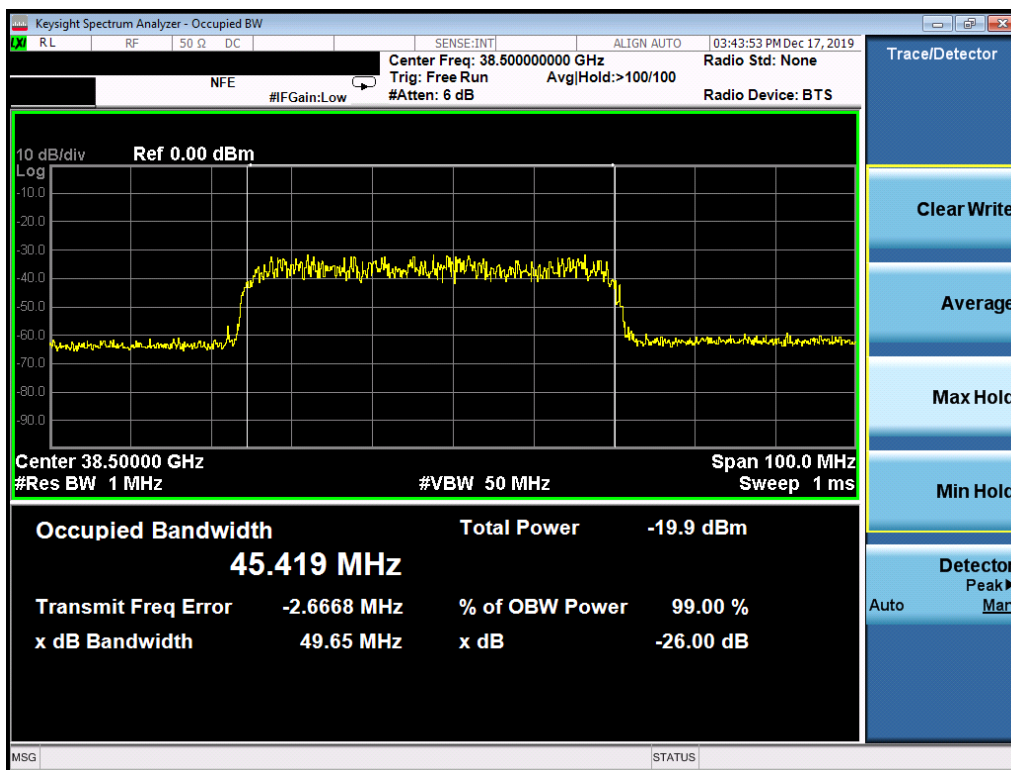


Plot 7-49. Ant2 Occupied Bandwidth Plot (50MHz-1CC – QPSK – Mid Channel)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset		Page 43 of 210

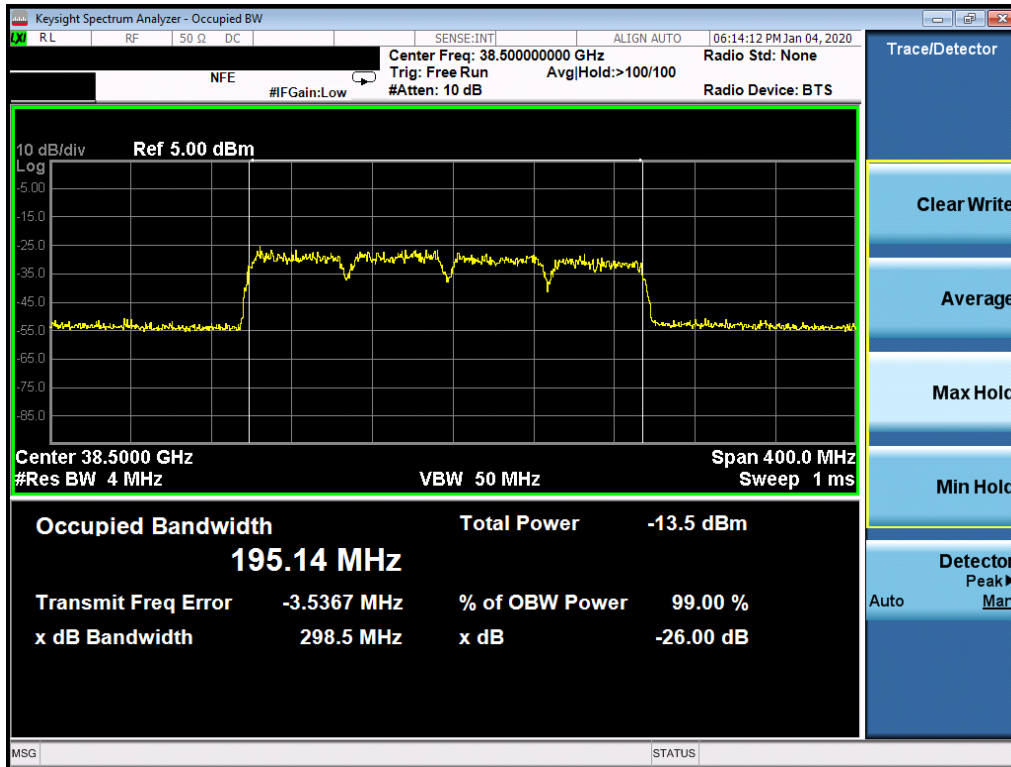


Plot 7-50. Ant2 Occupied Bandwidth Plot (50MHz-1CC – 16QAM – Mid Channel)

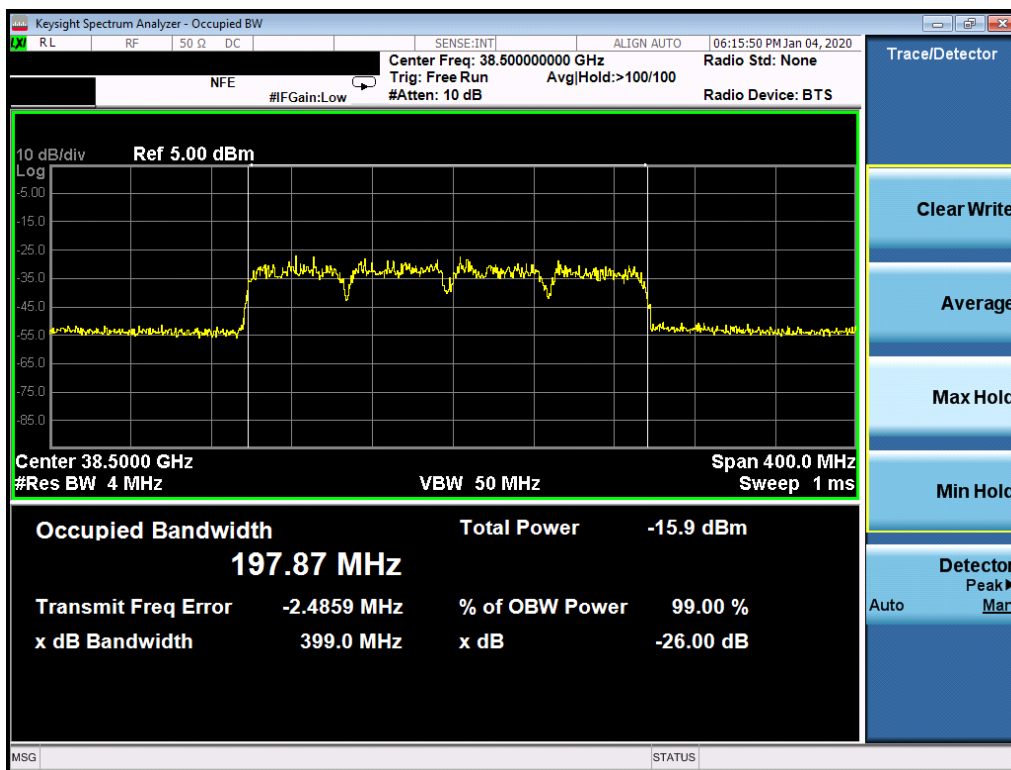


Plot 7-51. Ant2 Occupied Bandwidth Plot (50MHz-1CC – 64QAM – Mid Channel)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset		Page 44 of 210

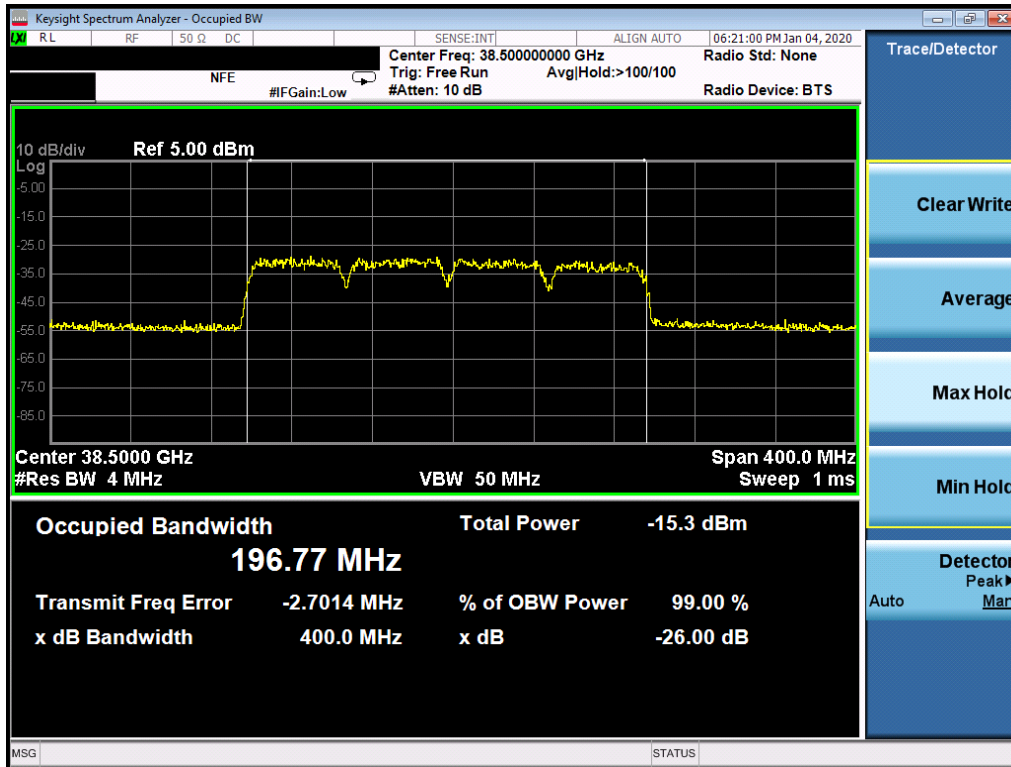


Plot 7-52. Ant2 Occupied Bandwidth Plot (50MHz-4CC – QPSK – Mid Channel)

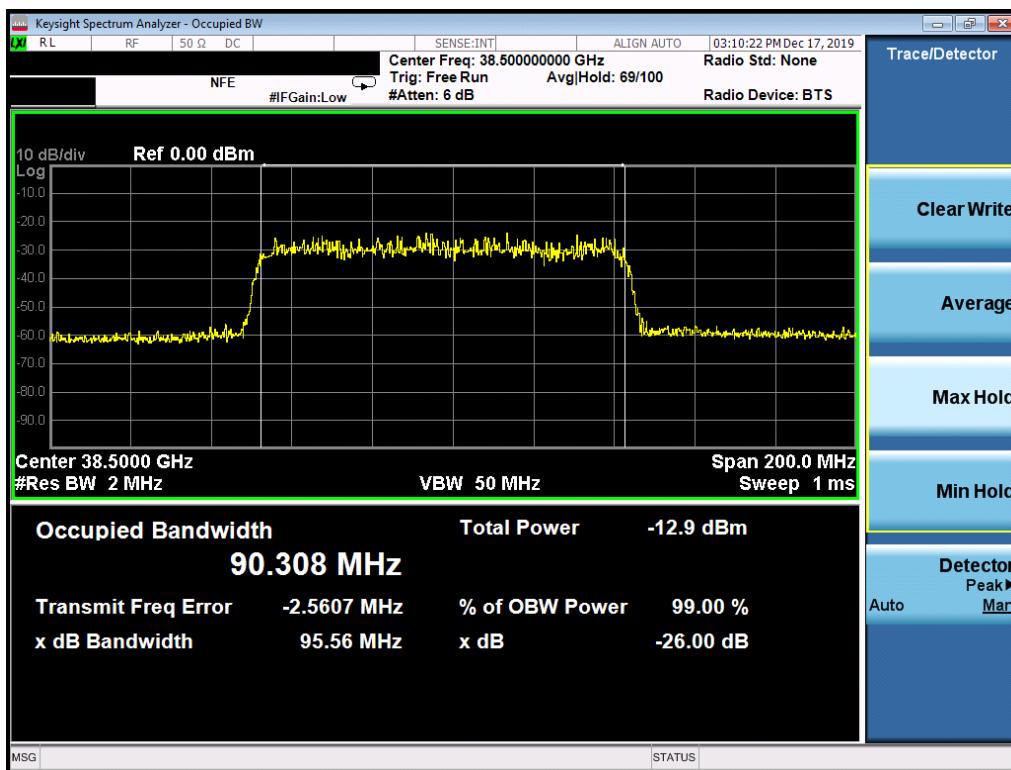


Plot 7-53. Ant2 Occupied Bandwidth Plot (50MHz-4CC – 16QAM – Mid Channel)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset		Page 45 of 210

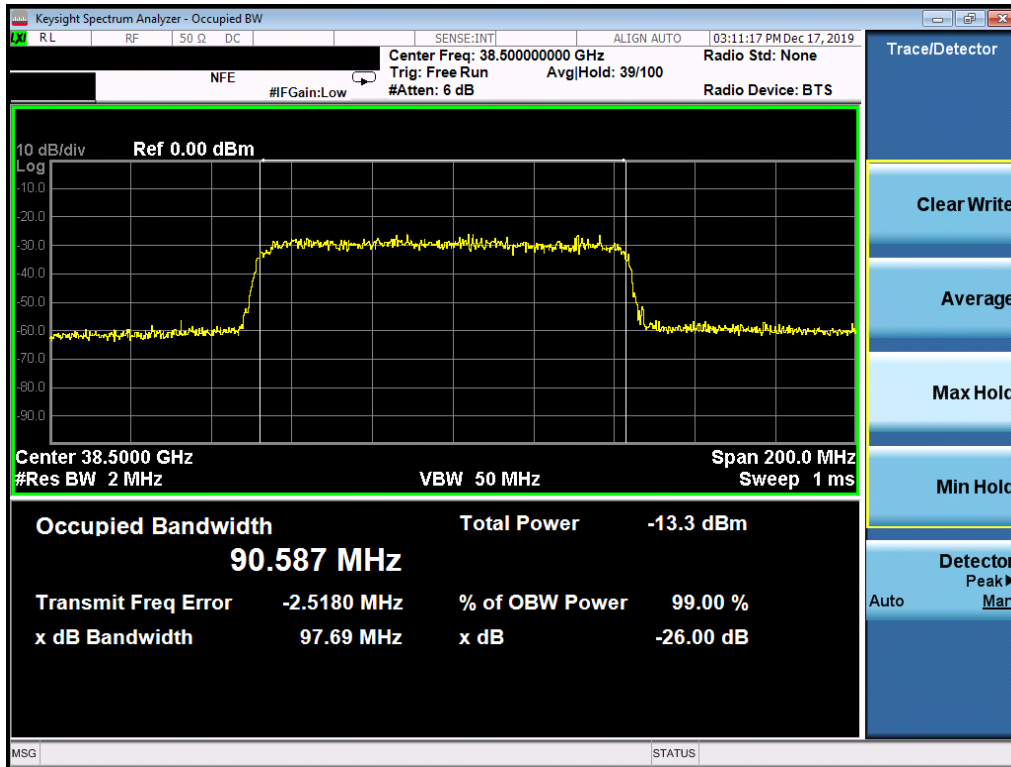


Plot 7-54. Ant2 Occupied Bandwidth Plot (50MHz-4CC – 64QAM – Mid Channel)

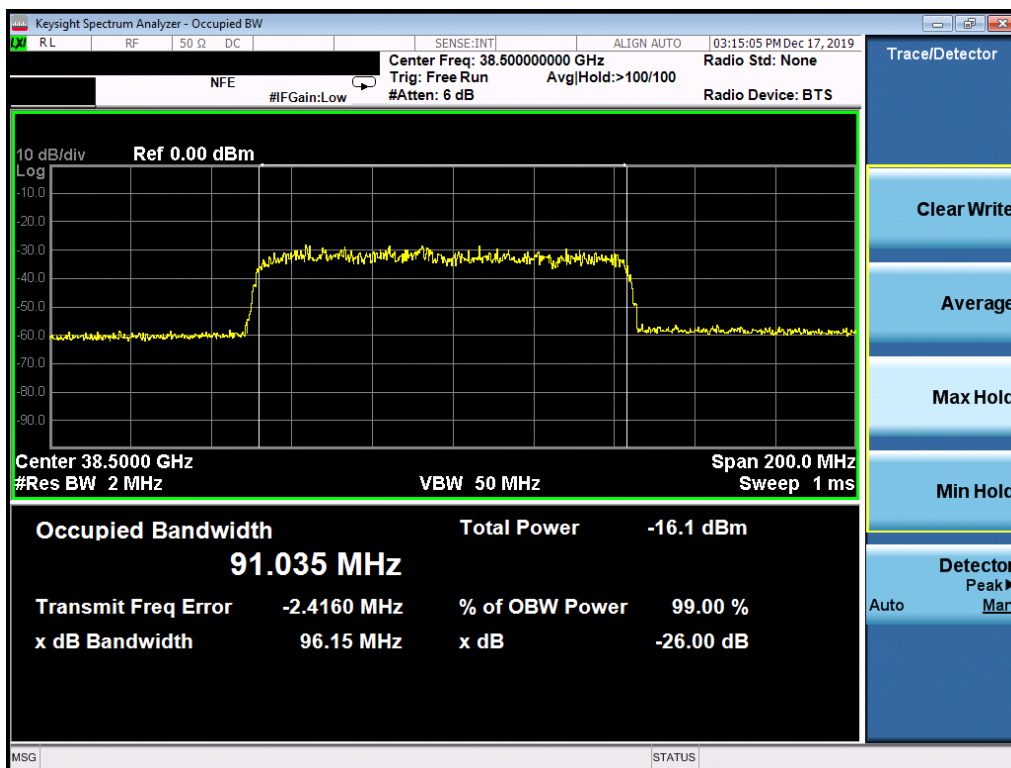


Plot 7-55. Ant2 Occupied Bandwidth Plot (100MHz-1CC – QPSK – Mid Channel)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset		Page 46 of 210

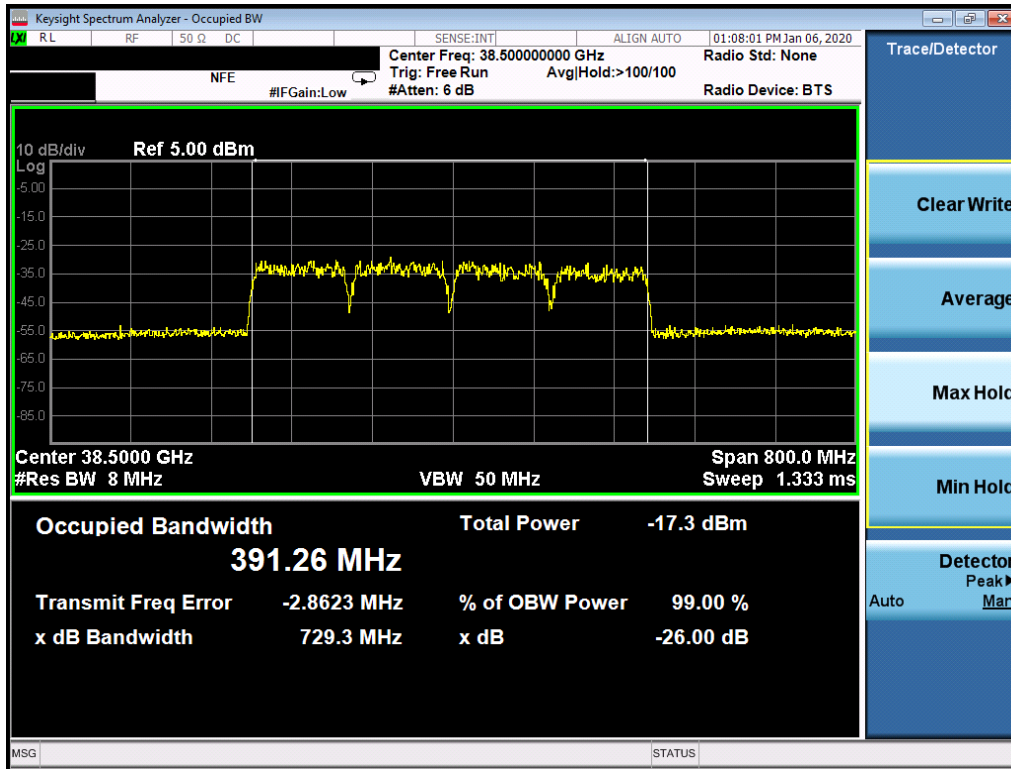


Plot 7-56. Ant2 Occupied Bandwidth Plot (100MHz-1CC – 16QAM – Mid Channel)

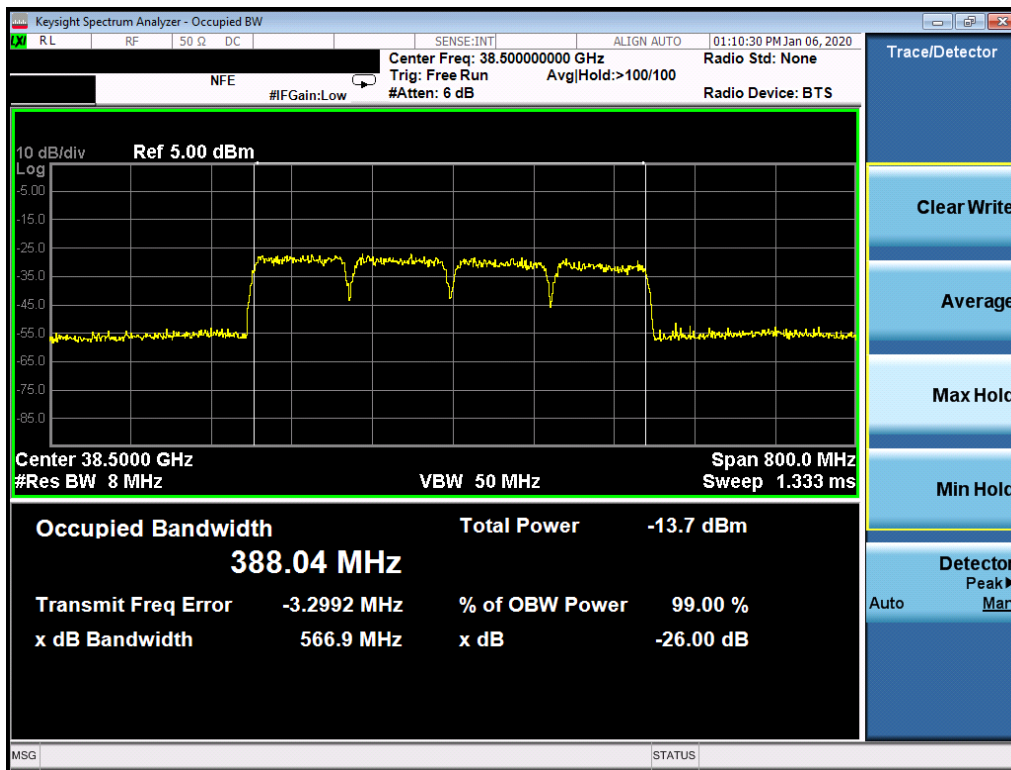


Plot 7-57. Ant2 Occupied Bandwidth Plot (100MHz-1CC – 64QAM – Mid Channel)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset		Page 47 of 210

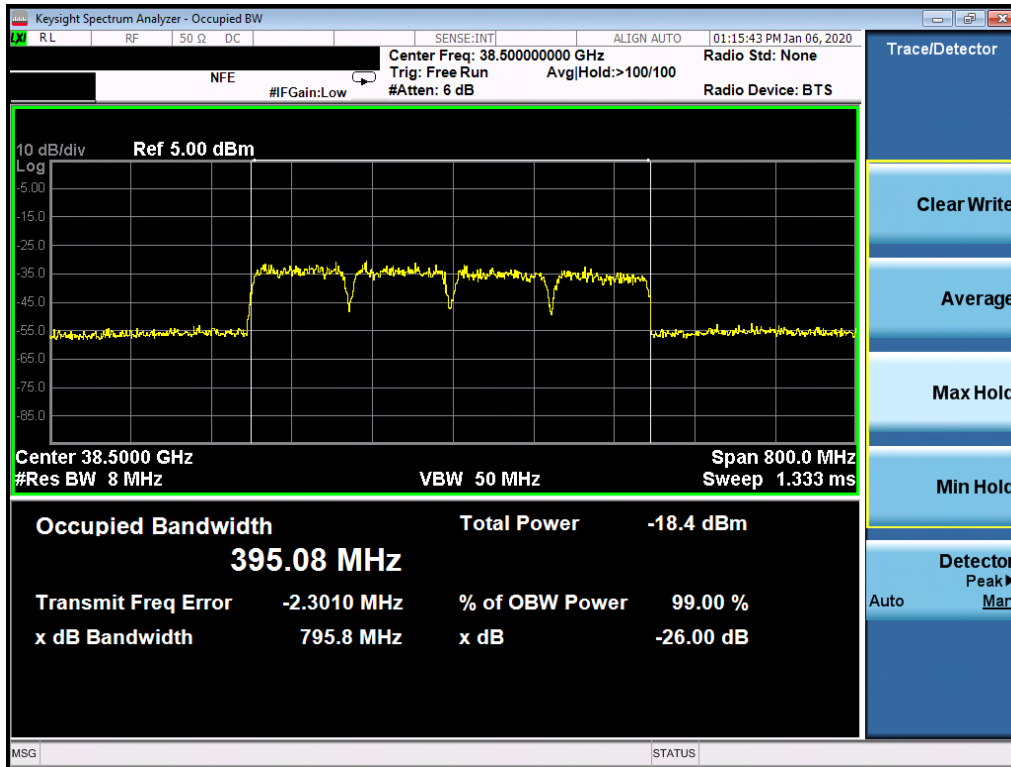


Plot 7-58. Ant2 Occupied Bandwidth Plot (100MHz-4CC – QPSK – Mid Channel)



Plot 7-59. Ant2 Occupied Bandwidth Plot (100MHz-4CC – 16QAM – Mid Channel)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset		Page 48 of 210

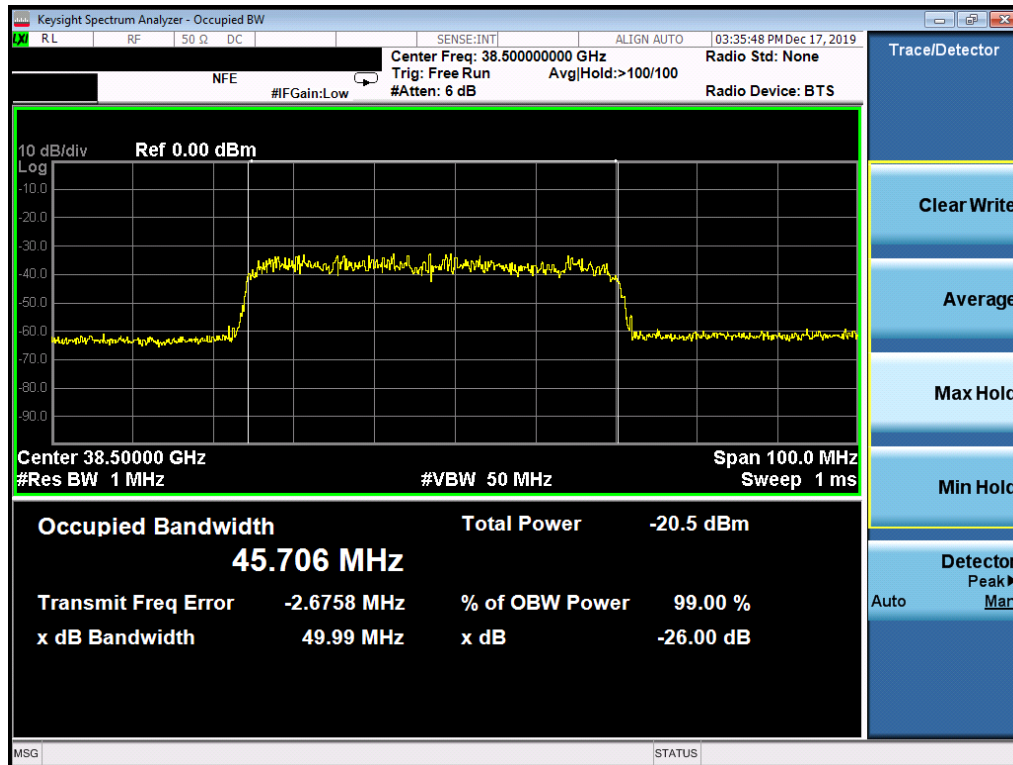


Plot 7-60. Ant2 Occupied Bandwidth Plot (100MHz-4CC – 64QAM – Mid Channel)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset		Page 49 of 210

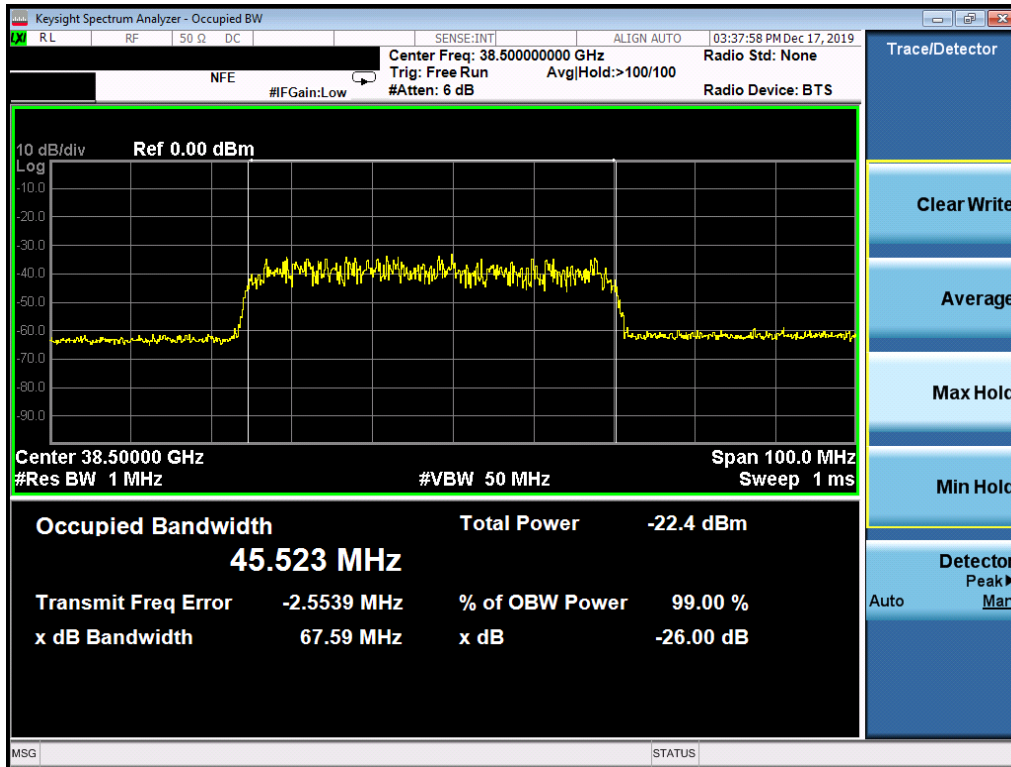
Channel	Bandwidth	CCs Active	Modulation	OBW [MHz]
Mid	50	1	QPSK	45.71
			16QAM	45.52
			64QAM	45.32
		4	QPSK	195.48
			16QAM	196.58
			64QAM	196.49
	100	1	QPSK	90.65
			16QAM	90.29
			64QAM	91.29
		4	QPSK	389.44
			16QAM	392.59
			64QAM	394.58

Table 7-7. Summary of Ant3 Occupied Bandwidths (n260)

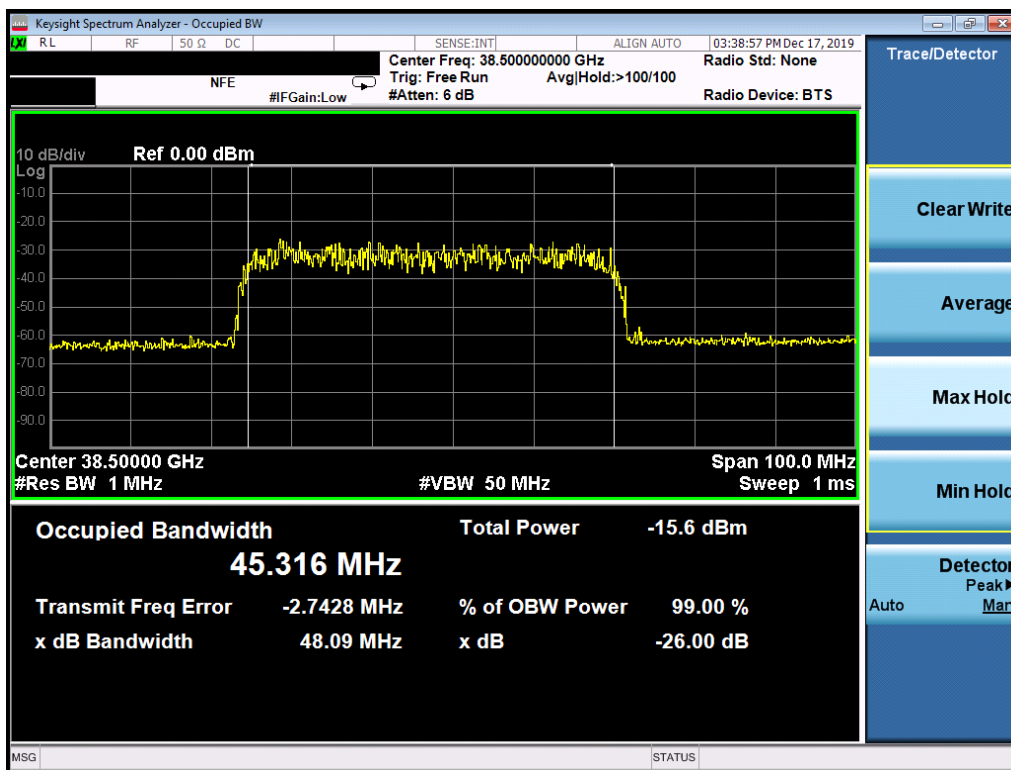


Plot 7-61. Ant3 Occupied Bandwidth Plot (50MHz-1CC – QPSK – Mid Channel)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset		Page 50 of 210

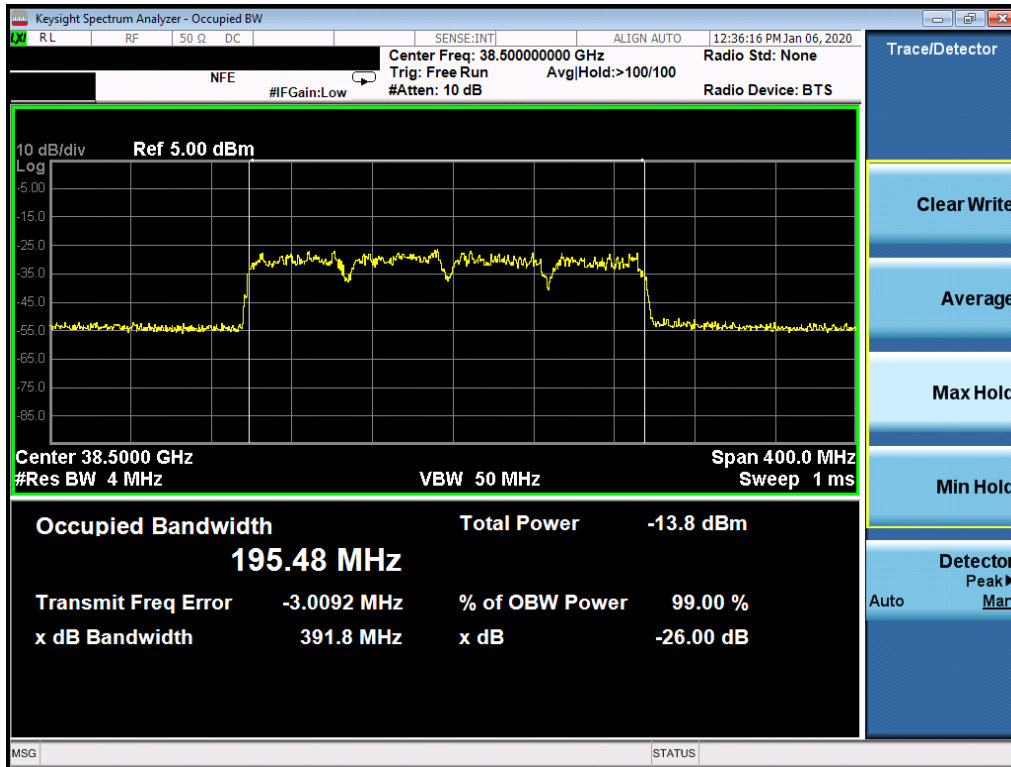


Plot 7-62. Ant3 Occupied Bandwidth Plot (50MHz-1CC – 16QAM – Mid Channel)

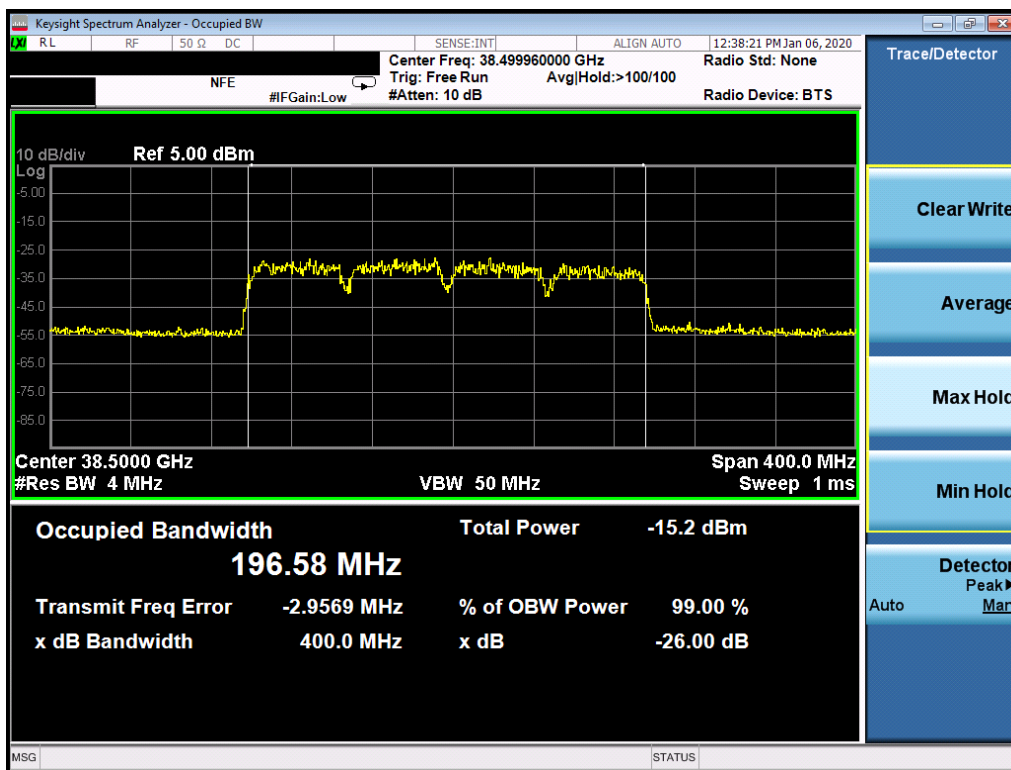


Plot 7-63. Ant3 Occupied Bandwidth Plot (50MHz-1CC – 64QAM – Mid Channel)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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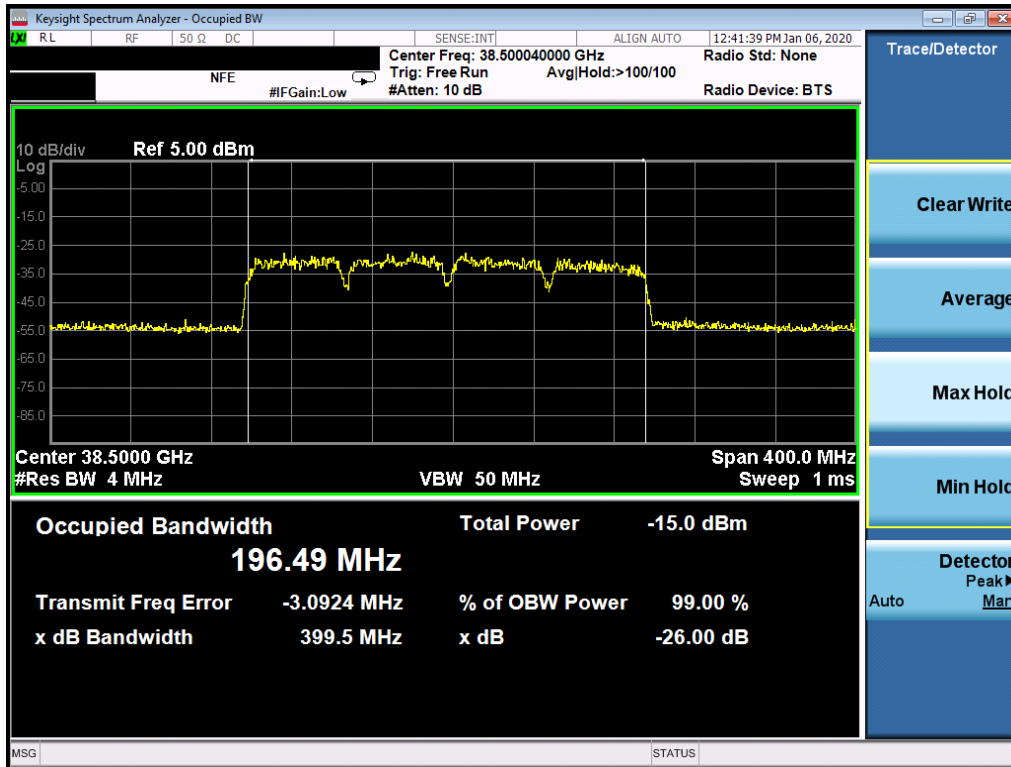


Plot 7-64. Ant3 Occupied Bandwidth Plot (50MHz-4CC – QPSK – Mid Channel)

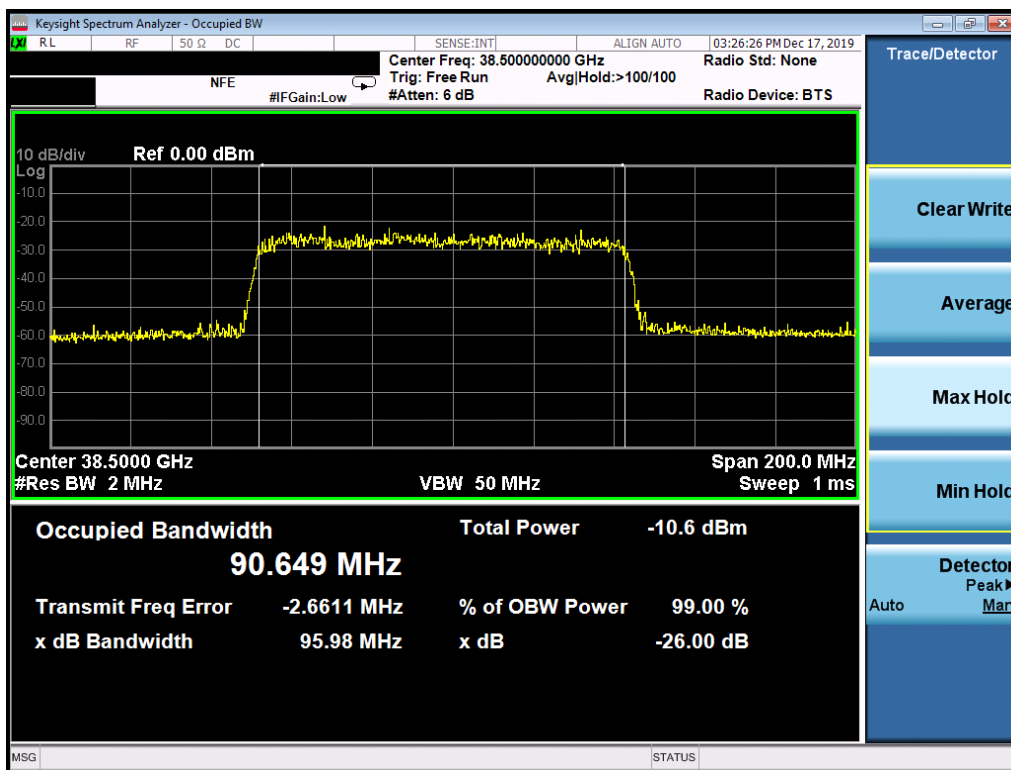


Plot 7-65. Ant3 Occupied Bandwidth Plot (50MHz-4CC – 16QAM – Mid Channel)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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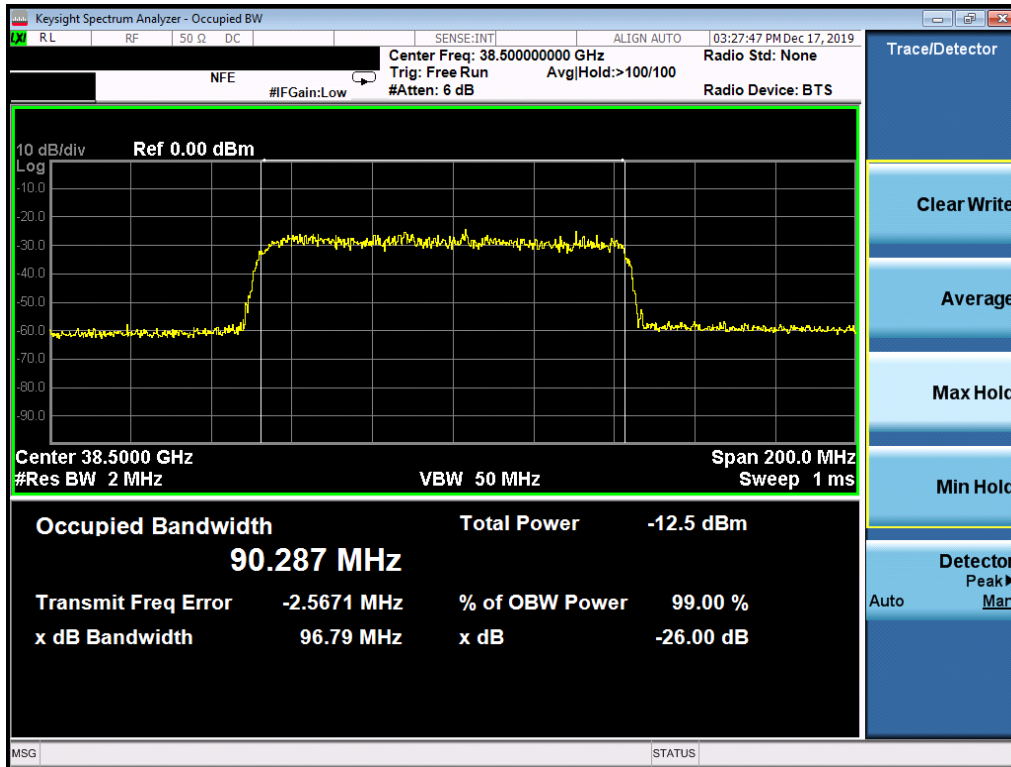


Plot 7-66. Ant3 Occupied Bandwidth Plot (50MHz-4CC – 64QAM – Mid Channel)

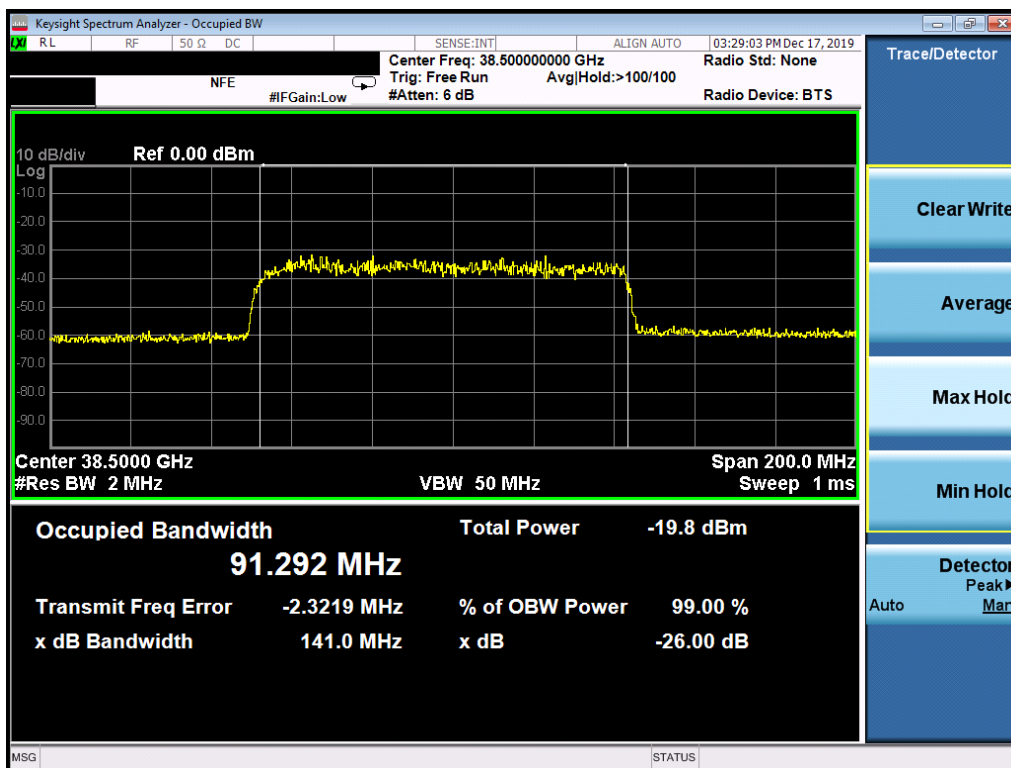


Plot 7-67. Ant3 Occupied Bandwidth Plot (100MHz-1CC – QPSK – Mid Channel)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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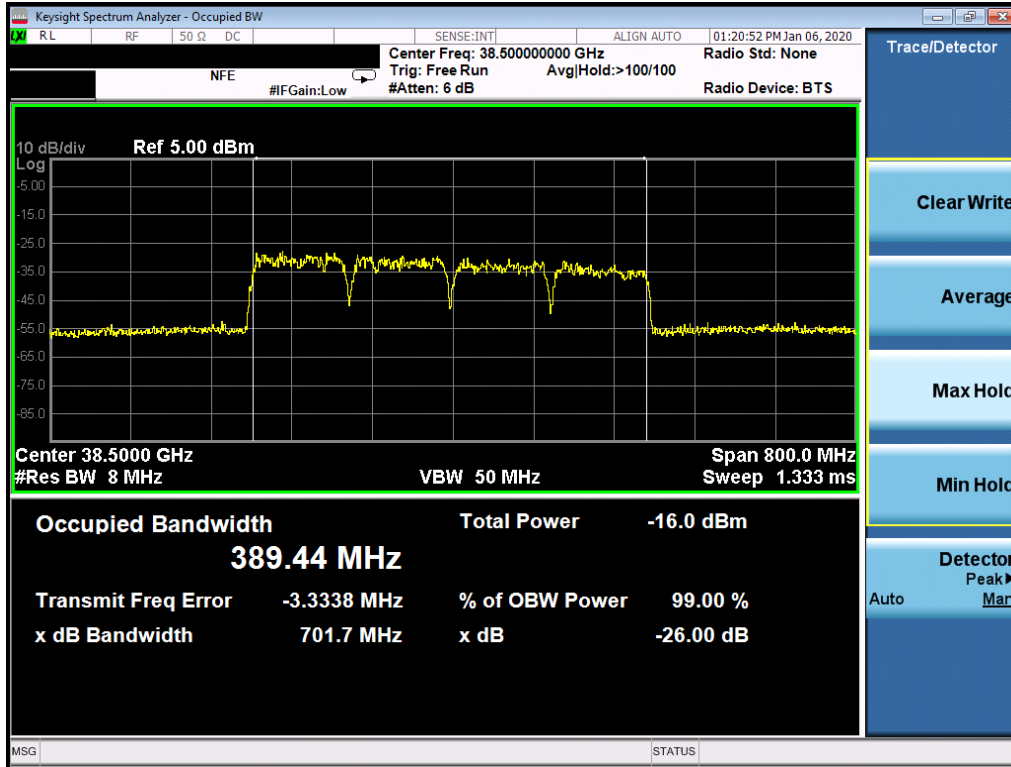


Plot 7-68. Ant3 Occupied Bandwidth Plot (100MHz-1CC – 16QAM – Mid Channel)

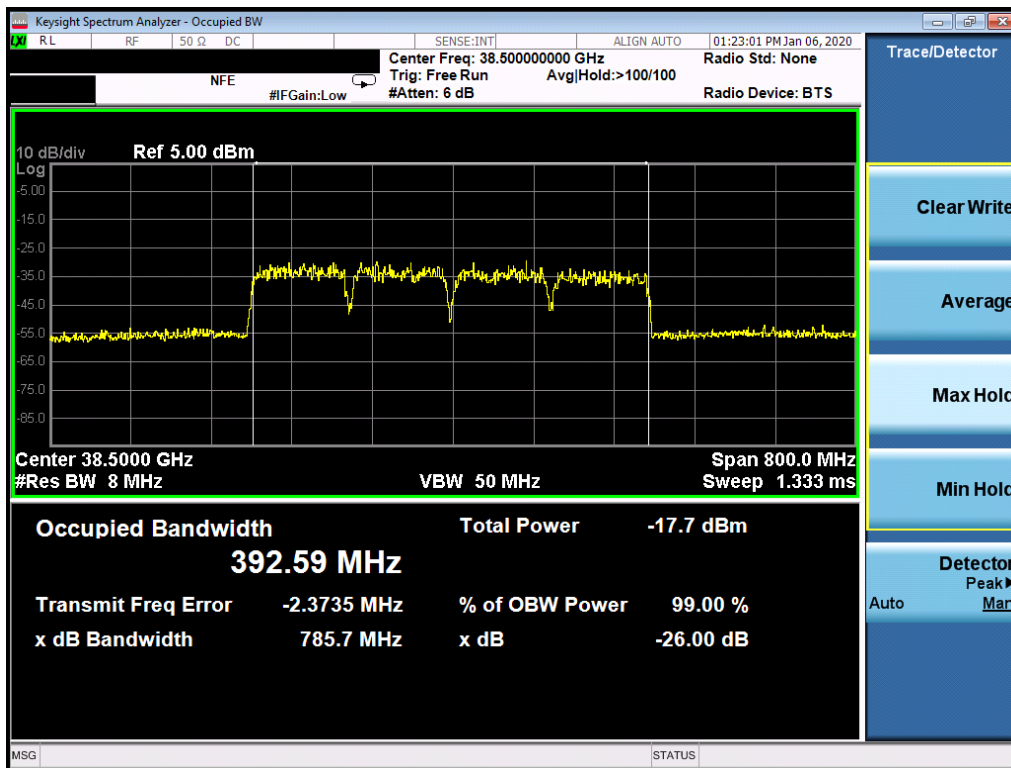


Plot 7-69. Ant3 Occupied Bandwidth Plot (100MHz-1CC – 64QAM – Mid Channel)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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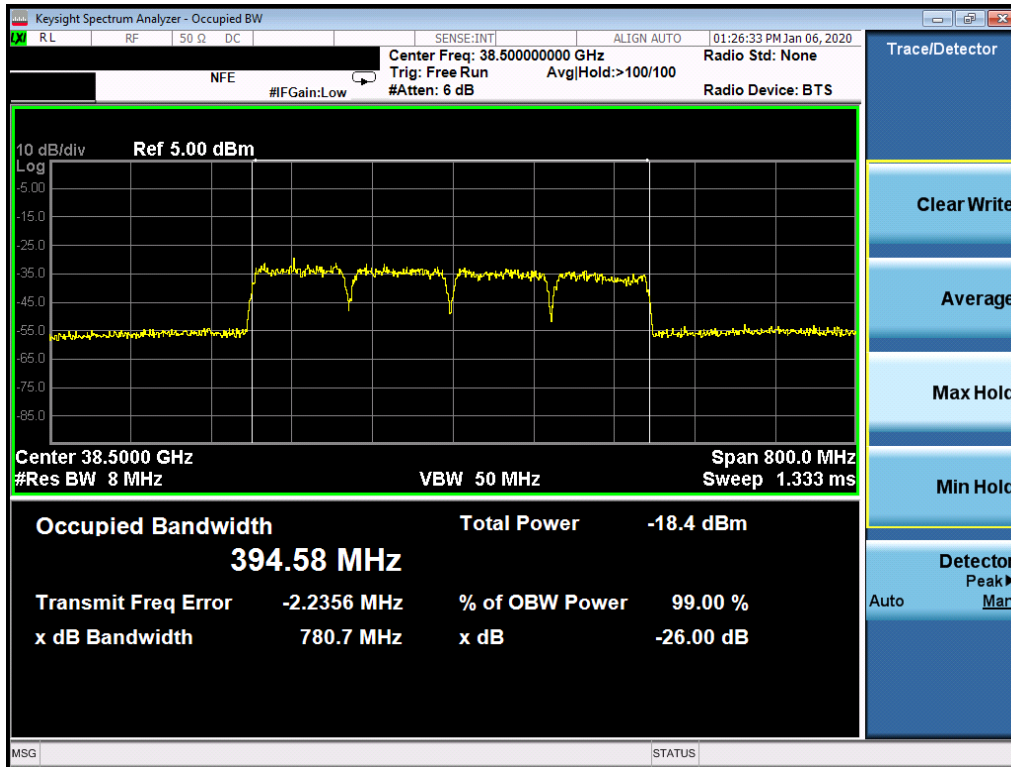


Plot 7-70. Ant3 Occupied Bandwidth Plot (100MHz-4CC – QPSK – Mid Channel)



Plot 7-71. Ant3 Occupied Bandwidth Plot (100MHz-4CC – 16QAM – Mid Channel)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Plot 7-72. Ant3 Occupied Bandwidth Plot (100MHz-4CC – 64QAM – Mid Channel)

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7.3 Equivalent Isotropic Radiated Power §2.1046, §30.202

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 its maximum duty cycle, at maximum power, and at the appropriate frequencies.

The average power of the sum of all antenna elements is limited to a maximum EIRP of +43 dBm.

Test Procedures Used

ANSI C63.26-2015 Section 5.2.4.4.1
KDB 842590 D01 v01 Section 4.2

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 $\geq 3 \times$ RBW
4. Span = 2x to 3x the OBW
5. No. of sweep points $\geq 2 \times$ 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

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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) Elements within the same antenna array are correlated to produce beamforming array gain. Antenna arrays cannot be correlated with another antenna array. During testing, only one antenna array was active.
- 3) EIRP measurements were taken at 1m test distance.
- 4) 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.
- 5) 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.

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Mode	Frequency [MHz]	Channel	Beam Pol	Modulation	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
SISO	27534.84	Low	H	QPSK	V	159	242	1/16	21.20
	27534.84	Low	V	QPSK	V	52	253	1/16	24.04
	27922.08	Mid	H	QPSK	V	141	237	1/16	20.69
	27922.08	Mid	V	QPSK	V	51	253	1/16	23.80
	28319.52	High	H	QPSK	V	141	236	1/16	23.19
	28319.52	High	V	QPSK	V	50	254	1/16	24.59
	28319.52	High	V	16QAM	V	50	254	1/16	22.46
	28319.52	High	V	64QAM	V	50	254	1/16	20.18
MIMO	27534.84	Low	H	QPSK	V	159	242	1/16	25.86
	27534.84	Low	V	QPSK	V	52	253		
	27922.08	Mid	H	QPSK	V	141	237	1/16	25.53
	27922.08	Mid	V	QPSK	V	51	253		
	28319.52	High	H	QPSK	V	141	236	1/16	26.94
	28319.52	High	V	QPSK	V	50	254		
	28319.52	High	H	16QAM	V	141	236	1/16	24.81
	28319.52	High	V	16QAM	V	50	254		
	28319.52	High	H	64QAM	V	141	236	1/16	22.58
	28319.52	High	V	64QAM	V	50	254		

Table 7-8. Ant1 EIRP Data (Band n261 - 50MHz-1CC)

Mode	Frequency [MHz]	Channel	Beam Pol	Modulation	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
SISO	27924.96	Mid	H	QPSK	V	156	230	1/31	18.98
	27924.96	Mid	V	QPSK	V	62	257	1/0	21.18
	27924.96	Mid	V	16QAM	V	62	257	1/0	19.79
	27924.96	Mid	V	64QAM	V	62	257	1/0	17.22
MIMO	28319.52	Mid	H	QPSK	V	156	230	1/0	23.23
	28319.52	Mid	V	QPSK	V	62	257		
	28319.52	Mid	H	16QAM	V	156	230	1/0	21.73
	28319.52	Mid	V	16QAM	V	62	257		
	28319.52	Mid	H	64QAM	V	156	230	1/0	19.41
	28319.52	Mid	V	64QAM	V	62	257		

Table 7-9. Ant1 EIRP Data (Band n261 - 50MHz-4CC)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Mode	Frequency [MHz]	Channel	Beam Pol	Modulation	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
SISO	27559.32	Low	H	QPSK	V	146	227	1/32	21.82
	27559.32	Low	V	QPSK	V	63	256	1/32	23.63
	27923.52	Mid	H	QPSK	V	145	231	1/32	22.77
	27923.52	Mid	V	QPSK	V	62	259	1/32	24.09
	28292.16	High	H	QPSK	V	142	236	1/32	23.48
	28292.16	High	V	QPSK	V	50	254	1/32	24.98
	28292.16	High	V	16QAM	V	50	254	1/32	22.68
	27923.52	Mid	V	64QAM	V	62	259	1/32	22.21
MIMO	27559.32	Low	H	QPSK	V	146	227	1/32	25.83
	27559.32	Low	V	QPSK	V	63	256		
	27923.52	Mid	H	QPSK	V	145	231	1/32	26.49
	27923.52	Mid	V	QPSK	V	62	259		
	28292.16	High	H	QPSK	V	142	236	1/32	27.30
	28292.16	High	V	QPSK	V	50	254		
	28292.16	High	H	16QAM	V	142	236	1/32	25.13
	28292.16	High	V	16QAM	V	50	254		
	28292.16	High	H	64QAM	V	142	236	1/32	22.98
	28292.16	High	V	64QAM	V	50	254		

Table 7-10. Ant1 EIRP Data (Band n261 - 100MHz-1CC)

Mode	Frequency [MHz]	Channel	Beam Pol	Modulation	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
SISO	27926.52	Mid	H	QPSK	V	153	232	1/63	18.01
	27926.52	Mid	V	QPSK	V	62	257	1/32	19.79
	27926.52	Mid	V	16QAM	V	62	257	1/32	17.98
	27926.52	Mid	V	64QAM	V	62	257	1/32	15.70
MIMO	28292.16	Mid	H	QPSK	V	153	232	1/32	22.00
	28292.16	Mid	V	QPSK	V	62	257		
	28292.16	Mid	H	16QAM	V	153	232	1/32	20.27
	28292.16	Mid	V	16QAM	V	62	257		
	28292.16	Mid	H	64QAM	V	153	232	1/32	18.13
	28292.16	Mid	V	64QAM	V	62	257		

Table 7-11. Ant1 EIRP Data (Band n261 - 100MHz-4CC)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Mode	Frequency [MHz]	Channel	Beam Pol	Modulation	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
SISO	27534.84	Low	H	QPSK	V	201	38	1/16	23.45
	27534.84	Low	V	QPSK	V	181	141	1/16	25.23
	27922.08	Mid	H	QPSK	V	200	43	1/16	22.64
	27922.08	Mid	V	QPSK	V	184	136	1/16	23.89
	28319.52	High	H	QPSK	V	197	33	1/16	22.63
	28319.52	High	V	QPSK	V	184	135	1/16	24.95
	27534.84	Low	V	16QAM	V	181	141	1/16	24.05
	27534.84	Low	V	64QAM	V	181	141	1/16	22.14
MIMO	27534.84	Low	H	QPSK	V	201	38	1/16	27.44
	27534.84	Low	V	QPSK	V	181	141		
	27534.84	Low	H	16QAM	V	201	38	1/16	26.19
	27534.84	Low	V	16QAM	V	181	141		
	27534.84	Low	H	64QAM	V	201	38	1/16	24.28
	27534.84	Low	V	64QAM	V	181	141		
	27922.08	Mid	H	QPSK	V	200	43	1/16	26.32
	27922.08	Mid	V	QPSK	V	184	136		
	28319.52	High	H	QPSK	V	197	33	1/16	26.94
	28319.52	High	V	QPSK	V	184	135		

Table 7-12. Ant2 EIRP Data (Band n261 - 50MHz-1CC)

Mode	Frequency [MHz]	Channel	Beam Pol	Modulation	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
SISO	27559.32	Low	H	QPSK	V	198	31	1/16	20.52
	27559.32	Low	V	QPSK	V	184	130	32/0	21.61
	27559.32	Low	V	16QAM	V	184	130	32/0	19.89
	27559.32	Low	V	64QAM	V	184	130	32/0	17.38
MIMO	27559.32	Low	H	QPSK	V	198	31	32/0	24.11
	27559.32	Low	V	QPSK	V	184	130		
	27559.32	Low	H	16QAM	V	198	31	32/0	22.45
	27559.32	Low	V	16QAM	V	184	130		
	27559.32	Low	H	64QAM	V	198	31	32/0	20.07
	27559.32	Low	V	64QAM	V	184	130		

Table 7-13. Ant2 EIRP Data (Band n261 - 50MHz-4CC)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Mode	Frequency [MHz]	Channel	Beam Pol	Modulation	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
SISO	27559.32	Low	H	QPSK	V	202	32	1/32	23.38
	27559.32	Low	V	QPSK	V	182	136	1/32	25.18
	27923.52	Mid	H	QPSK	V	200	36	1/32	23.59
	27923.52	Mid	V	QPSK	V	184	134	1/32	24.75
	28292.16	High	H	QPSK	V	200	41	1/32	24.02
	28292.16	High	V	QPSK	V	183	136	1/32	25.48
	28292.16	High	V	16QAM	V	183	136	1/32	23.51
	28292.16	High	V	64QAM	V	183	136	1/32	21.07
MIMO	27559.32	Low	H	QPSK	V	202	32	1/32	27.38
	27559.32	Low	V	QPSK	V	182	136		
	27923.52	Mid	H	QPSK	V	200	36	1/32	27.22
	27923.52	Mid	V	QPSK	V	184	134		
	28292.16	High	H	QPSK	V	200	41	1/32	27.82
	28292.16	High	V	QPSK	V	183	136		
	28292.16	High	H	16QAM	V	200	41	1/32	25.76
	28292.16	High	V	16QAM	V	183	136		
	28292.16	High	H	64QAM	V	200	41	1/32	23.44
	28292.16	High	V	64QAM	V	183	136		

Table 7-14. Ant2 EIRP Data (Band n261 - 100MHz-1CC)

Mode	Frequency [MHz]	Channel	Beam Pol	Modulation	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
SISO	27559.32	Low	H	QPSK	V	193	42	64/0	19.66
	27559.32	Low	V	QPSK	V	192	127		20.54
	27559.32	Low	V	16QAM	V	192	127		18.82
	27559.32	Low	V	64QAM	V	192	127		16.39
MIMO	27559.32	Low	H	QPSK	V	193	42	64/0	23.13
	27559.32	Low	V	QPSK	V	192	127		
	27559.32	Low	H	16QAM	V	193	42	64/0	21.43
	27559.32	Low	V	16QAM	V	192	127		
	27559.32	Low	H	64QAM	V	193	42	64/0	19.16
	27559.32	Low	V	64QAM	V	192	127		

Table 7-15. Ant2 EIRP Data (Band n261 - 100MHz-4CC)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Mode	Frequency [MHz]	Channel	Beam Pol	Modulation	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
SISO	27534.84	Low	H	QPSK	V	220	25	1/16	21.08
	27534.84	Low	V	QPSK	V	190	334	1/16	22.04
	27922.08	Mid	H	QPSK	V	222	26	1/16	20.23
	27922.08	Mid	V	QPSK	V	195	338	1/16	21.30
	28319.52	High	H	QPSK	V	222	30	1/16	21.88
	28319.52	High	V	QPSK	V	197	337	1/16	22.21
	28319.52	High	V	16QAM	V	197	337	1/16	19.77
	28319.52	High	V	64QAM	V	197	337	1/16	17.80
MIMO	27534.84	Low	H	QPSK	V	220	25	1/16	24.59
	27534.84	Low	V	QPSK	V	190	334		
	27922.08	Mid	H	QPSK	V	222	26	1/16	23.81
	27922.08	Mid	V	QPSK	V	195	338		
	28319.52	High	H	QPSK	V	222	30	1/16	25.05
	28319.52	High	V	QPSK	V	197	337		
	28319.52	High	H	16QAM	V	222	30	1/16	22.71
	28319.52	High	V	16QAM	V	197	337		
	28319.52	High	H	64QAM	V	222	30	1/16	20.78
	28319.52	High	V	64QAM	V	197	337		

Table 7-16. Ant3 EIRP Data (Band n261 - 50MHz-1CC)

Mode	Frequency [MHz]	Channel	Beam Pol	Modulation	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
SISO	27559.32	Low	H	QPSK	V	43	316	1/0	18.28
	27559.32	Low	V	QPSK	V	23	38	1/31	16.63
	27559.32	Low	H	16QAM	V	43	316	1/0	16.65
	27559.32	Low	H	64QAM	V	43	316	1/0	14.48
MIMO	27559.32	Low	H	QPSK	V	43	316	1/0	20.54
	27559.32	Low	V	QPSK	V	23	38		
	27559.32	Low	H	16QAM	V	43	316	1/0	18.72
	27559.32	Low	V	16QAM	V	23	38		
	27559.32	Low	H	64QAM	V	43	316	1/0	16.68
	27559.32	Low	V	64QAM	V	23	38		

Table 7-17. Ant3 EIRP Data (Band n261 - 50MHz-4CC)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
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Mode	Frequency [MHz]	Channel	Beam Pol	Modulation	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
SISO	27559.32	Low	H	QPSK	V	215	22	1/32	20.62
	27559.32	Low	V	QPSK	V	189	332	1/32	22.07
	27923.52	Mid	H	QPSK	V	214	26	1/32	20.35
	27923.52	Mid	V	QPSK	V	195	334	1/32	21.58
	28292.16	High	H	QPSK	V	219	29	1/32	21.98
	28292.16	High	V	QPSK	V	196	337	1/32	22.48
	28292.16	High	V	16QAM	V	196	337	1/32	20.13
	28292.16	High	V	64QAM	V	196	337	1/32	18.23
MIMO	27559.32	Low	H	QPSK	V	215	22	1/32	24.41
	27559.32	Low	V	QPSK	V	189	332		
	27923.52	Mid	H	QPSK	V	214	26	1/32	24.02
	27923.52	Mid	V	QPSK	V	195	334		
	28292.16	High	H	QPSK	V	219	29	1/32	25.25
	28292.16	High	V	QPSK	V	196	337		
	28292.16	High	H	16QAM	V	219	29	1/32	23.04
	28292.16	High	V	16QAM	V	196	337		
	28292.16	High	H	64QAM	V	219	29	1/32	21.03
	28292.16	High	V	64QAM	V	196	337		

Table 7-18. Ant3 EIRP Data (Band n261 - 100MHz-1CC)

Mode	Frequency [MHz]	Channel	Beam Pol	Modulation	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
SISO	27559.32	Low	H	QPSK	V	44	310	1/32	16.90
	27559.32	Low	V	QPSK	V	22	38	64/0	15.61
	27559.32	Low	H	16QAM	V	44	310	1/32	15.09
	27559.32	Low	H	64QAM	V	44	310	1/32	13.39
MIMO	27559.32	Low	H	QPSK	V	44	310	1/32	19.31
	27559.32	Low	V	QPSK	V	22	38		
	27559.32	Low	H	16QAM	V	44	310	1/32	17.55
	27559.32	Low	V	16QAM	V	22	38		
	27559.32	Low	H	64QAM	V	44	310	1/32	15.70
	27559.32	Low	V	64QAM	V	22	38		

Table 7-19. Ant3 EIRP Data (Band n261 - 100MHz-4CC)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Band n260

Mode	Frequency [MHz]	Channel	Beam Pol	Modulation	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
SISO	37027.32	Low	H	QPSK	V	79	83	1/16	20.13
	37027.32	Low	V	QPSK	V	292	265	1/16	23.91
	38497.44	Mid	H	QPSK	V	107	86	1/16	24.33
	38497.44	Mid	V	QPSK	V	291	265	1/16	25.75
	39966.24	High	H	QPSK	V	113	84	1/16	22.10
	39966.24	High	V	QPSK	V	291	264	1/16	23.08
	38497.44	Mid	V	16QAM	V	291	265	1/16	24.59
	38497.44	Mid	V	64QAM	V	291	265	1/16	21.49
MIMO	37027.32	Low	H	QPSK	V	79	83	1/16	25.42
	37027.32	Low	V	QPSK	V	292	265		
	38497.44	Mid	H	QPSK	V	107	86	1/16	28.10
	38497.44	Mid	V	QPSK	V	291	265		
	38497.44	Mid	H	16QAM	V	107	86	1/16	26.59
	38497.44	Mid	V	16QAM	V	291	265		
	38497.44	Mid	H	64QAM	V	107	86	1/16	23.94
	38497.44	Mid	V	64QAM	V	291	265		
	39966.24	High	H	QPSK	V	113	84	1/16	25.63
	39966.24	High	V	QPSK	V	291	264		

Table 7-20. Ant1 EIRP Data (Band n260 - 50MHz-1CC)

Mode	Frequency [MHz]	Channel	Beam Pol	Modulation	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
SISO	37100.04	Low	H	QPSK	V	270	96	1/16	17.47
	37100.04	Low	V	QPSK	V	265	90	1/16	19.32
	37100.04	Low	V	16QAM	V	265	90	1/16	17.50
	37100.04	Low	V	64QAM	V	265	90	1/16	15.37
MIMO	37100.04	Low	H	QPSK	V	270	96	1/16	21.50
	37100.04	Low	V	QPSK	V	265	90		
	37100.04	Low	H	16QAM	V	270	96	1/16	19.73
	37100.04	Low	V	16QAM	V	265	90		
	37100.04	Low	H	64QAM	V	270	96	1/16	17.61
	37100.04	Low	V	64QAM	V	265	90		

Table 7-21. Ant1 EIRP Data (Band n260 - 50MHz-4CC)

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Mode	Frequency [MHz]	Channel	Beam Pol	Modulation	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
SISO	37051.80	Low	H	QPSK	V	104	82	1/32	20.19
	37051.80	Low	V	QPSK	V	292	265	1/32	25.24
	38498.88	Mid	H	QPSK	V	113	83	1/32	23.92
	38498.88	Mid	V	QPSK	V	291	264	1/32	25.45
	39949.92	High	H	QPSK	V	113	83	1/32	22.43
	39949.92	High	V	QPSK	V	291	264	1/32	23.50
	38498.88	Mid	V	16QAM	V	291	264	1/32	23.15
	38498.88	Mid	V	64QAM	V	291	264	1/32	21.13
MIMO	37051.80	Low	H	QPSK	V	104	82	1/32	26.42
	37051.80	Low	V	QPSK	V	292	265		
	38498.88	Mid	H	QPSK	V	113	83	1/32	27.76
	38498.88	Mid	V	QPSK	V	291	264		
	38498.88	Mid	H	16QAM	V	113	83	1/32	25.63
	38498.88	Mid	V	16QAM	V	291	264		
	38498.88	Mid	H	64QAM	V	113	83	1/32	23.66
	38498.88	Mid	V	64QAM	V	291	264		
	39949.92	High	H	QPSK	V	113	83	1/32	26.01
	39949.92	High	V	QPSK	V	291	264		

Table 7-22. Ant1 EIRP Data (Band n260 - 100MHz-1CC)

Mode	Frequency [MHz]	Channel	Beam Pol	Modulation	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
SISO	38501.88	Mid	H	QPSK	V	262	97	1/32	15.90
	38501.88	Mid	V	QPSK	V	256	91	1/63	17.51
	38501.88	Mid	V	16QAM	V	256	91	1/63	16.01
	38501.88	Mid	V	64QAM	V	256	91	1/63	13.87
MIMO	39949.92	Mid	H	QPSK	V	262	97	1/63	19.79
	39949.92	Mid	V	QPSK	V	256	91		
	39949.92	Mid	H	16QAM	V	262	97	1/63	18.29
	39949.92	Mid	V	16QAM	V	256	91		
	39949.92	Mid	H	64QAM	V	262	97	1/63	16.35
	39949.92	Mid	V	64QAM	V	256	91		

Table 7-23. Ant1 EIRP Data (Band n260 - 100MHz-4CC)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Mode	Frequency [MHz]	Channel	Beam Pol	Modulation	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
SISO	37027.32	Low	H	QPSK	H	166	309	1/16	21.02
	37027.32	Low	V	QPSK	V	173	317	1/16	22.71
	38497.44	Mid	H	QPSK	H	168	308	1/16	24.69
	38497.44	Mid	V	QPSK	V	173	312	1/16	25.19
	39966.24	High	H	QPSK	H	171	305	1/16	22.68
	39966.24	High	V	QPSK	V	170	308	1/16	21.99
	38497.44	Mid	V	16QAM	V	173	312	1/16	23.55
	38497.44	Mid	V	64QAM	V	173	312	1/16	21.36
MIMO	37027.32	Low	H	QPSK	H	166	309	1/16	24.95
	37027.32	Low	V	QPSK	V	173	317		
	38497.44	Mid	H	QPSK	H	168	308	1/16	27.95
	38497.44	Mid	V	QPSK	V	173	312		
	38497.44	Mid	H	16QAM	H	168	308	1/16	26.17
	38497.44	Mid	V	16QAM	V	173	312		
	38497.44	Mid	H	64QAM	H	168	308	1/16	24.05
	38497.44	Mid	V	64QAM	V	173	312		
	39966.24	High	H	QPSK	H	171	305	1/16	25.36
	39966.24	High	V	QPSK	V	170	308		

Table 7-24. Ant2 EIRP Data (Band n260 - 50MHz-1CC)

Mode	Frequency [MHz]	Channel	Beam Pol	Modulation	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
SISO	38499.96	Mid	H	QPSK	H	175	339	1/31	20.23
	38499.96	Mid	V	QPSK	V	184	330	1/16	20.76
	38499.96	Mid	V	16QAM	V	184	330	1/16	18.65
	38499.96	Mid	V	64QAM	V	184	330	1/16	16.38
MIMO	39966.24	Mid	H	QPSK	H	175	339	1/16	23.51
	39966.24	Mid	V	QPSK	V	184	330		
	39966.24	Mid	H	16QAM	H	175	339	1/16	21.41
	39966.24	Mid	V	16QAM	V	184	330		
	39966.24	Mid	H	64QAM	H	175	339	1/16	19.17
	39966.24	Mid	V	64QAM	V	184	330		

Table 7-25. Ant2 EIRP Data (Band n260 - 50MHz-4CC)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Mode	Frequency [MHz]	Channel	Beam Pol	Modulation	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
SISO	37051.80	Low	H	QPSK	H	163	304	1/32	21.76
	37051.80	Low	V	QPSK	V	172	308	1/32	23.52
	38498.88	Mid	H	QPSK	H	171	314	1/32	24.58
	38498.88	Mid	V	QPSK	V	169	308	1/32	24.63
	39949.92	High	H	QPSK	H	177	315	1/32	22.95
	39949.92	High	V	QPSK	V	168	308	1/32	22.61
	38498.88	Mid	V	16QAM	V	169	308	1/32	23.00
	38498.88	Mid	V	64QAM	V	169	308	1/32	20.63
MIMO	37051.80	Low	H	QPSK	H	163	304	1/32	25.73
	37051.80	Low	V	QPSK	V	172	308		
	38498.88	Mid	H	QPSK	H	171	314	1/32	27.61
	38498.88	Mid	V	QPSK	V	169	308		
	38498.88	Mid	H	16QAM	H	171	314	1/32	25.84
	38498.88	Mid	V	16QAM	V	169	308		
	38498.88	Mid	H	64QAM	H	171	314	1/32	23.57
	38498.88	Mid	V	64QAM	V	169	308		
	39949.92	High	H	QPSK	H	177	315	1/32	25.79
	39949.92	High	V	QPSK	V	168	308		

Table 7-26. Ant2 EIRP Data (Band n260 - 100MHz-1CC)

Mode	Frequency [MHz]	Channel	Beam Pol	Modulation	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
SISO	38501.88	Mid	H	QPSK	H	175	316	1/32	20.28
	38501.88	Mid	V	QPSK	V	176	318	1/32	20.80
	38501.88	Mid	V	16QAM	V	176	318	1/32	19.41
	38501.88	Mid	V	64QAM	V	176	318	1/32	17.35
MIMO	39949.92	Mid	H	QPSK	H	175	316	1/32	23.55
	39949.92	Mid	V	QPSK	V	176	318		
	39949.92	Mid	H	16QAM	H	175	316	1/32	22.05
	39949.92	Mid	V	16QAM	V	176	318		
	39949.92	Mid	H	64QAM	H	175	316	1/32	20.16
	39949.92	Mid	V	64QAM	V	176	318		

Table 7-27. Ant2 EIRP Data (Band n260 - 100MHz-4CC)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Mode	Frequency [MHz]	Channel	Beam Pol	Modulation	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
SISO	37027.32	Low	H	QPSK	H	330	57	1/16	20.89
	37027.32	Low	V	QPSK	V	177	162	1/16	19.47
	38497.44	Mid	H	QPSK	H	315	66	1/16	23.00
	38497.44	Mid	V	QPSK	V	171	148	1/16	23.06
	39966.24	High	H	QPSK	H	319	52	1/16	20.85
	39966.24	High	V	QPSK	V	180	314	1/16	20.46
	38497.44	Mid	V	16QAM	V	171	148	1/16	20.77
	38497.44	Mid	V	64QAM	V	171	148	1/16	18.54
MIMO	37027.32	Low	H	QPSK	H	330	57	1/16	23.24
	37027.32	Low	V	QPSK	V	177	162		
	38497.44	Mid	H	QPSK	H	315	66	1/16	26.04
	38497.44	Mid	V	QPSK	V	171	148		
	38497.44	Mid	H	16QAM	H	315	66	1/16	23.74
	38497.44	Mid	V	16QAM	V	171	148		
	38497.44	Mid	H	64QAM	H	315	66	1/16	21.49
	38497.44	Mid	V	64QAM	V	171	148		
	39966.24	High	H	QPSK	H	319	52	1/16	23.67
	39966.24	High	V	QPSK	V	180	314		

Table 7-28. Ant3 EIRP Data (Band n260 - 50MHz-1CC)

Mode	Frequency [MHz]	Channel	Beam Pol	Modulation	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
SISO	38497.44	Mid	H	QPSK	H	331	72	1/31	19.09
	38497.44	Mid	V	QPSK	V	205	288	1/16	19.30
	38497.44	Mid	V	16QAM	V	205	288	1/31	17.20
	38497.44	Mid	V	64QAM	V	205	288	1/31	15.15
MIMO	39966.24	Mid	H	QPSK	H	331	72	1/16	22.19
	39966.24	Mid	V	QPSK	V	205	288		
	39966.24	Mid	H	16QAM	H	331	72	1/31	20.12
	39966.24	Mid	V	16QAM	V	205	288		
	39966.24	Mid	H	64QAM	H	331	72	1/31	17.98
	39966.24	Mid	V	64QAM	V	205	288		

Table 7-29. Ant3 EIRP Data (Band n260 - 50MHz-4CC)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Mode	Frequency [MHz]	Channel	Beam Pol	Modulation	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
SISO	37027.32	Low	H	QPSK	H	335	63	1/32	20.97
	37027.32	Low	V	QPSK	V	183	164	1/32	20.05
	38497.44	Mid	H	QPSK	H	337	74	1/32	22.50
	38497.44	Mid	V	QPSK	V	180	150	1/32	22.88
	39966.24	High	H	QPSK	H	330	71	1/32	20.12
	39966.24	High	V	QPSK	V	188	328	1/32	20.36
	38497.44	Mid	V	16QAM	V	180	150	1/32	21.12
	38497.44	Mid	V	64QAM	V	180	150	1/32	19.49
MIMO	37027.32	Low	H	QPSK	H	335	63	1/32	23.54
	37027.32	Low	V	QPSK	V	183	164		
	38497.44	Mid	H	QPSK	H	337	74	1/32	25.70
	38497.44	Mid	V	QPSK	V	180	150		
	38497.44	Mid	H	16QAM	H	337	74	1/32	23.76
	38497.44	Mid	V	16QAM	V	180	150		
	38497.44	Mid	H	64QAM	H	337	74	1/32	21.87
	38497.44	Mid	V	64QAM	V	180	150		
	39966.24	High	H	QPSK	H	330	71	1/32	23.25
	39966.24	High	V	QPSK	V	188	328		

Table 7-30. Ant3 EIRP Data (Band n260 - 100MHz-1CC)

Mode	Frequency [MHz]	Channel	Beam Pol	Modulation	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
SISO	38497.44	Mid	H	QPSK	H	335	68	1/63	19.08
	38497.44	Mid	V	QPSK	V	193	316	1/0	19.20
	38497.44	Mid	V	16QAM	V	193	316	1/0	17.92
	38497.44	Mid	V	64QAM	V	193	316	1/0	16.00
MIMO	39966.24	Mid	H	QPSK	H	335	68	1/0	22.15
	39966.24	Mid	V	QPSK	V	193	316		
	39966.24	Mid	H	16QAM	H	335	68	1/0	20.61
	39966.24	Mid	V	16QAM	V	193	316		
	39966.24	Mid	H	64QAM	H	335	68	1/0	18.84
	39966.24	Mid	V	64QAM	V	193	316		

Table 7-31. Ant3 EIRP Data (Band n260 - 100MHz-4CC)

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7.4 Radiated Spurious and Harmonic Emissions

§2.1051, §30.203

Test Overview

The spectrum is scanned from 30MHz to 100GHz for n261 and from 30MHz to 200GHz for n260. All out of band emissions are measured in a radiated test setup while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. 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
KDB 842590 D01 v01 Section 4.4.2 and Section 4.4.3

Test Settings

1. Start frequency was set to 30MHz and stop frequency was set to 100 GHz for n261 and 200GHz for n260. Several plots are used to show investigations in this entire span.
2. Detector = RMS
3. Trace mode = trace average
4. Sweep time = auto couple
5. Number of sweep points $\geq 2 \times \text{Span/RBW}$
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.
- 2) All radiated spurious emissions were measured as EIRP to compare with the §30.203 TRP limits.
- 3) Elements within the same antenna array are correlated to produce beamforming array gain. Antenna arrays cannot be correlated with another antenna array. During testing, only one antenna array was active.
- 4) The plots from 1-200GHz show corrected average EIRP levels. Plots below 1GHz are corrected field strength levels. The average EIRP reported below is calculated per section 5.2.7 of ANSI C63.26-2015 which states: $\text{EIRP (dBm)} = E \text{ (dB}\mu\text{V/m)} + 20\log(D) - 104.8$; where D is the measurement distance (in the far field region) in m. The field strength E is calculated $E \text{ (dB}\mu\text{V/m)} = \text{Spectrum Analyzer Level (dBm)} + \text{Antenna Factor (dB/m)} + \text{Cable Loss (dB)} + \text{Harmonic Mixer Conversion Loss (dB)} + 107$. 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.
- 5) 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: $R > 2D^2/\text{wavelength}$, where D is the larger between the dimension of the measurement antenna and the transmitting antenna of the EUT. In this case, D is the largest dimension of the measurement antenna.

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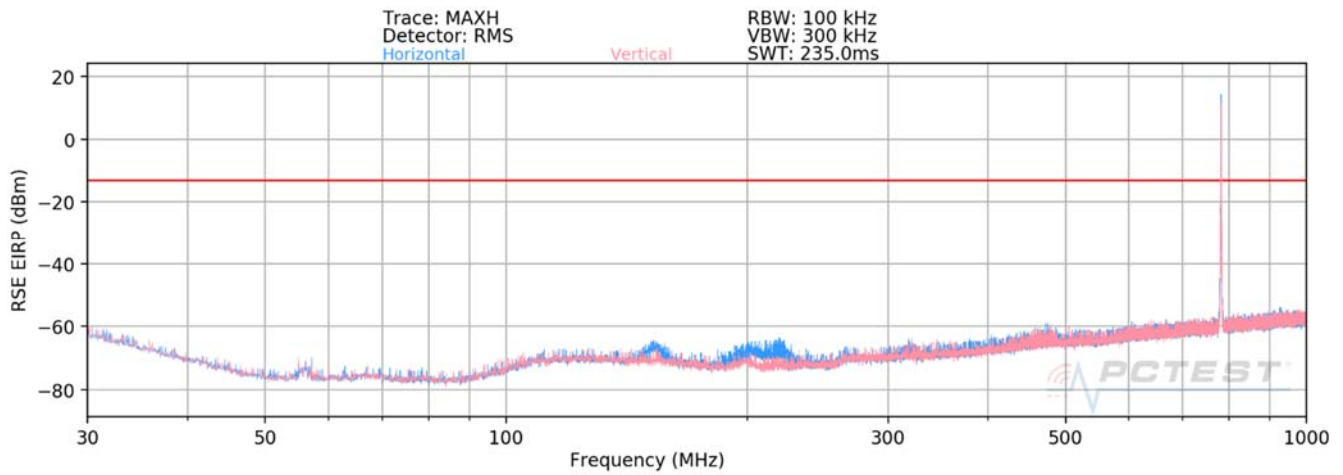
Frequency Range (GHz)	Wavelength(cm)	Far Field Distance (m)	Measurement Distance (m)
18-40	0.749	0.54	1.00
40-60	0.500	1.39	1.50
60-90	0.333	0.91	1.00
90-140	0.214	0.58	1.00
140-200	0.150	0.39	1.00

Table 7-32. Far-Field Distance & Measurement Distance per Frequency Range

- 6) All emissions from 30MHz - 60GHz were measured using a spectrum analyzer with an internal preamplifier. Emissions >60GHz were measured using a harmonic mixer with the spectrum analyzer.
- 7) All RSE's were measured with 1CC. It was determined that adding more CC's causes the overall amplitude of just 1CC to decrease, therefore, 1CC is the worst case for the purposes of spurious emissions measurements.
- 8) The "-" shown in the following RSE tables are used to denote a noise floor measurement.
- 9) All RSE's were investigated in EN-DC mode and with 802.11 chipset active. It was determined that there is no new emission introduced by EN-DC mode, or the 802.11 chipset. For EN-DC mode, n261 uses LTE Bands 13/5/12/2/66/48 and n260 uses LTE Bands 13/5/12/14/2/66/30/48.
- 10) There was no discernible difference in the spurious emission levels when using different LTE anchor bands. Thus, for Band n261, LTE Band 13 was used for QTM#0 / Ant1, LTE Band 4 was used for QTM#1 / Ant2 and LTE B48 was used for QTM2 / Ant3 EN-DC investigations. And for Band n260, LTE Band 13 was used for QTM#0 / Ant1, LTE Band 4 was used for QTM#1 / Ant2 and LTE B30 was used for QTM2 / Ant3 EN-DC investigations.
- 11) For the n261 band spurious emission measurements, the spectrum directly below the fundamental frequency is investigated from 18 - 27.375GHz and the spectrum directly above the fundamental frequency is investigated from 28.475 - 40GHz. The portion of spectrum from 27.375 - 27.5GHz and 28.35 - 28.475GHz is shown Section 7.5 which covers band edge emissions.
- 12) For the n260 band spurious emission measurements, the spectrum directly below the fundamental frequency is investigated from 18 - 36.85GHz and the spectrum directly above the fundamental frequency is investigated from 40.15 - 60GHz. The portion of spectrum from 36.85 - 40GHz and 40 - 40.15GHz is shown Section 7.5 which covers band edge emissions.
- 13) H Beam and V Beam radiated spurious emissions were investigated and V Beam was determined to be worst case for both n261 band and n260 band.

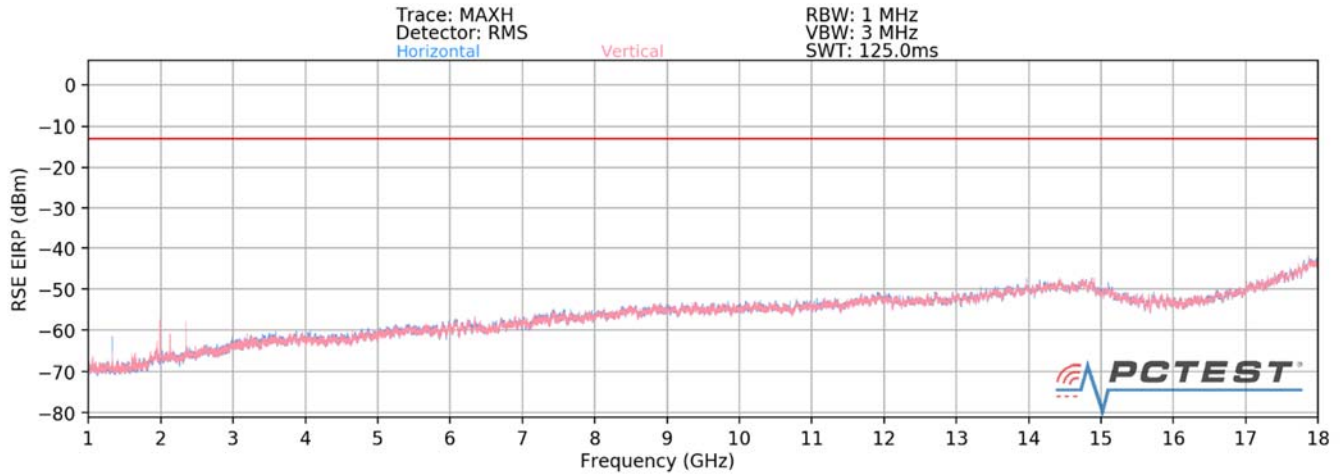
FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Band n261 – QTM#0 / ANT1
30MHz - 1GHz



Plot 7-73. Ant1-n261 Radiated Spurious Plot (1CC QPSK Mid Channel V Beam)

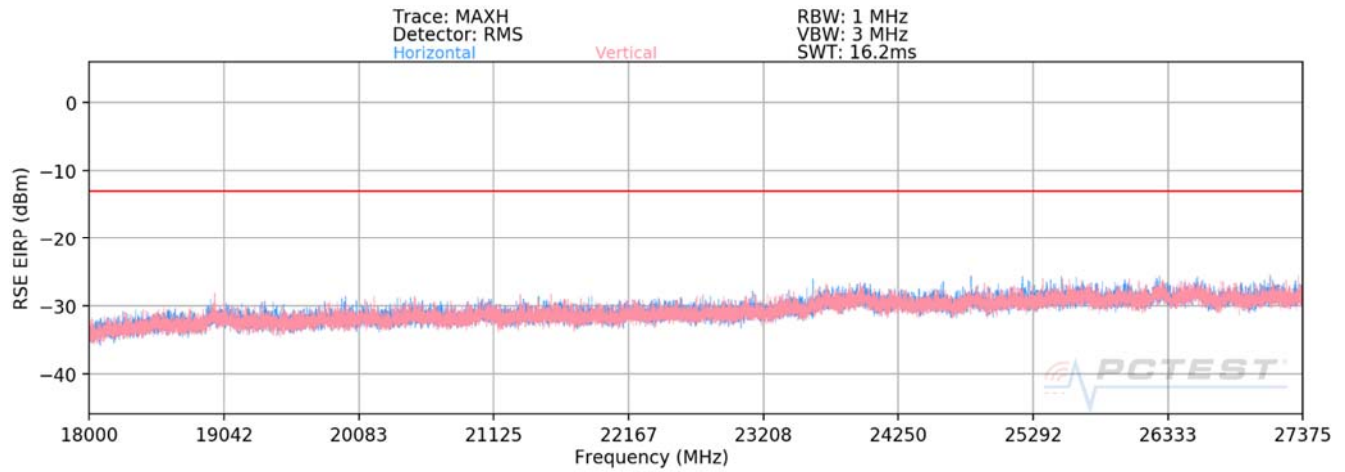
FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Plot 7-74. Ant1-n261 Radiated Spurious Plot 1GHz - 18GHz (1CC QPSK Mid Channel V Beam)

FCC ID: ZNFV600VM	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset		Page 74 of 210

18GHz - 27.375GHz



Plot 7-75. Ant1-n261 Radiated Spurious Plot (1CC QPSK Mid Channel V Beam)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset	Page 75 of 210	

Spurious Emissions EIRP Sample Calculation (n261)

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

$$\text{RSE EIRP (dBm)} = \text{Analyzer Level (dBm)} + 107 + \text{AFCL (dB/m)} + 20\text{Log(Dm)} - 104.8$$

Frequency [MHz]	Channel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
27224.50	Low	50	H	QPSK	H	281	108	-25.69	-13.00	-12.69
27185.00	Low	50	V	QPSK	H	227	106	-25.74	-13.00	-12.74
27122.50	Mid	50	H	QPSK	H	232	108	-25.50	-13.00	-12.50
27340.00	Mid	50	V	QPSK	H	313	296	-25.55	-13.00	-12.55
27196.50	High	50	H	QPSK	H	313	320	-26.15	-13.00	-13.15
27229.50	High	50	V	QPSK	H	201	320	-27.84	-13.00	-14.84

Table 7-33. Ant1 - SISO -Spurious Emissions Table (18GHz - 27.375GHz)

Channel	Bandwidth (MHz)	Modulation	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
Low	50	QPSK	-22.70	-13.00	-9.70
Mid	50	QPSK	-22.51	-13.00	-9.51
High	50	QPSK	-23.90	-13.00	-10.90

Table 7-34. Ant1 - MIMO -Spurious Emissions Table (18GHz - 27.375GHz)

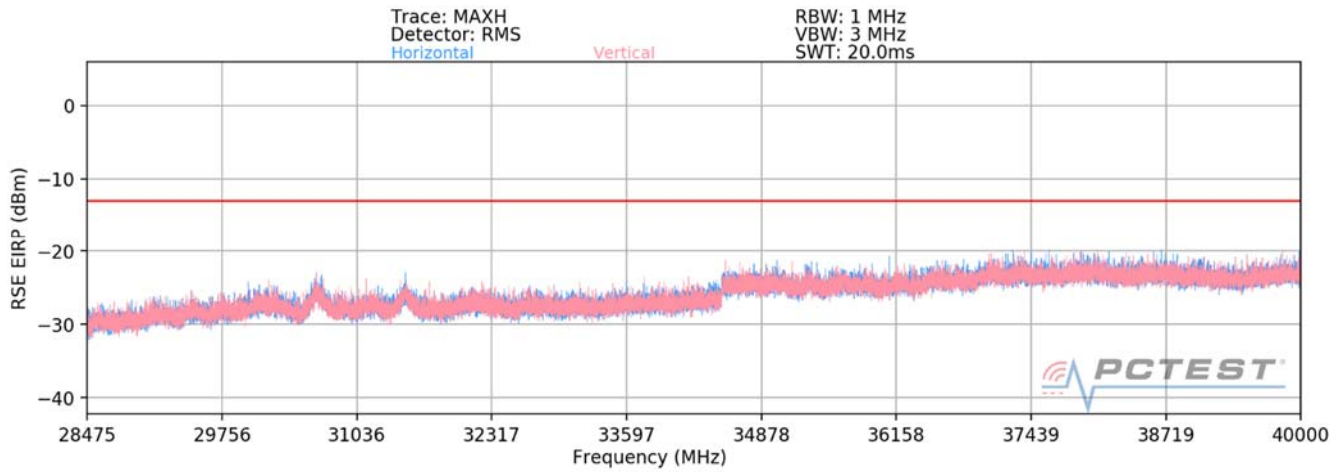
Notes

1. 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.
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

$$\text{EIRP(H Beam)} + \text{EIRP(V Beam)} = \text{EIRP(MIMO)}$$

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset		Page 76 of 210

28.475GHz - 40GHz



Plot 7-76. Ant1-n261 Radiated Spurious Plot (1CC QPSK Mid Channel V Beam)

FCC ID: ZNFV600VM	 MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset		Page 77 of 210

Spurious Emissions EIRP Sample Calculation (n261)

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

$$\text{RSE EIRP (dBm)} = \text{Analyzer Level (dBm)} + 107 + \text{AFCL (dB/m)} + 20\text{Log(Dm)} - 104.8$$

Frequency [MHz]	Channel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
38967.00	Low	50	H	QPSK	V	-	-	-23.13	-13.00	-10.13
38572.50	Low	50	V	QPSK	V	-	-	-23.76	-13.00	-10.76
39134.50	Mid	50	H	QPSK	V	-	-	-23.50	-13.00	-10.50
39203.00	Mid	50	V	QPSK	V	-	-	-23.82	-13.00	-10.82
37821.00	High	50	H	QPSK	V	-	-	-24.04	-13.00	-11.04
38949.00	High	50	V	QPSK	V	-	-	-24.48	-13.00	-11.48

Table 7-35. Ant1 - SISO -Spurious Emissions Table (28.475GHz - 40GHz)

Channel	Bandwidth (MHz)	Modulation	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
Low	50	QPSK	-20.42	-13.00	-7.42
Mid	50	QPSK	-20.65	-13.00	-7.65
High	50	QPSK	-21.24	-13.00	-8.24

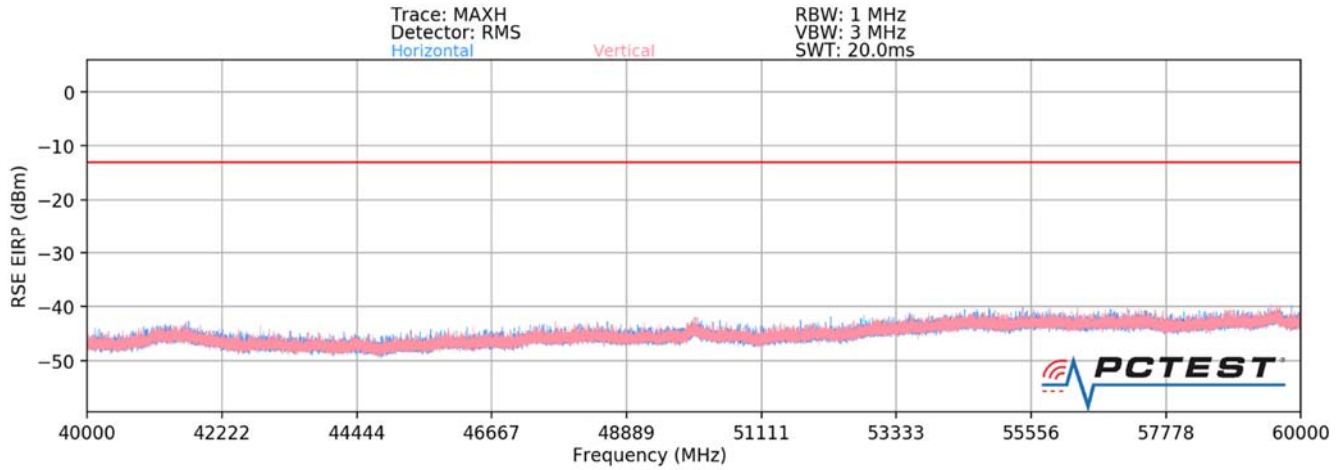
Table 7-36. Ant1 - MIMO -Spurious Emissions Table (28.475GHz - 40GHz)

Notes

1. 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.
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

$$\text{EIRP(H Beam)} + \text{EIRP(V Beam)} = \text{EIRP(MIMO)}$$

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Plot 7-77. Ant1-n261 Radiated Spurious Plot (1CC QPSK Mid Channel V Beam)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset		Page 79 of 210

Spurious Emissions EIRP Sample Calculation (n261)

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

$$\text{RSE EIRP (dBm)} = \text{Analyzer Level (dBm)} + 107 + \text{AFCL (dB/m)} + \text{Harmonic Mixer Conversion Loss[dB]} + 20\text{Log(Dm)} - 104.8$$

Frequency [MHz]	Channel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
55069.68	Low	50	H	QPSK	H	51	35	-40.40	-13.00	-27.40
55069.68	Low	50	V	QPSK	H	31	355	-41.29	-13.00	-28.29
55844.16	Mid	50	H	QPSK	H	51	38	-38.88	-13.00	-25.88
55844.16	Mid	50	V	QPSK	H	40	141	-40.11	-13.00	-27.11
56640.50	High	50	H	QPSK	H	88	10	-42.96	-13.00	-29.96
56640.50	High	50	V	QPSK	H	39	58	-40.87	-13.00	-27.87

Table 7-37. Ant1 - SISO -Spurious Emissions Table (40GHz - 60GHz)

Channel	Bandwidth (MHz)	Modulation	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
Low	50	QPSK	-37.81	-13.00	-24.81
Mid	50	QPSK	-36.44	-13.00	-23.44
High	50	QPSK	-38.78	-13.00	-25.78

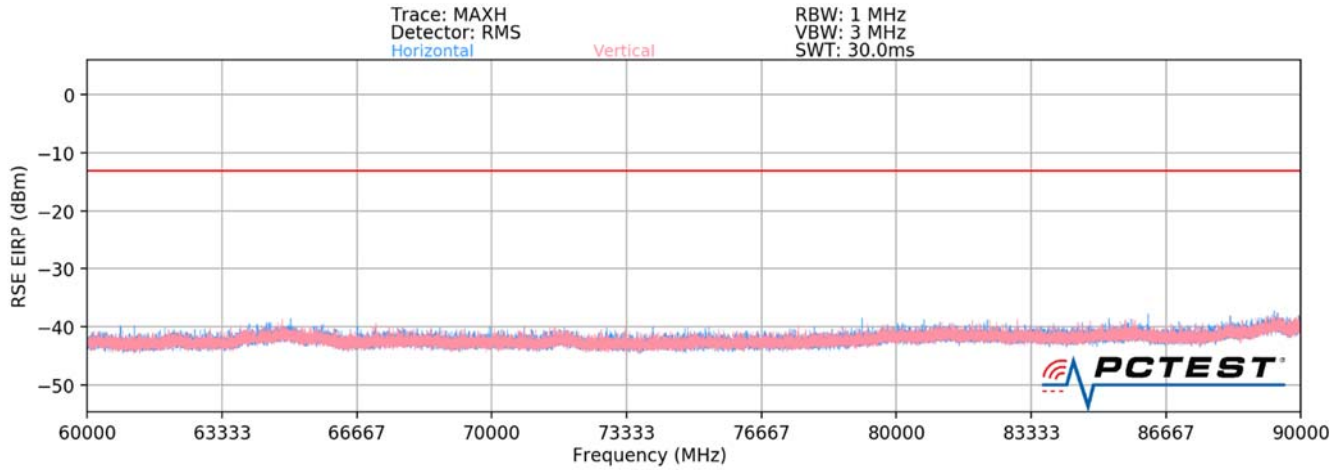
Table 7-38. Ant1 - MIMO -Spurious Emissions Table (40GHz - 60GHz)

Notes

1. 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.
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

$$\text{EIRP(H Beam)} + \text{EIRP(V Beam)} = \text{EIRP(MIMO)}$$

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset		Page 80 of 210



Plot 7-78. Ant1-n261 Radiated Spurious Plot (1CC QPSK Mid Channel V Beam)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset	Page 81 of 210	

Spurious Emissions EIRP Sample Calculation (n261)

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

$$\text{RSE EIRP (dBm)} = \text{Analyzer Level (dBm)} + 107 + \text{AFCL (dB/m)} + \text{Harmonic Mixer Conversion Loss[dB]} + 20\text{Log(Dm)} - 104.8$$

Frequency [MHz]	Channel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
82677.96	Low	50	H	QPSK	V	-	-	-37.87	-13.00	-24.87
82677.96	Low	50	V	QPSK	V	-	-	-37.84	-13.00	-24.84
83770.56	Mid	50	H	QPSK	V	-	-	-37.80	-13.00	-24.80
83770.56	Mid	50	V	QPSK	V	-	-	-37.94	-13.00	-24.94
84876.48	High	50	H	QPSK	V	-	-	-38.81	-13.00	-25.81
84876.48	High	50	V	QPSK	V	-	-	-38.22	-13.00	-25.22

Table 7-39. Ant1 - SISO -Spurious Emissions Table (60GHz - 90GHz)

Channel	Bandwidth (MHz)	Modulation	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
Low	50	QPSK	-34.84	-13.00	-21.84
Mid	50	QPSK	-34.86	-13.00	-21.86
High	50	QPSK	-35.49	-13.00	-22.49

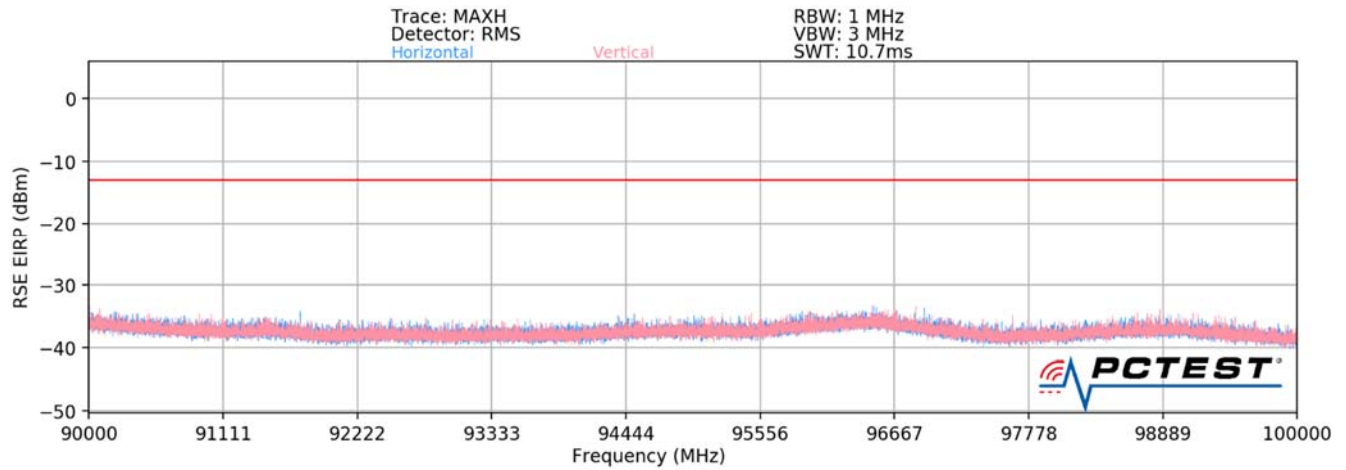
Table 7-40. Ant1 - MIMO -Spurious Emissions Table (60GHz - 90GHz)

Notes

1. 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.
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

$$\text{EIRP(H Beam)} + \text{EIRP(V Beam)} = \text{EIRP(MIMO)}$$

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset		Page 82 of 210



Plot 7-79. Ant1-n261 Radiated Spurious Plot (1CC QPSK Mid Channel V Beam)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset		Page 83 of 210

Spurious Emissions EIRP Sample Calculation (n261)

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

$$\text{RSE EIRP (dBm)} = \text{Analyzer Level (dBm)} + 107 + \text{AFCL (dB/m)} + \text{Harmonic Mixer Conversion Loss[dB]} + 20\text{Log(Dm)} - 104.8$$

Frequency [MHz]	Channel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
94318.61	Low	50	H	QPSK	H	-	-	-38.16	-13.00	-25.16
96458.90	Low	50	V	QPSK	V	-	-	-38.61	-13.00	-25.61
95135.68	Mid	50	H	QPSK	H	-	-	-39.18	-13.00	-26.18
94324.64	Mid	50	V	QPSK	V	-	-	-38.97	-13.00	-25.97
99717.60	High	50	H	QPSK	H	-	-	-37.65	-13.00	-24.65
95167.94	High	50	V	QPSK	V	-	-	-38.34	-13.00	-25.34

Table 7-41. Ant1 - SISO -Spurious Emissions Table (90GHz - 100GHz)

Channel	Bandwidth (MHz)	Modulation	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
Low	50	QPSK	-35.37	-13.00	-22.37
Mid	50	QPSK	-36.06	-13.00	-23.06
High	50	QPSK	-34.97	-13.00	-21.97

Table 7-42. Ant1 - MIMO -Spurious Emissions Table (90GHz - 100GHz)

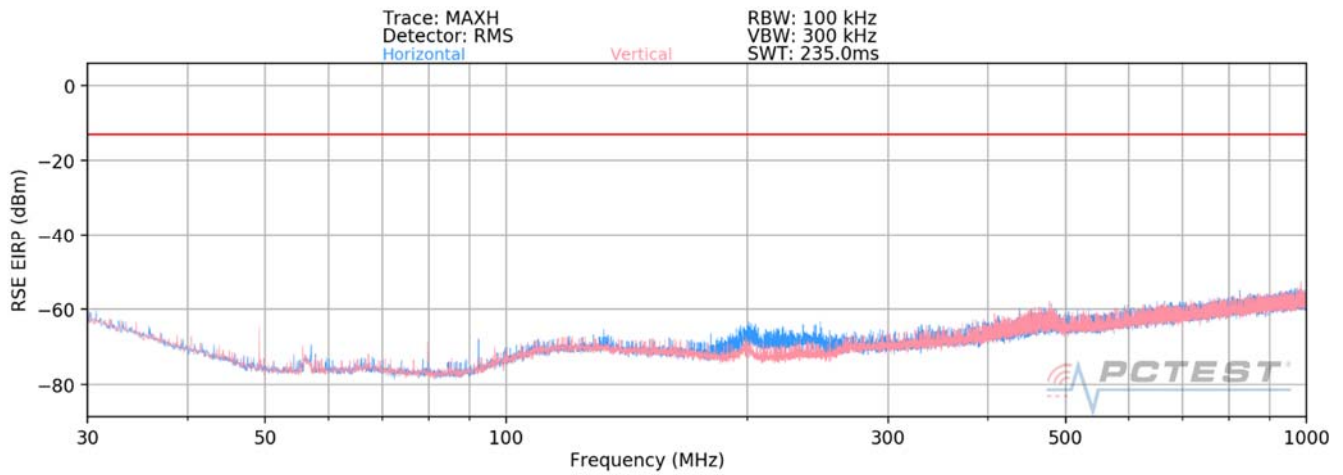
Notes

1. 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.
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

$$\text{EIRP(H Beam)} + \text{EIRP(V Beam)} = \text{EIRP(MIMO)}$$

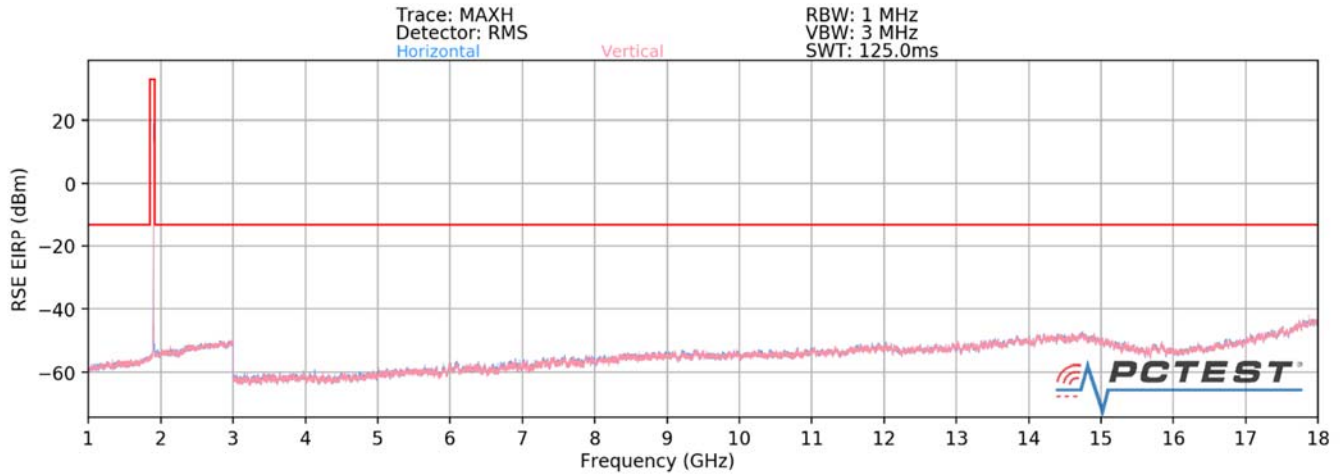
FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset		Page 84 of 210

Band n261 – QTM#1 / Ant2
30MHz - 1GHz



Plot 7-80. Ant2-n261 Radiated Spurious Plot (1CC QPSK Mid Channel V Beam)

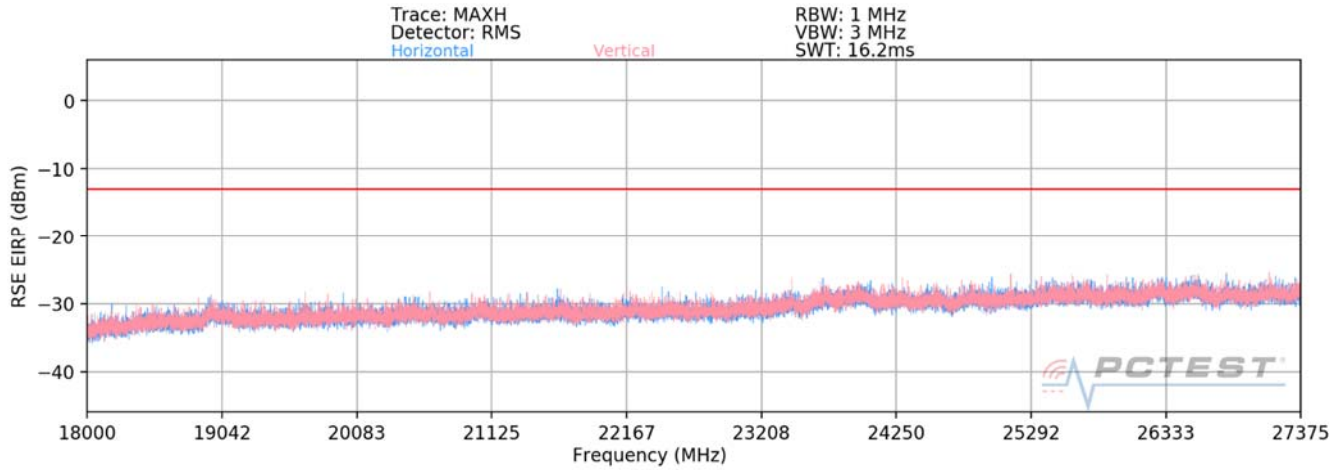
FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset		Page 85 of 210



Plot 7-81. Ant2-n261 Radiated Spurious Plot 1GHz - 18GHz (1CC QPSK Mid Channel V Beam)

FCC ID: ZNFV600VM	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset		Page 86 of 210

18GHz - 27.375GHz



Plot 7-82. Ant2-n261 Radiated Spurious Plot (1CC QPSK Mid Channel V Beam)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset	Page 87 of 210	

Spurious Emissions EIRP Sample Calculation (n261)

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

$$\text{RSE EIRP (dBm)} = \text{Analyzer Level (dBm)} + 107 + \text{AFCL (dB/m)} + 20\text{Log(Dm)} - 104.8$$

Frequency [MHz]	Channel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
25604.00	Low	50	H	QPSK	V	-	-	-29.09	-13.00	-16.09
26092.00	Low	50	V	QPSK	V	-	-	-29.02	-13.00	-16.02
26583.50	Mid	50	H	QPSK	V	-	-	-27.80	-13.00	-14.80
27061.00	Mid	50	V	QPSK	V	-	-	-27.57	-13.00	-14.57
26246.00	High	50	H	QPSK	V	-	-	-27.15	-13.00	-14.15
26120.00	High	50	V	QPSK	V	-	-	-29.97	-13.00	-16.97

Table 7-43. Ant2 - SISO -Spurious Emissions Table (18GHz - 27.375GHz)

Channel	Bandwidth (MHz)	Modulation	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
Low	50	QPSK	-26.04	-13.00	-13.04
Mid	50	QPSK	-24.67	-13.00	-11.67
High	50	QPSK	-25.32	-13.00	-12.32

Table 7-44. Ant2 - MIMO -Spurious Emissions Table (18GHz - 27.375GHz)

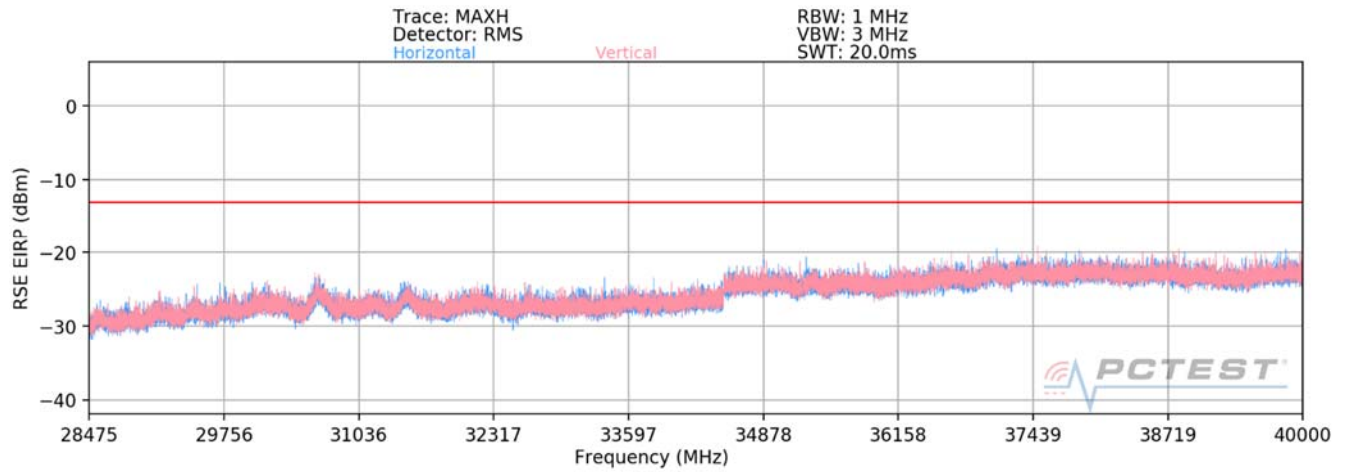
Notes

1. 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.
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

$$\text{EIRP(H Beam)} + \text{EIRP(V Beam)} = \text{EIRP(MIMO)}$$

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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28.475GHz - 40GHz



Plot 7-83. Ant2-n261 Radiated Spurious Plot (1CC QPSK Mid Channel V Beam)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset		Page 89 of 210

Spurious Emissions EIRP Sample Calculation (n261)

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

$$\text{RSE EIRP (dBm)} = \text{Analyzer Level (dBm)} + 107 + \text{AFCL (dB/m)} + 20\text{Log(Dm)} - 104.8$$

Frequency [MHz]	Channel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
38699.50	Low	50	H	QPSK	V	-	-	-22.62	-13.00	-9.62
38951.00	Low	50	V	QPSK	V	-	-	-22.78	-13.00	-9.78
39164.50	Mid	50	H	QPSK	V	-	-	-23.17	-13.00	-10.17
38648.00	Mid	50	V	QPSK	V	-	-	-23.39	-13.00	-10.39
38673.50	High	50	H	QPSK	V	-	-	-23.27	-13.00	-10.27
39558.50	High	50	V	QPSK	V	-	-	-23.76	-13.00	-10.76

Table 7-45. Ant2 - SISO -Spurious Emissions Table (28.475GHz - 40GHz)

Channel	Bandwidth (MHz)	Modulation	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
Low	50	QPSK	-19.69	-13.00	-6.69
Mid	50	QPSK	-20.27	-13.00	-7.27
High	50	QPSK	-20.50	-13.00	-7.50

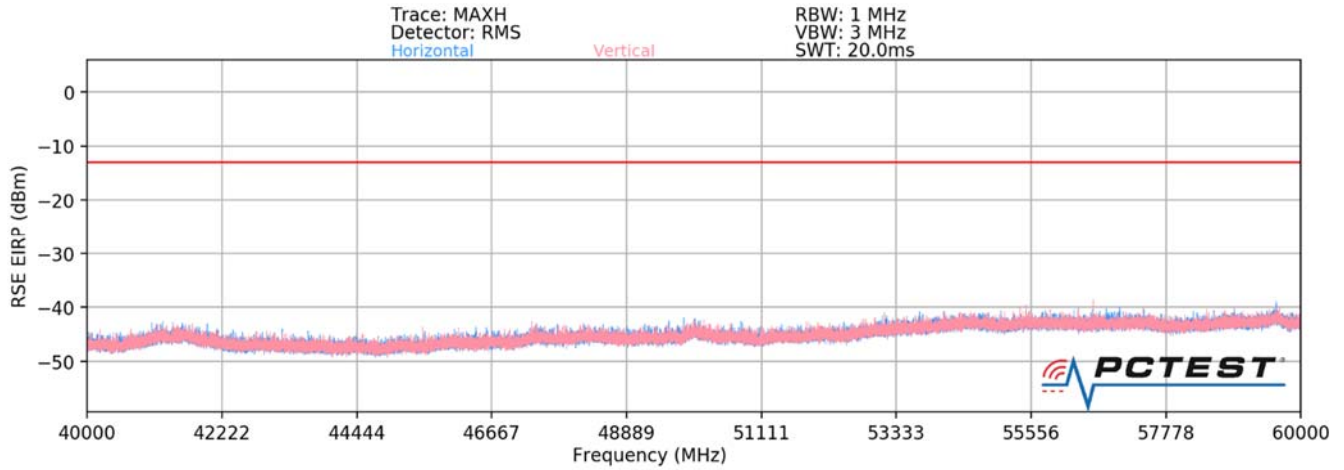
Table 7-46. Ant2 - MIMO -Spurious Emissions Table (28.475GHz - 40GHz)

Notes

1. 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.
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

$$\text{EIRP(H Beam)} + \text{EIRP(V Beam)} = \text{EIRP(MIMO)}$$

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset		Page 90 of 210



Plot 7-84. Ant2-n261 Radiated Spurious Plot (1CC QPSK Mid Channel V Beam)

FCC ID: ZNFV600VM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1911250199-06.ZNF	Test Dates: 11/25/2019-1/17/2020	EUT Type: Portable Handset		Page 91 of 210

Spurious Emissions EIRP Sample Calculation (n261)

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

$$\text{RSE EIRP (dBm)} = \text{Analyzer Level (dBm)} + 107 + \text{AFCL (dB/m)} + \text{Harmonic Mixer Conversion Loss[dB]} + 20\text{Log(Dm)} - 104.8$$

Frequency [MHz]	Channel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
55069.68	Low	50	H	QPSK	H	75	359	-40.19	-13.00	-27.19
55069.68	Low	50	V	QPSK	H	10	353	-41.33	-13.00	-28.33
55844.16	Mid	50	H	QPSK	H	75	357	-40.56	-13.00	-27.56
55844.16	Mid	50	V	QPSK	H	41	9	-39.22	-13.00	-26.22
56640.50	High	50	H	QPSK	H	91	350	-40.71	-13.00	-27.71
56640.50	High	50	V	QPSK	H	43	16	-40.03	-13.00	-27.03

Table 7-47. Ant2 - SISO -Spurious Emissions Table (40GHz - 60GHz)

Channel	Bandwidth (MHz)	Modulation	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
Low	50	QPSK	-37.71	-13.00	-24.71
Mid	50	QPSK	-36.83	-13.00	-23.83
High	50	QPSK	-37.35	-13.00	-24.35

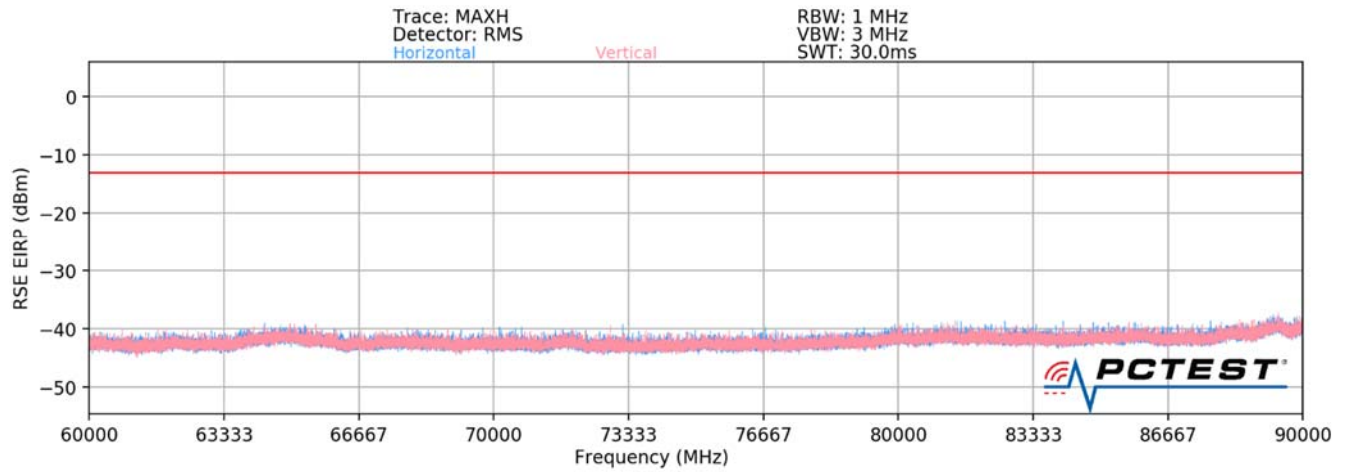
Table 7-48. Ant2 - MIMO -Spurious Emissions Table (40GHz - 60GHz)

Notes

1. 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.
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

$$\text{EIRP(H Beam)} + \text{EIRP(V Beam)} = \text{EIRP(MIMO)}$$

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Plot 7-85. Ant2-n261 Radiated Spurious Plot (1CC QPSK Mid Channel V Beam)

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Spurious Emissions EIRP Sample Calculation (n261)

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

$$\text{RSE EIRP (dBm)} = \text{Analyzer Level (dBm)} + 107 + \text{AFCL (dB/m)} + \text{Harmonic Mixer Conversion Loss[dB]} + 20\text{Log(Dm)} - 104.8$$

Frequency [MHz]	Channel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
82677.96	Low	50	H	QPSK	V	-	-	-38.30	-13.00	-25.30
82677.96	Low	50	V	QPSK	V	-	-	-38.19	-13.00	-25.19
83770.56	Mid	50	H	QPSK	V	-	-	-38.36	-13.00	-25.36
83770.56	Mid	50	V	QPSK	V	-	-	-37.91	-13.00	-24.91
84876.48	High	50	H	QPSK	V	-	-	-37.77	-13.00	-24.77
84876.48	High	50	V	QPSK	V	-	-	-37.85	-13.00	-24.85

Table 7-49. Ant2 - SISO -Spurious Emissions Table (60GHz - 90GHz)

Channel	Bandwidth (MHz)	Modulation	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
Low	50	QPSK	-35.23	-13.00	-22.23
Mid	50	QPSK	-35.12	-13.00	-22.12
High	50	QPSK	-34.80	-13.00	-21.80

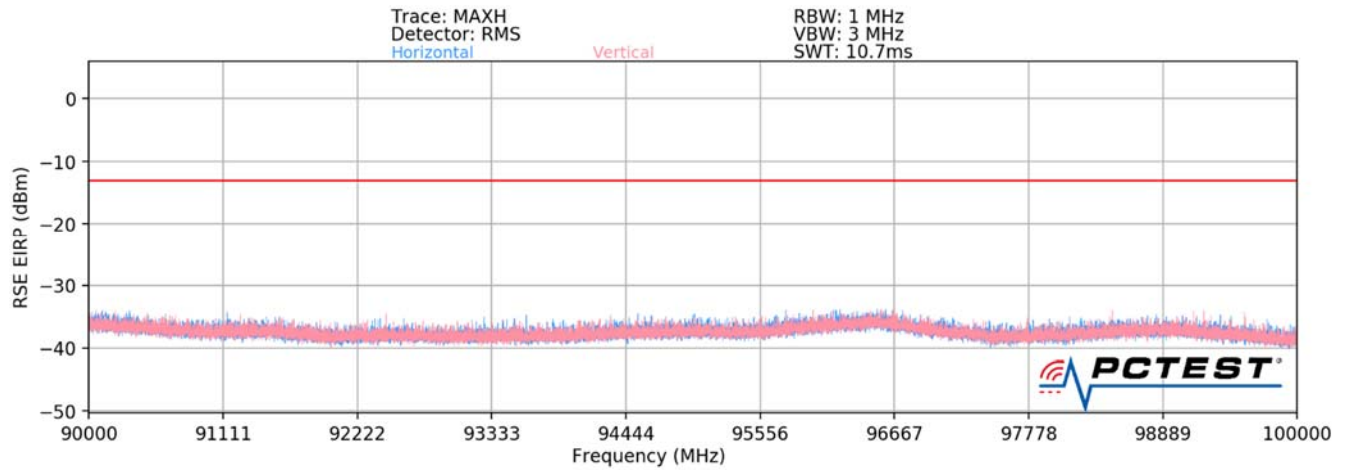
Table 7-50. Ant2 - MIMO -Spurious Emissions Table (60GHz - 90GHz)

Notes

1. 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.
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

$$\text{EIRP(H Beam)} + \text{EIRP(V Beam)} = \text{EIRP(MIMO)}$$

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Plot 7-86. Ant2-n261 Radiated Spurious Plot (1CC QPSK Mid Channel V Beam)

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Spurious Emissions EIRP Sample Calculation (n261)

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

$$\text{RSE EIRP (dBm)} = \text{Analyzer Level (dBm)} + 107 + \text{AFCL (dB/m)} + \text{Harmonic Mixer Conversion Loss[dB]} + 20\text{Log(Dm)} - 104.8$$

Frequency [MHz]	Channel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
92354.64	Low	50	H	QPSK	H	-	-	-38.61	-13.00	-25.61
93678.40	Low	50	V	QPSK	V	-	-	-39.76	-13.00	-26.76
95385.67	Mid	50	H	QPSK	H	-	-	-38.18	-13.00	-25.18
96438.31	Mid	50	V	QPSK	V	-	-	-37.67	-13.00	-24.67
94672.61	High	50	H	QPSK	H	-	-	-38.08	-13.00	-25.08
95782.68	High	50	V	QPSK	V	-	-	-39.16	-13.00	-26.16

Table 7-51. Ant2 - SISO -Spurious Emissions Table (90GHz - 100GHz)

Channel	Bandwidth (MHz)	Modulation	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
Low	50	QPSK	-36.14	-13.00	-23.14
Mid	50	QPSK	-34.91	-13.00	-21.91
High	50	QPSK	-35.58	-13.00	-22.58

Table 7-52. Ant2 - MIMO -Spurious Emissions Table (90GHz - 100GHz)

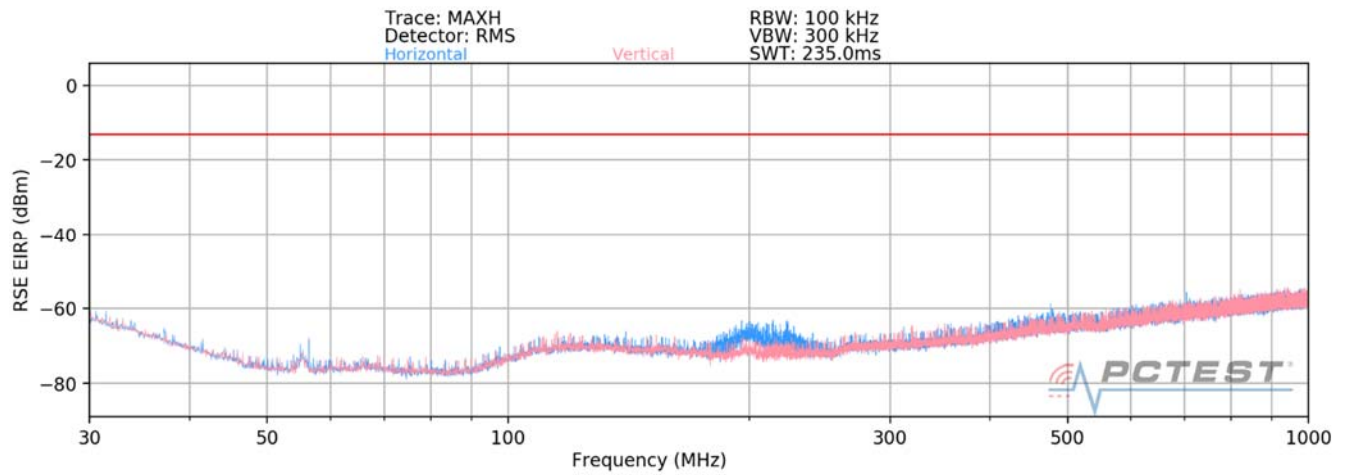
Notes

1. 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.
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

$$\text{EIRP(H Beam)} + \text{EIRP(V Beam)} = \text{EIRP(MIMO)}$$

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Band n261 – QTM#2 / Ant3
30MHz - 1GHz



Plot 7-87. Ant3-n261 Radiated Spurious Plot (1CC QPSK Mid Channel V Beam)

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