HCT CO.,LTD.
74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA
TEL: +82-31-645-6300 FAX: +82-31-645-6401

FCC Sub6 REPORT

Certification

Applicant Name:
SAMSUNG Electronics Co., Ltd.

Address:
129, Samsung-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Rep. of Korea

Date of Issue:
November 02, 2020

Location:
HCT CO., LTD.,
74, Seoicheon-ro 578beon-gil, Majang-myeon,
Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA

Report No.: HCT-RF-2011-FC008

FCC ID:	**A3LSMG991U**
APPLICANT:	**SAMSUNG Electronics Co., Ltd.**

Model(s):	SM-G991U
Additional Model(s):	SM-G991U1
EUT Type:	Mobile Phone
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s):	§27, §2

Mode (MHz)	Tx Frequency (MHz)	Emission Designator	Modulation	EIRP	
				Max. Power (W)	Max. Power (dBm)
Sub6 n77 (20)	3710.01 – 3969.99	17M8G7D	PI/2 BPSK	0.132	21.20
		17M9G7D	QPSK	0.130	21.15
		17M9W7D	16QAM	0.107	20.31
		18M0W7D	64QAM	0.084	19.24
		17M9W7D	256QAM	0.051	17.08
Sub6 n77 (30)	3715.02 – 3964.98	26M8G7D	PI/2 BPSK	0.095	19.78
		26M8G7D	QPSK	0.094	19.74
		26M9W7D	16QAM	0.091	19.59
		26M8W7D	64QAM	0.087	19.38
		26M7W7D	256QAM	0.053	17.22
Sub6 n77 (40)	3720.00 – 3960.00	35M9G7D	PI/2 BPSK	0.129	21.12
		35M8G7D	QPSK	0.130	21.15
		35M7W7D	16QAM	0.107	20.29
		35M7W7D	64QAM	0.084	19.27
		35M7W7D	256QAM	0.051	17.12
Sub6 n77 (50)	3725.01 – 3954.99	45M8G7D	PI/2 BPSK	0.137	21.37
		45M9G7D	QPSK	0.131	21.19
		45M7W7D	16QAM	0.113	20.52
		45M7W7D	64QAM	0.089	19.50
		45M8W7D	256QAM	0.053	17.26
Sub6 n77 (60)	3730.01 – 3950.00	57M8G7D	PI/2 BPSK	0.132	21.21
		57M8G7D	QPSK	0.129	21.11
		58M1W7D	16QAM	0.108	20.33
		58M0W7D	64QAM	0.086	19.33
		57M8W7D	256QAM	0.051	17.07
Sub6 n77 (70)	3735.00 – 3945.00	64M4G7D	PI/2 BPSK	0.092	19.62
		64M3G7D	QPSK	0.091	19.61
		64M3W7D	16QAM	0.087	19.41
		64M3W7D	64QAM	0.083	19.22
		64M5W7D	256QAM	0.051	17.08
Sub6 n77 (80)	3740.01 – 3939.99	77M1G7D	PI/2 BPSK	0.140	21.47
		77M2G7D	QPSK	0.138	21.41
		77M2W7D	16QAM	0.114	20.57
		77M2W7D	64QAM	0.090	19.56
		77M2W7D	256QAM	0.054	17.31
Sub6 n77 (90)	3745.01 – 3934.98	86M8G7D	PI/2 BPSK	0.137	21.36
		86M8G7D	QPSK	0.134	21.27
		87M0W7D	16QAM	0.112	20.50
		86M7W7D	64QAM	0.089	19.48
		87M1W7D	256QAM	0.053	17.27
Sub6 n77 (100)	3750.00 – 3930.00	96M7G7D	PI/2 BPSK	0.135	21.32
		96M5G7D	QPSK	0.132	21.22
		96M3W7D	16QAM	0.111	20.46
		96M5W7D	64QAM	0.088	19.43
		96M4W7D	256QAM	0.053	17.23

The measurements shown in this report were made in accordance with the procedures specified in CFR47 section §2.947. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.
HCT CO., LTD. Certifies that no party to this application has subject to a denial of Federal benefits that includes FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998,21 U.S. C.853(a)

REVIEWED BY

Report prepared by : Se Wook Park
Engineer of Telecommunication Testing Center

Report approved by : Jong Seok Lee
Manager of Telecommunication Testing Center

This test results were applied only to the test methods required by the standard.

This laboratory is not accredited for the test results marked *.
The above Test Report is the accredited test result by (KS Q) ISO/IEC 17025 and KOLAS(Korea Laboratory Accreditation Scheme), which signed the ILAC-MRA. (HCT Accreditation No.: KT197)

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2011-FC008	November 02, 2020	- First Approval Report

The result shown in this test report refer only to the sample(s) tested unless otherwise stated.

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MEASUREMENT REPORT

1. GENERAL INFORMATION

Applicant Name:	SAMSUNG Electronics Co., Ltd.
Address:	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
FCC ID:	A3LSMG991U
Application Type:	Certification
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s):	§27, §2
EUT Type:	Mobile Phone
Model(s):	SM-G991U
Additional Model(s):	SM-G991U1
SCS(kHz):	30
Bandwidth(MHz):	20, 30, 40, 50, 60, 70, 80, 90, 100
Waveform:	CP-OFDM, DFT-S-OFDM
Modulation:	DFT-S-OFDM: PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM CP-OFDM: QPSK, 16QAM, 64QAM, 256QAM
Tx Frequency:	3710.01 MHz – 3969.99 MHz (Sub6 n77(20 MHz)) 3715.02 MHz – 3964.98 MHz (Sub6 n77(30 MHz)) 3720.00 MHz – 3960.00 MHz (Sub6 n77(40 MHz)) 3725.01 MHz – 3954.99 MHz (Sub6 n77(50 MHz)) 3730.01 MHz – 3950.00 MHz (Sub6 n77(60 MHz)) 3735.00 MHz – 3945.00 MHz (Sub6 n77(70 MHz)) 3740.01 MHz – 3939.99 MHz (Sub6 n77(80 MHz)) 3745.01 MHz – 3934.98 MHz (Sub6 n77(90 MHz)) 3750.00 MHz – 3930.00 MHz (Sub6 n77(100 MHz))
Date(s) of Tests:	September 30, 2020 ~ November 02, 2020

2. INTRODUCTION

2.1. DESCRIPTION OF EUT

The EUT was a Mobile Phone with GSM/GPRS/EGPRS/UMTS, CDMA(BC0, 1, 10) and LTE, Sub6.

It also supports IEEE 802.11 a/b/g/n/ac/ax (HT20/40/80), Bluetooth, BT LE, NFC, WPT, mmWave(n260/261).

2.2. MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

2.3. TEST FACILITY

The Fully-anechoic chamber and conducted measurement facility used to collect the radiated data are located at the **74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA.**

3. DESCRIPTION OF TESTS

3.1 TEST PROCEDURE

Test Description	Test Procedure Used
Occupied Bandwidth	- KDB 971168 D01 v03r01 – Section 4.3 - ANSI C63.26-2015 – Section 5.4.4
Band Edge	- KDB 971168 D01 v03r01 – Section 6.0 - ANSI C63.26-2015 – Section 5.7
Spurious and Harmonic Emissions at Antenna Terminal	- KDB 971168 D01 v03r01 – Section 6.0 - ANSI C63.26-2015 – Section 5.7
Conducted Output Power	- N/A (See SAR Report)
Peak- to- Average Ratio	- KDB 971168 D01 v03r01 – Section 5.7 - ANSI C63.26-2015 – Section 5.2.3.4 - ANSI C63.26-2015 – Section 5.2.6(only GSM)
Frequency stability	- ANSI C63.26-2015 – Section 5.6
Effective Radiated Power/ Effective Isotropic Radiated Power	- KDB 971168 D01 v03r01 – Section 5.2 & 5.8 - ANSI/TIA-603-E-2016 – Section 2.2.17
Radiated Spurious and Harmonic Emissions	- KDB 971168 D01 v03r01 – Section 6.2 - ANSI/TIA-603-E-2016 – Section 2.2.12

3.2 RADIATED POWER

Test Overview

Radiated tests are performed in the Fully-anechoic chamber.

The equipment under test is placed on a non-conductive table 3-meters away from the receive antenna in accordance with ANSI/TIA-603-E-2016 Clause 2.2.17.

Test Settings

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
2. RBW = 1 – 5% of the expected OBW, not to exceed 1MHz
3. VBW ≥ 3 x RBW
4. Span = 1.5 times the OBW
5. No. of sweep points > 2 x span / RBW
6. Detector = RMS
7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto".
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

Test Note

1. The turntable is rotated through 360 degrees, and the receiving antenna scans in order to determine the level of the maximized emission.
2. A half wave dipole is then substituted in place of the EUT. For emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator and the previously recorded signal was duplicated.

   The power is calculated by the following formula;

   $$P_{d(dBm)} = Pg_{(dBm)} - \text{cable loss}_{(dB)} + \text{antenna gain}_{(dB)}$$

   Where: P_d is the dipole equivalent power and P_g is the generator output power into the substitution antenna.
3. The maximum value is calculated by adding the forward power to the calibrated source plus its appropriate gain value. These steps are repeated with the receiving antenna in both vertical and horizontal polarization. the difference between the gain of the horn and an isotropic antenna are taken into consideration
4. The EUT was tested in three orthogonal planes(X, Y, Z) and in all possible test configurations and positioning.
5. 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.

3.3 RADIATED SPURIOUS EMISSIONS

Test Overview

Radiated tests are performed in the Fully-anechoic chamber.

Radiated Spurious Emission Measurements at 3 meters by Substitution Method according to ANSI/TIA-603-E-2016.

Test Settings

1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
2. VBW ≥ 3 x RBW
3. Span = 1.5 times the OBW
4. No. of sweep points > 2 x span / RBW
5. Detector = Peak
6. Trace mode = Max Hold
7. The trace was allowed to stabilize
8. Test channel : Low/ Middle/ High
9. Frequency range : We are performed all frequency to 10^{th} harmonics from 9 kHz.

Test Note

1. Measurements value show only up to 3 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
2. The EUT was tested in three orthogonal planes(X, Y, Z) 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 test data
3. For spurious emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator and the previously recorded signal was duplicated.
   The spurious emissions is calculated by the following formula;

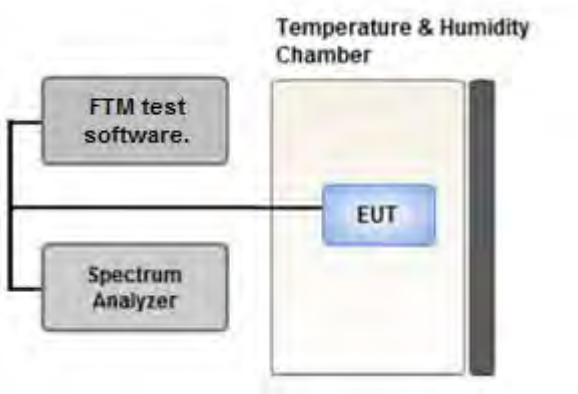
$$Result_{(dBm)} = Pg_{(dBm)} - \text{cable loss}_{(dB)} + \text{antenna gain}_{(dBi)}$$

   Where: $P_g$is the generator output power into the substitution antenna.

   If the fundalmatal frequency is below 1GHz, RF output power has been converted to EIRP.

$$EIRP_{(dBm)} = ERP_{(dBm)} + 2.15$$

3.4 PEAK- TO- AVERAGE RATIO



Test setup

① **CCDF Procedure for PAPR**

Test Settings

1. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Set the measurement interval as follows:
   .- for continuous transmissions, set to 1 ms,
   .- or burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize and set the measurement interval to a time that is less than or equal to the burst duration.
4. Record the maximum PAPR level associated with a probability of 0.1%.

② **Alternate Procedure for PAPR**

Use one of the procedures presented in 5.2(ANSI C63.26-2015) to measure the total peak power and record as P_{Pk}.

Use one of the applicable procedures presented 5.2(ANSI C63.26-2015) to measure the total average power and record as P_{Avg}. Determine the P.A.R. from:

$$P.A.R_{(dB)} = P_{Pk\ (dBm)} - P_{Avg\ (dBm)}\ (P_{Avg} = \text{Average Power + Duty cycle Factor})$$

Test Settings(Peak Power)

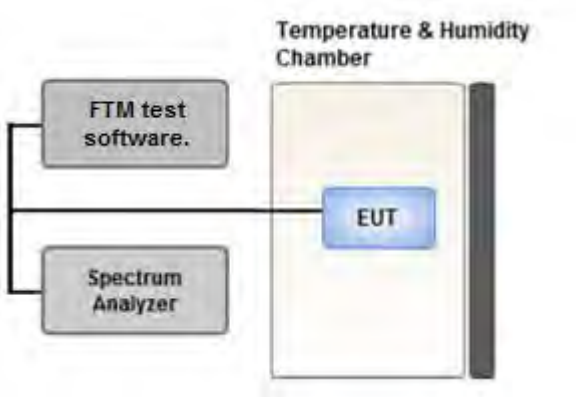
The measurement instrument must have a RBW that is greater than or equal to the OBW of the signal to be measured and a VBW ≥ 3 × RBW.

1. Set the RBW ≥ OBW.
2. Set VBW ≥ 3 × RBW.
3. Set span ≥ 2 × OBW.
4. Sweep time ≥ 10 × (number of points in sweep) × (transmission symbol period).
5. Detector = peak.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the peak marker function to determine the peak amplitude level.

Test Settings(Average Power)

1. Set span to 2 × to 3 × the OBW.
2. Set RBW ≥ OBW.
3. Set VBW ≥ 3 × RBW.
4. Set number of measurement points in sweep ≥ 2 × span / RBW.
5. Sweep time:
   Set ≥ [10 × (number of points in sweep) × (transmission period)] for single sweep (automation-compatible) measurement. The transmission period is the (on + off) time.
6. Detector = power averaging (rms).
7. Set sweep trigger to “free run.”
8. Trace average at least 100 traces in power averaging (rms) mode if sweep is set to auto-couple. (To accurately determine the average power over the on and off period of the transmitter, it can be necessary to increase the number of traces to be averaged above 100 or, if using a manually configured sweep time, increase the sweep time.)
9. Use the peak marker function to determine the maximum amplitude level.
10. Add [10 log (1/duty cycle)] to the measured maximum power level to compute the average power during continuous transmission. For example, add [10 log (1/0.25)] = 6 dB if the duty cycle is a constant 25%.

3.5 OCCUPIED BANDWIDTH.



Test setup

The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

The EUT makes a call to the communication simulator.

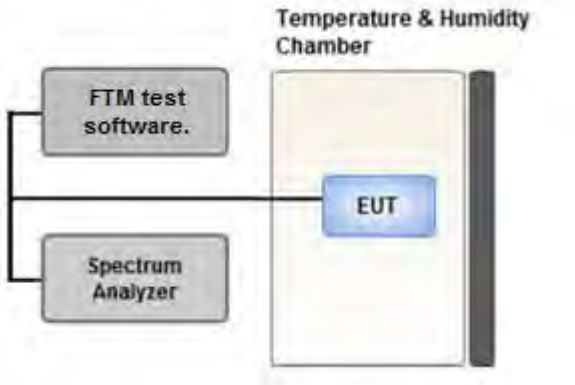
The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth

Test Settings

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth and the 26dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 – 5% of the expected OBW
3. VBW ≥ 3 x RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5% of the 99% occupied bandwidth observed in Step 7

3.6 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL



Test setup

Test Overview

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic.

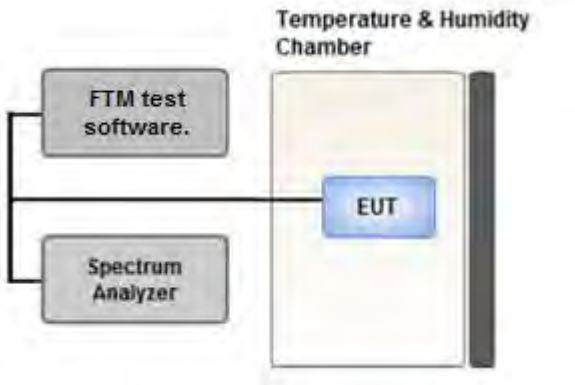
All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

All data rates 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.

Test Settings

1. RBW = 1 MHz
2. VBW ≥ 3 MHz
3. Detector = RMS
4. Trace Mode = trace average
5. Sweep time = auto
6. Number of points in sweep ≥ 2 x Span / RBW

3.7 BAND EDGE



Test setup

Test Overview

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum power and at the appropriate frequencies.

All data rates 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.

Test Settings

1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW : Please check the test notes below
4. VBW > 3 x RBW
5. Detector = RMS
6. Number of sweep points ≥ 2 x Span/RBW
7. Trace mode = trace average
8. Sweep time = auto couple
9. The trace was allowed to stabilize

Test Notes

For mobile operations in the 3700-3980 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed −13 dBm/MHz.

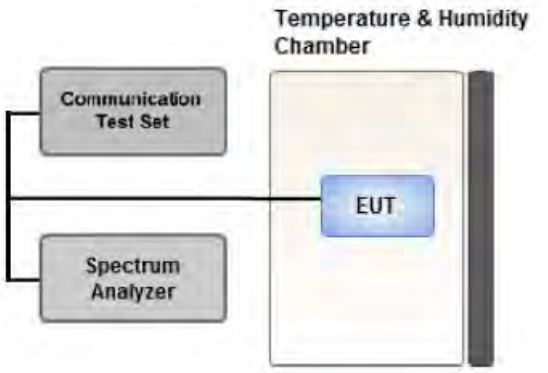
Measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater.

However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be either one percent of the emission bandwidth of the fundamental emission of the transmitter or 350 kHz.

In the bands between 1 and 5 MHz removed from the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be 500 kHz.

The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

3.8 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE



Test setup

Test Overview

Frequency stability testing is performed in accordance with the guidelines of ANSI C63.26-2015.

The frequency stability of the transmitter is measured by:

1. Temperature:

   The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.

2. Primary Supply Voltage:

   .- Unless otherwise specified, vary primary supply voltage from 85% to 115% of the nominal value for other than hand carried battery equipment.

   .- For hand carried, battery powered equipment, reduce the primary ac or dc supply voltage to the battery operating end point, which shall be specified by the manufacturer.

Test Settings

1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
2. The equipment is turned on in a “standby” condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

3.9 WORST CASE(RADIATED TEST)

- Waveform : All Waveform of operation were investigated and the worst case configuration results are reported.
  (Worst case: DFT-S-OFDM)
- The EUT was tested in three orthogonal planes(X, Y, Z) and in all possible test configurations and positioning.
- All modes of operation were investigated and the worst case configuration results are reported.
- EN-DC mode: SA(Power Class2), NSA(Power Class3)
- Radiated tests are measured stand alone & ENDC and the worst case configuration results are reported.
  (EIRP: Stand alone(PC2))
  (RSE: Stand alone(PC2), 2A-n77A(PC3))
- All RB sizes, offsets of operation were investigated and the worst case configuration results are reported.
  Please refer to the table below.
- SM-G991U & additional models were tested and the worst case results are reported.
  (Worst case : SM-G991U)

[Worst case]

Test Description	Modulation	RB size	RB offset	Axis
Effective Isotropic Radiated Power	PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM	1	1	X
Radiated Spurious and Harmonic Emissions	PI/2 BPSK	1	1	Z

3.10 WORST CASE(CONDUCTED TEST)

- Waveform : All Waveform of operation were investigated and the worst case configuration results are reported.
  (Worst case: DFT-S-OFDM)
- Modulation : All Modulation of operation were investigated and the worst case configuration results are reported.
  (Worst case: PI/2 BPSK)
- All RB sizes, offsets of operation were investigated and the worst case configuration results are reported.
  Please refer to the table below.
- All power calss of operation were investigated and the worst case configuration results are reported.
  (Worst case : Power Class2)
- SM-G991U & additional models were tested and the worst case results are reported.
  (Worst case : SM-G991U)

[Worst case]

Test Description	Modulation	Bandwidth (MHz)	Frequency	RB size	RB offset
Occupied Bandwidth,	PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM	20, 30, 40, 50, 60, 70, 80, 90, 100	Mid	Full RB	0
Peak-To-Average Ratio	PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM	20, 30, 40, 50, 60, 70, 80, 90, 100	Mid	1	Mid
Band Edge	PI/2 BPSK	20	Low	1	0
			High	1	50
		30	Low	1	0
			High	1	77
		40	Low	1	0
			High	1	105
		50	Low	1	0
			High	1	132
		60	Low	1	0
			High	1	161
		70	Low	1	0
			High	1	188
		80	Low	1	0
			High	1	216
		90	Low	1	0
			High	1	244
		100	Low	1	0
			High	1	272
		20, 30, 40, 50, 60, 70, 80, 90, 100	Low, High	Full RB	0
Spurious and Harmonic Emissions at Antenna Terminal	PI/2 BPSK	20, 30, 40, 50, 60, 70, 80, 90, 100	Low, Mid, High	1	1

4. LIST OF TEST EQUIPMENT

Manufacture	Model/ Equipment	Serial Number	Calibration Date	Calibration Interval	Calibration Due
T&M SYSTEM	FBSR-02B(WHK1.2/15G-10EF)/H.P.F	-	03/09/2020	Annual	03/09/2021
T&M SYSTEM	FBSR-02B(WHK3.3/18G-10EF)/H.P.F	-	03/09/2020	Annual	03/09/2021
Hewlett Packard	11667B / Power Splitter(DC~26.5 GHz)	11275	04/27/2020	Annual	04/27/2021
Hewlett Packard	E3632A/DC Power Supply	MY40004427	09/16/2020	Annual	09/16/2021
Schwarzbeck	UHAP/ Dipole Antenna	557	03/29/2019	Biennial	03/29/2021
Schwarzbeck	UHAP/ Dipole Antenna	558	03/29/2019	Biennial	03/29/2021
ESPEC	SU-642 / Chamber	93008124	03/18/2020	Annual	03/18/2021
Schwarzbeck	BBHA 9120D/ Horn Antenna(1~18GHz)	147	08/29/2019	Biennial	08/29/2021
Schwarzbeck	BBHA 9120D/ Horn Antenna(1~18GHz)	9120D-1298	09/25/2019	Biennial	09/25/2021
Schwarzbeck	BBHA 9170/ Horn Antenna(15~40GHz)	BBHA9170342	04/29/2019	Biennial	04/29/2021
Schwarzbeck	BBHA 9170/ Horn Antenna(15~40GHz)	BBHA9170124	02/11/2020	Biennial	02/11/2022
Agilent	N9020A/Signal Analyzer(10Hz~26.5GHz)	MY51110063	04/27/2020	Annual	04/27/2021
Hewlett Packard	8493C/ATTENUATOR(20dB)	17280	06/04/2020	Annual	06/04/2021
REOHDE & SCHWARZ	FSV40/Spectrum Analyzer(10Hz~40GHz)	100931	10/14/2020	Annual	10/14/2021
Agilent	8960 (E5515C)/ Base Station	MY48360800	08/26/2020	Annual	08/26/2021
Schwarzbeck	FMZB1513/ Loop Antenna(9kHz~30MHz)	1513-175	04/26/2019	Biennial	04/26/2021
Schwarzbeck	VULB9160/ Bilog Antenna	3150	03/12/2019	Biennial	03/12/2021
Schwarzbeck	VULB9160/ Hybrid Antenna	760	03/22/2019	Biennial	03/22/2021
Anritsu Corp.	MT8821C/Wideband Radio Communication Tester	6262116770	07/22/2020	Annual	07/22/2021
Anritsu Corp.	MT8820C/Wideband Radio Communication Tester	6201026545	01/22/2020	Annual	01/22/2021
REOHDE & SCHWARZ	SMB100A/ SIGNAL GENERATOR (100kHz~40GHz)	177633	07/13/2020	Annual	07/13/2021
KEYSIGHT	N9030B / Signal Analyzer(5Hz~40.0GHz)	MY55480167	06/04/2020	Annual	06/04/2021
HCT CO., LTD.,	FCC LTE Mobile Conducted RF Automation Test Software	-	-	-	-

Note:

1. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.
2. Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2017).
3. Model : FSV40/Spectrum
   - Use date of equipment : September 23, 2020 ~ October 12, 2020, October 14, 2020 ~.

5. 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 data shown herein 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.

Parameter	Expanded Uncertainty (±dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.82
Radiated Disturbance (9 kHz ~ 30 MHz)	3.40
Radiated Disturbance (30 MHz ~ 1 GHz)	4.80
Radiated Disturbance (1 GHz ~ 18 GHz)	5.70
Radiated Disturbance (18 GHz ~ 40 GHz)	5.05

6. SUMMARY OF TEST RESULTS

6.1 Test Condition : Conducted Test

Test Description	FCC Part Section(s)	Test Limit	Test Result
Occupied Bandwidth	§2.1049	N/A	PASS
Band Edge / Spurious and Harmonic Emissions at Antenna Terminal.	§2.1051, §27.53(i)(2)	< -13 dBm	PASS
Conducted Output Power	§2.1046	N/A	**See Note1**
Peak- to- Average Ratio	27.50(j)(4)	< 13 dB	PASS
Frequency stability / variation of ambient temperature	§2.1055, § 27.54	Emission must remain in band	PASS

Note:

1. See SAR Report
2. The same samples were used for SAR and EMC
3. All conducted tests except frequency stability were tested using FTM test software.
   (Frequency stability was tested using 5G Wireless Tester.)

6.2 Test Condition : Radiated Test

Test Description	FCC Part Section(s)	Test Limit	Test Result
Equivalent Isotropic Radiated Power	27.50(j)(3)	< 1 Watts max. EIRP	PASS
Radiated Spurious and Harmonic Emissions	§2.1053, §27.53(i)(2)	< -13 dBm	PASS

Note:

1. Radiateded tests were tested using FTM test software.

7. SAMPLE CALCULATION

7.1 ERP Sample Calculation

Ch./ Freq.		Measured Level(dBm)	Substitute Level(dBm)	Ant. Gain (dBd)	C.L	Pol.	ERP	
channel	Freq.(MHz)						W	dBm
128	824.20	-21.37	38.40	-10.61	0.95	H	0.483	26.84

ERP = Substitute LEVEL(dBm) + Ant. Gain – CL(Cable Loss)

1) The EUT mounted on a non-conductive turntable is 2.5 meter above test site ground level.
2) During the test , the turn table is rotated until the maximum signal is found.
3) Record the field strength meter's level.
4) Replace the EUT with dipole/Horn antenna that is connected to a calibrated signal generator.
5) Increase the signal generator output till the field strength meter's level is equal to the item (3).
6) The signal generator output level with Ant. Gain and cable loss are the rating of effective radiated power.

7.2 EIRP Sample Calculation

Ch./ Freq.		Measured Level(dBm)	Substitute Level(dBm)	Ant. Gain (dBi)	C.L	Pol.	EIRP	
channel	Freq.(MHz)						W	dBm
349000	1,732.50	-15.75	18.45	9.90	1.76	H	0.456	26.59

EIRP = Substitute LEVEL(dBm) + Ant. Gain – CL(Cable Loss)

1) The EUT mounted on a non-conductive turntable is 2.5 meter above test site ground level.
2) During the test , the turn table is rotated until the maximum signal is found.
3) Record the field strength meter's level.
4) Replace the EUT with dipole/Horn antenna that is connected to a calibrated signal generator.
5) Increase the signal generator output till the field strength meter's level is equal to the item (3).
6) The signal generator output level with Ant. Gain and cable loss are the rating of equivalent isotropic radiated power.

7.3. Emission Designator

GSM Emission Designator

Emission Designator = 249KGXW

GSM BW = 249 kHz

G = Phase Modulation

X = Cases not otherwise covered

W = Combination (Audio/Data)

EDGE Emission Designator

Emission Designator = 249KG7W

GSM BW = 249 kHz

G = Phase Modulation

7 = Quantized/Digital Info

W = Combination (Audio/Data)

WCDMA Emission Designator

Emission Designator = 4M17F9W

WCDMA BW = 4.17 MHz

F = Frequency Modulation

9 = Composite Digital Info

W = Combination (Audio/Data)

PSK Modulation

Emission Designator = 4M48G7D

LTE BW = 4.48 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data transmission; telemetry; telecommand

QAM Modulation

Emission Designator = 4M48W7D

LTE BW = 4.48 MHz

W = Amplitude/Angle Modulated

7 = Quantized/Digital Info

D = Data transmission; telemetry; telecommand

8. TEST DATA

8.1 EQUIVALENT ISOTROPIC RADIATED POWER

Freq (MHz)	Mod/ Bandwidth [SCS (kHz)]	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
3710.01	Sub6 n77/ 20 MHz [30 kHz]	PI/2 BPSK	-25.06	11.80	11.70	2.81	H	< 1.00	0.117	20.69
		QPSK	-25.10	11.76	11.70	2.81	H		0.116	20.65
		16-QAM	-26.01	10.85	11.70	2.81	H		0.094	19.74
		64-QAM	-27.00	9.86	11.70	2.81	H		0.075	18.75
		256-QAM	-29.15	7.71	11.70	2.81	H		0.046	16.60
3840.00		PI/2 BPSK	-25.07	12.82	11.24	2.86	H		0.132	21.20
		QPSK	-25.12	12.77	11.24	2.86	H		0.130	21.15
		16-QAM	-25.96	11.93	11.24	2.86	H		0.107	20.31
		64-QAM	-27.03	10.86	11.24	2.86	H		0.084	19.24
		256-QAM	-29.19	8.70	11.24	2.86	H		0.051	17.08
3969.99		PI/2 BPSK	-25.44	12.49	11.18	2.92	H		0.119	20.75
		QPSK	-25.50	12.43	11.18	2.92	H		0.117	20.69
		16-QAM	-26.34	11.59	11.18	2.92	H		0.096	19.85
		64-QAM	-27.37	10.56	11.18	2.92	H		0.076	18.82
		256-QAM	-29.56	8.37	11.18	2.92	H		0.046	16.63

Freq (MHz)	Mod/ Bandwidth [SCS (kHz)]	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
3715.02	Sub6 n77/ 30 MHz [30 kHz]	PI/2 BPSK	-26.81	10.03	11.70	2.82	H	< 1.00	0.078	18.91
		QPSK	-26.89	9.95	11.70	2.82	H		0.076	18.83
		16-QAM	-27.09	9.75	11.70	2.82	H		0.073	18.63
		64-QAM	-27.22	9.62	11.70	2.82	H		0.071	18.50
		256-QAM	-29.42	7.42	11.70	2.82	H		0.043	16.30
3840.00		PI/2 BPSK	-26.49	11.40	11.24	2.86	H		0.095	19.78
		QPSK	-26.53	11.36	11.24	2.86	H		0.094	19.74
		16-QAM	-26.68	11.21	11.24	2.86	H		0.091	19.59
		64-QAM	-26.89	11.00	11.24	2.86	H		0.087	19.38
		256-QAM	-29.05	8.84	11.24	2.86	H		0.053	17.22
3964.98		PI/2 BPSK	-27.64	10.31	11.16	2.92	H		0.072	18.55
		QPSK	-27.66	10.29	11.16	2.92	H		0.071	18.53
		16-QAM	-27.82	10.13	11.16	2.92	H		0.069	18.37
		64-QAM	-28.02	9.93	11.16	2.92	H		0.066	18.17
		256-QAM	-30.18	7.77	11.16	2.92	H		0.040	16.01

Freq (MHz)	Mod/ Bandwidth [SCS (kHz)]	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
3720.00	Sub6 n77/ 40 MHz [30 kHz]	PI/2 BPSK	-25.11	11.71	11.70	2.82	H	< 1.00	0.115	20.59
		QPSK	-25.01	11.81	11.70	2.82	H		0.117	20.69
		16-QAM	-25.98	10.84	11.70	2.82	H		0.094	19.72
		64-QAM	-26.95	9.87	11.70	2.82	H		0.075	18.75
		256-QAM	-29.08	7.74	11.70	2.82	H		0.046	16.62
3840.00		PI/2 BPSK	-25.15	12.74	11.24	2.86	H		0.129	21.12
		QPSK	-25.12	12.77	11.24	2.86	H		0.130	21.15
		16-QAM	-25.98	11.91	11.24	2.86	H		0.107	20.29
		64-QAM	-27.00	10.89	11.24	2.86	H		0.084	19.27
		256-QAM	-29.15	8.74	11.24	2.86	H		0.051	17.12
3960.00		PI/2 BPSK	-25.44	12.53	11.14	2.92	H		0.119	20.75
		QPSK	-25.40	12.57	11.14	2.92	H		0.120	20.79
		16-QAM	-26.19	11.78	11.14	2.92	H		0.100	20.00
		64-QAM	-27.26	10.71	11.14	2.92	H		0.078	18.93
		256-QAM	-29.40	8.57	11.14	2.92	H		0.048	16.79

Freq (MHz)	Mod/ Bandwidth [SCS (kHz)]	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
3725.01	Sub6 n77/ 50 MHz [30 kHz]	PI/2 BPSK	-25.31	11.51	11.70	2.83	H	< 1.00	0.109	20.38
		QPSK	-25.42	11.40	11.70	2.83	H		0.106	20.27
		16-QAM	-26.16	10.66	11.70	2.83	H		0.090	19.53
		64-QAM	-27.14	9.68	11.70	2.83	H		0.072	18.55
		256-QAM	-30.41	6.41	11.70	2.83	H		0.034	15.28
3840.00		PI/2 BPSK	-24.90	12.99	11.24	2.86	H		0.137	21.37
		QPSK	-25.08	12.81	11.24	2.86	H		0.131	21.19
		16-QAM	-25.75	12.14	11.24	2.86	H		0.113	20.52
		64-QAM	-26.77	11.12	11.24	2.86	H		0.089	19.50
		256-QAM	-29.01	8.88	11.24	2.86	H		0.053	17.26
3954.99		PI/2 BPSK	-25.49	12.49	11.12	2.92	H		0.117	20.69
		QPSK	-25.59	12.39	11.12	2.92	H		0.114	20.59
		16-QAM	-26.28	11.70	11.12	2.92	H		0.098	19.90
		64-QAM	-27.22	10.76	11.12	2.92	H		0.079	18.96
		256-QAM	-29.52	8.46	11.12	2.92	H		0.046	16.66

Freq (MHz)	Mod/ Bandwidth [SCS (kHz)]	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
3730.01	Sub6 n77/ 60 MHz [30 kHz]	PI/2 BPSK	-25.58	11.23	11.70	2.83	H	< 1.00	0.102	20.10
		QPSK	-25.68	11.13	11.70	2.83	H		0.100	20.00
		16-QAM	-26.47	10.34	11.70	2.83	H		0.083	19.21
		64-QAM	-27.43	9.38	11.70	2.83	H		0.067	18.25
		256-QAM	-29.70	7.11	11.70	2.83	H		0.040	15.98
3840.00		PI/2 BPSK	-25.06	12.83	11.24	2.86	H		0.132	21.21
		QPSK	-25.16	12.73	11.24	2.86	H		0.129	21.11
		16-QAM	-25.94	11.95	11.24	2.86	H		0.108	20.33
		64-QAM	-26.94	10.95	11.24	2.86	H		0.086	19.33
		256-QAM	-29.20	8.69	11.24	2.86	H		0.051	17.07
3950.00		PI/2 BPSK	-25.94	12.04	11.10	2.92	H		0.105	20.22
		QPSK	-26.03	11.95	11.10	2.92	H		0.103	20.13
		16-QAM	-26.80	11.18	11.10	2.92	H		0.086	19.36
		64-QAM	-27.81	10.17	11.10	2.92	H		0.068	18.35
		256-QAM	-30.06	7.92	11.10	2.92	H		0.041	16.10

Freq (MHz)	Mod/ Bandwidth [SCS (kHz)]	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
3735.00	Sub6 n77/ 70 MHz [30 kHz]	PI/2 BPSK	-27.22	9.66	11.70	2.84	H	< 1.00	0.071	18.53
		QPSK	-27.27	9.61	11.70	2.84	H		0.070	18.48
		16-QAM	-27.43	9.45	11.70	2.84	H		0.068	18.32
		64-QAM	-27.56	9.32	11.70	2.84	H		0.066	18.19
		256-QAM	-29.74	7.14	11.70	2.84	H		0.040	16.01
3840.00		PI/2 BPSK	-26.65	11.24	11.24	2.86	H		0.092	19.62
		QPSK	-26.66	11.23	11.24	2.86	H		0.091	19.61
		16-QAM	-26.86	11.03	11.24	2.86	H		0.087	19.41
		64-QAM	-27.05	10.84	11.24	2.86	H		0.083	19.22
		256-QAM	-29.19	8.70	11.24	2.86	H		0.051	17.08
3945.00		PI/2 BPSK	-27.84	10.13	11.09	2.92	H		0.068	18.30
		QPSK	-27.84	10.13	11.09	2.92	H		0.068	18.30
		16-QAM	-28.00	9.97	11.09	2.92	H		0.065	18.14
		64-QAM	-28.16	9.81	11.09	2.92	H		0.063	17.98
		256-QAM	-30.34	7.63	11.09	2.92	H		0.038	15.80

Freq (MHz)	Mod/ Bandwidth [SCS (kHz)]	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
3740.01	Sub6 n77/ 80 MHz [30 kHz]	PI/2 BPSK	-25.48	11.48	11.70	2.84	H	< 1.00	0.108	20.34
		QPSK	-25.60	11.36	11.70	2.84	H		0.105	20.22
		16-QAM	-26.39	10.57	11.70	2.84	H		0.088	19.43
		64-QAM	-27.38	9.58	11.70	2.84	H		0.070	18.44
		256-QAM	-29.69	7.27	11.70	2.84	H		0.041	16.13
3840.00		PI/2 BPSK	-24.80	13.09	11.24	2.86	H		0.140	21.47
		QPSK	-24.86	13.03	11.24	2.86	H		0.138	21.41
		16-QAM	-25.70	12.19	11.24	2.86	H		0.114	20.57
		64-QAM	-26.71	11.18	11.24	2.86	H		0.090	19.56
		256-QAM	-28.96	8.93	11.24	2.86	H		0.054	17.31
3939.99		PI/2 BPSK	-26.00	11.96	11.08	2.92	H		0.103	20.12
		QPSK	-26.07	11.89	11.08	2.92	H		0.101	20.05
		16-QAM	-26.89	11.07	11.08	2.92	H		0.084	19.23
		64-QAM	-27.87	10.09	11.08	2.92	H		0.067	18.25
		256-QAM	-30.17	7.79	11.08	2.92	H		0.039	15.95

Freq (MHz)	Mod/ Bandwidth [SCS (kHz)]	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
3745.01	Sub6 n77/ 90 MHz [30 kHz]	PI/2 BPSK	-25.49	11.51	11.70	2.84	H	< 1.00	0.109	20.37
		QPSK	-25.59	11.41	11.70	2.84	H		0.106	20.27
		16-QAM	-26.38	10.62	11.70	2.84	H		0.089	19.48
		64-QAM	-27.37	9.63	11.70	2.84	H		0.071	18.49
		256-QAM	-29.62	7.38	11.70	2.84	H		0.042	16.24
3840.00		PI/2 BPSK	-24.91	12.98	11.24	2.86	H		0.137	21.36
		QPSK	-25.00	12.89	11.24	2.86	H		0.134	21.27
		16-QAM	-25.77	12.12	11.24	2.86	H		0.112	20.50
		64-QAM	-26.79	11.10	11.24	2.86	H		0.089	19.48
		256-QAM	-29.00	8.89	11.24	2.86	H		0.053	17.27
3934.98		PI/2 BPSK	-26.07	11.91	11.07	2.92	H		0.101	20.06
		QPSK	-26.20	11.78	11.07	2.92	H		0.098	19.93
		16-QAM	-26.97	11.01	11.07	2.92	H		0.082	19.16
		64-QAM	-27.93	10.05	11.07	2.92	H		0.066	18.20
		256-QAM	-30.20	7.78	11.07	2.92	H		0.039	15.93

Freq (MHz)	Mod/ Bandwidth [SCS (kHz)]	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
3750.00	Sub6 n77/ 100 MHz [30 kHz]	PI/2 BPSK	-25.55	11.48	11.70	2.84	H	< 1.00	0.108	20.34
		QPSK	-25.66	11.37	11.70	2.84	H		0.106	20.23
		16-QAM	-26.43	10.60	11.70	2.84	H		0.088	19.46
		64-QAM	-27.41	9.62	11.70	2.84	H		0.071	18.48
		256-QAM	-29.62	7.41	11.70	2.84	H		0.042	16.27
3840.00		PI/2 BPSK	-24.95	12.94	11.24	2.86	H		0.135	21.32
		QPSK	-25.05	12.84	11.24	2.86	H		0.132	21.22
		16-QAM	-25.81	12.08	11.24	2.86	H		0.111	20.46
		64-QAM	-26.84	11.05	11.24	2.86	H		0.088	19.43
		256-QAM	-29.04	8.85	11.24	2.86	H		0.053	17.23
3930.00		PI/2 BPSK	-26.05	11.94	11.06	2.92	H		0.102	20.08
		QPSK	-26.16	11.83	11.06	2.92	H		0.099	19.97
		16-QAM	-26.89	11.10	11.06	2.92	H		0.084	19.24
		64-QAM	-27.88	10.11	11.06	2.92	H		0.067	18.25
		256-QAM	-30.12	7.87	11.06	2.92	H		0.040	16.01

8.2 RADIATED SPURIOUS EMISSIONS

▣ NR Band: N77 (Power Class2)

▣ ENDC Mode: SA

▣ Bandwidth: 20 MHz

▣ Modulation: PI/2 BPSK

▣ Distance: 1 meters

▣ SCS: 30 kHz

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)
664666 (3710.01)	7 420.02	-56.97	11.26	-49.59	4.11	H	-42.44	-13.00
	11 130.03	-63.51	12.30	-52.85	5.01	V	-45.56	-13.00
	14 840.04	-54.98	13.86	-49.29	6.01	V	-41.44	-13.00
656000 (3840.00)	7 680.00	-62.21	11.54	-55.32	4.18	V	-47.96	-13.00
	11 520.00	-62.92	12.44	-52.05	5.16	V	-44.77	-13.00
	15 360.00	-57.21	15.54	-52.13	6.07	V	-42.66	-13.00
664666 (3969.99)	7 939.98	-61.99	11.09	-55.12	4.28	H	-48.31	-13.00
	11 909.97	-61.99	12.76	-51.09	5.26	H	-43.59	-13.00
	15 879.96	-56.66	16.40	-49.46	6.21	V	-39.27	-13.00

ENDC-Mode: 2A-n77A(Power Class3)

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)
18900 (1880.0)	3,760.00	-59.43	11.64	-62.42	2.85	H	-53.63	-13.00
	5,640.00	-58.10	12.00	-54.88	3.54	V	-46.42	-13.00
	7,520.00	-63.08	11.54	-50.73	4.12	V	-43.31	-13.00

▣ NR Band: N77 (Power Class2)

▣ ENDC Mode: SA

▣ Bandwidth: 30 MHz

▣ Modulation: PI/2 BPSK

▣ Distance: 1 meters

▣ SCS: 30 kHz

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)
647668 (3715.02)	7 430.04	-63.63	11.28	-56.33	4.11	H	-49.16	-13.00
	11 145.06	-64.63	12.30	-53.31	5.02	H	-46.03	-13.00
	14 860.08	-56.97	13.88	-51.06	6.00	H	-43.18	-13.00
656000 (3840.00)	7 680.00	-63.06	11.54	-56.17	4.18	H	-48.81	-13.00
	11 520.00	-62.59	12.44	-51.72	5.16	V	-44.44	-13.00
	15 360.00	-57.11	15.54	-52.03	6.07	V	-42.56	-13.00
664332 (3964.98)	7 929.96	-64.06	11.08	-56.67	4.27	V	-49.86	-13.00
	11 894.94	-64.52	12.78	-54.22	5.30	V	-46.74	-13.00
	15 859.92	-57.12	16.40	-50.27	6.18	V	-40.05	-13.00

ENDC-Mode: 2A-n77A(Power Class3)

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)
18900 (1880.0)	3,760.00	-60.20	11.64	-63.19	2.85	H	-54.40	-13.00
	5,640.00	-58.98	12.00	-55.76	3.54	V	-47.30	-13.00
	7,520.00	-63.14	11.54	-50.79	4.12	V	-43.37	-13.00

▣ NR Band: N77 (Power Class2)

▣ ENDC Mode: SA

▣ Bandwidth: 40 MHz

▣ Modulation: PI/2 BPSK

▣ Distance: 1 meters

▣ SCS: 30 kHz

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)
648000 (3720.00)	7 440.00	-57.37	11.36	-50.25	4.13	H	-43.02	-13.00
	11 160.00	-64.22	12.30	-52.00	5.16	H	-44.86	-13.00
	14 880.00	-55.11	14.02	-49.47	5.96	V	-41.41	-13.00
656000 (3840.00)	7 680.00	-63.96	11.54	-57.07	4.18	H	-49.71	-13.00
	11 520.00	-63.80	12.44	-52.93	5.16	V	-45.65	-13.00
	15 360.00	-58.03	15.54	-52.95	6.07	H	-43.48	-13.00
664000 (3960.00)	7 920.00	-64.46	11.04	-56.95	4.26	V	-50.17	-13.00
	11 880.00	-63.44	12.80	-53.50	5.38	V	-46.08	-13.00
	15 840.00	-57.88	16.40	-50.55	6.23	H	-40.38	-13.00

ENDC-Mode: 2A-n77A(Power Class3)

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)
18900 (1880.0)	3,760.00	-60.03	11.64	-63.02	2.85	H	-54.23	-13.00
	5,640.00	-58.39	12.00	-55.17	3.54	V	-46.71	-13.00
	7,520.00	-63.91	11.54	-51.56	4.12	V	-44.14	-13.00

▣ NR Band: N77 (Power Class2)

▣ ENDC Mode: SA

▣ Bandwidth: 50 MHz

▣ Modulation: PI/2 BPSK

▣ Distance: 1 meters

▣ SCS: 30 kHz

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)
648334 (3725.01)	7 450.02	-57.08	11.40	-49.96	4.14	H	-42.70	-13.00
	11 175.03	-64.09	12.30	-52.97	5.14	H	-45.81	-13.00
	14 900.04	-55.46	14.10	-49.71	5.98	V	-41.59	-13.00
656000 (3840.00)	7 680.00	-63.97	11.54	-57.08	4.18	H	-49.72	-13.00
	11 520.00	-63.81	12.44	-52.94	5.16	V	-45.66	-13.00
	15 360.00	-58.06	15.54	-52.98	6.07	H	-43.51	-13.00
663666 (3954.99)	7 909.98	-64.72	11.02	-57.39	4.24	H	-50.61	-13.00
	11 864.97	-63.81	12.80	-53.64	5.33	V	-46.16	-13.00
	15 819.96	-57.79	16.40	-50.55	6.25	H	-40.40	-13.00

ENDC-Mode: 2A-n77A(Power Class3)

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)
18900 (1880.0)	3,760.00	-59.86	11.64	-62.85	2.85	H	-54.06	-13.00
	5,640.00	-58.99	12.00	-55.77	3.54	V	-47.31	-13.00
	7,520.00	-63.46	11.54	-51.11	4.12	V	-43.69	-13.00

▣ NR Band: N77 (Power Class2)

▣ ENDC Mode: SA

▣ Bandwidth: 60 MHz

▣ Modulation: PI/2 BPSK

▣ Distance: 1 meters

▣ SCS: 30 kHz

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)
649334 (3730.01)	7 460.01	-57.45	11.42	-50.36	4.13	H	-43.07	-13.00
	11 190.02	-64.31	12.30	-53.97	5.08	H	-46.75	-13.00
	14 920.02	-55.30	14.14	-49.35	6.00	V	-41.21	-13.00
656000 (3840.00)	7 680.00	-63.94	11.54	-57.05	4.18	H	-49.69	-13.00
	11 520.00	-63.71	12.44	-52.84	5.16	V	-45.56	-13.00
	15 360.00	-58.20	15.54	-53.12	6.07	V	-43.65	-13.00
662666 (3950.00)	7 899.99	-64.39	11.00	-57.34	4.22	V	-50.56	-13.00
	11 849.99	-63.77	12.80	-53.63	5.20	V	-46.03	-13.00
	15 799.98	-57.71	16.40	-51.13	6.24	H	-40.97	-13.00

ENDC-Mode: 2A-n77A(Power Class3)

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)
18900 (1880.0)	3,760.00	-60.13	11.64	-63.12	2.85	H	-54.33	-13.00
	5,640.00	-58.74	12.00	-55.52	3.54	V	-47.06	-13.00
	7,520.00	-63.63	11.54	-51.28	4.12	V	-43.86	-13.00

▣ NR Band: N77 (Power Class2)

▣ ENDC Mode: SA

▣ Bandwidth: 70 MHz

▣ Modulation: PI/2 BPSK

▣ Distance: 1 meters

▣ SCS: 30 kHz

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)
649000 (3735.00)	7 470.00	-57.19	11.42	-49.83	4.13	H	-42.54	-13.00
	11 205.00	-64.07	12.30	-53.10	5.08	H	-45.88	-13.00
	14 940.00	-55.42	14.14	-49.32	6.00	V	-41.18	-13.00
656000 (3840.00)	7 680.00	-63.94	11.54	-57.05	4.18	H	-49.69	-13.00
	11 520.00	-63.94	12.44	-53.07	5.16	V	-45.79	-13.00
	15 360.00	-58.18	15.54	-53.10	6.07	V	-43.63	-13.00
663000 (3945.00)	7 890.00	-64.50	11.00	-57.64	4.22	V	-50.86	-13.00
	11 835.00	-63.62	12.80	-53.35	5.20	V	-45.75	-13.00
	15 780.00	-57.91	16.40	-50.51	6.24	H	-40.35	-13.00

ENDC-Mode: 2A-n77A(Power Class3)

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)
18900 (1880.0)	3,760.00	-60.03	11.64	-63.02	2.85	H	-54.23	-13.00
	5,640.00	-58.16	12.00	-54.94	3.54	V	-46.48	-13.00
	7,520.00	-63.64	11.54	-51.29	4.12	V	-43.87	-13.00

▣ NR Band: N77 (Power Class2)

▣ ENDC Mode: SA

▣ Bandwidth: 80 MHz

▣ Modulation: PI/2 BPSK

▣ Distance: 1 meters

▣ SCS: 30 kHz

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)
649334 (3740.01)	7 480.02	-57.35	11.46	-50.06	4.08	H	-42.68	-13.00
	11 220.03	-63.98	12.26	-52.13	5.04	H	-44.91	-13.00
	14 960.04	-55.12	14.24	-48.79	5.98	V	-40.53	-13.00
656000 (3840.00)	7 680.00	-64.25	11.54	-57.36	4.18	H	-50.00	-13.00
	11 520.00	-63.73	12.44	-52.86	5.16	V	-45.58	-13.00
	15 360.00	-58.27	15.54	-53.19	6.07	H	-43.72	-13.00
662666 (3939.99)	7 879.98	-64.57	11.00	-57.78	4.22	V	-51.00	-13.00
	11 819.97	-63.49	12.86	-53.15	5.08	V	-45.37	-13.00
	15 759.96	-57.90	16.40	-50.41	6.15	H	-40.16	-13.00

ENDC-Mode: 2A-n77A(Power Class3)\

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)
18900 (1880.0)	3,760.00	-59.75	11.64	-62.74	2.85	H	-53.95	-13.00
	5,640.00	-58.28	12.00	-55.06	3.54	V	-46.60	-13.00
	7,520.00	-64.03	11.54	-51.68	4.12	V	-44.26	-13.00

▣ NR Band: N77 (Power Class2)

▣ ENDC Mode: SA

▣ Bandwidth: 90 MHz

▣ Modulation: PI/2 BPSK

▣ Distance: 1 meters

▣ SCS: 30 kHz

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)
649667 (3745.01)	7 490.01	-57.28	11.48	-50.12	4.08	H	-42.72	-13.00
	11 235.02	-64.37	12.23	-53.21	5.06	H	-46.04	-13.00
	14 980.02	-55.31	14.32	-49.33	6.02	V	-41.03	-13.00
656000 (3840.00)	7 680.00	-64.03	11.54	-57.14	4.18	H	-49.78	-13.00
	11 520.00	-63.69	12.44	-52.82	5.16	V	-45.54	-13.00
	15 360.00	-58.40	15.54	-53.32	6.07	H	-43.85	-13.00
662332 (3934.98)	7 869.96	-64.77	11.00	-57.91	4.20	V	-51.11	-13.00
	11 804.94	-63.65	12.89	-53.43	5.26	V	-45.80	-13.00
	15 739.92	-57.78	16.40	-50.79	6.15	H	-40.54	-13.00

ENDC-Mode: 2A-n77A(Power Class3)

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)
18900 (1880.0)	3,760.00	-59.99	11.64	-62.98	2.85	H	-54.19	-13.00
	5,640.00	-58.52	12.00	-55.30	3.54	V	-46.84	-13.00
	7,520.00	-63.55	11.54	-51.20	4.12	V	-43.78	-13.00

▣ NR Band: N77 (Power Class2)

▣ ENDC Mode: SA

▣ Bandwidth: 100 MHz

▣ Modulation: PI/2 BPSK

▣ Distance: 1 meters

▣ SCS: 30 kHz

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)
650000 (3750.00)	7 500.00	-56.99	11.50	-50.12	4.10	H	-42.72	-13.00
	11 250.00	-64.17	12.20	-53.49	5.13	H	-46.42	-13.00
	15 000.00	-55.08	14.40	-49.07	6.04	V	-40.71	-13.00
656000 (3840.00)	7 680.00	-64.17	11.54	-57.28	4.18	H	-49.92	-13.00
	11 520.00	-63.63	12.44	-52.76	5.16	V	-45.48	-13.00
	15 360.00	-58.16	15.54	-53.08	6.07	V	-43.61	-13.00
662000 (3930.00)	7 860.00	-64.70	11.00	-53.61	4.24	V	-46.85	-13.00
	11 790.00	-63.61	12.90	-54.06	5.39	V	-46.55	-13.00
	15 720.00	-57.73	16.40	-54.28	6.19	H	-44.07	-13.00

ENDC-Mode: 2A-n77A(Power Class3)

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)
18900 (1880.0)	3,760.00	-60.32	11.64	-63.31	2.85	H	-54.52	-13.00
	5,640.00	-58.90	12.00	-55.68	3.54	V	-47.22	-13.00
	7,520.00	-63.61	11.54	-51.26	4.12	V	-43.84	-13.00

8.3 PEAK-TO-AVERAGE RATIO

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (dB)
Sub6 n77	20 MHz	3840.00	BPSK	1	Mid	3.68
			QPSK			4.92
			16-QAM			5.57
			64-QAM			6.51
			256-QAM			5.88
	30 MHz		BPSK	1		3.71
			QPSK			4.94
			16-QAM			5.60
			64-QAM			6.46
			256-QAM			5.86
	40 MHz		BPSK	1		3.70
			QPSK			4.89
			16-QAM			5.60
			64-QAM			6.46
			256-QAM			5.85
	50 MHz		BPSK	1		3.68
			QPSK			4.65
			16-QAM			5.57
			64-QAM			6.50
			256-QAM			5.88
	60 MHz		BPSK	1		3.65
			QPSK			4.96
			16-QAM			5.58
			64-QAM			6.43
			256-QAM			5.86

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (dB)
Sub6 n77	70 MHz	3840.00	BPSK	1	Mid	3.64
			QPSK			5.16
			16-QAM			5.54
			64-QAM			6.46
			256-QAM			5.89
	80 MHz		BPSK	1		3.64
			QPSK			4.89
			16-QAM			5.54
			64-QAM			6.47
			256-QAM			5.89
	90 MHz		BPSK	1		3.66
			QPSK			4.96
			16-QAM			5.54
			64-QAM			6.47
			256-QAM			5.89
	100 MHz		BPSK	1		3.64
			QPSK			4.96
			16-QAM			5.54
			64-QAM			6.47
			256-QAM			5.90

Note:

1. Plots of the EUT's Peak- to- Average Ratio are shown Page 105 ~ 149.

8.4 OCCUPIED BANDWIDTH

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (MHz)
Sub6 n77	20 MHz	3840.00	BPSK	50	0	17.801
			QPSK			17.911
			16-QAM			17.896
			64-QAM			18.009
			256-QAM			17.881
	30 MHz		BPSK	100		26.839
			QPSK			26.798
			16-QAM			26.896
			64-QAM			26.834
			256-QAM			26.651
	40 MHz		BPSK	128		35.916
			QPSK			35.794
			16-QAM			35.708
			64-QAM			35.733
			256-QAM			35.660
	50 MHz		BPSK	100		45.802
			QPSK			45.848
			16-QAM			45.743
			64-QAM			45.732
			256-QAM			45.837
	60 MHz		BPSK	162		57.780
			QPSK			57.796
			16-QAM			58.071
			64-QAM			57.948
			256-QAM			57.751

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (MHz)
Sub6 n77	70 MHz	3840.00	BPSK	180	0	64.353
			QPSK			64.328
			16-QAM			64.267
			64-QAM			64.306
			256-QAM			64.454
	80 MHz		BPSK	216		77.059
			QPSK			77.197
			16-QAM			77.163
			64-QAM			77.187
			256-QAM			77.154
	90 MHz		BPSK	243		86.818
			QPSK			86.841
			16-QAM			87.024
			64-QAM			86.655
			256-QAM			87.090
	100 MHz		BPSK	270		96.654
			QPSK			96.544
			16-QAM			96.322
			64-QAM			96.471
			256-QAM			96.417

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 60~ 104.

8.5 CONDUCTED SPURIOUS EMISSIONS

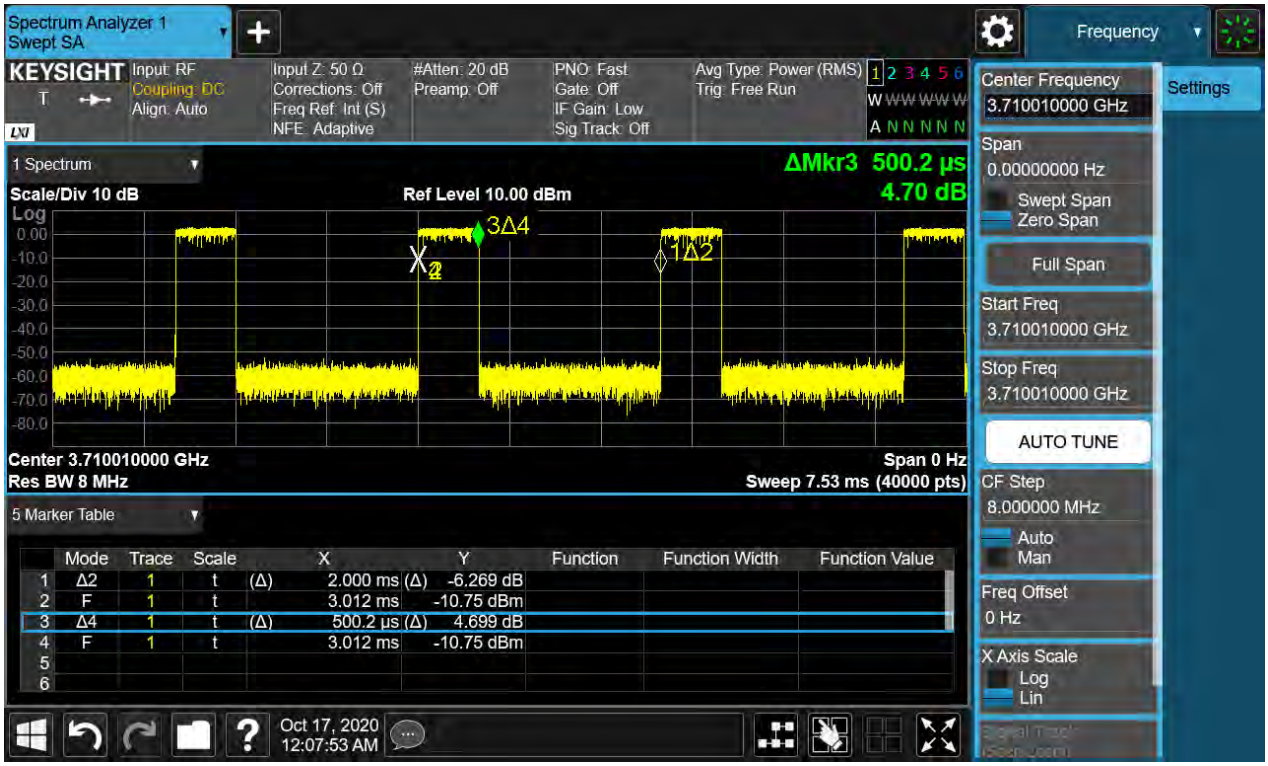
Band	Band Width (MHz)	Frequency (MHz)	Frequency of Maximum Harmonic (GHz)	Factor (dB)	Measurement Maximum Data (dBm)	Result (dBm)	Limit (dBm)
Sub6 n77	20	3710.01	7.4023	28.611	-70.406	-41.795	-13.00
		3840.00	4.8724	27.996	-72.484	-44.488	
		3969.99	8.0424	28.611	-72.475	-43.864	
	30	3715.02	7.4028	28.611	-68.704	-40.093	
		3840.00	7.9866	28.611	-72.397	-43.786	
		3964.98	8.0279	28.611	-72.647	-44.036	
	40	3720.00	7.4028	28.611	-71.563	-42.952	
		3840.00	8.5608	28.611	-72.442	-43.831	
		3960.00	8.8829	28.611	-71.333	-42.722	
	50	3725.01	5.4656	28.611	-72.655	-44.044	
		3840.00	3.2767	27.996	-69.994	-41.998	
		3954.99	3.2857	27.996	-71.657	-43.661	
	60	3730.01	3.2767	27.996	-71.231	-43.235	
		3840.00	3.2767	27.996	-72.213	-44.217	
		3950.00	9.9920	28.611	-72.828	-44.217	
	70	3735.00	7.4028	28.611	-72.510	-43.899	
		3840.00	6.0240	28.611	-73.077	-44.466	
		3945.00	7.9995	28.611	-71.796	-43.185	
	80	3740.01	7.4033	28.611	-71.294	-42.683	
		3840.00	3.2767	27.996	-70.524	-42.528	
		3939.99	7.4218	28.611	-72.787	-44.176	
	90	3745.01	7.4028	28.611	-71.831	-43.220	
		3840.00	6.0404	28.611	-72.894	-44.283	
		3934.98	8.0309	28.611	-73.037	-44.426	
	100	3750.00	8.0045	28.611	-72.573	-43.962	
		3840.00	4.9143	27.996	-72.758	-44.762	
		3930.00	8.9153	28.611	-72.608	-43.997	

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 258 ~ 311.

2. Duty Cycle factor already applied on the factor.

- Duty Cycle Factor(dB) = 6.02



- Factor(dB) = Duty Cycle factor + Cable Loss + Ext. Attenuator

- Result(dBm) = Reading + Factor

3. Factor(dB)

Frequency Range (GHz)	Factor [dB]
0.03 – 1	25.290
1 – 5	27.996
5 – 10	28.611
10 – 15	29.136
15 – 20	29.509
20 – 26.5	30.151
26.5 – 37.0	25.290

8.6 BAND EDGE

1. Plots of the EUT's Band Edge are shown Page 150 ~ 257.
2. Duty Cycle factor already applied on the offset.
   - Duty Cycle Factor(dB) = 6.02
   - Offset(dB) = Duty Cycle factor + Cable Loss + Ext. Attenuator

8.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

▣ BandWidth: 20 MHz

▣ Voltage(100%): 3.880 VDC

▣ Batt. Endpoint: 3.650 VDC

▣ LIMIT: Emission must remain in band

Test. Frequncy (MHz)	Voltage (%)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
3710.010	100%	+20(Ref)	3710 010 016	0.0	0.000 000	0.000
	100%	-30	3710 010 024	7.7	0.000 000	0.002
	100%	-20	3710 010 022	5.1	0.000 000	0.001
	100%	-10	3710 010 030	13.5	0.000 000	0.004
	100%	0	3710 010 030	13.3	0.000 000	0.004
	100%	+10	3710 010 023	6.6	0.000 000	0.002
	100%	+30	3710 010 025	8.6	0.000 000	0.002
	100%	+40	3710 010 033	16.4	0.000 000	0.004
	100%	+50	3710 010 026	9.2	0.000 000	0.002
	Batt. Endpoint	+20	3710 010 029	12.1	0.000 000	0.003
3969.990	100%	+20(Ref)	3969 990 006	0.0	0.000 000	0.000
	100%	-30	3969 990 009	3.7	0.000 000	0.001
	100%	-20	3969 990 015	9.7	0.000 000	0.002
	100%	-10	3969 990 013	7.2	0.000 000	0.002
	100%	0	3969 990 021	14.9	0.000 000	0.004
	100%	+10	3969 990 018	12.0	0.000 000	0.003
	100%	+30	3969 990 021	15.5	0.000 000	0.004
	100%	+40	3969 990 021	15.3	0.000 000	0.004
	100%	+50	3969 990 013	7.2	0.000 000	0.002
	Batt. Endpoint	+20	3969 990 016	10.5	0.000 000	0.003

▣ BandWidth: 30 MHz

▣ Voltage(100%): 3.880 VDC

▣ Batt. Endpoint: 3.650 VDC

▣ LIMIT: Emission must remain in band

Test. Frequncy (MHz)	Voltage (%)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
3715.020	100%	+20(Ref)	3715 020 016	0.0	0.000 000	0.000
	100%	-30	3715 020 024	8.3	0.000 000	0.002
	100%	-20	3715 020 022	6.5	0.000 000	0.002
	100%	-10	3715 020 022	6.2	0.000 000	0.002
	100%	0	3715 020 030	13.9	0.000 000	0.004
	100%	+10	3715 020 023	7.2	0.000 000	0.002
	100%	+30	3715 020 030	14.7	0.000 000	0.004
	100%	+40	3715 020 029	12.9	0.000 000	0.003
	100%	+50	3715 020 030	13.9	0.000 000	0.004
	Batt. Endpoint	+20	3715 020 027	11.1	0.000 000	0.003
3964.980	100%	+20(Ref)	3964 980 008	0.0	0.000 000	0.000
	100%	-30	3964 980 013	4.7	0.000 000	0.001
	100%	-20	3964 980 019	11.0	0.000 000	0.003
	100%	-10	3964 980 018	9.2	0.000 000	0.002
	100%	0	3964 980 014	5.2	0.000 000	0.001
	100%	+10	3964 980 018	9.1	0.000 000	0.002
	100%	+30	3964 980 019	10.8	0.000 000	0.003
	100%	+40	3964 980 013	5.0	0.000 000	0.001
	100%	+50	3964 980 019	10.2	0.000 000	0.003
	Batt. Endpoint	+20	3964 980 022	13.1	0.000 000	0.003

▣ BandWidth: 40 MHz

▣ Voltage(100%): 3.880 VDC

▣ Batt. Endpoint: 3.650 VDC

▣ LIMIT: Emission must remain in band

Test. Frequncy (MHz)	Voltage (%)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
3720.000	100%	+20(Ref)	3720 000 011	0.0	0.000 000	0.000
	100%	-30	3720 000 025	14.6	0.000 000	0.004
	100%	-20	3720 000 023	11.8	0.000 000	0.003
	100%	-10	3720 000 028	16.9	0.000 000	0.005
	100%	0	3720 000 020	9.2	0.000 000	0.002
	100%	+10	3720 000 021	10.6	0.000 000	0.003
	100%	+30	3720 000 014	3.1	0.000 000	0.001
	100%	+40	3720 000 020	9.0	0.000 000	0.002
	100%	+50	3720 000 028	16.9	0.000 000	0.005
	Batt. Endpoint	+20	3720 000 020	9.6	0.000 000	0.003
3960.000	100%	+20(Ref)	3960 000 017	0.0	0.000 000	0.000
	100%	-30	3960 000 032	15.6	0.000 000	0.004
	100%	-20	3960 000 029	12.5	0.000 000	0.003
	100%	-10	3960 000 027	10.0	0.000 000	0.003
	100%	0	3960 000 026	9.1	0.000 000	0.002
	100%	+10	3960 000 026	9.1	0.000 000	0.002
	100%	+30	3960 000 028	11.4	0.000 000	0.003
	100%	+40	3960 000 024	7.1	0.000 000	0.002
	100%	+50	3960 000 020	3.4	0.000 000	0.001
	Batt. Endpoint	+20	3960 000 030	13.5	0.000 000	0.003

▣ BandWidth: 50 MHz

▣ Voltage(100%): 3.880 VDC

▣ Batt. Endpoint: 3.650 VDC

▣ LIMIT: Emission must remain in band

Test. Frequncy (MHz)	Voltage (%)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
3725.010	100%	+20(Ref)	3725 010 007	0.0	0.000 000	0.000
	100%	-30	3725 010 021	14.1	0.000 000	0.004
	100%	-20	3725 010 024	17.0	0.000 000	0.005
	100%	-10	3725 010 016	8.9	0.000 000	0.002
	100%	0	3725 010 017	10.0	0.000 000	0.003
	100%	+10	3725 010 016	9.3	0.000 000	0.002
	100%	+30	3725 010 022	15.2	0.000 000	0.004
	100%	+40	3725 010 021	13.9	0.000 000	0.004
	100%	+50	3725 010 011	4.0	0.000 000	0.001
	Batt. Endpoint	+20	3725 010 010	3.6	0.000 000	0.001
3954.990	100%	+20(Ref)	3954 990 008	0.0	0.000 000	0.000
	100%	-30	3954 990 013	4.9	0.000 000	0.001
	100%	-20	3954 990 017	9.5	0.000 000	0.002
	100%	-10	3954 990 017	9.5	0.000 000	0.002
	100%	0	3954 990 015	7.2	0.000 000	0.002
	100%	+10	3954 990 017	9.0	0.000 000	0.002
	100%	+30	3954 990 014	6.7	0.000 000	0.002
	100%	+40	3954 990 014	6.7	0.000 000	0.002
	100%	+50	3954 990 020	12.5	0.000 000	0.003
	Batt. Endpoint	+20	3954 990 023	15.0	0.000 000	0.004

▣ BandWidth: 60 MHz

▣ Voltage(100%): 3.880 VDC

▣ Batt. Endpoint: 3.650 VDC

▣ LIMIT: Emission must remain in band

Test. Frequncy (MHz)	Voltage (%)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
3730.005	100%	+20(Ref)	3730 005 011	0.0	0.000 000	0.000
	100%	-30	3730 005 022	11.1	0.000 000	0.003
	100%	-20	3730 005 022	10.8	0.000 000	0.003
	100%	-10	3730 005 023	12.0	0.000 000	0.003
	100%	0	3730 005 022	11.0	0.000 000	0.003
	100%	+10	3730 005 022	10.2	0.000 000	0.003
	100%	+30	3730 005 031	19.3	0.000 001	0.005
	100%	+40	3730 005 029	17.5	0.000 000	0.005
	100%	+50	3730 005 028	16.9	0.000 000	0.005
	Batt. Endpoint	+20	3730 005 027	15.8	0.000 000	0.004
3949.995	100%	+20(Ref)	3949 995 013	0.0	0.000 000	0.000
	100%	-30	3949 995 026	12.7	0.000 000	0.003
	100%	-20	3949 995 019	5.6	0.000 000	0.001
	100%	-10	3949 995 021	8.3	0.000 000	0.002
	100%	0	3949 995 023	9.7	0.000 000	0.002
	100%	+10	3949 995 026	12.9	0.000 000	0.003
	100%	+30	3949 995 021	7.8	0.000 000	0.002
	100%	+40	3949 995 019	6.2	0.000 000	0.002
	100%	+50	3949 995 021	8.2	0.000 000	0.002
	Batt. Endpoint	+20	3949 995 022	9.0	0.000 000	0.002

▣ BandWidth: 70 MHz

▣ Voltage(100%): 3.880 VDC

▣ Batt. Endpoint: 3.650 VDC

▣ LIMIT: Emission must remain in band

Test. Frequncy (MHz)	Voltage (%)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
3735.000	100%	+20(Ref)	3735 000 011	0.0	0.000 000	0.000
	100%	-30	3735 000 022	10.9	0.000 000	0.003
	100%	-20	3735 000 017	6.6	0.000 000	0.002
	100%	-10	3735 000 025	14.7	0.000 000	0.004
	100%	0	3735 000 026	15.4	0.000 000	0.004
	100%	+10	3735 000 023	12.9	0.000 000	0.003
	100%	+30	3735 000 028	16.9	0.000 000	0.005
	100%	+40	3735 000 020	9.1	0.000 000	0.002
	100%	+50	3735 000 014	3.2	0.000 000	0.001
	Batt. Endpoint	+20	3735 000 021	9.9	0.000 000	0.003
3945.000	100%	+20(Ref)	3945 000 017	0.0	0.000 000	0.000
	100%	-30	3945 000 027	10.3	0.000 000	0.003
	100%	-20	3945 000 033	16.1	0.000 000	0.004
	100%	-10	3945 000 033	16.4	0.000 000	0.004
	100%	0	3945 000 030	13.4	0.000 000	0.003
	100%	+10	3945 000 027	10.2	0.000 000	0.003
	100%	+30	3945 000 023	5.8	0.000 000	0.001
	100%	+40	3945 000 026	8.8	0.000 000	0.002
	100%	+50	3945 000 030	13.1	0.000 000	0.003
	Batt. Endpoint	+20	3945 000 021	4.6	0.000 000	0.001

▣ BandWidth: 80 MHz

▣ Voltage(100%): 3.880 VDC

▣ Batt. Endpoint: 3.650 VDC

▣ LIMIT: Emission must remain in band

Test. Frequncy (MHz)	Voltage (%)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
3740.010	100%	+20(Ref)	3740 010 015	0.0	0.000 000	0.000
	100%	-30	3740 010 026	10.8	0.000 000	0.003
	100%	-20	3740 010 028	12.2	0.000 000	0.003
	100%	-10	3740 010 023	7.5	0.000 000	0.002
	100%	0	3740 010 032	16.5	0.000 000	0.004
	100%	+10	3740 010 021	5.2	0.000 000	0.001
	100%	+30	3740 010 028	12.6	0.000 000	0.003
	100%	+40	3740 010 030	14.9	0.000 000	0.004
	100%	+50	3740 010 023	7.5	0.000 000	0.002
	Batt. Endpoint	+20	3740 010 031	15.1	0.000 000	0.004
3939.990	100%	+20(Ref)	3939 990 008	0.0	0.000 000	0.000
	100%	-30	3939 990 013	5.1	0.000 000	0.001
	100%	-20	3939 990 013	5.2	0.000 000	0.001
	100%	-10	3939 990 024	16.5	0.000 000	0.004
	100%	0	3939 990 020	12.8	0.000 000	0.003
	100%	+10	3939 990 018	10.5	0.000 000	0.003
	100%	+30	3939 990 024	16.3	0.000 000	0.004
	100%	+40	3939 990 014	6.9	0.000 000	0.002
	100%	+50	3939 990 011	3.7	0.000 000	0.001
	Batt. Endpoint	+20	3939 990 018	10.8	0.000 000	0.003

▣ BandWidth: 90 MHz

▣ Voltage(100%): 3.880 VDC

▣ Batt. Endpoint: 3.650 VDC

▣ LIMIT: Emission must remain in band

Test. Frequncy (MHz)	Voltage (%)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
3745.005	100%	+20(Ref)	3745 005 013	0.0	0.000 000	0.000
	100%	-30	3745 005 020	6.5	0.000 000	0.002
	100%	-20	3745 005 030	16.7	0.000 000	0.004
	100%	-10	3745 005 019	5.5	0.000 000	0.001
	100%	0	3745 005 028	14.8	0.000 000	0.004
	100%	+10	3745 005 022	9.0	0.000 000	0.002
	100%	+30	3745 005 021	7.7	0.000 000	0.002
	100%	+40	3745 005 029	15.5	0.000 000	0.004
	100%	+50	3745 005 017	4.3	0.000 000	0.001
	Batt. Endpoint	+20	3745 005 019	5.7	0.000 000	0.002
3934.980	100%	+20(Ref)	3934 980 008	0.0	0.000 000	0.000
	100%	-30	3934 980 016	8.1	0.000 000	0.002
	100%	-20	3934 980 012	4.7	0.000 000	0.001
	100%	-10	3934 980 014	5.8	0.000 000	0.001
	100%	0	3934 980 021	13.5	0.000 000	0.003
	100%	+10	3934 980 020	12.1	0.000 000	0.003
	100%	+30	3934 980 013	4.9	0.000 000	0.001
	100%	+40	3934 980 014	5.8	0.000 000	0.001
	100%	+50	3934 980 021	13.2	0.000 000	0.003
	Batt. Endpoint	+20	3934 980 020	11.9	0.000 000	0.003

▣ BandWidth: 100 MHz

▣ Voltage(100%): 3.880 VDC

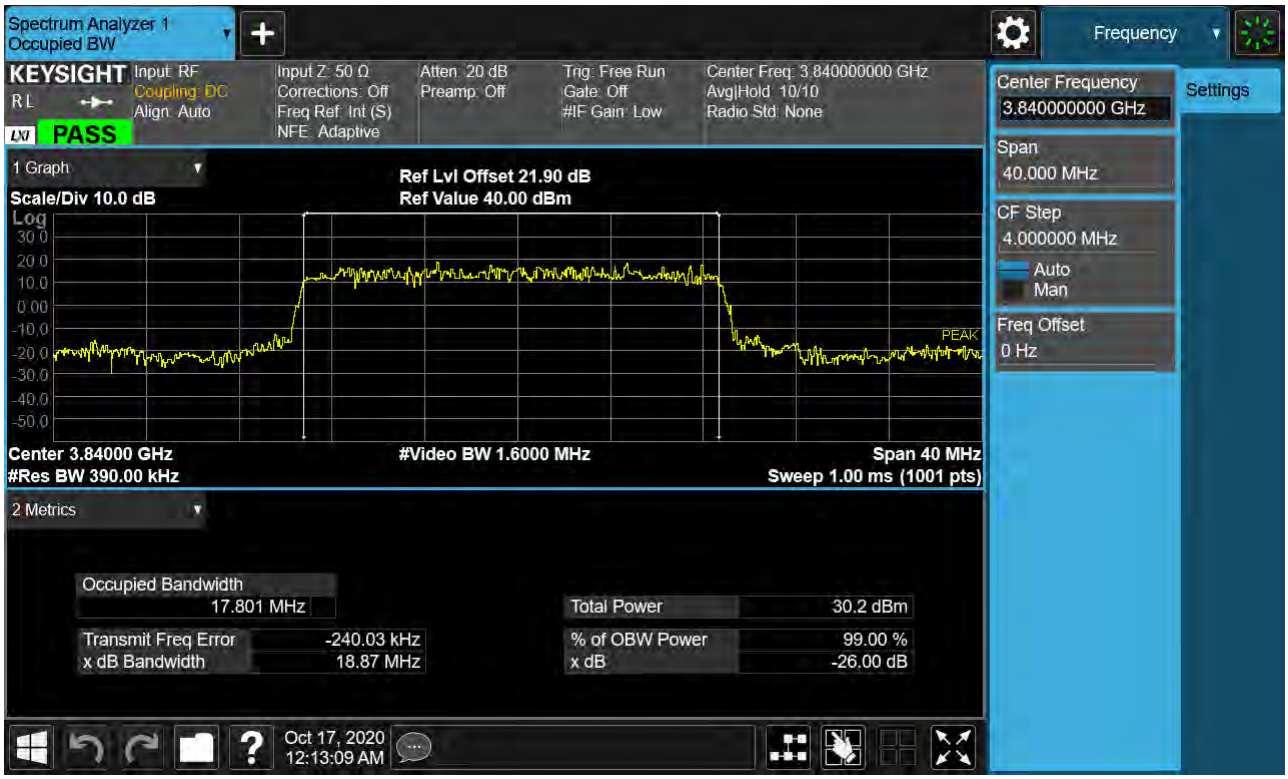
▣ Batt. Endpoint: 3.650 VDC

▣ LIMIT: Emission must remain in band

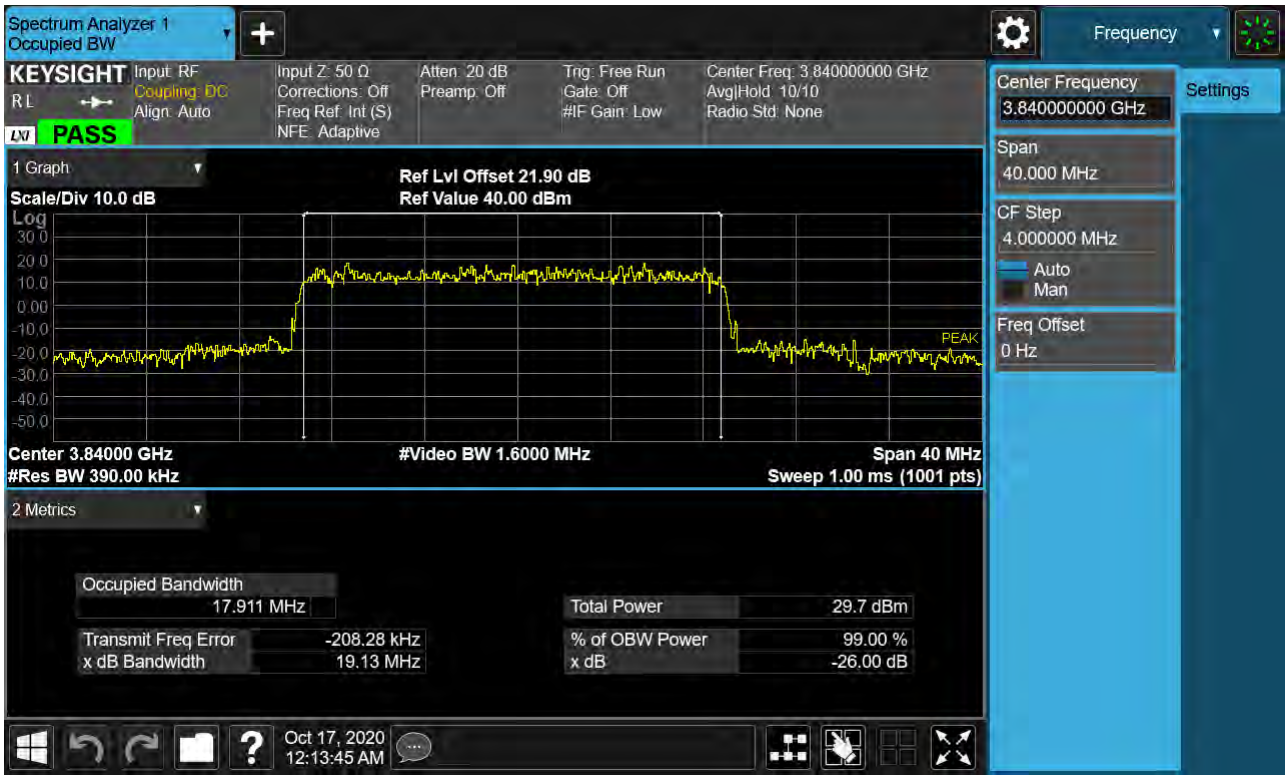
Test. Frequncy (MHz)	Voltage (%)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
3750.000	100%	+20(Ref)	3750 000 017	0.0	0.000 000	0.000
	100%	-30	3750 000 029	12.7	0.000 000	0.003
	100%	-20	3750 000 022	5.5	0.000 000	0.001
	100%	-10	3750 000 030	13.8	0.000 000	0.004
	100%	0	3750 000 023	6.7	0.000 000	0.002
	100%	+10	3750 000 024	7.0	0.000 000	0.002
	100%	+30	3750 000 022	5.6	0.000 000	0.001
	100%	+40	3750 000 029	12.4	0.000 000	0.003
	100%	+50	3750 000 020	3.2	0.000 000	0.001
	Batt. Endpoint	+20	3750 000 033	16.5	0.000 000	0.004
3930.000	100%	+20(Ref)	3930 000 009	0.0	0.000 000	0.000
	100%	-30	3930 000 023	13.4	0.000 000	0.003
	100%	-20	3930 000 014	4.5	0.000 000	0.001
	100%	-10	3930 000 016	7.1	0.000 000	0.002
	100%	0	3930 000 014	4.8	0.000 000	0.001
	100%	+10	3930 000 017	7.9	0.000 000	0.002
	100%	+30	3930 000 014	5.3	0.000 000	0.001
	100%	+40	3930 000 022	13.1	0.000 000	0.003
	100%	+50	3930 000 016	7.1	0.000 000	0.002
	Batt. Endpoint	+20	3930 000 021	12.1	0.000 000	0.003

9. TEST PLOTS

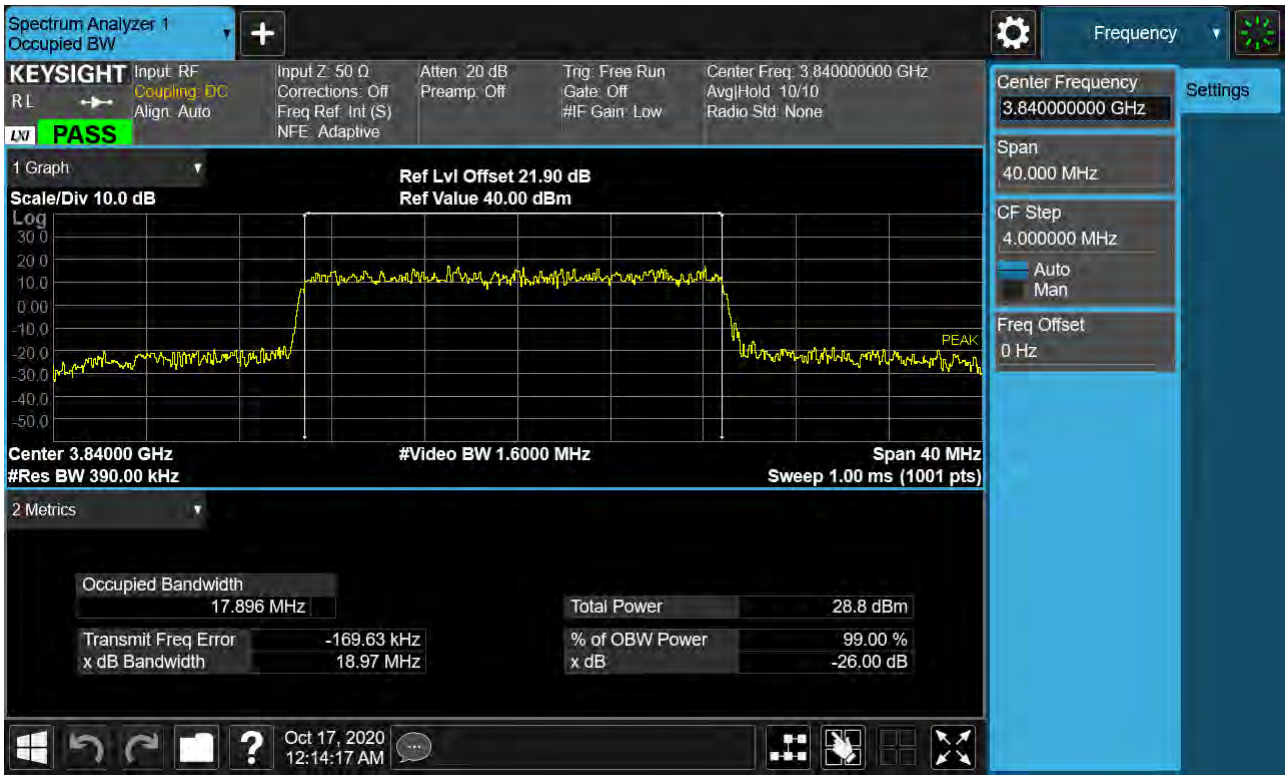
Sub6 n77. Occupied Bandwidth Plot (20M BW Ch.656000 BPSK)



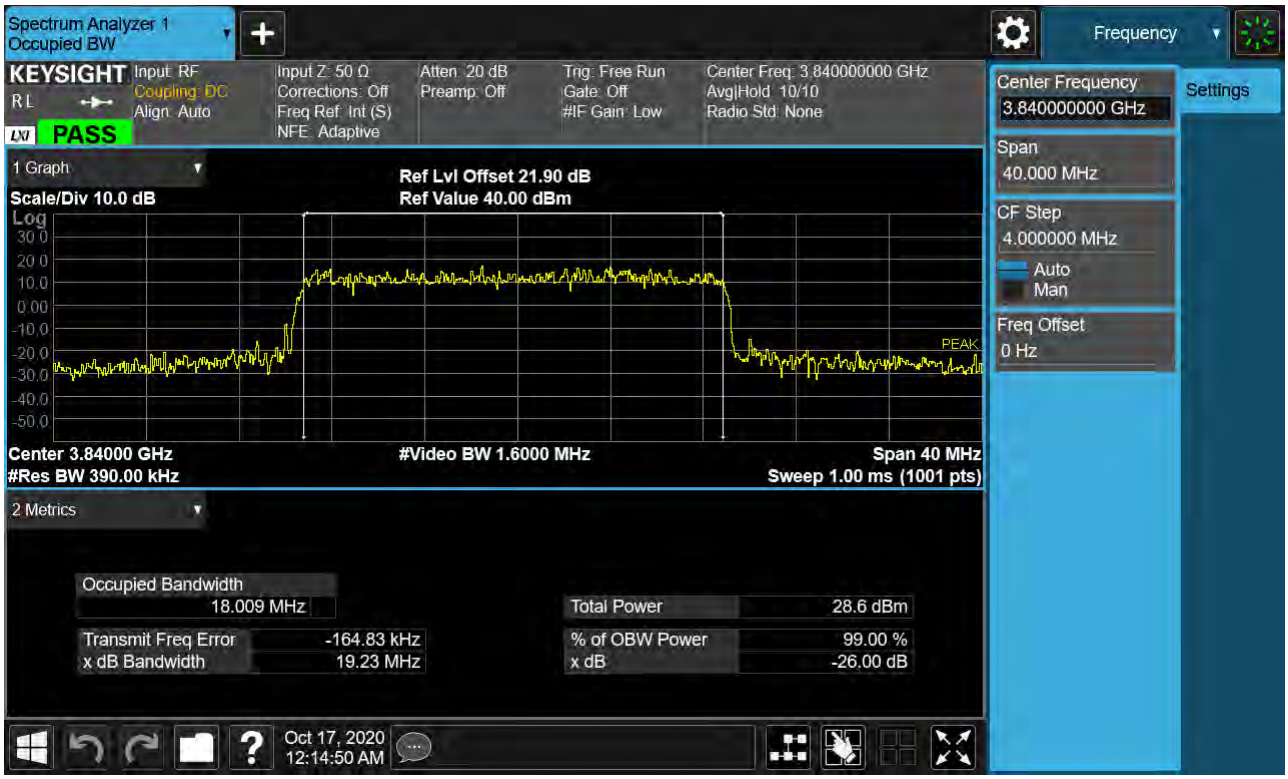
Sub6 n77. Occupied Bandwidth Plot (20M BW Ch.656000 QPSK)



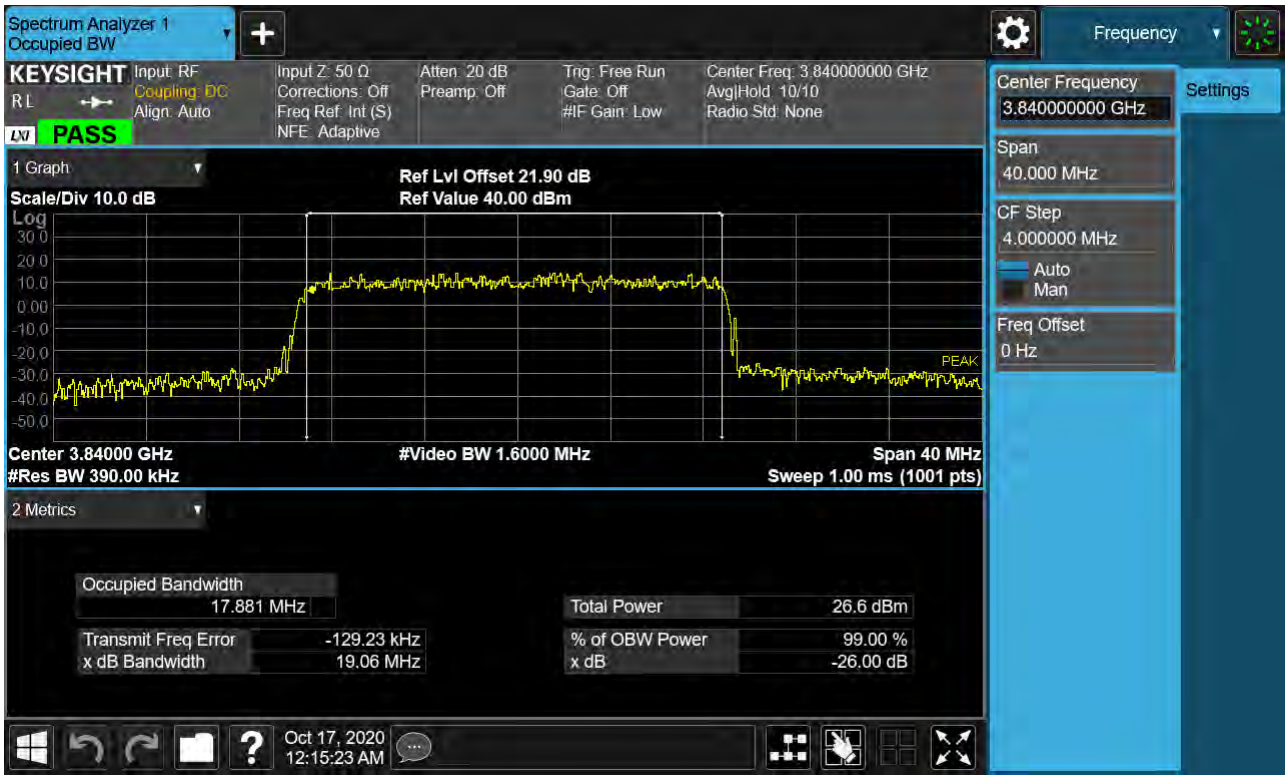
Sub6 n77. Occupied Bandwidth Plot (20M BW Ch.656000 16QAM)



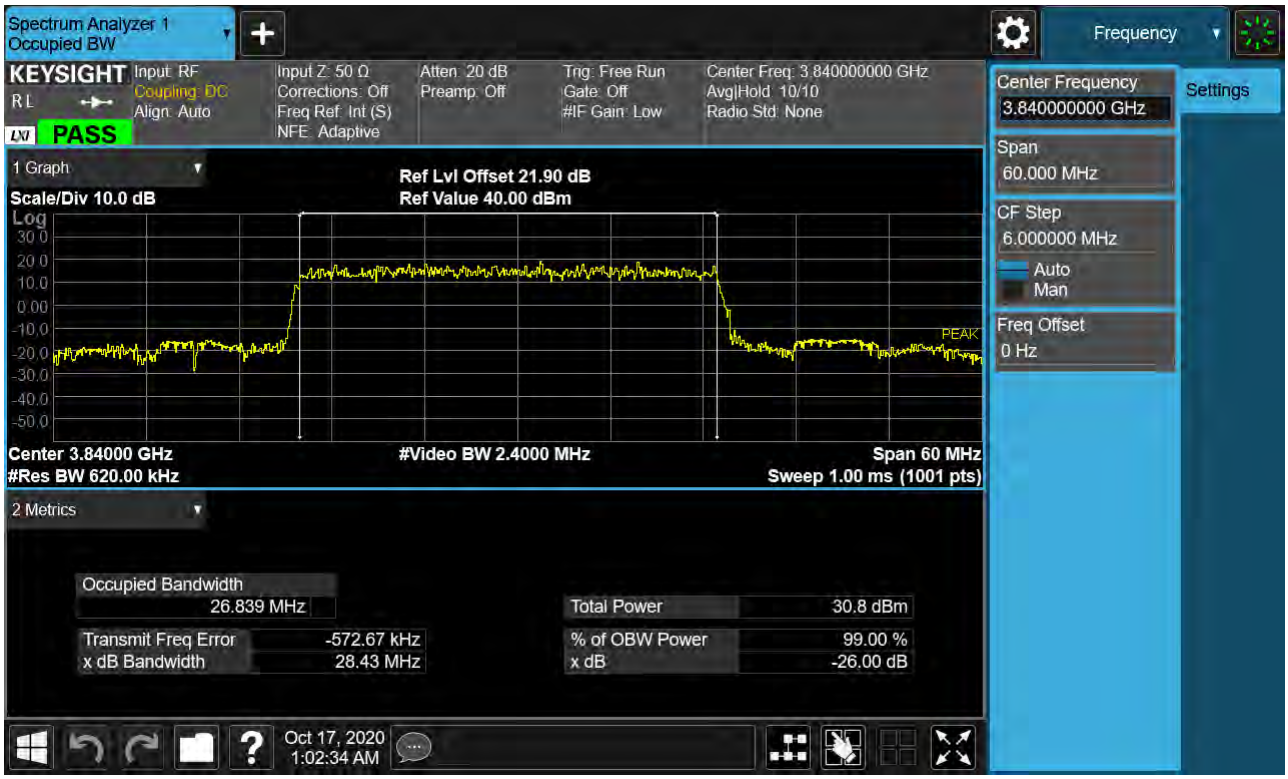
Sub6 n77. Occupied Bandwidth Plot (20M BW Ch.656000 64QAM)



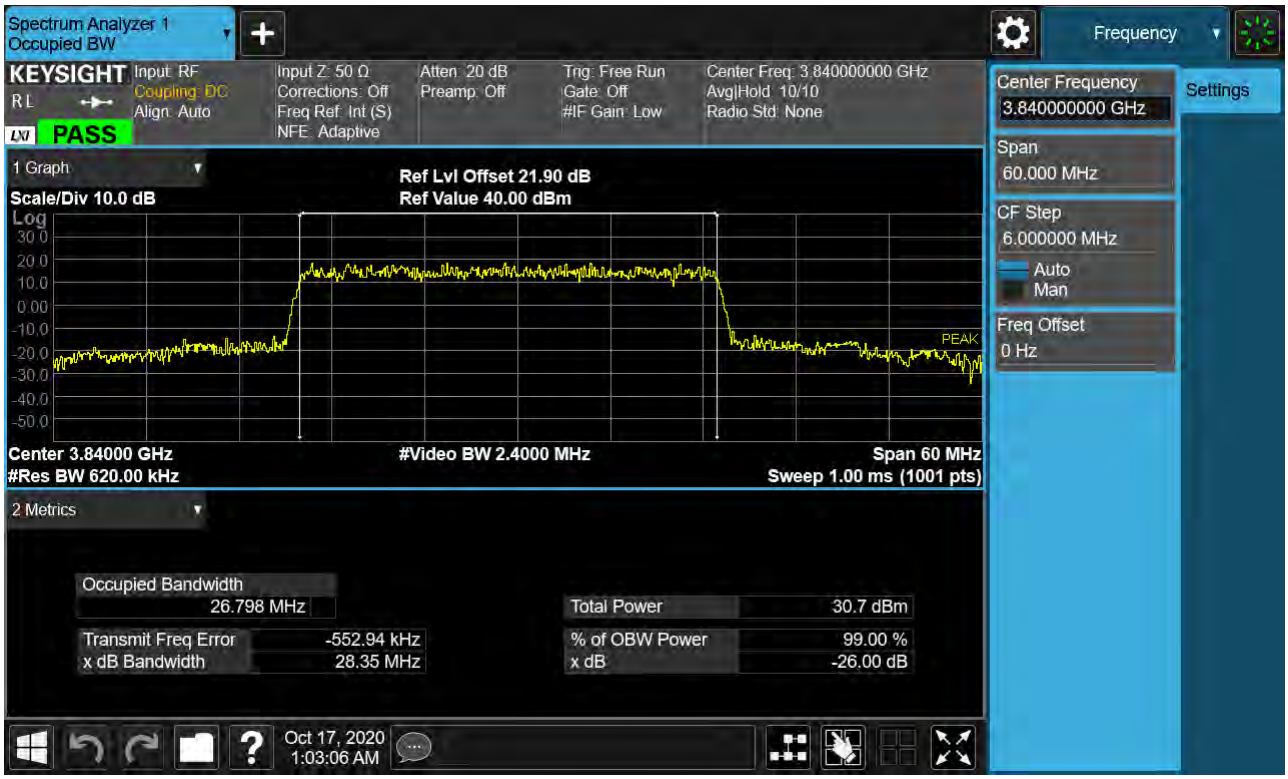
Sub6 n77. Occupied Bandwidth Plot (20M BW Ch.656000 256QAM)



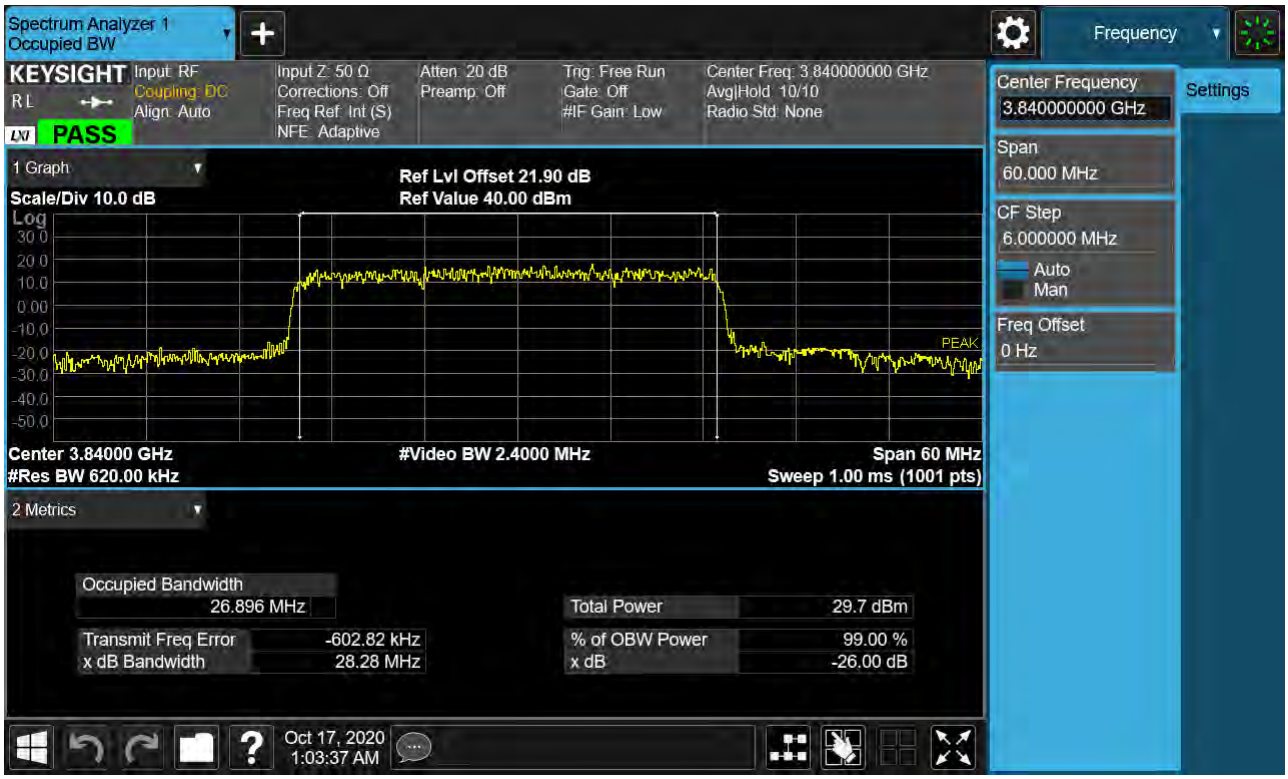
Sub6 n77. Occupied Bandwidth Plot (30M BW Ch.656000 BPSK)



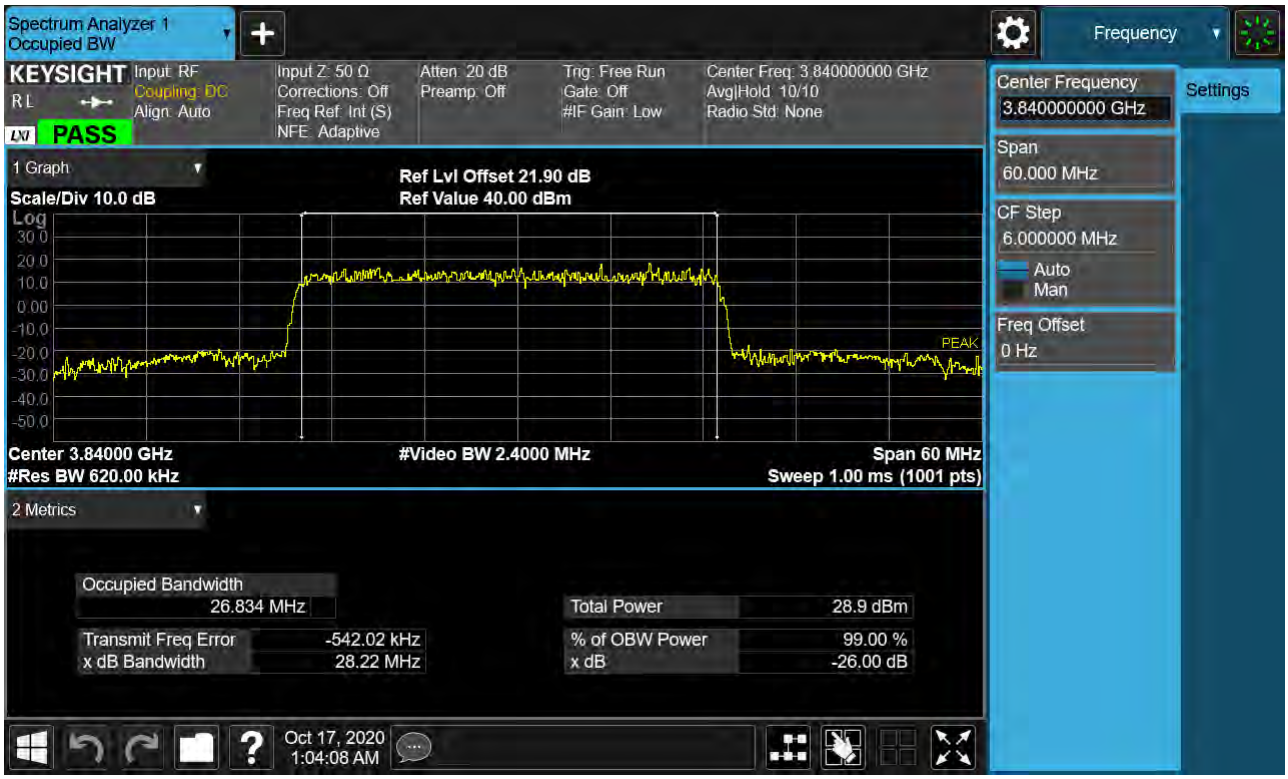
Sub6 n77. Occupied Bandwidth Plot (30M BW Ch.656000 QPSK)



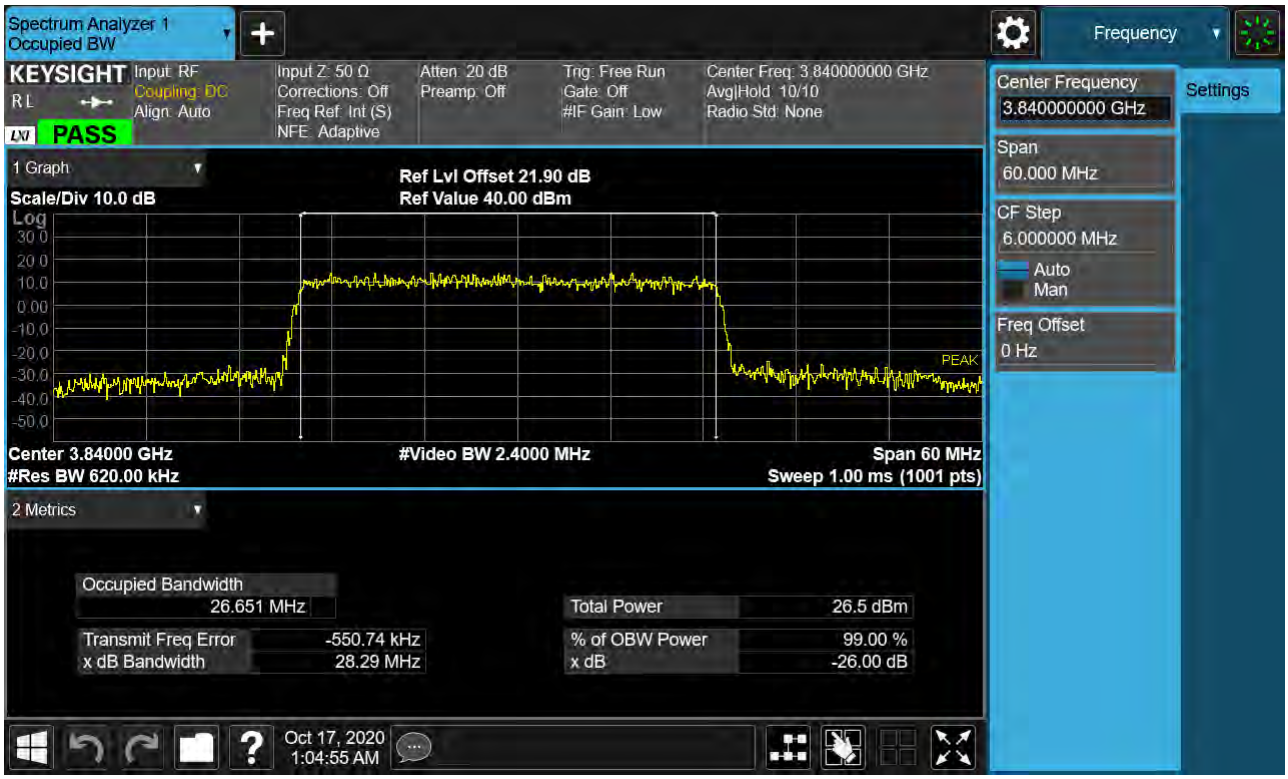
Sub6 n77. Occupied Bandwidth Plot (30M BW Ch.656000 16QAM)



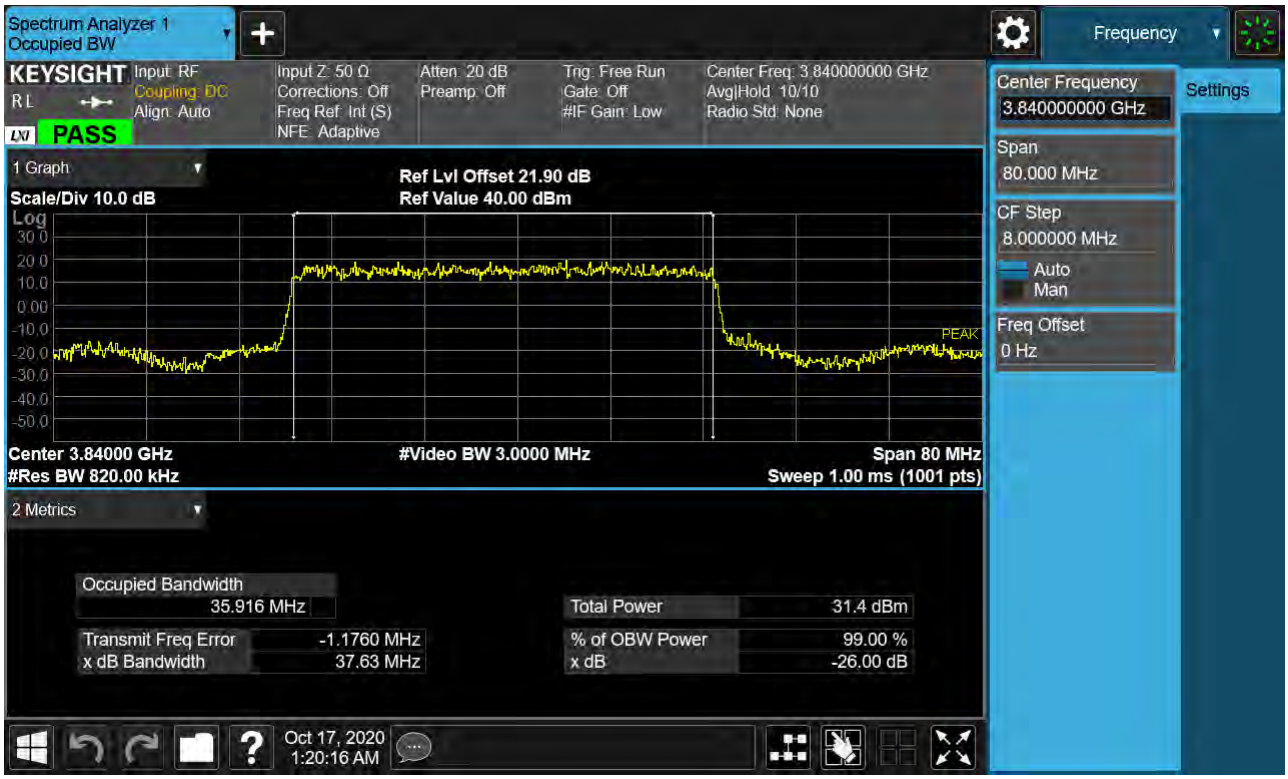
Sub6 n77. Occupied Bandwidth Plot (30M BW Ch.656000 64QAM)



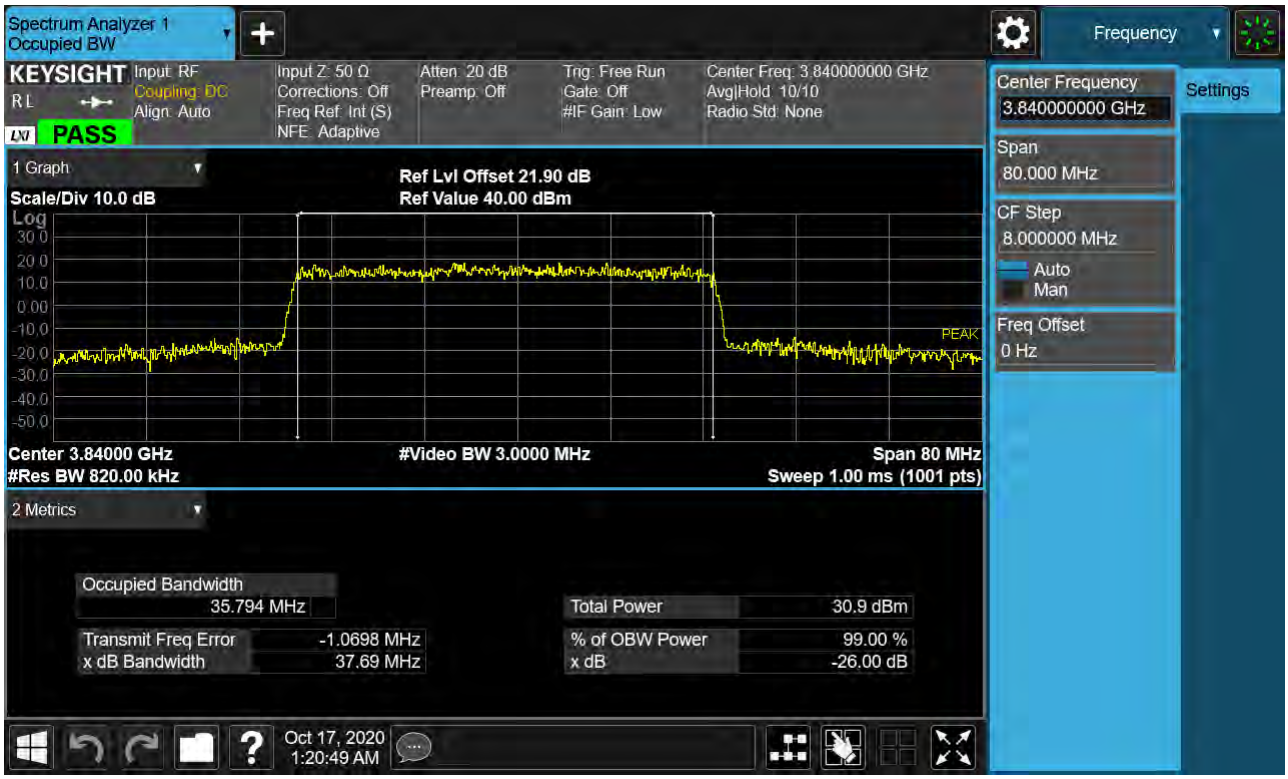
Sub6 n77. Occupied Bandwidth Plot (30M BW Ch.656000 256QAM)



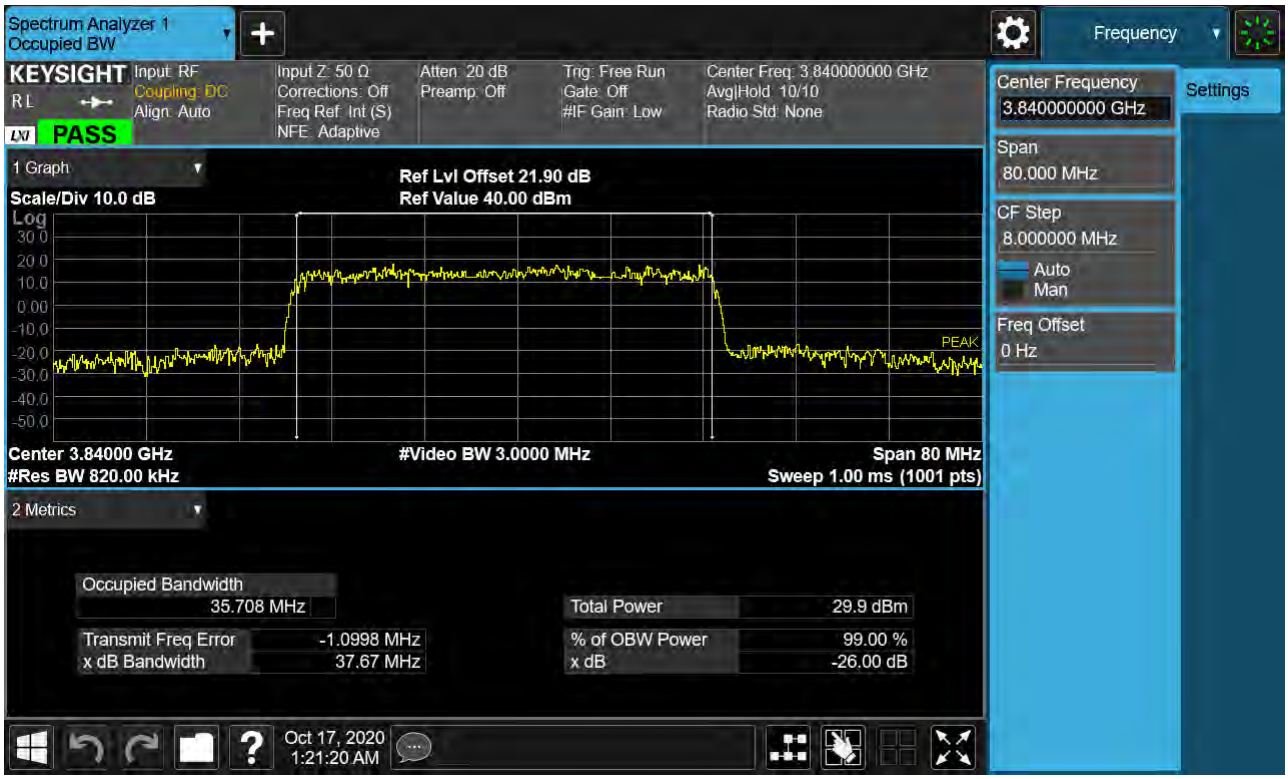
Sub6 n77. Occupied Bandwidth Plot (40M BW Ch.656000 BPSK)



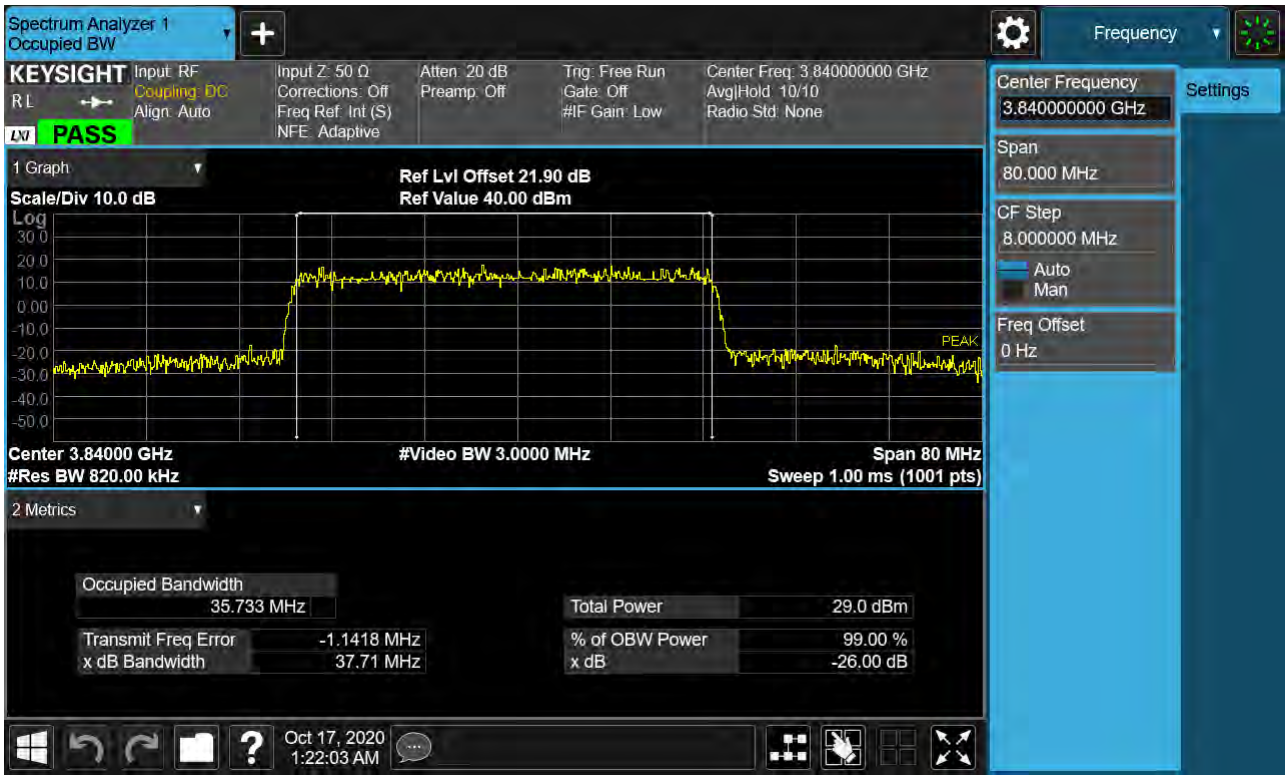
Sub6 n77. Occupied Bandwidth Plot (40M BW Ch.656000 QPSK)



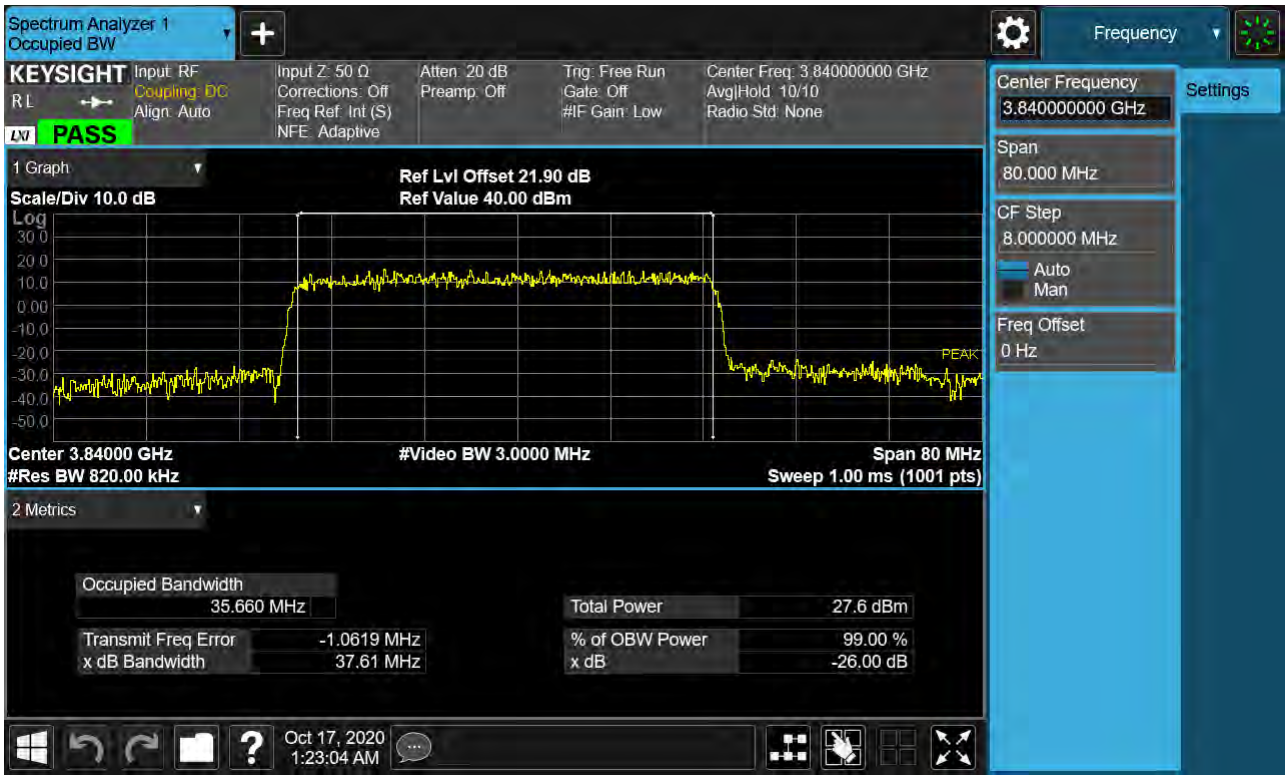
Sub6 n77. Occupied Bandwidth Plot (40M BW Ch.656000 16QAM)



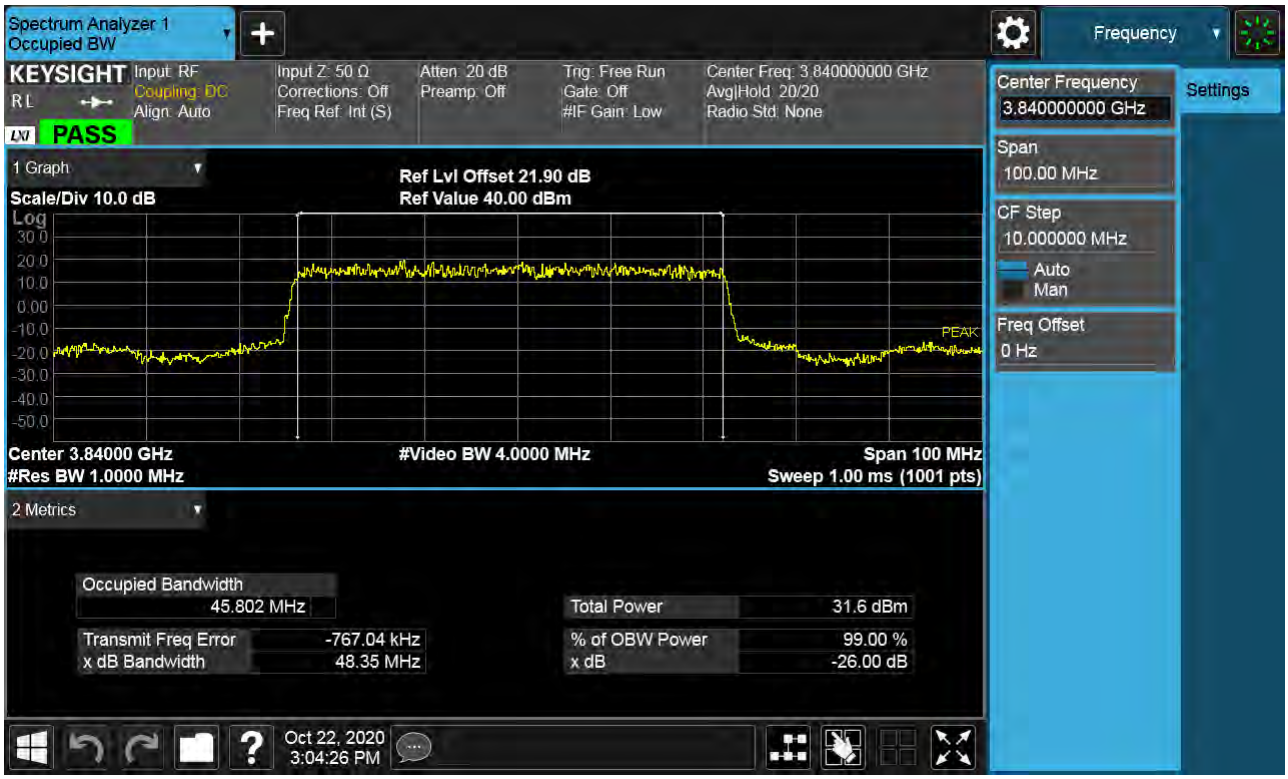
Sub6 n77. Occupied Bandwidth Plot (40M BW Ch.656000 64QAM)



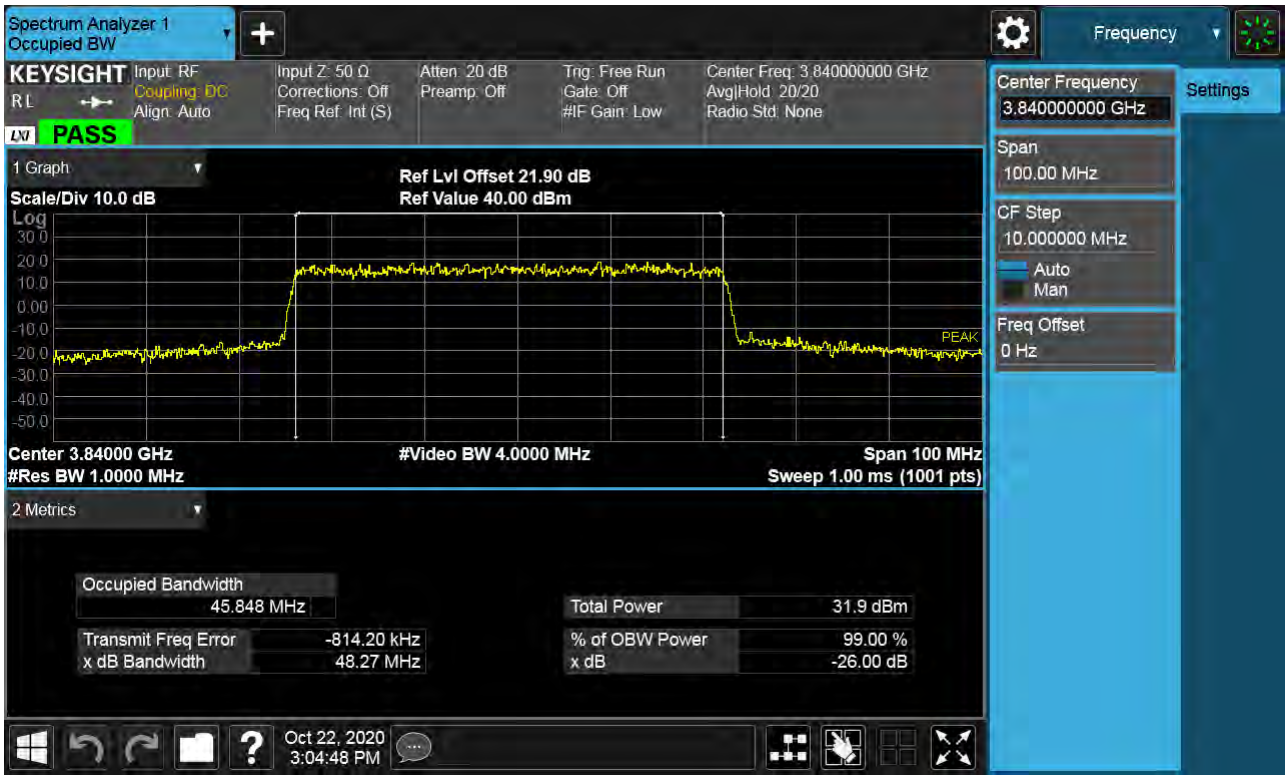
Sub6 n77. Occupied Bandwidth Plot (40M BW Ch.656000 256QAM)



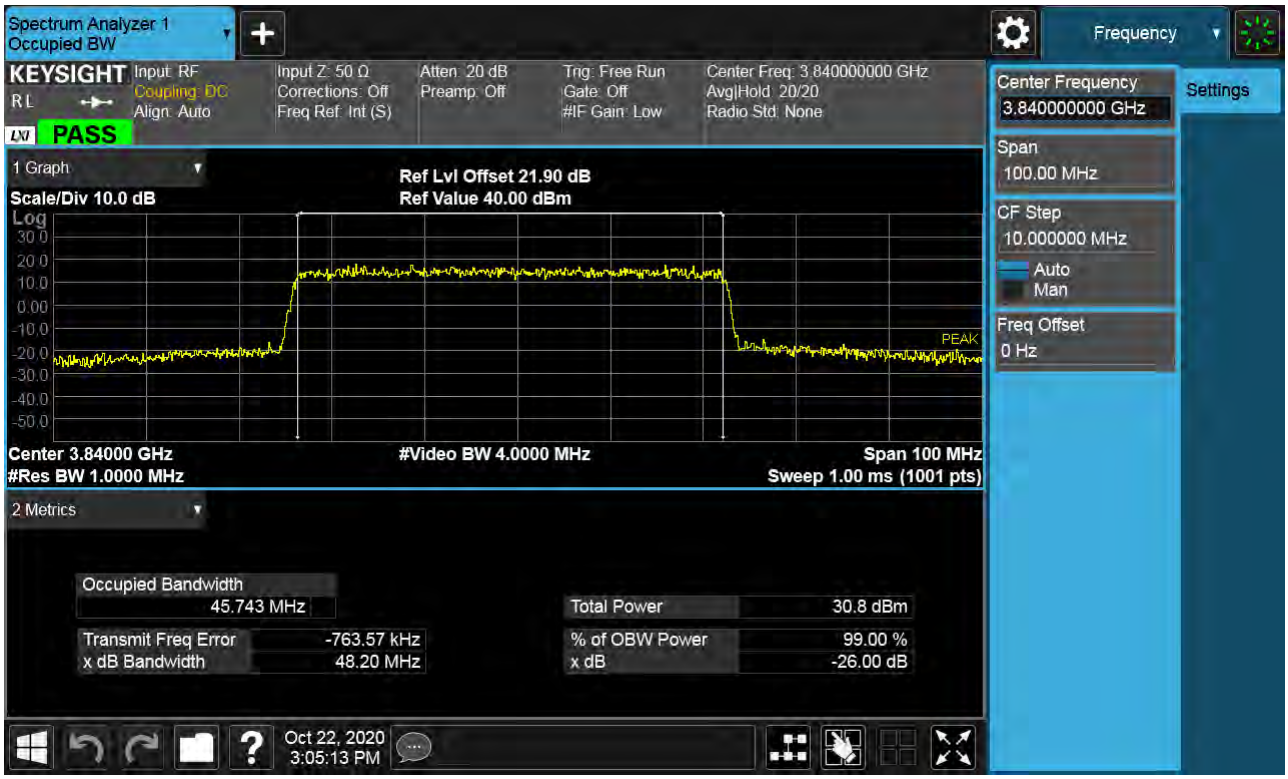
Sub6 n77. Occupied Bandwidth Plot (50M BW Ch.656000 BPSK)



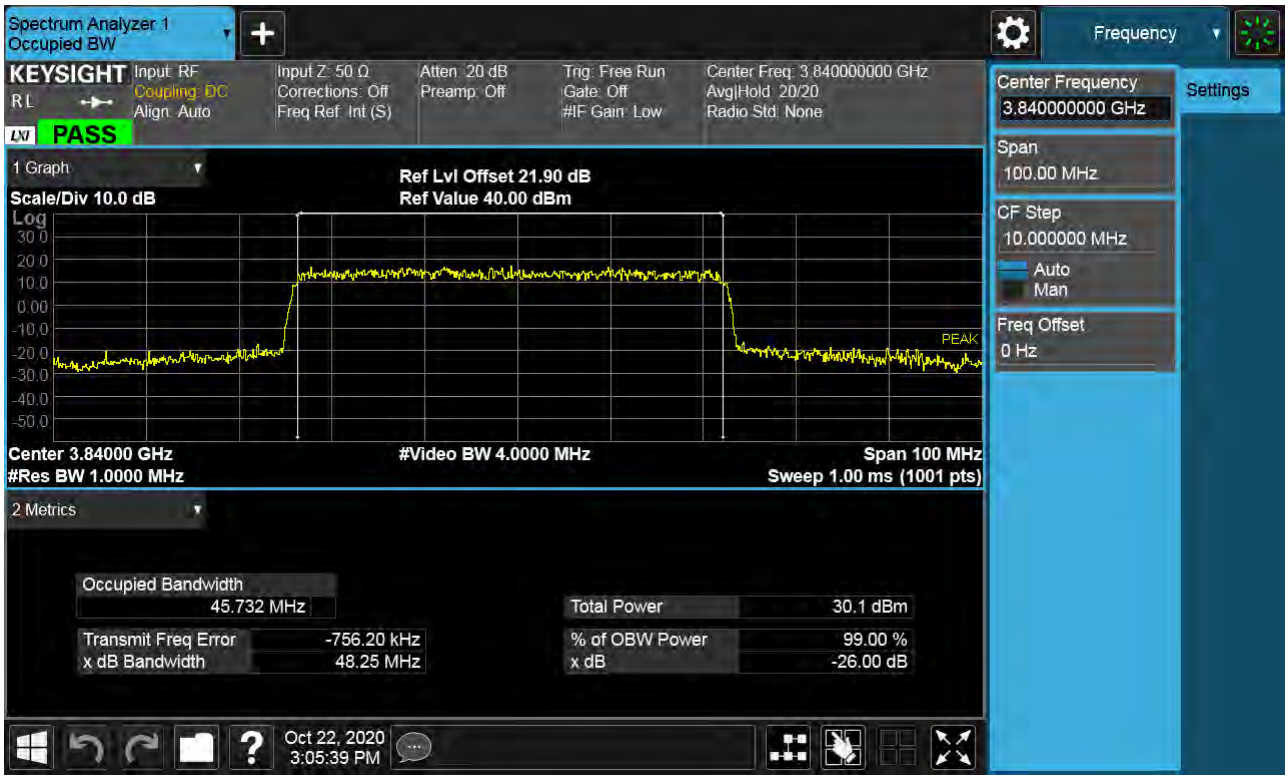
Sub6 n77. Occupied Bandwidth Plot (50M BW Ch.656000 QPSK)



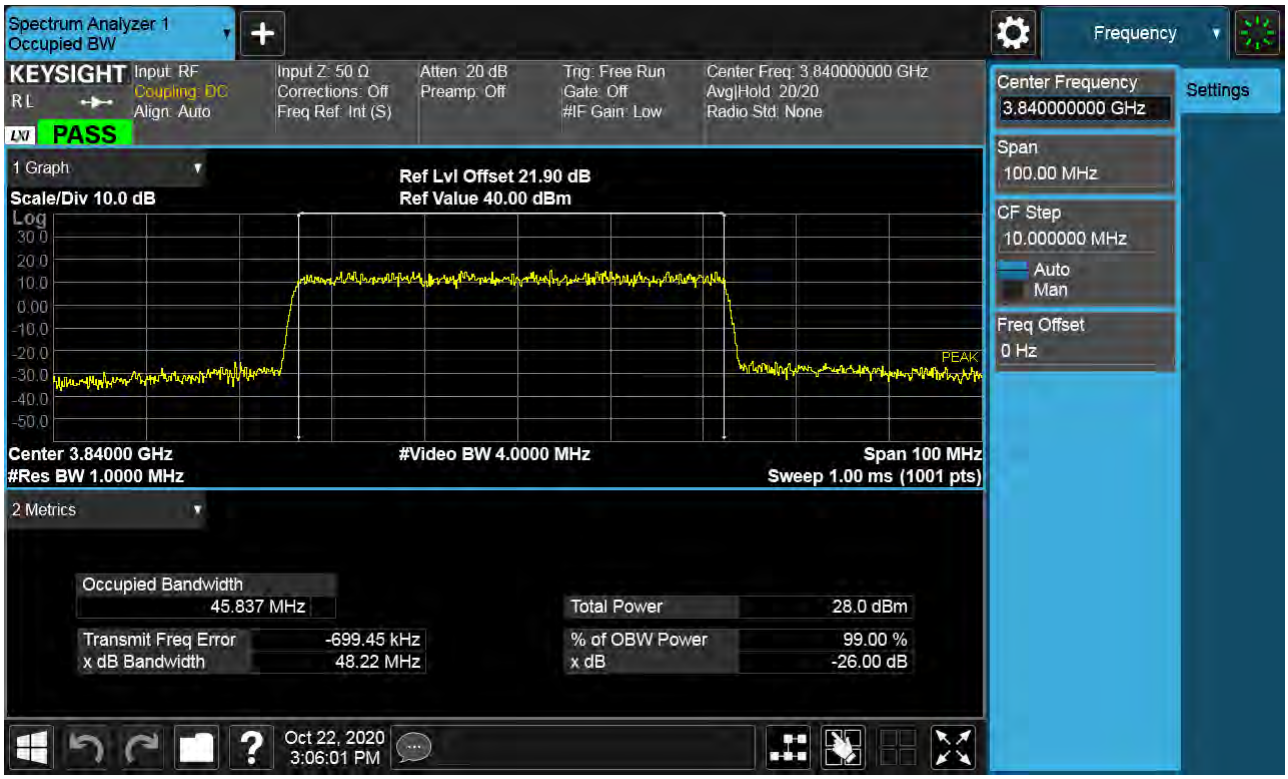
Sub6 n77. Occupied Bandwidth Plot (50M BW Ch.656000 16QAM)



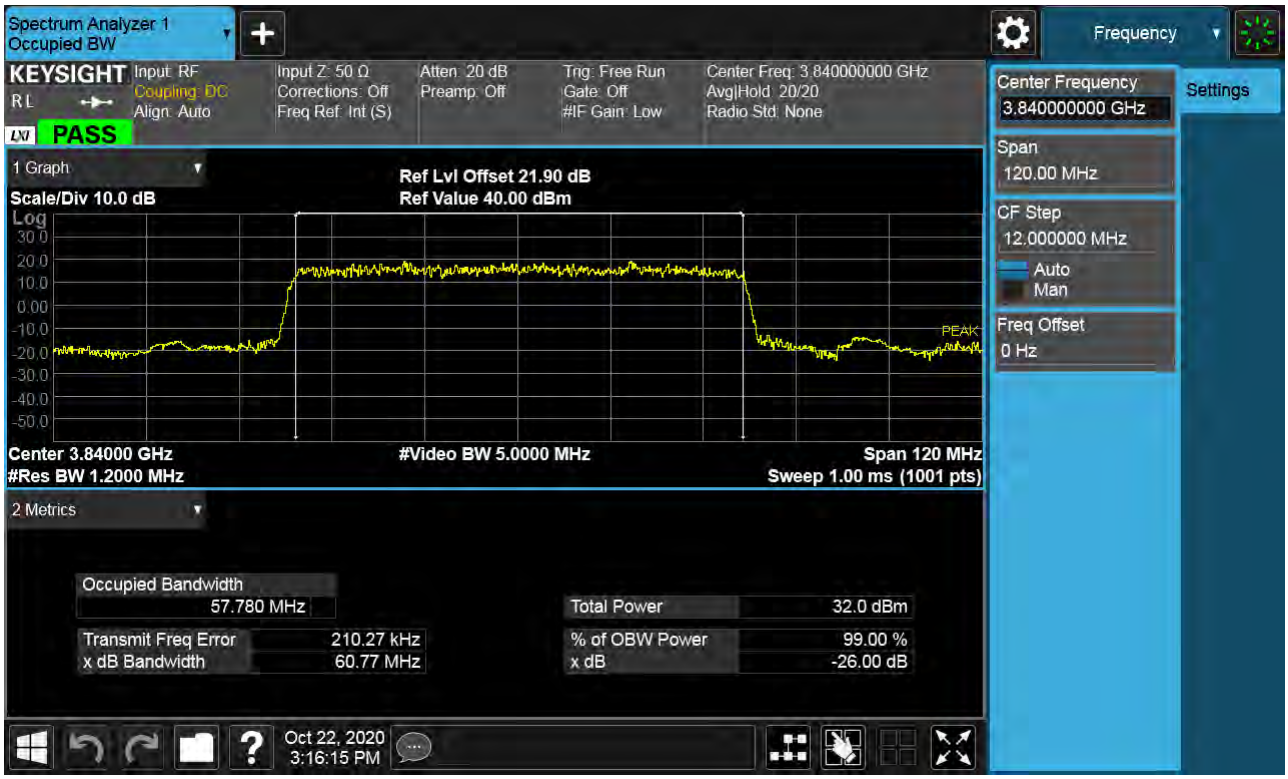
Sub6 n77. Occupied Bandwidth Plot (50M BW Ch.656000 64QAM)



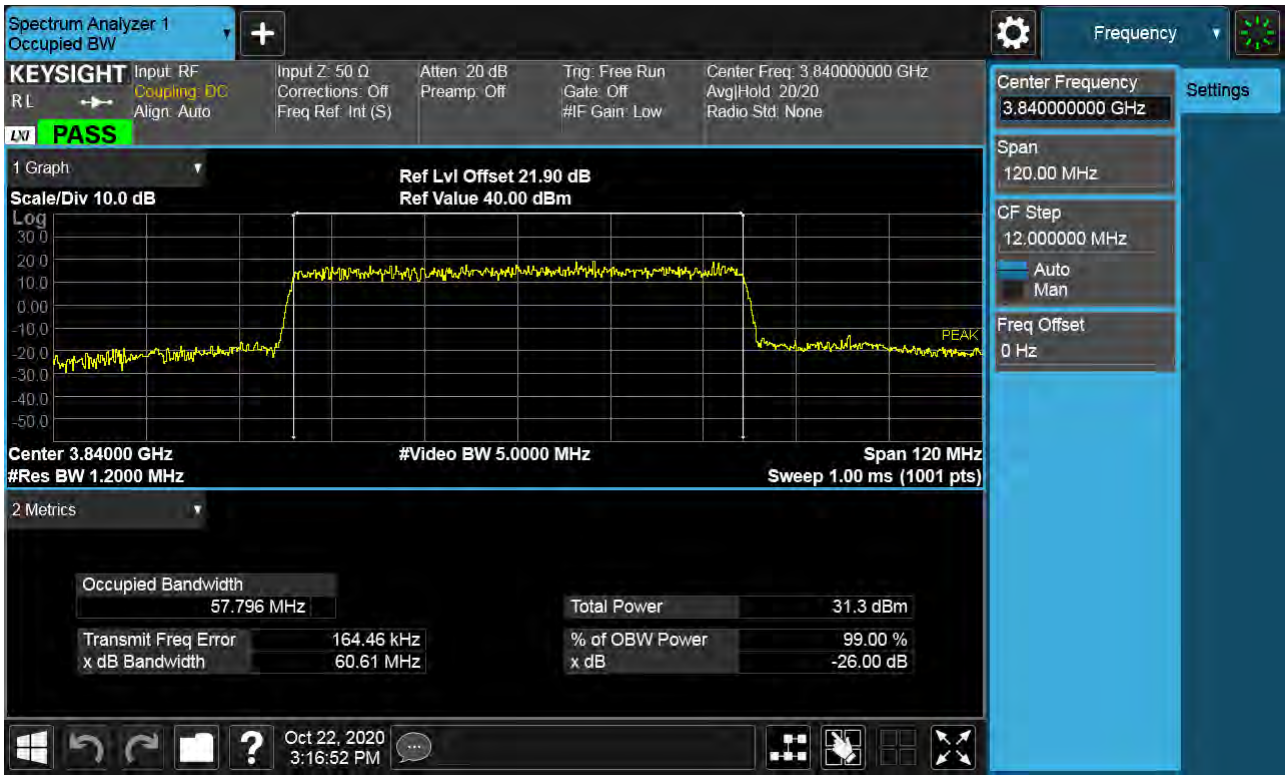
Sub6 n77. Occupied Bandwidth Plot (50M BW Ch.656000 256QAM)



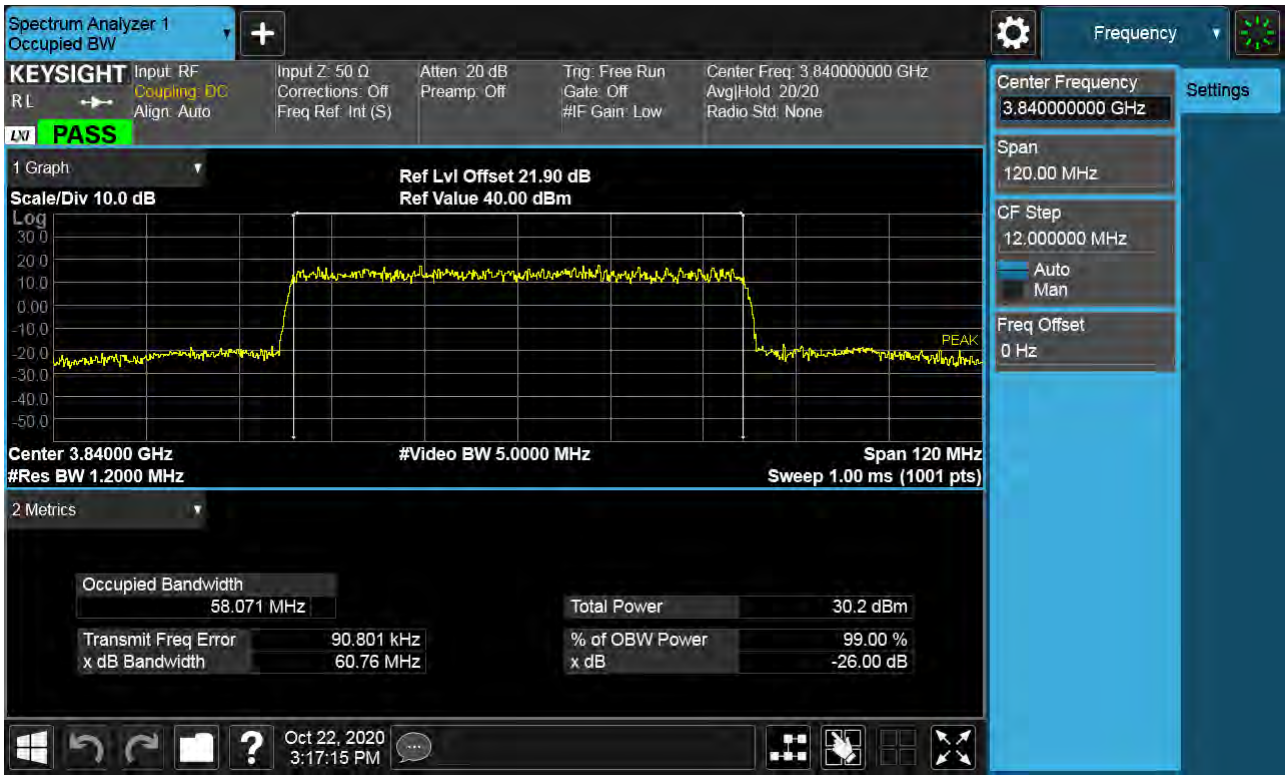
Sub6 n77. Occupied Bandwidth Plot (60M BW Ch.656000 BPSK)



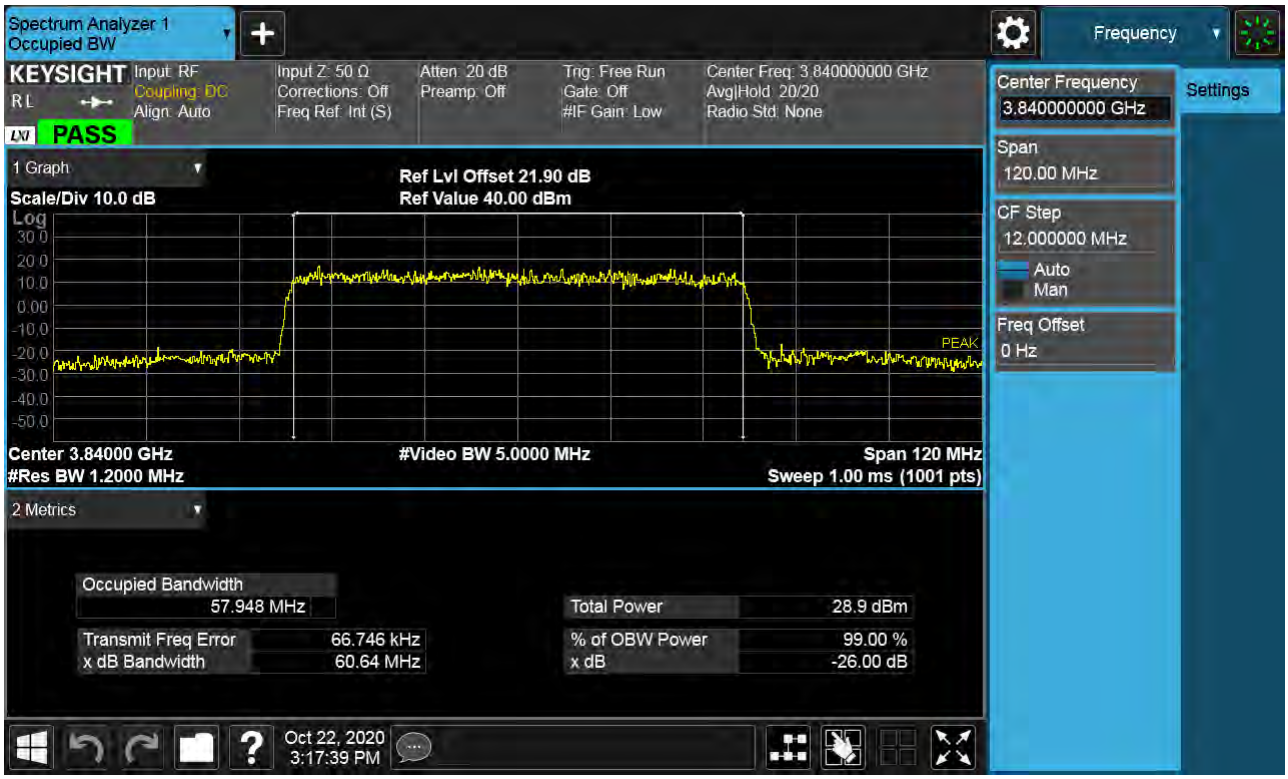
Sub6 n77. Occupied Bandwidth Plot (60M BW Ch.656000 QPSK)



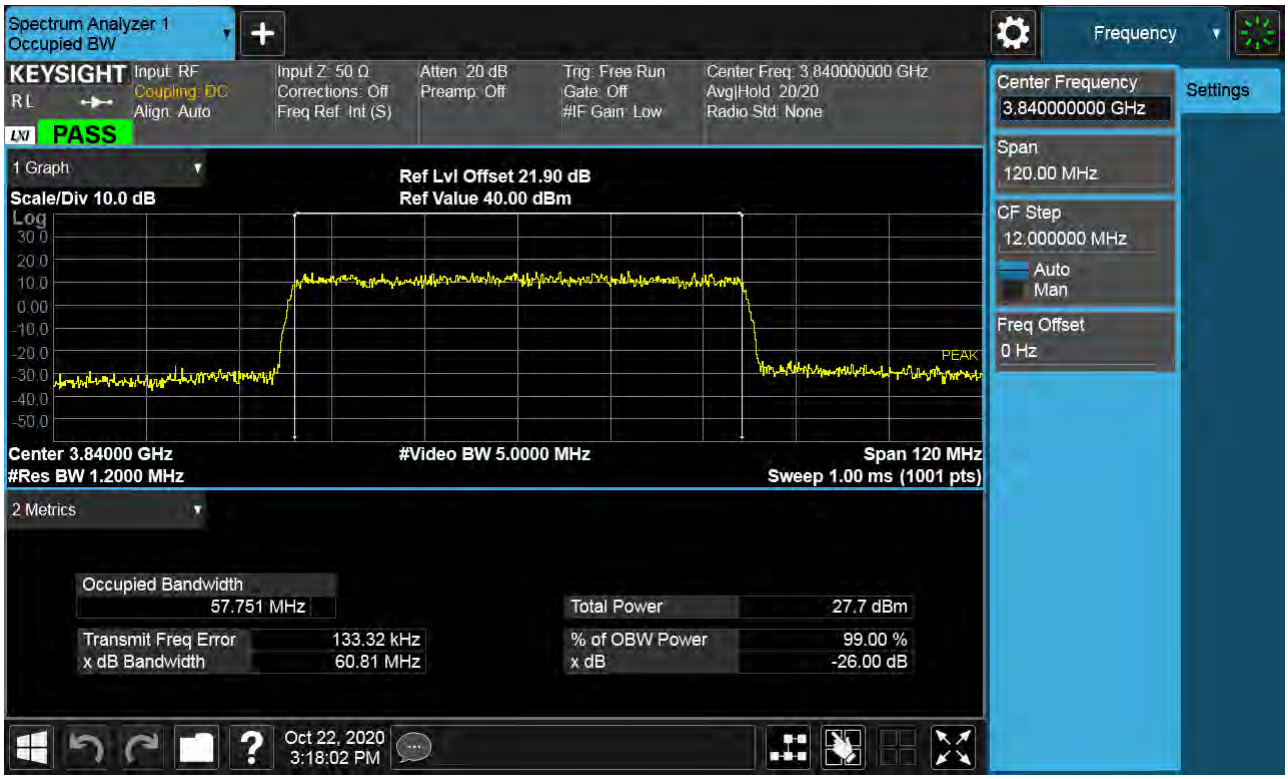
Sub6 n77. Occupied Bandwidth Plot (60M BW Ch.656000 16QAM)



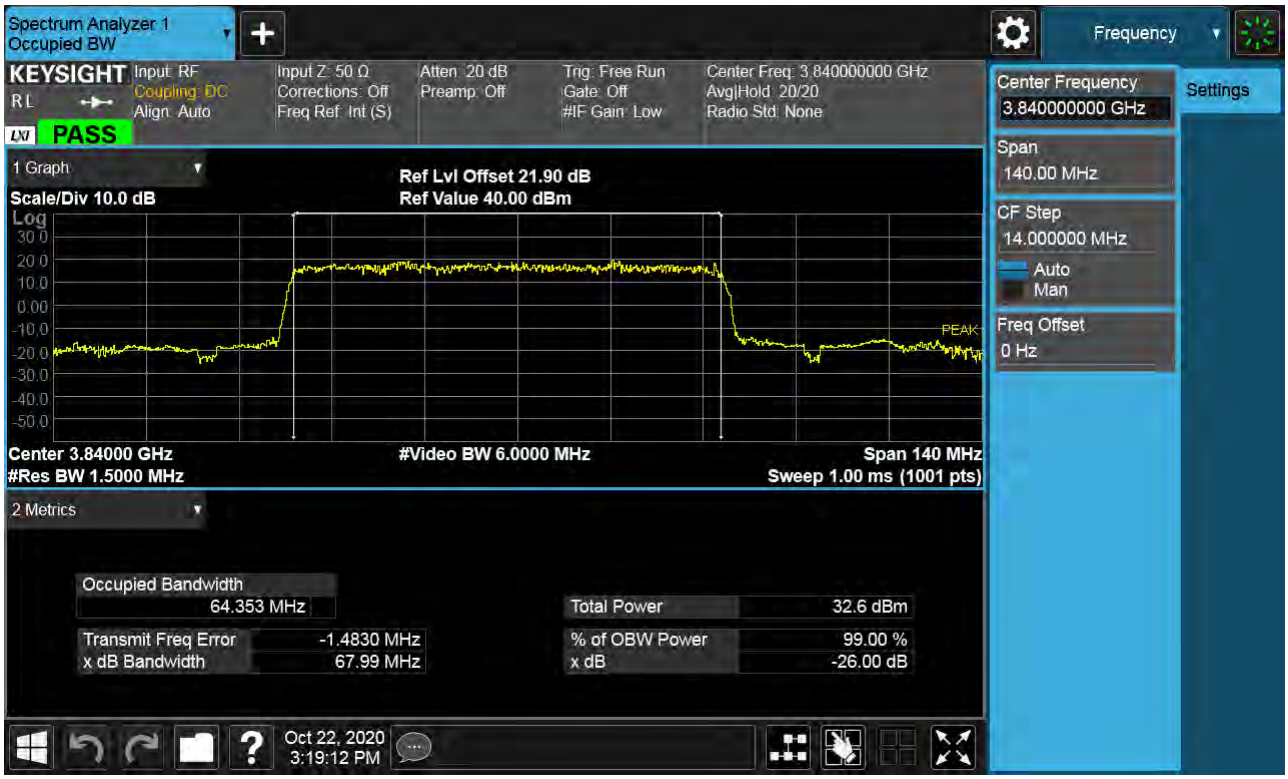
Sub6 n77. Occupied Bandwidth Plot (60M BW Ch.656000 64QAM)



Sub6 n77. Occupied Bandwidth Plot (60M BW Ch.656000 256QAM)

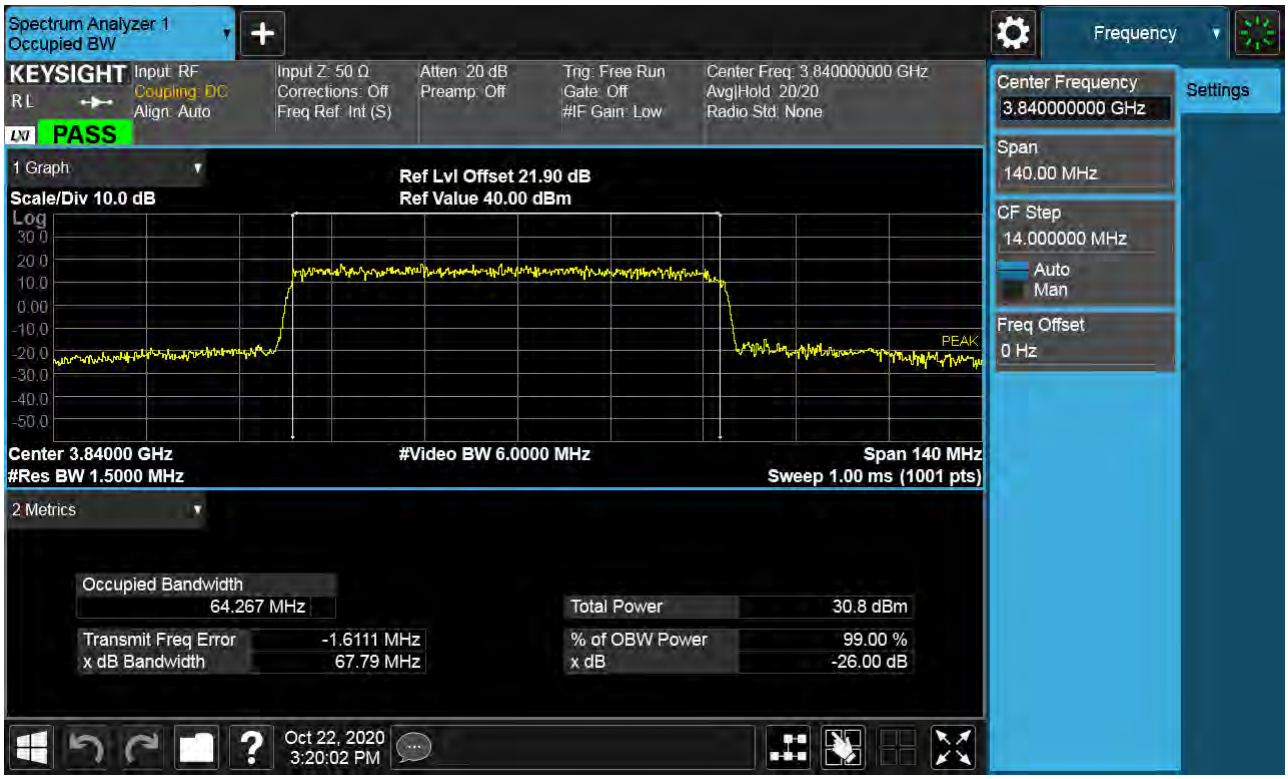


Sub6 n77. Occupied Bandwidth Plot (70M BW Ch.656000 BPSK)

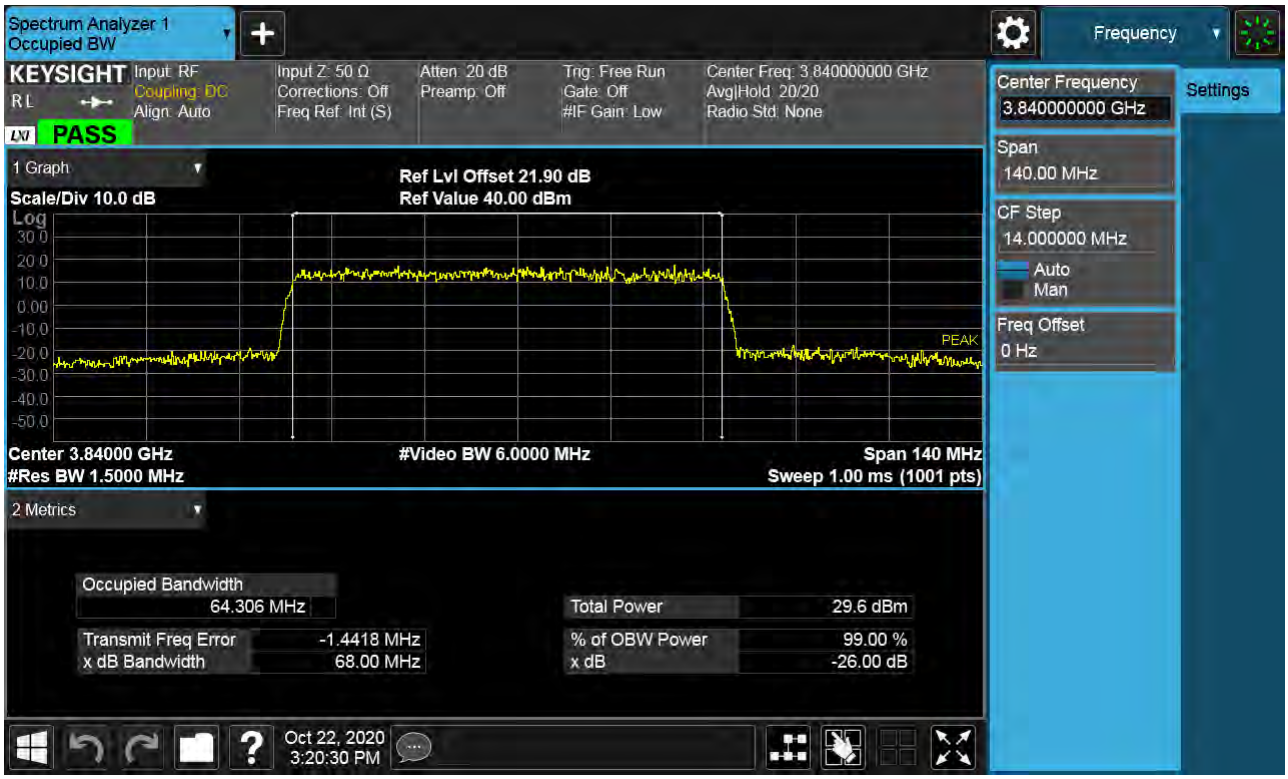


Sub6 n77. Occupied Bandwidth Plot (70M BW Ch.656000 QPSK)

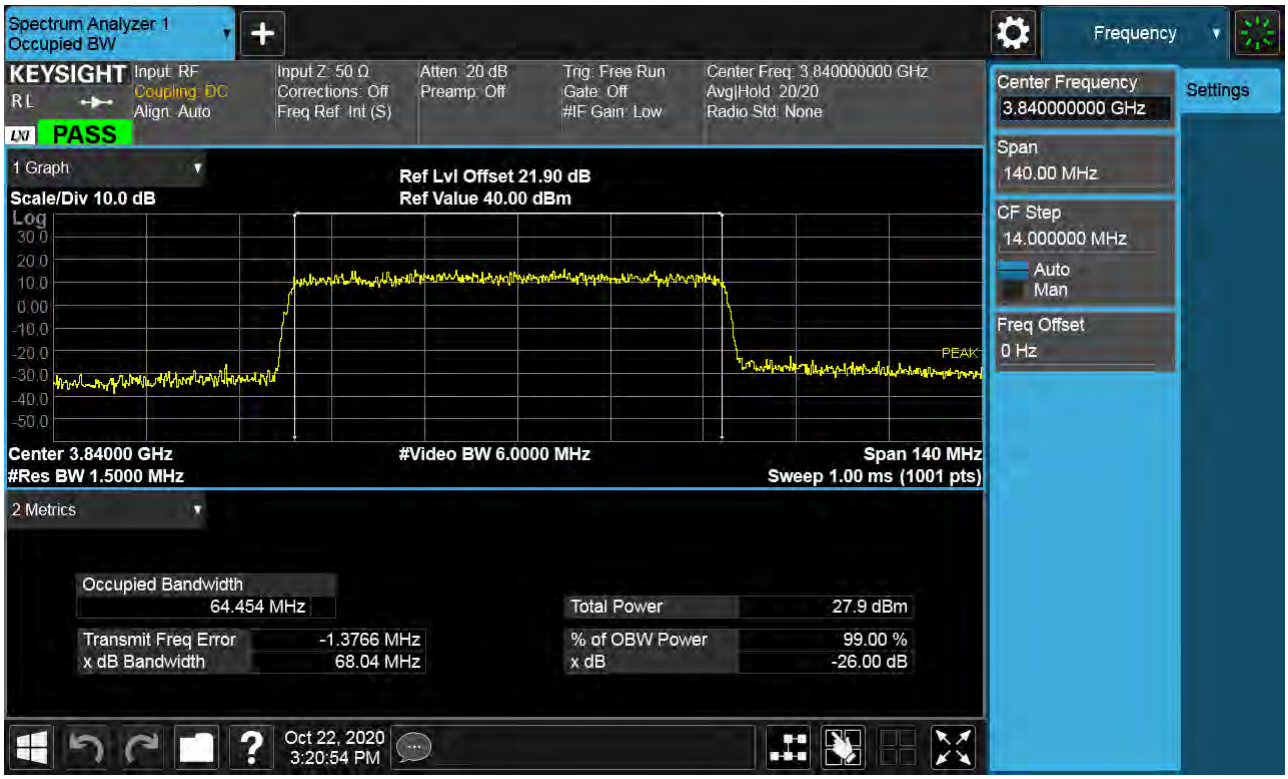
Sub6 n77. Occupied Bandwidth Plot (70M BW Ch.656000 16QAM)



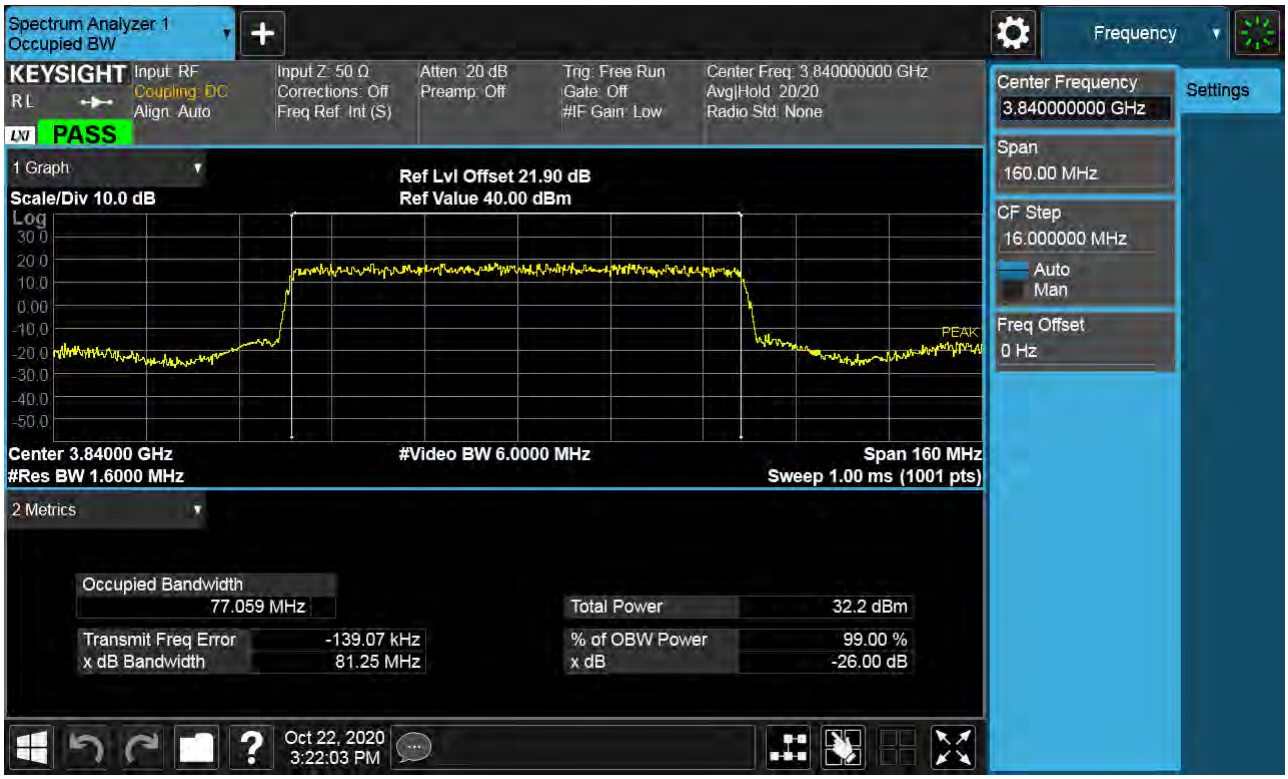
Sub6 n77. Occupied Bandwidth Plot (70M BW Ch.656000 64QAM)



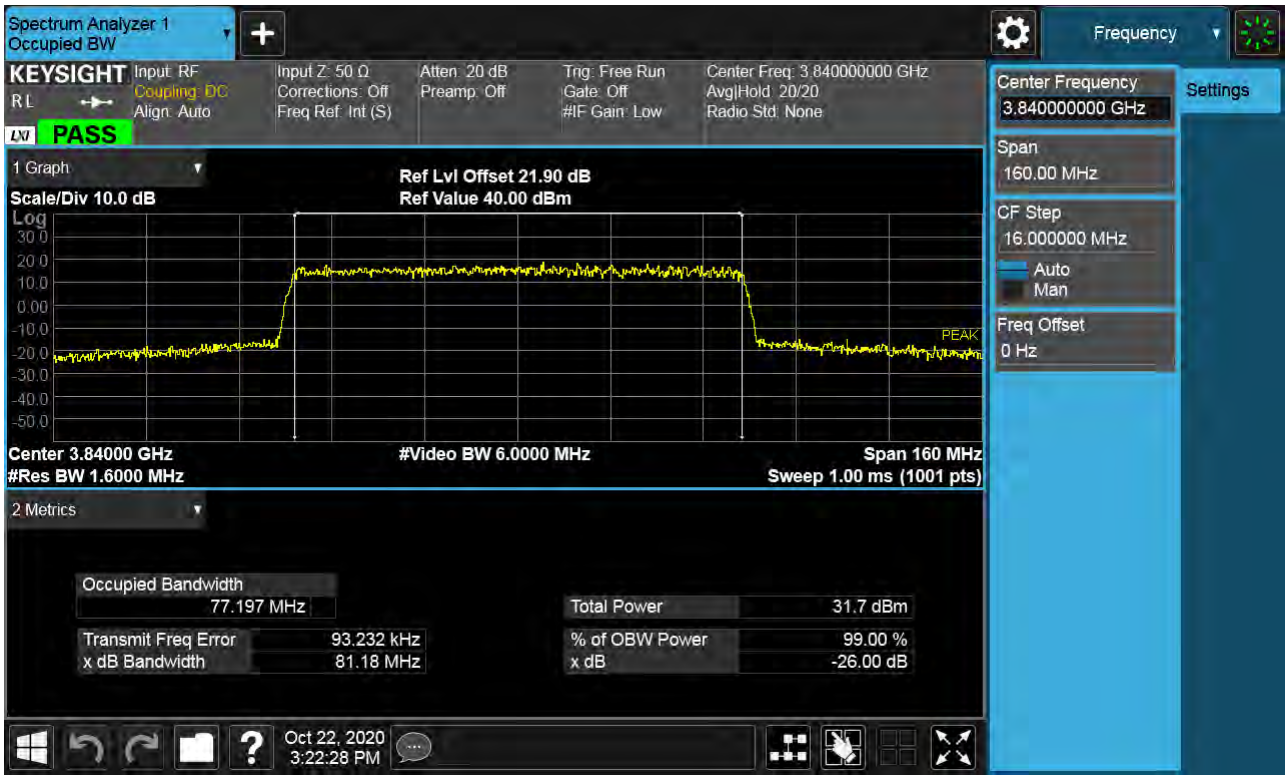
Sub6 n77. Occupied Bandwidth Plot (70M BW Ch.656000 256QAM)



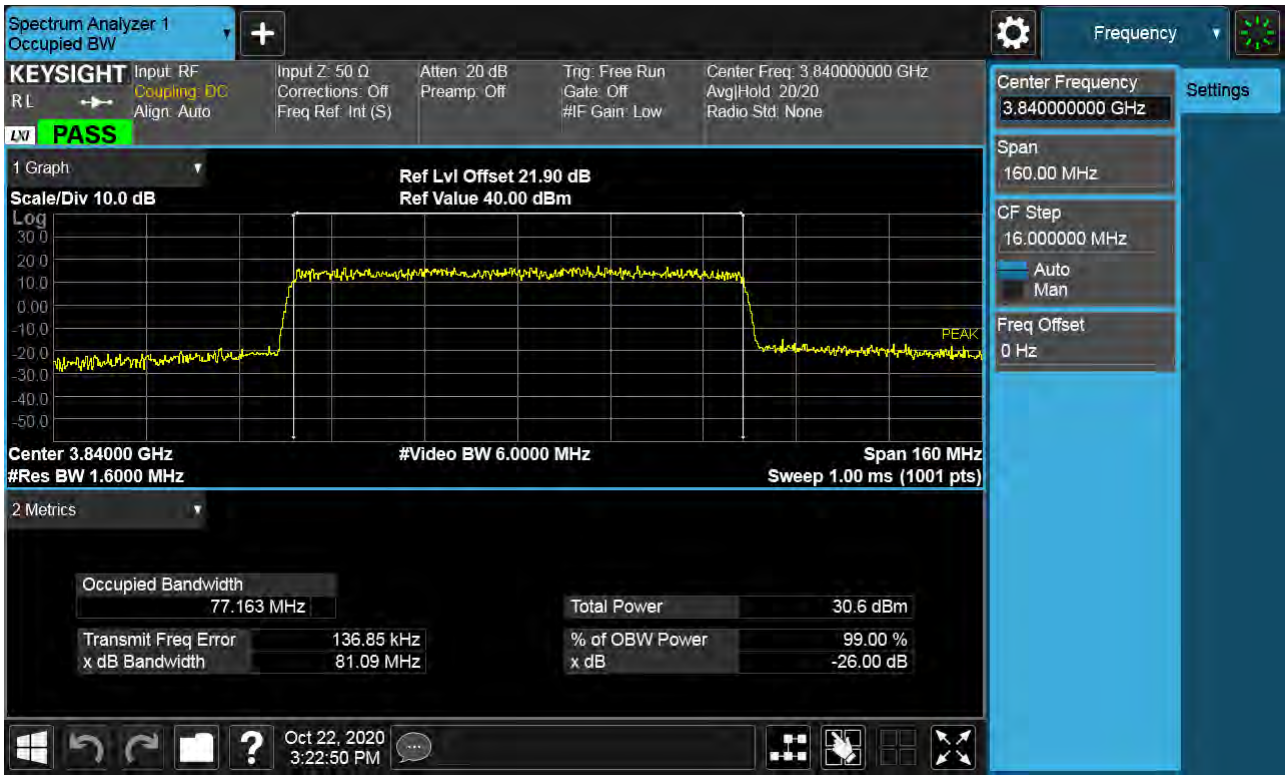
Sub6 n77. Occupied Bandwidth Plot (80M BW Ch.656000 BPSK)



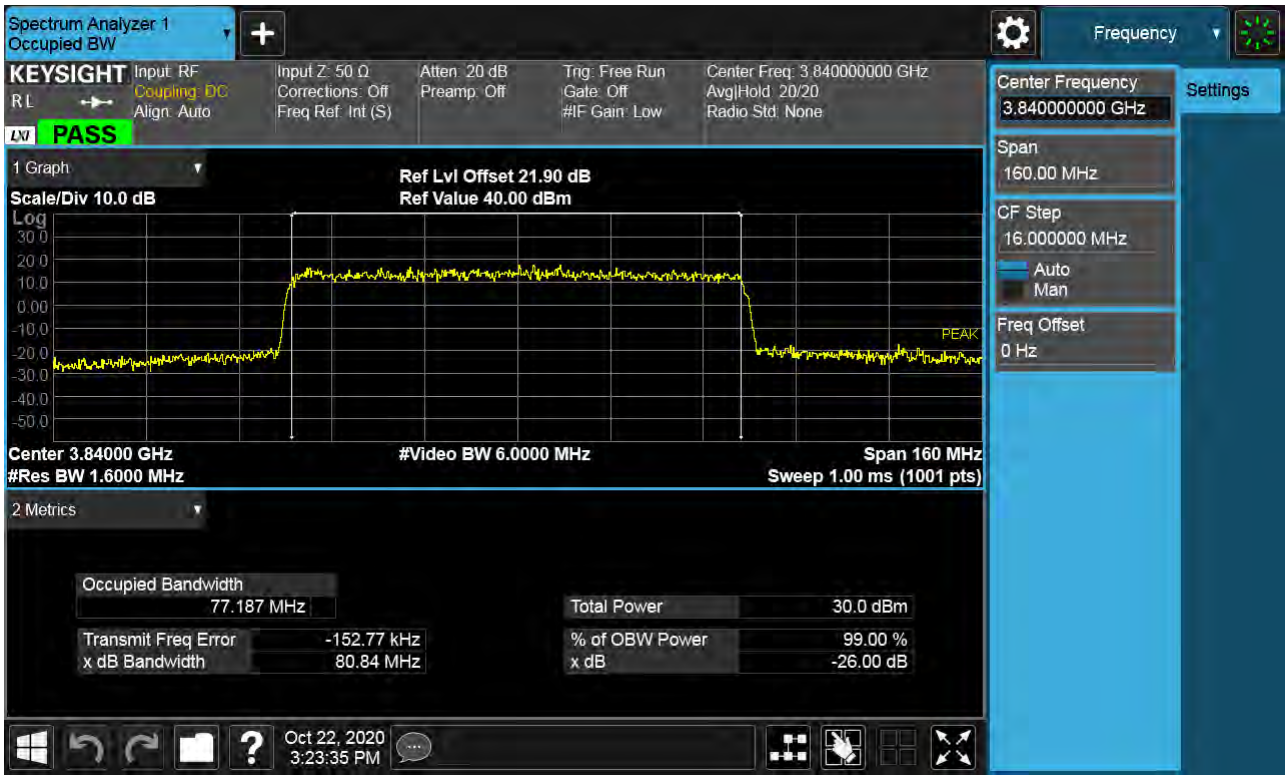
Sub6 n77. Occupied Bandwidth Plot (80M BW Ch.656000 QPSK)



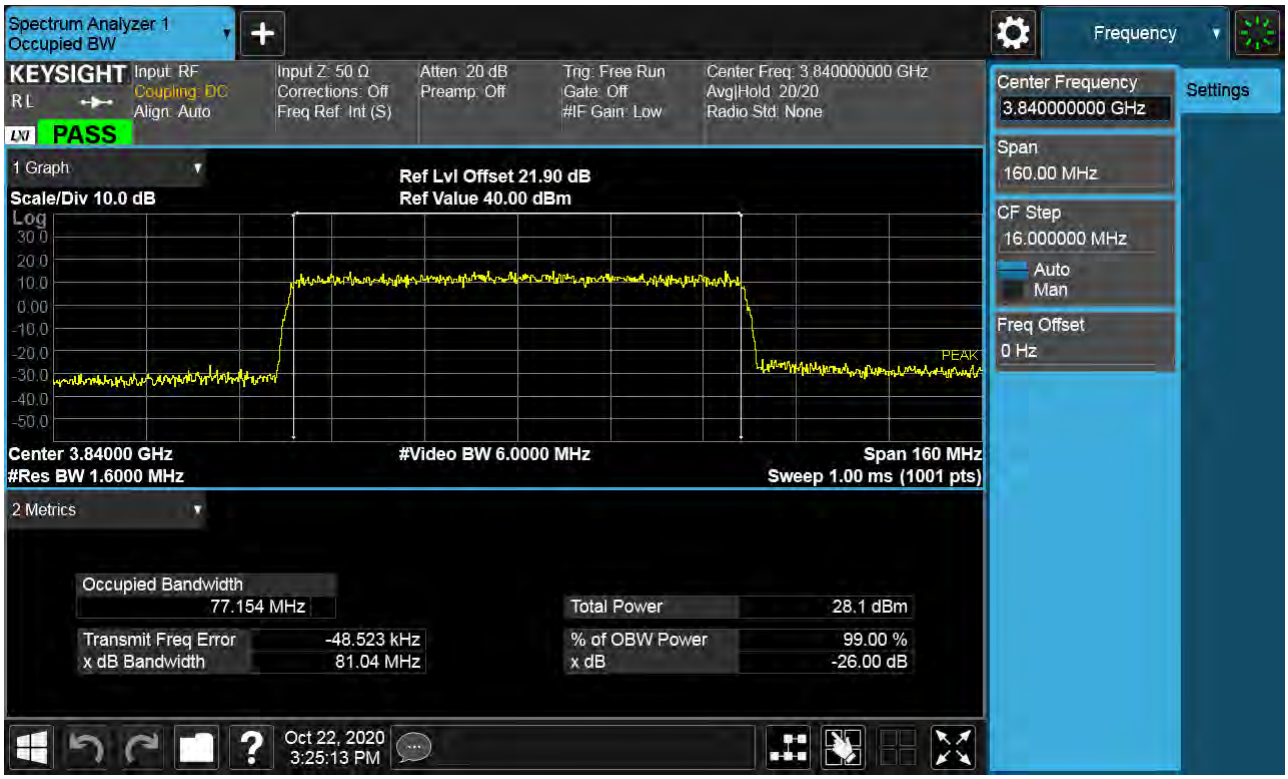
Sub6 n77. Occupied Bandwidth Plot (80M BW Ch.656000 16QAM)



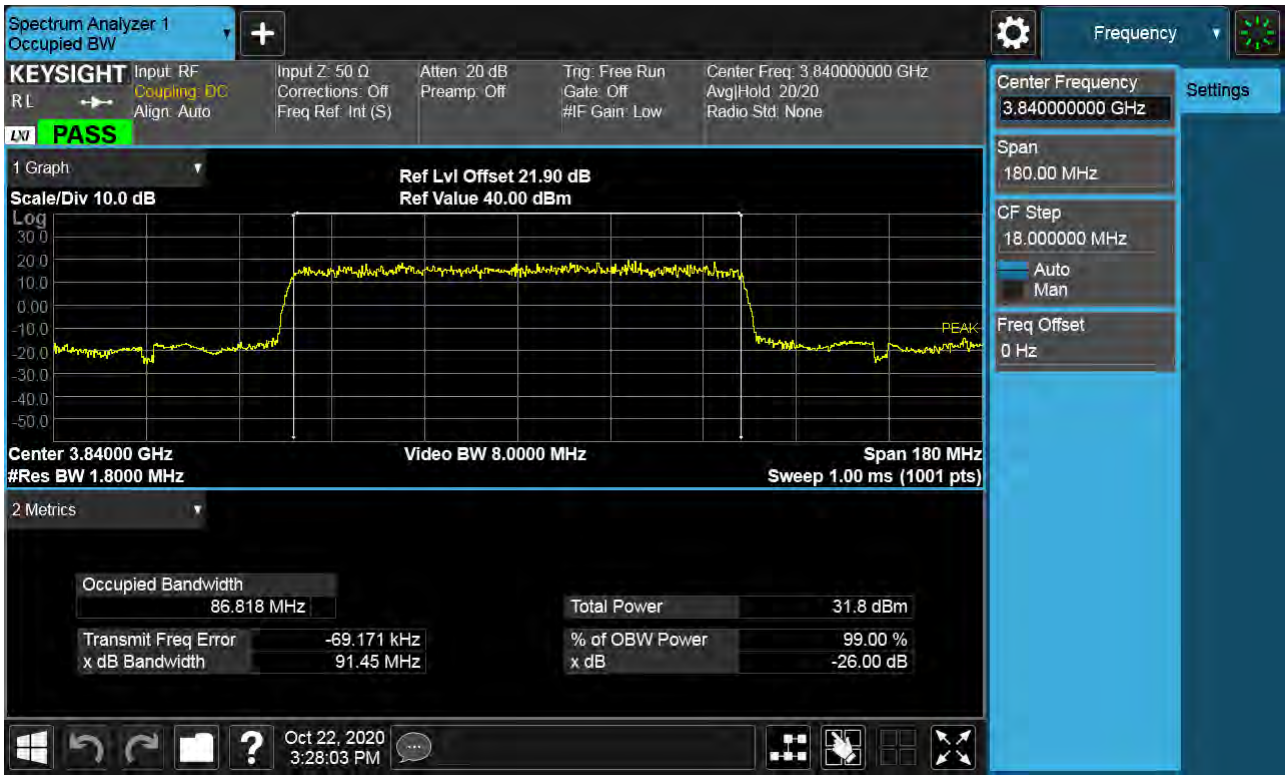
Sub6 n77. Occupied Bandwidth Plot (80M BW Ch.656000 64QAM)



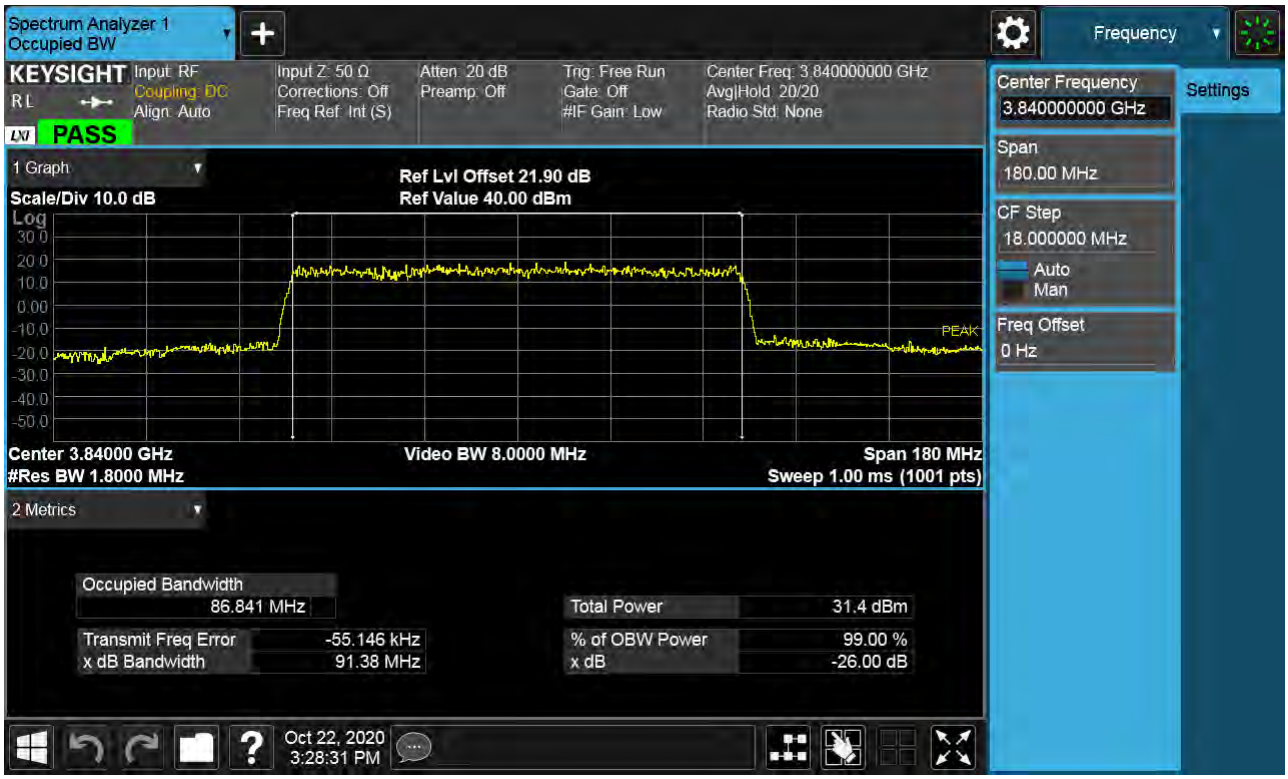
Sub6 n77. Occupied Bandwidth Plot (80M BW Ch.656000 256QAM)



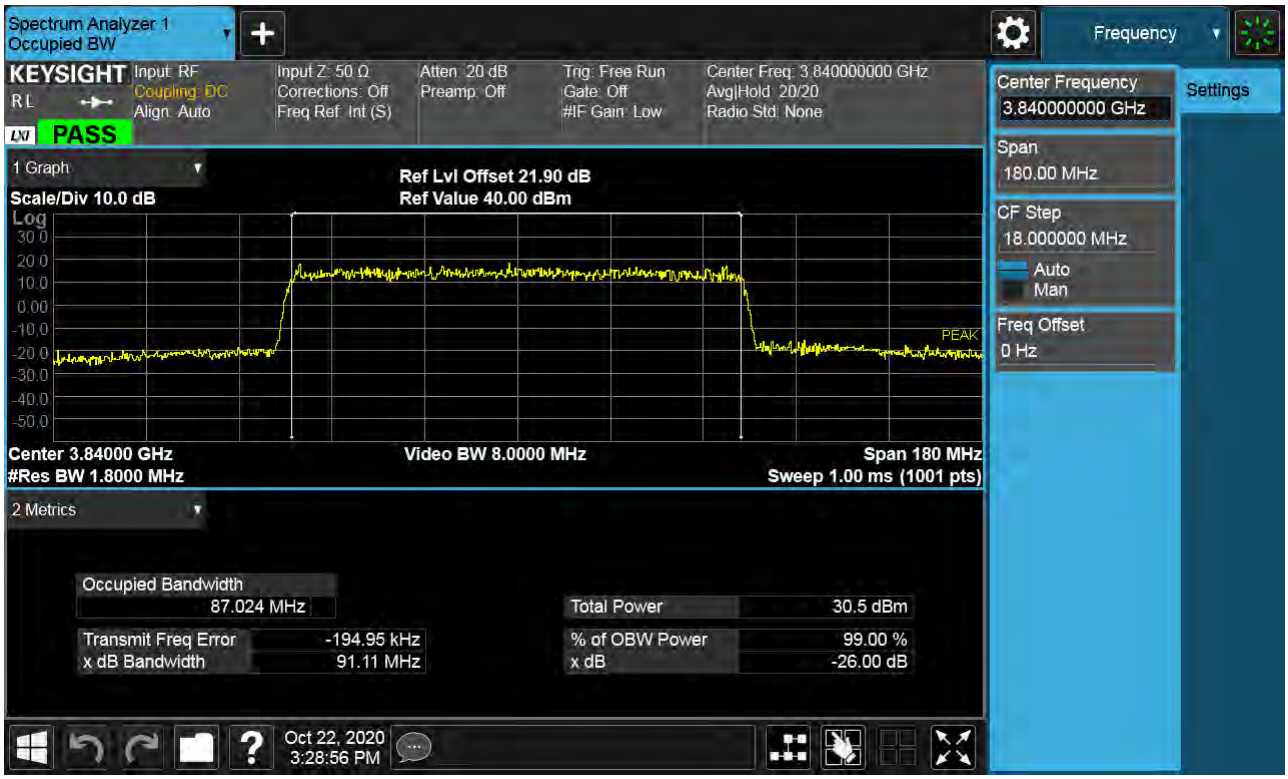
Sub6 n77. Occupied Bandwidth Plot (90M BW Ch.656000 BPSK)



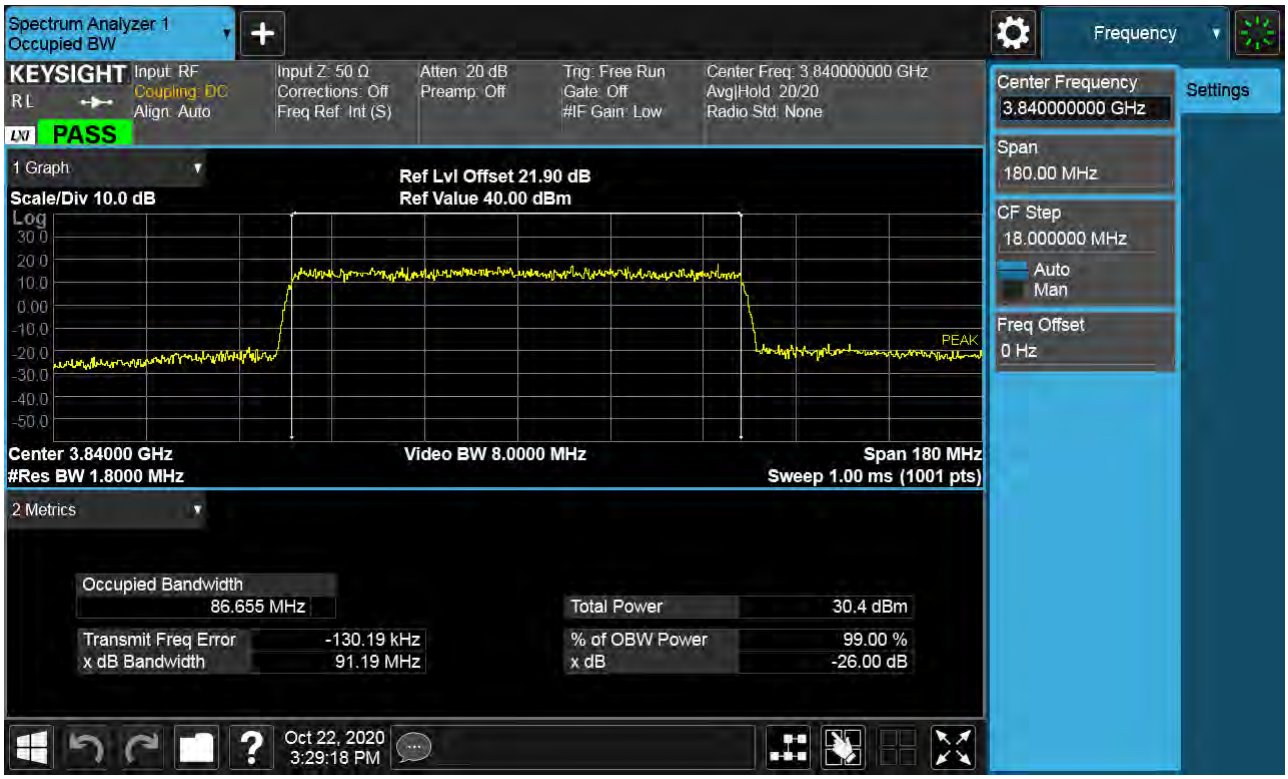
Sub6 n77. Occupied Bandwidth Plot (90M BW Ch.656000 QPSK)



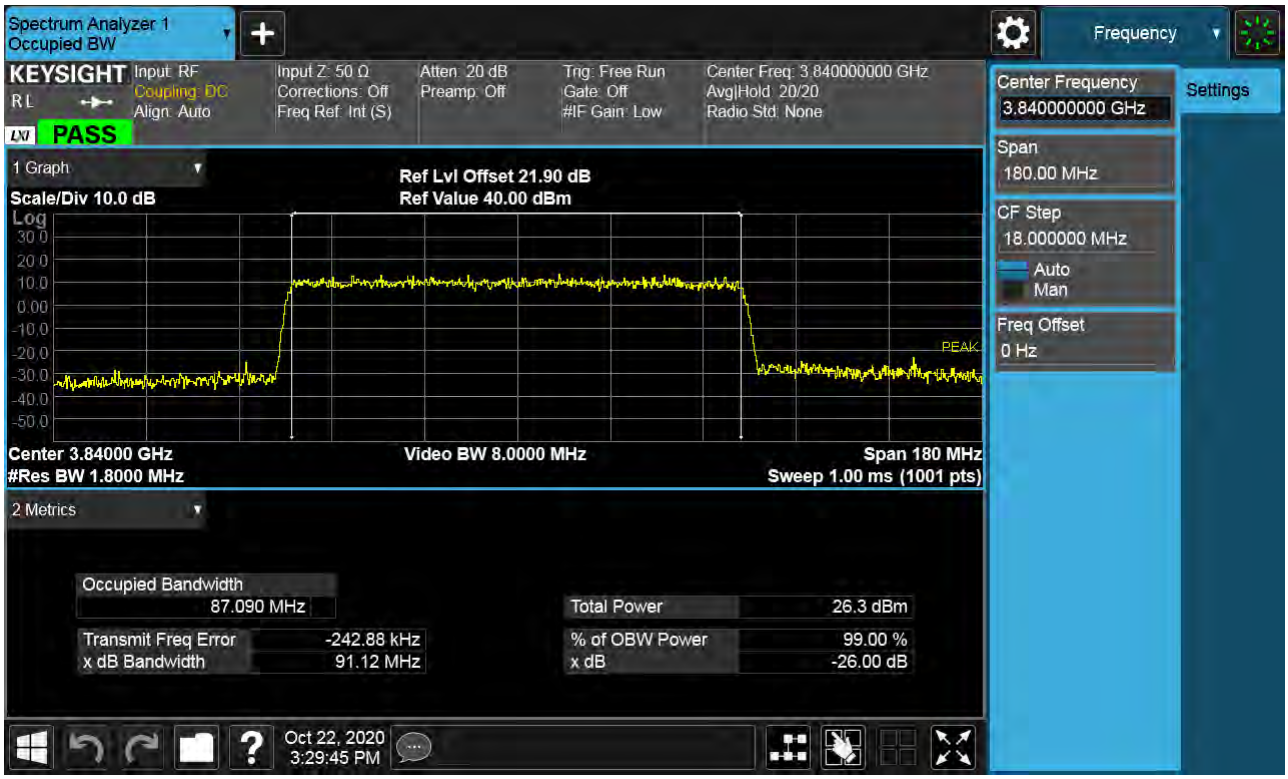
Sub6 n77. Occupied Bandwidth Plot (90M BW Ch.656000 16QAM)



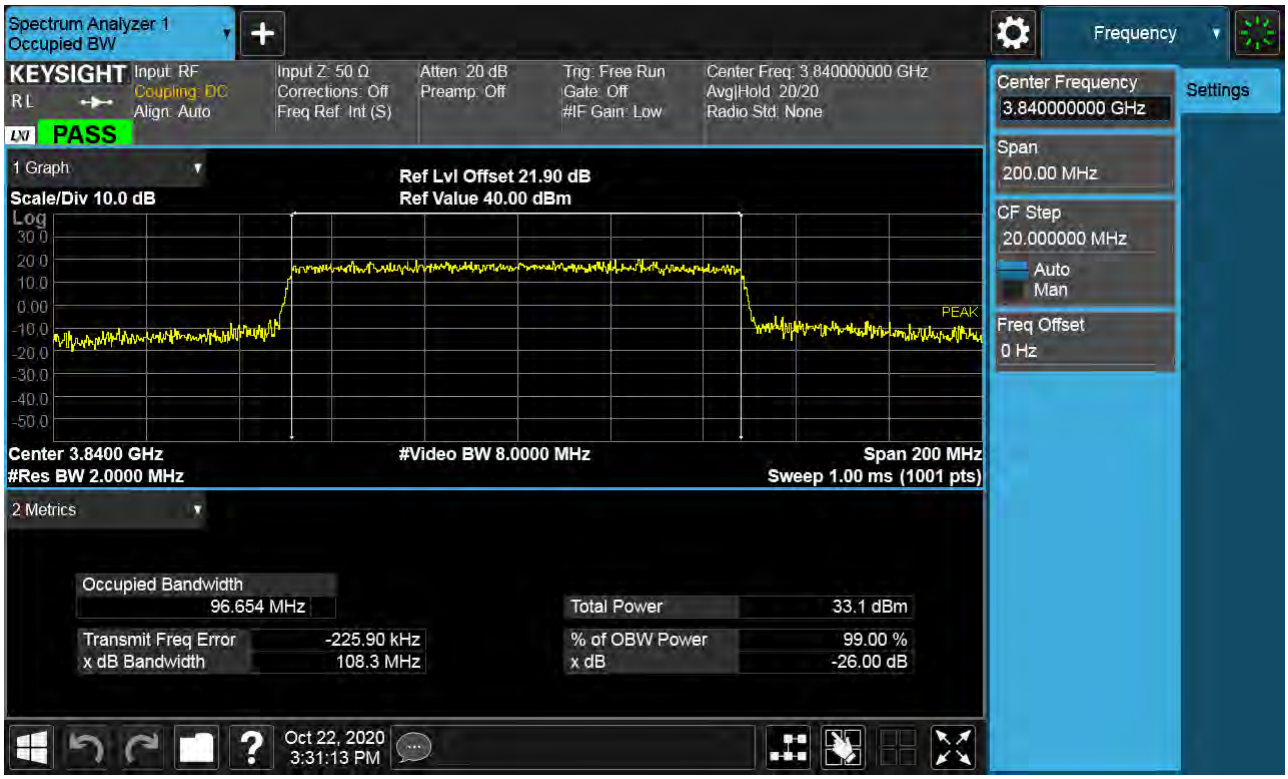
Sub6 n77. Occupied Bandwidth Plot (90M BW Ch.656000 64QAM)



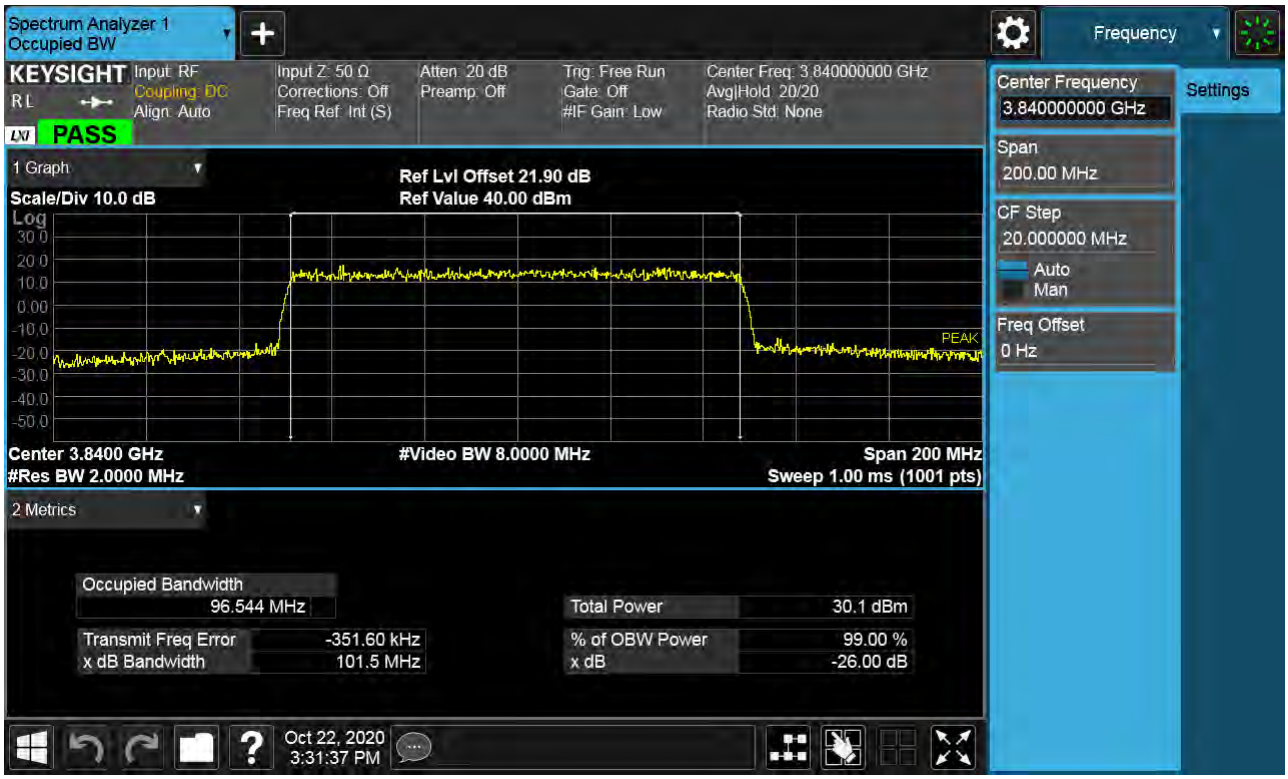
Sub6 n77. Occupied Bandwidth Plot (90M BW Ch.656000 256QAM)



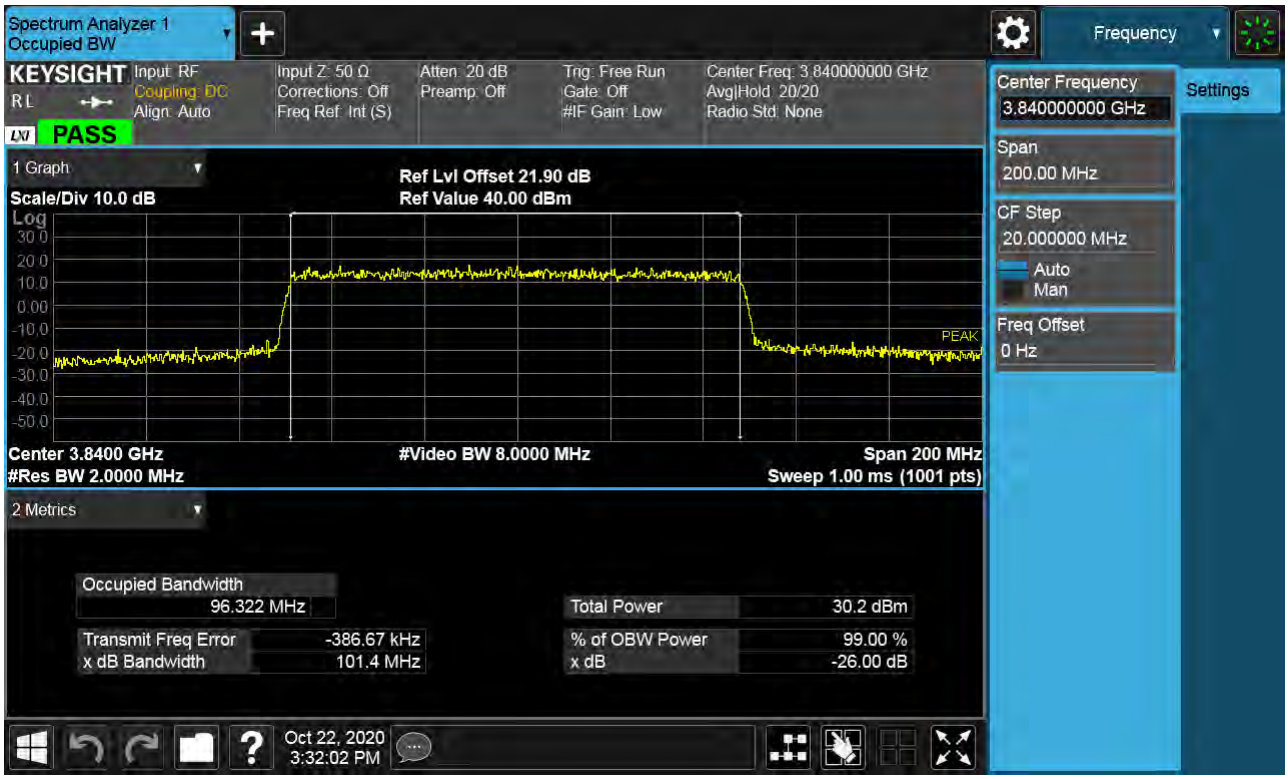
Sub6 n77. Occupied Bandwidth Plot (100M BW Ch.656000 BPSK)



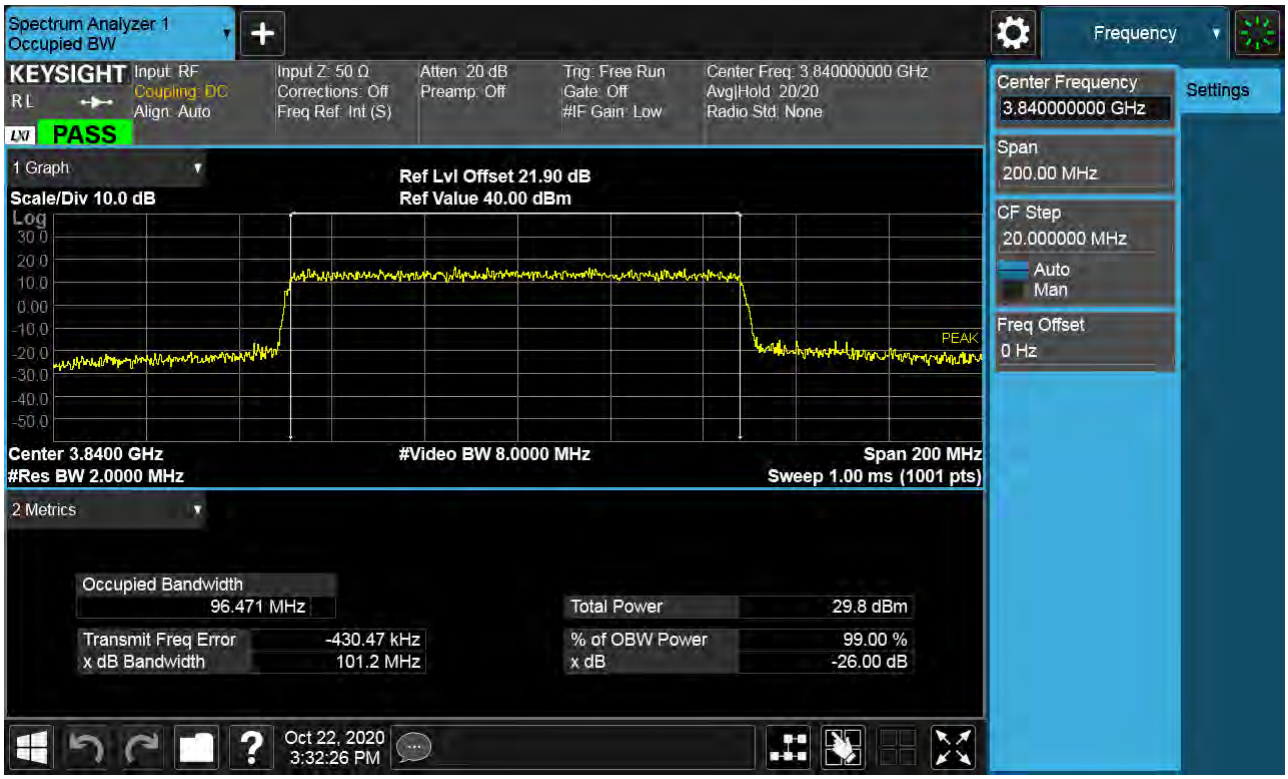
Sub6 n77. Occupied Bandwidth Plot (100M BW Ch.656000 QPSK)



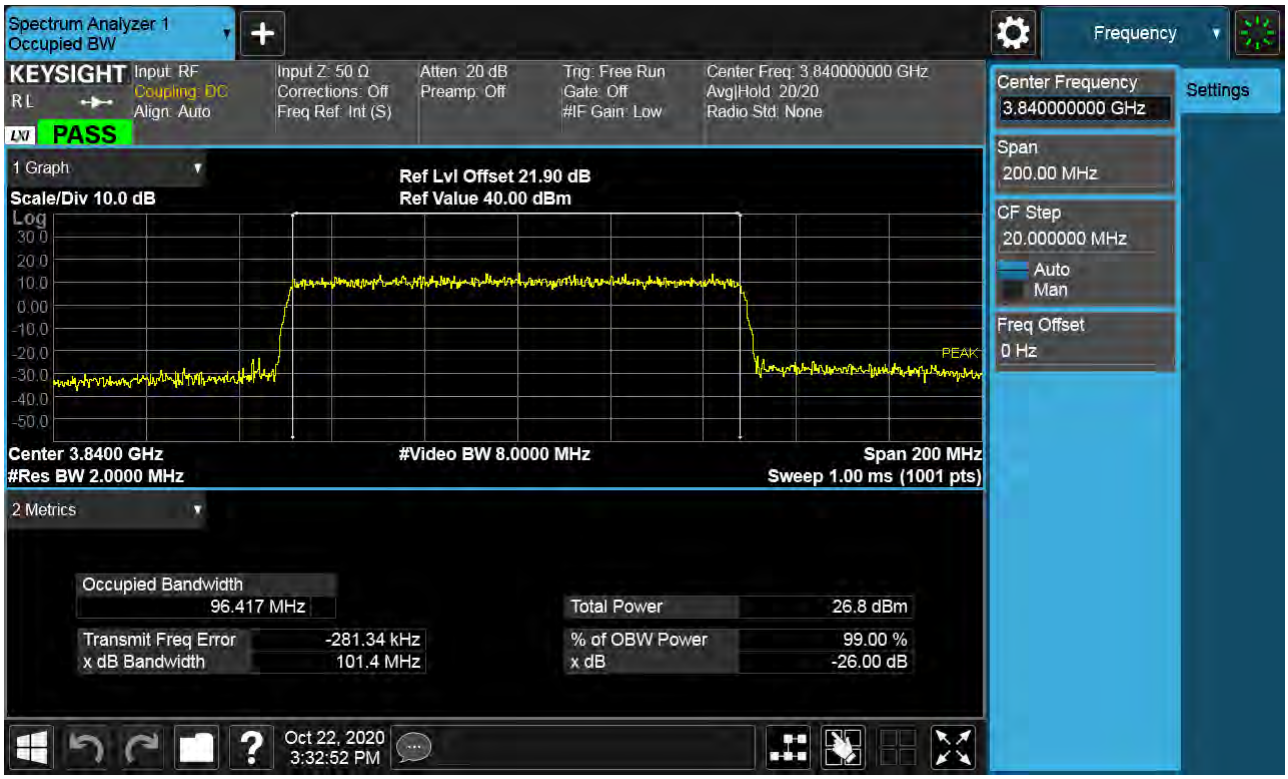
Sub6 n77. Occupied Bandwidth Plot (100M BW Ch.656000 16QAM)



Sub6 n77. Occupied Bandwidth Plot (100M BW Ch.656000 64QAM)



Sub6 n77. Occupied Bandwidth Plot (100M BW Ch.656000 256QAM)



Sub6 n77. PAR Plot (20M BW_Ch.656000_ BPSK)

Sub6 n77. PAR Plot (20M BW_Ch.656000_QPSK)

Sub6 n77. PAR Plot (20M BW_Ch.656000_16QAM)

Sub6 n77. PAR Plot (20M BW_Ch.656000_64QAM)

Sub6 n77. PAR Plot (20M BW_Ch.656000_256QAM)

Sub6 n77. PAR Plot (30M BW_Ch.656000_ BPSK)

Sub6 n77. PAR Plot (30M BW_Ch.656000_QPSK)

Sub6 n77. PAR Plot (30M BW_Ch.656000_16QAM)

Sub6 n77. PAR Plot (30M BW_Ch.656000_64QAM)

Sub6 n77. PAR Plot (30M BW_Ch.656000_256QAM)

Sub6 n77. PAR Plot (40M BW_Ch.656000_ BPSK)

Sub6 n77. PAR Plot (40M BW_Ch.656000_QPSK)

Sub6 n77. PAR Plot (40M BW_Ch.656000_16QAM)

Sub6 n77. PAR Plot (40M BW_Ch.656000_64QAM)

Sub6 n77. PAR Plot (40M BW_Ch.656000_256QAM)

Sub6 n77. PAR Plot (50M BW_Ch.656000_ BPSK)

Sub6 n77. PAR Plot (50M BW_Ch.656000_QPSK)

Sub6 n77. PAR Plot (50M BW_Ch.656000_16QAM)

Sub6 n77. PAR Plot (50M BW_Ch.656000_64QAM)

Sub6 n77. PAR Plot (50M BW_Ch.656000_256QAM)

Sub6 n77. PAR Plot (60M BW_Ch.656000_ BPSK)

Sub6 n77. PAR Plot (60M BW_Ch.656000_QPSK)

Sub6 n77. PAR Plot (60M BW_Ch.656000_16QAM)

Sub6 n77. PAR Plot (60M BW_Ch.656000_64QAM)

Sub6 n77. PAR Plot (60M BW_Ch.656000_256QAM)

Sub6 n77. PAR Plot (70M BW_Ch.656000_ BPSK)

Sub6 n77. PAR Plot (70M BW_Ch.656000_QPSK)

Sub6 n77. PAR Plot (70M BW_Ch.656000_16QAM)

Sub6 n77. PAR Plot (70M BW_Ch.656000_64QAM)

Sub6 n77. PAR Plot (70M BW_Ch.656000_256QAM)

Sub6 n77. PAR Plot (80M BW_Ch.656000_ BPSK)

Sub6 n77. PAR Plot (80M BW_Ch.656000_QPSK)

Sub6 n77. PAR Plot (80M BW_Ch.656000_16QAM)

Sub6 n77. PAR Plot (80M BW_Ch.656000_64QAM)

Sub6 n77. PAR Plot (80M BW_Ch.656000_256QAM)

Sub6 n77. PAR Plot (90M BW_Ch.656000_ BPSK)

Sub6 n77. PAR Plot (90M BW_Ch.656000_QPSK)

Sub6 n77. PAR Plot (90M BW_Ch.656000_16QAM)

Sub6 n77. PAR Plot (90M BW_Ch.656000_64QAM)

Sub6 n77. PAR Plot (90M BW_Ch.656000_256QAM)

Sub6 n77. PAR Plot (100M BW_Ch.656000_ BPSK)

Sub6 n77. PAR Plot (100M BW_Ch.656000_QPSK)

Sub6 n77. PAR Plot (100M BW_Ch.656000_16QAM)

Sub6 n77. PAR Plot (100M BW_Ch.656000_64QAM)

Sub6 n77. PAR Plot (100M BW_Ch.656000_256QAM)

Sub6 n77. Low Band Edge Plot (20M BW Ch.647334 BPSK 1RB)(1)

Sub6 n77. Low Band Edge Plot (20M BW Ch.647334 BPSK FullRB)(1)

Sub6 n77. Low Band Edge Plot (20M BW Ch.647334 BPSK 1RB)(2)