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TEST REPORT

FCC Test for NX-1300-K2

APPLICANT
JVCKENWOOD Corporation

REPORT NO.
HCT-RF-1911-FC005

DATE OF ISSUE
05 November 2019

HCT Co., Ltd.
74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 KOREA
Tel. +82 31 634 6300 F ax. +82 31 645 6401

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FCC ID
K44501101

Applicant	**JVCKENWOOD Corporation** 1-16-2 Hakusan Midori-ku Yokohama-shi Kanagawa 226-8525 Japan
Product Name	UHF TRANSCEIVER
Model(s)	NX-1300-K2
Additional Model(s)	NX-1300-K, NX-1302-K
Test Standard Used	Part 22, 74, 90
Frequency Range	450 MHz ~ 512 MHz

The result shown in this test report refer only to the sample(s) tested unless otherwise stated.
This test results were applied only to the test methods required by the standard.

Tested by
Kwon Jeong

Technical Manager
Jong Seok Lee

HCT CO., LTD.
Soo Chan Lee
SooChan Lee / CEO

REVISION HISTORY

The revision history for this test report is shown in table.

Revision No.	Date of Issue	Description
0	05 November 2019	Initial Release

The measurements shown in this report were made in accordance with the procedures specified in § 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)

CONTENTS

1. GENERAL INFORMATION

Manufacturer:	JVCKENWOOD Corporation
Address:	1-16-2 Hakusan Midori-ku Yokohama-shi Kanagawa 226-8525 Japan
FCC ID:	K44501101
EUT Type:	UHF TRANSCEIVER
Model(s):	NX-1300-K2
Additional Model(s):	NX-1300-K, NX-1302-K
Date(s) of Tests:	October 10, 2019 ~ November 05, 2019
Place of Tests:	HCT Co., Ltd. 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA

2. EUT DESCRIPTION

Power Supply Voltage	DC 7.5V
Output Power	5 W (Power output continuously variable to 1 W) (Max : 5.2 W)
Output Power (16K0F3E)	470-512 MHz : 5 W (Power output continuously variable to 1 W) 450-512 MHz : 2 W (Power output continuously variable to 1 W)
Battery type	KNB-45L Li-Ion Battery Pack (2000mA) KNB-53N Ni-MH Battery Pack (1400mA) KNB-29N Ni-MH Battery Pack (1500mA) KNB-69L Li-ion Battery Pack (2450mA) KNB-82LC (Li-ion Battery Pack)
Antenna	KRA-23M UHF Low Profile Helical Antenna (440-490 MHz) KRA-23M2 UHF Low Profile Helical Antenna (470-520 MHz) KRA-27M UHF Whip Antenna (440-490 MHz) KRA-27M2 UHF Whip Antenna (470-520 MHz) KRA-42M UHF Stubby Antenna (440-490 MHz) KRA-42M2 UHF Stubby Antenna (470-520 MHz)
Peak Antenna gain	KRA-23M UHF Low Profile Helical Antenna: 0 dBd KRA-23M2 UHF Low Profile Helical Antenna: 0 dBd KRA-27M UHF Whip Antenna: 0 dBd KRA-27M2 UHF Whip Antenna: 0 dBd KRA-42M UHF Stubby Antenna: 0 dBd KRA-42M2 UHF Stubby Antenna: 0 dBd
Type of Emission	16K0F3E, 11K0F3E: Analogue 8K30F1E, 8K30F1D, 8K30F7W: NXDN 7K60FXD, 7K60FXE: DMR 4K00F1E, 4K00F1D, 4K00F7W: NXDN 4K00F2D: CWID
Channel Bandwidth	25 kHz / 6.25 kHz / 12.5 kHz
Operating Temperature	-30 °C ~ +60 °C
Frequency Range	450 MHz ~ 512 MHz
Test Frequency	450.05 MHz / 481.05 MHz / 511.95 MHz
Test Frequency (16K0F3E)	2W : 450.05 MHz / 481.05 MHz / 511.95 MHz 5W : 470.05 MHz / 491.05 MHz / 511.95 MHz
Maximum deviation	16K0F3E: ± 5 kHz 11K0F3E: ± 2.5 kHz
Frequency Stability	± 1.0 ppm

3. TEST METHODOLOGY

TIA-603-E dated March 2016 entitled “Land Mobile FM or PM Communications Equipment Measurement and Performance Standards” were used in the measurement.

3.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

3.2 EUT EXERCISE

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the FCC Rules Part 2 and Part 22, 74, 90.

3.3 GENERAL TEST PROCEDURES

Radiated Emissions
Radiated emission measurements 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. The turntable is rotated through 360 degrees, and the receiving antenna scans in order to determine the level of the maximized emission. The level and position of the maximized emission is recorded with the spectrum analyzer using a positive peak detector.
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.

The maximum EIRP 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

3.4 DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition. Test program used to control the EUT for staying in continuous transmitting is programmed.

4. 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 equipments, which is traceable to recognized national standards.

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

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, Korea.

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements. Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.
All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods.”

6. WORST CASE CONFIGURATION AND MODE

Radiated test

1. NX-1300-K, NX-1300-K2, NX-1302-K & Additional Models were tested and the worst case results are reported.
   (Worst case : NX-1300-K2)
2. All modes of operation were investigated and the worst case configuration results are reported.
   - Mode : Stand alone + Microphone (High Power/ Low Power)
     Stand alone + Accessories (High Power/ Low Power)
     Stand alone + Microphone + Accessories (High Power/ Low Power)
   - Worstcase : Stand alone + Microphone (High Power)
3. All type of battery were investigated and the worst case configuration results are reported.
   - Battery type : KNB-45L, KNB-53N, KNB-29N, KNB-69L, KNB-82LC
   - Worstcase : KNB-69L
4. All Antenna were investigated and the worst case configuration results are reported.
   - Antenna type : KRA-23M, KRA-23M2, KRA-27M, KRA-27M2, KRA-42M, KRA-42M2
   - Worstcase : KRA-27M, KRA-27M2
5. Measurements value show only up to 8 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.

Conducted test

1. NX-1300-K, NX-1300-K2, NX-1302-K & Additional Models were tested and the worst case results are reported.
   (Worst case : NX-1300-K2)
2. Conducted Spurious Emission :
   All Power of operation were investigated and the worst case configuration results are reported.
   - Power : High Power/ Low Power
   - Worstcase : High Power
3. Frequency Stability :
   All Type of Emission were investigated and the worst case Type results are reported.
   - Worstcase : 16K0F3E, 11K0F3E, 4K00F2D
4. Transient Frequency Behavior :
   All Type of Emission were investigated and the worst case Type results are reported.
   - Worstcase : 16K0F3E, 11K0F3E, 4K00F1E/4K00F1D/4K00F7W

7. SUMMARY TEST OF RESULTS

Test Description	FCC Part Section(s)	Test Condition	Test Result
Carrier RF Output Power	§ 2.1046, § 22.565, § 74.461, § 90.205	CONDUCTED	PASS
Unwanted Emissions	§ 2.1051 § 22.359, § 74.462, § 74.535, § 90.210	CONDUCTED	PASS
Carrier Frequency Stability	§ 2.1055, § 22.355, § 74.464, § 90.213(a)		PASS
Audio Frequency Response	§ 2.1047(a)		PASS
Audio Low Pass Filter	§ 2.1047(a)		PASS
Modulation Limiting	§ 2.1047(b)		PASS
Transient Frequency Behavior	§ 74.462, § 90.214		PASS
Emission Mask	§ 2.1049, § 22.359, § 74.462, § 74.535, § 90.210		PASS
Adjacent Channel Power	§ 90.221		PASS
Field Strength of Spurious Radiation	§ 2.1053 § 22.359, § 74.462, § 74.535, § 90.210	RADIATED	PASS
Necessary Bandwidth	§ 2.202(g)	-	-

Test Limit

Test Description	Test Limit
Carrier RF Output Power	Varies
Unwanted Emissions	6.25 kHz: 55 + 10 log (P)dB 12.5 kHz: 50 + 10 log (P)dB 25 kHz: 43 + 10 log (P)dB
Carrier Frequency Stability	1 ppm
Audio Frequency Response	Varies
Audio Low Pass Filter	
Modulation Limiting	25 kHz = 5 kHz 12.5 kHz = 2.5 kHz
Transient Frequency Behavior	See Note2
Emission Mask	See Note1
Adjacent Channel Power	See Note3
Field Strength of Spurious Radiation	6.25 kHz: 55+ 10 log (P)dB 12.5 kHz: 50 + 10 log (P)dB 25 kHz: 43 + 10 log (P)dB

Note:

1. Emission Mask Limit :

Channel Bandwidth: 25kHz

Displacement Frequency (% of Authorized Bandwidth)	Minimum Attenuation (dB)
50 to 100	25 dB
100 to 250	35 dB
>250	$43 + 10 \log_{10}(COP)$

Channel Bandwidth: 12.5kHz

Channel Spacing (kHz)	Displacement Frequency Range	Minimum Attenuation (dB)
12.5 & 15	>5.625 kHz to 12.5 kHz	$7.27(f_d - 2.88)$
	>12.5 kHz	Whichever is less attenuation; 70 or $50 + 10 \log_{10}(COP)$

Channel Bandwidth: 6.25kHz

Channel Spacing (kHz)	Displacement Frequency Range	Minimum Attenuation (dB)
6.25 & 7.5	>3.0 kHz to 4.6 kHz	Whichever is less attenuation; 65 or $30 + 16.67(f_d - 3)$ or $55 + 10 \log_{10}(COP)$
	Greater than 4.6 kHz	Whichever is less attenuation; 65 or $55 + 10 \log_{10}(COP)$

2. Transient Frequency Behavior Limit :

Channel Bandwidth (kHz)	Time Intervals (Notes 1, 2)	Maximum Frequency Difference (kHz)	Transient Duration Limit (ms)	
			138-174 MHz	406.1-512 MHz
25	t_1	±25	5	10
	t_2	±12.5	20	25
	t_3	±25	5	10
12.5	t_1	±12.5	5	10
	t_2	±6.25	20	25
	t_3	±12.5	5	10
6.25	t_1	±6.25	5	10
	t_2	±3.125	20	25
	t_3	±6.25	5	10

3. Adjacent Channel Power:

Frequency offset(kHz)	Maximum ACP(dBc) for devices 1 watt and less	Maximum ACP(dBc) for devices above 1 watt
25	-55	-60
50	-70	-70
75	-70	-70

8. TEST RESULT

8.1 Carrier Output Power

▣ Definition

The conducted carrier power output rating for a transmitter is the power available at the output terminals of the transmitter when the output terminals are connected to the standard transmitter load.

▣ TEST CONFIGURATION

▣ TEST PROCEDURE

According to 2.2.1 in TIA-603-E Standard.

a) Connect the equipment as illustrated.

b) Measure the transmitter output power during the defined duty cycle(see 1.3.2).
Correct for all losses in the RF path.

c) The value recorded in step b) is the conducted carrier output power rating.

▣ TEST RESULTS(Carrier Output Power)

Certification	Type of Emission	Channel Bandwidth (kHz)	Test Frequency (MHz)	Carrier Output Power			
				High Power		Low Power	
				dBm	W	dBm	W
FCC	16K0F3E (2W)	25	450.05	32.79	1.90	29.49	0.89
			481.05	32.83	1.92	30.11	1.03
			511.95	32.98	1.99	30.26	1.06
FCC	16K0F3E (5W)	25	470.05	36.81	4.80	30.14	1.03
			491.05	36.77	4.75	30.22	1.05
			511.95	36.78	4.76	30.33	1.08
FCC	11K0F3E	12.5	450.05	37.07	5.10	29.73	0.94
			481.05	36.77	4.75	30.15	1.04
			511.95	36.85	4.85	30.37	1.09
FCC	8K30F1E, 8K30F1D, 8K30F7W	12.5	450.05	37.11	5.14	29.12	0.82
			481.05	36.79	4.78	30.08	1.02
			511.95	36.98	4.98	30.27	1.06
FCC	7K60FXD, 7K60FXE	12.5	450.05	37.07	5.09	29.62	0.92
			481.05	36.60	4.57	30.04	1.01
			511.95	36.85	4.84	30.20	1.05
FCC	4K00F1E, 4K00F1D, 4K00F7W	6.25	450.05	37.06	5.09	29.14	0.82
			481.05	36.73	4.71	30.04	1.01
			511.95	36.90	4.90	30.24	1.06
FCC	4K00F2D	6.25	450.05	37.14	5.18	30.00	1.00
			481.05	37.01	5.02	29.76	0.95
			511.95	37.10	5.13	29.95	0.99

▣ TEST RESULTS(ERP)

Certification	Type of Emission	Channel Bandwidth (kHz)	Test Frequency (MHz)	ERP			
				High Power		Low Power	
				dBm	W	dBm	W
FCC	16K0F3E (2W)	25	450.05	32.79	1.90	29.49	0.89
			481.05	32.83	1.92	30.11	1.03
			511.95	32.98	1.99	30.26	1.06
FCC	16K0F3E (5W)	25	470.05	36.81	4.80	30.14	1.03
			491.05	36.77	4.75	30.22	1.05
			511.95	36.78	4.76	30.33	1.08
FCC	11K0F3E	12.5	450.05	37.07	5.10	29.73	0.94
			481.05	36.77	4.75	30.15	1.04
			511.95	36.85	4.85	30.37	1.09
FCC	8K30F1E, 8K30F1D, 8K30F7W	12.5	450.05	37.11	5.14	29.12	0.82
			481.05	36.79	4.78	30.08	1.02
			511.95	36.98	4.98	30.27	1.06
FCC	7K60FXD, 7K60FXE	12.5	450.05	37.07	5.09	29.62	0.92
			481.05	36.60	4.57	30.04	1.01
			511.95	36.85	4.84	30.20	1.05
FCC	4K00F1E, 4K00F1D, 4K00F7W	6.25	450.05	37.06	5.09	29.14	0.82
			481.05	36.73	4.71	30.04	1.01
			511.95	36.90	4.90	30.24	1.06
FCC	4K00F2D	6.25	450.05	37.14	5.18	30.00	1.00
			481.05	37.01	5.02	29.76	0.95
			511.95	37.10	5.13	29.95	0.99

Note:

1. ERP = Carrier Output Power + Peak Antenna gain

8.2 Carrier Frequency Stability

▣ Definition

The carrier frequency stability is the ability of the transmitter to maintain an assigned carrier frequency.

▣ TEST CONFIGURATION

▣ TEST PROCEDURE

According to 2.2.2 in TIA-603-E Standard.

a) Connect the equipment as illustrated.

b) Operate the equipment in standby conditions for 15 minutes before proceeding.

c) Record the carrier frequency of the transmitter as *MCF* MHz

d) Calculate the ppm frequency error by the following:

ppm error = ((MCF_{MHz} / ACF_{MHz})-1)*10^6

where

MCF_{MHz} is the Measured Carrier Frequency in MHz

ACF_{MHz} is the Assigned Carrier Frequency in MHz

e) The value recorded in step d) is the carrier frequency stability.

▣ TEST RESULTS

(1) Frequency Stability (Temperature Variation)

450.05 MHz

Type of Emission	Power	Temperature (Degree C)	Frequency (Hz)	Frequency Error (Hz)	Frequency stability (ppm)	Limit (ppm)
16K0F3E	High Power (2W)	+20(Ref)	450.050008268	0.0000000	0.0000	1.0
		-30	450.050010230	0.0000020	0.0044	
		-20	450.049988392	-0.0000199	-0.0442	
		-10	450.050005890	-0.0000024	-0.0053	
		0	450.049986662	-0.0000216	-0.0480	
		+10	450.050008268	0.0000000	0.0000	
		+30	450.050001444	-0.0000068	-0.0152	
		+40	450.050033700	0.0000254	0.0565	
		+50	450.050000920	-0.0000073	-0.0163	
	Low Power	+20(Ref)	450.049997884	0.0000000	0.0000	
		-30	450.050015836	0.0000180	0.0399	
		-20	450.049968683	-0.0000292	-0.0649	
		-10	450.050016592	0.0000187	0.0416	
		0	450.050015791	0.0000179	0.0398	
		+10	450.049997884	0.0000000	0.0000	
		+30	450.050004667	0.0000068	0.0151	
		+40	450.049980484	-0.0000174	-0.0387	
		+50	450.049976524	-0.0000214	-0.0475	

481.05 MHz

Type of Emission	Power	Temperature (Degree C)	Frequency (Hz)	Frequency Error (Hz)	Frequency stability (ppm)	Limit (ppm)
16K0F3E	High Power (2W)	+20(Ref)	481.050002024	0.0000000	0.0000	1.0
		-30	481.049990841	-0.0000112	-0.0232	
		-20	481.050007085	0.0000051	0.0105	
		-10	481.049999930	-0.0000021	-0.0044	
		0	481.049994631	-0.0000074	-0.0154	
		+10	481.050002024	0.0000000	0.0000	
		+30	481.049995565	-0.0000065	-0.0134	
		+40	481.049996243	-0.0000058	-0.0120	
		+50	481.049987580	-0.0000144	-0.0300	
	Low Power	+20(Ref)	481.049994703	0.0000000	0.0000	
		-30	481.049967815	-0.0000269	-0.0559	
		-20	481.050007096	0.0000124	0.0258	
		-10	481.049990624	-0.0000041	-0.0085	
		0	481.050000452	0.0000057	0.0120	
		+10	481.049994703	0.0000000	0.0000	
		+30	481.049975899	-0.0000188	-0.0391	
		+40	481.049972838	-0.0000219	-0.0455	
		+50	481.050010554	0.0000159	0.0330	

511.95 MHz

Type of Emission	Power	Temperature (Degree C)	Frequency (Hz)	Frequency Error (Hz)	Frequency stability (ppm)	Limit (ppm)
16K0F3E	High Power (2W)	+20(Ref)	511.949999076	0.0000000	0.0000	1.0
		-30	511.950027904	0.0000288	0.0563	
		-20	511.950016544	0.0000175	0.0341	
		-10	511.949975612	-0.0000235	-0.0458	
		0	511.950004630	0.0000056	0.0108	
		+10	511.949999076	0.0000000	0.0000	
		+30	511.949999813	0.0000007	0.0014	
		+40	511.950006014	0.0000069	0.0136	
		+50	511.950021806	0.0000227	0.0444	
	Low Power	+20(Ref)	511.949993436	0.0000000	0.0000	
		-30	511.950018912	0.0000255	0.0498	
		-20	511.949998728	0.0000053	0.0103	
		-10	511.950021426	0.0000280	0.0547	
		0	511.949990711	-0.0000027	-0.0053	
		+10	511.949993436	0.0000000	0.0000	
		+30	511.949997084	0.0000036	0.0071	
		+40	511.949989455	-0.0000040	-0.0078	
		+50	511.950014866	0.0000214	0.0419	

470.05 MHz

Type of Emission	Power	Temperature (Degree C)	Frequency (Hz)	Frequency Error (Hz)	Frequency stability (ppm)	Limit (ppm)
16K0F3E	High Power (5W)	+20(Ref)	470.050407141	0.0000000	0.0000	1.0
		-30	470.050377617	-0.0000295	-0.0628	
		-20	470.050412801	0.0000057	0.0120	
		-10	470.050431712	0.0000246	0.0523	
		0	470.050433487	0.0000263	0.0560	
		+10	470.050407141	0.0000000	0.0000	
		+30	470.050417705	0.0000106	0.0225	
		+40	470.050392430	-0.0000147	-0.0313	
		+50	470.050391838	-0.0000153	-0.0326	
	Low Power	+20(Ref)	470.050378615	0.0000000	0.0000	
		-30	470.050365365	-0.0000133	-0.0282	
		-20	470.050365386	-0.0000132	-0.0281	
		-10	470.050355297	-0.0000233	-0.0496	
		0	470.050393309	0.0000147	0.0313	
		+10	470.050378615	0.0000000	0.0000	
		+30	470.050386817	0.0000082	0.0174	
		+40	470.050362840	-0.0000158	-0.0336	
		+50	470.050356458	-0.0000222	-0.0471	

491.05 MHz

Type of Emission	Power	Temperature (Degree C)	Frequency (Hz)	Frequency Error (Hz)	Frequency stability (ppm)	Limit (ppm)
16K0F3E	High Power (5W)	+20(Ref)	491.050426219	0.0000000	0.0000	1.0
		-30	491.050397632	-0.0000286	-0.0582	
		-20	491.050437318	0.0000111	0.0226	
		-10	491.050414834	-0.0000114	-0.0232	
		0	491.050452543	0.0000263	0.0536	
		+10	491.050426219	0.0000000	0.0000	
		+30	491.050455551	0.0000293	0.0597	
		+40	491.050419975	-0.0000062	-0.0127	
		+50	491.050439434	0.0000132	0.0269	
	Low Power	+20(Ref)	491.050410074	0.0000000	0.0000	
		-30	491.050429838	0.0000198	0.0402	
		-20	491.050411114	0.0000010	0.0021	
		-10	491.050401973	-0.0000081	-0.0165	
		0	491.050439094	0.0000290	0.0591	
		+10	491.050410074	0.0000000	0.0000	
		+30	491.050380817	-0.0000293	-0.0596	
		+40	491.050416520	0.0000064	0.0131	
		+50	491.050420767	0.0000107	0.0218	

511.95 MHz

Type of Emission	Power	Temperature (Degree C)	Frequency (Hz)	Frequency Error (Hz)	Frequency stability (ppm)	Limit (ppm)
16K0F3E	High Power (5W)	+20(Ref)	511.950420724	0.0000000	0.0000	1.0
		-30	511.950421994	0.0000013	0.0025	
		-20	511.950450057	0.0000293	0.0573	
		-10	511.950423014	0.0000023	0.0045	
		0	511.950433009	0.0000123	0.0240	
		+10	511.950420724	0.0000000	0.0000	
		+30	511.950425949	0.0000052	0.0102	
		+40	511.950437025	0.0000163	0.0318	
		+50	511.950410481	-0.0000102	-0.0200	
	Low Power	+20(Ref)	511.950435364	0.0000000	0.0000	
		-30	511.950422460	-0.0000129	-0.0252	
		-20	511.950456204	0.0000208	0.0407	
		-10	511.950443174	0.0000078	0.0153	
		0	511.950433860	-0.0000015	-0.0029	
		+10	511.950435364	0.0000000	0.0000	
		+30	511.950439205	0.0000038	0.0075	
		+40	511.950426387	-0.0000090	-0.0175	
		+50	511.950421404	-0.0000140	-0.0273	

450.05 MHz

Type of Emission	Power	Temperature (Degree C)	Frequency (Hz)	Frequency Error (Hz)	Frequency stability (ppm)	Limit (ppm)
11K0F3E	High Power	+20(Ref)	450.050396051	0.0000000	0.0000	1.0
		-30	450.050366645	-0.0000294	-0.0653	
		-20	450.050372217	-0.0000238	-0.0530	
		-10	450.050382044	-0.0000140	-0.0311	
		0	450.050412275	0.0000162	0.0360	
		+10	450.050396051	0.0000000	0.0000	
		+30	450.050371222	-0.0000248	-0.0552	
		+40	450.050399656	0.0000036	0.0080	
		+50	450.050415502	0.0000195	0.0432	
	Low Power	+20(Ref)	450.050392294	0.0000000	0.0000	
		-30	450.050396036	0.0000037	0.0083	
		-20	450.050420871	0.0000286	0.0635	
		-10	450.050374623	-0.0000177	-0.0393	
		0	450.050368420	-0.0000239	-0.0530	
		+10	450.050392294	0.0000000	0.0000	
		+30	450.050404714	0.0000124	0.0276	
		+40	450.050397372	0.0000051	0.0113	
		+50	450.050393810	0.0000015	0.0034	

481.05 MHz

Type of Emission	Power	Temperature (Degree C)	Frequency (Hz)	Frequency Error (Hz)	Frequency stability (ppm)	Limit (ppm)
11K0F3E	High Power	+20(Ref)	481.050420936	0.0000000	0.0000	1.0
		-30	481.050441205	0.0000203	0.0421	
		-20	481.050425108	0.0000042	0.0087	
		-10	481.050424589	0.0000037	0.0076	
		0	481.050417684	-0.0000033	-0.0068	
		+10	481.050420936	0.0000000	0.0000	
		+30	481.050399028	-0.0000219	-0.0455	
		+40	481.050420828	-0.0000001	-0.0002	
		+50	481.050413781	-0.0000072	-0.0149	
	Low Power	+20(Ref)	481.050418012	0.0000000	0.0000	
		-30	481.050388405	-0.0000296	-0.0615	
		-20	481.050414057	-0.0000040	-0.0082	
		-10	481.050419518	0.0000015	0.0031	
		0	481.050412564	-0.0000054	-0.0113	
		+10	481.050418012	0.0000000	0.0000	
		+30	481.050397748	-0.0000203	-0.0421	
		+40	481.050401506	-0.0000165	-0.0343	
		+50	481.050421058	0.0000030	0.0063	

511.95 MHz

Type of Emission	Power	Temperature (Degree C)	Frequency (Hz)	Frequency Error (Hz)	Frequency stability (ppm)	Limit (ppm)
11K0F3E	High Power	+20(Ref)	511.950445637	0.0000000	0.0000	1.0
		-30	511.950468703	0.0000231	0.0451	
		-20	511.950424893	-0.0000207	-0.0405	
		-10	511.950421501	-0.0000241	-0.0471	
		0	511.950446583	0.0000009	0.0018	
		+10	511.950445637	0.0000000	0.0000	
		+30	511.950460193	0.0000146	0.0284	
		+40	511.950446160	0.0000005	0.0010	
		+50	511.950464128	0.0000185	0.0361	
	Low Power	+20(Ref)	511.950444973	0.0000000	0.0000	
		-30	511.950450399	0.0000054	0.0106	
		-20	511.950447542	0.0000026	0.0050	
		-10	511.950464518	0.0000195	0.0382	
		0	511.950437668	-0.0000073	-0.0143	
		+10	511.950444973	0.0000000	0.0000	
		+30	511.950449347	0.0000044	0.0085	
		+40	511.950468194	0.0000232	0.0454	
		+50	511.950436641	-0.0000083	-0.0163	

450.05 MHz

Type of Emission	Power	Temperature (Degree C)	Frequency (Hz)	Frequency Error (Hz)	Frequency stability (ppm)	Limit (ppm)
4K00F2D	High Power	+20(Ref)	450.049982670	0.0000000	0.0000	1.0
		-30	450.049963963	-0.0000187	-0.0416	
		-20	450.049997563	0.0000149	0.0331	
		-10	450.049989976	0.0000073	0.0162	
		0	450.049975720	-0.0000070	-0.0154	
		+10	450.049982670	0.0000000	0.0000	
		+30	450.049992491	0.0000098	0.0218	
		+40	450.049964717	-0.0000180	-0.0399	
		+50	450.049970368	-0.0000123	-0.0273	
	Low Power	+20(Ref)	450.049976350	0.0000000	0.0000	
		-30	450.049985993	0.0000096	0.0214	
		-20	450.049952183	-0.0000242	-0.0537	
		-10	450.049996383	0.0000200	0.0445	
		0	450.049974003	-0.0000023	-0.0052	
		+10	450.049976350	0.0000000	0.0000	
		+30	450.049951119	-0.0000252	-0.0561	
		+40	450.049960264	-0.0000161	-0.0357	
		+50	450.050005200	0.0000288	0.0641	

481.05 MHz

Type of Emission	Power	Temperature (Degree C)	Frequency (Hz)	Frequency Error (Hz)	Frequency stability (ppm)	Limit (ppm)
4K00F2D	High Power	+20(Ref)	481.049980528	0.0000000	0.0000	1.0
		-30	481.050007576	0.0000270	0.0562	
		-20	481.049954687	-0.0000258	-0.0537	
		-10	481.050005728	0.0000252	0.0524	
		0	481.049961423	-0.0000191	-0.0397	
		+10	481.049980528	0.0000000	0.0000	
		+30	481.049988152	0.0000076	0.0158	
		+40	481.049982474	0.0000019	0.0040	
		+50	481.049976387	-0.0000041	-0.0086	
	Low Power	+20(Ref)	481.049975981	0.0000000	0.0000	
		-30	481.049974575	-0.0000014	-0.0029	
		-20	481.049982789	0.0000068	0.0142	
		-10	481.050001948	0.0000260	0.0540	
		0	481.049951445	-0.0000245	-0.0510	
		+10	481.049975981	0.0000000	0.0000	
		+30	481.049993071	0.0000171	0.0355	
		+40	481.049961845	-0.0000141	-0.0294	
		+50	481.049975952	0.0000000	-0.0001	

511.95 MHz

Type of Emission	Power	Temperature (Degree C)	Frequency (Hz)	Frequency Error (Hz)	Frequency stability (ppm)	Limit (ppm)
4K00F2D	High Power	+20(Ref)	511.949975384	0.0000000	0.0000	1.0
		-30	511.949966471	-0.0000089	-0.0174	
		-20	511.949969748	-0.0000056	-0.0110	
		-10	511.949998066	0.0000227	0.0443	
		0	511.950005093	0.0000297	0.0580	
		+10	511.949975384	0.0000000	0.0000	
		+30	511.949946798	-0.0000286	-0.0558	
		+40	511.949965381	-0.0000100	-0.0195	
		+50	511.949981034	0.0000056	0.0110	
	Low Power	+20(Ref)	511.949974771	0.0000000	0.0000	
		-30	511.949980565	0.0000058	0.0113	
		-20	511.949954080	-0.0000207	-0.0404	
		-10	511.949958887	-0.0000159	-0.0310	
		0	511.949958177	-0.0000166	-0.0324	
		+10	511.949974771	0.0000000	0.0000	
		+30	511.949953548	-0.0000212	-0.0415	
		+40	511.949988239	0.0000135	0.0263	
		+50	511.949951212	-0.0000236	-0.0460	

(2) Frequency Stability (Voltage Variation)

450.05 MHz

Type of Emission	Power	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)	Limit (ppm)
16K0F3E	High Power (2W)	85	6.38	450.050009260	0.0206	1.0
		100	7.50	450.050007756	0.0172	
		115	8.63	450.050008174	0.0182	
	Low Power	85	6.38	450.049997505	-0.0055	
		100	7.50	450.049997855	-0.0048	
		115	8.63	450.049997759	-0.0050	

481.05 MHz

Type of Emission	Power	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)	Limit (ppm)
16K0F3E	High Power (2W)	85	6.38	481.050001861	0.0039	1.0
		100	7.50	481.050001827	0.0038	
		115	8.63	481.050002329	0.0048	
	Low Power	85	6.38	481.049993913	-0.0127	
		100	7.50	481.049994726	-0.0110	
		115	8.63	481.049994459	-0.0115	

511.95 MHz

Type of Emission	Power	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)	Limit (ppm)
16K0F3E	High Power (2W)	85	6.38	511.949998444	-0.0030	1.0
		100	7.50	511.949996992	-0.0059	
		115	8.63	511.949998284	-0.0034	
	Low Power	85	6.38	511.949993795	-0.0121	
		100	7.50	511.949993329	-0.0130	
		115	8.63	511.949992828	-0.0140	

470.05 MHz

Type of Emission	Power	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)	Limit (ppm)
16K0F3E	High Power (5W)	85	6.38	470.050405699	0.8631	1.0
		100	7.50	470.050406063	0.8639	
		115	8.63	470.050406170	0.8641	
	Low Power	85	6.38	470.050380324	0.8091	
		100	7.50	470.050382531	0.8138	
		115	8.63	470.050381776	0.8122	

491.05 MHz

Type of Emission	Power	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)	Limit (ppm)
16K0F3E	High Power (5W)	85	6.38	491.050425200	0.8659	1.0
		100	7.50	491.050424460	0.8644	
		115	8.63	491.050423489	0.8624	
	Low Power	85	6.38	491.050410665	0.8363	
		100	7.50	491.050411030	0.8370	
		115	8.63	491.050411161	0.8373	

511.95 MHz

Type of Emission	Power	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)	Limit (ppm)
16K0F3E	High Power (5W)	85	6.38	511.950420257	0.8209	1.0
		100	7.50	511.950419739	0.8199	
		115	8.63	511.950420028	0.8204	
	Low Power	85	6.38	511.950434377	0.8485	
		100	7.50	511.950435851	0.8514	
		115	8.63	511.950434850	0.8494	

450.05 MHz

Type of Emission	Power	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)	Limit (ppm)
11K0F3E	High Power	85	6.38	450.050395885	0.8796	1.0
		100	7.50	450.050395584	0.8790	
		115	8.63	450.050395282	0.8783	
	Low Power	85	6.38	450.050391741	0.8704	
		100	7.50	450.050391861	0.8707	
		115	8.63	450.050391299	0.8695	

481.05 MHz

Type of Emission	Power	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)	Limit (ppm)
11K0F3E	High Power	85	6.38	481.050420705	0.8746	1.0
		100	7.50	481.050419980	0.8730	
		115	8.63	481.050419786	0.8726	
	Low Power	85	6.38	481.050419013	0.8710	
		100	7.50	481.050417647	0.8682	
		115	8.63	481.050418188	0.8693	

511.95 MHz

Type of Emission	Power	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)	Limit (ppm)
11K0F3E	High Power	85	6.38	511.950445437	0.8701	1.0
		100	7.50	511.950444317	0.8679	
		115	8.63	511.950444395	0.8680	
	Low Power	85	6.38	511.950443911	0.8671	
		100	7.50	511.950444843	0.8689	
		115	8.63	511.950444168	0.8676	

450.05 MHz

Type of Emission	Power	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)	Limit (ppm)
4K00F2D	High Power	85	6.38	450.049982664	-0.0385	1.0
		100	7.50	450.049982667	-0.0385	
		115	8.63	450.049982400	-0.0391	
	Low Power	85	6.38	450.049976588	-0.0520	
		100	7.50	450.049977350	-0.0503	
		115	8.63	450.049976528	-0.0522	

481.05 MHz

Type of Emission	Power	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)	Limit (ppm)
4K00F2D	High Power	85	6.38	481.049980827	-0.0399	1.0
		100	7.50	481.049978774	-0.0441	
		115	8.63	481.049979971	-0.0416	
	Low Power	85	6.38	481.049976079	-0.0497	
		100	7.50	481.049976384	-0.0491	
		115	8.63	481.049976625	-0.0486	

511.95 MHz

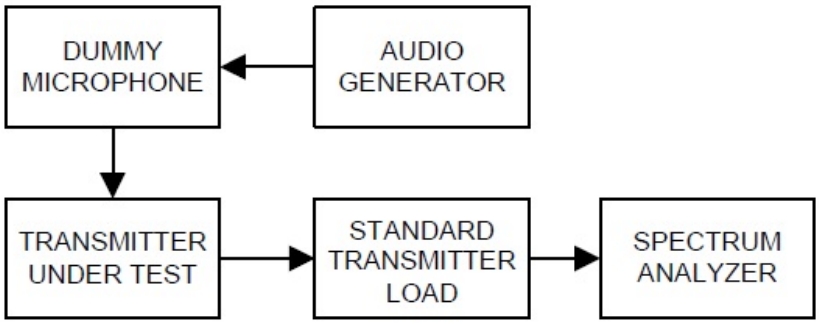
Type of Emission	Power	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)	Limit (ppm)
4K00F2D	High Power	85	6.38	511.949975774	-0.0473	1.0
		100	7.50	511.949973588	-0.0516	
		115	8.63	511.949974267	-0.0503	
	Low Power	85	6.38	511.949975303	-0.0482	
		100	7.50	511.949974633	-0.0495	
		115	8.63	511.949974782	-0.0493	

8.3 Occupied Bandwidth

▣ Definition

The transmitter sideband spectrum denotes the sideband power produced at a discrete frequency separation from the carrier up to the test bandwidth (see TIA-603-E Section 1.3.4.4) due to all sources of unwanted noise within the transmitter in a modulated condition.

▣ TEST CONFIGURATION



▣ TEST PROCEDURE

According to TIA-603-E Section 2.2.11.2

a) For EUT supporting audio modulation, the audio signal generator was adjusted to the frequency of maximum response and with output level set for +/- 2.5 kHz deviation (or 50 % modulation). (FM modulation).

b) With level constant, the signal level was increased 16 dB.

c) For EUT supporting digital modulation, the digital modulation mode was operated to its maximum extent.

d) Adjust the spectrum analyzer for the following setting:

1) RBW : 100Hz (Authorized Band 6 kHz),
100Hz (Authorized Band 11.25 kHz),
300Hz (Authorized Band 20 kHz)

2) VBW : Video Bandwidth at least 10 times the resolution bandwidth.

4) Sweep Speed : Sweep Speed slow enough to maintain measurement calibration.

5) Sampling Time : 10 times

6) Detector Mode = Positive Peak.

e) The occupied Bandwidth was measured with the Spectrum Analyzer controls set as shown on the test results.

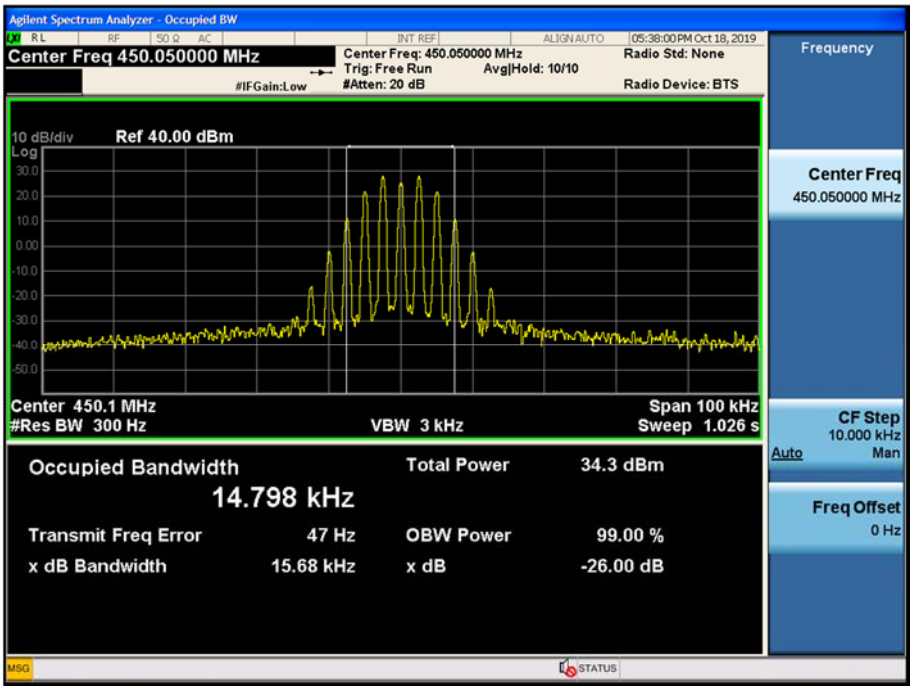
▣ TEST RESULTS

Certification	Type of Emission	Channel Bandwidth (kHz)	Power	Test Frequency (MHz)	Measured 99% OBW at Maximum Freq. Deviation(kHz)	Limit (kHz)
FCC	16K0F3E	25	High Power (2W)	450.05	14.798	20.00
				481.05	14.816	
				511.95	14.843	
			Low Power (1W)	450.05	14.793	
				481.05	14.814	
				511.95	14.840	
			High Power (5W)	470.05	14.796	
				491.05	14.779	
				511.95	14.834	
			Low Power (1W)	470.05	14.796	
				491.05	14.780	
				511.95	14.831	
FCC	11K0F3E	12.5	High Power	450.05	9.940	11.25
				481.05	9.943	
				511.95	9.950	
			Low Power	450.05	9.939	
				481.05	9.943	
				511.95	9.949	
FCC	8K30F1E, 8K30F1D, 8K30F7W	12.5	High Power	450.05	7.638	
				481.05	7.619	
				511.95	7.682	
			Low Power	450.05	7.617	
				481.05	7.602	
				511.95	7.679	
FCC	7K60FXD, 7K60FXE	12.5	High Power	450.05	7.424	
				481.05	7.397	
				511.95	7.460	
			Low Power	450.05	7.348	
				481.05	7.369	
				511.95	7.515	
FCC	4K00F1E, 4K00F1D, 4K00F7W	6.25	High Power	450.05	3.517	6.00
				481.05	3.520	
				511.95	3.540	
			Low Power	450.05	3.514	
				481.05	3.508	
				511.95	3.529	
FCC	4K00F2D	6.25	High Power	450.05	4.023	
				481.05	4.025	
				511.95	4.028	
			Low Power	450.05	4.022	
				481.05	4.026	
				511.95	4.028	

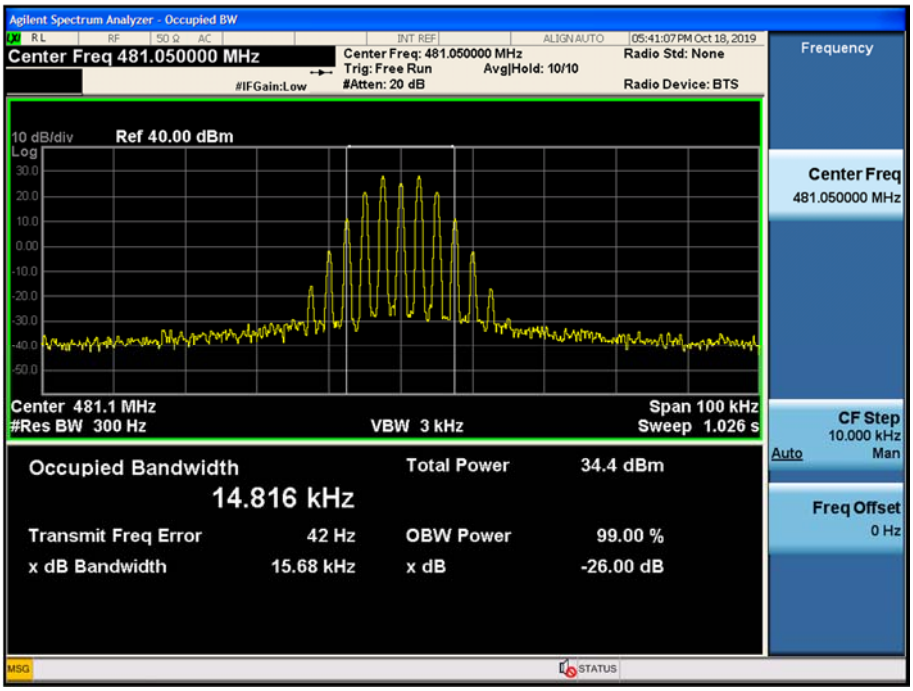
▣ Plots of 99% Bandwidth

16K0F3E_FCC

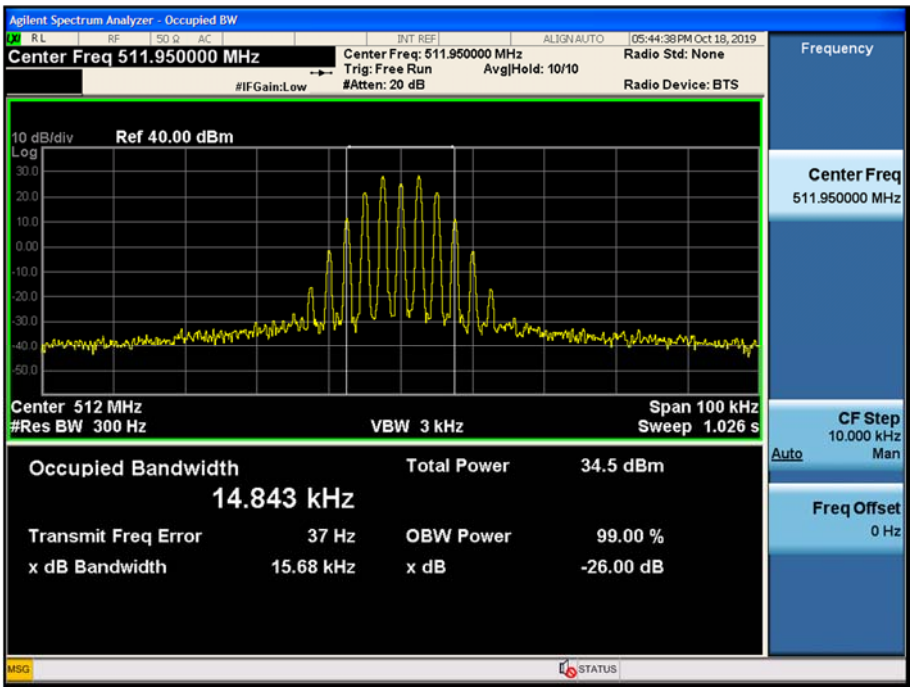
(450.05 MHz)_High_2W



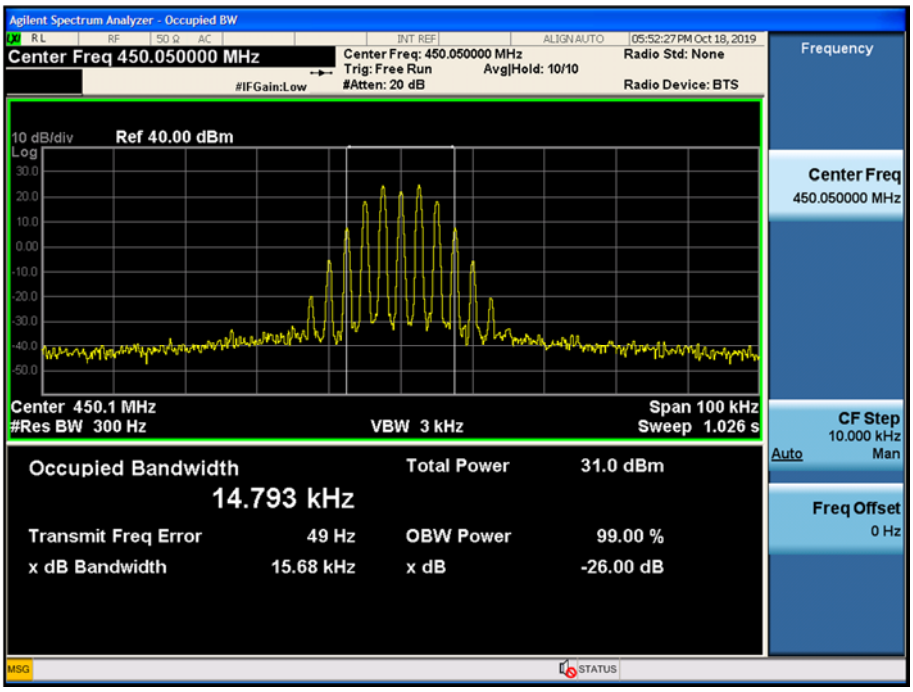
(481.05 MHz)_High_2W



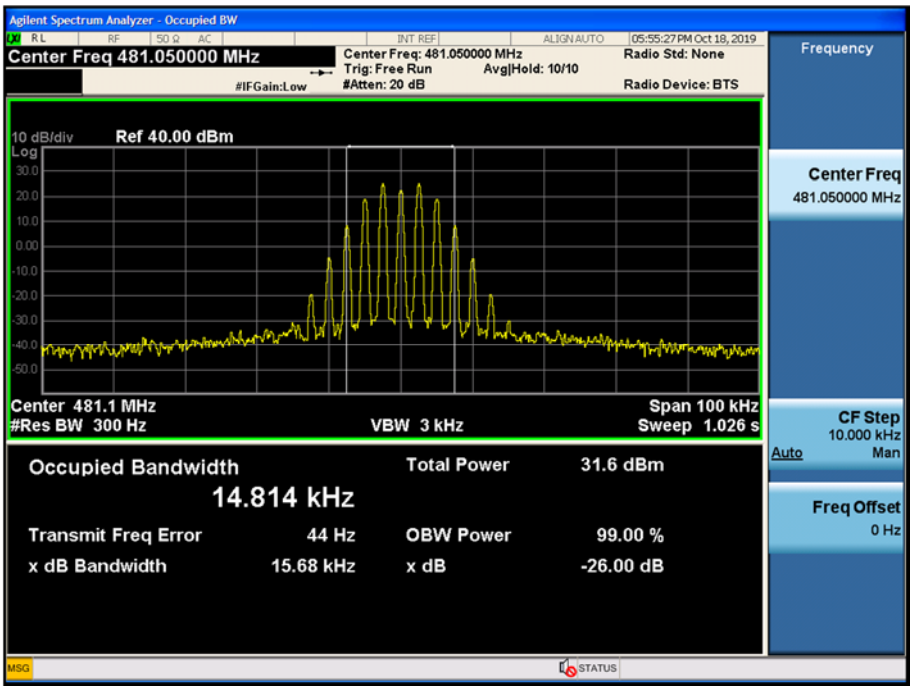
(511.95 MHz)_High_2W



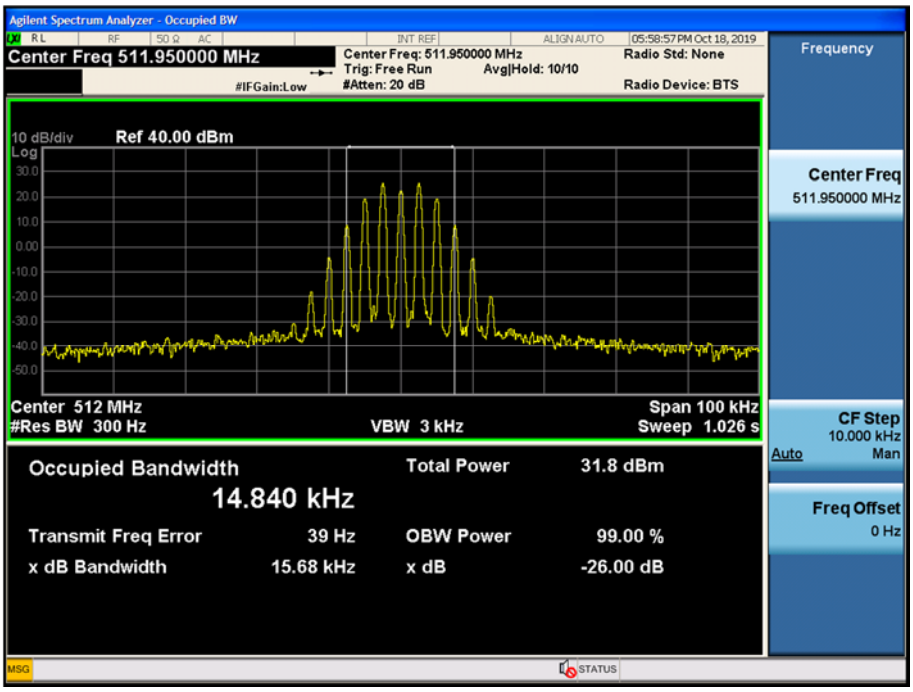
(450.05 MHz)_Low_1W



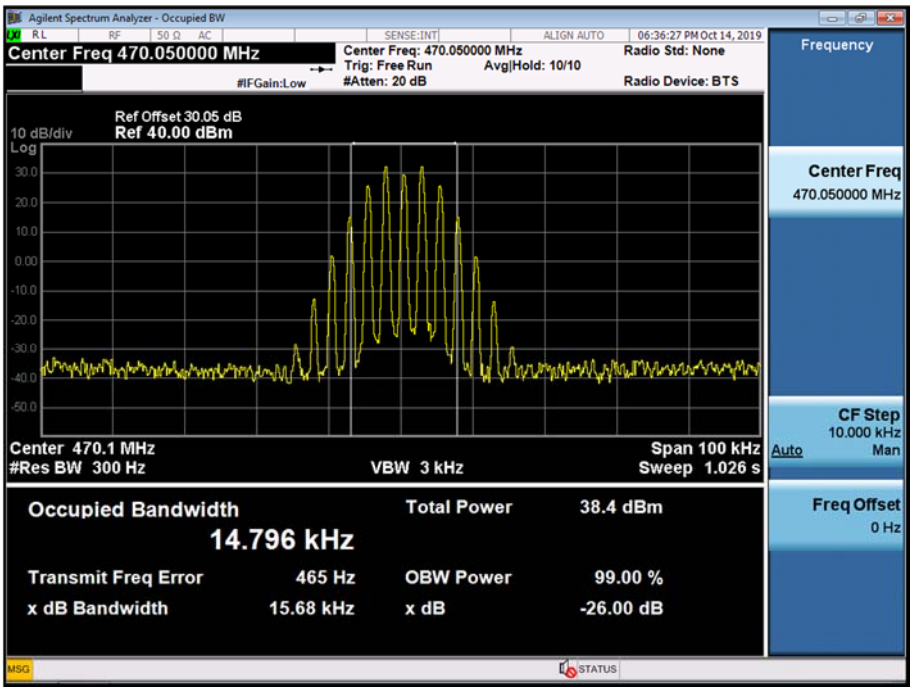
(481.05 MHz)_Low_1W



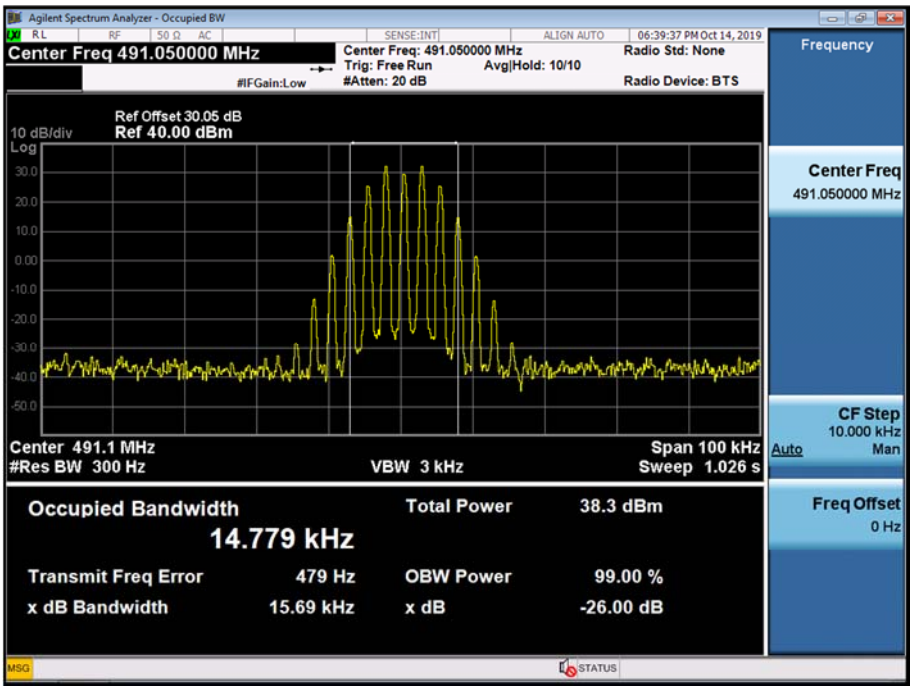
(511.95 MHz)_Low_1W



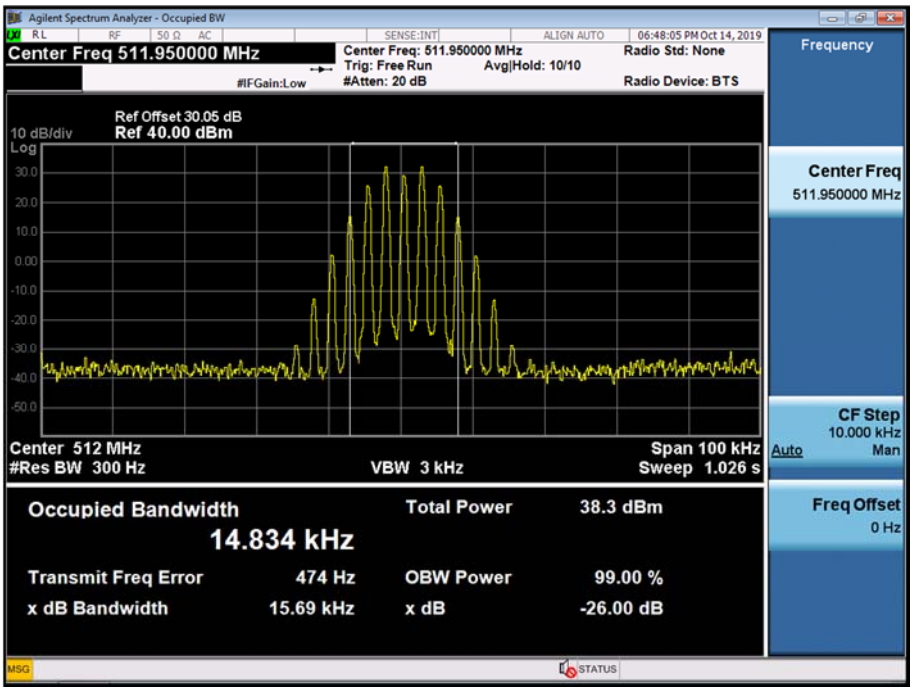
(470.05 MHz)_High_5W



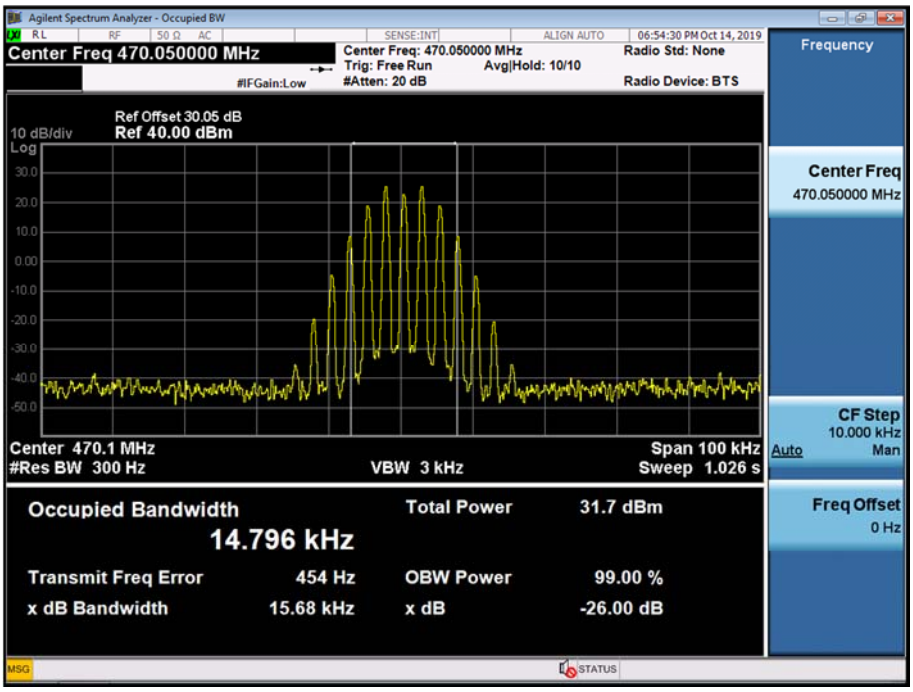
(491.05 MHz)_High_5W



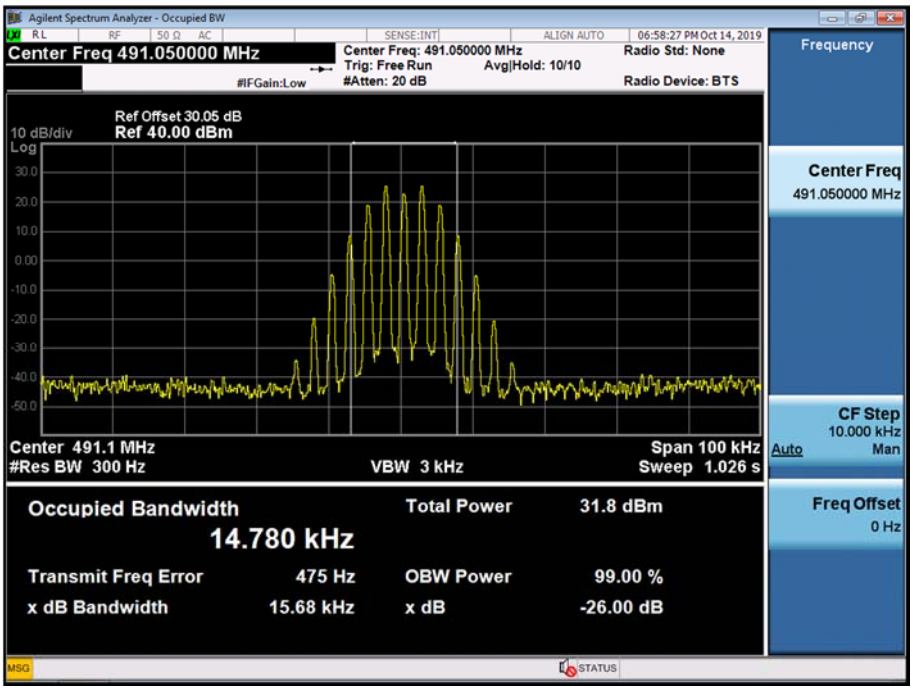
(511.95 MHz)_High_5W



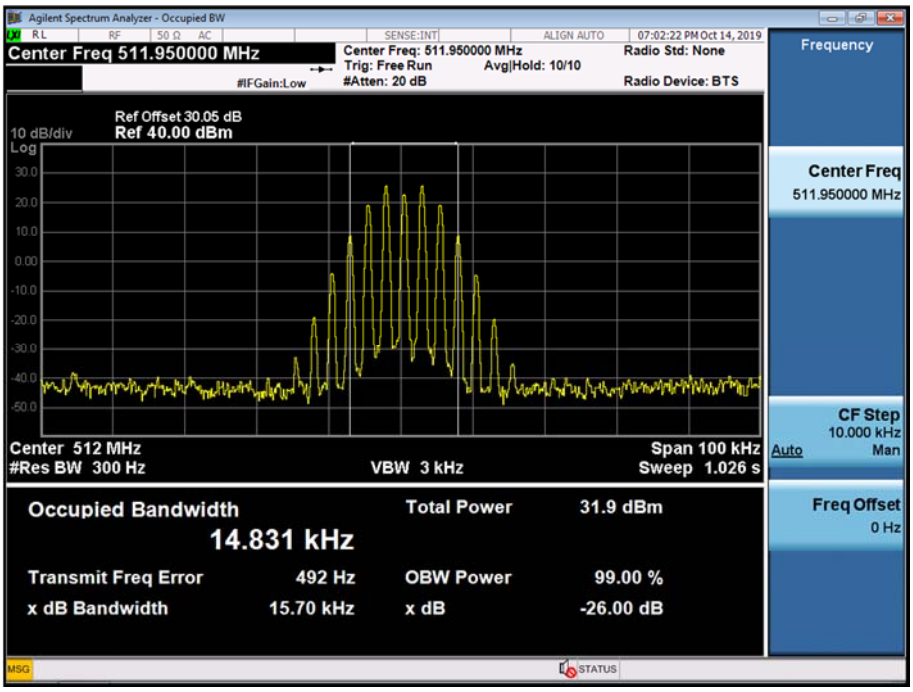
(470.05 MHz)_Low_1W



(491.05 MHz)_Low_1W

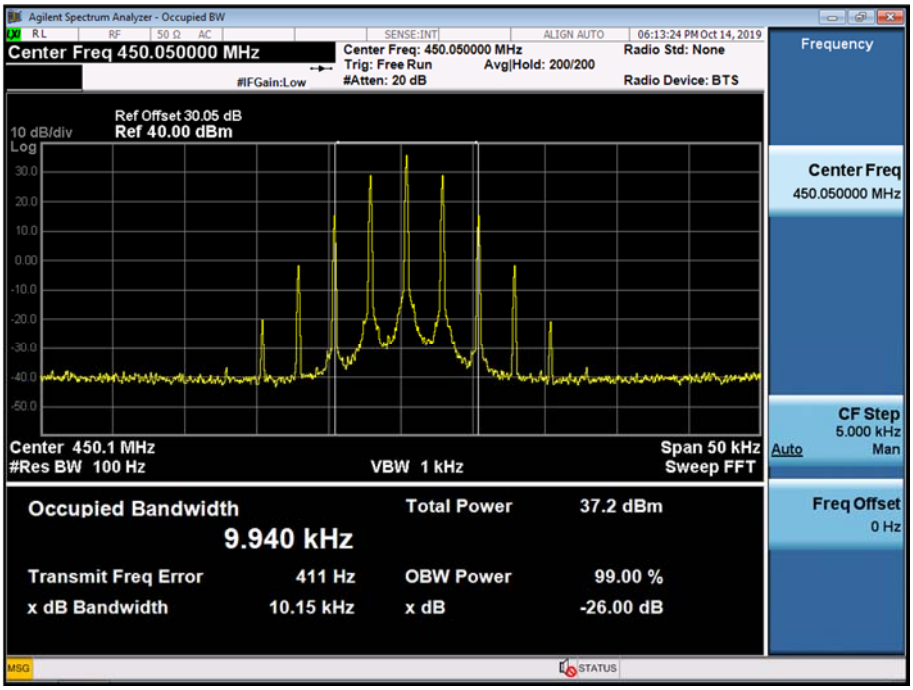


(511.95 MHz)_Low_1W

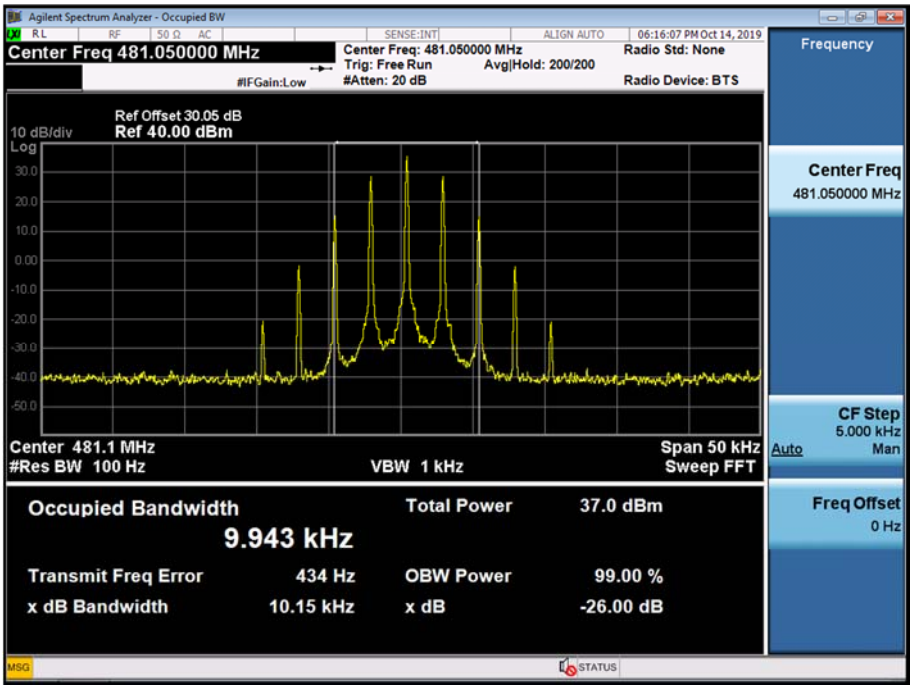


11K0F3E_FCC

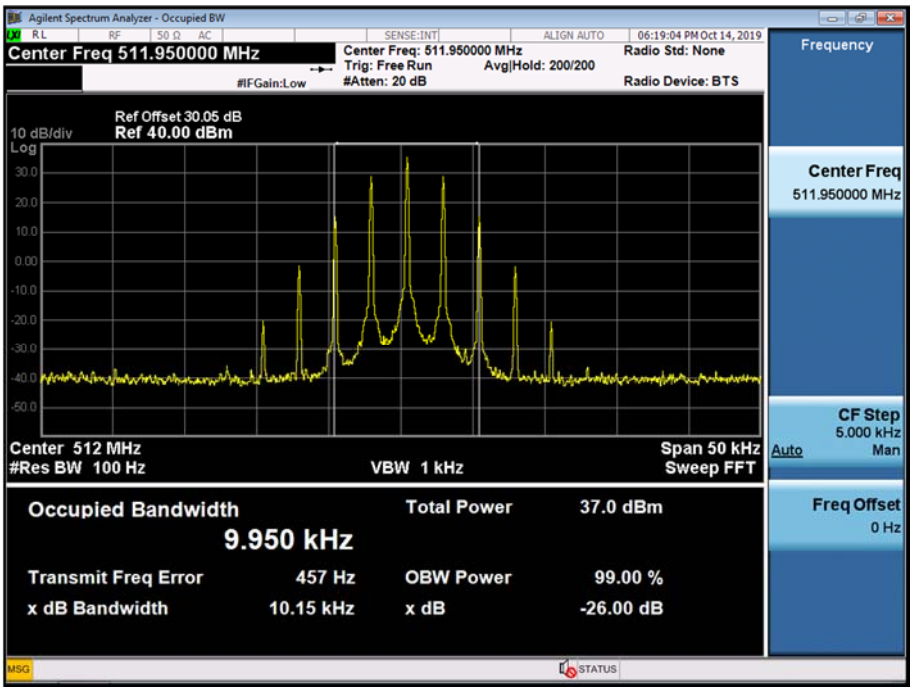
(450.05 MHz)_High



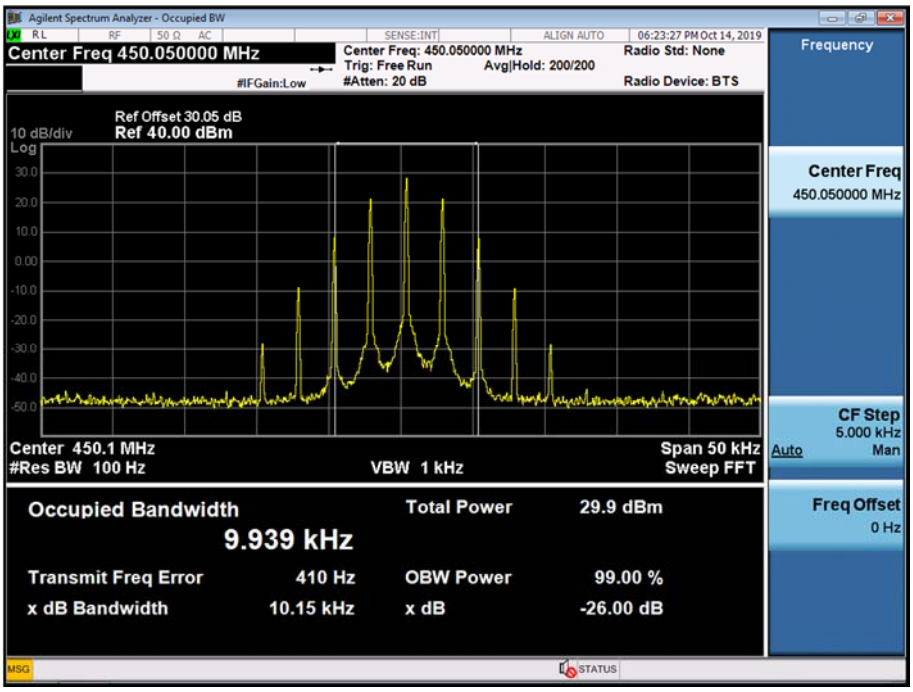
(481.05 MHz)_High



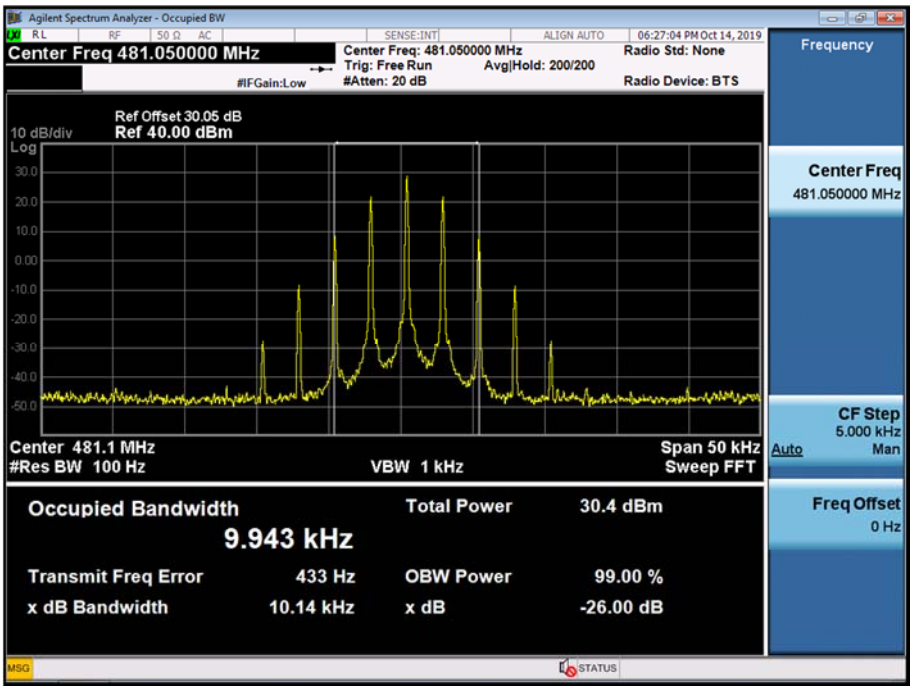
(511.95 MHz)_High



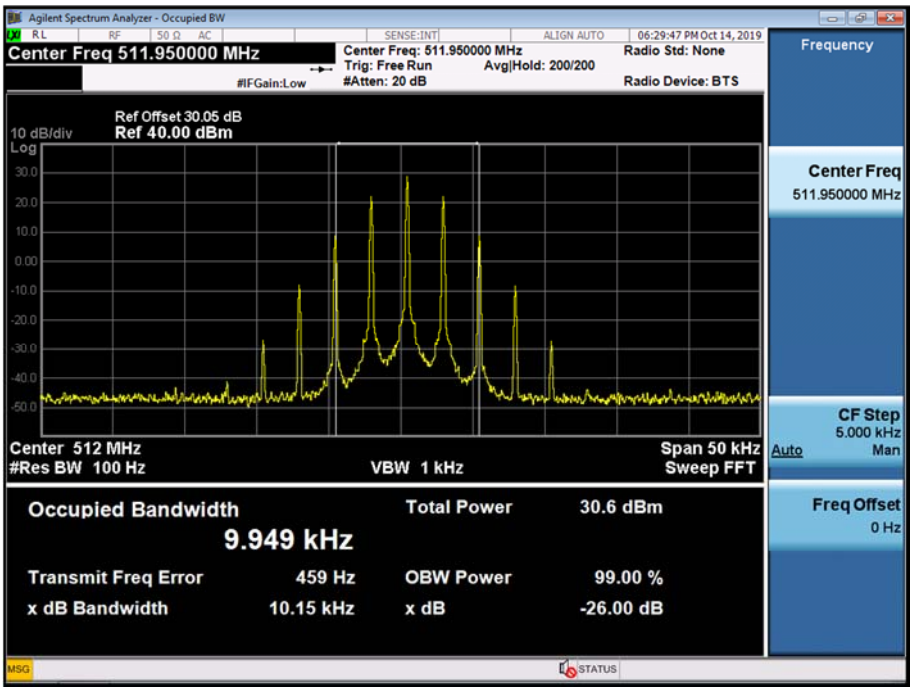
(450.05 MHz)_Low



(481.05 MHz)_Low

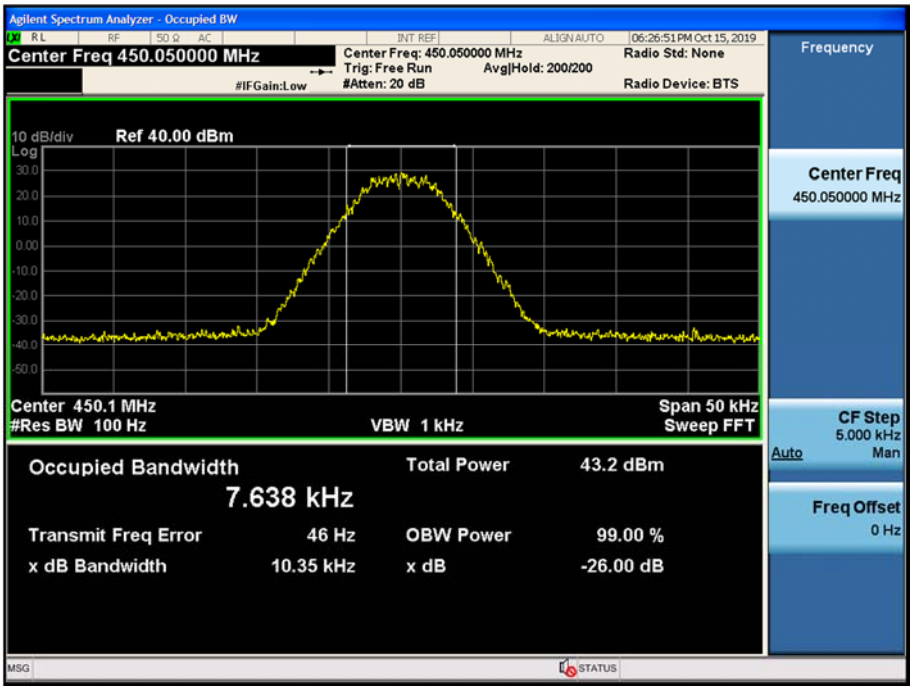


(511.95 MHz)_Low

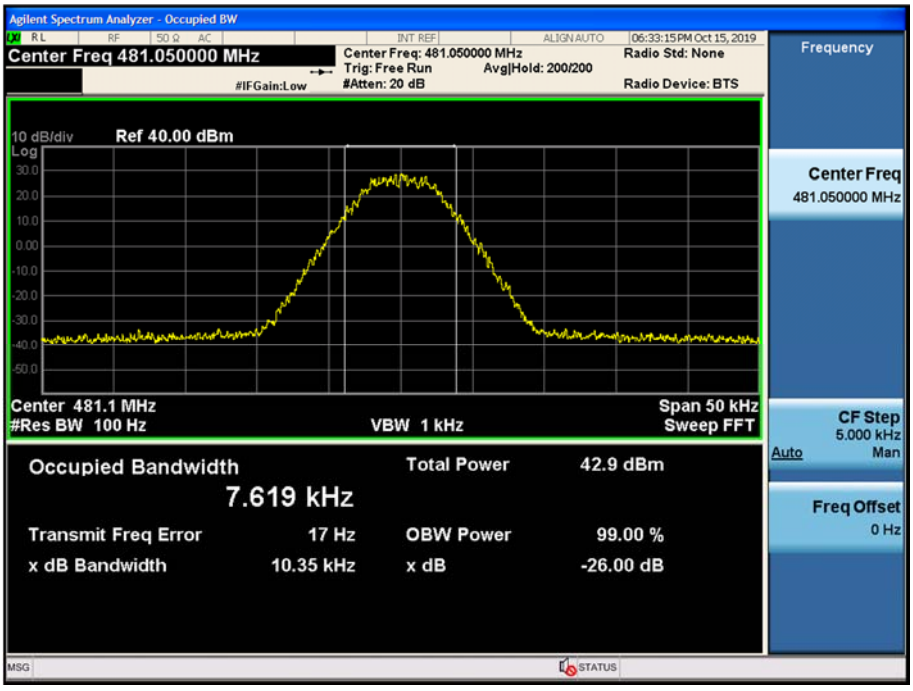


8K30F1E, 8K30F1D, 8K30F7W_FCC

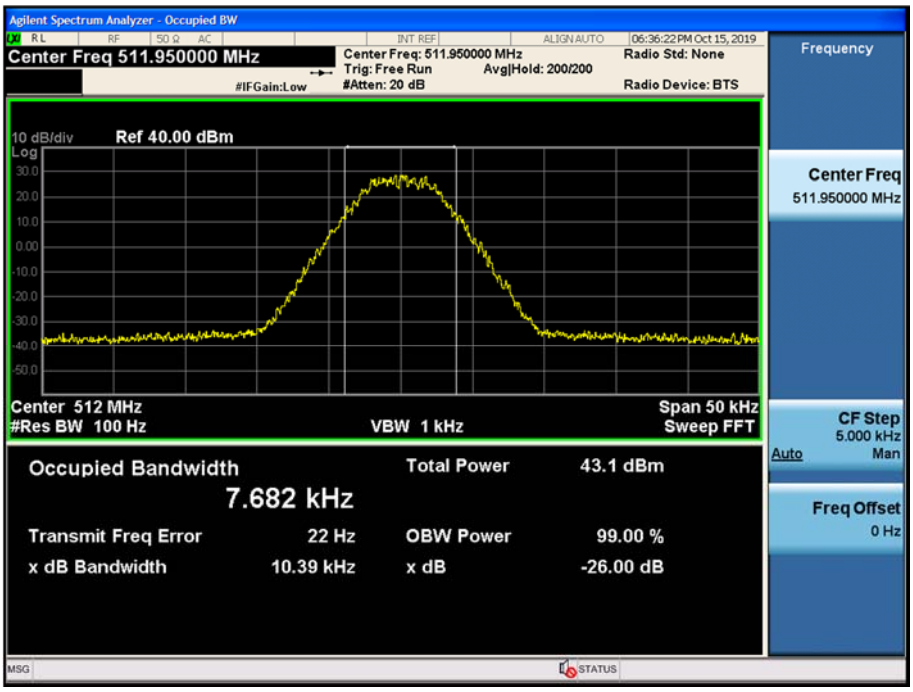
(450.05 MHz)_High



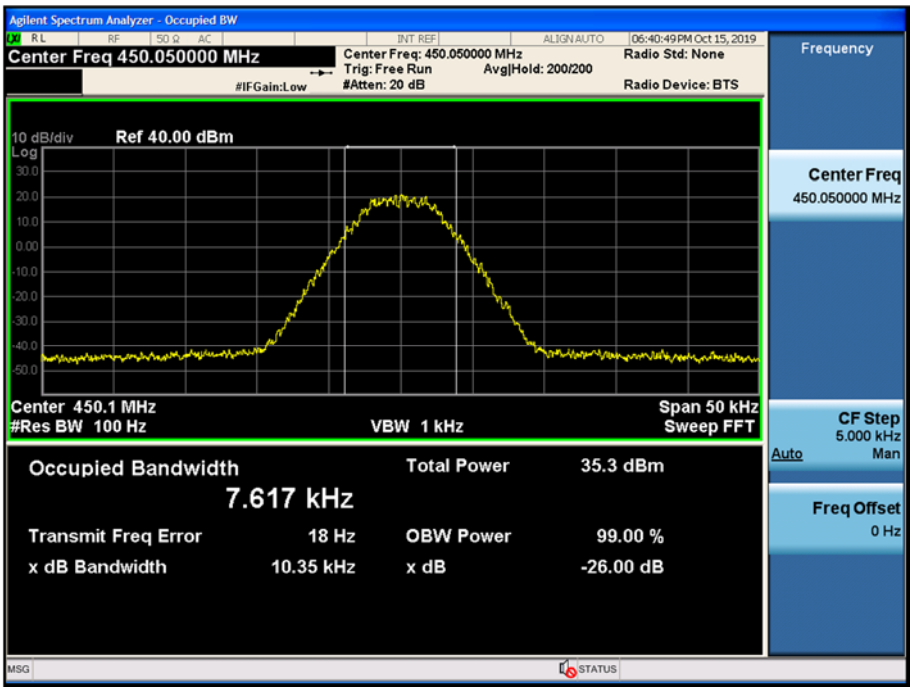
(481.05 MHz)_High



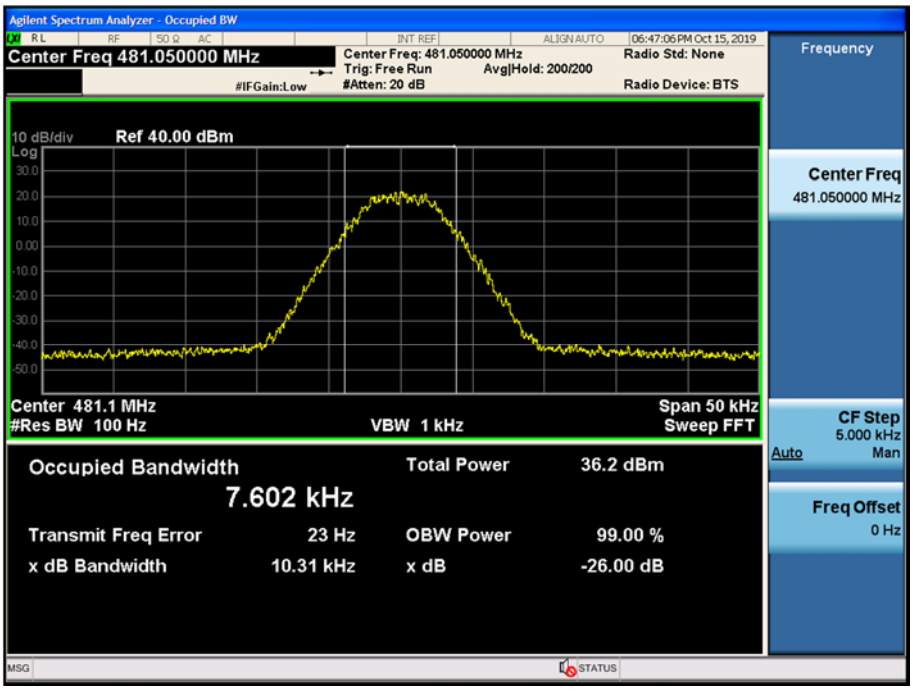
(511.95 MHz)_High



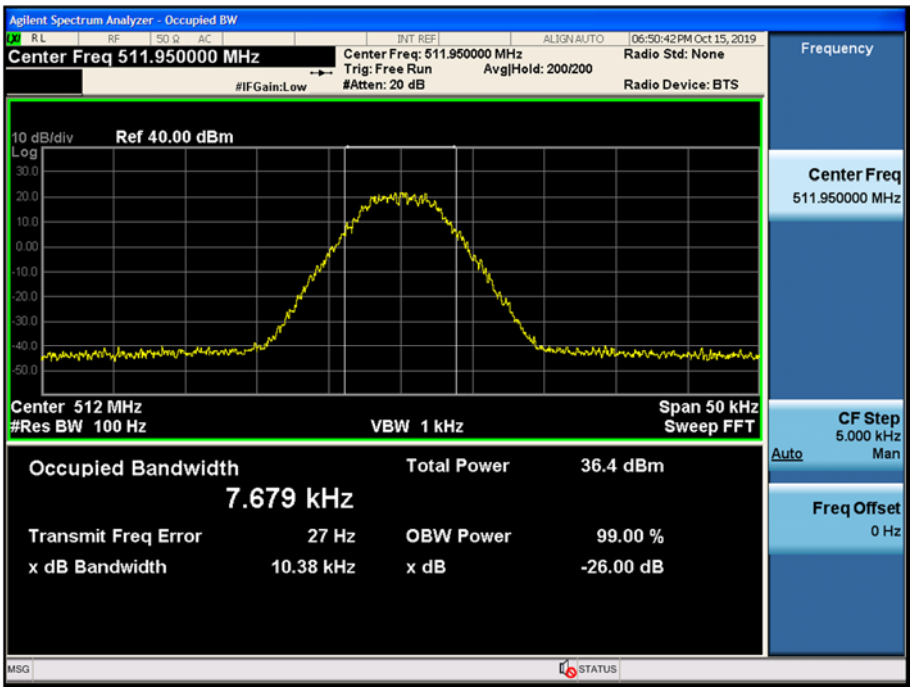
(450.05 MHz)_Low



(481.05 MHz)_Low

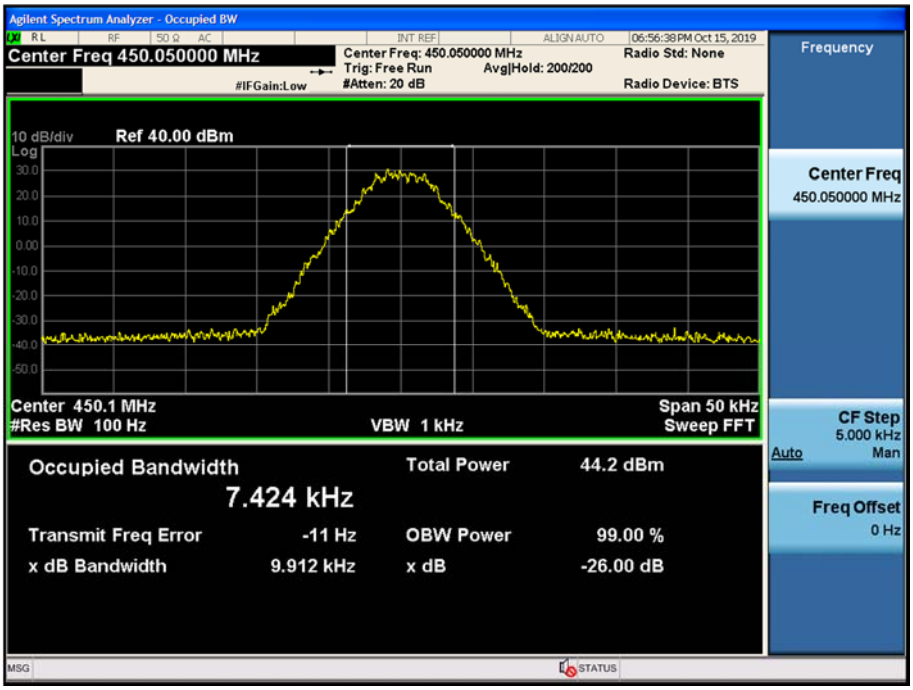


(511.95 MHz)_Low

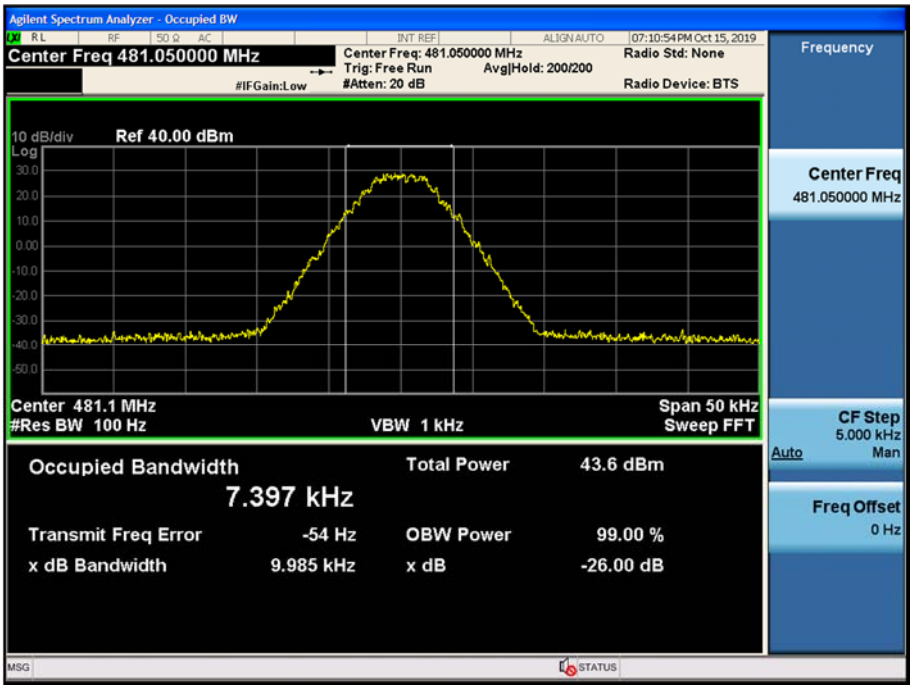


7K60FXD, 7K60FXE_FCC

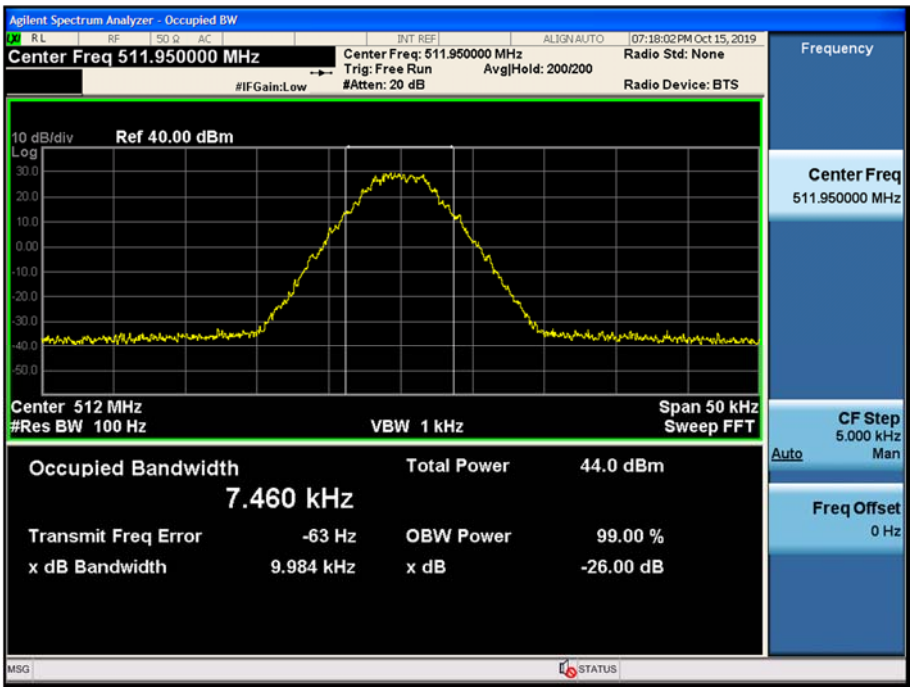
(450.05 MHz)_High



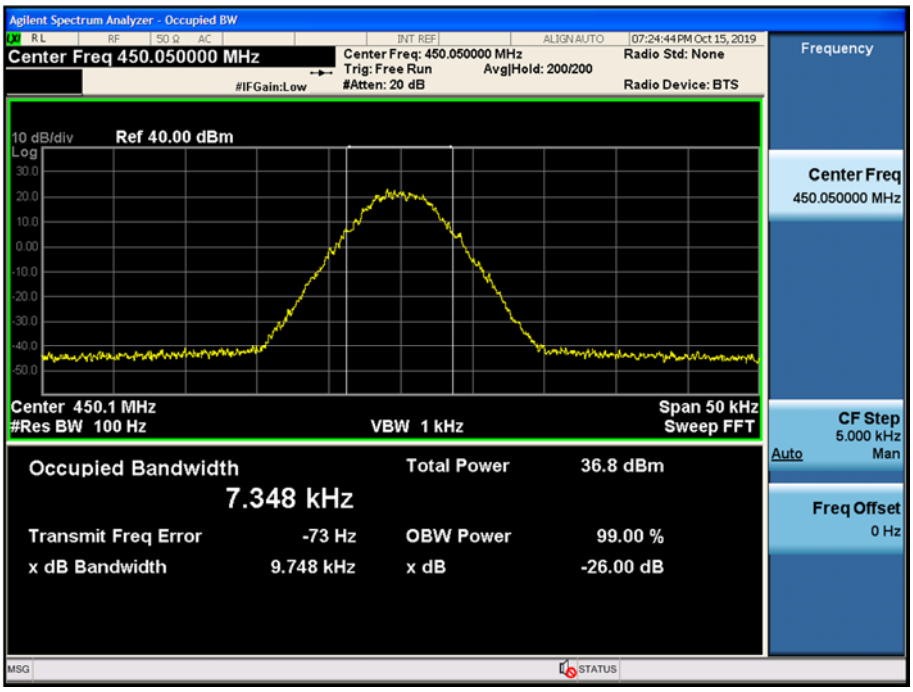
(481.05 MHz)_High



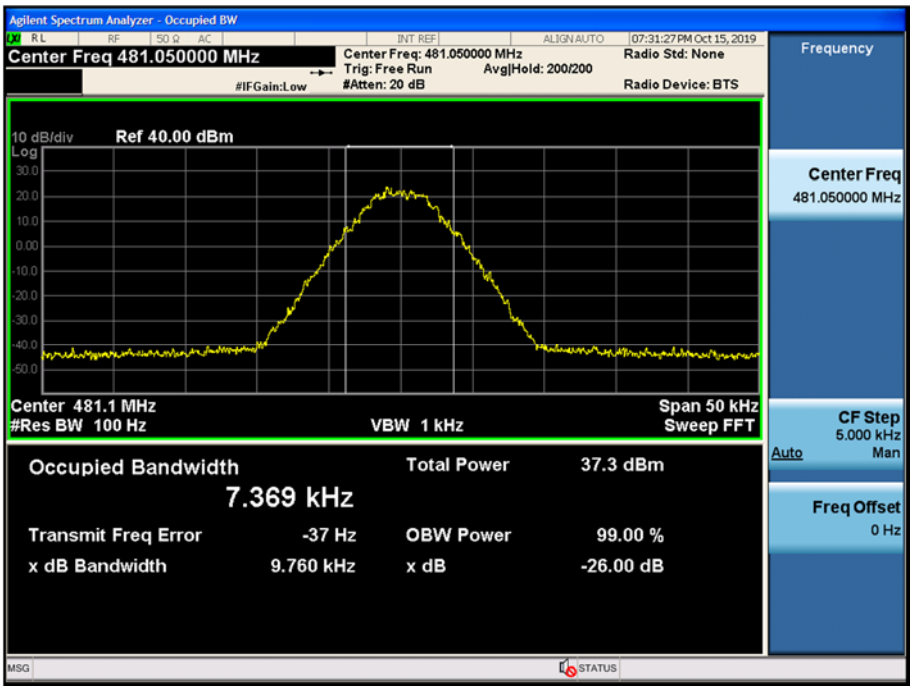
(511.95 MHz)_High



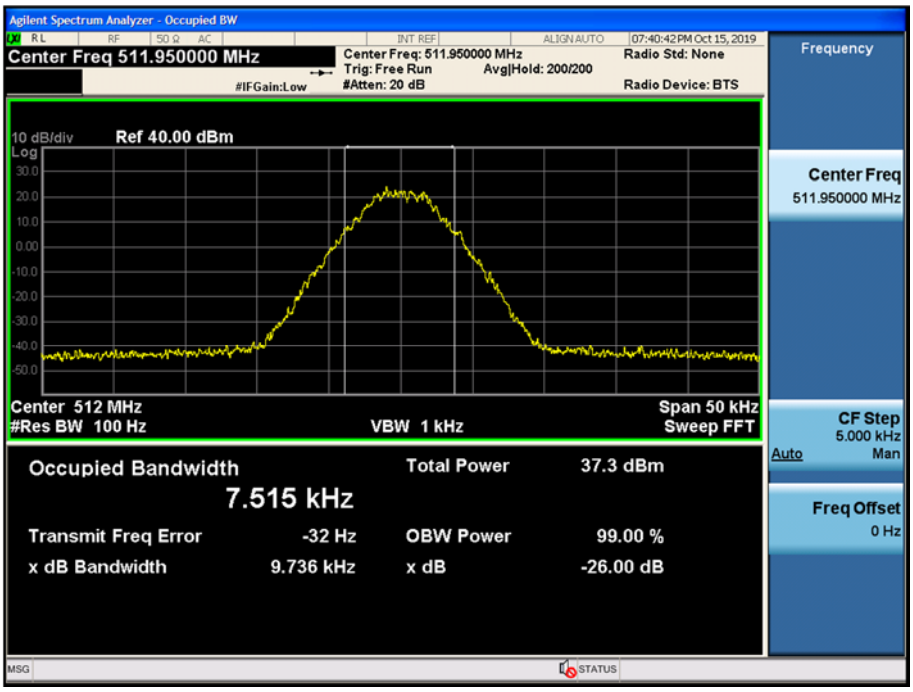
(450.05 MHz)_Low



(481.05 MHz)_Low

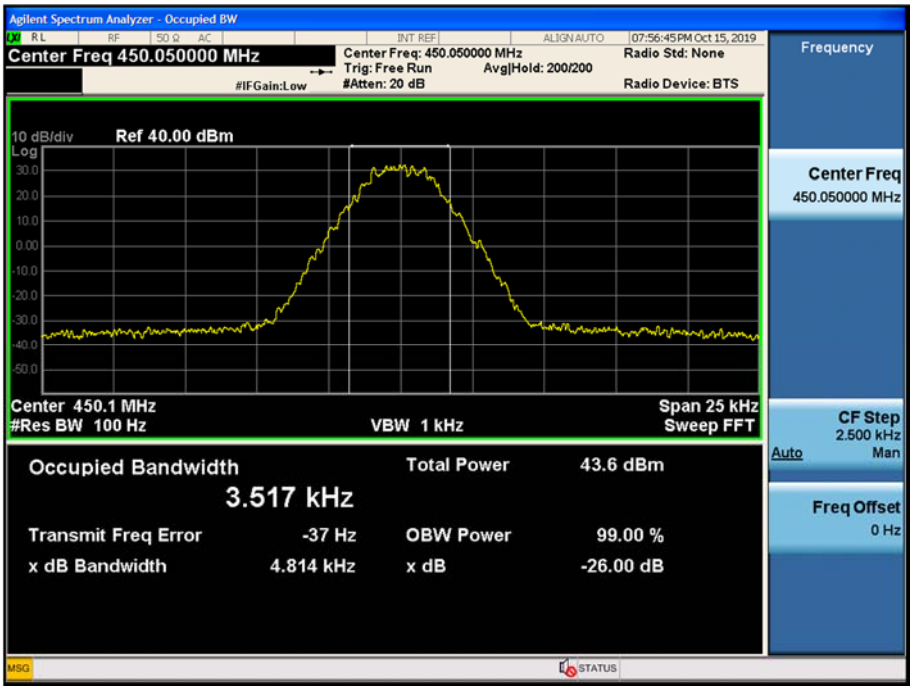


(511.95 MHz)_Low

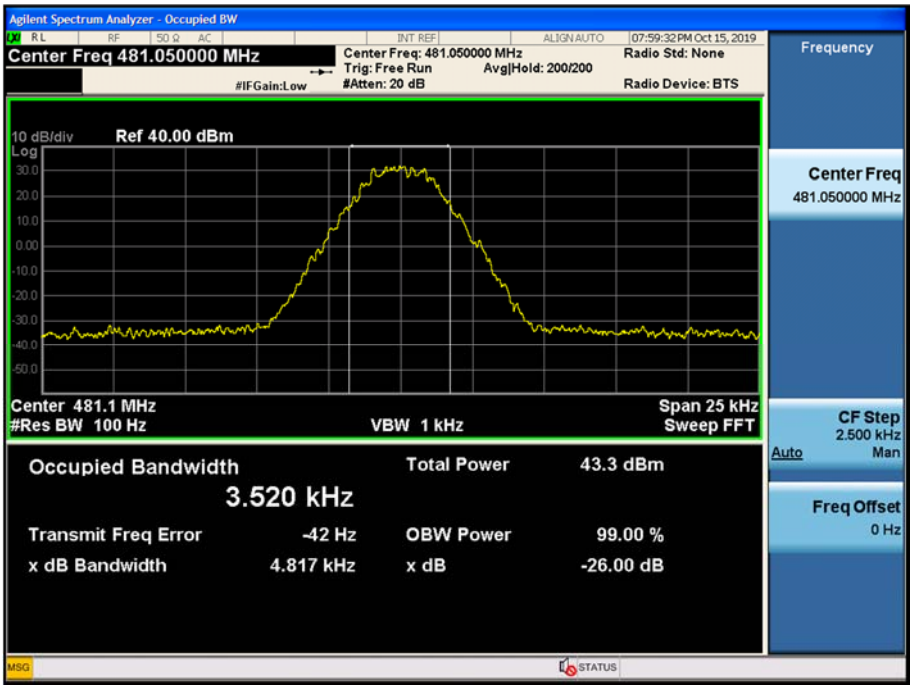


4K00F1E, 4K00F1D, 4K00F7W_FCC

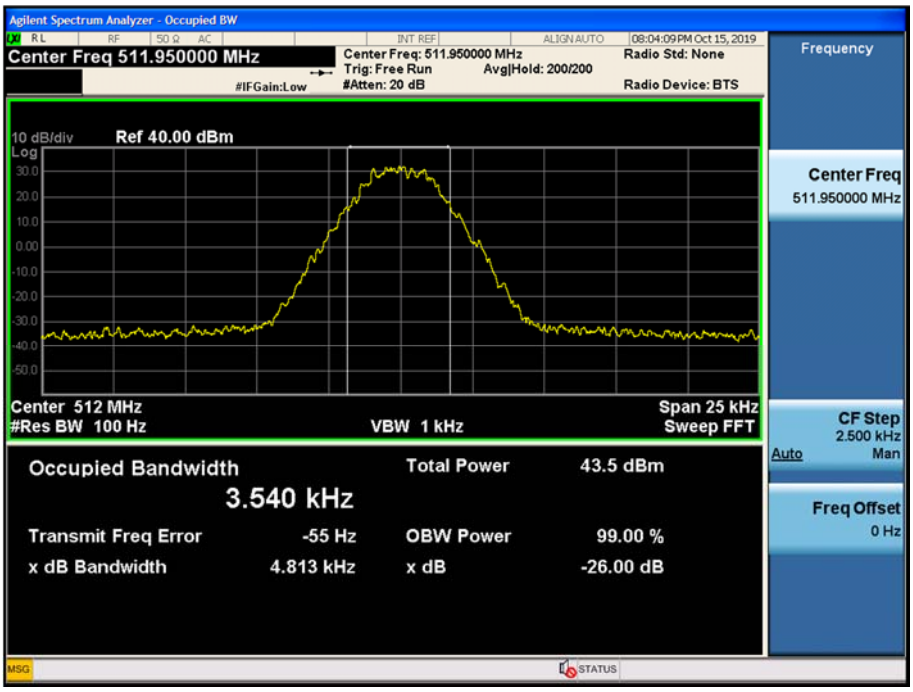
(450.05 MHz)_High



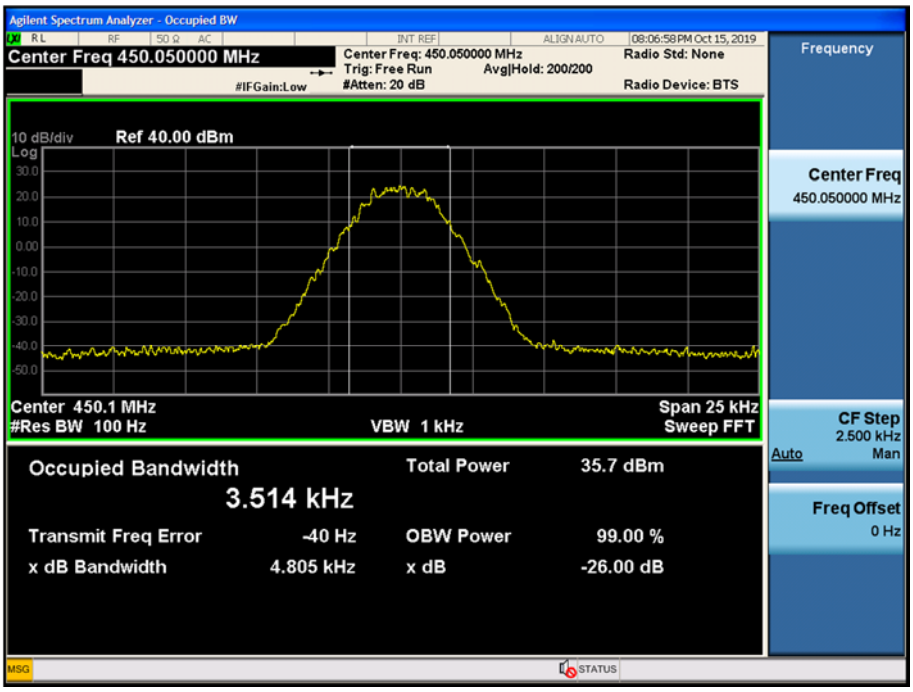
(481.05 MHz)_High



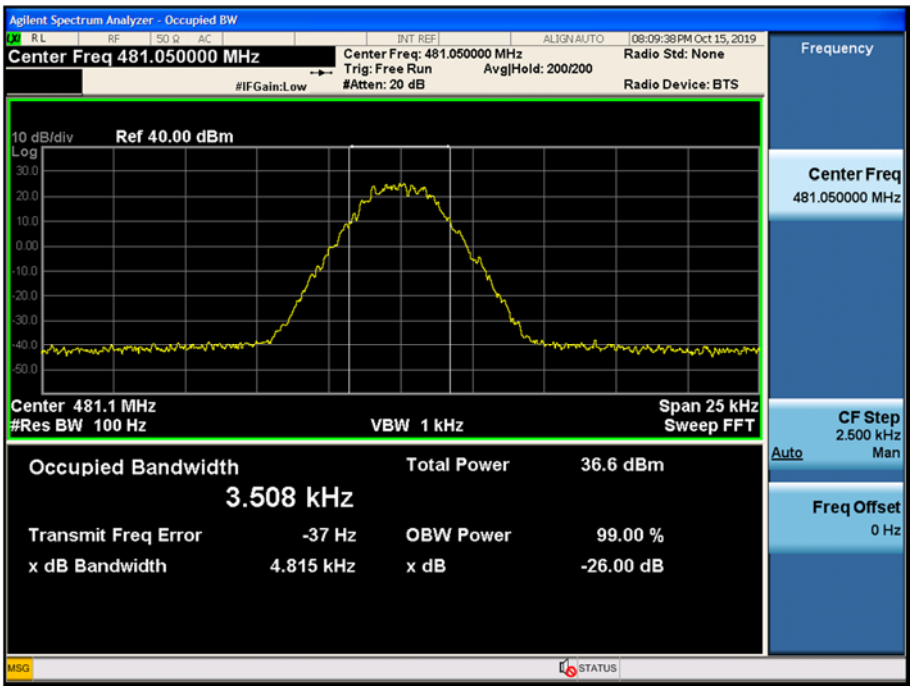
(511.95 MHz)_High



(450.05 MHz)_Low



(481.05 MHz)_Low



(511.95 MHz)_Low