

TEST REPORT

FCC/IC Test for NX-1300-K5

APPLICANT

JVCKENWOOD Corporation

REPORT NO.

HCT-RF-1907-FI025

DATE OF ISSUE

26 July 2019

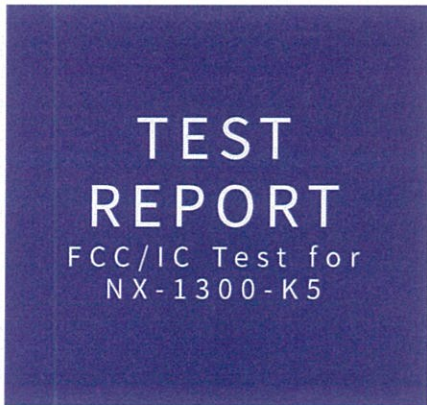
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FCC ID/IC
K44501100/282F-501100

Applicant	JVCKENWOOD Corporation 1-16-2 Hakusan Midori-ku Yokohama-shi Kanagawa 226-8525 Japan
Product Name	UHF TRANSCEIVER
Model(s)	NX-1300-K5
Additional Model(s)	NX-1300-K4
Test Standard Used	Part 2, 22, 74, 90 / RSS- Gen Issue 5, RSS-119 Issue 12
Frequency Range	FCC: 406.1 MHz ~ 470.0 MHz IC: 406.1 ~ 430.0 MHz, 450.0 ~ 470.0 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
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REVISION HISTORY

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

Revision No.	Date of Issue	Description
0	26 July 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)

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1. GENERAL INFORMATION

Manufacturer:	JVCKENWOOD Corporation
Address:	1-16-2 Hakusan Midori-ku Yokohama-shi Kanagawa 226-8525 Japan
FCC ID:	K44501100
ISED:	282F-501100
EUT Type:	UHF TRANSCEIVER
Model(s):	NX-1300-K5
Additional Model(s):	NX-1300-K4
Date(s) of Tests:	July 01, 2019 ~ July 26, 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 \pm 20%
Output Power	5 W (Power output continuously variable to 0.25 W) (Max : 5.2 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-23M3 UHF Low Profile Helical Antenna (400-450 MHz) KRA-27M UHF Whip Antenna (440-490 MHz) KRA-27M2 UHF Whip Antenna (470-520 MHz) KRA-27M3 UHF Whip Antenna (400-450 MHz) KRA-42M UHF Stubby Antenna (440-490 MHz) KRA-42M2 UHF Stubby Antenna (470-520 MHz) KRA-42M3 UHF Stubby Antenna (400-450 MHz)
Peak Antenna gain	KRA-23M UHF Low Profile Helical Antenna: 0 dBd KRA-23M2 UHF Low Profile Helical Antenna: 0 dBd KRA-23M3 UHF Low Profile Helical Antenna: 0 dBd KRA-27M UHF Whip Antenna: 0 dBd KRA-27M2 UHF Whip Antenna: 0 dBd KRA-27M3 UHF Whip Antenna: 0 dBd KRA-42M UHF Stubby Antenna: 0 dBd KRA-42M2 UHF Stubby Antenna: 0 dBd KRA-42M3 UHF Stubby Antenna: 0 dBd
Type of Emission	16K0F3E: Analogue (*16K0F3E is IC only) 11K0F3E: Analogue 8K30F1E, 8K30F1D, 8K30F7W: NXDN 7K60FXE, 7K60FXD: DMR 4K00F1E, 4K00F1D, 4K00F7W: NXDN 4K00F2D: CWID
Channel Bandwidth	25 kHz* / 6.25 kHz / 12.5 kHz (*25kHz is IC only)
Operating Temperature	-30 °C ~ +60 °C
Frequency Range	406.1 MHz ~ 470.0 MHz (FCC) 406.1 ~ 430.0 MHz, 450.0 ~ 470.0 MHz (IC)
Test Frequency	406.15 MHz / 429.95 MHz / 450.05 MHz / 469.95 MHz

Maximum deviation	16K0F3E: ± 5 kHz 11K0F3E: ± 2.5 kHz
Frequency Stability	± 1.0 ppm
PMN	NX-1300-K4, NX-1300-K5
HVIN	NX-1300-K4, NX-1300-K5
FVIN	N/A
HMN	N/A

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 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;

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

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-K5 & Additional Models were tested and the worst case results are reported.
(Worst case : NX-1300-K5)
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-23M3, KRA-27M, KRA-27M2, KRA-27M3,
KRA-42M, KRA-42M2, KRA-42M3
 - Worstcase : KRA-23M, KRA-23M3, KRA-27M, KRA-27M3
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-K5 & Additional Models were tested and the worst case results are reported.
(Worst case : NX-1300-K5)
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)	ISED Part Section(s)	Test Condition	Test Result
Carrier RF Output Power	§ 2.1046, § 22.565, § 74.461, § 90.205	RSS119 (5.4)	CONDUCTED	PASS
Unwanted Emissions	§ 2.1051 § 22.359, § 74.462, § 74.535, § 90.210	RSS119 (5.8)	CONDUCTED	PASS
99% Bandwidth(ISED)	NA	RSS119 (5.5)		PASS
Carrier Frequency Stability	§ 2.1055, § 22.355, § 74.464, § 90.213(a)	RSS119 (5.3)		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	RSS119 (5.9)		PASS
Emission Mask	§ 2.1049, § 22.359, § 74.462, § 74.535, § 90.210	RSS119 (5.8)	PASS	
Field Strength of Spurious Radiation	§ 2.1053 § 22.359, § 74.462, § 74.535, § 90.210	RSS119 (5.8)	RADIATED	PASS
Receiver Spurious Emissions	NA	RSS-Gen(7)		PASS
Necessary Bandwidth	§ 2.202(g)	-	-	-

Test Description	Test Limit(FCC)	Test Limit(IC)
Carrier RF Output Power	Varies	60W
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	6.25 kHz: 55+ 10 log (P)dB 12.5 kHz: 50 + 10 log (P)dB 25 kHz: 43 + 10 log (P)dB
99% Bandwidth(ISED)	N/A	6.25 kHz: 6 kHz 12.5 kHz: 11.25kHz 25 kHz: 20 kHz
Carrier Frequency Stability	6.25 kHz = 1 ppm 12.5 kHz = 2.5 ppm 25 kHz = 5 ppm	6.25 kHz = 1 ppm 12.5 kHz = 2.5 ppm 25 kHz = 5 ppm
Audio Frequency Response	Varies	N/A
Audio Low Pass Filter		
Modulation Limiting	25 kHz = 5 kHz 12.5 kHz = 2.5 kHz	N/A
Transient Frequency Behavior	<u>See Note3</u>	<u>See Note3</u>
Emission Mask	<u>See Note2</u>	<u>See Note2</u>
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	6.25 kHz: 55+ 10 log (P)dB 12.5 kHz: 50 + 10 log (P)dB 25 kHz: 43 + 10 log (P)dB
Receiver Spurious Emissions	N/A	<u>See Note1</u>

Note:

1. Receiver Spurious Emissions Limit :

Frequency (MHz)	Field Strength ($\mu\text{v}/\text{m}$ at 3 meters)
30 – 88	100
88 - 216	150
216 – 960	200
Above 960	500

2. 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 $55 + 10 \log_{10}(COP)$

3. 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

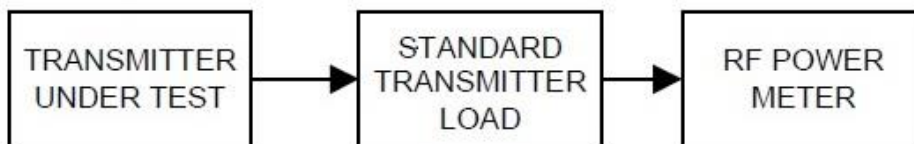
8. TEST RESULT

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
IC	16K0F3E	25	406.15	36.08	4.06	23.38	0.22
			429.95	35.91	3.90	22.75	0.19
			450.05	36.26	4.23	24.27	0.27
			469.95	36.04	4.02	25.04	0.32
FCC/IC	11K0F3E	12.5	406.15	36.09	4.06	23.36	0.22
			429.95	35.88	3.87	22.76	0.19
			450.05	36.27	4.23	24.27	0.27
			469.95	36.08	4.06	24.86	0.31
FCC/IC	8K30F1E, 8K30F1D, 8K30F7W	12.5	406.15	36.34	4.30	23.21	0.21
			429.95	36.20	4.17	22.42	0.17
			450.05	36.39	4.35	23.95	0.25
			469.95	36.30	4.27	24.36	0.27
FCC/IC	7K60FXD, 7K60FXE	12.5	406.15	36.39	4.36	23.25	0.21
			429.95	36.26	4.23	22.73	0.19
			450.05	36.46	4.42	24.06	0.25
			469.95	36.33	4.30	24.41	0.28
FCC/IC	4K00F1E, 4K00F1D, 4K00F7W	6.25	406.15	36.31	4.27	23.15	0.21
			429.95	36.16	4.13	22.86	0.19
			450.05	36.36	4.33	23.98	0.25
			469.95	36.28	4.24	24.38	0.27
FCC/IC	4K00F2D	6.25	406.15	35.92	3.91	22.68	0.19
			429.95	35.92	3.91	22.89	0.19
			450.05	36.23	4.20	22.89	0.19
			469.95	35.92	3.91	22.78	0.19

■ TEST RESULTS(ERP)

Certification	Type of Emission	Channel Bandwidth (kHz)	Test Frequency (MHz)	ERP			
				High Power		Low Power	
				dBm	W	dBm	W
IC	16K0F3E	25	406.15	36.08	4.06	23.38	0.22
			429.95	35.91	3.90	22.75	0.19
			450.05	36.26	4.23	24.27	0.27
			469.95	36.04	4.02	25.04	0.32
FCC/IC	11K0F3E	12.5	406.15	36.09	4.06	23.36	0.22
			429.95	35.88	3.87	22.76	0.19
			450.05	36.27	4.23	24.27	0.27
			469.95	36.08	4.06	24.86	0.31
FCC/IC	8K30F1E, 8K30F1D, 8K30F7W	12.5	406.15	36.34	4.30	23.21	0.21
			429.95	36.20	4.17	22.42	0.17
			450.05	36.39	4.35	23.95	0.25
			469.95	36.30	4.27	24.36	0.27
FCC/IC	7K60FXD, 7K60FXE	12.5	406.15	36.39	4.36	23.25	0.21
			429.95	36.26	4.23	22.73	0.19
			450.05	36.46	4.42	24.06	0.25
			469.95	36.33	4.30	24.41	0.28
FCC/IC	4K00F1E, 4K00F1D, 4K00F7W	6.25	406.15	36.31	4.27	23.15	0.21
			429.95	36.16	4.13	22.86	0.19
			450.05	36.36	4.33	23.98	0.25
			469.95	36.28	4.24	24.38	0.27
FCC/IC	4K00F2D	6.25	406.15	35.92	3.91	22.68	0.19
			429.95	35.92	3.91	22.89	0.19
			450.05	36.23	4.20	22.89	0.19
			469.95	35.92	3.91	22.78	0.19

Note:

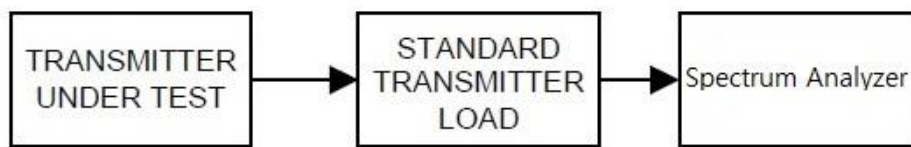
1. ERP = Carrier Output Power + Peak Antenna gain

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.

- Connect the equipment as illustrated.
- Operate the equipment in standby conditions for 15 minutes before proceeding.
- Record the carrier frequency of the transmitter as MCF_{MHz}
- Calculate the ppm frequency error by the following:

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

where

MCF_{MHz} is the Measured Carrier Frequency in MHz

ACF_{MHz} is the Assigned Carrier Frequency in MHz

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

▣ TEST RESULTS

(1) Frequency Stability (Temperature Variation)

406.15 MHz

Type of Emission	Power	Temperature (Degree C)	Frequency (Hz)	Frequency Error (Hz)	Frequency stability (ppm)	Limit (ppm)
16K0F3E	High Power	+20(Ref)	406.150437931	0.0000000	0.0000	1.0
		-30	406.150445492	0.0000076	0.0186	
		-20	406.150405048	-0.0000329	-0.0810	
		-10	406.150398950	-0.0000390	-0.0960	
		0	406.150413563	-0.0000244	-0.0600	
		+10	406.150428699	-0.0000092	-0.0227	
		+30	406.150400557	-0.0000374	-0.0920	
		+40	406.150409086	-0.0000288	-0.0710	
	Low Power	+50	406.150419233	-0.0000187	-0.0460	
		+20(Ref)	406.150437280	0.0000000	0.0000	
		-30	406.150402378	-0.0000349	-0.0859	
		-20	406.150419918	-0.0000174	-0.0427	
		-10	406.150430370	-0.0000069	-0.0170	
		0	406.150404010	-0.0000333	-0.0819	
		+10	406.150429889	-0.0000074	-0.0182	
		+30	406.150410621	-0.0000267	-0.0656	
+40	406.150430736	-0.0000065	-0.0161			
+50	406.150408031	-0.0000292	-0.0720			

429.95 MHz

Type of Emission	Power	Temperature (Degree C)	Frequency (Hz)	Frequency Error (Hz)	Frequency stability (ppm)	Limit (ppm)
16K0F3E	High Power	+20(Ref)	429.950477448	0.0000000	0.0000	1.0
		-30	429.950477578	0.0000001	0.0003	
		-20	429.950470364	-0.0000071	-0.0165	
		-10	429.950474385	-0.0000031	-0.0071	
		0	429.950472426	-0.0000050	-0.0117	
		+10	429.950458504	-0.0000189	-0.0441	
		+30	429.950433281	-0.0000442	-0.1027	
		+40	429.950459254	-0.0000182	-0.0423	
	Low Power	+50	429.950465843	-0.0000116	-0.0270	
		+20(Ref)	429.950461640	0.0000000	0.0000	
		-30	429.950456106	-0.0000055	-0.0129	
		-20	429.950460004	-0.0000016	-0.0038	
		-10	429.950444020	-0.0000176	-0.0410	
		0	429.950447500	-0.0000141	-0.0329	
		+10	429.950455486	-0.0000062	-0.0143	
		+30	429.950483191	0.0000216	0.0501	
+40	429.950450506	-0.0000111	-0.0259			
+50	429.950428954	-0.0000327	-0.0760			

450.05 MHz

Type of Emission	Power	Temperature (Degree C)	Frequency (Hz)	Frequency Error (Hz)	Frequency stability (ppm)	Limit (ppm)
16K0F3E	High Power	+20(Ref)	450.050426857	0.0000000	0.0000	1.0
		-30	450.050438040	0.0000112	0.0248	
		-20	450.050439015	0.0000122	0.0270	
		-10	450.050428140	0.0000013	0.0028	
		0	450.050455368	0.0000285	0.0634	
		+10	450.050433562	0.0000067	0.0149	
		+30	450.050450339	0.0000235	0.0522	
		+40	450.050442041	0.0000152	0.0337	
	+50	450.050415519	-0.0000113	-0.0252		
	Low Power	+20(Ref)	450.050439643	0.0000000	0.0000	
		-30	450.050451600	0.0000120	0.0266	
		-20	450.050465992	0.0000263	0.0585	
		-10	450.050430967	-0.0000087	-0.0193	
		0	450.050429927	-0.0000097	-0.0216	
		+10	450.050437051	-0.0000026	-0.0058	
		+30	450.050434963	-0.0000047	-0.0104	
+40		450.050456820	0.0000172	0.0382		
+50	450.050425136	-0.0000145	-0.0322			

469.95 MHz

Type of Emission	Power	Temperature (Degree C)	Frequency (Hz)	Frequency Error (Hz)	Frequency stability (ppm)	Limit (ppm)
16K0F3E	High Power	+20(Ref)	469.950491829	0.0000000	0.0000	1.0
		-30	469.950507984	0.0000162	0.0344	
		-20	469.950473261	-0.0000186	-0.0395	
		-10	469.950503474	0.0000116	0.0248	
		0	469.950485700	-0.0000061	-0.0130	
		+10	469.950496363	0.0000045	0.0096	
		+30	469.950518732	0.0000269	0.0572	
		+40	469.950496045	0.0000042	0.0090	
		+50	469.950512254	0.0000204	0.0435	
	Low Power	+20(Ref)	469.950482537	0.0000000	0.0000	
		-30	469.950476217	-0.0000063	-0.0134	
		-20	469.950517447	0.0000349	0.0743	
		-10	469.950492627	0.0000101	0.0215	
		0	469.950487849	0.0000053	0.0113	
		+10	469.950491808	0.0000093	0.0197	
		+30	469.950500381	0.0000178	0.0380	
		+40	469.950498076	0.0000155	0.0331	
		+50	469.950468160	-0.0000144	-0.0306	

406.15 MHz

Type of Emission	Power	Temperature (Degree C)	Frequency (Hz)	Frequency Error (Hz)	Frequency stability (ppm)	Limit (ppm)
11K0F3E	High Power	+20(Ref)	406.150452904	0.0000000	0.0000	1.0
		-30	406.150405774	-0.0000471	-0.1160	
		-20	406.150447584	-0.0000053	-0.0131	
		-10	406.150442384	-0.0000105	-0.0259	
		0	406.150416953	-0.0000360	-0.0885	
		+10	406.150426136	-0.0000268	-0.0659	
		+30	406.150423732	-0.0000292	-0.0718	
		+40	406.150432691	-0.0000202	-0.0498	
		+50	406.150413824	-0.0000391	-0.0962	
	Low Power	+20(Ref)	406.150450182	0.0000000	0.0000	
		-30	406.150456094	0.0000059	0.0146	
		-20	406.150405223	-0.0000450	-0.1107	
		-10	406.150457206	0.0000070	0.0173	
		0	406.150447852	-0.0000023	-0.0057	
		+10	406.150430734	-0.0000194	-0.0479	
		+30	406.150447405	-0.0000028	-0.0068	
		+40	406.150442535	-0.0000076	-0.0188	
		+50	406.150444650	-0.0000055	-0.0136	

429.95 MHz

Type of Emission	Power	Temperature (Degree C)	Frequency (Hz)	Frequency Error (Hz)	Frequency stability (ppm)	Limit (ppm)
11K0F3E	High Power	+20(Ref)	429.950460534	0.0000000	0.0000	1.0
		-30	429.950456041	-0.0000045	-0.0104	
		-20	429.950460246	-0.0000003	-0.0007	
		-10	429.950461457	0.0000009	0.0021	
		0	429.950441094	-0.0000194	-0.0452	
		+10	429.950454309	-0.0000062	-0.0145	
		+30	429.950464436	0.0000039	0.0091	
		+40	429.950448116	-0.0000124	-0.0289	
		+50	429.950447085	-0.0000134	-0.0313	
	Low Power	+20(Ref)	429.950424141	0.0000000	0.0000	
		-30	429.950434224	0.0000101	0.0235	
		-20	429.950424475	0.0000003	0.0008	
		-10	429.950441563	0.0000174	0.0405	
		0	429.950461120	0.0000370	0.0860	
		+10	429.950453555	0.0000294	0.0684	
		+30	429.950460495	0.0000364	0.0846	
		+40	429.950461768	0.0000376	0.0875	
		+50	429.950478601	0.0000545	0.1267	

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)	450.050423501	0.0000000	0.0000	1.0
		-30	450.050400734	-0.0000228	-0.0506	
		-20	450.050410182	-0.0000133	-0.0296	
		-10	450.050410068	-0.0000134	-0.0298	
		0	450.050452127	0.0000286	0.0636	
		+10	450.050429797	0.0000063	0.0140	
		+30	450.050406577	-0.0000169	-0.0376	
		+40	450.050399919	-0.0000236	-0.0524	
	Low Power	+50	450.050401080	-0.0000224	-0.0498	
		+20(Ref)	450.050429832	0.0000000	0.0000	
		-30	450.050416406	-0.0000134	-0.0298	
		-20	450.050404710	-0.0000251	-0.0558	
		-10	450.050418959	-0.0000109	-0.0242	
		0	450.050445687	0.0000159	0.0352	
		+10	450.050428295	-0.0000015	-0.0034	
		+30	450.050457319	0.0000275	0.0611	
+40	450.050443457	0.0000136	0.0303			
+50	450.050402897	-0.0000269	-0.0598			

469.95 MHz

Type of Emission	Power	Temperature (Degree C)	Frequency (Hz)	Frequency Error (Hz)	Frequency stability (ppm)	Limit (ppm)
11K0F3E	High Power	+20(Ref)	469.950478864	0.0000000	0.0000	1.0
		-30	469.950521482	0.0000426	0.0907	
		-20	469.950479518	0.0000007	0.0014	
		-10	469.950503134	0.0000243	0.0516	
		0	469.950495756	0.0000169	0.0359	
		+10	469.950495610	0.0000167	0.0356	
		+30	469.950489006	0.0000101	0.0216	
		+40	469.950479801	0.0000009	0.0020	
	Low Power	+50	469.950492324	0.0000135	0.0286	
		+20(Ref)	469.950491757	0.0000000	0.0000	
		-30	469.950503647	0.0000119	0.0253	
		-20	469.950493178	0.0000014	0.0030	
		-10	469.950482987	-0.0000088	-0.0187	
		0	469.950480888	-0.0000109	-0.0231	
		+10	469.950492004	0.0000002	0.0005	
		+30	469.950506360	0.0000146	0.0311	
+40	469.950515938	0.0000242	0.0515			
+50	469.950514190	0.0000224	0.0477			

406.15 MHz

Type of Emission	Power	Temperature (Degree C)	Frequency (Hz)	Frequency Error (Hz)	Frequency stability (ppm)	Limit (ppm)
4K00F2D	High Power	+20(Ref)	406.150143319	0.0000000	0.0000	1.0
		-30	406.150145132	0.0000018	0.0045	
		-20	406.150153678	0.0000104	0.0255	
		-10	406.150146477	0.0000032	0.0078	
		0	406.150128109	-0.0000152	-0.0374	
		+10	406.150130429	-0.0000129	-0.0317	
		+30	406.150151458	0.0000081	0.0200	
		+40	406.150156851	0.0000135	0.0333	
		+50	406.150137911	-0.0000054	-0.0133	
	Low Power	+20(Ref)	406.150011919	0.0000000	0.0000	
		-30	406.150018514	0.0000066	0.0162	
		-20	406.150042121	0.0000302	0.0744	
		-10	406.150056247	0.0000443	0.1091	
		0	406.150038913	0.0000270	0.0665	
		+10	406.150030824	0.0000189	0.0465	
		+30	406.150019184	0.0000073	0.0179	
		+40	406.150059248	0.0000473	0.1165	
		+50	406.150019094	0.0000072	0.0177	

429.95 MHz

Type of Emission	Power	Temperature (Degree C)	Frequency (Hz)	Frequency Error (Hz)	Frequency stability (ppm)	Limit (ppm)
4K00F2D	High Power	+20(Ref)	429.950175168	0.0000000	0.0000	1.0
		-30	429.950160310	-0.0000149	-0.0346	
		-20	429.950119655	-0.0000555	-0.1291	
		-10	429.950136281	-0.0000389	-0.0904	
		0	429.950173081	-0.0000021	-0.0049	
		+10	429.950148315	-0.0000269	-0.0625	
		+30	429.950133573	-0.0000416	-0.0967	
		+40	429.950136287	-0.0000389	-0.0904	
		+50	429.950153232	-0.0000219	-0.0510	
	Low Power	+20(Ref)	429.950045113	0.0000000	0.0000	
		-30	429.950052073	0.0000070	0.0162	
		-20	429.950016996	-0.0000281	-0.0654	
		-10	429.950039491	-0.0000056	-0.0131	
		0	429.950049331	0.0000042	0.0098	
		+10	429.950030596	-0.0000145	-0.0338	
		+30	429.950011011	-0.0000341	-0.0793	
		+40	429.950013722	-0.0000314	-0.0730	
		+50	429.950007112	-0.0000380	-0.0884	

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)	450.050148310	0.0000000	0.0000	1.0
		-30	450.050149117	0.0000008	0.0018	
		-20	450.050124150	-0.0000242	-0.0537	
		-10	450.050125154	-0.0000232	-0.0515	
		0	450.050134034	-0.0000143	-0.0317	
		+10	450.050127559	-0.0000208	-0.0461	
		+30	450.050121676	-0.0000266	-0.0592	
		+40	450.050145606	-0.0000027	-0.0060	
		+50	450.050113566	-0.0000347	-0.0772	
	Low Power	+20(Ref)	450.050000269	0.0000000	0.0000	
		-30	450.049984289	-0.0000160	-0.0355	
		-20	450.050002371	0.0000021	0.0047	
		-10	450.050014245	0.0000140	0.0311	
		0	450.050009425	0.0000092	0.0203	
		+10	450.049999498	-0.0000008	-0.0017	
		+30	450.049973707	-0.0000266	-0.0590	
		+40	450.050005216	0.0000049	0.0110	
		+50	450.049978454	-0.0000218	-0.0485	

469.95 MHz

Type of Emission	Power	Temperature (Degree C)	Frequency (Hz)	Frequency Error (Hz)	Frequency stability (ppm)	Limit (ppm)
4K00F2D	High Power	+20(Ref)	469.950164938	0.0000000	0.0000	1.0
		-30	469.950196286	0.0000313	0.0667	
		-20	469.950187069	0.0000221	0.0471	
		-10	469.950156575	-0.0000084	-0.0178	
		0	469.950197597	0.0000327	0.0695	
		+10	469.950169522	0.0000046	0.0098	
		+30	469.950190262	0.0000253	0.0539	
		+40	469.950142896	-0.0000220	-0.0469	
	Low Power	+50	469.950175607	0.0000107	0.0227	
		+20(Ref)	469.950008072	0.0000000	0.0000	
		-30	469.950007057	-0.0000010	-0.0022	
		-20	469.950057178	0.0000491	0.1045	
		-10	469.950008513	0.0000004	0.0009	
		0	469.950004073	-0.0000040	-0.0085	
		+10	469.950032446	0.0000244	0.0519	
		+30	469.950049593	0.0000415	0.0884	
+40	469.950006871	-0.0000012	-0.0026			
+50	469.950056182	0.0000481	0.1024			

(2) Frequency Stability (Voltage Variation)

406.15 MHz

Type of Emission	Power	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)	Limit (ppm)
16K0F3E	High Power	85	6.38	406.150388795	0.9573	1.0
		100	7.50	406.150389047	0.9579	
		115	8.63	406.150388957	0.9577	
	Low Power	85	6.38	406.150389556	0.9591	
		100	7.50	406.150390112	0.9605	
		115	8.63	406.150389956	0.9601	

429.95 MHz

Type of Emission	Power	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)	Limit (ppm)
16K0F3E	High Power	85	6.38	429.950418373	0.9731	1.0
		100	7.50	429.950418110	0.9725	
		115	8.63	429.950416776	0.9694	
	Low Power	85	6.38	429.950415412	0.9662	
		100	7.50	429.950415172	0.9656	
		115	8.63	429.950414444	0.9639	

450.05 MHz

Type of Emission	Power	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)	Limit (ppm)
16K0F3E	High Power	85	6.38	450.050394139	0.8758	1.0
		100	7.50	450.050393840	0.8751	
		115	8.63	450.050393332	0.8740	
	Low Power	85	6.38	450.050398033	0.8844	
		100	7.50	450.050397147	0.8825	
		115	8.63	450.050397092	0.8823	

469.95 MHz

Type of Emission	Power	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)	Limit (ppm)
16K0F3E	High Power	85	6.38	469.950456638	0.9717	1.0
		100	7.50	469.950455455	0.9692	
		115	8.63	469.950455748	0.9698	
	Low Power	85	6.38	469.950451997	0.9618	
		100	7.50	469.950450574	0.9588	
		115	8.63	469.950451312	0.9603	

406.15 MHz

Type of Emission	Power	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)	Limit (ppm)
11K0F3E	High Power	85	6.38	406.150386228	0.9510	1.0
		100	7.50	406.150386775	0.9523	
		115	8.63	406.150386101	0.9506	
	Low Power	85	6.38	406.150390856	0.9623	
		100	7.50	406.150390796	0.9622	
		115	8.63	406.150391155	0.9631	

429.95 MHz

Type of Emission	Power	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)	Limit (ppm)
11K0F3E	High Power	85	6.38	429.950414352	0.9637	1.0
		100	7.50	429.950414440	0.9639	
		115	8.63	429.950414406	0.9638	
	Low Power	85	6.38	429.950413851	0.9626	
		100	7.50	429.950413679	0.9622	
		115	8.63	429.950413500	0.9617	

450.05 MHz

Type of Emission	Power	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)	Limit (ppm)
11K0F3E	High Power	85	6.38	450.050390872	0.8685	1.0
		100	7.50	450.050393536	0.8744	
		115	8.63	450.050391877	0.8707	
	Low Power	85	6.38	450.050390163	0.8669	
		100	7.50	450.050390386	0.8674	
		115	8.63	450.050389586	0.8657	

469.95 MHz

Type of Emission	Power	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)	Limit (ppm)
11K0F3E	High Power	85	6.38	469.950455247	0.9687	1.0
		100	7.50	469.950454677	0.9675	
		115	8.63	469.950455015	0.9682	
	Low Power	85	6.38	469.950451224	0.9602	
		100	7.50	469.950450775	0.9592	
		115	8.63	469.950450953	0.9596	

406.15 MHz

Type of Emission	Power	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)	Limit (ppm)
4K00F2D	High Power	85	6.38	406.150131054	0.3227	1.0
		100	7.50	406.150133104	0.3277	
		115	8.63	406.150131984	0.3250	
	Low Power	85	6.38	406.150030224	0.0744	
		100	7.50	406.150029364	0.0723	
		115	8.63	406.150029333	0.0722	

429.95 MHz

Type of Emission	Power	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)	Limit (ppm)
4K00F2D	High Power	85	6.38	429.950147936	0.3441	1.0
		100	7.50	429.950149955	0.3488	
		115	8.63	429.950149411	0.3475	
	Low Power	85	6.38	429.950030064	0.0699	
		100	7.50	429.950030473	0.0709	
		115	8.63	429.950029613	0.0689	

450.05 MHz

Type of Emission	Power	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)	Limit (ppm)
4K00F2D	High Power	85	6.38	450.050125845	0.2796	1.0
		100	7.50	450.050126874	0.2819	
		115	8.63	450.050125879	0.2797	
	Low Power	85	6.38	450.049999572	-0.0010	
		100	7.50	450.050000225	0.0005	
		115	8.63	450.050000165	0.0004	

469.95 MHz

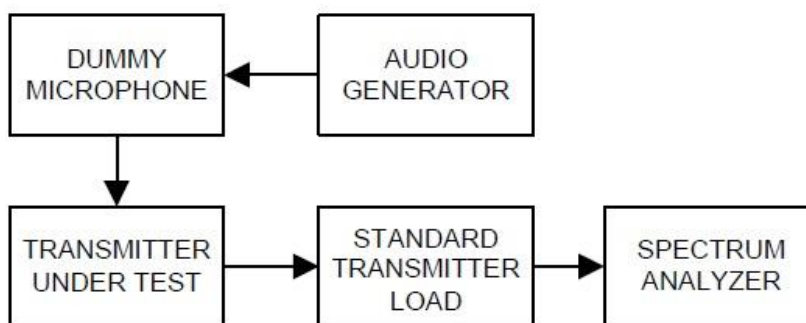
Type of Emission	Power	Diviation (%)	Voltage (V)	Frequency (MHz)	Frequency stability (ppm)	Limit (ppm)
4K00F2D	High Power	85	6.38	469.950169731	0.3612	1.0
		100	7.50	469.950169886	0.3615	
		115	8.63	469.950169174	0.3600	
	Low Power	85	6.38	469.950032600	0.0694	
		100	7.50	469.950031653	0.0674	
		115	8.63	469.950031870	0.0678	

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 / RSS-119 Section 5.5

- 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

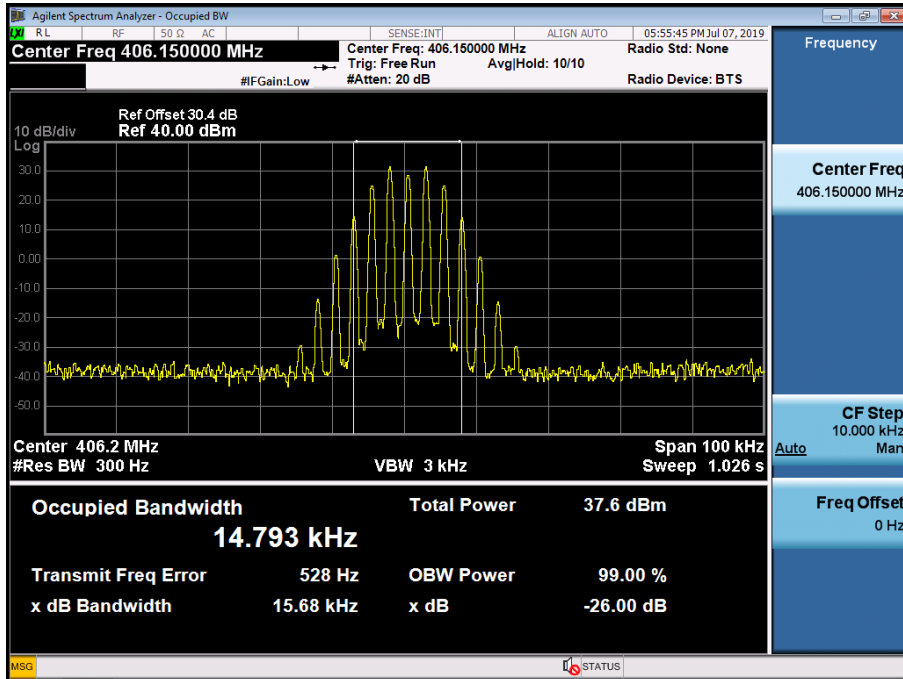
Certification	Type of Emission	Channel Bandwidth (kHz)	Power	Test Frequency (MHz)	Measured 99% OBW at Maximum Freq. Deviation(kHz)	Limit (kHz)
IC	16K0F3E	25	High Power	406.15	14.793	20.00
				429.95	14.873	
				450.05	14.791	
				469.95	14.765	
			Low Power	406.15	14.791	
				429.95	14.876	
				450.05	14.787	
				469.95	14.775	
FCC/IC	11K0F3E	12.5	High Power	406.15	9.942	11.25
				429.95	9.955	
				450.05	9.946	
				469.95	9.935	
			Low Power	406.15	9.941	
				429.95	9.957	
				450.05	9.943	
				469.95	9.937	
FCC/IC	8K30F1E, 8K30F1D, 8K30F7W	12.5	High Power	406.15	7.789	11.25
				429.95	7.981	
				450.05	7.761	
				469.95	7.715	
			Low Power	406.15	7.776	
				429.95	7.981	
				450.05	7.778	
				469.95	7.737	
FCC/IC	7K60FXD, 7K60FXE	12.5	High Power	406.15	7.562	6.00
				429.95	7.771	
				450.05	7.470	
				469.95	7.491	
			Low Power	406.15	7.562	
				429.95	7.716	
				450.05	7.530	
				469.95	7.450	
FCC/IC	4K00F1E, 4K00F1D, 4K00F7W	6.25	High Power	406.15	3.581	6.00
				429.95	3.641	
				450.05	3.551	
				469.95	3.543	
			Low Power	406.15	3.584	
				429.95	3.641	
				450.05	3.524	
				469.95	3.538	
FCC/IC	4K00F2D	6.25	High Power	406.15	4.036	6.00
				429.95	4.038	

Certification	Type of Emission	Channel Bandwidth (kHz)	Power	Test Frequency (MHz)	Measured 99% OBW at Maximum Freq. Deviation(kHz)	Limit (kHz)
				450.05	4.038	
				469.95	4.032	
			Low Power	406.15	4.021	
				429.95	4.030	
				450.05	4.019	
				469.95	4.019	

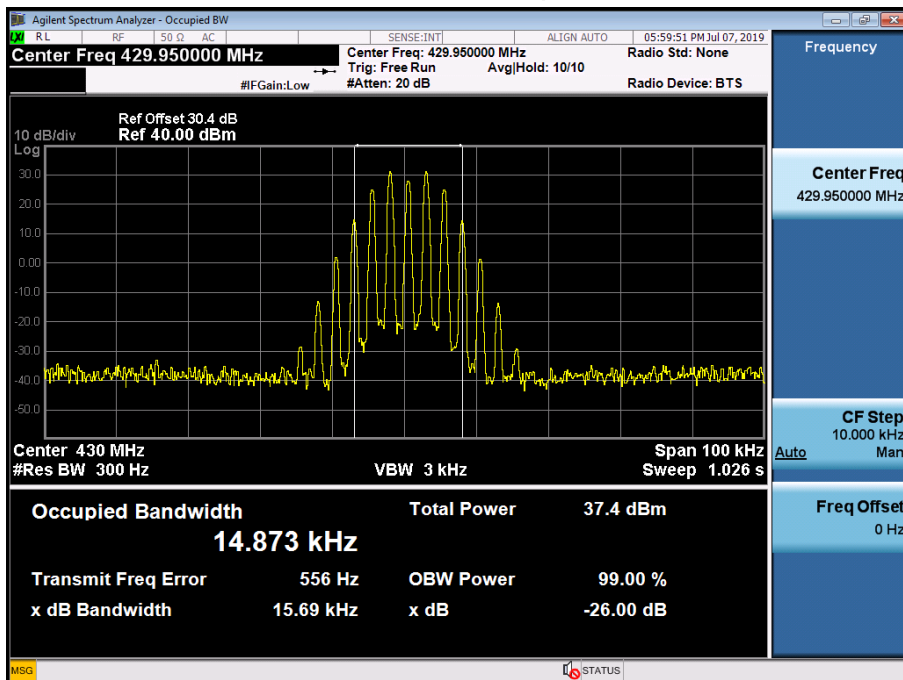
Plots of 99% Bandwidth

16K0F3E_IC

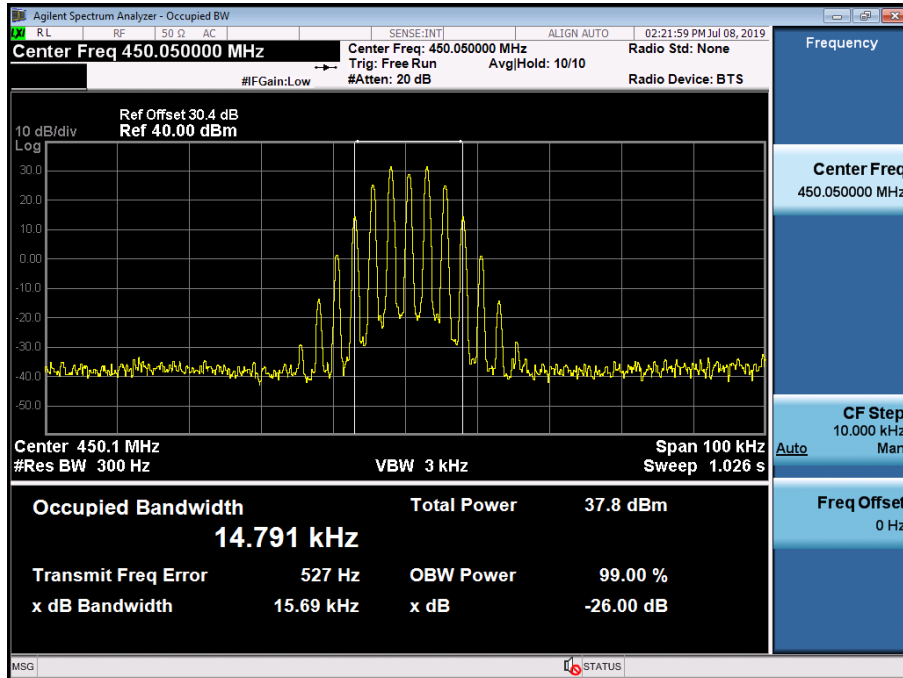
(406.15 MHz)_High



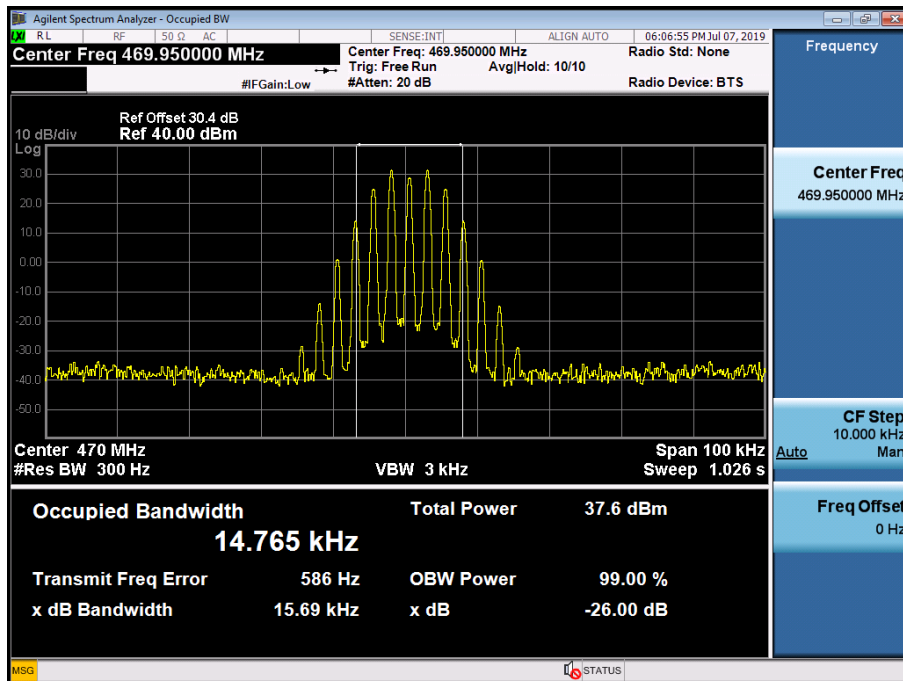
(429.95 MHz)_High



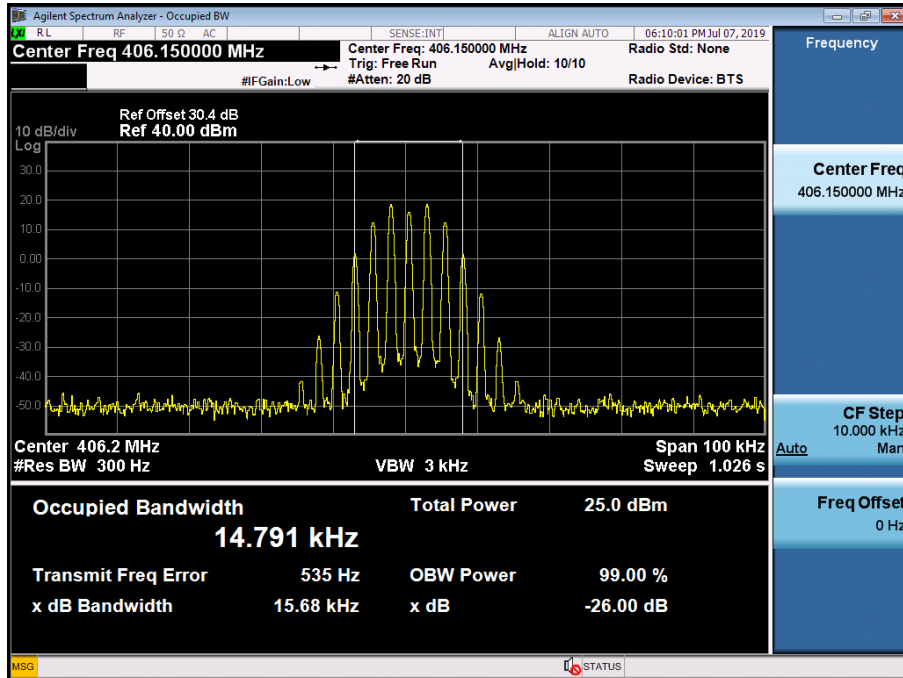
(450.05 MHz)_High



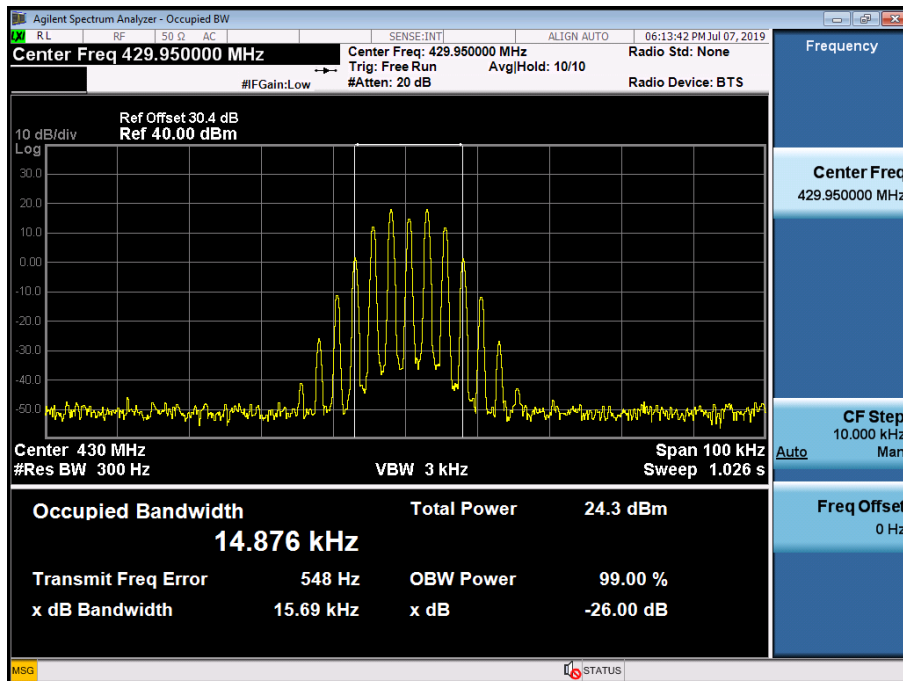
(469.95 MHz)_High



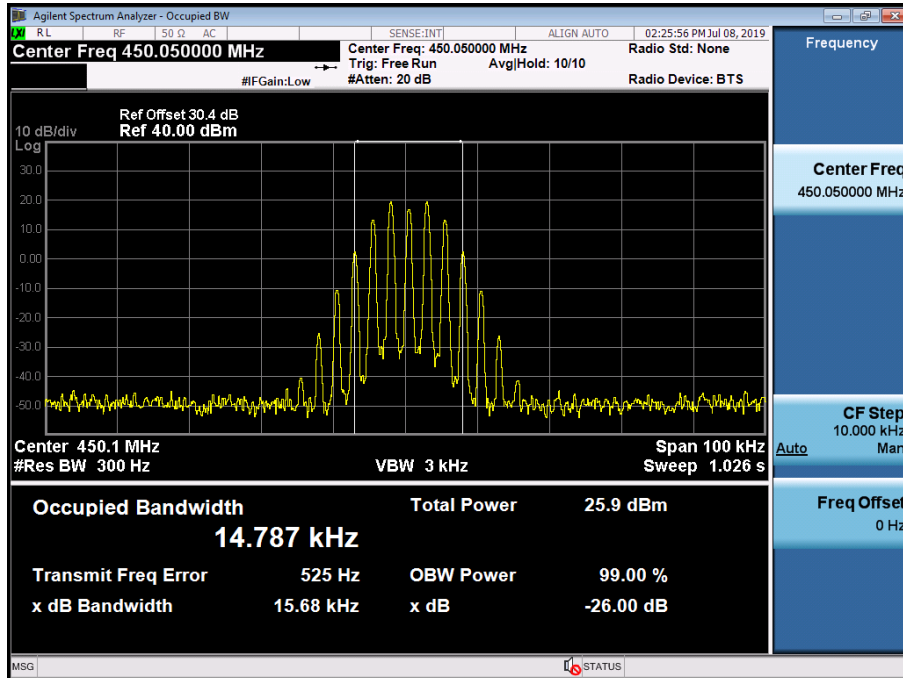
(406.15 MHz)_Low



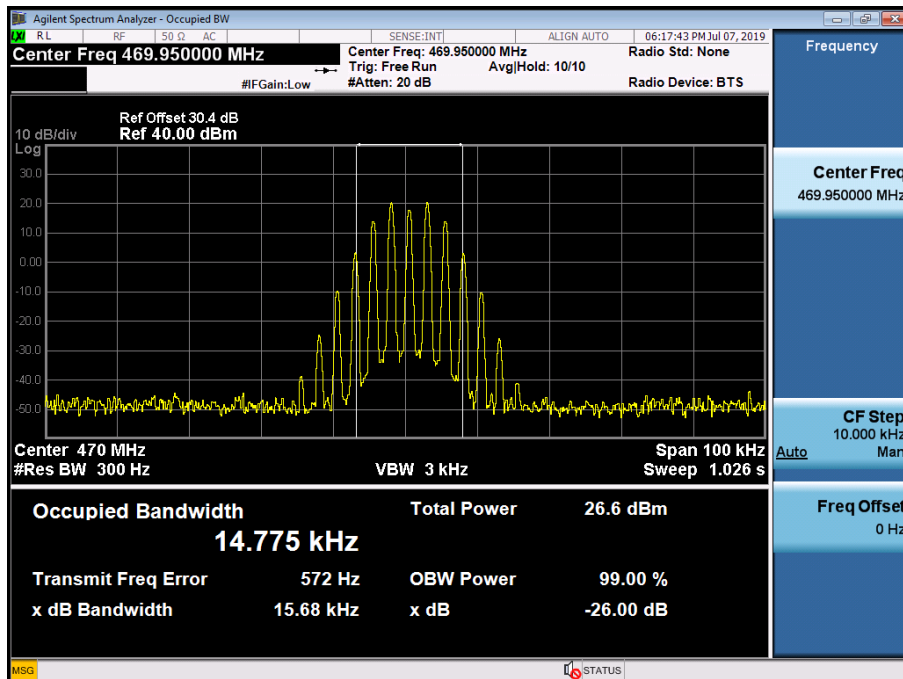
(429.95 MHz)_Low



(450.05 MHz)_Low

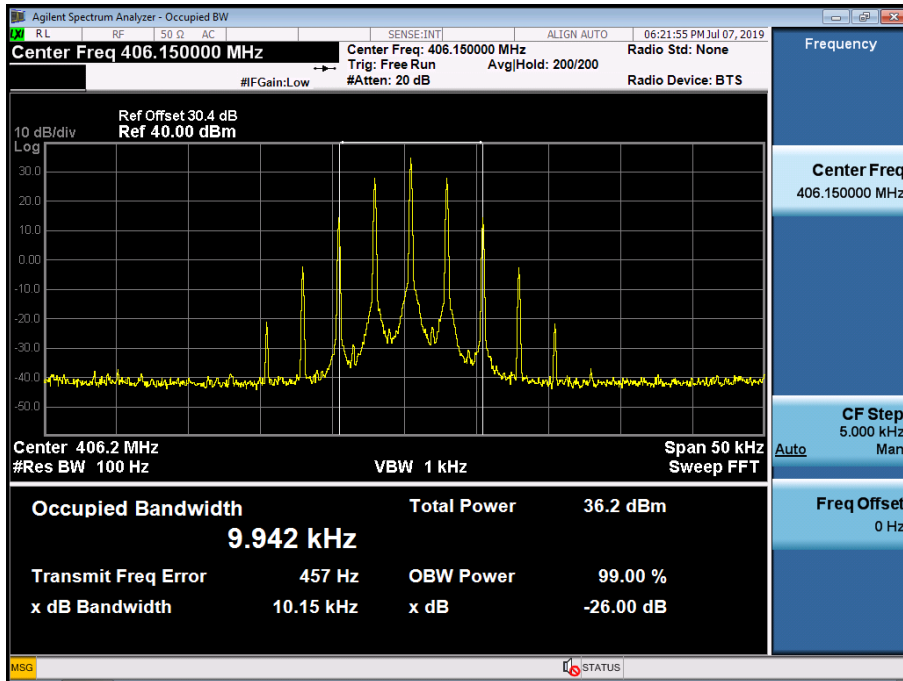


(469.95 MHz)_Low

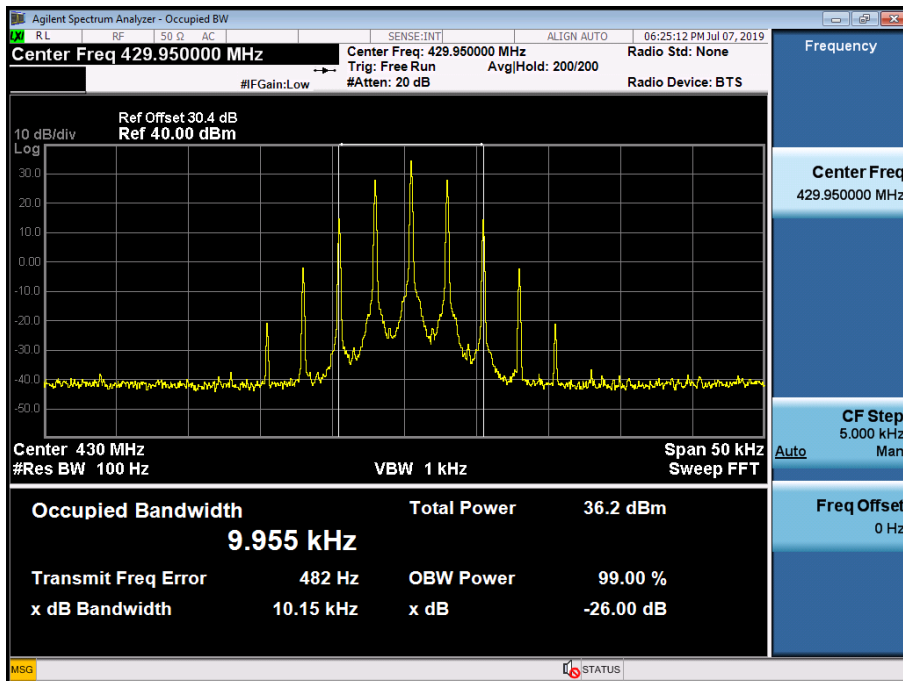


11K0F3E_FCC/IC

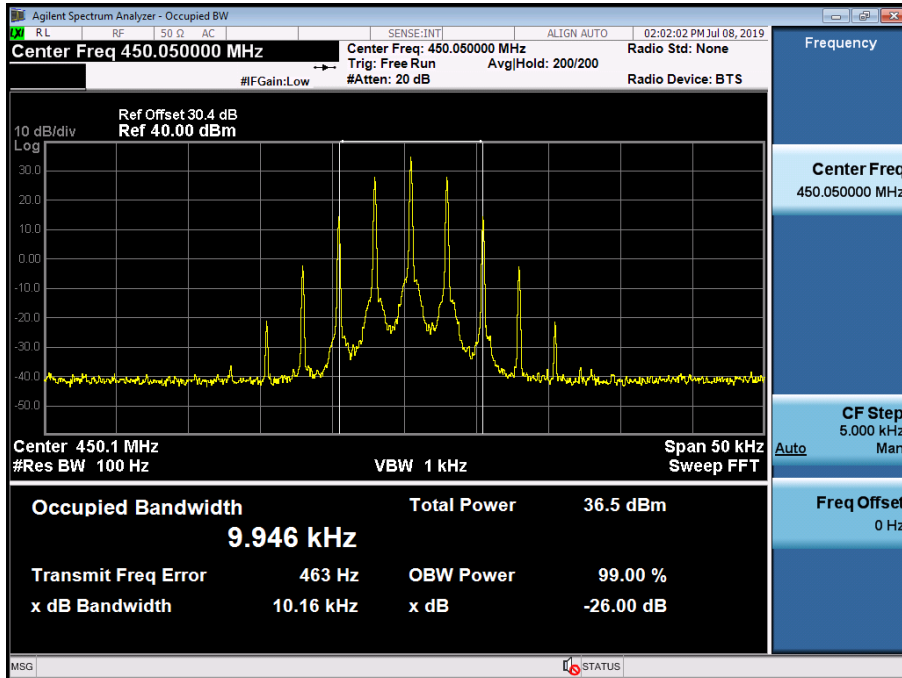
(406.15 MHz)_High



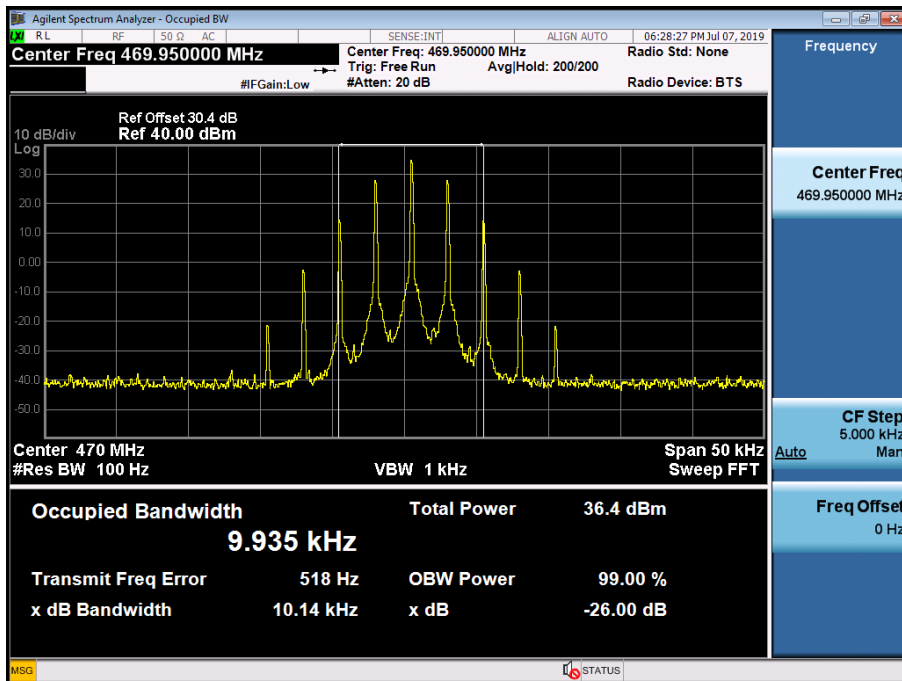
(429.95 MHz)_High



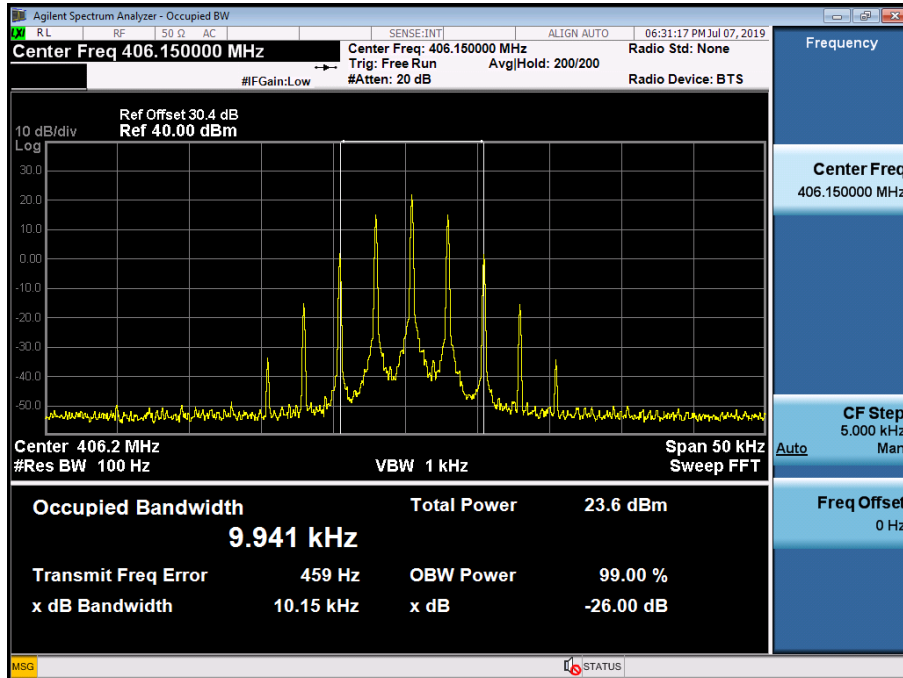
(450.05 MHz)_High



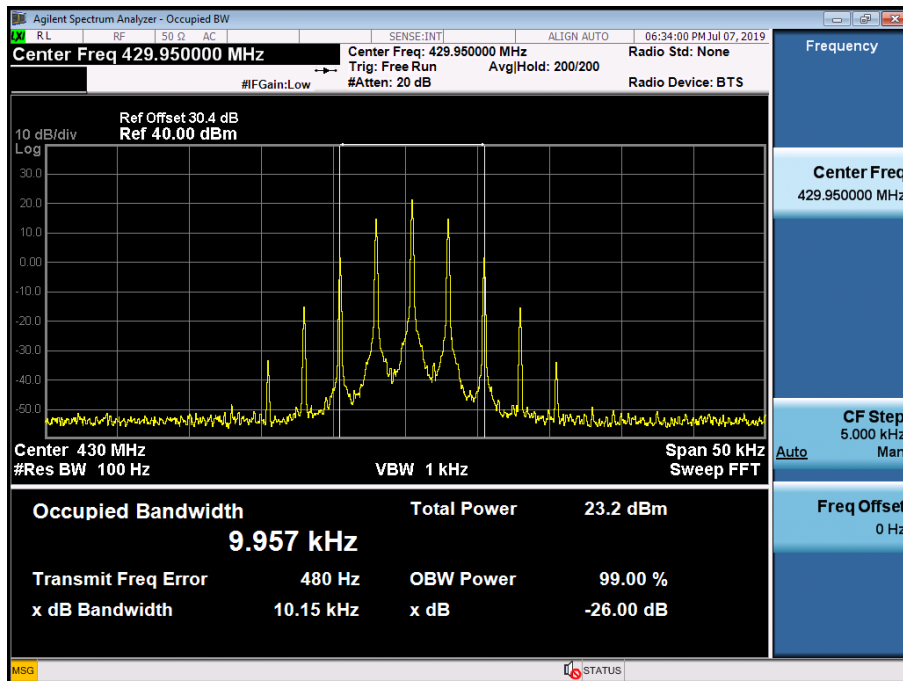
(469.95 MHz)_High



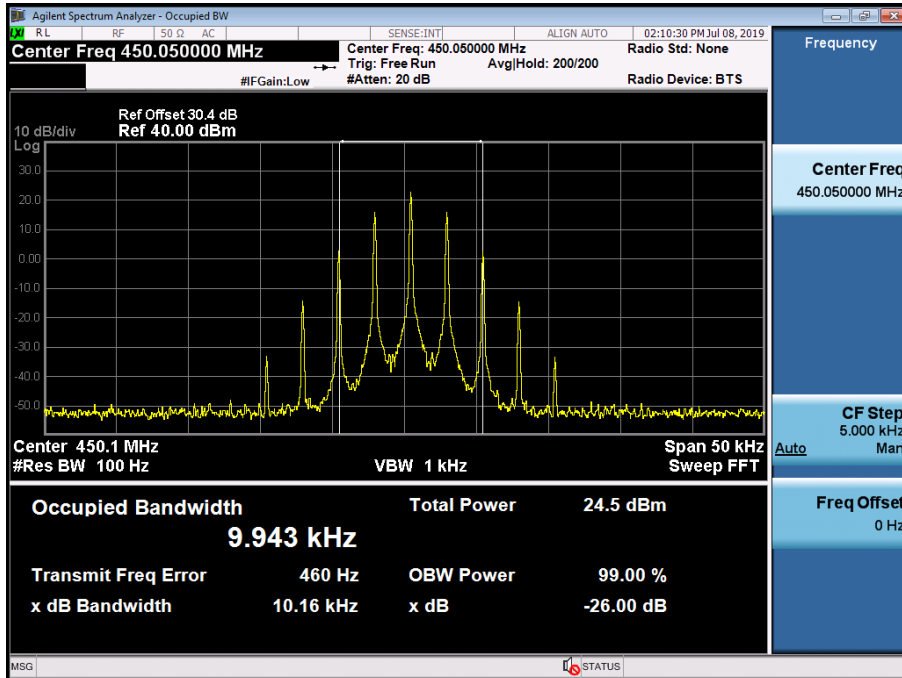
(406.15 MHz)_Low



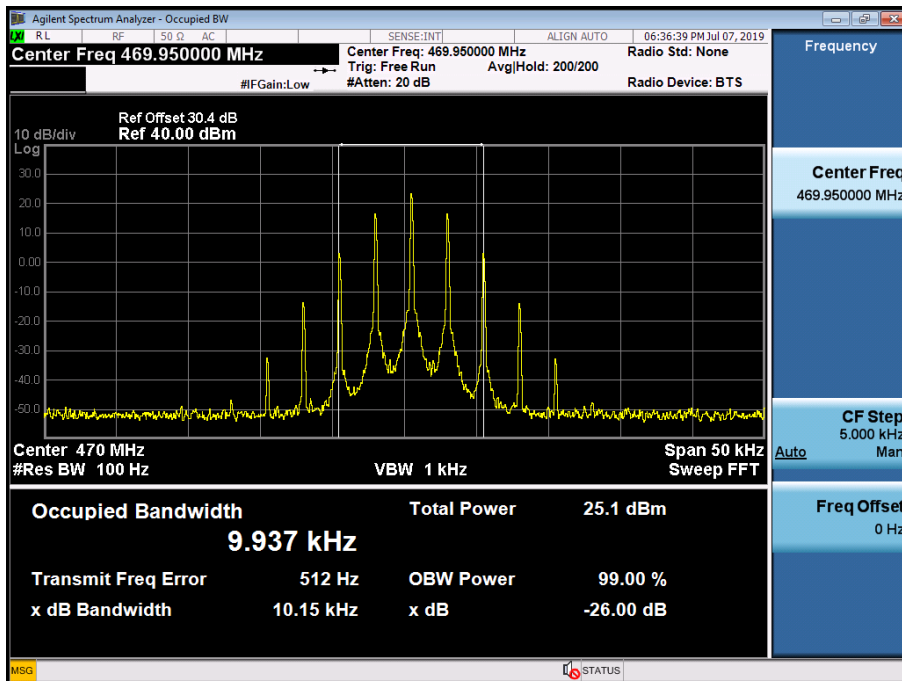
(429.95 MHz)_Low



(450.05 MHz)_Low

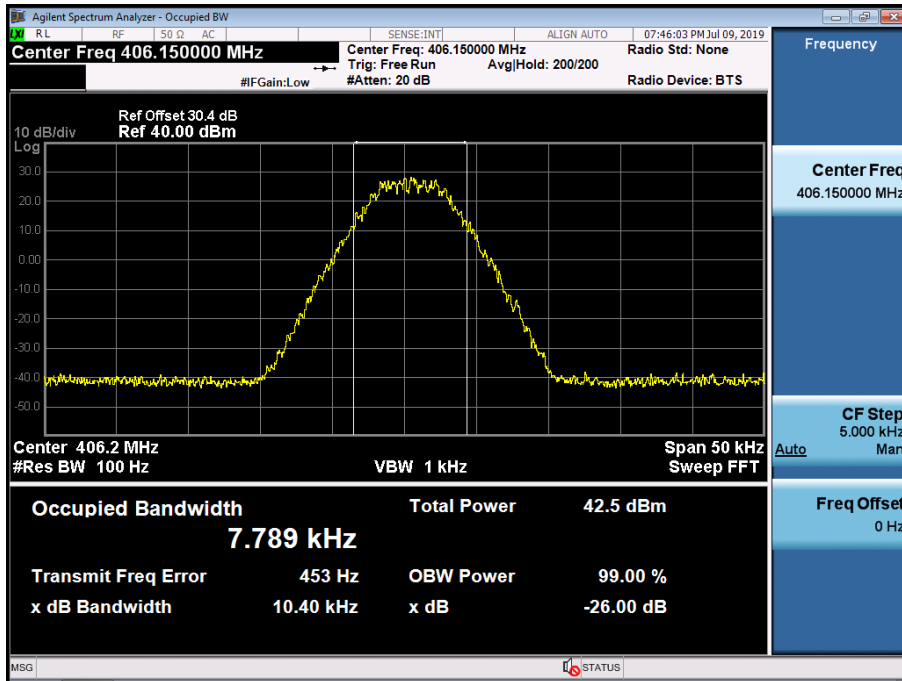


(469.95 MHz)_Low



8K30F1E, 8K30F1D, 8K30F7W_FCC/IC

(406.15 MHz)_High



(429.95 MHz)_High

