FCC Test Report

Report No.: AGC01284210504FE10

FCC ID	:	T4KD878UVII
PRODUCT DESIGNATION	:	Digital DMR and Analog UHF/VHF Two Way Radio
BRAND NAME	:	AnyTone
MODEL NAME	:	AT-D878UVII PLUS, AT-D878UVII, AT-D878UV V2, AT-D878UV PLUS V3, AT-D899UV
APPLICANT	:	Qixiang Electron Science & Technology Co., Ltd.
DATE OF ISSUE	:	Jul. 06, 2021
STANDARD(S)	:	FCC Part 90 Rules FCC Part 22 Rules
REPORT VERSION	:	V 1.0

***A**ttestation of **G**lobal Compliance (Shenzhen) Co., Ltd*

REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Jul. 06, 2021	Valid	Initial Release

TABLE OF CONTENTS

1. GENERAL INFORMATION

Applicant	Qixiang Electron Science & Technology Co., Ltd.
Address	Qixiang Building, Tangxi Industrial Zone, Luojiang District, Quanzhou, Fujian, China
Manufacturer	Qixiang Electron Science & Technology Co., Ltd.
Address	Qixiang Building, Tangxi Industrial Zone, Luojiang District, Quanzhou, Fujian, China
Factory	Qixiang Electron Science & Technology Co., Ltd.
Address	Qixiang Building, Tangxi Industrial Zone, Luojiang District, Quanzhou, Fujian, China
Product Designation	Digital DMR and Analog UHF/VHF Two Way Radio
Brand Name	AnyTone
Test Model	AT-D878UVII PLUS
Series Model(s)	AT-D878UVII, AT-D878UV V2, AT-D878UV PLUS V3, AT-D899UV
Difference Description	All the same except for the model name
Deviation from Standard	None
Date of Receipt	May 24, 2021
Date of Test	May 24, 2021~Jul. 06, 2021
Test Result	Pass

WE HEREBY CERTIFY THAT:
The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. The data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI/TIA-603-E-2016. The sample tested as described in this report is in compliance with the FCC Rules Part 22 and 90. The test results of this report relate only to the tested sample identified in this report.

Prepared By — Donjon Huang (Project Engineer) — Jul. 06, 2021

Reviewed By — Calvin Liu (Reviewer) — Jul. 06, 2021

Approved By — Forrest Lei (Authorized Officer) — Jul. 06, 2021

2. PRODUCT INFORMATION

2.1 PRODUCT TECHNICAL DESCRIPTION

Hardware Version	V2.00	
Software Version	V1.0	
Power Supply	DC 7.4V,3100mAh by battery, charging for DC8.4V	
Adapter Information	Input:100-240V AC 50/60Hz, 0.3A; Output: DC 12V 1A	
Communication Type	Voice / Data	
Operation Frequency Range	From 136MHz to 174MHz--VHF From 400MHz to 480MHz--UHF	
Modulation Type	Analog Voice:	FM
	Digital Voice/Digital Data:	4FSK
Digital Type	DMR	
Channel Separation	Analog Voice:	12.5 kHz
	Digital Voice/Digital Data:	12.5 kHz
Support Data Rate	9600bps	
Emission Designator	Analog Voice:	11K0F3E
	Digital Voice/Digital Data:	☒ VHF:7K39F1D-7W-12.5kHz ☒ VHF:7K39F1W-7W-12.5kHz ☒ UHF:7K52F1D-6W-12.5kHz ☒ UHF:7K52F1W-6W-12.5kHz
Rated Output Power	VHF:7W/0.2W/UHF:6W/0.2W (It was fixed by the manufacturer, any individual can't arbitrarily change it.)	
Maximum Transmitter Power	VHF: 37.98dBm(7W-12.5kHz)-Analog	VHF: 22.93dBm(0.2W-12.5kHz)-Analog
	VHF: 37.99dBm(7W-12.5kHz)-Digital	VHF: 22.95dBm(0.2W-12.5kHz)-Digital
	UHF: 37.66dBm(6W-12.5kHz)-Analog	UHF: 22.97dBm(0.2W-12.5kHz)-Analog
	UHF: 37.38dBm(6W-12.5kHz)-Digital	UHF: 22.89dBm(0.2W-12.5kHz)-Digital
Antenna Designation	Detachable Antenna	
Antenna Gain	2.15dBi	

Note:

1. The product has the same digital working characters when operating in both two digitized voice/data mode. So only one set of test results for digital modulation modes are provided in this test report.
2. This equipment is capable of supporting a minimum data rate of 4800 bits per second per 6.25 kHz of channel bandwidth. DMR interphone's bandwidth is 12.5 kHz, and it has a double time slot, one is the speech time slot, one is the data time slot, just language sequence is satisfied with 4800 bps/6.25 kHz BW.

2.2 TEST FREQUENCY LIST

Operation mode	Channel Separation	Operation Frequency Range	Test channel	Test Frequency
Analog/ Digital	12.5 kHz	400-480MHz	Bottom	406.125 MHz
	12.5 kHz	400-480MHz	Middle	453.2125 MHz
	12.5 kHz	400-480MHz	Middle	454.025 MHz
	12.5 kHz	400-480MHz	Middle	458.2125 MHz
	12.5 kHz	400-480MHz	Top	479.975 MHz
Analog/ Digital	12.5 kHz	136-174MHz	Bottom	136.025 MHz
	12.5 kHz	136-174MHz	Middle	151.850 MHz
	12.5 kHz	136-174MHz	Middle	155.025 MHz
	12.5 kHz	136-174MHz	Middle	161.610 MHz
	12.5 kHz	136-174MHz	Top	173.975 MHz

Note:
In section KDB 634817 D01 Sections II) (f) (1) and (2):
Test at least one frequency in each band for each rule part applied under and ensure the device is capable of operating on the frequency under each rule part. This requirement may result in testing on multiple frequencies. Testing on one frequency may be acceptable if multiple listed bands for a rule part with a continuous frequency range are split to remove a conflict with other rules and the technical requirements in the split bands are the same. Additional requirements for RF exposure may apply.

2.3 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for FCC ID: **T4KD878UVII,** filing to comply with Part 2, Part 22, and Part 90 of the Federal Communication Commission rules.

2.4 TEST METHODOLOGY

The tests were performed according to following standards:

No.	Identity	Document Title
1	FCC 47 CFR Part 22	Public Mobile Services
2	FCC 47 CFR Part 90	Private Land Mobile Radio Services
3	FCC 47 CFR Part 2	Frequency allocations and radio treaty matters; general rules and regulations
4	ANSI/TIA-603-E	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
5	ANSI C63.26-2015	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services
6	KDB 971168 D01	KDB 971168 D01 Power Meas License Digital Systems v03r01
7	KDB 579009 D03	KDB 579009 D03 Applications Part 90 Refarming Bands v01
8	KDB 634817 D01	KDB 634817 D01 Freq Range Listing for Grants v04r01

2.5 CALCULATION OF EMISSION INDICATORS

FCC Rules and Regulations Part 2.202: Necessary Bandwidth and Emission Bandwidth

For FM Mode (ChannelSpacing: 12.5kHz)

Emission Designator 11K0F3E
In this case, the maximum modulating frequency is 3.0 kHz with a 2.5 kHz deviation.
BW = 2(M+D) = 2*(3.0 kHz + 2.5 kHz) = 11 kHz = 11K0
F3E portion of the designator represents an FM voice transmission.
Therefore, the entire designator for 12.5 kHz channel spacing FM mode is 11K0F3E.

For FM Mode (Channel Spacing: 25kHz)

Emission Designator 16K0F3E
In this case, the maximum modulating frequency is 3.0 kHz with a 5.0 kHz deviation.
BW = 2(M+D) = 2*(3.0 kHz + 5.0 kHz) = 16 kHz = 16K0
F3E portion of the designator represents an FM voice transmission.
Therefore, the entire designator for 25 kHz channel spacing FM mode is 16K0F3E.

For Digital Mode (Channel Spacing: 12.5 kHz)

Emission Designator 7K60F1D and 7K60F1W
The 99% energy rule was used for digital mode. It basically states that 99% of the modulation energy falls within X kHz, in this case, 7.60 kHz.
F1D and F1W portion of the designator indicates digital information.
Therefore, the entire designator for 12.5 kHz channel spacing digital mode is 7K60F1D and 7K60F1W.

2.6 SPECIAL ACCESSORIES

Not available for this EUT intended for grant.

2.7 EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

3. TEST ENVIRONMENT

3.1 ADDRESS OF THE TEST LABORATORY

Laboratory: Attestation of Global Compliance (Shenzhen) Co., Ltd.

Address: 1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

3.2 TEST FACILITY

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L5488

Attestation of Global Compliance (Shenzhen) Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2017 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA-Lab Cert. No.: 5054.02

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

FCC-Registration No.: 975832

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files with Registration 975832.

IC-Registration No.: 24842

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the Certification and Engineering Bureau of Industry Canada. The acceptance letter from the IC is maintained in our files with Registration 24842.

3.3 ENVIRONMENTAL CONDITIONS

	NORMAL CONDITIONS	EXTREME CONDITIONS
Temperature range (℃)	15 - 35	-20 - 50
Relative humidty range	20 % - 75 %	20 % - 75 %
Pressure range (kPa)	86 - 106	86 - 106
Power supply	DC 7.4V	LV: DC 6.29V/HV: DC 8.51V
Note: The Extreme Temperature and Extreme Voltages declared by the manufacturer.		

3.4 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement y ±U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

Test Items	Measurement Uncertainty
Frequency stability	±0.5%
Transmitter power conducted	±0.8dB
Transmitter power Radiated	±1.3dB
Conducted spurious emission 9kHz-40 GHz	±2.7dB
Conducted Emission	±3.2 dB
Radiated Emission below 1GHz	±3.9 dB
Radiated Emission above 1GHz	±4.8 dB
Occupied Channel Bandwidth	±2 %
FM deviation	±2 %
Audio level	±0.98dB
Low Pass Filter Response	±0.65dB
Modulation Limiting	0.42 %
Transient Frequency Behavior	6.8 %

3.5 LIST OF EQUIPMENTS USED

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	Apr. 14, 2021	Apr. 13, 2022
EXA Signal Analyzer	Aglient	N9020A	W1312-60196	Aug. 21, 2020	Aug. 20, 2021
EXA Signal Analyzer	Aglient	N9020A	MY52090123	Sep. 03, 2020	Sep. 02, 2021
Horn antenna	SCHWARZBECK	BBHA 9170	#768	Sep.16, 2019	Sep.15, 2021
preamplifier	ChengYi	EMC184045SE	980508	Sep. 23, 2019	Sep. 22, 2021
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	Apr. 23, 2021	Apr. 22, 2023
Broadband Preamplifier	SCHWARZBECK	BBV 9718	9718-205	Jun. 09, 2020	Jun. 08, 2021
Broadband Preamplifier	SCHWARZBECK	BBV 9718	9718-205	Jun. 07, 2021	Jun. 06, 2022
HORN ANTENNA	EM	EM-AH-10180	/	Feb. 26, 2021	Feb. 25, 2022
SIGNAL GENERATOR	AGILENT	E4421B	MY43351603	May 11, 2021	May 10, 2022
SIGNAL GENERATOR	R&S	SMT03	A0304261	Jun. 09, 2020	Jun. 08, 2021
SIGNAL GENERATOR	R&S	SMT03	A0304261	Jun. 07, 2021	Jun. 06, 2022
ANTENNA	SCHWARZBECK	VULB9168	VULB9168-494	Jan. 08, 2021	Jan. 07, 2023
ANTENNA	SCHWARZBECK	VULB9168	D69250	Sep. 20, 2019	Sep. 19, 2021
Active loop antenna (9K-30MHz)	ZHINAN	ZN30900C	18051	May 22, 2021	May 21, 2022
Modulation Domain Analyzer	HP	53310A	3121A02467	Aug. 26, 2020	Aug. 25, 2021
Small environmental tester	ESPEC	SH-242	--	Sep. 03, 2020	Sep. 02, 2022
RF Communication Test Set	HP	8920B	US35010161	Sep. 03, 2020	Sep. 02, 2021
Attenuator	Weinachel Corp	58-30-33	ML030	Oct. 26, 2020	Oct. 25, 2021
RF Cable	R&S	1#	--	Each time	N/A
RF Cable	R&S	2#	--	Each time	N/A
Fliter-UHF	Microwave	N25155M2	498705	May 09, 2021	May 08, 2022
Fliter-VHF	Microwave	N26460M1	498703	May 09, 2021	May 08, 2022

4.SYSTEM TEST CONFIGURATION

4.1 EUT CONFIGURATION

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

4.2 EUT EXERCISE

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

4.3 CONFIGURATION OF TESTED SYSTEM

Fig. 2-1 Configuration of Tested System

Table 2-1 Equipment Used in Tested System

4.4 EQUIPMENT USED IN TESTED SYSTEM

The Following Peripheral Devices And Interface Cables Were Connected During The Measurement:
☐ Test Accessories Come From The Laboratory
☒ Test Accessories Come From The Manufacturer

Item	Equipment	Model No.	Identifier	Note
1	Digital DMR and Analog UHF/VHF Two Way Radio	AT-D878UVII PLUS	T4KD878UVII	EUT
2	Adapter	SAW12-120-1000 UD	Input: AC 100-240V,50/60HZ, 0.3A Output: DC 12V,1A	AE
3	Charger	QBC-45L	Input: DC 12V 1A Output: 8.4V,01A	AE
4	Battery	QB-44HL	DC 7.4V 3100mAh	AE
5	Back clip	N/A	N/A	AE
6	Antenna	QA-11UV	N/A	AE

4.5 SUMMARY OF TEST RESULTS

Item	FCC Rules	Description Of Test	Result
1	FCC 47 CFR PART 90/22	Antenna Equipment	Pass
2	§90.205&22.565& 2.1046	Maximum Transmitter Power	Pass
3	§90.207& 2.1047	Modulation Characteristic	Pass
4	§2.1047&90.242(b)(8)	Audio Low Pass Filter Response	Pass
5	§90.209& 22.359& 2.1049	Occupied Bandwidth	Pass
6	§90.210& 22.359& 2.1049	Emission Mask	Pass
7	§90.213& 22.355& 2.1055	Frequency Tolerance	Pass
8	§90.214	Transmitter Frequency Behavior	Pass
9	§90.210&22.359& 2.1051	Spurious Emission on Antenna Port	Pass
10	§90.210&22.359& 2.1053	Spurious Ratiated Emission	Pass

5.DESCRIPTION OF TEST MODES

The EUT (**Digital DMR and Analog UHF/VHF Two Way Radio**) has been tested under normal operating condition. (The top channel, the middle channel and the bottom channel) are chosen for testing at each channel separation.

NO.	TEST MODE DESCRIPTION	CHANNEL SEPARATION
1	TX Bottom channel-UHF	12.5 kHz
2	TX Middle channel-UHF	12.5 kHz
3	TX Middle channel-UHF	12.5 kHz
4	TX Top channel-UHF	12.5 kHz
5	TX Bottom channel-VHF	12.5 kHz
6	TX Middle channel-VHF	12.5 kHz
7	TX Middle channel-VHF	12.5 kHz
8	TX Middle channel-VHF	12.5 kHz
9	TX Top channel-VHF	12.5 kHz

Note:

1. Only the result of the worst case was recorded in the report, if no other cases.
2. The battery is full-charged during the test.
3. For Radiated Emission, 3axis were chosen for testing for each applicable mode.
4. For Conducted Test method, a temporary antenna connector is provided by the manufacture.
5. Manufacturers use computer PC programming software to switch and operate frequency points, refer to the instructions for details

6.FREQUENCY TOLERANCE

6.1 PROVISIONS APPLICABLE

a). According to FCC §2.1055, § 22.355 and §90.213, the frequency stability shall be measured with variation of ambient temperature from –30℃ to +50℃ centigrade.

b). According to FCC Part 2 Section 2.1055(d)(2), for battery powered equipment, the frequency stability shall be measured with reducing primary supply voltage to the battery operating end point, which is specified by the manufacturer.

c). According to FCC Part 90 Section 90.213, the frequency tolerance must be maintained within 0.00025% for 12.5 kHz channel separation and 0.0001% for 6.25 kHz channel separation.

6.2 MEASUREMENT PROCEDURE

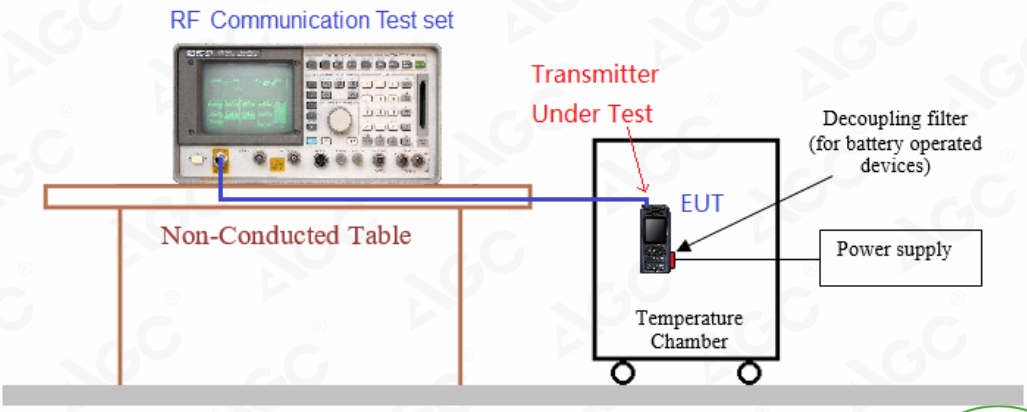
6.2.1 Frequency stability versus environmental temperature

1. Setup the configuration per figure 1 for frequencies measurement inside an environment chamber, Install new battery in the EUT.
2. Turn on EUT and set SA center frequency to the EUT radiated frequency. Set SA Resolution Bandwidth to 1kHz and Video Resolution Bandwidth to 1kHz and Frequency Span to 50kHz.Record this frequency as reference frequency.
3. Set the temperature of chamber to 50℃. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize. While maintaining a constant temperature inside the chamber, turn the EUT on and measure the EUT operating frequency.
4. Repeat step 2 with a 10℃ decreased per stage until the lowest temperature -30℃ is measured, record all measured frequencies on each temperature step.

6.2.2 Frequency stability versus input voltage

1. Setup the configuration per figure 1 for frequencies measured at temperature if it is within 15℃ to 25℃. Otherwise, an environment chamber set for a temperature of 20℃ shall be used. The EUT shall be powered by DC 7.4V.
2. Set SA center frequency to the EUT radiated frequency. Set SA Resolution Bandwidth to 1 kHz and Video Resolution Bandwidth to 1kHz. Record this frequency as reference frequency.
3. Supply the EUT primary voltage at the operating end point which is specified by manufacturer and record the frequency.

6.3 MEASUREMENT SETUP



6.4 MEASUREMENT RESULTS

12.5 kHz Channel Separation, Analog modulation, Assigned Frequency For VHF-7W								
Test conditions		Frequency error (ppm)					Limit (ppm)	Result
Voltage (V)	Temp (℃)	Test Frequency (MHz)						
		136.025	151.850	155.025	161.610	173.975		
7.40	-30	0.978	0.653	0.503	0.442	0.463	5	Pass
	-20	0.680	1.028	1.030	0.605	0.568		
	-10	0.684	0.565	0.649	0.744	0.687		
	0	1.012	1.090	0.974	0.392	0.773		
	10	0.572	0.549	0.747	0.789	0.452		
	20	0.593	0.794	1.079	0.959	0.848		
	30	0.890	0.745	0.698	0.578	0.662		
	40	0.695	0.649	0.777	0.545	0.645		
	50	1.010	0.821	0.736	0.506	0.775		
8.51	20	0.657	0.575	0.962	0.945	0.730		
6.29	20	0.566	0.656	0.936	0.633	0.326		

12.5 kHz Channel Separation, Analog modulation, Assigned Frequency For VHF-0.2W								
Test conditions		Frequency error (ppm)					Limit (ppm)	Result
Voltage (V)	Temp (℃)	Test Frequency (MHz)						
		136.025	151.850	155.025	161.610	173.975		
7.40	-30	0.600	0.744	0.681	0.975	0.398	5	Pass
	-20	0.930	0.665	0.679	0.729	0.472		
	-10	0.557	0.738	1.080	0.460	0.494		
	0	0.768	0.505	0.621	0.521	0.323		
	10	0.671	0.710	0.935	0.901	0.389		
	20	1.000	1.020	0.955	0.564	0.941		
	30	0.806	0.890	0.576	0.897	0.462		
	40	0.651	0.788	0.581	0.561	0.361		
	50	0.581	0.755	1.087	0.823	0.639		
8.51	20	0.854	0.802	1.070	0.365	0.722		
6.29	20	0.600	0.744	0.681	0.975	0.398		

12.5 kHz Channel Separation, Digital modulation, Assigned Frequency For VHF-7W								
Test conditions		Frequency error (ppm)					Limit (ppm)	Result
Voltage (V)	Temp (℃)	Test Frequency (MHz)						
		136.025	151.850	155.025	161.610	173.975		
7.40	-30	0.681	0.653	1.041	0.681	0.974	5	Pass
	-20	0.543	0.937	0.934	0.667	0.938		
	-10	0.683	1.067	0.556	0.449	0.685		
	0	0.622	0.854	1.079	0.562	0.356		
	10	0.868	0.748	1.072	0.837	0.328		
	20	0.887	0.727	0.803	0.374	0.939		
	30	0.539	0.748	0.644	0.965	0.659		
	40	0.628	0.822	1.074	0.707	0.498		
	50	1.071	0.900	1.082	0.622	0.905		
8.51	20	0.859	0.657	0.588	0.689	0.828		
6.29	20	0.647	0.953	0.785	0.745	0.301		

12.5 kHz Channel Separation, Digital modulation, Assigned Frequency For VHF-0.2W								
Test conditions		Frequency error (ppm)					Limit (ppm)	Result
Voltage (V)	Temp (℃)	Test Frequency (MHz)						
		136.025	151.850	155.025	161.610	173.975		
7.40	-30	0.746	0.993	0.914	0.746	0.633	5	Pass
	-20	0.717	0.715	0.522	0.716	0.819		
	-10	0.960	0.895	0.945	0.861	0.746		
	0	0.608	1.062	0.987	0.933	0.374		
	10	0.856	0.655	0.746	0.506	0.345		
	20	0.845	0.694	0.920	0.858	0.740		
	30	0.712	0.846	0.866	0.367	0.403		
	40	0.962	0.787	0.567	0.962	0.993		
	50	0.785	1.004	0.521	0.609	0.827		
8.51	20	0.658	0.620	1.061	0.528	0.731		
6.29	20	1.078	0.538	0.970	0.972	0.498		

12.5 kHz Channel Separation, Analog modulation, Assigned Frequency For UHF-6W							
Test conditions		Frequency error (ppm)				Limit (ppm)	Result
Voltage (V)	Temp (℃)	Test Frequency (MHz)					
		400.025	453.225	454.025	479.975		
7.40	-30	0.604	0.653	0.910	0.828	2.5	Pass
	-20	0.882	0.631	0.615	0.353		
	-10	0.974	1.024	0.904	0.412		
	0	0.854	0.504	0.685	0.654		
	10	0.534	0.533	1.089	0.515		
	20	0.749	0.800	0.904	0.979		
	30	0.720	1.081	0.508	0.972		
	40	0.842	0.755	0.941	0.713		
	50	0.505	0.769	0.883	0.617		
8.51	20	1.095	1.026	0.643	0.575		
6.29	20	0.967	0.570	0.716	0.781		

12.5 kHz Channel Separation, Analog modulation, Assigned Frequency For UHF-0.2W							
Test conditions		Frequency error (ppm)				Limit (ppm)	Result
Voltage (V)	Temp (℃)	Test Frequency (MHz)					
		400.025	453.225	454.025	479.975		
7.40	-30	0.696	0.984	0.912	0.315	2.5	Pass
	-20	0.798	0.596	0.519	0.961		
	-10	0.891	0.901	0.613	0.517		
	0	0.536	0.507	0.583	0.765		
	10	1.035	0.656	0.791	0.810		
	20	0.727	0.529	0.886	0.510		
	30	0.957	0.681	0.637	0.915		
	40	1.009	0.544	0.839	0.609		
	50	0.934	0.669	1.039	0.519		
8.51	20	0.508	0.630	0.785	0.970		
6.29	20	0.995	0.729	1.056	0.345		

12.5 kHz Channel Separation, Digital modulation, Assigned Frequency For UHF-7W							
Test conditions		Frequency error (ppm)				Limit (ppm)	Result
Voltage (V)	Temp (℃)	Test Frequency (MHz)					
		400.025	453.225	454.025	479.975		
7.40	-30	0.546	0.653	1.099	0.483	2.5	Pass
	-20	0.866	0.652	0.965	0.732		
	-10	0.789	0.989	0.697	0.944		
	0	0.849	0.759	0.597	0.334		
	10	0.739	0.937	1.088	0.533		
	20	0.991	0.876	0.703	0.482		
	30	0.769	0.547	0.769	0.536		
	40	0.520	0.853	0.645	0.491		
	50	0.574	0.700	0.879	0.839		
8.51	20	1.018	0.614	0.836	0.686		
6.29	20	0.818	0.757	0.841	0.702		

12.5 kHz Channel Separation, Digital modulation, Assigned Frequency For UHF-7W							
Test conditions		Frequency error (ppm)				Limit (ppm)	Result
Voltage (V)	Temp (℃)	Test Frequency (MHz)					
		400.025	453.225	454.025	479.975		
7.40	-30	0.954	0.964	0.737	0.509	2.5	Pass
	-20	0.591	0.625	0.858	0.877		
	-10	1.065	0.804	0.776	0.373		
	0	0.851	0.677	1.024	0.821		
	10	0.997	1.069	1.064	0.866		
	20	0.774	0.852	0.995	0.391		
	30	0.835	0.609	0.967	0.914		
	40	0.566	0.701	0.598	0.421		
	50	0.511	0.574	0.562	0.829		
8.51	20	1.046	1.012	0.909	0.966		
6.29	20	0.907	0.554	0.588	0.704		

7. EMISSION BANDWIDTH

7.1 PROVISIONS APPLICABLE

FCC Part 90.209 & FCC Part 22.359& FCC Part 2.1049:
The authorized bandwidth shall be 11.25 kHz for 12.5 kHz channel separation and 6 kHz for 6.25 kHz channel separation.

7.2 MEASUREMENT PROCEDURE

1.The EUT was modulated by 2.5kHz sine wave audio signal; the level of the audio signal employed is 16dB greater than that necessary to produce 50% of rated system deviation.

Rated system deviation is 2.5 kHz for 12.5kHz channel spacing).

2.Spectrum set as follow:

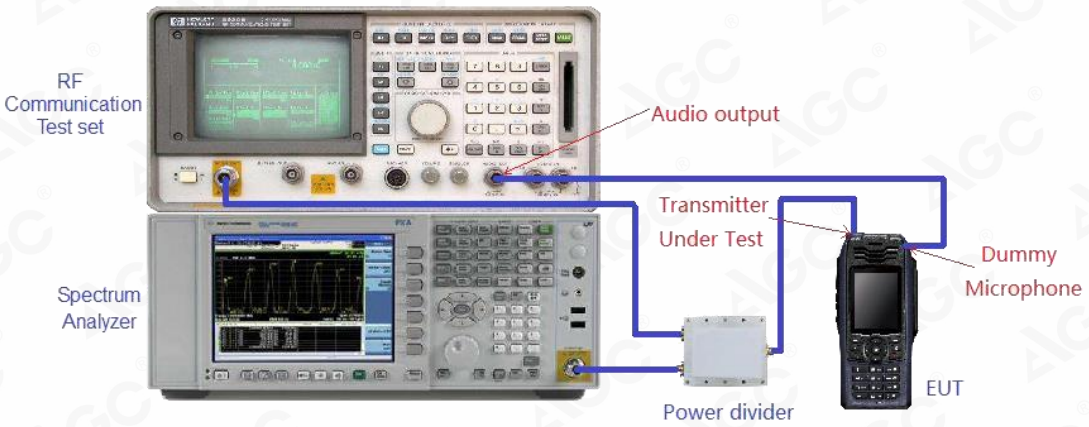
Centre frequency = fundamental frequency, span=50kHz for 12.5kHz channel spacing, RBW=100Hz, VBW=300Hz, Sweep = auto,

Detector function = peak, Trace = max hold

3.Set 99% Occupied Bandwidth and 26dB Occupied Bandwidth.

4.Measure and record the results in the test report.

7.3 MEASUREMENT SETUP



7.4 MEASUREMENT RESULTS

Measurement Result of VHF-Analog Modulation-7W				
Operating Frequency	12.5 kHz Channel Separation			
	Occupied Bandwidth	Emission Bandwidth	Limits	Result
136.025MHz	9.966 kHz	10.16 kHz	11.25 kHz	Pass
151.850MHz	9.965 kHz	10.16 kHz	11.25 kHz	Pass
155.7525MHz	9.964 kHz	10.16 kHz	11.25 kHz	Pass
161.610MHz	9.962 kHz	10.15 kHz	11.25 kHz	Pass
173.975MHz	9.951 kHz	10.15 kHz	11.25 kHz	Pass

Measurement Result of VHF-Analog Modulation-0.2W				
Operating Frequency	12.5 kHz Channel Separation			
	Occupied Bandwidth	Emission Bandwidth	Limits	Result
136.025MHz	9.965 kHz	10.16 kHz	11.25 kHz	Pass
151.850MHz	9.965 kHz	10.16 kHz	11.25 kHz	Pass
155.7525MHz	9.965 kHz	10.16 kHz	11.25 kHz	Pass
161.610MHz	9.963 kHz	10.15 kHz	11.25 kHz	Pass
173.975MHz	9.951 kHz	10.15 kHz	11.25 kHz	Pass

Measurement Result of UHF-Analog Modulation-6W				
Operating Frequency	12.5 kHz Channel Separation			
	Occupied Bandwidth	Emission Bandwidth	Limits	Result
406.125MHz	9.963 kHz	10.16 kHz	11.25 kHz	Pass
453.2125MHz	9.958 kHz	10.15 kHz	11.25 kHz	Pass
454.025MHz	9.960 kHz	10.15 kHz	11.25 kHz	Pass
458.2125MHz	9.960 kHz	10.15 kHz	11.25 kHz	Pass
479.975MHz	9.969 kHz	10.16 kHz	11.25 kHz	Pass

Measurement Result of UHF-Analog Modulation-0.2W				
Operating Frequency	12.5 kHz Channel Separation			
	Occupied Bandwidth	Emission Bandwidth	Limits	Result
406.125MHz	9.962 kHz	10.16 kHz	11.25 kHz	Pass
453.2125MHz	9.958 kHz	10.15 kHz	11.25 kHz	Pass
454.025MHz	9.958 kHz	10.15 kHz	11.25 kHz	Pass
458.2125MHz	9.959 kHz	10.15 kHz	11.25 kHz	Pass
479.975MHz	9.968 kHz	10.16 kHz	11.25 kHz	Pass

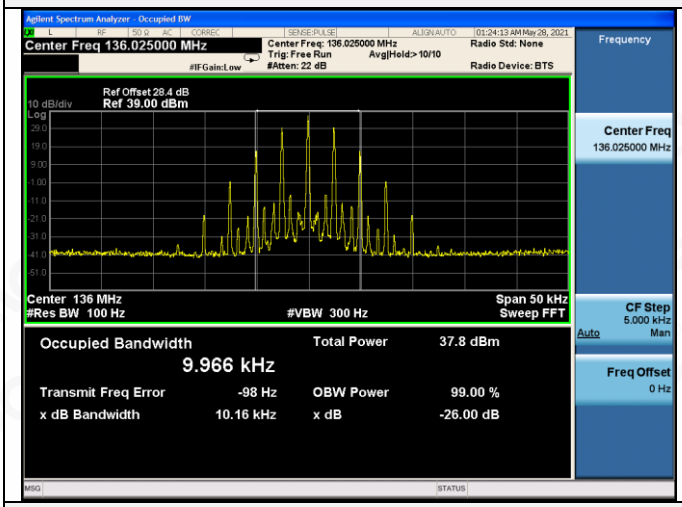
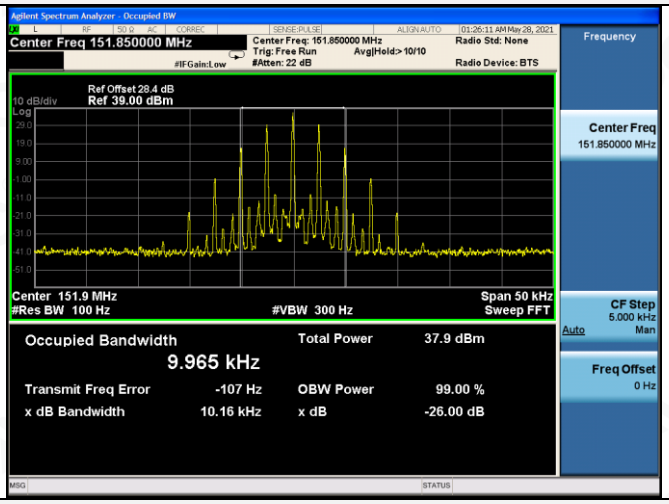
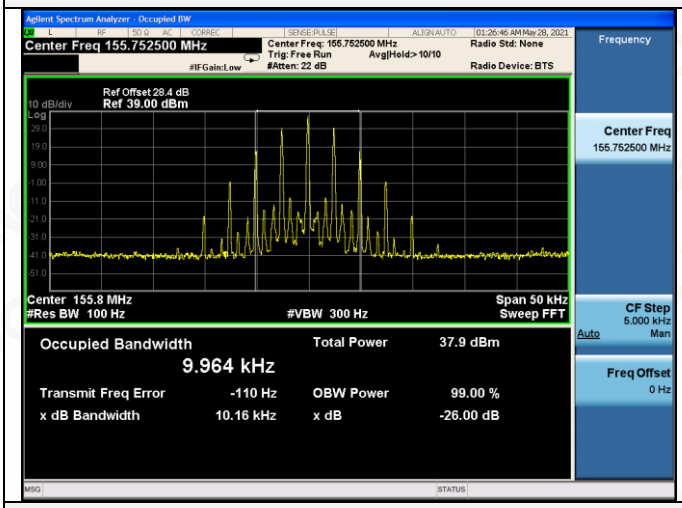
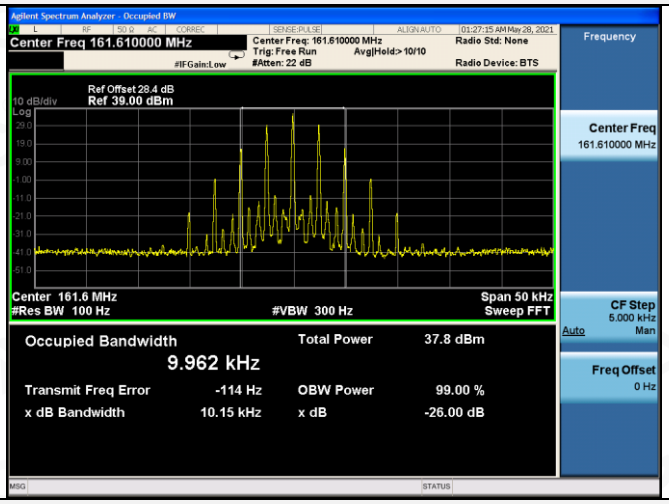
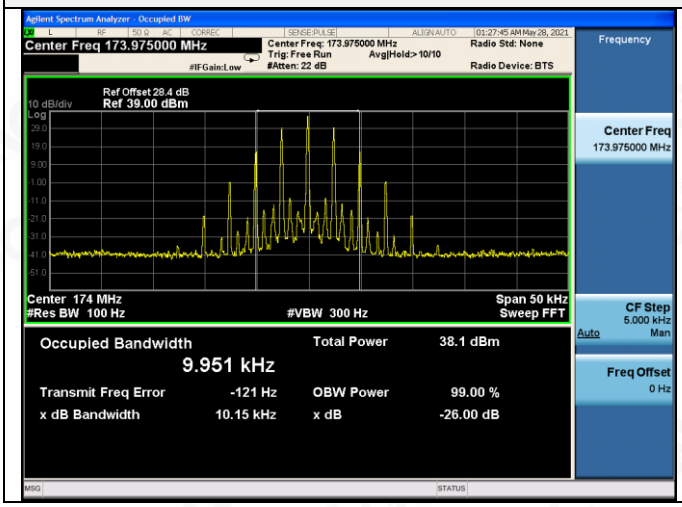
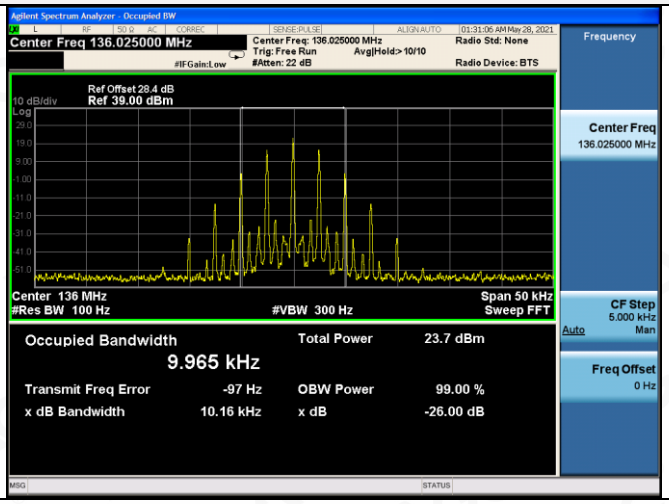
Measurement Result of VHF-Digital Modulation-7W				
Operating Frequency	12.5 kHz Channel Separation			
	Occupied Bandwidth	Emission Bandwidth	Limits	Result
136.025MHz	7.253 kHz	9.704 kHz	11.25 kHz	Pass
151.850MHz	7.367 kHz	9.787 kHz	11.25 kHz	Pass
155.7525MHz	7.346 kHz	10.04 kHz	11.25 kHz	Pass
161.610MHz	7.338 kHz	9.305 kHz	11.25 kHz	Pass
173.975MHz	7.303 kHz	9.924 kHz	11.25 kHz	Pass

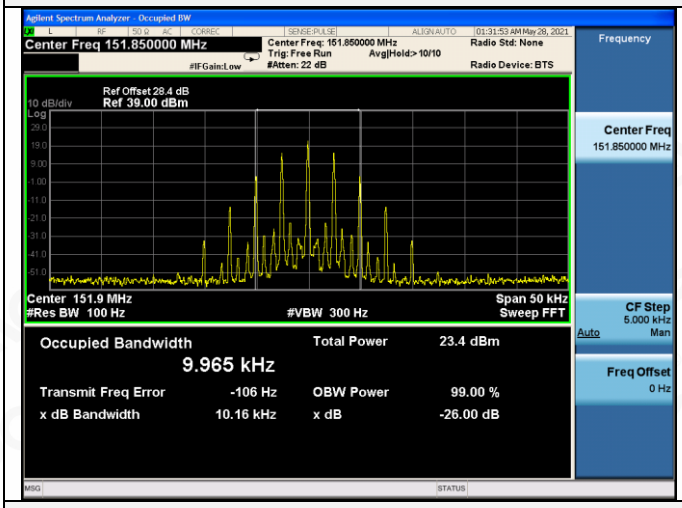
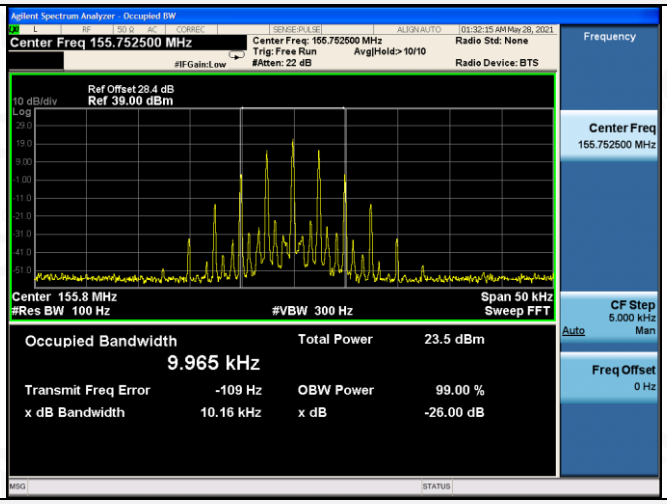
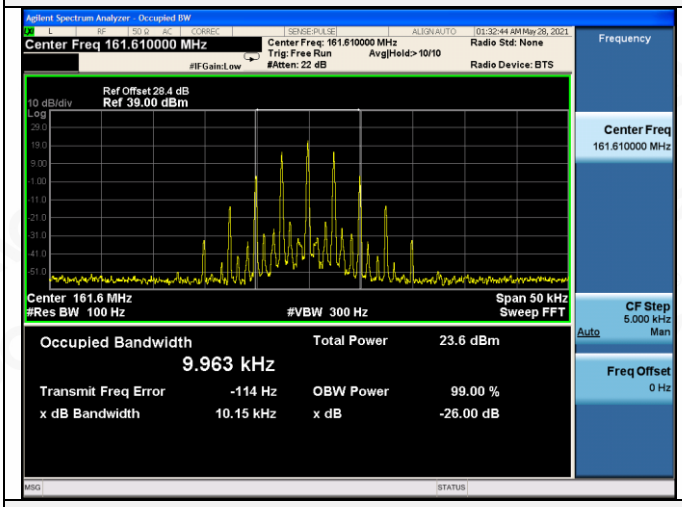
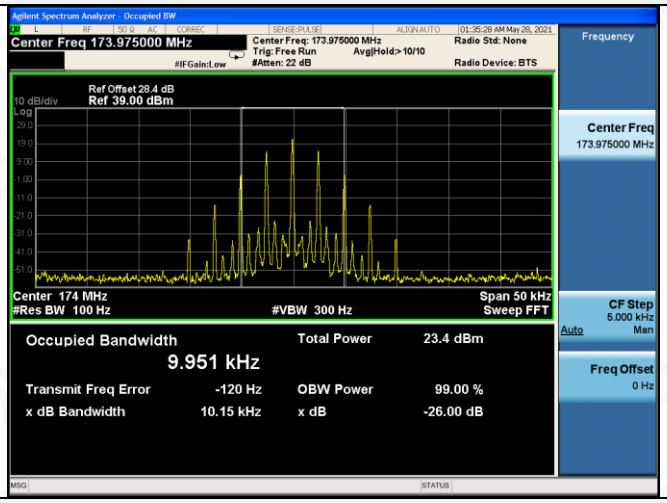
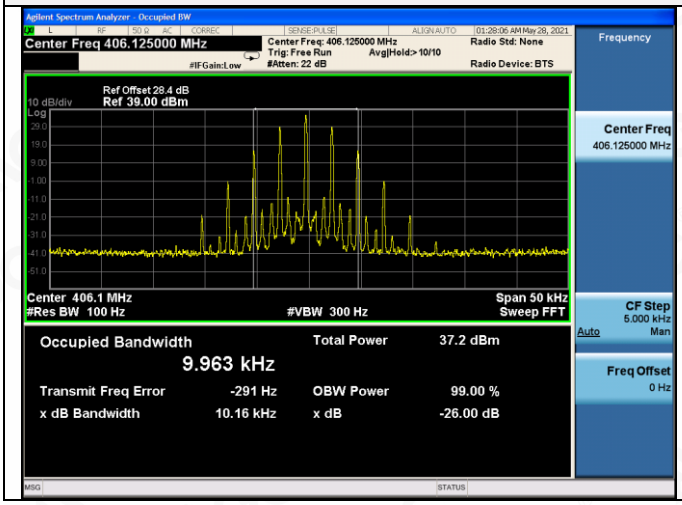
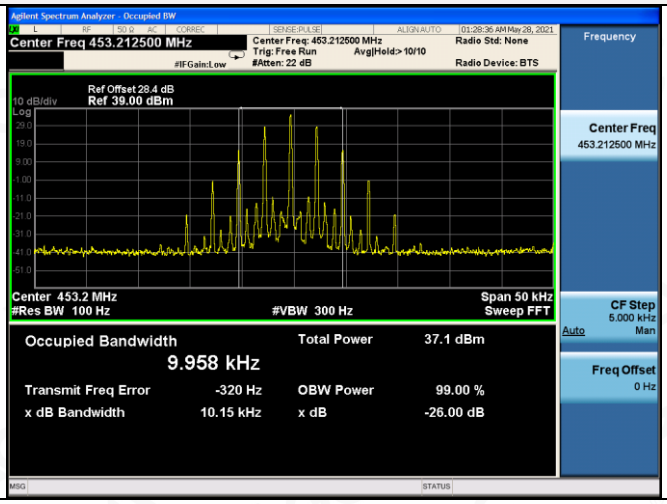
Measurement Result of VHF-Digital Modulation-0.2W				
Operating Frequency	12.5 kHz Channel Separation			
	Occupied Bandwidth	Emission Bandwidth	Limits	Result
136.025MHz	7.306 kHz	9.807 kHz	11.25 kHz	Pass
151.850MHz	7.351 kHz	9.739 kHz	11.25 kHz	Pass
155.7525MHz	7.391 kHz	10.47 kHz	11.25 kHz	Pass
161.610MHz	7.295 kHz	9.523 kHz	11.25 kHz	Pass
173.975MHz	7.208 kHz	9.750 kHz	11.25 kHz	Pass

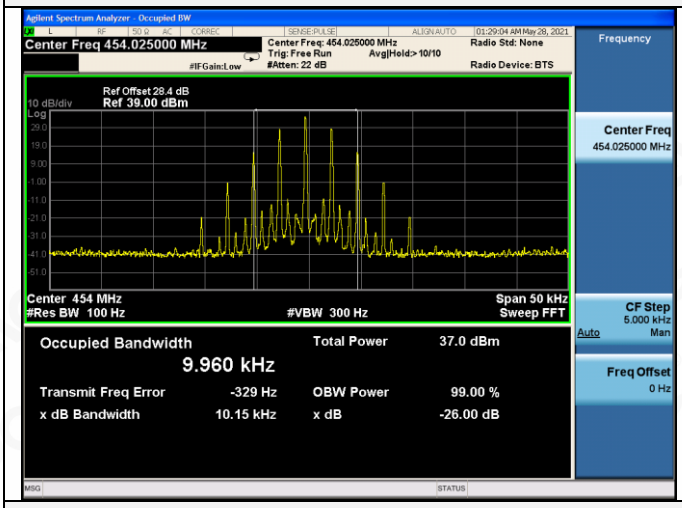
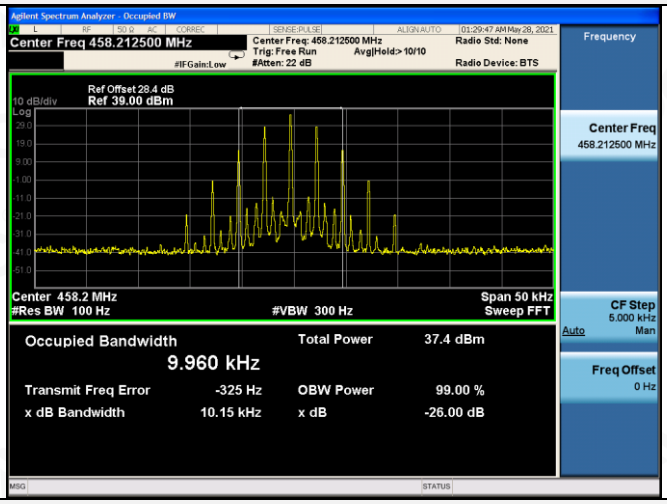
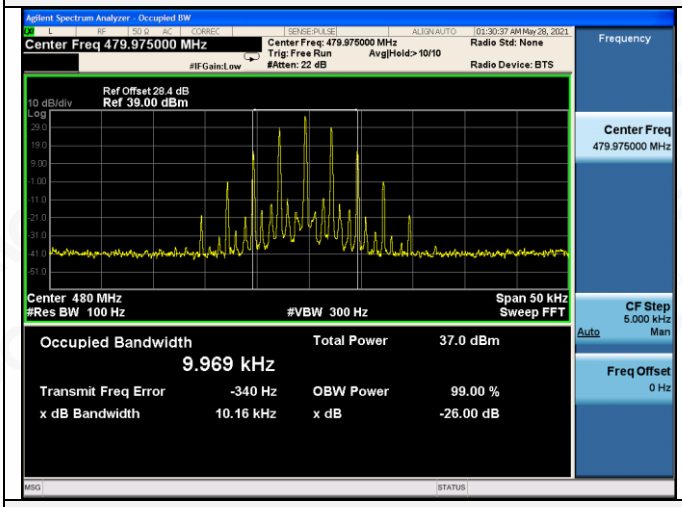
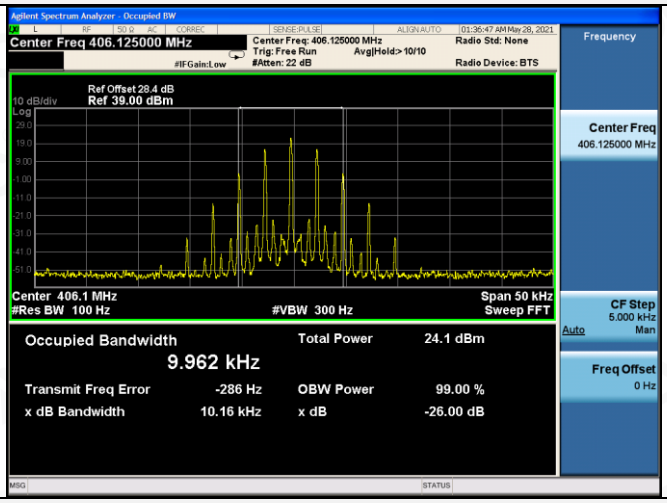
Measurement Result of UHF-Digital Modulation-6W				
Operating Frequency	12.5 kHz Channel Separation			
	Occupied Bandwidth	Emission Bandwidth	Limits	Result
406.125MHz	7.345 kHz	9.933 kHz	11.25 kHz	Pass
453.2125MHz	7.516 kHz	9.871 kHz	11.25 kHz	Pass
454.025MHz	7.348 kHz	9.518 kHz	11.25 kHz	Pass
458.2125MHz	7.300 kHz	9.700 kHz	11.25 kHz	Pass
479.975MHz	7.389 kHz	9.438 kHz	11.25 kHz	Pass

Measurement Result of UHF-Digital Modulation-0.2W				
Operating Frequency	12.5 kHz Channel Separation			
	Occupied Bandwidth	Emission Bandwidth	Limits	Result
406.125MHz	7.132 kHz	9.456 kHz	11.25 kHz	Pass
453.2125MHz	7.390 kHz	9.608 kHz	11.25 kHz	Pass
454.025MHz	6.932 kHz	9.312 kHz	11.25 kHz	Pass
458.2125MHz	7.095 kHz	9.579 kHz	11.25 kHz	Pass
479.975MHz	7.135 kHz	9.795 kHz	11.25 kHz	Pass

Test plot as follows:

12.5kHz, FM Modulation:136.025MHz-7W	12.5kHz, FM Modulation:151.850MHz-7W
	
12.5kHz, FM Modulation:155.7525MHz-7W	12.5kHz, FM Modulation:161.610MHz-7W
	
12.5kHz, FM Modulation:173.975MHz-7W	12.5kHz, FM Modulation:136.250MHz-0.2W
	

12.5kHz, FM Modulation:151.850MHz-0.2W	12.5kHz, FM Modulation:155.7525MHz-0.2W
	
12.5kHz, FM Modulation:161.610MHz-0.2W	12.5kHz, FM Modulation:173.975MHz-0.2W
	
12.5kHz, FM Modulation:406.125MHz-6W	12.5kHz, FM Modulation:453.2125MHz-6W
	

12.5kHz, FM Modulation:454.025MHz-6W	12.5kHz, FM Modulation:458.2125MHz-6W
	
12.5kHz, FM Modulation:479.975MHz-6W	12.5kHz, FM Modulation:406.125MHz-0.2W
	
12.5kHz, FM Modulation:453.2125MHz-0.2W	12.5kHz, FM Modulation:454.025MHz-0.2W