

---

# FCC Part 90& Part 22 Rules Test Report

---

Report No.: AGC02931190801FE10

**FCC ID** : POD-DMR5  
**PRODUCT DESIGNATION** : DMR Digital Transceiver  
**BRAND NAME** : TYT  
**MODEL NAME** : MD-680D, MD-680  
**APPLICANT** : TYT ELECTRONICS CO., LTD  
**DATE OF ISSUE** : Oct. 16, 2019  
**STANDARD(S)** : FCC Part 90 Rules  
: FCC Part 22 Rules  
**REPORT VERSION** : V 1.0

## Attestation of Global Compliance (Shenzhen) Co., Ltd

**CAUTION:**

This report shall not be reproduced except in full without the written permission of the test laboratory and shall not be quoted out of context.



### Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Oct. 16, 2019	Valid	Initial Release



**TABLE OF CONTENTS**

**1. VERIFICATION OF COMPLIANCE ..... 5**

**2. GENERAL INFORMATION..... 6**

    2.1 PRODUCT DESCRIPTION..... 6

    2.2 RELATED SUBMITTAL(S) / GRANT (S)..... 9

    2.3 TEST METHODOLOGY ..... 9

    2.4 TEST FACILITY ..... 9

    2.5 SPECIAL ACCESSORIES ..... 9

    2.6 EQUIPMENT MODIFICATIONS ..... 9

**3. SYSTEM TEST CONFIGURATION ..... 10**

    3.1 EUT CONFIGURATION..... 10

    3.2 EUT EXERCISE ..... 10

    3.3 GENERAL TECHNICAL REQUIREMENTS..... 10

    3.4 CONFIGURATION OF TESTED SYSTEM ..... 11

**4. SUMMARY OF TEST RESULTS ..... 12**

**5. DESCRIPTION OF TEST MODES..... 14**

**6. FREQUENCY TOLERANCE..... 15**

    6.1 PROVISIONS APPLICABLE..... 15

    6.2 MEASUREMENT PROCEDURE ..... 15

    6.3 TEST SETUP BLOCK DIAGRAM..... 16

    6.4 TEST RESULTS ..... 17

**7. EMISSION BANDWIDTH..... 25**

    7.1 PROVISIONS APPLICABLE..... 25

    7.2 MEASUREMENT PROCEDURE ..... 25

    7.3 TEST SETUP BLOCK DIAGRAM..... 25

    7.4 MEASUREMENT RESULT ..... 27

**8. UNWANTED RADIATION ..... 39**

    8.1 PROVISIONS APPLICABLE..... 39

    8.2 MEASUREMENT PROCEDURE ..... 39

    8.3 TEST SETUP BLOCK DIAGRAM..... 40

    8.4 MEASUREMENT RESULTS:..... 41

    8.5 EMISSION MASK PLOT..... 56

**9. MODULATION CHARACTERISTICS ..... 69**

    9.1 PROVISIONS APPLICABLE..... 69

    9.2 MEASUREMENT METHOD ..... 69

    9.3 MEASUREMENT RESULT ..... 70



<b>10. MAXIMUM TRANSMITTER POWER (CONDUCTED OUTPUT POWER) PEAK POWER .....</b>	<b>76</b>
10.1 PROVISIONS APPLICABLE .....	76
10.2 TEST PROCEDURE .....	76
10.3 TEST CONFIGURATION .....	76
10.4 TEST RESULT .....	78
10.5 CONDUCT SPURIOUS PLOT .....	82
<b>11. TRANSMITTER FREQUENCY BEHAVIOR .....</b>	<b>102</b>
11.1 PROVISIONS APPLICABLE .....	102
11.2 TEST METHOD .....	102
11.3 DESCRIBE LIMIT LINE OF TRANSMITTER FREQUENCY BEHAVIOR .....	103
11.4 MEASURE RESULT .....	104
<b>12. AUDIO LOW PASS FILTER RESPONSE .....</b>	<b>105</b>
12.1. TEST LIMITS .....	105
12.2. METHOD OF MEASUREMENTS .....	105
<b>APPENDIX I: PHOTOGRAPHS OF SETUP .....</b>	<b>107</b>
<b>APPENDIX II PHOTOGRAPHS OF EUT .....</b>	<b>108</b>



## 1. VERIFICATION OF COMPLIANCE

<b>Applicant:</b>	TYT ELECTRONICS CO., LTD
<b>Address</b>	Block 39-1, Optoelectronics-information industry base, Nan'an, Quanzhou, Fujian, China.
<b>Manufacturer:</b>	TYT ELECTRONICS CO., LTD
<b>Address</b>	Block 39-1, Optoelectronics-information industry base, Nan'an, Quanzhou, Fujian, China.
<b>Factory</b>	TYT ELECTRONICS CO., LTD
<b>Address</b>	Block 39-1, Optoelectronics-information industry base, Nan'an, Quanzhou, Fujian, China.
<b>Product Designation:</b>	DMR Digital Transceiver
<b>Brand Name:</b>	TYT
<b>Test Model</b>	MD-680D
<b>Serial Model</b>	MD-680
<b>Difference Description</b>	All the same except the brand name and model name.
<b>Date of Test:</b>	Sept 10, 2019~Oct. 16, 2019

### WE HEREBY CERTIFY THAT:

The above equipment was tested by Shenzhen Attestation of Global Compliance Science & Technology 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 90 and FCC Rules Part 22 requirements. The test results of this report relate only to the tested sample identified in this report.

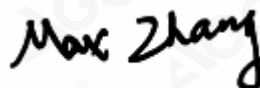
Prepared By



Calvin Liu  
(Project Engineer)

Oct. 16, 2019

Reviewed By



Max Zhang  
(Reviewer)

Oct. 16, 2019

Approved By



Forrest Lei  
Authorized Officer

Oct. 16, 2019

## 2. GENERAL INFORMATION

### 2.1 PRODUCT DESCRIPTION

The EUT is a **DMR Digital Transceiver** designed for voice/data communication. It is designed by way of utilizing the FM/4FSK modulation achieves the system operating.

A major technical description of EUT is described as following:

Communication Type	Voice / Data
Hardware Version	MD359S
Software Version	1.00
Modulation	FM/4FSK
Emission Type	7K60F1D/7K60F1E/11K0F3E
Emission Bandwidth	Analog:10.268 KHz(10W-12.5 KHz), 10.283 KHz(4W-12.5 KHz) Digital: 9.874 KHz(10W-12.5KHz), 9.898 KHz(4W-12.5KHz)
Peak Frequency Deviation	1.79KHz
Audio Frequency Response	11.46dB
Maximum Transmitter Power	Analog: 39.82dBm(10W-12.5 KHz), 35.91dBm (4W-12.5 KHz) Digital: 39.62dBm(10W-12.5KHz), 35.83dBm (4W-12.5KHz)
Output power Modification	10W/4W (It was fixed by the manufacturer, any individual can't arbitrarily change it.)
Data Rate	9600bps/12.5KHz(Channel Spacing)
Antenna Designation	Detachable
Antenna Gain	1.5dBi
Power Supply	DC 7.4V, 2200mAh (by battery) charging for DC 8.4V
Limiting Voltage	DC 6.29V-8.51V
Operation Frequency Range and Channel	Frequency Range:400 MHz to 480 MHz (UHF) Channel Separation: 12.5KHz(Digital/ Analog) Bottom Channel: 400.025MHz Middle Channel: 453.225MHz Middle Channel: 454.025MHz High Channel: 479.975MHz
Frequency Tolerance	1.188ppm



Frequency Range (MHz)	Rated Transmit Power(W)(Conducted)	Transmit Mode/Emission Designator
400-480	10W/4W	11K0F3E(Analog Voice;NB)
400-480	10W/4W	7K60FXD/7K60FXW(9600Data/Digital Voice NB )

Channel No. (6.25KHz)	Channel No. (12.5KHz)	12.5KHz Channel Spaced 400MHz Band Plan(MHz)
1	1-2	400.025
2		
3	3-4	440.025
4		
5	5-6	479.975
6		



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

**For FM Mode (Channel Spacing: 12.5kHz)**

Emission Designator 11K0F3E

In this case, the maximum modulating frequency is 3.0 kHz with a 2.5 kHz deviation.

$$BW = 2(M+D) = 2*(3.0 \text{ kHz} + 2.5 \text{ kHz}) = 11 \text{ kHz} = 11K0$$

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.

$$BW = 2(M+D) = 2*(3.0 \text{ kHz} + 5.0 \text{ kHz}) = 16 \text{ kHz} = 16K0$$

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

7K60F1E

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 F1E portion of the designator indicates digital information.

Therefore, the entire designator for 12.5 kHz channel spacing digital mode is 7K60F1D and 7K60F1E.





**2.2 RELATED SUBMITTAL(S) / GRANT (S)**

This submittal(s) (test report) is intended for FCC ID: **POD-DMR5**, filing to comply with Part 2, Part 22, and Part 90 of the Federal Communication Commission rules.

**2.3 TEST METHODOLOGY**

The radiated emission testing was performed according to the procedures of ANSI/TIA-603-E (2016).

**2.4 TEST FACILITY**

<b>Test Site</b>	Attestation of Global Compliance (Shenzhen) Co., Ltd
<b>Location</b>	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
<b>Designation Number</b>	CN1259
<b>FCC Test Firm Registration Number</b>	975832
<b>A2LA Cert. No.</b>	5054.02
<b>Description</b>	Attestation of Global Compliance(Shenzhen) Co., Ltd is accredited by A2LA

**2.5 SPECIAL ACCESSORIES**

Not available for this EUT intended for grant.

**2.6 EQUIPMENT MODIFICATIONS**

Not available for this EUT intended for grant.



### 3. SYSTEM TEST CONFIGURATION

#### 3.1 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.

#### 3.2 EUT EXERCISE

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

#### 3.3 GENERAL TECHNICAL REQUIREMENTS

For FCC Part 90& Part 22 requirements:

- (1). Section 90.205 & 22.565: RF Output Power
- (2). Section 90.207: Modulation Characteristic
- (3). Section 90.209 & 22.359: Occupied Bandwidth
- (4). Section 90.210 & 22.359: Emission Mask
- (5). Section 90.213 & 22.355: Frequency Tolerance
- (6). Section 90.214: Transient Frequency Behavior



### 3.4 CONFIGURATION OF TESTED SYSTEM

Fig. 2-1 Configuration of Tested System



Table 2-1 Equipment Used in Tested System

Item	Equipment	Model No.	Identifier	Note
1	DMR Digital Transceiver	MD-680D	FCC ID: POD-DMR5	EUT
2	Desktop charger	N/A	DC 8.4V, 300mA	Accessory
3	Adapter	T-1206	Input: AC 100-240V, 50/60Hz, 0.3A Output: DC 12.5V 500mA	Accessory
4	Battery	DM-V1	DC 7.4V 2200mAh	Accessory
5	Back clip	N/A	N/A	Accessory



#### 4. SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§90.205 & 22.565	Maximum Transmitter Power	Compliant
§90.207	Modulation Characteristic	Compliant
§90.209& 22.359	Occupied Bandwidth	Compliant
§90.210& 22.359	Emission Mask	Compliant
§90.213& 22.355	Frequency Tolerance	Compliant
§90.214	Transient Frequency Behavior	Compliant



**LIST OF EQUIPMENTS USED**

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	Jun. 12, 2019	Jun.11 , 2020
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Dec. 20, 2018	Dec. 19, 2019
Horn antenna	SCHWARZBECK	BBHA 9170	#768	Sep.18, 2018	Sep.17, 2019
Horn antenna	SCHWARZBECK	BBHA 9170	#768	Sep.16, 2019	Sep.15, 2020
preamplifier	ChengYi	EMC184045SE	980508	Oct.31, 2018	Oct 30, 2019
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	May. 26, 2018	May. 25, 2020
Broadband Preamplifier	SCHWARZBECK	BBV 9718	9718-205	Jun. 12, 2019	Jun.11 , 2020
HORN ANTENNA	EM	EM-AH-10180	/	Mar.01, 2018	Feb.29, 2020
SIGNAL GENERATOR	AGILENT	E4421B	122501288	May. 13, 2019	May. 12, 2020
SIGNAL GENERATOR	R&S	SMT03	A0304261	Jun. 12, 2019	Jun.11 , 2020
ANTENNA	SCHWARZBECK	VULB9168	VULB9168-494	Jan. 09, 2019	Jan. 08, 2020
ANTENNA	SCHWARZBECK	VULB9168	D69250	Sep.26, 2018	Sep.25, 2019
ANTENNA	SCHWARZBECK	VULB9168	D69250	Sep.24, 2019	Sep.23, 2020
Modulation Domain Analyzer	HP	53310A	3121A02467	Nov. 01, 2018	Oct. 31, 2019
Small environmental tester	ESPEC	SH-242	--	Feb. 25, 2019	Feb. 24, 2020
RF Communication Test Set	HP	8920B	--	Jun. 12, 2019	Jun.11 , 2020
Attenuator	Weinachel Corp	58-30-33	ML030	Jun. 12, 2019	Jun.11 , 2020
Vector Analyzer	Agilent	E4440A	--	Feb. 27, 2019	Feb. 26, 2020
RF Cable	R&S	1#	--	Each time	N/A
RF Cable	R&S	2#	--	Each time	N/A



## 5. DESCRIPTION OF TEST MODES

### RF TEST MODES

The EUT (**DMR Digital Transceiver**) 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.

#### Analog:

No.	TEST MODES	CHANNEL SEPARATION
1	Low Channel	12.5 KHz
2	Middle Channel	12.5 KHz
3	High Channel	12.5 KHz

#### Digital:

No.	TEST MODES	CHANNEL SEPARATION
1	Low Channel	12.5 KHz
2	Middle Channel	12.5 KHz
3	High Channel	12.5 KHz

**Note:** Only the result of the worst case was recorded in the report.



## 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  $-30^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$  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.
- d). According to FCC Part 22 Section 22.355, Frequency error must be kept within plus or minus 5ppm.

### 6.2 MEASUREMENT PROCEDURE

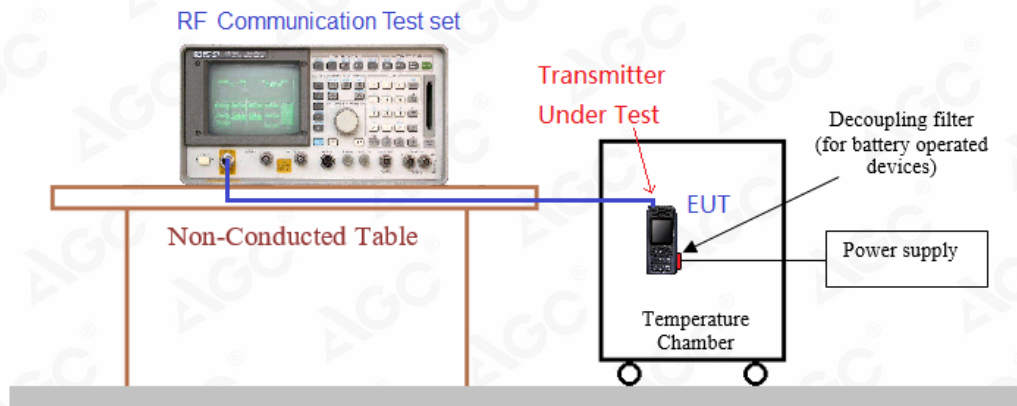
#### 6.2.1 Frequency stability versus environmental temperature

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  $50^{\circ}\text{C}$ . 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  $10^{\circ}\text{C}$  decreased per stage until the lowest temperature  $-30^{\circ}\text{C}$  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  $15^{\circ}\text{C}$  to  $25^{\circ}\text{C}$ . Otherwise, an environment chamber set for a temperature of  $20^{\circ}\text{C}$  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 TEST SETUP BLOCK DIAGRAM**





**6.4 TEST RESULTS**

**FCC PART 90:**

**UHF:**

**Analog:**

**(1) Frequency stability versus input voltage (Supply nominal voltage is 7.40V)-10W-12.5KHz**

Environment Temperature(°C)	Power (V)	Reference Frequency			Limit: ppm
		400.025MHz	454.025MHz	479.975MHz	
50	DC 7.40V	0.389	0.653	0.672	2.5
40	DC 7.40V	1.086	0.605	0.569	
30	DC 7.40V	0.988	0.563	0.627	
20	DC 7.40V	1.009	0.882	0.632	
10	DC 7.40V	0.858	0.997	1.010	
0	DC 7.40V	1.084	0.522	0.837	
-10	DC 7.40V	0.734	0.741	0.586	
-20	DC 7.40V	0.874	1.092	0.770	
-30	DC 7.40V	0.893	0.937	0.827	
Result	Pass				

**(2) Frequency stability versus input voltage (Battery endpoint is 6.29V) -10W-12.5KHz**

Environment Temperature(°C)	Power Supply (V)	Reference Frequency			Limit: ppm
		400.025MHz	454.025MHz	479.975MHz	
50	DC 6.29 V	0.871	0.482	0.576	2.5
40	DC 6.29 V	0.439	0.887	0.805	
30	DC 6.29 V	0.653	0.425	0.519	
20	DC 6.29 V	0.947	0.786	0.395	
10	DC 6.29 V	0.444	0.368	0.468	
0	DC 6.29 V	0.665	0.542	0.334	
-10	DC 6.29 V	0.710	0.606	0.670	
-20	DC 6.29 V	0.663	0.673	0.679	
-30	DC 6.29 V	0.647	0.867	0.609	
Result	Pass				



**Digital:**

**(1) Frequency stability versus input voltage (Supply nominal voltage is 7.40V)-10W-12.5KHz**

Environment Temperature(°C)	Power (V)	Reference Frequency			Limit: ppm
		400.025MHz	454.025MHz	479.975MHz	
50	DC 7.40V	0.681	0.653	0.922	2.5
40	DC 7.40V	0.659	1.043	0.640	
30	DC 7.40V	0.602	0.700	1.094	
20	DC 7.40V	0.634	0.672	0.583	
10	DC 7.40V	1.035	0.976	0.812	
0	DC 7.40V	0.586	0.702	0.962	
-10	DC 7.40V	0.510	0.692	0.631	
-20	DC 7.40V	1.058	0.786	0.959	
-30	DC 7.40V	0.901	1.036	0.796	
<b>Result</b>		<b>Pass</b>			

**(2) Frequency stability versus input voltage(Battery endpoint is 6.29V) -10W-12.5KHz**

Environment Temperature(°C)	Power (V)	Reference Frequency			Limit: ppm
		400.025MHz	454.025MHz	479.975MHz	
50	DC 6.29 V	0.534	0.538	0.634	2.5
40	DC 6.29 V	0.570	0.457	0.547	
30	DC 6.29 V	0.524	0.514	0.862	
20	DC 6.29 V	0.983	0.783	0.767	
10	DC 6.29 V	0.302	0.426	0.470	
0	DC 6.29 V	0.867	0.950	0.434	
-10	DC 6.29 V	0.358	0.620	0.527	
-20	DC 6.29 V	0.805	0.723	0.795	
-30	DC 6.29 V	0.640	0.806	0.626	
<b>Result</b>		<b>Pass</b>			



**Analog:**

**(1) Frequency stability versus input voltage (Supply nominal voltage is 7.40V)-4W-12.5KHz**

Environment Temperature(°C)	Power (V)	Reference Frequency			Limit: ppm
		400.025MHz	454.025MHz	479.975MHz	
50	DC 7.40V	0.936	0.653	1.098	2.5
40	DC 7.40V	0.954	0.968	0.885	
30	DC 7.40V	0.646	0.970	0.826	
20	DC 7.40V	0.911	0.816	1.023	
10	DC 7.40V	0.966	0.686	1.055	
0	DC 7.40V	0.864	0.771	0.733	
-10	DC 7.40V	1.045	0.801	0.543	
-20	DC 7.40V	0.771	0.852	0.691	
-30	DC 7.40V	0.775	0.542	0.976	
Result	Pass				

**(2) Frequency stability versus input voltage (Battery endpoint is 6.29V) -4W-12.5KHz**

Environment Temperature(°C)	Power Supply (V)	Reference Frequency			Limit: ppm
		400.025MHz	454.025MHz	479.975MHz	
50	DC 6.29 V	0.736	0.748	0.631	2.5
40	DC 6.29 V	0.779	0.417	0.382	
30	DC 6.29 V	0.674	0.399	0.375	
20	DC 6.29 V	0.741	0.867	0.559	
10	DC 6.29 V	0.304	0.982	0.959	
0	DC 6.29 V	0.559	0.998	0.486	
-10	DC 6.29 V	0.326	0.632	0.368	
-20	DC 6.29 V	0.632	0.959	0.865	
-30	DC 6.29 V	0.739	0.591	0.392	
Result	Pass				



**Digital:**

**(1) Frequency stability versus input voltage (Supply nominal voltage is 7.40V)-4W-12.5KHz**

Environment Temperature(°C)	Power (V)	Reference Frequency			Limit: ppm
		400.025MHz	454.025MHz	479.975MHz	
50	DC 7.40V	0.696	0.653	0.541	2.5
40	DC 7.40V	0.507	0.999	0.950	
30	DC 7.40V	0.823	0.677	0.977	
20	DC 7.40V	0.845	0.979	<b>1.188</b>	
10	DC 7.40V	1.007	0.756	0.665	
0	DC 7.40V	0.547	1.074	0.710	
-10	DC 7.40V	1.075	0.557	0.779	
-20	DC 7.40V	0.665	1.093	0.990	
-30	DC 7.40V	0.779	0.531	0.871	
Result	Pass				

**(2) Frequency stability versus input voltage(Battery endpoint is 6.29V) -4W-12.5KHz**

Environment Temperature(°C)	Power (V)	Reference Frequency			Limit: ppm
		400.025MHz	454.025MHz	479.975MHz	
50	DC 6.29 V	0.938	0.451	0.927	2.5
40	DC 6.29 V	0.418	0.678	0.344	
30	DC 6.29 V	0.766	0.809	0.858	
20	DC 6.29 V	0.899	0.559	0.506	
10	DC 6.29 V	0.441	0.339	0.648	
0	DC 6.29 V	0.799	0.956	0.723	
-10	DC 6.29 V	0.721	0.721	0.581	
-20	DC 6.29 V	0.898	0.826	0.473	
-30	DC 6.29 V	0.391	0.510	0.755	
Result	Pass				



**FCC PART 22:**

**UHF:**

**Analog:**

(1) Frequency stability versus input voltage (Supply nominal voltage is 7.40V)-10W-12.5KHz

Environment Temperature(°C)	Power (V)	Reference Frequency 454.025MHz	Limit: ppm
50	DC 7.40V	0.817	5
40	DC 7.40V	0.681	
30	DC 7.40V	0.841	
20	DC 7.40V	0.773	
10	DC 7.40V	0.925	
0	DC 7.40V	0.660	
-10	DC 7.40V	0.571	
-20	DC 7.40V	0.661	
-30	DC 7.40V	1.062	
Result	Pass		

(2) Frequency stability versus input voltage (Battery endpoint is 6.29V) -10W-12.5KHz

Environment Temperature(°C)	Power (V)	Reference Frequency 454.025MHz	Limit: ppm
50	DC 6.29V	0.653	5
40	DC 6.29V	0.570	
30	DC 6.29V	0.725	
20	DC 6.29V	1.040	
10	DC 6.29V	0.997	
0	DC 6.29V	0.872	
-10	DC 6.29V	0.664	
-20	DC 6.29V	0.904	
-30	DC 6.29V	1.000	
Result	Pass		



Attestation of Global Compliance

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

Add: 2/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community,  
Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China

Tel: +86-755 2523 4088

E-mail: agc@agc-cert.com

Service Hotline: 400 089 2118

(3) Frequency stability versus input voltage (Supply nominal voltage is 7.40V)-4W-12.5KHz

Environment Temperature(°C)	Power	Reference Frequency	Limit: ppm
	(V)	454.025MHz	
50	DC 7.40V	0.919	5
40	DC 7.40V	0.699	
30	DC 7.40V	0.648	
20	DC 7.40V	0.995	
10	DC 7.40V	1.020	
0	DC 7.40V	0.749	
-10	DC 7.40V	0.877	
-20	DC 7.40V	0.613	
-30	DC 7.40V	0.924	
Result	Pass		

(4) Frequency stability versus input voltage (Battery endpoint is 6.29V) -4W-12.5KHz

Environment Temperature(°C)	Power	Reference Frequency	Limit: ppm
	(V)	454.025MHz	
50	DC 6.29V	0.738	5
40	DC 6.29V	0.625	
30	DC 6.29V	0.641	
20	DC 6.29V	0.480	
10	DC 6.29V	0.530	
0	DC 6.29V	0.745	
-10	DC 6.29V	0.673	
-20	DC 6.29V	0.411	
-30	DC 6.29V	0.479	
Result	Pass		



**Digital:**

**(1) Frequency stability versus input voltage (Supply nominal voltage is 7.40V)-10W-12.5KHz**

Environment Temperature(°C)	Power (V)	Reference Frequency	Limit: ppm
		454.025MHz	
50	DC 7.40V	0.512	5
40	DC 7.40V	0.818	
30	DC 7.40V	0.821	
20	DC 7.40V	0.519	
10	DC 7.40V	0.767	
0	DC 7.40V	0.942	
-10	DC 7.40V	0.334	
-20	DC 7.40V	0.410	
-30	DC 7.40V	0.713	
<b>Result</b>	<b>Pass</b>		

**(2) Frequency stability versus input voltage (Battery endpoint is 6.29V) -10W-12.5KHz**

Environment Temperature(°C)	Power (V)	Reference Frequency	Limit: ppm
		454.025MHz	
50	DC 6.29V	0.963	5
40	DC 6.29V	0.450	
30	DC 6.29V	0.773	
20	DC 6.29V	0.468	
10	DC 6.29V	0.570	
0	DC 6.29V	0.301	
-10	DC 6.29V	0.534	
-20	DC 6.29V	0.493	
-30	DC 6.29V	0.906	
<b>Result</b>	<b>Pass</b>		



(3) Frequency stability versus input voltage (Supply nominal voltage is 7.40V)-4W-12.5KHz

Environment Temperature(°C)	Power (V)	Reference Frequency 454.025MHz	Limit: ppm
50	DC 7.40V	0.512	5
40	DC 7.40V	1.069	
30	DC 7.40V	0.535	
20	DC 7.40V	0.803	
10	DC 7.40V	0.813	
0	DC 7.40V	1.018	
-10	DC 7.40V	0.950	
-20	DC 7.40V	0.612	
-30	DC 7.40V	0.868	
Result	Pass		

(4) Frequency stability versus input voltage (Battery endpoint is 6.29V) -4W-12.5KHz

Environment Temperature(°C)	Power (V)	Reference Frequency 454.025MHz	Limit: ppm
50	DC 6.29V	0.653	5
40	DC 6.29V	0.590	
30	DC 6.29V	1.065	
20	DC 6.29V	0.845	
10	DC 6.29V	0.886	
0	DC 6.29V	1.013	
-10	DC 6.29V	0.833	
-20	DC 6.29V	1.031	
-30	DC 6.29V	0.861	
Result	Pass		





## 7. EMISSION BANDWIDTH

### 7.1 PROVISIONS APPLICABLE

FCC Part 90 & FCC Part 22:

The authorized bandwidth shall be 11.25 KHz for 12.5 KHz channel separation and 6 KHz for 6.25 KHz channel separation.

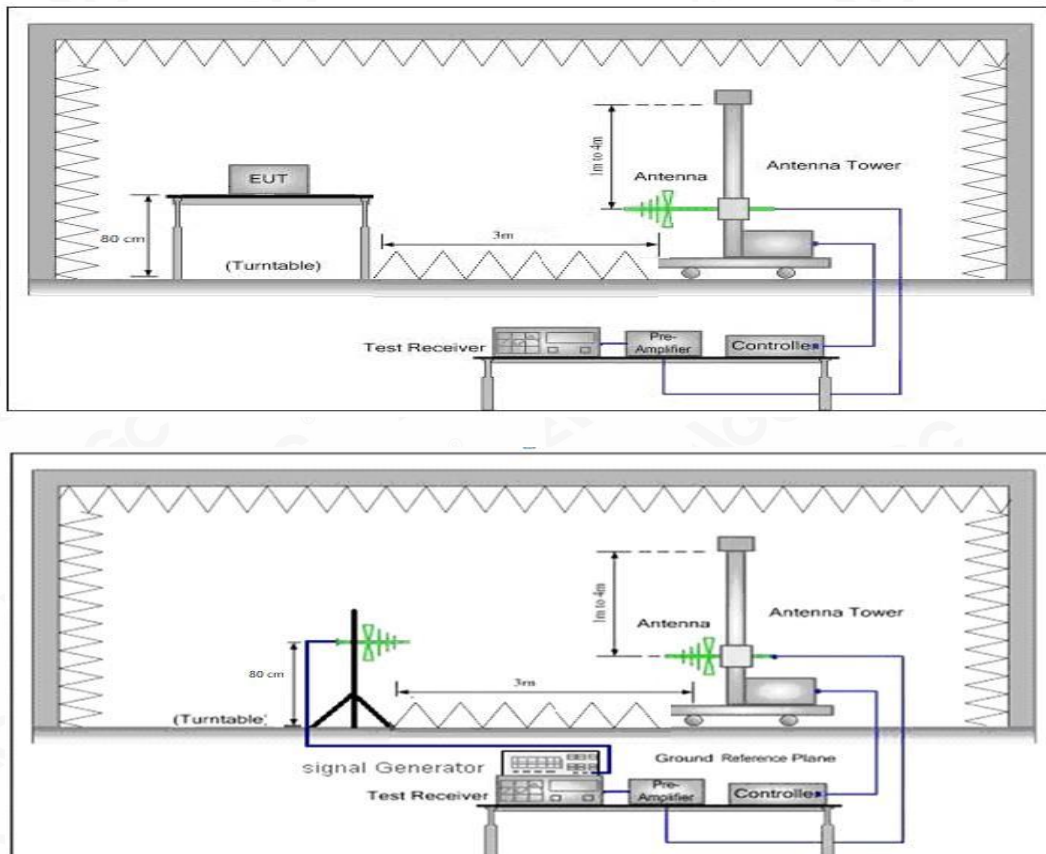
### 7.2 MEASUREMENT PROCEDURE

- 1). The EUT was placed on a turn table which is 0.8m above ground plane.
- 2). The EUT was modulated by 2.5 KHz Sine wave audio signal, The level of the audio signal employed is 16 dB greater than that necessary to produce 50% of rated system deviation. Rated system deviation is 2.5 kHz (12.5 kHz channel spacing).
- 3). Set SPA Center Frequency = fundamental frequency, RBW=100Hz.VBW= 300 Hz, Span =50 KHz.
- 4). Set SPA Max hold. Mark peak, -26 dB.

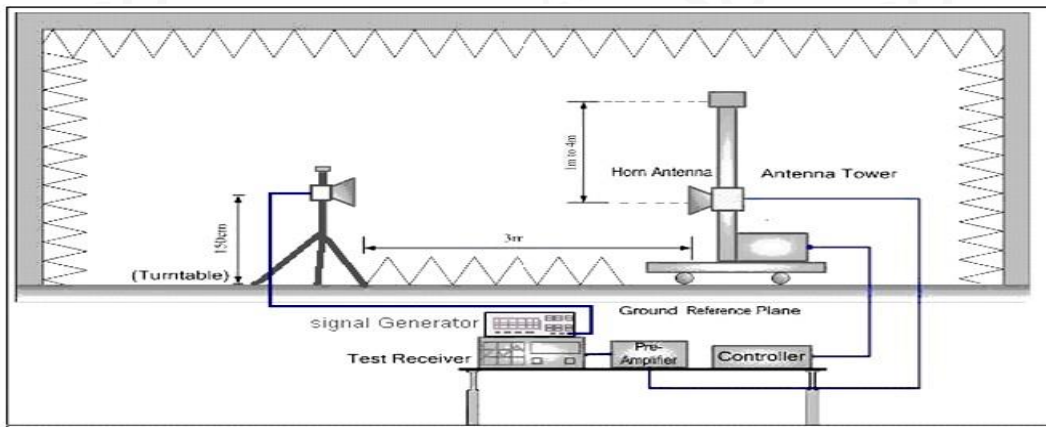
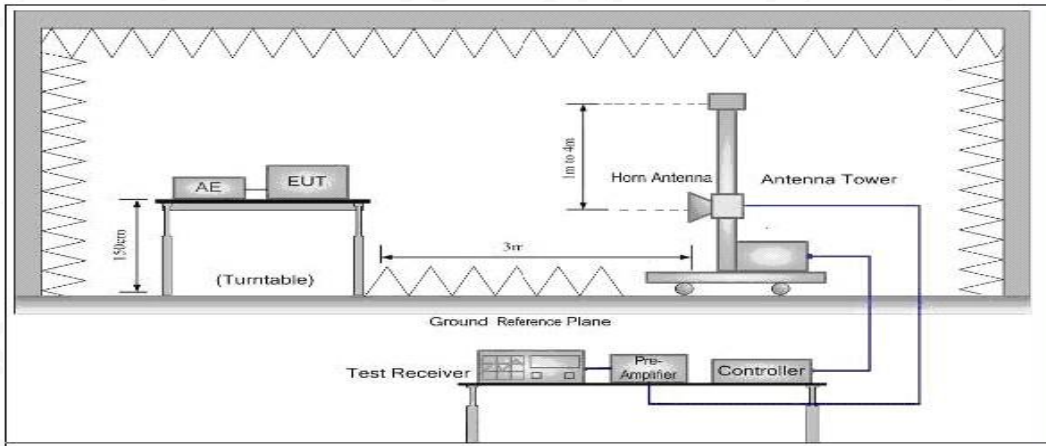
### 7.3 TEST SETUP BLOCK DIAGRAM

Radiation method:

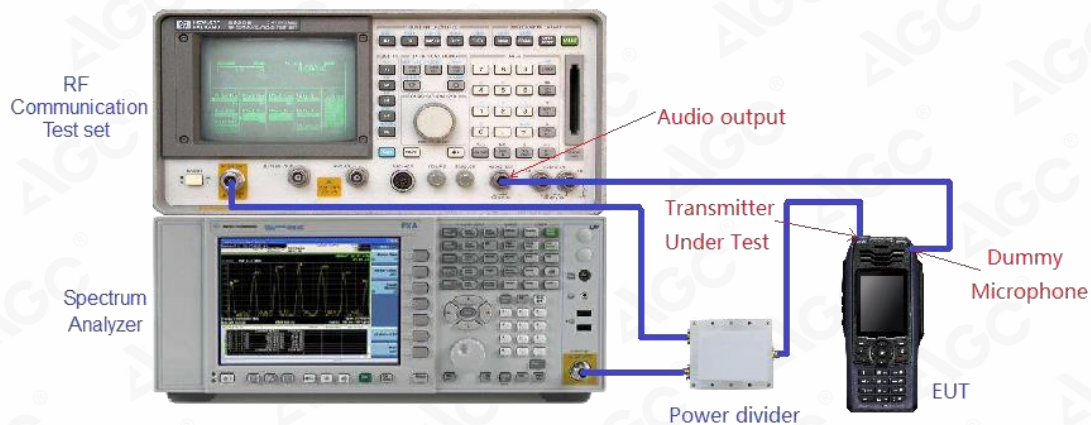
#### Radiated Below 1GHz



### Radiated Above 1 GHz



### Conduction method:

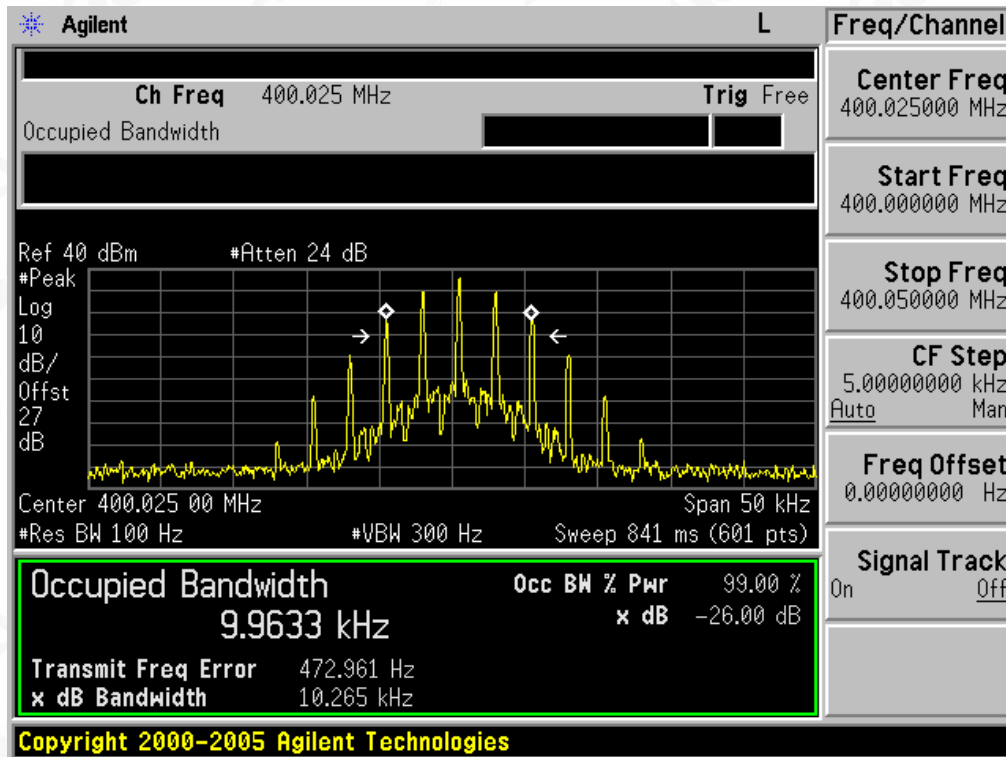


### 7.4 MEASUREMENT RESULT

UHF:  
Analog:

26 DB BANDWIDTH MEASUREMENT RESULT			
Operating Frequency	12.5 KHz Channel Separation		
	Test Data	Limits	Result
400.025MHz	10.265 KHz	11.25 KHz	Pass
453.225MHz	10.260 KHz	11.25 KHz	Pass
454.025MHz	10.268 KHz	11.25 KHz	Pass
479.975MHz	10.229 KHz	11.25 KHz	Pass

#### Occupied bandwidth of Bottom Channel (400.025MHz)-10W



Attestation of Global Compliance

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

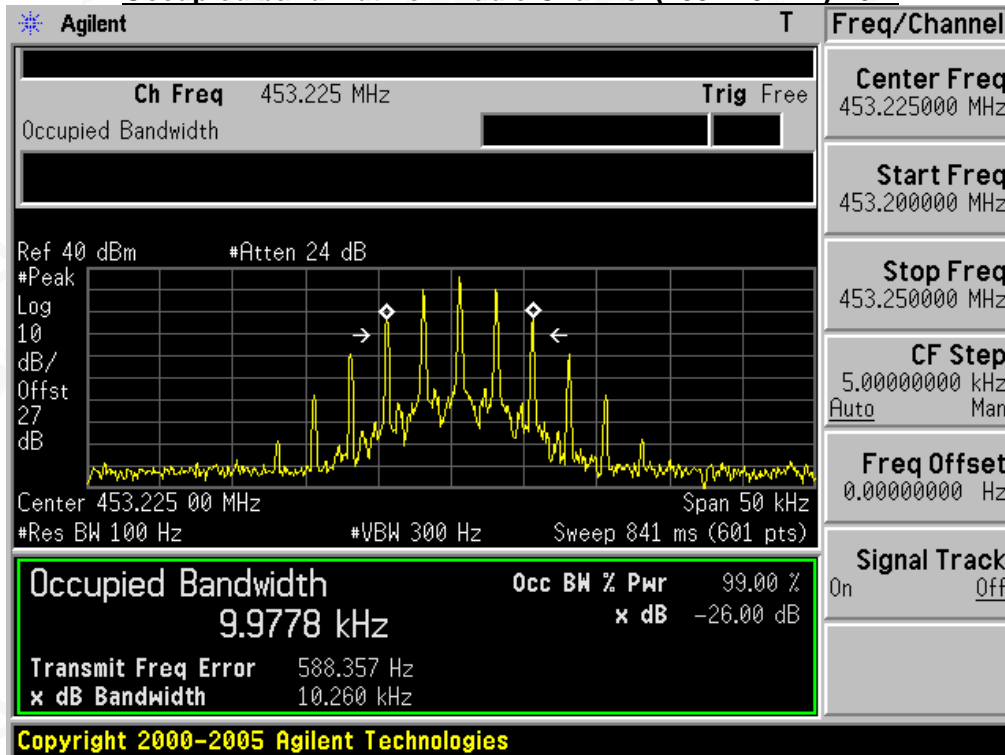
Add: 2/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community,  
Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China

Tel: +86-755 2523 4088

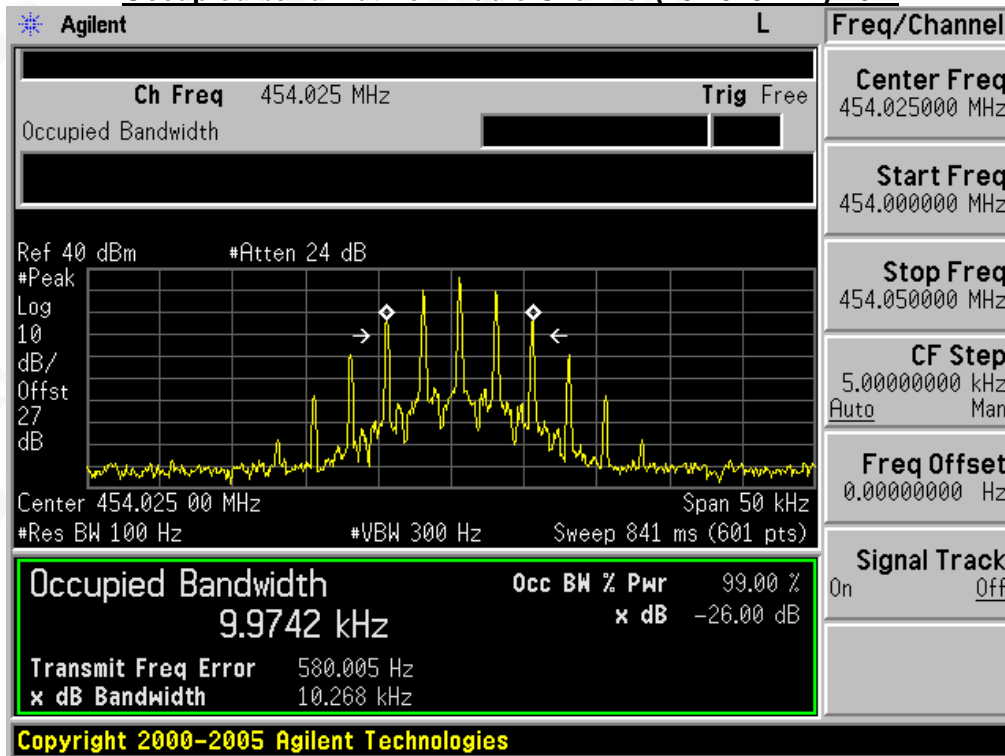
E-mail: agc@agc-cert.com

Service Hotline: 400 089 2118

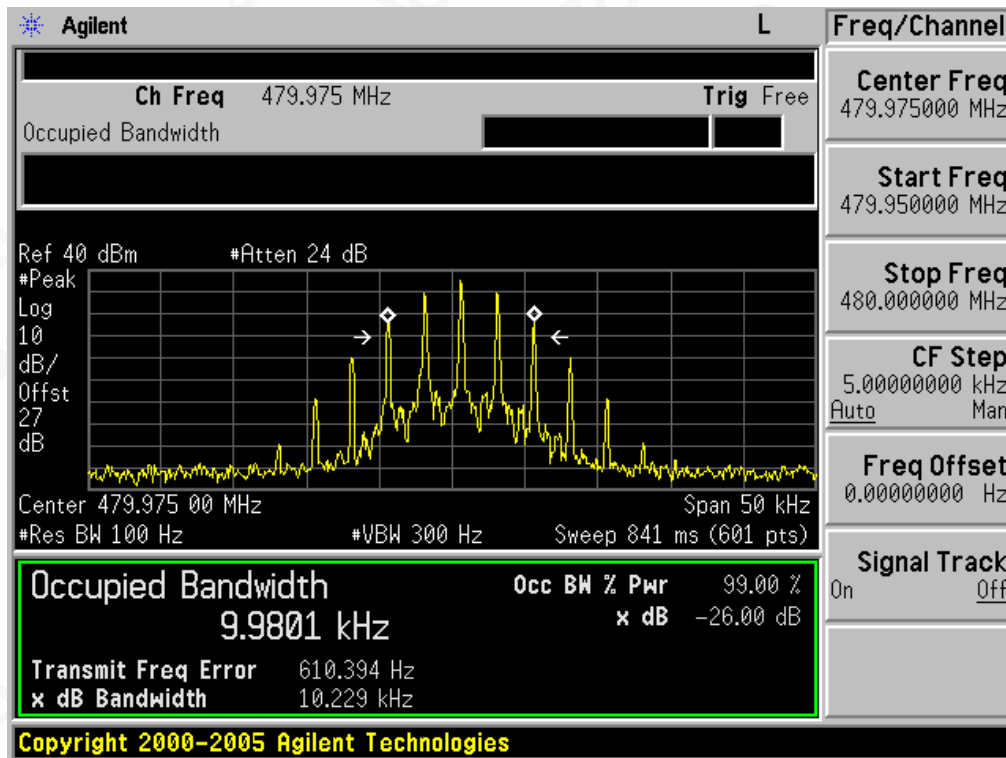
**Occupied bandwidth of Middle Channel (453.225MHz)-10W**



**Occupied bandwidth of Middle Channel (454.025MHz)-10W**

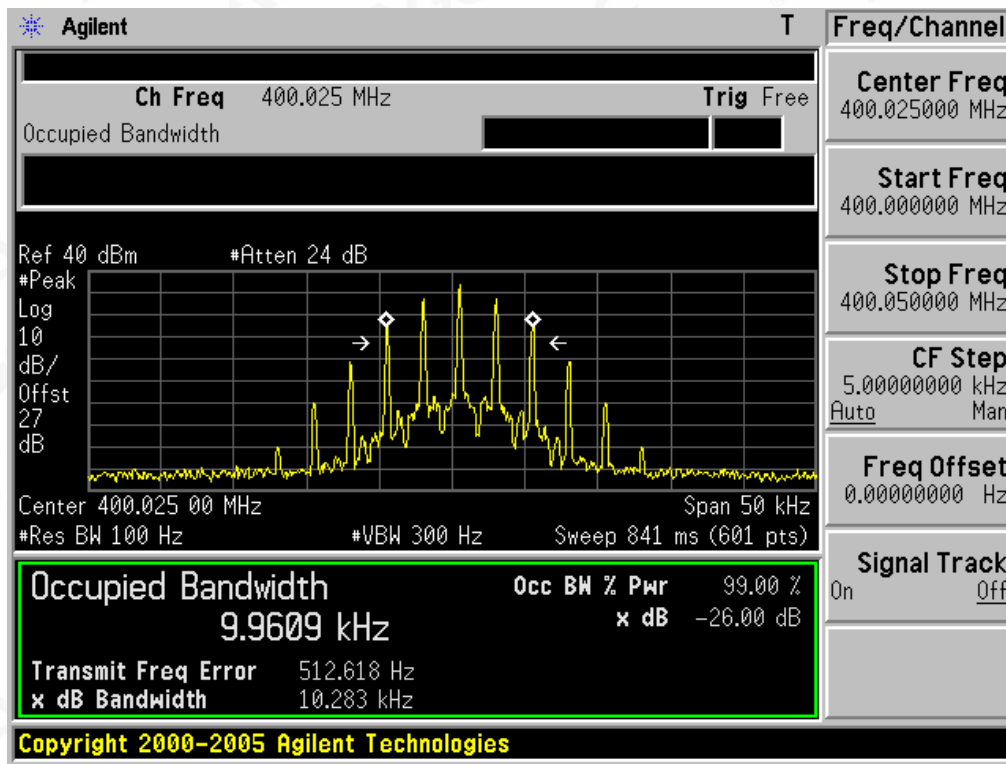


**Occupied bandwidth of Top Channel (479.975MHz)-10W**

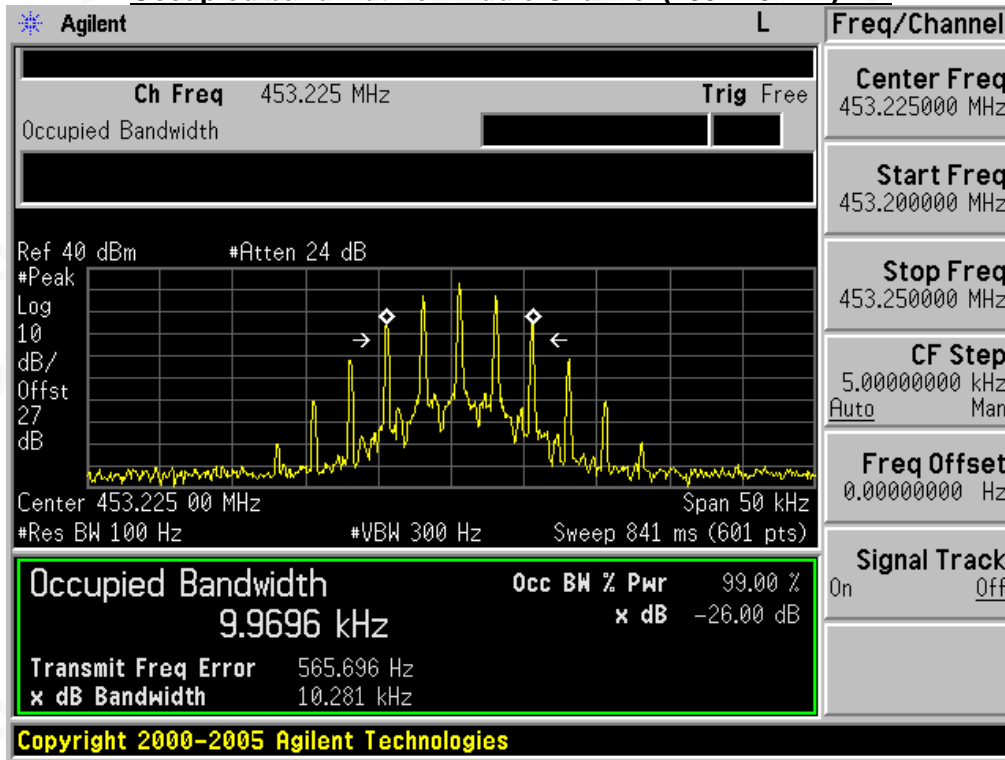


26 DB BANDWIDTH MEASUREMENT RESULT			
Operating Frequency	12.5 KHz Channel Separation		
	Test Data	Limits	Result
400.025MHz	10.283 KHz	11.25 KHz	Pass
453.225MHz	10.281 KHz	11.25 KHz	Pass
454.025MHz	10.233 KHz	11.25 KHz	Pass
479.975MHz	10.261 KHz	11.25 KHz	Pass

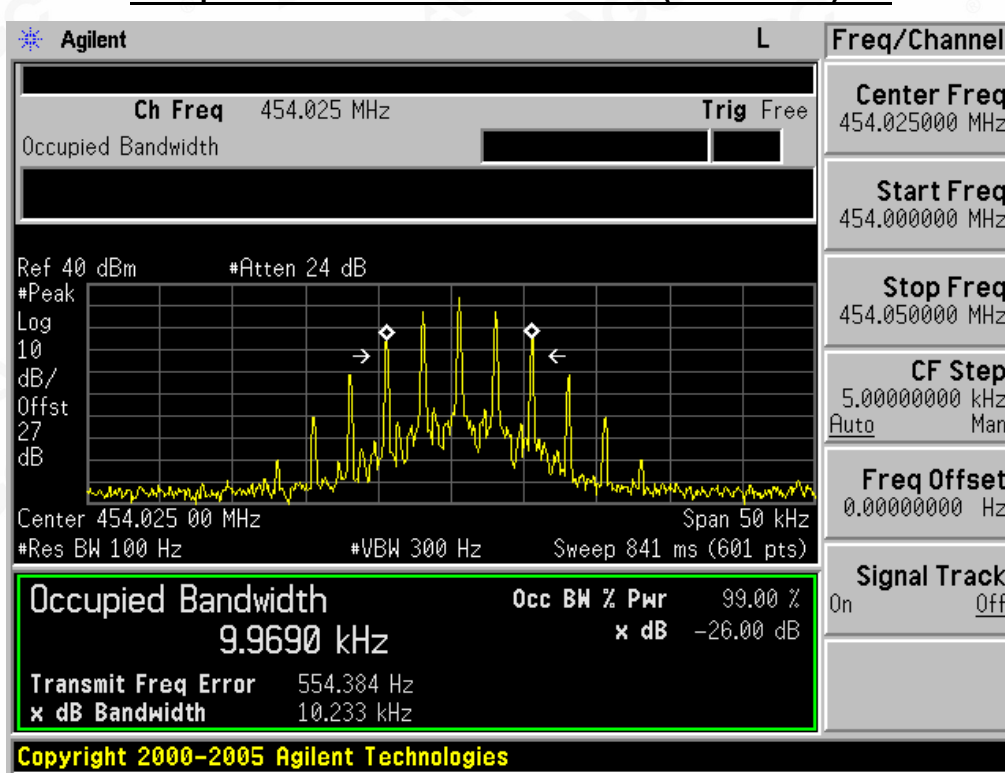
**Occupied bandwidth of Bottom Channel (400.025MHz)-4W**



**Occupied bandwidth of Middle Channel (453.225MHz)-4W**



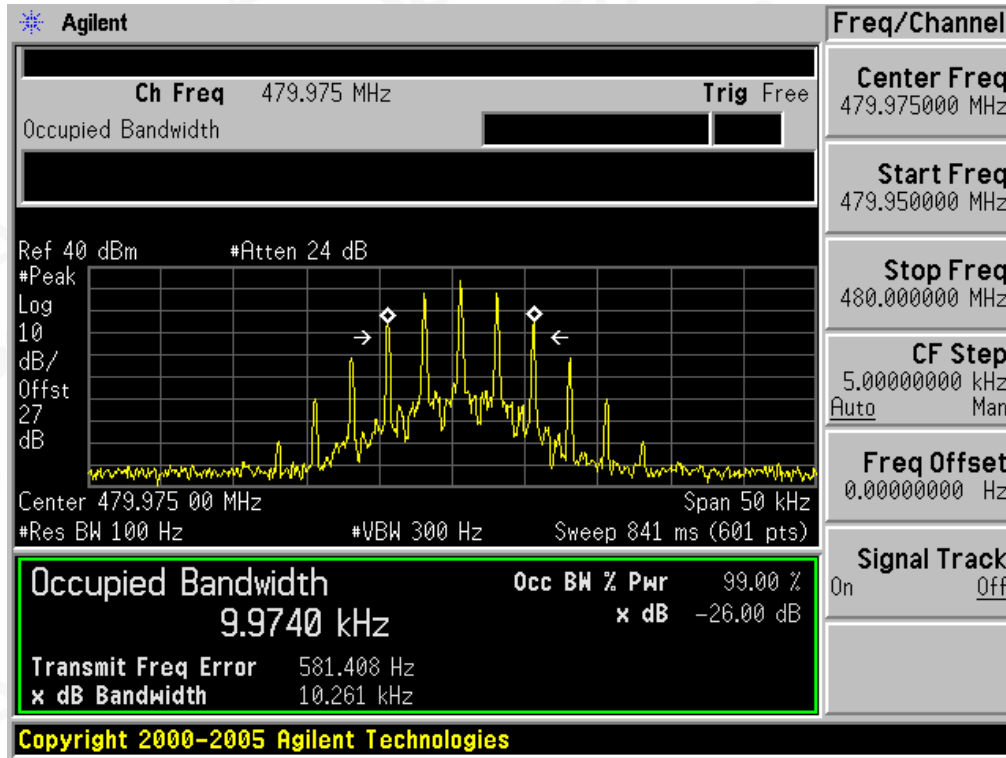
**Occupied bandwidth of Middle Channel (454.025MHz)-4W**



Attestation of Global Compliance

Attestation of Global Compliance(Shenzhen)Co.,Ltd.  
 Add: 2/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community,  
 Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China  
 Tel: +86-755 2523 4088 E-mail: agc@agc-cert.com Service Hotline:400 089 2118

**Occupied bandwidth of Top Channel (479.975MHz)-4W**

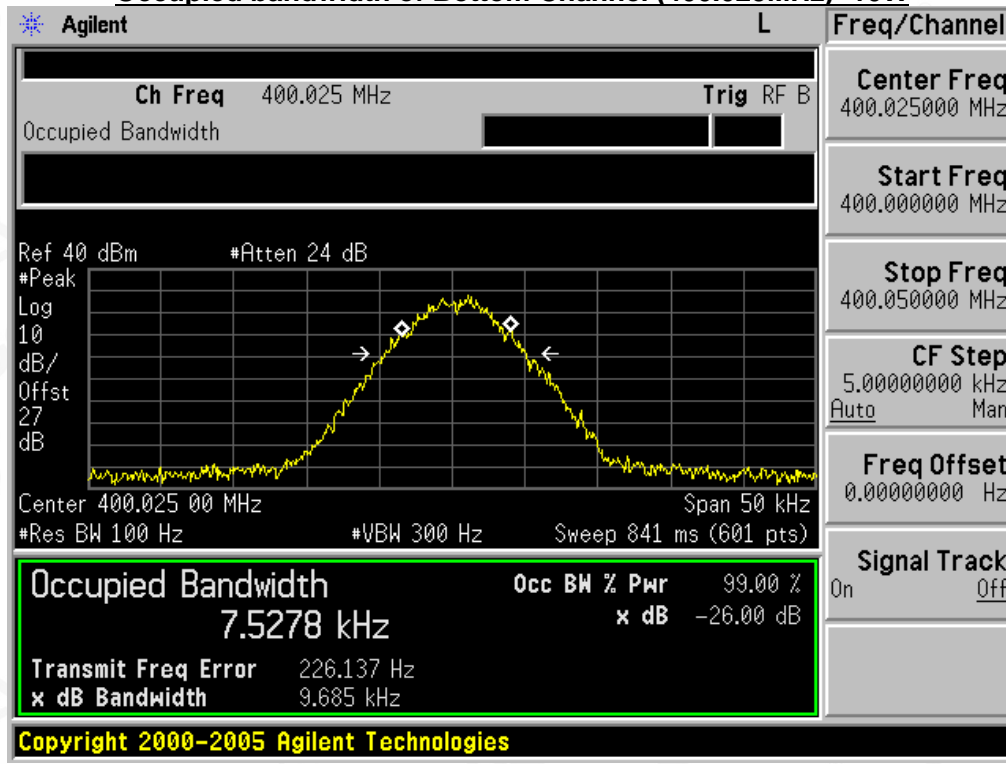


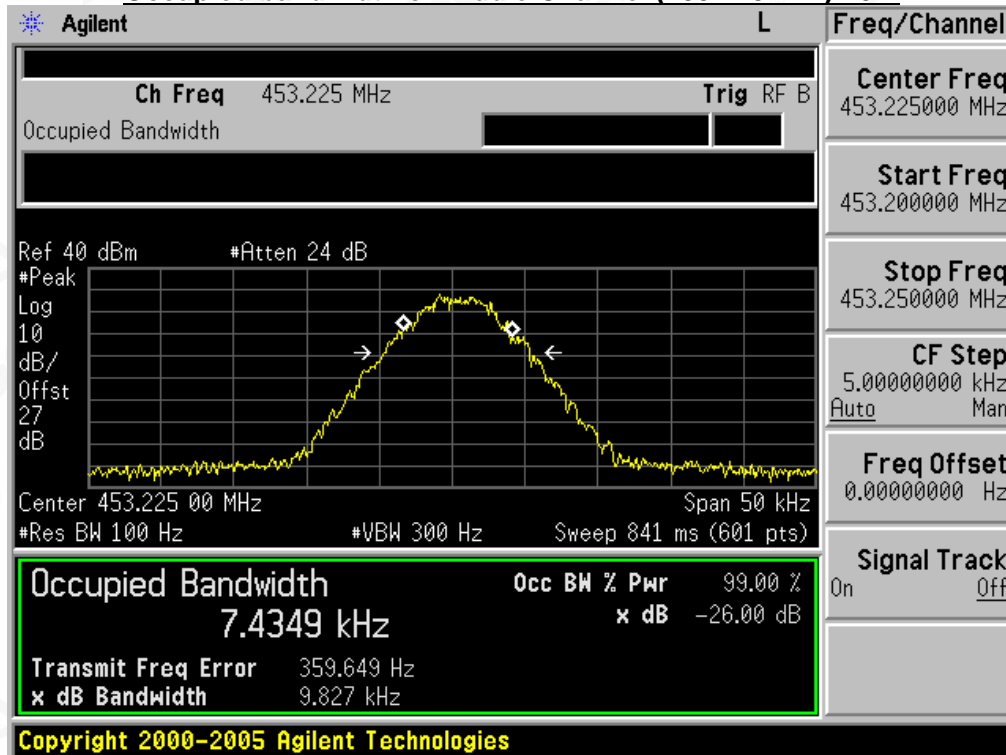
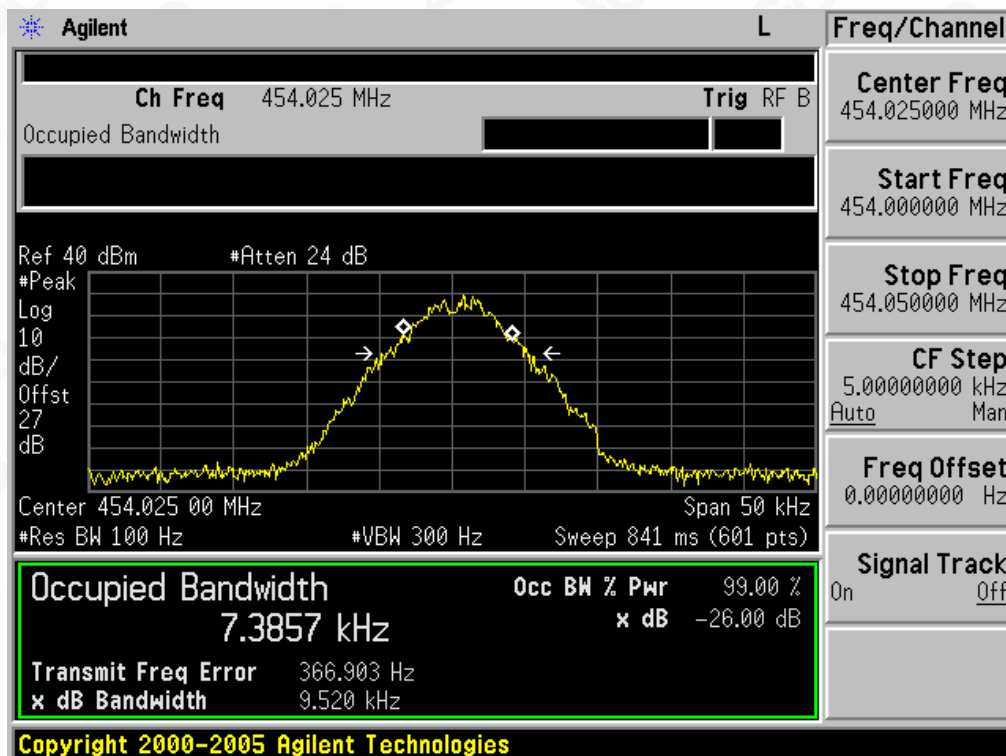


**Digital:  
TEST RESULTS**

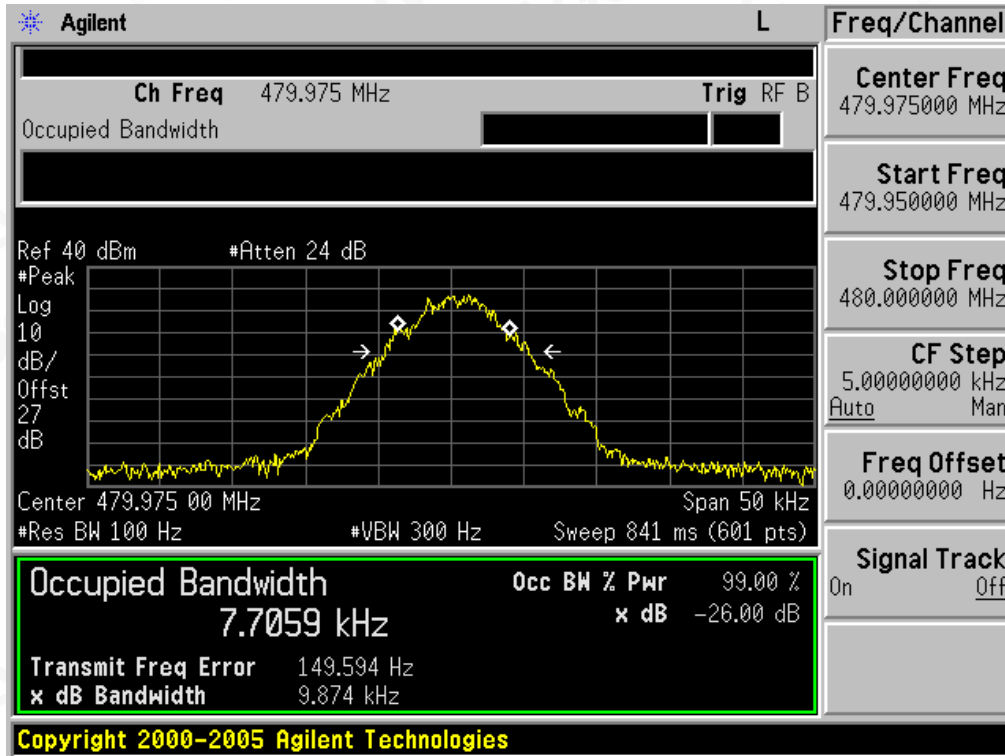
26 DB BANDWIDTH MEASUREMENT RESULT			
Operating Frequency	12.5 KHz Channel Separation		
	Test Data	Limits	Result
400.025MHz	9.685 KHz	11.25 KHz	Pass
453.225MHz	9.827 KHz	11.25 KHz	Pass
454.025MHz	9.520 KHz	11.25 KHz	Pass
479.975MHz	9.874 KHz	11.25 KHz	Pass

**Occupied bandwidth of Bottom Channel (400.025MHz) -10W**



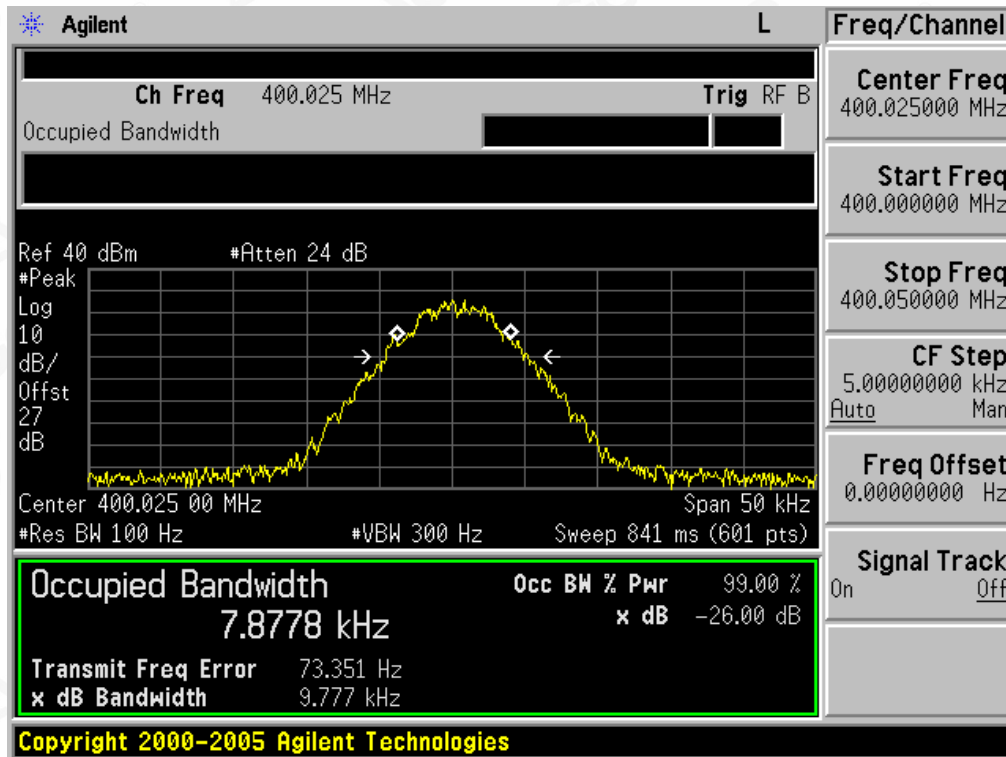
**Occupied bandwidth of Middle Channel (453.225MHz)-10W**

**Occupied bandwidth of Middle Channel (454.025MHz)-10W**


**Occupied bandwidth of Top Channel (479.975MHz )-10W**

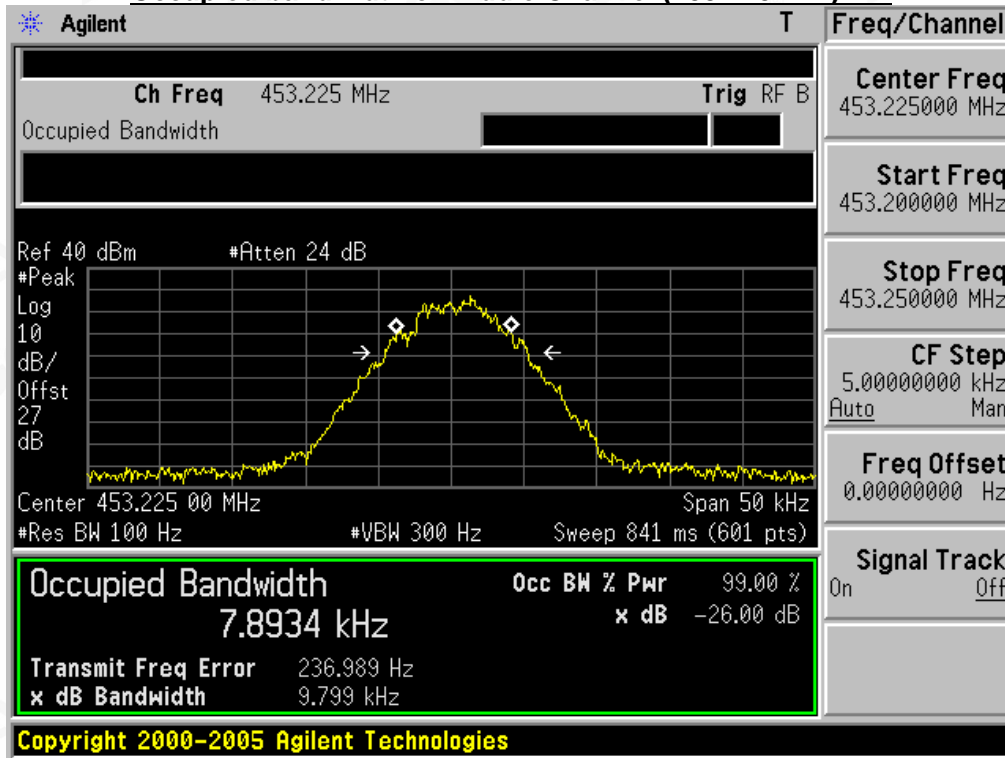


26 DB BANDWIDTH MEASUREMENT RESULT			
Operating Frequency	12.5 KHz Channel Separation		
	Test Data	Limits	Result
400.025MHz	9.777 KHz	11.25 KHz	Pass
453.225MHz	9.799 KHz	11.25 KHz	Pass
454.025MHz	9.592 KHz	11.25 KHz	Pass
479.975MHz	9.898 KHz	11.25 KHz	Pass

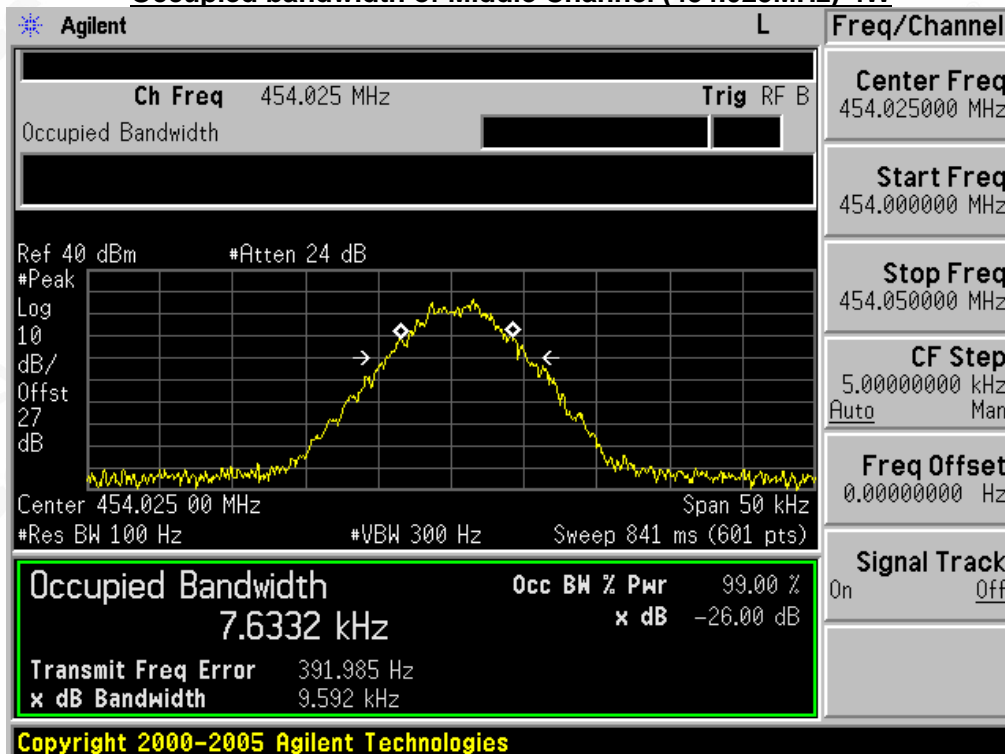
**Occupied bandwidth of Bottom Channel (400.025MHz)-4W**



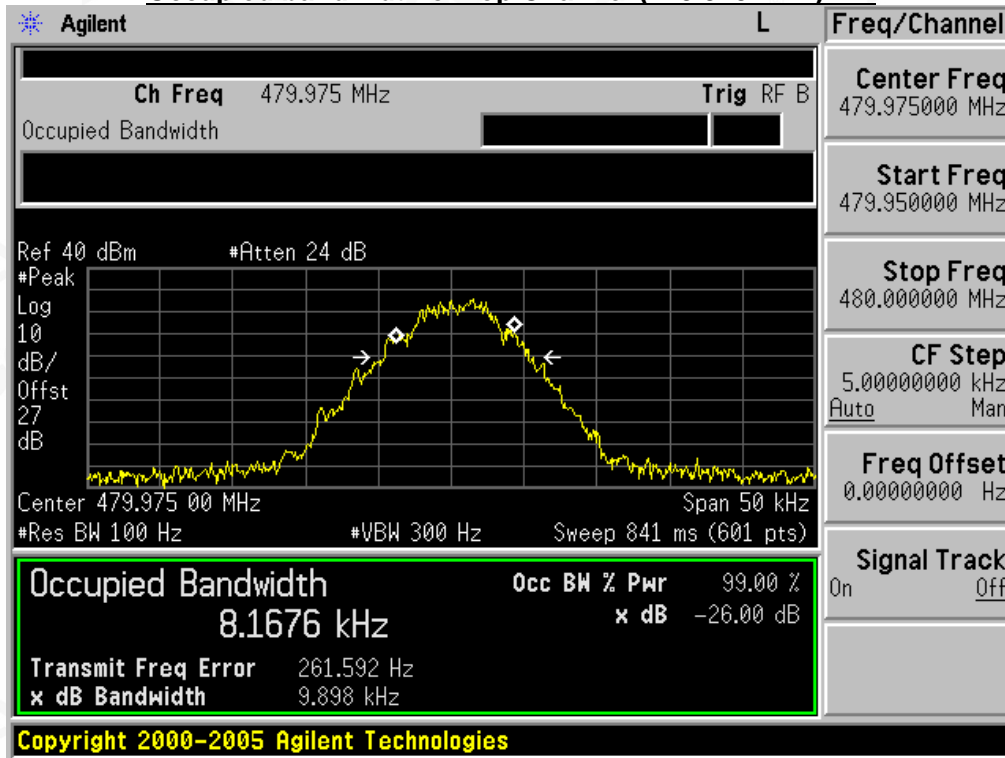
**Occupied bandwidth of Middle Channel (453.225MHz)-4W**



**Occupied bandwidth of Middle Channel (454.025MHz)-4W**



**Occupied bandwidth of Top Channel (479.975MHz)-4W**



Copyright 2000-2005 Agilent Technologies



Attestation of Global Compliance

Attestation of Global Compliance(Shenzhen)Co.,Ltd.  
Add: 2/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community,  
Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China  
Tel: +86-755 2523 4088 E-mail: agc@agc-cert.com Service Hotline:400 089 2118

## 7. UNWANTED RADIATION

### 8.1 PROVISIONS APPLICABLE

According to FCC §2.1049, §22.359 and §90.210, the power of each unwanted emission shall be less than Transmitted Power as specified below for transmitters designed to operate with each channel separation.

Emission Mask D -for 12.5 KHz Channel Separation:

- (1). On any frequency removed from the center of the authorized bandwidth  $f_0$  to 5.625 KHz removed from  $f_0$ : Zero dB.
- (2). On any frequency removed from the center of the authorized bandwidth by a displacement Frequency ( $f_d$  in KHz)  $f_0$  of more than 5.625 KHz but no more than 12.5 KHz: At least  $7.27(f_d - 2.88 \text{ KHz})$  dB
- (3). On any frequency removed from the center of the authorized bandwidth by a displacement Frequency ( $f_d$  in KHz)  $f_0$  of more than 12.5 KHz: At least  $50 + 10 \log(P)$  dB or 70 dB, whichever is lesser attenuation.

According to FCC §22.359:

- (a) *Out of band emissions*. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

### 8.2 MEASUREMENT PROCEDURE

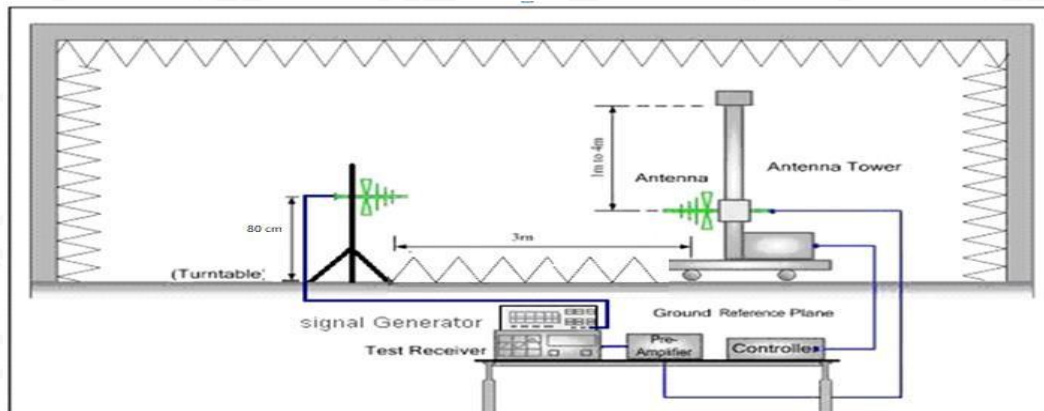
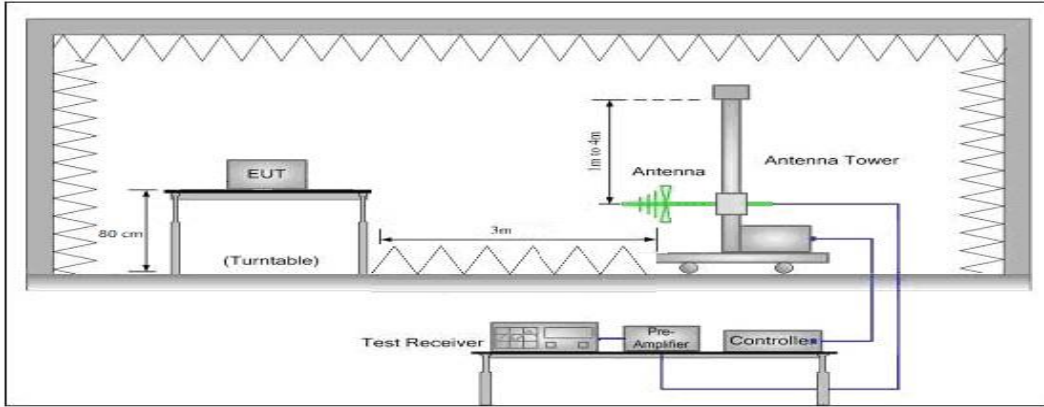
- (1) On a test site, the EUT shall be placed on a turntable, and in the position closest to the normal use as declared by the user.
- (2) The test antenna shall be oriented initially for vertical polarization located 3m from the EUT to correspond to the transmitter.
- (3) The output of the antenna shall be connected to the measuring receiver and either a peak or quasi-peak detector was used for the measurement as indicated on the report. The detector selection is based on how close the emission level was approaching the limit.
- (4) The transmitter shall be switched on; if possible, without the modulation and the measurement receiver shall be tuned to the frequency of the transmitter under test.
- (5) The test antenna shall be raised and lowered through the specified range of height until the measuring receiver detects a maximum signal level.
- (6) The transmitter shall then be rotated through  $360^\circ$  in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
- (7) The test antenna shall be raised and lowered again through the specified range of height until the measuring receiver detects a maximum signal level.
- (8) The maximum signal level detected by the measuring receiver shall be noted.
- (9) The measurement shall be repeated with the test antenna set to horizontal polarization.
- (10) Replace the antenna with a proper Antenna (substitution antenna).
- (11) The substitution antenna shall be oriented for vertical polarization and, if necessary, the length of the substitution antenna shall be adjusted to correspond to the frequency of transmitting.
- (12) The substitution antenna shall be connected to a calibrated signal generator.
- (13) If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
- (14) The test antenna shall be raised and lowered through the specified range of the height to ensure that the maximum signal is received.
- (15) The input signal to substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuation setting of the measuring receiver.
- (16) The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.
- (17) The measurement shall be repeated with the test antenna and the substitution antenna oriented for horizontal polarization.

### 8.3 TEST SETUP BLOCK DIAGRAM

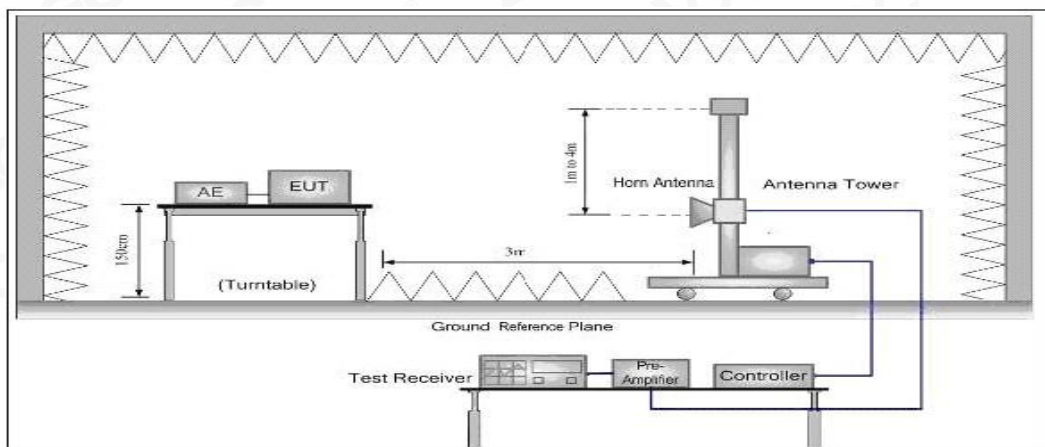
#### SUBSTITUTION METHOD: (Radiated Emissions)

Radiation method:

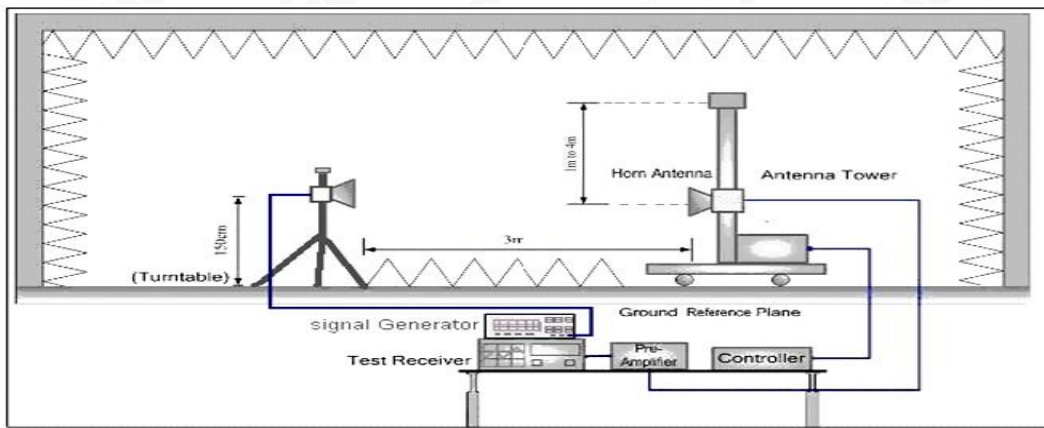
#### Radiated Below 1GHz



#### Radiated Above 1 GHz







## 8.4 MEASUREMENT RESULTS:

### Applicable Standard

FCC §2.1053, §22.359 and §90.210

On any frequency removed from the center of the authorized bandwidth by a displacement

Frequency ( $f_d$  in KHz) for of more than 12.5 KHz: at least  $50+10 \log(P)$  dB or 70 dB, whichever is lesser attenuation.

### Test Procedure

The RF output of the EUT was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100 kHz for below 1GHz and 1MHz for above 1GHz. Sufficient scans were taken to show any out of band emissions up to 10 harmonic.

In the semi-anechoic chamber, setup as illustrated above the DUT placed on the 0.8m height of Turn Table, rotated the table 45 degree each interval to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power for each degree interval. The "Read Value" is the spectrum reading of maximum power value.

The substitution antenna is substituted for DUT at the same position and signals generator (S.G) export the CW signal to the substitution antenna via a TX cable. The receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum radiation power. Record the power level of maximum radiation power from spectrum. So, the Measured substitution value = Ref level of S.G + TX cables loss – Substituted Antenna Gain.

$EIRP = \text{"Read Value"} + \text{Measured substitution value} + 2.15.$

### Limit: FCC PART 90:

At least  $50+10 \log(P) = 50+10 \log(10) = 60$  (dB)—10W    40-60=-20 dBm

At least  $50+10 \log(P) = 50+10 \log(4) = 56.02$  (dB)—4W    36.02-56.02=-20dBm

### FCC PART 22:

At least  $43+10 \log(P) = 43+10 \log(10) = 53$  (dB)—10W    40-53=-13 dBm

At least  $43+10 \log(P) = 43+10 \log(4) = 49.02$  (dB)—10W    36.02-49.02=-13 dBm



FCC PART 90:  
UHF:  
Analog:

**TEST RESULTS--10W**  
**Measurement Result for 12.5 KHz Channel Separation @ 400.025MHz**

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result (dBm)	Limit (dBm)	Result(P/F)
400.025	H	0		pass
800.050	H	-34.2	-20	pass
1200.075	H	-35.3	-20	pass
1600.100	H	-36.8	-20	pass
2000.125	H	-39.1	-20	pass
2400.150	H	-39.4	-20	pass
2800.175	H	-40.2	-20	pass
3200.200	H	-51.8	-20	pass
3600.225	H	-51.9	-20	pass
4000.250	H	-52.8	-20	pass

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result (dBm)	Limit (dBm)	Result(P/F)
400.025	V	0		pass
800.050	V	-33.5	-20	pass
1200.075	V	-35.7	-20	pass
1600.100	V	-37.6	-20	pass
2000.125	V	-40.3	-20	pass
2400.150	V	-41.7	-20	pass
2800.175	V	-47.5	-20	pass
3200.200	V	-51.2	-20	pass
3600.225	V	-52.2	-20	pass
4000.250	V	-53.4	-20	pass



Attestation of Global Compliance

Attestation of Global Compliance(Shenzhen)Co.,Ltd.  
Add: 2/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community,  
Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China  
Tel: +86-755 2523 4088 E-mail: agc@agc-cert.com Service Hotline:400 089 2118

**Measurement Result for 12.5 KHz Channel Separation @ 454.025MHz**

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result (dBm)	Limit (dBm)	Result(P/F)
454.025	V	0		pass
908.050	V	-33.1	-20	pass
1362.075	V	-34.7	-20	pass
1816.100	V	-36.1	-20	pass
2270.125	V	-43.7	-20	pass
2724.150	V	-45.9	-20	pass
3178.175	V	-47.4	-20	pass
3632.200	V	-51.3	-20	pass
4086.225	V	-52.1	-20	pass
4540.250	V	-53.5	-20	pass

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result (dBm)	Limit (dBm)	Result(P/F)
454.025	H	0		pass
908.050	H	-32.9	-20	pass
1362.075	H	-34.6	-20	pass
1816.100	H	-37.9	-20	pass
2270.125	H	-38.6	-20	pass
2724.150	H	-40.7	-20	pass
3178.175	H	-41.3	-20	pass
3632.200	H	-43.8	-20	pass
4086.225	H	-48.9	-20	pass
4540.250	H	-51.1	-20	pass



**Measurement Result for 12.5 KHz Channel Separation @ 479.975MHz**

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result (dBm)	Limit (dBm)	Result(P/F)
479.975	H	0		pass
959.950	H	-35.2	-20	pass
1439.925	H	-38.6	-20	pass
1919.900	H	-39.7	-20	pass
2399.875	H	-40.2	-20	pass
2879.850	H	-43.4	-20	pass
3359.825	H	-44.7	-20	pass
3839.800	H	-47.9	-20	pass
4319.775	H	-51.4	-20	pass
4799.750	H	-52.5	-20	pass

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result (dBm)	Limit (dBm)	Result(P/F)
479.975	V	0		pass
959.950	V	-34.6	-20	pass
1439.925	V	-35.2	-20	pass
1919.900	V	-37.7	-20	pass
2399.875	V	-38.3	-20	pass
2879.850	V	-41.2	-20	pass
3359.825	V	-42.3	-20	pass
3839.800	V	-47.9	-20	pass
4319.775	V	-48.6	-20	pass
4799.750	V	-50.1	-20	pass



**TEST RESULTS—4W**

**Measurement Result for 12.5 KHz Channel Separation @ 400.025MHz**

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result (dBm)	Limit (dBm)	Result(P/F)
400.025	H	0		pass
800.050	H	-36.3	-20	pass
1200.075	H	-38.5	-20	pass
1600.100	H	-39.4	-20	pass
2000.125	H	-41.5	-20	pass
2400.150	H	-42.3	-20	pass
2800.175	H	-45.9	-20	pass
3200.200	H	-48.0	-20	pass
3600.225	H	-49.2	-20	pass
4000.250	H	-50.7	-20	pass

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result (dBm)	Limit (dBm)	Result(P/F)
400.025	V	0		pass
800.050	V	-36.9	-20	pass
1200.075	V	37.2	-20	pass
1600.100	V	-40.3	-20	pass
2000.125	V	-41.9	-20	pass
2400.150	V	-42.5	-20	pass
2800.175	V	-43.6	-20	pass
3200.200	V	-48.7	-20	pass
3600.225	V	-49.5	-20	pass
4000.250	V	-51.4	-20	pass



**Measurement Result for 12.5 KHz Channel Separation @ 454.025MHz**

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result (dBm)	Limit (dBm)	Result(P/F)
454.025	H	0		pass
908.050	H	-37.4	-20	pass
1362.075	H	-38.1	-20	pass
1816.100	H	-39.5	-20	pass
2270.125	H	-40.7	-20	pass
2724.150	H	-41.4	-20	pass
3178.175	H	-45.8	-20	pass
3632.200	H	-47.6	-20	pass
4086.225	H	-49.9	-20	pass
4540.250	H	-51.3	-20	pass

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result (dBm)	Limit (dBm)	Result(P/F)
454.025	V	0		pass
908.050	V	-37.6	-20	pass
1362.075	V	-38.5	-20	pass
1816.100	V	-39.9	-20	pass
2270.125	V	-41.2	-20	pass
2724.150	V	-46.3	-20	pass
3178.175	V	-48.5	-20	pass
3632.200	V	-49.7	-20	pass
4086.225	V	-50.4	-20	pass
4540.250	V	-50.8	-20	pass



**Measurement Result for 12.5 KHz Channel Separation @ 479.975MHz**

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result (dBm)	Limit (dBm)	Result(P/F)
469.975	H	0		pass
939.950	H	-37.4	-20	pass
1409.925	H	-38.0	-20	pass
1879.900	H	-39.5	-20	pass
2349.875	H	-40.1	-20	pass
2819.850	H	-41.3	-20	pass
3289.825	H	-45.5	-20	pass
3759.800	H	-46.7	-20	pass
4229.775	H	-50.1	-20	pass
4699.750	H	-52.3	-20	pass

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result (dBm)	Limit (dBm)	Result(P/F)
469.975	V	0		pass
939.950	V	-35.1	-20	pass
1409.925	V	-35.8	-20	pass
1879.900	V	-37.3	-20	pass
2349.875	V	-38.1	-20	pass
2819.850	V	-39.5	-20	pass
3289.825	V	-40.2	-20	pass
3759.800	V	-41.3	-20	pass
4229.775	V	-45.5	-20	pass
4699.750	V	-49.9	-20	pass



Digital:

**TEST RESULTS-10W**  
**Measurement Result for 12.5 KHz Channel Separation @ 400.025MHz**

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result (dBm)	Limit (dBm)	Result(P/F)
400.025	H	0		pass
800.050	H	-35.5	-20	pass
1200.075	H	-36.3	-20	pass
1600.100	H	-37.5	-20	pass
2000.125	H	-39.1	-20	pass
2400.150	H	-42.2	-20	pass
2800.175	H	-45.3	-20	pass
3200.200	H	-47.4	-20	pass
3600.225	H	-50.0	-20	pass
4000.250	H	-51.9	-20	pass

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result (dBm)	Limit (dBm)	Result(P/F)
400.025	V	0		pass
800.050	V	-36.2	-20	pass
1200.075	V	-35.8	-20	pass
1600.100	V	-37.3	-20	pass
2000.125	V	-38.6	-20	pass
2400.150	V	-41.4	-20	pass
2800.175	V	-42.8	-20	pass
3200.200	V	-45.7	-20	pass
3600.225	V	-48.9	-20	pass
4000.250	V	-50.4	-20	pass



Attestation of Global Compliance

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

Add: 2/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community,  
Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China

Tel: +86-755 2523 4088

E-mail: agc@agc-cert.com

Service Hotline: 400 089 2118



**Measurement Result for 12.5 KHz Channel Separation @ 454.025MHz**

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result (dBm)	Limit (dBm)	Result(P/F)
454.025	H	0		pass
908.050	H	-36.1	-20	pass
1362.075	H	-37.4	-20	pass
1816.100	H	-38.4	-20	pass
2270.125	H	-39.7	-20	pass
2724.150	H	-40.8	-20	pass
3178.175	H	-42.6	-20	pass
3632.200	H	-45.3	-20	pass
4086.225	H	-47.8	-20	pass
4540.250	H	-50.9	-20	pass

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result (dBm)	Limit (dBm)	Result(P/F)
454.025	V	0		pass
908.050	V	-36.7	-20	pass
1362.075	V	-37.9	-20	pass
1816.100	V	-39.2	-20	pass
2270.125	V	-41.5	-20	pass
2724.150	V	-42.3	-20	pass
3178.175	V	-43.8	-20	pass
3632.200	V	-46.7	-20	pass
4086.225	V	-50.1	-20	pass
4540.250	V	-51.3	-20	pass



**Measurement Result for 12.5 KHz Channel Separation @ 479.975MHz**

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result (dBm)	Limit (dBm)	Result(P/F)
479.975	H	0		pass
959.950	H	-36.5	-20	pass
1439.925	H	-37.8	-20	pass
1919.900	H	-38.9	-20	pass
2399.875	H	-39.4	-20	pass
2879.850	H	-40.5	-20	pass
3359.825	H	-42.5	-20	pass
3839.800	H	-47.6	-20	pass
4319.775	H	-49.7	-20	pass
4799.750	H	-50.0	-20	pass

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result (dBm)	Limit (dBm)	Result(P/F)
479.975	V	0		pass
959.950	V	-36.7	-20	pass
1439.925	V	-37.9	-20	pass
1919.900	V	-38.9	-20	pass
2399.875	V	-40.5	-20	pass
2879.850	V	-42.9	-20	pass
3359.825	V	-44.4	-20	pass
3839.800	V	-46.8	-20	pass
4319.775	V	-49.3	-20	pass
4799.750	V	-51.2	-20	pass



**TEST RESULTS-4W**  
**Measurement Result for 12.5 KHz Channel Separation @ 400.025MHz**

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result (dBm)	Limit (dBm)	Result(P/F)
400.025	H	0		pass
800.050	H	-36.9	-20	pass
1200.075	H	-38.3	-20	pass
1600.100	H	-39.4	-20	pass
2000.125	H	-40.5	-20	pass
2400.150	H	-43.3	-20	pass
2800.175	H	-47.6	-20	pass
3200.200	H	-49.8	-20	pass
3600.225	H	-50.2	-20	pass
4000.250	H	-51.7	-20	pass

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result (dBm)	Limit (dBm)	Result(P/F)
400.025	V	0		pass
800.050	V	-37.1	-20	pass
1200.075	V	-38.8	-20	pass
1600.100	V	-39.4	-20	pass
2000.125	V	-40.2	-20	pass
2400.150	V	-41.9	-20	pass
2800.175	V	-44.5	-20	pass
3200.200	V	-48.7	-20	pass
3600.225	V	-50.1	-20	pass
4000.250	V	-51.3	-20	pass



**Measurement Result for 12.5 KHz Channel Separation @ 454.025MHz**

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result (dBm)	Limit (dBm)	Result(P/F)
454.025	H	0		pass
908.050	H	-36.4	-20	pass
1362.075	H	-37.6	-20	pass
1816.100	H	-38.9	-20	pass
2270.125	H	-40.2	-20	pass
2724.150	H	-41.3	-20	pass
3178.175	H	-45.7	-20	pass
3632.200	H	-47.3	-20	pass
4086.225	H	-49.8	-20	pass
4540.250	H	-50.2	-20	pass

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result (dBm)	Limit (dBm)	Result(P/F)
454.025	V	0		pass
908.050	V	-36.9	-20	pass
1362.075	V	-37.5	-20	pass
1816.100	V	-39.6	-20	pass
2270.125	V	-40.2	-20	pass
2724.150	V	-43.4	-20	pass
3178.175	V	-45.6	-20	pass
3632.200	V	-47.9	-20	pass
4086.225	V	-49.3	-20	pass
4540.250	V	-51.1	-20	pass



**Measurement Result for 12.5 KHz Channel Separation @ 479.975MHz**

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result (dBm)	Limit (dBm)	Result(P/F)
479.975	H	0		pass
959.950	H	-36.3	-20	pass
1439.925	H	-38.2	-20	pass
1919.900	H	-39.6	-20	pass
2399.875	H	-42.7	-20	pass
2879.850	H	-46.8	-20	pass
3359.825	H	-48.2	-20	pass
3839.800	H	-49.4	-20	pass
4319.775	H	-51.6	-20	pass
4799.750	H	-52.3	-20	pass

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result (dBm)	Limit (dBm)	Result(P/F)
479.975	V	0		pass
959.950	V	-36.5	-20	pass
1439.925	V	-37.3	-20	pass
1919.900	V	-39.8	-20	pass
2399.875	V	-40.1	-20	pass
2879.850	V	-44.3	-20	pass
3359.825	V	-47.5	-20	pass
3839.800	V	-48.5	-20	pass
4319.775	V	-50.7	-20	pass
4799.750	V	-52.1	-20	pass



FCC PART 22:  
Analog:

**TEST RESULTS--10W**

**Measurement Result for 12.5 KHz Channel Separation @ 454.025MHz**

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result (dBm)	Limit (dBm)	Result(P/F)
454.025	H	0		pass
908.050	H	-36.4	-13	pass
1362.075	H	-37.6	-13	pass
1816.100	H	-38.4	-13	pass
2270.125	H	-39.8	-13	pass
2724.150	H	-41.0	-13	pass
3178.175	H	-42.9	-13	pass
3632.200	H	-45.3	-13	pass
4086.225	H	-48.0	-13	pass
4540.250	H	-51.1	-13	pass

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result (dBm)	Limit (dBm)	Result(P/F)
454.025	V	0		pass
908.050	V	-37.2	-13	pass
1362.075	V	-37.9	-13	pass
1816.100	V	-39.5	-13	pass
2270.125	V	-41.5	-13	pass
2724.150	V	-42.5	-13	pass
3178.175	V	-43.8	-13	pass
3632.200	V	-46.5	-13	pass
4086.225	V	-50.0	-13	pass
4540.250	V	-51.2	-13	pass



Attestation of Global Compliance

Attestation of Global Compliance(Shenzhen)Co.,Ltd.  
Add: 2/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community,  
Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China  
Tel: +86-755 2523 4088 E-mail: agc@agc-cert.com Service Hotline:400 089 2118

**TEST RESULTS--4W**

**Measurement Result for 12.5 KHz Channel Separation @ 454.025MHz**

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result (dBm)	Limit (dBm)	Result(P/F)
454.025	H	0		pass
908.050	H	-36.1	-13	pass
1362.075	H	-37.9	-13	pass
1816.100	H	-38.6	-13	pass
2270.125	H	-40.1	-13	pass
2724.150	H	-41.1	-13	pass
3178.175	H	-42.7	-13	pass
3632.200	H	-45.3	-13	pass
4086.225	H	-48.1	-13	pass
4540.250	H	-51.2	-13	pass

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result (dBm)	Limit (dBm)	Result(P/F)
454.025	V	0		pass
908.050	V	-36.9	-13	pass
1362.075	V	-38.0	-13	pass
1816.100	V	-39.5	-13	pass
2270.125	V	-41.5	-13	pass
2724.150	V	-42.3	-13	pass
3178.175	V	-44.1	-13	pass
3632.200	V	-46.5	-13	pass
4086.225	V	-49.8	-13	pass
4540.250	V	-50.9	-13	pass



Digital:

**TEST RESULTS--10W**

**Measurement Result for 12.5 KHz Channel Separation @ 454.025MHz**

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result (dBm)	Limit (dBm)	Result(P/F)
454.025	H	0		pass
908.050	H	-35.8	-13	pass
1362.075	H	-37.3	-13	pass
1816.100	H	-38.4	-13	pass
2270.125	H	-39.5	-13	pass
2724.150	H	-40.4	-13	pass
3178.175	H	-42.6	-13	pass
3632.200	H	-44.9	-13	pass
4086.225	H	-47.6	-13	pass
4540.250	H	-50.7	-13	pass

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result (dBm)	Limit (dBm)	Result(P/F)
454.025	V	0		pass
908.050	V	-37.2	-13	pass
1362.075	V	-37.9	-13	pass
1816.100	V	-39.3	-13	pass
2270.125	V	-41.7	-13	pass
2724.150	V	-42.3	-13	pass
3178.175	V	-44.2	-13	pass
3632.200	V	-47.0	-13	pass
4086.225	V	-50.1	-13	pass
4540.250	V	-51.6	-13	pass



Attestation of Global Compliance

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

Add: 2/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community,  
Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China

Tel: +86-755 2523 4088

E-mail: agc@agc-cert.com

Service Hotline:400 089 2118



**TEST RESULTS--4W**

**Measurement Result for 12.5 KHz Channel Separation @ 454.025MHz**

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result (dBm)	Limit (dBm)	Result(P/F)
454.025	H	0		pass
908.050	H	-36.2	-13	pass
1362.075	H	-37.6	-13	pass
1816.100	H	-38.9	-13	pass
2270.125	H	-40.0	-13	pass
2724.150	H	-41.3	-13	pass
3178.175	H	-42.9	-13	pass
3632.200	H	-45.0	-13	pass
4086.225	H	-47.4	-13	pass
4540.250	H	-50.4	-13	pass

Emission Frequency (MHz)	Ant. Polarity(H/V)	Measurement Result (dBm)	Limit (dBm)	Result(P/F)
454.025	V	0		pass
908.050	V	-36.6	-13	pass
1362.075	V	-37.8	-13	pass
1816.100	V	-39.1	-13	pass
2270.125	V	-41.4	-13	pass
2724.150	V	-42.1	-13	pass
3178.175	V	-43.5	-13	pass
3632.200	V	-46.3	-13	pass
4086.225	V	-49.8	-13	pass
4540.250	V	-51.1	-13	pass



### 8.5 EMISSION MASK PLOT

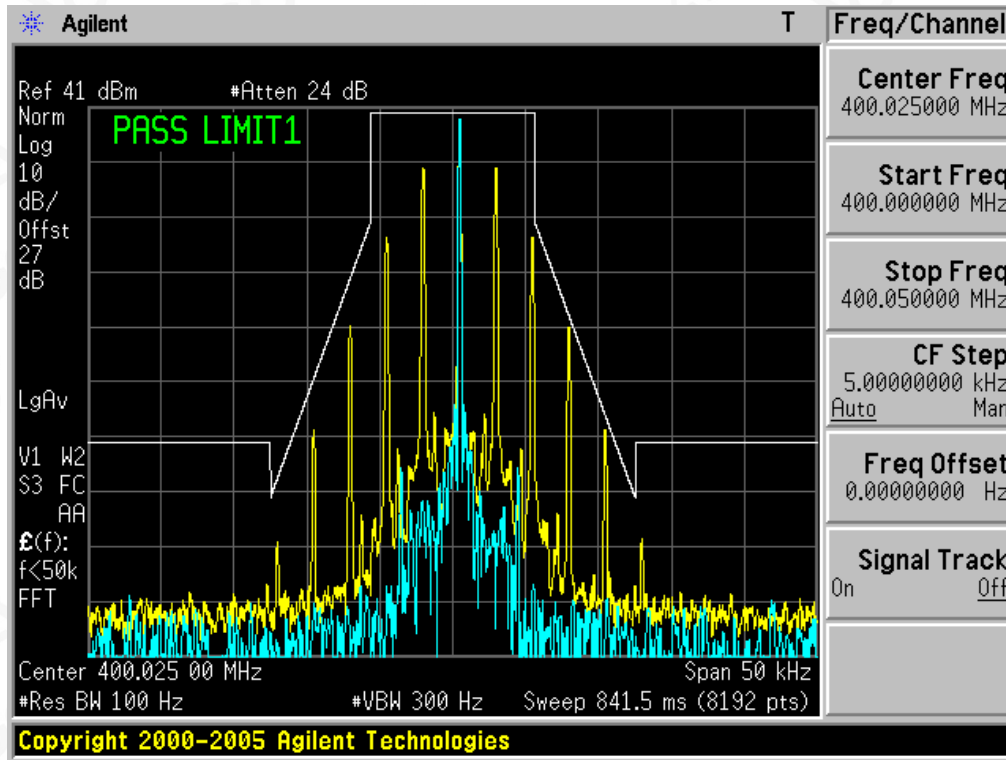
The detailed procedure employed for Emission Mask measurements are specified as following:

- The transmitter shall be modulated by a 2.5 kHz audio signal,
- The level of the audio signal employed is 16 dB greater than that necessary to produce 50% of rated system deviation. Rated system deviation is 2.5 kHz.

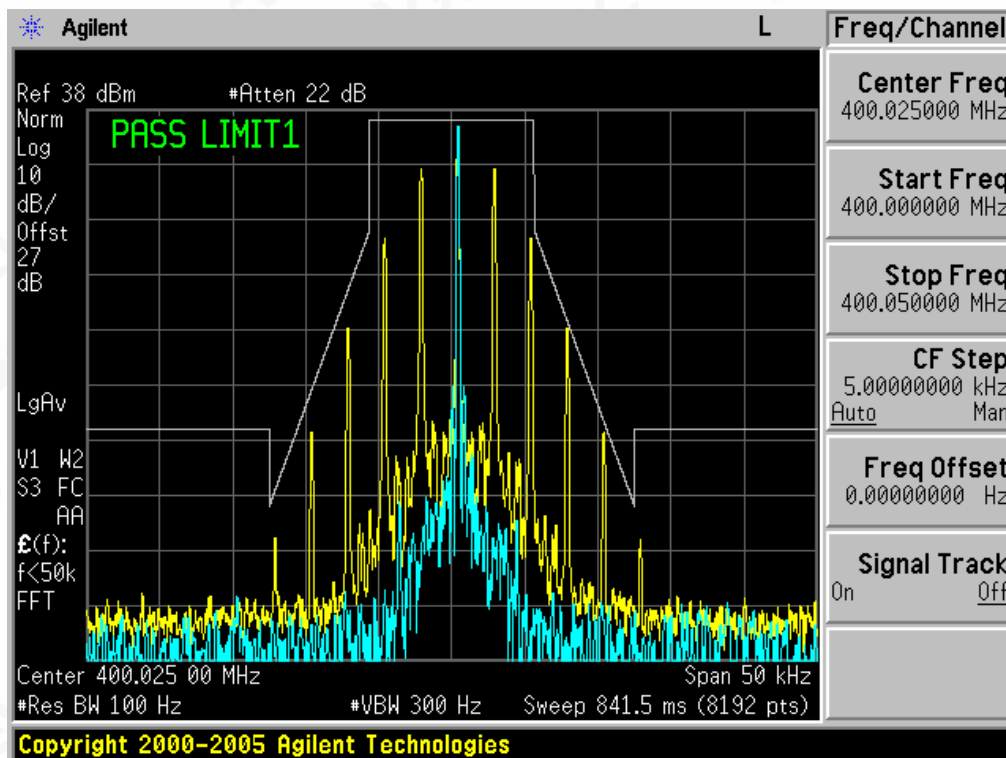


UHF:  
Analog:

**The Worst Emission Mask D for (400.025 MHz) of 12.5 KHz channel Separation (10W)**



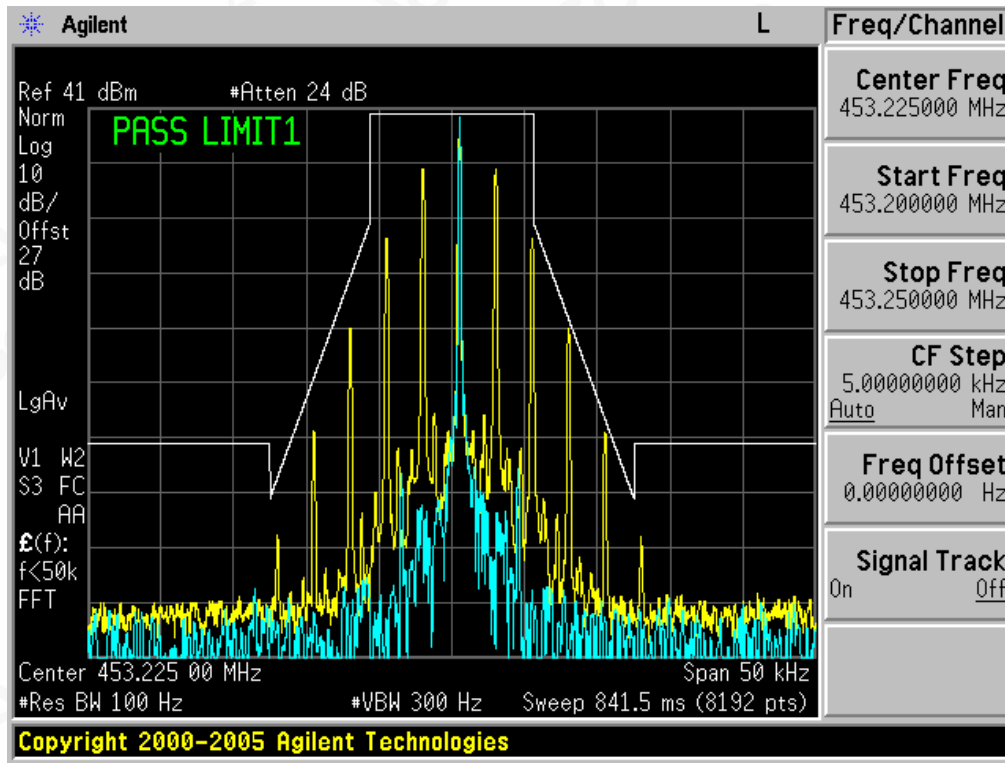
**The Worst Emission Mask D for (400.025 MHz) of 12.5 KHz channel Separation (4W)**



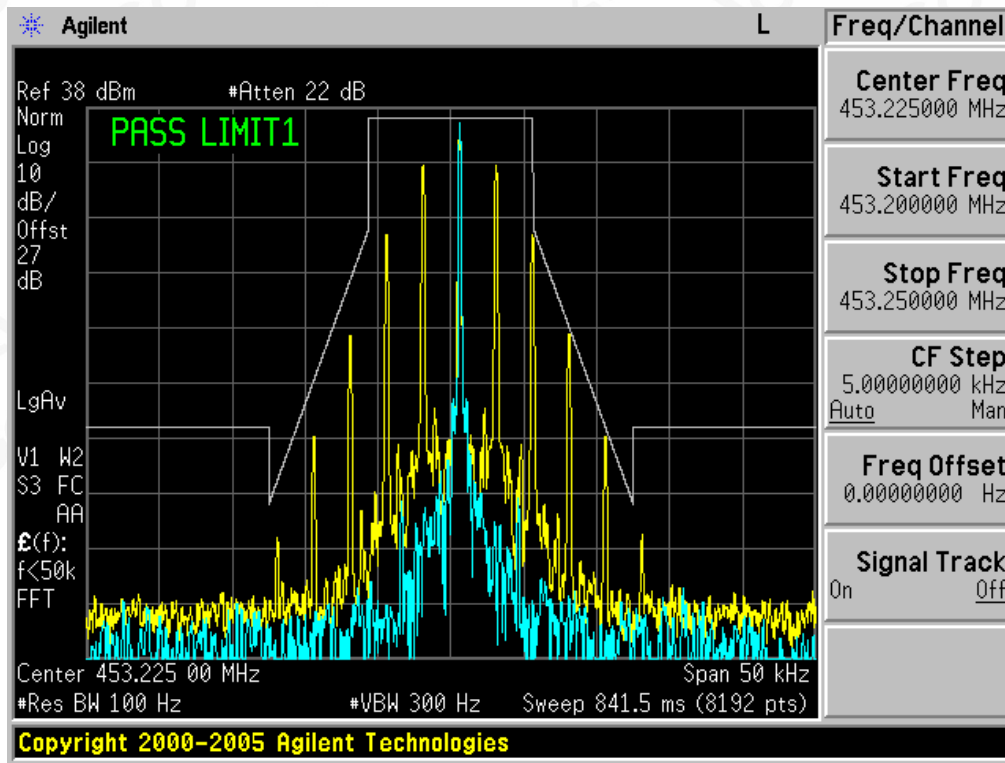
Attestation of Global Compliance

Attestation of Global Compliance(Shenzhen)Co.,Ltd.  
Add: 2/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community,  
Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China  
Tel: +86-755 2523 4088 E-mail: agc@agc-cert.com Service Hotline:400 089 2118

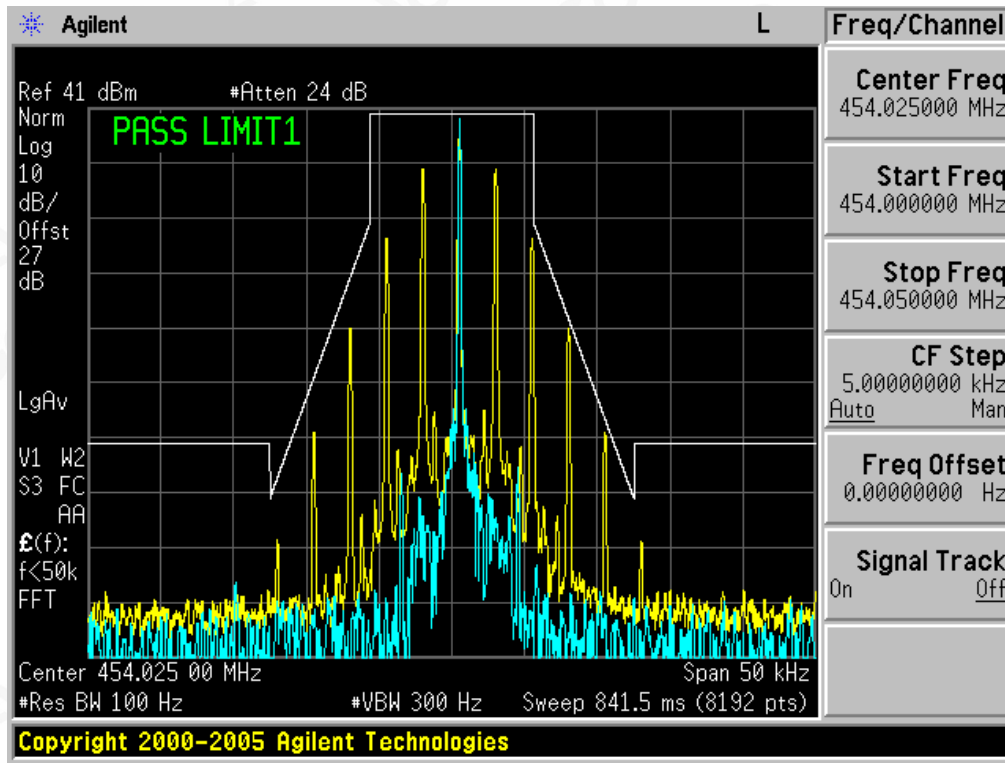
**The Worst Emission Mask D for (453.225 MHz) of 12.5 KHz channel Separation (10W)**



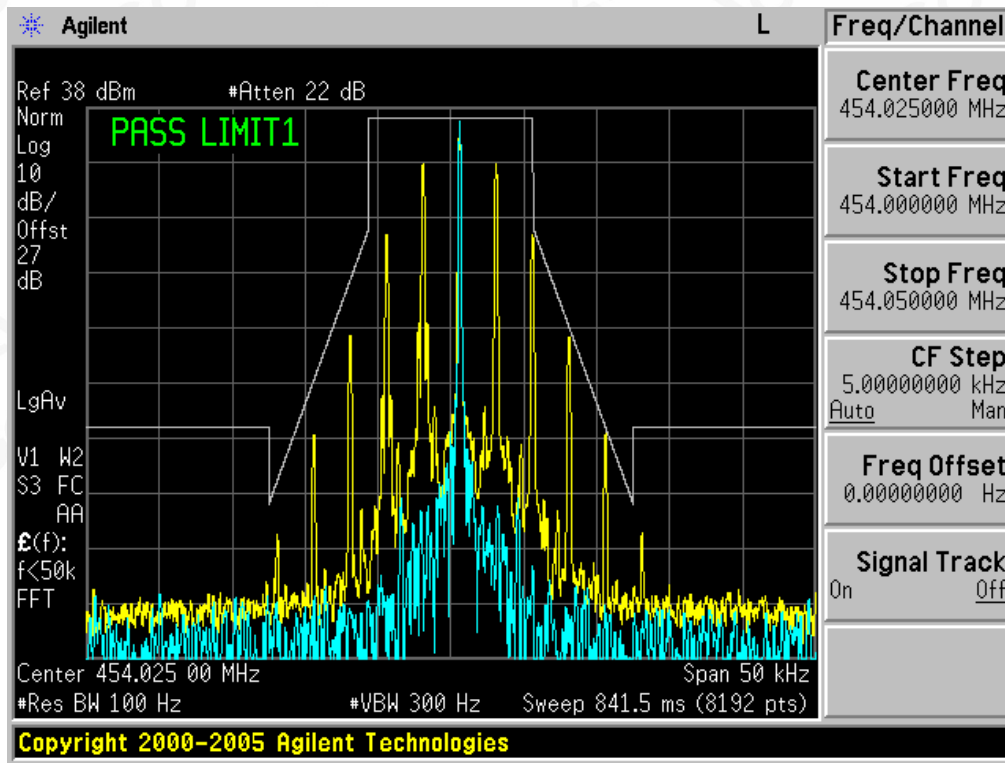
**The Worst Emission Mask D for (453.225 MHz) of 12.5 KHz channel Separation (4W)**



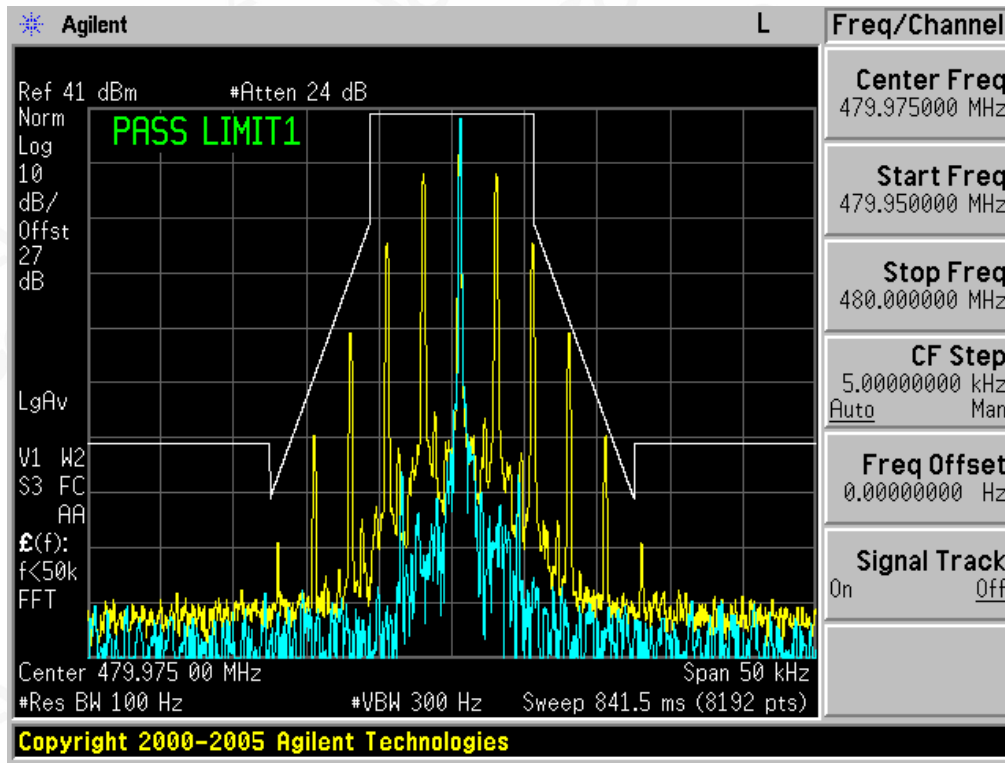
**The Worst Emission Mask D for (454.025 MHz) of 12.5 KHz channel Separation (10W)**



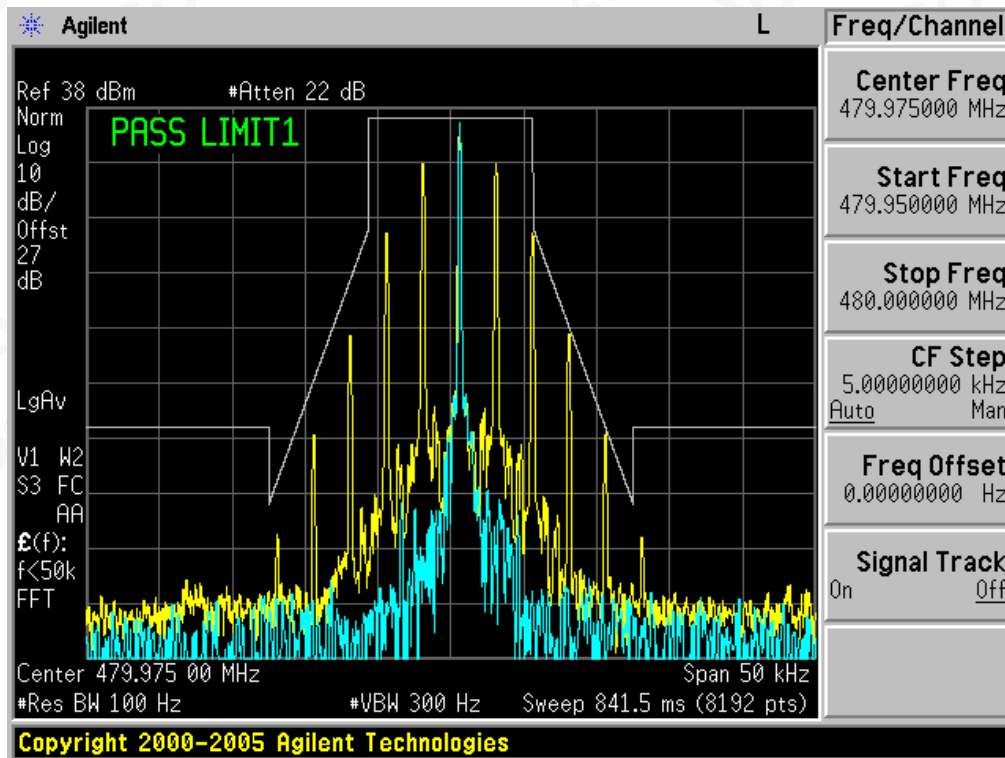
**The Worst Emission Mask D for (454.025 MHz) of 12.5 KHz channel Separation (4W)**



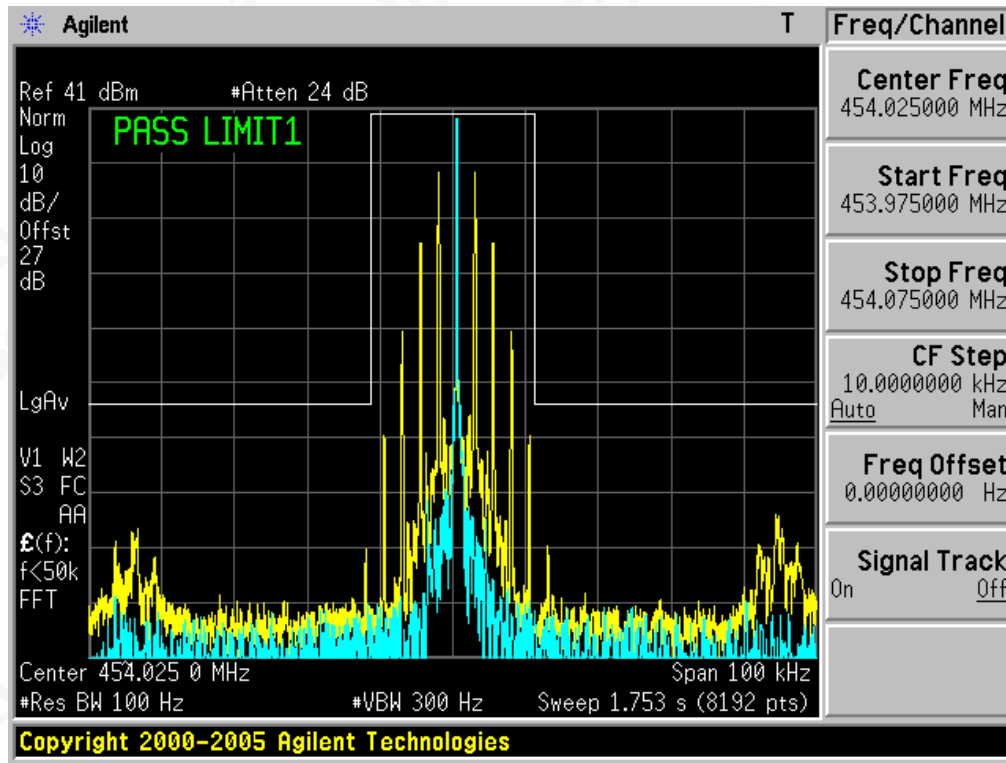
**The Worst Emission Mask D for (479.975 MHz) of 12.5 KHz channel Separation (10W)**



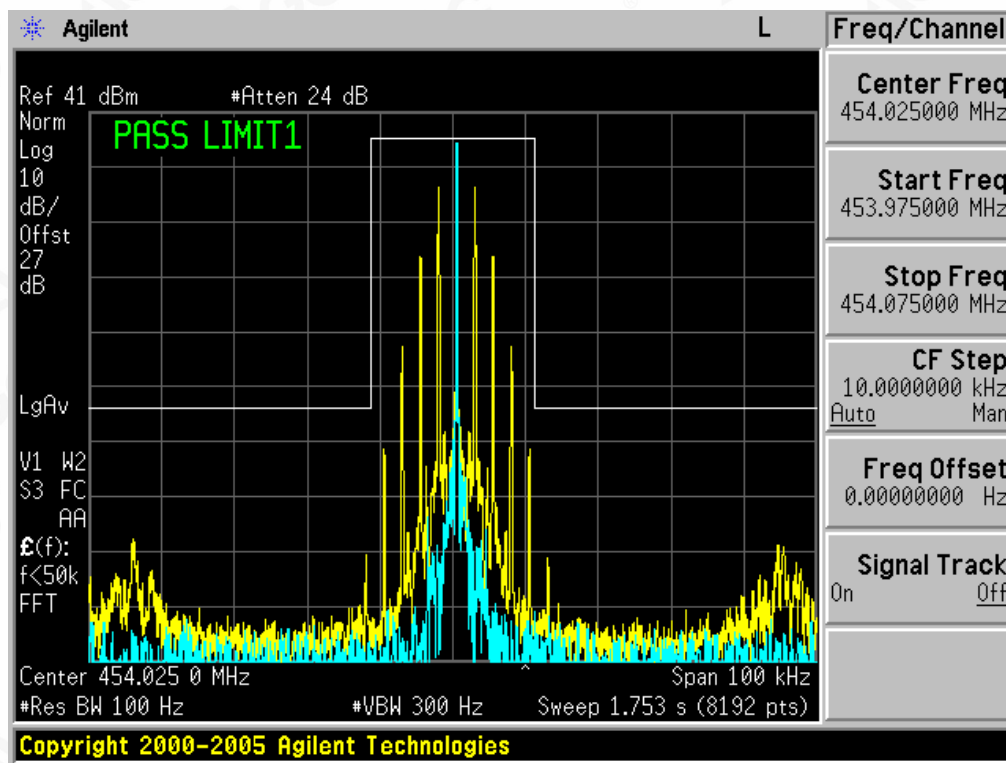
**The Worst Emission Mask D for (479.975 MHz) of 12.5 KHz channel Separation (4W)**



**The Worst Emission Mask § 22.359 for (454.025 MHz) of 12.5 KHz channel Separation (10W)**



**The Worst Emission Mask § 22.359 for (454.025 MHz) of 12.5 KHz channel Separation (4W)**



Attestation of Global Compliance

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

Add: 2/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community,  
Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China

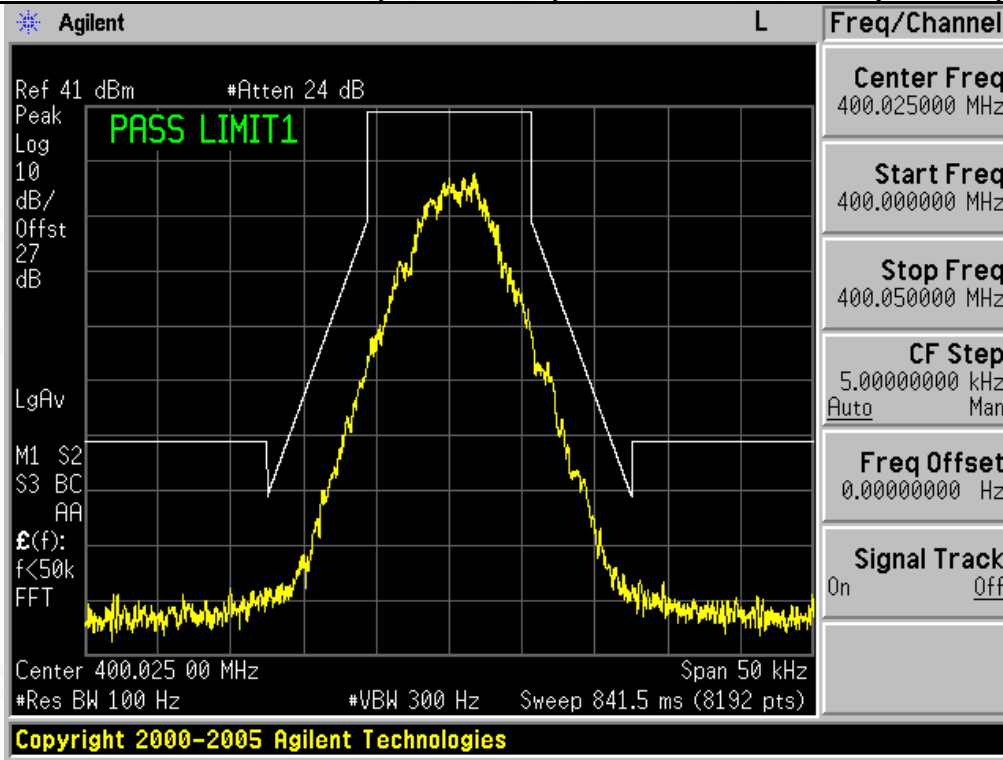
Tel: +86-755 2523 4088

E-mail: agc@agc-cert.com

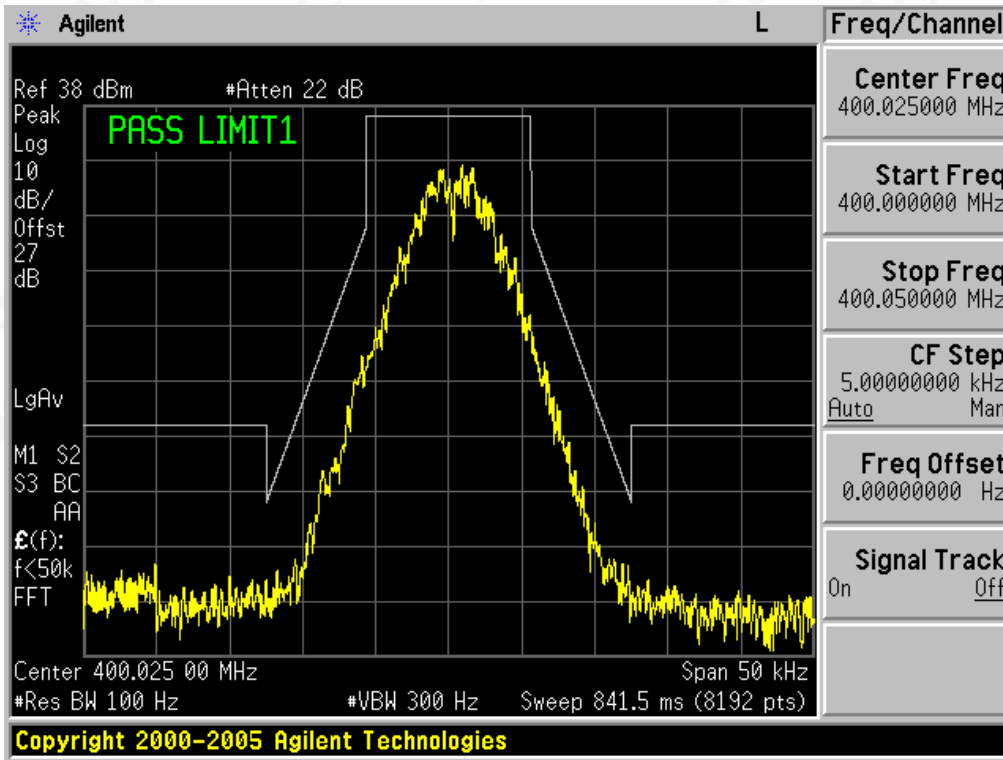
Service Hotline: 400 089 2118

Digital:

**The Worst Emission Mask D for (400.025 MHz) of 12.5 KHz channel Separation (10W)**



**The Worst Emission Mask D for (400.025 MHz) of 12.5 KHz channel Separation (4W)**



Attestation of Global Compliance

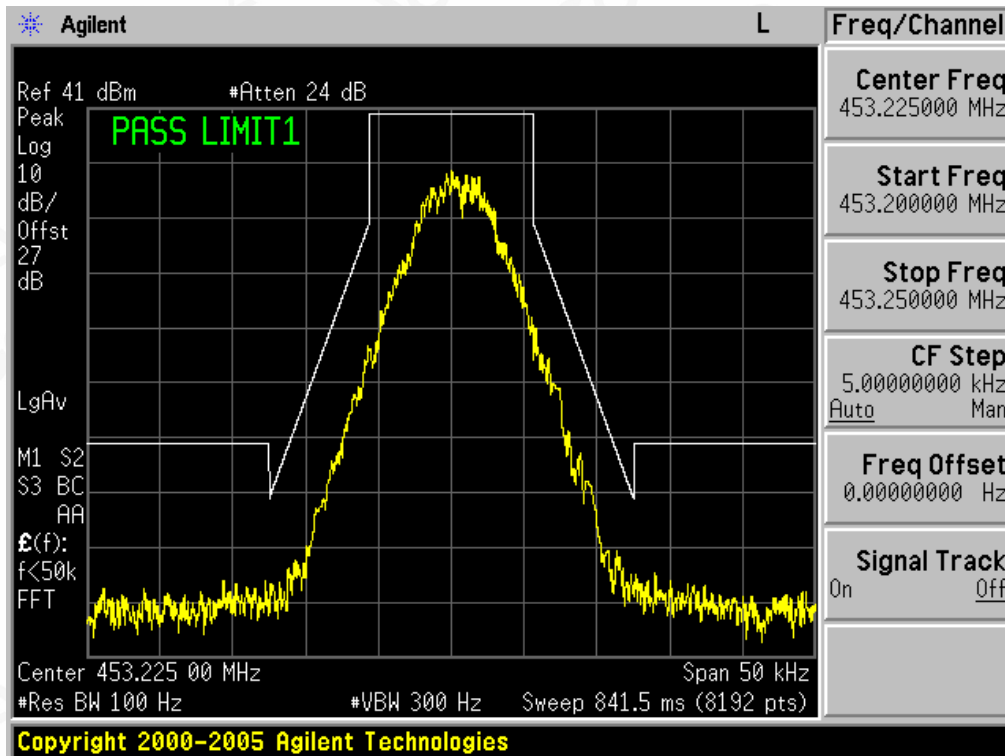
Attestation of Global Compliance(Shenzhen)Co.,Ltd.

Add: 2/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community,  
Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China

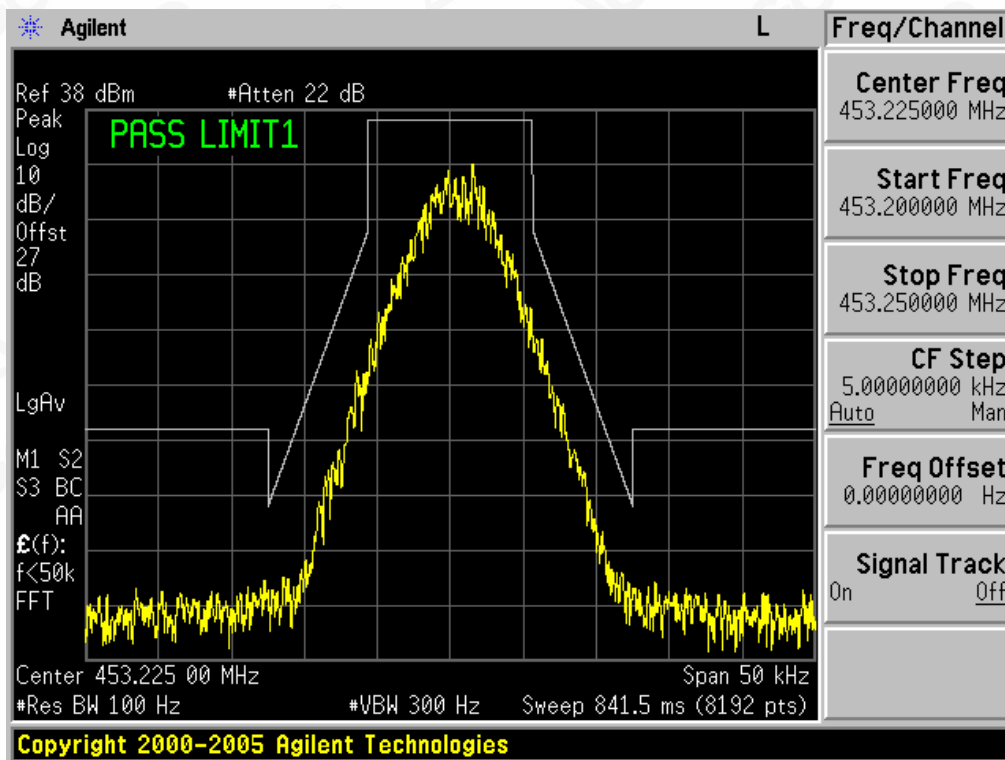
Tel: +86-755 2523 4088 E-mail: agc@agc-cert.com Service Hotline:400 089 2118



**The Worst Emission Mask D for (453.225 MHz) of 12.5 KHz channel Separation (10W)**



**The Worst Emission Mask D for (453.225 MHz) of 12.5 KHz channel Separation (4W)**



Attestation of Global Compliance

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

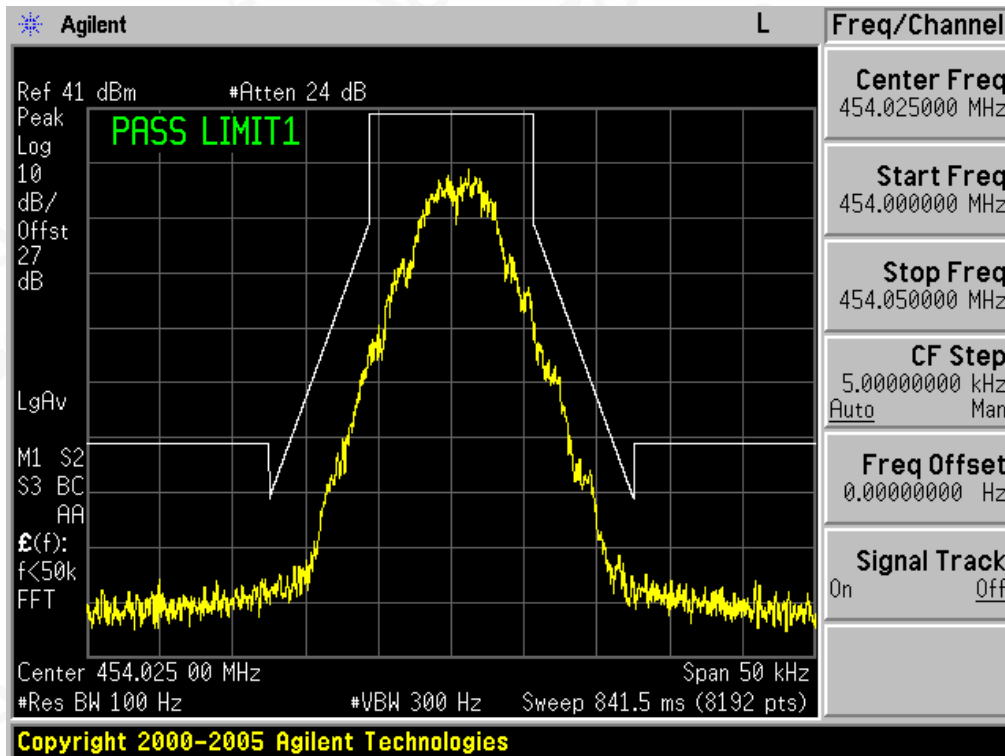
Add: 2/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community,  
Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China

Tel: +86-755 2523 4088

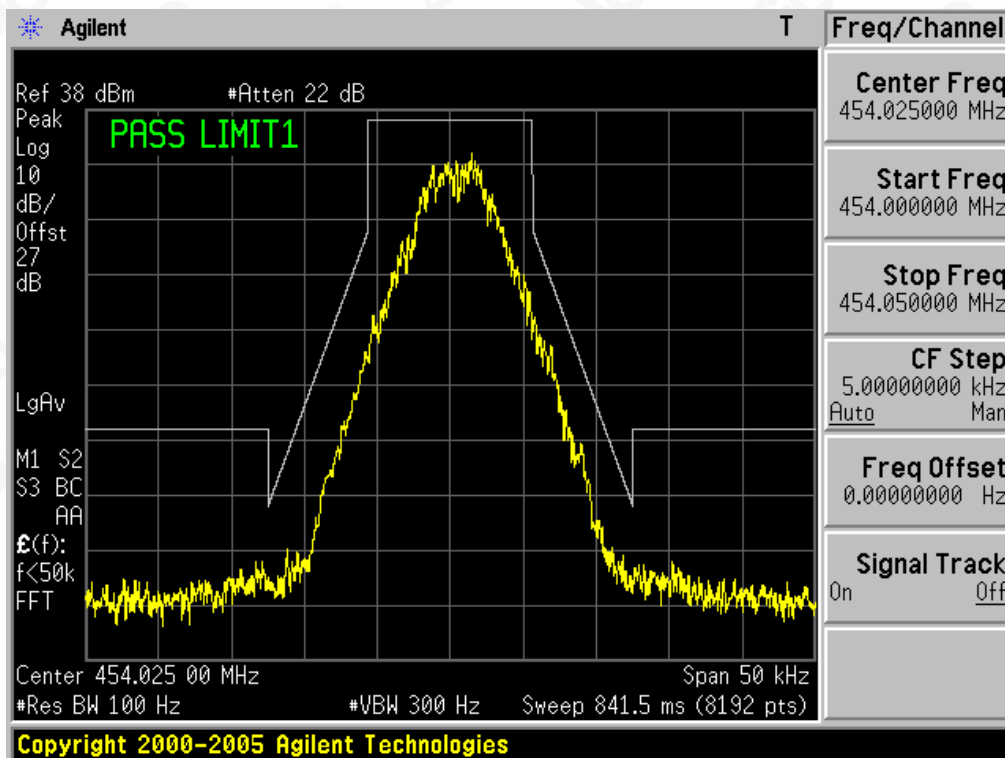
E-mail: agc@agc-cert.com

Service Hotline: 400 089 2118

**The Worst Emission Mask D for (454.025 MHz) of 12.5 KHz channel Separation (10W)**



**The Worst Emission Mask D for (454.025 MHz) of 12.5 KHz channel Separation (4W)**



Attestation of Global Compliance

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

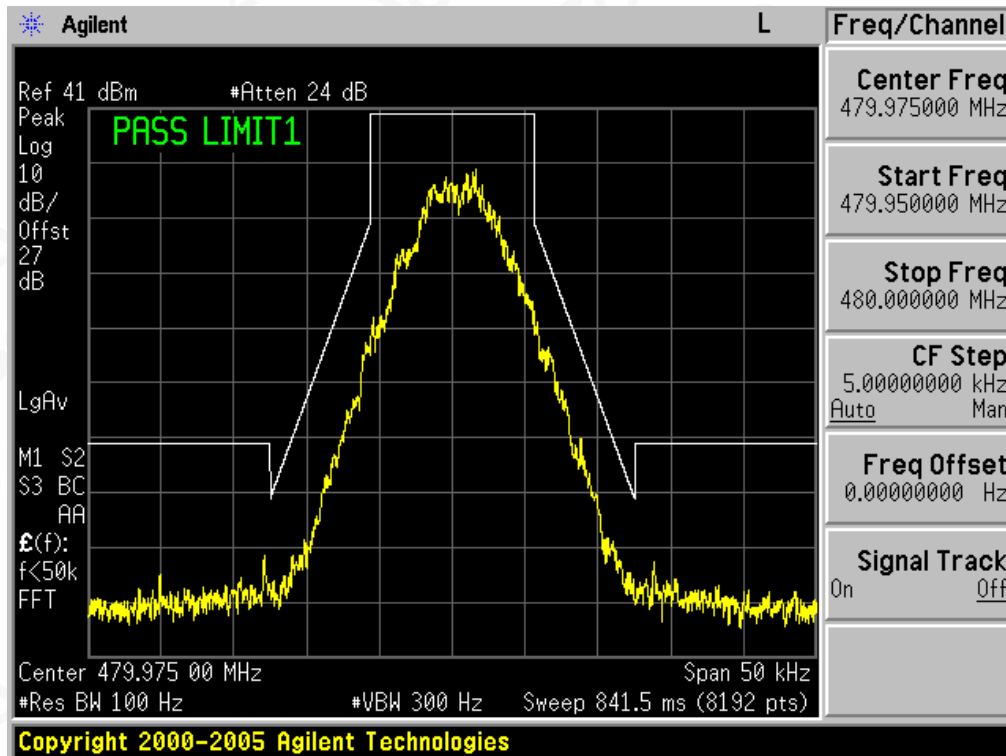
Add: 2/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community,  
Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China

Tel: +86-755 2523 4088

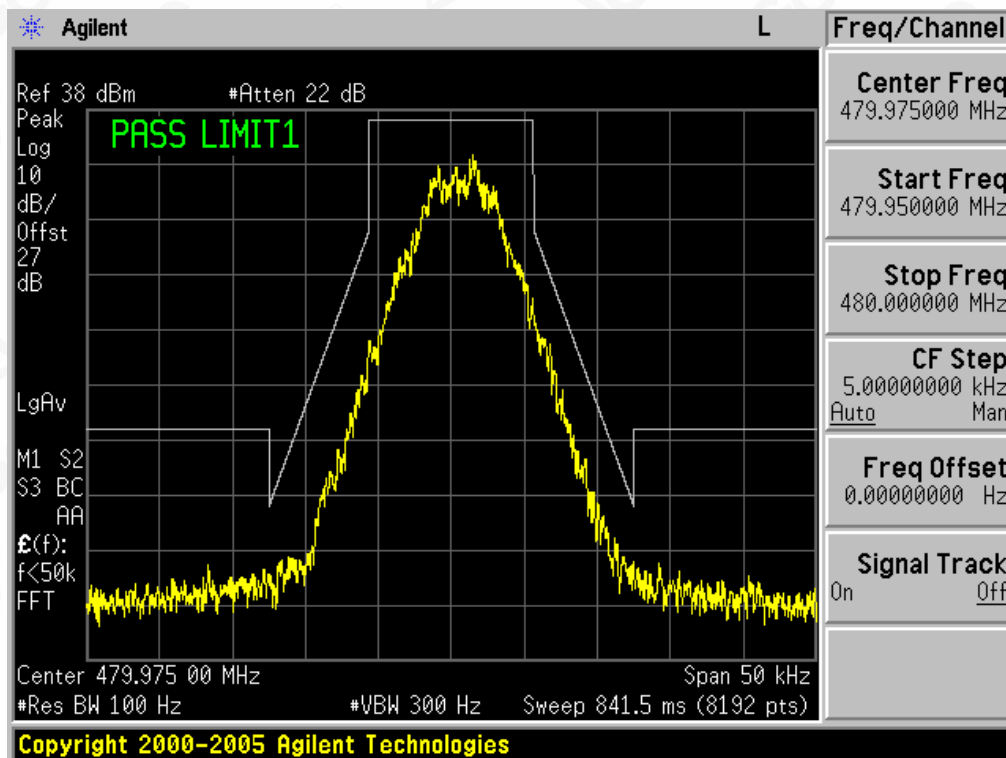
E-mail: agc@agc-cert.com

Service Hotline: 400 089 2118

**The Worst Emission Mask D for (479.975 MHz) of 12.5 KHz channel Separation (10W)**



**The Worst Emission Mask D for (479.975 MHz) of 12.5 KHz channel Separation (4W)**



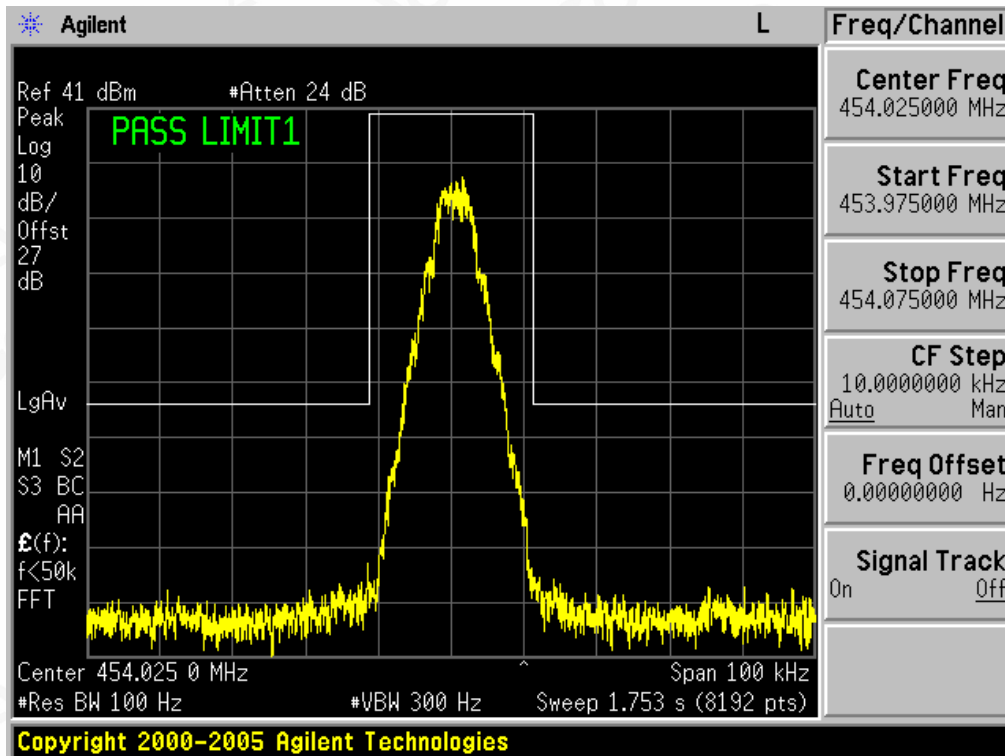
Attestation of Global Compliance

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

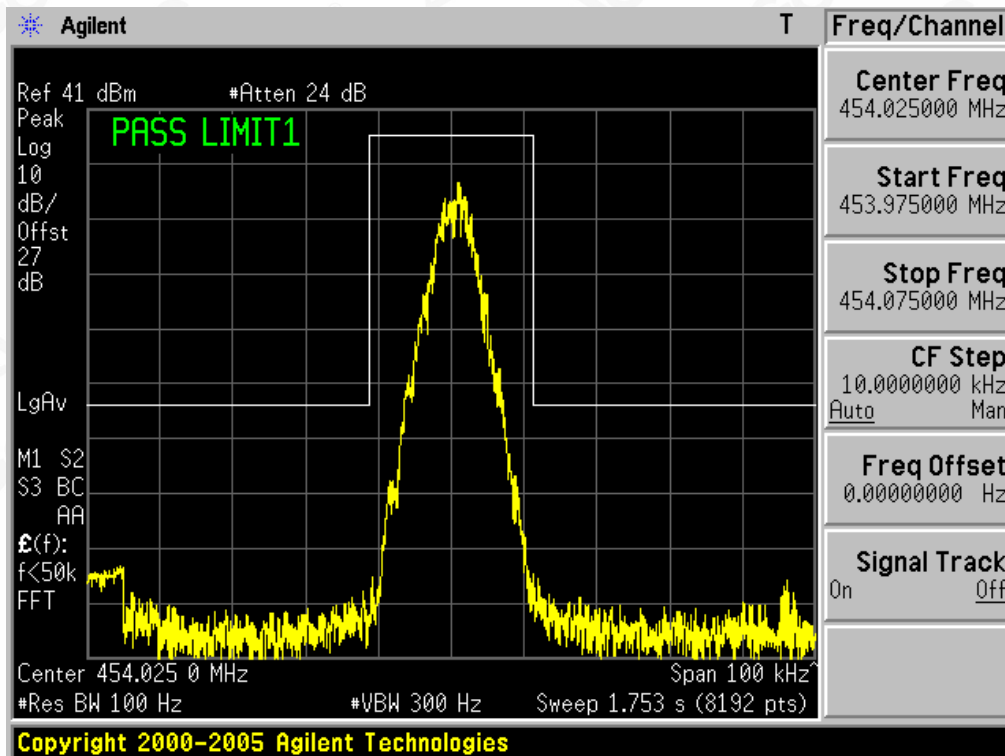
Add: 2/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community,  
Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China

Tel: +86-755 2523 4088 E-mail: agc@agc-cert.com Service Hotline:400 089 2118

**The Worst Emission Mask § 22.359 for (454.025 MHz) of 12.5 KHz channel Separation (10W)**



**The Worst Emission Mask § 22.359 for (454.025 MHz) of 12.5 KHz channel Separation (4W)**



Attestation of Global Compliance

Attestation of Global Compliance(Shenzhen)Co.,Ltd.  
Add: 2/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community,  
Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China  
Tel: +86-755 2523 4088 E-mail: agc@agc-cert.com Service Hotline:400 089 2118

## 9. MODULATION CHARACTERISTICS

### 9.1 PROVISIONS APPLICABLE

According to FCC§2.1047 and §90.207, for Voice Modulation Communication Equipment, the frequency response of the audio modulation circuit over a range of 100 to 5000Hz shall be measured.

### 9.2 MEASUREMENT METHOD

#### 9.2.1 Modulation Limit

- (1). Configure the EUT as shown in figure 1, adjust the audio input for 60% of rated system deviation at 1KHz using this level as a reference (0dB) and vary the input level from -20 to +20dB. Record the frequency deviation obtained as a function of the input level.
- (2). Repeat step 1 with input frequency changing to 300, 1000, 1500 and 3000Hz in sequence.

#### 9.2.2 Audio Frequency Response

- (1). Configure the EUT as shown in figure 1.
- (2). Adjust the audio input for 20% of rated system deviation at 1 KHz using this level as a reference (0 dB).
- (3). Vary the Audio frequency from 100 Hz to 10 KHz and record the frequency deviation.
- (4). Audio Frequency Response =  $20\log_{10}(\text{Deviation of test frequency}/\text{Deviation of 1 KHz reference})$ .



**9.3 MEASUREMENT RESULT**

**UHF:**

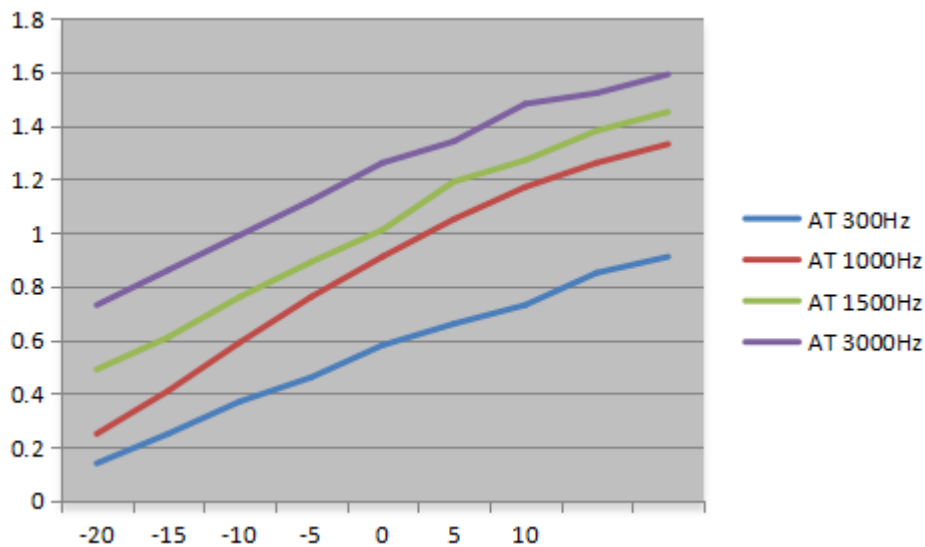
**Analog:**

**TEST RESULT TS FOR H POWER H LEVEL**

**(A). MODULATION LIMIT:**

**Bottom Channel @ 12.5 KHz Channel Separations**

Modulation Level (dB)	Peak Freq. Deviation At 300 Hz	Peak Freq. Deviation At 1000 Hz	Peak Freq. Deviation At 1500 Hz	Peak Freq. Deviation At 3000 Hz
-20	0.14	0.25	0.49	0.73
-15	0.25	0.41	0.61	0.86
-10	0.37	0.59	0.76	0.99
-5	0.46	0.76	0.89	1.12
0	0.58	0.91	1.01	1.26
+5	0.66	1.05	1.19	1.34
+10	0.73	1.17	1.27	1.48
+15	0.85	1.26	1.38	1.52
+20	0.91	1.33	1.45	1.59



Note: All the modes had been tested, but only the worst data recorded in the report.



Attestation of Global Compliance

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

Add: 2/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China

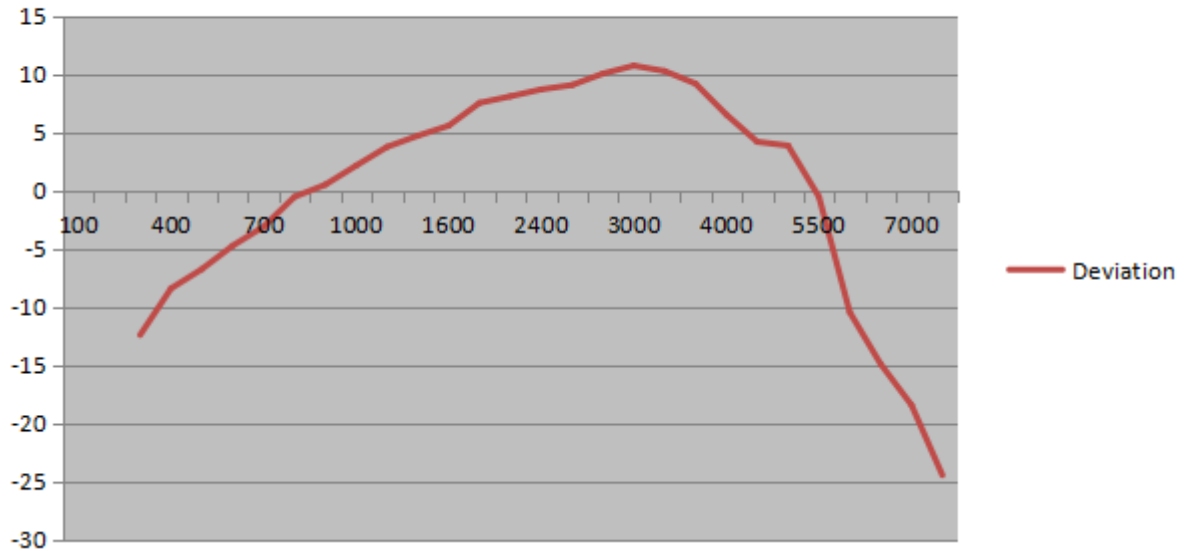
Tel: +86-755 2523 4088 E-mail: agc@agc-cert.com Service Hotline:400 089 2118

**(B). AUDIO FREQUENCY RESPONSE:**  
**Bottom Channel @ 12.5 KHz Channel Separations**

Frequency (Hz)	Deviation (KHz)	Audio Frequency Response(dB)
100	--	--
200	--	--
300	0.12	-12.40
400	0.19	-8.40
500	0.23	-6.74
600	0.29	-4.73
700	0.35	-3.10
800	0.47	-0.54
900	0.53	0.51
1000	0.64	2.14
1200	0.77	3.75
1400	0.86	4.71
1600	0.95	5.58
1800	1.19	7.53
2000	1.27	8.10
2400	1.36	8.69
2500	1.42	9.07
2800	1.59	10.05
3000	1.72	10.73
3200	1.63	10.26
3600	1.44	9.19
4000	1.06	6.53
4500	0.81	4.19
5000	0.78	3.86
5500	0.47	-0.54
6000	0.15	-10.46
6500	0.09	-14.89
7000	0.06	-18.42
7500	0.03	-24.44
9000	--	--
10000	--	--
14000	--	--
18000	--	--
20000	--	--
30000	--	--



### Frequency Response of High Channel 12.5 KHz Channel Separations



Note: All the modes had been tested, but only the worst data recorded in the report.

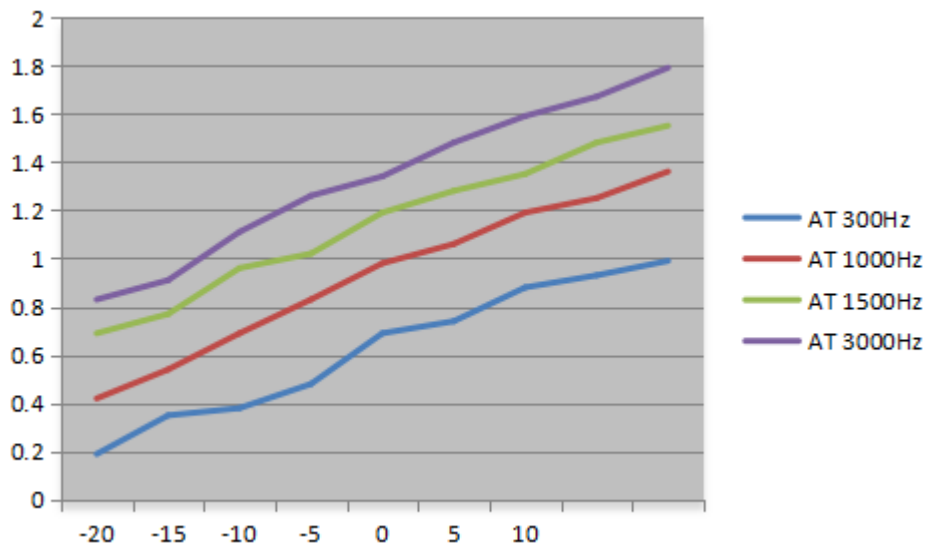




Digital:  
(A). MODULATION LIMIT:

Bottom Channel @ 12.5 KHz Channel Separations---H Power

Modulation Level (dB)	Peak Freq. Deviation At 300 Hz	Peak Freq. Deviation At 1000 Hz	Peak Freq. Deviation At 1500 Hz	Peak Freq. Deviation At 3000 Hz
-20	0.19	0.42	0.69	0.83
-15	0.35	0.54	0.77	0.91
-10	0.38	0.69	0.96	1.11
-5	0.48	0.83	1.02	1.26
0	0.69	0.98	1.19	1.34
+5	0.74	1.06	1.28	1.48
+10	0.88	1.19	1.35	1.59
+15	0.93	1.25	1.48	1.67
+20	0.99	1.36	1.55	1.79



Note: All the modes had been tested, but only the worst data recorded in the report.



**(B). AUDIO FREQUENCY RESPONSE:**

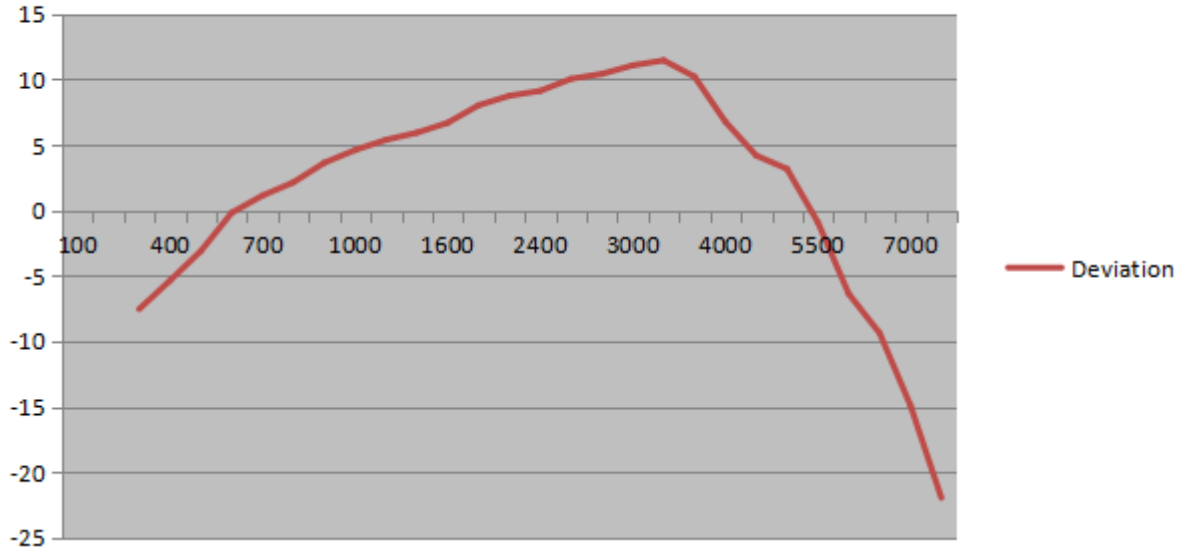
**Bottom Channel @ 12.5 KHz Channel Separations---H Power**

Frequency (Hz)	Deviation (KHz)	Audio Frequency Response(dB)
100	--	--
200	--	--
300	0.21	-7.54
400	0.27	-5.35
500	0.35	-3.10
600	0.49	-0.18
700	0.57	1.14
800	0.64	2.14
900	0.76	3.64
1000	0.85	4.61
1200	0.93	5.39
1400	0.99	5.93
1600	1.08	6.69
1800	1.26	8.03
2000	1.37	8.76
2400	1.43	9.13
2500	1.59	10.05
2800	1.66	10.42
3000	1.79	11.08
3200	1.87	11.46
3600	1.62	10.21
4000	1.09	6.77
4500	0.81	4.19
5000	0.72	3.17
5500	0.45	-0.92
6000	0.24	-6.38
6500	0.17	-9.37
7000	0.09	-14.89
7500	0.04	-21.94
9000	--	--
10000	--	--
14000	--	--
18000	--	--
20000	--	--
30000	--	--



**Frequency Response of High Channel---H Power**

**12.5 KHz Channel Separations**



Note: All the modes had been tested, but only the worst data recorded in the report.



## 8. MAXIMUM TRANSMITTER POWER (CONDUCTED OUTPUT POWER) PEAK POWER

### 10.1 PROVISIONS APPLICABLE

Per FCC §2.1046 § 22.565 and §90.205: Maximum ERP is dependent upon the station's antenna HAAT and required service area.

### 10.2 TEST PROCEDURE

The RF output of Two-way Radio was conducted to a spectrum analyzer through an appropriate attenuator.

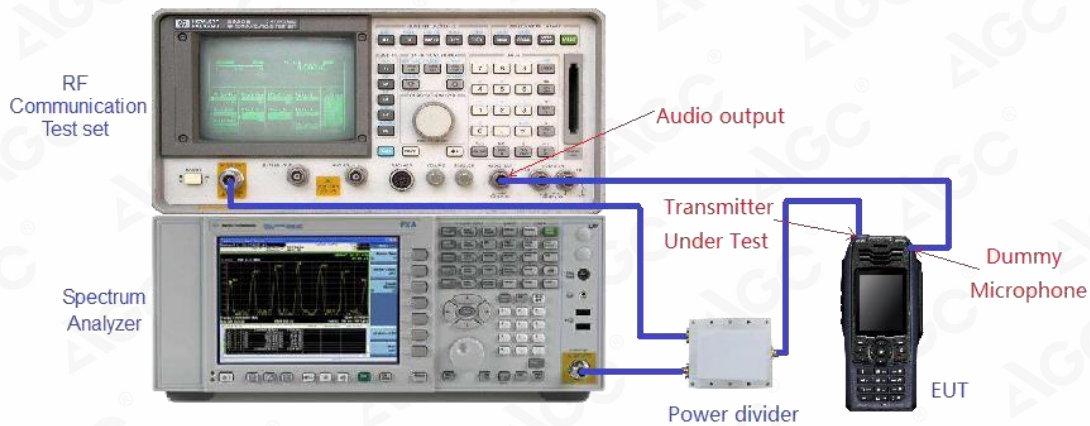
In the semi-anechoic chamber, setup as illustrated above the DUT placed on the 0.8m height of Turn Table, rotated the table 45 degree each interval to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power for each degree interval. The "Read Value" is the spectrum reading of maximum power value.

The substitution antenna is substituted for DUT at the same position and signals generator (S.G) export the CW signal to the substitution antenna via a TX cable. The receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum radiation power. Record the power level of maximum radiation power from spectrum. So, the Measured substitution value = Ref level of S.G + TX cables loss – Substituted Antenna Gain.

$$\text{EIRP} = \text{"Read Value"} + \text{Measured substitution value} + 2.15.$$

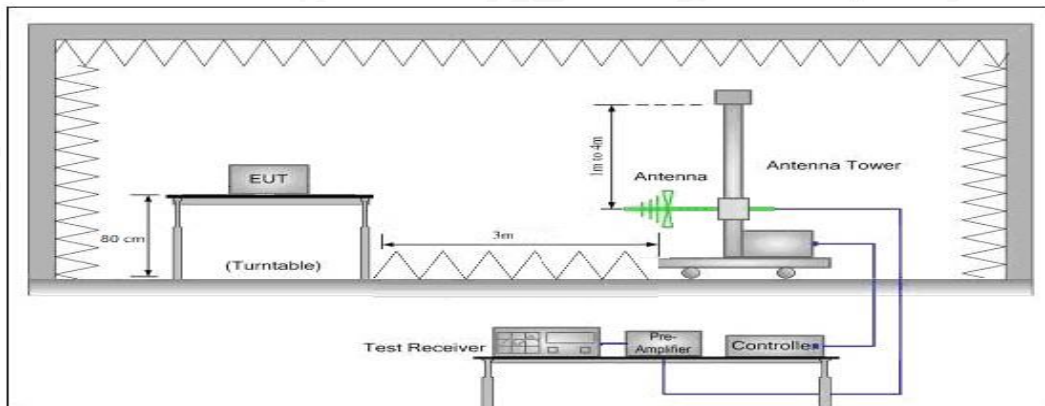
### 10.3 TEST CONFIGURATION

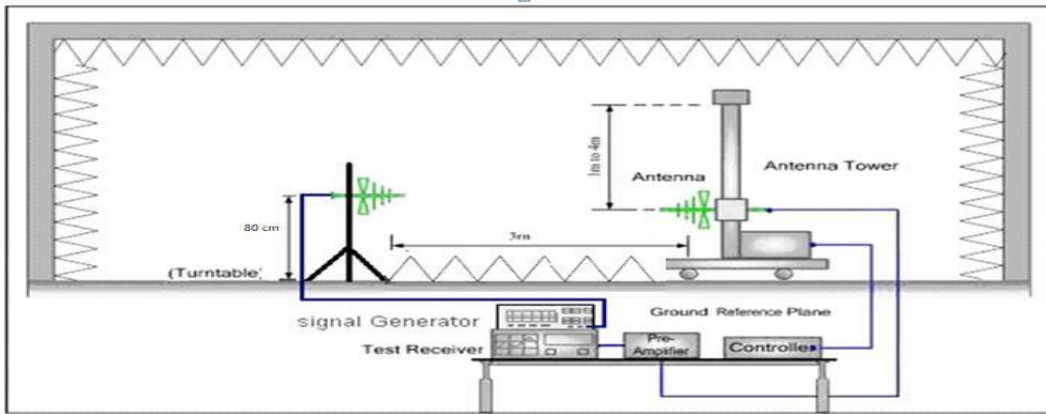
#### Conducted Output Power:



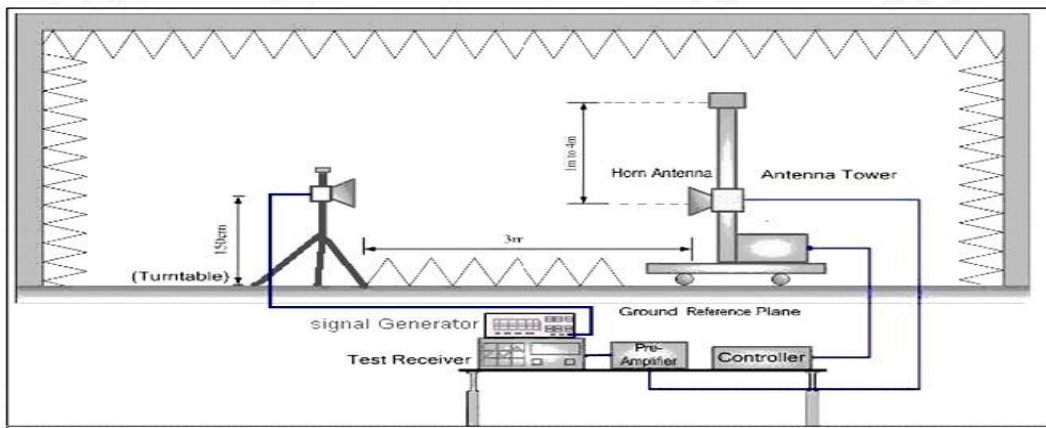
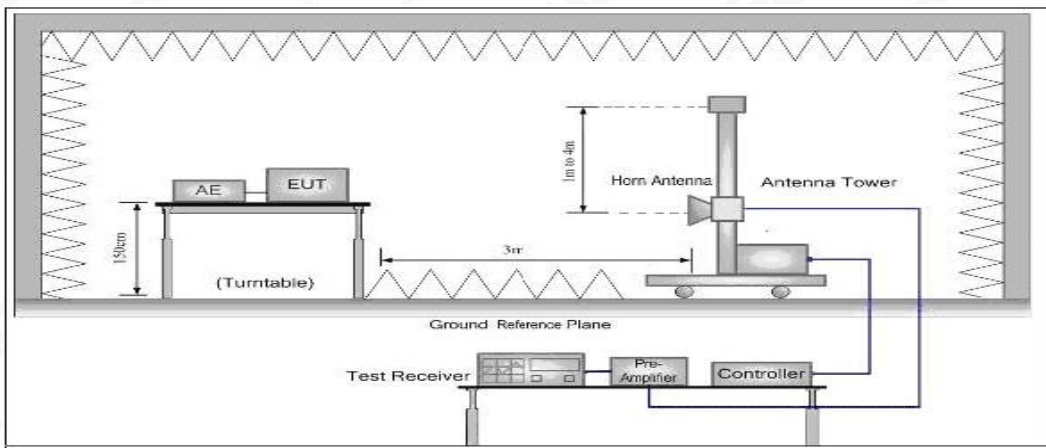
#### Effective Radiated Power

#### Radiated Below 1GHz





**Radiated Above 1 GHz**



#### 10.4 TEST RESULT

The maximum Conducted Power (CP) for VHF/UHF is  
Analog: 10W/4 W for 12.5 KHz Channel Separation UHF  
Digital: 10W/4 W for 12.5 KHz Channel Separation UHF  
Calculation Formula:  $CP = R + A + L$

Note:

- CP: The final Conducted Power
- R : The reading value from spectrum analyzer
- A : The attenuation value of the used attenuator
- L : The loss of all connection cables



UHF:  
Analog:

Conducted Power Measurement Results-10W		
Channel Separation	Channel	Measurement Result (dBm)
		For 40dBm(10W)
12.5 KHz	Bottom(400.025MHz)	39.74
	Middle(453.225MHz)	<b>39.82</b>
	Middle(454.025MHz)	39.79
	Top (479.975MHz )	39.69

Radiated Power Measurement Results-10W		
Channel Separation	Channel	Measurement Result (dBm)
		For 40dBm(10W)
12.5 KHz	Bottom(400.025MHz)	39.66
	Middle(453.225MHz)	<b>39.72</b>
	Middle(454.025MHz)	39.65
	Top (479.975MHz )	39.55

Conducted Power Measurement Results-4W		
Channel Separation	Channel	Measurement Result (dBm)
		For 36.02dBm(4W)
12.5 KHz	Bottom(400.025MHz)	35.88
	Middle(453.225MHz)	<b>35.91</b>
	Middle(454.025MHz)	35.79
	Top (479.975MHz )	35.77

Radiated Power Measurement Results-4W		
Channel Separation	Channel	Measurement Result (dBm)
		For 36.02dBm(4W)
12.5 KHz	Bottom(400.025MHz)	35.75
	Middle(453.225MHz)	<b>35.80</b>
	Middle(454.025MHz)	35.63
	Top (479.975MHz )	35.62



**Digital: Data + voice:**

Conducted Power Measurement Results-10W		
Channel Separation	Channel	Measurement Result (dBm)
		For 40dBm(10W)
12.5 KHz	Bottom(400.025MHz)	39.59
	Middle(453.225MHz)	<b>39.62</b>
	Middle(454.025MHz)	39.54
	Top (479.975MHz )	39.51

Radiated Power Measurement Results-10W		
Channel Separation	Channel	Measurement Result (dBm)
		For 40dBm(10W)
12.5 KHz	Bottom(400.025MHz)	39.43
	Middle(453.225MHz)	<b>39.49</b>
	Middle(454.025MHz)	39.38
	Top (479.975MHz )	39.36

**Data transmission mode:**

Conducted Power Measurement Results-10W		
Channel Separation	Channel	Measurement Result (dBm)
		For 40dBm(10W)
12.5 KHz	Bottom(400.025MHz)	39.31
	Middle(453.225MHz)	39.35
	Middle(454.025MHz)	39.29
	Top (479.975MHz )	<b>39.35</b>

Radiated Power Measurement Results-10W		
Channel Separation	Channel	Measurement Result (dBm)
		For 40dBm(10W)
12.5 KHz	Bottom(400.025MHz)	39.24
	Middle(453.225MHz)	39.27
	Middle(454.025MHz)	39.22
	Top (479.975MHz )	<b>39.29</b>





**Data + voice**

Conducted Power Measurement Results-4W		
Channel Separation	Channel	Measurement Result (dBm)
		For 36.02dBm(4W)
12.5 KHz	Bottom(400.025MHz)	35.78
	Middle(453.225MHz)	<b>35.83</b>
	Middle(454.025MHz)	35.67
	Top (479.975MHz )	35.70

Radiated Power Measurement Results-4W		
Channel Separation	Channel	Measurement Result (dBm)
		For 36.02dBm(4W)
12.5 KHz	Bottom(400.025MHz)	35.67
	Middle(453.225MHz)	<b>35.75</b>
	Middle(454.025MHz)	35.58
	Top (479.975MHz )	35.61

**Data transmission mode:**

Conducted Power Measurement Results-4W		
Channel Separation	Channel	Measurement Result (dBm)
		For 36.02dBm(4W)
12.5 KHz	Bottom(400.025MHz)	35.61
	Middle(453.225MHz)	<b>35.64</b>
	Middle(454.025MHz)	35.52
	Top (479.975MHz )	35.56

Radiated Power Measurement Results-4W		
Channel Separation	Channel	Measurement Result (dBm)
		For 36.02dBm(4W)
12.5 KHz	Bottom(400.025MHz)	35.49
	Middle(453.225MHz)	<b>35.51</b>
	Middle(454.025MHz)	35.44
	Top (479.975MHz )	35.47



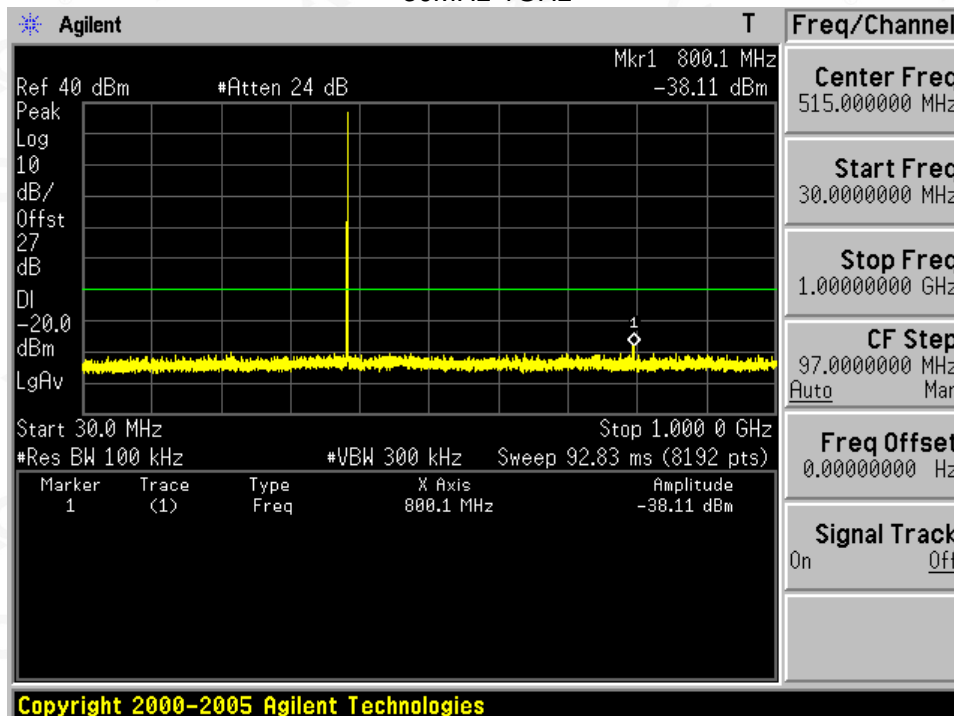
### 10.5 CONDUCT SPURIOUS PLOT

FCC PART 90:

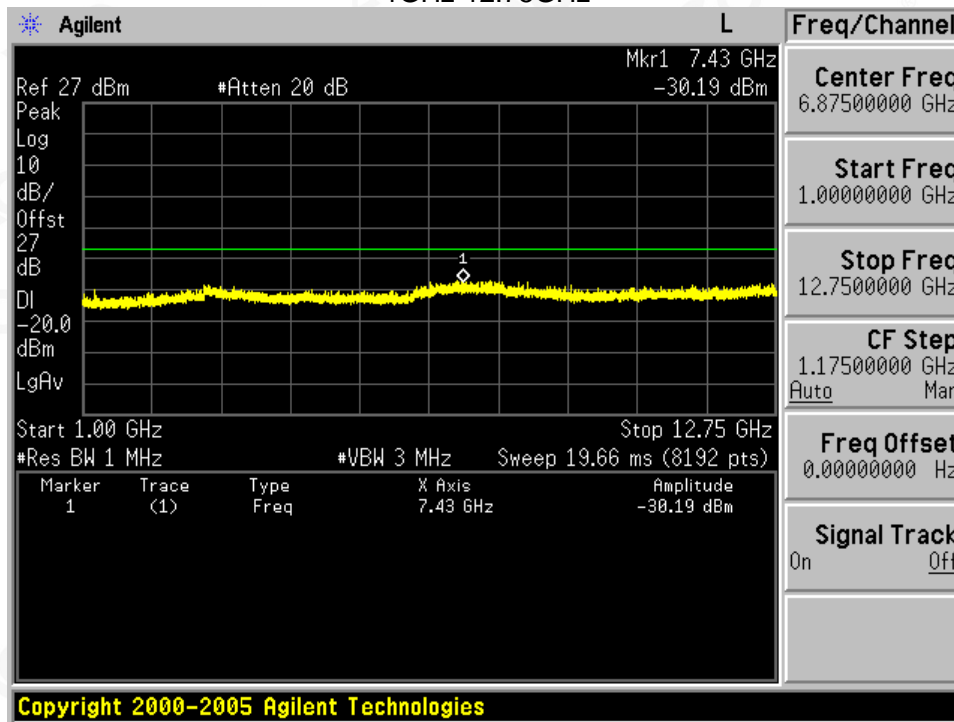
UHF:

Analog:

**Conducted Spurious Emission (worst) @ 400.025MHz With 12.5 KHz Channel Separation-10W**  
30MHz-1GHz



**Conduct Spurious Emission (worst) @ 400.025MHz With 12.5 KHz Channel Separation-10W**  
1GHz-12.75GHz



Attestation of Global Compliance

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

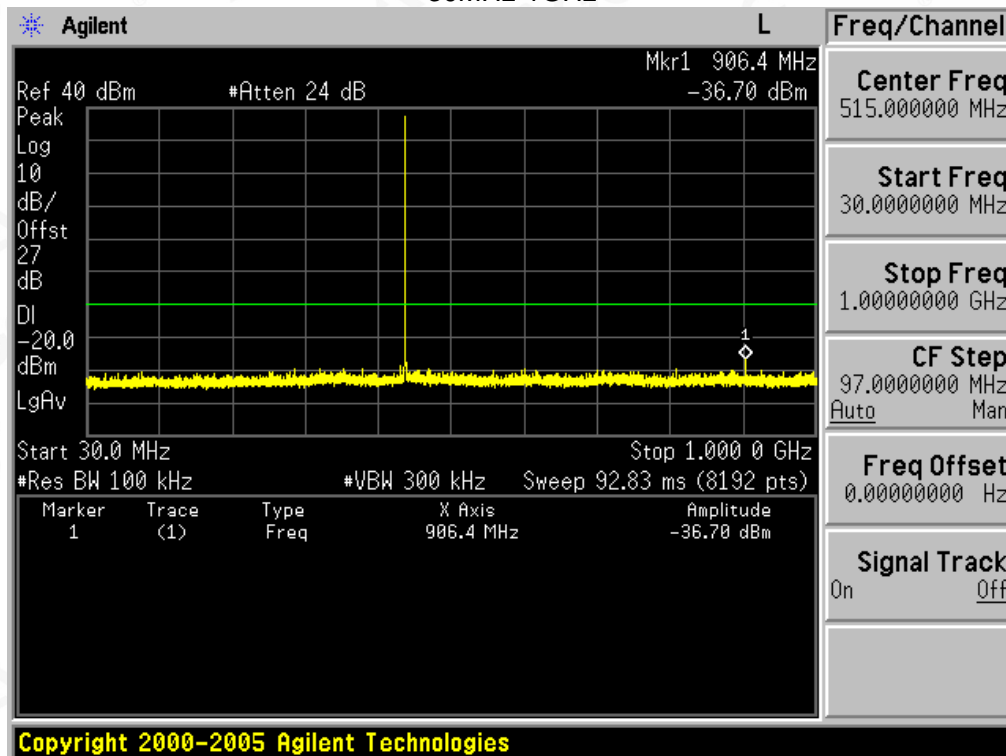
Add: 2/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community,  
Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China

Tel: +86-755 2523 4088

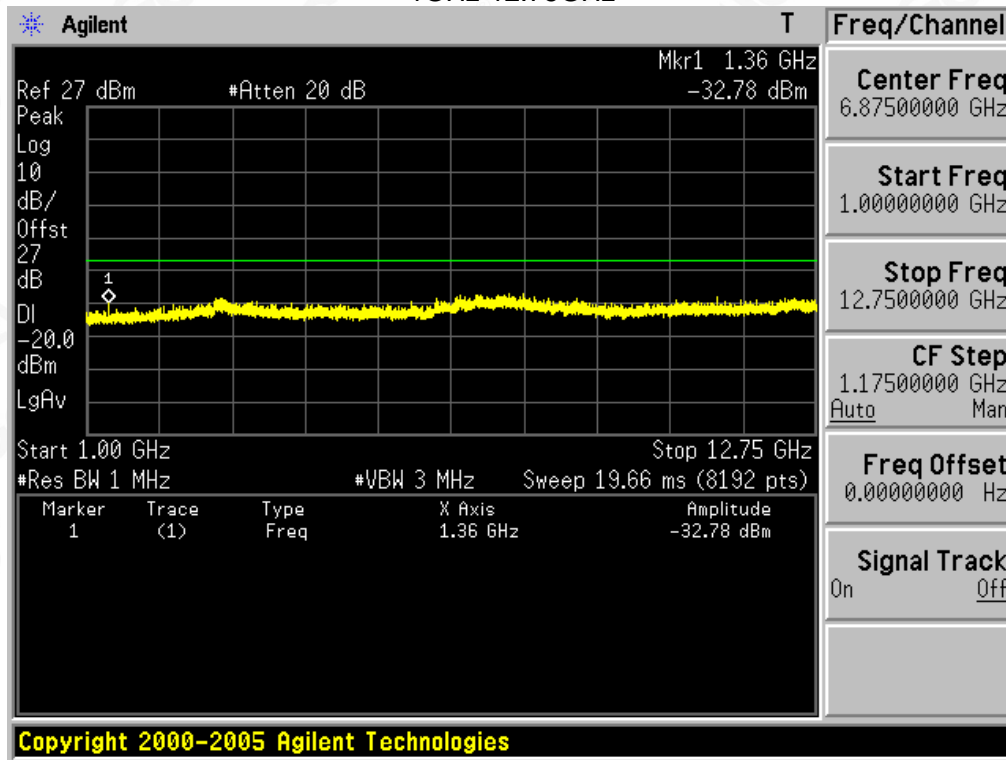
E-mail: agc@agc-cert.com

Service Hotline: 400 089 2118

**Conducted Spurious Emission (worst) @ 453.225MHz With 12.5 KHz Channel Separation-10W**  
30MHz-1GHz



**Conduct Spurious Emission (worst) @ 453.225MHz With 12.5 KHz Channel Separation-10W**  
1GHz-12.75GHz



Attestation of Global Compliance

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

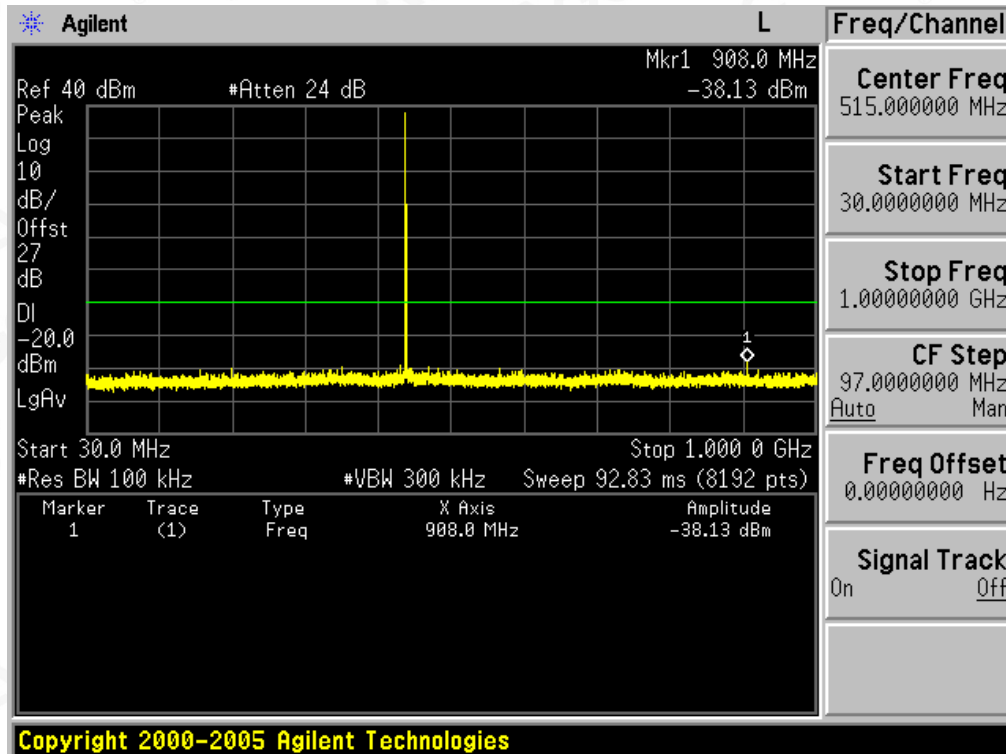
Add: 2/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community,  
Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China

Tel: +86-755 2523 4088

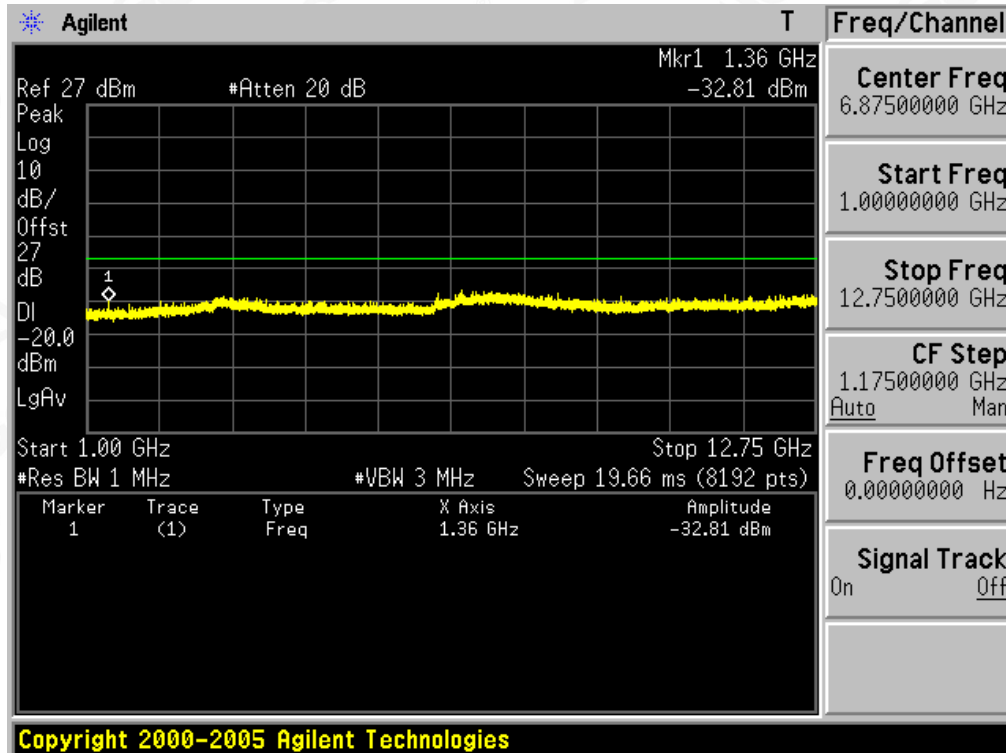
E-mail: agc@agc-cert.com

Service Hotline: 400 089 2118

**Conducted Spurious Emission (worst) @ 454.025MHz With 12.5 KHz Channel Separation-10W**  
30MHz-1GHz



**Conduct Spurious Emission (worst) @ 454.025MHz With 12.5 KHz Channel Separation-10W**  
1GHz-12.75GHz



Attestation of Global Compliance

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

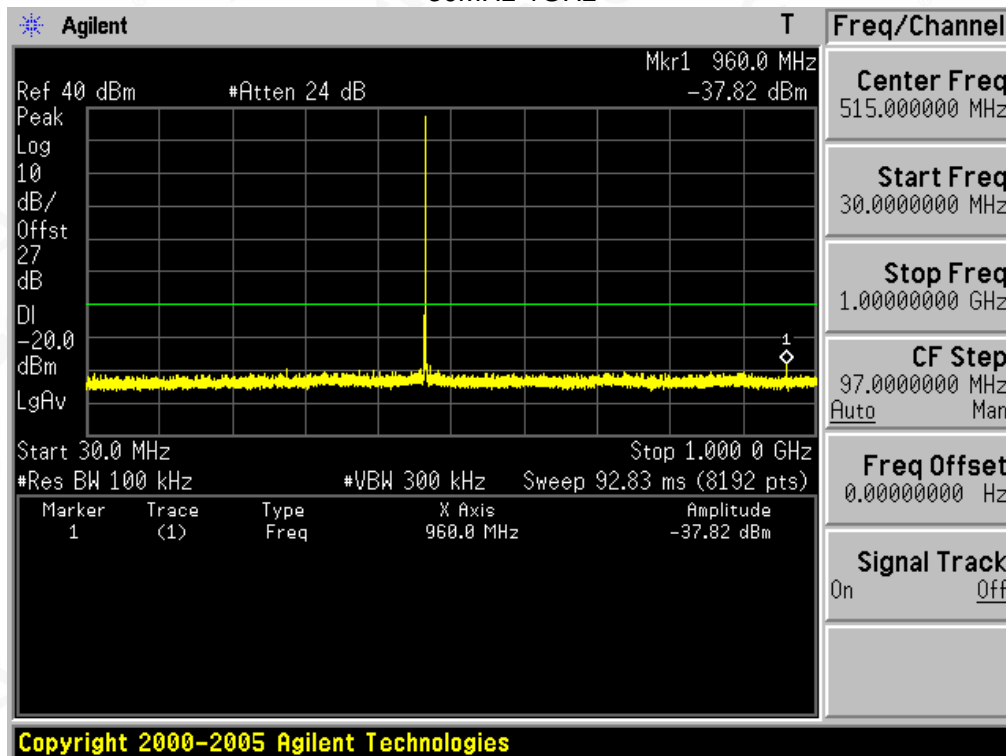
Add: 2/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China

Tel: +86-755 2523 4088

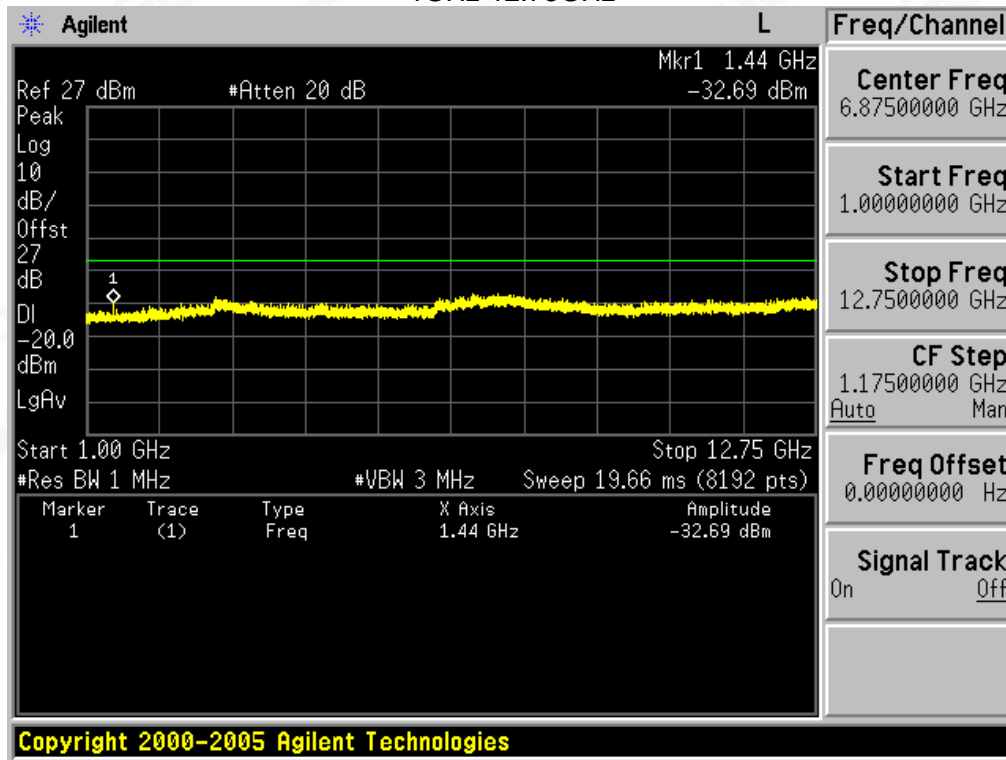
E-mail: agc@agc-cert.com

Service Hotline: 400 089 2118

**Conducted Spurious Emission (worst) @ 479.975MHz With 12.5 KHz Channel Separation-10W**  
30MHz-1GHz



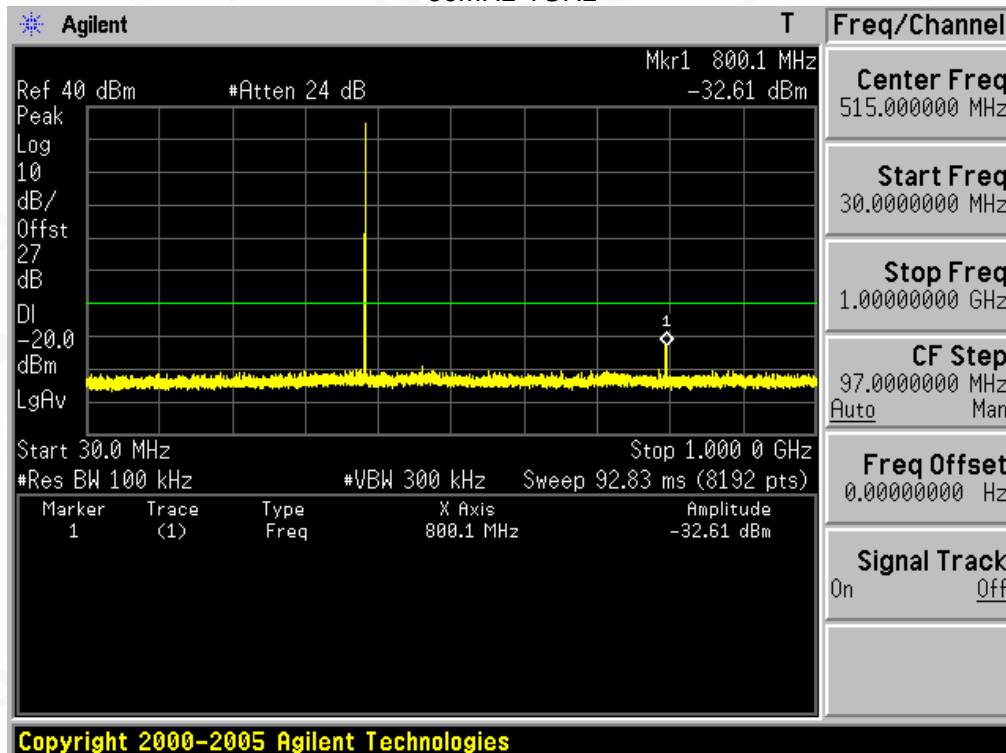
**Conduct Spurious Emission (worst) @ 479.975MHz With 12.5 KHz Channel Separation-10W**  
1GHz-12.75GHz



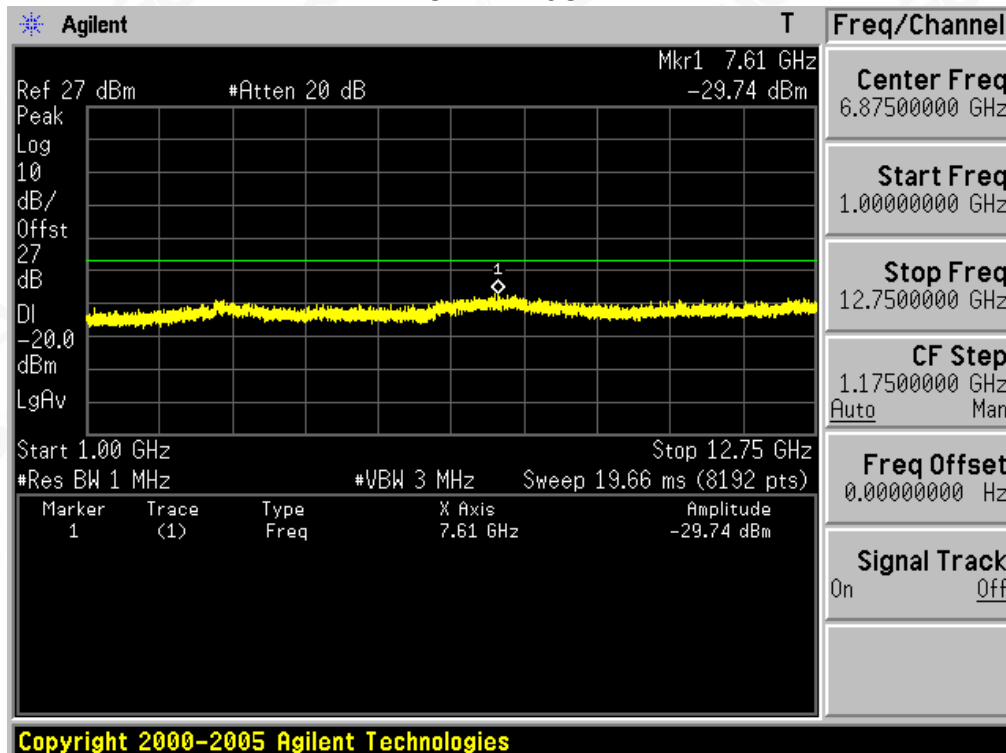
Attestation of Global Compliance

Attestation of Global Compliance(Shenzhen)Co.,Ltd.  
Add: 2/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community,  
Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China  
Tel: +86-755 2523 4088 E-mail: agc@agc-cert.com Service Hotline: 400 089 2118

**Conducted Spurious Emission (worst) @ 400.025MHz With 12.5 KHz Channel Separation-4W**  
30MHz-1GHz



**Conduct Spurious Emission (worst) @ 400.025MHz With 12.5 KHz Channel Separation4W**  
1GHz-12.75GHz



Attestation of Global Compliance

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

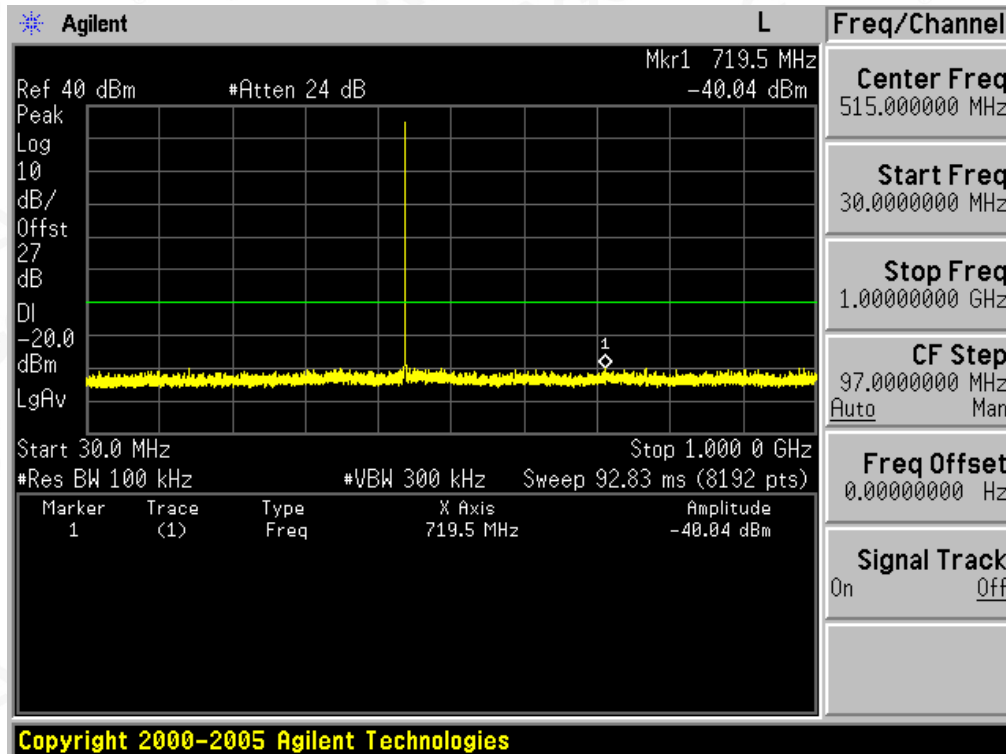
Add: 2/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China

Tel: +86-755 2523 4088

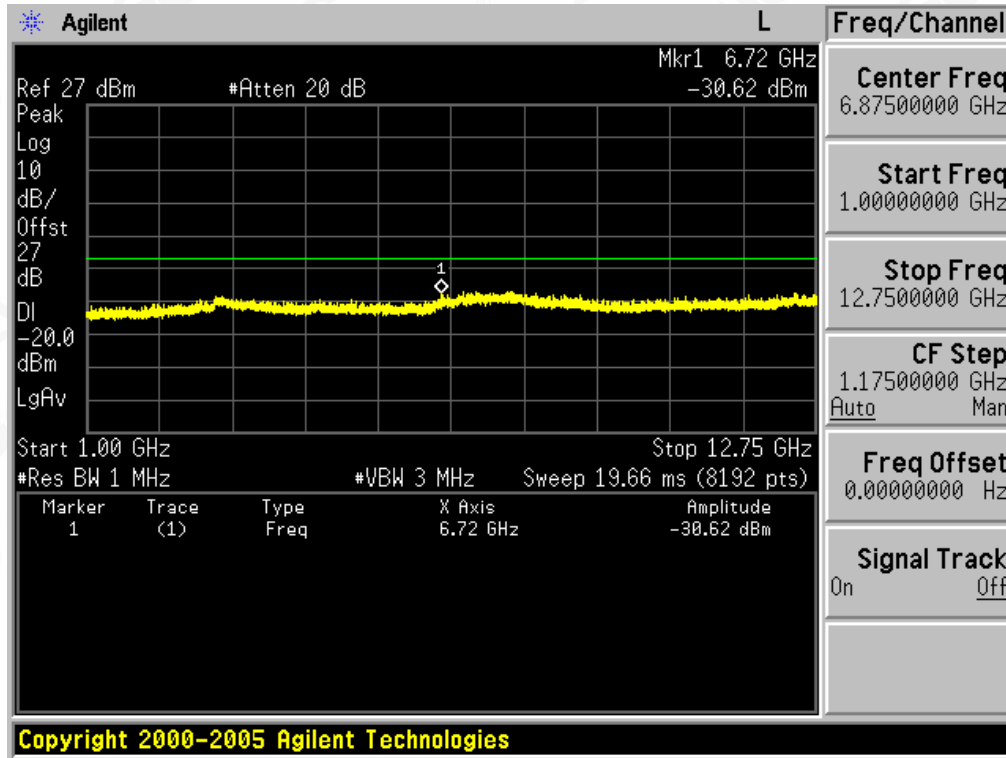
E-mail: agc@agc-cert.com

Service Hotline: 400 089 2118

**Conducted Spurious Emission (worst) @ 453.225MHz With 12.5 KHz Channel Separation-4W**  
30MHz-1GHz



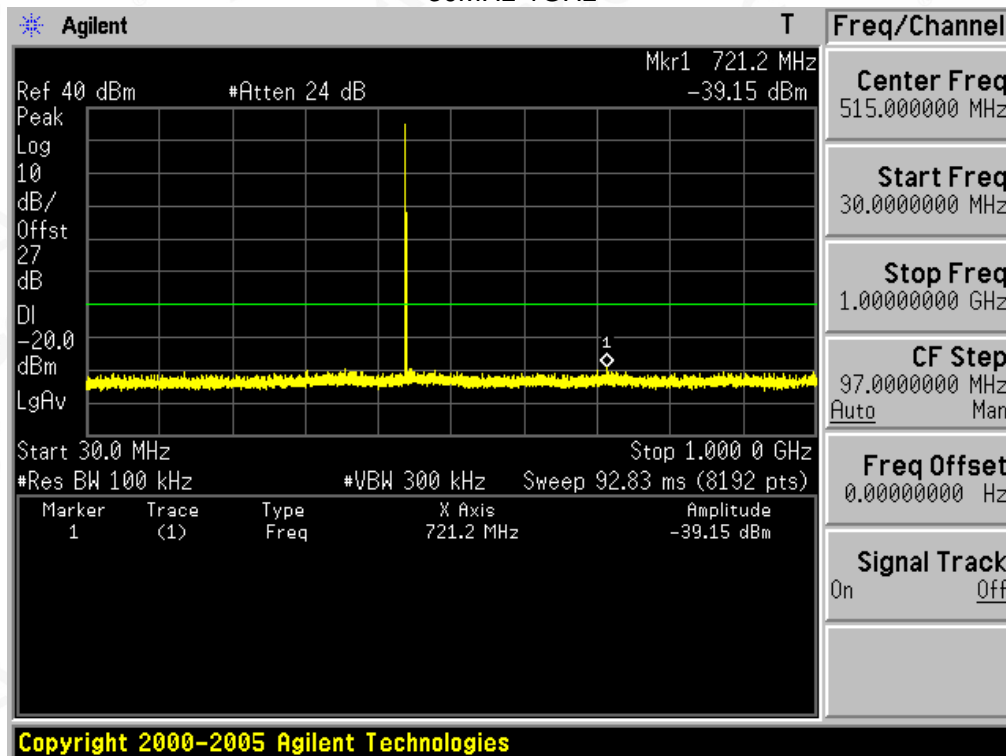
**Conduct Spurious Emission (worst) @ 453.225MHz With 12.5 KHz Channel Separation-4W**  
1GHz-12.75GHz



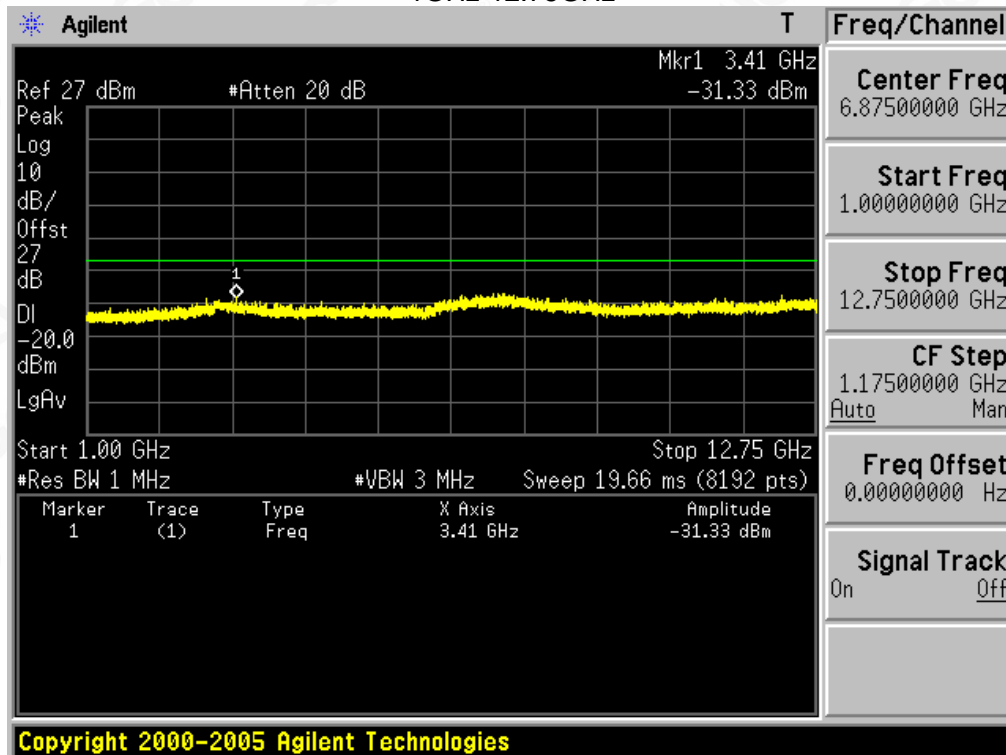
Attestation of Global Compliance

Attestation of Global Compliance(Shenzhen)Co.,Ltd.  
Add: 2/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community,  
Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China  
Tel: +86-755 2523 4088 E-mail: agc@agc-cert.com Service Hotline:400 089 2118

**Conducted Spurious Emission (worst) @ 454.025MHz With 12.5 KHz Channel Separation-4W**  
30MHz-1GHz



**Conduct Spurious Emission (worst) @ 454.025MHz With 12.5 KHz Channel Separation-4W**  
1GHz-12.75GHz



Attestation of Global Compliance

Attestation of Global Compliance(Shenzhen)Co.,Ltd.  
Add: 2/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community,  
Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China  
Tel: +86-755 2523 4088 E-mail: agc@agc-cert.com Service Hotline:400 089 2118