FCC Test Report

Report No.: AGC10636201001FE04

FCC ID	:	2ASVO7C-73
APPLICATION PURPOSE	:	Original Equipment
PRODUCT DESIGNATION	:	FM transmitter
BRAND NAME	:	CZERF
MODEL NAME	:	CZE-7C, FMUSER FU-7C, SIGNSTEK ST-7C
APPLICANT	:	Guangzhou Chuanzhou Electronic Technology Co., Ltd.
DATE OF ISSUE	:	Nov. 05, 2020
STANDARD(S)	:	FCC Part 73 Subpart D
REPORT VERSION	:	V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd

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REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Nov. 05, 2020	Valid	Initial Release

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TABLE OF CONTENTS

1. VERIFICATION OF CONFORMITY 5

2. GENERAL INFORMATION 6

2.1. PRODUCT DESCRIPTION 6

3. MEASUREMENT UNCERTAINTY 7

4. DESCRIPTION OF TEST MODES 8

5. SYSTEM TEST CONFIGURATION 9

5.1. CONFIGURATION OF EUT SYSTEM 9
5.2 EQUIPMENT USED IN TESTED SYSTEM 9
5.3. SUMMARY OF TEST RESULTS 9

6. TEST FACILITY 10

7. OUPUT POWER 11

7.1. TEST LIMIT 11
7.2. MEASUREMENT PROCEDURE 11
7.3. TEST SETUP 12
7.4. TEST RESULT 13

8. MODULATION CHARACTERISTICS 16

8.1 TEST LIMIT 16
8.2 MEASUREMENT METHOD 16
8.3. TEST SETUP 16
8.4 TEST RESULT 17

9. OCCUPIED BANDWIDTH 19

9.1. TEST LIMIT 19
9.2. MEASUREMENT PROCEDURE 19
9.3. TEST SET-UP 19
9.4. MEASUREMENT RESULTS 20

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10. FREQUENCY STABILITY 26

10.1. TEST LIMIT 26
10.2. MEASUREMENT PROCEDURE 26
10.3. TEST SET-UP 26
10.4. TEST RESULT 27

11. EMISSION MASK AND SPURIOUS EMISSIONS 28

11.1. TEST LIMIT 28
11.2. MEASUREMENT PROCEDURE 28
11.3. TEST SETUP 29
11.4. TEST RESULT 30

APPENDIX A: PHOTOGRAPHS OF TEST SETUP 42

APPENDIX B: PHOTOGRAPHS OF EUT 43

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1. VERIFICATION OF CONFORMITY

Applicant	Guangzhou Chuanzhou Electronic Technology Co., Ltd.
Address	2/F (Building C-1), No. 3, Chuangye 2nd Road, Guandao Village, Shapu, Xintang Town, Zengcheng, Guangzhou City
Manufacturer	Guangzhou Chuanzhou Electronic Technology Co., Ltd.
Address	2/F (Building C-1), No. 3, Chuangye 2nd Road, Guandao Village, Shapu, Xintang Town, Zengcheng, Guangzhou City
Factory	Guangzhou Chuanzhou Electronic Technology Co., Ltd.
Address	2/F (Building C-1), No. 3, Chuangye 2nd Road, Guandao Village, Shapu, Xintang Town, Zengcheng, Guangzhou City
Product Designation	FM transmitter
Brand Name	CZERF
Test Model	CZE-7C
Series Model	FMUSER FU-7C, SIGNSTEK ST-7C
Model Difference	All the series models are the same as the test model except for the model names and the color of appearance.
Date of test	Oct. 10, 2020 to Nov. 05, 2020
Deviation	No any deviation from the test method
Condition of Test Sample	Normal
Test Result	Pass
Report Template	AGCRT-US-NCE-FM/RF

We hereby certify that:

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.26 (2015) and the energy emitted by the sample EUT tested as described in this report is in compliance with radiated emission limits of FCC Part 73 Sub part D.

Prepared By	John Zeng Project Engineer	Nov. 05, 2020
Reviewed By	Max Zhang Reviewer	Nov. 05, 2020
Approved By	Forrest Lei Authorized Officer	Nov. 05, 2020

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2. GENERAL INFORMATION

2.1. PRODUCT DESCRIPTION

Operation Frequency	87.9MHz-91.9MHz
Maximum Conducted Power	7.06W
Classes of NCE-FM	Class D educational station
Modulation	FM
Number of channels	21(Channel Spacing is 200kHz)
Antenna Gain	2.5dBi
Antenna Designation	Dedicated Antenna
Hardware Version	V2.3
Software Version	V1.4
Power Supply	INPUT: 100-240V~ 50-60Hz 0.6A OUTPUT: 12V⎓1.67A

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3. 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%.

- Uncertainty of Radiated Emission below 1GHz, Uc = ±4.0 dB
- Uncertainty of Radiated Emission above 1GHz, Uc = ±4.8 dB
- Uncertainty of Maximum radiated power, Uc = ±0.8 dB
- Uncertainty of Occupied Channel Bandwidth: Uc = ±2 %

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4. DESCRIPTION OF TEST MODES

NO.	TEST MODE DESCRIPTION
1	Transmitting Low Channel (87.9MHz) mode
2	Transmitting Middle Channel (89.9MHz)mode
3	Transmitting High Channel (91.9MHz)mode

Note:

1. For Radiated Emission, 3axis were chosen for testing for each applicable mode.
2. For Conducted Test method, a temporary antenna connector is provided by the manufacture.

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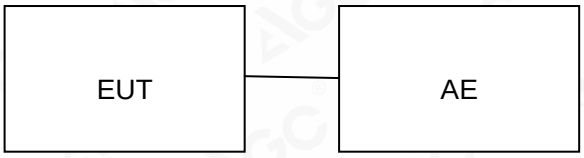
5. SYSTEM TEST CONFIGURATION

5.1. CONFIGURATION OF EUT SYSTEM

Configure :



5.2 EQUIPMENT USED IN TESTED SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	FM transmitter	CZE-7C	2ASVO7C-73	EUT
2	Adapter	ADS0202-U120167	INPUT: 100-240V 50/60Hz 0.6A OUTPUT: 12V⎓1.67A	Accessory

5.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§73.506 §73.210 §2.1046	Output power	Compliant
§2.1047	Modulation characteristics	Compliant
§73.310 §2.1055 §73.1545	Frequency stability	Compliant
§73.508 §73.310 §2.1049	Occupied bandwidth	Compliant
§73.508 §73.317 §2.1051	Spurious emissions	Compliant
§73.508 §73.317 §2.1051	Emission mask	Compliant

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6. TEST FACILITY

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

TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	May 15, 2020	May 14, 2021
EXA Signal Analyzer	Aglient	N9020A	MY52090123	Sep. 09, 2020	Sep. 08, 2021
Attenuator	Wariors	W13	11324	Sep. 09, 2020	Sep. 08, 2021
Horn antenna	ZHINAN	E-002	N/A	Sep. 03, 2020	Sep. 02, 2022
Active loop antenna (9K-30MHz)	ZHINAN	ZN30900C	18051	Jun. 14, 2020	Jun. 13, 2022
Double-Ridged Waveguide Horn	ETS-LINDGREN	3117	00034609	May 17, 2019	May 16, 2021
Broadband Preamplifier	ETS LINDGREN	3117PA	00225134	Sep. 03, 2020	Sep. 02, 2022
ANTENNA	SCHWARZBECK	VULB9168	494	Jan. 09, 2019	Jan. 08, 2021
Wireless communication tester	HP	8920B	US35010161	Sep. 15, 2020	Sep. 14, 2021
Test software	Tonscend	JS32-RE (Ver. 2.5)	N/A	N/A	N/A

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7. OUPUT POWER

7.1. TEST LIMIT

A Class D educational station is one operating with no more than 10 watts transmitter power output.

7.2. MEASUREMENT PROCEDURE

☒EIRP Test Method(ANSI C63.26 Section 5.2.7)

1. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. EIRP[dBm] = E[dB(μV)/m]− 95.2

☒Conducted Power Test Method(ANSI C63.26 Section 5.2.3.3)

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. RBW ⩾ OBW.
3. VBW ⩾3 x RBW.
4. Span ⩾2 x OBW.
5. Sweep time ⩾ 10 x (number of points in sweep) x (transmission symbol period)
6. Detector function: Peak.
7. Trace: Max hold.
8. Allow trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power, after any corrections for external attenuators and cables.

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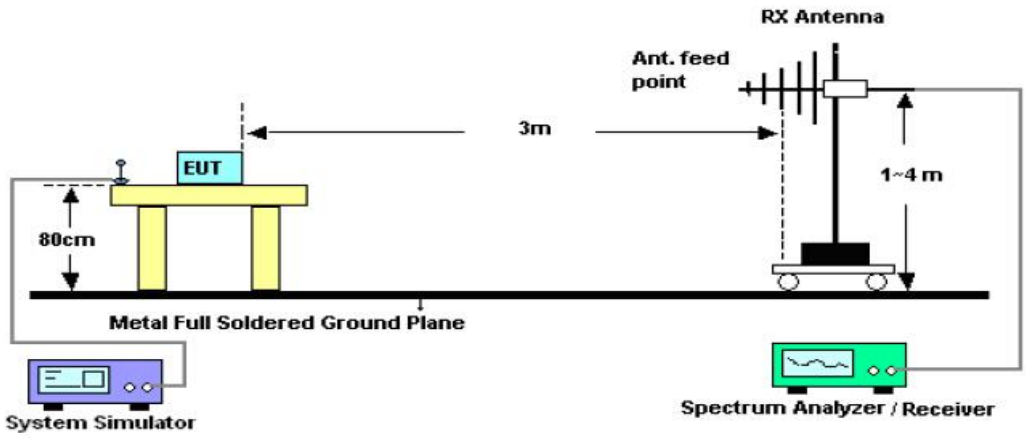
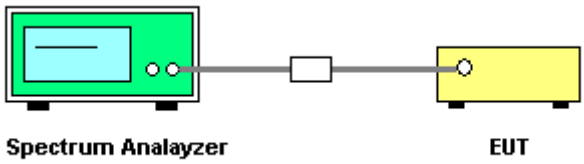
7.3. TEST SETUP

☒EIRP Test Method



☒Conducted Power Test Method



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7.4. TEST RESULT

EIRP Power：

Frequency MHz	Polarization	Reading dBm	Factor dB	Level dBm Peak	Limit dBm Average	Margin dB	Pass/Fail
87.9	Horizontal	13.74	22.41	36.15	40	-3.85	Pass
87.9	Vertical	11.33	25.29	36.62	40	-3.38	Pass
89.9	Horizontal	12.72	22.65	35.37	40	-4.63	Pass
89.9	Vertical	11.06	25.53	36.59	40	-3.41	Pass
91.9	Horizontal	12.42	22.86	35.28	40	-4.72	Pass
91.9	Vertical	10.63	25.78	36.41	40	-3.59	Pass

Conducted Power：

Test Channel	Peak Power (dBm)	Limit dBm)
87.9 MHz	38.281	40
89.9 MHz	38.374	40
91.9 MHz	38.486	40

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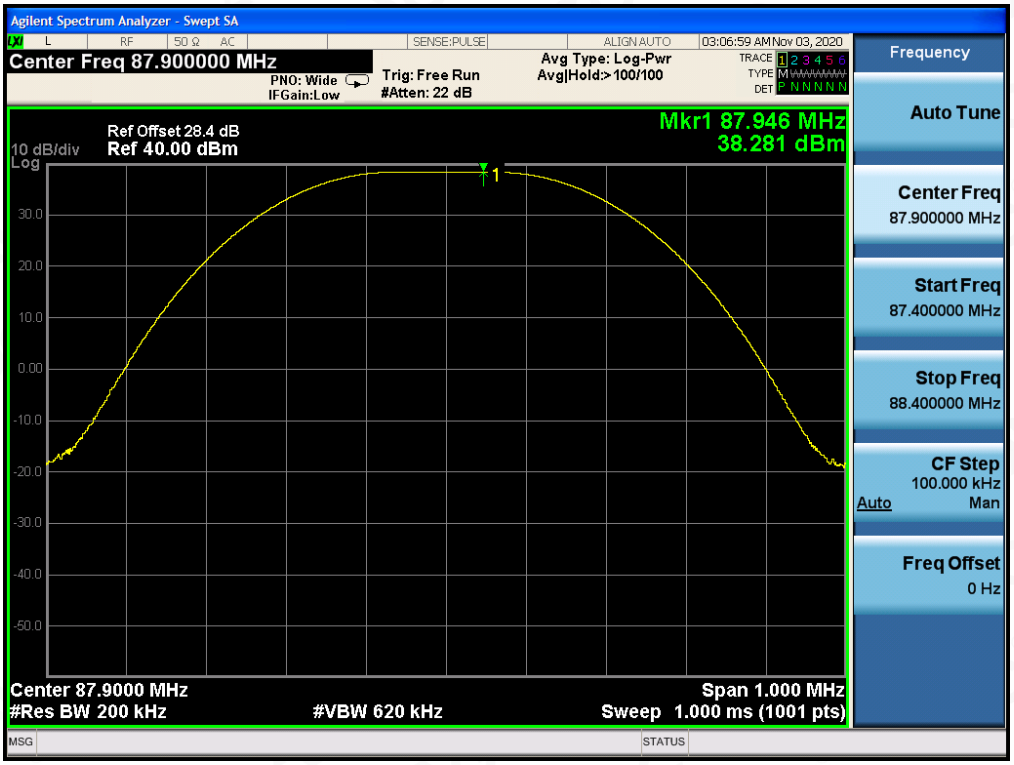
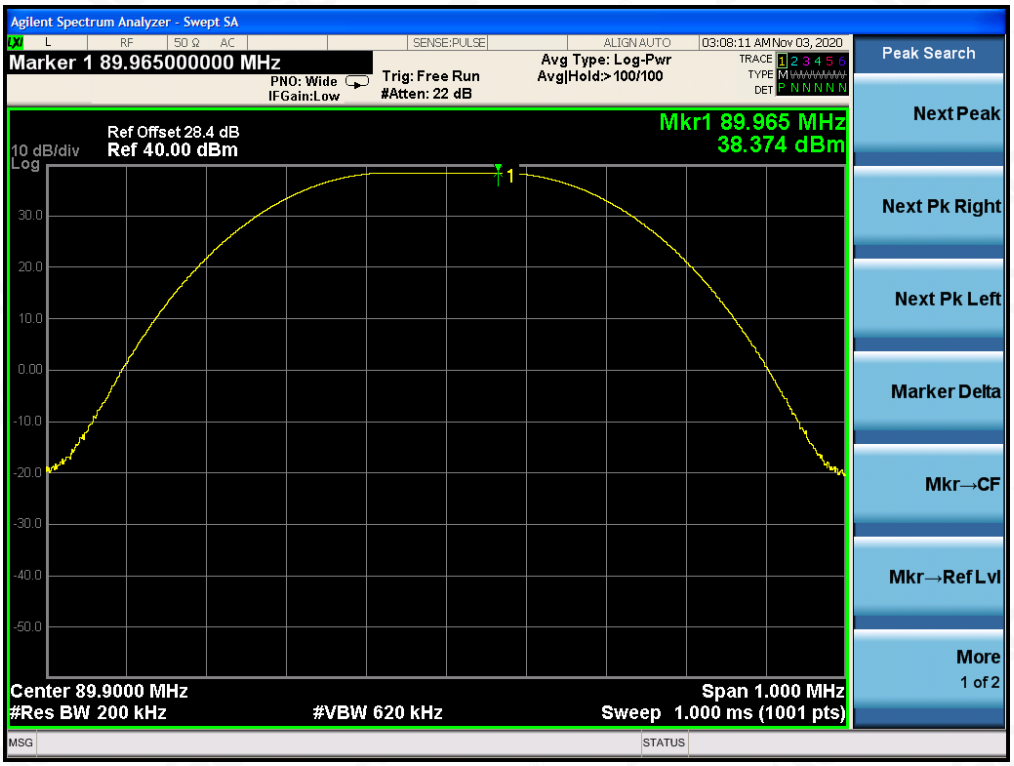
Low channel



Middle channel



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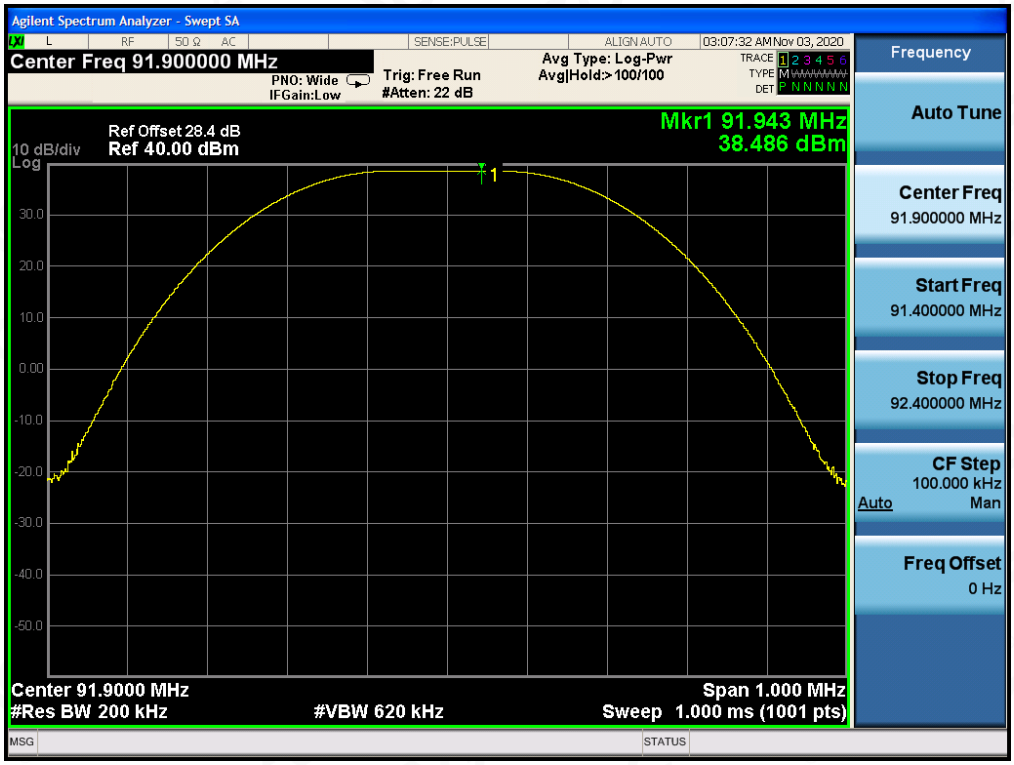
High channel



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8. MODULATION CHARACTERISTICS

8.1 TEST LIMIT

a).According to CFR 47 section 2.1047(a), for Voice Modulation Communication Equipment, the frequency response of the audio modulation circuit over a range of 100 to 5000Hz shall be measured.

b). According to CFR 47 section 73.310, For FM broadcast stations, a frequency deviation of ±75kHz is defined as 100% modulation.

8.2 MEASUREMENT METHOD

MODULATION LIMIT

1). Configure the EUT as shown in the set-up, 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 0 to +20dB in 5 dB increments. Record the frequency deviation obtained as a function of the input level.

2). Repeat step 1 with input frequency changing to 300, 2500, and 3000 Hz in sequence.

AUDIO FREQUENCY RESPONSE

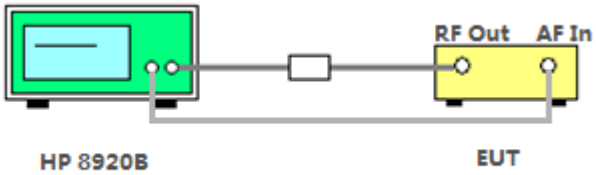
1). Configure the EUT as shown in Set-up.

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 300 Hz to 3000 Hz and record the frequency deviation.

4). Audio Frequency Response = 20log10 (Deviation of test frequency/Deviation of 1 KHz reference).

8.3. TEST SETUP



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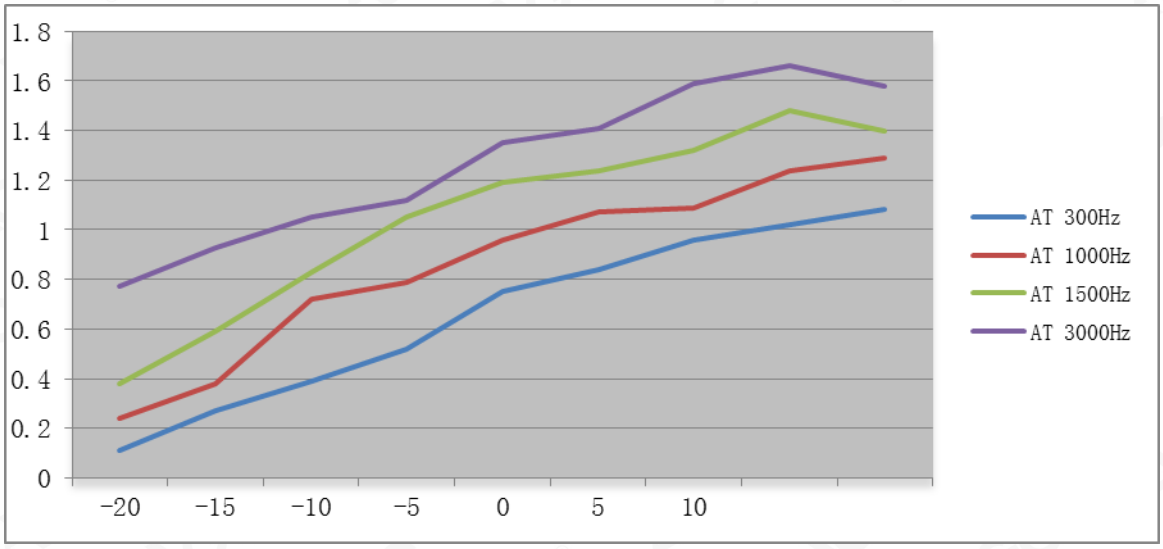
8.4 TEST RESULT

a). Modulation Limit:

Test Result @Low Channel

Modulation Level (dB)	Peak Positive Deviation At 300 Hz (KHz)	Peak Positive Deviation At 1000 Hz (KHz)	Peak Positive Deviation At 2500 Hz (KHz)	Peak Positive Deviation At 3000 Hz (KHz)
0	0.75	0.96	1.19	1.35
5	0.84	1.07	1.24	1.41
10	0.96	1.09	1.32	1.59
15	1.02	1.24	1.48	1.66
20	1.08	1.29	1.40	1.58
Modulation Level (dB)	Peak negative Deviation At 300 Hz (KHz)	Peak negative Deviation At 1000 Hz (KHz)	Peak negative Deviation At 2500 Hz (KHz)	Peak negative Deviation At 3000 Hz (KHz)
0	0.75	0.96	1.15	1.34
5	0.85	1.05	1.23	1.41
10	0.97	1.09	1.32	1.58
15	1.03	1.26	1.48	1.64
20	1.08	1.28	1.41	1.57



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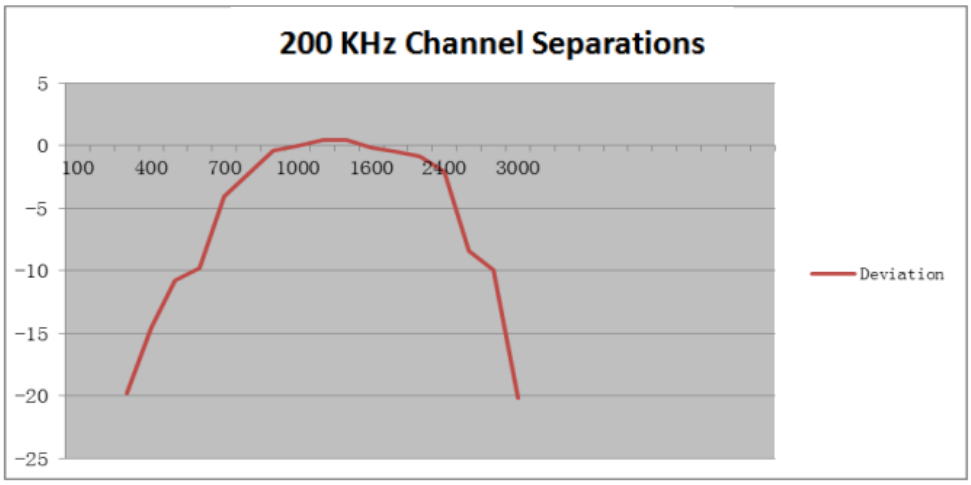
b). Audio Frequency Response:

Test Result @ Low Channel

Frequency (Hz)	Deviation (KHz)	Audio Frequency Response (dB)
100		
200	--	
300	0.24	-19.82
400	0.44	-14.55
500	0.68	-10.77
600	0.76	-9.81
700	1.47	-4.08
800	1.82	-2.22
900	2.24	-0.42
1000	2.35	0.00
1200	2.46	0.40
1400	2.47	0.43
1600	2.31	-0.15
1800	2.22	-0.49
2000	2.13	-0.85
2400	1.85	-2.08
2500	0.89	-8.43
2800	0.75	-9.92
3000	0.23	-20.19



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9. OCCUPIED BANDWIDTH

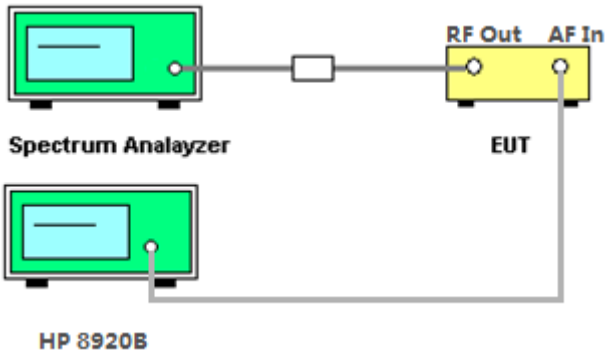
9.1. TEST LIMIT

The operating bandwidth shall not exceed 200 kHz.

9.2. MEASUREMENT PROCEDURE

1. For the occupied bandwidth measurements, the input signal shall be a 400Hz, 1 kHz and 15KHz tone. The level of the tone shall be set to the manufacturer's maximum rated input to the modulator.
2. Set the EUT Work on operation frequency.
3. Set Span = approximately 1.5 times the occupied bandwidth, centered on a channel
   The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be approximately three times RBW; Sweep = auto; Detector function = peak
4. Set SPA Trace 1 Max hold, then View.

9.3. TEST SET-UP



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9.4. MEASUREMENT RESULTS

Input 400Hz signal

Test Channel	-26dBc EBW (kHz)	99% OBW (kHz)	Limit (kHz)
87.9 MHz	145.4	136.16	200
89.9 MHz	152.9	143.17	200
91.9 MHz	158.1	148.52	200

Input 1KHz signal

Test Channel	-26dBc EBW (kHz)	99% OBW (kHz)	Limit (kHz)
87.9 MHz	146.0	136.50	200
89.9 MHz	153.4	143.30	200
91.9 MHz	158.3	148.51	200

Input 15KHz signal

Test Channel	-26dBc EBW (kHz)	99% OBW (kHz)	Limit (kHz)
87.9 MHz	146.1	136.53	200
89.9 MHz	153.6	143.44	200
91.9 MHz	158.9	148.59	200

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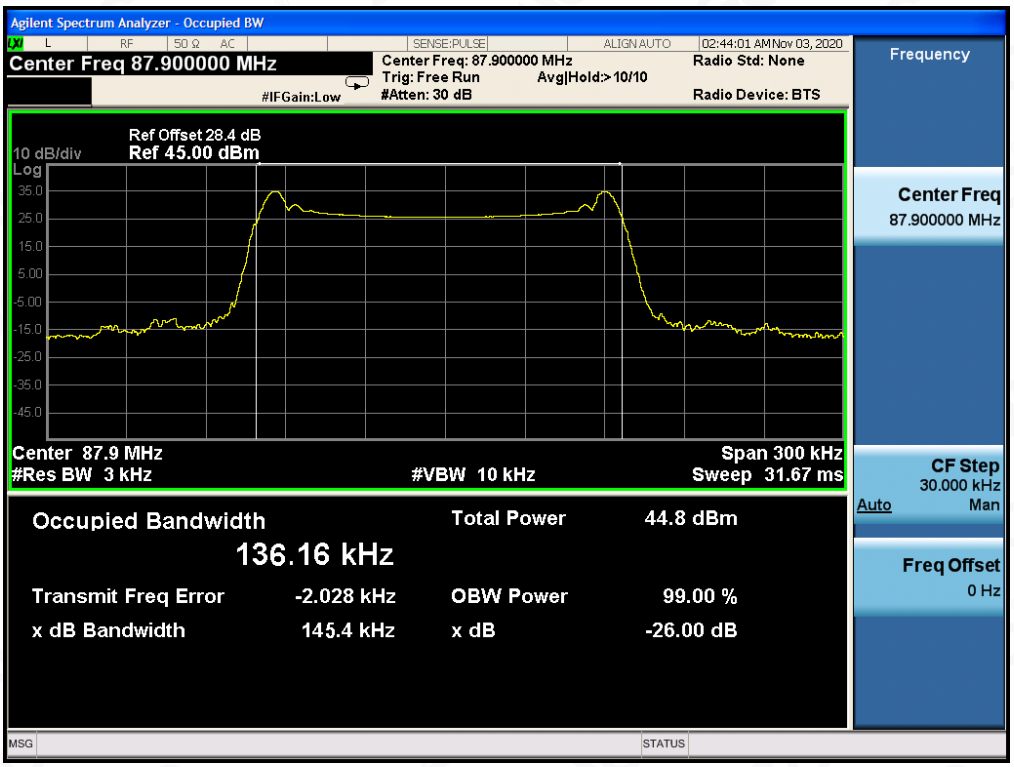
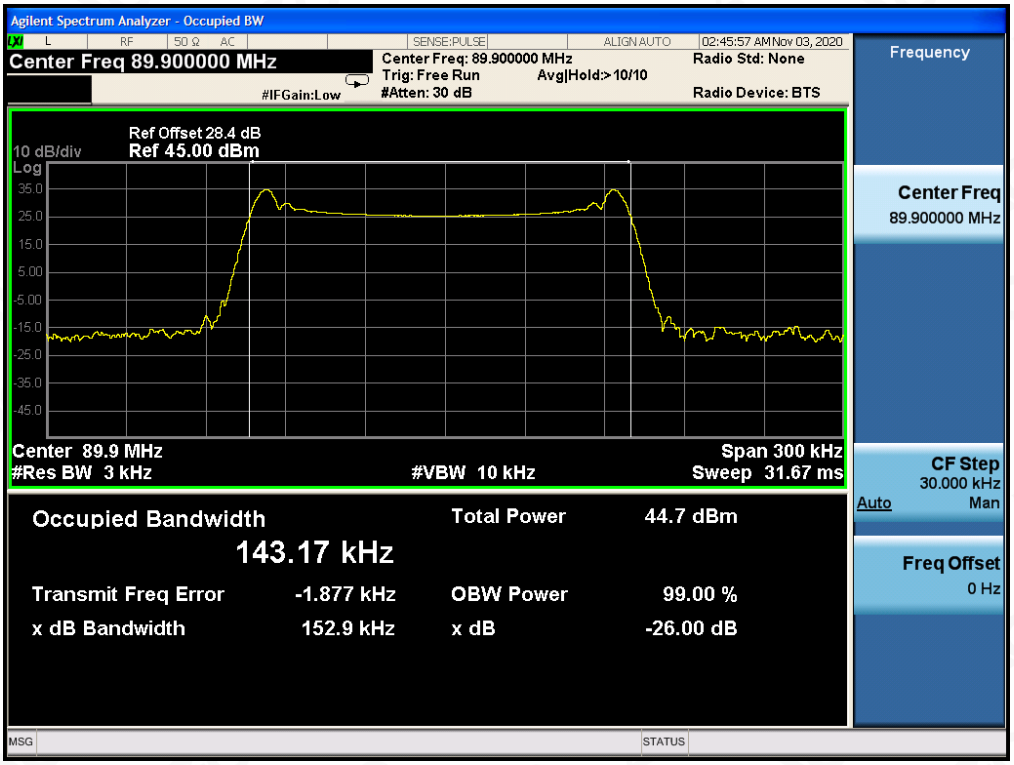
TEST PLOT OF BANDWIDTH

Input 400Hz signal Low channel



Input 400Hz signal Middle channel



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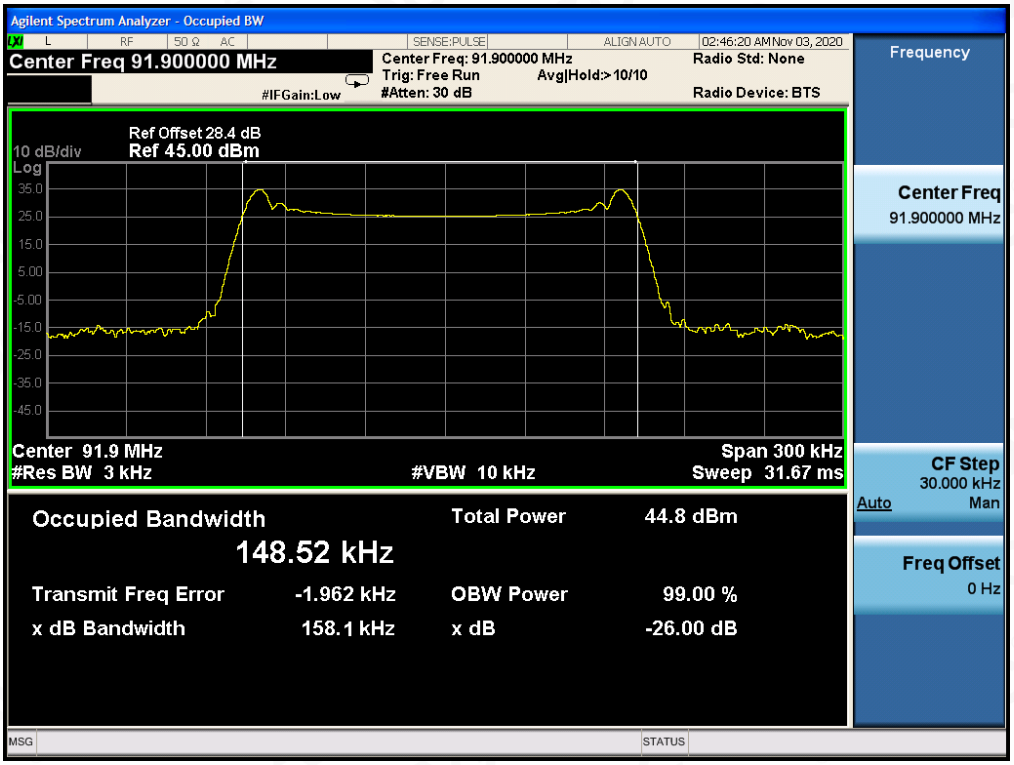
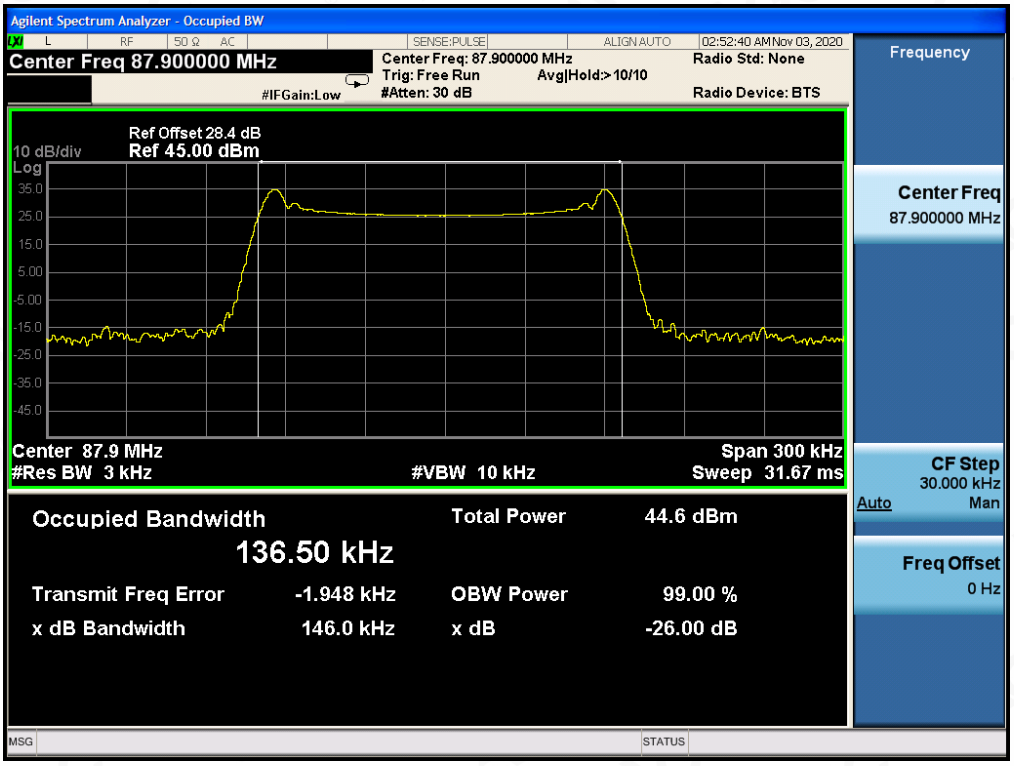
Input 400Hz signal High channel



Input 1KHz signal Low channel



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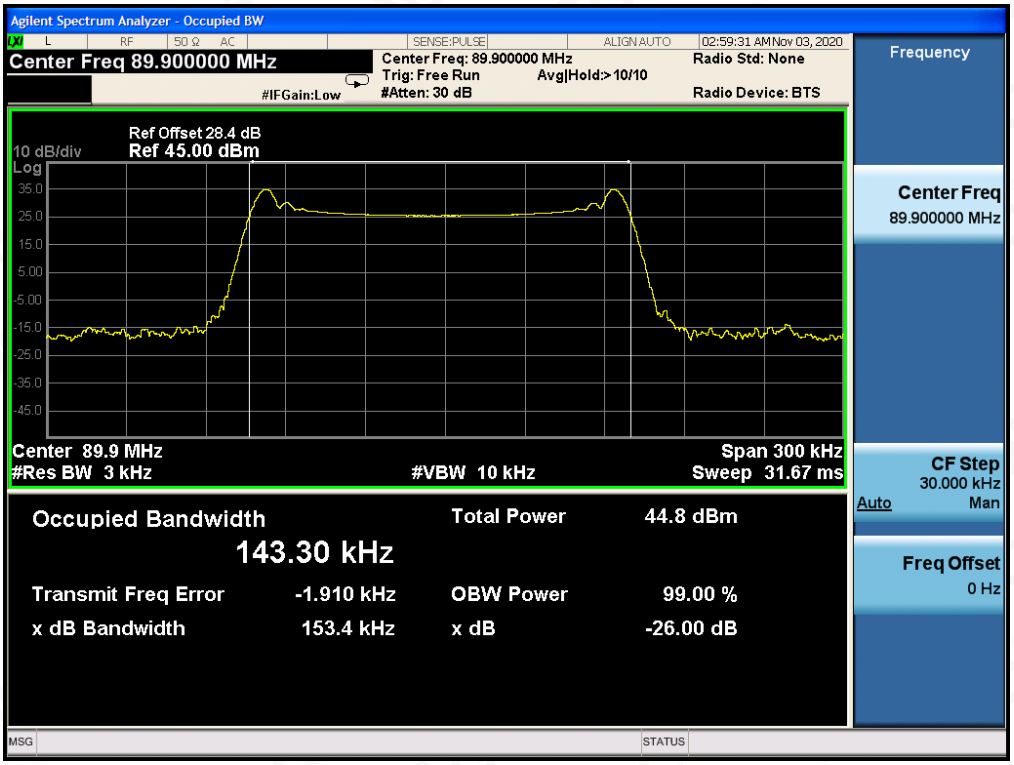
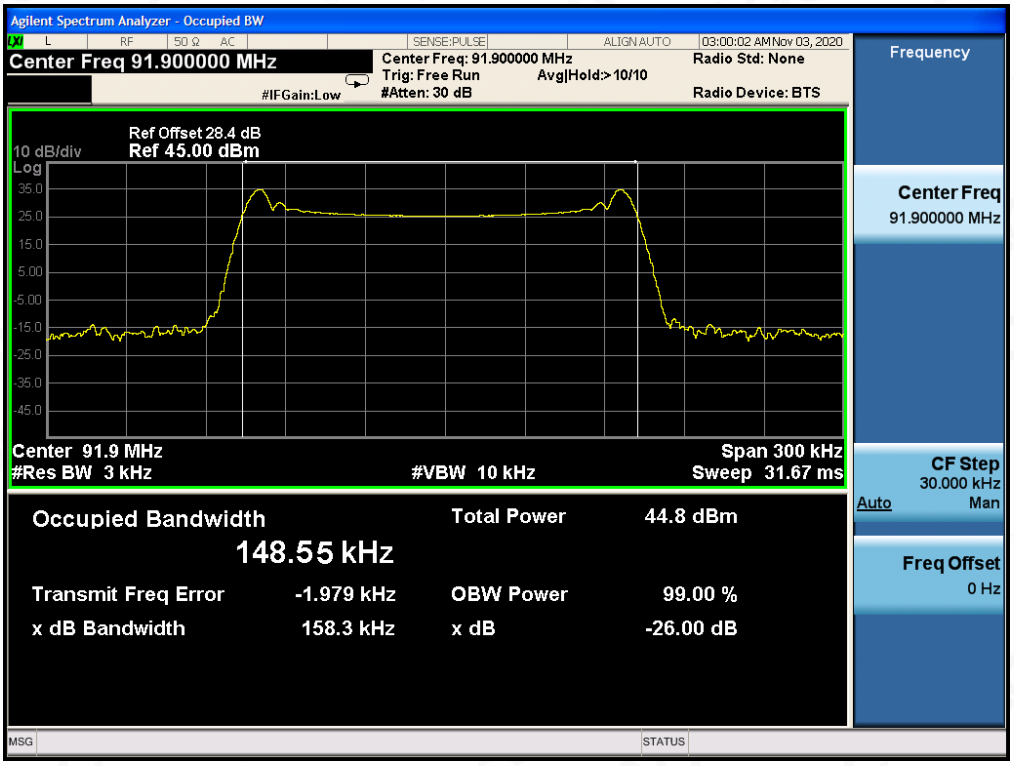
Input 1KHz signal Middle channel



Input 1KHz signal High channel



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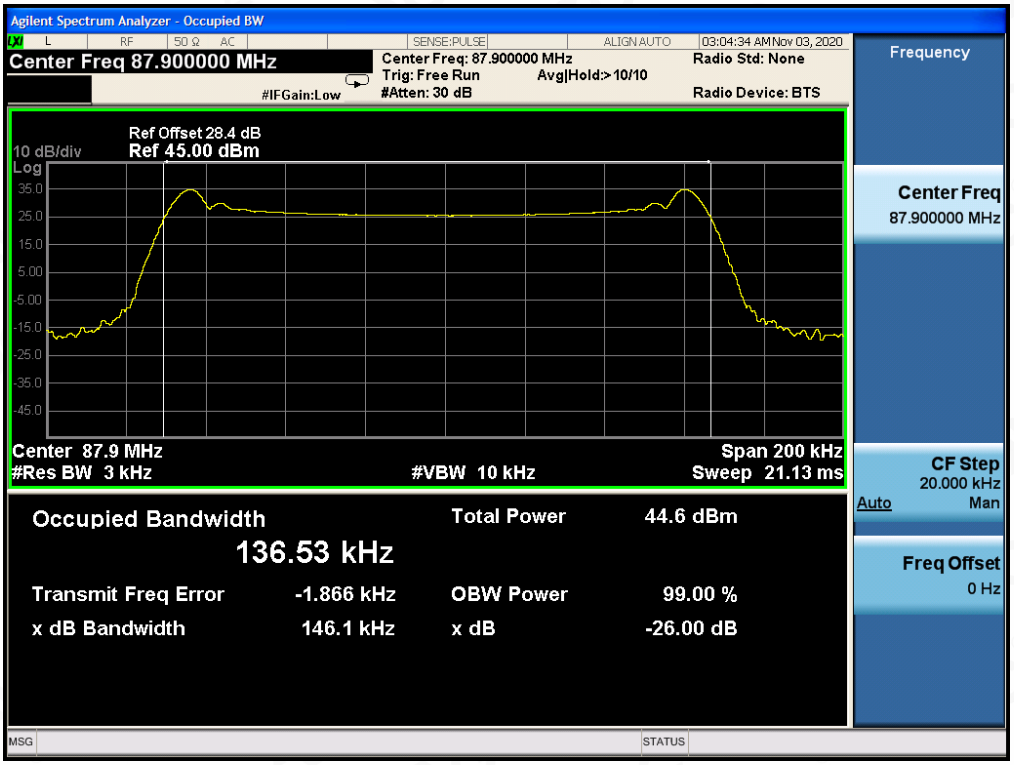
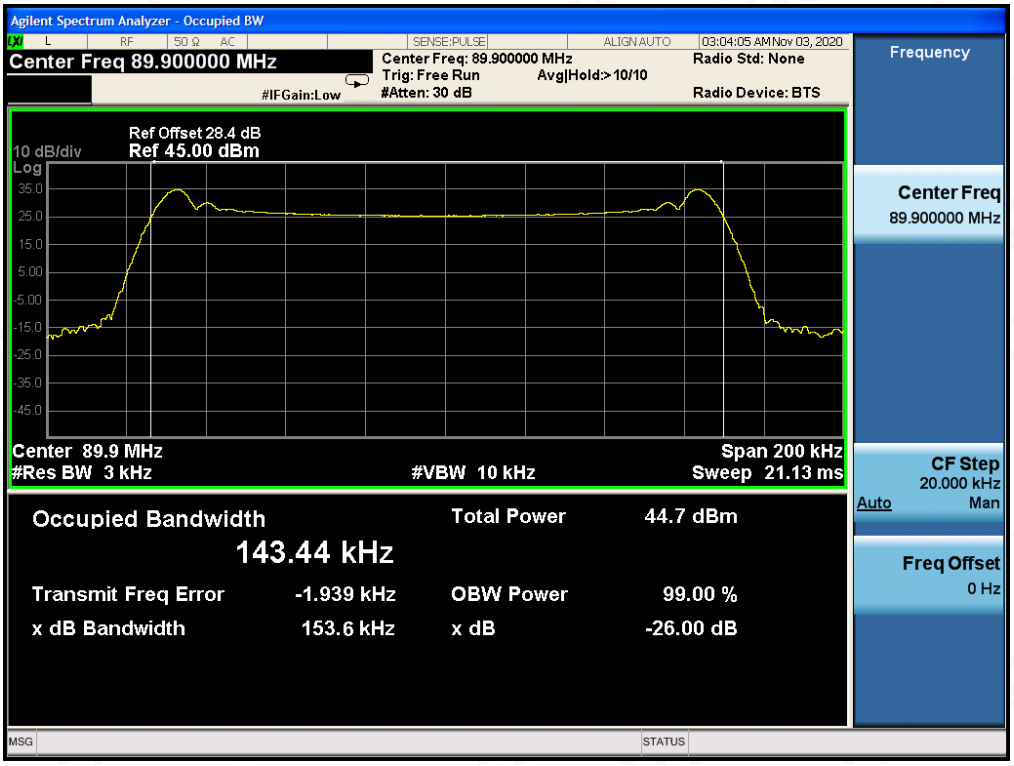
Input 15KHz signal Low channel



Input 15KHz signal Middle channel



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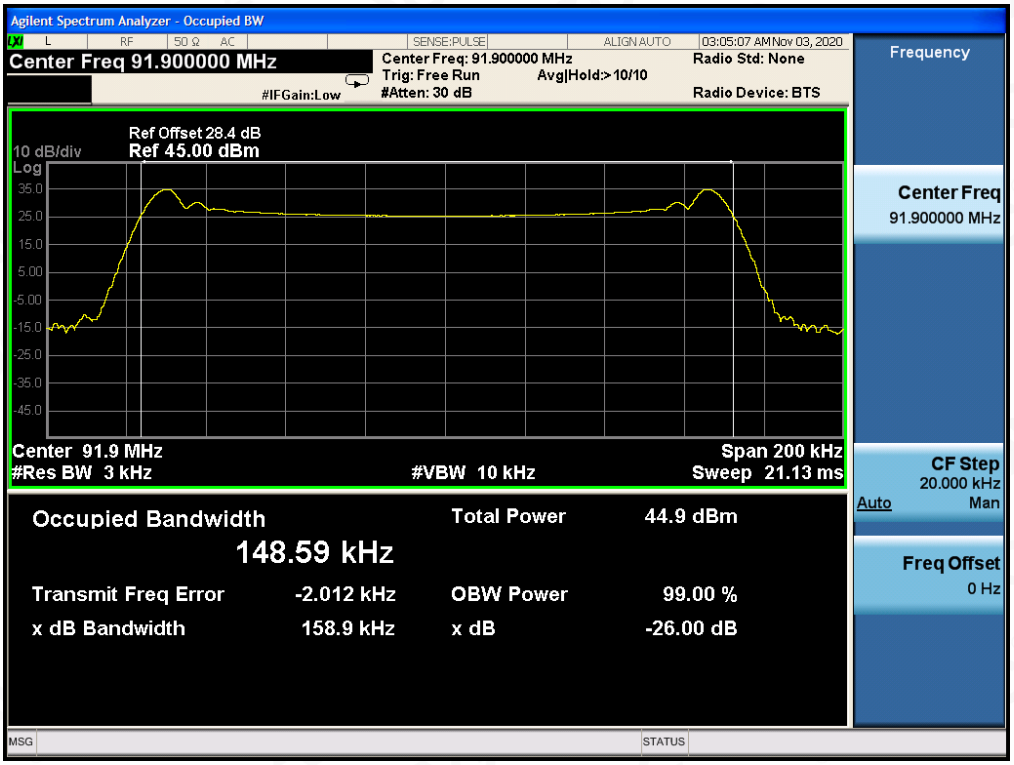
Input 15KHz signal High channel



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10. FREQUENCY STABILITY

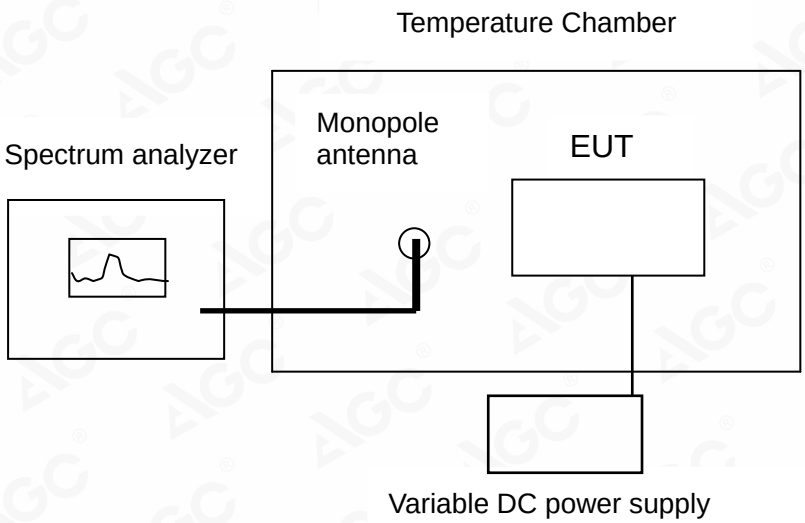
10.1. TEST LIMIT

The frequency tolerance of the carrier signal shall be maintained within ±3000Hz of the operating frequency over a temperature variation of 0 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.

10.2. MEASUREMENT PROCEDURE

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on the operation frequency.
3. Set SPA Centre Frequency = Operation Frequency, RBW= 1 KHz, VBW≥3×RBW.
4. Set SPA Trace 1 Max hold, then View.
5. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
6. Extreme temperature rule is 0°C~50°C.

10.3. TEST SET-UP



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10.4. TEST RESULT

Test frequency: 87.9 MHz

Voltage vs. Frequency Stability (Test Temperature: 20℃)

Voltage(V)	Measurement Frequency (MHz)	Max. Deviation (Hz)	Limit(Hz)	Conclusion
12.0	87.899775	239	±3000Hz	PASS
10.8	87.899761			
13.8	87.899762			

Temperature vs. Frequency Stability (Test Voltage: 12.00V)

Temperature	Measurement Frequency (MHz)	Max. Deviation (Hz)	Limit(Hz)	Conclusion
0℃	87.899774	237	±3000Hz	PASS
10℃	87.899778			
20℃	87.899771			
30℃	87.899772			
40℃	87.899763			
50℃	87.899764			

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11. EMISSION MASK AND SPURIOUS EMISSIONS

11.1. TEST LIMIT

Frequency range	Limit
Fc-600kHz< f	-13dBm
Fc-600kHz≤f <Fc-240kHz	35dB below the level of the un-modulated carrier
Fc-240kHz≤f ≤Fc-120kHz	25dB below the level of the un-modulated carrier
Fc+120kHz≤f ≤Fc+240kHz	25dB below the level of the un-modulated carrier
Fc+240kHz< f ≤Fc+600kHz	35dB below the level of the un-modulated carrier
Fc+600kHz< f	-13dBm

.

11.2. MEASUREMENT PROCEDURE

1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. EIRP[dBm] = E[dB(μV)/m]− 95.2

The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP
Start ~Stop Frequency	1000MHz~6000MHz/RB 1MHz for QP

Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP
Start ~Stop Frequency	1000MHz~6000MHz/RB 1MHz for QP

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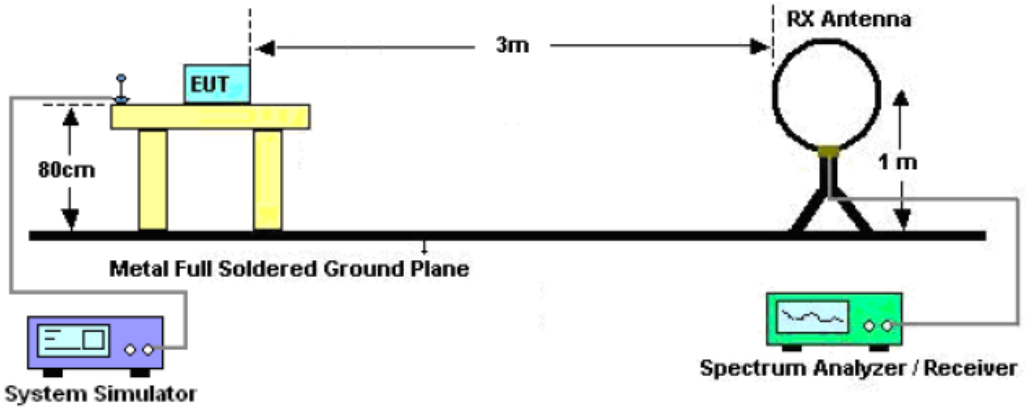
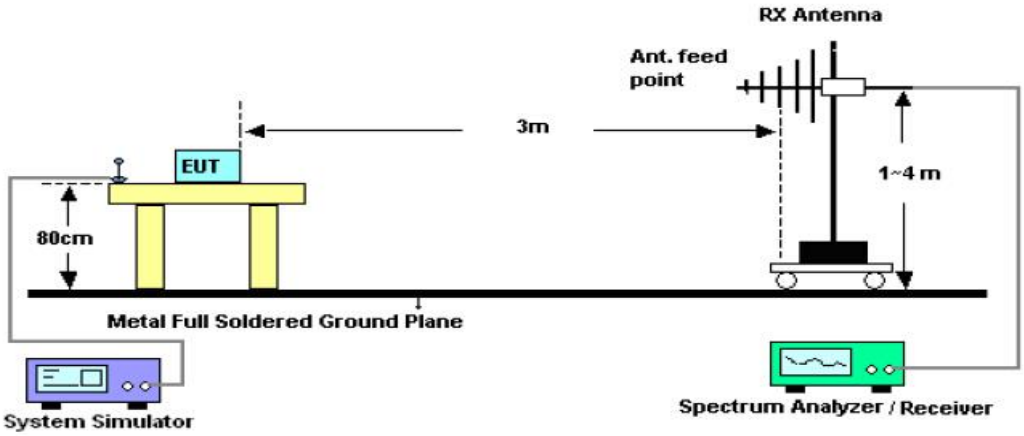
11.3. TEST SETUP

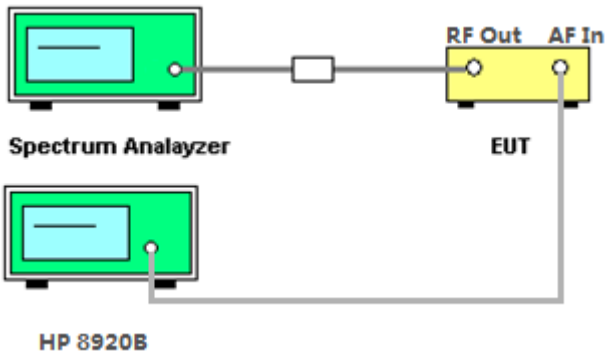
Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



Conducted Test Method for Mask



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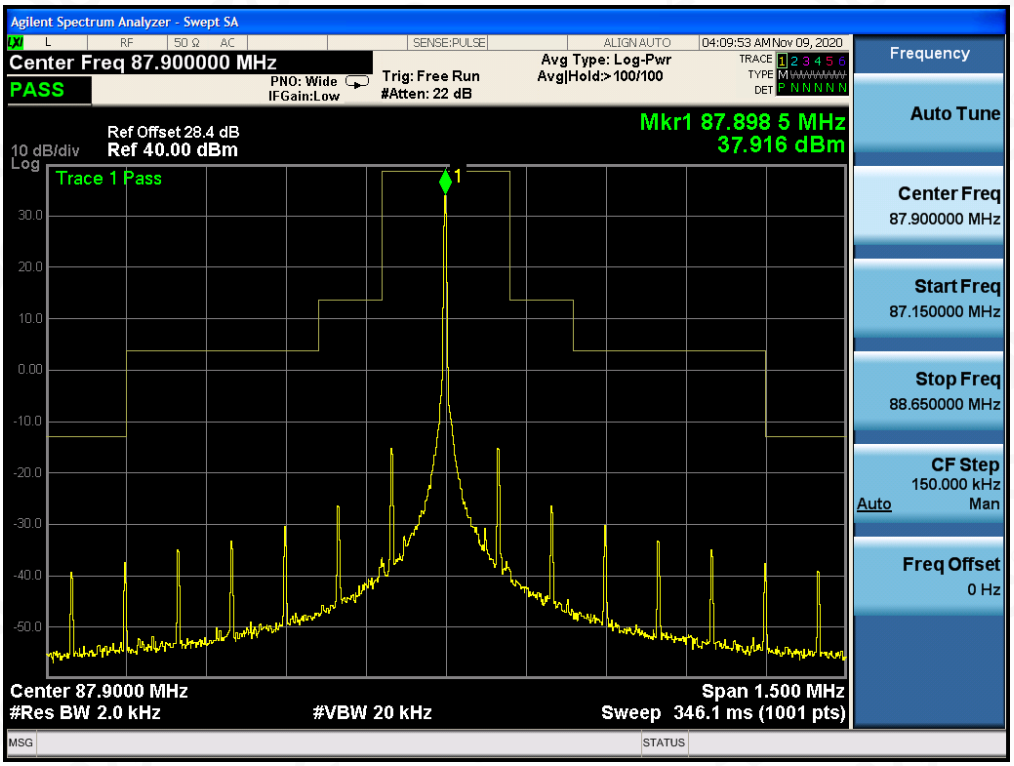
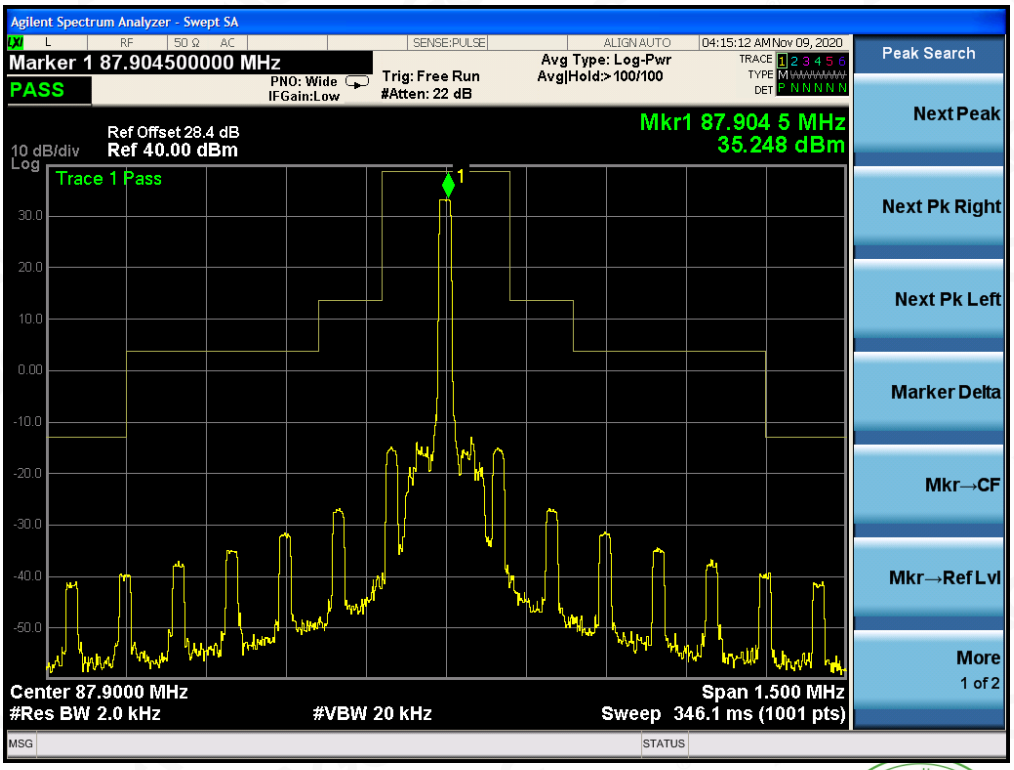
11.4. TEST RESULT

EMISSION MASK (Emissions within the band)

Unmodulated Carrier



Input 400Hz signal Low channel



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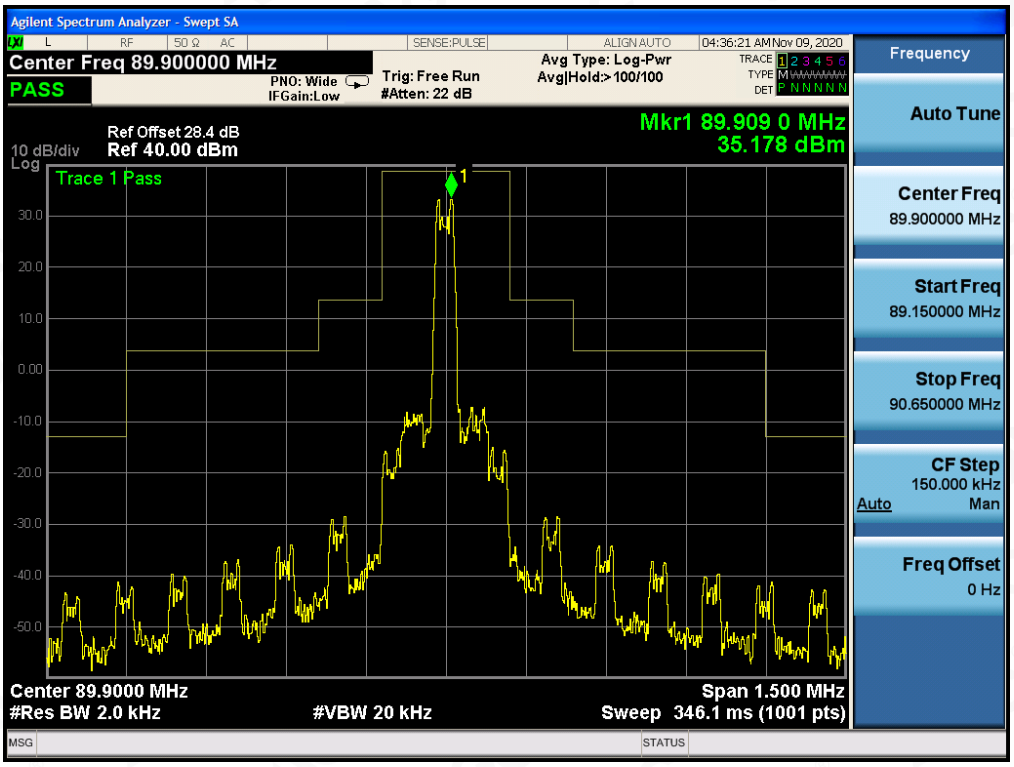
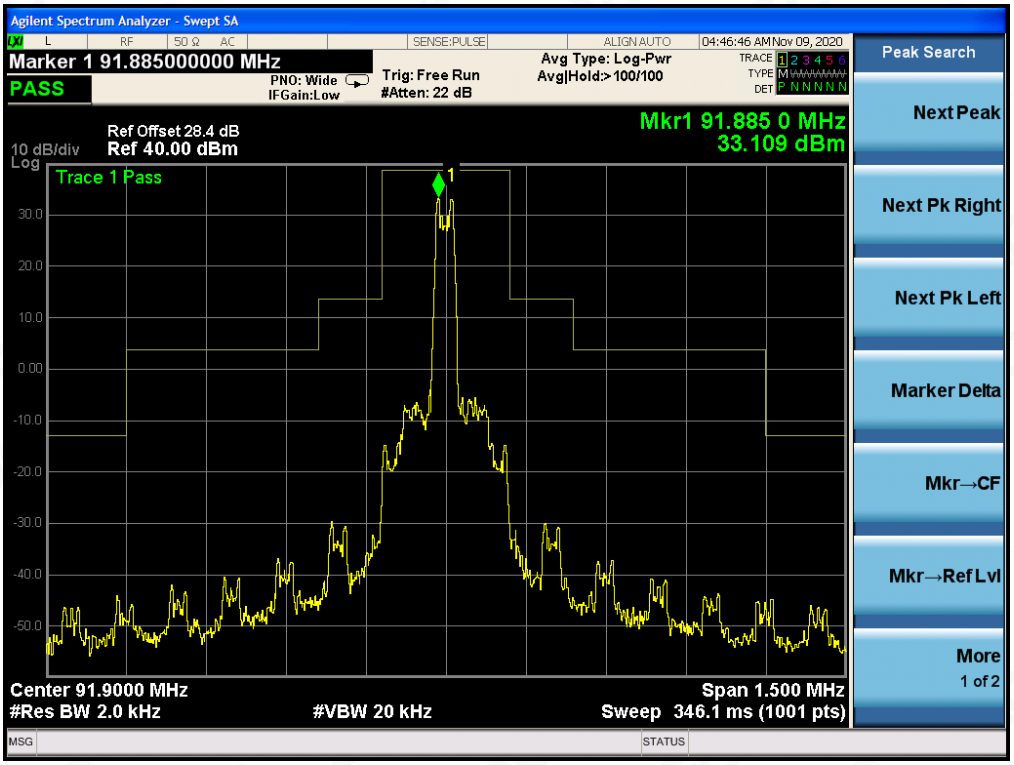
Input 400Hz signal Middle channel



Input 400Hz signal High channel



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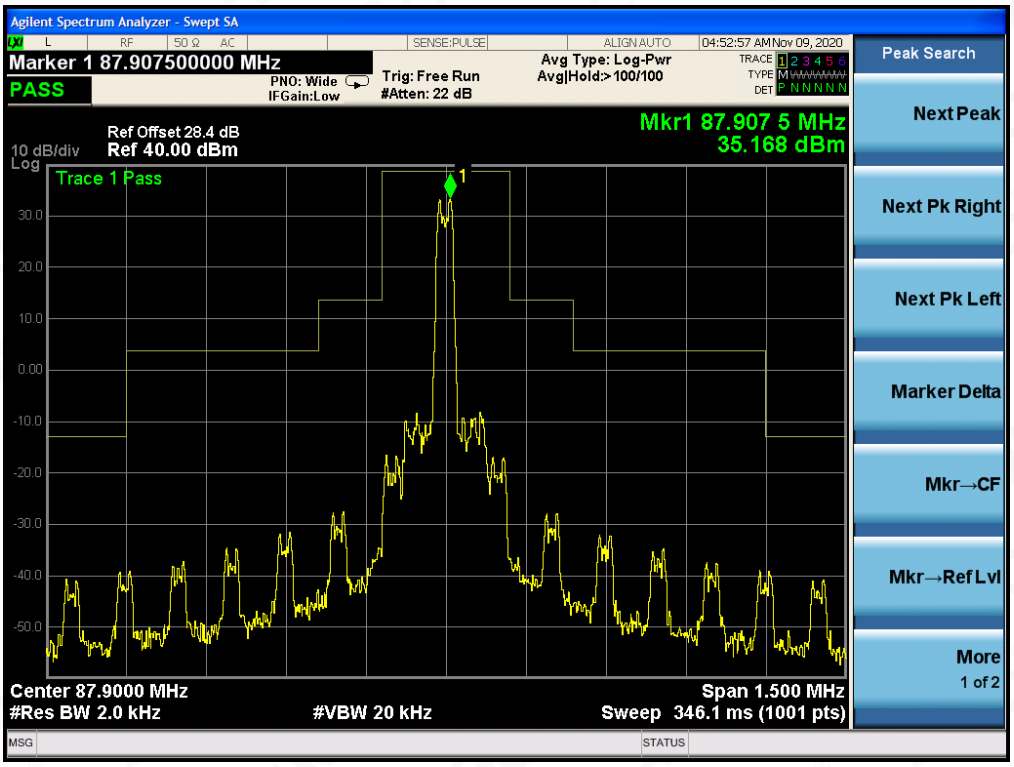
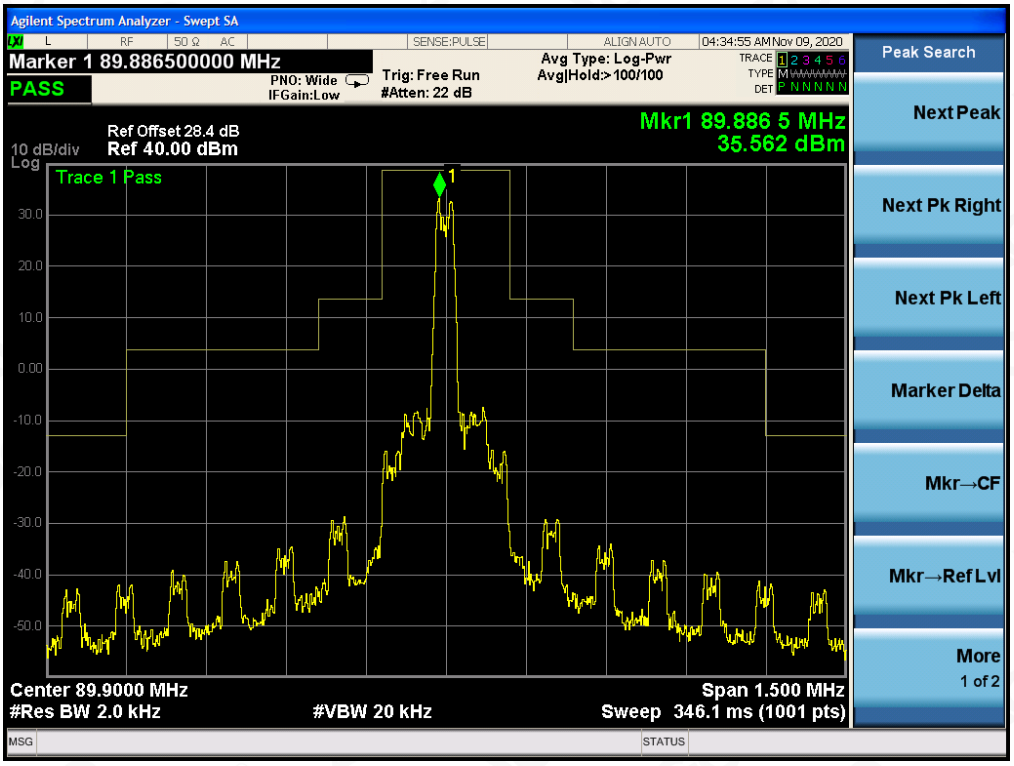
Input 1KHz signal Low channel



Input 1KHz signal Middle channel



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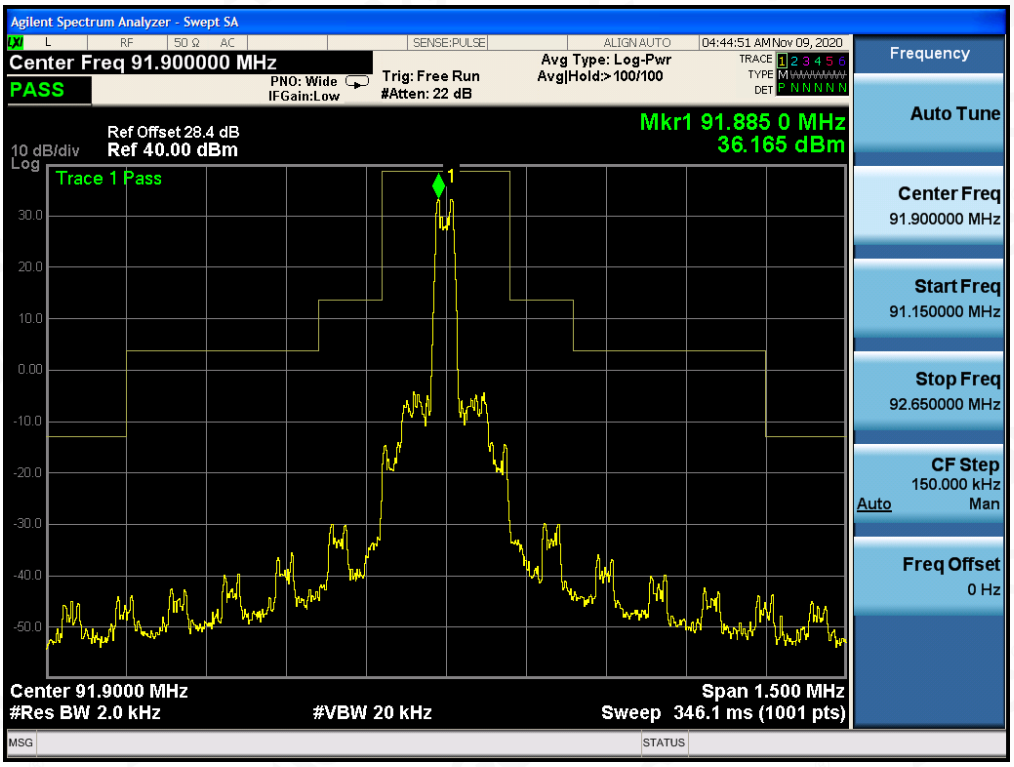
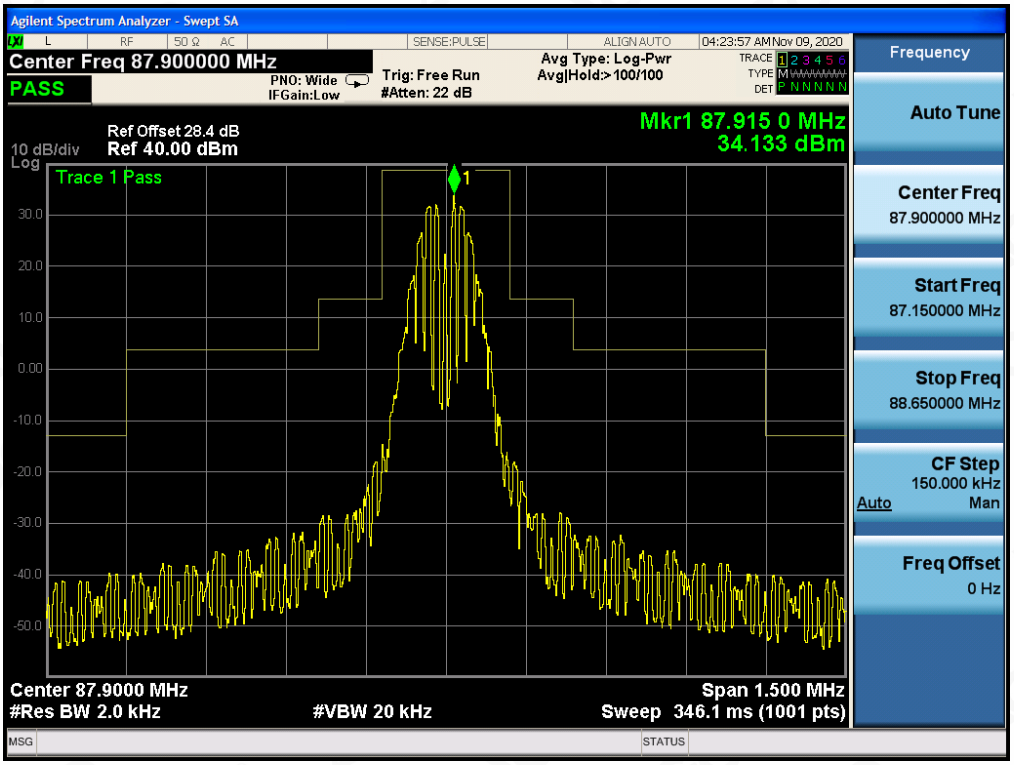
Tel: +86-755 2523 4088 E-mail: agc@agc-cert.com Web: http://cn.agc-cert.com/

Input 1KHz signal High channel



Input 15KHz signal Low channel



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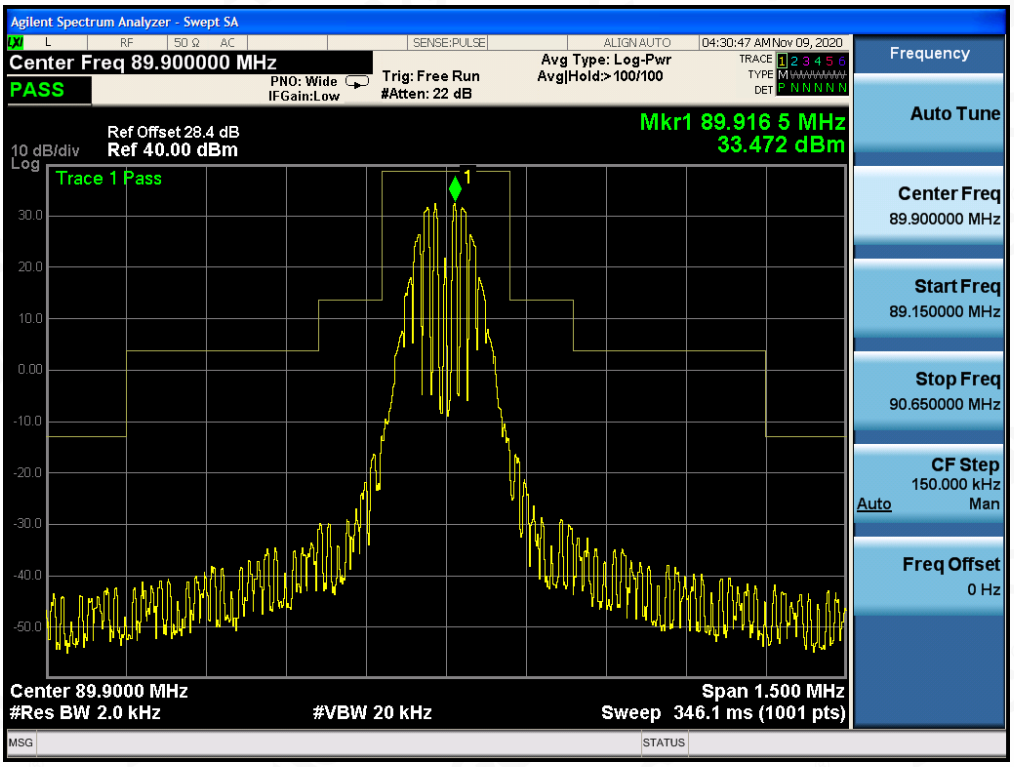
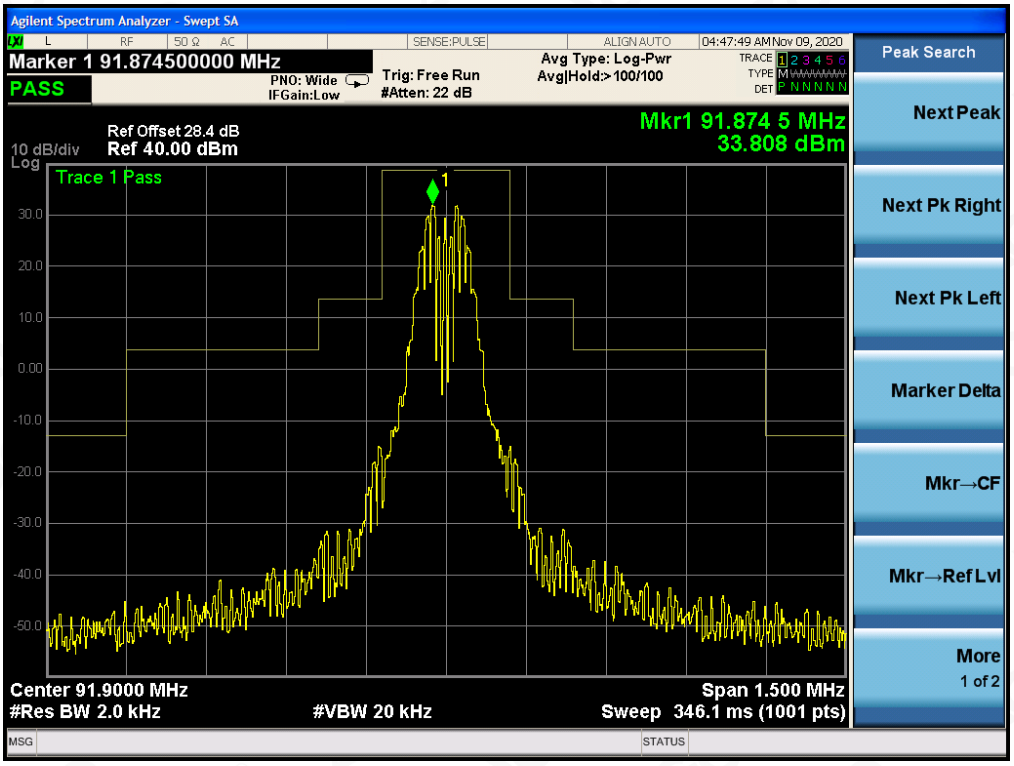
Input 15KHz signal Middle channel



Input 15KHz signal High channel



Note: The carrier power is the ref level, and The factor had been edited in the “Input Correction” of the Spectrum Analyzer.

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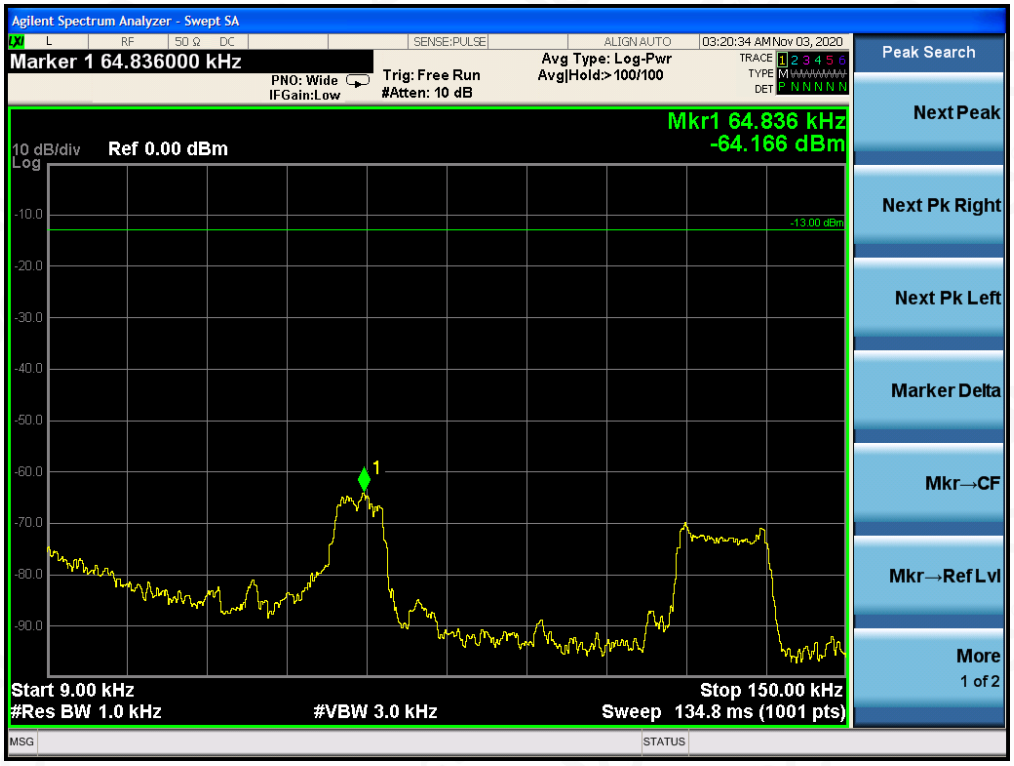
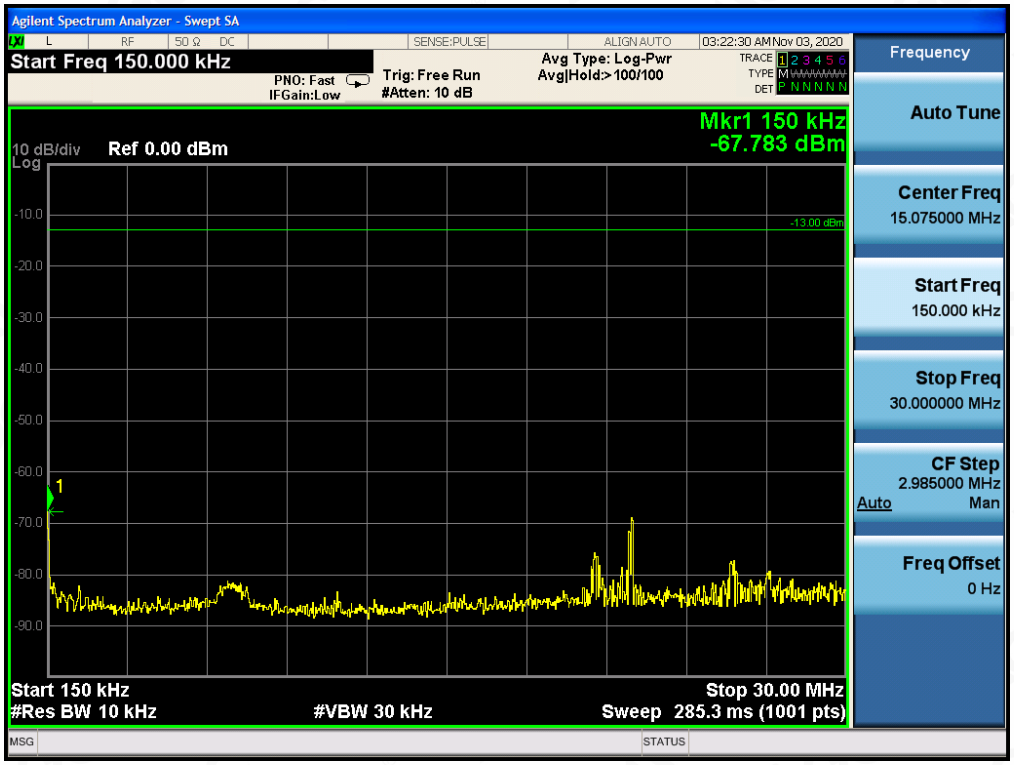
Spurs Low channel

9KHz-150KHz



150KHz-30MHz



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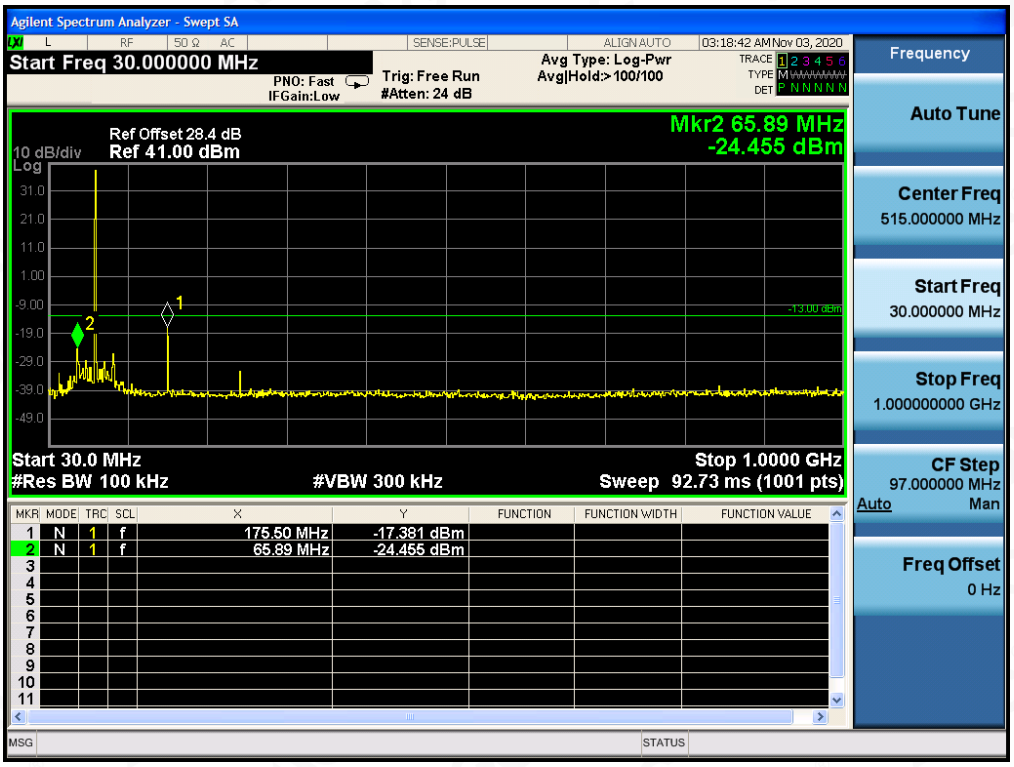
30MHz-1GHz



Spurs Middle channel

9KHz-150KHz

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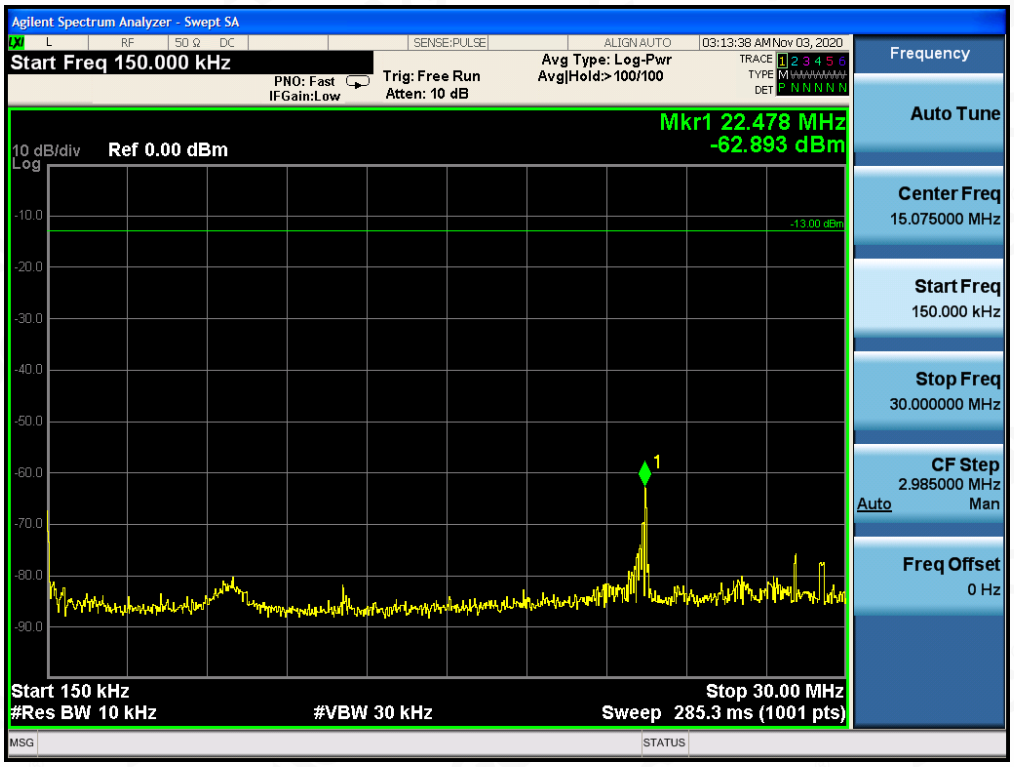
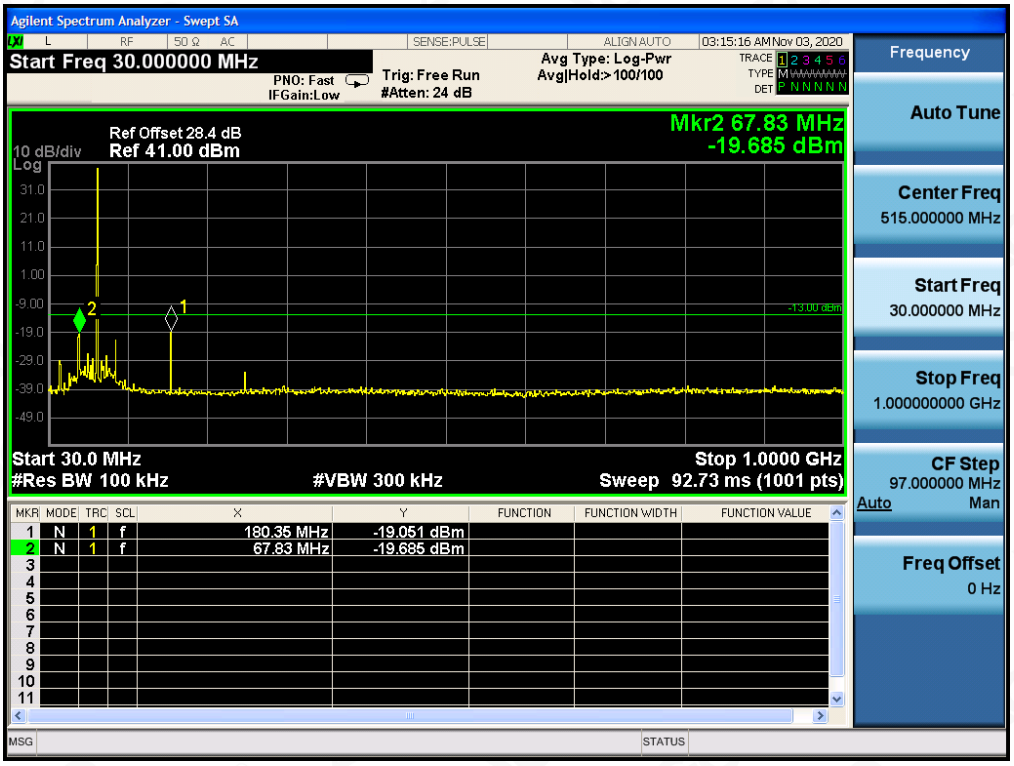
150KHz-30MHz



30MHz-1GHz



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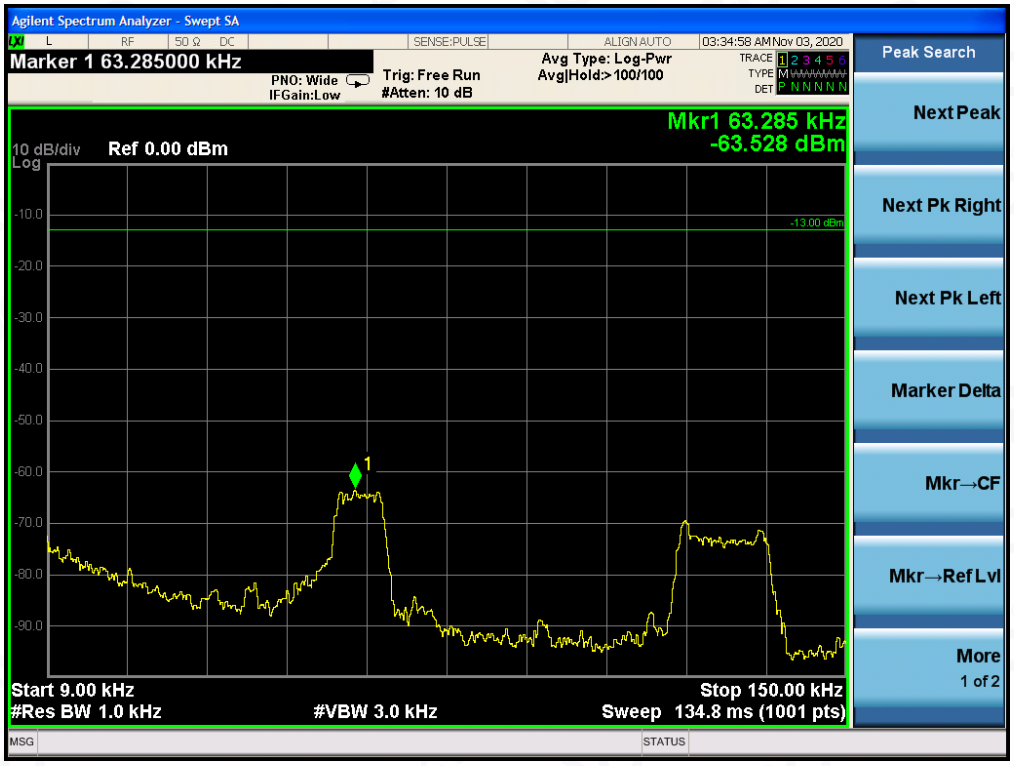
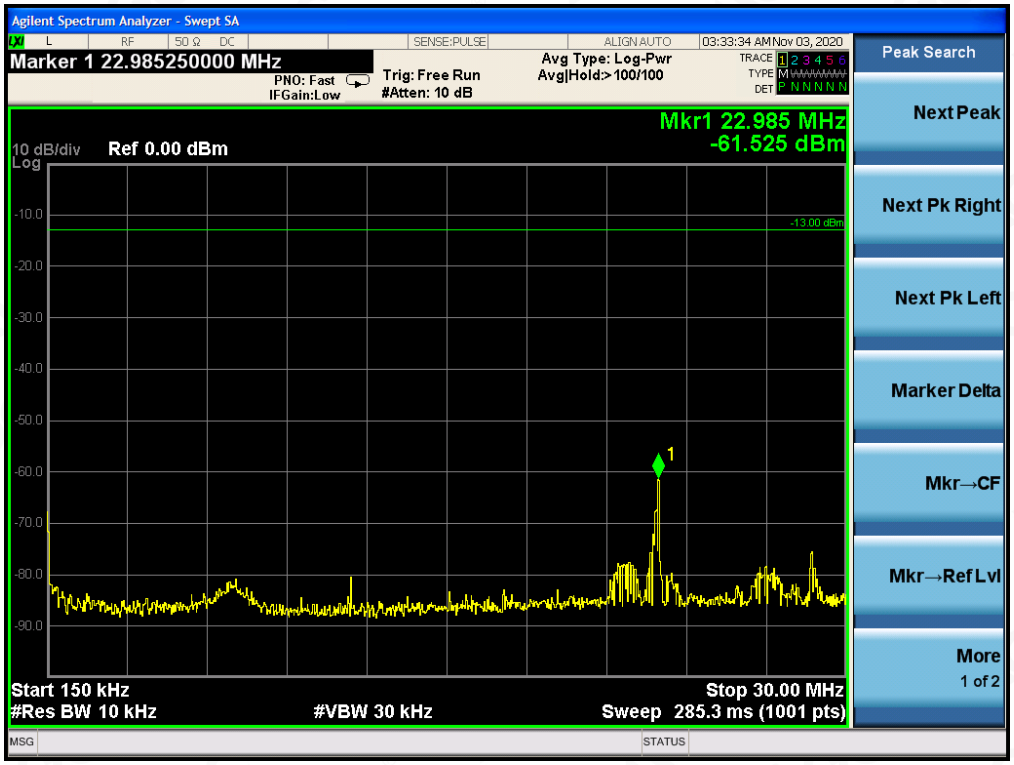
Spurs High channel

9KHz-150KHz



150KHz-30MHz



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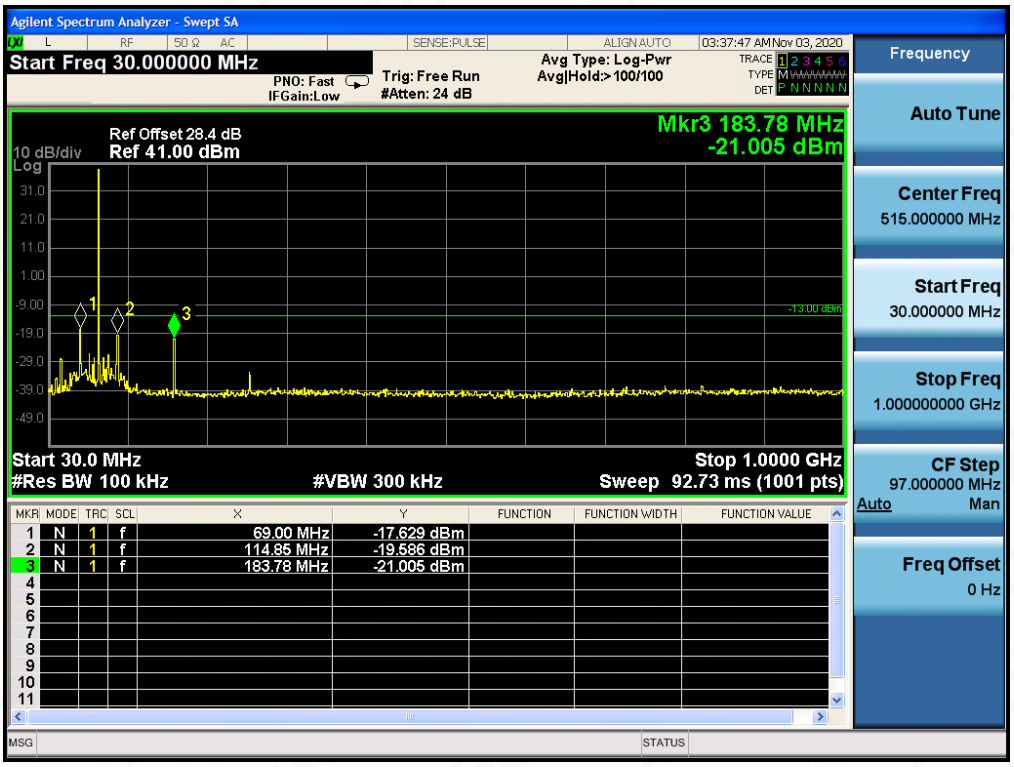
30MHz-1GHz



Note: The peak emissions without marker on the above plots are fundamental wave and need not to compare with the limit.

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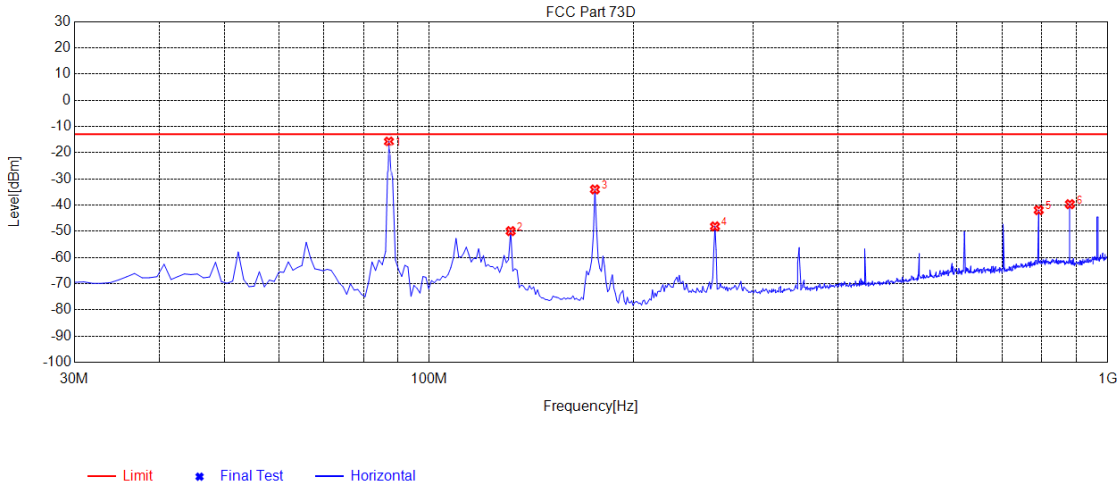
RADIATED EMISSION BELOW 30MHZ

The amplitude of spurious emissions from 9kHz to 30MHz which are attenuated more than 20 dB below the permissible value need not be reported.

RADIATED EMISSION 30MHz- 1GHZ

EUT:	FM transmitter	Model Name.:	CZE-7C
Temperature:	25 ℃	Relative Humidtity:	60%
Pressure:	1010 hPa	Test Voltage:	Normal
Test Mode:	Mode 1	Polarization:	Horizontal



NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]	Polarity
1	87.9000	-30.03	-16.62	36.99	53.61	22.41	0	Horizontal
2	131.8500	-74.76	-49.95	-13.00	36.95	24.81	59	Horizontal
3	175.5000	-60.54	-34.05	-13.00	21.05	26.49	179	Horizontal
4	263.7700	-77.78	-48.16	-13.00	35.16	29.62	234	Horizontal
5	791.4500	-82.09	-41.95	-13.00	28.95	40.14	152	Horizontal
6	879.7200	-79.72	-39.68	-13.00	26.68	40.04	206	Horizontal

RESULT: PASS

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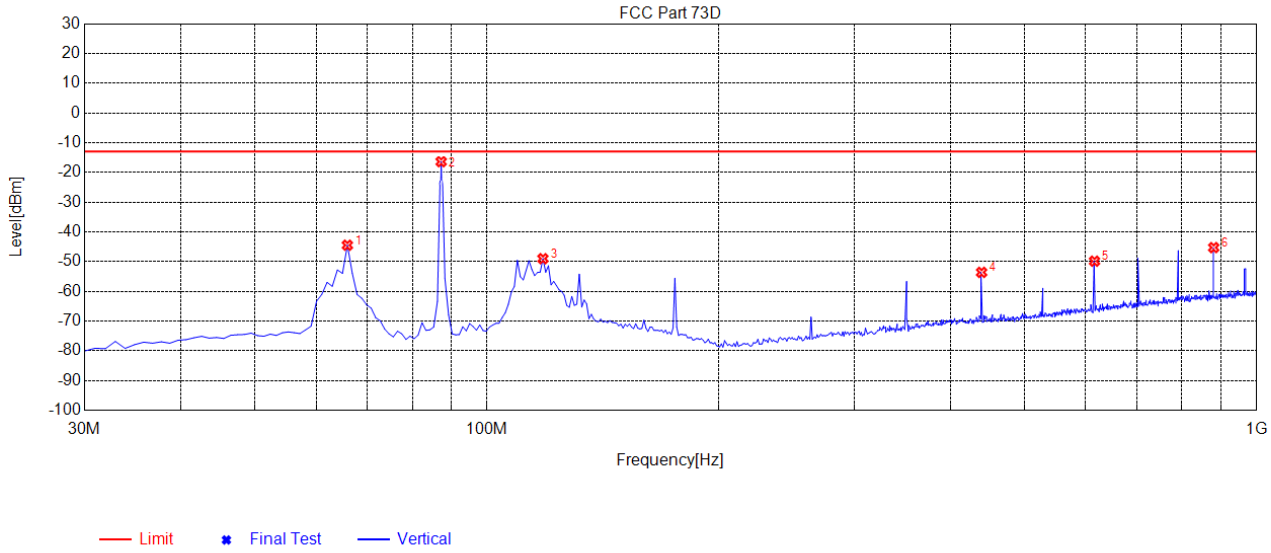
EUT:	FM transmitter	Model Name.:	CZE-7C
Temperature:	25 ℃	Relative Humidtity:	60%
Pressure:	1010 hPa	Test Voltage:	Normal
Test Mode:	Mode 1	Polarization:	Vertical



NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]	Polarity
1	65.8900	-70.81	-44.49	-13.00	31.49	26.32	284	Vertical
2	87.9000	-30.09	-16.20	36.99	53.19	25.29	284	Vertical
3	118.270	-78.73	-49.02	-13.00	36.02	29.71	303	Vertical
4	439.340	-86.16	-53.62	-13.00	40.62	32.54	284	Vertical
5	615.880	-85.85	-49.86	-13.00	36.86	35.99	340	Vertical
6	879.720	-85.41	-45.29	-13.00	32.29	40.12	118	Vertical

RESULT: PASS

Note: 1.Factor=Antenna Factor + Cable loss, Margin=Limit -Level.

The "Factor" value can be calculated automatically by software of measurement system.

2. All test modes had been pre-tested. Only the worst case mode 1 was recorded in the report.

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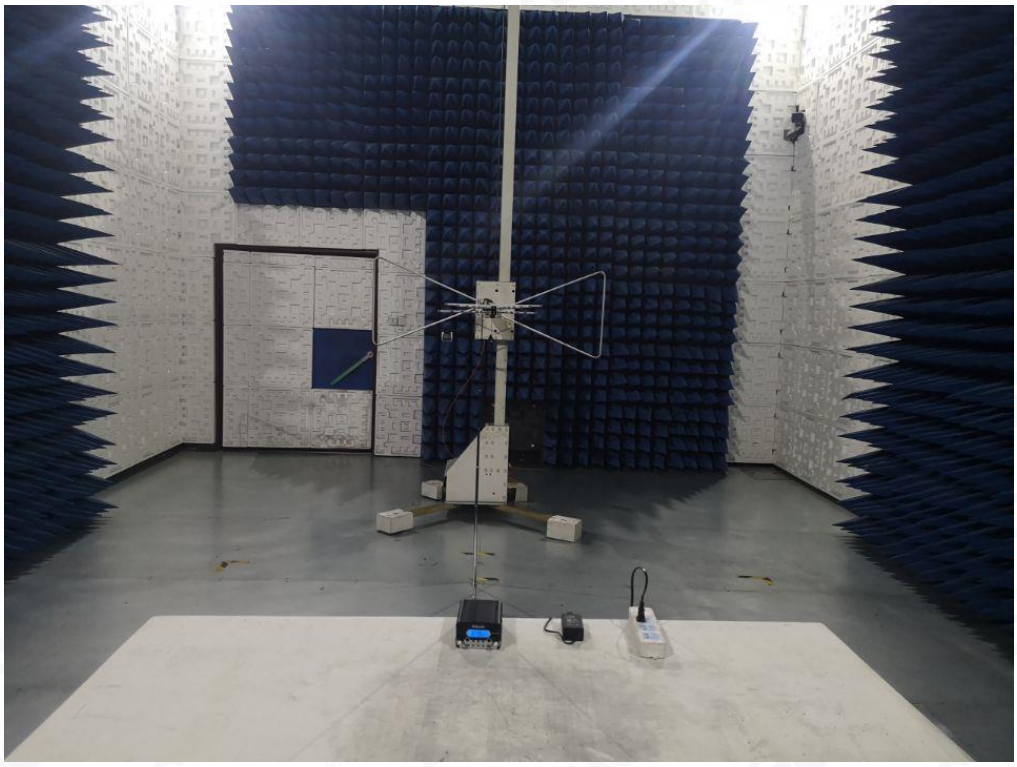
APPENDIX A: PHOTOGRAPHS OF TEST SETUP

RADIATED EMISSION TEST SETUP –BELOW 1GHz



RADIATED EMISSION TEST SETUP –BELOW 1GHz

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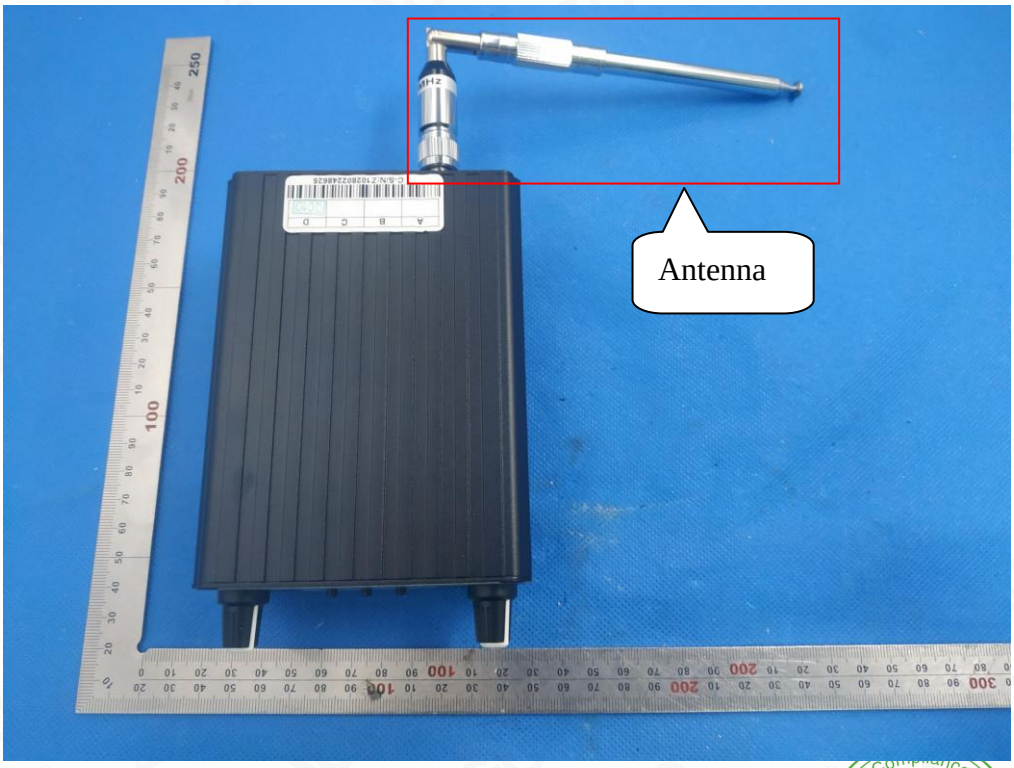
APPENDIX B: PHOTOGRAPHS OF EUT

Test model: CZE-7C

ALL VIEW OF EUT

TOP VIEW OF EUT



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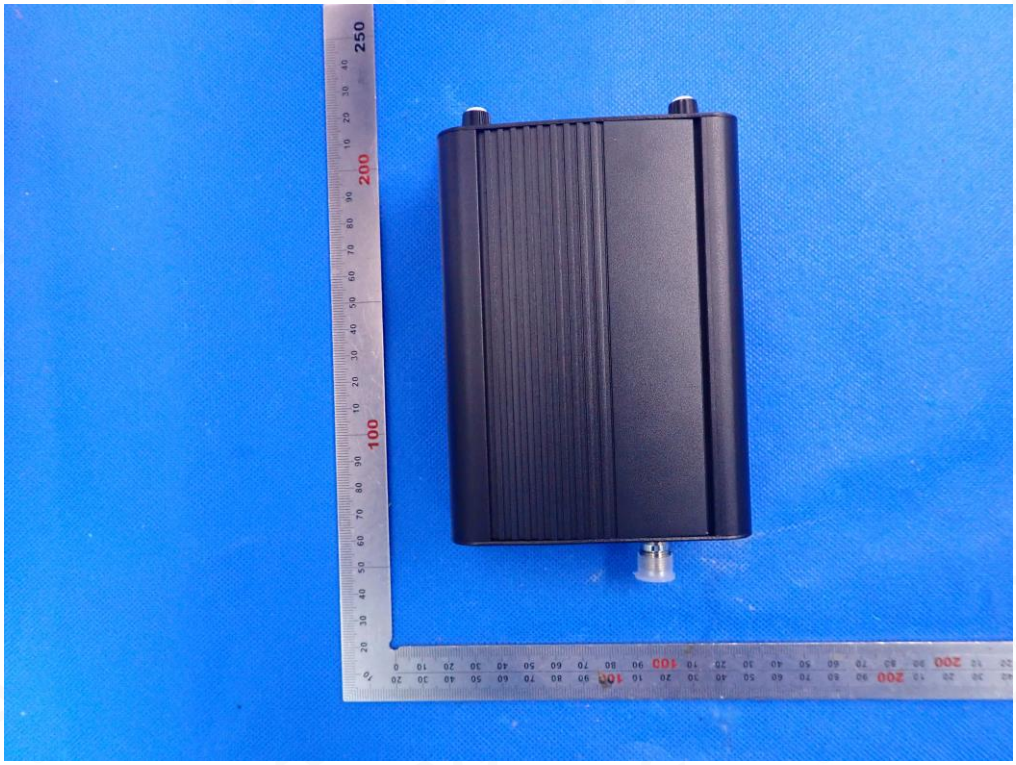
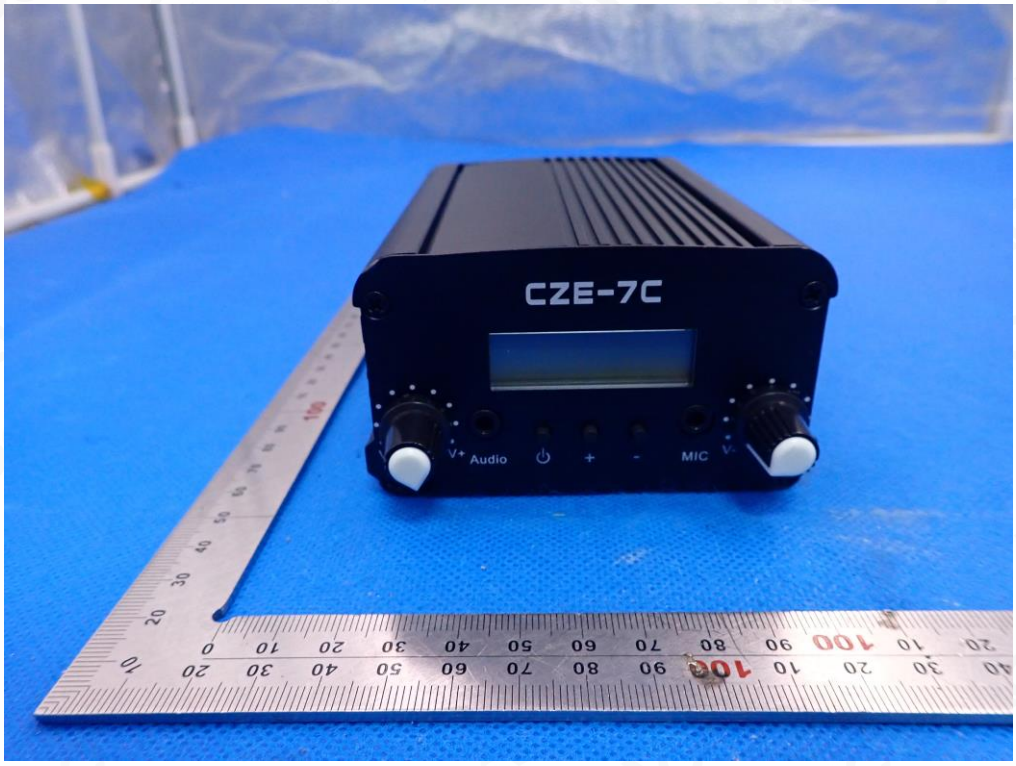
BOTTOM VIEW OF EUT



FRONT VIEW OF EUT



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