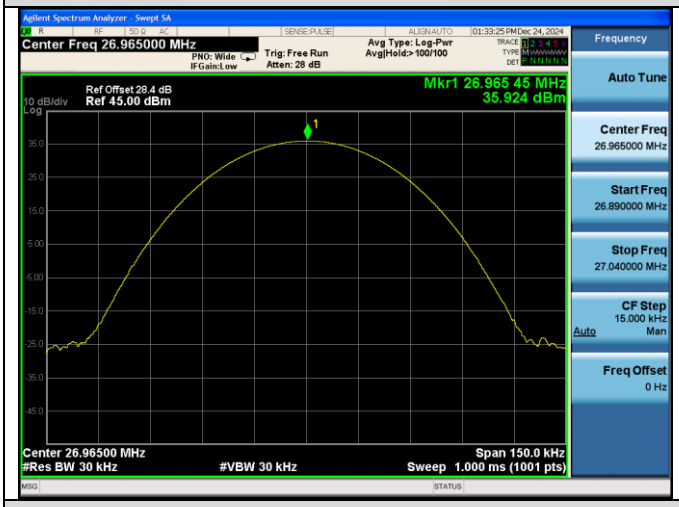
- For DC 12V System:

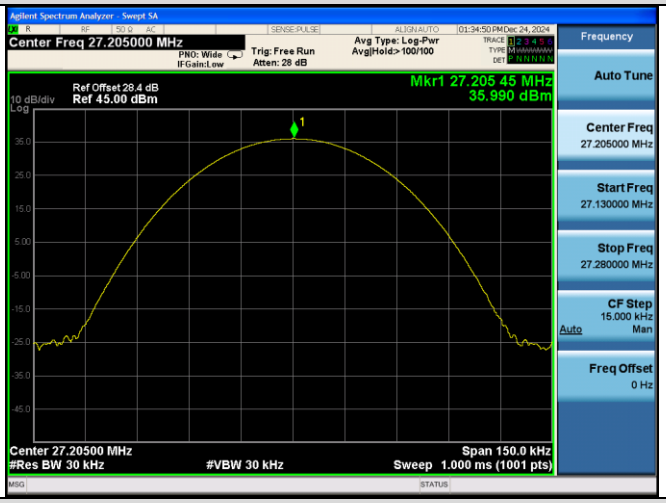
Conducted Power Measurement Results			
Test Mode	Channel Separation	Test Channel	Measurement Result (dBm)
CBRS TX_AM	10 kHz	26.965 MHz	35.924
		27.205 MHz	35.990
		27.405 MHz	35.970

Test plot as follows:

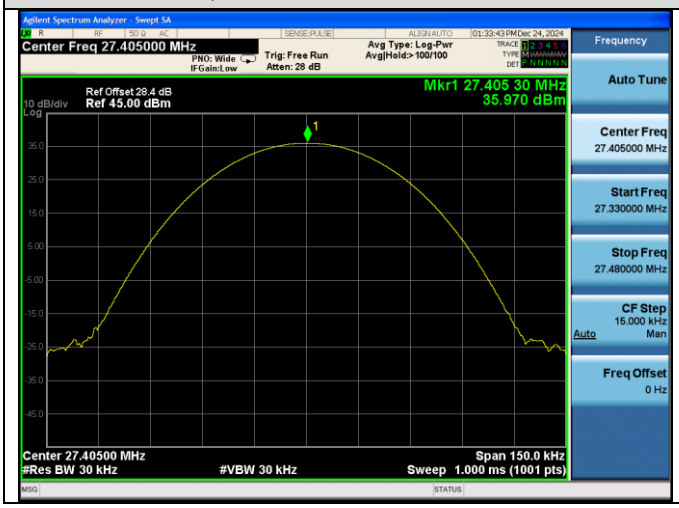
10kHz, AM Modulation:26.965MHz



10kHz, AM Modulation:27.205MHz



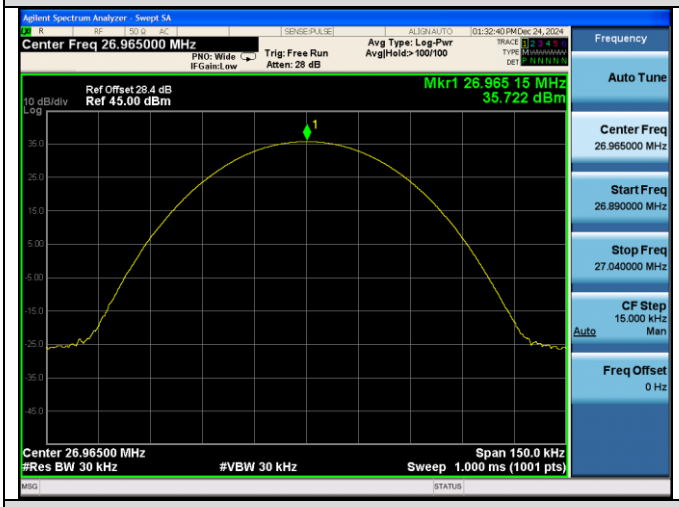
10kHz, AM Modulation:27.405MHz



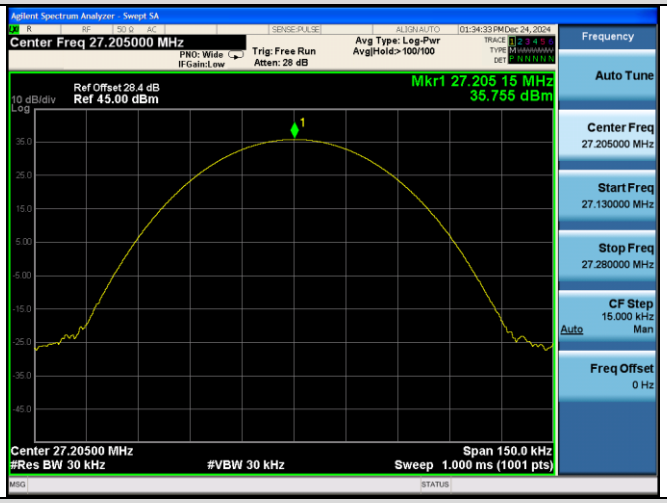
Conducted Power Measurement Results			
Test Mode	Channel Separation	Test Channel	Measurement Result (dBm)
CBRS TX_FM	10 kHz	26.965 MHz	35.722
		27.205 MHz	**35.755**
		27.405 MHz	35.744

Test plot as follows:

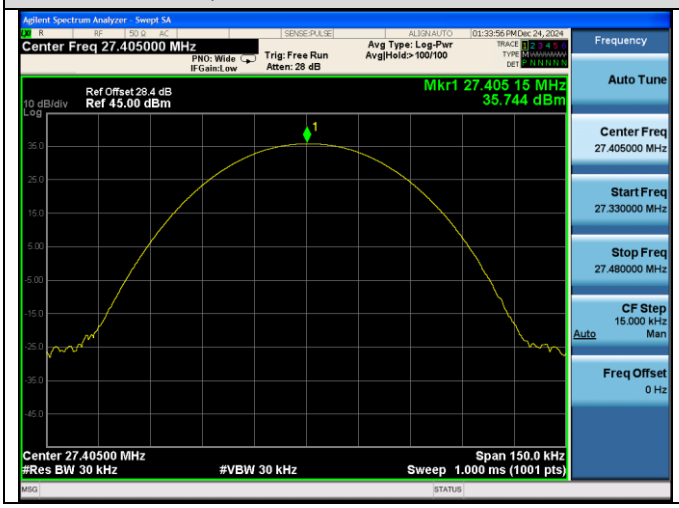
10kHz, FM Modulation:26.965MHz



10kHz,FM Modulation:27.205MHz



10kHz, FM Modulation:27.405MHz



10. Spurious Emission on Antenna Port

10.1 Provisions Applicable

Please refer to FCC 47 CFR 2.1051, 2.1057 & 95.979 for specification details.
Emissions shall be attenuated below the mean output power of the transmitter as follows:

FCC Rules	Attenuation Limit (dBc)
§ 95.979	At least 53 + 10 log (P) dB
§ 95.979	60 dB in any frequency band centered on a harmonic (i.e., an integer multiple of two or more times) of the carrier frequency.

10.2 Measurement Procedure

1. The RF output of the EUT is connected to the spectrum analyzer with appropriate attenuation.
2. The audio input is set to an unmodulated carrier
3. The resolution bandwidth of the spectrum analyzer is set to 100 kHz. A sufficient sweep is performed to
4. Display any out-of-band emissions up to the 10th harmonic. Minimum and maximum frequency range.

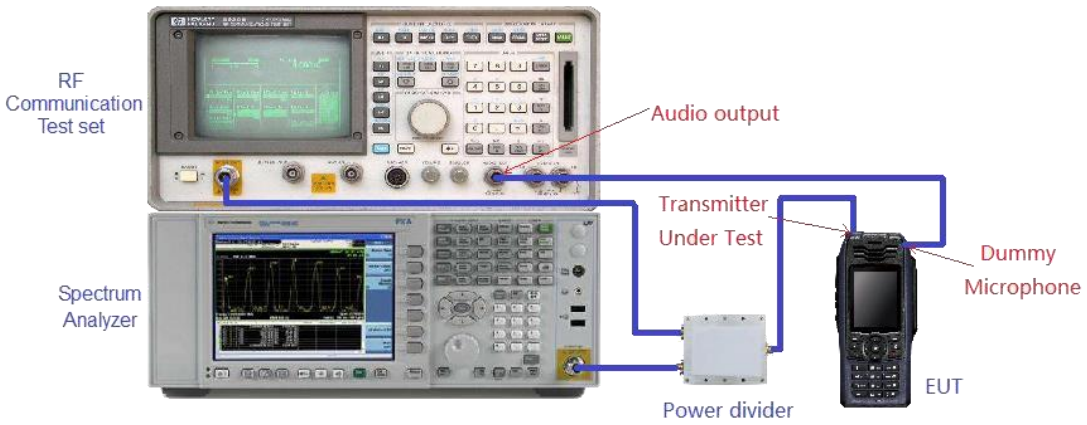
- Out-of-band unwanted spurious emission requirements:

5. Set RBW 100 kHz, VBW 300 kHz in the frequency band from 30MHz to 1GHz, and set
6. From 1GHz to the 10th harmonic, RBW=1MHz.VBW=3MHz.

- Harmonic emission spurious requirements:

7. According to the maximum transmit power of the measurement center frequency, attenuate 60dB downward
8. The reference level of the maximum transmit power is the conducted maximum transmit power, set the limit
9. In the frequency band from 30MHz to 1GHz, set RBW 100 kHz, VBW 300 kHz, and set
10. From 1GHz to the 10th harmonic, RBW=1MHz.VBW=3MHz.
11. Record whether the corresponding harmonic meets the limit requirements
12. Finally, record the spectrum or table in the report.

10.3 Measurement Setup



10.4 Measurement Result

- The Unwanted spurious emissions limits are as follows:

Attenuation Requirement Results	Reference limit
At least 53+10*log (P) =53+10log*(4W) =59.02 (dB)	Limit=P(dBm)- Preliminary calculation=-23dBm

- The Harmonic emissions spurious limits are as follows:

The maximum power of the measured fundamental frequency drops by at least 60Db

- For DC 12V System:

Test Mode	Fundamental Frequency (MHz)	Maximum Power (dBm)	Reference limit (dBm)
AM	26.965	35.930	-24.07
	27.205	36.008	-23.99
	27.405	35.967	-24.03
FM	26.965	35.664	-24.34
	27.205	35.694	-24.31
	27.405	35.691	-24.31

- The antenna end conducted spurious harmonic data are as follows:

➢ Worst case result with AM modulation mode:

Fundamental (MHz)	Harmonic Frequency (MHz)	Measurement Results (dBm)	Reference limit (dBm)	Margin (dB)
26.965	53.94	-37.095	-24.07	-13.03
27.205	54.43	-36.368	-23.99	-12.38
27.405	54.82	-37.310	-24.03	-13.28

- For DC 24V System:

Test Mode	Fundamental Frequency (MHz)	Maximum Power (dBm)	Reference limit (dBm)
AM	26.965	35.924	-24.08
	27.205	35.990	-24.01
	27.405	35.970	-24.03
FM	26.965	35.722	-24.28
	27.205	35.755	-24.25
	27.405	35.744	-24.26

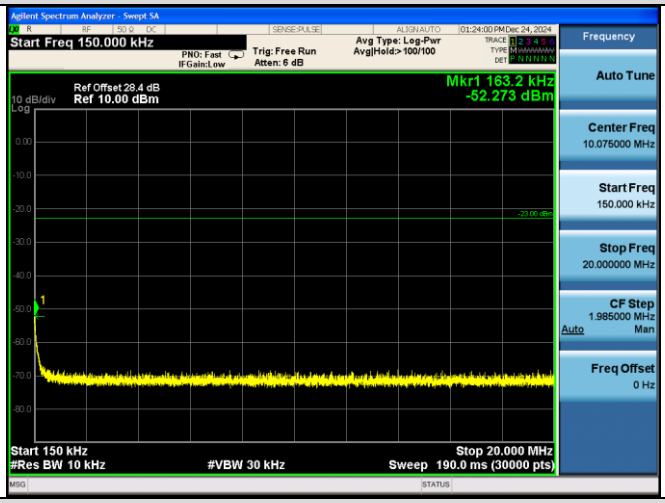
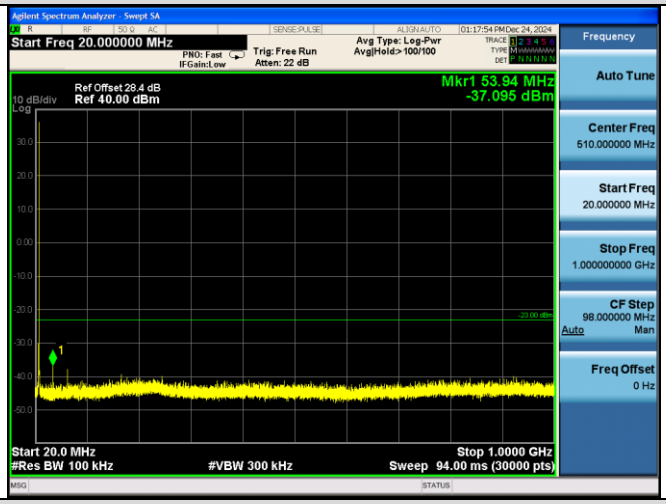
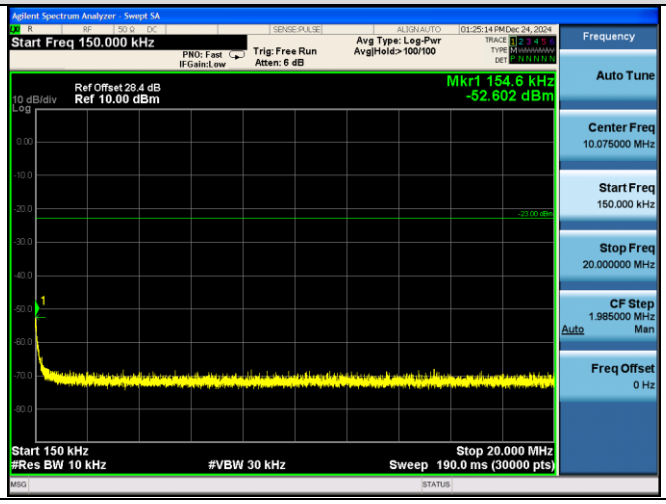
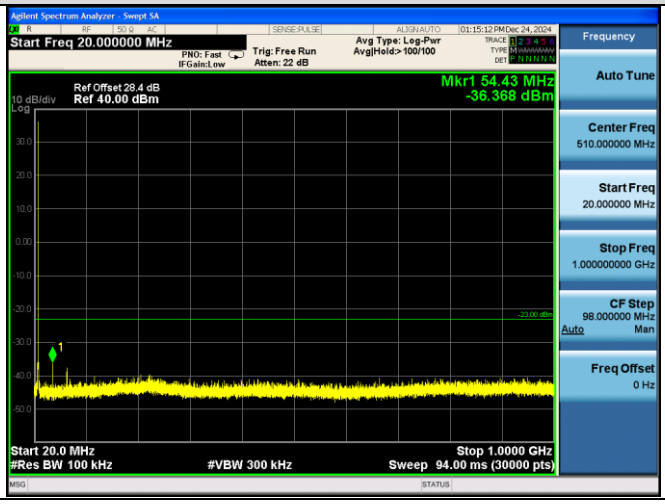
- The antenna end conducted spurious harmonic data are as follows:

➢ Worst case result with AM modulation mode:

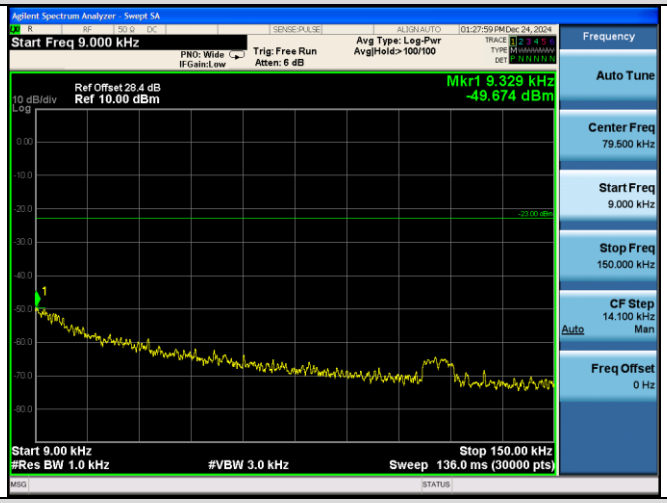
Fundamental (MHz)	Harmonic Frequency (MHz)	Measurement Results (dBm)	Reference limit (dBm)	Margin (dB)
26.965	53.97	-36.704	-24.08	-12.62
27.205	81.61	-35.535	-24.01	-11.53
27.405	54.82	-36.541	-24.03	-12.51

- The spectrum of the unwanted spurious data conducted at the antenna end is as follows:

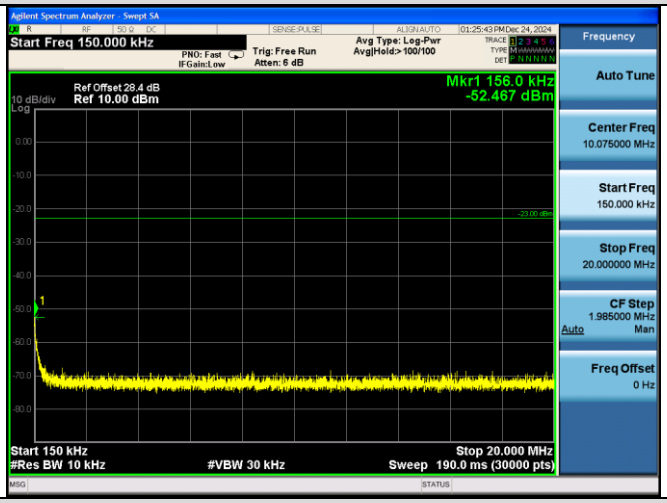
- For DC 12V System:

9kHz-150kHz @26.965MHz_AM, 10th Harmonic	150kHz-20MHz @26.965MHz_AM ,10th Harmonic
	
20MHz-1GHz @26.965MHz_AM,10th Harmonic	**9kHz-150kHz @27.205MHz_AM, 10th Harmonic**
	
150kHz-20MHz @27.205MHz_AM ,10th Harmonic	**20MHz-1GHz @27.205MHz_AM ,10th Harmonic**
	

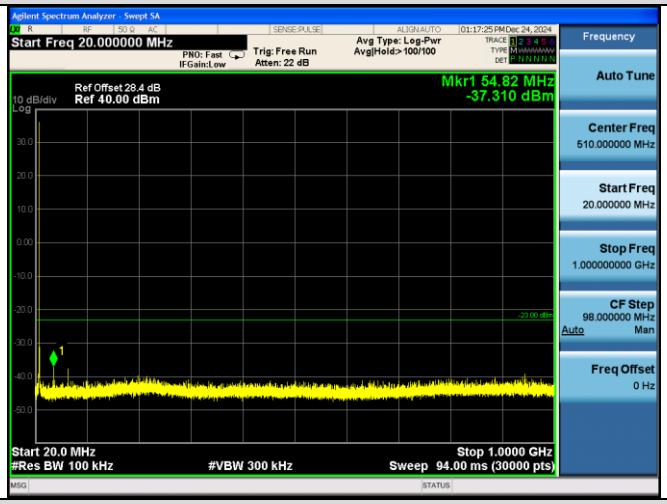
9kHz-150kHz @27.405MHz_AM, 10th Harmonic



150kHz-20MHz @27.405MHz_AM ,10th Harmonic

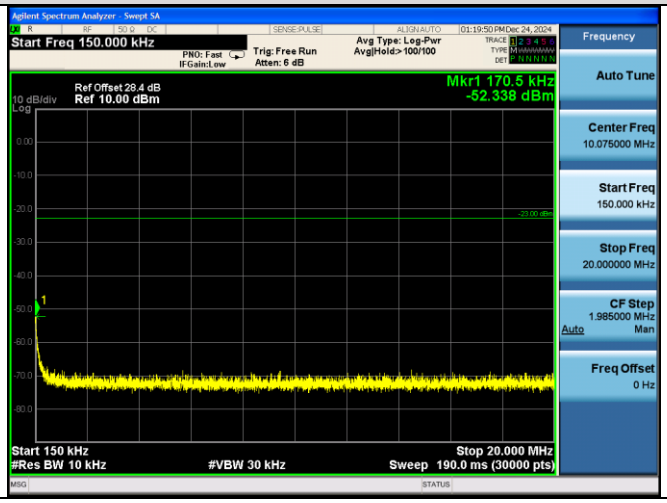


20MHz-1GHz @27.405MHz_AM,10th Harmonic

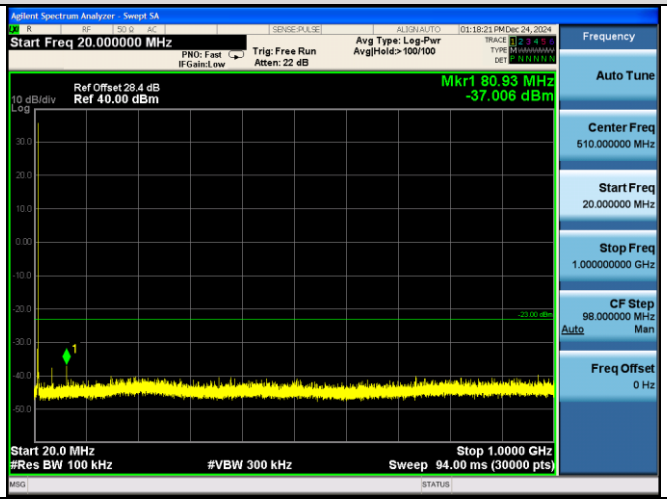


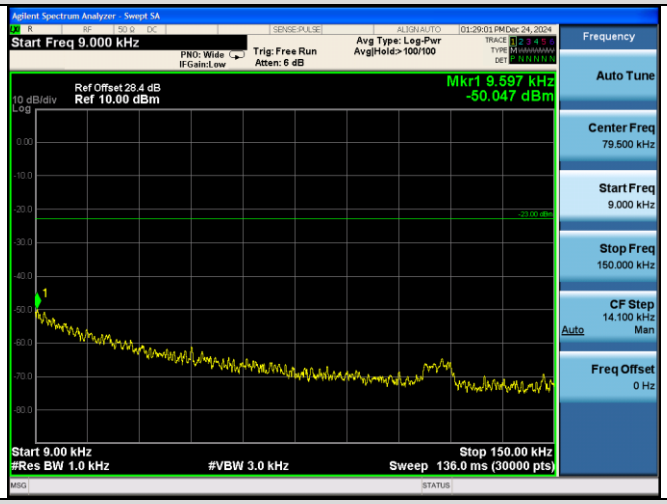
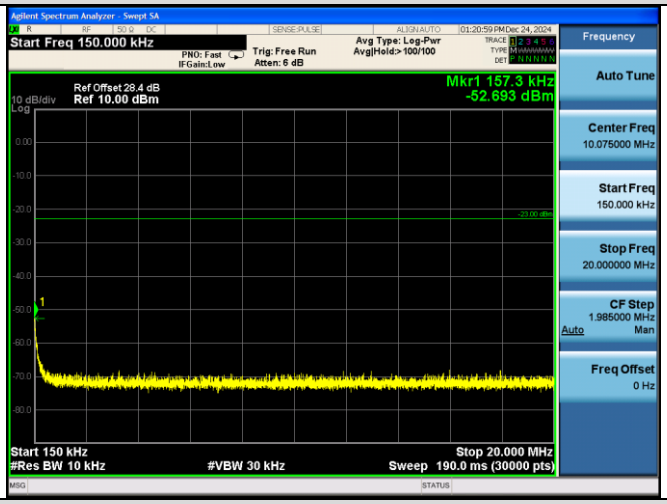
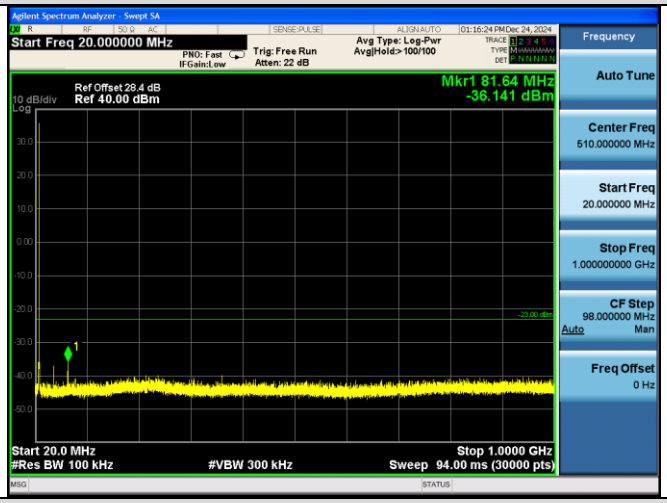
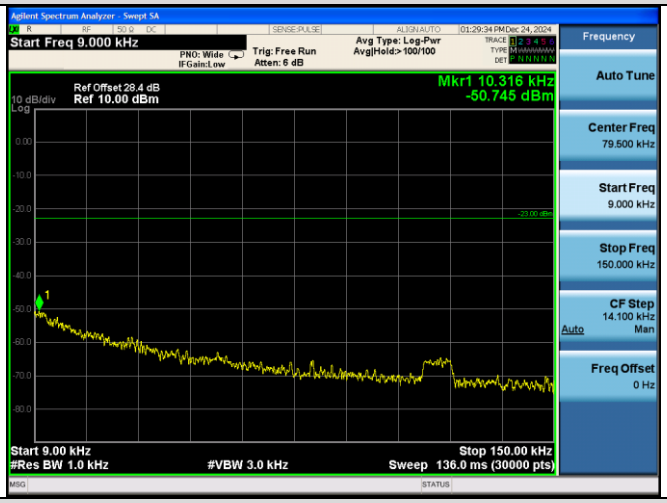
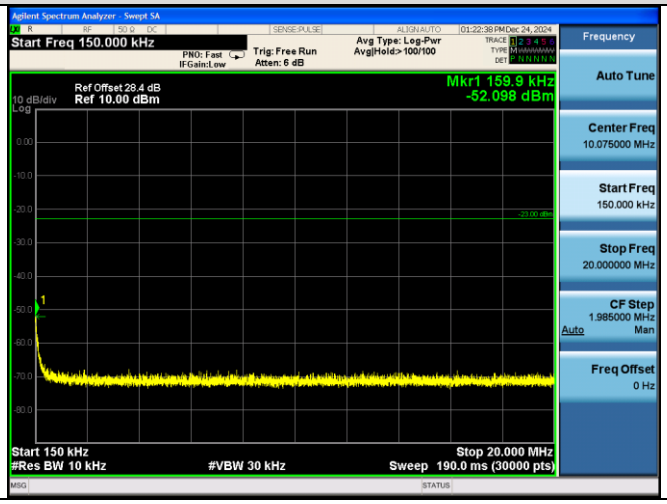
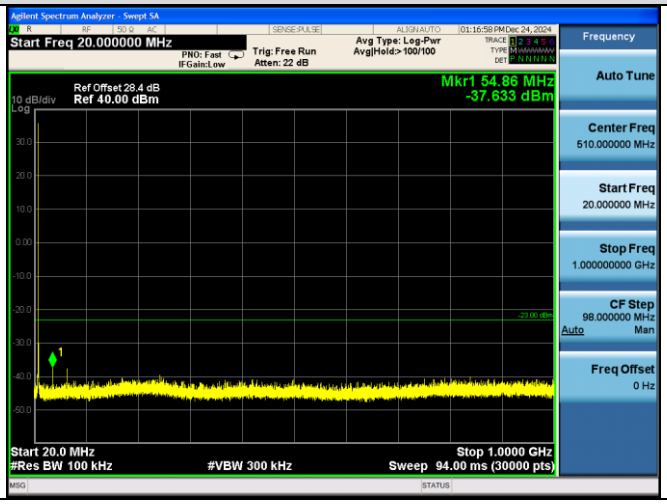
9kHz-150kHz @26.965MHz_FM, 10th Harmonic

150kHz-20MHz @26.965MHz_FM ,10th Harmonic

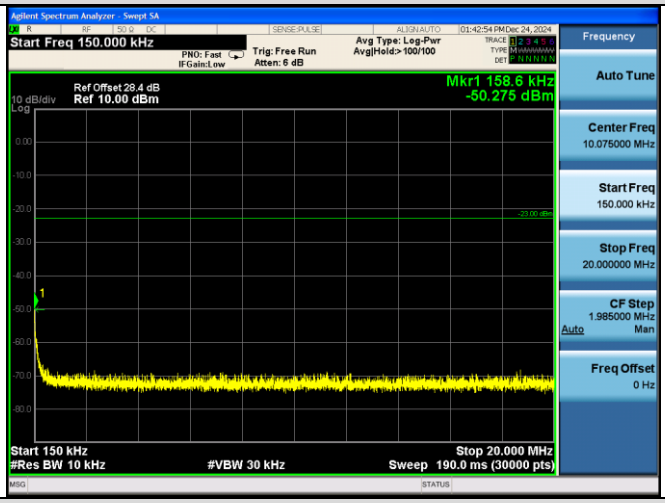
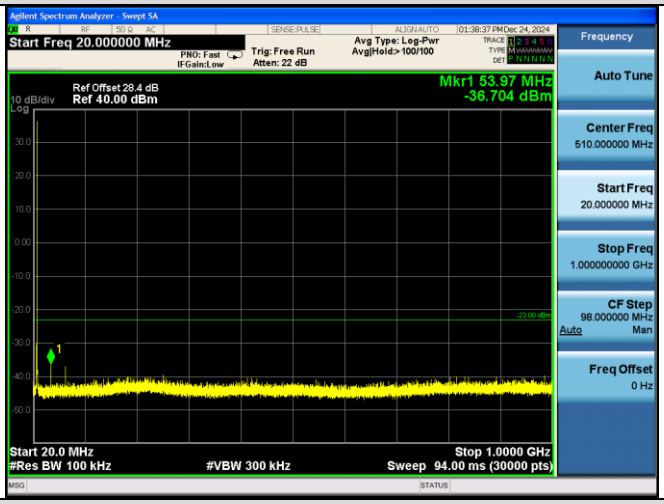
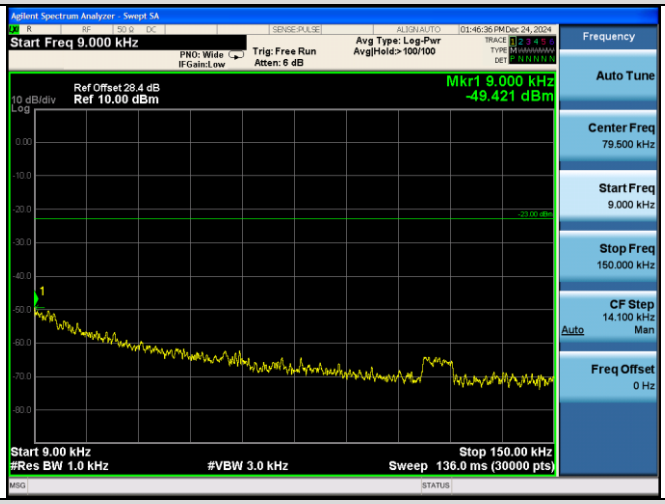
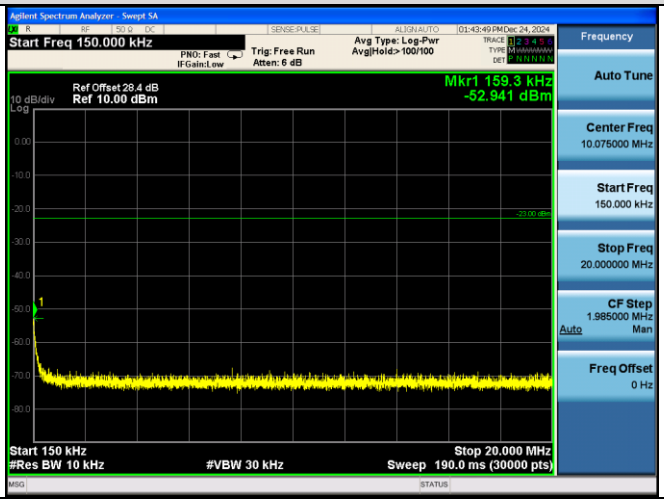
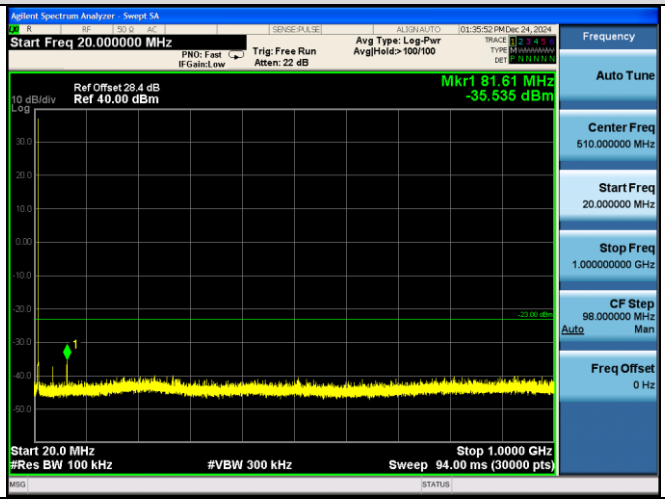


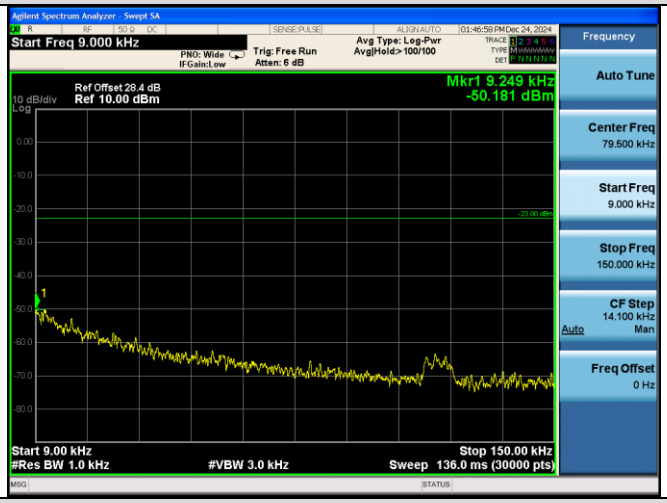
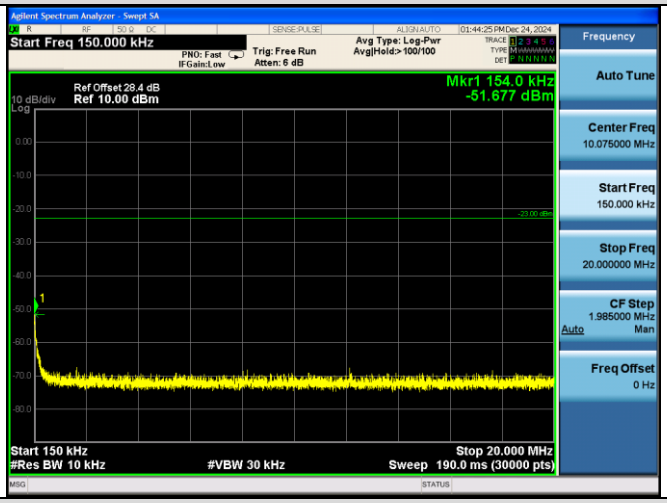
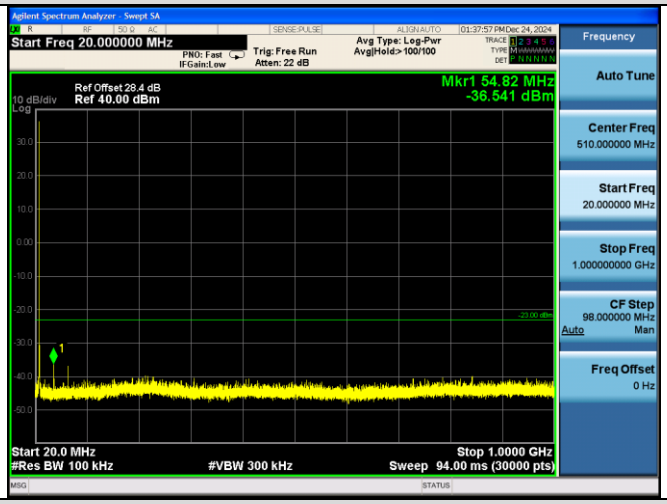
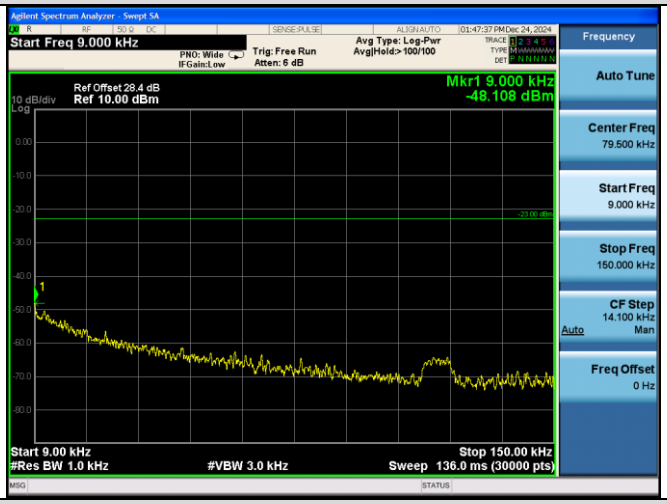
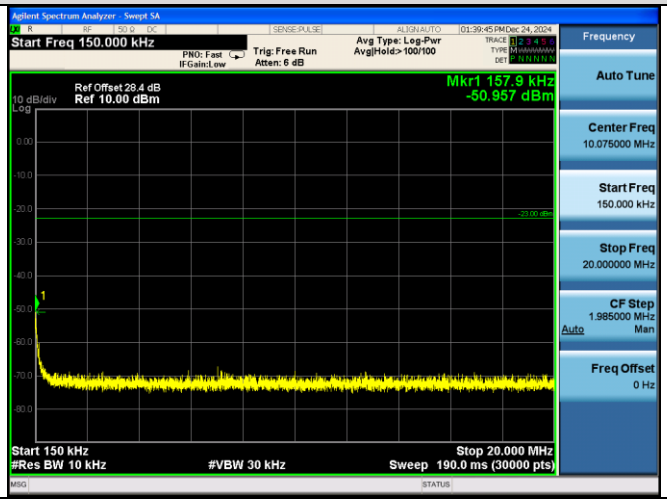
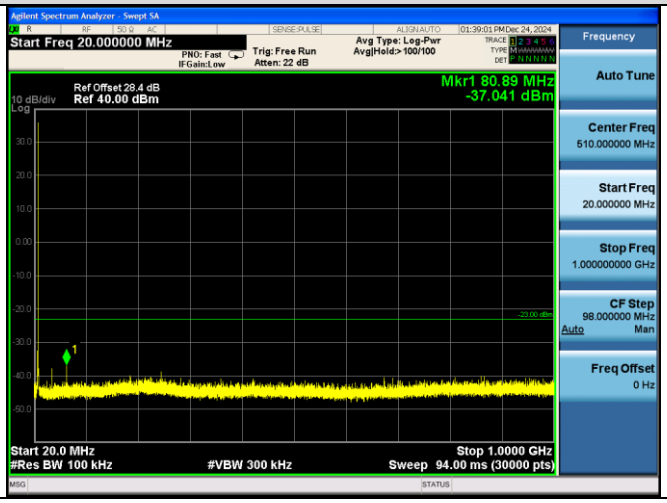
20MHz-1GHz @26.965MHz_FM ,10th Harmonic

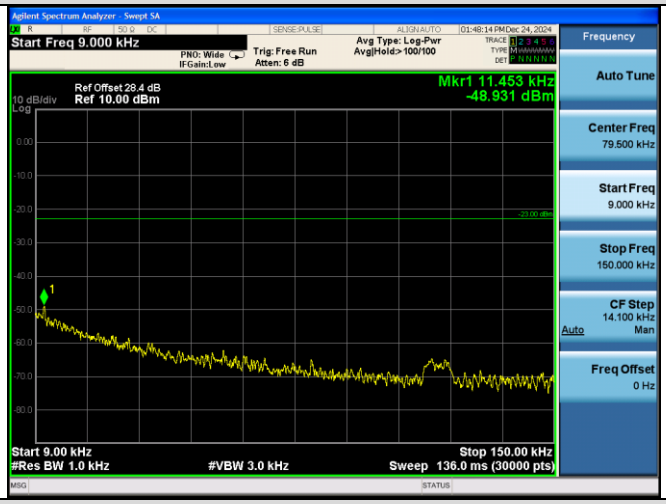
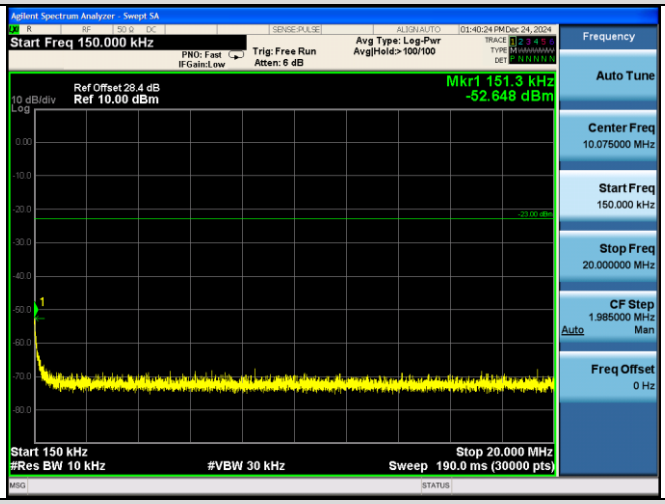
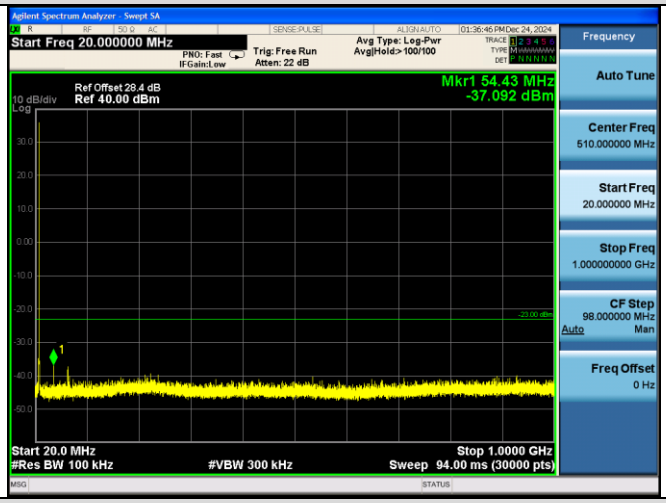
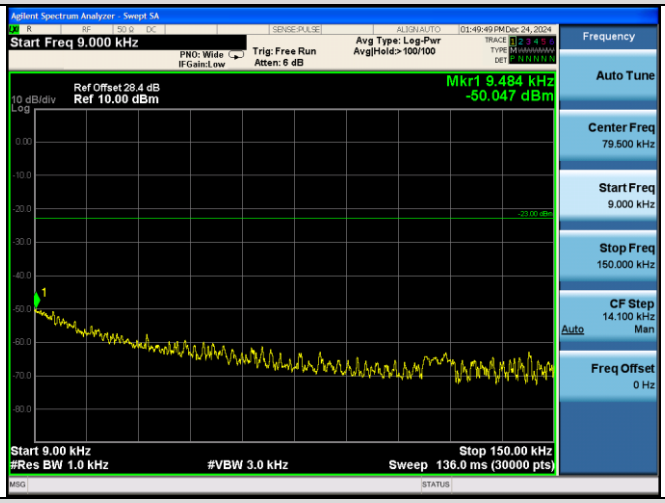
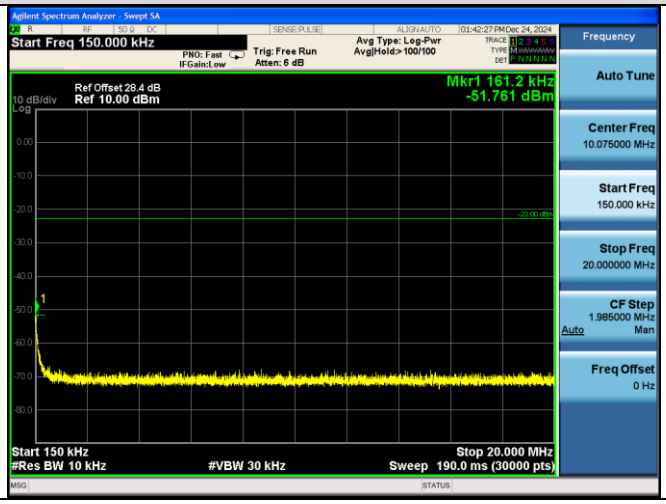
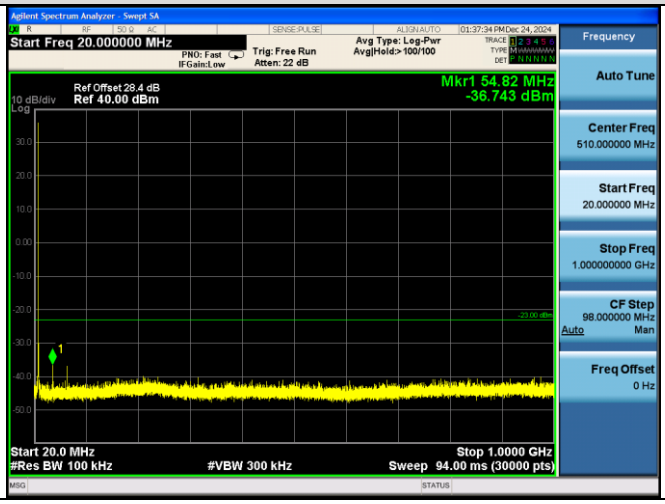


9kHz-150kHz @27.205MHz_FM, 10th Harmonic	150kHz-20MHz @27.205MHz_FM ,10th Harmonic
	
20MHz-1GHz @27.205MHz_FM,10th Harmonic	9kHz-150kHz @27.405MHz_FM, 10th Harmonic
	
150kHz-20MHz @27.405MHz_FM ,10th Harmonic	20MHz-1GHz @27.405MHz_FM ,10th Harmonic
	

- For DC 24V System:

9kHz-150kHz @26.965MHz_AM, 10th Harmonic	150kHz-20MHz @26.965MHz_AM ,10th Harmonic
	
20MHz-1GHz @26.965MHz_AM,10th Harmonic	**9kHz-150kHz @27.205MHz_AM, 10th Harmonic**
	
150kHz-20MHz @27.205MHz_AM ,10th Harmonic	**20MHz-1GHz @27.205MHz_AM ,10th Harmonic**
	

9kHz-150kHz @27.405MHz_AM, 10th Harmonic	150kHz-20MHz @27.405MHz_AM ,10th Harmonic
	
20MHz-1GHz @27.405MHz_AM,10th Harmonic	9kHz-150kHz @26.965MHz_FM, 10th Harmonic
	
150kHz-20MHz @26.965MHz_FM ,10th Harmonic	20MHz-1GHz @26.965MHz_FM ,10th Harmonic
	

9kHz-150kHz @27.205MHz_FM, 10th Harmonic	150kHz-20MHz @27.205MHz_FM ,10th Harmonic
	
20MHz-1GHz @27.205MHz_FM,10th Harmonic	9kHz-150kHz @27.405MHz_FM, 10th Harmonic
	
150kHz-20MHz @27.405MHz_FM ,10th Harmonic	20MHz-1GHz @27.405MHz_FM ,10th Harmonic
	

11. Modulation Characteristics

11.1 Provisions Applicable

According to FCC§2.1047 and §95.975 the following requirements are required:
Each CBRS transmitter type must be designed such that the modulation characteristics are in compliance with the rules in this section.

a) When emission type A3E is transmitted with voice modulation, the modulation percentage must be at least 85%, but not more than 100%.
b) When emission type A3E is transmitted by a CBRS transmitter having a transmitter output power of more than 2.5 W, the transmitter must contain a circuit that automatically prevents the modulation percentage from exceeding 100%.
c) When emission type F3E is transmitted the peak frequency deviation shall not exceed ±2 kHz.

12.2 Measurement Procedure

A. Modulation Limiting for AM modulation

1. Connect the equipment as illustrated.
2. Adjust to deliver 50% modulation at the audio frequency that produces the maximum modulation level
3. Record the modulation input level (mV) and use this level as 0dB for plotting modulation limiting.
4. Increment the audio signal level to 40dB above the reference level. Record the modulation level (%).
5. Repeat the measurements using a 400Hz and a 2500Hz sinusoidal audio signal, record the modulation level (%), perform for both positive and negative modulation.

B. Audio Frequency Response for AM modulation

1. Connect the equipment as illustrated.
2. Adjust to deliver 50% modulation at the audio frequency that produces the maximum modulation level
3. Record the modulation input level (mV) and use this level as 0dB for plotting modulation limiting.
4. Vary the modulating frequency from 100Hz to 10000Hz and record the input levels necessary to maintain a constant 50% modulation.
5. Graph the audio level in dB relative to the 0dB reference level as a function of the modulating frequency. Record audio frequency where it is impossible to perform the measurement.

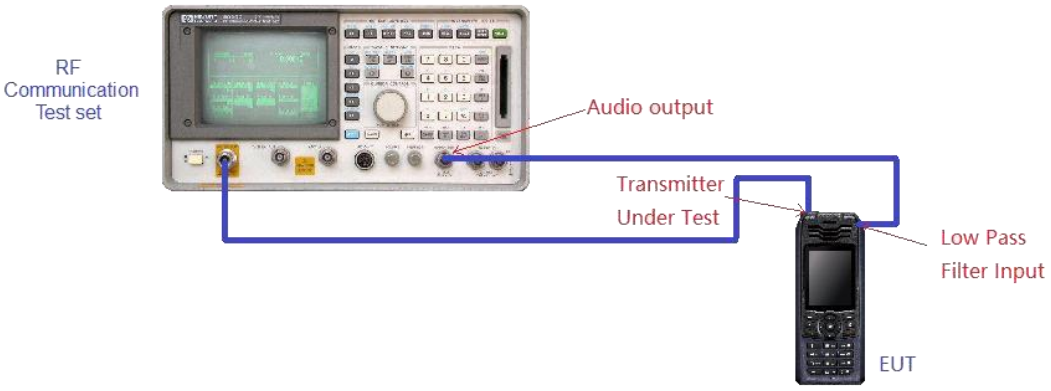
C. Modulation Limiting for FM modulation

1. Test layout and build equipment as shown below.
2. adjust the audio input for 60% of rated system deviation at 1kHz using this level as a reference (0dB).
3. Vary the input level from –20 to +20dB.
4. Record the frequency deviation obtained as a function of the input level.
5. Repeat step 2 with input frequency changing to 300, 1000, 1500 and 3000Hz in sequence.

D. Audio Frequency Response for FM modulation

1. Test layout and build equipment as shown below.
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 = 20log10 (Deviation of test frequency/Deviation of 1 kHz reference).

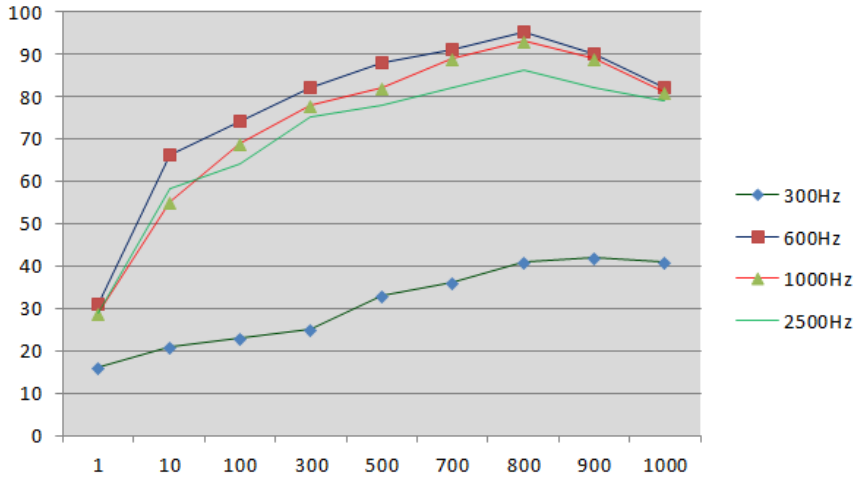
11.3 Measurement Setup



11.4 Measurement Result

A. Modulation Limit:

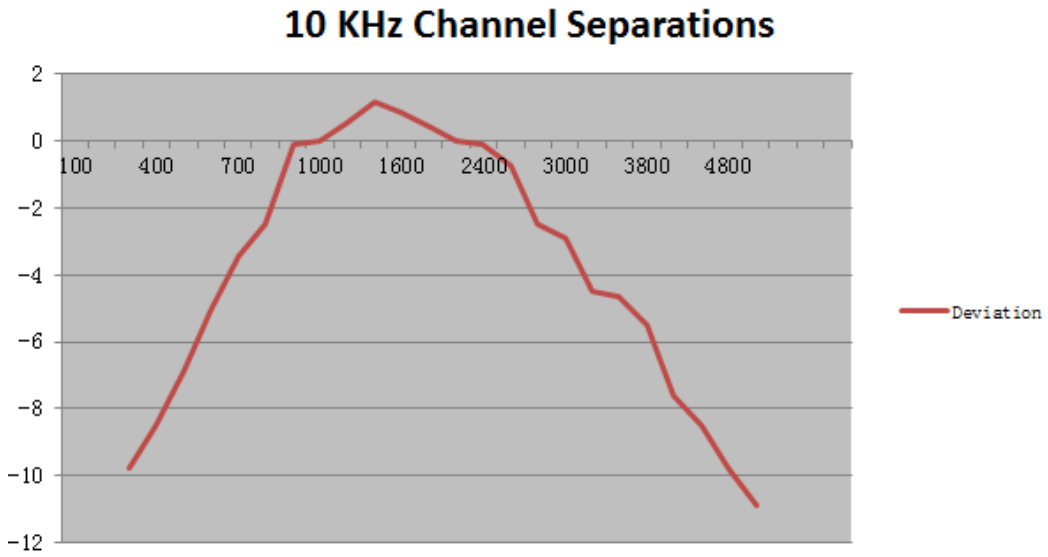
10kHz, AM modulation, Assigned Frequency:27.405MHz				
Modulation Level (mV)	Peak Freq. Deviation At 300 Hz (%)	Peak Freq. Deviation At 600 Hz (%)	Peak Freq. Deviation At 1000 Hz (%)	Peak Freq. Deviation At 2500 Hz (%)
1	16	31	29	29
10	21	66	55	58
100	23	74	69	64
300	25	82	78	75
500	33	88	82	78
700	36	91	89	82
800	41	95	93	86
900	42	90	89	82
1000	41	82	81	79



B. Audio Frequency Response:

10kHz, AM modulation, Assigned Frequency:27.405MHz			
Frequency (Hz)	modulation level (mV)	Deviation (kHz)	Audio Frequency Response(dB)
100		--	--
200		--	--
300	19.22	0.25	-9.77
400	13.74	0.29	-8.48
500	12.56	0.35	-6.85
600	8.14	0.43	-5.06
700	7.63	0.52	-3.41
800	7.19	0.58	-2.46
900	6.03	0.76	-0.11
1000	6.11	0.77	0.00
1200	6.08	0.82	0.55
1400	6.23	0.88	1.16
1600	5.01	0.85	0.86
1800	5.99	0.81	0.44
2000	5.36	0.77	0.00
2400	5.51	0.76	-0.11
2500	5.24	0.71	-0.70
2800	5.46	0.58	-2.46
3000	6.58	0.55	-2.92
3200	7.69	0.46	-4.47
3600	8.57	0.45	-4.67
3800	9.63	0.41	-5.47
4000	10.41	0.32	-7.63
4200	11.16	0.29	-8.48
4800	14.58	0.25	-9.77
5200	19.27	0.22	-10.88
6000	--	--	--

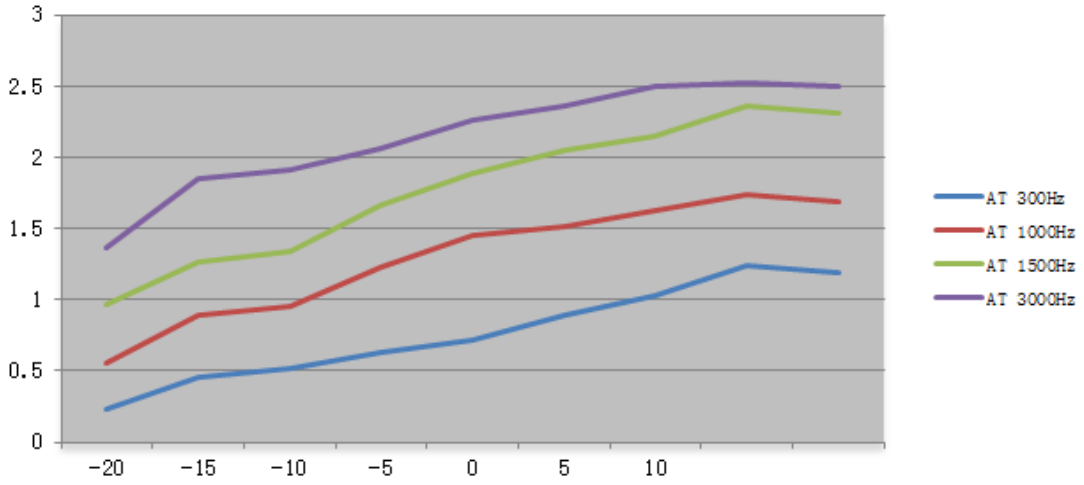
Audio Frequency Response@50%MI



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

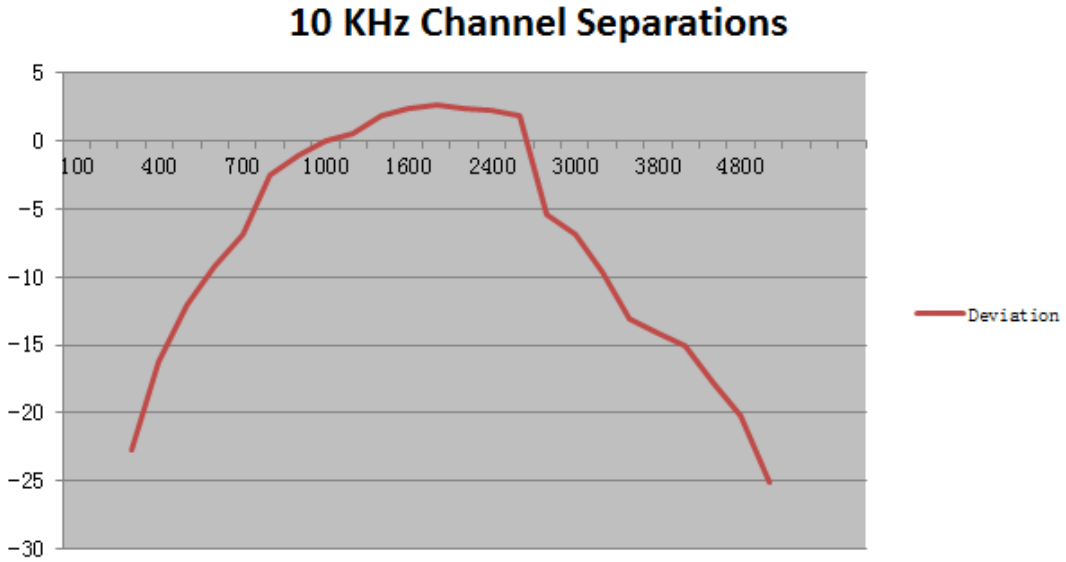
C. Modulation Limit:

10kHz, FM modulation, Assigned Frequency:27.405MHz				
Modulation Level (dB)	Peak Freq. Deviation At 300 Hz (kHz)	Peak Freq. Deviation At 1000 Hz (kHz)	Peak Freq. Deviation At 1500 Hz (kHz)	Peak Freq. Deviation At 3000 Hz (kHz)
-20	0.23	0.56	0.96	1.36
-15	0.45	0.89	1.26	1.85
-10	0.52	0.95	1.34	1.91
-5	0.63	1.23	1.66	2.06
0	0.71	1.45	1.89	2.26
+5	0.89	1.51	2.05	2.36
+10	1.03	1.63	2.15	2.49
+15	1.24	1.74	2.36	2.52
+20	1.19	1.69	2.31	2.49



D. Audio Frequency Response:

10kHz, FM modulation, Assigned Frequency:27.405MHz		
Frequency (Hz)	Deviation (kHz)	Audio Frequency Response(dB)
100	--	--
200	--	--
300	0.12	-22.66
400	0.25	-16.28
500	0.41	-11.99
600	0.56	-9.28
700	0.74	-6.86
800	1.22	-2.52
900	1.45	-1.02
1000	1.63	0.00
1200	1.74	0.57
1400	2.02	1.86
1600	2.15	2.41
1800	2.22	2.68
2000	2.16	2.45
2400	2.11	2.24
2500	2.03	1.91
2800	0.88	-5.35
3000	0.74	-6.86
3200	0.54	-9.60
3600	0.36	-13.12
4000	0.32	-14.14
4500	0.29	-15.00
5000	0.21	-17.80
5500	0.16	-20.16
6000	0.09	-25.16
6500	0.12	-22.66
7000	0.25	-16.28
7500	0.41	-11.99



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

Appendix I: Photographs of Test Setup

Refer to the Report No.: AGC05559241201AP01

Appendix II: Photographs of Test EUT

Refer to the Report No.: AGC05559241201AP02

-----End of Report-----

Conditions of Issuance of Test Reports

1. All samples and goods are accepted by the Attestation of Global Compliance (Shenzhen) Co., Ltd (the "Company") solely for testing and reporting in accordance with the following terms and conditions. The company provides its services on the basis that such terms and conditions constitute express agreement between the company and any person, firm or company requesting its services (the "Clients").

2. Any report issued by Company as a result of this application for testing services (the "Report") shall be issued in confidence to the Clients and the Report will be strictly treated as such by the Company. It may not be reproduced either in its entirety or in part and it may not be used for advertising or other unauthorized purposes without the written consent of the Company. The Clients to whom the Report is issued may, however, show or send it, or a certified copy thereof prepared by the Company to its customer, supplier or other persons directly concerned. The Company will not, without the consent of the Clients, enter into any discussion or correspondence with any third party concerning the contents of the Report, unless required by the relevant governmental authorities, laws or court orders.

3.The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders.

4. In the event of the improper use of the report as determined by the Company, the Company reserves the right to withdraw it, and to adopt any other additional remedies which may be appropriate.

5. Samples submitted for testing are accepted on the understanding that the Report issued cannot form the basis of, or be the instrument for, any legal action against the Company.

6. The Company will not be liable for or accept responsibility for any loss or damage however arising from the use of information contained in any of its Reports or in any communication whatsoever about its said tests or investigations.

7.Clients wishing to use the Report in court proceedings or arbitration shall inform the Company to that effect prior to submitting the sample for testing.

8. The Company is not responsible for recalling the electronic version of the original report when any revision is made to them. The Client assumes the responsibility to providing the revised version to any interested party who uses them.

9. Subject to the variable length of retention time for test data and report stored hereinto as otherwise specifically required by individual accreditation authorities, the Company will only keep the supporting test data and information of the test report for a period of six years. The data and information will be disposed of after the aforementioned retention period has elapsed. Under no circumstances shall we provide any data and information which has been disposed of after retention period. Under no circumstances shall we be liable for damage of any kind, including (but not limited to) compensatory damages, lost profits, lost data, or any form of special, incidental, indirect, consequential or punitive damages of any kind, whether based on breach of contract of warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.