

TECHNICAL DATA – SC-280 Wide band

A. RF POWER OUTPUT

1. Power measured using test set-up Figure 1.
Primary power 7.2 VDC at battery input connector.
2. Power Data for 146.025MHz to 173.975MHz @ 5W is presented in Paragraph 1.
3. Power Data for 146.025MHz to 173.975MHz @ 1W is presented in Paragraph 2.

B. FREQUENCY STABILITY

1.
 - a. Frequency stability with varying temperature. See Figure 1 for test set-up.
 - b. Data is presented on Paragraph 3 for Standard Primary Input Voltage of 7.2 VDC maintained throughout entire test.
2.
 - a. Frequency stability with Primary Input Voltage. See Figure 1 for test set-up.
 - b. Data is presented on Paragraph 4 for Standard Temperature of 25 degrees Celsius maintained throughout entire test.

C. OCCUPIED BANDWIDTH

1.
 - a. A spectrum analyzer was used to determine the occupied bandwidth.
See Figure 1 for test set-up.
 - b. Data is presented on Paragraph 5 to Paragraph 8 for Standard primary Input Voltage of 7.2 VDC maintained throughout entire test. The carrier and all detectable sidebands were displayed on the spectrum analyzer and pertinent data concerning amplitude and frequency were read from the screen.
 - c. un modulated : Data measured at 160.025MHz. (see Paragraph 5)
 - d. Input to transmitter audio circuits: 2500Hz sine wave at a level 16dB greater than that necessary to produce 50% modulation. Data measured at 160.025MHz and is typical of all frequencies. (see Paragraph 6)
 - e. Input to transmitter audio circuits: 2500Hz sine wave at a level 16dB greater than that necessary to produce 50% modulation with CTCSS(250.3Hz).
Data measured at 160.025MHz and is typical of all frequencies.
(see Paragraph 7)
 - f. Input to transmitter audio circuits: 2500Hz sine wave at a level 16dB greater than that necessary to produce 50% modulation with DCS(023).
Data measured at 160.025MHz and is typical of all frequencies.
(see Paragraph 8)

D. MODULATION CHARACTERISTICS

1. Modulation Deviation

- a. Measured using test set-up, see Figure 1.
- b. Primary Input Voltage of 7.2 VDC at battery input connector.
- c. Data (Positive peak) is presented in Paragraph 9
- d. Data (Negative peak) is presented in Paragraph 10.
- e. Data (Positive peak) with CTCSS (250.3Hz) is presented in Paragraph 11.
- f. Data (Negative peak) with CTCSS (250.3Hz) is presented in Paragraph 12.
- g. Data (Positive peak) with DCS (023) is presented in Paragraph 13.
- h. Data (Negative peak) with DCS (023) is presented in Paragraph 14.

2. Transmitter Audio Frequency Response

- a. Measured using test set-up, see Figure 1.
- b. Primary Input Voltage of 7.2 VDC at battery input connector.
Ref = 1 kHz tone response at +-1.5 kHz deviation. Curve was taken maintaining constant +- 1.5 kHz deviation.
- c. Data is presented in Paragraph 15.

3. Low-Pass Filter Response

- a. Measured using test set-up, see Figure 1.
- b. Primary Input Voltage of 7.2 VDC at battery input connector.
Input 1 kHz tone at a level 20dB greater than that required for 3 kHz deviation
The response at 1 kHz tone = 0dB. Curve was taken maintaining constant input at modulation sensitivity. Output of low-pass filter was monitored using Audio Analyzer
- c. Data is presented in Paragraph 16.

E. CONDUCTED SPURIOUS EMISSION

1. Conducted spurious data was measured at 25 degrees Celsius, 7.2 VDC applied at battery input connector external power input and using external antenna jack.
See Figure 1 for test set-up.
2. Data for 146.025MHz @ 5W is presented in Paragraph 17.
3. Data for 160.025MHz @ 5W is presented in Paragraph 18.
4. Data for 173.975MHz @ 5W is presented in Paragraph 19.
5. Data for 146.025MHz @ 1W is presented in Paragraph 20.
6. Data for 160.025MHz @ 1W is presented in Paragraph 21.

7. Data for 173.975MHz @ 1W is presented in Paragraph 22.
8. Data for 160.025MHz @ Receiver is presented in Paragraph 23.

F. TRANSIENT BEHAVIOR

- a. Measured using test set-up, see Figure 1.
- b. Primary Input Voltage of 7.2 VDC at battery input connector.
- c. Data is presented in Paragraph 24.

G. PARAGRAPHS

1. RF Power Output, 5W
2. RF Power Output, 1W
3. Frequency Stability vs. Temperature
4. Frequency Stability vs. Voltage
5. Occupied Bandwidth, un modulated
6. Occupied Bandwidth, 2500Hz Sine Wave
7. Occupied Bandwidth, 2500Hz Sine Wave with CTCSS (250.3Hz)
8. Occupied Bandwidth, 2500Hz Sine Wave with DCS (023)
9. Deviation vs. Audio input Level - Positive peak
10. Deviation vs. Audio input Level - Negative peak
11. Deviation vs. Audio input Level with CTCSS (250.3Hz) - Positive peak
12. Deviation vs. Audio input Level with CTCSS (250.3Hz) - Negative peak
13. Deviation vs. Audio input Level with DCS (023) - Positive peak
14. Deviation vs. Audio input Level with DCS (023) -Negative peak
15. Transmitter Audio Frequency Response
16. Audio Low-Pass Filter Response
17. Conducted Spurious Emissions, 146.025MHz @ 5W
18. Conducted Spurious Emissions, 160.025MHz @ 5W
19. Conducted Spurious Emissions, 173.975MHz @ 5W
20. Conducted Spurious Emissions, 146.025MHz @ 1W
21. Conducted Spurious Emissions, 160.025MHz @ 1W
22. Conducted Spurious Emissions, 173.975MHz @ 1W
23. Conducted Spurious Emissions, Receiver
24. Transient Behavior

H. FIGURE

1. TEST SET-UP

TECHNICAL DATA

Model Name		:	SC-280	
Sample Number		:	Sample 1	
Specification is Referenced		:	EIA/TIA-603	
Emission Type		:	16K0F3E	
Channel Spacing		:	25	(kHz)
Description		:	Handheld	
Mode		:	FM	
Frequency Range	TX	:	146.000 - 174.000	(MHz)
	RX	:	146.000 - 174.000	(MHz)
Test Voltage	Normal	:	7.2	(V)
	Extreme	:	6.12	(7.2-15%) (V)
		:	8.28	(7.2+15%) (V)
Temperature	Normal	:	25	(°C)
	Extreme	:	-30 - +60	(°C)
Test Frequency	TX	:	146.0250	(MHz)
	RX	:	146.0250	(MHz)
	TX	:	160.0250	(MHz)
	RX	:	160.0250	(MHz)
	TX	:	173.9750	(MHz)
	RX	:	173.9750	(MHz)
1st IF	RX	:	44.95	(MHz)
2nd IF	RX	:	455	(kHz)
Microphone Impedance		:	2000	(Ω)
Speaker Impedance		:	8	(Ω)
Rated RF Power	HIGH	:	5	(W)
	LOW	:	1	(W)
Test Operator		:	K.Atсутa	
Test Date	Start	:	2006/3/6	
	Finish	:	2006/3/31	

Carrier Frequency Stability - Temperature Variation

SAMPLE1		160.025			
Temperature[°C]	Measured	Frequency_error[Hz]	ppm	Upper Limit	Lower Limit
-30	160.02507	70	0.44	2.50	-2.50
-20	160.02524	240	1.50	2.50	-2.50
-10	160.02522	220	1.37	2.50	-2.50
0	160.02519	190	1.19	2.50	-2.50
10	160.02518	180	1.12	2.50	-2.50
20	160.02508	80	0.50	2.50	-2.50
30	160.02496	-40	-0.25	2.50	-2.50
40	160.02486	-140	-0.87	2.50	-2.50
50	160.02470	-300	-1.87	2.50	-2.50
60	160.02467	-330	-2.06	2.50	-2.50
70	160.02470	-300	-1.87	2.50	-2.50

Audio Frequency Response

Frequency[Hz]	Measured		Upper Limit	Lower Limit
	SAMPLE1			
100	-30.90			
200	-24.00			
300	-13.60		-9.46	-17.89
400	-9.78		-6.96	-12.90
500	-7.14		-5.02	-9.02
600	-5.14		-3.44	-7.44
700	-3.55		-2.10	-6.10
800	-2.20		-0.94	-4.94
900	-1.07		0.08	-3.92
1000	0.00		1.00	-3.00
1500	3.52		4.52	0.52
2000	5.82		7.02	3.02
2400	7.02		8.60	4.60
2500	7.21		8.96	4.96
2600	7.35		9.30	4.96
2700	7.44		9.63	4.96
2800	7.49		9.94	4.96
2900	7.47		10.25	4.96
3000	7.38		10.54	4.96
5000	-12.20			

Audio LPF Response

AF[kHz]	Measured		Limit
	SAMPLE1		
1000	0.00		0.00
2000	0.00		0.00
3000	-2.30		0.00
3100	-2.78		-0.85
3200	-3.28		-1.68
3300	-3.84		-2.48
3400	-4.45		-3.26
3500	-5.13		-4.02
4000	-9.11		-7.50
5000	-18.54		-13.31
6000	-33.62		-18.06
7000	-42.94		-22.08
8000	-53.40		-25.56
9000			-28.63
10000			-31.37
11000			-33.86
12000			-36.12
13000			-38.21
14000			-40.14
15000			-41.94
20000			-50.00
100000			-50.00

Modulation Limiting

Carrier

SAMPLE1									
INPUT		f=300Hz		f=1000Hz		f=3000Hz		Limit	
V[mV]	[dB]	Positive Peak	Negative Prak	Positive Peak	Negative Prak	Positive Peak	Negative Prak		
1.5	-20	0.13	0.13	0.35	0.36	0.76	0.76	5	
4.7	-10	0.26	0.25	0.99	0.99	2.27	2.26	5	
7.5	-6	0.36	0.36	1.56	1.56	2.76	2.77	5	
10.6	-3	0.50	0.49	2.20	2.18	2.88	2.89	5	
15.0	0	0.68	0.67	3.04	3.01	2.93	2.94	5	
21.2	3	0.93	0.94	3.85	3.81	2.97	2.96	5	
29.9	6	1.29	1.27	3.94	3.93	2.98	2.98	5	
47.4	10	1.98	1.96	4.08	4.07	2.98	2.98	5	
75.2	14	3.09	2.99	4.22	4.10	2.97	2.98	5	
94.6	16	3.73	3.50	4.27	4.15	2.98	2.98	5	
150.0	20	4.10	3.92	4.25	4.16	2.98	2.98	5	
474.3	30	4.61	4.56	4.23	4.27	3.03	3.03	5	

Modulation Limiting

with CTCSS 250.3Hz

SAMPLE1

INPUT		f=300Hz		f=1000Hz		f=3000Hz		Limit
V[mV]	[dB]	Positive Peak	Negative Prak	Positive Peak	Negative Prak	Positive Peak	Negative Prak	
1.5	-20	0.67	0.67	0.80	0.78	1.24	1.21	5
4.7	-10	0.79	0.78	1.42	1.39	2.54	2.54	5
7.4	-6	0.88	0.89	1.92	1.91	2.96	2.98	5
10.5	-3	0.99	0.99	2.45	2.44	3.07	3.07	5
14.8	0	1.14	1.15	3.20	3.20	3.10	3.12	5
20.9	3	1.38	1.37	3.87	3.80	3.15	3.15	5
29.5	6	1.69	1.64	3.96	3.91	3.15	3.16	5
46.8	10	2.28	2.27	4.05	4.00	3.15	3.16	5
74.2	14	3.18	3.18	4.17	4.07	3.15	3.16	5
93.4	16	3.76	3.61	4.21	4.10	3.15	3.16	5
148.0	20	4.08	3.95	4.20	4.10	3.15	3.17	5
468.0	30	4.53	4.54	4.21	4.23	3.18	3.20	5

SAMPLE1

INPUT		f=300Hz		f=1000Hz		f=3000Hz		Limit
V[mV]	[dB]	Positive Peak	Negative Peak	Positive Peak	Negative Peak	Positive Peak	Negative Peak	
1.5	-20	0.78	0.80	1.03	1.03	1.35	1.35	5
4.7	-10	0.89	0.91	1.52	1.54	2.58	2.64	5
7.4	-6	0.99	0.98	2.01	2.01	3.05	3.07	5
10.5	-3	1.06	1.10	2.56	2.56	3.13	3.13	5
14.8	0	1.25	1.28	3.28	3.22	3.19	3.22	5
20.9	3	1.46	1.49	3.94	3.96	3.22	3.25	5
29.5	6	1.73	1.76	4.05	4.00	3.21	3.27	5
46.8	10	2.34	2.37	4.11	4.15	3.22	3.26	5
74.2	14	3.25	3.20	4.28	4.17	3.22	3.27	5
93.4	16	3.73	3.75	4.29	4.22	3.21	3.26	5
148.0	20	4.15	4.03	4.26	4.18	3.22	3.25	5
468.0	30	4.59	4.23	4.23	4.30	3.23	3.26	5

Model Name SC-280
FCC ID O78SC280
Serial Number SAMPLE1
Emission Type 16K0F3E
Channel Spacing 25.0[kHz]

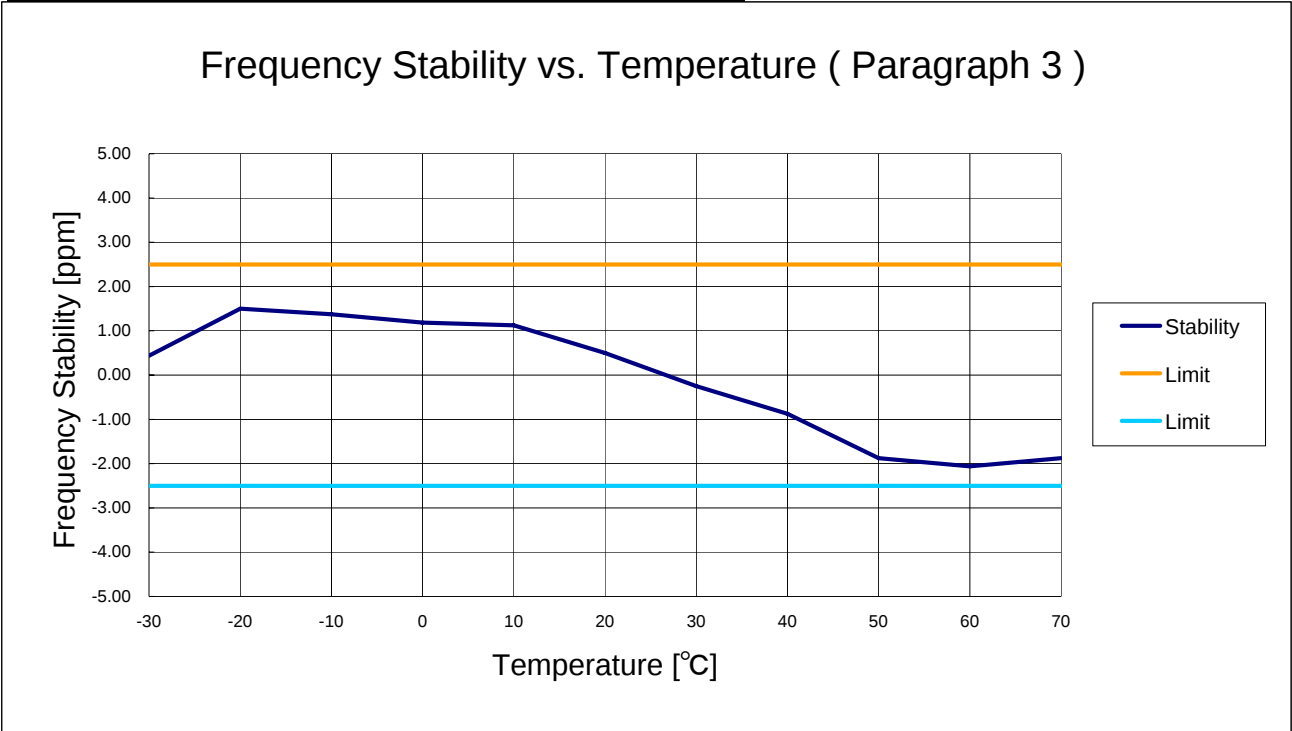
1. RF Power Output @5W (Paragraph 1)

Carrier Frequency [MHz]	RF Power Output [W]	Final D.C. Input Current [A]	D.C. Input Voltage [V]	D.C. Input Power [W]
146.0250	5.00	1.82	7.20	13.10
160.0250	4.95	1.81	7.20	13.03
179.9750	5.00	2.00	7.20	14.40

2. RF Power Output @1W (Paragraph 2)

Carrier Frequency [MHz]	RF Power Output [W]	Final D.C. Input Current [A]	D.C. Input Voltage [V]	D.C. Input Power [W]
146.0250	1.02	0.81	7.20	5.83
160.0250	1.05	0.75	7.20	5.40
179.9750	0.98	0.81	7.20	5.83

3.Frequency Stability vs. Temperature (Paragraph 3) : 160.025MHz



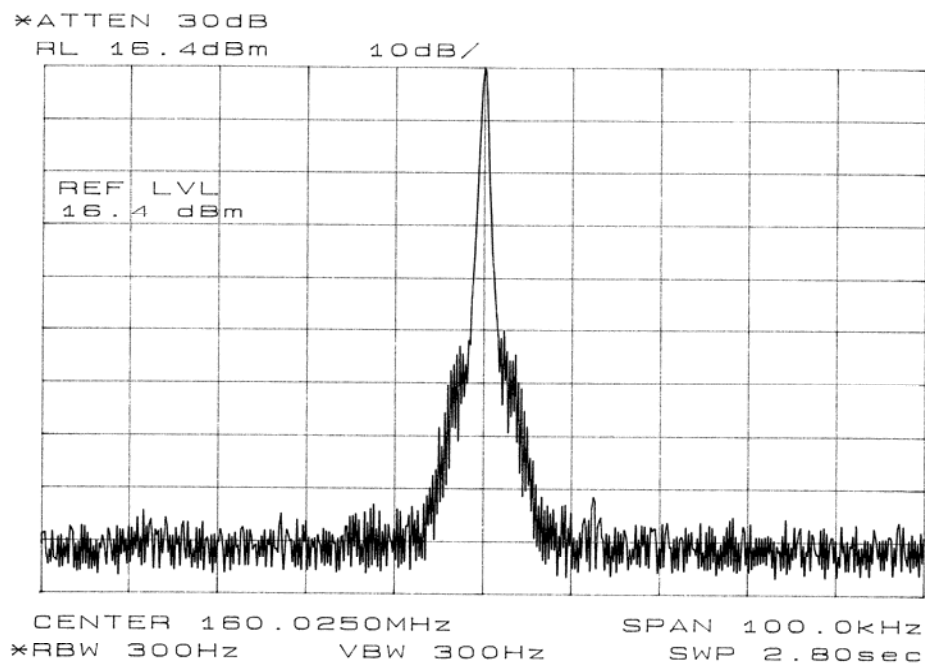
4. Frequency Stability vs. Voltage (Paragraph 4)

Carrier Frequency [MHz]	STV [%]	Voltage [V]	Change in Frequency		
			[MHz]	[Hz]	[ppm]
160.0250	100	7.2	160.02500	0	0.00
	85	6.12	160.02499	-10	-0.06
	115	8.28	160.02499	-10	-0.06

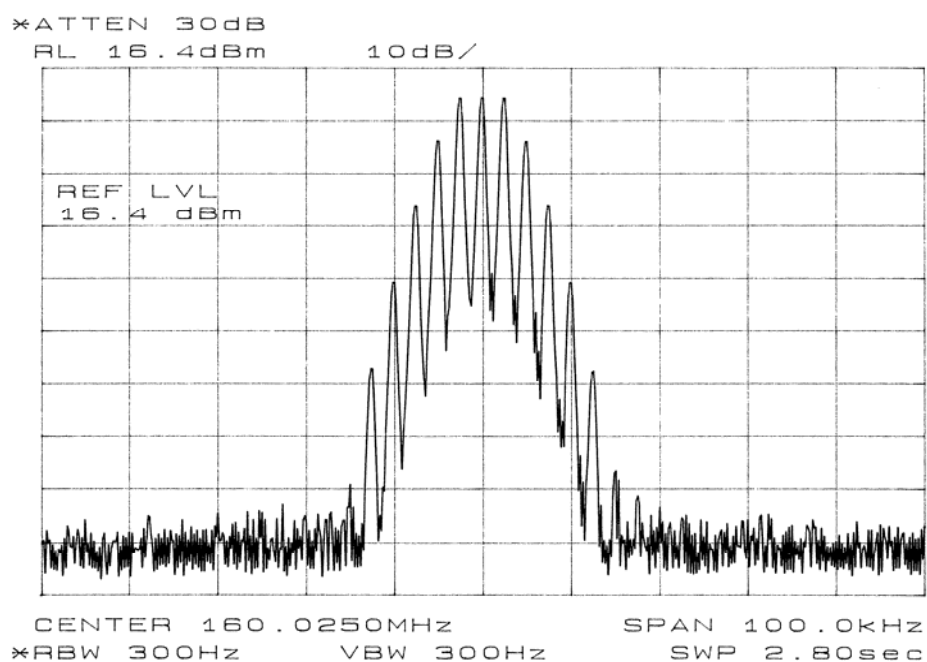
Model Name SC-280
FCC ID O78SC280
Serial Number SAMPLE1
Emission Type 16K0F3E
Channel Spacing 25.0[kHz]
Frequency 160.025[MHz]

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5. Occupied Bandwidth unmodulated (Paragraph 5)



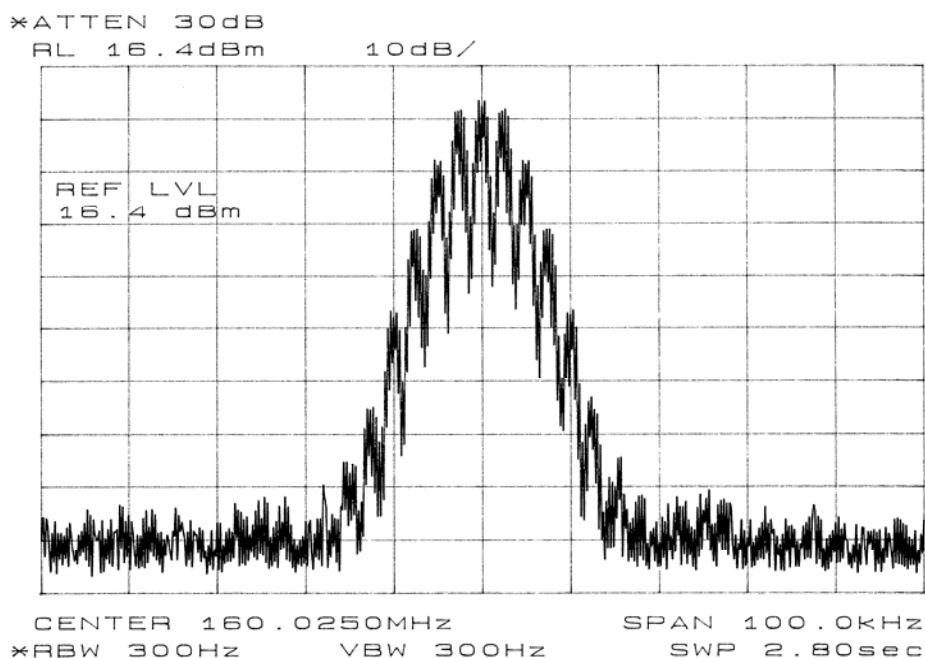
6. Occupied Bandwidth 2500Hz Sine Wave (Paragraph 6)



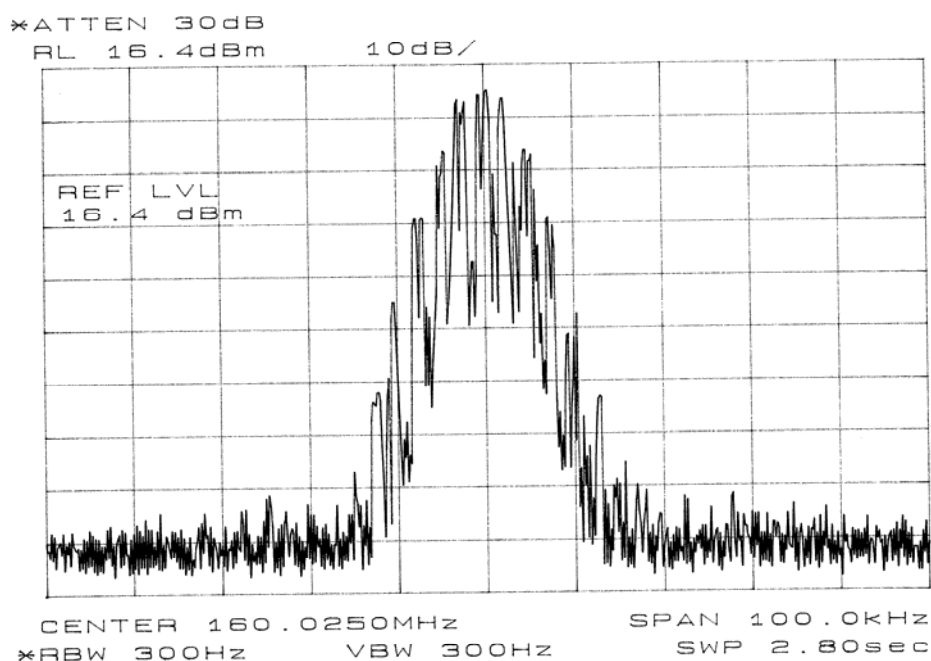
Model Name SC-280
FCC ID O78SC280
Serial Number SAMPLE1
Emission Type 16K0F3E
Channel Spacing 25.0[kHz]
Frequency 160.025[MHz]

Page 3 (V_Wide)

7. Occupied Bandwidth 2500Hz Sine Wave with CTCSS(250.3Hz) (Paragraph 7)



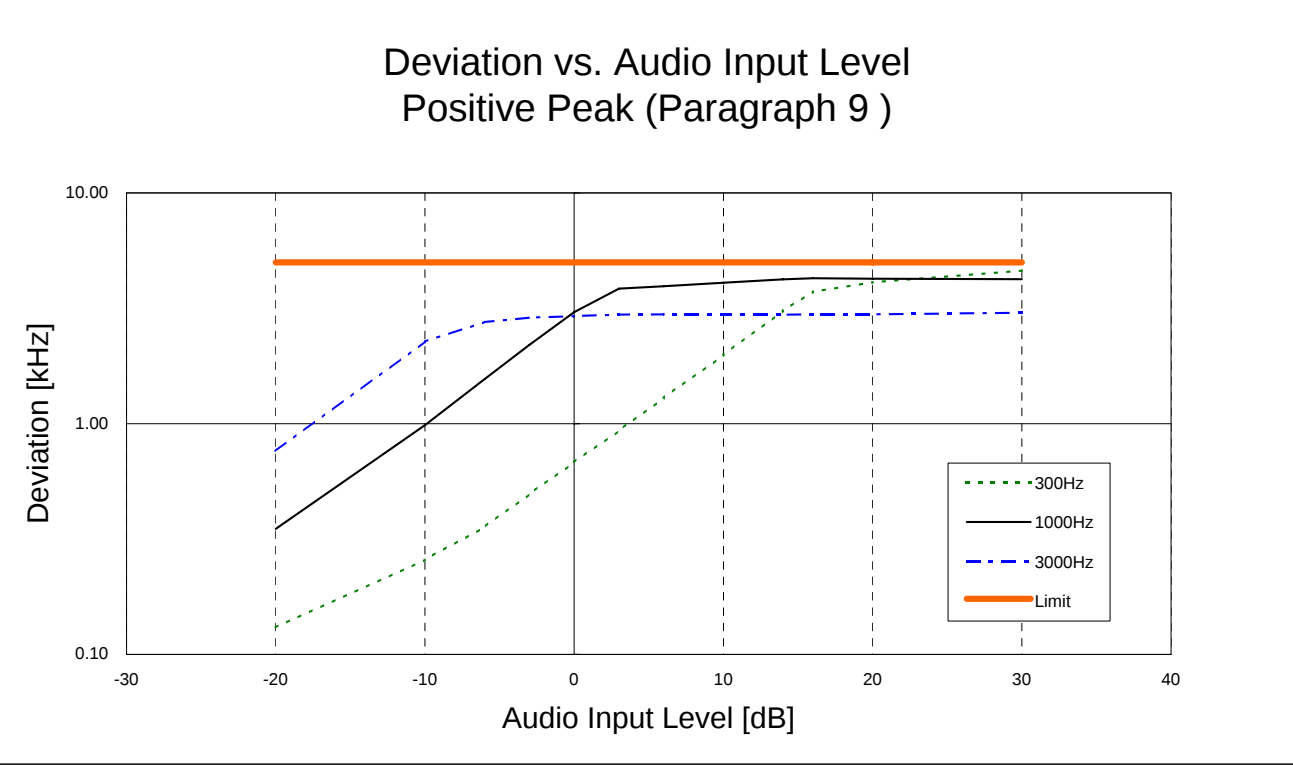
8. Occupied Bandwidth 2500Hz Sine Wave with DCS(023) (Paragraph 8)



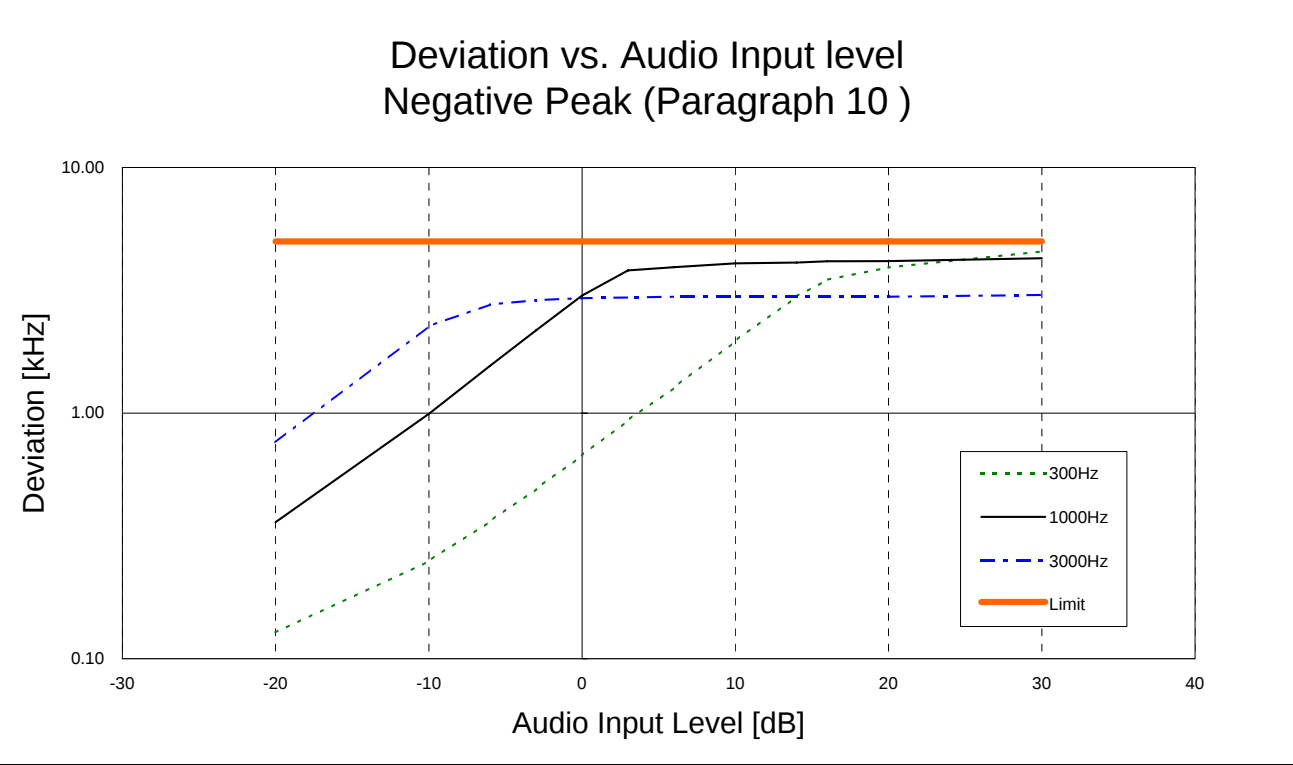
Model Name SC-280
FCC ID O78SC280
Serial Number SAMPLE1
Emission Type 16K0F3E
Channel Spacing 25.0[kHz]
Frequency 160.025[MHz]

0dB =15.0[mV]

9.Deviation vs. Audio Input Level (Paragraph 9)



10.Deviation vs. Audio Input Level (Paragraph 10)

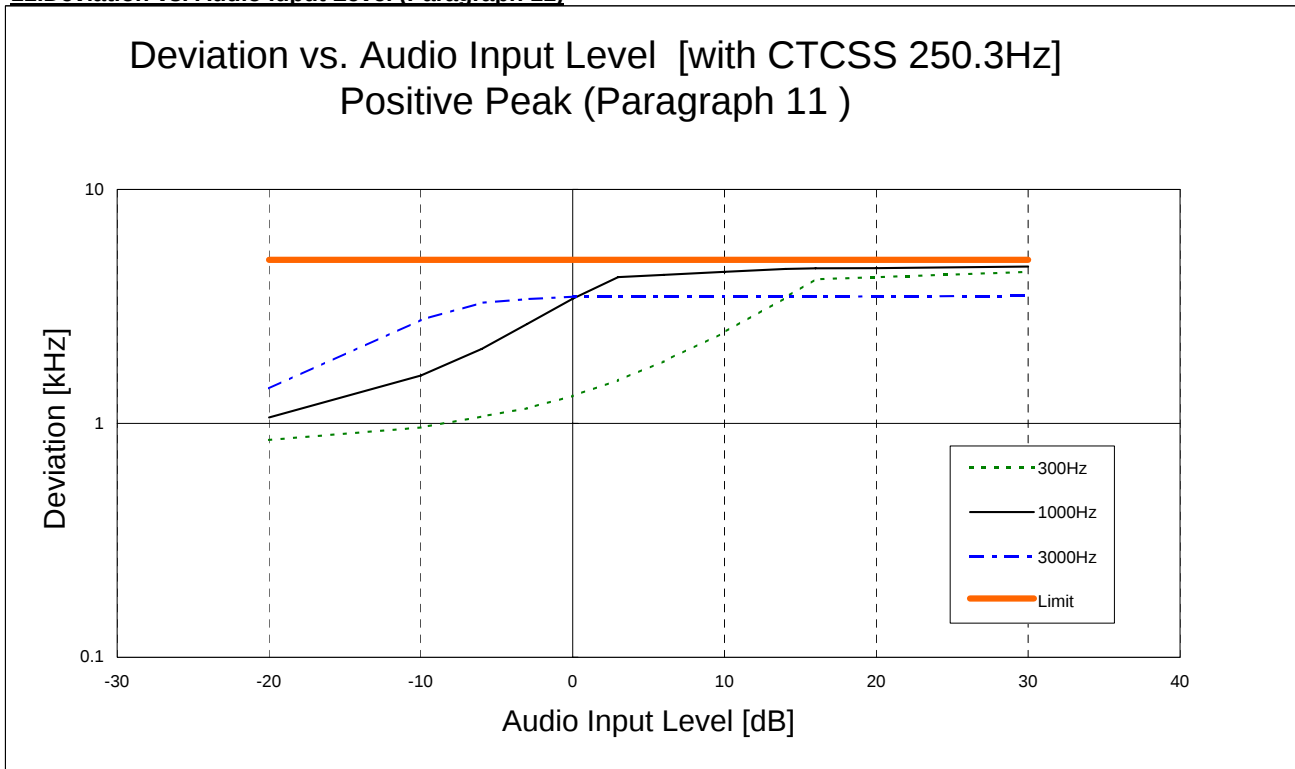


Model Name SC-280
FCC ID O78SC280
Serial Number SAMPLE1
Emission Type 16K0F3E
Channel Spacing 25.0[kHz]
Frequency 160.025[MHz]

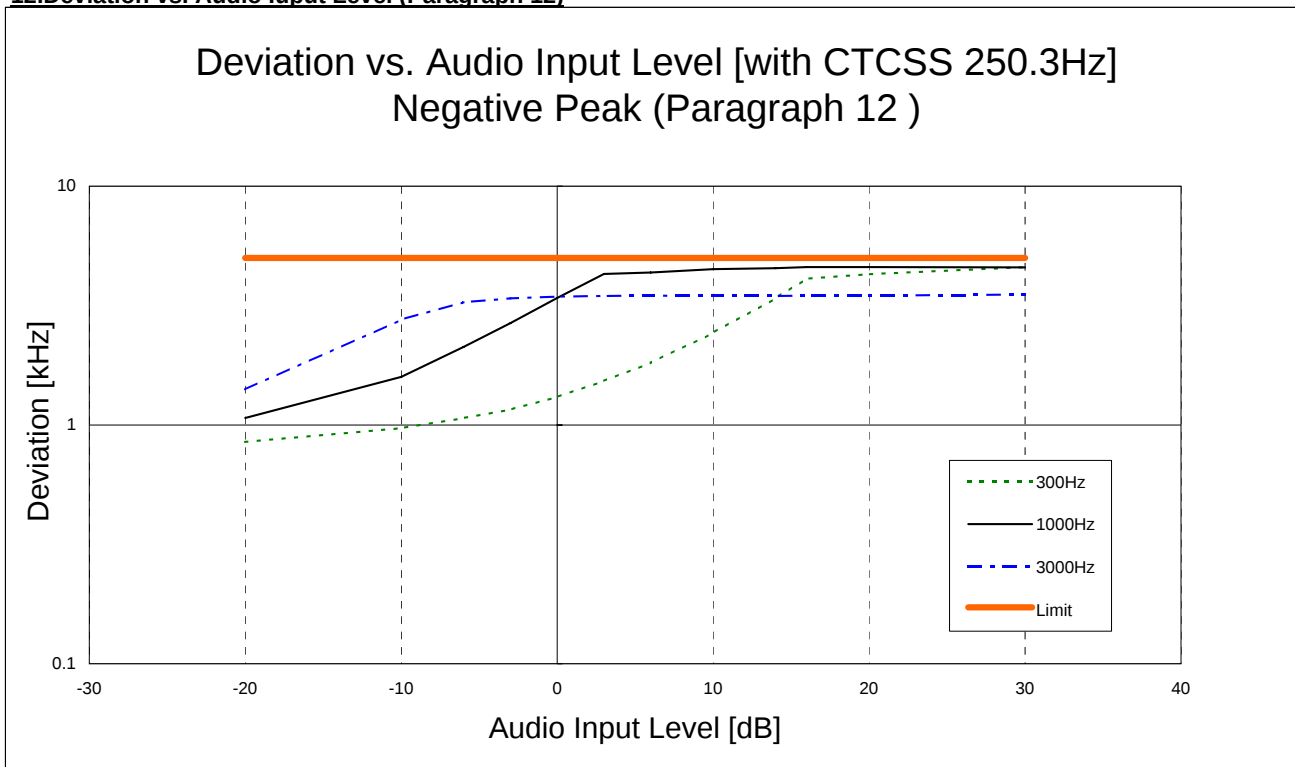
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0dB =15.0[mV]

11.Deviation vs. Audio Input Level (Paragraph 11)



12.Deviation vs. Audio Input Level (Paragraph 12)

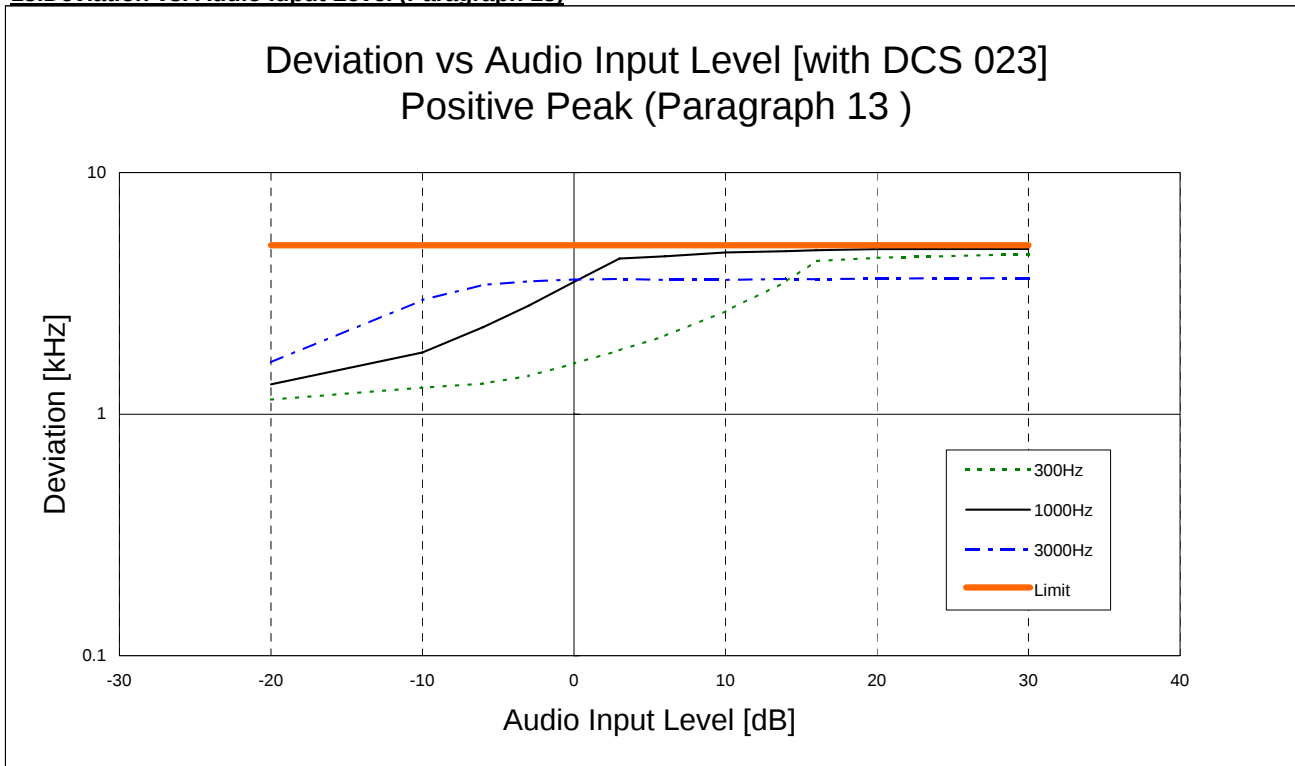


Model Name SC-280
FCC ID O78SC280
Serial Number SAMPLE1
Emission Type 16K0F3E
Channel Spacing 25.0[kHz]
Frequency 160.025[MHz]

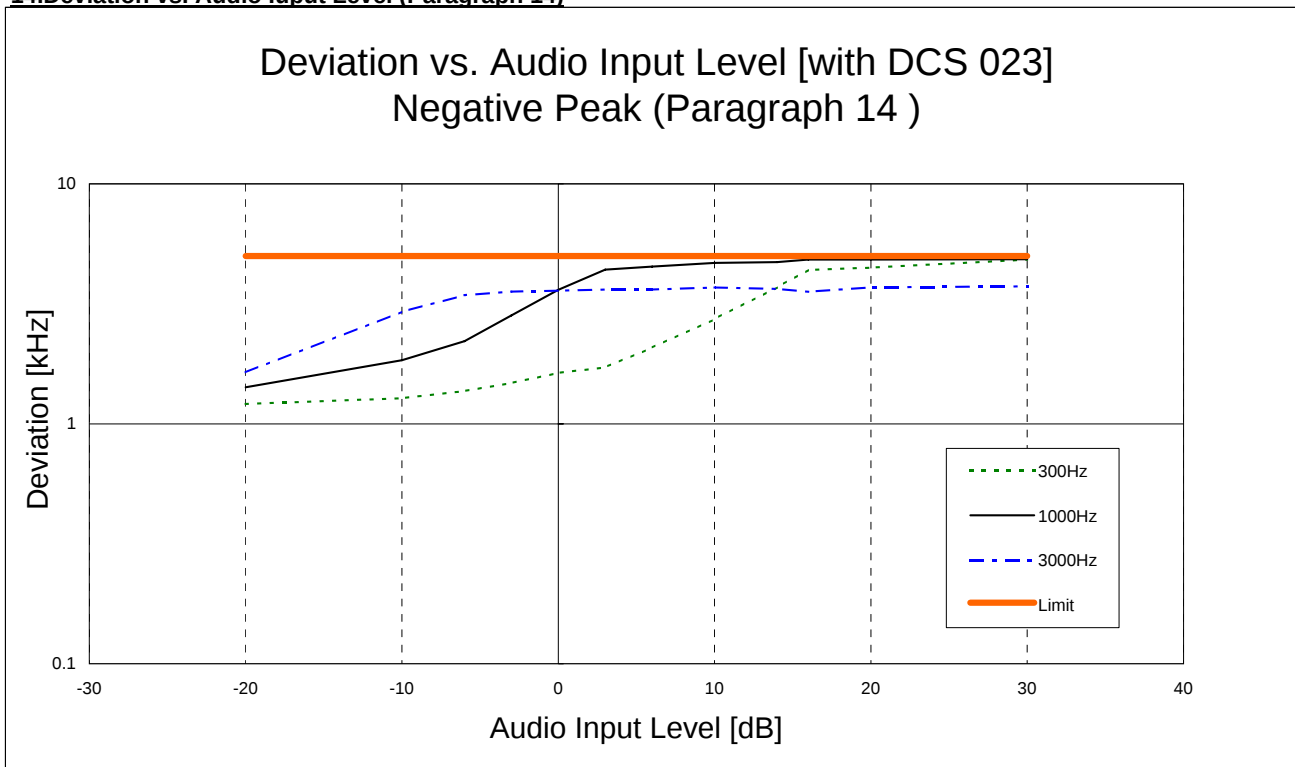
Page 6 (V_Wide)

0dB =15.0[mV]

13.Deviation vs. Audio Input Level (Paragraph 13)

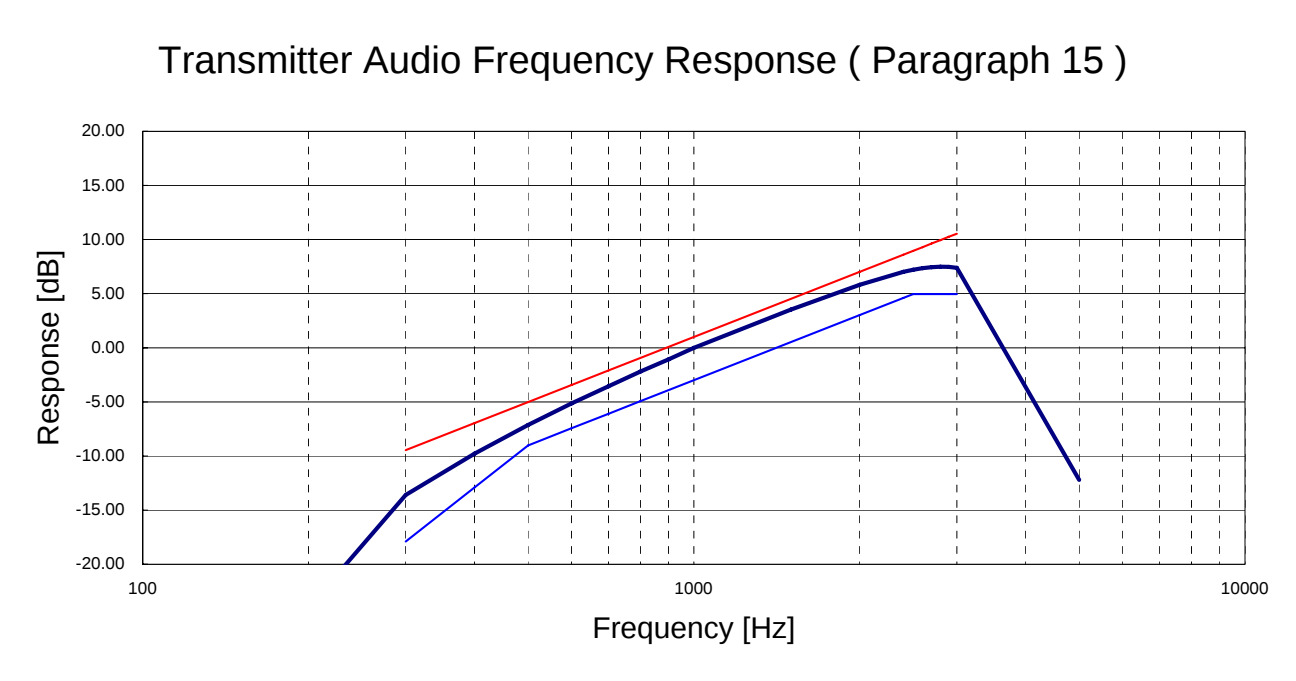


14.Deviation vs. Audio Input Level (Paragraph 14)

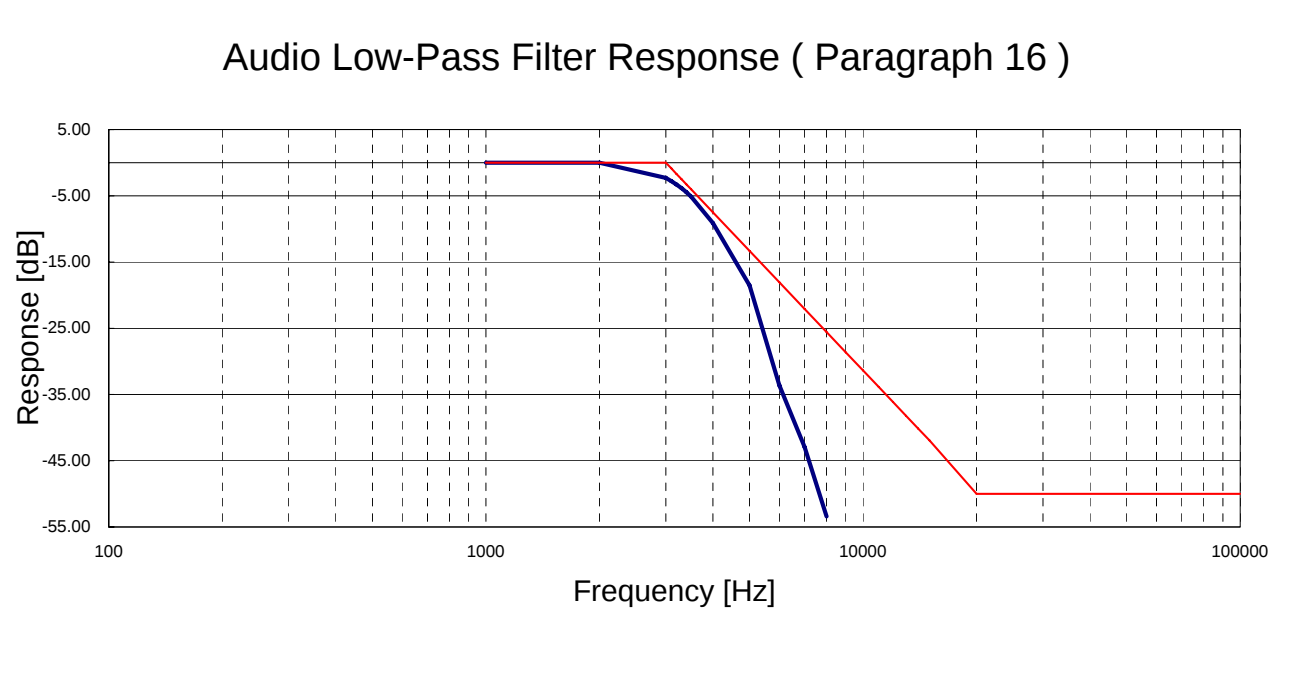


Model Name SC-280
FCC ID O78SC280
Serial Number SAMPLE1
Emission Type 16K0F3E
Channel Spacing 25.0[kHz]
Frequency 160.025[MHz]

15. Transmitter Audio Frequency Response (Paragraph 15)



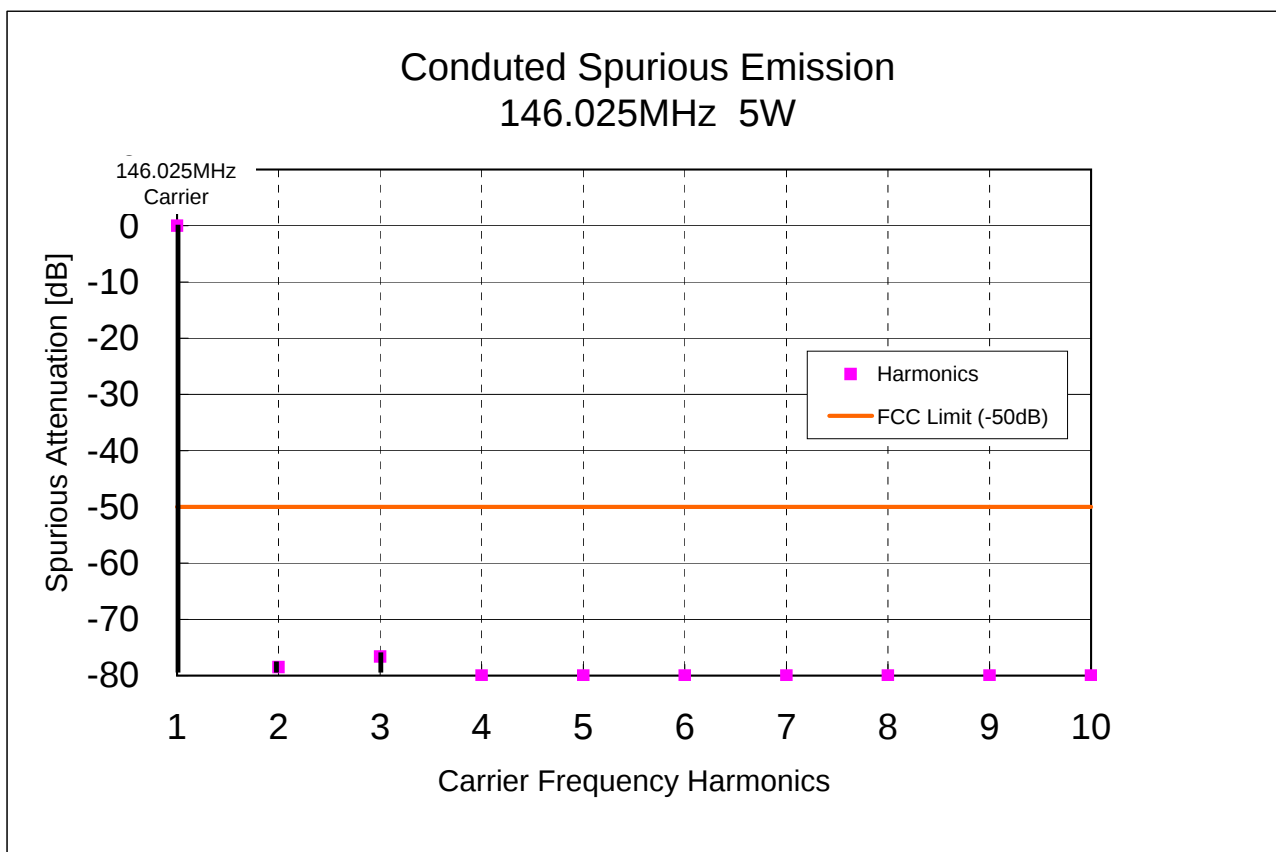
16. Audio Low-Pass Filter Response (Paragraph 16)



Model Name SC-280
 FCC ID O78SC280
 Serial Number SAMPLE1
 Emission Type 16K0F3E
 Channel Spacing 25.0[kHz]

17. Conducted Spurious Emission, 146.025MHz@5W (PARAGRAPH 17)

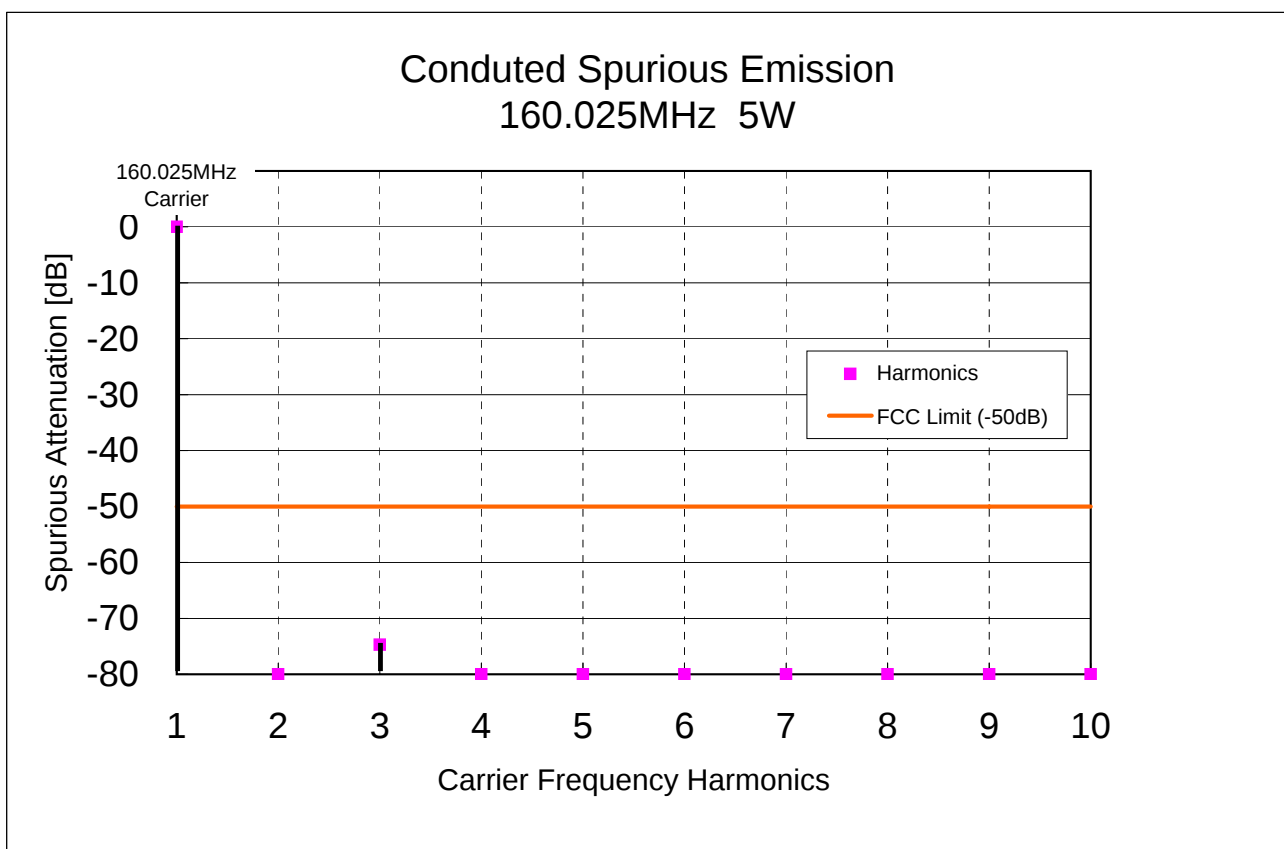
Harmonics	Emission Frequency [MHz]	Spurious Attenuation [dB]	FCC Limit
1	146.025(Carrier)	0.0	-50.0
2	292.050	-78.5	-50.0
3	438.075	-76.6	-50.0
4	584.100	-80.0	-50.0
5	730.125	-80.0	-50.0
6	876.150	-80.0	-50.0
7	1022.175	-80.0	-50.0
8	1168.200	-80.0	-50.0
9	1314.225	-80.0	-50.0
10	1460.250	-80.0	-50.0



Model Name SC-280
 FCC ID O78SC280
 Serial Number SAMPLE1
 Emission Type 16K0F3E
 Channel Spacing 25.0[kHz]

18. Conducted Spurious Emission, 160.025MHz@5W (PARAGRAPH 18)

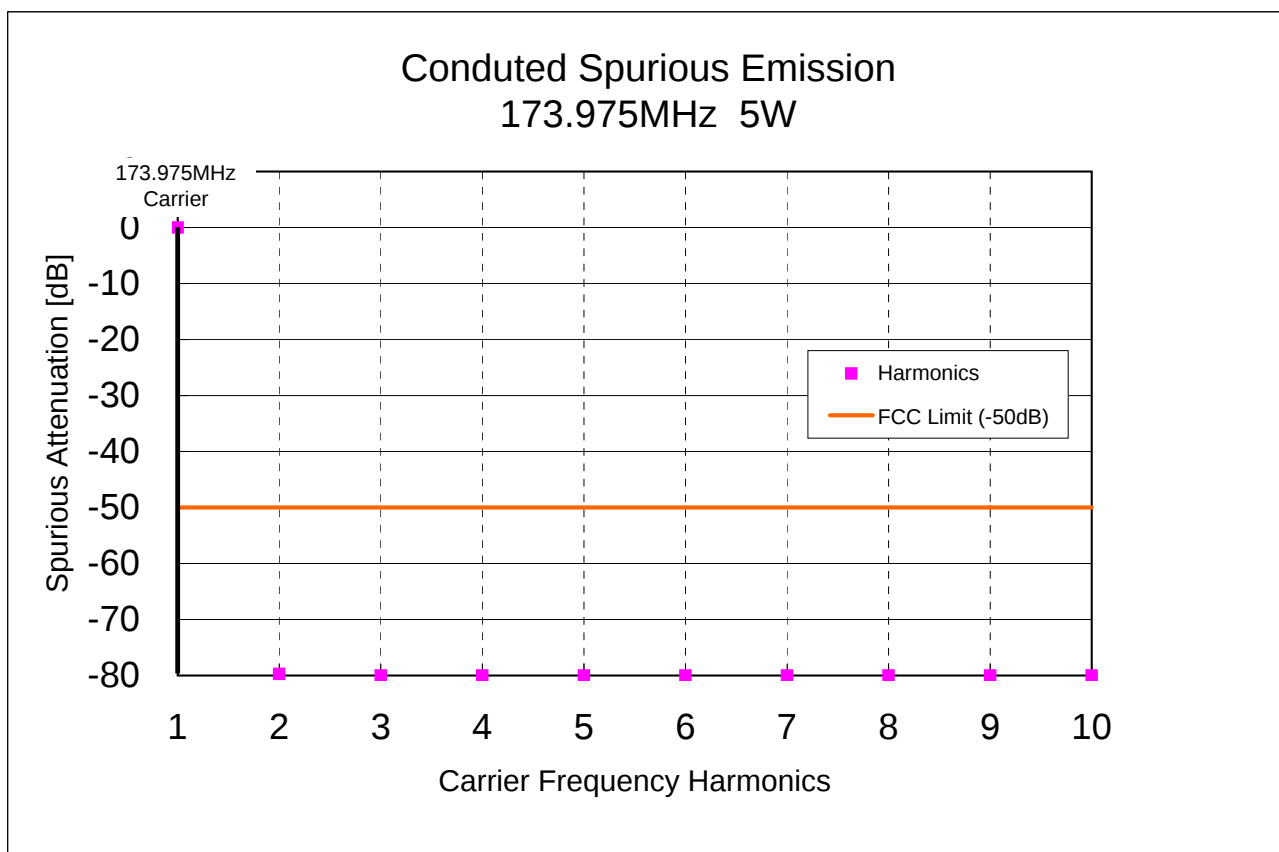
Harmonics	Emission Frequency [MHz]	Spurious Attenuation [dB]	FCC Limit
1	160.025(Carrier)	0.0	-50.0
2	320.050	-80.0	-50.0
3	480.075	-74.7	-50.0
4	640.100	-80.0	-50.0
5	800.125	-80.0	-50.0
6	960.150	-80.0	-50.0
7	1120.175	-80.0	-50.0
8	1280.200	-80.0	-50.0
9	1440.225	-80.0	-50.0
10	1600.250	-80.0	-50.0



Model Name SC-280
 FCC ID O78SC280
 Serial Number SAMPLE1
 Emission Type 16K0F3E
 Channel Spacing 25.0[kHz]

19. Conducted Spurious Emission, 173.975MHz@5W (PARAGRAPH 19)

Harmonics	Emission Frequency [MHz]	Spurious Attenuation [dB]	FCC Limit
1	173.975(Carrier)	0.0	-50.0
2	347.950	-79.7	-50.0
3	521.925	-80.0	-50.0
4	695.900	-80.0	-50.0
5	869.875	-80.0	-50.0
6	1043.850	-80.0	-50.0
7	1217.825	-80.0	-50.0
8	1391.800	-80.0	-50.0
9	1565.775	-80.0	-50.0
10	1739.750	-80.0	-50.0

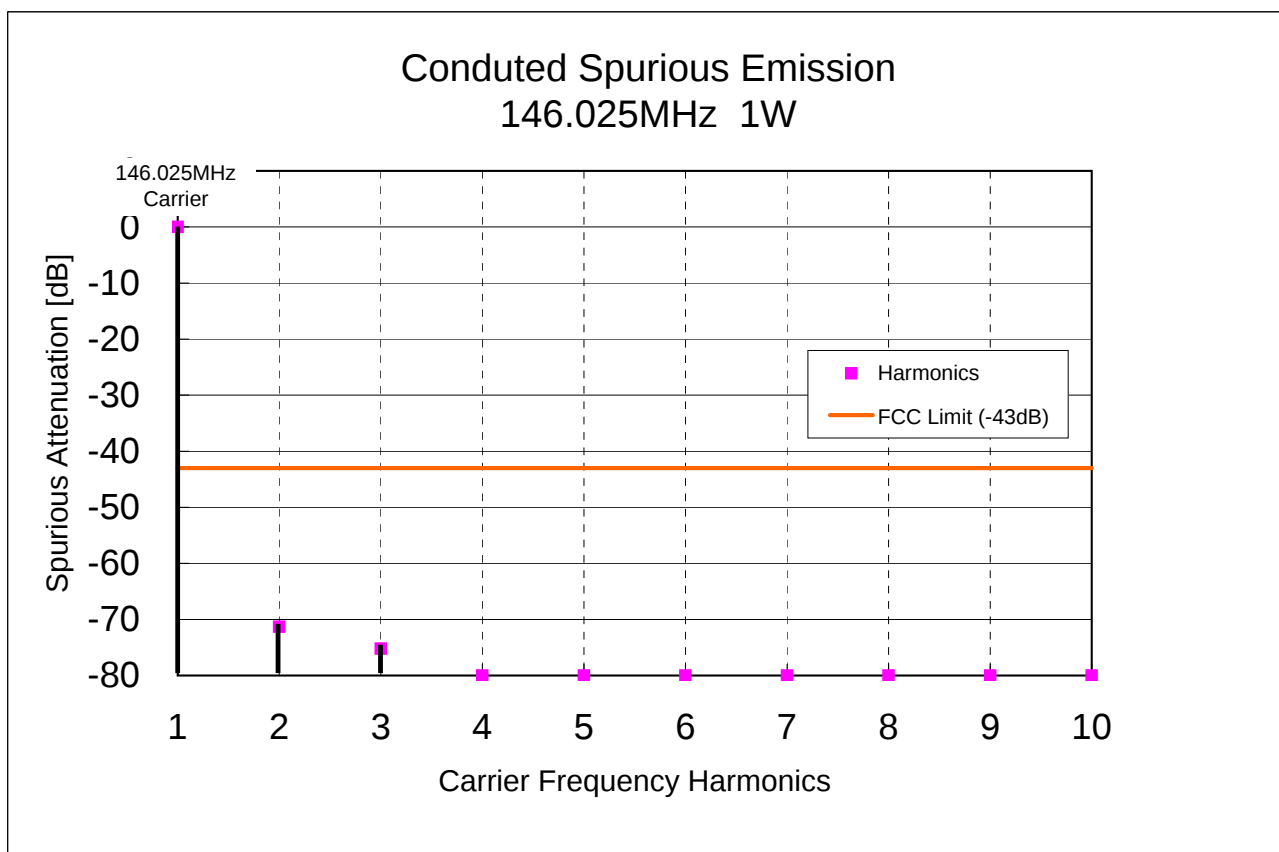


Model Name SC-280
FCC ID O78SC280
Serial Number SAMPLE1
Emission Type 16K0F3E
Channel Spacing 25.0[kHz]

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20. Conducted Spurious Emission, 146.025MHz@1W (PARAGRAPH 20)

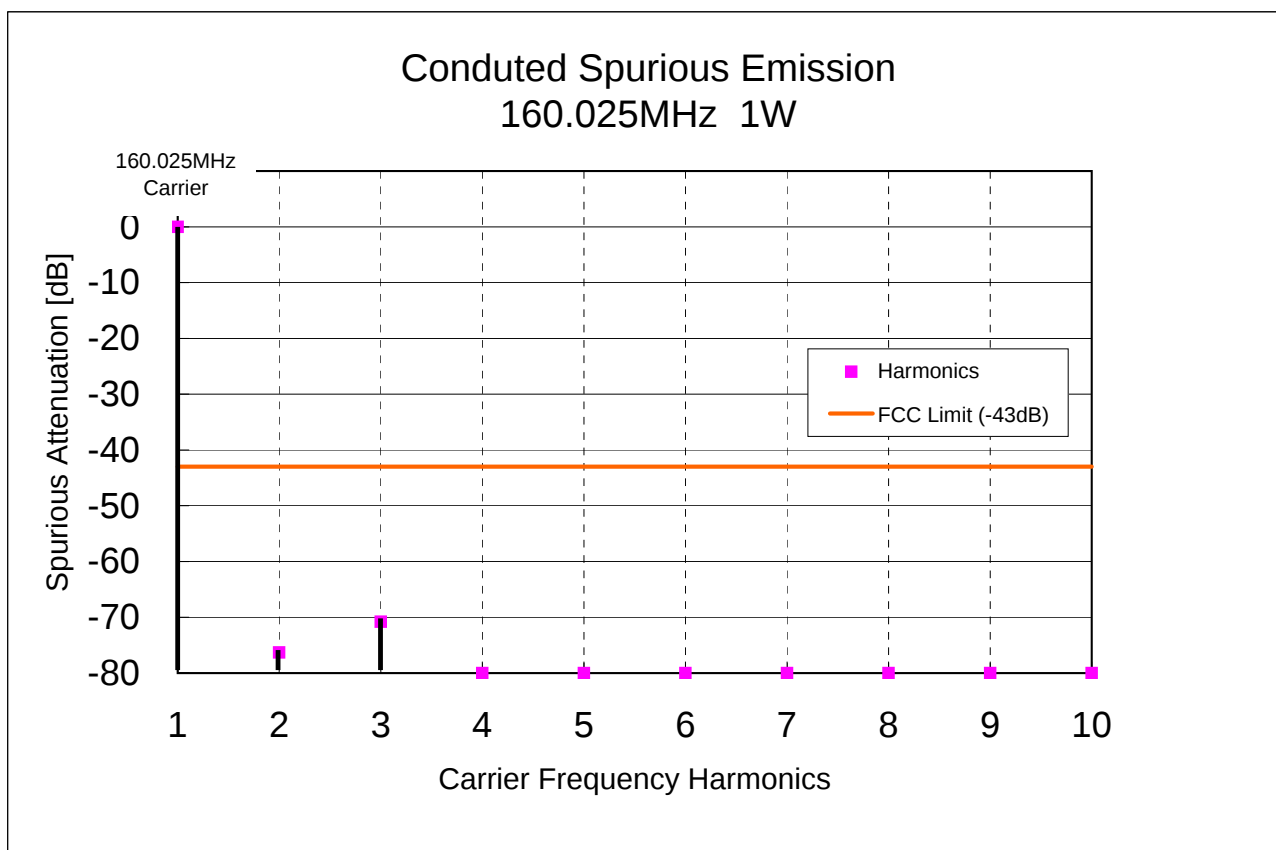
Harmonics	Emission Frequency [MHz]	Spurious Attenuation [dB]	FCC Limit
1	146.025(Carrier)	0.0	-43.0
2	292.050	-71.3	-43.0
3	438.075	-75.2	-43.0
4	584.100	-80.0	-43.0
5	730.125	-80.0	-43.0
6	876.150	-80.0	-43.0
7	1022.175	-80.0	-43.0
8	1168.200	-80.0	-43.0
9	1314.225	-80.0	-43.0
10	1460.250	-80.0	-43.0



Model Name SC-280
 FCC ID O78SC280
 Serial Number SAMPLE1
 Emission Type 16K0F3E
 Channel Spacing 25.0[kHz]

21. Conducted Spurious Emission, 160.025MHz@1W (PARAGRAPH 21)

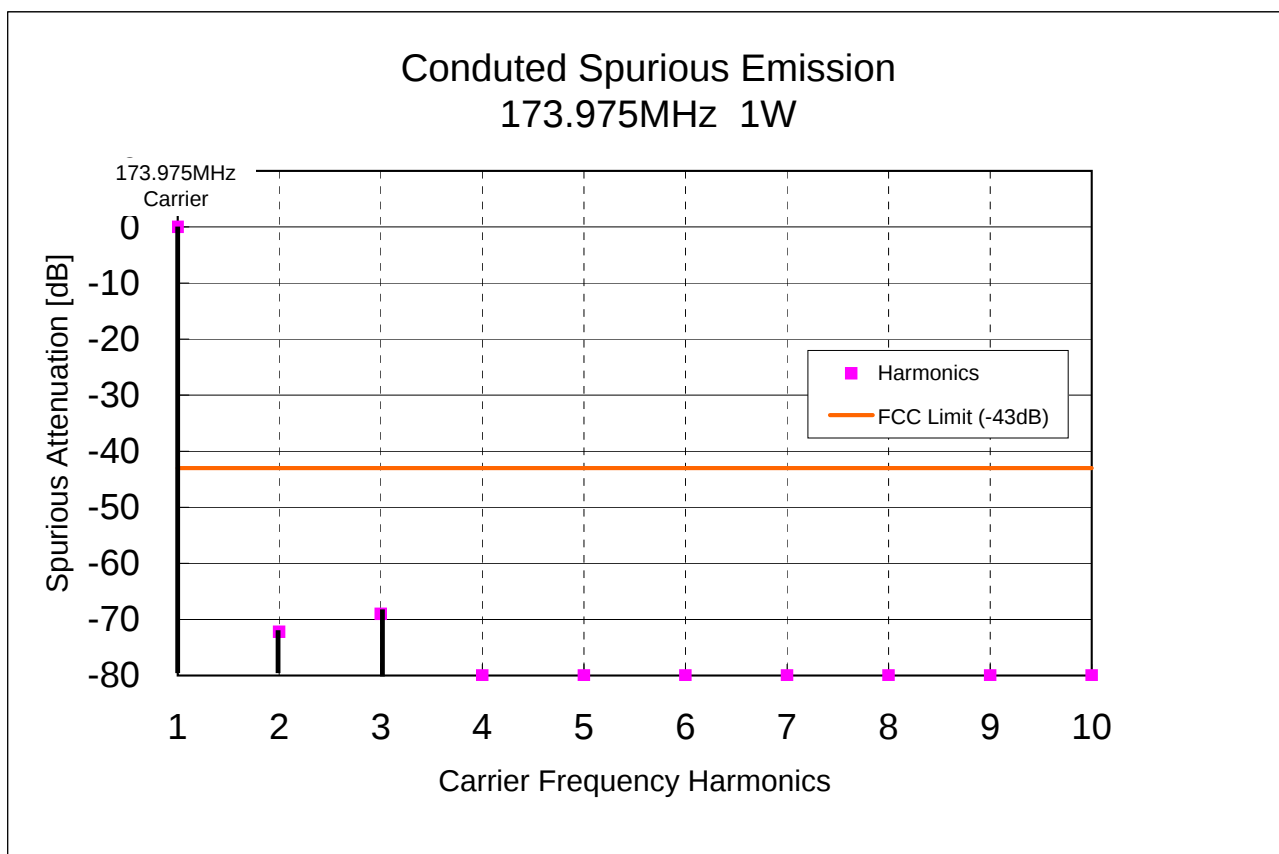
Harmonics	Emission Frequency [MHz]	Spurious Attenuation [dB]	FCC Limit
1	160.025(Carrier)	0.0	-43.0
2	320.050	-76.3	-43.0
3	480.075	-70.8	-43.0
4	640.100	-80.0	-43.0
5	800.125	-80.0	-43.0
6	960.150	-80.0	-43.0
7	1120.175	-80.0	-43.0
8	1280.200	-80.0	-43.0
9	1440.225	-80.0	-43.0
10	1600.250	-80.0	-43.0



Model Name SC-280
 FCC ID O78SC280
 Serial Number SAMPLE1
 Emission Type 16K0F3E
 Channel Spacing 25.0[kHz]

22. Conducted Spurious Emission, 173.975MHz@1W (PARAGRAPH 22)

Harmonics	Emission Frequency [MHz]	Spurious Attenuation [dB]	FCC Limit
1	173.975(Carrier)	0.0	-43.0
2	347.950	-72.2	-43.0
3	521.925	-69.0	-43.0
4	695.900	-80.0	-43.0
5	869.875	-80.0	-43.0
6	1043.850	-80.0	-43.0
7	1217.825	-80.0	-43.0
8	1391.800	-80.0	-43.0
9	1565.775	-80.0	-43.0
10	1739.750	-80.0	-43.0



Model Name SC-280
FCC ID O78SC280
Serial Number SAMPLE1
Emission Type 16K0F3E
Channel Spacing 25.0[kHz]
Frequency 160.025[MHz]

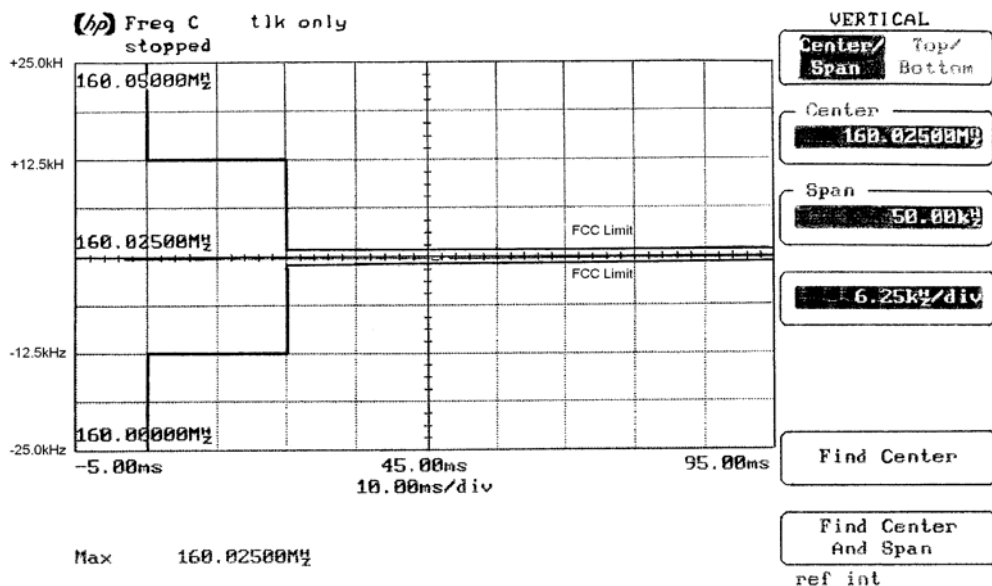
19. Conducted Spurious Emission@Receiver (Paragraph 19)

Frequency Tuned [MHz]	Frequency Emission [MHz]	Level [dBm]
160.0250	204.9750	-71.0
160.0250	409.9500	-82.0
160.0250	614.9250	-82.0
160.0250	819.9000	-82.0
160.0250	1024.8750	-82.0
160.0250	1229.8500	-82.0
160.0250	1434.8250	-82.0
160.0250	1639.8000	-82.0
160.0250	1844.7750	-82.0
160.0250	2049.7500	-82.0

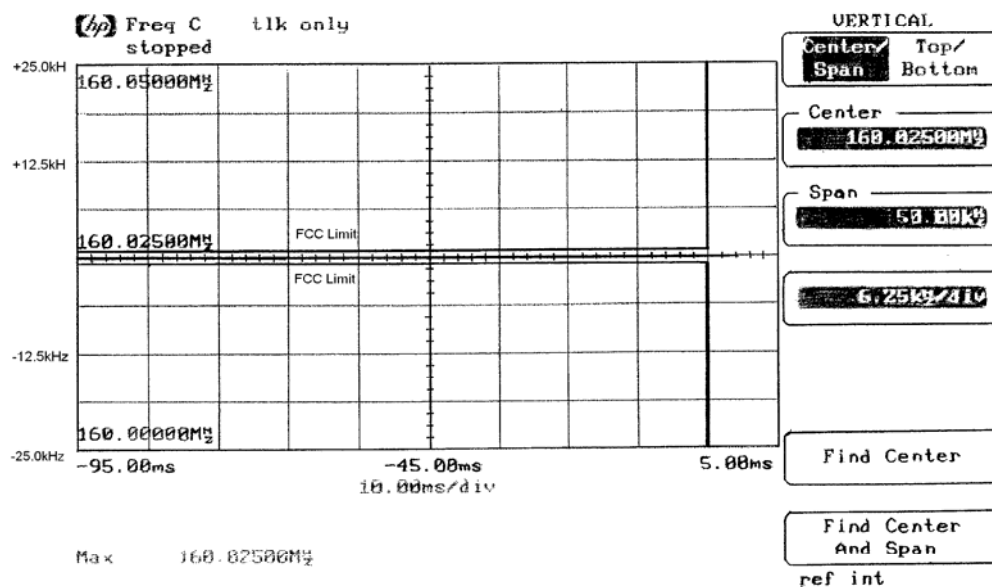
Model Name SC-280
 FCC ID O78SC280
 Serial Number SAMPLE1
 Emission Type 16K0F3E
 Channel Spacing 25.0[kHz]
 Frequency 160.025[MHz]

20. Transient Behavior (Paragraph 20)

Switch on condition 160.025MHz



Switch off condition 160.025MHz



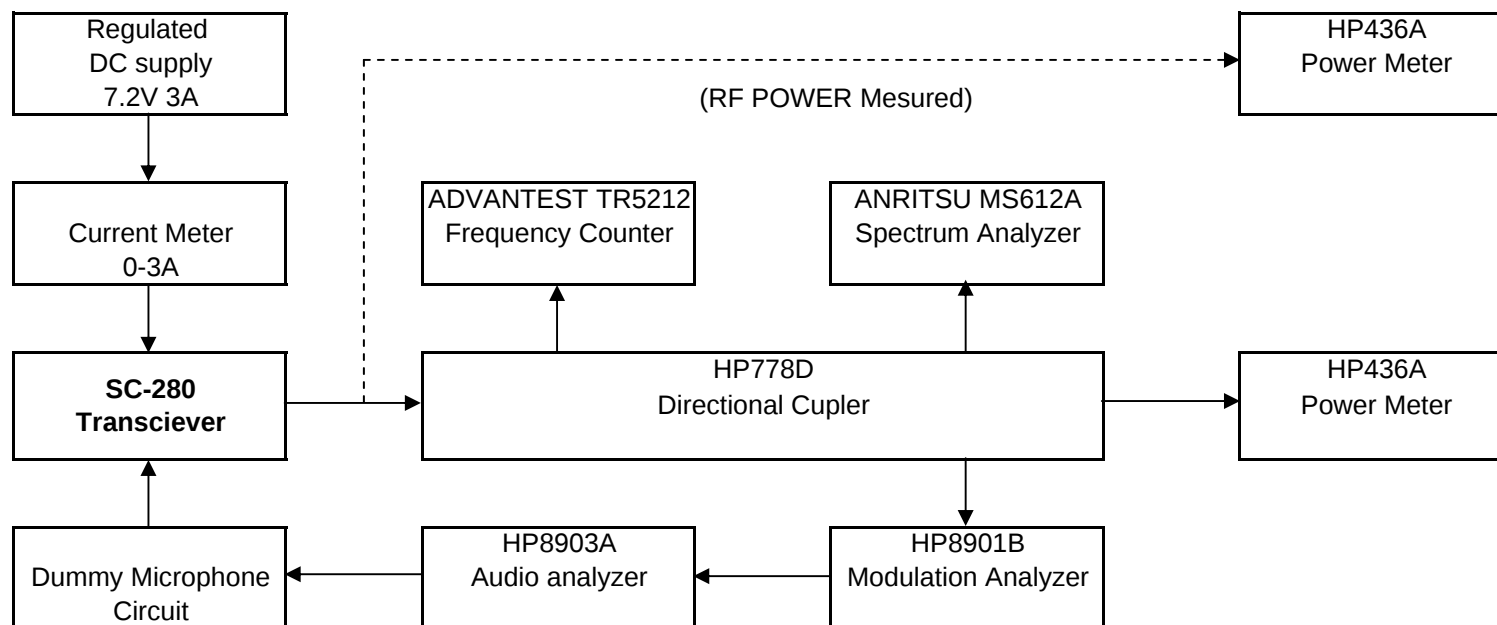


Figure 1. Test Set-Up