TEST REPORT

OF

FCC Part 90, Part 2

FCC ID : RXUSP6102

Equipment Under Test	:	Private Land Mobile Radio for Handheld(VHF)
Model No.	:	SP6102
Serial No.	:	N/A
Applicant	:	MAXON CIC Corp.
Manufacturer	:	MAXON CIC Corp.
Date of Test(s)	:	2007-10-02 ~ 2007-10-19
Date of Issue	:	2007-10-26

In the configuration tested, the EUT complied with the standards specified above.

Tested By: **Date** **2007-10-26**

Feel Jeong

Approved By **Date** **2007-10-26**

Denny Ham

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1. General Information

1-1. Testing Laboratory

SGS Testing Korea Co., Ltd.
Wireless Div. 2FL, 18-34, Sanbon-dong, Gunpo-si, Gyeonggi-do, Korea 435-040
www.electrolab.kr.sgs.com
Telephone : +82 +31 428 5700
FAX : +82 +31 427 2371

1-2. Details of Applicant

Applicant : MAXON CIC Corp.

Address : Chongho Bldg, #7-61, Yangjae-dong, Seocho-gu, Seoul, Korea

Contact Person : Phillip Son
Phone No. : 82-2-3498-3054
Fax No. : 82-2-3498-3115

1-3 Description of EUT

Kind of Product	Private Land Mobile Radio for Handheld(VHF)
Model Name	SP6102
Serial Number	N/A
Power Supply	DC 7.5 V
Frequency Range	148 MHz ~ 174 MHz
Transmit Power	1W(Low), 5 W(High)
Modulation Technique	FM
Number of Channels	208 Channels
Operating Conditions	-30 ~ 60 deg C
Antenna Type	Connected Type

1-4 Details of modification

- N/A

1-5. Test Equipment List

EQUIPMENT	MANUFACTURER	MODEL	CAL DUE.
Signal Generator	Agilent	E4438C	May 2008
Spectrum Analyzer	Agilent	E4440A	May 2008
Spectrum Analyzer	R&S	FSP40	Jan. 2008
Audio Analyzer	H.P.	8903B	Dec.2007
Modulation Analyzer	H.P.	8901B	Dec.2007
DC Power Supply	Agilent	6674A	May 2008
Tem/Hum Chamber	Han-Gil	HGTP-4050	Oct.2008
Power Sensor	Agilent	E9327A	May 2008
Power Meter	Agilent	4416A	May 2008
Attenuator	Weincshel	AZ3096	Dec.2007
Preamplifier	Agilent	8449B	May 2008
Preamplifier	Agilent	8447F	Jun.2008
Log-periodic	Rohde & Schwarz	UHALP9107	Jan.2009
Biconical Antenna	Schwarzbeck	VHA9103	Mar.2008
Horn Antenna	Rohde & Schwarz	HF906	Mar.2008
Signal Generator	R&S	SMR 20	Dec.2007
Horn Antenna	R&S	HF906	Aug.2008
Biconcai Antenna	R&S	HK116	May 2009
Log-Periodic Antenna	R&S	HL223	May 2009
Turn Table	INN-CO	CT 0800	N.C.R
Antenna Mast	INN-CO	MA 2000	N.C.R
Controller	INN-CO	CO 2000	N.C.R
Anechoic Chamber	SY Corporation	10m x 5m x 5m	Feb. 2008

1.6 Summary of Test Results

Description of Test	FCC Rule	Result
Output Power Conducted	2.1046(a), 90.205	Complied
Radiated Spurious Emissions	2.1053(a), 90.210	Complied
Conducted Spurious Emissions	2.1051, 90.210	Complied
Audio Frequency Response	2.1047(a)	Complied
Audio Low Pass Filter Frequency Response	2.1047(a)	Complied
Modulation Limiting	2.1047(b)	Complied
Occupied Bandwidth	2.1049, 90.210	Complied
Frequency Stability	90.213, 2.1055	Complied
Transient Frequency Behaviour of the Transmitter	90.214	Complied

2. Output Power Conducted : FCC 2.1046(a), FCC90.205

2.1. Limit

According to §90.205(r), The output power shall not exceed by more than 20 percent either the out-put power

2.2. Test Procedure

1. The conducted RF output power is the available power at the output terminals of the transmitter when the output terminals are corrected to the standard transmitter load.
2. The test sample is feeding a 50 ohm coaxial attenuator which is connected to a spectrum analyzer.
3. The power output at the transmitter antenna port is determined by adding the value of the attenuator to the spectrum analyzer reading.
4. The test are performed at the frequencies(low, middle, high channels of the EUT operating band) and full rated power levels of the transmitter.

2.3. Test results

Ambient temperature : 25℃ Relative humidity : 50%

Power Level [W]	Frequency [MHz]	Channel Spacing [kHz]	RF Output Power [W]	Nominal DC Voltage [V]
1	148.025	12.5	0.81	7.5
	160.025	12.5	0.94	7.5
	173.975	12.5	0.88	7.5
5	148.025	12.5	4.36	7.5
	160.025	12.5	4.60	7.5
	173.975	12.5	4.38	7.5

The supply voltage to the transmitter was set to 7.5 volts DC. The RF output power was measured with the indicated current applied into the final RF amplifying device.

RF Power Output 1 W, Frequency 160.025 MHz

Measured DC Current: 0.71 A

RF Power Output 5 W, Frequency 160.025 MHz

Measured DC Current: 1.81 A

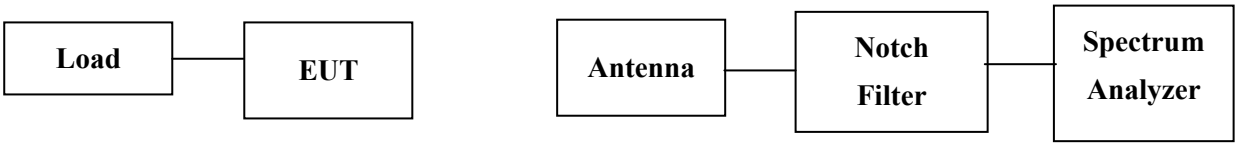
3. Radiated Spurious Emissions : FCC 2.1053(a), FCC90.210

3.1. Limit

According to §90.210, For 25 kHz channel : Spurious attenuated in dB= 43+ 10log (Power output in watts) Alternatively, an equivalent absolute level of -13 dBm is taken. For 12.5 kHz channel : Spurious attenuated in dB= 50+ 10log(Power output in watts) Alternatively, an equivalent absolute level of -20 dBm is taken.

3.2. Test Procedure

1 Radiated spurious emissions are emissions from the EUT when transmitting in non-radiating load on frequencies outside the operating band.
2. In order to suppress inter-modulation products in the spectrum analyzer a notch filter is used, if applicable.
3. The equipment is adjusted to obtain peak reading of received signal wherever they occur in the Spectrum by: rotating the transmitter under test, adjusting the antenna height.
4. The testing procedure is repeated for both horizontal and vertical polarization of the receiving antenna.
5. Relative signal strength is indicated on the spectrum analyzer connected to the receiving antenna. To obtain actual radiated signal strength for each spurious and harmonic frequency observed, a standard signal generator with calibrated output is connected to a dipole antenna adjusted to that particular frequency.
6. This dipole antenna is substituted for the transmitter under test.
7. The signal generator is adjusted in output level until a reading identical to that obtained with the actual transmitter is observed on the spectrum analyzer.
8. Signal strength is then read and recorded directly from the generator.



3.3. Test results

Ambient temperature : 24℃ Relative humidity : 49%

TX FREQ= 148.0250 MHz Low Power Setting Channel Spacing: 12.5 kHz

Frequency [MHz]	Polarization	Max. Power Value [dBm]	Specification Limit [dBm]	Margin [dB]
296.0500	V	<-40	-20	<20
444.0750	V	<-40	-20	<20
592.1000	V	<-40	-20	<20
740.1250	V	<-40	-20	<20
888.1500	V	<-40	-20	<20
1036.1750	V	<-40	-20	<20
1184.2000	V	<-40	-20	<20
1332.2250	V	<-40	-20	<20
1480.2500	V	<-40	-20	<20

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1184.2000	V	<-40	-20	<20
1332.2250	V	<-40	-20	<20
1480.2500	V	<-40	-20	<20

TX FREQ = 148.0250 MHz Low Power Setting Channel Spacing: 25 kHz

Frequency [MHz]	Polarization	Max. Power Value [dBm]	Specification Limit [dBm]	Margin [dB]
296.0500	V	<-40	-13	<27
444.0750	V	<-40	-13	<27
592.1000	V	<-40	-13	<27
740.1250	V	<-40	-13	<27
888.1500	V	<-40	-13	<27
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TX FREQ = 160.0250 MHz Low Power Setting Channel Spacing: 12.5 kHz

Frequency [MHz]	Polarization	Max. Power Value [dBm]	Specification Limit [dBm]	Margin [dB]
320.0500	V	<-40	-20	<20
480.0750	V	<-40	-20	<20
640.1000	V	<-40	-20	<20
800.1250	V	<-40	-20	<20
960.1500	V	<-40	-20	<20
1120.1750	V	<-40	-20	<20
1280.2000	V	<-40	-20	<20
1440.2250	V	<-40	-20	<20
1600.2500	V	<-40	-20	<20

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1120.1750	V	<-40	-13	<27
1280.2000	V	<-40	-13	<27
1440.2250	V	<-40	-13	<27
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1120.1750	V	<-40	-13	<27
1280.2000	V	<-40	-13	<27
1440.2250	V	<-40	-13	<27
1600.2500	V	<-40	-13	<27

TX FREQ = 173.9750 MHz Low Power Setting Channel Spacing: 12.5 kHz

Frequency [MHz]	Polarization	Max. Power Value [dBm]	Specification Limit [dBm]	Margin [dB]
347.9500	V	<-40	-20	<20
521.9250	V	<-40	-20	<20
695.9000	V	<-40	-20	<20
869.8750	V	<-40	-20	<20
1043.8500	V	<-40	-20	<20
1217.8250	V	<-40	-20	<20
1391.8000	V	<-40	-20	<20
1565.7750	V	<-40	-20	<20
1739.7500	V	<-40	-20	<20

TX FREQ = 173.9750 MHz High Power Setting Channel Spacing: 12.5 kHz

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695.9000	V	<-40	-20	<20
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1043.8500	V	<-40	-20	<20
1217.8250	V	<-40	-20	<20
1391.8000	V	<-40	-20	<20
1565.7750	V	<-40	-20	<20
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1391.8000	V	<-40	-13	<27
1565.7750	V	<-40	-13	<27
1739.7500	V	<-40	-13	<27

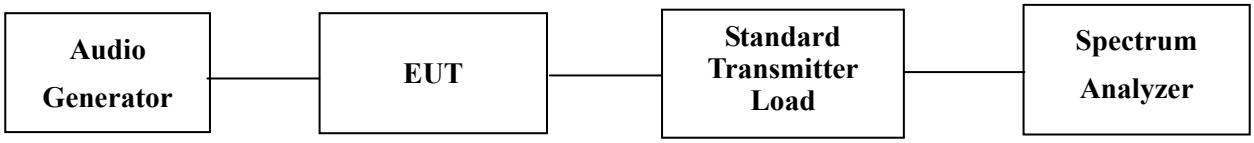
4. Conducted Spurious Emissions : FCC 2.1051, FCC90.210

4.1. Limit

According to §90.210, For 25 kHz channel : Spurious attenuated in dB= 43+ 10log(Power output in watts) Alternatively, an equivalent absolute level of -13 dBm is taken. For 12.5 kHz channel : Spurious attenuated in dB= 50+ 10log(Power output in watts) Alternatively, an equivalent absolute level of -20 dBm is taken

4.2. Test Procedure

1. Conducted spurious emissions are emissions at the antenna terminal on frequencies outside the operating band. The test is performed according the principle below using a computer controlled test set-up.
2. The transmitter is modulated with 2500Hz sine wave at an input level 16dB greater than that necessary to produce 50% of rated system deviation.

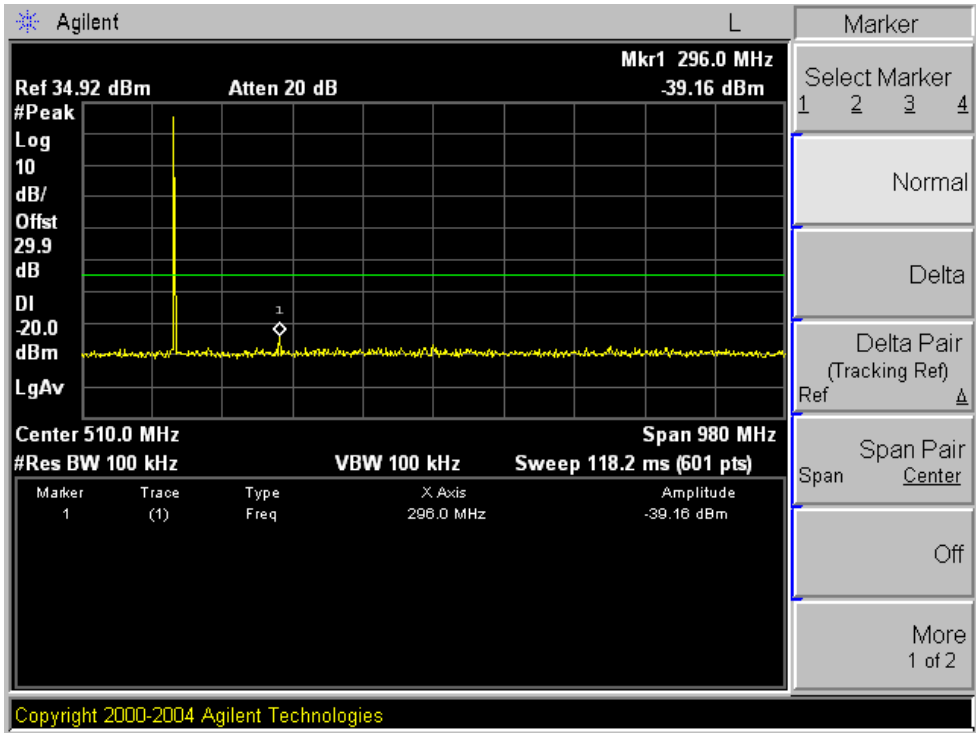


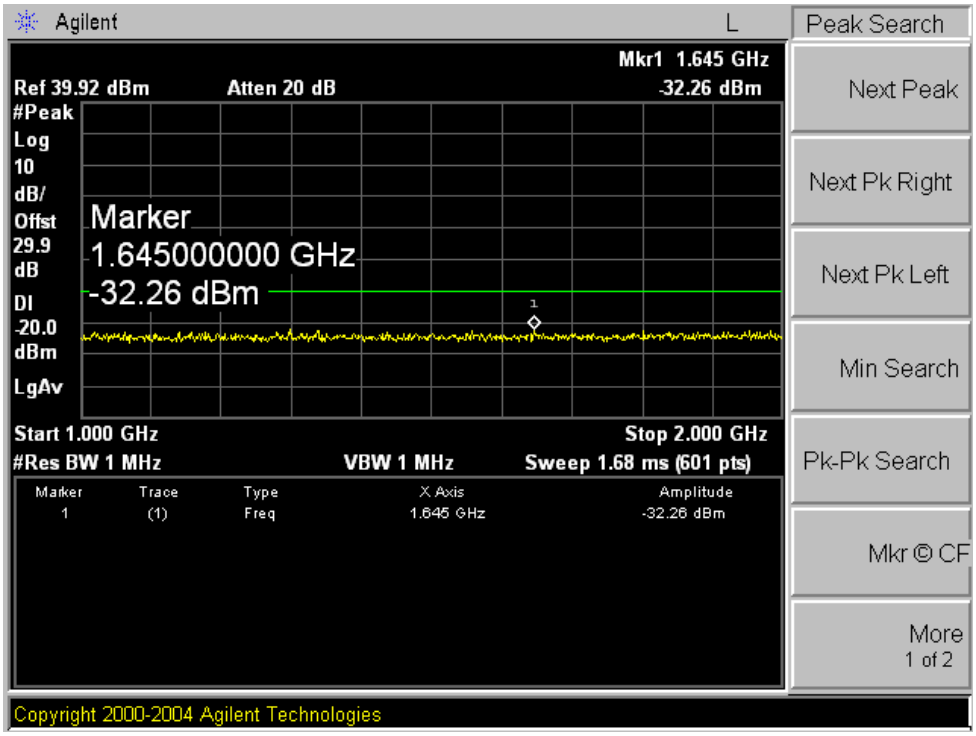
4.3. Test Results

Ambient temperature : 25℃ Relative humidity : 49%

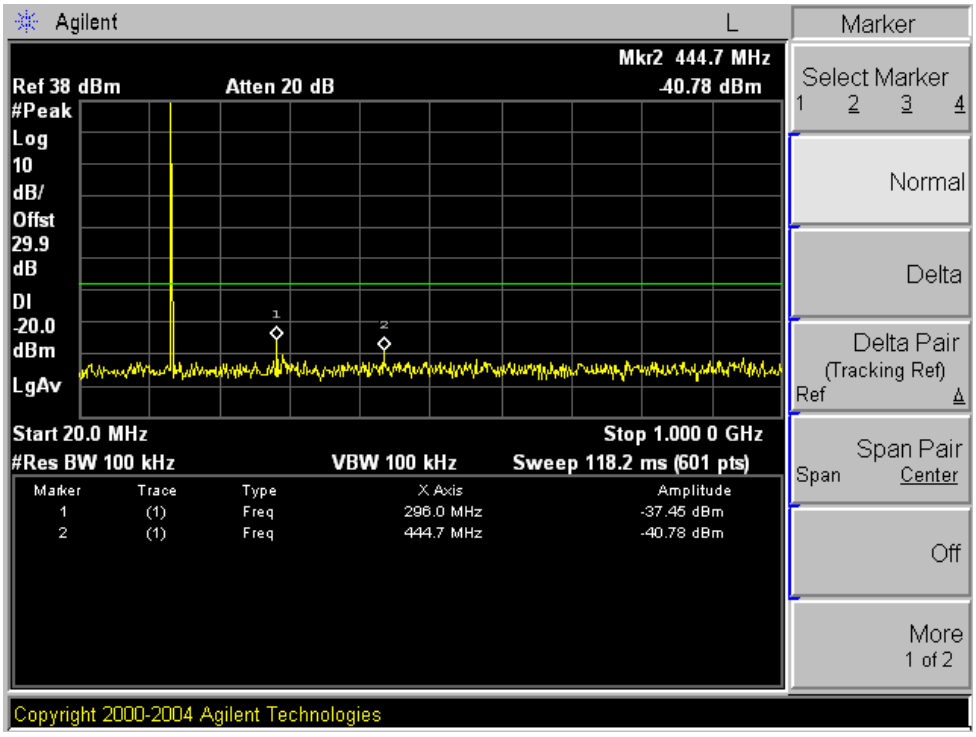
Please refer to the following plots.

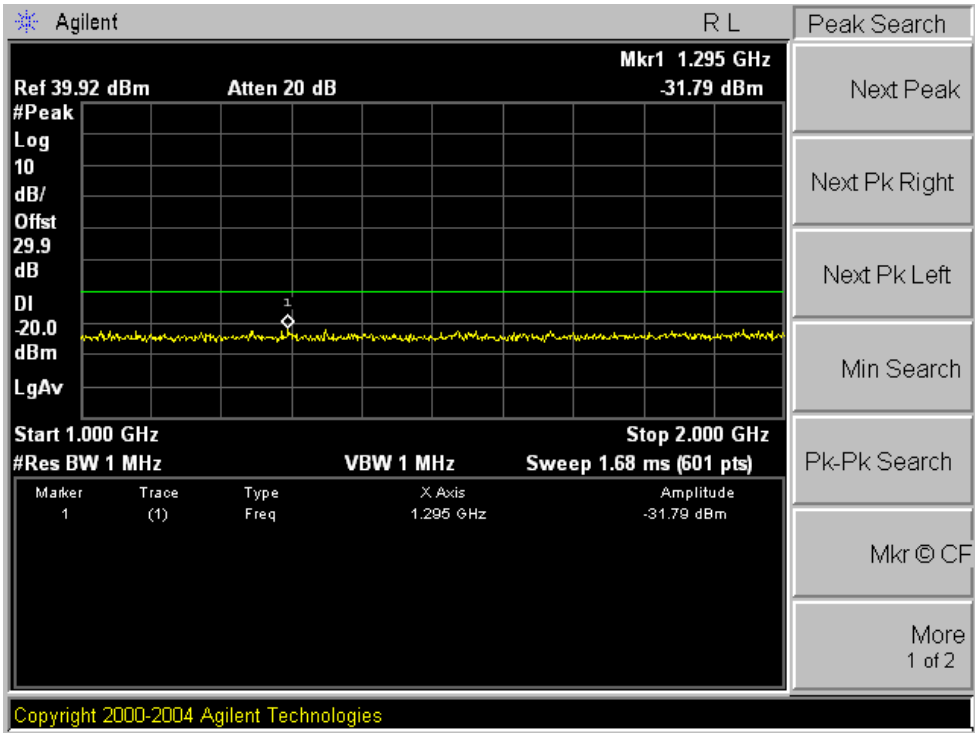
TX FREQ= 148.0250 MHz **Low Power Setting** **Channel Spacing: 12.5 kHz**



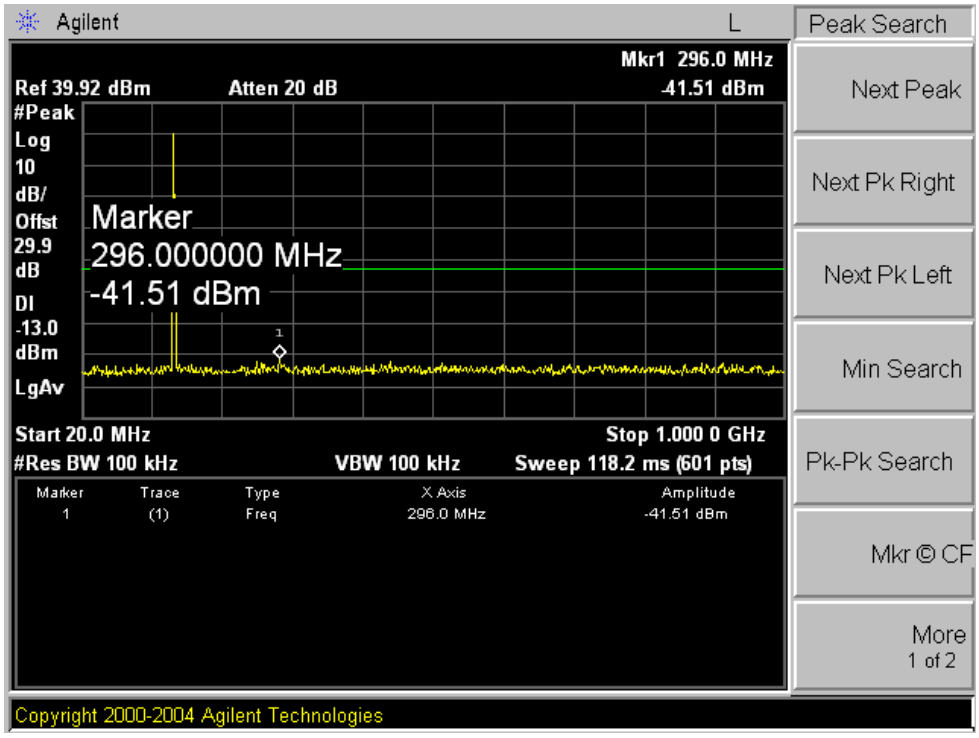


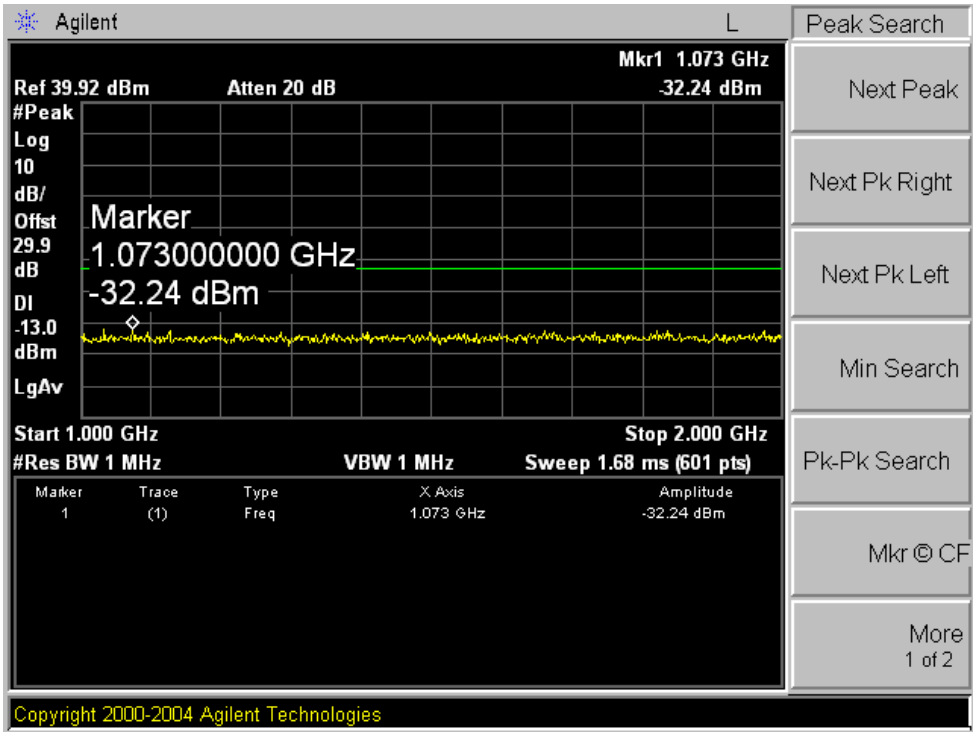
TX FREQ = 148.0250 MHz **High Power Setting** **Channel Spacing: 12.5 kHz**



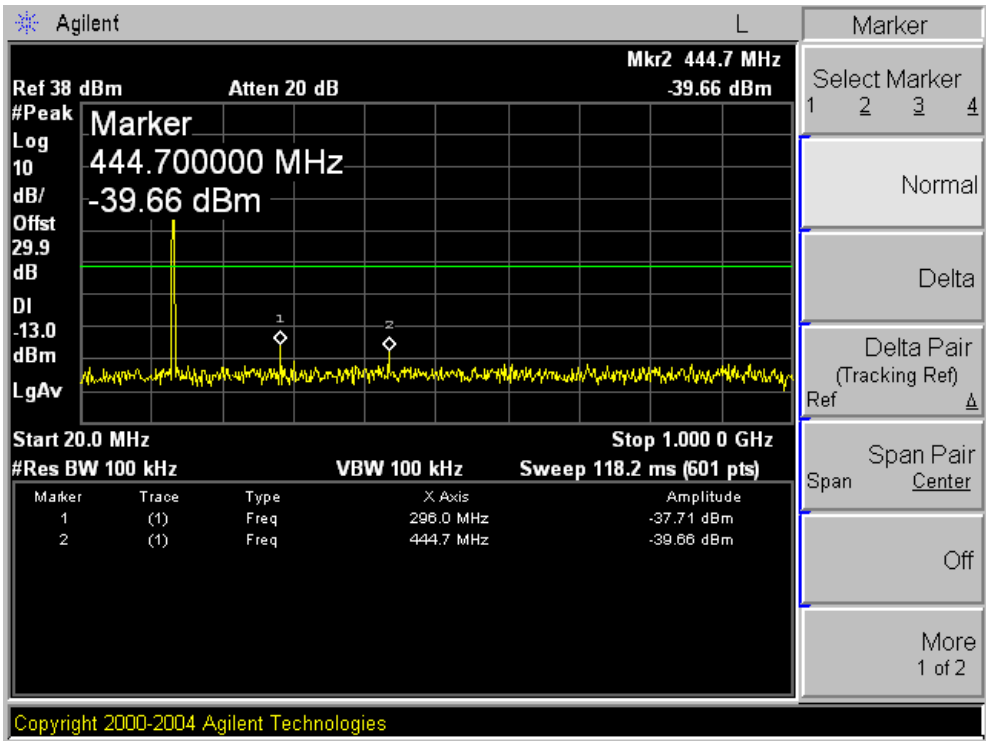


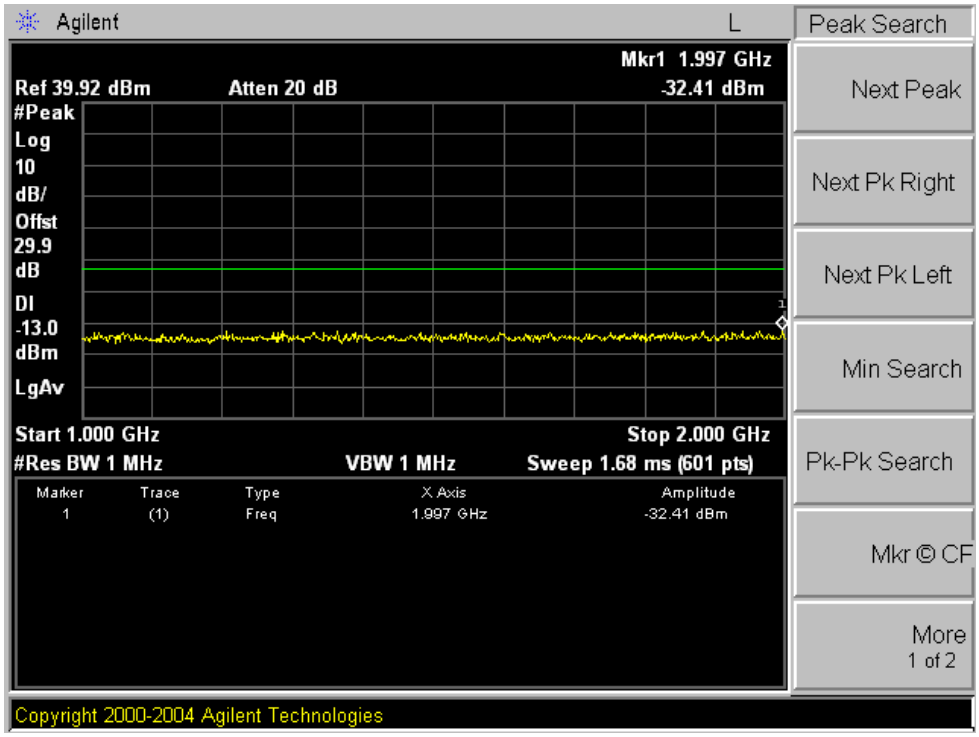
TX FREQ = 148.0250 MHz **Low Power Setting** **Channel Spacing: 25 kHz**



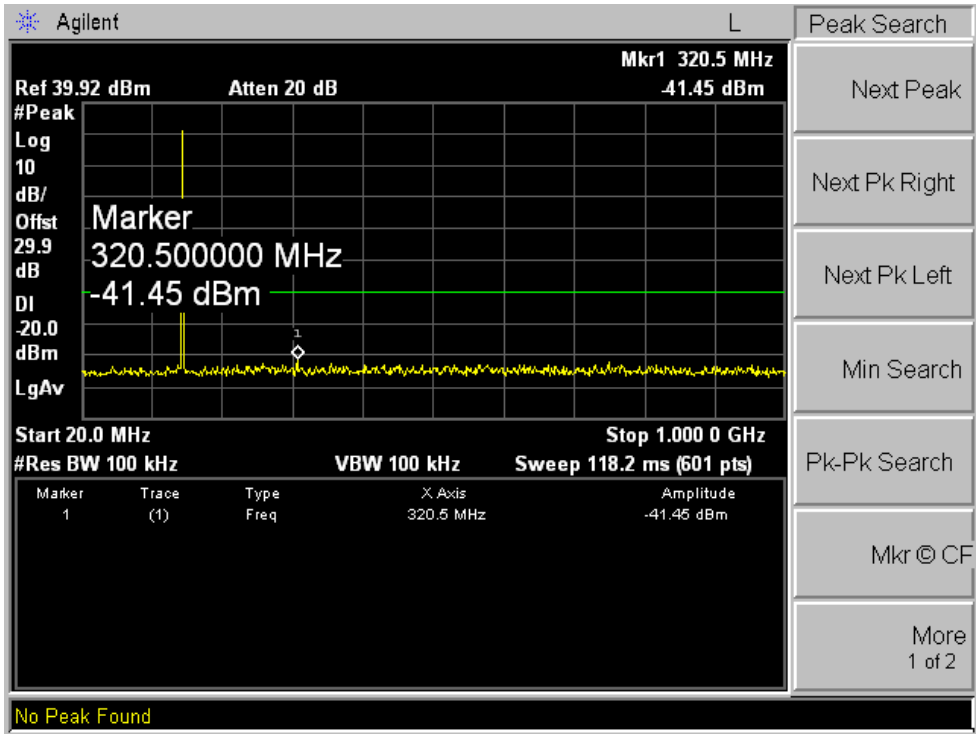


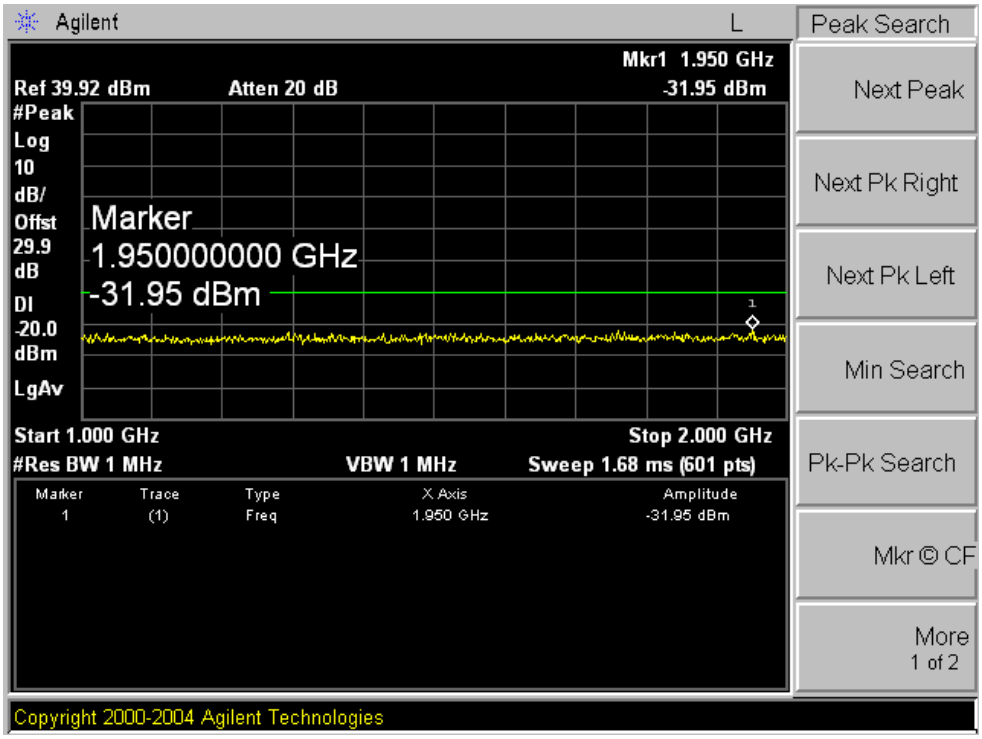
TX FREQ = 148.0250 MHz **High Power Setting** **Channel Spacing: 25 kHz**



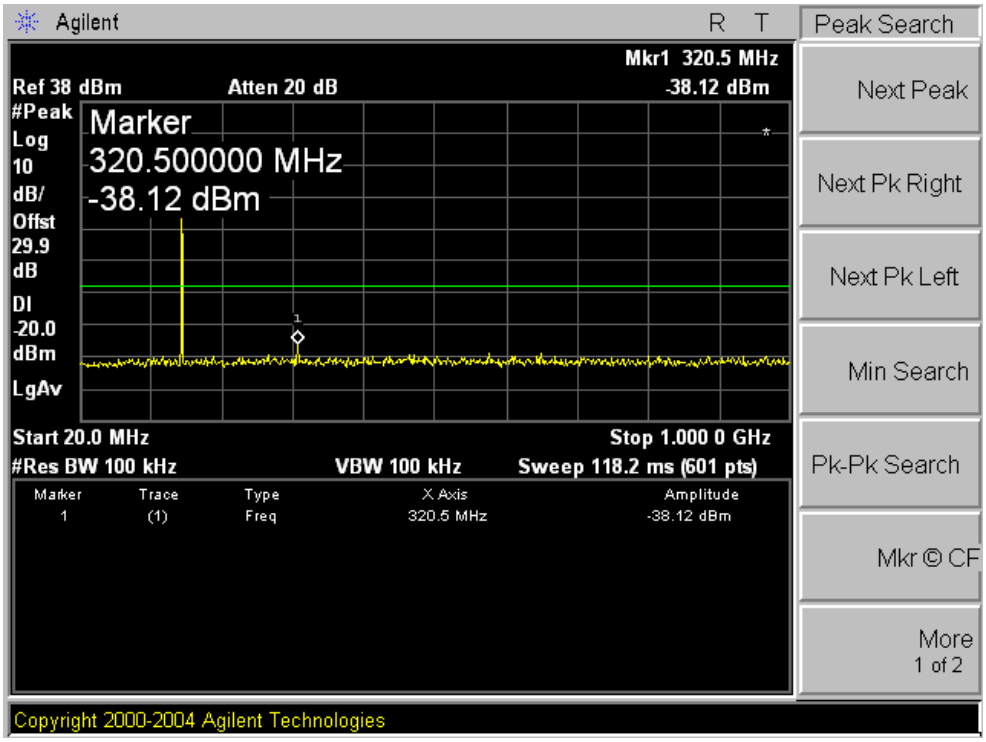


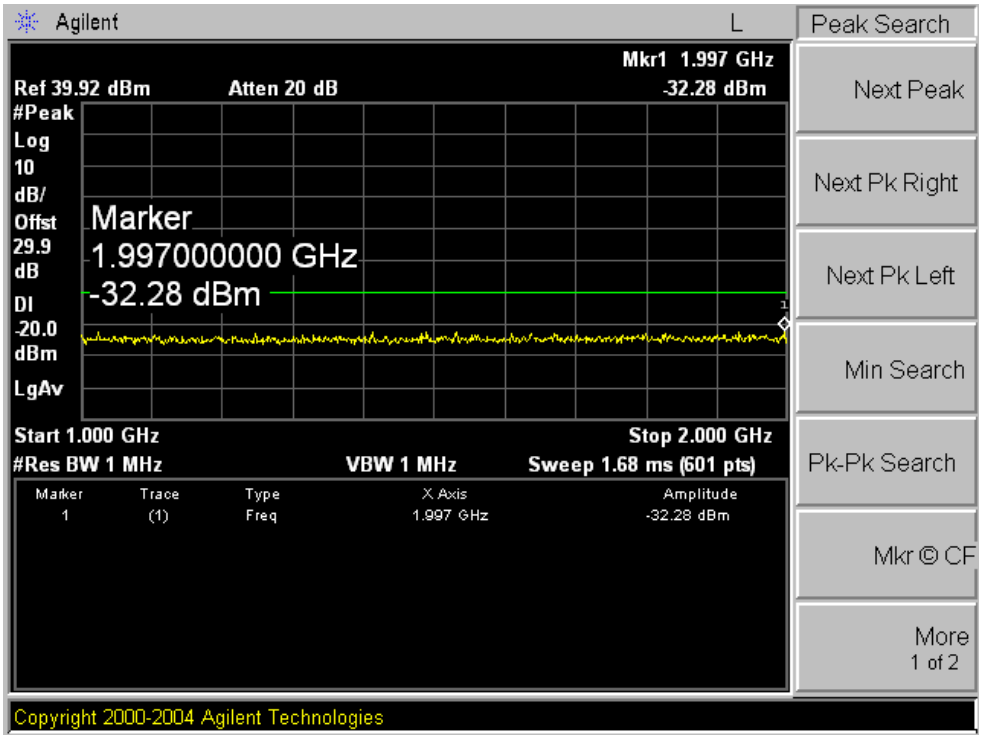
TX FREQ = 160.0250 MHz **Low Power Setting** **Channel Spacing: 12.5 kHz**



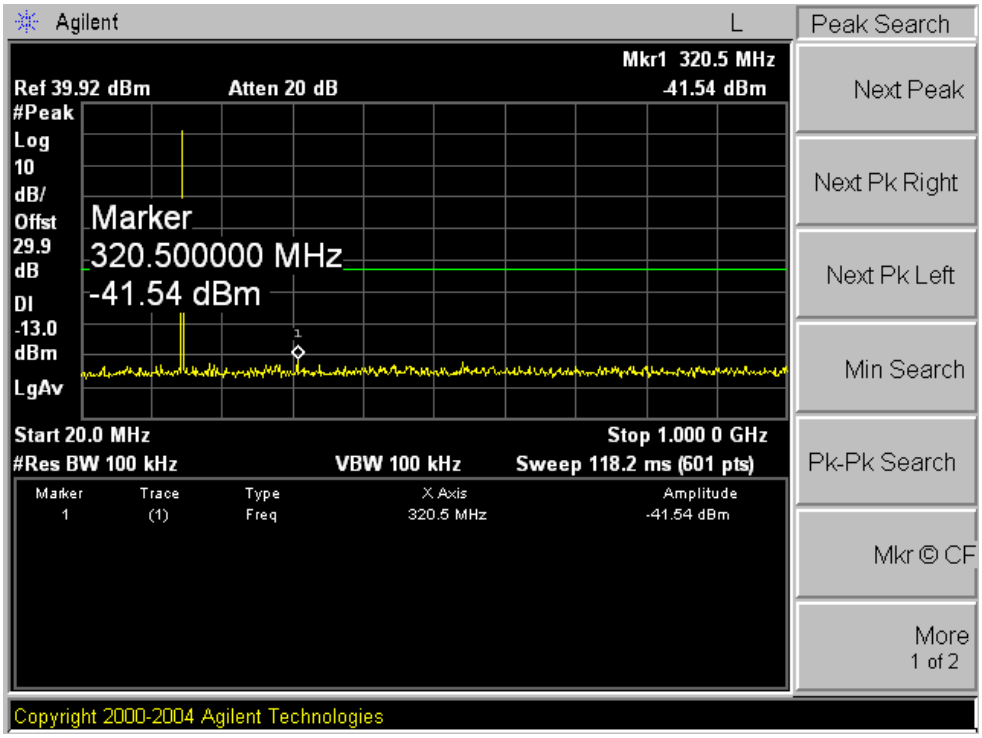


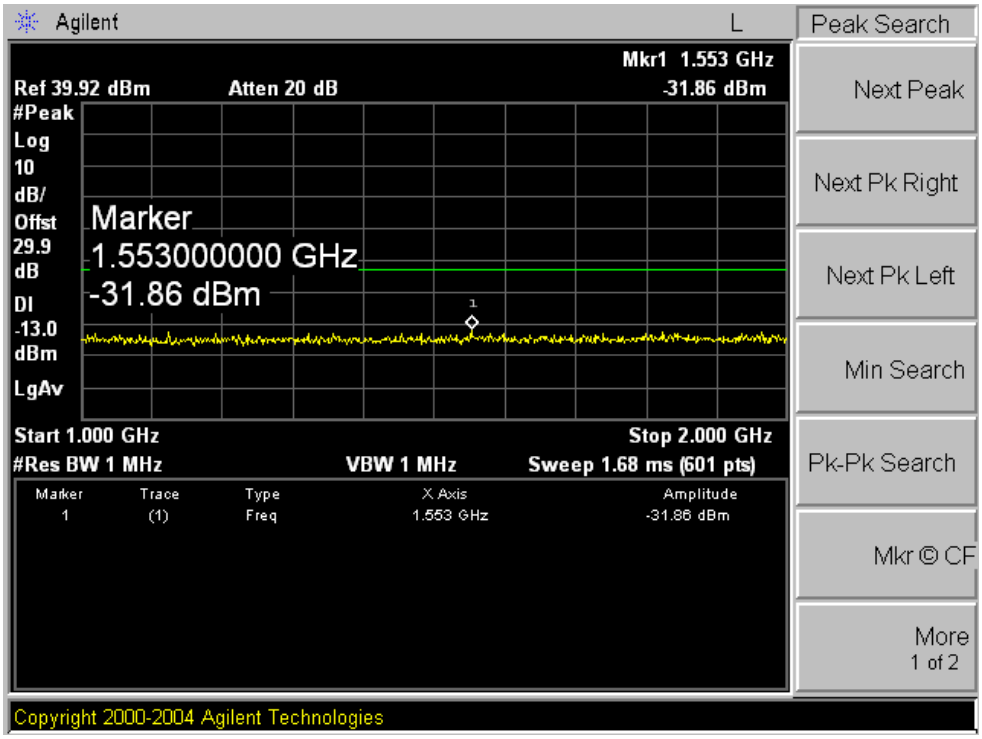
TX FREQ = 160.0250 MHz **High Power Setting** **Channel Spacing: 12.5 kHz**



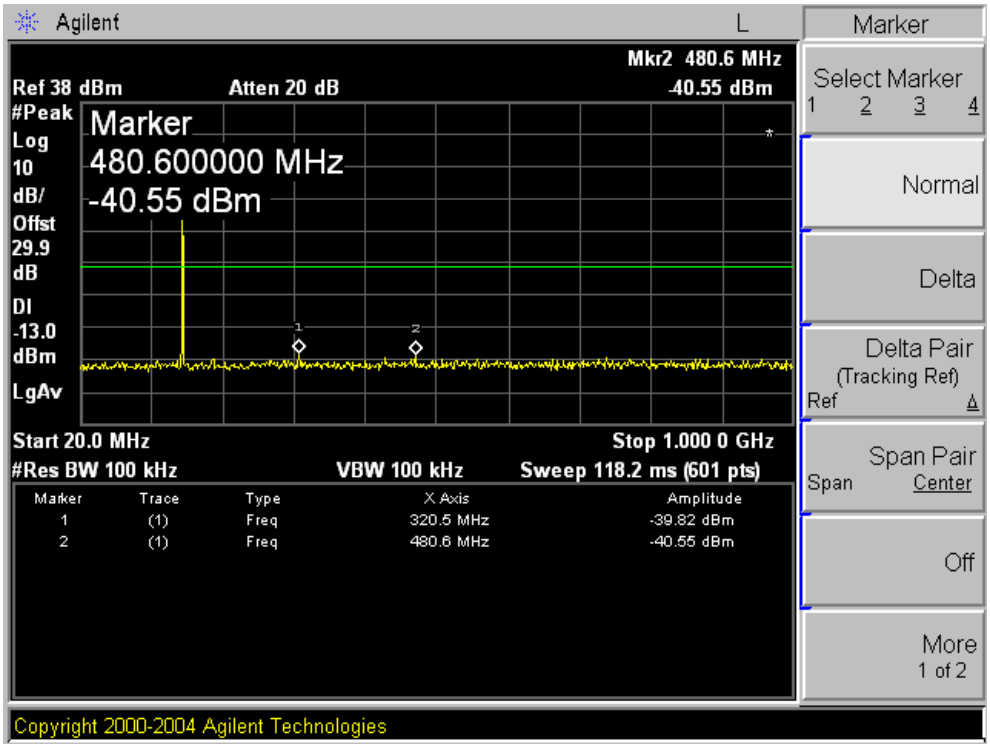


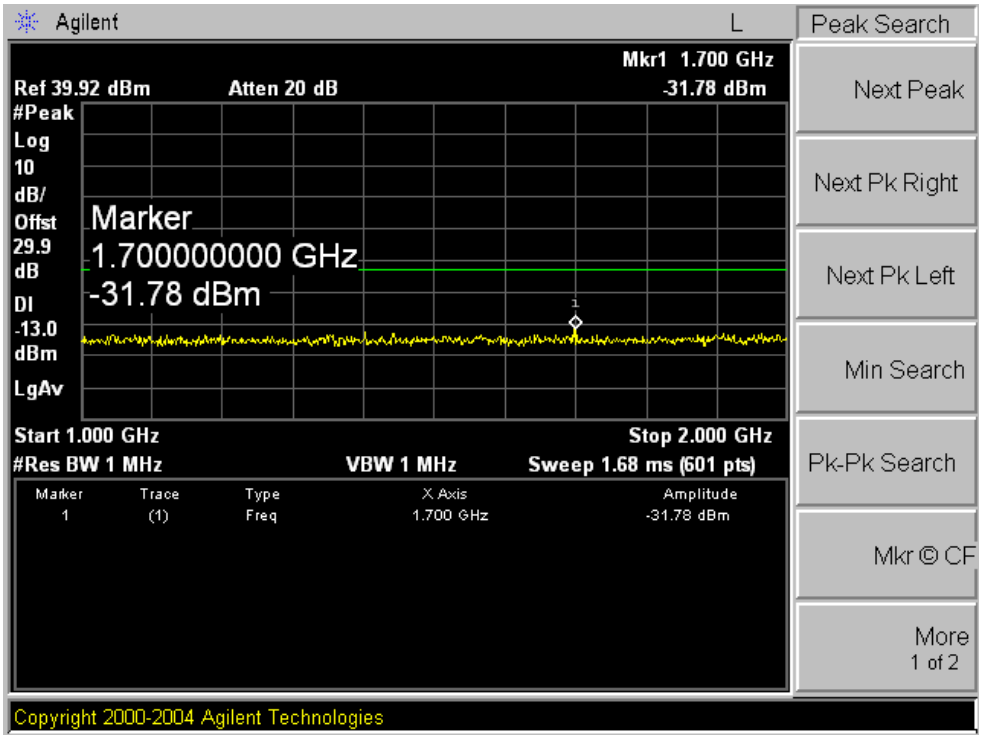
TX FREQ = 160.0250 MHz **Low Power Setting** **Channel Spacing: 25 kHz**



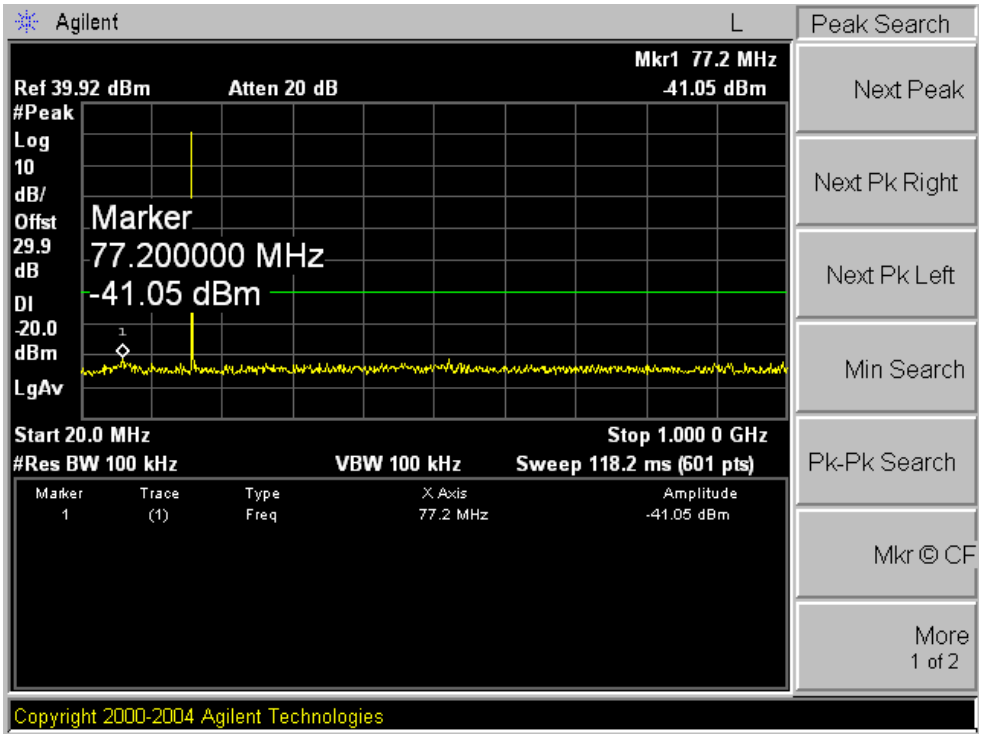


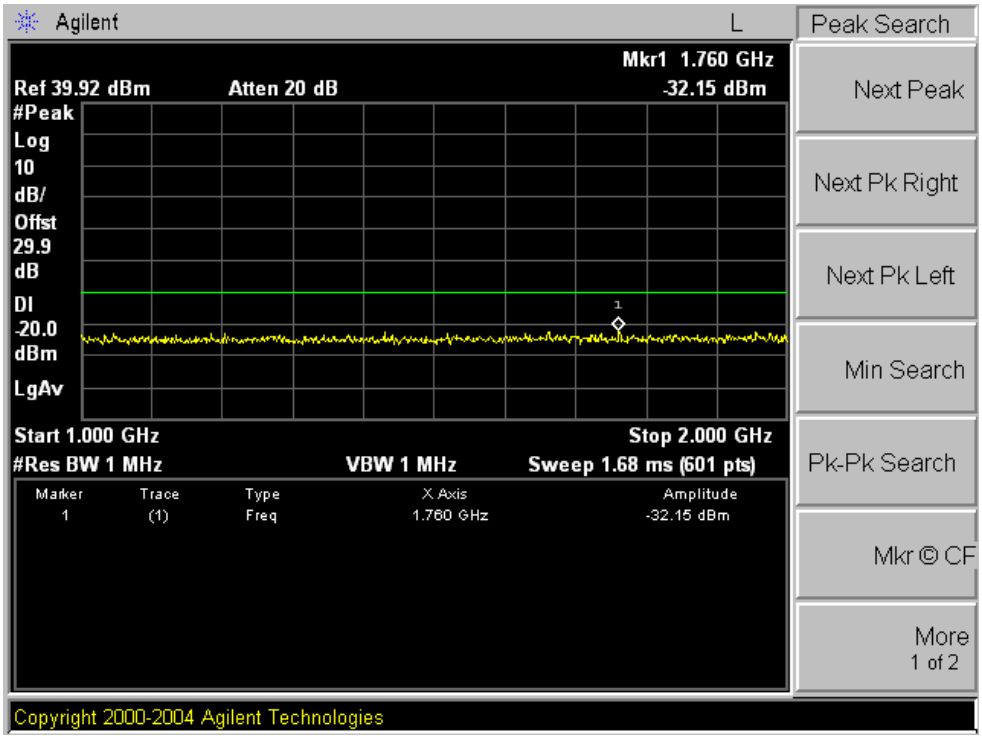
TX FREQ = 160.0250 MHz **High Power Setting** **Channel Spacing: 25 kHz**



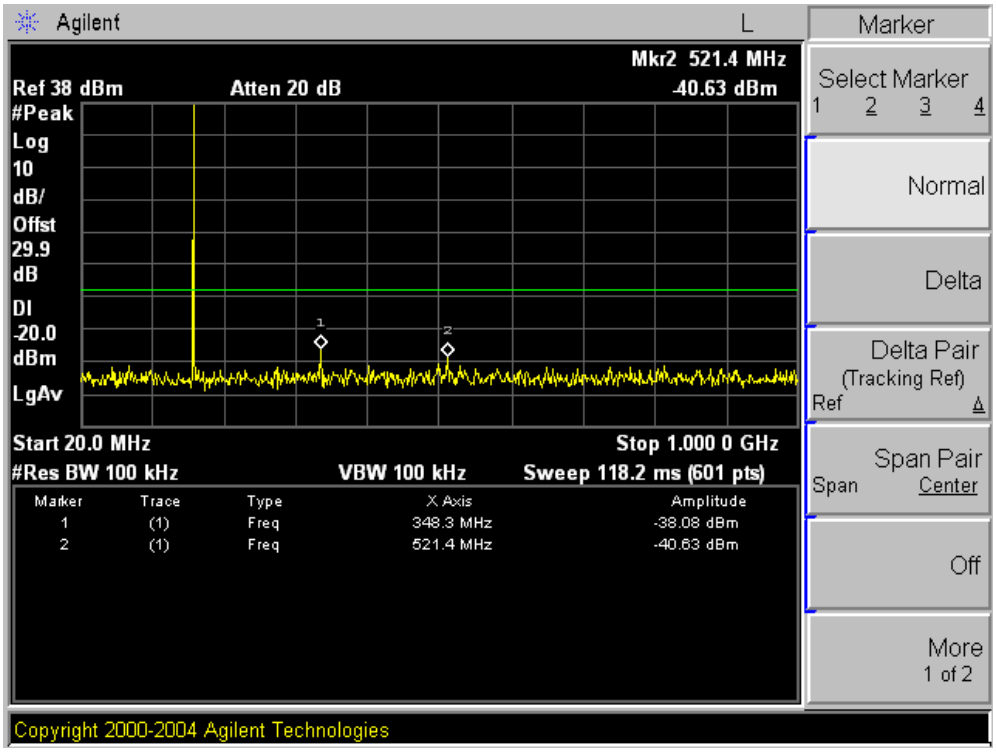


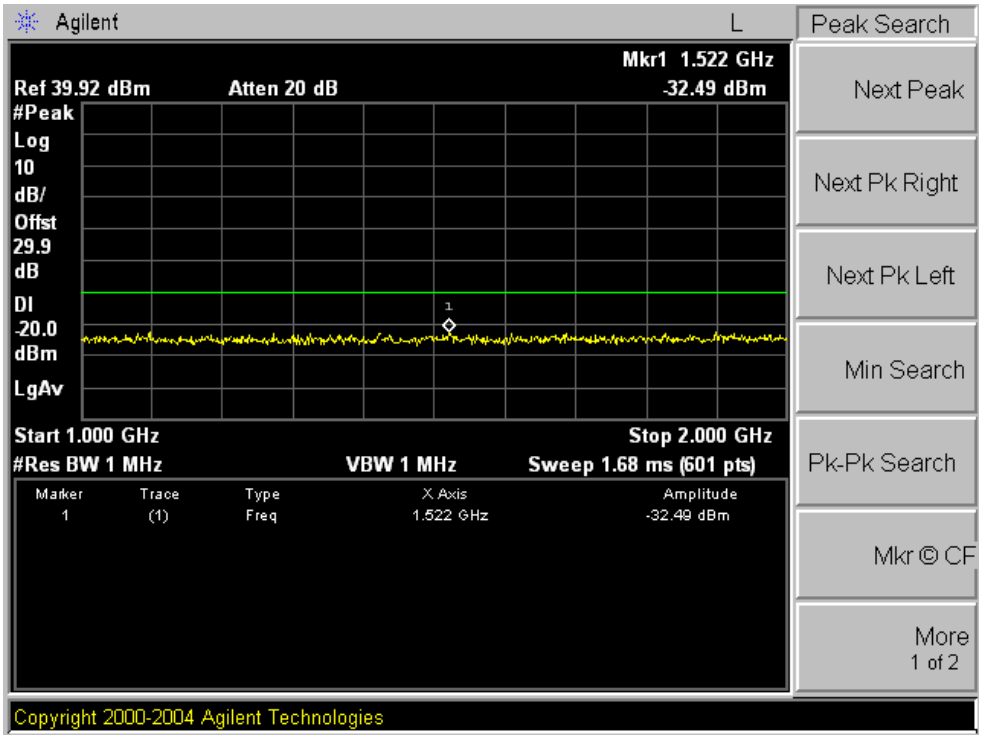
TX FREQ = 173.9750 MHz **Low Power Setting** **Channel Spacing: 12.5 kHz**





TX FREQ = 173.9750 MHz **High Power Setting** **Channel Spacing: 12.5 kHz**





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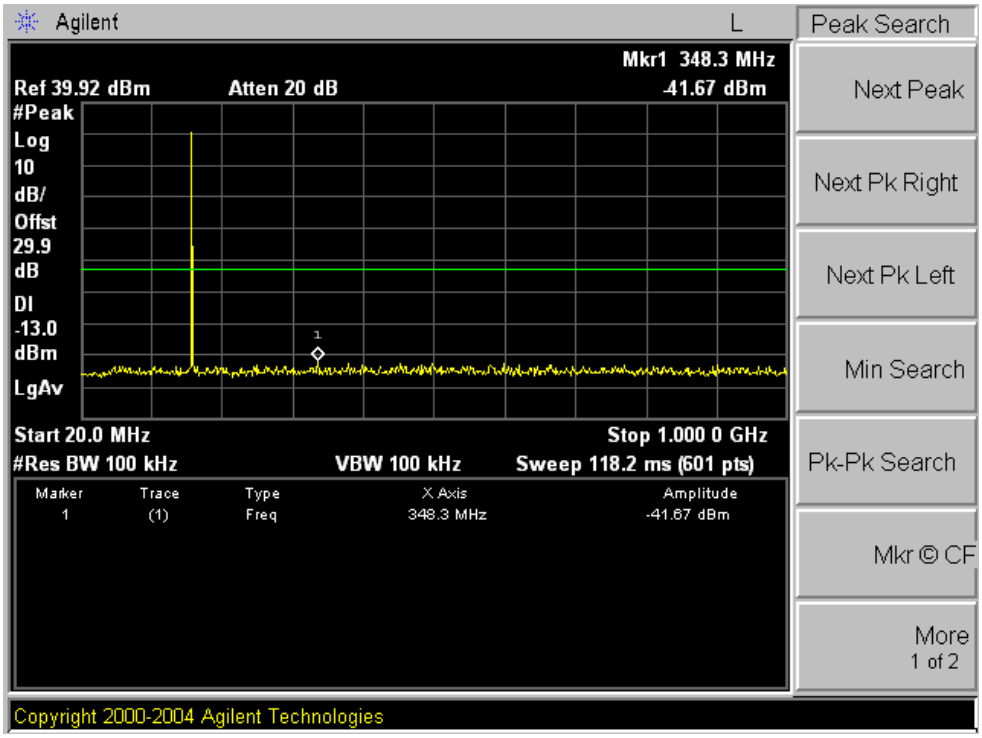
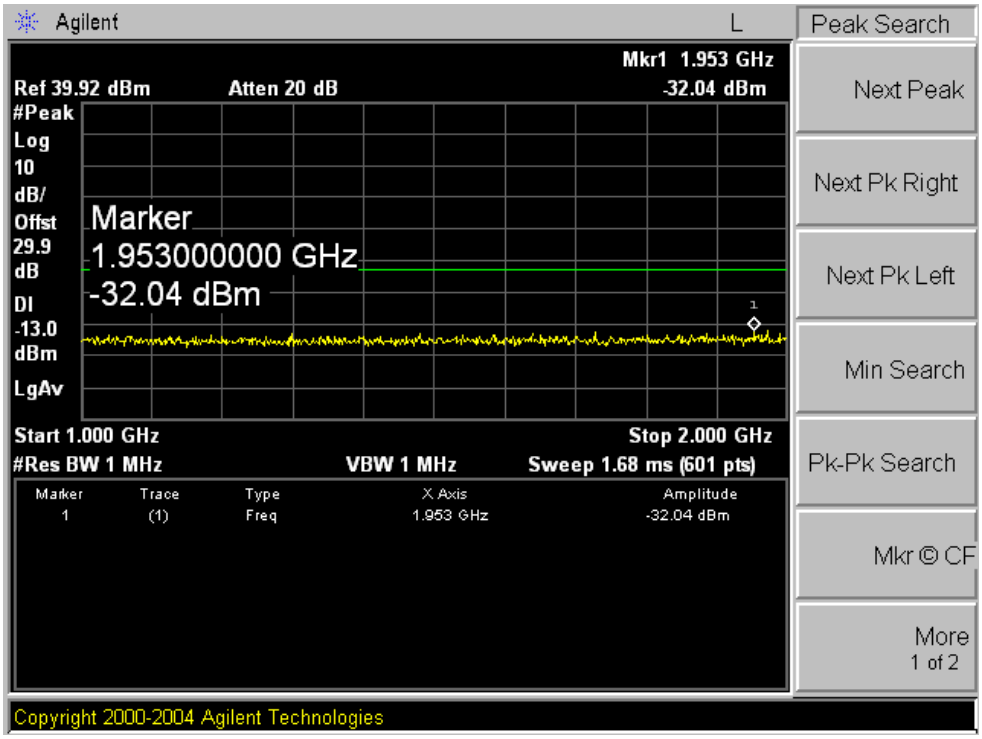
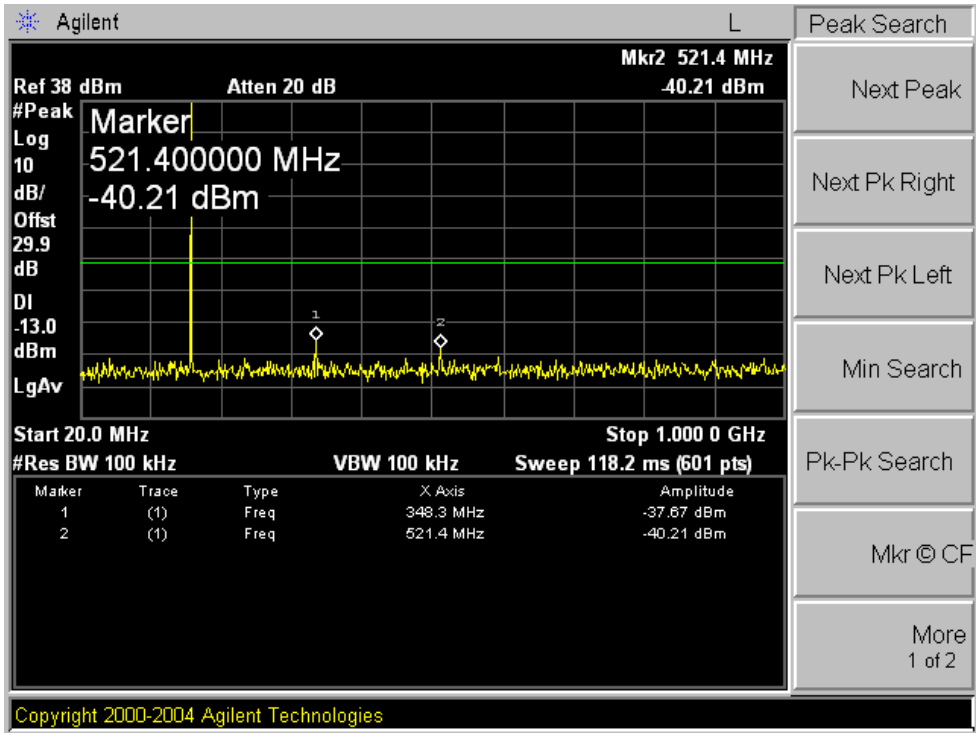
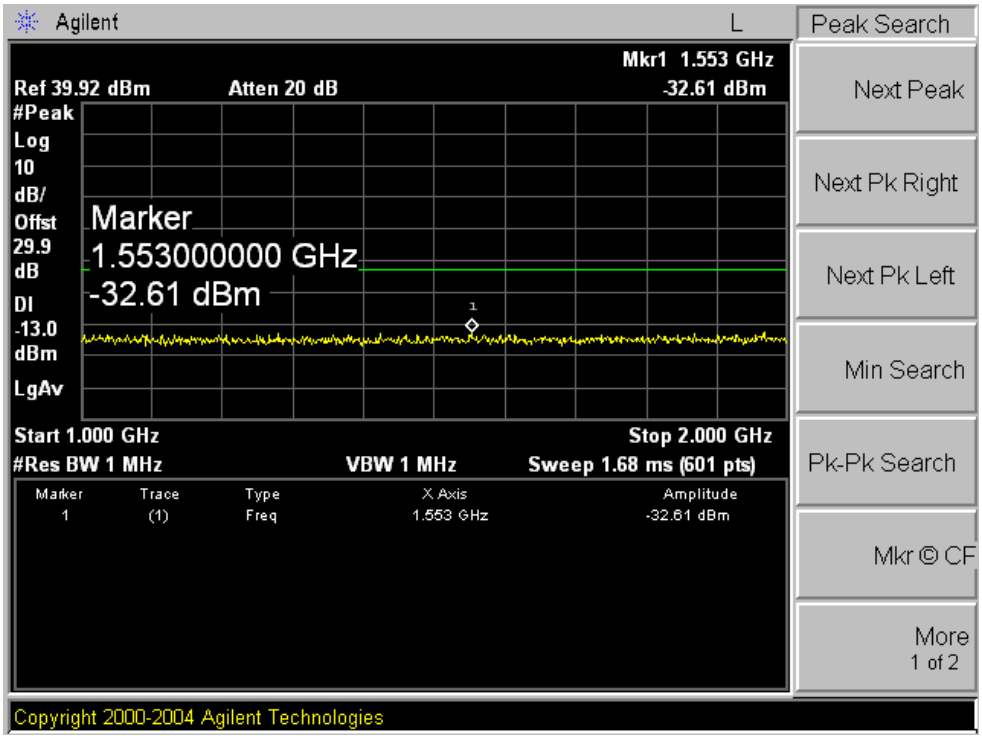




TX FREQ = 173.9750 MHz **High Power Setting** **Channel Spacing: 25 kHz**





5. Audio Frequency Response : FCC 2.1.047(a)

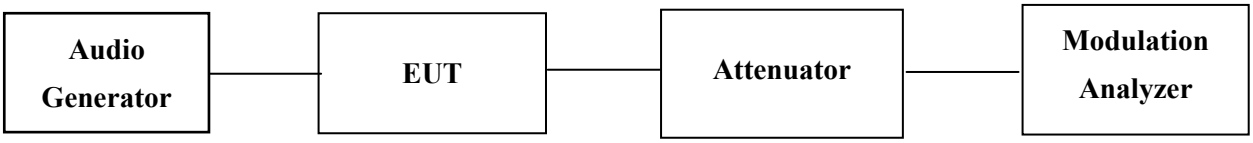
5.1. Limit

Minimum Standard - The audio frequency response shall not vary more than +1 or -3 dB from 300 to 3000 Hz as referenced to 1000 Hz level (with the exception of a permissible 6 dB/octave roll off from 2500 to 3000 Hz).

5.2. Test Procedure

1. The audio frequency response is the degree of closeness to which the frequency deviation of the transmitter follows a prescribed characteristic.
2. The frequency response of the audio modulation part is adjusted to get 20% of the rated system deviation.
3. The deviations obtained over the frequency range from 100Hz to 5000Hz are recorded and compared with the reference deviation as follows:

$$\text{Audio Frequency Response} = 20\log [DEV_{Freq} / DEV_{ref}]$$



5.3. Test Results

Ambient temperature : 24℃ Relative humidity : 49%

Operating Frequency : 160.0250 MHz

Channel : Middle

Nominal DC Voltage: 7.5 Vdc

Audio frequency [Hz]	Channel spacing 12.5 kHz		Channel spacing 25 kHz	
	Measured Deviation [kHz]	Calculated Response [dB]	Measured Deviation [kHz]	Calculated Response [dB]
100	0.05	-20.72	0.05	-25.68
200	0.07	-16.71	0.13	-17.59
300	0.13	-11.63	0.24	-12.58
400	0.18	-8.87	0.35	-9.24
500	0.23	-6.71	0.45	-6.90
600	0.29	-4.73	0.57	-4.93
700	0.34	-3.35	0.67	-3.45
800	0.39	-2.07	0.78	-2.11
900	0.45	-0.95	0.89	-1.01
1000	0.50	0.00	1.00	0.00
2000	1.04	6.34	2.09	6.42
2500	1.17	7.38	2.37	7.49
3000	1.10	6.82	2.22	6.92
4000	0.65	2.21	1.30	2.31
5000	0.33	-3.58	0.66	-3.62

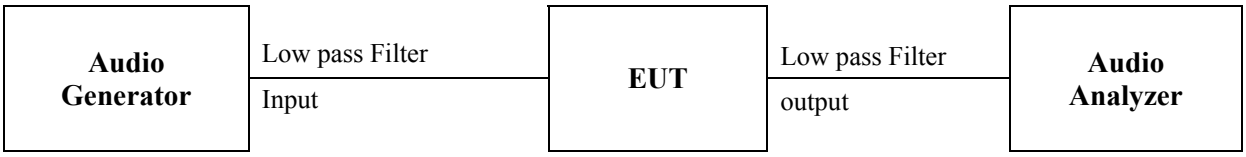
6. Audio Low Pass Filter Frequency Response : FCC 2.1047(a)

6.1. Limit

According EIA/TIA 603, b) For equipment operating with 25 kHz spacing channels between 406 and 512MHz through 896 MHz, and between 929 MHz through 930 MHz:
At frequencies from 3000 Hz through 20,000 Hz, the attenuation shall be greater than the attenuation at 1000 Hz by at least: 60 log10 (f / 3000) dB where: f is the audio frequency in Hz.
At frequencies above 20,000 Hz the attenuation shall be greater than the attenuation at 1000 Hz by at least: 50 dB.
c) For equipment operating on channels between 896 MHz through 901 MHz, between 935 MHz through 940 MHz, and 12.5 or 15 kHz spaced channels in the frequency range 138-174 MHz and 406-512 MHz.
At frequencies from 3000 Hz through 20,000 Hz the attenuation shall be greater than the attenuation at 1000 Hz by at least: 100 log10 (f / 3000) dB where: f is the audio frequency in Hz.

6.2. Test Procedure

1. Connect the audio frequency generator as close as possible the input of the post limiter low pass filter within the transmitter under test.
2. Connect the audio spectrum analyzer to the output of the post limiter low pass filter within the transmitter under test.
3. Apply a 1000 Hz tone from the audio frequency generator and adjust the level per manufacturer's specifications.
4. Record the dB level of the 1000 Hz spectral line on the audio spectrum analyzer as LEV_{REF} .
5. Set the audio frequency generator to the desired test frequency between 3000 Hz and the upper low pass filter limit.
6. Record audio spectrum analyzer levels, at the test frequency in step 5).
7. Record the dB level on the audio spectrum analyzer as LEV_{FREQ}
8. Calculate the audio frequency response at the test frequency as: low pass frequency response = $LEV_{FREQ} - LEV_{REF}$
9. Repeat steps 7) through 8) for all the desired test frequencies.



6.3. Test Results

Ambient temperature : 24℃ Relative humidity : 49%

Operating Frequency : 160.0250 MHz

Channel : Middle

Nominal DC Voltage: 7.5 Vdc

Audio frequency [kHz]	Channel spacing 12.5 kHz	Channel spacing 25 kHz
	Response [dB]	Response [dB]
1	0	0
2	1.67	2.85
3	-1.01	-1.21
4	-15.18	-14.2
5	-33.8	-27.75
6	-48.38	-47.2
7	-63.01	-57.06
8	-58.22	-58.61
9	-65.59	-65.24
10	<-67	<-70
20	<-67	<-70