

FCC PART 24D & PART 90

TEST REPORT

For

Hytera Communications Co., Ltd.

HYT Tower, Hi-Tech Industrial Park North,
Nanshan District, Shenzhen, China

FCC ID: YAMX1PU5

Report Type: Original Report	Product Type: Digital Portable Radio
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Report Number: <u>RSZ130508001-00B</u>	
Report Date: <u>2013-08-08</u>	
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Note: This test report is prepared for the customer shown above and for the equipment described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Hytera Communications Co., Ltd.*'s product, model number: *X1p U(5)* (FCC ID: *YAMX1PU5*) or the "EUT" in this report was a *Digital Portable Radio*, which was measured approximately: 21.1 cm (L) x 6.0 cm (W) x 2.1 cm (H), rated with input voltage: DC 7.4V battery.

** All measurement and test data in this report was gathered from production sample serial number: 1305028 (Assigned by BACL, Shenzhen). The EUT supplied by the applicant was received on 2013-05-08.*

Objective

This test report is prepared on behalf of *Hytera Communications Co., Ltd.* in accordance with Part 2, and Part 24D, 90 of the Federal Communication Commissions rules.

Related Submittal(s)/Grant(s)

FCC Part 15.247 DSS submission with FCC ID: *YAMX1PU5*.

Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of federal Regulations Title 47 Part 2, Sub-part J as well as the following individual parts:

Part 24 – Personal Communications Service
Part 90 – Private Land Mobile Radio Service

Applicable Standards: TIA 603-D and ANSI 63.4-2009.

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement uncertainty with radiated emission is 5.91 dB for 30MHz-1GHz and 4.92 dB for above 1GHz, 1.95dB for conducted measurement.

Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on December 06, 2010. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

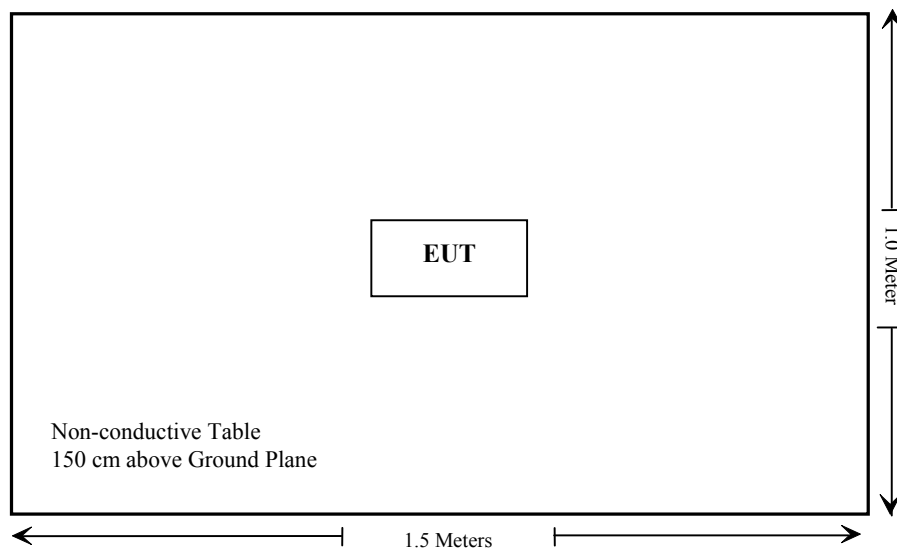
Description of Test Configuration

The system was configured for testing in a test mode which has been done in the factory.

Equipment Modifications

No modification was made to the EUT tested.

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Results
§2.1093	RF Exposure	Compliance
§2.1046; § 24.132; §90.205	RF Output Power	Compliance
§2.1047; §90.207	Modulation Characteristic	Compliance
§2.1049; § 24.131; §90.209; §90.210	Occupied Bandwidth & Emission Mask	Compliance
§2.1051; § 24.133; §90.210	Spurious Emission at Antenna Terminal	Compliance
§2.1053; § 24.133; §90.210	Spurious Radiated Emissions	Compliance
§2.1055; § 24.135; §90.213	Frequency Stability	Compliance
§90.214	Transient Frequency Behavior	Not Applicable

FCC §1.1307(b) & §2.1093 - RF EXPOSURE

Applicable Standard

According to FCC §1.1307(b) and §2.1093, portable device operates Part 90 should be subjected to routine environmental evaluation for RF exposure prior or equipment authorization or use.

Result: Compliance.

Please refer to SAR Report Number: RSZ130508001-20A.

FCC §2.1046 & §24.132 & §90.205 - RF OUTPUT POWER

Applicable Standard

FCC §2.1046, §24.132 and §90.205.

Test Procedure

Conducted RF Output Power:

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

Spectrum Analyzer Setting:

R B/W	Video B/W
100 kHz	300 kHz

Radiated Power Output (ERP)

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load, which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT, During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to teeth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the ERP were measured by the substitution.

Absolute level=substituted level +Antenna gain-Cable Loss

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23
HP	Synthesized Sweeper	8341B	2624A00116	2013-05-17	2014-05-16
COM POWER	Dipole Antenna	AD-100	041000	2012-06-06	2015-06-05

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	24~25 °C
Relative Humidity:	52~56 %
ATM Pressure:	100.1~100.9 kPa

The testing was performed by Bell Hu on 2013-05-23, 2013-05-29.

Test Result: Compliance. Please refer to following table.

Modulation Type	Frequency Range (MHz)	Channel Separation (kHz)	Frequency (MHz)	Output Power (dBm)		
				Conducted High Power	Conducted Low Power	Radiated High Power
Analog (FM)	806-824	12.5	806.0125	35.16	31.21	31.0
			817.0125	35.18	31.02	31.2
			823.9875	35.16	31.03	31.0
		25	806.0125	35.19	31.26	31.2
			817.0125	35.08	31.08	31.3
			823.9875	35.08	31.00	31.3
	851-869	12.5	851.0125	35.16	30.96	32.0
			860.0125	35.27	31.34	32.1
			868.9875	35.41	31.45	32.2
		25	851.0125	35.19	30.95	32.1
			860.0125	35.28	31.35	32.2
			868.9875	35.34	31.41	32.5
	896-902	12.5	896.0125	34.55	31.49	32.3
			900.9875	34.55	31.38	32.0
935-941	12.5	935.0125	34.68	31.12	32.1	
		939.9875	34.66	31.10	31.5	
Digital (4FSK)	806-825	12.5	806.0125	35.19	31.44	31.0
			817.0125	35.15	31.08	31.1
			823.9875	35.11	31.21	31.2
	851-870	12.5	851.0125	35.34	31.07	32.1
			860.0125	35.32	31.34	32.2
			868.9875	35.43	31.45	32.4
	896-902	12.5	896.0125	34.54	31.48	32.2
			900.9875	34.54	31.35	31.3
	935-941	12.5	935.0125	34.69	31.14	31.0
			939.9875	34.66	31.11	31.3

Note: limit: The limit is dependent upon the station's antenna HAAT and required service area.

FCC §2.1047 & §90.207 - MODULATION CHARACTERISTIC

Applicable Standard

FCC§2.1047 & §90.207:

- (a) Equipment which utilizes voice modulated communication shall show the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz. for equipment which is required to have a low pass filter, the frequency response of the filter, or all of the circuitry installed between the modulation limited and the modulated stage shall be supplied.
- (b) Equipment which employs modulation limiting, a curve showing the percentage of modulation versus the modulation input voltage shall be supplied.

Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Due Date
HP	RF Communication Test Set	8920A	3325U00859	2013-05-07	2014-05-07
LEADER	MILLIVOLTMETER	LMV-181A	6041126	2013-05-13	2014-05-13

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements, traceable to National Primary Standards and International System of Units (SI).

Test Procedure

Test Method: TIA/EIA-603 2.2.3

Test Data

Environmental Conditions

Temperature:	25°C
Relative Humidity:	56 %
ATM Pressure:	100.1 kPa

The testing was performed by Bell Hu on 2013-06-15.

Test Mode: Transmitting

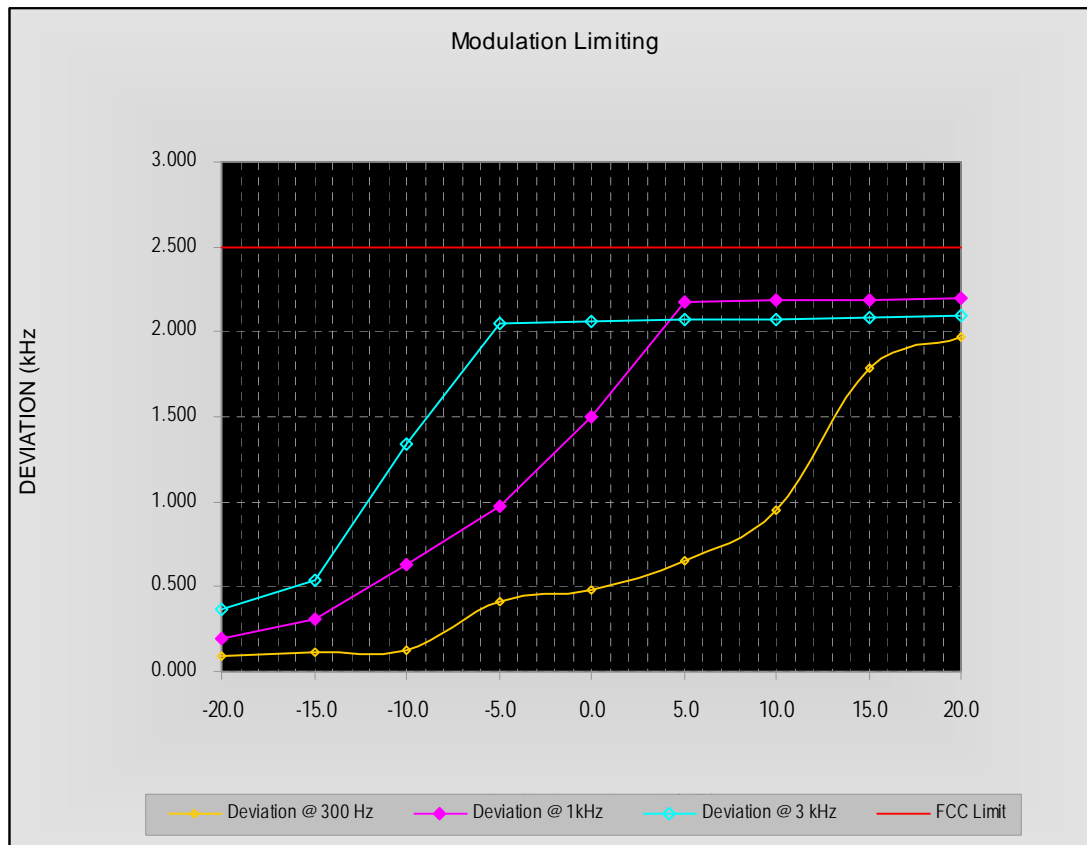
Result: Compliance.

Analog Modulation:

MODULATION LIMITING

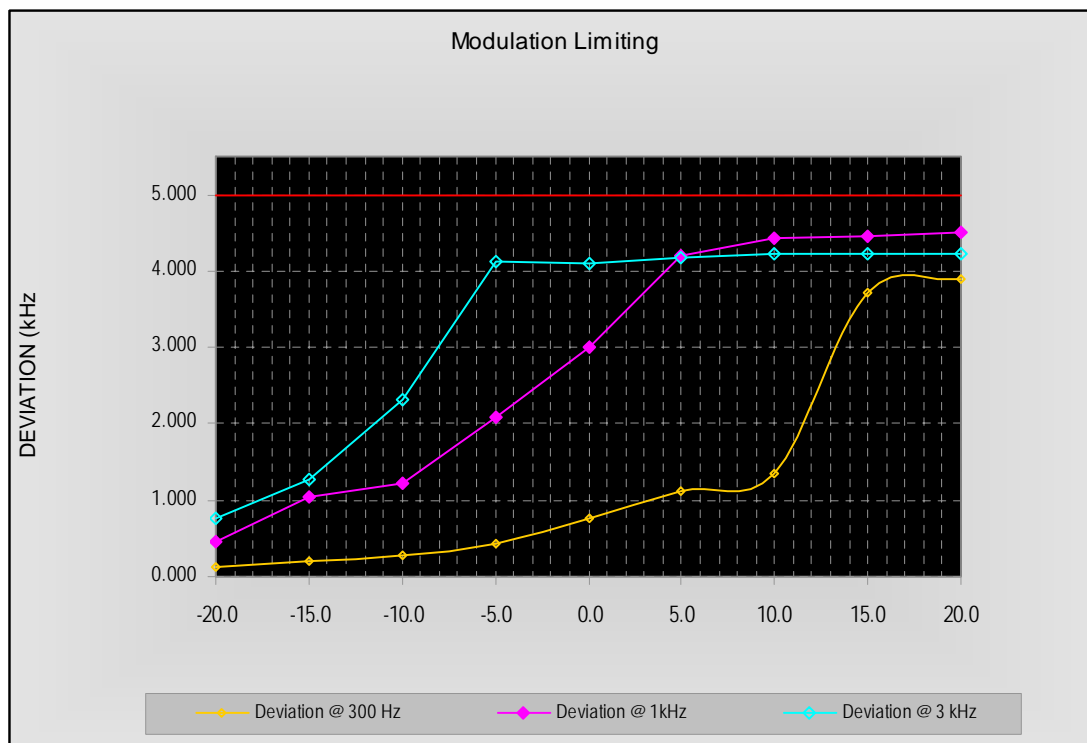
Carrier Frequency: 817.0125 MHz, Channel Separation=12.5 kHz

Audio Input Level [dB]	Frequency Deviation (kHz)			Limit [kHz]
	@ 300 Hz	@ 1kHz	@ 3 kHz	
20.0	1.964	2.196	2.098	2.5
15.0	1.786	2.192	2.086	2.5
10.0	0.956	2.185	2.071	2.5
5.0	0.650	2.180	2.068	2.5
0.0	0.482	1.500	2.061	2.5
-5.0	0.415	0.968	2.053	2.5
-10.0	0.129	0.635	1.342	2.5
-15.0	0.119	0.312	0.543	2.5
-20.0	0.096	0.198	0.368	2.5



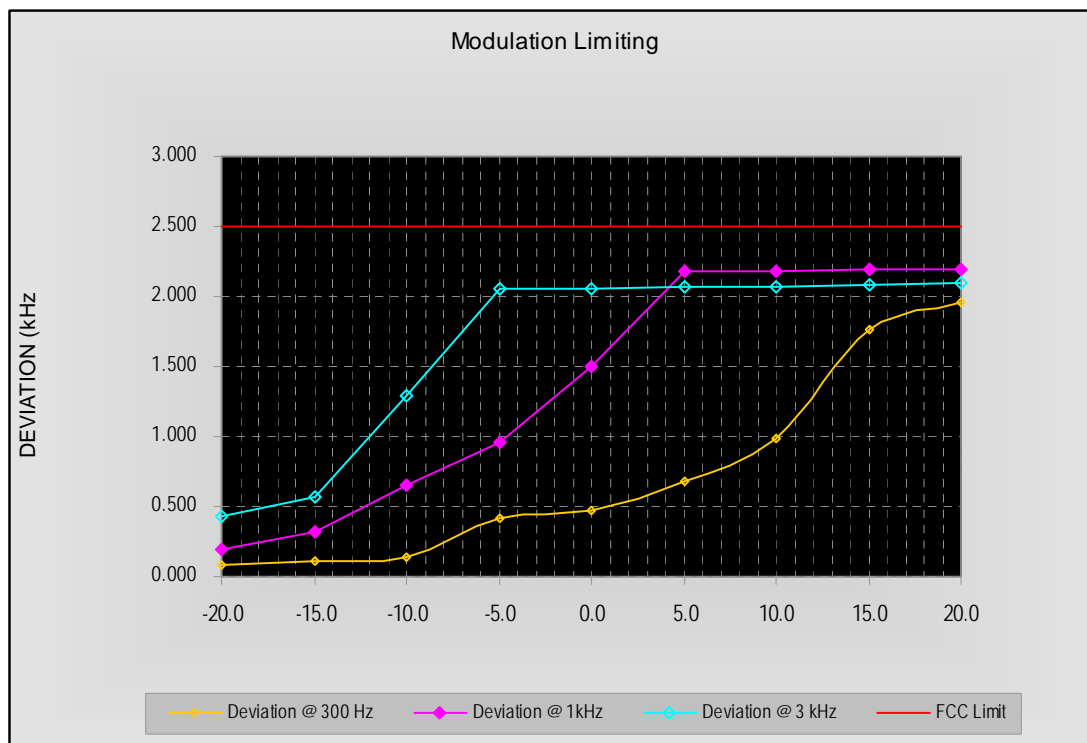
Carrier Frequency: 817.0125 MHz, Channel Separation=25 kHz

Audio Input Level [dB]	Frequency Deviation (kHz)			Limit [kHz]
	@ 300 Hz	@ 1kHz	@ 3 kHz	
20.0	3.896	4.501	4.225	5.0
15.0	3.712	4.458	4.225	5.0
10.0	1.345	4.423	4.225	5.0
5.0	1.120	4.212	4.165	5.0
0.0	0.758	3.000	4.112	5.0
-5.0	0.425	2.082	4.132	5.0
-10.0	0.275	1.222	2.315	5.0
-15.0	0.196	1.032	1.265	5.0
-20.0	0.126	0.456	0.755	5.0



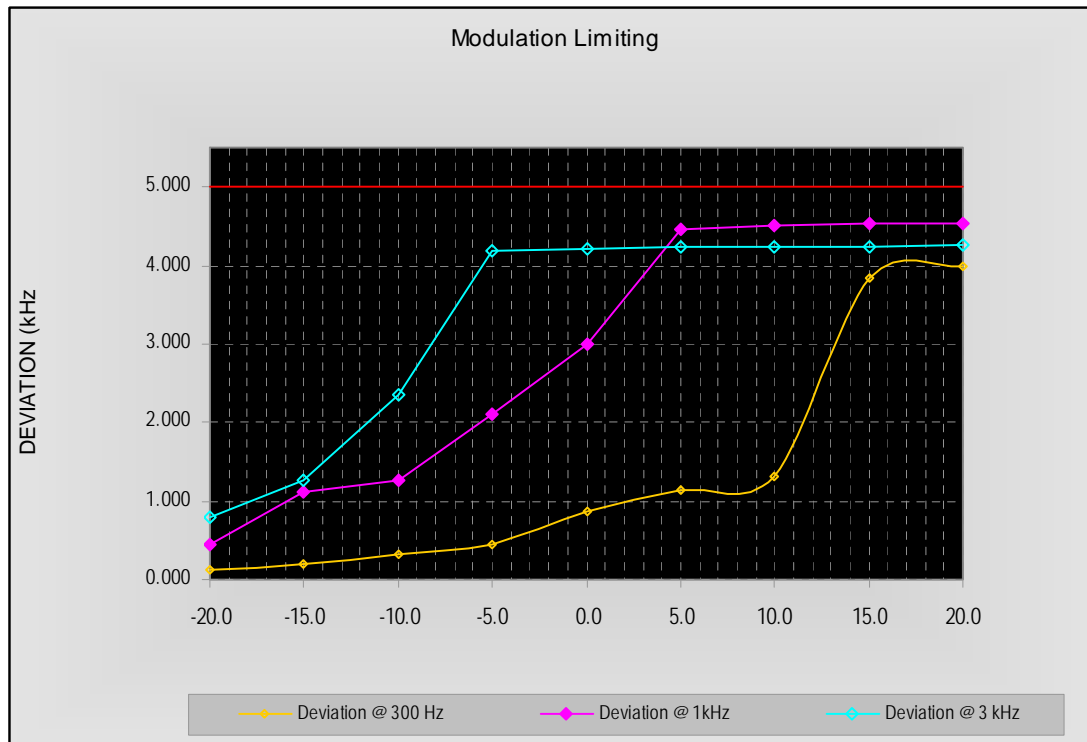
Carrier Frequency: 860.0125 MHz, Channel Separation=12.5 kHz

Audio Input Level [dB]	Frequency Deviation (kHz)			Limit [kHz]
	@ 300 Hz	@ 1kHz	@ 3 kHz	
20.0	1.964	2.196	2.095	2.5
15.0	1.769	2.191	2.079	2.5
10.0	0.986	2.186	2.072	2.5
5.0	0.675	2.185	2.068	2.5
0.0	0.479	1.500	2.061	2.5
-5.0	0.416	0.953	2.056	2.5
-10.0	0.133	0.655	1.285	2.5
-15.0	0.112	0.321	0.564	2.5
-20.0	0.090	0.196	0.435	2.5



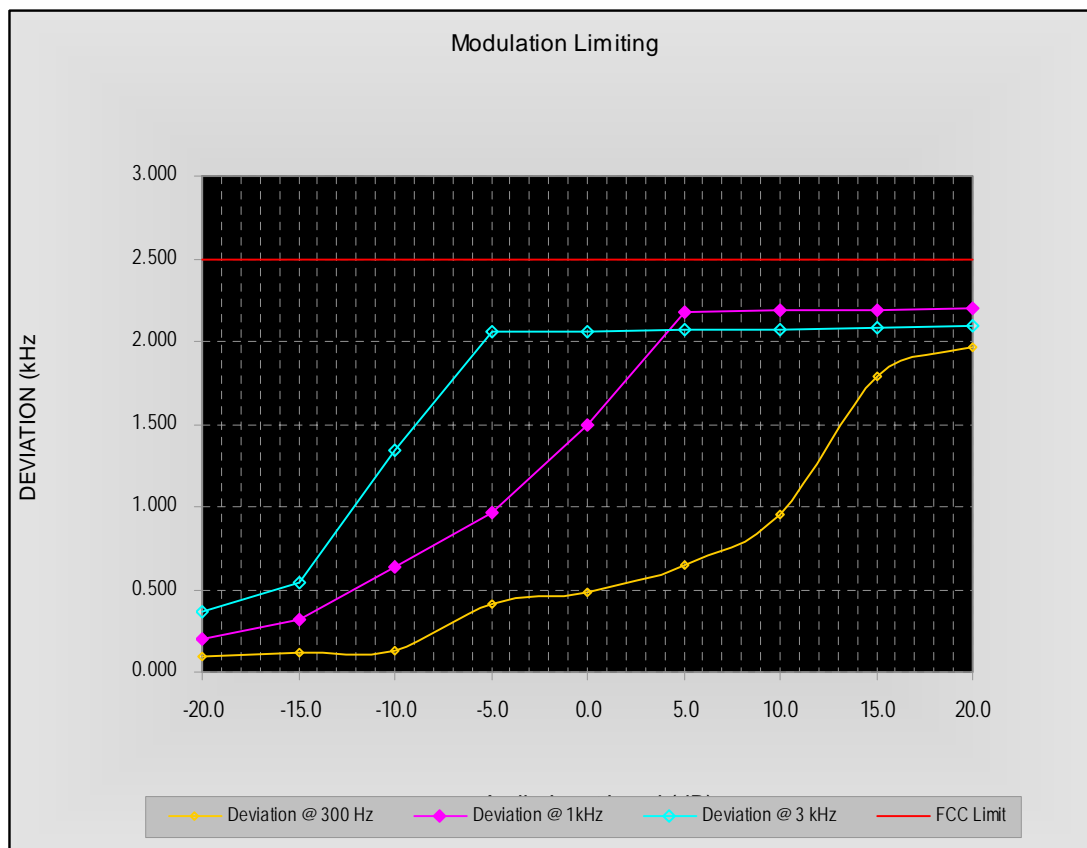
Carrier Frequency: 860.0125 MHz, Channel Separation=25 kHz

Audio Input Level [dB]	Frequency Deviation (kHz)			Limit [kHz]
	@ 300 Hz	@ 1kHz	@ 3 kHz	
20.0	3.985	4.535	4.253	5.0
15.0	3.852	4.531	4.246	5.0
10.0	1.321	4.512	4.241	5.0
5.0	1.128	4.456	4.235	5.0
0.0	0.876	3.000	4.206	5.0
-5.0	0.456	2.102	4.193	5.0
-10.0	0.325	1.253	2.357	5.0
-15.0	0.210	1.103	1.254	5.0
-20.0	0.112	0.452	0.786	5.0



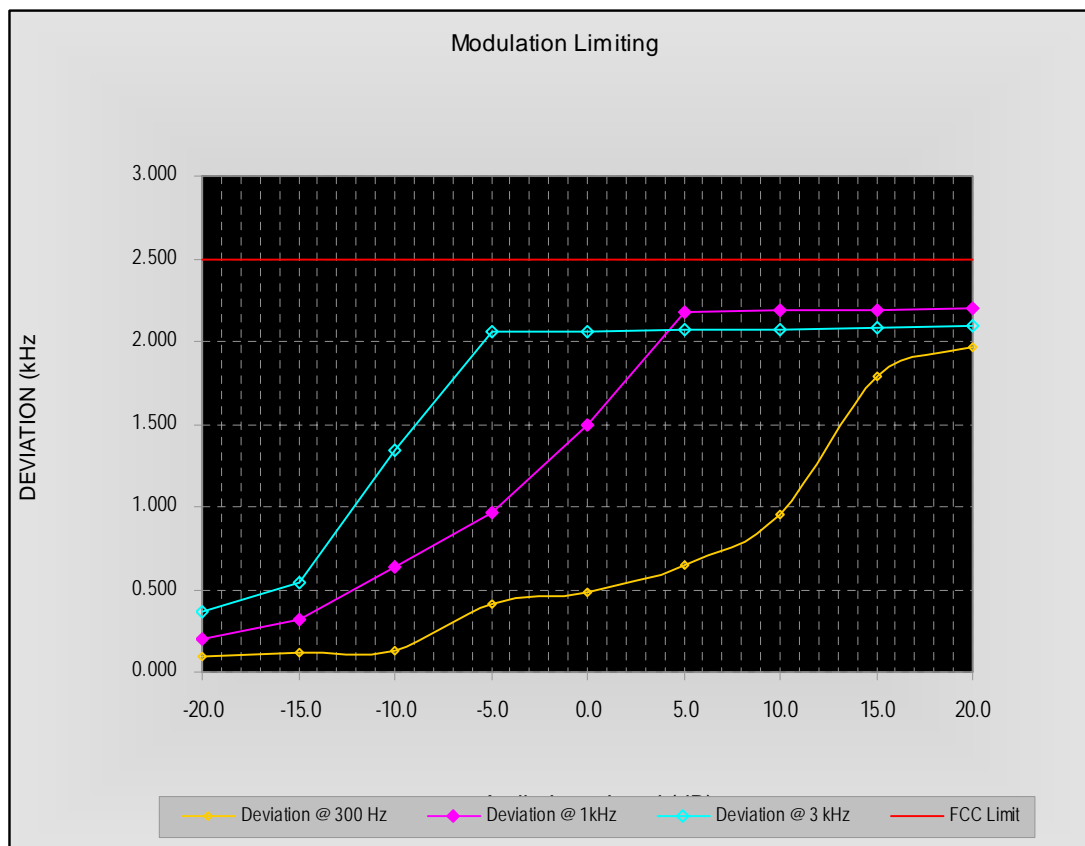
Carrier Frequency: 900.9875 MHz, Channel Separation=12.5 kHz

Audio Input Level [dB]	Frequency Deviation (kHz)			Limit [kHz]
	@ 300 Hz	@ 1kHz	@ 3 kHz	
20.0	1.985	2.201	2.096	2.5
15.0	1.765	2.198	2.086	2.5
10.0	0.986	2.189	2.076	2.5
5.0	0.657	2.186	2.075	2.5
0.0	0.485	1.500	2.072	2.5
-5.0	0.412	0.986	2.070	2.5
-10.0	0.135	0.651	1.354	2.5
-15.0	0.124	0.315	0.566	2.5
-20.0	0.098	0.202	0.410	2.5



Carrier Frequency: 939.9875 MHz, Channel Separation=12.5 kHz

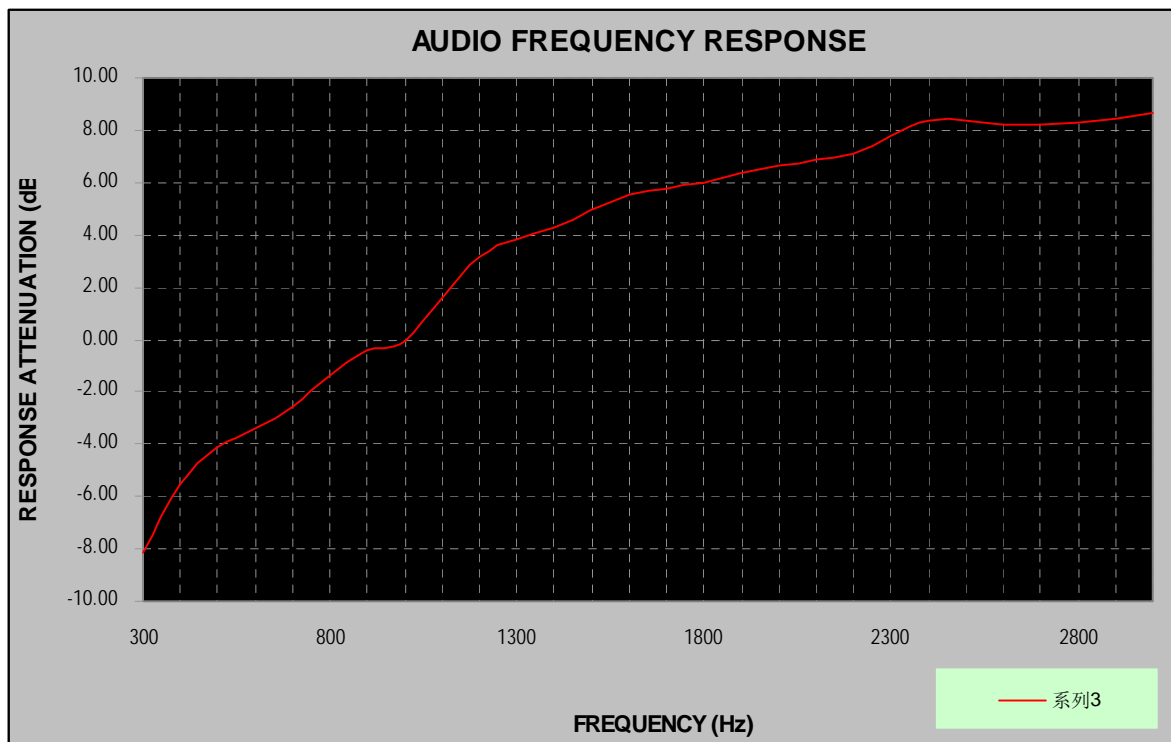
Audio Input Level [dB]	Frequency Deviation (kHz)			Limit [kHz]
	@ 300 Hz	@ 1kHz	@ 3 kHz	
20.0	1.985	2.201	2.100	2.5
15.0	1.765	2.198	2.099	2.5
10.0	0.986	2.189	2.098	2.5
5.0	0.657	2.186	2.086	2.5
0.0	0.485	1.500	2.076	2.5
-5.0	0.412	0.986	2.062	2.5
-10.0	0.135	0.651	1.354	2.5
-15.0	0.124	0.315	0.553	2.5
-20.0	0.098	0.202	0.412	2.5



Audio Frequency Response

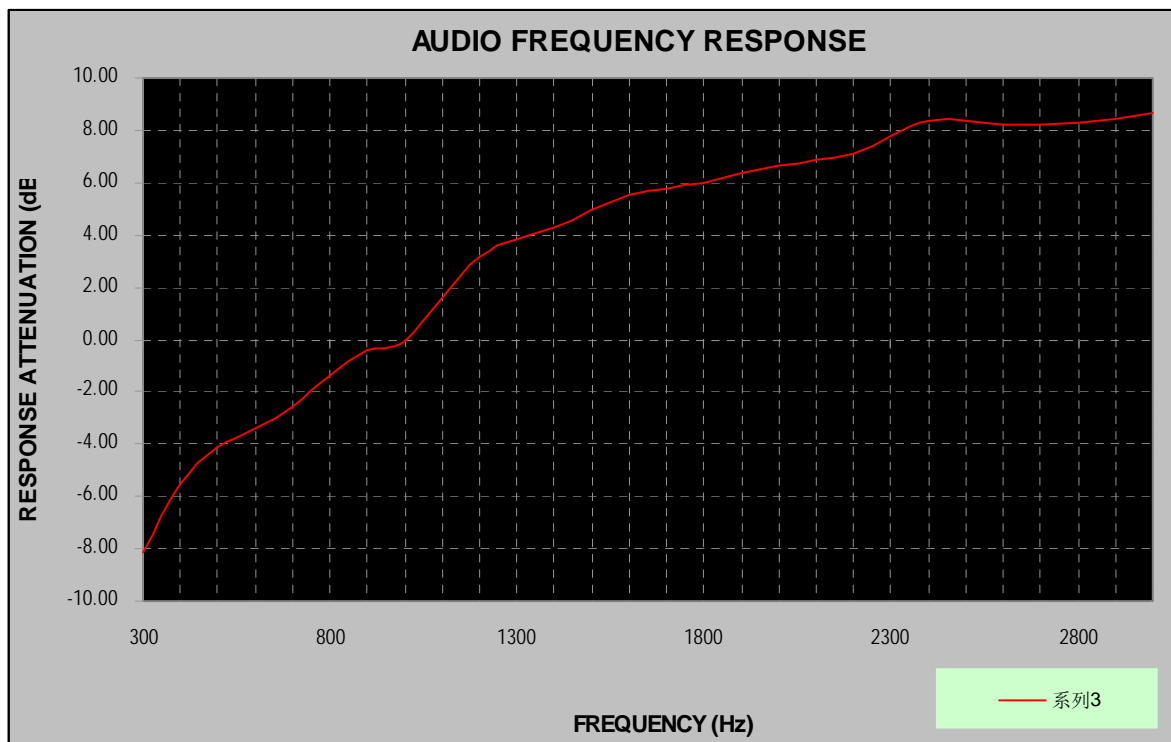
Carrier Frequency: 817.0125 MHz, Channel Separation=12.5 kHz

Audio Frequency (Hz)	Response Attenuation (dB)
300	-8.12
400	-5.53
500	-4.16
600	-3.36
700	-2.54
800	-1.35
900	-0.40
1000	0.00
1200	3.13
1400	4.26
1600	5.56
1800	5.95
2000	6.63
2200	7.11
2400	8.33
2600	8.23
2800	8.28
3000	8.65



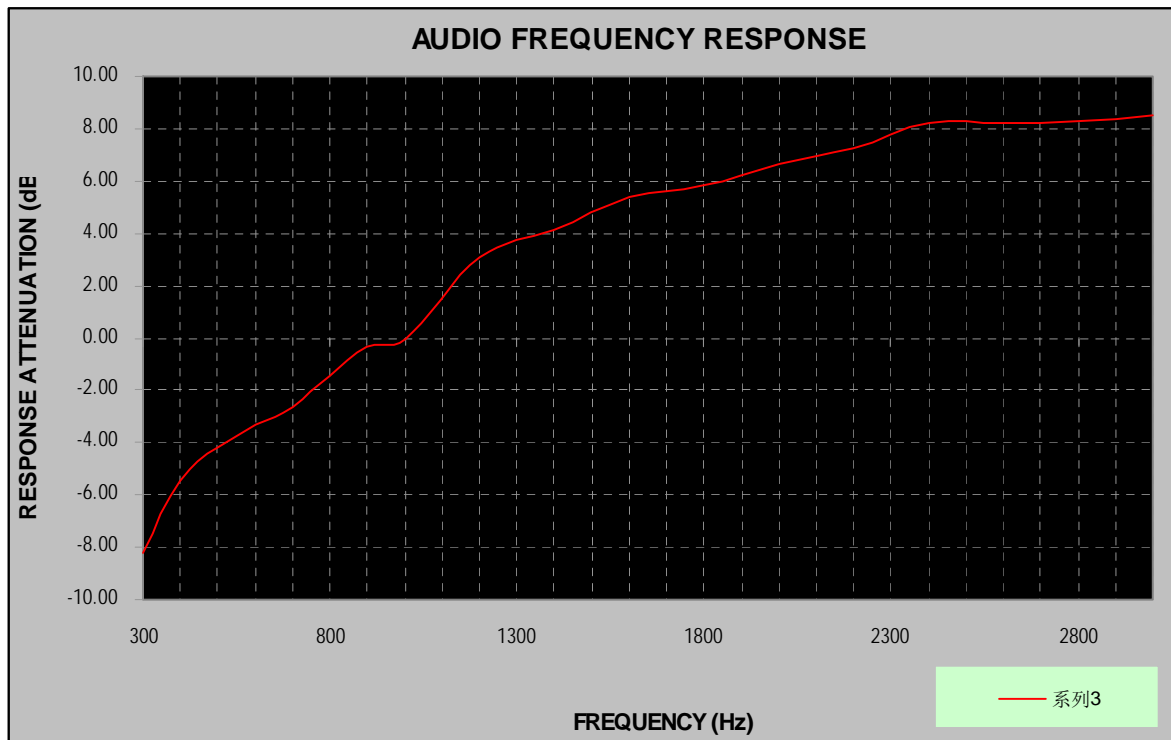
Carrier Frequency: 817.0125 MHz, Channel Separation=25 kHz

Audio Frequency (Hz)	Response Attenuation (dB)
300	-8.65
400	-6.68
500	-5.32
600	-4.32
700	-1.83
800	-1.25
900	-0.53
1000	0.00
1200	1.35
1400	2.56
1600	2.68
1800	4.65
2000	6.53
2200	7.35
2400	7.65
2600	7.34
2800	8.67
3000	8.79



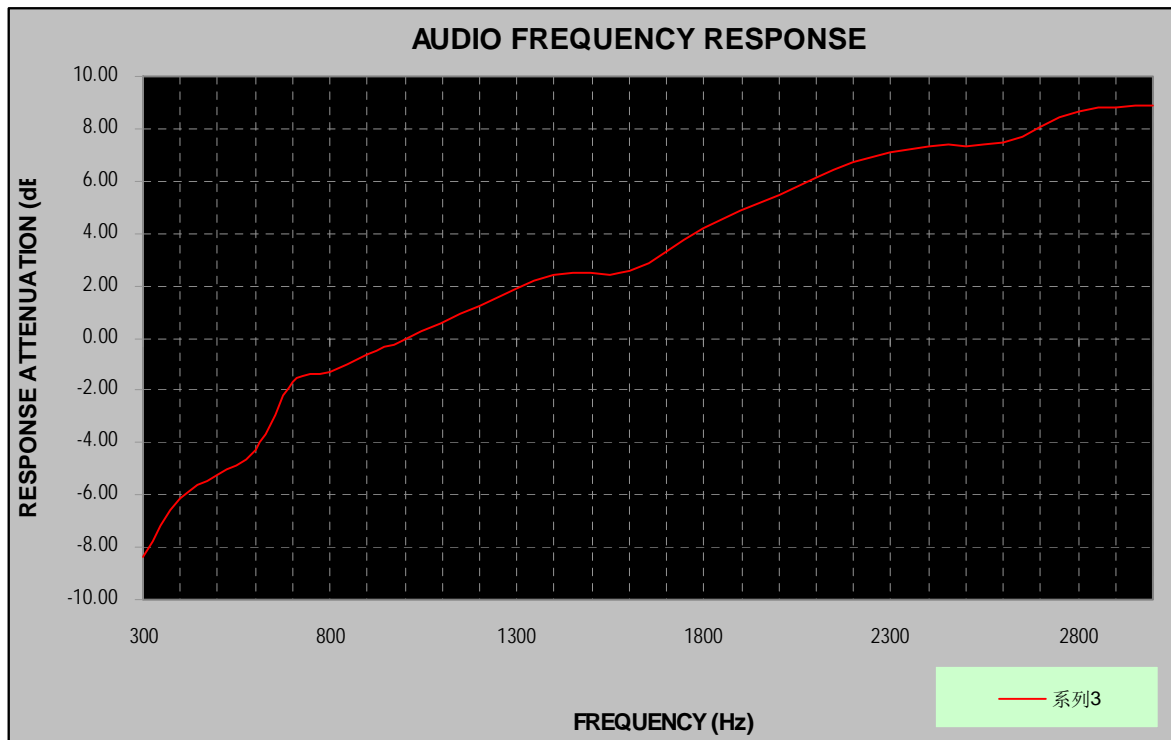
Carrier Frequency: 860.0125 MHz, Channel Separation=12.5 kHz

Audio Frequency (Hz)	Response Attenuation (dB)
300	-8.23
400	-5.43
500	-4.21
600	-3.32
700	-2.65
800	-1.45
900	-0.32
1000	0.00
1200	3.12
1400	4.12
1600	5.42
1800	5.86
2000	6.65
2200	7.23
2400	8.19
2600	8.21
2800	8.29
3000	8.54



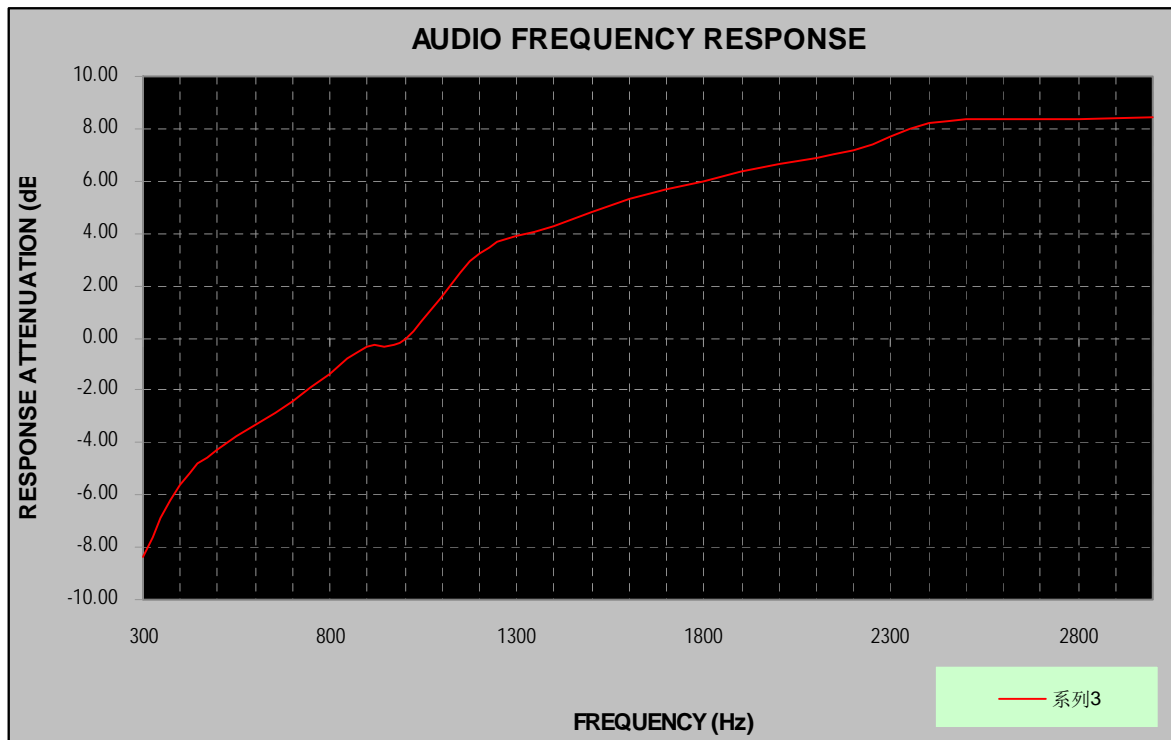
Carrier Frequency: 860.0125 MHz, Channel Separation=25 kHz

Audio Frequency (Hz)	Response Attenuation (dB)
300	-8.35
400	-6.15
500	-5.21
600	-4.26
700	-1.67
800	-1.32
900	-0.64
1000	0.00
1200	1.26
1400	2.42
1600	2.53
1800	4.23
2000	5.46
2200	6.76
2400	7.34
2600	7.46
2800	8.64
3000	8.87



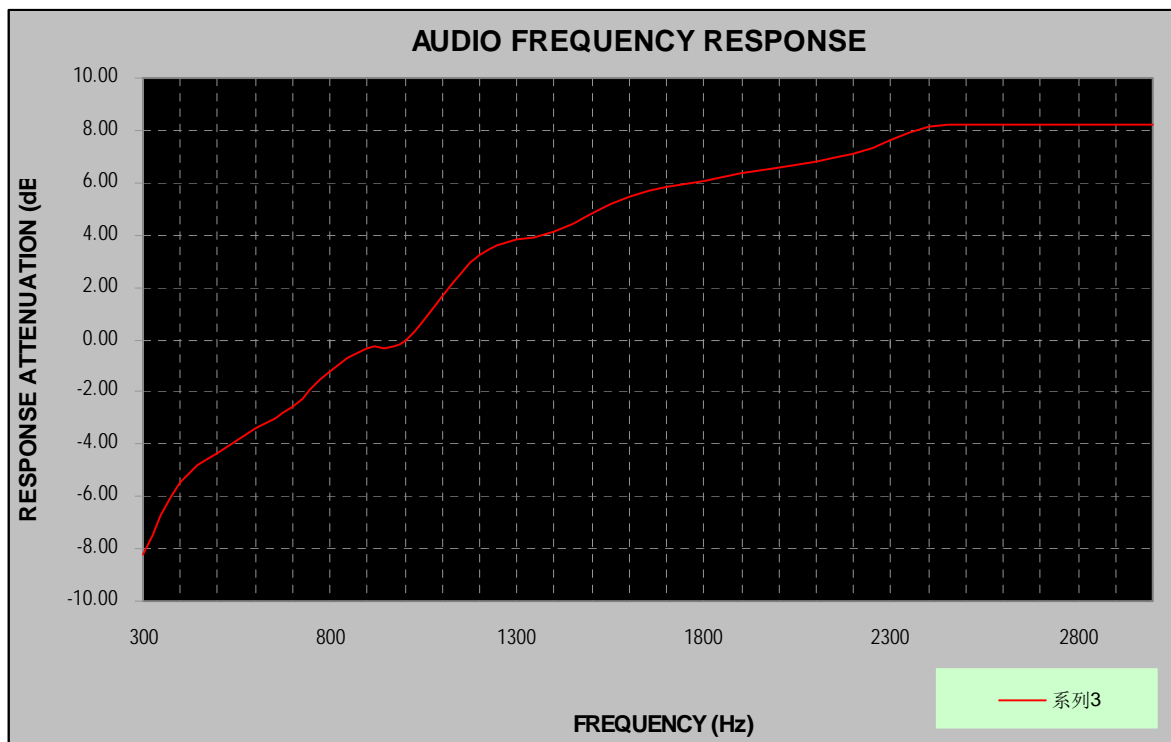
Carrier Frequency: 900.9875 MHz, Channel Separation=12.5 kHz

Audio Frequency (Hz)	Response Attenuation (dB)
300	-8.36
400	-5.65
500	-4.25
600	-3.32
700	-2.45
800	-1.36
900	-0.32
1000	0.00
1200	3.25
1400	4.25
1600	5.34
1800	5.99
2000	6.65
2200	7.15
2400	8.25
2600	8.35
2800	8.35
3000	8.45



Carrier Frequency: 939.9875 MHz, Channel Separation=12.5 kHz

Audio Frequency (Hz)	Response Attenuation (dB)
300	-8.24
400	-5.45
500	-4.32
600	-3.42
700	-2.58
800	-1.26
900	-0.32
1000	0.00
1200	3.21
1400	4.16
1600	5.46
1800	6.05
2000	6.55
2200	7.08
2400	8.16
2600	8.18
2800	8.21
3000	8.25

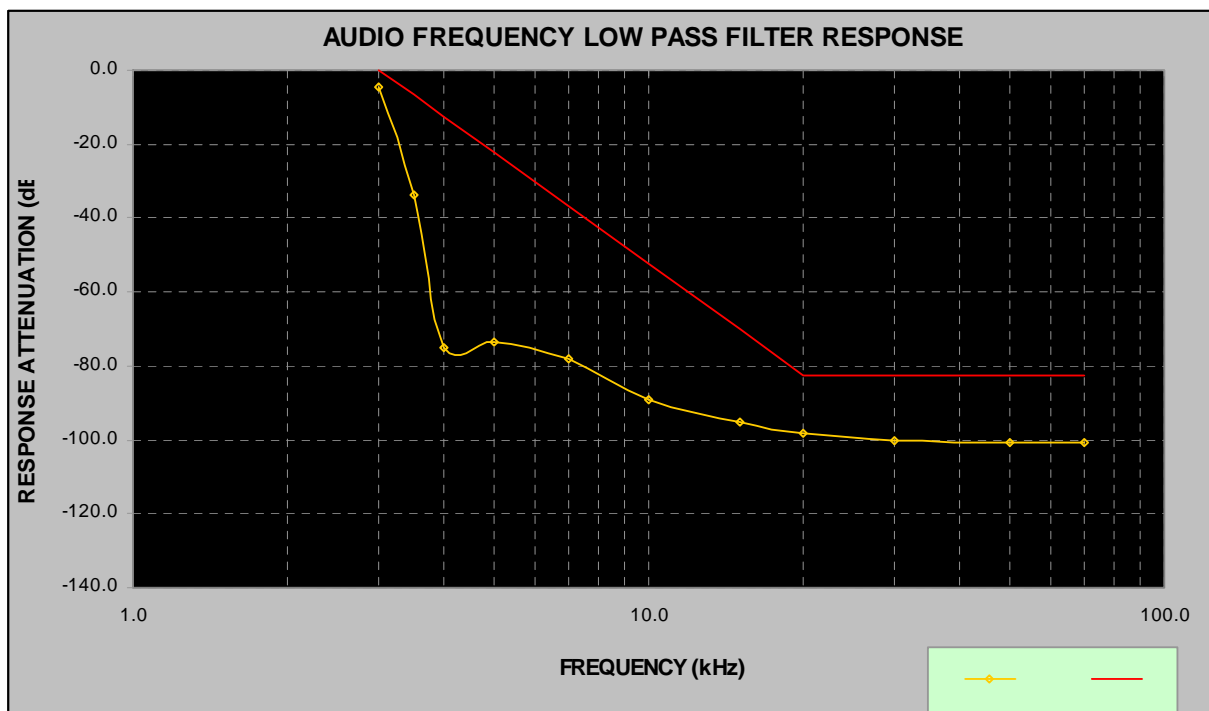


Audio Frequency Low Pass Filter Response

Analog Modulation:

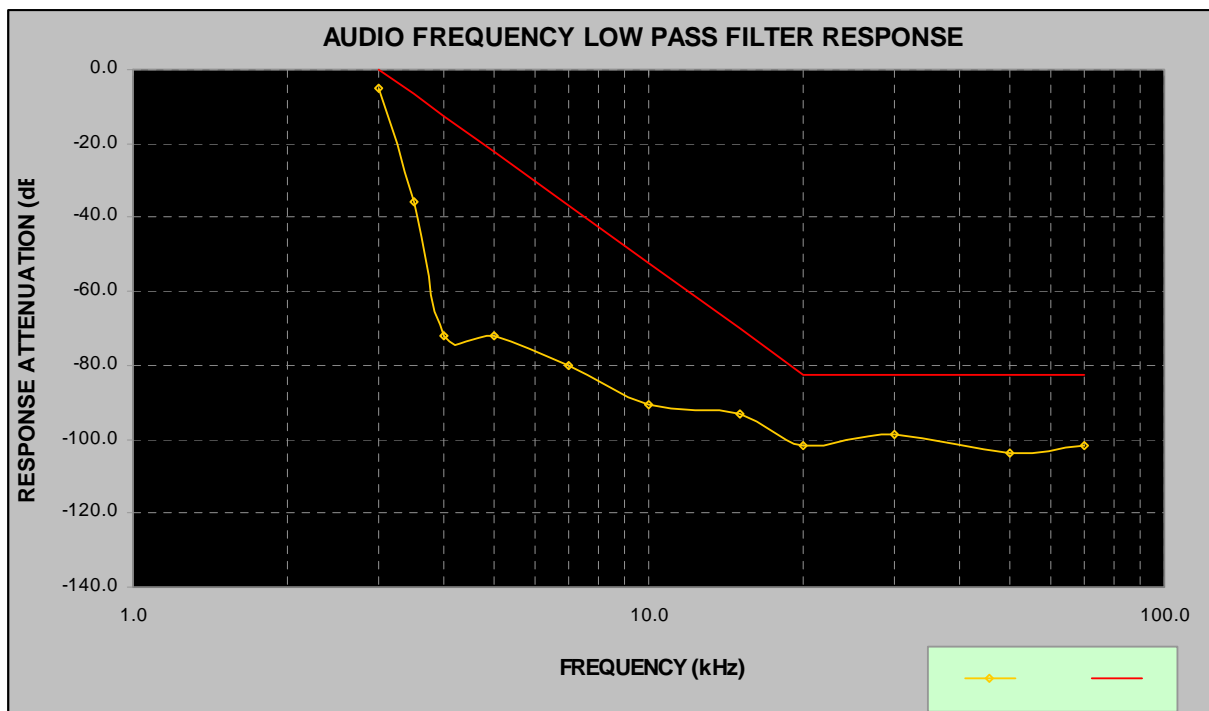
Carrier Frequency: 817.0125 MHz, Channel Separation=12.5 kHz

Audio Frequency (kHz)	Response Attenuation (dB)	Limit (dB)
3.0	-4.7	0.0
3.5	-33.7	-6.7
4.0	-75.0	-12.5
5.0	-73.5	-22.2
7.0	-78.1	-36.8
10.0	-89.1	-52.3
15.0	-95.2	-69.9
20.0	-98.2	-82.4
30.0	-100.0	-82.4
50.0	-100.7	-82.4
70.0	-100.7	-82.4



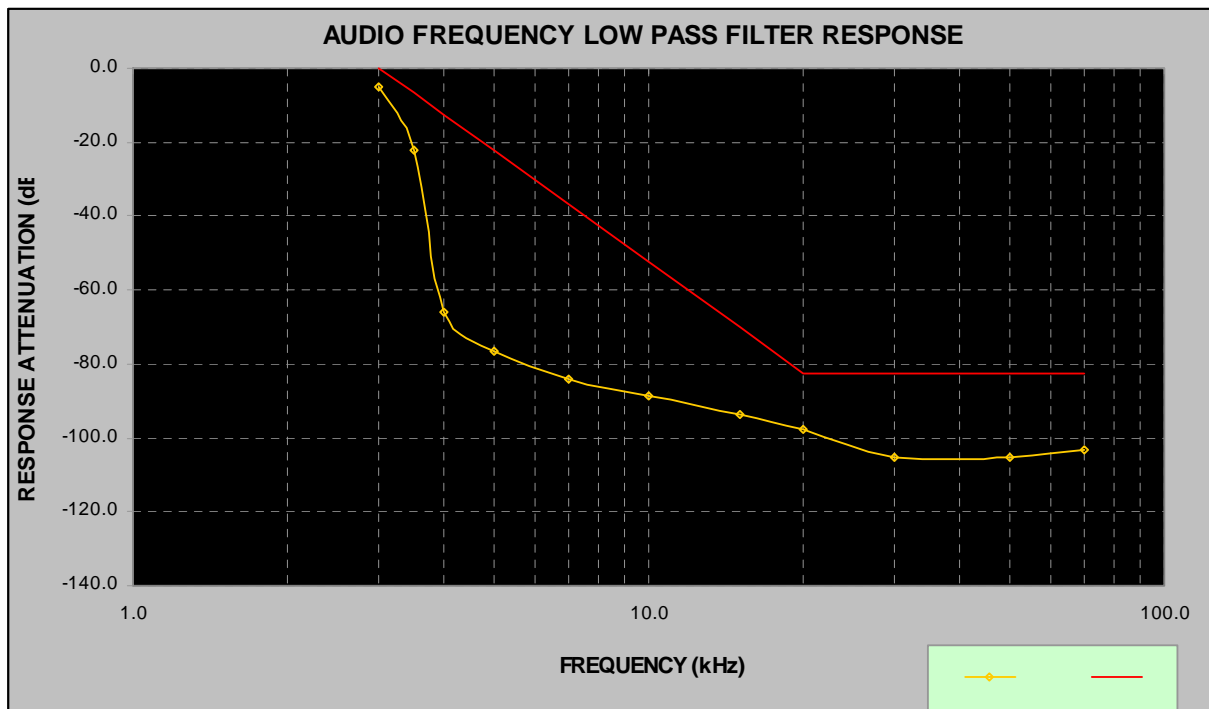
Carrier Frequency: 817.0125 MHz, Channel Separation=25 kHz

Audio Frequency (kHz)	Response Attenuation (dB)	Limit (dB)
3.0	-5.0	0.0
3.5	-36.0	-6.7
4.0	-72.0	-12.5
5.0	-72.0	-22.2
7.0	-80.0	-36.8
10.0	-90.6	-52.3
15.0	-93.2	-69.9
20.0	-101.7	-82.4
30.0	-98.7	-82.4
50.0	-103.7	-82.4
70.0	-101.7	-82.4



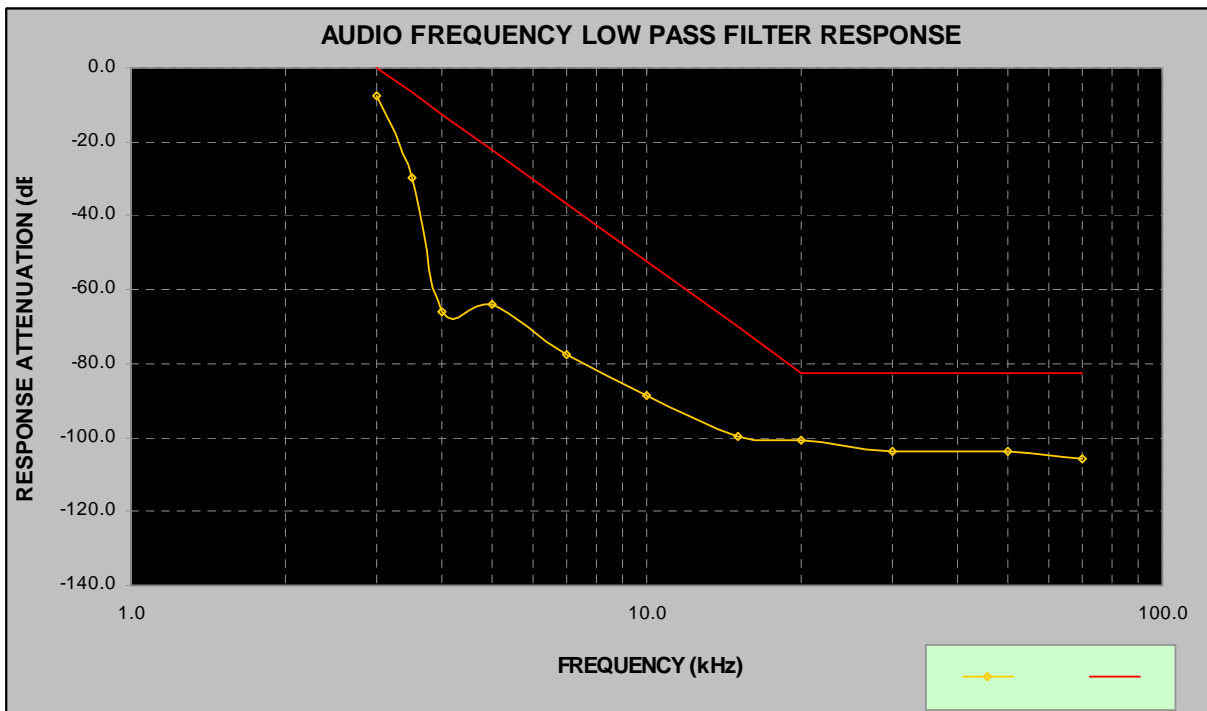
Carrier Frequency: 860.0125 MHz, Channel Separation=12.5 kHz

Audio Frequency (kHz)	Response Attenuation (dB)	FCC Limit (dB)
3.0	-5.0	0.0
3.5	-22.2	-6.7
4.0	-66.0	-12.5
5.0	-76.5	-22.2
7.0	-84.0	-36.8
10.0	-88.6	-52.3
15.0	-93.5	-69.9
20.0	-97.6	-82.4
30.0	-105.3	-82.4
50.0	-105.3	-82.4
70.0	-103.2	-82.4



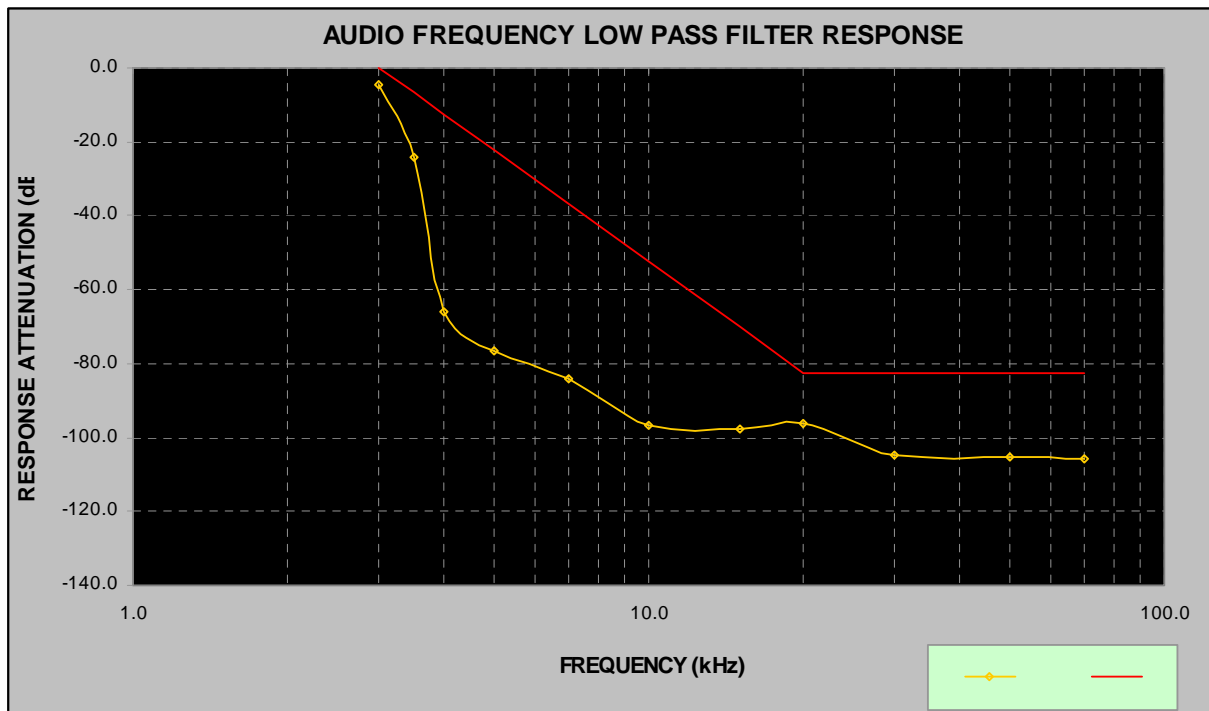
Carrier Frequency: 860.0125 MHz, Channel Separation=25 kHz

Audio Frequency (kHz)	Response Attenuation (dB)	FCC Limit (dB)
3.0	-7.6	0.0
3.5	-29.7	-6.7
4.0	-66.0	-12.5
5.0	-64.0	-22.2
7.0	-77.6	-36.8
10.0	-88.6	-52.3
15.0	-99.7	-69.9
20.0	-100.7	-82.4
30.0	-103.7	-82.4
50.0	-103.7	-82.4
70.0	-105.8	-82.4



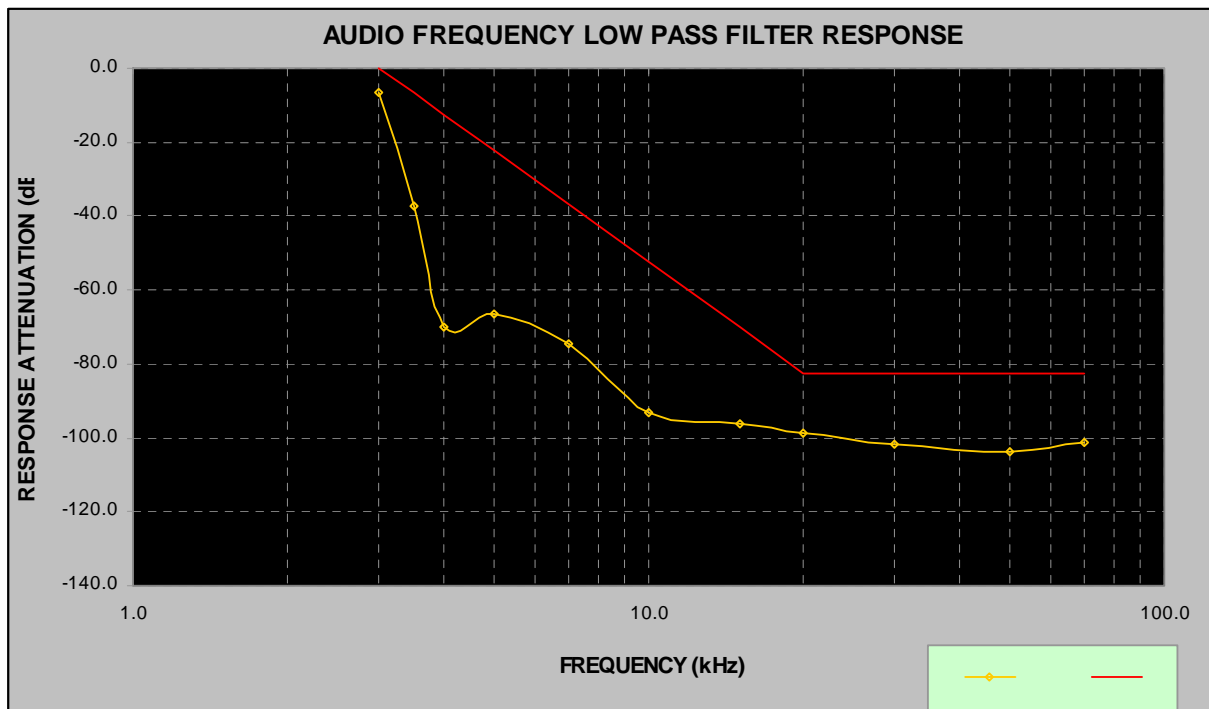
Carrier Frequency: 900.9875 MHz, Channel Separation=12.5 kHz

Audio Frequency (kHz)	Response Attenuation (dB)	FCC Limit (dB)
3.0	-4.5	0.0
3.5	-24.3	-6.7
4.0	-66.0	-12.5
5.0	-76.5	-22.2
7.0	-84.0	-36.8
10.0	-96.7	-52.3
15.0	-97.7	-69.9
20.0	-96.0	-82.4
30.0	-104.6	-82.4
50.0	-105.2	-82.4
70.0	-105.9	-82.4



Carrier Frequency: 939.9875 MHz, Channel Separation=12.5 kHz

Audio Frequency (kHz)	Response Attenuation (dB)	FCC Limit (dB)
3.0	-6.5	0.0
3.5	-37.3	-6.7
4.0	-70.0	-12.5
5.0	-66.5	-22.2
7.0	-74.5	-36.8
10.0	-93.2	-52.3
15.0	-96.0	-69.9
20.0	-98.7	-82.4
30.0	-101.7	-82.4
50.0	-103.7	-82.4
70.0	-101.2	-82.4



FCC §2.1049 & §24.131 & §90.209 & §90.210 – OCCUPIED BANDWIDTH & EMISSION MASK

Applicable Standard

FCC §2.1049, §24.131, §90.209 and §90.210

Emission Mask B and Emission Mask I

Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23
HP	RF Communication Test Set	8920A	3325U00859	2013-05-07	2014-05-07

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements, traceable to National Primary Standards and International System of Units (SI).

Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The resolution bandwidth of the spectrum analyzer was set at 300 Hz.

Test Data

Environmental Conditions

Temperature:	23 ~ 26°C
Relative Humidity:	50 ~ 56 %
ATM Pressure:	100.0 ~ 100.1 kPa

The testing was performed by Bell Hu on 2013-07-12.

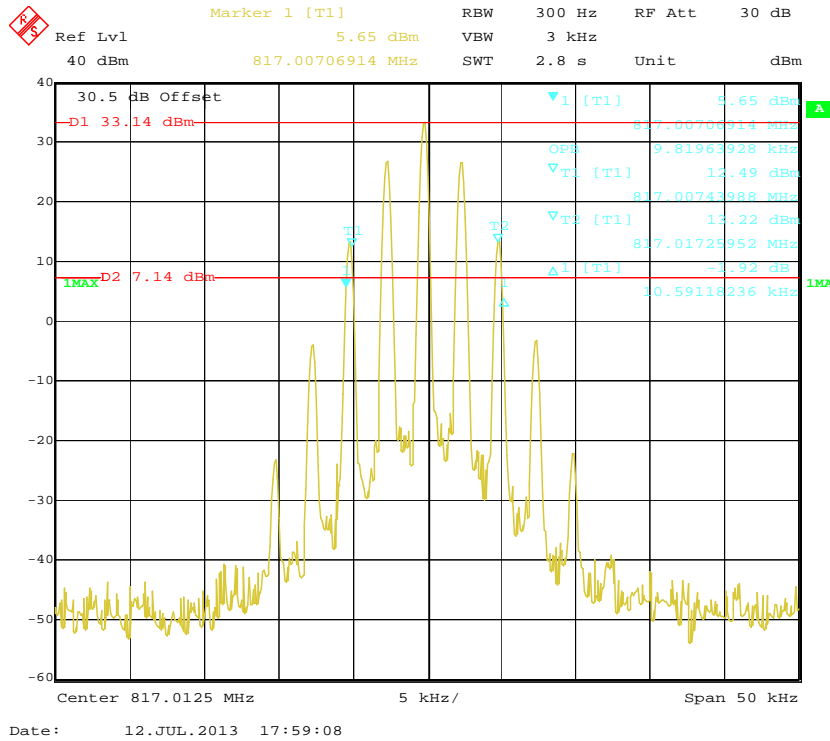
Test Mode: Transmitting

Modulation	Frequency Rang (MHz)	Frequency (MHz)	Channel Separation (kHz)	99% Occupied Bandwidth (kHz)	26 dB Emissions Bandwidth (kHz)
Analog (FM)	806-824	817.0125	12.5	9.82	10.59
			25.0	14.83	15.73
	851-869	860.0125	12.5	9.82	10.62
			25.0	14.83	15.73
	896-902	900.9875	12.5	9.92	10.62
	935-941	939.9875	12.5	9.92	10.62
Digital (4FSK)	806-824	817.0125	12.5	7.62	9.72
	851-869	860.0125	12.5	7.42	9.42
	896-902	900.9875	12.5	8.02	9.92
	935-941	939.9875	12.5	7.11	9.52

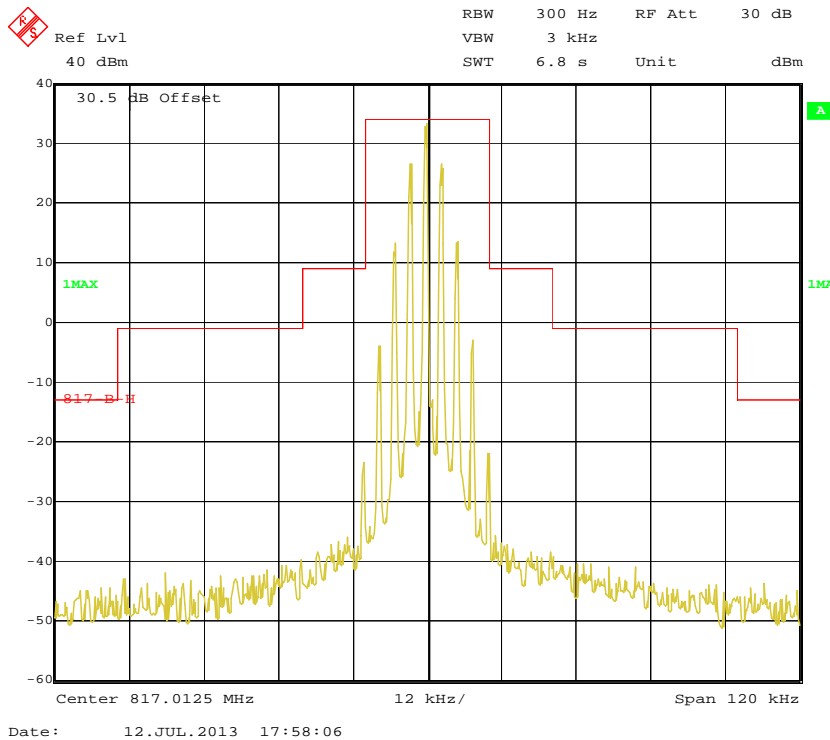
Note: Limit

806-824, 851-869 MHz: 20 kHz for 12.5KHz Channel Separation
 896-901, 935-941MHz: 13.6 kHz for 12.5KHz Channel Separation

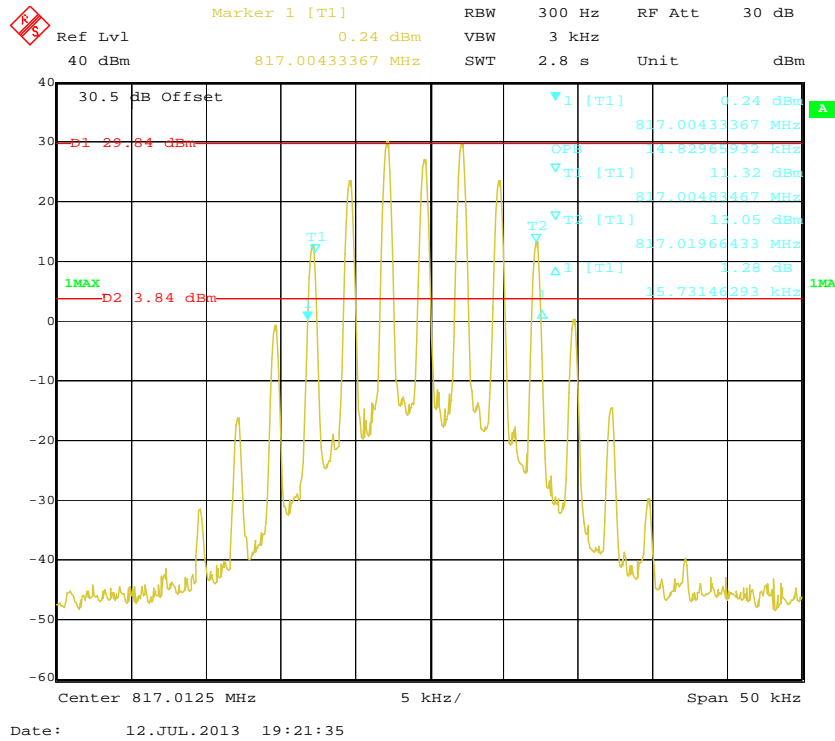
Analog Modulation:
817.0125 MHz: 99% Occupied & 26 dB Bandwidth with 12.5 kHz Channel Spacing



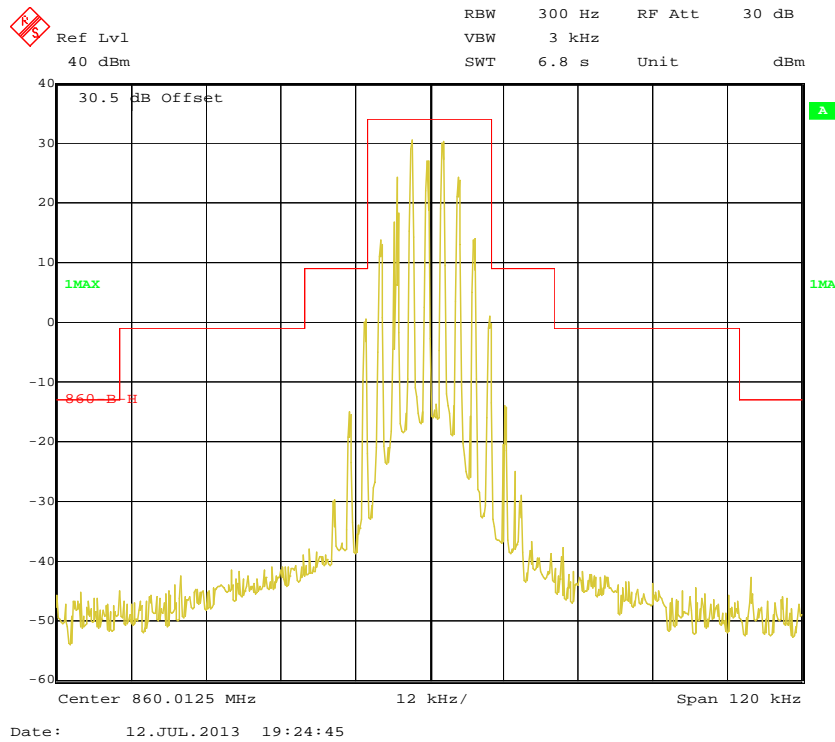
817.0125 MHz: Emission Mask with 12.5 kHz Channel Spacing



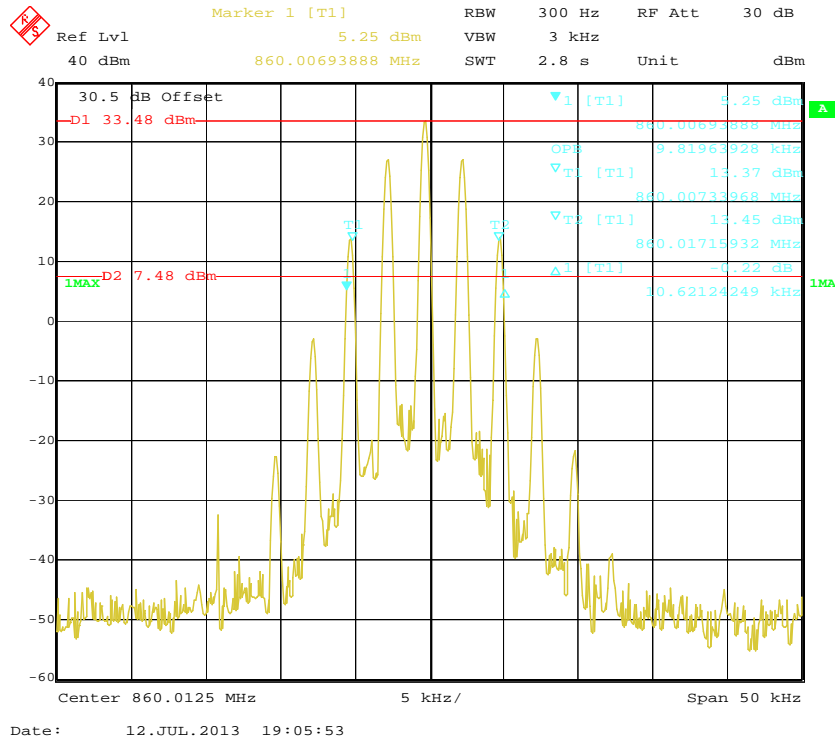
817.0125 MHz: 99% Occupied & 26 dB Bandwidth with 25 kHz Channel Spacing



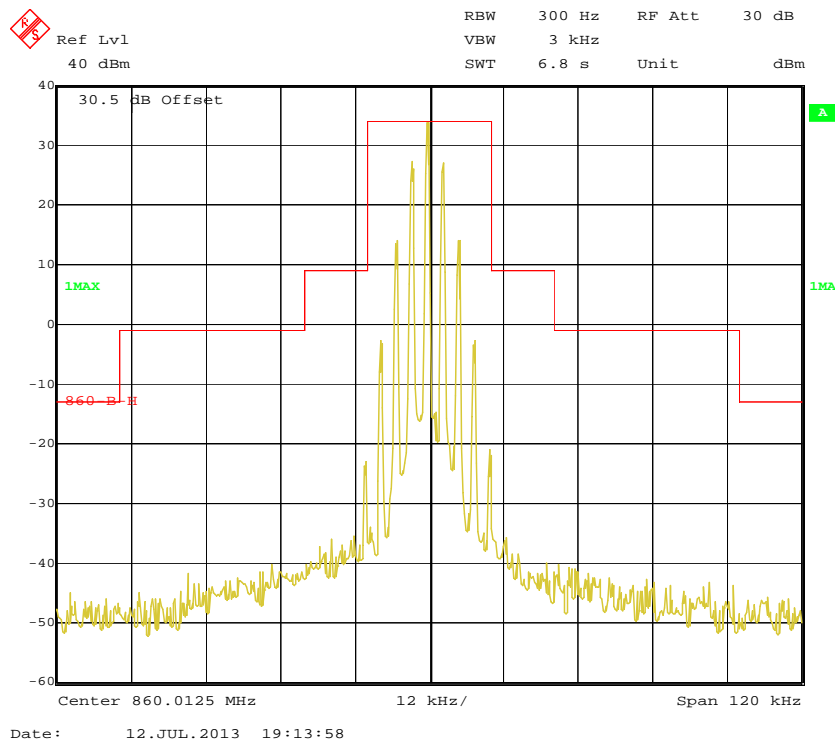
817.0125 MHz: Emission Mask with 25 kHz Channel Spacing



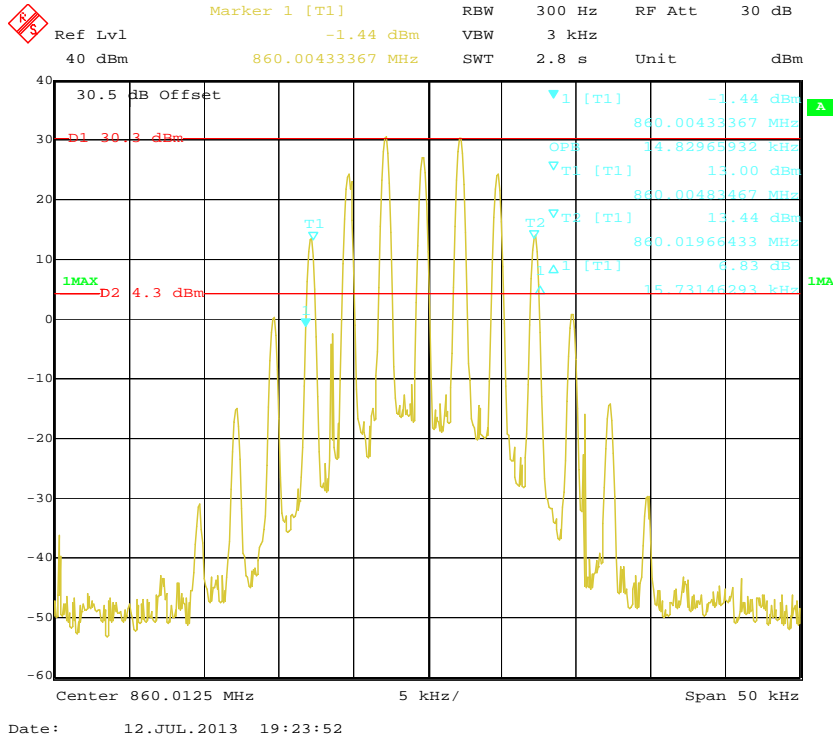
860.0125 MHz: 99% Occupied & 26 dB Bandwidth with 12.5 kHz Channel Spacing



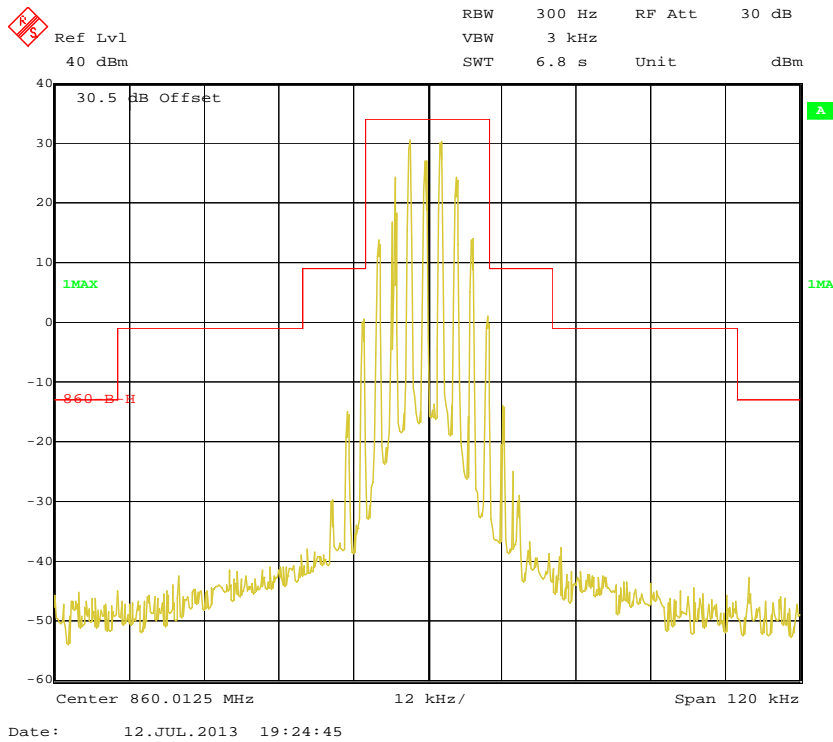
860.0125 MHz: Emission Mask with 12.5 kHz Channel Spacing



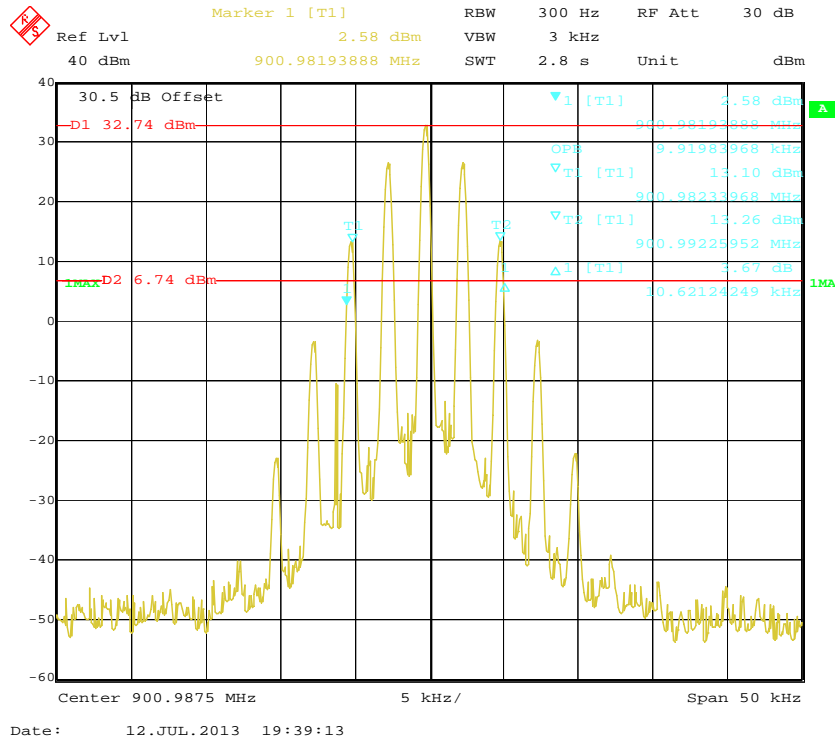
860.0125 MHz: Emission Mask with 25 kHz Channel Spacing



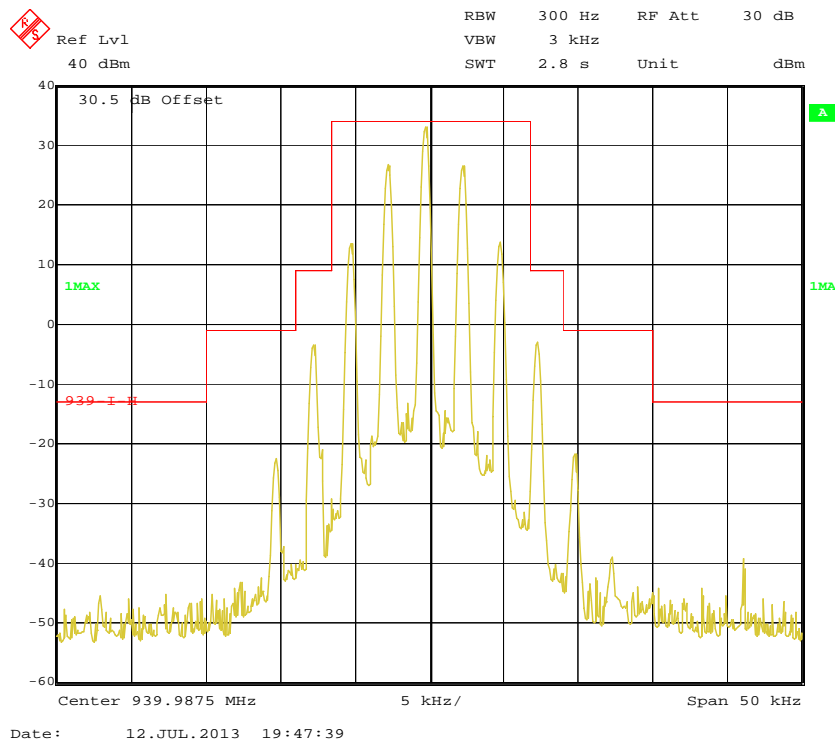
860.0125 MHz: Emission Mask with 25 kHz Channel Spacing



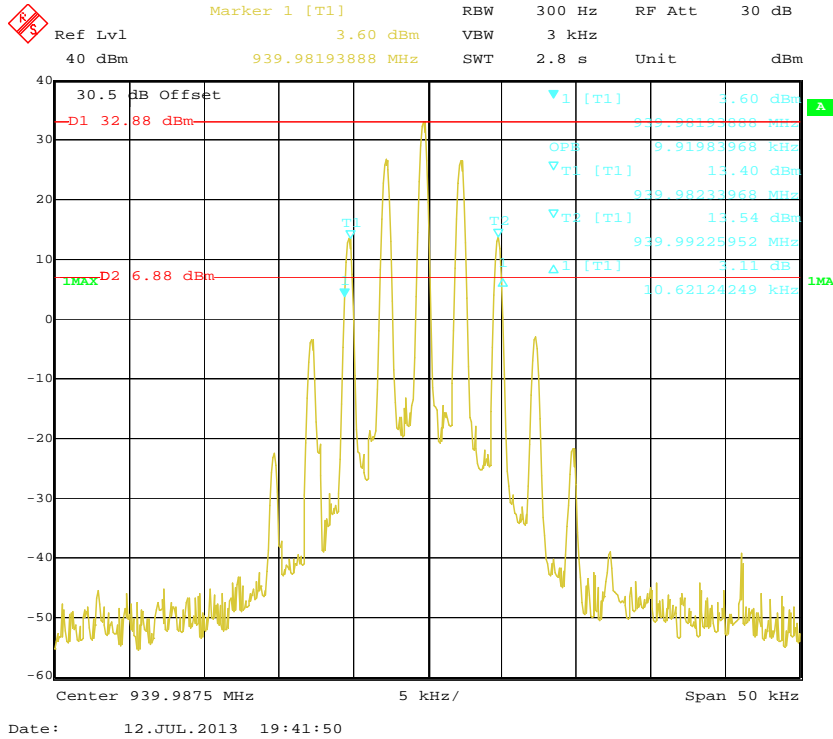
900.9875 MHz: 99% Occupied & 26 dB Bandwidth with 12.5 kHz Channel Spacing



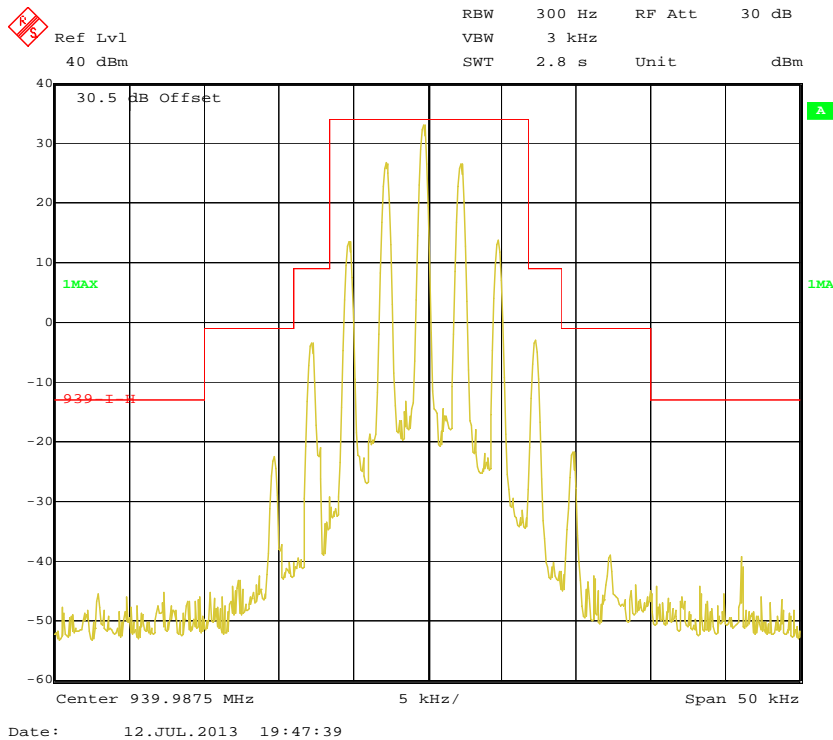
900.9875 MHz: Emission Mask with 12.5 kHz Channel Spacing



939.9875 MHz: 99% Occupied & 26 dB Bandwidth with 12.5 kHz Channel Spacing

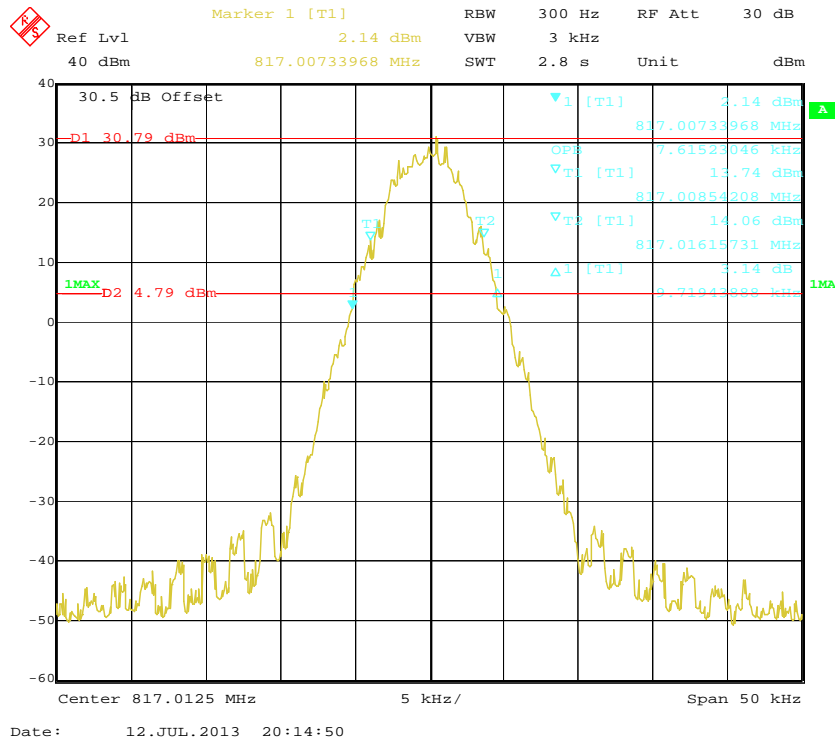


939.9875 MHz: Emission Mask with 12.5 kHz Channel Spacing

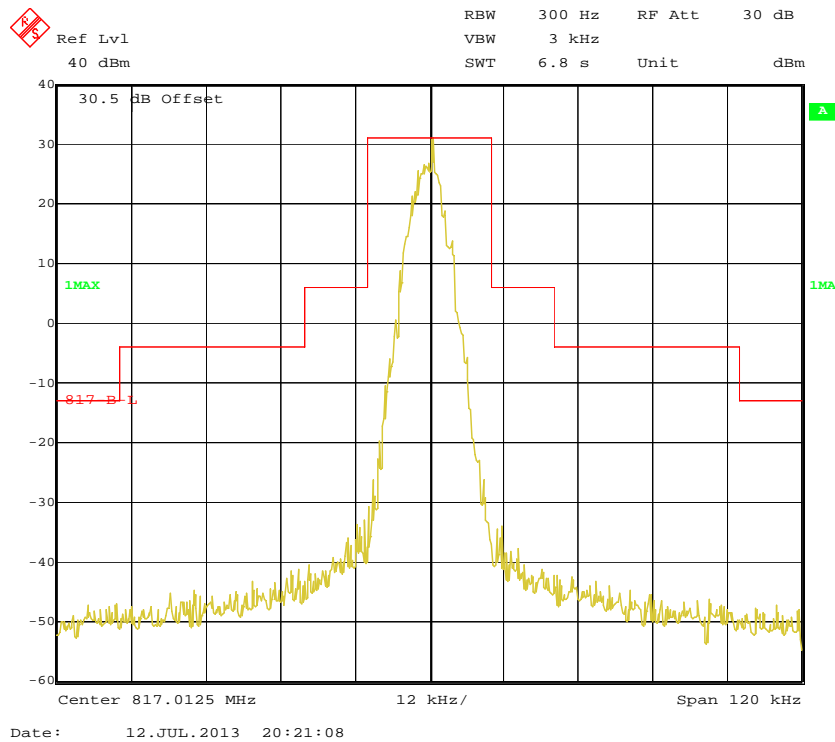


Digital Modulation:

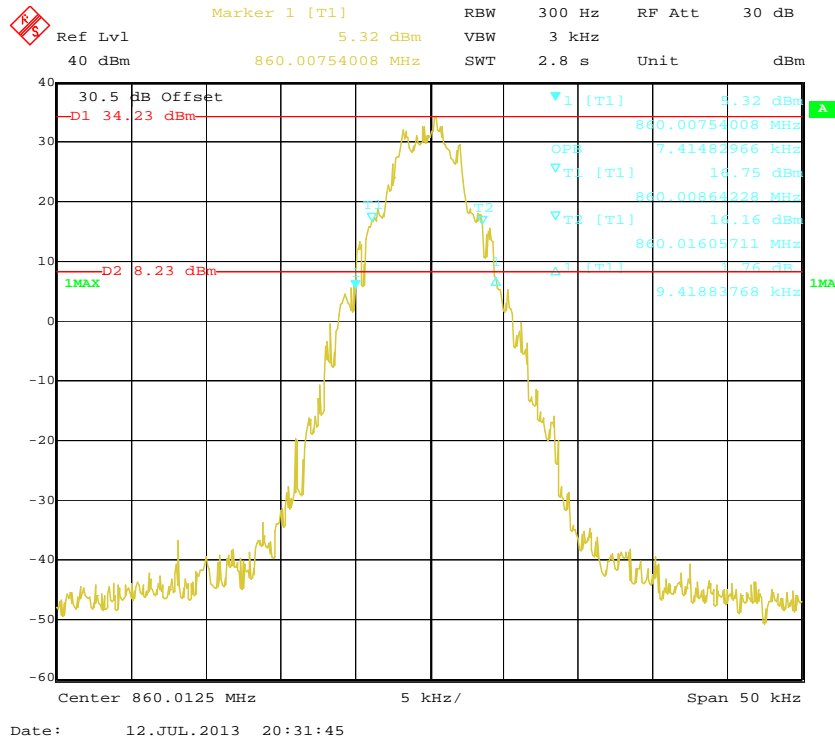
817.0125 MHz: 99% Occupied & 26 dB Bandwidth with 12.5 kHz Channel Spacing



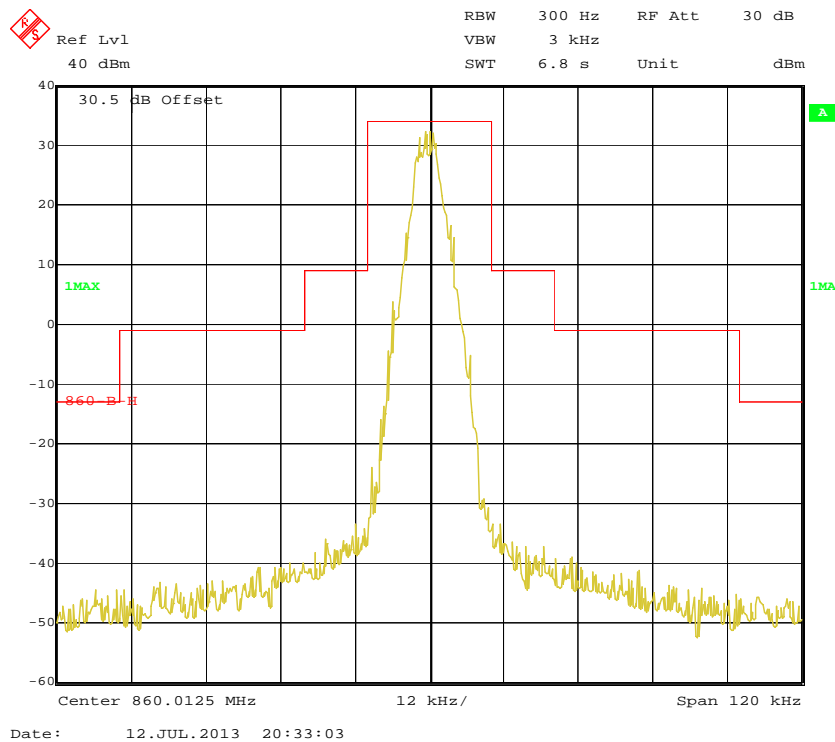
817.0125 MHz: Emission Mask with 12.5 kHz Channel Spacing



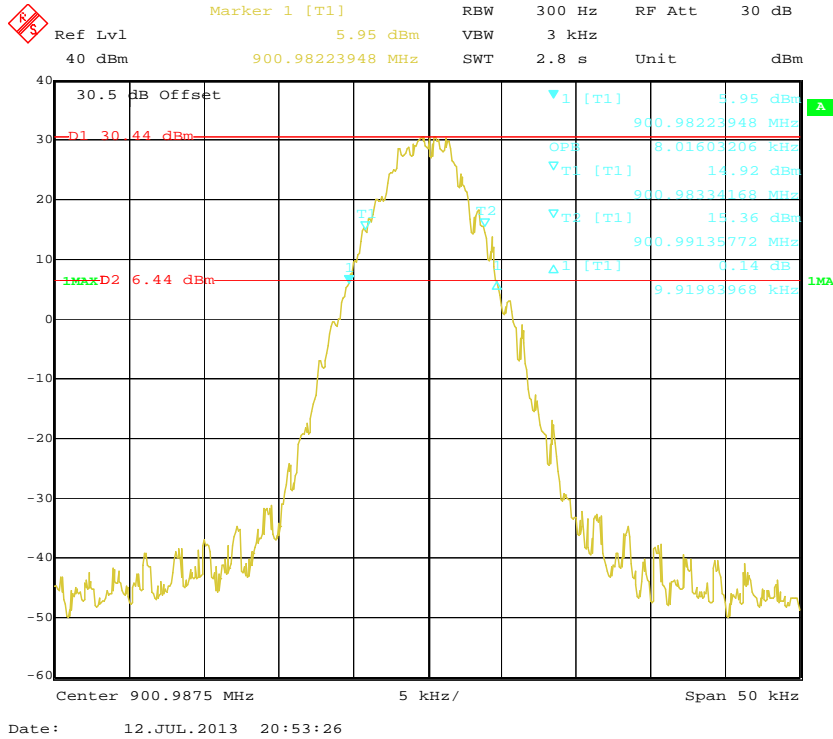
860.0125 MHz: 99% Occupied & 26 dB Bandwidth with 12.5 kHz Channel Spacing



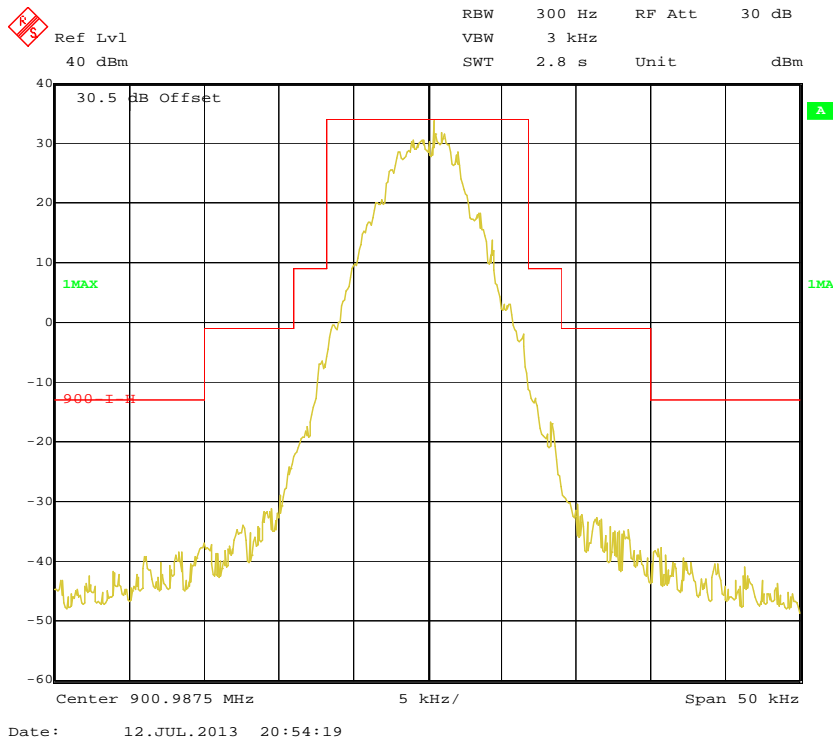
860.0125 MHz: Emission Mask with 12.5 kHz Channel Spacing



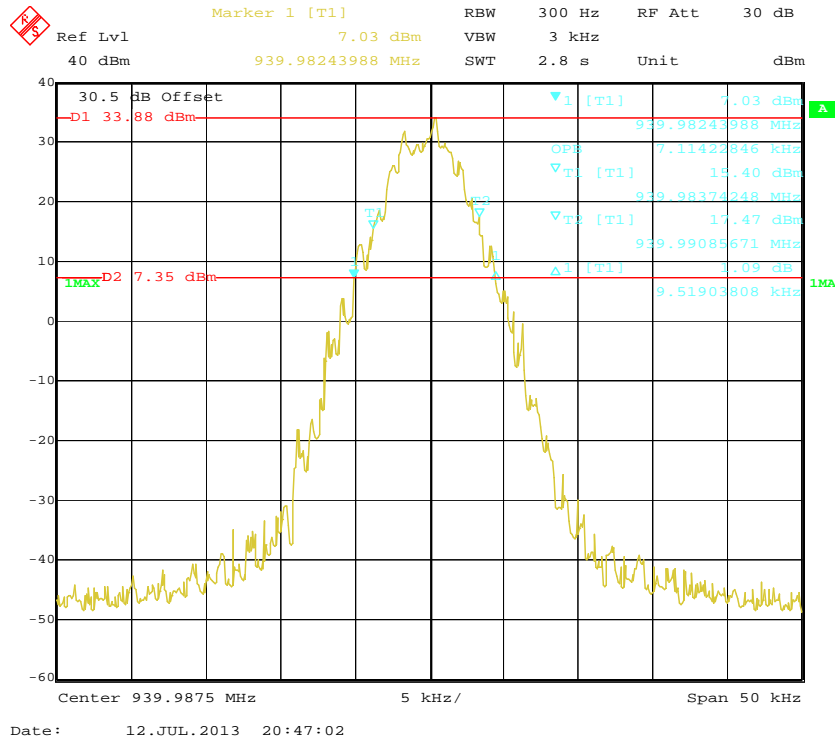
900.9875 MHz: 99% Occupied & 26 dB Bandwidth with 12.5 kHz Channel Spacing



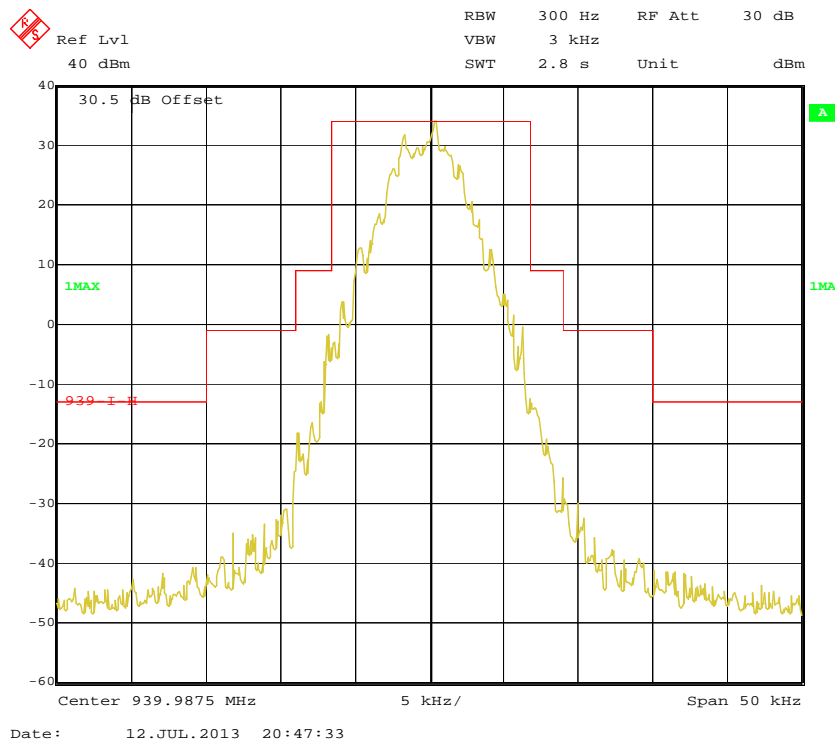
900.9875 MHz: Emission Mask with 12.5 kHz Channel Spacing



939.9875 MHz: 99% Occupied & 26 dB Bandwidth with 12.5 kHz Channel Spacing



939.9875 MHz: Emission Mask with 12.5 kHz Channel Spacing



FCC §2.1051 & §24.133 & §90.210 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Applicable Standard

FCC §90.210 and §24.133

Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements, traceable to National Primary Standards and International System of Units (SI).

Test Procedure

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

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	54 %
ATM Pressure:	100.1 kPa

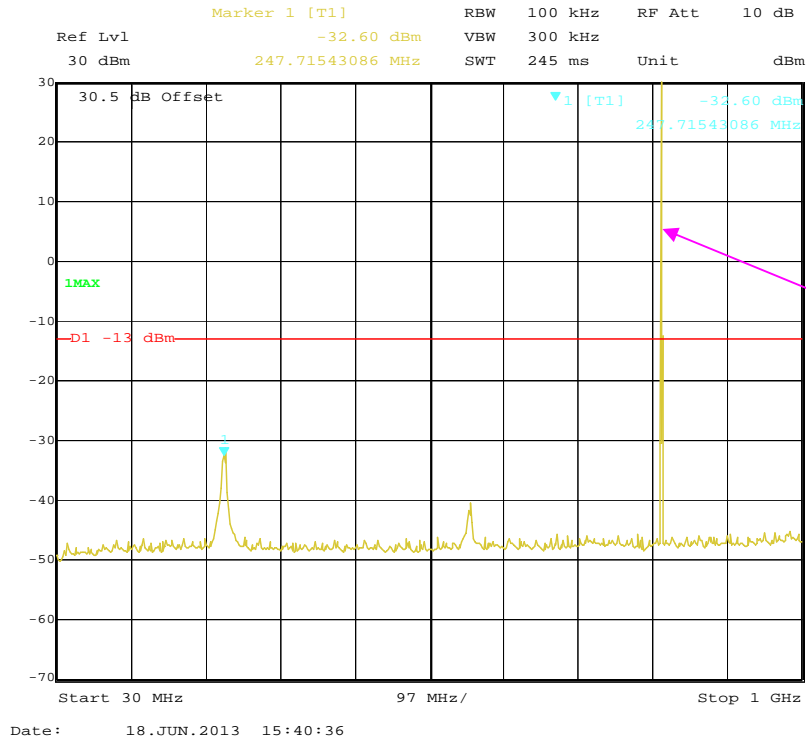
The testing was performed by Bell Hu on 2013-06-18.

Test Mode: Transmitting

Please refer to the following plots.

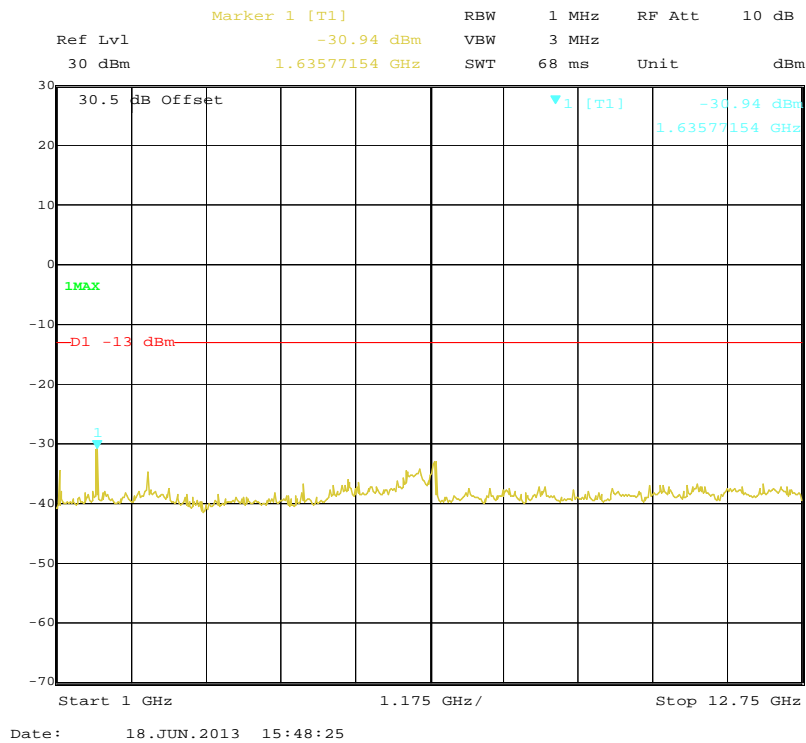
Analog Modulation:

817.0125 MHz: 30 MHz – 1 GHz, Spacing Channel 12.5 kHz

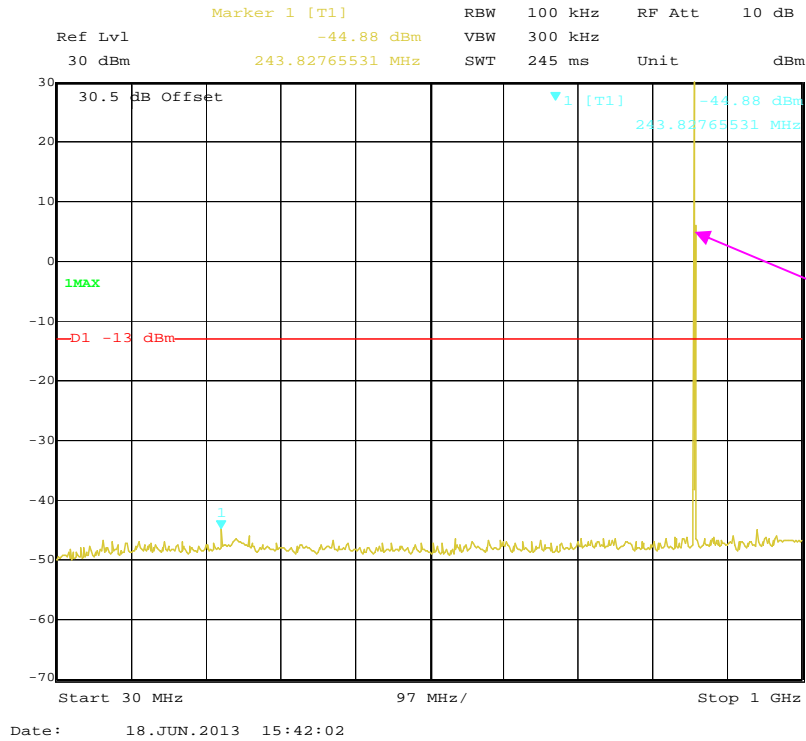


Fund. test with notch filter

817.0125 MHz: 1 GHz – 12.75 GHz, Spacing Channel 12.5 kHz

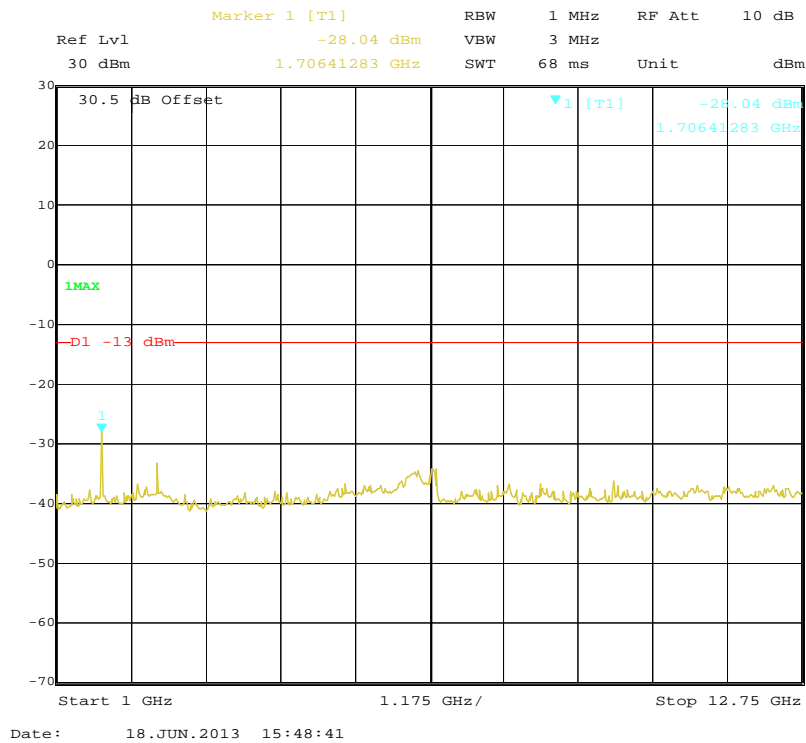


860.0125 MHz: 30 MHz – 1 GHz, Spacing Channel 12.5 kHz

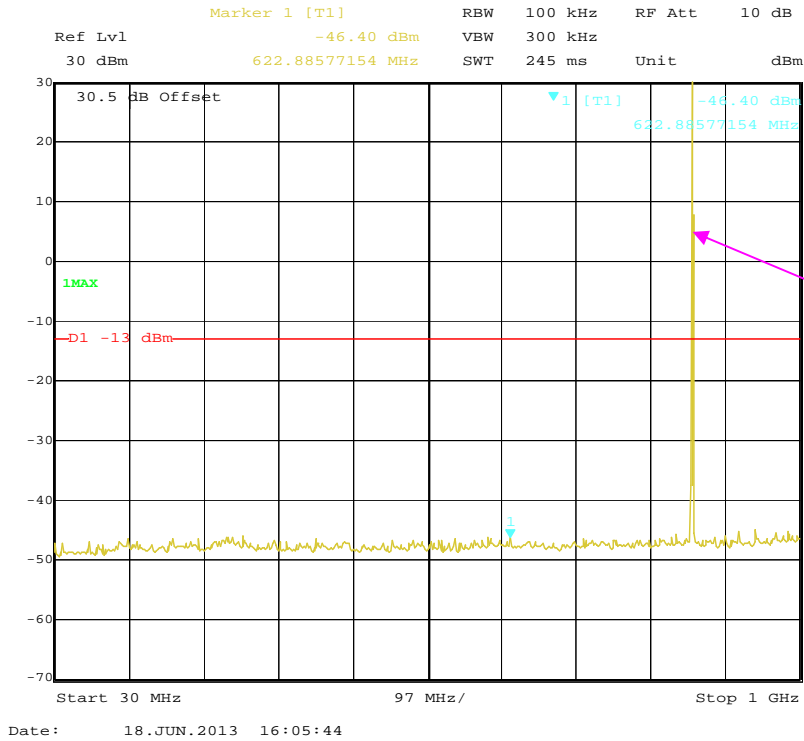


Fund.test with notch filter

860.0125 MHz: 1 GHz – 12.75 GHz, Spacing Channel 12.5 kHz

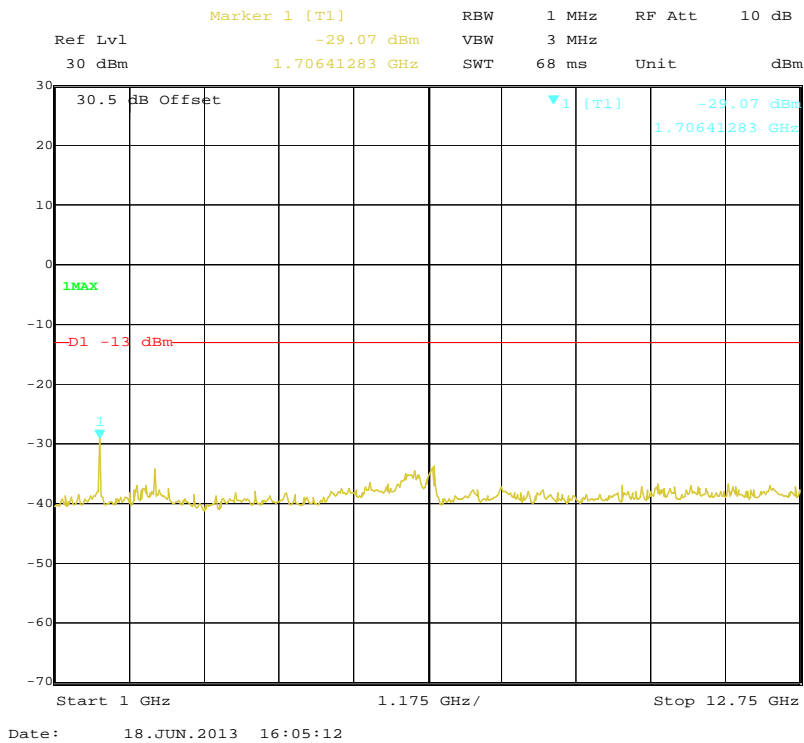


860.0125 MHz: 30 MHz – 1 GHz, Spacing Channel 25 kHz

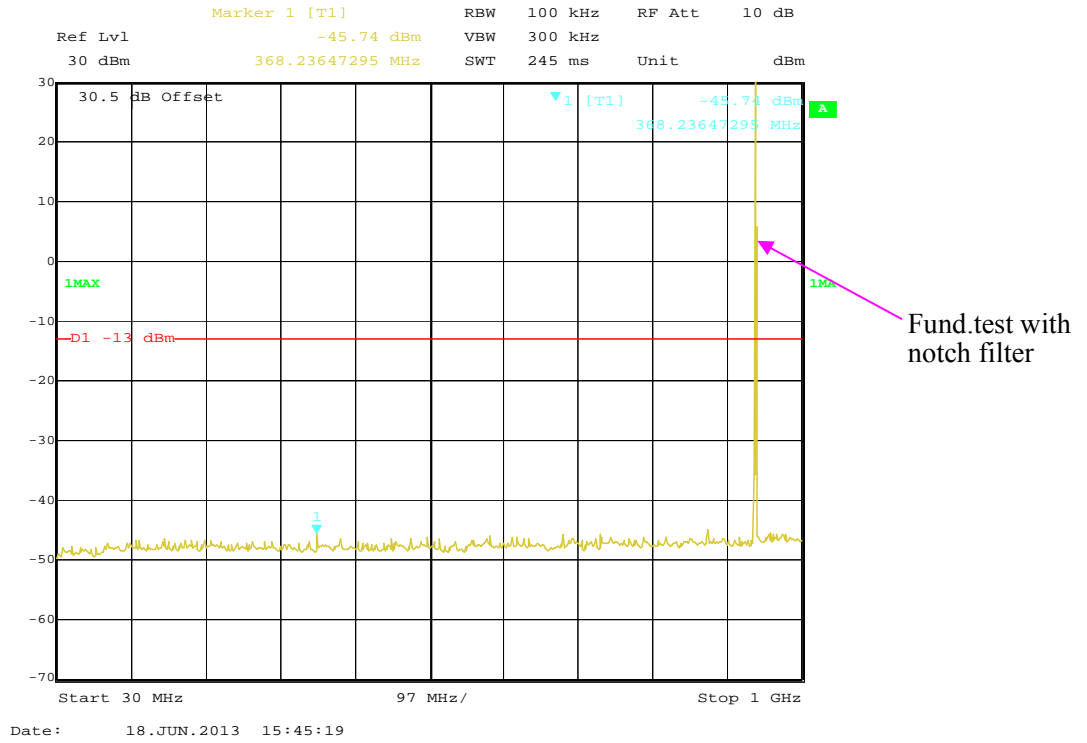


Fund. test with notch filter

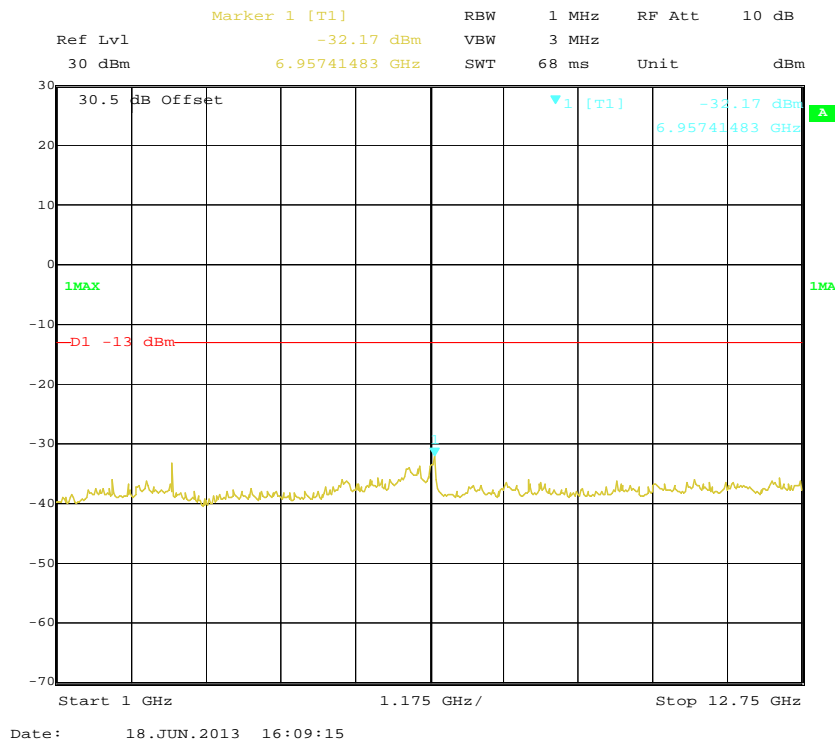
860.0125 MHz: 1 GHz – 12.75 GHz, Spacing Channel 25 kHz



939.9875 MHz: 30 MHz – 1 GHz, Spacing Channel 12.5 kHz

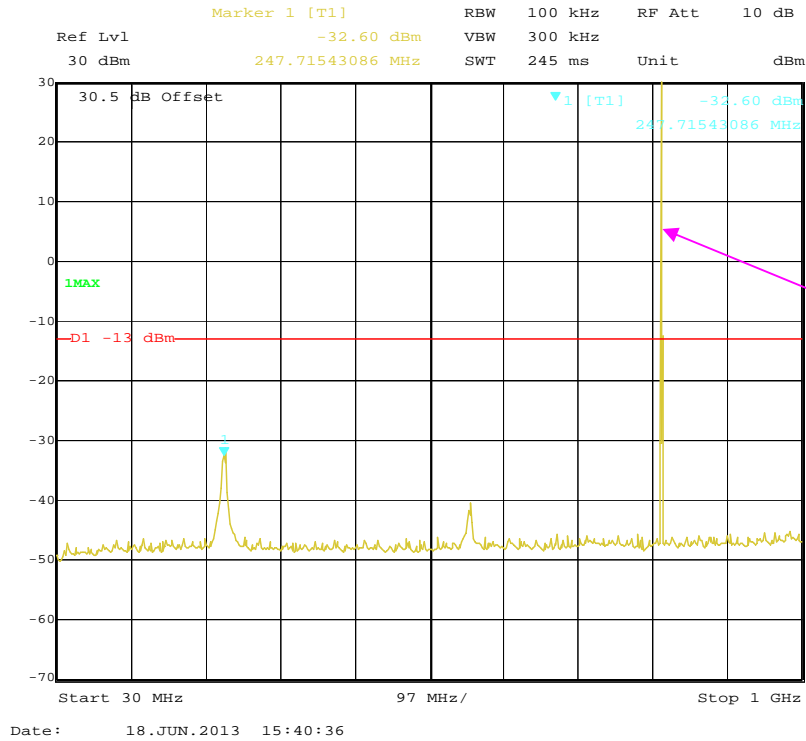


939.9875 MHz: 1 GHz – 12.75 GHz, Spacing Channel 12.5 kHz



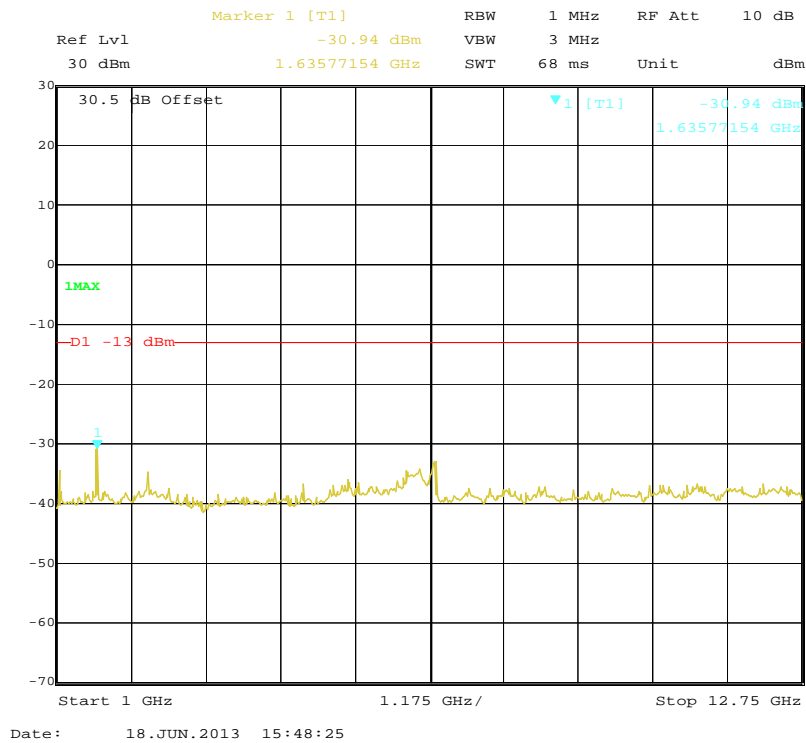
Digital Modulation:

817.0125 MHz: 30 MHz – 1 GHz, Spacing Channel 12.5 kHz

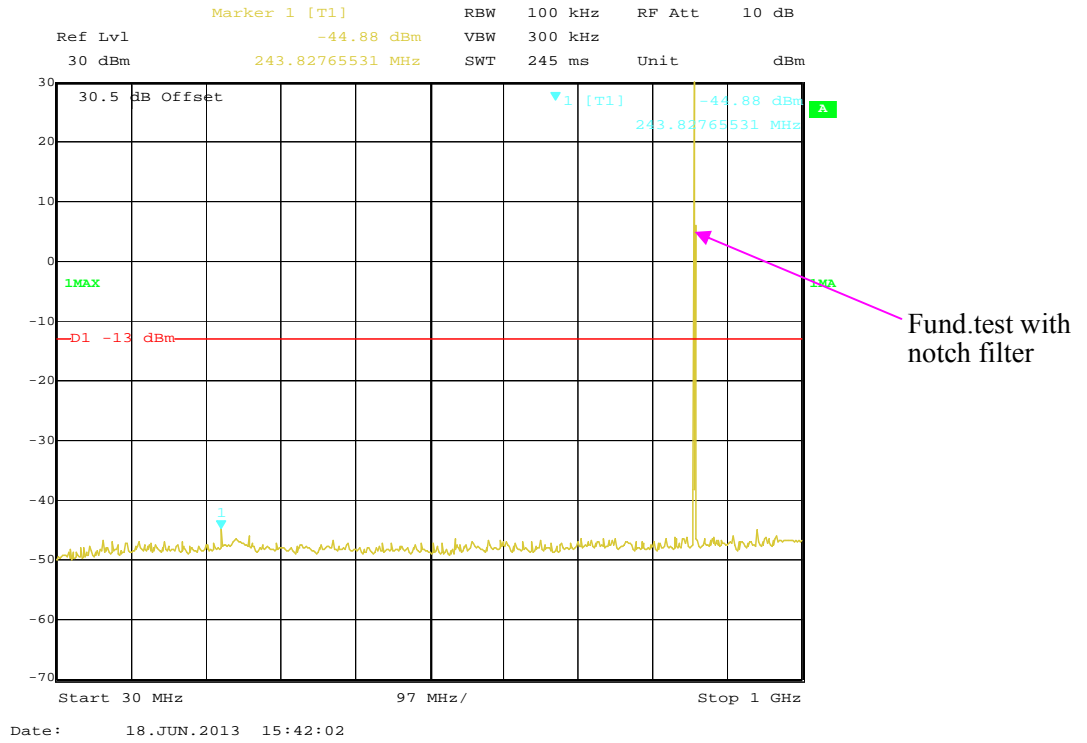


Fund. test with notch filter

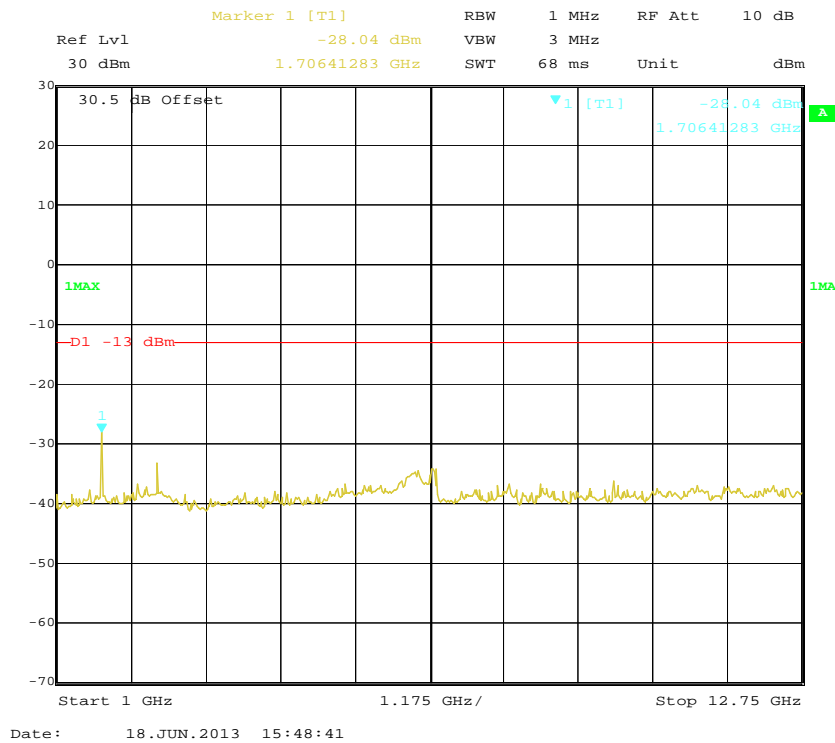
817.0125 MHz: 1 GHz – 12.75 GHz, Spacing Channel 12.5 kHz



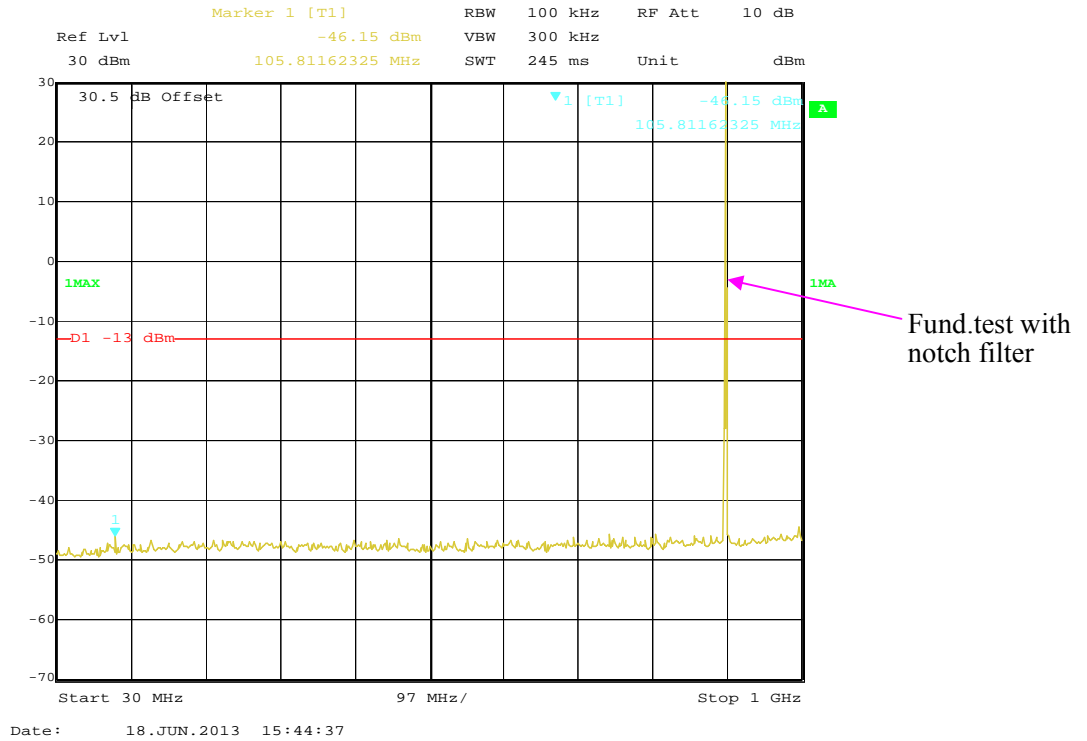
860.0125 MHz: 30 MHz – 1 GHz, Spacing Channel 12.5 kHz



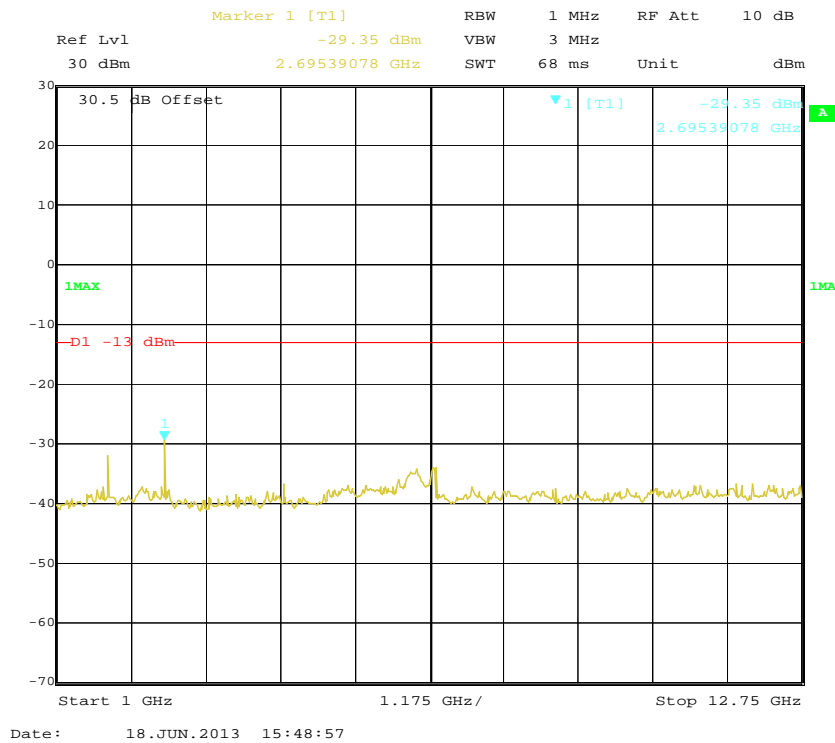
860.0125 MHz: 1 GHz – 12.75 GHz, Spacing Channel 12.5 kHz



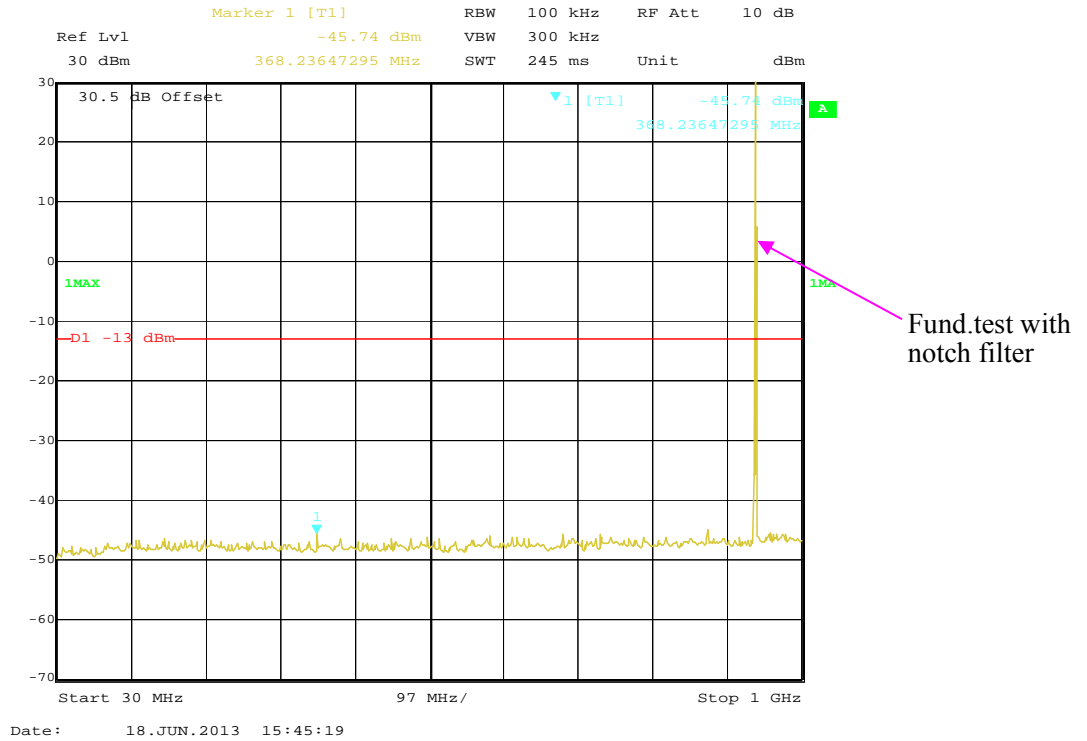
900.9875 MHz: 30 MHz – 1 GHz, Spacing Channel 12.5 kHz



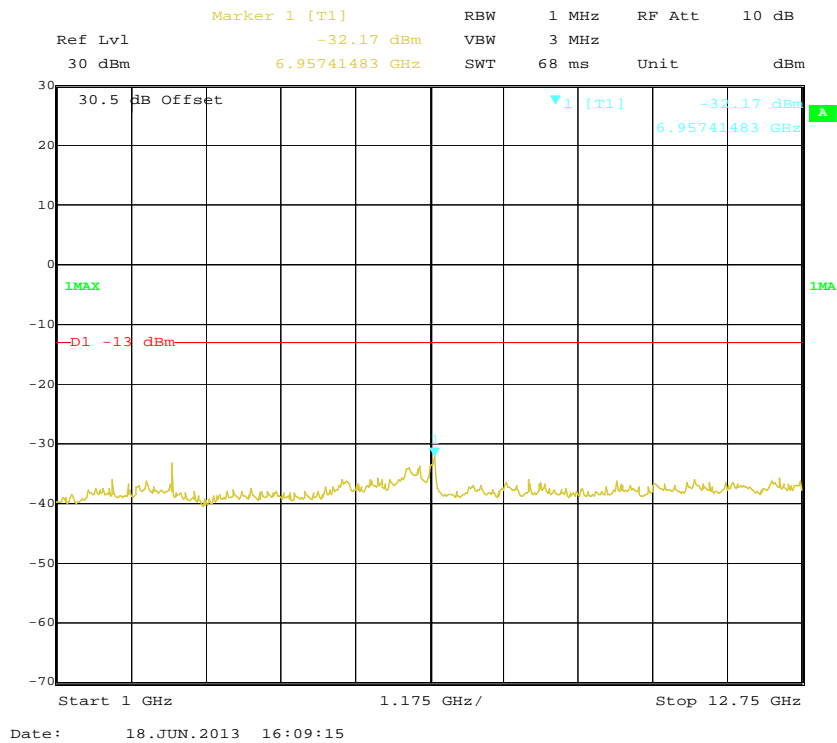
900.9875 MHz: 1 GHz – 12.75 GHz, Spacing Channel 12.5 kHz



939.9875 MHz: 30 MHz – 1 GHz, Spacing Channel 12.5 kHz



939.9875 MHz: 1 GHz – 12.75 GHz, Spacing Channel 12.5 kHz



FCC §2.1053 & §24.133 & §90.210 - RADIATED SPURIOUS EMISSIONS

Applicable Standard

FCC §2.1053, §24.133 and §90.210

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2013-05-09	2014-05-09
HP	Amplifier	8447E	1937A01046	2012-11-24	2013-11-23
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2011-11-28	2014-11-27
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23
Sunol Sciences	Horn Antenna	DRH-118	A052304	2011-12-01	2014-11-30
HP	Synthesized Sweeper	8341B	2624A00116	2013-05-17	2014-05-16
Mini-Circuits	Amplifier	ZVA-213+	N/A	2012-11-24	2013-11-23
A.H. System	Horn Antenna	SAS-200/571	135	2012-02-11	2015-02-10
COM POWER	Dipole Antenna	AD-100	041000	2012-06-06	2015-06-05
Electro-Mechanics	Horn antenna	3116	9510-2270	2012-10-14	2013-10-13

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements, traceable to National Primary Standards and International System of Units (SI).

Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load, which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to teeth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB = 10 lg (TXpwr in Watts/0.001)-the absolute level

Spurious attenuation limit in dB = 43 + 10 Log₁₀ (power out in Watts)

Test Data

Environmental Conditions

Temperature:	25°C
Relative Humidity:	56 %
ATM Pressure:	100.1 kPa

The testing was performed by Bell Hu on 2013-05-26.

Test Mode: Transmitting

30 MHz – 10 GHz:

Frequency (MHz)	Receiver Reading (dBμV)	Turn Table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 90	
			Height (m)	Polar (H/V)	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		Limit (dBm)	Margin (dB)
Analog Modulation (817.0125 MHz), Channel Spacing 12.5 kHz										
1634.0	45.21	69	1.7	V	-58.4	0.95	9.4	-49.95	-13	36.95
1634.0	43.01	255	1.2	H	-59.1	0.95	9.4	-50.65	-13	37.65
3268.0	41.28	237	1.6	H	-53.1	2.08	10.8	-44.38	-13	31.38
3268.0	38.96	69	1.7	V	-54.6	2.08	10.8	-45.88	-13	32.88
Analog Modulation (817.0125 MHz), Channel Spacing 25 kHz										
1634.0	39.98	201	1.9	V	-63.6	0.95	9.40	-55.15	-13	42.15
1634.0	37.89	105	1.7	H	-64.2	0.95	9.40	-55.75	-13	42.75
3268.0	40.28	78	1.8	H	-54.1	2.08	10.80	-45.38	-13	32.38
3268.0	37.99	214	1.7	V	-55.6	2.08	10.80	-46.88	-13	33.88
Analog Modulation (860.0125 MHz), Channel Spacing 12.5 kHz										
1720.0	39.26	61	1.8	V	-63.8	0.97	9.4	-55.37	-13	42.37
1720.0	36.77	114	1.2	H	-63.7	0.97	9.4	-55.27	-13	42.27
3440.0	40.27	145	1.7	H	-56.6	2.22	10.8	-48.02	-13	35.02
3440.0	38.19	22	1.6	V	-57.7	2.22	10.8	-49.12	-13	36.12
Analog Modulation (860.0125 MHz), Channel Spacing 25 kHz										
1720.0	40.52	92	1.7	V	-62.5	0.97	9.40	-54.07	-13	41.07
1720.0	37.96	67	1.7	H	-62.5	0.97	9.40	-54.07	-13	41.07
3440.0	41.05	280	1.8	H	-55.8	2.22	10.80	-47.22	-13	34.22
3440.0	38.22	255	1.7	V	-57.7	2.22	10.80	-49.12	-13	36.12
Analog Modulation (900.9875 MHz), Channel Spacing 12.5 kHz										
1801.0	42.15	24	1.8	V	-61.4	1.00	9.40	-53.00	-13	40.00
1801.0	39.09	303	1.8	H	-60.8	1.00	9.40	-52.40	-13	39.40
3602.0	41.11	313	1.7	H	-57.2	2.45	10.50	-49.15	-13	36.15
3602.0	40.25	108	1.4	V	-55.9	2.45	10.50	-47.85	-13	34.85

Frequency (MHz)	Receiver Reading (dBµV)	Turn Table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 90	
			Height (m)	Polar (H/V)	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		Limit (dBm)	Margin (dB)
Analog Modulation (939.9875 MHz), Channel Spacing 12.5 kHz										
1880.0	42.28	87	1.8	V	-56.0	1.03	9.40	-47.63	-13	34.63
1880.0	40.71	301	1.3	H	-57.4	1.03	9.40	-49.03	-13	36.03
3760.0	39.36	275	1.4	H	-57.9	2.59	10.40	-50.09	-13	37.09
3760.0	39.01	354	1.2	V	-57.5	2.59	10.40	-49.69	-13	36.69
Digital Modulation (817.0125 MHz), Channel Spacing 12.5 kHz										
1634.0	43.92	275	1.6	V	-59.7	0.95	9.40	-51.25	-13	38.25
1634.0	42.77	292	1.3	H	-59.3	0.95	9.40	-50.85	-13	37.85
3268.0	44.36	274	1.5	H	-50.1	2.08	10.80	-41.38	-13	28.38
3268.0	41.82	305	1.6	V	-51.7	2.08	10.80	-42.98	-13	29.98
Digital Modulation (860.00125 MHz), Channel Spacing 12.5 kHz										
1720.0	45.36	304	1.8	V	-57.7	0.97	9.40	-49.27	-13	36.27
1720.0	43.98	29	1.5	H	-56.5	0.97	9.40	-48.07	-13	35.07
3440.0	44.63	218	1.3	H	-52.3	2.22	10.80	-43.72	-13	30.72
3440.0	43.81	46	1.3	V	-52.1	2.22	10.80	-43.52	-13	30.52
Digital Modulation (900.9875 MHz), Channel Spacing 12.5 kHz										
1801.0	39.86	208	1.9	V	-63.7	1.00	9.40	-55.30	-13	42.30
1801.0	39.05	222	1.5	H	-60.8	1.00	9.40	-52.40	-13	39.40
3602.0	41.22	197	1.9	H	-57.1	2.45	10.50	-49.05	-13	36.05
3602.0	40.73	189	1.7	V	-55.4	2.45	10.50	-47.35	-13	34.35
Digital Modulation (939.9875 MHz), Channel Spacing 12.5 kHz										
1880.0	43.37	183	1.4	V	-54.9	1.03	9.40	-46.53	-13	33.53
1880.0	42.52	353	1.4	H	-55.6	1.03	9.40	-47.23	-13	34.23
3760.0	45.03	276	1.3	H	-52.2	2.59	10.40	-44.39	-13	31.39
3760.0	46.29	104	1.8	V	-50.3	2.59	10.40	-42.49	-13	29.49

Note:

Below 1GHz, the data which is 20dB below the limit was not recorded.

Absolute Level = SG Level - Cable loss + Antenna Gain

Margin = Limit- Absolute Level

FCC §2.1055 & §24.135 & §90.213- FREQUENCY STABILITY**Applicable Standard**

FCC §2.1055, §24.135 and §90.213

Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Due Date
Hewlett-Packard	Frequency Counter	5343A	2232A00827	2013-05-09	2014-05-09
ESPEC	Temperature & Humidity Chamber	EL-10KA	09107726	2012-11-02	2013-11-01
Long Wei	DC Power Supply	TPR-6420D	398363	N/A	N/A

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements, traceable to National Primary Standards and International System of Units (SI).

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to a frequency counter via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the counter.

Test Data**Environmental Conditions**

Temperature:	25 °C
Relative Humidity:	55 %
ATM Pressure:	100.1 kPa

The testing was performed by Bell Hu on 2013-06-05.

Test Mode: Transmitting

For Analog Modulation

Reference Frequency: 817.0125 MHz, Limit: 2.5 ppm, 12.5 kHz			
Test Environment		Frequency Measure with Time Elapsed	
Temperature (°C)	Power Supplied (V _{DC})	Measured Frequency error (MHz)	Frequency Error (ppm)
Frequency Stability versus Input Temperature			
50	7.4	817.01179	-0.87
40	7.4	817.01312	0.76
30	7.4	817.01235	-0.18
20	7.4	817.01165	-1.04
10	7.4	817.01172	-0.95
0	7.4	817.01228	-0.27
-10	7.4	817.01234	-0.20
-20	7.4	817.01223	-0.33
-30	7.4	817.01213	-0.45
Frequency Stability versus Input Voltage			
20	6.2	817.01240	-0.12

Reference Frequency: 817.0125 MHz, Limit: 2.5 ppm, 25 kHz			
Test Environment		Frequency Measure with Time Elapsed	
Temperature (°C)	Power Supplied (V _{DC})	Measured Frequency error (MHz)	Frequency Error (ppm)
Frequency Stability versus Input Temperature			
50	7.4	817.01241	-0.11
40	7.4	817.01210	-0.49
30	7.4	817.01203	-0.58
20	7.4	817.01241	-0.11
10	7.4	817.01206	-0.54
0	7.4	817.01209	-0.50
-10	7.4	817.01221	-0.35
-20	7.4	817.01241	-0.11
-30	7.4	817.01224	-0.32
Frequency Stability versus Input Voltage			
20	6.2	817.01135	-1.41

Reference Frequency: 860.0125 MHz, Limit: 2.5 ppm, 12.5 kHz			
Test Environment		Frequency Measure with Time Elapsed	
Temperature (°C)	Power Supplied (V_{DC})	Measured Frequency error (MHz)	Frequency Error (ppm)
Frequency Stability versus Input Temperature			
50	7.4	860.01239	-0.13
40	7.4	860.01169	-0.94
30	7.4	860.01194	-0.65
20	7.4	860.01184	-0.77
10	7.4	860.01208	-0.49
0	7.4	860.01183	-0.78
-10	7.4	860.01194	-0.65
-20	7.4	860.01175	-0.87
-30	7.4	860.01187	-0.73
Frequency Stability versus Input Voltage			
20	6.2	860.01208	-0.49

Reference Frequency: 860.0125 MHz, Limit: 2.5 ppm, 25 kHz			
Test Environment		Frequency Measure with Time Elapsed	
Temperature (°C)	Power Supplied (V_{DC})	Measured Frequency error (MHz)	Frequency Error (ppm)
Frequency Stability versus Input Temperature			
50	7.4	860.01154	-1.12
40	7.4	860.01188	-0.72
30	7.4	860.01175	-0.87
20	7.4	860.01175	-0.87
10	7.4	860.01132	-1.37
0	7.4	860.01176	-0.86
-10	7.4	860.01188	-0.72
-20	7.4	860.01164	-1.00
-30	7.4	860.01175	-0.87
Frequency Stability versus Input Voltage			
20	6.2	860.01198	-0.60

Reference Frequency: 900.9875 MHz, Limit: 1.5 ppm, 12.5 kHz			
Test Environment		Frequency Measure with Time Elapsed	
Temperature (°C)	Power Supplied (V _{DC})	Measured Frequency error (MHz)	Frequency Error (ppm)
Frequency Stability versus Input Temperature			
50	7.4	900.98711	-0.43
40	7.4	900.98675	-0.83
30	7.4	900.98767	0.19
20	7.4	900.98762	0.13
10	7.4	900.98716	-0.38
0	7.4	900.98781	0.34
-10	7.4	900.98771	0.23
-20	7.4	900.98769	0.21
-30	7.4	900.98768	0.20
Frequency Stability versus Input Voltage			
20	6.2	900.98787	0.41

Reference Frequency: 939.9875 MHz, Limit: 1.5 ppm, 12.5 kHz			
Test Environment		Frequency Measure with Time Elapsed	
Temperature (°C)	Power Supplied (V _{DC})	Measured Frequency error (MHz)	Frequency Error (ppm)
Frequency Stability versus Input Temperature			
50	7.4	939.98689	-0.65
40	7.4	939.98753	0.03
30	7.4	939.98773	0.21
20	7.4	939.98766	0.17
10	7.4	939.98714	-0.38
0	7.4	939.98725	-0.27
-10	7.4	939.98736	-0.15
-20	7.4	939.98789	0.41
-30	7.4	939.98769	0.20
Frequency Stability versus Input Voltage			
20	6.2	939.98701	-0.52

For Digital Modulation

Reference Frequency: 817.0125 MHz, Limit: 2.5 ppm, 12.5 kHz			
Test Environment		Frequency Measure with Time Elapsed	
Temperature (°C)	Power Supplied (V _{DC})	Measured Frequency error (MHz)	Frequency Error (ppm)
Frequency Stability versus Input Temperature			
50	7.4	817.01213	-0.45
40	7.4	817.01212	-0.47
30	7.4	817.01192	-0.70
20	7.4	817.01213	-0.46
10	7.4	817.01238	-0.15
0	7.4	817.01208	-0.52
-10	7.4	817.01247	-0.03
-20	7.4	817.01219	-0.37
-30	7.4	817.01238	-0.15
Frequency Stability versus Input Voltage			
20	6.2	817.01208	-0.52

Reference Frequency: 860.0125 MHz, Limit: 2.5 ppm, 12.5 kHz			
Test Environment		Frequency Measure with Time Elapsed	
Temperature (°C)	Power Supplied (V _{DC})	Measured Frequency error (MHz)	Frequency Error (ppm)
Frequency Stability versus Input Temperature			
50	7.4	860.01198	-0.60
40	7.4	860.01223	-0.31
30	7.4	860.01205	-0.53
20	7.4	860.01184	-0.77
10	7.4	860.01227	-0.27
0	7.4	860.01247	-0.04
-10	7.4	860.01187	-0.73
-20	7.4	860.01225	-0.29
-30	7.4	860.01227	-0.27
Frequency Stability versus Input Voltage			
20	6.2	860.01205	-0.53

Reference Frequency: 900.9875 MHz, Limit: 1.5 ppm, 12.5 kHz			
Test Environment		Frequency Measure with Time Elapsed	
Temperature (°C)	Power Supplied (V _{DC})	Measured Frequency error (MHz)	Frequency Error (ppm)
Frequency Stability versus Input Temperature			
50	7.4	900.98704	-0.51
40	7.4	900.98668	-0.91
30	7.4	900.98669	-0.90
20	7.4	900.98746	-0.05
10	7.4	900.98709	-0.46
0	7.4	900.98733	-0.19
-10	7.4	900.98678	-0.80
-20	7.4	900.98741	-0.10
-30	7.4	900.98690	-0.67
Frequency Stability versus Input Voltage			
20	6.2	900.98785	0.38

Reference Frequency: 939.9875 MHz, Limit: 1.5 ppm, 12.5 kHz			
Test Environment		Frequency Measure with Time Elapsed	
Temperature (°C)	Power Supplied (V _{DC})	Measured Frequency error (MHz)	Frequency Error (ppm)
Frequency Stability versus Input Temperature			
50	7.4	939.98783	0.35
40	7.4	939.98755	0.05
30	7.4	939.98753	0.03
20	7.4	939.98777	0.28
10	7.4	939.98778	0.30
0	7.4	939.98786	0.38
-10	7.4	939.98780	0.32
-20	7.4	939.98760	0.11
-30	7.4	939.98789	0.42
Frequency Stability versus Input Voltage			
20	6.2	939.98701	-0.52

***** END OF REPORT *****