FCC PART 22, 74 and 90

TEST REPORT

For

Hytera Communications Co., Ltd.

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

FCC ID: YAMRD98XSU2

Report Type:	**Product Type:**
Original Report	Digital Base Station Repeater

Test Engineer:	Gardon Zhang
Report Number:	RSZ131014001-00
Report Date:	2013-12-17
Reviewed By:	Alvin Huang RF Leader
Prepared By:	Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Hytera Communications Co., Ltd.*'s product, model number: *RD982S U(2) (FCC ID: YAMRD98XSU2)* or the "EUT" in this report was a *Digital Base Station Repeater*, which was measured approximately: 366 mm (L) x 483 mm (W) x 88 mm (H), rated with input voltage: DC 13.6V.

Note: The product, series model RD980S U(2), RD982S U(2), RD985S U(2), RD986S U(2) and RD988S U(2) are electrically identical, they are just diffetent in model number due to market purposes , which was explained in the attached declaration letter. And the model RD982S U(2) was selected for fully testing.

** All measurement and test data in this report was gathered from production sample serial number: 1310007 (Assigned by BACL, Shenzhen). The EUT supplied by the applicant was received on 2013-10-14.*

Objective

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

Related Submittal(s)/Grant(s)

No related submittal.

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 22 – Public Mobile Service
Part 74 – Experimental Radio, Auxiliary, Special Broadcast and other Program Distributonal 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.

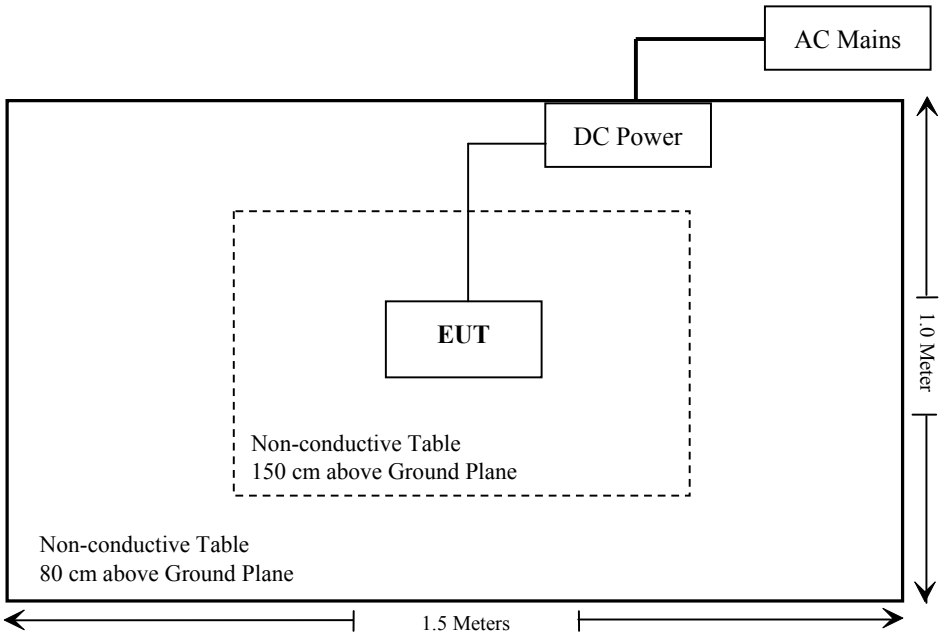
Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Mean Well	DC Power	SP-320-13.5	N/A

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Results
§1.1307 (b)(1), §2.1091	Maximum Permissible Exposure (MPE)	Compliance
§2.1046; § 22.727; §74.461; §90.205	RF Output Power	Compliance
§2.1047; §74.463;§90.207	Modulation Characteristic	Compliance
§2.1049;§22.357;§ 22.731; §74.462;§90.209; §90.210	Occupied Bandwidth & Emission Mask	Compliance
§2.1051; §22.861; §74.461;§90.210	Spurious Emission at Antenna Terminal	Compliance
§2.1053; §22.861; §74.461;§90.210	Spurious Radiated Emissions	Compliance
§2.1055; § 22.355; §74.464;§90.213	Frequency Stability	Compliance
§90.214	Transient Frequency Behavior	Compliance

FCC§1.1307 (b) (1) & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart 1.1307 (b)(1), 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

(A) Limits for Occupational/Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	($900/f^2$)*	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6

f = frequency in MHz
* = Plane-wave equivalent power density

Result

Calculated Formulary:

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

S = power density (in appropriate units, e.g. mW/cm2)
P = power input to the antenna (in appropriate units, e.g., mW).
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

Frequency (MHz)	Antenna Gain		Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
	(dBi)	(numeric)	(dBm)	(mW)			
490.000	6.5	4.47	47.71	59020	350	0.17	1.63

Radiation Exposure Statement:

To comply with FCC RF exposure requirements, a minimum separation distance of 350cm is required between the antenna and all public persons.

Result: Compliance

FCC §2.1046 & § 22.659 & §74.461 & §90.205- RF OUTPUT POWER

Applicable Standard

FCC §2.1046, § 22.659, §74.461 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

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

*** 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:	25 ℃
Relative Humidity:	56 %
ATM Pressure:	100.1 kPa

The testing was performed by Gardon Zhang on 2013-11-05 and 2013-11-06.

Test Mode: Transmitting

Test Result: Compliance. Please refer to following table.

Modulation	Frequency Spacing (kHz)	Frequency (MHz)	Power level	Conducted Output Power (dBm)	Conducted Output Power (W)	Note
Analog	12.5	450.0125	High	47.68	58.614	For FCC Part 74
			Low	37.71	5.902	For FCC Part 74
		469.9875	High	47.70	58.884	For FCC Part 90
			Low	37.74	5.943	For FCC Part 90
		490.0000	High	47.71	59.020	For FCC Part 90
			Low	37.65	5.821	For FCC Part 90
		511.9875	High	47.65	58.210	For FCC Part 22
			Low	37.62	5.781	For FCC Part 22
		519.9875	High	47.65	58.210	For Federal
			Low	37.64	5.808	For Federal
Digital	12.5	450.0125	High	47.54	56.754	For FCC Part 74
			Low	37.58	5.728	For FCC Part 74
		469.9875	High	47.61	57.677	For FCC Part 90
			Low	37.49	5.610	For FCC Part 90
		490.0000	High	47.68	58.614	For FCC Part 90
			Low	37.69	5.875	For FCC Part 90
		511.9875	High	47.62	57.810	For FCC Part 22
			Low	37.58	5.728	For FCC Part 22
		519.9875	High	47.49	56.105	For Federal
			Low	37.61	5.768	For Federal

FCC §2.1047 & §74.463 & §90.207 - MODULATION CHARACTERISTIC

Applicable Standard

FCC§2.1047, §74.463 and §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	2013-05-09	2014-05-08

*** 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:	24 ℃
Relative Humidity:	55 %
ATM Pressure:	100.1 kPa

The testing was performed by Gardon Zhang on 2013-11-21.

Test Mode: Transmitting

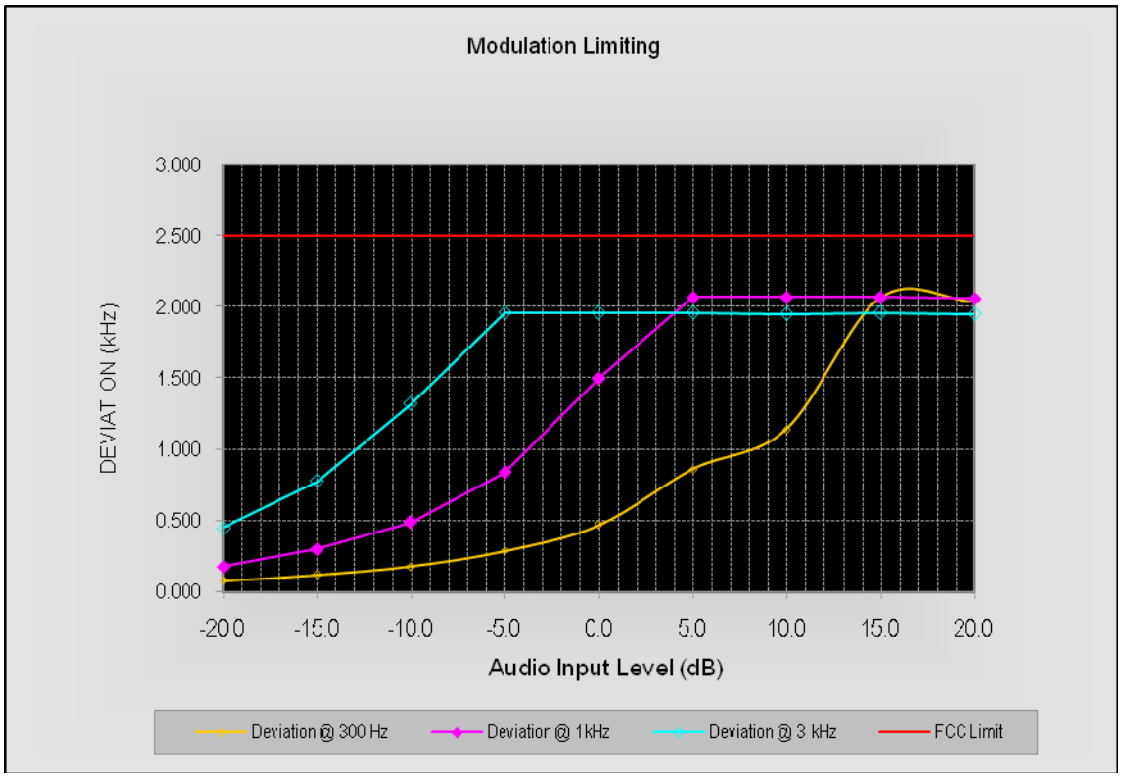
Result: Compliance.

Analog Modulation:

MODULATION LIMITING

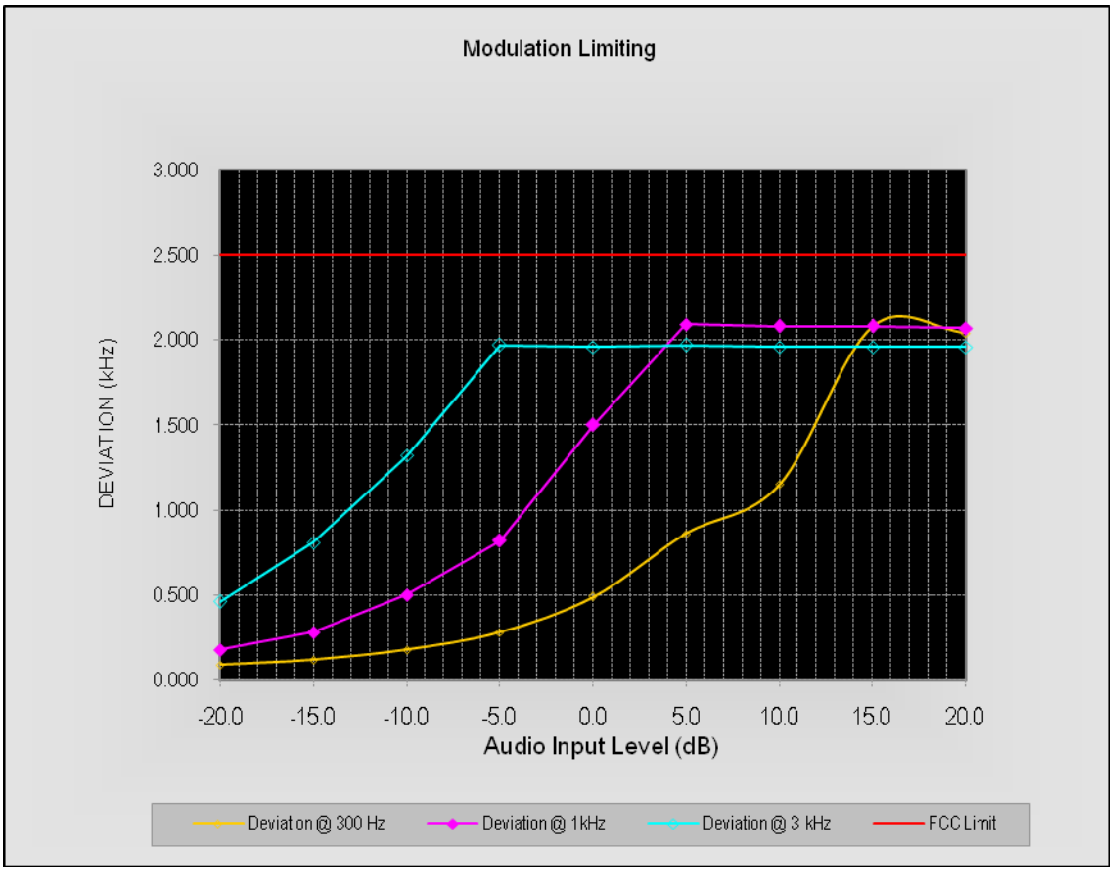
Carrier Frequency: 469.9875 MHz, Channel Separation=12.5 kHz, Low Power

Audio Input Level [dB]	Frequency Deviation (kHz)			Limit [kHz]
	@ 300 Hz	@ 1kHz	@ 3 kHz	
20.0	2.040	2.060	1.950	2.5
15.0	2.070	2.070	1.960	2.5
10.0	1.140	2.070	1.950	2.5
5.0	0.860	2.070	1.960	2.5
0.0	0.470	1.500	1.960	2.5
-5.0	0.290	0.840	1.960	2.5
-10.0	0.180	0.490	1.320	2.5
-15.0	0.120	0.300	0.780	2.5
-20.0	0.080	0.180	0.450	2.5



Carrier Frequency: 469.9875 MHz, Channel Separation=12.5 kHz, High Power

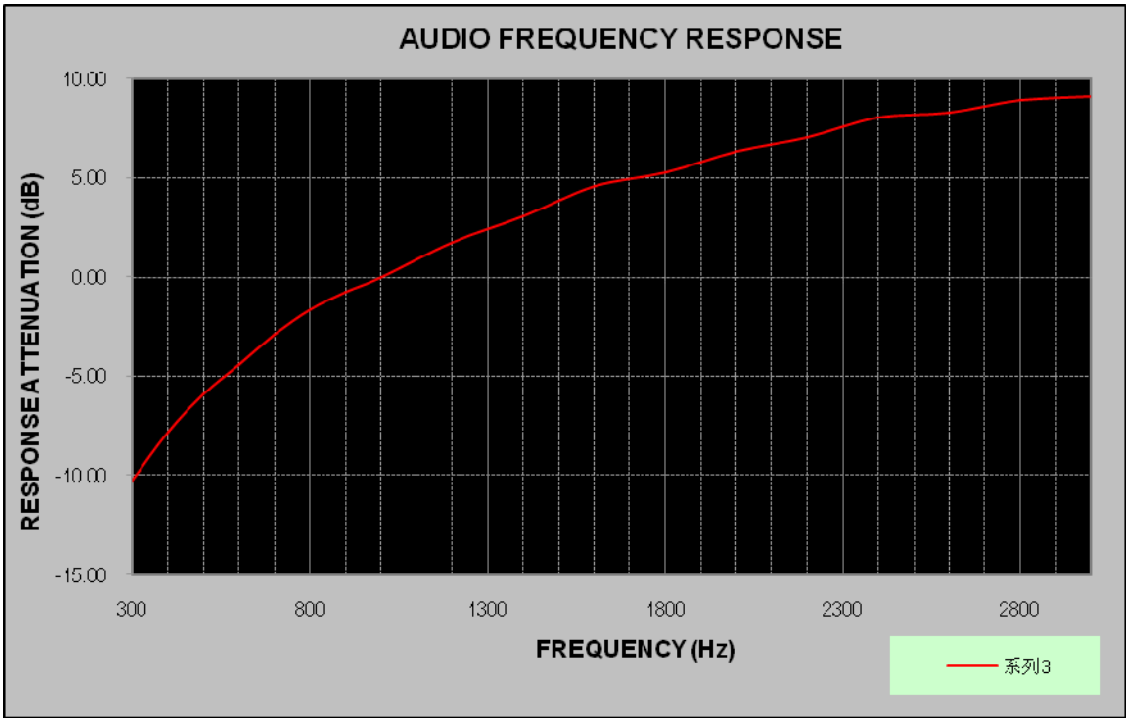
Audio Input Level [dB]	Frequency Deviation (kHz)			Limit [kHz]
	@ 300 Hz	@ 1kHz	@ 3 kHz	
20.0	2.040	2.070	1.960	2.5
15.0	2.080	2.080	1.960	2.5
10.0	1.150	2.080	1.960	2.5
5.0	0.860	2.090	1.970	2.5
0.0	0.490	1.500	1.960	2.5
-5.0	0.280	0.820	1.970	2.5
-10.0	0.180	0.500	1.320	2.5
-15.0	0.120	0.280	0.810	2.5
-20.0	0.090	0.180	0.460	2.5



Audio Frequency Response

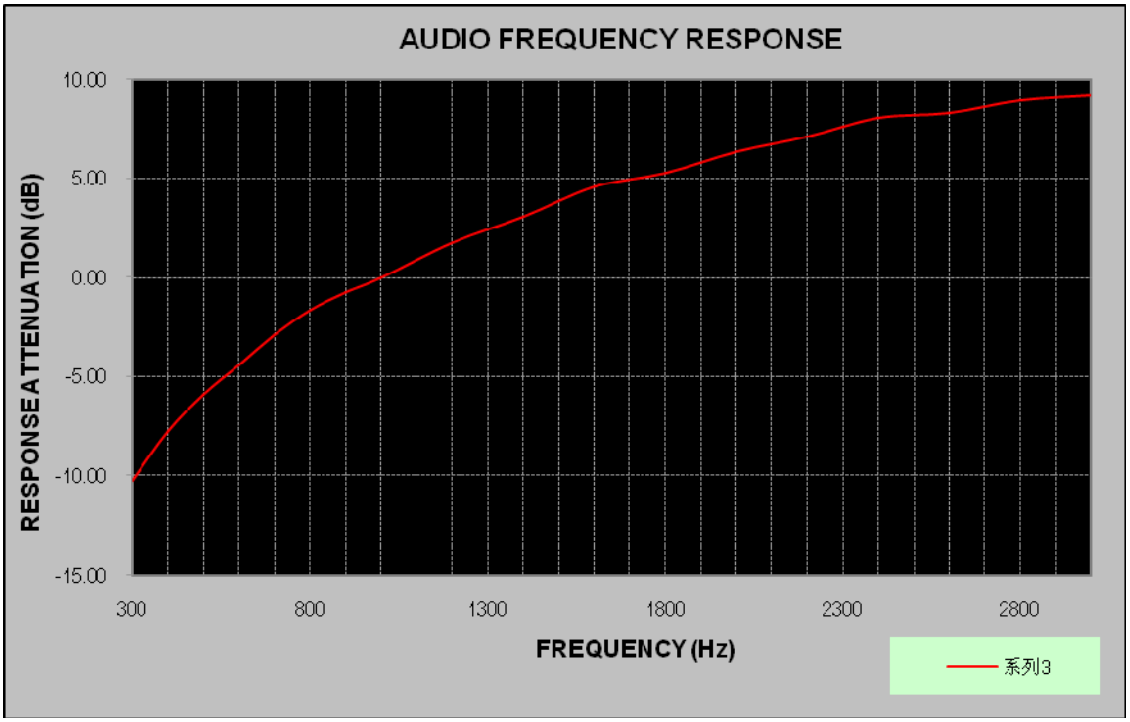
Carrier Frequency: 469.9875 MHz, Channel Separation=12.5 kHz, Low Power

Audio Frequency (Hz)	Response Attenuation (dB)
300	-10.24
400	-7.77
500	-5.88
600	-4.37
700	-2.91
800	-1.63
900	-0.75
1000	0.00
1200	1.79
1400	3.07
1600	4.56
1800	5.27
2000	6.34
2200	7.06
2400	8.04
2600	8.29
2800	8.91
3000	9.14



Carrier Frequency: 469.9875 MHz, Channel Separation=12.5 kHz, High Power

Audio Frequency (Hz)	Response Attenuation (dB)
300	-10.27
400	-7.76
500	-5.90
600	-4.38
700	-2.91
800	-1.63
900	-0.74
1000	0.00
1200	1.77
1400	3.08
1600	4.56
1800	5.27
2000	6.33
2200	7.08
2400	8.06
2600	8.31
2800	8.93
3000	9.16

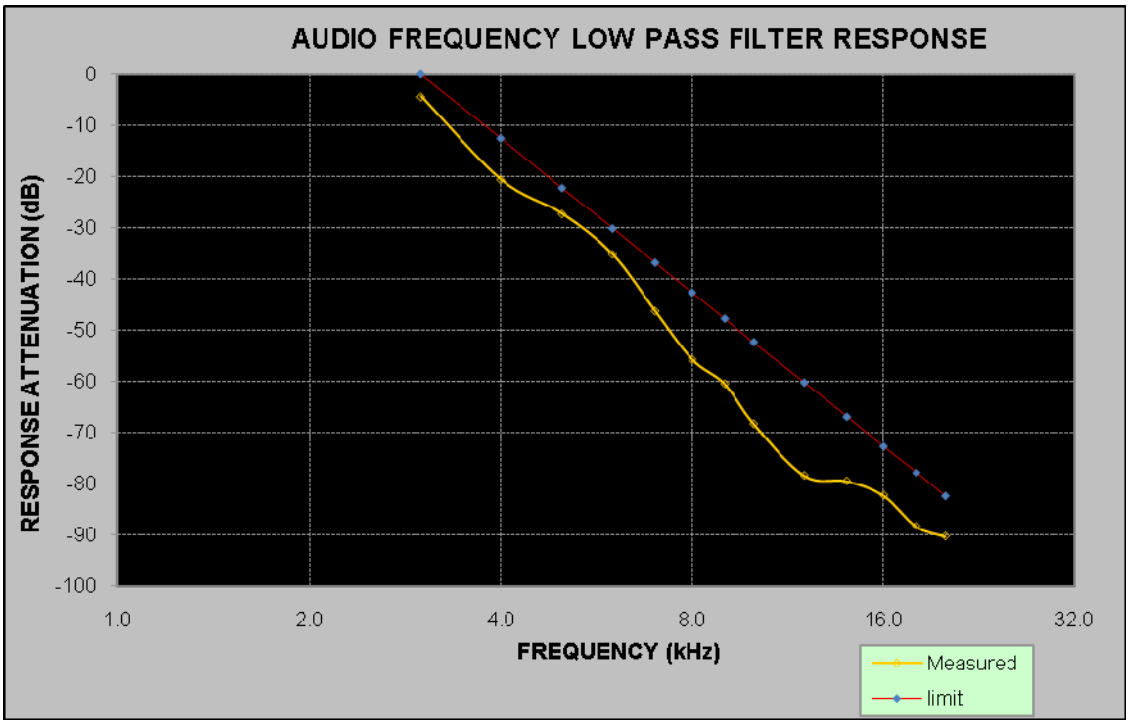


Audio Frequency Low Pass Filter Response

Analog Modulation:

Carrier Frequency: 469.9875 MHz, Channel Separation=12.5 kHz

Audio Frequency (kHz)	Response Attenuation (dB)	FCC Limit (dB)
3.0	-4.3	0.0
4.0	-20.5	-12.5
5.0	-27.2	-22.2
6.0	-35.1	-30.1
7.0	-46.2	-36.8
8.0	-55.6	-42.6
9.0	-60.4	-47.7
10.0	-68.2	-52.3
12.0	-78.3	-60.2
14.0	-79.4	-66.9
16.0	-82.2	-72.7
18.0	-88.2	-77.8
20.0	-90.2	-82.4



FCC §2.1049 & §22.357 & § 22.731 & §74.462 & §90.209 & §90.210 – OCCUPIED BANDWIDTH & EMISSION MASK

Applicable Standard

FCC §2.1049, §22.357, § 22.731, §74.462, §90.209 and §90.210

Emission Mask D—12.5 kHz channel bandwidth equipment. For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

1) For any frequency removed from the center of the authorized bandwidth f_0 to 5.625 kHz removed from f_0, 0dB.

2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 5.626 kHz but no more than 12.5 kHz, at least 7.27 (f_d –2.88 kHz) dB.

3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 12.5 kHz at least:

50+10logP=50+10 log (1.574) = 51.97 dB

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 100 Hz and the spectrum was recorded in the frequency band ±50 kHz from the carrier frequency.

Test Data

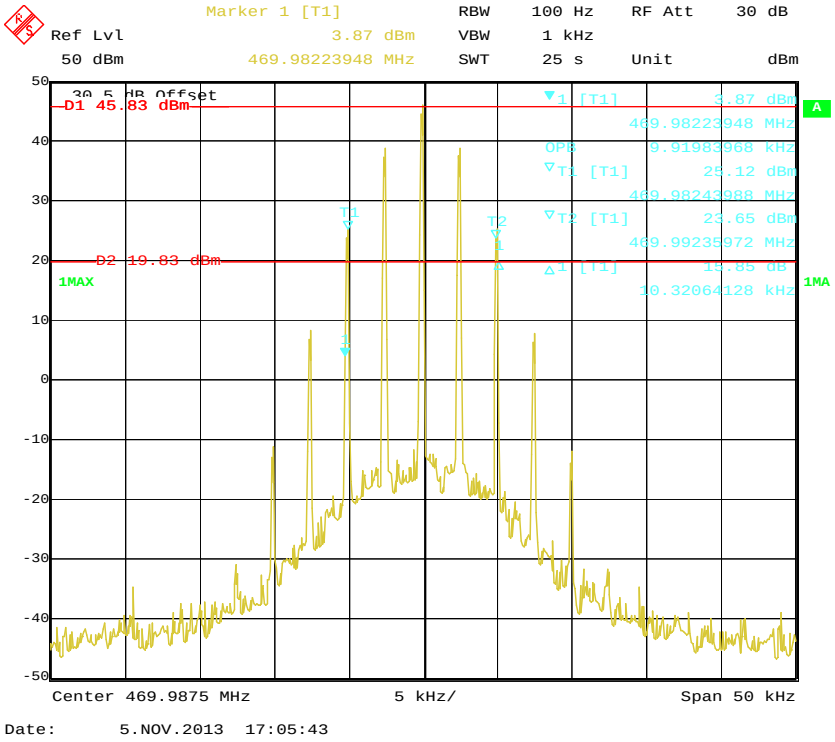
Environmental Conditions

Temperature:	20 ~ 25 ℃
Relative Humidity:	50 ~ 56 %
ATM Pressure:	100.1 kPa

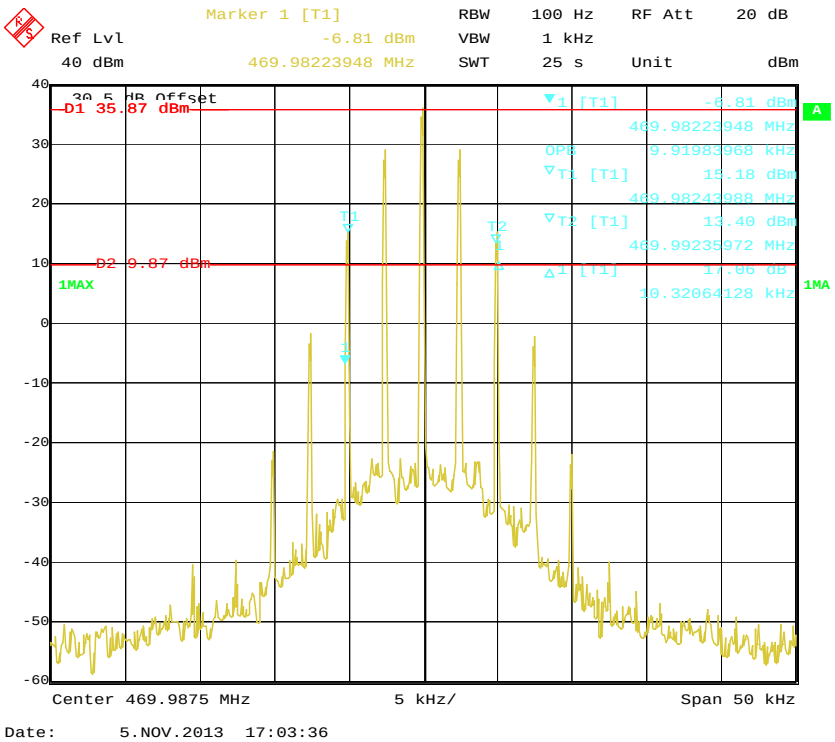
The testing was performed by Gardon Zhang from 2013-11-05 to 2013-11-07.

Modulation	Channel Separation (kHz)	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emissions Bandwidth (kHz)	Power Level
Analog	12.5	469.9875	9.92	10.32	High Power
	12.5	469.9875	9.92	10.32	Low Power
Digital	12.5	469.9875	7.92	9.82	High Power
	12.5	469.9875	8.02	9.82	Low Power

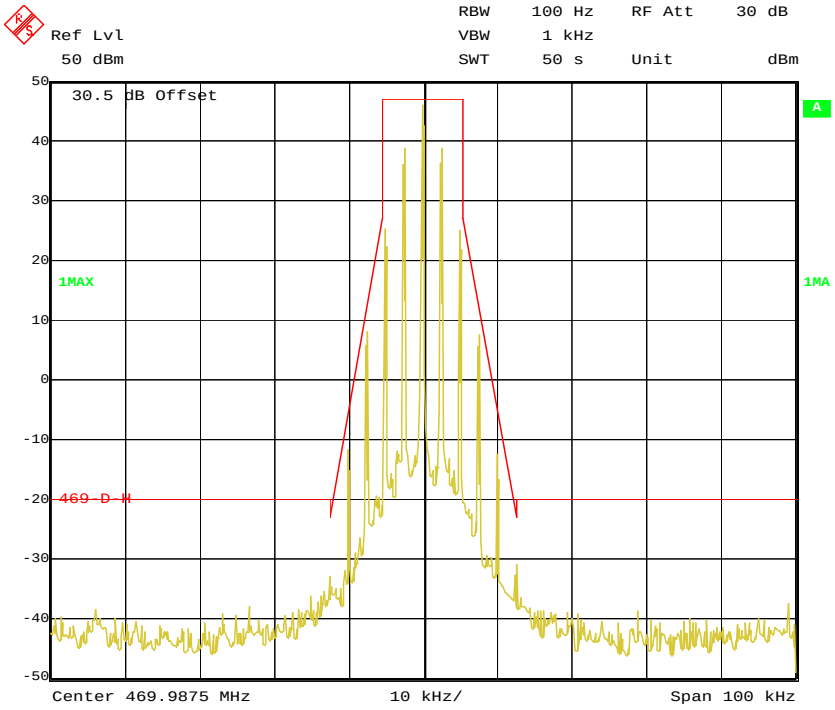
Analog Modulation: 99% Occupied & 26 dB Bandwidth with High Power



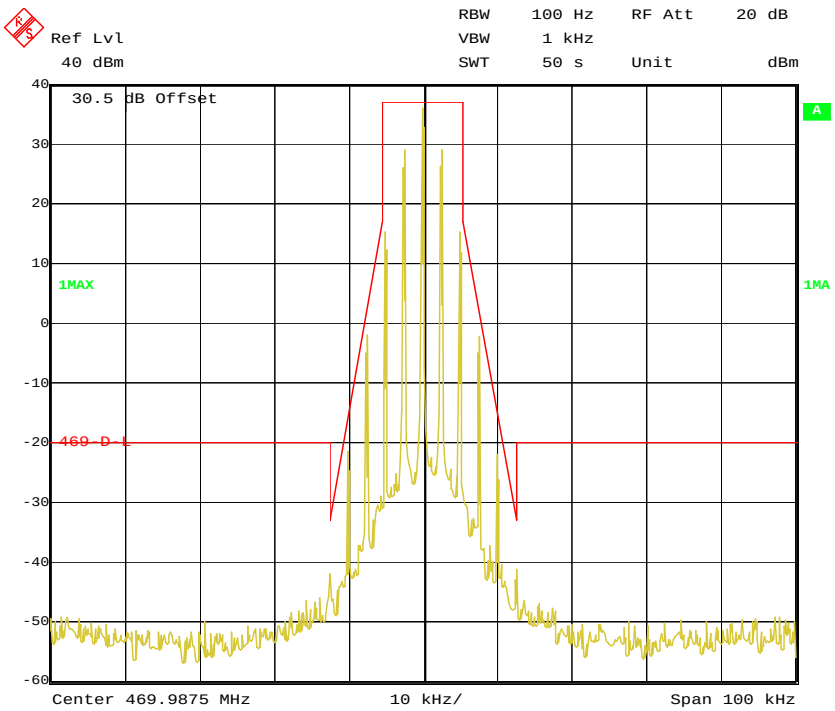
Analog Modulation: 99% Occupied & 26 dB Bandwidth with Low Power



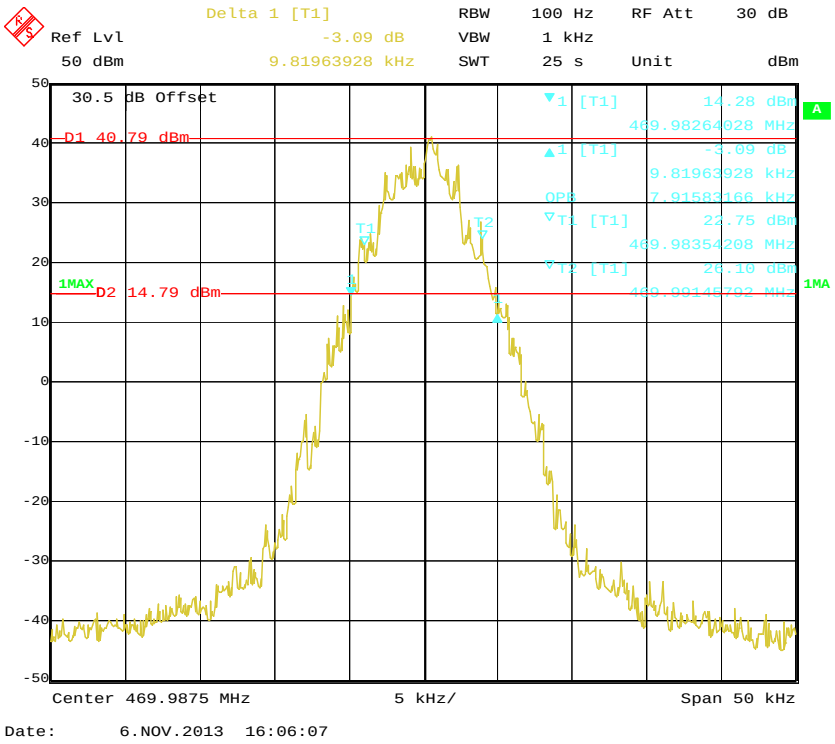
Analog Modulation: Emission Mask with High Power



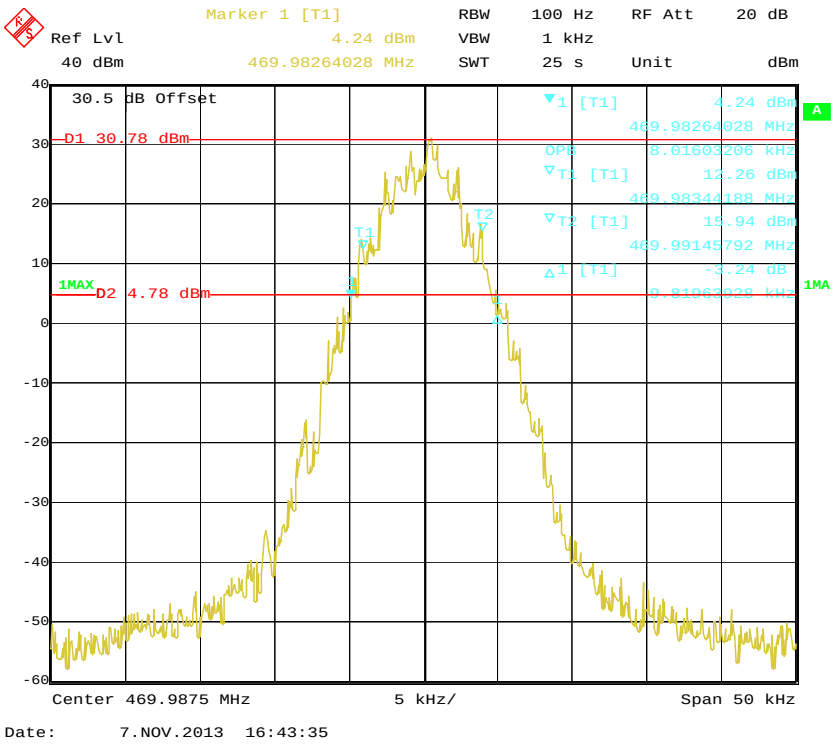
Analog Modulation: Emission Mask with Low Power



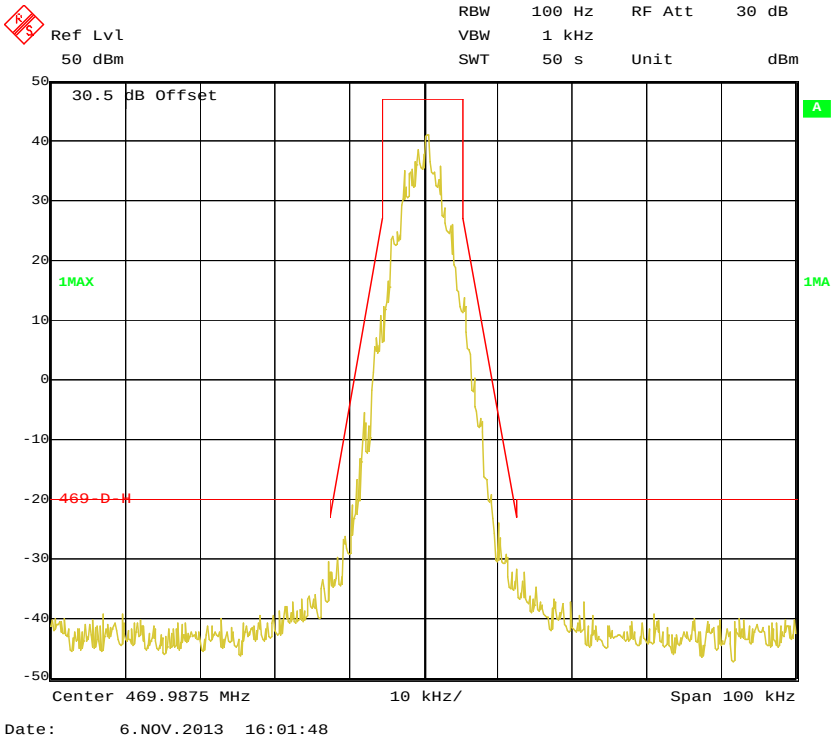
Digital Modulation: 99% Occupied & 26 dB Bandwidth with High Power



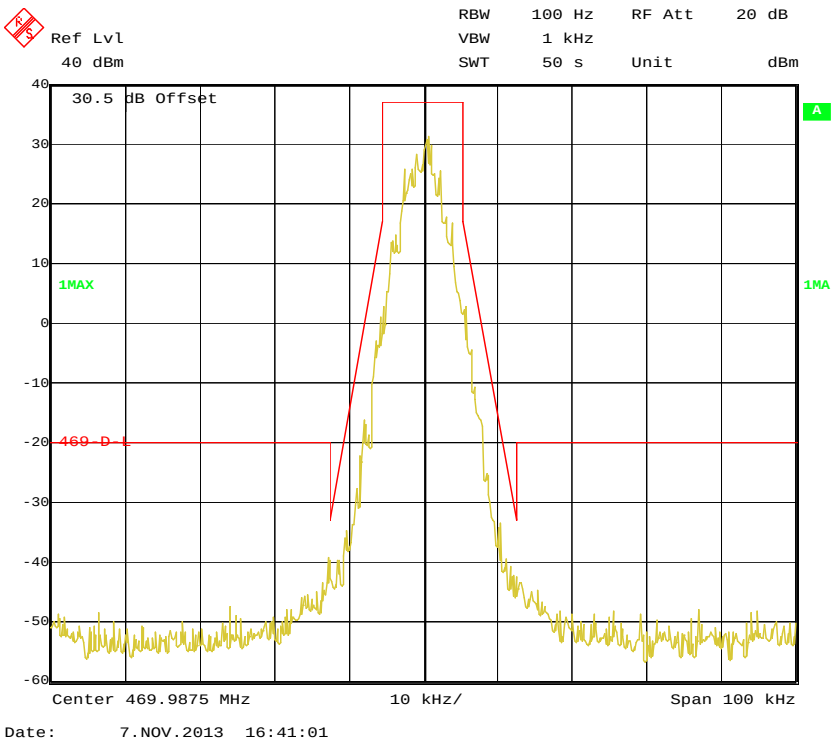
Digital Modulation: 99% Occupied & 26 dB Bandwidth with Low Power



Digital Modulation: Emission Mask with High Power



Digital Modulation: Emission Mask with Low Power



FCC §2.1051 & §22.861 & §74.461 & §90.210 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Applicable Standard

Emission Mask D—12.5 kHz channel bandwidth equipment. For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

1) For any frequency removed from the center of the authorized bandwidth f_0 to 5.625 kHz removed from f_0, 0 dB.

2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 5.626 kHz but no more than 12.5 kHz, at least 7.27 (f_d –2.88 kHz) dB.

3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 12.5 kHz at least:

50+10logP=50+10log (P) dB

Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2013-11-12	2014-11-12

*** 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 100kHz 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 ℃
Relative Humidity:	56 %
ATM Pressure:	100.1 kPa

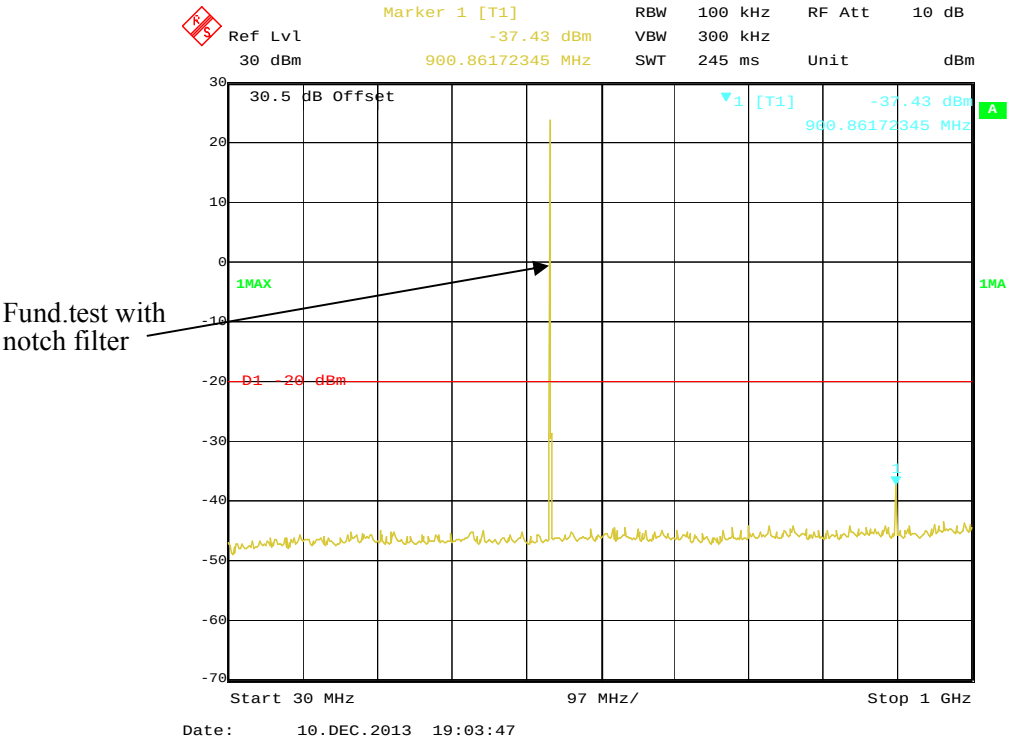
The testing was performed by Gardon Zhang on 2013-11-06 and 2013-12-10.

Test Mode: Transmitting

Please refer to the following plots.

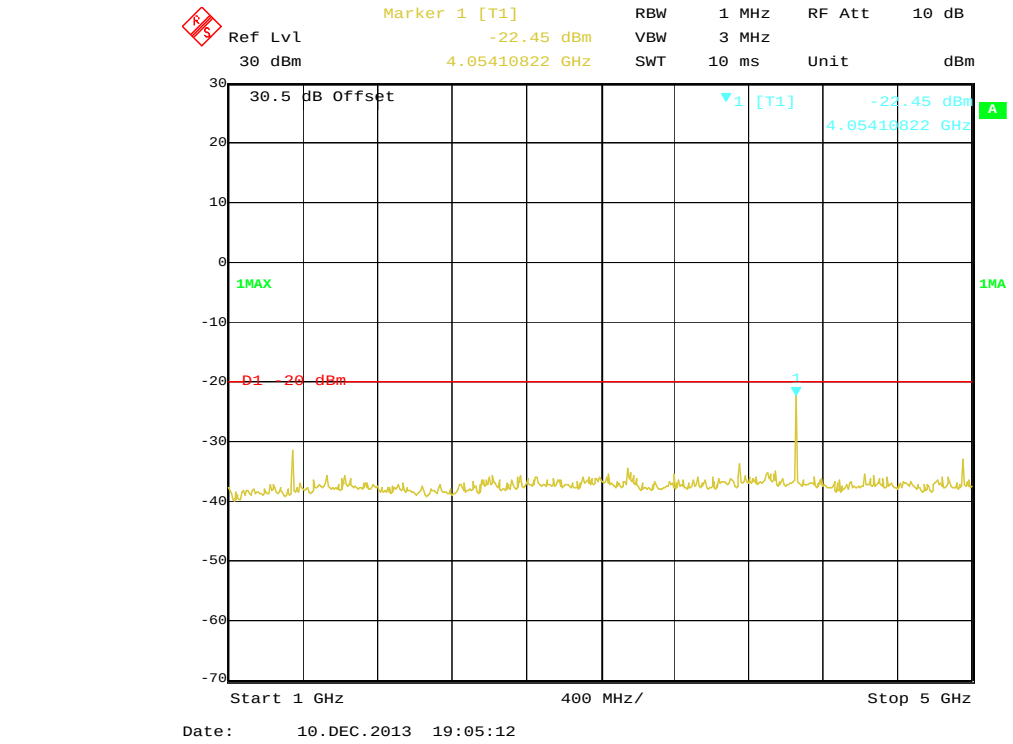
Analog Modulation:

450.0125 MHz: 30 MHz – 1 GHz, Spacing Channel 12.5 kHz, For FCC Part 74

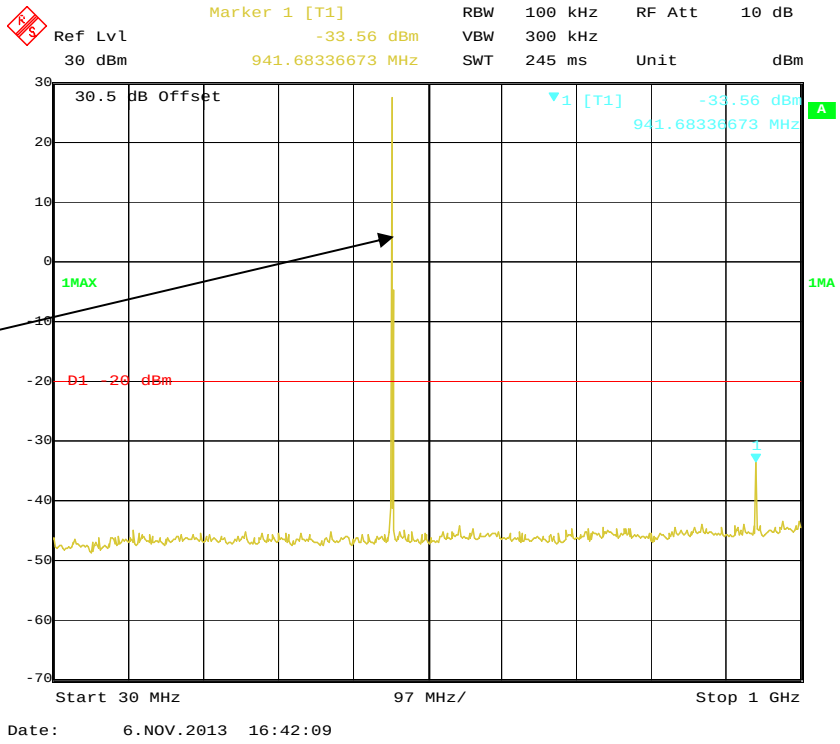


Fund.test with notch filter

450.0125 MHz: 1 GHz – 5 GHz, Spacing Channel 12.5 kHz, For FCC Part 74

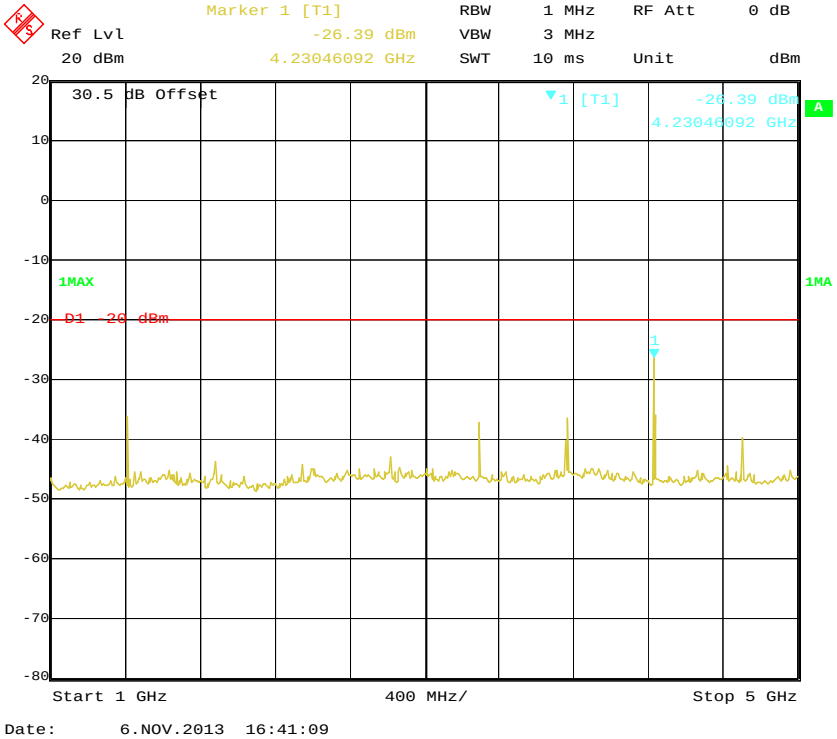


469.9875 MHz: 30 MHz – 1 GHz, Spacing Channel 12.5 kHz, For FCC Part 90

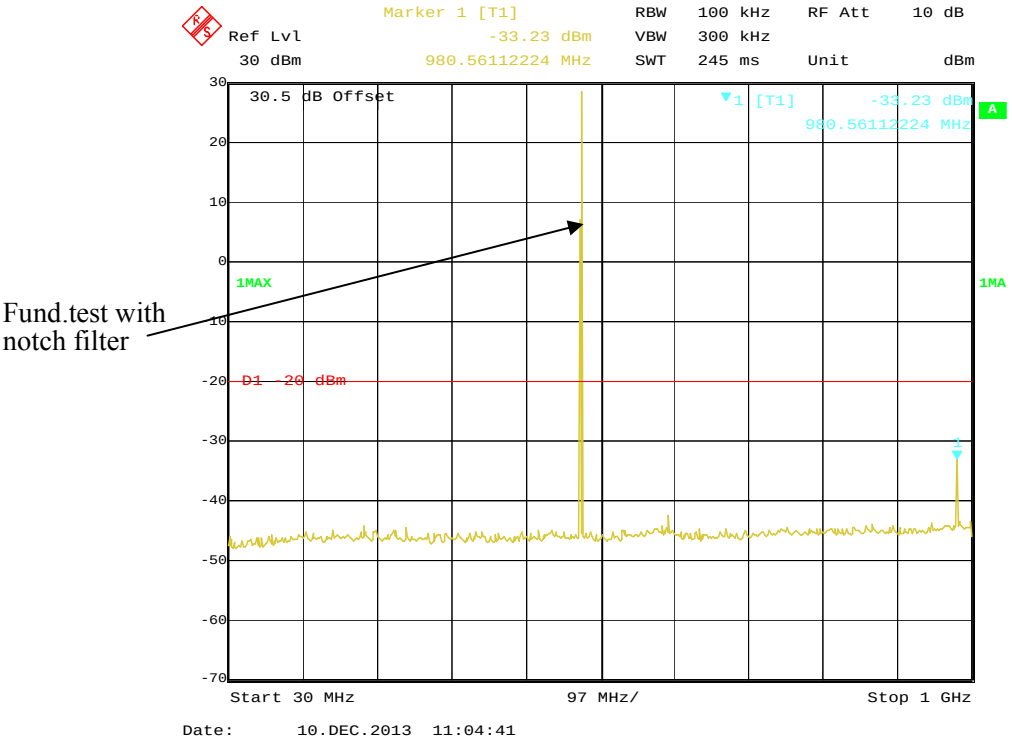


Fund.test with notch filter

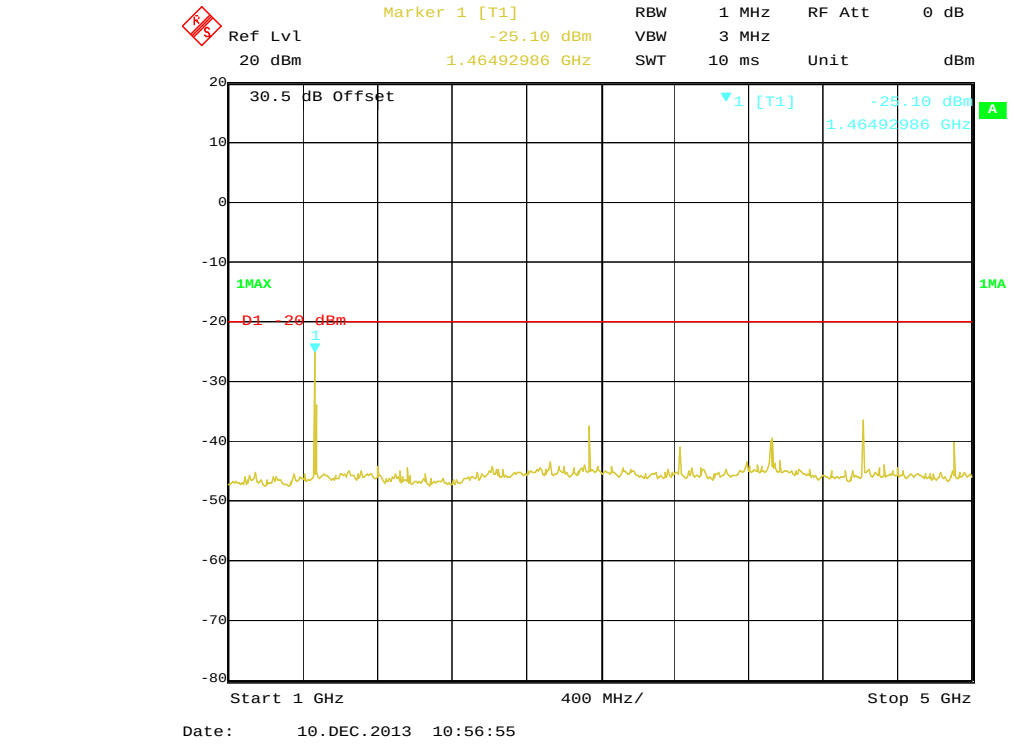
469.9875 MHz: 1 GHz – 5 GHz, Spacing Channel 12.5 kHz, For FCC Part 90



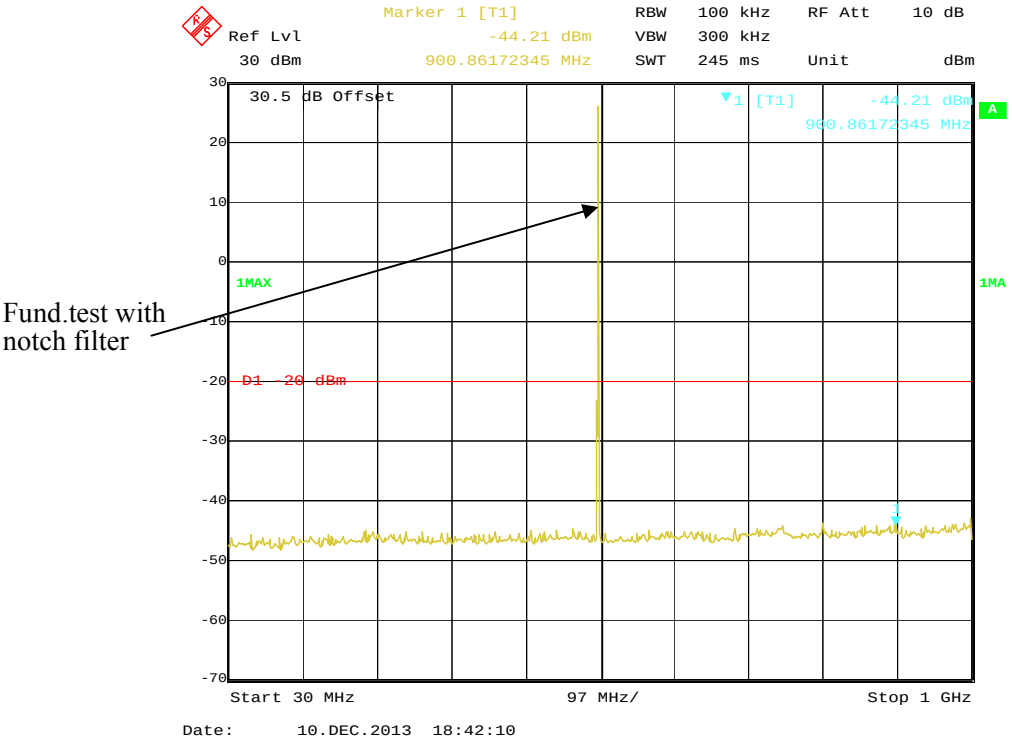
490.0000 MHz: 30 MHz – 1 GHz, Spacing Channel 12.5 kHz, For FCC Part 90



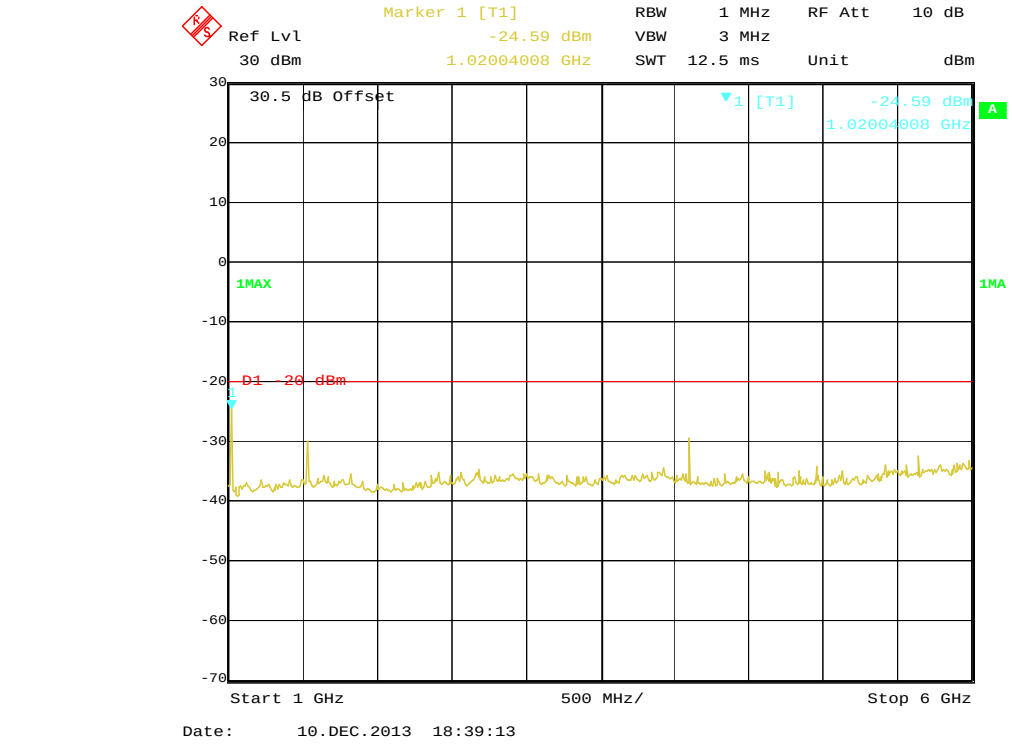
490.0000 MHz: 1 GHz – 5 GHz, Spacing Channel 12.5 kHz, For FCC Part 90



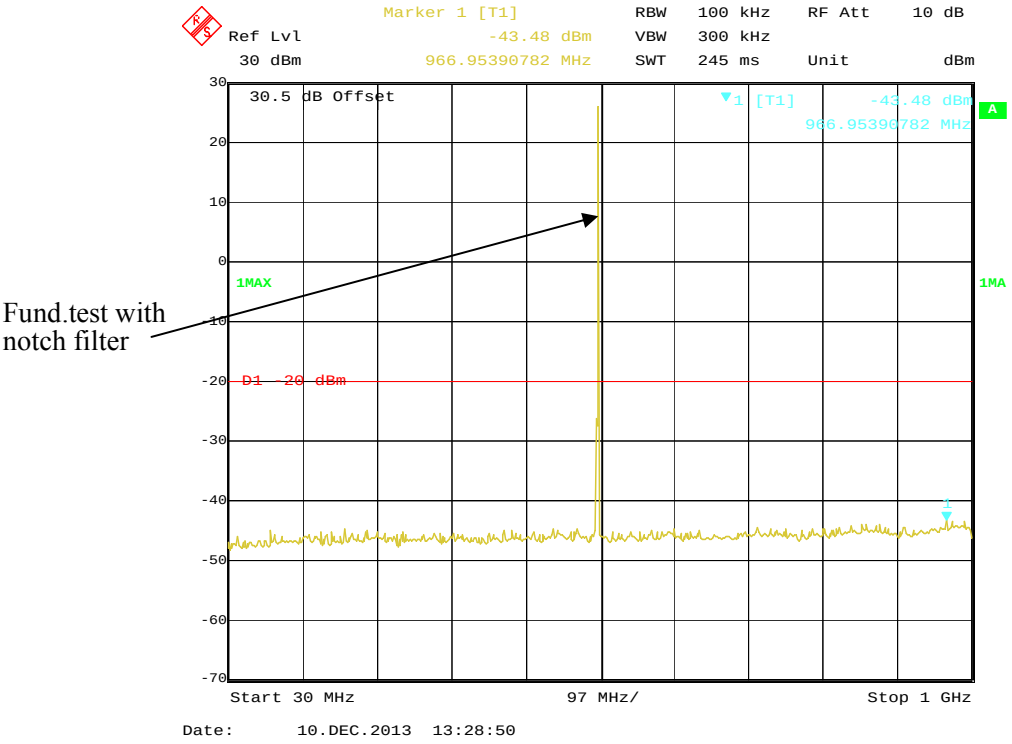
511.9875MHz: 30 MHz – 1 GHz, Spacing Channel 12.5 kHz, For FCC Part 22



511.9875 MHz: 1 GHz – 6 GHz, Spacing Channel 12.5 kHz, For FCC Part 22

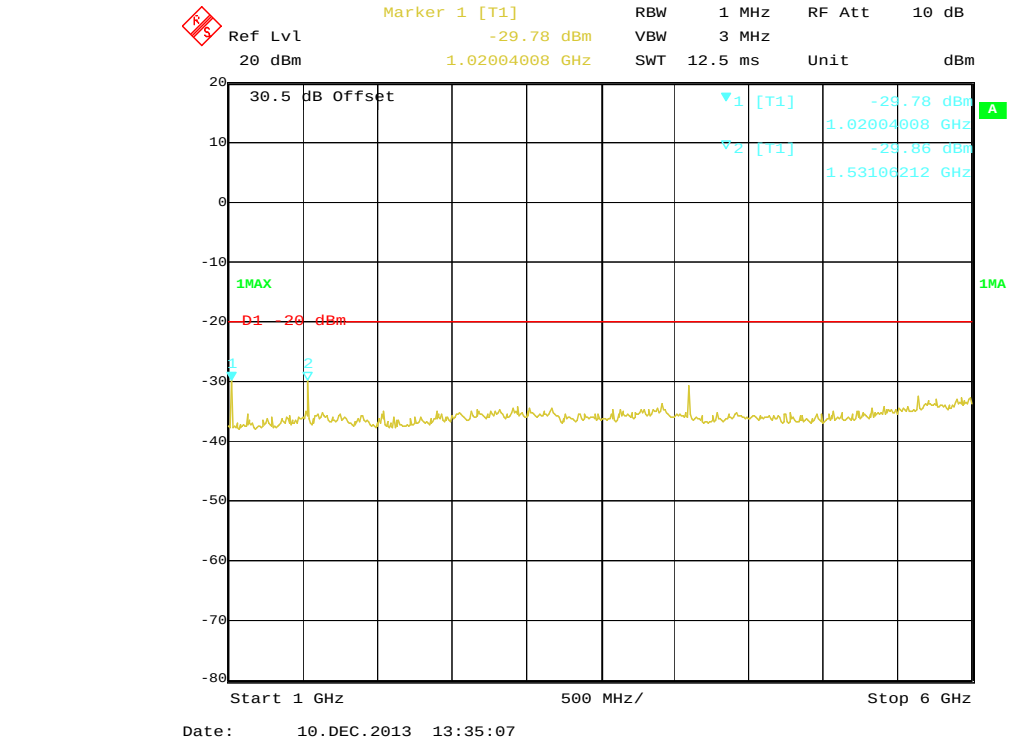


519.9875MHz: 30 MHz – 1 GHz, Spacing Channel 12.5 kHz, For Federal



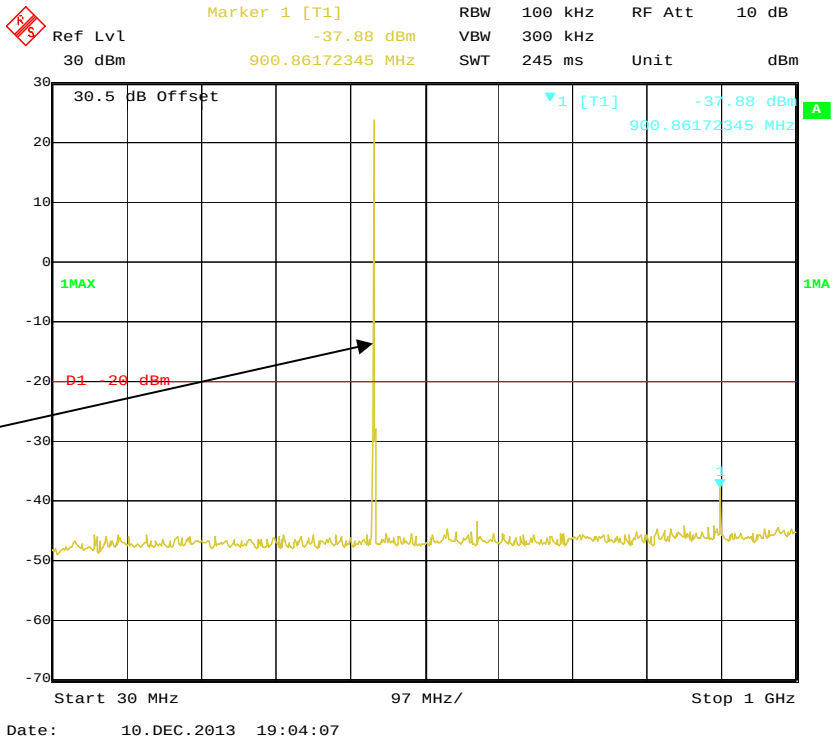
Fund.test with notch filter

519.9875 MHz: 1 GHz – 6 GHz, Spacing Channel 12.5 kHz For Federal



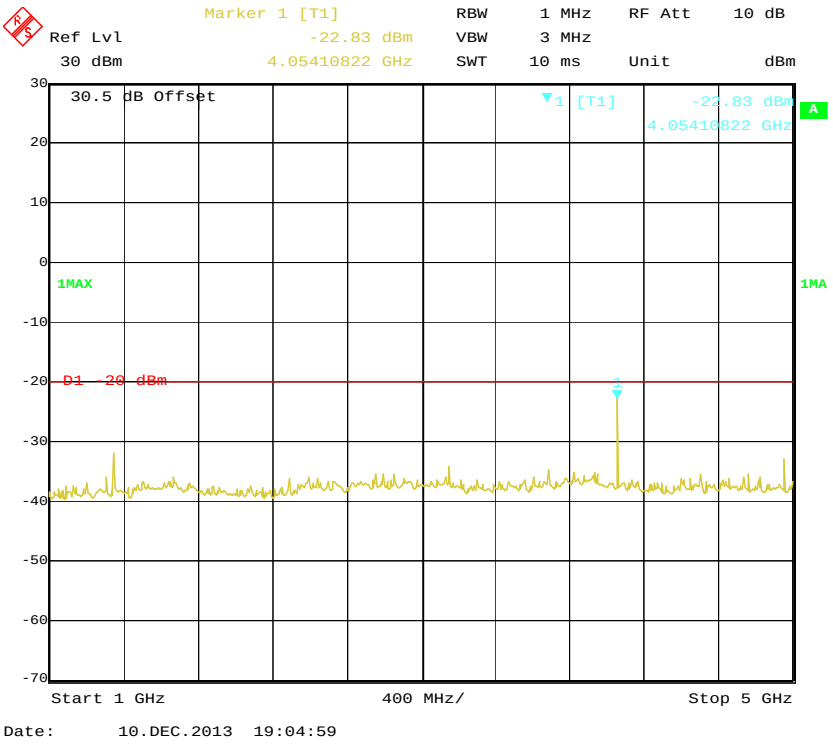
Digital Modulation:

450.0125 MHz: 30 MHz – 1 GHz, For FCC Part 74

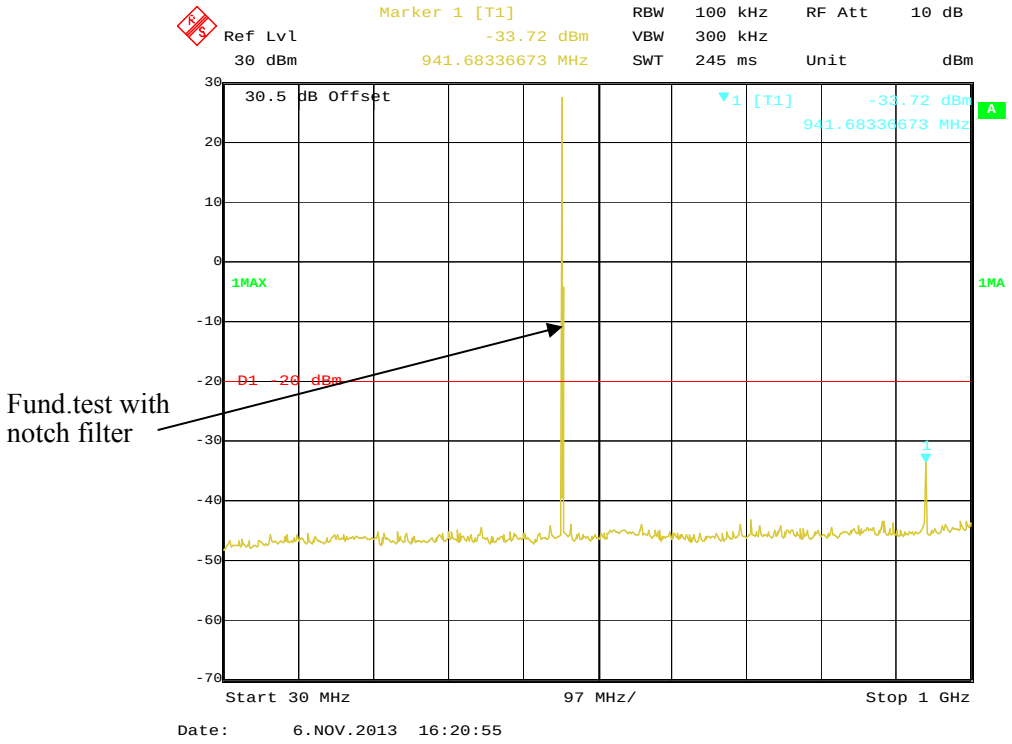


Fund.test with notch filter

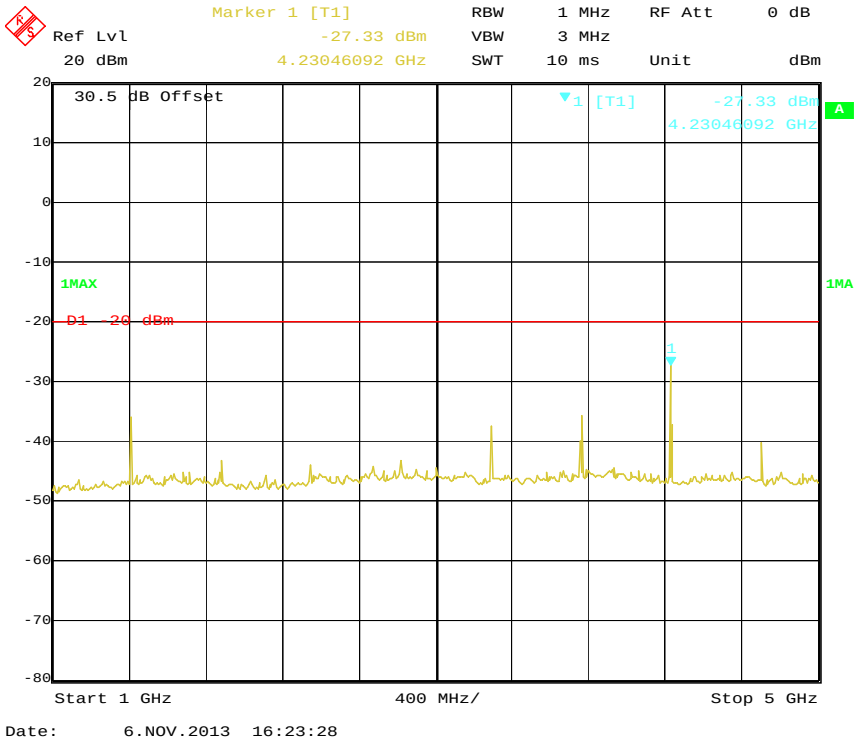
450.0125 MHz: 1 GHz – 5 GHz, For FCC Part 74



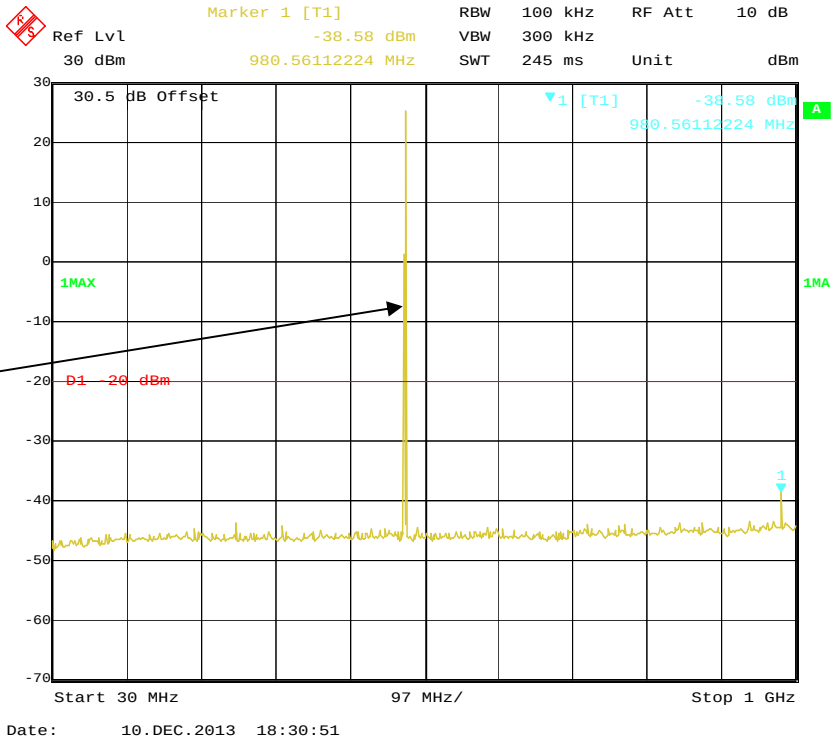
469.9875 MHz: 30 MHz – 1 GHz, For FCC Part 90



469.9875 MHz: 1 GHz – 5 GHz, For FCC Part 90

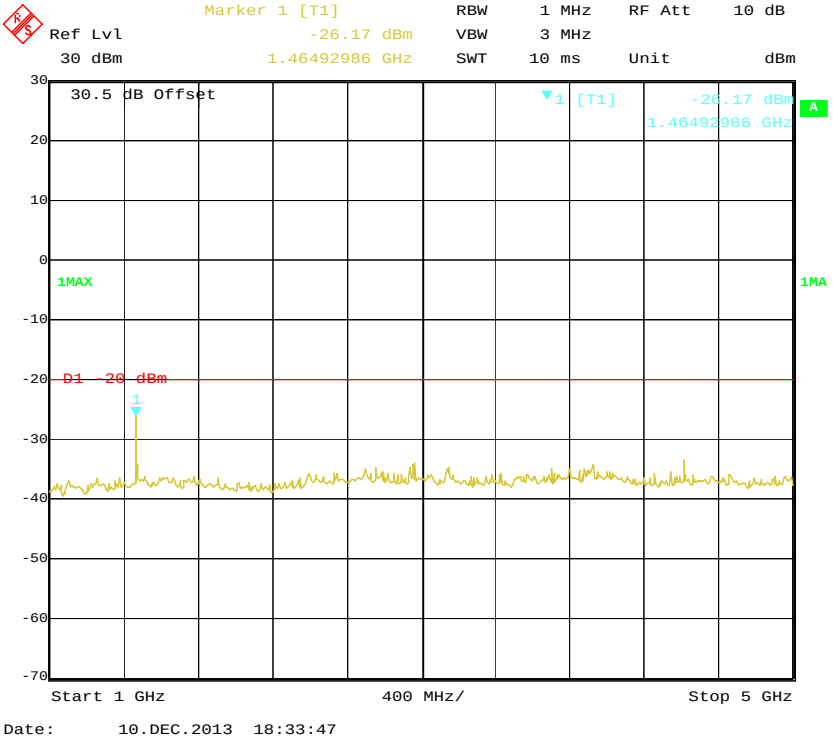


490.0000 MHz: 30 MHz – 1 GHz, For FCC Part 90

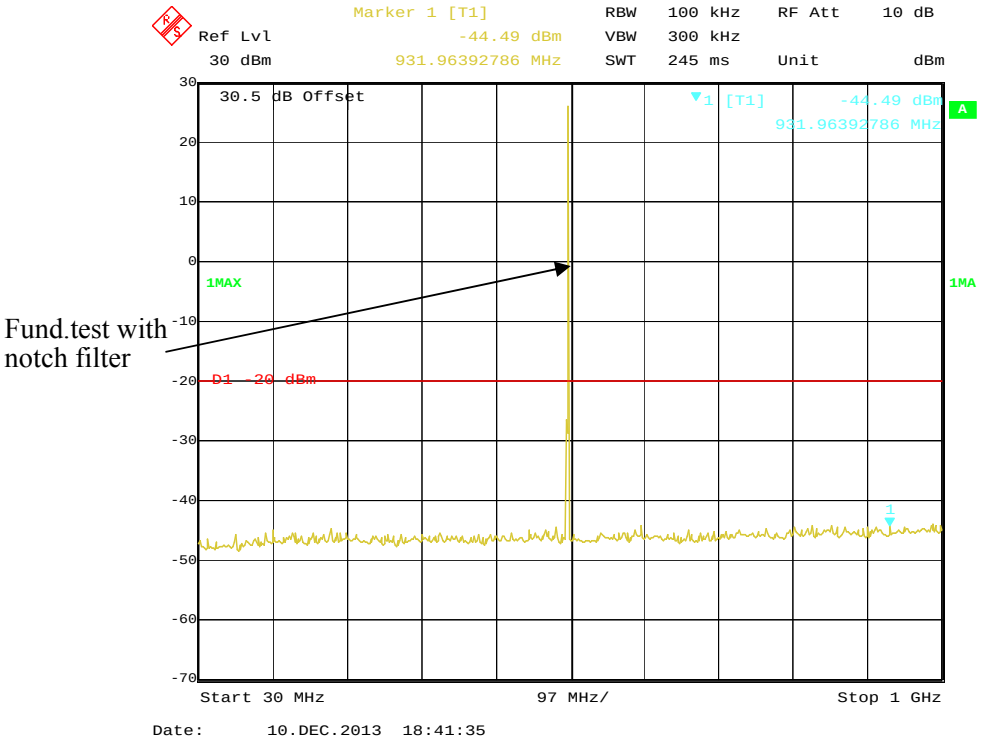


Fund.test with notch filter

490.0000MHz: 1 GHz – 5 GHz, For FCC Part 90

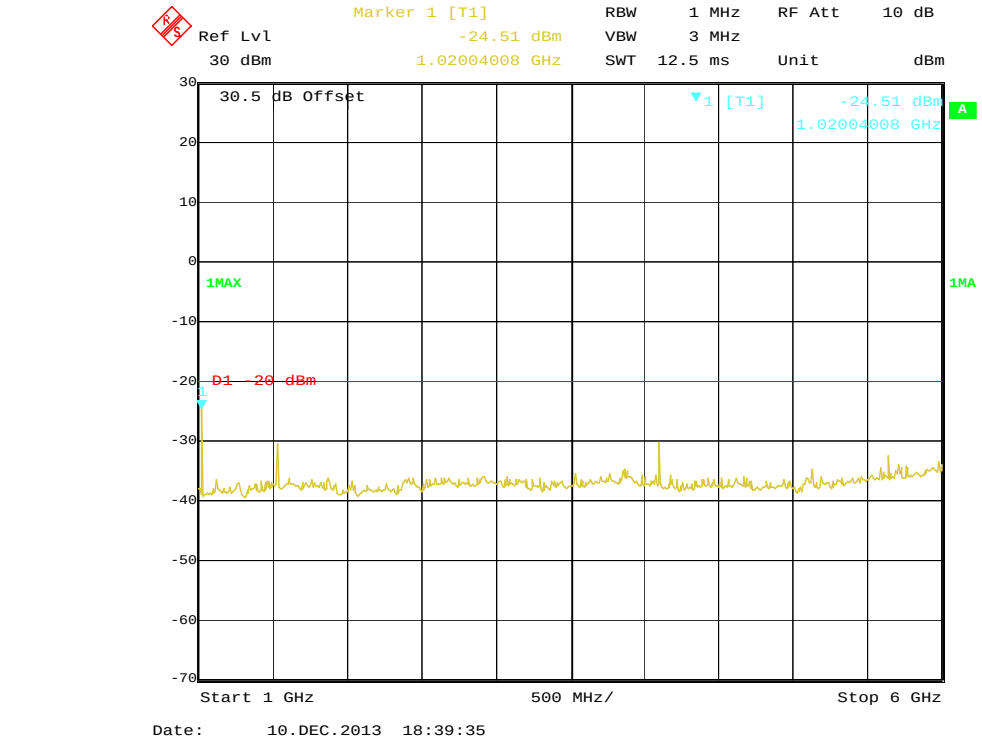


511.9875 MHz: 30 MHz – 1 GHz, For FCC Part 22

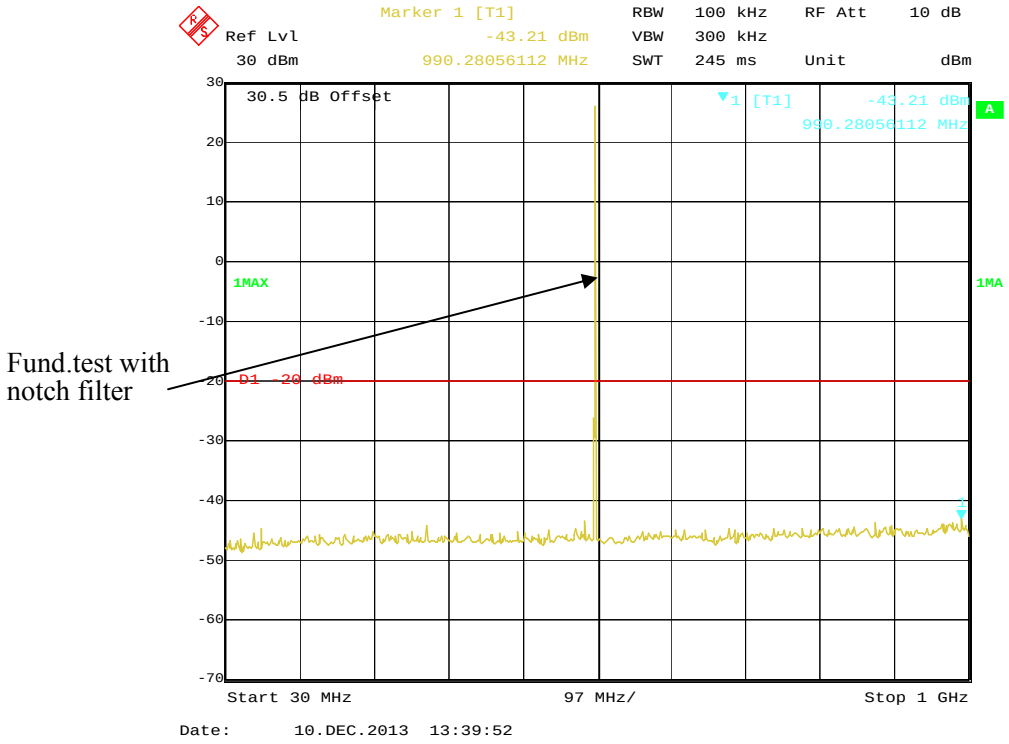


Fund.test with notch filter

511.9875 MHz: 1 GHz – 6 GHz, For FCC Part 22

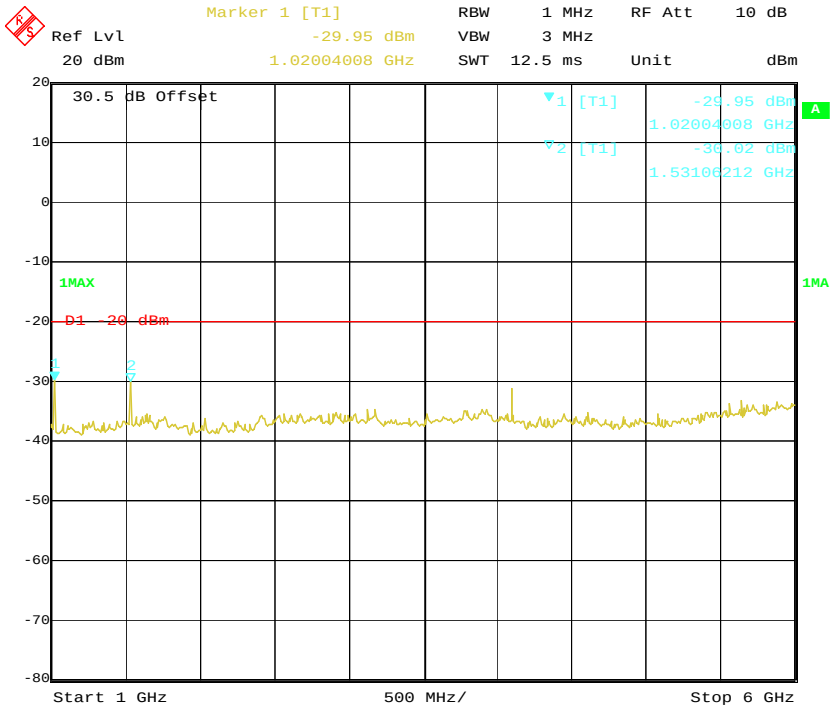


519.9875 MHz: 30 MHz – 1 GHz, For Federal



Fund.test with notch filter

519.9875 MHz: 1 GHz – 6 GHz, For Federal



FCC §2.1053 & §22.861 & §74.461 & §90.210 - RADIATED SPURIOUS EMISSIONS

Applicable Standard

FCC §2.1053, §22.861, §74.461 and §90.210

Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Due Date
Sunol Sciences	Horn Antenna	DRH-118	A052304	2011-12-01	2014-11-30
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
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2013-09-17	2014-09-17
HP	Amplifier	8447E	1937A01046	2013-09-30	2014-09-30
Mini	Amplifier	ZVA-183-S+	5969001149	2013-04-03	2014-04-03
HP	Signal Generator	8657A	3217A04699	2012-12-19	2013-12-18
A.H. System	Horn Antenna	SAS-200/571	135	2012-02-11	2015-02-10
HP	Synthesized Sweeper	8341B	2624A00116	2013-05-09	2014-05-09
COM POWER	Dipole Antenna	AD-100	041000	2013-06-06	2014-06-05

*** 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 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 1g (TXpwr in Watts/0.001)-the absolute level

Spurious attenuation limit in dB =50+10 Log_{10} (power out in Watts) for EUT with a 12.5 kHz channel bandwidth.

Test Data

Environmental Conditions

Temperature:	25℃
Relative Humidity:	56 %
ATM Pressure:	100.1 kPa

The testing was performed by Gardon Zhang on 2013-11-06 and 2013-12-11.

Test Mode: Transmitting

30MHz - 5GHz:

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 (450.0125MHz), Channel Spacing 12.5 kHz, For FCC Part 74										
900.0	39.68	152	1.5	V	-63.0	0.55	0.00	-63.55	-20	43.55
900.0	36.75	142	1.3	H	-60.1	0.55	0.00	-60.65	-20	40.65
3150.0	46.62	360	1.2	H	-47.8	2.00	10.50	-39.30	-20	19.30
3150.0	45.30	153	1.4	V	-48.5	2.00	10.50	-40.00	-20	20.00
Analog Modulation (469.9875 MHz), Channel Spacing 12.5 kHz, For FCC Part 90										
940.0	36.81	240	1.1	V	-60.1	0.68	0.00	-60.78	-20	40.78
940.0	34.51	150	1.5	H	-62.4	0.68	0.00	-63.08	-20	43.08
3290.0	41.21	317	1.6	H	-53.2	2.08	10.80	-44.48	-20	24.48
3290.0	42.68	133	1.4	V	-50.9	2.08	10.80	-42.18	-20	22.18
Analog Modulation (490.0000 MHz), Channel Spacing 12.5 kHz, For FCC Part 90										
980.0	37.52	102	1.2	V	-59.3	0.70	0.00	-60.00	-20	40.00
980.0	36.21	10	1.2	H	-60.7	0.70	0.00	-61.40	-20	41.40
3430.0	44.23	186	1.3	H	-50.3	2.15	10.80	-41.65	-20	21.65
3430.0	43.15	157	1.6	V	-50.0	2.15	10.80	-41.35	-20	21.35
Analog Modulation (511.9875 MHz), Channel Spacing 12.5 kHz, For FCC Part 22										
1024.0	45.32	287	1.2	V	-58.8	0.75	6.00	-53.55	-20	33.55
1024.0	41.35	176	1.3	H	-59.7	0.75	6.00	-54.45	-20	34.45
3584.0	44.65	143	1.2	H	-50.0	2.20	10.50	-41.70	-20	21.70
3584.0	44.10	305	1.6	V	-48.3	2.20	10.50	-40.00	-20	20.00
Analog Modulation (519.9875 MHz), Channel Spacing 12.5 kHz, For Federal										
1040.0	42.15	309	1.2	V	-61.3	0.75	6.00	-56.05	-20	36.05
1040.0	39.86	156	1.3	H	-61.5	0.75	6.00	-56.25	-20	36.25
3640.0	43.51	249	1.2	H	-51.2	2.20	10.50	-42.90	-20	22.90
3640.0	42.24	167	1.1	V	-50.4	2.20	10.50	-42.10	-20	22.10

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)
Digital Modulation (450.0125 MHz), For FCC Part 74										
900.0	40.65	0	1.2	V	-62.0	0.55	0.00	-62.55	-20	42.55
900.0	38.45	0	1.3	H	-58.4	0.55	0.00	-58.95	-20	38.95
3150.0	47.34	175	1.3	H	-47.0	2.00	10.50	-38.50	-20	18.50
3150.0	44.30	162	1.2	V	-49.4	2.00	10.50	-40.90	-20	20.90
Digital Modulation (469.9875 MHz), For FCC Part 90										
940.0	34.22	240	1.1	V	-62.7	0.68	0.00	-63.38	-20	43.38
940.0	32.68	150	1.5	H	-64.3	0.68	0.00	-64.98	-20	44.98
3290.0	41.29	134	1.5	H	-53.1	2.08	10.80	-44.38	-20	24.38
3290.0	42.00	60	1.7	V	-51.6	2.08	10.80	-42.88	-20	22.88
Digital Modulation (490.0000 MHz), For FCC Part 90										
980.0	39.67	175	1.3	V	-57.1	0.70	0.00	-57.80	-20	37.80
980.0	37.35	136	1.5	H	-59.8	0.70	0.00	-60.50	-20	40.50
3430.0	46.35	159	1.3	H	-48.1	2.15	10.80	-39.45	-20	19.45
3430.0	45.11	84	1.1	V	-48.3	2.15	10.80	-39.65	-20	19.65
Digital Modulation (511.9875 MHz), For FCC Part 22										
1024.0	43.24	86	1.2	V	-61.0	0.75	6.00	-55.75	-20	35.75
1024.0	42.15	140	1.1	H	-58.8	0.75	6.00	-53.55	-20	33.55
3584.0	46.45	136	1.0	H	-48.3	2.20	10.50	-40.00	-20	20.00
3584.0	43.50	164	1.3	V	-49.6	2.20	10.50	-41.30	-20	21.30
Digital Modulation (519.9875 MHz), For Federal										
1040.0	40.21	110	1.2	V	-63.2	0.75	6.00	-57.95	-20	37.95
1040.0	37.67	360	1.3	H	-63.6	0.75	6.00	-58.35	-20	38.35
3640.0	44.64	152	1.3	H	-50.0	2.20	10.50	-41.70	-20	21.70
3640.0	42.01	0	1.3	V	-50.6	2.20	10.50	-42.30	-20	22.30

Note:
Absolute Level = SG Level - Cable loss + Antenna Gain
Margin = Limit- Absolute Level

FCC §2.1055 & § 22.355 & §74.464 & §90.213- FREQUENCY STABILITY

Applicable Standard

FCC §2.1055, § 22.355, §74.464 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	2013-11-01	2014-11-01

*** 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 ℃
Relative Humidity:	56 %
ATM Pressure:	100.1 kPa

The testing was performed by Gardon Zhang on 2013-11-06.

Test Mode: Transmitting

Reference Frequency: 469.9875 MHz, Limit: 1.5 ppm, Channel Spacing: 12.5 kHz			
Test Environment		**Frequency Measure with Time Elapsed**	
Temperature (℃)	**Power Supplied (V_{DC})**	**Measured Frequency error (MHz)**	**Frequency Error (ppm)**
Frequency Stability versus Input Temperature			
50	13.6	469.987624	0.26
40	13.6	469.987672	0.37
30	13.6	469.987608	0.23
20	13.6	469.987634	0.29
10	13.6	469.987610	0.23
0	13.6	469.987653	0.33
-10	13.6	469.987602	0.22
-20	13.6	469.987640	0.30
-30	13.6	469.987614	0.24
Frequency Stability versus Input Voltage			
20	11.0	469.987643	0.30

FCC §90.214 - TRANSIENT FREQUENCY BEHAVIOR

Applicable Standard

Regulations: FCC §90.214
Test method: ANSI/TIA-603-D 2010, section 2.2.19.3

Test Equipment List and Details

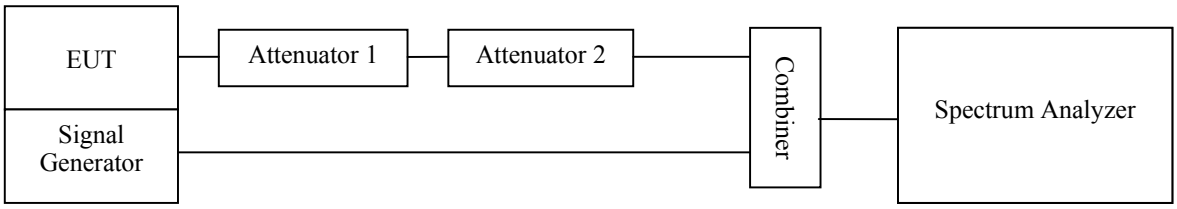
Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23
HP	RF Communication Test Set	8920A	3325U00859	2013-05-07	2014-05-07
R&S	Spectrum Analyzer	FSV13	8512003602	2013-08-25	2014-08-24

*** 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

a) Connect the EUT and test equipment as shown on the following block diagram.
b) Set the Spectrum Analyzer to measure FM deviation, and tune the RF frequency to the transmitter assigned frequency.
c) Set the signal generator to the assigned transmitter frequency and modulate it with a 1 kHz tone at ±12.5 kHz deviation and set its output level to -100dBm.
d) Turn on the transmitter.
e) Supply sufficient attenuation via the RF attenuator to provide an input level to the Spectrum Analyzer that is 40 dB below the maximum allowed input power when the transmitter is operating at its rated power level. Note this power level on the Spectrum Analyzer as P_0.
f) Turn off the transmitter.
g) Adjust the RF level of the signal generator to provide RF power equal to P_0. This signal generator RF level shall be maintained throughout the rest of the measurement.
h) Remove the attenuation 1, so the input power to the Spectrum Analyzer is increased by 30 dB when the transmitter is turned on.
i) Adjust the vertical amplitude control of the spectrum analyzer to display the 1000 Hz at ±4 divisions vertically centered on the display. Set trigger mode of the Spectrum Analyzer to “Video”, and tune the “trigger level” on suitable level. Then set the “tiger offset” to -10ms for turn on and -15ms for turn off.
j) Turn on the transmitter and the transient wave will be captured on the screen of Spectrum Analyzer. Observe the stored display. The instant when the 1 kHz test signal is completely suppressed is considered to be t_{on}. The trace should be maintained within the allowed divisions during the period t_1 and t_2.

k) Then turn off the transmitter, and another transient wave will be captured on the screen of Spectrum Analyzer. The trace should be maintained within the allowed divisions during the period t_3.



Test Data

Environmental Conditions

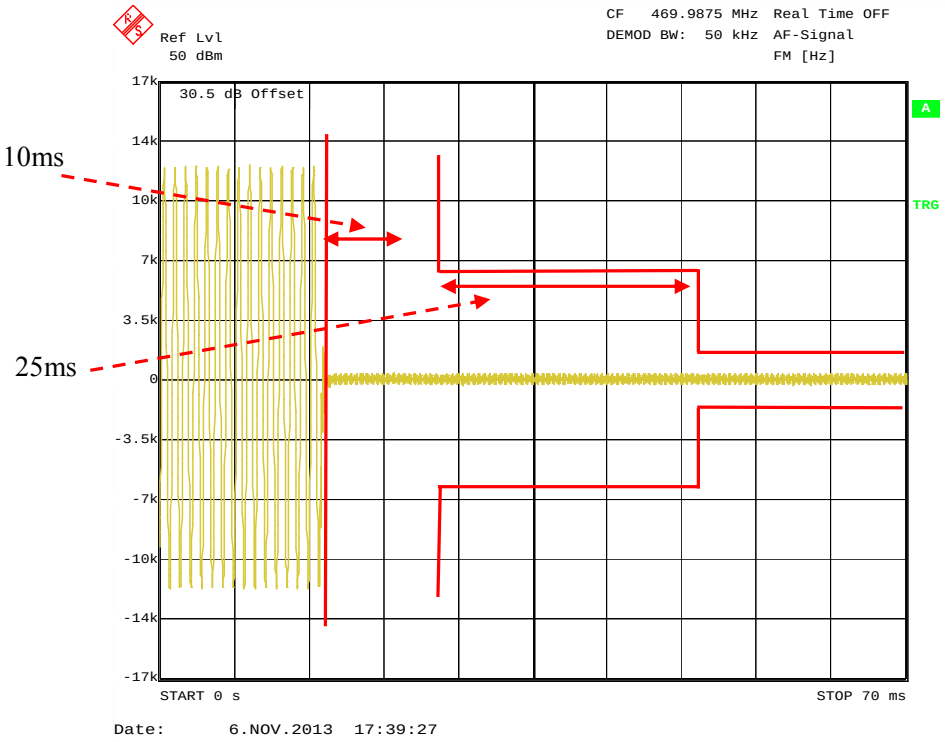
Temperature:	25 ℃
Relative Humidity:	56 %
ATM Pressure:	100.1 kPa

The testing was performed by Gardon Zhang on 2013-11-06.

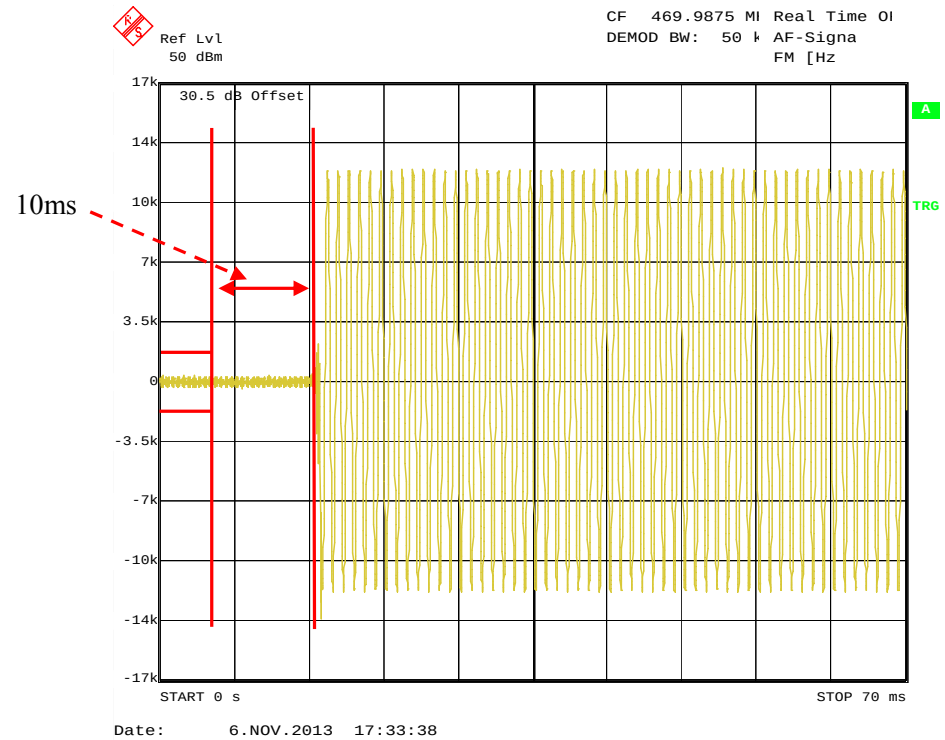
Channel Separation (kHz)	Transient Period (ms)	Transient Frequency	Result
12.5	<10 (t1)	+/-12.5 kHz	Pass
	<25 (t2)	+/-6.25 kHz	
	<10 (t3)	+/-12.5 kHz	

Please refer to the following plots.

Analog Modulation, Turn on

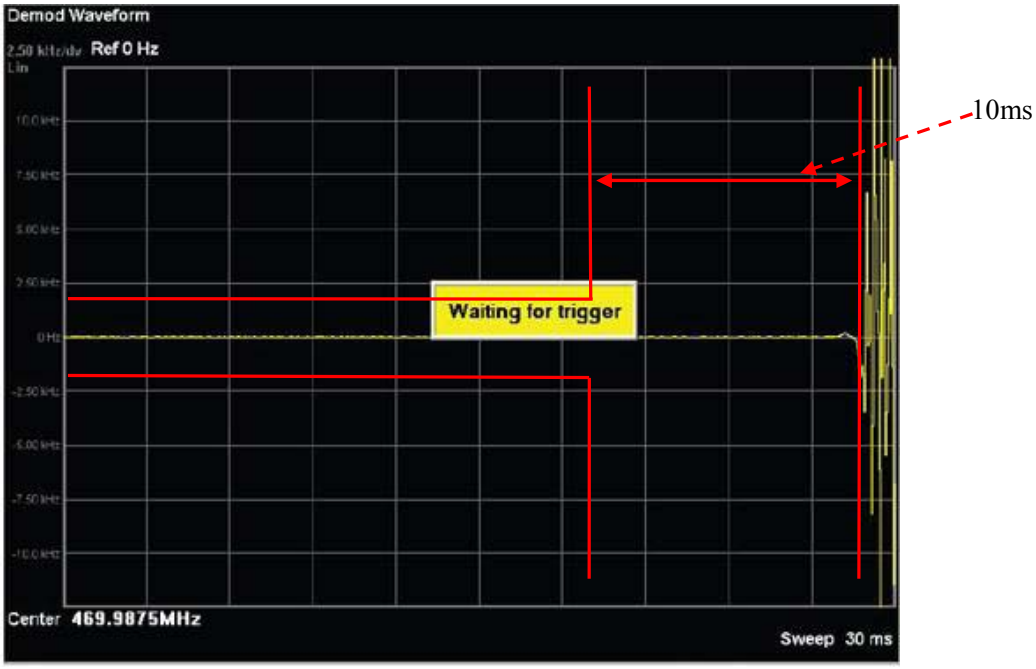


Analog Modulation, Turn off



Digital Modulation, Turn on

Digital Modulation, Turn off



PRODUCT SIMILARITY DECLARATION LETTER

Hytera Communications Co.,Ltd.
HYT Tower, Hi-Tech Industrial Park North, Nanshan District, Shenzhen China
Tel: +86-0755-26972999- 1210 Fax: 0755-86137130

2013-10-17

Product Similarity Declaration

To Whom It May Concern,

We, Hytera Communications Corporation Ltd., hereby declare that our Digital Base Station Repeater, Model Number: RD980S U(2), RD985S U(2), RD986S U(2), RD988S U(2)are electrically identical with RD982S U(2) that was certified by BACL.
There are named differently due to market purpose.

Please contact me if you have any question.

Signature: Lei Xiong

Lei Xiong
General Director

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