NVLAP LAB CODE 200707-0

FCC PART 90 TYPE APPROVAL

EMI MEASUREMENT AND TEST REPORT

For

Kirmuss & Associates/ Infinity Advanced Technologies

13401 West 43rd Drive, Unit 11,
Golden, Co., USA 80403

FCC ID: ULXKAPP1045UP

This Report Concerns:	Equipment Type:
☒ Original Report	Two-way Radio

Test Engineer:	Simon Mo simon mo
Report No.:	RSZ08050405
Test Date:	2008-05-24 to 2008-05-29
Report Date:	2008-05-29
Reviewed By:	EMC Manager: Green Xu Green. Xu
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

TABLE OF CONTENTS

GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *Kirmuss & Associates/ Infinity Advanced Technologies's* product, model number: *P-1045-U-P* or the "EUT" as referred to in this report is a *Two-way Radio*. The EUT is measured approximately 5.3 cm L x 4.0 cmW x 23.0 cmH, rated input voltage: DC 7.4 V battery.

** All measurement and test data in this report was gathered from production sample serial number: 0805005 (Assigned by BACL, Shenzhen). The EUT was received on 2008-05-04.*

Objective

This Type approval report is prepared on behalf of *Kirmuss & Associates/ Infinity Advanced Technologies* in accordance with Part 2, and Part 90 of the Federal Communication Commissions rules.

Related Submittal(s)/Grant(s)

No related submittal(s).

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 90 – Private Land Mobile Radio Service

Applicable Standards: TIA 603-C and ANSI 63.4-2003.

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

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located in 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 November 04, 2004. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

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.

Additionally, Bay Area Compliance Laboratories Corp. (Shenzhen) is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200707-0).

NVLAP LAB CODE 200707-0

The current scope of accreditations can be found at http://ts.nist.gov/ts/htdocs/210/214/scopes/2007070.htm.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in a typical fashion (as normally used by a typical user).

Equipment Modifications

No modifications were made to the unit tested.

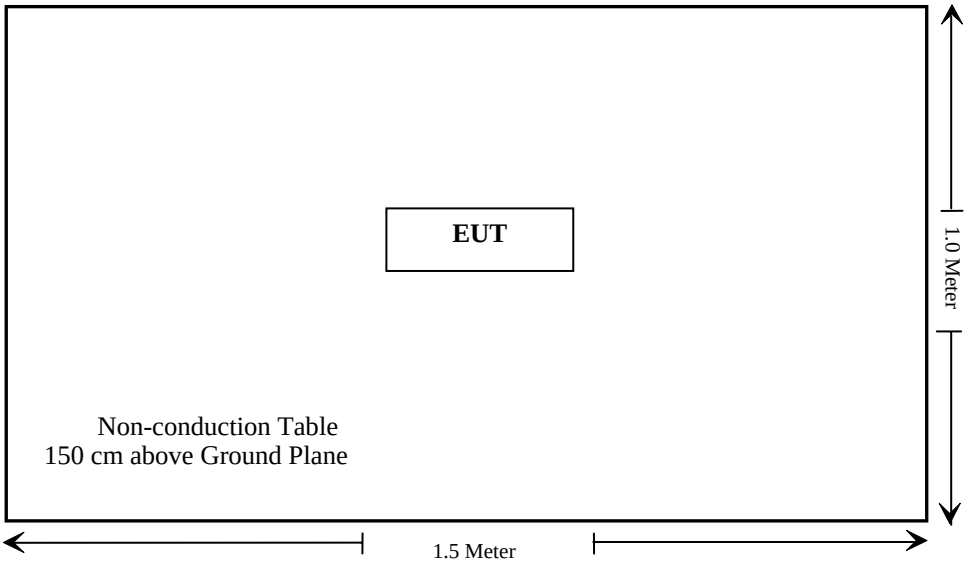
Configuration of Test Setup

Lie

Side

Stand

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Results
§1.1307(b) §2.1093	RF Exposure	Compliant, refer to SAR Report
§2.1046, §90.205	RF Output Power	Compliant
§2.1047 §90.207	Modulation Characteristic	Compliant
§2.1049, §90.209;210	Occupied Bandwidth & Emission Mask	Compliant
§2.1051 §90.210	Spurious Emission at Antenna Terminal	Compliant
§ 2.1053 § 90.210	Spurious Radiated Emissions	Compliant
§ 2.1055 § 90.213	Frequency stability	Compliant
§ 90.214	Transient Frequency Behavior	Compliant

§1.1307(b) & §2.1093 - RF EXPOSURE

Applicable Standard

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

Result: Compliance.

Please refer to SAR Report (Report No.: B0805087-SAR).

§2.1046 and §90.205 – RF OUTPUT POWER

Applicable Standard

CFR47 2.1046, and §90.205.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2007-08-14	2008-08-14
Sunol Sciences	Bilog Antenna	JB1	A040904-2	2007-08-14	2008-08-14
Rohde&Schwarz	Spectrum Analyzer	FSEM30	849720/019	2008-05-09	2009-05-09
HP	Signal Generator	HP8657A	2849U00982	2007-10-16	2008-10-16
A.H. System	Horn Antenna	SAS-200/571	135	2008-05-17	2009-05-17
Giga-tronics	Signal Generator	1026	270801	2007-09-29	2008-09-29

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

Conducted RF Output Power:

TIA-603-C section 2.2.1

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

Radiated Power Output (ERP)

TIA-603-C section 2.2.17

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 Data

Environmental Conditions

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

The testing was performed by Simon Mo on 2008-05-24.

Test Mode: Transmitting

Test Result: Compliance.

Please refer to following plot and table.

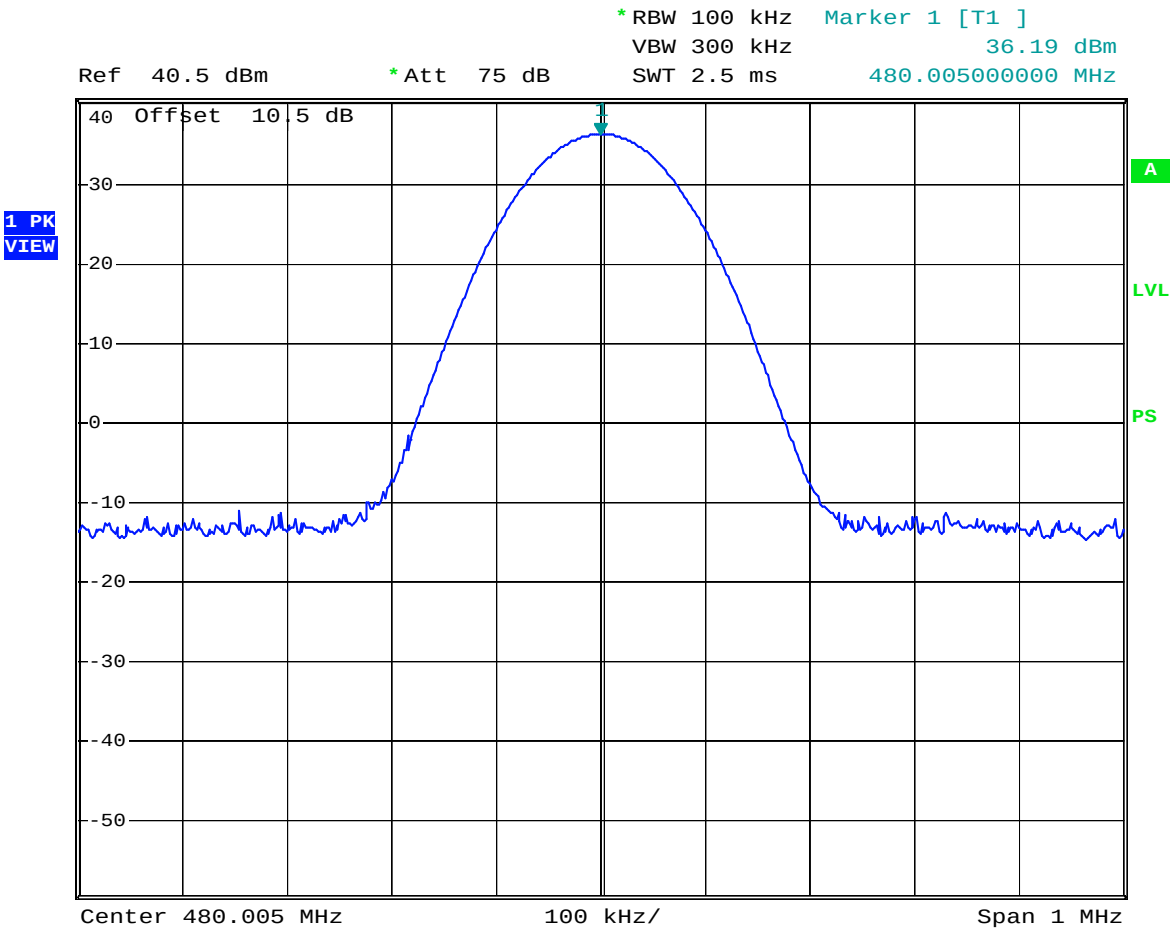
Conducted Output Power:

Frequency (MHz)	Channel Separation (kHz)	Conducted Output power (dBm)	Conducted Output power (Watt)
480.005	12.5	36.19	4.159

Radiated Power Output (ERP)

Indicated		Table Angle Degree	Test Antenna		Substituted			Ant. Gain (dBd)	Cable Loss (dB)	Absolute Level (dBm)	Output Power (Watt)
Freq. (MHz)	Amp. (dBuV)		Height (m)	Polar (H/V)	Freq. (MHz)	Level (dBm)	Polar (H/V)				
Middle Channel (480.005 MHz)											
480.005	114.01	154	1.5	V	480.005	39.78	V	0	3.73	36.05	4.027
480.005	94.20	147	1.6	H	480.005	24.05	H	0	3.73	20.32	0.11

Conducted Output Power



kirmuss&Associates M/N:P-1045-U-P RF output power

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§2.1047 and §90.207 - MODULATION CHARACTERISTIC

Applicable Standard

CFR47 §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	Serial Number	Calibration Date	Calibration Due Date
HP	Modulation Analyzer	8901B	3438A05208	2008-04-11	2009-04-11
NANYAN	Audio Generator	NY2201	019829	2007-12-23	2008-12-23

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

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

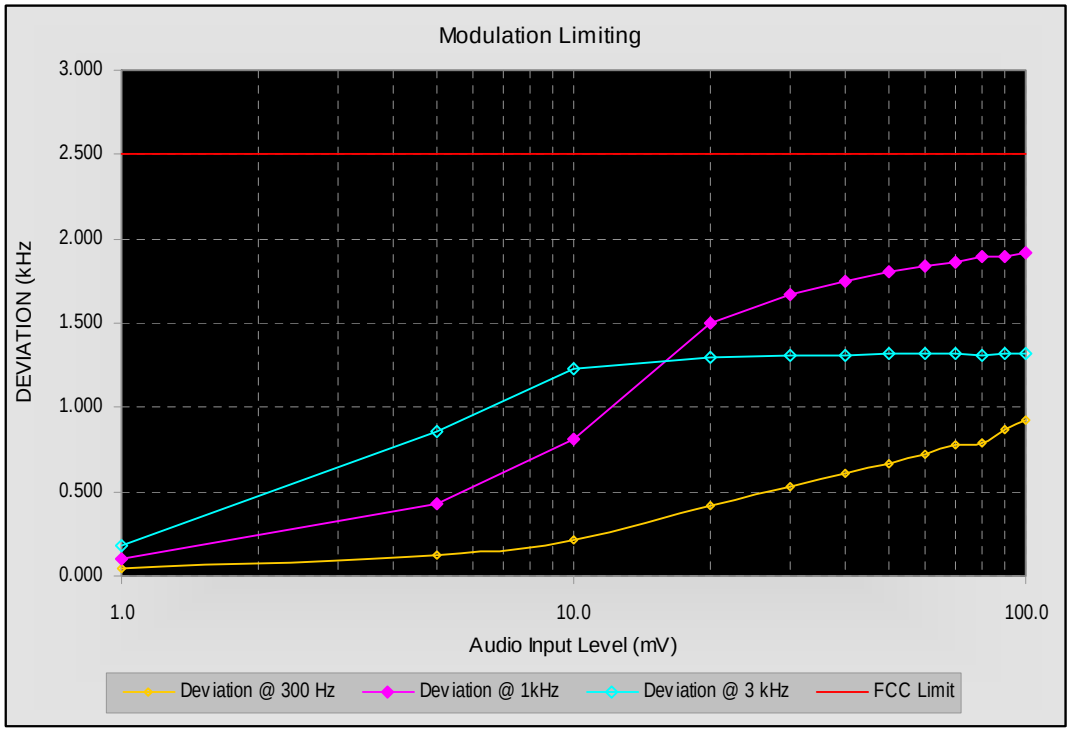
The testing was performed by Simon Mo on 2008-05-29.

Test Mode: Transmitting

MODULATION LIMITING

Carrier Frequency: 480.005 MHz; Channel Separation= 12.5 kHz

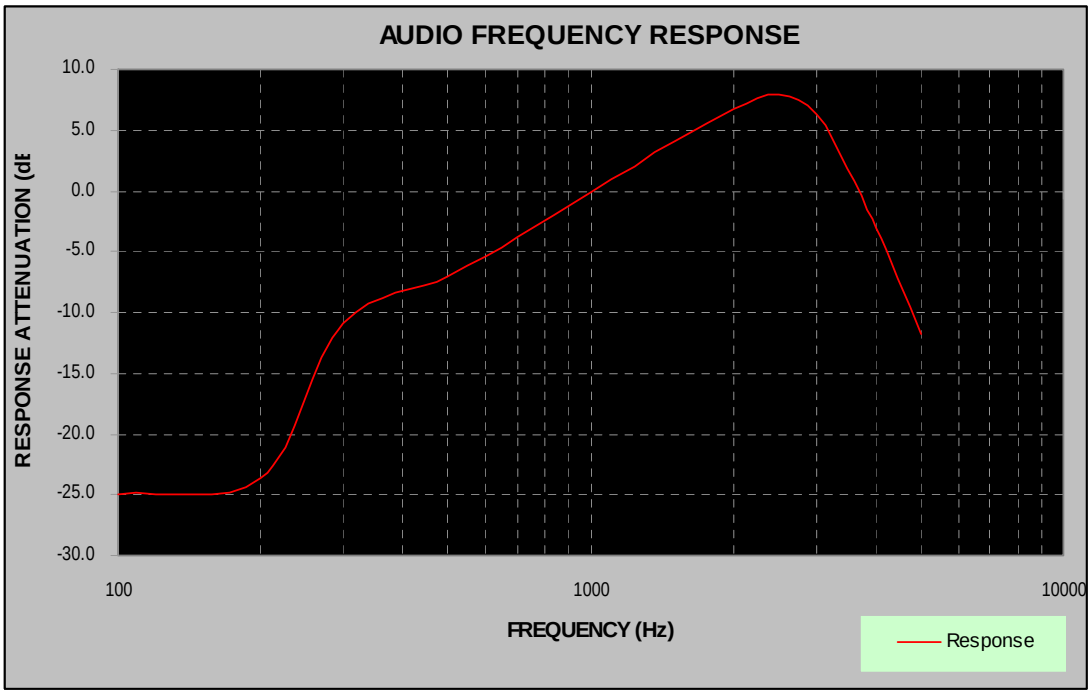
Audio Input Level [mV]	Deviation (@300Hz) [kHz]	Deviation (@ 1kHz) [kHz]	Deviation (@ 3kHz) [kHz]	FCC Limit [kHz]
1.0	0.045	0.101	0.186	2.5
5.0	0.126	0.426	0.862	2.5
10.0	0.218	0.816	1.226	2.5
20.0	0.416	1.497	1.296	2.5
30.0	0.533	1.668	1.303	2.5
40.0	0.607	1.748	1.308	2.5
50.0	0.668	1.802	1.314	2.5
60.0	0.727	1.835	1.316	2.5
70.0	0.782	1.862	1.319	2.5
80.0	0.793	1.893	1.312	2.5
90.0	0.869	1.898	1.314	2.5
100.0	0.920	1.914	1.314	2.5



AUDIO FREQUENCY RESPONSE

Carrier Frequency: 480.005 MHz; Channel Separation= 12.5 kHz

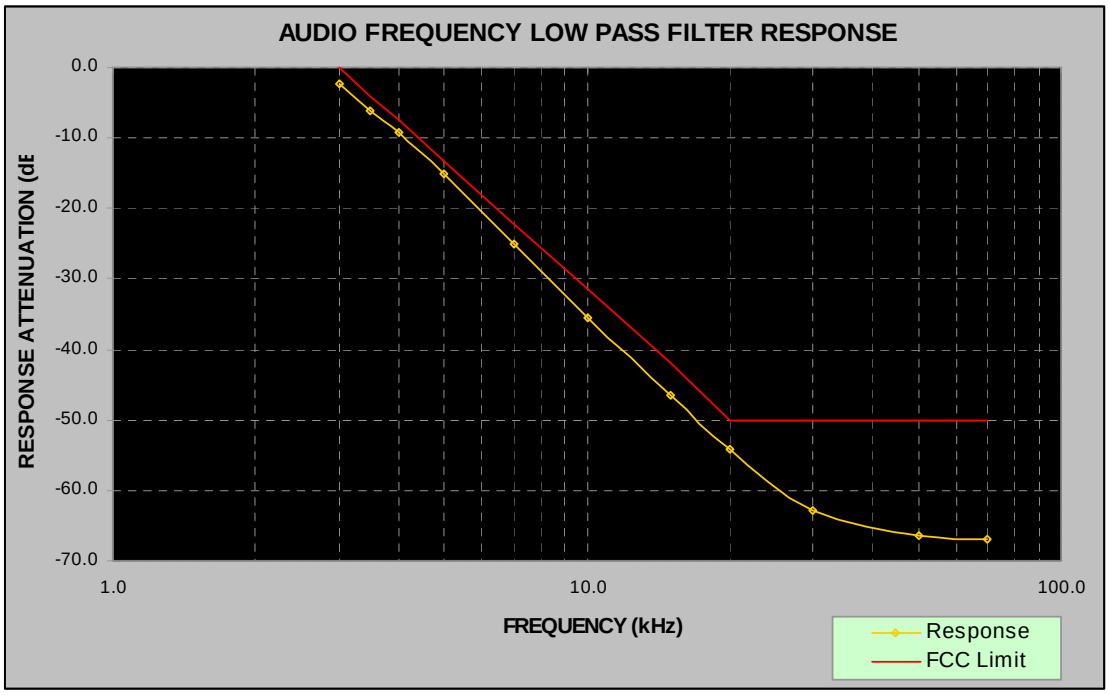
Audio Frequency (Hz)	Response Attenuation (dB)
100	-25.0
200	-23.6
300	-10.9
500	-7.0
700	-3.7
1000	0.0
1500	4.1
2000	6.7
2500	7.9
3000	6.3
3500	1.8
4000	-3.1
5000	-11.8



AUDIO FREQUENCY LOW PASS FILTER RESPONSE

Carrier Frequency: 480.005 MHz; Channel Separation= 12.5 kHz

Audio Frequency (kHz)	Response Attenuation (dB)	FCC Limit (dB)
3.0	-2.4	0.0
3.5	-6.2	-4.0
4.0	-9.2	-7.5
5.0	-15.0	-13.3
7.0	-25.0	-22.1
10.0	-35.5	-31.4
15.0	-46.6	-42.0
20.0	-54.2	-50.0
30.0	-62.8	-50.0
50.0	-66.3	-50.0
70.0	-66.9	-50.0



§2.1049 and § 90.209 – OCCUPIED BANDWIDTH

Applicable Standard

CFR47 §2.1049, §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 5.625kHz 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 5.626kHz but no more than 12.5kHz, at least 7.27 (f_d –2.88kHz) dB.

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

43+10logP=43+10log (4.195) = 49.12 dB

The resolution bandwidth was 300Hz or greater for measuring up to 250kHz from the edge of the authorized frequency segment, and 30kHz or greater for measuring more than 250kHz from the authorized frequency segment.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2007-10-16	2008-10-16
HP	Modulation Analyzer	8901B	3438A05208	2008-04-11	2009-04-11
NANYAN	Audio Generator	NY2201	019829	2007-12-23	2008-12-23

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

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 and the spectrum was recorded in the frequency band ±50 KHz from the carrier frequency.

Test Data

Environmental Conditions

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

The testing was performed by Simon Mo on 2008-05-24.

Emission Designator Calculation:

Channel separation = 12.5 kHz

Bn = 2M+2DK

M = 3000

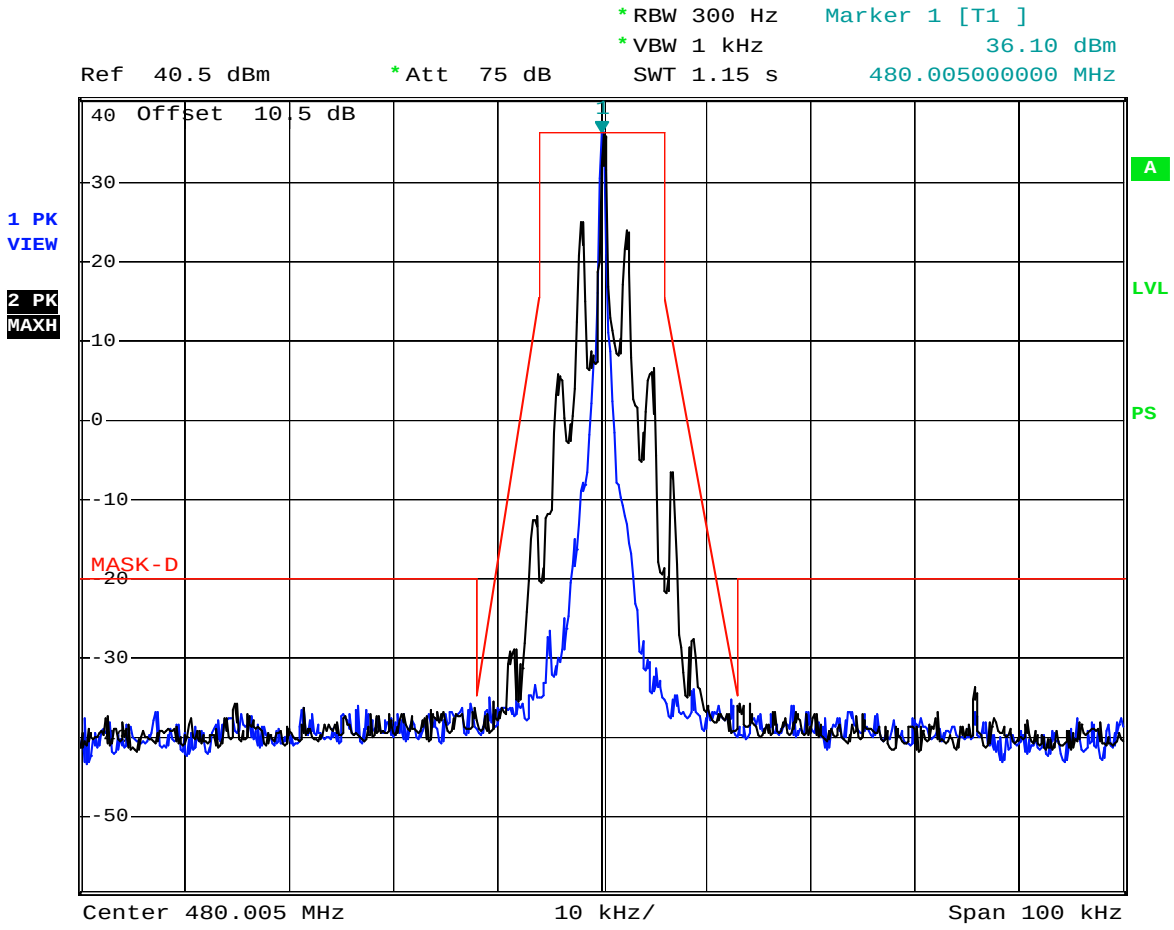
D = 2.5 kHz

K = 1

Bn = 2*(3000) +2*(2500) = 11 kHz

Type of Emission: 11K0F3E

Emission Mask



kirmuss&Associates M/N:P-1045-U-P emission mask(12.5KHz)

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§2.1051 and §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 5.625kHz 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 5.626kHz but no more than 12.5kHz, at least 7.27 (f_d –2.88kHz) dB.

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

43+10log(P) dB

The resolution bandwidth was 300Hz or greater for measuring up to 250kHz from the edge of the authorized frequency segment, and 30kHz or greater for measuring more than 250kHz from the authorized frequency segment.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde&Schwarz	Spectrum Analyzer	FSEM30	849720/019	2008-05-09	2009-05-09
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2007-10-16	2008-10-16

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

The RF output of the Two-way Radio was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100 kHz. Sufficient scans were taken to show any out of band emissions up to 10^{th} harmonic.

Test Data

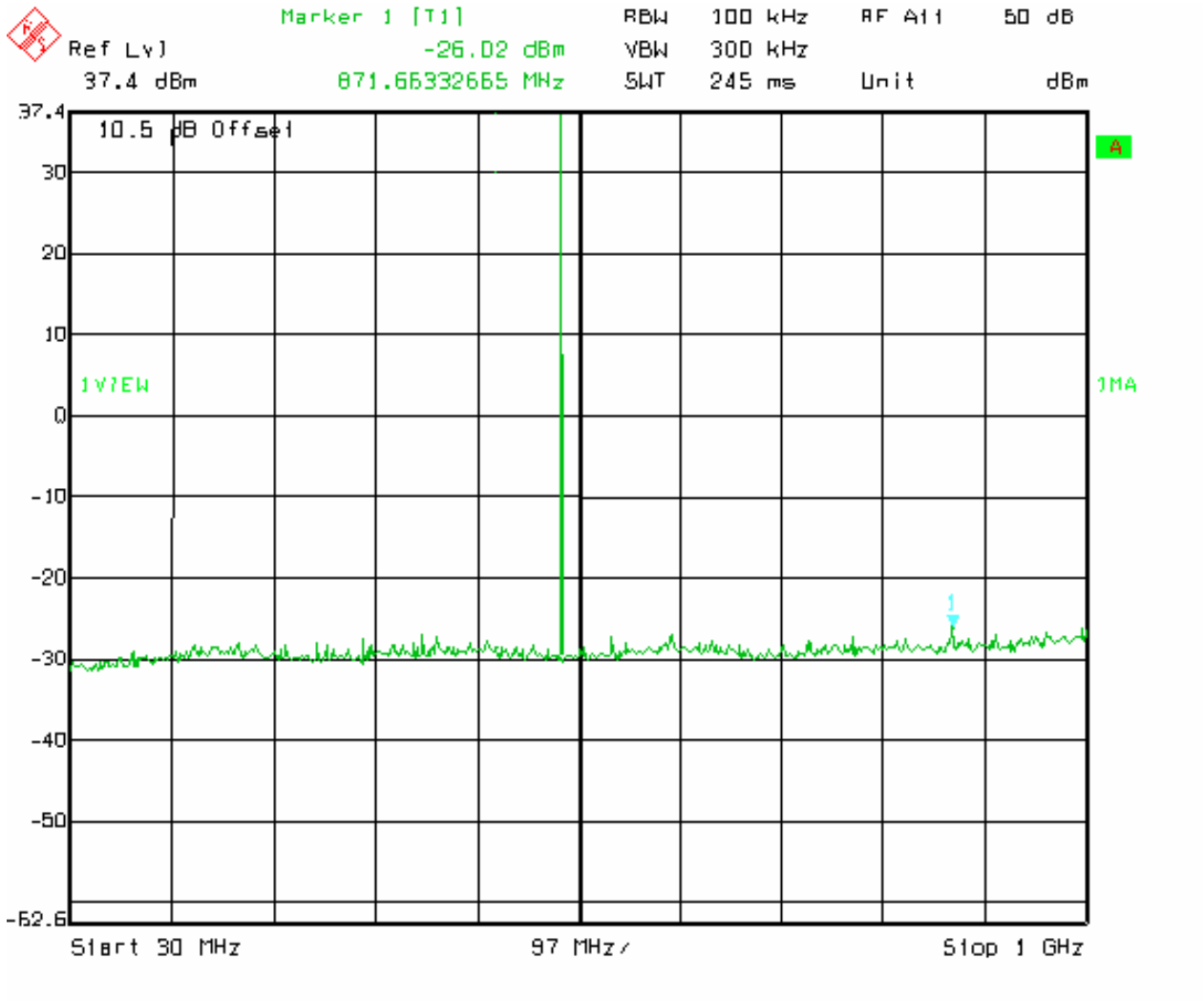
Environmental Conditions

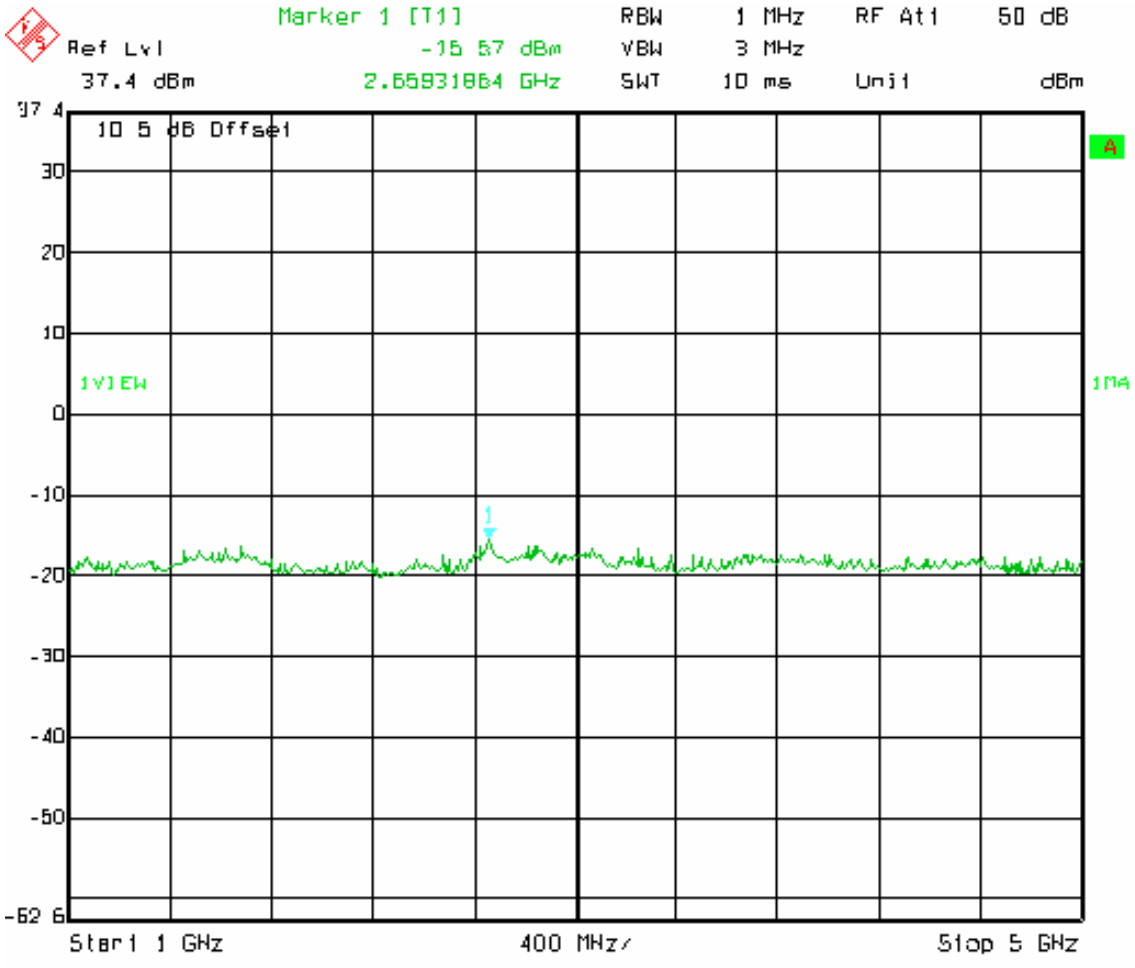
Temperature:	25 ° C
Relative Humidity:	56%
ATM Pressure:	100.1 kPa

The testing was performed by Simon Mo on 2008-05-28.

Test Mode: Transmitting

12.5 kHz Channel Spacing

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RBW 1 MHz
RF Att 50 dB
Ref Lvl
-15.57 dBm
VBW 3 MHz
37.4 dBm
2.65931864 GHz
SWT 10 ms
Unit dBm
37.4
10.5 dB Offset
30
20
10
VIEW
0
-10
-20
-30
-40
-50
-62.6
A
1MA
Start 1 GHz
400 MHz/
Stop 5 GHz

§2.1053 and §90.210 - RADIATED SPURIOUS EMISSIONS

Applicable Standard

CFR47 §2.1053 and §90.210

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sunol Sciences	Horn Antenna	DRH-118	A052604	2007-09-25	2008-09-25
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2007-08-14	2008-08-14
Sunol Sciences	Bilog Antenna	JB1	A040904-2	2007-08-14	2008-08-14
Rohde&Schwarz	Spectrum Analyzer	FSEM30	849720/019	2008-05-09	2009-05-09
HP	Signal Generator	HP8657A	2849U00982	2007-10-16	2008-10-16
A.H. System	Horn Antenna	SAS-200/571	135	2008-05-17	2009-05-17
Giga-tronics	Signal Generator	1026	270801	2007-09-29	2008-09-29

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

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 =43+10 Log_{10} (power out in Watts)

Test Results Summary

5.06 dB at **1440.015 MHz** in the **Vertical** polarization.

Test Data

Environmental Conditions

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

The testing was performed by Simon Mo on 2008-05-26.

Test Mode: Transmitting

Indicated		Table Angle Degree	Test Antenna		Substituted			Antenna Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	FCC Part 90	
Freq. (MHz)	Reading (dBuV)		Height (m)	Polar (H/V)	Freq. (MHz)	Level (dBm)	Polar (H/V)				Limit (dBm)	Margin (dB)
Middle Channel (480.005 MHz)												
1440.015	69.33	254	1.5	V	1440.015	-30.35	V	6.5	1.21	-25.06	-20	5.06
960.01	42.35	145	1.8	V	960.01	-20.50	V	0	5.82	-26.32	-20	6.32
1920.02	61.48	158	1.5	V	1920.02	-32.90	V	6.3	1.36	-27.6	-20	7.60
1440.015	66.32	256	1.5	H	1440.015	-33.85	H	6.5	1.21	-28.56	-20	8.56
2400.025	50.68	230	1.2	V	2400.025	-34.80	V	7.5	1.62	-28.92	-20	8.92
2400.025	43.12	320	1.4	H	2400.025	-38.10	H	7.5	1.62	-32.22	-20	12.22
2880.03	51.68	145	1.5	V	2880.03	-38.20	V	7.4	2.24	-33.04	-20	13.04
1920.02	51.99	179	1.4	H	1920.02	-38.20	H	6.3	1.36	-33.26	-20	13.26
960.01	33.79	168	1.6	H	960.01	-28.00	H	0	5.82	-33.82	-20	13.82
2880.03	49.74	258	1.2	H	2880.03	-44.00	H	7.4	2.24	-38.84	-20	18.84

§2.1055 and §90.213- FREQUENCY STABILITY

Applicable Standard

CFR47 §2.1055& §90.213

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
WUHUAN	Temperature & Humidity Chamber	HTP205	20021115	2007-12-28	2008-12-28
Hewlett-Packard	Frequency Counter	5342A	2317A08289	2008-03-24	2009-03-24

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

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 f Spectrum Analyzer 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.

The frequency stability shall be measured with variation of primary supply voltage as follows:

(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

Test Data

Environmental Conditions

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

The testing was performed by Simon Mo on 2008-05-29.

Test Mode: Transmitting

Frequency Stability Versus temperature

Reference Frequency: 480.005 MHz, Limit: ±2.5 ppm			
Environment Temperature (°C)	**Power Supplied (Vdc)**	**Frequency Measure with Time Elapsed**	
		Measured Frequency (MHz)	**Frequency Error (ppm)**
50	7.4	480.0050040	0.008
40	7.4	480.0050020	0.004
30	7.4	480.0050000	0
20	7.4	480.0050000	0
10	7.4	480.0050000	0
0	7.4	480.0050110	0.023
-10	7.4	480.0050080	0.017
-20	7.4	480.0050080	0.017

Frequency Stability versus Voltage

Reference Frequency 480.005 MHz, Limit: ±2.5 ppm		
Power Supplied (Vdc)	**Frequency Measure with Time Elapsed**	
	Measured Frequency (MHz)	**Frequency Error (ppm)**
6.4	480.0050060	0.0125

§90.214 - TRANSIENT FREQUENCY BEHAVIOR

Applicable Standard

CFR47 §90.214

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
TEKTRONIX	Digital Phosphor Oscilloscope	TDS 7104	B020518	2008-04-11	2009-04-11
HP	Modulation Analyzer	8901B	3438A05208	2008-04-11	2009-04-11
HP	Signal Generator	HP8657A	2849U00982	2007-10-16	2008-10-16

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

TIA/EIA-603-C 2.2.19

Test Data

Environmental Conditions

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

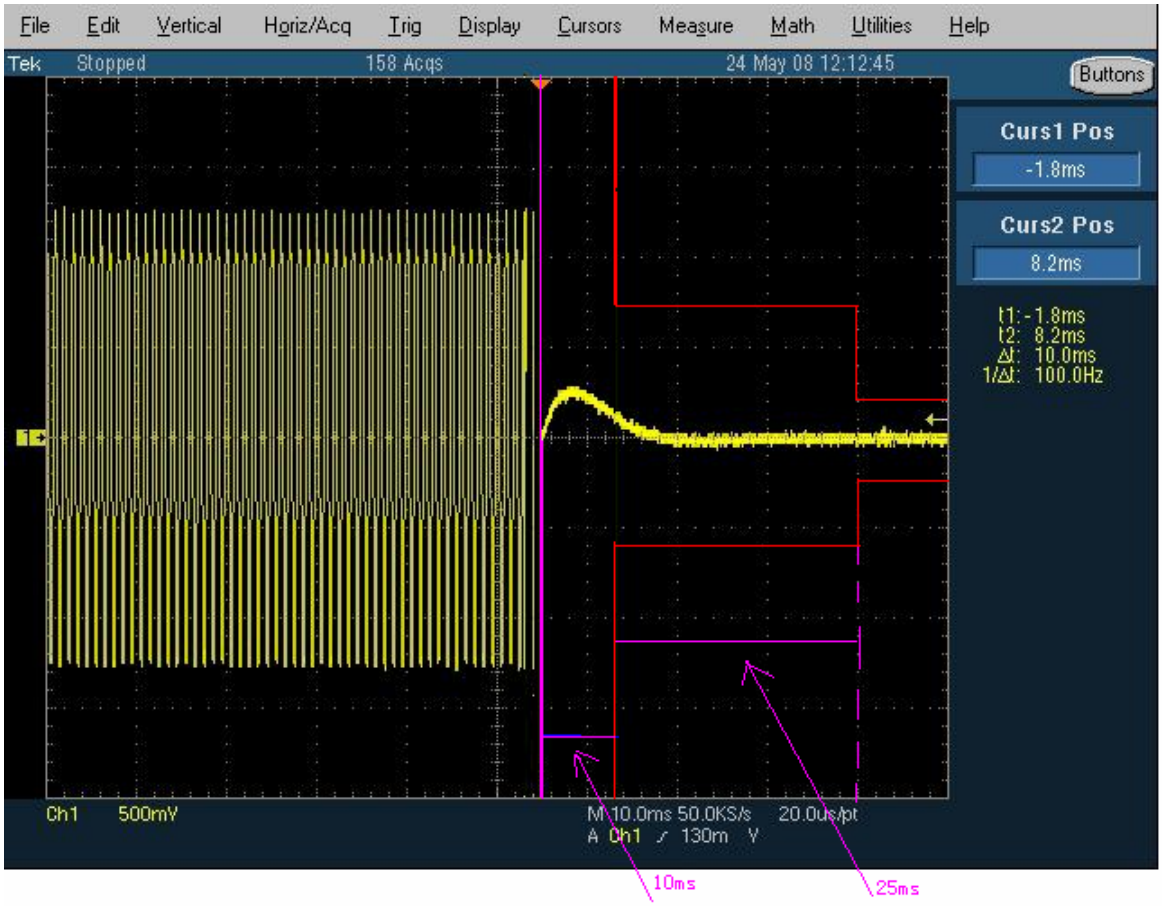
The testing was performed by Simon Mo on 2008-05-28.

Test Mode: Transmitting

Frequency (MHz)	Channel Separation (kHz)	Transient Period (ms)	Transient Frequency	Result
480.005	12.5	10	<+/-12.5 kHz	Pass
		25	<+/-6.25 kHz	
		10	<+/-12.5 kHz	

Test Result: Compliance.

Turn on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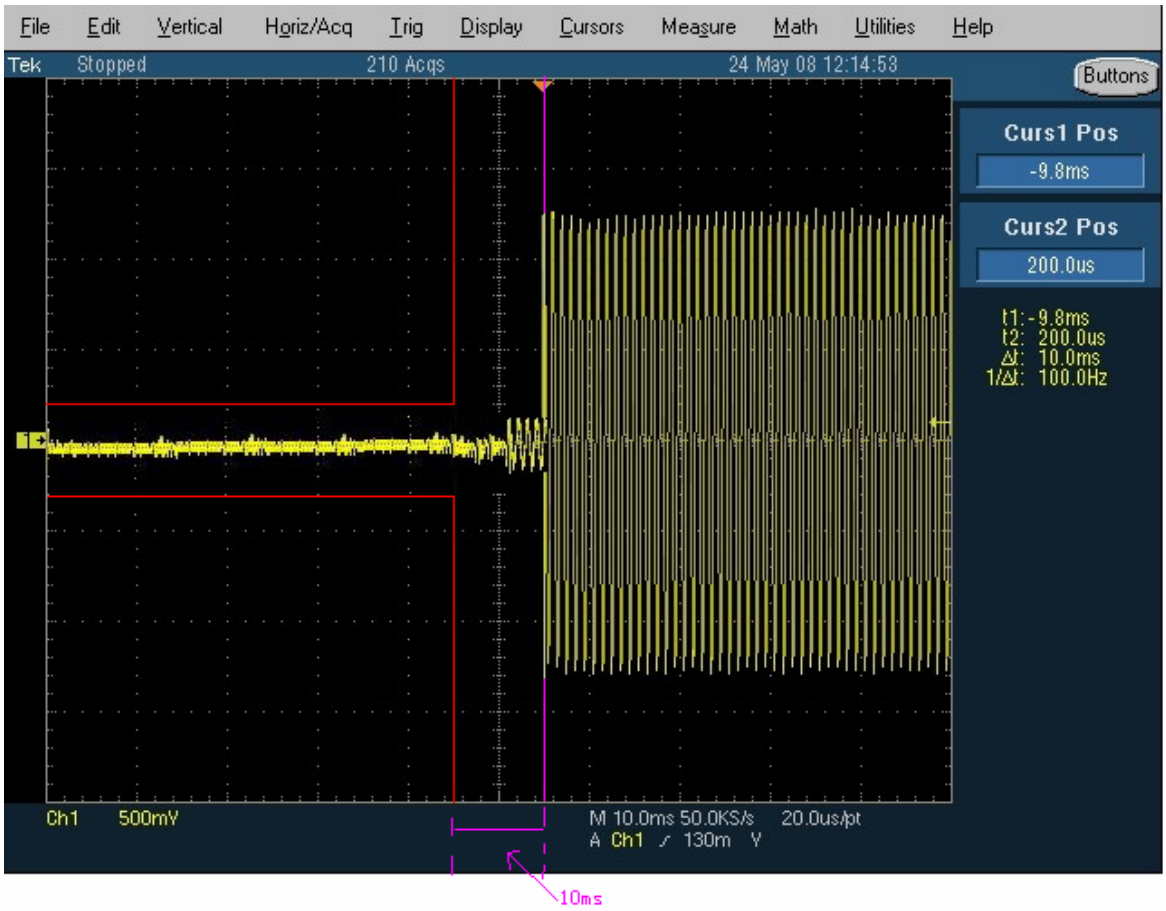
Tek Stopped 158 Acqs 24 May 08 12:12:45
Buttons
Curs1 Pos
-1.8ms
Curs2 Pos
8.2ms
t1:-1.8ms
t2: 8.2ms
Δt: 10.0ms
1/Δt: 100.0Hz
Ch1 500mV
M 10.0ms 50.0KS/s 20.0us/pt
A Ch1 ⟋ 130m V
10ms
25ms

Turn off



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