

FCC PART 90

TEST REPORT

For

**Shenzhen HQT Science&Technology Co., Ltd.**

5/F, East of Building M-8, Central Zone, Hi-tech Industrial Park,

Nanshan District, Shenzhen, Guangdong, China

**FCC ID: P6NTH-8000U**

<b>Report Type:</b> Original Report	<b>Product Type:</b> Two-way radio
<b>Test Engineer:</b> <u>Brown Lu</u>	<i>Brown Lu</i>
<b>Report Number:</b> <u>RSZ120731551-00</u>	
<b>Report Date:</b> <u>2012-09-04</u>	
<b>Reviewed By:</b> <u>Sula Huang</u>	<i>Sula Huang</i>
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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. This report **must not** be used by the customer to claim product certification, approval, or endorsement by NVLAP\*, NIST, or any agency of the Federal Government.

\* This report may contain data that are not covered by the NVLAP accreditation and shall be marked with an asterisk "★"

**TABLE OF CONTENTS**

**GENERAL INFORMATION.....4**

    PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) .....4

    OBJECTIVE .....4

    RELATED SUBMITTAL(S)/GRANT(S).....4

    TEST METHODOLOGY .....4

    TEST FACILITY .....5

**SYSTEM TEST CONFIGURATION.....6**

    DESCRIPTION OF TEST CONFIGURATION .....6

    EQUIPMENT MODIFICATIONS .....6

    BLOCK DIAGRAM OF TEST SETUP .....6

**SUMMARY OF TEST RESULTS .....7**

**FCC §1.1307(b) & §2.1093 - RF EXPOSURE.....8**

    APPLICABLE STANDARD .....8

**FCC §2.1046 & §90.205 - RF OUTPUT POWER.....9**

    APPLICABLE STANDARD .....9

    TEST EQUIPMENT LIST AND DETAILS.....9

    TEST PROCEDURE .....9

    TEST DATA .....9

**FCC §2.1047 & §90.207 - MODULATION CHARACTERISTIC .....11**

    APPLICABLE STANDARD .....11

    TEST EQUIPMENT LIST AND DETAILS.....11

    TEST PROCEDURE .....11

    TEST DATA .....11

**FCC §2.1049, §90.209 & §90.210 – OCCUPIED BANDWIDTH & EMISSION MASK .....24**

    APPLICABLE STANDARD .....24

    TEST EQUIPMENT LIST AND DETAILS.....24

    TEST PROCEDURE .....25

    TEST DATA .....25

**FCC §2.1051 & §90.210 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS .....30**

    APPLICABLE STANDARD .....30

    TEST EQUIPMENT LIST AND DETAILS.....30

    TEST PROCEDURE .....31

    TEST DATA .....31

**FCC §2.1053 & §90.210 - RADIATED SPURIOUS EMISSIONS .....34**

    APPLICABLE STANDARD .....34

    TEST EQUIPMENT LIST AND DETAILS.....34

    TEST PROCEDURE .....34

    TEST DATA .....35

**FCC §2.1055 & §90.213 - FREQUENCY STABILITY.....36**

    APPLICABLE STANDARD .....36

    TEST EQUIPMENT LIST AND DETAILS.....36

    TEST DATA .....36

**FCC §90.214 - TRANSIENT FREQUENCY BEHAVIOR.....38**

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APPLICABLE STANDARD .....	38
TEST EQUIPMENT LIST AND DETAILS.....	38
TEST PROCEDURE .....	38
TEST DATA .....	38

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## GENERAL INFORMATION

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### Product Description for Equipment under Test (EUT)

The *Shenzhen HQT Science & Technology Co., Ltd.*'s product, model number: *TH-8000 (FCC ID: P6NTH-8000U)* (the "EUT") in this report is a *Two-way radio*, which was measured approximately 12.0 cm (H) x 5.5 cm (W) x 3.4 cm (D), rated input voltage: DC 7.4 V Li-poly rechargeable battery.

Technical specifications:

Frequency range: 400~470 MHz  
Output power: 1.035 W (Low); 4.093 W (High) (Conducted power)  
Modulation: FM  
Frequency spacing: 12.5 kHz

*\* All measurement and test data in this report was gathered from production sample serial number: 1207035 (Assigned by BACL, Shenzhen). The EUT was received on 2012-07-31.*

### Objective

This test report is prepared on behalf of *Shenzhen HQT Science & Technology Co., Ltd.* in accordance with Part 2, and Part 90 of the Federal Communication Commissions rules.

### Related Submittal(s)/Grant(s)

No Related Submittal(s)/Grant(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-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.

## 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.

Additionally, Bay Area Compliance Laboratories Corp. (Shenzhen) is an ISO/IEC 17025 accredited laboratory, and is accredited by National Voluntary Laboratory Accredited Program (Lab Code 200707-0).



The current scope of accreditations can be found at <http://ts.nist.gov/Standards/scopes/2007070.htm>.

## SYSTEM TEST CONFIGURATION

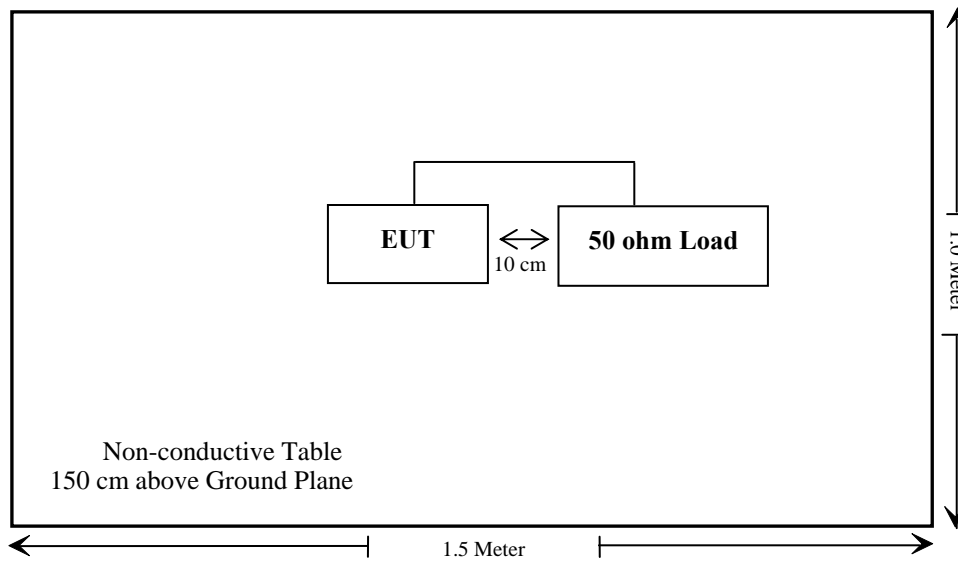
### Description of Test Configuration

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

### Equipment Modifications

No Equipment Modifications.

### Block Diagram of Test Setup



**SUMMARY OF TEST RESULTS**

<b>FCC Rules</b>	<b>Description of Test</b>	<b>Results</b>
§1.1307 (b); §2.1093	RF Exposure	Compliance
§2.1046; §90.205	RF Output Power	Compliance
§2.1047; §90.207	Modulation Characteristic	Compliance
§2.1049; §90.209; §90.210	Authorized Bandwidth & Emission Mask	Compliance
§2.1051; §90.210	Spurious Emission at Antenna Terminal	Compliance
§2.1053; §90.210	Spurious Radiated Emissions	Compliance
§2.1055; §90.213	Frequency Stability	Compliance
§90.214	Transient Frequency Behavior	Compliance

Note: The uncertainty of any RF tests which use conducted method measurement is 0.96 dB.  
The uncertainty of any radiation emissions measurement is 4.0 dB.

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

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### **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: RSZ120803550-20.



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

### Applicable Standard

FCC §2.1046 and §90.205.

### Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2011-11-24	2012-11-23

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

### Test Procedure

Conducted RF Output Power:

TIA-603-D section 2.2.1

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

Spectrum Analyzer setting:

<u>RBW</u>	<u>Video B/W</u>
100 kHz	300 kHz

### Test Data

#### Environmental Conditions

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	56%
<b>ATM Pressure:</b>	100.1 kPa

*The testing was performed by Brown Lu on 2012-08-29.*

*Test Mode: Transmitting*

**Test Result:** Compliance. Please refer to following table and plot.

Channel Spacing (kHz)	Frequency (MHz)	Conducted Output Power (dBm)	Conducted Output Power (mW)	Power Level Setting
12.5	406.50	29.90	977.24	Low
12.5	406.50	35.85	3845.92	High
12.5	418.00	29.87	970.51	Low
12.5	418.00	36.07	4045.76	High
12.5	429.50	30.15	1035.14	Low
12.5	429.50	36.04	4017.91	High
12.5	440.50	30.09	1020.94	Low
12.5	440.50	35.88	3872.58	High
12.5	455.00	29.88	972.75	Low
12.5	455.00	36.05	4027.17	High
12.5	469.95	30.00	1000.00	Low
12.5	469.95	36.12	4092.61	High

## 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 Communications Test Set	HP8920A	3438A05201	2012-06-14	2013-06-13

\* **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

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	56%
<b>ATM Pressure:</b>	100.1 kPa

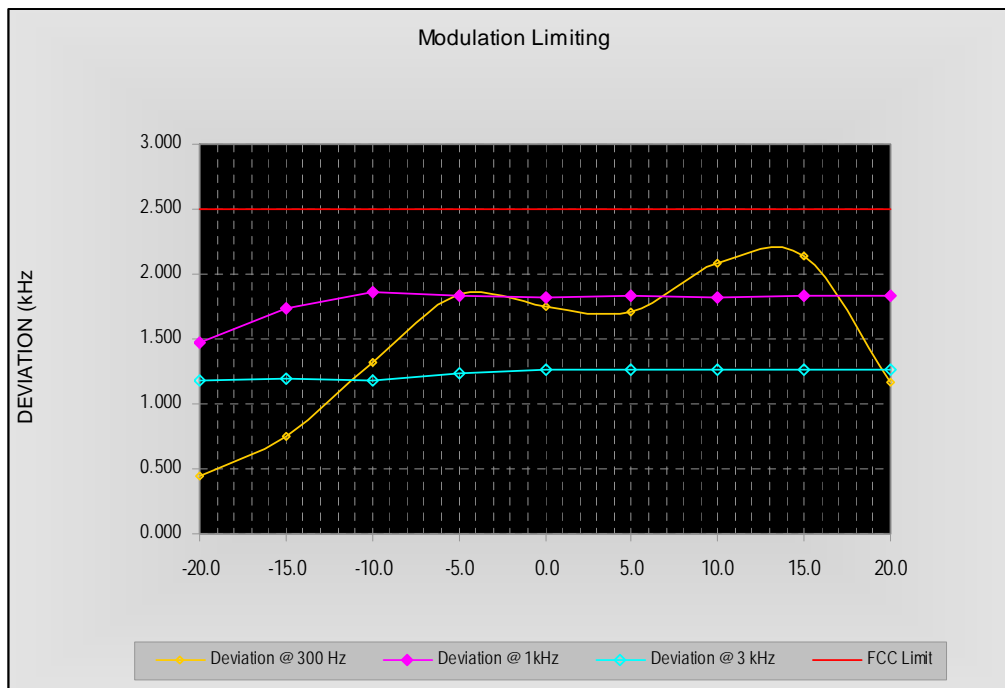
*The testing was performed by Brown Lu on 2012-08-29.*

*Test Mode: Transmitting*

### MODULATION LIMITING

Carrier Frequency: 418 MHz-Low Power, Channel Separation = 12.5 kHz

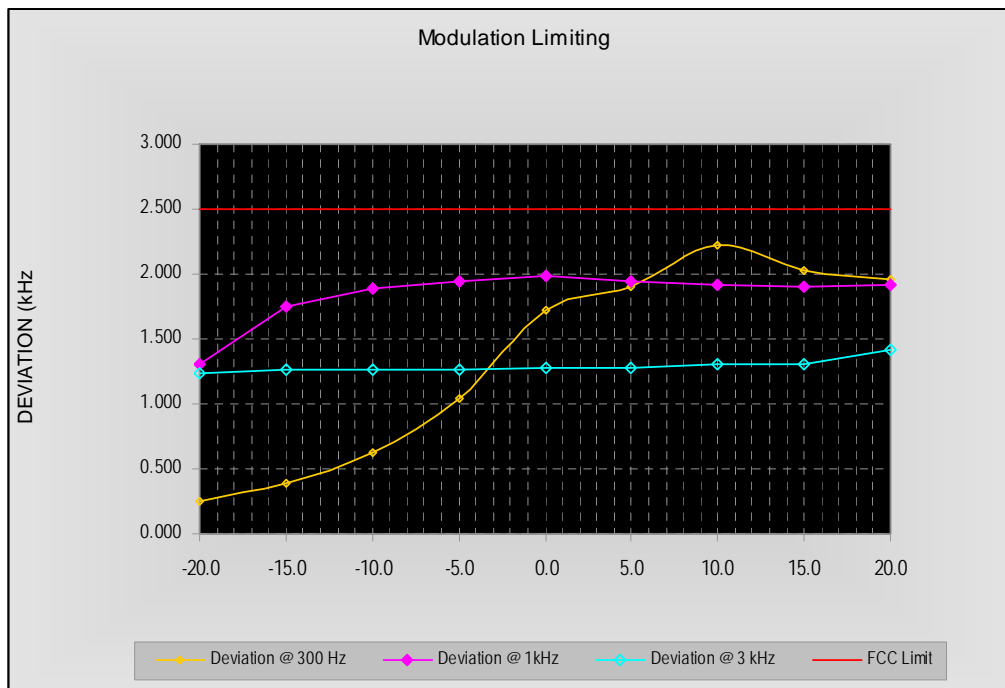
Audio Input Level [dBm]	Frequency Deviation (kHz)			FCC Limit [kHz]
	@ 300 Hz	@ 1kHz	@ 3 kHz	
20.0	1.166	1.833	1.267	2.5
15.0	2.144	1.828	1.266	2.5
10.0	2.087	1.823	1.269	2.5
5.0	1.703	1.836	1.262	2.5
0.0	1.753	1.825	1.263	2.5
-5.0	1.852	1.832	1.234	2.5
-10.0	1.325	1.863	1.185	2.5
-15.0	0.756	1.736	1.192	2.5
-20.0	0.444	1.472	1.181	2.5



### MODULATION LIMITING

Carrier Frequency: 418 MHz-High Power, Channel Separation = 12.5 kHz

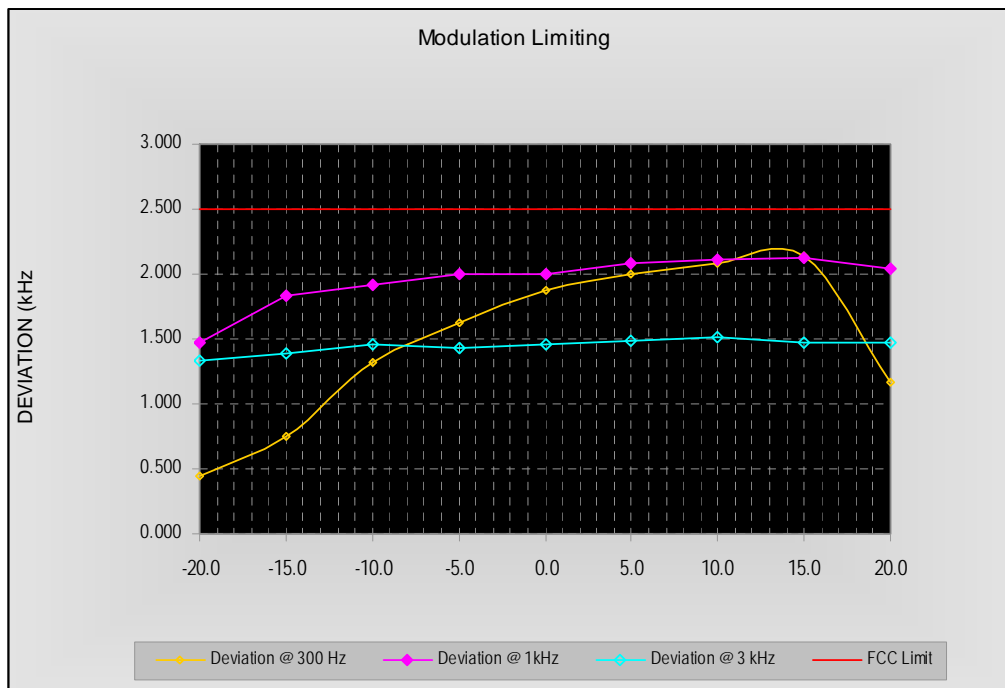
Audio Input Level [dBm]	Frequency Deviation (kHz)			FCC Limit [kHz]
	@ 300 Hz	@ 1kHz	@ 3 kHz	
20.0	1.957	1.912	1.422	2.5
15.0	2.032	1.900	1.308	2.5
10.0	2.216	1.920	1.310	2.5
5.0	1.909	1.940	1.280	2.5
0.0	1.721	1.987	1.272	2.5
-5.0	1.035	1.942	1.258	2.5
-10.0	0.625	1.883	1.264	2.5
-15.0	0.395	1.750	1.259	2.5
-20.0	0.244	1.308	1.241	2.5



### MODULATION LIMITING

Carrier Frequency: 455 MHz-Low Power, Channel Separation = 12.5 kHz

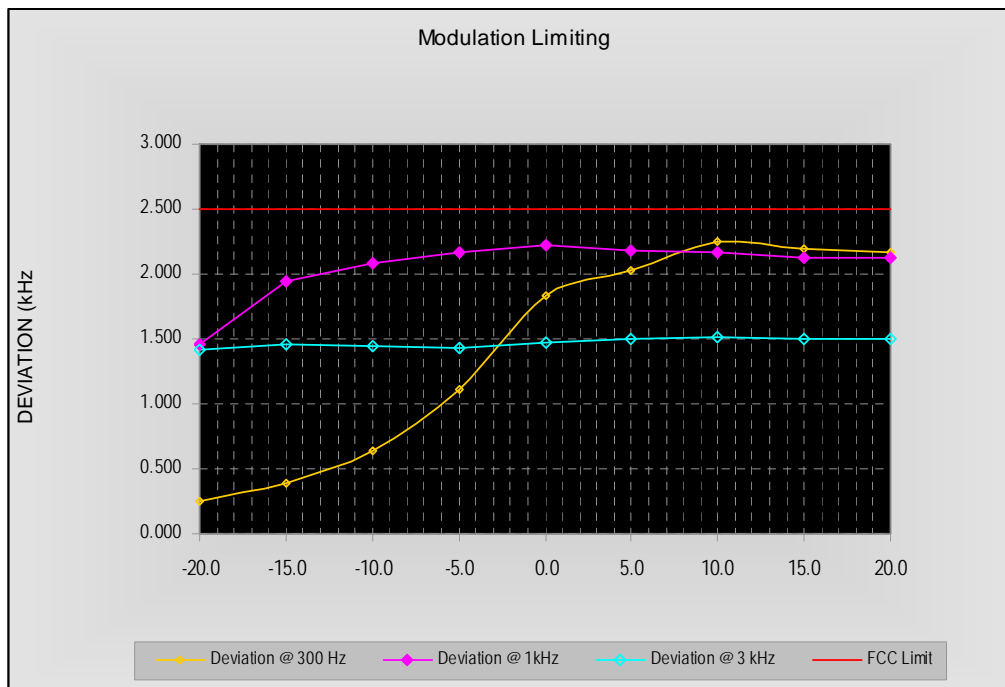
Audio Input Level [dBm]	Frequency Deviation (kHz)			FCC Limit [kHz]
	@ 300 Hz	@ 1kHz	@ 3 kHz	
20.0	1.166	2.043	1.467	2.5
15.0	2.144	2.123	1.466	2.5
10.0	2.090	2.110	1.509	2.5
5.0	2.000	2.080	1.482	2.5
0.0	1.880	2.001	1.463	2.5
-5.0	1.620	1.998	1.434	2.5
-10.0	1.325	1.923	1.455	2.5
-15.0	0.756	1.836	1.392	2.5
-20.0	0.444	1.472	1.331	2.5



### MODULATION LIMITING

Carrier Frequency: 455 MHz-High Power, Channel Separation = 12.5 kHz

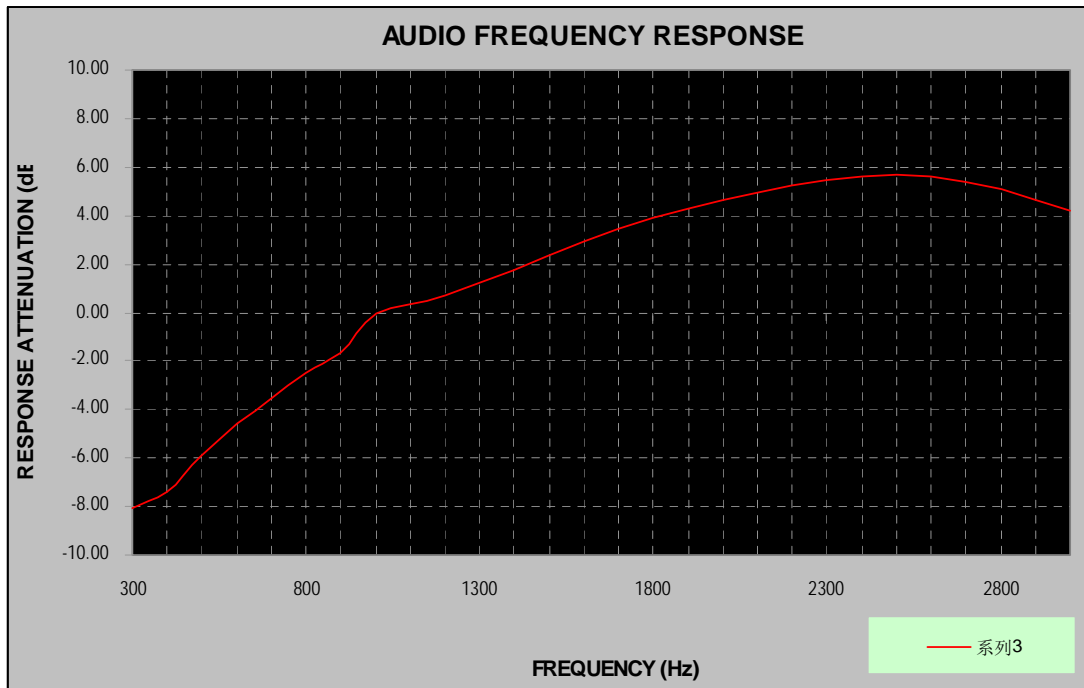
Audio Input Level [dBm]	Frequency Deviation (kHz)			FCC Limit [kHz]
	@ 300 Hz	@ 1kHz	@ 3 kHz	
20.0	2.166	2.127	1.498	2.5
15.0	2.199	2.122	1.495	2.5
10.0	2.246	2.163	1.516	2.5
5.0	2.032	2.175	1.502	2.5
0.0	1.833	2.218	1.472	2.5
-5.0	1.109	2.162	1.435	2.5
-10.0	0.645	2.086	1.445	2.5
-15.0	0.395	1.950	1.459	2.5
-20.0	0.244	1.465	1.411	2.5



### Audio Frequency Response

Carrier Frequency: 418 MHz-Low Power, Channel Separation = 12.5 kHz

Audio Frequency (Hz)	Response Attenuation (dB)
300	-8.05
400	-7.41
500	-5.88
600	-4.55
700	-3.50
800	-2.48
900	-1.66
1000	0.00
1200	0.68
1400	1.76
1600	2.95
1800	3.87
2000	4.64
2200	5.28
2400	5.61
2600	5.62
2800	5.12
3000	4.17

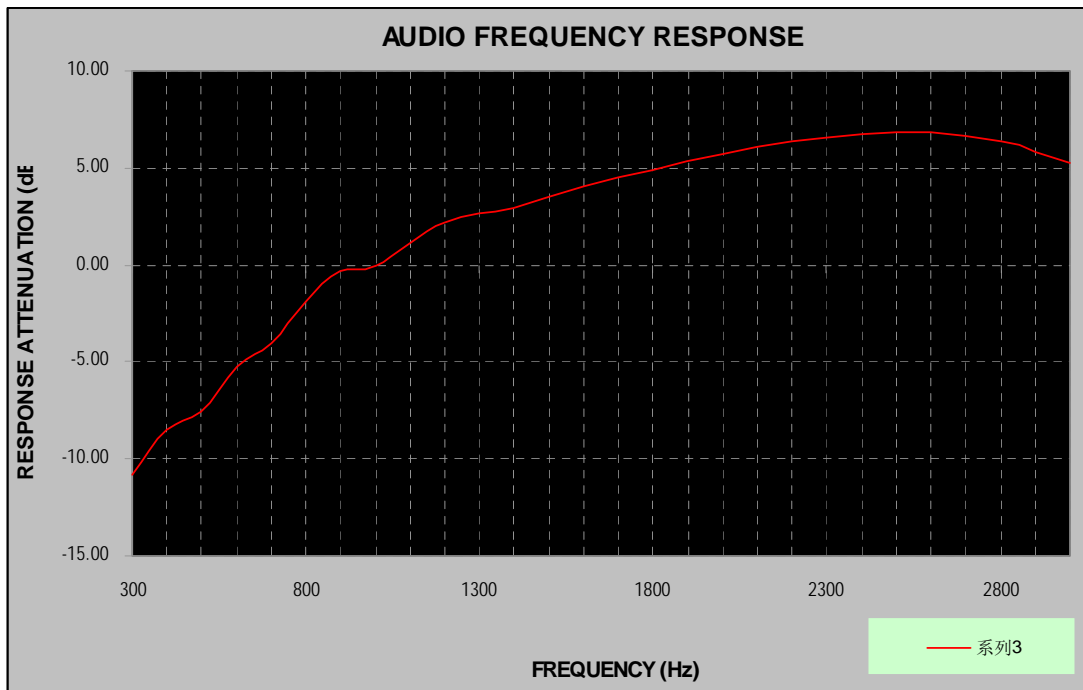




### Audio Frequency Response

Carrier Frequency: 418 MHz-High Power, Channel Separation = 12.5 kHz

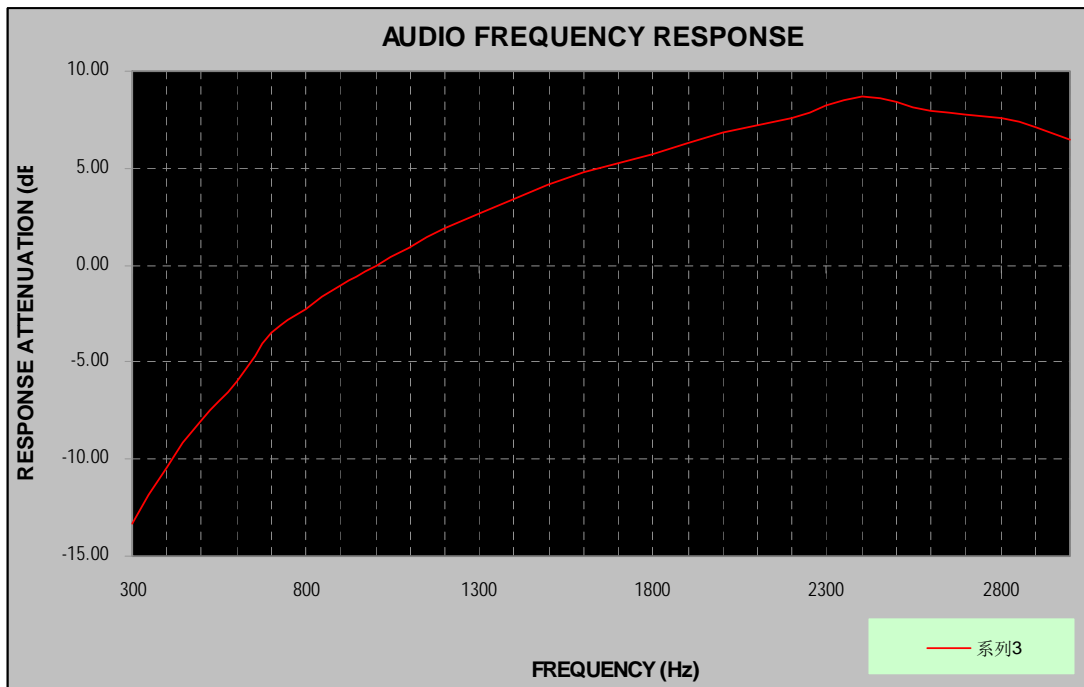
Audio Frequency (Hz)	Response Attenuation (dB)
300	-10.81
400	-8.50
500	-7.54
600	-5.22
700	-4.01
800	-1.89
900	-0.28
1000	0.00
1200	2.24
1400	2.97
1600	4.03
1800	4.89
2000	5.74
2200	6.39
2400	6.77
2600	6.86
2800	6.40
3000	5.31



### Audio Frequency Response

Carrier Frequency: 455 MHz-Low Power, Channel Separation = 12.5 kHz

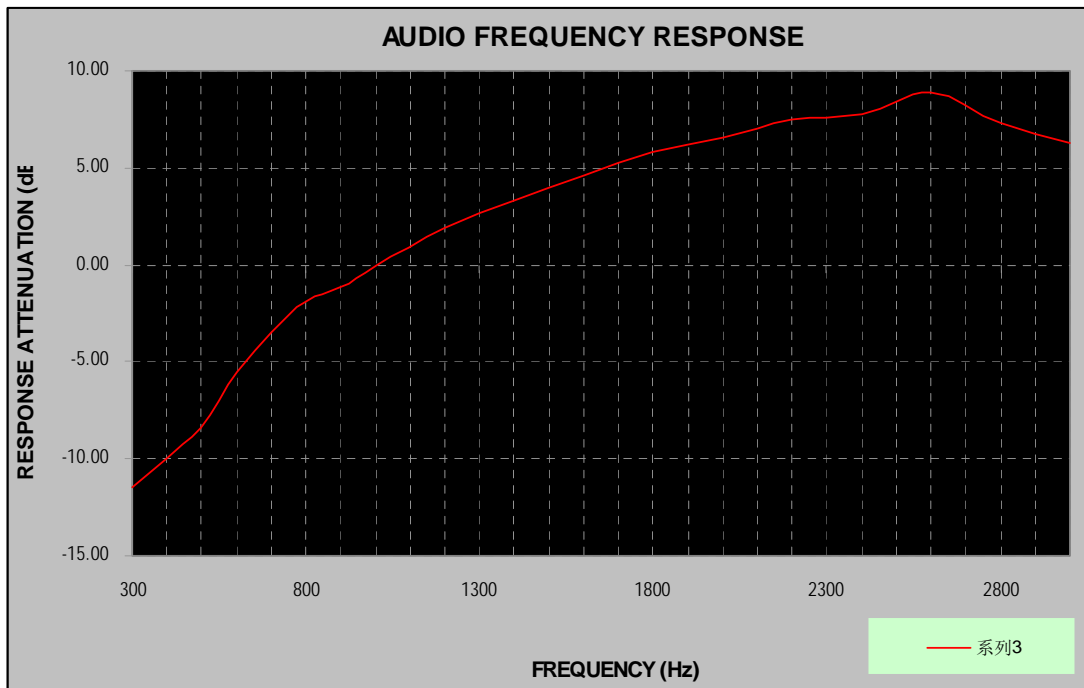
Audio Frequency (Hz)	Response Attenuation (dB)
300	-13.31
400	-10.46
500	-8.05
600	-5.99
700	-3.50
800	-2.27
900	-1.09
1000	0.00
1200	1.87
1400	3.44
1600	4.84
1800	5.76
2000	6.82
2200	7.54
2400	8.72
2600	8.00
2800	7.55
3000	6.46



### Audio Frequency Response

Carrier Frequency: 455 MHz-High Power, Channel Separation = 12.5 kHz

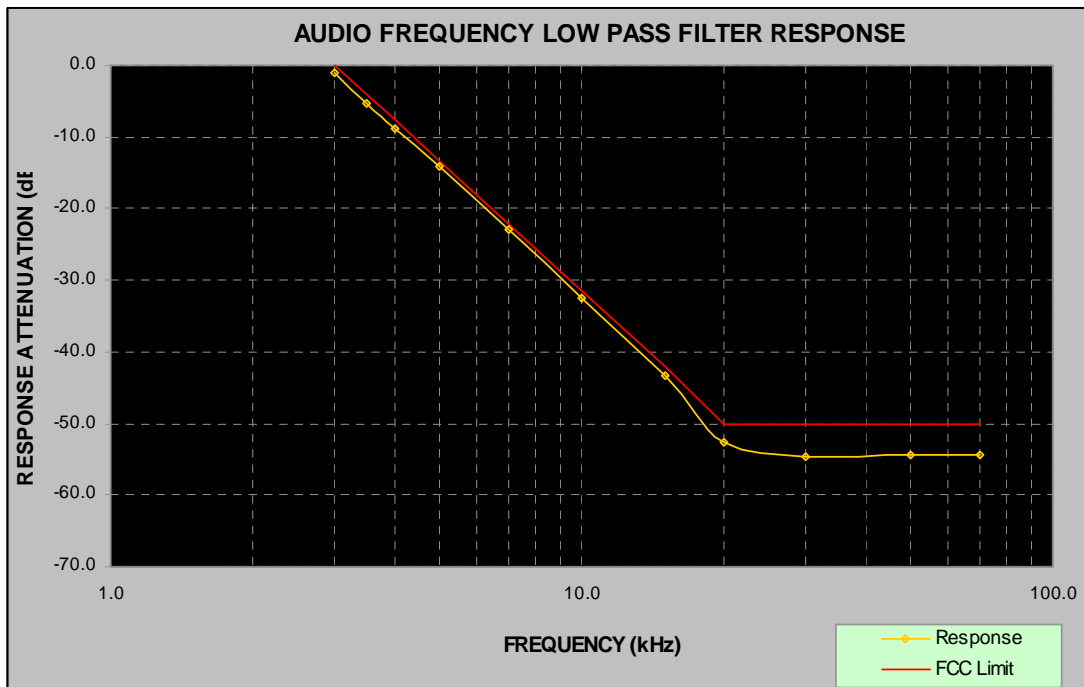
Audio Frequency (Hz)	Response Attenuation (dB)
300	-11.44
400	-10.01
500	-8.40
600	-5.51
700	-3.48
800	-1.89
900	-1.13
1000	0.00
1200	1.91
1400	3.32
1600	4.64
1800	5.83
2000	6.57
2200	7.52
2400	7.74
2600	8.92
2800	7.32
3000	6.31



**Audio Frequency Response Low Pass Filter**

Carrier Frequency: 418 MHz-Low Power, Channel Separation = 12.5 kHz

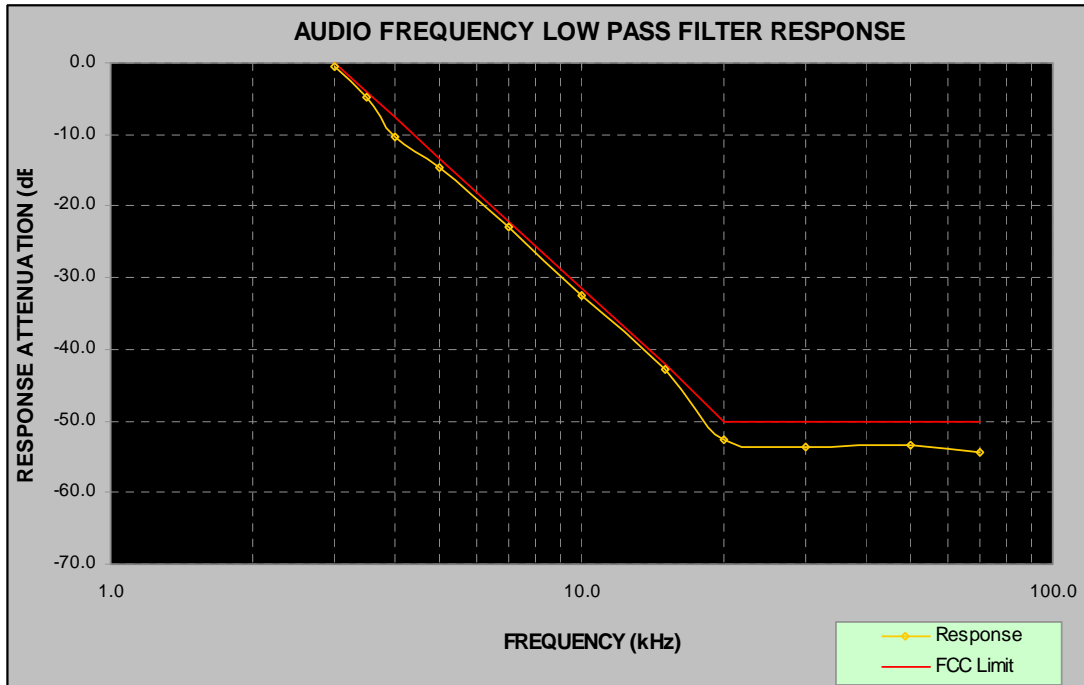
Audio Frequency (kHz)	Response Attenuation (dB)	FCC Limit (dB)
3.0	-1.0	0.0
3.5	-5.3	-4.0
4.0	-8.8	-7.5
5.0	-14.2	-13.3
7.0	-23.0	-22.1
10.0	-32.5	-31.4
15.0	-43.4	-42.0
20.0	-52.7	-50.0
30.0	-54.6	-50.0
50.0	-54.5	-50.0
70.0	-54.3	-50.0



**Audio Frequency Response Low Pass Filter**

Carrier Frequency: 418 MHz-High Power, Channel Separation = 12.5 kHz

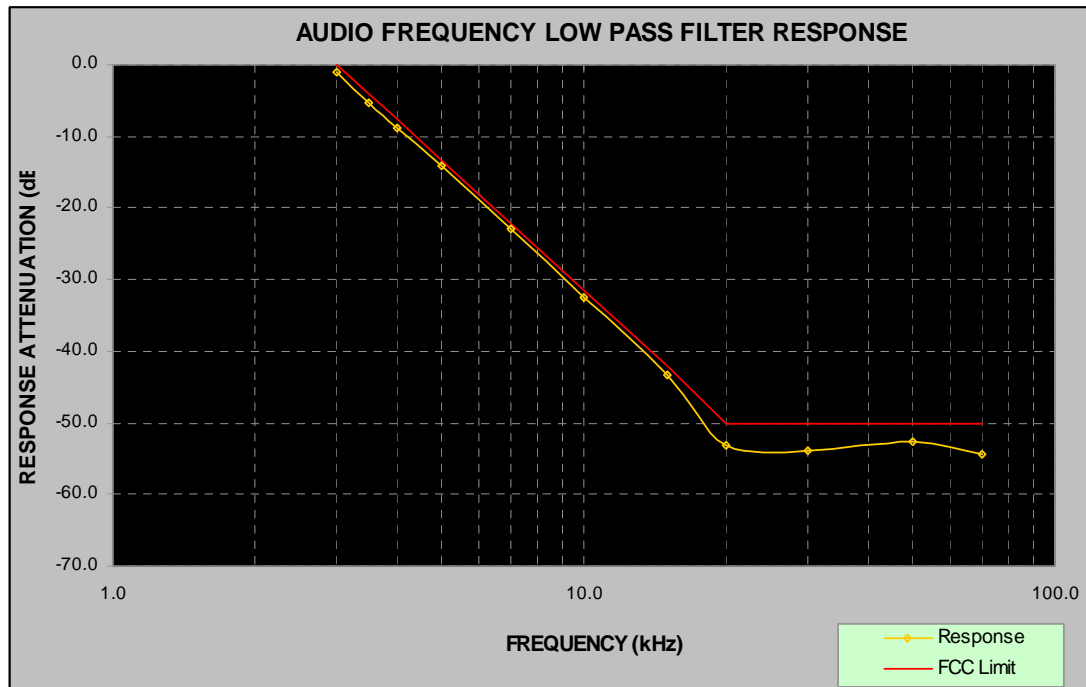
Audio Frequency (kHz)	Response Attenuation (dB)	FCC Limit (dB)
3.0	-0.6	0.0
3.5	-4.8	-4.0
4.0	-10.3	-7.5
5.0	-14.6	-13.3
7.0	-23.0	-22.1
10.0	-32.5	-31.4
15.0	-42.9	-42.0
20.0	-52.7	-50.0
30.0	-53.6	-50.0
50.0	-53.5	-50.0
70.0	-54.3	-50.0



**Audio Frequency Response Low Pass Filter**

Carrier Frequency: 455 MHz-Low Power, Channel Separation = 12.5 kHz

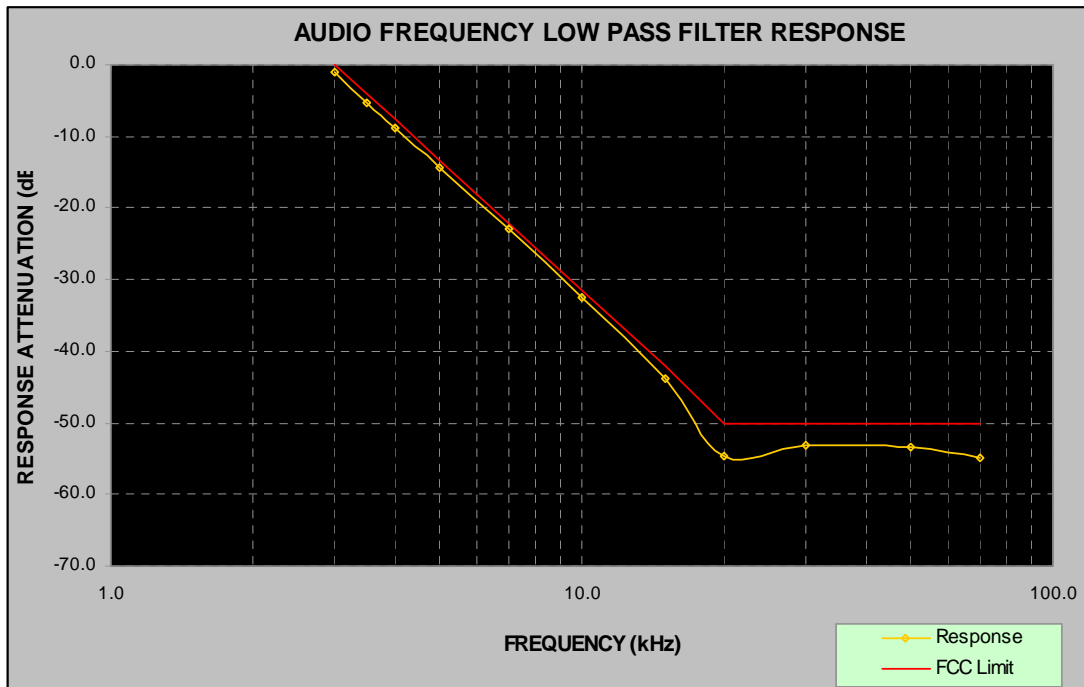
Audio Frequency (kHz)	Response Attenuation (dB)	FCC Limit (dB)
3.0	-1.0	0.0
3.5	-5.3	-4.0
4.0	-8.8	-7.5
5.0	-14.2	-13.3
7.0	-23.0	-22.1
10.0	-32.5	-31.4
15.0	-43.4	-42.0
20.0	-53.2	-50.0
30.0	-53.8	-50.0
50.0	-52.5	-50.0
70.0	-54.3	-50.0



**Audio Frequency Response Low Pass Filter**

Carrier Frequency: 455 MHz-High Power, Channel Separation = 12.5 kHz

Audio Frequency (kHz)	Response Attenuation (dB)	FCC Limit (dB)
3.0	-0.9	0.0
3.5	-5.3	-4.0
4.0	-8.9	-7.5
5.0	-14.4	-13.3
7.0	-23.0	-22.1
10.0	-32.5	-31.4
15.0	-43.9	-42.0
20.0	-54.7	-50.0
30.0	-53.2	-50.0
50.0	-53.5	-50.0
70.0	-54.9	-50.0



## FCC §2.1049, §90.209 & §90.210 – OCCUPIED BANDWIDTH & EMISSION MASK

### Applicable Standard

FCC §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 5.625 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 5.625 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) dB

Emission Mask B. For transmitters that are equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as follows:

- 1) For any frequency removed from the center of the assigned channel by more than 50 percent up to and including 100 percent of the authorized bandwidth, at least 25 dB.
- 2) On any frequency removed from the center of the assigned channel by more than 100 percent up to and including 250 percent, at least 35 dB.
- 3) On any frequency removed from the center of the assigned channel by more than 250 percent at least:

(43+10logP) dB

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

### Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2011-11-24	2012-11-23
HP	RF Communications Test Set	HP8920A	3438A05201	2012-06-14	2013-06-13

\* **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  $\pm 35$  kHz from the carrier frequency.

## Test Data

### Environmental Conditions

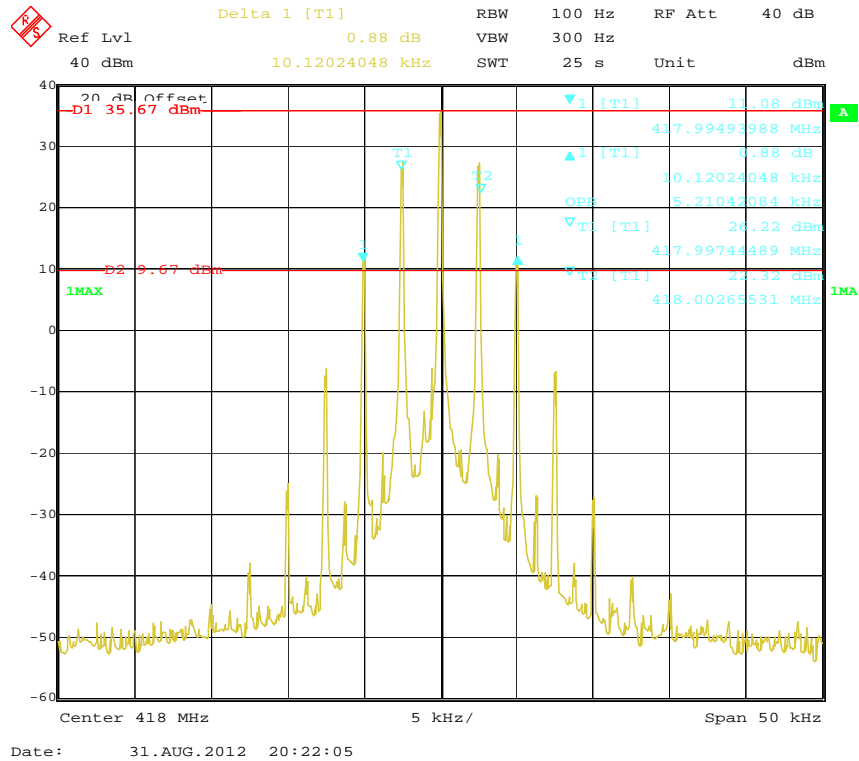
<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	56%
<b>ATM Pressure:</b>	100.1 kPa

*The testing was performed by Brown Lu on 2012-08-31.*

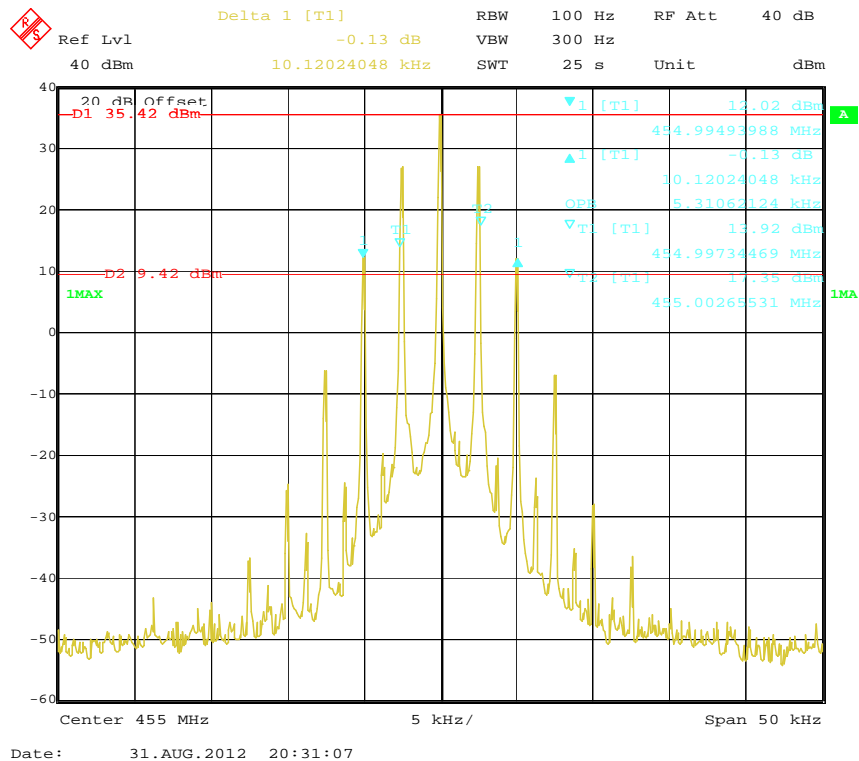
Result: Compliance. Please refer to the following table and plot.

<b>Frequency (MHz)</b>	<b>99% Occupied Bandwidth (kHz)</b>	<b>26 dB Bandwidth (kHz)</b>	<b>Power Level Setting</b>
418.0	5.21	10.12	High
455.0	5.31	10.12	High

### 99% Occupied Bandwidth, 418.0 MHz - High Power



### 99% Occupied Bandwidth, 455.0 MHz - High Power



**Emission Designator:**

$B_n = 2M + 2DK$

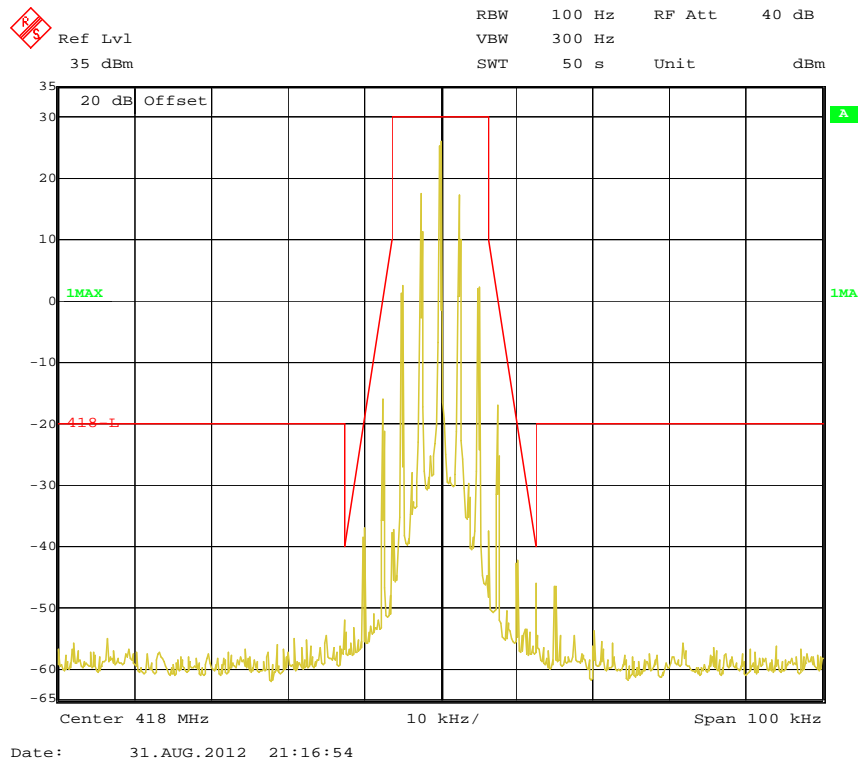
Where  $M = 3 \text{ kHz}$ ,  $D = 2.25 \text{ kHz}$ ,  $K = 1$

$B_n = 2 \cdot 3 + 2 \cdot 2.25 = 10.50 \text{ kHz}$

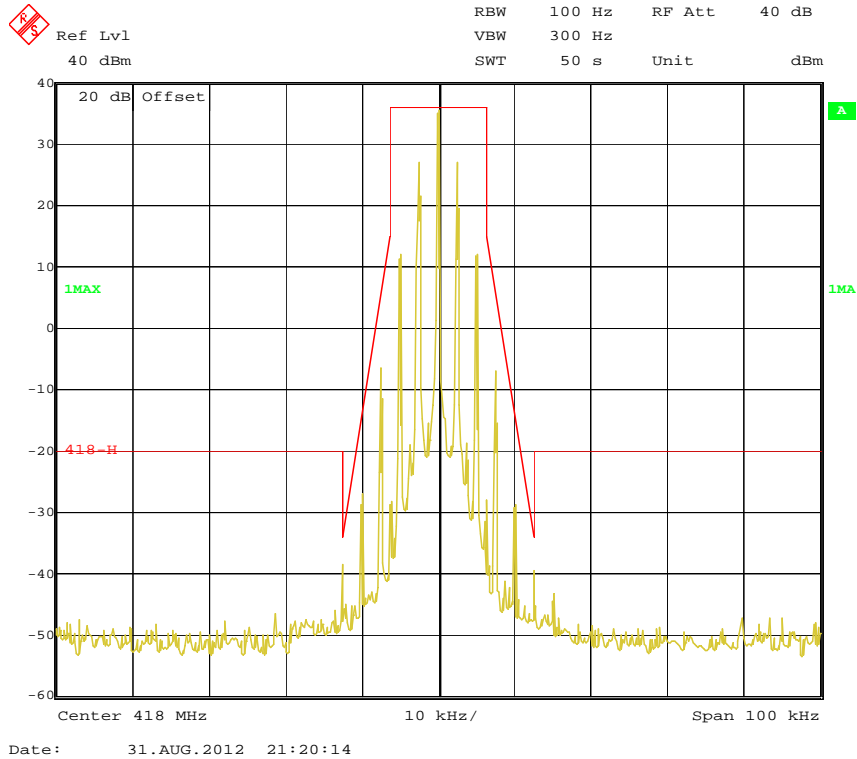
Type of emission: 10K5F3E

Please refer to the emission mask hereinafter plots.

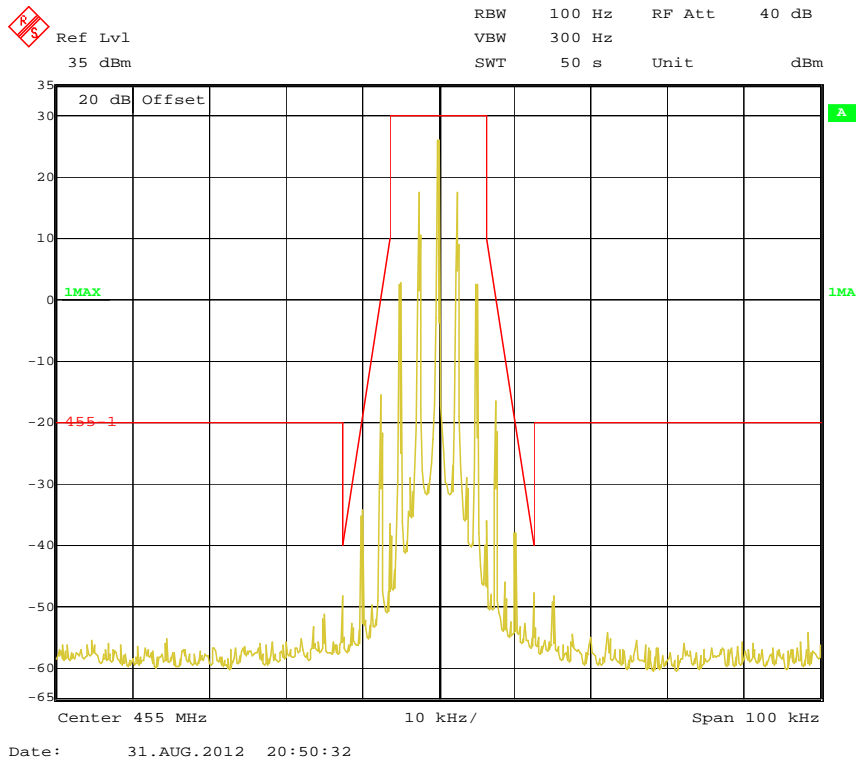
**Emission Mask D, 418.0 MHz - Low Power**



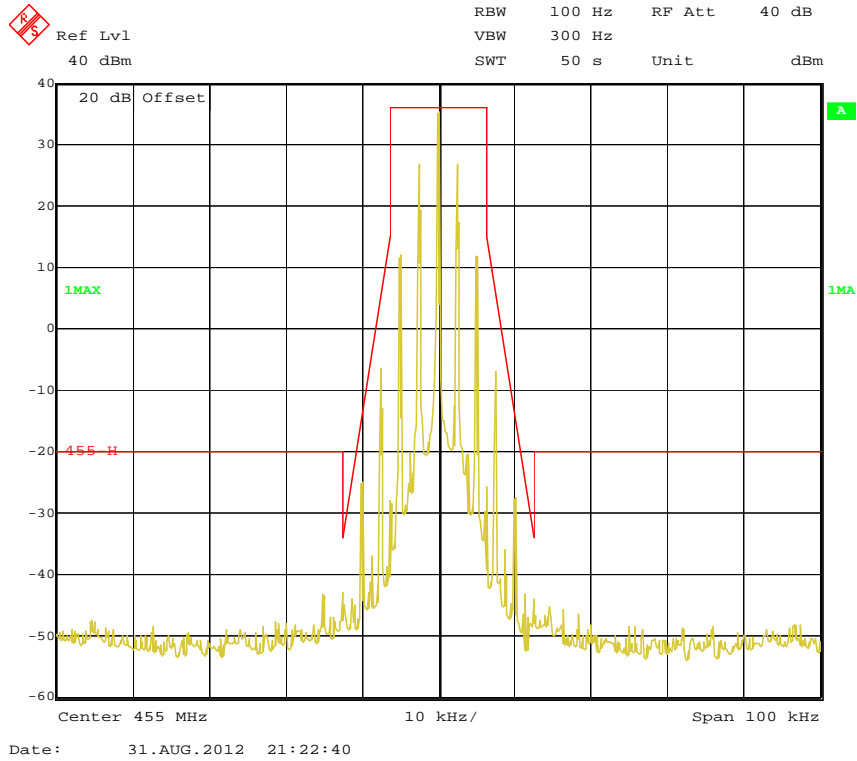
### Emission Mask D, 418.0 MHz - High Power



### Emission Mask D, 455.0 MHz - Low Power



### Emission Mask D, 455.0 MHz - High Power



## FCC §2.1051 & §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 5.625 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) dB

Emission Mask B. For transmitters that are equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as follows:

- 1) For any frequency removed from the center of the assigned channel by more than 50 percent up to and including 100 percent of the authorized bandwidth, at least 25 dB.
- 2) On any frequency removed from the center of the assigned channel by more than 100 percent up to and including 250 percent, at least 35 dB.
- 3) On any frequency removed from the center of the assigned channel by more than 250 percent at least:

(43+10logP) dB

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

### Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2011-11-24	2012-11-23
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2011-11-17	2012-11-16

\* **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 EUT was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 1MHz. Sufficient scans were taken to show any out of band emissions up to 10<sup>th</sup> harmonic.

## Test Data

### Environmental Conditions

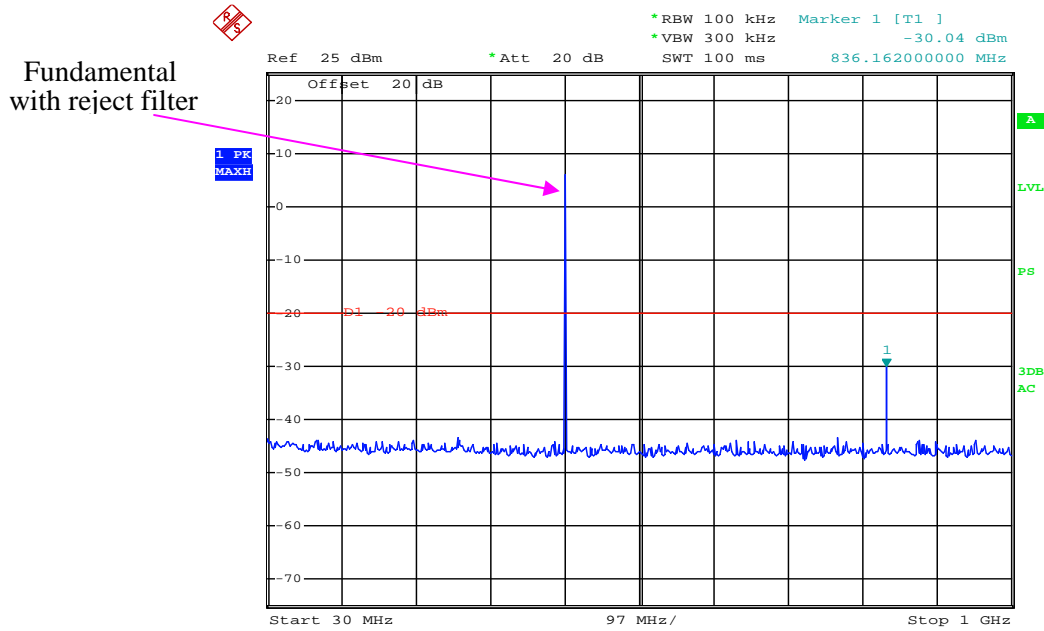
<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	56%
<b>ATM Pressure:</b>	100.1 kPa

*The testing was performed by Brown Lu on 2012-08-19 and 2012-08-29.*

*Test Mode: Transmitting*

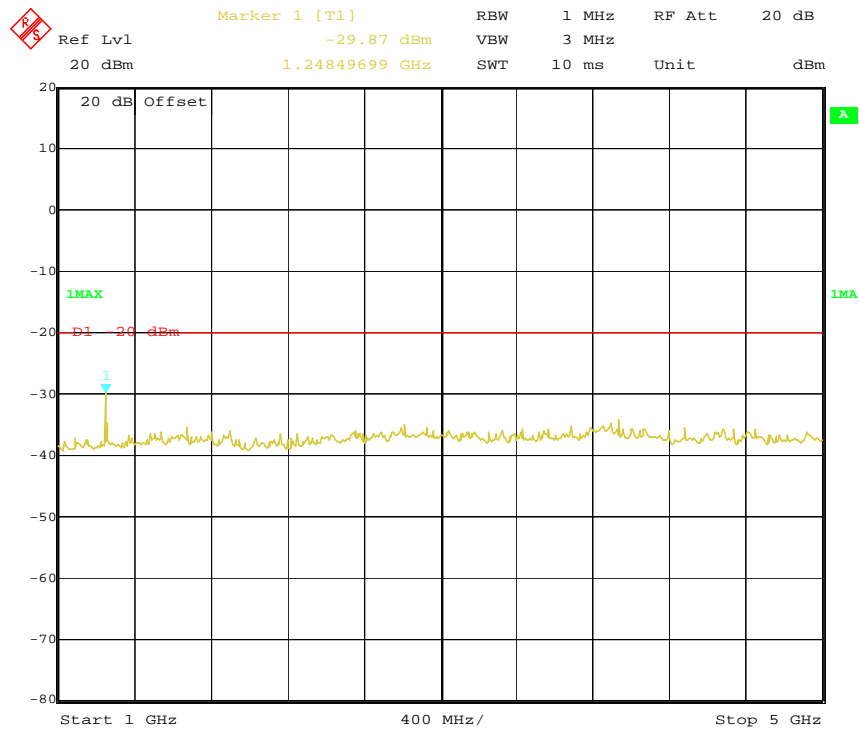
Please refer to the following plots.

### 30 MHz - 1 GHz (418.0 MHz)-High power



Date: 29.AUG.2012 19:22:59

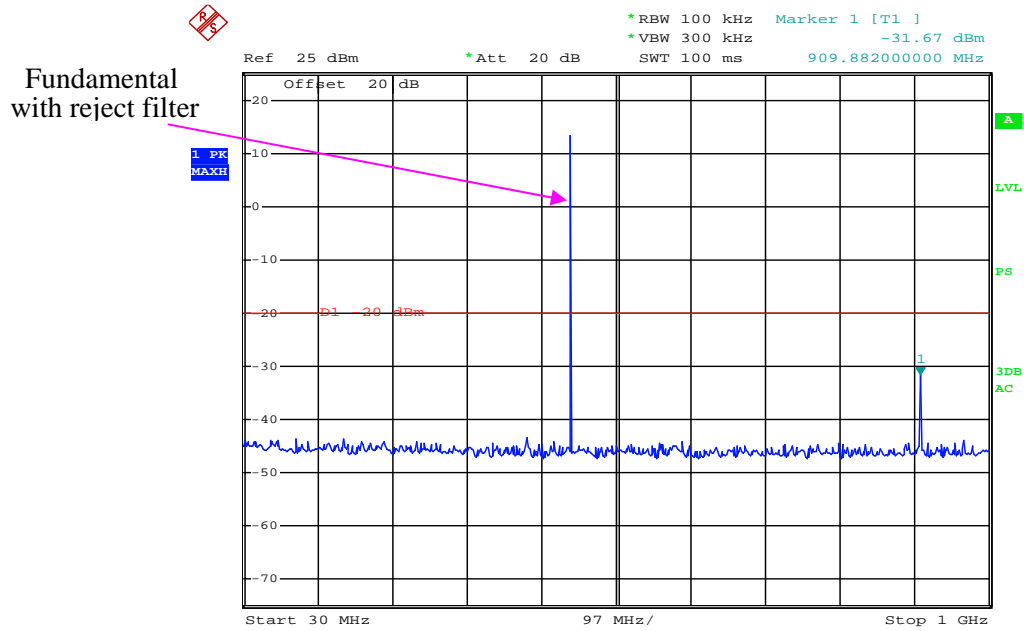
### 1 GHz - 5 GHz (418.0 MHz)- High power



Date: 19.AUG.2012 22:50:15

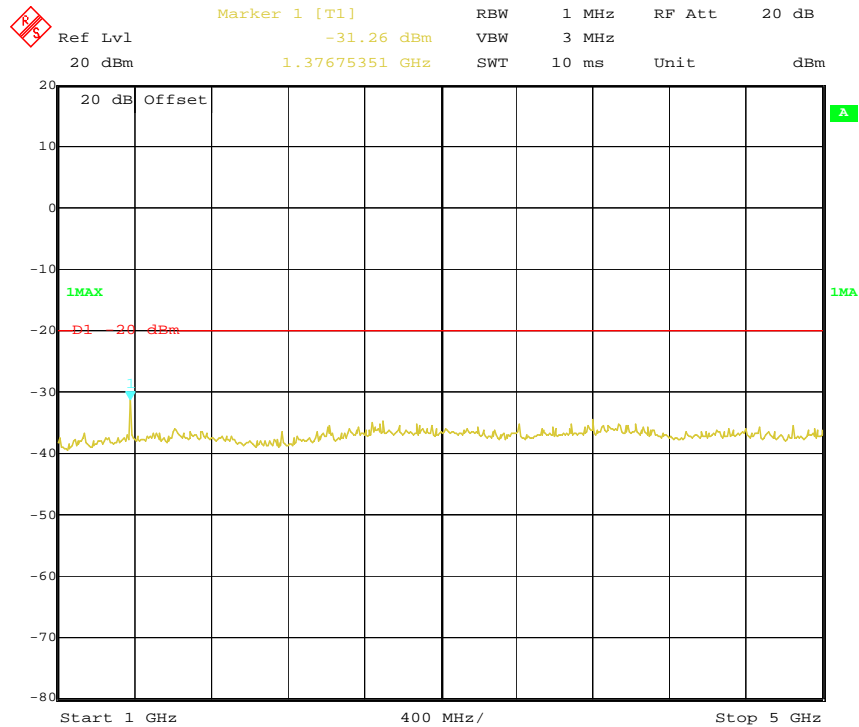


### 30 MHz - 1 GHz (455.0 MHz)- High power



Date: 29.AUG.2012 19:24:44

### 1 GHz - 5 GHz (455.0 MHz)- High power



Date: 19.AUG.2012 22:49:10

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

### Applicable Standard

FCC §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	A052304	2011-12-01	2012-11-30
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2012-03-17	2013-03-16
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2011-11-24	2012-11-23
Mini-Circuits	Amplifier	ZVA-213+	N/A	2011-11-24	2012-11-23
HP	Signal Generator	HP8657A	2849U00982	2011-10-21	2012-10-20
HP	Amplifier	8447E	1937A01057	2011-11-24	2012-11-23
HP	Synthesized Sweeper	8341B	2624A00116	2012-04-11	2013-04-10
COM POWER	Dipole Antenna	AD-100	041000	2011-09-25	2012-09-25
A.H. System	Horn Antenna	SAS-200/571	135	2012-02-11	2013-02-10

\* **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 tenth 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 Log<sub>10</sub> (power out in Watts)

Spurious attenuation limit in dB = 50 + 10 Log<sub>10</sub> (power out in Watts) for EUT with a 12.5 kHz channel bandwidth.

**Test Data****Environmental Conditions**

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	56%
<b>ATM Pressure:</b>	100.1 kPa

The testing was performed by Brown Lu on 2012-08-31.

Test Mode: Transmitting

**30 MHz to 10th harmonic of the fundamental frequency**

Frequency (MHz)	S.A. Reading (dB $\mu$ V/m)	TurnTable 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)
Channel (418.0 MHz), High power										
836.0	33.43	135	1.5	V	-36.6	0.68	0.00	-37.28	-20	17.28
836.0	32.56	38	1.6	H	-38.5	0.68	0.00	-39.18	-20	19.18
3344.0	40.14	98	1.9	H	-54.3	2.08	10.80	-45.58	-20	25.58
3344.0	38.11	118	1.5	V	-55.5	2.08	10.80	-46.78	-20	26.78
1672.0	38.99	46	1.6	V	-61.5	0.97	9.40	-53.07	-20	33.07
1254.0	36.73	83	1.8	H	-61.7	0.84	8.50	-54.04	-20	34.04
1254.0	37.60	224	1.6	V	-62.0	0.84	8.50	-54.34	-20	34.34
1672.0	34.57	38	1.7	H	-68.5	0.97	9.40	-60.07	-20	40.07
Channel (455.0 MHz), High power										
910	34.68	87	1.6	V	-36.3	0.71	0.00	-37.01	-20	17.01
910	33.56	116	1.7	H	-37.4	0.71	0.00	-38.11	-20	18.11
3640.0	36.92	335	1.7	H	-61.2	2.45	10.50	-53.15	-20	33.15
3640.0	35.25	227	1.9	V	-62.3	2.45	10.50	-54.25	-20	34.25
1365.0	36.54	13	1.5	V	-64.9	0.88	9.00	-56.78	-20	36.78
1365.0	35.21	74	1.6	H	-65.4	0.88	9.00	-57.28	-20	37.28

Note:

Absolute Level = SG Level - Cable loss + Antenna Gain

Margin = Limit - Corr. Amplitude

## FCC §2.1055 & §90.213 - FREQUENCY STABILITY

### Applicable Standard

FCC §2.1055 & §90.213

### Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Due Date
Hewlett-Packard	Frequency Counter	5342A	2317A08289	2012-04-15	2013-04-14
ESPEC	Temperature & Humidity Chamber	EL-10KA	09107726	2010-11-24	2011-11-23

\* **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 Data

#### Environmental Conditions

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	56%
<b>ATM Pressure:</b>	100.1 kPa

*The testing was performed by Brown Lu on 2012-08-31.*

*Test Mode: Transmitting*

Reference Frequency: 418.0 MHz, channel Separation :12.5 kHz				
Test Environment		Frequency Measure with Time Elapsed		
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	Measured Frequency (MHz)	Frequency Error (ppm)	Limit (ppm)
Frequency Stability versus Temperature				
50	7.4	417.999967	0.0789	2.5
40	7.4	417.999988	0.0287	2.5
30	7.4	417.999975	0.0598	2.5
20	7.4	417.999956	0.1053	2.5
10	7.4	417.999958	0.1005	2.5
0	7.4	417.999974	0.0622	2.5
-10	7.4	417.999989	0.0263	2.5
-20	7.4	417.999957	0.1029	2.5
-30	7.4	417.999984	0.0383	2.5
Frequency Stability versus Voltage				
20	6.3	417.999986	0.0335	2.5

Reference Frequency: 455.0 MHz, channel Separation :12.5 kHz				
Test Environment		Frequency Measure with Time Elapsed		
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	Measured Frequency (MHz)	Frequency Error (ppm)	Limit (ppm)
Frequency Stability versus Temperature				
50	7.4	455.000040	0.0879	2.5
40	7.4	455.000039	0.0857	2.5
30	7.4	455.000037	0.0813	2.5
20	7.4	455.000036	0.0791	2.5
10	7.4	455.000034	0.0747	2.5
0	7.4	455.000038	0.0835	2.5
-10	7.4	455.000039	0.0857	2.5
-20	7.4	455.000033	0.0725	2.5
-30	7.4	455.000041	0.0901	2.5
Frequency Stability versus Voltage				
20	6.3	455.000046	0.1011	2.5

Note: the battery operation end point is 6.3V which specified by manufacturer.

## FCC §90.214 - TRANSIENT FREQUENCY BEHAVIOR

### Applicable Standard

FCC §90.214

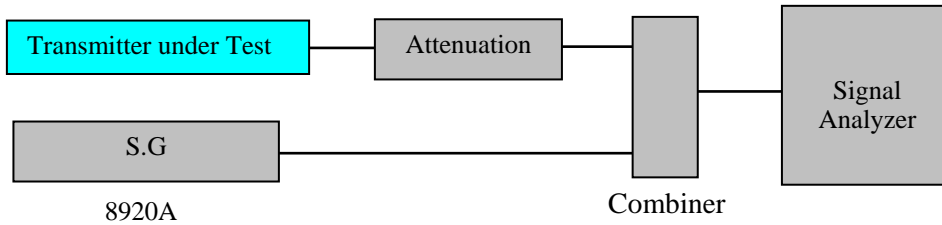
### Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2011-11-24	2012-11-23
HP	RF Communications Test Set	HP8920A	3438A05201	2012-06-14	2013-06-13

\* **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-603-D 2.2.19.2



### Test Data

#### Environmental Conditions

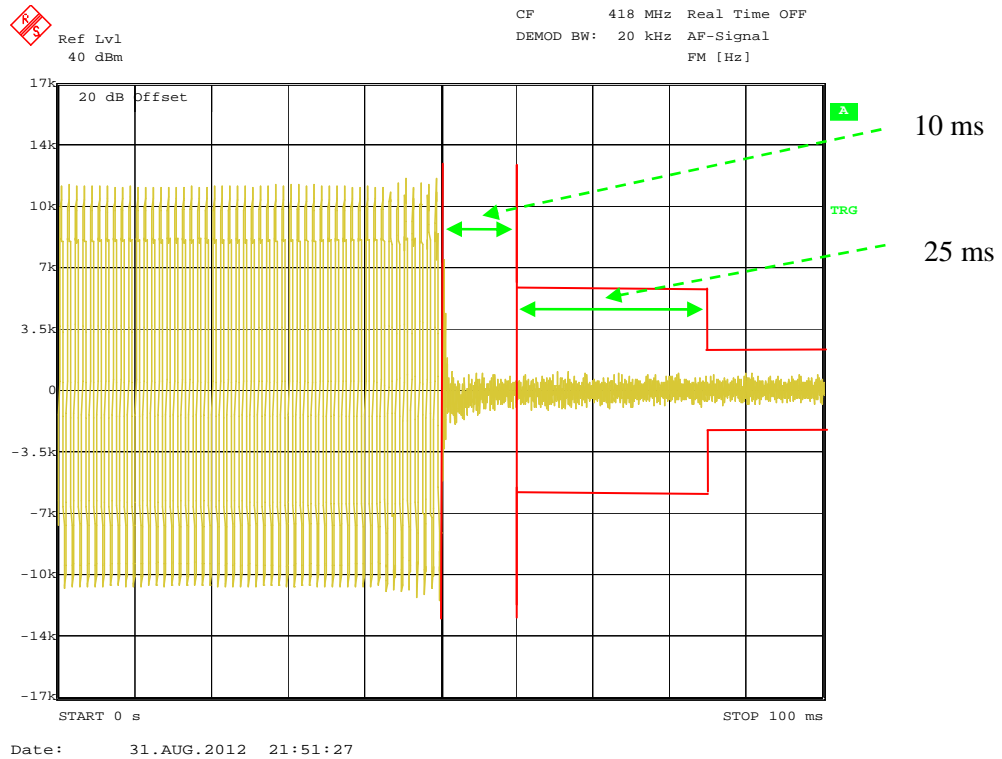
<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	56%
<b>ATM Pressure:</b>	100.1 kPa

The testing was performed by Brown Lu on 2012-08-31.

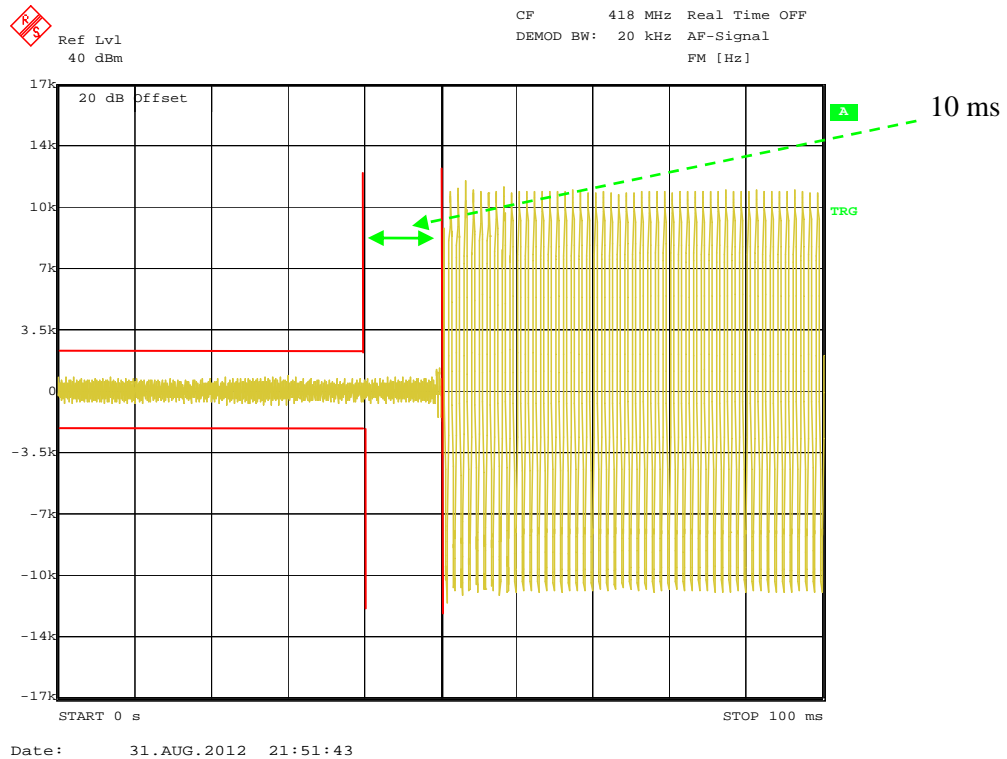
Operation Frequency (MHz)	Channel Separation (kHz)	Time Period (ms)	Maximum frequency difference (kHz)	Result
418.0	12.5	10(t <sub>1</sub> )	± 12.5	Pass
		25(t <sub>2</sub> )	± 6.25	
		10(t <sub>3</sub> )	± 12.5	
455.0	12.5	10(t <sub>1</sub> )	± 12.5	Pass
		25(t <sub>2</sub> )	± 6.25	
		10(t <sub>3</sub> )	± 12.5	

Please refer to the following plots.

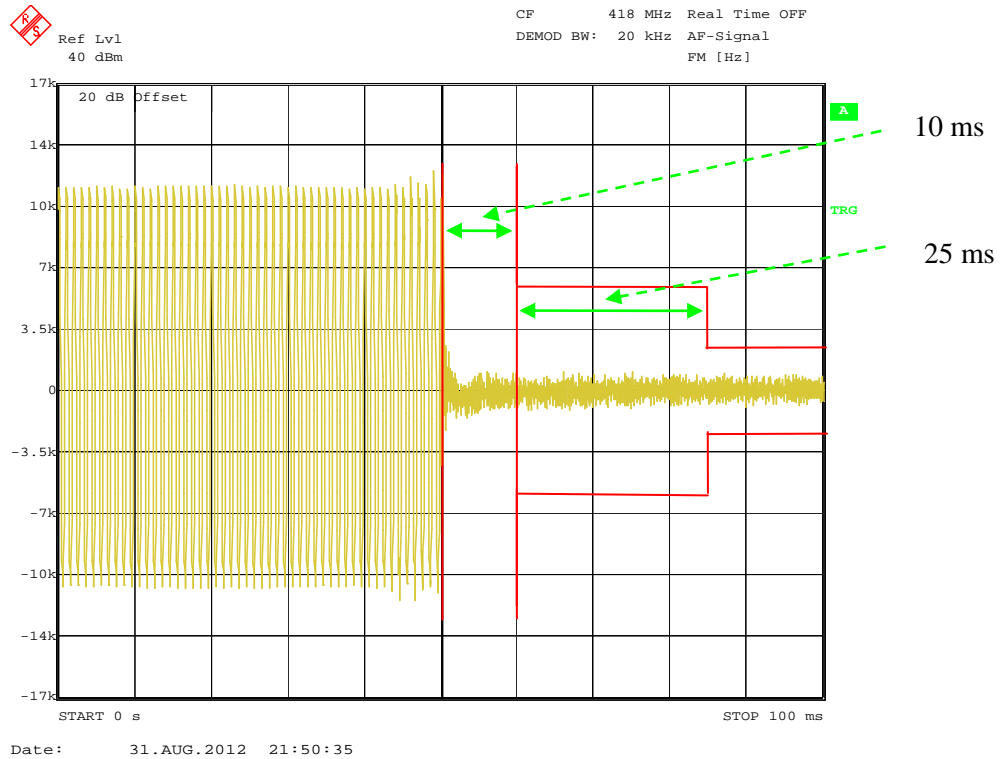
### Turn on (Frequency at 418.0 MHz, Low Power)



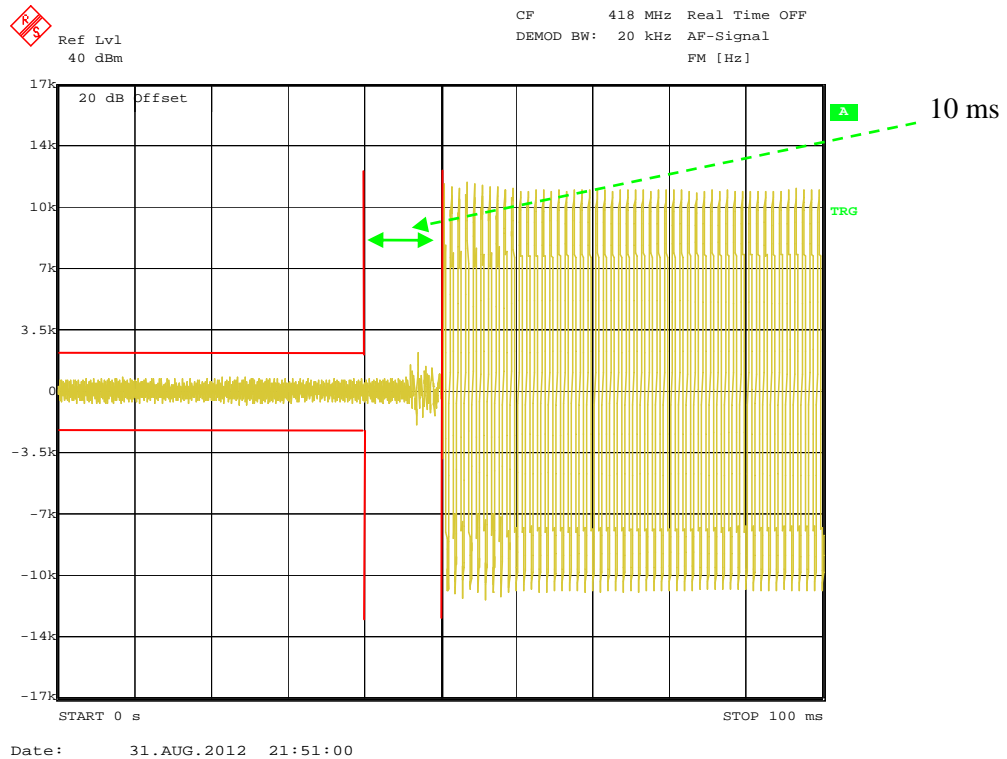
### Turn off (Frequency at 418.0 MHz, Low Power)



### Turn on (Frequency at 418.0 MHz, High Power)

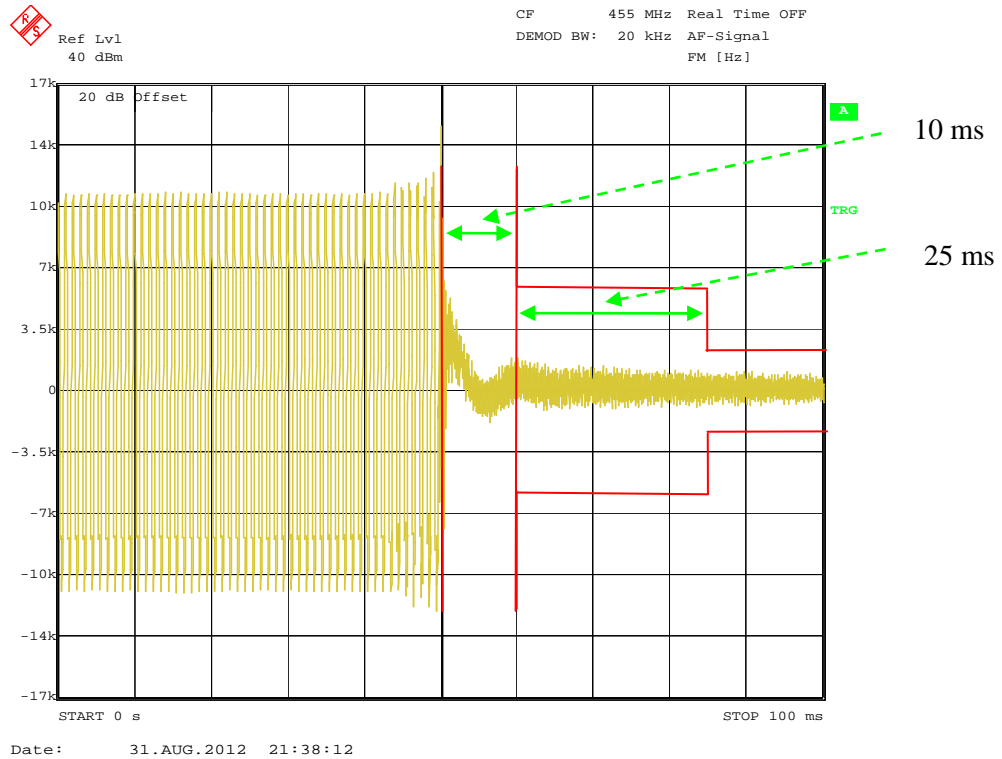


### Turn off (Frequency at 418.0 MHz, High Power)

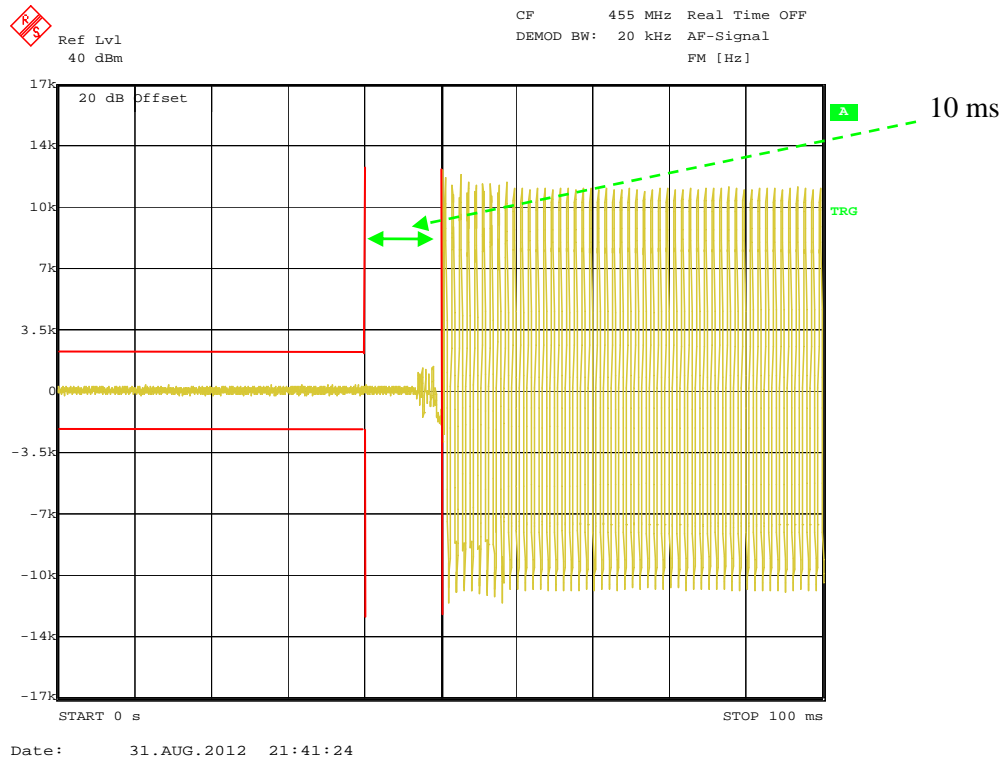




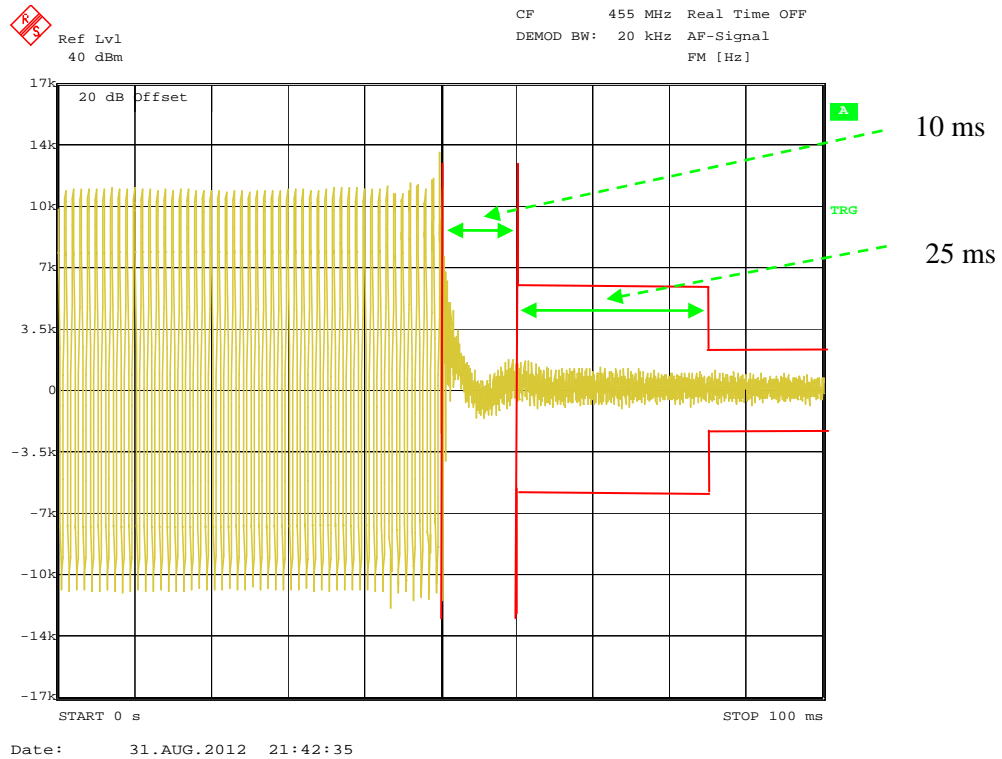
### Turn on (Frequency at 455.0 MHz, Low Power)



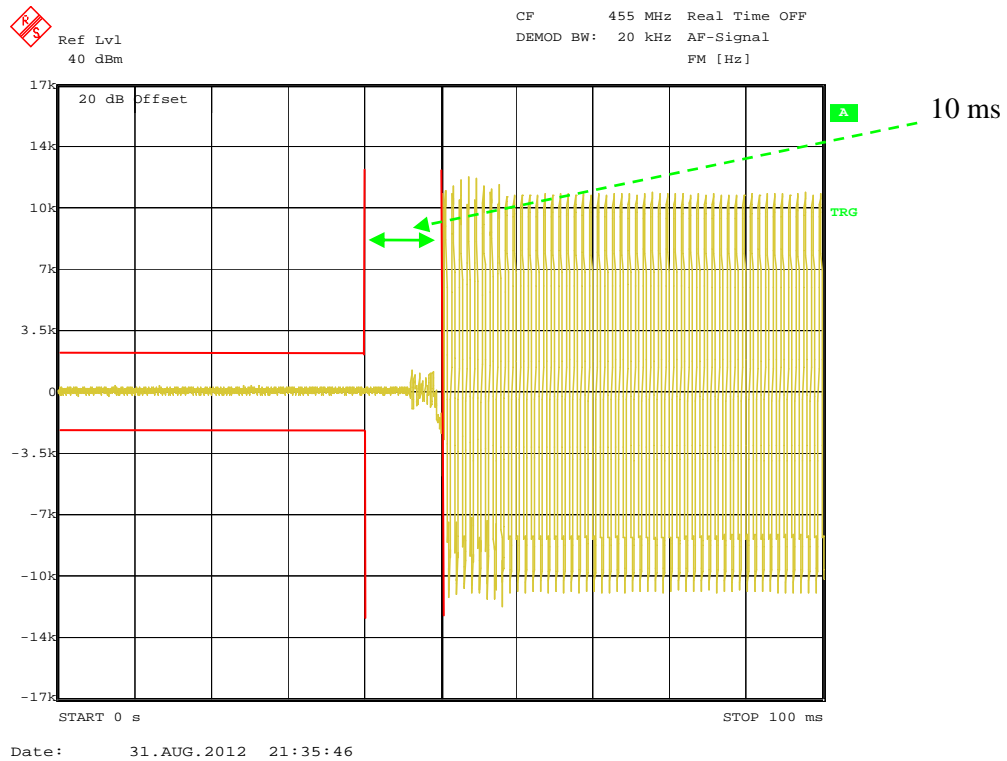
### Turn off (Frequency at 455.0 MHz, Low Power)



### Turn on (Frequency at 455.0 MHz, High Power)



### Turn off (Frequency at 455.0 MHz, High Power)



\*\*\*\*\* End of Report \*\*\*\*\*