FCC PART 90
TEST REPORT

For

QUANZHOU BAOJIE ELECTRONICS CO.,LTD.

Dongmen Industrial area, Fengzhou Town, West door outside, Quanzhou City, Fujian Province, China

FCC ID: OBJ-1255

Report Type:	**Product Type:**
Original Report	Dual Band Vehicle Radio

Test Engineer:	Leon Chen (Leon Chen)
Report Number:	R1XM120531050-00
Report Date:	2012-10-19
Reviewed By:	Jerry Zhang (Jerry Zhang) EMC Engineer
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *QUANZHOU BAOJIE ELECTRONICS CO.,LTD.'s* product, model number: *BJ-UV55 (FCC ID: OBJ-1255)* (the "EUT") in this report is a *Dual Band Vehicle Radio*, which was measured approximately 15.5 cm(H) x 16.0 cm(W) x 4.0 cm(D), rated input voltage: DC 13.8V.

** All measurement and test data in this report was gathered from production sample serial number: 120521BJ5508 (Assigned by BACL, Dongguan). The EUT was received on 2012-06-11.*

Objective

This test report is prepared on behalf of *QUANZHOU BAOJIE ELECTRONICS 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).

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. (Dongguan). 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. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China

Test site at Bay Area Compliance Laboratories Corp. (Dongguan) 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 February 02, 2012. 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.: 273710. 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.

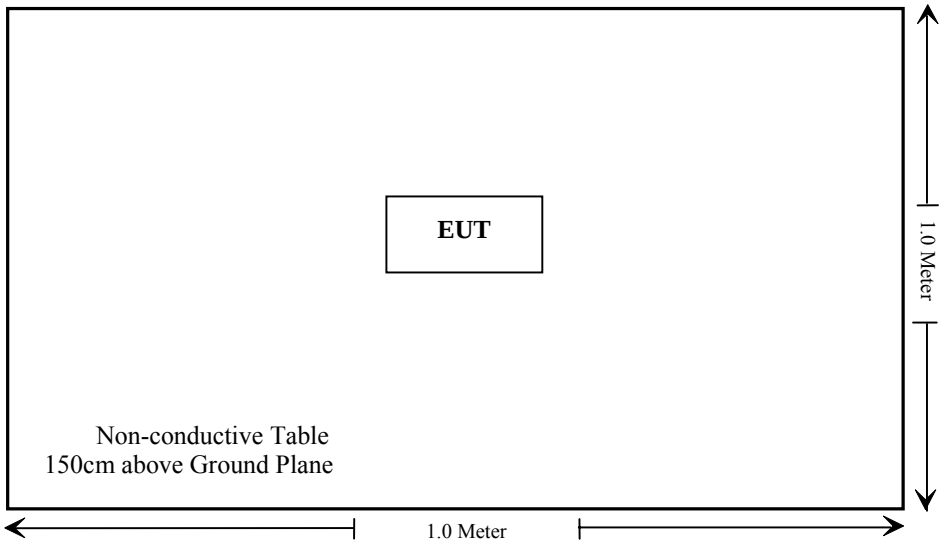
Specfication:

Operating Frequency Band	VHF: 136-174 MHz UHF: 400-470 MHz
Modulation Mode	FM
Channnel Separation	12.5 kHz
Transmitter Power	UHF High: 10W~50W/Low: 8W~20W VHF High: 10W~40W/Low: 8W~20W

Equipment Modifications

No modifications were made to the unit tested.

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; §90.205	RF Output Power	Compliance
§2.1047; §90.207	Modulation Characteristic	Compliance
§2.1049; §90.209; §90.210	Occupied 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.

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

Applicable Standard

According to 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.

Limits for Occupational/Controlled Exposure

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|, |H| 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

Limits for General Population/Uncontrolled Exposure

Limits for General Population/Uncontrolled 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|, |H| or S (minutes)**
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

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

MPE Calculation

Predication of MPE limit at a given distance

$$S = PG/4\pi R^2$$

Where: S = power density (in appropriate units, e.g. mW/cm^2);
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
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

Frequency (MHz)	Antenna Gain		Conducted Power		Duty factor	Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
	(dBi)	(numeric)	(dBm)	(mW)				
136.025	5.0	3.16	46.18	41495	50%	100	0.522	1.0
400.025	5.0	3.16	46.97	49774	50%	100	0.626	1.333

Note:

The EUT is occupation use only.

Because of the EUT is used for Push-To-Talk(PTT) between users and/or base stations a conservative 50% duty cycle is applied.

Result: Pass

FCC §2.1046 & §90.205- RF OUTPUT POWER

Applicable Standard

FCC §2.1046 and §90.205.

Test Procedure

Conducted RF Output Power:

TIA-603-D section 2.2.1

Radiated method:

TIA 603-D section 2.2.17

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

Spectrum Analyzer setting:

RBW	***Video B/W***
100 kHz	*300 kHz*

Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSEM	DE31388	2012-3-15	2013-3-14

Test Data

Environmental Conditions

Temperature:	27.3 °C
Relative Humidity:	59%
ATM Pressure:	100.4 kPa

The testing was performed by Leon Chen on 2012-09-20.

Test Mode: Transmitting

Test Result: Compliance.

Please refer to following table.

UHF:

Frequency Spacing (kHz)	Frequency (MHz)	High Power Level (dBm)	Low Power Level (dBm)
12.5	400.025	46.97	40.52
12.5	435	41.26	41.39
12.5	469.975	40.94	39.45

VHF:

Frequency Spacing (kHz)	Frequency (MHz)	High Power Level (dBm)	Low Power Level (dBm)
12.5	136.025	46.18	42.08
12.5	155	44.68	42.57
12.5	173.975	40.95	40.98

Note: The device has different output power declared by the manufacturer

UHF Band: 10-50 Watts (High Power Setting), 8-20 Watts (Low Power Setting)

VHF Band: 10-40 Watts (High Power Setting), 8-20 Watts (Low Power Setting)

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 Procedure

Test Method: TIA/EIA-603 2.2.3

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

Test Data

Environmental Conditions

Temperature:	27.3 °C
Relative Humidity:	59%
ATM Pressure:	100.4 kPa

The testing was performed by Leon Chen on 2012-09-20.

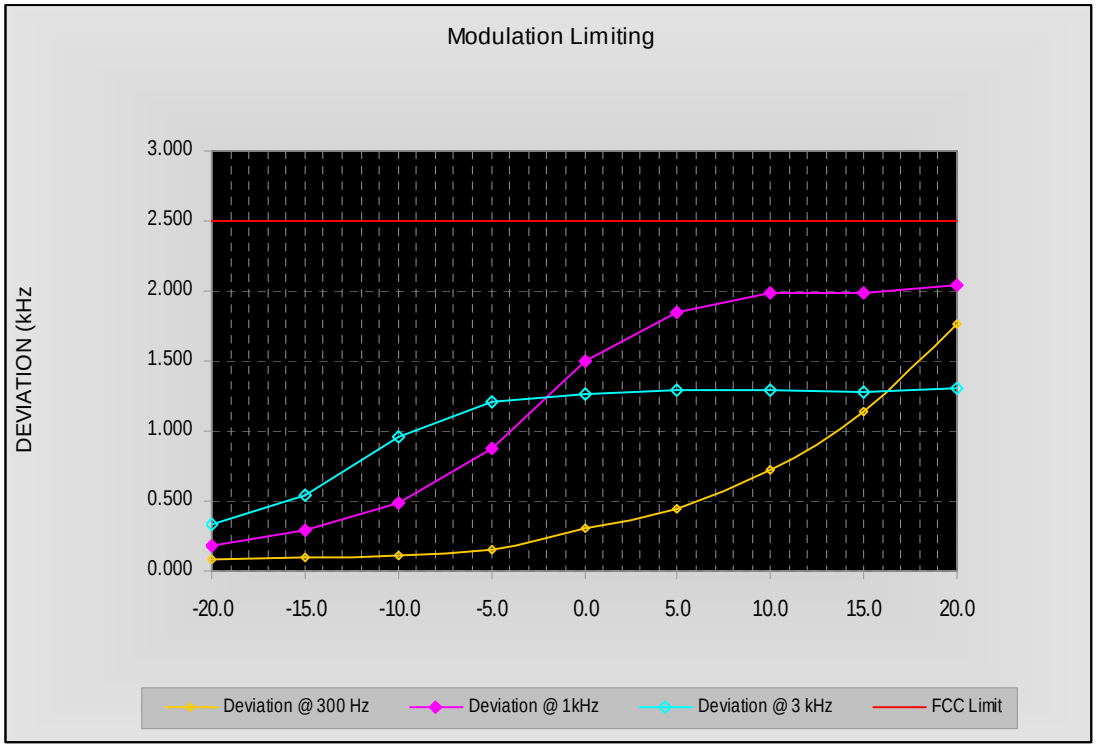
Test Mode: Transmitting

UHF:

MODULATION LIMITING (high power level)

Carrier Frequency: 435 MHz, Channel Separation = 12.5 kHz

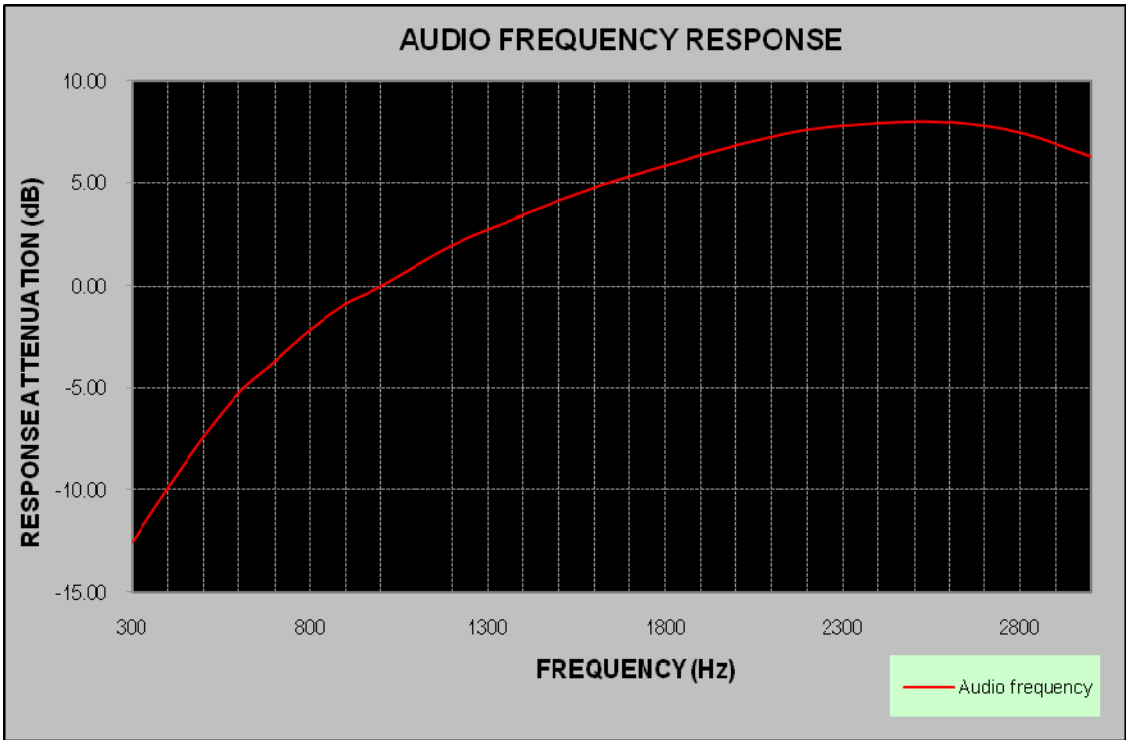
Audio Input Level [dBm]	Frequency Deviation (kHz)			FCC Limit [kHz]
	@ 300 Hz	@ 1kHz	@ 3 kHz	
20.0	1.761	2.039	1.310	2.5
15.0	1.141	1.985	1.279	2.5
10.0	0.718	1.986	1.295	2.5
5.0	0.442	1.848	1.292	2.5
0.0	0.305	1.500	1.266	2.5
-5.0	0.157	0.878	1.205	2.5
-10.0	0.108	0.493	0.958	2.5
-15.0	0.102	0.288	0.546	2.5
-20.0	0.085	0.174	0.328	2.5



Audio Frequency Response (high power level)

Carrier Frequency: 435 MHz, Channel Separation = 12.5 kHz

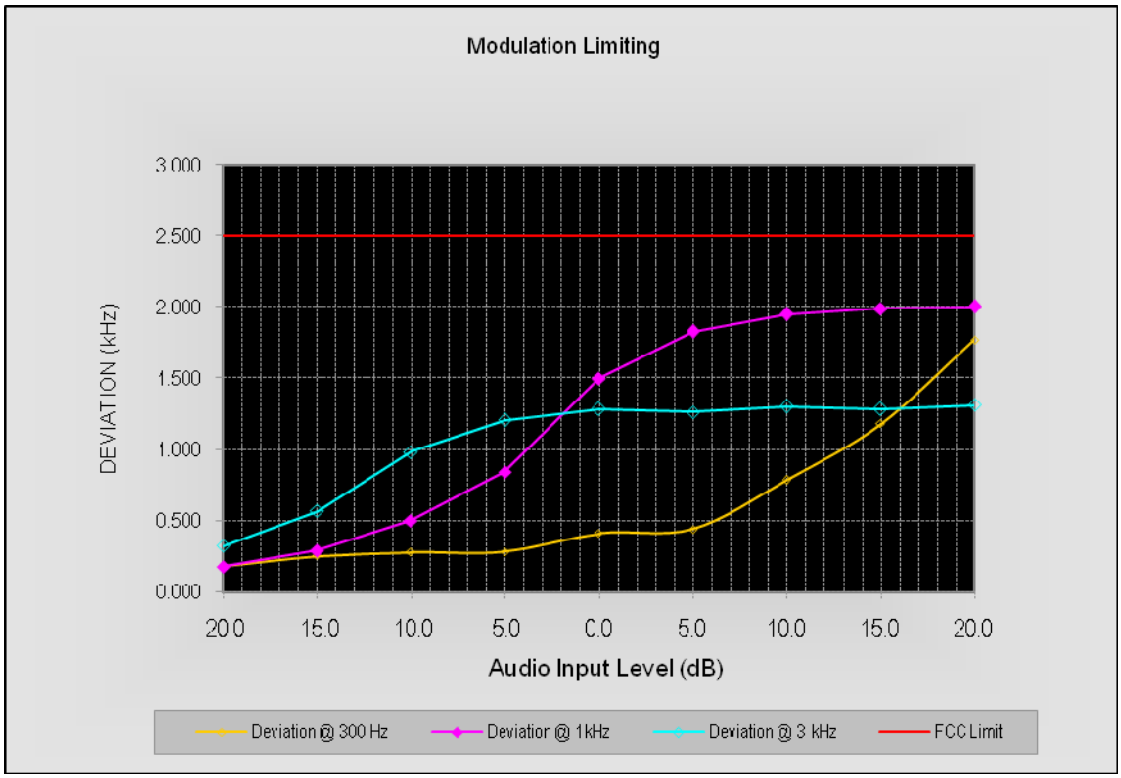
Audio Frequency (Hz)	Response Attenuation (dB)
300	-12.54
400	-9.84
500	-7.41
600	-5.19
700	-3.72
800	-2.11
900	-0.88
1000	0.00
1200	2.02
1400	3.46
1600	4.76
1800	5.85
2000	6.82
2200	7.59
2400	7.95
2600	7.99
2800	7.46
3000	6.30



MODULATION LIMITING (low power level)

Carrier Frequency: 435 MHz, Channel Separation = 12.5 kHz

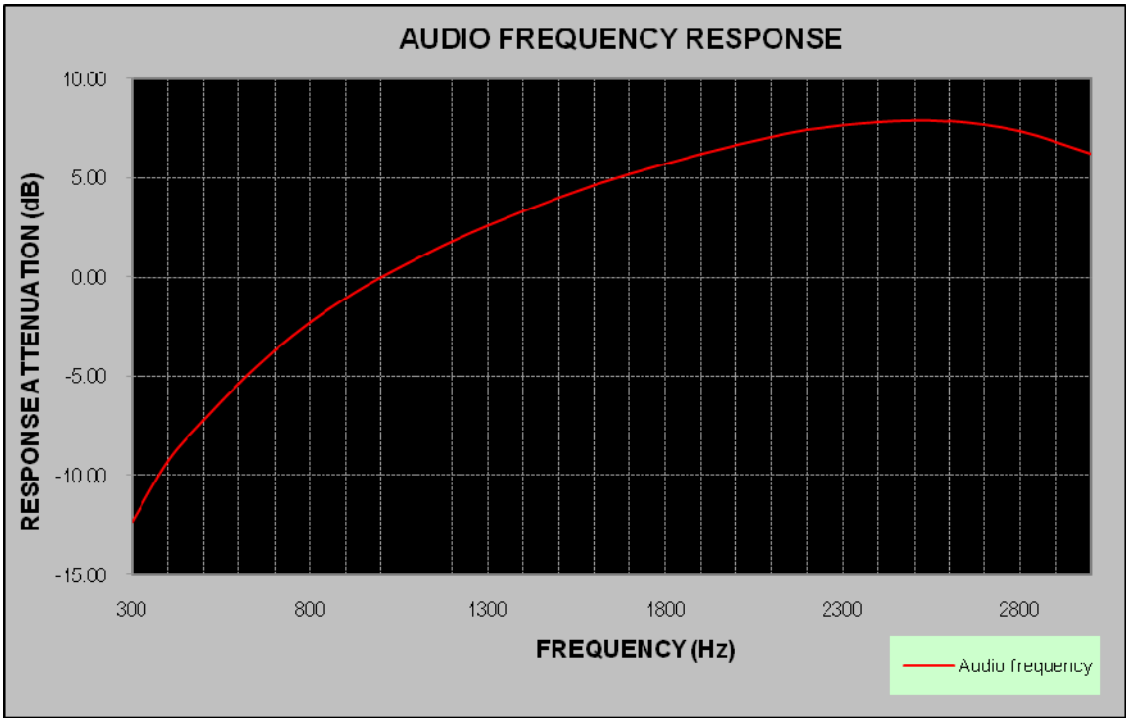
Audio Input Level [dBm]	Frequency Deviation (kHz)			FCC Limit [kHz]
	@ 300 Hz	@ 1kHz	@ 3 kHz	
20.0	1.772	2.004	1.314	2.5
15.0	1.182	1.992	1.287	2.5
10.0	0.786	1.952	1.303	2.5
5.0	0.442	1.827	1.262	2.5
0.0	0.412	1.500	1.285	2.5
-5.0	0.285	0.843	1.205	2.5
-10.0	0.281	0.501	0.985	2.5
-15.0	0.253	0.291	0.570	2.5
-20.0	0.185	0.178	0.325	2.5



Audio Frequency Response (low power level)

Carrier Frequency: 435 MHz, Channel Separation = 12.5 kHz

Audio Frequency (Hz)	Response Attenuation (dB)
300	-12.32
400	-9.27
500	-7.25
600	-5.32
700	-3.72
800	-2.27
900	-1.05
1000	0.00
1200	1.84
1400	3.35
1600	4.65
1800	5.75
2000	6.66
2200	7.40
2400	7.83
2600	7.85
2800	7.34
3000	6.23

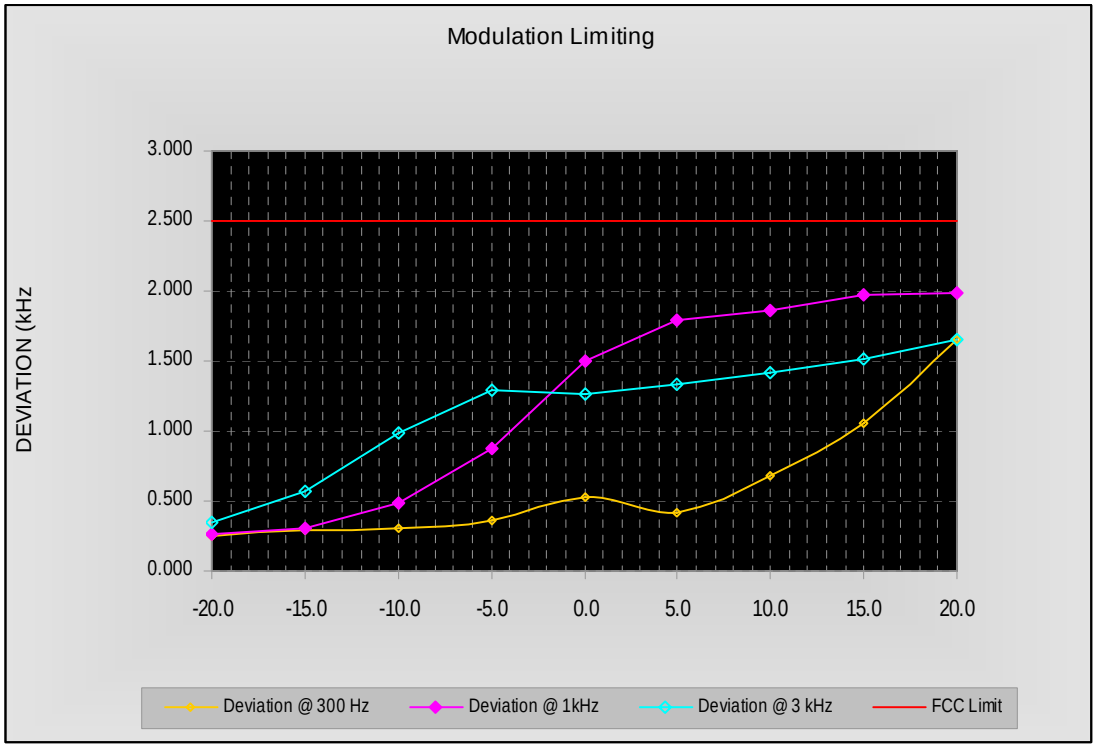


VHF:

MODULATION LIMITING (high power level)

Carrier Frequency: 155 MHz, Channel Separation = 12.5 kHz

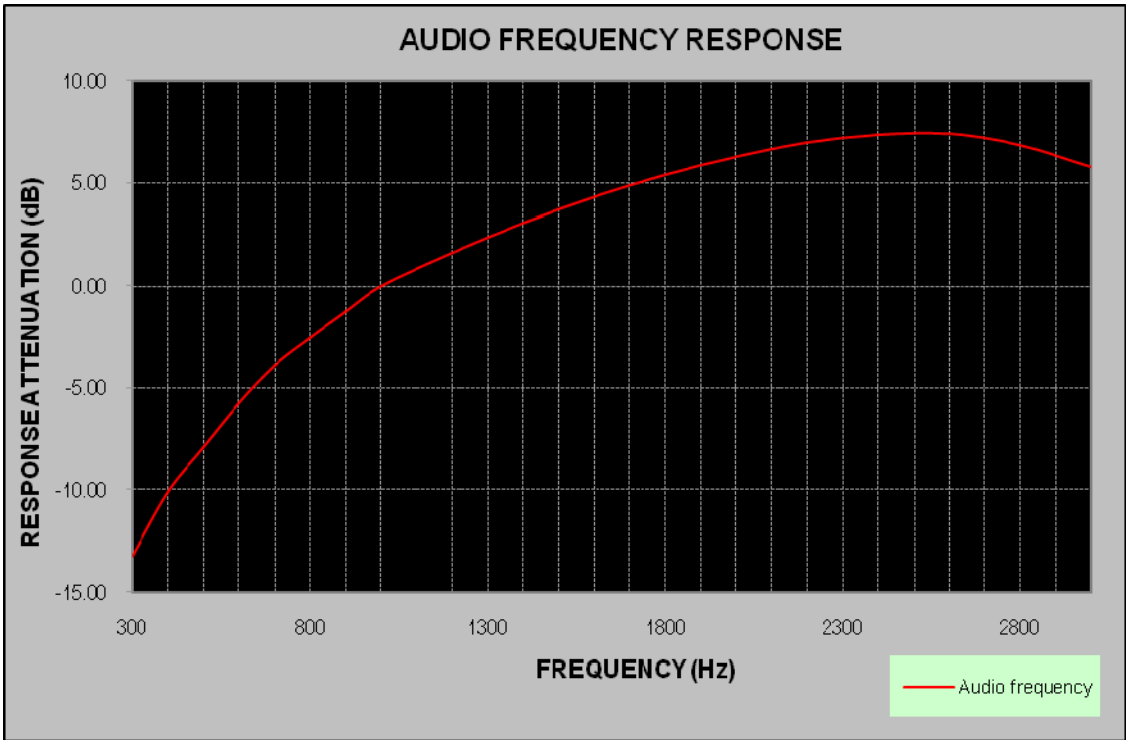
Audio Input Level [dBm]	Frequency Deviation (kHz)			FCC Limit [kHz]
	@ 300 Hz	@ 1kHz	@ 3 kHz	
20.0	1.648	1.988	1.653	2.5
15.0	1.054	1.973	1.512	2.5
10.0	0.679	1.858	1.423	2.5
5.0	0.418	1.797	1.335	2.5
0.0	0.534	1.500	1.258	2.5
-5.0	0.364	0.878	1.285	2.5
-10.0	0.305	0.492	0.982	2.5
-15.0	0.287	0.305	0.570	2.5
-20.0	0.244	0.258	0.344	2.5



Audio Frequency Response (high power level)

Carrier Frequency: 155 MHz, Channel Separation = 12.5 kHz

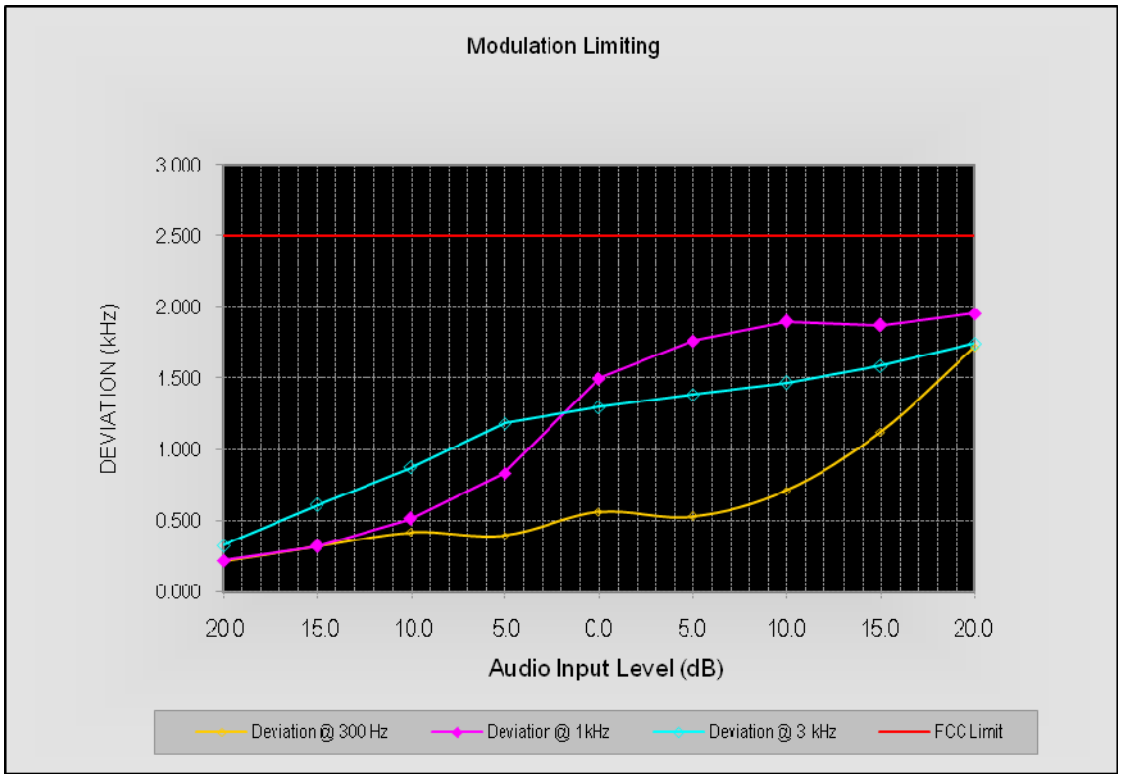
Audio Frequency (Hz)	Response Attenuation (dB)
300	-13.23
400	-10.06
500	-7.92
600	-5.71
700	-3.90
800	-2.50
900	-1.27
1000	0.00
1200	1.64
1400	3.07
1600	4.35
1800	5.40
2000	6.29
2200	6.95
2400	7.34
2600	7.39
2800	6.87
3000	5.78



MODULATION LIMITING (low power level)

Carrier Frequency: 155 MHz, Channel Separation = 12.5 kHz

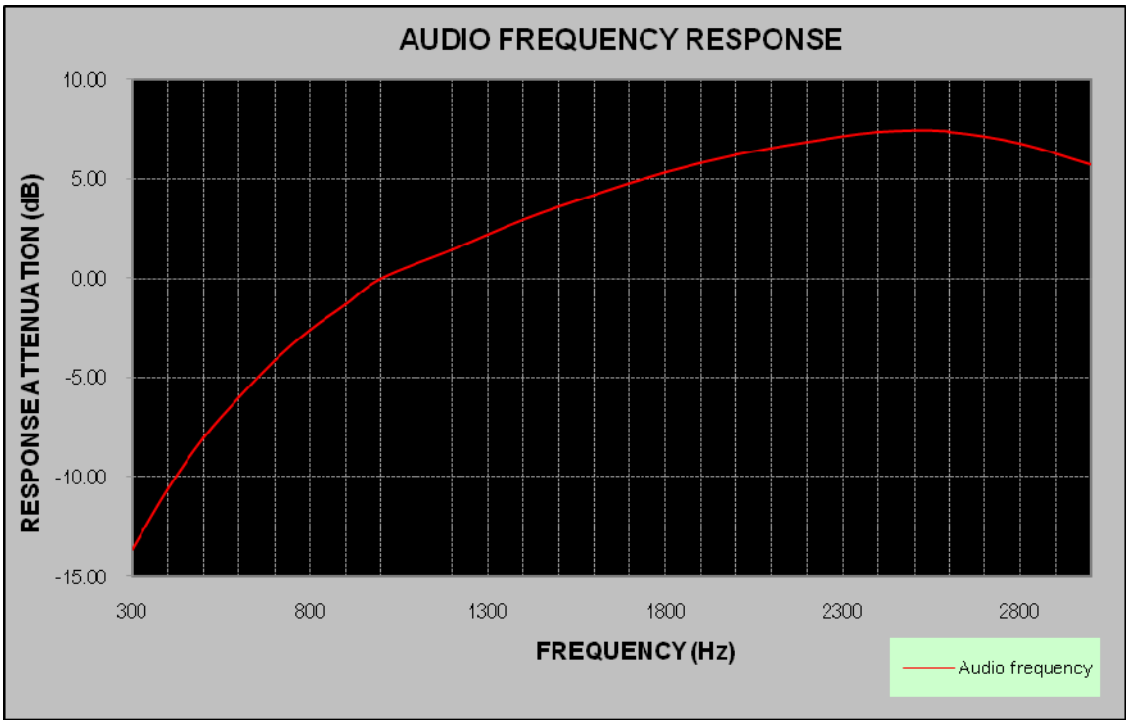
Audio Input Level [dBm]	Frequency Deviation (kHz)			FCC Limit [kHz]
	@ 300 Hz	@ 1kHz	@ 3 kHz	
20.0	1.721	1.954	1.745	2.5
15.0	1.124	1.873	1.589	2.5
10.0	0.712	1.897	1.468	2.5
5.0	0.532	1.765	1.385	2.5
0.0	0.565	1.500	1.298	2.5
-5.0	0.398	0.834	1.185	2.5
-10.0	0.421	0.515	0.876	2.5
-15.0	0.321	0.323	0.612	2.5
-20.0	0.215	0.224	0.326	2.5



Audio Frequency Response (low power level)

Carrier Frequency: 155 MHz, Channel Separation = 12.5 kHz

Audio Frequency (Hz)	Response Attenuation (dB)
300	-13.64
400	-10.57
500	-8.05
600	-5.99
700	-4.12
800	-2.55
900	-1.33
1000	0.00
1200	1.47
1400	2.98
1600	4.23
1800	5.34
2000	6.22
2200	6.84
2400	7.32
2600	7.37
2800	6.79
3000	5.73



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 5.626 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

Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSEM	DE31388	2012-3-15	2013-3-14

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 ±35 kHz from the carrier frequency.

Test Data

Environmental Conditions

Temperature:	27.4 °C
Relative Humidity:	59%
ATM Pressure:	100.5 kPa

The testing was performed by Leon Chen on 2012-11-22.

UHF:

26 dB Bandwidth(kHz)	99% Occupied Bandwidth(kHz)	Frequency (MHz)	Emission power
10.69	5.51	400.025	High powe level
10.70	5.51	469.975	High power level

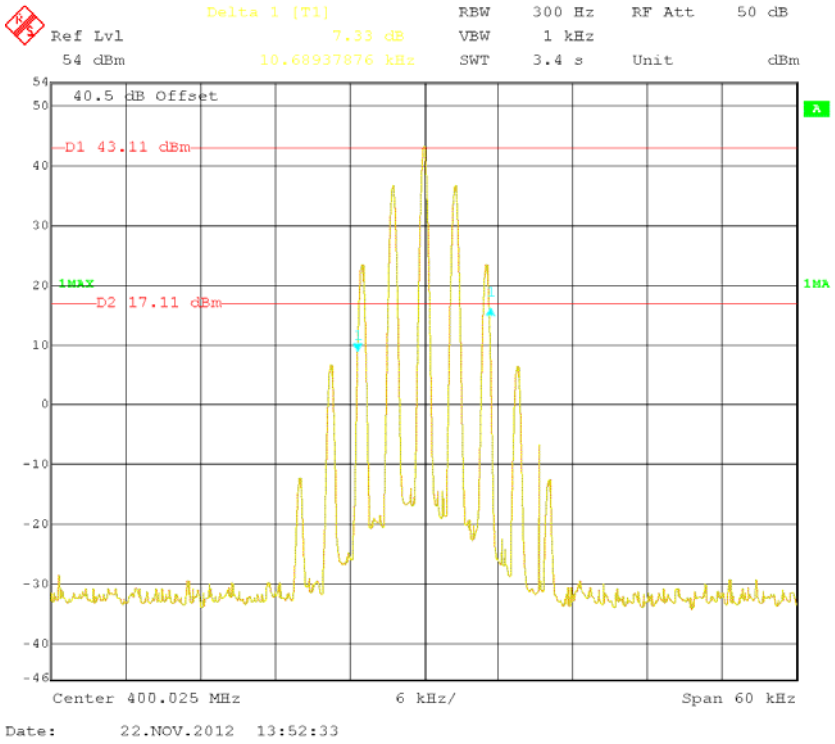
VHF:

26 dB Bandwidth(kHz)	99% Occupied Bandwidth(kHz)	Frequency (MHz)	Emission power
10.68	5.51	136.025	High power level
10.68	5.51	173.975	High power level

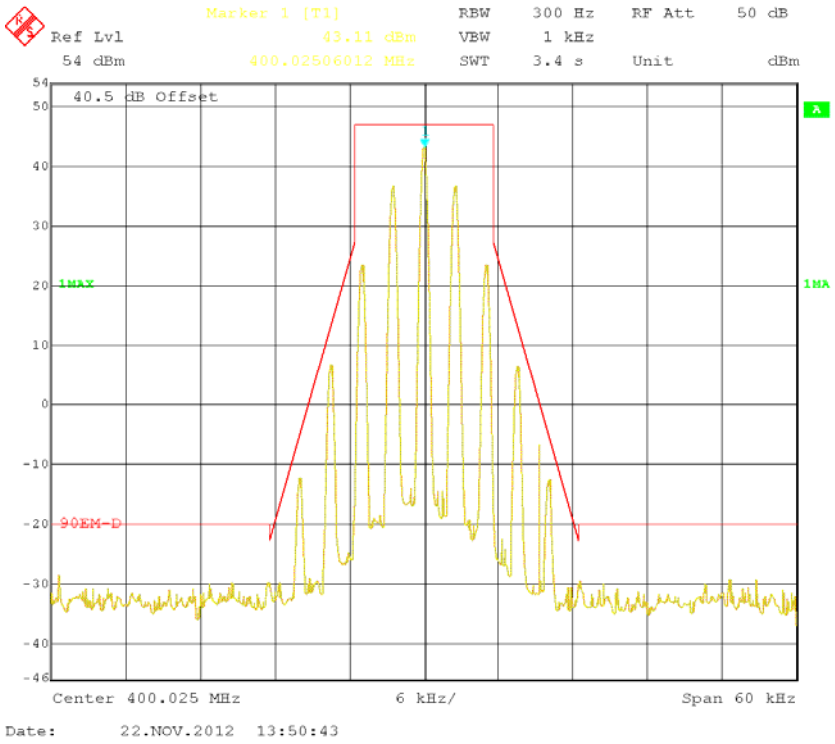
Please refer to the emission mask hereinafter plots.

UHF – low channel:

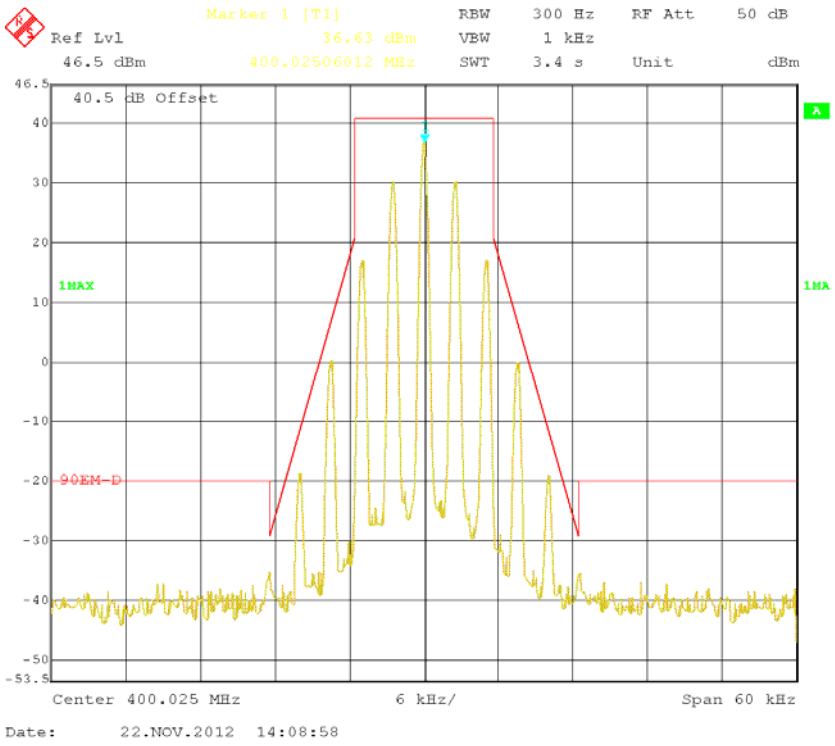
Occupied Bandwidth



Emission Mask – Type D (High power level)

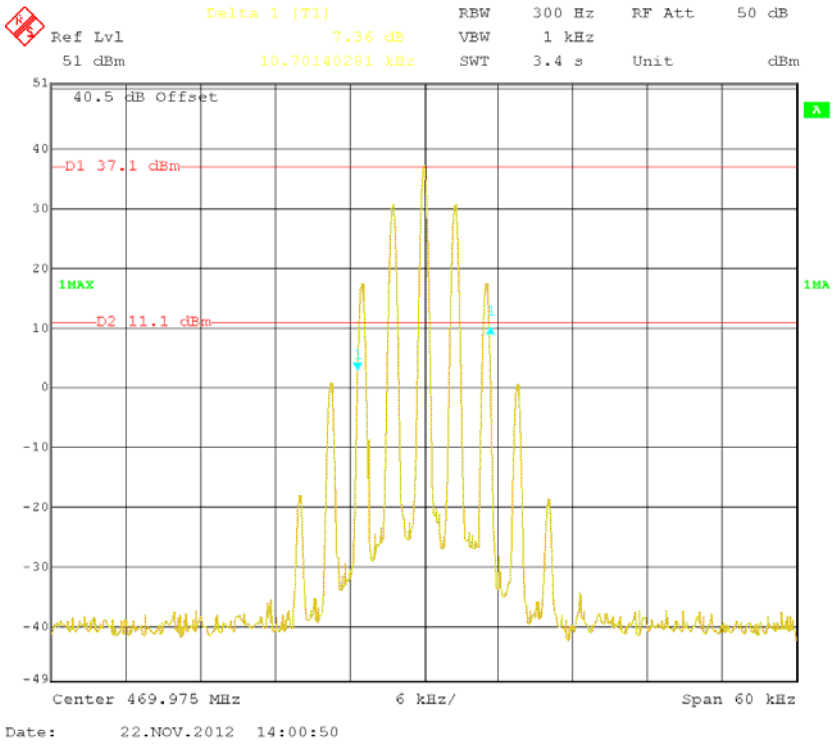


Emission Mask – Type D (Low power level)

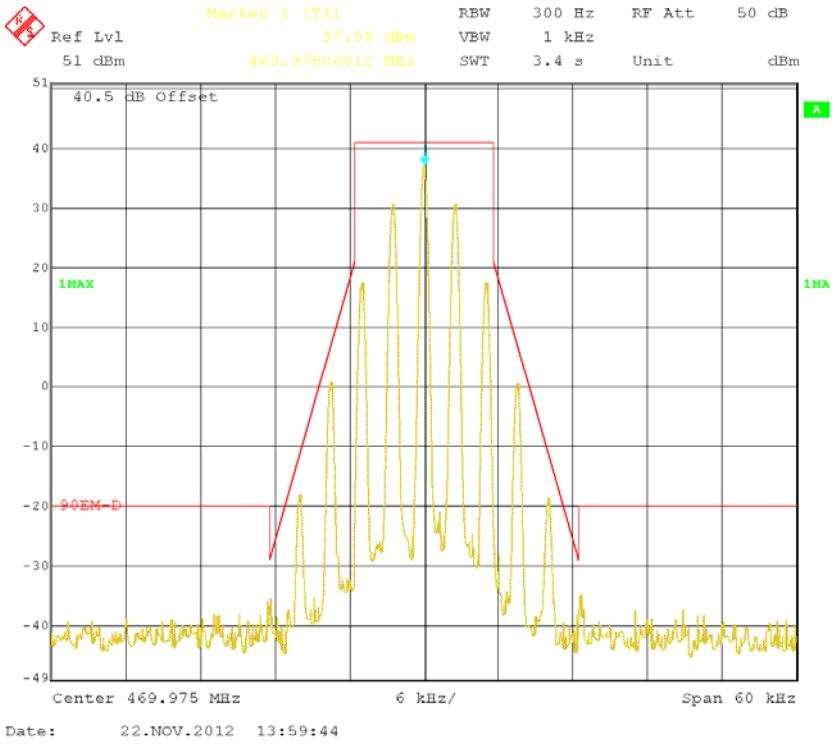


UHF – high channel:

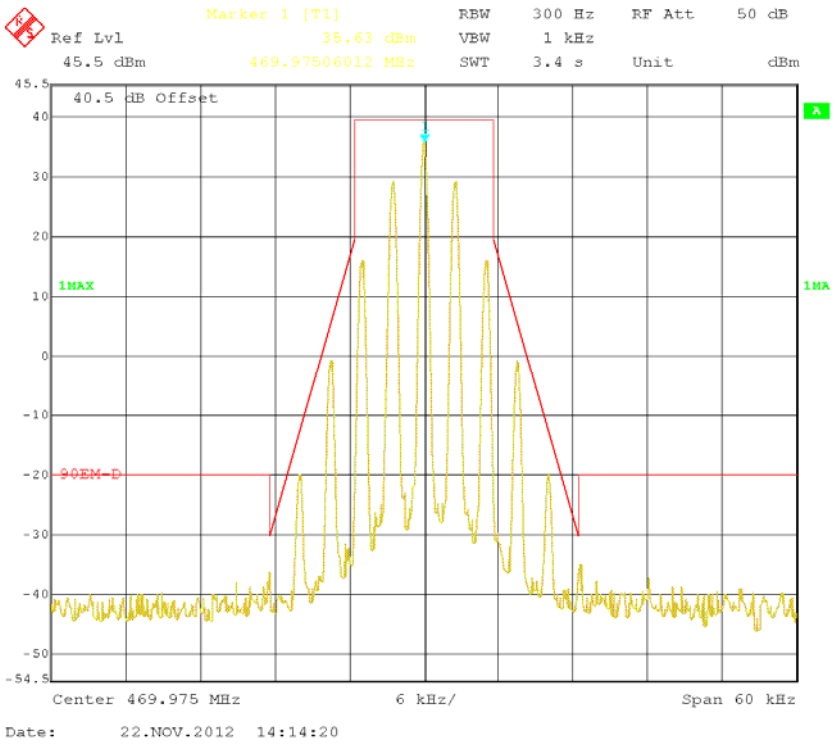
Occupied Bandwidth – high channel



Emission Mask – Type D (High power level)

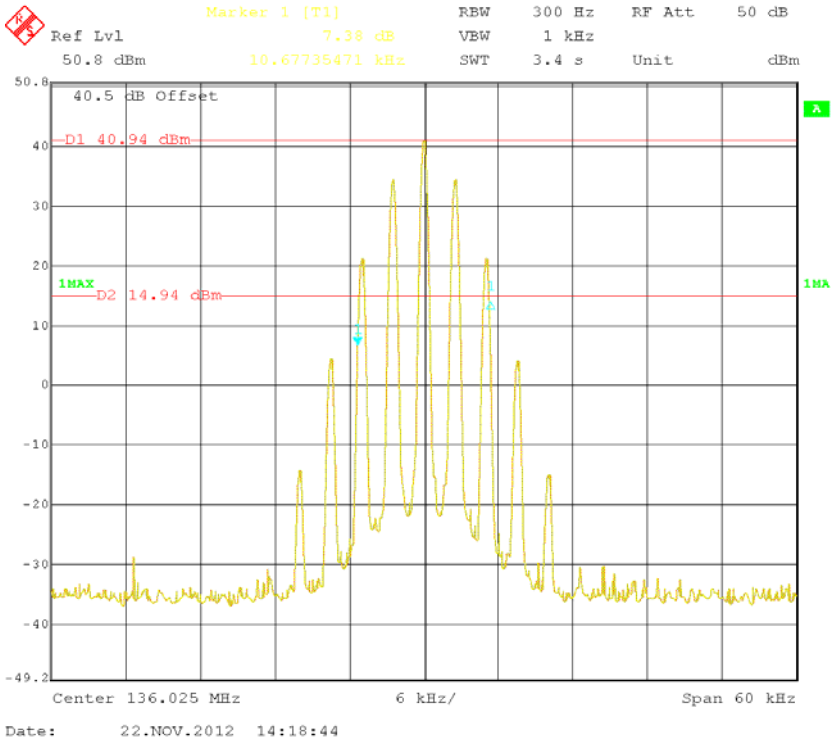


Emission Mask – Type D (Low power level)

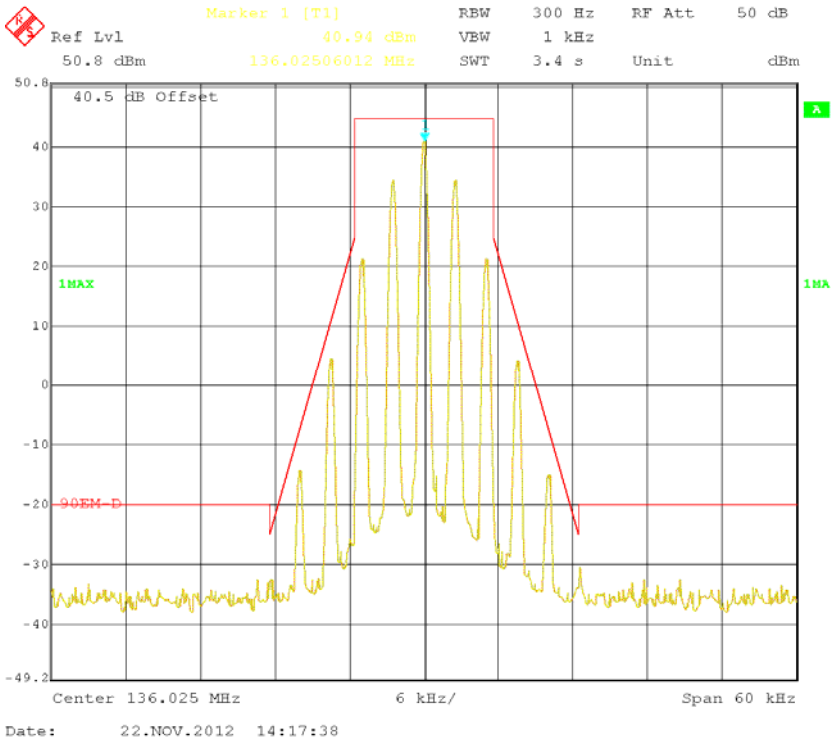


VHF – low channel:

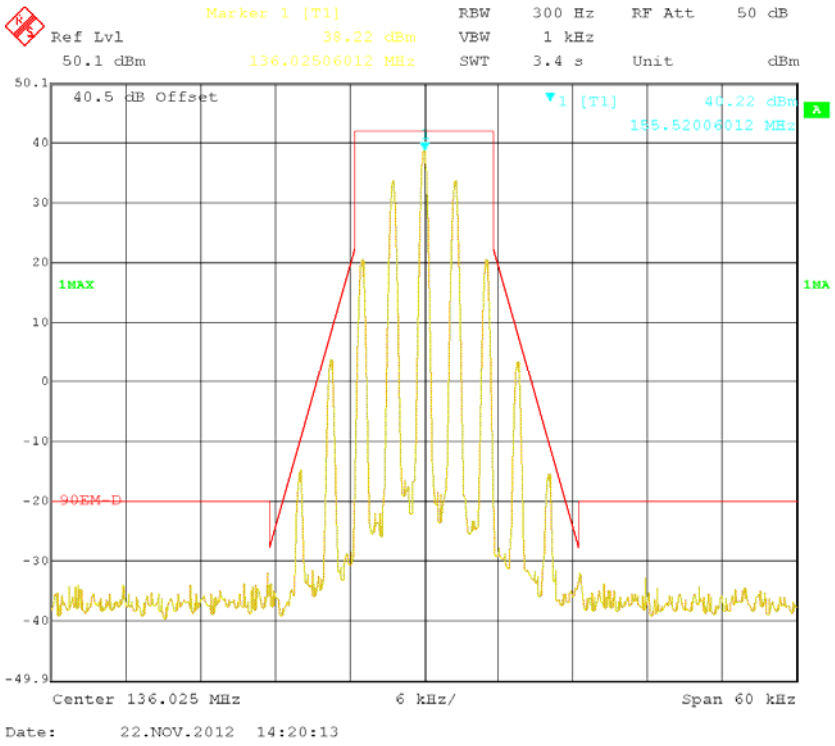
Occupied Bandwidth



Emission Mask- Channel – Type D (high power level)

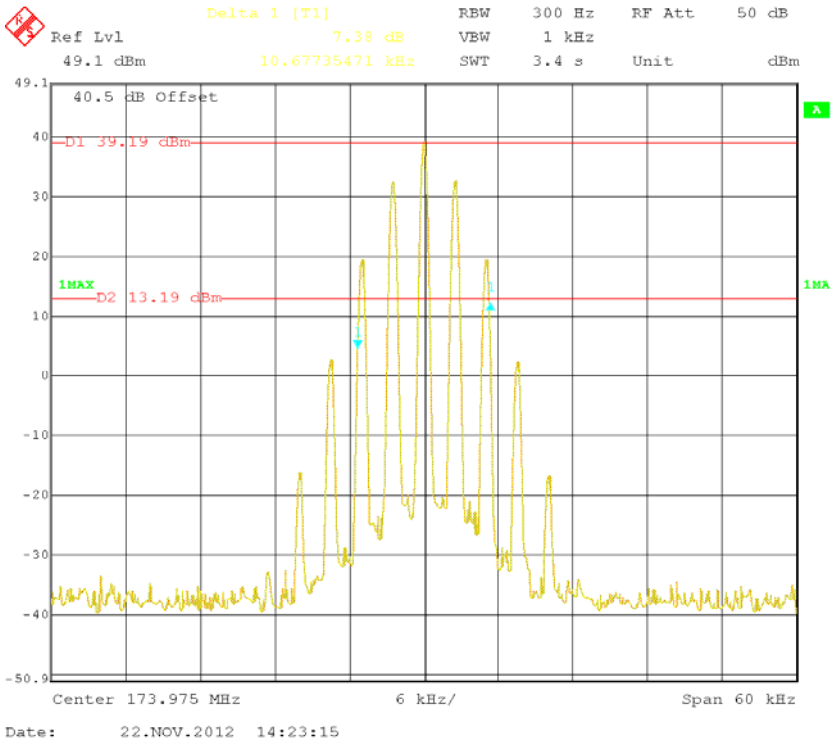


Emission Mask- Channel – Type D (low power level)

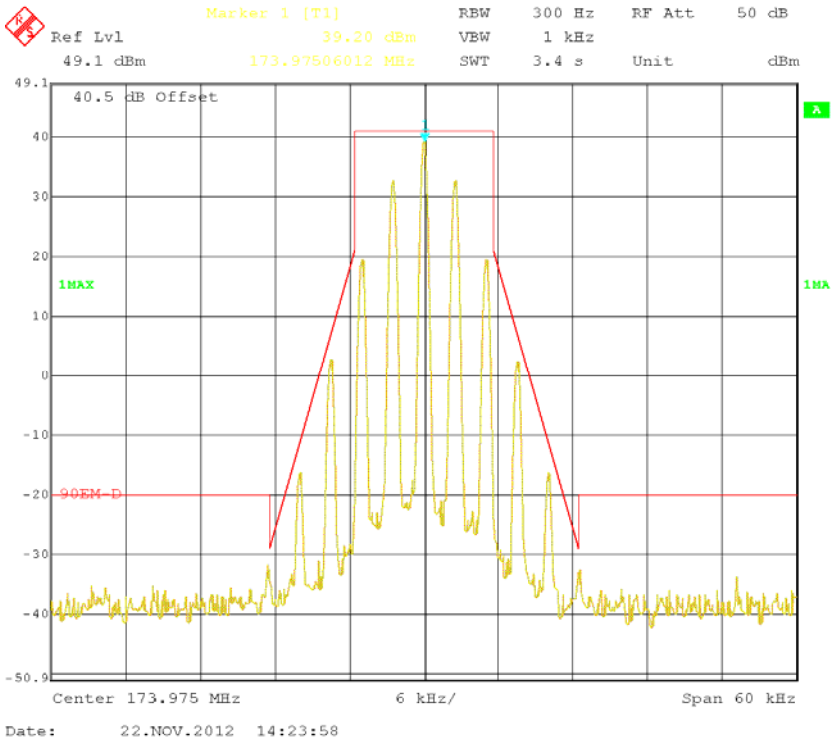


VHF – high channel:

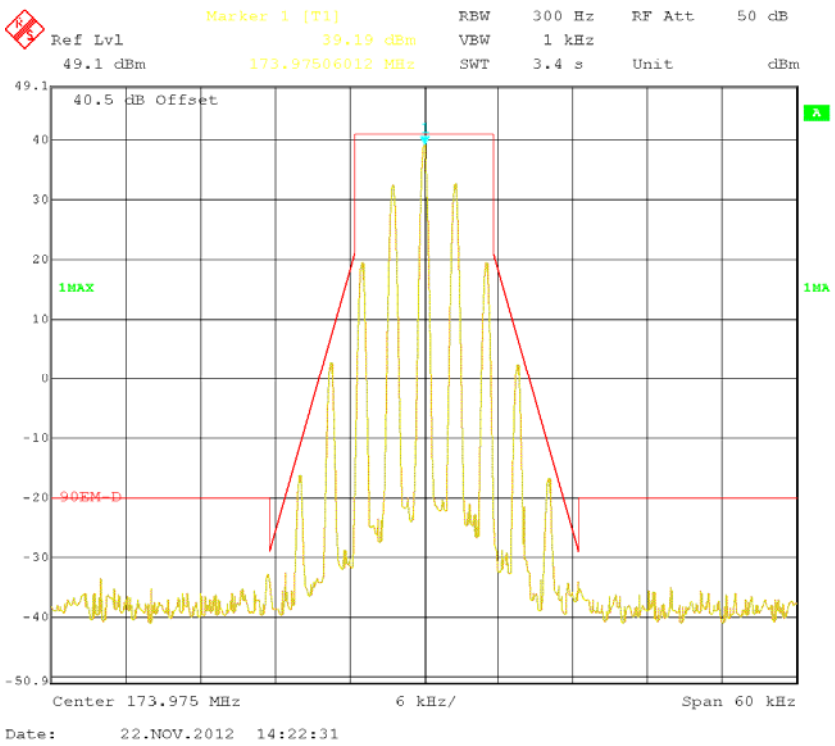
Occupied Bandwidth – high channel



Emission Mask- Channel – Type D (high power level)



Emission Mask- Channel – Type D (low power level)



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 5.626 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	Spectrum Analyzer	FSP38	100478	2012-5-14	2013-5-13

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 10th harmonic.

Test Data

Environmental Conditions

Temperature:	27.3 °C
Relative Humidity:	59%
ATM Pressure:	100.4 kPa

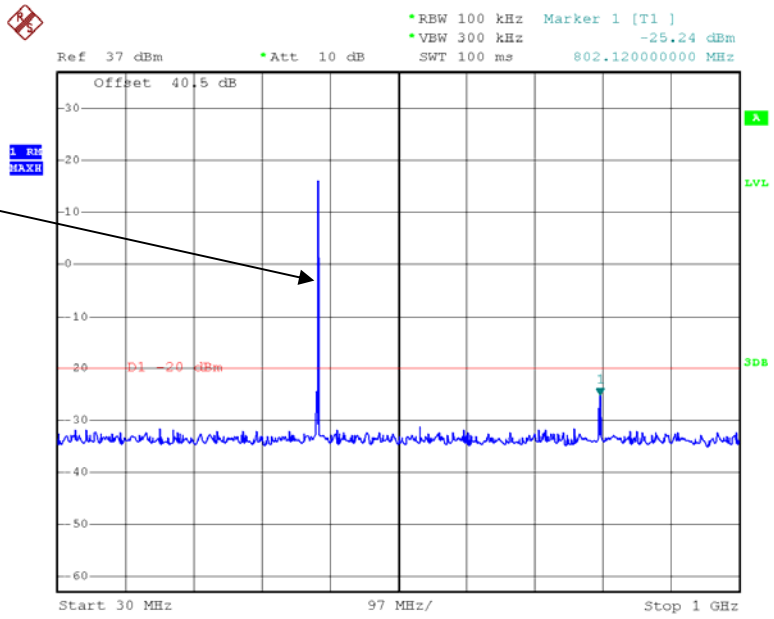
The testing was performed by Leon Chen on 2012-11-22.

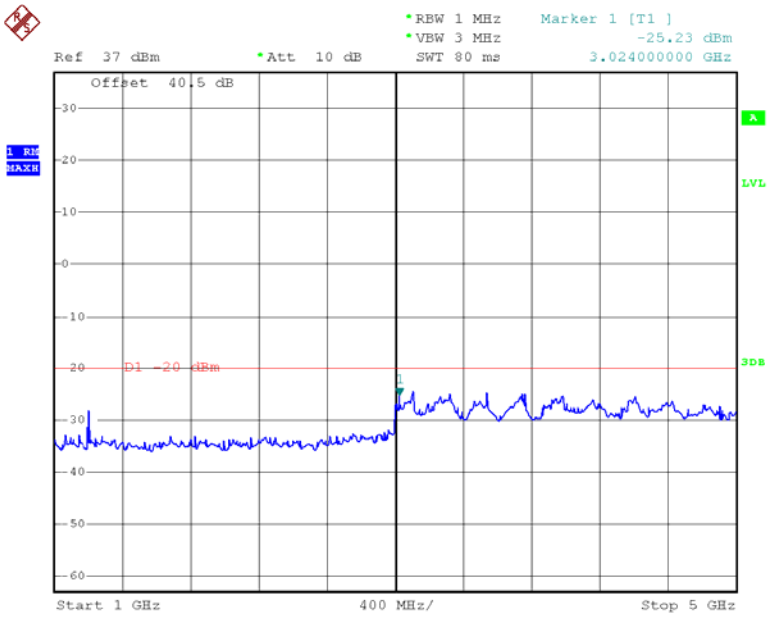
Please refer to the following plots.

UHF - Low channel (high power):

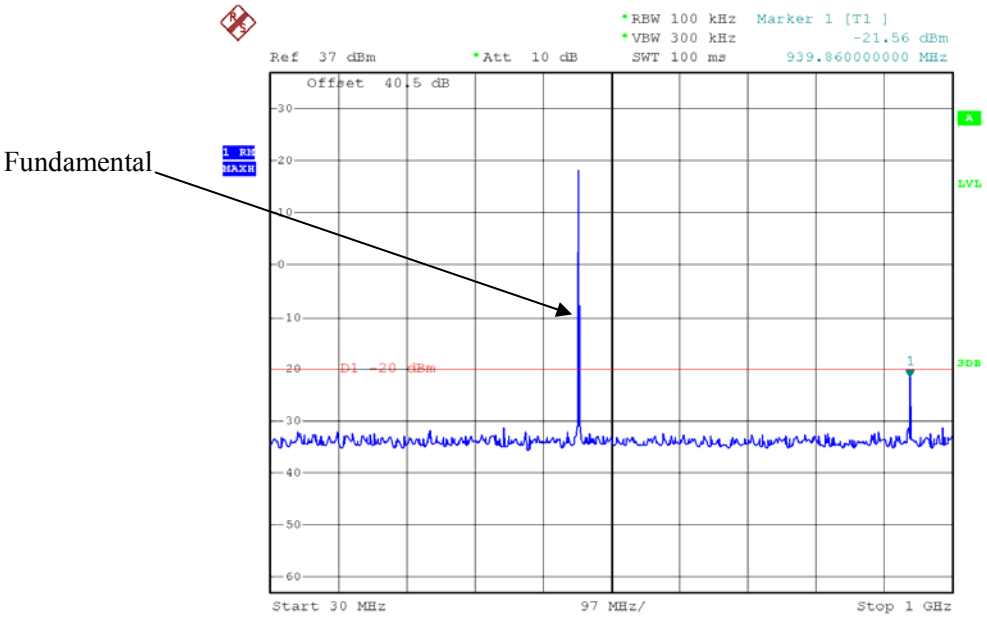
30 MHz - 5 GHz

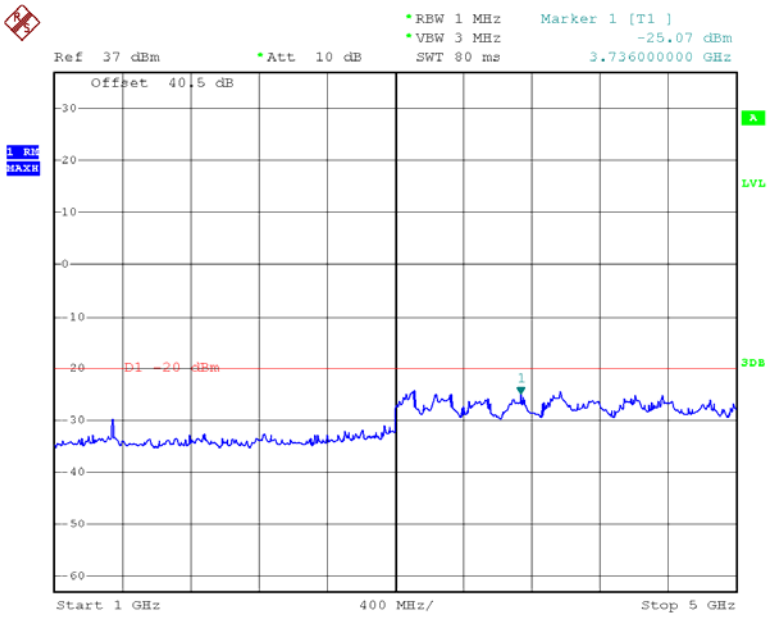
Fundamental



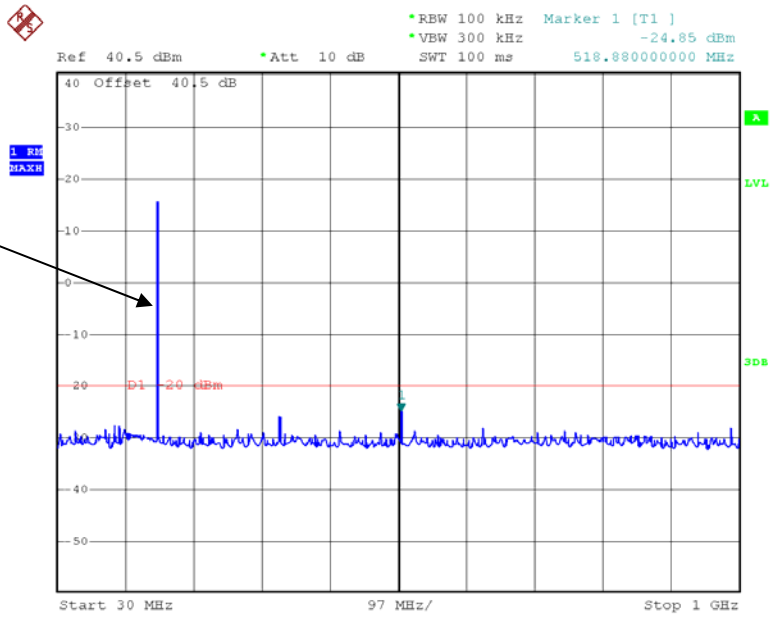


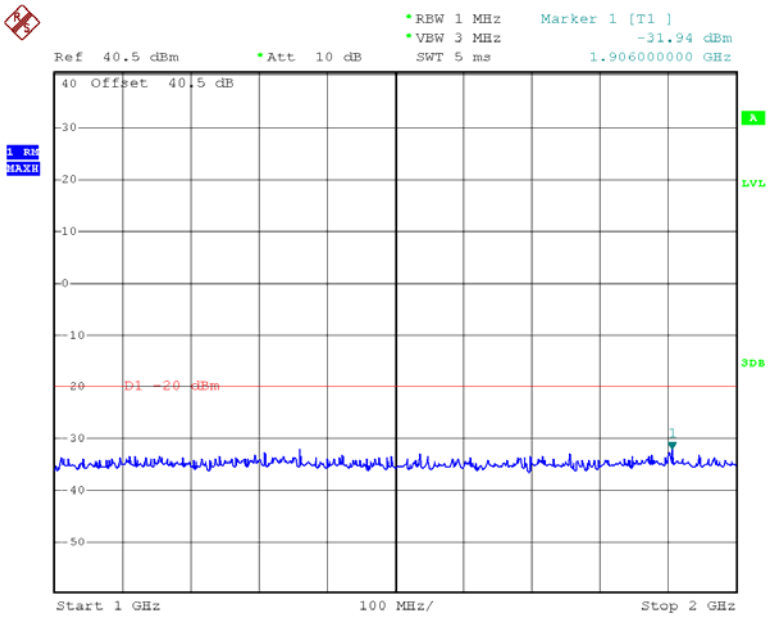
UHF - High channel (high power):



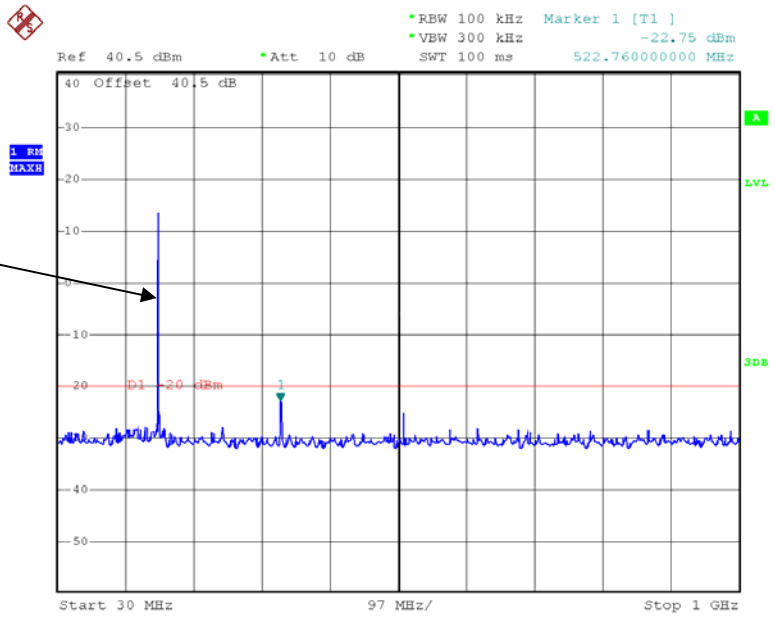


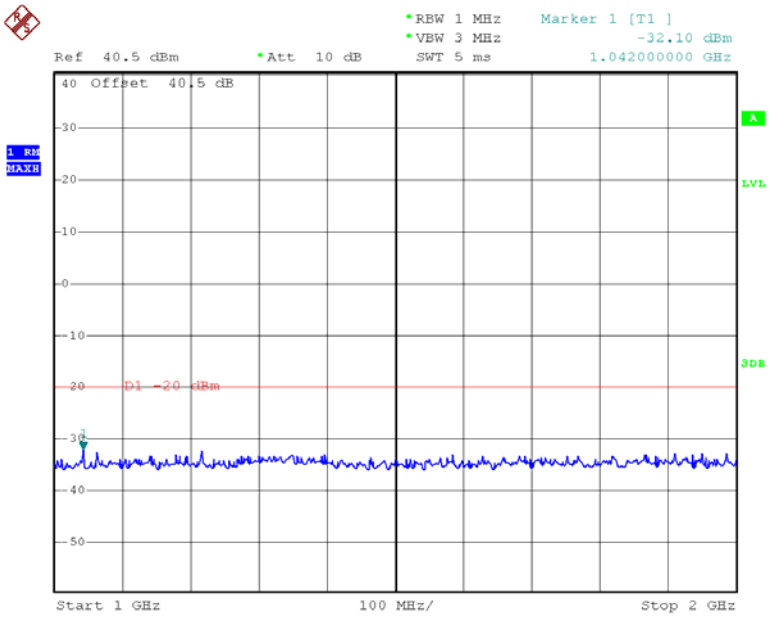
VHF - low channel (high power):





VHF - high channel (high power):





FCC §2.1053 & §90.210 - RADIATED SPURIOUS EMISSIONS

Applicable Standard

FCC §2.1053 and §90.210

Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSEM	DE31388	2012-3-15	2013-3-14
Sunol Sciences	Hybrid Antennas	JB3	A060611-3	2012-03-16	2013-03-15
Dayang	Horn Antenna	OMCDH10180	10279001A	2008-08-22	2013-08-21
EMCO	Adjustable Dipole Antenna System	3121C	9109-753	2012-04-24	2013-04-23
Dayang	Horn Antenna	OMCDH10180	10279001B	2010-07-30	2015-07-29
HP	Signal Generator	8648A	3426A00831	2012-3-15	2013-3-14
HP	Pre-amplifier	8447E	2434A02181	2012-03-08	2013-03-07
Mini-Circuits	Wideband Amplifier	ZVA-183-S+	96901149	2012-04-24	2013-04-23
Giga	Signal Generator	1026	320408	2012-03-15	2013-03-14

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)
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:	27.4 °C
Relative Humidity:	59%
ATM Pressure:	100.5 kPa

The testing was performed by Leon Chen on 2012-09-21.

UHF band – high power level:

TX mode:

Frequency	Polar	S.G. Reading	S.G. Level	Antenna Gain	Cable Loss	Absolute Level	Limit	Margin
MHz	H/V	dBµV	dBm	dBd/dBi	dB	dBm	dBm	dB
f_c =400.025MHz								
800.18	H	53.21	-38.6	0.0	0.8	-39.4	-20.0	19.4
1200	H	56.12	-44.4	7.3	1.2	-38.3	-20.0	18.3
1600.1	H	53.26	-48.9	10.1	1.4	-40.2	-20.0	20.2
800.18	V	52.45	-36.9	0.0	0.8	-37.7	-20.0	17.7
1200	V	59.68	-41.1	7.3	1.2	-35.0	-20.0	15.0
1600.1	V	56.32	-45.8	10.1	1.4	-37.1	-20.0	17.1
f_c =469.975MHz								
348.16	H	60.32	-41.3	0.0	0.4	-41.7	-20.0	21.7
941.8	H	48.14	-39.8	0.0	0.9	-40.7	-20.0	20.7
1408.8	H	55.21	-46.9	9.0	1.3	-39.2	-20.0	19.2
1877.76	H	56.24	-44.8	11.6	1.6	-34.8	-20.0	14.8
348.16	V	57.19	-41.9	0.0	0.4	-42.3	-20.0	22.3
941.8	V	46.41	-38.9	0.0	0.9	-39.8	-20.0	19.8
1408.8	V	58.95	-43.2	9.0	1.3	-35.5	-20.0	15.5
1877.76	V	53.76	-47.7	11.6	1.6	-37.7	-20.0	17.7

Note:
The unit of Antenna Gain is dBd for frequency below 1GHz, and the unit of Antenna Gain is dBi for frequency above 1GHz.

VHF band – high power level:

TX mode:

Frequency	Polar	S.G. Reading	S.G. Level	Antenna Gain	Cable Loss	Absolute Level	Limit	Margin
MHz	H/V	dBμV	dBm	dBd/dBi	dB	dBm	dBm	dB
f_c =136.025MHz								
408.3	H	55.23	-39.6	0.0	0.5	-40.1	-20.0	20.1
544.1	H	51.38	-39.1	0.0	0.5	-39.6	-20.0	19.6
680.87	H	51.62	-38.0	0.0	0.6	-38.6	-20.0	18.6
817.64	H	49.38	-42.5	0.0	0.8	-43.3	-20.0	23.3
1632.34	H	47.68	-54.2	10.4	1.4	-45.2	-20.0	25.2
408.3	V	52.13	-40.1	0.0	0.5	-40.6	-20.0	20.6
545.07	V	48.9	-38.8	0.0	0.5	-39.3	-20.0	19.3
680.87	V	46.87	-40.6	0.0	0.6	-41.2	-20.0	21.2
817.64	V	46.35	-42.8	0.0	0.8	-43.6	-20.0	23.6
1632.34	V	45.98	-56.0	10.4	1.4	-47.0	-20.0	27.0
f_c =173.975MHz								
348.16	H	61.54	-40.1	0.0	0.4	-40.5	-20.0	20.5
521.79	H	51.74	-37.6	0.0	0.5	-38.1	-20.0	18.1
696.39	H	50.6	-38.3	0.0	0.6	-38.9	-20.0	18.9
870.02	H	51.25	-40.8	0.0	0.7	-41.5	-20.0	21.5
1565.74	H	50.71	-51.5	9.9	1.4	-43.0	-20.0	23.0
348.16	V	55.32	-43.7	0.0	0.4	-44.1	-20.0	24.1
521.79	V	47.92	-39.4	0.0	0.5	-39.9	-20.0	19.9
696.39	V	46.41	-40.8	0.0	0.6	-41.4	-20.0	21.4
870.02	V	45.48	-43.2	0.0	0.7	-43.9	-20.0	23.9
1565.74	V	49.72	-52.4	9.9	1.4	-43.9	-20.0	23.9

Note:
The unit of Antenna Gain is dBd for frequency below 1GHz, and the unit of Antenna Gain is dBi for frequency above 1GHz.

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
Rohde & Schwarz	Spectrum Analyzer	FSEM	DE31388	2012-3-15	2013-3-14
ESPEC	Humidity tester	ESX-4CA	018 463	2012-3-2	2013-3-1

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external AC 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 AC 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.

Test Data

Environmental Conditions

Temperature:	26.8 °C
Relative Humidity:	58%
ATM Pressure:	100.5 kPa

The testing was performed by Leon Chen on 2012-09-19.

Test Mode: Transmitting

UHF:

Reference Frequency: 435MHz, Limit:2.5 ppm			
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed	
		MCF (MHz)	PPM Error
50	13.8	434.999831	-0.389
40	13.8	434.999824	-0.405
30	13.8	434.999839	-0.370
20	13.8	434.999848	-0.349
10	13.8	434.999867	-0.306
0	13.8	434.999892	-0.248
-10	13.8	434.999875	-0.287
-20	13.8	434.999815	-0.425
-30	13.8	434.999896	-0.239
25	15.9	434.999856	-0.331
25	11.7	434.999843	-0.361

VHF:

Reference Frequency: 155MHz, Limit:5 ppm			
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed	
		MCF (MHz)	PPM Error
50	13.8	154.999968	-0.206
40	13.8	154.999929	-0.458
30	13.8	154.999932	-0.439
20	13.8	154.999948	-0.335
10	13.8	154.999950	-0.323
0	13.8	154.999971	-0.187
-10	13.8	154.999936	-0.413
-20	13.8	154.999946	-0.348
-30	13.8	154.999938	-0.400
25	15.9	154.999912	-0.568
25	11.7	154.999928	-0.465

FCC §90.214 - TRANSIENT FREQUENCY BEHAVIOR

Applicable Standard

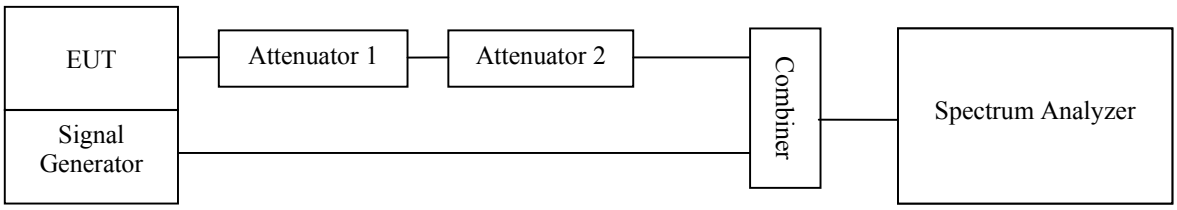
Regulations: FCC §90.214
Test method: ANSI/TIA-603-D 2010, section 2.2.19.3

Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSEM	DE31388	2012-3-15	2013-3-14
HP	Signal Generator	8648A	3426A00831	2012-10-9	2013-10-8

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

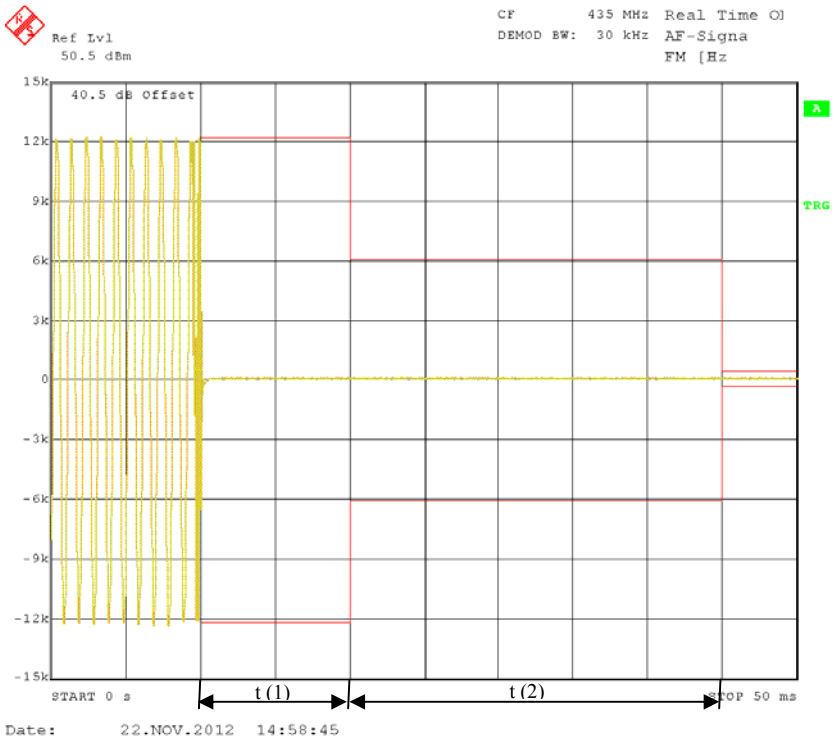
Environmental Conditions

Temperature:	27.4 °C
Relative Humidity:	59%
ATM Pressure:	100.5 kPa

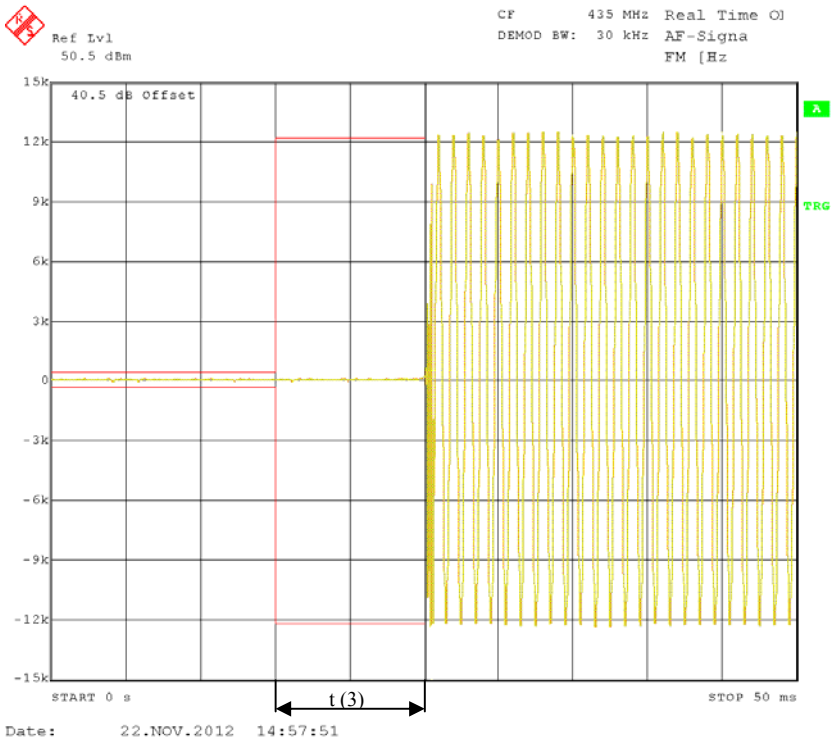
The testing was performed by Leon Chen on 2012-11-22.

UHF:

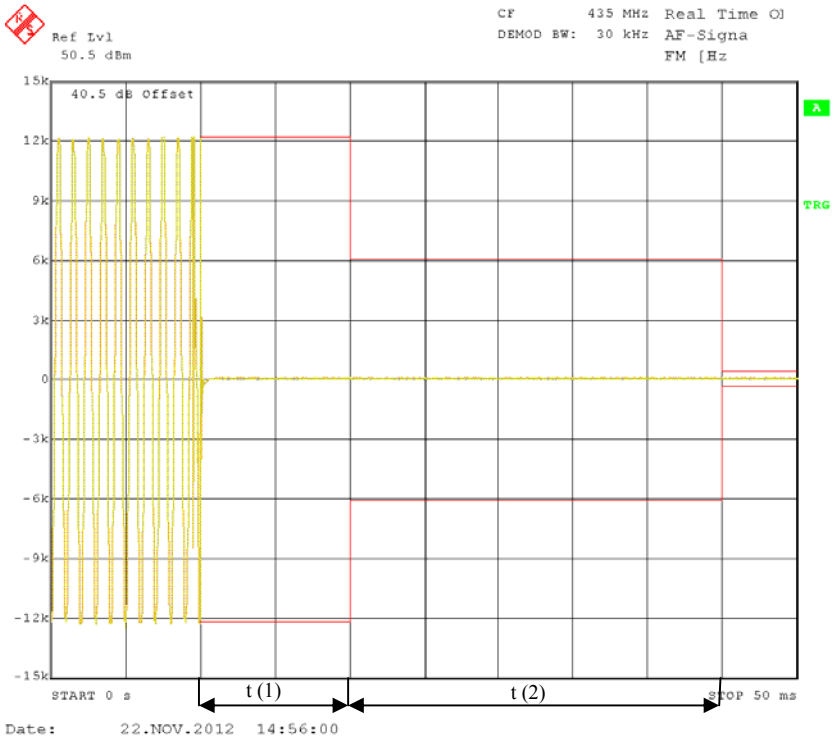
Turn on –Middle Channel (high power level)



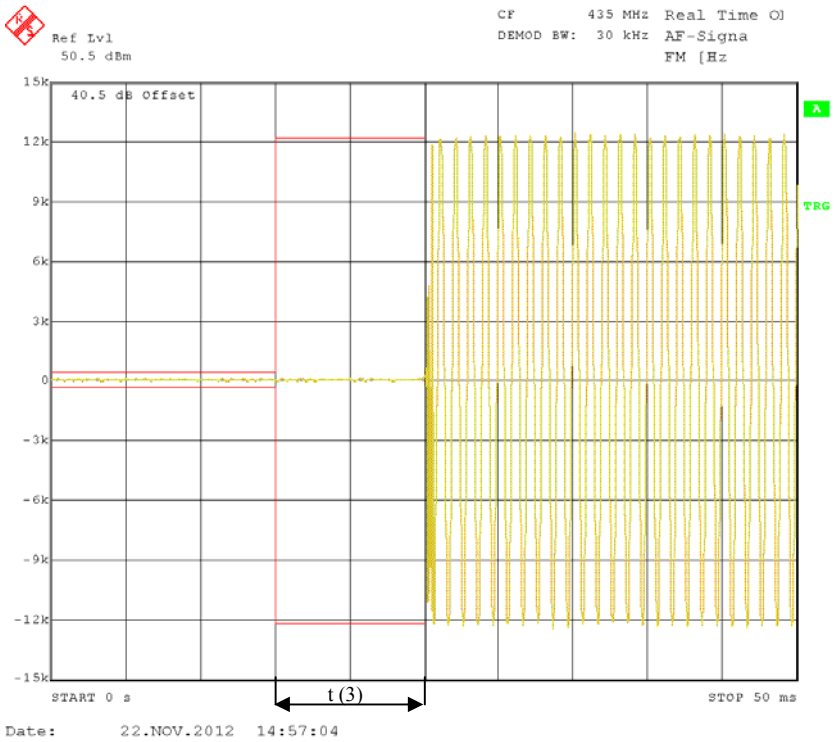
Turn off –Middle Channel (high power level)



Turn on –Middle Channel (low power level)

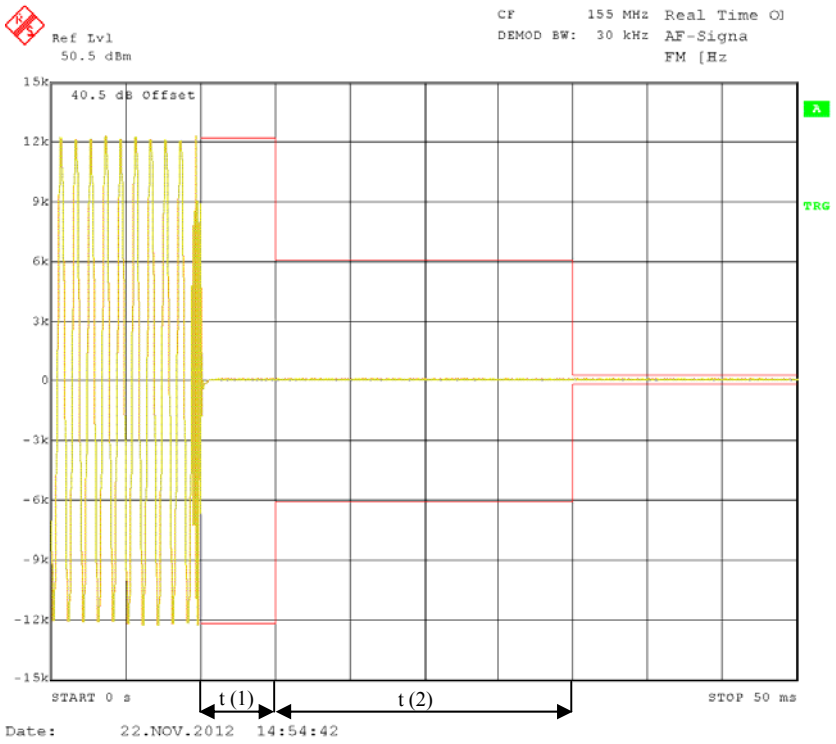


Turn off –Middle Channel (low power level)

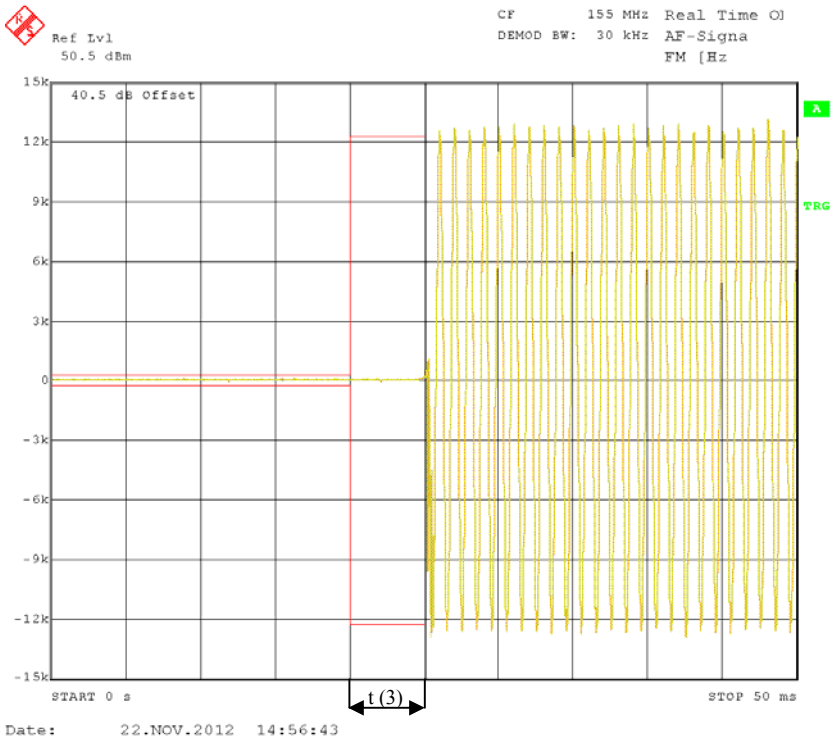


VHF:

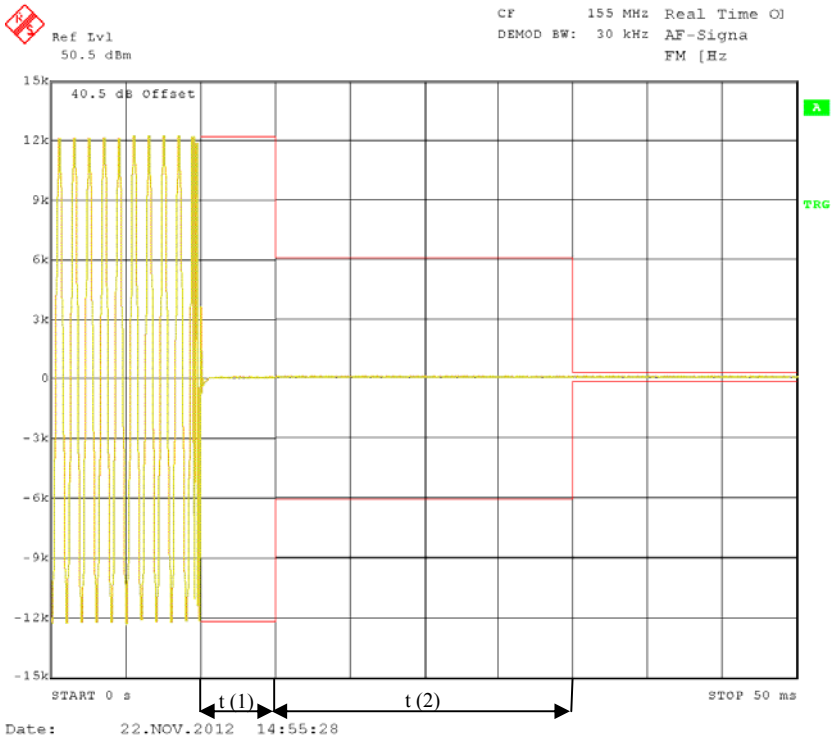
Turn on –Middle Channel (high power level)



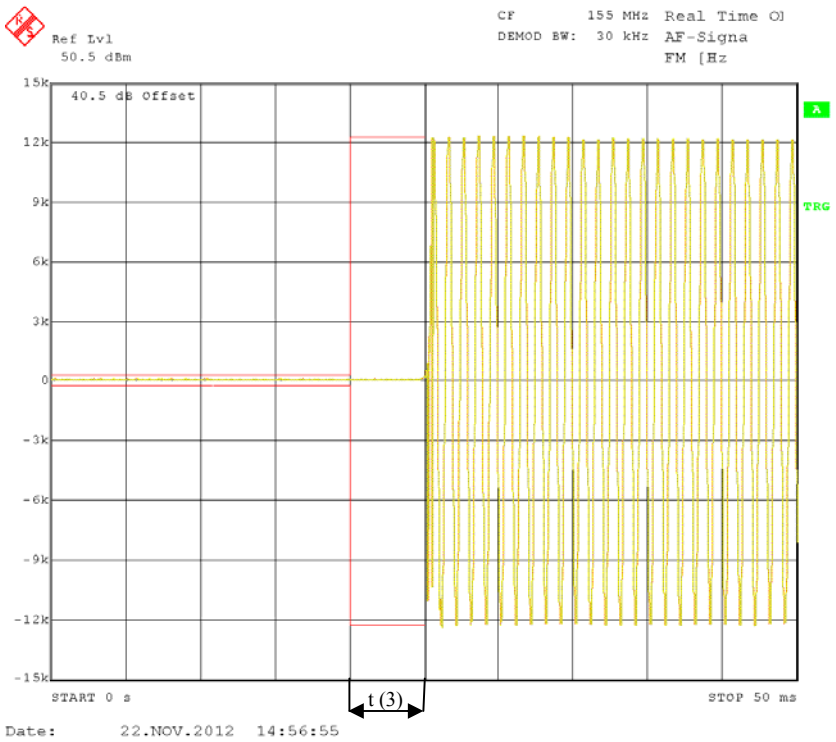
Turn off –Middle Channel (high power level)



Turn on –Middle Channel (low power level)



Turn off –Middle Channel (low power level)



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