FCC / INDUSTRY CANADA MEASUREMENT REPORT

CERTIFICATION OF COMPLIANCE
FCC PART90 & INDUSTRY CANADA RSS-119 CERTIFICATION

PRODUCT	:	Two Way Radio Land Mobile Service (LMR)
MODEL/TYPE NO	:	SP1402
FCC ID	:	RXUSP1402
TRADE NAME	:	maxon cic Maxon CIC Corp.
APPLICANT	:	Chongho Building, #7-61 Yangjae-Dong, Seocho-Gu, Seoul, 137-130, Korea Attn. : Hyun Koo Kang / Senior Manager
CLASSIFICATION	:	TNF Licensed Non-Broadcast Station Transmitter Held to Face
RULE PART(S)	:	FCC Part 90 Private land mobile radio services RSS-119 Land Mobile and Fixed Radio Transmitters and Receivers, 27.4 MHz to 960 MHz
FCC PROCEDURE	:	Certification
DATES OF TEST	:	December 26, 2007 to January 18, 2008
DATES OF ISSUE	:	January 21, 2008
TEST REPORT No.	:	BWS-08-RF-0002
TEST LAB.	:	BWS TECH Inc.(FCC Registration Number : 553281)

This Two Way Radio SP1402 has been tested in accordance with the measurement procedures specified in ANSI C63.4-2003 and ANSI/TIA-603-B-2002 at the BWS TECH/EMC Test Laboratory and has been shown to be complied with the electromagnetic radiated emission limits specified in FCC Rule Part 90 and Industry Canada RSS-119.
I attest to the accuracy of data. All measurement herein was performed by me or were made under my supervision. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them. The results of testing in this report apply to the product/system, which was tested only. Other similar equipment may not necessarily produce the same results due to production tolerance and measurement uncertainties.

January 21, 2008
(Date)

Tested by **CY-Choi**

January 21, 2008
(Date)

Reviewed by **TaeHyun, Nam**

BWS TECH Inc.
www.bws.co.kr
#611-1 Maesan-Ri, Mohyeon-Myeon, Yongin-Si, Gyeonggi-Do, 449-853 Korea
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FCC / INDUSTRY CANADA TEST REPORT

Scope – *Measurement and determination of electromagnetic emission(EME) of radio frequency devices including intentional radiators and/or unintentional radiators for compliance with the technical rules and regulations of the U.S Federal Communications Commission(FCC)*

1. General Information

Applicant

Company Name	Maxon CIC Corp.
Company Address	Chongho Building, #7-61 Yangjea-Dong, Seocho-Gu, Seoul, 137-130, Korea
Phone/Fax	Phone : +82-2-3498-3060 Fax : 02-3498-3115

Manufacturer

Company Name	Maxon CIC Thailand Co., Ltd(MCTL)
Company Address	40/23 Moo 5 Rojana Industrial Park Tambol U-Thai, Amphur U-Thai Ayutthaya 13210 Thailand
Phone/Fax	Tel No. : +66-(0)35-719-498~501 Fax No. : +66-(0)35-719-492

● **EUT Type**	Two Way Radio (LMR)
● **Model Number**	SP1402
● **FCC Identifier**	RXUSP1402
● **S/N**	0711000001
● **FCC Rule Part(s)**	FCC Part 90 Private land mobile radio services RSS-119 Land Mobile and Fixed Radio Transmitters and Receivers, 27.4 MHz to 960 MHz
● **FCC Classification**	TNF : Licensed Non-Broadcast Station Transmitter
● **Freq. Range**	440 MHz ~ 470 MHz
● **Channel**	16 Channels
● **Modulation Method**	FM
● **Emission Designator**	11K0F3E, 16K0F3E
● **RF Power Output**	1/5 Watt
● **Test Procedure**	ANSI C63.4-2003 and ANSI/TIA-603-B-2002
● **Dates of Tests**	December 26, 2008 to January 18, 2008
● **Place of Tests**	BWS TECH Inc.(FCC Registration Number : 553281) #611-1 Maesan-Ri, Mohyeon-Myeon, Yongin-Si, Gyeonggi-Do, 449-853 Korea TEL: +82 31 333 5997 FAX: +82 31 333 0017
● **Test Report No.**	BWS-08-RF-0002

2. Description of Test Facility

The measurement for radiated and conducted emission test were conducted at the open area test site of BWS TECH Inc. facility located at #611-1 Maesan-Ri, Mohyeon-Myeon, Yongin-Si, Gyeonggi-Do, 449-853 Korea. The site is constructed in conformance with the requirements of the ANSI C63.4-2000 and CISPR Publication 16. The BWS TECH measurement facility has been filed to the Commission with the FCC for 3 and 10-meter site configurations. Detailed description of test facility was found to be in compliance with the requirements of Section 2.948 FCC Rules according to the ANSI C63.4-2000 and registered to the Federal Communications Commission (Registration Number : 553281).

The measurement procedure described in American National Standard for Method of Measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz (ANSI C.63.4-2000) was used in determining radiated and conducted emissions from the Maxon C IC Corp. Two Way Radio Model : SP1402.

3. Product Information

The Equipment Under Test (EUT) is the MAXON CIC CO LTD Two Way Radio model: SP1402(FCC ID: RXUSP1402).

SP1402 is FM transceiver operating between 440 to 470 MHz with an output power of 5 W (1 W at low power).
The SP1402 offers many advanced features found in more expensive Land Mobile Radios.

SP1402 is designed to provide new choice of competitive price for everyone but is powerful and reliable tool for your daily business. Its very rugged construction is resistant to shock and vibration. SP1402 will experience a reliable, easy to use the radio at a great value.

3.1 DC Voltage and Currents

The DC voltages applied to and DC currents into the several elements of the final radio frequency amplifying stage for normal operation over power range were;

Standby: 7.5 Volts, 0.10 Ampare
Receive: 7.5 Volts, 0.60 Ampare
Low Power: 7.5 Volts, 0.70 Ampare
High Power: 7.5 volts, 1.50 Ampare

3.2 Emission Designator

Type of Emission : F3E

Necessary Bandwidth and Emission Bandwidth:
12.5 kHz (Narrow Band) : Bn = 11K0F3E
25 kHz (Wide Band) : Bn = 16K0F3E

Calculation:

Maximum Modulation(M) in kHz : 3
Maximum Deviation(D) in kHz : 2.5(NB) and 5(WB)
Constant Factor(k) : 1
Bn = 2M + 2DK

3.3 General Specification

Equipment Type	:	Hand-portable
Performance Specifications	:	TIA/EIA-603, EN300 086
Band	:	UHF (440 ~ 470 MHz)
Channel Spacings	:	12.5 kHz / 25 kHz
RF Output Power	:	5 / 1 Watt
Modulation Type	:	8.5KOF3E /16KOF3E (FM)
Audio Power	:	500 mW (EXT with 8 Ω) 1 W (INT with 4 Ω)
Intermediate Frequencies	:	1st 45.1 MHz 2nd 455 kHz
Channels	:	16 Channel
Frequency Source	:	Synthesizer
Power Supply	:	Ni-MH (1550 mA) 7.5 Vdc NOMIN ±10% Vdc EXTER
Inter-modulation	:	< -65dB
Spurious and image rejection	:	< -70dB
Maximum Audio Output	:	More than 1W
Audio Distortion	:	less than 5%

3.4 EUT operating conditions & test configuration

3.4.1 Client Condition

Temperature : -30 ℃ ~ +60 ℃
Humidity : 95 %

3.4.2 EUT Operating Condition

Operating Mode : Transmitter was operated in a continues transmission mode with the carrier modulated as specified in the test data.
Special test Software : Not Used.
Special test Hardware : Not Used.
TX Frequency Band : 400 MHz ~ 470 MHz
Test Frequencies : 1st 440.025 MHz
2nd 455.000 MHz
3rd 469.975 MHz
Modulation : FM Modulation
Modulation Signal Source : External Source

3.4.3 Description of EUT modification

The device tested is not modified anything, mechanical or circuits to improve EMI status during a test.
No EMI suppression device(s) was added and/or modified during testing.

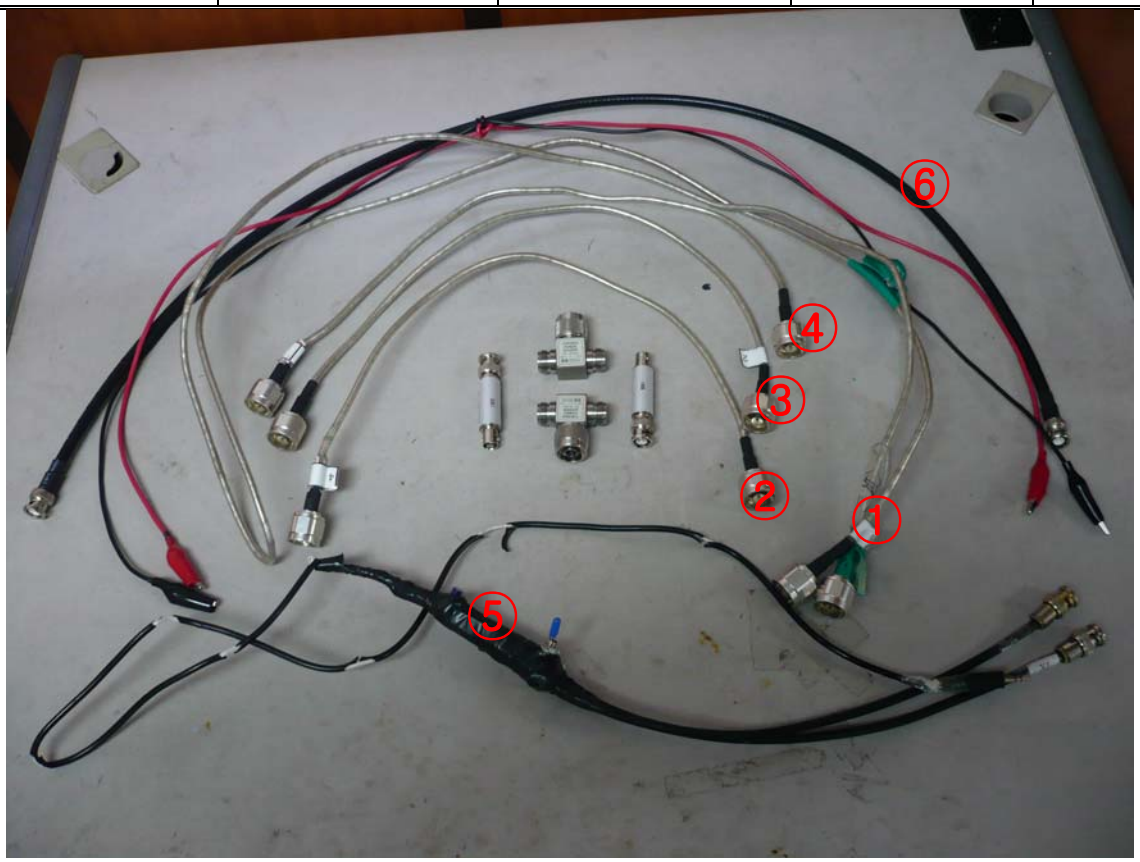
3.4.4 Description of Test System

Type of Peripheral Equipment Used:

Description	Model Name	Serial No.	Manufacturer	FCC ID
EUT	SL1402	0711000001	Maxon CIC Corp.	-

Type of Cables Used:

Device from	Device to	Type of Cable	Cable Number	Length
EUT	Spectrum Analyzer	RF Cable (N Type)	①	2.0 m
Signal Generator 1	EUT	RF Cable (N Type)	②	0.5 m
Signal Generator 2	EUT	RF Cable (N Type)	③	0.5 m
Signal Generator 3	EUT	RF Cable (N Type)	④	0.5 m
Test Fixer	Modulation Analyzer	BNC to Audio (8Ω)	⑤	1.0 m
Audio Analyzer	Test Fixer	BNC to Audio (8Ω)	⑥	1.0 m



4. Summary of Test Results

TEST REQUIREMENTS	FCC Paragraph	RSS Paragraph	Result
Power Line Conducted Emission	§15.207	-	Pass
Radiated Emission Tests	§15.209	-	Pass
RF Power Output (Conducted)	§2.1046	RSS-119 §5.4	Pass
Audio Frequency Response	§2.1047(A)	-	Pass
Audio Low pass Filter Response	§2.1047(A)	-	Pass
Modulation Limiting	§2.1047(B)	-	Pass
Occupied Bandwidth	§2.1049	RSS-119 §5.5	Pass
Spurious Emissions at Antenna Terminals	§2.1051	RSS-119 §5.8	Pass
Field Strength of Spurious Radiation	§2.1053	RSS-119 §5.8	Pass
Frequency Stability/Temperature Variation	§2.1055	RSS-119 §5.3	Pass
Transient Frequency Behavior	§90.214	RSS-119 §5.9	Pass

5. TEST DATA

5.1 Power Line Conducted Emission

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 kHz on the 230V AC power and return leads of the EUT according to the methods defined in FCC Part 15.207. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane as shown in section 3.1.5. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position producing maximum conducted emissions.

5.1.1 Test Condition

Frequency Range of Test	:	150 kHz to 30 MHz
Test Standard	:	FCC Part 15.207
Test Date	:	December 26, 2007
Temperature/Humidity	:	23 °C/ 40 %

5.1.2 Test Standard

Item		Frequency Range (MHz)	Limit (dBuV)	
			Quasi-Peak	Average-Peak
☐	Class A	0.15 ~ 0.5	79	66
		0.5 ~ 30	73	60
☒	Class B	0.15 ~ 0.5	66 – 56	56 – 46
		0.5 ~ 5	56	46
		5 ~ 30	60	50

5.1.3 Test Equipment List

Equipment Type	Model	Manufacture	Serial No	Cal Due Date
TEST RECEIVER	ESPI	ROHDE & SCHWARZ	100063	11. 19. 2008
Conducted Cable	N/A	N/A	N/A	N/A
LISN	FCC-LISN-50-50-2-02	FCC	03074	11. 02. 2008

5.1.4 Test Result of Power Line Conducted Emission

EUT : SP1402

Input Voltage : 230V, 50Hz

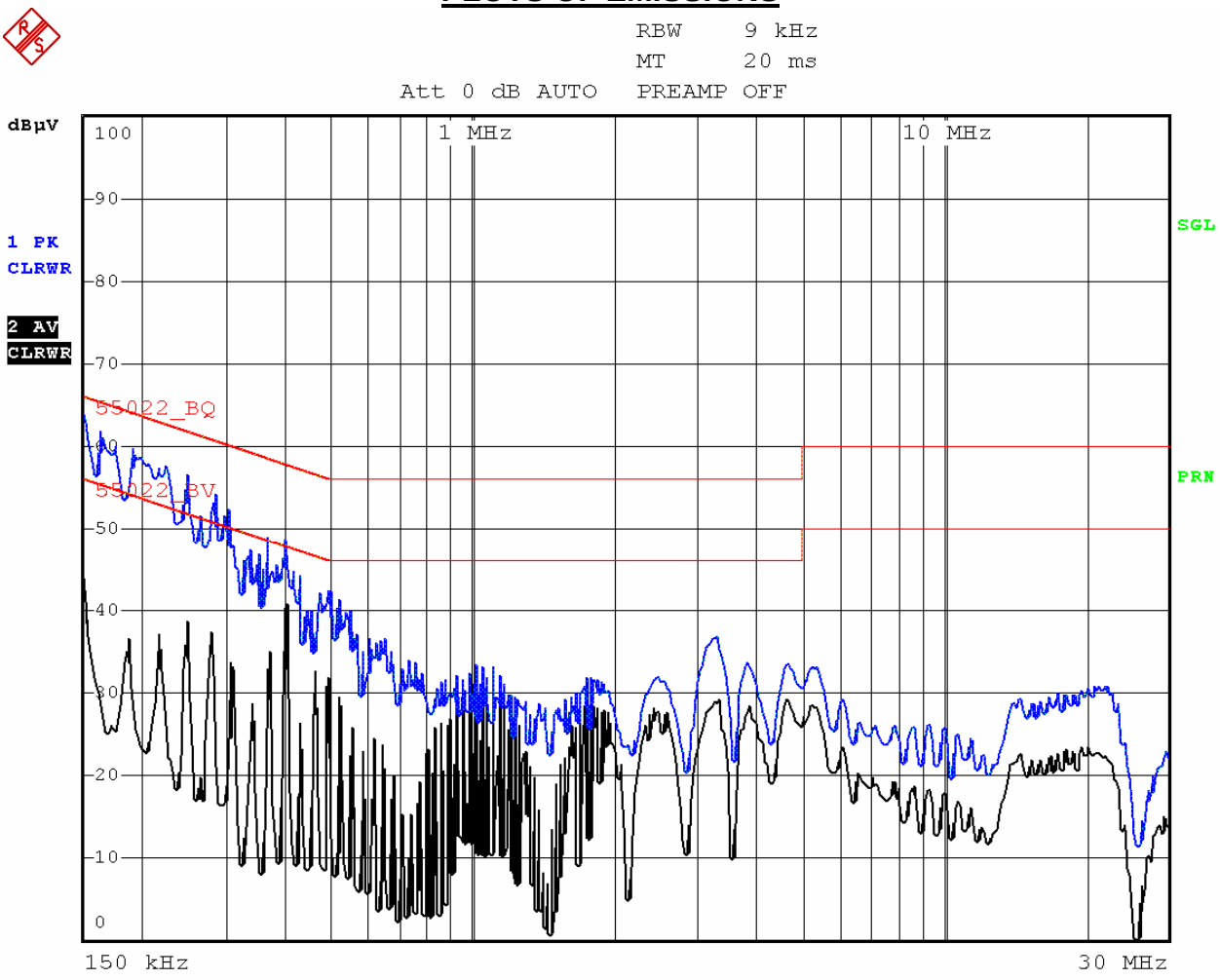
Power Line Conducted Emission Test Results : **PASS**

Test data sheets follow.

Freq [MHz]	Correction		Phase [H/N]	Quasi-Peak Mode				Average Mode			
	AMN	C.L		Limit	Reading	Emission Level	Margin	Limit	Reading	Emission Level	Margin
				[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]
0.150	0.06	0.03	H	66.00	63.82	63.91	2.09	56.00	43.97	44.06	11.94
0.186	0.06	0.03	N	65.00	60.47	60.56	4.44	55.00	32.58	32.67	22.33
0.222	0.07	0.10	H	64.00	57.53	57.70	6.30	54.00	29.51	29.68	24.32
0.246	0.07	0.10	H	63.30	56.59	56.76	6.54	53.30	38.62	38.79	14.51
0.282	0.07	0.16	H	62.30	54.09	54.32	7.98	52.30	31.87	32.10	20.20
0.398	0.08	0.24	H	56.00	48.61	48.93	7.07	46.00	40.19	40.51	5.49

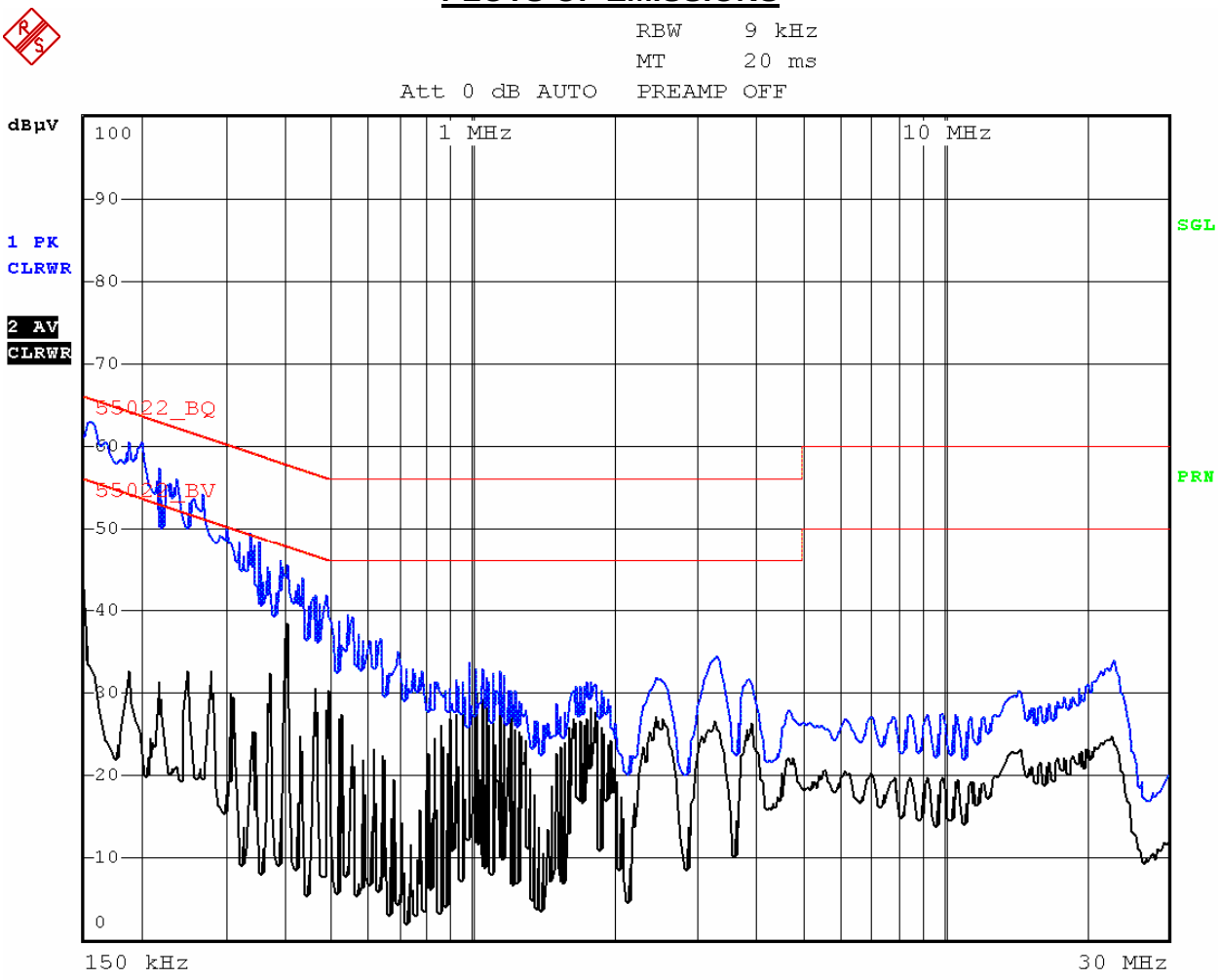
Notes:
1. All modes of operation were investigated and the worst-case emissions are reported.
See the plots in next 2 pages.
2. Line N = (Neutral), Line H = (Hot)
3. Measurement uncertainty estimated at ±1.38 dB.
The measurement uncertainty is given with a confidence of 95.45 % with the coverage factor, k=2

PLOTS OF EMISSIONS



Test Model: SP1402
Test Mode: HOT
Classification: FCC Part 15.207

PLOTS OF EMISSIONS



Test Model: SP1402
Test Mode: NEUTRAL
Classification: FCC Part 15.207

5.2 Radiated Emission Test (Stand-by and Receive Mode)

Radiated emissions form 30 MHz to 1000 MHz were measured with a bandwidth of 120 kHz according to the methods defines in FCC Part 15.209. The EUT was placed on a nonmetallic stand in the open-field site, 0.8 meter above the ground plane. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions.

5.2.1 Test Condition

Frequency Range of Test	:	30 MHz to 1000 MHz
Test Standard	:	FCC Part 15.209
Test Date	:	December 26, 2007
Temperature/Humidity	:	13 °C/ 39 %

5.2.2 Test Standard

Frequency Range (MHz)	Limit (dBuV)	
	Quasi-Peak	Average-Peak
30 ~ 88	40.0	N/A
88 ~ 216	43.5	N/A
216 ~ 960	46.0	N/A
Above 960	54.0	N/A

5.2.3 Test Equipment List

Equipment Type	Model	Manufacture	Serial No	Cal Due Date
Bilog Antenna	VULB 9160	SCHWARZBECK	9160-3122	12. 29. 2008
Open Site Cable	N/A	N/A	N/A	N/A
Antenna Mast	JAC-3	DAIL EMC	N/A	N/A
Antenna Turntable Controller	JAC-2	JAEMC	N/A	N/A
EMI Receiver	ESVN30	ROHDE & SCHWARZ	832854/010	07. 13. 2008

5.2.4 Test Result of Radiated Emission

EUT : SP1402

Test distance : 3 m

Radiated Emission Test Result : **PASS**
Test data sheets follow.

Frequency [MHz]	Reading [dBμV]	Polarization [*H/**V]	Ant.Factor [dB/m]	Cable Loss [dB]	Limit [dBμV/m]	Emission Level [dBμV/m]	Margin [dB]
1st Channel : 440.025 MHz							
393.675	13.56	V	15.64	4.50	40.00	33.70	6.30
393.675	12.76	H	15.64	4.50	40.00	32.90	7.10
787.350	1.93	V	12.00	6.67	43.50	20.60	22.90
787.350	3.12	H	12.31	6.67	43.50	22.10	21.40
2nd Channel : 455.000 MHz							
408.650	14.63	V	15.99	4.59	46.00	35.20	10.80
408.650	9.43	H	15.99	4.59	46.00	30.00	16.00
817.300	-5.55	V	22.75	6.80	46.00	24.00	22.00
817.300	-6.05	H	22.75	6.80	46.00	23.50	22.50
3rd Channel : 469.975 MHz							
423.625	15.92	V	16.32	4.65	46.00	36.90	9.10
423.625	15.82	H	16.32	4.65	46.00	36.80	9.20
847.250	-3.05	V	22.94	6.91	46.00	26.80	19.20
847.250	-4.15	H	22.94	6.91	46.00	25.70	20.30

Notes:
1. * H : Horizontal polarization , ** V : Vertical polarization
2. Emission Level = Reading + Antenna factor + Cable loss
3. Margin value = Emission Level - Limit
4. All other emissions not reported were more than 25dB below the permitted limit.
5. Measurement uncertainty estimated at ±4.08 dB.
   The measurement uncertainty is given with a confidence of 95.45 % with the coverage factor, k=2.

5.3 RF Power Output (Conducted)

5.3.1 Specification

FCC Rules Part 2, Section 2.1046
FCC Rules Part 90, Section 90.205
Industry Canada, RSS-119 Section 5.4

5.3.2 Method of Measurement

ANSI/TIA-603-B-2002 Section 2.2.1

5.3.3 Measurement Set-Up

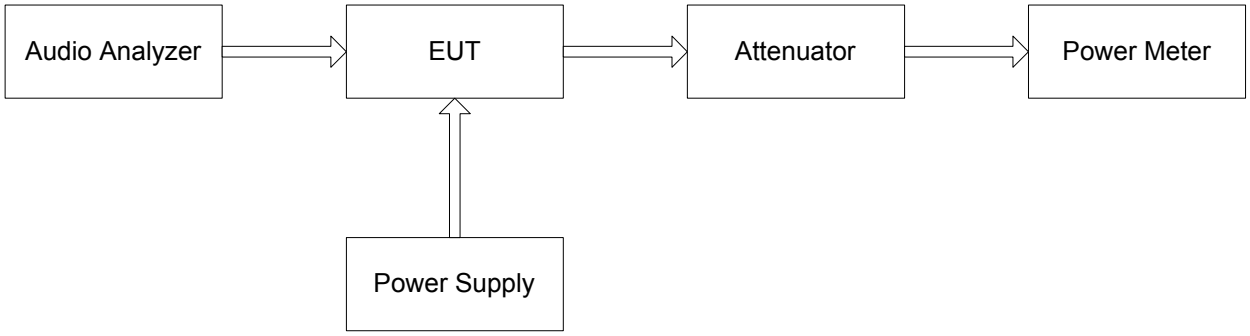


Fig.1

5.3.4 Test Equipment List

Equipment	Model Name	Manufacturer
EUT	SP1402	Maxon CIC Corp.
Power Supply	GP-4303TP	EG Digital
Audio Analyzer	8903B	Agilent
Attenuator	33-30-33	WEINSCHEL
Power Sensor	8481A	Agilent
Power Meter	E4418A	Agilent

5.3.5 Test Procedure

-. The unit was turn-up in accordance with the alignment procedure stated in the FIG. 1 , and was loaded into a 50 ohm resistive termination.
-. The unit was powered though its normally accompanied power cord by a DC power supply.
-. Power supply voltage was set to nominal voltage at the power supply terminals with transmitter off.
-. The unit was operated for three consecutive test cycles of 15 minutes standby and 5 minutes in transmitting.
-. The EUT was aligned for transmitter operation on three frequencies(Fo) at full rated power per the tune-up procedure outlined in the Product Specification. This represents frequencies at the 1st, 2nd, 3rd and 4th end of the EUT operating frequency band.

5.3.6 Test Result (Narrow Band)

Frequency (MHz)	Measured Power (dBm)	Rated Power (Watts)
Low Power (Ref. 1 Watt)		
440.025	30.81	1.205
455.000	30.11	1.026
469.975	29.90	0.977
High Power (Ref. 5 Watts)		
440.025	37.23	5.284
455.000	36.32	4.285
469.975	35.71	3.724

5.3.7 Test Result (WideBand)

Frequency (MHz)	Measured Power (dBm)	Rated Power (Watts)
Low Power (Ref. 1 Watt)		
440.025	30.69	1.172
455.000	30.10	1.023
469.975	29.90	0.977
High Power (Ref. 5 Watts)		
440.025	37.20	5.248
455.000	36.25	4.217
469.975	35.62	3.648

5.4 Modulation Characteristics – Audio Frequency Response

5.4.1 Specification

FCC Rules Part 2, Section 2.1047(a)
FCC Rules Part 90, Section 90.207 & 90.242(b)(8)
Industry Canada, RSS-119 Section 6.6

5.4.2 Method of Measurement

ANSI/TIA-603-B-2002 Section 2.2.6

5.4.3 Measurement Set-Up

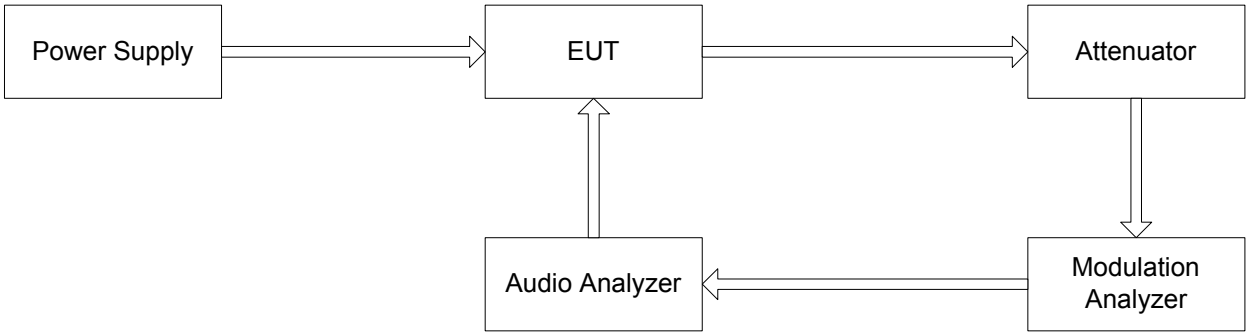


Fig.2

5.4.4 Test Equipment List

Equipment	Model Name	Manufacturer
EUT	SP1402	Maxon CIC Corp.
Power Supply	GP-4303TP	EG Digital
Audio Analyzer	8903B	Agilent
Modulation Analyzer	8901B	Agilent
Attenuator	33-30-33	WEINSCHEL

5.4.5 Test Procedure

-. The unit was turn-up in accordance with the alignment procedure stated in the FIG. 2 , and was loaded into a 50 ohm resistive termination.
-. The audio analyzer was connected to the audio input circuit/microphone of the EUT.
-. The audio signal input was adjusted to obtain 20% modulation at 1 kHz, and this point was taken as the 0 dB reference level.
-. With input levels held constant and below limiting at all frequencies, the audio signal generator was varied from 100 Hz to 10 kHz.
-. The response in dB relative to 1 kHz was then measured, using the HP 8901A Modulation Analyzer.
-. No limit is required by the FCC for audio frequency response. The measured audio response data shows the role-off curve at 3 kHz.

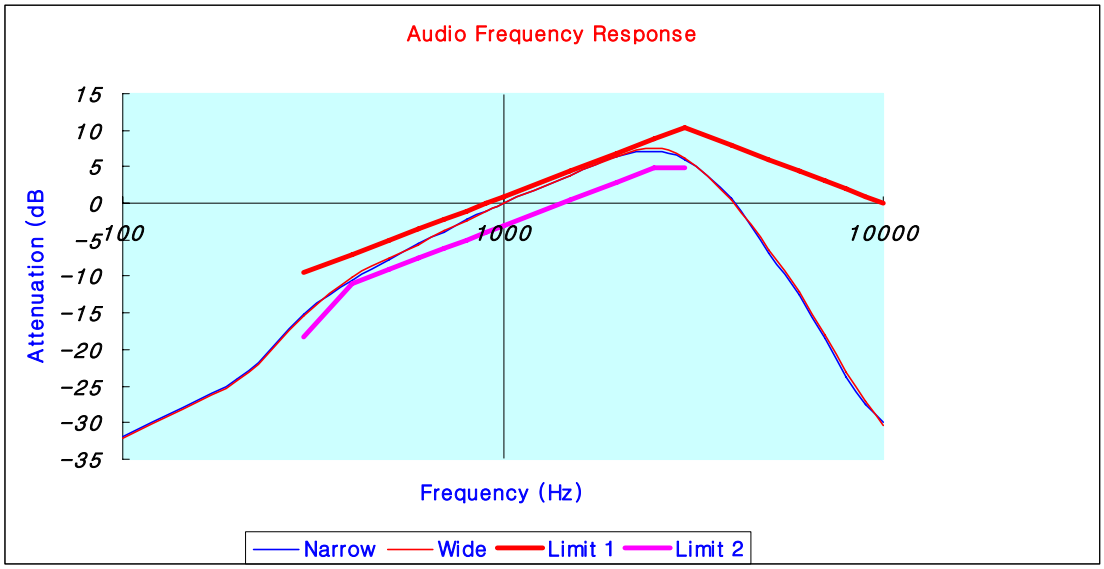
5.4.6 Test Results

5.4.6.1 Test Data 1

FCC Rules :	Part 2 §2.1047(a) & §90.242(b)(8)
IC Rules :	RSS-119 Section 6.6
Operating Frequency :	440.025 MHz
Channel :	1st Channel
Reference Voltage :	7.5 VDC
Power Output :	5 Watts

Audio Input Frequency (Hz)	Attenuation (dB)	
	Channel Spacing : 12.5 kHz	Channel Spacing : 25 kHz
100	-32.0	-32.1
200	-24.0	-24.3
300	-15.1	-15.5
400	-10.6	-10.2
500	-7.7	-7.5
600	-5.5	-5.7
700	-4.0	-3.7
800	-2.2	-2.4
900	-1.0	-1.1
1000	0	0
1500	+3.8	+3.8
2000	+6.5	+6.3
2500	+7.1	+7.6
3000	+5.9	+6.2
4000	+0.7	+0.5
5000	-6.7	-6.3
6000	-12.5	-12.2
7000	-18.5	-18.0
8000	-23.7	-23.1
9000	-27.6	-27.0
10000	-30.0	-30.3

5.4.6.2 Graph 1

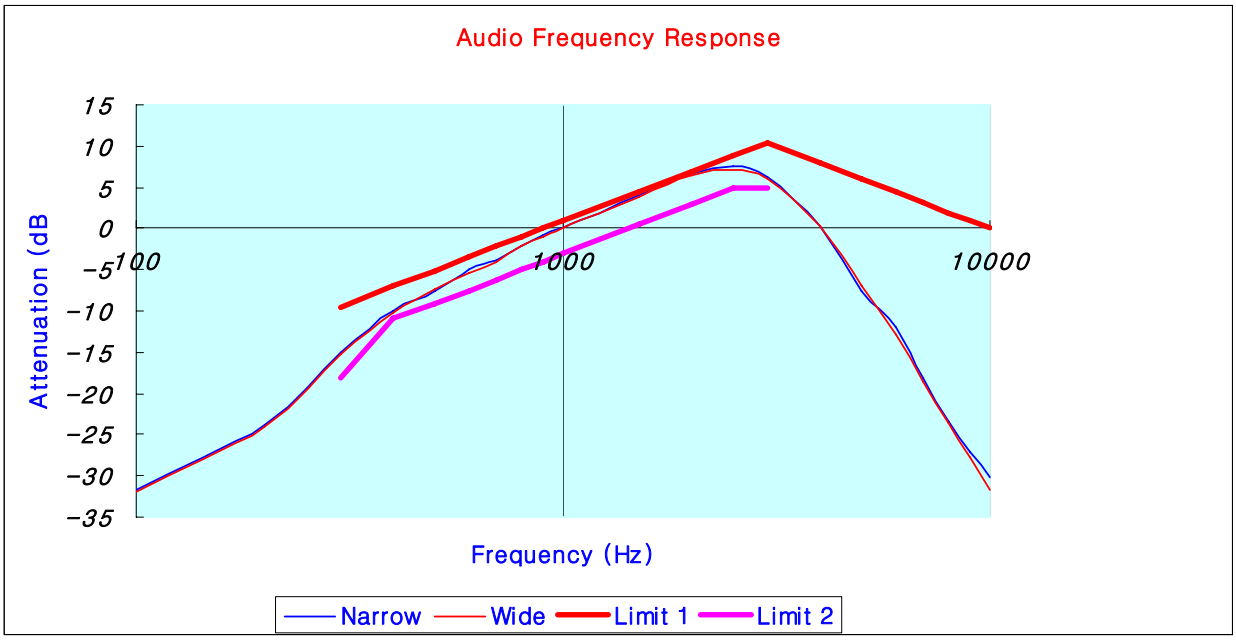


5.4.6.3 Test Data 2

FCC Rules :	Part 2 §2.1047(a) & §90.242(b)(8)
IC Rules :	RSS-119 Section 6.6
Operating Frequency :	455.000 MHz
Channel :	2nd Channel
Reference Voltage :	7.5 VDC
Power Output :	5 Watts

Audio Input Frequency (Hz)	Attenuation (dB)	
	Channel Spacing : 12.5 kHz	Channel Spacing : 25 kHz
100	-31.7	-32.0
200	-23.8	-24.0
300	-15.0	-15.2
400	-10.1	-10.2
500	-7.5	-7.3
600	-5.0	-5.5
700	-3.8	-4.0
800	-2.0	-2.2
900	-0.7	-1.0
1000	0	0
1500	+4.1	+3.9
2000	+6.7	+6.5
2500	+7.5	+7.1
3000	+6.2	+6.0
4000	+0.3	+0.2
5000	-7.6	-7.0
6000	-12.0	-12.8
7000	-18.2	-18.5
8000	-23.3	-23.5
9000	-27.2	-27.7
10000	-30.2	-31.8

5.4.6.4 Graph 2

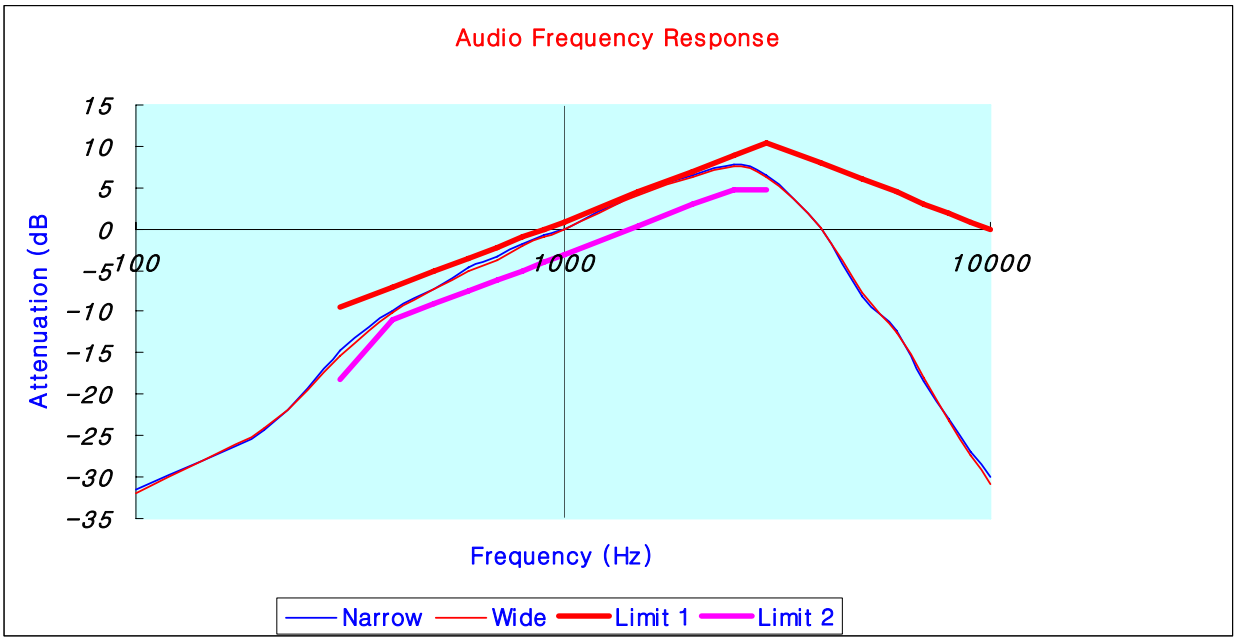


5.4.6.5 Test Data 3

FCC Rules :	Part 2 §2.1047(a) & §90.242(b)(8)
IC Rules :	RSS-119 Section 6.6
Operating Frequency :	469.975 MHz
Channel :	3rd Channel
Reference Voltage :	7.5 VDC
Power Output :	5 Watts

Audio Input Frequency (Hz)	Attenuation (dB)	
	Channel Spacing : 12.5 kHz	Channel Spacing : 25 kHz
100	-31.5	-32.0
200	-24.2	-24.0
300	-14.8	-15.4
400	-9.8	-10.0
500	-7.2	-7.2
600	-4.6	-5.0
700	-3.3	-3.8
800	-1.8	-2.0
900	-0.8	-1.0
1000	0	0
1500	+4.2	+4.0
2000	+6.5	+6.3
2500	+7.7	+7.5
3000	+6.5	+6.3
4000	+0.1	+0.2
5000	-8.1	-7.8
6000	-12.2	-12.5
7000	-18.4	-18.0
8000	-23.0	-23.2
9000	-26.9	-27.3
10000	-30.0	-30.8

5.4.6.6 Graph 3



5.5 Modulation Characteristics – Audio Low pass Filter Response

5.5.1 Specification

FCC Rules Part 2, Section 2.1047(a)
FCC Rules Part 90, Section 90.207 & 90.242(b)(8)
Industry Canada, RSS-119 Section 6.6

5.5.2 Method of Measurement

ANSI/TIA-603-B-2002 Section 2.2.15

5.5.3 Measurement Set-Up

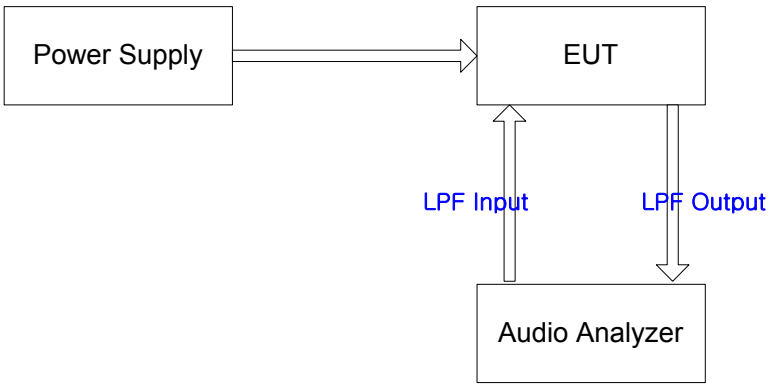


Fig.3

5.5.4 Test Equipment List

Equipment	Model Name	Manufacturer
EUT	SP1402	Maxon CIC Corp.
Power Supply	IPS-30B03DD	INTERACT
Audio Analyzer	8903B	Agilent

5.5.5 Test Procedure

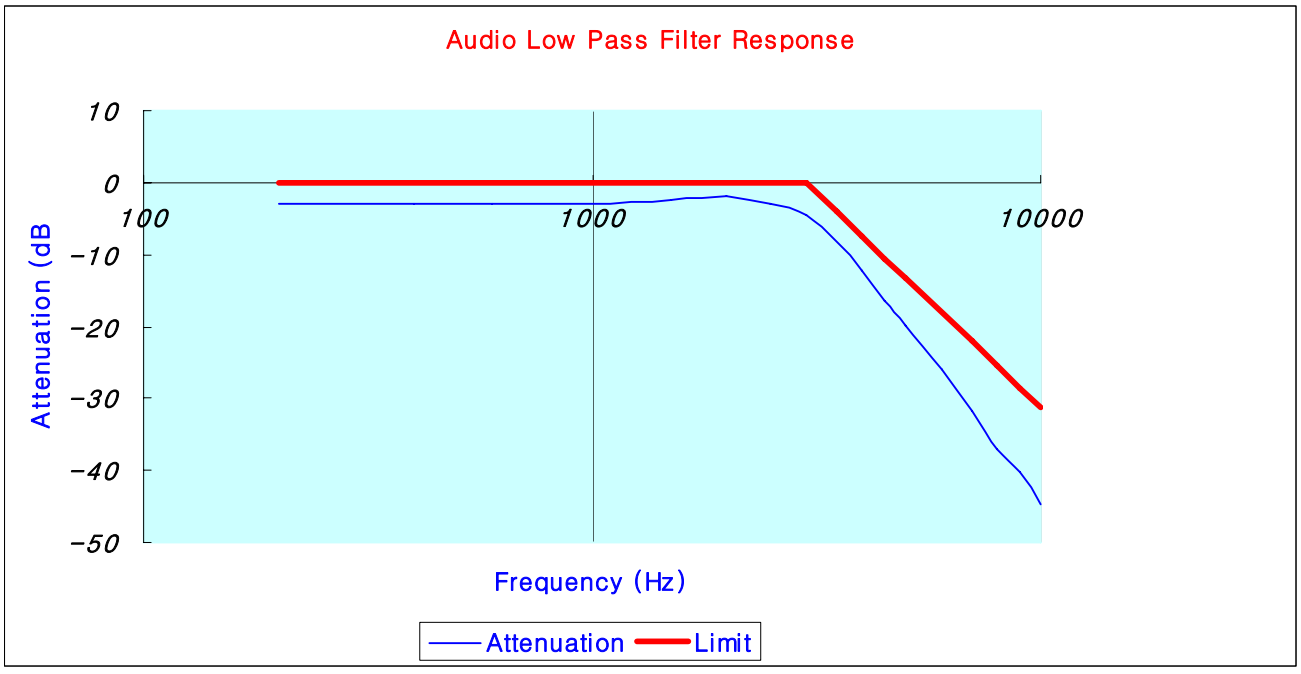
-. The unit was turn-up in accordance with the alignment procedure stated in the FIG. 3 , and was loaded into a 50 ohm resistive termination.
-. To measure the audio low pass filter response, an audio analyzer were connected to the actual Printed Circuit Board of the transmitter.
-. Audio analyzer monitored the output of the audio filter.
-. An AF input level was maintained constant at least 10 dB below the saturation level at 1 kHz tone.
-. Record the dB level of the 1 kHz tone of the audio analyzer.
-. Set the audio input frequency to desired test frequency between 3 kHz and upper low pass filter limit.
-. Record dB level on the audio analyzer.
-. Calculate the audio frequency response as LPF response = LEV_{FREQ} - LEV_{REF}
-. Audio frequencies in 3 kHz to 20 kHz : Minimum Attenuation to reference point shell be greater than 60log(f/3) dB, above 20 kHz, at least 50dB attenuation. (“f” in kHz)

5.5.5 Test Result

5.5.5.1 Data

Audio Input Frequency (Hz)	Attenuation (dB)	Limit (dB)
100	-2.9	-
200	-2.9	-
400	-3.0	-
600	-3.0	-
800	-3.0	-
1000	-2.9	-
1500	-2.3	-
2000	-1.8	-
2500	-3.0	-
3000	-4.5	0
3500	-8.3	-4
4000	-12.2	-7.5
4500	-16.4	-10.5
5000	-19.8	-13.3
6000	-26.0	-18.0
7000	-31.7	-22.0
8000	-37.0	-25.5
9000	-40.3	-28.5
10000	-44.8	-31.3

5.5.5.2 Graph



5.6 Modulation Characteristics – Modulation Limiting

5.6.1 Specification

FCC Rules Part 2, Section 2.1047(b)
FCC Rules Part 90, Section 90.207
Industry Canada, RSS-119 Section 6.6

5.6.2 Method of Measurement

ANSI/TIA-603-B-2002 Section 2.2.3

5.6.3 Measurement Set-Up

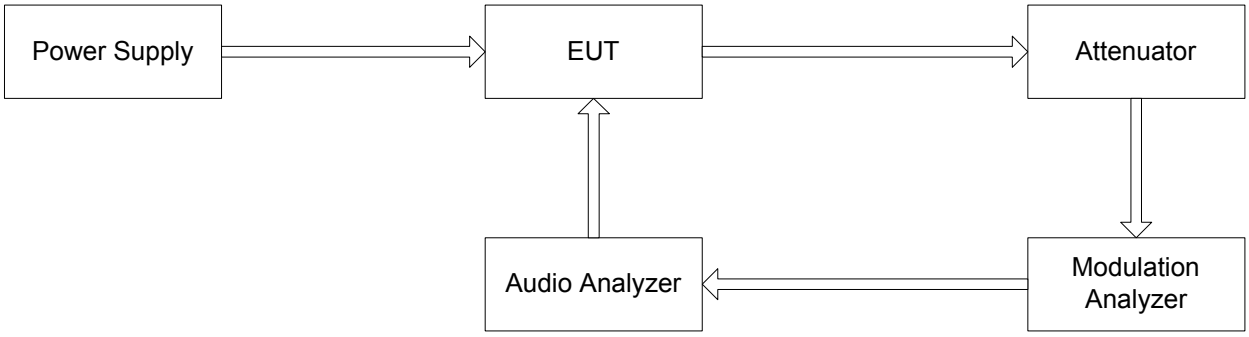


Fig.4

5.6.4 Test Equipment List

Equipment	Model Name	Manufacturer
EUT	SP1402	Maxon CIC Corp.
Power Supply	IPS-30B03DD	INTERACT
Audio Analyzer	8903B	Agilent
Modulation Analyzer	8901B	Agilent
Attenuator	33-30-33	WEINSCHEL

5.6.5 Test Procedure

-. The unit was turn-up in accordance with the alignment procedure stated in the FIG. 4, and was loaded into a 50 ohm resistive termination.
-. Apply an 1kHz modulating signal to EUT from the audio frequency analyzer.
-. Increase the level from the AF generator by between -60 dBm and +17 dBm.
-. Measure the steady-state deviation.
-. With the AF generator level hold constant, vary the audio frequency from 300 Hz to 3000 Hz. Record the maximum deviation.
-. Set the modulation analyzer to measure the peak negative deviation and repeat the test above.

5.6.6 Test Result

5.6.6.1 Data (Narrow Band, 1st Channel)

Audio Input Level (dBmV)	Positive Peak Deviation (kHz)			Negative Peak Deviation (kHz)		
	300 Hz	1 kHz	3 kHz	300 Hz	1 kHz	3 kHz
-60	0.10	0.10	0.14	0.10	0.11	0.13
-55	0.10	0.13	0.15	0.10	0.13	0.16
-50	0.10	0.17	0.21	0.10	0.17	0.21
-45	0.10	0.23	0.31	0.10	0.24	0.31
-40	0.10	0.35	0.49	0.10	0.35	0.49
-35	0.10	0.57	0.80	0.10	0.57	0.81
-30	0.10	0.95	1.36	0.10	0.95	1.36
-25	0.13	1.59	1.60	0.13	1.60	1.60
-20	0.18	1.81	1.67	0.17	1.83	1.67
-15	0.24	1.94	1.70	0.24	1.94	1.69
-10	0.37	1.99	1.59	0.38	1.97	1.69
-5	0.60	2.00	1.52	0.61	1.98	1.65
0	1.15	1.96	1.44	1.19	2.03	1.59
+5	1.78	1.95	1.48	1.84	2.04	1.62
+10	2.36	1.92	1.64	2.26	1.90	1.70
+15	2.31	1.85	1.69	2.28	2.08	1.70
+17	2.25	1.84	1.69	2.27	2.07	1.70

5.6.6.2 Data (Narrow Band, 2nd Channel)

Audio Input Level (dBmV)	Positive Peak Deviation (kHz)			Negative Peak Deviation (kHz)		
	300 Hz	1 kHz	3 kHz	300 Hz	1 kHz	3 kHz
-60	0.09	0.10	0.13	0.09	0.10	0.13
-55	0.10	0.12	0.16	0.10	0.13	0.16
-50	0.10	0.17	0.22	0.10	0.16	0.21
-45	0.10	0.23	0.32	0.10	0.24	0.32
-40	0.10	0.35	0.50	0.10	0.36	0.50
-35	0.13	0.56	0.81	0.13	0.56	0.82
-30	0.16	0.95	1.36	0.17	0.95	1.36
-25	0.23	1.57	1.57	0.22	1.58	1.57
-20	0.34	1.78	1.63	0.34	1.79	1.62
-15	0.54	1.90	1.65	0.53	1.89	1.65
-10	0.87	1.94	1.53	0.89	1.92	1.63
-5	1.50	1.95	1.48	1.52	1.95	1.59
0	1.94	1.93	1.43	1.97	1.99	1.55
+5	2.07	1.91	1.46	2.05	1.99	1.58
+10	2.21	1.84	1.59	2.21	2.00	1.66
+15	2.26	1.80	1.64	2.21	2.01	1.67
+17	2.23	1.79	1.63	2.20	2.00	1.65

5.6.6.3 Data (Narrow Band, 3rd Channel)

Audio Input Level (dBmV)	Positive Peak Deviation (kHz)			Negative Peak Deviation (kHz)		
	300 Hz	1 kHz	3 kHz	300 Hz	1 kHz	3 kHz
-60	0.10	0.10	0.13	0.10	0.10	0.13
-55	0.10	0.13	0.17	0.10	0.13	0.16
-50	0.10	0.18	0.25	0.10	0.17	0.22
-45	0.10	0.25	0.37	0.10	0.24	0.35
-40	0.10	0.37	0.55	0.10	0.36	0.53
-35	0.12	0.60	0.83	0.13	0.57	0.81
-30	0.17	0.93	1.40	0.17	0.95	1.37
-25	0.22	1.60	1.60	0.25	1.61	1.58
-20	0.35	1.81	1.65	0.37	1.80	1.63
-15	0.55	1.93	1.67	0.53	1.91	1.66
-10	0.90	1.97	1.54	0.92	1.93	1.61
-5	1.53	1.97	1.50	1.55	1.96	1.60
0	1.96	1.97	1.47	1.98	2.00	1.57
+5	2.10	1.95	1.48	2.10	2.00	1.60
+10	2.26	1.87	1.63	2.25	2.03	1.68
+15	2.31	1.82	1.67	2.28	2.02	1.68
+17	2.23	1.80	1.67	2.22	2.00	1.66

5.6.6.5 Data (WideBand, 1st Channel)

Audio Input Level (dBmV)	Positive Peak Deviation (kHz)			Negative Peak Deviation (kHz)		
	300 Hz	1 kHz	3 kHz	300 Hz	1 kHz	3 kHz
-60	0.10	0.15	0.17	0.10	0.14	0.17
-55	0.10	0.18	0.24	0.10	0.18	0.23
-50	0.10	0.27	0.39	0.10	0.26	0.37
-45	0.10	0.43	0.58	0.10	0.40	0.56
-40	0.10	0.67	0.99	0.11	0.69	0.98
-35	0.14	1.12	1.60	0.14	1.18	1.55
-30	0.18	1.89	2.76	0.17	1.90	2.68
-25	0.25	3.20	3.20	0.26	3.23	3.12
-20	0.35	3.68	3.32	0.37	3.65	3.18
-15	0.51	3.90	3.38	0.55	3.88	3.32
-10	0.85	3.98	3.16	0.90	3.93	3.20
-5	1.47	4.09	3.08	1.50	3.96	3.10
0	2.89	3.91	2.90	2.92	4.02	3.18
+5	3.71	3.88	2.98	3.78	4.08	3.20
+10	4.73	3.83	3.25	4.71	4.16	3.33
+15	4.60	3.71	3.37	4.55	4.20	3.33
+17	4.52	3.70	3.32	4.48	4.18	3.33

5.6.6.6 Data (WideBand, 2nd Channel)

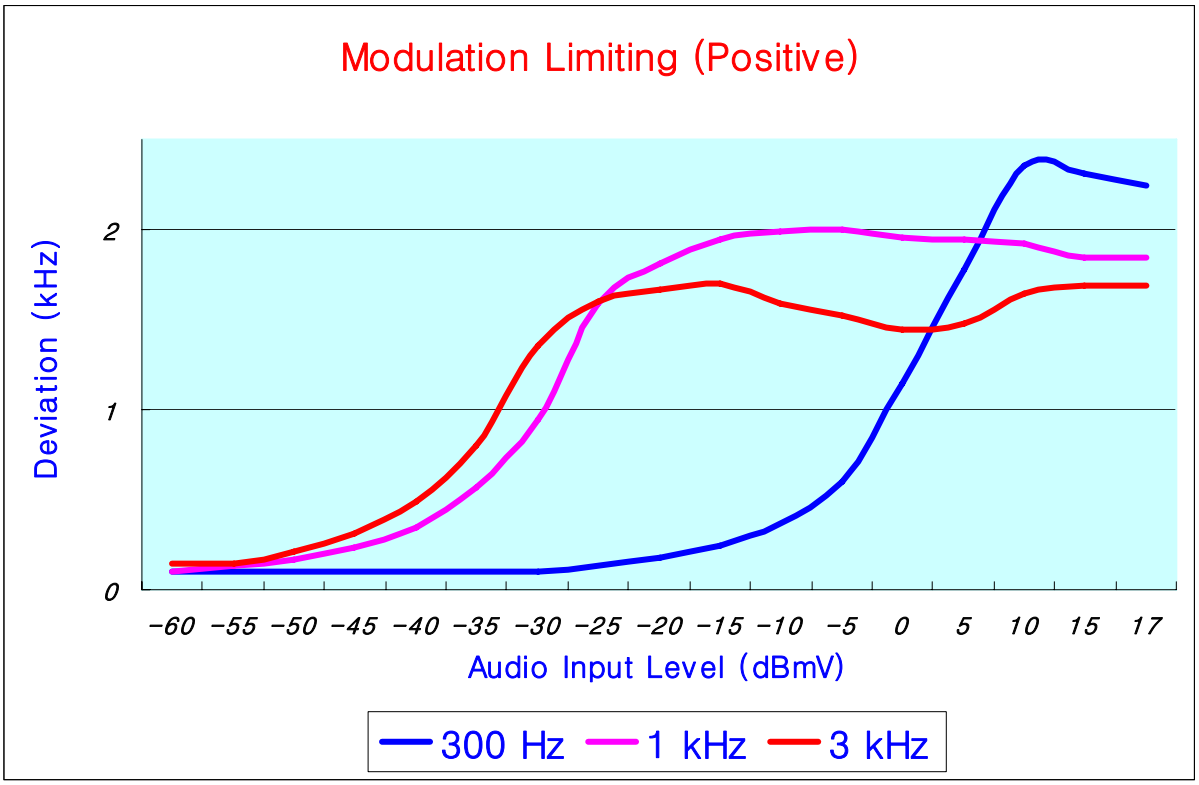
Audio Input Level (dBmV)	Positive Peak Deviation (kHz)			Negative Peak Deviation (kHz)		
	300 Hz	1 kHz	3 kHz	300 Hz	1 kHz	3 kHz
-60	0.10	0.15	0.17	0.10	0.14	0.17
-55	0.10	0.18	0.24	0.10	0.18	0.23
-50	0.10	0.26	0.35	0.10	0.26	0.34
-45	0.10	0.40	0.54	0.10	0.38	0.55
-40	0.11	0.64	0.90	0.11	0.63	0.90
-35	0.13	1.07	1.54	0.14	1.07	1.53
-30	0.17	1.84	2.64	0.16	1.84	2.61
-25	0.22	3.14	3.13	0.23	3.13	3.09
-20	0.32	3.58	3.26	0.32	3.55	3.22
-15	0.50	3.81	3.30	0.51	3.77	3.26
-10	0.83	3.91	3.08	0.85	3.84	3.25
-5	1.43	3.95	2.96	1.45	3.85	3.16
0	2.83	3.86	2.80	2.89	3.94	3.06
+5	3.67	3.84	2.88	3.73	3.97	3.12
+10	4.66	3.75	3.18	4.40	4.02	3.28
+15	4.55	3.63	3.28	4.39	4.08	3.28
+17	4.46	3.62	3.27	4.39	4.06	3.27

5.6.6.7 Data (WideBand, 3rd Channel)

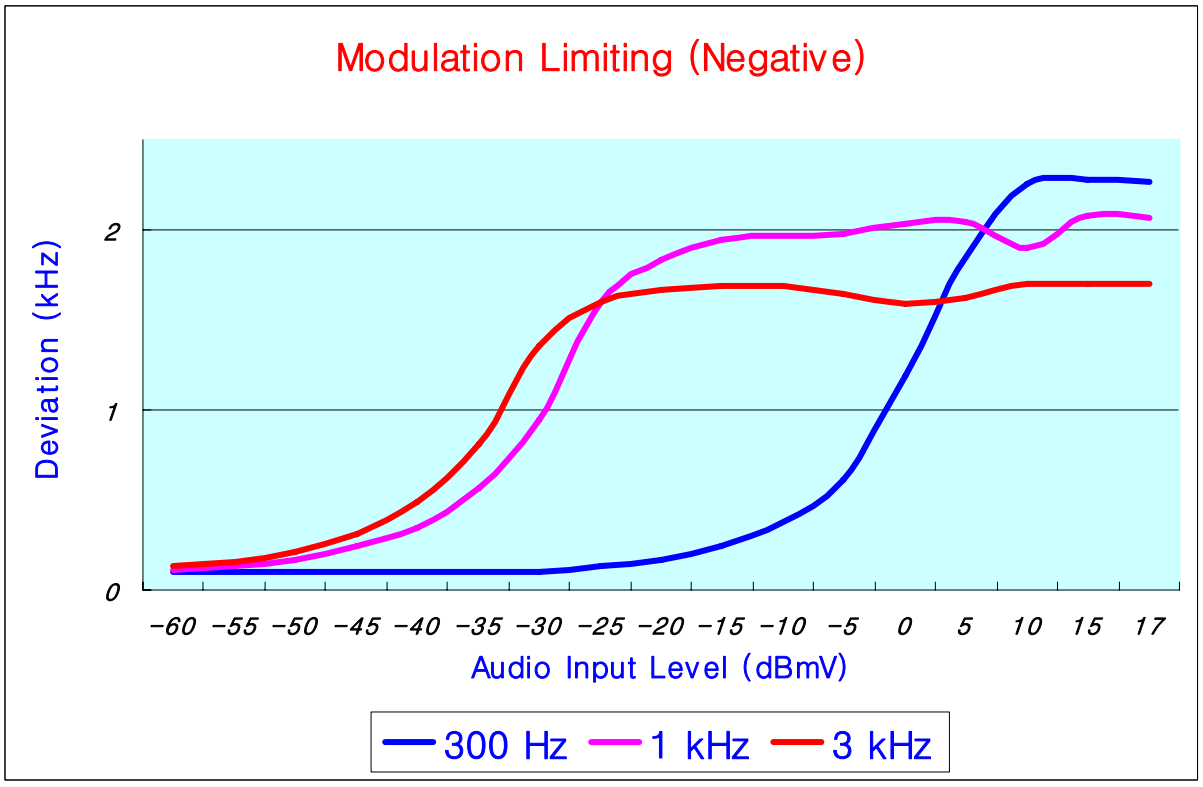
Audio Input Level (dBmV)	Positive Peak Deviation (kHz)			Negative Peak Deviation (kHz)		
	300 Hz	1 kHz	3 kHz	300 Hz	1 kHz	3 kHz
-60	0.10	0.15	0.17	0.10	0.14	0.17
-55	0.10	0.18	0.24	0.10	0.18	0.23
-50	0.10	0.30	0.33	0.10	0.28	0.34
-45	0.10	0.45	0.57	0.10	0.41	0.56
-40	0.11	0.67	0.89	0.11	0.65	0.92
-35	0.14	1.14	1.50	0.14	1.10	1.52
-30	0.18	1.90	2.60	0.17	1.85	2.65
-25	0.25	3.18	3.08	0.23	3.17	3.11
-20	0.35	3.54	3.15	0.34	3.50	3.15
-15	0.52	3.76	3.22	0.56	3.72	3.18
-10	0.87	3.83	3.00	0.86	3.79	3.02
-5	1.40	3.85	2.87	1.47	3.79	3.05
0	2.79	3.79	2.71	2.85	3.88	2.90
+5	3.60	3.79	2.80	3.70	3.90	3.04
+10	4.58	3.68	3.10	4.35	3.94	3.16
+15	4.45	3.65	3.22	4.34	4.01	3.14
+17	4.33	3.56	3.23	4.31	4.00	3.16

5.6.7 Graph

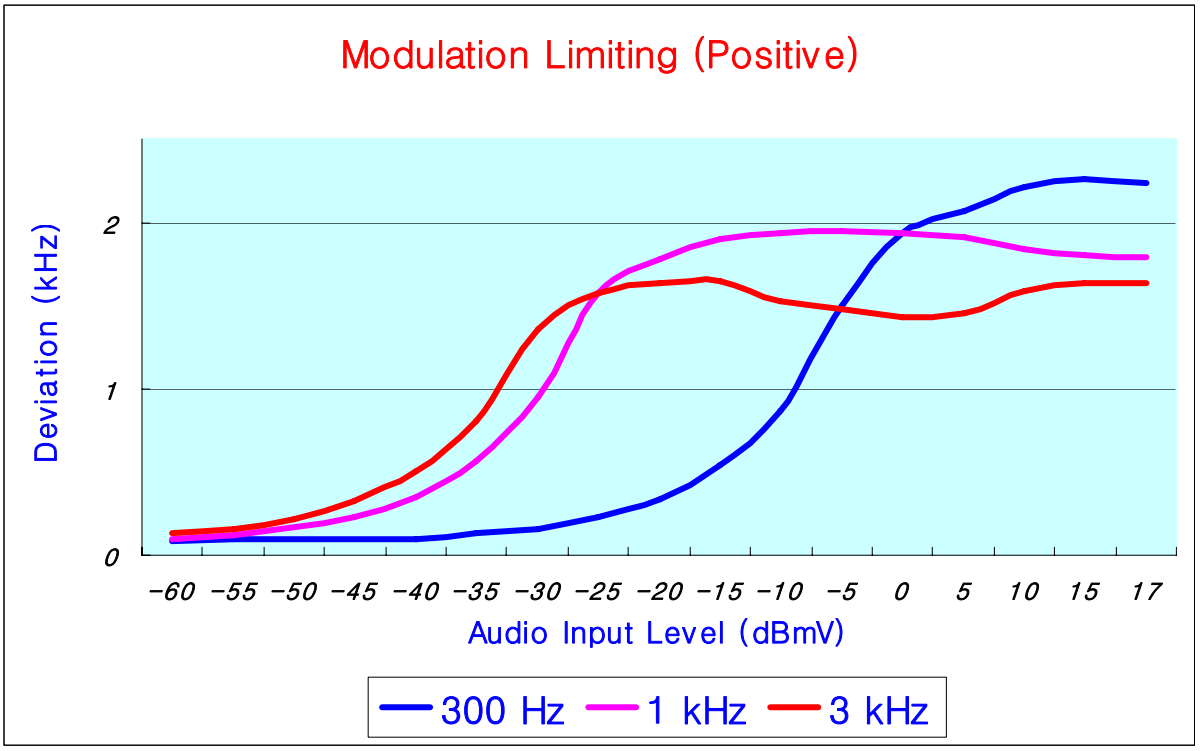
5.6.7.1 Narrow Band, 1st Channel, Positive



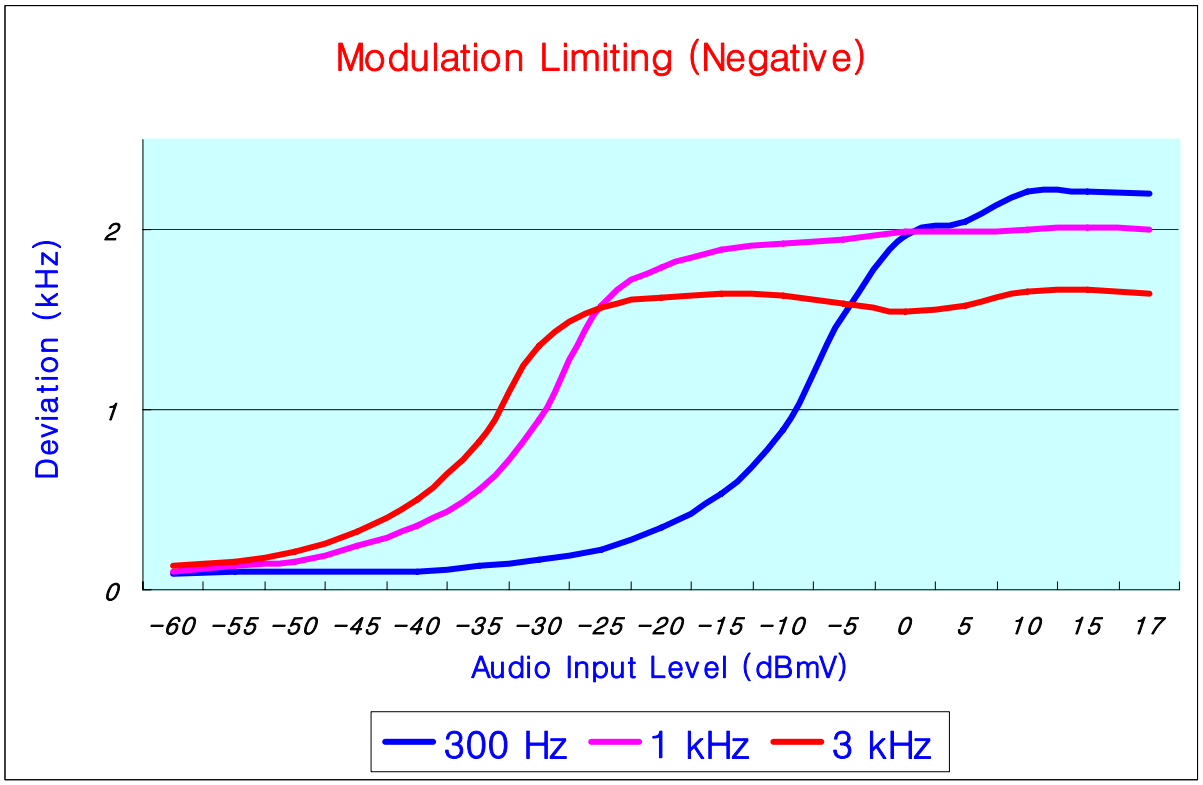
5.6.7.2 Narrow Band, 1st Channel, Negative



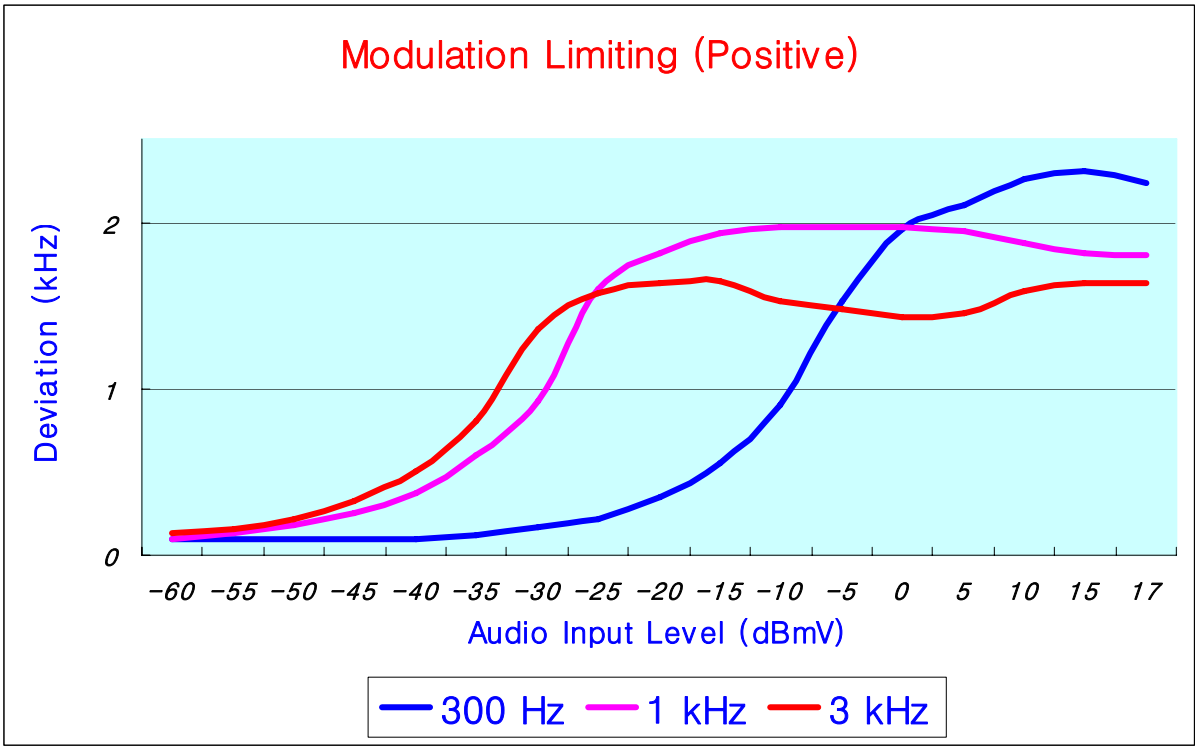
5.6.7.3 Narrow Band, 2nd Channel, Positive



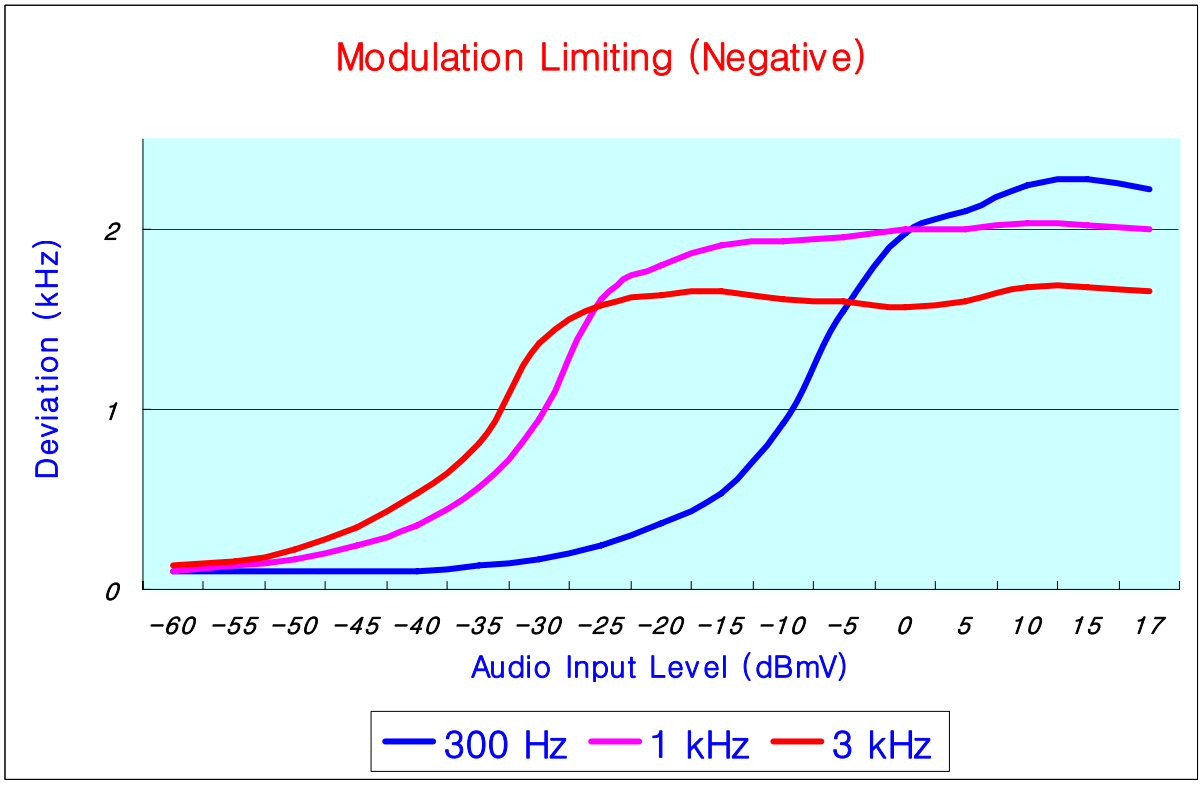
5.6.7.4 Narrow Band, 2nd Channel, Negative



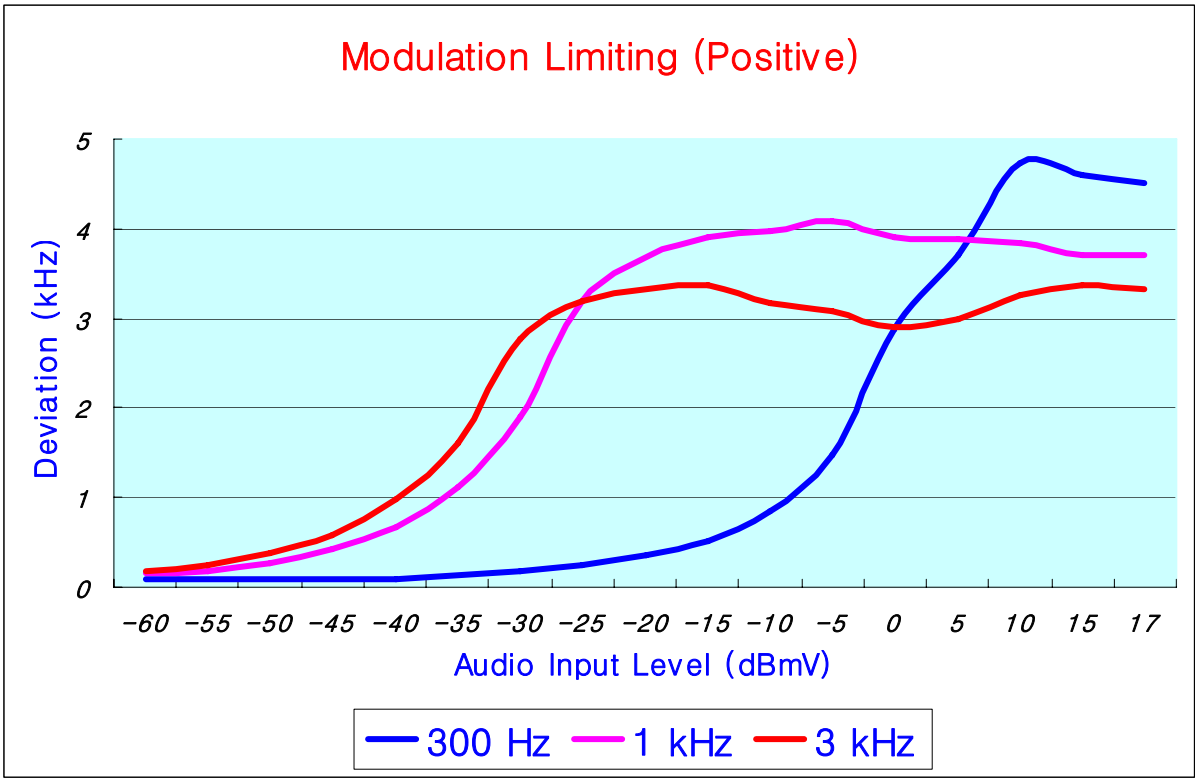
5.6.7.5 Narrow Band, 3rd Channel, Positive



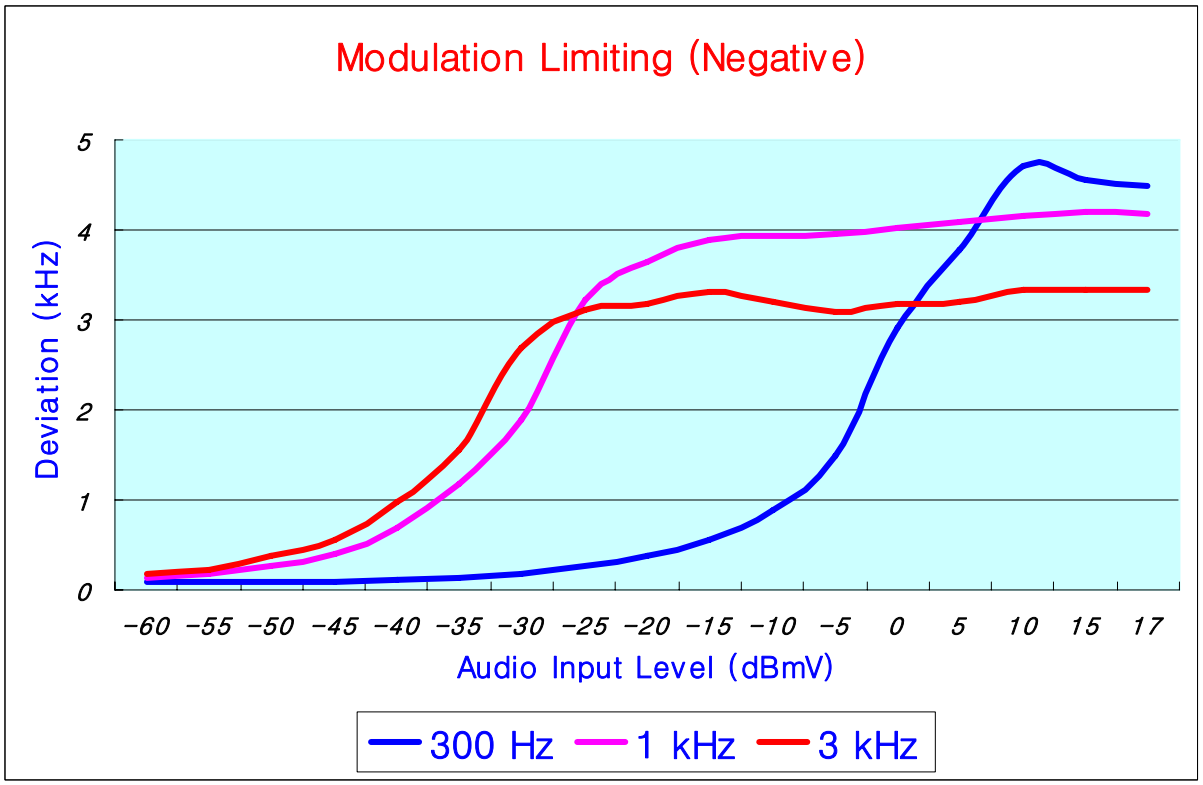
5.6.7.6 Narrow Band, 3rd Channel, Negative



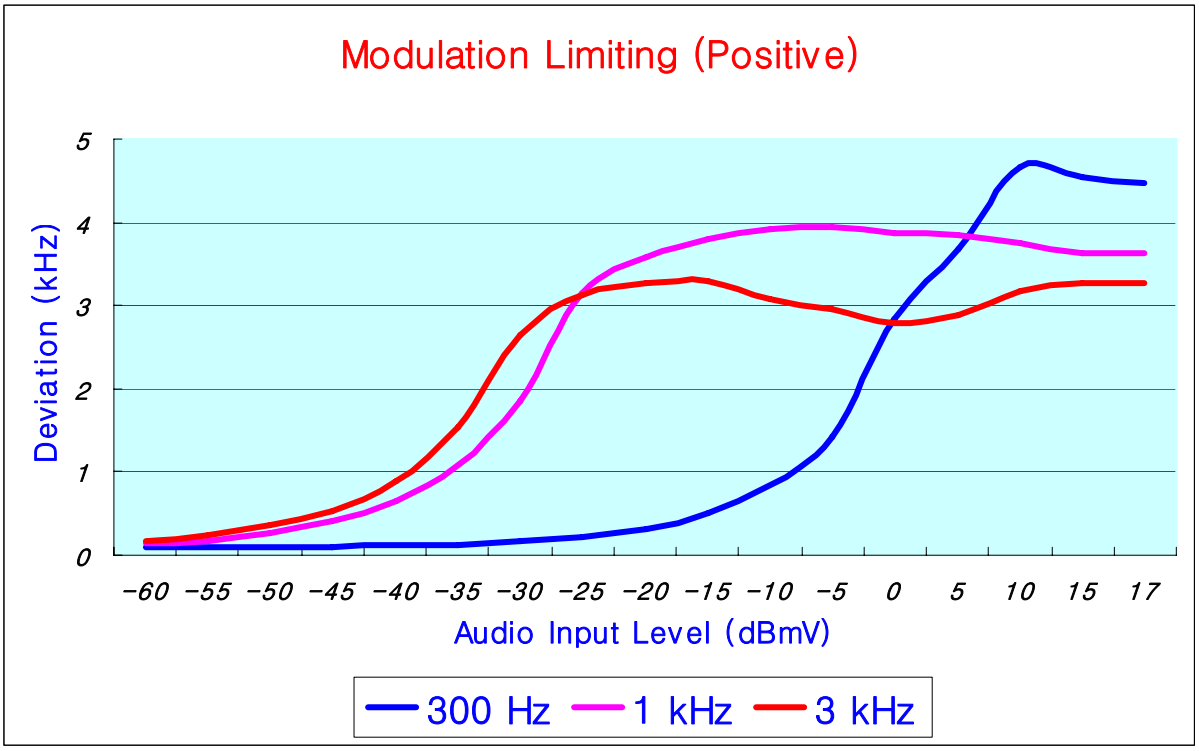
5.6.8.7 WideBand, 1st Channel, Positive



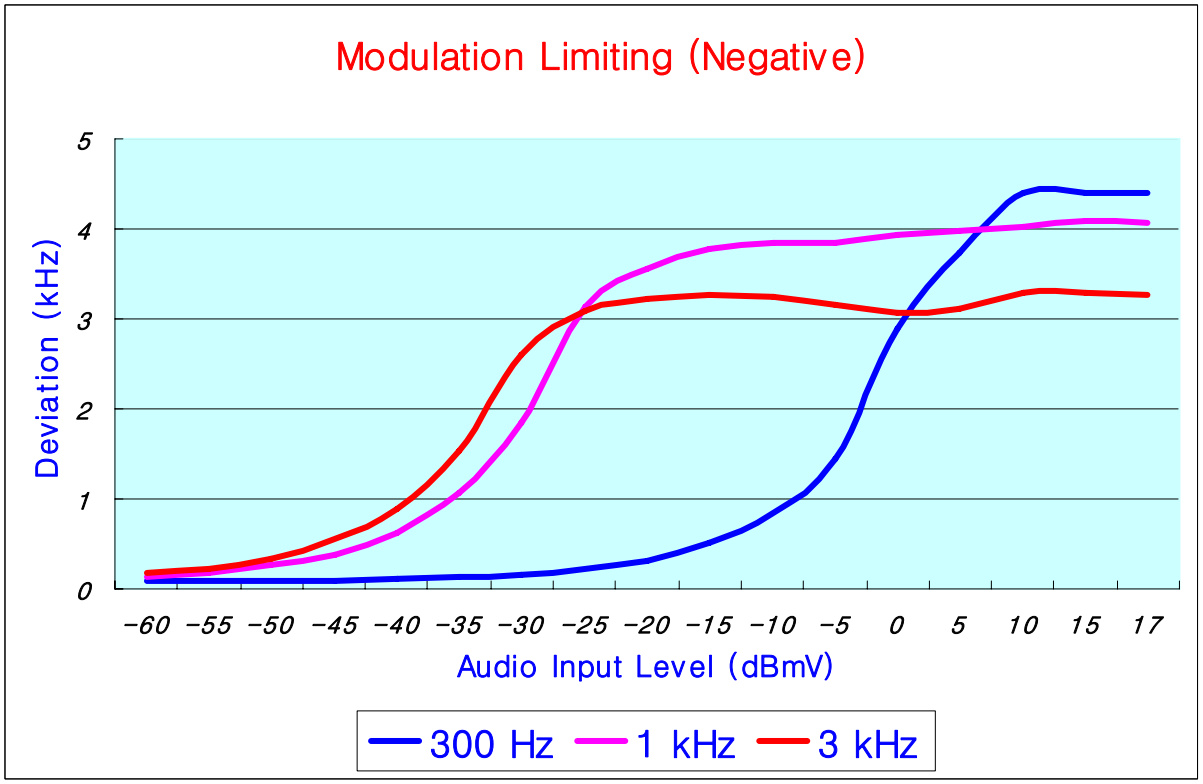
5.6.8.8 WideBand, 1st Channel, Negative



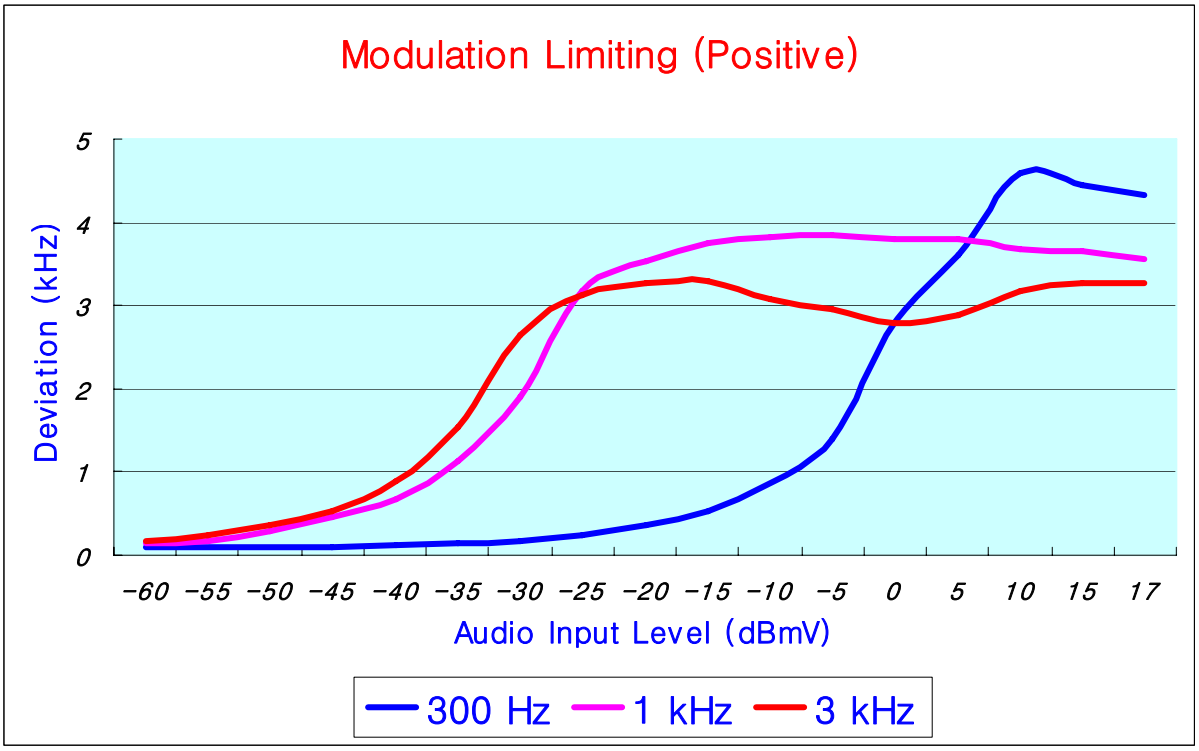
5.6.8.9 WideBand, 2nd Channel, Positive



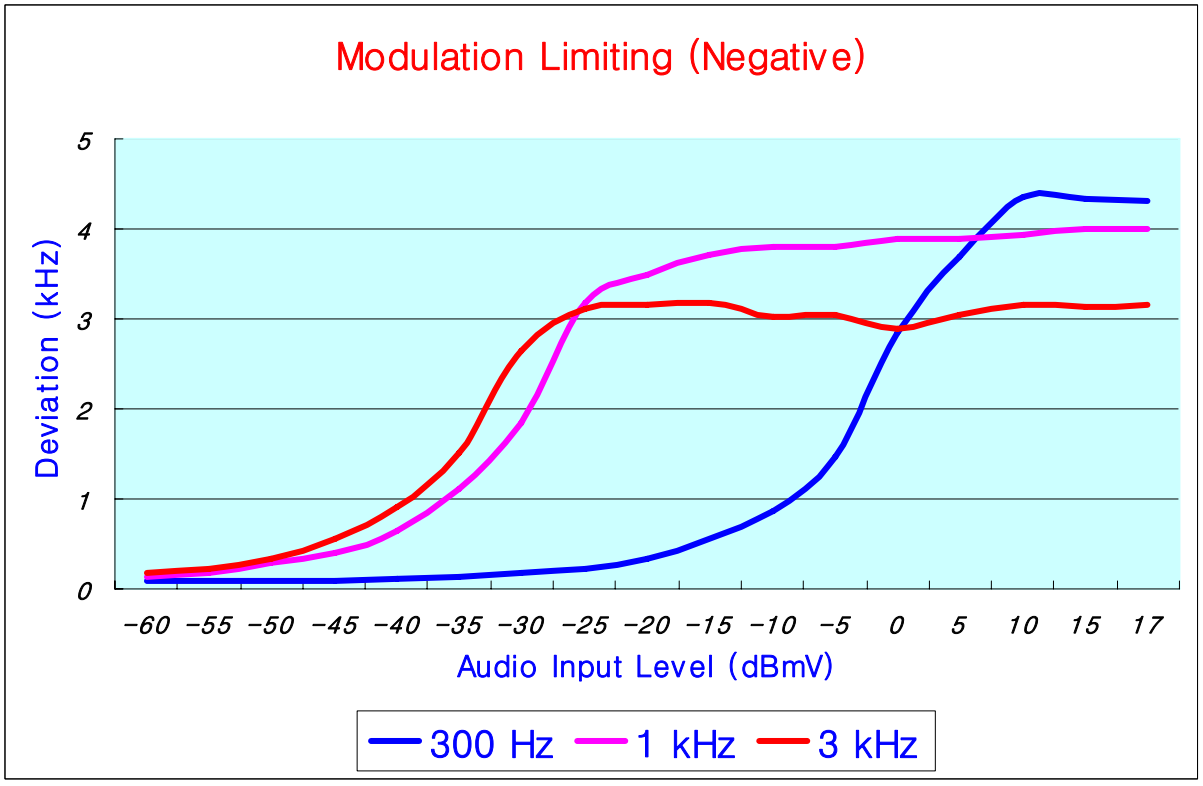
5.6.8.10 WideBand, 2nd Channel, Negative



5.6.8.11 WideBand, 3rd Channel, Positive



5.6.8.12 WideBand, 3rd Channel, Negative



5.7 Occupied Bandwidth

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission. pecified limits according to the emission mask per section 90.210 is as below.

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

(1) On any frequency removed from the assigned frequency by more than 50 percent, but not more than 100 percent of the authorized bandwidth: At least 25 dB.

(2) On any frequency removed from the assigned frequency by more than 100 percent, but not more than 250 per-cent of the authorized bandwidth: At least 35 dB.

(3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized band-width: At least 43 + 10 log (P) dB.

Emission Mask D. 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) On any frequency from the center of the authorized bandwidth f0 to 5.625 kHz removed from f0: Zero dB.

(2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 5.625 kHz but no more than 12.5 kHz: At least 7.27(fd ´2.88 kHz) dB.

(3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 12.5 kHz: At least 50 + 10 log (P) dB or 70 dB, whichever is the lesser attenuation.

5.7.1 Specification

FCC Rules Part 2, Section 2.1049
FCC Rules Part 90, Section 90.210
Industry Canada, RSS-119 Section 5.5

5.7.2 Method of Measurement

ANSI/TIA-603-B-2002 Section 2.2.11

5.7.3 Measurement Set-Up

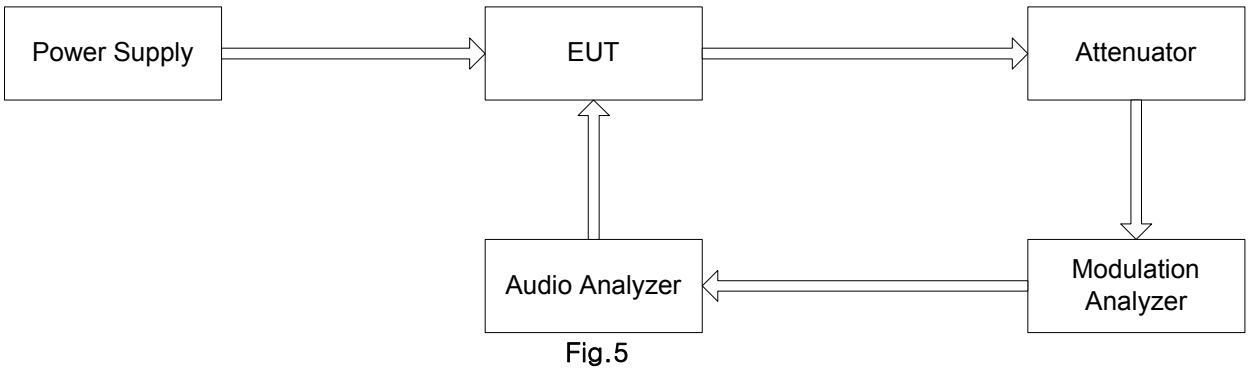


Fig.5

5.7.4 Test Equipment List

Equipment	Model Name	Manufacturer
EUT	SP1402	Maxon CIC Corp.
Power Supply	IPS-30B03DD	INTERACT
Audio Analyzer	8903B	Agilent
Spectrum Analyzer	FSP7	Rohde & Shwarz
Attenuator	33-30-33	WEINSCHEL

5.7.5 Measurement Procedure

-. The unit was turn-up in accordance with the alignment procedure stated in the FIG. 5 , and was loaded into a 50 ohm resistive termination.
-. The radio transmitter was modulated by a 2500 Hz tone at an input level 16 dB greater than that necessary to produce 50 percent modulation. The input level shall be established at the frequency of maximum response of the audio modulating circuit.
-. The occupied bandwidth data is obtained for 25kHz and 12.5 kHz channel bandwidth.

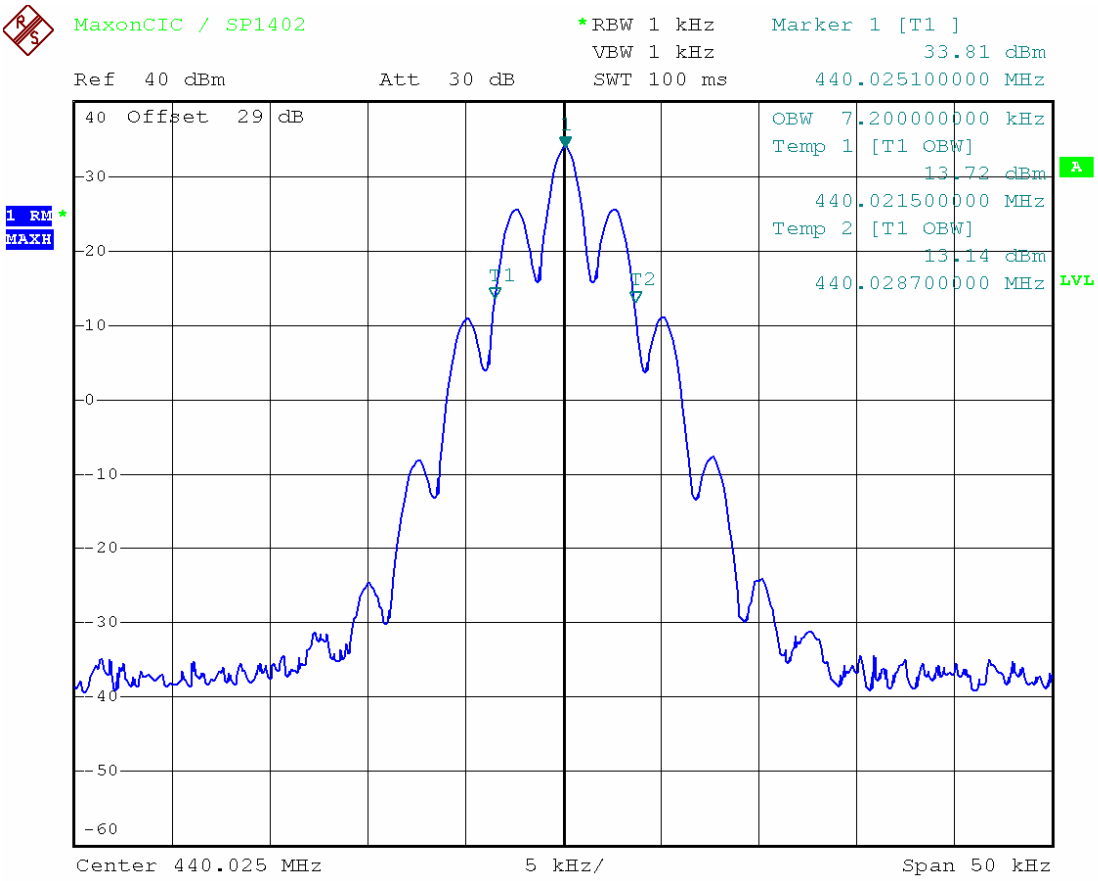
5.7.6 Data

Frequency (MHz)	Channel Spacing	Applicable Emission Mask	99% Bandwidth (kHz)	Maximum Authorized Bandwidth (KHz)
440.025 MHz	Narrow	D	7.2	11.25
	Wide	B	11.7	20.00
455.000 MHz	Narrow	D	7.0	11.25
	Wide	B	11.5	20.00
469.975 MHz	Narrow	D	7.0	11.25
	Wide	B	11.5	20.00

5.7.6 99% Bandwidth

5.7.6.1 Plot 1

FCC Rules :	Part 2 §2.1053(a) & §90.210
IC Rules :	RSS-119 Section 5.5
Operating Frequency :	440.025 MHz
Channel :	1st Channel
Power Output :	5 Watts
Channel Spacing :	Narrow Band
Modulation Signal :	FM modulation with 2.5kHz sine wave signal
Emission Mask :	99% Bandwidth
Reference Voltage :	7.5 VDC



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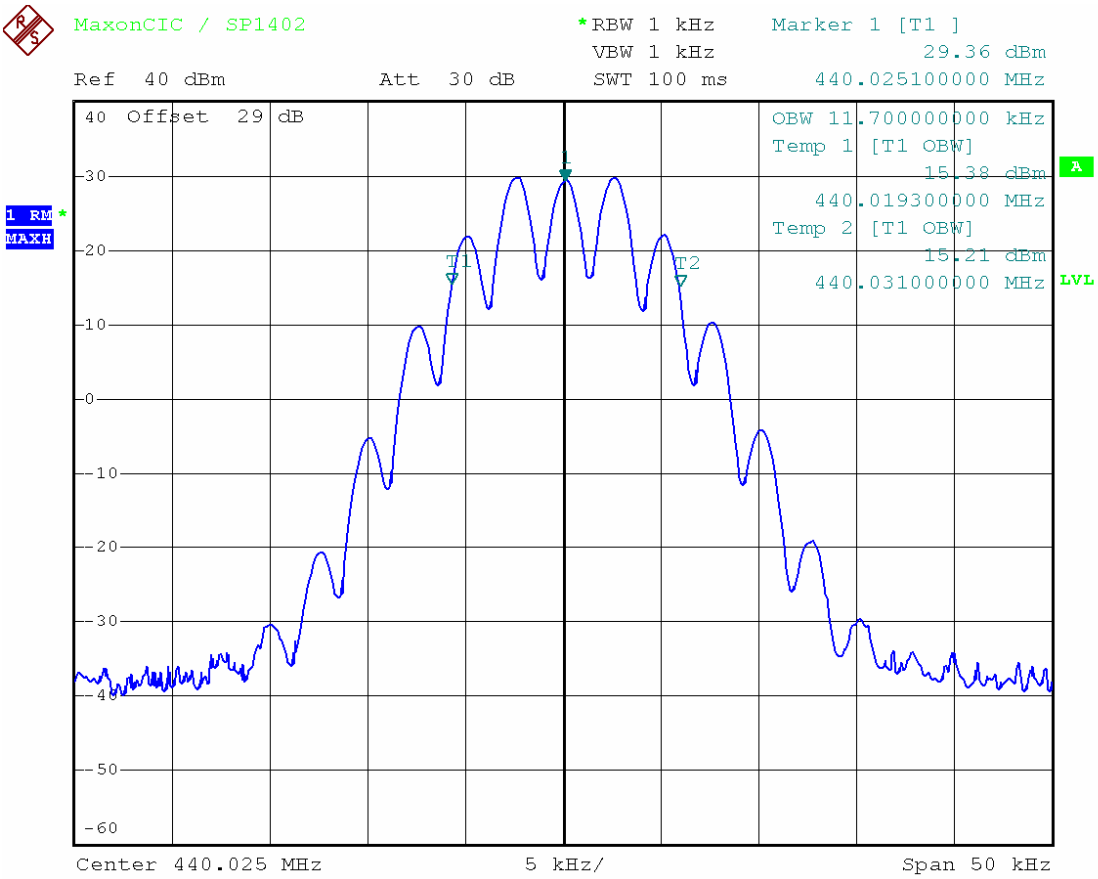
5.7.6.2 Plot 2

FCC Rules :	Part 2 §2.1053(a) & §90.210
IC Rules :	RSS-119 Section 5.5
Operating Frequency :	440.025 MHz
Channel :	1st Channel
Power Output :	5 Watts
Channel Spacing :	WideBand
Modulation Signal :	FM modulation with 2.5kHz sine wave signal
Emission Mask :	99% Bandwidth
Reference Voltage :	7.5 VDC



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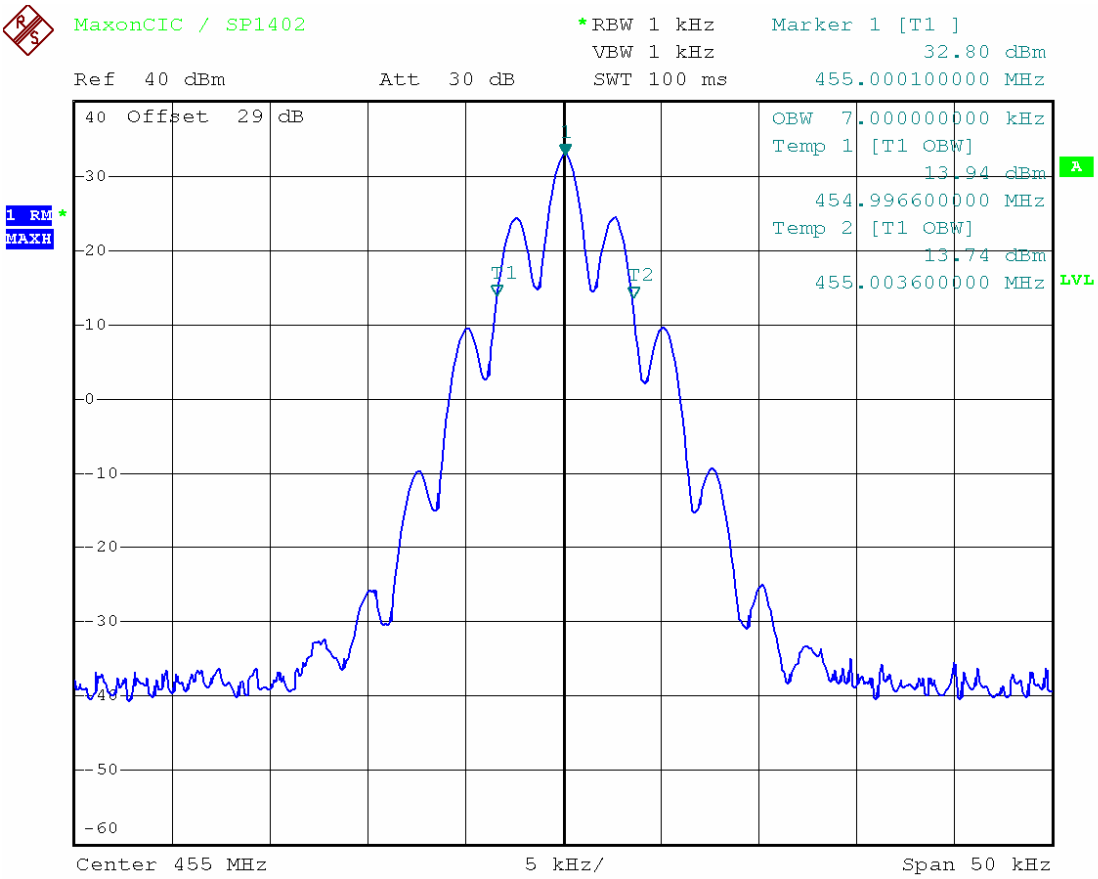
5.7.6.3 Plot 3

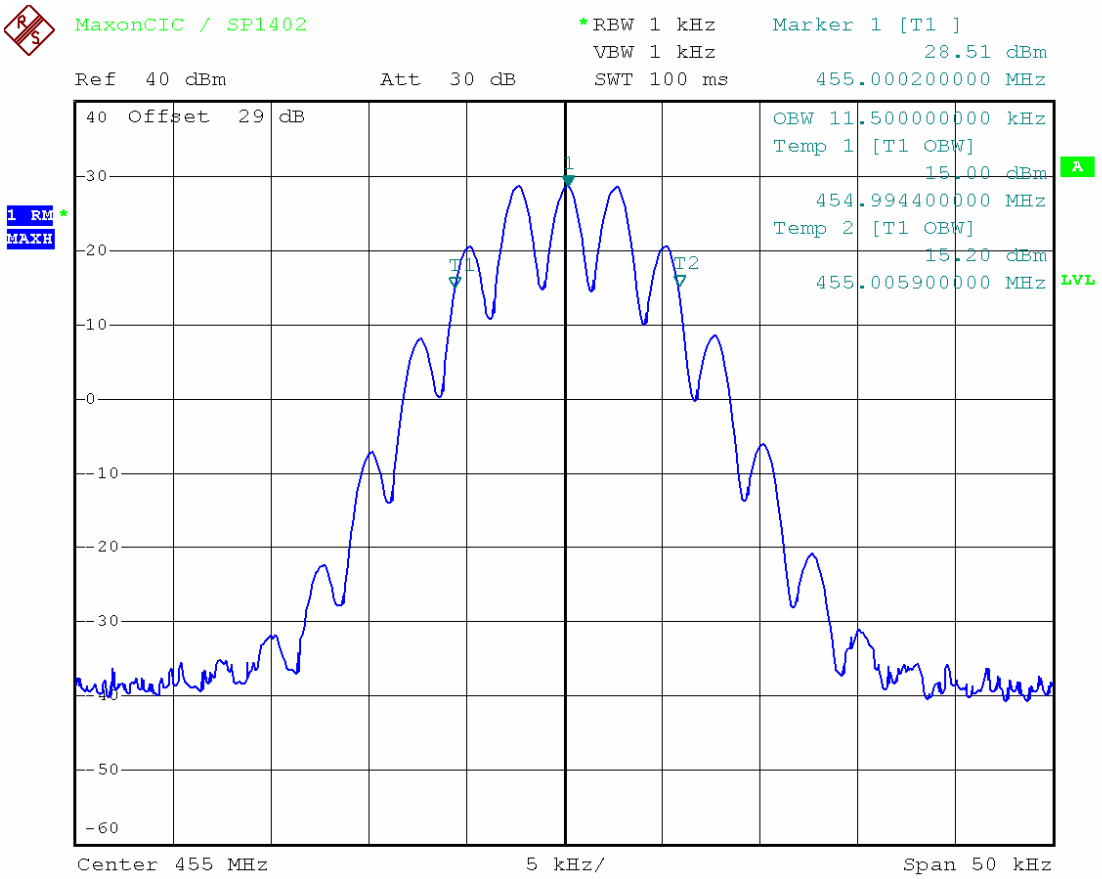
FCC Rules :	Part 2 §2.1053(a) & §90.210
IC Rules :	RSS-119 Section 5.5
Operating Frequency :	455.000 MHz
Channel :	2nd Channel
Power Output :	5 Watts
Channel Spacing :	Narrow Band
Modulation Signal :	FM modulation with 2.5kHz sine wave signal
Emission Mask :	99% Bandwidth
Reference Voltage :	7.5 VDC



Date: 18.JAN.2008 09:51:03

5.7.6.4 Plot 4

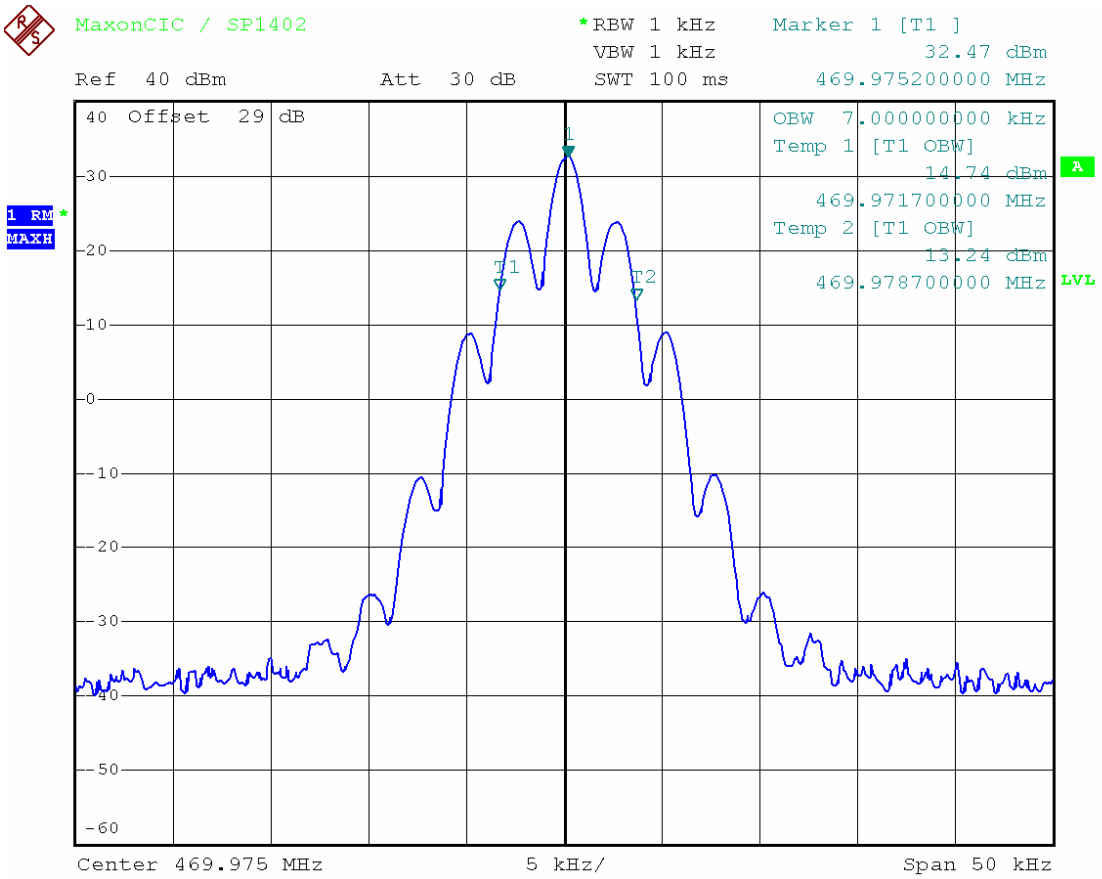
FCC Rules :	Part 2 §2.1053(a) & §90.210
IC Rules :	RSS-119 Section 5.5
Operating Frequency :	455.000 MHz
Channel :	2nd Channel
Power Output :	5 Watts
Channel Spacing :	WideBand
Modulation Signal :	FM modulation with 2.5kHz sine wave signal
Emission Mask :	99% Bandwidth
Reference Voltage :	7.5 VDC



Date: 18.JAN.2008 09:53:49

5.7.6.5 Plot 5

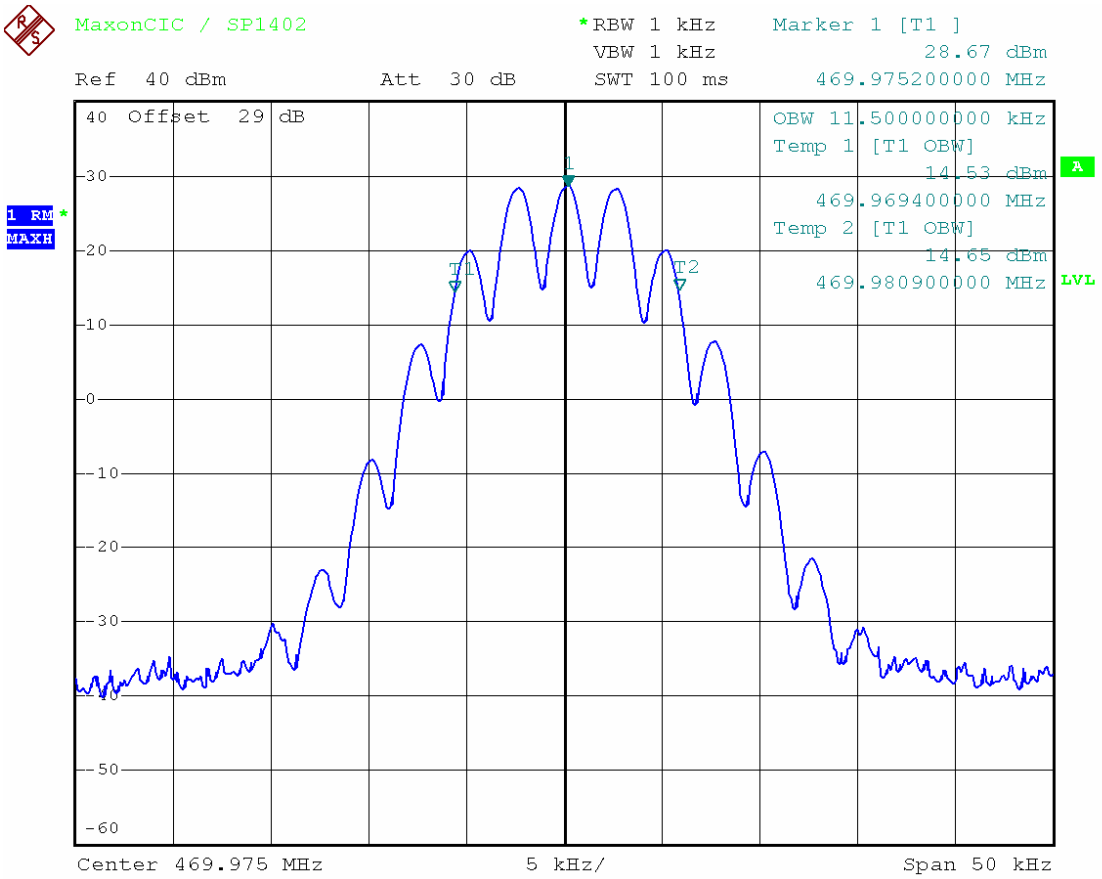
FCC Rules :	Part 2 §2.1053(a) & §90.210
IC Rules :	RSS-119 Section 5.5
Operating Frequency :	469.975 MHz
Channel :	3rd Channel
Power Output :	5 Watts
Channel Spacing :	Narrow Band
Modulation Signal :	FM modulation with 2.5kHz sine wave signal
Emission Mask :	99% Bandwidth
Reference Voltage :	7.5 VDC



Date: 18.JAN.2008 09:51:40

5.7.6.6 Plot 6

FCC Rules :	Part 2 §2.1053(a) & §90.210
IC Rules :	RSS-119 Section 5.5
Operating Frequency :	469.975 MHz
Channel :	3rd Channel
Power Output :	5 Watts
Channel Spacing :	WideBand
Modulation Signal :	FM modulation with 2.5kHz sine wave signal
Emission Mask :	99% Bandwidth
Reference Voltage :	7.5 VDC

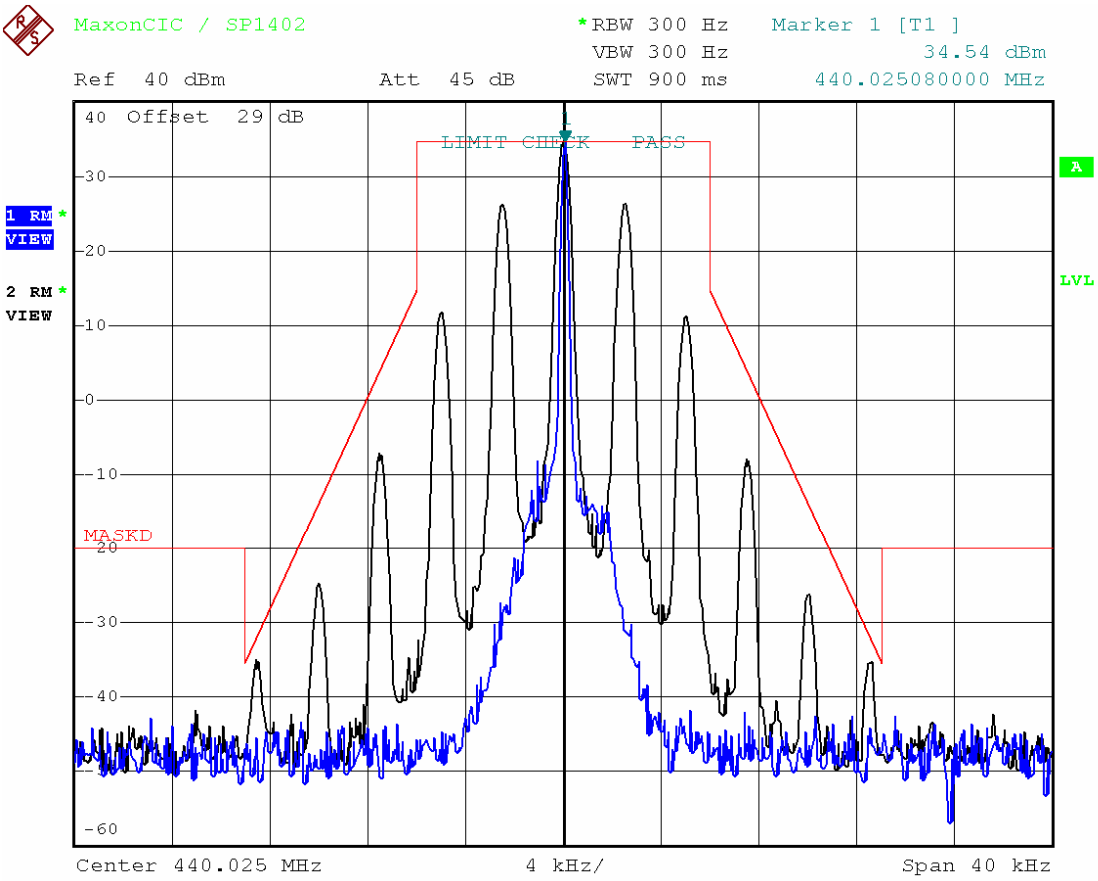


Date: 18.JAN.2008 09:53:20

5.7.7 Emission Mask

5.5.7.1 Plot 1

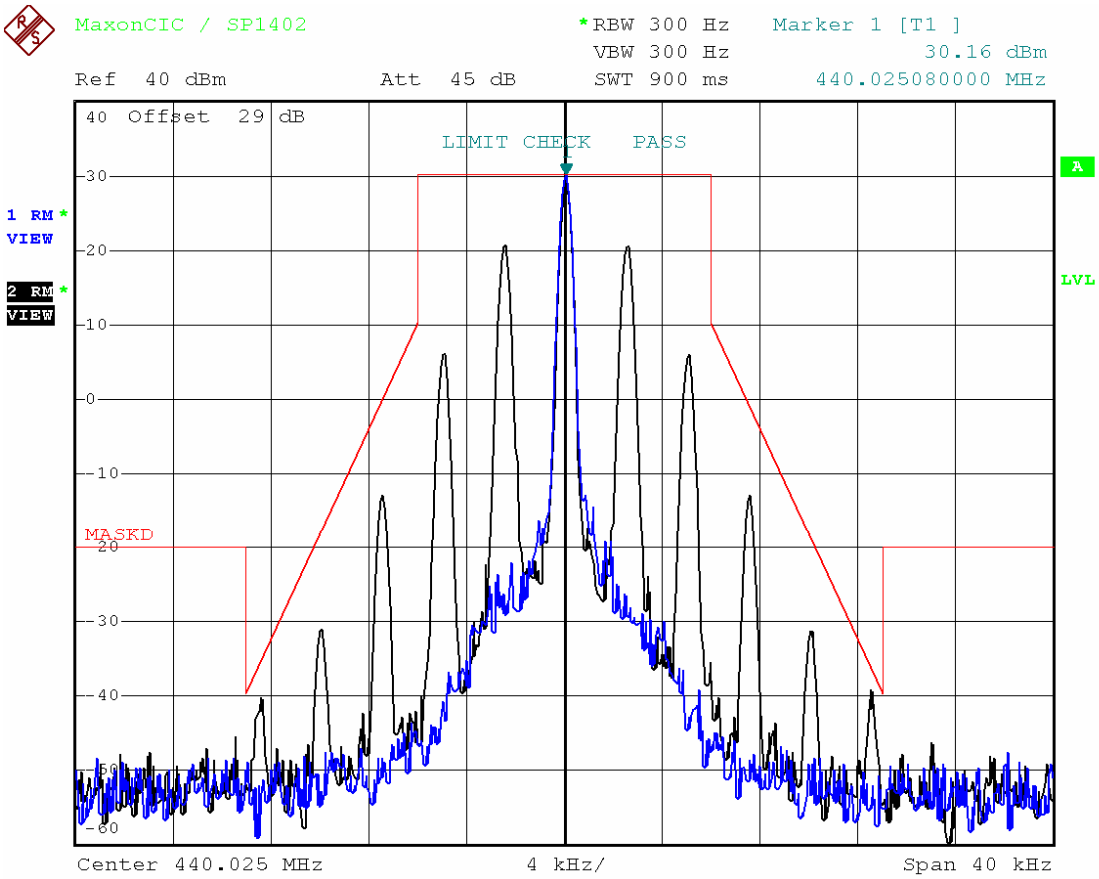
FCC Rules :	Part 2 §2.1053(a) & §90.210
IC Rules :	RSS-119 Section 5.5
Operating Frequency :	440.025 MHz
Channel :	1st Channel
Power Output :	5 Watts
Channel Spacing :	Narrow Band
Modulation Signal :	FM modulation with 2.5kHz sine wave signal
Emission Mask :	Mask B
Reference Voltage :	7.5 VDC



Date: 18.JAN.2008 12:02:43

5.7.7.2 Plot 2

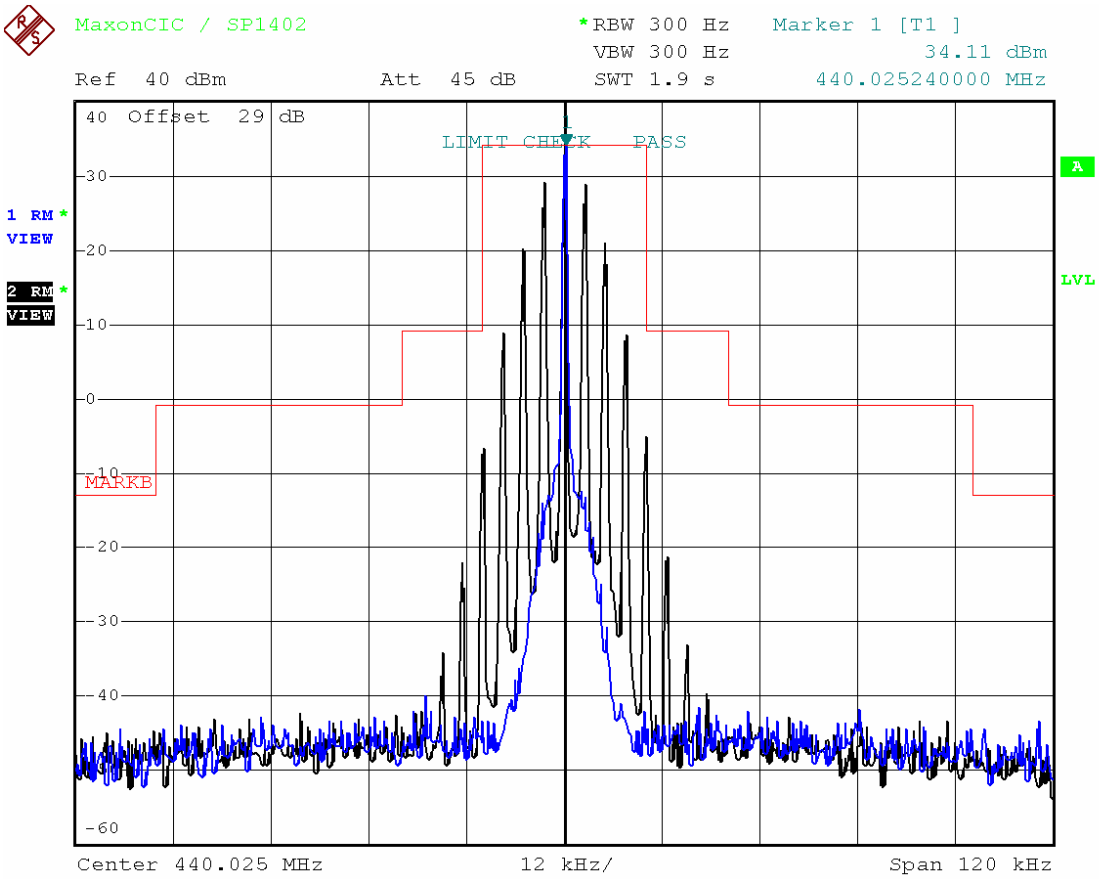
FCC Rules :	Part 2 §2.1053(a) & §90.210
IC Rules :	RSS-119 Section 5.5
Operating Frequency :	440.025 MHz
Channel :	1st Channel
Power Output :	1 Watts
Channel Spacing :	Narrow Band
Modulation Signal :	FM modulation with 2.5kHz sine wave signal
Emission Mask :	Mask B
Reference Voltage :	7.5 VDC



Date: 18.JAN.2008 12:06:15

5.7.7.3 Plot 3

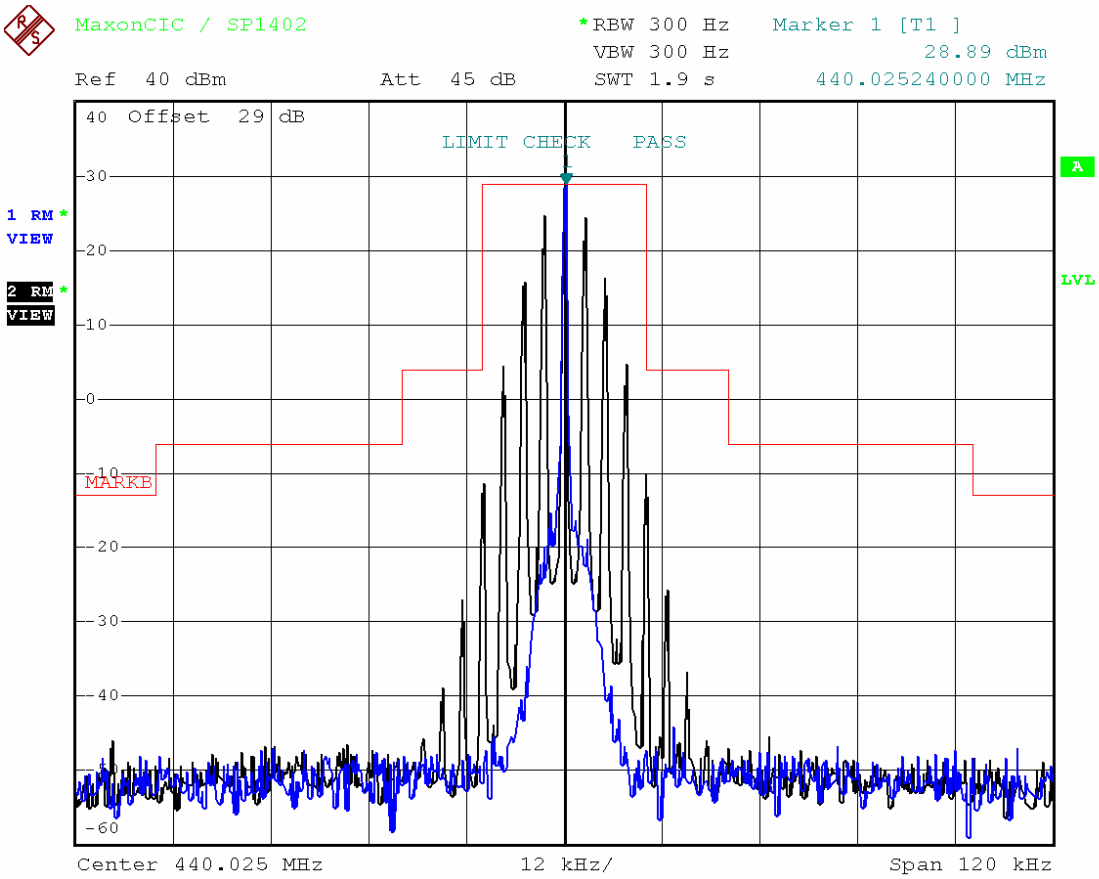
FCC Rules :	Part 2 §2.1053(a) & §90.210
IC Rules :	RSS-119 Section 5.5
Operating Frequency :	440.025 MHz
Channel :	1st Channel
Power Output :	5 Watts
Channel Spacing :	WideBand
Modulation Signal :	FM modulation with 2.5kHz sine wave signal
Emission Mask :	Mask B
Reference Voltage :	7.5 VDC



Date: 18.JAN.2008 13:02:42

5.7.7.4 Plot 4

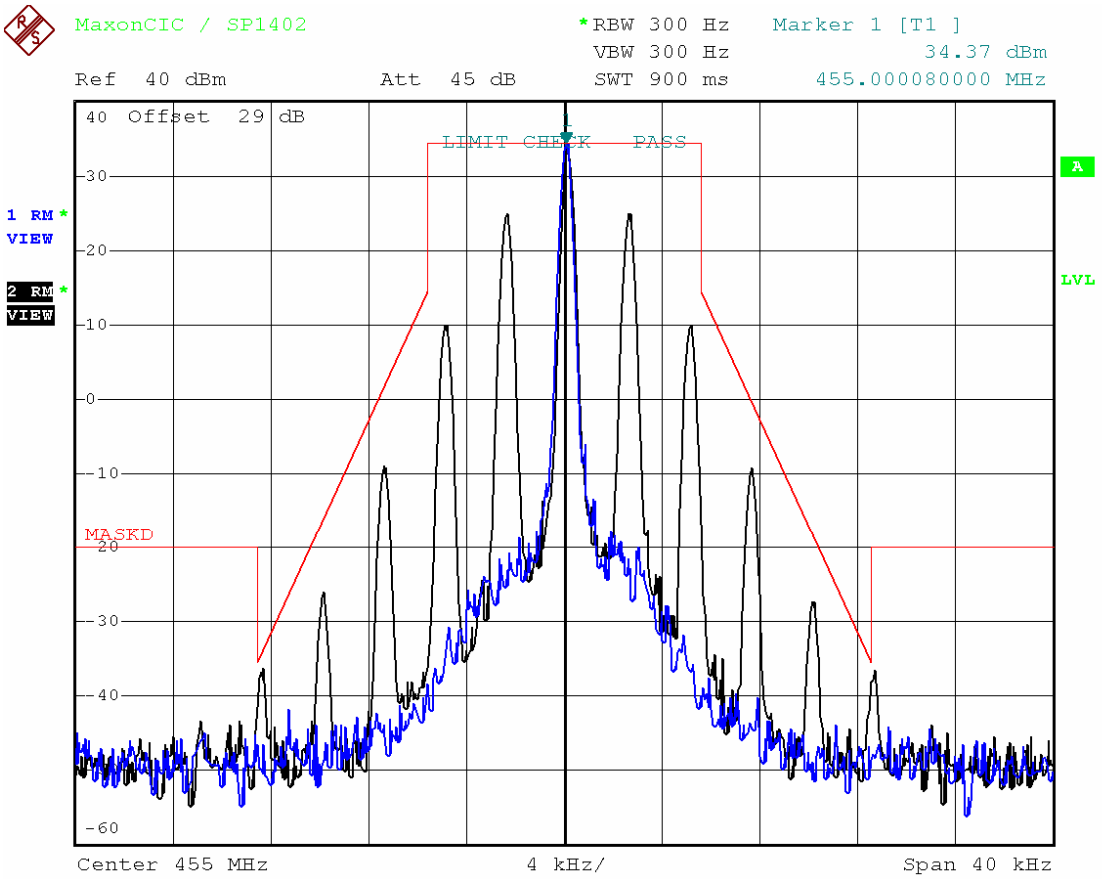
FCC Rules :	Part 2 §2.1053(a) & §90.210
IC Rules :	RSS-119 Section 5.5
Operating Frequency :	440.025 MHz
Channel :	1st Channel
Power Output :	1 Watts
Channel Spacing :	WideBand
Modulation Signal :	FM modulation with 2.5kHz sine wave signal
Emission Mask :	Mask B
Reference Voltage :	7.5 VDC



Date: 18.JAN.2008 13:04:30

5.7.7.5 Plot 5

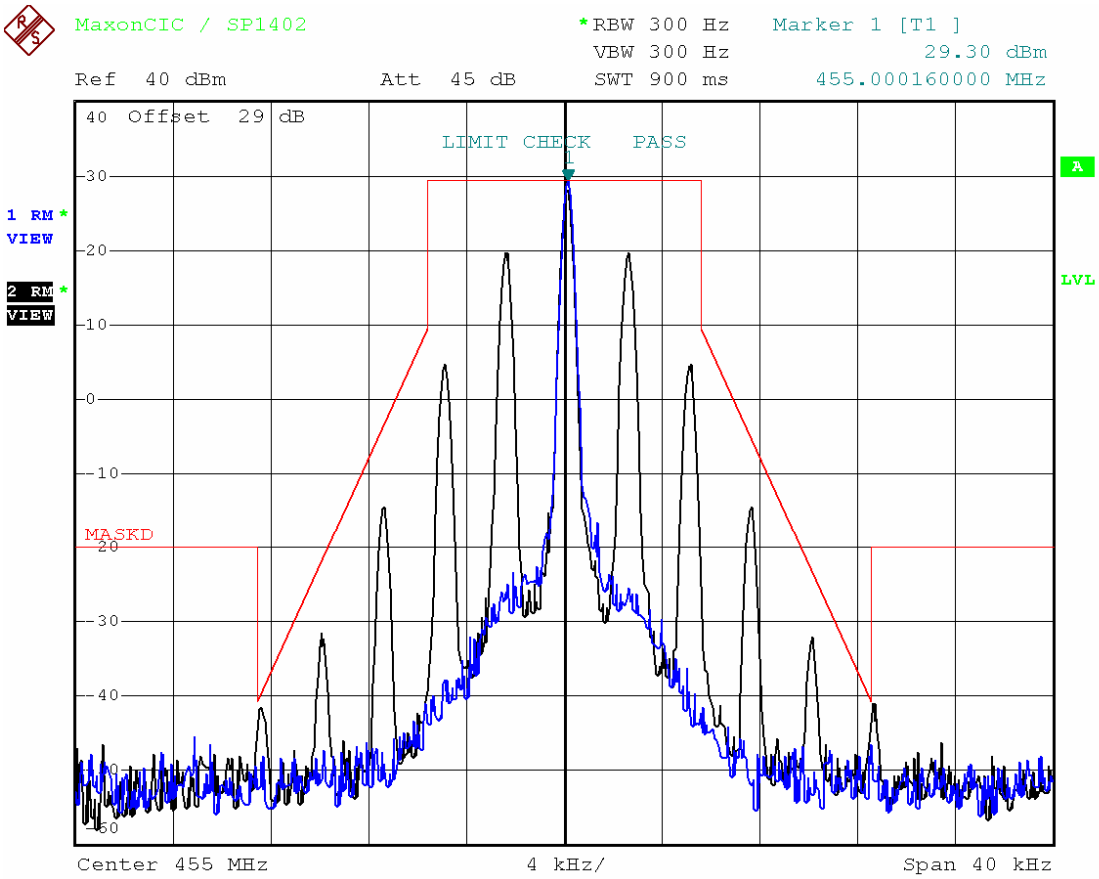
FCC Rules :	Part 2 §2.1053(a) & §90.210
IC Rules :	RSS-119 Section 5.5
Operating Frequency :	455.000 MHz
Channel :	2nd Channel
Power Output :	5 Watts
Channel Spacing :	Narrow Band
Modulation Signal :	FM modulation with 2.5kHz sine wave signal
Emission Mask :	Mask D
Reference Voltage :	7.5 VDC



Date: 18.JAN.2008 12:13:37

5.7.7.6 Plot 6

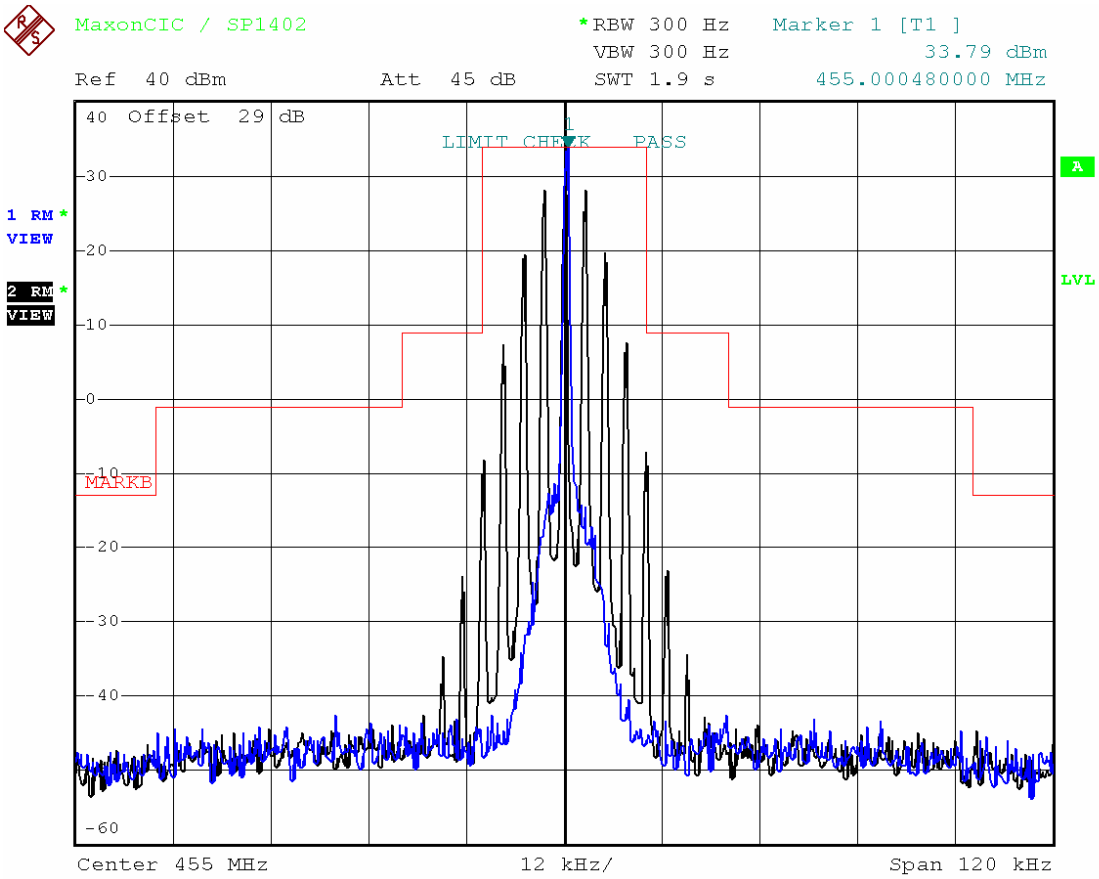
FCC Rules :	Part 2 §2.1053(a) & §90.210
IC Rules :	RSS-119 Section 5.5
Operating Frequency :	455.000 MHz
Channel :	2nd Channel
Power Output :	1 Watt
Channel Spacing :	Narrow Band
Modulation Signal :	FM modulation with 2.5kHz sine wave signal
Emission Mask :	Mask D
Reference Voltage :	7.5 VDC



Date: 18.JAN.2008 12:16:45

5.7.7.7 Plot 7

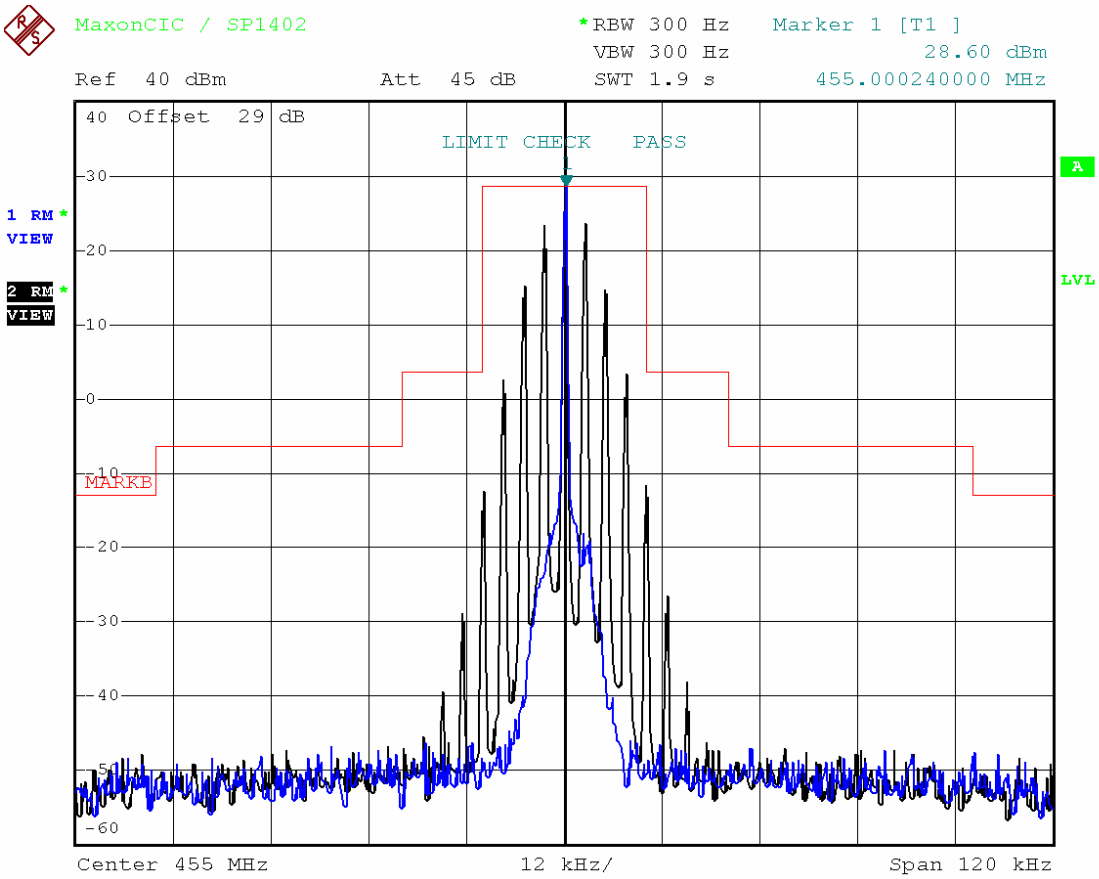
FCC Rules :	Part 2 §2.1053(a) & §90.210
IC Rules :	RSS-119 Section 5.5
Operating Frequency :	455.000 MHz
Channel :	2nd Channel
Power Output :	5 Watts
Channel Spacing :	WideBand
Modulation Signal :	FM modulation with 2.5kHz sine wave signal
Emission Mask :	Mask B
Reference Voltage :	7.5 VDC



Date: 18.JAN.2008 12:56:12

5.7.7.8 Plot 8

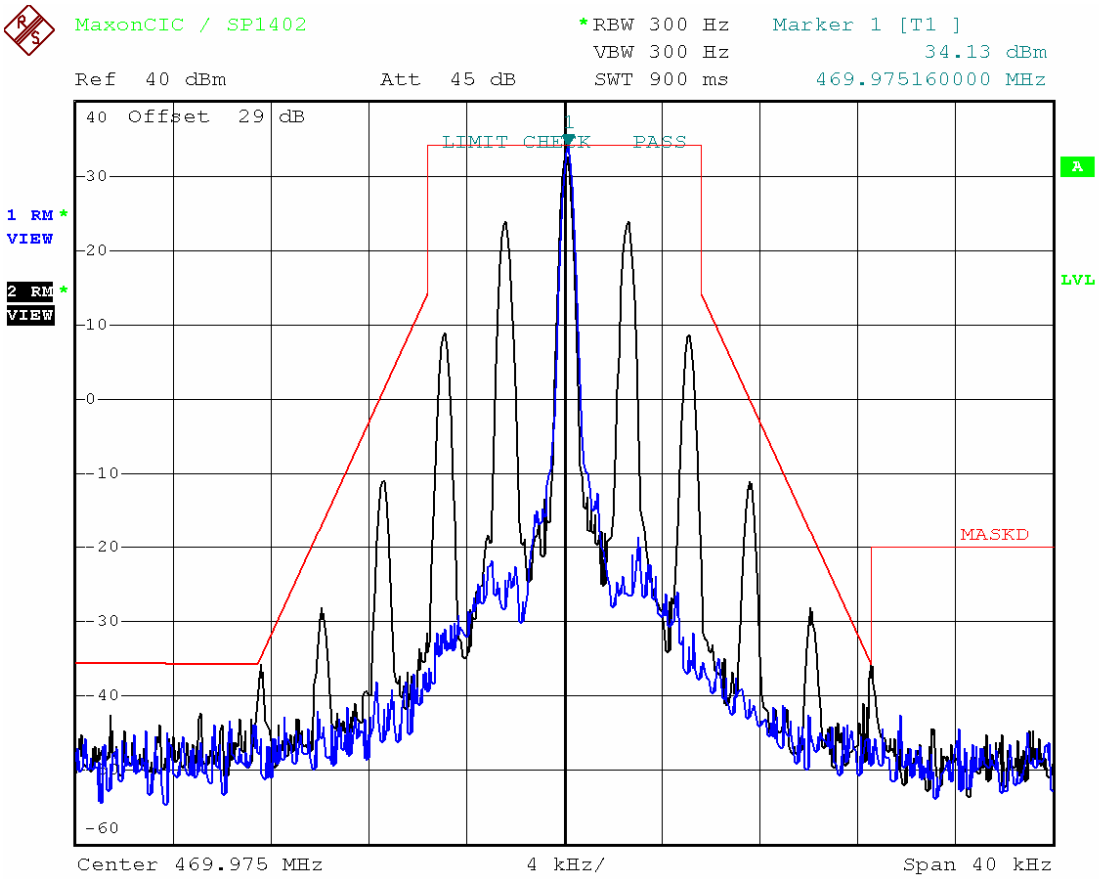
FCC Rules :	Part 2 §2.1053(a) & §90.210
IC Rules :	RSS-119 Section 5.5
Operating Frequency :	455.000 MHz
Channel :	2nd Channel
Power Output :	1 Watt
Channel Spacing :	WideBand
Modulation Signal :	FM modulation with 2.5kHz sine wave signal
Emission Mask :	Mask B
Reference Voltage :	7.5 VDC



Date: 18.JAN.2008 12:58:27

5.7.7.9 Plot 9

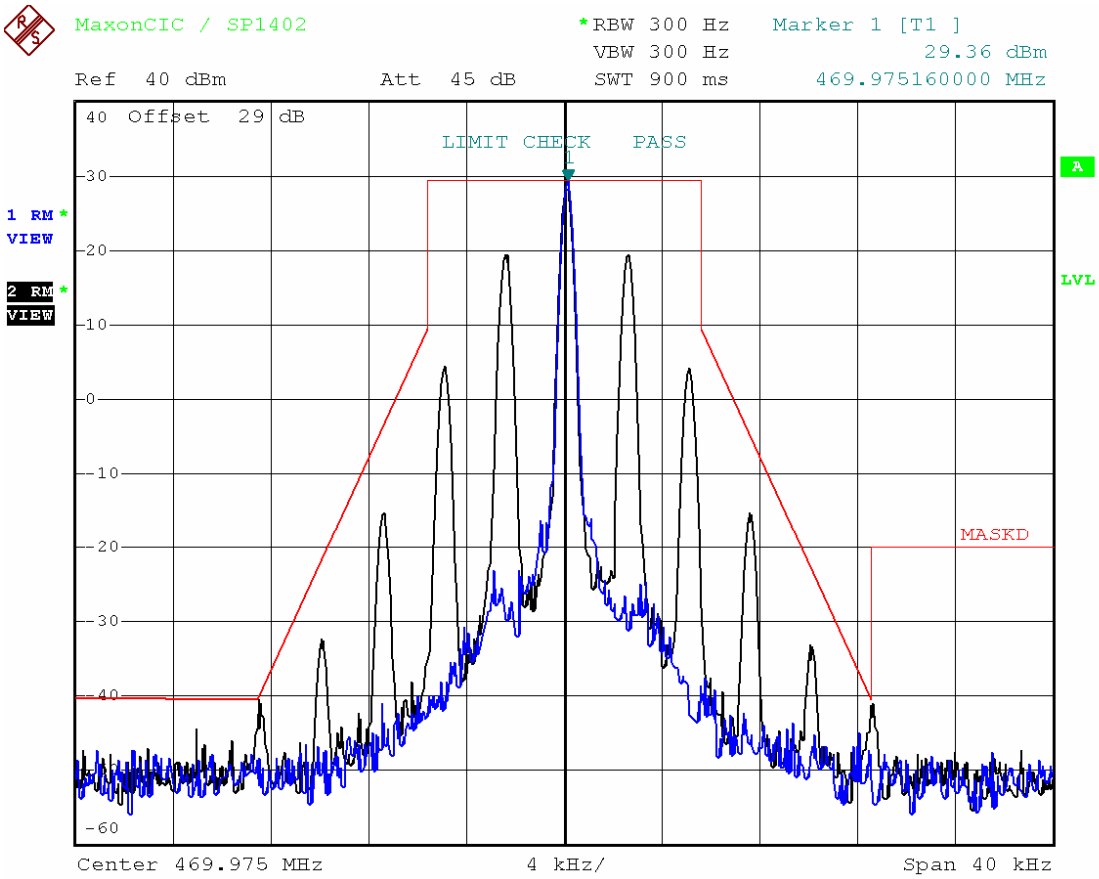
FCC Rules :	Part 2 §2.1053(a) & §90.210
IC Rules :	RSS-119 Section 5.5
Operating Frequency :	469.975 MHz
Channel :	3rd Channel
Power Output :	5 Watts
Channel Spacing :	Narrow Band
Modulation Signal :	FM modulation with 2.5kHz sine wave signal
Emission Mask :	Mask D
Reference Voltage :	7.5 VDC



Date: 18.JAN.2008 12:22:05

5.7.7.10 Plot 10

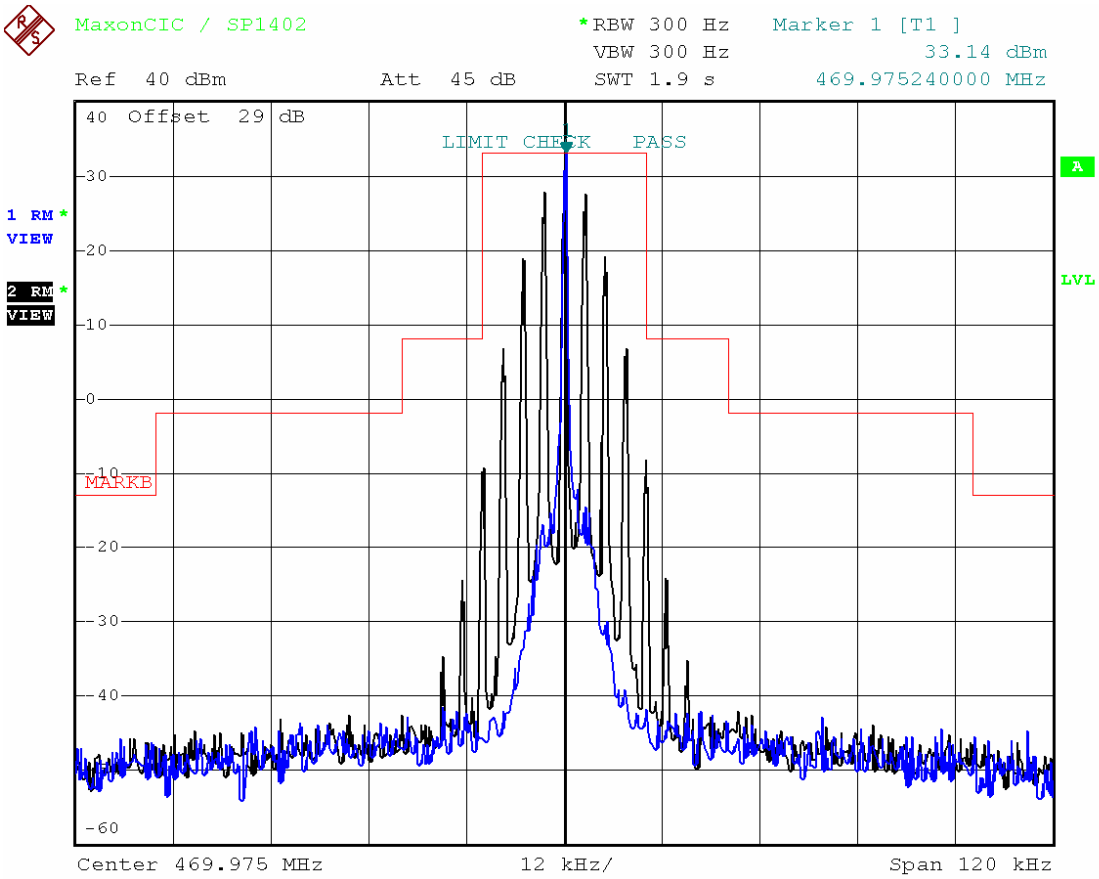
FCC Rules :	Part 2 §2.1053(a) & §90.210
IC Rules :	RSS-119 Section 5.5
Operating Frequency :	469.975 MHz
Channel :	3rd Channel
Power Output :	1 Watts
Channel Spacing :	Narrow Band
Modulation Signal :	FM modulation with 2.5kHz sine wave signal
Emission Mask :	Mask D
Reference Voltage :	7.5 VDC



Date: 18.JAN.2008 12:24:11

5.7.7.11 Plot 11

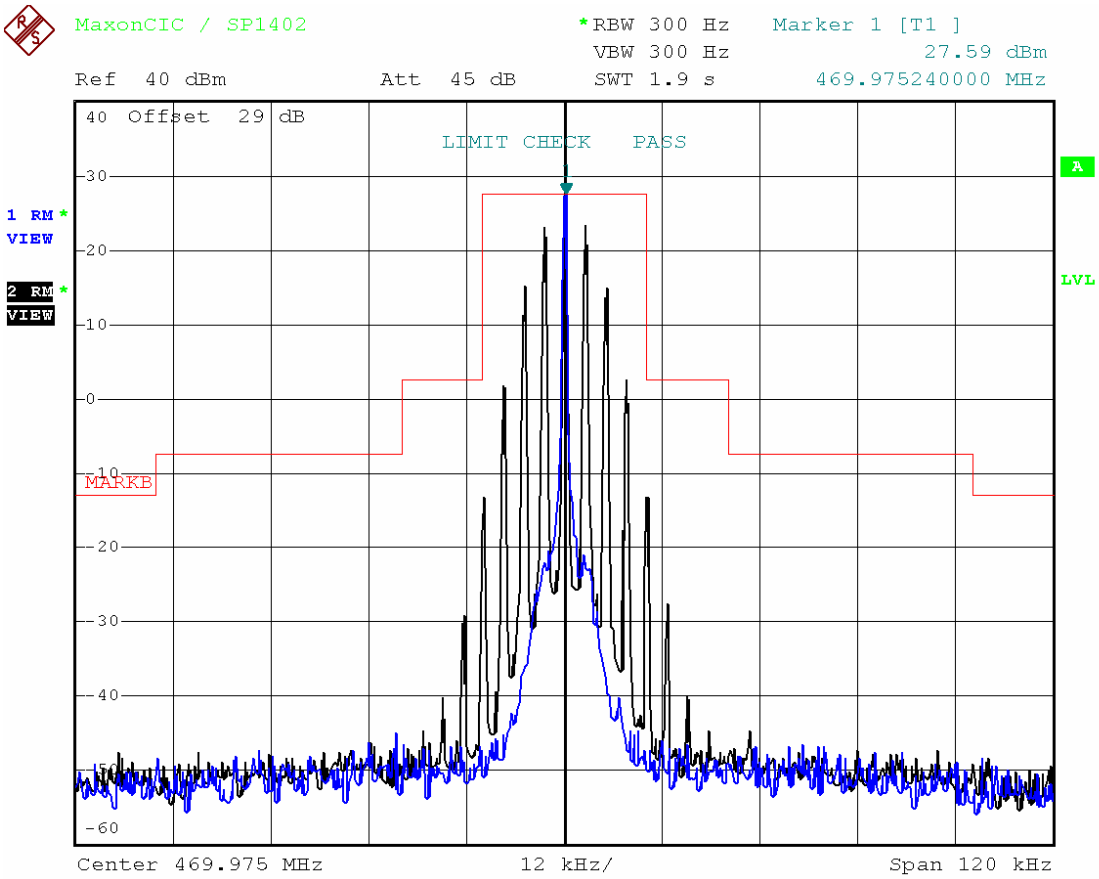
FCC Rules :	Part 2 §2.1053(a) & §90.210
IC Rules :	RSS-119 Section 5.5
Operating Frequency :	469.975 MHz
Channel :	3rd Channel
Power Output :	5 Watts
Channel Spacing :	WideBand
Modulation Signal :	FM modulation with 2.5kHz sine wave signal
Emission Mask :	Mask B
Reference Voltage :	7.5 VDC



Date: 18.JAN.2008 12:46:10

5.7.7.12 Plot 12

FCC Rules :	Part 2 §2.1053(a) & §90.210
IC Rules :	RSS-119 Section 5.5
Operating Frequency :	469.975 MHz
Channel :	3rd Channel
Power Output :	1 Watts
Channel Spacing :	WideBand
Modulation Signal :	FM modulation with 2.5kHz sine wave signal
Emission Mask :	Mask B
Reference Voltage :	7.5 VDC



Date: 18.JAN.2008 12:49:27

5.8 Spurious Emissions at Antenna Terminals

Conducted spurious emissions are emissions at the antenna terminals on a frequency or frequencies which are ourside of band sufficient to ensure transmission or information of required quality for the class of communication desired.

5.8.1 Specification

FCC Rules Part 2, Section 2.1051
FCC Rules Part 90, Section 90.210
Industry Canada, RSS-119 Section 5.8

5.8.2 Method of Measurement

ANSI/TIA-603-B-2002 Section 2.2.13

5.8.3 Measurement Set-Up

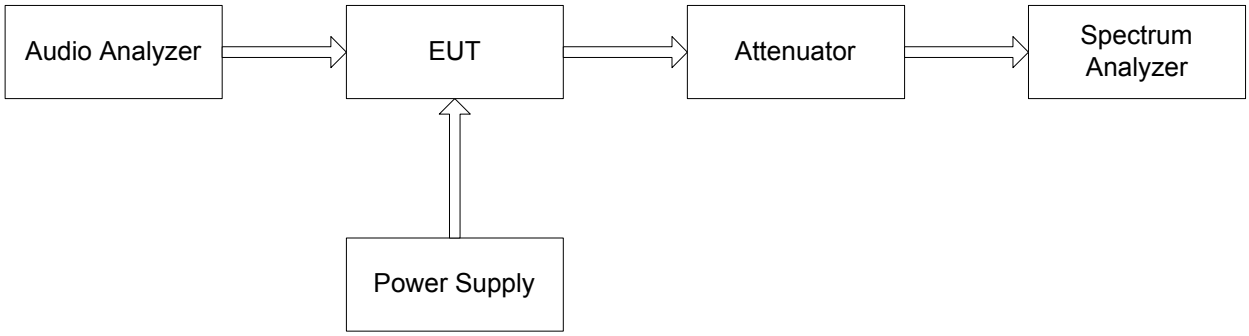


Fig.6

5.8.4 Test Equipment List

Equipment	Model Name	Manufacturer
EUT	SP1402	Maxon CIC Corp.
Power Supply	IPS-30B03DD	INTERACT
Audio Analyzer	8903B	Agilent
Spectrum Analyzer	FSP7	Rohde & Shwarz
Attenuator	33-30-33	WEINSCHEL

5.8.5 Measurement Procedure

-. The unit was turned-up in accordance with the alignment procedure stated in the FIG. 6, and was loaded into a 50 ohm resistive termination.
-. The antenna output terminal of the EUT was connected to the input of a 50 ohm spectrum analyzer through a matched 10 dB attenuator and notch filter.
-. Transmitter was set to the maximum power output condition.
-. The unit was modulated with a 2.5 kHz audio tone at an input level 16dB greater than that required 50% modulation. The spectrum was scanned from the lowest frequency generated in the equipment to the 10^{th} harmonic of the carrier.
-. The limit was applied according the $50+10\log_{10}$(P: mean power in Watts) dB.

5.8.5 Data

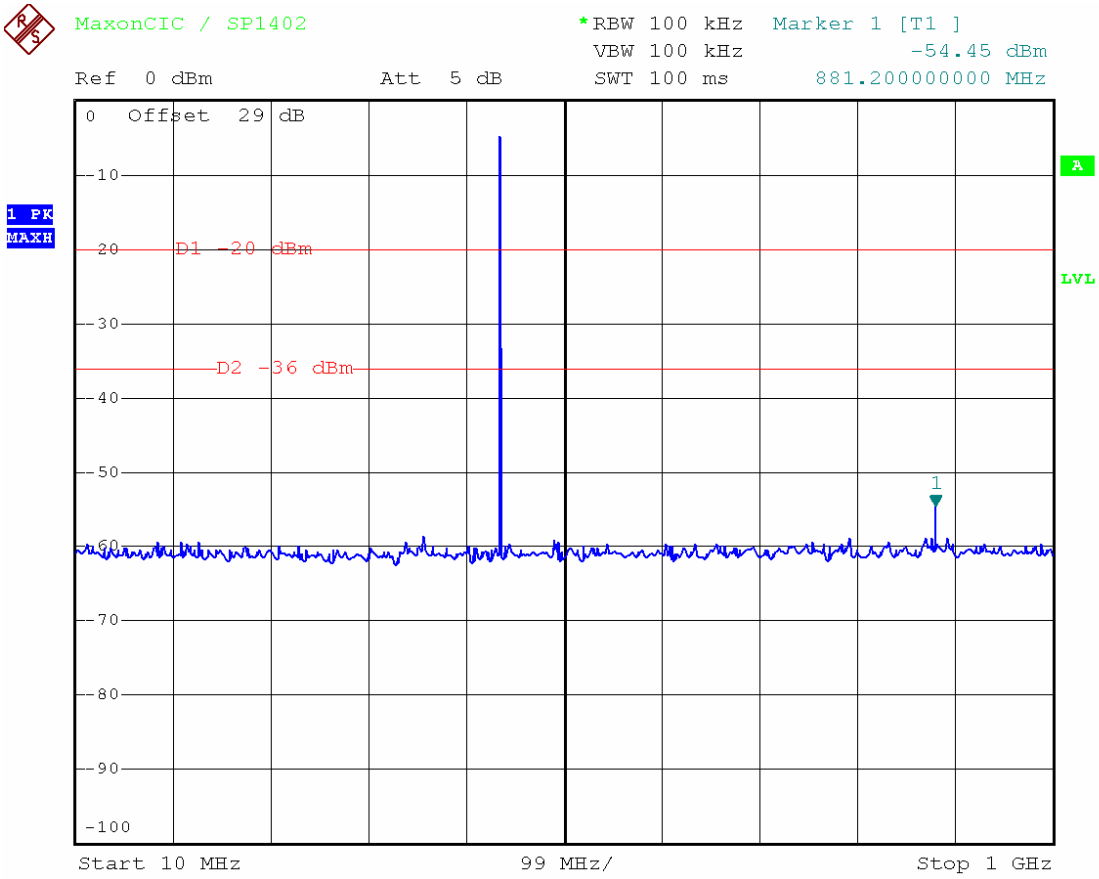
Frequency (MHz)	Transmitter Spurious Emissions		
	Level (dBm)	Limit (dBm)	Margin (dB)
880.050	-54.45	-20	34.45
1320.075	-48.06		28.06
1760.100	-48.21		28.21
-	-		-
910.000	-40.68	-20	20.68
1365.000	-51.43		31.43
1820.000	-51.98		31.98
-	-		-
939.950	-37.98	-20	17.98
1409.925	-53.17		33.17
1879.900	-52.49		32.49
2349.875	-52.95		32.95

5.8.6 Plots

5.8.6.1 1st Channel

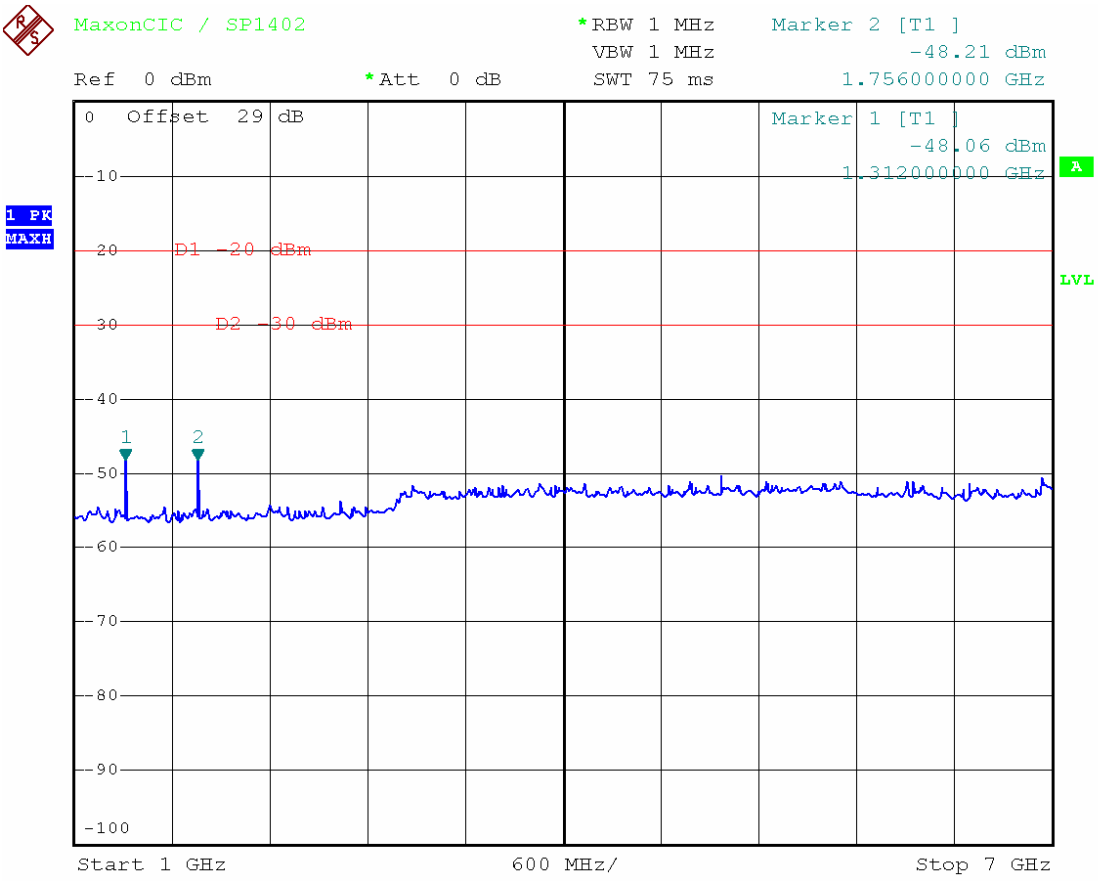
FCC Rules :	Part 2 §2.1051 & §90.210
IC Rules :	RSS-119 Section 5.8
Operating Frequency :	440.025 MHz
Channel :	1st Channel
Power Output :	5 Watts
Channel Spacing :	WideBand
Reference Voltage :	7.5 VDC
Limit :	50 + 10log$_{10}$P (-20dBm)

5.8.6.1.1 10 MHz ~ 1 GHz



Date: 18.JAN.2008 14:04:25

5.8.6.1.2 1 GHz ~ 7 GHz

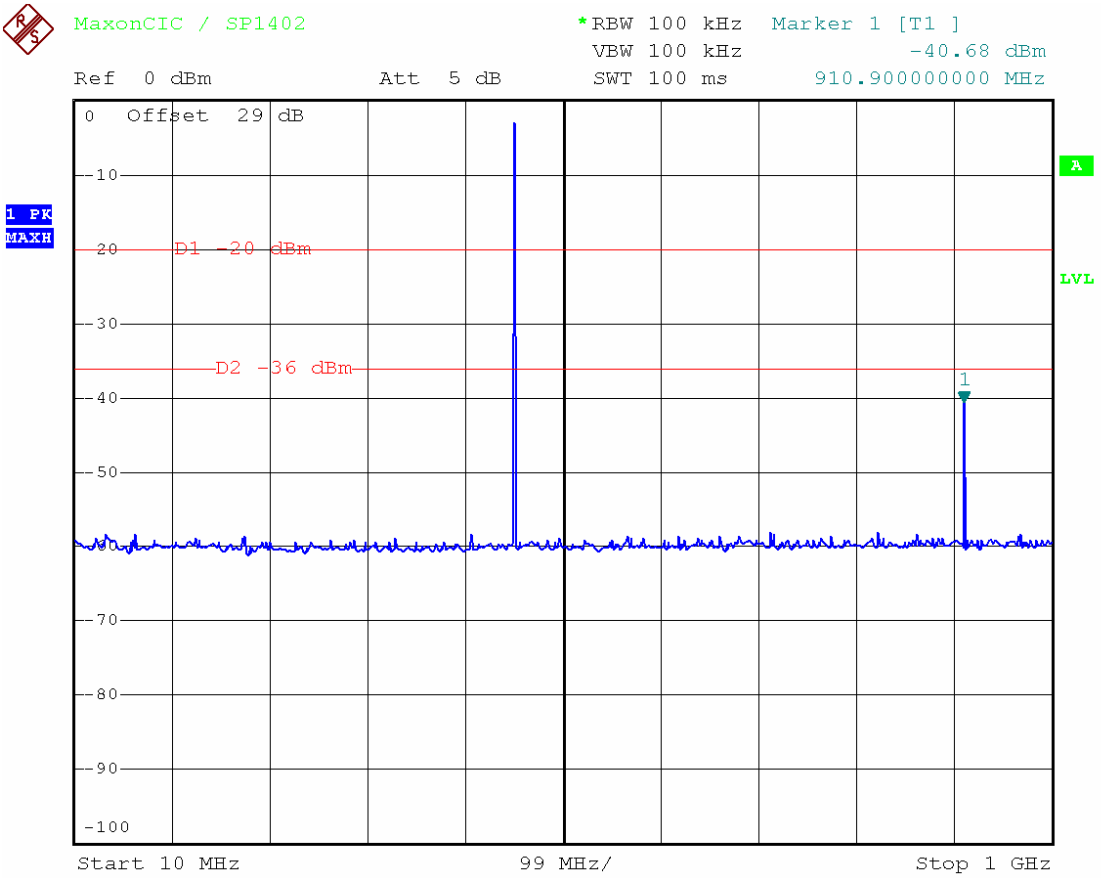


Date: 18.JAN.2008 14:12:49

5.8.6.2 2nd Channel

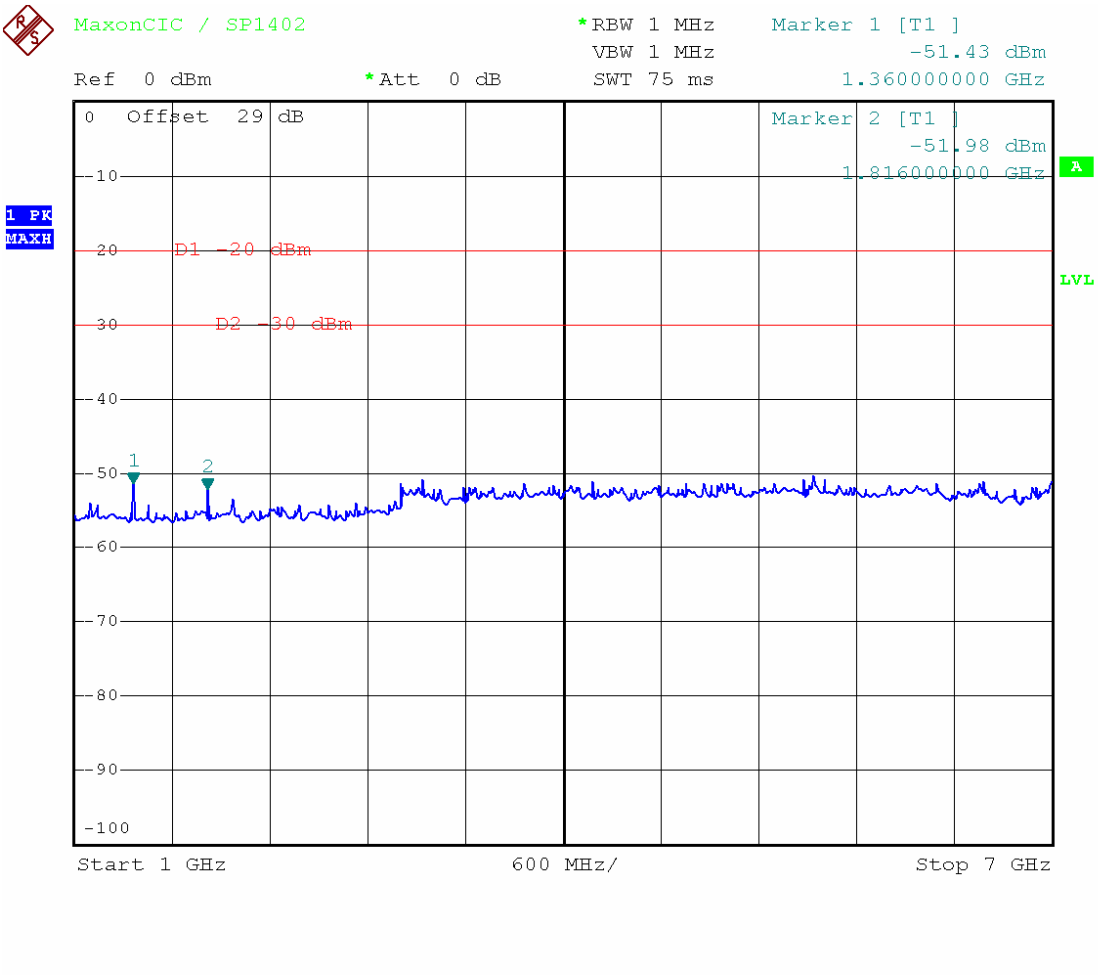
FCC Rules :	Part 2 §2.1051 & §90.210
IC Rules :	RSS-119 Section 5.8
Operating Frequency :	455.000 MHz
Channel :	2nd Channel
Power Output :	5 Watts
Channel Spacing :	WideBand
Reference Voltage :	7.5 VDC
Limit :	50 + 10log$_{10}$P (-20dBm)

5.8.6.2.1 10 MHz ~ 1 GHz



Date: 18.JAN.2008 14:09:30

5.8.6.2.2 1 GHz ~ 7 GHz

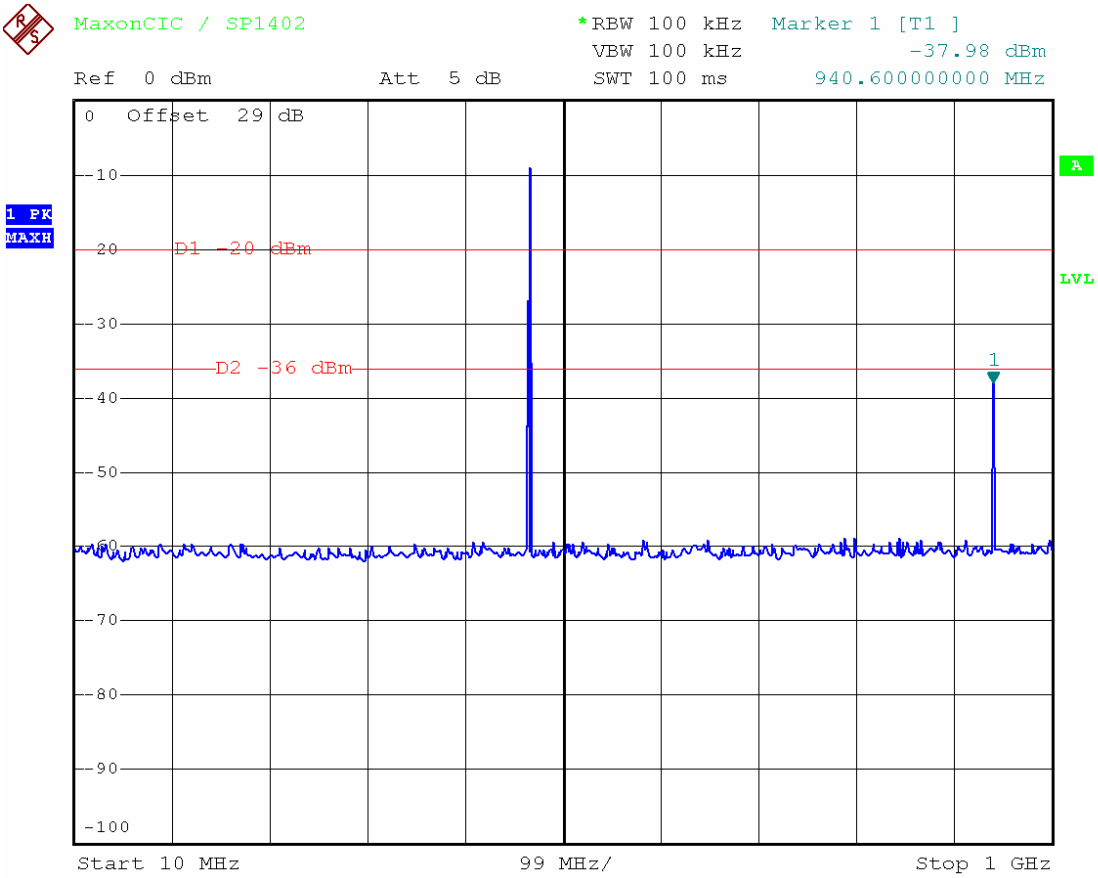


Date: 18.JAN.2008 14:14:18

5.8.6.3 3rd Channel

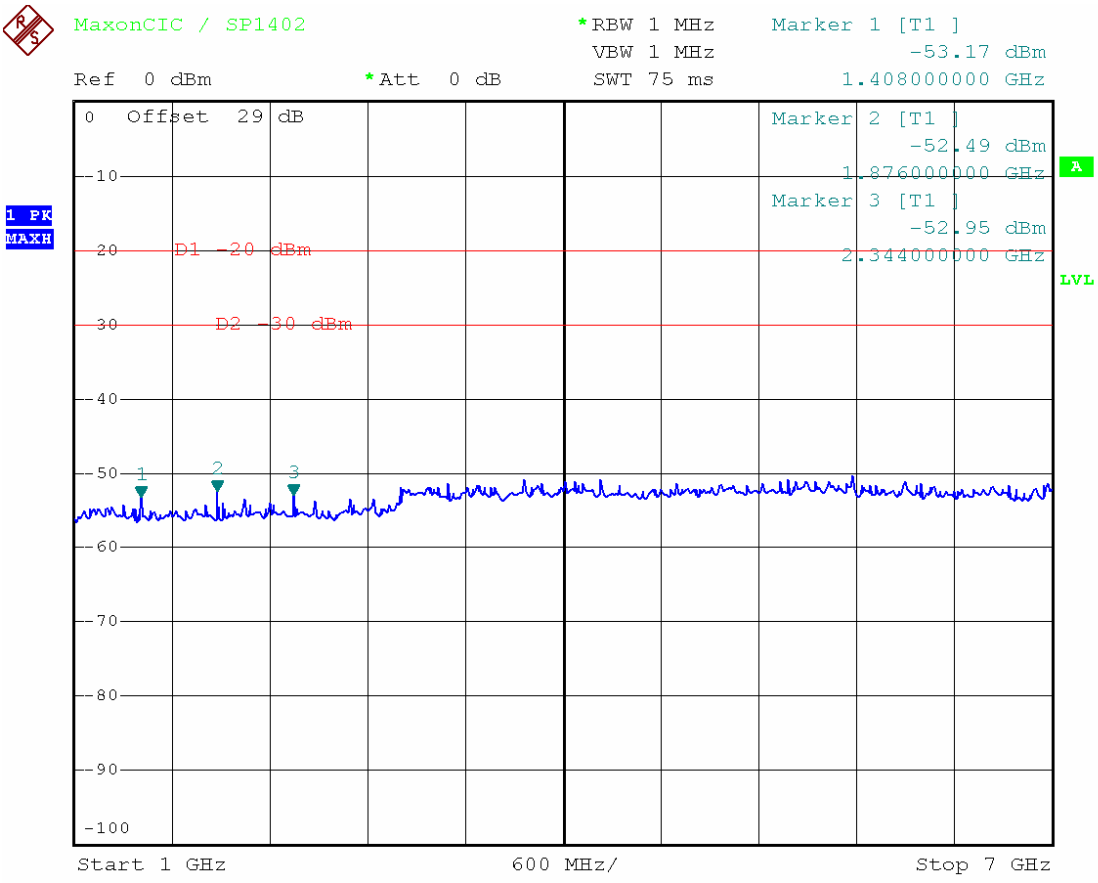
FCC Rules :	Part 2 §2.1051 & §90.210
IC Rules :	RSS-119 Section 5.8
Operating Frequency :	469.975 MHz
Channel :	3rd Channel
Power Output :	5 Watts
Channel Spacing :	WideBand
Reference Voltage :	7.5 VDC
Limit :	50 + 10log$_{10}$P (-20dBm)

5.8.6.3.1 10 MHz ~ 1 GHz



Date: 18.JAN.2008 14:10:22

5.8.6.3.2 1 GHz ~ 7 GHz



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5.9 Field Strength of Spurious Radiation

Radiated spurious emissions are emissions from the equipment when transmitting load on frequency or frequencies which are outside of band sufficient to ensure transmission or information of required quality for the class of communication desired.

5.9.1 Specification

FCC Rules Part 2, Section 2.1053(a)
FCC Rules Part 90, Section 90.210
Industry Canada, RSS-119 Section 5.8

5.9.2 Method of Measurement

ANSI/TIA-603-B-2002 Section 2.2.12

5.9.3 Measurement Set-Up

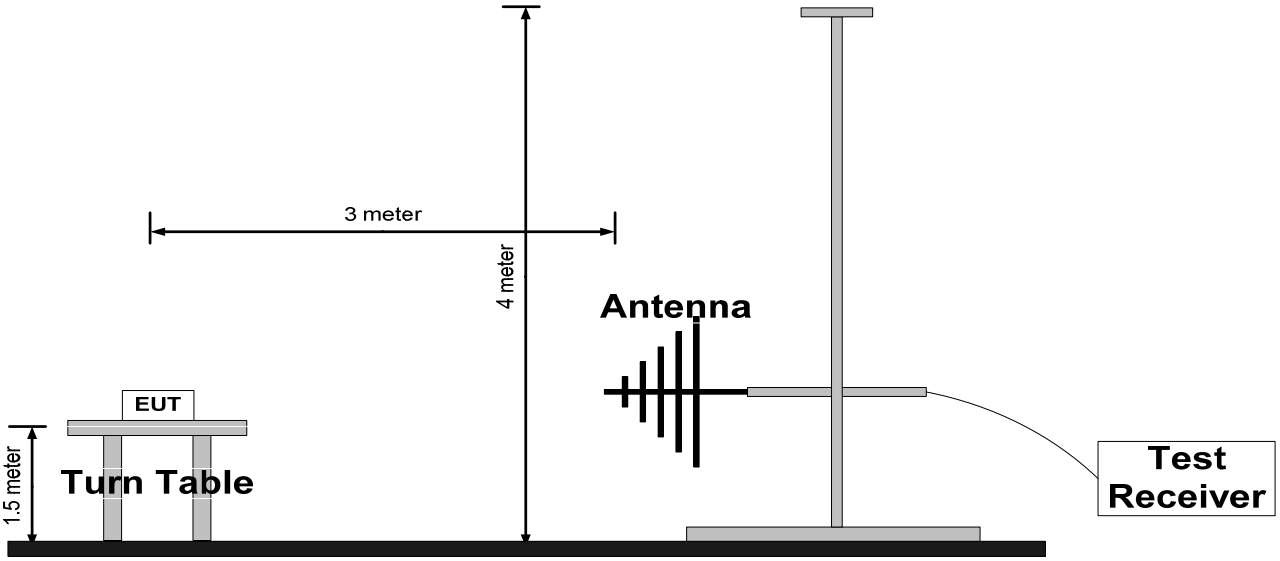


Fig.7

5.9.4 Test Equipment List

Equipment	Model Name	Manufacturer
EUT	SP1402	Maxon CIC Corp.
Power Supply	IPS-30B03DD	INTERACT
Audio Analyzer	8903B	Agilent
Spectrum Analyzer	E7403A	Agilent
Bilog Antenna	VULB9160	SWALZBECK
Horn Antenna	BBHA 9120 D	SWALZBECK

5.9.5 Test Data

FCC Rules :	Part 2 §2.1053(a) & §90.210
IC Rules :	RSS-119 Section 5.8
Power Output :	4 Watts
Reference Voltage :	7.5 VDC
Channel Spacing :	WideBand
Limit :	$50 + 10\log_{10}P$ (-20dBm)

Frequency [MHz]	Spectrum Reading [dBuV/m]	Ant. Pol. [H/V]	S.G Level [dBm]	Ant. Gain [dBi]	Loss [dB]	Emission Level [dBm]	Limit [dBm]	Margin [dB]
440.025	134.0	V	+35.6	6.6	4.3	+37.9	-	-
880.050	52.3	V	-43.2	5.8	6.4	-43.8	-20.0	23.8
1320.075	62.0	-	-33.9	7.8	8.0	-34.1		14.1
1760.100	47.9	-	-49.1	10.3	9.4	-48.2		28.2
2200.125	49.1	-	-46.9	10.5	10.6	-47.0		27.0
455.000	133.8	V	+35.5	6.6	4.4	+37.7	-	-
910.000	55.0	V	-40.4	5.8	6.5	-41.1	-20.0	21.1
1365.000	61.0	-	-34.9	7.9	8.1	-35.1		15.1
1820.000	49.9	-	-47.0	10.4	9.6	-46.2		26.2
469.975	132.2	V	+33.9	6.6	4.4	+36.1	-	-
939.950	58.8	V	-36.3	5.6	6.6	-37.3	-20.0	17.3
1409.925	57.2	-	-38.6	8.0	8.3	-38.9		18.9
1879.900	53.2	-	-43.5	10.4	9.8	-42.9		22.9
2349.875	48.4	-	-47.3	10.6	11.0	-47.7		27.7

Note :

1. The spectrum bandwidth was set to RBW 100 kHz (freq. up to 1GHz) and RBW 1 MHz (freq above 1GHz).
2. Transmitter was set to the high power output (5 watts) condition.
3. The spectrum was checked from 30 MHz up to the 10th harmonic of the carrier frequency.
4. All emission not reported were found to be more than 20dB below the limit.
5. The EUT was positioned through 3 orthogonal axis and worst-case are reported.
6. Transmitter was set to the high power output (5 watts) condition because the high power setting is the worst case emission condition.
7. The measurement has been made both narrow and wide band but the attached plots are for narrowband. There is no difference in the test result for the bandwidth setting.
8. ERP measurements were performed using the standard battery with full charged condition.
9. The limit was applied according to the section 90.210(d) 50+10logP or –20dBm or 70dBc whichever is less.

5.10 Frequency Stability / Temperature Variation

5.10.1 Specification

FCC Rules Part 2, Section 2.1055
FCC Rules Part 90, Section 90.231
Industry Canada, RSS-119 Section 5.3

5.10.2 Method of Measurement

ANSI/TIA-603-B-2002 Section 2.2.2

5.10.3 Measurement Set-Up

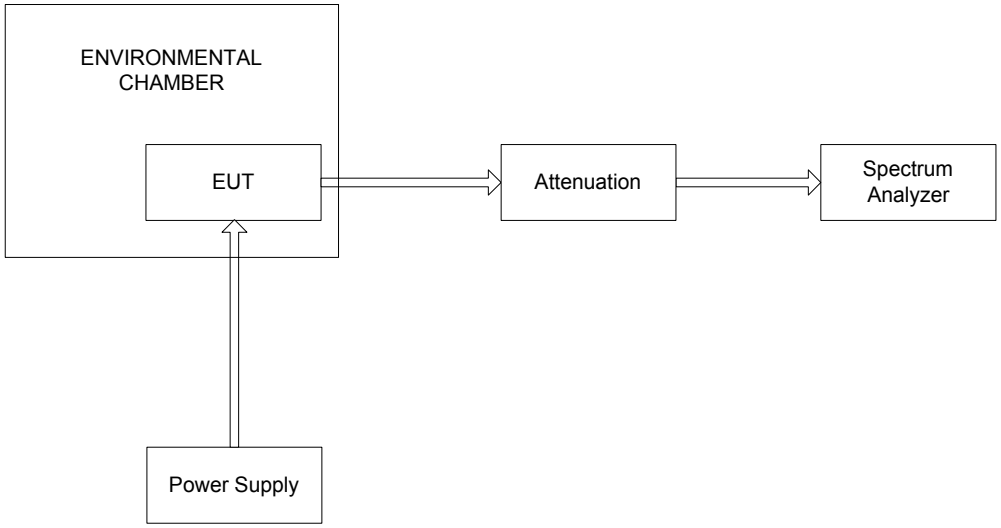


Fig.8

5.10.4 Test Equipment List

Equipment	Model Name	Manufacturer
EUT	SP1402	Maxon CIC Corp.
Power Supply	IPS-30B03DD	INTERACT
Attenuator	33-30-33	WEINSCHEL
Spectrum Analyzer	FSP7	Rohde & Shwarz
Environmental Chamber	EN-GLMP-54	ENEX

5.10.5 Test Procedure

-. The unit was turn-up in accordance with the alignment procedure stated in the FIG. 8 , and was loaded into a 50 ohm resistive termination.
-. With all power removed, the temperature was decreased to -30°C and permitted to stabilize for three hours. Power was applied and the maximum change in frequency was noted within one minute.
-. With power OFF, the temperature was raised in 10°C steps. The sample was permitted to stabilize at each step for at least one-half hour. Power was applied and the maximum frequency change was noted within one minute.
-. The temperature tests were performed for the worst case.
-. FCC Limits (according to part 90.213) : 2.5 x 10^{-6} x Frequency

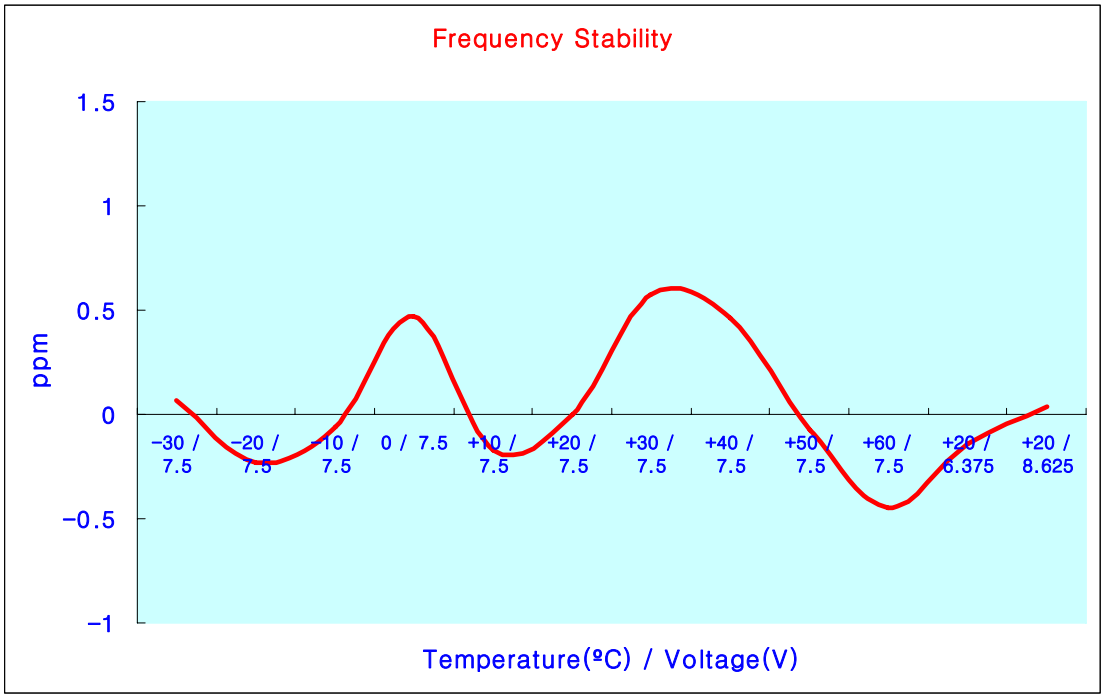
5.10.6 Test Result 1

FCC Rules :	Part 2 §2.1055 & §90.231
IC Rules :	RSS-119 Section 5.3
Operating Frequency :	440.025 MHz
Channel :	1st Channel
Power Output :	5 Watts
Modulation :	Non-Modulation
Reference Voltage :	7.5 VDC

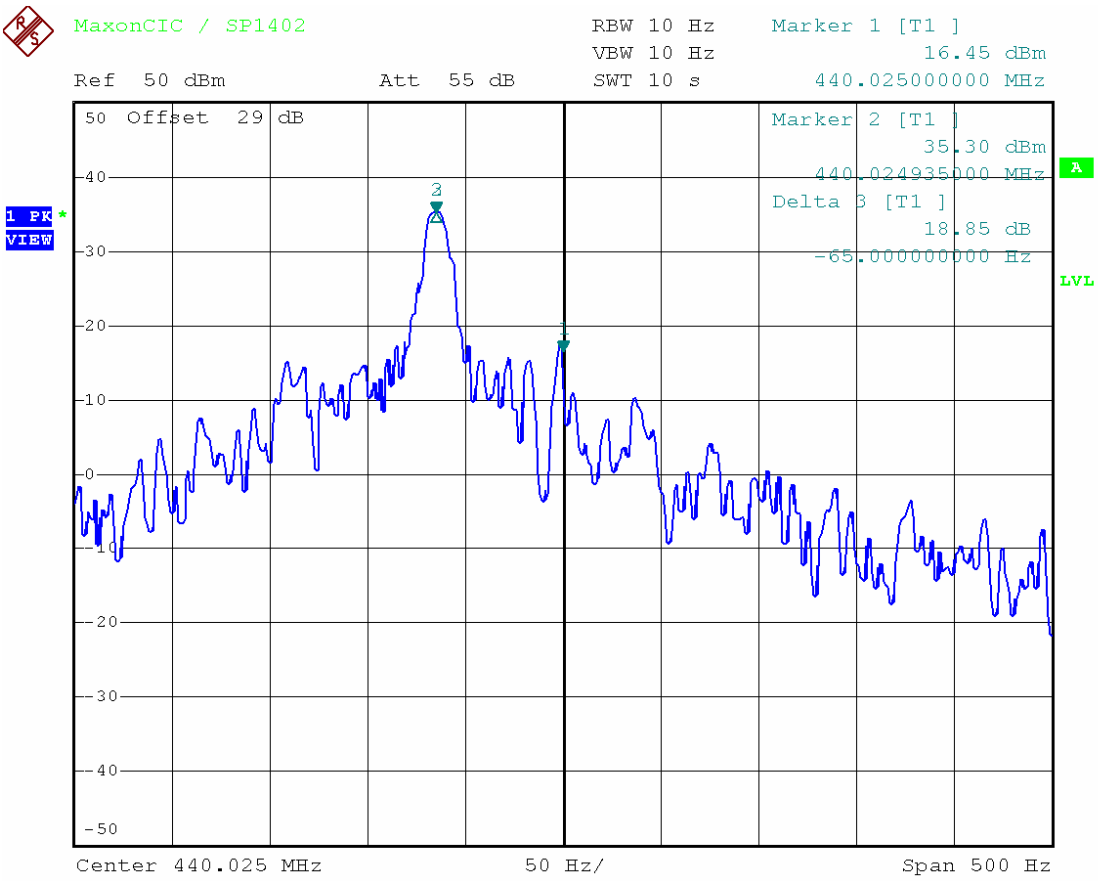
5.10.6.1 Data

Voltage (%)	Power Supply (Vdc)	Temperature (ºC)	Frequency (Hz)	Deviation (ppm)	Limit (ppm)
100 %	7.5	-30	440.024935	+0.070	2.5
100 %	7.5	-20	440.024803	-0.230	2.5
100 %	7.5	-10	440.024878	-0.059	2.5
100 %	7.5	0	440.025110	+0.468	2.5
100 %	7.5	+10	440.024830	-0.168	2.5
100 %	7.5	+20 (ref)	440.024904	0	2.5
100 %	7.5	+30	440.025156	+0.573	2.5
100 %	7.5	+40	440.025108	+0.464	2.5
100 %	7.5	+50	440.024871	-0.075	2.5
100 %	7.5	+60	440.024706	-0.450	2.5
85 %	6.375	+20	440.024842	-0.141	2.5
115 %	8.625	+20	440.024920	+0.036	2.5

5.10.6.2 Graph

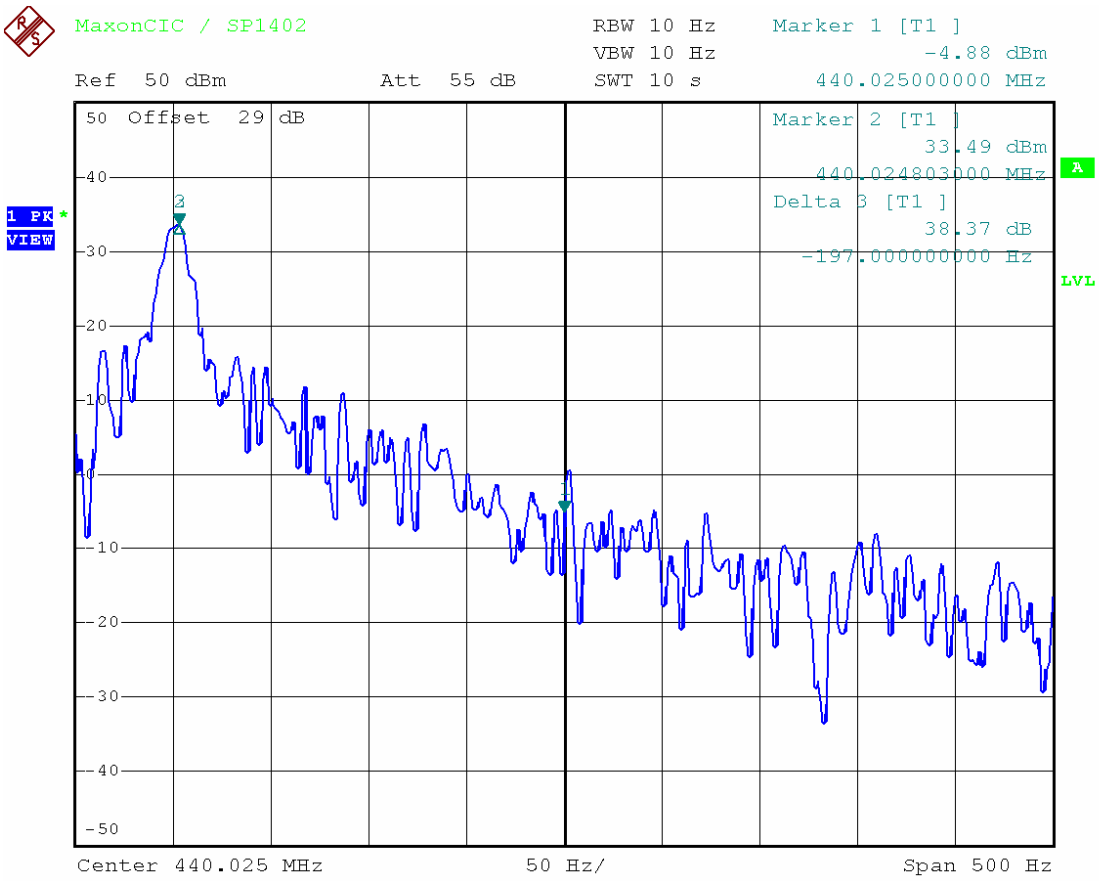


5.10.6.3 Plot 1 (-30℃)



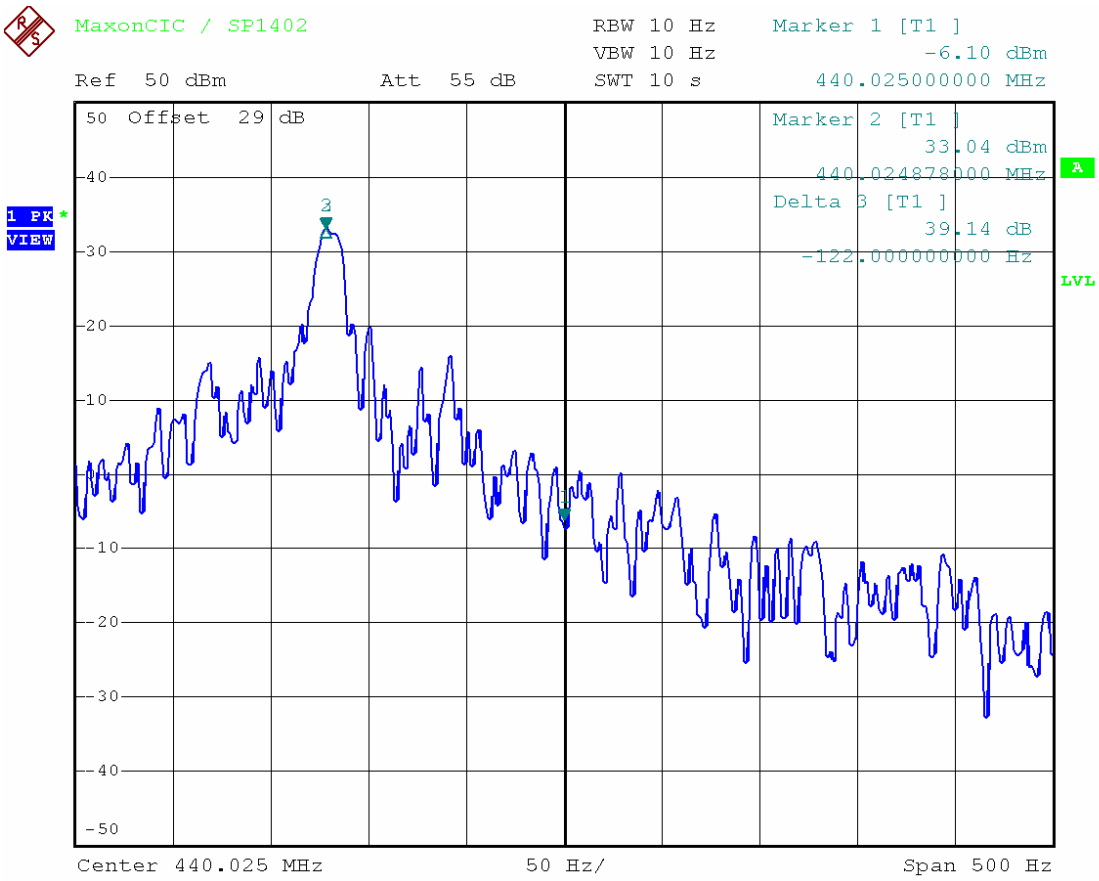
Date: 22.JAN.2008 09:31:08

5.10.6.4 Plot 2 (-20℃)



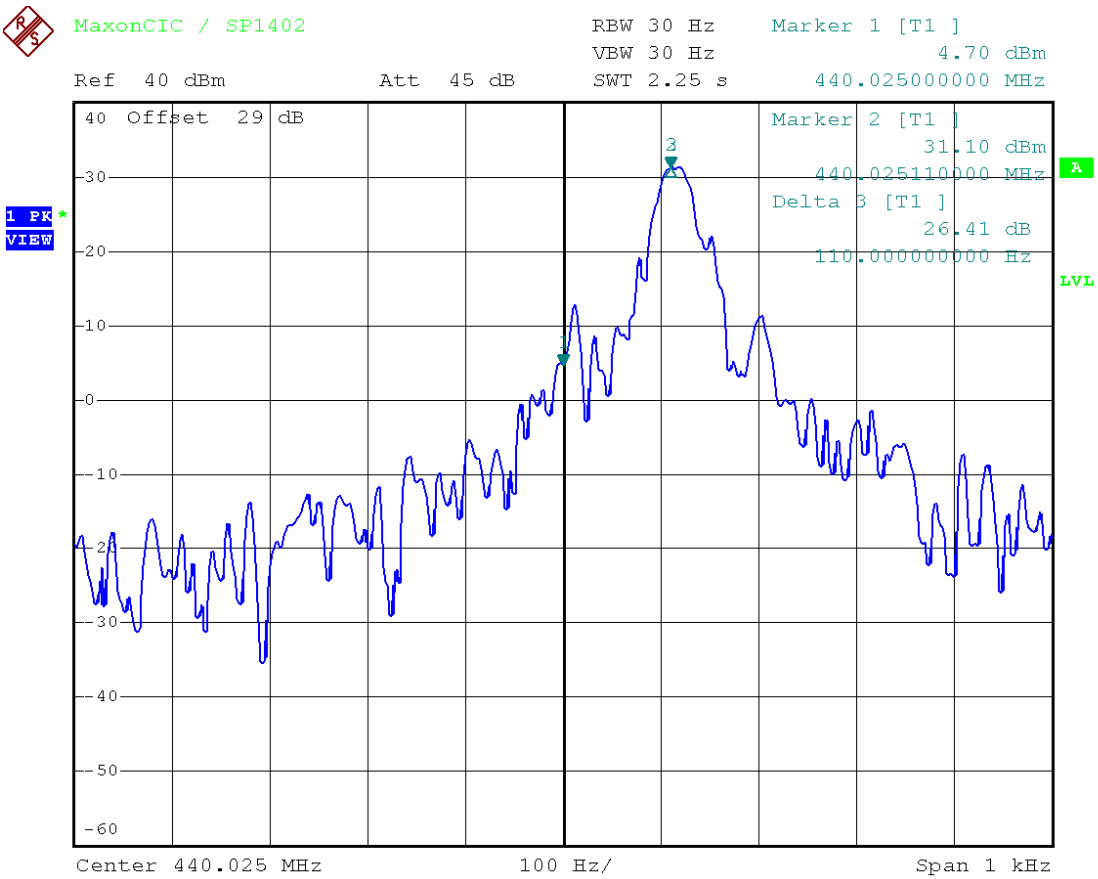
Date: 22.JAN.2008 11:20:02

5.10.6.5 Plot 3 (-10℃)



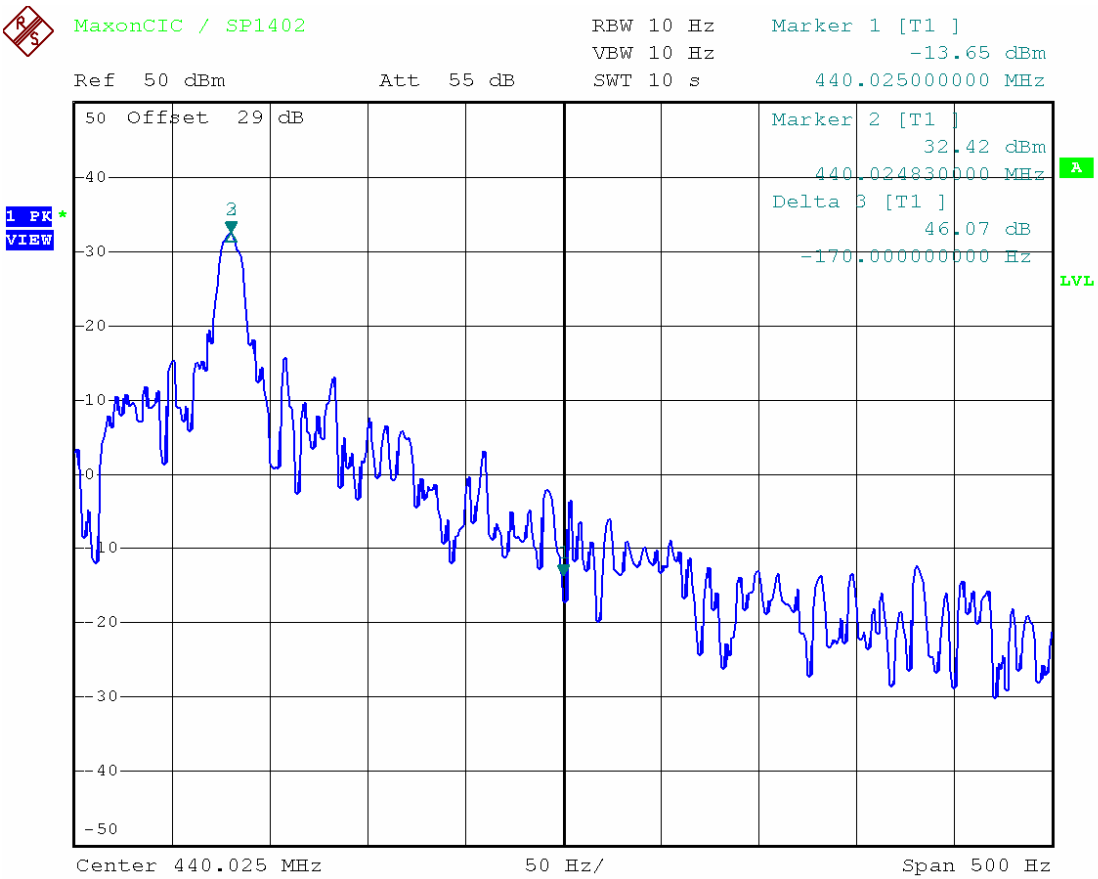
Date: 22.JAN.2008 11:49:47

5.10.6.6 Plot 4 (0℃)



Date: 22.JAN.2008 14:29:36

5.10.6.7 Plot 5 (+10℃)

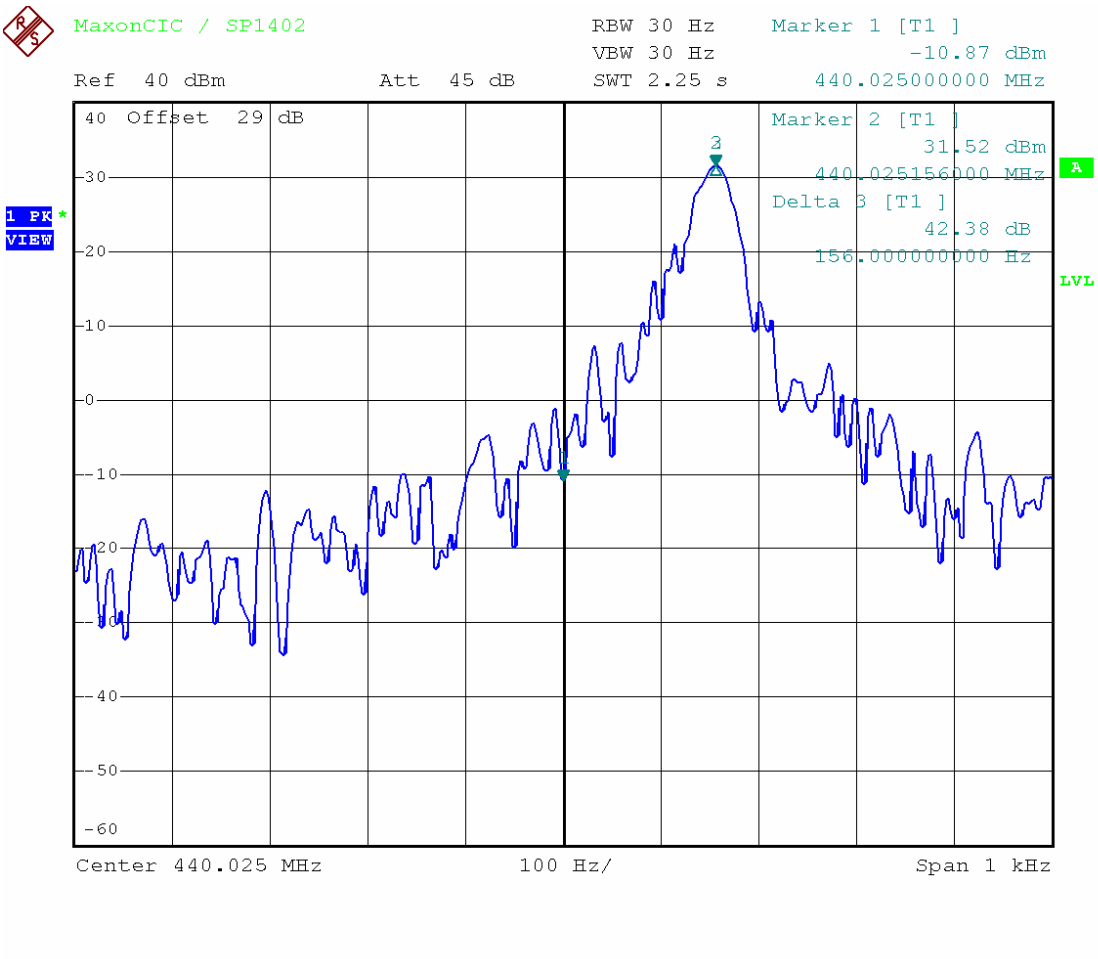


Date: 22.JAN.2008 12:48:01

5.10.6.8 Plot 6 (+20℃)

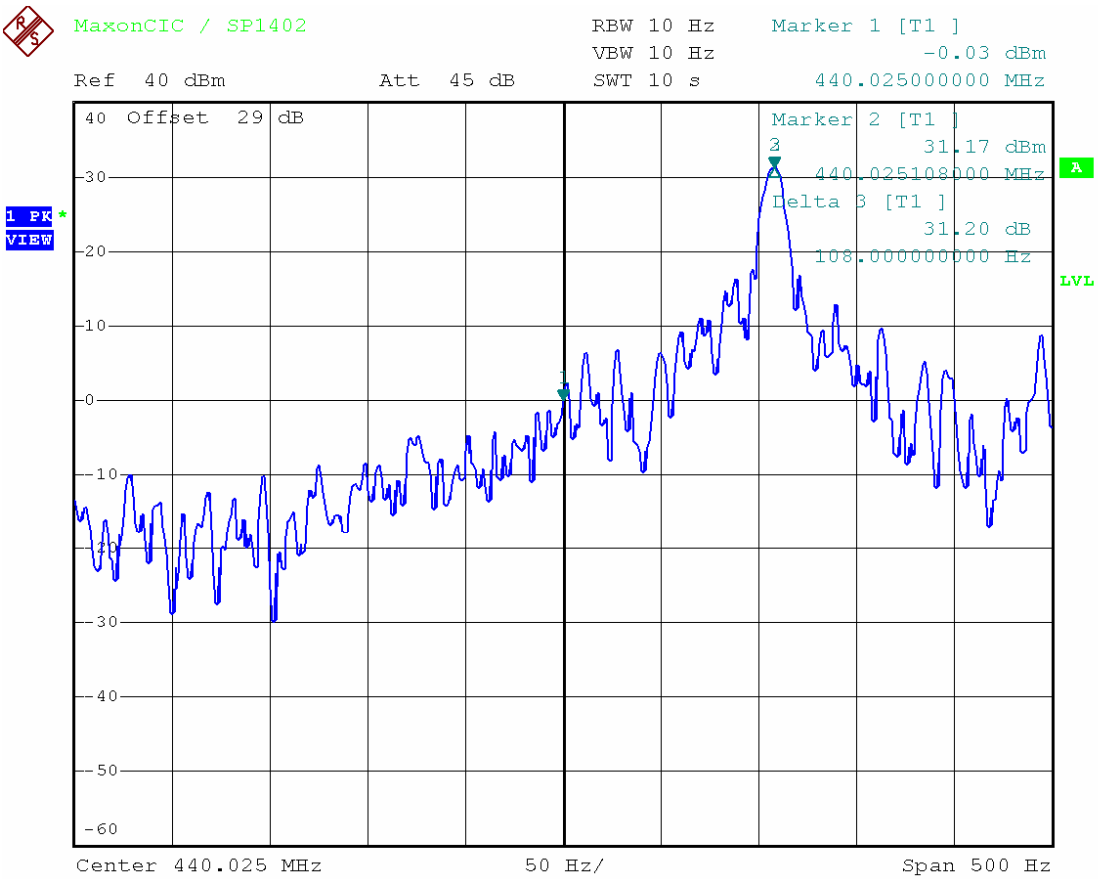
Date: 22.JAN.2008 14:24:49

5.10.6.9 Plot 7 (+30℃)



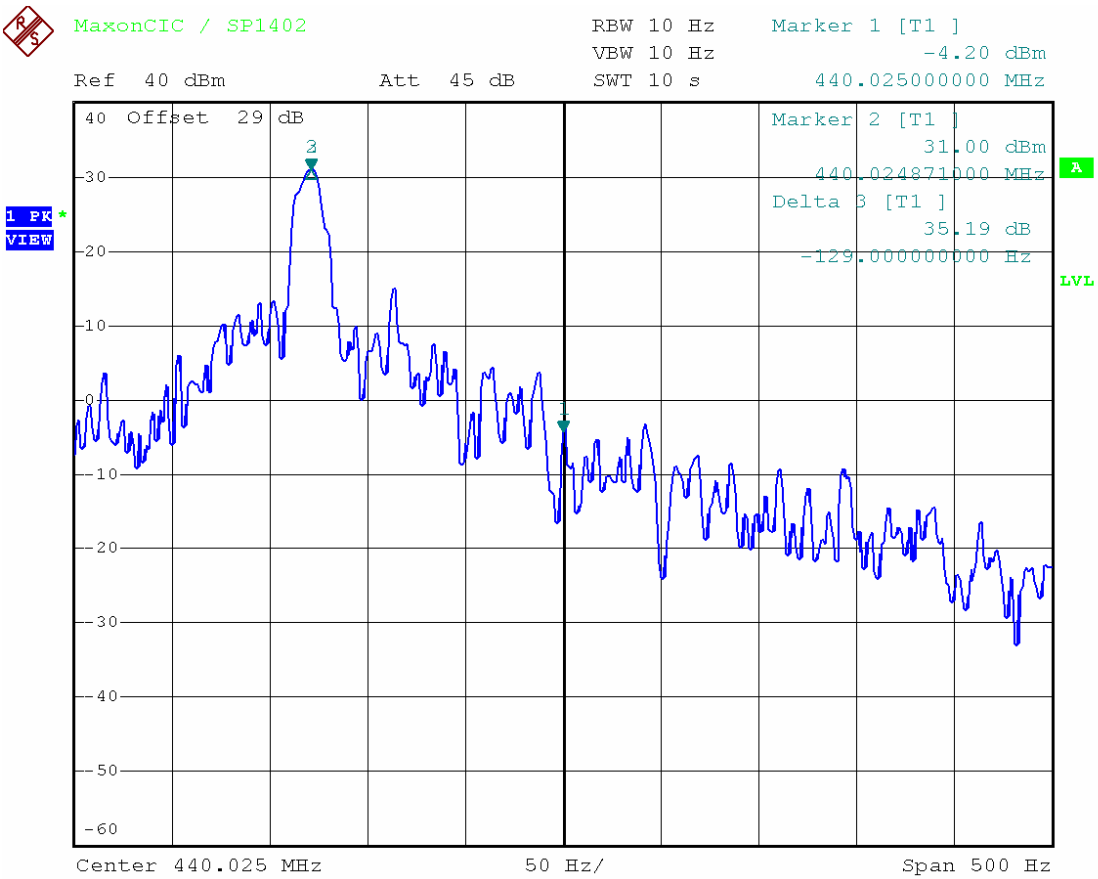
Date: 22.JAN.2008 13:23:19

5.10.6.10 Plot 8 (+40℃)



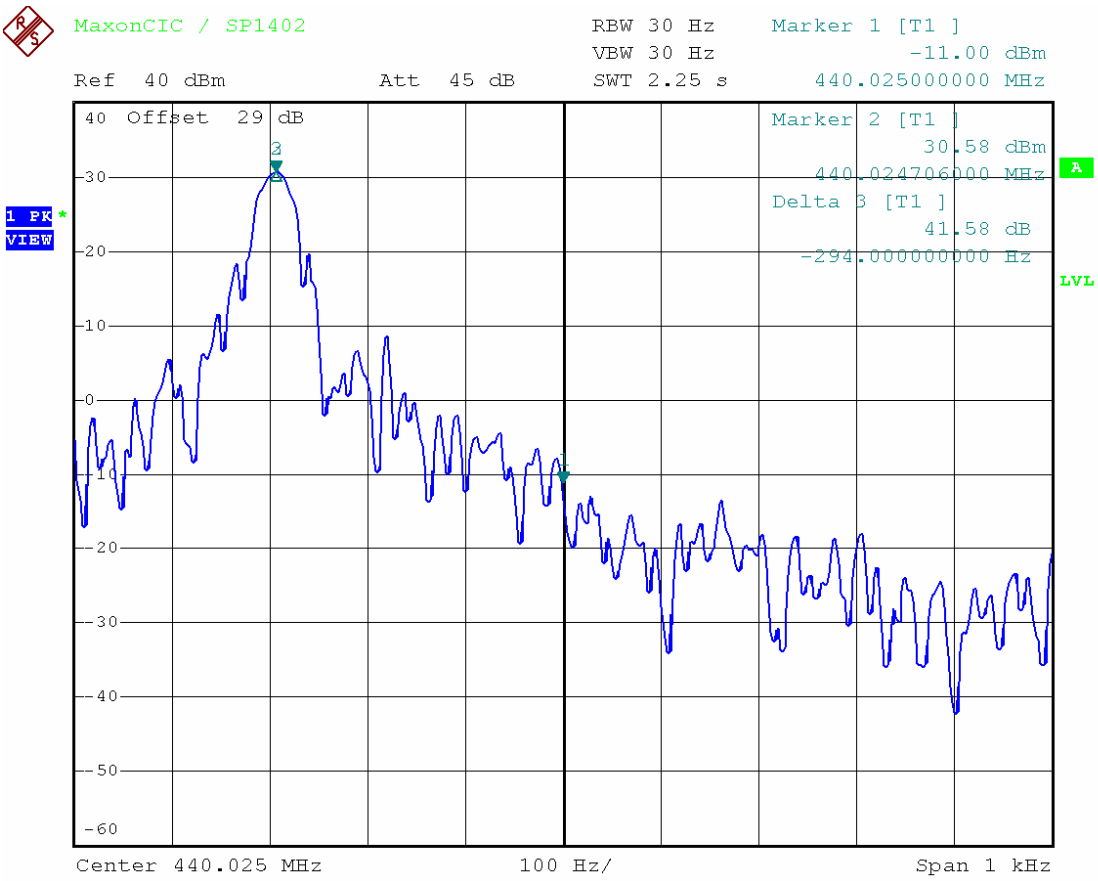
Date: 22.JAN.2008 13:31:20

5.10.6.11 Plot 9 (+50℃)



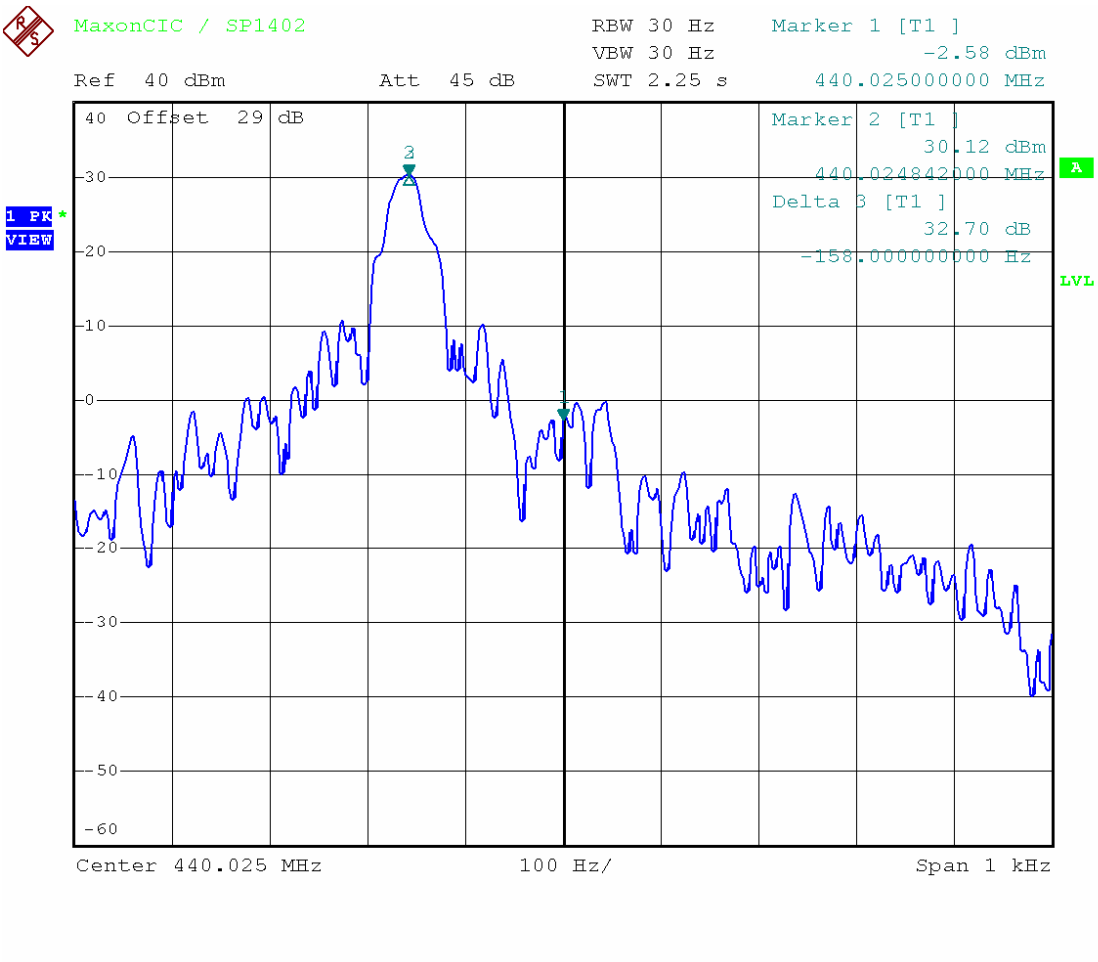
Date: 22.JAN.2008 13:47:52

5.10.6.12 Plot 10 (+60℃)



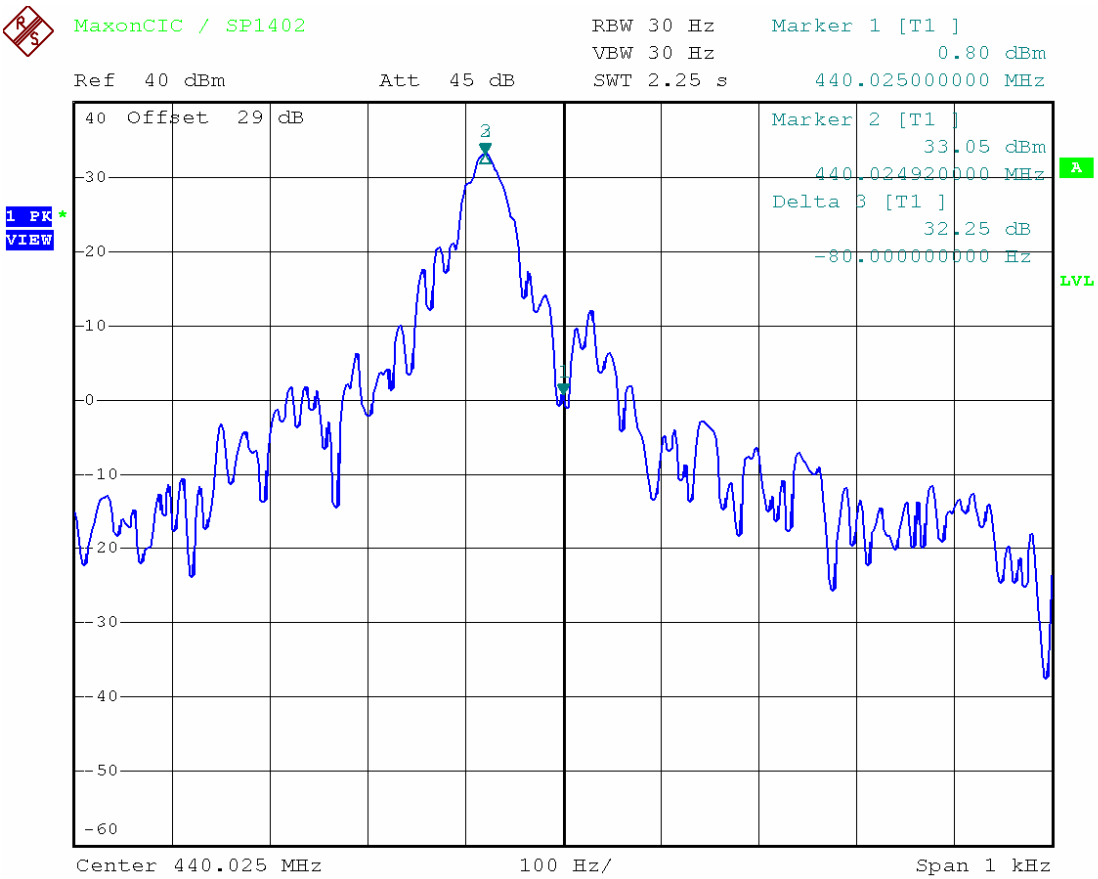
Date: 22.JAN.2008 14:05:04

5.10.6.13 Plot 11 (20℃, 6.375 V)



Date: 22.JAN.2008 14:23:48

5.10.6.14 Plot 12 (20℃, 8.625 V)



Date: 22.JAN.2008 14:24:25

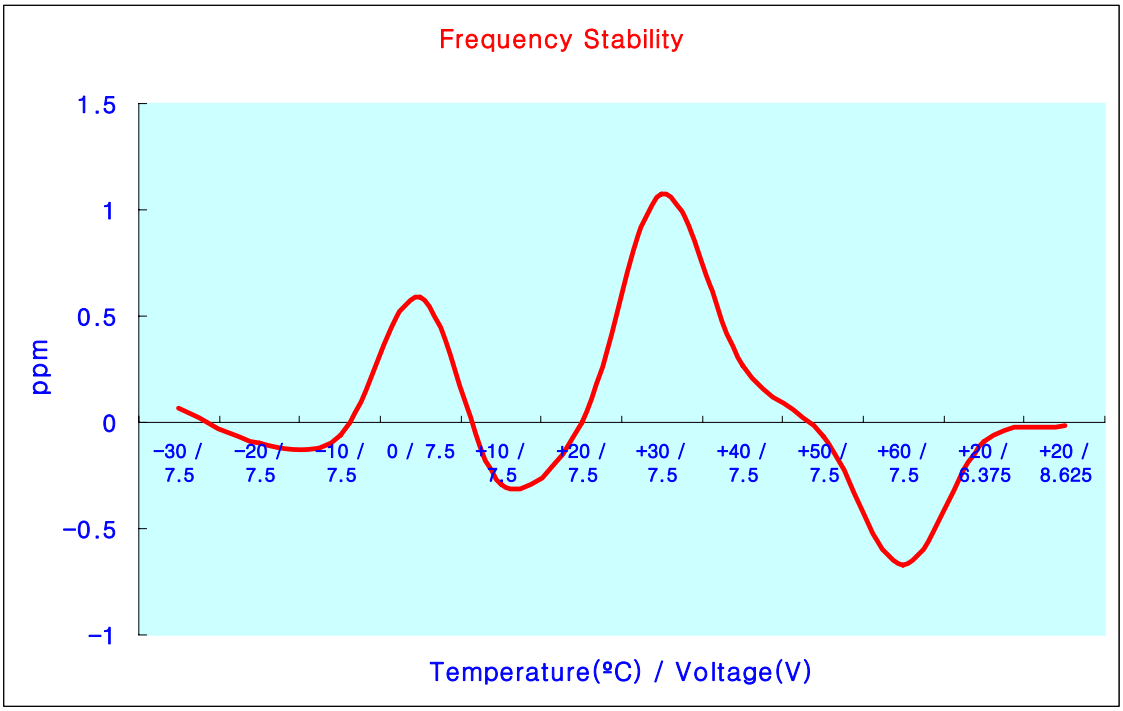
5.10.7 Test Result 2

FCC Rules :	Part 2 §2.1055 & §90.231
IC Rules :	RSS-119 Section 5.3
Operating Frequency :	455.000 MHz
Channel :	2nd Channel
Power Output :	5 Watts
Modulation :	Non-Modulation
Reference Voltage :	7.5 VDC

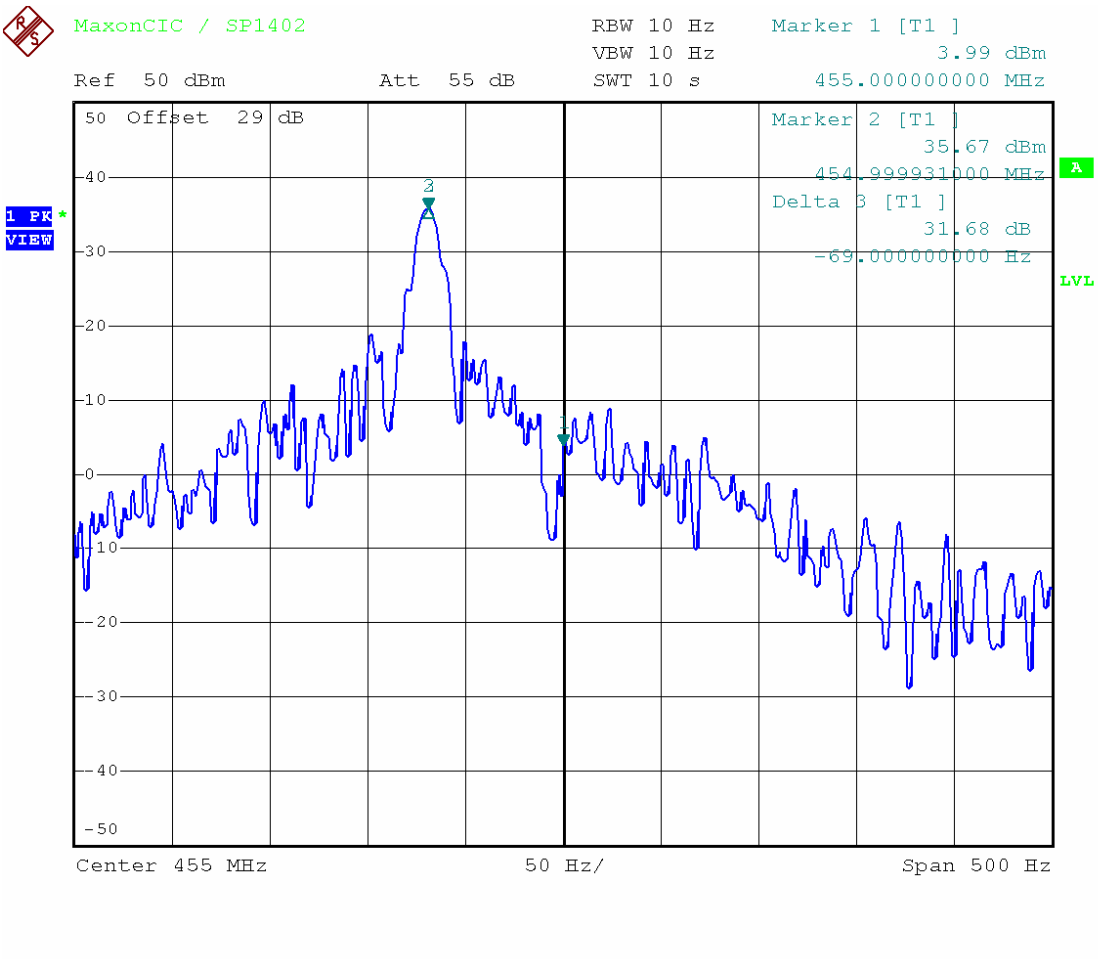
5.10.7.1 Data

Voltage (%)	Power Supply (Vdc)	Temperature (ºC)	Frequency (Hz)	Deviation (ppm)	Limit (ppm)
100 %	7.5	-30	454.999931	+0.068	2.5
100 %	7.5	-20	454.999855	-0.099	2.5
100 %	7.5	-10	454.999874	-0.057	2.5
100 %	7.5	0	455.000168	+0.589	2.5
100 %	7.5	+10	454.999767	-0.292	2.5
100 %	7.5	+20 (ref)	454.999900	0	2.5
100 %	7.5	+30	455.000390	+1.077	2.5
100 %	7.5	+40	455.000021	+0.266	2.5
100 %	7.5	+50	454.999868	-0.070	2.5
100 %	7.5	+60	454.999596	-0.668	2.5
85 %	6.375	+20	454.999858	-0.092	2.5
115 %	8.625	+20	454.999892	-0.018	2.5

5.10.7.2 Graph

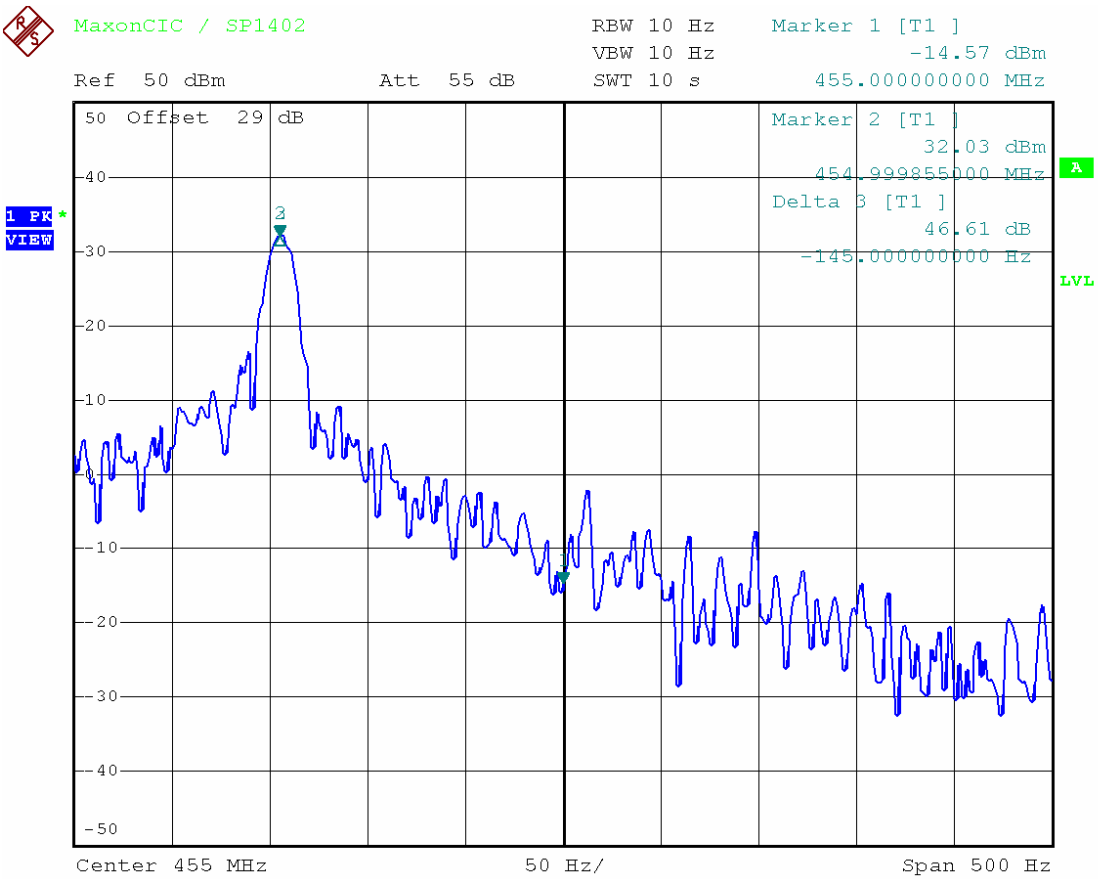


5.10.7.3 Plot 1 (-30℃)



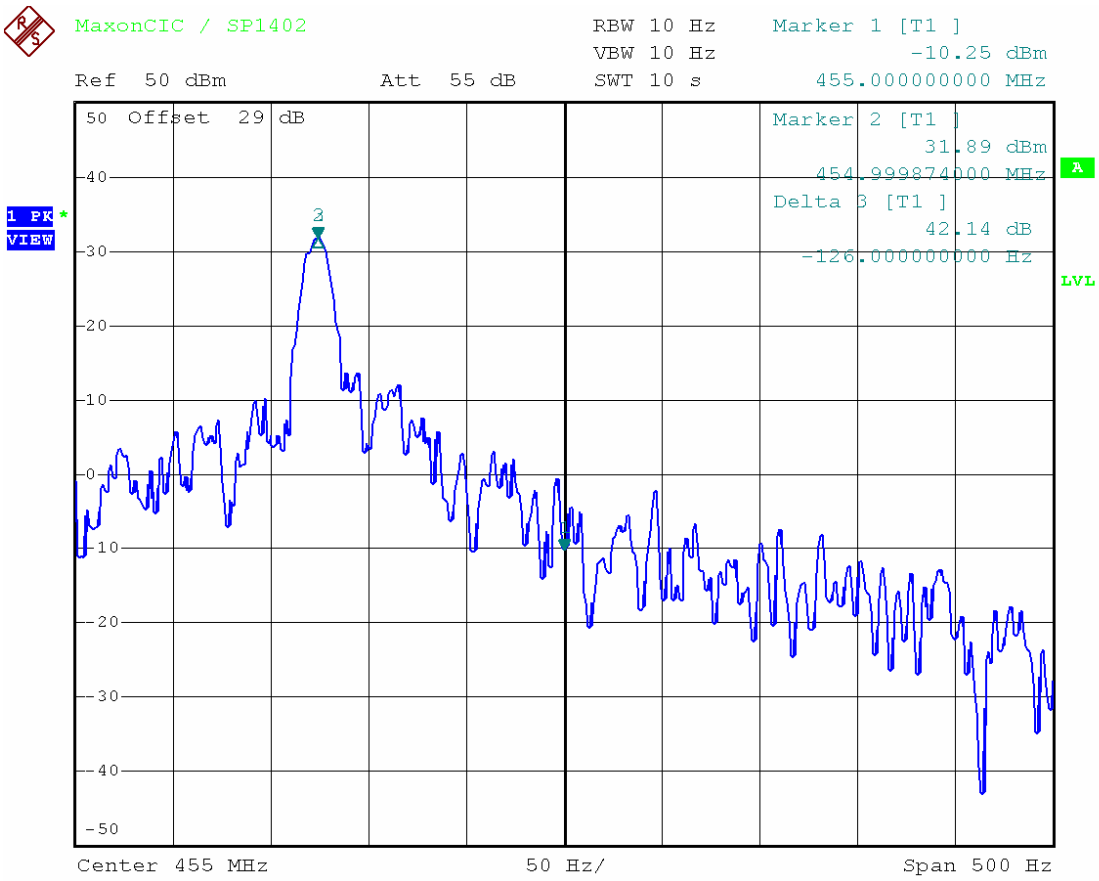
Date: 22.JAN.2008 09:27:20

5.10.7.4 Plot 2 (-20℃)



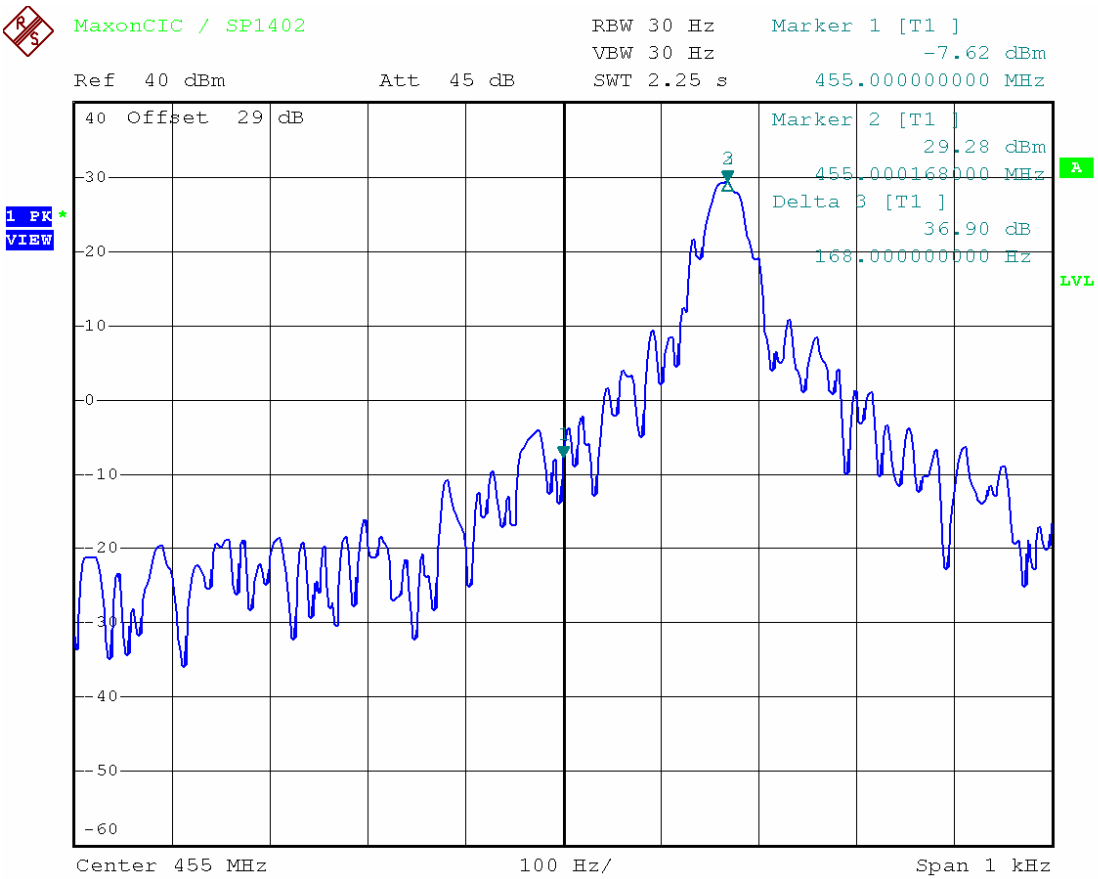
Date: 22.JAN.2008 11:20:57

5.10.7.5 Plot 3 (-10℃)



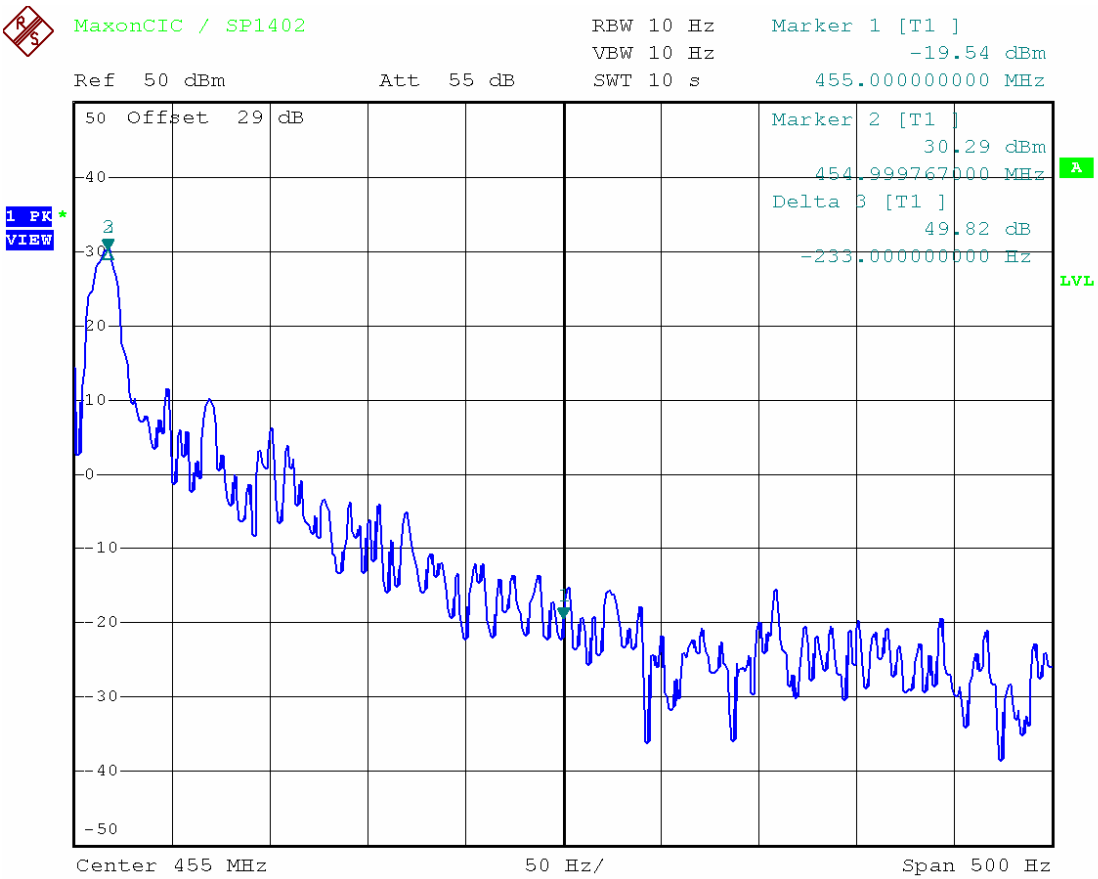
Date: 22.JAN.2008 11:48:49

5.10.7.6 Plot 4 (0℃)



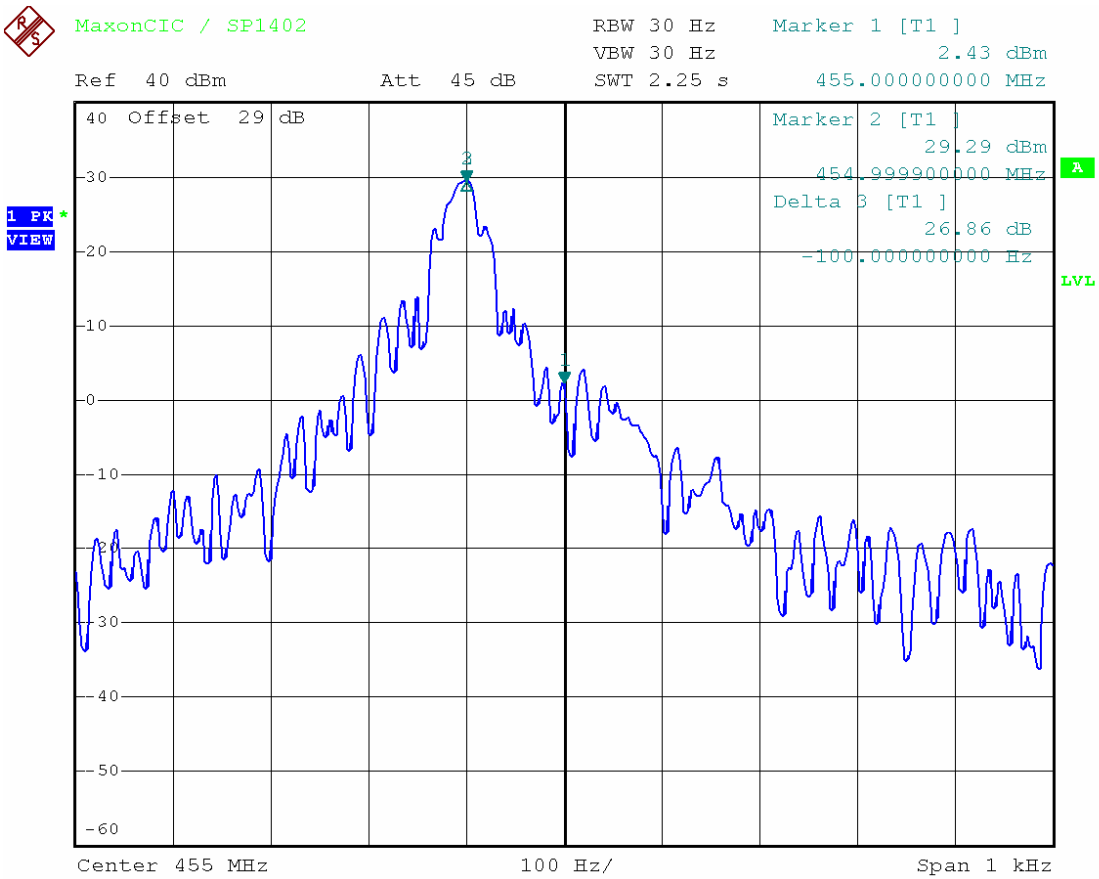
Date: 22.JAN.2008 14:31:51

5.10.7.7 Plot 5 (+10℃)



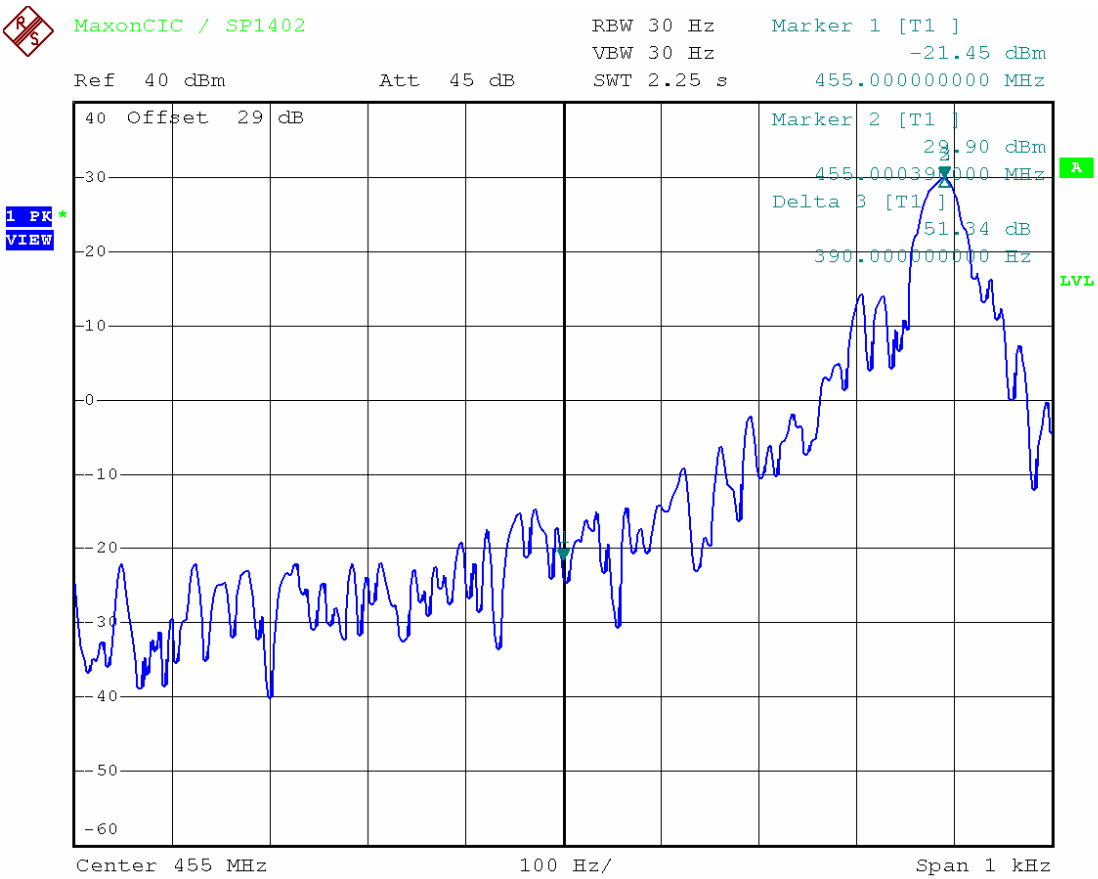
Date: 22.JAN.2008 12:52:28

5.10.7.8 Plot 6 (+20℃)



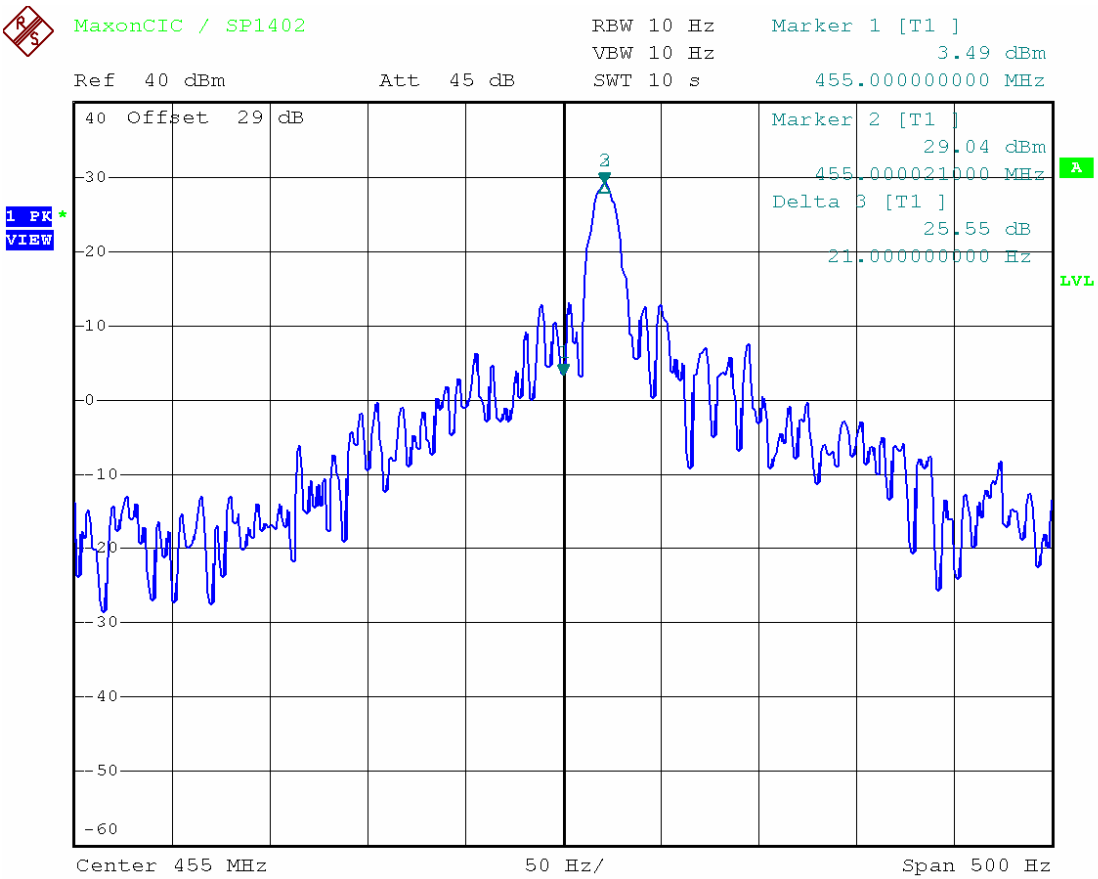
Date: 22.JAN.2008 14:22:16

5.10.7.9 Plot 7 (+30℃)



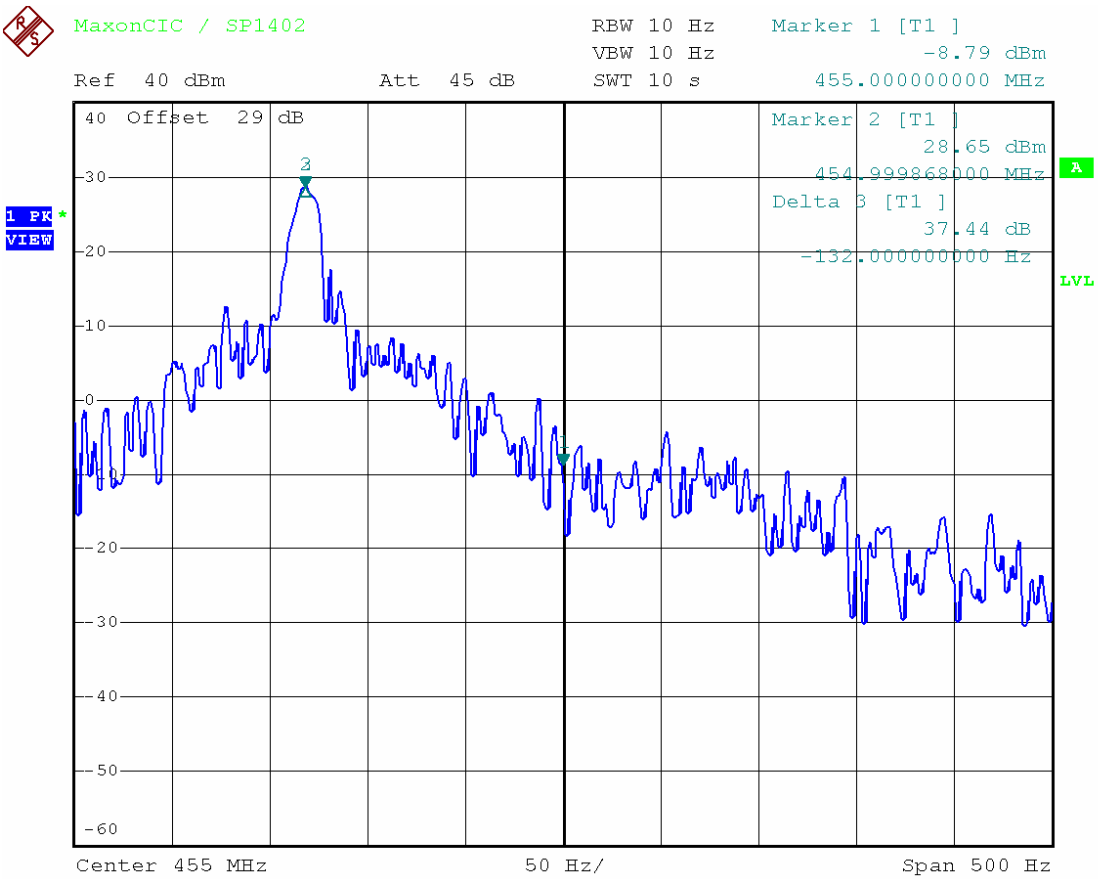
Date: 22.JAN.2008 13:20:35

5.10.7.10 Plot 8 (+40℃)



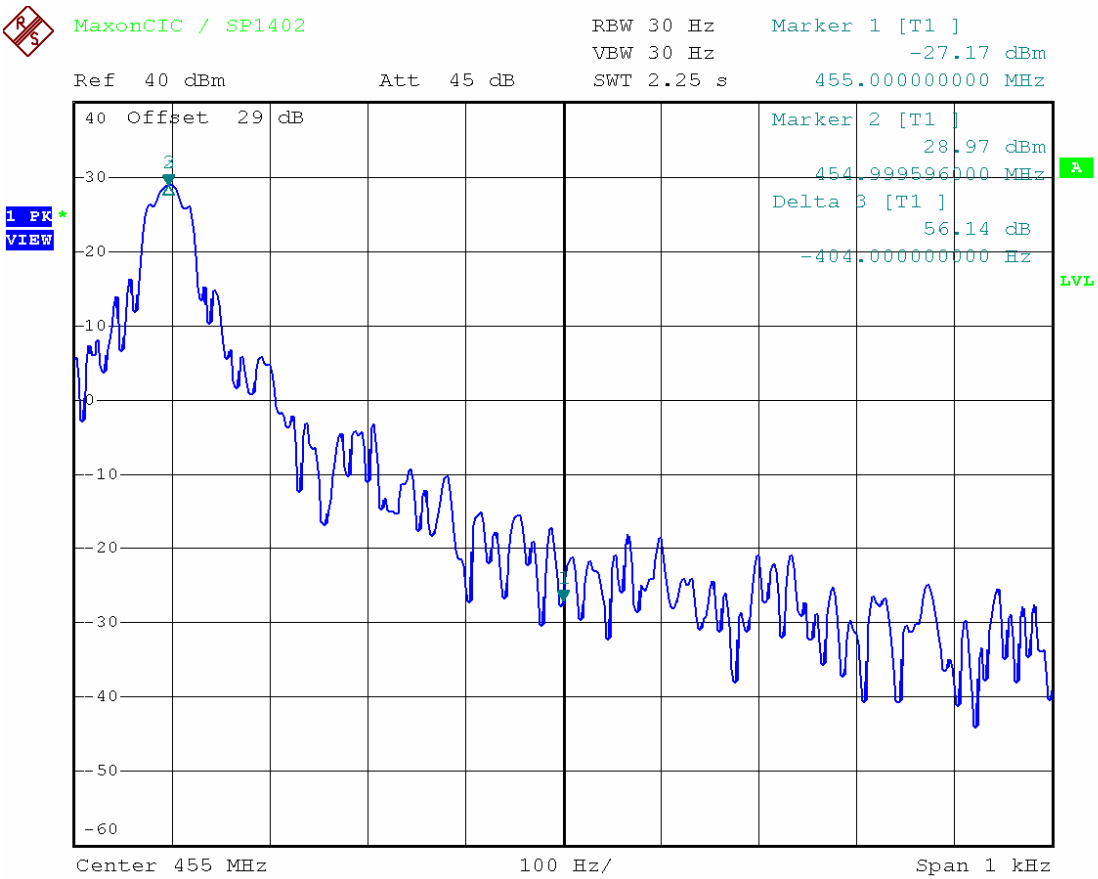
Date: 22.JAN.2008 13:34:45

5.10.7.11 Plot 9 (+50℃)



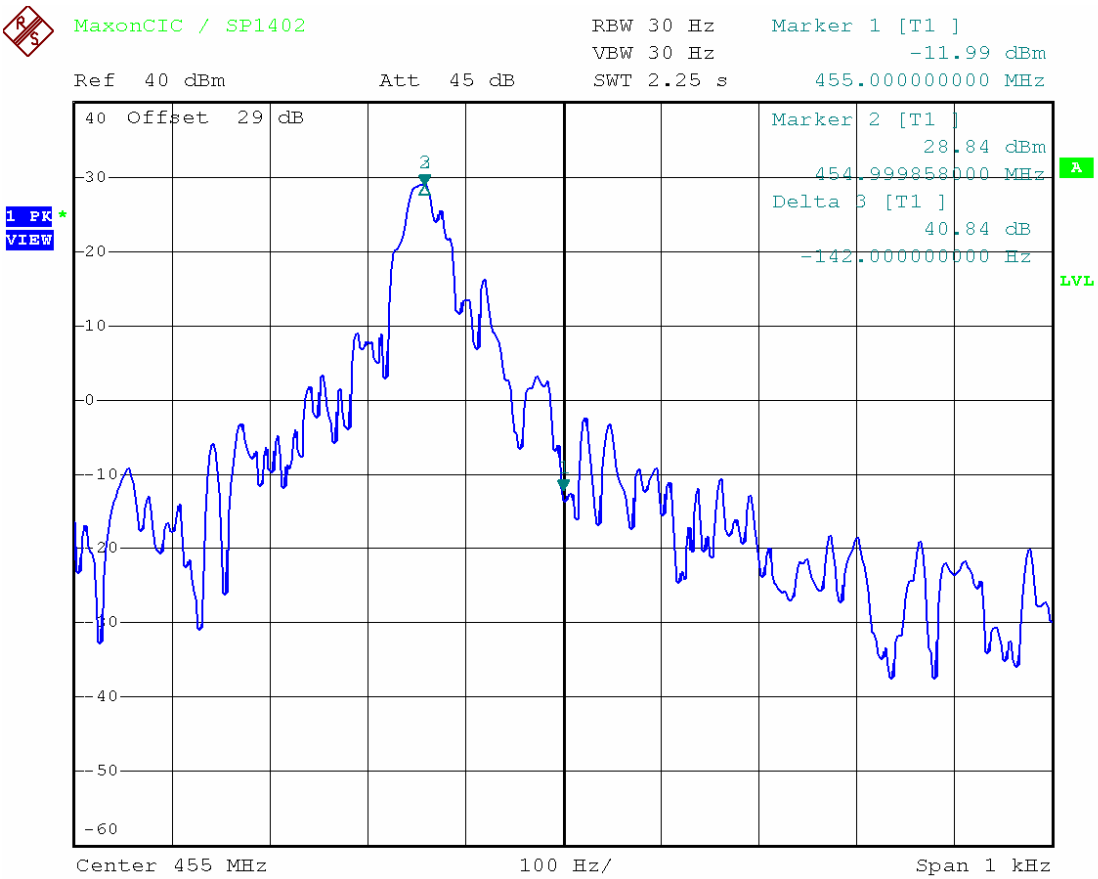
Date: 22.JAN.2008 13:47:02

5.10.7.12 Plot 10 (+60℃)



Date: 22.JAN.2008 14:07:29

5.10.7.13 Plot 11 (20℃, 6.375 V)



Date: 22.JAN.2008 14:23:06

5.10.7.14 Plot 12 (20℃, 8.625 V)

Date: 22.JAN.2008 14:22:46

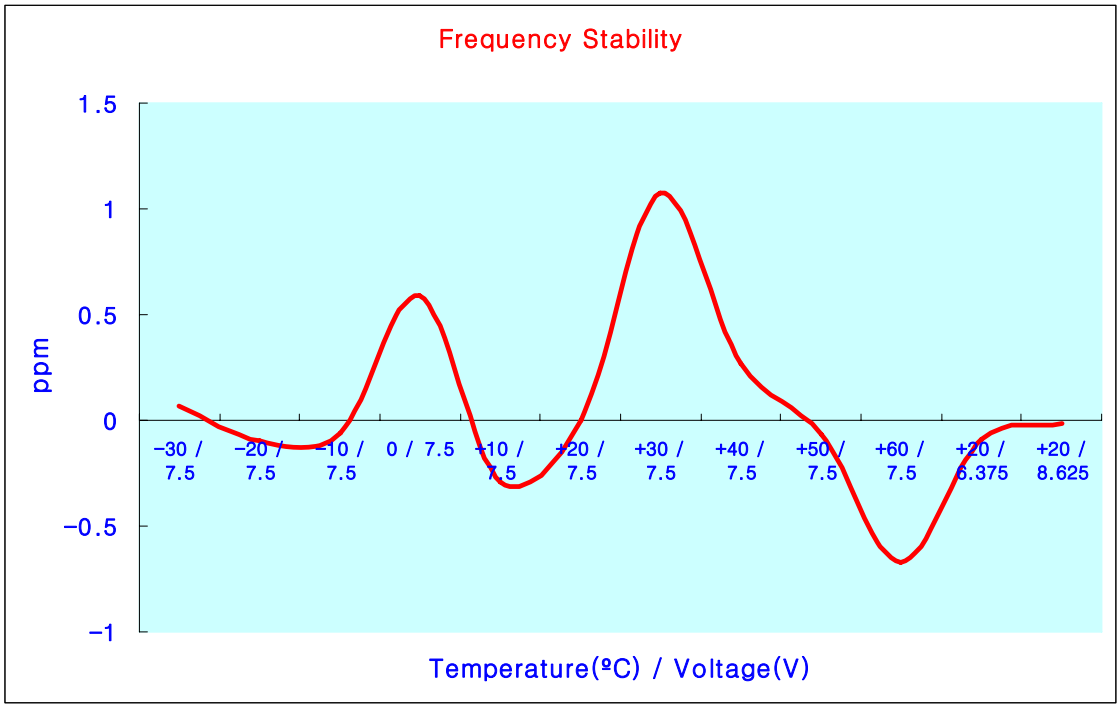
5.10.8 Test Result 3

FCC Rules :	Part 2 §2.1055 & §90.231
IC Rules :	RSS-119 Section 5.3
Operating Frequency :	469.975 MHz
Channel :	3rd Channel
Power Output :	5 Watts
Modulation :	Non-Modulation
Reference Voltage :	7.5 VDC

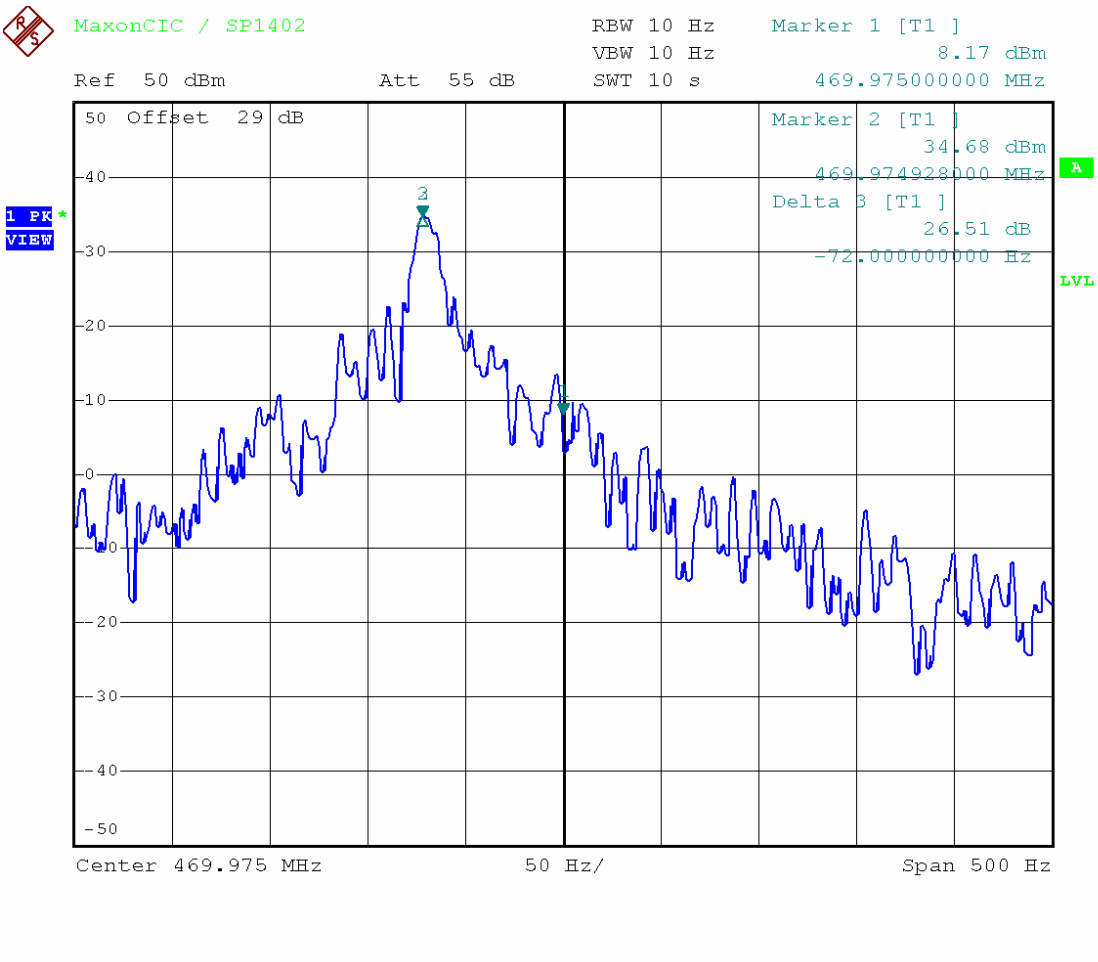
5.10.8.1 Data

Voltage (%)	Power Supply (Vdc)	Temperature (ºC)	Frequency (Hz)	Deviation (ppm)	Limit (ppm)
100 %	7.5	-30	469.974928	+0.094	2.5
100 %	7.5	-20	469.974830	-0.115	2.5
100 %	7.5	-10	469.974836	-0.102	2.5
100 %	7.5	0	469.975190	+0.651	2.5
100 %	7.5	+10	469.974779	-0.223	2.5
100 %	7.5	+20 (ref)	469.974884	0	2.5
100 %	7.5	+30	469.975318	+0.923	2.5
100 %	7.5	+40	469.974920	+0.077	2.5
100 %	7.5	+50	469.974899	+0.032	2.5
100 %	7.5	+60	469.974588	-0.630	2.5
85 %	6.375	+20	469.974860	-0.051	2.5
115 %	8.625	+20	469.974898	+0.030	2.5

5.10.8.2 Graph

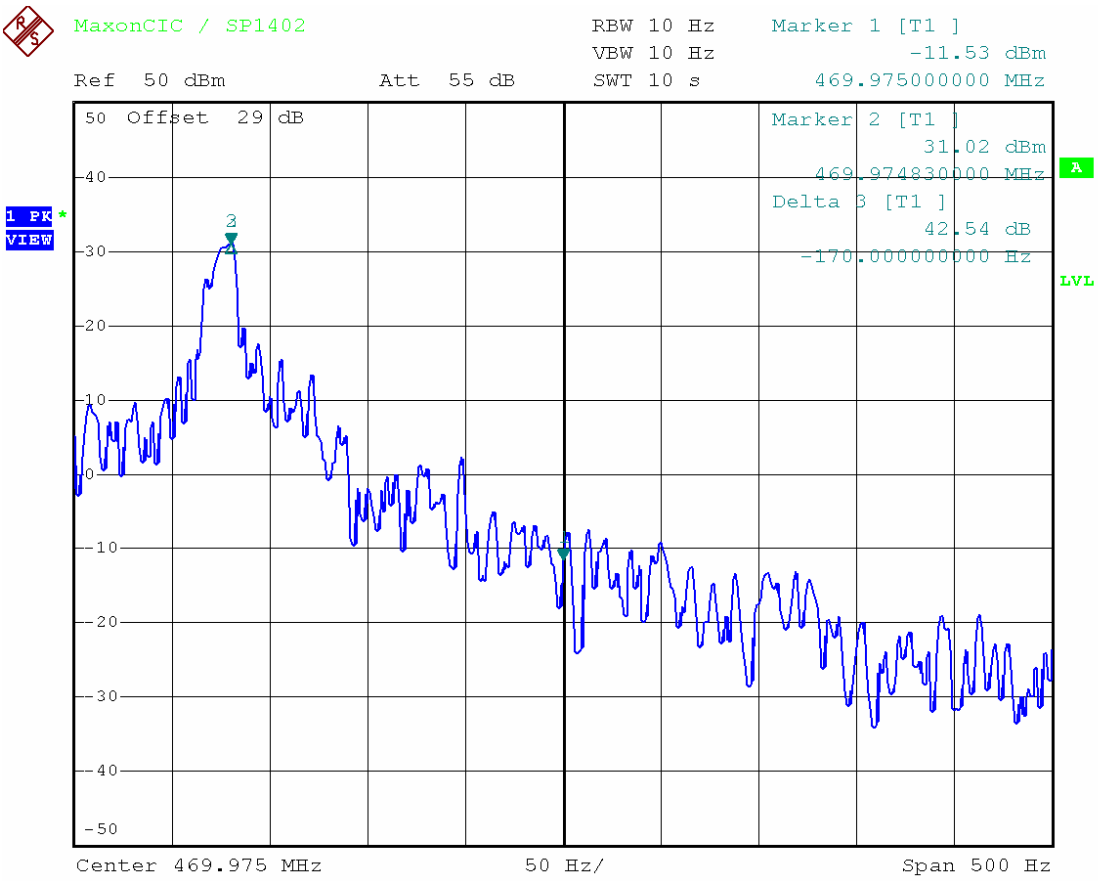


5.10.8.3 Plot 1 (-30℃)



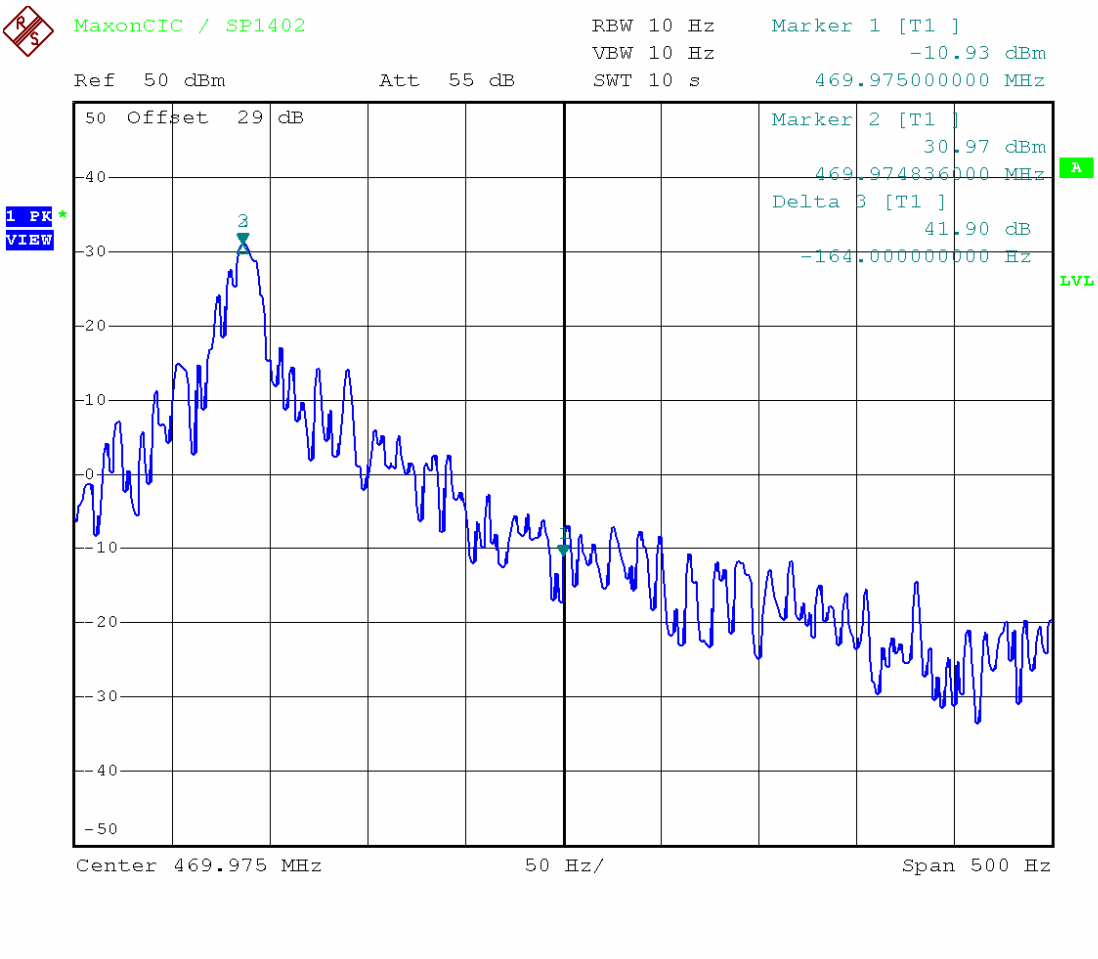
Date: 22.JAN.2008 09:26:35

5.10.8.4 Plot 2 (-20℃)



Date: 22.JAN.2008 11:21:43

5.10.8.5 Plot 3 (-10℃)

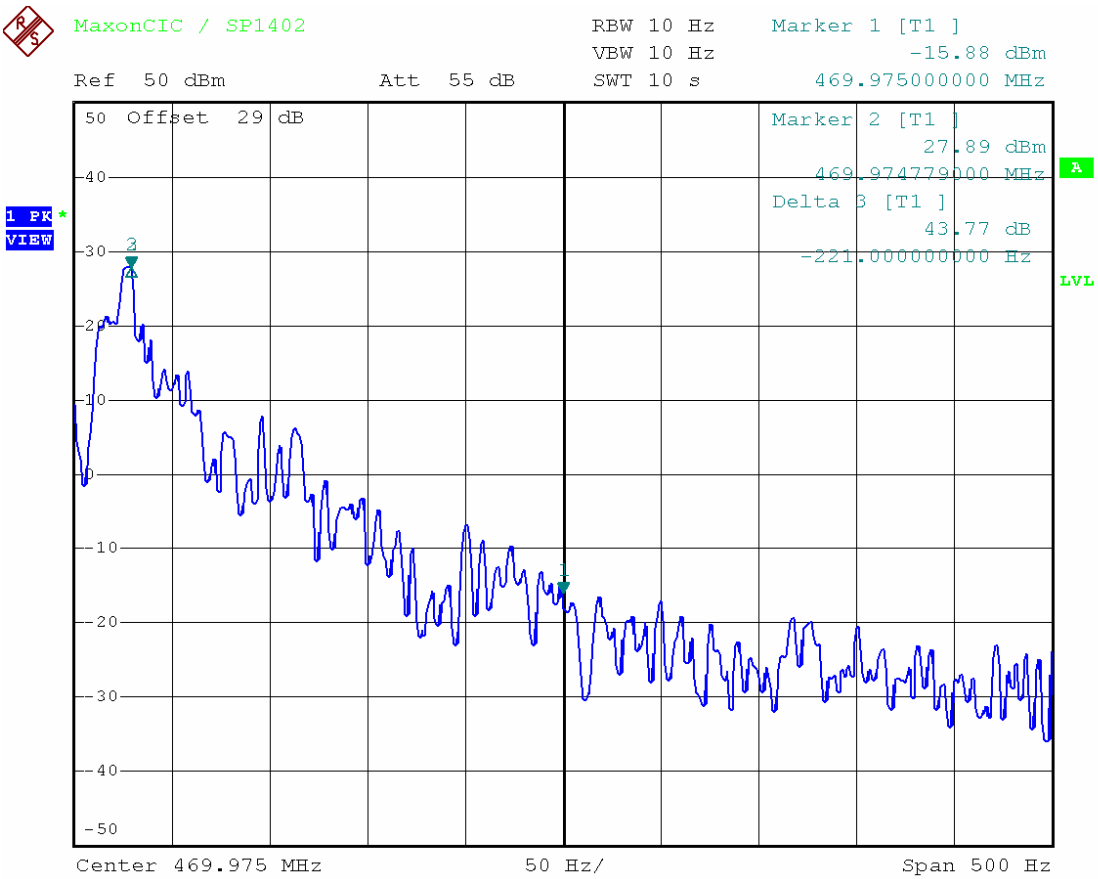


Date: 22.JAN.2008 11:47:58

5.10.8.6 Plot 4 (0℃)

Date: 22.JAN.2008 14:33:09

5.10.8.7 Plot 5 (+10℃)

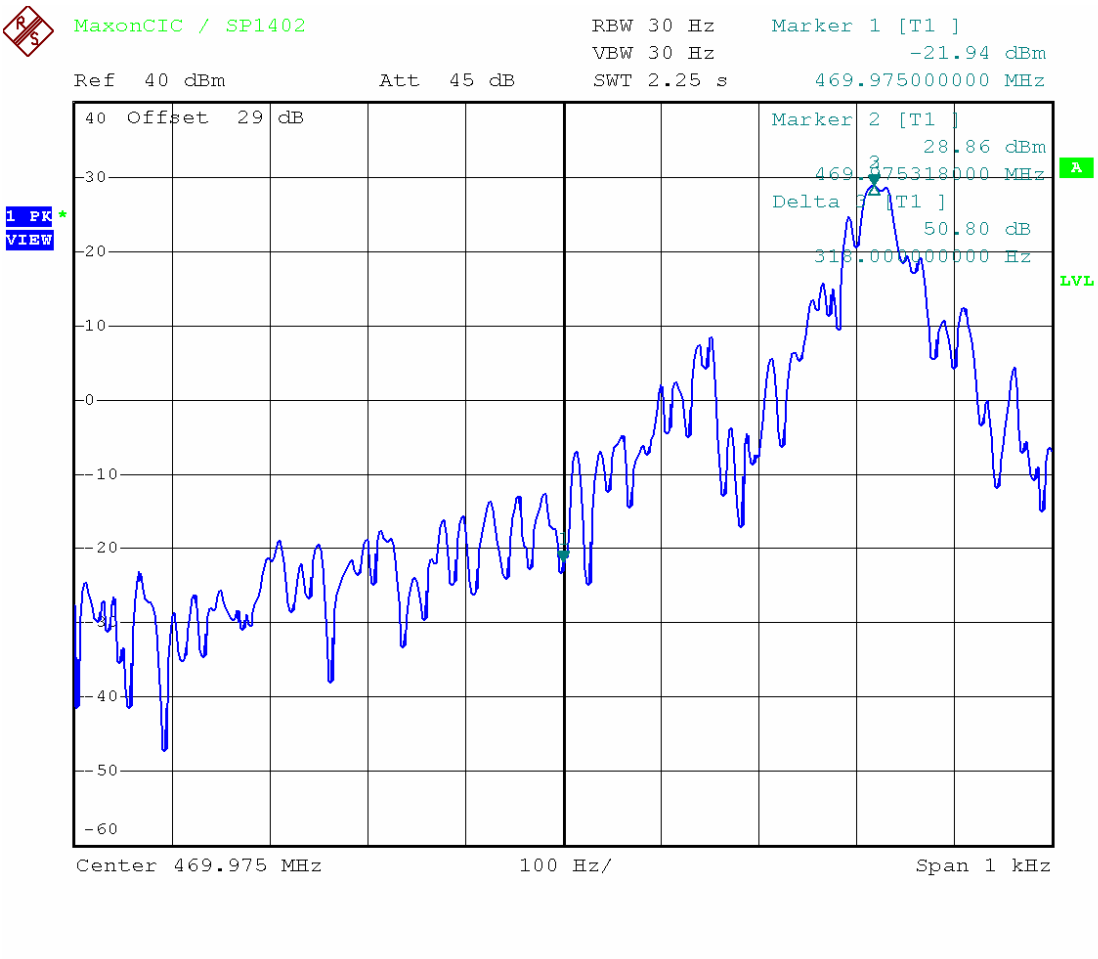


Date: 22.JAN.2008 12:54:45

5.10.8.8 Plot 6 (+20℃)

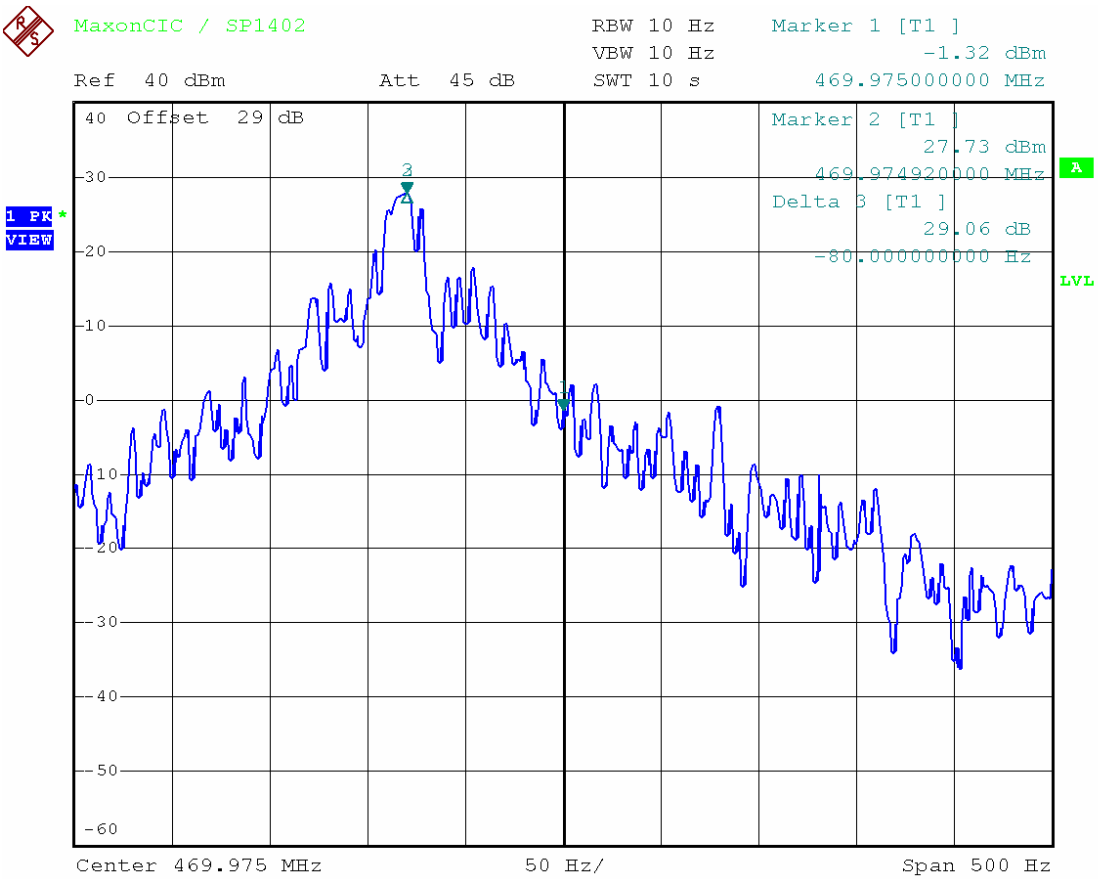
Date: 22.JAN.2008 14:21:35

5.10.8.9 Plot 7 (+30℃)



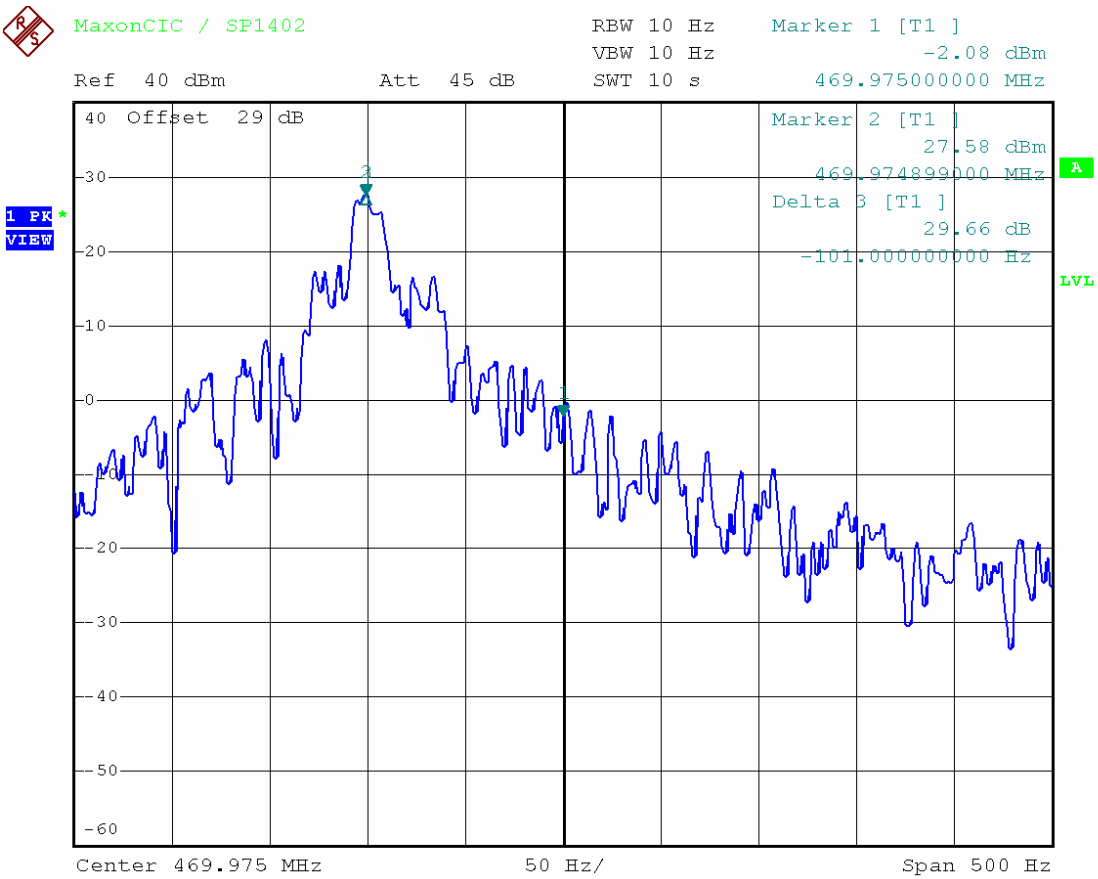
Date: 22.JAN.2008 13:21:49

5.10.8.10 Plot 8 (+40℃)



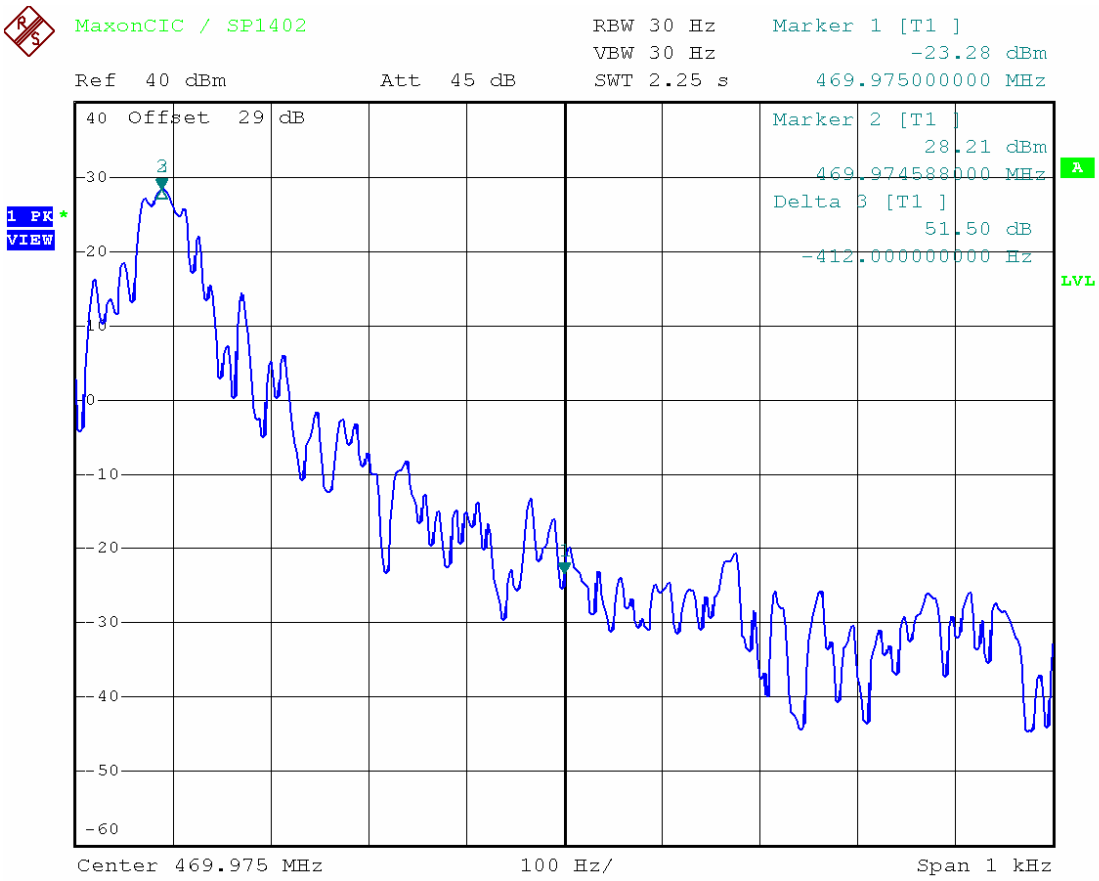
Date: 22.JAN.2008 13:36:31

5.10.8.11 Plot 9 (+50℃)



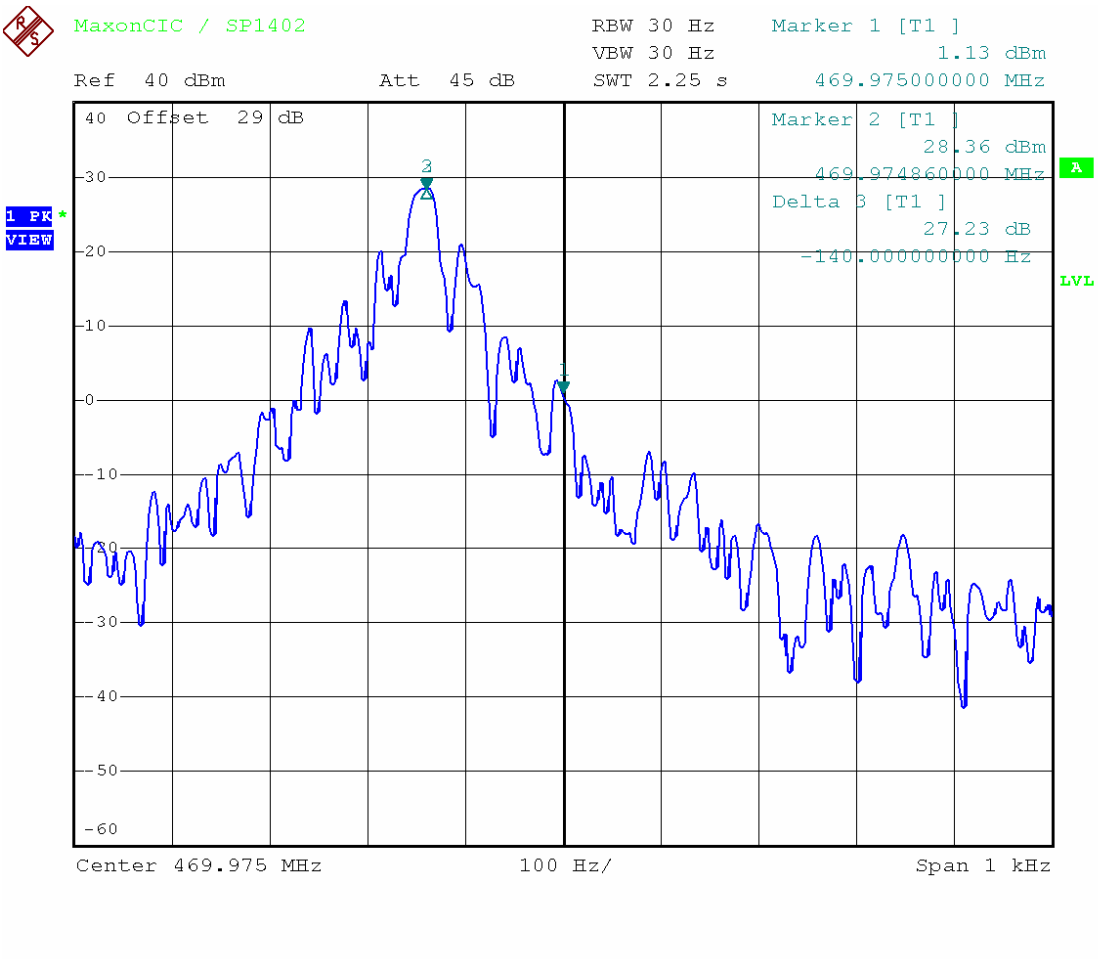
Date: 22.JAN.2008 13:46:22

5.10.8.12 Plot 10 (+60℃)



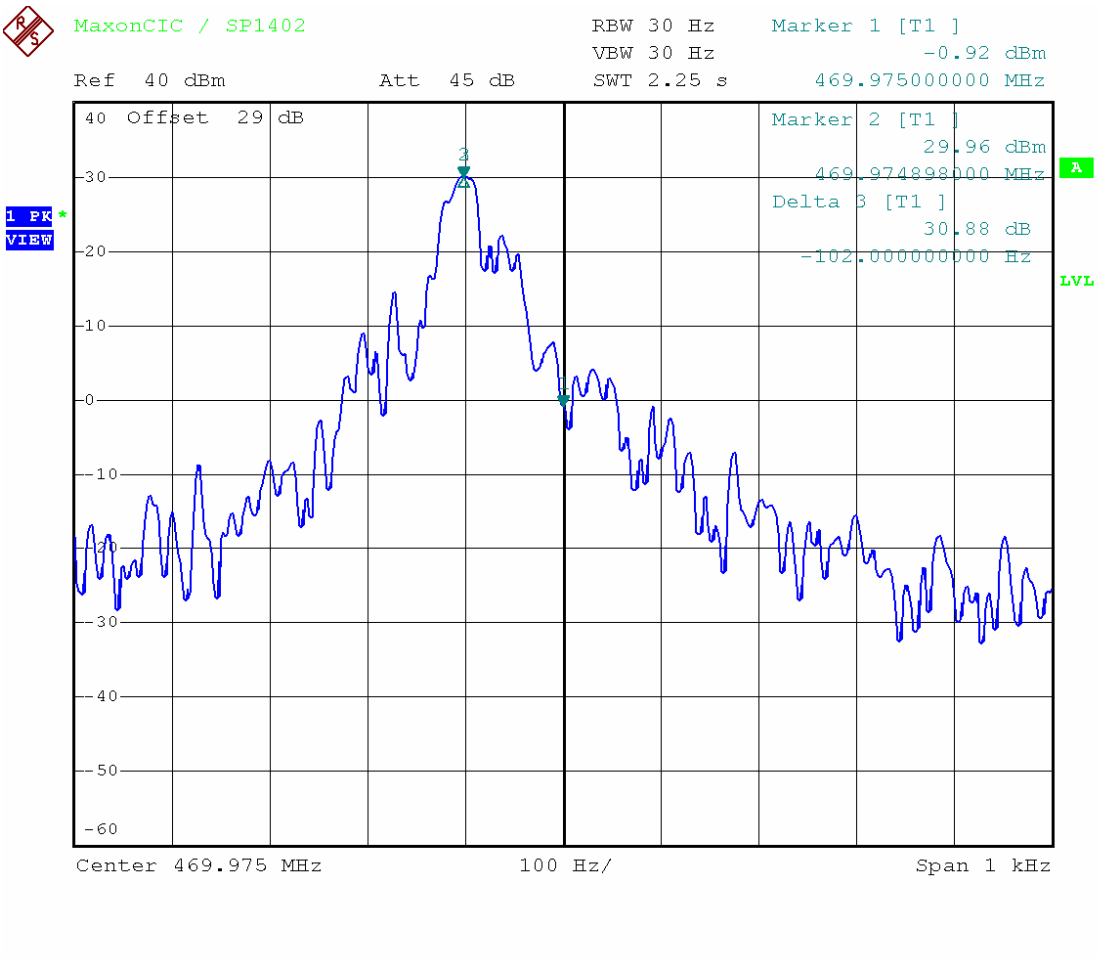
Date: 22.JAN.2008 14:08:38

5.10.8.13 Plot 11 (20℃, 6.375 V)



Date: 22.JAN.2008 14:20:30

5.10.8.14 Plot 12 (20℃, 8.625 V)



Date: 22.JAN.2008 14:20:53

5.11 Transient Frequency Behavior

5.11.1 Specification

FCC Rules Part 90, Section 90.214
Industry Canada, RSS-119 Section 5.9

5.11.2 Method of Measurement

ANSI/TIA-603-B-2002 Section 2.2.19

5.11.3 Measurement Set-Up

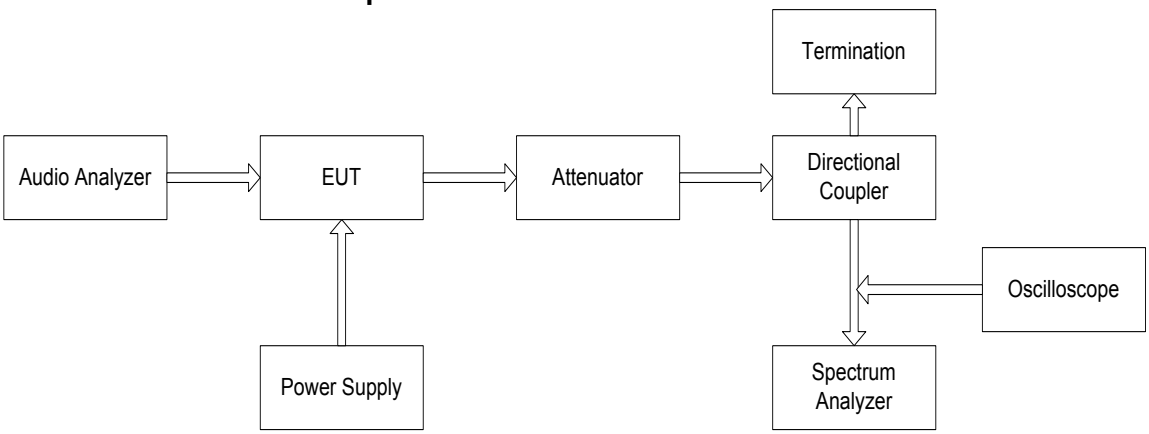


Fig.9

5.11.4 Test Equipment List

Equipment	Model Name	Manufacturer
EUT	SP1402	Maxon CIC Corp.
Power Supply	IPS-30B03DD	INTERACT
Audio Analyzer	8903B	Agilent
Attenuator	33-30-33	WEINSCHEL
Directional Coupler	778D	Agilent
Termination	8173	Bird
Oscilloscope	TDS3032	Tektronix
Spectrum Analyzer	FSP7	Rohde & Shwarz

5.11.5 Test Procedure

-. The unit was turn-up in accordance with the alignment procedure stated in the FIG. 9, and was loaded into a 50 ohm resistive termination.
-. Using the variable attenuator the transmitter level was set to 40 dB below the test receivers maximum input level, then the transmitter was turned off.
-. With the transmitter off the signal generator was set 20dB below the level of the transmitter in the above step, this level will be maintained with the signal generator through-out the test.
-. Reduce the attenuation between the transmitter and the RF detector by 30 dB.
-. With the levels set as above the transient frequency behavior was observed & recorded.
-. Requirements

5.11.6 Limit

Transient Frequency Difference Limits

Time Interval	Max. Permitted Frequency Difference for 25 and 30 kHz Channel Spacing (in kHz)	Max. Permitted Frequency Difference for 12.5 and 15 kHz Channel Spacing (in kHz)
t1 or t3	25	12.5
t2	12.5	6.25

Transient Duration Limits

Time Intervals	Frequency Ranges (MHz)		
	30 to 174	406 to 512	806 to 940
t1	5.0 ms	10.0 ms	20.0 ms
t2	20.0 ms	25.0 ms	50.0 ms
t3	5.0 ms	10.0 ms	10.0 ms

The transient frequency behaviour of the transmitter is the variation in time of the transmitter frequency difference from the nominal frequency of the transmitter when the RF output power is switched on and off.

ton: according to the method of measurement described the switch-on instant ton of a transmitter is defined by the condition when the output power, measured at the antenna terminal, exceeds 0,1 % of the nominal power.

t1: period of time starting at ton and finishing.

t2: period of time starting at the end of t1 and finishing.

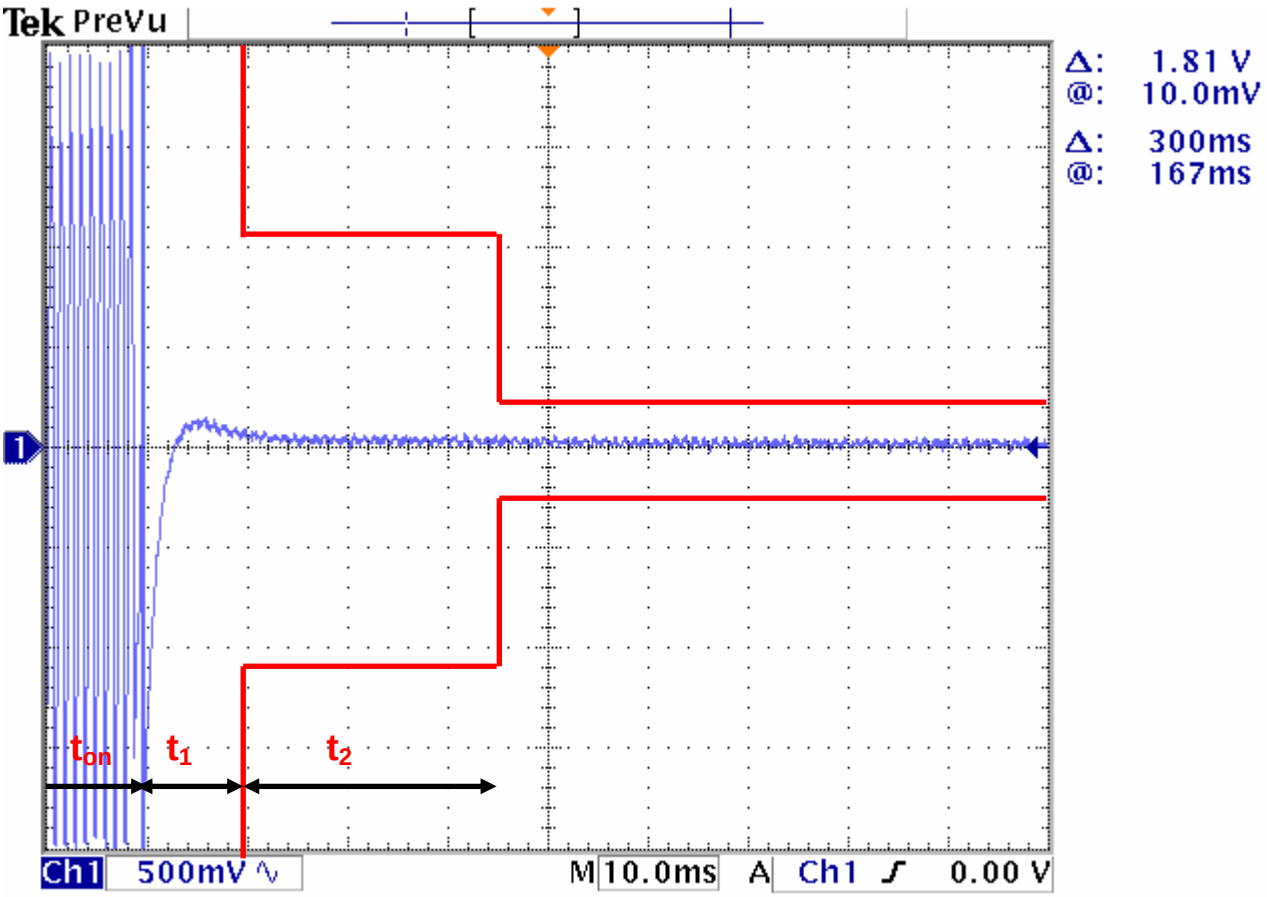
toff: switch-off instant defined by the condition when the nominal power falls below 0,1 % of the nominal power.

t3: period of time that finishing at toff and starting.

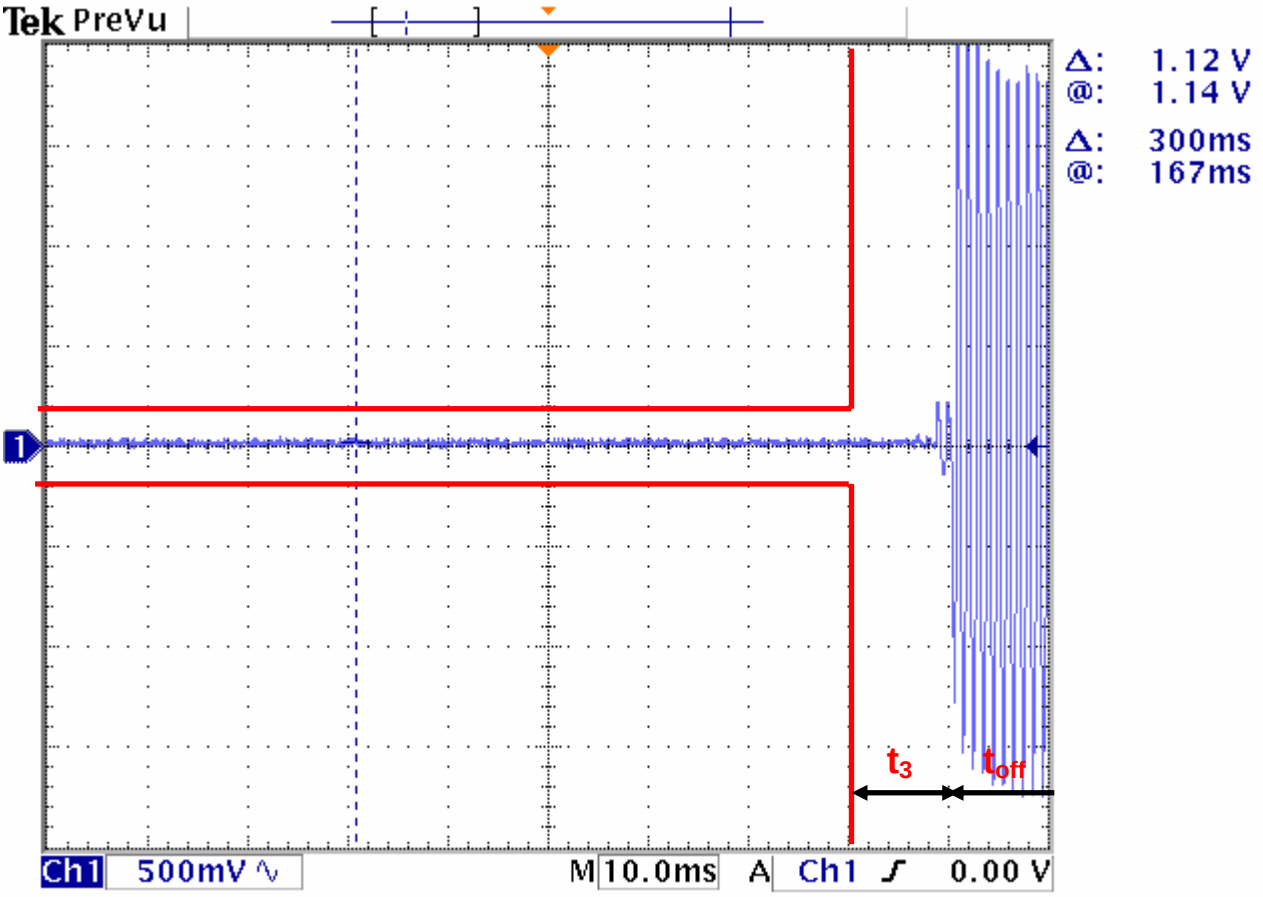
5.11.7 Test Plot 1

FCC Rules :	Part 90 §90.231
IC Rules :	RSS-119 Section 5.9
Operating Frequency :	440.025 MHz
Channel :	1st Channel
Power Output :	5 Watts
Channel Spacing :	Narrow Band
Reference Voltage :	7.5 VDC

5.11.7.1 Switch on condition t_{on}, t_1 and t_2



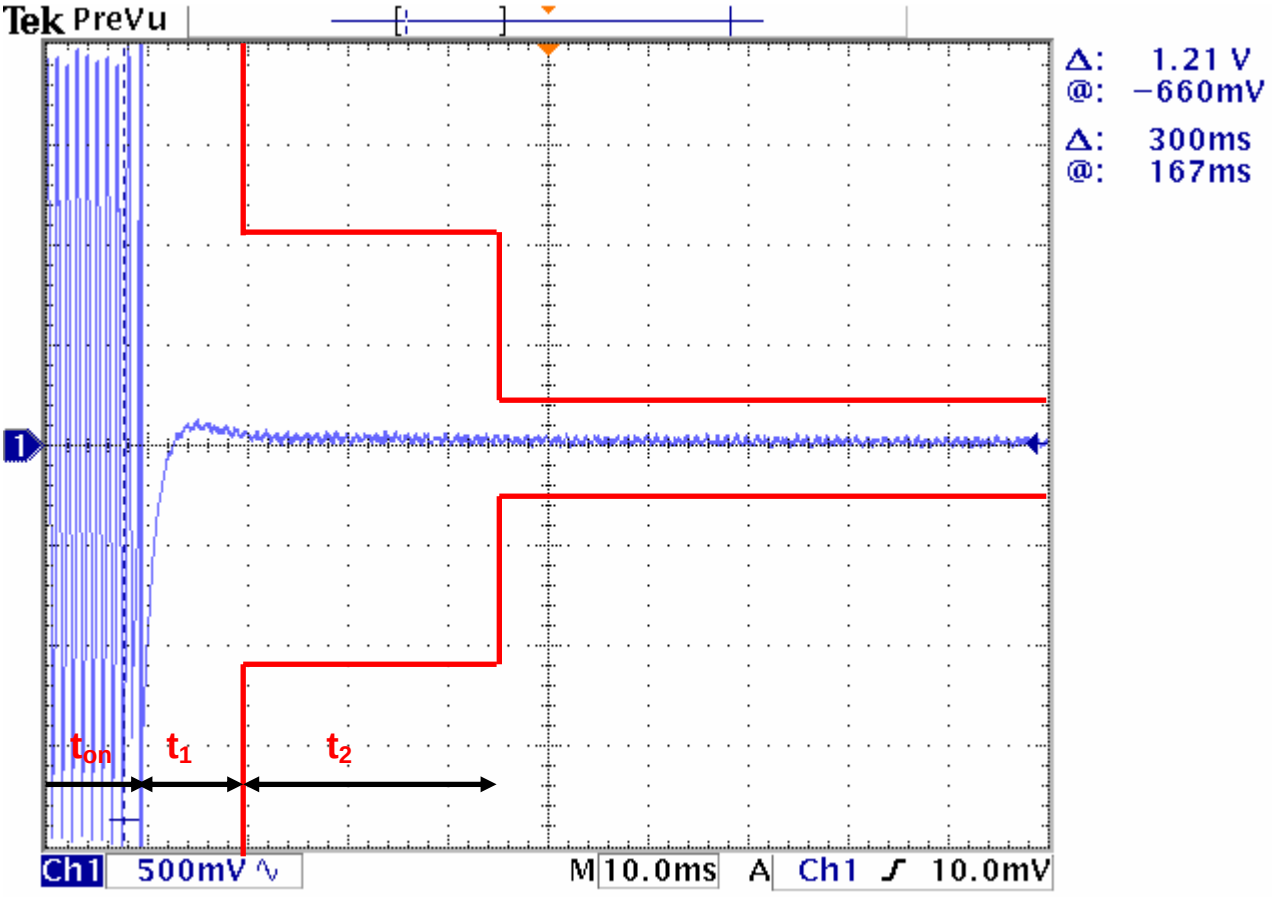
5.11.7.2 Switch off condition t3, t_{off}



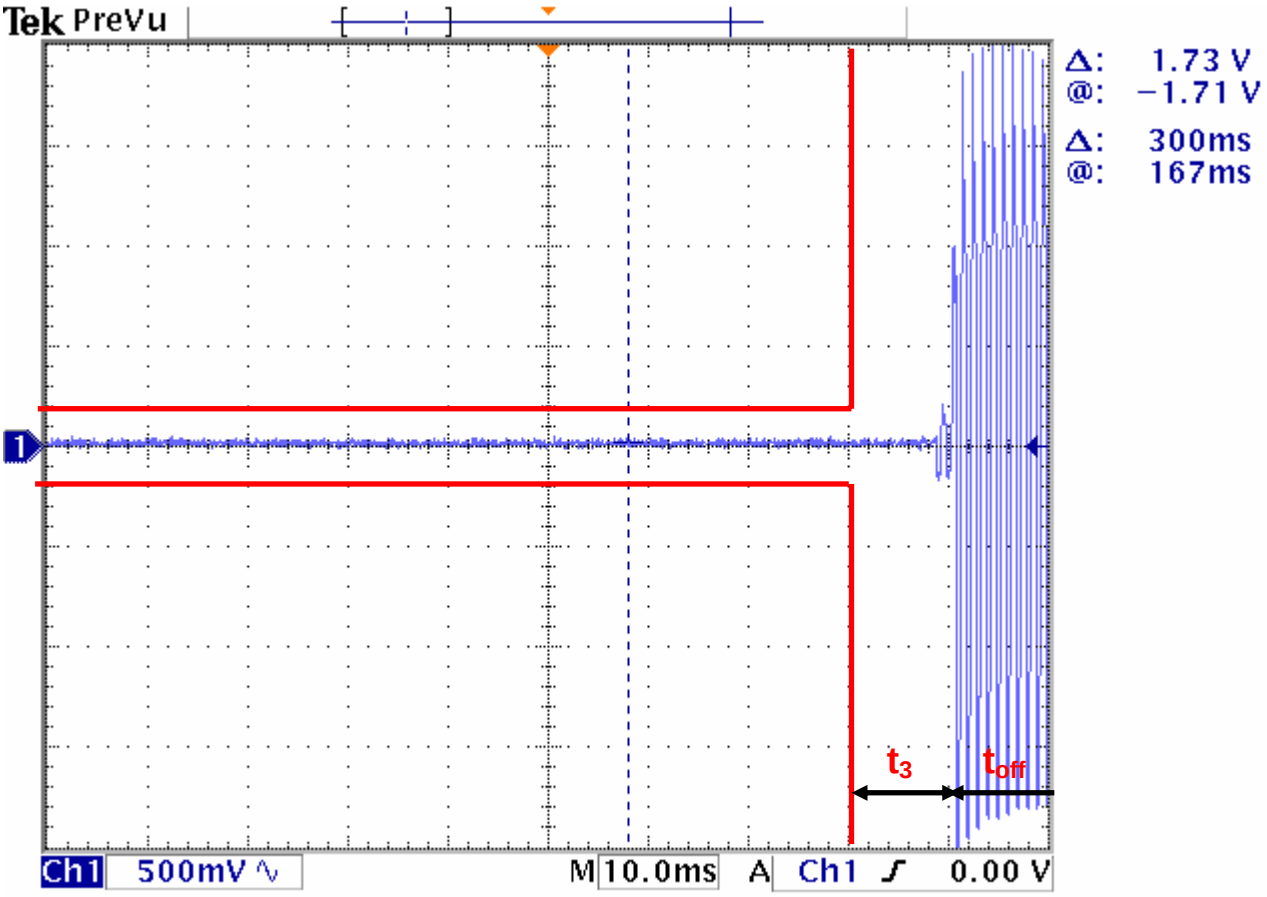
5.11.8 Test Plot 2

FCC Rules :	Part 90 §90.231
IC Rules :	RSS-119 Section 5.9
Operating Frequency :	455.000 MHz
Channel :	2nd Channel
Power Output :	5 Watts
Channel Spacing :	Narrow Band
Reference Voltage :	7.5 VDC

5.11.8.1 Switch on condition t_{on}, t_1 and t_2



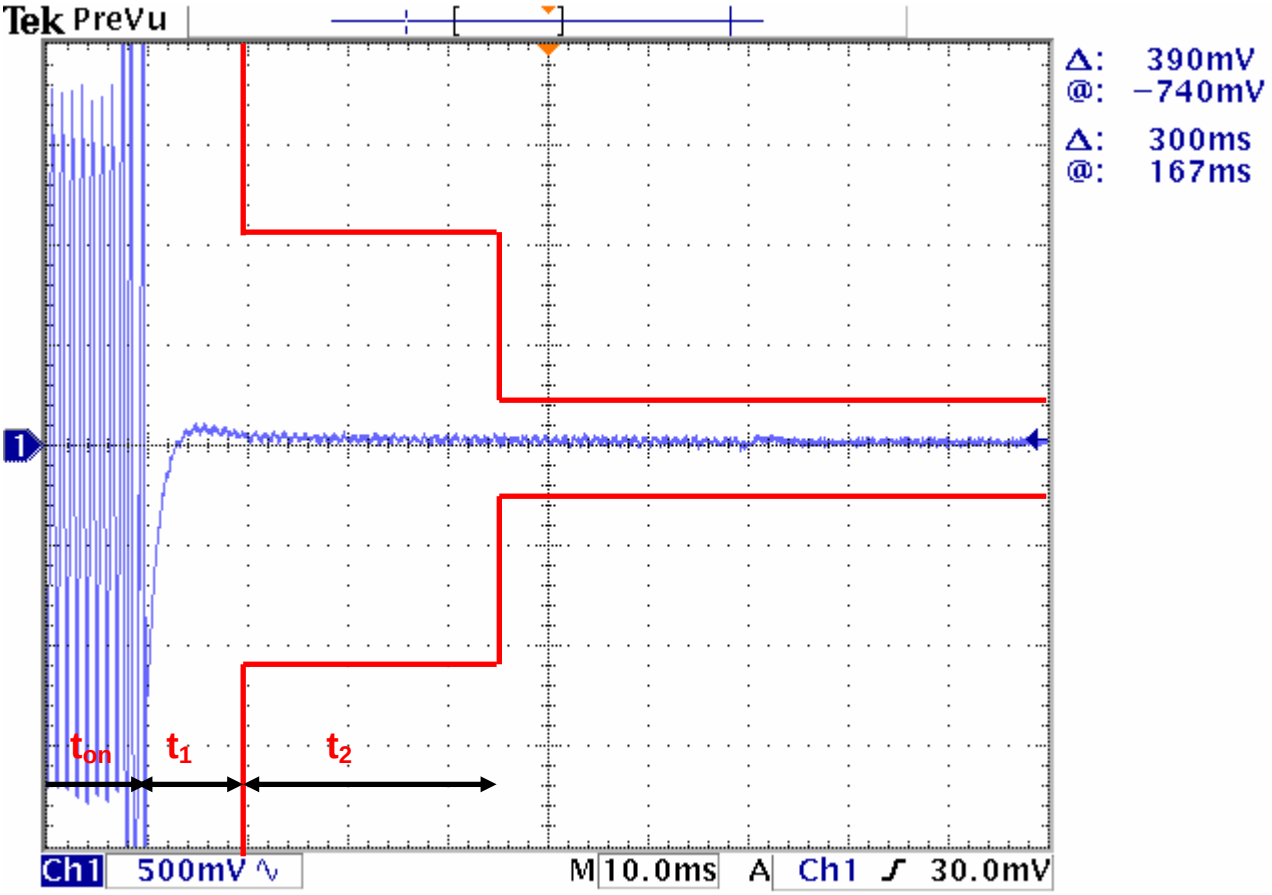
5.11.8.2 Switch off condition t3, t_{off}



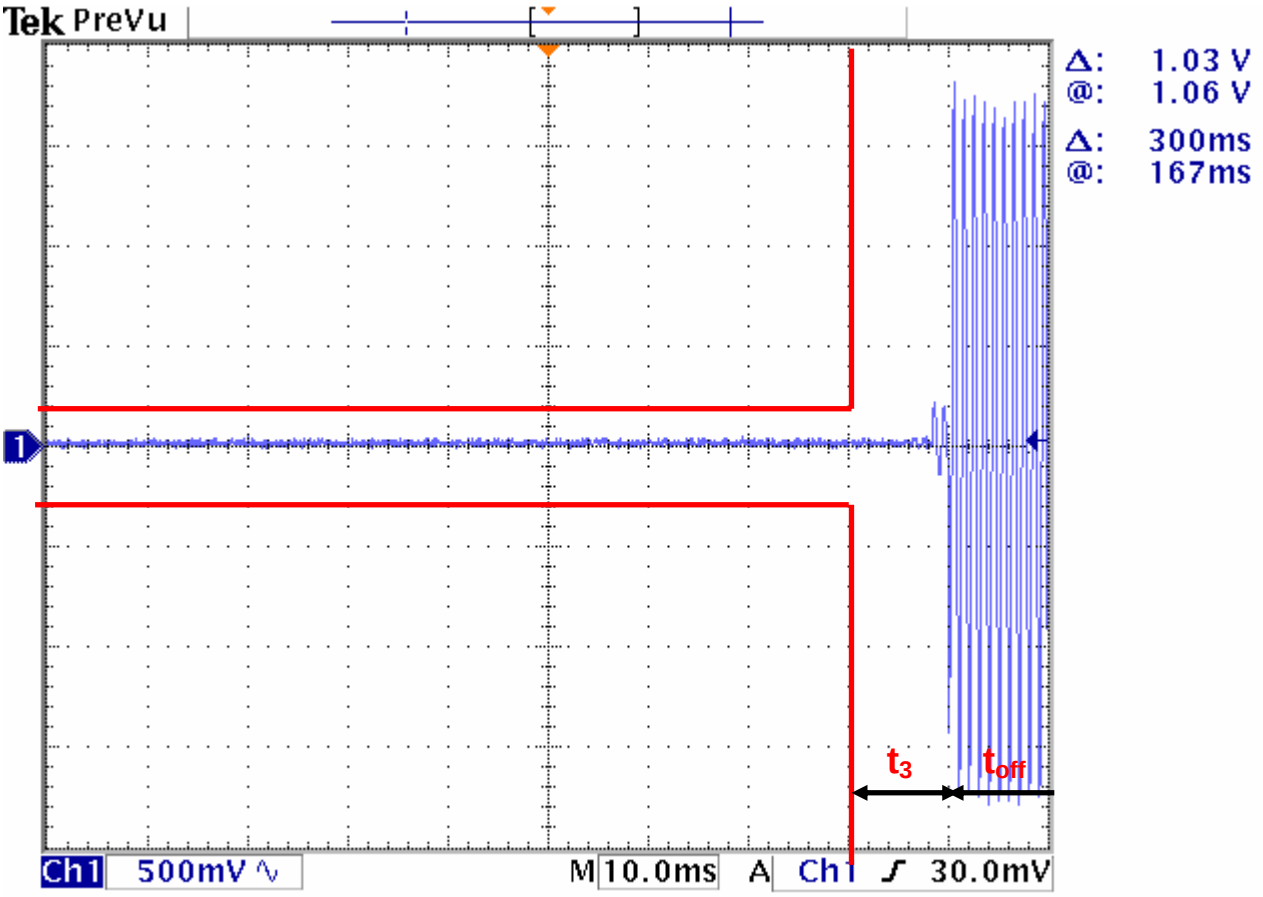
5.11.9 Test Plot 3

FCC Rules :	Part 90 §90.231
IC Rules :	RSS-119 Section 5.9
Operating Frequency :	469.975 MHz
Channel :	3rd Channel
Power Output :	5 Watts
Channel Spacing :	Narrow Band
Reference Voltage :	7.5 VDC

5.9.9.1 Switch on condition t_{on}, t_1 and t_2



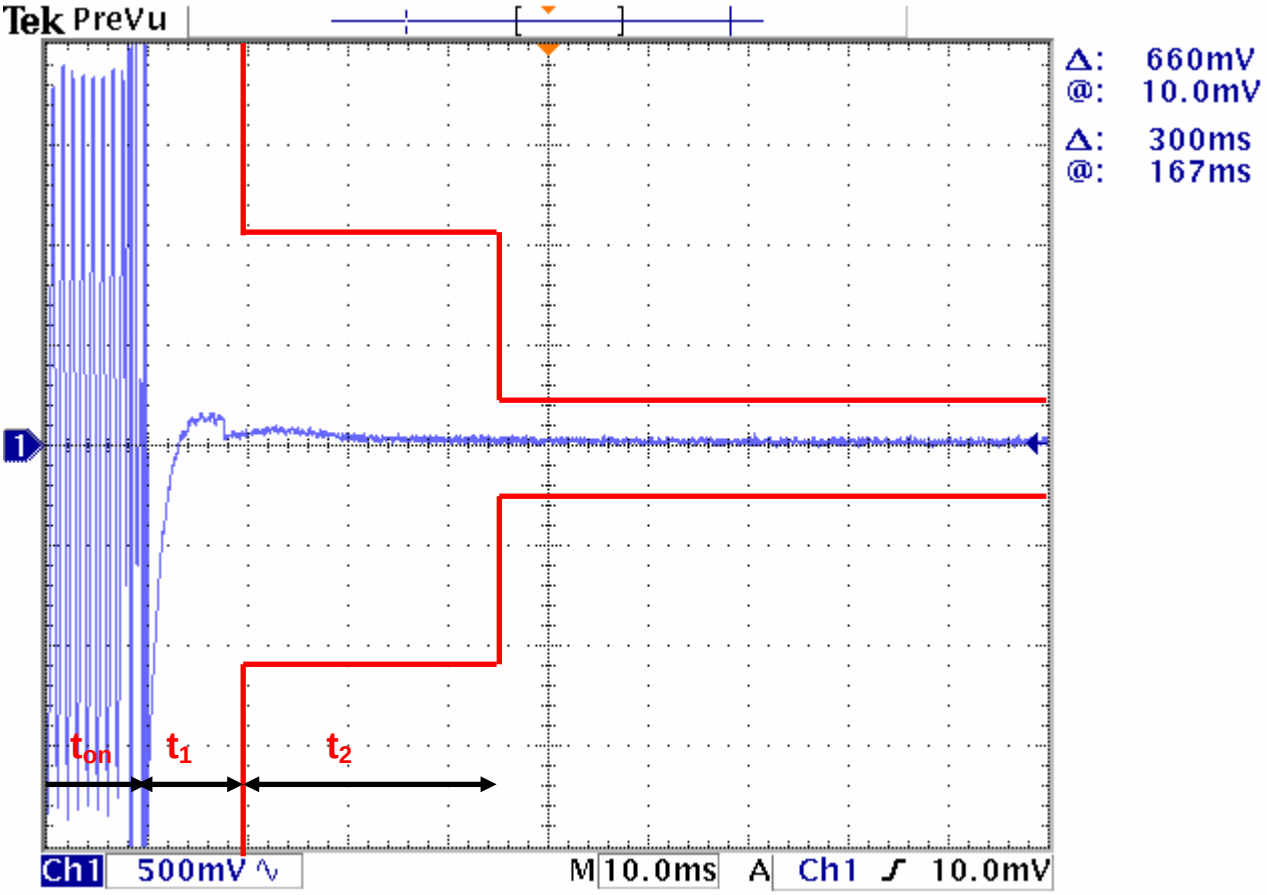
5.11.9.2 Switch off condition t3, t_{off}



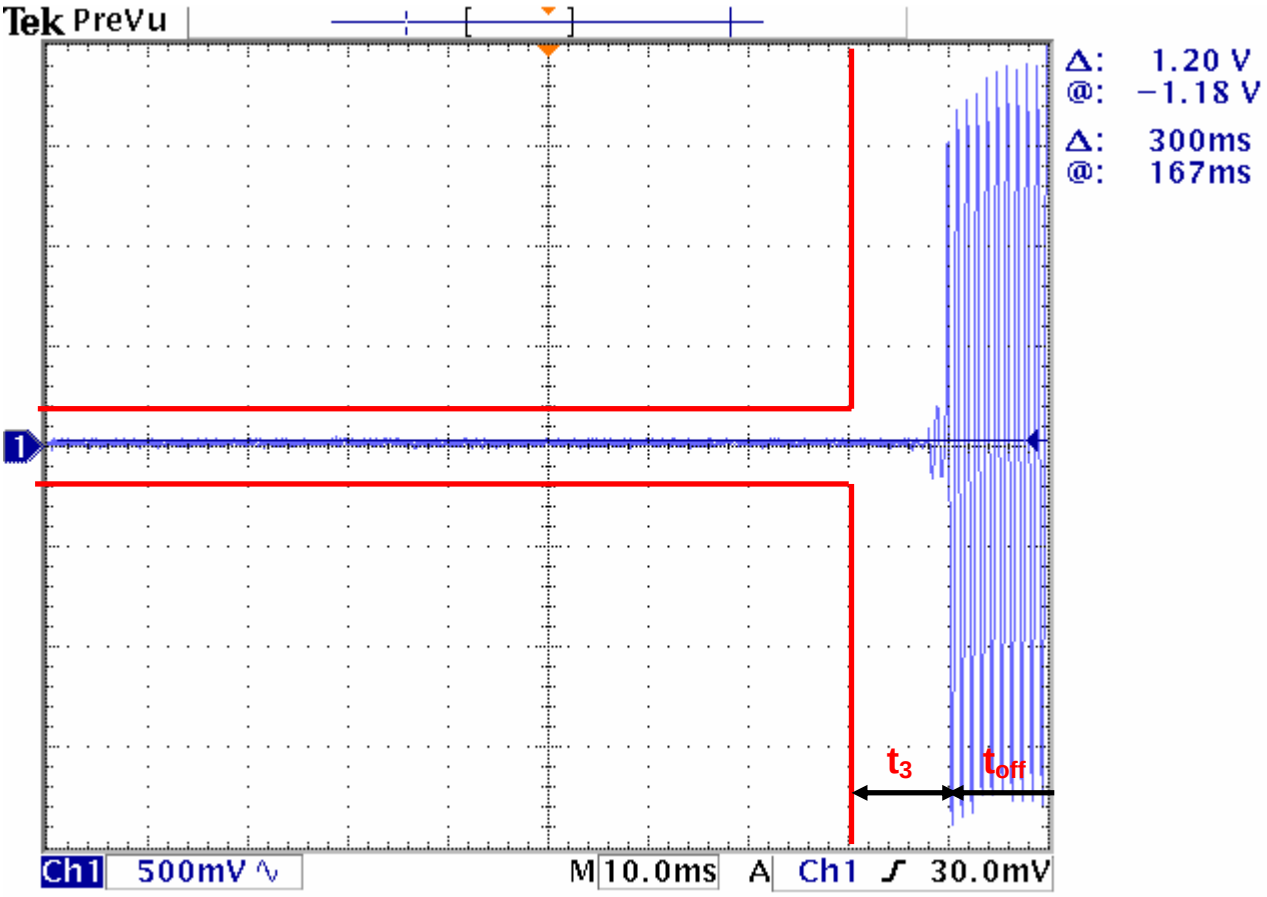
5.11.10 Test Plot 4

FCC Rules :	Part 90 §90.231
IC Rules :	RSS-119 Section 5.9
Operating Frequency :	440.025 MHz
Channel :	1st Channel
Power Output :	5 Watts
Channel Spacing :	WideBand
Reference Voltage :	7.5 VDC

5.11.10.1 Switch on condition t_{on}, t_1 and t_2



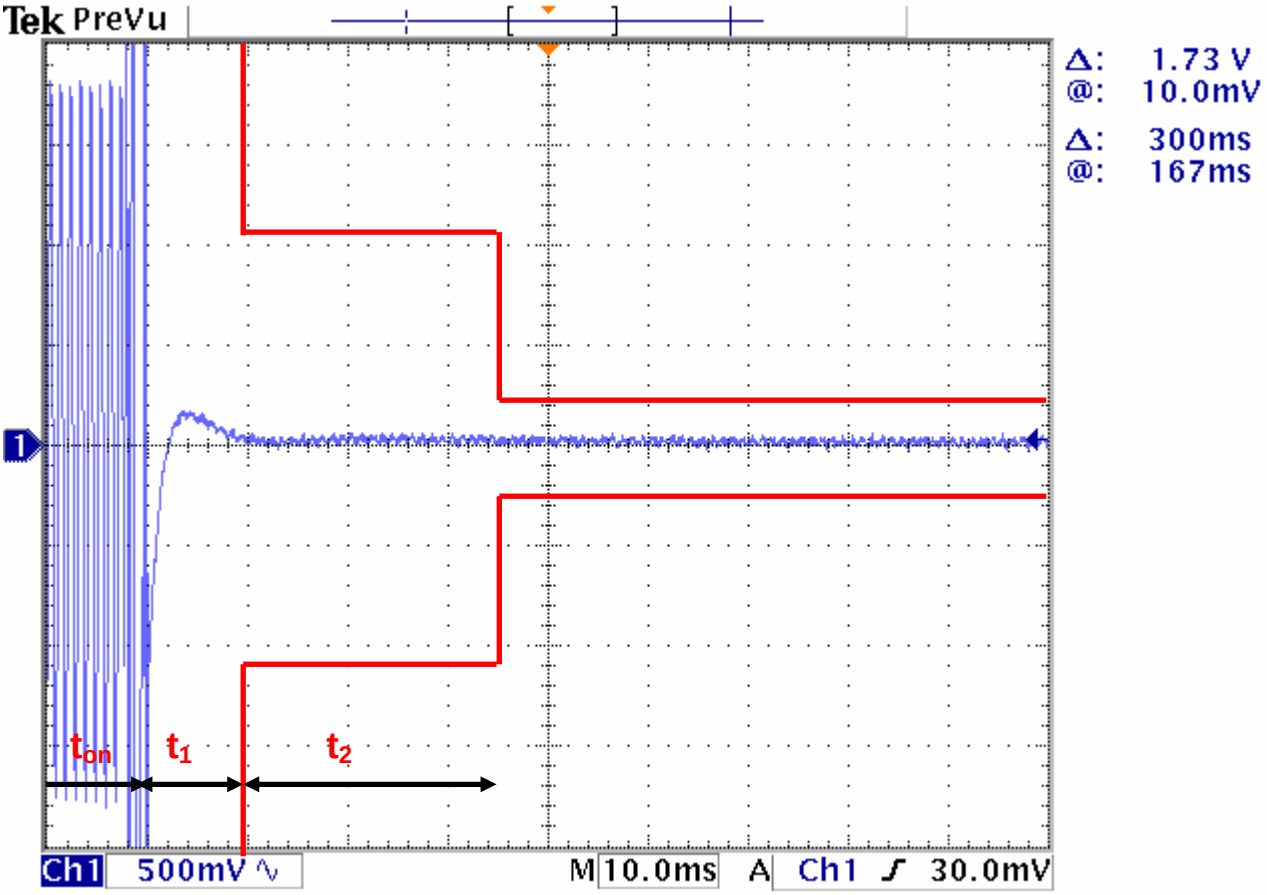
5.11.10.2 Switch off condition t3, t_{off}



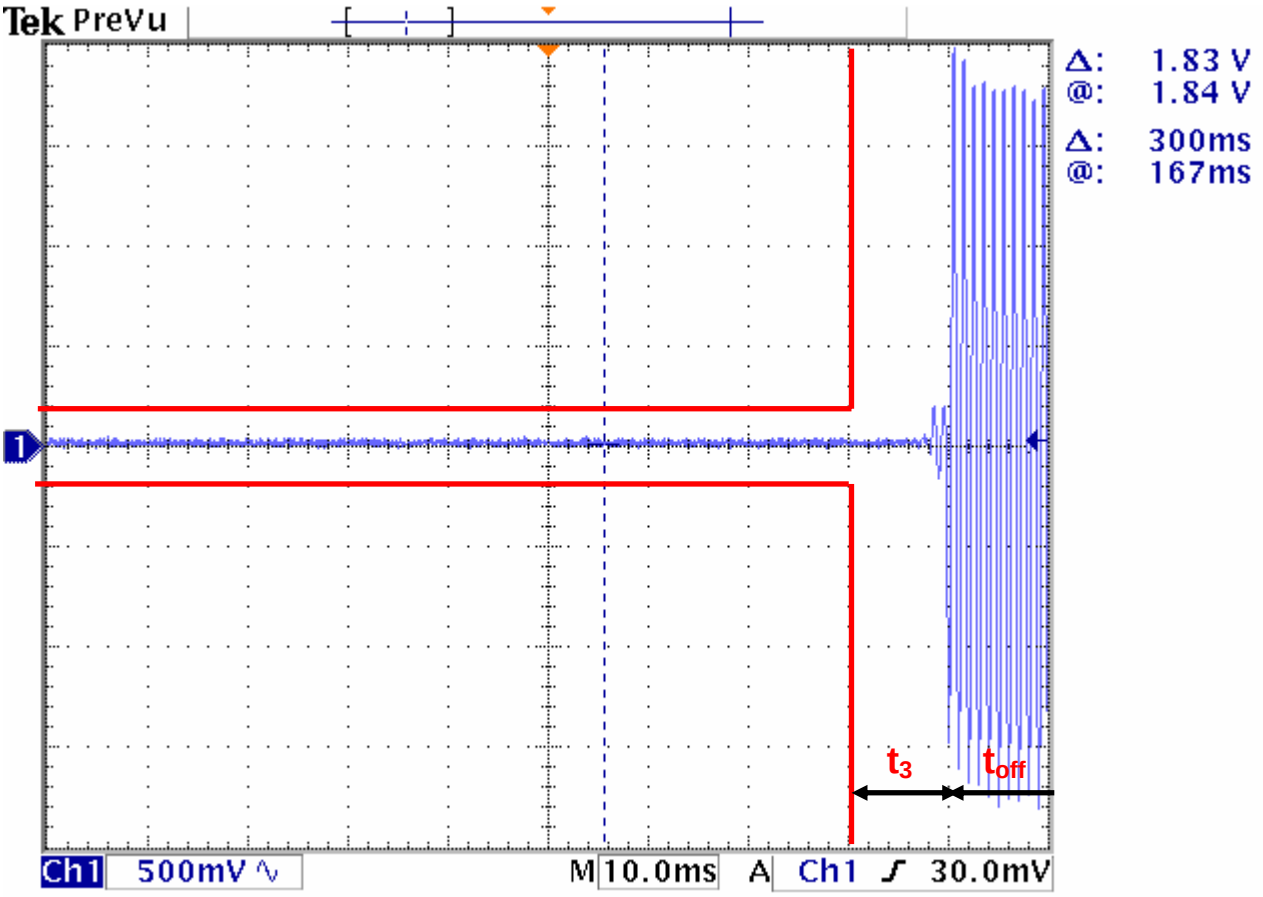
5.11.11 Test Plot 5

FCC Rules :	Part 90 §90.231
IC Rules :	RSS-119 Section 5.9
Operating Frequency :	455.000 MHz
Channel :	2nd Channel
Power Output :	5 Watts
Channel Spacing :	WideBand
Reference Voltage :	7.5 VDC

5.11.12.1 Switch on condition t_{on}, t_1 and t_2



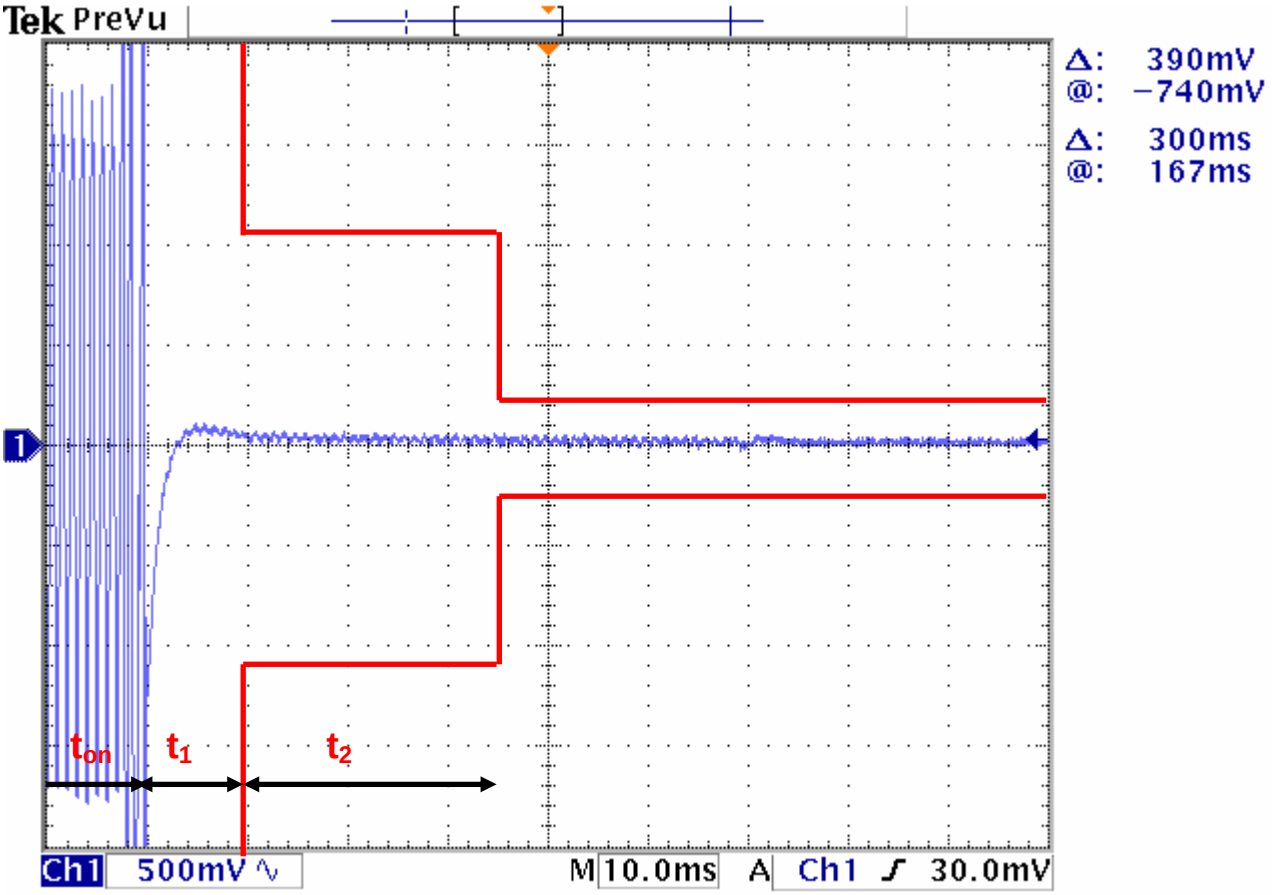
5.11.11.2 Switch off condition t3, t_{off}



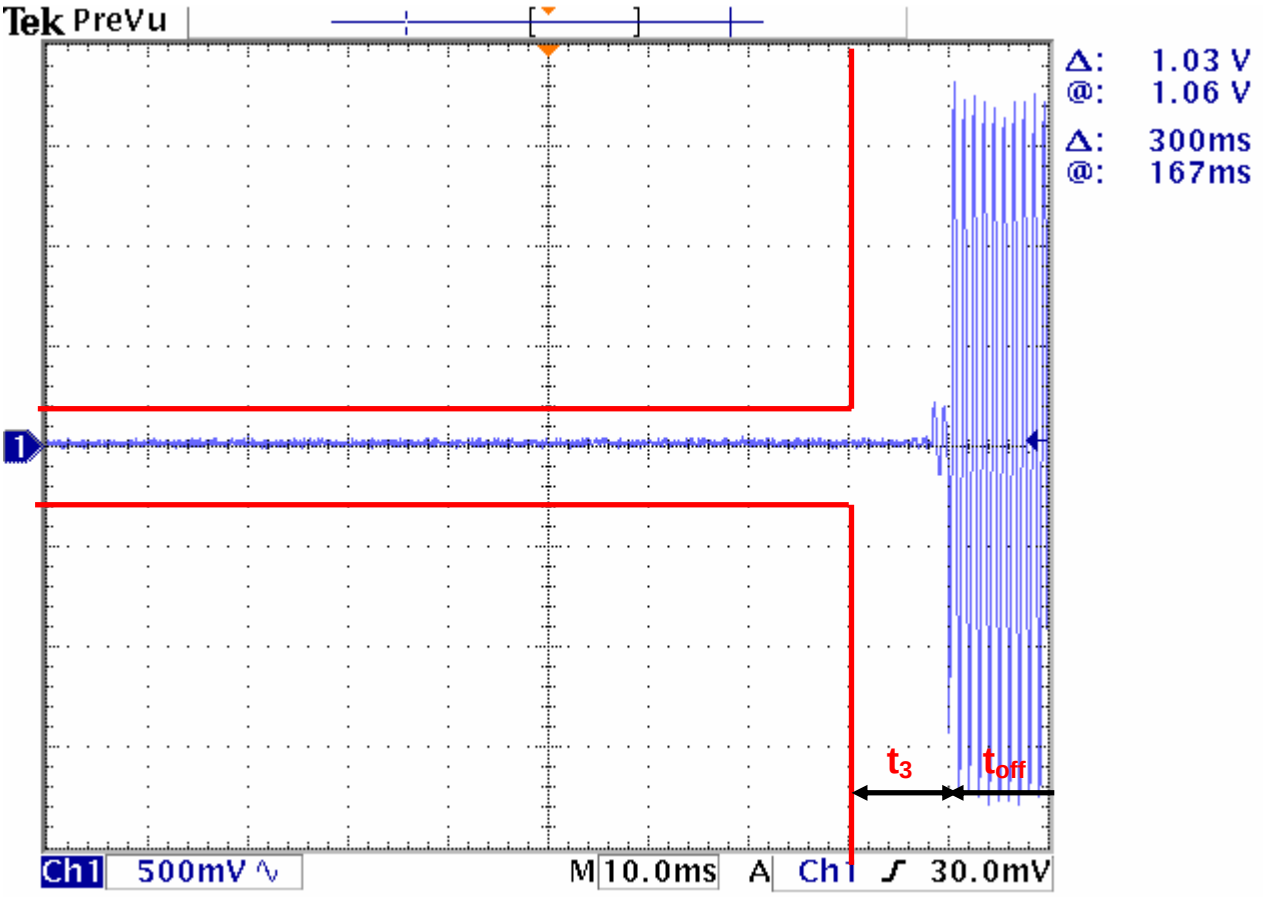
5.11.12 Test Plot 6

FCC Rules :	Part 90 §90.231
IC Rules :	RSS-119 Section 5.9
Operating Frequency :	469.975 MHz
Channel :	3rd Channel
Power Output :	5 Watts
Channel Spacing :	WideBand
Reference Voltage :	7.5 VDC

5.11.12.1 Switch on condition t_{on}, t_1 and t_2



5.11.12.2 Switch off condition t3, t_{off}



6. TEST EQUIPMENTS LIST

	EQUIPMENT	MODEL	MANUFACTURE	SERIAL NUMBER	Calibration Due date
1	Receiver	ESVS30	Rohde & Schwarz	832854/010	06/22/08
2	Spectrum analyzer	FSP7	Rohde & Schwarz	100001	02/22/08
3	Signal Generator	E4432B	Agilent	US40053157	07/15/08
4	Signal Generator	2030	Marconi	119330/022	11/16/08
5	Signal Generator	2022D	Marconi	119157/001	11/16/08
6	Modulation Analyzer	8901B	Agilent	3028A03124	02/22/08
7	Audio Analyzer	8903B	Agilent	3011A09344	02/22/08
8	Digital Oscilloscope	TDS3032	Tektronix	B019436	11/20/08
9	Frequency Counter	R5372	Advantest	41855204	02/22/08
10	Shield Room (7m x 4m x 3m)	N/A	SJEMC	0004	N/A
11	Turn Table	OSC-30	N/A	BWS-01	N/A
12	Antenna Mast	JAC-3	Dail EMC	N/A	N/A
13	Temperature & Humidity chanber	EN-GLMP-54	Enex	N/A	03/23/08
14	Bilog Antenna	VULB9160	Schwarzbeck	VULB9160-3122	12/29/08
15	Bilog Antenna	VULB9161	Schwarzbeck	VULB9161-4067	12/23/08
16	Bilog Antenna	VULB9161	Schwarzbeck	VULB9161-4068	12/23/08
17	Horn Antenna	BBHA 9120 D	Schwarzbeck	BBHA 9120 D 234	02/07/08
18	Horn Antenna	BBHA 9120 D	Schwarzbeck	BBHA 9120 D 517	02/07/08
19	Horn Antenna	BBHA 9170	Schwarzbeck	BBHA9170157	02/07/08
20	Power Meter	E4418A	Agilent	GB38272621	11/14/08
21	Power Sensor	E9301B	Agilent	US40010238	11/14/08
22	Power supply	GP-4303TP	EG Digital	0108181	11/07/08
23	Directional Coupler	778D	Agilent	1144A08477	11/14/08
24	Power Divider/Combiner	11636A	Agilent	05774	11/14/08
25	Power Divider/Combiner	11636A	Agilent	05870	11/14/08