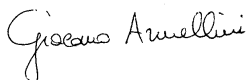


RAPPORTO DI PROVA / TEST REPORT

Rif./Ref.No. FCCTR_140655B-4	Data / Date: 30/09/2014	Pagine / Pages : 25
Scopo delle prove / Test object :	Prove di tipo in accordo a / Type test according to: FCC Cfr 47 Parts 2.815, 2.1033, 2.1046, 2.1053 Parts 97.305, 97.307 (d) (e), 97.313, 97.315, 97.317	
Richiedente / Applicant :	RM Costruzioni elettroniche S.r.l. Via IV Novembre, 42 – 40050 Ponte della Venturina – BO – ITALY Tel. +39 0534 60460	
Persona di riferimento / Applicant's referee :	Mr. Andrea Molinari	
Marchio commerciale / Trade mark :		
Fabbricante / Manufacturer :	RM COSTRUZIONI ELETTRONICHE S.r.l.	
Prodotto / Product :	120W HF Linear Power Amplifier	
Modello / Model :	KL 7405V	
Modello Derivato/Derived Model	KL 7405	
Data ricevimento campioni / Date of test sample receipt:	27/05/2014	
Campioni verificati / No. of tested samples	1	
Data verifiche / Testing date :	27-28/05/2014	
Sito di prova / Testing site :	Prima Ricerca & Sviluppo Via Campagna - 92 I-22020 FALOPPIO (CO)	
Esito delle valutazioni / Assessment results :	CONFORME / COMPLIANT	
Verifiche effettuate da / Verifications carried out by :	Enrico BANFI Tecnico di laboratorio EMC e RADIO / EMC and RADIO Test Engineer	
Approvato / Approved by :	Giacomo ARMELLINI Responsabile Laboratorio EMC e RADIO/ EMC and RADIO Laboratory Manager	

I risultati delle prove riportati nel presente rapporto di prova si riferiscono solo ai campioni esaminati./The test results reported in this test report shall refer only to the samples tested

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PRIMA RICERCA & SVILUPPO S.r.l.

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1 RELEASE CONTROL RECORD

TEST REPORT NUMBER	REASON OF CHANGE	DATE OF ISSUE
FCCTR_140655B-0	Original release	03/06/2014
FCCTR_140655B-1	Added EUT Dimension; Corrected absorbing current	23/06/2014
FCCTR_140655B-2	Corrected typing error Page 6, page 9.	07/08/2014
FCCTR_140655B-3	Added spurious Radiated Emission	29/09/2014
FCCTR_140655B-4	Correct typing error	30/09/2014

2 TECHNICAL INFORMATION OF EQUIPMENT UNDER TEST (EUT)

2.1 EUT Identification EUT Identification

DESCRIPTION :	120W HF Linear Power Amplifier
TRADEMARK:	
MODEL:	KL 7405V
S/N:	Prototype
DERIVED MODEL	KL 7405
MANUFACTURER:	RM COSTRUZIONI ELETTRONICHE S.r.l.
COUNTRY OF MANUFACTURER:	ITALY
COMPOSED BY:	SINGLE
EUT DIMENSIONS :	H:85 x W:190 x L:190 (mm)
	H:70 x W:190 x L:190 (mm)
EUT STANDING:	Vehicle

2.2 EUT Technical Data

POWER SOURCE :	EXTERNAL
POWER SUPPLY NOMINAL VOLTAGE:	12-14V DC
NOMINAL POWER OR ABSORBING CURRENT :	Max 18A
TYPICAL USAGE :	Amateur Radio

2.3 EUT ports identification

This section contains descriptions of all ports, the length and the type of the cable provided by manufacturer needed for the tests. Moreover it is specified if the ports are ever or optionally connected.

Port		Description	Connector	Max cable length
1	Enclosure	Metallic	---	---
2	AC mains input/output ports	Port NOT present	---	---
3	DC mains input/output ports	12V	---	---

Note: During the tests all cables must be what provided the manufacturer or the same that used in the real employment of the EUT.

2.4 Modifications incorporated in E.U.T.

The following items are the modifications introduced in the equipment under test:

- None

2.5 Auxiliary equipment

- None

2.6 Difference of derived model

The **KL 7405** is a derived model of 120W HF Linear Power **Amplifier KL 7405V**. (basic model)

The differences declared by the manufacturer are listed in the following table (see also next photographs)

Table1: Difference between basic and derived model as declared by manufacturer		
Basic model	Derived model	Difference between basic and derived model
KL 7405	KL 7405V	No cooling fan

3 OTHER INFORMATION

The amplifier operates only in the amateur radio bands below 30 MHz.

The amplifier is NOT capable of operation on any frequency outside of the amateur bands including 26-28 MHz.

The amplifier typically requires 5 Watts of drive to obtain full output power depending upon which transmit band it is on.

The gain of the amplifier is less than 15dB on all bands under all conditions.

In *off* or *standby* positions the amplifier does NOT amplify. The exciter energy is simply passed on to the antenna at the same level in which it entered the amplifier. The spurious emissions of the transceiver remain unaffected.

PART 2.815 (b) (1) (2)

The **KL 7405V** external RF amplifier is not capable of amplification in the frequency band 26-28 MHz and cannot be modified to operate in the 26-28 MHz frequency band. Any attempt to drive the amplifier in the 26-28 MHz frequency band will result in 0 dB gain from input to output of the amplifier.

PART 97.313

The output power will not exceed 250 Watts into 50 Ohm resistive load. Therefore, it is impossible for the output power to reach or exceed the 1500 Watts PEP legal limit.

PART 2.1033 (c) (8)

Input Power: DC Voltage (12 Volts) x DC Current (18 Amps) = 216 Watts

4 OPERATING TEST MODES AND CONDITIONS

OPERATING CONDITION	DESCRIPTION
#1	Input Power 5W, max GAIN

5 SUMMARY OF TEST RESULTS

Port		Phenomena	Reference Standard	Operating condition	Result
1	RF Power Output	Max Gain	Part 2.1046 (a), Part 97.317 (a) (2)	#1	Within the limit
2	RF Power Output	Spurious Conducted Emissions	Part 2.1053, Part 97.307 (d) (e)	#1	Within the limit
3	RF Power Output	Spurious Radaited Emissions	Part 2.1053, Part 97.307 (d) (e)	#1	Within the limit

6 TEST RESULTS

RF POWER OUTPUT.....	8
STRENGTH OF SPURIOUS EMISSIONS (Conducted).....	10
STRENGTH OF SPURIOUS EMISSIONS (Radiated)	18

**TEST
1.**

RF POWER OUTPUT

**REFERENCE
DOCUMENT**

FCC Cfr 47 **Part 2.1046 (a), Part 97.317 (a) (2)**
Part 2.1033 (b) (6)
Part 15.31 (a) (3) [see also] Note to paragraph (a) (3); Part 97

- TEST SETUP: Acc. to reference standard
- TEST LOCATION: Radio Test Area
- TEST EQUIPMENT USED FOR TEST: Power Meter Rohde & Schwarz NRVD,
Thermal Power Sensor NRV-Z53
RF Generator Agilent N9310A
- TESTED PORT: RF Output

TEST CONDITIONS:			MEASURED
Ambient temperature :	15 - 35 °C		24 ± 3 °C
Ambient humidity :	25 - 75 %rH		40 ± 5 %rH
Pressure :	85 - 106 kPa	(860 mbar - 1060 mbar)	950 ± 50 mbar
Voltage :			12V

OPERATING CONDITION (Rif. Section. 2.6) : #1

RESULT: WITHIN THE LIMITS

TEST RESULT

The setup to measure the RF power output was made by connecting the output of the the exciter to the input of the **KL 7405V** amplifier.

A watt-meter was placed in-line between the amplifier and a 50 ohm load. The exciter was tuned to a frequency in the center of each band shown. The amplifier was powered with the voltage and current previously indicated. The input and output power was recorded by a wattmeter, and the gain was calculated. The gain does not exceed 15dB and the output power is under 1.5kW PEP into a 50 ohm load.

Frequency (MHz)	Input level (W)	Output level (W)	GAIN
28,2	5	125,9	14
29	5	117,5	13,7
30	5	107,5	13,4

**TEST
2.**

STRENGTH OF SPURIOUS EMISSIONS (CONDUCTED)

REFERENCE
DOCUMENT

Part 2.1053, Part 97.307 (d) (e)

- TEST SETUP: In according to manufacturer specifications
- TEST LOCATION: Radio Test Area
- TEST EQUIPMENT USED FOR TEST: Spectrum Analyzer Rohde & Schwarz Mod. FSP 40
RF Generator Agilent N9310A
- TESTED PORT: RF Output Port

TEST CONDITIONS:			MEASURED
Ambient temperature :	15 - 35 °C		24 ± 3 °C
Ambient humidity :	25 - 75 %rH		40 ± 5 %rH
Pressure :	85 - 106 kPa	(860 mbar - 1060 mbar)	950 ± 50 mbar
Voltage :			12 Vdc

OPERATING CONDITION (Rif. Section. 2.6) : **#1**

RESULT: **WITHIN THE LIMIT**

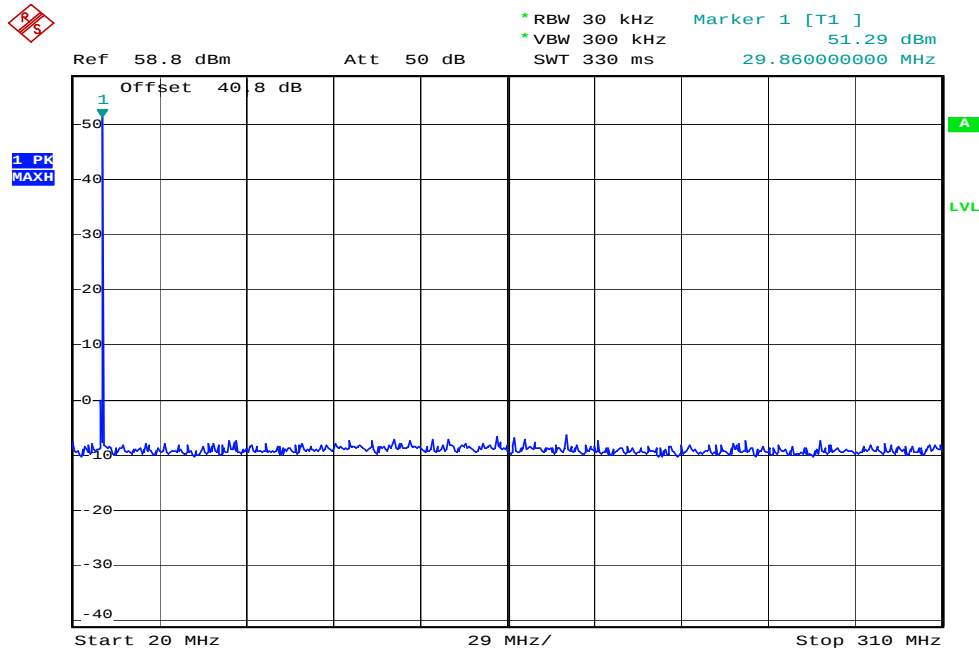
The setup to measure the strength of spurious emissions was made by connecting the output of the exciter to the input of the **KL 7405V** amplifier. A 50 ohm load was connected to the amplifier, and a spectrum analyzer was connected to the 50 ohm load. The exciter was tuned to the frequency shown and each harmonic of that frequency up to the tenth was observed on the spectrum analyzer.

For the execution of the tests have been used two Resolution BW: 30kHz and 100kHz.

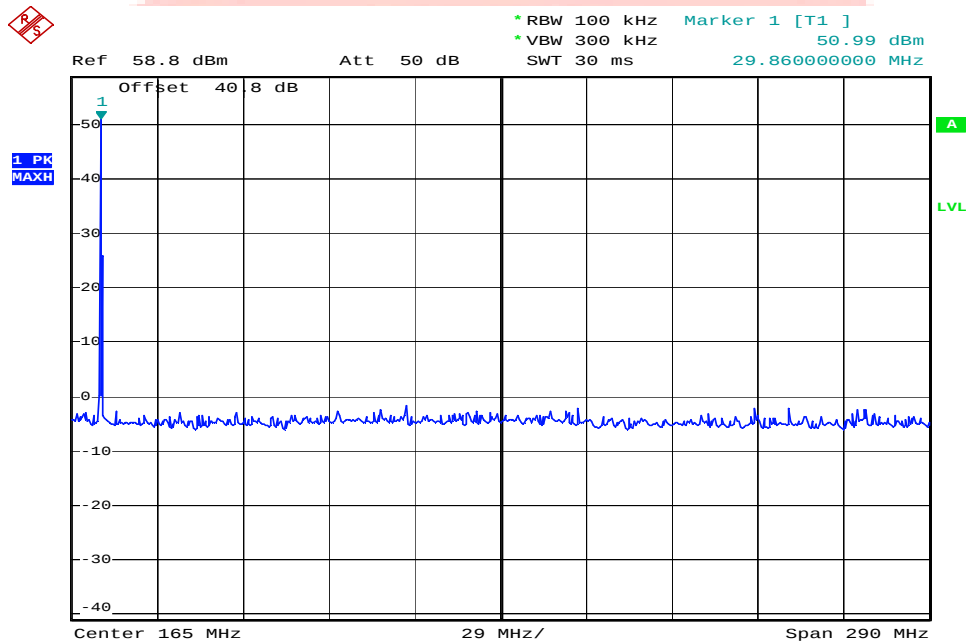


Frequency: 30MHz; Wavelength band:10m

Frequency (MHz)	Harmonics (MHz)	dB Below Main	>43dB Below
30,000	30		Yes
30,000	60	>60	Yes
30,000	90	>60	Yes
30,000	120	>60	Yes
30,000	150	>60	Yes
30,000	180	>60	Yes
30,000	210	>60	Yes
30,000	240	>60	Yes
30,000	270	>60	Yes
30,000	300	>60	Yes



Date: 1. JAN. 2000 02:34:58



Date: 1. JAN. 2000 02:35:20

Frequency: 28.850MHz; Wavelength band:10m

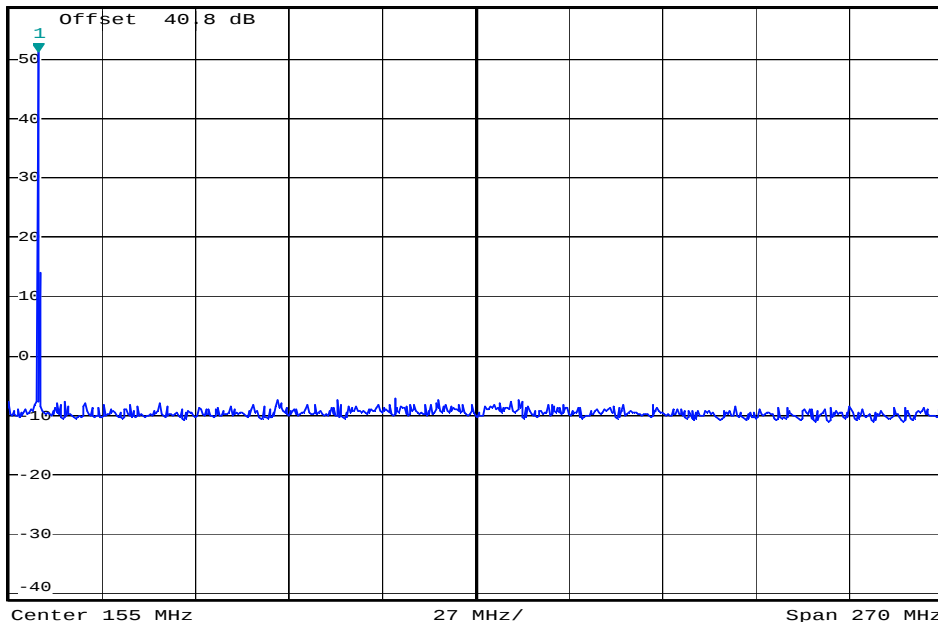
Frequency (MHz)	Harmonics (MHz)	dB Below Main	>43dB Below
28,85	28,85		Yes
28,85	57,70	>60	Yes
28,85	86,55	>60	Yes
28,85	115,40	>60	Yes
28,85	144,25	>60	Yes
28,85	173,10	>60	Yes
28,85	201,95	>60	Yes
28,85	230,80	>60	Yes
28,85	259,65	>60	Yes
28,85	288,50	>60	Yes



*RBW 30 kHz Marker 1 [T1]
*VBW 300 kHz 51.41 dBm
SWT 300 ms 28.640000000 MHz

Ref 58.8 dBm

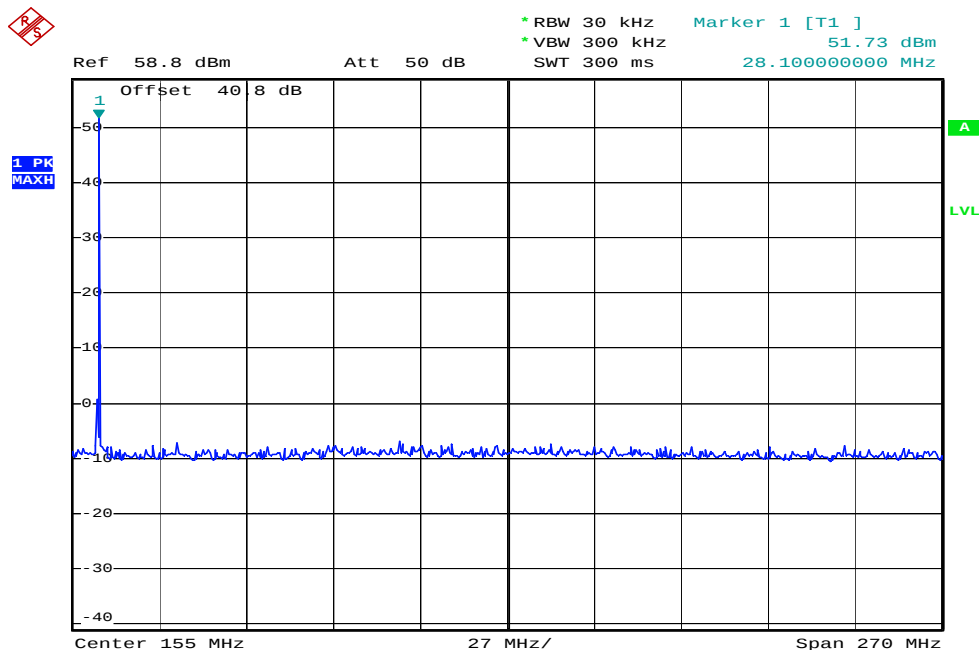
Att 50 dB



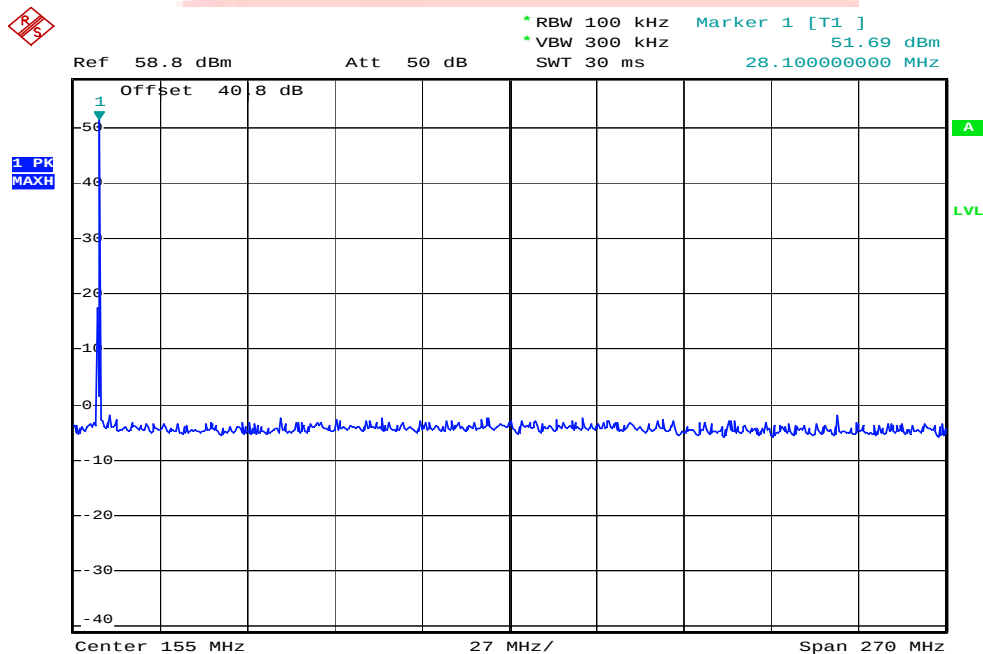
Date: 1.JAN.2000 02:33:32

Frequency: 28.10MHz; Wavelength band:10m

Frequency (MHz)	Harmonics (MHz)	dB Below Main	>43dB Below
28,1	28,1		Yes
28,1	56,2	>60	Yes
28,1	84,3	>60	Yes
28,1	112,4	>60	Yes
28,1	140,5	>60	Yes
28,1	168,6	>60	Yes
28,1	196,7	>60	Yes
28,1	224,8	>60	Yes
28,1	252,9	>60	Yes
28,1	281,0	>60	Yes



Date: 1. JAN. 2000 02:30:11



Date: 1. JAN. 2000 02:30:52

**TEST
3.**

STRENGTH OF SPURIOUS EMISSIONS (RADIATED)

REFERENCE
DOCUMENT

Part 2.1053, Part 97.307 (d) (e)

- TEST SETUP: In according to manufacturer specifications
- TEST LOCATION: Semi-anechoic chamber (CISPR 16-1 :1993)
Siemens+Matsushita type B84117-D6019-T232
Measure distance 3 meters
- TEST EQUIPMENT USED FOR TEST: EMI receiver Rohde & Schwarz Mod. ESU40
Chase Antenna Mod. CBL 6111

TEST CONDITIONS:		MEASURED
Ambient temperature :	15 - 35 °C	24 ± 3 °C
Ambient humidity :	25 - 75 %rH	40 ± 5 %rH
Pressure :	85 - 106 kPa (860 mbar - 1060 mbar)	950 ± 50 mbar
Voltage :		12 Vdc

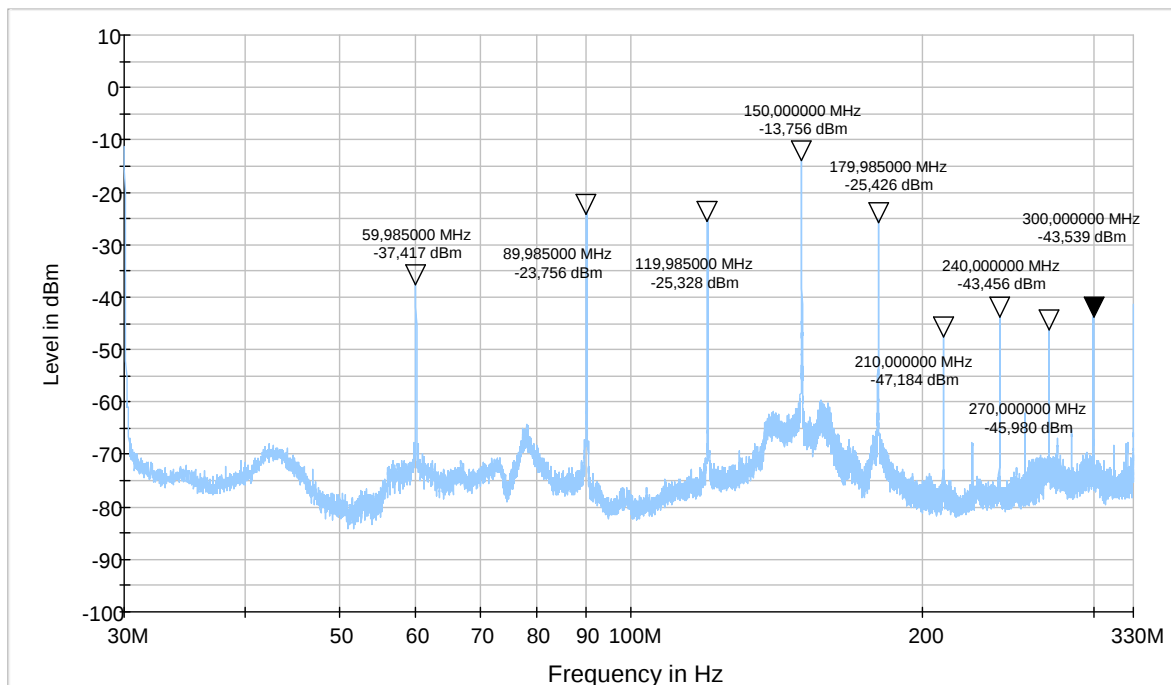
OPERATING CONDITION (Rif. Section. 2.6) : **#1**

RESULT: **WITHIN THE LIMIT**

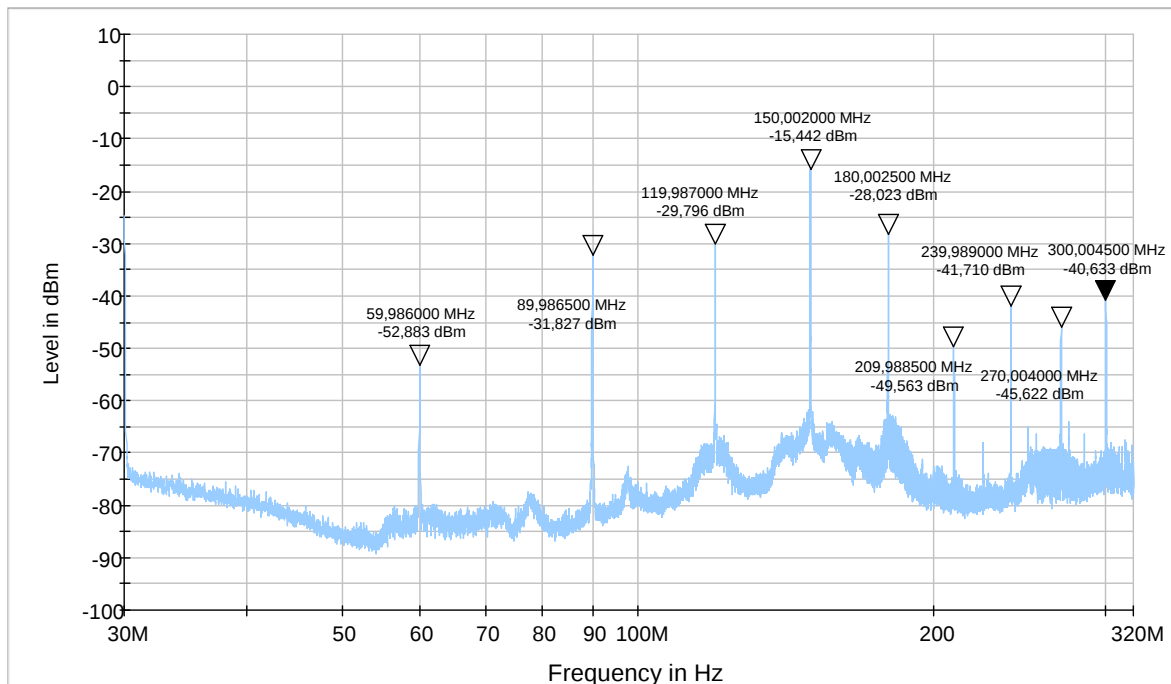
Frequency: 30.000MHz; Wavelength band:10m

Frequency (MHz)	Harmonics (MHz)	dB Below Main	>43dB Below
30,000	----	----	Yes
	59.9850	87.727	Yes
	89.9850	74.066	Yes
	119.9850	75.630	Yes
	150.000	64.066	Yes
	179.9850	75.736	Yes
	210.0000	97.494	Yes
	240.0000	92.020	Yes
	270.0000	95.932	Yes
	300.0000	93.849	Yes

Vertical polarization



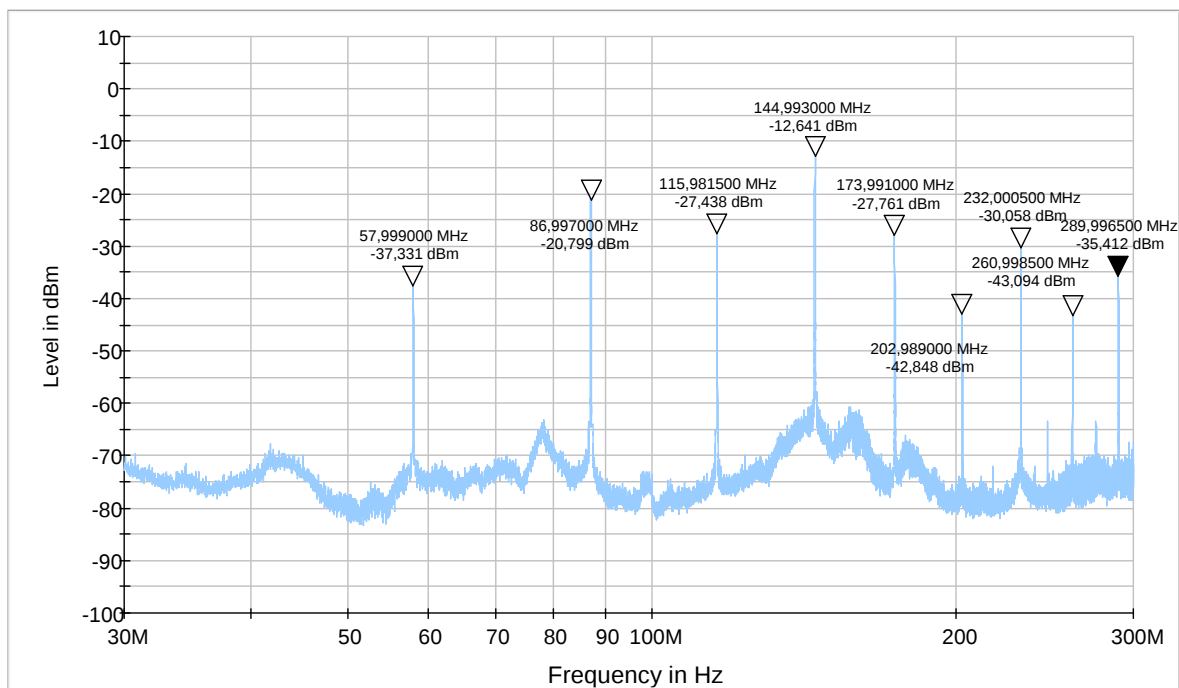
Horizontal polarization



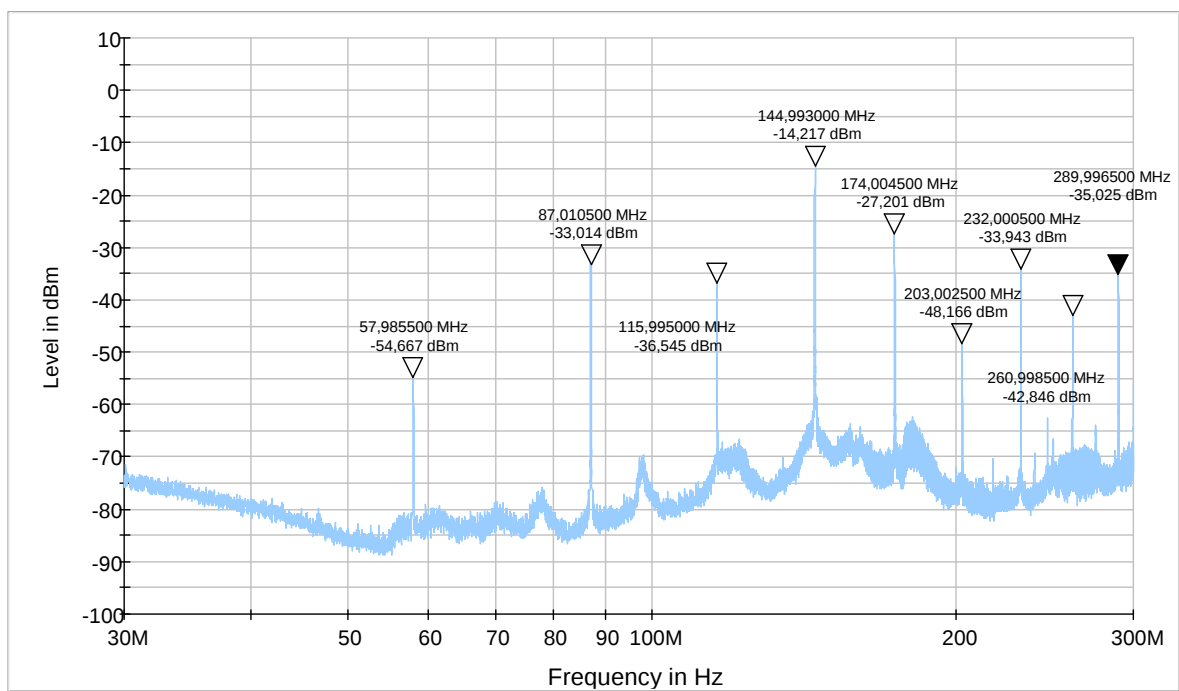
Frequency: 29.000MHz; Wavelength band:10m

Frequency (MHz)	Harmonics (MHz)	dB Below Main	>43dB Below
29.0000	----	----	Yes
	57.9900	88.031	Yes
	86.9970	71.499	Yes
	115.9815	78.138	Yes
	144.9930	63.341	Yes
	173.9910	77.901	Yes
	202.9890	93.540	Yes
	232.0050	80.758	Yes
	260.9985	93.564	Yes
	289.9965	85.725	Yes

Vertical polarization



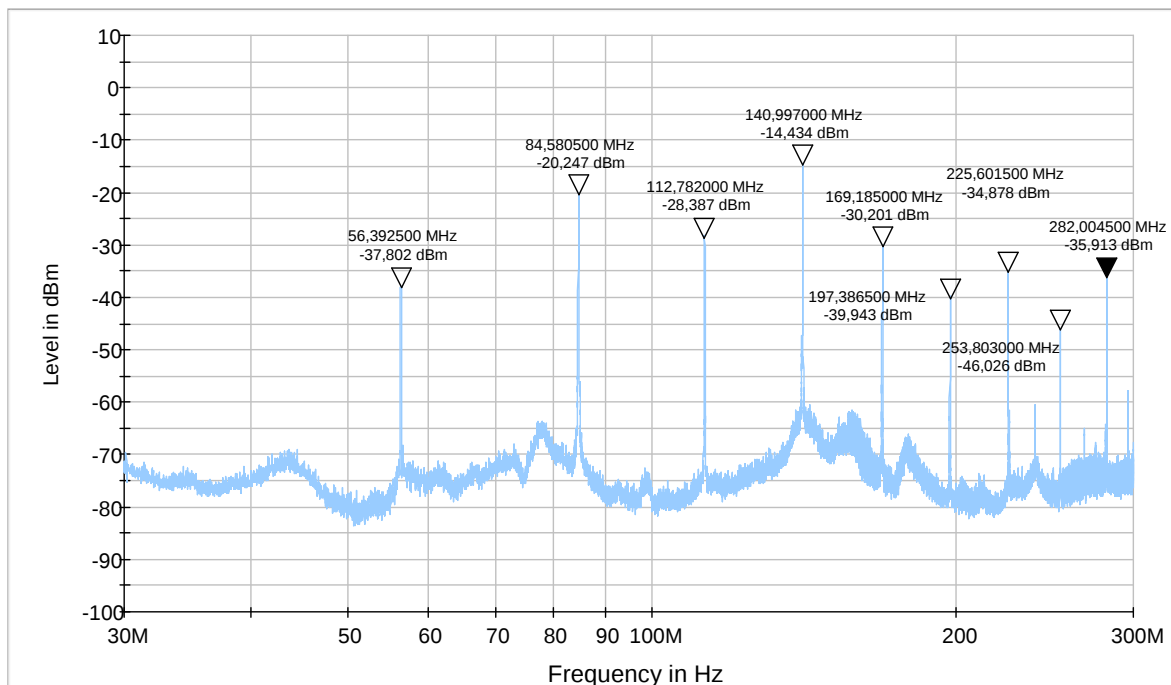
Horizontal polarization



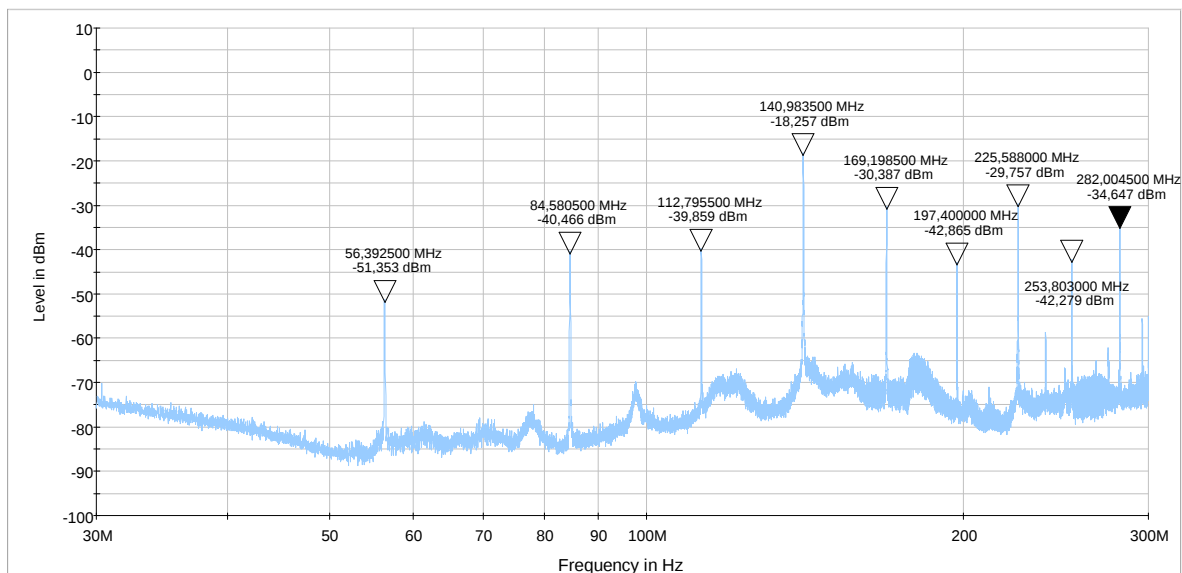
Frequency: 28.200MHz; Wavelength band:10m

Frequency (MHz)	Harmonics (MHz)	dB Below Main	>43dB Below
28,200	----	----	Yes
	56.3925	88.800	Yes
	84.5805	71.240	Yes
	112.7820	79.387	Yes
	140.9870	65.434	Yes
	169.1850	81.201	Yes
	197.3865	90.943	Yes
	225.6015	85.878	Yes
	253.8030	93.279	Yes
	282.0045	85.647	Yes

Vertical polarization



Horizontal polarization



7 LIST OF EQUIPMENT USED

EQUIPMENT	IDENTIFICATION NUMBER	CAL. DUE
POWER METER	EMC.359	JEN.2015
VOLTAGE GENERATOR	EMC.397	MAR.2015
SPECTRUM ANALYZER	EMC.332	APR.2015
RF GENERATOR	--	--
SEMI ANECHOIC CHAMBER	EMC.191	MAR.2015
EMI RECEIVER	EMC.359	SEPT.2015
ANTENNA	EMC.022	MAY.2015