FCC PART 95 TEST REPORT

for

Wireless Callbox

Model No.: MURS Multi-Mile Wireless Communication System

FCC ID: ZX9GC556047

of

Applicant: **IntercomsOnline.com**
Address: **8161 Highway 100, #194, Nashville, TN 37221, United States**

Tested and Prepared

by

Worldwide Testing Services (Taiwan) Co., Ltd.

FCC Registration No.: 930600

Industry Canada filed test laboratory Reg. No. IC 5679A-1

A2LA Accredited No.: 2732.01

Report No.: W6M21108-11786-C-1

6F, NO. 58, LANE 188, RUEY-KUANG RD., NEIHU TAIPEI 114, TAIWAN, R.O.C.
TEL: 886-2-66068877 FAX: 886-2-66068879 E-mail: wts@wts-lab.com

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1. General Information

1.1 Notes

The purpose of conformity testing is to increase the probability of adherence to the essential requirements or conformity specifications, as appropriate.
The complexity of the technical specifications, however, means that full and thorough testing is impractical for both technical and economic reasons.
Furthermore, there is no guarantee that a test sample which has passed all the relevant tests conforms to a specification.
Neither is there any guarantee that such a test sample will interwork with other genuinely open systems.
The existence of the tests nevertheless provides the confidence that the test sample possesses the qualities as maintained and that is performance generally conforms to representative cases of communications equipment.

The test results of this test report relate exclusively to the item tested as specified in 1.5.
The test report may only be reproduced or published in full.
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Tester:

October 19, 2011	Danny Sung	Danny Sung
Date WTS-Lab.	Name	Signature

Technical responsibility for area of testing:

October 19, 2011	Chang Tse-Ming	Chang Tse-Ming
Date WTS	Name	Signature

1.2 Testing laboratory

1.2.1 Location

OATS
No.5-1, Lishui, Shuang Sing Village,
Wanli Dist., New Taipei City 207,
Taiwan (R.O.C.)
3 meter semi-anechoic chamber
No.35, Aly. 21, Ln. 228, Ankang Rd., Neihu Dist., Taipei City 114, Taiwan (R.O.C.)
TEL:886-2-6613-0228
FAX:886-2-2791-5046

Company
Worldwide Testing Services(Taiwan) Co., Ltd.
6F, NO. 58, LANE 188, RUEY-KUANG RD.
NEIHU, TAIPEI 114, TAIWAN R.O.C.
Tel : 886-2-66068877
Fax : 886-2-66068879

1.2.2 Details of accreditation status

Accredited testing laboratory

A2LA accredited number: 2732.01

FCC filed test laboratory Reg. No. 930600

Industry Canada filed test laboratory Reg. No. IC 5679A-1

Test location, where different from Worldwide Testing Services (Taiwan) Co., Ltd. :

Name:	./.
Accredited number:	./.
Street:	./.
Town:	./.
Country:	./.
Telephone:	./.
Fax:	./.

1.3 Details of approval holder

Name:	IntercomsOnline.com
Street:	8161 Highway 100, #194,
City:	Nashville, TN 37221
Country:	United States
Telephone:	615-662-4141
Fax:	615-247-9949

1.4 Application details

Date of receipt of test item:	August 31, 2011
Date of test:	from September 1, 2011 to October 19, 2011

1.5 General information of Test item

Type of test item:	Wireless Callbox
Model Number:	MURS Multi-Mile Wireless Communication System
Brand Name:	IntercomsOnline.com
Multi-listing model number:	./.
Photos:	See appendix

Technical data

Operating frequency band:

Frequency(MHz)	Used Band
151.820 MHz	☒
151.880 MHz	☒
151.940 MHz	☒
154.570 MHz	☒
154.600 MHz	☒

Sample tested frequency:	151.820 / 151.94 / 154.60 MHz
Number of RF-channels:	5
Type of modulation:	FM
Designation of emission:	11K0F3E

Registration number: W6M21108-11786-C-1
FCC ID: ZX9GC556047

Antenna Type:	VHF antenna, antenna gain 2~3 dBi
Connection of Antenna:	☒ detachable ☐ not detachable
Power supply	DC 13V
End point of Battery voltage:	DC 13V
Operation modes:	Half-duplex

Manufacturer: (if applicable)

Name:	Access Device Integrated Communications Corp.
Street:	No. 193, Sec. 1, Chungching Road, Taya,
Town:	Taichung,
Country:	Taiwan 428, R.O.C.

1.6 Test standards

Technical standard:

FCC RULES PART 95 - Personal Radio Service
(2010-10) Subpart J - Multi-Use Radio Service (MURS)
Subpart E - Technical Regulations
FCC RULES PART 2 - Frequency Allocations General Rules and Regulations (2010-10)

FCC RULES PART 15 – Subpart B (2010-10)

2. Technical test

2.1 Summary of test results

No deviations from the technical specification(s) were ascertained in the course of the tests performed. ☒

or

The deviations as specified in 3 were ascertained in the course of the tests performed. ☐

2.2 Test environment

Temperature: 23 °C

Relative humidity content: 20 ... 75 %

Air pressure: 86-103 KPa

2.3 Description of Tested System

The EUT was tested with the Accessories or Peripherals Listed below:

Equipment	Model No.	Series No.	Software	Cable information	Note
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

Explanation: The EUT was configured as stand alone device, and there are no accessories or peripherals during the test.

2.4 Test Equipment List

No.	Test equipment	Type	Serial No.	Manufacturer	Cal. Date	Next Cal. Date
ETSTW-CE 001	EMI TEST RECEIVER	ESHS10	842121/013	R&S	2011/9/2	2012/9/1
ETSTW-CE 003	AC POWER SOURCE	APS-9102	D161137	GW	Function Test	
ETSTW-CE 004	ZWEILEITER-V-NETZNACHBILDUNG TWO-LINE V-NETWORK	ESH3-Z5	840731/011	R&S	2011/3/10	2012/3/9
ETSTW-CE 005	Line-Impedance Stabilisation Network	NNBM 8126D	137	Schwarzbeck	2011/9/5	2012/9/4
ETSTW-CE 006	IMPULSBEGRENZER PULSE LIMITER	ESH3-Z2	100226	R&S	2011/3/8	2012/3/7
ETSTW-CE 007	SPECTRUM ANALYZER 5GHz	FSB	849670/001	R&S	Pre-test Use NCR	
ETSTW-CE 008	HF-EICHLEITUNG RF STEP ATTENUATOR 139dB DPSP	334.6010.02	844581/024	R&S	Function Test	
ETSTW-CE 009	TEMP.&HUMIDITY CHAMBER	GTH-225-40-1P-U	MAA0305-009	GIANT FORCE	2011/7/13	2012/7/12
ETSTW-CE 013	CISPR 22 TWO BALANCED TELECOM PAIRS IMPEDANCE STABILIZATION NETWORK	FCC-TLISN-T4-02	20242	FCC	2011/9/6	2012/9/5
ETSTW-CE 016	TWO-LINE V-NETWORK	ENV216	100050	R&S	2011/2/21	2012/2/20
ETSTW-CE 024	IMPEDANCE STABILIZATION NETWORK	ISN T800	29454	TESEQ	2011/1/10	2012/1/9
ETSTW-CS 004	COUPLING AND DECOUPLING NETWORK	CDN M016	20053	SCHAFFNER	2011/8/12	2012/8/11
ETSTW-CS 005	RF Power Amplifier	100A250A	306547	AR	Function Test	
ETSTW-CS 009	6 dB Attenuator	75-A-FFN-06	70998	BIRD	2011/5/20	2012/5/19
ETSTW-CS 010	6 dB Attenuator	SA3N1007-06	None	AISI	2011/7/29	2012/7/28
ETSTW-RE 003	EMI TEST RECEIVER	ESI 26	831438/001	R&S	2011/8/16	2012/8/15
ETSTW-RE 004	EMI TEST RECEIVER	ESI 40	832427/004	R&S	2011/9/5	2012/9/4
ETSTW-RE 005	EMI TEST RECEIVER	ESVS10	843207/020	R&S	2011/9/2	2012/9/1
ETSTW-RE 010	ABSORBING CLAMP	MDS 21	3469	Schwarzbeck	2011/9/7	2012/9/6
ETSTW-RE 012	TUNABLE BANDREJECT FILTER	D.C 0309	146	K&L	Function Test	
ETSTW-RE 013	TUNABLE BANDREJECT FILTER	D.C 0336	397	K&L	Function Test	
ETSTW-RE 019	MICROWAVE HORN ANTENNA	22240-25	121074	FM	2011/4/25	2012/4/24
ETSTW-RE 020	MICROWAVE HORN ANTENNA	AT4002A	306915	AR	Function Test	
ETSTW-RE 027	Passive Loop Antenna	6512	00034563	ETS-Lindgren	2011/7/19	2012/7/18
ETSTW-RE 030	Double-Ridged Guide Horn Antenna	3117	00035224	EMCO	2011/2/25	2012/2/24
ETSTW-RE 032	Millivoltmeter	URV 55	849086/013	R&S	2011/10/3	2012/10/2
ETSTW-RE 033	WaveRunner 6000A Serise Oscilloscope	WAVERUNNER 6100A	LCRY0604P14508	LeCroy	Function Test	
ETSTW-RE 034	Power Sensor	URV5-Z4	839313/006	R&S	2011/10/3	2012/10/2
ETSTW-RE 042	Biconical Antenna	HK116	100172	R&S	2011/1/14	2012/1/13
ETSTW-RE 043	Log-Periodic Dipole Antenna	HL223	100166	R&S	2011/4/26	2012/4/25
ETSTW-RE 044	Log-Periodic Antenna	HL050	100094	R&S	2011/4/25	2012/4/24
ETSTW-RE 045	ESA-E SERIES SPECTRUM ANALYZER	E4404B	MY45111242	Agilent	Pre-test Use NCR	

ETSTW-RE 048	Triple Loop Antenna	HXYZ 9170	HXYZ 9170-134	Schwarzbeck	2011/8/29	2012/8/28
ETSTW-RE 049	TRILOG Super Broadband test Antenna	VULB 9160	9160-3185	Schwarzbeck	2011/4/8	2012/4/7
ETSTW-RE 050	Attenuator 10dB	50HF-010-1	None	JFW	2011/3/4	2012/3/3
ETSTW-RE 051	Attenuator 6dB	50HF-006-1	None	JFW	2011/3/4	2012/3/3
ETSTW-RE 053	Attenuator 3dB	50HF-003-1	None	JFW	2011/3/4	2012/3/3
ETSTW-RE 055	SPECTRUM ANALYZER	FSU 26	200074	R&S	2011/5/30	2012/5/29
ETSTW-RE 060	Attenuator 30dB	5015-30	F651012z-01	ATM	2011/3/4	2012/3/3
ETSTW-RE 061	Amplifier Module	CHC 1	None	ETS	2011/5/18	2012/5/17
ETSTW-RE 062	Amplifier Module	CHC 2	None	KMIC	2010/11/30	2011/11/29
ETSTW-RE 064	Bluetooth Test Set	MT8852B-042	6K00005709	Anritsu	Function Test	
ETSTW-RE 065	Amplifier	AMF-6F-18002650-25-10P	941608	MITEQ	2011/4/8	2012/4/7
ETSTW-RE 066	Highpass Filter	H1G013G1	206015	MICROWAVE CIRCUITS, INC.	2011/3/4	2012/3/3
ETSTW-RE 072	CELL SITE TEST SET	8921A	3339A00375	HP	2011/10/3	2012/10/2
ETSTW-RE 073	Power Meter	N1911A	MY45100769	Agilent	2011/1/10	2012/1/9
ETSTW-RE 074	Power Sensor	N1921A	MY45241198	Agilent	2011/1/10	2012/1/9
ETSTW-RE 081	Highpass Filter	H03G13G1	4260-02 DC0428	MICROWAVE CIRCUITS, INC.	2011/3/4	2012/3/3
ETSTW-RE 096	SIGNAL GENERATOR	SMIQ 03B	102274	R&S	2011/5/31	2012/5/30
ETSTW-RE 099	DC Block	50DB-007-1	None	JFW	2011/3/10	2012/3/9
ETSTW-RE 105	2.4GHz Notch Filter	NO124411	39555	MICROWAVE CIRCUITS, INC.	2011/3/11	2012/3/10
ETSTW-RE 106	Humidity Temperature Meter	TES-1366	091011113	TES	2011/3/24	2012/3/23
ETSTW-RE 111	Log-Periodic Dipole Array Antenna	VULB 9160	9160-3309	Schwarz beck	2010/12/17	2011/12/16
ETSTW-RE 112	AC POWER SOURCE	TFC-1005	None	T-Power	Function test	
ETSTW-RE 114	2.4GHz Notch Filter	N0124411	473873	MICROWAVE CIRCUITS	2011/1/13	2012/1/12
ETSTW-RE 120	RF Player	MP9200	MP9210-111022	ADIVIC	Function test	
ETSTW-RE 121	SPECTRUM ANALYZER	FSU43	100013	R&S	2011/6/23	2012/6/22
ETSTW-RE 122	SIGNAL GENERATOR	SMF100A	102149	R&S	2011/7/4	2012/7/3
ETSTW-RE 125	5GHz Notch filter	5NSL11-5200/E221.3-O/O	1	K&L Microwave	2011/8/19	2012/8/18
ETSTW-RE 126	5GHz Notch filter	5NSL11-5800/E221.3-O/O	1	K&L Microwave	2011/8/19	2012/8/18
ETSTW-EMI 001	HARMONICS 1000	HAR1000-1P	093	EMC-PARTNER	2011/9/1	2012/8/31
ETSTW-EMS 001	BASELSTRASSE 160 CH-4242 LAUFEN	CN-EFT1000	354	EMC-PARTNER	Function Test	
ETSTW-EMS 002	Frequency Converter	YF-6020	0308014	None	Function Test	
ETSTW-EMS 003	EMC Immunity Test System	TRA2000IN6	579	EMC-PARTNER	2010/11/3	2011/11/2
ETSTW-EMS 009	Magnetic Field Antenna	MF1000-1	104	EMC-PARTNER	Function Test	
ETSTW-EMS 012	EM Injection Clamp	F-203I-23MM	476	FCC	2011/6/1	2012/5/31
ETSTW-EMS 015	HVAC Trms Power Clamp Meter	3079K	070800649	TES	2011/10/3	2012/10/2
ETSTW-EMS 016	EMF Tester	1390	071208732	TES	2011/10/3	2012/10/2

ETSTW-EMS 017	Multimeter	DM-1220	518614	HOLA	2011/8/11	2012/8/10
ETSTW-EMS 019	Electrostatic Discharge Simulator	ESS-2002	ESS06Y6300	NoiseKen	2010/11/25	2011/11/24
ETSTW-EMS 020	Humidity Temperature Meter	TES-1366	091011116	TES	2011/3/24	2012/3/23
ETSTW-RS 003	RF Power Amplifier	30S1G3	306933	AR	Function Test	
ETSTW-RS 004	RF Power Amplifier	150W1000	307009	AR	Function Test	
ETSTW-RS 006	SIGNAL GENERATOR	SML03	101551	R&S	2011/3/7	2012/3/6
ETSTW-RS 007	14" COLOR VIDEO MONITOR	HS-CM145A	0512011548	None	Function Test	
ETSTW-RS 009	SIGNAL GENERATOR	8648C	3642U01656	HP	2011/2/23	2012/2/22
ETSTW-RS 010	Broadband Field Meter	NBM-520	C-0195	Narda	2011/9/8	2012/9/7
ETSTW-GSM 002	Universal Radio Communication Tester	CMU 200	109439	R&S	2011/10/3	2012/10/2
ETSTW-GSM 019	Band Reject Filter	WRCTF824/849-822/851-40 /12+9SS	3	WI	2011/1/14	2012/1/13
ETSTW-GSM 020	Band Reject Filter	WRCD1747/1748-1743/1752-32/5SS	1	WI	2011/1/14	2012/1/13
ETSTW-GSM 021	Band Reject Filter	WRCD1879.5/1880.5-1875.5/1884.5-32/5SS	3	WI	2011/1/14	2012/1/13
ETSTW-GSM 022	Band Reject Filter	WRCT901.9/903.1-904.25-50/8SS	1	WI	2011/1/14	2012/1/13
ETSTW-GSM 023	Power Divider	4901.19.A	None	SUHNER	2011/9/19	2012/9/18
ETSTW-Cable 002	Microwave Cable	SUCOFLEX 104（S_Cable 7）	238093	HUBER+SUHNER	2011/5/18	2012/5/17
ETSTW-Cable 003	Microwave Cable	SUCOFLEX 104（S_Cable 11）	209953	HUBER+SUHNER	2011/5/18	2012/5/17
ETSTW-Cable 010	BNC Cable	5 M BNC Cable	None	JYE BAO CO.,LTD.	2011/3/8	2012/3/7
ETSTW-Cable 011	BNC Cable	BNC Cable 1	None	JYE BAO CO.,LTD.	Pre-test Use NCR	
ETSTW-Cable 012	BNC Cable	BNC Cable 2	None	JYE BAO CO.,LTD.	2011/3/8	2012/3/7
ETSTW-Cable 013	Microwave Cable	SUCOFLEX 104（S_Cable 5）	232345	HUBER+SUHNER	Function Test	
ETSTW-Cable 016	BNC Cable	Switch Box	B Cable 1	Schwarz beck	2011/3/4	2012/3/3
ETSTW-Cable 017	BNC Cable	X Cable	B Cable 2	Schwarz beck	2011/3/4	2012/3/3
ETSTW-Cable 018	BNC Cable	Y Cable	B Cable 3	Schwarz beck	2011/3/4	2012/3/3
ETSTW-Cable 019	BNC Cable	Z Cable	B Cable 4	Schwarz beck	2011/3/4	2012/3/3
ETSTW-Cable 022	N TYPE Cable	OATS Cable 3	0002	JYE BAO CO.,LTD.	2011/3/4	2012/3/3
ETSTW-Cable 026	Microwave Cable	SUCOFLEX 104	279075	HUBER+SUHNER	2011/3/10	2012/3/9
ETSTW-Cable 027	Microwave Cable	SUCOFLEX 104	279083	HUBER+SUHNER	2011/3/10	2012/3/9
ETSTW-Cable 028	Microwave Cable	FA147A0015M2020	30064-2	UTIFLEX	2011/4/26	2012/4/25
ETSTW-Cable 029	Microwave Cable	FA147A0015M2020	30064-3	UTIFLEX	2011/4/26	2012/4/25
ETSTW-Cable 030	Microwave Cable	SUCOFLEX 104（S_Cable 9）	279067	SPECTRUM	2011/3/10	2012/3/9
ETSTW-Cable 031	Microwave Cable	SUCOFLEX 104（S_Cable 10）	238092	HUBER+SUHNER	2010/11/30	2011/11/29
ETSTW-Cable 039	Microwave Cable	SUCOFLEX 104（S_Cable 19）	316739	HUBER+SUHNER	2011/5/18	2012/5/17
ETSTW-Cable 040	Microwave Cable	SUCOFLEX 104（S_Cable 20）	316738	HUBER+SUHNER	Function Test	
ETSTW-Cable 043	Microwave Cable	SUCOFLEX 104	317576	HUBER+SUHNER	2010/11/30	2011/11/29
ETSTW-Cable 047	Microwave Cable	SUCOFLEX 104	325518	HUBER+SUHNER	2010/11/30	2011/11/29

ETSTW-Cable 051	BNC Cable	BNC Cable 6	None	JYE BAO CO.,LTD.	2011/3/31	2012/3/30
ETSTW-Cable 052	BNC Cable	Clamp Cable	None	Schwarz beck	2011/3/31	2012/3/30
ETSTW-Cable 053	N TYPE To SMA Cable	OATS Cable 4	None	JYE BAO CO.,LTD.	2011/3/4	2012/3/3
ETSTW-Cable 054	BNC To SMA Cable	OATS Cable 5	None	JYE BAO CO.,LTD.	2011/3/4	2012/3/3
ETSTW-Cable 055	Microwave Cable	SUCOFLEX 104	None	HUBER+SUHNER	Function Test	
ETSTW-Cable 056	N TYPE Cable	N30N30-JBY240-80CM	20110621-1.0	JYE BAO CO.,LTD.	Function Test	
ETSTW-Cable 057	N TYPE Cable	N30N30-JBY240-80CM	20110621-1.1	JYE BAO CO.,LTD.	Function Test	
WTSTW-SW 001	EMI TEST SOFTWARE	Harmonics-1000	None	EMC PARTNER	HARCS Version 4.16 Firmware Version 2.18	
WTSTW-SW 002	EMI TEST SOFTWARE	EZ_EMC	None	Farad	Version ETS-03A1	
WTSTW-SW 003	EMS TEST SOFTWARE	i2	None	AUDIX	Version 3.2007-8-17b	
WTSTW-SW 005	GSM Fading Level Correction	GSMFadLevCor	None	R&S	Version 1.66	

2.5 General Test Procedure

POWER LINE CONDUCTED INTERFERENCE: The procedure used was ANSI STANDARD C63.4-2009 5.2 using a 50µH LISN (if necessary). Both lines were observed. The bandwidth of the spectrum analyzer was 10 kHz with an appropriate sweep speed.

RADIATION INTERFERENCE: The test procedure used was according to ANSI STANDARD C63.4-2009 6.4 employing a spectrum analyzer. For investigated frequency is equal to or below 1GHz, the RBW and VBW of the spectrum analyzer was 100 kHz and 100kHz respectively with an appropriate sweep speed. For investigated frequency is above 1GHz, both of RBW and VBW of the spectrum analyzer were 1 MHz with an appropriate sweep speed. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The ambient temperature of the UUT was 23°C with a humidity of 40 %.

The table used for radiated measurements is capable of continuous rotation. The spectrum was scanned from 30 MHz to the frequency specified as follows:

(1) If the intentional radiator operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
(2) If the intentional radiator operates at or above 10 GHz and below 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.
(3) If the intentional radiator operates at or above 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 200 GHz, whichever is lower, unless specified otherwise elsewhere in the rules.
(4) If the intentional radiator contains a digital device, regardless of whether this digital device controls the functions of the intentional radiator or the digital device is used for additional control or function purposes other than to enable the operation of the intentional radiator, the frequency range shall be investigated up to the range specified in paragraphs (a)(1)-(a)(3) of this section or the range applicable to the digital device, as shown in paragraph (b)(1) of this Section, whichever is the higher frequency range of investigation.

For hand-held devices, an exploratory test was performed with three (3) orthogonal planes to determine the highest emissions.

Measurements were made by at the registered open field test site located at The Registration Number: 930600. When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes.

ANSI STANDARD C63.4-2009 10.2.7: Any measurements that utilize special test software shall be indicated and referenced in the test report. During testing, test software ’EZ EMC’ was used for setting up different operation modes.

3. Test results (enclosure)

TEST CASE	Para. Number	Required	Test passed	Test failed
RF Power Output	2.1046; 95.639 (h)	☒	☒	☐
Modulation Deviation	2.1047 (b) 95.631 (j)	☒	☒	☐
Audio Frequency Response	2.1047 (a) 95.631 (j)	☒	☒	☐
Occupied Bandwidth / Emission Mask	2.1049 (c)(1); 95.633 (f) 95.635 (e)	☒	☒	☐
Radiated Spurious Emission Transmitter	2.1053 95.635 (e)	☒	☒	☐
Radiated Spurious Emission Receiver	Part 15B	☒	☒	☐
Frequency Stability vs. Temperature	2.1055 (b); 95.632(c)	☒	☒	☐
Frequency Stability vs. Voltage	2.1055 (a)(1); 95.632(c)	☒	☒	☐

The follows is intended to leave blank.

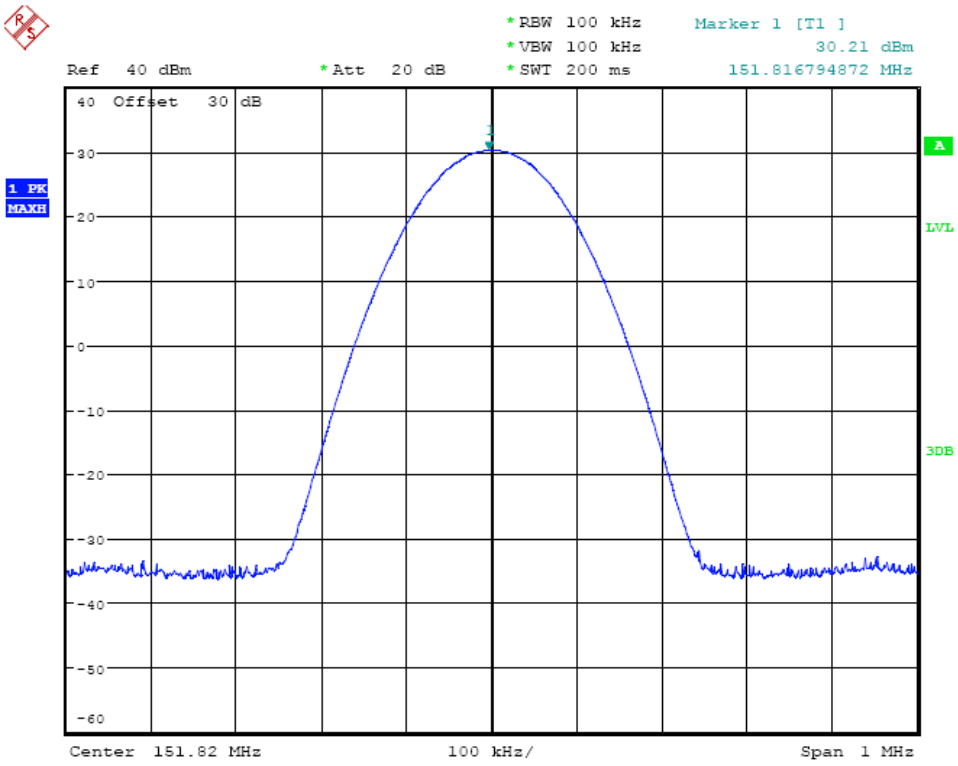
4. RF Power Output (conducted), FCC 2.1046; 95.639

4.1 Test procedure

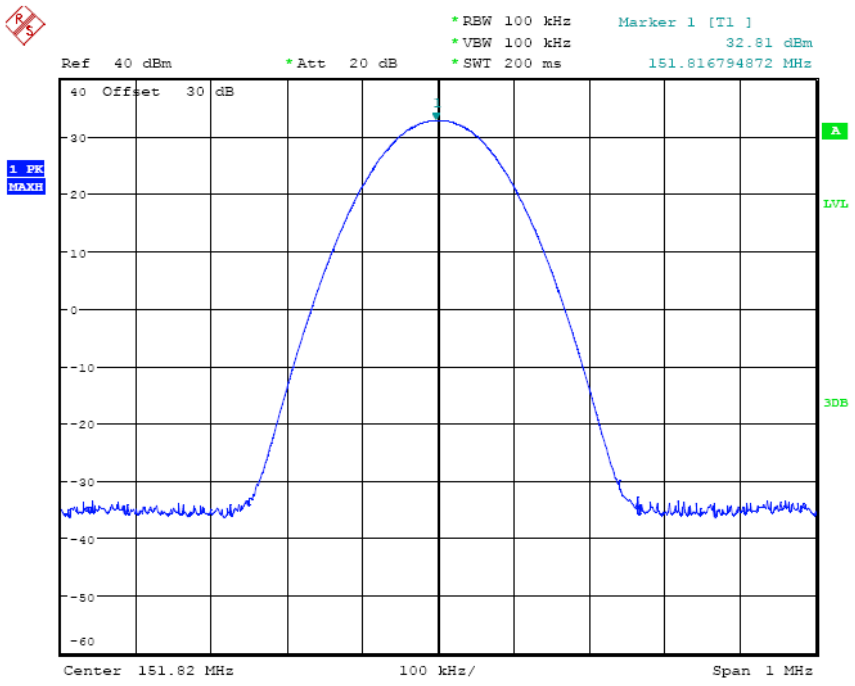
This transmitter output was connected to a calibrated coaxial attenuator, the other end of which was connected to a spectrum analyzer. Transmitter output was derived with the spectrum analyzer in dBm. The power output at the transmitter antenna port was determined by assign the value of the attenuator to the spectrum analyzer reading.

An HP power meter was also used to measure the RF power.
Tests were performed with an un-modulated carrier at three frequencies (low, middle and high channels) and on all power levels, which can be set-up on the transmitters, if applicable.

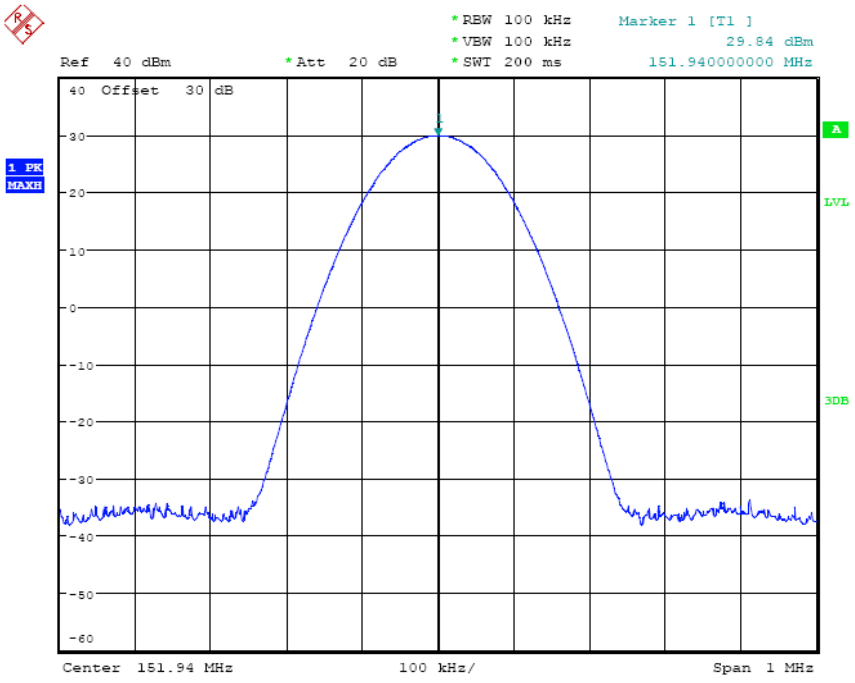
4.2 Test Results



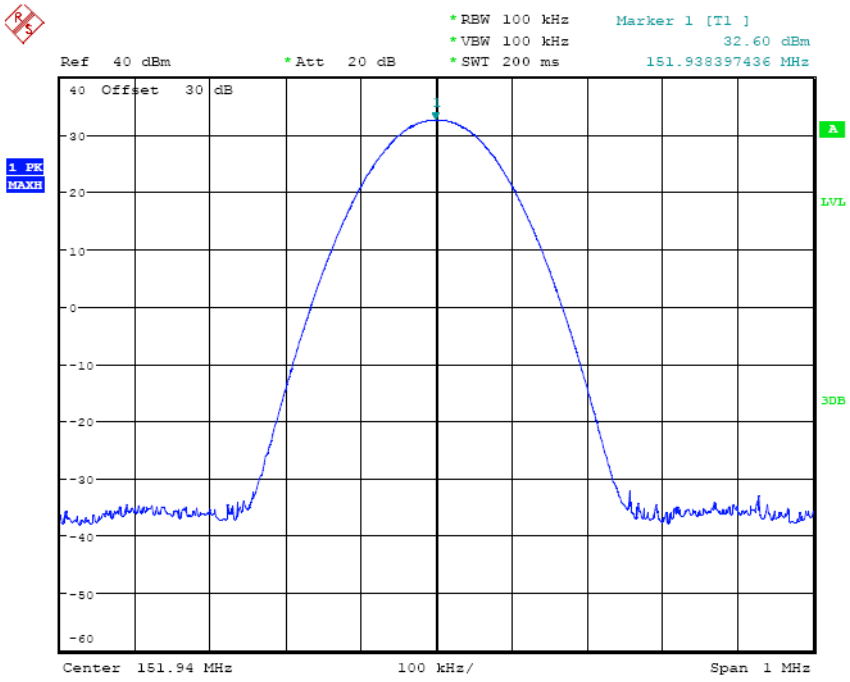
MAX OUTPUT POWER 151.82MHz LOW POWER
Date: 31.AUG.2011 09:56:13



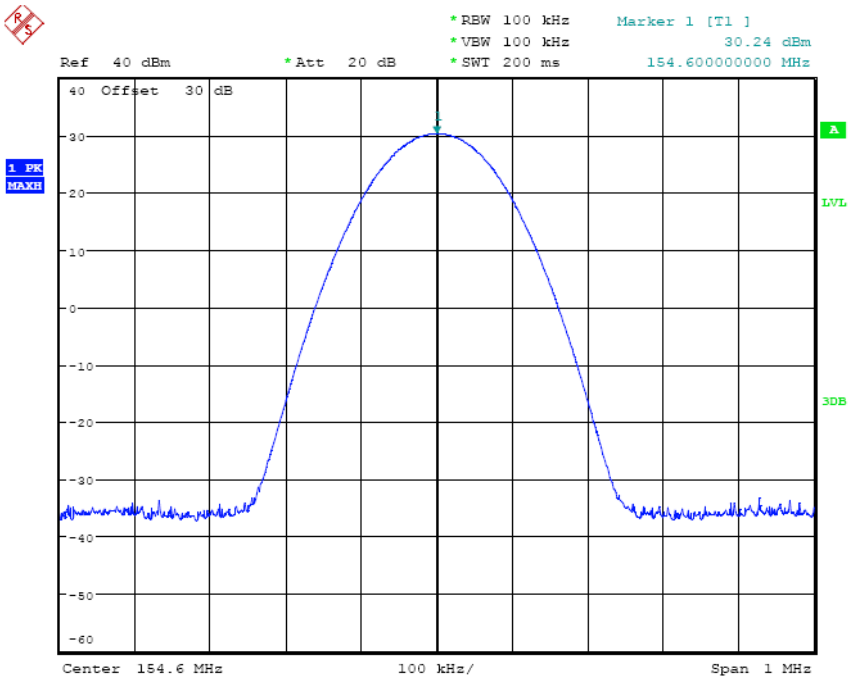
MAX OUTPUT POWER 151.82MHz HIGH POWER
Date: 31.AUG.2011 09:57:16



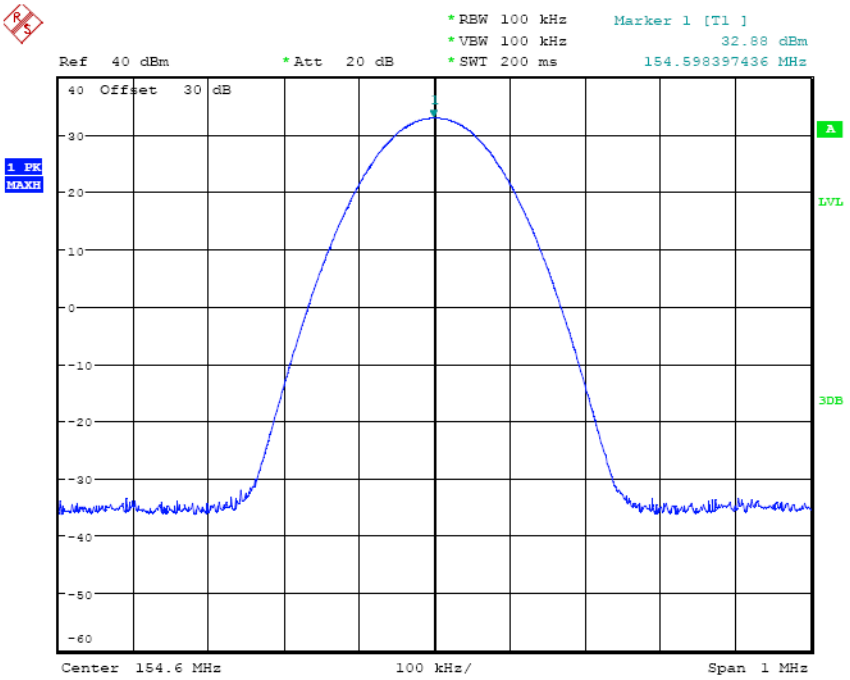
MAX OUTPUT POWER 151.94MHz LOW POWER
Date: 19.OCT.2011 10:16:39



MAX OUTPUT POWER 151.94MHz HIGH POWER
Date: 19.OCT.2011 10:16:09



MAX OUTPUT POWER 154.60MHz LOW POWER
Date: 31.AUG.2011 09:58:51



4.3 Limits:

No MURS unit, under any condition of modulation, shall exceed 2 Watts transmitter power output.

Test equipment used: ETSTW-RE 060, ETSTW-RE 072, ETSTW-RE 055

5. Radiated Power

5.1 Test Procedure

The EUT was positioned on a non-conductive turntable, 0.8m above the ground on an open test site.
The radiated emission at the fundamental frequency was measured at 3m distance with a test antenna and spectrum analyzer.

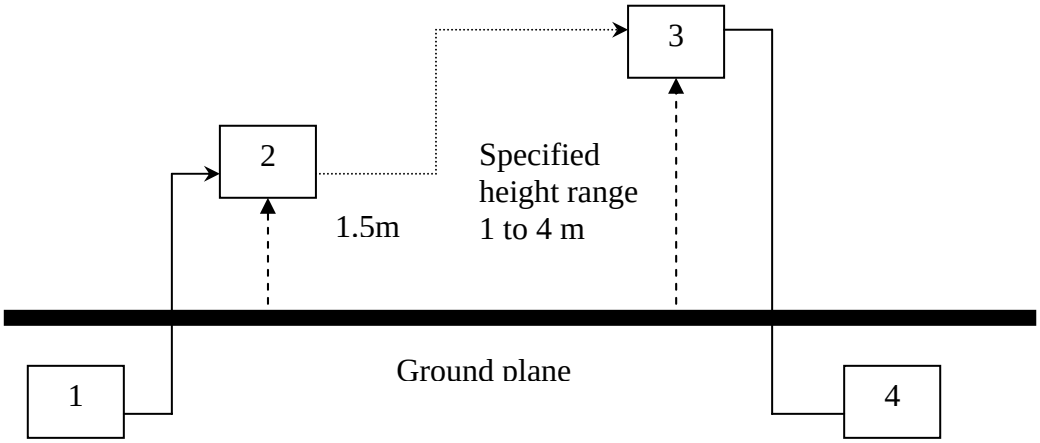
Worst case emission was recorded with the rotation of the turntable and the rising and lowering of the test antenna.

Substitution RF power Measurement at WTS

General:

The applied substitution method follows ANSI/TIA/EIA-603, ANSI/TIA/EIA-102.CAAA or the appropriate ETSI rules respectively.

The actual signal generated by the EUT can be determined by means of a substitution measurement in which a known signal source replaces the device to be measured.



1) Signal generator ;
2) Substitution antenna ;
3) Test antenna ;
4) Spectrum analyzer or selective voltmeter.

The substitution antenna replaces the transmitter antenna at the same position and in vertical polarization. The frequency of the signal generator shall be adjusted to the measurement frequency.
The test antenna shall be raised or lowered, if necessary, to ensure that the maximum signal is still received. The input signal to the substitution antenna shall be adjusted in level until an equal or a known related level to that detected from the transmitter is obtained in the measurement receiver.
If a fully anechoic chamber is used as test site in order to provide free space conditions there is no need to change the height of the antenna.

The measurement will be repeated in horizontal position.

Calibration:

In order to make this kind of measurement more effective and to avoid subjective measurement faults ETS has installed automatic computer controlled measurement procedures.
With the above described substitution method a test site is calibrated over the full frequency range which is used in suitable frequency steps. For a certain power level on the substitution antenna the received power over the whole frequency range is documented. All necessary antenna gains, cable losses, filter losses and amplifications of preamplifiers are taken in consideration. The summary of this calibration measurement performs a transducer factor that is related to the considered test site and a certain measurement distance. Differences of the radiated power levels of different test samples are determined by internal attenuation of measurement receiver. The proper function of such test site will be maintained by short term plausibility checks and periodical re-calibration.

Testing:
Now the test sample will be putted on the table at the defined position and the radiated power will be receiver and documented by the measurement receiver.
On test sites with ground plane the measurement antenna will be lowered and raised to maximum values at significant frequencies.
For peak power measurements the sample is turned by the turntable over 360 degree in order to find the direction with the maximum radiation or to document the max reading with the MAXHOLD function during the rotation.

5.2 Test results

Model: Callbox Date: From: 2011/9/27 to 2011/10/19
TX POWER 151.82MHz
Mode: LOW Temperature: 24 °C Engineer: Rick
Polarization: Horizontal Humidity: 60 %

Frequency (MHz)	Reading (dBm) Peak	Factor (dB) Corr.	Result (dBm)	Limit (dBm)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
151.8230	-2.60	24.03	21.43	33.00	-11.57	140	150

Polarization: Vertical

Frequency (MHz)	Reading (dBm) Peak	Factor (dB) Corr.	Result (dBm)	Limit (dBm)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
151.8270	2.24	24.57	26.81	33.00	-6.19	145	150

TX POWER 151.82MHz
Mode: HIGH
Polarization: Horizontal

Frequency (MHz)	Reading (dBm) Peak	Factor (dB) Corr.	Result (dBm)	Limit (dBm)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
151.8230	0.23	24.03	24.26	33.00	-8.74	130	150

Polarization: Vertical

Frequency (MHz)	Reading (dBm) Peak	Factor (dB) Corr.	Result (dBm)	Limit (dBm)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
151.8250	5.48	24.57	30.05	33.00	-2.95	155	150

TX POWER 151.94MHz

Mode: LOW

Polarization: Horizontal

Frequency (MHz)	Reading (dBm) Peak	Factor (dB) Corr.	Result (dBm)	Limit (dBm)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
151.9430	-3.51	24.03	20.52	33.00	-12.48	130	150

Polarization: Vertical

Frequency (MHz)	Reading (dBm) Peak	Factor (dB) Corr.	Result (dBm)	Limit (dBm)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
151.9410	0.99	24.58	25.57	33.00	-7.43	125	150

TX POWER 151.94MHz

Mode: HIGH

Polarization: Horizontal

Frequency (MHz)	Reading (dBm) Peak	Factor (dB) Corr.	Result (dBm)	Limit (dBm)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
151.9410	0.89	24.03	24.92	33.00	-8.08	120	150

Polarization: Vertical

Frequency (MHz)	Reading (dBm) Peak	Factor (dB) Corr.	Result (dBm)	Limit (dBm)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
151.9410	5.10	24.58	29.68	33.00	-3.32	130	150

TX POWER 154.60MHz

Mode: LOW

Polarization: Horizontal

Frequency (MHz)	Reading (dBm) Peak	Factor (dB) Corr.	Result (dBm)	Limit (dBm)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
154.6010	-3.61	24.22	20.61	33.00	-12.39	135	150

Polarization: Vertical

Frequency (MHz)	Reading (dBm) Peak	Factor (dB) Corr.	Result (dBm)	Limit (dBm)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
154.5990	0.98	24.80	25.78	33.00	-7.22	140	150

TX POWER 154.60MHz

Mode: HIGH

Polarization: Horizontal

Frequency (MHz)	Reading (dBm) Peak	Factor (dB) Corr.	Result (dBm)	Limit (dBm)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
154.6010	-1.01	24.22	23.21	33.00	-9.79	160	150

Polarization: Vertical

Frequency (MHz)	Reading (dBm) Peak	Factor (dB) Corr.	Result (dBm)	Limit (dBm)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
154.5990	4.45	24.80	29.25	33.00	-3.75	155	150

Test equipment used: ETSTW-RE 004, ETSTW-RE 042, ETSTW-RE 061, ETSTW-RE 072

Explanation: Please see attached diagram as appendix.

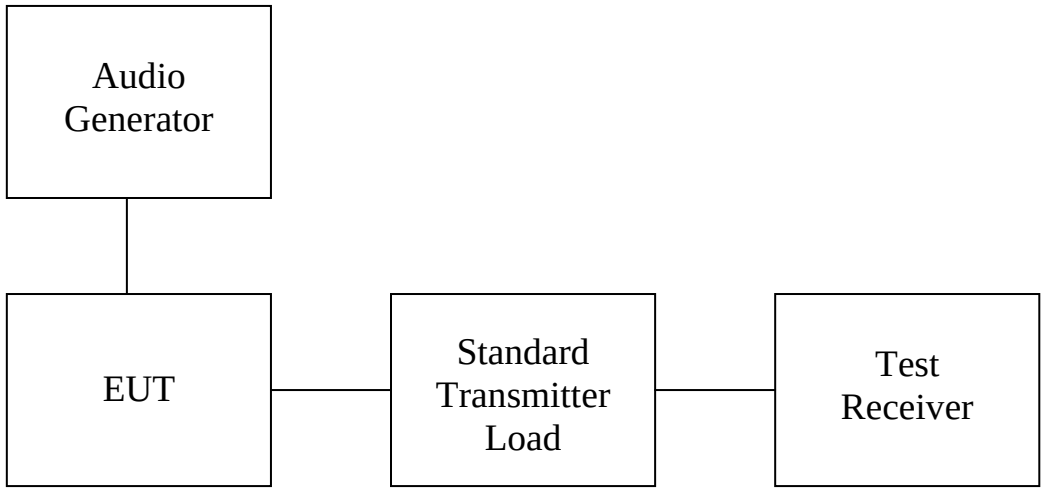
5.3 Limits:

No MURS unit, under any condition of modulation, shall exceed 2 Watts transmitter power output.

6. Modulation Deviation, FCC 2.1047 (b), 95.631(j)

6.1 Test procedure

Modulation limiting is the transmitter circuit's ability to limit the transmitter from producing deviations in excess of rated system deviation.
The audio signal generator is connected to the audio input of the EUT with its full rating.
The modulation response is measured at certain modulation frequencies, related to 1000Hz reference signal. Tests are performed for positive and negative modulation.



6.2 Test results:

See attached diagrams in appendix.

6.3 Limits:

A MURS transmitter must transmit only emission types A1D, A2B, A2D, A3E, F2B, F1D, F2D, F3E, G3E. Emission types A3E, F3E and G3E include selective calling or tone-operated squelch tones to establish or continue voice communications. MURS transmitters are prohibited from transmitting in the continuous carrier mode.

Test equipment used: ETSTW-RE 072, ETSTW-RE 055

7. Audio frequency response, FCC 2.1047 (a)

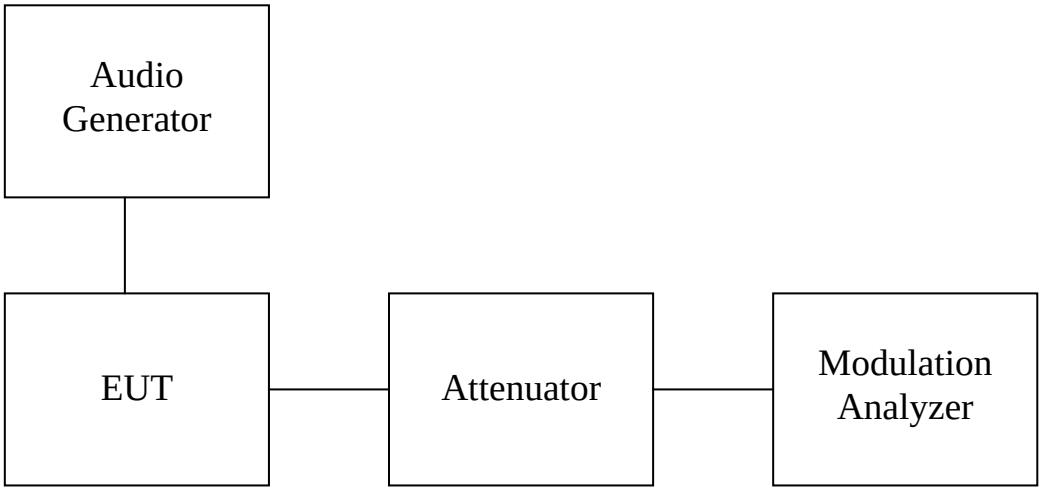
7.1 Test procedure

The audio frequency response is the degree of closeness to which the frequency deviation of the transmitter follows a prescribed characteristic.
The frequency response of the audio modulation part is measured over a frequency range of 100 Hz to 5000Hz.

For 1000Hz tone reference signal the audio generator level is adjusted to get 20% of the rated system deviation.

The deviations obtained over the frequency range from 100Hz to 5000Hz are recorded and compared with the reference deviation as follows:

$$\text{Audio Frequency Response} = 20 \log [\ DEV_{Freq} / \ DEV_{ref}\ ].$$



7.2 Test results:

See attached diagrams in appendix.

7.3 Limits:

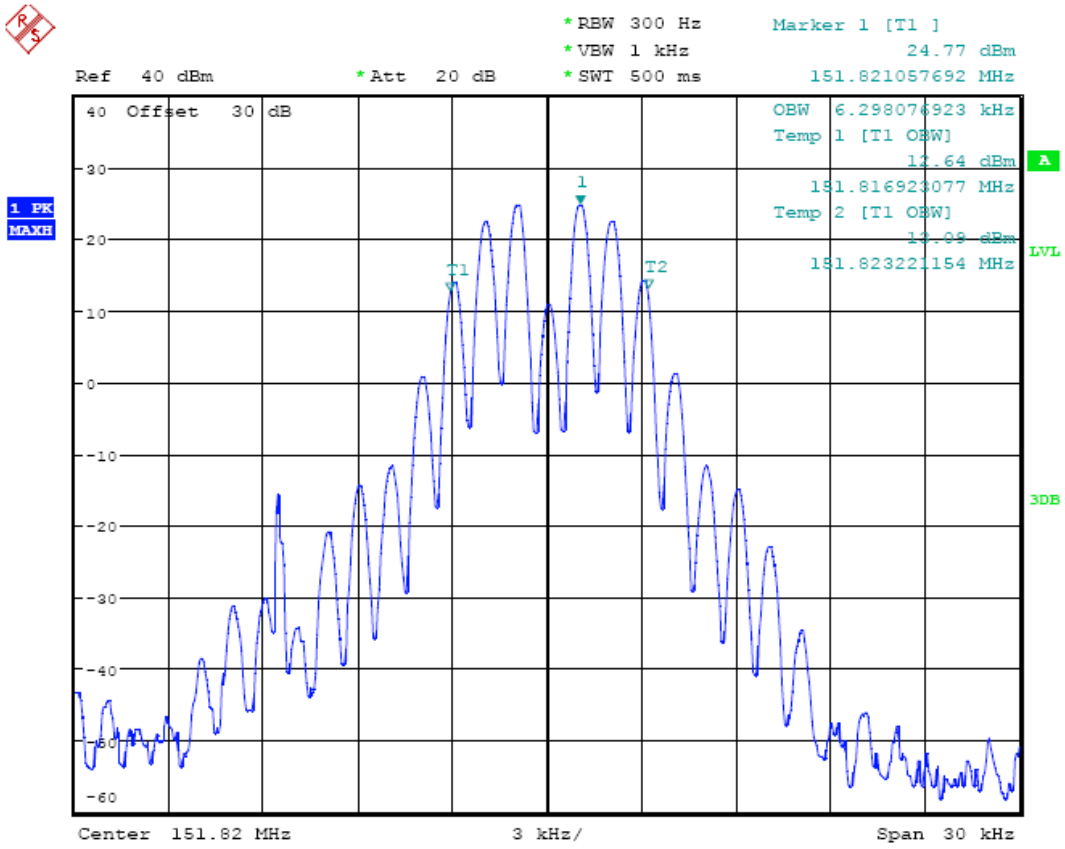
A MURS transmitter must transmit only emission types A1D, A2B, A2D, A3E, F2B, F1D, F2D, F3E, G3E. Emission types A3E, F3E and G3E include selective calling or tone-operated squelch tones to establish or continue voice communications. MURS transmitters are prohibited from transmitting in the continuous carrier mode.

Test equipment used: ETSTW-RE 072, ETSTW-RE 055

8. Occupied Bandwidth/Emission Mask, FCC 2.1049 (c) ; 95.632

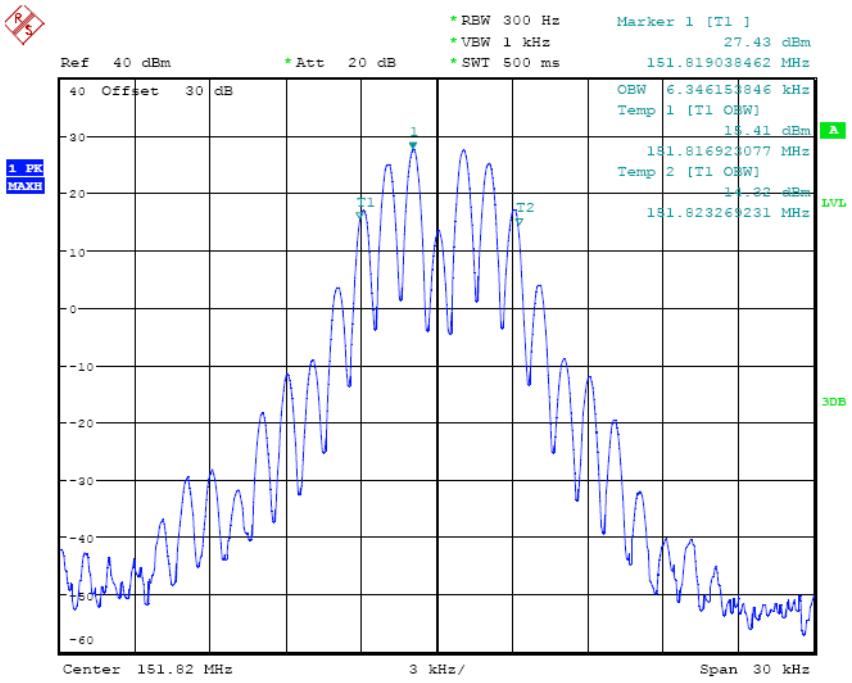
The authorized bandwidth is 11.25 kHz on frequencies 151.820 MHz, 151.880 MHz and 151.940 MHz.
The authorized bandwidth is 20.0 kHz on frequencies 154.570 and 154.600 MHz.

8.1 Test Results



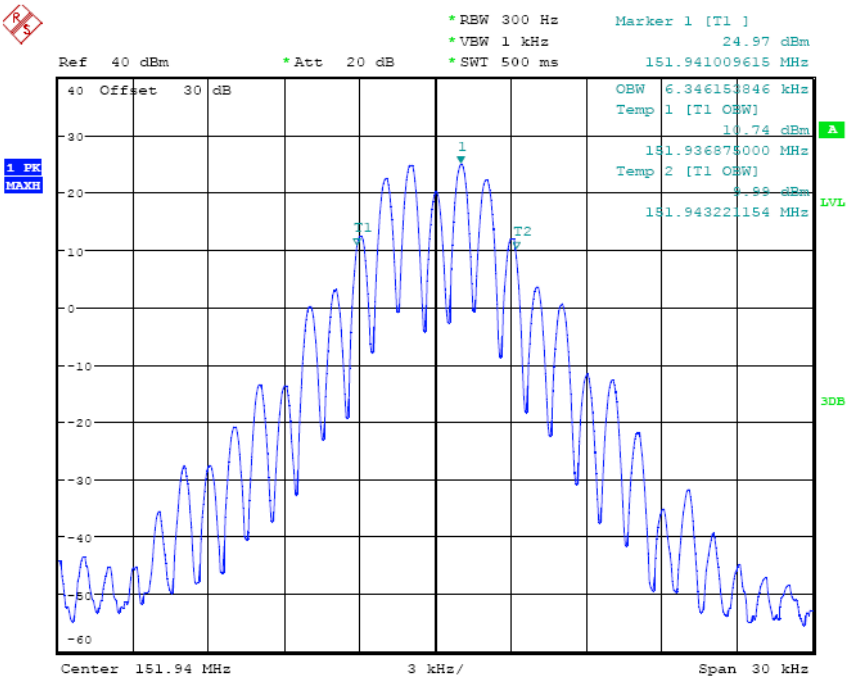
Occupied Bandwidth 151.82MHz LOW POWER

Date: 31.AUG.2011 10:11:19



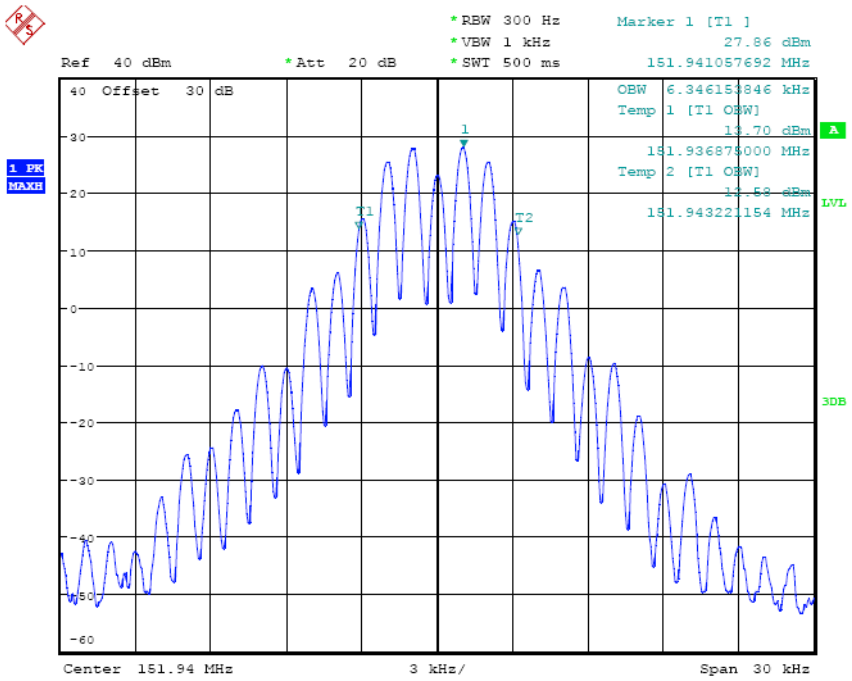
Occupied Bandwidth 151.82MHz HIGH POWER

Date: 31.AUG.2011 10:11:57



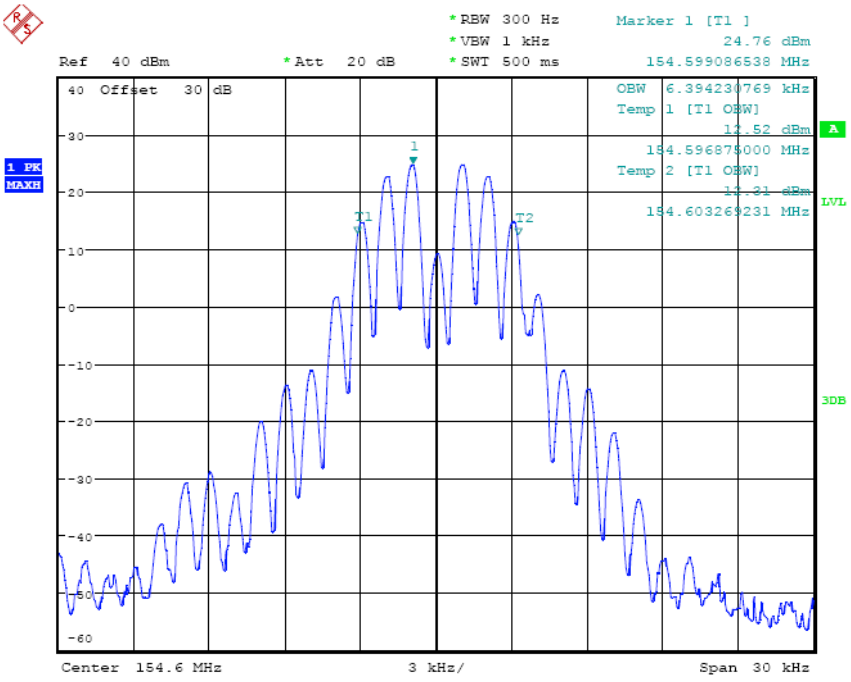
Occupied Bandwidth 151.94MHz LOW POWER

Date: 19.OCT.2011 10:21:02



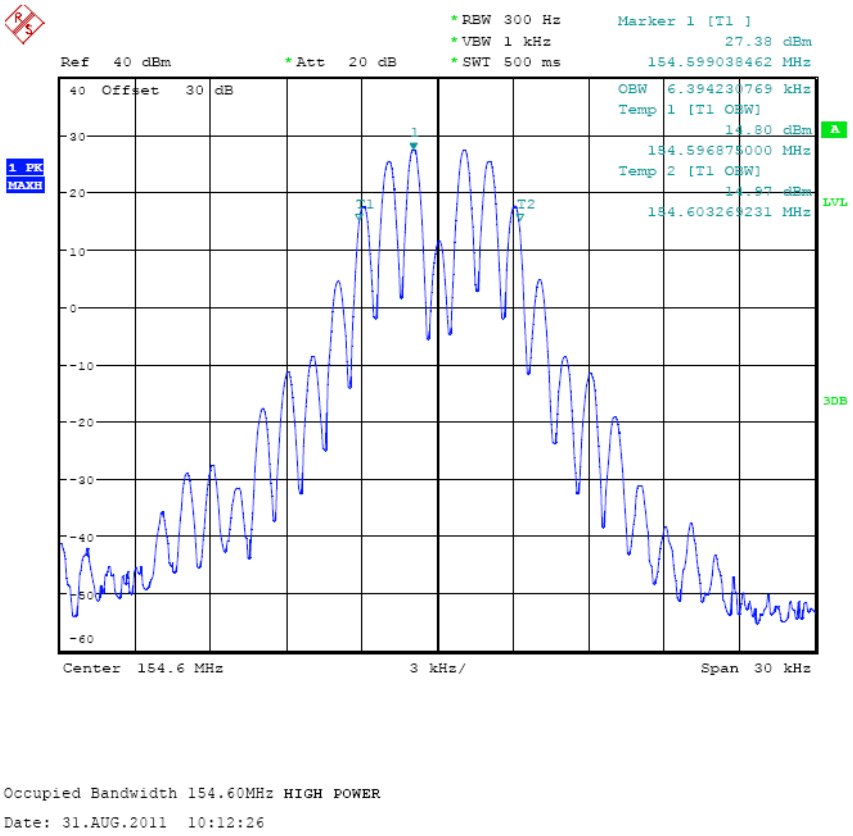
Occupied Bandwidth 151.94MHz HIGH POWER

Date: 19.OCT.2011 10:20:23



Occupied Bandwidth 154.60MHz LOW POWER

Date: 31.AUG.2011 10:04:47



8.2 Limit

Frequencies	Authorized bandwidth
151.820 MHz 151.880 MHz 151.940 MHz	11.25 kHz
154.570 and 154.60 MHz	20.0 kHz

Test equipment used: ETSTW-RE 072, ETSTW-RE 055

9. Radiated Spurious Emission, FCC 2.1053; 95.635

9.1 Test procedure

The EUT was positioned on a non-conductive turntable, 0.8m above the ground plane.
The radiated emission at the fundamental frequency was measured at 3 m distance with a test antenna and spectrum analyzer.
Worst case emission was recorded with the rotation of the turntable and the raising and lowering of the test antenna.
ERP was measured using a substitution method. The EUT was replaced by reference antenna connected to a signal generator.
The test of spurious radiated emission has been carried out with the validated test software. The measurements below 1GHz were performed with a measurement bandwidth of 100 kHz, above 1GHz with a bandwidth of 1MHz.
Spurious emission limits near the carrier are defined by a emission mask.

9.2 Test Results

The measurements of the spurious emission at the upper, center and lower channel, if applicable.
The measurement diagrams show that all significant spurious emissions are well below the limit line.

9.2.1 Spurious emission near the carrier:

The Results of Emission Mask: ☒ PASSED ☐ NOT PASSED

9.2.2 Spurious emission not near the carrier:

Date: From 2011/9/27 to 2011/10/19

Model: MURS Multi-Mile Wireless Communication System
Mode: TX 151.82MHz HIGH Temperature: 24 °C Engineer: Rick
Polarization: Horizontal Humidity: 60 %

Frequency (MHz)	Reading (dBm) Peak	Factor (dB) Corr.	Result (dBm)	Limit (dBm)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
39.2627	-59.00	22.97	-36.03	-20.00	-16.03	260	150
302.6051	-51.56	27.42	-24.14	-20.00	-4.14	135	150
454.9098	-64.43	29.73	-34.70	-20.00	-14.70	145	150
607.2144	-74.75	33.06	-41.69	-20.00	-21.69	140	150
759.5190	-78.75	34.89	-43.86	-20.00	-23.86	150	150
1060.1200	-45.59	7.12	-38.47	-20.00	-18.47	135	150
2430.8620	-41.73	8.91	-32.82	-20.00	-12.82	140	150

Polarization: Vertical

Frequency (MHz)	Reading (dBm) Peak	Factor (dB) Corr.	Result (dBm)	Limit (dBm)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
120.9936	-58.95	21.22	-37.73	-20.00	-17.73	190	150
302.6051	-51.45	29.23	-22.22	-20.00	-2.22	135	150
454.9098	-69.91	29.45	-40.46	-20.00	-20.46	150	150
607.2144	-76.52	34.29	-42.23	-20.00	-22.23	140	150
759.5190	-77.58	33.78	-43.80	-20.00	-23.80	135	150
1060.1200	-42.78	5.70	-37.08	-20.00	-17.08	140	150
2430.8620	-43.51	10.36	-33.15	-20.00	-13.15	130	150

Mode: TX 151.94MHz HIGH
Polarization: Horizontal

Frequency (MHz)	Reading (dBm) Peak	Factor (dB) Corr.	Result (dBm)	Limit (dBm)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
37.7814	-58.81	22.99	-35.82	-20.00	-15.82	140	150
302.8442	-51.57	27.44	-24.13	-20.00	-4.13	270	150
455.2693	-64.34	29.72	-34.62	-20.00	-14.62	180	150
607.6942	-74.64	33.07	-41.57	-20.00	-21.57	250	150
760.1193	-78.83	34.89	-43.94	-20.00	-23.94	90	150
1060.9600	-45.57	7.16	-38.41	-20.00	-18.41	60	150
2432.7800	-41.89	8.91	-32.98	-20.00	-12.98	130	150

Polarization: Vertical

Frequency (MHz)	Reading (dBm) Peak	Factor (dB) Corr.	Result (dBm)	Limit (dBm)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
120.5908	-58.90	21.22	-37.68	-20.00	-17.68	50	150
302.8442	-51.32	29.25	-22.07	-20.00	-2.07	160	150
455.2693	-69.82	29.45	-40.37	-20.00	-20.37	170	150
607.6942	-76.54	34.29	-42.25	-20.00	-22.25	200	150
760.1193	-77.77	33.80	-43.97	-20.00	-23.97	300	150
1060.9600	-42.63	5.71	-36.92	-20.00	-16.92	80	150
2432.7800	-43.26	10.30	-32.96	-20.00	-12.96	170	150

Mode: TX 154.60MHz HIGH
Polarization: Horizontal

Frequency (MHz)	Reading (dBm) Peak	Factor (dB) Corr.	Result (dBm)	Limit (dBm)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
49.3430	-58.43	21.69	-36.74	-13.00	-23.74	130	150
307.4148	-47.89	27.72	-20.17	-13.00	-7.17	160	150
462.9260	-68.13	29.51	-38.62	-13.00	-25.62	145	150
616.8337	-70.79	33.29	-37.50	-13.00	-24.50	140	150
772.3447	-80.31	34.96	-45.35	-13.00	-32.35	150	150
1541.0820	-47.96	5.67	-42.29	-13.00	-29.29	155	150
2316.6330	-50.20	9.29	-40.91	-13.00	-27.91	160	150

Polarization: Vertical

Frequency (MHz)	Reading (dBm) Peak	Factor (dB) Corr.	Result (dBm)	Limit (dBm)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
175.7532	-59.92	23.23	-36.69	-13.00	-23.69	330	150
307.4148	-51.46	29.58	-21.88	-13.00	-8.88	140	150
461.3226	-71.69	29.49	-42.20	-13.00	-29.20	150	150
616.8337	-74.05	34.34	-39.71	-13.00	-26.71	155	150
770.7415	-76.68	34.03	-42.65	-13.00	-29.65	140	150
1541.0820	-48.79	5.77	-43.02	-13.00	-30.02	140	150
2466.9340	-49.58	9.23	-40.35	-13.00	-27.35	130	150

Note:

1. **Correction Factor = Antenna Gain + Cable Loss + Amplifier Gain**
2. **The formula of measured value as: Test Result = Reading + Correction Factor**
3. **All not in the table noted test results are more than 20 dB below the relevant limits.**
4. **See the attached diagram as appendix.**

Test equipment used: ETSTW-RE 003, ETSTW-RE 030, ETSTW-RE 111, ETSTW-RE 062, ETSTW-RE 072

9.3 Explanation of test result

The measurements of the spurious emissions at the equipment output terminals were performed pursuant to the test procedure above in order to verify that any emissions are below the limits given by § 95.635(e).

Calculation of test results:

Such factors like antenna correction, cable loss, external attenuation etc. are already included in the provided measurement results. This is done by using validated test software and calibrated test system according the accreditation requirements.

In the Table being listed the critical peak and average value an exhibit the compliance with the above calculated Limits.

9.4 Limits

For transmitters designed to operate in the MURS, transmitters shall comply with the following:

Frequency	Mask with audio low pass filter	Mask without audio low pass filter
151.820 MHz, 151.880 MHz and 151.940 MHz.....	(1)	(1)
154.570 MHz and 154.600 MHz	(2)	(3)

(1) Emission Mask 1—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: (i) On any frequency from the center of the authorized bandwidth foto 5.625 kHz removed from f_o: Zero dB. (ii) On any frequency removed from the center of the authorized

bandwidth by a displacement frequency (f_d in kHz) of more than 5.625 kHz but no more than 12.5 kHz: at least 7.27(f_d-2.88 kHz) dB. (iii) 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 + 10 log (P) dB or 70 dB, whichever is the lesser attenuation. (2) Emission Mask 2—For transmitters designed to operate with a 25 kHz channel bandwidth that are equipped with an audio low-pass filter, the power of any emission must be below the unmodulated carrier power (P) as follows: (i) 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. (ii) On any frequency removed from the assigned frequency by more than 100 percent, but not more than 250 percent of the authorized bandwidth: at least 35 dB. (iii) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: at least 43 + 10 log (P) dB. (3) Emission Mask 3—For transmitters designed to operate with a 25 kHz channel bandwidth that are not equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier output power (P) as follows: (i) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 5 kHz, but not more than 10 kHz: at least 83 log (f_d/5) dB. (ii) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 10 kHz, but not more than 250 percent of the authorized band-width: at least 29 log (f_d^2/11) dB or 50 dB, whichever is the lesser attenuation. (iii) On any frequency removed from the center of the authorized bandwidth by more than 250 percent of the authorized bandwidth: at least 43 + 10 log (P) dB.

The compliance limit was calculated as the following table:
151.820 MHz, 151.880 MHz and 151.940 MHz

Maximum transmitter output power	30.05 dBm
Required attenuation	50 + 10 x Log(1.01157945) = 50.05 dBm
Maximum transmitter output power Required attenuation Compliance limit	30.05 dBm 50.05 dB -20 dBm

154.570 MHz and 154.600 MHz

Maximum transmitter output power	29.25 dBm
Required attenuation	43 + 10 x Log(0.84139514) = 42.25 dBm
Maximum transmitter output power Required attenuation Compliance limit	29.25 dBm 42.25 dB -13 dBm

10. Frequency Stability vs. Temperature, FCC 2.1055, 95.632

10.1 Test procedure

The equipment under test was connected to an external DC 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 DC leads and RF output cable, exited the chamber through an opening made for that purpose.
After the temperature stabilized the frequency output was recorded from the counter.

10.2 Test Results

151.82 MHz

Temperature(℃)	Frequency(MHz)	Error(kHz)	Error(ppm)
-30	151.820724	0.564	3.715
-20	151.820560	0.400	2.635
-10	151.820384	0.224	1.475
0	151.820128	-0.032	-0.211
+10	151.820112	-0.048	-0.316
+20	151.820064	-0.096	-0.632
+30	151.820160	0.000	0.000
+40	151.820160	0.000	0.000
+50	151.820000	-0.160	-1.054

151.94 MHz

Temperature(℃)	Frequency(MHz)	Error(kHz)	Error(ppm)
-30	151.940672	0.532	3.501
-20	151.940530	0.390	2.567
-10	151.940354	0.214	1.408
0	151.940128	-0.012	-0.079
+10	151.940112	-0.028	-0.184
+20	151.940088	-0.052	-0.342
+30	151.940112	-0.028	-0.184
+40	151.940112	-0.028	-0.184
+50	151.940000	-0.140	-0.921

154.60 MHz

Temperature(℃)	Frequency(MHz)	Error(kHz)	Error(ppm)
-30	154.600620	0.500	3.234
-20	154.600500	0.380	2.458
-10	154.600324	0.204	1.320
0	154.600128	0.008	0.052
+10	154.600112	-0.008	-0.052
+20	154.600112	-0.008	-0.052
+30	154.600064	-0.056	-0.362
+40	154.600064	-0.056	-0.362
+50	154.600000	-0.120	-0.776

10.3 Limits:

According to FCC 95.632(c), MURS transmitters must maintain a frequency stability of 5.0 ppm, or 2.0 ppm if designed to operate with a 6.25 kHz bandwidth.

Test equipment used: ETSTW-RE 072, ETSTW-RE 055, ETSTW-CE 009

11. Frequency Stability vs. Voltage, FCC 2.1055 (d) ; 95.632

11.1 Test procedure

An external variable DC power supply was connected to the battery terminals of the equipment under test.
For hand carried, battery powered equipment primary supply voltage was reduced to the battery operating end point as specified by the manufacturer. The output frequency was recorded for each battery voltage.

11.2 Test Results

151.82 MHz

Voltage	Frequency(MHz)	Error(kHz)	Error(ppm)
Norm	151.820160	--	--
10.2V	151.820160	0.000	0.000
13.8V	151.820160	0.000	0.000

151.94 MHz

Voltage	Frequency(MHz)	Error(kHz)	Error(ppm)
Norm	151.940140	--	--
10.2V	151.940160	0.020	0.132
13.8V	151.940160	0.020	0.132

154.60 MHz

Voltage	Frequency(MHz)	Error(kHz)	Error(ppm)
Norm	154.600120	--	--
10.2V	154.600160	0.040	0.259
13.8V	154.600160	0.040	0.259

11.3 Limits:

According to FCC 95.632(c), MURS transmitters must maintain a frequency stability of 5.0 ppm, or 2.0 ppm if designed to operate with a 6.25 kHz bandwidth.

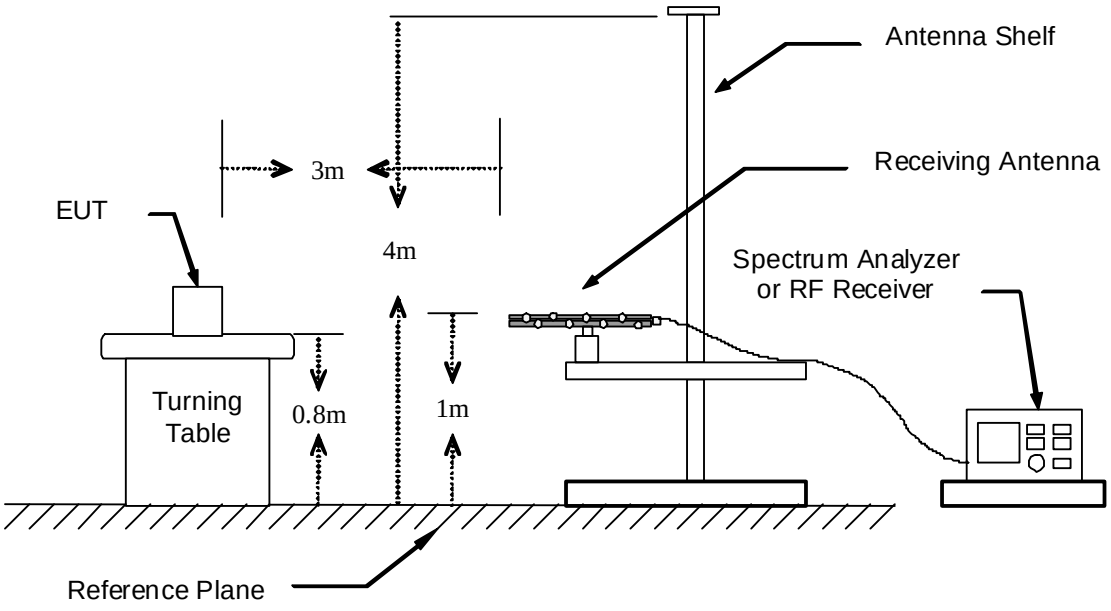
Test equipment used: ETSTW-RE 072, ETSTW-RE 055, ETSTW-CE 009

12. Receiver Radiated Spurious Emission

12.1 Test Procedures

1. Configure the EUT according to ANSI C63.4.
2. The EUT was placed on the top of the turn table 0.8 meter above ground.
3. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turn table.
4. Power on the EUT and all the supporting units.
5. The turn table was rotated 360 degrees to determine the position of the highest radiation.
6. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emission field strength of both horizontal and vertical polarization.
7. For each suspected emission, the antenna tower was scan (from 1 M to 4 M) and then the turn table was rotated (from 0 degree to 360 degrees) to find the maximum reading.
8. Adjust the spectrum analyzer for the following settings:
   - Resolution Bandwidth = 100 kHz for spurious emissions below 1 GHz and 1 MHz for spurious emissions above 1GHz.
   - Video Bandwidth = 100 kHz for spurious emissions below 1 GHz, and 1 MHz for spurious emissions above 1 GHz.
   - Sweep Speed slow enough to maintain measurement calibration.
   - Detector Mode = Positive Peak.

12.2 Test Setup



12.3 Test Result

Model:	MURS Multi-Mile Wireless Communication System	Date: From 2011/9/2 to 2011/10/19			
Mode:	RX 151.82 MHz	Temperature:	24 °C	Engineer:	Kevin
Polarization:	Horizontal	Humidity:	60 %		

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
189.3988	9.82	peak	12.50	22.32	43.50	-21.18	220	100
381.8437	4.25	peak	16.83	21.08	46.00	-24.92	120	100
504.3086	5.11	peak	19.33	24.44	46.00	-21.56	310	100
757.0140	4.49	peak	24.15	28.64	46.00	-17.36	60	100

Frequency (MHz)	Reading (dBuV) Peak	Ave.	Factor (dB) Corr.	Result @3m (dBuV/m) Peak	Ave.	Limit @3m (dBuV/m) Peak	Ave.	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
2118.2360	44.48	---	1.14	45.62	---	74.00	54.00	-28.38	200	100
2815.6310	43.12	---	2.30	45.42	---	74.00	54.00	-28.58	130	100

Polarization: Vertical

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
55.2705	15.64	peak	13.30	28.94	40.00	-11.06	50	100
96.0922	8.32	peak	10.79	19.11	43.50	-24.39	230	100
189.3988	9.01	peak	12.50	21.51	43.50	-21.99	60	100
572.3447	6.49	peak	20.82	27.31	46.00	-18.69	120	100

Frequency (MHz)	Reading (dBuV) Peak	Ave.	Factor (dB) Corr.	Result @3m (dBuV/m) Peak	Ave.	Limit @3m (dBuV/m) Peak	Ave.	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
2100.2000	45.02	---	1.11	46.13	---	74.00	54.00	-27.87	250	100
3140.2810	43.54	---	2.62	46.16	---	74.00	54.00	-27.84	120	100

Mode: RX 151.94MHz
Polarization: Horizontal

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
188.1940	9.61	peak	12.66	22.27	43.50	-21.23	70	105
382.6141	4.31	peak	16.85	21.16	46.00	-24.84	60	115
503.9695	5.29	peak	19.33	24.62	46.00	-21.38	240	115
755.7541	4.64	peak	24.13	28.77	46.00	-17.23	70	115

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Frequency (MHz)	Reading (dBuV) Peak	Ave.	Factor (dB) Corr.	Result @3m (dBuV/m) Peak	Ave.	Limit @3m (dBuV/m) Peak	Ave.	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
2119.0480	44.33	---	1.14	45.47	---	74.00	54.00	-28.53	250	110
2815.2910	43.29	---	2.30	45.59	---	74.00	54.00	-28.41	160	115

Polarization: Vertical

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
53.4237	15.46	peak	13.27	28.73	40.00	-11.27	300	115
96.6202	8.34	peak	10.84	19.18	43.50	-24.32	260	115
187.5935	8.88	peak	12.74	21.62	43.50	-21.88	190	110
570.6210	6.42	peak	20.78	27.20	46.00	-18.80	100	130

Frequency (MHz)	Reading (dBuV) Peak	Ave.	Factor (dB) Corr.	Result @3m (dBuV/m) Peak	Ave.	Limit @3m (dBuV/m) Peak	Ave.	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
2098.7340	44.83	---	1.11	45.94	---	74.00	54.00	-28.06	230	120
3140.3710	43.58	---	2.62	46.20	---	74.00	54.00	-27.80	100	115

Mode: RX 154.60MHz
Polarization: Horizontal

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
55.2705	5.93	peak	13.30	19.23	40.00	-20.77	350	100
189.3988	9.90	peak	12.50	22.40	43.50	-21.10	200	100
442.1042	5.45	peak	18.32	23.77	46.00	-22.23	50	100
745.3507	5.57	peak	23.95	29.52	46.00	-16.48	170	100

Frequency (MHz)	Reading (dBuV) Peak	Ave.	Factor (dB) Corr.	Result @3m (dBuV/m) Peak	Ave.	Limit @3m (dBuV/m) Peak	Ave.	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
1997.9960	43.93	---	1.10	45.03	---	74.00	54.00	-28.97	230	100
3266.5330	43.15	---	2.74	45.89	---	74.00	54.00	-28.11	110	100

Polarization: Vertical

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
55.2705	15.18	peak	13.30	28.48	40.00	-11.52	250	100
189.3988	9.88	peak	12.50	22.38	43.50	-21.12	60	100
572.3447	6.17	peak	20.82	26.99	46.00	-19.01	110	100
801.7234	5.17	peak	24.60	29.77	46.00	-16.23	270	100

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Frequency (MHz)	Reading (dBuV) Peak	Ave.	Factor (dB) Corr.	Result @3m (dBuV/m) Peak	Ave.	Limit @3m (dBuV/m) Peak	Ave.	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
1991.9840	44.08	---	1.05	45.13	---	74.00	54.00	-28.87	270	100
2460.9220	44.24	---	1.81	46.05	---	74.00	54.00	-27.95	120	100

Note
1. Correction Factor = Antenna factor + Cable loss - Preamplifier
2. The formula of measured value as: Test Result = Reading + Correction Factor
3. Detector function in the form: PK = Peak, QP = Quasi Peak, AV = Average
4. All not in the table noted test results are more than 20 dB below the relevant limits.
5. See attached diagrams in appendix.

Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency of Emission (MHz)	Field Strength (microvolts/meter)	Field Strength (dBmicrovolts/meter)
30 – 88	100	40.0
88 – 216	150	43.5
216 – 960	200	46.0
Above 960	500	54.0

Test equipment used: ETSTW-RE 003, ETSTW-RE 004, ETSTW-RE 042, ETSTW-RE 043, ETSTW-RE 044

13. Maximum Permissible Exposure

13.1 Applicable Standard

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.3 m normally can be maintained between the user and the device.

13.2 MPE Calculation Method

(A) 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 $\|E\|^2$, $\|H\|^2$ 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

(B) 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 $\|E\|^2$, $\|H\|^2$ 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

$$E\ (V/m) = \frac{\sqrt{30 \times P \times G}}{d} \qquad \text{Power Density: } Pd\ (W/m^2) = \frac{E^2}{377}$$

E = Electric field (V/m) P = output power (W) G = EUT Antenna numeric gain (numeric)
d = Separation distance between radiator and human body (m)
The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$

Max output power (W)	Antenna Gain	Power Density(S) (mW/cm²)	Limit of Power Density (S) (mW/cm²)	Test Result
1.9408	3.0	0.1926	0.2	Complies

From the peak EUT RF output power, the minimum mobile separation distance, d=0.4 m, as well as the gain of the used antenna, the RF power density can be obtained.

Appendix

A Measurement diagrams

1. RF Power Output
2. Audio frequency response
3. Emission Mask
4. Radiation Spurious Emission
5. Frequency Stability vs. Temperature

No diagrams
Refer to point 10.2

6. Frequency Stability vs. Voltage

No diagrams
Refer to point 11.2

B Photos

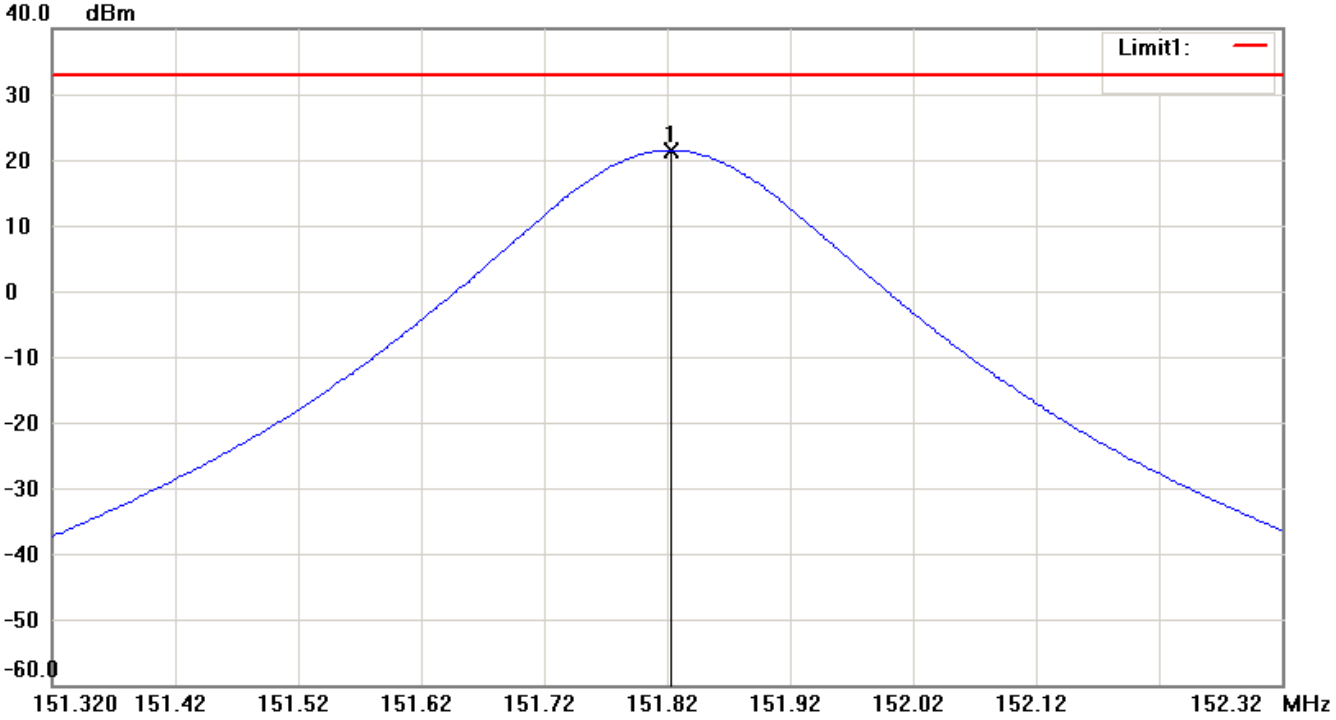
1. External Photos
2. Internal Photos
3. Set Up Photo of Radiated Emission

Registration number: W6M21108-11786-C-1
FCC ID: ZX9GC556047

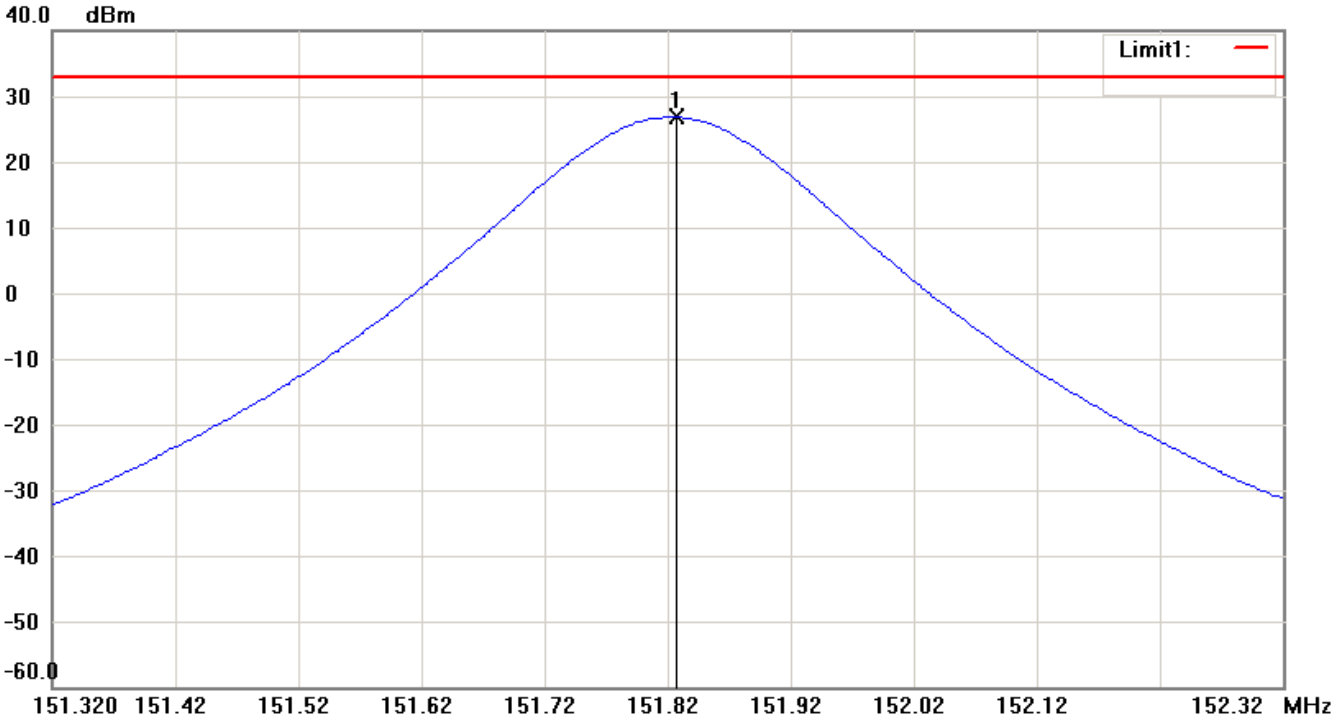
RF Power Output Radiated

151.82MHz LOW

Polarization H

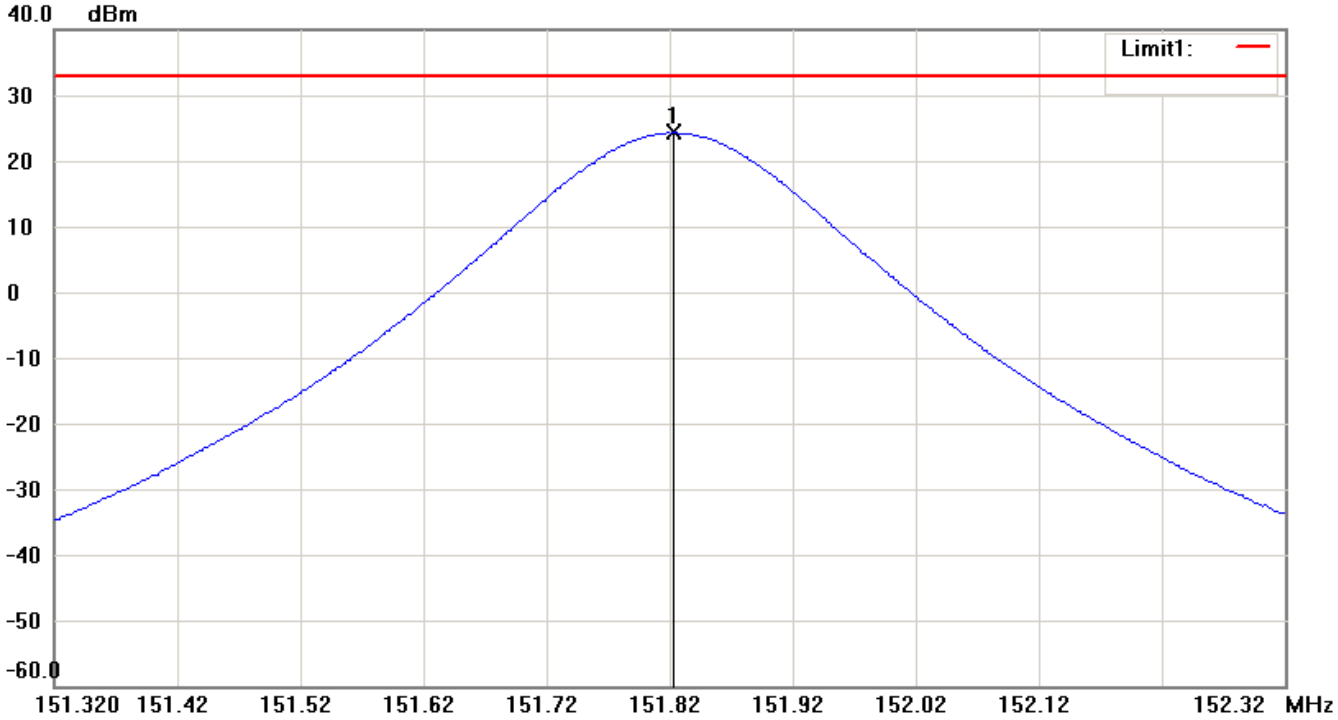


Polarization V



Registration number: W6M21108-11786-C-1
FCC ID: ZX9GC556047

151.82MHz HIGH
Polarization H



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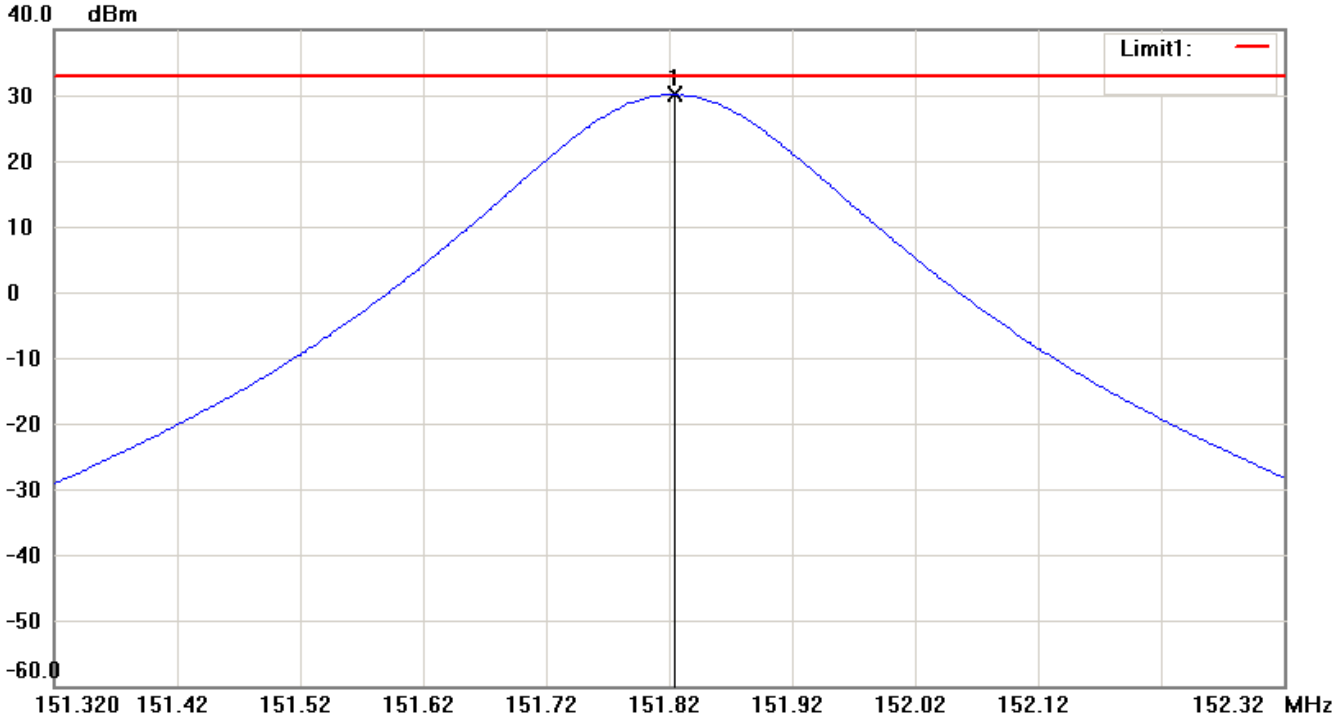
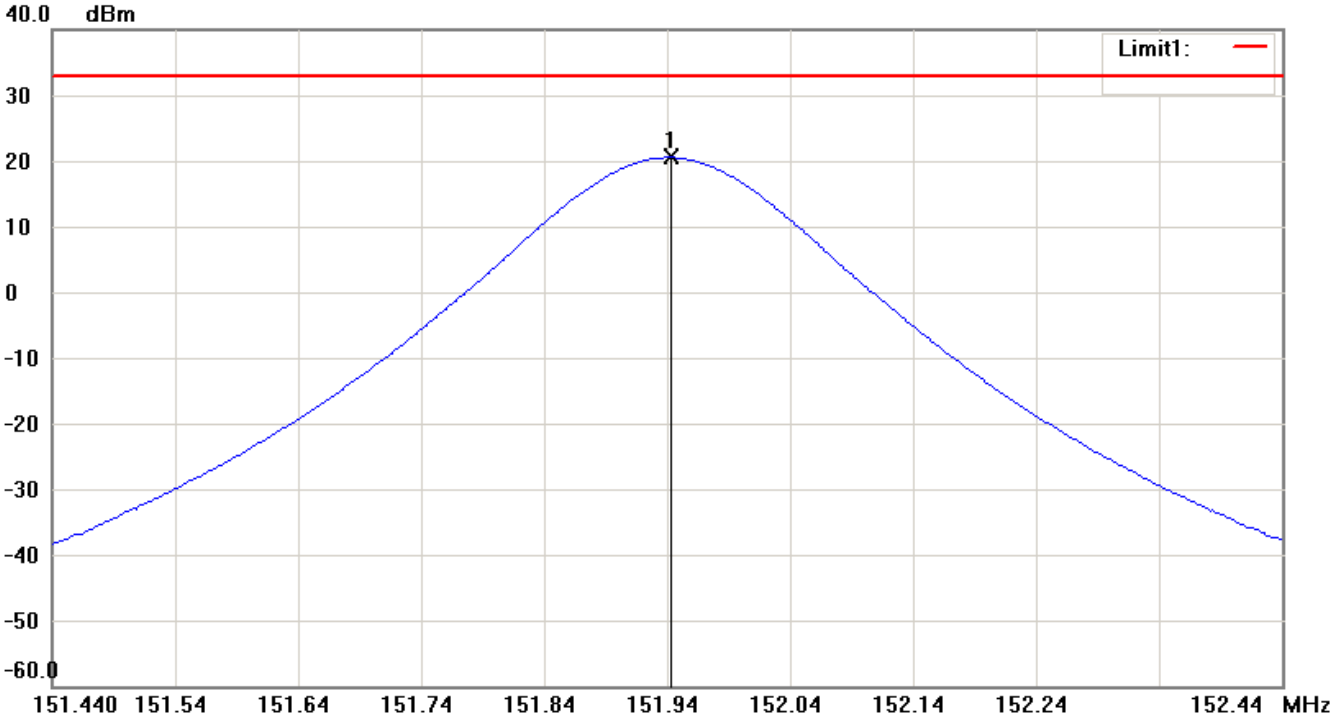
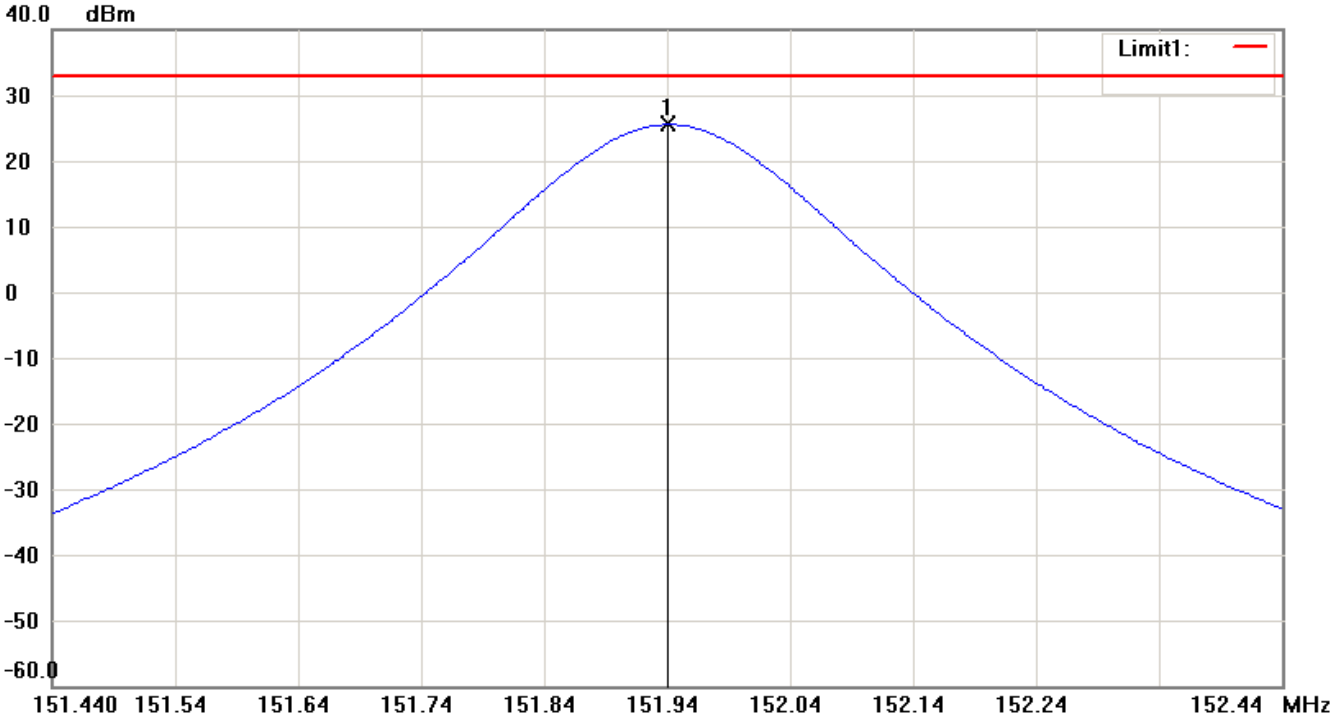


Registration number: W6M21108-11786-C-1
FCC ID: ZX9GC556047

151.94MHz LOW
Polarization H

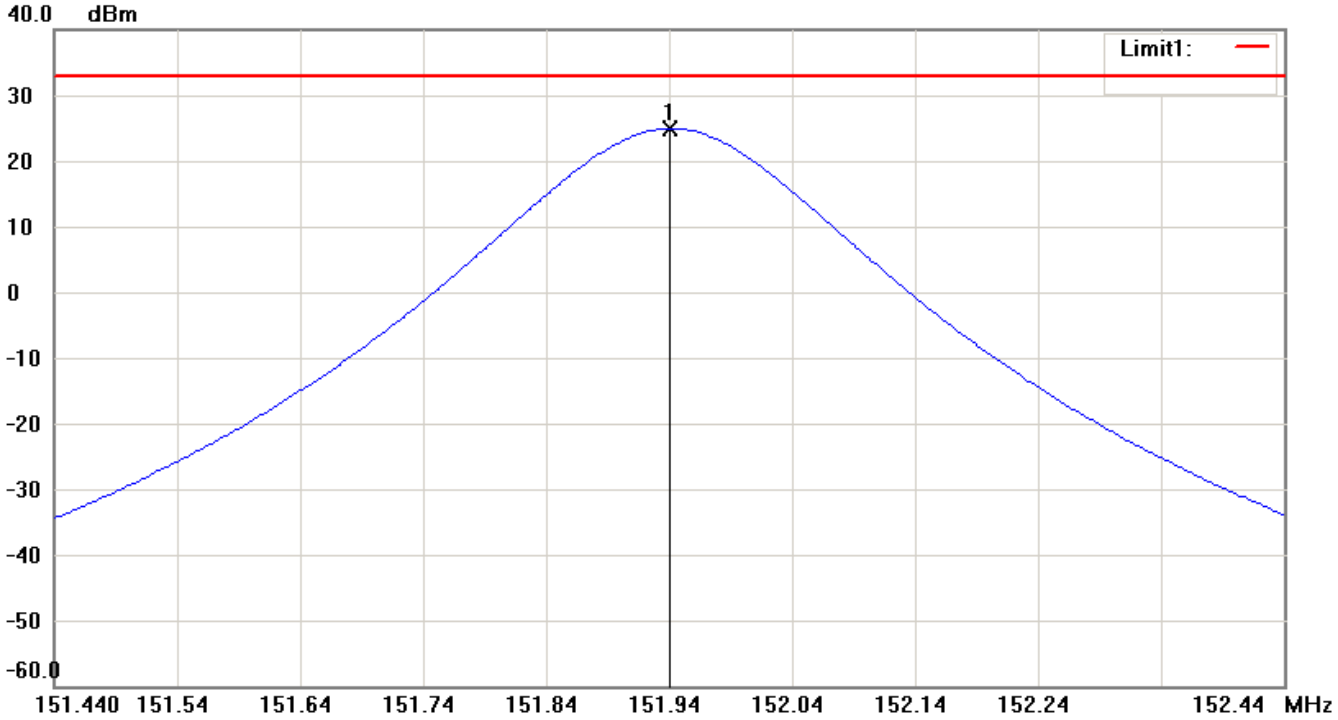


Polarization V

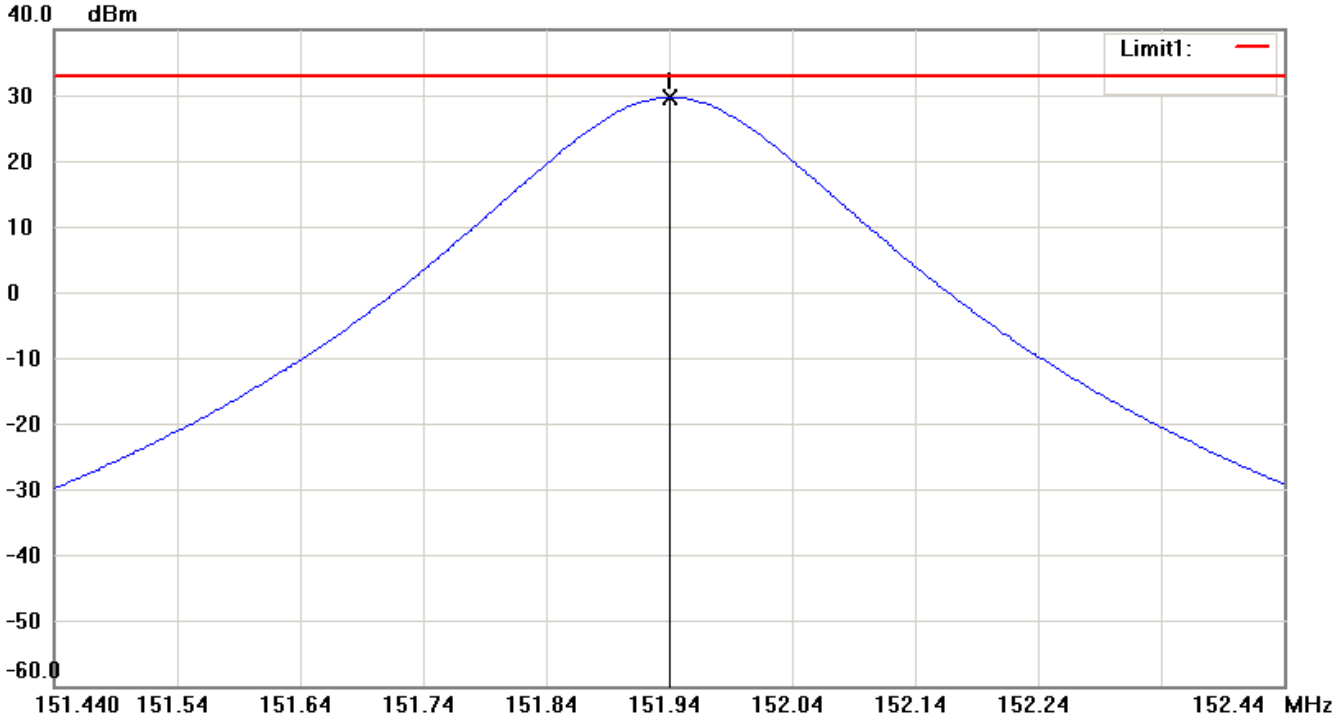


Registration number: W6M21108-11786-C-1
FCC ID: ZX9GC556047

151.94MHz HIGH
Polarization H

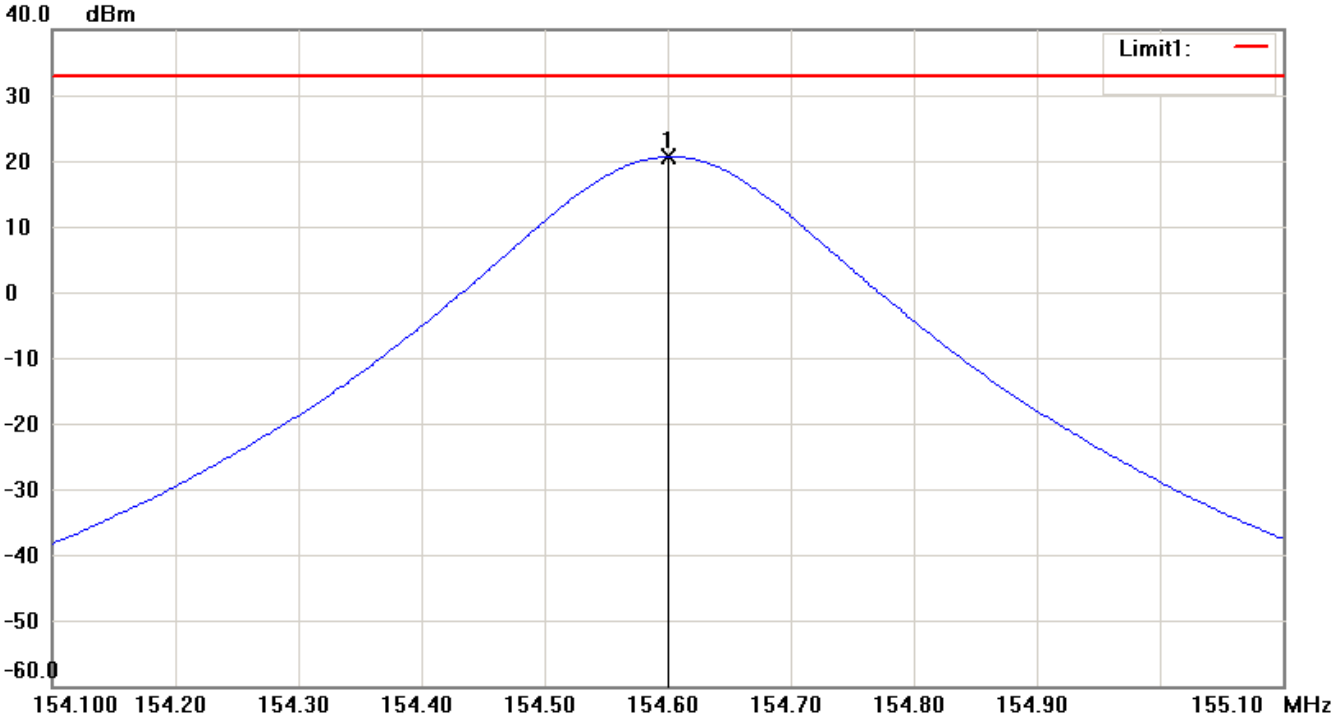


Polarization V

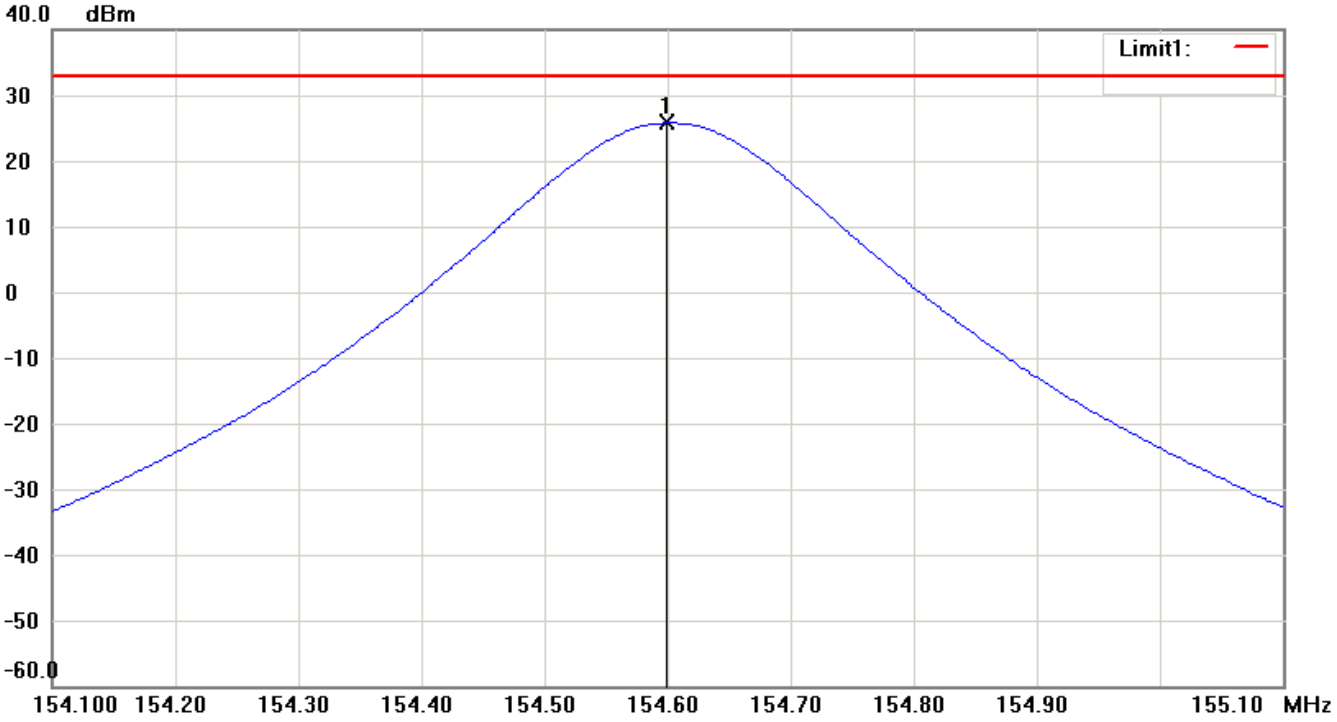


Registration number: W6M21108-11786-C-1
FCC ID: ZX9GC556047

154.60MHz LOW
Polarization H

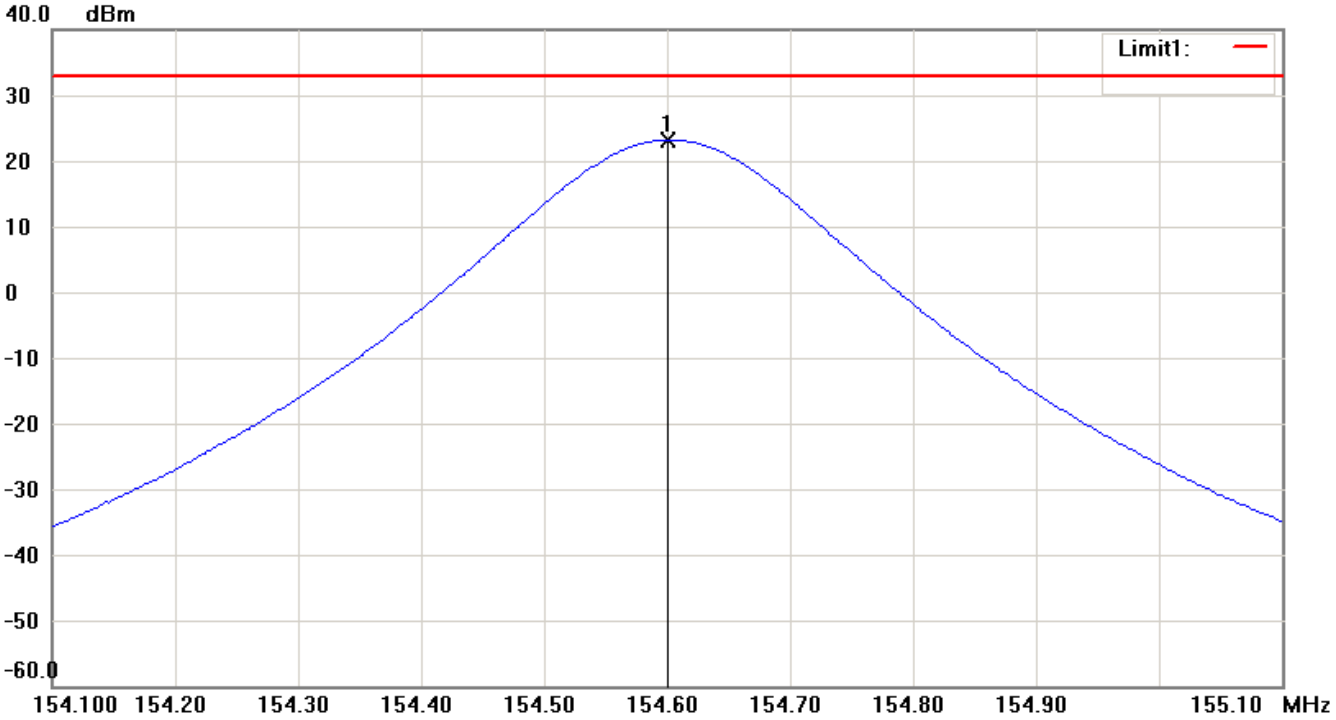


Polarization V

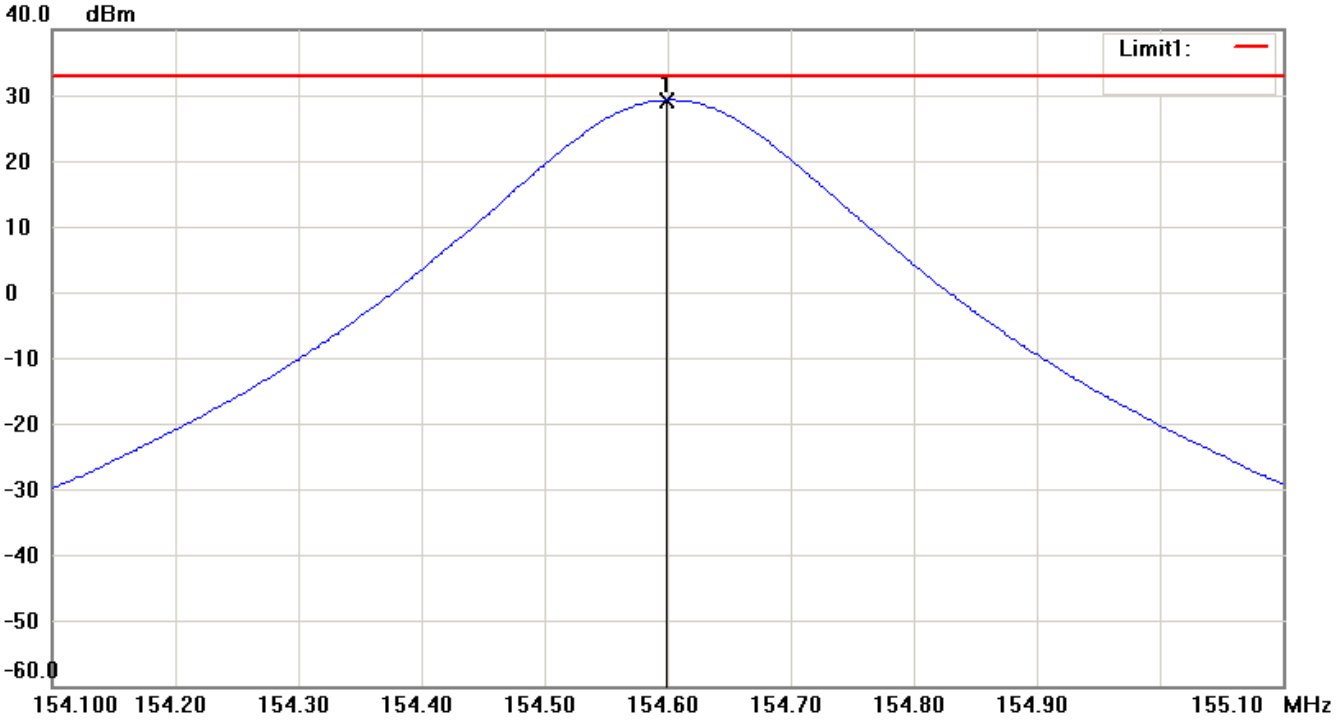


Registration number: W6M21108-11786-C-1
FCC ID: ZX9GC556047

154.60MHz HIGH
Polarization H



Polarization V

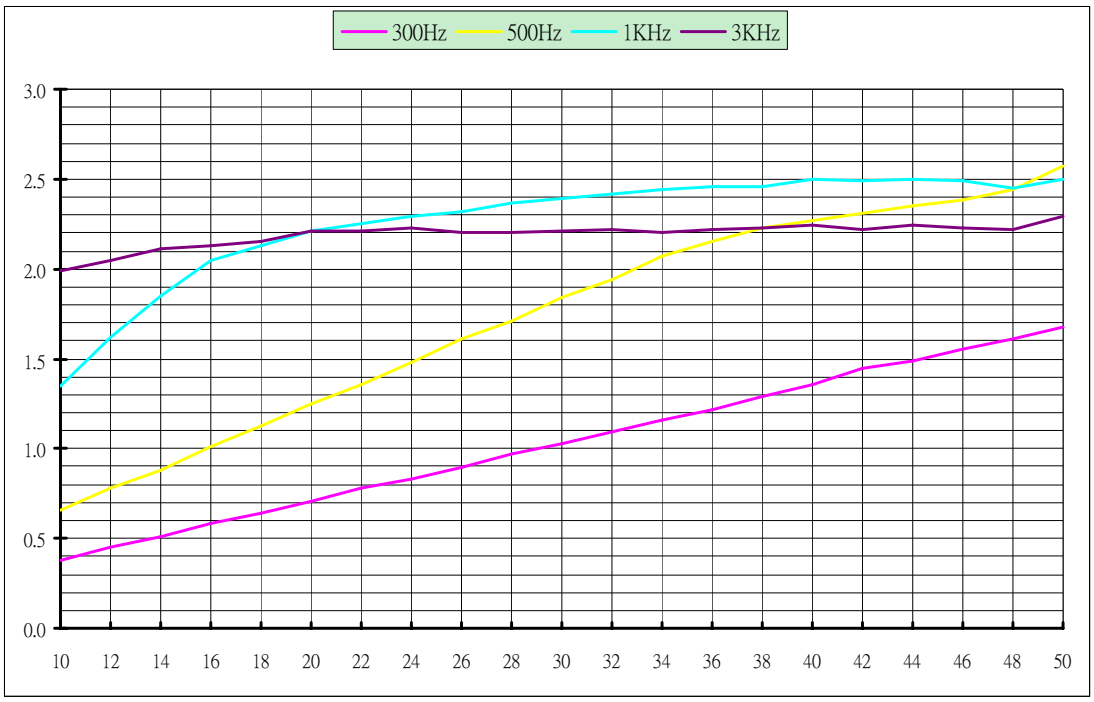


Registration number: W6M21108-11786-C-1
FCC ID: ZX9GC556047

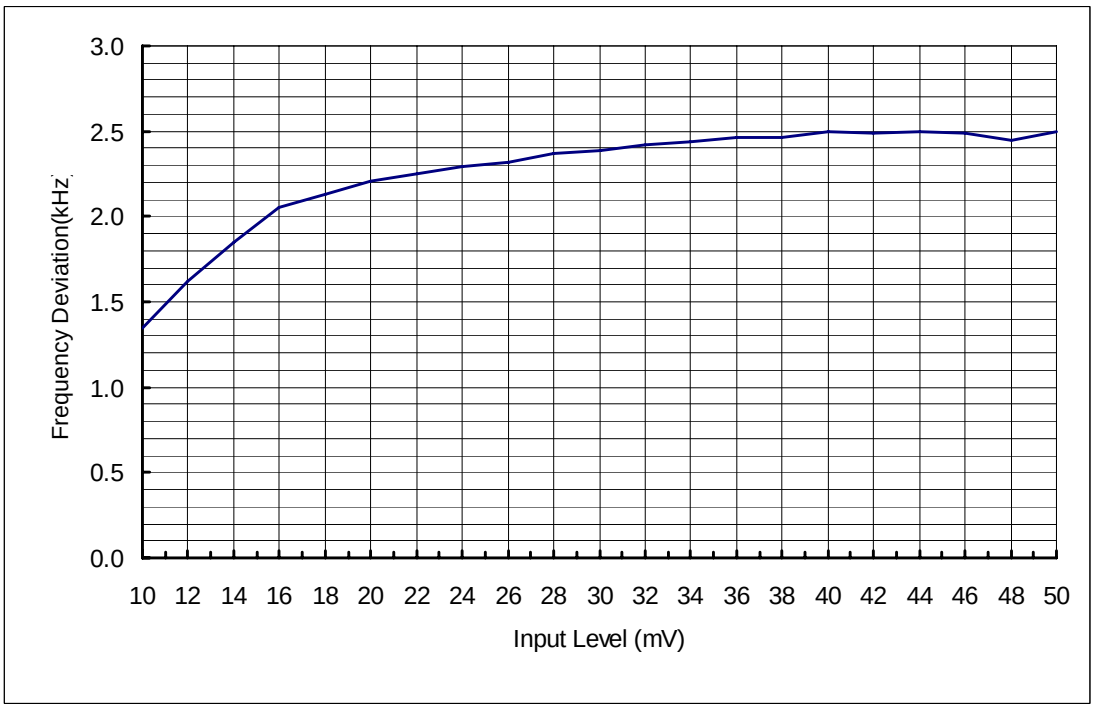
Audio frequency response

151.82 MHz

Modulation Characteristics

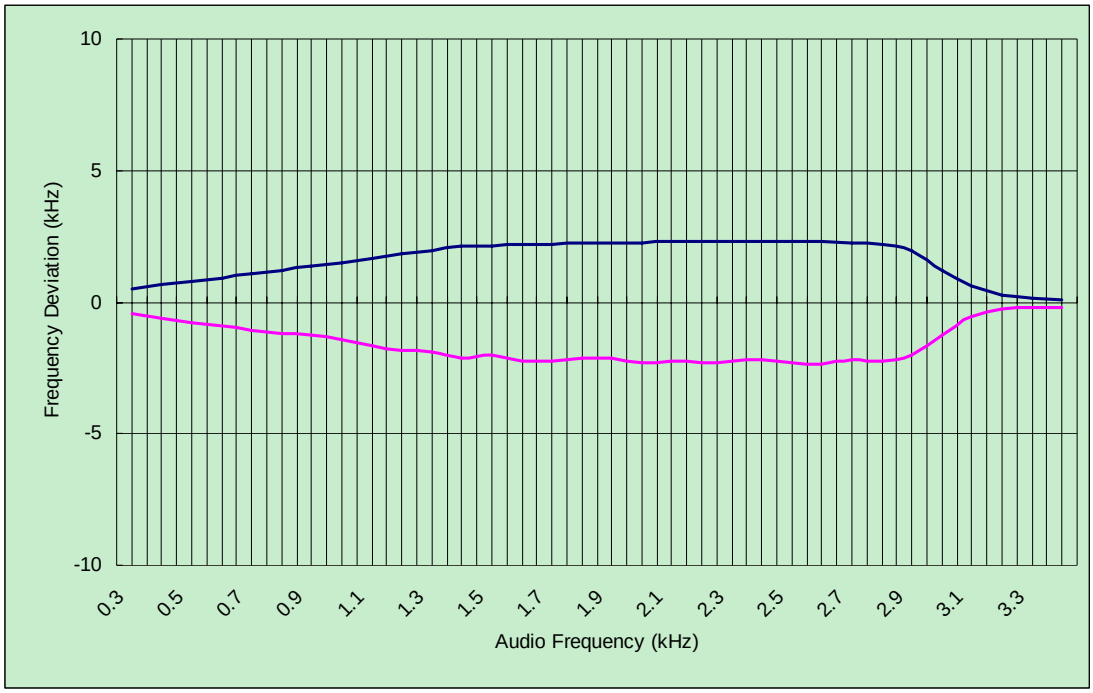


Frequency Deviation at 1kHz

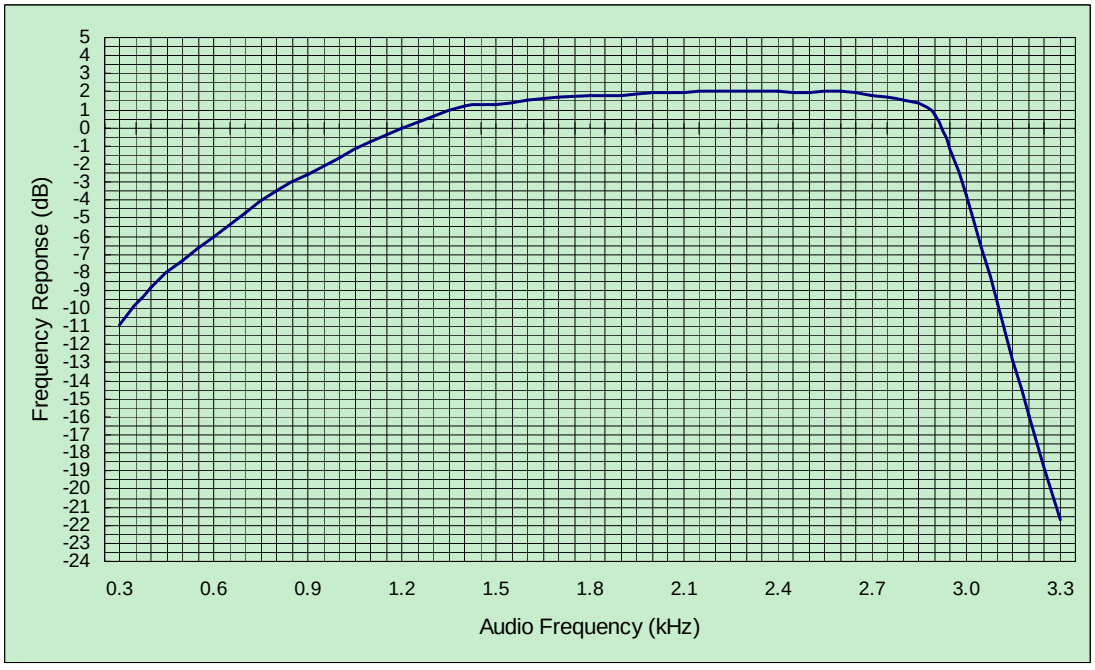


Registration number: W6M21108-11786-C-1
FCC ID: ZX9GC556047

Frequency Deviation

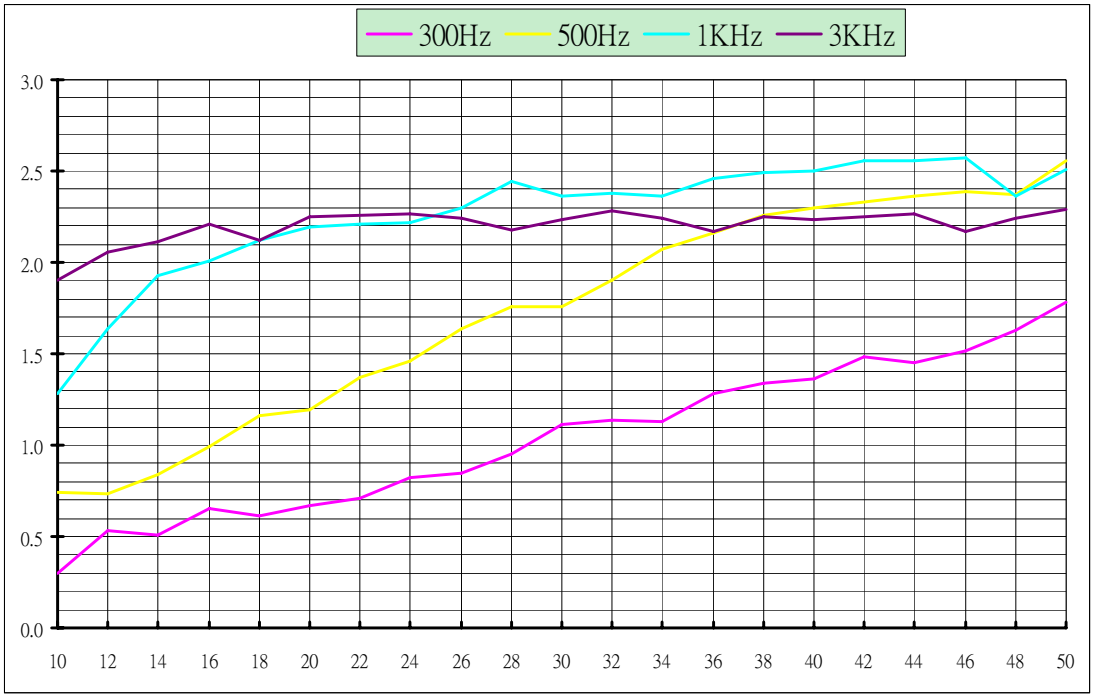


Audio Response

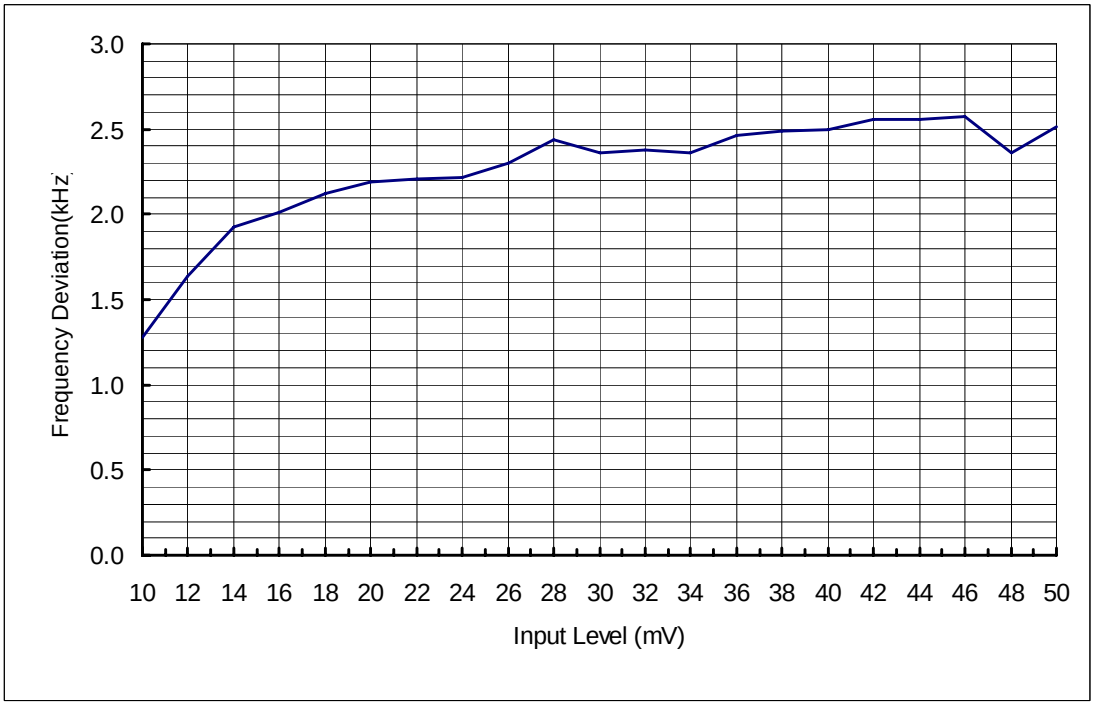


Registration number: W6M21108-11786-C-1
FCC ID: ZX9GC556047

151.94 MHz
Modulation Characteristics



Frequency Deviation at 1kHz



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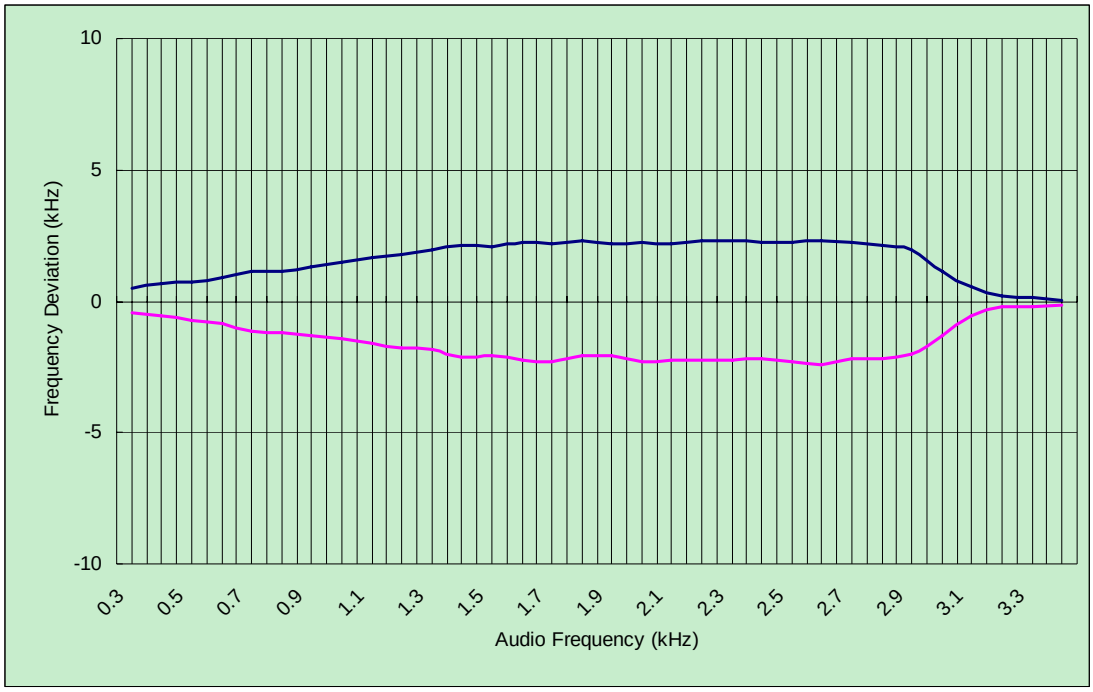
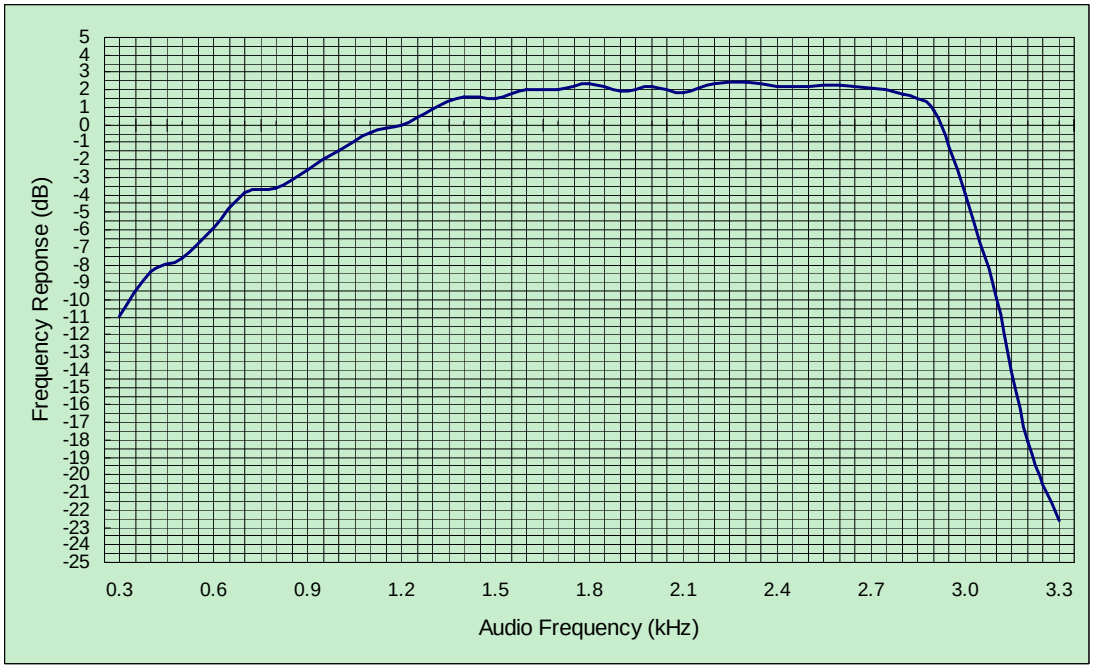
FCC ID: ZX9GC556047

Frequency Deviation

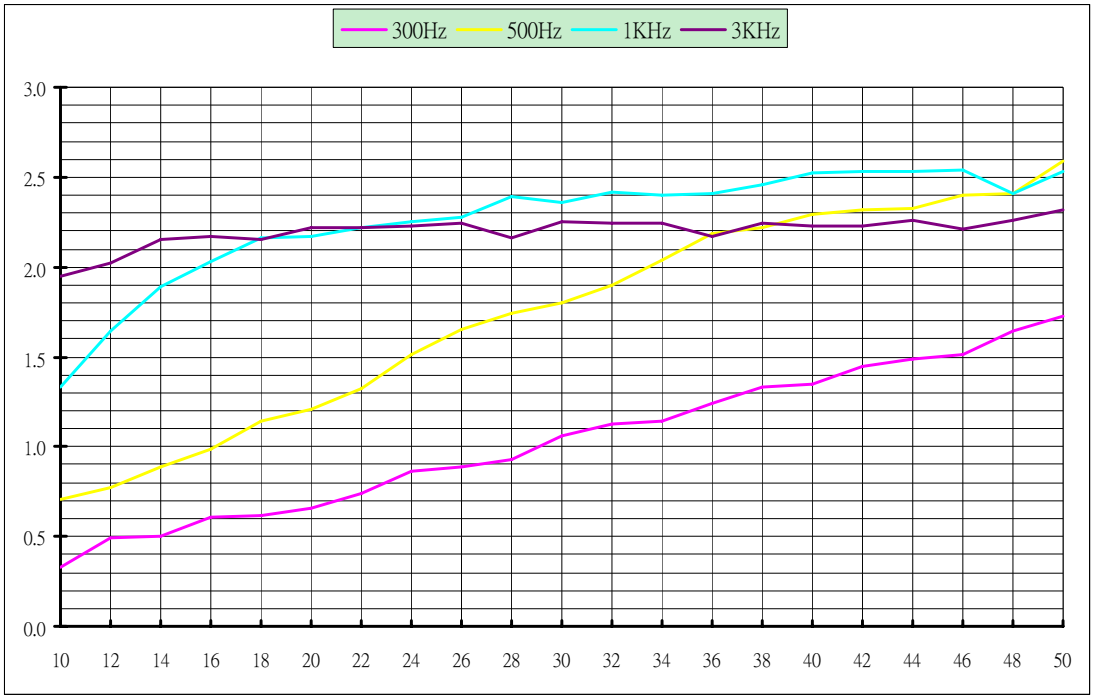


Audio Response

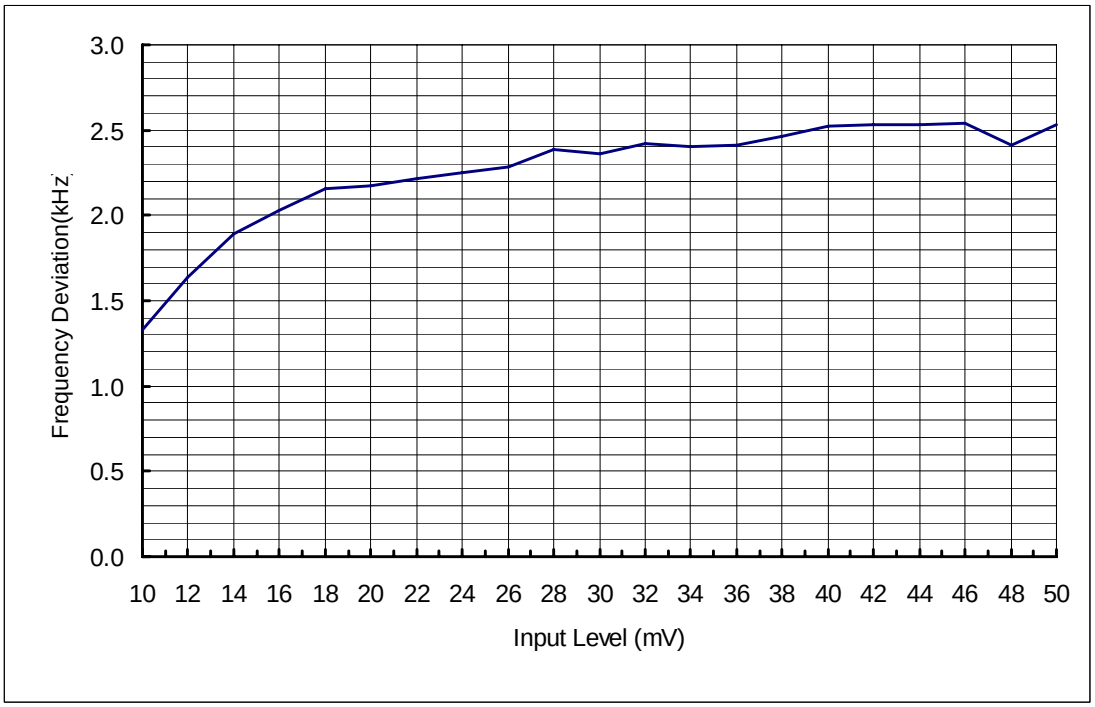


Registration number: W6M21108-11786-C-1
FCC ID: ZX9GC556047

154.60 MHz
Modulation Characteristics

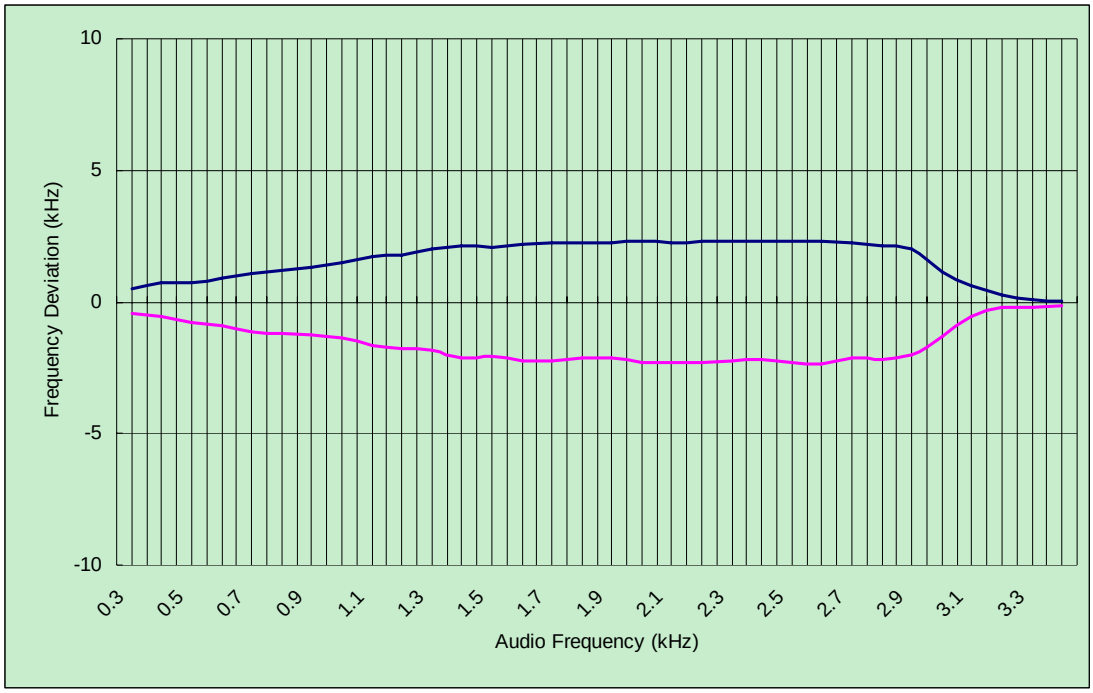


Frequency Deviation at 1kHz

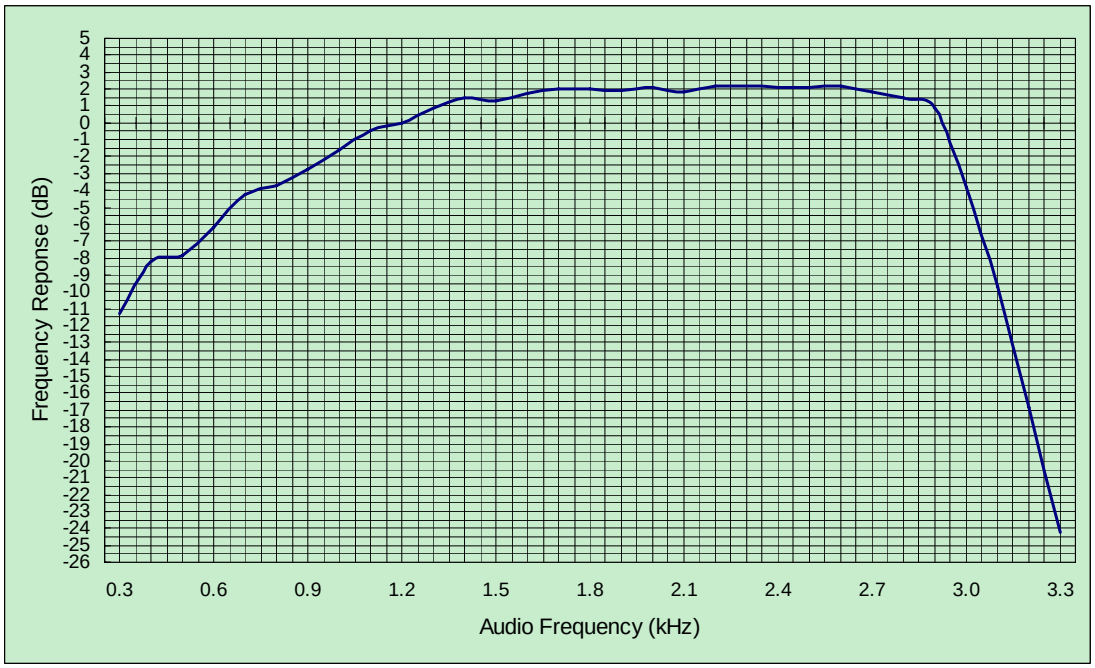


Registration number: W6M21108-11786-C-1
FCC ID: ZX9GC556047

Frequency Deviation

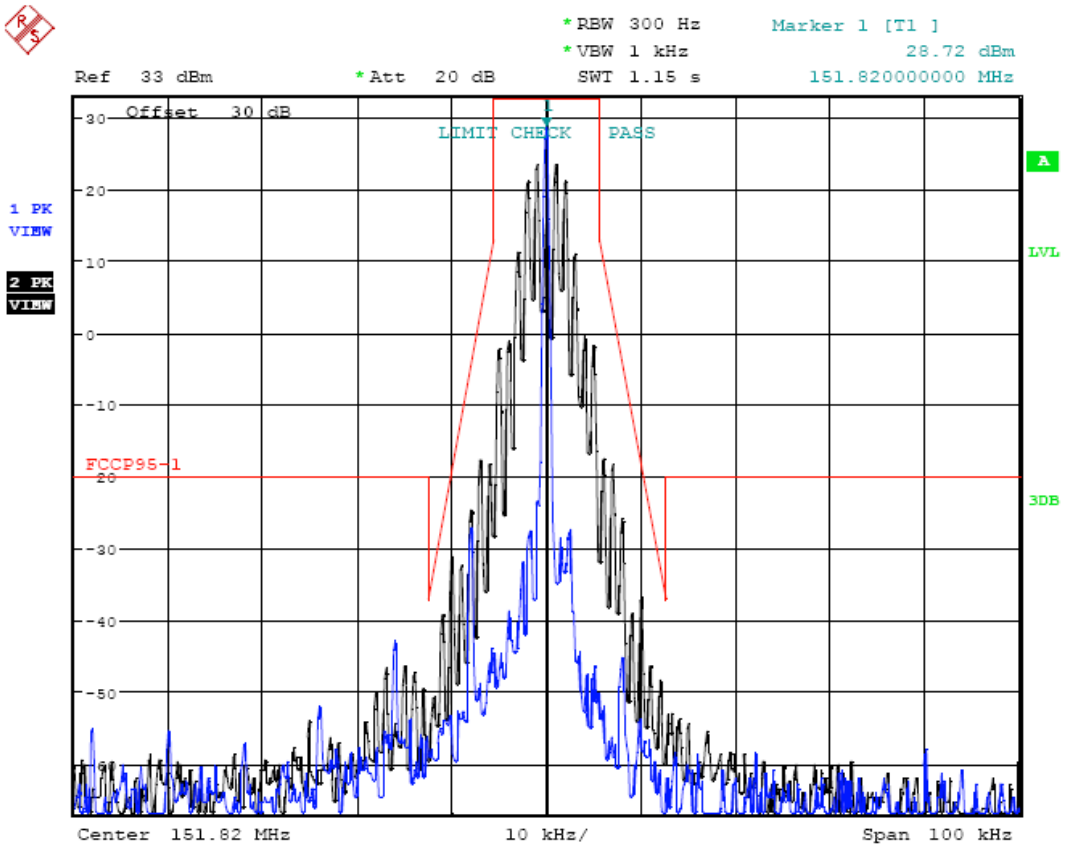


Audio Response



Registration number: W6M21108-11786-C-1
FCC ID: ZX9GC556047

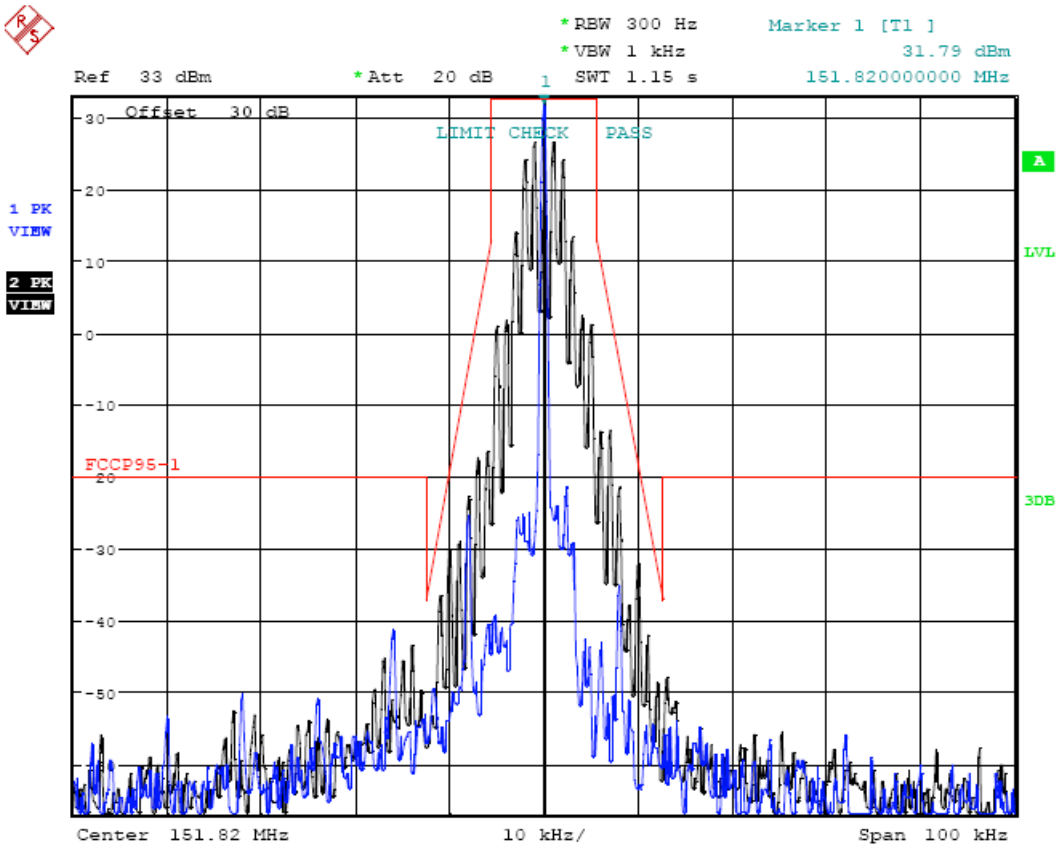
Emission Mask



EMISSION MASK 151.82MHz LOW POWER

Date: 9.SEP.2011 13:40:37

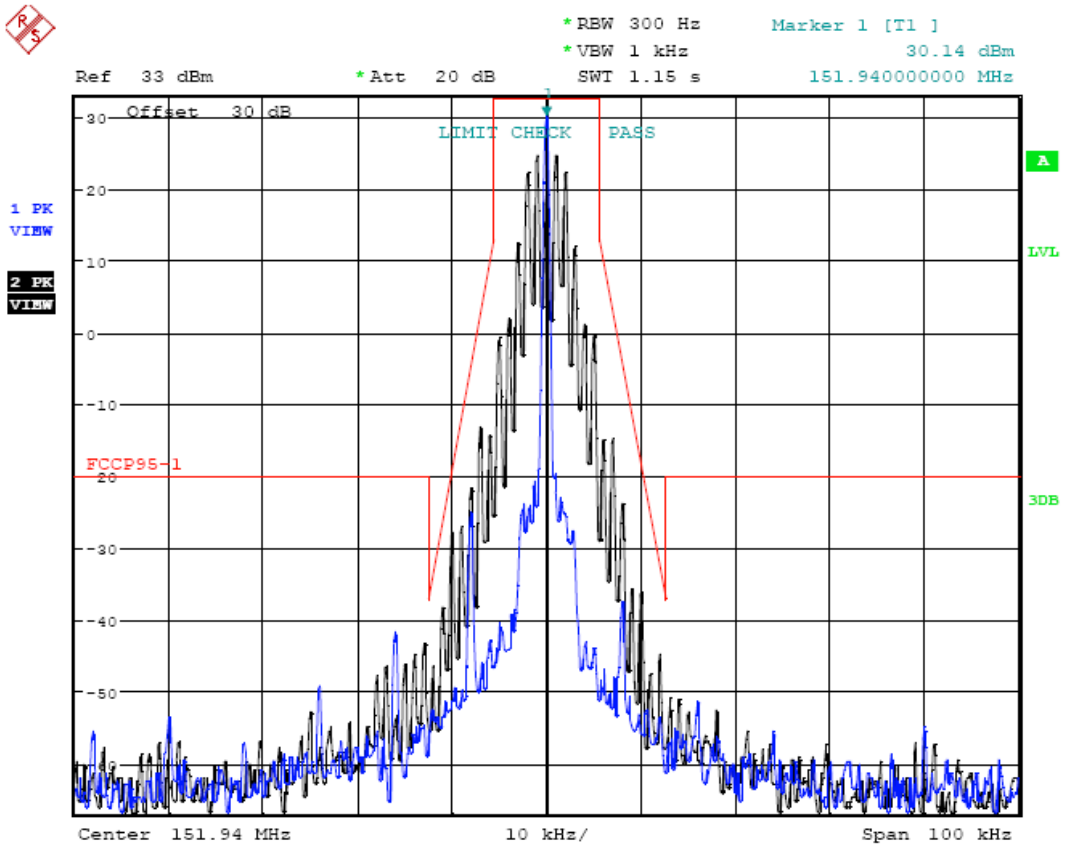
Registration number: W6M21108-11786-C-1
FCC ID: ZX9GC556047



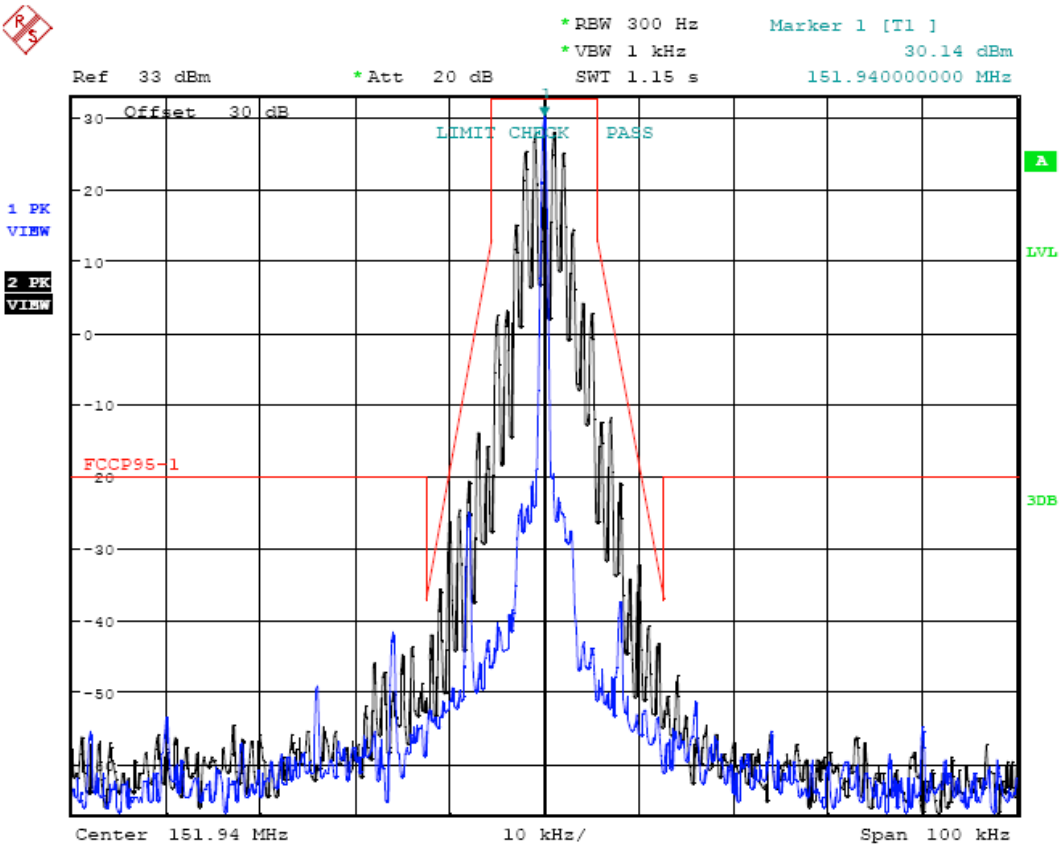
EMISSION MASK 151.82MHz HIGH POWER

Date: 9.SEP.2011 13:39:50

Registration number: W6M21108-11786-C-1
FCC ID: ZX9GC556047



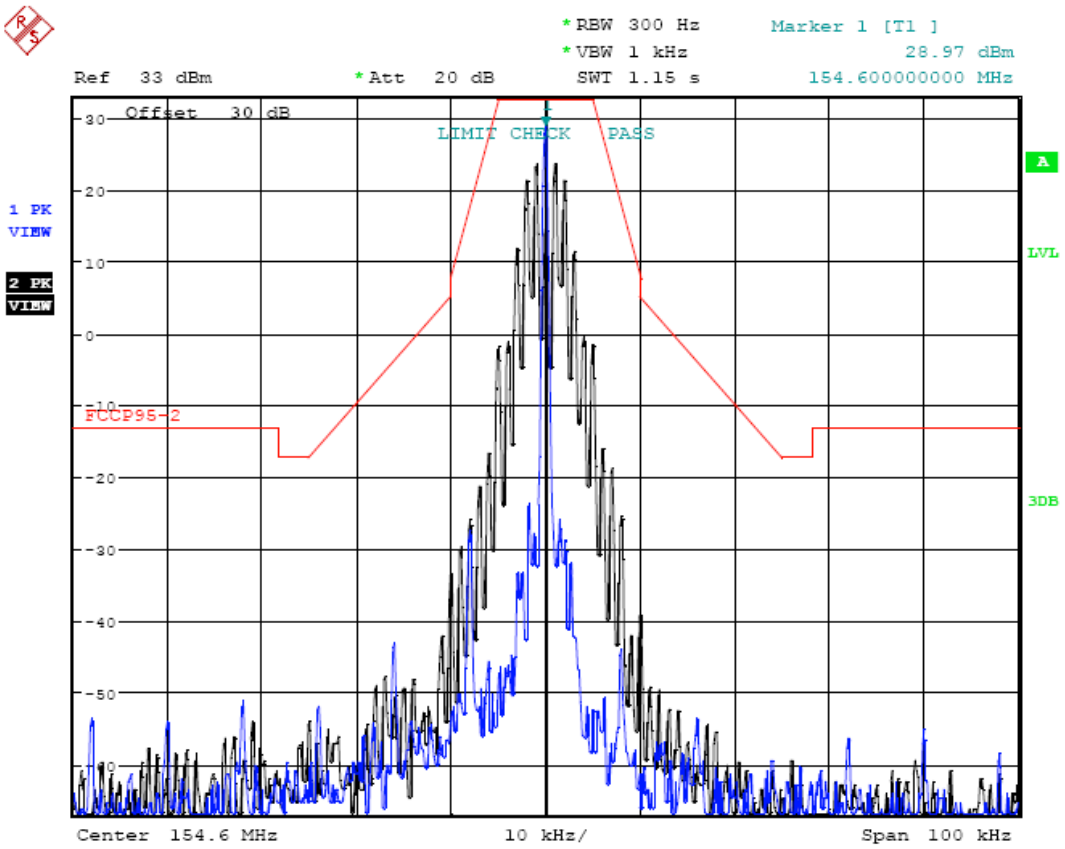
EMISSION MASK 151.94MHz LOW POWER
Date: 19.OCT.2011 10:18:05



EMISSION MASK 151.94MHz HIGH POWER

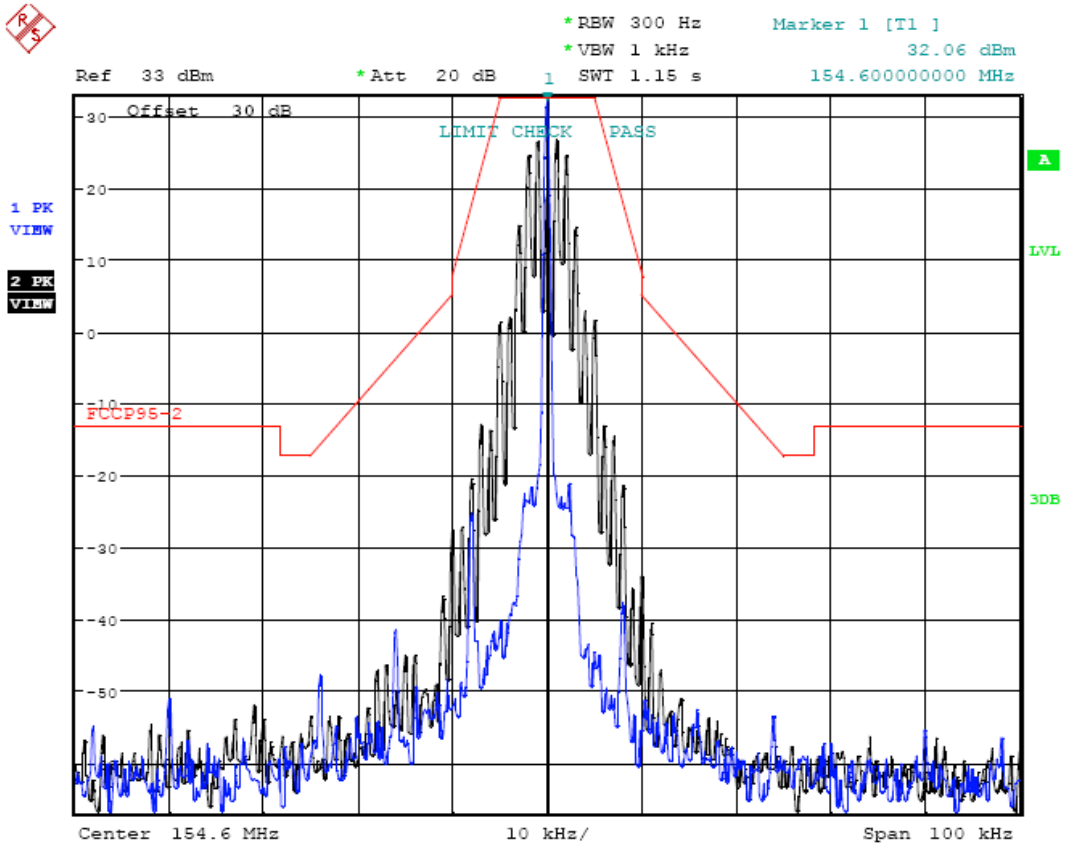
Date: 19.OCT.2011 10:18:50

Registration number: W6M21108-11786-C-1
FCC ID: ZX9GC556047



EMISSION MASK 154.60MHz LOW POWER

Date: 9.SEP.2011 13:38:06

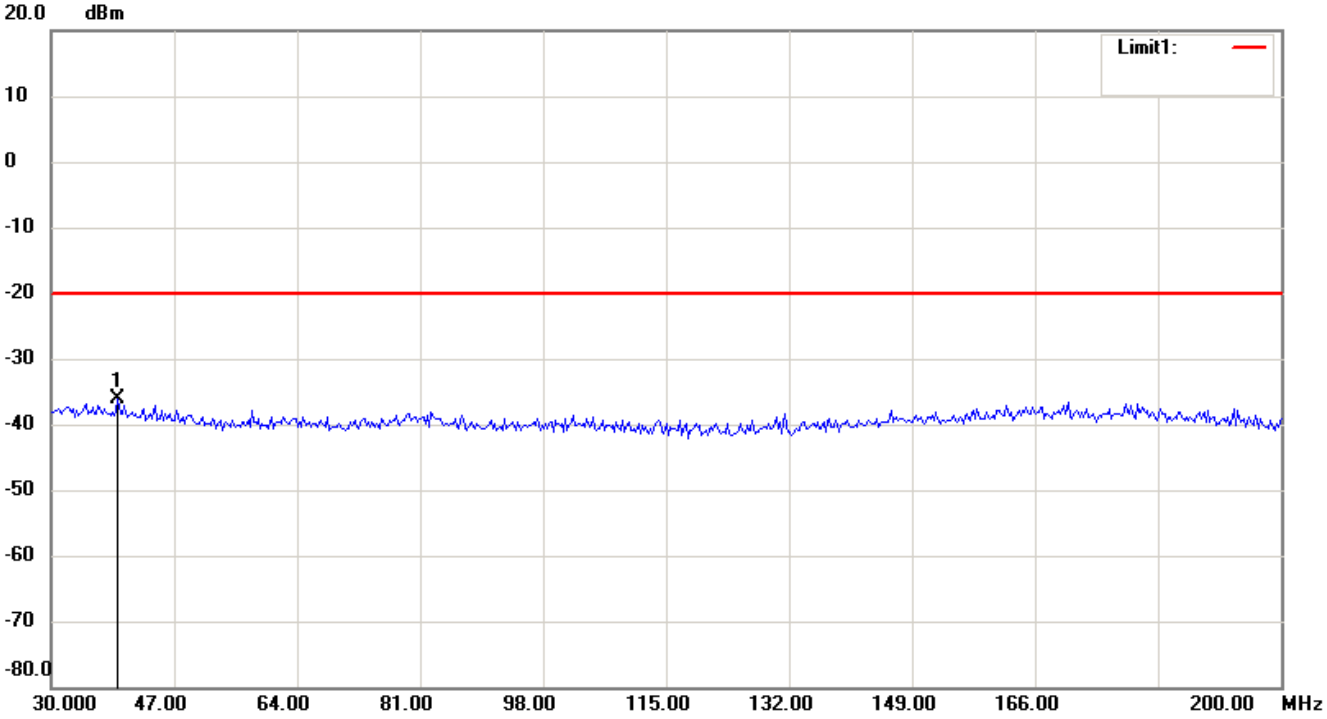


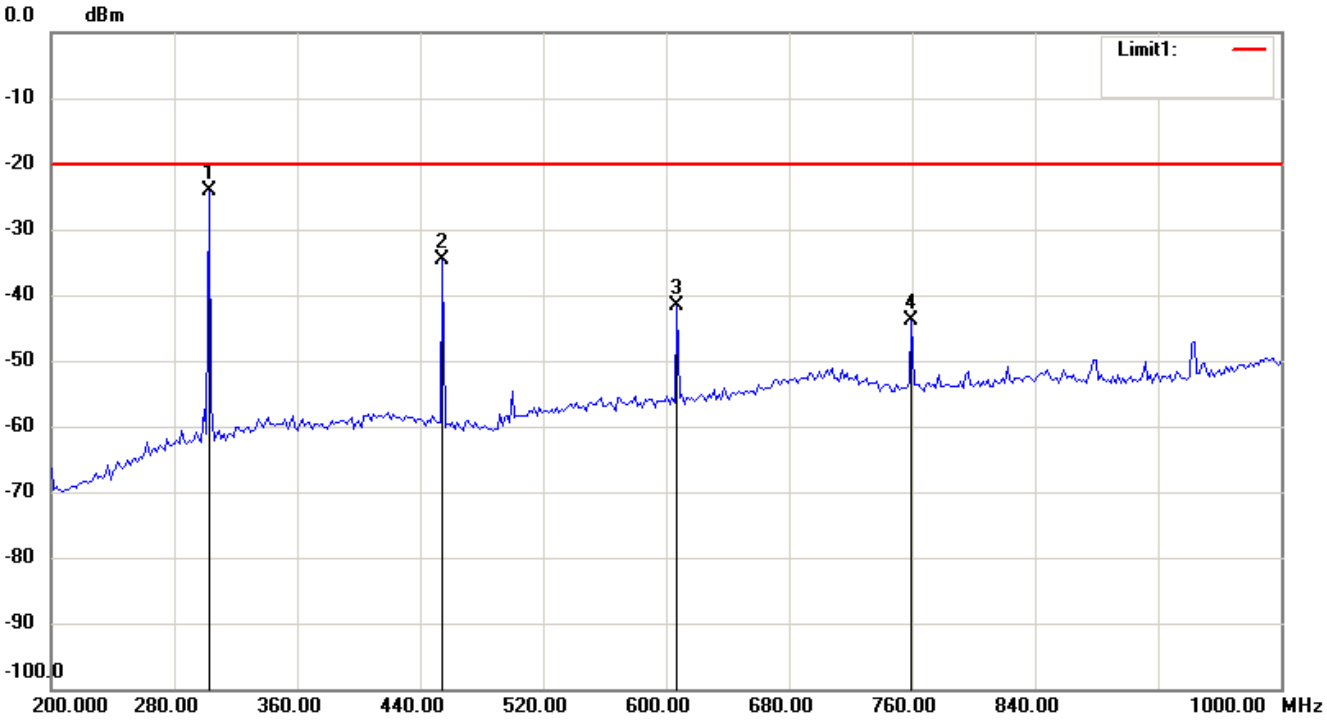
EMISSION MASK 154.60MHz HIGH POWER

Date: 9.SEP.2011 13:30:39

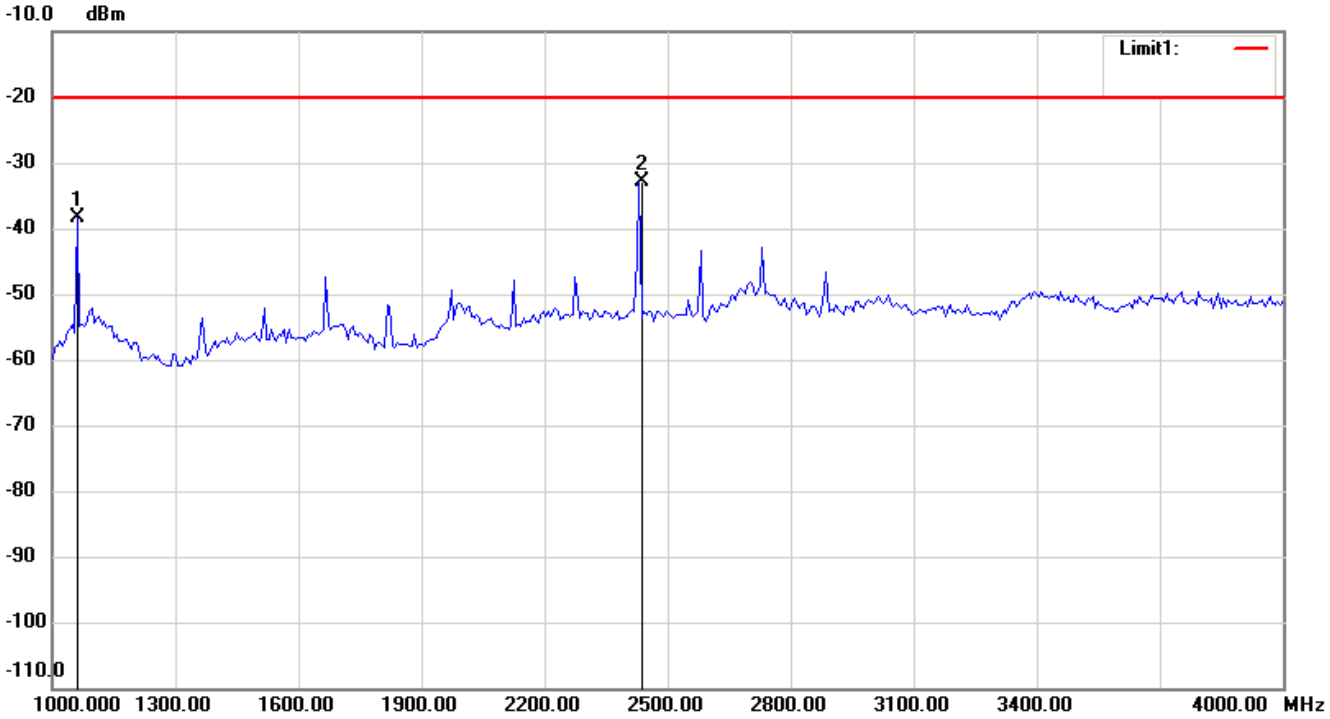
Registration number: W6M21108-11786-C-1
FCC ID: ZX9GC556047

Radiated emission TX
151.82 MHz
Antenna Polarization H

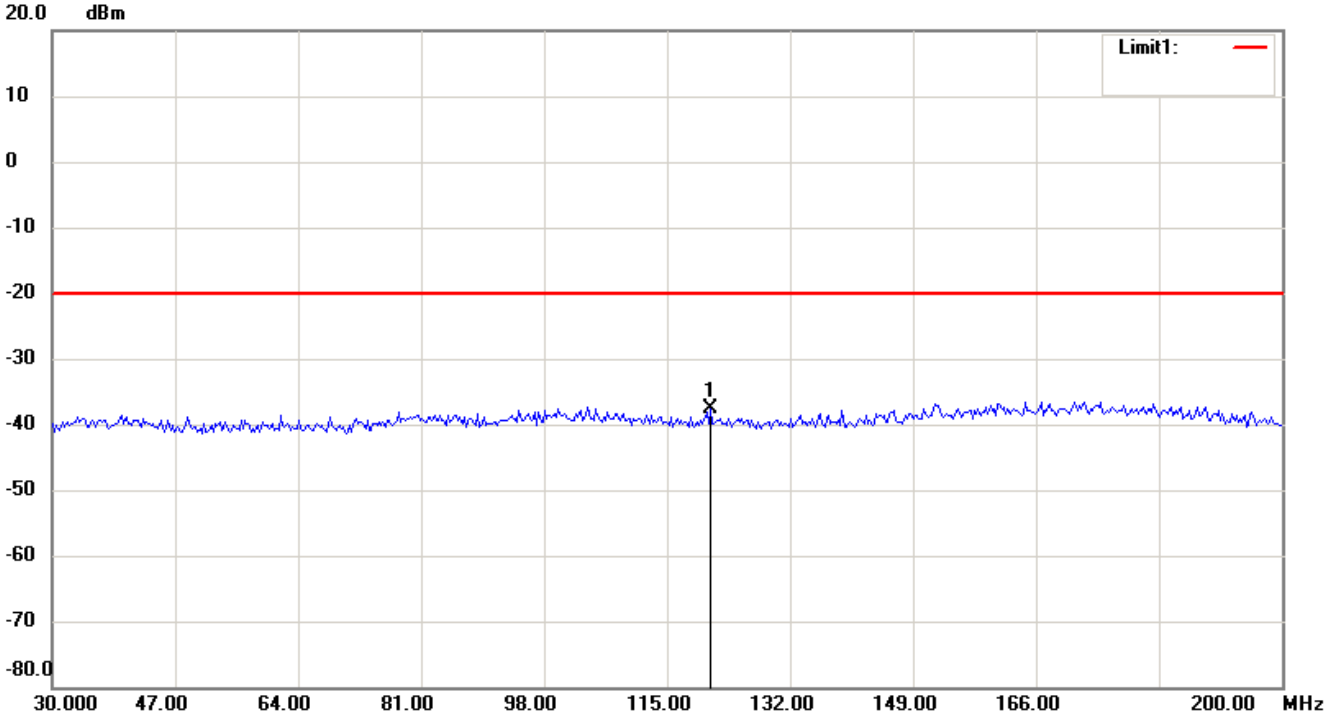


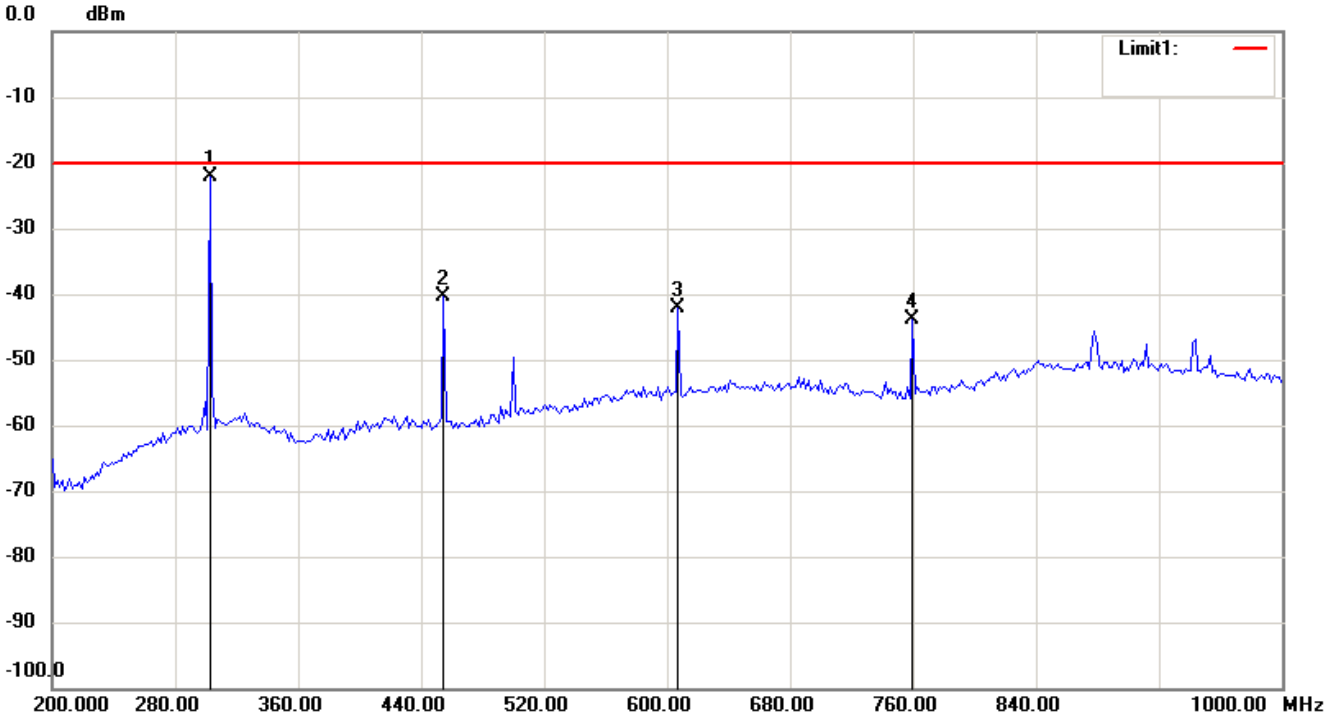


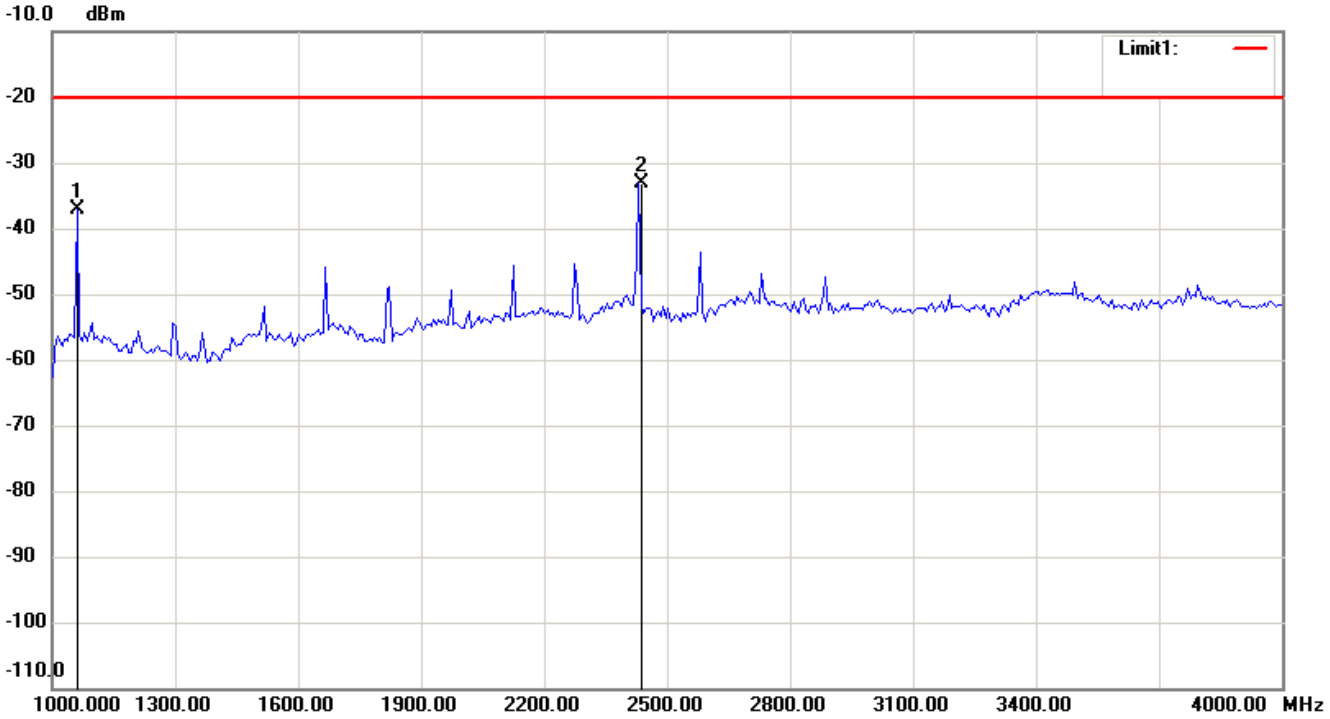
Registration number: W6M21108-11786-C-1
FCC ID: ZX9GC556047



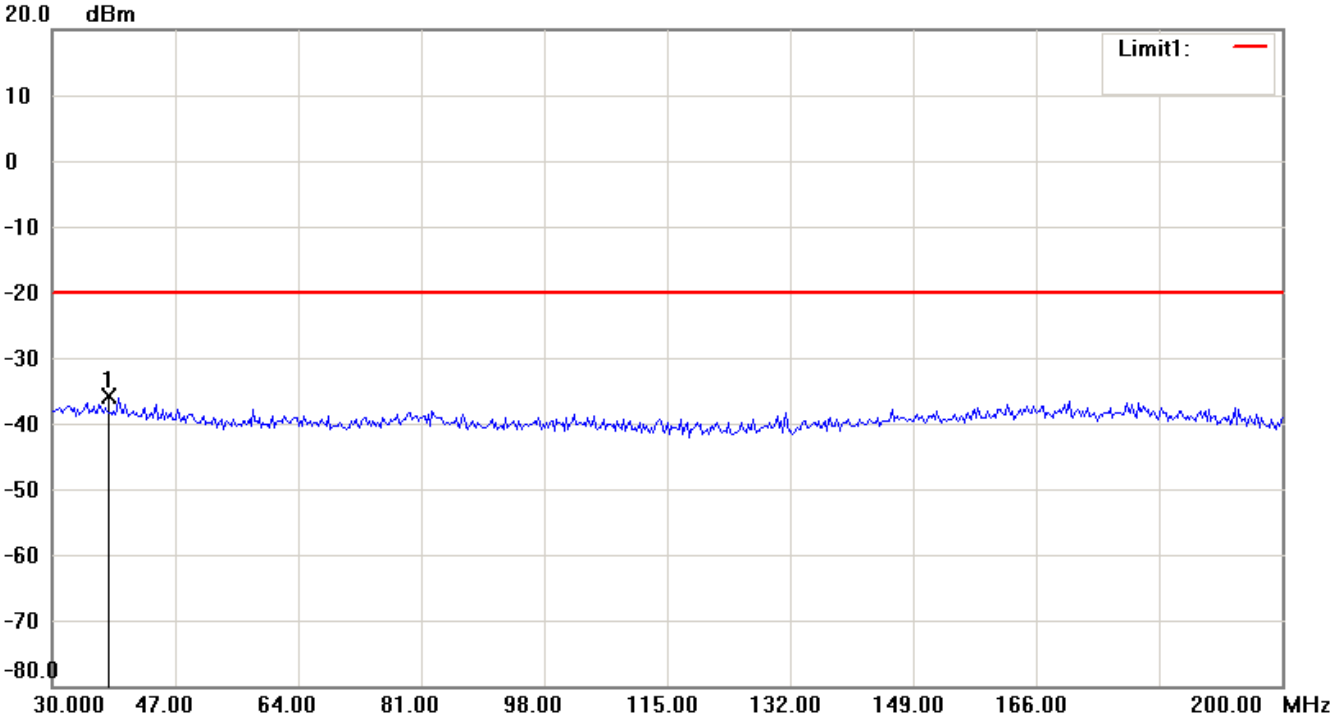
Antenna Polarization V

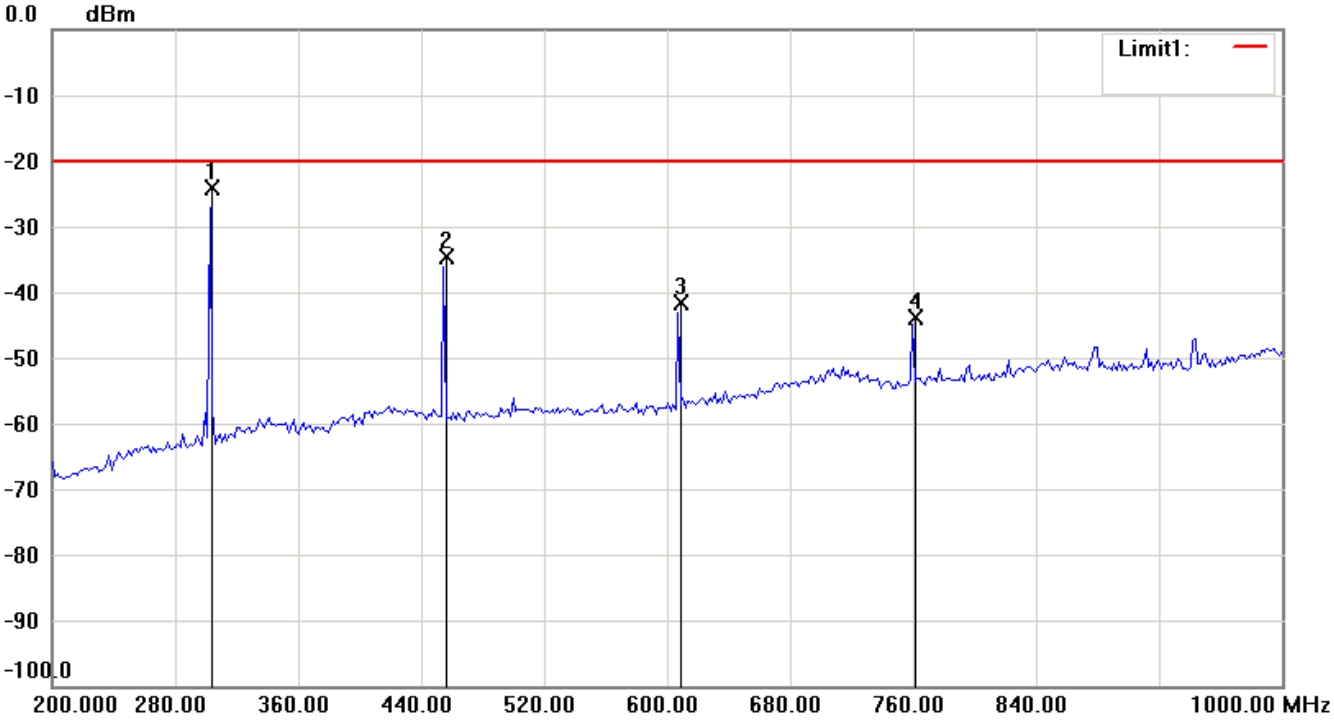



0.0 dBm
Limit1:
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100.0
1
2
3
4
200.000 280.00 360.00 440.00 520.00 600.00 680.00 760.00 840.00 1000.00 MHz

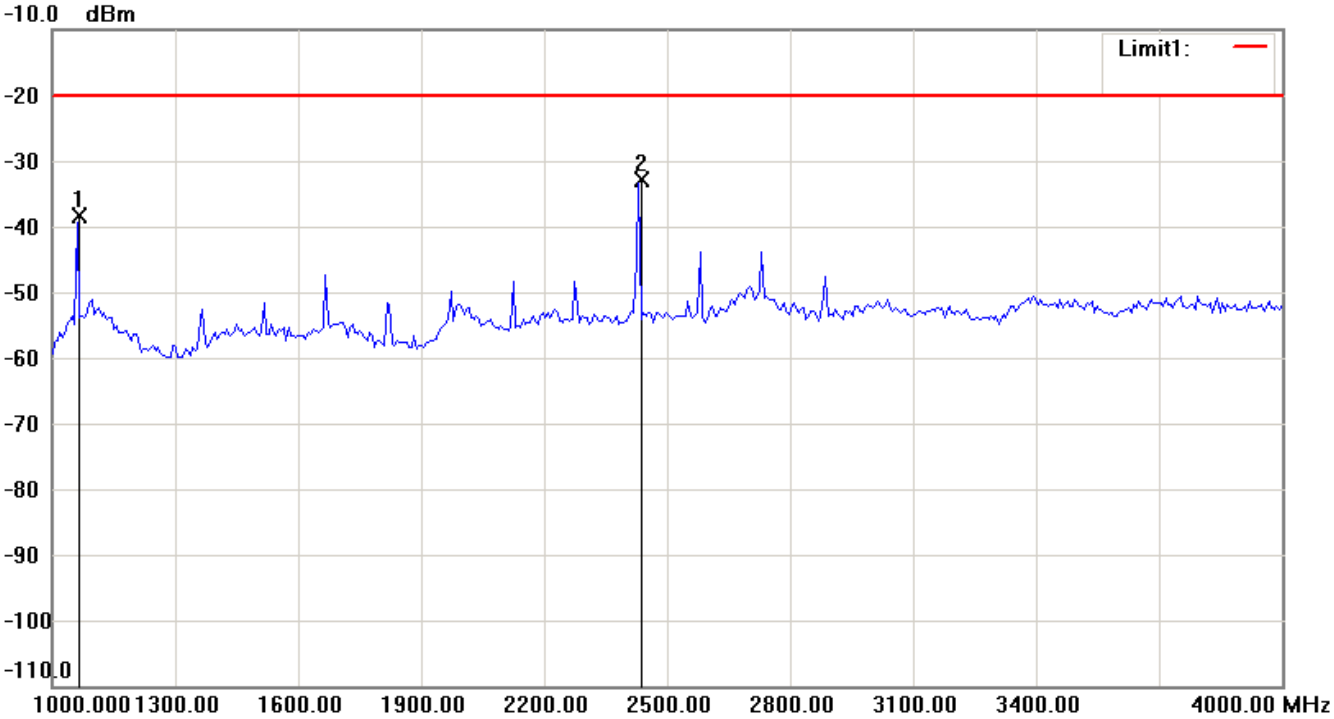

-10.0 dBm
Limit1:
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110.0
1
2
1000.000 1300.00 1600.00 1900.00 2200.00 2500.00 2800.00 3100.00 3400.00 4000.00 MHz

151.94MHz
Antenna Polarization H

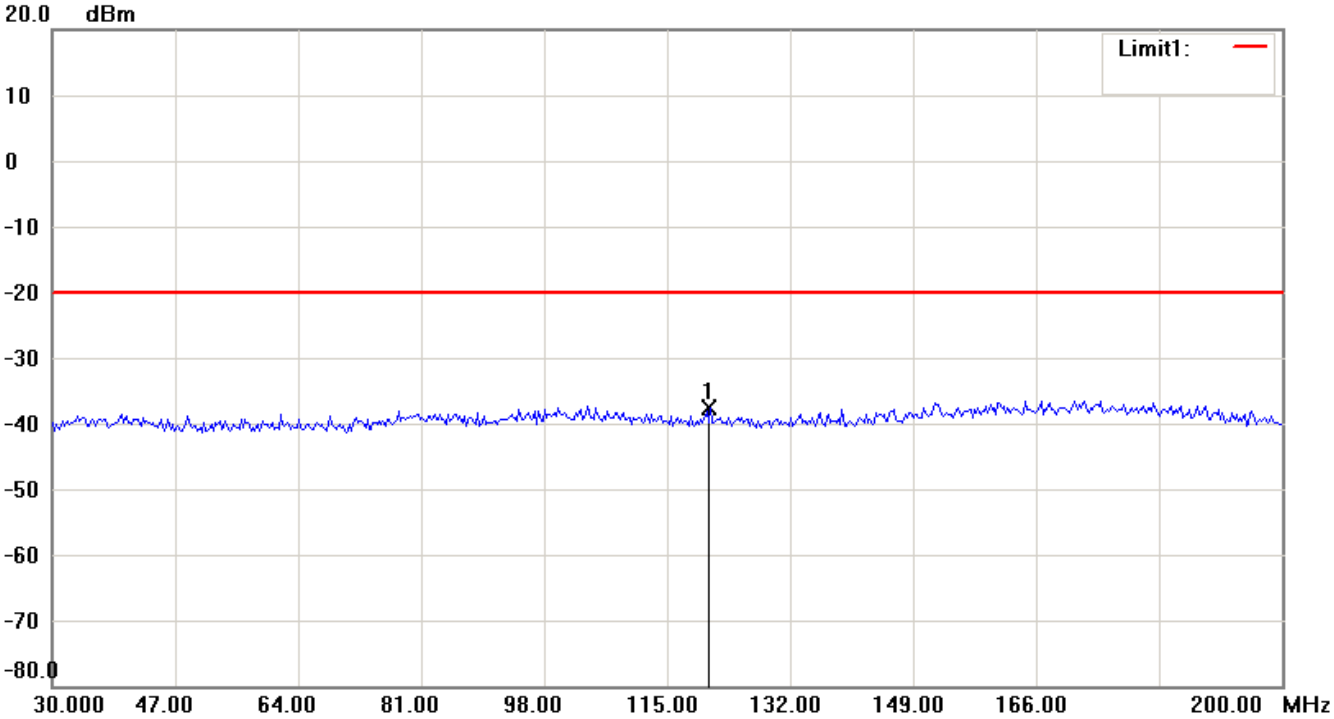


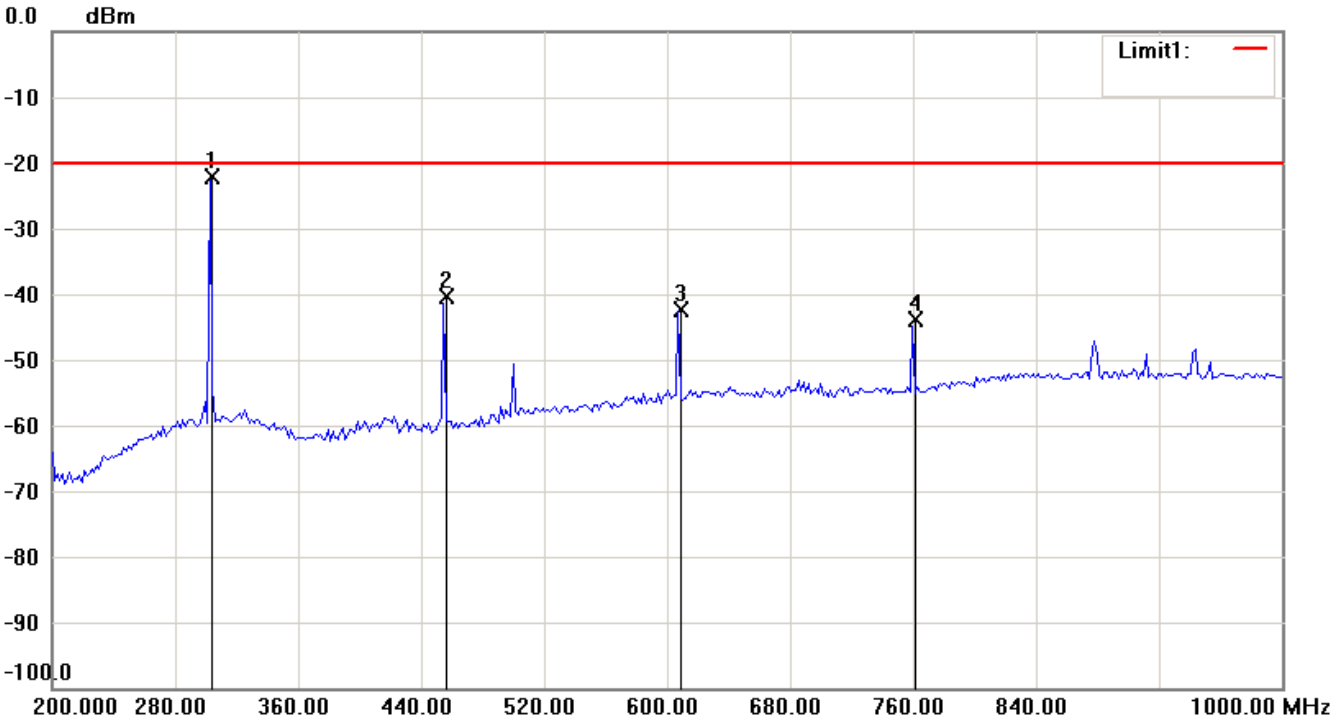


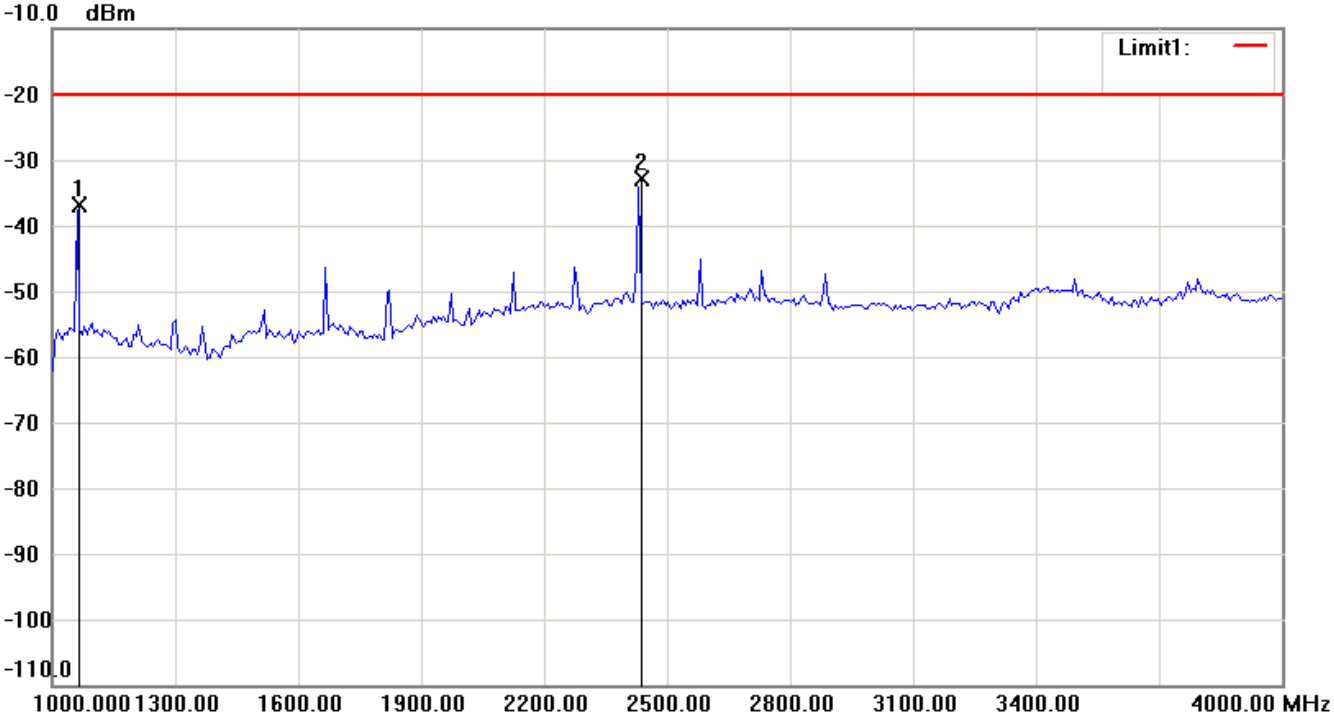
Registration number: W6M21108-11786-C-1
FCC ID: ZX9GC556047



Antenna Polarization V

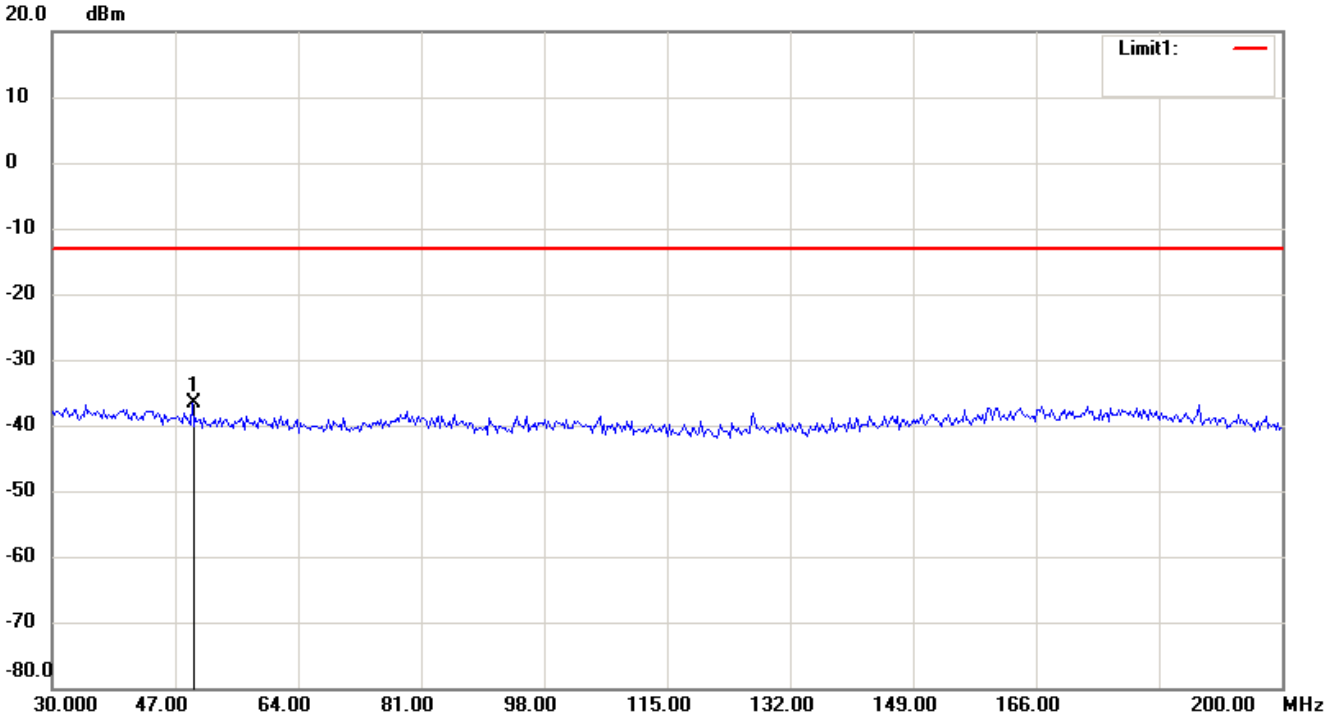


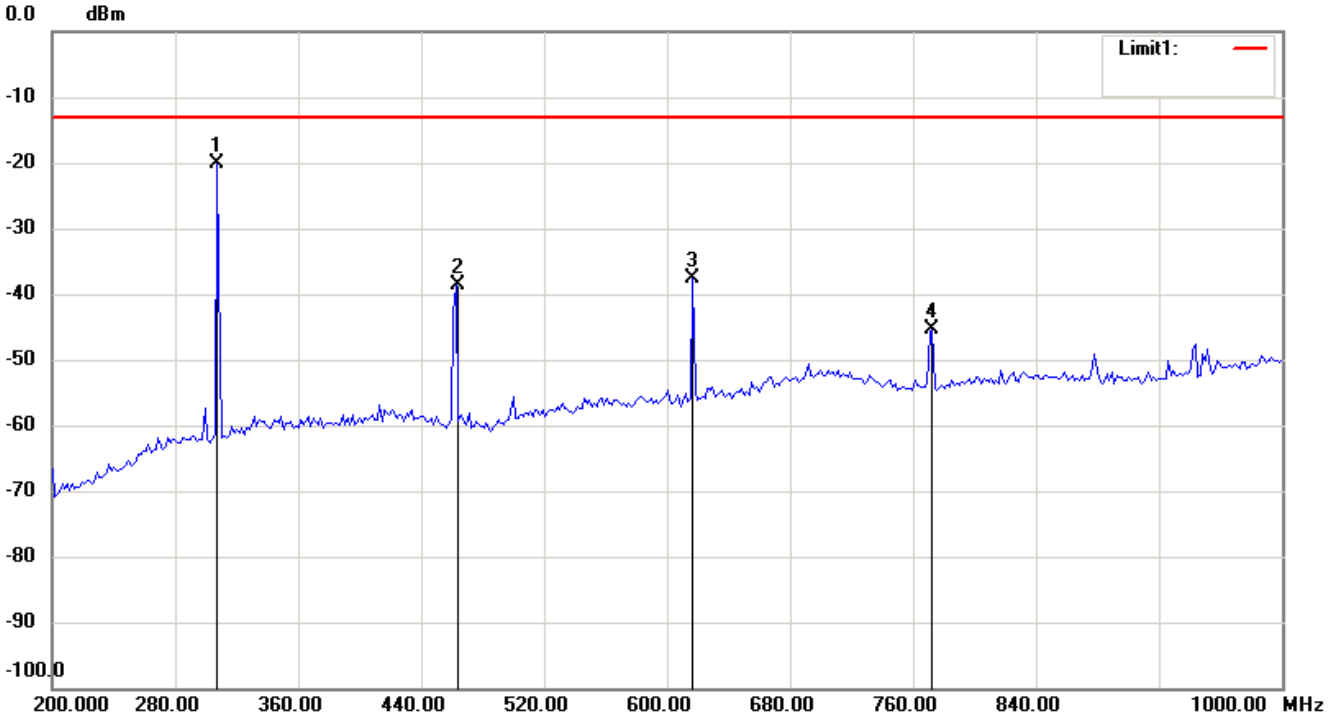

0.0 dBm
Limit1:
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100.0
1
2
3
4
200.000 280.00 360.00 440.00 520.00 600.00 680.00 760.00 840.00 1000.00 MHz


-10.0 dBm
Limit1:
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110.0
1
2
1000.000 1300.00 1600.00 1900.00 2200.00 2500.00 2800.00 3100.00 3400.00 4000.00 MHz

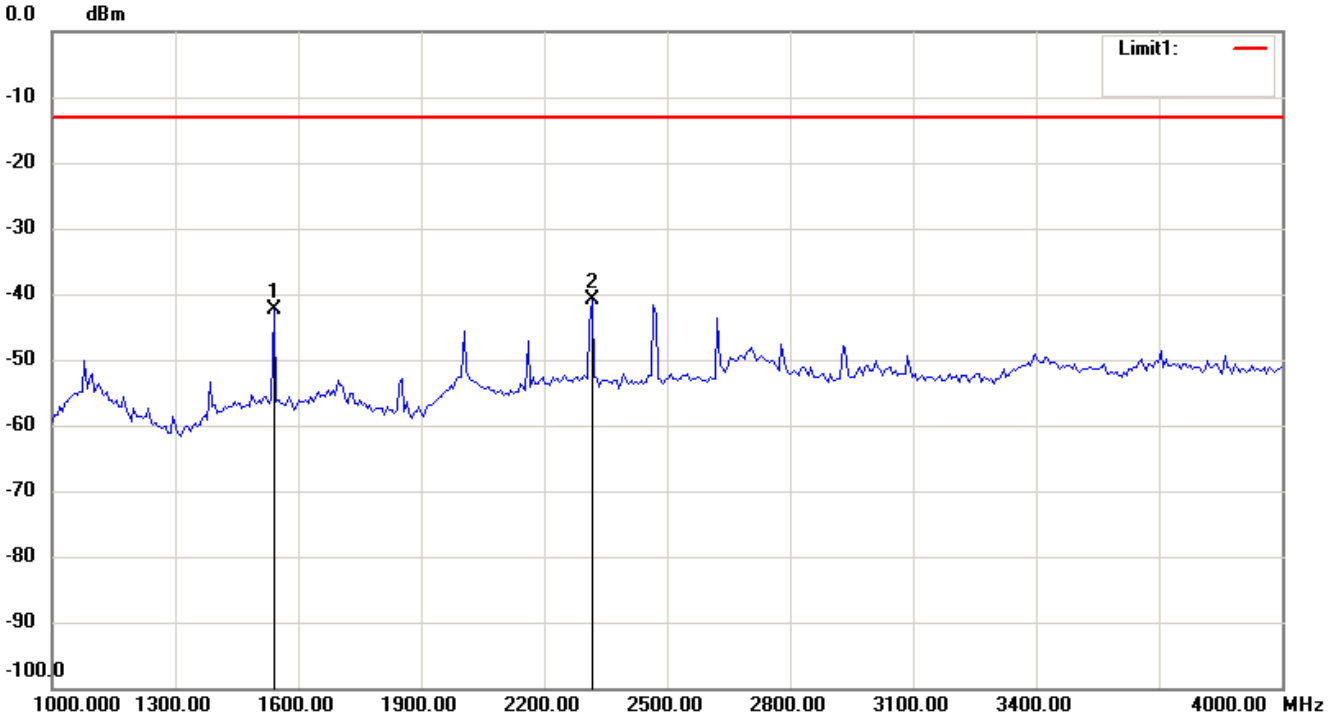
Registration number: W6M21108-11786-C-1
FCC ID: ZX9GC556047

154.60 MHz
Antenna Polarization H

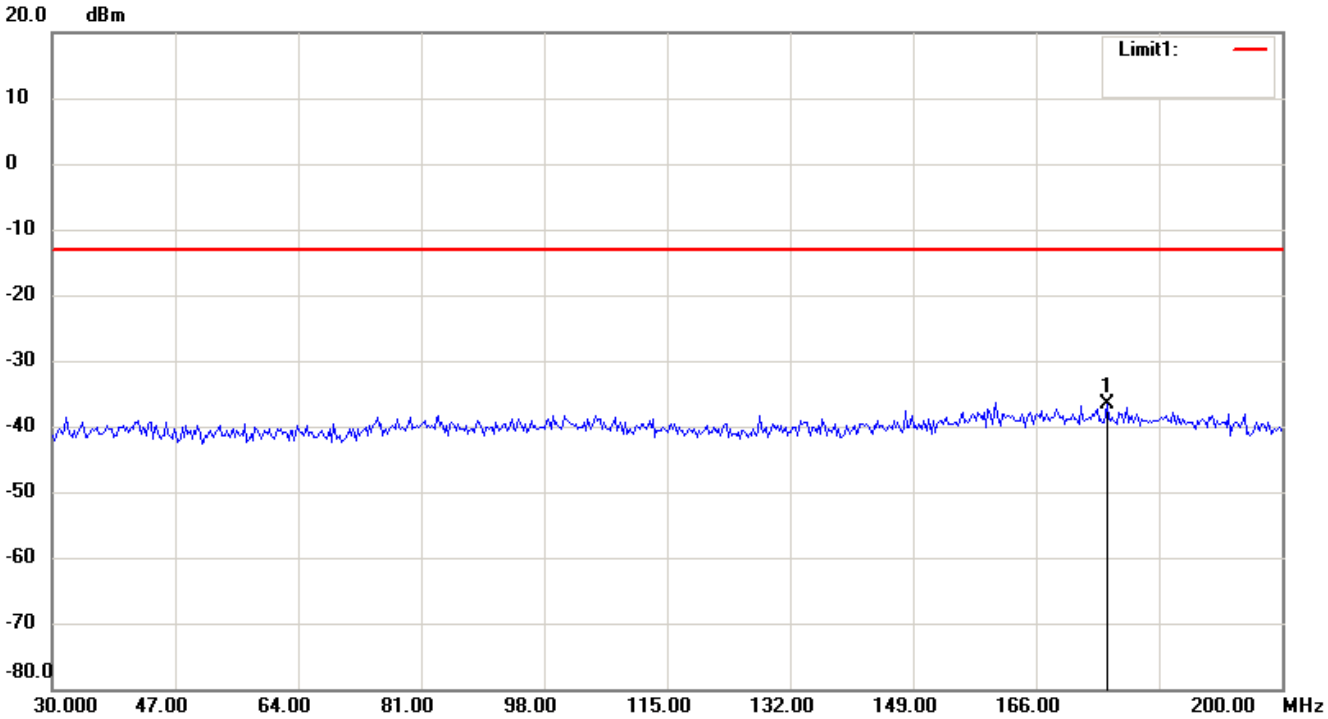


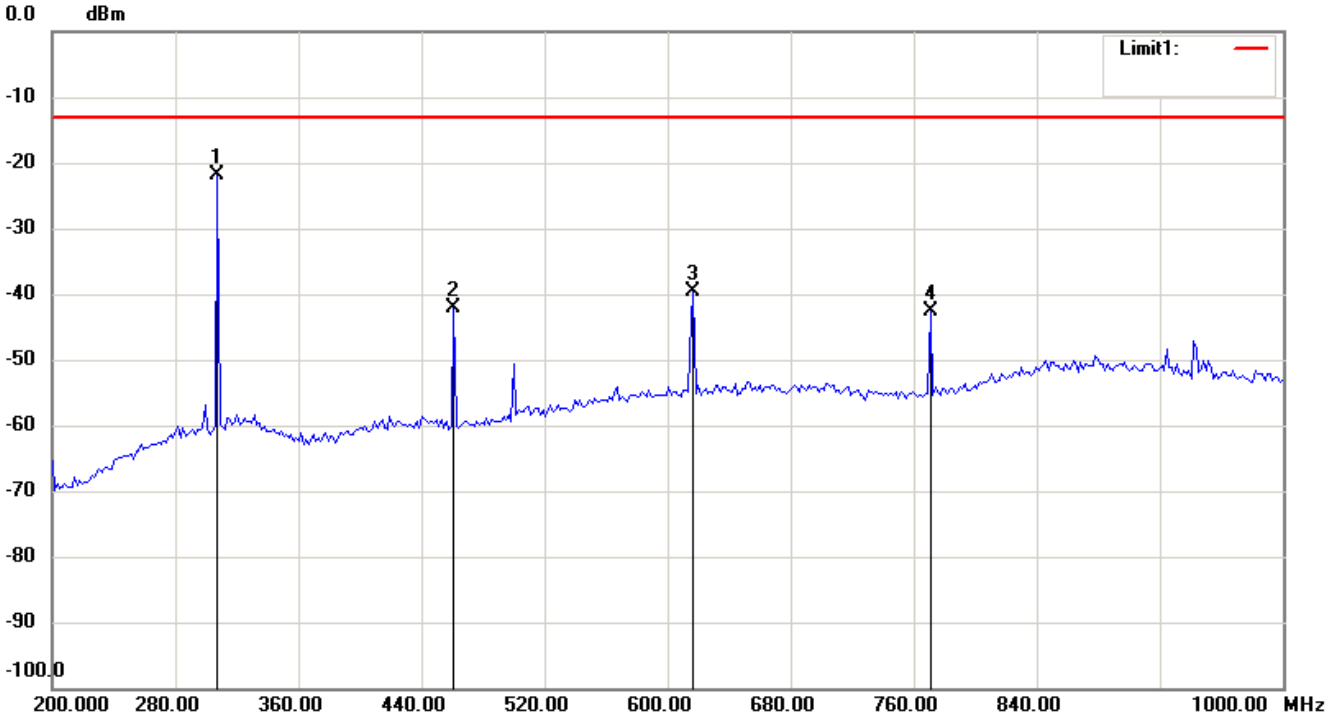


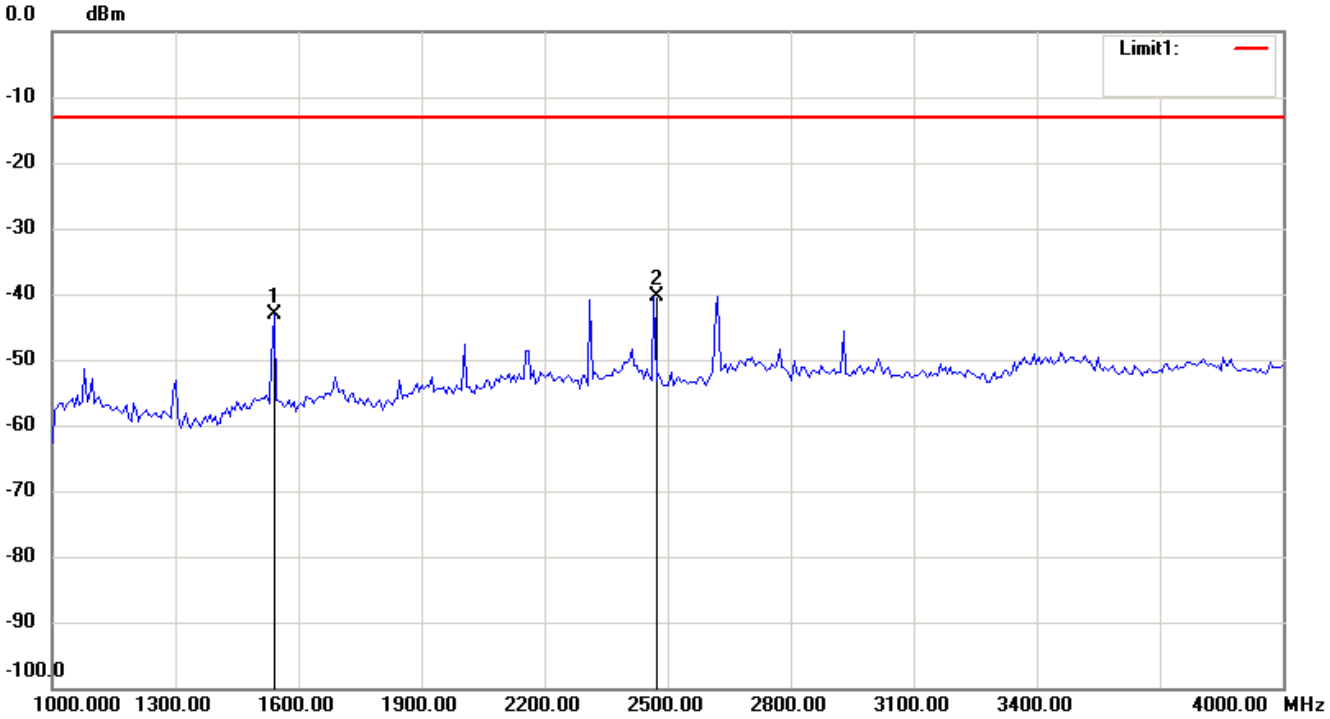
Registration number: W6M21108-11786-C-1
FCC ID: ZX9GC556047



Antenna Polarization V

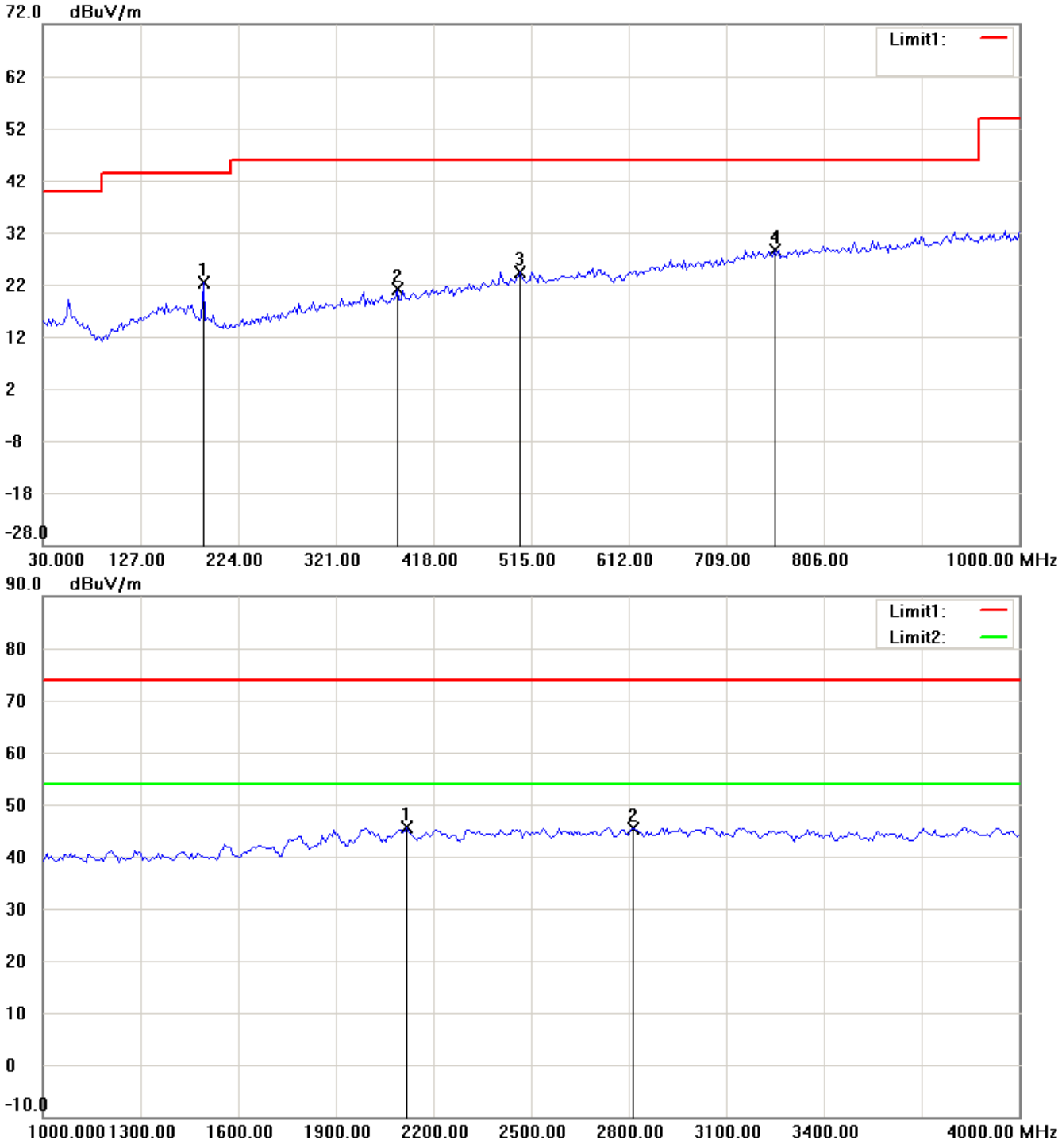



0.0 dBm
Limit1:
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100.0
1
2
3
4
200.000 280.00 360.00 440.00 520.00 600.00 680.00 760.00 840.00 1000.00 MHz


0.0 dBm
Limit1:
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100.0
1
2
1000.000 1300.00 1600.00 1900.00 2200.00 2500.00 2800.00 3100.00 3400.00 4000.00 MHz

Registration number: W6M21108-11786-C-1
FCC ID: ZX9GC556047

RX
151.82 MHz
Antenna Polarization H

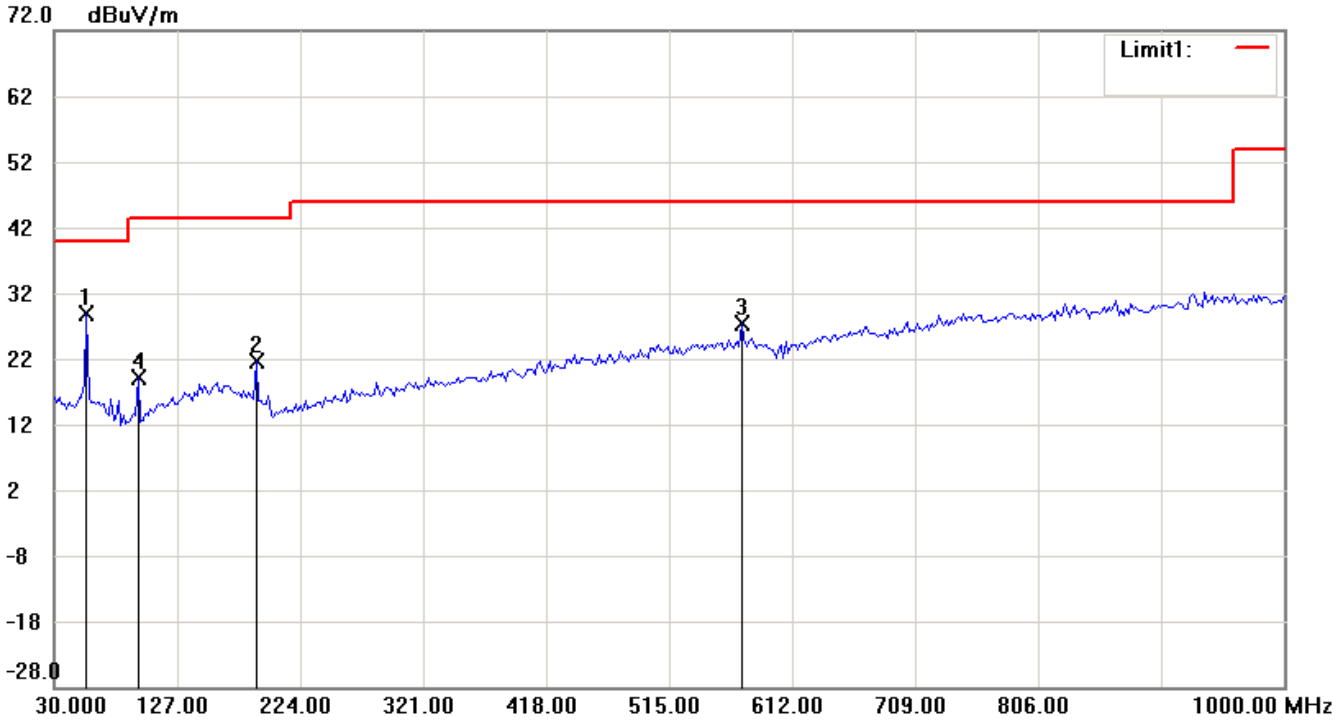


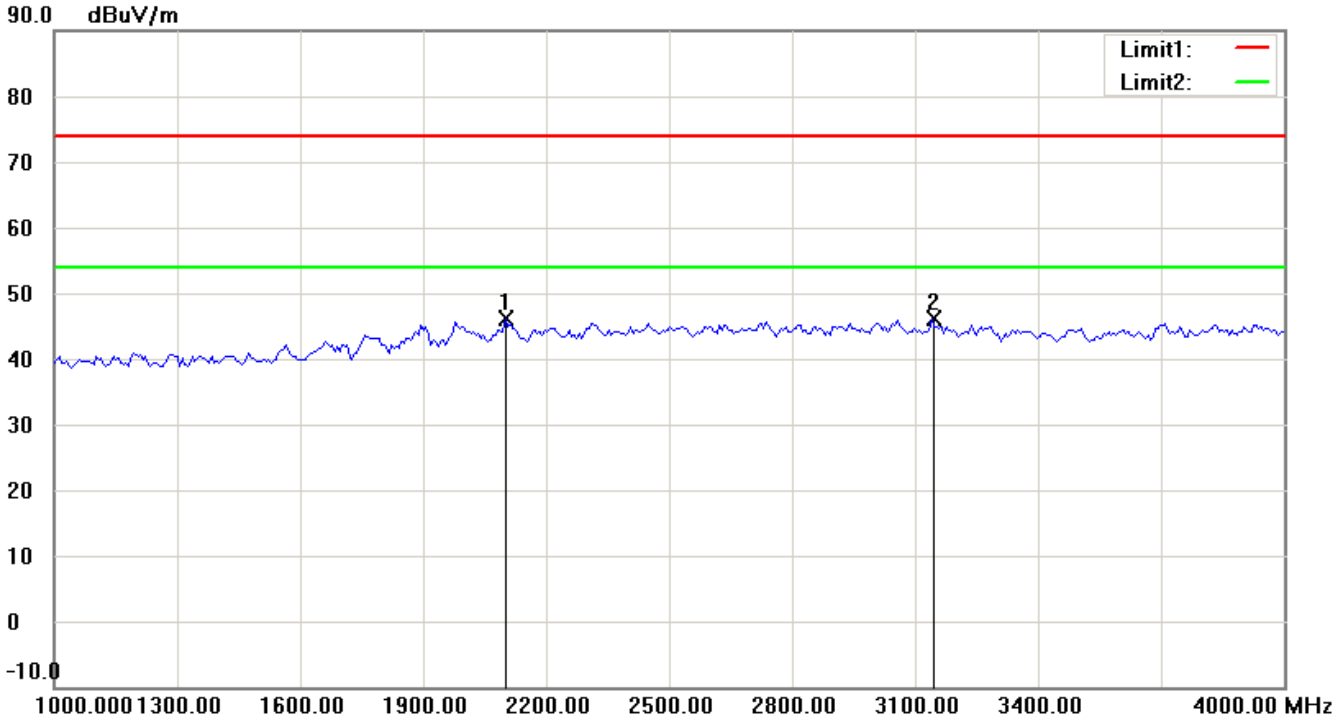
Note: Up Line: Peak Limit Line Down Line: Ave Limit Line

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

Registration number: W6M21108-11786-C-1
FCC ID: ZX9GC556047

Antenna Polarization V



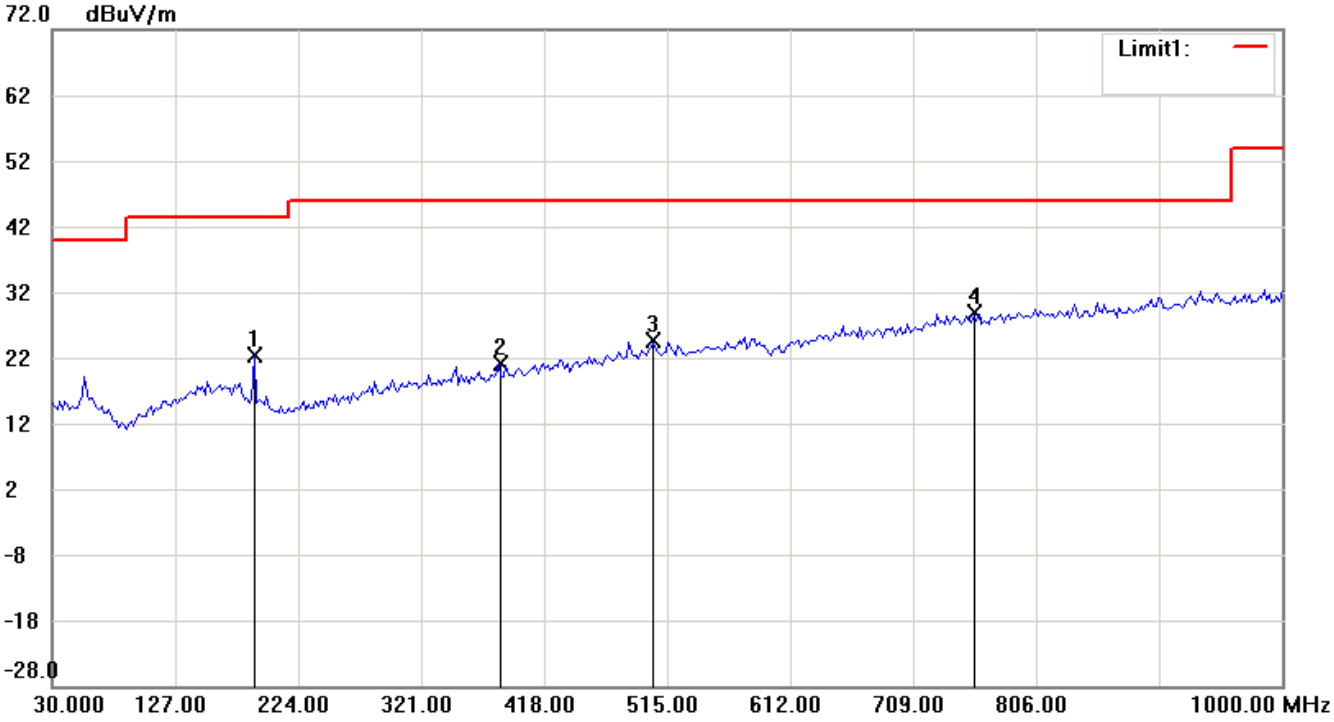


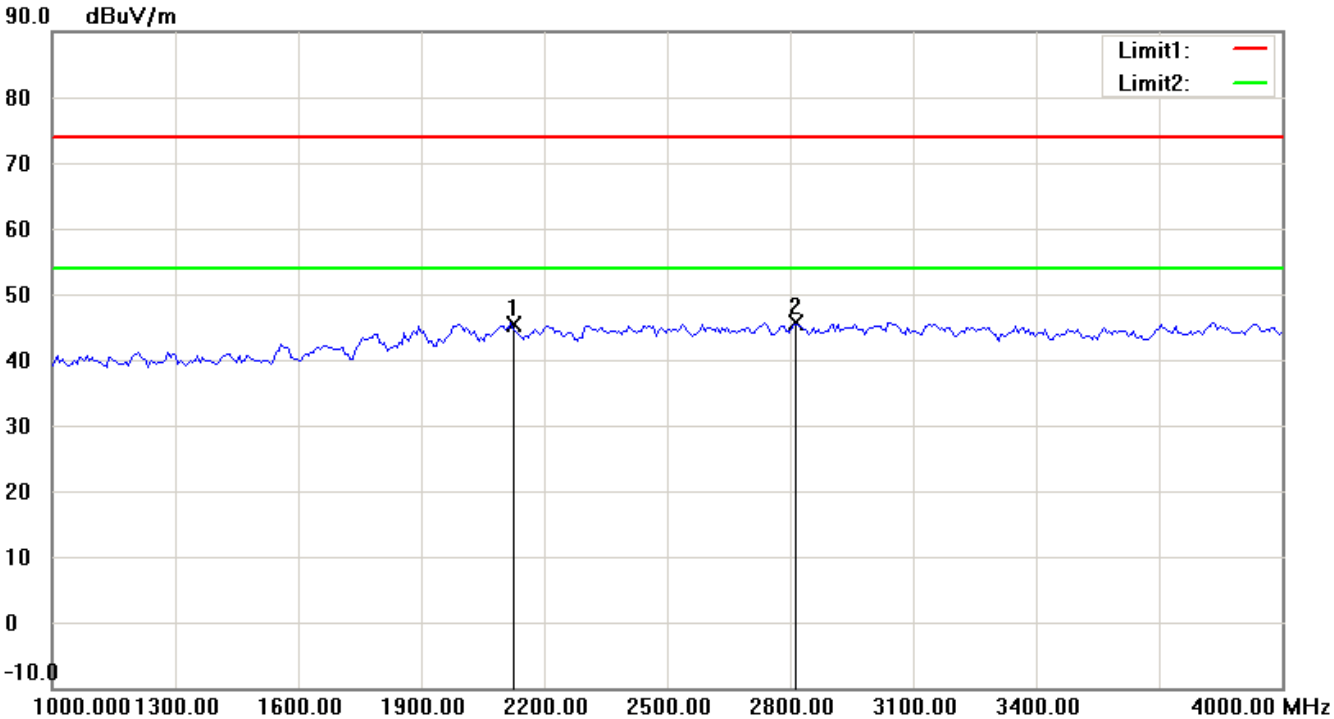
Note: Up Line: Peak Limit Line Down Line: Ave Limit Line

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

Registration number: W6M21108-11786-C-1
FCC ID: ZX9GC556047

151.94 MHz
Antenna Polarization H



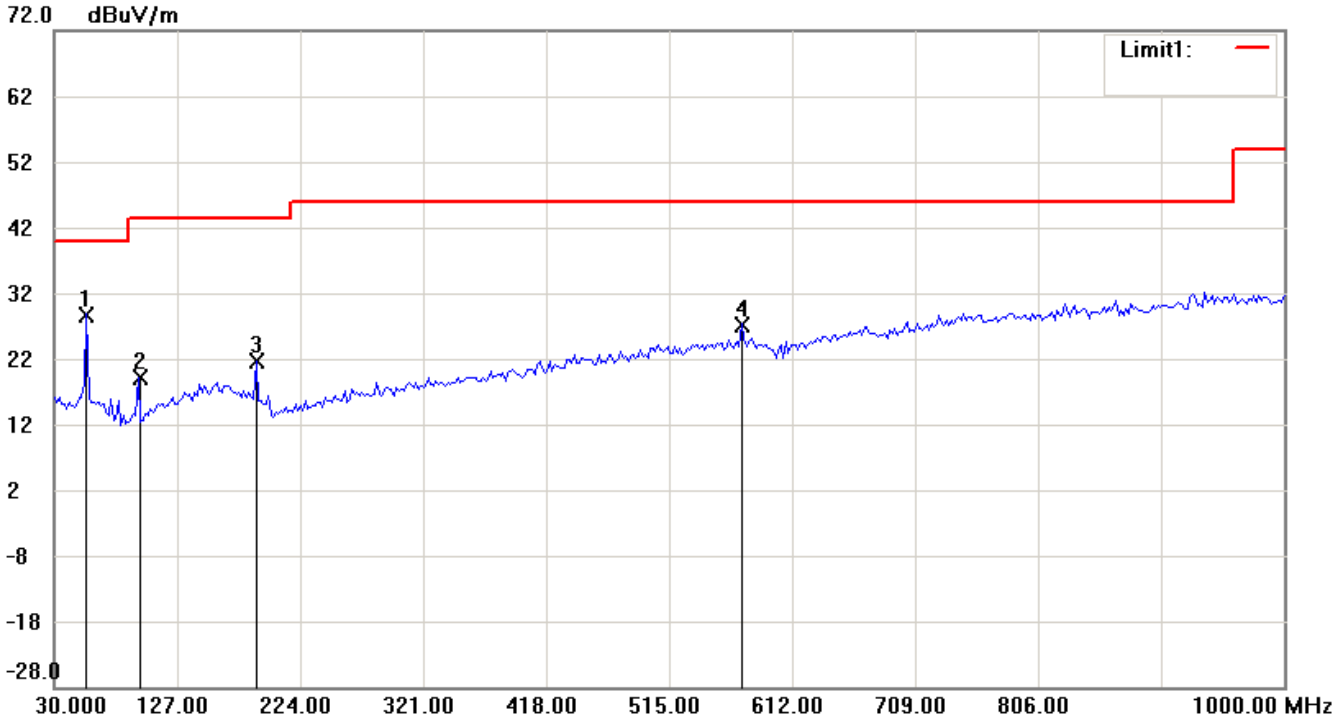


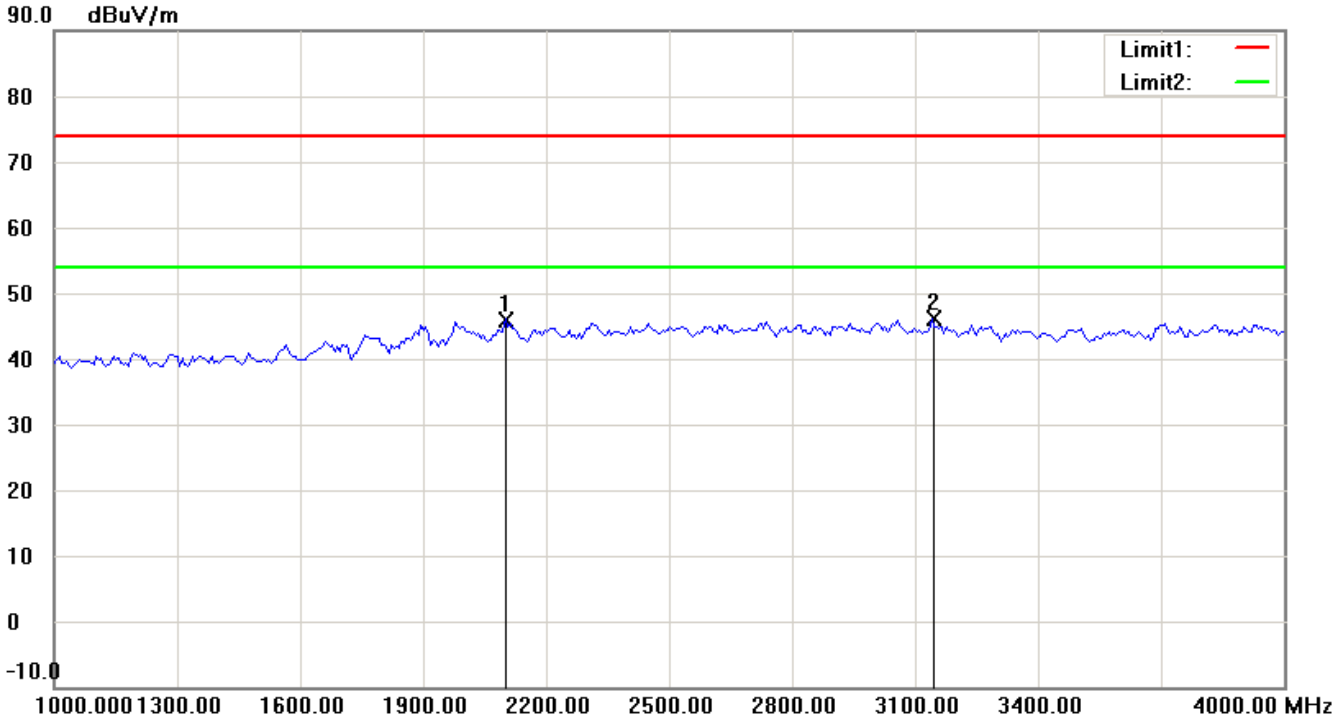
Note: Up Line: Peak Limit Line Down Line: Ave Limit Line

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

Registration number: W6M21108-11786-C-1
FCC ID: ZX9GC556047

Antenna Polarization V



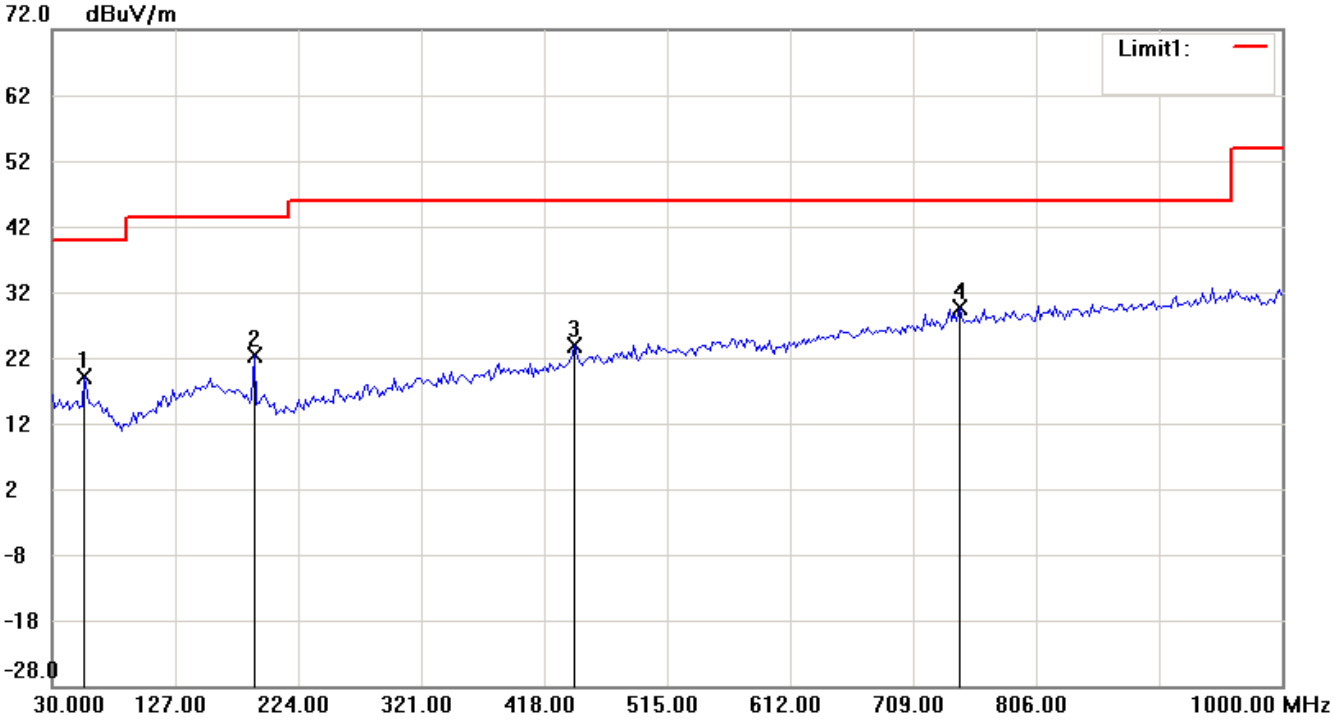


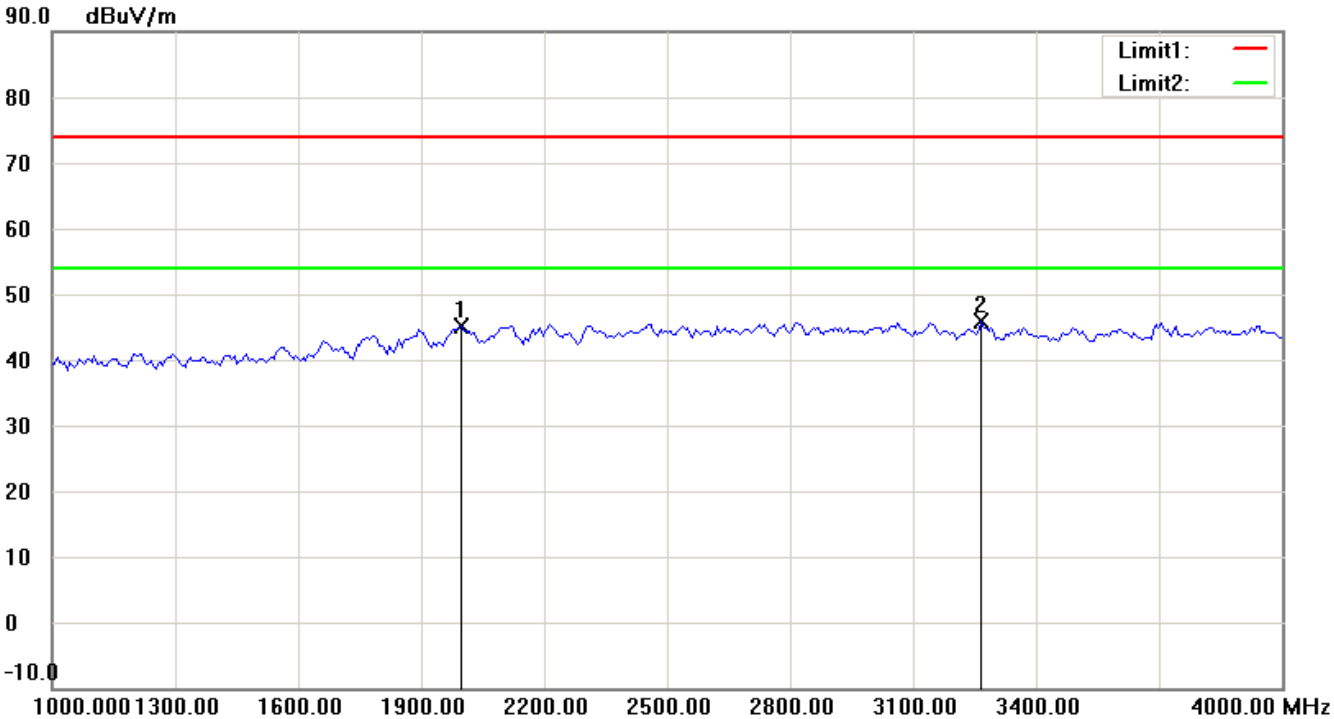
Note: Up Line: Peak Limit Line Down Line: Ave Limit Line

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

Registration number: W6M21108-11786-C-1
FCC ID: ZX9GC556047

154.60 MHz
Antenna Polarization H



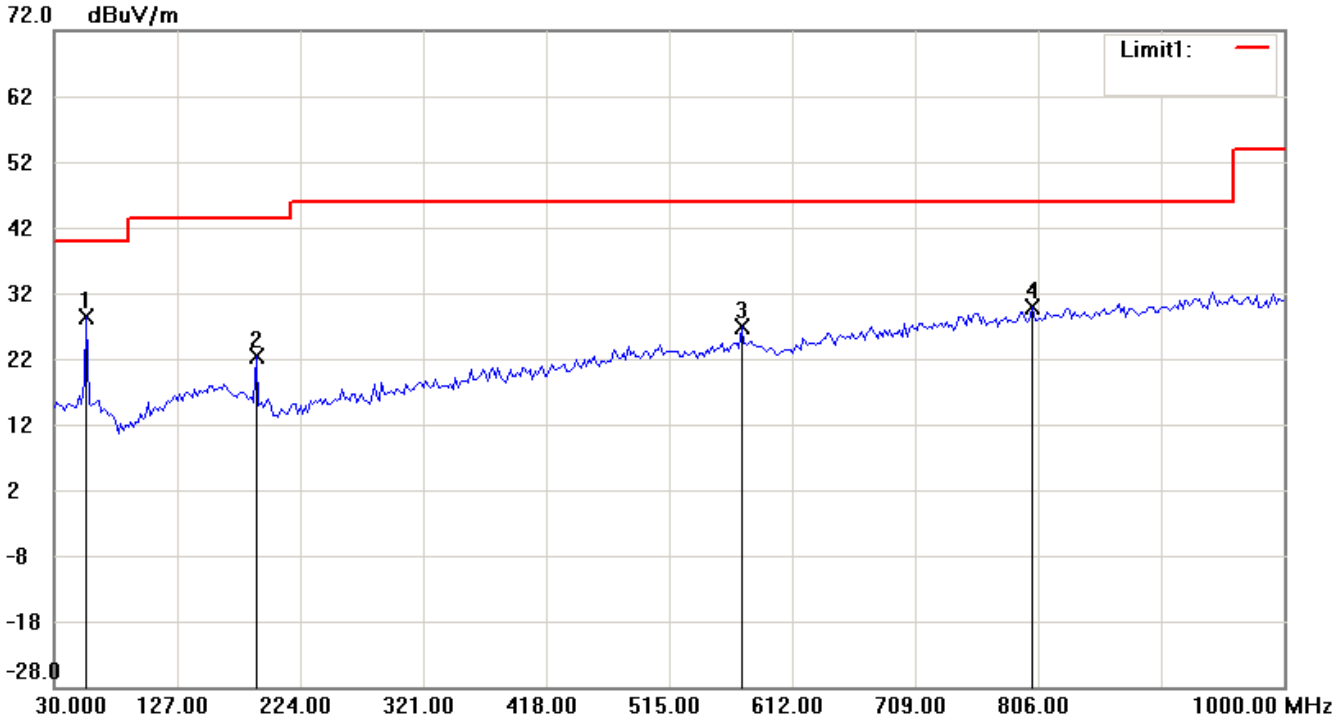


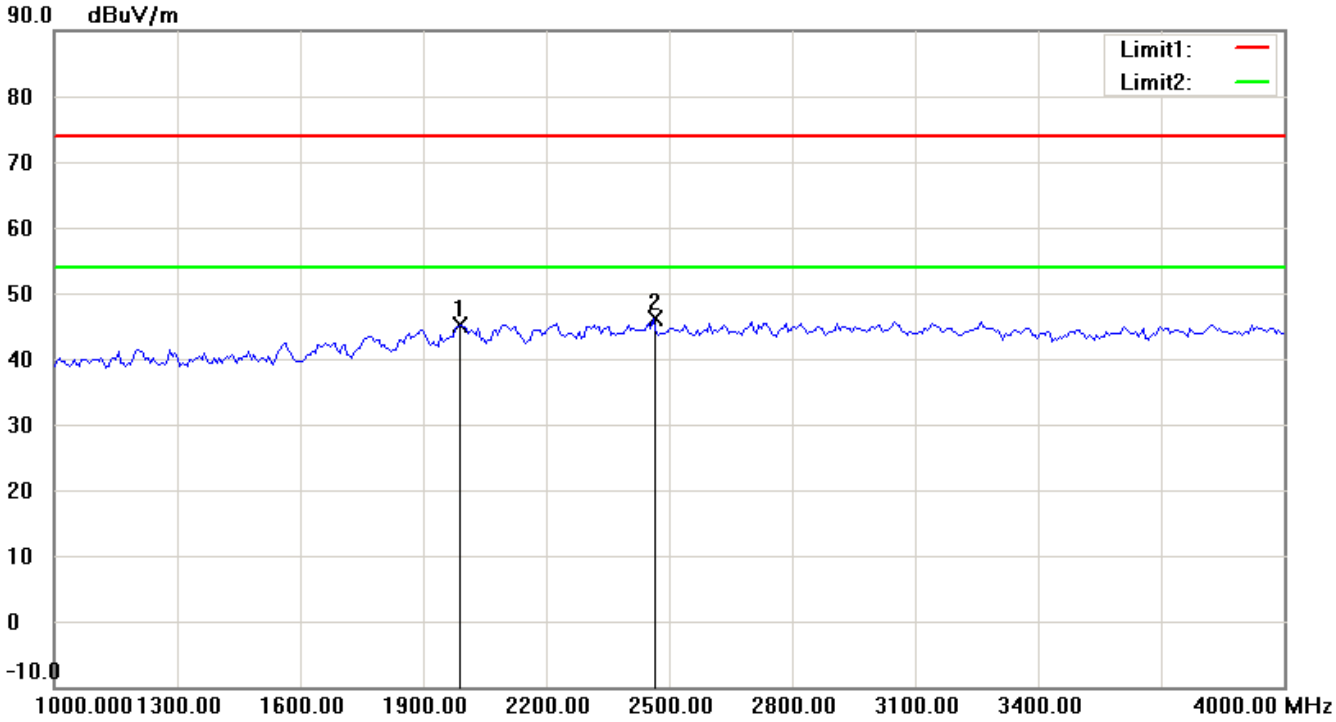
Note: Up Line: Peak Limit Line Down Line: Ave Limit Line

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

Registration number: W6M21108-11786-C-1
FCC ID: ZX9GC556047

Antenna Polarization V





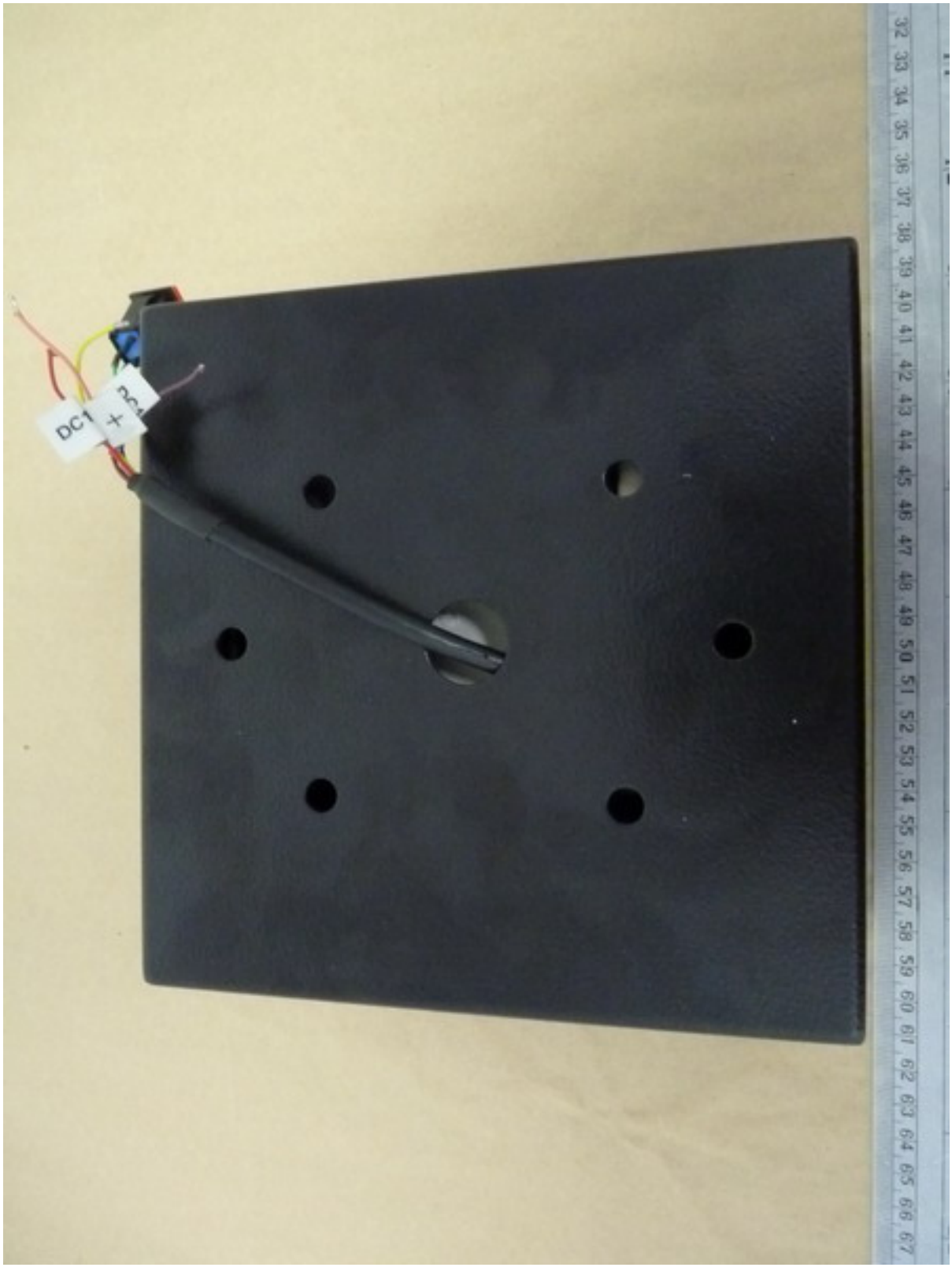
Note: Up Line: Peak Limit Line Down Line: Ave Limit Line

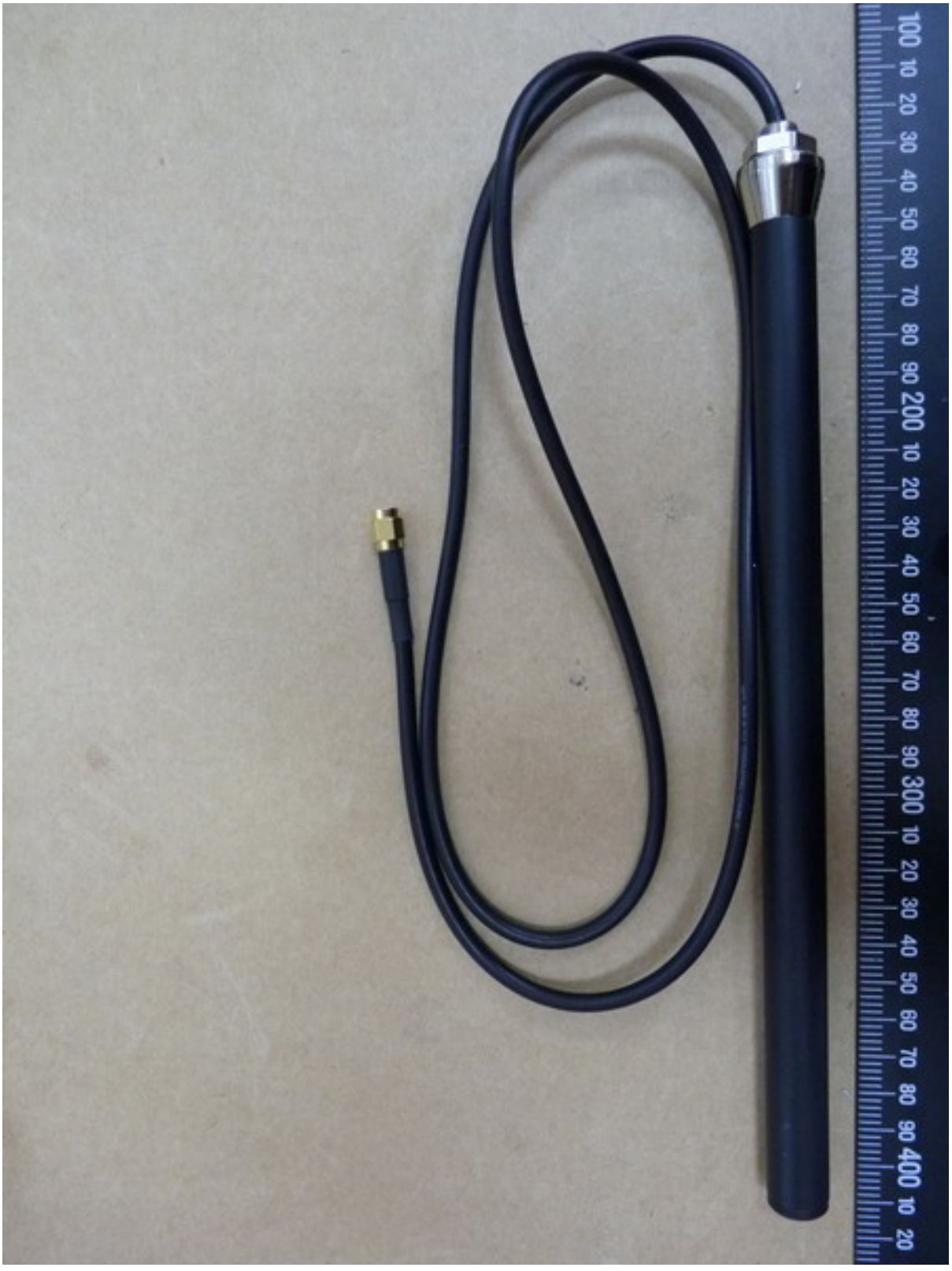
1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

Registration number: W6M21108-11786-C-1
FCC ID: ZX9GC556047

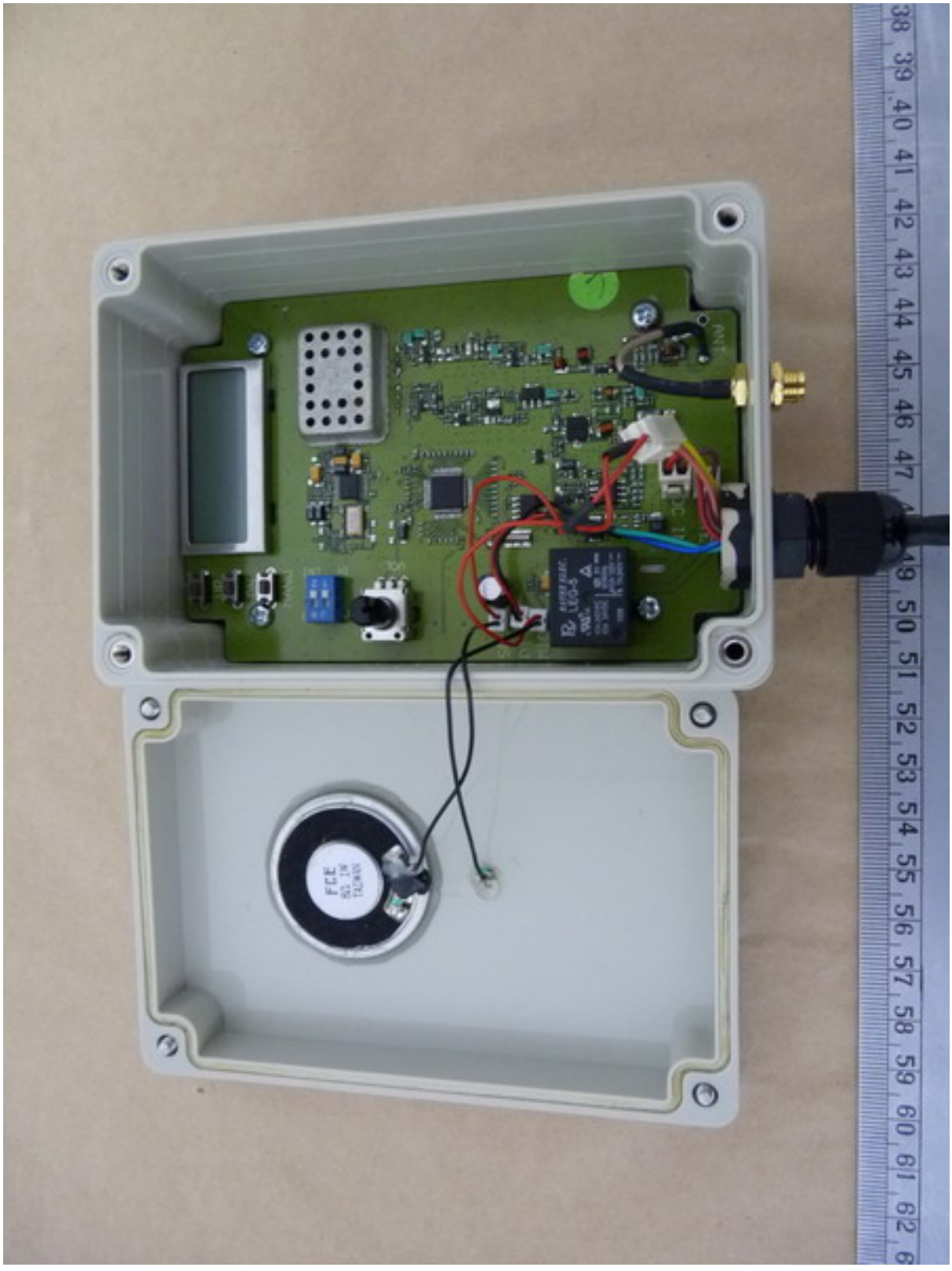
Pictures
External Photos

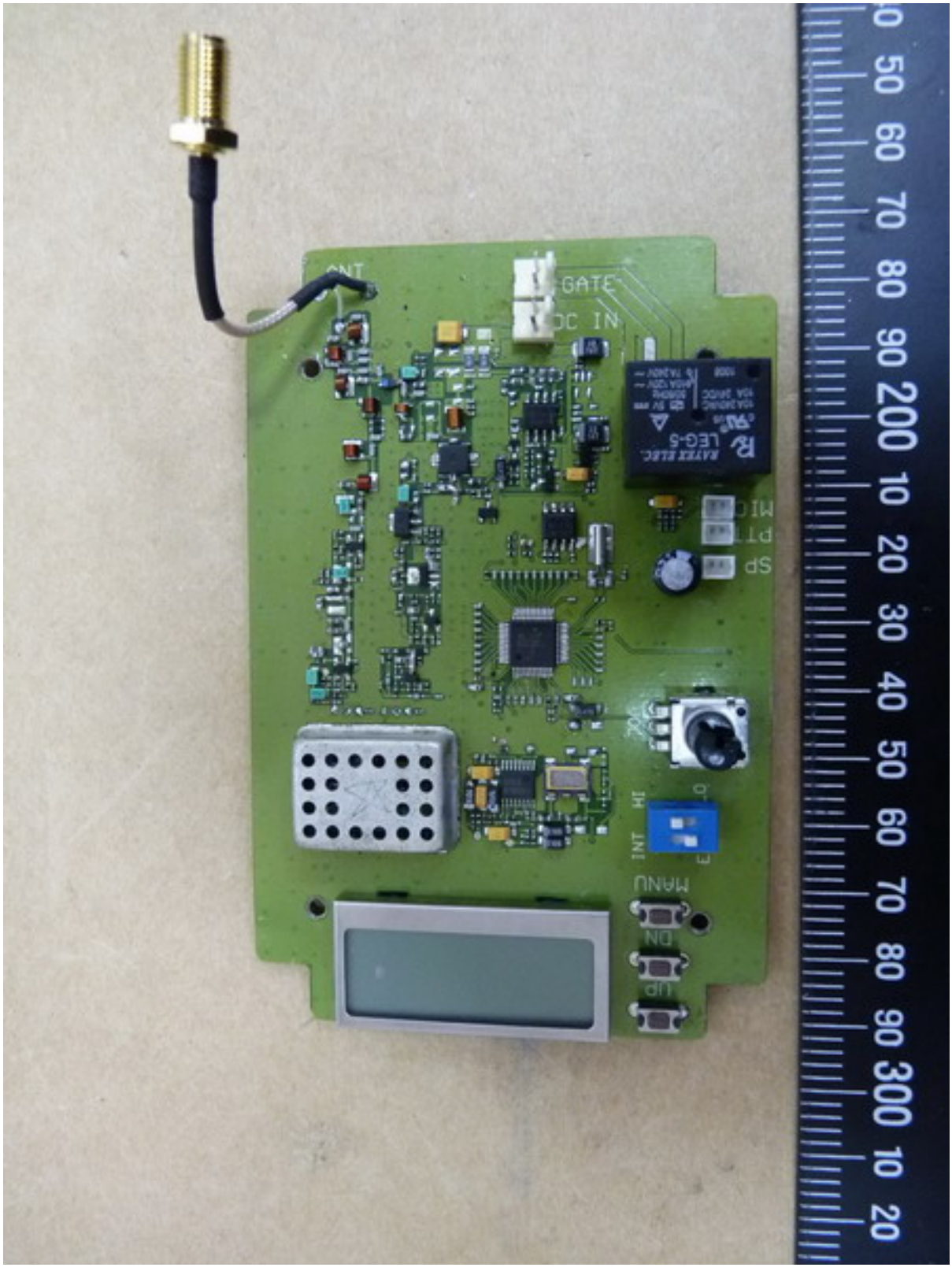

MURS Multi-Mile Wireless
Communication System
PUSH TO TALK
1. PRESS AND HOLD button to TALK
2. SPEAK after the BEEP
3. RELEASE button to LISTEN
4. REPEAT to TALK again

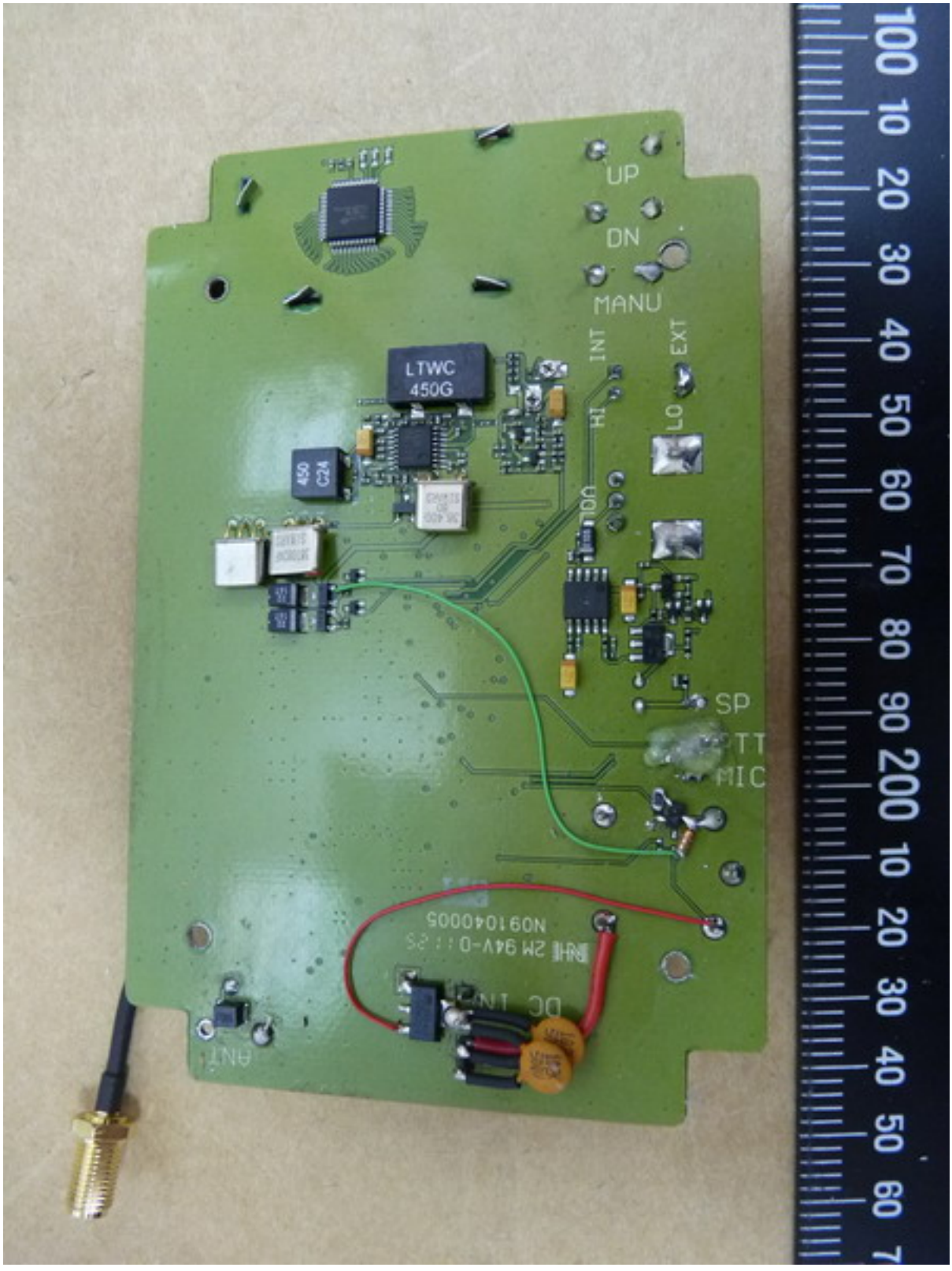

DC1
+

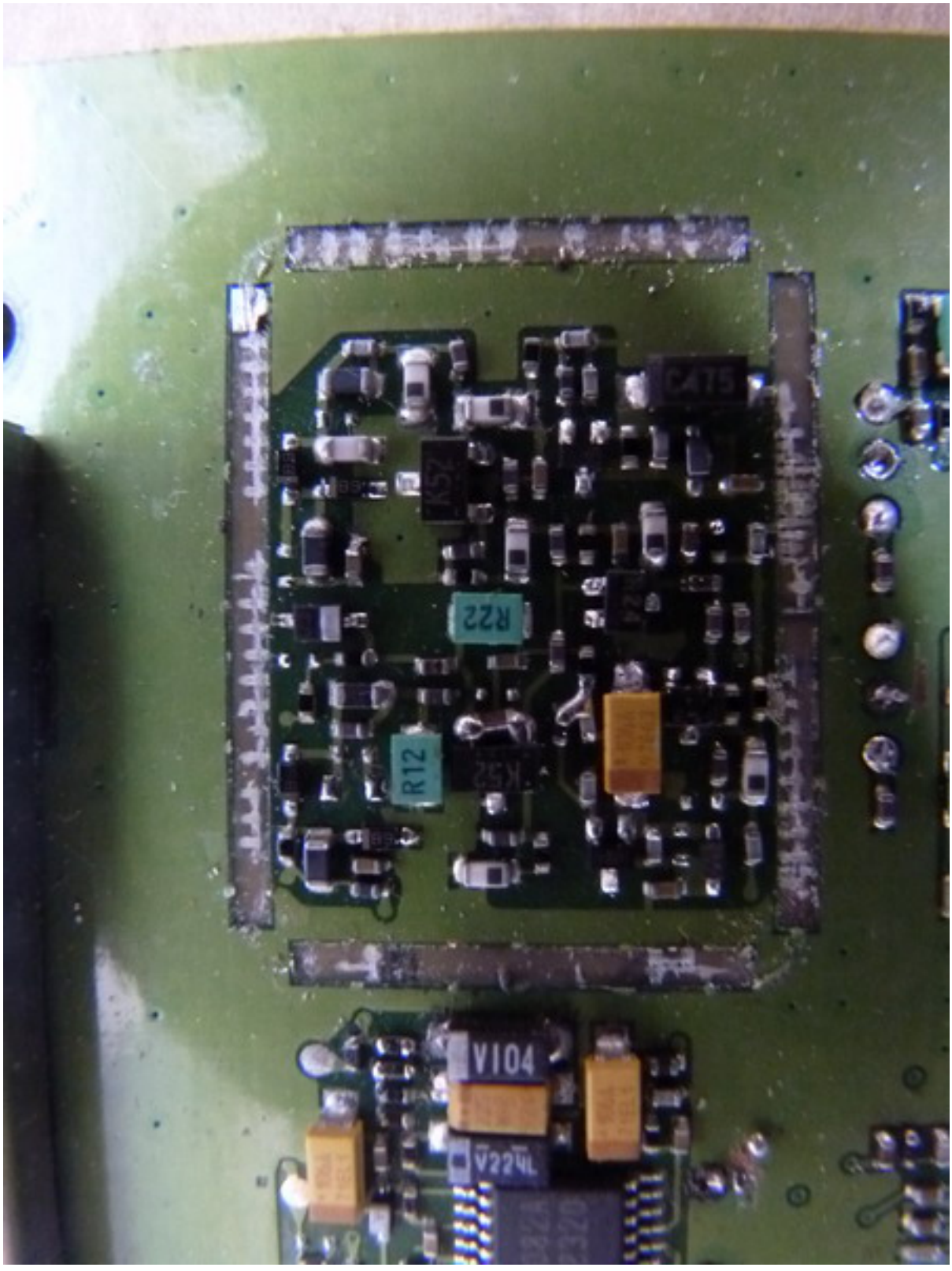


Internal Photos




GATE
DC IN
MANU
UP
DN
INT
HI


UP
DN
MANU
INT
EXT
LO
HI
LTWC
450G
SP
MIC


R22
R12
V104

Registration number: W6M21108-11786-C-1
FCC ID: ZX9GC556047

Set Up Photo of Radiated Emission