

**FCC PART 15 SUBPART C TEST REPORT**

**for**

**Electronic Swinghandle**

**Model No.: H3-EM-69-100-10**

**FCC ID: YKRH3EM69**

of

Applicant: **Southco., Inc**

Address: 210 North Brinton Lake Road Concordville, Pennsylvania  
19331-0116 United States

Tested and Prepared

by

**Worldwide Testing Services (Taiwan) Co., Ltd.**

**FCC Registration No.: 930600**

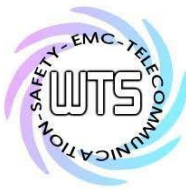
**Industry Canada filed test laboratory Reg. No. IC 5679A-1**

**A2LA Accredited No.: 2732.01**



**Report No.: W6M21210-12817-C-1**

6F, NO. 58, LANE 188, RUEY-KUANG RD., NEIHU TAIPEI 114, TAIWAN, R.O.C.  
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Registration number: W6M21210-12817-C-1  
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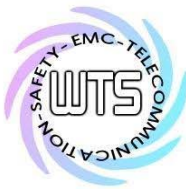
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**APPENDIX**



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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 its 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.

Reproduction or publication of extracts from the report requires the prior written approval of the Worldwide Testing Services(Taiwan) Co., Ltd.

**Tester:**

December 04, 2012

Robert Ren

Date

WTS-Lab.

Name

Signature

**Technical responsibility for area of testing:**

December 04, 2012

Danny Sung

Date

WTS

Name

Signature



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## **1.2 Testing laboratory**

### **1.2.1 Location**

OATS

No.5-1, Shuang Sing Village,

LiShuei Rd., Wanli Dist.,

New Taipei City 207, Taiwan (R.O.C.)

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: Southco,. Inc

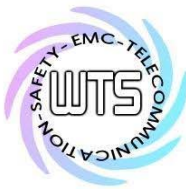
Street: 210 North Brinton Lake Road

Town: Concordville, Pennsylvania 19331-0116

Country: United States

Telephone: 1 610-361-6098

Fax: 1 610-361-7100



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#### **1.4 Application details**

Date of receipt of test item: October 29, 2012

Date of test: From October 30, 2012 to December 04, 2012

#### **1.5 General information of Test item**

Type of test item: Electronic Swinghandle

Model Number: H3-EM-69-100-10

Multi-listing model number: H3-EM-69-100, H3-EM-69-200, H3-EM-69-200-10,  
H3-EM-69-300, H3-EM-69-300-10

Brand name: Southco

Photos: see Appendix

##### Technical data

Transmitting Frequency: 125 kHz

Operation modes: Duplex

Modulation Type: FSK

Antenna Type: Loop antenna

Power supply: DC 12~24 V

##### **Manufacturer: (if different from Approval Holder)**

Name: ./.

Street: ./.

Town: ./.

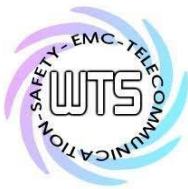
Country: ./.

Additional information: ./.

#### **1.6 Test standards**

Technical standard :

FCC RULES 15 SUBPART C § 2.1049, § 15.203, § 15.209, § 15.207 (2011-10)



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## **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
Details of power supply	DC 12~24 V
Extreme conditions parameters:	test voltage : -- extreme min : -- V max : -- V



# Worldwide Testing Services(Taiwan) Co., Ltd.

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## 2.3 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	2012/9/5	2013/9/4
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	2011/12/28	2012/12/27
ETSTW-CE 005	Line-Impedance Stabilisation Network	NNBM 8126D	137	Schwarzbeck	2012/9/26	2013/9/25
ETSTW-CE 006	IMPULSBEGRENZER PULSE LIMITER	ESH3-Z2	100226	R&S	2012/3/5	2013/3/4
ETSTW-CE 007	SPECTRUM ANALYZER 5GHZ	FSB	849670/001	R&S	Pre-test Use	
ETSTW-CE 008	HF-EICHLITUNG 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	2012/7/3	2013/7/2
ETSTW-CE 013	CISPR 22 TWO BALANCED TELECOM PAIRS IMPEDANCE STABILIZATION NETWORK	FCC-TLISN-T4-02	20242	FCC	2012/9/6	2013/9/5
ETSTW-CE 024	IMPEDANCE STABILIZATION NETWORK	ISN T800	29454	TESEQ	2012/1/4	2013/1/3
ETSTW-CS 004	COUPLING AND DECOUPLING NETWORK	CDN M016	20053	SCHAFFNER	2012/8/10	2013/8/09
ETSTW-CS 005	RF Power Amplifier	100A250A	306547	AR	Function Test	
ETSTW-CS 010	6 dB Attenuator	SA3N1007-06	None	AISI	Function test	
ETSTW-RE 003	EMI TEST RECEIVER	ESI 26	831438/001	R&S	2012/8/10	2013/8/09
ETSTW-RE 004	EMI TEST RECEIVER	ESI 40	832427/004	R&S	2012/9/5	2013/9/4
ETSTW-RE 005	EMI TEST RECEIVER	ESVS10	843207/020	R&S	2012/9/5	2013/9/4
ETSTW-RE 010	ABSORBING CLAMP	MDS 21	3469	Schwarzbeck	2012/9/5	2013/9/4
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 018	MICROWAVE HORN ANTENNA	AT4560	27212	AR	2012/10/12	2013/10/11
ETSTW-RE 019	MICROWAVE HORN ANTENNA	22240-25	121074	FM	2012/4/03	2013/4/02
ETSTW-RE 020	MICROWAVE HORN ANTENNA	AT4002A	306915	AR	Function Test	
ETSTW-RE 027	Passive Loop Antenna	6512	00034563	ETS-Lindgren	2012/8/01	2013/7/31
ETSTW-RE 028	Log-Periodic Dipole Array Antenna	3148	34429	EMCO	Function Test	
ETSTW-RE 029	Biconical Antenna	3109	33524	EMCO	Function Test	
ETSTW-RE 030	Double-Ridged Guide Horn Antenna	3117	00035224	EMCO	2012/2/21	2013/2/20
ETSTW-RE 032	Millivoltmeter	URV 55	849086/013	R&S	2012/10/5	2013/10/4
ETSTW-RE 033	WaveRunner 6000A Serie Oscilloscope	WAVERUNNER 6100A	LCRY0604P14508	LeCroy	Function Test	
ETSTW-RE 034	Power Sensor	URV5-Z4	839313/006	R&S	2012/10/5	2013/10/4
ETSTW-RE 042	Biconical Antenna	HK116	100172	R&S	2012/1/10	2013/1/9
ETSTW-RE 043	Log-Periodic Dipole Antenna	HL223	100166	R&S	2012/4/13	2013/4/12

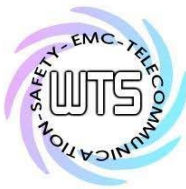


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ETSTW-RE 044	Log-Periodic Antenna	HL050	100094	R&S	2012/4/06	2013/4/05
ETSTW-RE 045	ESA-E SERIES SPECTRUM ANALYZER	E4404B	MY45111242	Agilent	Pre-test Use	
ETSTW-RE 048	Triple Loop Antenna	HXYZ 9170	HXYZ 9170-134	Schwarzbeck	2012/8/28	2013/8/27
ETSTW-RE 049	TRILOG Super Broadband test Antenna	VULB 9160	9160-3185	Schwarzbeck	2012/3/23	2013/3/22
ETSTW-RE 050	Attenuator 10dB	50HF-010-1	None	JFW	2012/3/3	2013/3/2
ETSTW-RE 051	Attenuator 6dB	50HF-006-1	None	JFW	2012/3/3	2013/3/2
ETSTW-RE 053	Attenuator 3dB	50HF-003-1	None	JFW	2012/3/3	2013/3/2
ETSTW-RE 055	SPECTRUM ANALYZER	FSU 26	200074	R&S	2012/5/29	2013/5/28
ETSTW-RE 060	Attenuator 30dB	5015-30	F651012z-01	ATM	2012/3/3	2013/3/2
ETSTW-RE 061	Amplifier Module	CHC 1	None	ETS	2012/5/17	2013/5/16
ETSTW-RE 062	Amplifier Module	CHC 2	None	KMIC	2012/11/28	2013/11/27
ETSTW-RE 064	Bluetooth Test Set	MT8852B-042	6K00005709	Anritsu	Function Test	
ETSTW-RE 065	Amplifier	AMF-6F-18002650-25-10P	941608	MITEQ	2012/4/6	2013/4/5
ETSTW-RE 069	Double-Ridged Guide Horn Antenna	3117	00069377	EMCO	Function Test	
ETSTW-RE 072	CELL SITE TEST SET	8921A	3339A00375	HP	2012/10/5	2013/10/4
ETSTW-RE 073	Power Meter	N1911A	MY45100769	Agilent	2012/1/4	2013/1/3
ETSTW-RE 074	Power Sensor	N1921A	MY45241198	Agilent	2012/1/4	2013/1/3
ETSTW-RE 088	SOLID STATE AMPLIFIER	KMA180265A01	99057	KMIC	2012/10/12	2013/10/11
ETSTW-RE 099	DC Block	50DB-007-1	None	JFW	2012/3/5	2013/3/4
ETSTW-RE 105	2.4GHz Notch Filter	NO124411	39555	MICROWAVE CIRCUITS, INC.	2012/3/5	2013/3/4
ETSTW-RE 106	Humidity Temperature Meter	TES-1366	091011113	TES	2012/11/28	2013/11/27
ETSTW-RE 111	TRILOG Super Broadband test Antenna	VULB 9160	9160-3309	Schwarz beck	2011/12/27	2012/12/26
ETSTW-RE 112	AC POWER SOURCE	TFC-1005	None	T-Power	Function test	
ETSTW-RE 115	2.4GHz Notch Filter	N0124411	473874	MICROWAVE CIRCUITS	2012/1/12	2013/1/11
ETSTW-RE 120	RF Player	MP9200	MP9210-111022	ADIVIC	Function test	
ETSTW-RE 122	SIGNAL GENERATOR	SMF100A	102149	R&S	2012/7/3	2013/7/2
ETSTW-RE 125	5GHz Notch filter	5NSL11-5200/E221.3-O/O	1	K&L Microwave	2012/8/18	2013/8/17
ETSTW-RE 126	5GHz Notch filter	5NSL11-5800/E221.3-O/O	1	K&L Microwave	2012/8/18	2013/8/17
ETSTW-RE 127	RF Switch Box	RFS-01	None	WTS	2012/3/3	2013/3/2
ETSTW-EMI 001	HARMONICS 1000	HAR1000-1P	093	EMC-PARTNER	2012/8/10	2013/8/09
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	2012/11/6	2013/11/5
ETSTW-EMS 009	Magnetic Field Antenna	MF1000-1	104	EMC-PARTNER	Function Test	
ETSTW-EMS 010	Coupling De-coupling Network	CDN-UTP8	014	EMC-PARTNER	Function Test	
ETSTW-EMS 012	EM Injection Clamp	F-203I-23MM	476	FCC	2012/5/29	2013/5/28

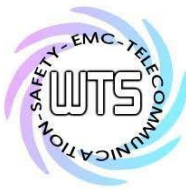




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ETSTW-EMS 016	EMF Tester	1390	071208732	TES	2012/10/5	2013/10/4
ETSTW-EMS 017	Multimeter	DM-1220	518614	HOLA	2012/8/10	2013/8/09
ETSTW-EMS 019	Electrostatic Discharge Simulator	ESS-2002	ESS06Y6300	NoiseKen	2012/10/5	2013/10/4
ETSTW-EMS 020	Humidity Temperature Meter	TES-1366	091011116	TES	2011/12/20	2012/12/19
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	2012/2/29	2013/2/28
ETSTW-RS 007	14" COLOR VIDEO MONITOR	HS-CM145A	0512011548	None	Function Test	
ETSTW-RS 009	SIGNAL GENERATOR	8648C	3642U01656	HP	2012/2/20	2013/2/19
ETSTW-RS 010	Broadband Field Meter	NBM-520	C-0195	Narda	2012/9/24	2013/9/23
ETSTW-GSM 002	Universal Radio Communication Tester	CMU 200	109439	R&S	2012/10/5	2013/10/4
ETSTW-GSM 019	Band Reject Filter	WRCTF824/849-822/851-40 /12+9SS	3	WI	2012/1/13	2013/1/12
ETSTW-GSM 020	Band Reject Filter	WRCD1747/1748-1743/1752-32/5SS	1	WI	2012/1/13	2013/1/12
ETSTW-GSM 021	Band Reject Filter	WRCD1879.5/1880.5-1875.5/1884.5-32/5SS	3	WI	2012/1/13	2013/1/12
ETSTW-GSM 022	Band Reject Filter	WRCT901.9/903.1-904.25-50/8SS	1	WI	2012/1/13	2013/1/12
ETSTW-GSM 023	Power Divider	4901.19.A	None	SUHNER	2012/9/18	2013/9/17
ETSTW-Cable 002	Microwave Cable	SUCOFLEX 104 (S_Cable 7)	238093	HUBER+SUHNER	2012/5/17	2013/5/16
ETSTW-Cable 003	Microwave Cable	SUCOFLEX 104 (S_Cable 11)	209953	HUBER+SUHNER	2012/5/17	2013/5/16
ETSTW-Cable 010	BNC Cable	5 M BNC Cable	None	JYE BAO CO.,LTD.	2012/3/5	2013/3/4
ETSTW-Cable 011	BNC Cable	BNC Cable 1	None	JYE BAO CO.,LTD.	Pre-test Use NCR	
ETSTW-Cable 012	N TYPE To SMA Cable	Cable 012	None	JYE BAO CO.,LTD.	2012/3/5	2013/3/4
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	2012/3/3	2013/3/2
ETSTW-Cable 017	BNC Cable	X Cable	B Cable 2	Schwarz beck	2012/3/3	2013/3/2
ETSTW-Cable 018	BNC Cable	Y Cable	B Cable 3	Schwarz beck	2012/3/3	2013/3/2
ETSTW-Cable 019	BNC Cable	Z Cable	B Cable 4	Schwarz beck	2012/3/3	2013/3/2
ETSTW-Cable 022	N TYPE Cable	5006	0002	JYE BAO CO.,LTD.	2012/4/6	2013/4/5
ETSTW-Cable 026	Microwave Cable	SUCOFLEX 104	279075	HUBER+SUHNER	2012/3/5	2013/3/4
ETSTW-Cable 027	Microwave Cable	SUCOFLEX 104	279083	HUBER+SUHNER	2012/3/5	2013/3/4
ETSTW-Cable 028	Microwave Cable	FA147A0015M2020	30064-2	UTIFLEX	2012/10/12	2013/10/11
ETSTW-Cable 029	Microwave Cable	FA147A0015M2020	30064-3	UTIFLEX	2012/10/12	2013/10/11
ETSTW-Cable 030	Microwave Cable	SUCOFLEX 104 (S_Cable 9)	279067	HUBER+SUHNER	2012/3/5	2013/3/4
ETSTW-Cable 031	Microwave Cable	SUCOFLEX 104 (S_Cable 10)	238092	HUBER+SUHNER	2012/11/28	2013/11/27
ETSTW-Cable 032	Microwave Cable	SUCOFLEX 104 (S_Cable 12)	237301	HUBER+SUHNER	Function Test	
ETSTW-Cable 039	Microwave Cable	SUCOFLEX 104 (S_Cable 19)	316739	HUBER+SUHNER	2012/5/17	2013/5/16

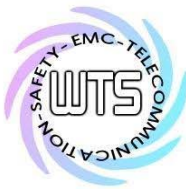


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ETSTW-Cable 040	Microwave Cable	SUCOFLEX 104 (S_Cable 20)	316738	HUBER+SUHNER	Function Test	
ETSTW-Cable 043	Microwave Cable	SUCOFLEX 104	317576	HUBER+SUHNER	2012/11/28	2013/11/27
ETSTW-Cable 047	Microwave Cable	SUCOFLEX 104	325518	HUBER+SUHNER	2012/11/28	2013/11/27
ETSTW-Cable 051	BNC Cable	BNC Cable 6	None	JYE BAO CO.,LTD.	2012/3/30	2013/3/29
ETSTW-Cable 052	BNC Cable	Clamp Cable	None	Schwarz beck	2012/3/30	2013/3/29
ETSTW-Cable 053	N TYPE To SMA Cable	RG142	None	JYE BAO CO.,LTD.	2012/4/6	2013/4/5
ETSTW-Cable 054	BNC To SMA Cable	RG142	None	JYE BAO CO.,LTD.	2012/4/6	2013/4/5
ETSTW-Cable 055	N TYPE Cable	N30N30-JBY240-80CM	20110621-1.1	JYE BAO CO.,LTD.	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	



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## **2.4 General Test Procedure**

**POWER LINE CONDUCTED INTERFERENCE:** The procedure used was ANSI STANDARD C63.4-2009 5.2 using a 50 $\mu$ H 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.

**FORMULA OF CONVERSION FACTORS:** The Field Strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dB $\mu$ V) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB.

Example:

Freq (MHz)      METER READING + ACF + CABLE LOSS (to the receiver) = FS  
33                      20 dB $\mu$ V + 10.36 dB + 6 dB = 36.36 dB $\mu$ V/m @3m

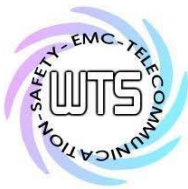
**ANSI STANDARD C63.4-2009 6.3.1 MEASUREMENT PROCEDURES:** The EUT was placed on a table 80 cm height and with dimensions of 1m by 1.5m (non metallic table). The EUT was placed in the centre of the table. The table used for radiated measurements is capable of continuous rotation. The spectrum was scanned from 30 MHz to 10<sup>th</sup> harmonic of the fundamental.

Peak readings were taken in three (3) orthogonal planes and the highest readings.

Measurements were made by Worldwide Testing Services(Taiwan) Co., Ltd. at the registered open field test site located at No.5-1, Lishui, Shuang Sing Village, Wanli Dist., New Taipei City 207, Taiwan (R.O.C.). 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.



# Worldwide Testing Services(Taiwan) Co., Ltd.

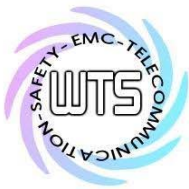
Registration number: W6M21210-12817-C-1

FCC ID: YKRH3EM69

## **3 Test results (enclosure)**

Test case	Para. Number	Required	Test passed	Test failed
Peak Output Power	15.209	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Spurious Emissions radiated – Transmitter operating	15.209	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Spurious Emissions radiated – Receiver operating	15.109	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Occupied bandwidth	2.1049	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Antenna Requirement	FCC 15.203	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Power Line Conducted Emission	FCC 15.207	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

The following is intentionally left blank.



Registration number: W6M21210-12817-C-1

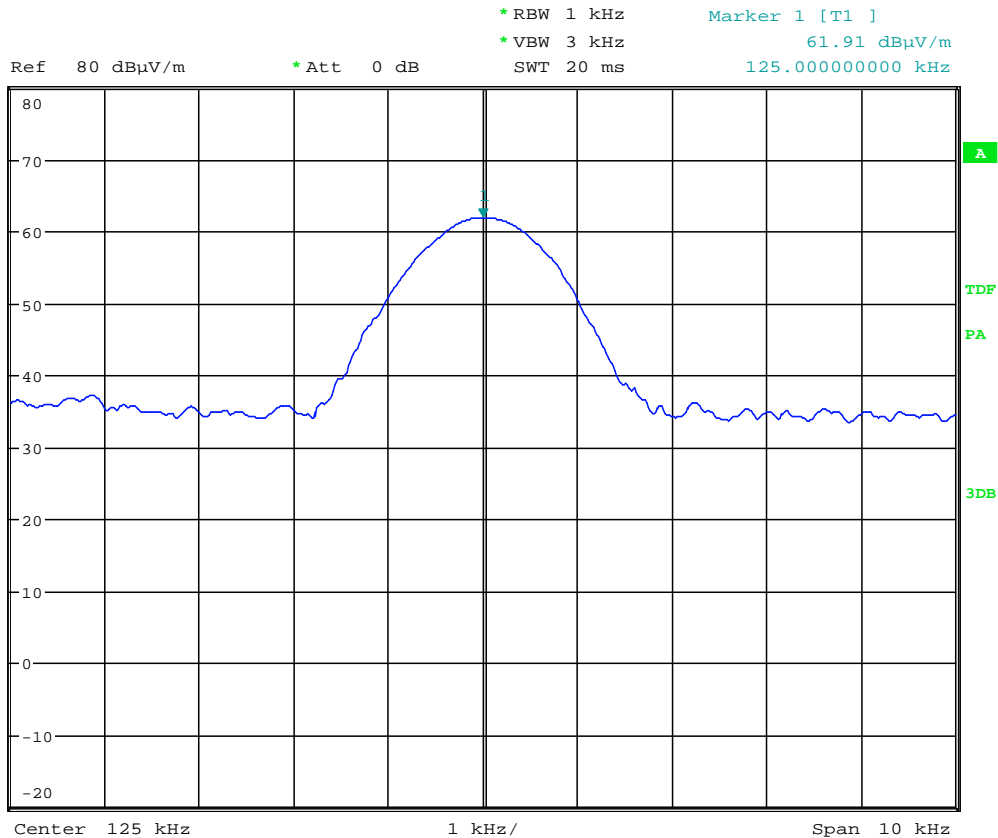
FCC ID: YKRH3EM69

## 3.1 Peak Output Power

FCC Rules: 15.209

The power was measured with modulation ( declared by the applicant).

### 12 VDC



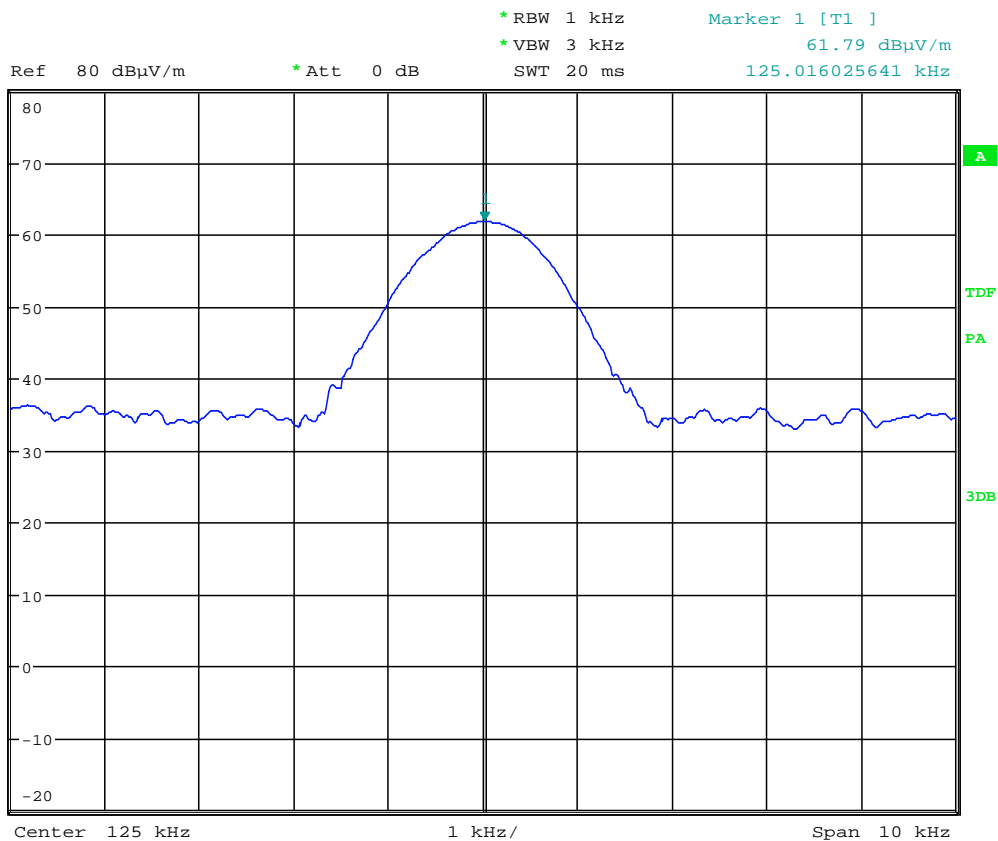
POWER

Date: 9.NOV.2012 16:15:43



Registration number: W6M21210-12817-C-1  
 FCC ID: YKRH3EM69

## 24 VDC



POWER

Date: 9.NOV.2012 16:16:51

Limits: 15.209

Frequency of Emission (MHz)	Field Strength of Fundamental Limit uV/m	Measurement distance
0.009 – 0.490	2400 / f (KHz)	300
0.49 – 1.705	24000 / f (KHz)	30
1.705 – 30	30	30
30 – 88	100	3
88 – 216	150	3
216 – 960	200	3
Above 960	500	3



## **Worldwide Testing Services(Taiwan) Co., Ltd.**

Registration number: W6M21210-12817-C-1  
FCC ID: YKRH3EM69

The test was performed in the anechoic OATS at 3 meter test distance, i.e. the distance between measuring antenna and EUT boundary. The results were extrapolated by using the square of an inverse linear distance factor DF:

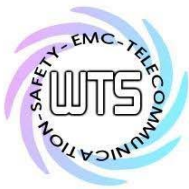
DF (distance factor) =  $40 \log (D_1/D_2) = 80 \text{ dB}$ , where

$D_1$  is the 300 meter specified measurement distance,  
 $D_2$  is the 3 meter test measurement distance.

For 125 kHz frequency the calculated limit is:

$\text{Limit}_{3\text{m}} = \text{Limit}_{300\text{m}} + \text{DF} = 25.67 \text{ dBuV/m} + 80 \text{ dB} = 105.67 \text{ dBuV/m}$

Test equipment used: ETSTW-RE 003, ETSTW-RE 004, ETSTW-RE 027, ETSTW-RE 055.



Registration number: W6M21210-12817-C-1

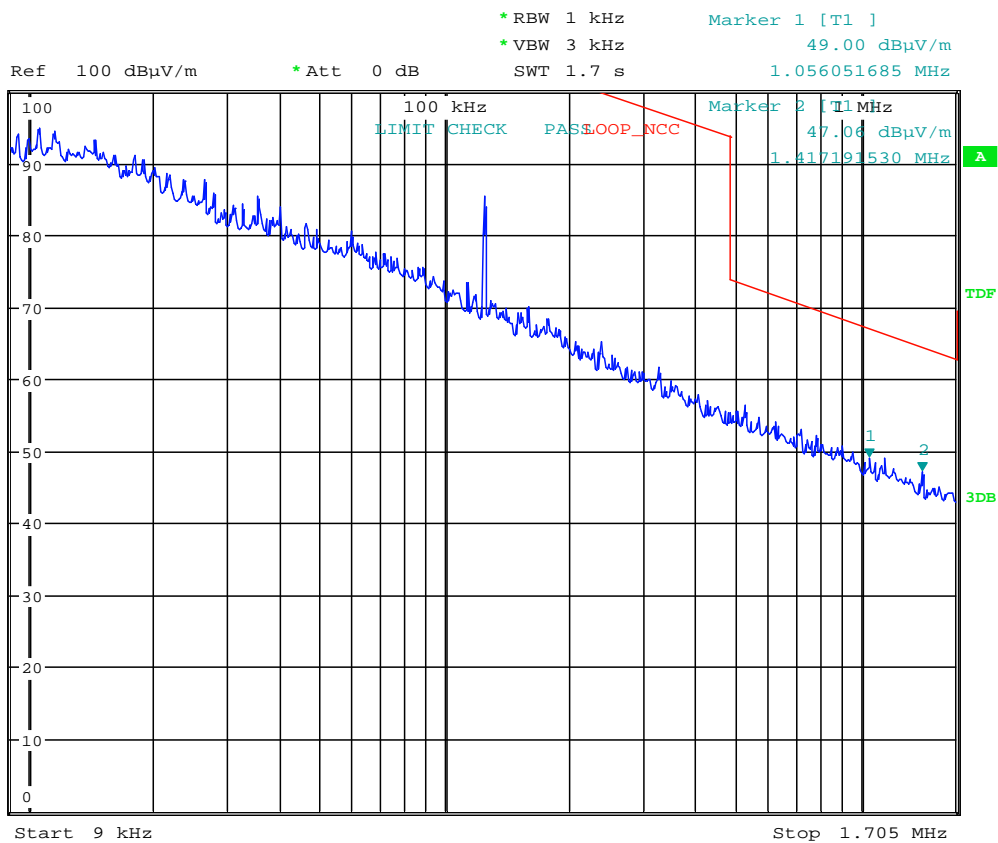
FCC ID: YKRH3EM69

## 3.2 Spurious Emissions radiated – Transmitter operating

FCC Rules: 15.209

The field strength of any emission appearing outside of the specific band shall not exceed the general radiated emission limits in 15.209.

### For the frequency from 9 kHz to 30 MHz:



Radiated

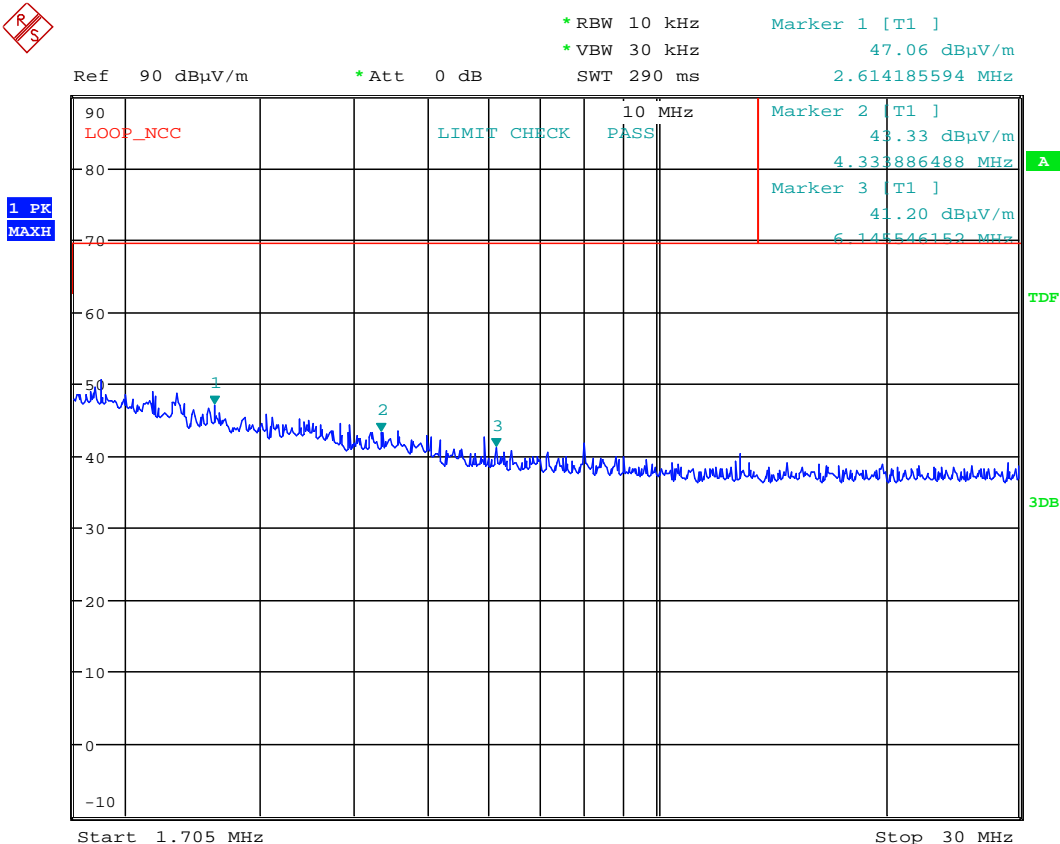
Date: 9.NOV.2012 16:57:15





# Worldwide Testing Services(Taiwan) Co., Ltd.

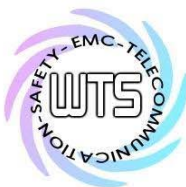
Registration number: W6M21210-12817-C-1  
FCC ID: YKRH3EM69



Radiated

Date: 9.NOV.2012 16:55:34

Note: The above field strength limits are specified at a distance of 3 meters.



# Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21210-12817-C-1  
 FCC ID: YKRH3EM69

## **For the frequency from 30 MHz to 1000 MHz.:**

Model: H3-EM-69-100-10 Date: 2012/11/10  
 Mode: TX Temperature: 24 °C Engineer: Vic  
 Polarization: Horizontal Humidity: 60 %

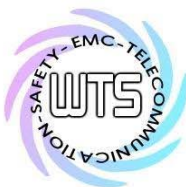
Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
45.5510	5.34	QP	14.02	19.36	40.00	-20.64	80	100
61.1022	6.86	QP	13.05	19.91	40.00	-20.09	155	100
111.6432	6.69	QP	12.77	19.46	43.50	-24.04	75	100
144.6894	6.01	QP	14.94	20.95	43.50	-22.55	315	100
164.1282	9.52	QP	14.87	24.39	43.50	-19.11	200	100
179.6793	10.65	QP	13.64	24.29	43.50	-19.21	175	100

Polarization: Vertical

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
51.3828	15.56	QP	14.02	29.58	40.00	-10.42	70	100
59.1583	15.31	QP	13.35	28.66	40.00	-11.34	245	100
98.0361	13.19	QP	10.43	23.62	43.50	-19.88	85	100
119.4188	11.17	QP	13.20	24.37	43.50	-19.13	60	100
164.1283	9.98	QP	14.87	24.85	43.50	-18.65	325	100
177.7355	10.22	QP	13.84	24.06	43.50	-19.44	175	100

### **Note**

- 1. Correction Factor = Antenna factor + Cable loss - Pre-amplifier**
- 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. Measurement uncertainty for 3m measurement : 0.009-30 MHz : ±6.45 dB, 30-1000 MHz = ± 3.72 dB, 1-18 GHz = ± 5.56 dB, 18-40 GHz = ± 3.46 dB ; Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.**
- 6. See attached diagrams in the Appendix.**



# Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21210-12817-C-1  
 FCC ID: YKRH3EM69

All other not noted test plots do not contain significant test results in relation to the limits.

**TEST RESULT (Transmitter):** The unit DOES meet the FCC requirements.

Limits: 15.209

Frequency of Emission (MHz)	Field Strength of Fundamental Limit uV/m	Measurement distance
0.009 – 0.490	2400 / f (KHz)	300
0.49 – 1.705	24000 / f (KHz)	30
1.705 – 30	30	30
30 – 88	100	3
88 – 216	150	3
216 – 960	200	3
Above 960	500	3

\* In the emission table above, the tighter limit applies at the band edges.

The test was performed in the anechoic chamber at 3 meter test distance, i.e. the distance between measuring antenna and EUT boundary. The results were extrapolated by using the square of an inverse linear distance factor DF:

$$DF = 40 \log (D_1/D_2) = 80 \text{ dB, where}$$

For  $D_1$  is the 300 meter specified measurement distance.

$D_2$  is the 3 meter test measurement distance.

The DF = 80 dB was applied for limit calculation at 3 meter test distance measurements.

For  $D_1$  is the 30 meter specified measurement distance.

$D_2$  is the 3 meter test measurement distance.

The DF = 40 dB was applied for limit calculation at 3 meter test distance measurements.

If the frequency between 9 – 490 kHz,

$$\text{Limit} = 20\log(2400/f(\text{kHz})) + 80$$

If the frequency between 490 – 1705 kHz,

$$\text{Limit} = 20\log(2400/f(\text{kHz})) + 40$$

If the frequency between 1705 – 30000 kHz,

$$\text{Limit} = 20\log 30 + 40$$

For 125 kHz frequency the calculated limit is:

$$\text{Limit}_{3m} = \text{Limit}_{300m} + DF = 25.67 \text{ dBuV/m} + 80 \text{ dB} = 105.67 \text{ dBuV/m}$$

Test equipment used: ETSTW-RE 003, ETSTW-RE 004, ETSTW-RE 027, ETSTW-RE 028, ETSTW-RE 029, ETSTW-RE 055, ETSTW-RE 049.



Registration number: W6M21210-12817-C-1  
 FCC ID: YKRH3EM69

### 3.3 Occupied Bandwidth

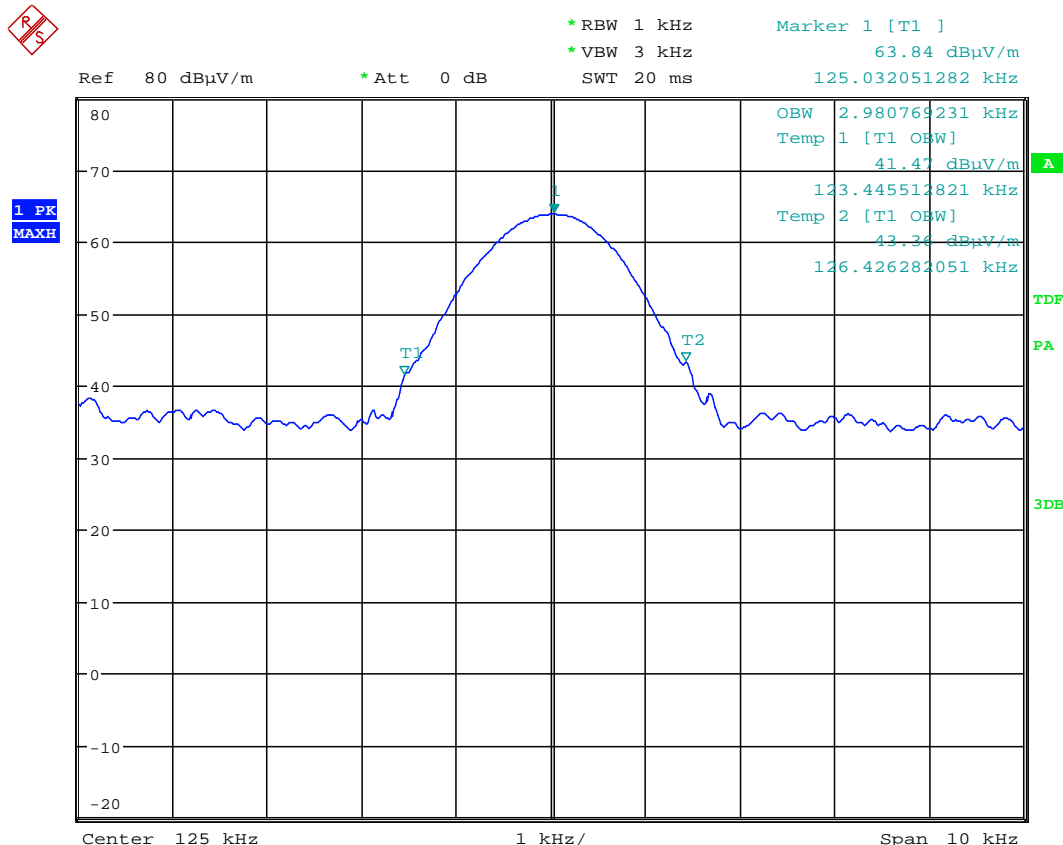
FCC Rules: 2.1049

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 are each equal to 0.5% of the total mean power radiated by a given emission.

The resolution bandwidth of the spectrum analyzer shall be set to a value greater than 5.0% of the allowed bandwidth specifications are given, the following guidelines are used:

Fundamental frequency	Minimum resolution bandwidth
9 kHz to 30 MHz	1 kHz
30 MHz to 1000 MHz	10 kHz
1000 MHz to 40 GHz	100 kHz

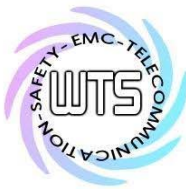
### Test result:



Bandwidth

Date: 9.NOV.2012 16:17:57

Test equipment: ETSTW-RE 055



Registration number: W6M21210-12817-C-1

FCC ID: YKRH3EM69

### **3.4 Antenna requirement**

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

Explanation: This antenna is Loop antenna which passes antenna requirement.

The equipment meets the requirements	yes <input checked="" type="checkbox"/>	no <input type="checkbox"/>
--------------------------------------	--	--------------------------------



Registration number: W6M21210-12817-C-1

FCC ID: YKRH3EM69

## 3.5 Radiated Emissions from Receiver Section of Receiver Part

**For the frequency from 9 kHz to 30 MHz:**

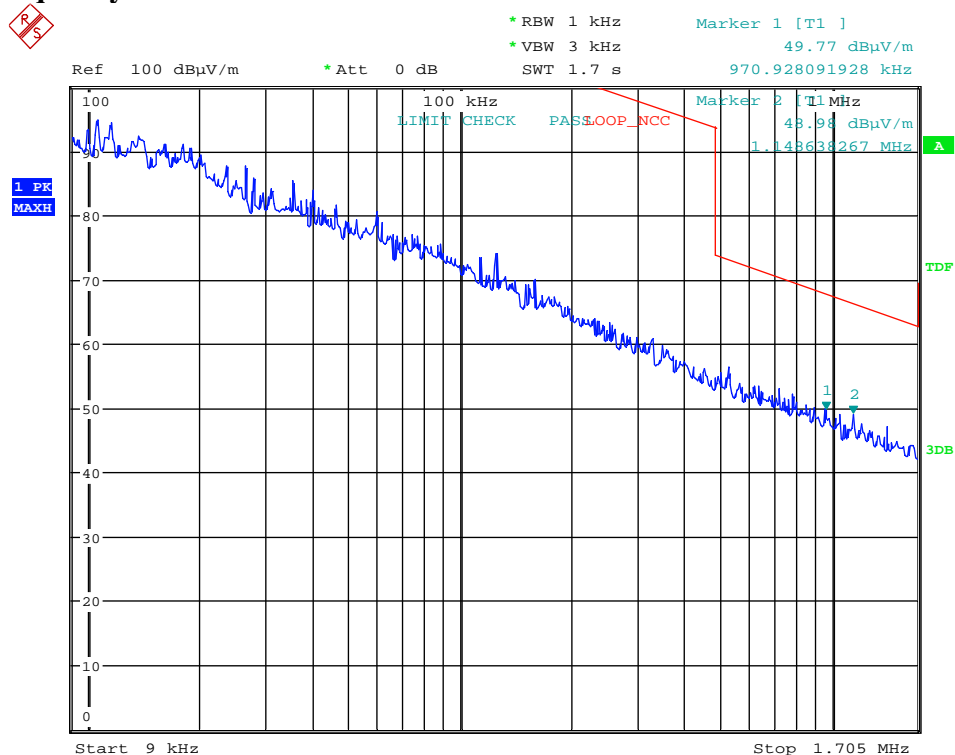
FCC Rule: 15.209

The field strength of any emission appearing outside of the specific band shall not exceed the general radiated emission limits in 15.209.

Frequency of Emission (MHz)	Field Strength of Fundamental Limit uV/m	Measurement distance
0.009 – 0.490	2400 / f (KHz)	300
0.49 – 1.705	24000 / f (KHz)	30
1.705 – 30	30	30
30 – 88	100	3
88 – 216	150	3
216 – 960	200	3
Above 960	500	3

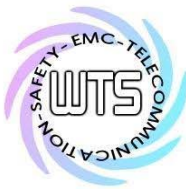
\* In the emission table above, the tighter limit applies at the band edges.

**For the frequency from 9 kHz to 30 MHz:**



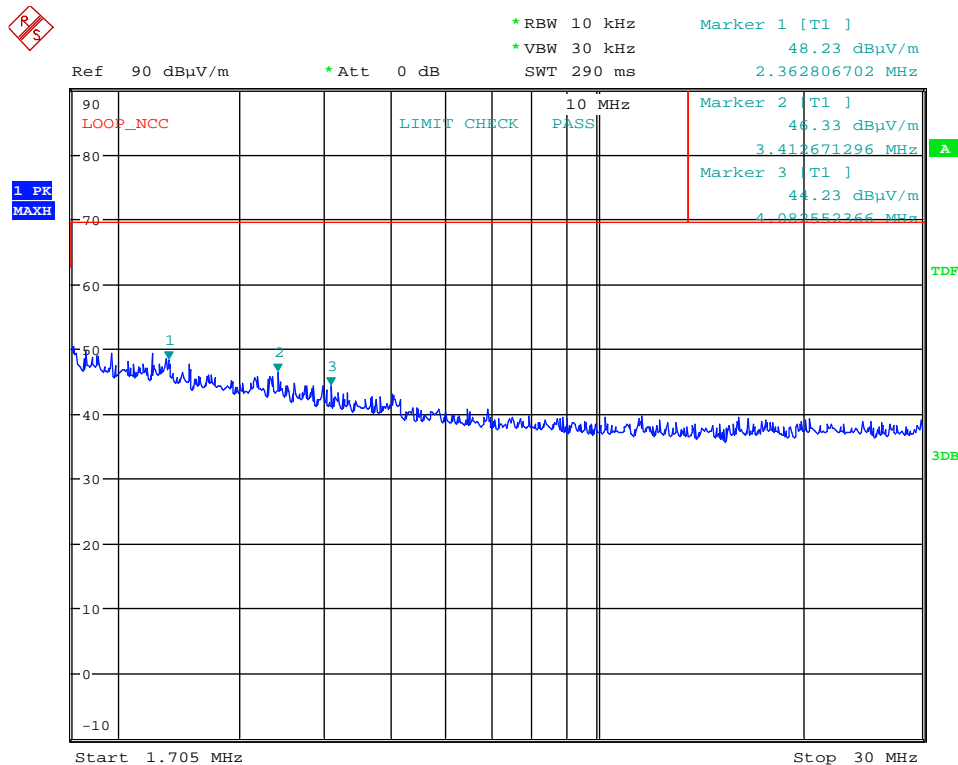
Radiated

Date: 9.NOV.2012 16:56:48



# Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21210-12817-C-1  
 FCC ID: YKRH3EM69



Radiated  
 Date: 9.NOV.2012 16:59:48

Note: The above field strength limits are specified at a distance of 3 meters.

The test was performed in the anechoic chamber at 3 meter test distance, i.e. the distance between measuring antenna and EUT boundary. The results were extrapolated by using the square of an inverse linear distance factor DF:

$$DF = 40 \log (D_1/D_2) = 80 \text{ dB, where}$$

For  $D_1$  is the 300 meter specified measurement distance.

$D_2$  is the 3 meter test measurement distance.

The DF = 80 dB was applied for limit calculation at 3 meter test distance measurements.

For  $D_1$  is the 30 meter specified measurement distance.

$D_2$  is the 3 meter test measurement distance.

The DF = 40 dB was applied for limit calculation at 3 meter test distance measurements.

If the frequency between 9 – 490 kHz, limit =  $20\log(2400/f(\text{kHz})) + 80$

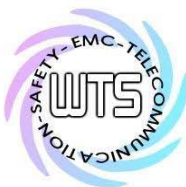
If the frequency between 490 – 1705 kHz, limit =  $20\log(2400/f(\text{kHz})) + 40$

If the frequency between 1705 – 30000 kHz, limit =  $20\log 30 + 40$

For 125 kHz frequency the calculated limit is:

$$\text{Limit}_{3m} = \text{Limit}_{300m} + DF = 25.67 \text{ dBuV/m} + 80 \text{ dB} = 105.67 \text{ dBuV/m}$$

Test equipment used: ETSTW-RE 003, ETSTW-RE 004, ETSTW-RE 027, ETSTW-RE 028, ETSTW-RE 029, ETSTW-RE 055, ETSTW-RE 049.



# Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21210-12817-C-1

FCC ID: YKRH3EM69

**For the frequency from 30 MHz to 1000 MHz.:**

FCC Rule: 15.109

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

Model: H3-EM-69-100-10 Date: 2012/11/10  
 Mode: RX Temperature: 24 °C Engineer: Vic  
 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)
45.5510	5.70	QP	14.02	19.72	40.00	-20.28	65	100
59.1582	5.54	QP	13.35	18.89	40.00	-21.11	325	100
111.6432	6.86	QP	12.77	19.63	43.50	-23.87	55	100
164.1282	9.98	QP	14.87	24.85	43.50	-18.65	85	100
183.5671	11.41	QP	13.33	24.74	43.50	-18.76	200	100
193.2865	11.41	QP	12.68	24.09	43.50	-19.41	145	100

Polarization: Vertical

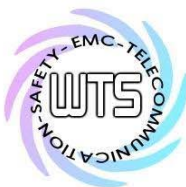
Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
39.7194	11.82	QP	13.65	25.47	40.00	-14.53	345	100
51.3828	15.37	QP	14.02	29.39	40.00	-10.61	100	100
61.1022	14.58	QP	13.05	27.63	40.00	-12.37	275	100
119.4188	11.29	QP	13.20	24.49	43.50	-19.01	85	100
164.1283	9.91	QP	14.87	24.78	43.50	-18.72	50	100
177.7355	10.54	QP	13.84	24.38	43.50	-19.12	145	100

Test equipment used: ETSTW-RE 003, ETSTW-RE 004, ETSTW-RE 028, ETSTW-RE 029, ETSTW-RE 030, ETSTW-RE 044, ETSTW-RE 064

**Note**

- Correction Factor = Antenna factor + Cable loss - Preamplifier**
- The formula of measured value as: Test Result = Reading + Correction Factor**
- Detector function in the form : PK = Peak, QP = Quasi Peak, AV = Average**
- All not in the table noted test results are more than 20 dB below the relevant limits.**
- Measurement uncertainty for 3m measurement : 0.009-30 MHz : ±6.45 dB, 30-1000 MHz = ± 3.72 dB, 1-18 GHz = ± 5.56 dB, 18-40 GHz = ± 3.46 dB ; Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.**
- See attached diagrams in the Appendix.**





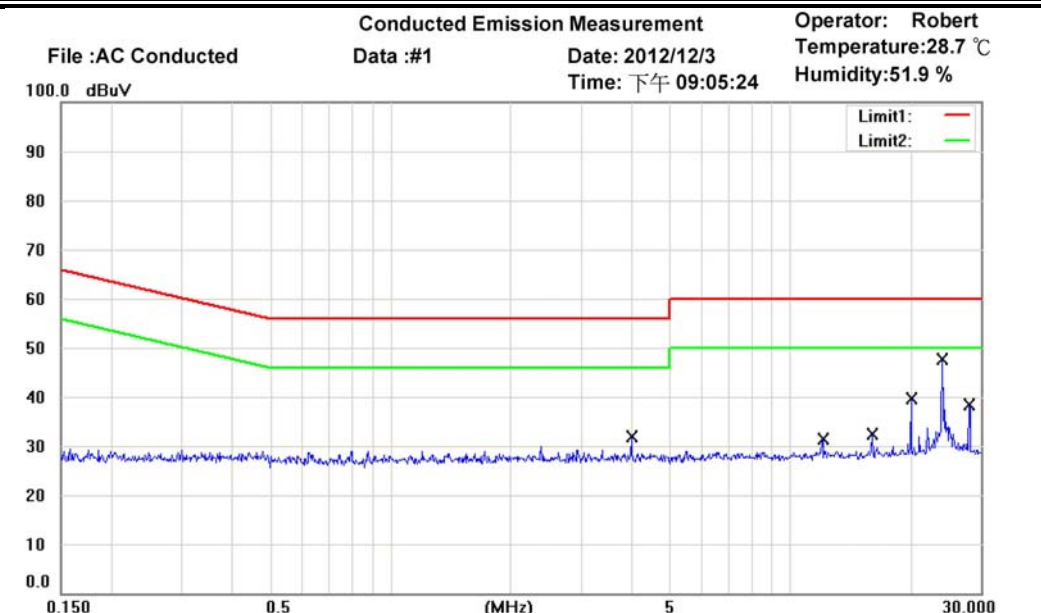
Registration number: W6M21210-12817-C-1  
 FCC ID: YKRH3EM69

### 3.6 Power Line Conducted Emission

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the table bellows with this provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals.

This measurement was transact first with instrumentation using an average and peak detector and a 10 kHz bandwidth. If the peak detector achieves a calculated level, the measurement is repeated by an instrumentation using a quasi-peak detector.

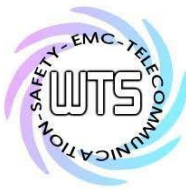
Frequency	Level (dBμV)	
	quasi-peak	average
150 kHz	Lower limit line	Lower limit line



File :AC Conducted      Conducted Emission Measurement      Operator: Robert  
 Data :#1      Date: 2012/12/3      Temperature:28.7 °C  
 Time: 下午 09:05:24      Humidity:51.9 %

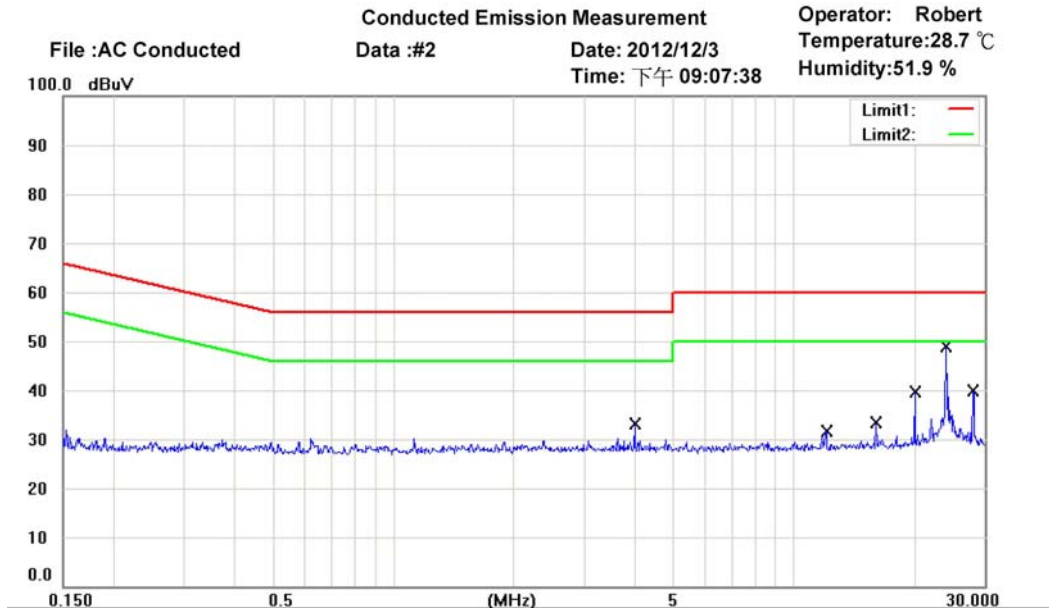
Site : Chamber\_03  
 Condition : FCC Part 15 Class B Conduction (QP)      Phase: N  
 EUT : W6M21210-12817      Power : 110VAC  
 M/N: H3-EM-69-100-10  
 Test Mode :  
 Note :

Mk.	Frequency (MHz)	Reading (dBμV)	Detector	Corrected factor(dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Comment
	3.9987	17.77	QP	10.04	27.81	56.00	-28.19	
	3.9987	15.02	AVG	10.04	25.06	46.00	-20.94	
	12.0125	5.47	QP	10.28	15.75	60.00	-44.25	
	12.0125	2.48	AVG	10.28	12.76	50.00	-37.24	
	16.0000	18.80	QP	10.38	29.18	60.00	-30.82	
	16.0000	15.96	AVG	10.38	26.34	50.00	-23.66	
	20.0000	27.30	QP	10.52	37.82	60.00	-22.18	
	20.0000	23.28	AVG	10.52	33.80	50.00	-16.20	
	24.0125	22.42	QP	10.61	33.03	60.00	-26.97	
	24.0125	11.64	AVG	10.61	22.25	50.00	-27.75	
	28.0000	27.52	QP	10.70	38.22	60.00	-21.78	
*	28.0000	24.03	AVG	10.70	34.73	50.00	-15.27	



# Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21210-12817-C-1  
 FCC ID: YKRH3EM69



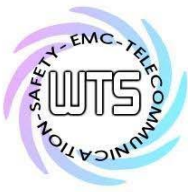
Site : Chamber\_03  
 Condition : FCC Part 15 Class B Conduction (QP)      Phase: L1  
 EUT : W6M21210-12817      Power : 110VAC  
 M/N: H3-EM-69-100-10  
 Test Mode :  
 Note :

Mk.	Frequency (MHz)	Reading (dBuV)	Detector	Corrected factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Comment
	3.9987	17.97	QP	10.30	28.27	56.00	-27.73	
	3.9987	15.15	AVG	10.30	25.45	46.00	-20.55	
	12.0000	18.19	QP	10.59	28.78	60.00	-31.22	
	12.0000	14.71	AVG	10.59	25.30	50.00	-24.70	
	16.0000	18.97	QP	10.73	29.70	60.00	-30.30	
	16.0000	16.08	AVG	10.73	26.81	50.00	-23.19	
	20.0000	27.48	QP	10.91	38.39	60.00	-21.61	
	20.0000	23.44	AVG	10.91	34.35	50.00	-15.65	
	24.0000	36.40	QP	10.99	47.39	60.00	-12.61	
*	24.0000	32.11	AVG	10.99	43.10	50.00	-6.90	
	28.0000	27.16	QP	11.08	38.24	60.00	-21.76	
	28.0000	23.71	AVG	11.08	34.79	50.00	-15.21	

**Limits:**

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi Peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

Test equipment used: ETSTW-CE 001, ETSTW-CE 004, ETSTW-CE 006, ETSTW-RE 064.

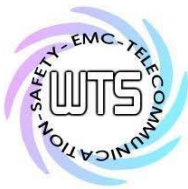


Registration number: W6M21210-12817-C-1  
FCC ID: YKRH3EM69

## **Appendix**

### **Measurement diagrams**

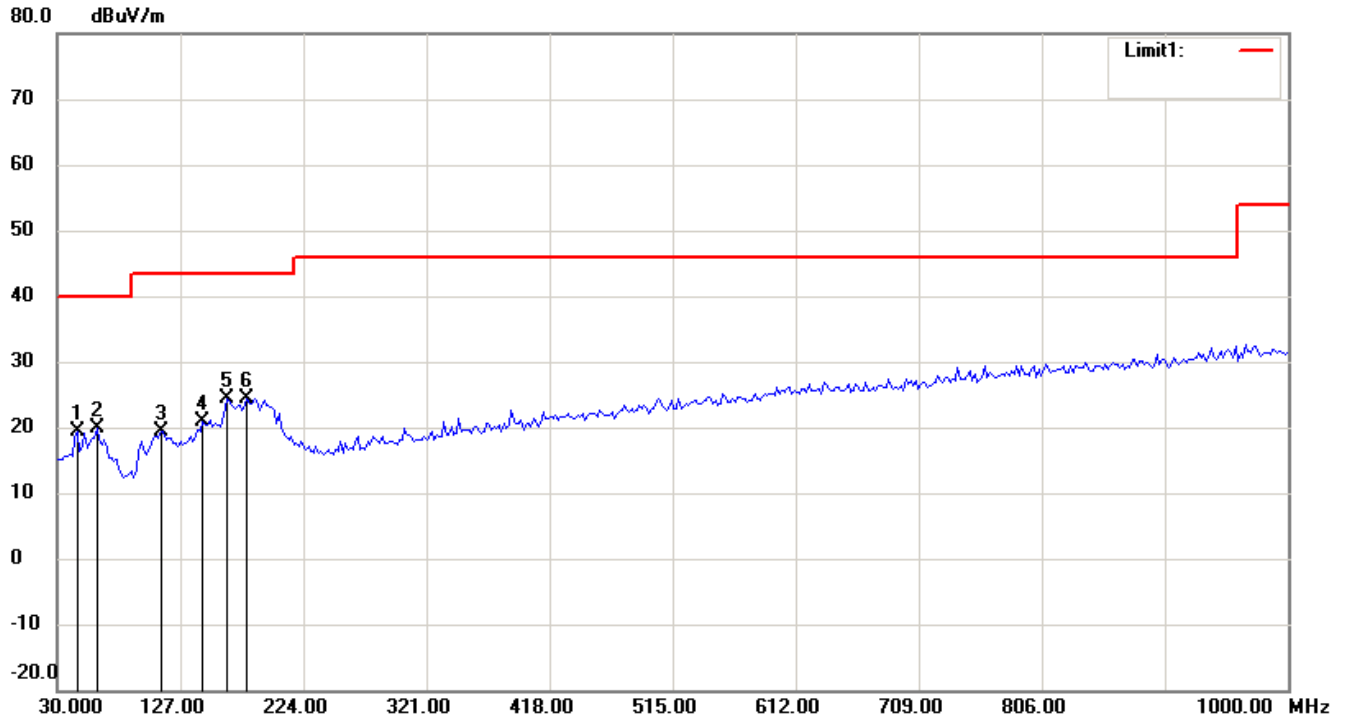
Spurious Emissions Radiated



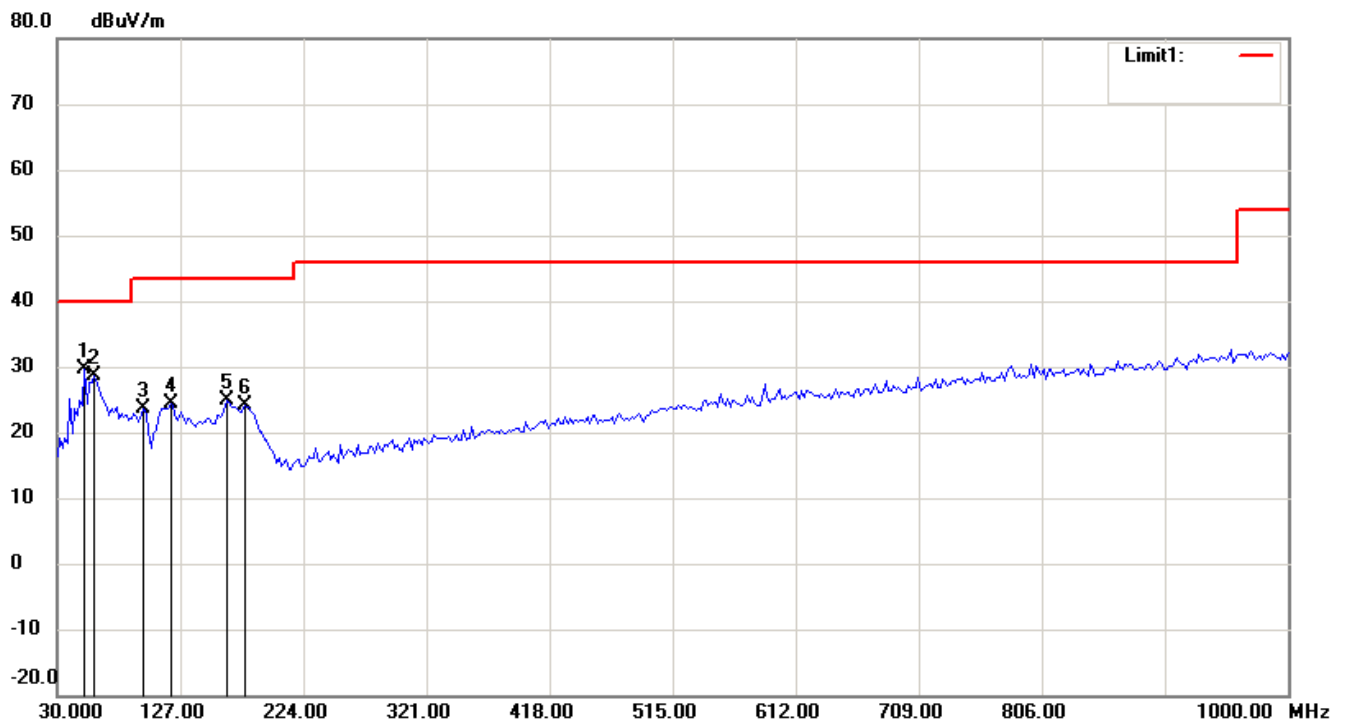
Registration number: W6M21210-12817-C-1

FCC ID: YKRH3EM69

## Spurious Emissions radiated –Transmitter - Frequency from 30 MHz to 1000 MHz Antenna Polarization H

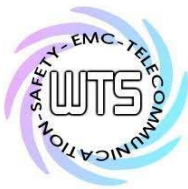


## Antenna Polarization V



### Note:

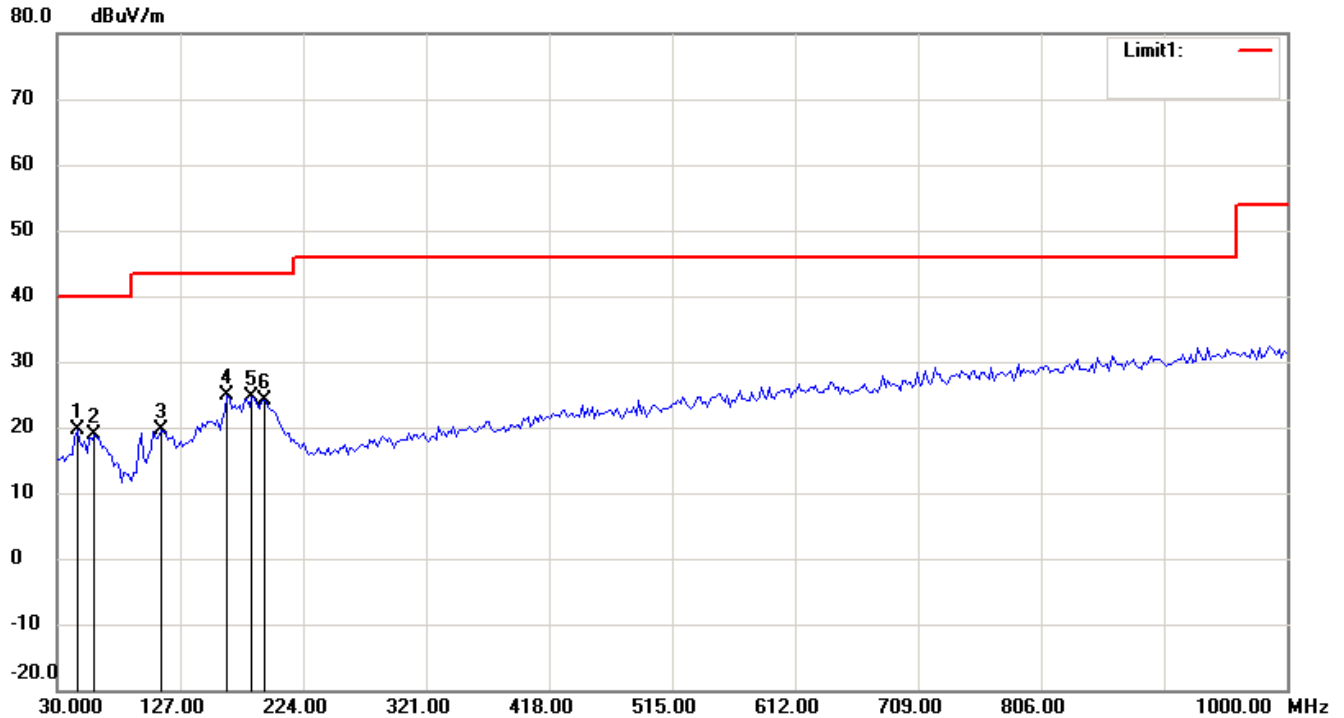
1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification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



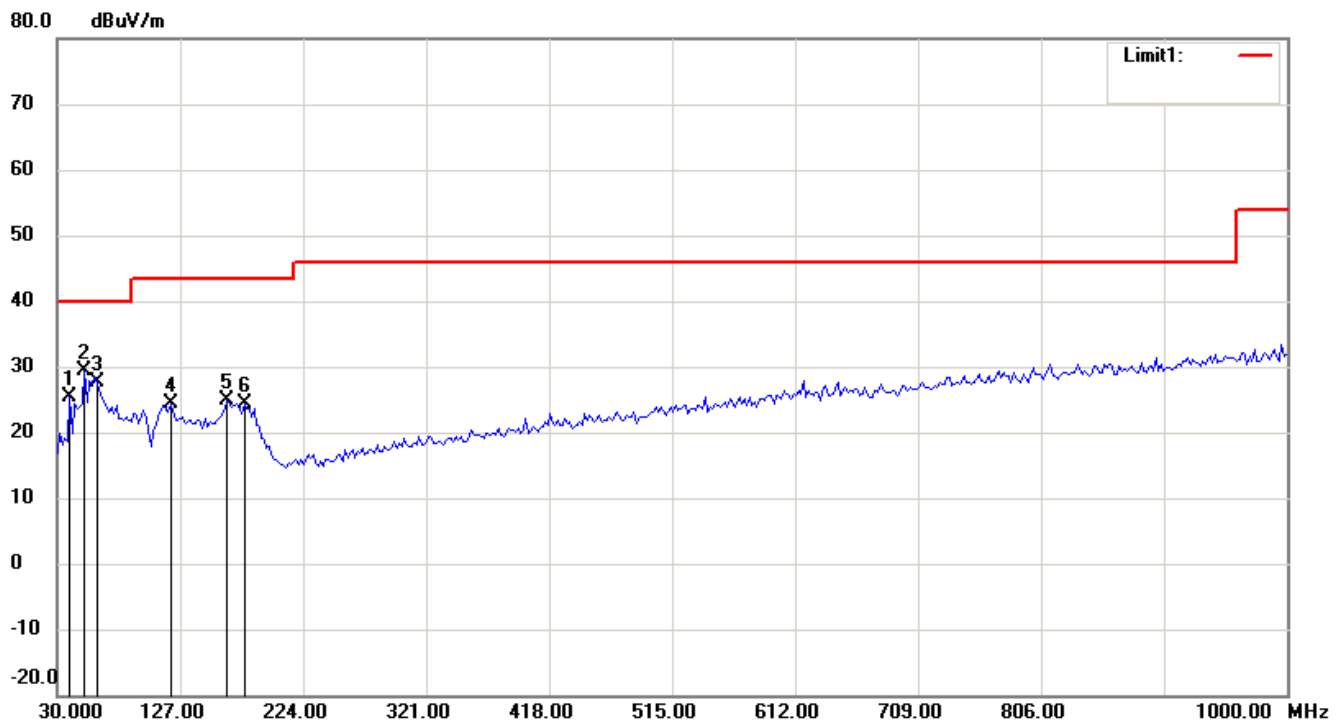
Registration number: W6M21210-12817-C-1

FCC ID: YKRH3EM69

## Spurious Emissions radiated –Receiver - Frequency from 30 MHz to 1000 MHz Antenna Polarization H



## Antenna Polarization V



### Note:

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.