

FCC PART 90 / IC RSS-119 TEST REPORT

for

Long Range Dual Mode Radio Phone

with UHF 2-Way Radio Handset

Model No.: SPR-922U1

FCC ID: A8J-SPR922U1

IC: 10103A-SPR922U1

of

Applicant: EnGenius Technologies

Address: 1580 Scenic Avenue, Costa Mesa California

United States 92626

Tested and Prepared

by

Worldwide Testing Services (Taiwan) Co., Ltd.

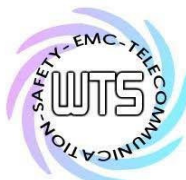
FCC Registration No.: 930600

Industry Canada filed test laboratory Reg. No. IC 5679A-1, IC 5107A-1

A2LA Accredited No.: 2732.01



Report No.: W6M21601-15546-C-1



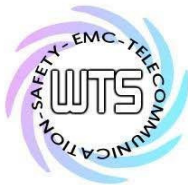
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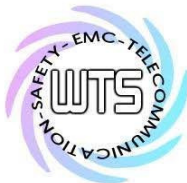
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1. GENERAL INFORMATION

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:

March 30, 2016

Mark Cheng

Date

WTS-Lab.

Name

Signature

Technical responsibility for area of testing:

March 30, 2016

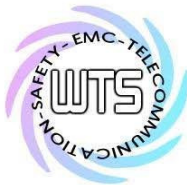
Kevin Wang

Date

WTS

Name

Signature



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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.)
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

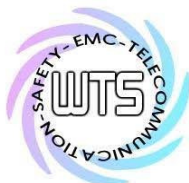
A2LA accredited number: 2732.01

FCC filed test laboratory Reg. No. 930600

Industry Canada filed test laboratory Reg. No. IC 5679A-1, IC 5107A-1

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

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



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1.3 Details of Approval Holder

Name: EnGenius Technologies
Street: 1580 Scenic Avenue,
City: Costa Mesa California
Country: United States 92626
Telephone: 888.735.7888
Fax: 714.432.8667

1.4 Application Details

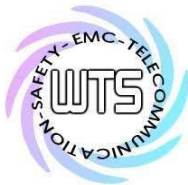
Date of receipt of test item: March 17, 2016
Date of test: from March 18, 2016 to March 30, 2016

1.5 General Information of Test Item

Type of test item: Long Range Dual Mode Radio Phone with UHF 2-Way Radio Handset
Model Number: SPR-922U1
Brand Name: EnGenius
Multi-listing model number: DuraFon-UHF-HC
Photos: See appendix

Technical Data

Operating frequency band: 461.0375-469.5625 MHz
Sample tested frequency: 461.0375 MHz, 464.5 MHz, 469.5625 MHz
Type of modulation: FM
Channel spacing: 12.5 kHz
Rated system deviation: 2.5 kHz
Designation of emission: 7K08F3E
Antenna Type / Gain: Dipole antenna / 0 dBi
Connection of Antenna: ☒ detachable ☐ not detachable
Power Rating: Battery 3.7 VDC, 2300 mAh
Operation modes: Half-duplex



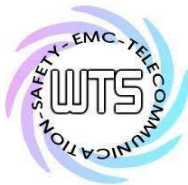
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Manufacturer: (if applicable)

Name:	Senao Networks, Inc.
Street:	No.500 Fusing 3rd.,Hwa-Ya Technology
Town:	ParkKuei-Shan Hsiang, Taoyuan County,
Country:	Taiwan

1.6 Test Standards

Technical standard: FCC RULES PART 90 (2015-10)
RSS-119 Issue 12: May 2015



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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 %

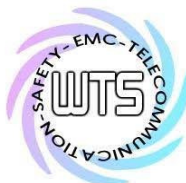
Air pressure: 86-103 KPa

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.



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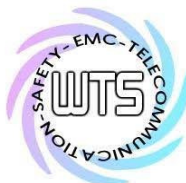
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2.4 Test Equipment List

No.	Test equipment	Type	Serial No.	Manufacturer	Cal. Date	Next Cal. Date
ETSTW-CE 001	EMI TEST RECEIVER	ESHS10	842121/013	R&S	2015/9/4	2016/9/3
ETSTW-CE 003	AC POWER SOURCE	APS-9102	D161137	GW	Function Test	
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	2015/7/13	2016/7/12
ETSTW-CE 016	TWO-LINE V-NETWORK	ENV216	100050	R&S	2015/9/7	2016/9/6
ETSTW-RE 003	EMI TEST RECEIVER	ESI 26	831438/001	R&S	2015/8/14	2016/8/13
ETSTW-RE 004	EMI TEST RECEIVER	ESI 40	832427/004	R&S	2015/9/4	2016/9/3
ETSTW-RE 005	EMI TEST RECEIVER	ESVS10	843207/020	R&S	2015/8/14	2016/8/13
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	2015/6/22	2016/6/21
ETSTW-RE 027	Passive Loop Antenna	6512	00034563	ETS-Lindgren	2015/6/16	2016/6/15
ETSTW-RE 030	Double-Ridged Guide Horn Antenna	3117	00035224	ETS-Lindgren	2016/3/16	2017/3/15
ETSTW-RE 042	Biconical Antenna	HK116	100172	R&S	2016/1/25	2017/1/24
ETSTW-RE 043	Log-Periodic Dipole Antenna	HL223	100166	R&S	2016/3/16	2017/3/15
ETSTW-RE 044	Log-Periodic Antenna	HL050	100094	R&S	2016/3/16	2017/3/15
ETSTW-RE 045	ESA-E SERIES SPECTRUM ANALYZER	E4404B	MY45111242	Agilent	Pre-test Use	
ETSTW-RE 049	TRILOG Super Broadband test Antenna	VULB 9160	9160-3185	Schwarzbeck	2016/3/16	2017/3/15
ETSTW-RE 050	Attenuator 10dB	50HF-010-1	None	JFW	2016/2/25	2017/2/24
ETSTW-RE 051	Attenuator 6dB	50HF-006-1	None	JFW	2016/2/25	2017/2/24
ETSTW-RE 053	Attenuator 3dB	50HF-003-1	None	JFW	2016/2/25	2017/2/24
ETSTW-RE 055	SPECTRUM ANALYZER	FSU 26	200074	R&S	2016/2/27	2017/2/26
ETSTW-RE 060	Attenuator 30dB	5015-30	F651012z-01	ATM	2016/2/25	2017/2/24
ETSTW-RE 062	Amplifier Module	CHC 2	None	KMIC	2015/11/25	2016/11/24
ETSTW-RE 064	Bluetooth Test Set	MT8852B-042	6K00005709	Anritsu	Function Test	
ETSTW-RE 069	Double-Ridged Guide Horn Antenna	3117	00069377	ETS-Lindgren	Function Test	
ETSTW-RE 072	CELL SITE TEST SET	8921A	3339A00375	HP	2015/9/6	2016/9/5
ETSTW-RE 088	SOLID STATE AMPLIFIER	KMA180265A01	99057	KMIC	2015/9/21	2016/9/20
ETSTW-RE 099	DC Block	50DB-007-1	None	JFW	2016/2/25	2017/2/24
ETSTW-RE 111	TRILOG Super Broadband test Antenna	VULB 9160	9160-3309	Schwarz beck	2015/9/18	2016/9/17
ETSTW-RE 112	AC POWER SOURCE	TFC-1005	T-0A023536	T-Power	Function test	
ETSTW-RE 115	2.4GHz Notch Filter	N0124411	473874	MICROWAVE CIRCUITS	2016/1/13	2017/1/12
ETSTW-RE 120	RF Player	MP9200	MP9210-111022	ADIVIC	Function test	



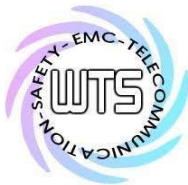
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ETSTW-RE 122	SIGNAL GENERATOR	SMF100A	102149	R&S	2015/6/8	2016/6/7
ETSTW-RE 125	5GHz Notch filter	5NSL11-5200/E221.3-O/O	1	K&L Microwave	2015/8/11	2016/8/10
ETSTW-RE 126	5GHz Notch filter	5NSL11-5800/E221.3-O/O	1	K&L Microwave	2015/8/11	2016/8/10
ETSTW-RE 127	RF Switch Box	RFS-01	None	WTS	2016/2/25	2017/2/24
ETSTW-RE 128	5.3GHz Notch filter	N0153001	SN487233	Microwave Circuits	2015/8/11	2016/8/10
ETSTW-RE 129	5.5GHz Notch filter	N0555984	SN487234	Microwave Circuits	2015/8/11	2016/8/10
ETSTW-RE 130	Handheld RF Spectrum Analyzer	N9340A	CN0147000204	Agilent	Pre-test Use	
ETSTW-RE 143	Humidity Temperature Meter	TES-1260	110104623	TES	2015/9/9	2016/9/8
ETSTW-GSM 002	Universal Radio Communication Tester	CMU 200	109439	R&S	2016/3/4	2017/3/3
ETSTW-GSM 003	Radio Communication Analyzer	MT8820C	6201342073	Anritsu	2016/2/3	2017/2/2
ETSTW-GSM 019	Band Reject Filter	WRCTF824/849-822/851-40 /12+9SS	3	WI	2016/1/13	2017/1/12
ETSTW-GSM 020	Band Reject Filter	WRCD1747/1748-1743/1752-32/5SS	1	WI	2016/1/13	2017/1/12
ETSTW-GSM 021	Band Reject Filter	WRCD1879.5/1880.5-1875.5/1884.5-32/5SS	3	WI	2016/1/13	2017/1/12
ETSTW-GSM 022	Band Reject Filter	WRCT901.9/903.1-904.25-50/8SS	1	WI	2016/1/13	2017/1/12
ETSTW-GSM 023	Power Divider	4901.19.A	None	SUHNER	2015/9/16	2016/9/15
ETSTW-Cable 010	BNC Cable	5 M BNC Cable	None	JYE BAO CO.,LTD.	2015/9/11	2016/9/10
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.	2015/9/11	2016/9/10
ETSTW-Cable 016	BNC Cable	Switch Box	B Cable 1	Schwarz beck	2016/2/24	2017/2/23
ETSTW-Cable 017	BNC Cable	X Cable	B Cable 2	Schwarz beck	2016/2/24	2017/2/23
ETSTW-Cable 018	BNC Cable	Y Cable	B Cable 3	Schwarz beck	2016/2/24	2017/2/23
ETSTW-Cable 019	BNC Cable	Z Cable	B Cable 4	Schwarz beck	2016/2/24	2017/2/23
ETSTW-Cable 020	N TYPE Cable	OATS Cable 1	N30N30-L335-15M	JYE BAO CO.,LTD.	2015/4/23	2016/4/22
ETSTW-Cable 022	N TYPE Cable	5006	0002	JYE BAO CO.,LTD.	2016/3/14	2017/3/13
ETSTW-Cable 026	Microwave Cable	SUCOFLEX 104	279075	HUBER+SUHNER	2016/2/25	2017/2/24
ETSTW-Cable 027	Microwave Cable	SUCOFLEX 104	279083	HUBER+SUHNER	2015/5/14	2016/5/13
ETSTW-Cable 028	Microwave Cable	FA147A0015M2020	30064-2	UTIFLEX	2015/9/21	2016/9/20
ETSTW-Cable 029	Microwave Cable	FA147A0015M2020	30064-3	UTIFLEX	2015/9/21	2016/9/20
ETSTW-Cable 030	Microwave Cable	SUCOFLEX 104 (S_Cable 9)	279067	HUBER+SUHNER	2016/2/25	2017/2/24
ETSTW-Cable 031	Microwave Cable	SUCOFLEX 104 (S_Cable 10)	238092	HUBER+SUHNER	2015/11/25	2016/11/24
ETSTW-Cable 043	Microwave Cable	SUCOFLEX 104	317576	HUBER+SUHNER	2015/11/25	2016/11/24
ETSTW-Cable 048	Microwave Cable	SUCOFLEX 104	325518	HUBER+SUHNER	2015/11/25	2016/11/24
ETSTW-Cable 058	Microwave Cable	SUCOFLEX 104	none	HUBER+SUHNER	2016/3/14	2017/3/13
WTSTW-SW 002	EMI TEST SOFTWARE	EZ EMC	None	Farad	Version ETS-03A1	



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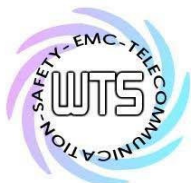
2.5 General Test Procedure

POWER LINE CONDUCTED INTERFERENCE: The procedure used was ANSI STANDARD C63.10-2013 using a 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 C63.10-2013 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 100 kHz 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.

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.



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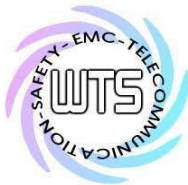
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3. TEST RESULTS (ENCLOSURE)

TEST CASE	PARA. NUMBER	SECTION	REQUIRED	TEST PASSED	TEST FAILED
MODULATION CHARACTERISTICS	2.1047(a) (b); 2.1033(c) IC RSS-119 5.2	4	☒	☒	☐
FREQUENCY STABILITY	90.213 IC RSS-119 5.3	5	☒	☒	☐
TRANSMITTER OUTPUT POWER	90.205 IC RSS-119 5.4	6	☒	☒	☐
EMISSION MASKS	90.210 IC RSS-119 5.5	7	☒	☒	☐
TRANSMITTER SPURIOUS RADIATED EMISSION	90.210 IC RSS-119 5.8	8	☒	☒	☐
TRANSMITTER SPURIOUS CONDUCTED EMISSION	90.210 IC RSS-119 5.8	9	☒	☒	☐
TRANSIENT FREQUENCY BEHAVIOR	90.214 IC RSS-119 5.9	10	☒	☒	☐

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4. MODULATION CHARACTERISTICS

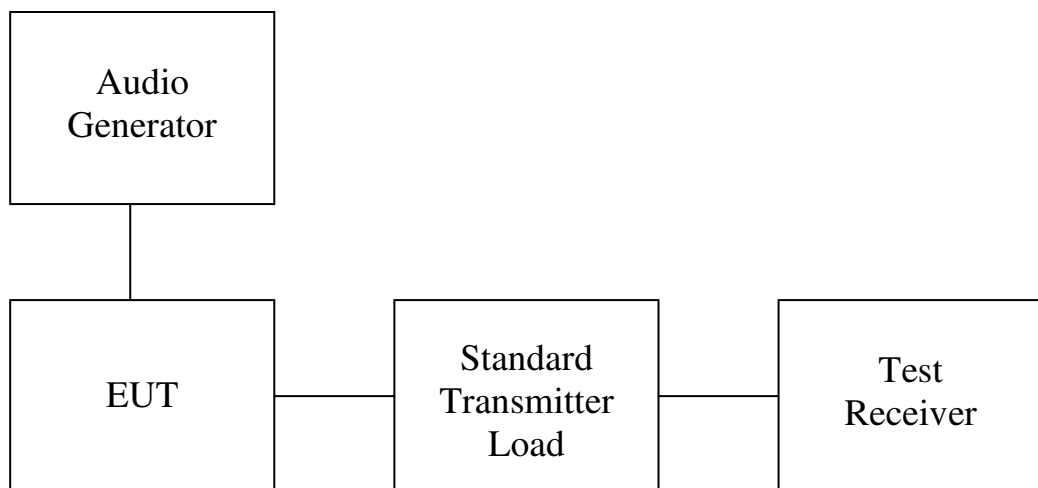
4.1 Test procedure

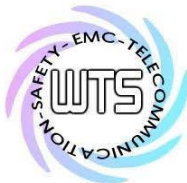
Modulation limiting is the transmitter circuit's ability to limit the transmitter from producing deviations in excess of rated system deviation.

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.

4.2 Test Setup





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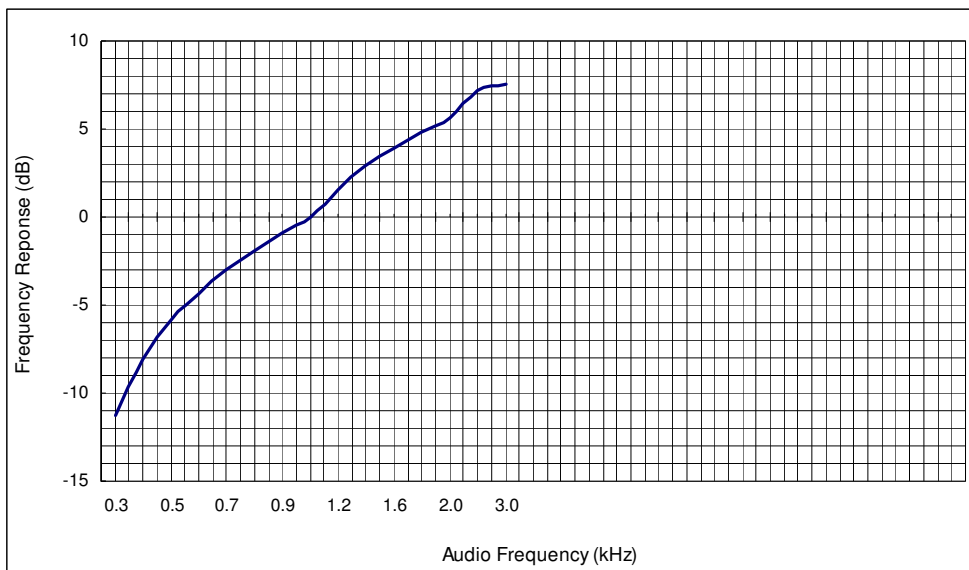
4.3 Test results

4.3.1 Audio Frequency Response

Rule Part No.: Part 2.1047(a)(b) Method of Measurement: The audio frequency response was measured in accordance with TIA/EIA Specification 603 with no exception. A curve or equivalent data showing the frequency response of the audio modulating circuit over a range of 300 – 3000Hz shall be submitted. The audio frequency response curve is shown below.

Test Audio level (1kHz and 20% max. deviation): 0.4mV

Audio Frequency (kHz)	A.R (dB)	F.D.
461.0375 MHz		
0.3	-11.229	0.14
0.4	-8.131	0.20
0.5	-5.852	0.26
0.6	-4.324	0.31
0.7	-3.025	0.36
0.8	-1.896	0.41
0.9	-0.896	0.46
1.0	0.000	0.51
1.2	1.555	0.61
1.4	2.874	0.71
1.6	3.910	0.80
1.8	4.836	0.89
2.0	5.673	0.98
2.5	7.138	1.16
3.0	7.504	1.21





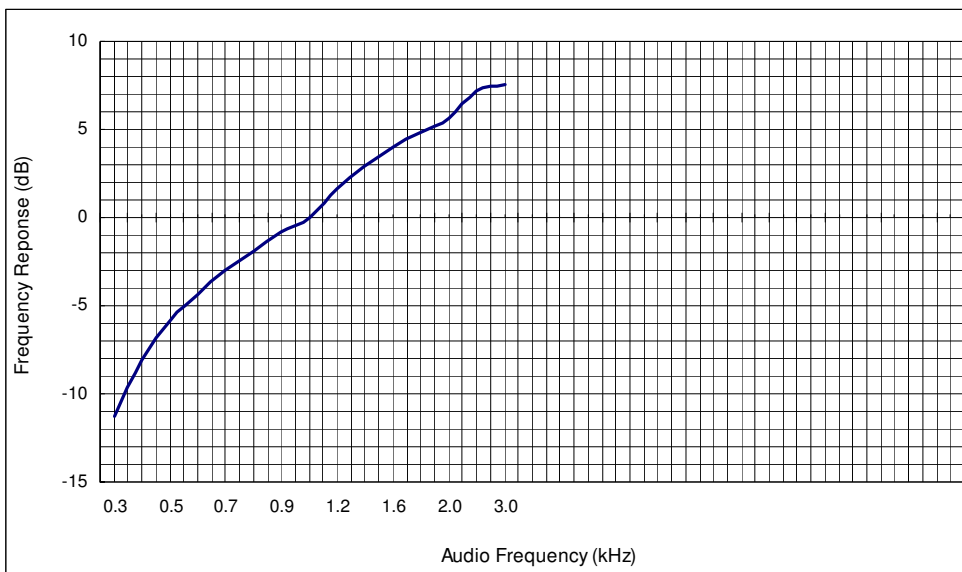
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Audio Frequency (kHz)	A.R (dB)	F.D.
464.5 MHz		
0.3	-11.229	0.14
0.4	-8.131	0.20
0.5	-5.852	0.26
0.6	-4.324	0.31
0.7	-3.025	0.36
0.8	-1.896	0.41
0.9	-0.821	0.46
1.0	0.000	0.51
1.2	1.612	0.61
1.4	2.874	0.71
1.6	4.018	0.81
1.8	4.836	0.89
2.0	5.673	0.98
2.5	7.138	1.16
3.0	7.576	1.22



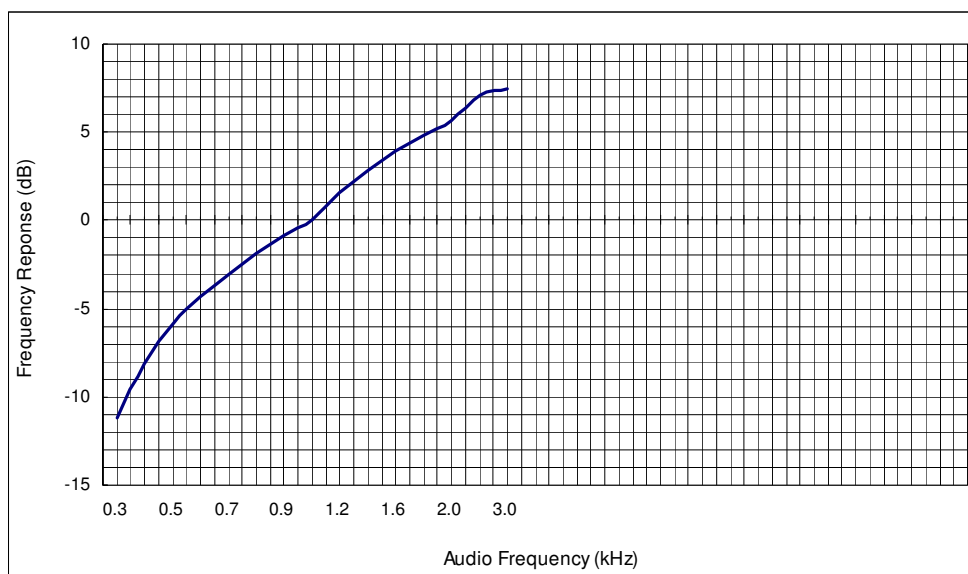


Registration number: W6M21601-15546-C-1

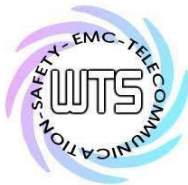
FCC ID: A8J-SPR922U1

IC: 10103A-SPR922U1

Audio Frequency (kHz)	A.R (dB)	F.D.
469.5625 MHz		
0.3	-11.398	0.14
0.4	-8.299	0.20
0.5	-6.021	0.26
0.6	-4.493	0.31
0.7	-3.194	0.36
0.8	-2.064	0.41
0.9	-1.065	0.46
1.0	0.000	0.52
1.2	1.528	0.62
1.4	2.705	0.71
1.6	3.850	0.81
1.8	4.668	0.89
2.0	5.504	0.98
2.5	6.969	1.16
3.0	7.407	1.22



Test equipment used: ETSTW-RE 072



Registration number: W6M21601-15546-C-1
 FCC ID: A8J-SPR922U1
 IC: 10103A-SPR922U1

4.3.2 Audio Input Versus Modulation

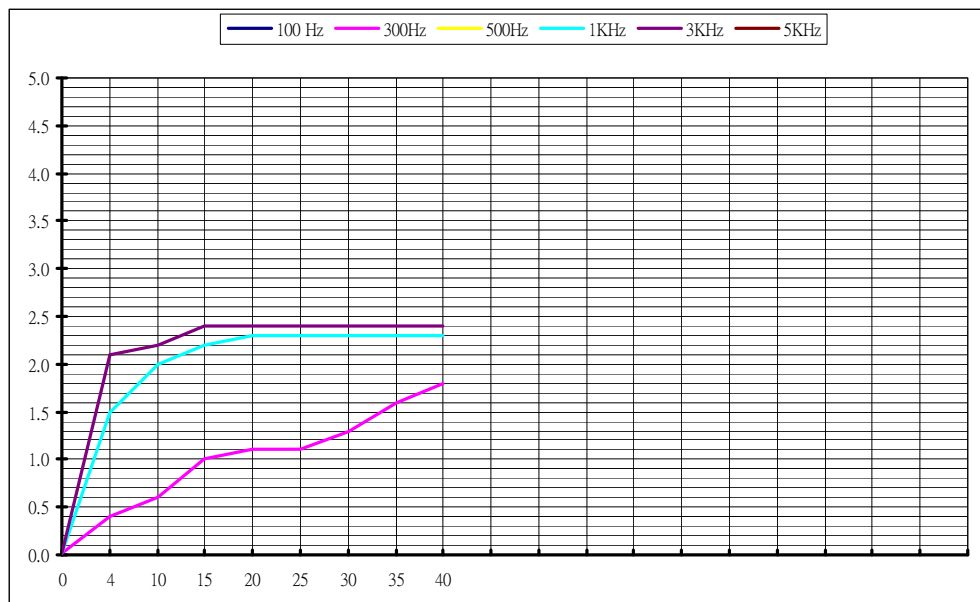
Rule Part No.: Part 2.1047(b) & 90

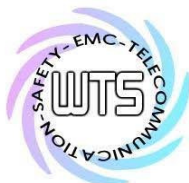
Test Requirements: Modulation cannot exceed 100% max deviation.

Method of Measurement: The audio input level needed for a particular percentage of modulation was measured in accordance with TIA/EIA Specification 603. The audio input curves versus modulation are shown below. Curves are provided for audio input frequencies of 300, 1000, and 3000 Hz.

EUT Max deviation: 2.5kHz 60% EUT Max deviation: 1.5kHz

Input Audio Level (mV)	300Hz	1kHz	3kHz
461.0375 MHz			
0	0.0	0.0	0.0
4	0.4	1.5	2.1
10	0.6	2.0	2.2
15	1.0	2.2	2.4
20	1.1	2.3	2.4
25	1.1	2.3	2.4
30	1.3	2.3	2.4
35	1.6	2.3	2.4
40	1.8	2.3	2.4





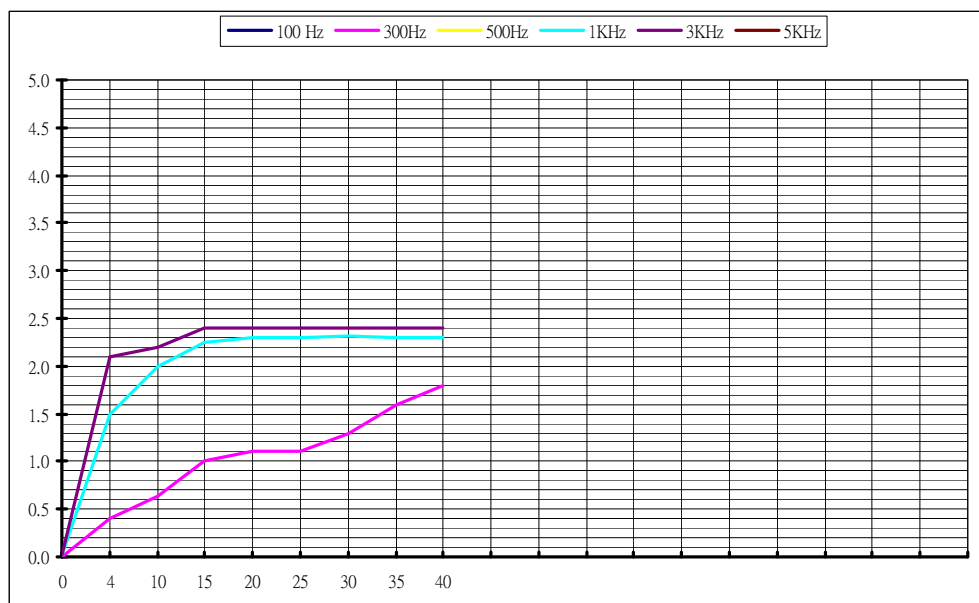
Worldwide Testing Services(Taiwan) Co., Ltd.

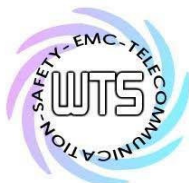
Registration number: W6M21601-15546-C-1

FCC ID: A8J-SPR922U1

IC: 10103A-SPR922U1

Input Audio Level (mV)	300Hz	1kHz	3kHz
464.5 MHz			
0	0.0	0.0	0.0
4	0.4	1.5	2.1
10	0.6	2.0	2.2
15	1.0	2.2	2.4
20	1.1	2.3	2.4
25	1.1	2.3	2.4
30	1.3	2.3	2.4
35	1.6	2.3	2.4
40	1.8	2.3	2.4





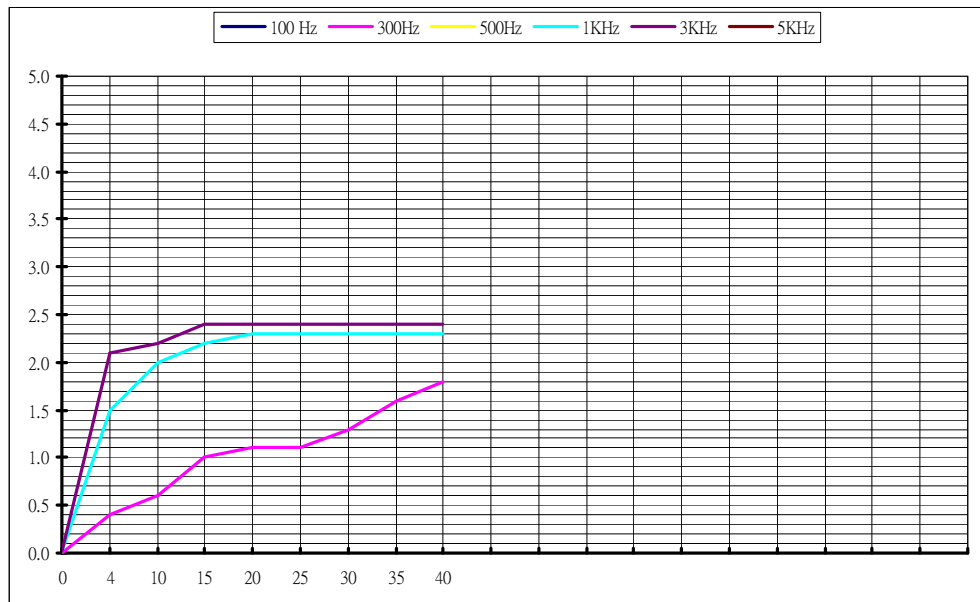
Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21601-15546-C-1

FCC ID: A8J-SPR922U1

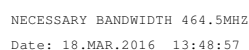
IC: 10103A-SPR922U1

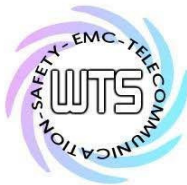
Input Audio Level (mV)	300Hz	1kHz	3kHz
469.5625 MHz			
0	0.0	0.0	0.0
4	0.4	1.5	2.1
10	0.6	2.0	2.2
15	1.0	2.2	2.4
20	1.1	2.3	2.4
25	1.1	2.3	2.4
30	1.3	2.3	2.4
35	1.6	2.3	2.4
40	1.8	2.3	2.4



Test equipment used: ETSTW-RE 072

4.3.3 Necessary Bandwidth

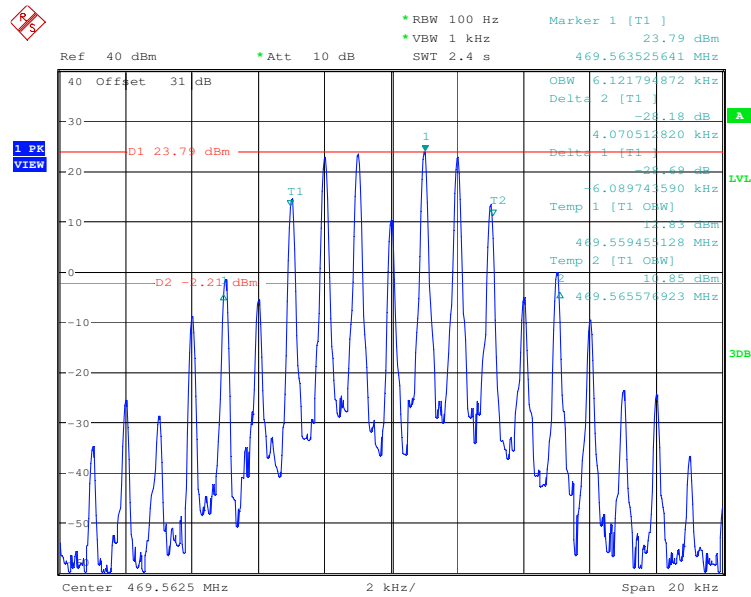




Registration number: W6M21601-15546-C-1

FCC ID: A8J-SPR922U1

IC: 10103A-SPR922U1



NECESSARY BANDWIDTH 469.5625MHZ
Date: 18.MAR.2016 13:55:21

Frequency (MHz)	26dB Bandwidth (kHz)	99% Occupied Bandwidth (kHz)	Max. Limit (kHz)
461.0375	4.10256	7.0833	11.25
464.5	4.07051	6.1218	11.25
469.5625	4.07505	6.1218	11.25

Test equipment used: ETSTW-RE 055, ETSTW-RE072

Registration number: W6M21601-15546-C-1

FCC ID: A8J-SPR922U1

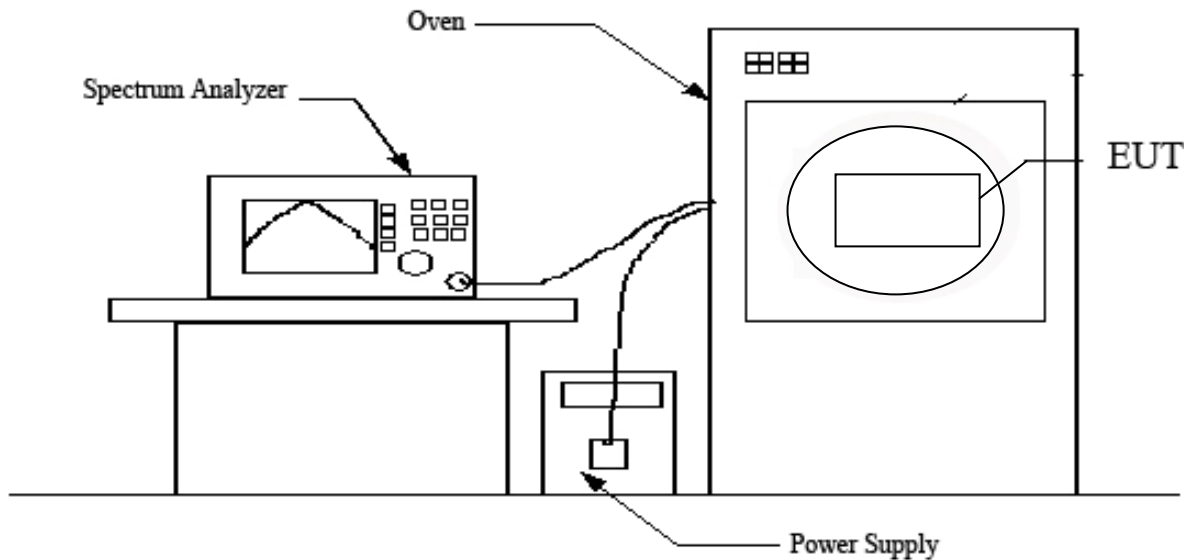
IC: 10103A-SPR922U1

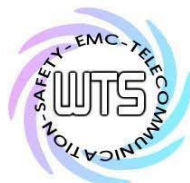
5. FREQUENCY STABILITY

5.1 Test Procedures

1. The transmitter output is connected to the spectrum analyzer through an attenuator.
2. Set RBW of spectrum analyzer to 1kHz and VBW to 1kHz.
3. Use peak detector mode, Max-hold and search the peak of trace 1.
4. According to the part 2.1055(d)(1), the supply voltage has to be changed from 85 to 115 percent of the nominal value.
5. According to the part 2.1055(a)(1), extreme temperature has to be changed from -20°C to 50°C.
According to the applicant's demand, extreme temperature has to be changed from -20°C to 60°C.
6. Read the frequency of the carrier and calculate the deviation.

5.2 Test Setup





Registration number: W6M21601-15546-C-1

FCC ID: A8J-SPR922U1

IC: 10103A-SPR922U1

5.3 Test Result

Nominal Frequency : 461.0375 MHz		Nominal Frequency : 464.5 MHz		Nominal Frequency : 469.5625 MHz	
Voltage V.S Frequency Stability		Voltage V.S Frequency Stability		Voltage V.S Frequency Stability	
3.7 V	461.037427	3.7 V	464.50008	3.7 V	469.562403
4.255 V	461.037427	4.255 V	464.50008	4.255 V	469.562403
3.145 V	461.037442	3.145 V	464.500114	3.145 V	469.562423
Max Deviation (MHz)	-0.000058	Max Deviation (MHz)	0.000114	Max Deviation (MHz)	-0.000077
Max Deviation (ppm)	-0.125803	Max Deviation (ppm)	0.245425	Max Deviation (ppm)	-0.163982
Limit (ppm)	2.5	Limit (ppm)	2.5	Limit (ppm)	2.5
Voltage V.S Frequency Stability		Voltage V.S Frequency Stability		Voltage V.S Frequency Stability	
Temperature (°C)	Measurement Frequency	Temperature (°C)	Measurement Frequency	Temperature (°C)	Measurement Frequency
-20	461.037195	-20	464.499919	-20	469.562195
-10	461.037227	-10	464.499935	-10	469.562235
0	461.037291	0	464.499967	0	469.562275
10	461.037443	10	464.500048	10	469.562452
20	461.037427	20	464.500032	20	469.562403
30	461.037492	30	464.500096	30	469.562492
40	461.037492	40	464.500112	40	469.562492
50	461.037481	50	464.50008	50	469.562474
60	461.037468	60	464.500048	60	469.562452
Max Deviation (MHz)	-0.000305	Max Deviation (MHz)	0.000112	Max Deviation (MHz)	-0.000305
Max Deviation (ppm)	-0.661551	Max Deviation (ppm)	0.241119	Max Deviation (ppm)	-0.649541
Limit (ppm)	2.5	Limit (ppm)	2.5	Limit (ppm)	2.5

Test equipment used: ETSTW-RE 055

Registration number: W6M21601-15546-C-1

FCC ID: A8J-SPR922U1

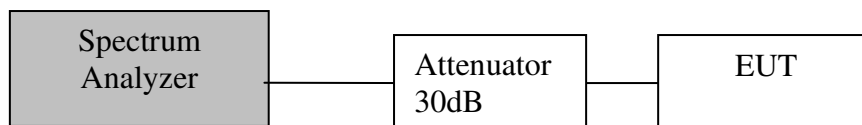
IC: 10103A-SPR922U1

6. TRANSMITTER OUTPUT POWER

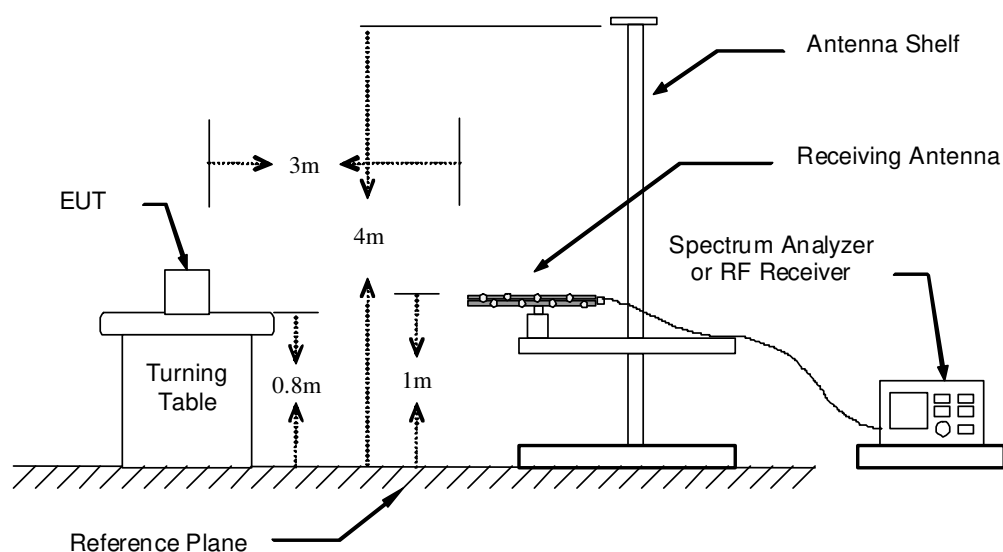
6.1 Test Procedures

1. The EUT was placed on the top of the turntable in semi-anechoic chamber.
2. The test shall be made in the transmitting mode. Antenna tower was scan (from 1 M to 4 M) and the turn table was rotated by 360 degrees to determine the position of the highest radiation.
3. The receiving Horn antenna was placed 0.5 meters far away from the turntable.
4. The receiving antenna was fixed on the same height with the EUT to find maximum suspected emissions. Recorded suspected value is indicated as Read Level (Raw).
5. Replace the EUT by standard antenna and feed the RF port by signal generator.
6. Adjust the frequency of the signal generator to the suspected emission and slightly rotate the turntable to locate the position with maximum reading.
7. Adjust the power level of the signal generator to reach the same reading with Read Level (Raw).
8. The level of the spurious emission is the power level of (7) plus the gain of the standard antenna in dBd and minus the loss of the cable used between the signal generator and the standard antenna.

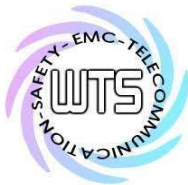
6.2 Test Setup



Setup for Conducted Power



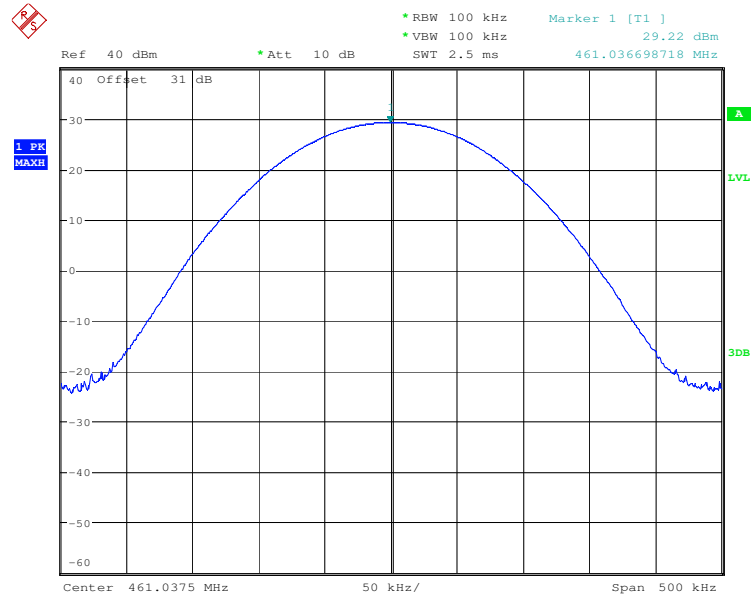
Setup for Radiated Power



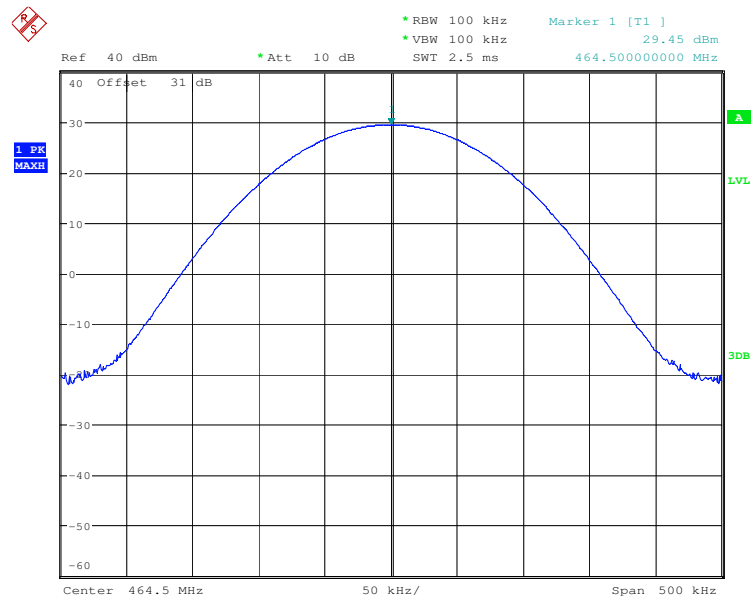
Registration number: W6M21601-15546-C-1
FCC ID: A8J-SPR922U1
IC: 10103A-SPR922U1

6.3 Test Result

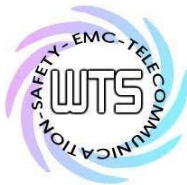
6.3.1 Conducted Power



MAX OUTPUT POWER 461.0375MHZ
Date: 18.MAR.2016 11:57:34



MAX OUTPUT POWER 464.5MHZ
Date: 18.MAR.2016 11:56:26

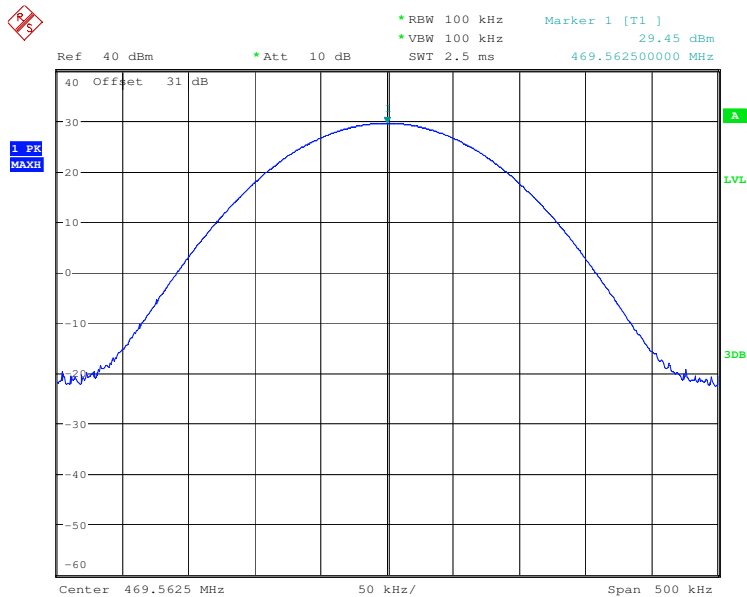


Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21601-15546-C-1

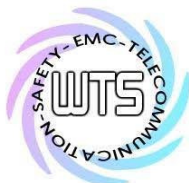
FCC ID: A8J-SPR922U1

IC: 10103A-SPR922U1



MAX OUTPUT POWER 469.5625MHZ
 Date: 18.MAR.2016 11:57:01

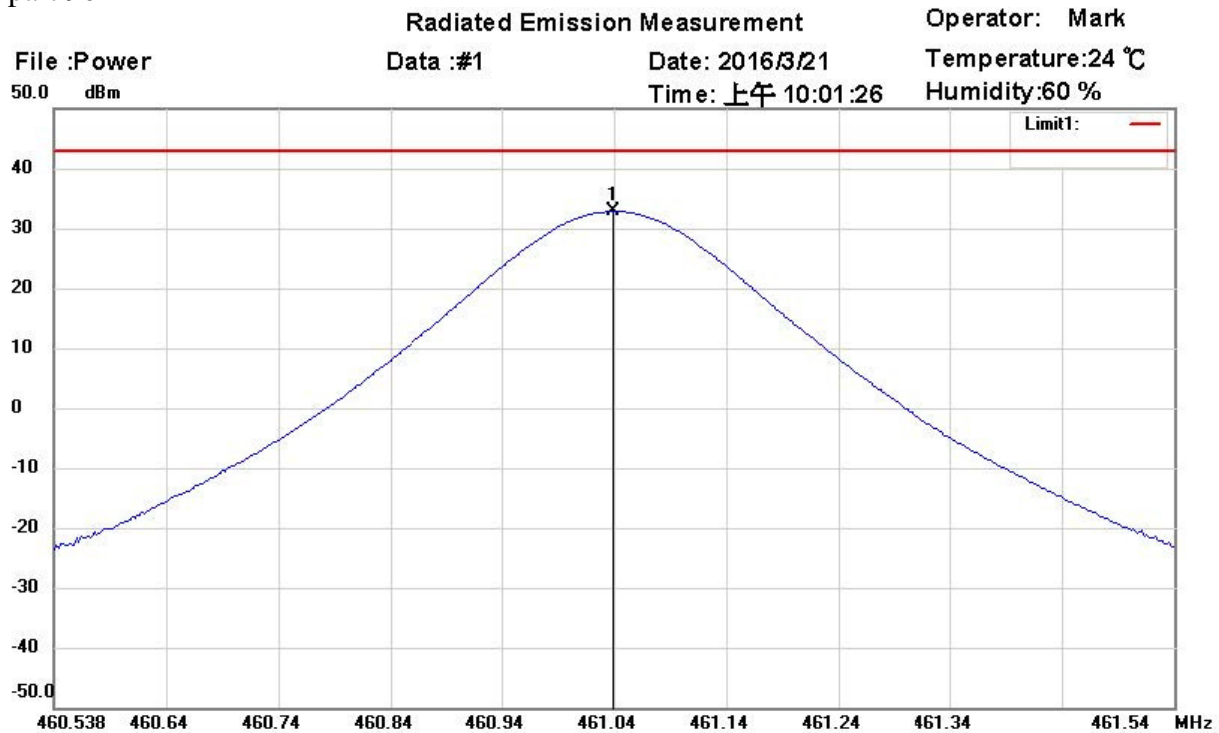
Sample tested frequency	TX output power
461.0375 MHz	29.22 dBm
464.5 MHz	29.45 dBm
469.5625 MHz	29.45 dBm



Registration number: W6M21601-15546-C-1
FCC ID: A8J-SPR922U1
IC: 10103A-SPR922U1

6.3.2 Radiated Power

FCC part 90



Site : Chamber

Condition : FCC_part 90 POWER

EUT : W6M21601-15546

M/N:

Test Mode : Power 461.0375MHz

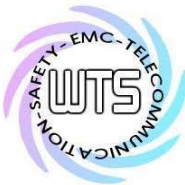
Note :

Polarization: *Horizontal*

Power : 3.7 Vd.c.

Distance: 3m

Mk.	Frequency (MHz)	Reading (dBm)	Detector	Corr. factor (dB)	Result (dBm)	Limit (dBm)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	461.0365	0.94	peak	31.92	32.86	43.00	150	170	-10.14	



Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21601-15546-C-1

FCC ID: A8J-SPR922U1

IC: 10103A-SPR922U1

Radiated Emission Measurement

Operator: Mark

File :Power

Data :#2

Date: 2016/3/21

Temperature:24 °C

50.0 dBm

Time: 上午 10:02:49

Humidity:60 %



Site : Chamber

Condition : FCC_part 90 POWER

EUT : W6M21601-15546

M/N:

Test Mode : Power 461.0375MHz

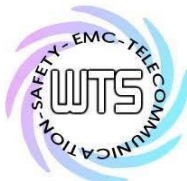
Note :

Polarization: *Vertical*

Power : 3.7 Vd.c.

Distance: 3m

Mk.	Frequency (MHz)	Reading (dBm)	Detector	Corr. factor (dB)	Result (dBm)	Limit (dBm)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	461.0385	-14.56	peak	28.33	13.77	43.00	150	40	-29.23	



Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21601-15546-C-1

FCC ID: A8J-SPR922U1

IC: 10103A-SPR922U1

Radiated Emission Measurement

Operator: Mark

File :Power

Data :#1

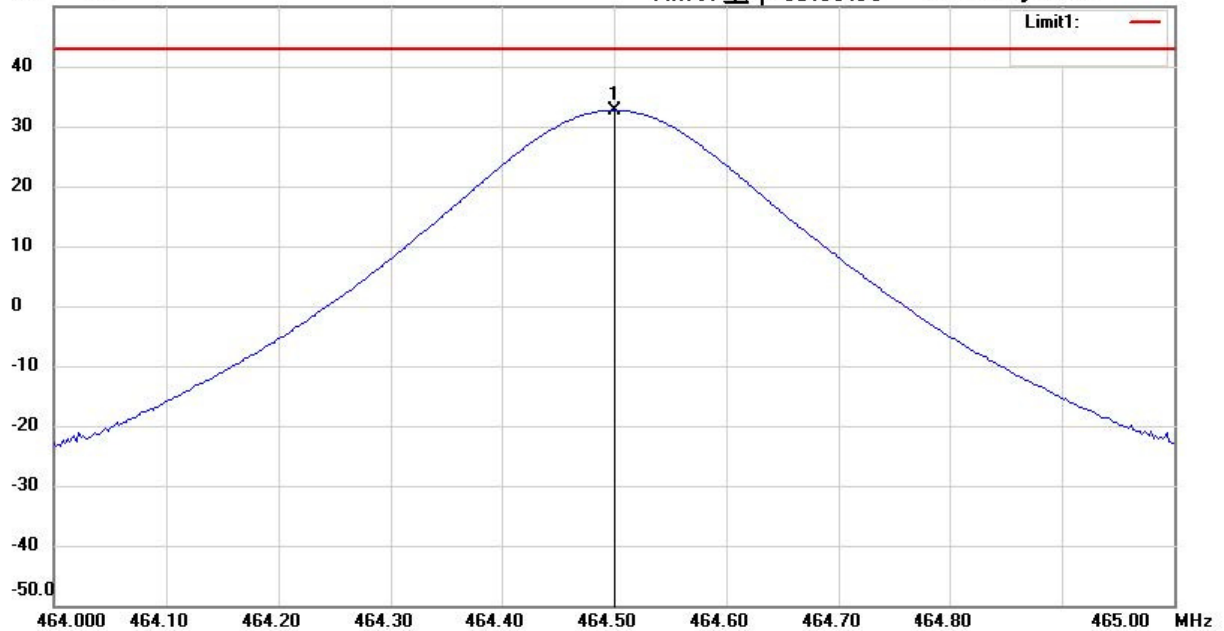
Date: 2016/3/21

Temperature:24 °C

50.0 dBm

Time: 上午 09:56:38

Humidity:60 %



Site : Chamber

Condition : FCC_part 90 POWER

EUT : W6M21601-15546

M/N:

Test Mode : Power 464.5MHz

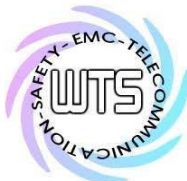
Note :

Polarization: *Horizontal*

Power : 3.7 Vd.c.

Distance: 3m

Mk.	Frequency (MHz)	Reading (dBm)	Detector	Corr. factor (dB)	Result (dBm)	Limit (dBm)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	464.5010	0.94	peak	31.79	32.73	43.00	150	150	-10.27	



Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21601-15546-C-1

FCC ID: A8J-SPR922U1

IC: 10103A-SPR922U1

Radiated Emission Measurement

Operator: Mark

File :Power

Data :#2

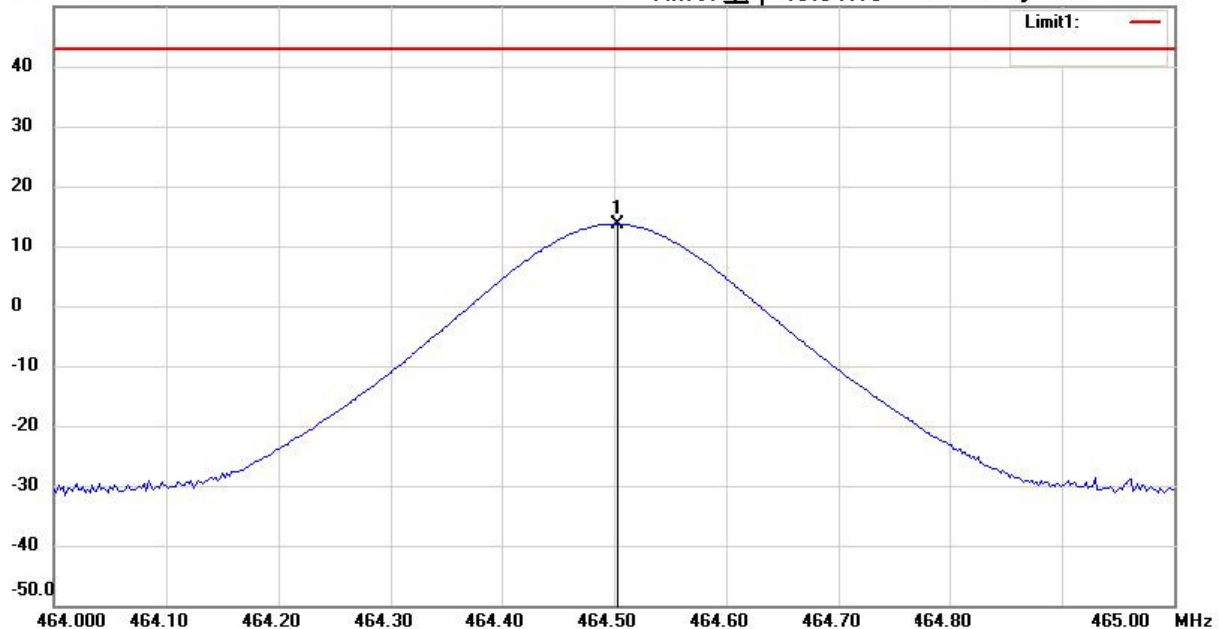
Date: 2016/3/21

Temperature:24 °C

50.0 dBm

Time: 上午 10:04:15

Humidity:60 %



Site : Chamber

Condition : FCC_part 90 POWER

EUT : W6M21601-15546

M/N:

Test Mode : Power 464.5MHz

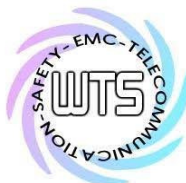
Note :

Polarization: *Vertical*

Power : 3.7 Vd.c.

Distance: 3m

Mk.	Frequency (MHz)	Reading (dBm)	Detector	Corr. factor (dB)	Result (dBm)	Limit (dBm)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	464.5030	-14.77	peak	28.48	13.71	43.00	150	100	-29.29	



Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21601-15546-C-1

FCC ID: A8J-SPR922U1

IC: 10103A-SPR922U1

Radiated Emission Measurement

Operator: Mark

File :Power

Data :#1

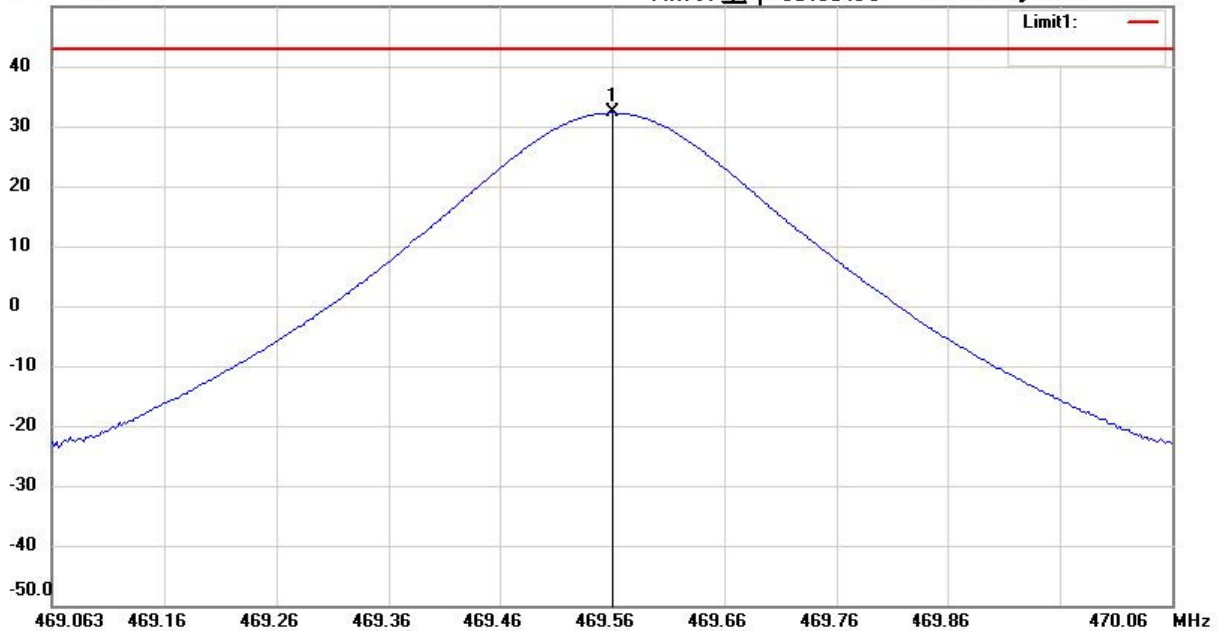
Date: 2016/3/21

Temperature:24 °C

50.0 dBm

Time: 上午 09:59:53

Humidity:60 %



Site : Chamber

Condition : FCC_part 90 POWER

EUT : W6M21601-15546

M/N:

Test Mode : Power 469.5625MHz

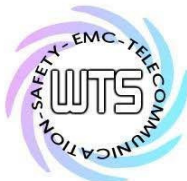
Note :

Polarization: *Horizontal*

Power : 3.7 Vd.c.

Distance: 3m

Mk.	Frequency (MHz)	Reading (dBm)	Detector	Corr. factor (dB)	Result (dBm)	Limit (dBm)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	469.5635	0.67	peak	31.60	32.27	43.00	150	210	-10.73	

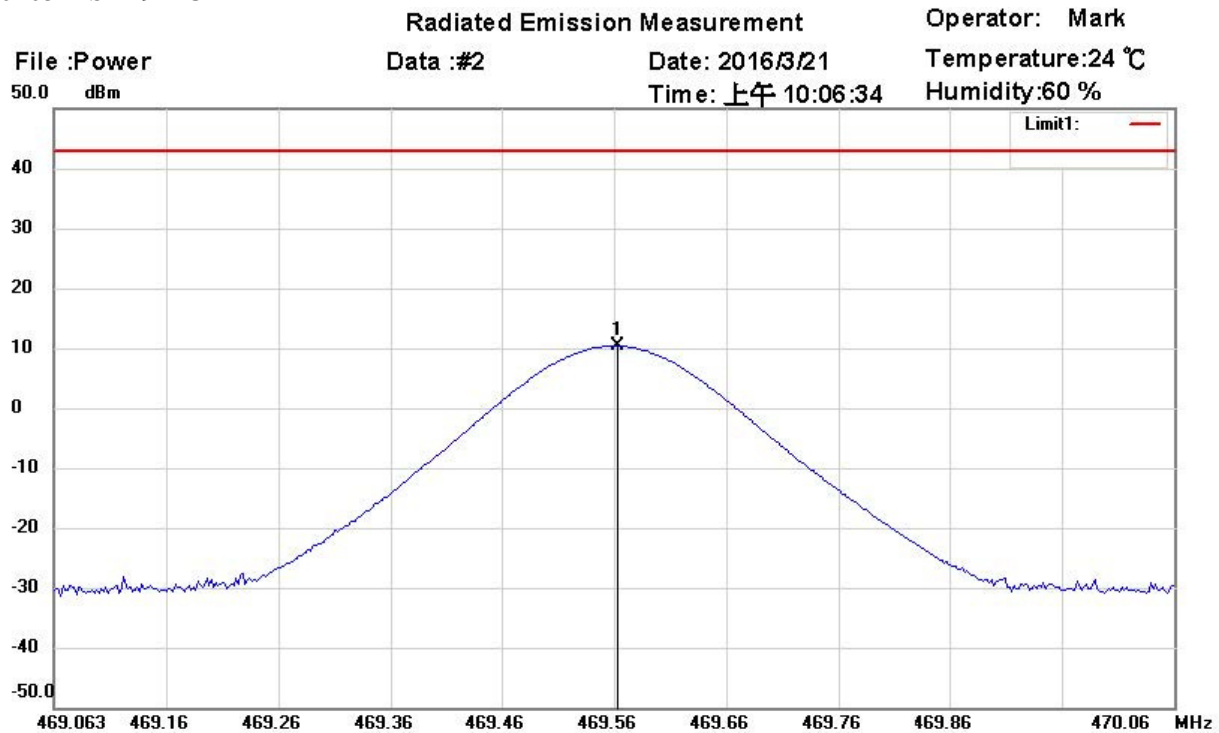


Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21601-15546-C-1

FCC ID: A8J-SPR922U1

IC: 10103A-SPR922U1



Site : Chamber

Condition : FCC_part 90 POWER

EUT : W6M21601-15546

M/N:

Test Mode : Power 469.5625MHz

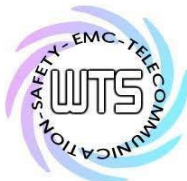
Note :

Polarization: *Vertical*

Power : 3.7 Vd.c.

Distance: 3m

Mk.	Frequency (MHz)	Reading (dBm)	Detector	Corr. factor (dB)	Result (dBm)	Limit (dBm)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	469.5655	-18.27	peak	28.71	10.44	43.00	150	20	-32.56	



Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21601-15546-C-1
FCC ID: A8J-SPR922U1
IC: 10103A-SPR922U1
IC RSS-119

Radiated Emission Measurement

Operator: Mark
Temperature: 24 °C
Humidity: 60 %

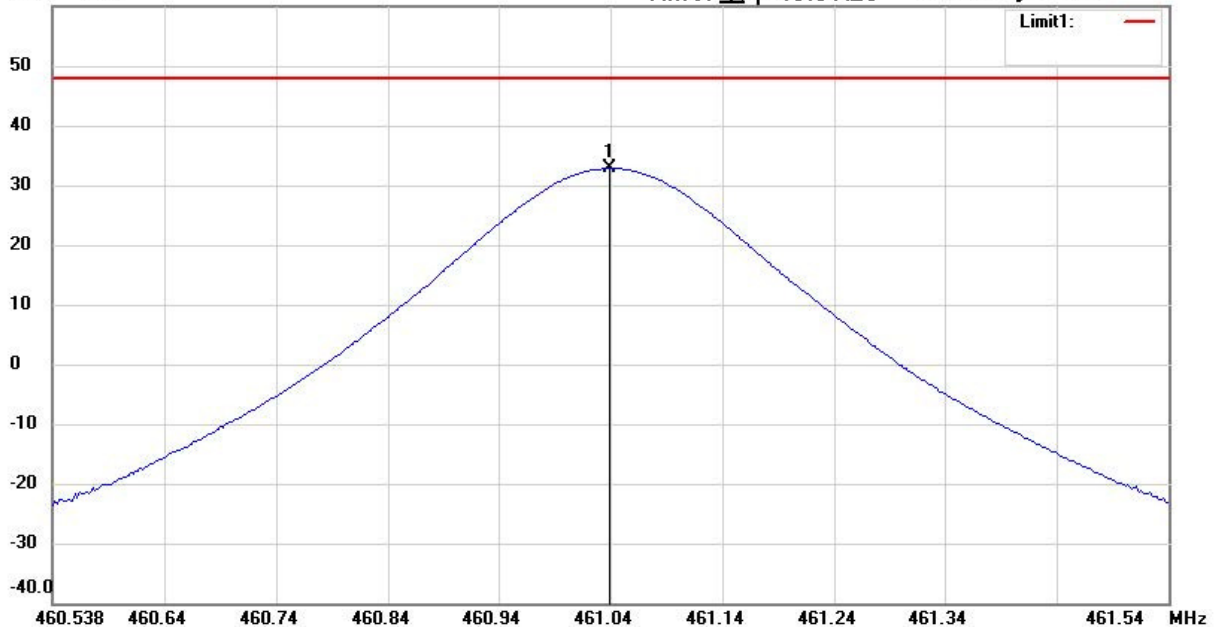
File : Power

Data : #1

Date: 2016/3/21

Time: 上午 10:01:26

60.0 dBm



Site : Chamber

Condition : RSS-119 POWER

EUT : W6M21601-15546

M/N:

Test Mode : Power 461.0375MHz

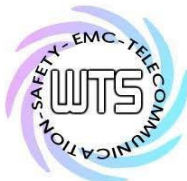
Note :

Polarization: *Horizontal*

Power : 3.7 Vd.c.

Distance: 3m

Mk.	Frequency (MHz)	Reading (dBm)	Detector	Corr. factor (dB)	Result (dBm)	Limit (dBm)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	461.0365	0.94	peak	31.92	32.86	47.78	150	170	-14.92	



Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21601-15546-C-1

FCC ID: A8J-SPR922U1

IC: 10103A-SPR922U1

Radiated Emission Measurement

Operator: Mark

File :Power

Data :#2

Date: 2016/3/21

Temperature:24 °C

60.0 dBm

Time: 上午 10:02:49

Humidity:60 %



Site : Chamber

Condition : RSS-119 POWER

EUT : W6M21601-15546

M/N:

Test Mode : Power 461.0375MHz

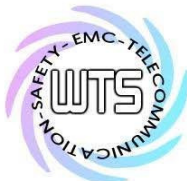
Note :

Polarization: *Vertical*

Power : 3.7 Vd.c.

Distance: 3m

Mk.	Frequency (MHz)	Reading (dBm)	Detector	Corr. factor (dB)	Result (dBm)	Limit (dBm)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	461.0385	-14.56	peak	28.33	13.77	47.78	150	40	-34.01	



Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21601-15546-C-1

FCC ID: A8J-SPR922U1

IC: 10103A-SPR922U1

Radiated Emission Measurement

Operator: Mark

Temperature: 24 °C

Humidity: 60 %

File : Power

Data : #1

Date: 2016/3/21

Time: 上午 09:56:38

60.0 dBm



Site : Chamber

Condition : RSS-119 POWER

EUT : W6M21601-15546

M/N:

Test Mode : Power 464.5MHz

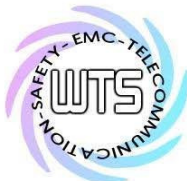
Note :

Polarization: *Horizontal*

Power : 3.7 Vd.c.

Distance: 3m

Mk.	Frequency (MHz)	Reading (dBm)	Detector	Corr. factor (dB)	Result (dBm)	Limit (dBm)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	464.5010	0.94	peak	31.79	32.73	47.78	150	150	-15.05	



Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21601-15546-C-1

FCC ID: A8J-SPR922U1

IC: 10103A-SPR922U1

Radiated Emission Measurement

Operator: Mark

Temperature: 24 °C

Humidity: 60 %

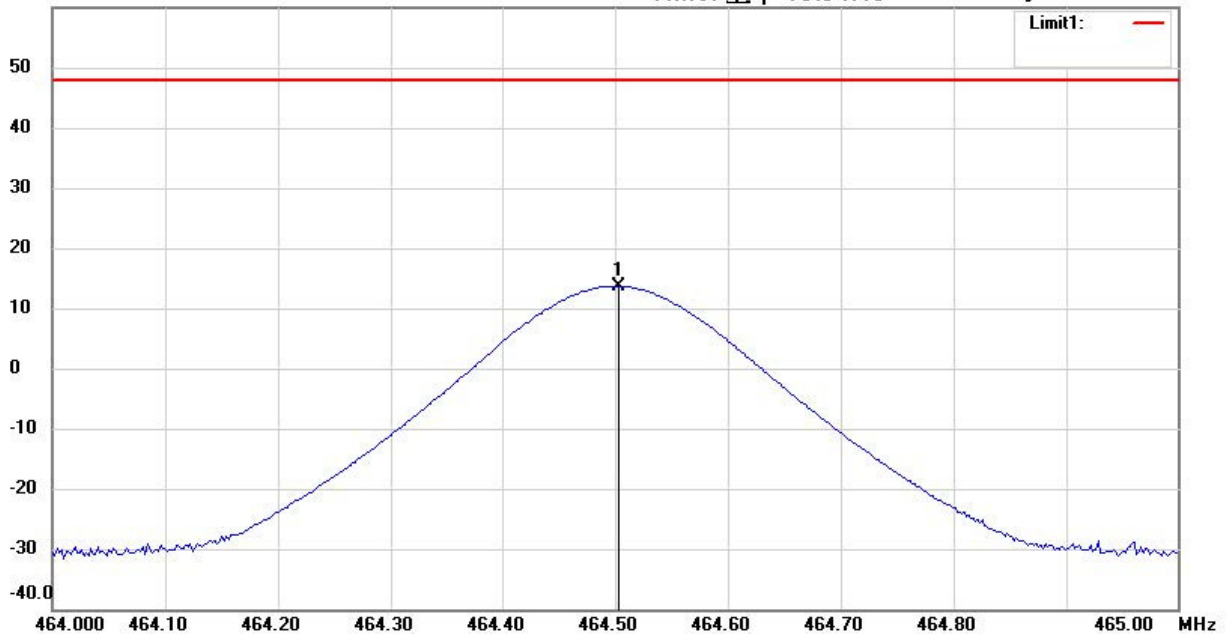
File : Power

Data : #2

Date: 2016/3/21

Time: 上午 10:04:15

60.0 dBm



Site : Chamber

Condition : RSS-119 POWER

EUT : W6M21601-15546

M/N:

Test Mode : Power 464.5MHz

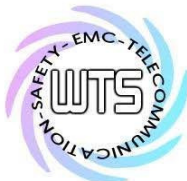
Note :

Polarization: *Vertical*

Power : 3.7 Vd.c.

Distance: 3m

Mk.	Frequency (MHz)	Reading (dBm)	Detector	Corr. factor (dB)	Result (dBm)	Limit (dBm)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	464.5030	-14.77	peak	28.48	13.71	47.78	150	100	-34.07	



Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21601-15546-C-1

FCC ID: A8J-SPR922U1

IC: 10103A-SPR922U1

Radiated Emission Measurement

Operator: Mark

Data :#1

Date: 2016/3/21

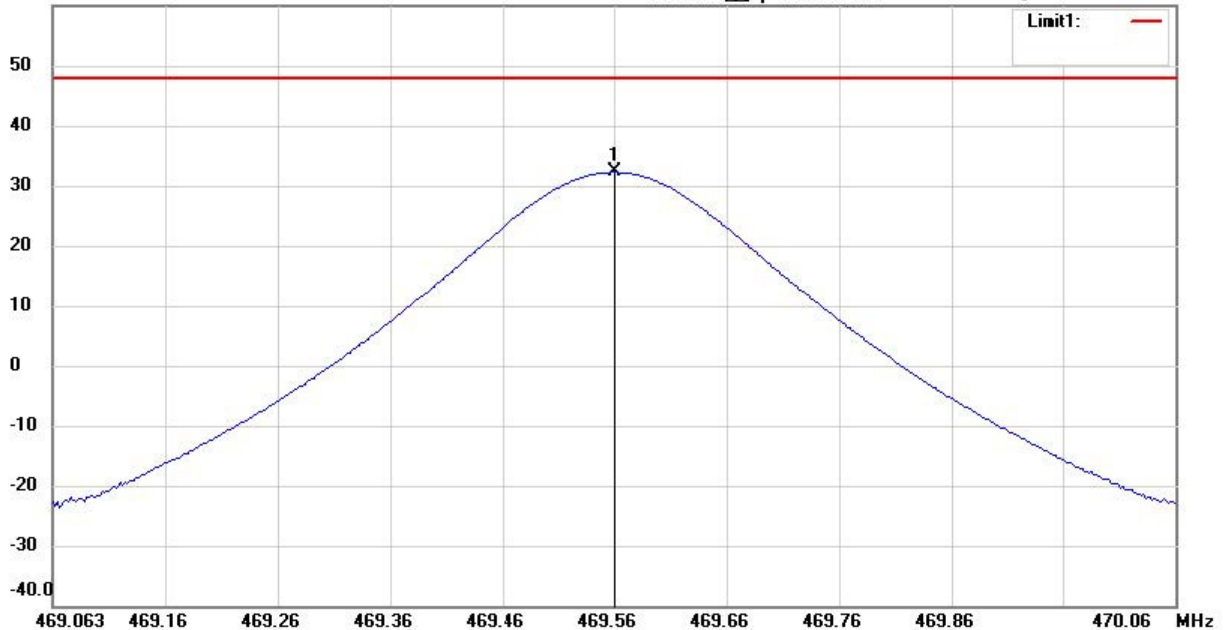
Temperature: 24 °C

Time: 上午 09:59:53

Humidity: 60 %

File :Power

60.0 dBm



Site : Chamber

Condition : RSS-119 POWER

EUT : W6M21601-15546

M/N:

Test Mode : Power 469.5625MHz

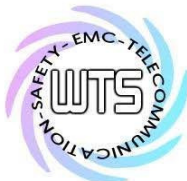
Note :

Polarization: *Horizontal*

Power : 3.7 Vd.c.

Distance: 3m

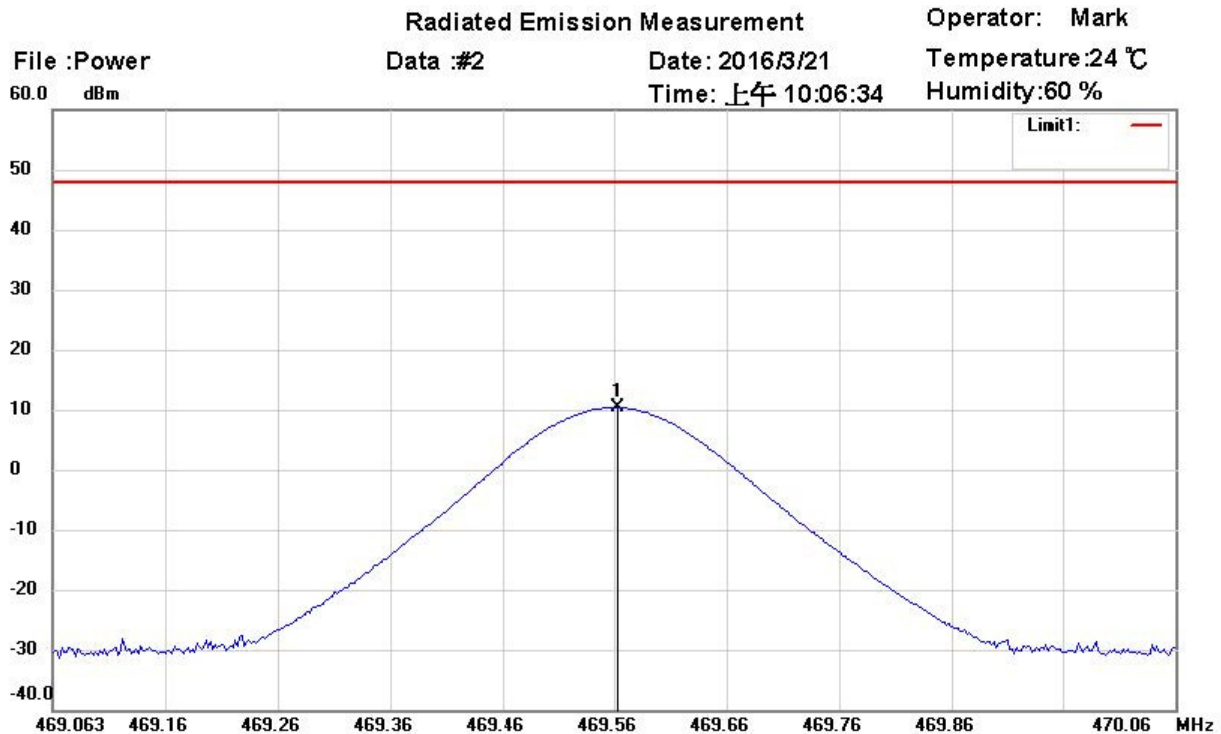
Mk.	Frequency (MHz)	Reading (dBm)	Detector	Corr. factor (dB)	Result (dBm)	Limit (dBm)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	469.5635	0.67	peak	31.60	32.27	47.78	150	210	-15.51	



Registration number: W6M21601-15546-C-1

FCC ID: A8J-SPR922U1

IC: 10103A-SPR922U1



Site : Chamber

Condition : RSS-119 POWER

EUT : W6M21601-15546

M/N:

Test Mode : Power 469.5625MHz

Note :

Polarization: *Vertical*

Power : 3.7 Vd.c.

Distance: 3m

Mk.	Frequency (MHz)	Reading (dBm)	Detector	Corr. factor (dB)	Result (dBm)	Limit (dBm)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	469.5655	-18.27	peak	28.71	10.44	47.78	150	20	-37.34	

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

6.4 Limit

Power limit according to FCC § 90.261: 20 watts (43 dBm)

Power limit according to IC RSS-119 5.4 Table 2: 60 watts (47.78 dBm)

Registration number: W6M21601-15546-C-1

FCC ID: A8J-SPR922U1

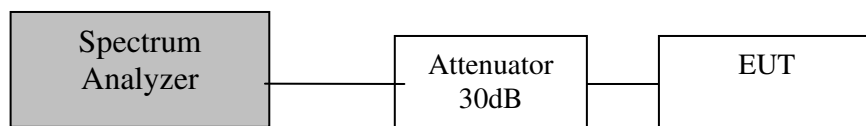
IC: 10103A-SPR922U1

7. EMISSION MASKS

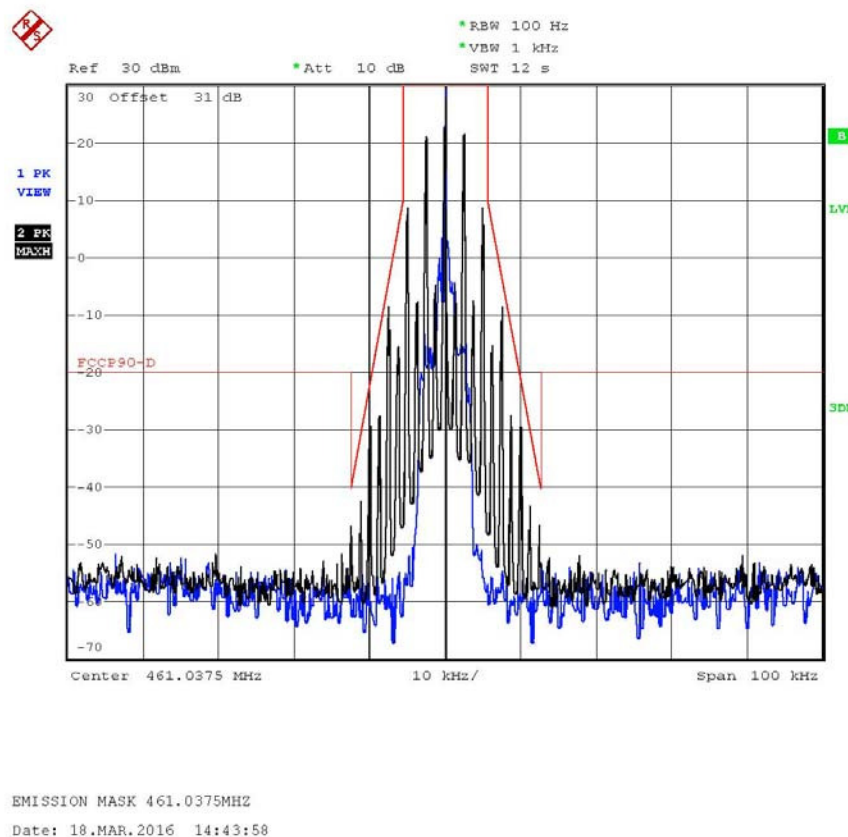
7.1 Test Procedures

1. The transmitter output is connected to the spectrum analyzer through an attenuator.
2. Set RBW of spectrum analyzer to 100 Hz and VBW to 1 kHz.
3. Mark the frequency with maximum peak power as the center of the display of the spectrum
4. Set the span to 100 kHz and the sweep time to Auto.
5. Record the power spectral and compare to the Mask.

7.2 Test Setup



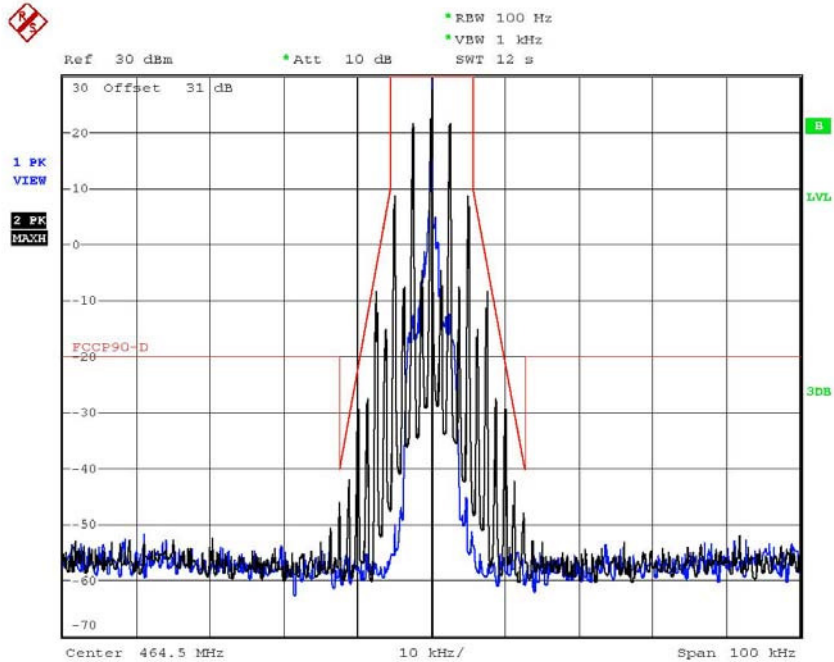
7.3 Test Result



Registration number: W6M21601-15546-C-1

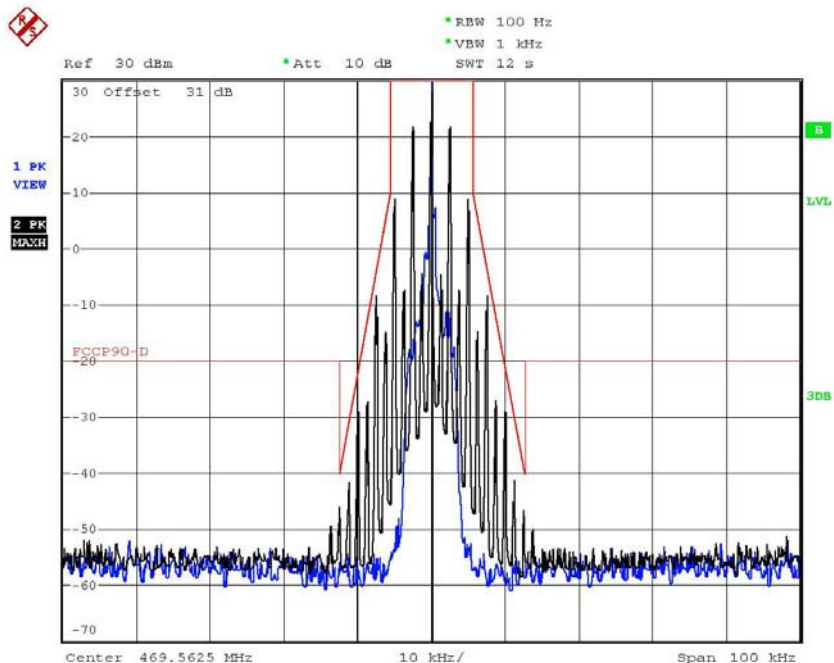
FCC ID: A8J-SPR922U1

IC: 10103A-SPR922U1



EMISSION MASK 464.5MHZ

Date: 18.MAR.2016 14:46:13



EMISSION MASK 469.5625MHZ

Date: 18.MAR.2016 14:49:59

Limit according to FCC § 90.210: 12.5 kHz: Emission Mask D / 25 kHz: Emission Mask B.
Test equipment used: ETSTW-RE 055, ETSTW-RE072

Registration number: W6M21601-15546-C-1

FCC ID: A8J-SPR922U1

IC: 10103A-SPR922U1

8. TRANSMITTER SPURIOUS RADIATED EMISSION

8.1 Test Procedures

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.

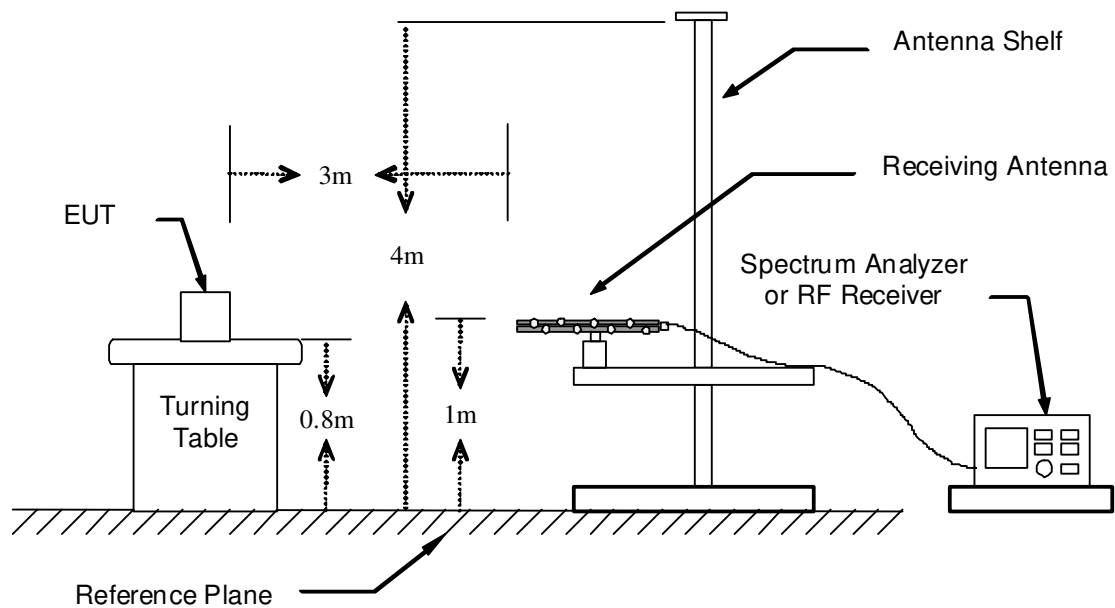
Worst case emission was recorded with the rotation of the turntable and the raising and lowering of the test antenna.

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 an emission mask.

8.2 Test Setup





Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21601-15546-C-1

FCC ID: A8J-SPR922U1

IC: 10103A-SPR922U1

8.3 Test Result

Model: SPR-922U1

Date: --

Mode: --

Temperature: -- °C

Engineer: --

Polarization: --

Humidity: -- %

Frequency (MHz)	Reading (dBm) Peak	Factor (dB) Corr.	Result (dBm)	Limit (dBm)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--

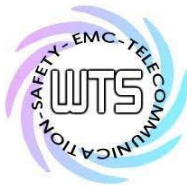
Polarization: --

Frequency (MHz)	Reading (dBm) Peak	Factor (dB) Corr.	Result (dBm)	Limit (dBm)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--

- 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. Measurement uncertainty above 30-1000 MHz = ± 2.04 dB, 1-18 GHz = ± 2.66 dB, 18-40 GHz = ± 2.67 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 appendix.

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

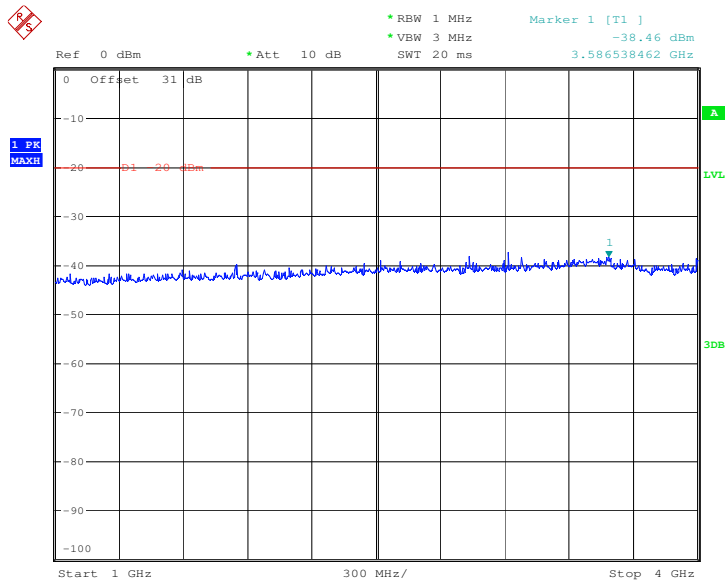
IC: 10103A-SPR922U1



Registration number: W6M21601-15546-C-1

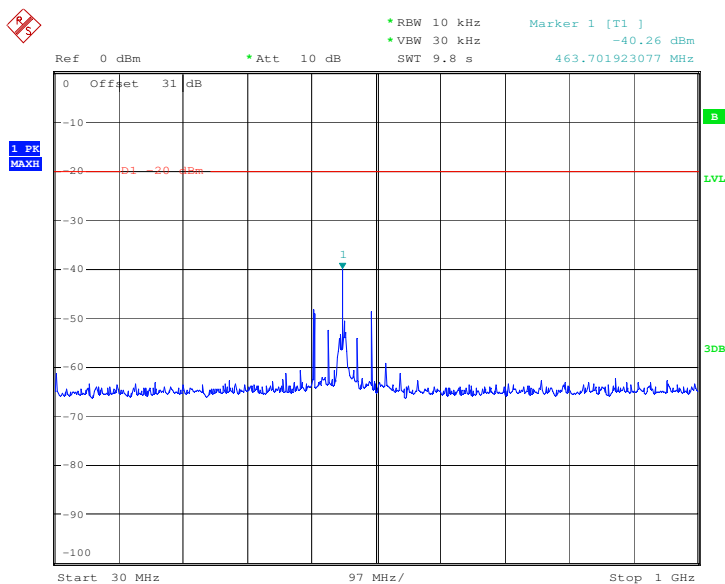
FCC ID: A8J-SPR922U1

IC: 10103A-SPR922U1



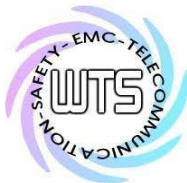
CONDUCTED SPURIOUS EMISSION ABOVE 1G 461.0375MHZ

Date: 18.MAR.2016 16:16:04



CONDUCTED SPURIOUS EMISSION BELOW 1G 464.5MHZ

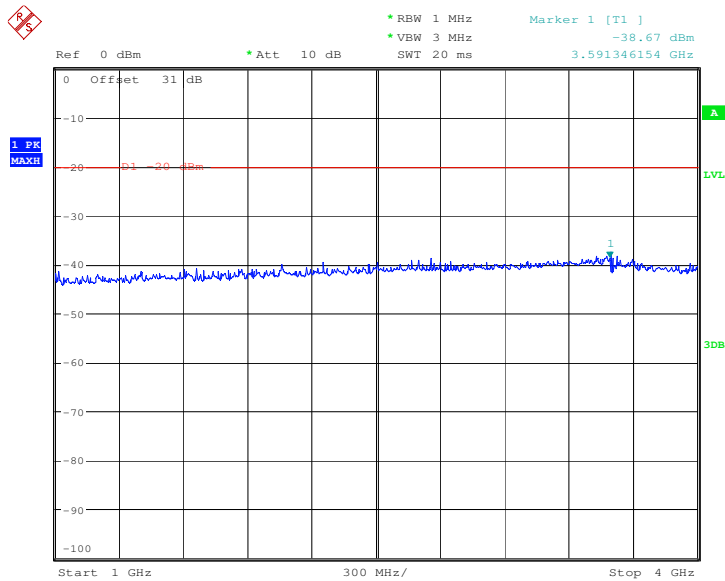
Date: 18.MAR.2016 16:05:21



Registration number: W6M21601-15546-C-1

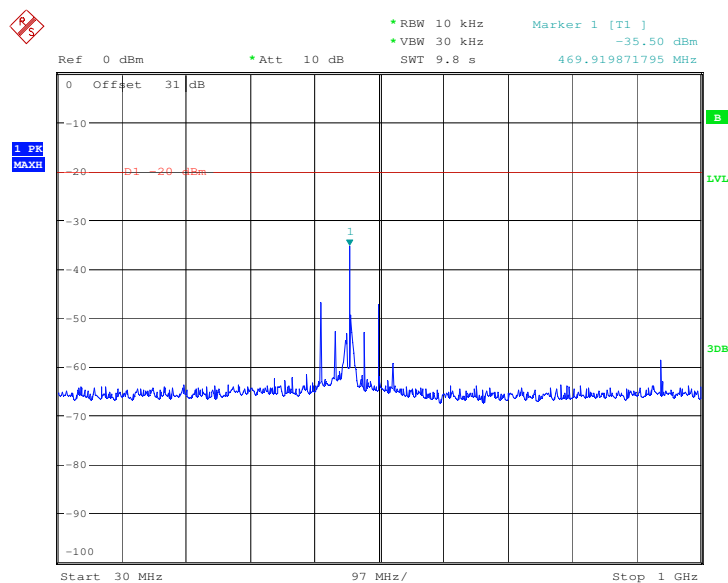
FCC ID: A8J-SPR922U1

IC: 10103A-SPR922U1



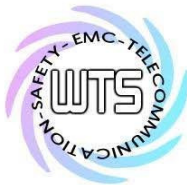
CONDUCTED SPURIOUS EMISSION ABOVE 1G 464.5MHZ

Date: 18.MAR.2016 16:07:52



CONDUCTED SPURIOUS EMISSION BELOW 1G 469.5625MHZ

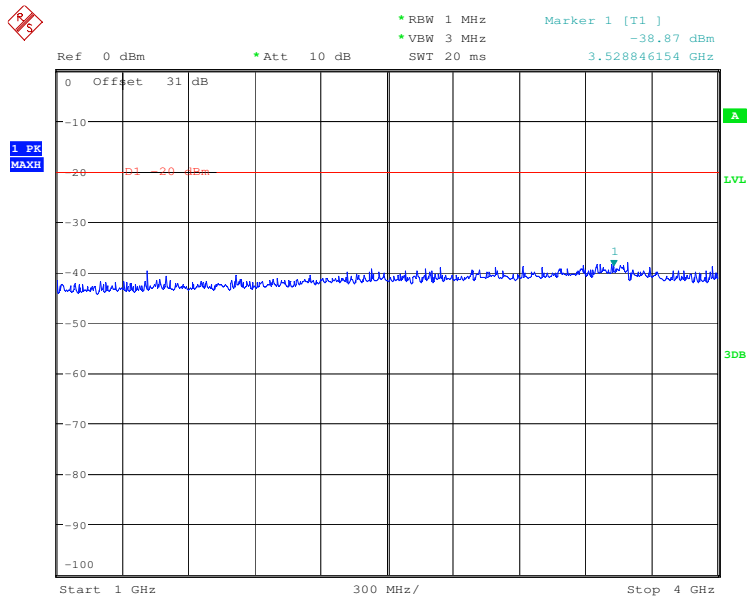
Date: 18.MAR.2016 16:09:42



Registration number: W6M21601-15546-C-1

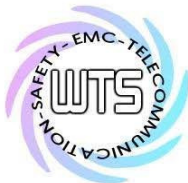
FCC ID: A8J-SPR922U1

IC: 10103A-SPR922U1



CONDUCTED SPURIOUS EMISSION ABOVE 1G 469.5625MHZ
Date: 18.MAR.2016 16:08:21

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



Registration number: W6M21601-15546-C-1

FCC ID: A8J-SPR922U1

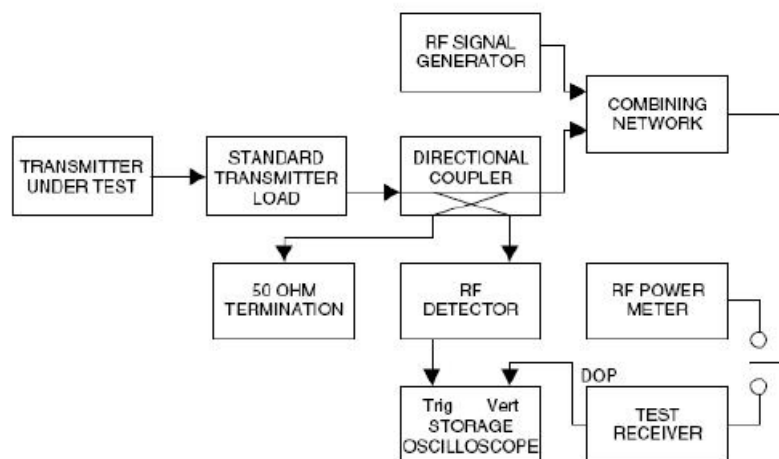
IC: 10103A-SPR922U1

10. TRANSIENT FREQUENCY BEHAVIOR

10.1 Test Procedures

1. SG to the assigned transmitter frequency and modulate it with a 1 kHz tone at ± 25 kHz deviation and set its output level to below 30dB of EUT signal level to receiver.
2. Set the horizontal sweep rate on the storage oscilloscope to 10 ms per division and adjust the display to continuously view the 1000 Hz tone from the DOP. Adjust the vertical amplitude control of the oscilloscope to display the 1000 Hz at ± 4 divisions vertically centered on the display.
3. Transmitter on and observe the stored display. The output at the DOP, due to the change in the ratio of power between the signal generator input power and the transmitter output power will, because of the capture effect of the test receiver, produce a change in display: For the first part of the sweep it will show the 1 kHz test signal. Then once the receiver's demodulator has been captured by the transmitter power, the display will show the frequency difference from the assigned frequency to the actual transmitter frequency versus time. The instant when the 1 kHz test signal is completely suppressed (including any capture time due to phasing) is considered to be t_{on} . The trace should be maintained within the allowed divisions during the period t_1 and t_2 . See the figure in the appropriate standards section.
4. During the time from the end of t_2 to the beginning of t_3 the frequency difference should not exceed the limits set by the FCC in 47 CFR 90.214 and outlined in 3.2.2. The allowed limit is equal to the transmitter frequency times its FCC frequency tolerance times ± 4 display divisions divided by 25 kHz. For example, at a transmitter assigned frequency of 500 MHz and a frequency tolerance of 5 ppm. This would be 500 MHz times 5 ppm times ± 4 divisions divided by 25 kHz. This equals ± 0.4 divisions in this example. Greater vertical sensitivity may be required to view this accurately
5. Adjust the oscilloscope trigger controls so it will trigger on a decreasing magnitude from the RF peak detector, at 1 division from the right side of the display, when the transmitter is turned off. Set the controls to store the display. The moment when the 1 kHz test signal starts to rise is considered to provide t_{off} .

10.2 Test Setup



Registration number: W6M21601-15546-C-1

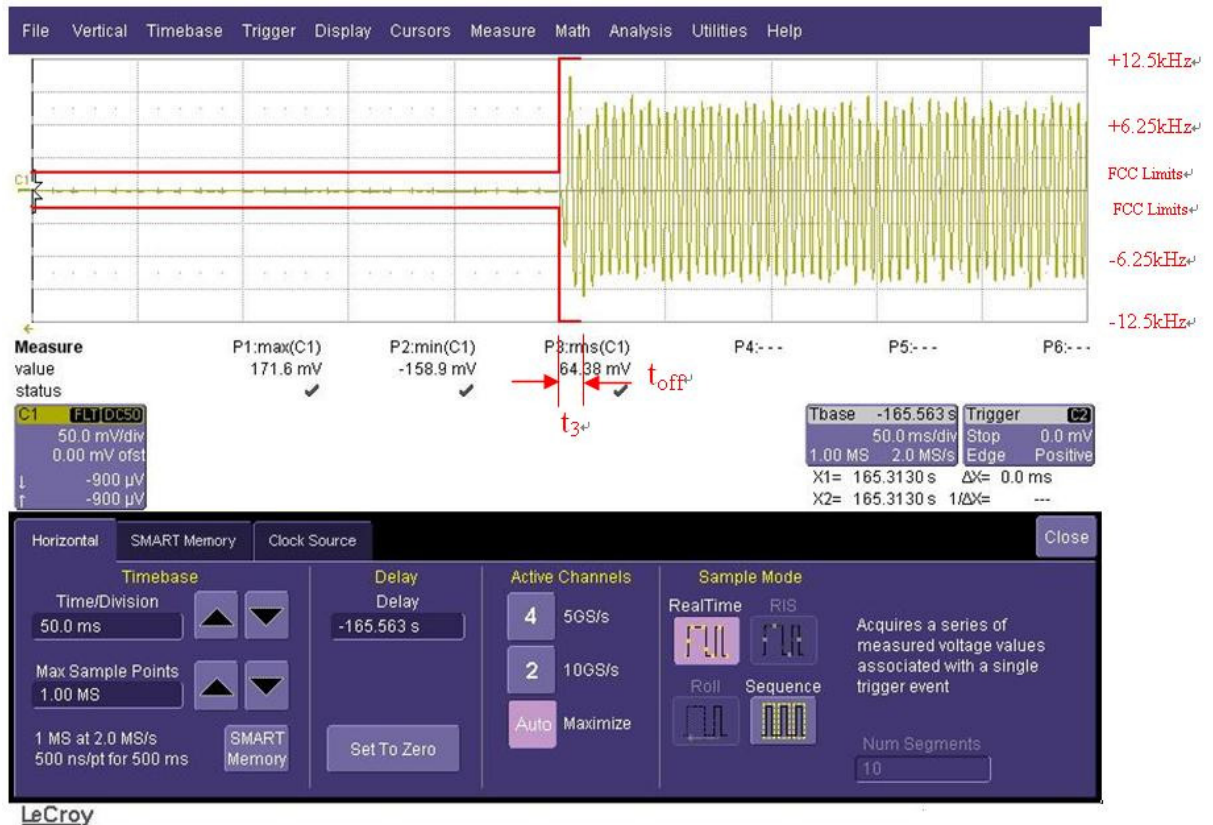
FCC ID: A8J-SPR922U1

IC: 10103A-SPR922U1

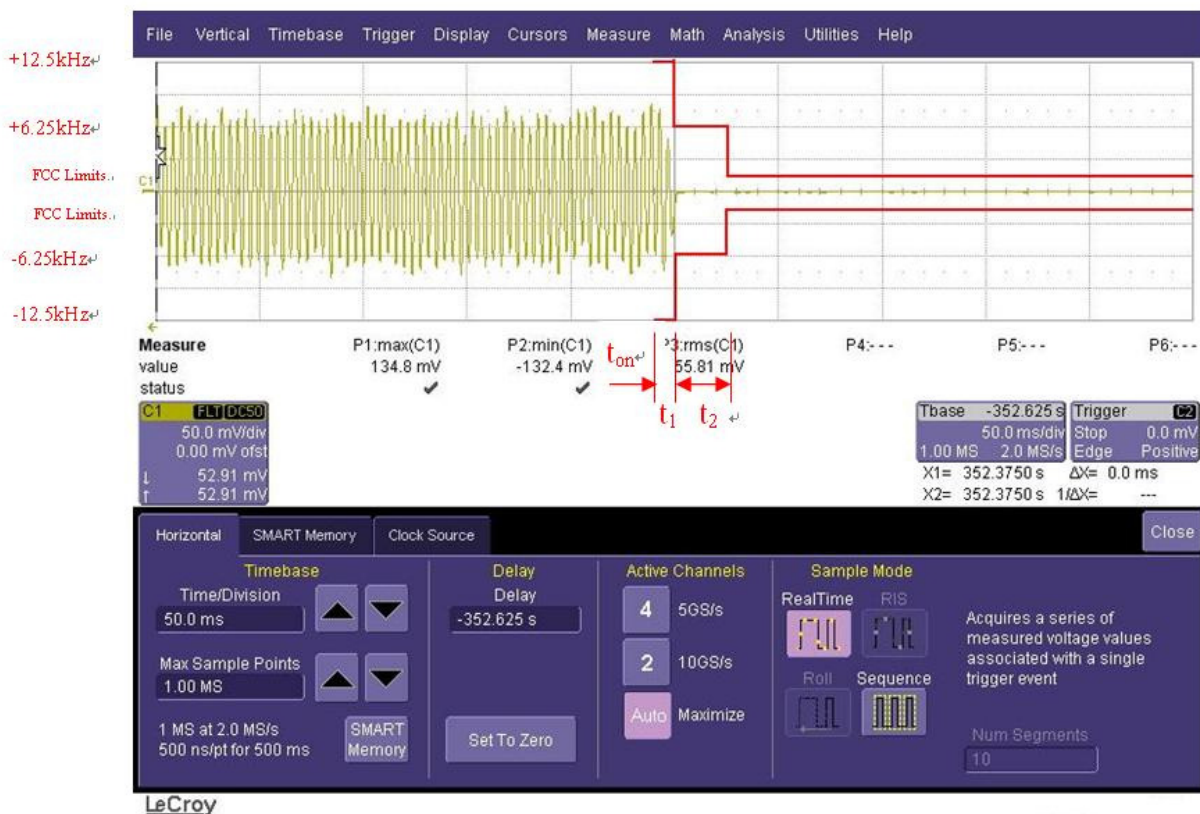
10.3 Test Result

461.0375 MHz

Off



On



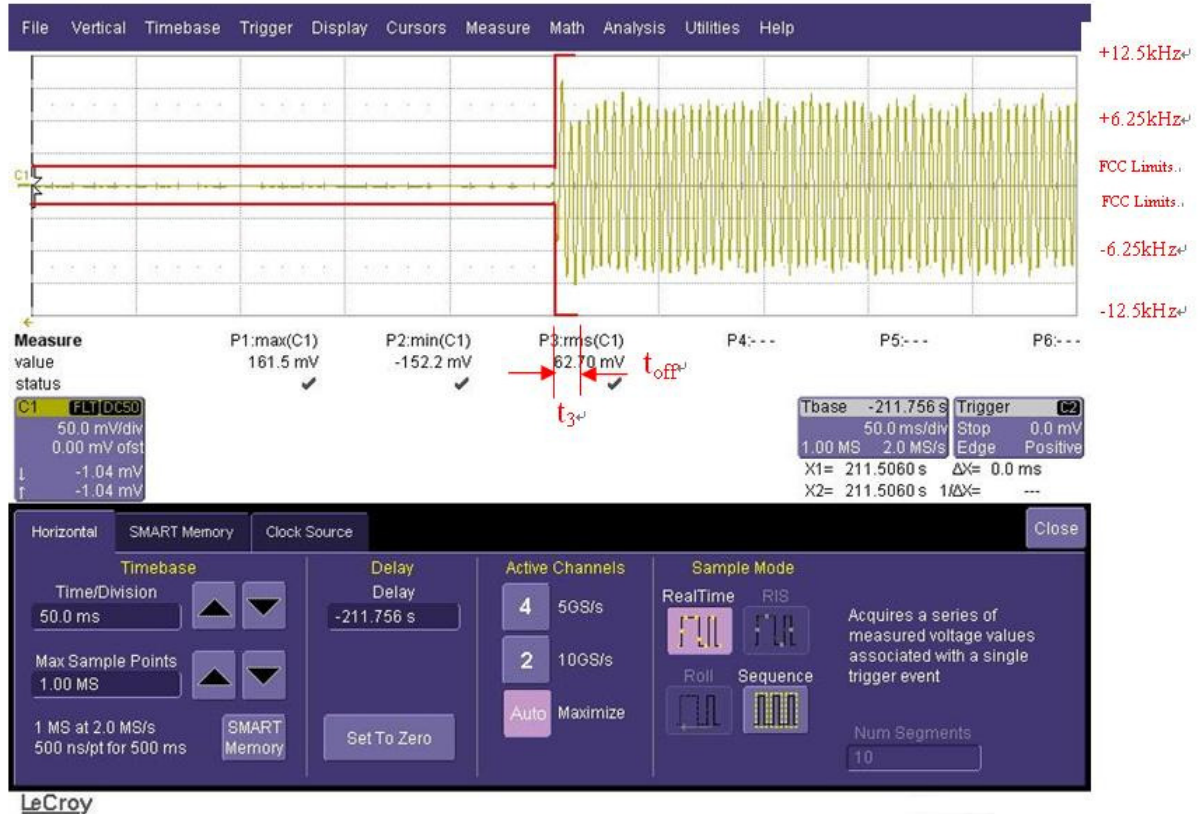
Registration number: W6M21601-15546-C-1

FCC ID: A8J-SPR922U1

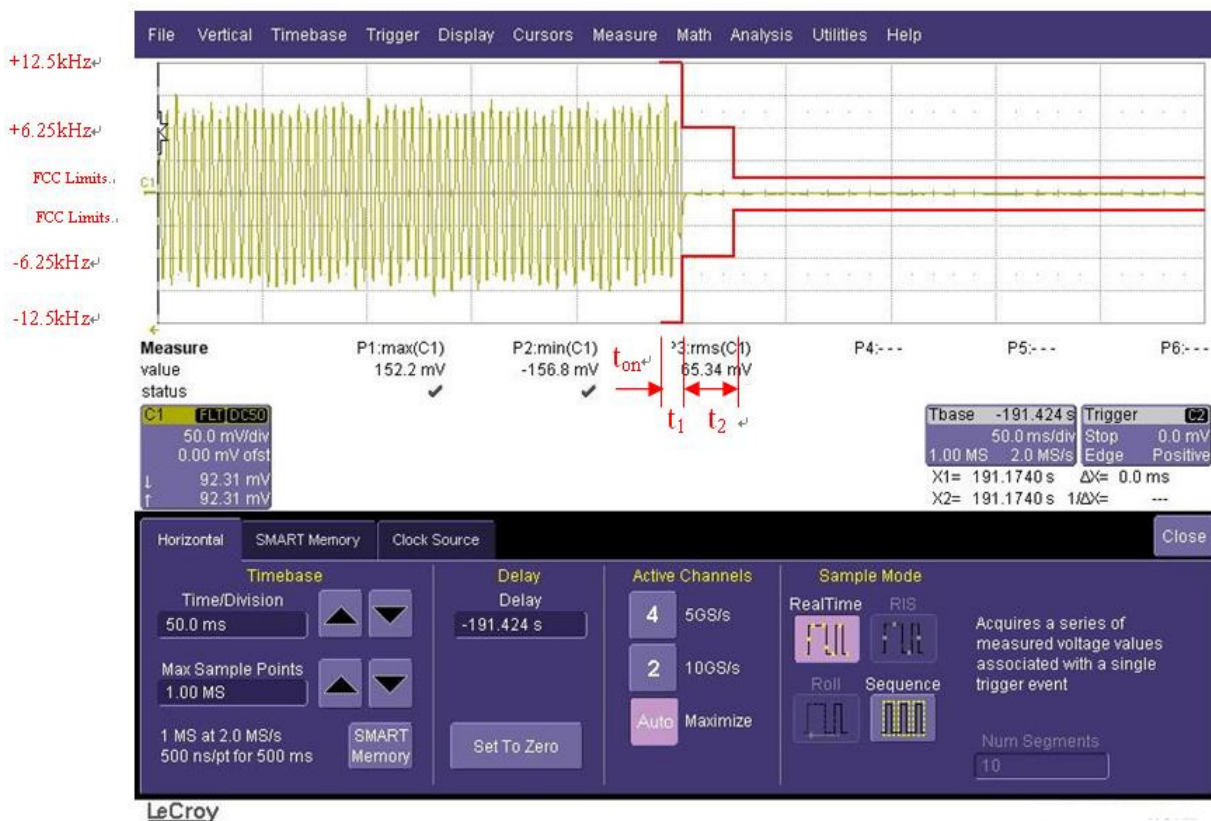
IC: 10103A-SPR922U1

464.5 MHz

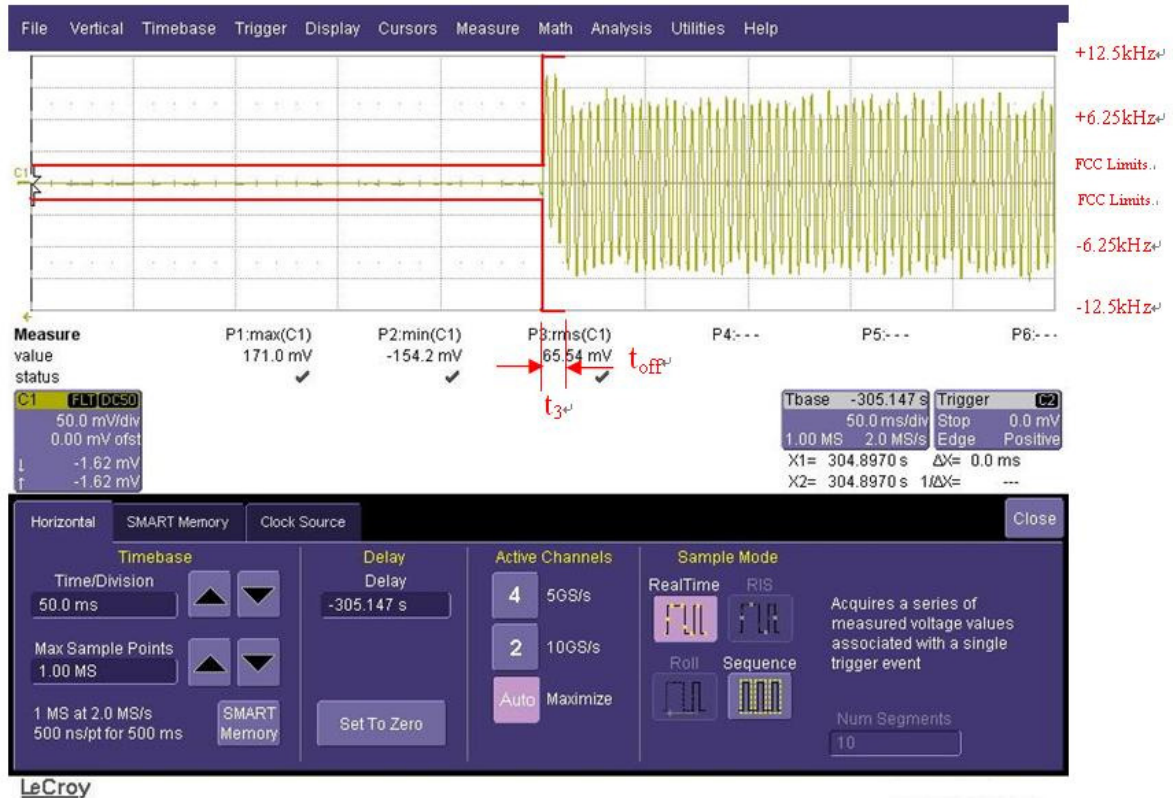
Off



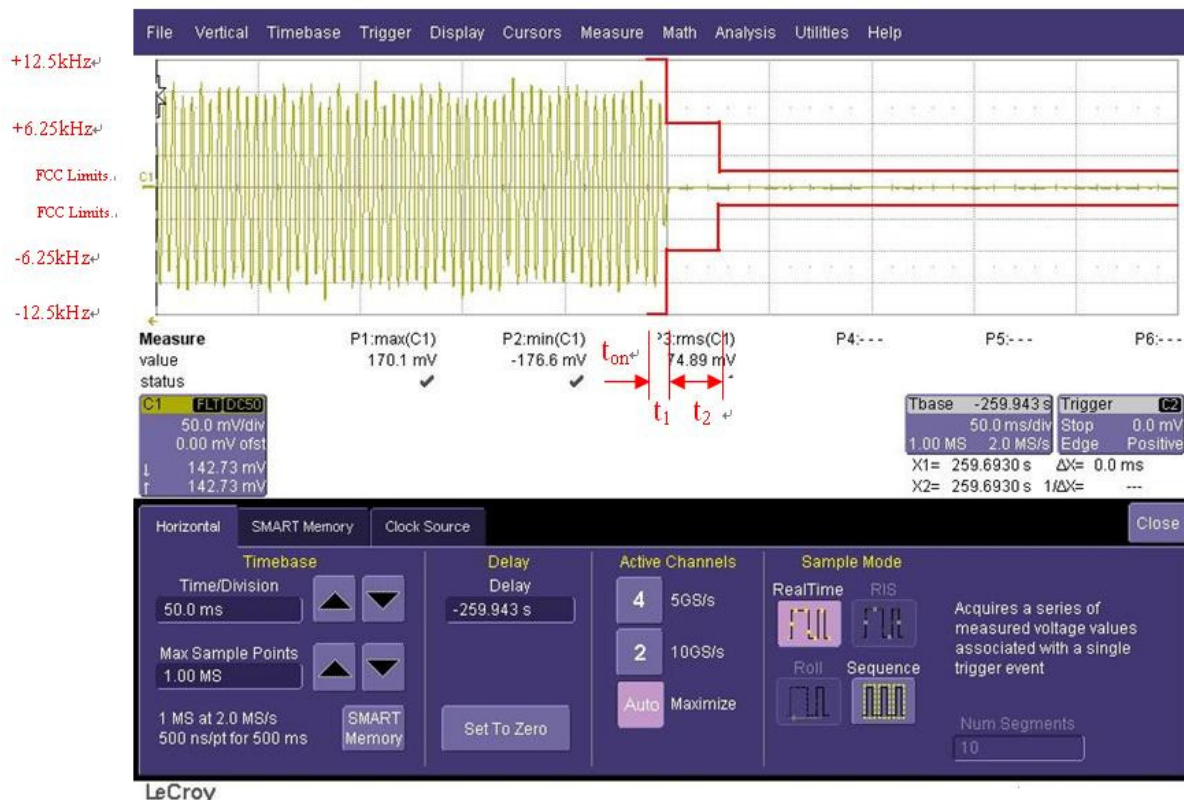
On



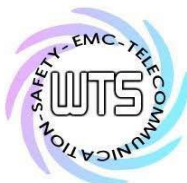
Registration number: W6M21601-15546-C-1
 FCC ID: A8J-SPR922U1
 IC: 10103A-SPR922U1
 469.5625 MHz
 Off



On



Test equipment used: ETSTW-RE 072



Registration number: W6M21601-15546-C-1

FCC ID: A8J-SPR922U1

IC: 10103A-SPR922U1

§90.214 Transient Frequency Behavior.

Transmitters designed to operate in the 150-174 MHz and 421-512 MHz frequency bands must maintain transient frequencies within the maximum frequency difference limits during the time intervals indicated:

Time intervals ^{1 2}	Maximum frequency difference ³	All equipment	
		150 to 174 MHz	421 to 512 MHz
Transient Frequency Behavior for Equipment Designed to Operate on 25 kHz Channels			
t ₁ ⁴	±25.0 kHz	5.0 ms	10.0 ms
t ₂	±12.5 kHz	20.0 ms	25.0 ms
t ₃ ⁴	±25.0 kHz	5.0 ms	10.0 ms
Transient Frequency Behavior for Equipment Designed to Operate on 12.5 kHz Channels			
t ₁ ⁴	±12.5 kHz	5.0 ms	10.0 ms
t ₂	±6.25 kHz	20.0 ms	25.0 ms
t ₃ ⁴	±12.5 kHz	5.0 ms	10.0 ms
Transient Frequency Behavior for Equipment Designed to Operate on 6.25 kHz Channels			
t ₁ ⁴	±6.25 kHz	5.0 ms	10.0 ms
t ₂	±3.125 kHz	20.0 ms	25.0 ms
t ₃ ⁴	±6.25 kHz	5.0 ms	10.0 ms

¹ t_{on} is the instant when a 1 kHz test signal is completely suppressed, including any capture time due to phasing.

t_1 is the time period immediately following t_{on} .

t_2 is the time period immediately following t_1 .

t_3 is the time period from the instant when the transmitter is turned off until t_{off} .

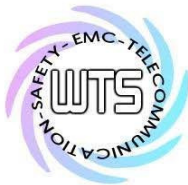
t_{off} is the instant when the 1 kHz test signal starts to rise.

² During the time from the end of t_2 to the beginning of t_3 , the frequency difference must not exceed the limits specified in §90.213.

³ Difference between the actual transmitter frequency and the assigned transmitter frequency.

⁴ If the transmitter carrier output power rating is 6 watts or less, the frequency difference during this time period may exceed the maximum frequency difference for this time period.

[62 FR 2040, Jan. 15, 1997]



Registration number: W6M21601-15546-C-1
FCC ID: A8J-SPR922U1
IC: 10103A-SPR922U1

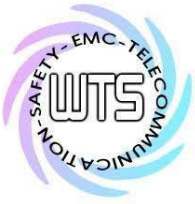
Appendix

A. Photos

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

B. Measurement diagrams

Transmitter Spurious Radiated Emission



Worldwide Testing Services(Taiwan) Co., Ltd.

B. Measurement diagrams



Address:6F.,No.58,Ln 188,Ruey Kuang Rd,Neihu,Taipei
Tel:+886-2-6606-8877
Fax:+886-2-6606-8875

Radiated Emission Measurement

Operator: Mark

File :1

Data :#1

Date: 2016/3/21

Temperature:24 °C

-10.0 dBm

Time: 下午 01:26:50

Humidity:60 %



Site : Chamber

Condition : FCC_part 90 RE

EUT : W6M21601-15546

M/N:

Test Mode : Tx 461.0375MHz

Note :

Polarization: *Horizontal*

Power : 3.7 Vd.c.

Distance: 3m

Mk.	Frequency (MHz)	Reading (dBm)	Detector	Corr. factor (dB)	Result (dBm)	Limit (dBm)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	70.2005	-102.58	peak	21.84	-80.74	-20.00	150	140	-60.74	
	194.5491	-102.21	peak	21.47	-80.74	-20.00	150	20	-60.74	

*:Maximum data x:Over limit !:over margin



Address:6F.,No.58,Ln 188,Ruey Kuang Rd,Neihu,Taipei
Tel:+886-2-6606-8877
Fax:+886-2-6606-8875

Radiated Emission Measurement

Operator: Mark

File :1

Data :#2

Date: 2016/3/21

Temperature:24 °C

-10.0 dBm

Time: 下午 01:18:10

Humidity:60 %



Site : Chamber

Condition : FCC_part 90 RE

EUT : W6M21601-15546

M/N:

Test Mode : Tx 461.0375MHz

Note :

Polarization: *Vertical*

Power : 3.7 Vd.c.

Distance: 3m

Mk.	Frequency (MHz)	Reading (dBm)	Detector	Corr. factor (dB)	Result (dBm)	Limit (dBm)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	77.3548	-97.34	peak	21.72	-75.62	-20.00	150	100	-55.62	
	86.8940	-97.37	peak	21.74	-75.63	-20.00	150	80	-55.63	

*:Maximum data x:Over limit !:over margin



Address:6F.,No.58,Ln 188,Ruey Kuang Rd,Neihu,Taipei
Tel:+886-2-6606-8877
Fax:+886-2-6606-8875

Radiated Emission Measurement

Operator: Mark

File :2

Data :#1

Date: 2016/3/21

Temperature:24 °C

-10.0 dBm

Time: 上午 10:25:15

Humidity:60 %



Site : Chamber

Condition : FCC_part 90 RE

EUT : W6M21601-15546

M/N:

Test Mode : Tx 461.0375MHz

Note :

Polarization: *Horizontal*

Power : 3.7 Vd.c.

Distance: 3m

Mk.	Frequency (MHz)	Reading (dBm)	Detector	Corr. factor (dB)	Result (dBm)	Limit (dBm)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	680.9620	-75.49	peak	-2.97	-78.46	-20.00	150	100	-58.46	
*	929.4590	-44.88	peak	-1.57	-46.45	-20.00	150	200	-26.45	

*:Maximum data x:Over limit !:over margin



Address:6F.,No.58,Ln 188,Ruey Kuang Rd,Neihu,Taipei
Tel:+886-2-6606-8877
Fax:+886-2-6606-8875

Radiated Emission Measurement

Operator: Mark

File :2

Data :#2

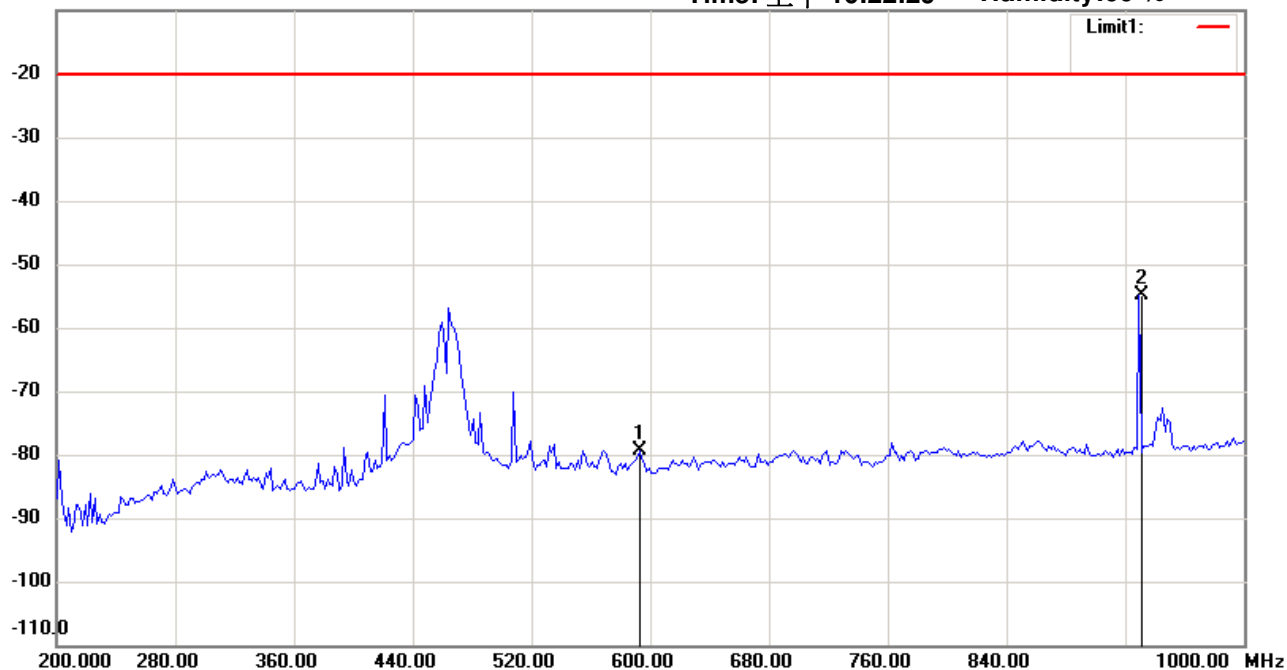
Date: 2016/3/21

Temperature:24 °C

-10.0 dBm

Time: 上午 10:22:29

Humidity:60 %



Site : Chamber

Condition : FCC_part 90 RE

EUT : W6M21601-15546

M/N:

Test Mode : Tx 461.0375MHz

Note :

Polarization: **Vertical**

Power : 3.7 Vd.c.

Distance: 3m

Mk.	Frequency (MHz)	Reading (dBm)	Detector	Corr. factor (dB)	Result (dBm)	Limit (dBm)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	592.7856	-73.60	peak	-5.83	-79.43	-20.00	150	150	-59.43	
*	929.4590	-52.54	peak	-2.22	-54.76	-20.00	150	200	-34.76	

*:Maximum data x:Over limit !:over margin



Address:6F.,No.58,Ln 188,Ruey Kuang Rd,Neihu,Taipei
Tel:+886-2-6606-8877
Fax:+886-2-6606-8875

Radiated Emission Measurement

Operator: Mark

File :3

Data :#1

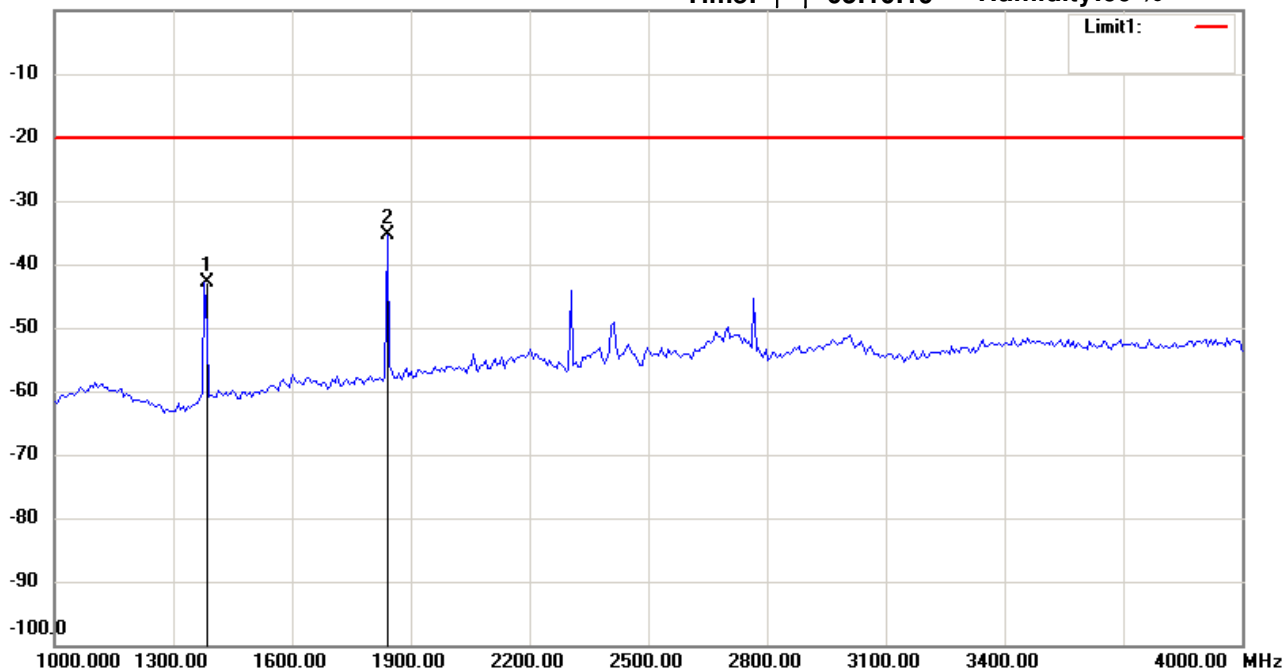
Date: 2016/3/18

Temperature:24 °C

0.0 dBm

Time: 下午 05:10:19

Humidity:60 %



Site : Chamber

Condition : FCC_part 90 RE

EUT : W6M21601-15546

M/N:

Test Mode : Tx 461.0375MHz

Note :

Polarization: *Horizontal*

Power : 3.7 Vd.c.

Distance: 3m

Mk.	Frequency (MHz)	Reading (dBm)	Detector	Corr. factor (dB)	Result (dBm)	Limit (dBm)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1378.758	-43.20	peak	0.31	-42.89	-20.00	150	240	-22.89	
*	1841.683	-38.46	peak	3.15	-35.31	-20.00	150	180	-15.31	

*:Maximum data x:Over limit !:over margin



Address:6F.,No.58,Ln 188,Ruey Kuang Rd,Neihu,Taipei
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Fax:+886-2-6606-8875

Radiated Emission Measurement

Operator: Mark

File :3

Data :#2

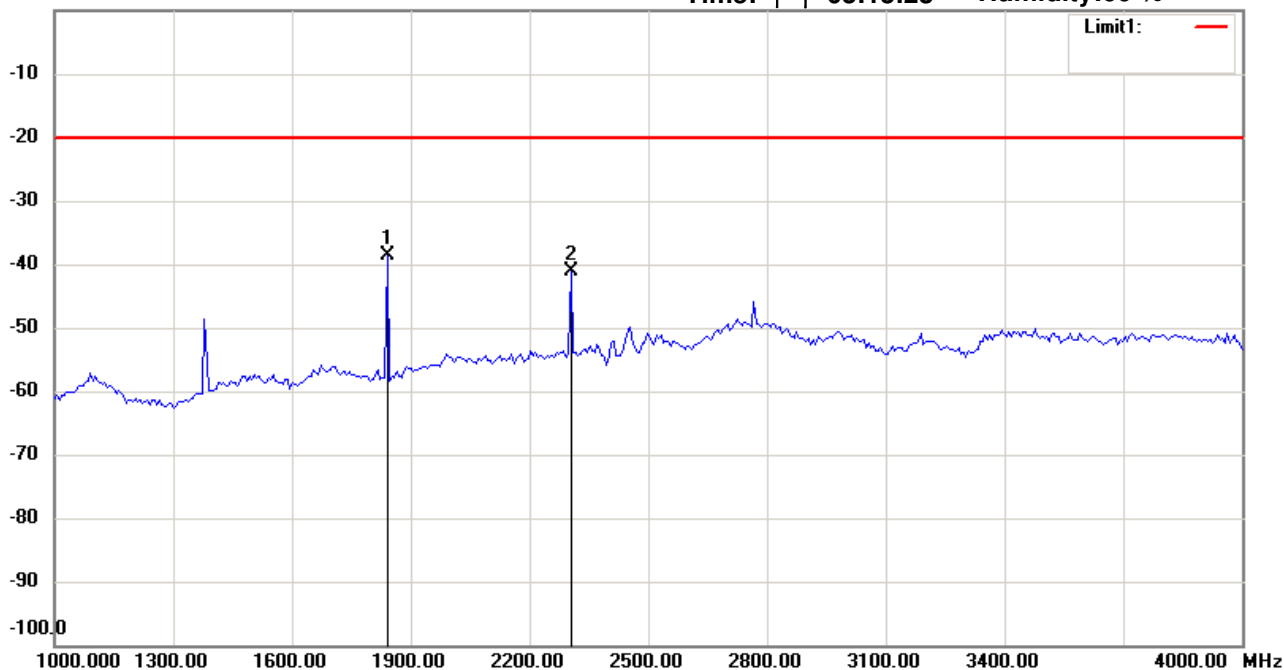
Date: 2016/3/18

Temperature:24 °C

0.0 dBm

Time: 下午 05:15:23

Humidity:60 %



Site : Chamber

Condition : FCC_part 90 RE

EUT : W6M21601-15546

M/N:

Test Mode : Tx 461.0375MHz

Note :

Polarization: Vertical

Power : 3.7 Vd.c.

Distance: 3m

Mk.	Frequency (MHz)	Reading (dBm)	Detector	Corr. factor (dB)	Result (dBm)	Limit (dBm)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	1841.683	-41.66	peak	3.01	-38.65	-20.00	150	180	-18.65	
	2304.609	-47.93	peak	6.80	-41.13	-20.00	150	240	-21.13	

*:Maximum data x:Over limit !:over margin



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Radiated Emission Measurement

Operator: Mark

File :1

Data :#1

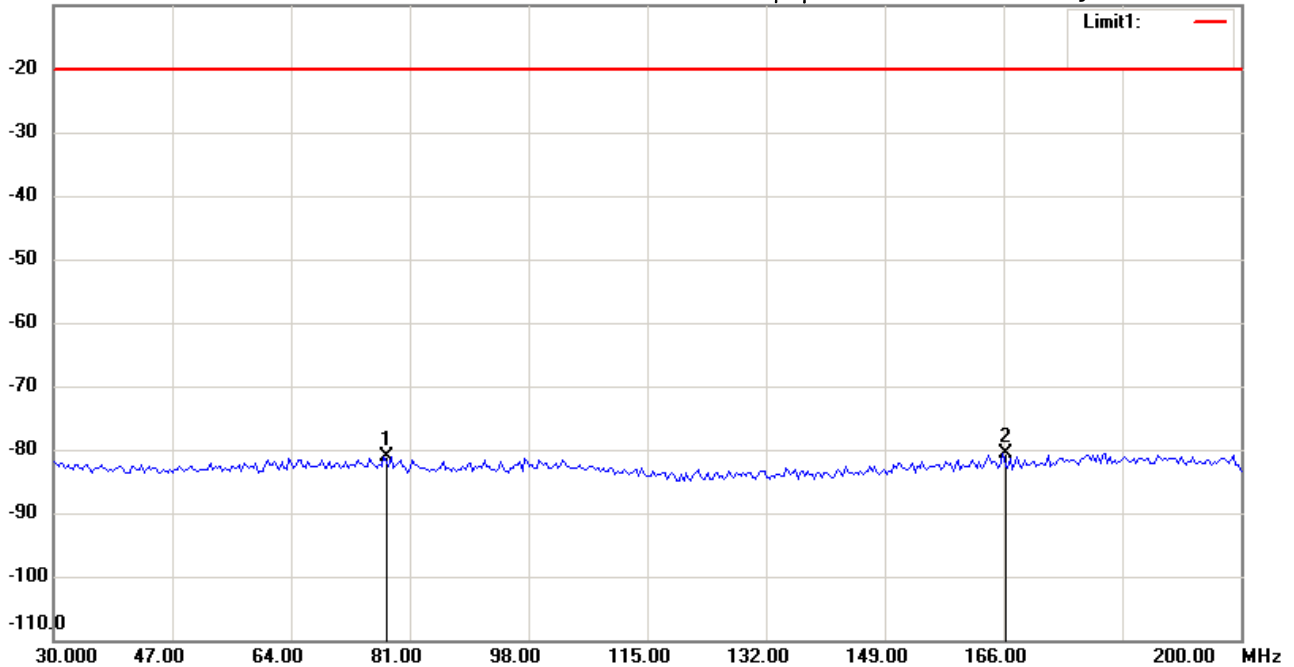
Date: 2016/3/21

Temperature:24 °C

-10.0 dBm

Time: 下午 01:25:57

Humidity:60 %



Site : Chamber

Condition : FCC_part 90 RE

EUT : W6M21601-15546

M/N:

Test Mode : Tx 464.5MHz

Note :

Polarization: *Horizontal*

Power : 3.7 Vd.c.

Distance: 3m

Mk.	Frequency (MHz)	Reading (dBm)	Detector	Corr. factor (dB)	Result (dBm)	Limit (dBm)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	77.3548	-102.87	peak	21.73	-81.14	-20.00	150	240	-61.14	
*	165.9320	-102.12	peak	21.47	-80.65	-20.00	150	280	-60.65	

*:Maximum data x:Over limit !:over margin



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Radiated Emission Measurement

Operator: Mark

File :1

Data :#2

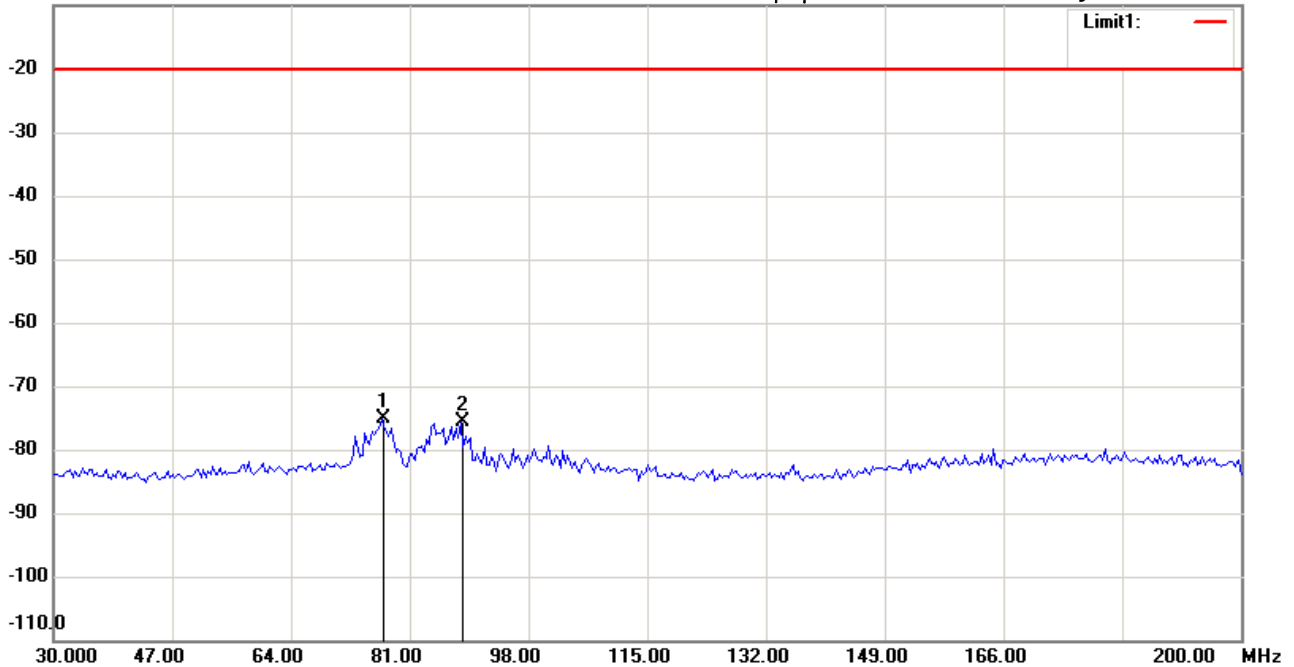
Date: 2016/3/21

Temperature:24 °C

-10.0 dBm

Time: 下午 01:19:15

Humidity:60 %



Site : Chamber

Condition : FCC_part 90 RE

EUT : W6M21601-15546

M/N:

Test Mode : Tx 464.5MHz

Note :

Polarization: **Vertical**

Power : 3.7 Vd.c.

Distance: 3m

Mk.	Frequency (MHz)	Reading (dBm)	Detector	Corr. factor (dB)	Result (dBm)	Limit (dBm)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	77.0141	-96.76	peak	21.72	-75.04	-20.00	150	170	-55.04	
	88.2566	-97.35	peak	21.75	-75.60	-20.00	150	240	-55.60	

*:Maximum data x:Over limit !:over margin



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Radiated Emission Measurement

Operator: Mark

File : 2

Data : #1

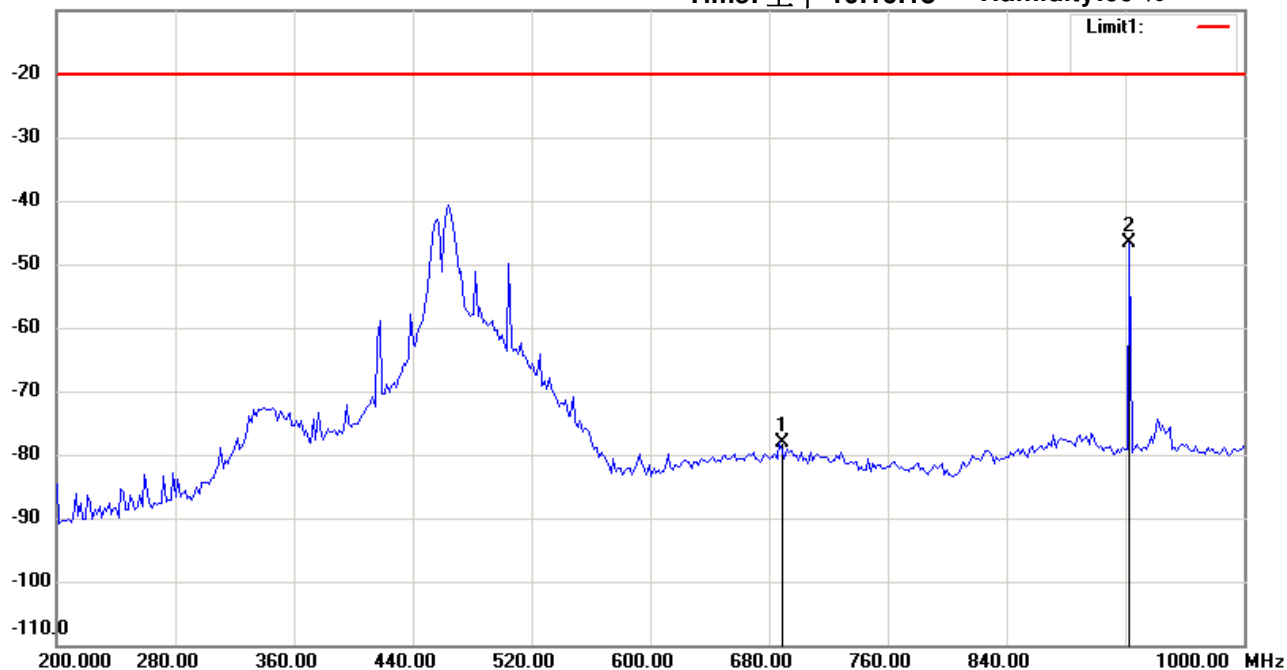
Date: 2016/3/21

Temperature: 24 °C

-10.0 dBm

Time: 上午 10:16:18

Humidity: 60 %



Site : Chamber

Condition : FCC_part 90 RE

EUT : W6M21601-15546

M/N:

Test Mode : Tx 464.5MHz

Note :

Polarization: *Horizontal*

Power : 3.7 Vd.c.

Distance: 3m

Mk.	Frequency (MHz)	Reading (dBm)	Detector	Corr. factor (dB)	Result (dBm)	Limit (dBm)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	687.3748	-75.23	peak	-2.96	-78.19	-20.00	150	170	-58.19	
*	923.0461	-45.14	peak	-1.38	-46.52	-20.00	150	240	-26.52	

*:Maximum data x:Over limit !:over margin



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Radiated Emission Measurement

Operator: Mark

File :2

Data :#2

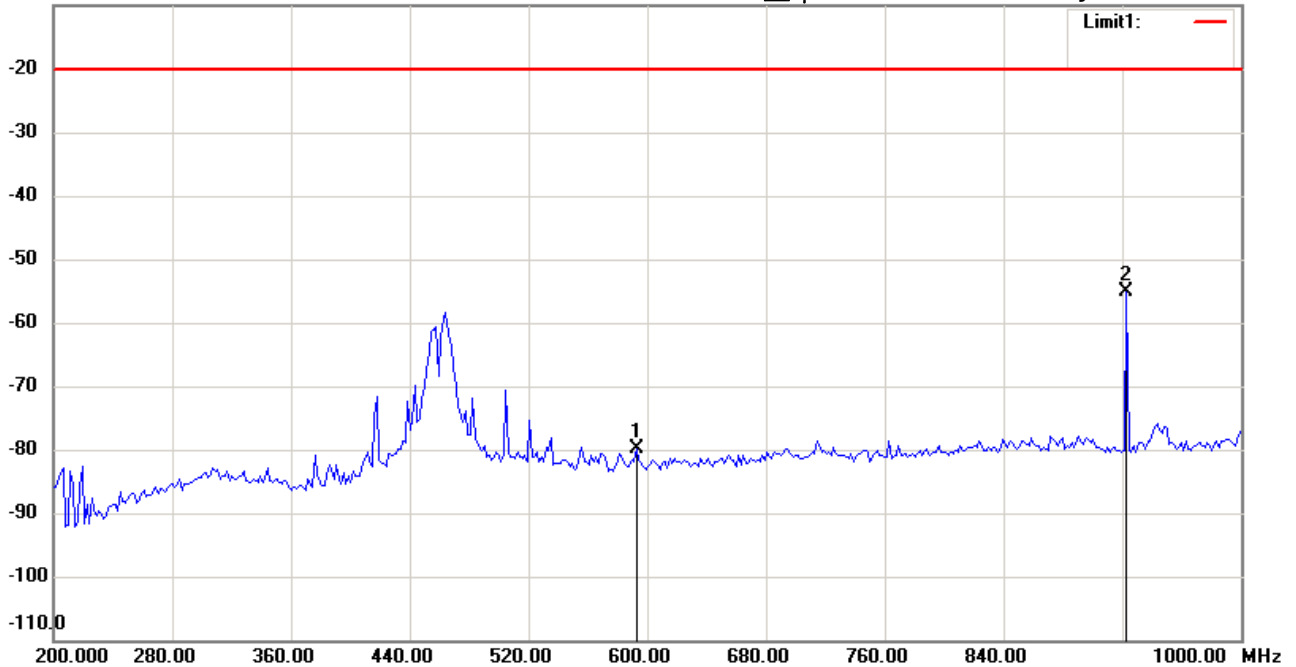
Date: 2016/3/21

Temperature:24 °C

-10.0 dBm

Time: 上午 10:18:17

Humidity:60 %



Site : Chamber

Condition : FCC_part 90 RE

EUT : W6M21601-15546

M/N:

Test Mode : Tx 464.5MHz

Note :

Polarization: *Vertical*

Power : 3.7 Vd.c.

Distance: 3m

Mk.	Frequency (MHz)	Reading (dBm)	Detector	Corr. factor (dB)	Result (dBm)	Limit (dBm)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	592.7856	-74.07	peak	-5.83	-79.90	-20.00	150	200	-59.90	
*	923.0461	-53.00	peak	-2.12	-55.12	-20.00	150	100	-35.12	

*:Maximum data x:Over limit !:over margin



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Radiated Emission Measurement

Operator: Mark

File :3

Data :#1

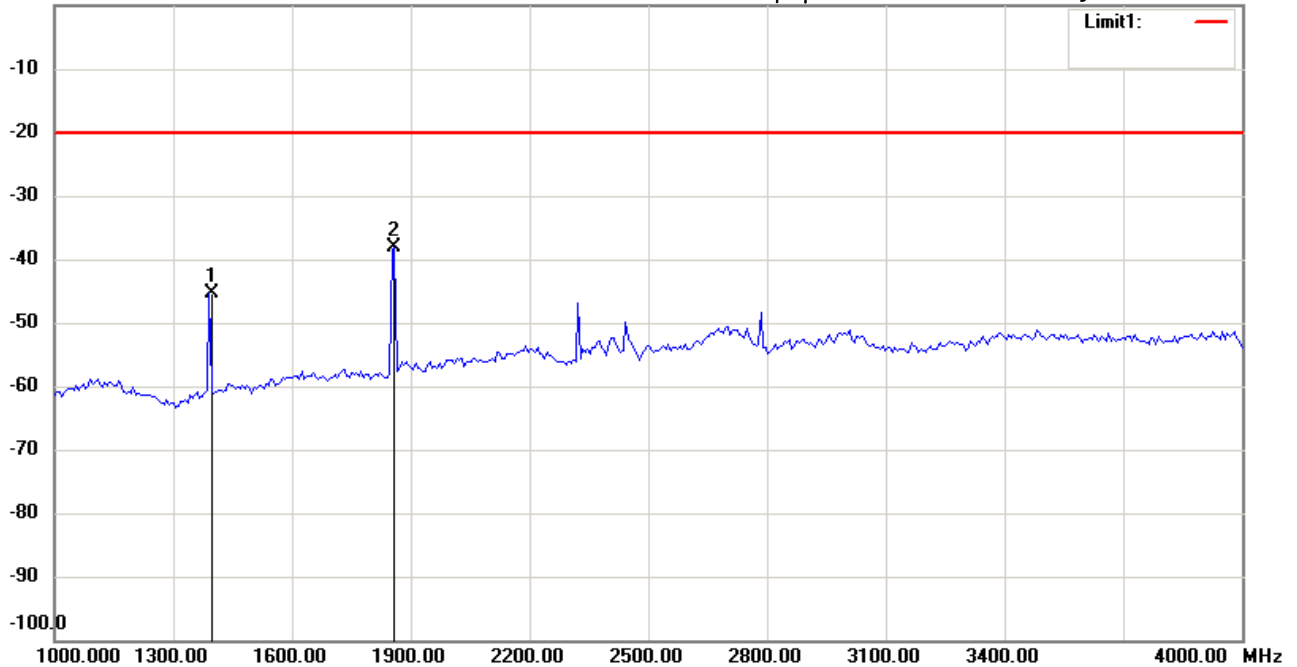
Date: 2016/3/18

Temperature:24 °C

0.0 dBm

Time: 下午 05:21:05

Humidity:60 %



Site : Chamber

Condition : FCC_part 90 RE

EUT : W6M21601-15546

M/N:

Test Mode : Tx 464.5MHz

Note :

Polarization: *Horizontal*

Power : 3.7 Vd.c.

Distance: 3m

Mk.	Frequency (MHz)	Reading (dBm)	Detector	Corr. factor (dB)	Result (dBm)	Limit (dBm)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1390.782	-46.10	peak	0.61	-45.49	-20.00	150	240	-25.49	
*	1859.719	-41.43	peak	3.32	-38.11	-20.00	150	280	-18.11	

*:Maximum data x:Over limit !:over margin



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Radiated Emission Measurement

Operator: Mark

File :3

Data :#2

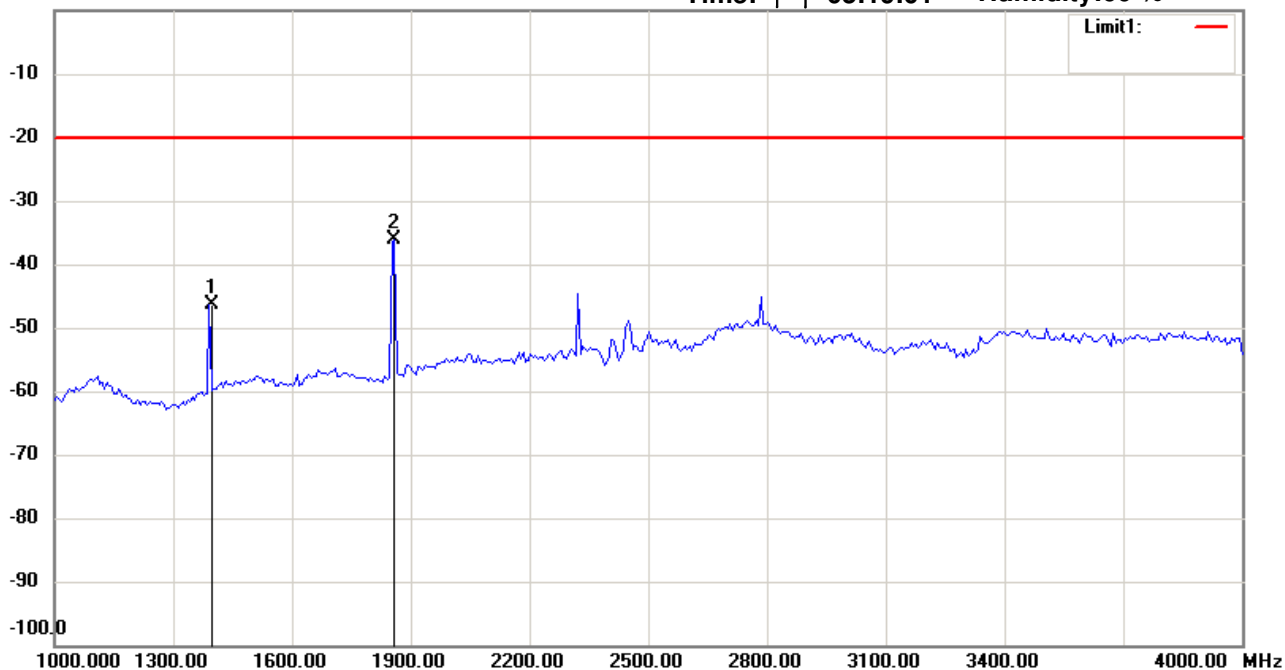
Date: 2016/3/18

Temperature:24 °C

0.0 dBm

Time: 下午 05:19:01

Humidity:60 %



Site : Chamber

Condition : FCC_part 90 RE

EUT : W6M21601-15546

M/N:

Test Mode : Tx 464.5MHz

Note :

Polarization: *Vertical*

Power : 3.7 Vd.c.

Distance: 3m

Mk.	Frequency (MHz)	Reading (dBm)	Detector	Corr. factor (dB)	Result (dBm)	Limit (dBm)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1390.782	-47.49	peak	1.23	-46.26	-20.00	150	140	-26.26	
*	1859.719	-39.43	peak	3.23	-36.20	-20.00	150	200	-16.20	

*:Maximum data x:Over limit !:over margin



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Radiated Emission Measurement

Operator: Mark

File :1

Data :#1

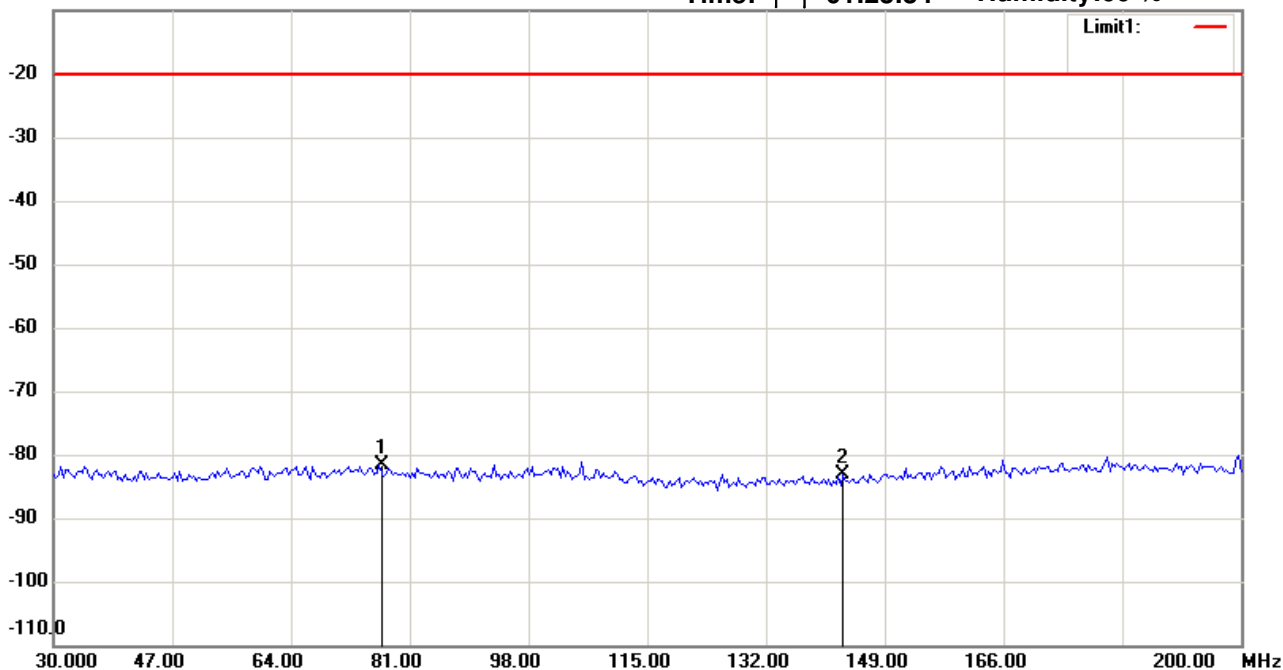
Date: 2016/3/21

Temperature:24 °C

-10.0 dBm

Time: 下午 01:23:34

Humidity:60 %



Site : Chamber

Condition : FCC_part 90 RE

EUT : W6M21601-15546

M/N:

Test Mode : Tx 469.5625MHz

Note :

Polarization: *Horizontal*

Power : 3.7 Vd.c.

Distance: 3m

Mk.	Frequency (MHz)	Reading (dBm)	Detector	Corr. factor (dB)	Result (dBm)	Limit (dBm)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	76.6734	-103.39	peak	21.74	-81.65	-20.00	150	170	-61.65	
	143.1062	-103.28	peak	20.26	-83.02	-20.00	150	250	-63.02	

*:Maximum data x:Over limit !:over margin



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Radiated Emission Measurement

Operator: Mark

File :1

Data :#2

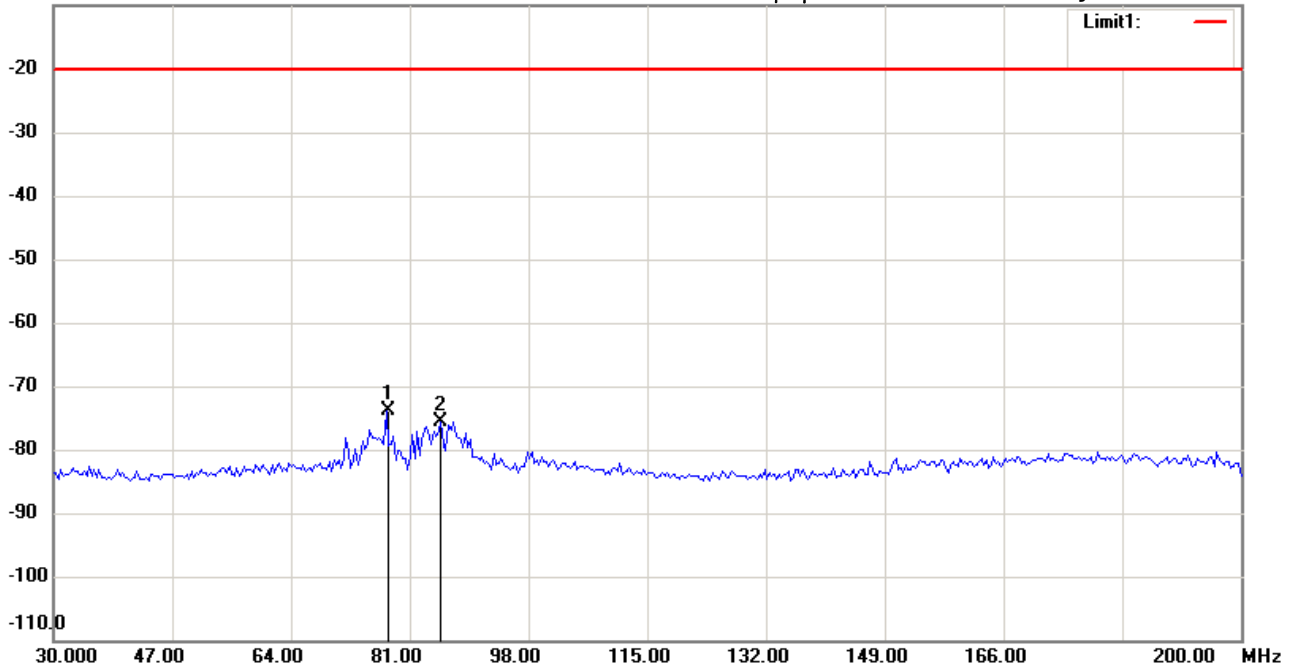
Date: 2016/3/21

Temperature:24 °C

-10.0 dBm

Time: 下午 01:20:13

Humidity:60 %



Site : Chamber

Condition : FCC_part 90 RE

EUT : W6M21601-15546

M/N:

Test Mode : Tx 469.5625MHz

Note :

Polarization: Vertical

Power : 3.7 Vd.c.

Distance: 3m

Mk.	Frequency (MHz)	Reading (dBm)	Detector	Corr. factor (dB)	Result (dBm)	Limit (dBm)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	77.6955	-95.50	peak	21.71	-73.79	-20.00	150	170	-53.79	
	85.5311	-97.41	peak	21.72	-75.69	-20.00	150	250	-55.69	

*:Maximum data x:Over limit !:over margin



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Radiated Emission Measurement

Operator: Mark

File :2

Data :#1

Date: 2016/3/21

Temperature:24 °C

-10.0 dBm

Time: 上午 10:13:22

Humidity:60 %



Site : Chamber

Condition : FCC_part 90 RE

EUT : W6M21601-15546

M/N:

Test Mode : Tx 469.5625MHz

Note :

Polarization: *Horizontal*

Power : 3.7 Vd.c.

Distance: 3m

Mk.	Frequency (MHz)	Reading (dBm)	Detector	Corr. factor (dB)	Result (dBm)	Limit (dBm)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	708.2164	-75.28	peak	-3.26	-78.54	-20.00	150	180	-58.54	
*	939.0782	-44.42	peak	-1.85	-46.27	-20.00	150	310	-26.27	

*:Maximum data x:Over limit !:over margin



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Radiated Emission Measurement

Operator: Mark

File :2

Data :#2

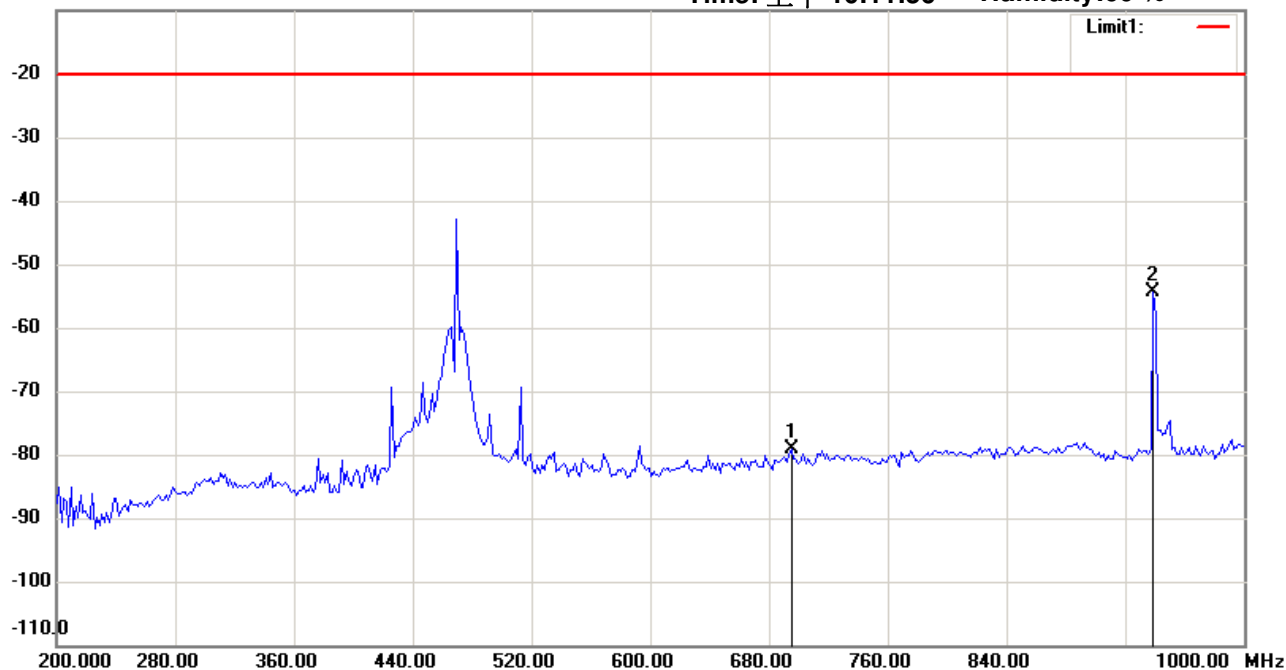
Date: 2016/3/21

Temperature:24 °C

-10.0 dBm

Time: 上午 10:11:56

Humidity:60 %



Site : Chamber

Condition : FCC_part 90 RE

EUT : W6M21601-15546

M/N:

Test Mode : Tx 469.5625MHz

Note :

Polarization: **Vertical**

Power : 3.7 Vd.c.

Distance: 3m

Mk.	Frequency (MHz)	Reading (dBm)	Detector	Corr. factor (dB)	Result (dBm)	Limit (dBm)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	695.3908	-75.55	peak	-3.45	-79.00	-20.00	150	180	-59.00	
*	939.0782	-52.08	peak	-2.36	-54.44	-20.00	150	150	-34.44	

*:Maximum data x:Over limit !:over margin



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Tel:+886-2-6606-8877
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Radiated Emission Measurement

Operator: Mark

File :3

Data :#1

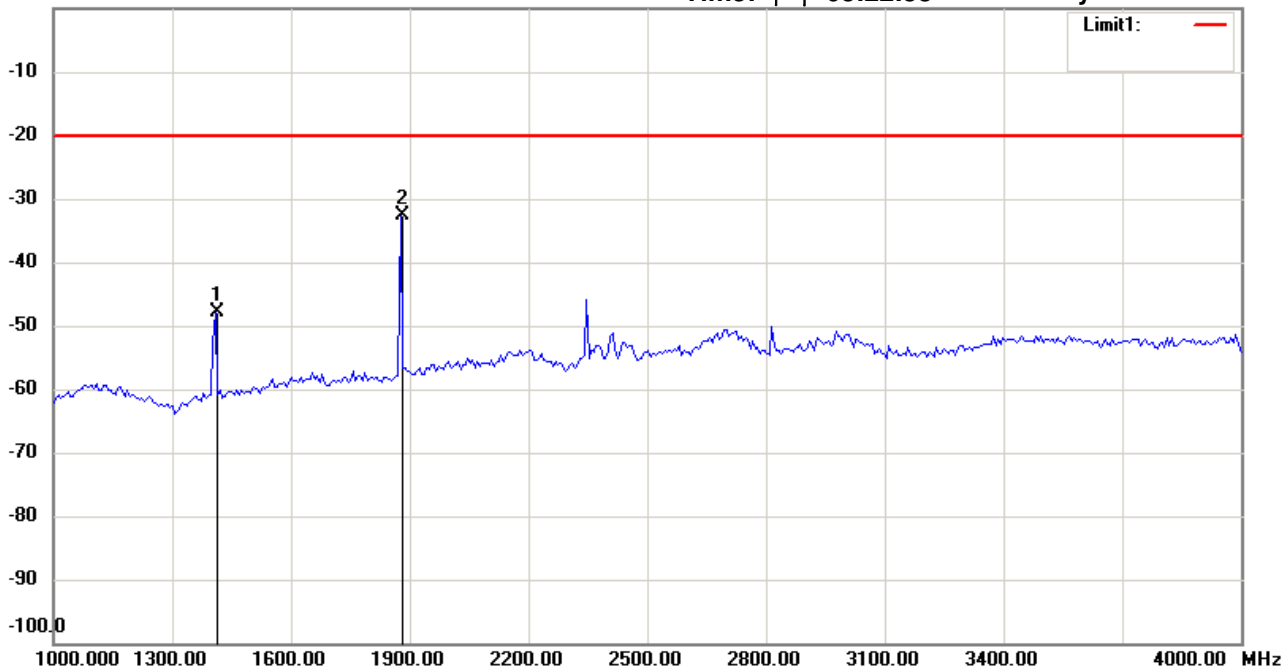
Date: 2016/3/18

Temperature:24 °C

0.0 dBm

Time: 下午 05:22:53

Humidity:60 %



Site : Chamber

Condition : FCC_part 90 RE

EUT : W6M21601-15546

M/N:

Test Mode : Tx 469.5625MHz

Note :

Polarization: *Horizontal*

Power : 3.7 Vd.c.

Distance: 3m

Mk.	Frequency (MHz)	Reading (dBm)	Detector	Corr. factor (dB)	Result (dBm)	Limit (dBm)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1408.818	-48.73	peak	0.82	-47.91	-20.00	150	240	-27.91	
*	1877.756	-36.17	peak	3.49	-32.68	-20.00	150	210	-12.68	

*:Maximum data x:Over limit !:over margin



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Radiated Emission Measurement

Operator: Mark

File :3

Data :#2

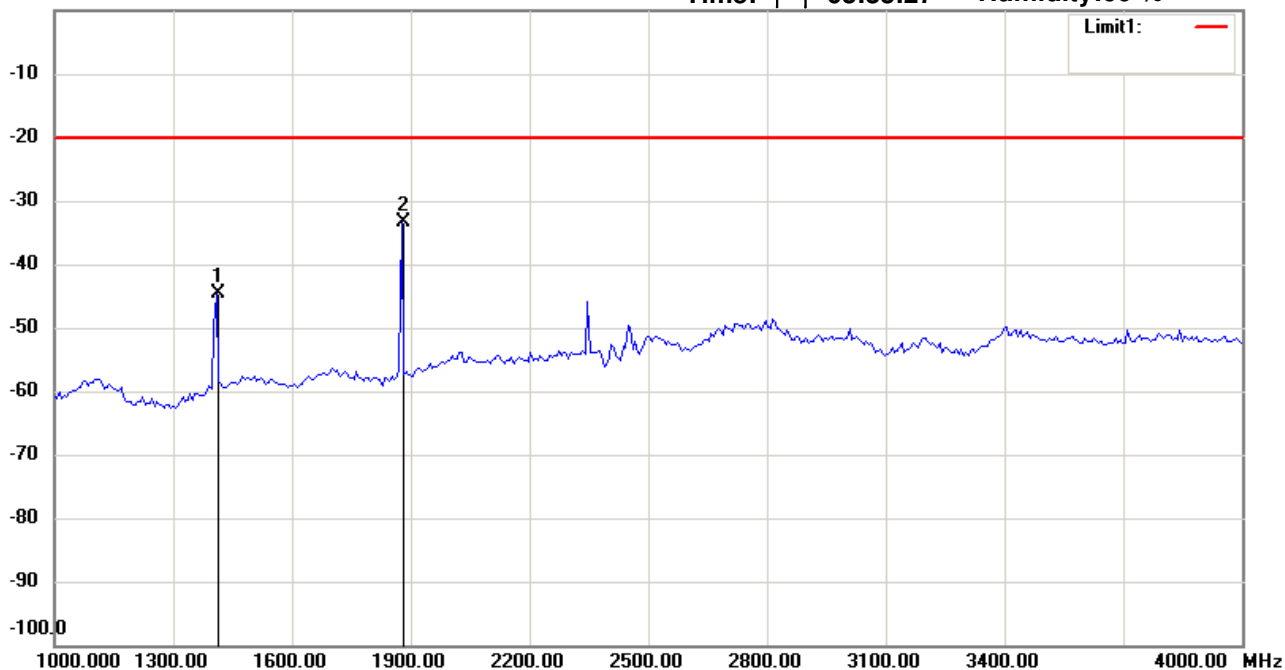
Date: 2016/3/18

Temperature:24 °C

0.0 dBm

Time: 下午 05:35:27

Humidity:60 %



Site : Chamber

Condition : FCC_part 90 RE

EUT : W6M21601-15546

M/N:

Test Mode : Tx 469.5625MHz

Note :

Polarization: Vertical

Power : 3.7 Vd.c.

Distance: 3m

Mk.	Frequency (MHz)	Reading (dBm)	Detector	Corr. factor (dB)	Result (dBm)	Limit (dBm)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1408.818	-46.32	peak	1.60	-44.72	-20.00	150	240	-24.72	
*	1877.756	-36.84	peak	3.45	-33.39	-20.00	150	250	-13.39	

*:Maximum data x:Over limit !:over margin