FCC Part 74 Subpart H

EMI TEST REPORT

of

E.U.T. : UHF PLL Handheld Transmitter
FCC ID. : INGUF-10TH
Model No. : UF-10TH
Working Frequency : 502-607.875, 614.125-697.875MHz

for

APPLICANT : JTS Professional Co., Ltd.
ADDRESS : No. 148, Industry 9th Road, Tali Dist., Taichung City 41280
Taiwan, R.O.C.

Test Performed by

ELECTRONICS TESTING CENTER (ETC) , TAIWAN
NO. 34. LIN 5, DINGFU VIL., LINKOU DIST.,
NEW TAIPEI CITY, TAIWAN, 24442, R.O.C.
TEL : (02)26023052 FAX : (02)26010910
http:// www.etc.org.tw ; e-mail:emc@etc.org.tw

Report Number : 12-12-RBF-027-04

TEST REPORT CERTIFICATION

Applicant	:	JTS Professional Co., Ltd. No. 148, Industry 9th Road, Tali Dist., Taichung City 41280 Taiwan, R.O.C.
Manufacturer	:	JTS Professional Co., Ltd. No. 148, Industry 9th Road, Tali Dist., Taichung City 41280 Taiwan, R.O.C.
Description of EUT	:	
a) Type of EUT	:	UHF PLL Handheld Transmitter
b) Trade Name	:	JTS
c) Model No.	:	UF-10TH
d) FCC ID	:	INGUF-10TH
e) Working Frequency	:	502~607.875, 614.125~697.875 MHz
f) Power Supply	:	DC 1.5V Battery*2

Regulation Applied: FCC Rules and Regulations Part 74 Subpart H

I HEREBY CERTIFY THAT; The data shown in this report were made in accordance with the procedures given in ANSI C63.4 and the energy emitted by the device was founded to be within the limits applicable. I assume full responsibility for accuracy and completeness of these data.

Issued Date : Apr. 03, 2013

Test Engineer : 

(Vincent Chang, Engineer)

Approve & Authorized Signer : 

S. S. Liou, Section Manager
EMC Dept. II of ELECTRONICS
TESTING CENTER, TAIWAN

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1. GENERAL INFORMATION

1.1 Product Description

a) Type of EUT	:	UHF PLL Handheld Transmitter
b) Trade Name	:	JTS
c) Model No.	:	UF-10TH
d) FCC ID	:	INGUF-10TH
e) Working Frequency	:	502~607.875, 614.125~697.875 MHz
f) Power Supply	:	DC 1.5V Battery*2
g) Emission Designator	:	119KF3E 2M+2DK=2x(2kHz)+2x(57.5kHz)x1=119kHz

1.2 Test Methodology

Both conducted and radiated testing were performed according to the procedures in chapter 13 of ANSI C63.4 (2003). Test also follow “TIA-603-C(2004)-Land Mobile FM or PM Communications Equipment Measurement and Performance Standsrds” and section 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, and 2.1055 of Part 2 of CFR 47.

1.3 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located on the roof top of Building at NO. 34. LIN 5, DINGFU VIL., LINKOU DIST.,NEW TAIPEI CITY, TAIWAN, 24442, R.O.C.

This site has been fully described in a report submitted to your office, and accepted in a letter dated Jan. 11, 2011.

2. REQUIREMENTS OF PROVISIONS

2.1 Definition

Intentional radiator:
A device that intentionally generates and emits radio frequency energy by radiation or induction.

2.2 Frequencies Available

According to sec. 74.802 of Part 74, the following frequencies are available for low power auxiliary station :

Frequencies (MHz)

26.100-26.480	455.000-456.000
54.000-72.000	470.000-488.000
76.000-88.000	488.000-494.000
161.625-161.775	494.000-608.000
174.000-216.000	614.000-806.000
450.000-451.000	944.000-952.000

2.3 Requirements for Radio Equipment on Certification

(1) RF Output Power
For transmitters, the power output shall be measured at the RF output terminals.

(2) Modulation Characteristics
For Voice Modulated Communication Equipment, a curve or equivalent data showing the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz shall be submitted.

(3) Occupied Bandwidth
For radiotelephone transmitter, other than single sideband or indenpent sideband transmitter, when modulateed by a 2.5kHz tone at an input level 16 dB greater than that necessary to produce 50 percent modulation.

(4) Spurious Emissions at Antenna Terminals
The radio frequency voltage or power generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminal when properly loaded with a suitable artificial antenna.

(5) Field Strength of Spurious Emissions

Measurements shall be made to detect spurious emission that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal condition of installation and operation.

(6) Frequencies Tolerance

a) The frequency stability shall be measured with variation of ambient temperature.
b) The frequency stability shall be measured with variation of primary supply voltage.

2.4 Labeling Requirement

Each equipment for which a type acceptance application is filed on or after May 1,1981, shall bear an identification plate or label pursuant to §2.925（Identification of equipment） and §2.926（FCC identifier）.

3. OUTPUT POWER MEASUREMENT

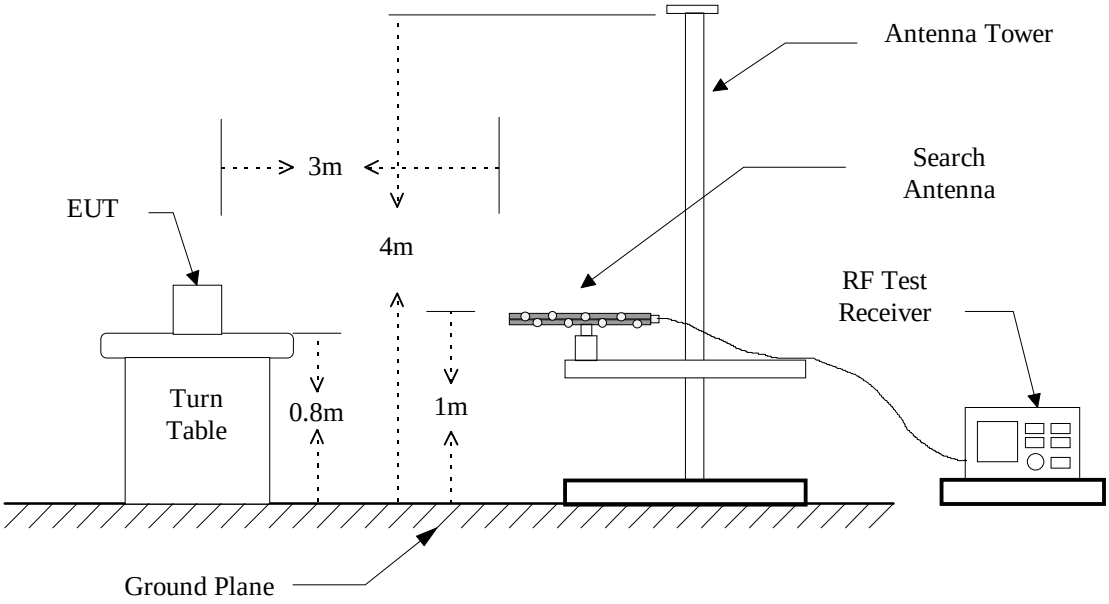
3.1 Provision Applicable

According to §74.861(e)(1)(ii), the output power shall not exceed 250 milliwatts.

3.2 Measurement Procedure

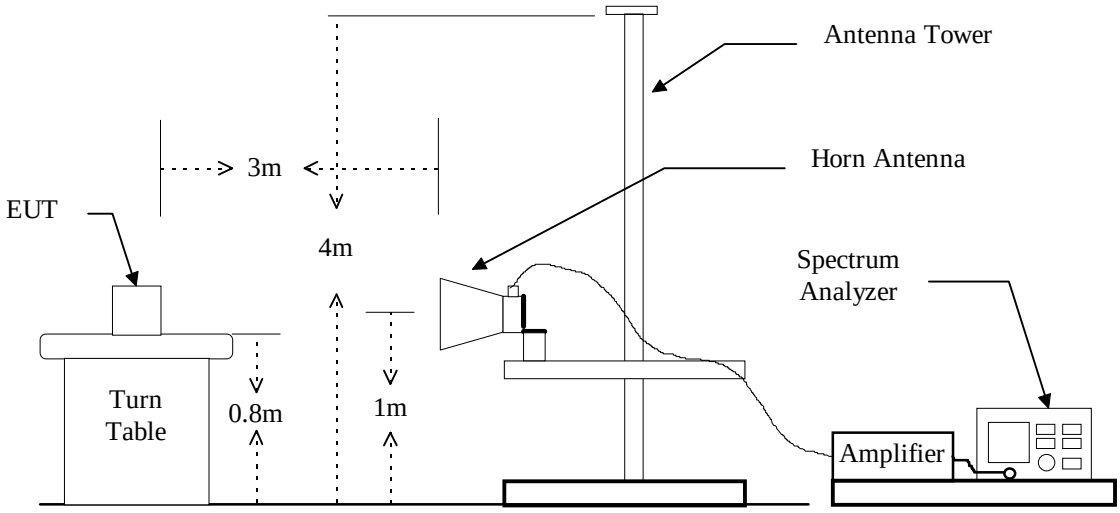
1. Setup the configuration per figure 1 and 2 for frequencies measured below and above 1 GHz respectively, adjusting the input voltage to produce the maximum power.
2. Adjust the analyzer for each frequency measured in chapter 6 on a 1 MHz frequency span and 1MHz resolution bandwidth.
3. The search antenna is to be raised and lowered over a range from 1 to 4 meters in horizontally polarized orientation. Position the highness when the highest value is indicated on spectrum analyzer, then change the orientation of EUT on test table over a range from 0 ° to 360 °, and record the highest value indicated on spectrum analyzer as reference value.
4. Repeat step 3 until all frequencies need to be measured were complete.
5. Repeat step 4 with search antenna in vertical polarized orientations.
6. Replace the EUT with a tuned dipole antenna (horn antenna for above 1 GHz) relative to each frequency in horizontally polarized orientation and as the same polarized orientation with search antenna. Connect the tuned dipole antenna to a standard signal generator (SG) via a low loss cable. Power on the SG and tune the right frequency in measuring as well as set SG at a appreciated output level. Rise and lower the search antenna to get the highest value on spectrum analyzer, and then hold this position. Adjust the SG output to get a identical value derived from step 3 on spectrum analyzer. Record this value for result calculated.
7. Repeat step 6 until all frequencies need to be measured were complete.
8. Repeat step 7 with both dipole antenna (horn antenna for above 1 GHz) and search antenna in vertical polarized orientations.

Figure 1 : Frequencies measured below 1 GHz configuration



Note: For substitution method, replace the EUT with a tuned dipole antenna relative to each frequency and connect to a standard signal generator (SG) via a low loss cable.

Figure 2 : Frequencies measured above 1 GHz configuration



Note: For substitution method, replace the EUT with a horn antenna and connect to a standard signal generator (SG) via a low loss cable.

3.3 Test Data

Band 502-607.875, 614.125-697.875MHz

Operated mode : TX Test Date : Sep. 17, 2012
Temperature : 26 °C Humidity : 58 %

Frequency (MHz)	Meter Reading (dB μ V/m)	SG Reading (dBm)	Cable Loss (dB)	Antenna Gain	Result (dBm)	Output Power (mW)	Limit (mW)
502.000	84.00	11.10	2.00	---	9.10	8.128	250

Frequency (MHz)	Meter Reading (dB μ V/m)	SG Reading (dBm)	Cable Loss (dB)	Antenna Gain	Result (dBm)	Output Power (mW)	Limit (mW)
607.875	81.30	10.80	2.20	----	8.90	7.762	250

Frequency (MHz)	Meter Reading (dB μ V/m)	SG Reading (dBm)	Cable Loss (dB)	Antenna Gain	Result (dBm)	Output Power (mW)	Limit (mW)
614.125	81.70	11.00	2.30	----	9.00	7.943	250

Frequency (MHz)	Meter Reading (dB μ V/m)	SG Reading (dBm)	Cable Loss (dB)	Antenna Gain	Result (dBm)	Output Power (mW)	Limit (mW)
697.875	80.80	11.20	2.30	----	8.90	7.762	250

Note: For measured frequency below 1GHz, a tuned dipole antenna is used.

3.4 Result Calculation

Result calculation is as following :

Result = SG Reading + Cable Loss + Antenna Gain Corrected

Antenna Gain Corrected : is used for antenna other than dipole to convert radiated power to ERP.

$$mW = \log^{-1}\left[\frac{\text{Result(dBm)}}{10}\right]$$

3.5 Test Equipment

Equipment	Manufacturer	Model No.	Calibration Date	Next Cal. Date
EMI Test Receiver	Rohde & Schwarz	ESCI	2012/04/26	2013/04/26
Dipole Antenna	Schwarzbeck	897;898	2012/09/07	2013/09/07
Log-periodic Antenna	EMCO	3146	2012/10/17	2013/10/17
Amplifier	HP	8447D	2012/05/16	2013/05/16
Signal generator	HP	83732B	2012/09/06	2013/09/06

4. MODULATION CHARACTERISTICS

4.1 Provisions Applicable

According to § 2.1047 (a), for Voice Modulated Communication Equipment, the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz shall be measured.

4.2 Measurement Method

A) Modulation Limit

1. Position the EUT as shown in figure 3, adjust the audio input frequency to 100 Hz and the input level from 0V to maximum permitted input voltage with recording each carrier frequency deviation responding to respective input level.

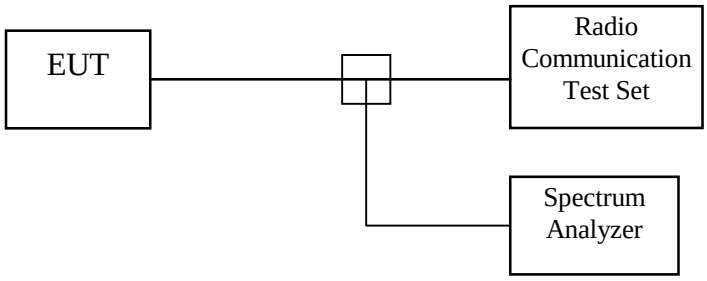
2. Repeat step 1 with changing the input frequency for 200, 500, 1000, 3000, and 5000 Hz in sequence.

B) Frequency response of all circuits

1. Position the EUT as shown in figure 3.

2. Vary the modulating frequency from 100 Hz to 15000 Hz with constant input voltage (derived from 5.4(a) of this test report), and observe the change in output.

Figure 3 : Modulation characteristic measurement configuration



4.3 Measurement Instrument

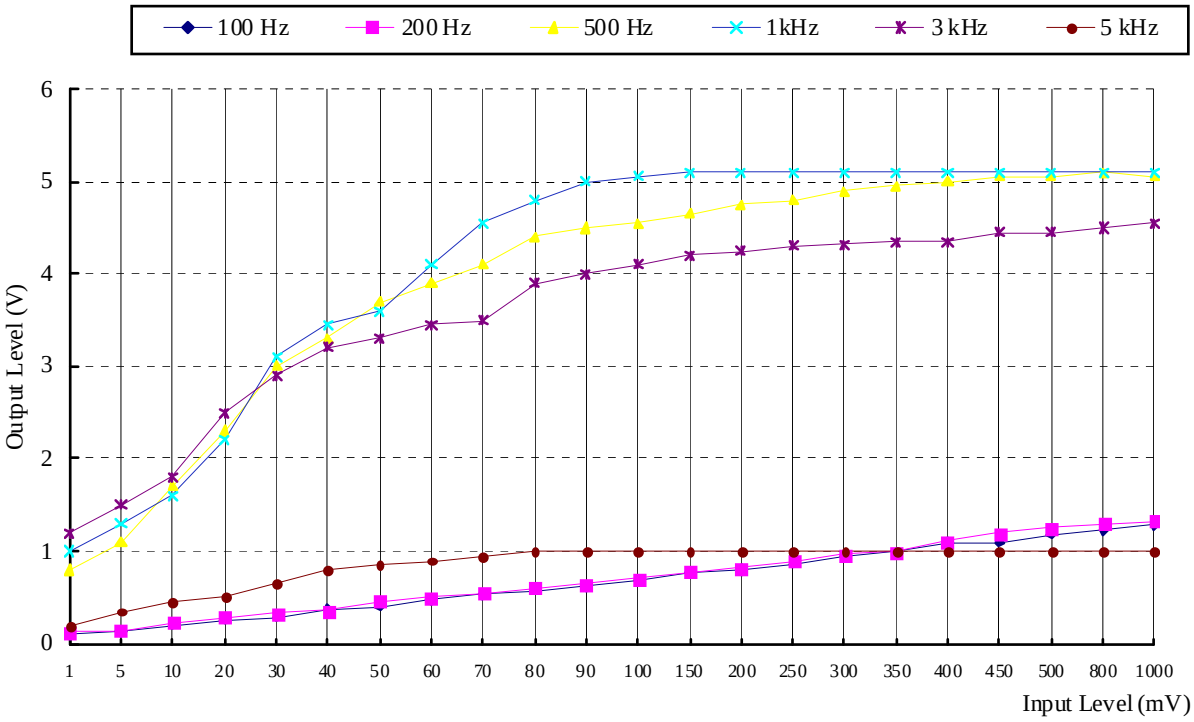
Equipment	Manufacturer	Model No.	Calibration Date	Next Cal. Date
Communications Service Monitor	AEROFLEX	2945B	2012/05/04	2013/05/07
Spectrum Analyzer	Rohde & Schwarz	FSP40	2012/09/20	2013/09/20

4.4 Measurement Result

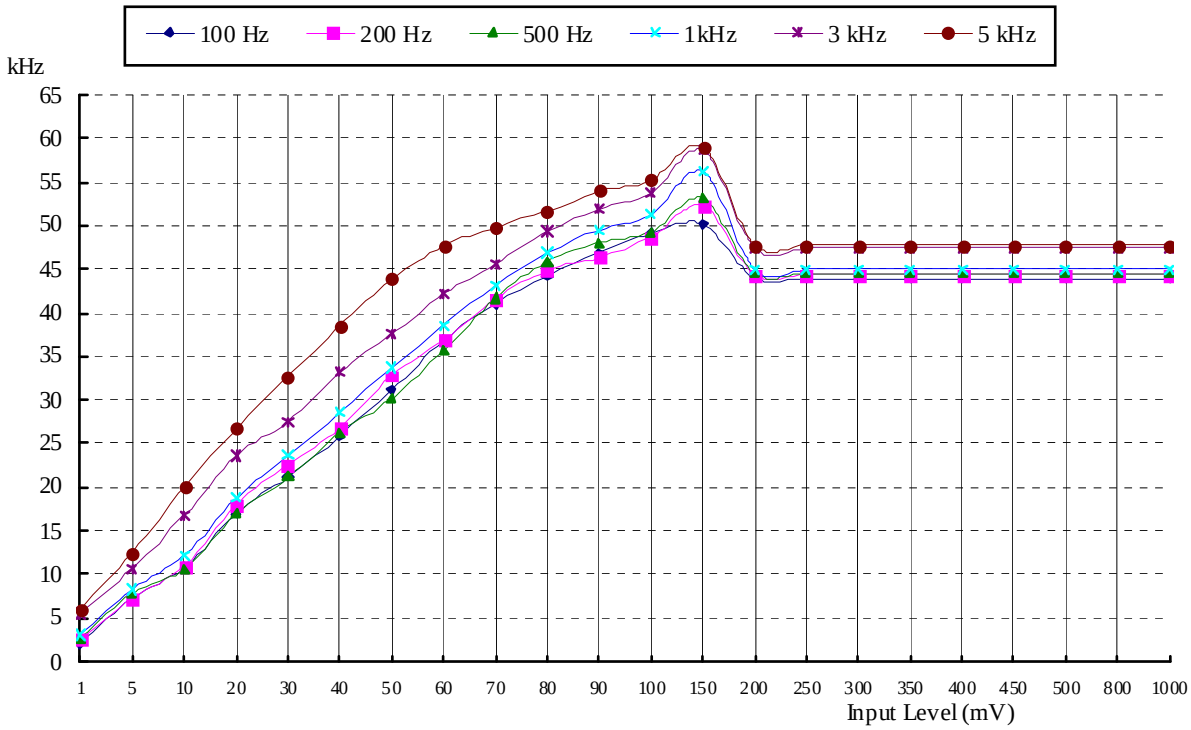
RF Frequency : 502MHz;

Test Date : Mar. 28, 2013 Temperature : 25 °C Humidity : 65 %

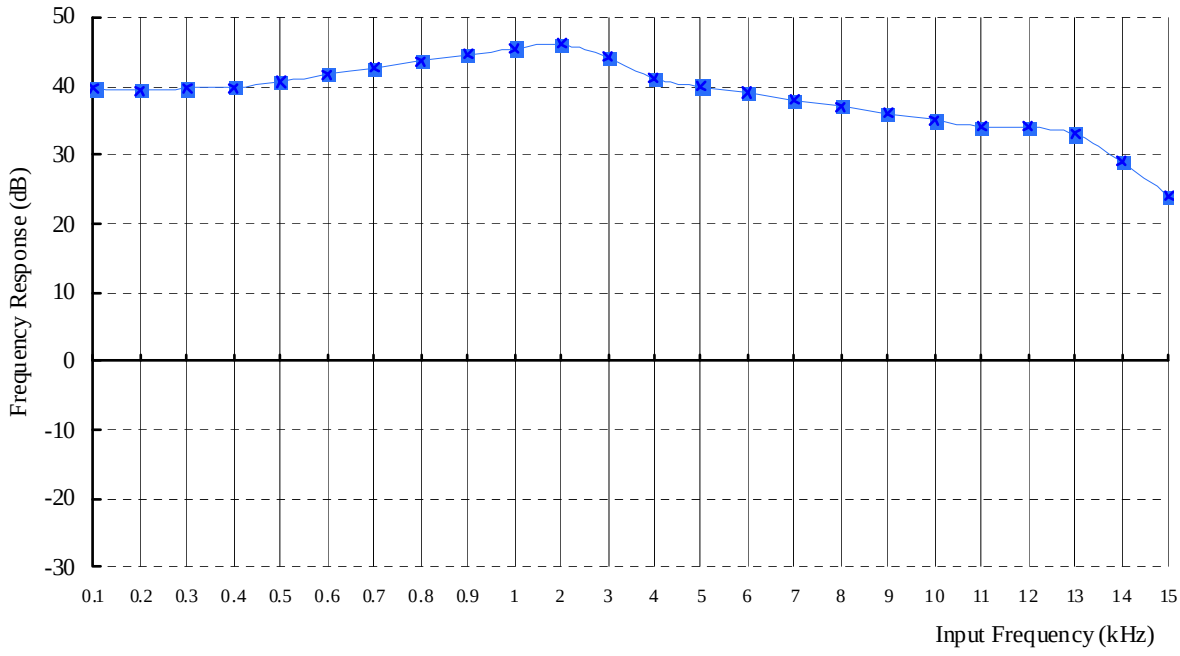
A). Frequency response



B). Modulation Limit



C). Frequency response of all circuits



5. OCCUPIED BANDWIDTH OF EMISSION

5.1 Provisions Applicable

According to §2.1049 (c)(1), For radiotelephone transmitter, other than single sideband or indenpent sideband transmitter, when modulateed by a 2.5kHz tone at an input level 16 dB greater than that necessary to produce 50 percent modulation.
According to §74.861(e)(5), the frequency emission bandwidth shall not exceed 200 kHz.

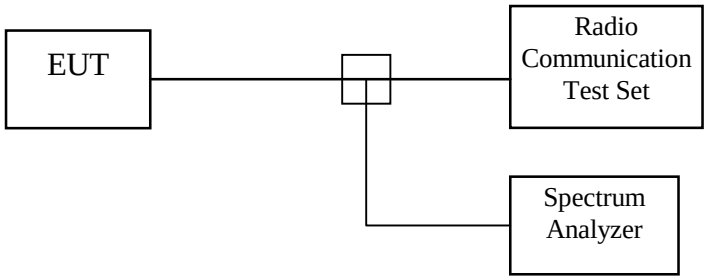
5.2 Measurement Method

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

2. Position the EUT as shown in figure 4, and Install new batteries in the EUT. Turn on the EUT ant set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.

3. Apply a 2.5 kHz modulation signal to EUT and measure the frequencies of the modulated signal from the EUT where it is the specified number of dB below the reference level set in step 2. This is the occupied bandwidth specified.

Figure 4 : Occupied bandwidth measurement configuration



5.3 Occupied Bandwidth Test Equipment

Equipment	Manufacturer	Model No.	Calibration Date	Next Cal. Date
Communications Service Monitor	AEROFLEX	2945B	2012/05/04	2013/05/07
Spectrum Analyzer	Rohde & Schwarz	FSP40	2012/09/20	2013/09/20

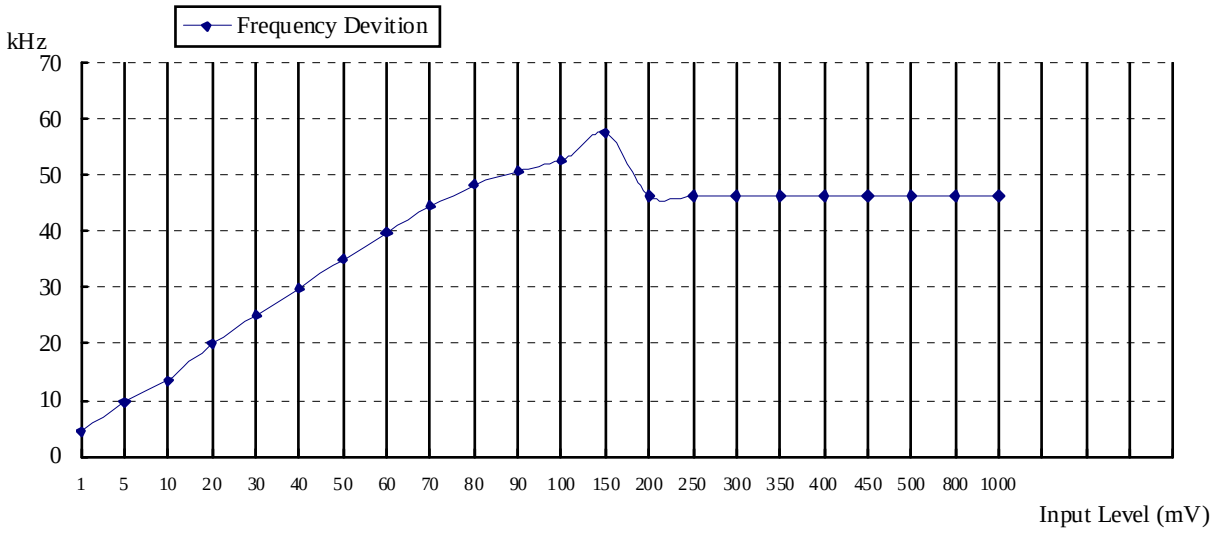
5.4 Bandwidth Measured

5.4.1 Input Level Derived

RF Frequency : 502MHz;

Test Date : Mar. 28, 2013 Temperature : 25 °C Humidity : 65 %

Input Audio Frequency : 2.5 kHz, Sine Wave

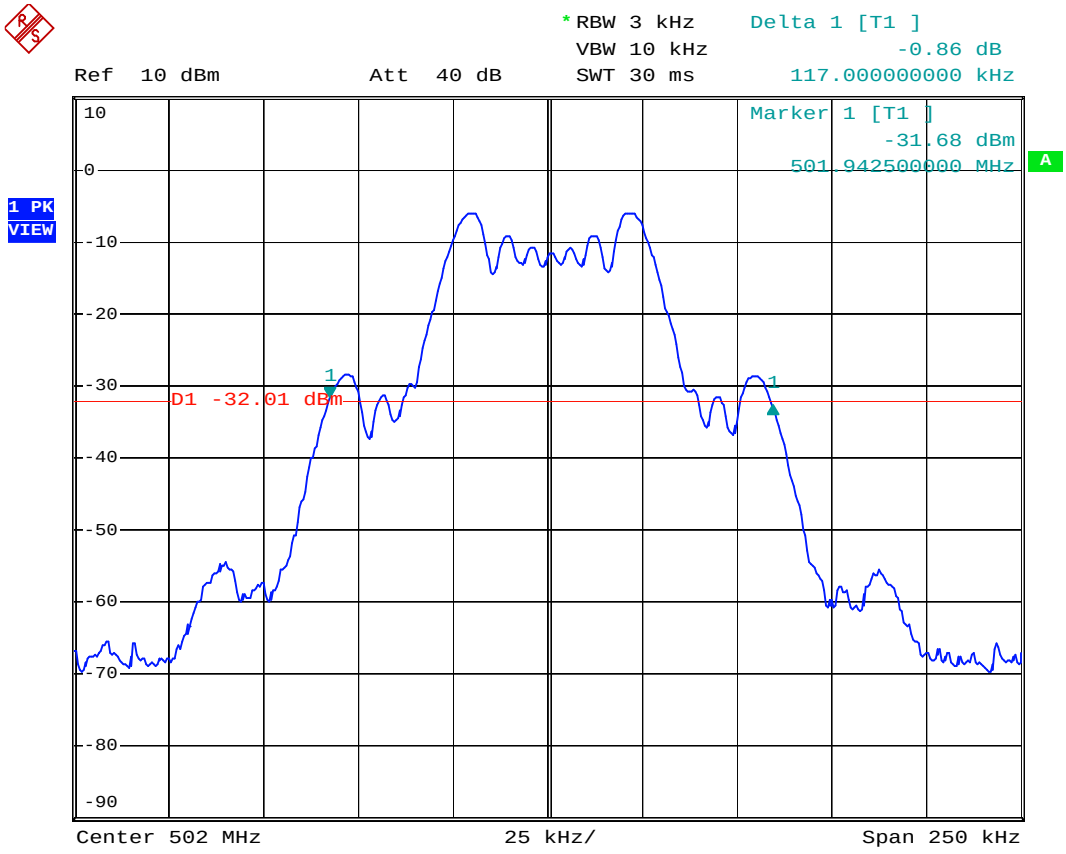


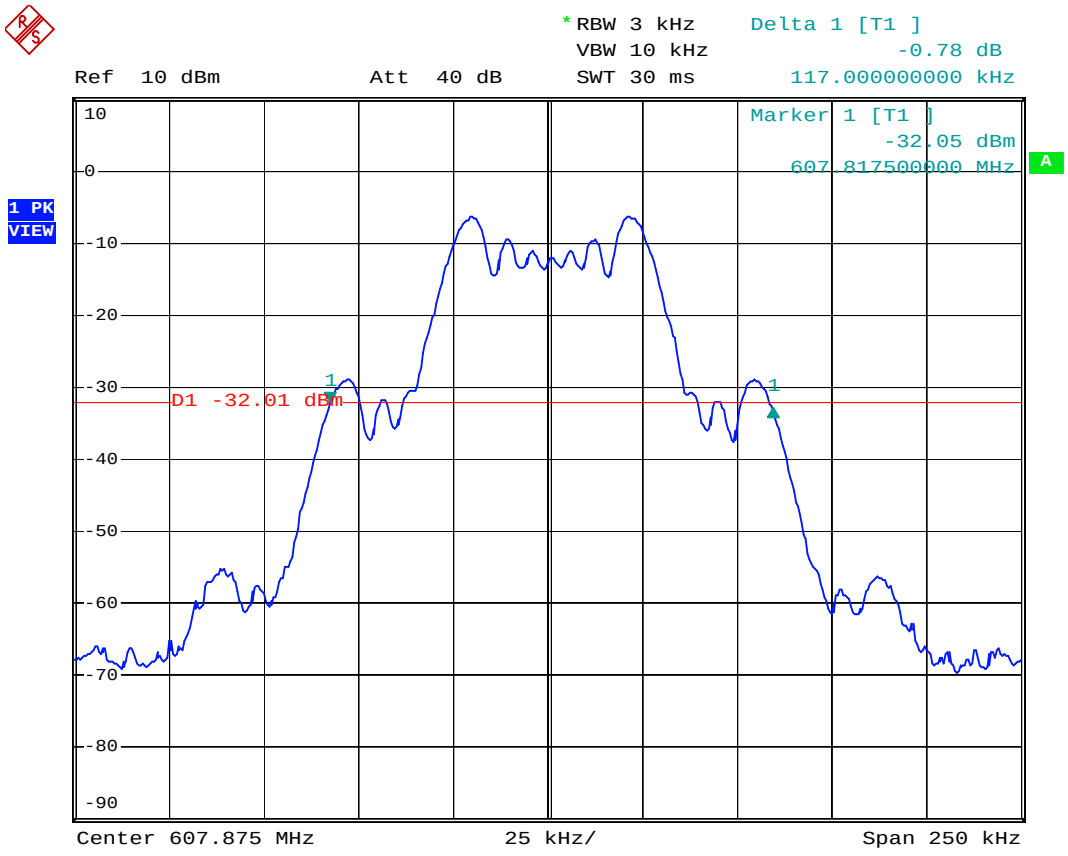
The Level input to produce 50% modulation is 40 mV, therefore the magnitude 16 dB greater than it is 252 mV.

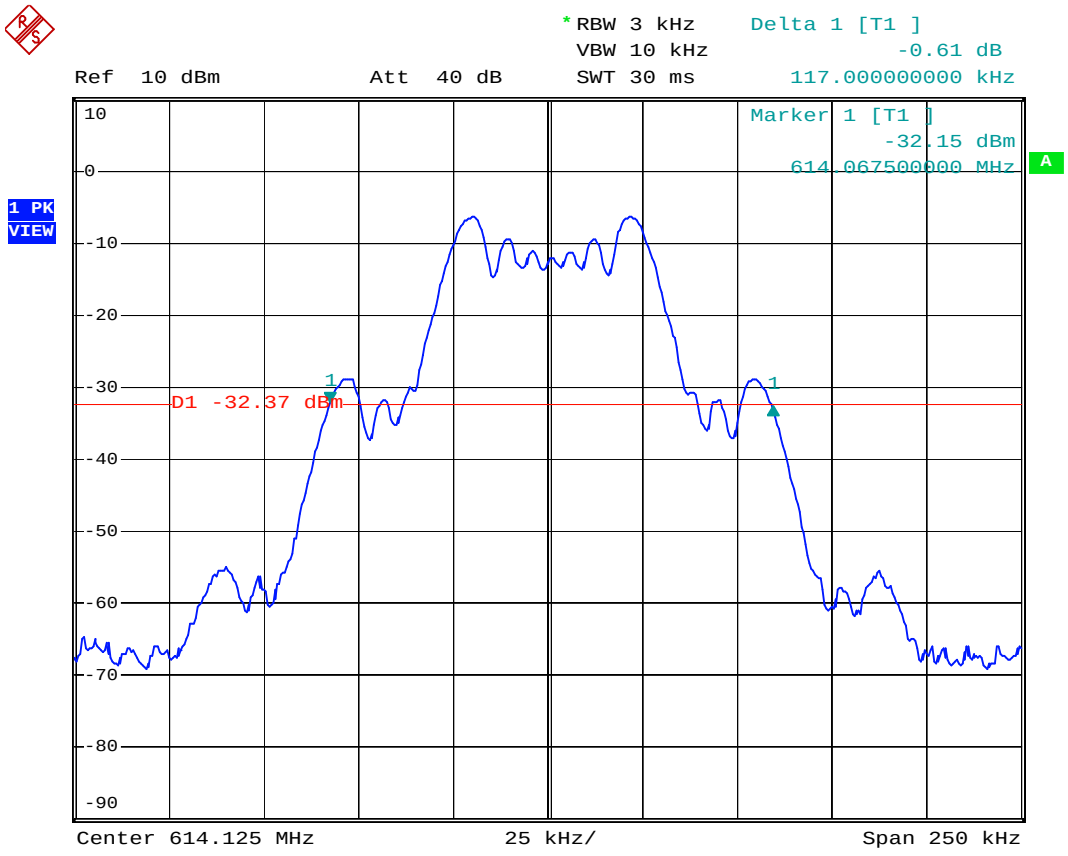
5.4.2 Occupied Bandwidth Plotted

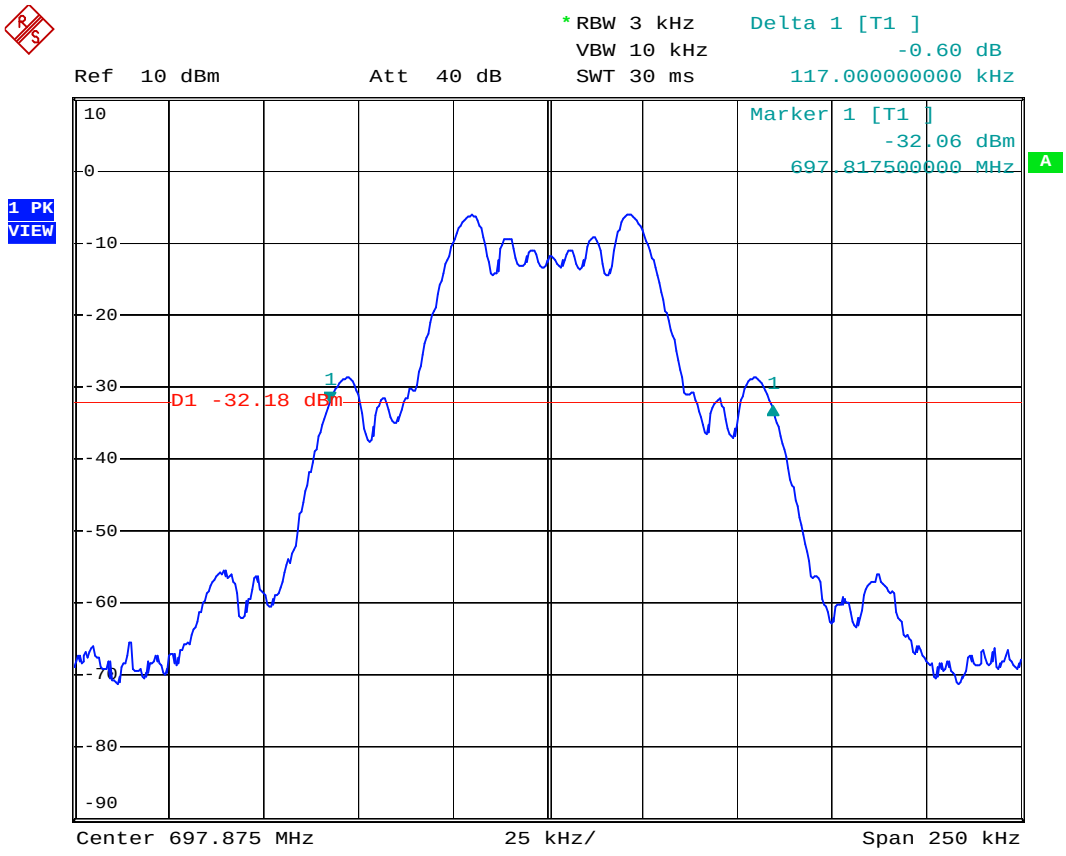
Test Date : Mar. 28, 2013 Temperature : 25 °C Humidity : 65 %

RF Frequency (MHz)	26 dB Bandwidth (kHz)
502.000	117
607.875	117
614.125	117
697.875	117


*RBW 3 kHz
VBW 10 kHz
SWT 30 ms
Delta 1 [T1]
-0.86 dB
117.000000000 kHz
Ref 10 dBm
Att 40 dB
Marker 1 [T1]
-31.68 dBm
501.942500000 MHz
1 PK
VIEW
A
D1 -32.01 dBm
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 502 MHz
25 kHz/
Span 250 kHz


*RBW 3 kHz
VBW 10 kHz
SWT 30 ms
Delta 1 [T1]
-0.78 dB
117.000000000 kHz
Ref 10 dBm
Att 40 dB
Marker 1 [T1]
-32.05 dBm
607.817500000 MHz
1 PK
VIEW
A
D1 -32.01 dBm
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 607.875 MHz
25 kHz/
Span 250 kHz


*RBW 3 kHz
VBW 10 kHz
SWT 30 ms
Delta 1 [T1]
-0.61 dB
117.000000000 kHz
Ref 10 dBm
Att 40 dB
Marker 1 [T1]
-32.15 dBm
614.067500000 MHz
1 PK
VIEW
A
D1 -32.37 dBm
Center 614.125 MHz
25 kHz/
Span 250 kHz


*RBW 3 kHz
VBW 10 kHz
SWT 30 ms
Delta 1 [T1]
-0.60 dB
117.000000000 kHz
Ref 10 dBm
Att 40 dB
Marker 1 [T1]
-32.06 dBm
697.817500000 MHz
A
1 PK
VIEW
D1 -32.18 dBm
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 697.875 MHz
25 kHz/
Span 250 kHz

6. FIELD STRENGTH OF EMISSION

6.1 Provisions Applicable

According to §2.1053, measurements shall be made to detect spurious emission that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal condition of installation and operation. Information submitted shall include the relative radiated power of spurious emission with reference to the rated power output of the transmitter, assuming all emissions are radiated from a halfwave dipole antenna.

According to §74.861(e)(6), the mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the follwing sceedule:

(i) on any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least 25 dB.

(ii) on any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: at least 35 dB.

(iii) on any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth shall be attenuated below the unmodulated carrier by at least 43 plus 10 Log(output power in watts) dB.

6.2 Measurement Procedure

1. Setup the configuration per figure 1 and 2 for frequencies measured below and above 1 GHz respectively, adjusting the input voltage to produce the maximum power as measured in chapter 3.
2. Adjust the analyzer for each frequency measured in chapter 6 on a 1 MHz frequency span and 1MHz resolution bandwidth.
3. The search antenna is to be raised and lowered over a range from 1 to 4 meters in horizontally polarized orientation. Position the highness when the highest value is indicated on spectrum analyzer, then change the orientation of EUT on test table over a range from 0 ° to 360 °, and record the highest value indicated on spectrum analyzer as reference value.
4. Repeat step 3 until all frequencies need to be measured were complete.
5. Repeat step 4 with search antenna in vertical polarized orientations.
6. Replace the EUT with a tuned dipole antenna (horn antenna for above 1 GHz) relative to each frequency in horizontally polarized orientation and as the same polarized orientation with search antenna. Connect the tuned dipole antenna to a standard signal generator (SG) via a low loss cable. Power on the SG and tune the right frequency in measuring as well as set SG at a appreciated output level. Rise and lower the search antenna to get the highest value on spectrum analyzer, and then hold this position. Adjust the SG output to get a identical value derived from step 3 on spectrum analyzer. Record this value for result calculated.

7. Repeat step 6 until all frequencies need to be measured were complete.
8. Repeat step 7 with both dipole antenna (horn antenna for above 1 GHz) and search antenna in vertical polarized orientations.

6.3 Measuring Instrument

Equipment	Manufacturer	Model No.	Calibration Date	Next Cal. Date
Spectrum Analyzer	Rohde & Schwarz	FSP40	2012/09/20	2013/09/20
Double Ridged Antenna	EMCO	3115	2012/05/18	2013/05/18
Double Ridged Antenna	EMCO	3115	2012/05/18	2013/05/18
Log-periodic Antenna	EMCO	3146	2012/10/17	2013/10/17
Biconical Antenna	EMCO	3110	2012/10/17	2013/10/17
Dipole Antenna	Schwarzbeck	897;898	2012/09/07	2013/09/07
Amplifier	HP	8449B	2013/01/09	2014/01/09
Amplifier	HP	8447D	2012/05/16	2013/05/16
Signal generator	HP	83732B	2012/09/06	2013/09/06

Measuring instrument setup in frequency band measured is as following :

Frequency Band (MHz)	Instrument	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	Spectrum Analyzer	Peak	100 kHz	100 kHz
Above 1000	Spectrum Analyzer	Peak	1 MHz	1 MHz

6.4 Measuring Data

6.4.1. Emission Test Data

a. Tx Frequency: 502MHz

Operated mode : TX Test Date :Mar. 28, 2013
Temperature : 26 °C Humidity : 58 %

Unmodulated carrier output power is 9.1 dBm , or 8.128 mW (ERP).
The limit of spurious or harmonics is calculated as following :

9.1-[43+10log(carrier output power in W)], or -13dBm

Frequency (MHz)	Meter Reading (dBuV) H	V	SG Reading (dBm) H	V	Antenna Gain	Antenna Gain Corr'	Cable Loss (dB)	Result (dBm) H	V	Limit (dBm)	Margin (dB)
1004.000	---	---	---	---	---	---	---	---	---	250	---
1506.000	---	---	---	---	---	---	---	---	---	250	---
2008.000	---	---	---	---	---	---	---	---	---	250	---
2510.000	---	---	---	---	---	---	---	---	---	250	---
3012.000	---	---	---	---	---	---	---	---	---	250	---
3514.000	---	---	---	---	---	---	---	---	---	250	---
4016.000	---	---	---	---	---	---	---	---	---	250	---
4518.000	---	---	---	---	---	---	---	---	---	250	---
5020.000	---	---	---	---	---	---	---	---	---	250	---

Note :

1. Remark "---" means that the emission level is too weak to be detected.
2. For measured frequency below 1GHz, a tuned dipole antenna is used.
3. Result calculation is as following :

   Result = SG Reading +Cable Loss +Antenna Gain +Antenna Gain Corrected

   Antenna Gain Corrected : is used for antenna other than dipole to convert radiated power to ERP.
4. Spurious or harmonics above 1 GHz is too low to be detected or attenuated more than 60 dB from limit value.

b. Tx Frequency: 607.875 MHz

Operated mode : TX Test Date :Mar. 28, 2013
Temperature : 26 °C Humidity : 58 %

Unmodulated carrier output power is 8.9 dBm , or 7.762 mW (ERP).
The limit of spurious or harmonics is calculated as following :
8.9-[43+10log(carrier output power in W)], or -13dBm

Frequency (MHz)	Meter Reading (dBuV) H	V	SG Reading (dBm) H	V	Antenna Gain	Antenna Gain Corr'	Cable Loss (dB)	Result (dBm) H	V	Limit (dBm)	Margin (dB)
1215.750	---	---	---	---	6.4	-2.0	1.30	---	---	250	---
1823.625	---	---	---	---	9.3	-2.0	1.75	---	---	250	---
2431.500	---	---	---	---	9.2	-2.0	1.75	---	---	250	---
3039.375	---	---	---	---	9.7	-2.0	1.75	---	---	250	---
3647.250	---	---	---	---	9.6	-2.0	2.10	---	---	250	---
4255.125	---	---	---	---	10.6	-2.0	2.10	---	---	250	---
4863.000	---	---	---	---	10.9	-2.0	2.10	---	---	250	---
5470.875	---	---	---	---	10.9	-2.0	2.60	---	---	250	---
6078.750	---	---	---	---	12.1	-2.0	2.60	---	---	250	---

Note :

1. Remark "---" means that the emission level is too weak to be detected.
2. For measured frequency below 1GHz, a tuned dipole antenna is used.
3. Result calculation is as following :
   Result = SG Reading +Cable Loss +Antenna Gain +Antenna Gain Corrected
   Antenna Gain Corrected : is used for antenna other than dipole to convert radiated power to ERP.
4. Spurious or harmonics above 1 GHz is too low to be detected or attenuated more than 60 dB from limit value.

c. Tx Frequency: 614.125MHz

Operated mode : TX Test Date :Mar. 28, 2013
Temperature : 26 °C Humidity : 58 %

Unmodulated carrier output power is 9.0 dBm , or 7.943 mW (ERP).
The limit of spurious or harmonics is calculated as following :

9.0-[43+10log(carrier output power in W)], or -13dBm

Frequency (MHz)	Meter Reading (dBuV) H	V	SG Reading (dBm) H	V	Antenna Gain	Antenna Gain Corr'	Cable Loss (dB)	Result (dBm) H	V	Limit (dBm)	Margin (dB)
1228.250	---	---	---	---	6.4	-2.0	1.30	---	---	250	---
1842.375	---	---	---	---	9.3	-2.0	1.75	---	---	250	---
2456.500	---	---	---	---	9.2	-2.0	1.75	---	---	250	---
3070.625	---	---	---	---	9.7	-2.0	1.75	---	---	250	---
3684.750	---	---	---	---	9.6	-2.0	2.10	---	---	250	---
4298.875	---	---	---	---	10.6	-2.0	2.10	---	---	250	---
4913.000	---	---	---	---	10.9	-2.0	2.10	---	---	250	---
5527.125	---	---	---	---	10.9	-2.0	2.60	---	---	250	---
6141.250	---	---	---	---	12.1	-2.0	2.60	---	---	250	---

Note :

1. Remark "---" means that the emission level is too weak to be detected.
2. For measured frequency below 1GHz, a tuned dipole antenna is used.
3. Result calculation is as following :

   Result = SG Reading +Cable Loss +Antenna Gain +Antenna Gain Corrected

   Antenna Gain Corrected : is used for antenna other than dipole to convert radiated power to ERP.
4. Spurious or harmonics above 1 GHz is too low to be detected or attenuated more than 60 dB from limit value.

d. Tx Frequency: 697.875MHz

Operated mode : TX Test Date :Mar. 28, 2013
Temperature : 26 °C Humidity : 58 %

Unmodulated carrier output power is 8.9 dBm , or 7.762 mW (ERP).
The limit of spurious or harmonics is calculated as following :

8.9-[43+10log(carrier output power in W)], or -13dBm

Frequency (MHz)	Meter Reading (dBuV) H	V	SG Reading (dBm) H	V	Antenna Gain	Antenna Gain Corr'	Cable Loss (dB)	Result (dBm) H	V	Limit (dBm)	Margin (dB)
1395.750	---	---	---	---	6.4	-2.0	1.30	---	---	250	---
2093.625	---	---	---	---	9.3	-2.0	1.75	---	---	250	---
2791.500	---	---	---	---	9.2	-2.0	1.75	---	---	250	---
3489.375	---	---	---	---	9.7	-2.0	1.75	---	---	250	---
4187.250	---	---	---	---	9.6	-2.0	2.10	---	---	250	---
4885.125	---	---	---	---	10.6	-2.0	2.10	---	---	250	---
5583.000	---	---	---	---	10.9	-2.0	2.10	---	---	250	---
6280.875	---	---	---	---	10.9	-2.0	2.60	---	---	250	---
6978.750	---	---	---	---	12.1	-2.0	2.60	---	---	250	---

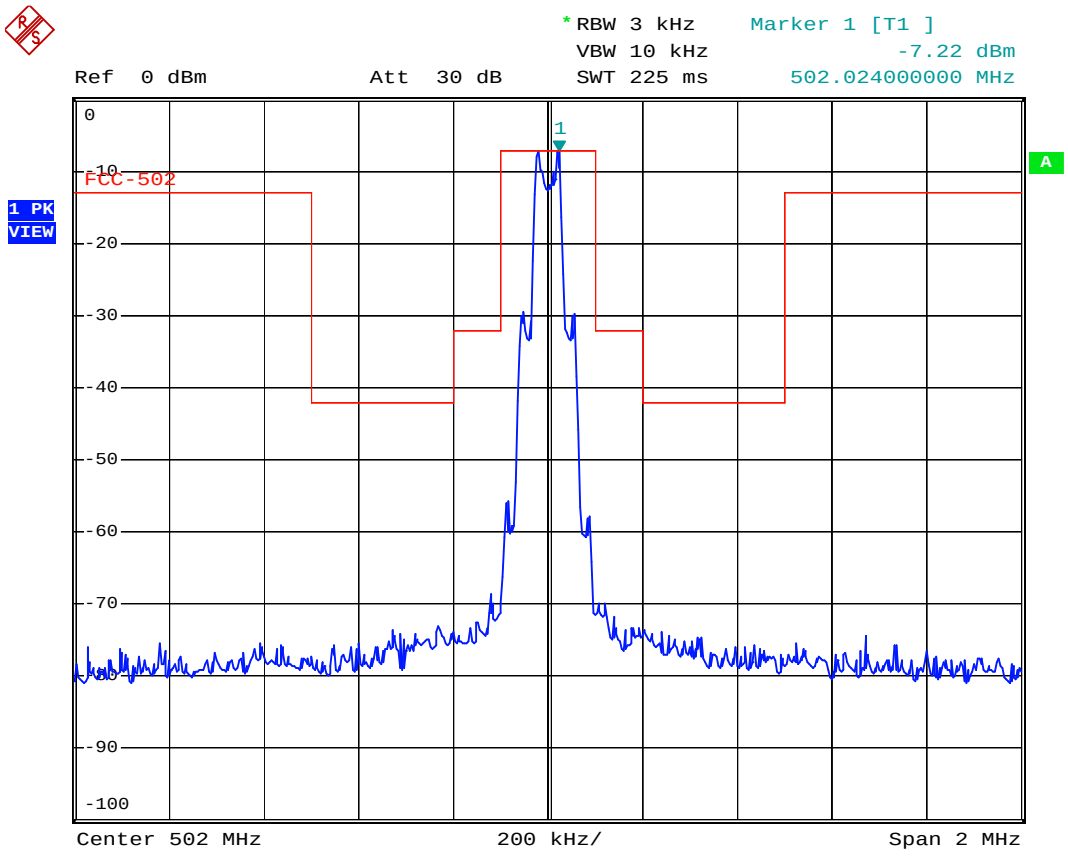
Note :

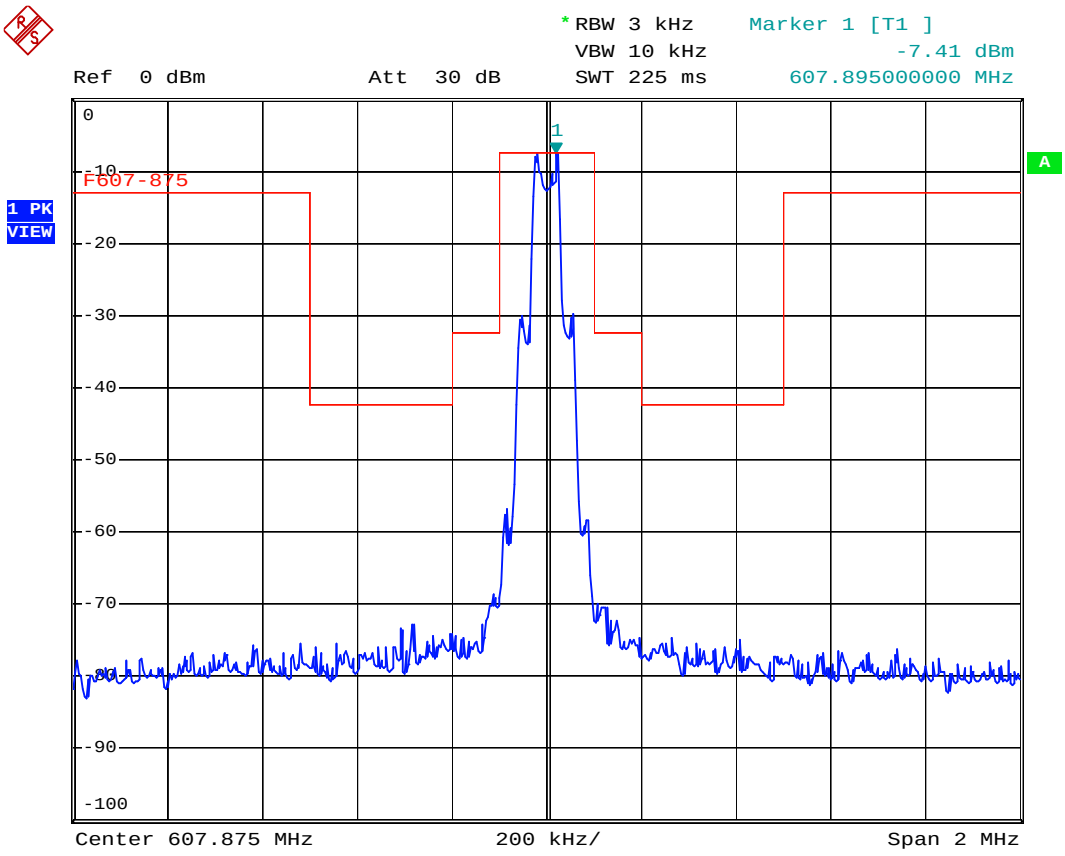
1. Remark "---" means that the emission level is too weak to be detected.
2. For measured frequency below 1GHz, a tuned dipole antenna is used.
3. Result calculation is as following :

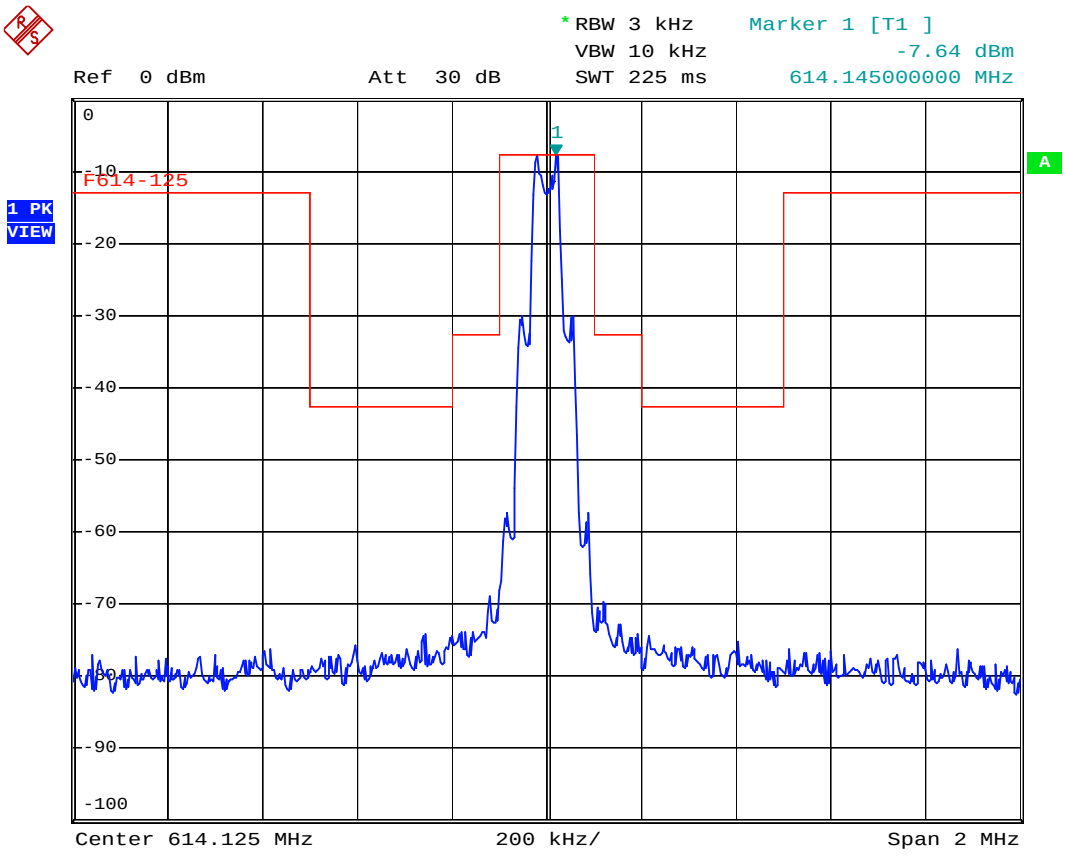
   Result = SG Reading +Cable Loss +Antenna Gain +Antenna Gain Corrected

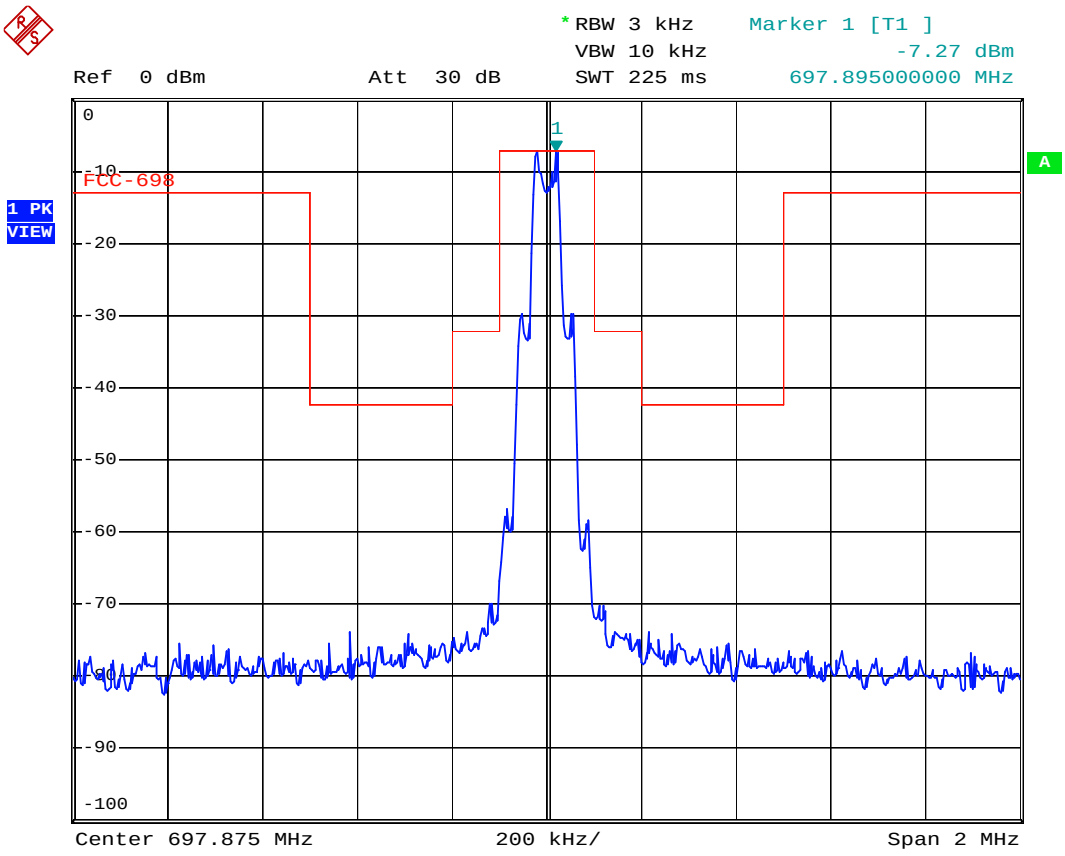
   Antenna Gain Corrected : is used for antenna other than dipole to convert radiated power to ERP.
4. Spurious or harmonics above 1 GHz is too low to be detected or attenuated more than 60 dB from limit value.

6.4.2 Emission mask plots




*RBW 3 kHz
VBW 10 kHz
SWT 225 ms
Marker 1 [T1]
-7.41 dBm
607.895000000 MHz
Ref 0 dBm
Att 30 dB
1 PK
VIEW
F607-875
A
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
Center 607.875 MHz
200 kHz/
Span 2 MHz

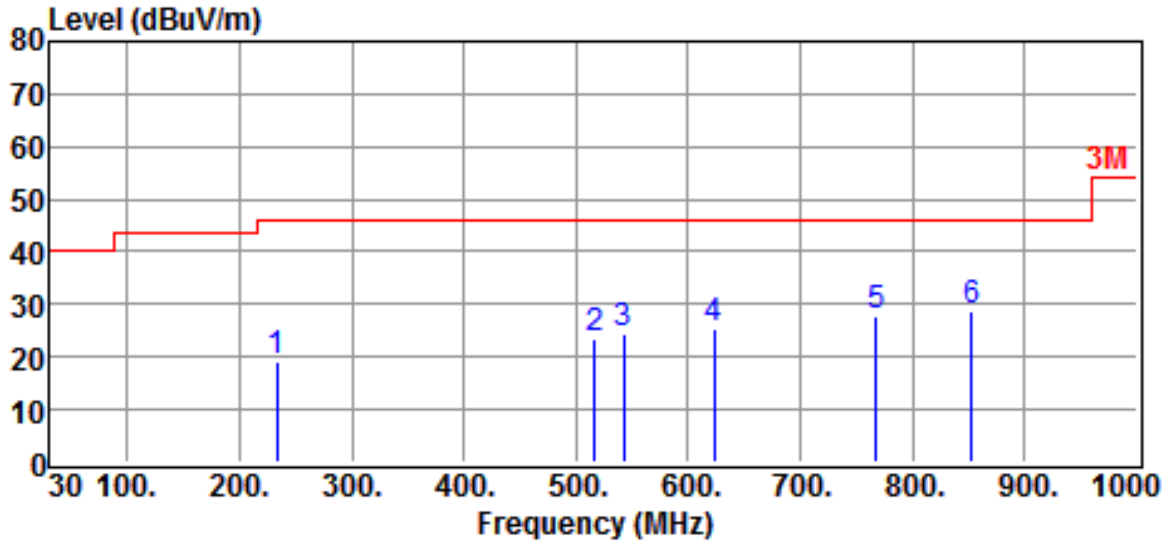

*RBW 3 kHz
VBW 10 kHz
SWT 225 ms
Marker 1 [T1]
-7.64 dBm
614.145000000 MHz
Ref 0 dBm
Att 30 dB
1 PK
VIEW
F614-125
A
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
Center 614.125 MHz
200 kHz/
Span 2 MHz


*RBW 3 kHz
VBW 10 kHz
SWT 225 ms
Marker 1 [T1]
-7.27 dBm
697.895000000 MHz
Ref 0 dBm
Att 30 dB
1 PK
VIEW
FCC-698
A
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
Center 697.875 MHz
200 kHz/
Span 2 MHz

6.5 Other Emission

a) Emission frequencies below 1 GHz

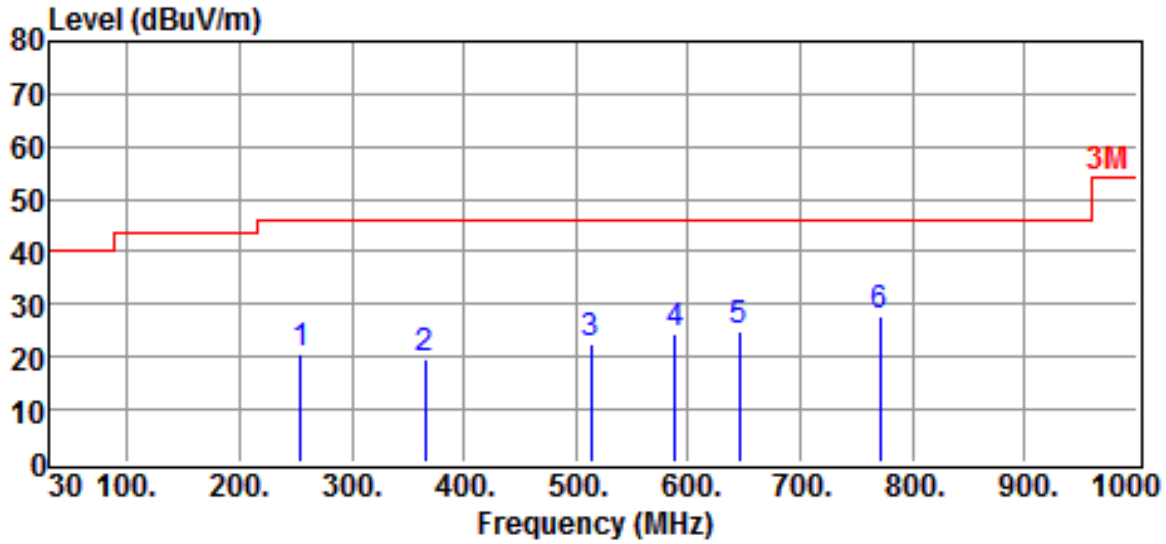
Test Date : Mar. 27, 2013 Temperature : 20 °C Humidity : 65 %



Site	:OPEN SITE	Date	:2013-03-27
Limit	:3M	Ant. Pol.	:HORIZONTAL
EUT	: Wireless Microphone System	Temp.	:20°C
Power Rating	:DC 1.5V * 2	Humi.	:65%
Model	: UF-10TH	Engineer.	:VC
Test Mode	:TX OPERATION MODE		

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
233.7000	0.0	19.0	19.0	46.0	-27.0	QP
516.9400	1.5	21.8	23.3	46.0	-22.7	QP
542.1600	2.5	22.1	24.6	46.0	-21.4	QP
623.6400	2.0	23.6	25.6	46.0	-20.4	QP
767.2000	1.7	26.1	27.8	46.0	-18.2	QP
852.5600	1.0	27.6	28.6	46.0	-17.4	QP

Note :
1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The margin value=Limit - Result



Site	:OPEN SITE	Date	:2013-03-27
Limit	:3M	Ant. Pol.	:VERTICAL
EUT	: Wireless Microphone System	Temp.	:20°C
Power Rating	:DC 1.5V * 2	Humi.	:65%
Model	: UF-10TH	Engineer.	:VC
Test Mode	:TX OPERATION MODE		

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
255.0400	0.2	20.5	20.7	46.0	-25.3	QP
365.6200	1.5	18.2	19.7	46.0	-26.3	QP
513.0600	0.8	21.8	22.6	46.0	-23.4	QP
588.7200	1.4	22.9	24.3	46.0	-21.7	QP
644.9800	0.9	24.1	25.0	46.0	-21.0	QP
771.0800	1.6	26.1	27.7	46.0	-18.3	QP

Note :
1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The margin value=Limit - Result

b) Emission frequencies above 1 GHz

Radiated emission frequencies above 1 GHz to 25 GHz were too low to be measured with a pre-amplifier of 35 dB.

6.6 Radiated Measurement Photos

7. FREQUENCY STABILITY MEASUREMENT

7.1 Provisions Applicable

According to §2.1055 (a)(1), the frequency stability shall be measured with variation of ambient temperature from -30℃to +50℃centigrade, and according to §2.1055 (d)(2), the frequency stability shall be measured with variation of primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

According to §74.861(e)(4), the frequency tolerance of the transmitter shall be 0.005 percent.

7.2 Measurement Procedure

A) Frequency stability versus environmental temperature

1. Setup the configuration per figure 5 for frequencies measured at ambient temperature if it is within 15℃to 25℃. Otherwise, an environmental chamber set for a temperature of 20℃shall be used.

2. Turn on EUT and set SA center frequency to the right frequency needs to be measured. Then set SA RBW to 30 kHz, VBW to 100kHz and frequency span to 500 kHz. Record this frequency to be a reference.

3. Set the temperature of chamber to 50℃. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize. While maintaining a constant temperature inside the chamber, turn the EUT on and measure the EUT operating frequency.

4. Repeat step 2 with a 10℃decreased per stage until the lowest temperature -30℃is measured, record all measurement frequencies.

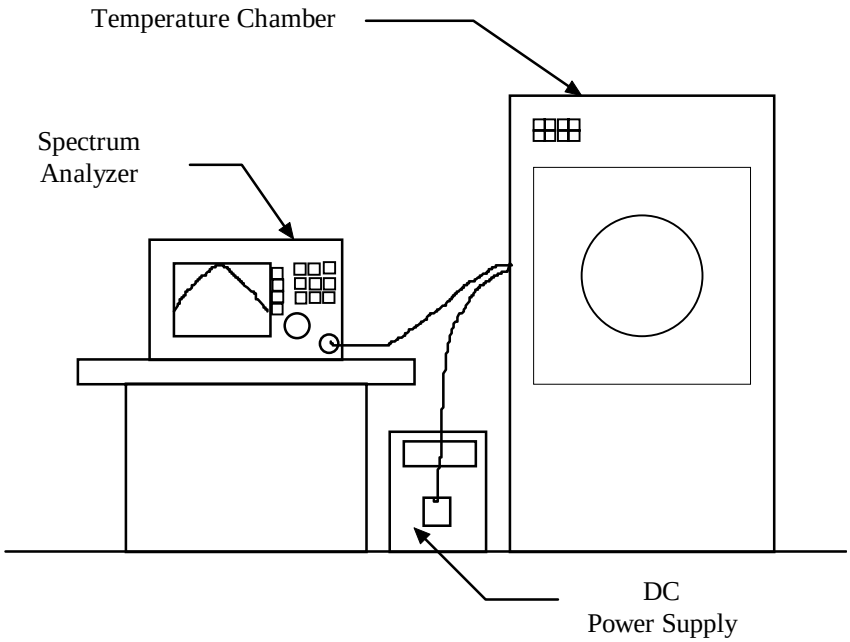
B) Frequency stability versus input voltage

1. Setup the configuration per figure 7 for frequencies measured at ambient temperature if it is within 15℃to 25℃. Otherwise, an environmental chamber set for a temperature of 20℃shall be used. Install new batteries in the EUT.

2. Set SA center frequency to the right frequency needs to be measured. Then set SA RBW to 30 kHz, VBW to 100kHz and frequency span to 500 kHz. Record this frequency to be a reference.

3. For non hand carried, battery operated device, supply the EUT primary voltage with 85 and 115 percent of the nominal value and record the frequency.

Figure 5 : Frequency stability measurement configuration



7.3 Measurement Instrument

Equipment	Manufacturer	Model No.	Calibration Date	Next Cal. Date
Spectrum Analyzer	Rohde & Schwarz	FSP40	2012/09/20	2013/09/20
Temperature Chamber	MALLIER	MCT-2X-M	2012/05/03	2013/05/03

7.4 Measurement Data

Test Date : Mar. 27, 2013 Temperature : 20 °C Humidity : 65 %

A. Tx Frequency 502MHz

A1. Frequency stability versus enviroment tempture

Reference Frequency :502 MHz		Limit：0.005%					
Enviroment Tempture (℃)	Power Supplied (Vdc)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	3.0Vdc	502.0157	0.00313	501.9952	-0.00096	501.9888	-0.00224
40		502.0036	0.00072	501.9999	-0.00002	501.9995	-0.00011
30		502.0076	0.00152	502.0190	0.00379	501.9885	-0.00229
20		502.0161	0.00320	502.0175	0.00348	501.9962	-0.00075
10		501.9814	-0.00371	502.0166	0.00330	501.9922	-0.00156
0		502.0021	0.00042	502.0151	0.00301	501.9952	-0.00095
-10		502.0046	0.00091	502.0119	0.00236	501.9858	-0.00283
-20		501.9981	-0.00037	502.0053	0.00105	501.9821	-0.00356
-30		501.9981	-0.00037	502.0115	0.00230	501.9862	-0.00274

A2. Frequency stability versus supplied voltage (85% - 115%)

Reference Frequency : 502 MHz		Limit：0.005%					
Enviroment Tempture (℃)	Power Supplied (Vdc)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
25	2.55	502.0029	0.00058	502.0120	0.00240	501.9978	-0.00043
25	3.45	502.0079	0.00157	501.9920	-0.00160	501.9903	-0.00193

Test Date : Mar. 27, 2013 Temperature : 20 °C Humidity : 65 %

B. Tx Frequency 607.875MHz

B1. Frequency stability versus enviroment tempture

Reference Frequency : 607.875MHz		Limit：0.005%					
Enviroment Tempture (℃)	Power Supplied (Vdc)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	3.0Vdc	607.8601	-0.00245	607.8693	-0.00094	607.8928	0.00293
40		607.8953	0.00335	607.8558	-0.00316	607.8555	-0.00320
30		607.8748	-0.00003	607.8914	0.00269	607.8689	-0.00100
20		607.8856	0.00174	607.8715	-0.00058	607.8559	-0.00314
10		607.8653	-0.00160	607.8725	-0.00041	607.8714	-0.00058
0		607.8536	-0.00352	607.8685	-0.00107	607.8911	0.00265
-10		607.8866	0.00191	607.8665	-0.00139	607.8587	-0.00268
-20		607.8908	0.00260	607.8765	0.00024	607.8752	0.00004
-30		607.8676	-0.00122	607.8933	0.00301	607.8874	0.00204

B2. Frequency stability versus supplied voltage (85% - 115%)

Reference Frequency : 607.875MHz		Limit：0.005%					
Enviroment Tempture (℃)	Power Supplied (Vdc)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
25	2.55	607.8759	0.00015	607.8677	-0.00121	607.8542	-0.00342
25	3.45	607.8902	0.00250	607.8637	-0.00187	607.8657	-0.00153

Test Date : Mar. 27, 2013 Temperature : 20 °C Humidity : 65 %

C. Tx Frequency 614.125MHz

C1. Frequency stability versus enviroment tempture

Reference Frequency : 614.125 MHz		Limit：0.005%					
Enviroment Tempture (℃)	Power Supplied (Vdc)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	3.0Vdc	614.1071	-0.00291	614.1084	-0.00270	614.1461	0.00344
40		614.1094	-0.00255	614.1291	0.00068	614.1446	0.00319
30		614.1260	0.00016	614.1171	-0.00128	614.1289	0.00064
20		614.1406	0.00253	614.1131	-0.00194	614.1056	-0.00315
10		614.1045	-0.00334	614.1408	0.00258	614.1036	-0.00348
0		614.1437	0.00305	614.1090	-0.00261	614.1273	0.00038
-10		614.1388	0.00225	614.1480	0.00374	614.1367	0.00190
-20		614.1187	-0.00103	614.1070	-0.00294	614.1376	0.00205
-30		614.1339	0.00144	614.1266	0.00026	614.1385	0.00220

C2. Frequency stability versus supplied voltage (85% - 115%)

Reference Frequency : 614.125 MHz		Limit：0.005%					
Enviroment Tempture (℃)	Power Supplied (Vdc)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
25	2.55	614.1320	0.00114	614.1333	0.00135	614.1201	-0.00080
25	3.45	614.1171	-0.00128	614.1476	0.00367	614.1308	0.00094

Test Date : Mar. 27, 2013 Temperature : 20 °C Humidity : 65 %

D. Tx Frequency 697.875MHz

D1. Frequency stability versus enviroment tempture

Reference Frequency : 697.875 MHz		Limit：0.005%					
Enviroment Tempture (℃)	Power Supplied (Vdc)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	3.0Vdc	697.8571	-0.00256	697.8917	0.00239	697.8840	0.00129
40		697.8674	-0.00109	697.8529	-0.00316	697.8550	-0.00287
30		697.8932	0.00261	697.8518	-0.00333	697.8659	-0.00130
20		697.8630	-0.00172	697.8787	0.00054	697.8591	-0.00228
10		697.8958	0.00298	697.8579	-0.00245	697.8808	0.00083
0		697.8491	-0.00371	697.8871	0.00173	697.8763	0.00018
-10		697.8636	-0.00164	697.8907	0.00225	697.8938	0.00269
-20		697.8581	-0.00242	697.8772	0.00032	697.8605	-0.00207
-30		697.8863	0.00161	697.8715	-0.00050	697.8935	0.00265

C2. Frequency stability versus supplied voltage (85% - 115%)

Reference Frequency : 697.875 MHz		Limit：0.005%					
Enviroment Tempture (℃)	Power Supplied (Vdc)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
25	2.55	697.8663	-0.00125	697.9005	0.00366	697.8847	0.00139
25	3.45	697.8747	-0.00004	697.8731	-0.00028	697.8864	0.00163

8 CONDUCTED EMISSION MEASUREMENT

8.1 Standard Applicable

This EUT is excused from investigation of conducted emission, for it is powered by DC battery only. According to §15.207 (d), measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines.