FCC Part 74 Subpart H

EMI TEST REPORT

of

E.U.T. : Tour Guide System
FCC ID : NTMWT-500T
Model No. : WT-500T
Working Frequency : 584~608、640~664 MHz

for

APPLICANT : OKAYO ELECTRONICS CO., LTD.
ADDRESS : No.2, Gongye 10th Rd., Dali Dist., Taichung 41280, Taiwan

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 : 13-09-RBF-034-01

TEST REPORT CERTIFICATION

Applicant	:	OKAYO ELECTRONICS CO., LTD. No.2, Gongye 10th Rd., Dali Dist., Taichung 41280, Taiwan
Manufacturer	:	OKAYO ELECTRONICS CO., LTD. No.2, Gongye 10th Rd., Dali Dist., Taichung 41280, Taiwan
Description of EUT	:	
a) Type of EUT	:	Tour Guide System
b) Trade Name	:	OKAYO
c) Model No.	:	WT-500T
d) FCC ID	:	NTMWT-500T
e) Working Frequency	:	584~608、640~664 MHz
f) Power Supply	:	1.2V(Ni-MH) x 1 AA type rechargeable batteries / 1.5V x 1 AA Alkaline disposable

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 : Nov. 04, 2013

Test Engineer : Jiapeng Chen
(Jiapeng Chen, Engineer)

Approve & Authorized Signer : S. S. Liou
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	:	Tour Guide System
b) Trade Name	:	OKAYO
c) Model No.	:	WT-500T
d) FCC ID	:	NTMWT-500T
e) Working Frequency	:	584~608、640~664 MHz
f) Power Supply	:	1.2V(Ni-MH) x 1 AA type rechargeable batteries / 1.5V x 1 AA Alkaline disposable
g) Emission Designator	:	44K0F3E 2M+2DK = 2x(10kHz) + 2x(12kHz)x1 = 44kHz

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	614.000-698.000
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

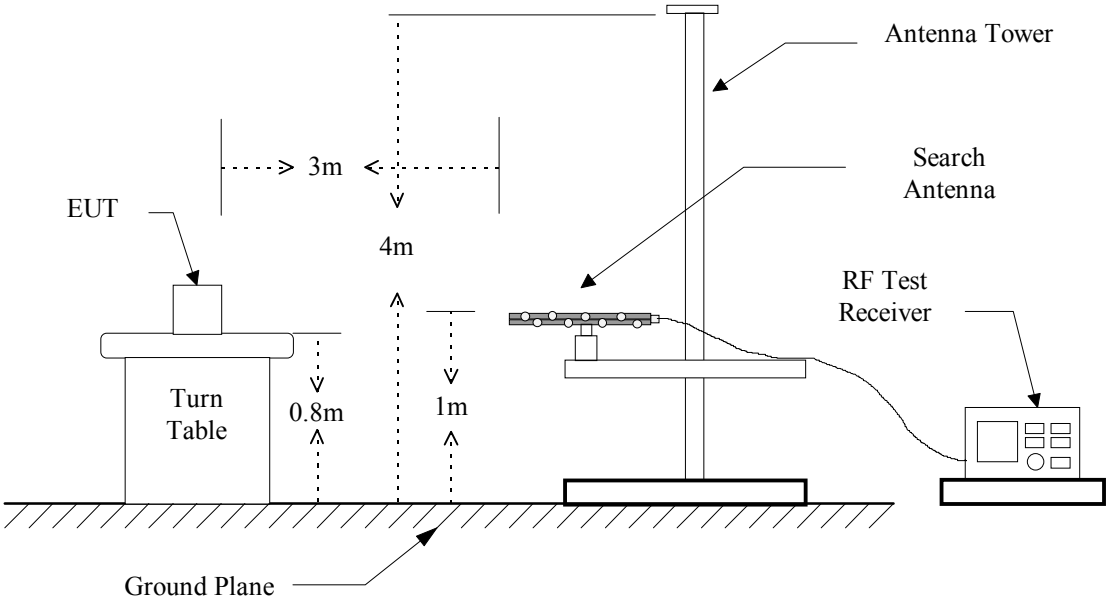
3.1 Provision Applicable

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

3.2 Measurement Procedure

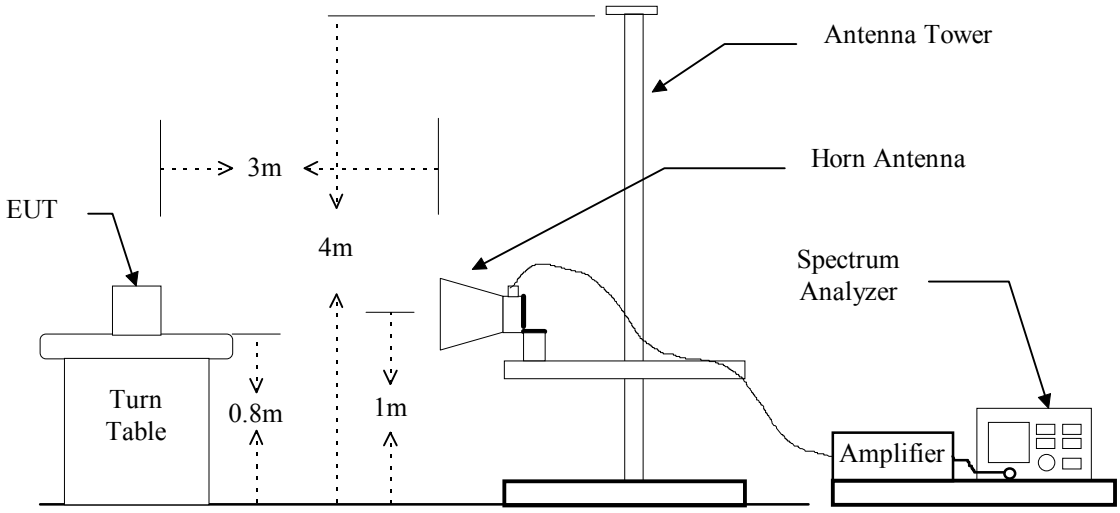
1. Setup the configuration per figure 1 and 2 for frequencies measured below and above 1 GHz respectively, adjusting the input voltage to produce the maximum power.
2. Adjust the analyzer for each frequency measured in chapter 6 on a 1 MHz frequency span and 1MHz resolution bandwidth.
3. The search antenna 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

Operated mode : TX
Temperature : 23 °C
Test Date : Oct. 22, 2013
Humidity : 60 %

Frequency (MHz)	Meter Reading (dBμV/m) H	V	SG Reading (dBm) H	V	Amp Gain (dB)	Antenna Gain(dB)	Cable Loss(dB)	Result (dBm) H	V	Result (max)(mW)	Limit 24dBm(250mW)
584.050	69.9	77.8	-5.30	6.20	---	---	2.2	-7.5	4.0	2.5	250.0

Frequency (MHz)	Meter Reading (dBμV/m) H	V	SG Reading (dBm) H	V	Amp Gain (dB)	Antenna Gain(dB)	Cable Loss(dB)	Result (dBm) H	V	Result (max)(mW)	Limit 24dBm(250mW)
590.050	71.3	78.1	-3.4	7.0	---	---	2.2	-5.6	4.8	3.0	250.0

Frequency (MHz)	Meter Reading (dBμV/m) H	V	SG Reading (dBm) H	V	Amp Gain (dB)	Antenna Gain(dB)	Cable Loss(dB)	Result (dBm) H	V	Result (max)(mW)	Limit 24dBm(250mW)
603.200	72.3	79.4	-1.5	9.2	---	---	2.2	-3.7	7.0	5.0	250.0

Frequency (MHz)	Meter Reading (dBμV/m) H	V	SG Reading (dBm) H	V	Amp Gain (dB)	Antenna Gain(dB)	Cable Loss(dB)	Result (dBm) H	V	Result (max)(mW)	Limit 24dBm(250mW)
640.025	70.3	77.2	-3.0	6.1	---	---	2.4	-5.4	3.7	2.3	250.0

Frequency (MHz)	Meter Reading (dBμV/m) H	V	SG Reading (dBm) H	V	Amp Gain (dB)	Antenna Gain(dB)	Cable Loss(dB)	Result (dBm) H	V	Result (max)(mW)	Limit 24dBm(250mW)
651.175	69.6	76.1	-3.5	4.7	---	---	2.4	-5.9	2.3	1.7	250.0

Frequency (MHz)	Meter Reading (dBμV/m) H	V	SG Reading (dBm) H	V	Amp Gain (dB)	Antenna Gain(dB)	Cable Loss(dB)	Result (dBm) H	V	Result (max)(mW)	Limit 24dBm(250mW)
663.975	69.3	74.6	-3.3	4.0	---	---	2.3	-5.6	1.7	1.5	250.0

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.

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

3.5 Test Equipment

Equipment	Manufacturer	Model No.	Calibration Date	Next Cal. Date
EMI Test Receiver	Rohde & Schwarz	ESCI	2013/05/14	2014/05/13
Dipole Antenna	Schwarzbeck	897;898	2013/09/07	2014/09/07
Log-periodic Antenna	EMCO	3146	2013/10/16	2014/10/15
Amplifier	HP	8447D	2013/05/03	2014/05/02
Signal generator	HP	83732B	2013/09/05	2014/09/04

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.

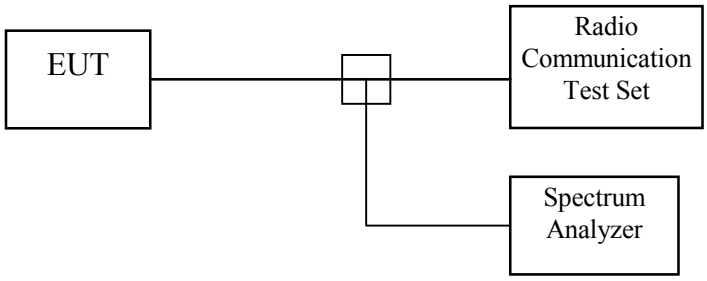
2. Repeat step 1 with changing the input frequency for 200, 500, 1000, 3000, and 5000 Hz in sequence.

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

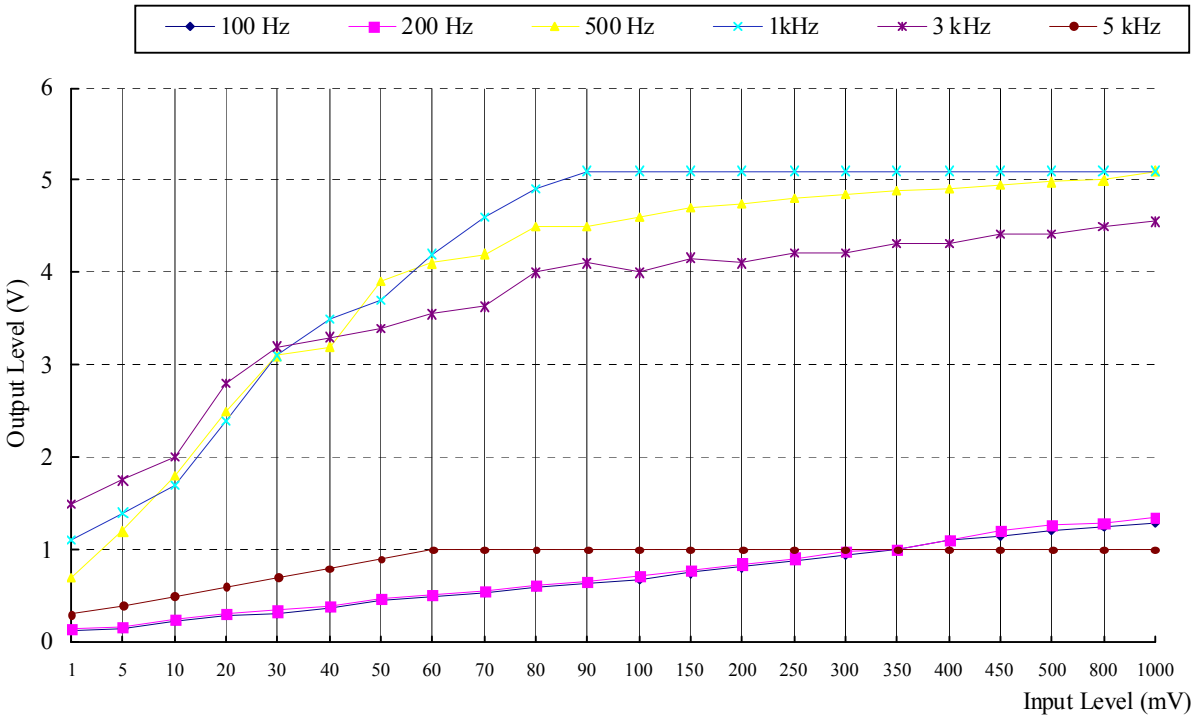
Equipment	Manufacturer	Model No.	Calibration Date	Next Cal. Date
Communications Service Monitor	AEROFLEX	2945B	2013/05/13	2014/05/12
Spectrum Analyzer	Rohde & Schwarz	FSP40	2012/12/07	2013/12/06

4.4 Measurement Result

Test Mode: Line in
RF Frequency : 584.050MHz;

Test Date : Oct. 22, 2013 Temperature : 23 °C Humidity : 60 %

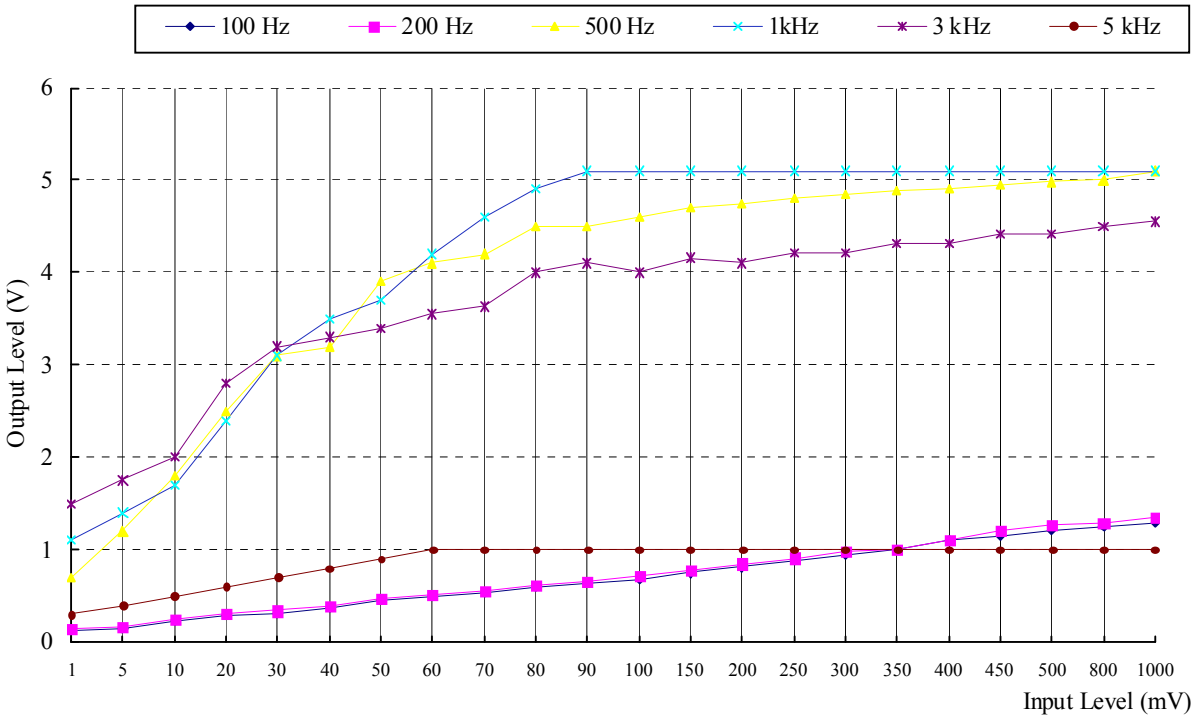
A). Frequency response



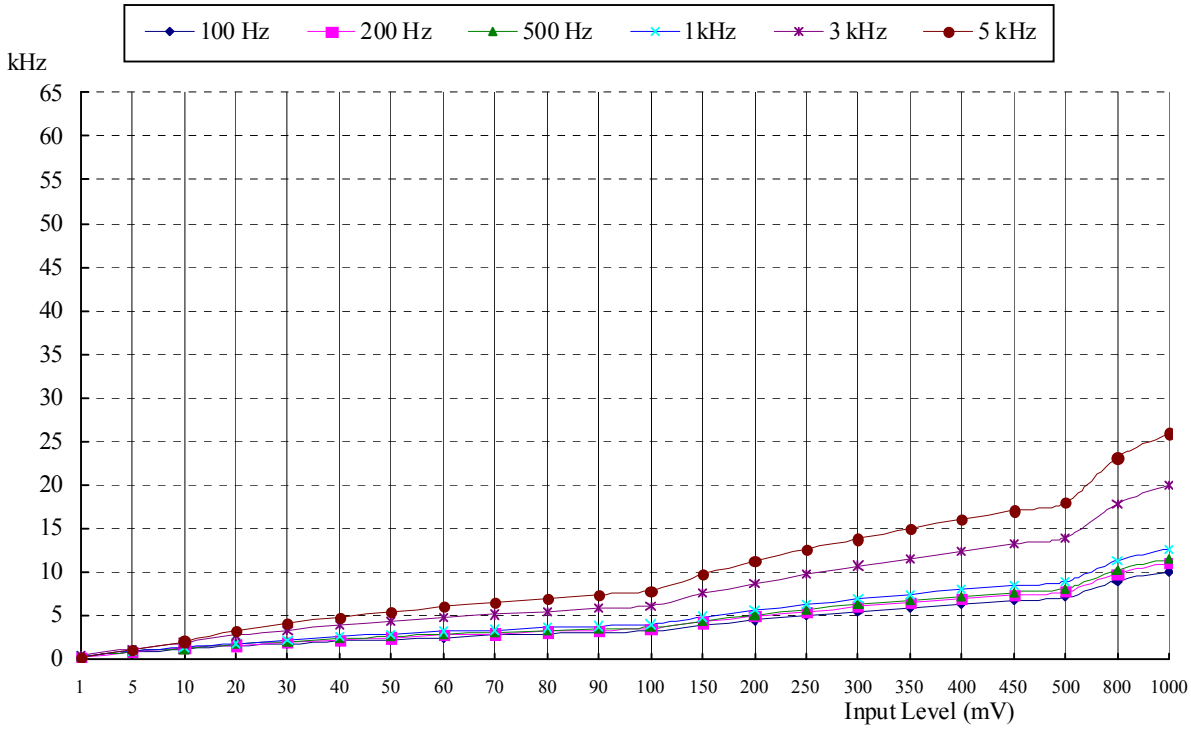
Test Mode: Mic
RF Frequency : 584.050MHz;

Test Date : Oct. 22, 2013 Temperature : 23 °C Humidity : 60 %

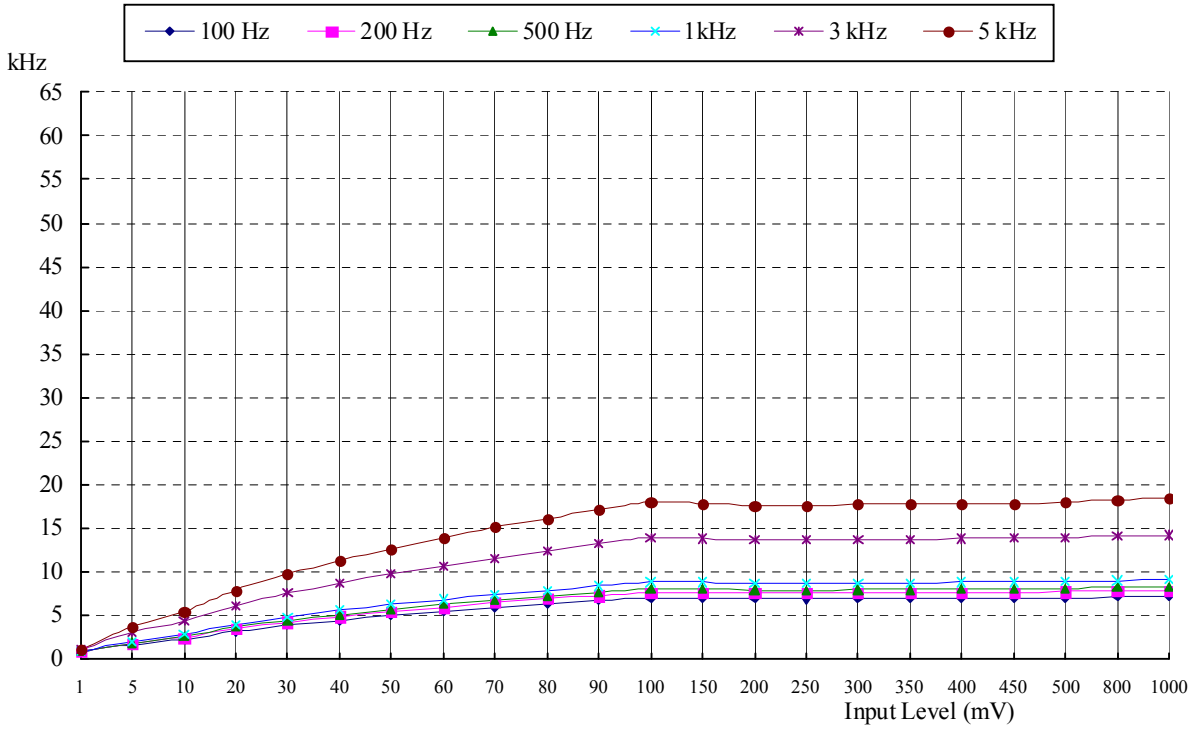
A). Frequency response



Test Mode: Line in
RF Frequency : 584.050MHz;
B). Modulation Limit

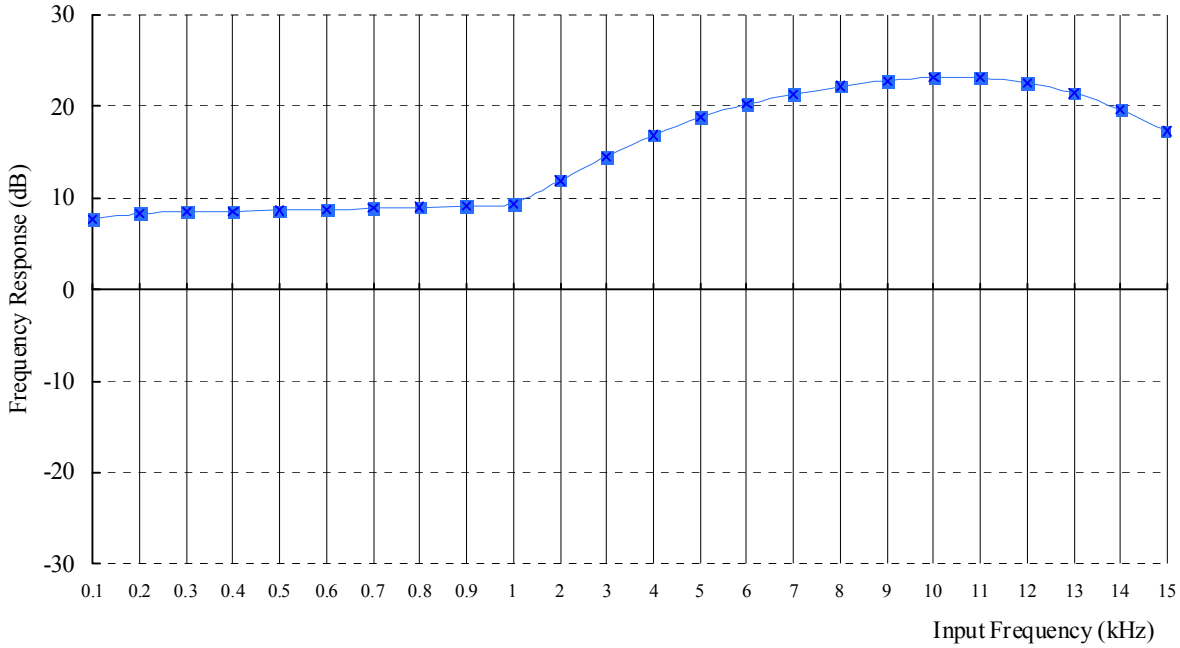


Test Mode: Mic
RF Frequency : 584.050MHz;
B). Modulation Limit



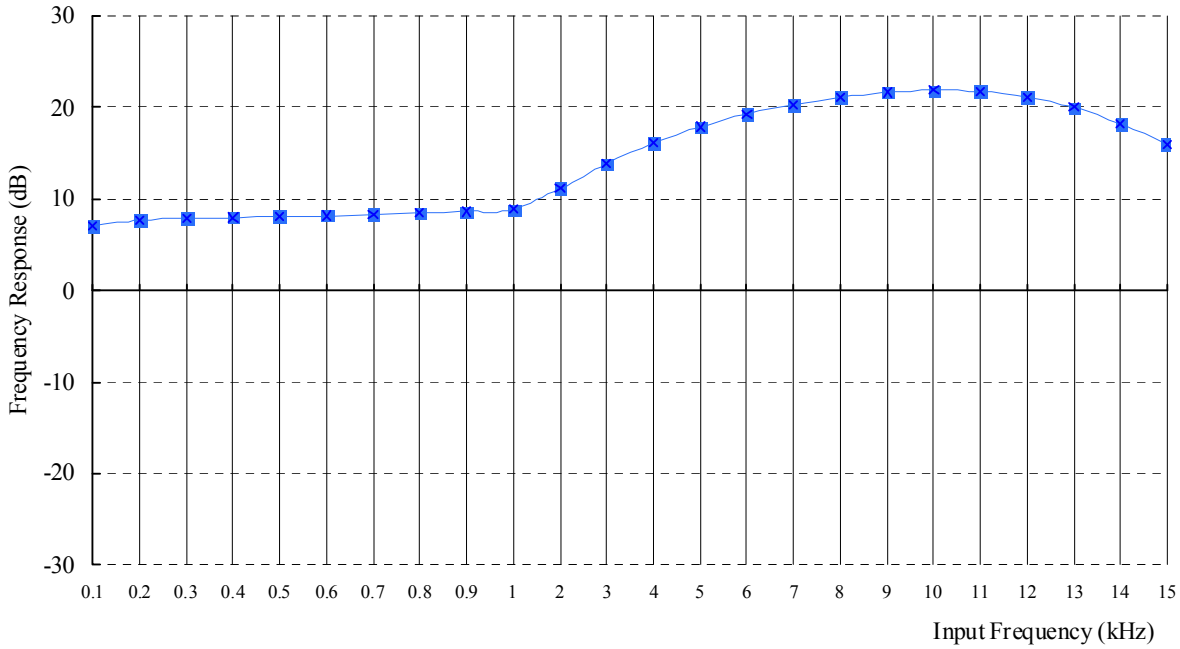
Test Mode: Line in
RF Frequency : 584.050MHz;

C). Frequency response of all circuits



Test Mode: Mic
RF Frequency : 584.050MHz;

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.

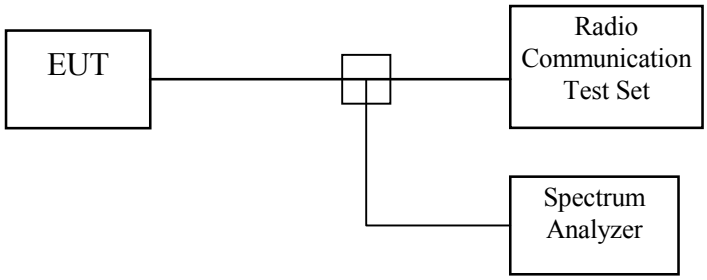
5.2 Measurement Method

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	2013/05/13	2014/05/12
Spectrum Analyzer	Rohde & Schwarz	FSP40	2012/12/07	2013/12/06

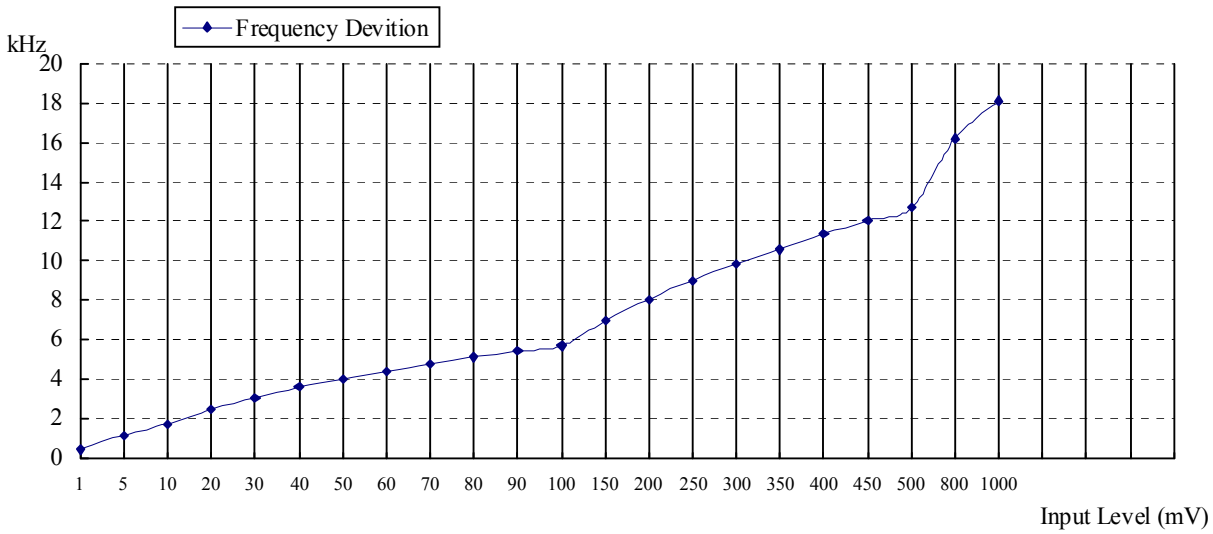
5.4 Bandwidth Measured

5.4.1 Input Level Derived

Test Mode: Line in
RF Frequency : 584.050MHz;

Test Date : Oct. 22, 2013 Temperature : 25 °C Humidity : 55 %

Input Audio Frequency : 2.5 kHz, Sine Wave

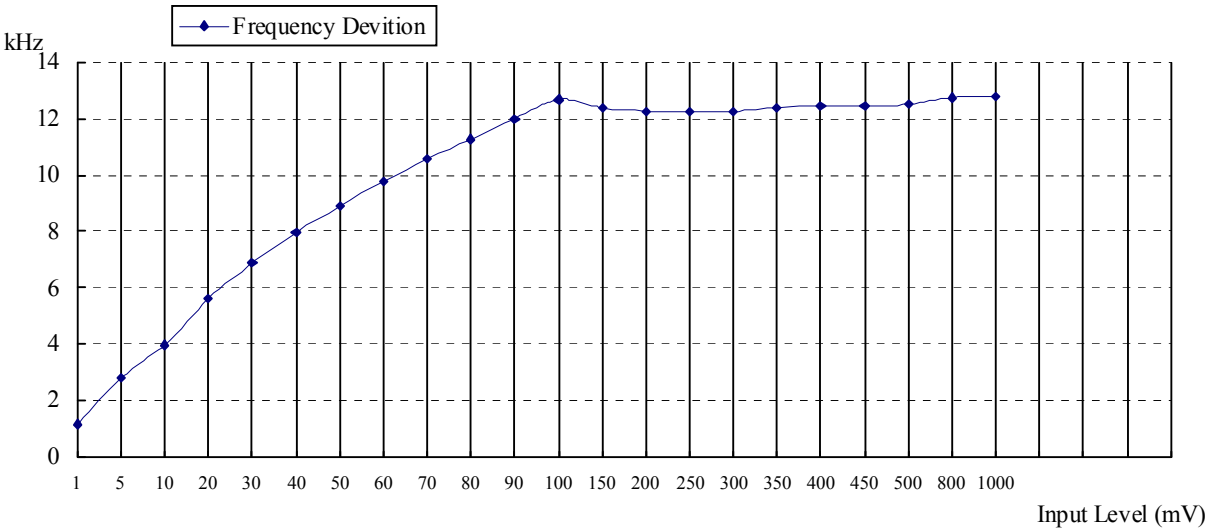


Line in
The Level input to produce 50% modulation is 100 mV, therefore the magnitude 16 dB greater than it is 630.9 mV.

Test Mode: Mic
RF Frequency : 584.050MHz;

Test Date : Oct. 22, 2013 Temperature : 25 °C Humidity : 55 %

Input Audio Frequency : 2.5 kHz, Sine Wave



Mic
The Level input to produce 50% modulation is 50 mV, therefore the magnitude 16 dB greater than it is 316.2 mV.

5.4.2 Occupied Bandwidth Plotted

Test Date : Oct. 22, 2013 Temperature : 25 °C Humidity : 55 %

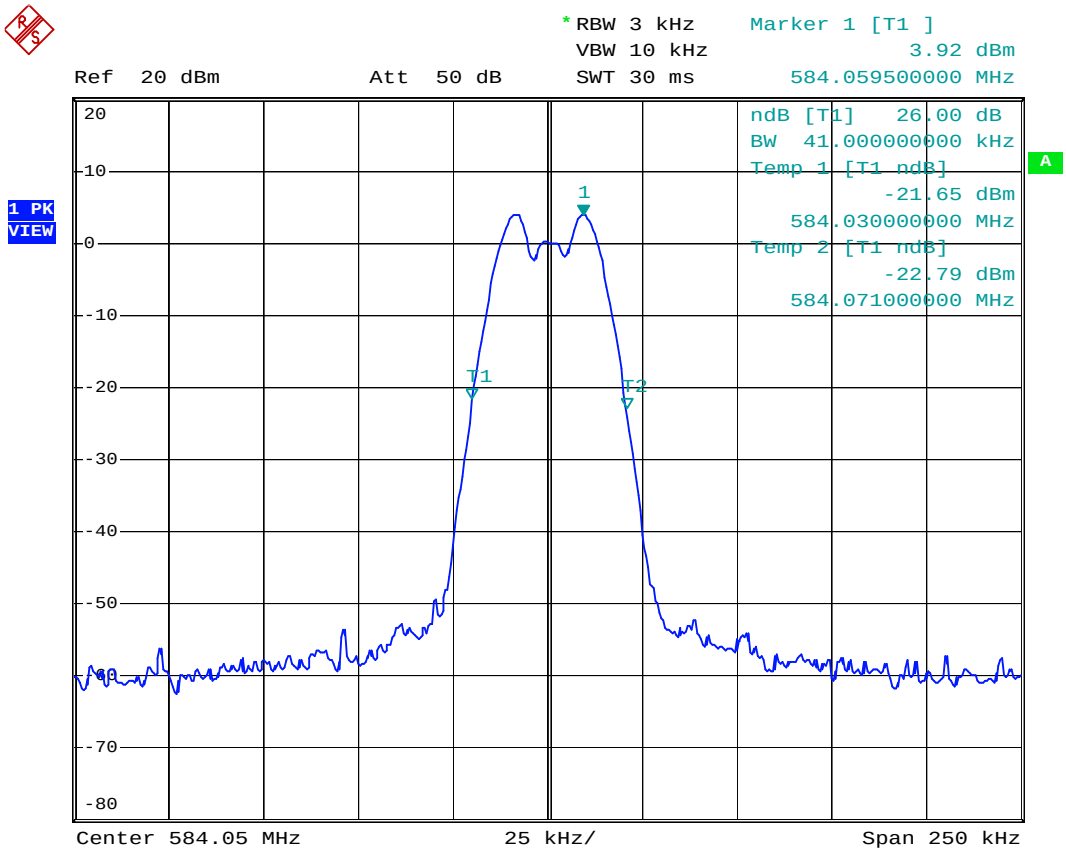
Test Mode: Line

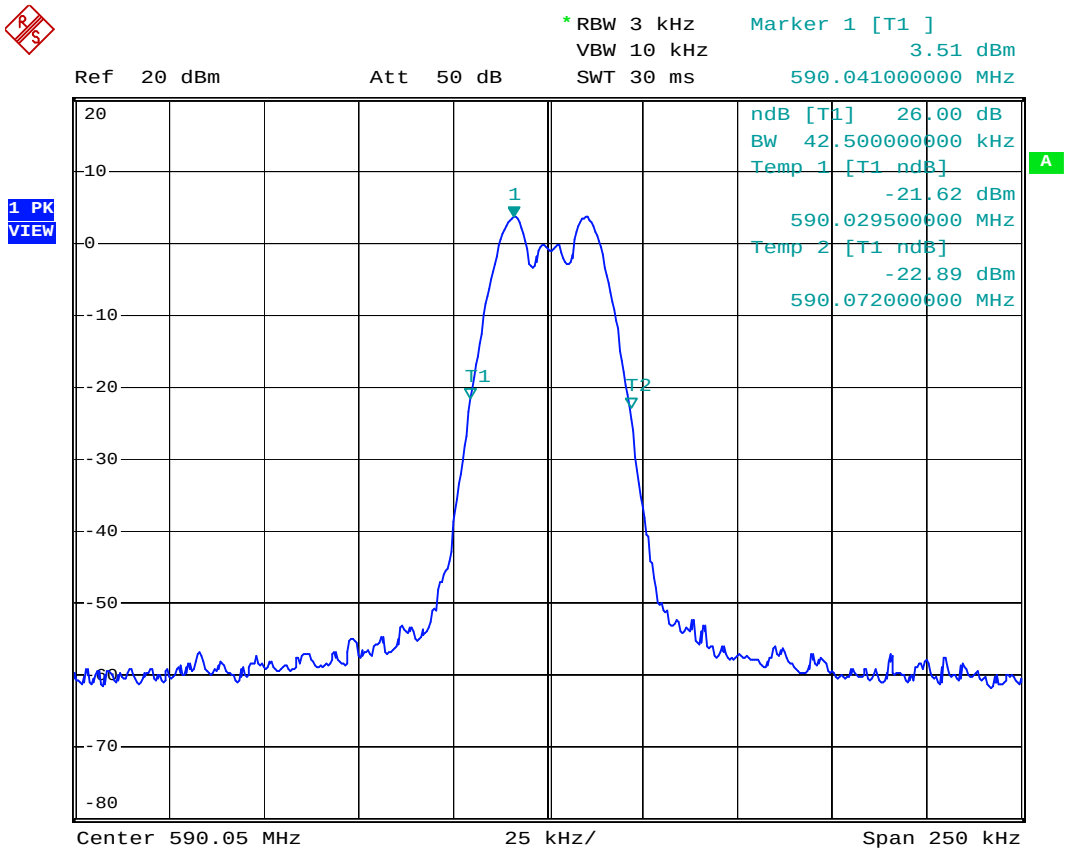
RF Frequency (MHz)	26 dB Bandwidth (kHz)
584.059	41.0
590.041	42.5
603.210	42.5
640.035	41.5
651.185	40.0
663.967	42.0

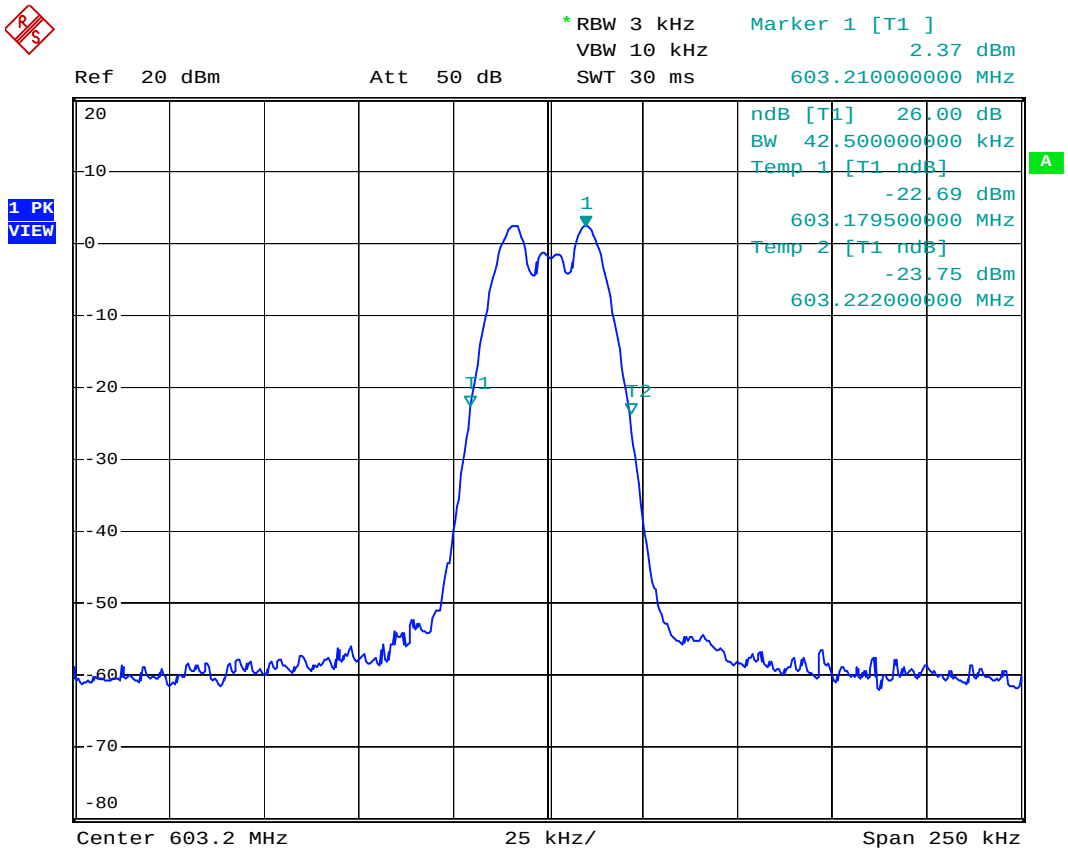
Test Mode: Mic

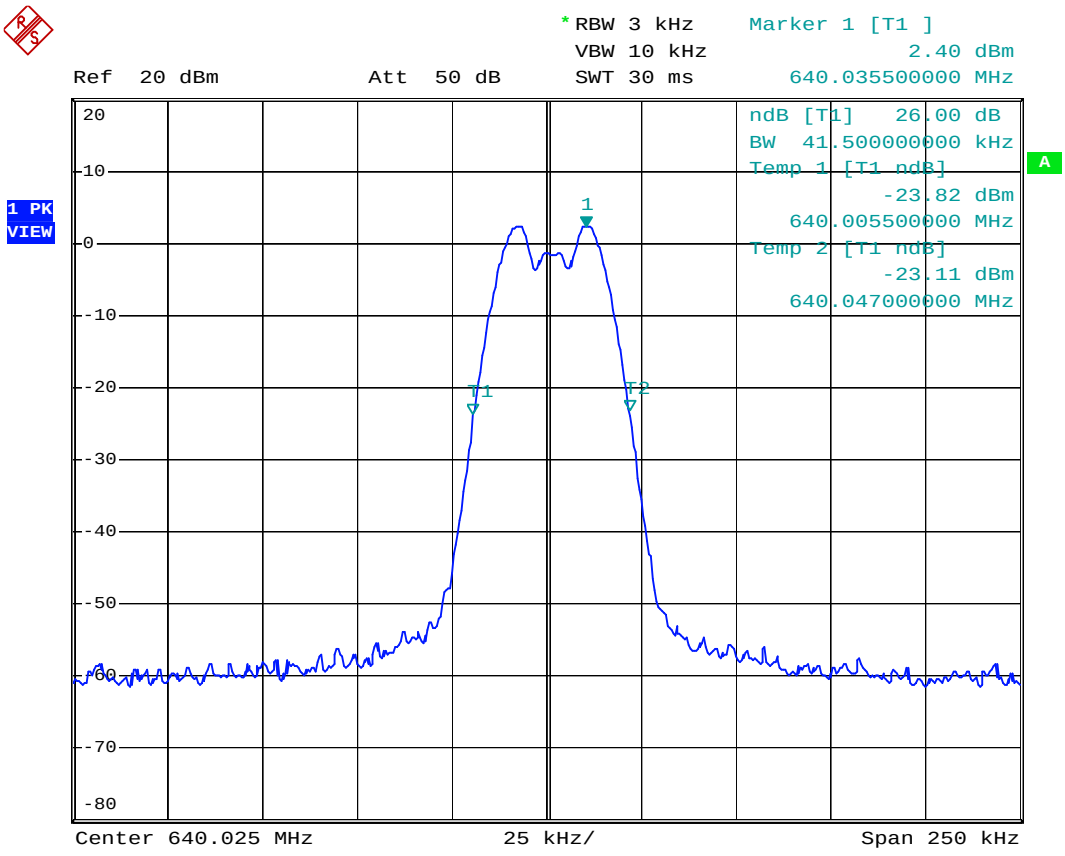
RF Frequency (MHz)	26 dB Bandwidth (kHz)
584.041	42.0
590.041	43.5
603.211	43.5
640.036	42.5
651.166	44.0
663.987	46.5

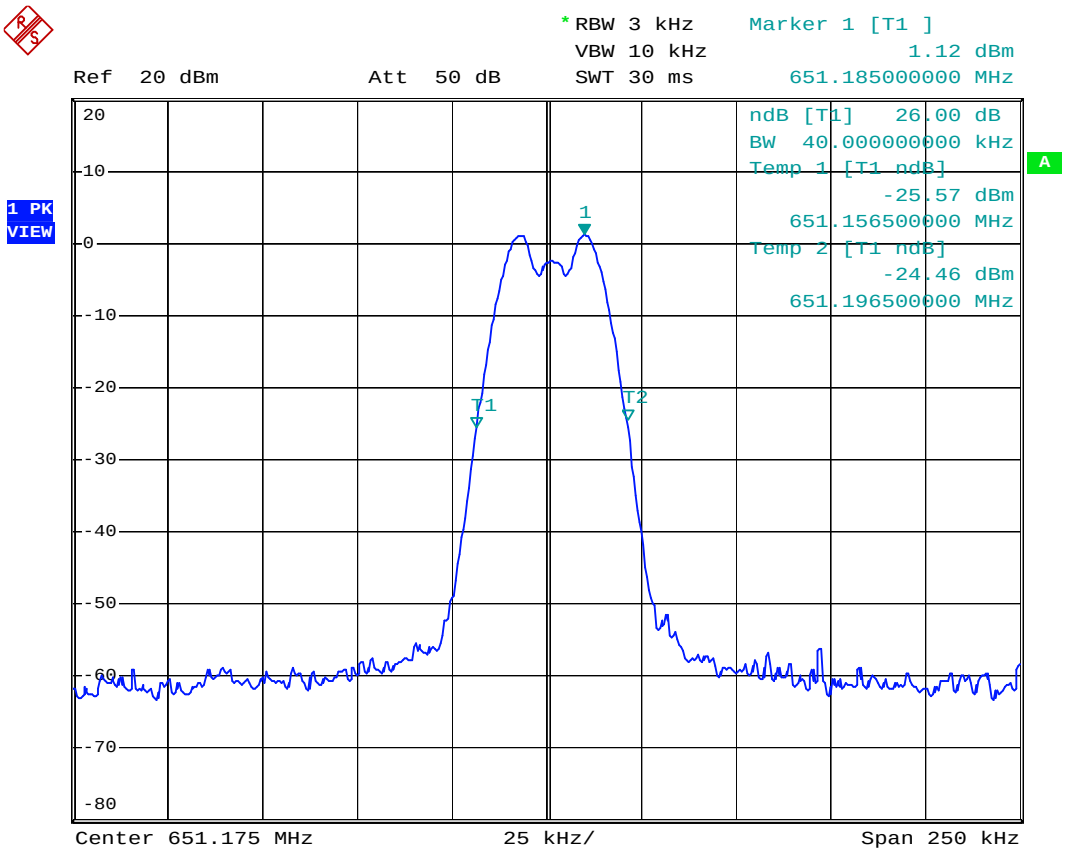
Test Mode: Line

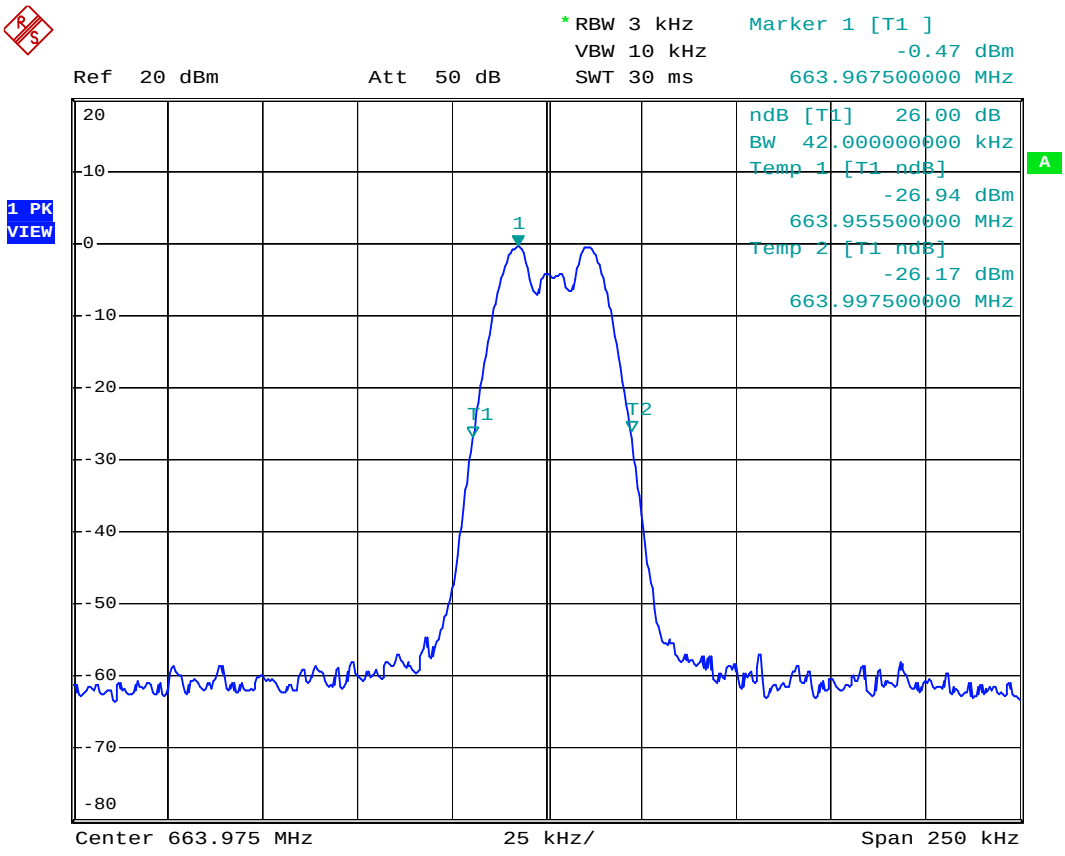



*RBW 3 kHz
VBW 10 kHz
SWT 30 ms
Marker 1 [T1]
3.51 dBm
590.041000000 MHz
Ref 20 dBm
Att 50 dB
ndB [T1] 26.00 dB
BW 42.500000000 kHz
Temp 1 [T1 ndB]
-21.62 dBm
590.029500000 MHz
Temp 2 [T1 ndB]
-22.89 dBm
590.072000000 MHz
1 PK
VIEW
A
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
T1
T2
Center 590.05 MHz
25 kHz/
Span 250 kHz

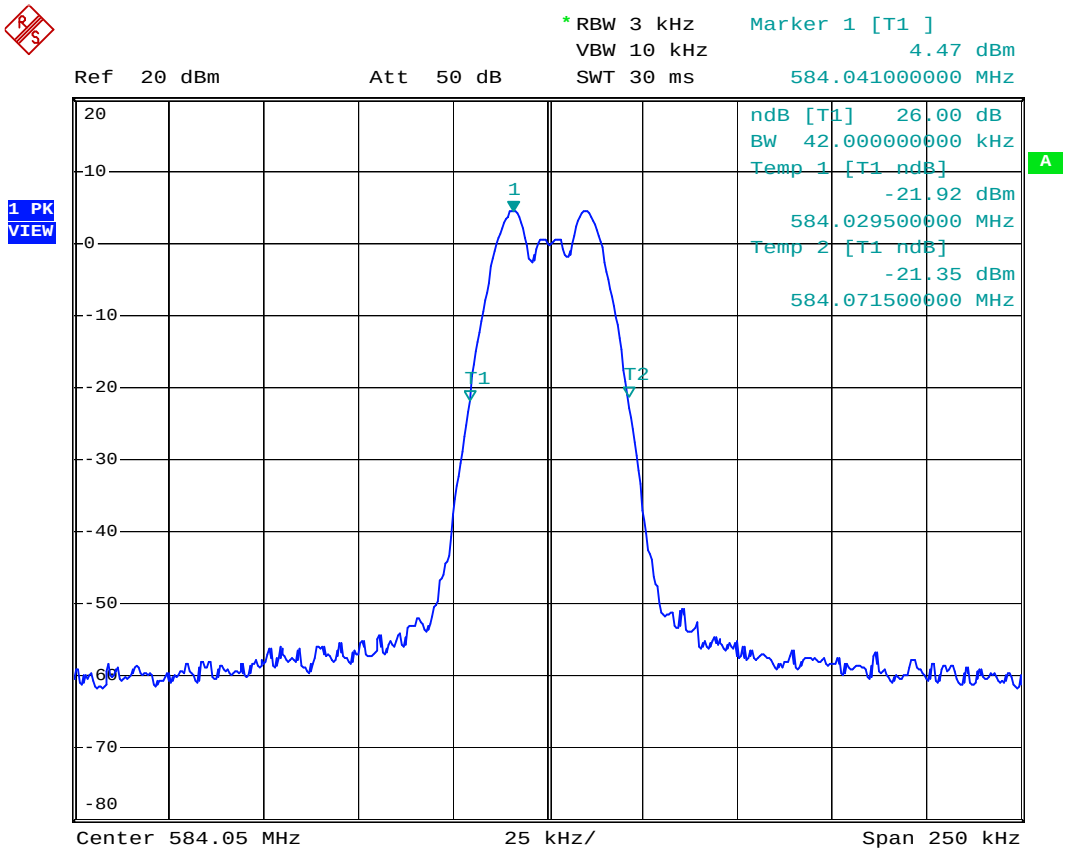

*RBW 3 kHz
VBW 10 kHz
SWT 30 ms
Marker 1 [T1]
2.37 dBm
603.210000000 MHz
Ref 20 dBm
Att 50 dB
ndB [T1] 26.00 dB
BW 42.500000000 kHz
Temp 1 [T1 ndB]
-22.69 dBm
603.179500000 MHz
Temp 2 [T1 ndB]
-23.75 dBm
603.222000000 MHz
1 PK
VIEW
A
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
T1
T2
Center 603.2 MHz
25 kHz/
Span 250 kHz

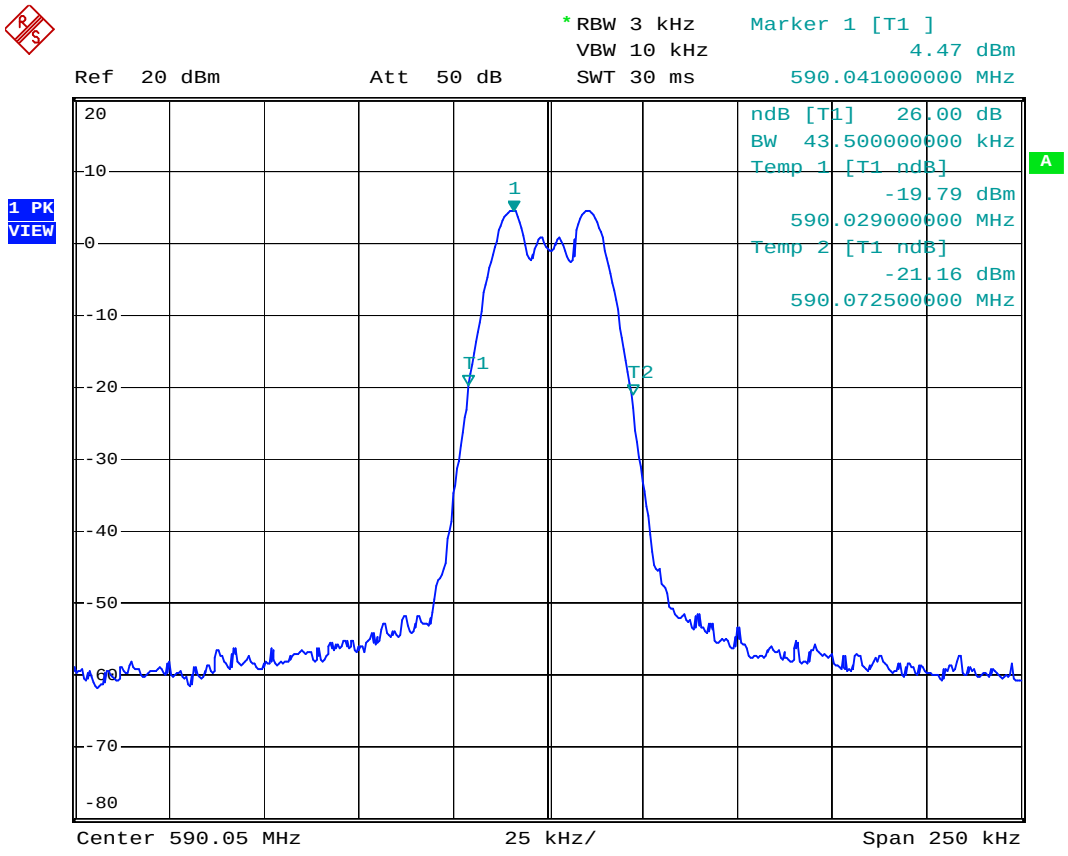

*RBW 3 kHz
VBW 10 kHz
SWT 30 ms
Marker 1 [T1]
2.40 dBm
640.035500000 MHz
Ref 20 dBm
Att 50 dB
ndB [T1] 26.00 dB
BW 41.500000000 kHz
Temp 1 [T1 ndB]
-23.82 dBm
640.005500000 MHz
Temp 2 [T1 ndB]
-23.11 dBm
640.047000000 MHz
1 PK
VIEW
A
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
T1
T2
Center 640.025 MHz
25 kHz/
Span 250 kHz

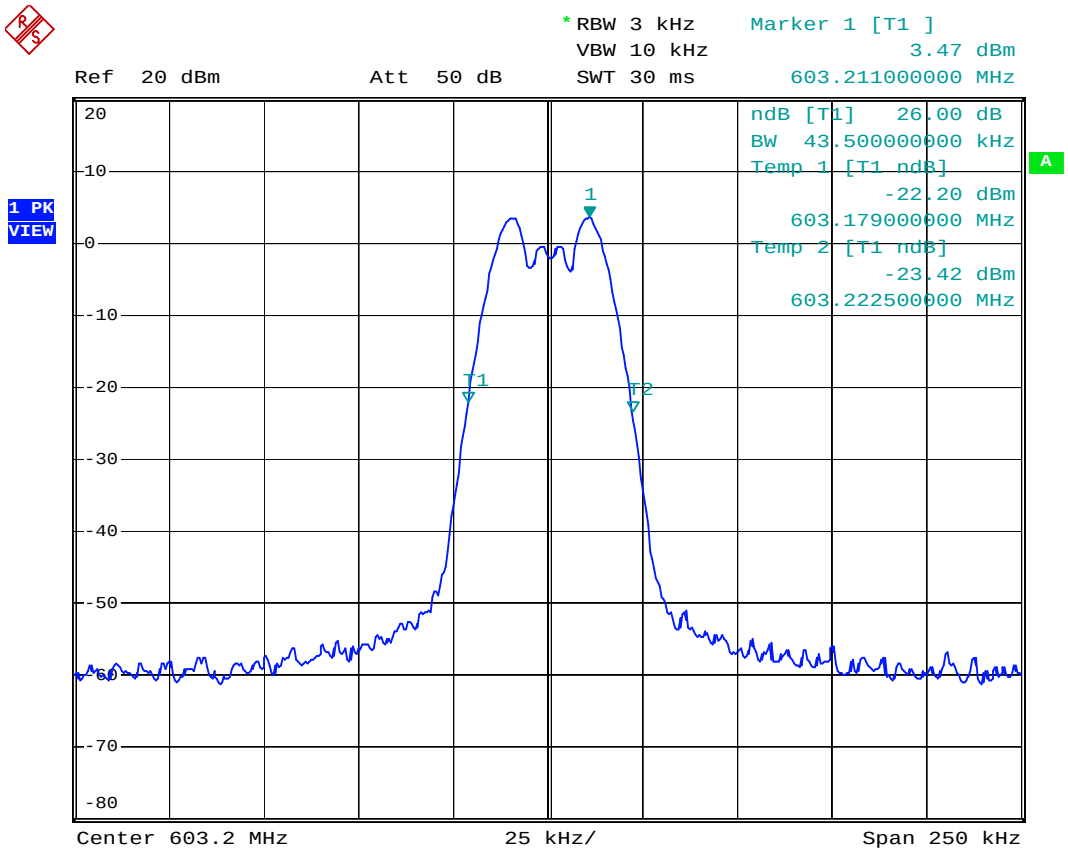

*RBW 3 kHz
VBW 10 kHz
SWT 30 ms
Marker 1 [T1]
1.12 dBm
651.185000000 MHz
Ref 20 dBm
Att 50 dB
ndB [T1] 26.00 dB
BW 40.000000000 kHz
Temp 1 [T1 ndB]
-25.57 dBm
651.156500000 MHz
Temp 2 [T1 ndB]
-24.46 dBm
651.196500000 MHz
1 PK
VIEW
A
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
T1
T2
Center 651.175 MHz
25 kHz/
Span 250 kHz

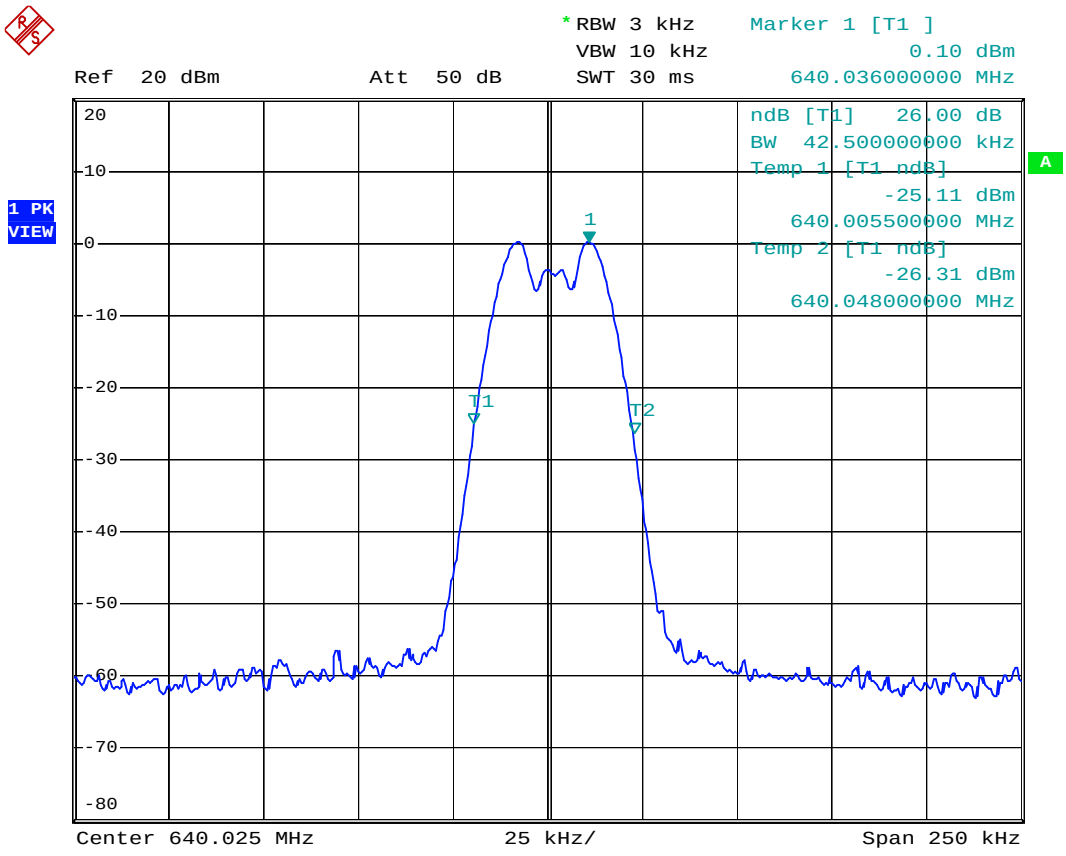

*RBW 3 kHz
VBW 10 kHz
SWT 30 ms
Marker 1 [T1]
-0.47 dBm
663.967500000 MHz
Ref 20 dBm
Att 50 dB
ndB [T1] 26.00 dB
BW 42.000000000 kHz
Temp 1 [T1 ndB]
-26.94 dBm
663.955500000 MHz
Temp 2 [T1 ndB]
-26.17 dBm
663.997500000 MHz
1 PK
VIEW
A
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
T1
T2
Center 663.975 MHz
25 kHz/
Span 250 kHz

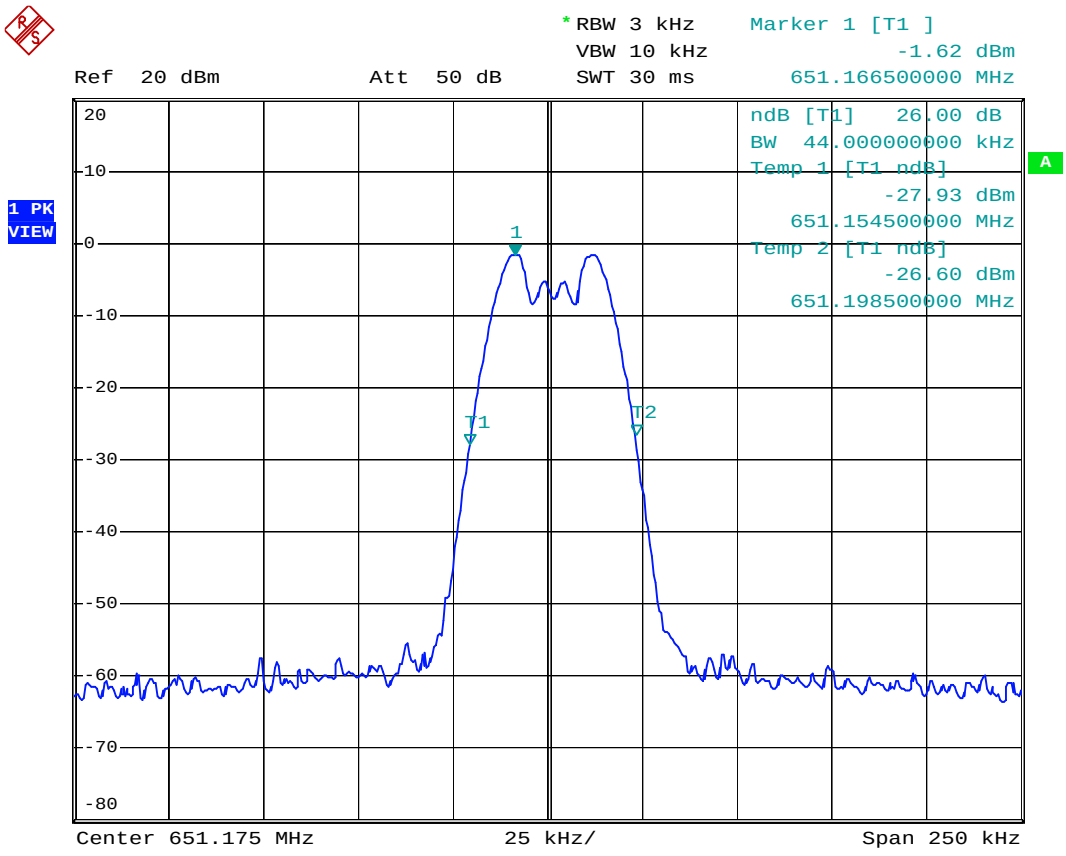
Test Mode: Mic

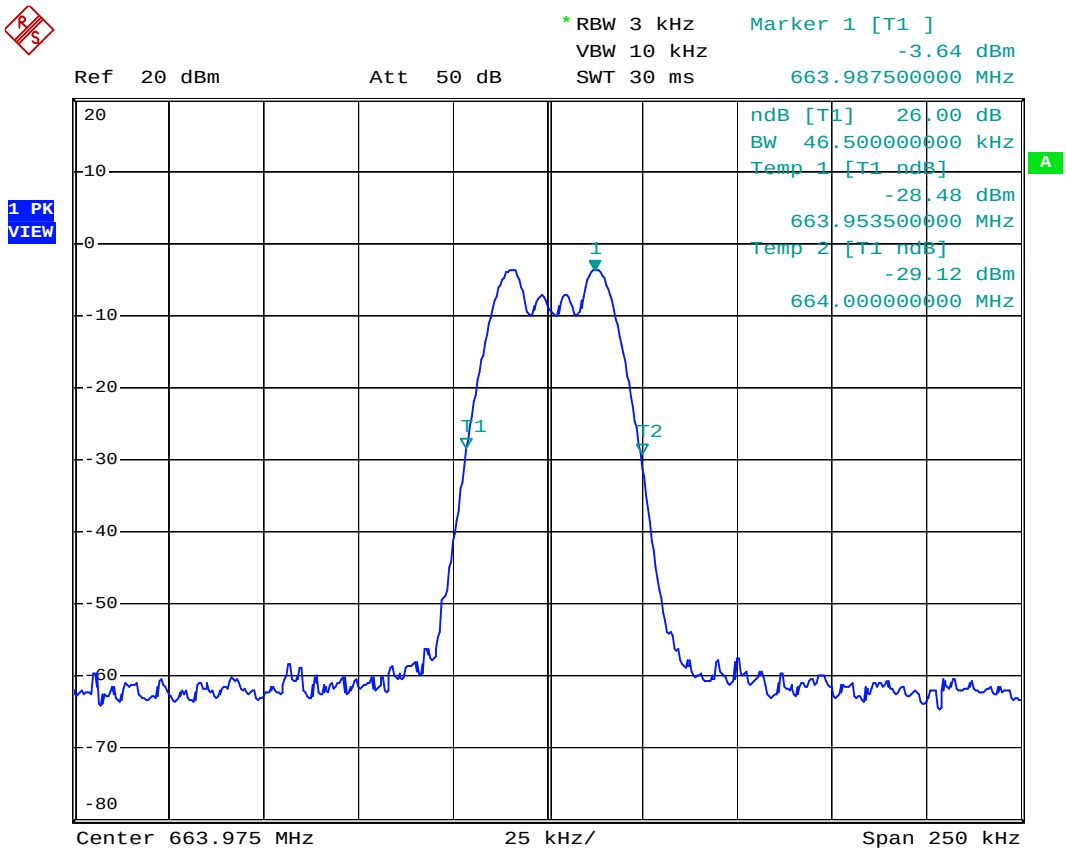



*RBW 3 kHz
VBW 10 kHz
SWT 30 ms
Marker 1 [T1]
4.47 dBm
590.041000000 MHz
Ref 20 dBm
Att 50 dB
ndB [T1] 26.00 dB
BW 43.500000000 kHz
Temp 1 [T1 ndB]
-19.79 dBm
590.029000000 MHz
Temp 2 [T1 ndB]
-21.16 dBm
590.072500000 MHz
1 PK
VIEW
A
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
T1
T2
Center 590.05 MHz
25 kHz/
Span 250 kHz


*RBW 3 kHz
VBW 10 kHz
SWT 30 ms
Marker 1 [T1]
3.47 dBm
603.211000000 MHz
Ref 20 dBm
Att 50 dB
ndB [T1] 26.00 dB
BW 43.500000000 kHz
Temp 1 [T1 ndB]
-22.20 dBm
603.179000000 MHz
Temp 2 [T1 ndB]
-23.42 dBm
603.222500000 MHz
1 PK
VIEW
A
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
T1
T2
Center 603.2 MHz
25 kHz/
Span 250 kHz


*RBW 3 kHz
VBW 10 kHz
SWT 30 ms
Marker 1 [T1]
0.10 dBm
640.036000000 MHz
Ref 20 dBm
Att 50 dB
ndB [T1] 26.00 dB
BW 42.500000000 kHz
Temp 1 [T1 ndB]
-25.11 dBm
640.005500000 MHz
Temp 2 [T1 ndB]
-26.31 dBm
640.048000000 MHz
1 PK
VIEW
A
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
T1
T2
1
Center 640.025 MHz
25 kHz/
Span 250 kHz


*RBW 3 kHz
VBW 10 kHz
SWT 30 ms
Marker 1 [T1]
-1.62 dBm
651.166500000 MHz
Ref 20 dBm
Att 50 dB
ndB [T1] 26.00 dB
BW 44.000000000 kHz
Temp 1 [T1 ndB]
-27.93 dBm
651.154500000 MHz
Temp 2 [T1 ndB]
-26.60 dBm
651.198500000 MHz
1 PK
VIEW
A
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
1
T1
T2
Center 651.175 MHz
25 kHz/
Span 250 kHz


*RBW 3 kHz
VBW 10 kHz
SWT 30 ms
Marker 1 [T1]
-3.64 dBm
663.987500000 MHz
Ref 20 dBm
Att 50 dB
ndB [T1] 26.00 dB
BW 46.500000000 kHz
Temp 1 [T1 ndB]
-28.48 dBm
663.953500000 MHz
Temp 2 [T1 ndB]
-29.12 dBm
664.000000000 MHz
1 PK
VIEW
A
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
T1
T2
1
Center 663.975 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	2012/12/07	2013/12/06
Double Ridged Antenna	EMCO	3115	2013/04/29	2014/04/28
Double Ridged Antenna	EMCO	3115	2013/04/29	2014/04/28
Log-periodic Antenna	EMCO	3146	2013/10/16	2014/10/15
Biconical Antenna	EMCO	3110	2013/10/16	2014/10/15
Dipole Antenna	Schwarzbeck	897;898	2013/09/07	2014/09/07
Amplifier	HP	8449B	2013/01/09	2014/01/08
Amplifier	HP	8447D	2013/05/03	2014/05/02
Signal generator	HP	83732B	2013/09/05	2014/09/04

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: 584.050MHz

Operated mode : TX Test Date :Oct. 22, 2013
Temperature : 23°C Humidity : 60%

Unmodulated carrier output power is 4.0 dBm , or 2.5 mW (ERP).
The limit of spurious or harmonics is calculated as following :

4.0-[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)
1168.100	63.3	69.0	-48.6	-42.9	---	6.4	2.3	-44.5	-38.8	-13.0	-25.8
1752.150	60.3	65.7	-48.9	-43.5	---	7.7	2.8	-44.0	-38.6	-13.0	-25.6
2336.200	58.7	60.4	-48.3	-46.5	---	8.7	3.2	-42.8	-41.0	-13.0	-28.0
2920.250	61.2	62.5	-43.8	-42.4	---	9.0	3.7	-38.5	-37.1	-13.0	-24.1
3504.300	55.1	50.3	-47.6	-52.5	---	9.4	4.0	-42.2	-47.1	-13.0	-29.2
4088.350	53.5	52.7	-47.1	-48.2	---	9.1	4.4	-42.4	-43.5	-13.0	-29.4
4672.400	49.5	50.5	-50.3	-49.2	---	9.9	4.7	-45.1	-44.0	-13.0	-31.0
5256.450	45.3	46.3	-53.8	-52.6	---	9.8	5.0	-49.0	-47.8	-13.0	-34.8
5840.500	54.5	56.3	-44.1	-42.2	---	10.5	5.2	-38.8	-36.9	-13.0	-23.9

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.

b. Tx Frequency: 590.050 MHz

Operated mode : TX Test Date :Oct. 22, 2013
Temperature : 23°C Humidity : 60%

Unmodulated carrier output power is 4.8 dBm , or 3.0 mW (ERP).
The limit of spurious or harmonics is calculated as following :

4.8-[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)
1180.100	64.7	70.7	-47.1	-41.1	---	6.5	2.3	-42.9	-36.9	-13.0	-23.9
1770.150	63.4	67.8	-45.8	-41.3	---	7.6	2.8	-41.0	-36.5	-13.0	-23.5
2360.200	50.0	53.1	-56.9	-53.7	---	8.8	3.2	-51.3	-48.1	-13.0	-35.1
2950.250	64.0	62.8	-40.9	-42.0	---	8.9	3.7	-35.7	-36.8	-13.0	-22.7
3540.300	54.9	52.6	-47.6	-50.1	---	9.4	4.0	-42.2	-44.7	-13.0	-29.2
4130.350	51.7	52.5	-48.8	-48.3	---	9.2	4.4	-44.0	-43.5	-13.0	-30.5
4720.400	49.5	50.7	-50.2	-48.9	---	9.9	4.7	-45.0	-43.7	-13.0	-30.7
5310.450	45.8	46.3	-53.3	-52.6	---	9.8	5.0	-48.5	-47.8	-13.0	-34.8
5900.500	53.9	56.6	-44.7	-41.9	---	10.6	5.3	-39.4	-36.6	-13.0	-23.6

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.

c. Tx Frequency: 603.200 MHz

Operated mode : TX Test Date :Oct. 22, 2013
Temperature : 23°C Humidity : 60%

Unmodulated carrier output power is 7.0 dBm , or 5.0 mW (ERP).
The limit of spurious or harmonics is calculated as following :

7.0-[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)
1206.400	65.9	72.7	-45.8	-39.0	---	6.5	2.3	-41.6	-34.8	-13.0	-21.8
1809.600	68.6	69.5	-40.4	-39.5	---	7.6	2.8	-35.6	-34.7	-13.0	-21.7
2412.800	64.7	65.5	-42.0	-41.2	---	9.0	3.3	-36.3	-35.5	-13.0	-22.5
3016.000	64.4	64.5	-40.3	-40.1	---	8.9	3.7	-35.1	-34.9	-13.0	-21.9
3619.200	56.0	62.6	-46.2	-39.8	---	9.3	4.1	-41.0	-34.6	-13.0	-21.6
4222.400	53.2	51.9	-47.2	-48.7	---	9.4	4.4	-42.2	-43.7	-13.0	-29.2
4825.600	53.4	53.7	-46.2	-45.7	---	9.8	4.8	-41.2	-40.7	-13.0	-27.7
5428.800	50.5	54.3	-48.5	-44.5	---	9.9	5.1	-43.7	-39.7	-13.0	-26.7
6032.000	56.0	59.1	-42.4	-39.3	---	10.8	5.3	-36.9	-33.8	-13.0	-20.8

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.

d. Tx Frequency: 640.025 MHz

Operated mode : TX Test Date :Oct. 22, 2013
Temperature : 23°C Humidity : 60%

Unmodulated carrier output power is 3.7 dBm , or 2.3 mW (ERP).
The limit of spurious or harmonics is calculated as following :

3.7-[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)
1280.050	66.7	73.1	-44.7	-38.2	---	6.9	2.4	-40.2	-33.7	-13.0	-20.7
1920.075	68.5	68.0	-40.0	-40.4	---	7.5	2.9	-35.4	-35.8	-13.0	-22.4
2560.100	69.4	68.5	-36.8	-37.6	---	9.3	3.4	-30.9	-31.7	-13.0	-17.9
3200.125	66.6	67.0	-37.3	-36.9	---	9.1	3.8	-32.0	-31.6	-13.0	-18.6
3840.150	62.6	63.7	-38.7	-37.9	---	9.1	4.2	-33.8	-33.0	-13.0	-20.0
4480.175	49.3	53.5	-50.7	-46.6	---	10.1	4.6	-45.2	-41.1	-13.0	-28.1
5120.200	52.7	50.3	-46.5	-48.7	---	9.7	4.9	-41.7	-43.9	-13.0	-28.7
5760.225	53.9	55.8	-44.8	-42.8	---	10.4	5.2	-39.6	-37.6	-13.0	-24.6
6400.250	59.1	57.6	-38.8	-40.2	---	10.9	5.5	-33.4	-34.8	-13.0	-20.4

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.

e. Tx Frequency: 651.175 MHz

Operated mode : TX Test Date :Oct. 22, 2013
Temperature : 23°C Humidity : 60%

Unmodulated carrier output power is 2.3 dBm , or 1.7 mW (ERP).
The limit of spurious or harmonics is calculated as following :

2.3-[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)
1302.350	65.6	71.7	-45.7	-39.5	---	7.0	2.4	-41.1	-34.9	-13.0	-21.9
1953.525	70.4	68.5	-37.9	-39.8	---	7.5	3.0	-33.4	-35.3	-13.0	-20.4
2604.700	69.9	69.6	-36.2	-36.4	---	9.2	3.4	-30.4	-30.6	-13.0	-17.4
3255.875	64.8	64.7	-38.9	-39.0	---	9.2	3.9	-33.6	-33.7	-13.0	-20.6
3907.050	54.6	59.0	-46.5	-42.4	---	9.0	4.3	-41.8	-37.7	-13.0	-24.7
4558.225	48.3	47.5	-51.6	-52.5	---	10.1	4.6	-46.1	-47.0	-13.0	-33.1
5209.400	47.9	45.8	-51.3	-53.1	---	9.8	5.0	-46.5	-48.3	-13.0	-33.5
5860.575	49.3	50.4	-49.3	-48.1	---	10.6	5.2	-43.9	-42.7	-13.0	-29.7
6511.750	55.1	55.3	-42.6	-42.4	---	10.9	5.5	-37.2	-37.0	-13.0	-24.0

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.

f. Tx Frequency: 663.975 MHz

Operated mode : TX Test Date :Oct. 22, 2013
Temperature : 23°C Humidity : 60%

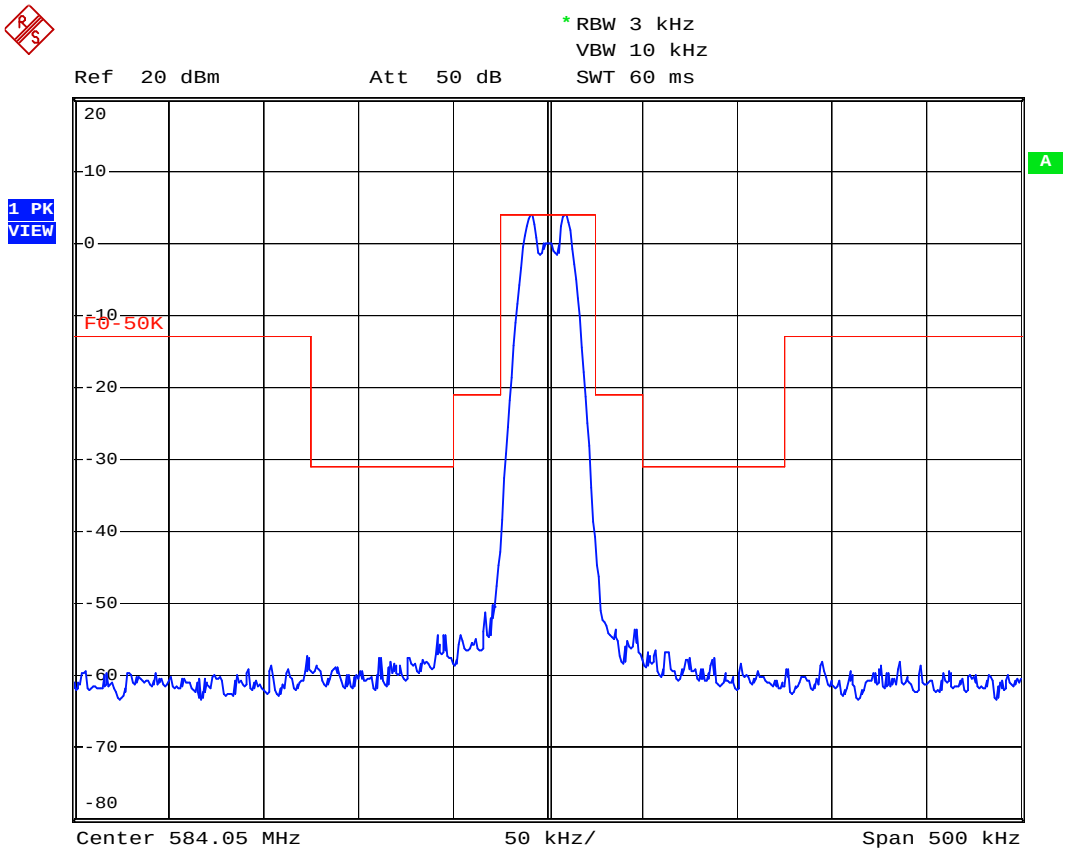
Unmodulated carrier output power is 1.7 dBm , or 1.5 mW (ERP).
The limit of spurious or harmonics is calculated as following :
1.7-[43+10log(carrier output power in W)], or -13dBm

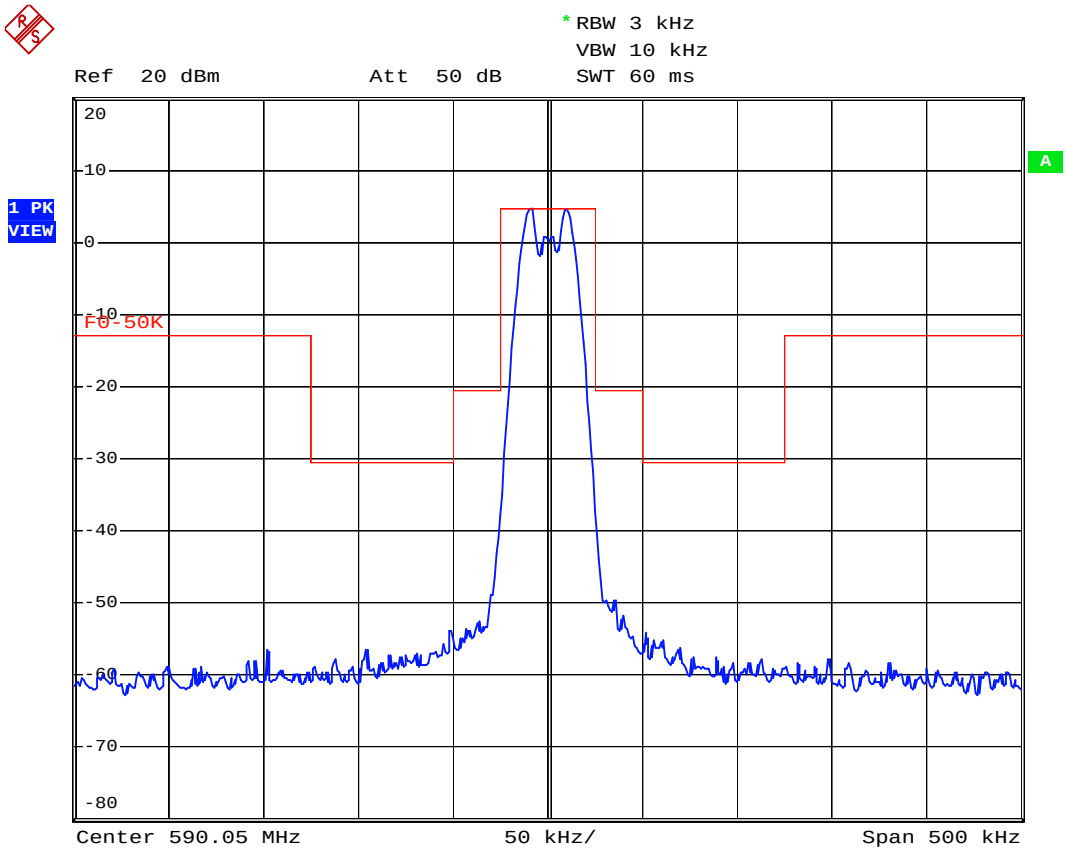
Frequency (MHz)	Meter Reading (dBuV) H	V	SG Reading (dBm) H	V	Antenna Gain	Antenna Gain Corr'	Cable Loss (dB)	Result (dBm) H	V	Limit (dBm)	Margin (dB)
1327.950	64.3	71.9	-46.9	-39.2	---	7.0	2.4	-42.3	-34.6	-13.0	-21.6
1991.925	68.3	68.6	-39.9	-39.5	---	7.5	3.0	-35.4	-35.0	-13.0	-22.0
2655.900	68.4	66.6	-37.5	-39.2	---	9.2	3.5	-31.8	-33.5	-13.0	-18.8
3319.875	62.7	58.8	-40.8	-44.7	---	9.2	3.9	-35.5	-39.4	-13.0	-22.5
3983.850	48.1	51.0	-52.7	-50.1	---	8.9	4.3	-48.1	-45.5	-13.0	-32.5
4647.825	46.6	50.3	-53.2	-49.5	---	10.0	4.7	-47.9	-44.2	-13.0	-31.2
5311.800	45.3	44.9	-53.8	-54.0	---	9.8	5.0	-49.0	-49.2	-13.0	-36.0
5975.775	44.0	45.2	-54.5	-53.2	---	10.8	5.3	-49.0	-47.7	-13.0	-34.7
6639.750	49.1	47.4	-48.5	-50.1	---	10.8	5.6	-43.3	-44.9	-13.0	-30.3

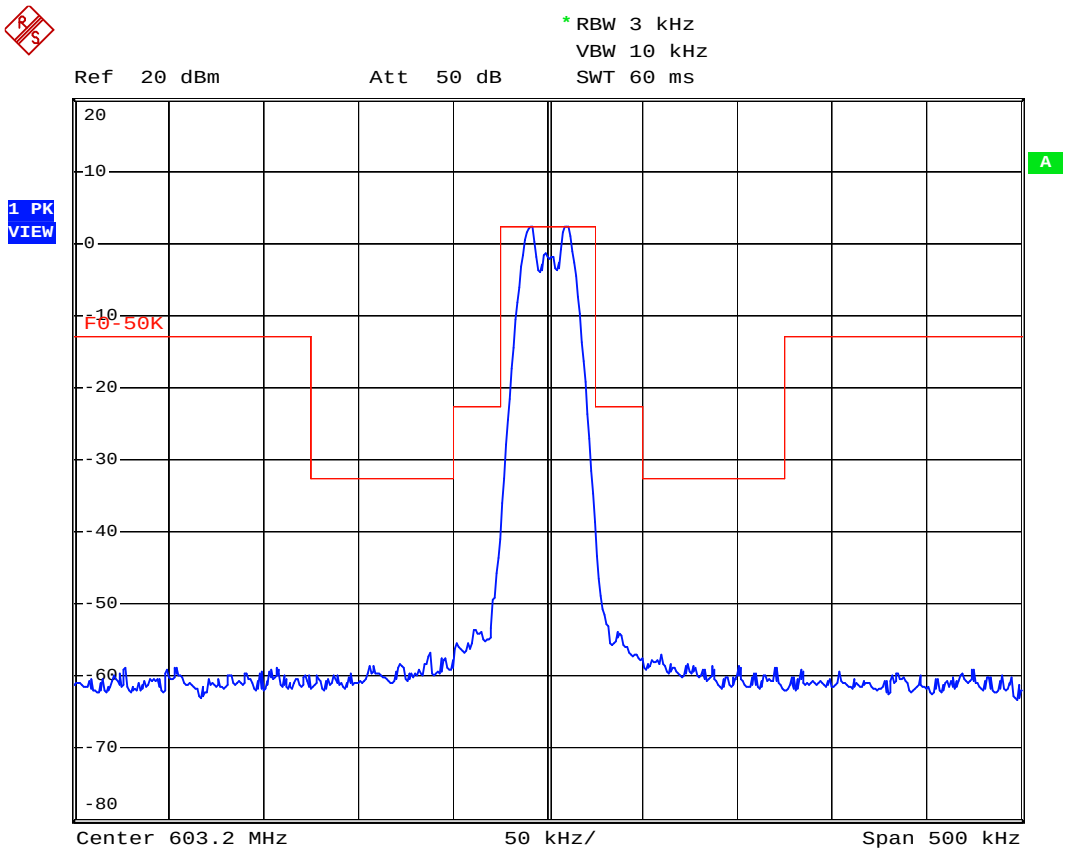
Note :
1. Remark "---" means that the emission level is too weak to be detected.
2. For measured frequency below 1GHz, a tuned dipole antenna is used.
3. Result calculation is as following :
   Result = SG Reading +Cable Loss +Antenna Gain +Antenna Gain Corrected
   Antenna Gain Corrected : is used for antenna other than dipole to convert radiated power to ERP.

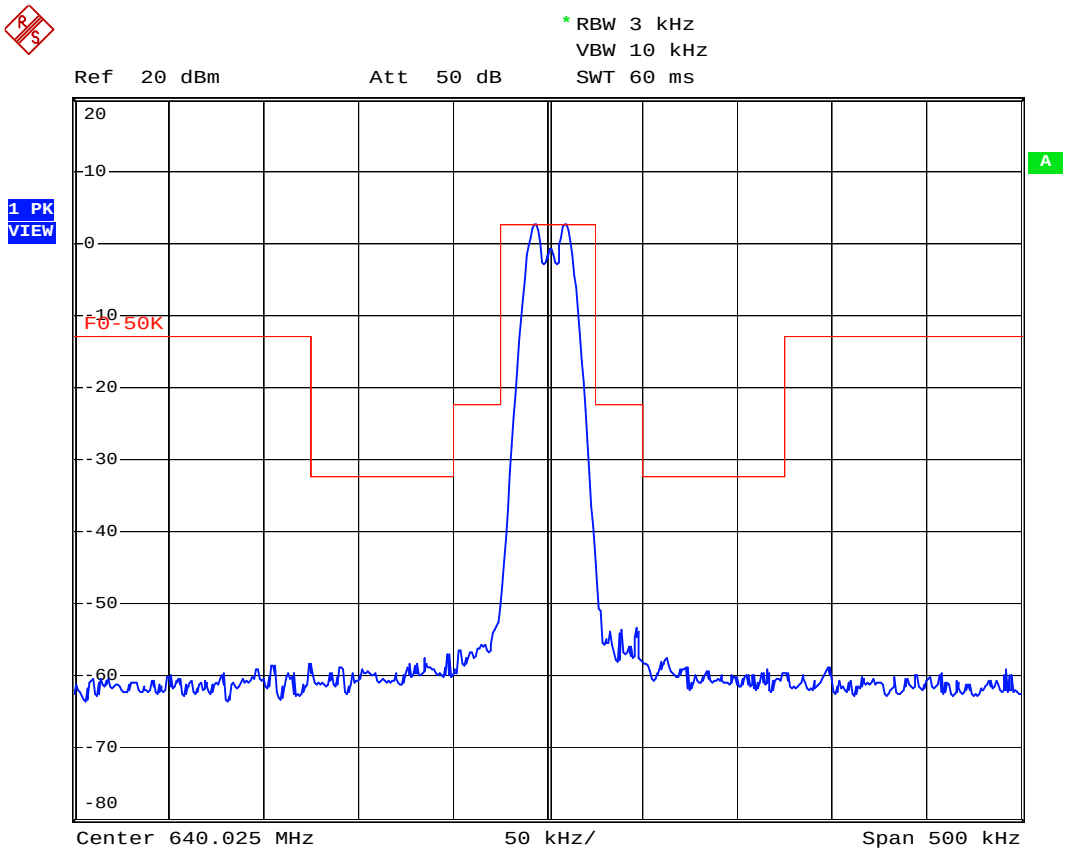
6.4.2 Emission mask plots

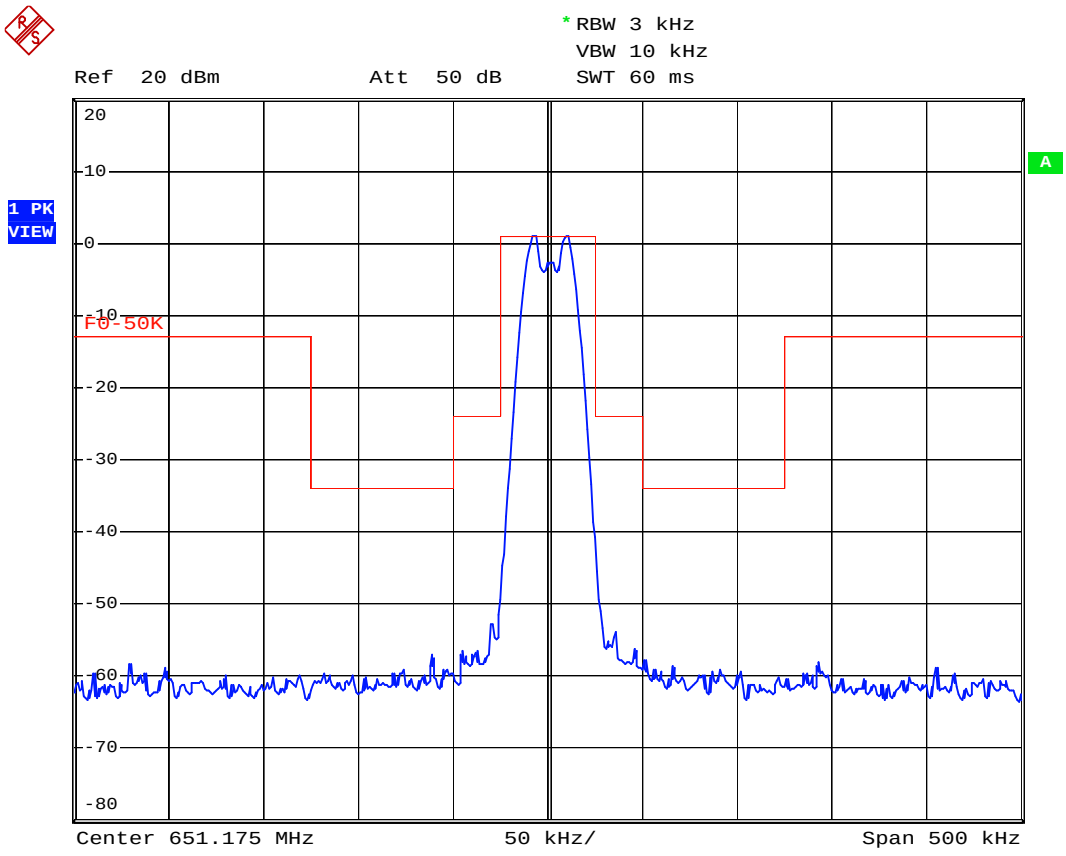
Test Mode:Line

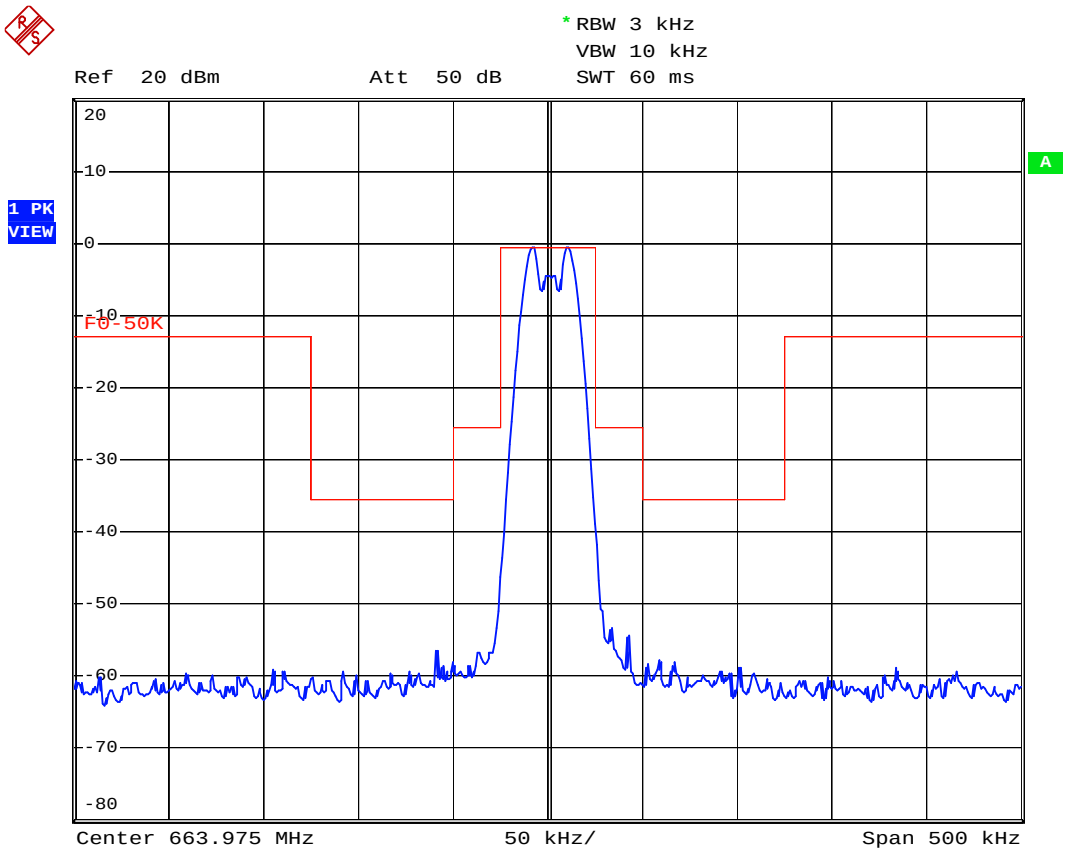



*RBW 3 kHz
VBW 10 kHz
SWT 60 ms
Ref 20 dBm
Att 50 dB
1 PK
VIEW
A
F0-50K
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 590.05 MHz
50 kHz/
Span 500 kHz

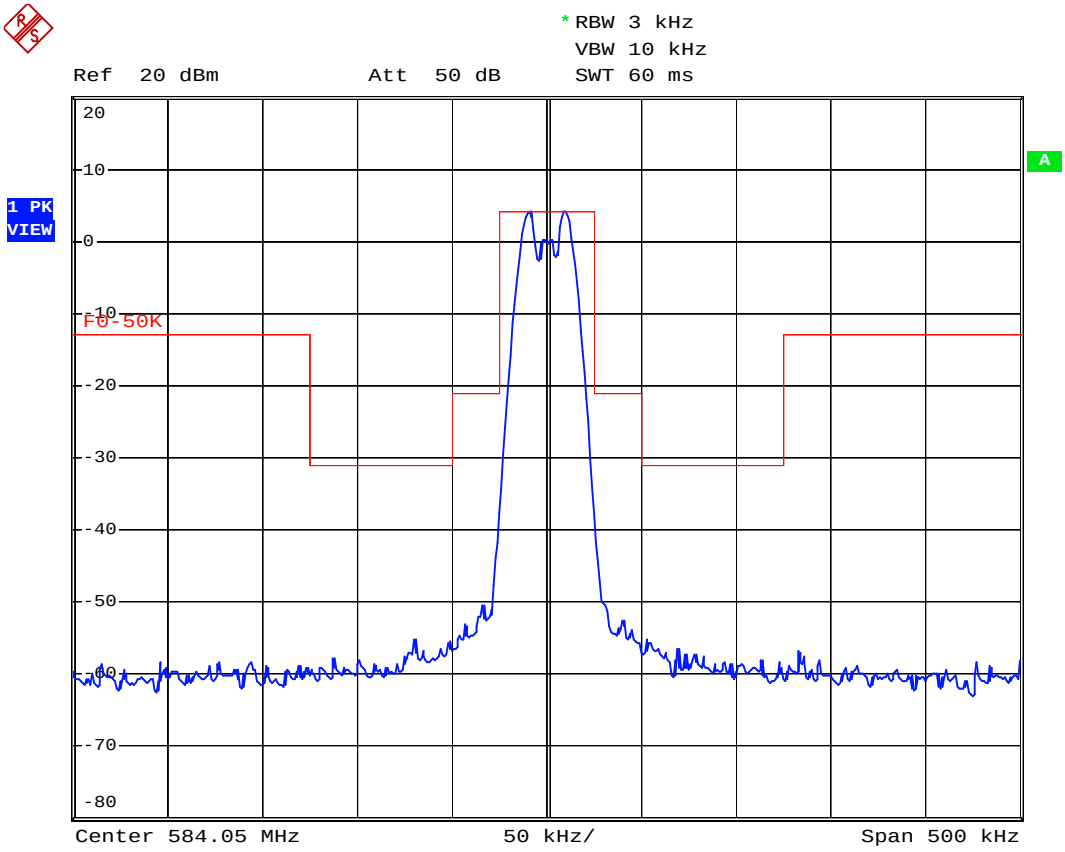

RBW 3 kHz
VBW 10 kHz
SWT 60 ms
Ref 20 dBm
Att 50 dB
1 PK
VIEW
A
F0-50K
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 603.2 MHz
50 kHz/
Span 500 kHz

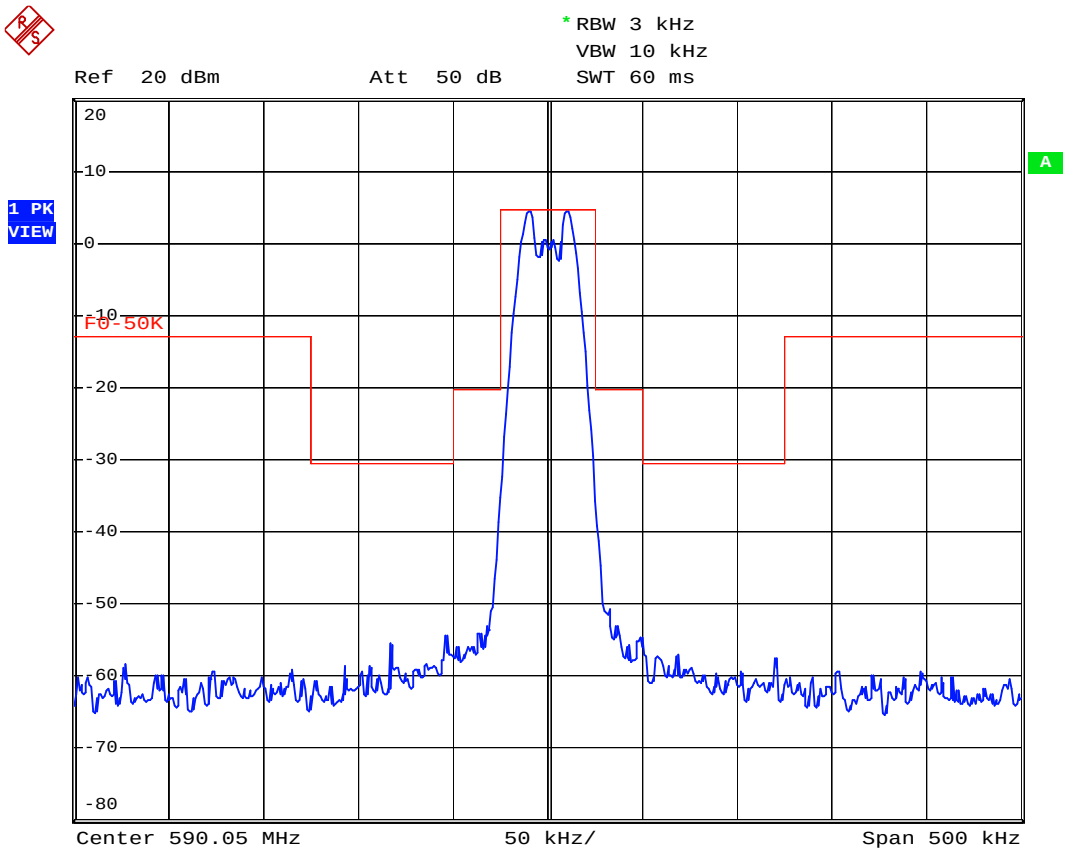

RBW 3 kHz
VBW 10 kHz
SWT 60 ms
Ref 20 dBm
Att 50 dB
1 PK
VIEW
A
F0-50K
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 640.025 MHz
50 kHz/
Span 500 kHz

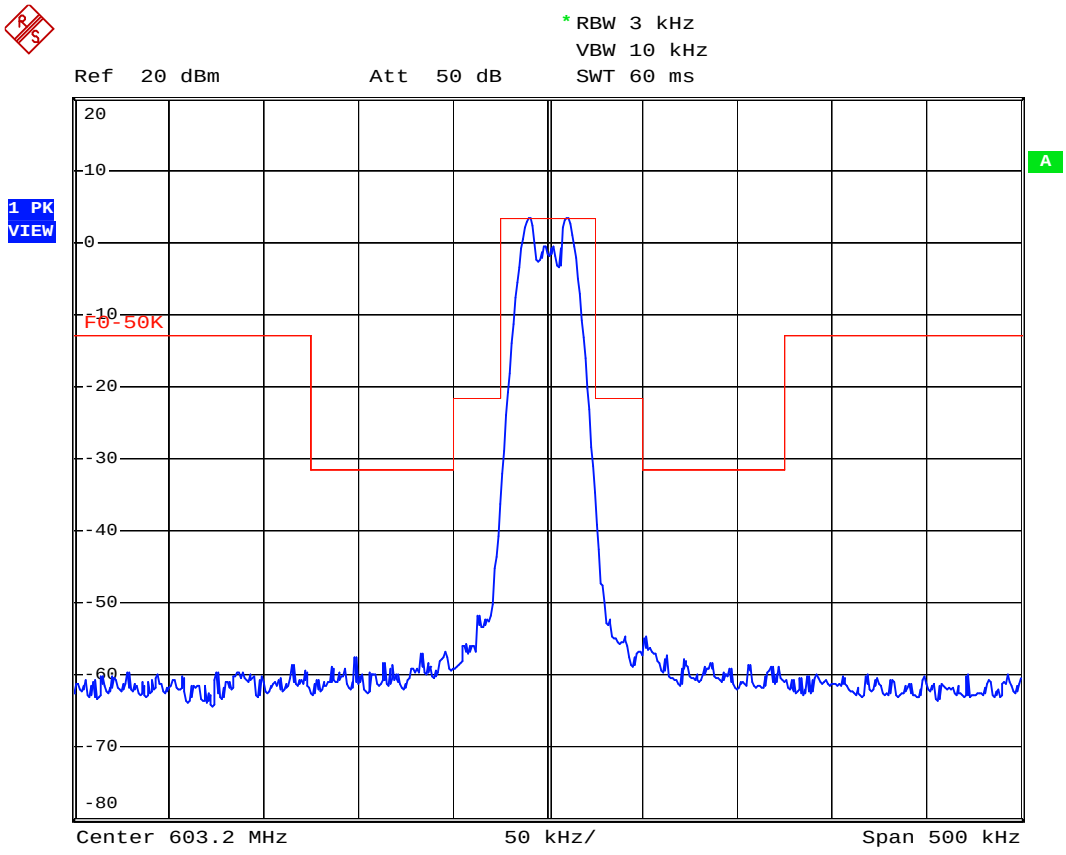

*RBW 3 kHz
VBW 10 kHz
SWT 60 ms
Ref 20 dBm
Att 50 dB
1 PK
VIEW
A
F0-50K
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 651.175 MHz
50 kHz/
Span 500 kHz

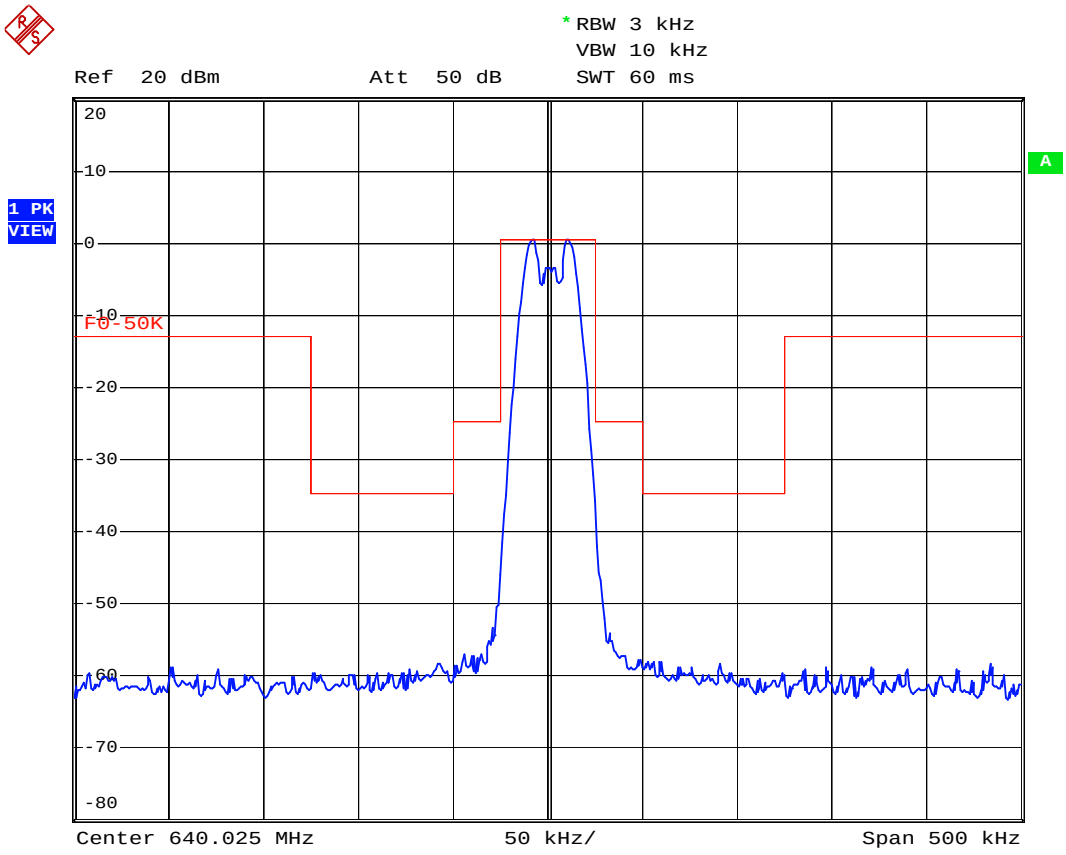

*RBW 3 kHz
VBW 10 kHz
SWT 60 ms
Ref 20 dBm
Att 50 dB
1 PK
VIEW
A
F0-50K
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 663.975 MHz
50 kHz/
Span 500 kHz

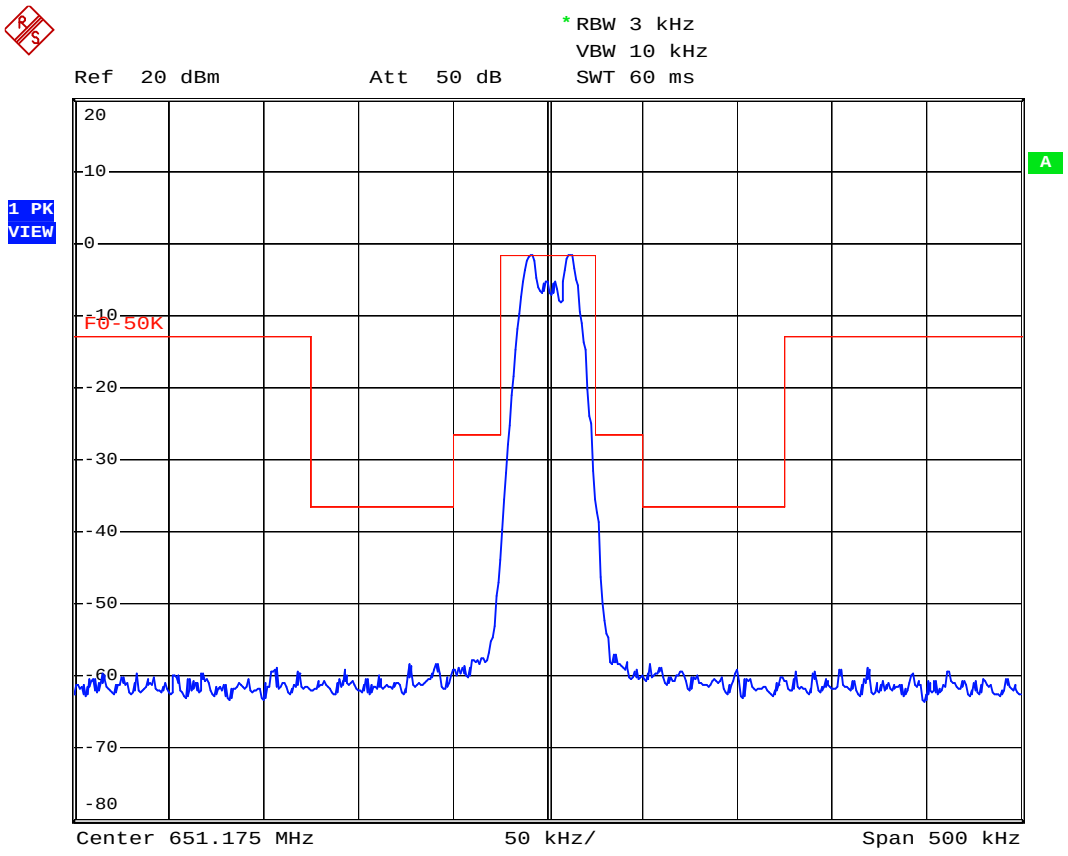
Test Mode:Mic

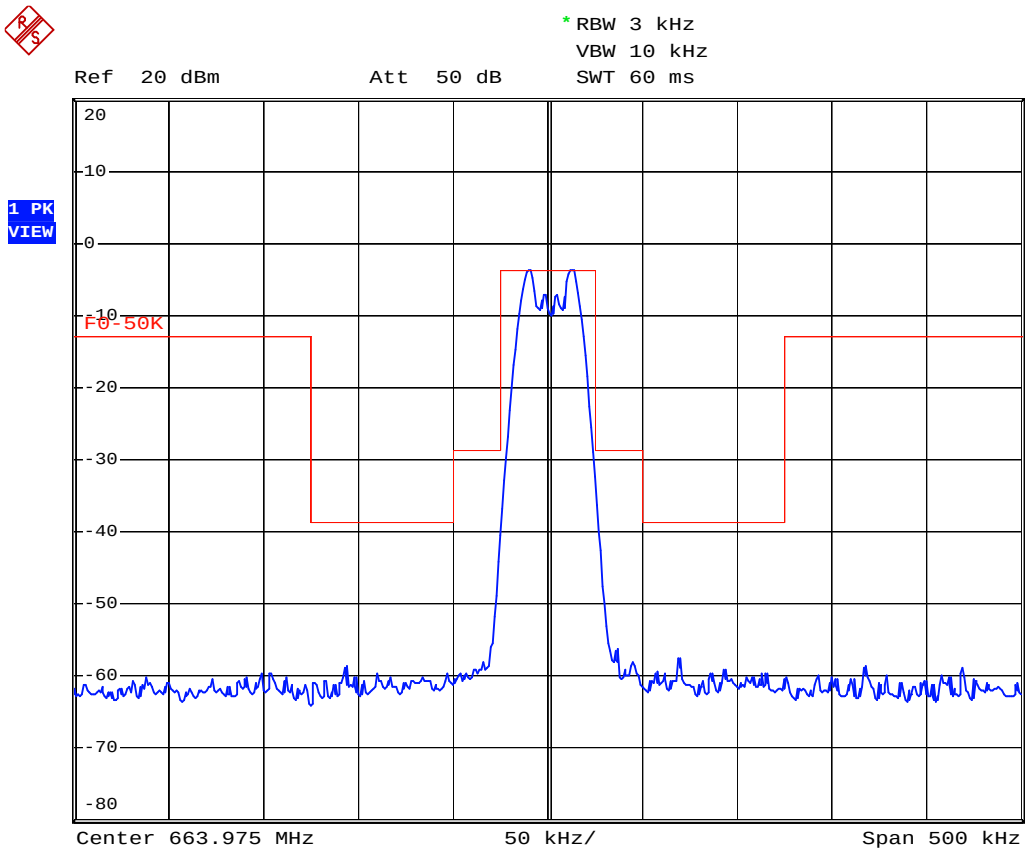



RBW 3 kHz
VBW 10 kHz
SWT 60 ms
Ref 20 dBm
Att 50 dB
1 PK
VIEW
A
F0-50K
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 590.05 MHz
50 kHz/
Span 500 kHz


RBW 3 kHz
VBW 10 kHz
SWT 60 ms
Ref 20 dBm
Att 50 dB
1 PK
VIEW
A
F0-50K
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 603.2 MHz
50 kHz/
Span 500 kHz


RBW 3 kHz
VBW 10 kHz
SWT 60 ms
Ref 20 dBm
Att 50 dB
1 PK
VIEW
A
F0-50K
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 640.025 MHz
50 kHz/
Span 500 kHz

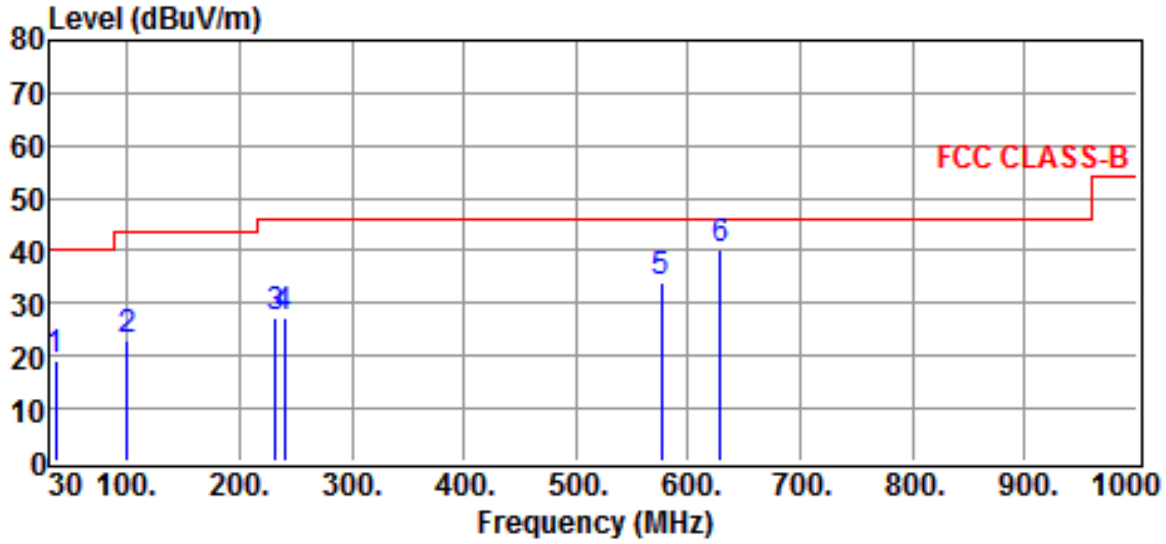

*RBW 3 kHz
VBW 10 kHz
SWT 60 ms
Ref 20 dBm
Att 50 dB
1 PK
VIEW
A
F0-50K
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 651.175 MHz
50 kHz/
Span 500 kHz


*RBW 3 kHz
VBW 10 kHz
SWT 60 ms
Ref 20 dBm
Att 50 dB
1 PK
VIEW
F0-50K
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 663.975 MHz
50 kHz/
Span 500 kHz

6.5 Other Emission

a) Emission frequencies below 1 GHz

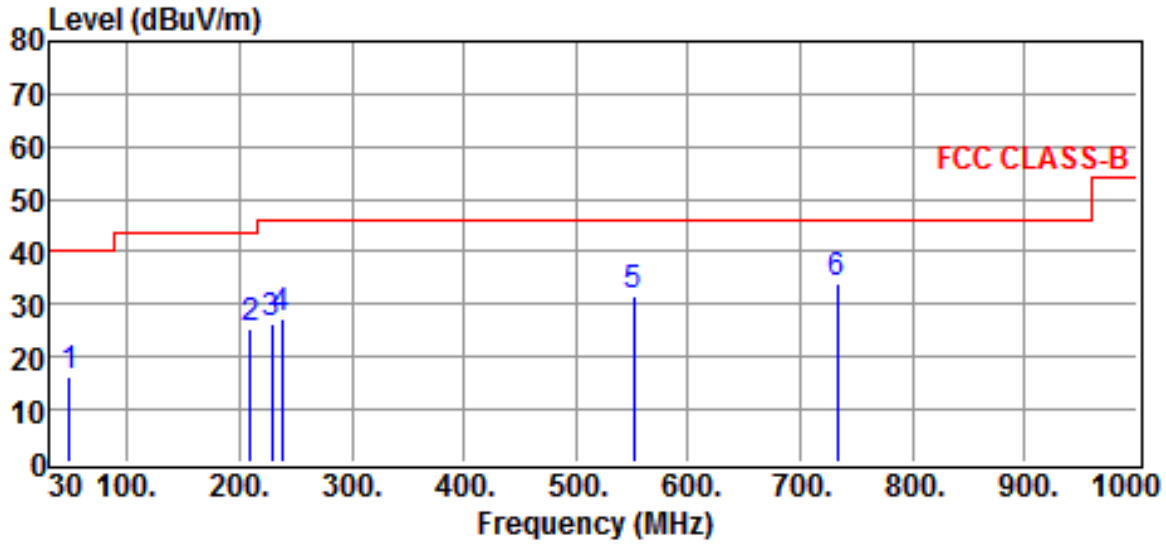
Test Date : Oct. 23, 2013 Temperature : 23 °C Humidity : 58 %



Site	:Open Site	Date	:2013-10-23
Limit	:FCC CLASS-B	Ant. Pol.	:HORIZONTAL
EUT	:Tour Guide System	Temp.	:23°C
Power Rating	:DC 1.5V	Humi.	:58%
Model	:WT-500T	Engineer.	:Jiapeng
Test Mode	:TX Other Emissions		

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
35.9600	5.2	14.0	19.2	40.0	-20.8	QP
100.1900	12.1	10.9	23.0	43.5	-20.5	QP
232.1700	8.6	18.9	27.5	46.0	-18.5	QP
240.0300	8.1	19.4	27.5	46.0	-18.5	QP
576.5000	11.1	22.8	33.9	46.0	-12.1	QP
629.0000	16.6	23.8	40.4	46.0	-5.6	QP

Note :
1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The expanded uncertainty of the radiated emission tests is 3.53 dB.
4. The margin value=Limit - Result



Site	:Open Site	Date	:2013-10-23
Limit	:FCC CLASS-B	Ant. Pol.	:VERTICAL
EUT	:Tour Guide System	Temp.	:23°C
Power Rating	:DC 1.5V	Humi.	:58%
Model	:WT-500T	Engineer.	:Jiapeng
Test Mode	:TX Other Emissions		

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
48.9700	4.1	12.1	16.2	40.0	-23.8	QP
209.6700	7.3	18.0	25.3	43.5	-18.2	QP
228.9100	7.6	18.8	26.4	46.0	-19.6	QP
237.8600	8.3	19.2	27.5	46.0	-18.5	QP
551.3000	9.4	22.3	31.7	46.0	-14.3	QP
733.3000	8.3	25.6	33.9	46.0	-12.1	QP

Note :
1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The expanded uncertainty of the radiated emission tests is 3.53 dB.
4. 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.

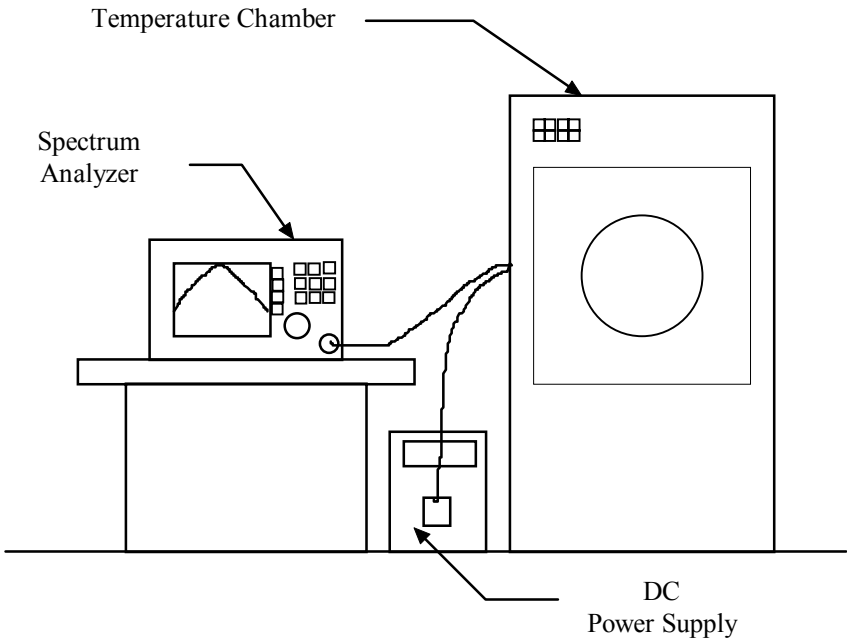
B) Frequency stability versus input voltage

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	2012/12/07	2013/12/06
Temperature Chamber	MALLIER	MCT-2X-M	2013/05/02	2014/05/01

7.4 Measurement Data

Test Date : Oct. 24, 2013 Temperature : 23 °C Humidity : 60 %

A. Tx Frequency 584.050MHz

A1. Frequency stability versus enviroment tempture

Reference Frequency :584.050 MHz		Limit：0.005%					
Enviroment	Power	Frequency measured with time elapsed					
Tempture	Supplied	2 minute		5 minute		10 minute	
(℃)	(Vdc)	(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	1.5	584.0404	-0.00164	584.0674	0.00297	584.0667	0.00285
40		584.0578	0.00134	584.0718	0.00372	584.0716	0.00370
30		584.0529	0.00049	584.0572	0.00123	584.0421	-0.00136
20		584.0425	-0.00129	584.0528	0.00047	584.0689	0.00324
10		584.0691	0.00326	584.0402	-0.00168	584.0296	-0.00349
0		584.0563	0.00108	584.0660	0.00273	584.0374	-0.00215
-10		584.0395	-0.00180	584.0648	0.00254	584.0382	-0.00203
-20		584.0440	-0.00103	584.0344	-0.00268	584.0686	0.00319
-30		584.0705	0.00351	584.0577	0.00133	584.0685	0.00316

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

Reference Frequency :584.050 MHz		Limit：0.005%					
Enviroment	Power	Frequency measured with time elapsed					
Tempture	Supplied	2 minute		5 minute		10 minute	
(℃)	(Vac)	(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
25	1.3	584.0406	-0.00161	584.0319	-0.00310	584.0458	-0.00073
25	1.7	584.0603	0.00177	584.0435	-0.00111	584.0701	0.00345

Test Date : Oct. 24, 2013 Temperature : 23 °C Humidity : 60 %

B. Tx Frequency 590.050MHz

B1. Frequency stability versus enviroment tempture

Reference Frequency :590.050 MHz		Limit：0.005%					
Enviroment Tempture (℃)	Power Supplied (Vdc)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	1.5	590.0425	-0.00127	590.0636	0.00231	590.0665	0.00280
40		590.0662	0.00275	590.0417	-0.00140	590.0675	0.00296
30		590.0457	-0.00073	590.0428	-0.00122	590.0726	0.00383
20		590.0493	-0.00012	590.0706	0.00349	590.0412	-0.00149
10		590.0502	0.00003	590.0508	0.00014	590.0639	0.00235
0		590.0596	0.00163	590.0709	0.00354	590.0411	-0.00151
-10		590.0635	0.00229	590.0296	-0.00346	590.0626	0.00214
-20		590.0396	-0.00176	590.0294	-0.00349	590.0558	0.00099
-30		590.0657	0.00266	590.0453	-0.00080	590.0347	-0.00259

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

Reference Frequency :590.050 MHz		Limit：0.005%					
Enviroment Tempture (℃)	Power Supplied (Vac)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
25	1.3	590.0282	-0.00370	590.0536	0.00061	590.0305	-0.00330
25	1.7	590.0468	-0.00055	590.0575	0.00127	590.0354	-0.00248

Test Date : Oct. 24, 2013 Temperature : 23 °C Humidity : 60 %

C. Tx Frequency 603.200MHz

C1. Frequency stability versus enviroment tempture

Reference Frequency : 603.200 MHz		Limit：0.005%					
Enviroment Tempture (℃)	Power Supplied (Vdc)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	1.5	603.1809	-0.00316	603.1863	-0.00227	603.2068	0.00112
40		603.2224	0.00371	603.2121	0.00200	603.1821	-0.00297
30		603.1797	-0.00336	603.1793	-0.00343	603.2082	0.00137
20		603.2179	0.00297	603.1785	-0.00356	603.2000	-0.00001
10		603.2118	0.00196	603.2118	0.00195	603.2103	0.00170
0		603.2207	0.00344	603.1874	-0.00208	603.1901	-0.00163
-10		603.2014	0.00023	603.1823	-0.00293	603.1847	-0.00253
-20		603.1807	-0.00320	603.1927	-0.00121	603.1875	-0.00207
-30		603.1865	-0.00224	603.2075	0.00124	603.2030	0.00050

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

Reference Frequency : 603.200 MHz		Limit：0.005%					
Enviroment Tempture (℃)	Power Supplied (Vac)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
25	1.3	603.2210	0.00348	603.2204	0.00339	603.2031	0.00052
25	1.7	603.2068	0.00112	603.1956	-0.00073	603.2136	0.00225

D. Tx Frequency 640.025MHz

D1. Frequency stability versus enviroment tempture

Reference Frequency :640.025 MHz		Limit：0.005%					
Enviroment Tempture (℃)	Power Supplied (Vdc)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	1.5	640.0263	0.00020	640.0053	-0.00308	640.0171	-0.00123
40		640.0353	0.00161	640.0399	0.00232	640.0011	-0.00373
30		640.0169	-0.00126	640.0068	-0.00284	640.0056	-0.00303
20		640.0076	-0.00272	640.0015	-0.00368	640.0275	0.00040
10		640.0078	-0.00269	640.0024	-0.00353	640.0175	-0.00118
0		640.0231	-0.00030	640.0119	-0.00205	640.0014	-0.00368
-10		640.0303	0.00083	640.0476	0.00353	640.0312	0.00097
-20		640.0430	0.00280	640.0380	0.00203	640.0488	0.00372
-30		640.0004	-0.00384	640.0194	-0.00088	640.0158	-0.00144

D2. Frequency stability versus supplied voltage (85% - 115%)

Reference Frequency :640.025 MHz		Limit：0.005%					
Enviroment Tempture (℃)	Power Supplied (Vac)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
25	1.3	640.0371	0.00189	640.0257	0.00010	640.0268	0.00029
25	1.7	640.0396	0.00228	640.0352	0.00160	640.0191	-0.00093

Test Date : Oct. 24, 2013 Temperature : 23 °C Humidity : 60 %

E. Tx Frequency 651.175MHz

E1. Frequency stability versus enviroment tempture

Reference Frequency :651.175 MHz		Limit：0.005%					
Enviroment Tempture (℃)	Power Supplied (Vdc)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	1.5	651.1940	0.00292	651.1675	-0.00116	651.1937	0.00286
40		651.1954	0.00313	651.1888	0.00212	651.1883	0.00205
30		651.1767	0.00026	651.1946	0.00300	651.1559	-0.00293
20		651.1757	0.00011	651.1705	-0.00070	651.1626	-0.00191
10		651.1601	-0.00229	651.1582	-0.00259	651.1592	-0.00243
0		651.1530	-0.00338	651.1762	0.00019	651.1630	-0.00184
-10		651.1623	-0.00194	651.1893	0.00219	651.1583	-0.00256
-20		651.1521	-0.00352	651.1853	0.00158	651.1888	0.00212
-30		651.1565	-0.00284	651.1504	-0.00378	651.1818	0.00104

E2. Frequency stability versus supplied voltage (85% - 115%)

Reference Frequency :651.175 MHz		Limit：0.005%					
Enviroment Tempture (℃)	Power Supplied (Vac)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
25	1.3	651.1619	-0.00201	651.1678	-0.00110	651.1712	-0.00058
25	1.7	651.1800	0.00077	651.1948	0.00304	651.1696	-0.00083

Test Date : Oct. 24, 2013 Temperature : 23 °C Humidity : 60 %

F. Tx Frequency 663.975MHz

F1. Frequency stability versus enviroment tempture

Reference Frequency : 663.975 MHz		Limit：0.005%					
Enviroment	Power	Frequency measured with time elapsed					
Tempture	Supplied	2 minute		5 minute		10 minute	
(℃)	(Vdc)	(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	1.5	663.9966	0.00325	663.9801	0.00077	663.9874	0.00187
40		663.9669	-0.00123	663.9972	0.00335	663.9690	-0.00090
30		663.9558	-0.00289	663.9838	0.00133	663.9764	0.00021
20		663.9918	0.00253	663.9572	-0.00267	663.9914	0.00246
10		663.9711	-0.00059	663.9782	0.00048	663.9940	0.00287
0		663.9955	0.00309	663.9720	-0.00045	663.9628	-0.00183
-10		663.9512	-0.00358	663.9776	0.00039	663.9826	0.00115
-20		663.9638	-0.00169	663.9546	-0.00307	663.9778	0.00043
-30		663.9781	0.00046	663.9735	-0.00022	663.9702	-0.00072

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

Reference Frequency : 663.975 MHz		Limit：0.005%					
Enviroment	Power	Frequency measured with time elapsed					
Tempture	Supplied	2 minute		5 minute		10 minute	
(℃)	(Vac)	(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
25	1.3	663.9895	0.00219	663.9700	-0.00075	663.9522	-0.00343
25	1.7	663.9499	-0.00377	663.9939	0.00285	663.9542	-0.00314

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.