

FCC Part 74 Subpart H

EMI TEST REPORT

of

E.U.T. : BODYPACK TRANSMITTER
FCC ID. : DLAS416LTX
Model No. : S4.16LTX
Working Frequency : 616-630 MHz

for

APPLICANT : TOA Corporation
ADDRESS : 2-1 Takamatsu-cho, Takarazuka-shi, Hyogo-ken,
665-0043, Japan

Test Performed by

ELECTRONICS TESTING CENTER (ETC) , TAIWAN
NO. 34. LIN 5. DINGFU, LINKOU DIST.,
NEW TAIPEI CITY, TAIWAN, 24442, R.O.C.
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Report Number : 11-08-RBF-172

TEST REPORT CERTIFICATION

Applicant : TOA Corporation
2-1 Takamatsu-cho, Takarazuka-shi, Hyogo-ken, 665-0043, Japan

Manufacturer : Dynatron Industrial Co., Ltd.
No. 89, Din Pin Rd. Ray Fong Industrial Area, Ray Fong Town,
Taipei Hsien, Taiwan, R.O.C.

Description of EUT :

a) Type of EUT : BODYPACK TRANSMITTER

b) Trade Name : TOA Corporation, TRANTEC

c) Model No. : S4.16LTX

d) FCC ID : DLAS416LTX

e) Working Frequency : 616~630 MHz

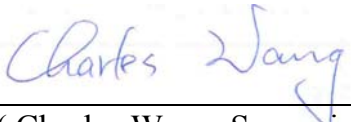
f) Power Supply : Battery DC 9V

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 found to be within the limits applicable. I assume full responsibility for accuracy and completeness of these data.

Issued Date : Nov. 11, 2011

Test Engineer : 
(Vincent Chang, Engineer)

Check By : 
(Charles Wang, Supervisor)

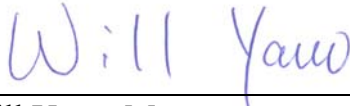
Approve & Authorized : 
Will Yauo, Manager
EMC Dept. II of ELECTRONICS
TESTING CENTER, TAIWAN

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1. GENERAL INFORMATION

1.1 Product Description

a) Type of EUT	: BODYPACK TRANSMITTER
b) Trade Name	: TOA Corporation, TRANTEC
c) Model No.	: S4.16LTX
d) FCC ID	: DLAS416LTX
e) Working Frequency	: 616~630 MHz
f) Power Supply	: Battery DC 9V
g) Emission Designator	: 126KF3E 2M+2DK=2x(46kHz)+2x(17kHz)x1=126kHz

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 Standards" 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 TSUEN, LINKOU SHIANG TAIPEI COUNTY, TAIWAN, 24442, R.O.C.

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

2. REQUIREMENTS OF PROVISIONS

2.1 Definition

Intentional radiator:

A device that intentionally generates and emits its 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 independent sideband transmitter, when modulated 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 height 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 2 : Frequencies measured below 1 GHz configuration

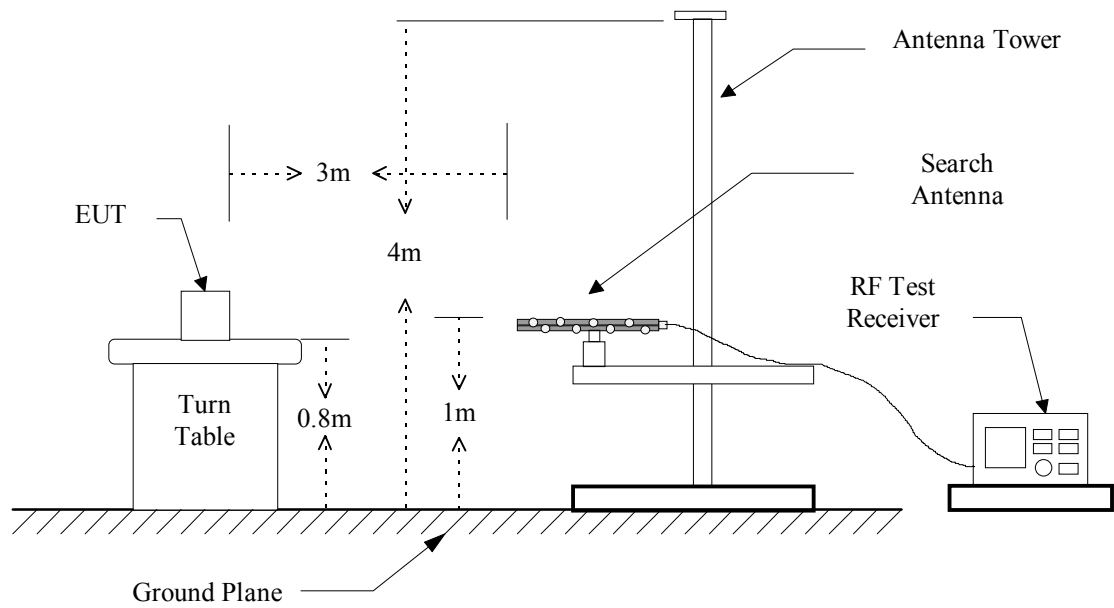
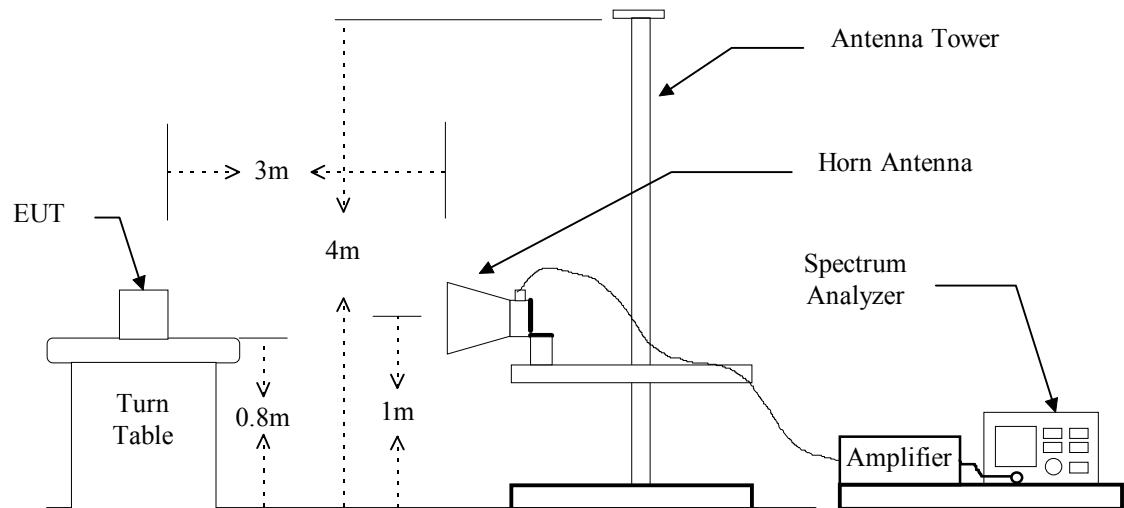


Figure 1 : Frequencies measured above 1 GHz configuration



3.3 Test Data

Band 616 – 630MHz

Operated mode : TX
 Temperature : 28 °C

Test Date : Sep. 06, 2011
 Humidity : 65 %

Frequency (MHz)	Meter Reading (dB μ V/m)	SG Reading (dBm)	Cable Loss (dB)	Antenna Gain	Result (dBm)	Output Power (mW)	Limit (mW)
616.775	75.3	4.9	2.3	----	8.1	6.457	250

Frequency (MHz)	Meter Reading (dB μ V/m)	SG Reading (dBm)	Cable Loss (dB)	Antenna Gain	Result (dBm)	Output Power (mW)	Limit (mW)
622.2	75.2	4.7	2.3	----	7.8	6.026	250

Frequency (MHz)	Meter Reading (dB μ V/m)	SG Reading (dBm)	Cable Loss (dB)	Antenna Gain	Result (dBm)	Output Power (mW)	Limit (mW)
629.950	75.8	5.1	2.3	----	8.2	6.607	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.

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

3.5 Test Equipment

Equipment	Manufacturer	Model No.	Calibration Date	Next Cal. Date
EMI Test Receiver	Rohde & Schwarz	ESCI	2011/05/09	2012/05/07
Dipole Antenna	Schwarzbeck	897;898	2011/09/03	2012/09/02
Log-periodic Antenna	EMCO	3146	2010/10/11	2011/10/10
Amplifier HP		8447D	2011/05/27	2012/05/25
Signal generator	HP	8656B	2010/12/09	2011/12/08

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

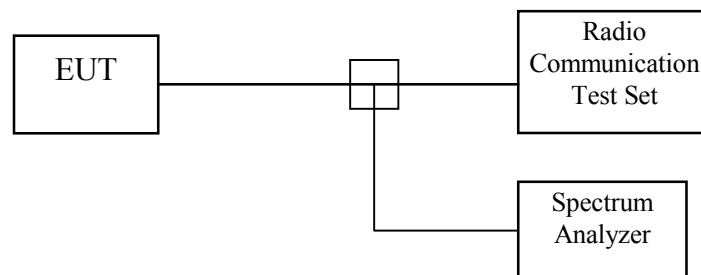
A) Modulation Limit

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

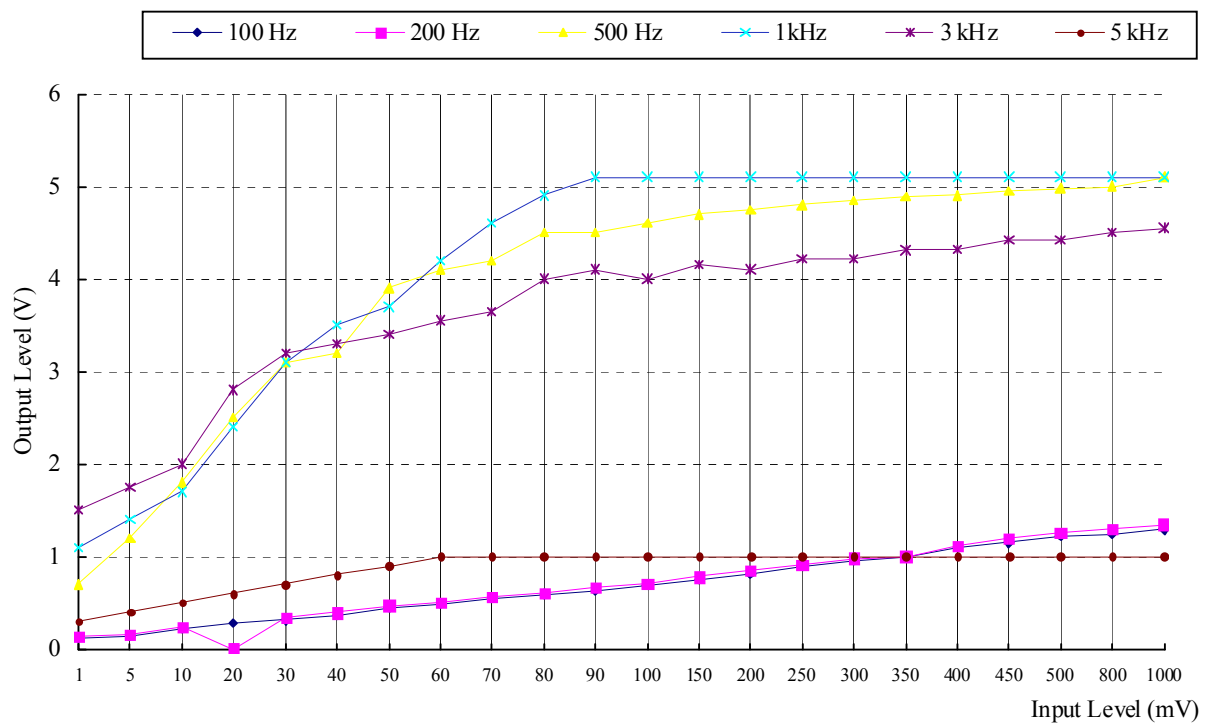
Equipment	Manufacturer	Model No.	Calibration Date	Next Cal. Date
Communications Service Monitor	AEROFLEX 2945B		2010/12/10	2011/12/09
Spectrum Analyzer	Rohde & Schwarz	FSP40	2010/09/17	2011/09/16

4.4 Measurement Result

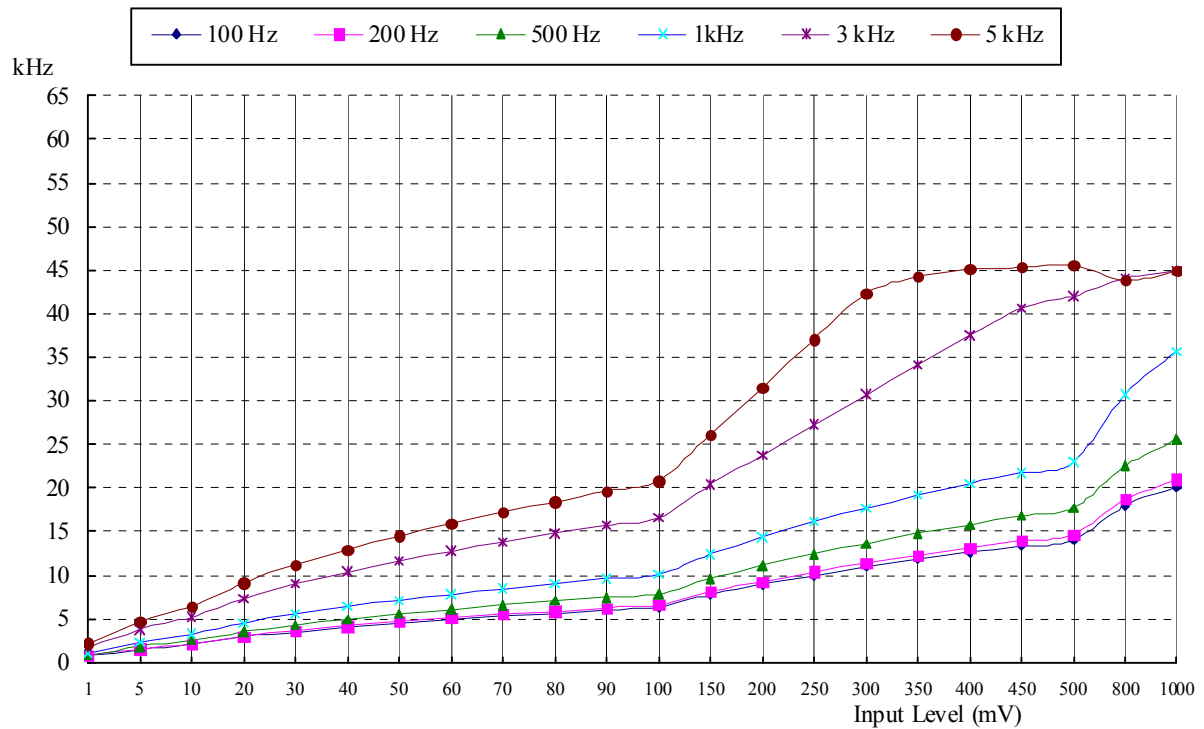
1. RF Frequency : 616.775MHz;

Test Date : Sep. 08, 2011Temperature : 26 °C Humidity : 60 %

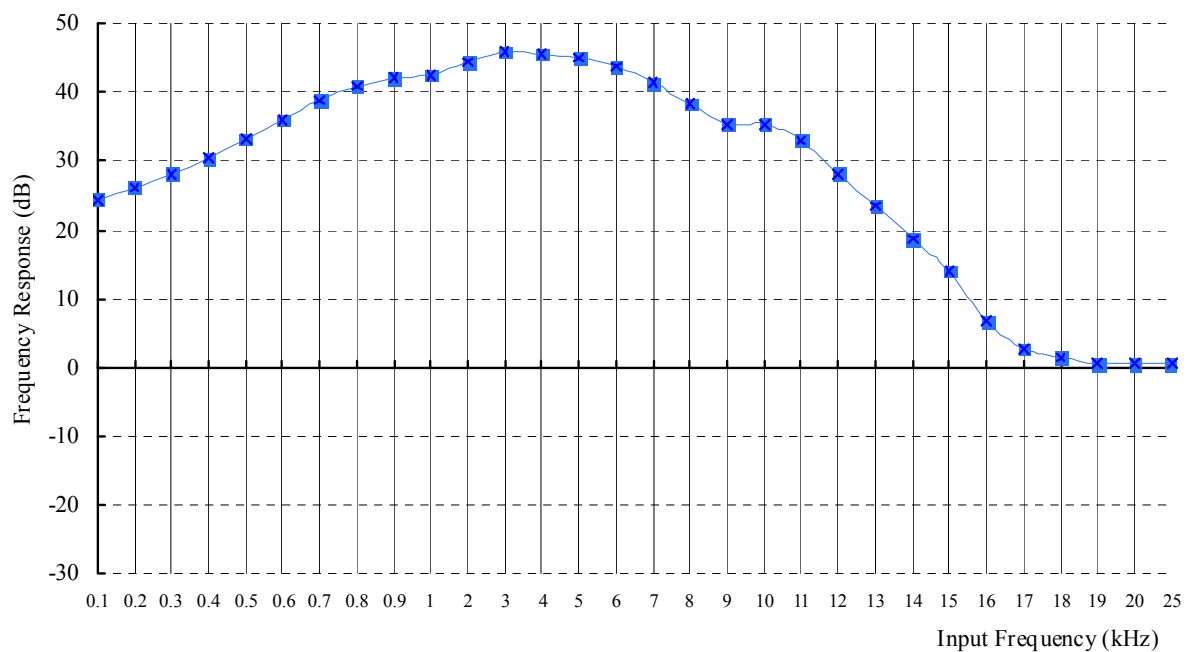
A). Frequency response



B). Modulation Limit



C). Frequency response of all circuits



5. OCCUPIED BANDWIDTH OF EMISSION

5.1 Provisions Applicable

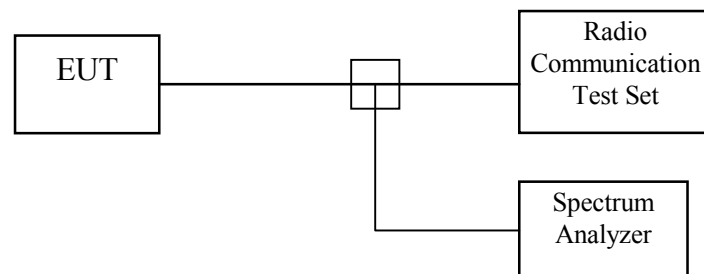
According to §2.1049 (c)(1), For radiotelephone transmitter, other than single sideband or independent sideband transmitter, when modulated by a 2.5kHz tone at an input level 16 dB greater than that necessary to produce 50 percent modulation.

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 and 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		2010/12/10	2011/12/09
Spectrum Analyzer	Rohde & Schwarz	FSP40	2010/09/17	2011/09/16

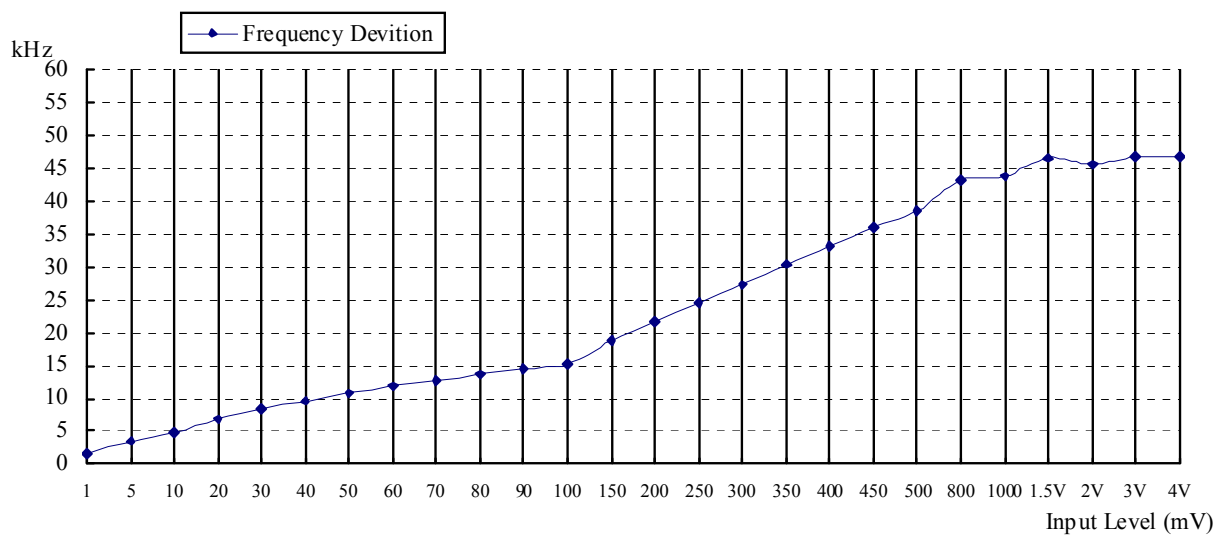
5.4 Bandwidth Measured

5.4.1 Input Level Derived

1. RF Frequency : 616.775MHz;

Test Date : Sep. 08, 2011Temperature : 26 °C Humidity : 60 %

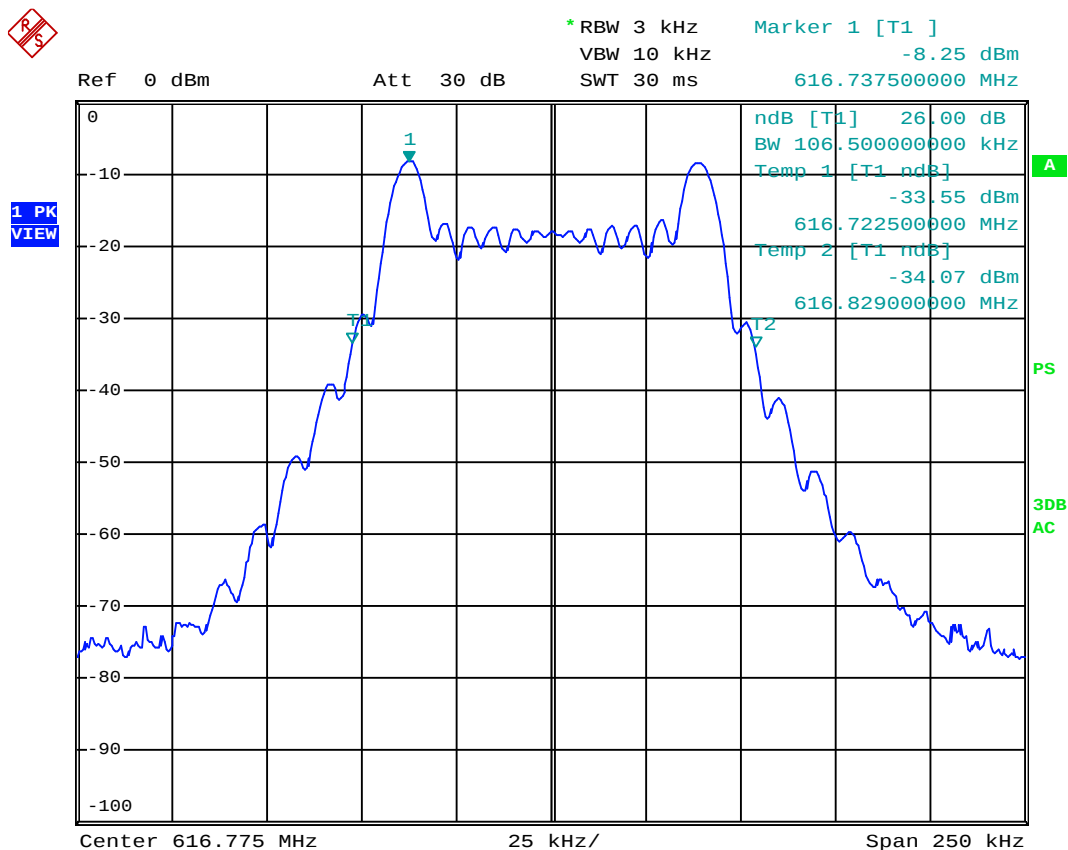
Input Audio Frequency : 2.5 kHz, Sine Wave

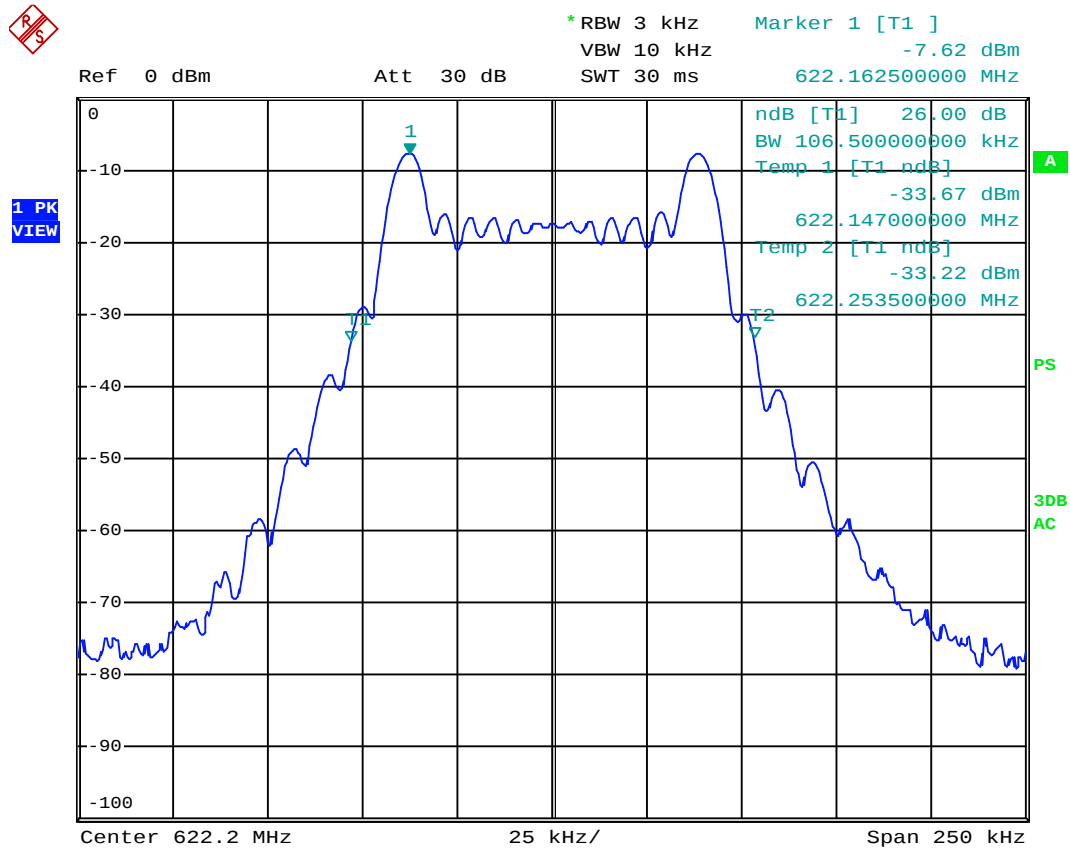


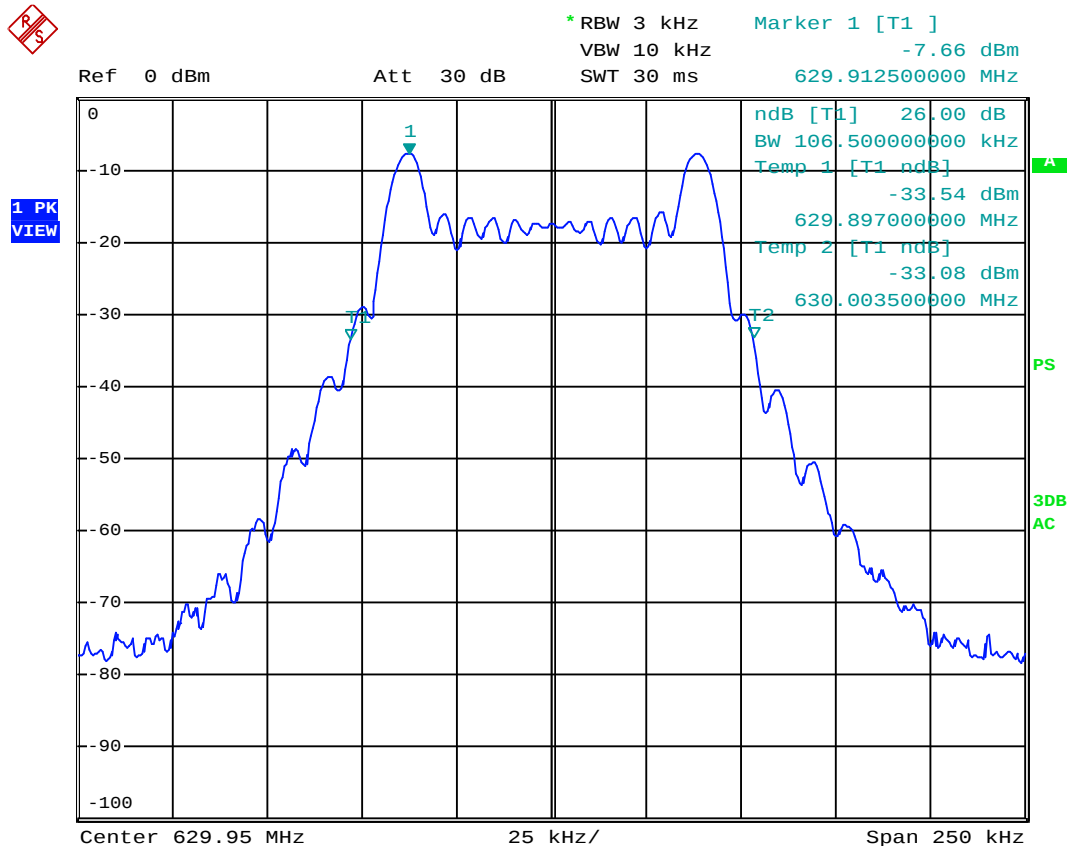
The Level input to produce 50 % modulation is 250 m V, therefore the magnitude 16 dB greater than it is 1577 mV.

5.4.2 Occupied Bandwidth PlottedTest Date : Sep. 08, 2011Temperature : 26 °C Humidity : 60 %

RF Frequency (MHz)	26 dB Bandwidth (kHz)
616.775 106.5	
622.200 106.5	
629.950 106.5	







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 half wave 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 following schedule:

- (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 height 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	2010/09/17	2011/09/16
Double Ridged Antenna	EMCO	3115	2011/05/30	2012/05/28
Double Ridged Antenna	EMCO	3115	2011/05/30	2012/05/28
Log-periodic Antenna	EMCO	3146	2010/10/11	2011/10/10
Biconical Antenna	EMCO	3110	2010/10/11	2011/10/10
Dipole Antenna	Schwarzbeck	897;898	2011/09/03	2012/09/02
Amplifier HP		8449B	2010/12/29	2011/12/28
Amplifier HP		8447D	2011/05/27	2012/05/25
Signal generator	HP	8656B	2010/12/09	2011/12/08

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: 616.775MHz

Operated mode : TX

Test Date : Sep. 06, 2011

Temperature : 28 °C

Humidity : 65 %

Unmodulated carrier output power is 8.1 dBm , or 6.457 mW (ERP).

The limit of spurious or harmonics is calculated as following :

$$8.1 - [43 + 10 \log(\text{carrier output power in W})], \text{ or } -13 \text{ dBm}$$

Frequency (MHz)	Meter Reading (dBuV)		SG Reading (dBm)		Antenna Gain	Antenna Gain Corr'	Cable Loss (dB)	Result (dBm)		Limit (dBm)	Margin (dB)
	H	V	H	V				H	V		
1233.550	---	---	---	---	6.4	-2.0	1.30	---	---	-13.0	---
1850.325	---	---	---	---	9.3	-2.0	1.75	---	---	-13.0	---
2467.100	---	---	---	---	9.2	-2.0	1.75	---	---	-13.0	---
3083.875	---	---	---	---	9.7	-2.0	1.75	---	---	-13.0	---
3700.650	---	---	---	---	9.6	-2.0	2.10	---	---	-13.0	---
4317.425	---	---	---	---	10.6	-2.0	2.10	---	---	-13.0	---
4934.200	---	---	---	---	10.9	-2.0	2.10	---	---	-13.0	---
5550.975	---	---	---	---	10.9	-2.0	2.60	---	---	-13.0	---
6167.750	---	---	---	---	12.1	-2.0	2.60	---	---	-13.0	---

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 :

$$\text{Result} = \text{SG Reading} + \text{Cable Loss} + \text{Antenna Gain} + \text{Antenna Gain Corrected}$$

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: 622.2MHz

Operated mode : TX
Temperature : 28 °C

Test Date : Sep. 06, 2011
Humidity : 65 %

Unmodulated carrier output power is 7.8 dBm , or 6.026 mW (ERP).

The limit of spurious or harmonics is calculated as following :

$$7.8 - [43 + 10 \log(\text{carrier output power in W})], \text{ or } -13 \text{ dBm}$$

Frequency (MHz)	Meter Reading (dBuV)		SG Reading (dBm)		Antenna Gain	Antenna Gain Corr'	Cable Loss (dB)	Result (dBm)		Limit (dBm)	Margin (dB)
	H	V	H	V				H	V		
1244.400	---	---	---	---	6.4	-2.0	1.30	---	---	-13.0	---
1866.600	---	---	---	---	9.3	-2.0	1.75	---	---	-13.0	---
2488.800	---	---	---	---	9.2	-2.0	1.75	---	---	-13.0	---
3111.000	---	---	---	---	9.7	-2.0	1.75	---	---	-13.0	---
3733.200	---	---	---	---	9.6	-2.0	2.10	---	---	-13.0	---
4355.400	---	---	---	---	10.6	-2.0	2.10	---	---	-13.0	---
4977.600	---	---	---	---	10.9	-2.0	2.10	---	---	-13.0	---
5599.800	---	---	---	---	10.9	-2.0	2.60	---	---	-13.0	---
6222.000	---	---	---	---	12.1	-2.0	2.60	---	---	-13.0	---

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 :

$$\text{Result} = \text{SG Reading} + \text{Cable Loss} + \text{Antenna Gain} + \text{Antenna Gain Corrected}$$

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: 629.950MHz

Operated mode : TX
 Temperature : 28 °C

Test Date : Sep. 06, 2011
 Humidity : 65 %

Unmodulated carrier output power is 8.2 dBm , or 6.607 mW (ERP).

The limit of spurious or harmonics is calculated as following :

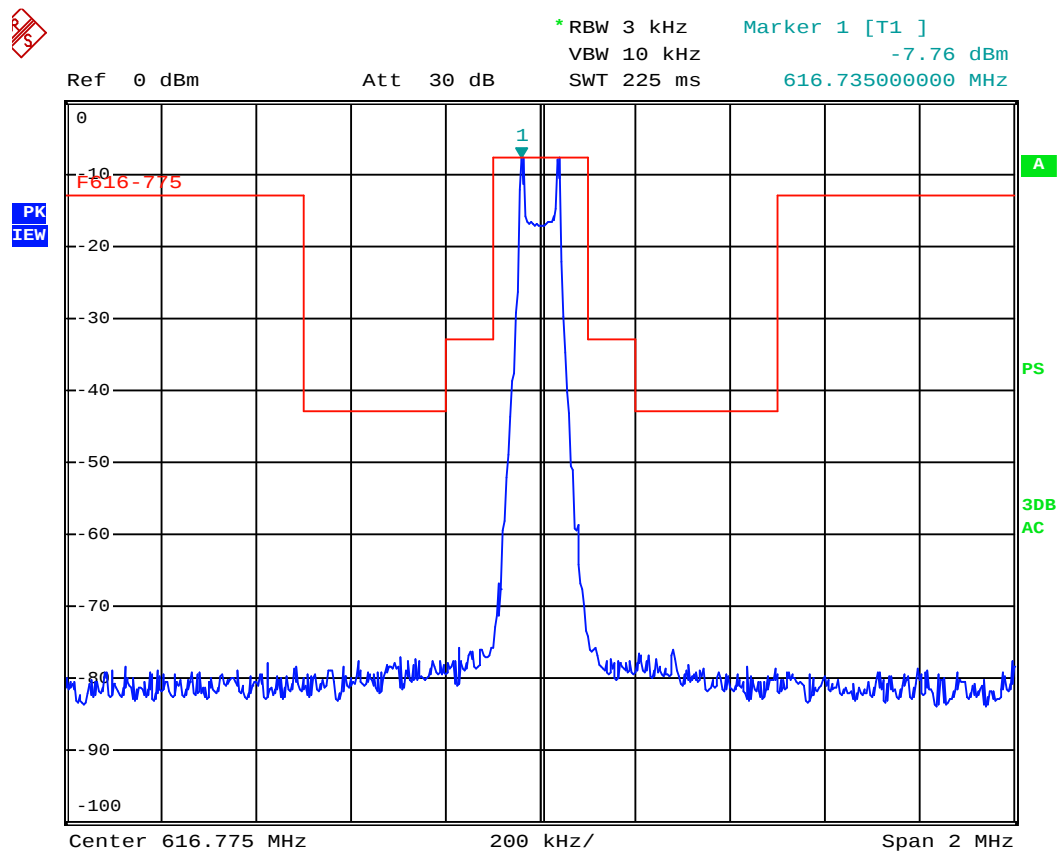
$$8.2-[43+10\log(\text{carrier output power in W})], \text{ or } -13\text{dBm}$$

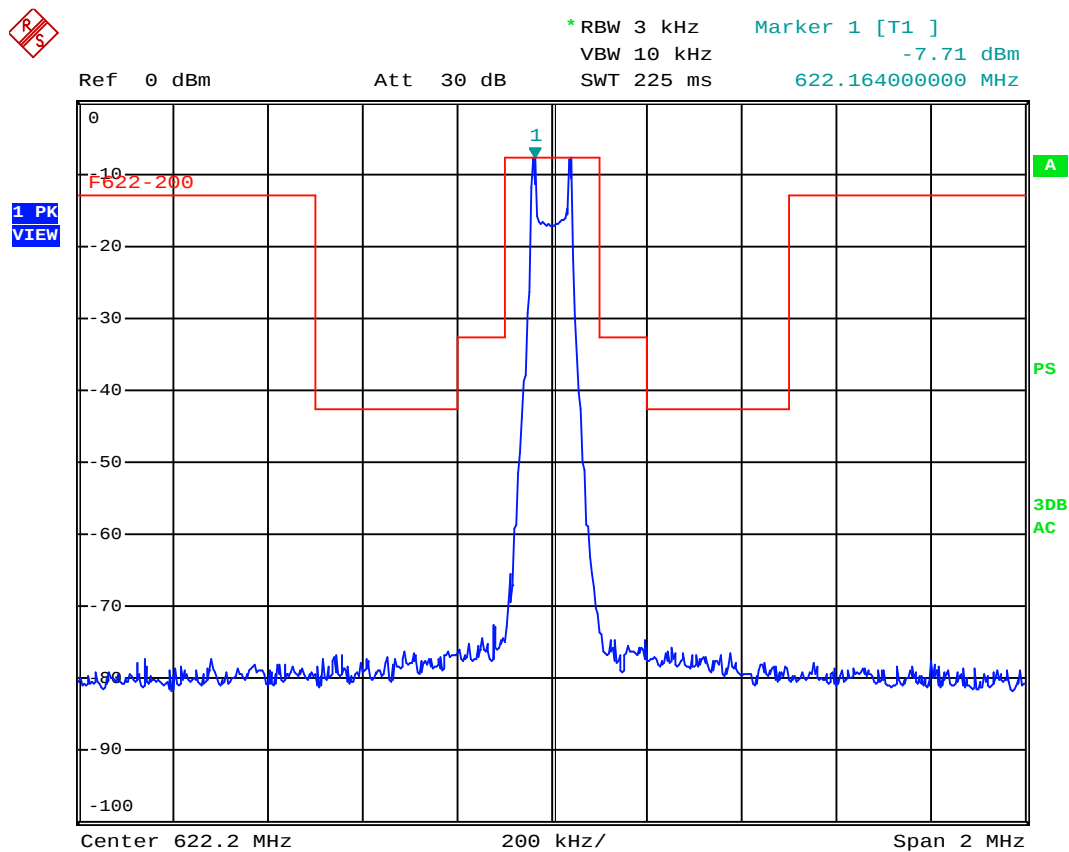
Frequency (MHz)	Meter Reading (dBuV)		SG Reading (dBm)		Antenna Gain	Antenna Gain Corr'	Cable Loss (dB)	Result (dBm)		Limit (dBm)	Margin (dB)
	H	V	H	V				H	V		
1259.900	---	---			6.4	-2.0	1.30	---	---	-13.0	---
1889.850	---	---			9.3	-2.0	1.75	---	---	-13.0	---
2519.800	---	---			9.2	-2.0	1.75	---	---	-13.0	---
3149.750	---	---			9.7	-2.0	1.75	---	---	-13.0	---
3779.700	---	---			9.6	-2.0	2.10	---	---	-13.0	---
4409.650	---	---			10.6	-2.0	2.10	---	---	-13.0	---
5039.600	---	---			10.9	-2.0	2.10	---	---	-13.0	---
5669.550	---	---			10.9	-2.0	2.60	---	---	-13.0	---
6299.500	---	---			12.1	-2.0	2.60	---	---	-13.0	---

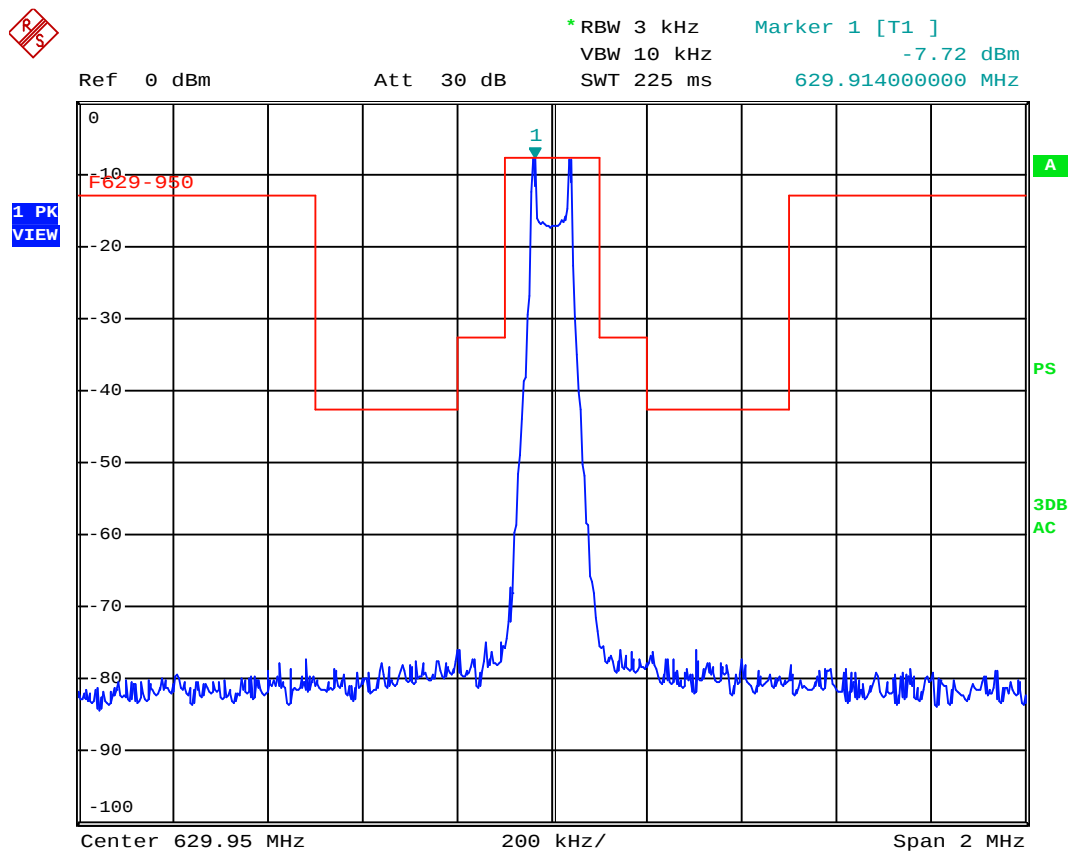
Note :

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.
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







6.5 Other Emission

a) Emission frequencies below 1 GHz

Test Date : Sep. 06, 2011

Temperature : 28 °C Hum

idity : 65 %

Frequency (MHz)	Ant-Pol H/V	Meter Reading (dBuV)	Corrected Factor (dB)	Result @3m (dBuV/m)	Limit @3m (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (m)
40.18	V	5.6	12.5	18.1	40.0	-21.9	175	1.0
118.62	V	7.3	12.8	20.1	43.5	-23.4	182	1.0
182.92	V	4.1	16.7	20.8	43.5	-22.7	180	1.0
194.77	V	3.4	18.1	21.5	43.5	-22.0	179	1.0
241.11	V	2.9	19.8	22.7	46.0	-23.3	177	1.0
262.34	V	3.9	21.0	24.9	46.0	-21.1	178	1.0

Note :

1. Remark “---” means that the emissions level is too low to be measured.
2. The expanded uncertainty of the radiated emission tests is 3.53 dB.

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°C to +50°C 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

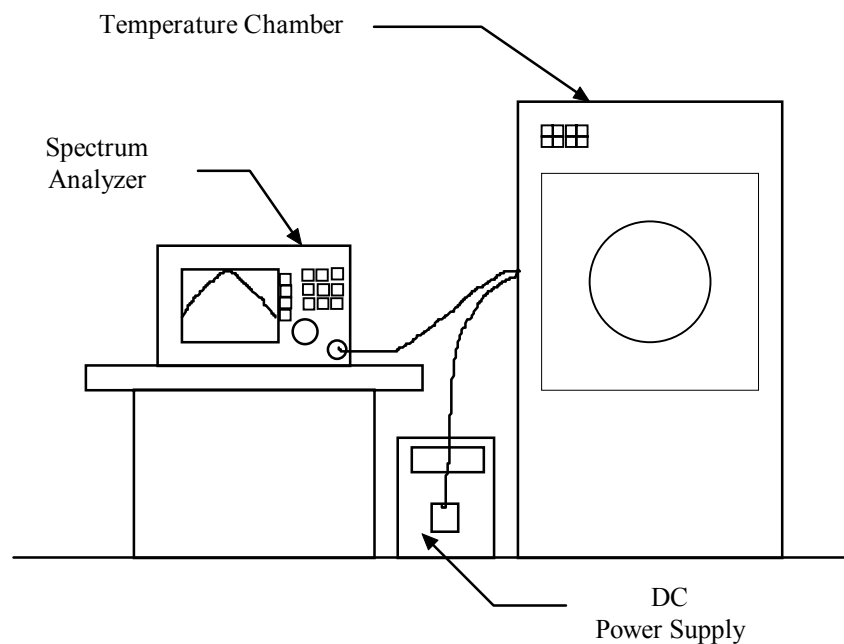
1. Setup the configuration per figure 5 for frequencies measured at ambient temperature if it is within 15°C to 25°C. Otherwise, an environmental chamber set for a temperature of 20°C shall be used.
2. Turn on EUT and set SA center frequency to the right frequency needs to be measured. Then set SA RBW 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°C. 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 °C decreased per stage until the lowest temperature -30 °C 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°C to 25°C. Otherwise, an environmental chamber set for a temperature of 20°C 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	2010/09/17	2011/09/16
Temperature Chamber	MALLIER	MCT-2X-M	2010/12/28	2011/12/27

7.4 Measurement DataTest Date : Sep. 08, 2011Temperature : 26 °C Humidity : 60 %**A. Tx Frequency 616.775MHz****A1. Frequency stability versus enviroment tempture**

Reference Frequency :616.775 MHz		Limit : 0.005%					
Enviroment Tempture (°C)	Power Supplied (Vdc)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	9Vdc (New Batt.)	616.7741	-0.00014	616.7621	-0.00209	616.7751	0.00002
40		616.7740	-0.00016	616.7873	0.00199	616.7517	-0.00378
30		616.7966	0.00351	616.7589	-0.00261	616.7518	-0.00376
20		616.7979	0.00371	616.7940	0.00308	616.7916	0.00270
10		616.7630	-0.00194	616.7704	-0.00074	616.7549	-0.00325
0		616.7798	0.00078	616.7891	0.00228	616.7782	0.00052
-10		616.7706	-0.00071	616.7872	0.00198	616.7717	-0.00053
-20		616.7733	-0.00028	616.7696	-0.00087	616.7627	-0.00200
-30		616.7829	0.00129	616.7856	0.00171	616.7602	-0.00240

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

Reference Frequency : 616.775 MHz		Limit : 0.005%					
Enviroment Tempture (°C)	Power Supplied (Vac)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
25	9	616.7718	-0.00052	616.7773	0.00037	616.7924	0.00282
25	9	616.7560	-0.00309	616.7612	-0.00223	616.7844	0.00153

Test Date : Sep. 08, 2011Temperature : 26 °C Humidity : 60 %**B. Tx Frequency 622.200MHz****B1. Frequency stability versus enviroment tempture**

Reference Frequency : 622.2 MHz		Limit : 0.005%					
Enviroment Tempture (°C)	Power Supplied (Vdc)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	9Vdc (New Batt.)	622.1798	-0.00325	622.1913	-0.00140	622.2112	0.00180
40		622.1884	-0.00186	622.2068	0.00109	622.1833	-0.00269
30		622.1813	-0.00301	622.2048	0.00077	622.1895	-0.00169
20		622.2158	0.00254	622.1991	-0.00015	622.1787	-0.00343
10		622.1962	-0.00062	622.2156	0.00250	622.2002	0.00003
0		622.1902	-0.00158	622.2076	0.00122	622.1919	-0.00130
-10		622.1823	-0.00285	622.1922	-0.00125	622.2113	0.00181
-20		622.1940	-0.00096	622.2230	0.00369	622.1998	-0.00002
-30		622.1861	-0.00223	622.1869	-0.00210	622.1964	-0.00057

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

Reference Frequency : 622.2 MHz		Limit : 0.005%					
Enviroment Tempture (°C)	Power Supplied (Vdc)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
25	9	622.2113	0.00181	622.2035	0.00057	622.2034	0.00055
25	9	622.2196	0.00314	622.2026	0.00042	622.1770	-0.00370

Test Date : Sep. 08, 2011Temperature : 26 °C Humidity : 60 %**C. Tx Frequency 629.950MHz****C1. Frequency stability versus enviroment tempture**

Reference Frequency : 629.950 MHz		Limit : 0.005%					
Enviroment Tempture (°C)	Power Supplied (Vdc)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	9Vdc (New Batt.)	629.9378	-0.00193	629.9502	0.00003	629.9416	-0.00134
40		629.9478	-0.00035	629.9542	0.00066	629.9539	0.00061
30		629.9601	0.00160	629.9547	0.00075	629.9397	-0.00163
20		629.9616	0.00184	629.9661	0.00256	629.9583	0.00132
10		629.9502	0.00003	629.9702	0.00321	629.9510	0.00015
0		629.9347	-0.00242	629.9258	-0.00384	629.9368	-0.00210
-10		629.9281	-0.00348	629.9311	-0.00301	629.9592	0.00146
-20		629.9512	0.00019	629.9739	0.00379	629.9681	0.00287
-30		629.9295	-0.00326	629.9572	0.00115	629.9455	-0.00071

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

Reference Frequency : 629.950 MHz		Limit : 0.005%					
Enviroment Tempture (°C)	Power Supplied (Vdc)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
25	9	629.9399	-0.00161	629.9362	-0.00219	629.9264	-0.00375
25	9	629.9398	-0.00161	629.9570	0.00112	629.9460	-0.00063

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.