# *FCC Part 74 Subpart H*
# *EMI TEST REPORT*

*of*

E.U.T. : Wireless Bodypack Transmitter
FCC ID. : NTMEJ5T
Model No. : EJ-5T
Working Frequency : 514~544 MHz, 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 : 15-05-RBF-002-01

# TEST REPORT CERTIFICATION

| | | |
|---|---|---|
| Applicant | : | OKAYO ELECTRONICS CO., LTD.<br>No.2, Gongye 10th Rd., Dali Dist., Taichung 41280, Taiwan |
| Manufacturer | : | OKAYO ELECTRONICS CO., LTD.<br>No.2, Gongye 10th Rd., Dali Dist., Taichung 41280, Taiwan |
| Description of EUT | : | |
| a) Type of EUT | : | Wireless Bodypack Transmitter |
| b) Trade Name | : | OKAYO |
| c) Model No. | : | EJ-5T |
| d) FCC ID | : | NTMEJ5T |
| e) Working Frequency | : | 514~544 MHz, 640~664 MHz |
| f) Power Supply | : | 3.7 V Li-ion rechargeable battery /<br>AC/DC Power Adapter; Model: ATS005-W050U<br>I/P: AC100~240V, 50-60Hz, 0.19A MAX<br>O/P: DC5.0V, 1.0A, 5.00W MAX |

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 C63.10-2009 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 : Jun. 18, 2015

Test Engineer : Vincent Chang

(Vincent Chang , 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 | : | Wireless Bodypack Transmitter |
| b) Trade Name | : | OKAYO |
| c) Model No. | : | EJ-5T |
| d) FCC ID | : | NTMEJ5T |
| e) Working Frequency | : | 514~544 MHz, 640~664 MHz |
| f) Power Supply | : | 3.7 V Li-ion rechargeable battery /<br>AC/DC Power Adapter; Model: ATS005-W050U<br>I/P: AC100~240V, 50-60Hz, 0.19A MAX<br>O/P: DC5.0V, 1.0A, 5.00W MAX |
| g) Emission Designator | : | 102KF3E<br>2M+2DK=2x(5kHz)+2x(46kHz)x1=102kHz |

## 1.2 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.10-2009. 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 is FCC 2.948 listed and accepted in a letter dated Jan. 29, 2014.

Registration Number: 90589

# 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

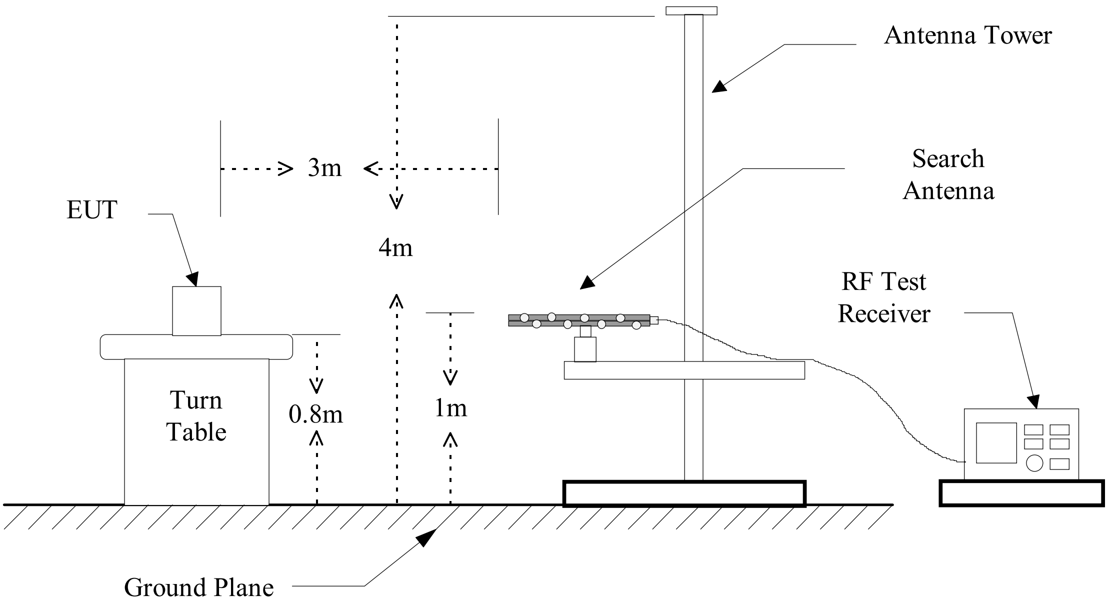
## 3.1 Provision Applicable

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

## 3.2 Measurement Procedure

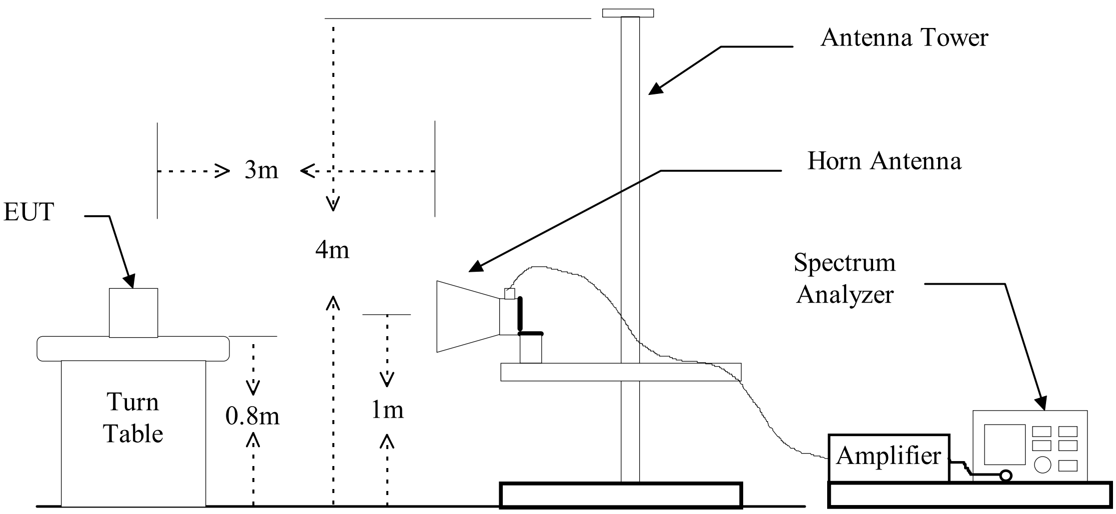
1. Setup the configuration per figure 1 and 2 for frequencies measured below and above 1 GHz respectively, adjusting the input voltage to produce the maximum power.
2. Adjust the analyzer for each frequency measured in chapter 6 on a 1 MHz frequency span and 1MHz resolution bandwidth.
3. The search antenna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

Operated mode : TX Test Date : May 22, 2015
Temperature : 25 °C Humidity : 68 %

| Frequency (MHz) | Meter Reading (dBμV/m) | SG Reading (dBm) | Cable Loss (dB) | Antenna Gain | Result (dBm) | Output Power (mW) | Limit (mW) |
|---|---|---|---|---|---|---|---|
| 514.100 | 83.70 | 10.90 | 2.0 | ---- | 8.90 | 7.762 | 250.0 |

| Frequency (MHz) | Meter Reading (dBμV/m) | SG Reading (dBm) | Cable Loss (dB) | Antenna Gain | Result (dBm) | Output Power (mW) | Limit (mW) |
|---|---|---|---|---|---|---|---|
| 529.000 | 84.30 | 11.50 | 2.0 | ---- | 9.50 | 8.913 | 250.0 |

| Frequency (MHz) | Meter Reading (dBμV/m) | SG Reading (dBm) | Cable Loss (dB) | Antenna Gain | Result (dBm) | Output Power (mW) | Limit (mW) |
|---|---|---|---|---|---|---|---|
| 543.900 | 83.90 | 11.30 | 2.0 | ---- | 9.30 | 8.511 | 250.0 |

| Frequency (MHz) | Meter Reading (dBμV/m) | SG Reading (dBm) | Cable Loss (dB) | Antenna Gain | Result (dBm) | Output Power (mW) | Limit (mW) |
|---|---|---|---|---|---|---|---|
| 640.100 | 82.50 | 11.40 | 2.4 | ---- | 9.00 | 7.943 | 250.0 |

| Frequency (MHz) | Meter Reading (dBμV/m) | SG Reading (dBm) | Cable Loss (dB) | Antenna Gain | Result (dBm) | Output Power (mW) | Limit (mW) |
|---|---|---|---|---|---|---|---|
| 652.100 | 83.10 | 11.70 | 2.4 | ---- | 9.30 | 8.511 | 250.0 |

| Frequency (MHz) | Meter Reading (dBμV/m) | SG Reading (dBm) | Cable Loss (dB) | Antenna Gain | Result (dBm) | Output Power (mW) | Limit (mW) |
|---|---|---|---|---|---|---|---|
| 663.900 | 82.30 | 11.70 | 2.3 | ---- | 9.40 | 8.710 | 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.

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

## 3.5 Test Equipment

| Equipment | Manufacturer | Model No. | Calibration Date | Next Cal. Date |
|---|---|---|---|---|
| EMI Test Receiver | Rohde & Schwarz | ESL | 2014/09/26 | 2015/09/25 |
| Biconical Antenna | EMCO | 3110 | 2014/11/04 | 2015/11/03 |
| Log-periodic Antenna | EMCO | 3146 | 2014/11/04 | 2015/11/03 |
| Amplifier | HP | 8447D | 2014/05/29 | 2015/05/28 |
| Signal generator | HP | 83732B | 2014/10/16 | 2015/10/15 |

# 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.

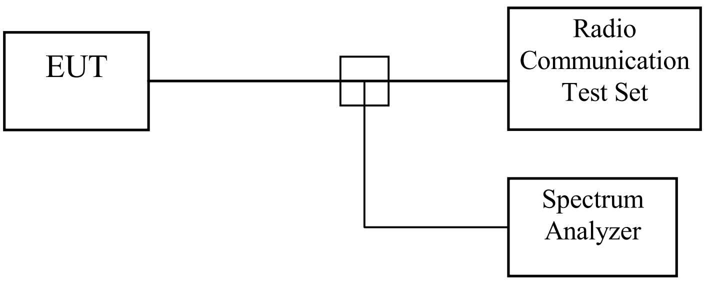
2. Repeat step 1 with changing the input frequency for 200, 500, 1000, 3000, and 5000 Hz in sequence.

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

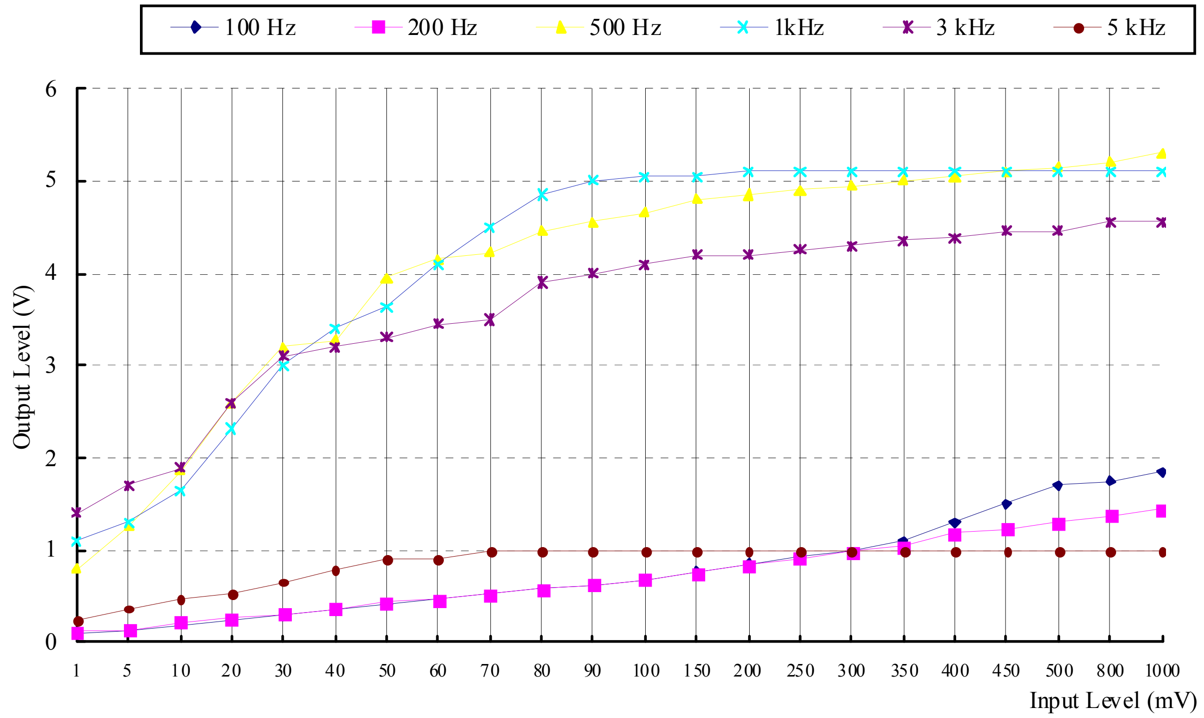
| Equipment | Manufacturer | Model No. | Calibration Date | Next Cal. Date |
|---|---|---|---|---|
| Communications Service Monitor | AEROFLEX | 2945B | 2014/08/12 | 2015/08/11 |
| EMI Test Receiver | Rohde & Schwarz | ESU 40 | 2014/08/15 | 2015/08/14 |

## 4.4 Measurement Result

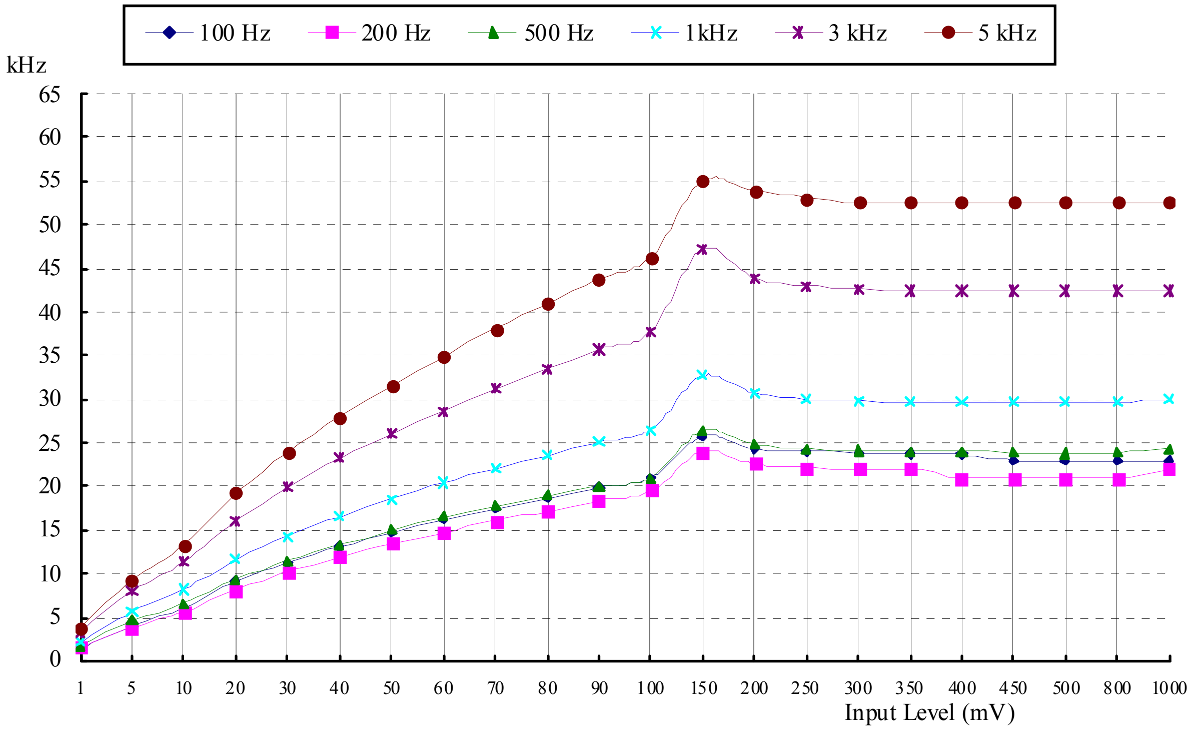
**RF Frequency : 514.100MHz**

Test Date : May 22, 2015 Temperature : 25 °C Humidity : 68 %

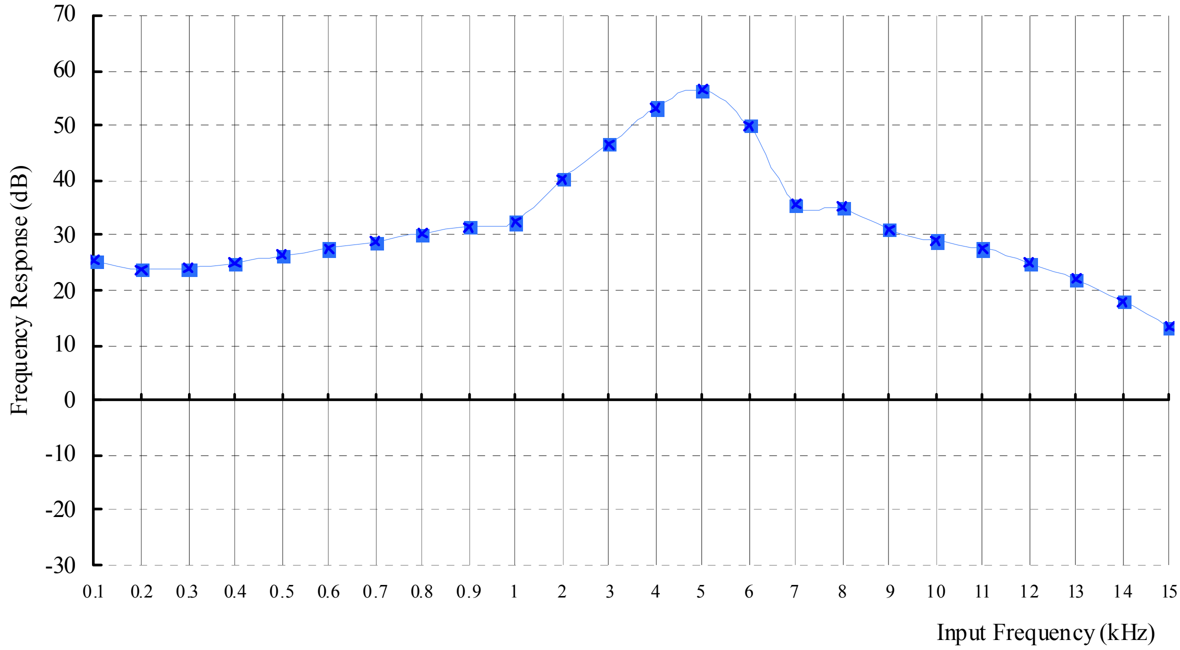
A). Frequency response
Mode : MIC IN




B). Modulation Limit
Mode : MIC IN



C). Frequency response of all circuits
Mode : MIC IN



# 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.

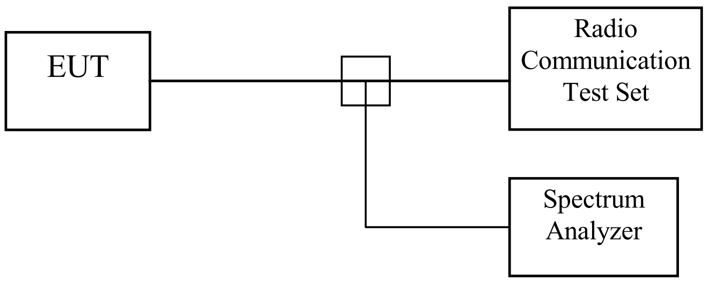
## 5.2 Measurement Method

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 | 2014/08/12 | 2015/08/11 |
| EMI Test Receiver | Rohde & Schwarz | ESU 40 | 2014/08/15 | 2015/08/14 |

## 5.4 Bandwidth Measured

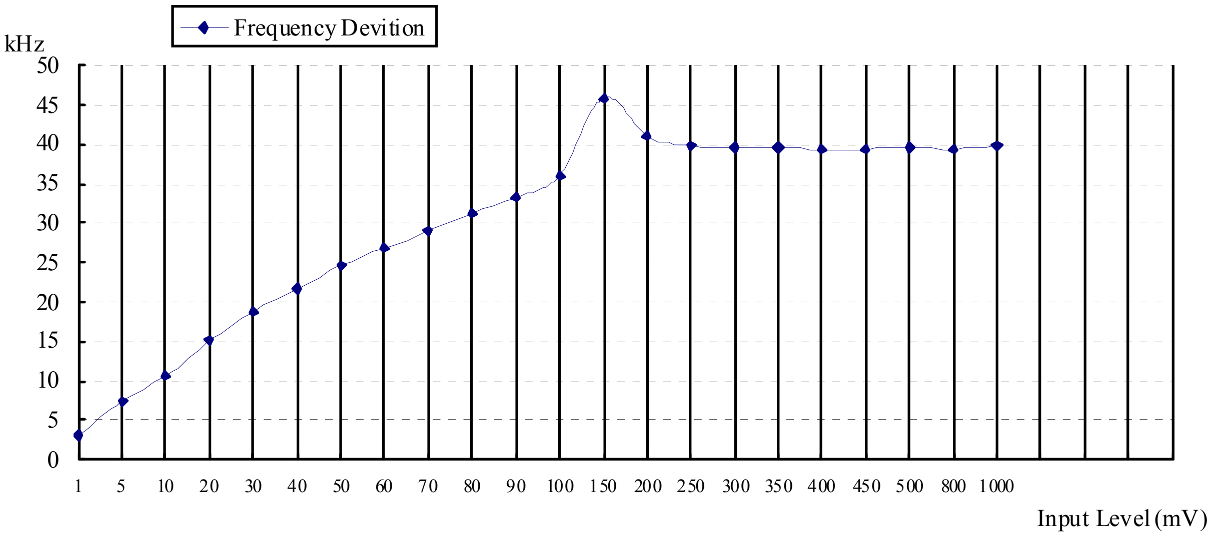
### 5.4.1 Input Level Derived

**RF Frequency : 514.100MHz**

Test Date : May 22, 2015 Temperature : 25 °C Humidity : 68 %

Input Audio Frequency : 2.5 kHz, Sine Wave

Mode : MIC IN

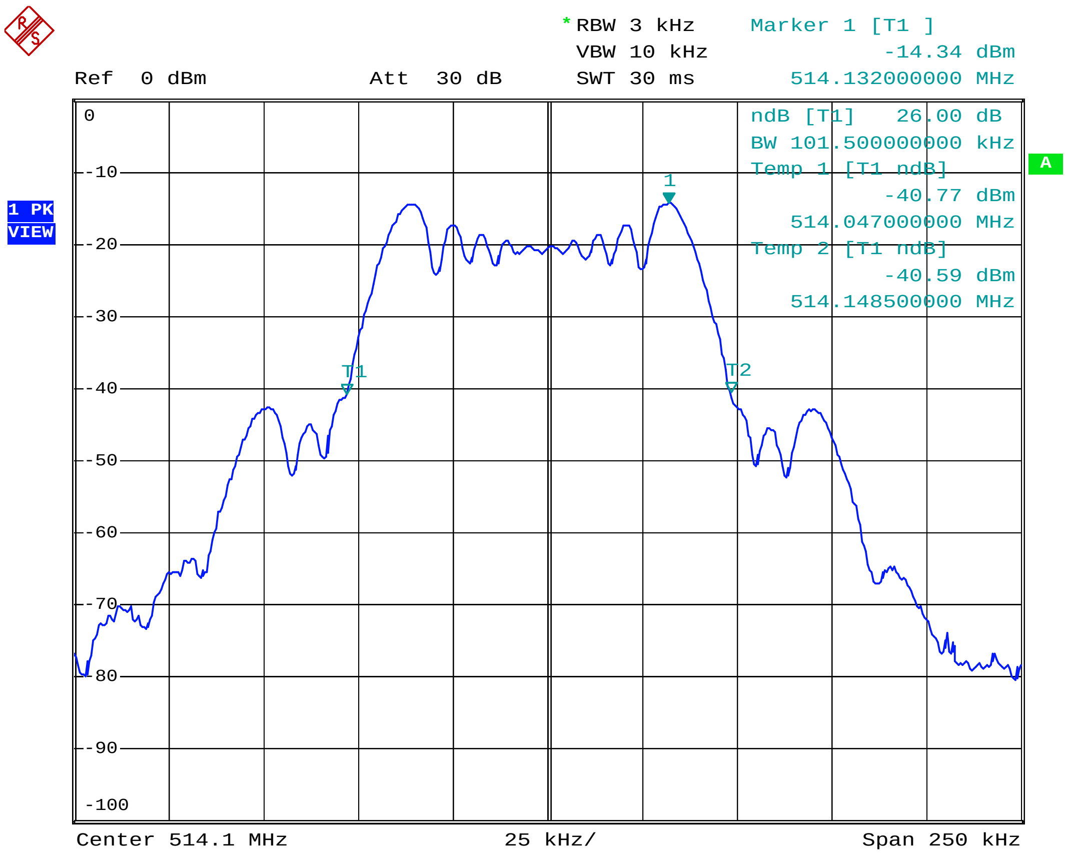


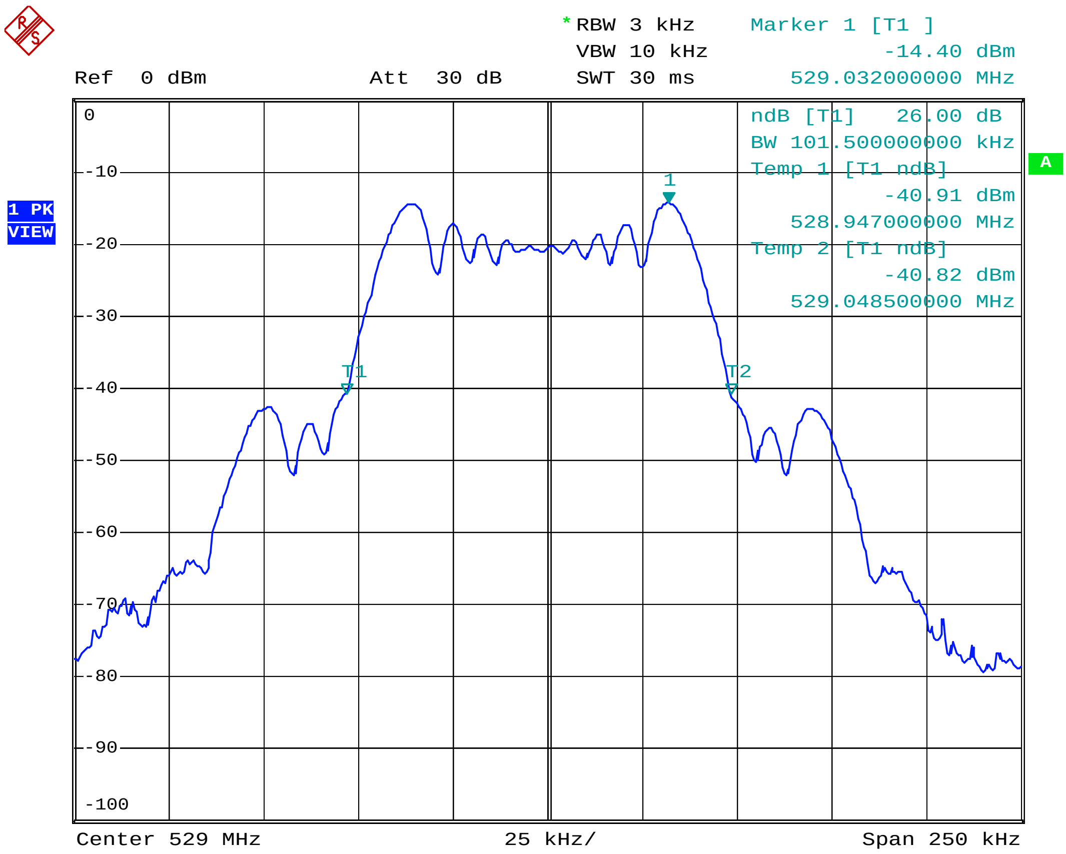

The Level input to produce 50% modulation is 40 mV, therefore the magnitude 16 dB greater than it is 252.3 mV.

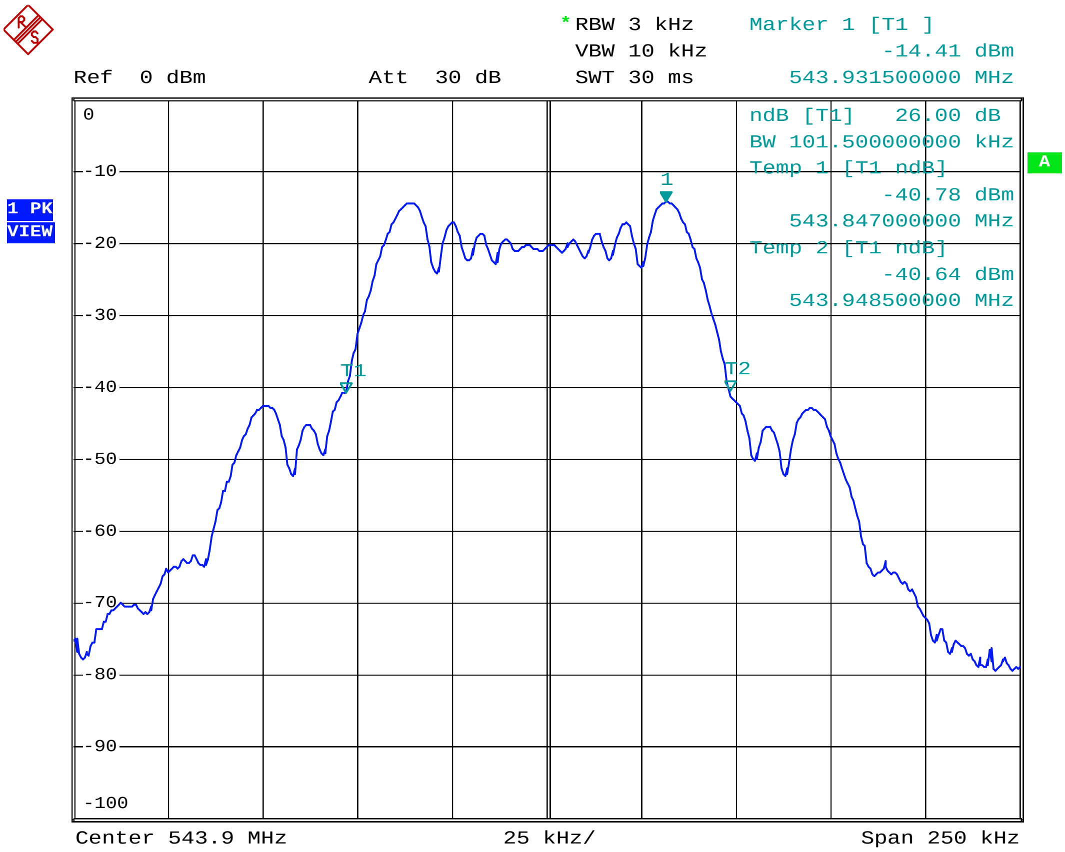
### 5.4.2 Occupied Bandwidth Plotted

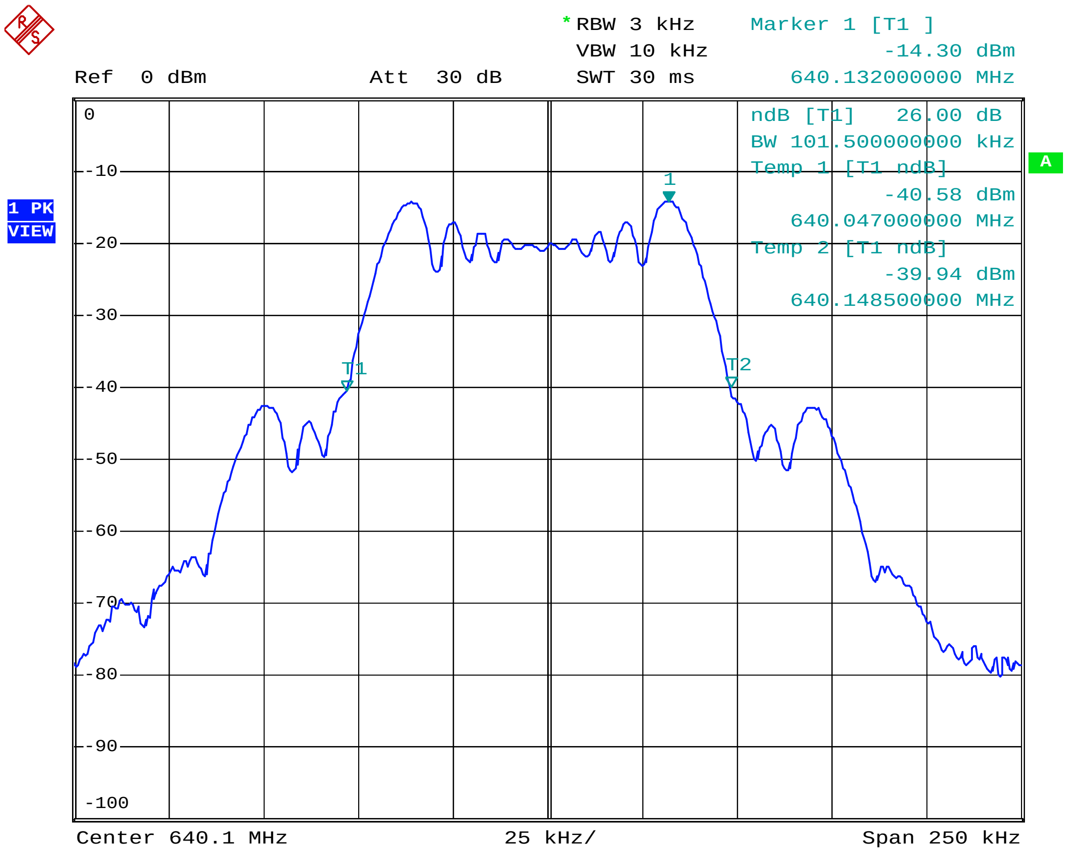
Test Date : May 22, 2015 Temperature : 25 °C Humidity : 68 %

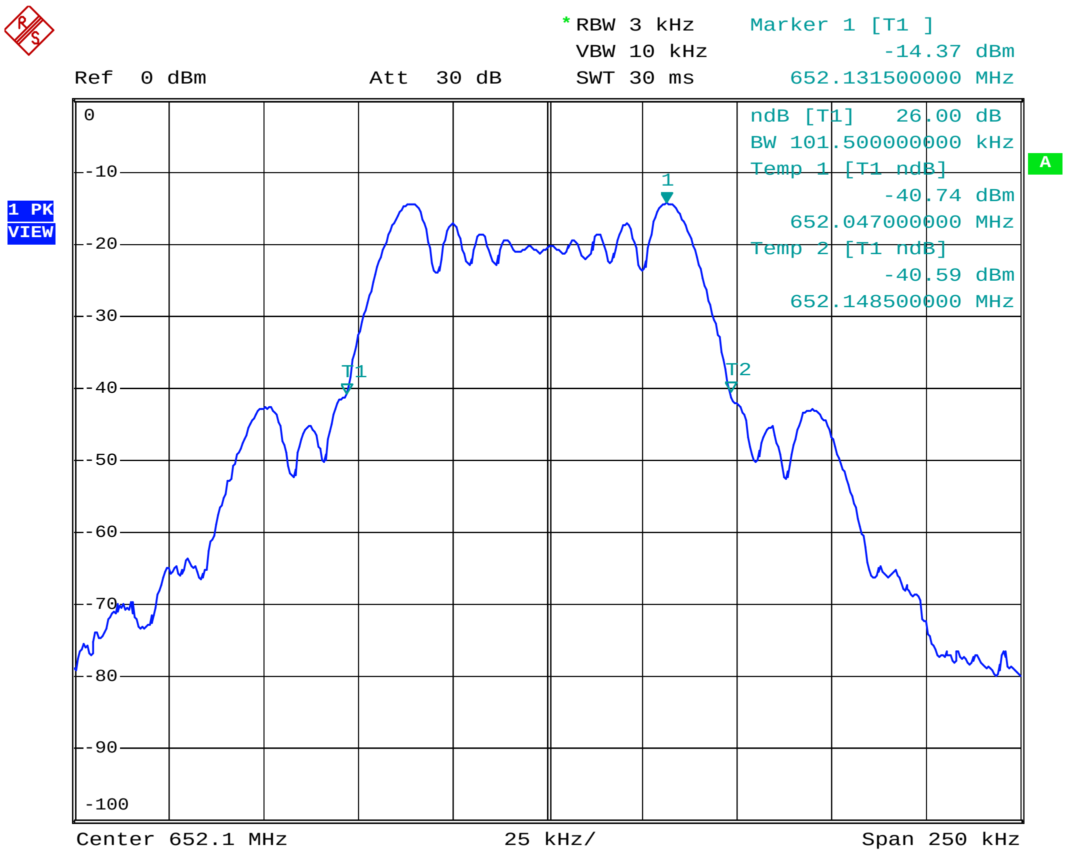
| RF Frequency (MHz) | 26 dB Bandwidth (kHz) |
|---|---|
| 514.100 | 101.5 |
| 529.000 | 101.5 |
| 543.900 | 101.5 |
| 640.100 | 101.5 |
| 652.100 | 101.5 |
| 663.900 | 101.5 |

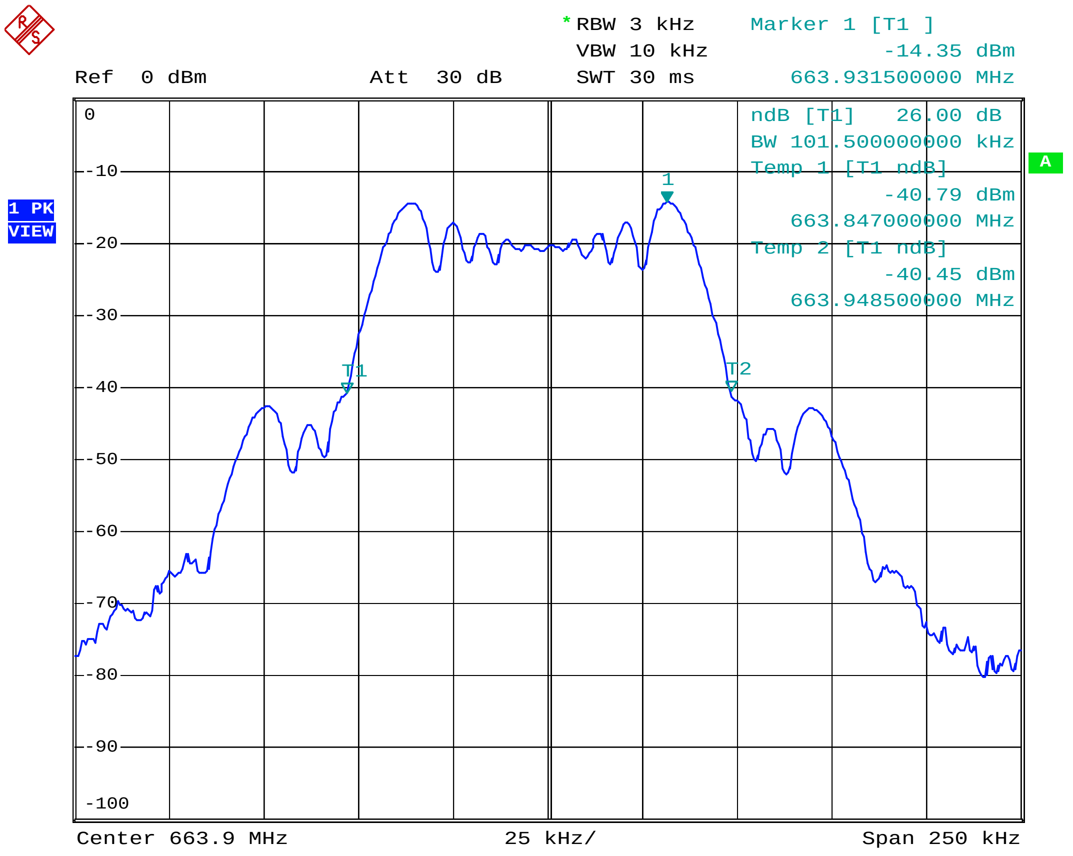

*RBW 3 kHz
VBW 10 kHz
SWT 30 ms
Ref 0 dBm
Att 30 dB
Marker 1 [T1 ]
-14.34 dBm
514.132000000 MHz
ndB [T1] 26.00 dB
BW 101.500000000 kHz
Temp 1 [T1 ndB]
-40.77 dBm
514.047000000 MHz
Temp 2 [T1 ndB]
-40.59 dBm
514.148500000 MHz
1 PK
VIEW
A
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
T1
T2
1
Center 514.1 MHz
25 kHz/
Span 250 kHz


*RBW 3 kHz
VBW 10 kHz
Ref 0 dBm
Att 30 dB
SWT 30 ms
Marker 1 [T1 ]
-14.40 dBm
529.032000000 MHz
ndB [T1] 26.00 dB
BW 101.500000000 kHz
Temp 1 [T1 ndB]
-40.91 dBm
528.947000000 MHz
Temp 2 [T1 ndB]
-40.82 dBm
529.048500000 MHz
1 PK
VIEW
A
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
1
T1
T2
Center 529 MHz
25 kHz/
Span 250 kHz


*RBW 3 kHz
VBW 10 kHz
SWT 30 ms
Ref 0 dBm
Att 30 dB
Marker 1 [T1 ]
-14.41 dBm
543.931500000 MHz
ndB [T1] 26.00 dB
BW 101.500000000 kHz
Temp 1 [T1 ndB]
-40.78 dBm
543.847000000 MHz
Temp 2 [T1 ndB]
-40.64 dBm
543.948500000 MHz
1 PK
VIEW
A
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
1
T1
T2
Center 543.9 MHz
25 kHz/
Span 250 kHz


*RBW 3 kHz
VBW 10 kHz
SWT 30 ms
Ref 0 dBm
Att 30 dB
Marker 1 [T1 ]
-14.30 dBm
640.132000000 MHz
ndB [T1] 26.00 dB
BW 101.500000000 kHz
Temp 1 [T1 ndB]
-40.58 dBm
640.047000000 MHz
Temp 2 [T1 ndB]
-39.94 dBm
640.148500000 MHz
1 PK
VIEW
A
T1
T2
1
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
Center 640.1 MHz
25 kHz/
Span 250 kHz


*RBW 3 kHz
VBW 10 kHz
SWT 30 ms
Marker 1 [T1 ]
-14.37 dBm
652.131500000 MHz
Ref 0 dBm
Att 30 dB
ndB [T1] 26.00 dB
BW 101.500000000 kHz
Temp 1 [T1 ndB]
-40.74 dBm
652.047000000 MHz
Temp 2 [T1 ndB]
-40.59 dBm
652.148500000 MHz
1 PK
VIEW
A
T1
T2
1
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
Center 652.1 MHz
25 kHz/
Span 250 kHz


*RBW 3 kHz
VBW 10 kHz
Ref 0 dBm
Att 30 dB
SWT 30 ms
Marker 1 [T1 ]
-14.35 dBm
663.931500000 MHz
ndB [T1] 26.00 dB
BW 101.500000000 kHz
Temp 1 [T1 ndB]
-40.79 dBm
663.847000000 MHz
Temp 2 [T1 ndB]
-40.45 dBm
663.948500000 MHz
1 PK
VIEW
A
Center 663.9 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 |
|---|---|---|---|---|
| EMI Test Receiver | Rohde & Schwarz | ESU 40 | 2014/08/15 | 2015/08/14 |
| Double Ridged Antenna | EMCO | 3115 | 2014/10/22 | 2015/10/21 |
| Double Ridged Antenna | EMCO | 3115 | 2014/08/18 | 2015/08/17 |
| Log-periodic Antenna | EMCO | 3146 | 2014/11/04 | 2015/11/03 |
| Biconical Antenna | EMCO | 3110 | 2014/11/04 | 2015/11/03 |
| Amplifier | HP | 8449B | 2014/08/12 | 2015/08/11 |
| Amplifier | HP | 8447D | 2014/11/10 | 2015/11/09 |
| Signal generator | HP | 83732B | 2014/10/16 | 2015/10/15 |

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

**1. Tx Frequency:514~544MHz**

**a. Tx Frequency: 514.100MHz**

Operated mode : TX Test Date :May 22, 2015

Temperature : 25°C Humidity : 68%

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) | | SG Reading (dBm) | | Antenna Gain | Antenna Gain Corr’ | Cable Loss (dB) | Result (dBm) | | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | H | V | H | V | | | | H | V | | |
| 1028.200 | 60.4 | 64.5 | -52.1 | -48.0 | 5.9 | -2.0 | 2.1 | -50.3 | -46.2 | -13.0 | -33.2 |
| 1542.300 | --- | --- | --- | --- | 8.2 | -2.0 | 2.6 | --- | --- | -13.0 | --- |
| 2056.400 | --- | --- | --- | --- | 8.3 | -2.0 | 3.0 | --- | --- | -13.0 | --- |
| 2570.500 | --- | --- | --- | --- | 9.5 | -2.0 | 3.4 | --- | --- | -13.0 | --- |
| 3084.600 | --- | --- | --- | --- | 9.2 | -2.0 | 3.8 | --- | --- | -13.0 | --- |
| 3598.700 | --- | --- | --- | --- | 9.3 | -2.0 | 4.1 | --- | --- | -13.0 | --- |
| 4112.800 | --- | --- | --- | --- | 9.7 | -2.0 | 4.4 | --- | --- | -13.0 | --- |
| 4626.900 | --- | --- | --- | --- | 10.5 | -2.0 | 4.7 | --- | --- | -13.0 | --- |
| 5141.000 | --- | --- | --- | --- | 10.1 | -2.0 | 5.0 | --- | --- | -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.

**b. Tx Frequency: 529.000MHz**

Operated mode : TX Test Date :May 22, 2015
Temperature : 22°C Humidity : 68%

Unmodulated carrier output power is 9.5 dBm , or 8.913 mW (ERP).

The limit of spurious or harmonics is calculated as following :

9.5-[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) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1058.000 | 60.3 | 64.6 | -52.1 | -47.7 | 6.0 | -2.0 | 2.1 | -50.2 | -45.8 | -13.0 | -32.8 |
| 1587.000 | --- | --- | --- | --- | 8.2 | -2.0 | 2.6 | --- | --- | -13.0 | --- |
| 2116.000 | --- | --- | --- | --- | 8.5 | -2.0 | 3.1 | --- | --- | -13.0 | --- |
| 2645.000 | --- | --- | --- | --- | 9.5 | -2.0 | 3.5 | --- | --- | -13.0 | --- |
| 3174.000 | --- | --- | --- | --- | 9.2 | -2.0 | 3.8 | --- | --- | -13.0 | --- |
| 3703.000 | --- | --- | --- | --- | 9.3 | -2.0 | 4.2 | --- | --- | -13.0 | --- |
| 4232.000 | --- | --- | --- | --- | 10.0 | -2.0 | 4.5 | --- | --- | -13.0 | --- |
| 4761.000 | --- | --- | --- | --- | 10.3 | -2.0 | 4.8 | --- | --- | -13.0 | --- |
| 5290.000 | --- | --- | --- | --- | 10.2 | -2.0 | 5.1 | --- | --- | -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.

**c. Tx Frequency: 543.900MHz**

Operated mode : TX    Test Date :May 22, 2015
Temperature : 22°C    Humidity : 68%

Unmodulated carrier output power is 9.3 dBm , or 8.511 mW (ERP).

The limit of spurious or harmonics is calculated as following :

9.3-[43+10log(carrier output power in W)], or -13dBm

| Frequency (MHz) | Meter Reading (dBuV) H | Meter Reading (dBuV) V | SG Reading (dBm) H | SG Reading (dBm) V | Antenna Gain | Antenna Gain Corr' | Cable Loss (dB) | Result (dBm) H | Result (dBm) V | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1087.800 | 60.8 | 64.6 | -51.5 | -47.6 | 6.2 | -2.0 | 2.2 | -49.5 | -45.6 | -13.0 | -32.6 |
| 1631.700 | --- | --- | --- | --- | 8.2 | -2.0 | 2.7 | --- | --- | -13.0 | --- |
| 2175.600 | --- | --- | --- | --- | 8.7 | -2.0 | 3.1 | --- | --- | -13.0 | --- |
| 2719.500 | --- | --- | --- | --- | 9.4 | -2.0 | 3.5 | --- | --- | -13.0 | --- |
| 3263.400 | --- | --- | --- | --- | 9.3 | -2.0 | 3.9 | --- | --- | -13.0 | --- |
| 3807.300 | --- | --- | --- | --- | 9.4 | -2.0 | 4.2 | --- | --- | -13.0 | --- |
| 4351.200 | --- | --- | --- | --- | 10.2 | -2.0 | 4.5 | --- | --- | -13.0 | --- |
| 4895.100 | --- | --- | --- | --- | 10.1 | -2.0 | 4.8 | --- | --- | -13.0 | --- |
| 5439.000 | --- | --- | --- | --- | 10.3 | -2.0 | 5.1 | --- | --- | -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.

**2. Tx Frequency:640~664MHz**
**a. Tx Frequency: 640.100MHz**

Operated mode : TX Test Date :May 22, 2015
Temperature : 22°C Humidity : 68%

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) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1280.200 | 59.8 | 62.5 | -51.6 | -48.8 | 7.1 | -2.0 | 2.4 | -48.9 | -46.1 | -13.0 | -33.1 |
| 1920.300 | --- | --- | --- | --- | 8.2 | -2.0 | 2.9 | --- | --- | -13.0 | --- |
| 2560.400 | --- | --- | --- | --- | 9.6 | -2.0 | 3.4 | --- | --- | -13.0 | --- |
| 3200.500 | --- | --- | --- | --- | 9.2 | -2.0 | 3.9 | --- | --- | -13.0 | --- |
| 3840.600 | --- | --- | --- | --- | 9.4 | -2.0 | 4.3 | --- | --- | -13.0 | --- |
| 4480.700 | --- | --- | --- | --- | 10.6 | -2.0 | 4.6 | --- | --- | -13.0 | --- |
| 5120.800 | --- | --- | --- | --- | 10.1 | -2.0 | 5.0 | --- | --- | -13.0 | --- |
| 5760.900 | --- | --- | --- | --- | 10.7 | -2.0 | 5.3 | --- | --- | -13.0 | --- |
| 6401.000 | --- | --- | --- | --- | 11.3 | -2.0 | 5.6 | --- | --- | -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.

**b. Tx Frequency: 652.100MHz**

Operated mode : TX Test Date :May 22, 2015
Temperature : 22°C Humidity : 68%

Unmodulated carrier output power is 9.3 dBm , or 8.511 mW (ERP).

The limit of spurious or harmonics is calculated as following :

9.3-[43+10log(carrier output power in W)], or -13dBm

| 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 | | |
| 1304.200 | 60.0 | 62.6 | -51.3 | -48.6 | 7.2 | -2.0 | 2.4 | -48.5 | -45.8 | -13.0 | -32.8 |
| 1956.300 | --- | --- | --- | --- | 8.2 | -2.0 | 3.0 | --- | --- | -13.0 | --- |
| 2608.400 | --- | --- | --- | --- | 9.5 | -2.0 | 3.5 | --- | --- | -13.0 | --- |
| 3260.500 | --- | --- | --- | --- | 9.3 | -2.0 | 3.9 | --- | --- | -13.0 | --- |
| 3912.600 | --- | --- | --- | --- | 9.4 | -2.0 | 4.3 | --- | --- | -13.0 | --- |
| 4564.700 | --- | --- | --- | --- | 10.5 | -2.0 | 4.7 | --- | --- | -13.0 | --- |
| 5216.800 | --- | --- | --- | --- | 10.2 | -2.0 | 5.0 | --- | --- | -13.0 | --- |
| 5868.900 | --- | --- | --- | --- | 10.8 | -2.0 | 5.3 | --- | --- | -13.0 | --- |
| 6521.000 | --- | --- | --- | --- | 11.4 | -2.0 | 5.6 | --- | --- | -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.

**c. Tx Frequency: 663.900MHz**

Operated mode : TX | Test Date :May 22, 2015
Temperature : 22°C | Humidity : 68%

Unmodulated carrier output power is 9.4 dBm , or 8.710 mW (ERP).

The limit of spurious or harmonics is calculated as following :

9.4-[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) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1327.800 | 59.8 | 62.8 | -51.4 | -48.3 | 7.3 | -2.0 | 2.4 | -48.5 | -45.4 | -13.0 | -32.4 |
| 1991.700 | --- | --- | --- | --- | 8.2 | -2.0 | 3.0 | --- | --- | -13.0 | --- |
| 2655.600 | --- | --- | --- | --- | 9.5 | -2.0 | 3.5 | --- | --- | -13.0 | --- |
| 3319.500 | --- | --- | --- | --- | 9.3 | -2.0 | 3.9 | --- | --- | -13.0 | --- |
| 3983.400 | --- | --- | --- | --- | 9.4 | -2.0 | 4.3 | --- | --- | -13.0 | --- |
| 4647.300 | --- | --- | --- | --- | 10.4 | -2.0 | 4.7 | --- | --- | -13.0 | --- |
| 5311.200 | --- | --- | --- | --- | 10.2 | -2.0 | 5.1 | --- | --- | -13.0 | --- |
| 5975.100 | --- | --- | --- | --- | 10.9 | -2.0 | 5.4 | --- | --- | -13.0 | --- |
| 6639.000 | --- | --- | --- | --- | 11.3 | -2.0 | 5.7 | --- | --- | -13.0 | --- |

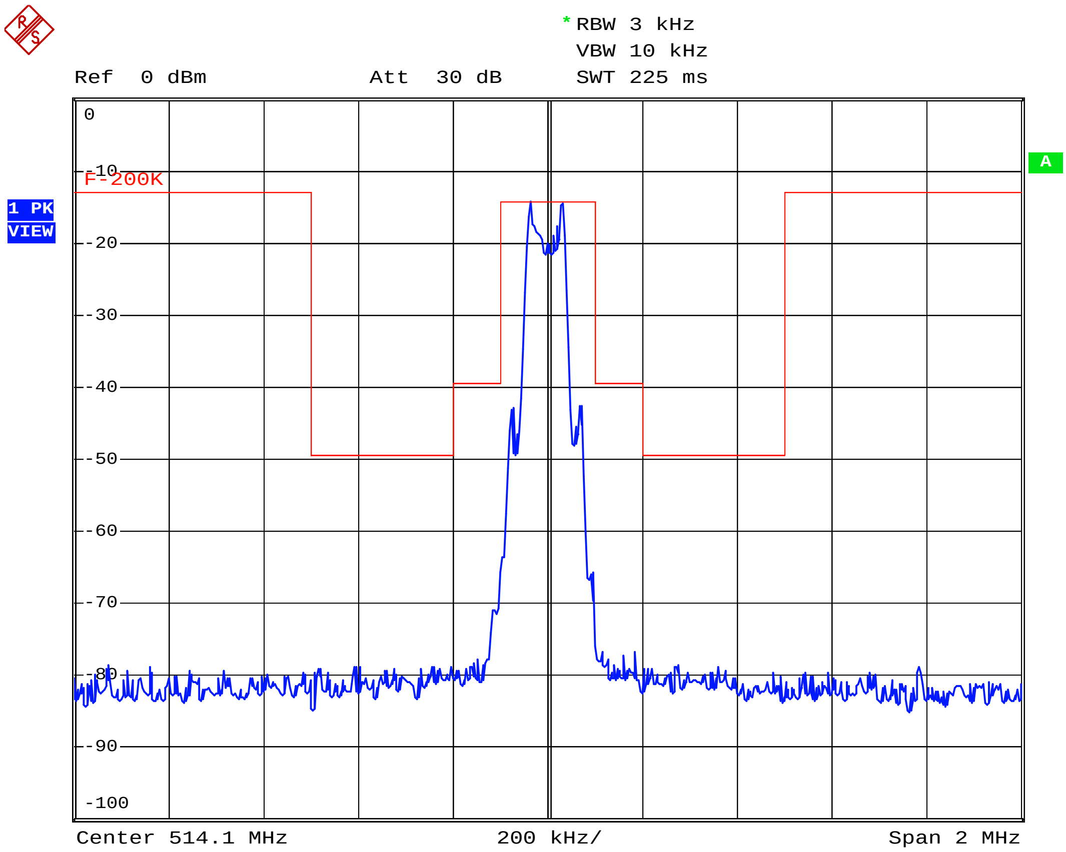
Note :

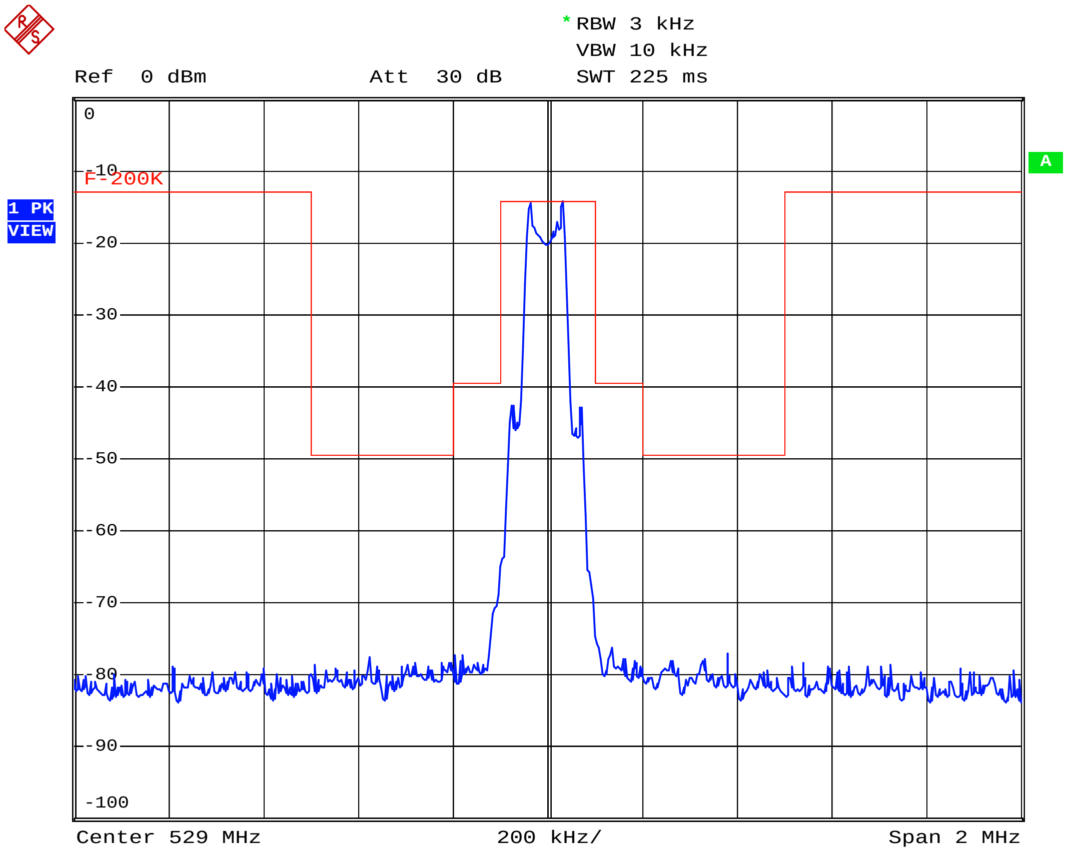
1. Remark “---“ means that the emission level is too weak to be detected.
2. For measured frequency below 1GHz, a tuned dipole antenna is used.
3. Result calculation is as following :

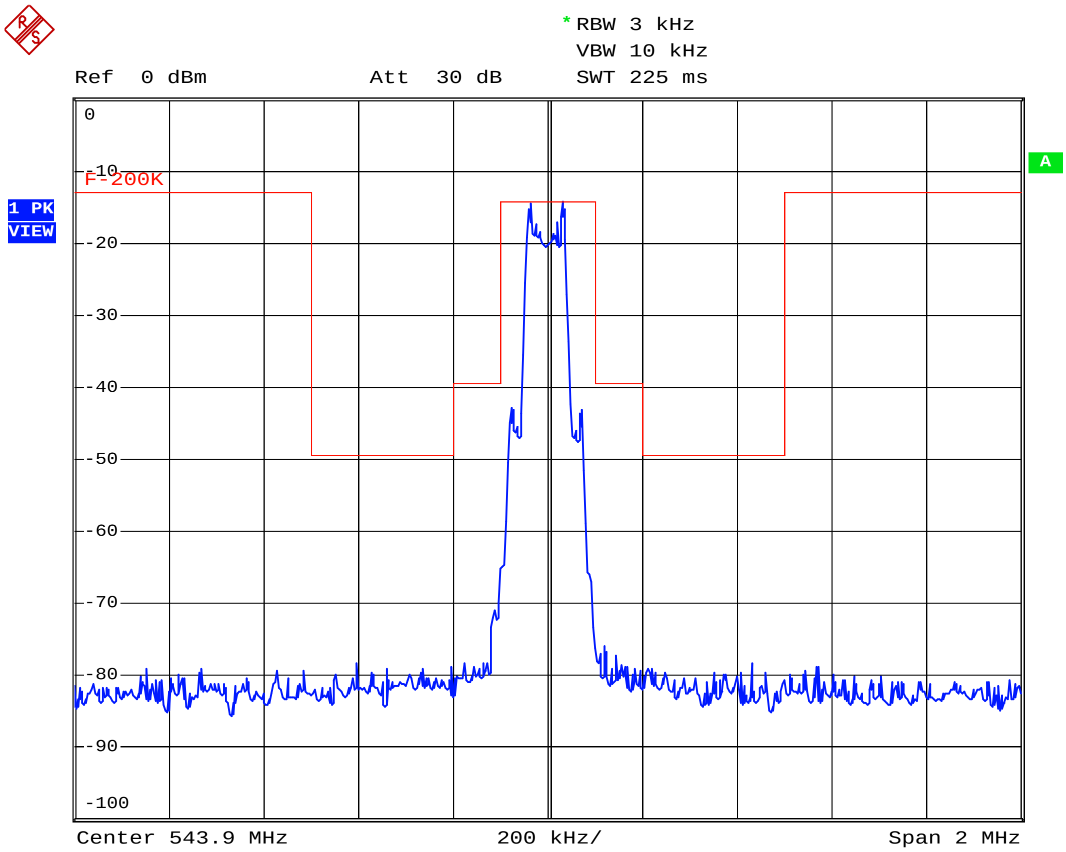
   Result ＝ SG Reading - Cable Loss +Antenna Gain +Antenna Gain Corrected

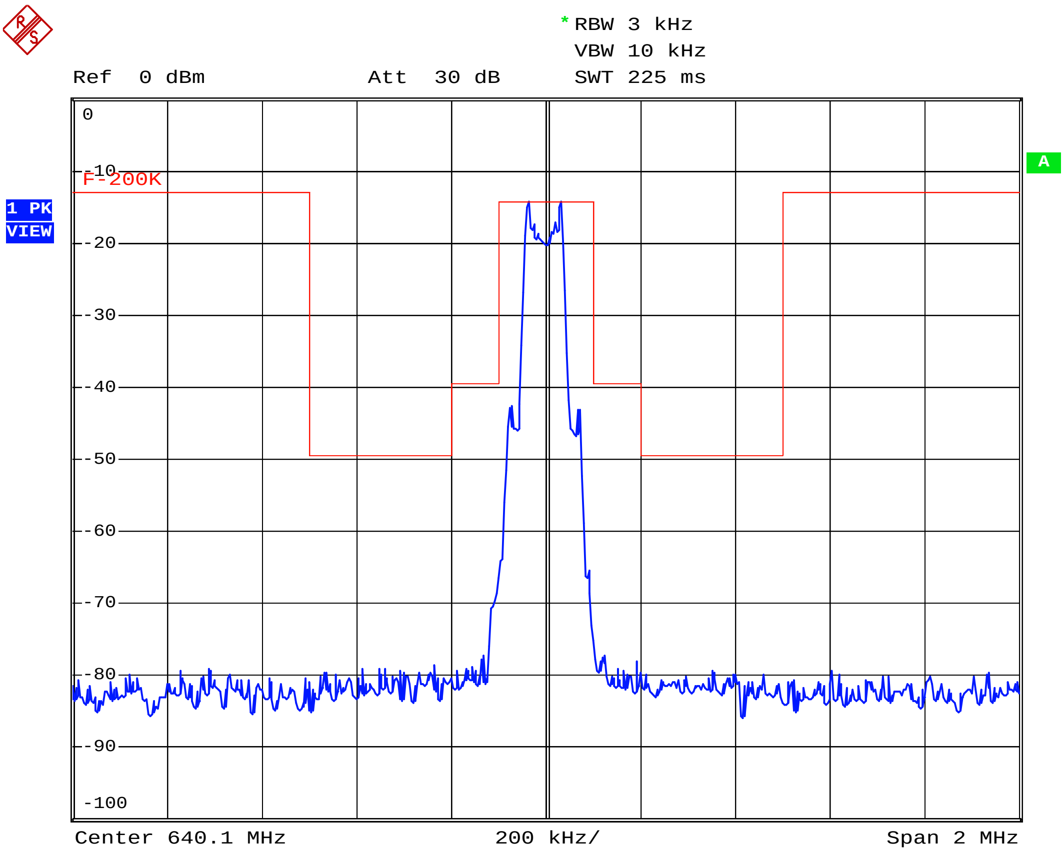
   Antenna Gain Corrected : is used for antenna other than dipole to convert radiated power to ERP.

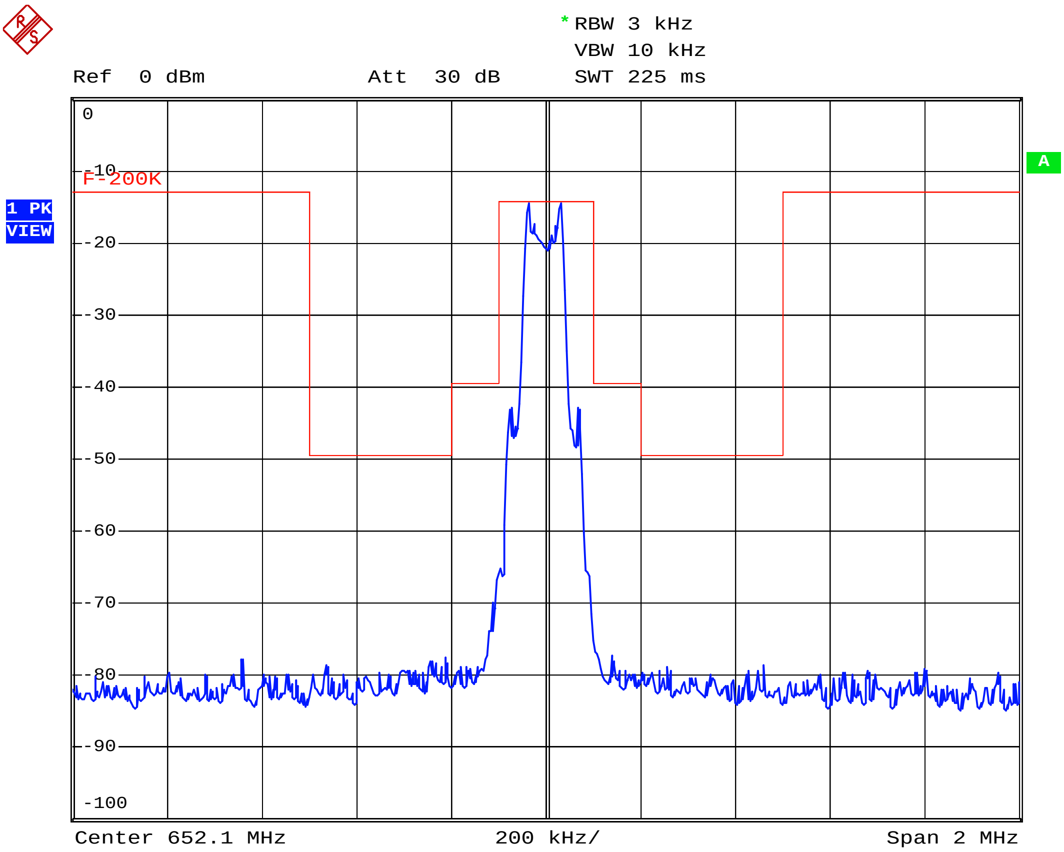
### 6.4.2 Emission mask plots

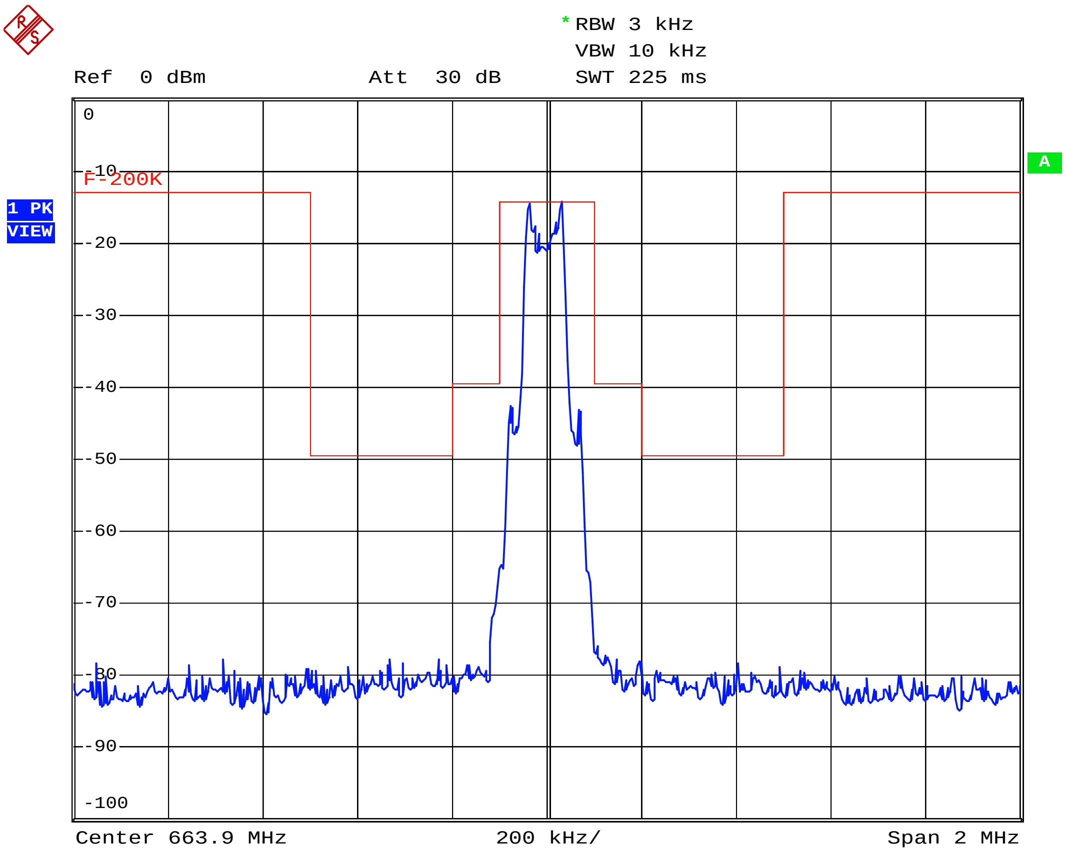



*RBW 3 kHz
VBW 10 kHz
Ref 0 dBm
Att 30 dB
SWT 225 ms
0
-10
F-200K
1 PK
VIEW
A
-20
-30
-40
-50
-60
-70
-80
-90
-100
Center 529 MHz
200 kHz/
Span 2 MHz


*RBW 3 kHz
VBW 10 kHz
Ref 0 dBm
Att 30 dB
SWT 225 ms
0
-10
F-200K
1 PK
VIEW
A
-20
-30
-40
-50
-60
-70
-80
-90
-100
Center 543.9 MHz
200 kHz/
Span 2 MHz


*RBW 3 kHz
VBW 10 kHz
SWT 225 ms
Ref 0 dBm
Att 30 dB
0
-10
F-200K
-20
-30
-40
-50
-60
-70
-80
-90
-100
1 PK
VIEW
A
Center 640.1 MHz
200 kHz/
Span 2 MHz

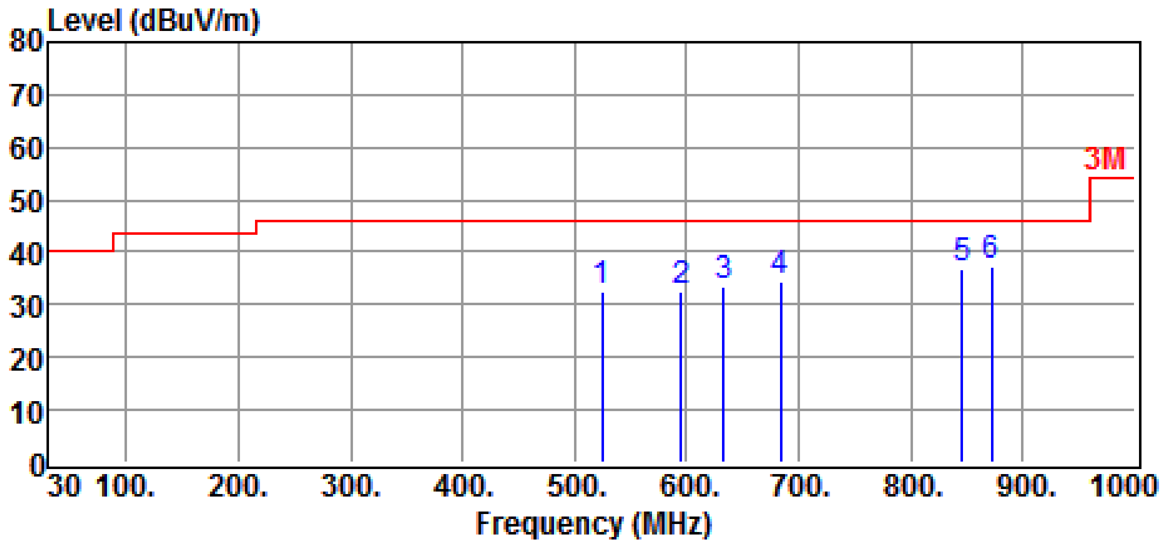

*RBW 3 kHz
VBW 10 kHz
Ref 0 dBm
Att 30 dB
SWT 225 ms
F-200K
1 PK
VIEW
A
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
Center 652.1 MHz
200 kHz/
Span 2 MHz


*RBW 3 kHz
VBW 10 kHz
Ref 0 dBm
Att 30 dB
SWT 225 ms
0
-10
F-200K
1 PK
VIEW
A
-20
-30
-40
-50
-60
-70
-80
-90
-100
Center 663.9 MHz
200 kHz/
Span 2 MHz

## 6.5 Other Emission

a) Emission frequencies below 1 GHz

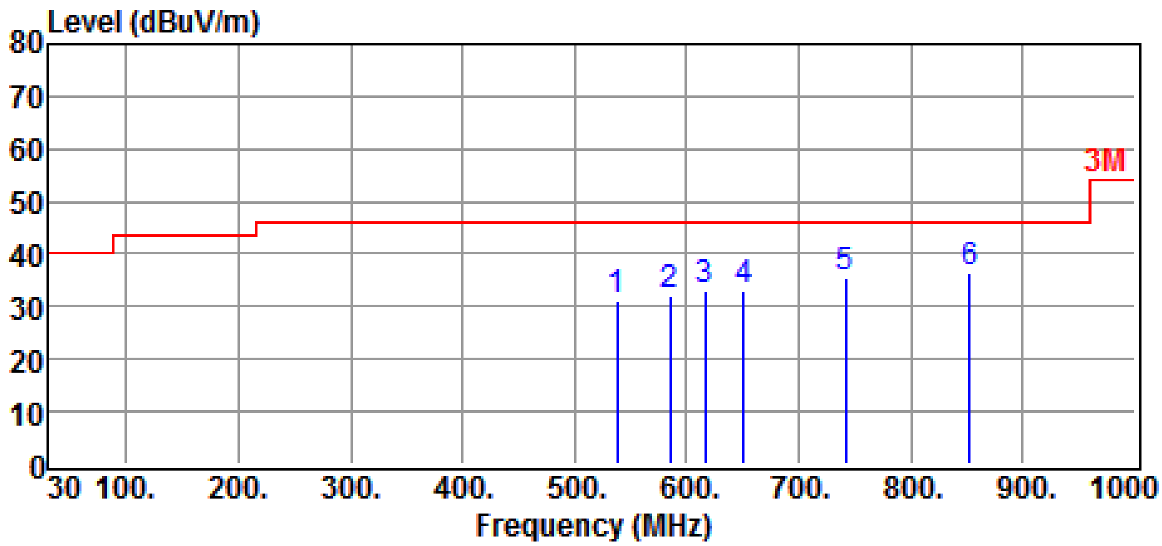
Test Date : May 20, 2015    Temperature : 25°C    Humidity : 68 %




| | | | |
|---|---|---|---|
| Site | :OPEN SITE | Date | :2015-05-20 |
| Limit | :3M | Ant. Pol. | :HORIZONTAL |
| EUT | :Wireless Bodypack Transmitter | Temp. | :25℃ |
| Power Rating | :DC BATTERY | Humi. | :68% |
| Model | :EJ-5T | Engineer. | :VC |
| Test Mode | :OPERATION MODE | | |

| Freq MHz | Reading dBuV | Correction Factor dB | Result dBuV/m | Limits dBuV/m | Over limit dB | Detector |
|---|---|---|---|---|---|---|
| 524.7000 | 10.2 | 22.2 | 32.4 | 46.0 | -13.6 | QP |
| 594.5400 | 9.4 | 23.2 | 32.6 | 46.0 | -13.4 | QP |
| 633.3400 | 9.5 | 24.0 | 33.5 | 46.0 | -12.5 | QP |
| 683.7800 | 9.4 | 25.2 | 34.6 | 46.0 | -11.4 | QP |
| 845.7700 | 9.1 | 27.6 | 36.7 | 46.0 | -9.3 | QP |
| 871.9600 | 9.6 | 28.0 | 37.6 | 46.0 | -8.4 | QP |

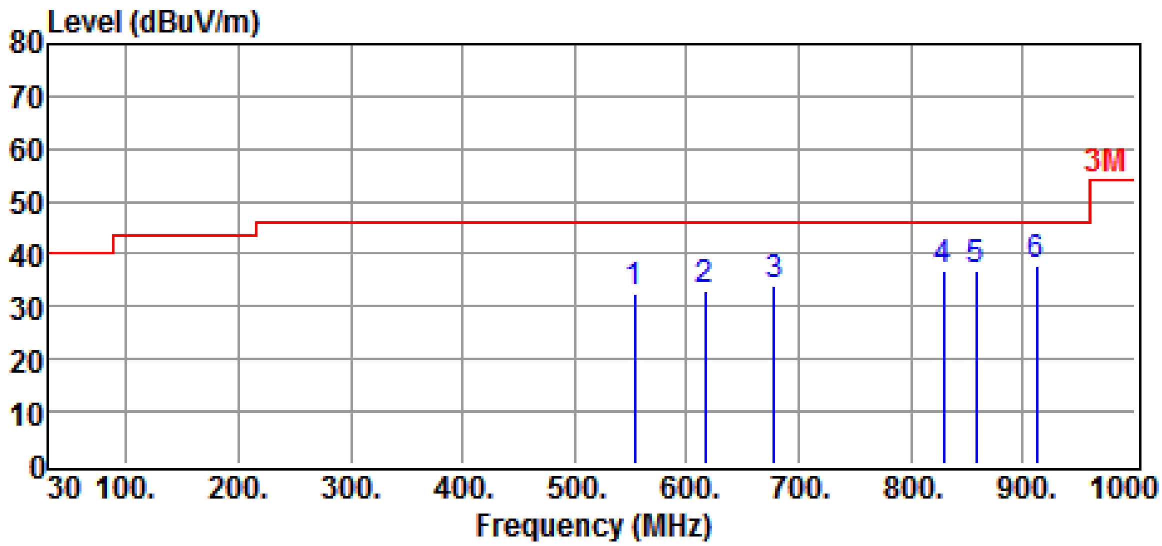
Note :
1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss
3. The margin value=Limit - Result




| | | | |
|---|---|---|---|
| Site | :OPEN SITE | Date | :2015-05-20 |
| Limit | :3M | Ant. Pol. | :VERTICAL |
| EUT | :Wireless Bodypack Transmitter | Temp. | :25℃ |
| Power Rating | :DC BATTERY | Humi. | :68% |
| Model | :EJ-5T | Engineer. | :VC |
| Test Mode | :OPERATION MODE | | |

| Freq<br>MHz | Reading<br>dBuV | Correction Factor<br>dB | Result<br>dBuV/m | Limits<br>dBuV/m | Over limit<br>dB | Detector |
|---|---|---|---|---|---|---|
| 538.2800 | 8.9 | 22.4 | 31.3 | 46.0 | -14.7 | QP |
| 584.8400 | 9.0 | 23.0 | 32.0 | 46.0 | -14.0 | QP |
| 615.8800 | 9.7 | 23.5 | 33.2 | 46.0 | -12.8 | QP |
| 650.8000 | 8.4 | 24.4 | 32.8 | 46.0 | -13.2 | QP |
| 741.9800 | 9.6 | 26.0 | 35.6 | 46.0 | -10.4 | QP |
| 852.5600 | 8.6 | 27.7 | 36.3 | 46.0 | -9.7 | QP |

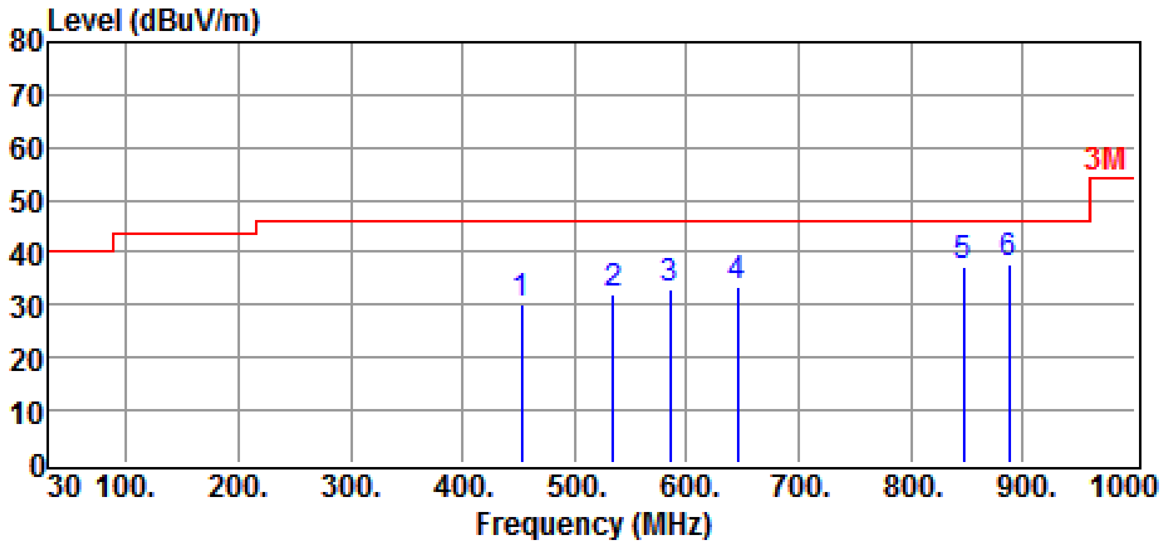
Note :
1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss
3. The margin value=Limit - Result




| | | | |
|---|---|---|---|
| Site | :OPEN SITE | Date | :2015-05-20 |
| Limit | :3M | Ant. Pol. | :HORIZONTAL |
| EUT | :Wireless Bodypack Transmitter | Temp. | :25℃ |
| Power Rating | :AC120V/60Hz | Humi. | :68% |
| Model | :EJ-5T | Engineer. | :VC |
| Test Mode | :CHARGE MODE | | |

| Freq MHz | Reading dBuV | Correction Factor dB | Result dBuV/m | Limits dBuV/m | Over limit dB | Detector |
|---|---|---|---|---|---|---|
| 553.8000 | 9.9 | 22.6 | 32.5 | 46.0 | -13.5 | QP |
| 615.8800 | 9.7 | 23.5 | 33.2 | 46.0 | -12.8 | QP |
| 677.9600 | 8.8 | 25.1 | 33.9 | 46.0 | -12.1 | QP |
| 829.2800 | 9.5 | 27.2 | 36.7 | 46.0 | -9.3 | QP |
| 858.3800 | 8.9 | 27.9 | 36.8 | 46.0 | -9.2 | QP |
| 911.7300 | 9.5 | 28.6 | 38.1 | 46.0 | -7.9 | QP |

Note :
1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss
3. The margin value=Limit - Result




| | | | |
|---|---|---|---|
| Site | :OPEN SITE | Date | :2015-05-20 |
| Limit | :3M | Ant. Pol. | :VERTICAL |
| EUT | :Wireless Bodypack Transmitter | Temp. | :25℃ |
| Power Rating | :AC120V/60Hz | Humi. | :68% |
| Model | :EJ-5T | Engineer. | :VC |
| Test Mode | :CHARGE MODE | | |

| Freq<br><br>MHz | Reading<br><br>dBuV | Correction Factor<br>dB | Result<br><br>dBuV/m | Limits<br><br>dBuV/m | Over limit<br><br>dB | Detector |
|---|---|---|---|---|---|---|
| 452.9200 | 9.5 | 20.6 | 30.1 | 46.0 | -15.9 | QP |
| 534.4000 | 9.9 | 22.4 | 32.3 | 46.0 | -13.7 | QP |
| 584.8400 | 10.1 | 23.0 | 33.1 | 46.0 | -12.9 | QP |
| 644.9800 | 9.4 | 24.3 | 33.7 | 46.0 | -12.3 | QP |
| 846.7400 | 9.9 | 27.6 | 37.5 | 46.0 | -8.5 | QP |
| 887.4800 | 9.6 | 28.2 | 37.8 | 46.0 | -8.2 | QP |

Note :
1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss
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

(Battery Mode)

(Charge Mode)

# 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.

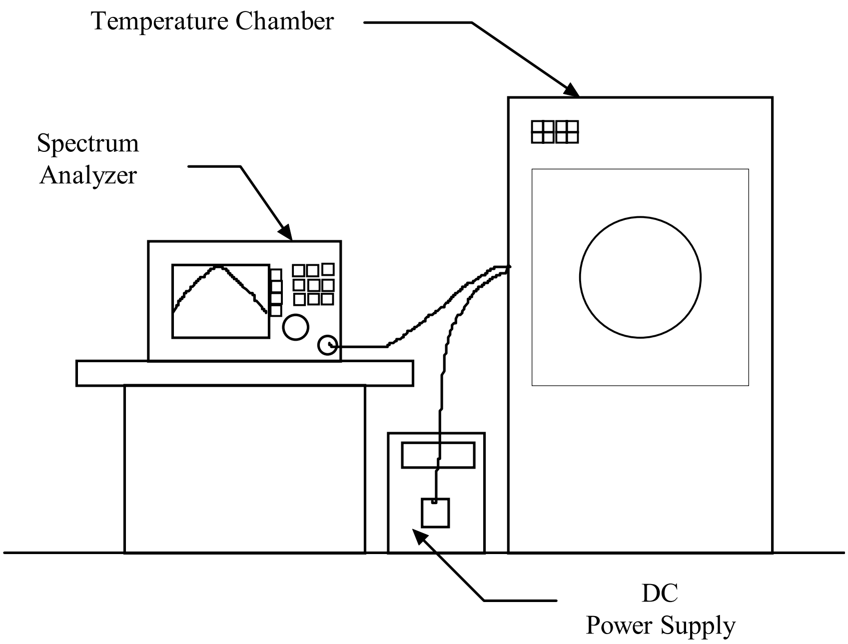
B) Frequency stability versus input voltage

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 |
|---|---|---|---|---|
| EMI Test Receiver | Rohde & Schwarz | ESU 40 | 2014/08/15 | 2015/08/14 |
| Temperature Chamber | MALLIER | MCT-2X-M | 2014/10/27 | 2015/10/26 |

## 7.4 Measurement Data

Test Date : May 20, 2015 Temperature : 25 °C Humidity : 68 %

### A. Tx Frequency 514.100MHz

A1. Frequency stability versus enviroment tempture

| Reference Frequency 514.100 MHz Limit：0.005% | | | | | | | |
|---|---|---|---|---|---|---|---|
| Enviroment Tempture (℃) | Power Supplied (Vac) | Frequency measured with time elapsed | | | | | |
| | | 2 minute | | 5 minute | | 10 minute | |
| | | (MHz) | (%) | (MHz) | (%) | (MHz) | (%) |
| 50 | 120.0 | 514.1159 | 0.00309 | 514.1153 | 0.00298 | 514.1157 | 0.00305 |
| 40 | | 514.1104 | 0.00202 | 514.1110 | 0.00214 | 514.1125 | 0.00243 |
| 30 | | 514.1075 | 0.00146 | 514.1079 | 0.00154 | 514.1070 | 0.00136 |
| 20 | | 514.1035 | 0.00068 | 514.1038 | 0.00074 | 514.1042 | 0.00082 |
| 10 | | 514.0993 | -0.00014 | 514.0986 | -0.00027 | 514.0985 | -0.00029 |
| 0 | | 514.0932 | -0.00132 | 514.0934 | -0.00128 | 514.0940 | -0.00117 |
| -10 | | 514.0909 | -0.00177 | 514.0914 | -0.00167 | 514.0908 | -0.00179 |
| -20 | | 514.0866 | -0.00261 | 514.0867 | -0.00259 | 514.0864 | -0.00265 |
| -30 | | 514.0813 | -0.00364 | 514.0814 | -0.00362 | 514.0812 | -0.00366 |

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

| Reference Frequency : 514.100 MHz Limit：0.005% | | | | | | | |
|---|---|---|---|---|---|---|---|
| Enviroment Tempture (℃) | Power Supplied (Vac) | Frequency measured with time elapsed | | | | | |
| | | 2 minute | | 5 minute | | 10 minute | |
| | | (MHz) | (%) | (MHz) | (%) | (MHz) | (%) |
| 25 | 138.0 | 514.1061 | 0.00119 | 514.1060 | 0.00117 | 514.1057 | 0.00111 |
| 25 | 102.0 | 514.1071 | 0.00138 | 514.1064 | 0.00124 | 514.1068 | 0.00132 |

Test Date : May 20, 2015 Temperature : 25 °C Humidity : 68 %

**B. Tx Frequency 663.900MHz**

B1. Frequency stability versus enviroment tempture

| Reference Frequency : 663.900MHz | | Limit：0.005% | | | | | |
|---|---|---|---|---|---|---|---|
| Enviroment Tempture (℃) | Power Supplied (Vac) | Frequency measured with time elapsed | | | | | |
| | | 2 minute | | 5 minute | | 10 minute | |
| | | (MHz) | (%) | (MHz) | (%) | (MHz) | (%) |
| 50 | 120.0 | 663.9187 | 0.00281 | 663.9198 | 0.00299 | 663.9196 | 0.00295 |
| 40 | | 663.9142 | 0.00214 | 663.9140 | 0.00210 | 663.9141 | 0.00212 |
| 30 | | 663.9129 | 0.00195 | 663.9123 | 0.00186 | 663.9122 | 0.00184 |
| 20 | | 663.9077 | 0.00115 | 663.9067 | 0.00101 | 663.9061 | 0.00093 |
| 10 | | 663.9036 | 0.00054 | 663.9033 | 0.00050 | 663.9033 | 0.00050 |
| 0 | | 663.8959 | -0.00061 | 663.8957 | -0.00064 | 663.8956 | -0.00066 |
| -10 | | 663.8932 | -0.00102 | 663.8929 | -0.00107 | 663.8933 | -0.00101 |
| -20 | | 663.8881 | -0.00179 | 663.8874 | -0.00190 | 663.8868 | -0.00199 |
| -30 | | 663.8822 | -0.00268 | 663.8814 | -0.00280 | 663.8814 | -0.00281 |

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

| Reference Frequency : 663.900MHz | | Limit：0.005% | | | | | |
|---|---|---|---|---|---|---|---|
| Enviroment Tempture (℃) | Power Supplied (Vac) | Frequency measured with time elapsed | | | | | |
| | | 2 minute | | 5 minute | | 10 minute | |
| | | (MHz) | (%) | (MHz) | (%) | (MHz) | (%) |
| 25 | 138.0 | 663.9105 | 0.00158 | 663.9100 | 0.00151 | 663.9102 | 0.00154 |
| 25 | 102.0 | 663.9108 | 0.00163 | 663.9102 | 0.00154 | 663.9105 | 0.00158 |

# 8 CONDUCTED EMISSION MEASUREMENT

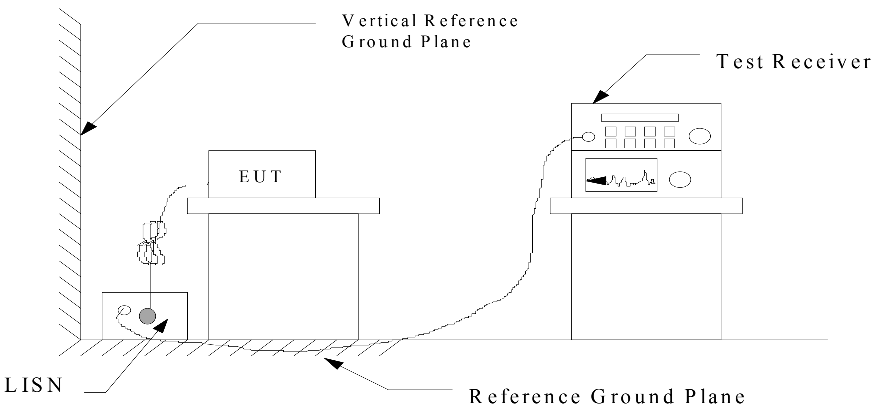
## 8.1 Standard Applicable

For unintentional and intentional device, Line Conducted Emission Limits are in accordance to § 15.107(a) and § 15.207(a) respectively. Both Limits are identical specification.

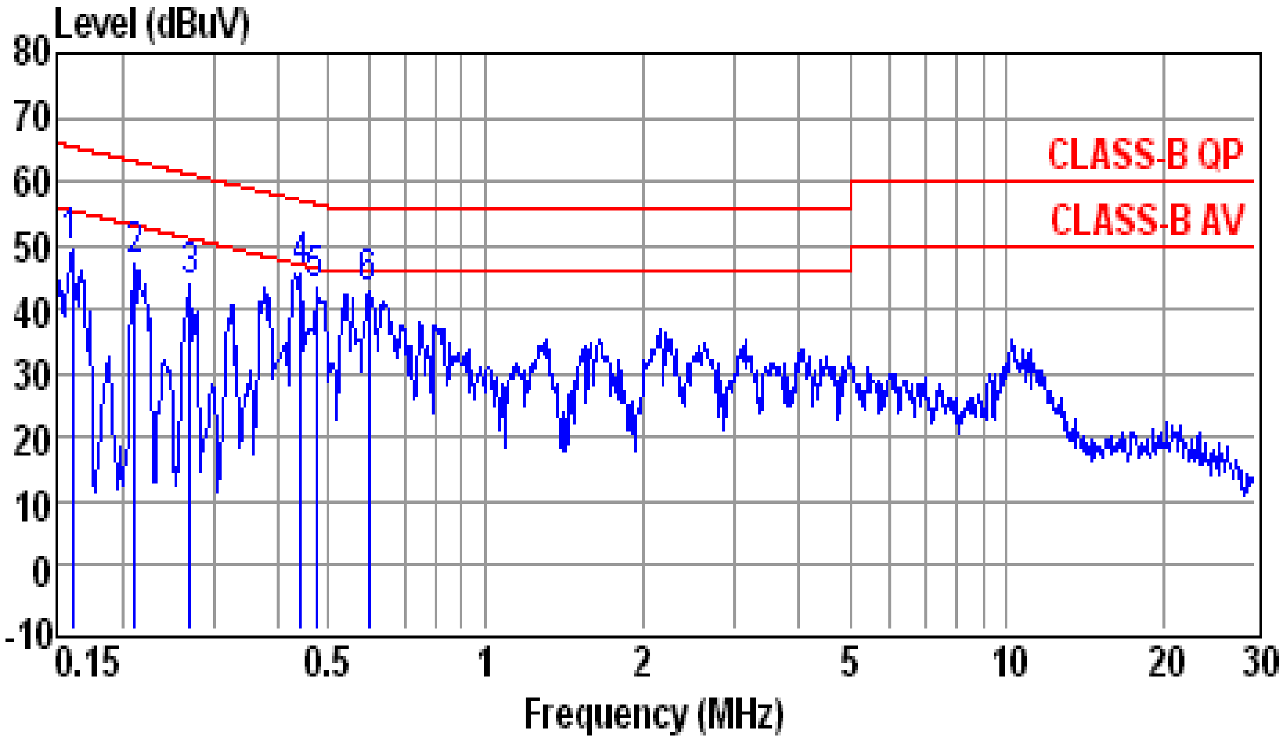
## 8.2 Measurement Procedure

1. Setup the configuration per figure 3.
2. A preliminary scan with a spectrum monitor is performed to identify the frequency of emission that has the highest amplitude relative to the limit by operating the EUT in selected modes of operation, typical cable positions, and with a typical system configuration.
3. Record the 6 or 8 highest emissions relative to the limit.
4. Measure each frequency obtained from step 3 by a test receiver set on quasi peak detector function, and then record the accuracy frequency and emission level. If all emissions measured in the specified band are attenuated more than 20 dB from the limit, this step would be ignored, and the peak detector function would be used.
5. Confirm the highest three emissions with variation of the EUT cable configuration and record the final data.
6. Repeat all above procedures on measuring each operation mode of EUT.

Figure 3 : Conducted emissions measurement configuration



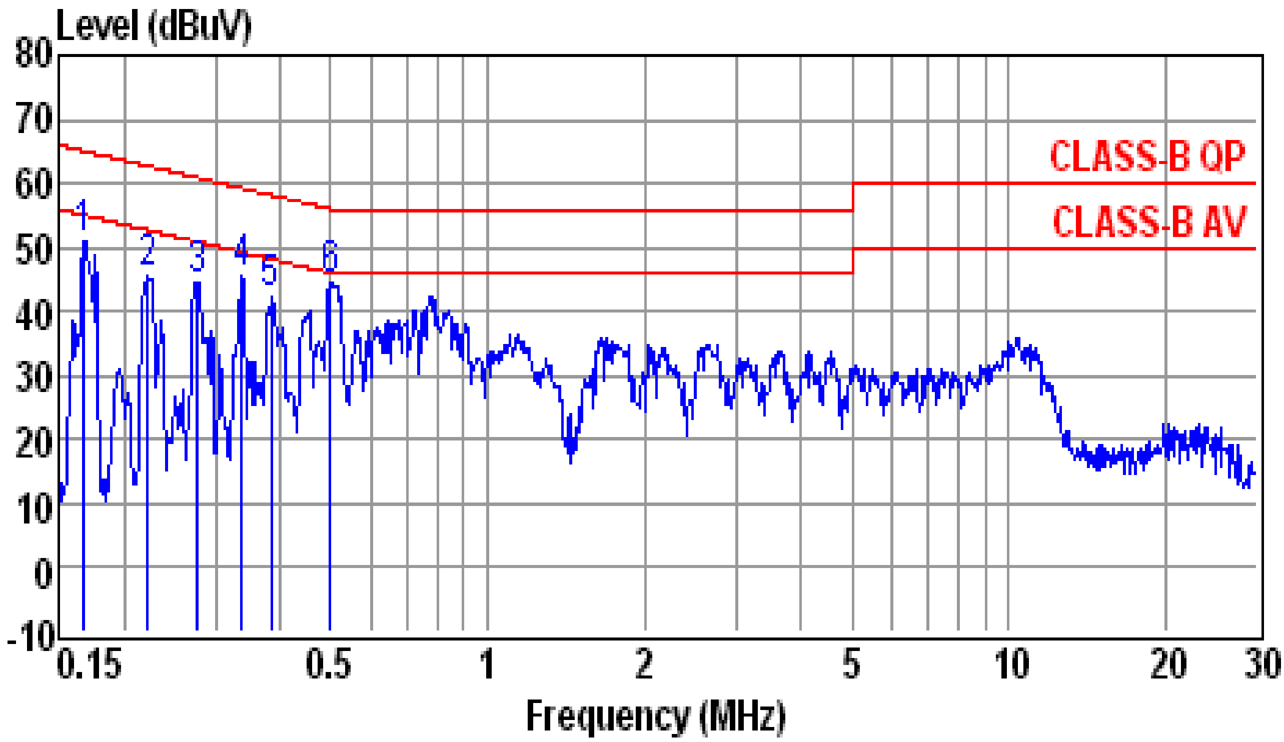
## 8.3 Conducted Emission Data




| | | | |
|---|---|---|---|
| Site | : conducted #1 | Date | : 05-21-2015 |
| Condition | : CLASS-B QP | LISN | : NEUTRAL |
| Tem / Hum | : 25 ℃ / 68% | Test Mode | : charge mode |
| EUT | :Wireless Bodypack Transmitter | | |
| Power Rating | : AC120V/60Hz (ADAPTER) | | |
| Memo | : | Memo | : |

| Freq (MHz) | Reading (dBuV) | Factor (dB) | Emission Level (dBuV) | Limit Line (dBuV) | Over Limit (dB) | Remark |
|---|---|---|---|---|---|---|
| 0.1607 | 39.12 | 10.14 | 49.26 | 65.43 | -16.17 | QP |
| 0.2117 | 36.98 | 10.14 | 47.12 | 63.14 | -16.02 | QP |
| 0.2701 | 33.91 | 10.15 | 44.06 | 61.12 | -17.06 | QP |
| 0.4421 | 35.60 | 10.16 | 45.76 | 57.02 | -11.26 | QP |
| 0.4736 | 33.10 | 10.17 | 43.27 | 56.45 | -13.18 | QP |
| 0.5948 | 32.44 | 10.18 | 42.62 | 56.00 | -13.38 | QP |

Note :
1. Result = Reading + Factor
2. Factor = LISN Factor + Cable Loss




| | | | |
|---|---|---|---|
| Site | : conducted #1 | Date | : 05-21-2015 |
| Condition | : CLASS-B QP | LISN | : LINE |
| Tem / Hum | : 25 ℃ / 68% | Test Mode | : charge mode |
| EUT | :Wireless Bodypack Transmitter | | |
| Power Rating | : AC120V/60Hz (ADAPTER) | | |
| Memo | : | Memo | : |

| Freq (MHz) | Reading (dBuV) | Factor (dB) | Emission Level (dBuV) | Limit Line (dBuV) | Over Limit (dB) | Remark |
|---|---|---|---|---|---|---|
| 0.1677 | 40.74 | 10.13 | 50.87 | 65.08 | -14.21 | QP |
| 0.2220 | 35.63 | 10.13 | 45.76 | 62.74 | -16.98 | QP |
| 0.2773 | 34.49 | 10.14 | 44.63 | 60.90 | -16.27 | QP |
| 0.3374 | 35.11 | 10.15 | 45.26 | 59.27 | -14.01 | QP |
| 0.3832 | 32.32 | 10.15 | 42.47 | 58.21 | -15.74 | QP |
| 0.4994 | 34.43 | 10.16 | 44.59 | 56.01 | -11.42 | QP |

Note :
1. Result = Reading + Factor
2. Factor = LISN Factor + Cable Loss

## 8.4 Result Data Calculation

The result data is calculated by adding the LISN Factor to the measured reading. The basic equation with a sample calculation is as follows:

***RESULT = READING + LISN FACTOR***

Assume a receiver reading of 22.5 dB$\mu$V is obtained, and LISN Factor is 0.1 dB, then the total of disturbance voltage is 22.6 dB$\mu$V.

RESULT = 22.5 + 0.1 = 22.6 dB$\mu$V
Level in $\mu$V = Common Antilogarithm[(22.6 dB$\mu$V)/20]
= 13.48 $\mu$V

## 8.5 Conducted Measurement Equipment

The following test equipment are used during the conducted test .

| Equipment | Manufacturer | Model No. | Calibration Date | Next Cal. Date |
|---|---|---|---|---|
| EMI Test Receiver | Rohde & Schwarz | ESCI | 2014/09/09 | 2015/09/08 |
| LISN | EMCO | 3625/2 | 2014/10/29 | 2015/10/28 |
| LISN | Rohde & Schwarz | ESH2-Z5 | 2015/04/09 | 2016/04/08 |

## 8.6 Photos of Conduction Measuring Setup