

## FCC PART 90

## TEST REPORT

For

### Fujian BelFone Communications Technology Co., Ltd.

A15, Huaqiao Economic Development Zone, Shuangyang, Luojiang, Quanzhou, Fujian, China

**FCC ID: 2AARFBFTD51101**

|                                                                                                                                                                                                                                                                                                                             |                                             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
| <b>Report Type:</b><br>Original Report                                                                                                                                                                                                                                                                                      | <b>Product Type:</b><br>Digital transceiver |
| <b>Report Number:</b> RSZ171116010-00                                                                                                                                                                                                                                                                                       |                                             |
| <b>Report Date:</b> 2018-03-12                                                                                                                                                                                                                                                                                              |                                             |
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## GENERAL INFORMATION

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### Product Description for Equipment under Test (EUT)

The Fujian BelFone Communications Technology Co., Ltd.'s product, model number: *BF-TD511 UHF* (FCC ID: 2AARFBFTD51101) in this report is a *Digital transceiver*, which was measured approximately: 119 mm (L) \* 57 mm (W) \* 32 mm (H) for main EUT, 84 mm (L) x 80 mm (W) x 49 mm (H) for charger, rated with input voltage: DC 7.4V rechargeable battery or DC 9V from adapter for charging.

#### Adapter information

Model: RSF-DY056-09000800

Input: AC 100-240V~50/60Hz 0.4A

Output: DC 9V, 0.8A

*Notes: This products model: BF-TD512 UHF, BF-TD510 UHF and BF-TD511 UHF are identical schematics and only are different for model name, LCD display and keyboards. Model BF-TD511 UHF was selected for fully testing, the detailed information can be referred to the attached declaration which was stated and guaranteed by the applicant.*

*\* All measurement and test data in this report was gathered from production sample serial number: 1702541 (Assigned by BACL, Shenzhen). The EUT supplied by the applicant was received on 2017-11-16.*

### Objective

This test report is prepared on behalf of *Fujian BelFone Communications Technology Co., Ltd.* in accordance with Part 2, and Part 90 of the Federal Communication Commissions rules.

### Related Submittal(s)/Grant(s)

No Related Submittal(s)/Grant(s).

### Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of federal Regulations Title 47 Part 2, Sub-part J as well as the following individual parts:

Part 90 – Private Land Mobile Radio Service

Applicable Standards: TIA 603-D and ANSI C63.4-2014.

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

**Measurement Uncertainty**

| Parameter                    | uncertainty           |
|------------------------------|-----------------------|
| Occupied Channel Bandwidth   | $\pm 5\%$             |
| RF output power, conducted   | $\pm 1.5\text{dB}$    |
| Unwanted Emission, conducted | $\pm 1.5\text{dB}$    |
| All emissions, radiated      | $\pm 4.88\text{dB}$   |
| Temperature                  | $\pm 1^\circ\text{C}$ |
| Supply voltages              | $\pm 0.4\%$           |

**Test Facility**

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, Guangdong, China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 382179, the FCC Designation No. : CN5001.

The test site has been registered with ISED Canada under ISED Canada Registration Number 3062B.

## SYSTEM TEST CONFIGURATION

### Description of Test Configuration

The system was configured for testing in a test mode which has been done in the factory.

#### EUT Specification:

|                          |                     |
|--------------------------|---------------------|
| Operating frequency band | 400-480MHz          |
| Modulation type          | 4FSK                |
| Channel separation       | 12.5kHz             |
| Rate Output Power        | High:4.2W<br>Low:1W |

### EUT Exercise Software

No exercise software was used.

### Special Accessories

No special accessory was used.

### Equipment Modifications

No modification was made to the EUT tested.

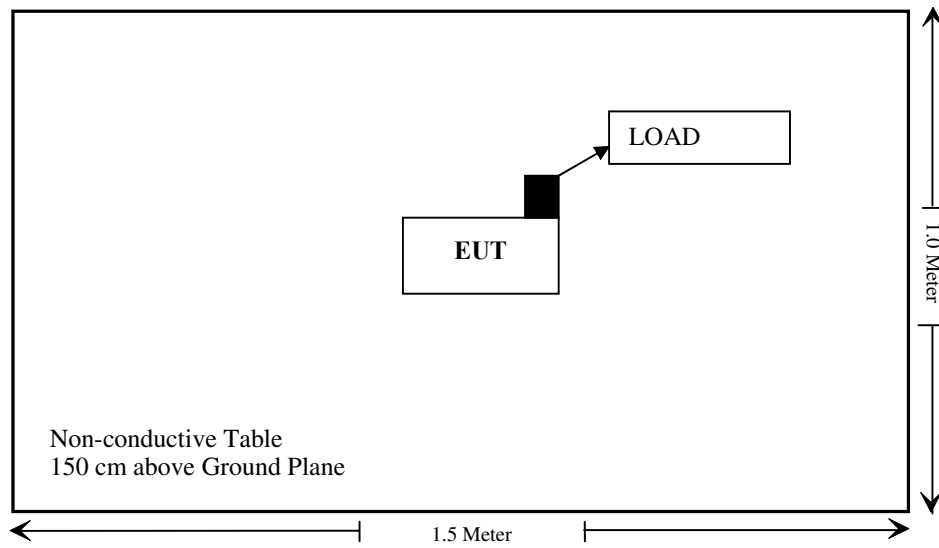
### Support Equipment List and Details

| Manufacturer | Description | Model | Serial Number |
|--------------|-------------|-------|---------------|
| N/A          | Load        | N/A   | N/A           |

### External I/O Cable

| Cable Description | Length (m) | From Port | To  |
|-------------------|------------|-----------|-----|
| N/A               | N/A        | N/A       | N/A |

### Block Diagram of Test Setup



**SUMMARY OF TEST RESULTS**

| FCC Rules         | Description of Test                   | Results    |
|-------------------|---------------------------------------|------------|
| §1.1307 & §2.1093 | RF EXPOSURE                           | Compliance |
| §2.1046; §90.205  | RF Output Power                       | Compliance |
| §2.1047; §90.207  | Modulation Characteristic             | Compliance |
| §2.1049; §90.210  | Occupied Bandwidth & Emission Mask    | Compliance |
| §2.1051; §90.210  | Spurious Emission at Antenna Terminal | Compliance |
| §2.1053; §90.210  | Spurious Radiated Emissions           | Compliance |
| §2.1055; §90.213  | Frequency Stability                   | Compliance |
| §90.214           | Transient Frequency Behavior          | Compliance |

**TEST EQUIPMENT LIST**

| Manufacturer                  | Description                    | Model                 | Serial Number          | Calibration Date | Calibration Due Date |
|-------------------------------|--------------------------------|-----------------------|------------------------|------------------|----------------------|
| <b>Radiated Emission Test</b> |                                |                       |                        |                  |                      |
| Sunol Sciences                | Horn Antenna                   | DRH-118               | A052604                | 2017-12-22       | 2020-12-21           |
| Rohde & Schwarz               | Signal Analyzer                | FSIQ26                | 8386001028             | 2017-04-24       | 2018-04-24           |
| Sunol Sciences                | Bi-log Antenna                 | JB1                   | A040904-2              | 2017-12-17       | 2020-12-16           |
| Mini                          | Pre-amplifier                  | ZVA-183-S+            | 5969001149             | 2017-05-21       | 2018-05-21           |
| HP                            | Amplifier                      | HP8447E               | 1937A01046             | 2017-11-19       | 2018-05-21           |
| Anritsu                       | Signal Generator               | 68369B                | 004114                 | 2017-12-24       | 2018-12-24           |
| Rohde & Schwarz               | EMI Test Receiver              | ESCI                  | 101120                 | 2017-12-07       | 2018-12-07           |
| COM POWER                     | Dipole Antenna                 | AD-100                | 041000                 | NCR              | NCR                  |
| A.H. System                   | Horn Antenna                   | SAS-200/571           | 135                    | 2015-08-18       | 2018-08-17           |
| Ducommun technologies         | RF Cable                       | UFA210A-1-4724-30050U | MFR64369<br>223410-001 | 2017-11-19       | 2018-05-21           |
| Ducommun technologies         | RF Cable                       | 104PEA                | 218124002              | 2017-11-19       | 2018-05-21           |
| Ducommun technologies         | RF Cable                       | RG-214                | 1                      | 2017-11-19       | 2018-05-21           |
| Ducommun technologies         | RF Cable                       | RG-214                | 2                      | 2017-11-19       | 2018-05-21           |
| <b>RF Conducted Test</b>      |                                |                       |                        |                  |                      |
| Rohde & Schwarz               | SPECTRUM ANALYZER              | FSU26                 | 200120                 | 2016-12-05       | 2017-12-05           |
| Rohde & Schwarz               | SPECTRUM ANALYZER              | FSU26                 | 200120                 | 2017-12-05       | 2018-12-05           |
| ESPEC                         | Temperature & Humidity Chamber | EL-10KA               | 09107726               | 2016-11-22       | 2017-11-22           |
| ESPEC                         | Temperature & Humidity Chamber | EL-10KA               | 09107726               | 2017-11-22       | 2018-11-22           |
| Long Wei                      | DC Power Supply                | TPR-6420D             | 398363                 | NCR              | NCR                  |
| Ducommun technologies         | RF Cable                       | RG-214                | 3                      | 2017-05-22       | 2017-11-22           |
| Ducommun technologies         | RF Cable                       | RG-214                | 3                      | 2017-11-22       | 2018-05-22           |
| WEINSCHL                      | 30dB Attenuator                | 53-30-43              | PG633                  | 2017-05-22       | 2017-11-22           |
| WEINSCHL                      | 30dB Attenuator                | 53-30-43              | PG633                  | 2017-11-22       | 2018-05-22           |

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

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## **FCC §1.1307 & §2.1093 - RF EXPOSURE**

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### **Applicable Standard**

FCC§1.1310 and §2.1093.

### **Test Result**

Compliance, please refer to the SAR report: RSZ171116010-20.

## FCC §2.1046 & §90.205 - RF OUTPUT POWER

### Applicable Standard

FCC §2.1046 and §90.205

### Test Procedure

Conducted RF Output Power:

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

Spectrum Analyzer Setting:

|         |           |
|---------|-----------|
| R B/W   | Video B/W |
| 100 kHz | 300 kHz   |

### Test Data

#### Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 25 °C     |
| Relative Humidity: | 56 %      |
| ATM Pressure:      | 101.0 kPa |

The testing was performed by Jacob Kong on 2018-02-12.

Test Mode: Transmitting

**Test Result:** Compliance. Please refer to following table.

| Modulation | Channel Separation (kHz) | Frequency (MHz) | Power Level | Output Power (dBm) | Output Power (W) |
|------------|--------------------------|-----------------|-------------|--------------------|------------------|
| Digital    | 12.5                     | 400.0125        | High        | 36.78              | 4.76             |
|            |                          |                 | Low         | 30.68              | 1.17             |
|            | 12.5                     | 453.2125        | High        | 36.74              | 4.72             |
|            |                          |                 | Low         | 30.54              | 1.13             |
|            | 12.5                     | 479.9875        | High        | 36.91              | 4.91             |
|            |                          |                 | Low         | 29.73              | 0.94             |

Note: The rated high power is 4.2W. The limit of the high output power is 3.36W-5.04W.  
The rated low power is 1W. The limit of the low output power is 0.8W-1.2W.

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## **FCC §2.1047 & §90.207 - MODULATION CHARACTERISTIC**

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### **Applicable Standard**

According to FCC § 2.1047(d), Part 90 there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

**FCC §2.1049 & §90.210 – OCCUPIED BANDWIDTH & EMISSION MASK****Applicable Standard**

FCC §2.1049 and §90.210

Emission Mask D - 12.5 kHz channel bandwidth equipment. For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

- 1) For any frequency removed from the center of the authorized bandwidth  $f_0$  to 5.625 kHz removed from  $f_0$ , 0dB.
- 2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $f_d$  in kHz) of more than 5.626 kHz but no more than 12.5 kHz, at least 7.27 ( $f_d - 2.88$  kHz) dB.
- 3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $f_d$  in kHz) of more than 12.5 kHz at least: At least  $50 + 10 \log (P)$  dB or 70 dB, whichever is the lesser attenuation.

**Test Procedure**

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The resolution bandwidth of the spectrum analyzer was set at 100 Hz and the spectrum was recorded in the frequency band  $\pm 50$  kHz from the carrier frequency.

**Test Data****Environmental Conditions**

|                           |           |
|---------------------------|-----------|
| <b>Temperature:</b>       | 25 °C     |
| <b>Relative Humidity:</b> | 54 %      |
| <b>ATM Pressure:</b>      | 101.0 kPa |

*The testing was performed by Jacob Kong on 2017-11-21.*

| Modulation | Channel Separation (kHz) | Frequency (MHz) | Power Level | 99% Occupied Bandwidth (kHz) | 26 dB Emissions Bandwidth (kHz) |
|------------|--------------------------|-----------------|-------------|------------------------------|---------------------------------|
| Digital    | 12.5                     | 453.2125        | High        | 7.131                        | 9.135                           |
|            |                          |                 | Low         | 7.452                        | 9.295                           |

*Note: Emission bandwidth was based on calculation method instead of measurement.*

Emission Designator Per CFR 47 §2.201& §2.202&,  $B_n = 2M + 2D$

For Digital Mode (Channel Spacing: 12.5 kHz)

Emission Designator 7K60F1D and 7K60F1E

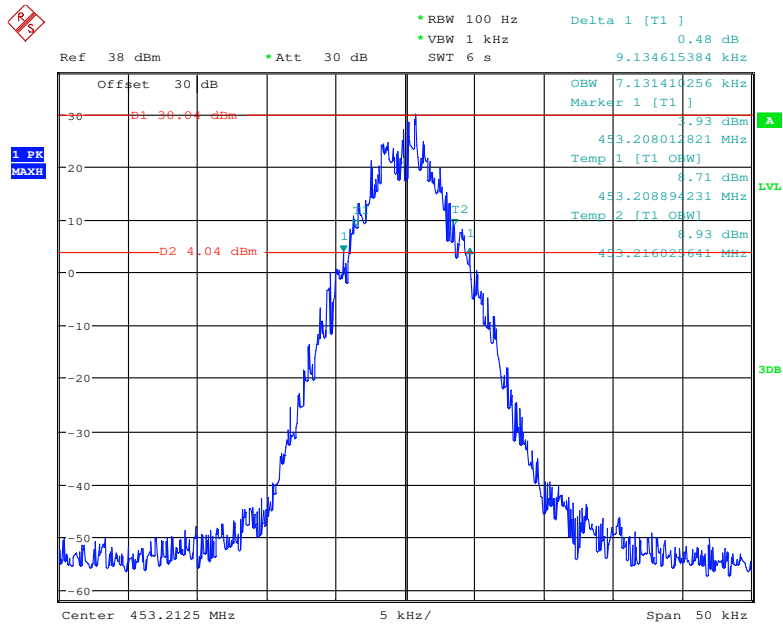
The 99% energy rule (title 47CFR 2.1049) was used for digital mode. It basically states that 99% of the modulation energy falls within X kHz, in this case, 7.452 kHz. The emission mask was obtained from 47CFR 90.210(d).

F1D and F1E portion of the designator indicates digital information.

Therefore, the entire designator for 12.5 kHz channel spacing digital mode is 7K60F1D and 7K60F1E.

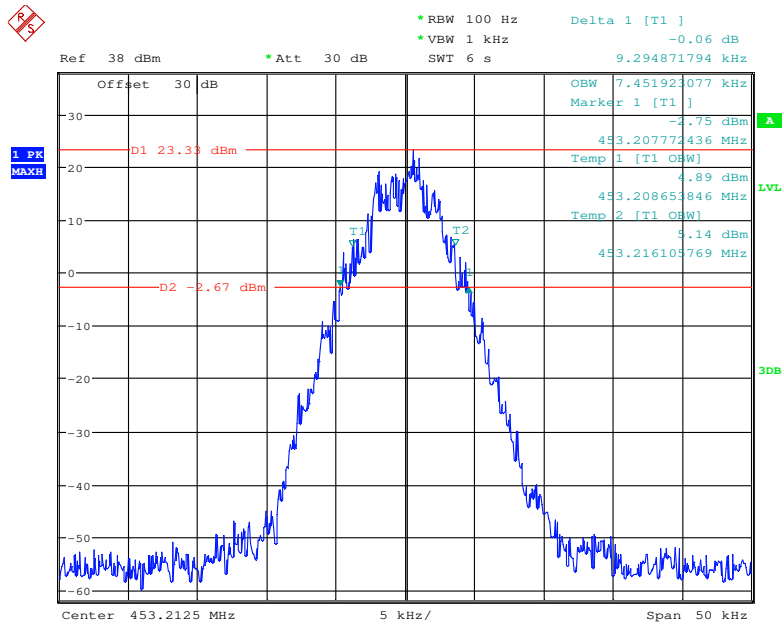
# Digital Modulation:

## Frequency 453.2125 MHz: 99% Occupied & 26 dB Bandwidth, High Power



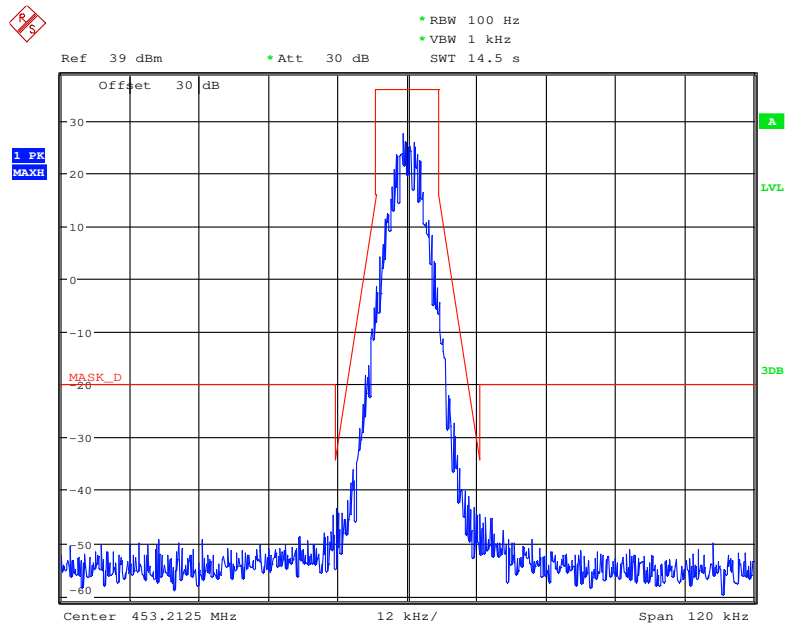
Date: 21.NOV.2017 09:47:53

## Frequency 453.2125 MHz: 99% Occupied & 26 dB Bandwidth, Low Power



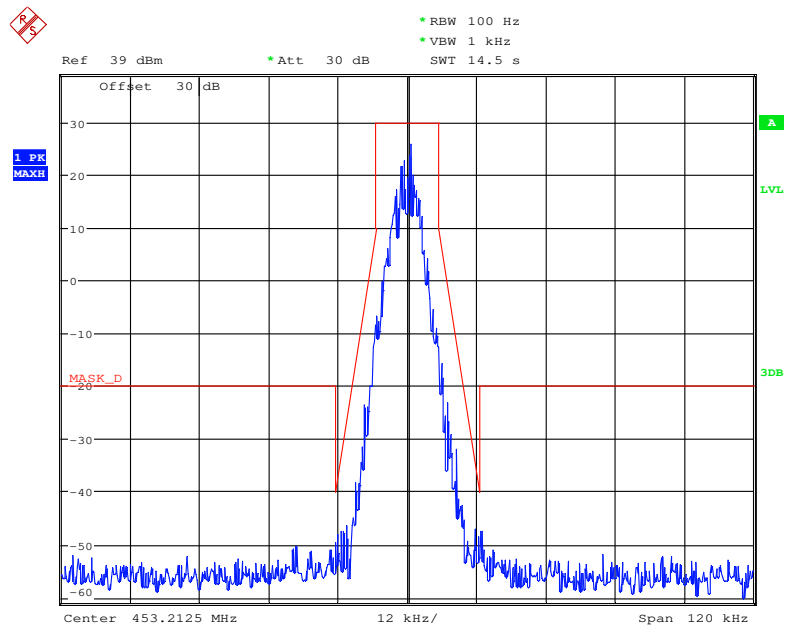
Date: 21.NOV.2017 09:46:34

### Frequency 453.2125 MHz: Emission Mask, High Power



Date: 21.NOV.2017 11:47:15

### Frequency 453.2125 MHz: Emission Mask, Low Power



Date: 21.NOV.2017 11:49:36

## FCC §2.1051 & §90.210 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

### Applicable Standard

Emission Mask D—12.5 kHz channel bandwidth equipment. For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

- 1) For any frequency removed from the center of the authorized bandwidth  $f_0$  to 5.625 kHz removed from  $f_0$ , 0 dB.
- 2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $f_d$  in kHz) of more than 5.626 kHz but no more than 12.5 kHz, at least  $7.27 (f_d - 2.88 \text{ kHz})$  dB.
- 3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $f_d$  in kHz) of more than 12.5 kHz: At least  $50 + 10 \log (P)$  dB or 70 dB, whichever is the lesser attenuation.

### Test Procedure

The RF output of the EUT was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100kHz for below 1GHz, and 1MHz for above 1GHz. Sufficient scans were taken to show any out of band emissions up to 10<sup>th</sup> harmonic.

### Test Data

#### Environmental Conditions

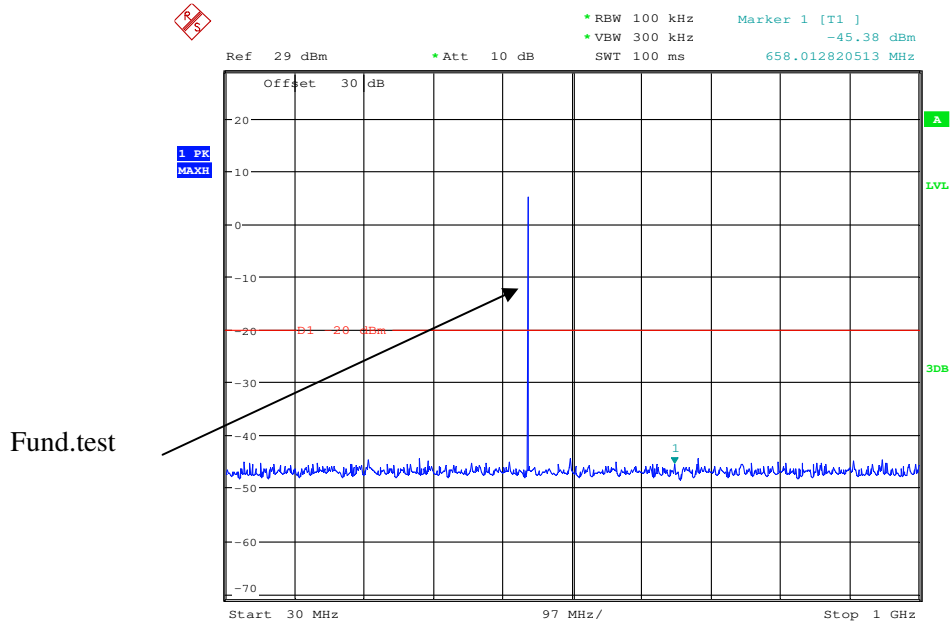
|                    |           |
|--------------------|-----------|
| Temperature:       | 25 °C     |
| Relative Humidity: | 54 %      |
| ATM Pressure:      | 101.0 kPa |

*The testing was performed by Jacob Kong on 2017-11-21.*

*Test Mode: Transmitting, please refer to the following plots.*

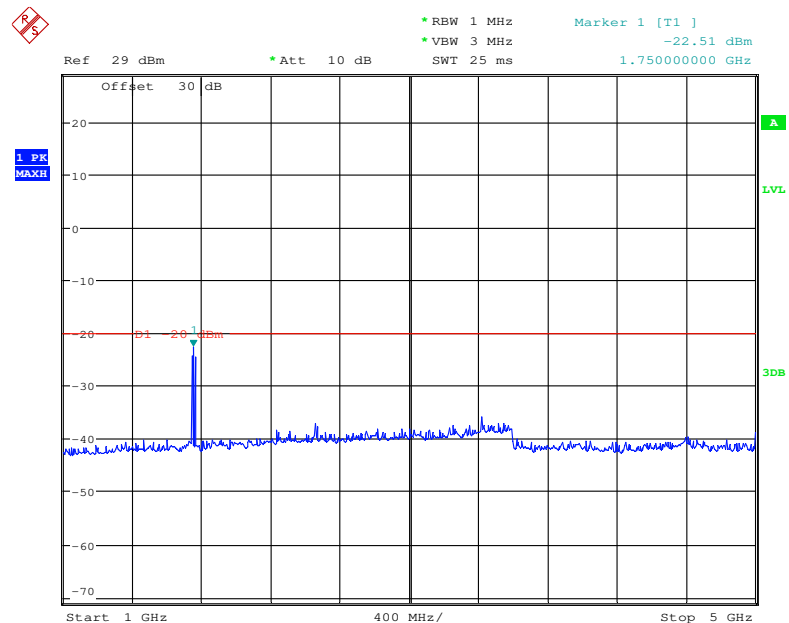
**Digital Modulation:**

**30MHz – 1 GHz, Spacing Channel 12.5 kHz, 453.2125 MHz**



Date: 21.NOV.2017 15:03:08

**1 GHz – 5 GHz, Spacing Channel 12.5 kHz, 453.2125 MHz**



Date: 21.NOV.2017 15:03:46

## **FCC §2.1053 & §90.210 - RADIATED SPURIOUS EMISSIONS**

### **Applicable Standard**

FCC §2.1053 and §90.210

### **Test Procedure**

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load, which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to teeth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB = 10 lg (TXpwr in Watts/0.001)-the absolute level

Spurious attenuation limit in dB = 50 + 10 Log<sub>10</sub> (power out in Watts) for EUT with a 12.5 kHz channel bandwidth.

### **Test Data**

#### **Environmental Conditions**

|                           |           |
|---------------------------|-----------|
| <b>Temperature:</b>       | 25 °C     |
| <b>Relative Humidity:</b> | 56 %      |
| <b>ATM Pressure:</b>      | 101.0 kPa |

*The testing was performed by Jacob Kong on 2018-01-10.*

Test Mode: Transmitting(High power level)

**30MHz - 5GHz:**

Model: BF-TD511 UHF:

| Frequency<br>(MHz)             | Receiver<br>Reading<br>(dBμV) | Turn<br>Table<br>Angle<br>Degree | Rx Antenna    |                | Substituted    |                       |                         | Absolute<br>Level<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|--------------------------------|-------------------------------|----------------------------------|---------------|----------------|----------------|-----------------------|-------------------------|----------------------------|----------------|----------------|
|                                |                               |                                  | Height<br>(m) | Polar<br>(H/V) | Level<br>(dBm) | Cable<br>Loss<br>(dB) | Antenna<br>Gain<br>(dB) |                            |                |                |
| Digital Modulation 453.2125MHz |                               |                                  |               |                |                |                       |                         |                            |                |                |
| 906.425                        | 44.24                         | 2                                | 2.5           | H              | -52.8          | 0.70                  | 0                       | -53.50                     | -20            | 33.50          |
| 906.425                        | 45.36                         | 79                               | 1.6           | V              | -51.6          | 0.70                  | 0                       | -52.30                     | -20            | 32.30          |
| 1359.6375                      | 45.73                         | 70                               | 2.1           | H              | -62.2          | 1.60                  | 8.30                    | -55.50                     | -20            | 35.50          |
| 1359.6375                      | 57.95                         | 272                              | 2.3           | V              | -50.3          | 1.60                  | 8.30                    | -43.60                     | -20            | 23.60          |

Model: BF-TD512 UHF:

| Frequency<br>(MHz)             | Receiver<br>Reading<br>(dBμV) | Turn<br>Table<br>Angle<br>Degree | Rx Antenna    |                | Substituted    |                       |                         | Absolute<br>Level<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|--------------------------------|-------------------------------|----------------------------------|---------------|----------------|----------------|-----------------------|-------------------------|----------------------------|----------------|----------------|
|                                |                               |                                  | Height<br>(m) | Polar<br>(H/V) | Level<br>(dBm) | Cable<br>Loss<br>(dB) | Antenna<br>Gain<br>(dB) |                            |                |                |
| Digital Modulation 453.2125MHz |                               |                                  |               |                |                |                       |                         |                            |                |                |
| 906.425                        | 45.80                         | 280                              | 1.7           | H              | -51.2          | 0.70                  | 0                       | -51.90                     | -20            | 31.90          |
| 906.425                        | 44.04                         | 82                               | 1.6           | V              | -53.0          | 0.70                  | 0                       | -53.70                     | -20            | 33.70          |
| 1359.6375                      | 59.56                         | 317                              | 1.3           | H              | -48.4          | 1.60                  | 8.30                    | -41.70                     | -20            | 21.70          |
| 1359.6375                      | 62.22                         | 346                              | 1.3           | V              | -46.0          | 1.60                  | 8.30                    | -39.30                     | -20            | 19.30          |

Model: BF-TD510 UHF:

| Frequency<br>(MHz)             | Receiver<br>Reading<br>(dBμV) | Turn<br>Table<br>Angle<br>Degree | Rx Antenna    |                | Substituted    |                       |                         | Absolute<br>Level<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|--------------------------------|-------------------------------|----------------------------------|---------------|----------------|----------------|-----------------------|-------------------------|----------------------------|----------------|----------------|
|                                |                               |                                  | Height<br>(m) | Polar<br>(H/V) | Level<br>(dBm) | Cable<br>Loss<br>(dB) | Antenna<br>Gain<br>(dB) |                            |                |                |
| Digital Modulation 453.2125MHz |                               |                                  |               |                |                |                       |                         |                            |                |                |
| 906.425                        | 45.52                         | 321                              | 1.0           | H              | -51.5          | 0.70                  | 0                       | -52.20                     | -20            | 32.20          |
| 906.425                        | 44.62                         | 9                                | 1.4           | V              | -52.4          | 0.70                  | 0                       | -53.10                     | -20            | 33.10          |
| 1359.6375                      | 49.42                         | 355                              | 1.6           | H              | -58.5          | 1.60                  | 8.30                    | -51.80                     | -20            | 31.80          |
| 1359.6375                      | 63.16                         | 126                              | 2.0           | V              | -45.1          | 1.60                  | 8.30                    | -38.40                     | -20            | 18.40          |

**Note:**

Absolute Level = Substituted Level - Cable loss + Antenna Gain

Margin = Limit- Absolute Level

## FCC §2.1055 & §90.213 - FREQUENCY STABILITY

### Applicable Standard

FCC §2.1055 and §90.213

### Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to a frequency counter via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the counter.

### Test Data

#### Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 25 °C     |
| Relative Humidity: | 56 %      |
| ATM Pressure:      | 101.0 kPa |

The testing was performed by Jacob Kong on 2017-12-31.

Test Mode: Transmitting

| Reference Frequency: 453.2125MHz, Limit: ±2.5 ppm, Digital 12.5 kHz |                                   |                                     |                       |
|---------------------------------------------------------------------|-----------------------------------|-------------------------------------|-----------------------|
| Test Environment                                                    |                                   | Frequency Measure with Time Elapsed |                       |
| Temperature (°C)                                                    | Power Supplied (V <sub>DC</sub> ) | Measured Frequency error (MHz)      | Frequency Error (ppm) |
| Frequency Stability versus Input Temperature                        |                                   |                                     |                       |
| 50                                                                  | 7.4                               | 453.212339                          | -0.3552               |
| 40                                                                  |                                   | 453.212380                          | -0.2648               |
| 30                                                                  |                                   | 453.212416                          | -0.1853               |
| 20                                                                  |                                   | 453.212379                          | -0.2670               |
| 10                                                                  |                                   | 453.212325                          | -0.3861               |
| 0                                                                   |                                   | 453.212341                          | -0.3508               |
| -10                                                                 |                                   | 453.212358                          | -0.3133               |
| -20                                                                 |                                   | 453.212382                          | -0.2604               |
| -30                                                                 |                                   | 453.212376                          | -0.2736               |
| Frequency Stability versus Input Voltage                            |                                   |                                     |                       |
| 20                                                                  | 6.4                               | 453.212355                          | -0.3199               |

## FCC §90.214 - TRANSIENT FREQUENCY BEHAVIOR

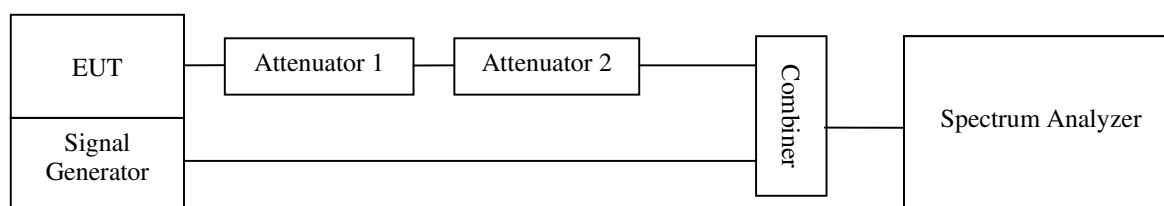
### Applicable Standard

Regulations: FCC §90.214

Test method: ANSI/TIA-603-D 2010, section 2.2.19.3

### Test Procedure

- Connect the EUT and test equipment as shown on the following block diagram.
- Set the Spectrum Analyzer to measure FM deviation, and tune the RF frequency to the transmitter assigned frequency.
- Set the signal generator to the assigned transmitter frequency and modulate it with a 1 kHz tone at  $\pm 12.5$  kHz deviation and set its output level to -100dBm.
- Turn on the transmitter.
- Supply sufficient attenuation via the RF attenuator to provide an input level to the Spectrum Analyzer that is 40 dB below the maximum allowed input power when the transmitter is operating at its rated power level. Note this power level on the Spectrum Analyzer as  $P_0$ .
- Turn off the transmitter.
- Adjust the RF level of the signal generator to provide RF power equal to  $P_0$ . This signal generator RF level shall be maintained throughout the rest of the measurement.
- Remove the attenuation 1, so the input power to the Spectrum Analyzer is increased by 30 dB when the transmitter is turned on.
- Adjust the vertical amplitude control of the spectrum analyzer to display the 1000 Hz at  $\pm 4$  divisions vertically centered on the display. Set trigger mode of the Spectrum Analyzer to "Video", and tune the "trigger level" on suitable level. Then set the "trigger offset" to -10ms for turn on and -15ms for turn off.
- Turn on the transmitter and the transient wave will be captured on the screen of Spectrum Analyzer. Observe the stored display. The instant when the 1 kHz test signal is completely suppressed is considered to be  $t_{on}$ . The trace should be maintained within the allowed divisions during the period  $t_1$  and  $t_2$ .
- Then turn off the transmitter, and another transient wave will be captured on the screen of Spectrum Analyzer. The trace should be maintained within the allowed divisions during the period  $t_3$ .



### Test Data

#### Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 25 °C     |
| Relative Humidity: | 56 %      |
| ATM Pressure:      | 101.0 kPa |

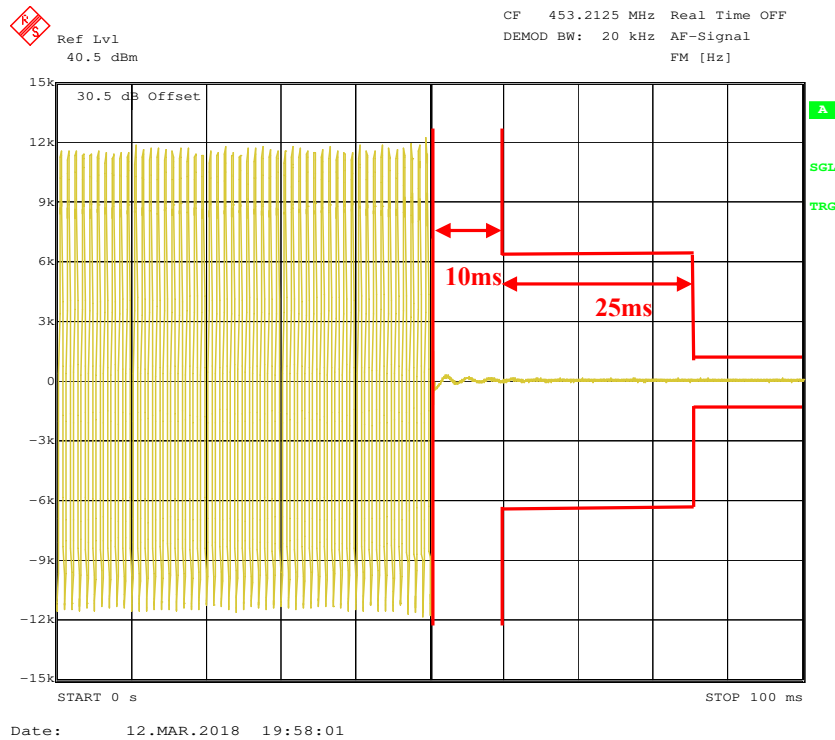
The testing was performed by Jacob Kong on 2018-03-12.

| Channel Separation<br>(kHz) | Transient Period<br>(ms) | Transient Frequency | Result |
|-----------------------------|--------------------------|---------------------|--------|
| 12.5                        | 10 (t1)                  | <+/-12.5 kHz        | Pass   |
|                             | 25(t2)                   | <+/-6.25 kHz        |        |
|                             | 10 (t3)                  | <+/-12.5 kHz        |        |

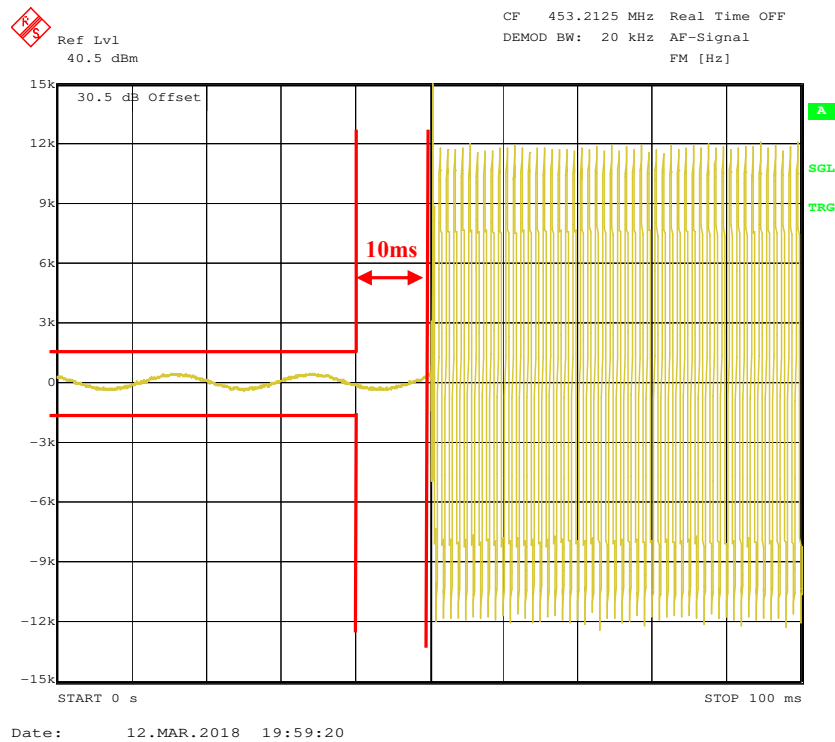
Please refer to the following plots.

Channel: 453.2125 MHz, 12.5 kHz

### Turn on



### Turn off



\*\*\*\*\* END OF REPORT \*\*\*\*\*