

# PARTIAL TEST REPORT

of

## RE Directive (2014/53/EU)

### ETSI EN 300 328 v2.2.2

**Product:** Bluetooth 4.2 Module

**Brand:** FANSTEL

**Model:** BC832

**Model Difference:** N/A

**Applicant:** Fanstel Corporation, Taipei

**Address:** 10F-10, No. 79, Sec. 1, Hsin Tai Wu Rd.,  
Hsi-Chih, New Taipei City 221 Taiwan

**Test Performed by:**  
**International Standards Laboratory Corp.**

<LT Lab.>

\*Address:

No. 120, Lane 180, Hsin Ho Rd.

Lung-Tan Dist., Tao Yuan City 325, Taiwan

\*Tel : 886-3-407-1718; Fax: 886-3-407-1738

**Report No.: ISL-16LR342E328-R1**

**Issue Date : 2021/01/15**

Test results given in this report apply only to the specific sample(s) tested and are traceable to national or international standard through calibration of the equipment and evaluating measurement uncertainty herein.

The determination of the test results is determined by customer agreement, regulations or standard document specifications. The uncertainty of the measurement does not include in consideration of the test result unless the customer required the determination of uncertainty via the agreement, regulation or standard document specification.

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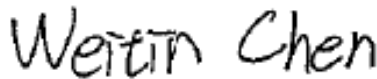


## VERIFICATION OF COMPLIANCE

**Applicant:** Fanstel Corporation, Taipei  
**Equipment Under Test:** Bluetooth 4.2 Module  
**Brand Name:** FANSTEL  
**Model Number:** BC832  
**Model Different:** N/A  
**Date of Test:** 2020/12/01 ~ 2020/12/16  
**Date of EUT Received:** 2020/12/01

| APPLICABLE STANDARDS   |
|--|
| ETSI EN 300 328 V2.2.2   |
| This report only covers partial test item, including EIRP, Tx RSE, and Receiver Blocking |

The above equipment was tested by International Standards Laboratory Corp. for compliance with the requirements set forth in the European Standard ETSI EN 300328 V V2.2.2. under article 3.2 of RE Directive 2014/53/EU. The results of testing in this report apply to the product/system that was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

|                     |   |              |  |
|---------------------|---|--------------|--|
| <i>Test By:</i>     | <br><hr style="border: 0.5px solid black;"/> <i>Weitin Chen / Senior Engineer</i>  | <i>Date:</i> | 2021/01/15<br><hr style="border: 0.5px solid black;"/> |
| <i>Prepared By:</i> | <br><hr style="border: 0.5px solid black;"/> <i>Elisa Chen / Senior Engineer</i>   | <i>Date:</i> | 2021/01/15<br><hr style="border: 0.5px solid black;"/> |
| <i>Approved By:</i> | <br><hr style="border: 0.5px solid black;"/> <i>Jerry Liu / Associate Director</i> | <i>Date:</i> | 2021/01/15<br><hr style="border: 0.5px solid black;"/> |

## Version

| <b>Version No.</b> | <b>Date</b> | <b>Description</b>           |
|--------------------|-------------|------------------------------|
| 00                 | 2021/01/15  | Initial creation of document |
|                    |             |                              |

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## 1. Description of Equipment under Test (EUT)

### General:

|                             |                      |
|-----------------------------|----------------------|
| Product Name:               | Bluetooth 4.2 Module |
| Brand Name:                 | FANSTEL              |
| Model Name:                 | BC832                |
| Model Difference:           | N/A                  |
| Type of Equipment:          | plug-in equipment    |
| Temperature Range:          | -25°C to + 75°C      |
| Simultaneous transmissions: | No                   |
| Geo-location capability:    | No                   |
| Power Supply:               | 1.7Vdc to 3.6Vdc     |

### BT:

|                            |  |
|----------------------------|--|
| Bluetooth Version          | BT 4.2 (GFSK)  |
| Frequency Range:           | 2402 – 2480MHz   |
| Channel number:            | 40 channels  |
| Modulation type:           | Wide band Modulation   |
| Transmit Power:<br>(EIRP)  | 3.0 dBm  |
| Dwell Time:                | N/A  |
| Operating Mode:            | Point-to-Point   |
| Adaptive/ Non-Adaptive     | Adaptive   |
| LBT (Listen Before Talk)   | Yes  |
|                            | <input checked="" type="checkbox"/> Adaptive Frequency Hopping using LBT based DAA<br><input type="checkbox"/> Adaptive Frequency Hopping using other forms of DAA (non-LBT based)<br><input type="checkbox"/> Short Control Signaling Transmissions |
| Occupied Channel Bandwidth | Within 2400-2483.5MHz  |
| Duty Cycle                 | N/A  |
| Antenna Beam forming       | No   |
| Antenna Designation:       | Type: Chip Antenna, 1 dBi max  |

The EUT is compliance with Bluetooth 4.2 Standard.

## 2. Description of Test Modes

The EUT has been tested under Operating condition. To control the EUT for staying in continuous transmitting and receiving mode is programmed.

BLE: Lowest (2402MHz), Mid (2442MHz) and Highest (2480MHz) mode.

### **Normal test conditions :**

Refer to section 5.1.1.2 of EN 300328

Temperature : + 15°C to 35 °C

Relative humidity: 20 % to 75 %

Normal Voltage: 3.6Vdc

### **Extreme test conditions :**

Refer to section 5.1.1.3 of EN 300328

Where tests at extreme temperatures are required, measurements shall be made over the extremes of the operating temperature range as declared by the manufacturer.

Extreme temperatures: -25°C to + 50°C

### **3. General Description of Applied Standards**

The EUT According to the Specifications, it must comply with the requirements of the following standards:

ETSI EN 300 328 V2.2.2 – Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band; Harmonized Standard for access to radio spectrum

### **4. Test Facility**

International Standards Laboratory Corp.

<LT Lab.>

No. 120, Lane 180, Hsin Ho Rd., Lung-Tan Dist., Tao Yuan City 325, Taiwan

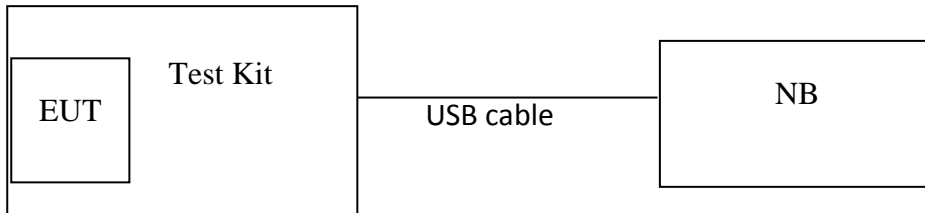
A fully anechoic chamber was used for the radiated spurious emissions test.

TAF Accreditation Lab. Lab number: 0997

## 5. Block Diagram of Test Setup

### 5.1 EUT Configuration

**Fig. 1 Configuration of Tested System**



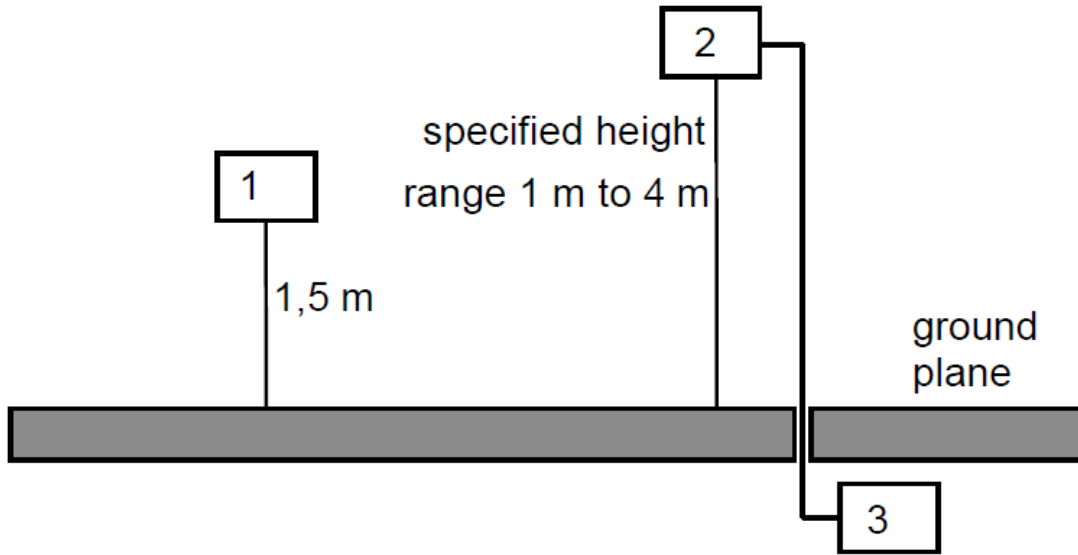
**Table 1 Equipment Used in Tested System**

| Item | Equipment | Mfr/Brand | Model/<br>Type No. | Series No. | Data Cable | Power Cord   |
|------|-----------|-----------|--------------------|------------|------------|--------------|
| 1    | Notebook  | Lenovo    | X220i              | N/A        | N/A        | Non-shielded |
| 2    | Test Kit  | N/A       | N/A                | N/A        | N/A        | N/A          |



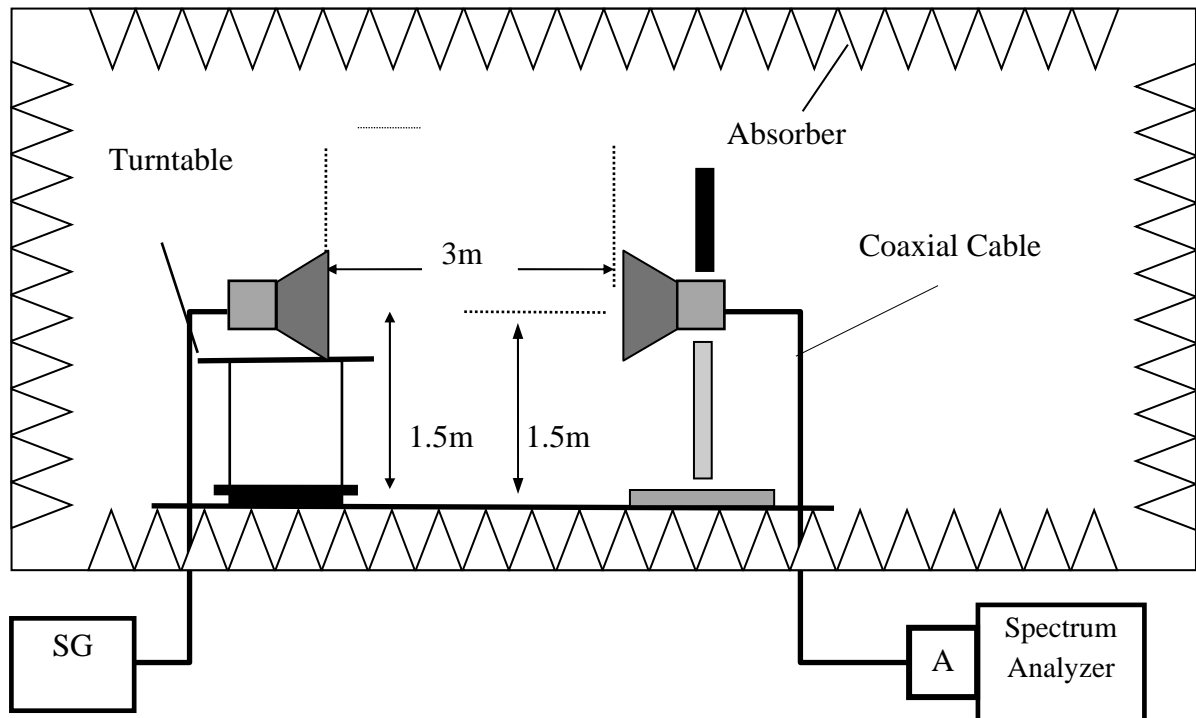
## 5.2 Test Setup for ERP/EIRP Measurement

### 5.2.1 Step 1. Field Strength Measurement OATS or SAR test Site

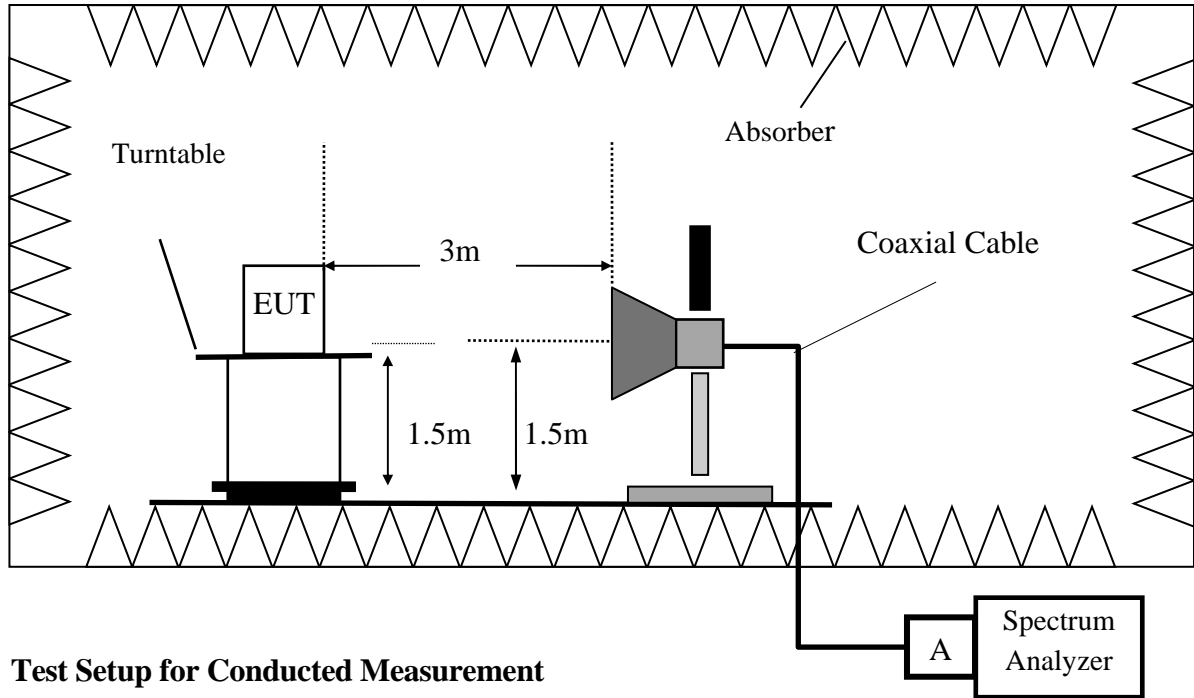


- 1) UUT
- 2) Measurement antenna
- 3) Measurement equipment

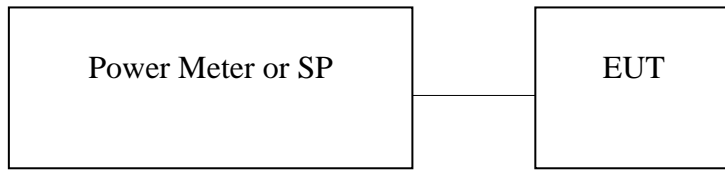
### FAR Test Site



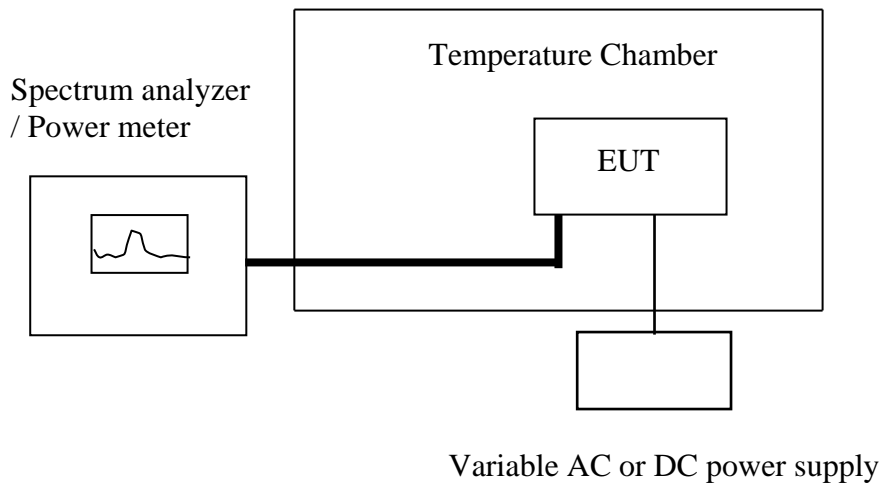
**Step 2. SUBSTITUTION METHOD:**



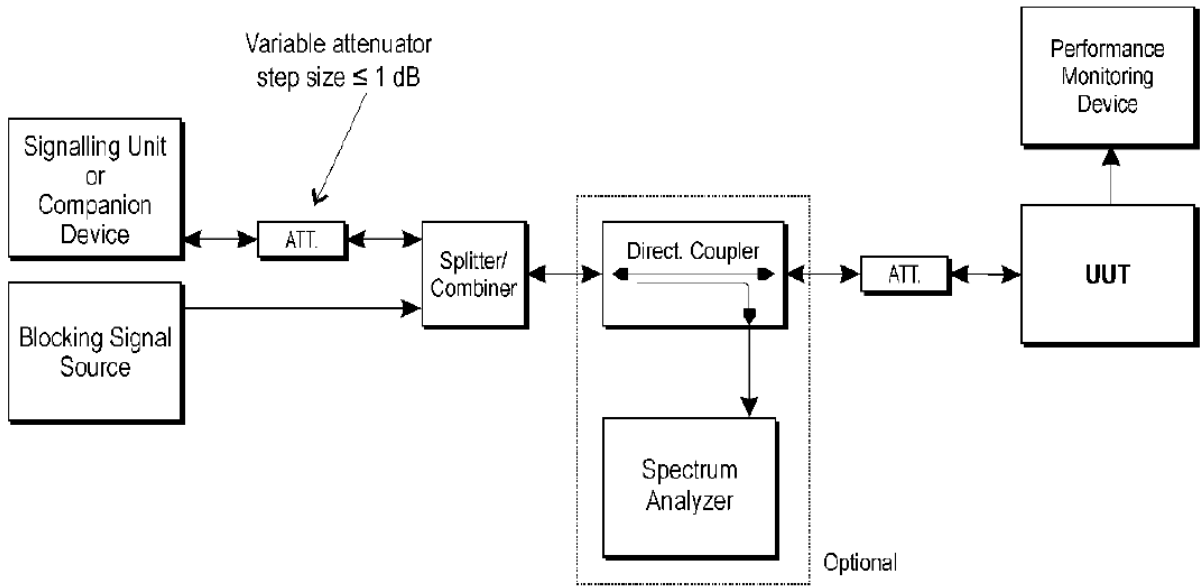
**5.3 Test Setup for Conducted Measurement**



**5.4 Test Setup for Extreme test**



### 5.5 Test Setup for verifying the receiver blocking of an equipment



**Figure 6: Test Set-up for receiver blocking**

### 5.6 Measurement Equipment Used:

| Location Conducted | Equipment Name               | Brand                | Model   | S/N  | Last Cal. Date | Next Cal. Date |
|--------------------|------------------------------|----------------------|---|--|----------------|----------------|
| Chamber 16         | Spectrum Analyzer (26.5GHz)  | Agilent              | N9010A  | MY52100117                                 | 09/02/2020     | 09/02/2021     |
| Chamber 16         | Dipole antenna               | Schwarzbeck          | VHAP,30-300                                   | 919  | 05/11/2020     | 05/11/2021     |
| Chamber 16         | Dipole antenna               | Schwarzbeck          | UHAP,300-1000                                 | 1195                                       | 05/11/2020     | 05/11/2021     |
| Chamber 16         | Loop Antenna                 | EM                   | EM-6879                                       | 271  | 05/21/2020     | 05/21/2021     |
| Chamber 16         | Bilog Antenna                | Schwarzbeck          | VULB9168 w 5dB Att.                           | 9168-495                                   | 10/14/2020     | 10/14/2021     |
| Chamber 16         | Horn antenna (1GHz - 18GHz)  | EM                   | EM-AH-10180                                   | 2011071401                                 | 11/23/2020     | 11/23/2021     |
| Chamber 16         | Horn antenna (18GHz - 26GHz) | Com-power            | AH-826  | 081001                                     | 11/23/2020     | 11/23/2021     |
| Chamber 16         | Horn antenna (26GHz - 40GHz) | Com-power            | AH-640  | 100A                                       | 03/13/2020     | 03/13/2021     |
| Chamber 16         | Preamplifier (9kHz - 1.3GHz) | HP                   | 8447F   | 3113A04621                                 | 06/19/2020     | 06/19/2021     |
| Chamber 16         | Preamplifier (1GHz - 26GHz)  | EM                   | EM01M26G                                      | 060559                                     | 05/21/2020     | 05/21/2021     |
| Chamber 16         | Preamplifier (26GHz - 40GHz) | MITEQ                | JS4-26004000-27-5A                            | 818471                                     | 05/04/2020     | 05/04/2021     |
| Chamber 16         | Cable (100kHz-1GHz)          | HUBER SUHNER         | Sucoflex 104A                                 | 1166 cable 001                             | 12/25/2020     | 12/25/2021     |
| Chamber 16         | Cable (9kHz-18GHz)           | Huber Suhner & Scube | Sucoflex 104A & CA3601-3601-L & CA3601-3601-L | 50927/4A & 1166-1G-26G-01 & 1166-1G-26G-02 | 12/25/2020     | 12/25/2021     |
| Chamber 16         | Cable (18GHz-40GHz)          | HUBER SUHNER         | Sucoflex 102                                  | 27963/2&37421/2                            | 11/19/2020     | 11/19/2021     |
| Chamber 16         | Signal Generator             | Anritsu              | MG3692A                                       | 20311                                      | 01/03/2021     | 01/03/2022     |
| Chamber 16         | Test Software                | Audix                | E3 Ver:6.12023                                | N/A  | N/A            | N/A            |

| Location Conducted | Equipment Name                               | Brand       | Model                      | S/N                      | Last Cal. Date | Next Cal. Date |
|--------------------|--|-------------|----------------------------|--------------------------|----------------|----------------|
| Conducted          | Power Meter                                  | Anritsu     | ML2495A                    | 1116010                  | 09/25/2020     | 09/25/2021     |
| Conducted          | Power Sensor                                 | Anritsu     | MA2411B                    | 34NKF50                  | 09/25/2020     | 09/25/2021     |
| Conducted          | Power Sensor                                 | DARE        | RPR3006W                   | 13I00030SNO33            | 01/04/2021     | 01/04/2022     |
| Conducted          | Power Sensor                                 | DARE        | RPR3006W                   | 13I00030SNO34            | 01/04/2021     | 01/04/2022     |
| Conducted          | Power Sensor                                 | DARE        | RPR3006W                   | 14I00889SNO35            | 06/29/2020     | 06/29/2021     |
| Conducted          | Power Sensor                                 | DARE        | RPR3006W                   | 14I00889SNO36            | 06/29/2020     | 06/29/2021     |
| Conducted          | Temperature Chamber                          | KSON        | THS-B4H100                 | 2287                     | 03/11/2020     | 03/11/2021     |
| Conducted          | DC Power supply                              | ABM         | 8185D                      | N/A                      | 01/05/2021     | 01/05/2022     |
| Conducted          | AC Power supply                              | EXTECH      | CFC105W                    | NA                       | N/A            | N/A            |
| Conducted          | Spectrum analyzer                            | Keysight    | N9010A                     | MY56070257               | 09/23/2020     | 09/23/2021     |
| Conducted          | Test Software                                | DARE        | Radiation<br>Ver:2013.1.23 | NA                       | NA             | NA             |
| Conducted          | Test Software                                | R&S         | CMUGO<br>Ver:2.0.0         | N/A                      | N/A            | N/A            |
| Conducted          | Universal Digital Radio Communication Tester | R&S         | CMU200                     | 111968                   | 11/29/2020     | 11/29/2021     |
| Conducted          | Wideband Radio Communication Tester          | R&S         | CMW500                     | 1201.002K501087<br>93-JG | 10/28/2020     | 10/28/2021     |
| Conducted          | BT Simulator                                 | Agilent     | N4010A                     | MY48100200               | NA             | NA             |
| Conducted          | GPS Simulator                                | Welnavigate | GS-50                      | 701523                   | NA             | NA             |
| Conducted (TS8997) | Wideband Radio Communication Tester          | R&S         | CMW500                     | 168811                   | 07/19/2020     | 07/19/2021     |
| Conducted (TS8997) | Signal Generator                             | R&S         | SMB100B                    | 101085                   | 10/28/2020     | 10/28/2021     |
| Conducted (TS8997) | Vector Signal Generator                      | R&S         | SMBV100A                   | 263246                   | 10/28/2020     | 10/28/2021     |
| Conducted (TS8997) | Signal analyzer 40GHz                        | R&S         | FSV40                      | 101884                   | 10/20/2020     | 10/20/2021     |
| Conducted (TS8997) | OSP150 extension unit CAM-BUS                | R&S         | OSP150                     | 101107                   | 04/06/2020     | 04/06/2021     |
| Conducted (TS8997) | Test Software                                | R&S         | EMC32                      | NA                       | NA             | NA             |

## **6. RF Output Power**

### **6.1. Limit**

For adaptive equipment using wide band modulations other than FHSS, the maximum RF output power shall be 20 dBm.

The maximum RF output power for non-adaptive equipment shall be declared by the supplier and shall not exceed 20 dBm. See clause 5.3.1 m). For non-adaptive equipment using wide band modulations other than FHSS, the maximum RF output power shall be equal to or less than the value declared by the supplier.

This limit shall apply for any combination of power level and intended antenna assembly.

### **6.2. Test Procedure**

See Sub-Clause 5.4.2.1 of ETSI EN 300 328 for the test conditions

See Sub-Clause 5.4.2.2 of ETSI EN 300 328 for the test method

### 6.3. Test Result

Example Calculation:

Pburst values (A) = Reading + Cable Loss

RF output power (P) = A+G+Y

Ambient temperature: 25°C

Relative humidity: 60%

Test Date: 2020/12/07

#### Test Mode: BLE

Pburst values (value "A" in dBm)

antenna assembly gain "G" in dBi

1.00 dBi

beamforming gain "Y" in dB

0.00 dB

Cable Loss=

21.00 dB

| TEST CONDITIONS         | TRANSMITTER POWER (dBm) |            |                  |            |                   |            |
|-------------------------|-------------------------|------------|------------------|------------|-------------------|------------|
|                         | Lowest Frequency        |            | Middle Frequency |            | Highest Frequency |            |
| Temp -20 °C             | P                       | 0.80 dBm   | P                | 2.50 dBm   | P                 | 3.70 dBm   |
|                         | A                       | -0.20 dBm  | A                | 1.50 dBm   | A                 | 2.70 dBm   |
|                         | Reading                 | -21.20 dBm | Reading          | -19.50 dBm | Reading           | -18.30 dBm |
| Temp 25 °C              | P                       | -0.10 dBm  | P                | 2.30 dBm   | P                 | 3.10 dBm   |
|                         | A                       | -1.10 dBm  | A                | 1.30 dBm   | A                 | 2.10 dBm   |
|                         | Reading                 | -22.10 dBm | Reading          | -19.70 dBm | Reading           | -18.90 dBm |
| Temp 50 °C              | P                       | 0.40 dBm   | P                | 1.50 dBm   | P                 | 2.60 dBm   |
|                         | A                       | -0.60 dBm  | A                | 0.50 dBm   | A                 | 1.60 dBm   |
|                         | Reading                 | -21.60 dBm | Reading          | -20.50 dBm | Reading           | -19.40 dBm |
| Limit(P)                | 20dBm                   |            |                  |            |                   |            |
| Measurement uncertainty | + 0.28dB / - 0.30dB     |            |                  |            |                   |            |

## 7. Transmitter Unwanted Emissions in the Spurious Domain

### 7.1 Limit

This requirement applies to all types of equipment using wide band modulations other than FHSS.

The transmitter unwanted emissions in the spurious domain shall not exceed the values given in table 2.

In case of equipment with antenna connectors, these limits apply to emissions at the antenna port (conducted). For emissions radiated by the cabinet or emissions radiated by integral antenna equipment (without antenna connectors), these limits are e.r.p. for emissions up to 1 GHz and e.i.r.p. for emissions above 1 GHz.

**Table 2: Transmitter limits for spurious emissions**

| Frequency range     | Maximum power | Bandwidth |
|---------------------|---------------|-----------|
| 30 MHz to 47 MHz    | -36 dBm       | 100 kHz   |
| 47 MHz to 74 MHz    | -54 dBm       | 100 kHz   |
| 74 MHz to 87.5 MHz  | -36 dBm       | 100 kHz   |
| 87.5 MHz to 118 MHz | -54 dBm       | 100 kHz   |
| 118 MHz to 174 MHz  | -36 dBm       | 100 kHz   |
| 174 MHz to 230 MHz  | -54 dBm       | 100 kHz   |
| 230 MHz to 470 MHz  | -36 dBm       | 100 kHz   |
| 470 MHz to 694 MHz  | -54 dBm       | 100 kHz   |
| 694 MHz to 1 GHz    | -36 dBm       | 100 kHz   |
| 1 GHz to 12.75 GHz  | -30 dBm       | 1 MHz     |

### 7.2 Test Procedure

See Sub-Clause 5.4.9.1 of ETSI EN 300 328 for the test conditions

See Sub-Clause 5.4.9.2 and 5.4.9.2.2 of ETSI EN 300 328 for Conducted Pre-Scan test method.

See Sub-Clause 5.4.9.2.2 of ETSI EN 300 328 for final Radiated test method.



### 7.3 Test Result

**Test Mode: BLE mode, TX CH Low**

**Ambient temperature: 25°C**

**Relative humidity: 60%**

**Test Date: 2020/12/07**

| No | Freq MHz | Reading dBm | Aux dB | Level dBm | Limit dBm | Margin dB | Pol V/H    |
|----|----------|-------------|--------|-----------|-----------|-----------|------------|
| 1  | 69.77    | -68.67      | 2.89   | -65.78    | -54.00    | -11.78    | VERTICAL   |
| 2  | 116.33   | -69.61      | 1.94   | -67.67    | -54.00    | -13.67    | VERTICAL   |
| 3  | 504.33   | -81.20      | 8.95   | -72.25    | -54.00    | -18.25    | VERTICAL   |
| 4  | 561.56   | -81.41      | 9.20   | -72.21    | -54.00    | -18.21    | VERTICAL   |
| 5  | 609.09   | -82.31      | 10.50  | -71.81    | -54.00    | -17.81    | VERTICAL   |
| 6  | 659.53   | -80.95      | 12.43  | -68.52    | -54.00    | -14.52    | VERTICAL   |
| 7  | 4804.00  | -64.35      | 15.71  | -48.64    | -30.00    | -18.64    | VERTICAL   |
| 8  | 7206.00  | -55.94      | 22.45  | -33.49    | -30.00    | -3.49     | VERTICAL   |
|    |          |             |        |           |           |           |            |
| 1  | 71.71    | -68.87      | 3.91   | -64.96    | -54.00    | -10.96    | HORIZONTAL |
| 2  | 114.39   | -71.12      | 1.81   | -69.31    | -54.00    | -15.31    | HORIZONTAL |
| 3  | 216.24   | -77.48      | 2.41   | -75.07    | -54.00    | -21.07    | HORIZONTAL |
| 4  | 501.42   | -80.75      | 8.47   | -72.28    | -54.00    | -18.28    | HORIZONTAL |
| 5  | 542.16   | -81.01      | 9.80   | -71.21    | -54.00    | -17.21    | HORIZONTAL |
| 6  | 665.35   | -80.89      | 11.93  | -68.96    | -54.00    | -14.96    | HORIZONTAL |
| 7  | 4804.00  | -57.57      | 15.63  | -41.94    | -30.00    | -11.94    | HORIZONTAL |
| 8  | 7206.00  | -56.05      | 23.43  | -32.62    | -30.00    | -2.62     | HORIZONTAL |

|                         |                         |
|-------------------------|-------------------------|
| Measurement uncertainty | 30MHz - 80MHz: 5.04dB   |
|                         | 80MHz - 1000MHz: 3.76dB |
|                         | 1GHz - 26GHz: 4.45dB    |

**Remark:**

1. The emission behaviors belong to narrowband spurious emission.
2. Remark " --- " means that the emission level is too low to be measured
3. Aux: Field strength to EIRP correction factor
4. Level (dBm) = Reading (dBm) + Aux (dB)
5. Measurement Range upto 12.75GHz.

**Test Mode: BLE mode, TX CH High**

**Ambient temperature: 25°C**

**Relative humidity: 60%**

**Test Date: 2020/12/07**

| No | Freq MHz | Reading dBm | Aux dB | Level dBm | Limit dBm | Margin dB | Pol V/H    |
|----|----------|-------------|--------|-----------|-----------|-----------|------------|
| 1  | 69.77    | -68.30      | 2.89   | -65.41    | -54.00    | -11.41    | VERTICAL   |
| 2  | 106.63   | -69.42      | 0.49   | -68.93    | -54.00    | -14.93    | VERTICAL   |
| 3  | 191.02   | -76.57      | 2.31   | -74.26    | -54.00    | -20.26    | VERTICAL   |
| 4  | 508.21   | -81.29      | 8.94   | -72.35    | -54.00    | -18.35    | VERTICAL   |
| 5  | 606.18   | -82.48      | 10.39  | -72.09    | -54.00    | -18.09    | VERTICAL   |
| 6  | 662.44   | -82.49      | 12.54  | -69.95    | -54.00    | -15.95    | VERTICAL   |
| 7  | 4960.00  | -61.52      | 16.40  | -45.12    | -30.00    | -15.12    | VERTICAL   |
| 8  | 7440.00  | -61.36      | 23.04  | -38.32    | -30.00    | -8.32     | VERTICAL   |
|    |          |             |        |           |           |           |            |
| 1  | 71.71    | -70.02      | 3.91   | -66.11    | -54.00    | -12.11    | HORIZONTAL |
| 2  | 116.33   | -71.73      | 1.98   | -69.75    | -54.00    | -15.75    | HORIZONTAL |
| 3  | 216.24   | -77.95      | 2.41   | -75.54    | -54.00    | -21.54    | HORIZONTAL |
| 4  | 513.06   | -77.55      | 8.86   | -68.69    | -54.00    | -14.69    | HORIZONTAL |
| 5  | 579.02   | -82.63      | 10.74  | -71.89    | -54.00    | -17.89    | HORIZONTAL |
| 6  | 664.38   | -81.36      | 11.91  | -69.45    | -54.00    | -15.45    | HORIZONTAL |
| 7  | 4960.00  | -58.13      | 16.15  | -41.98    | -30.00    | -11.98    | HORIZONTAL |
| 8  | 7440.00  | -57.67      | 23.28  | -34.39    | -30.00    | -4.39     | HORIZONTAL |

|                         |                         |
|-------------------------|-------------------------|
| Measurement uncertainty | 30MHz - 80MHz: 5.04dB   |
|                         | 80MHz - 1000MHz: 3.76dB |
|                         | 1GHz - 26GHz: 4.45dB    |

**Remark:**

1. The emission behaviors belong to narrowband spurious emission.
2. Remark " --- " means that the emission level is too low to be measured
3. Aux: Field strength to EIRP correction factor
4. Level (dBm) = Reading (dBm) + Aux (dB)
5. Measurement Range upto 12.75GHz.

## 8. Receiver Blocking

### 8.1 Receiver Blocking

This requirement applies to all receiver categories below.

#### Receiver categories

##### Receiver category 1

Adaptive equipment with a maximum RF output power greater than 10 dBm e.i.r.p. shall be considered as receiver category 1 equipment.

##### Receiver category 2

Non-adaptive equipment with a Medium Utilization (MU) factor greater than 1 % and less than or equal to 10 % or adaptive equipment with a maximum RF output power of 10 dBm e.i.r.p. shall be considered as receiver category 2 equipment.

##### Receiver category 3

Non-adaptive equipment with a maximum Medium Utilization (MU) factor of 1 % or adaptive equipment with a maximum RF output power of 0 dBm e.i.r.p. shall be considered as receiver category 3 equipment.

### 8.2 Limit

While maintaining the minimum performance criteria as defined in clause 4.3.2.11.3, the blocking levels at specified frequency offsets shall be equal to or greater than the limits defined for the applicable receiver category provided table 3, table 4 or table 5.

**Table 3: Receiver Blocking parameters receiver category 1 equipment**

| Wanted signal mean power from companion device (dBm)<br>(see notes 1 and 4)  | Blocking signal frequency (MHz) | Blocking signal power (dBm)<br>(see note 4) | Type of blocking signal |
|--|---------------------------------|---|-------------------------|
| (-133 dBm + 10 × log <sub>10</sub> (OCBW))<br>or -68 dBm whichever is less<br>(see note 2)   | 2380                            | -34   | CW                      |
|  | 2504                            |   |                         |
| (-139 dBm + 10 × log <sub>10</sub> (OCBW))<br>or -74 dBm whichever is less<br>(see note 3)   | 2300                            |   |                         |
|  | 2330                            |   |                         |
|  | 2360                            |   |                         |
|  | 2524                            |   |                         |
|  | 2584                            |   |                         |
| NOTE 1: OCBW is in Hz.   |                                 |   |                         |
| NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to P <sub>min</sub> + 26 dB where P <sub>min</sub> is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal. |                                 |   |                         |
| NOTE 3: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to P <sub>min</sub> + 20 dB where P <sub>min</sub> is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal. |                                 |   |                         |
| NOTE 4: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.         |                                 |   |                         |

**Table 4: Receiver Blocking parameters receiver category 2 equipment**

| Wanted signal mean power from companion device (dBm) (see notes 1 and 3)  | Blocking signal frequency (MHz) | Blocking signal power (dBm) (see note 3) | Type of blocking signal |
|---|---------------------------------|--|-------------------------|
| $(-139 \text{ dBm} + 10 \times \log_{10}(\text{OCBW}) + 10 \text{ dB})$<br>or $(-74 \text{ dBm} + 10 \text{ dB})$ whichever is less<br>(see note 2)   | 2380<br>2504<br>2300<br>2584    | -34                                      | CW                      |
| <p>NOTE 1: OCBW is in Hz.</p> <p>NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to <math>P_{\text{min}} + 26 \text{ dB}</math> where <math>P_{\text{min}}</math> is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.</p> <p>NOTE 3: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.</p> |                                 |  |                         |

**Table 5: Receiver Blocking parameters receiver category 3 equipment**

| Wanted signal mean power from companion device (dBm) (see notes 1 and 3)  | Blocking signal frequency (MHz) | Blocking signal power (dBm) (see note 3) | Type of blocking signal |
|---|---------------------------------|--|-------------------------|
| $(-139 \text{ dBm} + 10 \times \log_{10}(\text{OCBW}) + 20 \text{ dB})$<br>or $(-74 \text{ dBm} + 20 \text{ dB})$ whichever is less<br>(see note 2)   | 2380<br>2504<br>2300<br>2584    | -34                                      | CW                      |
| <p>NOTE 1: OCBW is in Hz.</p> <p>NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative the test may be performed using a wanted signal up to <math>P_{\text{min}} + 30 \text{ dB}</math> where <math>P_{\text{min}}</math> is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.</p> <p>NOTE 3: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.</p> |                                 |  |                         |

### 8.3 Test Procedure

See Sub-Clause 5.4.11.1 of ETSI EN 300 328 for the test conditions

See Sub-Clause 5.4.11.2 of ETSI EN 300 328 for conducted method.

## 8.4 Test Result

### Receiver Blocking (Lowest Channel)

Definition: Receiver blocking is a measure of the ability of the equipment to receive a wanted signal on its operating channel without exceeding a given degradation in the presence of an unwanted signal (blocking signal) on frequencies other than those of the operating band.

#### Summary

| DUT Frequency (MHz) | Receiver Category | Companion RMS burst power (dBm) | Result |
|---------------------|-------------------|---------------------------------|--------|
| 2402.000000         | 2                 | ---                             | PASS   |

#### Measurement Overview

| Blocking Frequency (MHz) | Result no Offset | Result Offset 1 | Result Offset 2 | Result |
|--------------------------|------------------|-----------------|-----------------|--------|
| 2380.000000              | PASS             | not tested      | not tested      | PASS   |
| 2300.000000              | PASS             | not tested      | not tested      | PASS   |

#### Measurements

| # | Blocking Frequency (MHz) | Blocking Frequency Offset (MHz) | Generator Frequency (MHz) | Blocking Level at DUT (dBm) | Generator Level (dBm) | Attenuation Generator to DUT (dB) |
|---|--------------------------|---------------------------------|---------------------------|-----------------------------|-----------------------|-----------------------------------|
| 1 | 2380.000000              | 0.000000                        | 2380.000000               | -33.0                       | -3.6                  | 29.4                              |
| 2 | 2380.000000              | 2.000000                        | ---                       | ---                         | ---                   | ---                               |
| 3 | 2380.000000              | -2.000000                       | ---                       | ---                         | ---                   | ---                               |
| 4 | 2300.000000              | 0.000000                        | 2300.000000               | -33.0                       | -3.6                  | 29.4                              |
| 5 | 2300.000000              | 2.000000                        | ---                       | ---                         | ---                   | ---                               |
| 6 | 2300.000000              | -2.000000                       | ---                       | ---                         | ---                   | ---                               |

(continuation of the "Measurements" table from column 7 ...)

| # | Level of Wanted Signal at DUT (dBm) | Wanted Level Offset (dB) | Attenuation Companion to DUT (dB) | Result     |
|---|-------------------------------------|--------------------------|-----------------------------------|------------|
| 1 | -65.8                               | 0.0                      | 30.5                              | PASS       |
| 2 | -65.8                               | 0.0                      | ---                               | not tested |
| 3 | -65.8                               | 0.0                      | ---                               | not tested |
| 4 | -65.8                               | 0.0                      | 30.5                              | PASS       |
| 5 | -65.8                               | 0.0                      | ---                               | not tested |
| 6 | -65.8                               | 0.0                      | ---                               | not tested |

#### DUT Monitoring

| # | Blocking Frequency (MHz) | Blocking Frequency Offset (MHz) | Name    | Value | Limit Min | Limit Max | Result |
|---|--------------------------|---------------------------------|---------|-------|-----------|-----------|--------|
| 1 | 2380.000000              | 0.000000                        | BLE PER | 0.000 | ---       | 10.000    | PASS   |
| 2 | 2300.000000              | 0.000000                        | BLE PER | 0.000 | ---       | 10.000    | PASS   |

## Receiver Blocking (Highest Channel)

Definition: Receiver blocking is a measure of the ability of the equipment to receive a wanted signal on its operating channel without exceeding a given degradation in the presence of an unwanted signal (blocking signal) on frequencies other than those of the operating band.

### Summary

| DUT Frequency (MHz) | Receiver Category | Companion RMS burst power (dBm) | Result |
|---------------------|-------------------|---------------------------------|--------|
| 2480.000000         | 2                 | ---                             | PASS   |

### Measurement Overview

| Blocking Frequency (MHz) | Result no Offset | Result Offset 1 | Result Offset 2 | Result |
|--------------------------|------------------|-----------------|-----------------|--------|
| 2504.000000              | PASS             | not tested      | not tested      | PASS   |
| 2584.000000              | PASS             | not tested      | not tested      | PASS   |

### Measurements

| # | Blocking Frequency (MHz) | Blocking Frequency Offset (MHz) | Generator Frequency (MHz) | Blocking Level at DUT (dBm) | Generator Level (dBm) | Attenuation Generator to DUT (dB) |
|---|--------------------------|---------------------------------|---------------------------|-----------------------------|-----------------------|-----------------------------------|
| 1 | 2504.000000              | 0.000000                        | 2504.000000               | -33.0                       | -3.6                  | 29.4                              |
| 2 | 2504.000000              | 2.000000                        | ---                       | ---                         | ---                   | ---                               |
| 3 | 2504.000000              | -2.000000                       | ---                       | ---                         | ---                   | ---                               |
| 4 | 2584.000000              | 0.000000                        | 2584.000000               | -33.0                       | -3.7                  | 29.3                              |
| 5 | 2584.000000              | 2.000000                        | ---                       | ---                         | ---                   | ---                               |
| 6 | 2584.000000              | -2.000000                       | ---                       | ---                         | ---                   | ---                               |

(continuation of the "Measurements" table from column 7 ...)

| # | Level of Wanted Signal at DUT (dBm) | Wanted Level Offset (dB) | Attenuation Companion to DUT (dB) | Result     |
|---|-------------------------------------|--------------------------|-----------------------------------|------------|
| 1 | -65.8                               | 0.0                      | 30.4                              | PASS       |
| 2 | -65.8                               | 0.0                      | ---                               | not tested |
| 3 | -65.8                               | 0.0                      | ---                               | not tested |
| 4 | -65.8                               | 0.0                      | 30.4                              | PASS       |
| 5 | -65.8                               | 0.0                      | ---                               | not tested |
| 6 | -65.8                               | 0.0                      | ---                               | not tested |

### DUT Monitoring

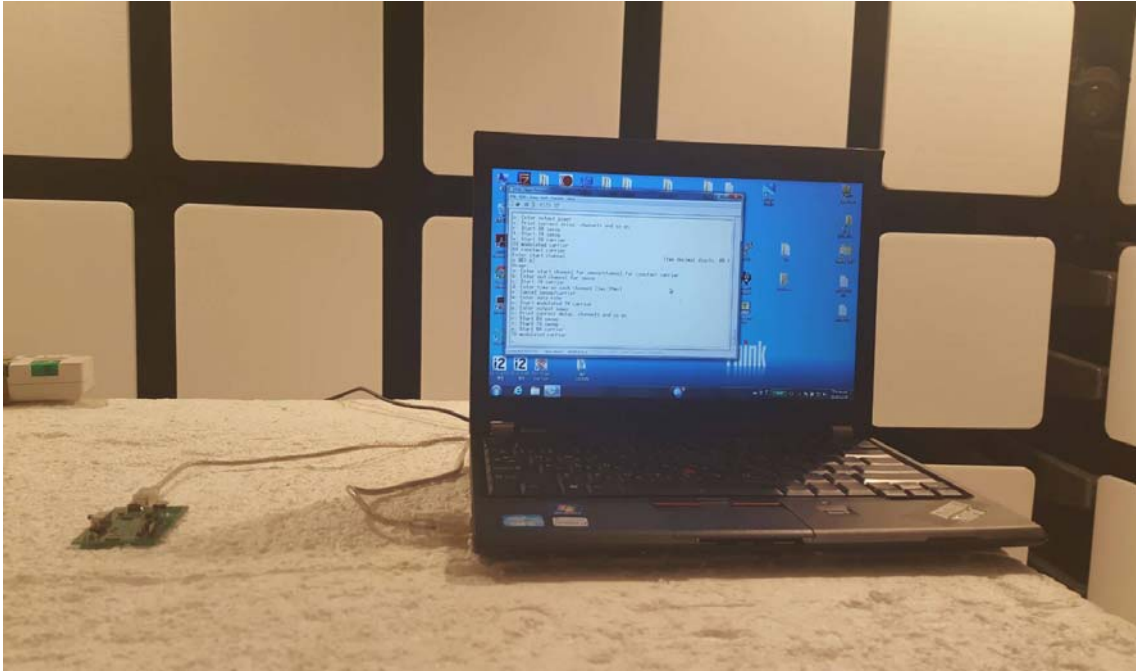
| # | Blocking Frequency (MHz) | Blocking Frequency Offset (MHz) | Name    | Value | Limit Min | Limit Max | Result |
|---|--------------------------|---------------------------------|---------|-------|-----------|-----------|--------|
| 1 | 2504.000000              | 0.000000                        | BLE PER | 0.000 | ---       | 10.000    | PASS   |
| 2 | 2584.000000              | 0.000000                        | BLE PER | 0.100 | ---       | 10.000    | PASS   |

# APPENDIX 1

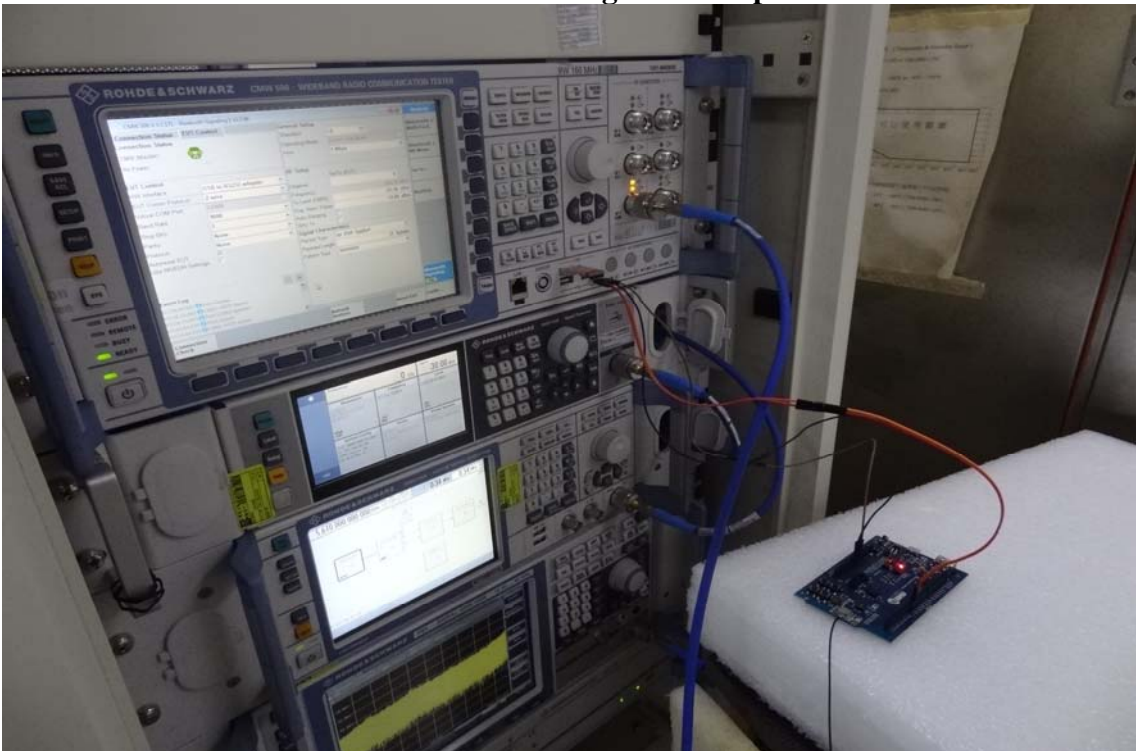
## PHOTOGRAPHS OF SET UP







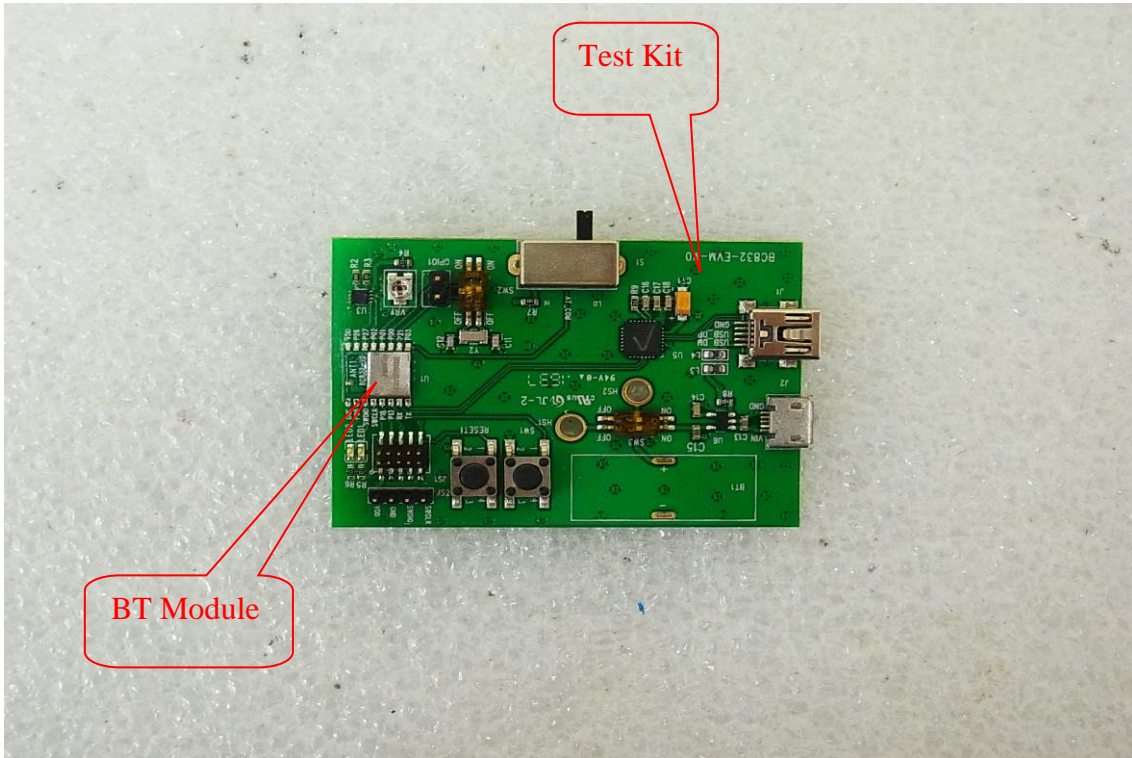
**Receiver Blocking Test Setup**



## **APPENDIX 2**

# **PHOTOGRAPHS OF EUT**

**EUT 1**

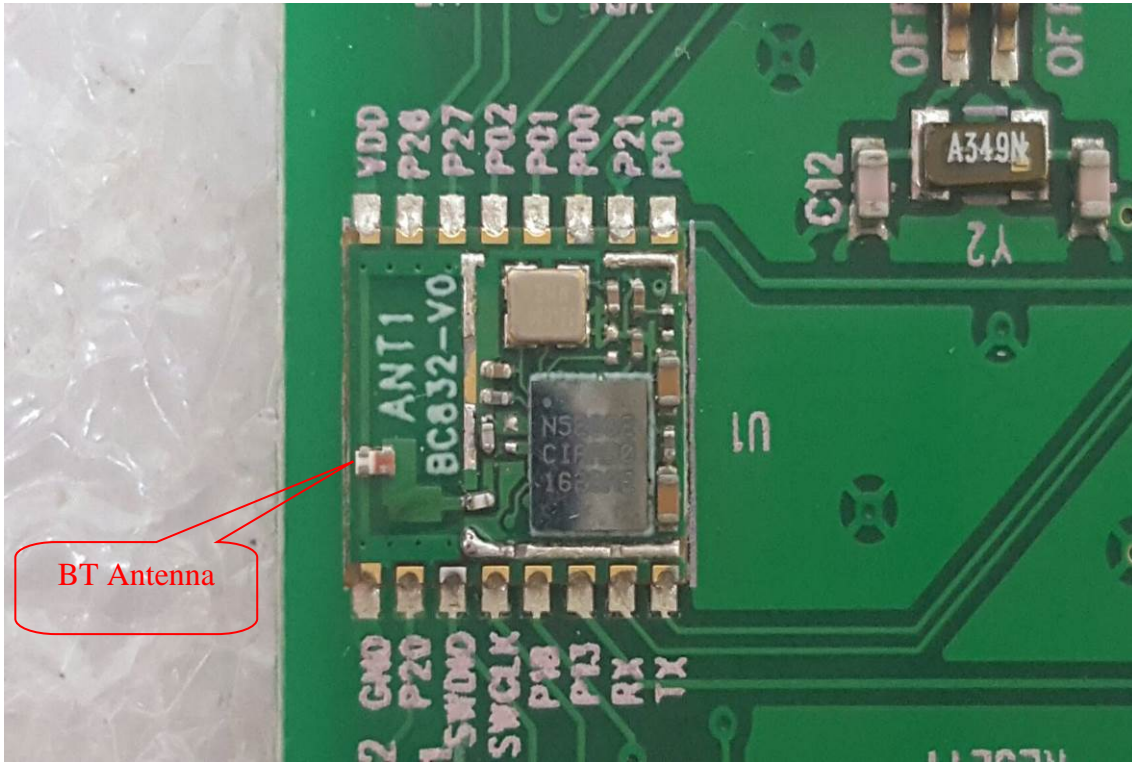


**EUT 2**

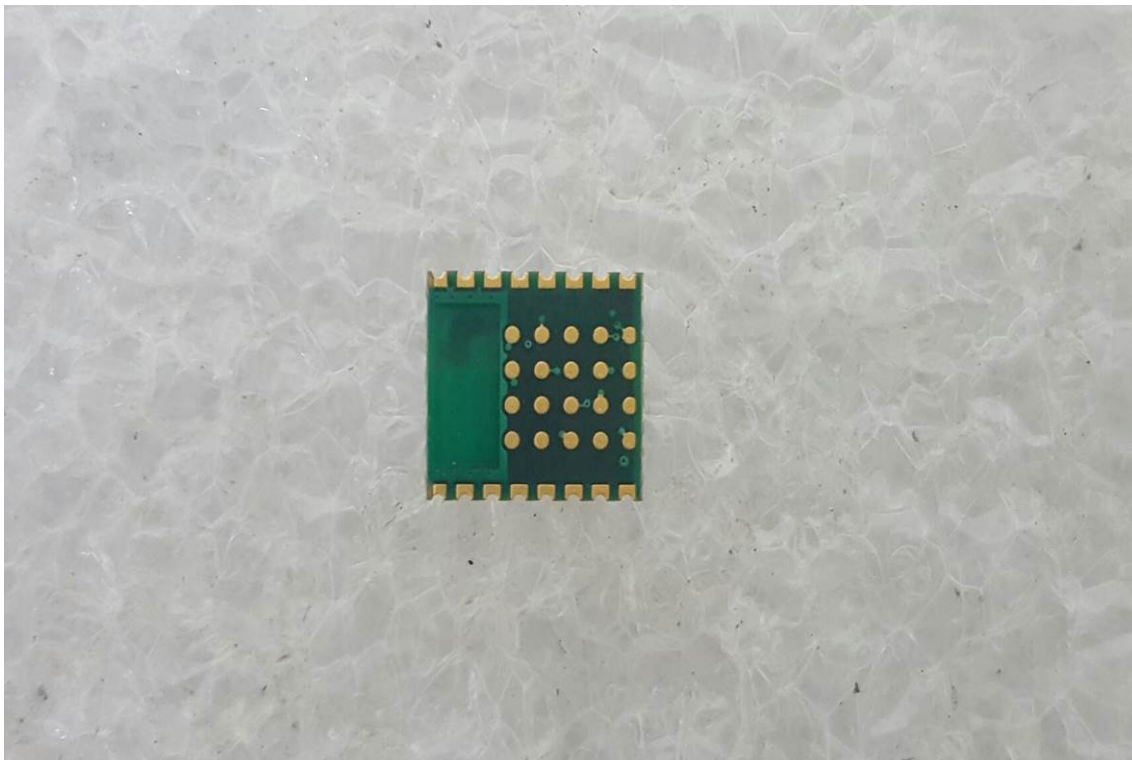




**EUT 3**



**EUT 4**



*~ End of Report ~*