

# MEASUREMENT REPORT

## EN 302 502 V2.1.1 WLAN 802.11a/n/ac

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**Applicant:** Compex Systems Pte Ltd  
**Address:** No:9 Harrison Road, Harrison Industrial Building, #05-01,  
Singapore 369651

**Product:** 802.11ac Dual Band Module  
**Serial Model:** WLE600VX, WLE600VX-I  
**Brand Name:** COMPEX  
**Standards:** ETSI EN 302 502 V2.1.1 (2017-03)  
**Result:** Complies  
**Test Date:** June 20 ~ July 11, 2017

Reviewed By : *Jame Yuan*  
( Jame Yuan )

Approved By : *Marlin Chen*  
( Marlin Chen )



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standards through the calibration of the equipment and evaluated measurement uncertainty herein.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

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## Revision History

| Report No.   | Version | Description    | Issue Date | Note  |
|--------------|---------|----------------|------------|-------|
| 1706RSU02404 | Rev. 01 | Initial report | 06-30-2017 | Valid |
|              |         |                |            |       |

Note: This test report was based on MRT report number 1503RSU02908 and updated the standard EN 302 502 version from v1.2.1 to v2.1.1. Besides the receiver blocking items, there is no any other updated item.

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## 1. General Information

### 1.1. Applicant

Compex Systems Pte Ltd

No:9 Harrison Road, Harrison Industrial Building, #05-01, Singapore 369651

### 1.2. Manufacturer

Compex Systems Pte Ltd

No:9 Harrison Road, Harrison Industrial Building, #05-01, Singapore 369651

### 1.3. Testing Facility

#### Test Site

MRT Technology (Suzhou) Co., Ltd

#### Test Site Location

D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China

#### Test Facility / Accreditations

Measurements were performed at MRT Laboratory located in Tian'edang Rd., Suzhou, China

- MRT facility is a FCC registered (MRT Reg. No. 809388) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules.
- MRT facility is an IC registered (MRT Reg. No. 11384A-1) test laboratory with the site description on file at Industry Canada.
- MRT facility is a VCCI registered (R-4179, G-814, C-4664, T-2206) test laboratory with the site description on file at VCCI Council.
- MRT Lab is accredited to ISO 17025 by the American Association for Laboratory Accreditation (A2LA) under the American Association for Laboratory Accreditation Program (A2LA Cert. No. 3628.01) in EMC, Telecommunications and Radio testing for FCC, Industry Canada, EU and TELEC Rules.



#### 1.4. Feature of Equipment under Test

|                 |                           |
|-----------------|---------------------------|
| Product Name:   | 802.11ac Dual Band Module |
| Model No :      | WLE600VX, WLE600VX-I      |
| Brand Name:     | COMPEX                    |
| Frequency Range | 802.11a/b/g/n/ac          |

Note: The difference of models is for different marketing requirement.

#### 1.5. Product Specification Subjective

|                    |   |
|--------------------|---|
| Frequency Range    | 802.11a /n-HT20/ac-VHT20:<br>5745 ~ 5825MHz   |
| Channel Number     | 802.11a/n-HT20/ac-VHT20: 5  |
| Type of Modulation | 802.11a/n/ac: OFDM  |
| Data Rate          | 802.11a: 6/9/12/18/24/36/48/54Mbps<br>802.11n: up to 300Mbps<br>802.11ac: up to 866.6Mbps |

#### 1.6. Operation Frequency / Channel List

802.11a/n-HT20/ac-VHT20

| Channel | Frequency | Channel | Frequency | Channel | Frequency |
|---------|-----------|---------|-----------|---------|-----------|
| 149     | 5745 MHz  | 153     | 5765 MHz  | 157     | 5785 MHz  |
| 161     | 5805 MHz  | 165     | 5825 MHz  | N/A     | N/A       |

### 1.7. Description of Available Antennas

| Antenna No. | Manufacturer                          | Tx Paths | Max Directional Gain (dBi) |
|-------------|---------------------------------------|----------|----------------------------|
| Antenna 1#  | Kunshan Wavelink Electronic Co., Ltd. | 2        | 2.4GHz: 2.0, 5GHz: 2.0     |
| Antenna 2#  | TAOGLAS Inc                           | 2        | 2.4GHz: 4.5, 5GHz: 6.7     |
| Antenna 3#  | Compex Systems Pte Ltd                | 2        | 2.4GHz: 5.0, 5GHz: 5.0     |
| Antenna 4#  | Compex Systems Pte Ltd                | 2        | 2.4GHz: 5.0, 5GHz: 5.0     |
| Antenna 5#  | Smart Ant Inc                         | 2        | 5GHz: 7.0                  |
| Antenna 6#  | Kenbotong Communication LTD           | 2        | 5GHz: 10.0                 |
| Antenna 7#  | Sensor Systems, Inc.                  | 2        | 2.4GHz: 8.0, 5GHz: 8.0     |

Note 1: The frequency bands (5150~5350MHz & 5470~5725MHz) support the max antenna gain 7dBi and another frequency band (5725~5850MHz) supports the max antenna gain 10dBi.

Note 2: We selected the antenna 6# for all radiated emission testing.

### 1.8. Standards Applicable for Testing

The EUT complies with the requirements of ETSI EN 302 502 V2.1.1.

## 2. Test Summary

| Clause<br>EN 302 502 | Test Parameter    | Result<br>(Pass/Fail) | Remark |
|----------------------|-------------------|-----------------------|--------|
| 4.2.7                | Receiver Blocking | Pass                  | --     |

### 3. Receiver Blocking

#### 3.1. Limit

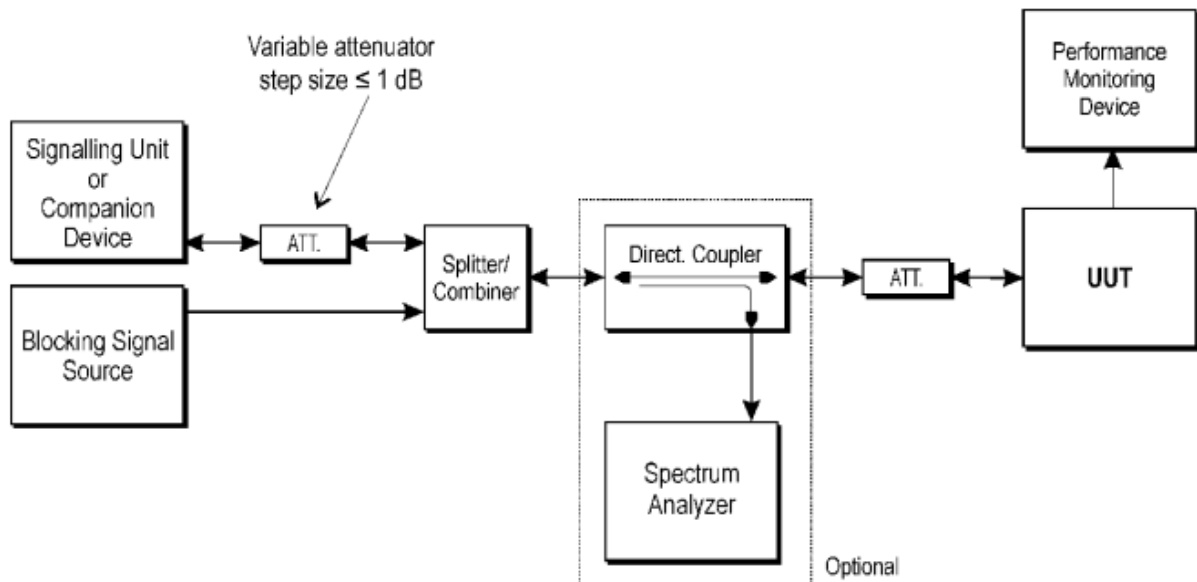
While maintaining the minimum performance criteria as defined in clause 4.2.7.3, the blocking levels at specified frequency offsets shall be equal to or greater than the limits defined in table 4.

| Table 4: Receiver Blocking parameters                |                                 |                             |                         |
|--|---------------------------------|-----------------------------|-------------------------|
| Wanted signal mean power from companion device (dBm) | Blocking signal frequency (MHz) | Blocking signal power (dBm) | Type of blocking signal |
| $P_{MIN} + 6$ dB                                     | 5 420                           | -42                         | CW                      |
|  | 5 925                           |                             |                         |
| $P_{MIN} + 6$ dB                                     | 5 320                           |                             | CW                      |
|  | 6 025                           |                             |                         |
|  | 6 125                           |                             |                         |

NOTE 1: Pmin is the minimum level of the wanted signal (in dBm) required to meet the minimum performance criteria as defined in clause 4.2.7.3 in the absence of any blocking signal.

NOTE 2: The levels specified are levels in front of the UUT antenna. In case of conducted measurements, the same levels should be used at the antenna connector irrespective of antenna gain.

#### 3.2. Test Setup



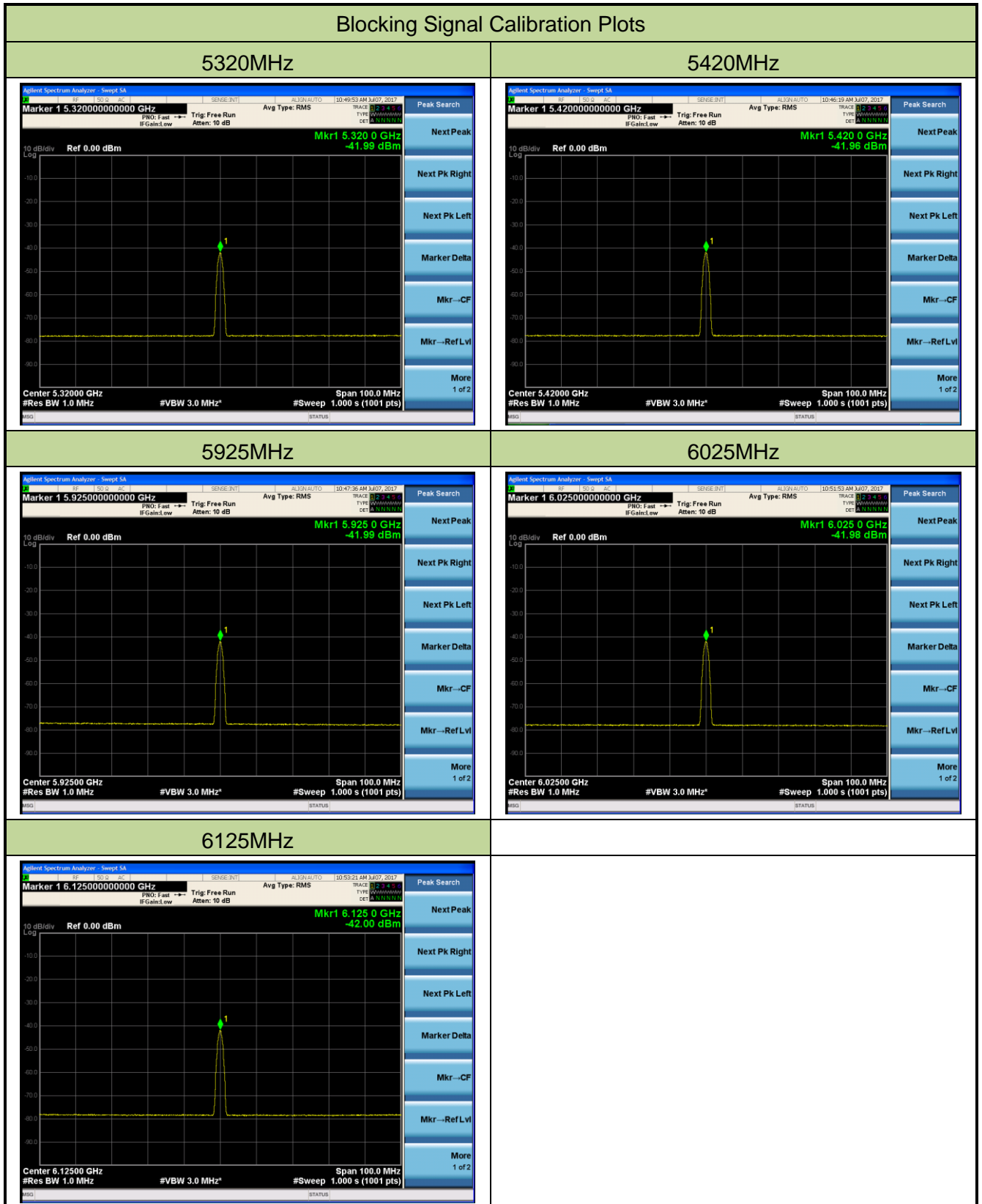
**Figure 9: Test Set-up for receiver blocking**

#### 3.3. Test Procedure

Refer to ETSI EN 302 502 V2.1.1 (2017-03) Clause 5.4.7.2.1



### 3.4. Test Result



|               |            |                   |      |
|---------------|------------|-------------------|------|
| Test Engineer | Andy Zhu   | Temperature       | 26°C |
| Test Data     | 2017/07/07 | Relative Humidity | 54%  |
| Test Mode     | 802.11a    | Test Site         | TR4  |

| Channel | Wanted Signal Mean Power from Companion Device (dBm) | Blocking Signal Frequency (MHz) | Blocking Signal Power (dBm) | Type of Blocking Signal | PER Test Result | Limit (PER) | Test Result |
|---------|--|---------------------------------|-----------------------------|-------------------------|-----------------|-------------|-------------|
| 149     | $P_{\min} + 6 \text{ dB}$                            | 5420                            | -42                         | CW                      | 0.0             | < 10%       | Pass        |
|         |  | 5925                            |                             |                         | 0.0             |             | Pass        |
|         |  | 5320                            |                             |                         | 0.0             |             | Pass        |
|         |  | 6025                            |                             |                         | 0.1             |             | Pass        |
|         |  | 6125                            |                             |                         | 0.0             |             | Pass        |

#### 4. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

| Parameter                         | Uncertainty  |
|-----------------------------------|--------------|
| Radio Frequency                   | $\pm 10$ ppm |
| RF output power, conducted        | $\pm 1.5$ dB |
| Power Spectral Density, conducted | $\pm 3$ dB   |
| Spurious Emissions, radiated      | $\pm 6$ dB   |
| Temperature                       | $\pm 2$ °C   |
| Humidity                          | $\pm 5$ %    |
| Time                              | $\pm 10$ %   |

## 5. List of Measuring Instrument

Receiver Blocking - TR3

| Instrument                             | Manufacturer  | Type No.         | Serial No.   | Cali. Interval | Cali. Due Date |
|--|---------------|------------------|--------------|----------------|----------------|
| Vector Signal Generator                | Agilent       | E4438C           | MY49872484   | 1 year         | 2017/12/06     |
| 4 Ch. Simultaneous Sampling<br>14      | Agilent       | U2531A           | TW55453505   | N/A            | N/A            |
| 4 Ch. Simultaneous Sampling<br>14      | Agilent       | U2531A           | TW55453512   | N/A            | N/A            |
| Wideband Radio<br>Communication Tester | R&S           | CMW 500          | 1201.0002K50 | 1 year         | 2017/11/10     |
| Directional Coupler                    | Narda         | 4216-20          | 1395         | 1 year         | 2018/03/28     |
| Power Splitter                         | Mini-Circuits | ZFRSC-123-<br>S+ | N/A          | N/A            | N/A            |
| Temperature/Humidity Meter             | Yuhuaze       | HTC-2            | N/A          | 1 year         | 2017/12/20     |

| Software | Version | Function          |
|----------|---------|-------------------|
| e3       | V8.3.5  | EMI Test Software |

\_\_\_\_\_ The End \_\_\_\_\_