

## TEST REPORT

**Report Number: 19120559HKG-002**

Application For Original Grant of 47 CFR Part 15 Certification

**FCC ID: ACJ96NKX-TGB850**

**Prepared and Checked by:**

**Approved by:**

Signed On File

Leung Chiu Kuen, Stanley  
Engineer

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Tang Kwan Mo, Jess  
Lead Engineer  
Date: July 16, 2020

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## TEST REPORT

### GENERAL INFORMATION

|                                    |                                                                                                                                 |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| <b>Grantee:</b>                    | Panasonic Corporation of North America                                                                                          |
| <b>Grantee Address:</b>            | 2 Riverfront Plaza,<br>9/F., Newark,<br>NJ 07102, USA                                                                           |
| <b>FCC Specification Standard:</b> | FCC Part 15, October 1, 2019 Edition                                                                                            |
| <b>FCC ID:</b>                     | ACJ96NKX-TGB850                                                                                                                 |
| <b>FCC Model(s):</b>               | KX-TGB850, KX-TGBA852, KX-TG2153SK                                                                                              |
| <b>Type of EUT:</b>                | Class B Digital portion                                                                                                         |
| <b>Description of EUT:</b>         | DECT Cordless Telephone                                                                                                         |
| <b>Serial Number:</b>              | N/A                                                                                                                             |
| <b>Sample Receipt Date:</b>        | December 13, 2020                                                                                                               |
| <b>Date of Test:</b>               | December 18, 2019 - May 21, 2020                                                                                                |
| <b>Report Date:</b>                | July 16, 2020                                                                                                                   |
| <b>Environmental Conditions:</b>   | Temperature: +10 to 40°C<br>Humidity: 10 to 90%                                                                                 |
| <b>Conclusion:</b>                 | Test was conducted by client submitted sample. The submitted sample as received complied with the 47 CFR Part 15 Certification. |

## TEST REPORT

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## TEST REPORT

### 1.0 TEST RESULTS SUMMARY & STATEMENT OF COMPLIANCE

#### 1.1 Summary of Test Results

| Test Items                                     | FCC Part 15 Section | Results | Details See Section |
|------------------------------------------------|---------------------|---------|---------------------|
| Radiated Emission from Class B Digital portion | 15.109              | Pass    | 4.2                 |
| AC Power Line Conducted Emission               | 15.107              | Pass    | 4.3                 |

#### 1.2 Statement of Compliance

The equipment under test is found to be complying with the following standards:

FCC Part 15, October 1, 2019 Edition

## TEST REPORT

### 2.0 GENERAL DESCRIPTION

#### 2.1 Product Description

The KX-TGB850 is a DECT Cordless Telephone. It operates at frequency range of 1921.536MHz to 1928.448MHz with 5 channels (1921.536MHz, 1923.264MHz, 1924.992MHz, 1926.720MHz and 1928.448MHz). The Base Unit is powered by an adaptor 100-240VAC 50/60Hz 0.2A max.

The Model(s): KX-TGBA852 and KX-TG2153SK are the same as the Model: KX-TGB850 in electronics/electrical designs including software & firmware, PCB layout and construction design/physical design/enclosure as declared by client. The only differences between these models are model number, color of enclosure, number of handsets and chargers, and packaging material to be sold for marketing purpose as declared by client. Suffix (xy) indicates different packaging material, different number of handsets and chargers, and different color of enclosure as declared by client.

Connection between the device and the telephone network is accomplished through the use of USOC RJ11C in the 2-wire loop calling central office line.

The circuit description is saved with filename: descri.pdf.

#### 2.2 Test Methodology

Both AC power line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.4 (2014). Preliminary radiated scans and all radiated measurements were performed in radiated emission test site. All Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "Justification Section" of this Application.

#### 2.2 Test Facility

The radiated emission test site and AC power line conducted measurement facility used to collect the radiated data and AC Power Line conducted data are at Intertek Testing Services Hong Kong Ltd., which is located at Workshop No. 3, G/F., World-Wide Industrial Centre, 43-47 Shan Mei Street, Fo Tan, Sha Tin, N.T., Hong Kong SAR, China. This test facility and site measurement data have been fully placed on file with FCC.

## TEST REPORT

### 3.0 SYSTEM TEST CONFIGURATION

#### 3.1 Justification

For radiated emissions testing, the equipment under test (EUT) was setup normal mode to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, all cables (if any) were manipulated to produce worst case emissions.

The Base Unit was powered by a 100-240VAC 50/60Hz 0.2A max to 6VDC 0.45A 2.7W or 100-240VAC 50/60Hz 0.2A max to 6VDC 0.4A adaptor.

For the measurements, the EUT was attached to a plastic stand if necessary and placed on the wooden turntable. If the base unit attached to peripherals, they were connected and operational to simulate typical use.

The signal was maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization were varied during the search for maximum signal level. The antenna height was varied from 1 to 4 meters. Radiated emissions were taken at three meters unless the signal level was too low for measurement at that distance. If necessary, a pre-amplifier was used and/or the test was conducted at a closer distance.

For radiated measurement, the spectrum analyzer resolution bandwidth was 100 kHz for frequencies below 1000 MHz.

Radiated emission measurement was performed from the frequency 30MHz to 1GHz.

Detector function for radiated emissions is in peak mode.

For AC line conducted emission test, the EUT along with its peripherals were placed on a 1.0m(W)x1.5m(L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane. The EUT was connected to power mains through a line impedance stabilization network (LISN), which provided 50ohm coupling impedance for measuring instrument. The LISN housing, measuring instrument case, reference ground plane, and vertical ground plane were bounded together. The excess power cable between the EUT and the LISN was bundled.

All connecting cables of EUT and peripherals were manipulated to find the maximum emission.

All relevant operation modes have been tested, and the worst case data was included in this report.

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### 3.2 EUT Exercising Software

The EUT exercise program (if any) used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use.

### 3.3 Details of EUT and Description of Accessories

#### Details of EUT:

An AC adaptor and/or a battery (provided with the unit) were used to power the device. Their descriptions are listed below.

- (1) An AC adaptor (100-240VAC 50/60Hz 0.2A max to 6VDC 0.45A 2.7W, Model: AT-332A-060045A, Brand: Baijunda) (Supplied by Client)
- (2) An AC adaptor (100-240VAC 50/60Hz 0.2A max to 6VDC 0.4A, Model: MN0063-L060040, Brand: Meic) (Supplied by Client)

#### Description of Accessories:

- (1) Telecommunication cable with RJ11C connectors (1m, unshielded), terminated (Supplied by Intertek)
- (2) Handset (Model: KX-TGBA85, FCC ID: ACJ96NKX-TGBA85 ) (Supplied by Client)

### 3.4 Measurement Uncertainty

When determining of the test conclusion, the Measurement Uncertainty of test at a level of confidence of 95% has been considered. The values of the Measurement uncertainty for radiated emission test and RF conducted measurement test are  $\pm 5.3\text{dB}$  and  $\pm 0.99\text{dB}$  respectively. The value of the Measurement uncertainty for conducted emission test is  $\pm 4.2\text{dB}$ .

Uncertainty and Compliance - Unless the standard specifically states that measured values are to be extended by the measurement uncertainty in determining compliance, all compliance determinations are based on the actual measured value.

## TEST REPORT

### 4.0 TEST RESULTS

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

#### 4.1 Field Strength Calculation

The field strength is calculated by adding the reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below.

$$FS = RA + AF + CF - AG + PD + AV$$

where

- FS = Field Strength in dB $\mu$ V/m
- RA = Receiver Amplitude (including preamplifier) in dB $\mu$ V
- CF = Cable Attenuation Factor in dB
- AF = Antenna Factor in dB
- AG = Amplifier Gain in dB
- PD = Pulse Desensitization in dB
- AV = Average Factor in -dB

In the radiated emission table which follows, the reading shown on the data table may reflect the preamplifier gain. An example of the calculations, where the reading does not reflect the preamplifier gain, follows:

$$FS = RA + AF + CF - AG + PD + AV$$

#### Example

Assume a receiver reading of 62.0 dB $\mu$ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted. The pulse desensitization factor of the spectrum analyzer was 0 dB, and the resultant average factor was -10 dB. The net field strength for comparison to the appropriate emission limit is 32 dB $\mu$ V/m. This value in dB $\mu$ V/m was converted to its corresponding level in  $\mu$ V/m.

$$RA = 62.0 \text{ dB}\mu\text{V}$$

$$AF = 7.4 \text{ dB}$$

$$CF = 1.6 \text{ dB}$$

$$AG = 29 \text{ dB}$$

$$PD = 0 \text{ dB}$$

$$AV = -10 \text{ dB}$$

$$FS = 62 + 7.4 + 1.6 - 29 + 0 + (-10) = 32 \text{ dB}\mu\text{V/m}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(32 \text{ dB}\mu\text{V/m})/20] = 39.8 \mu\text{V/m}$$



## TEST REPORT

### 4.2 Radiated Emissions

#### 4.2.1 Radiated Emissions Configuration Photographs:

Worst Case Radiated Emission  
at

836.444 MHz

The worst case radiated emission configuration photographs are attached in the Appendix and saved with filename: config photos.pdf

#### 4.2.2 Radiated Emissions Data:

The data in tables 1-2 list the significant emission frequencies, the limit and the margin of compliance.

Judgement:

Passed by 9.9 dB margin

## TEST REPORT

### RADIATED EMISSIONS DATA

Mode: Base unit Answer Machine mode with Meic adaptor

Table 1  
Pursuant to FCC Part 15 Section 15.109 Emissions Requirements

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-amp (dB) | Antenna Factor (dB) | Net at 3m (dBμV/m) | Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|--------------|---------------------|--------------------|----------------------|-------------|
| V            | 44.744          | 29.5           | 16           | 10.0                | 23.5               | 40.0                 | -16.5       |
| V            | 60.344          | 31.9           | 16           | 10.0                | 25.9               | 40.0                 | -14.1       |
| V            | 118.722         | 20.6           | 16           | 14.0                | 18.6               | 43.5                 | -24.9       |
| V            | 147.728         | 22.7           | 16           | 14.0                | 20.7               | 43.5                 | -22.8       |
| V            | 261.681         | 18.1           | 16           | 21.0                | 23.1               | 46.0                 | -22.9       |
| V            | 352.478         | 16.9           | 16           | 24.0                | 24.9               | 46.0                 | -21.1       |
| V            | 504.578         | 20.3           | 16           | 26.0                | 30.3               | 46.0                 | -15.7       |
| H            | 836.444         | 21.1           | 16           | 31.0                | 36.1               | 46.0                 | -9.9        |

#### NOTES:

1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters.
3. Negative value in the margin column shows emission below limit.
4. Measurement Uncertainty is  $\pm 5.3$ dB at a level of confidence of 95%.

## TEST REPORT

### RADIATED EMISSIONS DATA

Mode: Base unit Answer Machine mode with Baijunda adaptor

Table 2  
Pursuant to FCC Part 15 Section 15.109 Emissions Requirements

| Polarization | Frequency (MHz) | Reading (dB $\mu$ V) | Pre-amp (dB) | Antenna Factor (dB) | Net at 3m (dB $\mu$ V/m) | Limit at 3m (dB $\mu$ V/m) | Margin (dB) |
|--------------|-----------------|----------------------|--------------|---------------------|--------------------------|----------------------------|-------------|
| V            | 62.502          | 19.5                 | 16           | 10.0                | 13.5                     | 40.0                       | -26.5       |
| V            | 131.236         | 20.9                 | 16           | 14.0                | 18.9                     | 43.5                       | -24.6       |
| V            | 257.664         | 19.4                 | 16           | 21.0                | 24.4                     | 46.0                       | -21.6       |
| V            | 628.992         | 16.8                 | 16           | 29.0                | 29.8                     | 46.0                       | -16.2       |
| H            | 794.879         | 16.5                 | 16           | 31.0                | 31.5                     | 46.0                       | -14.5       |
| H            | 960.771         | 16.0                 | 16           | 33.0                | 33.0                     | 54.0                       | -21.0       |

#### NOTES:

5. Peak detector is used for the emission measurement.
6. All measurements were made at 3 meters.
7. Negative value in the margin column shows emission below limit.
8. Measurement Uncertainty is  $\pm 5.3$ dB at a level of confidence of 95%.

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### 4.3 AC Power Line Conducted Emissions:

[ ] Not applicable – EUT is only powered by battery for operation.

[ × ] EUT connects to AC power line. Emission Data is listed in following pages.

[ ] Base Unit connects to AC power line and has transmission. Handset connects to AC power line (indirectly) but has no transmission. Emission Data of Base Unit is listed in following pages.

#### 4.3.1 AC Power Line Conducted Emissions Configuration Photographs:

Worst Case AC Power Line Conducted Emission  
at

2.8905 MHz

The worst case AC power Line conducted emission configuration photographs are saved with filename:  
config photos.pdf

#### 4.3.2 AC Power Line Conducted Emissions Data:

The plot(s) and data in the following pages list the significant emission frequencies, the limit and the worst case margin of compliance.

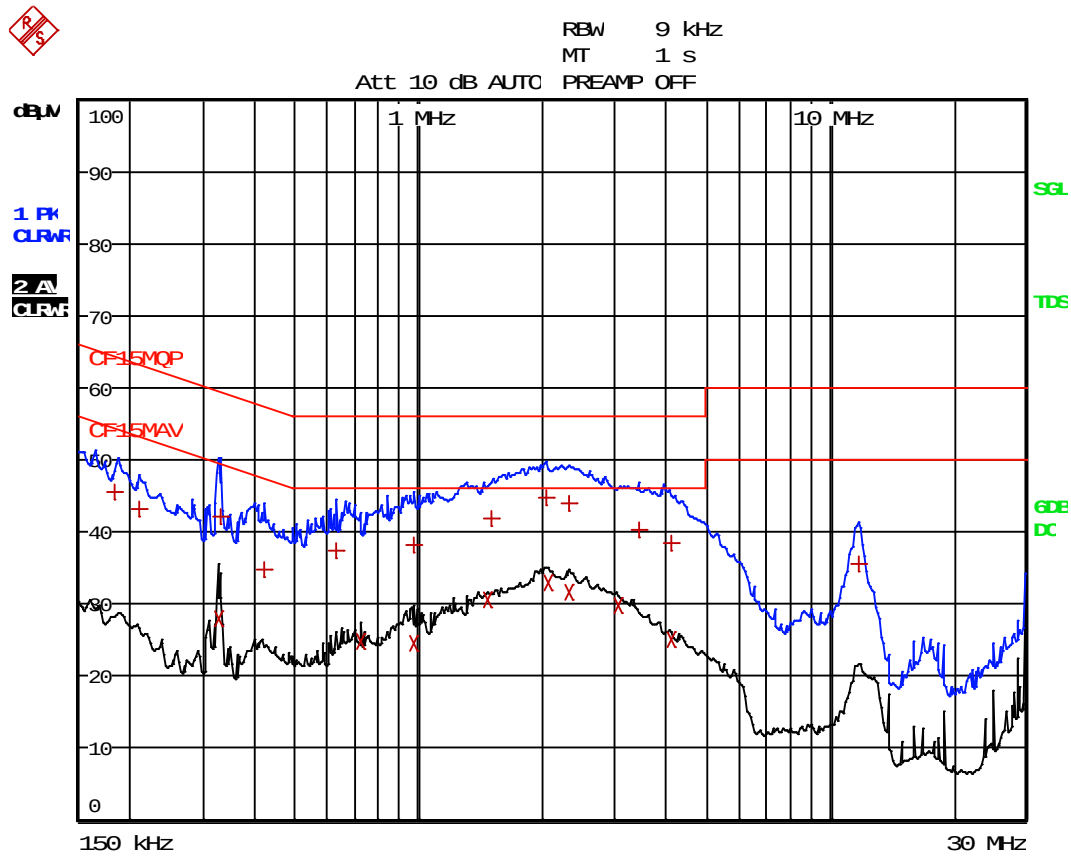
Judgment:

Passed by 1.35 dB margin compared with cispr average limit

## TEST REPORT

Worst Case:

Base unit Talk mode with Meic adaptor



## TEST REPORT

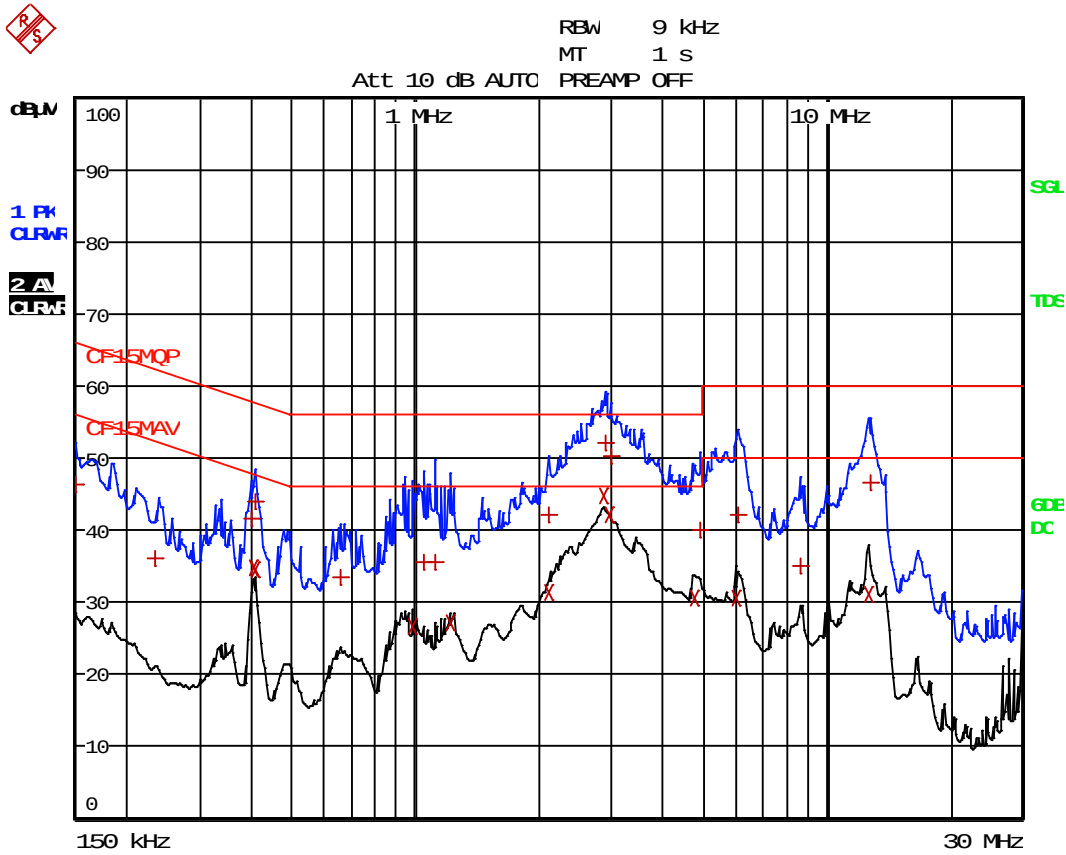
Worst Case: Base unit Talk mode with Meic adaptor

| EDIT PEAK LIST (Final Measurement Results) |             |            |    |                |
|--------------------------------------------|-------------|------------|----|----------------|
| Trace1:                                    | CF15MQP     |            |    |                |
| Trace2:                                    | CF15MAV     |            |    |                |
| Trace3:                                    | ---         |            |    |                |
| TRACE                                      | FREQUENCY   | LEVEL dBµV |    | DELTA LIMIT dB |
| 1 Quasi Peak                               | 186 kHz     | 45.45      | N  | -18.76         |
| 1 Quasi Peak                               | 213 kHz     | 43.18      | L1 | -19.90         |
| 2 CISPR Average                            | 325.5 kHz   | 28.07      | N  | -21.49         |
| 1 Quasi Peak                               | 330 kHz     | 42.24      | N  | -17.20         |
| 1 Quasi Peak                               | 420 kHz     | 34.90      | L1 | -22.54         |
| 1 Quasi Peak                               | 631.5 kHz   | 37.52      | N  | -18.47         |
| 2 CISPR Average                            | 721.5 kHz   | 24.67      | L1 | -21.32         |
| 1 Quasi Peak                               | 978 kHz     | 38.12      | N  | -17.87         |
| 2 CISPR Average                            | 978 kHz     | 24.42      | N  | -21.57         |
| 2 CISPR Average                            | 1.4775 MHz  | 30.63      | L1 | -15.36         |
| 1 Quasi Peak                               | 1.5 MHz     | 41.86      | L1 | -14.14         |
| 1 Quasi Peak                               | 2.049 MHz   | 44.73      | L1 | -11.26         |
| 2 CISPR Average                            | 2.067 MHz   | 32.95      | L1 | -13.04         |
| 1 Quasi Peak                               | 2.319 MHz   | 43.83      | L1 | -12.16         |
| 2 CISPR Average                            | 2.337 MHz   | 31.67      | L1 | -14.32         |
| 2 CISPR Average                            | 3.0795 MHz  | 29.72      | L1 | -16.27         |
| 1 Quasi Peak                               | 3.444 MHz   | 40.25      | N  | -15.74         |
| 2 CISPR Average                            | 4.1145 MHz  | 24.97      | N  | -21.02         |
| 1 Quasi Peak                               | 4.1505 MHz  | 38.41      | L1 | -17.58         |
| 1 Quasi Peak                               | 11.7915 MHz | 35.58      | N  | -24.41         |

## TEST REPORT

Worst Case:

Base unit ringing and charging mode with Baijunda adaptor



## TEST REPORT

Worst Case: Base unit ringing and charging mode with Baijunda adaptor

| EDIT PEAK LIST (Final Measurement Results) |            |            |  |                |
|--------------------------------------------|------------|------------|--|----------------|
| Trace1:                                    | CF15MQP    |            |  |                |
| Trace2:                                    | CF15MAV    |            |  |                |
| Trace3:                                    | ---        |            |  |                |
| TRACE                                      | FREQUENCY  | LEVEL dBμV |  | DELTA LIMIT dB |
| 1 Quasi Peak                               | 150 kHz    | 46.42 L1   |  | -19.57         |
| 1 Quasi Peak                               | 235.5 kHz  | 36.06 L1   |  | -26.18         |
| 1 Quasi Peak                               | 397.5 kHz  | 41.48 L1   |  | -16.42         |
| 2 CISPR Average                            | 402 kHz    | 34.64 N    |  | -13.16         |
| 1 Quasi Peak                               | 406.5 kHz  | 44.08 N    |  | -13.63         |
| 2 CISPR Average                            | 406.5 kHz  | 34.60 N    |  | -13.11         |
| 1 Quasi Peak                               | 654 kHz    | 33.38 N    |  | -22.61         |
| 2 CISPR Average                            | 982.5 kHz  | 26.72 L1   |  | -19.27         |
| 1 Quasi Peak                               | 1.0455 MHz | 35.52 L1   |  | -20.48         |
| 1 Quasi Peak                               | 1.113 MHz  | 35.55 L1   |  | -20.44         |
| 2 CISPR Average                            | 1.221 MHz  | 27.28 L1   |  | -18.71         |
| 2 CISPR Average                            | 2.1075 MHz | 31.39 N    |  | -14.60         |
| 1 Quasi Peak                               | 2.112 MHz  | 42.11 N    |  | -13.89         |
| 2 CISPR Average                            | 2.8905 MHz | 44.64 N    |  | -1.35          |
| 1 Quasi Peak                               | 2.9175 MHz | 51.98 N    |  | -4.01          |
| 2 CISPR Average                            | 2.958 MHz  | 42.01 L1   |  | -3.98          |
| 1 Quasi Peak                               | 2.9985 MHz | 50.33 L1   |  | -5.66          |
| 2 CISPR Average                            | 4.7805 MHz | 30.48 N    |  | -15.51         |
| 1 Quasi Peak                               | 4.9245 MHz | 39.96 N    |  | -16.03         |
| 2 CISPR Average                            | 6.045 MHz  | 30.50 N    |  | -19.49         |



# TEST REPORT

## Worst Case:

## Base unit Answer Machine mode with Baijunda adaptor

| EDIT PEAK LIST (Final Measurement Results) |             |            |    |                |
|--------------------------------------------|-------------|------------|----|----------------|
| Trace1:                                    |             | CF15MQP    |    |                |
| Trace2:                                    |             | CF15MAV    |    |                |
| Trace3:                                    |             | ---        |    |                |
| TRACE                                      | FREQUENCY   | LEVEL dBµV |    | DELTA LIMIT dB |
| 1 Quasi Peak                               | 6.0855 MHz  | 42.06      | N  | -17.93         |
| 1 Quasi Peak                               | 8.6595 MHz  | 35.04      | L1 | -24.95         |
| 2 CISPR Average                            | 12.7095 MHz | 31.15      | N  | -18.84         |
| 1 Quasi Peak                               | 12.867 MHz  | 46.67      | N  | -13.32         |

## TEST REPORT

### 5.0 EQUIPMENT LIST

#### 1) Radiated Emissions Test

| Equipment            | EMI Test Receiver | Spectrum Analyzer | Biconical Antenna |
|----------------------|-------------------|-------------------|-------------------|
| Registration No.     | EW-3156           | EW-2253           | EW-0571           |
| Manufacturer         | R&S               | R&S               | EMCO              |
| Model No.            | ESR26             | FSP40             | 3104C             |
| Calibration Date     | August 01, 2019   | November 18, 2019 | July 23, 2019     |
| Calibration Due Date | August 01, 2020   | November 18, 2020 | January 23, 2021  |

| Equipment            | Log Periodic Antenna | BiConiLog Antenna<br>(30MHz - 6GHz) | Double Ridged Guide<br>Antenna |
|----------------------|----------------------|-------------------------------------|--------------------------------|
| Registration No.     | EW-0447              | EW-3408                             | EW-1133                        |
| Manufacturer         | EMCO                 | EMCO                                | EMCO                           |
| Model No.            | 3146                 | 3142E                               | 3115                           |
| Calibration Date     | September 25, 2019   | April 25, 2019                      | November 29, 2018              |
| Calibration Due Date | May 25, 2021         | October 25, 2020                    | May 29, 2020                   |

#### 2) Conducted Emissions Test

| Equipment            | EMI Test Receiver | Artificial Mains<br>Network | RF Cable 9kHz to<br>1000MHz |
|----------------------|-------------------|-----------------------------|-----------------------------|
| Registration No.     | EW-2251           | EW-2874                     | EW-3170                     |
| Manufacturer         | R&S               | R&S                         | N/A                         |
| Model No.            | ESCI              | ENV-216                     | 9kHz to 1000MHz             |
| Calibration Date     | June 21, 2019     | July 05, 2019               | May 28, 2019                |
| Calibration Due Date | June 21, 2020     | July 05, 2020               | July 16, 2020               |

**END OF TEST REPORT**