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TEST REPORT

Report Number: 19110587HKG-002

Application For Original Grant of 47 CFR Part 15 Certification

FCC ID: ACJ96NKX-TGB810

Prepared and Checked by:	Approved by:
Signed On File Leung Chiu Kuen, Stanley Engineer	Digitally signed by Jess Tang Location: Intertek Testing Services Hong Kong Limited Tang Kwan Mo, Jess Lead Engineer Date: July 20, 2020

TEST REPORT

GENERAL INFORMATION

Grantee:	Panasonic Corporation of North America
Grantee Address:	2 Riverfront Plaza, 9/F., Newark, NJ 07102, USA
FCC Specification Standard:	FCC Part 15, October 1, 2019 Edition
FCC ID:	ACJ96NKX-TGB810
FCC Model(s):	KX-TGB810, KX-TGB812
Type of EUT:	Class B Digital portion
Description of EUT:	DECT Cordless Telephone - Base Unit
Serial Number:	N/A
Sample Receipt Date:	November 15, 2019
Date of Test:	December 18, 2019 - May 21, 2020
Report Date:	July 20, 2020
Environmental Conditions:	Temperature: +10 to 40°C Humidity: 10 to 90%
Conclusion:	Test was conducted by client submitted sample. The submitted sample as received complied with the 47 CFR Part 15 Certification.

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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

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2.0 GENERAL DESCRIPTION

2.1 Product Description

The KX-TGB810 is a DECT Cordless Telephone - Base Unit. 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-TGB812 is the same as the Model: KX-TGB810 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 and packaging material to be sold for marketing purpose 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.

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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 were 100 kHz for frequencies below 1000 MHz and 1MHz for frequencies above 1000MHz.

Radiated emission measurement was performed from the frequency 30MHz to 10GHz.

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-TGBA81, FCC ID: ACJ96NKX-TGBA81) (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 ±5.3dB and ±0.99dB respectively. The value of the Measurement uncertainty for conducted emission test is ±4.2dB.

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.

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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 dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
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 reflects 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 dBμV 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 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 62.0 dBμV
AF = 7.4 dB
CF = 1.6 dB
AG = 29 dB
PD = 0 dB
AV = -10 dB
FS = 62 + 7.4 +1.6 -29 +0 + (-10) = 32 dBμV/m
Level in μV/m = Common Antilogarithm [(32 dBμV/m)/20] = 39.8 μV/m

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4.2 Radiated Emissions

4.2.1 Radiated Emissions Configuration Photographs:

Worst Case Radiated Emission
at

146.388 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 8.1 dB margin

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RADIATED EMISSIONS DATA

Mode: Base unit Ringing and Charging 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	31.094	33.7	16	10.0	27.7	40.0	-12.4
V	60.709	36.2	16	10.0	30.2	40.0	-9.8
V	80.819	38.2	16	6.0	28.2	40.0	-11.8
V	112.872	33.8	16	14.0	31.8	43.5	-11.7
V	146.388	37.4	16	14.0	35.4	43.5	-8.1
V	219.756	27.7	16	17.0	28.7	46.0	-17.3

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 ±5.3dB at a level of confidence of 95%.

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RADIATED EMISSIONS DATA

Mode: Base unit Ringing and Charging mode with Baijunda adaptor

Table 2
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	31.502	28.5	16	10.0	22.5	40.0	-17.5
V	112.454	18.1	16	14.0	16.1	43.5	-27.4
V	131.201	20.7	16	14.0	18.7	43.5	-24.8
V	165.889	26.2	16	17.0	27.2	43.5	-16.3
V	200.881	21.6	16	16.0	21.6	43.5	-21.9
V	387.826	10.6	16	24.0	18.6	46.0	-27.4

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 ±5.3dB 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

2.9715 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:

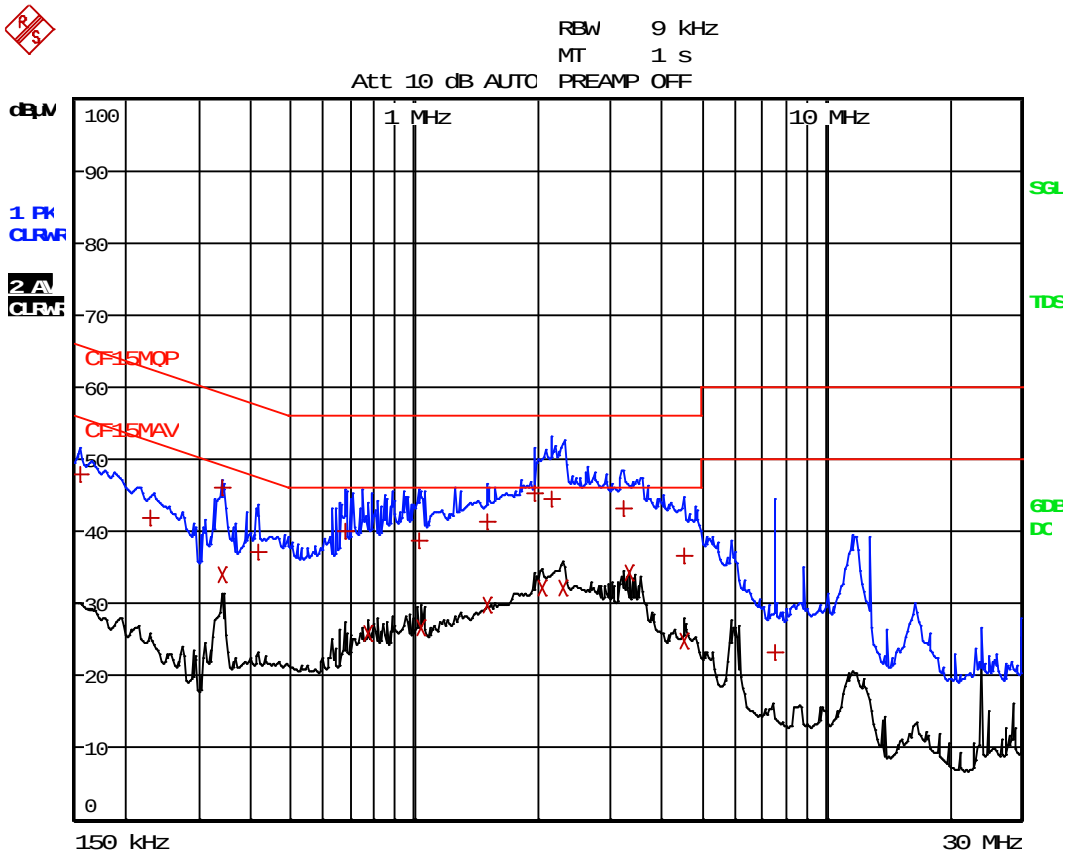
The plot(s) and data in the following pages list the significant emission frequencies, the limit and the worst case margin of compliance.

Judgment:

Passed by 2.43 dB margin compared with cispr average limit

TEST REPORT

Worst Case: Base unit Ringing and Charging mode with Meic adaptor



TEST REPORT

Worst Case: Base unit Ringing and Charging mode with Meic adaptor

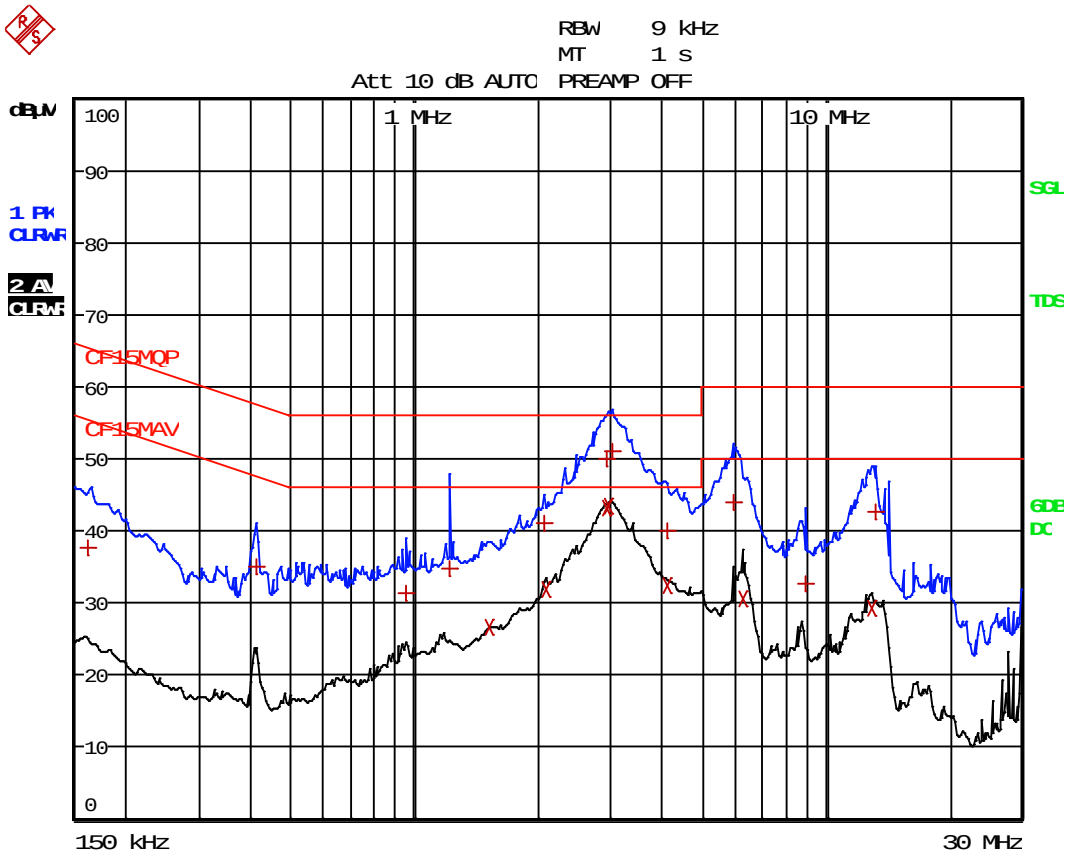
EDIT PEAK LIST (Final Measurement Results)

Trace1: CF15MQP
Trace2: CF15MAV
Trace3: ---

	TRACE	FREQUENCY	LEVEL dBµV		DELTA LIMIT dB
1	Quasi Peak	154.5 kHz	47.85	N	-17.89
1	Quasi Peak	231 kHz	41.88	L1	-20.53
1	Quasi Peak	339 kHz	46.05	N	-13.16
2	CISPR Averag	339 kHz	33.90	N	-15.32
1	Quasi Peak	415.5 kHz	37.09	N	-20.43
1	Quasi Peak	676.5 kHz	39.93	N	-16.06
2	CISPR Averag	771 kHz	25.87	N	-20.12
1	Quasi Peak	1.0275 MHz	38.64	L1	-17.35
2	CISPR Averag	1.0365 MHz	26.59	L1	-19.40
1	Quasi Peak	1.5135 MHz	41.35	L1	-14.64
2	CISPR Averag	1.5135 MHz	29.78	L1	-16.21
1	Quasi Peak	1.968 MHz	45.16	N	-10.83
2	CISPR Averag	2.049 MHz	32.26	N	-13.73
1	Quasi Peak	2.1705 MHz	44.58	N	-11.41
2	CISPR Averag	2.301 MHz	32.05	N	-13.94
1	Quasi Peak	3.2415 MHz	43.18	L1	-12.81
2	CISPR Averag	3.3495 MHz	34.20	L1	-11.79
2	CISPR Averag	4.524 MHz	24.68	L1	-21.32
1	Quasi Peak	4.569 MHz	36.72	N	-19.27
1	Quasi Peak	7.5435 MHz	23.10	N	-36.89

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	163.5 kHz	37.57	N	-27.71
1	Quasi Peak	411 kHz	35.01	N	-22.61
1	Quasi Peak	955.5 kHz	31.42	L1	-24.57
1	Quasi Peak	1.212 MHz	34.90	N	-21.09
2	CISPR Average	1.518 MHz	26.68	N	-19.31
1	Quasi Peak	2.076 MHz	41.06	N	-14.93
2	CISPR Average	2.0895 MHz	31.80	N	-14.19
2	CISPR Average	2.9265 MHz	43.26	N	-2.73
1	Quasi Peak	2.9535 MHz	49.95	N	-6.04
2	CISPR Average	2.9715 MHz	43.56	N	-2.43
1	Quasi Peak	3.039 MHz	51.03	L1	-4.96
1	Quasi Peak	4.128 MHz	40.02	L1	-15.97
2	CISPR Average	4.128 MHz	32.40	L1	-13.59
1	Quasi Peak	5.9685 MHz	43.85	N	-16.14
2	CISPR Average	6.315 MHz	30.58	L1	-19.41
1	Quasi Peak	8.9925 MHz	32.63	N	-27.36
2	CISPR Average	12.9255 MHz	29.15	N	-20.84
1	Quasi Peak	13.218 MHz	42.70	L1	-17.29

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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 (30MHz - 6GHz)	Double Ridged Guide 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	LISN	RF Cable 9kHz to 1000MHz
Registration No.	EW-2251	EW-2501	EW-3170
Manufacturer	R&S	R&S	N/A
Model No.	ESCI	ENV-216	9kHz to 1000MHz
Calibration Date	June 21, 2019	May 10, 2019	May 28, 2019
Calibration Due Date	June 21, 2020	May 10, 2020	July 20, 2020

END OF TEST REPORT