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TEST REPORT

Report No.: 18091134HKG-002

Johnson Controls Inc.

Application For Certification
(Original Grant)

FCC ID: RNL-KONOZW
IC: 4970A-KONOZW

Transceiver

Prepared and Checked by:	**Approved by:**
Signed On File Wong Cheuk Ho, Herbert Lead Engineer	Digitally signed by Kenneth Wong Location: Intertek Testing Services Hong Kong Ltd. Wong Kwok Yeung, Kenneth Senior Lead Engineer Date: December 05, 2018

TEST REPORT

GENERAL INFORMATION

Grantee:	Johnson Controls Inc.
Grantee Address:	4747 South Broad Street Building 101, Suite 330, Philadelphia, PA 19112, USA.
Contact Person:	Kurt Mease
Tel:	856-234-7905
Fax:	N/A
e-mail:	Kurt.mease@jci.com
Manufacturer:	Johnson Controls Inc.
Manufacturer Address:	4747 South Broad Street Building 101, Suite 330, Philadelphia, PA 19112, USA.
Brand Name:	Lux
Model / HVIN:	KN-ZW-WH1-B04
PMN:	KONOzw Smart Hub Thermostat
Type of EUT:	Transceiver
Description of EUT:	KONOzw Smart Hub Thermostat
Serial Number:	N/A
FCC ID / IC:	RNL-KONOZW / 4970A-KONOZW
Date of Sample Submitted:	September 26, 2018
Date of Test:	September 26, 2018 to December 04, 2018
Report No.:	18091134HKG-002
Report Date:	December 05, 2018
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 / RSS-210 Issue 9 Certification.

TEST REPORT

SUMMARY OF TEST RESULT

Test Specification	Reference	Results
Transmitter Power Line Conducted Emissions	15.207 / RSS-Gen 8.8	Pass
Radiated Emission Radiated Emission on the Bandedge	15.249, 15.209 / RSS-210 B.10, RSS-210 4.4	Pass
Radiated Emission in Restricted Bands	15.205 / RSS-210 4.1	Pass

The equipment under test is found to be complying with the following standards:
FCC Part 15, October 1, 2017 Edition
RSS-210 Issue 9, August 2016
RSS-Gen Issue 5, April 2018

Note: 1. The EUT uses a permanently attached antenna which, in accordance to section 15.203, is considered sufficient to comply with the pervisions of this section.
2. Pursuant to FCC part 15 Section 15.215(c), the 20 dB bandwidth of the emission was contained within the frequency band designated (mentioned as above) which the EUT operated. The effects, if any, from frequency sweeping, frequency hopping, other modulation techniques and frequency stability over excepted variations in temperature and supply voltage were considered.

TEST REPORT

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TEST REPORT

1.0 GENERAL DESCRIPTION

1.1 Product Description

The Equipment Under Test (EUT) is a KONOzw Smart Hub Thermostat, which equipped with a Z-wave module (two channel: 908.4MHz, 916MHz). After connecting the EUT to the Z-wave home control system, user can control the home heater/cooler system. The EUT is powered by 4X size "AA" batteries or 24VAC.

Antenna Type: Internal, Integral

For electronic filing, the brief circuit description is saved with filename: descri.pdf.

1.2 Related Submittal(s) Grants

This is a single application for certification of a transceiver.

1.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.10 (2013). All radiated measurements were performed in an 3m Chamber . Preliminary scans were performed in the 3m Chamber only to determine worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the **"Justification Section"** of this Application.

1.4 Test Facility

The 3m Chamber and conducted measurement facility used to collect the radiated data 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. This test facility and site measurement data have been placed on file with the FCC and IC No. 2042V-1.

TEST REPORT

2.0 SYSTEM TEST CONFIGURATION

2.1 Justification

The system was configured for testing in a typical fashion (as a customer would normally use it), and in the confines as outlined in ANSI C63.10 (2013).

The device was powered by 6.0VDC (4 x new 1.5V type “AA” batteries) or 24VAC. Both powering method were tested. The worse-case result is shown in the report only (powered by 24VAC).

For maximizing emissions, the EUT was rotated through 360°, the antenna height was varied from 1 meter to 4 meters above the ground plane, and the antenna polarization was changed. This step by step procedure for maximizing emissions led to the data reported in Exhibit 3.0.

The rear of unit shall be flushed with the rear of the table.

The equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). The EUT was mounted to a plastic stand if necessary and placed on the wooden turntable, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

2.2 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 typical use.

2.3 Special Accessories

There are no special accessories necessary for compliance of this product.

2.4 Measurement Uncertainty

When determining of the test conclusion, the Measurement Uncertainty of test has been considered.

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.

2.5 Support Equipment List and Description

24V AC transformer (Input: 120V, Output: 24V) (Provided by Intertek)

TEST REPORT

3.0 EMISSION 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.

3.1 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any), Average Factor (optional) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG - 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
AV = Average Factor in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows:

FS = RR + LF

where FS = Field Strength in dBµV/m
RR = RA - AG - AV in dBµV
LF = CF + AF in dB

Assume a receiver reading of 52.0 dBµV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB are added. The amplifier gain of 29 dB and average factor of 5 dB are subtracted, giving a field strength of 32 dBµV/m. This value in dBµV/m was converted to its corresponding level in µV/m.

RA = 52.0 dBµV/m
AF = 7.4 dB
CF = 1.6 dB
AG = 29.0 dB
AV = 5.0 dB
FS = RR + LF
FS = 18 + 9 = 27 dBµV/m

RR = 18.0 dBµV
LF = 9.0 dB

Level in µV/m = Common Antilogarithm [(27 dBµV/m)/20] = 22.4 µV/m

TEST REPORT

3.2 Radiated Emission Configuration Photograph

The worst case in radiated emission was found at 87.472 MHz

For electronic filing, the worst case radiated emission configuration photographs are saved with filename: radiated photos.pdf.

3.3 Radiated Emission Data

The data on the following page lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

Judgment: Passed by 0.5 dB

3.4 Conducted Emission Configuration Photograph

The worst case in line-conducted emission was found at 9.204 MHz

For electronic filing, the worst case line-conducted configuration photographs are saved with filename: conducted photo.pdf.

3.5 Conducted Emission Data

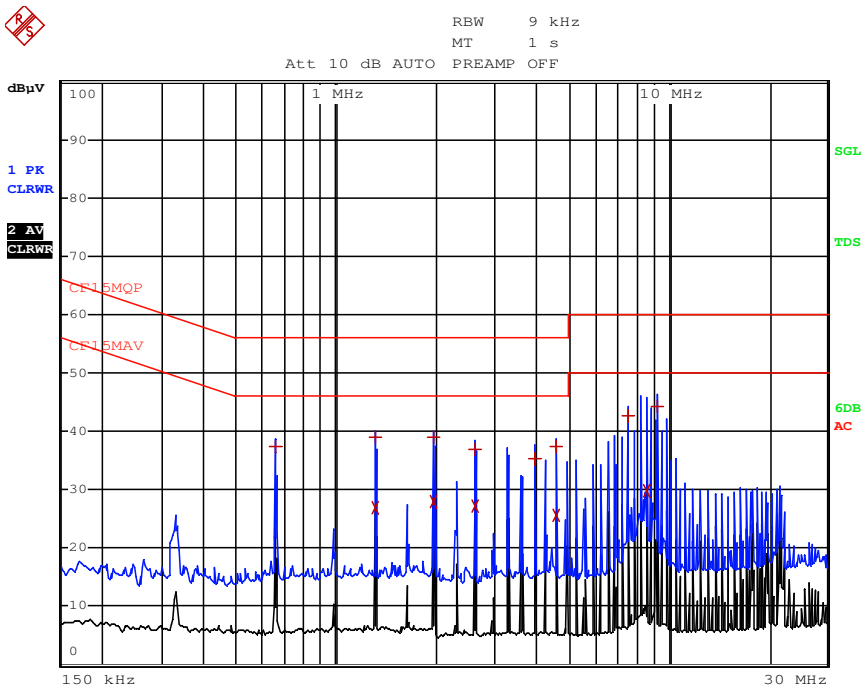
For electronic filing, the graph and data table of conducted emission is saved with filename: conducted.pdf.

Judgment: Pass by 15.8 dB

TEST REPORT

CONDUCTED EMISSION

Model: KN-ZW-WH1-B04
Date of Test: December 04, 2018
Worst-Case Operating Mode: Z-wave Operating



EDIT PEAK LIST (Final Measurement Results)

Trace1: CF15MQP
Trace2: CF15MAV
Trace3: ---

	TRACE	FREQUENCY	LEVEL dBµV		DELTA LIMIT dB
1	Quasi Peak	658.5 kHz	37.35	L1	-18.64
1	Quasi Peak	1.3155 MHz	39.04	N	-16.95
2	CISPR Average	1.3155 MHz	26.82	N	-19.17
1	Quasi Peak	1.9725 MHz	39.03	N	-16.96
2	CISPR Average	1.9725 MHz	28.03	N	-17.96
1	Quasi Peak	2.6295 MHz	36.91	L1	-19.08
2	CISPR Average	2.6295 MHz	27.08	N	-18.91
1	Quasi Peak	3.948 MHz	35.39	N	-20.61
1	Quasi Peak	4.605 MHz	37.34	L1	-18.65
2	CISPR Average	4.605 MHz	25.64	N	-20.35
1	Quasi Peak	7.5615 MHz	42.68	N	-17.31
2	CISPR Average	8.5515 MHz	29.87	N	-20.12
1	Quasi Peak	9.204 MHz	44.21	N	-15.78

Note: Measurement Uncertainty is ±4.2dB at a level of confidence of 95%.

TEST REPORT

RADIATED EMISSIONS

Model: KN-ZW-WH1-B04
Date of Test: December 04, 2018
Worst-Case Operating Mode: Transmitting

Table 1

Pursuant to FCC Part 15 Section 15.249 / RSS-210 B10.0 Requirement

Lowest Channel

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Quasi-Peak (dBµV/m)	Quasi-Peak Limit at 3m (dBµV/m)	Margin (dB)
V	902.000	26.6	16	32.0	42.6	46.0	-3.4
V	908.400	72.6	16	32.0	88.6	94.0	-5.4
V	928.000	25.0	16	33.0	42.0	46.0	-4.0

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	1816.800	34.6	33	27.2	28.8	54.0	-25.2
V	2725.200	41.8	33	30.4	39.2	54.0	-14.8
V	3633.600	35.9	33	33.3	36.2	54.0	-17.8
V	4542.000	34.5	33	34.9	36.4	54.0	-17.6
V	5450.400	35.1	33	35.7	37.8	54.0	-16.2
V	6358.800	36.1	33	36.9	40.0	54.0	-14.0
V	7267.200	36.3	33	37.9	41.2	54.0	-12.8
V	8175.600	38.6	33	39.0	44.6	54.0	-9.4
V	9084.000	36.4	33	40.4	43.8	54.0	-10.2

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
V	1816.800	37.6	33	27.2	31.8	74.0	-42.2
V	2725.200	43.4	33	30.4	40.8	74.0	-33.2
V	3633.600	37.1	33	33.3	37.4	74.0	-36.6
V	4542.000	36.5	33	34.9	38.4	74.0	-35.6
V	5450.400	36.8	33	35.7	39.5	74.0	-34.5
V	6358.800	37.3	33	36.9	41.2	74.0	-32.8
V	7267.200	37.3	33	37.9	42.2	74.0	-31.8
V	8175.600	40.6	33	39.0	46.6	74.0	-27.4
V	9084.000	37.4	33	40.4	44.8	74.0	-29.2

NOTES:
1. Peak Detector Data unless otherwise stated. Average measurement method is according to ANSI C63.10.

2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distances were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative sign in the column shows value below limit.

4. Horn antenna is used for the emission over 1000MHz.

5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 4.1.

6. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

TEST REPORT

Model: KN-ZW-WH1-B04
Date of Test: December 04, 2018
Worst-Case Operating Mode: Transmitting

Table 2

Pursuant to FCC Part 15 Section 15.249 / RSS-210 B10.0 Requirement

Highest Channel

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Quasi-Peak (dBµV/m)	Quasi-Peak Limit at 3m (dBµV/m)	Margin (dB)
V	902.000	26.8	16	32.0	42.8	46.0	-3.2
V	916.000	74.8	16	33.0	91.8	94.0	-2.2
V	928.000	25.2	16	33.0	42.2	46.0	-3.8

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	1832.000	34.2	33	27.2	28.4	54.0	-25.6
V	2748.000	42.4	33	30.4	39.8	54.0	-14.2
V	3664.000	36.5	33	33.3	36.8	54.0	-17.2
V	4580.000	34.5	33	34.9	36.4	54.0	-17.6
V	5496.000	34.8	33	35.7	37.5	54.0	-16.5
V	6412.000	36.1	33	36.9	40.0	54.0	-14.0
V	7328.000	36.7	33	37.9	41.6	54.0	-12.4
V	8244.000	39.6	33	39.0	45.6	54.0	-8.4
V	9160.000	36.0	33	40.4	43.4	54.0	-10.6

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
V	1832.000	36.6	33	27.2	30.8	74.0	-43.2
V	2748.000	43.0	33	30.4	40.4	74.0	-33.6
V	3664.000	37.1	33	33.3	37.4	74.0	-36.6
V	4580.000	36.7	33	34.9	38.6	74.0	-35.4
V	5496.000	37.7	33	35.7	40.4	74.0	-33.6
V	6412.000	36.3	33	36.9	40.2	74.0	-33.8
V	7328.000	37.7	33	37.9	42.6	74.0	-31.4
V	8244.000	42.6	33	39.0	48.6	74.0	-25.4
V	9160.000	37.0	33	40.4	44.4	74.0	-29.6

NOTES:

1. Peak Detector Data unless otherwise stated. Average measurement method is according to ANSI C63.10.

2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distances were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative sign in the column shows value below limit.

4. Horn antenna is used for the emission over 1000MHz.

5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 4.1.

6. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

TEST REPORT

Model: KN-ZW-WH1-B04
Date of Test: December 04, 2018
Worst-Case Operating Mode: Z-wave Operating

Table 3
Pursuant to FCC Part 15 Section 15.209 / RSS-210 4.4 Requirement

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)
V	50.612	43.8	16	11.0	38.8	40.0	-1.2
V	87.472	46.5	16	9.0	39.5	40.0	-0.5
V	95.354	46.4	16	12.0	42.4	43.5	-1.1
V	97.294	46.5	16	12.0	42.5	43.5	-1.0
V	97.900	46.2	16	12.0	42.2	43.5	-1.3
V	117.664	42.5	16	14.0	40.5	43.5	-3.0
H	133.426	40.5	16	14.0	38.5	43.5	-5.0
V	250.432	32.0	16	20.0	36.0	46.0	-10.0
H	412.422	25.8	16	25.0	34.8	46.0	-11.2

NOTES:
1. Quasi-Peak Detector Data unless otherwise stated.
2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distances were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative sign in the column shows value below limit.
4. Horn antenna is used for the emission over 1000MHz.
5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 4.1.
6. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

TEST REPORT

4.0 EQUIPMENT PHOTOGRAPHS

For electronic filing, the photographs are saved with filename: external photos.pdf and internal photos.pdf.

5.0 PRODUCT LABELLING

For electronics filing, the FCC ID label artwork and the label location are saved with filename: label.pdf.

6.0 TECHNICAL SPECIFICATIONS

For electronic filing, the block diagram and schematic of the tested EUT are saved with filename: block.pdf and circuit.pdf respectively.

7.0 INSTRUCTION MANUAL

For electronic filing, a preliminary copy of the Instruction Manual is saved with filename: manual.pdf.

This manual will be provided to the end-user with each unit sold/leased in the United States and Canada.

TEST REPORT

8.0 MISCELLANEOUS INFORMATION

The miscellaneous information includes details of the test procedure and measured bandwidth.

8.1 Radiated Emission on the Bandedge

The bandedge data is shown in frequency table 1 and 2.

TEST REPORT

8.2 Discussion of Pulse Desensitization

Pulse desensitivity is not applicable for this device. Since the transmitter transmits the RF signal continuously.

8.3 Calculation of Average Factor

N/A

8.4 Emissions Test Procedures

The following is a description of the test procedure used by Intertek Testing Services Hong Kong Ltd. in the measurements of transmitter operating under the Part 15, Subpart C rules.

The transmitting equipment under test (EUT) is placed on a wooden turntable which is four feet in diameter and approximately 0.8m in height above the ground plane for emission measurement at or below 1GHz and 1.5m in height above the ground plane for emission measurement above 1GHz. During the radiated emissions test, the turntable is rotated and any cables leaving the EUT are manipulated to find the configuration resulting in maximum emissions. The EUT is adjusted through all three orthogonal axis to obtain maximum emission levels. The antenna height and polarization are also varied during the testing to search for maximum signal levels. The height of the antenna is varied from one to four meters.

Detector function for radiated emissions is in peak mode. Average readings, when required, are taken by measuring the duty cycle of the equipment under test and subtracting the corresponding amount in dB from the measured peak readings. A detailed description for the calculation of the average factor can be found in Exhibit 8.3.

The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or 40 GHz, whichever is lower. For line conducted emissions, the range scanned is 150 kHz to 30 MHz.

TEST REPORT

8.4 Emissions Test Procedures (cont'd)

The EUT is warmed up for 15 minutes prior to the test.

AC power to the unit is varied from 85% to 115% nominal and variation in the fundamental emission field strength is recorded. If battery powered, a new, fully charged battery is used.

Conducted measurements were made as described in ANSI C63.10 (2013).

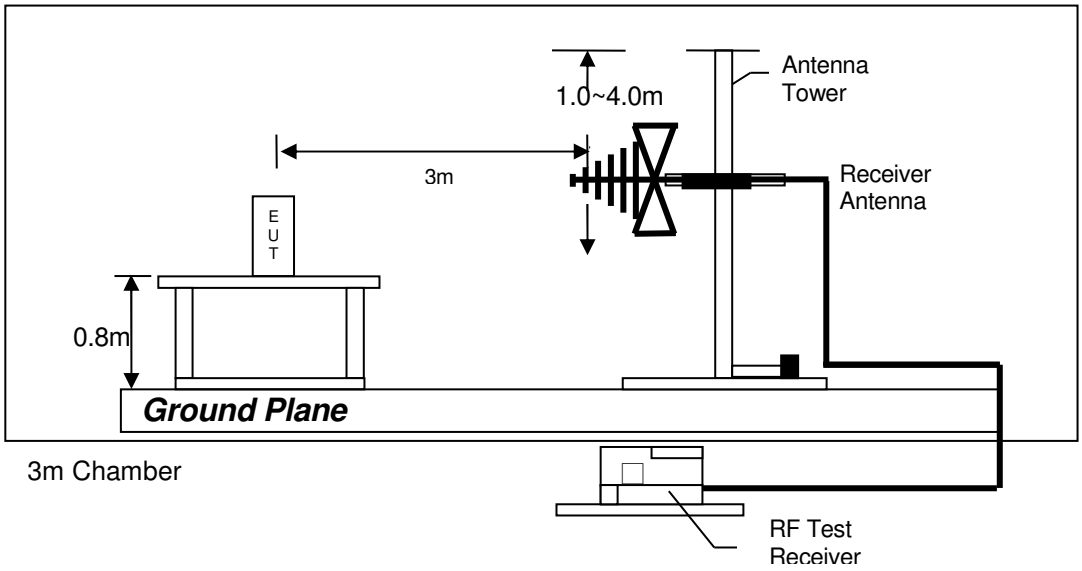
The IF bandwidth used for measurement of radiated signal strength was 100 kHz or greater when frequency is below 1000 MHz. Where pulsed transmissions of short enough pulse duration warrant, a greater bandwidth is selected according to the recommendations of Hewlett Packard Application Note 150-2. A discussion of whether pulse desensitivity is applicable to this unit is included in this report (See Exhibit 8.1). Above 1000 MHz, a resolution bandwidth of 3 MHz is used.

Transmitter measurements are normally conducted at a measurement distance of three meters. However, to assure low enough noise floor in the forbidden bands and above 1 GHz, signals are acquired at a distance of one meter or less. All measurements are extrapolated to three meters using inverse scaling, unless otherwise reported. Measurements taken at a closer distance are so marked.

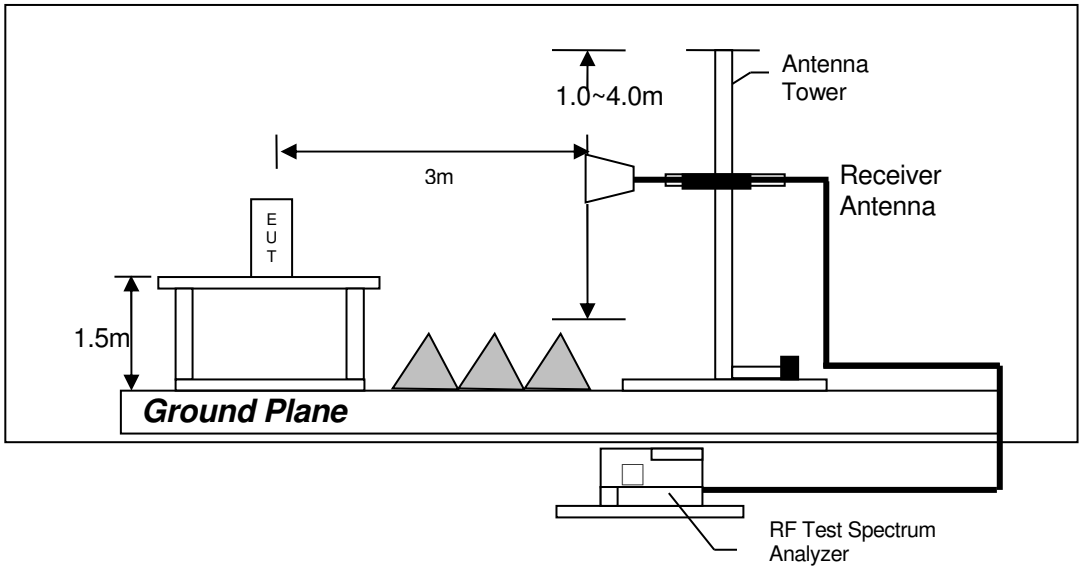
TEST REPORT

8.4.1 Radiated Emission Test Setup

The figure below shows the test setup, which is utilized to make these measurements.



Test setup of radiated emissions up to 1GHz



Test setup of radiated emissions above 1GHz

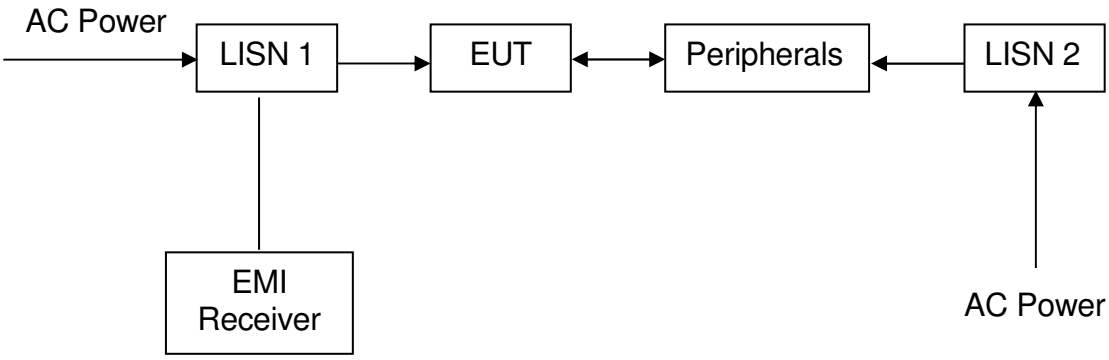
TEST REPORT

8.4.2 Conducted Emission Test Procedures

For tabletop equipment, the EUT along with its peripherals were placed on a 1.0m(W)×1.5m(L) and 0.8m in height wooden table. For floor-standing equipment, the EUT and all cables were insulated, if required, from the ground plane by up to 12 mm of insulating material. 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 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room. The excess power cable between the EUT and the LISN was bundled.

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

8.4.3 Conducted Emission Test Setup



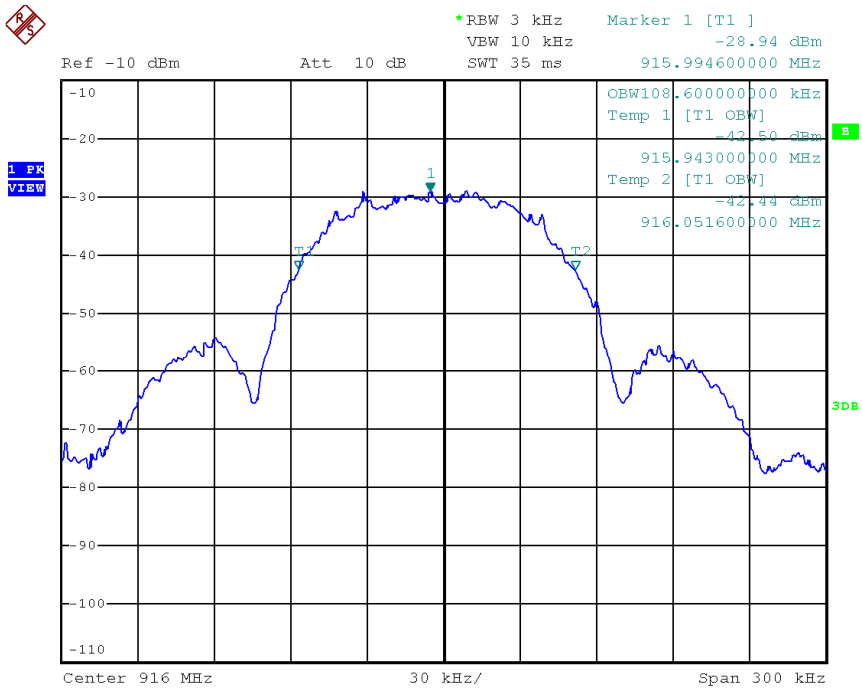
TEST REPORT

8.5 Occupied Bandwidth

Occupied Bandwidth Results:

	Occupied Bandwidth (kHz)
Low Channel: 908.4MHz	88.8
High Channel: 916MHz	108.6

The worst case is shown as below



TEST REPORT

9.0 CONFIDENTIALITY REQUEST

For electronic filing, a preliminary copy of the confidentiality request is saved with filename: request.pdf.

10.0 EQUIPMENT LIST

1) Radiated Emissions Test

Equipment	EMI Test Receiver	Spectrum Analyzer	Biconical Antenna
Registration No.	EW-2666	EW-3281	EW-0571
Manufacturer	R&S	ROHDESCHWARZ	EMCO
Model No.	ESCI7	FSV40	3104C
Calibration Date	August 28, 2018	January 02, 2018	February 27, 2018
Calibration Due Date	August 28, 2019	January 02, 2019	August 27, 2019

Equipment	Log Periodic Antenna	Double Ridged Guide Antenna	14m Double Shield RF Cable (20MHz to 6GHz)
Registration No.	EW-0447	EW-1015	EW-2505
Manufacturer	EMCO	EMCO	RADIALL
Model No.	3148	3115	nm / br5d / sma 14m
Calibration Date	January 17, 2018	November 17, 2017	October 27, 2018
Calibration Due Date	July 17, 2019	May 17, 2019	October 27, 2019

Equipment	RF Cable 14m (1GHz to 26.5GHz)	RF Pre-amplifier 3 pcs (9kHz to 40GHz)	Solid State Low Noise Preamplifier Assembly (1 - 18)GHz
Registration No.	EW-2781	EW-3006	EW-3229
Manufacturer	GREATBILLION	SCHWARZBECK	BONN ELEKTRO
Model No.	SMA m/SHF5MPU /SMA m ra14m,26G	BBV 9718 BBV9744 BBV 9721	BLMA 0118-5G
Calibration Date	October 27, 2018	January 30, 2018	January 30, 2018
Calibration Due Date	October 27, 2019	January 30, 2019	January 30, 2019

Equipment	Active Loop H-field (9kHz to 30MHz)	Pyramidal Horn Antenna
Registration No.	EW-2313	EW-0905
Manufacturer	ELECTROMETRI	EMCO
Model No.	EM-6876	3160-09
Calibration Date	March 08, 2018	August 18, 2017
Calibration Due Date	September 08, 2019	February 18, 2019

TEST REPORT

2) Conducted Emissions Test

Equipment	RF Cable 240cm (RG142)	Artificial Mains Network	EMI Test Receiver
Registration No.	EW-2454	EW-2501	EW-2666
Manufacturer	RADIALL	ROHDESCHWARZ	R&S
Model No.	bnc m st / 142 /bnc m ra 240cm	ENV-216	ESCI7
Calibration Date	March 27, 2018	February 14, 2018	August 28, 2018
Calibration Due Date	March 27, 2019	February 14, 2019	August 28, 2019

TEST REPORT

3) Bandwidth/Bandedge Measurement

Equipment	RF Cable (up to 40GHz) 1.5m length	Spectrum Analyzer
Registration No.	EW-3104	EW-2249
Manufacturer	N/A	R&S
Model No.	SMA-M to SMA-M	FSP30
Calibration Date	July 03, 2018	May 17, 2018
Calibration Due Date	July 03, 2019	May 17, 2019

END OF TEST REPORT