

Evaluation Report

Electromagnetic Compatibility Evaluation for the Multi-functional Smart Lampposts Pilot Scheme

Issue : A1

Date : 12th August 2022

Report No.: 15052TR1

The Client: Office of the Government Chief Information Officer (OGCIO)


Issued by: Electromagnetic Compatibility Centre
Smart City Division
Hong Kong Productivity Council

Address: LG1, HKPC Building
78 Tat Chee Avenue
Kowloon Tong
Kowloon
Hong Kong

Note:

This report shall not be reproduced except in full, without written approval of Hong Kong Productivity Council

Table of Revision

Issue	Date	Written By	Description
A1	12 August 2022	 Mr. LAM Wui Ting Senior Consultant EMC Centre, HKPC	First Issue

Disclaimer:

- This report shall not be reproduced except in full, without written approval of Hong Kong Productivity Council
- The Service is provided on an "as is" basis. HKPC makes no representation or warranty as to the accuracy, completeness, reliability or currency of the content of the Service and makes no warranty of whatsoever nature with regards to the material used. HKPC expressly disclaims warranties of any kind including, without limitation, the implied warranties of merchantability or revenue potential, fitness for any particular purpose, product performance, non-infringement, ability to interwork with any third party service or equipment. HKPC assumes no legal liability or responsibility for the use or application of the Service and/or the material associated therewith.

Table of Contents

	Page
Abbreviated Terms -----	P.5
<u>SECTION A</u>	
1. Executive Summary -----	P.7
1.1 Purpose -----	P.7
1.2 On-site Field Evaluation -----	P.7
1.3 Laboratory Evaluation -----	P.9
1.4 Conclusion-----	P.11
1.5 Recommendation -----	P.11
<u>SECTION B</u>	
<u>Part I – On-site Field Evaluation</u>	
1. Introduction -----	P.14
2. Methodologies, Guidelines and Standards -----	P.15
3. Testing Period, Location and Setup -----	P.16
3.1 Time Period -----	P.16
3.2 Test Locations, Lamppost Numbers and Test Dates ---	P.16
3.3 Location maps -----	P.18
3.4 Measurement Procedure -----	P.21
3.5 Test Equipment -----	P.24
4. Reference Emission Limits -----	P.25
4.1 Reference Levels of Radiofrequency Electromagnetic Fields (EMF) -----	P.25
4.2 Electromagnetic Compatibility (EMC) - Harmful effect to the functioning of surrounding electronic devices and the lamppost itself -----	P.25
5. Test Results -----	P.27
6. Conclusion -----	P.53
7. Recommendation -----	P.54

Part II – Laboratory Evaluation

1. Introduction -----	P.56
2. Methodologies and Applicable Standards -----	P.57
3. Equipment under Test (EUT) Description -----	P.67
3.1 EUT system configuration -----	P.67
3.2 List of devices of four (4) combinations -----	P.68
3.3 EUT Ports Diagram -----	P.69
4. Test Results -----	P.70
4.1 Radiated E-Field Emissions -----	P.70
4.2 Conducted Emissions -----	P.84
4.3 Electrostatic Discharge (ESD) -----	P.92
4.4 Radiated RF Immunity Test -----	P.100
4.5 Electrical Fast Transients Immunity Test -----	P.106
4.6 Surge Immunity Test -----	P.111
4.7 Conducted RF Immunity -----	P.117
4.8 Power Frequency Magnetic Field Immunity Test -	P.122
4.9 Voltage Dips, Short Interruptions and Voltage Variations Immunity -----	P.127
5. Conclusions -----	P.133
6. Recommendation -----	P.140

Appendix A – Assessment Data for On-site Field Evaluation

Abbreviated Terms

The followings are abbreviations used in this report:

AC	Alternating Current
AM	Amplitude Modulation
AMN	Artificial Mains Network
AV	Average
BW	Bandwidth
DC	Direct Current
CDN	Coupling Decoupling Network
dB	Decibel
EFT	Electrical Fast Transient
EMC	Electromagnetic Compatibility
EMF	Electromagnetic Fields
EMI	Electromagnetic Interference
ESD	Electrostatic Discharge
EUT	Equipment Under Test
FAC	Fully Anechoic Chamber
HCP	Horizontal Coupling Plane
Hz	Hertz
ICNIRP	International Commission on Non-ionizing Radiation Protection
LTE	Long Term Evolution
PK	Peak
PoE	Power over Ethernet
QP	Quasi-Peak
RBW	Resolution Bandwidth
RF	Radio Frequency
RMS	Root Mean Square
SAC	Semi Anechoic Chamber
VCP	Vertical Coupling Plane

SECTION A

1. Executive Summary

1.1 Purpose

An electromagnetic compatibility (EMC) evaluation has been performed to ensure the proper operation of the smart lampposts, in a variety of equipment installed within these smart lampposts, and in the vicinity of the electromagnetic radiation environment.

It is evaluated with reference to international EMC standards and the International Commission on Non-ionizing Radiation Protection (ICNIRP) guidelines, and considers whether the environment is causing:

- electromagnetic interference to its surrounding environment;
- adverse interaction with electromagnetic fields;
- harmful effects on the functioning of surrounding electronic devices such as cell phones; and
- harmful effects on the functioning of devices and equipment within the lamppost itself.

The evaluation is performed in 2 parts, namely on-site field evaluation and laboratory evaluation, which are described in the following paragraphs.

1.2 On-site Field Evaluation

The purpose is to present and conclude the On-site Field Evaluation results on whether electromagnetic radiation from the smart lampposts do not exceed the limits set out in the ICNIRP guidelines and EMC standards, which would impose any harmful effects on the functioning of devices and equipment of the lamppost itself and surrounding electronic devices such as cell phones. The focus of the evaluation is the interaction between the surrounding environment and each individual smart lamppost, in particular those with smart devices installed.

The full measurement methodology is described in Section B Part I of this document.

The On-site Field Evaluation for fifty (50) smart lampposts in Shing Kai Road, Kwun Tong Town Centre and Sheung Yuet Road were conducted in February and April 2022.

The on-site field evaluation covered the frequency range from Direct Current (DC) (0Hz) to 6 GHz. The electromagnetic radiated emissions in the on-site field evaluation were conducted and identified while the smart lampposts were running normally.

From the measured results, it is confirmed that the electromagnetic radiated emissions from the fifty (50) smart lampposts in Shing Kai Road, Kwun Tong Town Centre and Sheung Yuet Road are complied with the ICNIRP guidelines and EMC standards: EN 55035 - Electromagnetic compatibility of multimedia equipment — Immunity Requirements, EN 61547 - Equipment for general lighting purposes — EMC immunity requirements and EN 61000-6-1 - Generic standards – Immunity standard for residential, commercial and light industrial environments.

It is concluded that the electromagnetic radiated emissions posed no adverse interactions with electromagnetic fields, no harmful effects on the functioning of devices and equipment of the lamppost itself as well as to the surrounding electronic devices such as cell phones.

Table 1: Summary of On-site Field Evaluation Results

On-site Field Evaluation Tests		
Location	No. of Lampposts	Results
Shing Kai Road	20	Complied
Kwun Tong Town Centre	10	Complied
Sheung Yuet Road	20	Complied

1.3 Laboratory Evaluation

The purpose of this part is to present and conclude the Laboratory Evaluation results for four (4) combinations of different smart devices in smart lampposts which do not exceed the emission limit and immunity requirements set out in EMC standards EN 55032: 2015 + AC: 2016: “Electromagnetic compatibility of multimedia equipment — Emission Requirements”, EN 61547: 2009: “Equipment for general lighting purposes - EMC immunity requirements” and EN 61000-6-1:2019: “Generic standards – Immunity standard for residential, commercial and light industrial environments”.

The Laboratory EMC evaluation included a total of nine (9) EMC test items for full EMC emission and immunity tests according to the standards of EN 55032, EN 61547 and EN 61000-6-1. The focus of this part is on the electromagnetic emission and tolerance of the smart devices without the electromagnetic environmental effects.

In this evaluation, the full measurement methodology is described in Section B Part II of this document.

The Laboratory Evaluation results are compared to those stipulated in the standards of EN 55032, EN 61547 and EN 61000-6-1.

It is confirmed that the design and configurations of the four device combinations of Set #1, Set #2, Set #3 and Set #4 are within the specified limits with proper margins and fulfilled the specified performance criteria. All tests performed are in compliance with standards EN 55032, EN 61547 and EN 61000-6-1.

Table 2: Summary of Laboratory Evaluation Results

Laboratory Evaluation Tests		
Combination	Devices	Results
Standard pack: Smart Lampposts Monitoring and Access Control System (SMACS) sensors, Bluetooth Beacons, Sensor Gateway Computer, PoE Switch, Batched Sparse Code (BATS) module and antenna, 24/48V DC Miniature Circuit Breaker (MCB)		
Set #1 (with 5 pieces of snap ferrites)	Standard Pack + Meteorological Sensor (Basic), LTE Router and antenna	Complied
Set #2 (with 5 pieces of snap ferrites)	Standard Pack + Meteorological Sensor (Full), Fibre Switch	Complied
Set #3 (with 5 pieces of snap ferrites)	Standard Pack + Meteorological Sensor (Full), Air Quality Sensor, LTE Router and antenna	Complied
Set #3 (with EMI shielding cable and 4 pieces of snap ferrites)	Standard Pack + Meteorological Sensor (Full), Air Quality Sensor, LTE Router and antenna	Complied
Set #4 (with 5 pieces of snap ferrites)	Standard Pack + Meteorological Sensor (Full), Air Quality Sensor, LTE Router and antenna, LiDAR and Edge Computer	Complied
Set #4 (with EMI shielding cable and 4 pieces of snap ferrites)	Standard Pack + Meteorological Sensor (Full), Air Quality Sensor, LTE Router and antenna, LiDAR and Edge Computer	Complied

1.4 Conclusion

It is confirmed that all measured results of the On-site Field Evaluation for fifty (50) smart lampposts in Shing Kai Road, Kwun Tong Town Centre and Sheung Yuet Road and Laboratory Evaluation for four (4) combinations of different smart devices in smart lamppost are below the specified limits and complied the ICNIRP and EMC standards.

1.5 Recommendation

It is recommended that:

- On-site field evaluations should be carried out for the existing smart lampposts in case there is considerable change in the surrounding environment, in order to keep track with any changes of the electromagnetic environment in the location where each smart lamppost is installed to ensure no new and rising electromagnetic interference from surroundings would affect the smart devices in the existing smart lampposts.
- In case of any major changes of the smart devices installed on the smart lamppost such as major design upgrade or lamppost relocation, a preliminary evaluation should be carried out to assess the influence of EMC performance of the smart lamppost.
- An on-site field evaluation should be performed after new installation of the smart lampposts in other districts, whether by full testing or by selection of representative samples, to ensure the proper operation of the smart lampposts in a different electromagnetic radiation environment.

In addition, it is recommended that the following EMC design technique for installing the smart devices on each lamppost could be used to minimize the electromagnetic interference coupling effect to an acceptable level for EMC emission and immunity test requirements as specified by relevant international standards.

- Using electromagnetic interference (EMI) shielding cable to reduce electrical noise and its impact on the signal, to lower electromagnetic radiation, and to prevent crosstalk from happening between nearby cables.
- EMI filters (e.g. snap ferrites) can be used to minimize the coupling effect by locating it near the power module in close proximity.
- Proper cable routing plays an important role in preventing loop, which acts as an antenna, from forming between wires/cables that causes differential EMI to be coupled into or out of the system.

Section B

Part I – On-site Field Evaluation

1. Introduction

- 1.1 The purpose of this part is to present and conclude the On-site Field results of the electromagnetic compatibility evaluation on whether electromagnetic field radiations from the smart lampposts do not exceed the limits set out in the ICNIRP guidelines and EMC standards, which would impose any harmful effects on the functioning of devices and equipment of the lamppost itself and surrounding electronic devices such as cell phones.

2. Methodologies, Guidelines and Standards

2.1 The guidelines and standards adopted are as below:

Standard	Name
EN 55035	Electromagnetic compatibility of multimedia equipment — Immunity Requirements
EN 61547	Equipment for general lighting purposes — EMC immunity requirements
EN 61000-6-1	Generic standards – Immunity standard for residential, commercial and light industrial environments
ICNIRP Guidelines, 2020	ICNIRP Guidelines for limiting exposure to electromagnetic fields (100 kHz to 300 GHz). Health Phys 118(5):483-524; 2020
ICNIRP Guidelines, 2010	ICNIRP Guidelines for Limiting Exposure to Time-Varying Electric and Magnetic Fields (1 Hz – 100kHz). Health Physics 99 (6): 818-836; 2010.
CISPR 16-2-3: 2010+A2:2014	Specification for radio disturbance and immunity measuring apparatus and methods Part 2-3: Methods of measurement of disturbances and immunity — Radiated disturbance measurements

Table 1: ICNIRP Guidelines and EMC Standards

2.2 The methodologies for the On-site Field Evaluation results of electromagnetic compatibility evaluation are as follows. A total of 6 antennas used for electromagnetic field measurement in the DC (0Hz) to 6GHz frequency range. The measurement antennas shall be setup at the location 1.0 meter away from the selected lamppost and oriented in vertical and horizontal polarizations. The frequency of the measuring equipment is set to the dedicated operation frequency range of the antenna. The antenna tripod is used to fix and secure the position of the antenna without falling. The antenna shall be linked to the EMI test receiver via a calibrated coaxial cable. The antenna factors and cable loss are loaded into the EMI test receiver prior to commencing the measurements. The detailed method procedure shall be further explained in section 3.4.

3 Testing Period, Location and Setup

3.1 Test Period

The On-site Field Evaluation tests for fifty (50) smart lampposts were conducted during the period between 9 February to 16 February 2022 and 20 April to 22 April 2022.

3.2 Test Locations, Lamppost Numbers and Test Dates

The test locations, lamppost numbers and test dates are tabulated in Table 2 and indicated in Section 3.3.

Item	Test Locations and Lamppost Number	Test Date
1.	Shing Kai Road - DF3633	8 Feb 2022
2.	Shing Kai Road - DF3634	8 Feb 2022
3.	Shing Kai Road - DF3635	8 Feb 2022
4.	Shing Kai Road - DF3636	8 Feb 2022
5.	Shing Kai Road - DF3637	8 Feb 2022
6.	Shing Kai Road - DF3638	8 Feb 2022
7.	Shing Kai Road - DF3639	8 Feb 2022
8.	Shing Kai Road - DF3640	9 Feb 2022
9.	Shing Kai Road - DF3641	9 Feb 2022
10.	Shing Kai Road - DF3644	9 Feb 2022
11.	Shing Kai Road - DF3645	9 Feb 2022
12.	Shing Kai Road - DF3646	9 Feb 2022
13.	Shing Kai Road - DF3647	9 Feb 2022
14.	Shing Kai Road - DF3648	9 Feb 2022
15.	Shing Kai Road - DF3649	11 Feb 2022
16.	Shing Kai Road - DF3650	11 Feb 2022
17.	Shing Kai Road - DF3651	11 Feb 2022
18.	Shing Kai Road - DF3652	11 Feb 2022
19.	Shing Kai Road - DF3653	11 Feb 2022
20.	Shing Kai Road - DF3654	11 Feb 2022
21.	Kwun Tong Town Centre – GF3637	15-16 Feb 2022
22.	Kwun Tong Town Centre – GF3638	15-16 Feb 2022
23.	Kwun Tong Town Centre – GF3639	15-16 Feb 2022
24.	Kwun Tong Town Centre – GF3640	15-16 Feb 2022
25.	Kwun Tong Town Centre – GF3641	15-16 Feb 2022

26.	Kwun Tong Town Centre – AB4816	15-16 Feb 2022
27.	Kwun Tong Town Centre – AB4818	15-16 Feb 2022
28.	Kwun Tong Town Centre – GF3642	15-16 Feb 2022
29.	Kwun Tong Town Centre – GF3643	15-16 Feb 2022
30.	Kwun Tong Town Centre – GF3644	15-16 Feb 2022
31.	Sheung Yuet Road – GF0709	20-22 Apr 2022
32.	Sheung Yuet Road – GF0710	20-22 Apr 2022
33.	Sheung Yuet Road – AA6337	20-22 Apr 2022
34.	Sheung Yuet Road – AA6338	20-22 Apr 2022
35.	Sheung Yuet Road – E7685	20-22 Apr 2022
36.	Sheung Yuet Road – AB1558	20-22 Apr 2022
37.	Sheung Yuet Road – E7688	20-22 Apr 2022
38.	Sheung Yuet Road – E7689	20-22 Apr 2022
39.	Sheung Yuet Road – E7690	20-22 Apr 2022
40.	Sheung Yuet Road – E7691	20-22 Apr 2022
41.	Sheung Yuet Road – E7692	20-22 Apr 2022
42.	Sheung Yuet Road – E8450	20-22 Apr 2022
43.	Sheung Yuet Road – AB3072	20-22 Apr 2022
44.	Sheung Yuet Road – E7701	20-22 Apr 2022
45.	Sheung Yuet Road – E7703	20-22 Apr 2022
46.	Sheung Yuet Road – E7704	20-22 Apr 2022
47.	Sheung Yuet Road – E7707	20-22 Apr 2022
48.	Sheung Yuet Road – E7708	20-22 Apr 2022
49.	Sheung Yuet Road – E7709	20-22 Apr 2022
50.	Sheung Yuet Road – E7710	20-22 Apr 2022

Table 2: Test Locations and Measurement Dates

The positions of lampposts in Sheung Yuet Road:



The positions of lampposts in Kwun Tong Town Centre (URA part 1):



3.4 **Measurement Procedure**

The measurement procedure covers the frequency ranges from DC to 20Hz, from 20 Hz to 9kHz, from 9kHz to 30MHz, from 30 to 200 MHz, from 200 to 1000 MHz and from 1 to 6GHz, as stated in Section 3.4.1 to 3.4.2.

3.4.1 Procedure 1: DC to 20 Hz

Step 1) The axial probe of Gauss/ Tesla Meter shall be oriented initially in the X direction. The phase centre of the axial probe should be positioned 1.0m apart from the selected test position and 1.5 m above the floor.

Step 2) Press the POWER switch to turn on the Gauss/ Tesla Meter and select DC mode to measure DC magnetic field.

Step 3) Put the axial probe into zero flux chamber and then press the Zero pushbutton.

Step 4) Measure the value. The result will be recorded on the record sheet.

Step 5) The measurements will be repeated for the Y and Z directions of the axial probe of Gauss/ Tesla Meter.

3.4.2 Procedure 2: 20Hz to 6GHz

Step 1) Select a suitable antenna to measure a desired frequency range as stated in the following table:

Frequency Range	Antenna
20Hz – 9kHz	Magnetic Field Pickup Coil
9kHz – 30MHz	Active Loop
30MHz – 200MHz	Biconical
200MHz – 1000MHz	Log-periodic
1GHz – 6GHz	Double-ridged Horn

Step 2) The antenna shall be oriented initially in the X direction. The phase centre of the measuring antenna should be positioned 1.0m apart from the selected lamppost and 1.5 m above the floor.

Step 3) The antenna shall be connected to the EMI test receiver together by a calibrated coaxial cable. The appropriate antenna factors will be loaded before the measurement.

Step 4) The EMI test receiver shall be in “**Receiver**” mode for the detection of the radiated emissions, using peak and RMS detector. The resolution bandwidth (RBW) of the EMI test receiver shall be set as following table.

Frequency Range	Resolution bandwidth (RBW)
20Hz – 9kHz	200Hz
9kHz – 150kHz	200Hz
150kHz – 30MHz	9kHz
30MHz – 200MHz	120kHz
200MHz – 1000MHz	120kHz
1GHz – 6GHz	1MHz

Continuous frequency sweep or scanning (with respect to the frequency range of test antenna), and trace max-hold function should be used for convenience.

Step 5) The maximum Peak and RMS values of the three highest disturbances frequencies displayed on the EMI test receiver will be recorded in the record sheet and the above settings used in the relevant measurements will be recorded.

Step 6) Step 4 to Step 5 will be repeated for Y and Z directions of the antenna.

Step 7) Step 2 to Step 6 will be repeated to measure other frequency ranges by using the antennas stated in Step 1.

3.5 **Test Equipment**

The test equipment items used for the measurements are listed in the following table:

Item No.	Description	Range of Measurement	Manufacturer	Model
1	Gauss/Tesla meter with standard transverse probe	Ranges: 30mT/300mT/3T Resolution: 0.01mT/0.1mT/1mT	F.W.Bell	5180
2	EMC Test Receiver	Freq Range: 20Hz – 26GHz	R & S	ESU26
3	Active Loop Antenna	Freq Range: 9KHz – 30MHZ	EMCO	6502
4	Magnetic Field Pickup Coil	Freq Range: 5Hz – 10MHz	R & S	HZ-10
5	Biconical Antenna	Freq Range: 20MHz – 300MHz	R & S	HK116
6	Log-periodic Antenna	Freq Range: 200MHz – 1.3GHz	R & S	HL223
7	Double-Ridged Guide Horn Antenna	Freq Range: 1GHz – 18GHz	EMCO	3115

Table 3: Test Equipment

4. Reference Emission Limits

4.1 Reference Levels of Radiofrequency Electromagnetic Fields (EMF)

The On-site Field Evaluation for EMF Exposures about adverse interaction is carried out by measuring against reference levels (Table 4) for local exposure, averaged over 6 min, to electromagnetic fields from DC (0Hz) to 6GHz (unperturbed rms values) to analyze harmful effects according to ICNIRP Guidelines:

- (i) ICNIRP Guidelines for limiting exposure to electromagnetic fields (100 kHz to 300 GHz). Health Phys 118(5):483-524; 2020
- (ii) ICNIRP Guidelines for Limiting Exposure to Time-Varying Electric and Magnetic Fields (1 Hz – 100kHz). Health Physics 99 (6): 818-836; 2010.

Reference levels for local exposure, averaged over 6 min, to electromagnetic fields from DC to 300 GHz (unperturbed rms values)			
Frequency Range	E-field Strength (dB μ V/m)	H-field Strength (dB μ A/m)	Magnetic flux density (mT)
DC (0Hz)	-	-	400
1 – 8 Hz	-	-	40 – 0.625
20 – 25 Hz	-	166 – 164	-
25 – 400 Hz	-	164	-
0.4 – 3 kHz	-	164 – 146	-
0.003 – 0.1 MHz	-	146	-
0.1 – 30 MHz	-	153 - 124	-
30 – 400 MHz	156	-	-
400 – 2,000 MHz	156 – 162	-	-
2 – 6 GHz	162	-	-

Table 4: Reference Levels Given in ICNIRP Guidelines

4.2 Electromagnetic Compatibility (EMC) - Harmful effect to the functioning of surrounding electronic devices and the lamppost itself

The On-site Field Evaluation is also carried out by measuring and identifying the electromagnetic disturbance signal levels against the

immunity test levels (Table 5) generated by the lampposts according to the standards:

- (i) EN 61547: Equipment for general lighting purposes — EMC immunity requirements
- (ii) EN 61000-6-1: Generic standards – Immunity standard for residential, commercial and light industrial environments

Frequency Range	E-field Strength (dB μ V/m)	
	Standards	
	EN 61547	EN 61000-6-1
80 – 1000 MHz	130	130
1.4 – 6 GHz	-	130

Table 5: EMC Standard limit

5. Test Results

The test results for the On-site Field Evaluation of electromagnetic compatibility are presented in this section. The measured frequency range, limit, results for smart lampposts are summarized as in the following tables. Appendix A of this report illustrates the overall results and limitations plotted in graphical format (measured value against frequency).

Test Location: 1. Shing Kai Road – DF3633

Measurement date: 8 February 2022, Temperature : 20°C, Humidity : 56 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBµA/m	Not greater than 146 – 124 dBµA/m	Not greater than 156 dBµV/m	Not greater than 156 - 162 dBµV/m	Not greater than 162 dBµV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBµV/m	Not greater than 130 dBµV/m	Not greater than 130 dBµV/m
Result	0.05 mT	Highest value : 117.2 dBµA/m at 50Hz in Page A9. Therefore, all results are below the limit 146 dBµA/m as shown in Appendix A, Pages A-8 to A-10	Highest value : 39.2 dBµA/m at 10kHz in Page A12. Therefore, all results are below 124 dBµA/m as shown in Appendix A, Pages A-11 to A-16	Highest value : 76.4 dBµV/m at 106.311MHz in Page A19. Therefore, all results are below 156 and 130 dBµV/m as shown in Appendix A, Pages A-17 to A-19	Highest value : 101.9 dBµV/m at 940.190MHz in Page A20. Therefore, all results are below 156 and 130 dBµV/m as shown in Appendix A, Pages A-20 to A-22	Highest value : 110.0 dBµV/m at 1.839GHz in Page A25. Therefore, all results are below 162 and 130 dBµV/m as shown in Appendix A, Pages A-23 to A-25
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Test Location: 2. Shing Kai Road – DF3634

Measurement date: 8 February 2022, Temperature : 19.1 °C, Humidity : 57 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBµA/m	Not greater than 146 – 124 dBµA/m	Not greater than 156 dBµV/m	Not greater than 156 - 162 dBµV/m	Not greater than 162 dBµV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBµV/m	Not greater than 130 dBµV/m	Not greater than 130 dBµV/m
Result	0.05 mT	Highest value : 116.6 dBµA/m at 50Hz in Page A26. Therefore, all results are below the limit 146 dBµA/m as shown in Appendix A, Pages A-26 to A-28	Highest value : 63.3 dBµA/m at 2.472MHz in Page A34. Therefore, all results are below 124 dBµA/m as shown in Appendix A, Pages A-29 to A-34	Highest value : 96.1 dBµV/m at 106.29MHz in Page A36. Therefore, all results are below 156 and 130 dBµV/m as shown in Appendix A, Pages A-35 to A-37	Highest value : 105.6 dBµV/m at 940.190MHz in Page A40. Therefore, all results are below 156 and 130 dBµV/m as shown in Appendix A, Pages A-38 to A-40	Highest value : 106.4 dBµV/m at 2.647GHz in Page A41. Therefore, all results are below 162 and 130 dBµV/m as shown in Appendix A, Pages A-41 to A-43
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Note: In Appendix A, the plotted lines in black color are the measured results of peak value while the plotted lines in blue color are the measured results of rms values.

Test Location: 3. Shing Kai Road – DF3635

Measurement date: 8 February 2022, Temperature : 19.8 °C, Humidity : 59 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.05 mT	Highest value : 115.96 dBμA/m at 50Hz in Page A45. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-44 to A-46	Highest value : 37.5 dBμA/m at 10kHz in Page A49. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-47 to A-52	Highest value : 91.9 dBμV/m at 96.930MHz in Page A54. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-53 to A-55	Highest value : 98.56 dBμV/m at 940.13MHz in Page A56. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-56 to A-58	Highest value : 99.4 dBμV/m at 1.825GHz in Page A61. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-59 to A-61
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelinesf	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Test Location: 4. Shing Kai Road – DF3636

Measurement date: 8 February 2022, Temperature : 19.8°C, Humidity : 55 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.05 mT	Highest value : 116.62 dBμA/m at 50Hz in Page A63. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-62 to A-64	Highest value : 37.1 dBμA/m at 16.962MHz in Page A67. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-65 to A-70	Highest value : 92.52 dBμV/m at 96.870MHz in Page A72. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-71 to A-73	Highest value : 102.91 dBμV/m at 940.220MHz in Page A76. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-74 to A-76	Highest value : 96.79 dBμV/m at 2.122GHz in Page A78. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-77 to A-79
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Note: In Appendix A, the plotted lines in black color are the measured results of peak value while the plotted lines in blue color are the measured results of rms values.

Test Location: 5. Shing Kai Road – DF3637

Measurement date: 8 February 2022, Temperature : 21.3 °C, Humidity : 53%

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.05 mT	Highest value : 117.82 dBμA/m at 50Hz in Page A80. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-80 to A-82	Highest value : 31.94 dBμA/m at 9.95kHz in Page A85. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-83 to A-88	Highest value : 98.61 dBμV/m at 101.760MHz in Page A90. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-89 to A-91	Highest value : 99.45 dBμV/m at 949.880MHz in Page A94. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-92 to A-94	Highest value : 103.9 dBμV/m at 2.121GHz in Page A96. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-95 to A-97
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Test Location: 6. Shing Kai Road – DF3638

Measurement date: 8 February 2022, Temperature : 20.7°C, Humidity : 51 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.05 mT	Highest value : 116.1 dBμA/m at 50Hz in Page A99. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-98 to A-100	Highest value : 34.91 dBμA/m at 10kHz in Page A103. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-101 to A-106	Highest value : 96.47 dBμV/m at 96.96MHz in Page A108. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-107 to A-109	Highest value : 98.73 dBμV/m at 940.190MHz in Page A112. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-110 to A-112	Highest value : 97.47 dBμV/m at 2.120GHz in Page A115. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-113 to A-115
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Note: In Appendix A, the plotted lines in black color are the measured results of peak value while the plotted lines in blue color are the measured results of rms values.

Test Location: 7. Shing Kai Road – DF3639

Measurement date: 8 February 2022, Temperature : 19°C, Humidity : 53 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.05 mT	Highest value : 117.56 dBμA/m at 50Hz in Page A116. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-116 to A-118	Highest value : 41.27 dBμA/m at 13.589MHz in Page A123. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-119 to A-124	Highest value : 90.8 dBμV/m at 96.870MHz in Page A127. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-125 to A-127	Highest value : 95.9 dBμV/m at 940.040MHz in Page A128. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-128 to A-130	Highest value : 101.80 dBμV/m at 1.871GHz in Page A132. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-131 to A-133
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Test Location: 8. Shing Kai Road – DF3640

Measurement date: 9 February 2022, Temperature : 18.4 °C, Humidity : 61 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.05 mT	Highest value : 114.12 dBμA/m at 50Hz in Page A136. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-134 to A-136	Highest value : 38.46 dBμA/m at 15.90kHz in Page A137. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-137 to A-142	Highest value : 92.1 dBμV/m at 94.350MHz in Page A144. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-143 to A-145	Highest value : 98.0 dBμV/m at 940.070MHz in Page A148. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-146 to A-148	Highest value : 99.36 dBμV/m at 2.121GHz in Page A150. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-149 to A-151
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Note: In Appendix A, the plotted lines in black color are the measured results of peak value while the plotted lines in blue color are the measured results of rms values.

Test Location: 9. Shing Kai Road – DF3641

Measurement date: 9 February 2022, Temperature : 19.4°C, Humidity : 63 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.05 mT	Highest value : 117.2 dBμA/m at 50Hz in Page A153. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-152 to A-154	Highest value : 35.4 dBμA/m at 10kHz in Page A155. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-155 to A-160	Highest value : 93.5 dBμV/m at 92.070MHz in Page A161. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-161 to A-163	Highest value : 97.1 dBμV/m at 940.160MHz in Page A166. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-164 to A-166	Highest value : 96.3 dBμV/m at 2.618GHz in Page A167. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-167 to A-169
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Test Location: 10. Shing Kai Road – DF3644

Measurement date: 9 February 2022, Temperature : 19.7 °C, Humidity : 59 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.05 mT	Highest value : 113.6 dBμA/m at 50Hz in Page A172. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-170 to A-172	Highest value : 44.8 dBμA/m at 15.900kHz in Page A174. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-173 to A-178	Highest value : 93.0 dBμV/m at 106.26MHz in Page A180. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-179 to A-181	Highest value : 105.8 dBμV/m at 940.070MHz in Page A183. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-182 to A-184	Highest value : 112.4 dBμV/m at 1.866GHz in Page A185. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-185 to A-187
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Note: In Appendix A, the plotted lines in black color are the measured results of peak value while the plotted lines in blue color are the measured results of rms values.

Test Location: 11. Shing Kai Road – DF3645

Measurement date: 9 February 2022, Temperature : 19.7 °C, Humidity : 61 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.05 mT	Highest value : 118.7 dBμA/m at 50Hz in Page A189. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-188 to A-190	Highest value : 41.8 dBμA/m at 15.9kHz in Page A192. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-191 to A-196	Highest value : 90.51 dBμV/m at 101.820MHz in Page A198. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-197 to A-199	Highest value : 95.10 dBμV/m at 940.100MHz in Page A202. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-200 to A-202	Highest value : 98.72 dBμV/m at 1.848GHz in Page A205. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-203 to A-205
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Test Location: 12. Shing Kai Road – DF3646

Measurement date: 9 February 2022, Temperature : 19.6 °C, Humidity : 59 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.05 mT	Highest value : 116.56 dBμA/m at 50Hz in Page A206. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-206 to A-208	Highest value : 38.03 dBμA/m at 566.250kHz in Page A212. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-209 to A-214	Highest value : 90.06 dBμV/m at 106.320MHz in Page A216. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-215 to A-217	Highest value : 108.23 dBμV/m at 939.800MHz in Page A219. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-218 to A-220	Highest value : 105.59 dBμV/m at 3.585GHz in Page A221. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-221 to A-223
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Note: In Appendix A, the plotted lines in black color are the measured results of peak value while the plotted lines in blue color are the measured results of rms values.

Test Location: 13. Shing Kai Road – DF3647

Measurement date: 9 February 2022, Temperature : 20.1 °C, Humidity : 61 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.05 mT	Highest value : 113.47 dBμA/m at 50Hz in Page A224. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-224 to A-226	Highest value : 39.46 dBμA/m at 566.250kHz in Page A231. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-227 to A-232	Highest value : 87.11 dBμV/m at 101.730MHz in Page A234. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-233 to A-235	Highest value : 104.22 dBμV/m at 939.830MHz in Page A238. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-236 to A-238	Highest value : 104.22 dBμV/m at 2.629GHz in Page A241. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-239 to A-241
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Test Location: 14. Shing Kai Road – DF3648

Measurement date: 9 February 2022, Temperature : 19.8 °C, Humidity : 57 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.05 mT	Highest value : 111.75 dBμA/m at 50Hz in Page A242. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-242 to A-244	Highest value : 40.29 dBμA/m at 2.472MHz in Page A250. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-245 to A-250	Highest value : 91.09 dBμV/m at 101.790MHz in Page A252. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-251 to A-253	Highest value : 106.59 dBμV/m at 939.770MHz in Page A254. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-254 to A-256	Highest value : 104.28 dBμV/m at 3.571GHz in Page A258. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-257 to A-259
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Note: In Appendix A, the plotted lines in black color are the measured results of peak value while the plotted lines in blue color are the measured results of rms values.

Test Location: 15. Shing Kai Road – DF3649

Measurement date: 11 February 2022, Temperature : 21.1 °C, Humidity : 65 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.05 mT	Highest value : 117.06 dBμA/m at 50Hz in Page A260. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-260 to A-262	Highest value : 36.19 dBμA/m at 566.250kHz in Page A267. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-263 to A-268	Highest value : 88.90 dBμV/m at 98.910MHz in Page A270. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-269 to A-271	Highest value : 100.14 dBμV/m at 940.070MHz in Page A273. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-272 to A-274	Highest value : 103.12 dBμV/m at 1.861GHz in Page A277. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-275 to A-277
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Test Location: 16. Shing Kai Road – DF3650

Measurement date: 11 February 2022, Temperature : 25 °C, Humidity : 55 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.05 mT	Highest value : 115.87 dBμA/m at 50Hz in Page A278. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-278 to A-280	Highest value : 35.7 dBμA/m at 15.900kHz in Page A283. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-281 to A-286	Highest value : 85.39 dBμV/m at 96.930MHz in Page A288. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-287 to A-289	Highest value : 98.89 dBμV/m at 939.830MHz in Page A290. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-290 to A-292	Highest value : 102.77 dBμV/m at 1.856GHz in Page A295. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-293 to A-295
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Note: In Appendix A, the plotted lines in black color are the measured results of peak value while the plotted lines in blue color are the measured results of rms values.

Test Location: 17. Shing Kai Road – DF3651

Measurement date: 11 February 2022, Temperature : 23.5 °C, Humidity : 53 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.05 mT	Highest value : 114.8 dBμA/m at 50Hz in Page A296. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-296 to A-298	Highest value : 40.9 dBμA/m at 23.181MHz in Page A304. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-299 to A-304	Highest value : 85.1 dBμV/m at 96.840MHz in Page A306. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-305 to A-307	Highest value : 95.56 dBμV/m at 939.830MHz in Page A310. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-308 to A-310	Highest value : 95.84 dBμV/m at 1.951GHz in Page A313. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-311 to A-313
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Test Location: 18. Shing Kai Road – DF3652

Measurement date: 11 February 2022, Temperature : 21.7 °C, Humidity : 63 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.05 mT	Highest value : 114.42 dBμA/m at 50Hz in Page A316. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-314 to A-316	Highest value : 43.61 dBμA/m at 2.301Hz in Page A322. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-317 to A-322	Highest value : 85.31 dBμV/m at 32.700MHz in Page A323. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-323 to A-325	Highest value : 93.9 dBμV/m at 940.220MHz in Page A328. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-326 to A-328	Highest value : 95.3 dBμV/m at 2.123GHz in Page A331. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-329 to A-331
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Note: In Appendix A, the plotted lines in black color are the measured results of peak value while the plotted lines in blue color are the measured results of rms values.

Test Location: 19. Shing Kai Road – DF3653

Measurement date: 11 February 2022, Temperature : 21.6 °C, Humidity : 66 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.05 mT	Highest value : 115.4 dBμA/m at 20Hz in Page A332. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-332 to A-334	Highest value : 36.7 dBμA/m at 17.700kHz in Page A337. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-335 to A-340	Highest value : 85.2 dBμV/m at 89.550MHz in Page A341. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-341 to A-343	Highest value : 93.9 dBμV/m at 939.800MHz in Page A346. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-344 to A-346	Highest value : 94.3 dBμV/m at 2.120GHz in Page A349. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-347 to A-349
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Test Location: 20. Shing Kai Road – DF3654

Measurement date: 11 February 2022, Temperature : 20.9 °C, Humidity : 69 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.05 mT	Highest value : 115.1 dBμA/m at 50Hz in Page A350. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-350 to A-352	Highest value : 40.63 dBμA/m at 22.328MHz in Page A358. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-353 to A-358	Highest value : 84.8 dBμV/m at 101.850MHz in Page A359. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-359 to A-361	Highest value : 99.9 dBμV/m at 940.130MHz in Page A362. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-362 to A-364	Highest value : 109.500 dBμV/m at 2.120GHz in Page A365. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-365 to A-367
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Note: In Appendix A, the plotted lines in black color are the measured results of peak value while the plotted lines in blue color are the measured results of rms values.

Test Location: 21. Kwun Tong Town Centre – GF3637

Measurement date: 15-16 February 2022, Temperature : 20.9 °C, Humidity : 69 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.05 mT	Highest value : 114.25 dBμA/m at 20Hz in Page A370. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-368 to A-370	Highest value : 41.19 dBμA/m at 620.250kHz in Page A375. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-371 to A-376	Highest value : 68.73 dBμV/m at 101.790MHz in Page A377. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-377 to A-379	Highest value : 116.62 dBμV/m at 940.100MHz in Page A380. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-380 to A-382	Highest value : 123.54 dBμV/m at 2.624GHz in Page A383. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-383 to A-385
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Test Location: 22. Kwun Tong Town Centre – GF3638

Measurement date: 15-16 February 2022, Temperature : 20 °C, Humidity : 60 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.05 mT	Highest value : 111.78 dBμA/m at 50Hz in Page A386. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-386 to A-388	Highest value : 44.73 dBμA/m at 85.25kHz in Page A391. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-389 to A-394	Highest value : 86.35 dBμV/m at 96.870MHz in Page A395. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-395 to A-397	Highest value : 112.58 dBμV/m at 939.77MHz in Page A398. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-398 to A-400	Highest value : 115.60 dBμV/m at 3.494GHz in Page A401. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-401 to A-403
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Note: In Appendix A, the plotted lines in black color are the measured results of peak value while the plotted lines in blue color are the measured results of rms values.

Test Location: 23. Kwun Tong Town Centre – GF3639

Measurement date: 15-16 February 2022, Temperature : 19.4°C, Humidity : 62 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBµA/m	Not greater than 146 – 124 dBµA/m	Not greater than 156 dBµV/m	Not greater than 156 - 162 dBµV/m	Not greater than 162 dBµV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBµV/m	Not greater than 130 dBµV/m	Not greater than 130 dBµV/m
Result	0.05 mT	Highest value : 111.74 dBµA/m at 50Hz in Page A404. Therefore, all results are below the limit 146 dBµA/m as shown in Appendix A, Pages A-404 to A-406	Highest value : 42.58 dBµA/m at 10kHz in Page A412. Therefore, all results are below 124 dBµA/m as shown in Appendix A, Pages A-407 to A-412	Highest value : 87.64 dBµV/m at 89.490MHz in Page A413. Therefore, all results are below 156 and 130 dBµV/m as shown in Appendix A, Pages A-413 to A-415	Highest value : 109.91 dBµV/m at 939.830MHz in Page A416. Therefore, all results are below 156 and 130 dBµV/m as shown in Appendix A, Pages A-416 to A-418	Highest value : 111.74 dBµV/m at 1.876GHz in Page A419. Therefore, all results are below 162 and 130 dBµV/m as shown in Appendix A, Pages A-419 to A-421
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Test Location: 24. Kwun Tong Town Centre – GF3640

Measurement date: 15-16 February 2022, Temperature : 19.3 °C, Humidity : 64 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBµA/m	Not greater than 146 – 124 dBµA/m	Not greater than 156 dBµV/m	Not greater than 156 - 162 dBµV/m	Not greater than 162 dBµV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBµV/m	Not greater than 130 dBµV/m	Not greater than 130 dBµV/m
Result	0.05 mT	Highest value : 114.7 dBµA/m at 20Hz in Page A422. Therefore, all results are below the limit 146 dBµA/m as shown in Appendix A, Pages A-422 to A-424	Highest value : 66.48 dBµA/m at 20kHz in Page A427. Therefore, all results are below 124 dBµA/m as shown in Appendix A, Pages A-425 to A-430	Highest value : 82.0 dBµV/m at 92.100MHz in Page A433. Therefore, all results are below 156 and 130 dBµV/m as shown in Appendix A, Pages A-431 to A-433	Highest value : 110.4 dBµV/m at 939.800MHz in Page A435. Therefore, all results are below 156 and 130 dBµV/m as shown in Appendix A, Pages A-434 to A-436	Highest value : 113.1 dBµV/m at 2.160GHz in Page A439. Therefore, all results are below 162 and 130 dBµV/m as shown in Appendix A, Pages A-437 to A-439
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Note: In Appendix A, the plotted lines in black color are the measured results of peak value while the plotted lines in blue color are the measured results of rms values.

Test Location: 25. Kwun Tong Town Centre – GF3641

Measurement date: 15-16 February 2022, Temperature : 19.1°C, Humidity : 62 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.05 mT	Highest value : 112.48 dBμA/m at 50Hz in Page A440. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-440 to A-442	Highest value : 38.81 dBμA/m at 58.200kHz in Page A444. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-443 to A-448	Highest value : 80.78 dBμV/m at 98.940MHz in Page A449. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-449 to A-451	Highest value : 105.54 dBμV/m at 939.770MHz in Page A452. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-452 to A-454	Highest value : 107.37 dBμV/m at 1.876GHz in Page A455. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-455 to A-457
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Test Location: 26. Kwun Tong Town Centre – AB4816

Measurement date: 15-16 February 2022, Temperature : 20.1 °C, Humidity : 58 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.05 mT	Highest value : 113.9 dBμA/m at 50Hz in Page A458. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-458 to A-460	Highest value : 57.95 dBμA/m at 18.0kHz in Page A463. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-461 to A-466	Highest value : 90.92 dBμV/m at 143.220MHz in Page A469. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-467 to A-469	Highest value : 111.00 dBμV/m at 939.830MHz in Page A470. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-470 to A-472	Highest value : 118.89 dBμV/m at 2.112GHz in Page A474. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-473 to A-475
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Note: In Appendix A, the plotted lines in black color are the measured results of peak value while the plotted lines in blue color are the measured results of rms values.

Test Location: 27. Kwun Tong Town Centre – AB4818

Measurement date: 15-16 February 2022, Temperature : 20.2 °C, Humidity : 59 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.05 mT	Highest value : 113.15 dBμA/m at 50Hz in Page A477. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-476 to A-478	Highest value : 57.26 dBμA/m at 12.100kHz in Page A480. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-479 to A-484	Highest value : 70.26 dBμV/m at 98.880MHz in Page A485. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-485 to A-487	Highest value : 111.52 dBμV/m at 939.830MHz in Page A489. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-488 to A-490	Highest value : 112.61 dBμV/m at 3.564GHz in Page A492. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-491 to A-493
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Test Location: 28. Kwun Tong Town Centre – GF3642

Measurement date: 15-16 February 2022, Temperature : 19.7 °C, Humidity : 61 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.05 mT	Highest value : 112.07 dBμA/m at 50Hz in Page A496. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-494 to A-496	Highest value : 54.41 dBμA/m at 10.10kHz in Page A499. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-497 to A-502	Highest value : 82.83 dBμV/m at 89.460MHz in Page A503. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-503 to A-505	Highest value : 111.05 dBμV/m at 952.310MHz in Page A508. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-506 to A-508	Highest value : 108.13 dBμV/m at 1.858GHz in Page A509. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-509 to A-511
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Note: In Appendix A, the plotted lines in black color are the measured results of peak value while the plotted lines in blue color are the measured results of rms values.

Test Location: 29. Kwun Tong Town Centre – GF3643

Measurement date: 15-16 February 2022, Temperature : 19.4 °C, Humidity : 61 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.05 mT	Highest value : 114.23 dBμA/m at 20Hz in Page A514. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-512 to A-514	Highest value : 42.10 dBμA/m at 20kHz in Page A517. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-515 to A-520	Highest value : 77.21 dBμV/m at 92.100MHz in Page A522. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-521 to A-523	Highest value : 106.10 dBμV/m at 940.220MHz in Page A524. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-524 to A-526	Highest value : 108.35 dBμV/m at 1.860GHz in Page A528. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-527 to A-529
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Test Location: 30. Kwun Tong Town Centre – GF3644

Measurement date: 15-16 February 2022, Temperature : 19.2 °C, Humidity : 59 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.05 mT	Highest value : 111.73 dBμA/m at 50Hz in Page A532. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-530 to A-532	Highest value : 42.92 dBμA/m at 20kHz in Page A533. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-533 to A-538	Highest value : 80.16 dBμV/m at 92.130MHz in Page A540. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-539 to A-541	Highest value : 106.08 dBμV/m at 953.780MHz in Page A542. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-542 to A-544	Highest value : 110.05 dBμV/m at 1.860GHz in Page A545. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-545 to A-547
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Note: In Appendix A, the plotted lines in black color are the measured results of peak value while the plotted lines in blue color are the measured results of rms values.

Test Location: 31. Sheung Yuet Road – GF0709

Measurement date: 20-22 April 2022, Temperature : 27 °C, Humidity : 48 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.12 mT	Highest value : 111.58 dBμA/m at 20Hz in Page A548. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-548 to A-550	Highest value : 53.95 dBμA/m at 30kHz in Page A553. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-551 to A-556	Highest value : 92.59 dBμV/m at 98.910MHz in Page A558. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-557 to A-559	Highest value : 108.77 dBμV/m at 939.830MHz in Page A562. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-560 to A-562	Highest value : 113.06 dBμV/m at 1.792GHz in Page A564. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-563 to A-565
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Test Location: 32. Sheung Yuet Road – GF0710

Measurement date: 20-22 April 2022, Temperature : 26.9 °C, Humidity : 49 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.16 mT	Highest value : 114.73 dBμA/m at 50Hz in Page A566. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-566 to A-568	Highest value : 54.12 dBμA/m at 10kHz in Page A571. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-569 to A-574	Highest value : 94.47 dBμV/m at 101.820MHz in Page A576. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-575 to A-577	Highest value : 102.84 dBμV/m at 940.130MHz in Page A579. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-578 to A-580	Highest value : 106.73 dBμV/m at 3.482GHz in Page A581. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-581 to A-583
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Note: In Appendix A, the plotted lines in black color are the measured results of peak value while the plotted lines in blue color are the measured results of rms values.

Test Location: 33. Sheung Yuet Road – AA6337

Measurement date: 20-22 April 2022, Temperature : 28.6 °C, Humidity : 55 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.18 mT	Highest value : 116.51 dBμA/m at 20Hz in Page A584. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-584 to A-586	Highest value : 58.84 dBμA/m at 10kHz in Page A588. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-587 to A-592	Highest value : 94.44 dBμV/m at 90.23MHz in Page A593. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-593 to A-595	Highest value : 103.53 dBμV/m at 939.770MHz in Page A597. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-596 to A-598	Highest value : 108.35 dBμV/m at 1.869GHz in Page A599. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-599 to A-601
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Test Location: 34. Sheung Yuet Road – AA6338

Measurement date: 20-22 April 2022, Temperature : 26.9 °C, Humidity : 50 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.13 mT	Highest value : 116.53 dBμA/m at 20Hz in Page A602. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-602 to A-604	Highest value : 54.38 dBμA/m at 625.20kHz in Page A605. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-605 to A-610	Highest value : 95.33 dBμV/m at 101.760MHz in Page A613. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-611 to A-613	Highest value : 102.54 dBμV/m at 939.800MHz in Page A615. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-614 to A-616	Highest value : 109.96 dBμV/m at 3.583GHz in Page A617. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-617 to A-619
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Note: In Appendix A, the plotted lines in black color are the measured results of peak value while the plotted lines in blue color are the measured results of rms values.

Test Location: 35. Sheung Yuet Road – E7685

Measurement date: 20-22 April 2022, Temperature : 29.5 °C, Humidity : 54 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.11 mT	Highest value : 113.26 dBμA/m at 20Hz in Page A620. Therefore, all results are below the limit 146 dBμA/m as show A-620 to A-622	Highest value : 56.73 dBμA/m at 10kHz in Page A625. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-623 to A-628	Highest value : 86.82 dBμV/m at 98.91MHz in Page A631. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-629 to A-631	Highest value : 108.53 dBμV/m at 939.860MHz in Page A632. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-632 to A-634	Highest value : 110.61 dBμV/m at 3.573GHz in Page A636. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-635 to A-637
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Test Location: 36. Sheung Yuet Road – AB1558

Measurement date: 20-22 April 2022, Temperature : 26.9 °C, Humidity : 60 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.12 mT	Highest value : 113.33 dBμA/m at 20Hz in Page A638. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-638 to A-640	Highest value : 45.65 dBμA/m at 10kHz in Page A642. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-641 to A-646	Highest value : 87.66 dBμV/m at 101.790MHz in Page A647. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-647 to A-649	Highest value : 106.98 dBμV/m at 940.100MHz in Page A652. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-650 to A-652	Highest value : 104.62 dBμV/m at 1.833GHz in Page A655. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-653 to A-655
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Note: In Appendix A, the plotted lines in black color are the measured results of peak value while the plotted lines in blue color are the measured results of rms values.

Test Location: 37. Sheung Yuet Road – E7688

Measurement date: 20-22 April 2022, Temperature : 25.9 °C, Humidity : 50 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.05 mT	Highest value : 113.86 dBμA/m at 20Hz in Page A656. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-656 to A-658	Highest value : 61.51 dBμA/m at 10kHz in Page A660. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-659 to A-664	Highest value : 91.29 dBμV/m at 153.900MHz in Page A666. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-665 to A-667	Highest value : 103.30 dBμV/m at 940.070MHz in Page A670. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-668 to A-670	Highest value : 104.78 dBμV/m at 3.561GHz in Page A671. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-671 to A-673
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Test Location: 38. Sheung Yuet Road – E7689

Measurement date: 20-22 April 2022, Temperature : 28.4 °C, Humidity : 49 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.04 mT	Highest value : 110.95 dBμA/m at 50Hz in Page A675. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-674 to A-676	Highest value : 47.43 dBμA/m at 782.25kHz in Page A677. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-677 to A-682	Highest value : 87.05 dBμV/m at 98.91MHz in Page A684. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-683 to A-685	Highest value : 99.96 dBμV/m at 940.130MHz in Page A688. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-686 to A-688	Highest value : 107.99 dBμV/m at 2.138GHz in Page A690. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-689 to A-691
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Note: In Appendix A, the plotted lines in black color are the measured results of peak value while the plotted lines in blue color are the measured results of rms values.

Test Location: 39. Sheung Yuet Road – E7690

Measurement date: 20-22 April 2022, Temperature : 27.2 °C, Humidity : 48 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.12 mT	Highest value : 117.13 dBμA/m at 20Hz in Page A692. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-692 to A-694	Highest value : 57.08 dBμA/m at 10kHz in Page A697. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-695 to A-700	Highest value : 91.41 dBμV/m at 153.900MHz in Page A702. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-701 to A-703	Highest value : 109.33 dBμV/m at 940.070MHz in Page A706. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-704 to A-706	Highest value : 108.08 dBμV/m at 1.818GHz in Page A709. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-707 to A-709
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Test Location: 40. Sheung Yuet Road – E7691

Measurement date: 20-22 April 2022, Temperature : 30.3 °C, Humidity : 37 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.11 mT	Highest value : 110.43 dBμA/m at 50Hz in Page A710. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-710 to A-712	Highest value : 50.66 dBμA/m at 782.25kHz in Page A716. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-713 to A-718	Highest value : 90.15 dBμV/m at 89.490MHz in Page A720. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-719 to A-721	Highest value : 106.76 dBμV/m at 931.250MHz in Page A723. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-722 to A-724	Highest value : 106.79 dBμV/m at 2.168GHz in Page A726. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-725 to A-727
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Note: In Appendix A, the plotted lines in black color are the measured results of peak value while the plotted lines in blue color are the measured results of rms values.

Test Location: 41. Sheung Yuet Road – E7692

Measurement date: 20-22 April 2022, Temperature : 25 °C, Humidity : 50 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.04 mT	Highest value : 114.26 dBμA/m at 20Hz in Page A728. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-728 to A-730	Highest value : 50.81 dBμA/m at 782.250kHz in Page A735. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-731 to A-736	Highest value : 92.71 dBμV/m at 94.350MHz in Page A738. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-737 to A-739	Highest value : 115.23 dBμV/m at 935.150MHz in Page A742. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-740 to A-742	Highest value : 109.67 dBμV/m at 3.577GHz in Page A745. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-743 to A-745
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Test Location: 42. Sheung Yuet Road – E8450

Measurement date: 20-22 April 2022, Temperature : 31.6 °C, Humidity : 26 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.12 mT	Highest value : 111.12 dBμA/m at 20Hz in Page A746. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-746 to A-748	Highest value : 60.83 dBμA/m at 23.55kHz in Page A751. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-749 to A-754	Highest value : 94.71 dBμV/m at 94.350MHz in Page A757. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-755 to A-757	Highest value : 111.130 dBμV/m at 939.860MHz in Page A759. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-758 to A-760	Highest value : 110.56 dBμV/m at 1.860GHz in Page A762. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-761 to A-763
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Note: In Appendix A, the plotted lines in black color are the measured results of peak value while the plotted lines in blue color are the measured results of rms values.

Test Location: 43. Sheung Yuet Road – AB3072

Measurement date: 20-22 April 2022, Temperature : 28 °C, Humidity : 46 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.09 mT	Highest value : 114.05 dBμA/m at 50Hz in Page A766. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-764 to A-766	Highest value : 53.50 dBμA/m at 782.250kHz in Page A771. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-767 to A-772	Highest value : 94.75 dBμV/m at 101.790MHz in Page A773. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-773 to A-775	Highest value : 108.01 dBμV/m at 939.830MHz in Page A777. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-776 to A-778	Highest value : 118.36 dBμV/m at 1.813GHz in Page A781. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-779 to A-781
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Test Location: 44. Sheung Yuet Road – E7701

Measurement date: 20-22 April 2022, Temperature : 34.8 °C, Humidity : 33 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.08 mT	Highest value : 112.23 dBμA/m at 20Hz in Page A782. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-782 to A-784	Highest value : 50.18 dBμA/m at 782.25kHz in Page A788. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-785 to A-790	Highest value : 89.57 dBμV/m at 98.910MHz in Page A793. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-791 to A-793	Highest value : 107.27 dBμV/m at 956.570MHz in Page A794. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-794 to A-796	Highest value : 112.17 dBμV/m at 1.814GHz in Page A798. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-797 to A-799
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Note: In Appendix A, the plotted lines in black color are the measured results of peak value while the plotted lines in blue color are the measured results of rms values.

Test Location: 45. Sheung Yuet Road – E7703

Measurement date: 20-22 April 2022, Temperature : 29.3 °C, Humidity : 58 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.07 mT	Highest value : 113.27 dBμA/m at 20Hz in Page A800. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-800 to A-802	Highest value : 45.74 dBμA/m at 10kHz in Page A804. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-803 to A-808	Highest value : 86.97 dBμV/m at 89.490MHz in Page A809. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-809 to A-811	Highest value : 102.87 dBμV/m at 953.000MHz in Page A813. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-812 to A-814	Highest value : 111.94 dBμV/m at 1.870GHz in Page A816. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-815 to A-817
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Test Location: 46. Sheung Yuet Road – E7704

Measurement date: 20-22 April 2022, Temperature : 23 °C, Humidity : 63 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.18 mT	Highest value : 116.42 dBμA/m at 20Hz in Page A818. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-818 to A-820	Highest value : 45.21 dBμA/m at 10kHz in Page A822. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-821 to A-826	Highest value : 89.45 dBμV/m at 98.940MHz in Page A827. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-827 to A-829	Highest value : 104.15 dBμV/m at 954.560MHz in Page A830. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-830 to A-832	Highest value : 111.54 dBμV/m at 1.868GHz in Page A834. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-833 to A-835
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied to ICNIRP Guidelines and EMC standards

Note: In Appendix A, the plotted lines in black color are the measured results of peak value while the plotted lines in blue color are the measured results of rms values.

Test Location: 47. Sheung Yuet Road – E7707

Measurement date: 20-22 April 2022, Temperature : 27.1 °C, Humidity : 62 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.06 mT	Highest value : 115.44 dBμA/m at 20Hz in Page A838. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-836 to A-838	Highest value : 37.28 dBμA/m at 14.150MHz in Page A843. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-839 to A-844	Highest value : 87.02 dBμV/m at 94.410MHz in Page A846. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-845 to A-847	Highest value : 105.06 dBμV/m at 959.720MHz in Page A849. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-848 to A-850	Highest value : 107.57 dBμV/m at 2.641GHz in Page A852. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-851 to A-853
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Test Location: 48. Sheung Yuet Road – E7708

Measurement date: 20-22 April 2022, Temperature : 28.7 °C, Humidity : 53 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.12 mT	Highest value : 116.69 dBμA/m at 20Hz in Page A854. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-854 to A-856	Highest value : 41.73 dBμA/m at 10kHz in Page A858. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-857 to A-862	Highest value : 84.96 dBμV/m at 94.440MHz in Page A865. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-863 to A-865	Highest value : 106.30 dBμV/m at 956.570MHz in Page A866. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-866 to A-868	Highest value : 109.93 dBμV/m at 2.148GHz in Page A870. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-869 to A-871
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Note: In Appendix A, the plotted lines in black color are the measured results of peak value while the plotted lines in blue color are the measured results of rms values.

Test Location: 49. Sheung Yuet Road – E7709

Measurement date: 20-22 April 2022, Temperature : 26 °C, Humidity : 67 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.13 mT	Highest value : 110.45 dBμA/m at 50Hz in Page A874. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-872 to A-874	Highest value : 51.92 dBμA/m at 10kHz in Page A876. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-875 to A-880	Highest value : 86.65 dBμV/m at 106.320MHz in Page A883. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-881 to A-883	Highest value : 106.27 dBμV/m at 956.540MHz in Page A886. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-884 to A-886	Highest value : 107.77 dBμV/m at 1.839GHz in Page A888. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-887 to A-889
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Test Location: 50. Sheung Yuet Road – E7710

Measurement date: 20-22 April 2022, Temperature : 29.4 °C, Humidity : 46 %

Frequency Range	DC - 20Hz	20 Hz - 9kHz	9kHz - 30MHz	30MHz – 200MHz	200MHz – 1GHz	1GHz – 6GHz
ICNIRP Limit	Not greater than 400 - 0.625 mT	Not greater than 166 – 146 dBμA/m	Not greater than 146 – 124 dBμA/m	Not greater than 156 dBμV/m	Not greater than 156 - 162 dBμV/m	Not greater than 162 dBμV/m
EMC Limit	N.A.	N.A.	N.A.	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m	Not greater than 130 dBμV/m
Result	0.19 mT	Highest value : 116.75 dBμA/m at 20Hz in Page A890. Therefore, all results are below the limit 146 dBμA/m as shown in Appendix A, Pages A-890 to A-892	Highest value : 47.34 dBμA/m at 17.75kHz in Page A895. Therefore, all results are below 124 dBμA/m as shown in Appendix A, Pages A-893 to A-898	Highest value : 86.00 dBμV/m at 94.440MHz in Page A901. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-899 to A-901	Highest value : 120.76 dBμV/m at 956.540MHz in Page A904. Therefore, all results are below 156 and 130 dBμV/m as shown in Appendix A, Pages A-902 to A-904	Highest value : 113.05 dBμV/m at 1.843GHz in Page A905. Therefore, all results are below 162 and 130 dBμV/m as shown in Appendix A, Pages A-905 to A-907
Conclusion	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards	Complied with ICNIRP Guidelines and EMC standards

Note: In Appendix A, the plotted lines in black color are the measured results of peak value while the plotted lines in blue color are the measured results of rms values.

6. Conclusion

The On-site Field EMC Evaluations of fifty (50) smart lampposts in Shing Kai Road, Kwun Tong Town Centre and Sheung Yuet Road were conducted in February and April 2022.

The on-site field test covered the frequency range from DC (0Hz) to 6 GHz. From the measured results, the electromagnetic radiated emissions from the frequency range of DC to 6GHz were evaluated and identified while the smart lampposts were running normally.

It is confirmed that the electromagnetic radiated emission from fifty (50) smart lampposts in Shing Kai Road, Kwun Tong Town Centre and Sheung Yuet Road were complied with the ICNIRP guidelines. There is also no imposed harmful effect to the functioning of devices and equipment of the lamppost itself and surrounding electronic devices such as cell phones.

7. Recommendation

It is recommended that

- On-site field evaluations should be carried out for the existing smart lampposts in case there is considerable change in the surrounding environment, in order to keep track with any changes of the electromagnetic environment in the location where each smart lamppost is installed to ensure no new and rising electromagnetic interference from surroundings would affect the smart devices in the existing smart lampposts.
- In case of any major changes of the smart devices installed on the smart lamppost such as major design upgrade or lamppost relocation, a preliminary evaluation should be carried out to assess the influence of EMC performance of the smart lamppost.
- An on-site field evaluation should be performed after new installation of the smart lampposts in other districts, whether by full testing or by selection of representative samples, to ensure the proper operation of the smart lampposts in a different electromagnetic radiation environment.

Section B

Part II – Laboratory Evaluation

1. Introduction

- 1.1 The purpose of this part is to present and conclude the Laboratory Evaluation results of electromagnetic compatibility evaluation for four (4) combinations of different smart devices which do not exceed the emission limit and immunity requirement set out in EMC standards EN 55032: 2015 + AC: 2016: “Electromagnetic compatibility of multimedia equipment — Emission Requirements”, EN 61547: 2009: “Equipment for general lighting purposes - EMC immunity requirements” and EN 61000-6-1:2019: “Generic standards – Immunity standard for residential, commercial and light industrial environments”.
- 1.2 The Laboratory EMC evaluation included a total of nine (9) EMC test items for full EMC emission and immunity tests according to standards of EN 55032, EN 61547 and EN 61000-6-1. In this evaluation, the measurement method can be referred to section 2 below.

2. Methodologies and Applicable Standards

2.1 The EMC standards adopted are as below:

Standard	Name
EN 55032: 2015 + AC: 2016	Electromagnetic compatibility of multimedia equipment — Emission Requirements
EN 61547: 2009	Equipment for general lighting purposes - EMC immunity requirements
EN 61000-6-1:2019	Generic standards – Immunity standard for residential, commercial and light industrial environments

Table 1: EMC Standards

2.2 The following methodologies were adopted in EMC test items:

EMC Test Item	Test Methods / Standards	Ports
Radiated Emission	EN 55032: 2015 + AC: 2016	- Enclosure Port
Conducted Emission	EN 55032: 2015 + AC: 2016	- AC Power Supply Port
Electrostatic Discharge (ESD)	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-2:2009)	- Enclosure Port
Radiated RF Immunity	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-3: 2006 + A2: 2010)	- Enclosure Port
Electrical Fast Transient Immunity Test	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-4:2012)	- AC Power Supply Port
Surge Immunity Test	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-5:2014)	- AC Power Supply Port
Conducted Immunity Test	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-6:2014)	- AC Power Supply Port
Power Frequency Magnetic Field Immunity and DC Magnetic Field Immunity	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN61000-4-8:2010)	- Enclosure Port
Voltage Dips and Voltage Interruption Immunity	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-11:2004 +A1:2017)	- AC Power Supply Port

Table 2: Test items and methods

2.2.1 Radiated Emissions Test

Objective

To measure the radiated emissions from the equipment and its associated cables.

Procedure

The Equipment will be set up with the AC power cables and interface cables positioned in a representative manner.

The Equipment will be set to the worst case emission mode. The worst case emissions shall be assessed by changing the operating conditions of the Equipment under test (EUT), various processing routines shall be exercised and cable orientation varied. The emissions shall be measured with the equipment operating under normal conditions with all inputs and outputs functional. Digital data should operate at the fastest rate to be used.

With the antenna at 3m spacing from the centre of the EUT and set at 1m height vertically, scan the frequency range and record all emissions using a receiver with the peak detector as a pre scan to determine the emissions.

Having identified the highest frequencies, the emissions shall be measured by using the quasi-peak detector with the equipment rotated on the turntable at both vertical and horizontal polarization.

2.2.2 Conducted Emissions Test

Objective

To measure the conducted emissions on the input AC supply port and telecommunications.

Procedure

The EUT will be positioned inside the shielded room. The EUT will be placed on the floor above the horizontal ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The measurement at AC supply port will be made using the Artificial mains network (AMN).

The AMN will be placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for AMNs mounted on top of the ground reference plane. This distance is between the closest points of the AMN and ISN and the EUT. All other units of the EUT and associated equipment shall be at least 0.8 m from the AMN.

The EMC measuring receiver shall be set to peak detector mode, 9kHz Resolution bandwidth and the frequency range 0.15 to 30MHz slowly swept and recording the emission profile. The measurements will be taken over the limited frequency ranges using the quasi-peak and average detectors.

2.2.3 Electrostatic discharge

Objective

To determine the immunity of the EUT subject to Electrostatic discharge.

Procedure

The EUT will be positioned on the floor in the screened enclosure and operated in the normal mode. A vertical coupling plane (VCP) shall be placed near the EUT. The EUT and its cables will be isolated from the coupling plane by an insulating support 0.5 mm in thickness.

Indirect discharges:

The indirect electrostatic discharges will be applied to the front edge of horizontal coupling plane (HCP) opposite the centre point of each unit (if applicable) of the EUT and 0,1 m from the front of the EUT. The other indirect discharges will be applied to the centre of vertical edge of coupling plane in the contact discharge mode. 4 sides of the EUT will be exposed to the indirect discharges in the contact discharge mode.

Direct discharges:

The direct electrostatic discharges will be applied only to those points and metallic surfaces of the EUT in the contact discharge mode and insulated surfaces of the EUT in the air discharge mode which are accessible to persons during normal use.

2.2.4 Radiated Immunity Test

Objective

To determine the immunity of the EUT to radiate electric fields over the frequency range.

Procedure

The EUT will be placed in the full-anechoic chamber facing the generating antenna. The EUT shall be subjected to electric fields at frequency band 80MHz to 6GHz in both horizontal and vertical polarizations whilst monitoring 3V/m respectively with 80% AM modulated with 1kHz.

The Equipment shall be configured such that the four sides (Azimuth: 0, 90, 180, 270) of the equipment are subjected to the RF field.

The Equipment shall be monitored for performance changes. Any changes shall be recorded together with the threshold for normal operation.

2.2.5 Electrical Fast Transients Test

Objective

To determine the immunity of the EUT to transient signals coupled onto the power and signal cables.

Procedure

The Equipment shall be positioned in the screened enclosure and operated in the normal mode.

The transient generator output shall be set to 2kV for AC mains port and the transients will be applied to each cable for 1 minute with both positive and negative transients in turn.

The Equipment will be monitored for any changes and in the event of a malfunction, the effects and the threshold voltage level will be recorded.

2.2.6 Surge Test

Objective

To determine the immunity of the EUT to surges coupled onto the cables, either directly through the power supply, or indirectly through capacitive and inductive coupling.

Procedure

The Equipment shall be positioned in the screened enclosure and operated in the most susceptible mode.

For AC power line, the surge generator shall be selected a suitable Coupling Decoupling Network to inject surges between line to ground for Common Mode and line to line for Differential Mode.

The transient generator output shall be set to suitable levels for all lines and five positive and five negative impulses each at 0°, 90°, 180° and at 270°; applied at 1 minute intervals. The Equipment will be monitored for any changes and in the event of a malfunction the effects and the threshold level will be recorded.

2.2.7 Conducted Immunity Test

Objective

To determine the immunity of the EUT to common mode RF signals coupled onto the power and signal cables over the frequency range 0.15 - 80MHz.

Procedure

The Equipment will be positioned inside the screened enclosure with CDN's or Injection Clamp connected to the defined cables.

The CDN will be calibrated 0.15 MHz to 80MHz to determine the forward power drive to achieve the defined voltage. With the Equipment operating in the defined modes, the RF forward power with 1kHz 80% am added shall be injected into the CDN, and the frequency range slowly swept whilst monitoring the Equipment for susceptibility.

If the Equipment is susceptible, the effects shall be recorded and the RF levels reduced to determine the threshold conditions and these levels recorded.

2.2.8 Pulsed Magnetic Field Immunity Test

Objective

To determine the immunity of the EUT to subject to Pulsed Magnetic Field which is generated by lightning strikes on buildings and other metal structures.

Procedure

The EUT will be positioned in an inductive coil which is connected to the test generator. The required impulse is delivered to an inductive coil to generate a Pulsed Magnetic Field. The plane of the inductive coil shall then be rotated by 90° in order to expose the EUT to the test field with three orthogonal orientations. Any changes shall be recorded together with the threshold for normal operation

2.2.9 Voltage Dips, Short Interruptions and Voltage Variations Test

Objective

To establish a common reference for evaluating the immunity of electrical and electronic equipment when subjected to voltage dips, short interruptions and voltage variations.

Procedure

The Equipment shall be positioned in the screened enclosure and operated in the normal mode.

The test shall be carried out by applying dips, short interruptions and variations to the EUT mains power supply. The EUT shall be tested for each selected combination of test level and duration with a sequence of three dips/interruptions with intervals of 10 s minimum (between each test event). The Equipment will be monitored for any changes and in the event of a malfunction, the effects and the threshold voltage level will be recorded.

3. Equipment under Test (EUT) Description

The EUT identification, system configuration, ports diagram, test condition, list of ancillary equipment / assembly / part in the EUT system, as well as outlook and dimension are detailed in the following subsections.

3.1 EUT system configuration

The following four (4) sets of combinations are configured to form representative combinations of existing smart devices from simple to complex scenarios.

Set	Sensor	Positioning Device	Edge Computer	Network Device	Antenna	Power Supply
1	Basic Suite SMACS	Bluetooth Beacons	Sensor Gateway BATS Module	LTE Router PoE Switch	Router Antenna BATS Antenna	24/48V DC MCB
2	Full Suite SMACS	Bluetooth Beacons	Sensor Gateway BATS Module	Fibre Switch PoE Switch	BATS Antenna	24/48V DC MCB
3	Full Suite Air Quality Sensor SMACS	Bluetooth Beacons	Sensor Gateway BATS Module	LTE Router PoE Switch	Router Antenna BATS Antenna	24/48V DC MCB
4	Full Suite Air Quality Sensor LiDAR SMACS	Bluetooth Beacons	Sensor Gateway LiDAR Edge Computer BATS Module	LTE Router PoE Switch	Router Antenna BATS Antenna	24/48V DC MCB

Table 3: EUT system configuration

3.2 List of devices of four (4) combinations

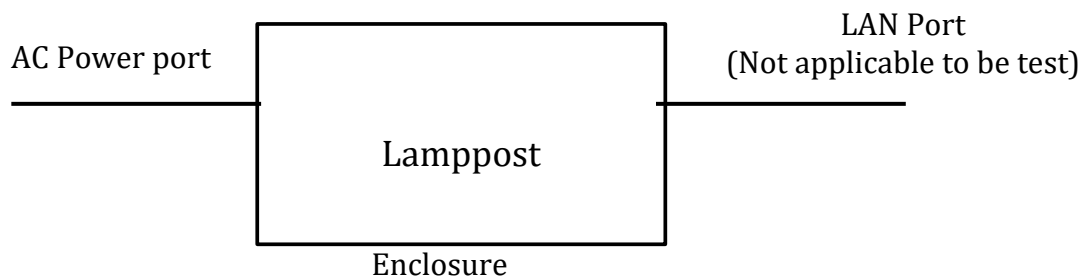
The following devices lists form four (4) sets of combinations used to evaluate the EMC performance.

Type	Name	Manufacturer	Model Number
Sensor	Basic Suite	Fronttech	FWS300
	Full Suite Top	Gill	GMX600
	Full Suite 3M	Gill	GMX500
	Full Suite Gamma	Berthold	LB-126S
	Air Quality Sensor	Sapiens	NAS-AF300
	LiDAR	Ouster	OSI-64-BH
	SMACS Sensor	-	-
Positioning Device	Bluetooth Beacon	LSCM	-
Edge Computer	Sensor Gateway	Advantech	UNO-420
	LiDAR Edge Computer	AKK	-
	BATS Module	nhop	-
Network Device	PoE Switch	Cisco	IE1000
	Fibre Switch	Cisco	IE2000
	LTE Router	Cisco	IR809
DC Power Supply	24V	Meanwell	HEP-185-24A
	48V	Meanwell	HEP-185-48A
Antenna	LTE Antenna	CISCO	ANT-4G-OMNI-OUT-N
	BATS Antenna	nhop	-

Table 4: List of devices of four (4) combinations

3.3 EUT Ports Diagram

The EMC test is only applicable to the port that is the particular interface of the EUT to the external environment (e.g. AC Power port, Enclosure port and so on). The interconnection among devices inside the smart lamppost are not deemed to be tested. Besides, EMC Test is not applicable for LAN port for monitoring the EUT's performance during the test according to EMC standard. Therefore, AC Power and Enclosure are the only applicable ports to be tested.



4. Test Results

4.1 Radiated E-Field Emissions

Port Tested

- Enclosure Port

Standard: EN 55032: 2015 + AC: 2016

Test Title: Radiated E-Field Emissions

EUT

EUT: Combination Set #1, Set #2, Set #3 and Set #4

Mode of Operation: Normal Operation Mode

Operation Condition: AC operation

Mains Voltage: 230 Volts Mains Frequency: 50Hz

DC Voltage: Nil DC Supply Type: Nil

Test Setup

Figure No: Photo 1 and Photo 10

Location: NFAC

Equipment List

EMC 039 / EMC 185 / EMC 582 / EMC 567 / EMC 604 / EMC 621 / EMC 700

Environment

Temperature 23 °C Humidity 53 % Atm. Pressure X kPa

Note: All maximized emissions were obtained when the following changes were made to the measurement arrangement:

EUT rotated
Antenna height scanned
Antenna polarization changed

Test Results for Combination Set #1(with 5 pieces of snap ferrites):

	Frequency (MHz)	Detector (PK/AV/QP)	Antenna Polarity (V/H)	Antenna Height (m)	Table Azimuth (°)	Result (dB μ V/m)	Limit (dB μ V/m)	Margins & Comments (Pass/Fail)
1.	30.579	QP	V	1.00	30	35.2	41.97	PASS
2.	34.670	QP	V	1.00	0	33.1	41.83	PASS
3.	38.880	QP	V	1.00	0	32.9	41.68	PASS
4.	43.767	QP	V	1.00	0	34.7	41.51	PASS
5.	98.392	QP	V	1.24	120	31.0	39.60	PASS
6.	172.801	QP	V	1.00	60	30.6	37.00	PASS
7.	226.875	QP	V	1.00	149	24.4	35.10	PASS
8.	250.003	QP	V	1.00	140	25.0	42.00	PASS
9.	293.332	QP	V	1.50	118	23.9	42.00	PASS
10.	349.670	QP	V	1.00	90	30.1	42.00	PASS
11.	500.000	QP	V	1.00	100	31.9	42.00	PASS
12.	750.001	QP	V	1.00	20	29.1	42.00	PASS
13.	94.362	QP	H	1.00	70	32.3	39.74	PASS
14.	98.514	QP	H	1.30	151	32.7	39.60	PASS
15.	108.771	QP	H	1.00	0	32.5	39.24	PASS
16.	123.481	QP	H	1.00	30	31.8	38.73	PASS
17.	168.771	QP	H	1.00	50	29.9	37.14	PASS
18.	172.800	QP	H	1.00	65	30.4	37.00	PASS
19.	226.935	QP	H	1.40	62	26.8	35.10	PASS
20.	250.003	QP	H	1.40	50	33.4	42.00	PASS
21.	259.392	QP	H	1.00	80	24.2	42.00	PASS
22.	345.710	QP	H	1.00	120	32.2	42.00	PASS
23.	500.000	QP	H	1.00	180	28.2	42.00	PASS
24.	843.760	QP	H	1.00	200	31.0	42.00	PASS
25.	1026.500	PK	V	1.00	0	36.6	70.0	PASS
		AV				22.6	50.0	PASS
26.	1738.500	PK	V	1.00	0	36.2	70.0	PASS
		AV				22.8	50.0	PASS
27.	2144.550	PK	V	1.00	0	38.8	70.0	PASS
		AV				25.2	50.0	PASS
28.	2386.000	PK	V	1.00	0	38.7	70.0	PASS
		AV				25.4	50.0	PASS
29.	2847.250	PK	V	1.00	0	40.2	70.0	PASS
		AV				26.0	50.0	PASS
30.	4851.750	PK	V	1.00	0	40.8	74.0	PASS
		AV				26.7	54.0	PASS

31.	1136.500	PK AV	H	1.00	0	35.0 21.9	70.0 50.0	PASS PASS
32.	1643.000	PK AV	H	1.00	0	35.8 22.2	70.0 50.0	PASS PASS
33.	1987.250	PK AV	H	1.00	0	38.3 24.4	70.0 50.0	PASS PASS
34.	2414.000	PK AV	H	1.00	0	39.8 33.9	70.0 50.0	PASS PASS
35.	2851.250	PK AV	H	1.00	0	38.9 26.3	70.0 50.0	PASS PASS
36.	4179.250	PK AV	H	1.00	0	39.2 25.8	74.0 54.0	PASS PASS
OVERALL RESULT for Combination Set #1 (with 5 pieces of snap ferrites): PASS								

Note: 1. Test distance for frequency 30 – 1000 MHz and 1000 – 6000 MHz =3 meters
2. PK is Peak, AV is Average and QP is Quasi-peak.
3. The limit is given in Table A.6 of standard EN 55032: 2015 + AC: 2016

Test Results for Combination Set #2 (with 5 pieces of snap ferrites):

	Frequency (MHz)	Detector (PK/AV/QP)	Antenna Polarity (V/H)	Antenna Height (m)	Table Azimuth (°)	Result (dB μ V/m)	Limit (dB μ V/m)	Margins & Comments (Pass/Fail)
1.	30.089	QP	V	1.00	0	29.1	41.99	PASS
2.	33.448	QP	V	1.00	30	31.4	41.87	PASS
3.	36.136	QP	V	1.00	0	33.5	41.78	PASS
4.	132.728	QP	V	1.00	0	23.4	38.40	PASS
5.	165.990	QP	V	1.80	0	29.9	37.24	PASS
6.	198.512	QP	V	1.90	0	29.6	36.10	PASS
7.	216.380	QP	V	1.40	0	28.2	35.47	PASS
8.	225.830	QP	V	1.90	0	27.0	35.14	PASS
9.	236.330	QP	V	1.60	120	31.2	42.00	PASS
10.	248.921	QP	V	2.00	330	30.4	42.00	PASS
11.	262.580	QP	V	1.80	80	29.5	42.00	PASS
12.	318.252	QP	V	1.00	90	20.6	42.00	PASS
13.	68.345	QP	H	1.73	90	20.0	40.65	PASS
14.	138.418	QP	H	1.25	100	26.2	38.20	PASS
15.	149.160	QP	H	1.20	80	26.9	37.82	PASS
16.	184.884	QP	H	1.00	60	29.4	36.57	PASS
17.	189.090	QP	H	1.00	50	28.9	36.43	PASS
18.	198.540	QP	H	1.00	0	27.2	36.10	PASS
19.	216.365	QP	H	1.00	0	27.0	35.47	PASS
20.	227.918	QP	H	1.00	0	27.7	35.07	PASS
21.	231.061	QP	H	1.50	30	28.5	42.00	PASS
22.	248.900	QP	H	1.50	60	27.3	42.00	PASS
23.	624.989	QP	H	1.00	0	27.0	42.00	PASS
24.	812.488	QP	H	1.00	120	33.0	42.00	PASS
25.	1040.250	PK	V	1.00	0	36.2	70.0	PASS
		AV				22.8	50.0	PASS
26.	1467.500	PK	V	1.00	0	37.4	70.0	PASS
		AV				24.0	50.0	PASS
27.	1912.750	PK	V	1.00	0	37.7	70.0	PASS
		AV				24.3	50.0	PASS
28.	2542.000	PK	V	1.00	0	39.9	70.0	PASS
		AV				26.0	50.0	PASS
29.	4101.000	PK	V	1.00	0	40.1	74.0	PASS
		AV				26.5	54.0	PASS
30.	5778.500	PK	V	1.00	0	53.2	74.0	PASS
		AV				27.7	54.0	PASS

31.	1032.500	PK AV	H	1.00	0	36.0 22.7	70.0 50.0	PASS PASS
32.	1375.000	PK AV	H	1.00	0	34.7 21.6	70.0 50.0	PASS PASS
33.	1945.000	PK AV	H	1.00	0	37.9 24.5	70.0 50.0	PASS PASS
34.	2681.500	PK AV	H	1.00	0	39.2 26.0	70.0 50.0	PASS PASS
35.	4562.000	PK AV	H	1.00	0	40.2 26.7	74.0 54.0	PASS PASS
36.	5731.500	PK AV	H	1.00	0	49.1 27.3	74.0 54.0	PASS PASS
OVERALL RESULT for Combination Set #2 (with 5 pieces of snap ferrites): PASS								

Note: 1. Test distance for frequency 30 – 1000 MHz and 1000 – 6000 MHz =3 meters
2. PK is Peak, AV is Average and QP is Quasi-peak.
3. The limit is given in Table A.6 of standard EN 55032: 2015 + AC: 2016

Test Results for Combination Set #3 (with 5 pieces of snap ferrites):

	Frequency (MHz)	Detector (PK/AV/QP)	Antenna Polarity (V/H)	Antenna Height (m)	Table Azimuth (°)	Result (dBμV/m)	Limit (dBμV/m)	Margins & Comments (Pass/Fail)
1.	30.639	QP	V	1.00	120	25.2	41.97	PASS
2.	38.945	QP	V	1.00	0	28.4	41.68	PASS
3.	129.498	QP	V	1.00	50	30.9	38.51	PASS
4.	157.554	QP	V	1.00	0	29.8	37.53	PASS
5.	192.210	QP	V	1.80	0	30.1	36.32	PASS
6.	198.480	QP	V	1.80	0	29.1	36.10	PASS
7.	211.100	QP	V	1.50	0	27.9	35.66	PASS
8.	225.808	QP	V	1.80	0	27.1	35.14	PASS
9.	237.375	QP	V	1.40	90	29.7	42.00	PASS
10.	265.760	QP	V	1.20	60	31.4	42.00	PASS
11.	389.360	QP	V	1.00	120	33.6	42.00	PASS
12.	576.620	QP	V	1.00	90	24.5	42.00	PASS
13.	107.519	QP	H	1.00	320	29.1	39.28	PASS
14.	125.749	QP	H	1.20	30	30.9	38.64	PASS
15.	158.850	QP	H	1.50	60	29.8	37.49	PASS
16.	164.906	QP	H	1.00	0	30.3	37.27	PASS
17.	188.158	QP	H	1.20	320	30.2	36.46	PASS
18.	197.430	QP	H	1.00	40	30.0	36.13	PASS
19.	216.362	QP	H	1.00	0	28.1	35.47	PASS
20.	224.766	QP	H	1.20	30	26.8	35.18	PASS
21.	254.177	QP	H	1.40	60	30.1	42.00	PASS
22.	282.237	QP	H	1.20	90	33.4	42.00	PASS
23.	395.810	QP	H	1.50	120	32.7	42.00	PASS
24.	553.640	QP	H	1.00	0	25.7	42.00	PASS
25.	1077.750	PK	V	1.00	0	36.2	70.0	PASS
		AV				22.5	50.0	PASS
		PK				37.4	70.0	PASS
26.	1913.750	AV	V	1.00	0	24.0	50.0	PASS
		PK				38.3	70.0	PASS
		AV				25.7	50.0	PASS
27.	2441.000	PK	V	1.00	0	40.0	70.0	PASS
		AV				25.8	50.0	PASS
		PK				40.6	70.0	PASS
28.	2923.250	AV	V	1.00	0	27.0	50.0	PASS
		PK				40.3	74.0	PASS
		AV				27.1	54.0	PASS
29.	3891.500	PK	V	1.00	0	40.3	74.0	PASS
30.	5531.500	AV	V	1.00	0	27.1	54.0	PASS

31.	1051.500	PK AV	H	1.00	0	33.9 20.9	70.0 50.0	PASS PASS
32.	1602.500	PK AV	H	1.00	0	34.8 21.3	70.0 50.0	PASS PASS
33.	2206.500	PK AV	H	1.00	0	38.1 25.4	70.0 50.0	PASS PASS
34.	2857.000	PK AV	H	1.00	0	38.9 25.9	70.0 50.0	PASS PASS
35.	4433.000	PK AV	H	1.00	0	39.4 26.6	74.0 54.0	PASS PASS
36.	5153.500	PK AV	H	1.00	0	43.7 26.5	74.0 54.0	PASS PASS
OVERALL RESULT for Combination Set #3 (with 5 pieces of snap ferrites): PASS								

Note: 1. Test distance for frequency 30 – 1000 MHz and 1000 – 6000 MHz =3 meters
2. PK is Peak, AV is Average and QP is Quasi-peak.
3. The limit is given in Table A.6 of standard EN 55032: 2015 + AC: 2016

Test Results for Combination Set #3 (with EMI shielding cable and 4 pieces of snap ferrites):

	Frequency (MHz)	Detector (PK/AV/QP)	Antenna Polarity (V/H)	Antenna Height (m)	Table Azimuth (°)	Result (dBμV/m)	Limit (dBμV/m)	Margins & Comments (Pass/Fail)
1.	31.372	QP	V	1.00	0	34.1	41.95	PASS
2.	35.340	QP	V	1.00	0	30.9	41.81	PASS
3.	121.661	QP	V	1.60	0	27.3	38.79	PASS
4.	178.826	QP	V	1.00	0	27.9	36.79	PASS
5.	188.070	QP	V	1.40	30	28.3	36.46	PASS
6.	199.541	QP	V	1.20	90	26.5	36.06	PASS
7.	240.784	QP	V	1.00	20	27.3	35.88	PASS
8.	211.100	QP	V	1.60	0	27.6	35.66	PASS
9.	224.750	QP	V	1.50	30	26.5	35.18	PASS
10.	244.670	QP	V	1.20	60	28.7	42.00	PASS
11.	268.850	QP	V	1.00	200	27.0	42.00	PASS
12.	320.870	QP	V	1.80	200	26.4	42.00	PASS
13.	93.628	QP	H	1.00	250	19.9	39.77	PASS
14.	104.742	QP	H	1.00	160	23.8	39.38	PASS
15.	152.790	QP	H	1.40	120	27.2	37.70	PASS
16.	174.633	QP	H	1.40	0	29.0	36.93	PASS
17.	184.814	QP	H	1.20	300	29.9	36.58	PASS
18.	195.512	QP	H	1.20	320	26.5	36.20	PASS
19.	204.866	QP	H	1.00	0	28.3	35.87	PASS
20.	212.162	QP	H	1.40	60	27.3	35.62	PASS
21.	226.874	QP	H	1.00	180	27.6	35.10	PASS
22.	237.368	QP	H	1.50	0	30.0	42.00	PASS
23.	254.150	QP	H	1.30	0	26.4	42.00	PASS
24.	326.713	QP	H	1.80	100	26.9	42.00	PASS
25.	1077.500	PK	V	1.00	0	36.4	70.0	PASS
		AV				22.8	50.0	PASS
26.	1926.750	PK	V	1.00	0	37.2	70.0	PASS
		AV				24.3	50.0	PASS
27.	2438.500	PK	V	1.00	0	38.1	70.0	PASS
		AV				26.0	50.0	PASS
28.	2933.000	PK	V	1.00	0	40.1	70.0	PASS
		AV				25.2	50.0	PASS
29.	3894.750	PK	V	1.00	0	40.5	70.0	PASS
		AV				26.8	50.0	PASS
30.	5531.750	PK	V	1.00	0	40.4	74.0	PASS
		AV				27.2	54.0	PASS

31.	1062.500	PK AV	H	1.00	0	33.9 20.9	70.0 50.0	PASS PASS
32.	1610.500	PK AV	H	1.00	0	34.8 21.3	70.0 50.0	PASS PASS
33.	2208.000	PK AV	H	1.00	0	38.2 24.9	70.0 50.0	PASS PASS
34.	2858.750	PK AV	H	1.00	0	39.2 26.1	70.0 50.0	PASS PASS
35.	4432.750	PK AV	H	1.00	0	39.6 26.5	74.0 54.0	PASS PASS
36.	5153.000	PK AV	H	1.00	0	43.2 26.6	74.0 54.0	PASS PASS
OVERALL RESULT for Combination Set #3 (with EMI shielding cable and 4 pieces of snap ferrites): PASS								

Note:

1. Test distance for frequency 30 – 1000 MHz and 1000 – 6000 MHz =3 meters
2. PK is Peak, AV is Average and QP is Quasi-peak.
3. The limit is given in Table A.6 of standard EN 55032: 2015 + AC: 2016

Test Results for Combination Set #4 (with 5 pieces of snap ferrites):

	Frequency (MHz)	Detector (PK/AV/QP)	Antenna Polarity (V/H)	Antenna Height (m)	Table Azimuth (°)	Result (dB μ V/m)	Limit (dB μ V/m)	Margins & Comments (Pass/Fail)
1.	30.304	QP	V	1.00	0	34.1	41.98	PASS
2.	35.204	QP	V	1.00	0	32.9	41.81	PASS
3.	46.027	QP	V	1.00	30	29.8	41.43	PASS
4.	124.999	QP	V	1.00	0	30.6	38.67	PASS
5.	185.945	QP	V	1.00	0	28.2	36.54	PASS
6.	198.503	QP	V	1.20	60	27.1	36.10	PASS
7.	206.930	QP	V	1.00	0	26.2	35.80	PASS
8.	227.930	QP	V	1.00	0	27.1	35.07	PASS
9.	249.997	QP	V	1.00	0	31.5	42.00	PASS
10.	321.562	QP	V	1.00	0	29.8	42.00	PASS
11.	468.740	QP	V	1.00	80	30.8	42.00	PASS
12.	671.808	QP	V	1.00	240	31.1	42.00	PASS
13.	73.032	QP	H	1.00	200	29.2	40.49	PASS
14.	80.121	QP	H	1.00	180	28.0	40.25	PASS
15.	124.998	QP	H	1.00	0	30.3	38.67	PASS
16.	169.440	QP	H	1.40	30	29.6	37.11	PASS
17.	186.960	QP	H	1.20	60	30.2	36.50	PASS
18.	199.590	QP	H	1.20	80	27.4	36.06	PASS
19.	217.428	QP	H	1.00	0	27.4	35.44	PASS
20.	225.819	QP	H	1.00	0	27.6	35.14	PASS
21.	233.182	QP	H	1.00	0	33.4	42.00	PASS
22.	316.460	QP	H	1.00	0	29.8	42.00	PASS
23.	391.248	QP	H	1.00	0	33.2	42.00	PASS
24.	468.740	QP	H	1.40	60	35.5	42.00	PASS
25.	1020.500	PK	V	1.00	0	37.8	70.0	PASS
		AV				22.8	50.0	PASS
26.	1134.250	PK	V	1.00	0	37.6	70.0	PASS
		AV				25.4	50.0	PASS
27.	1533.250	PK	V	1.00	0	36.5	70.0	PASS
		AV				23.4	50.0	PASS
28.	1942.500	PK	V	1.00	0	38.1	70.0	PASS
		AV				24.9	50.0	PASS
29.	2893.500	PK	V	1.00	0	39.6	74.0	PASS
		AV				26.1	54.0	PASS
30.	3674.000	PK	V	1.00	0	40.5	74.0	PASS
		AV				25.4	54.0	PASS

31.	1040.250	PK AV	H	1.00	0	36.8 22.9	70.0 50.0	PASS PASS
32.	1312.750	PK AV	H	1.00	0	37.4 24.8	70.0 50.0	PASS PASS
33.	19.80250	PK AV	H	1.00	0	37.2 26.1	70.0 50.0	PASS PASS
34.	2700.250	PK AV	H	1.00	0	39.6 25.7	70.0 50.0	PASS PASS
35.	4117.000	PK AV	H	1.00	0	40.1 26.2	74.0 54.0	PASS PASS
36.	5757.750	PK AV	H	1.00	0	39.4 25.7	74.0 54.0	PASS PASS
OVERALL RESULT for Combination Set #4 (with 5 pieces of snap ferrites): PASS								

Note:

1. Test distance for frequency 30 – 1000 MHz and 1000 – 6000 MHz =3 meters
2. PK is Peak, AV is Average and QP is Quasi-peak.
3. The limit is given in Table A.6 of standard EN 55032: 2015 + AC: 2016

Test Results for Combination Set #4 (with EMI shielding cable and 4 pieces of snap ferrites):

	Frequency (MHz)	Detector (PK/AV/QP)	Antenna Polarity (V/H)	Antenna Height (m)	Table Azimuth (°)	Result (dB μ V/m)	Limit (dB μ V/m)	Margins & Comments (Pass/Fail)
1.	31.830	QP	V	1.00	0	33.2	41.93	PASS
2.	38.944	QP	V	1.00	30	32.4	41.68	PASS
3.	45.570	QP	V	1.00	60	29.4	41.45	PASS
4.	125.001	QP	V	1.00	0	30.8	38.67	PASS
5.	179.976	QP	V	1.00	0	27.8	36.75	PASS
6.	195.030	QP	V	1.20	90	26.7	36.22	PASS
7.	209.030	QP	V	1.00	0	26.3	35.73	PASS
8.	227.964	QP	V	1.00	0	25.9	35.07	PASS
9.	234.370	QP	V	1.00	0	30.1	42.00	PASS
10.	262.280	QP	V	1.00	30	32.2	42.00	PASS
11.	317.930	QP	V	1.00	60	31.7	42.00	PASS
12.	412.582	QP	V	1.00	0	32.3	42.00	PASS
13.	71.148	QP	H	1.00	240	29.0	40.55	PASS
14.	78.635	QP	H	1.00	200	28.2	40.29	PASS
15.	125.001	QP	H	1.00	0	30.1	38.67	PASS
16.	175.654	QP	H	1.40	0	28.8	36.86	PASS
17.	184.884	QP	H	1.20	60	29.8	36.57	PASS
18.	198.959	QP	H	1.20	300	27.2	36.08	PASS
19.	209.030	QP	H	1.00	0	28.4	35.69	PASS
20.	227.964	QP	H	1.40	80	27.1	35.18	PASS
21.	234.370	QP	H	1.20	120	33.2	42.00	PASS
22.	262.280	QP	H	1.20	100	32.9	42.00	PASS
23.	317.930	QP	H	1.20	100	31.8	42.00	PASS
24.	412.582	QP	H	1.00	0	32.8	42.00	PASS
25.	1050.250	PK	V	1.00	0	37.9	70.0	PASS
		AV				23.2	50.0	PASS
26.	1370.500	PK	V	1.00	0	36.8	70.0	PASS
		AV				24.2	50.0	PASS
27.	1957.250	PK	V	1.00	0	36.5	70.0	PASS
		AV				24.1	50.0	PASS
28.	2832.250	PK	V	1.00	0	38.1	70.0	PASS
		AV				24.2	50.0	PASS
29.	4374.250	PK	V	1.00	0	39.2	74.0	PASS
		AV				25.1	54.0	PASS
30.	5679.750	PK	V	1.00	0	38.7	74.0	PASS
		AV				26.1	54.0	PASS

31.	1028.250	PK AV	H	1.00	0	35.1 22.8	70.0 50.0	PASS PASS
32.	1602.500	PK AV	H	1.00	0	35.9 23.2	70.0 50.0	PASS PASS
33.	2235.750	PK AV	H	1.00	0	36.9 24.0	70.0 50.0	PASS PASS
34.	2849.750	PK AV	H	1.00	0	38.0 25.1	70.0 50.0	PASS PASS
35.	4433.000	PK AV	H	1.00	0	39.5 25.4	74.0 54.0	PASS PASS
36.	5219.500	PK AV	H	1.00	0	40.4 26.1	74.0 54.0	PASS PASS
OVERALL RESULT for Combination Set #4 (with EMI shielding cable and 4 pieces of snap ferrites): PASS								

Note:

1. Test distance for frequency 30 – 1000 MHz and 1000 – 6000 MHz =3 meters
2. PK is Peak, AV is Average and QP is Quasi-peak.
3. The limit is given in Table A.6 of standard EN 55032: 2015 + AC: 2016

Test Equipment

Equipment	Make	Model No.	Serial No.	Ref. No.
Log Periodic Antenna	Rohde & Schwarz	HL223	841516/017	EMC 039
Bi-conical Antenna	Rohde & Schwarz	HK116	100241	EMC 576
Double Ridged Horn Antenna	EMCO	3115	9002-3351	EMC 185
Test Receiver	Rohde & Schwarz	ESU8	100141	EMC 582
Thermo-Hygrometer	Oregon	THG312	N/A	EMC 621
High Frequency cable	Hubersuhner	SUCOFLEX 104	72799/6	EMC 604
Coaxial Cable	Huber+Suhner	SF118/11n/11n/12000.0	800018/118	EMC 719

Uncertainty

The reported uncertainty is the expanded uncertainty U for a level of confidence of 95%, together with its coverage factor k = 2. The combined standard uncertainty u_c can be calculated as $u_c = U/k$ and its degrees of freedom Λ_{eff} is given by a t-distribution with its k value.		
Expanded Uncertainty	U_{lab}	U_{cisp}
30 MHz to 200 MHz	5.18 dB	6.30 dB
200 MHz to 1 GHz	6.09 dB	6.30 dB
1 GHz to 6 GHz	4.55 dB	5.20 dB

Note

- The statements of conformity is made in this report as follows:

PASS – Results within limits/specifications
FAIL – Results exceed limits/specifications

- The decision rule is applied in this report as follows:

The customer agreed that Pass/Fail decisions are based on acceptance limits chosen based on simple acceptance ($w = 0$, $AL = TL$). Statements of conformity are binary (i.e., PASS /FAIL). No measurement instrumentation uncertainty is taken into account according to the standards applied. The estimate of the measurand is assumed to have a normal probability distribution and specific risk is used for the risk calculation. In this case, the risk that accepted items are outside the tolerance limit is up to 50%. The risk of false rejection is up to 50% for measured results outside the tolerance according to CISPR 16-4-2: 2011+A1:2014+A2:2018.

4.2 Conducted Emissions

Port Tested

- AC Power Supply Port

Test Standard: EN 55032: 2015 + AC: 2016

Test Title: Conducted Emissions

EUT

EUT: Combination Set #1, Set #2, Set #3 and Set #4

Mode of Operation: Normal Operation Mode

Operation Condition: AC operation

Mains Voltage: 230 Volts Mains Frequency: 50Hz

DC Voltage: Nil DC Supply Type: Nil

Test Setup

Figure No: Photo 2 and Photo 11

Location: NFAC

Equipment List

EMC 582 / EMC 621 / EMC 678 / EMC 601/ EMC 682

Environment

Temperature 23 °C Humidity 58 % Atm. Pressure X kPa

Test Results

For Combination Set #1 (with 5 pieces of snap ferrites):

Ref.	Frequency (MHz)	Detector (PK/AV/QP)	Line Measured	Result (dBμV)	Limit (dBμV)	Margins & Comments (Pass/Fail/Uncertain)
1.	0.154	QP AV	Live	57.5 47.2	65.8 55.8	Pass Pass
2.	1.224	QP AV	Live	42.4 39.4	56.0 46.0	Pass Pass
3.	1.530	QP AV	Live	41.6 38.6	56.0 46.0	Pass Pass
4.	3.366	QP AV	Live	41.4 39.0	56.0 46.0	Pass Pass
5.	4.285	QP AV	Live	39.7 38.0	56.0 46.0	Pass Pass
6.	4.589	QP AV	Live	41.3 38.8	60.0 50.0	Pass Pass
7.	0.154	QP AV	Neutral	57.9 47.1	65.8 55.8	Pass Pass
8.	1.224	QP AV	Neutral	42.5 39.5	61.2 51.2	Pass Pass
9.	1.530	QP AV	Neutral	42.1 38.9	56.0 46.0	Pass Pass
10.	3.367	QP AV	Neutral	42.1 39.2	56.0 46.0	Pass Pass
11.	4.284	QP AV	Neutral	39.4 38.8	56.0 46.0	Pass Pass
12.	4.590	QP AV	Neutral	41.9 39.1	56.0 46.0	Pass Pass
OVERALL RESULT for Combination Set #1 (with 5 pieces of snap ferrites): PASS						

For Combination Set #2 (with 5 pieces of snap ferrites):

Ref.	Frequency (MHz)	Detector (PK/AV/QP)	Line Measured	Result (dBμV)	Limit (dBμV)	Margins & Comments (Pass/Fail/Uncertain)
1.	0.156	QP	Live	56.8	65.6	Pass
		AV		47.1	55.6	Pass
2.	0.235	QP	Live	45.8	62.2	Pass
		AV		34.8	52.2	Pass
3.	0.609	QP	Live	45.3	56.0	Pass
		AV		26.0	46.0	Pass
4.	1.530	QP	Live	38.7	56.0	Pass
		AV		36.4	46.0	Pass
5.	1.836	QP	Live	35.4	56.0	Pass
		AV		30.9	46.0	Pass
6.	4.284	QP	Live	36.0	56.0	Pass
		AV		33.3	46.0	Pass
7.	0.156	QP	Neutral	57.6	65.6	Pass
		AV		47.5	55.6	Pass
8.	0.237	QP	Neutral	46.8	62.2	Pass
		AV		36.1	52.2	Pass
9.	0.612	QP	Neutral	36.2	56.0	Pass
		AV		24.0	46.0	Pass
10.	1.530	QP	Neutral	38.7	56.0	Pass
		AV		36.4	46.0	Pass
11.	2.142	QP	Neutral	38.3	56.0	Pass
		AV		36.2	46.0	Pass
12.	4.896	QP	Neutral	36.0	56.0	Pass
		AV		30.2	46.0	Pass
OVERALL RESULT for Combination Set #2 (with 5 pieces of snap ferrites):					PASS	

For Combination Set #3 (with 5 pieces of snap ferrites):

Ref.	Frequency (MHz)	Detector (PK/AV/QP)	Line Measured	Result (dBμV)	Limit (dBμV)	Margins & Comments (Pass/Fail/Uncertain)
1.	0.152	QP	Live	55.9	65.8	Pass
		AV		45.6	55.8	Pass
2.	0.219	QP	Live	48.0	62.8	Pass
		AV		31.4	52.8	Pass
3.	0.607	QP	Live	46.0	56.0	Pass
		AV		25.3	46.0	Pass
4.	1.530	QP	Live	36.2	56.0	Pass
		AV		31.6	46.0	Pass
5.	4.897	QP	Live	35.4	56.0	Pass
		AV		28.8	46.0	Pass
6.	7.925	QP	Live	45.8	60.0	Pass
		AV		42.9	50.0	Pass
7.	0.156	QP	Neutral	55.3	65.6	Pass
		AV		45.8	55.6	Pass
8.	0.217	QP	Neutral	46.7	62.9	Pass
		AV		28.9	52.9	Pass
9.	0.816	QP	Neutral	36.3	56.0	Pass
		AV		20.4	46.0	Pass
10.	4.429	QP	Neutral	33.0	56.0	Pass
		AV		22.7	46.0	Pass
11.	7.925	QP	Neutral	45.7	60.0	Pass
		AV		42.0	50.0	Pass
12.	8.311	QP	Neutral	44.9	60.0	Pass
		AV		41.8	50.0	Pass
OVERALL RESULT for Combination Set #3 (with 5 pieces of snap ferrites): PASS						

For Combination Set #3 (with EMI shielding cable and 4 pieces of snap ferrites):

Ref.	Frequency (MHz)	Detector (PK/AV/QP)	Line Measured	Result (dBμV)	Limit (dBμV)	Margins & Comments (Pass/Fail/Uncertain)
1.	0.163	QP	Live	54.7	65.3	Pass
		AV		41.2	55.3	Pass
2.	0.217	QP	Live	46.9	62.9	Pass
		AV		32.7	52.9	Pass
3.	0.609	QP	Live	46.8	56.0	Pass
		AV		28.1	46.0	Pass
4.	1.530	QP	Live	34.8	56.0	Pass
		AV		30.0	46.0	Pass
5.	2.142	QP	Live	34.6	56.0	Pass
		AV		28.5	46.0	Pass
6.	2.411	QP	Live	35.6	56.0	Pass
		AV		23.5	46.0	Pass
7.	0.163	QP	Neutral	54.9	65.3	Pass
		AV		38.7	55.3	Pass
8.	0.218	QP	Neutral	48.6	62.9	Pass
		AV		33.7	52.9	Pass
9.	0.609	QP	Neutral	41.8	56.0	Pass
		AV		25.2	46.0	Pass
10.	1.530	QP	Neutral	34.9	56.0	Pass
		AV		29.9	46.0	Pass
11.	2.142	QP	Neutral	35.0	56.0	Pass
		AV		28.5	46.0	Pass
12.	2.413	QP	Neutral	36.6	56.0	Pass
		AV		23.7	46.0	Pass
OVERALL RESULT for Combination Set #3 (with EMI shielding cable and 4 pieces of snap ferrites): PASS						

For Combination Set #4 (with 5 pieces of snap ferrites):

Ref.	Frequency (MHz)	Detector (PK/AV/QP)	Line Measured	Result (dBμV)	Limit (dBμV)	Margins & Comments (Pass/Fail/Uncertain)
1.	0.156	QP	Live	47.8	65.6	Pass
		AV		39.5	55.6	Pass
2.	0.215	QP	Live	46.3	63.0	Pass
		AV		36.4	53.0	Pass
3.	0.534	QP	Live	42.9	56.0	Pass
		AV		29.5	46.0	Pass
4.	0.712	QP	Live	40.9	56.0	Pass
		AV		26.2	46.0	Pass
5.	10.298	QP	Live	45.9	60.0	Pass
		AV		39.9	50.0	Pass
6.	28.772	QP	Live	48.3	60.0	Pass
		AV		39.0	50.0	Pass
7.	0.156	QP	Neutral	46.5	65.6	Pass
		AV		38.3	55.6	Pass
8.	0.228	QP	Neutral	45.6	62.5	Pass
		AV		34.9	52.5	Pass
9.	0.534	QP	Neutral	40.9	56.0	Pass
		AV		24.4	46.0	Pass
10.	0.696	QP	Neutral	39.7	56.0	Pass
		AV		23.1	46.0	Pass
11.	10.297	QP	Neutral	44.8	60.0	Pass
		AV		38.2	50.0	Pass
12.	28.770	QP	Neutral	47.2	60.0	Pass
		AV		38.4	50.0	Pass
OVERALL RESULT for Combination Set #4 (with 5 pieces of snap ferrites): PASS						

For Combination Set #4 (with EMI shielding cable and 4 pieces of snap ferrites):

Ref.	Frequency (MHz)	Detector (PK/AV/QP)	Line Measured	Result (dBμV)	Limit (dBμV)	Margins & Comments (Pass/Fail/Uncertain)
1.	0.156	QP	Live	47.6	65.6	Pass
		AV		39.2	55.6	Pass
2.	0.215	QP	Live	46.2	63.0	Pass
		AV		36.8	53.0	Pass
3.	0.532	QP	Live	42.8	56.0	Pass
		AV		29.2	46.0	Pass
4.	0.705	QP	Live	40.7	56.0	Pass
		AV		26.3	46.0	Pass
5.	10.297	QP	Live	45.6	60.0	Pass
		AV		39.7	50.0	Pass
6.	28.769	QP	Live	48.2	60.0	Pass
		AV		38.8	50.0	Pass
7.	0.156	QP	Neutral	46.9	65.6	Pass
		AV		38.8	55.6	Pass
8.	0.215	QP	Neutral	46.0	63.0	Pass
		AV		36.2	53.0	Pass
9.	0.537	QP	Neutral	39.2	56.0	Pass
		AV		26.4	46.0	Pass
10.	0.708	QP	Neutral	39.0	56.0	Pass
		AV		26.2	46.0	Pass
11.	10.297	QP	Neutral	44.9	60.0	Pass
		AV		38.5	50.0	Pass
12.	28.770	QP	Neutral	49.1	60.0	Pass
		AV		38.6	50.0	Pass
OVERALL RESULT for Combination Set #4 (with EMI shielding cable and 4 pieces of snap ferrites): PASS						

Test Equipment

Equipment	Make	Model No.	Serial No.	Ref. No.
Test Receiver	Rohde & Schwarz	ESU8	100141	EMC 582
Line Impedance Stabilization Network	Rohde & Schwarz	ENV216	102170	EMC 678
Thermo-Hygrometer	Oregon	THG312	N/A	EMC 621
Double Shield Cable	Huber+ Suhner	RG223/U-01	None	EMC 682

Uncertainty

The reported uncertainty is the expanded uncertainty U for a level of confidence of 95%, together with its coverage factor $k = 2$. The combined standard uncertainty u_c can be calculated as $u_c = U/k$ and its degrees of freedom Λ_{eff} is given by a t-distribution with its k value.		
Expanded Uncertainty	U_{lab}	U_{cisp}
150 kHz to 30 MHz	2.28 dB	3.40 dB

Note

- The statements of conformity is made in this report as follows:

PASS – Results within limits/specifications
FAIL – Results exceed limits/specifications

- The decision rule is applied in this report as follows:

The customer agreed that Pass/Fail decisions are based on acceptance limits chosen based on simple acceptance ($w = 0$, $AL = TL$). Statements of conformity are binary (i.e., PASS /FAIL). No measurement instrumentation uncertainty is taken into account according to the standards applied. The estimate of the measurand is assumed to have a normal probability distribution and specific risk is used for the risk calculation. In this case, the risk that accepted items are outside the tolerance limit is up to 50%. The risk of false rejection is up to 50% for measured results outside the tolerance according to CISPR 16-4-2: 2011+A1:2014+A2:2018.

4.3 Electrostatic Discharge (ESD)

Port Tested

Enclosure Port

Test Standard: EN 61000-6-1:2019 and EN 61547: 2009 (Basic standard: EN 61000-4-2 : 2009)

Test Title: Electrostatic Discharge

EUT

EUT: Combination Set #1, Set #2, Set #3 and Set #4

Mode of Operation: Normal Operation Mode

Operation Condition: AC operation

Mains Voltage: 230 Volts Mains Frequency: 50Hz

DC Voltage: Nil DC Supply Type: Nil

Test Setup

Figure No: Photo 3 and Photo 12

Location: NFAC

Equipment List

EMC 583 / EMC 591 / EMC 621

Environment

Temperature 25 °C Humidity 48 % Atm. Pressure 100.2 kPa

Monitoring

VISUAL:	<input checked="" type="checkbox"/>	CCTV:	<input type="checkbox"/>
AUDIO:	<input type="checkbox"/>	MIC/SPK:	<input type="checkbox"/>
SINAD:	<input type="checkbox"/>	LIMIT:	_____ dB
S/N:	<input type="checkbox"/>	LIMIT:	_____ dB
OTHERS:	<input checked="" type="checkbox"/>	Figure No.:	_____
DETAILS	<u>Monitoring the ping status of the EUT by notebook computer through LAN.</u>		

Performance Criteria(s)

A	No degradation from stated performance <input type="checkbox"/>	<p>The EUT shall continue to operate as intended without operator intervention. No degradation of performance, loss of function or change of operating state is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum + performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.</p>
B	Continue operation after test <input checked="" type="checkbox"/>	<p>The EUT shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of operator intervention; no degradation of performance or loss of function is performance. During the test, degradation of performance is, however, allowed. No change of actual operating state or stored data is allowed. If the manufacturer does not specify the minimum performance level or the permissible performance loss, then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.</p>

C	<p>Loss of function allowed with user intervention</p> <p>[]</p>	<p><u>Temporary loss of function is allowed during the test, provided the function,</u></p> <p><u>is self-recoverable or can be restored by the operation of the controls.</u></p>
---	---	--

Test Results

Direct Contact Discharge (10 discharges on each test point)								
Test Points	Level 1: 2kV		Level 2: 4kV		Level 3: 6kV		Level 4: 8kV	
	+	-	+	-	+	-	+	-
Screws of the EUT for Combination Set #1(with 5 pieces of snap ferrites)	N.A.	N.A.	Pass	Pass	N.A.	N.A.	N.A.	N.A.
Keyhole of the EUT for Combination Set #1(with 5 pieces of snap ferrites)	N.A.	N.A.	Pass	Pass	N.A.	N.A.	N.A.	N.A.
Screws of the EUT for Combination Set #2(with 5 pieces of snap ferrites)	N.A.	N.A.	Pass	Pass	N.A.	N.A.	N.A.	N.A.
Keyhole of the EUT for Combination Set #2(with 5 pieces of snap ferrites)	N.A.	N.A.	Pass	Pass	N.A.	N.A.	N.A.	N.A.
Screws of the EUT for Combination Set #3(with 5 pieces of snap ferrites)	N.A.	N.A.	Pass	Pass	N.A.	N.A.	N.A.	N.A.
Keyhole of the EUT for Combination Set #3(with 5 pieces of snap ferrites)	N.A.	N.A.	Pass	Pass	N.A.	N.A.	N.A.	N.A.
Screws of the EUT for Combination Set #3(with EMI shielding cable and 4 pieces of snap ferrites)	N.A.	N.A.	Pass	Pass	N.A.	N.A.	N.A.	N.A.
Keyhole of the EUT for Combination Set #3(with EMI shielding cable and 4 pieces of snap ferrites)	N.A.	N.A.	Pass	Pass	N.A.	N.A.	N.A.	N.A.
Screws of the EUT for Combination Set #4(with 5 pieces of snap ferrites)	N.A.	N.A.	Pass	Pass	N.A.	N.A.	N.A.	N.A.
Keyhole of the EUT for Combination Set #4(with 5 pieces of snap ferrites)	N.A.	N.A.	Pass	Pass	N.A.	N.A.	N.A.	N.A.
Screws of the EUT for Combination Set #4(with EMI shielding cable and 4 pieces of snap ferrites)	N.A.	N.A.	Pass	Pass	N.A.	N.A.	N.A.	N.A.
Keyhole of the EUT for Combination Set #4(with EMI shielding cable and 4 pieces of snap ferrites)	N.A.	N.A.	Pass	Pass	N.A.	N.A.	N.A.	N.A.

The equipment under test continued to operate as intended and there was no loss of function during and after test. Therefore, the EUT met the specification of performance criteria.

Comments:	Nil

4.4 Radiated RF Immunity Test

Port Tested

- Enclosure Port

Test

Test Standard: EN 61000-6-1:2019 and EN 61547: 2009 (Basic standard: EN 61000-4-3: 2006 + A2: 2010)

Test Title: Radiated RF Immunity Test

EUT

EUT: Combination Set #1, Set #2, Set #3 and Set #4

Mode of Operation: Normal Operation Mode

Operation Condition: AC operation

Mains Voltage: 230 Volts Mains Frequency: 50Hz

DC Voltage: Nil DC Supply Type: Nil

Test Setup

Figure No: Photo 4 and Photo 13

Location: NFAC

Equipment List

EMC 089 / EMC167 / EMC 592 / EMC 593 / EMC598 / EMC 605 / EMC 607 / EMC 621 / EMC 664 /

EMC 665

Environment

Temperature 23 °C Humidity 58 % Atm. Pressure x kPa

Monitoring

VISUAL:	<input checked="" type="checkbox"/>	CCTV:	<input type="checkbox"/>
AUDIO:	<input type="checkbox"/>	MIC/SPK:	<input type="checkbox"/>
SINAD:	<input type="checkbox"/>	LIMIT:	_____ dB
S/N:	<input type="checkbox"/>	LIMIT:	_____ dB
OTHERS:	<input checked="" type="checkbox"/>	Figure No.:	_____
DETAILS	Monitoring the status of the EUT by notebook computer through LAN.		

Performance Criteria(s)

A	No degradation from stated performance <input checked="" type="checkbox"/>	<p>The EUT shall continue to operate as intended without operator intervention. No degradation of performance, loss of function or change of operating state is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.</p>
B	Continue operation after test <input type="checkbox"/>	<p>The EUT shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of operator intervention; no degradation of performance or loss of function is performance. During the test, degradation of performance is, however, allowed. No change of actual operating state or stored data is allowed. If the manufacturer does not specify the minimum performance level or the permissible performance loss, then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.</p>

C	<p>Loss of function allowed with user intervention</p> <p>[]</p>	<p><u>Temporary loss of function is allowed during the test, provided the function,</u></p> <p><u>is self-recoverable or can be restored by the operation of the controls.</u></p>
---	--	--

Test Conditions

Calibrated:	[X]	Closed Loop:	[]
Frequency Range:	<u>80 – 1000 MHz</u>	Frequency Step:	<u>1% of fundamental</u>
Modulation:	[X]	Modulation Method:	<u>1 kHz AM 80% depth</u>
Severity Level:		Dwell Time:	<u>1 Second</u>
Level 1	1 V/m []	Size of UFA:	<u>1.5m X 1.5m</u>
Level 2	3 V/m [X]	Partial Illumination:	<u>No</u>
Level 3	10 V/m []		
Level x	<u> </u> V/m []		
Table azimuth:	0°, 90°, 180°, 270°		
Vertical Polarization:	[X]	Horizontal Polarization:	[X]

Calibrated:	[X]	Closed Loop:	[]
Frequency Range:	<u>1.4 – 6.0GHz</u>	Frequency Step:	<u>1% of fundamental</u>
Modulation:	[X]	Modulation Method:	<u>1 kHz AM 80% depth</u>
Severity Level:		Dwell Time:	<u>1 Second</u>
Level 1	1 V/m []	Size of UFA:	<u>1.5m X 1.5m</u>
Level 2	3 V/m [X]	Partial Illumination:	<u>No</u>
Level 3	10 V/m []		
Level x	<u> </u> V/m []		
Table azimuth:	0°, 90°, 180°, 270°		
Vertical Polarization:	[X]	Horizontal Polarization:	[X]

Result

OVERALL RESULT for Combination Set #1(with 5 pieces of snap ferrites):	PASS
OVERALL RESULT for Combination Set #2(with 5 pieces of snap ferrites):	PASS
OVERALL RESULT for Combination Set #3 (with 5 pieces of snap ferrites):	PASS
OVERALL RESULT for Combination Set #3 (with EMI shielding cable and 4 pieces of snap ferrites):	PASS
OVERALL RESULT for Combination Set #4 (with 5 pieces of snap ferrites):	PASS
OVERALL RESULT for Combination Set #4 (with EMI shielding cable and 4 pieces of snap ferrites):	PASS

Test Equipment

Equipment	Make	Model No.	Serial No.	Ref. No.
Power Amplifier	Kalmus	122FC	7620-2	EMC 089
Biconical Antenna	EMCO	3109	89032398	EMC 167
RF Power Meter	Boonton	4232A	13042	EMC 592
RF Amplifier	Prana	AP32MT310	973	EMC 593
Signal Generator	Agilent Technologies	N5183A	MY50140517	EMC 598
Power Amplifier	MILMEGA	AS0104-400/200	1041471 / 1041472 / 1041473	EMC 605
Stacked Double Log Peroidic Antenna	Schwarzbeck	STLP9128D	9128D020	EMC 607
Thermo-Hygrometer	Oregon	THG312	N/A	EMC 621
Power Amplifier	Milmega	AS1860-50	1041474	EMC 664
Horn Antenna	Amplifier Research	ATH4G6	0336126	EMC 665

Immunity Test Records

For 0° degree:

The equipment under test continued to operate as intended and there was no loss of function during and after test. Therefore, the EUT met the specification of performance criteria A.

For 90° degree:

The equipment under test continued to operate as intended and there was no loss of function during and after test. Therefore, the EUT met the specification of performance criteria A.

For 180° degree:

The equipment under test continued to operate as intended and there was no loss of function during and after test. Therefore, the EUT met the specification of performance criteria A.

For 270° degree:

The equipment under test continued to operate as intended and there was no loss of function during and after test. Therefore, the EUT met the specification of performance criteria A.

Comments: Nil

4.5 Electrical Fast Transients Immunity Test

Port Tested

- AC Power Supply Power Port

Test

Test Standard: EN 61000-6-1:2019 and EN 61547: 2009 (Basic standard: EN 61000-4-4:2012)

Test Title: Electrical Fast Transients Immunity Test

EUT

EUT: Combination Set #1, Set #2, Set #3 and Set #4

Mode of Operation: Normal Operation Mode

Operation Condition: AC operation

Mains Voltage: 230 Volts Mains Frequency: 50Hz

DC Voltage: Nil DC Supply Type: Nil

Test Setup

Figure No: Photo 5 and Photo 14

Location: NFAC

Equipment List

EMC 635 / EMC 694 / EMC 695 / EMC 621

Environment

Temperature 23 °C Humidity 59 % Atm. Pressure X kPa

Monitoring

VISUAL:	<input checked="" type="checkbox"/>	CCTV:	<input type="checkbox"/>
AUDIO:	<input type="checkbox"/>	MIC/SPK:	<input type="checkbox"/>
SINAD:	<input type="checkbox"/>	LIMIT:	_____ dB
S/N:	<input type="checkbox"/>	LIMIT:	_____ dB
OTHERS:	<input type="checkbox"/>	Figure No.:	_____
DETAILS	Monitoring the status of the EUT by notebook computer through LAN.		

Performance Criteria(s)

A	No degradation from stated performance <input type="checkbox"/>	<p>The EUT shall continue to operate as intended without operator intervention. No degradation of performance, loss of function or change of operating state is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.</p>
B	Continue operation after test <input checked="" type="checkbox"/>	<p>The EUT shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of operator intervention; no degradation of performance or loss of function is performance. During the test, degradation of performance is, however, allowed. No change of actual operating state or stored data is allowed. If the manufacturer does not specify the minimum performance level or the permissible performance loss, then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.</p>

C	Loss of function allowed with user intervention []	Temporary loss of function is allowed during the test, provided the function,
		is self-recoverable or can be restored by the operation of the controls.

Port(s) Tested

AC Power Supply Port	[x]
----------------------	-------

Applied Voltage:

AC / DC and functional earth		
LEVEL 1	± 0.5kV	[]
LEVEL 2	± 1.0kV	[X]
LEVEL 3	± 2.0kV	[]
LEVEL 4	± 4.0kV	[]
LEVEL x	_____	[]

Test Conditions

Repetition Rate:	5 kHz	Rise Time	5 / 50 ns (Tr / Th)
		/ Impulse Duration:	
Test Duration:	_____ 1 minute		

Test Results

Port	Coupling Mode (CDN / CLAMP)	Level 1: 0.5kV		Level 2: 1kV		Level 3: 2kV		Level 4: 4kV	
		+	-	+	-	+	-	+	-
AC Power Supply Port for Combination Set #1 (with 5 pieces of snap ferrites)	CDN	N. A.	N. A.	Pass	Pass	N. A.	N. A.	N. A.	N. A.
AC Power Supply Port for Combination Set #2 (with 5 pieces of snap ferrites)	CDN	N. A.	N. A.	Pass	Pass	N. A.	N. A.	N. A.	N. A.
AC Power Supply Port for Combination Set #3 (with 5 pieces of snap ferrites)	CDN	N. A.	N. A.	Pass	Pass	N. A.	N. A.	N. A.	N. A.
AC Power Supply Port for Combination Set #4 (with EMI shielding cable and 4 pieces of snap ferrites)	CDN	N. A.	N. A.	Pass	Pass	N. A.	N. A.	N. A.	N. A.

AC Power Supply Port for Combination Set #3 (with 5 pieces of snap ferrites)	CDN	N. A.	N. A.	Pass	Pass	N. A.	N. A.	N. A.	N. A.
AC Power Supply Port for Combination Set #4 (with EMI shielding cable and 4 pieces of snap ferrites)	CDN	N. A.	N. A.	Pass	Pass	N. A.	N. A.	N. A.	N. A.

Result

OVERALL RESULT for Combination Set #1(with 5 pieces of snap ferrites): PASS

OVERALL RESULT for Combination Set #2(with 5 pieces of snap ferrites): PASS

OVERALL RESULT for Combination Set #3 (with 5 pieces of snap ferrites): PASS

OVERALL RESULT for Combination Set #3 (with EMI shielding cable and 4 pieces of snap ferrites): PASS

OVERALL RESULT for Combination Set #4 (with 5 pieces of snap ferrites): PASS

OVERALL RESULT for Combination Set #4 (with EMI shielding cable and 4 pieces of snap ferrites): PASS

Test Equipment

Equipment	Make	Model No.	Serial No.	Ref. No.
Surge / Burst Generator	Teseq	NSG 3060	1420 / 1745	EMC 635
Burst CDN	Teseq	CDN 3083-B100	3012	EMC 694
Burst Coupling Clamp	Teseq	CDN 3425	3098	EMC 695
Thermo-Hygrometer	Oregon	THG312	N/A	EMC 621

The equipment under test continued to operate as intended and there was no loss of function during and after test. Therefore, the EUT met the specification of performance criteria A.

Comments: Nil

4.6 Surge Immunity Test

Port Tested

- AC Power Supply Power Port

Test

Test Standard: EN 61000-6-1:2019 and EN 61547: 2009 (Basic standard: EN 61000-4-5:2014)

Test Title: Surge Immunity Test

EUT

EUT: Combination Set #1, Set #2, Set #3 and Set #4

Mode of Operation: Normal Operation Mode

Operation Condition: AC operation

Mains Voltage: 230 Volts Mains Frequency: 50Hz

DC Voltage: Nil DC Supply Type: Nil

Test Setup

Figure No: Photo 6 and Photo 15

Location: NFAC

Equipment List

EMC 710 / EMC 637 / EMC 621

Environment

Temperature 24 °C Humidity 58 % Atm. Pressure X kPa

Monitoring

VISUAL:	<input checked="" type="checkbox"/>	CCTV:	<input type="checkbox"/>
AUDIO:	<input type="checkbox"/>	MIC/SPK:	<input type="checkbox"/>
SINAD:	<input type="checkbox"/>	LIMIT:	_____ dB
S/N:	<input type="checkbox"/>	LIMIT:	_____ dB
OTHERS:	<input type="checkbox"/>	Figure No.:	_____
DETAILS	Monitoring the status of the EUT by notebook computer through LAN.		

Performance Criteria(s)

A	No degradation from stated performance <input type="checkbox"/>	<p>The EUT shall continue to operate as intended without operator intervention. No degradation of performance, loss of function or change of operating state is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.</p>
B	Continue operation after test <input checked="" type="checkbox"/>	<p>The EUT shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of operator intervention; no degradation of performance or loss of function is performance. During the test, degradation of performance is, however, allowed. No change of actual operating state or stored data is allowed. If the manufacturer does not specify the minimum performance level or the permissible performance loss, then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.</p>

C	Loss of function allowed with user intervention []	<u>Temporary loss of function is allowed during the test, provided the function,</u>
		<u>is self-recoverable or can be restored by the operation of the controls.</u>

Port(s) Tested

	COMMON MODE (Line to GND / Earth)	DIFFERENTIAL MODE (Line to Line)
AC Power Supply Port	[X]	[X]

Applied Voltage

LEVEL 1	± 0.5kV	[]
LEVEL 2	± 1.0kV	[X]
LEVEL 3	± 2.0kV	[X]
LEVEL 4	± 4.0kV	[]
LEVEL x	_____	[]

Test Conditions

Repetition Rate:	<u>1 per minute</u>	Rise Time / Impulse Duration:	<u>1.2 / 50 μs (Tr / Th)</u>
Test Duration:	<u>120 minutes</u>	Phase Shift:	<u>0°, 90°, 180°, 270°</u>

Test Equipment

Equipment	Make	Model No.	Serial No.	Ref. No.
Surge / Burst Generator	Teseq	NSG 3040	199826-011SC	EMC 710
Surge Coupling Decoupling Network for unshielded symmetrical high speed communication lines	Teseq	CDN HSS-2	38292	EMC 637
Thermo-Hygrometer	Oregon	THG312	N/A	EMC 621

Test Results

Port	Coupling Mode (CDN / CLAMP)	Level 1: 0.5kV		Level 2: 1kV		Level 3: 2kV		Level 4: 4kV	
		+	-	+	-	+	-	+	-
AC Power Supply Port for Combination Set #1 (with 5 pieces of snap ferrites)	CDN (Live to Neutral)	N. A.	N. A.	Pass	Pass	N. A.	N. A.	N. A.	N. A.
AC Power Supply Port for Combination Set #1 (with 5 pieces of snap ferrites)	CDN (Live to GND)	N. A.	N. A.	N. A.	N. A.	Pass	Pass	N. A.	N. A.
AC Power Supply Port for Combination Set #1 (with 5 pieces of snap ferrites)	CDN (Neutral to GND)	N. A.	N. A.	N. A.	N. A.	Pass	Pass	N. A.	N. A.
AC Power Supply Port for Combination Set #2 (with 5 pieces of snap ferrites)	CDN (Live to Neutral)	N. A.	N. A.	Pass	Pass	N. A.	N. A.	N. A.	N. A.
AC Power Supply Port for Combination Set #2 (with 5 pieces of snap ferrites)	CDN (Live to GND)	N. A.	N. A.	N. A.	N. A.	Pass	Pass	N. A.	N. A.
AC Power Supply Port for Combination Set #2 (with 5 pieces of snap ferrites)	CDN (Neutral to GND)	N. A.	N. A.	N. A.	N. A.	Pass	Pass	N. A.	N. A.
AC Power Supply Port for Combination Set #3 (with 5 pieces of snap ferrites)	CDN (Live to Neutral)	N. A.	N. A.	Pass	Pass	N. A.	N. A.	N. A.	N. A.
AC Power Supply Port for Combination Set #3 (with 5 pieces of snap ferrites)	CDN (Live to GND)	N. A.	N. A.	N. A.	N. A.	Pass	Pass	N. A.	N. A.
AC Power Supply Port for Combination Set #3 (with 5 pieces of snap ferrites)	CDN (Neutral to GND)	N. A.	N. A.	N. A.	N. A.	Pass	Pass	N. A.	N. A.
AC Power Supply Port for Combination Set #3 (with EMI shielding cable and 4 pieces of snap ferrites)	CDN (Live to Neutral)	N. A.	N. A.	Pass	Pass	N. A.	N. A.	N. A.	N. A.
AC Power Supply Port for Combination Set #3 (with EMI shielding cable and 4 pieces of snap ferrites)	CDN (Live to GND)	N. A.	N. A.	N. A.	N. A.	Pass	Pass	N. A.	N. A.
AC Power Supply Port for Combination Set #3 (with EMI shielding cable and 4 pieces of snap ferrites)	CDN (Neutral to GND)	N. A.	N. A.	N. A.	N. A.	Pass	Pass	N. A.	N. A.
AC Power Supply Port for Combination Set #4 (with 5 pieces of snap ferrites)	CDN (Live to Neutral)	N. A.	N. A.	Pass	Pass	N. A.	N. A.	N. A.	N. A.

AC Power Supply Port for Combination Set #4 (with 5 pieces of snap ferrites)	CDN (Live to GND)	N. A.	N. A.	N. A.	N. A.	Pass	Pass	N. A.	N. A.
AC Power Supply Port for Combination Set #4 (with 5 pieces of snap ferrites)	CDN (Neutral to GND)	N. A.	N. A.	N. A.	N. A.	Pass	Pass	N. A.	N. A.
AC Power Supply Port for Combination Set #4 (with EMI shielding cable and 4 pieces of snap ferrites)	CDN (Live to Neutral)	N. A.	N. A.	Pass	Pass	N. A.	N. A.	N. A.	N. A.
AC Power Supply Port for Combination Set #4 (with EMI shielding cable and 4 pieces of snap ferrites)	CDN (Live to GND)	N. A.	N. A.	N. A.	N. A.	Pass	Pass	N. A.	N. A.
AC Power Supply Port for Combination Set #4 (with EMI shielding cable and 4 pieces of snap ferrites)	CDN (Neutral to GND)	N. A.	N. A.	N. A.	N. A.	Pass	Pass	N. A.	N. A.

OVERALL RESULT for Combination Set #1(with 5 pieces of snap ferrites): PASS

OVERALL RESULT for Combination Set #2(with 5 pieces of snap ferrites): PASS

OVERALL RESULT for Combination Set #3 (with 5 pieces of snap ferrites): PASS

OVERALL RESULT for Combination Set #3 (with EMI shielding cable and four pieces of snap ferrites): PASS

OVERALL RESULT for Combination Set #4 (with 5 pieces of snap ferrites): PASS

OVERALL RESULT for Combination Set #4 (with EMI shielding cable and four pieces of snap ferrites): PASS

4.7 Conducted RF Immunity

Ports Tested

- AC Power Supply Power Port

Test

Test Standard: EN 61000-6-1:2019 and EN 61547: 2009 (Basic standard: EN 61000-4-6:2014)

Test Title: Conducted Immunity Test

EUT

EUT: Combination Set #1, Set #2, Set #3 and Set #4

Mode of Operation: Normal Operation Mode

Operation Condition: AC operation

Mains Voltage: 230 Volts Mains Frequency: 50Hz

DC Voltage: Nil DC Supply Type: Nil

Test Setup

Figure No: Photo 7 and Photo 16

Location: NFAC

Equipment List

EMC 056 / EMC 070 / EMC 291 / EMC 538 / EMC 592 / EMC 621

Environment

Temperature 24 °C Humidity 58 % Atm. Pressure X kPa

Monitoring

VISUAL:	<input checked="" type="checkbox"/>	CCTV:	<input type="checkbox"/>
AUDIO:	<input type="checkbox"/>	MIC/SPK:	<input type="checkbox"/>
SINAD:	<input type="checkbox"/>	LIMIT:	_____ dB
S/N:	<input type="checkbox"/>	LIMIT:	_____ dB
OTHERS:	<input type="checkbox"/>	Figure No.:	_____
DETAILS	Monitoring the status of the EUT through LAN to notebook computer.		

Performance Criteria(s)

A	No degradation from stated performance <input checked="" type="checkbox"/>	<p>The EUT shall continue to operate as intended without operator intervention. No degradation of performance, loss of function or change of operating state is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.</p>
B	Continue operation after test <input type="checkbox"/>	<p>The EUT shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of operator intervention; no degradation of performance or loss of function is performance. During the test, degradation of performance is, however, allowed. No change of actual operating state or stored data is allowed. If the manufacturer does not specify the minimum performance level or the permissible performance loss, then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.</p>

C	Loss of function allowed with user intervention []	<u>Temporary loss of function is allowed during the test, provided the function,</u>
		<u>is self-recoverable or can be restored by the operation of the controls.</u>

Test Conditions

Frequency Range:	<u>150 kHz to 80 MHz</u>	Frequency Step:	<u>1% of fundamental</u>
Modulation:	[x]	Modulation Method:	<u>1 kHz AM 80% depth</u>
Field Strength:		Dwell Time:	<u>1 secs</u>
Level 1	1 V []		
Level 2	3 V [X]		
Level 3	10 V []		
Level x	<u> V []</u>		
CDN:	[x]		
Clamp Injection:	[]		
Direct Injection:	[]		

Results

OVERALL RESULT for Combination Set #1(with 5 pieces of snap ferrites):	PASS
OVERALL RESULT for Combination Set #2(with 5 pieces of snap ferrites):	PASS
OVERALL RESULT for Combination Set #3 (with 5 pieces of snap ferrites):	PASS
OVERALL RESULT for Combination Set #3 (with EMI shielding cable and 4 pieces of snap ferrites):	PASS
OVERALL RESULT for Combination Set #4 (with 5 pieces of snap ferrites):	PASS
OVERALL RESULT for Combination Set #4 (with EMI shielding cable and 4 pieces of snap ferrites):	PASS

Equipment List

Equipment	Make	Model No.	Serial No.	Ref. No.
Signal Generator	R & S	SMY01	840258/024	EMC 056
Coupling Decoupling Network	Fischer	4413-25	9603	EMC 070
Amplifier	Kalmus	737LC-CE	8026-1	EMC 291
Coupling Decoupling Network	Fischer	FCC-801-M2-25A	1041	EMC 538
RF Power Meter	Boonton	4232A	13042	EMC 592
Thermo-Hygrometer	Oregon	THG312	N/A	EMC 621

The equipment under test continued to operate as intended and there was no loss of function during and after test. Therefore, the EUT met the specification of performance criteria.

4.8 Power Frequency Magnetic Field Immunity Test

Port Tested

- Enclosure Port

Test

Test Standard: EN 61000-6-1:2019 and EN 61547: 2009 (Basic standard: EN61000-4-8:2010)

Test Title: Power Frequency Magnetic Field Immunity

EUT

EUT: Combination Set #1, Set #2, Set #3 and Set #4

Mode of Operation: Normal Operation Mode

Operation Condition: AC operation

Mains Voltage: 230 Volts Mains Frequency: 50Hz

DC Voltage: Nil DC Supply Type: Nil

Test Setup

Figure No: Photo 8 and Photo 17

Location: NFAC

Equipment List

EMC 492 / EMC 692 / EMC 621 / EMC 537 / EMC 712 / EMC 713 / Tailor-made Coil

Environment

Temperature 24 °C Humidity 58 % Atm. Pressure X kPa

Monitoring

VISUAL:	<input checked="" type="checkbox"/>	CCTV:	<input type="checkbox"/>
AUDIO:	<input type="checkbox"/>	MIC/SPK:	<input type="checkbox"/>
SINAD:	<input type="checkbox"/>	LIMIT:	_____ dB
S/N:	<input type="checkbox"/>	LIMIT:	_____ dB
OTHERS:	<input type="checkbox"/>	Figure No.:	_____
DETAILS	Monitoring the status of the EUT by notebook computer through LAN.		

Performance Criteria(s)

A	No degradation from stated performance <input checked="" type="checkbox"/>	<p>The EUT shall continue to operate as intended without operator intervention. No degradation of performance, loss of function or change of operating state is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.</p>
B	Continue operation after test <input type="checkbox"/>	<p>The EUT shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of operator intervention; no degradation of performance or loss of function is performance. During the test, degradation of performance is, however, allowed. No change of actual operating state or stored data is allowed. If the manufacturer does not specify the minimum performance level or the permissible performance loss, then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.</p>

C	Loss of function allowed with user intervention []	Temporary loss of function is allowed during the test, provided the function, is self-recoverable or can be restored by the operation of the controls.
---	--	--

Test Results

Power Frequency Magnetic Field Immunity:

Port Tested:	Enclosure for Combination Set #1 (with 5 pieces of snap ferrites)		
		Duration	Result
Test Level:	3 A/m	60 s	PASS

Port Tested:	Enclosure for Combination Set #2 (with 5 pieces of snap ferrites)		
		Duration	Result
Test Level:	3 A/m	60 s	PASS

Port Tested:	Enclosure for Combination Set #3 (with 5 pieces of snap ferrites)		
		Duration	Result
Test Level:	3 A/m	60 s	PASS

Port Tested:	Enclosure for Combination Set #3 (with EMI shielding cable and 4 pieces of snap ferrites)		
		Duration	Result
Test Level:	3 A/m	60 s	PASS

Port Tested:	Enclosure for Combination Set #4 (with 5 pieces of snap ferrites)		
		Duration	Result
Test Level:	3 A/m	60 s	PASS

Port Tested:	Enclosure for Combination Set #4 (with EMI shielding cable and 4 pieces of snap ferrites)		
		Duration	Result
Test Level:	3A/m	60 s	PASS

OVERALL RESULT for Combination Set #1(with 5 pieces of snap ferrites): PASS

OVERALL RESULT for Combination Set #2(with 5 pieces of snap ferrites): PASS

OVERALL RESULT for Combination Set #3 (with 5 pieces of snap ferrites): PASS

OVERALL RESULT for Combination Set #3 (with EMI shielding cable and 4 pieces of snap ferrites): PASS

OVERALL RESULT for Combination Set #4 (with 5 pieces of snap ferrites): PASS

OVERALL RESULT for Combination Set #4 (with EMI shielding cable and 4 pieces of snap ferrites): PASS

Test Equipment

Equipment	Make	Model No.	Serial No.	Ref. No.
Gauss / Tesla Meter	F.W. Bell	5180	1743095	EMC 692
Thermo-Hygrometer	Oregon	THG312	N/A	EMC 621
Digital Multimeter	Fluke	79 III	77251244	EMC 537
Magnetic Field Coil	Teseq	INA 702	354	EMC 712
Magnetic Field Option	Teseq	MFO 6501	1018	EMC 713
Tailor-made Coil	N.A.	N.A.	N.A.	N.A.

4.9 Voltage Dips, Short Interruptions and Voltage Variations Immunity

Port Tested

AC Power Supply Port

Test

Test Standard: EN 61000-6-1:2019 and EN 61547: 2009 (Basic standard: EN 61000-4-11:2004 +A1:2017)

Test Title: Voltage Dips, Short Interruptions and Voltage Variations Immunity Test

EUT

EUT: Combination Set #1, Set #2, Set #3 and Set #4

Mode of Operation: Normal Operation Mode

Operation Condition: AC operation

Mains Voltage: 230 Volts Mains Frequency: 50Hz

DC Voltage: Nil DC Supply Type: Nil

Test Setup

Figure No: Photo 9 and Photo 18

Location: NFAC

Equipment List

EMC 710 / EMC 711 / EMC 621

Environment

Temperature 24 °C Humidity 58 % Atm. Pressure X.

Monitoring

VISUAL:	<input checked="" type="checkbox"/>	CCTV:	<input type="checkbox"/>
AUDIO:	<input type="checkbox"/>	MIC/SPK:	<input type="checkbox"/>
SINAD:	<input type="checkbox"/>	LIMIT:	_____ dB
S/N:	<input type="checkbox"/>	LIMIT:	_____ dB
OTHERS:	<input type="checkbox"/>	Figure No.:	_____
DETAILS	Monitoring the status of the EUT by notebook computer through LAN.		

Performance Criteria(s)

A	No degradation from stated performance <input type="checkbox"/>	<p>The EUT shall continue to operate as intended without operator intervention. No degradation of performance, loss of function or change of operating state is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.</p>
B	Continue operation after test <input checked="" type="checkbox"/>	<p>The EUT shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of operator intervention; no degradation of performance or loss of function is performance. During the test, degradation of performance is, however, allowed. No change of actual operating state or stored data is allowed. If the manufacturer does not specify the minimum performance level or the permissible performance loss, then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.</p>

C	Loss of function allowed with user intervention [X]	Temporary loss of function is allowed during the test, provided the function,
		is self-recoverable or can be restored by the operation of the controls.

Test Results

Port Tested:	AC Power Supply Port for Combination Set #1(with 5 pieces of snap ferrites):		
Number of Dips:	3	Repetition:	10 Seconds
	Reduction of supply	Duration	
Voltage Dips:	30%	10 ms	[x]
Voltage Interruptions:	>95%	5000 ms	[x]

Port Tested:	AC Power Supply Port for Combination Set #2 (with 5 pieces of snap ferrites):		
Number of Dips:	3	Repetition:	10 Seconds
	Reduction of supply	Duration	
Voltage Dips:	30%	10 ms	[x]
Voltage Interruptions:	>95%	5000 ms	[x]

Port Tested:	AC Power Supply Port for Combination Set #3 (with 5 pieces of snap ferrites)		
Number of Dips:	3	Repetition:	10 Seconds
	Reduction of supply	Duration	
Voltage Dips:	30%	10 ms	[x]
Voltage Interruptions:	>95%	5000 ms	[x]

Port Tested:	AC Power Supply Port for Combination Set #3 (with EMI shielding cable and 4 pieces of snap ferrites)		
Number of Dips:	3	Repetition:	10 Seconds
	Reduction of supply	Duration	
Voltage Dips:	30%	10 ms	[x]
Voltage Interruptions:	>95%	5000 ms	[x]

Port Tested:	AC Power Supply Port for Combination Set #4 (with 5 pieces of snap ferrites)		
Number of Dips:	3	Repetition:	10 Seconds
	Reduction of supply	Duration	
Voltage Dips:	30%	10 ms	[x]
Voltage Interruptions:	>95%	5000 ms	[x]

Port Tested:	AC Power Supply Port for Combination Set #3 (with EMI shielding cable and 4pieces of snap ferrites)		
Number of Dips:	3	Repetition:	10 Seconds
	Reduction of supply	Duration	
Voltage Dips:	30%	10 ms	[x]
Voltage Interruptions:	>95%	5000 ms	[x]

OVERALL RESULT for Combination Set #1(with 5 pieces of snap ferrites):	PASS
OVERALL RESULT for Combination Set #2(with 5 pieces of snap ferrites):	PASS
OVERALL RESULT for Combination Set #3 (with 5 pieces of snap ferrites):	PASS
OVERALL RESULT for Combination Set #3 (with EMI shielding cable and 4 pieces of snap ferrites):	PASS
OVERALL RESULT for Combination Set #4 (with 5 pieces of snap ferrites):	PASS
OVERALL RESULT for Combination Set #4 (with EMI shielding cable and 4 pieces of snap ferrites):	PASS

Test Equipment

Equipment	Make	Model No.	Serial No.	Ref. No.
Surge / Brust Generator	Teseq	NSG 3040	6174	EMC 710
Power Quality Module	Teseq	PQM 3403	2550	EMC 711
Thermo-Hygrometer	Oregon	THG312	N/A	EMC 621

The equipment under test continued to operate as intended and there was no loss of function during and after test. Therefore, the EUT met the specification of performance criteria B.

Nil

5. Conclusions

The Laboratory EMC evaluations for four (4) combinations Set #1, Set #2, Set #3 and Set #4 of smart lampposts have been conducted in February, March and April 2022 in HKPC EMC Centre.

The Laboratory EMC evaluation included a total of nine (9) EMC test items for full EMC emission and immunity tests according to standards of EN 55032, EN 61547 and EN 61000-6-1. From our measured results, the four (4) combinations Set #1, Set #2, Set #3 and Set #4 of smart lampposts devices were evaluated and tested while they were operating normally.

The results are compared to those stipulated in the standards of EN 55032, EN 61547 and EN 61000-6-1.

It is confirmed that the design and configurations of the four (4) devices combinations Set #1, Set #2, Set #3 and Set #4 of smart lampposts are within the specified limits with sufficient margin and fulfilled the specified performance criteria. All tests performed are in compliance with standards EN 55032, EN 61547 and EN 61000-6-1.

The following table summarizes the EMC Test Items, Test Standards, Ports for four (4) combinations Set #1, Set #2, Set #3 and Set #4 of smart lampposts.

Combinations Set #1 of smart lampposts (with 5 pieces of snap ferrites)			
EMC Test Item	Test Methods / Standards	Ports	Results
Radiated Emission	EN 55032: 2015 + AC: 2016	- Enclosure Port	Pass
Conducted Emission	EN 55032: 2015 + AC: 2016	- AC Power Supply Port	Pass
Electrostatic Discharge (ESD)	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-2:2009)	- Enclosure Port	Pass
Radiated RF Immunity	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-3: 2006 + A2: 2010)	- Enclosure Port	Pass
Electrical Fast Transient Immunity Test	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-4:2012)	- AC Power Supply Port	Pass
Surge Immunity Test	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-5:2014)	- AC Power Supply Port	Pass
Conducted Immunity Test	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-6:2014)	- AC Power Supply Port	Pass
Power Frequency Magnetic Field Immunity and DC Magnetic Field Immunity	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN61000-4-8:2010)	- Enclosure Port	Pass
Voltage Dips and Voltage Interruption Immunity	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-11:2004 +A1:2017)	- AC Power Supply Port	Pass

Note: As U_{lab} in the applicable tests listed in this report are less than U_{CISPR} according to CISPR 16-4-2: 2011+A1:2014+A2:2018, the Statement of Conformity is made for emission test as follows:

Pass – Results within limits/specifications

Fail – Results exceed limits/specifications

Combinations Set #2 of smart lampposts (with 5 pieces of snap ferrites)			
EMC Test Item	Test Methods / Standards	Ports	Results
Radiated Emission	EN 55032: 2015 + AC: 2016	- Enclosure Port	Pass
Conducted Emission	EN 55032: 2015 + AC: 2016	- AC Power Supply Port	Pass
Electrostatic Discharge (ESD)	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-2:2009)	- Enclosure Port	Pass
Radiated RF Immunity	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-3: 2006 + A2: 2010)	- Enclosure Port	Pass
Electrical Fast Transient Immunity Test	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-4:2012)	- AC Power Supply Port	Pass
Surge Immunity Test	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-5:2014)	- AC Power Supply Port	Pass
Conducted Immunity Test	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-6:2014)	- AC Power Supply Port	Pass
Power Frequency Magnetic Field Immunity and DC Magnetic Field Immunity	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN61000-4-8:2010)	- Enclosure Port	Pass
Voltage Dips and Voltage Interruption Immunity	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-11:2004 +A1:2017)	- AC Power Supply Port	Pass

Note: As U_{lab} in the applicable tests listed in this report are less than U_{cisp} according to CISPR 16-4-2: 2011+A1:2014+A2:2018, the Statement of Conformity is made for emission test as follows:

Pass – Results within limits/specifications

Fail – Results exceed limits/specifications

Combinations Set #3 of smart lampposts (with 5 pieces of snap ferrites)			
EMC Test Item	Test Methods / Standards	Ports	Results
Radiated Emission	EN 55032: 2015 + AC: 2016	- Enclosure Port	Pass
Conducted Emission	EN 55032: 2015 + AC: 2016	- AC Power Supply Port	Pass
Electrostatic Discharge (ESD)	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-2:2009)	- Enclosure Port	Pass
Radiated RF Immunity	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-3: 2006 + A2: 2010)	- Enclosure Port	Pass
Electrical Fast Transient Immunity Test	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-4:2012)	- AC Power Supply Port	Pass
Surge Immunity Test	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-5:2014)	- AC Power Supply Port	Pass
Conducted Immunity Test	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-6:2014)	- AC Power Supply Port	Pass
Power Frequency Magnetic Field Immunity and DC Magnetic Field Immunity	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN61000-4-8:2010)	- Enclosure Port	Pass
Voltage Dips and Voltage Interruption Immunity	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-11:2004 +A1:2017)	- AC Power Supply Port	Pass

Note: As U_{lab} in the applicable tests listed in this report are less than U_{CISPR} according to CISPR 16-4-2: 2011+A1:2014+A2:2018, the Statement of Conformity is made for emission test as follows:

Pass – Results within limits/specifications

Fail – Results exceed limits/specifications

Combinations Set #3 of smart lampposts (with EMI shielding cable and 4 pieces of snap ferrites)			
EMC Test Item	Test Methods / Standards	Ports	Results
Radiated Emission	EN 55032: 2015 + AC: 2016	- Enclosure Port	Pass
Conducted Emission	EN 55032: 2015 + AC: 2016	- AC Power Supply Port	Pass
Electrostatic Discharge (ESD)	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-2:2009)	- Enclosure Port	Pass
Radiated RF Immunity	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-3: 2006 + A2: 2010)	- Enclosure Port	Pass
Electrical Fast Transient Immunity Test	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-4:2012)	- AC Power Supply Port	Pass
Surge Immunity Test	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-5:2014)	- AC Power Supply Port	Pass
Conducted Immunity Test	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-6:2014)	- AC Power Supply Port	Pass
Power Frequency Magnetic Field Immunity and DC Magnetic Field Immunity	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN61000-4-8:2010)	- Enclosure Port	Pass
Voltage Dips and Voltage Interruption Immunity	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-11:2004 +A1:2017)	- AC Power Supply Port	Pass

Note: As U_{lab} in the applicable tests listed in this report are less than U_{cisp} according to CISPR 16-4-2: 2011+A1:2014+A2:2018, the Statement of Conformity is made for emission test as follows:

Pass – Results within limits/specifications

Fail – Results exceed limits/specifications

Combinations Set #4 of smart lampposts (with 5 pieces of snap ferrites)			
EMC Test Item	Test Methods / Standards	Ports	Results
Radiated Emission	EN 55032: 2015 + AC: 2016	- Enclosure Port	Pass
Conducted Emission	EN 55032: 2015 + AC: 2016	- AC Power Supply Port	Pass
Electrostatic Discharge (ESD)	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-2:2009)	- Enclosure Port	Pass
Radiated RF Immunity	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-3: 2006 + A2: 2010)	- Enclosure Port	Pass
Electrical Fast Transient Immunity Test	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-4:2012)	- AC Power Supply Port	Pass
Surge Immunity Test	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-5:2014)	- AC Power Supply Port	Pass
Conducted Immunity Test	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-6:2014)	- AC Power Supply Port	Pass
Power Frequency Magnetic Field Immunity and DC Magnetic Field Immunity	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN61000-4-8:2010)	- Enclosure Port	Pass
Voltage Dips and Voltage Interruption Immunity	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-11:2004 +A1:2017)	- AC Power Supply Port	Pass

Note: As U_{lab} in the applicable tests listed in this report are less than U_{cisp} according to CISPR 16-4-2: 2011+A1:2014+A2:2018, the Statement of Conformity is made for emission test as follows:

Pass – Results within limits/specifications

Fail – Results exceed limits/specifications

Combinations Set #4 of smart lampposts (with EMI shielding cable and 4 pieces of snap ferrites)			
EMC Test Item	Test Methods / Standards	Ports	Results
Radiated Emission	EN 55032: 2015 + AC: 2016	- Enclosure Port	Pass
Conducted Emission	EN 55032: 2015 + AC: 2016	- AC Power Supply Port	Pass
Electrostatic Discharge (ESD)	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-2:2009)	- Enclosure Port	Pass
Radiated RF Immunity	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-3: 2006 + A2: 2010)	- Enclosure Port	Pass
Electrical Fast Transient Immunity Test	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-4:2012)	- AC Power Supply Port	Pass
Surge Immunity Test	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-5:2014)	- AC Power Supply Port	Pass
Conducted Immunity Test	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-6:2014)	- AC Power Supply Port	Pass
Power Frequency Magnetic Field Immunity and DC Magnetic Field Immunity	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN61000-4-8:2010)	- Enclosure Port	Pass
Voltage Dips and Voltage Interruption Immunity	EN 61000-6-1:2019 and EN 61547: 2009 (Basic Standard: EN 61000-4-11:2004 +A1:2017)	- AC Power Supply Port	Pass

Note: As U_{lab} in the applicable tests listed in this report are less than U_{cisp} according to CISPR 16-4-2: 2011+A1:2014+A2:2018, the Statement of Conformity is made for emission test as follows:

Pass – Results within limits/specifications

Fail – Results exceed limits/specifications

6. Recommendation

In addition, it is recommended that the following EMC design technique for installing the smart devices on each lamppost could be used to minimize the electromagnetic interference coupling effect to an acceptable level for EMC emission and immunity test requirements as specified by relevant international standards.

- Using electromagnetic interference (EMI) shielding cable to reduce electrical noise and its impact on the signal, to lower electromagnetic radiation, and to prevent crosstalk from happening between nearby cables.
- EMI filters (e.g. snap ferrites) can be used to minimize the coupling effect by locating it near the power module in close proximity.
- Proper cable routing plays an important role in preventing loop, which acts as an antenna, from forming between wires/cables that causes differential EMI to be coupled into or out of the system.

-END-