ETSI EN 301 489-1 V2.1.1: 2017/-17 V3.1.1: 2017
EMISSION/IMMUNITY/HARMONICS/FLICKER
COMPLIANCE

Test Report

FOR

W-Bridge

Model No.: W-Bridge

Trade Mark: N/A

Report No.: ED170823047E

Issue Date: September 04, 2017

Prepared for

HAYA LIGHT EQUIPMENT LIMITED COMPANY.

6th of Guanglong Road, Zhongluotan Town, Baiyun District, Guangzhou City China.

Prepared by

EMTEK(DONGGUAN) CO., LTD.
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1 TEST RESULT CERTIFICATION

Applicant	:	HAYA LIGHT EQUIPMENT LIMITED COMPANY. 6th of Guanglong Road, Zhongluotan Town, Baiyun District, Guangzhou City China.
Manufacture	:	HAYA LIGHT EQUIPMENT LIMITED COMPANY. 6th of Guanglong Road, Zhongluotan Town, Baiyun District, Guangzhou City China.
EUT	:	W-Bridge
Model	:	W-Bridge
Trademark	:	N/A

Measurement Procedure Used:

APPLICABLE STANDARDS	
STANDARD	**TEST RESULT**
ETSI EN 301 489-1 V2.1.1: 2017	PASS
ETSI EN 301 489-17 V3.1.1: 2017	PASS

The device described above is tested by EMTEK (DONGGUAN) CO., LTD and EMTEK (SHENZHEN) CO., LTD. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and EMTEK (DONGGUAN) CO., LTD. is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the ETSI EN 301 489-1 V2.1.1: 2017 and ETSI EN 301 489-17 V3.1.1: 2017 requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of EMTEK (DONGGUAN) CO., LTD.

Date of Test : August 14, 2017 to September 01, 2017

Prepared by : Abby Li/Editor

Reviewer : Tomas Yang/Supervisor

Approve & Authorized Signer : Sam Lv/Manager

Modified History

Version	Summary	Revision Date	Report No.
V1.0	Original Report	/	ED170823047E

2 EUT DESCRIPTION

Product:	W-Bridge	
Model Number:	W-Bridge	
Trademark:	N/A	
Modulation:	☐WIFI	DSSS with DBPSK/DQPSK/CCK for 802.11b; OFDM with BPSK/QPSK/16QAM/64QAM for 802.11g/n;
	☒BT-CM	GFSK, π/4-DQPSK, 8DPSK
	☐BT-LE	GFSK
Frequency Range:	☐ WIFI	☐2412-2472MHz for 802.11b; ☐2412-2472MHz for 802.11g; ☐2412-2472MHz for 802.11n(HT20); ☐2422-2462MHz for 802.11n(HT40);
	☒BT-CM	☒2402-2480MHz
	☐BT-LE	☐2402-2480MHz
Number of Channels:	☐WIFI	☐13 Channels for 802.11b; ☐13 Channels for 802.11g; ☐13 Channels for 802.11n(HT20); ☐9 Channels for 802.11n(HT40);
	☒BT-CM	☒79 Channels
	☐BT-LE	☐40 Channels
Smart system:	☐WIFI	☐SISO ☐MIMO
	☒BT-CM	☒SISO ☐MIMO
	☐BT-LE	☐SISO ☐MIMO
Max Transmit Power:	☐WIFI	
	☒BT-CM	2.40dBm
	☐BT-LE	
Antenna:	☐WIFI	
	☒BT-CM	PCB Antenna
	☐BT-LE	
Antenna Gain:	☐WIFI	
	☒BT-CM	0 dBi
	☐BT-LE	
Kind of Device	Bluetooth Ver.2.1+EDR	
Power supply:	☐DC 3.7V Battery	
	☒AC 230V/50Hz	
Temperature Range:	-20°C ~ +55°C	

3 SUMMARY OF TEST RESULT

Applicable Standard: ETSI EN 301 489-1 V2.1.1: 2017			
Standard	**Description of Test Item**	**Result**	**Remarks**
EN 55032:2015	Conducted Emissions From The AC Mains Power Ports Emission Test 150 kHz – 30 MHz	PASS	
	Asymmetric Mode Conducted Emissions Emission Test 150 kHz – 30 MHz	-	Note1
	Radiated Emissions 30 MHz – 1000 MHz @ 3 m 1000 MHz – 6000 MHz @ 3 m	PASS	
EN 61000-3-2:2006 +A1:2009+A2:2009	Harmonic current emission test	-	Note1
EN 61000-3-3:2013	Voltage fluctuations & flicker tests	PASS	
EN 61000-4-2:2009	Electrostatic Discharge ± 2, 4 kV Contact Discharge ± 2, 4, 8 kV Air Discharge Standard Criterion B	PASS	
EN 61000-4-3:2006 +A1:2008+A2:2010	Radio frequency electromagnetic field Frequency Range: 80 MHz to 6000 MHz and Electromagnetic field: 3 V/m (unmodulated, r.m.s) Amplitude modulated: 80 % AM (1 kHz) Standard Criterion A	PASS	Note2
EN 61000-4-4:2012	Fast transients, common mode AC ports 5/50 ns, ± 1 kV, 5 kHz DC ports 5/50 ns, ± 0.5 kV I/O ports 5/50 ns, ± 0.5 kV, 5 kHz Standard Criterion B	PASS	
EN 61000-4-5:2006	Surge (Power port 1.2/50 µs, Signal port 10/700 µs / 1.2/50 µs) AC ports: line to line: ± 0.5 kV, 1 kV line to earth: ± 0.5 kV, 1 kV, 2 kV indoor signal ports and telecommunication ports: ± 0.5 kV outdoor signal ports and telecommunication ports for symmetrically operated: ± 1 kV non-symmetrically operated: ± 0.5 kV, 1 kV Standard Criterion B	PASS	
EN 61000-4-6:2009	Radio frequency, common mode Frequency Range：150 kHz to 80 MHz Electromagnetic field：3 V (unmodulated, r.m.s) Amplitude modulated：80 % AM (1 kHz) Standard Criterion A	PASS	Note2
EN 61000-4-11:2004	Voltage dips and interruptions voltage dip 0% 10 ms (0.5 cycles) – Standard Criterion B voltage dip 0% 20 ms (1.0 cycles) – Standard Criterion B voltage dip 70% (at 50 Hz) 500 ms (25 cycles) – Standard Criterion C voltage interruption 0% (at 50 Hz) 5000 ms (250 cycles) – Standard Criterion C	PASS	Note2
Note1: Not applicable Note2: Tested By EMTEK(SHENZHEN) CO., LTD			

4 TEST METHODOLOGY

4.1 GENERAL DESCRIPTION OF APPLIED STANDARDS

According to its specifications, the EUT must comply with the requirements of the following standards:
ETSI EN 301 489-1: ElectroMagnetic Compatibility (EMC) standard for radio equipment and services;
Part 1: Common technical requirements; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU and the essential requirements of article 6 of Directive 2014/30/EU
Final Draft ETSI EN 301 489-3: ElectroMagnetic Compatibility (EMC) standard for radio equipment and services;
Part 3: Specific conditions for Short-Range Devices (SRD); Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU

4.2 MEASUREMENT EQUIPMENT USED

FOR POWER LINE CONDUCTED EMISSION

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde&Schwarz	ESCI	100137	May 16, 2017	1 Year
2.	L.I.S.N.	Rohde&Schwarz	ENV216	100017	May 16, 2017	1 Year
3.	RF Switching Unit	CDS	RSU-M2	38401	May 16, 2017	1 Year

FOR RADIATED EMISSION MEASUREMENT

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCI	100137	May 16, 2017	1 Year
2.	Bilog Antenna	Schwarzbeck	VULB9163	000141	May 16, 2017	1 Year
3.	Power Amplifier	CDS	RSU-M352	818	May 16, 2017	1 Year
4.	Power Amplifier	HP	8447F	OPT H64	May 16, 2017	1 Year
5.	Color Monitor	SUNSPO	SP-140A	N/A	May 16, 2017	1 Year
6.	Single Line Filter	JIANLI	XL-3	N/A	May 16, 2017	1 Year
7.	Single Phase Power Line Filter	JIANLI	DL-2X100B	N/A	May 16, 2017	1 Year
8.	3 Phase Power Line Filter	JIANLI	DL-4X100B	N/A	May 16, 2017	1 Year
9.	DC Power Filter	JIANLI	DL-2X50B	N/A	May 16, 2017	1 Year
10.	Cable	Schwarzbeck	PLF-100	519489	May 17, 2017	1 Year
11.	Cable	Rosenberger	CIL02	A0783566	May 17, 2017	1 Year
12.	Cable	Rosenberger	RG 233/U	525178	May 17, 2017	1 Year

FOR HARMONIC / FLICKER MEASUREMENT

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Power Frequency Test System	EMTEST	DPA500	U0526100506	May 16, 2017	1 Year
2.	AC Frequency Conversion Power	EMTEST	ACS 500	V526100507	May 16, 2017	1 Year
3.	PC	LENOVO	T2900D	SS12485803	May 16, 2017	1 Year

FOR ELECTROSTATIC DISCHARGE TEST

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	ESD Tester	TESEQ AG	NSG437	EE166	May 16, 2017	1 Year

FOR RADIO-FREQUENCY, ELECTROMAGNETIC FIELD IMMUNITY

Ite	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.

m						Interval
1	Signal Generator	Agilent	N5181A	MY50145187	May 16, 2017	1 Year
2	RF Power Meter. Dual Channel	BOONTON	4232A	10539	May 17, 2017	1 Year
3	50ohm Diode Power Sensor	BOONTON	51011EMC	34236/34238	May 17, 2017	1 Year
4	Field Strength Meter	DARE	RSS1006A	10I00037SO22	May 17, 2017	1 Year
5	50ohm Diode Power Sensor	BOONTON	51011EMC	36164	May 17, 2017	1 Year
6	Power Amplifier	MILMEGA	80RF1000-175	1059345	May 16, 2017	1 Year
7	Power Amplifier	MILMEGA	AS0102-55	1018770	May 16, 2017	1 Year
8	Power Amplifier	MILMEGA	AS1860-50	1059346	May 16, 2017	1 Year
9	Log.-Per. Antenna	Schwarzbeck	VULP 9118E	811	May 17, 2017	1 Year
10	Broad-Band Horn Antenna	Schwarzbeck	STLP 9149	9149-227	May 17, 2017	1 Year
11	Multi-function interface system	DARE	CTR1009B	12I00250SNO72	N/A	N/A
12	Automatic switch group	DARE	RSW1004A	N/A	N/A	N/A

FOR ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Burst Tester	EM TEST	UCS500M6B	V0526100502	May 16, 2017	1 Year
2.	Coupling Clamp	EM TEST	HFK	0605-10	May 16, 2017	1 Year

FOR SURGE TEST

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Surge Generator	EM TEST	VCS 500M6T	V0526100503	May 16, 2017	1 Year

FOR IMMUNITY TEST OF CONDUCTED DISTURBANCE INDUCED BY RF FIELD

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Simulator	EMTEST	CWS500C	0900-12	May 17, 2017	1 Year
2	CDN	EMTEST	CDN-M2	5100100100	May 17, 2017	1 Year
3	CDN	EMTEST	CDN-M3	0900-11	May 17, 2017	1 Year
4	Injection Clamp	EMTEST	F-2031-23MM	368	May 17, 2017	1 Year
5	Attenuator	EMTEST	ATT6	0010222A	May 17, 2017	1 Year

FOR VOLTAGE DIPS AND INTERRUPTIONS TEST

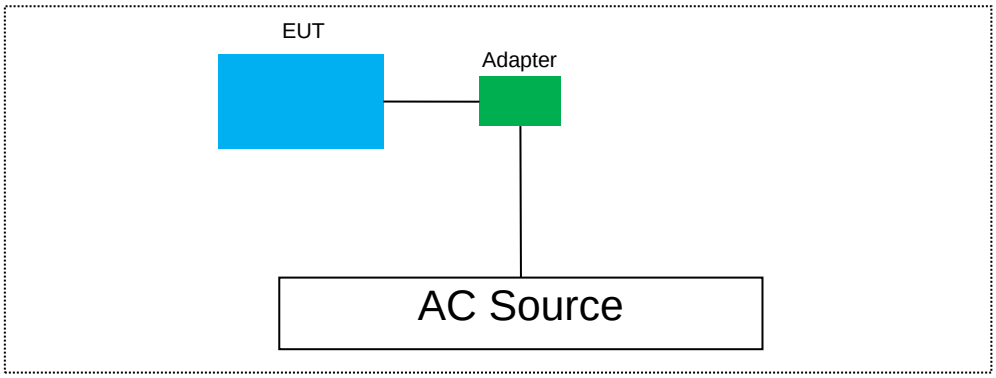
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	45KVA AC Power source	Teseq	NSG 1007-45/45KVA	1305A02873	May 16, 2017	1 Year
2	Signal conditioning Unit	Teseq	CCN 1000-3	1305A02873	May 16, 2017	1 Year
3	Three phase impedance network	Teseq/Germany	INA2197/37A	1305A02873	May 16, 2017	1 Year
4	Three phase impedance network	Teseq/Germany	INA 2196/75A	1305A02874	May 16, 2017	1 Year
5	Profline 2100 AC Switching Unit	Teseq/Germany	NSG2200-3	A22714	May 16, 2017	1 Year

4.3 DESCRIPTION OF TEST MODES

Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Mode	Description
1	BT LINK, BT IDLE
2	
3	

4.4 BLOCK DIAGRAM CONFIGURATION OF TEST SYSTEM



4.5 SUPPORT EQUIPMENT

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Note
1.	N/A	N/A	N/A	N/A	N/A

Notes:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

5 FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

No.281, Guantai Road, Nancheng District, Dongguan, Guangdong, China.

Bldg 69, Majialong Industry Zone District, Nanshan District, Shenzhen, China
The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.10 and CISPR Publication 22.

5.2 LABORATORY ACCREDITATIONS AND LISTINGS

Site Description		
EMC Lab.	:	Accredited by CNAS, 2015.09.24
	:	The certificate is valid until 2018.07.03
	:	The Laboratory has been assessed and proved to be in compliance
	:	with CNAS/CL01:2006
		The Certificate Registration Number is L3150
		Registered on Industry Canada, January 13, 2017
		The Certificate Number is 9444A

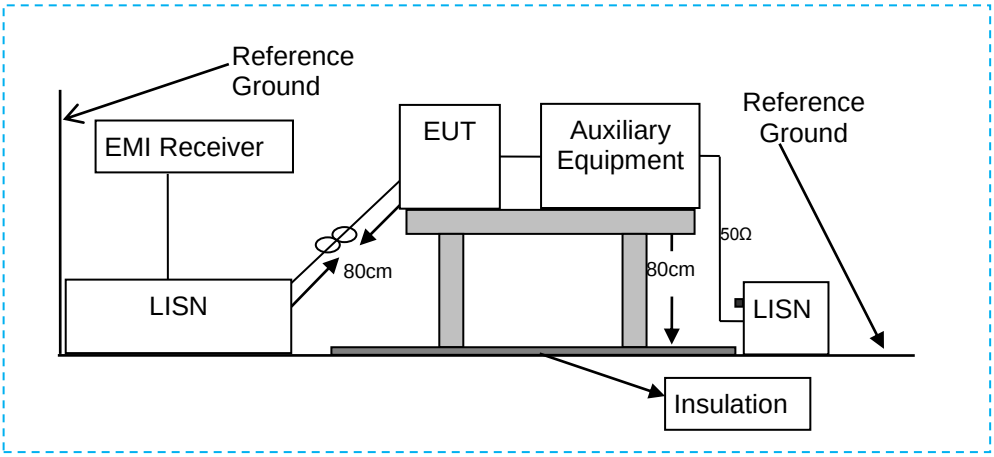
6 TEST SYSTEM UNCERTAINTY

Maximum measurement uncertainty of the test system

Test Item	Measurement Uncertainty
Conducted Emissions	2.96dB(9k~150kHz Conduction 1#) 2.74dB(150k-30MHz Conduction 1#)
Radiated Emission(3m Chamber)	3.78dB (30M~1GHz Polarize: H) 4.27dB (30M~1GHz Polarize: V) 3.7dB (1~18GHz Polarize: H) 3.6dB (1~18GHz Polarize: V)
Voltage fluctuations & flicker tests	0.07%
Harmonic current emission test	1.8%
Electrostatic Discharge	6 %
Radio frequency, common mode	1.45(Using CDN Test) 2.37(Using EM Clamp Test)
Radio frequency electromagnetic field	2.10dB(80MHz-1000MHz) 1.76dB(1000MHz-6000MHz)
Uncertainty for test site temperature and humidity	0.6℃ 4%

7 CONDUCTED EMISSIONS FROM THE AC MAINS POWER PORTS

7.1 BLOCK DIAGRAM OF TEST SETUP



7.2 MEASURING STANDARD

ETSI EN 301 489-1 Clause 8.4
EN 55032: 2015 Clause A.3

7.3 CONDUCTED EMISSION LIMITS (CLASS B)

Power Line Conducted Emission Limits

Applicable to 1. AC mains power ports				
Table clause	Frequency range MHz	Coupling device	Detector type / bandwidth	Class B limits dB(μV)
A10.1	0,15 to 0,5	AMN	Quasi Peak / 9 kHz	66 to 56
	0,5 to 5			56
	5 to 30			60
A10.2	0,15 to 0,5	AMN	Average / 9 kHz	56 to 46
	0,5 to 5			46
	5 to 30			50
Apply A10.1 and A10.2 across the entire frequency range.				

7.4 EUT CONFIGURATION ON MEASUREMENT

The following equipments are installed on Conducted Emission Measurement to meet EN 55032 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

7.5 OPERATING CONDITION OF EUT

Operating Condition of EUT are listed in section 4.4.

7.6 TEST PROCEDURE

The EUT is put on the plane 0.8m high above the ground by insulating support and connected to the AC mains through Line Impedance Stability Network (L.I.S.N). This provided a 50ohm coupling impedance for the tested equipments. Both sides of AC line are investigated to find out the maximum conducted emission according to the EN55032 regulations during conducted emission measurement.
The bandwidth of the Receiver (R&S ESCS30) is set at 9kHz in 150kHz~30MHz and 200Hz in

9kHz~150kHz.
The frequency range from 150kHz to 30MHz is investigated.
The results were obtained from the following equation

Result dB(uV):

Measurement Level dB(uV)= LISN factor(dB) +Cable Loss(dB) +Reading LeveldB(uV)
Note: LISN factor(dB) and Cable Loss(dB) are included Reading dB(uV) in test software.

Over(dB)= Emission Level dB(uV)- Limit dB(uV)

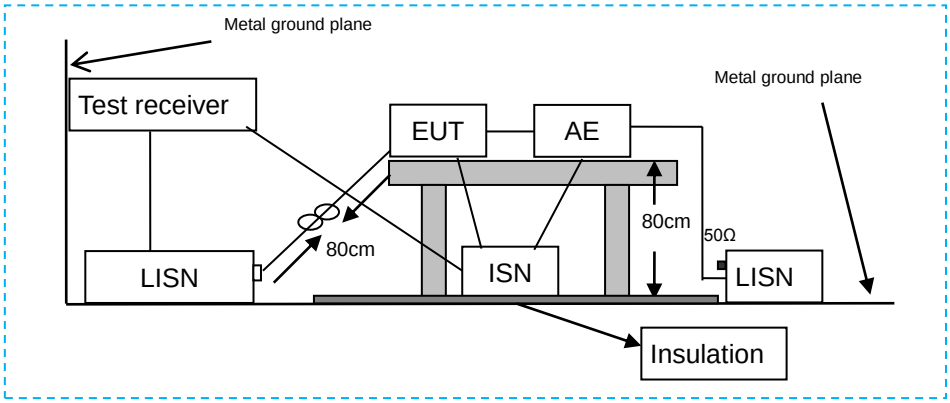
7.7 MEASURING RESULTS

PASS.

All of the Configurations were tested,
the data of the worst case are recorded in the appendix A.

8 ASYMMETRIC MODE CONDUCTED EMISSIONS

8.1 BLOCK DIAGRAM OF TEST SETUP



8.2 MEASURING STANDARD

ETSI EN 301 489-1 Clause 8.7
EN 55032: 2015 Clause A.3

8.3 CONDUCTED EMISSION LIMITS

Applicable to
1. Wired Network Ports
2. Optical Fibre Ports With Metallic Shield or Tension Members
3. Broadcast Receiver Tuner Ports
4. Antenna Ports

Table clause	Frequency range MHz	Coupling device (see Table A.8)	Detector type / bandwidth	Class B voltage limits dB(μV)	Class B current limits dB(μA)
A12.1	0,15 to 0,5	AAN	Quasi Peak / 9 kHz	84 to 74	n/a
	0,5 to 30			74	
	0,15 to 0,5	AAN	Average / 9 kHz	74 to 64	
	0,5 to 30			64	
A12.2	0,15 to 0,5	CVP and current probe	Quasi Peak / 9 kHz	84 to 74	40 to 30
	0,5 to 30			74	30
	0,15 to 0,5	CVP and current probe	Average / 9 kHz	74 to 64	30 to 20
	0,5 to 30			64	20
A12.3	0,15 to 0,5	Current Probe	Quasi Peak / 9 kHz	n/a	40 to 30
	0,5 to 30				30
	0,15 to 0,5	Current Probe	Average / 9 kHz		30 to 20
	0,5 to 30				20

The choice of coupling device and measurement procedure is defined in Annex C.
Screened ports including TV broadcast receiver tuner ports are measured with a common-mode impedance of 150 Ω. This is typically accomplished with the screen terminated by 150 Ω to earth.
AC mains ports that also have the function of a wired network port shall meet the limits given in Table A.10.
The measurement shall cover the entire frequency range.
The application of the voltage and/or current limits is dependent on the measurement procedure used. Refer to Table C.1 for applicability.
Measurement is required at only one EUT supply voltage and frequency.
Applicable to ports listed above and intended to connect to cables longer than 3 m.

8.4 EUT CONFIGURATION ON MEASUREMENT

The following equipments are installed on Conducted Emission Measurement to meet EN 55032 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

8.5 OPERATING CONDITION OF EUT

Operating Condition of EUT are listed in section 4.4.

8.6 TEST PROCEDURE

The EUT is put on the plane 0.8m high above the ground by insulating support and connected to the AC mains through Line Impedance Stability Network (L.I.S.N) or connected to the telecommunication port through an impedance stabilization network (ISN). L.I.S.N provided a 50ohm coupling impedance for the tested equipments AC mains port, I.S.N provided a common mode (asymmetric mode) impedance of 150 Ω to the telecommunication port under test. Both sides of AC line and telecommunication line are investigated to find out the maximum conducted emission according to the EN 55032 regulations during conducted emission measurement.
The bandwidth of the Receiver (R&S ESCS30) is set at 9kHz in 150kHz~30MHz and 200Hz in 9kHz~150kHz.

The frequency range from 150kHz to 30MHz is investigated.

Result dB(uV):

Measurement Level dB(uV)= ISN factor(dB) +Cable Loss(dB) +Reading Level dB(uV)
Note: ISN factor(dB) and Cable Loss(dB) are included Reading dB(uV) in test software.

Over(dB)= Emission Level dB(uV)- Limit dB(uV)

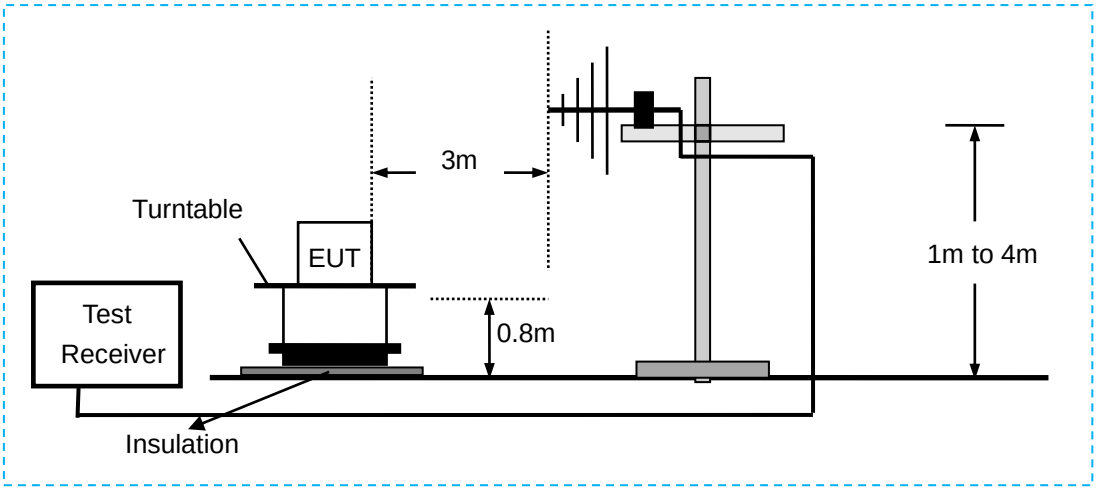
8.7 MEASURING RESULTS

Not Applicable

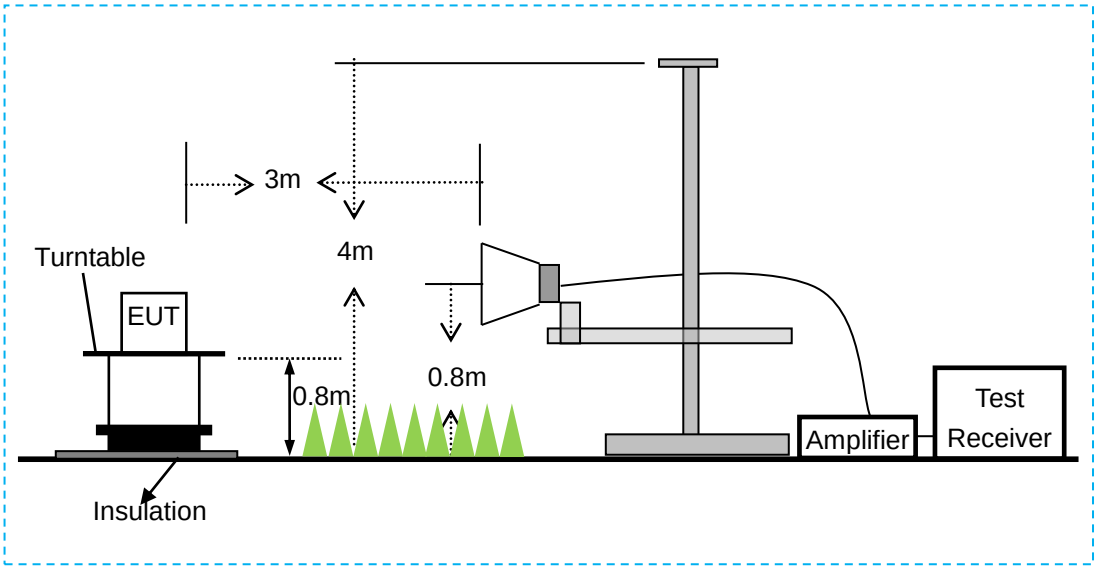
9 RADIATED EMISSIONS

9.1 BLOCK DIAGRAM OF TEST SETUP

Below 1GHz



Above 1GHz



9.2 MEASURING STANDARD

ETSI EN 301 489-1 Clause 8.2
EN 55032: 2015 Clause A.2

9.3 RADIATED EMISSION LIMITS (CLASS B)

All emanations from a class B device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified below:

Table clause	Frequency range MHz	Measurement			Class B limits dB(mV/m)
		Facility (see Table A.1)	Distance m	Detector type /bandwidth	
A4.1	30 to 230	OATS/SAC	10	Quasi Peak / 120 kHz	30
	230 to 1 000				37
A4.2	30 to 230	OATS/SAC	3		40
	230 to 1 000				47
A4.3	30 to 230	FAR	10	Quasi Peak / 120 kHz	32 to 25
	230 to 1 000				32
A4.4	30 to 230	FAR	3		42 to 35
	230 to 1 000				42
Apply only table clause A4.1 or A4.2 or A4.3 or A4.4 across the entire frequency range. These requirements are not applicable to the local oscillator and harmonics frequencies of equipment covered by Table A.6.					

Table clause	Frequency range MHz	Measurement			Class B limits dB(mV/m)
		Facility (see Table A.1)	Distance m	Detector type/ bandwidth	
A5.1	1 000 to 3 000	FSOATS	3	Average/ 1 MHz	50
	3 000 to 6 000				54
A5.2	1 000 to 3 000			Peak/ 1 MHz	70
	3 000 to 6 000				74
Apply A5.1 and A5.2 across the frequency range from 1 000 MHz to the highest required frequency of measurement derived from Table 1.					

9.4 EUT CONFIGURATION ON MEASUREMENT

The EN 55032 regulations test method must be used to find the maximum emission during radiated emission measurement.

9.5 OPERATING CONDITION OF EUT

Operating Condition of EUT is listed in section 4.4.

9.6 TEST PROCEDURE

The EUT is placed on a turntable which is 0.8 meter high above the ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 and 10 meters away from the receiving antenna that is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Bilog antenna (calibrated by Dipole Antenna) and horn antenna are used as a receiving antenna. Both horizontal and vertical polarization of the antenna is set on test.

ResultdB(uV/m):

Measurement Level dB(uV/m)= Antenna factor(dB) –Amp Factor +Cable Loss(dB) +Reading Level dB(uV)

Note: Antenna factor(dB) and Cable Loss(dB) are included Correct factor(dB) in test software.

Margin QP(db)=Reading Level dB(uV/m)- Limit dB(uV/m) for 30~1GHz
Over(dB)= Emission Level dB(uV/m)- Limit dB(uV/m) for above 1GHz

The bandwidth of the Receiver is set at 120 kHz (For 30MHz to 1000MHz).
The resolution bandwidth of the receiver RS ESU26 was set at 1MHz ((For above 1GHz.).
The frequency range for 1GHz to 6GHz was checked with peak and average detector, measurement distance is 3m in 3m Anechoic chamber.

The frequency range for 30MHz to 1GHz was checked with Quasi-peak detector, measurement distance is 3m in 3m semi-chamber.

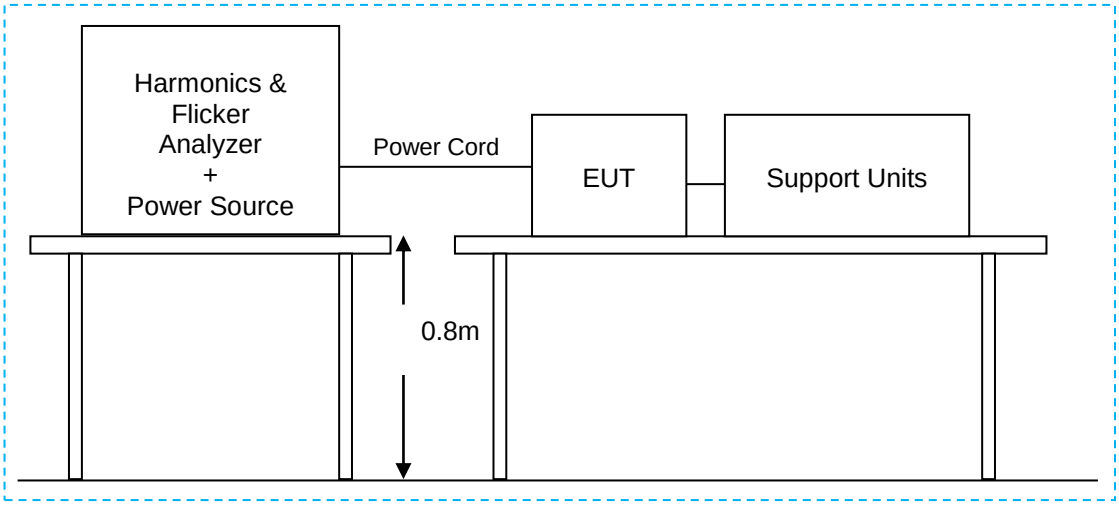
9.7 MEASURING RESULTS

PASS.

All of the Configurations were tested,
the data of the worst case are recorded in the appendix A.

10 HARMONIC CURRENT EMISSION TEST

10.1 BLOCK DIAGRAM OF TEST SETUP



10.2 MEASURING STANDARD

ETSI EN 301 489-1 Clause 8.5
EN 61000-3-2

10.3 OPERATION CONDITION OF EUT

Operating Condition of EUT are listed in section 4.4.

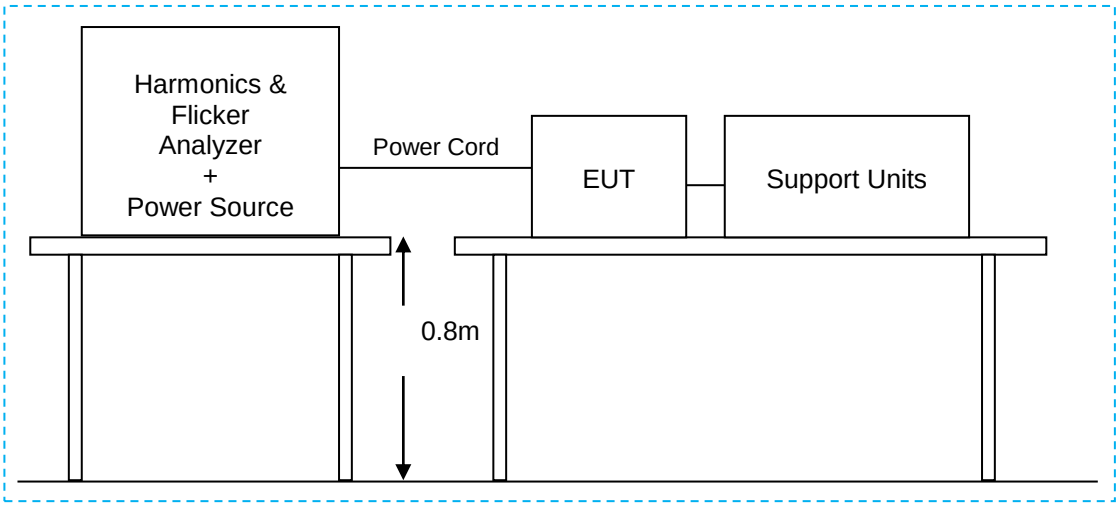
10.4 MEASURING RESULTS

N/A

Note: According to clause 7 of EN 61000-3-2, equipment with a rated power of 75W or less, no limits apply.

11 VOLTAGE FLUCTUATION AND FLICKER TESTS

11.1 BLOCK DIAGRAM OF TEST SETUP



11.2 MEASURING STANDARD

ETSI EN 301 489-1 Clause 8.6
EN 61000-3-3

11.3 OPERATION CONDITION OF EUT

Operating Condition of EUT are listed in section 4.4.

11.4 MEASURING RESULTS

PASS.

All of the Configurations were tested,
the data of the worst case are recorded in the appendix A.

12 PERFORMANCE CRITERIA

12.1 GENERAL PERFORMANCE CRITERIA

The performance criteria are:
• performance criteria A for immunity tests with phenomena of a continuous nature;
• performance criteria B for immunity tests with phenomena of a transient nature;
• performance criteria C for immunity tests with power interruptions exceeding a certain time.

The equipment shall meet the minimum performance criteria as specified in the following clauses.

12.2 PERFORMANCE TABLE

Criteria	During test	After test
A	Shall operate as intended. (see note 1). Shall be no loss of function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance (see note 3). Shall be no loss of function. Shall be no loss of stored data or user programmable functions.
B	May show loss of function (one or more). May show degradation of performance (see note 2). Shall be no unintentional transmissions.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no degradation of performance (see note 3). Shall be no loss of stored data or user programmable functions.
C	May be loss of function (one or more).	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no degradation of performance (see note 3).

NOTE 1: Operate as intended during the test allows a level of degradation not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance.
If the minimum performance level or the permissible performance degradation is not specified by the manufacturer 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.

NOTE 2: Degradation of performance during the test is understood as a degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance.
If the minimum performance level or the permissible performance degradation is not specified by the manufacturer 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.

NOTE 3: No degradation of performance after the test is understood as no degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed.
If the minimum performance level or the permissible performance degradation is not specified by the manufacturer 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.

12.3 PERFORMANCE CRITERIA FOR CONTINUOUS PHENOMENA APPLIED TO TRANSMITTERS (CT)

The performance criteria A shall apply.
Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an ACKnowledgement (ACK) or Not ACKnowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

12.4 PERFORMANCE CRITERIA FOR TRANSIENT PHENOMENA APPLIED TO TRANSMITTERS (TT)

The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5 000 ms duration, for which performance criteria C shall apply.
Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an acknowledgement (ACK) or not-acknowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

12.5 PERFORMANCE CRITERIA FOR CONTINUOUS PHENOMENA APPLIED TO RECEIVERS (CR)

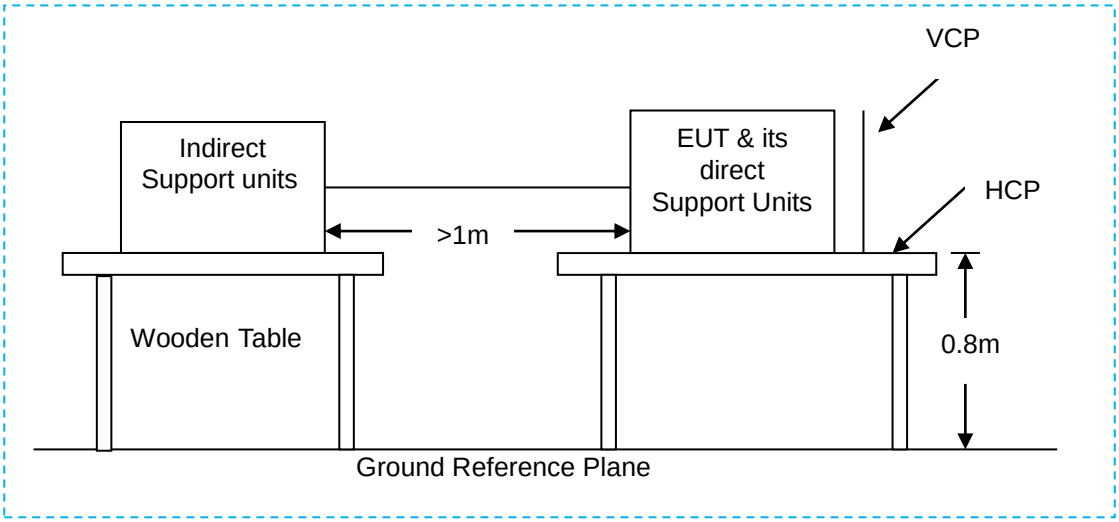
The performance criteria A shall apply.
Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

12.6 PERFORMANCE CRITERIA FOR TRANSIENT PHENOMENA APPLIED TO RECEIVERS (TR)

The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5 000 ms duration for which performance criteria C shall apply.
Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

13 ELECTROSTATIC DISCHARGE

13.1 BLOCK DIAGRAM OF TEST SETUP



13.2 TEST STANDARD

According to ETSI EN 301 489-1 Clause 9.3 and EN 61000-4-2

13.3 SEVERITY LEVELS AND PERFORMANCE CRITERION

13.3.1 SEVERITY LEVEL

Level	Test Voltage Contact Discharge (kV)	Test Voltage Air Discharge (kV)
1	±2	±2
2	±4	±4
3	±6	±8
4	±8	±15
X	Special	Special

13.3.2 PERFORMANCE CRITERION

☐ CT	☒ TT	☐ CR	☒ TR

13.4 OPERATING CONDITION OF EUT

Operating Condition of EUT are listed in section 4.4.

13.5 TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.3.2 and EN 61000-4-2 for the measurement methods.

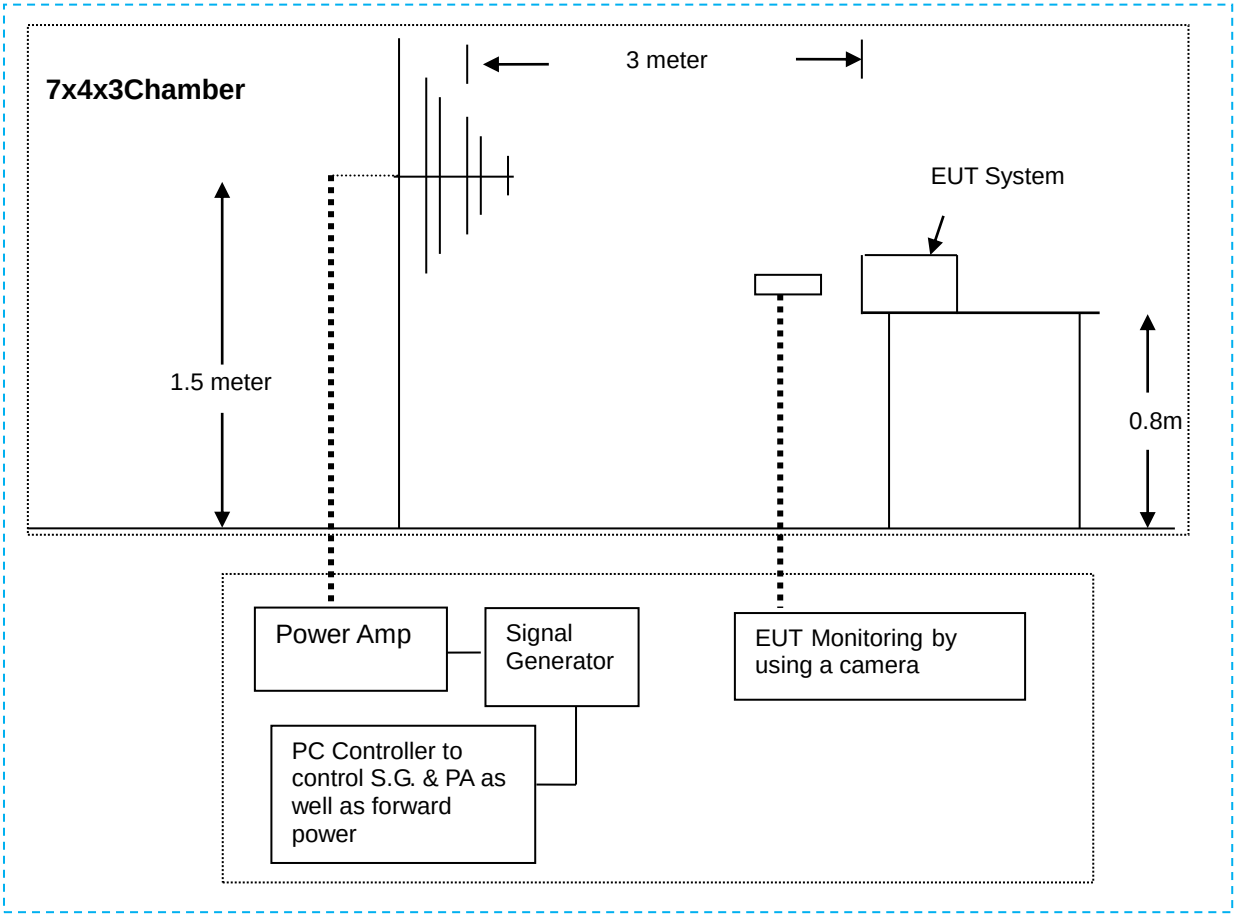
13.6TEST RESULTS

PASS.

All of the Configurations were tested,
the data of the worst case are recorded in the appendix A.

14 RADIO FREQUENCY ELECTROMAGNETIC FIELD

14.1BLOCK DIAGRAM OF TEST SETUP



14.2TEST STANDARD

According to ETSI EN 301 489-1 Clause 9.2 and EN 61000-4-3

14.3SEVERITY LEVELS AND PERFORMANCE CRITERION

14.3.1 SEVERITY LEVELS

Level	Field Strength V/m
1	1
2	3
3	10
X	Special

14.3.2 PERFORMANCE CRITERION

☒ CT	☐ TT	☒ CR	☐ TR

14.4 OPERATING CONDITION OF EUT

Operating Condition of EUT are listed in section 4.4.

14.5 TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.2.2 and EN 61000-4-3 for the measurement methods.

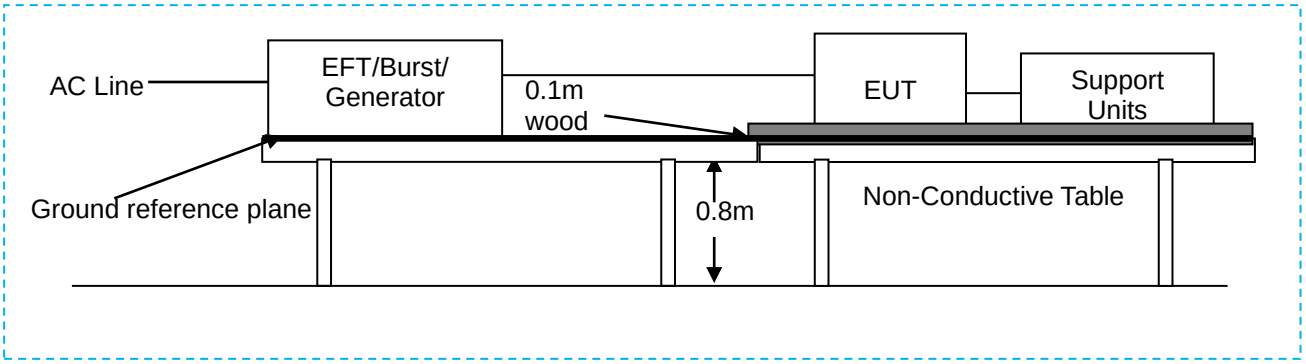
14.6 TEST RESULTS

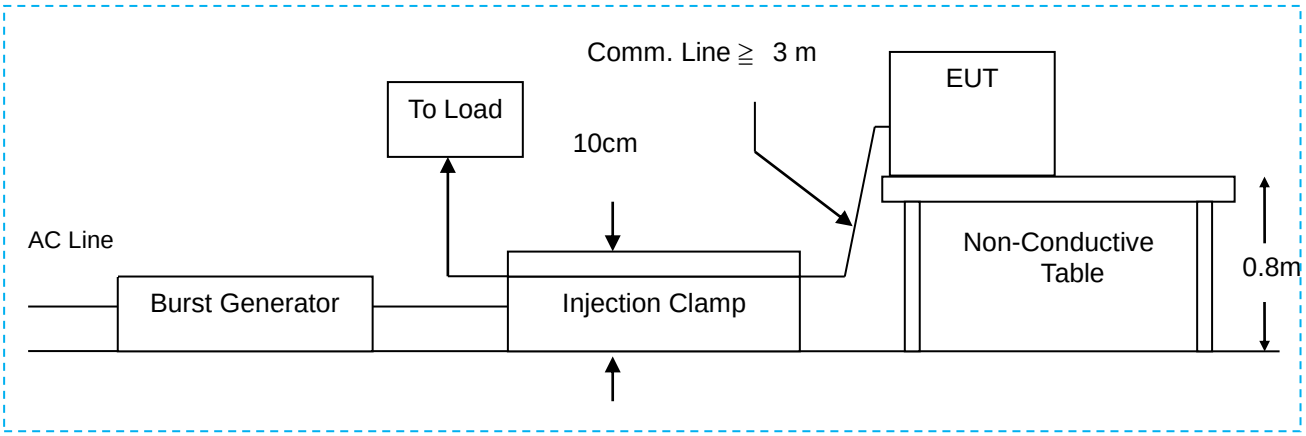
PASS.

All of the Configurations were tested,
the data of the worst case are recorded in the appendix A.

15 FAST TRANSIENTS, COMMON MODE

15.1 BLOCK DIAGRAM OF TEST SETUP





15.2 TEST STANDARD

According to ETSI EN 301 489-1 Clause 9.4 and EN 61000-4-4

15.3 SEVERITY LEVELS AND PERFORMANCE CRITERION

15.3.1 SEVERITY LEVEL

Open Circuit Output Test Voltage ±10%		
Level	On Power Supply Lines	On I/O (Input/Output) Signal data and control lines
1	0.5 kV	0.25 kV
2	1 kV	0.5 kV
3	2 kV	1 kV
4	4 kV	2 kV
X	Special	Special

15.3.2 Performance criterion

☐ CT	☒ TT	☐ CR	☒ TR

15.4 OPERATING CONDITION OF EUT

Operating Condition of EUT are listed in section 4.4.

15.5 TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.4.2 and EN 61000-4-4 for the measurement methods.

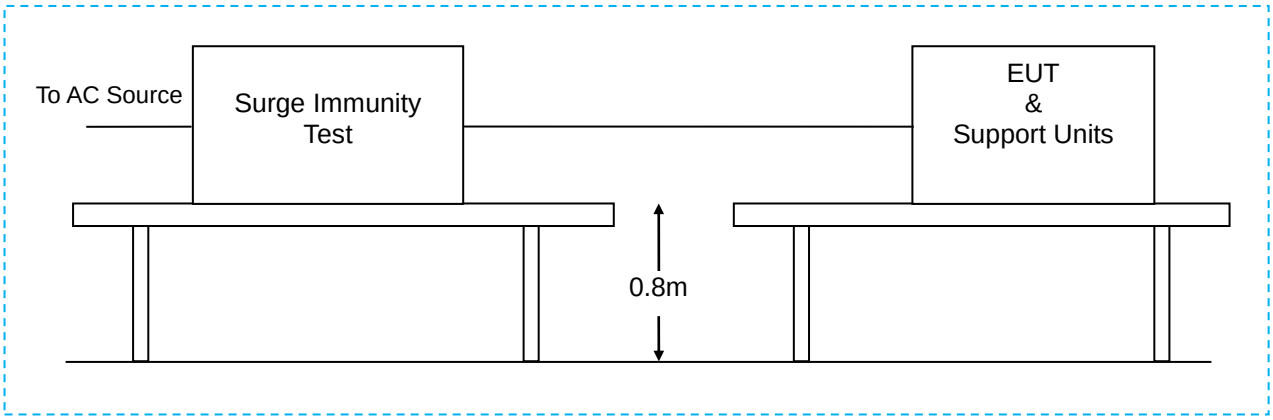
15.6 TEST RESULTS

PASS.

All of the Configurations were tested,
the data of the worst case are recorded in the appendix A.

16 SURGE

16.1 BLOCK DIAGRAM OF TEST SETUP



16.2 TEST STANDARD

According to ETSI EN 301 489-1 Clause 9.8 and EN 61000-4-5

16.3 SEVERITY LEVELS AND PERFORMANCE CRITERION

16.3.1 SEVERITY LEVEL

Severity Level	Open-Circuit Test Voltage kV
1	0.5
2	1.0
3	2.0
4	4.0
*	Special

16.3.2 PERFORMANCE CRITERION

☐ CT	☒ TT	☐ CR	☒ TR

16.4 OPERATING CONDITION OF EUT

Operating Condition of EUT are listed in section 4.4.

16.5 TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.8.2 and EN 61000-4-5 for the measurement methods.

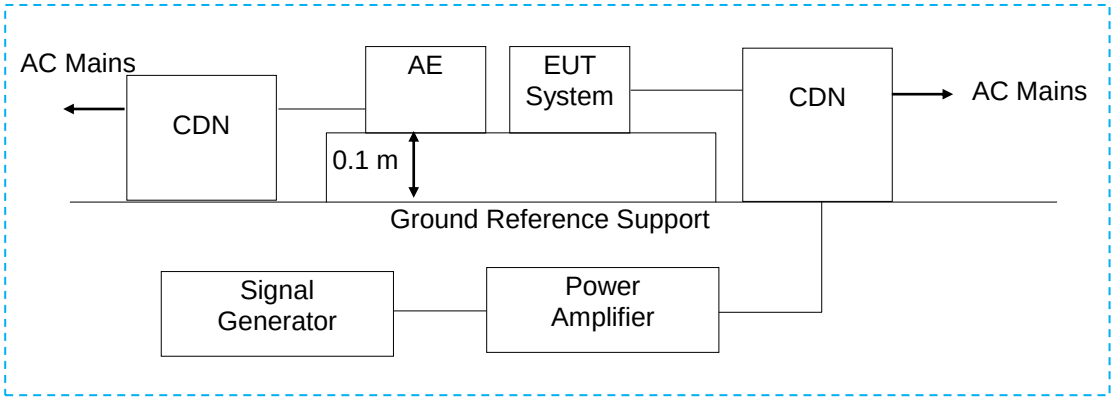
16.6 TEST RESULTS

PASS.

All of the Configurations were tested,
the data of the worst case are recorded in the appendix A.

17 RADIO FREQUENCY, COMMON MODE

17.1 BLOCK DIAGRAM OF TEST SETUP



17.2 TEST STANDARD

According to ETSI EN 301 489-1 Clause 9.5 and EN 61000-4-6

17.3 SEVERITY LEVELS AND PERFORMANCE CRITERION

17.3.1 Severity level

Level	Field Strength V
1	1
2	3
3	10
X	Special

17.3.2 Performance criterion

☒ CT	☐ TT	☒ CR	☐ TR

17.4 OPERATING CONDITION OF EUT

Operating Condition of EUT are listed in section 4.4.

17.5 TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.5.2 and EN 61000-4-6 for the measurement methods.

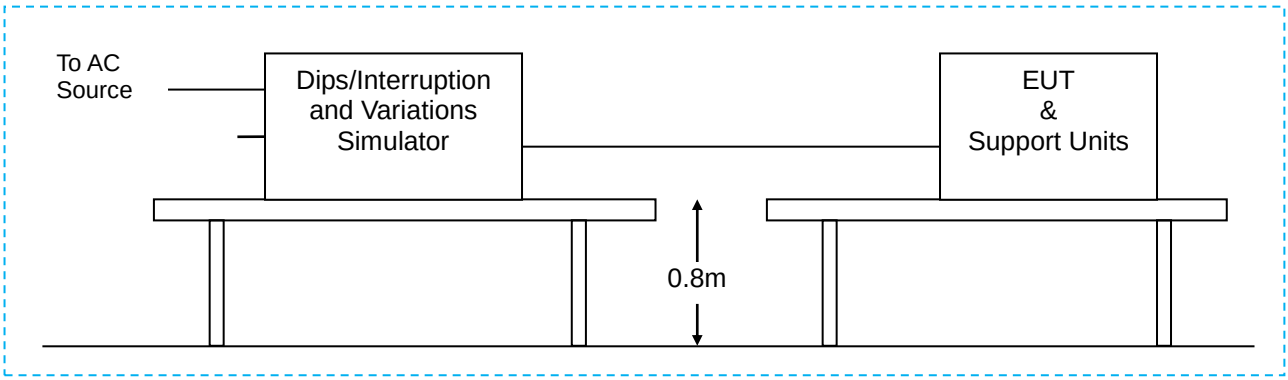
17.6 TEST RESULTS

PASS.

All of the Configurations were tested,
the data of the worst case are recorded in the appendix A.

18 VOLTAGE DIPS AND INTERRUPTIONS

18.1BLOCK DIAGRAM OF TEST SETUP



18.2 TEST STANDARD

According to ETSI EN 301 489-1 Clause 9.7 and EN 61000-4-11

18.3 SEVERITY LEVELS AND PERFORMANCE CRITERION

18.3.1 SEVERITY LEVEL

Test Level %UT	Voltage dip and short interruptions %UT	Duration (in period)	Performance criterion
0	100	0.5	B
0	100	1	B
70	30	25	C
0	100	250	C

18.3.2 Performance criterion

☐ CT	☒ TT	☐ CR	☒ TR

18.4 OPERATING CONDITION OF EUT

Operating Condition of EUT are listed in section 4.4.

18.5 TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.7.2 and EN 61000-4-11 for the measurement methods.

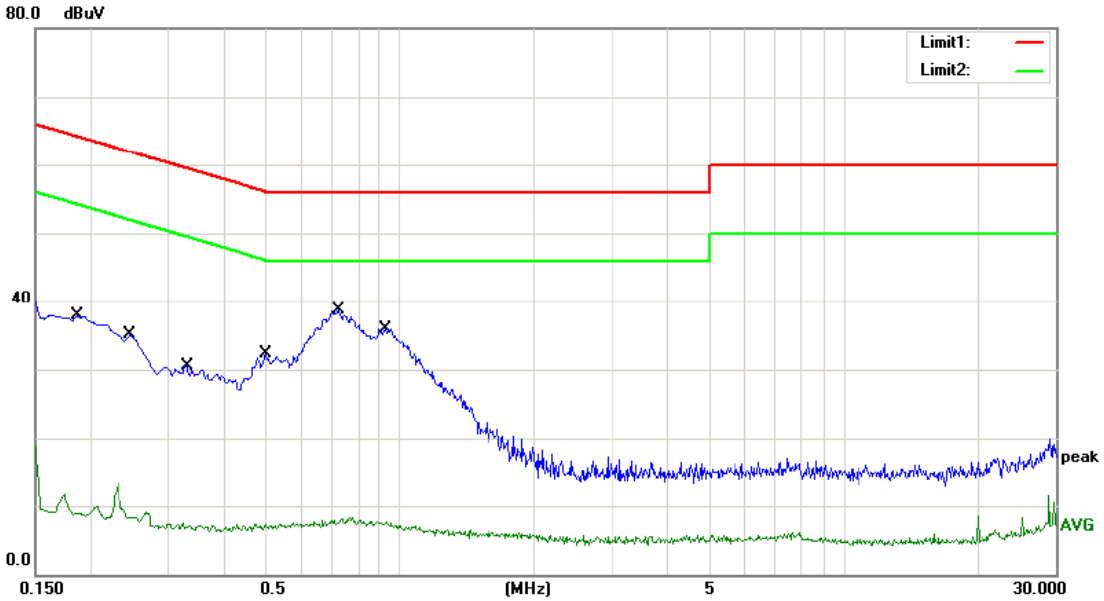
18.6 TEST RESULTS

PASS.

All of the Configurations were tested,
the data of the worst case are recorded in the appendix A.

19 APPENDIX A TEST DATA

19.1 WORST DATA FOR CONDUCTED EMISSIONS FROM THE AC MAINS POWER PORTS(BT LINK)



Site site #1 Phase: *L1* Temperature: 24

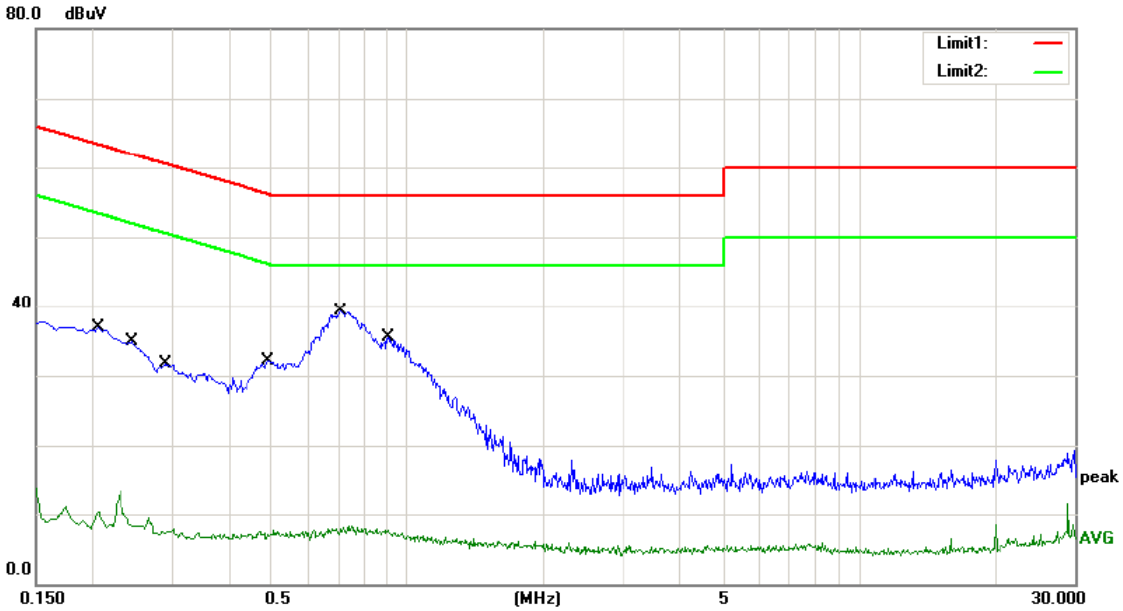
Limit: (CE)EN301489 Power: AC 230V/50Hz Humidity: 55 %

Mode: BT Link

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1860	25.44	9.79	35.23	64.21	-28.98	QP	
2		0.1860	-0.86	9.79	8.93	54.21	-45.28	AVG	
3		0.2460	23.30	9.80	33.10	61.89	-28.79	QP	
4		0.2460	-1.42	9.80	8.38	51.89	-43.51	AVG	
5		0.3300	18.29	9.81	28.10	59.45	-31.35	QP	
6		0.3300	-2.73	9.81	7.08	49.45	-42.37	AVG	
7		0.4980	20.26	9.84	30.10	56.03	-25.93	QP	
8		0.4980	-2.65	9.84	7.19	46.03	-38.84	AVG	
9	*	0.7220	26.36	9.84	36.20	56.00	-19.80	QP	
10		0.7220	-2.24	9.84	7.60	46.00	-38.40	AVG	
11		0.9260	23.66	9.84	33.50	56.00	-22.50	QP	
12		0.9260	-2.44	9.84	7.40	46.00	-38.60	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator: washington



Site site #1 Phase: N Temperature: 24

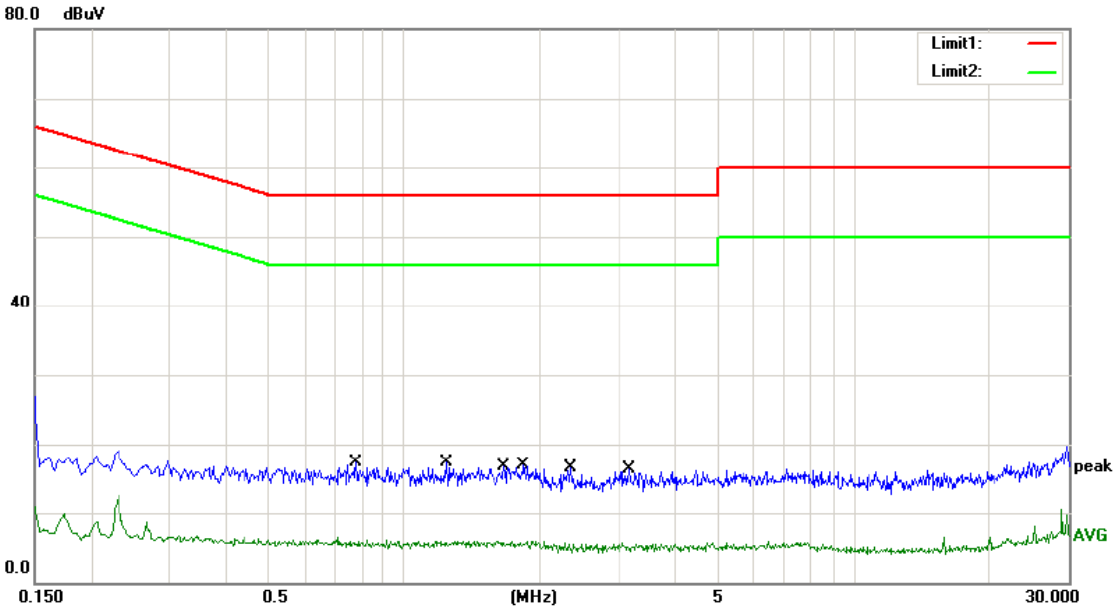
Limit: (CE)EN301489 Power: AC 230V/50Hz Humidity: 55 %

Mode: BT Link

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2060	22.86	9.79	32.65	63.37	-30.72	QP	
2		0.2060	0.52	9.79	10.31	53.37	-43.06	AVG	
3		0.2460	21.70	9.80	31.50	61.89	-30.39	QP	
4		0.2460	-1.39	9.80	8.41	51.89	-43.48	AVG	
5		0.2900	18.20	9.80	28.00	60.52	-32.52	QP	
6		0.2900	-2.51	9.80	7.29	50.52	-43.23	AVG	
7		0.4900	20.26	9.84	30.10	56.17	-26.07	QP	
8		0.4900	-2.97	9.84	6.87	46.17	-39.30	AVG	
9	*	0.7060	27.26	9.84	37.10	56.00	-18.90	QP	
10		0.7060	-2.04	9.84	7.80	46.00	-38.20	AVG	
11		0.9060	23.36	9.84	33.20	56.00	-22.80	QP	
12		0.9060	-2.18	9.84	7.66	46.00	-38.34	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator: washington



Site site #1 Phase: *L1* Temperature: 24

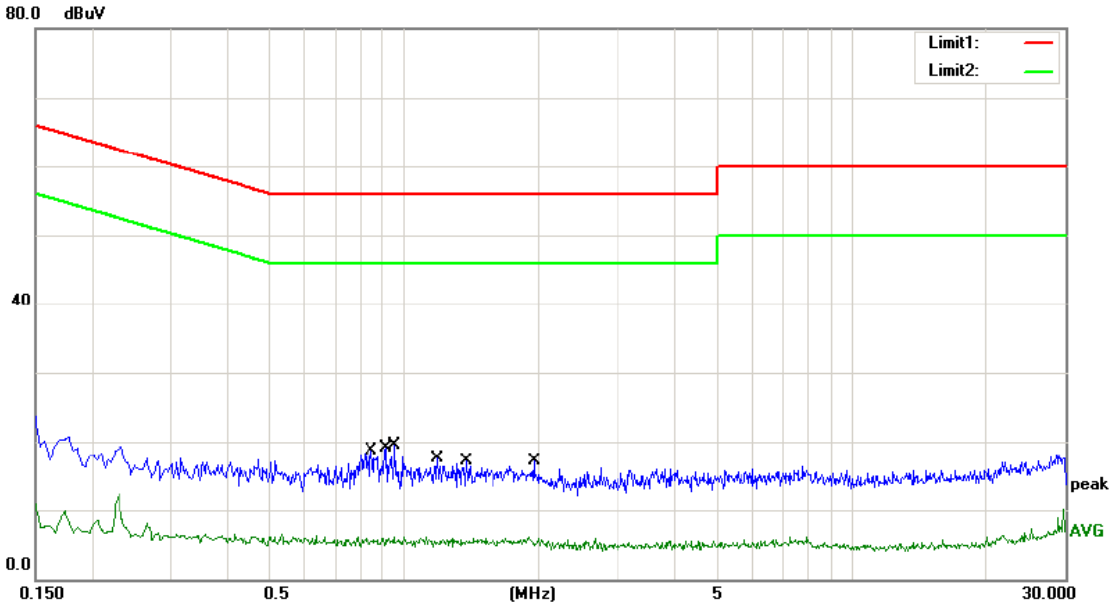
Limit: (CE)EN301489 Power: AC 120V/60Hz Humidity: 55 %

Mode: BT Link

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.7780	5.36	9.84	15.20	56.00	-40.80	QP	
2		0.7780	-4.30	9.84	5.54	46.00	-40.46	AVG	
3		1.2380	5.46	9.84	15.30	56.00	-40.70	QP	
4		1.2380	-4.34	9.84	5.50	46.00	-40.50	AVG	
5		1.6700	4.36	9.84	14.20	56.00	-41.80	QP	
6	*	1.6700	-4.15	9.84	5.69	46.00	-40.31	AVG	
7		1.8460	5.16	9.84	15.00	56.00	-41.00	QP	
8		1.8460	-4.26	9.84	5.58	46.00	-40.42	AVG	
9		2.3340	4.46	9.84	14.30	56.00	-41.70	QP	
10		2.3340	-5.46	9.84	4.38	46.00	-41.62	AVG	
11		3.1580	4.05	9.85	13.90	56.00	-42.10	QP	
12		3.1580	-5.19	9.85	4.66	46.00	-41.34	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator: washington



Site site #1 Phase: N Temperature: 24

Limit: (CE)EN301489 Power: AC 120V/60Hz Humidity: 55 %

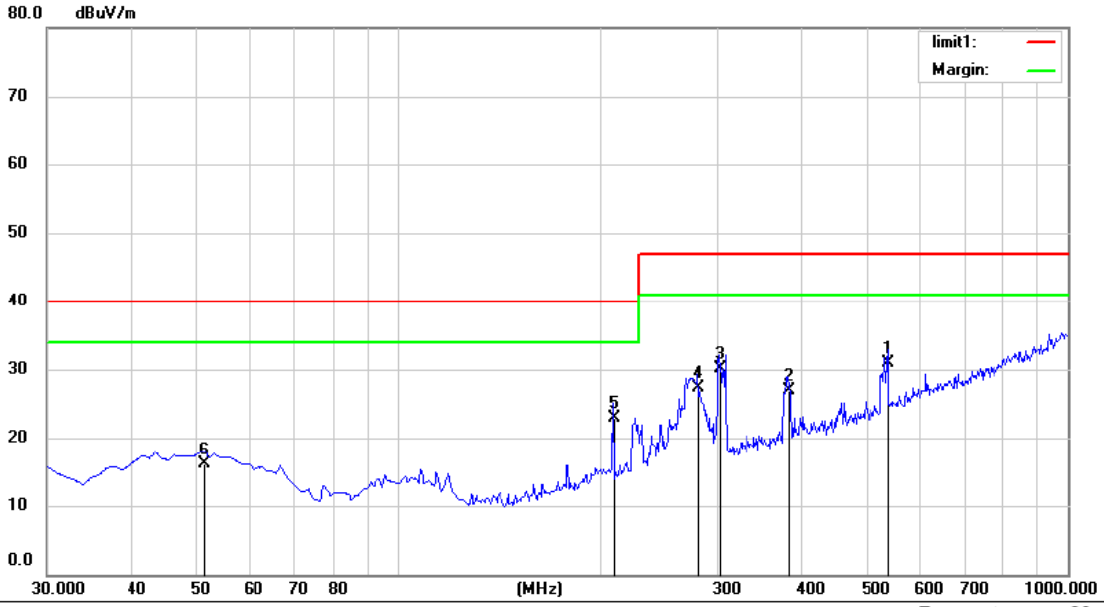
Mode: BT Link

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.8460	6.46	9.84	16.30	56.00	-39.70	QP	
2		0.8460	-4.33	9.84	5.51	46.00	-40.49	AVG	
3		0.9180	6.96	9.84	16.80	56.00	-39.20	QP	
4		0.9180	-4.64	9.84	5.20	46.00	-40.80	AVG	
5	*	0.9580	7.66	9.84	17.50	56.00	-38.50	QP	
6		0.9580	-4.46	9.84	5.38	46.00	-40.62	AVG	
7		1.1900	5.48	9.84	15.32	56.00	-40.68	QP	
8		1.1900	-4.67	9.84	5.17	46.00	-40.83	AVG	
9		1.3780	5.36	9.84	15.20	56.00	-40.80	QP	
10		1.3780	-4.77	9.84	5.07	46.00	-40.93	AVG	
11		1.9500	5.16	9.84	15.00	56.00	-41.00	QP	
12		1.9500	-4.82	9.84	5.02	46.00	-40.98	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator: washington

19.2WORST DATA FOR RADIATED EMISSIONS(BT LINK)



Site Chamber #1 Polarization: ***Horizontal*** Temperature: 26

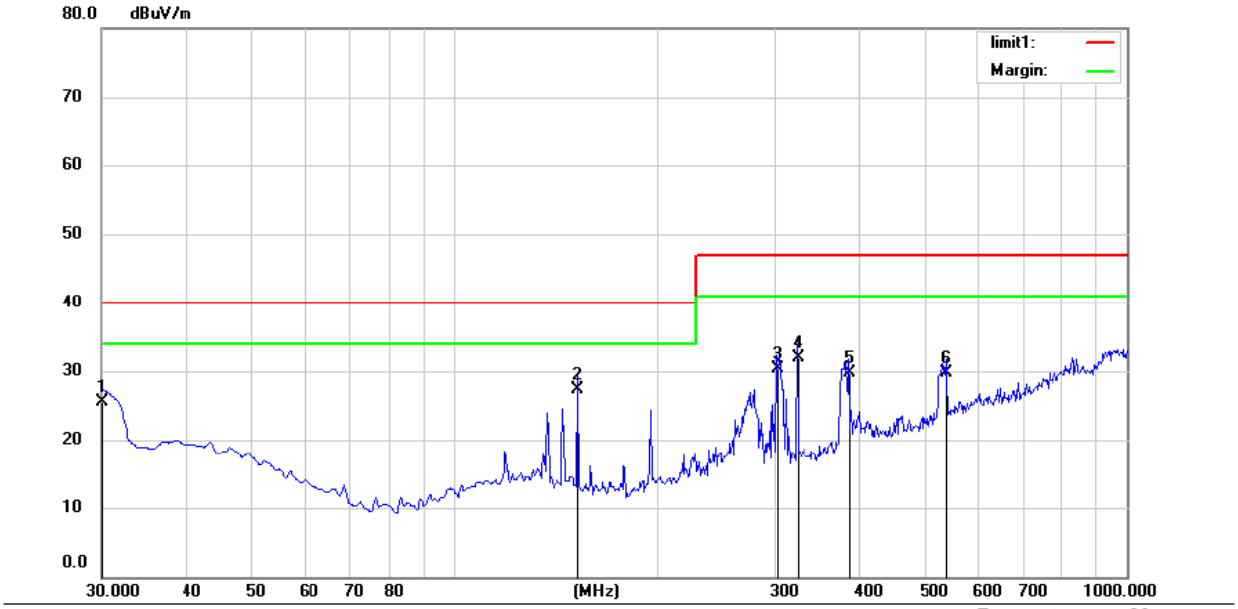
Limit: (RE)EN301489_3m Power: AC 230V/50Hz Humidity: 55 %

Mode:BT Link

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	540.2200	38.90	-8.00	30.90	47.00	-16.10	QP			
2		383.0800	38.21	-11.29	26.92	47.00	-20.08	QP			
3		301.6000	44.05	-13.91	30.14	47.00	-16.86	QP			
4		280.2600	41.98	-14.62	27.36	47.00	-19.64	QP			
5		209.4500	40.43	-17.43	23.00	40.00	-17.00	QP			
6		51.3400	31.73	-15.59	16.14	40.00	-23.86	QP			

*:Maximum data x:Over limit !:over margin Operator: Lin



Site Chamber #1 Polarization: ***Vertical*** Temperature: 26

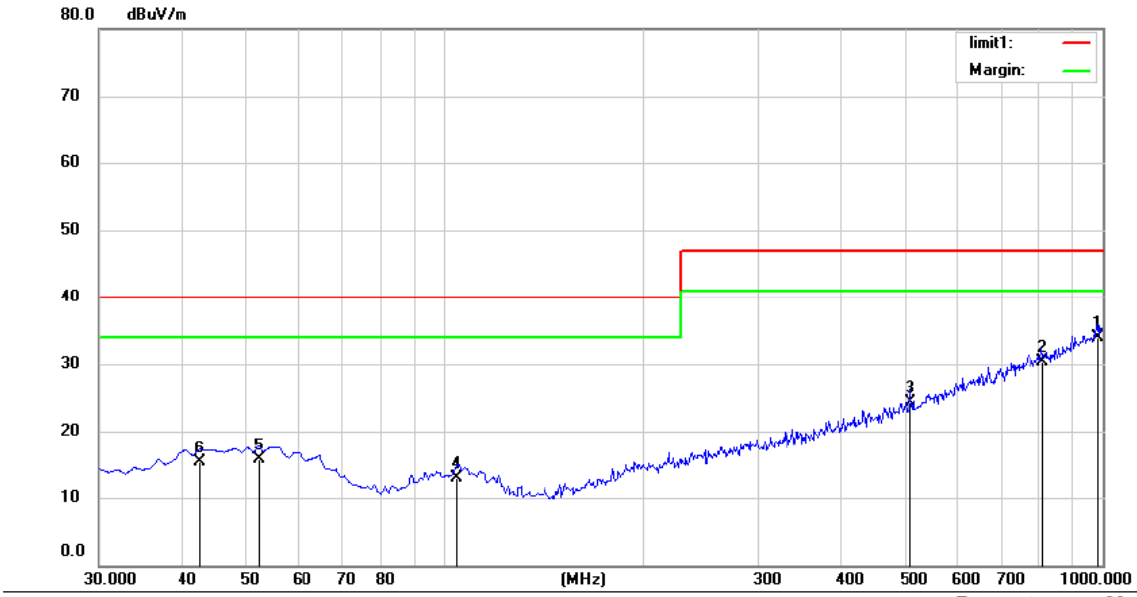
Limit: (RE)EN301489_3m Power: AC 230V/50Hz Humidity: 55 %

Mode:BT Link

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		30.0000	40.88	-15.36	25.52	40.00	-14.48	QP			
2	*	153.1900	46.09	-18.82	27.27	40.00	-12.73	QP			
3		301.6000	45.26	-14.93	30.33	47.00	-16.67	QP			
4		323.9100	45.51	-13.61	31.90	47.00	-15.10	QP			
5		386.9600	41.64	-11.87	29.77	47.00	-17.23	QP			
6		540.2200	38.13	-8.49	29.64	47.00	-17.36	QP			

*:Maximum data x:Over limit I:over margin Operator: Lin



Site Chamber #1 Polarization: ***Horizontal*** Temperature: 26

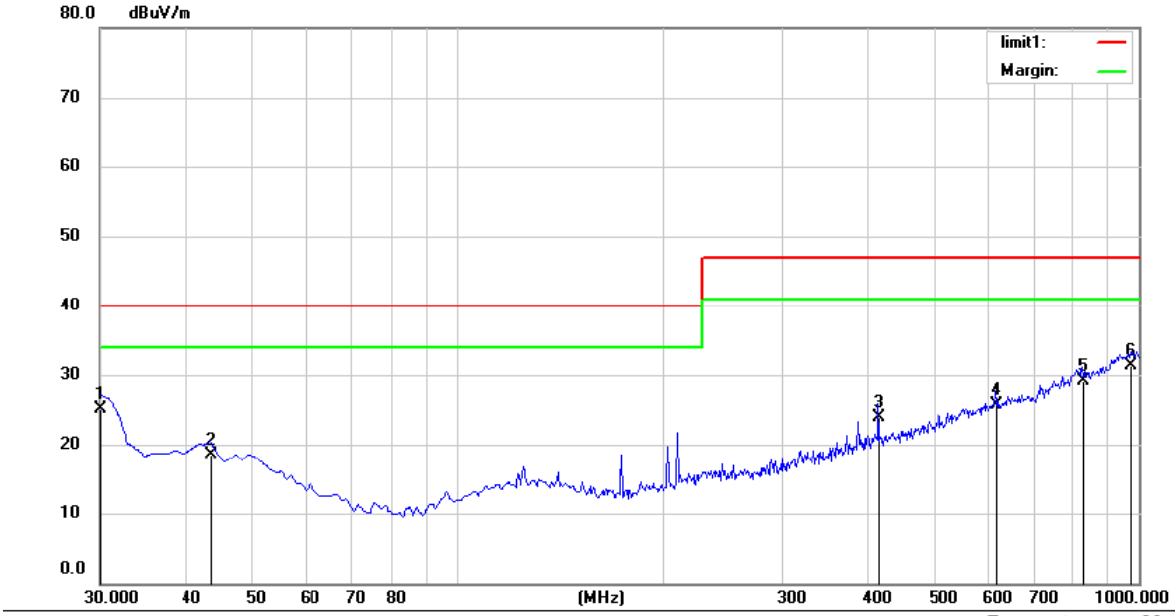
Limit: (RE)EN301489_3m Power: AC 120V/60Hz Humidity: 55 %

Mode:BT Link

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	982.5400	32.46	1.38	33.84	47.00	-13.16	QP			
2		808.9100	32.64	-2.38	30.26	47.00	-16.74	QP			
3		510.1500	32.92	-8.68	24.24	47.00	-22.76	QP			
4		104.9031	31.09	-18.18	12.91	40.00	-27.09	QP			
5		52.3100	31.31	-15.62	15.69	40.00	-24.31	QP			
6		42.7494	31.29	-16.07	15.22	40.00	-24.78	QP			

*:Maximum data x:Over limit !:over margin Operator: Lin



Site Chamber #1 Polarization: ***Vertical*** Temperature: 26

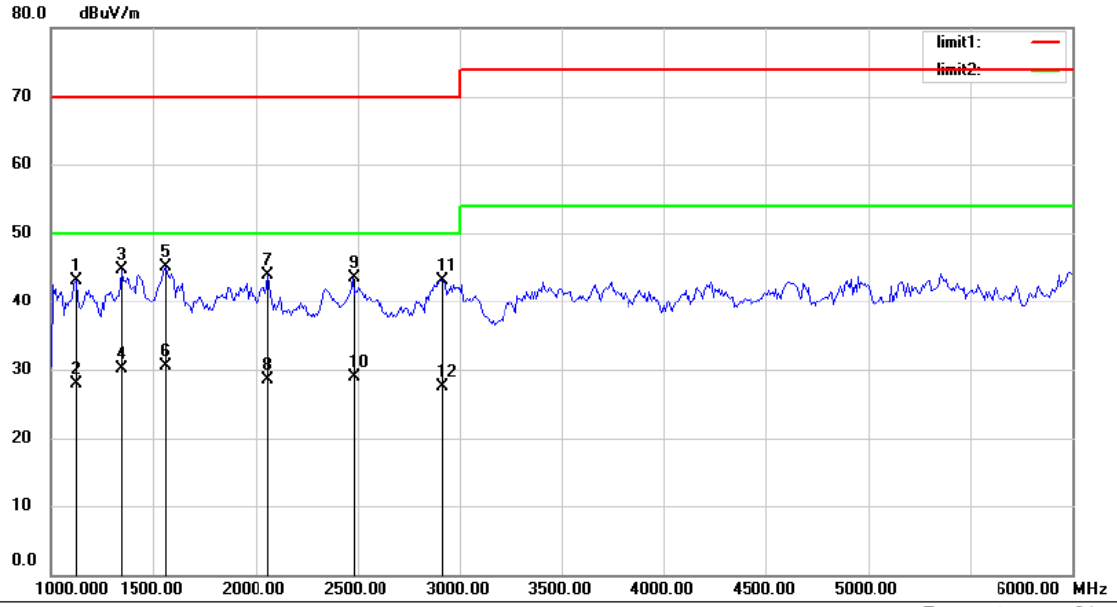
Limit: (RE)EN301489_3m Power: AC 120V/60Hz Humidity: 55 %

Mode: BT Link

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	30.0000	40.50	-15.36	25.14	40.00	-14.86	QP			
2		43.5800	32.34	-13.86	18.48	40.00	-21.52	QP			
3		416.0600	35.04	-11.21	23.83	47.00	-23.17	QP			
4		617.8200	32.94	-7.23	25.71	47.00	-21.29	QP			
5		830.2500	32.32	-3.15	29.17	47.00	-17.83	QP			
6		973.8100	31.97	-0.67	31.30	47.00	-15.70	QP			

*:Maximum data x:Over limit !:over margin Operator: Lin



Site Chamber #1 Polarization: ***Horizontal*** Temperature: 24

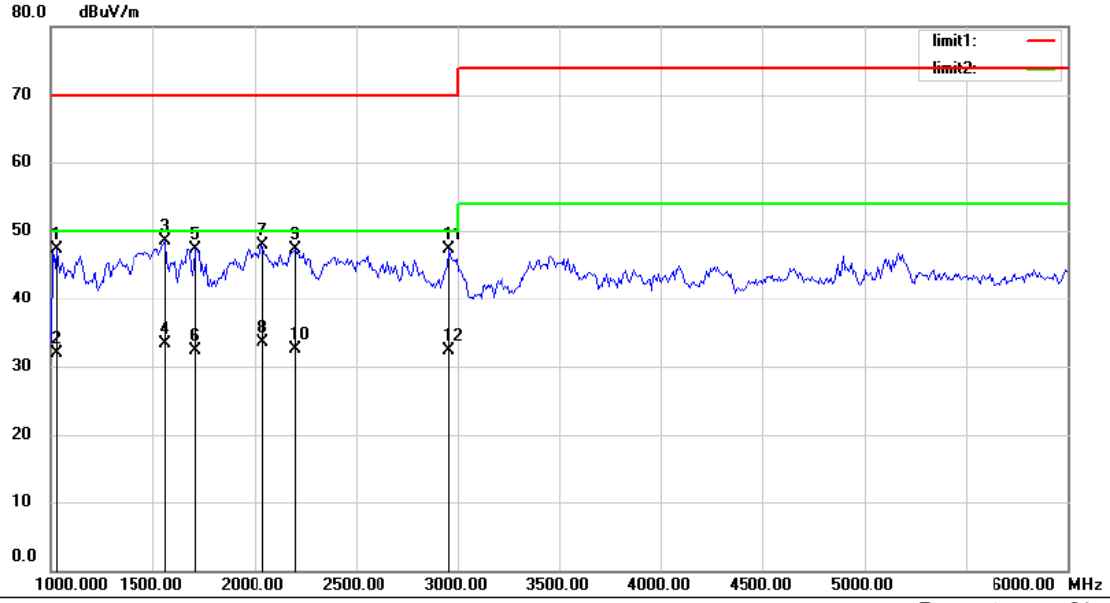
Limit: (RE)EN301489_3m_PEAK Power: AC 230V/50Hz Humidity: 55 %

Mode:BT Link

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		1120.192	56.06	-13.02	43.04	70.00	-26.96	peak			
2		1120.192	41.02	-13.02	28.00	50.00	-22.00	AVG			
3		1344.551	56.41	-11.80	44.61	70.00	-25.39	peak			
4		1344.551	41.89	-11.80	30.09	50.00	-19.91	AVG			
5		1560.897	57.07	-12.04	45.03	70.00	-24.97	peak			
6	*	1560.897	42.45	-12.04	30.41	50.00	-19.59	AVG			
7		2065.705	53.79	-9.89	43.90	70.00	-26.10	peak			
8		2065.705	38.46	-9.89	28.57	50.00	-21.43	AVG			
9		2474.359	52.09	-8.67	43.42	70.00	-26.58	peak			
10		2474.359	37.58	-8.67	28.91	50.00	-21.09	AVG			
11		2915.064	50.52	-7.43	43.09	70.00	-26.91	peak			
12		2915.064	35.03	-7.43	27.60	50.00	-22.40	AVG			

*:Maximum data x:Over limit !:over margin Operator: Lin



Site Chamber #1 Polarization: *Vertical* Temperature: 24

Limit: (RE)EN301489_3m_PEAK Power: AC 230V/50Hz Humidity: 55 %

Mode: BT Link

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		1032.051	60.51	-13.30	47.21	70.00	-22.79	peak			
2		1032.051	45.26	-13.30	31.96	50.00	-18.04	AVG			
3		1560.897	60.57	-12.04	48.53	70.00	-21.47	peak			
4		1560.897	45.25	-12.04	33.21	50.00	-16.79	AVG			
5		1713.141	59.31	-11.95	47.36	70.00	-22.64	peak			
6		1713.141	44.34	-11.95	32.39	50.00	-17.61	AVG			
7		2033.654	58.16	-10.21	47.95	70.00	-22.05	peak			
8	*	2033.654	43.79	-10.21	33.58	50.00	-16.42	AVG			
9		2201.923	55.72	-8.51	47.21	70.00	-22.79	peak			
10		2201.923	41.02	-8.51	32.51	50.00	-17.49	AVG			
11		2955.128	54.66	-7.40	47.26	70.00	-22.74	peak			
12		2955.128	39.62	-7.40	32.22	50.00	-17.78	AVG			

*:Maximum data x:Over limit !:over margin Operator: Lin

19.3DATA FOR VOLTAGE FLUCTUATIONS & FLICKER TESTS

Test Report

Report title:	Harmonic
Company Name:	EMTEK
Date of test:	9:00 30.Aug 2017
Tester:	Alan
Standard used:	EN/IEC 61000-3-3 Flicker
Short time (Pst):	10 min
Observation time:	10 min (1 Flicker measurement)
Flickermeter:	230V / 50Hz
Flicker Impedance:	Zref (IEC 60725)
Customer:	HAYA LIGHT EQUIPMENT LIMITED COMPANY.
E. U. T.:	W-Bridge

Test Result	PASS

Maximum Flicker results

	EUT values	**Limit**	**Result**
Pst	0.028	1.00	PASS
Plt	0.028	0.65	PASS
dc [%]	0.005	3.30	PASS
dmax [%]	0.071	4.00	PASS
dt [s]	0.000	0.50	PASS

19.4DATA FOR ELECTROSTATIC DISCHARGE

Electrostatic Discharge Test Results

Applicant	HAYA LIGHT EQUIPMENT LIMITED COMPANY		
EUT	W-Bridge	Test Date	August 30, 2017
M/N	W-Bridge	Temperature	22℃
Power Supply	AC 230V/50Hz	Humidity	50%
Air discharge	±2.0, ± 4.0 kV, ± 8.0kV	Test engineer	CSL
Contact discharge	± 2.0, ± 4.0kV	Criterion	TT&TR
Test Mode	BT LINK, BT IDLE		

Location	**Kind** A-Air Discharge C-Contact Discharge	**Result**
Port	A,C	CT&CR
Slot	A	CT&CR
HCP of front, rear, left, right	C	CT&CR
VCP of front, rear, left, right	C	CT&CR

Note: N/A

19.5DATA FOR RADIO FREQUENCY ELECTROMAGNETIC FIELD

Radio-Frequency, Electromagnetic Field Test Results Test Results

Applicant	HAYA LIGHT EQUIPMENT LIMITED COMPANY		
EUT	W-Bridge	Test Date	August 29, 2017
M/N	W-Bridge	Temperature	22℃
Field Strength	3 V/m	Humidity	50%
Power Supply	AC 230V/50Hz	Criterion	CT&CR
Test engineer	CSL	Frequency Range	80MHz to 6000MHz
Modulation	☐ None	☐Pulse	☒ AM 1kHz 80%
Steps	1%		
Test Mode	BT LINK, BT IDLE		

	Horizontal	Vertical	Horizontal	Vertical
Front	CT&CR	CT&CR		
Right	CT&CR	CT&CR		
Rear	CT&CR	CT&CR		
Left	CT&CR	CT&CR		

Note:

19.6DATA FOR FAST TRANSIENTS, COMMON MODE

Fast Transients, Common Mode Test Results

Applicant	HAYA LIGHT EQUIPMENT LIMITED COMPANY		
EUT	W-Bridge	Test Date	August 30, 2017
M/N	W-Bridge	Temperature	22℃
Input Voltage	AC 230V/50Hz	Humidity	58%
Test Engineer	CSL	Criterion	TT&TR
Line : ☒ AC Mains ☐ DC Line		Line : ☒ Signal ☐ I/O Cable	
Coupling : ☒ Direct		Coupling : ☒ Capacitive	
Test Time : 120s			
OperationMode	BT LINK, BT IDLE		

Line	Test Voltage	Result(+)	Result(-)
☒L	0.5/1kV	CT&CR	CT&CR
☒N	0.5/1kV	CT&CR	CT&CR
☒PE	0.5/1kV	CT&CR	CT&CR
☒L、N	0.5/1kV	CT&CR	CT&CR
☒L、PE	0.5/1kV	CT&CR	CT&CR
☒N、PE	0.5/1kV	CT&CR	CT&CR
☒L、N、PE	0.5/1kV	CT&CR	CT&CR
☐Signal Line	0.5kV		

Note:

19.7DATA FOR SURGE

Surge Test Results

Applicant	HAYA LIGHT EQUIPMENT LIMITED COMPANY		
EUT	W-Bridge	Test Date	August 30, 2017
M/N	W-Bridge	Temperature	22℃
Power Supply	AC 230V/50Hz	Humidity	50%
Test engineer	CSL	Criterion	TT&TR
Test Mode	BT LINK, BT IDLE		

Location	Polarity	Phase Angle	Number of Pulse	Pulse Voltage (kV)	Result
☒L-N	+	0°	5	0.5/1.0	CT&CR
	+	90°	5	0.5/1.0	CT&CR
	+	180°	5	0.5/1.0	CT&CR
	+	270°	5	0.5/1.0	CT&CR
	-	0°	5	0.5/1.0	CT&CR
	-	90°	5	0.5/1.0	CT&CR
	-	180°	5	0.5/1.0	CT&CR
	-	270°	5	0.5/1.0	CT&CR
☒L-PE	+	0°	5	1.0/2.0	CT&CR
	+	90°	5	1.0/2.0	CT&CR
	+	180°	5	1.0/2.0	CT&CR
	+	270°	5	1.0/2.0	CT&CR
	-	0°	5	1.0/2.0	CT&CR
	-	90°	5	1.0/2.0	CT&CR
	-	180°	5	1.0/2.0	CT&CR
	-	270°	5	1.0/2.0	CT&CR
☒N-PE	+	0°	5	1.0/2.0	CT&CR
	+	90°	5	1.0/2.0	CT&CR
	+	180°	5	1.0/2.0	CT&CR
	+	270°	5	1.0/2.0	CT&CR
	-	0°	5	1.0/2.0	CT&CR
	-	90°	5	1.0/2.0	CT&CR
	-	180°	5	1.0/2.0	CT&CR
	-	270°	5	1.0/2.0	CT&CR
☐Signal Line	+		5	0.5/1.0	
	-		5	0.5/1.0	

Note: * Means the network interrupt.

19.8DATA FOR RADIO FREQUENCY, COMMON MODE

Radio frequency, common mode Test Results

Applicant	HAYA LIGHT EQUIPMENT LIMITED COMPANY		
EUT	W-Bridge	Test Date	August 29, 2017
M/N	W-Bridge	Temperature	22℃
Power Supply	AC 230V/50Hz	Humidity	58%
Test Engineer	CSL	Criterion	TT&TR
Test Mode	BT LINK, BT IDLE		

Frequency Range (MHz)	Injected Position	Strength (Unmodulated)	Criterion	Result
0.15 ~ 80	☒AC Mains	3V	TT&TR	CT&CR
0.15 ~ 80	☐Signal line	3V	TT&TR	

Frequency Range (MHz)	Injected Position	Strength (Unmodulated)	Criterion	Result

Remark **:** 1. Modulation Signal**:**1kHz 80% AM	Note:

19.9DATA FOR VOLTAGE DIPS AND INTERRUPTIONS

Voltage Dips and Interruptions Test Results

Applicant	HAYA LIGHT EQUIPMENT LIMITED COMPANY		
EUT	W-Bridge	Test Date	August 29, 2017
M/N	W-Bridge	Temperature	22℃
Power Supply	AC 230V/50Hz	Humidity	50%
Test Engineer	CSL	Criterion	TT&TR
Test Mode	BT LINK, BT IDLE		

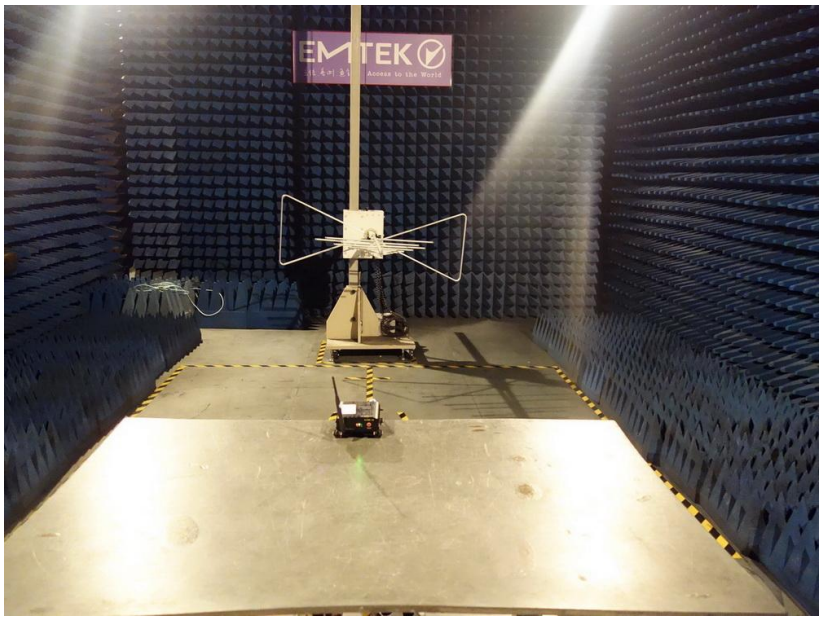
Test Level % U_T	Voltage Dips & Short Interruptions % U_T	Duration (in periods)	Phase Angle	Criterion TT&TR	Result
0	100	0.5P	0°-360°	TT&TR	CT&CR
0	100	1P	0°-360°	TT&TR	CT&CR
70	30	25P	0°-360°	TT&TR	CT&CR
0	100	250P	0°-360°	TT&TR	TT&TR

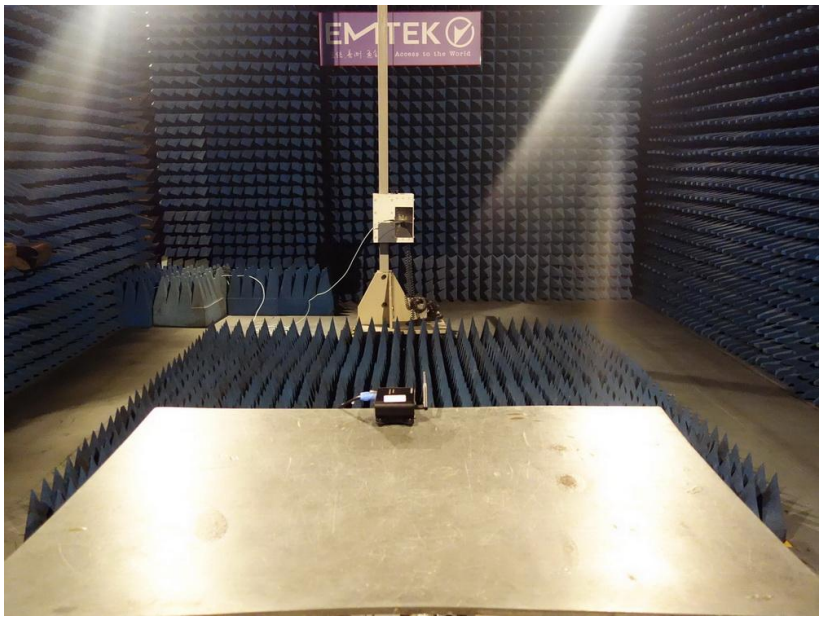
Note: * Means EUT Shut down, lost function. It should be recoverable by operator.

20 APPENDIX B PHOTOGRAPHS OF TEST SETUP

20.1 PHOTO FOR CONDUCTED EMISSIONS FROM THE AC MAINS POWER PORTS

20.2 PHOTO FOR RADIATED EMISSIONS

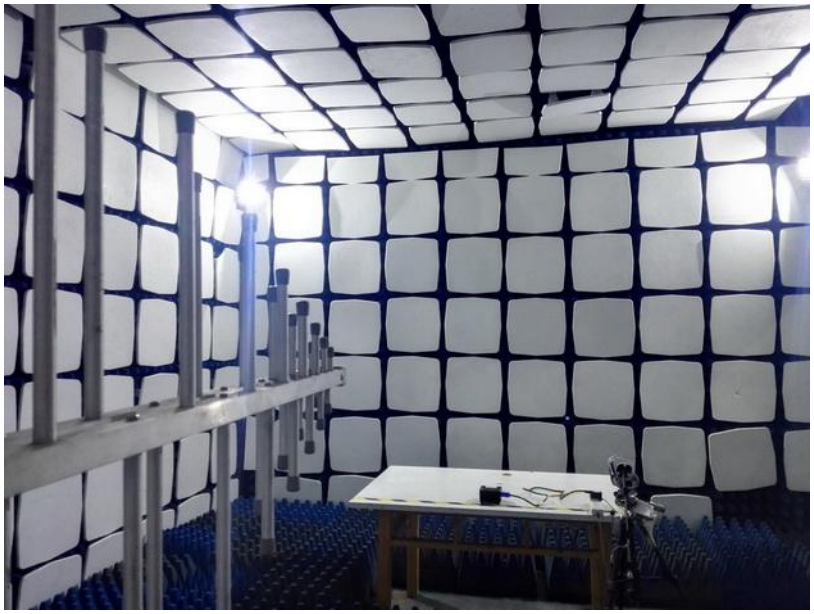




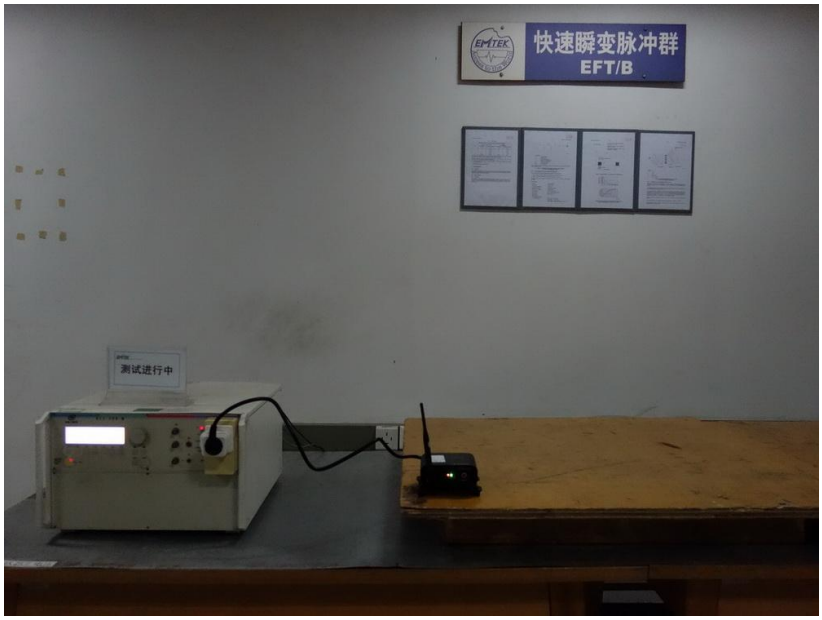
20.3 PHOTO FOR VOLTAGE FLUCTUATIONS & FLICKER TESTS

20.4PHOTO FOR ELECTROSTATIC DISCHARGE

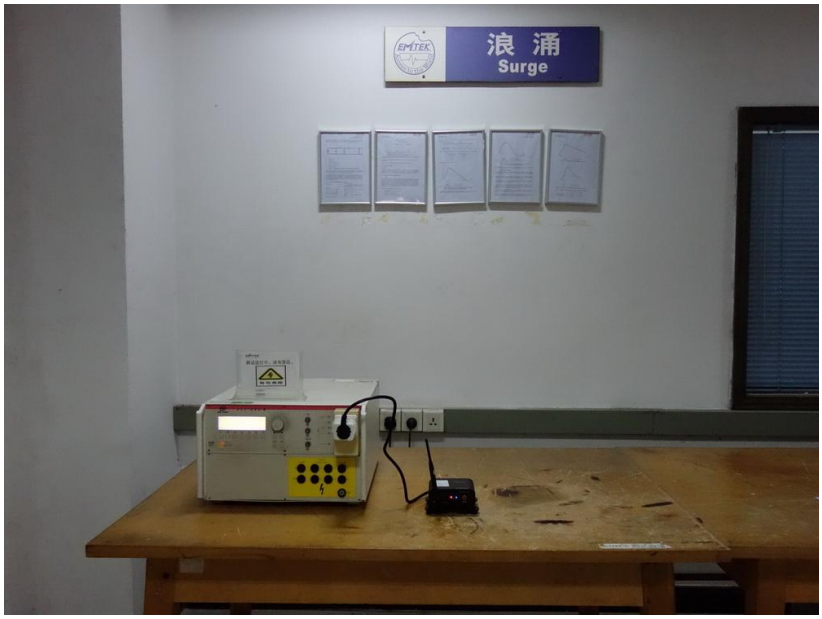
20.5PHOTO FOR RADIO FREQUENCY ELECTROMAGNETIC FIELD



20.6PHOTO FOR FAST TRANSIENTS, COMMON MODE



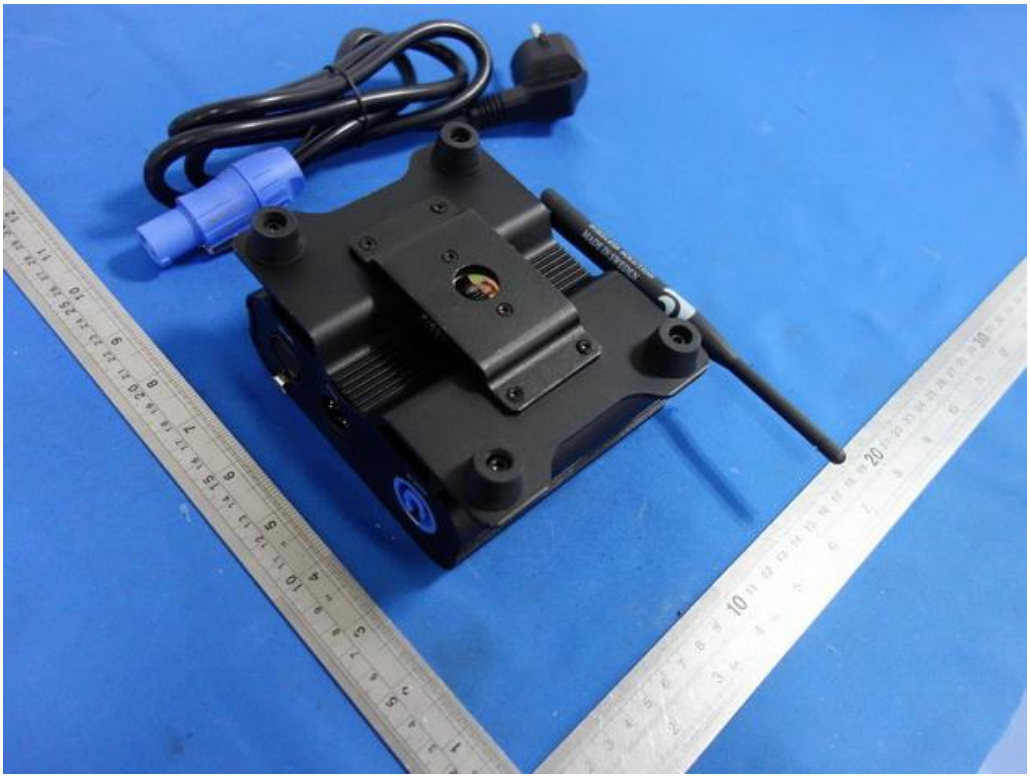
20.7PHOTO FOR SURGE



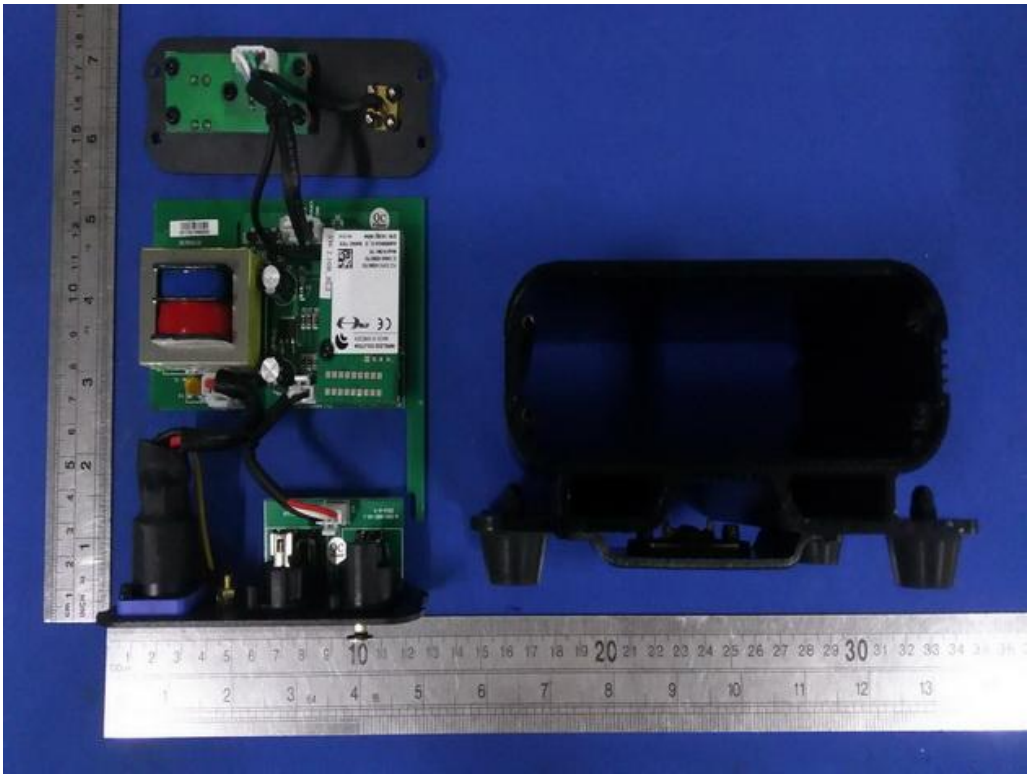
20.8PHOTO FOR RADIO FREQUENCY, COMMON MODE

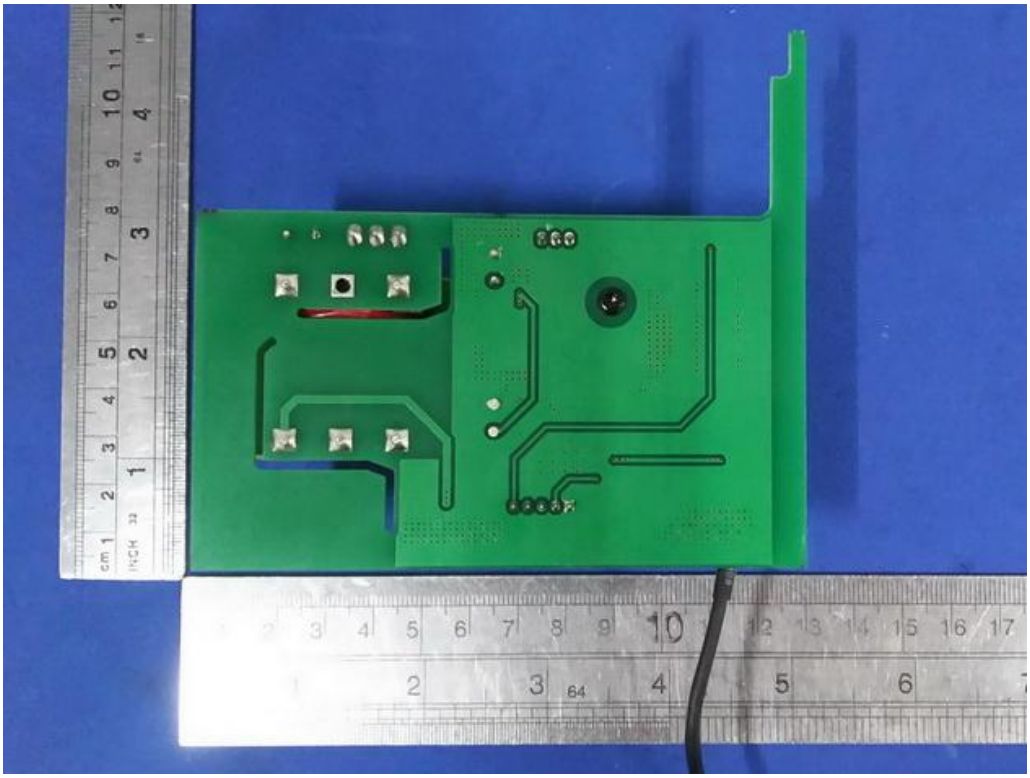
20.9PHOTO FOR VOLTAGE DIPS AND INTERRUPTIONS

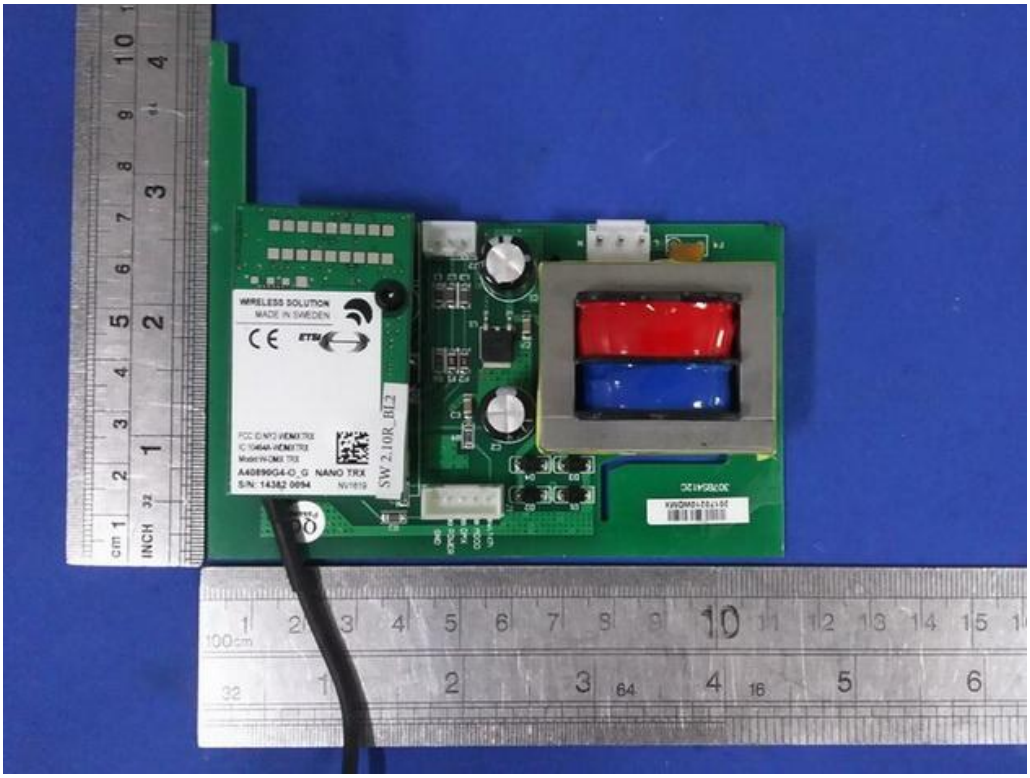
21 APPENDIX C PHOTOGRAPHS OF EUT

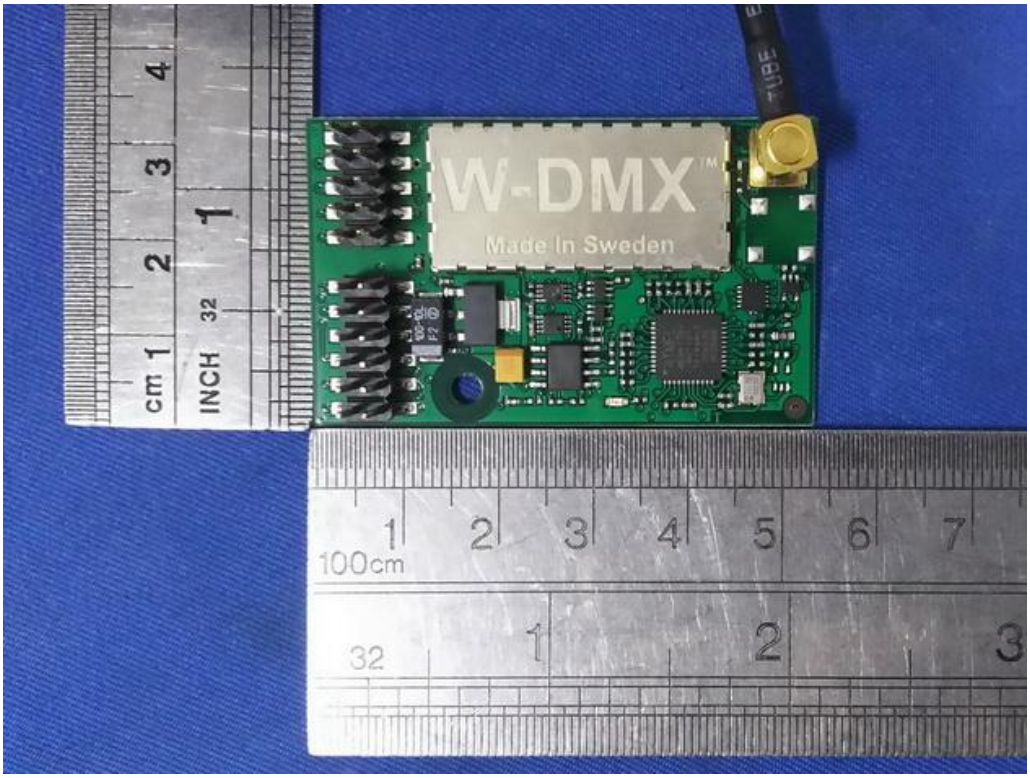


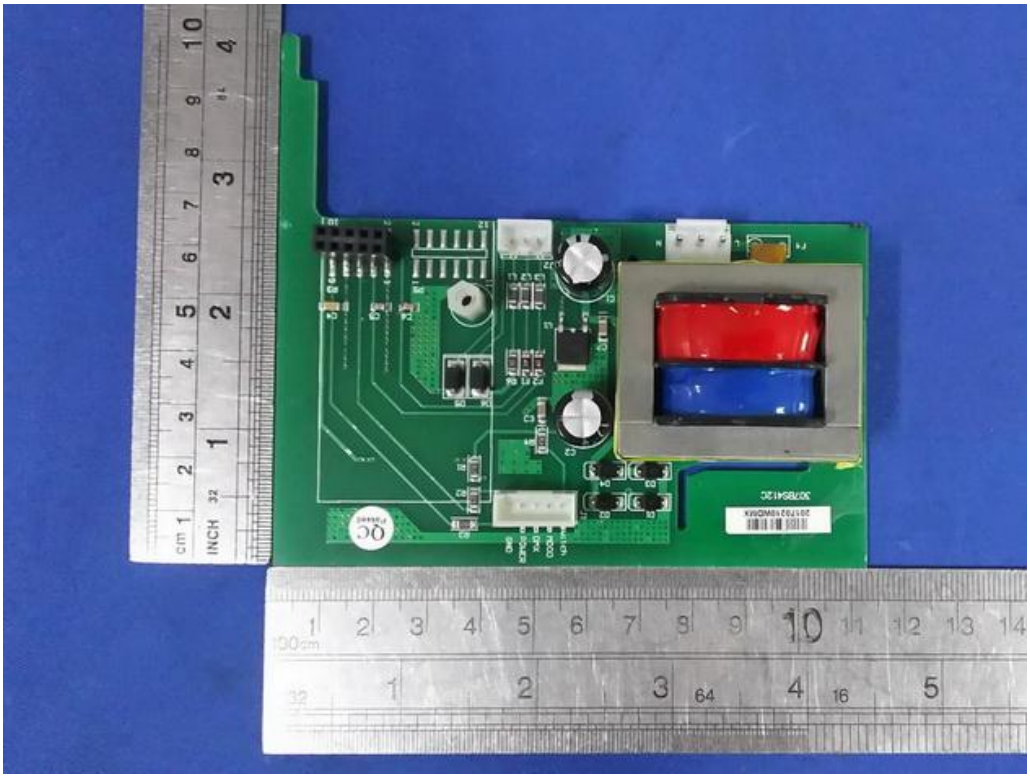

MAINS IN
DMX IN
DMX OUT

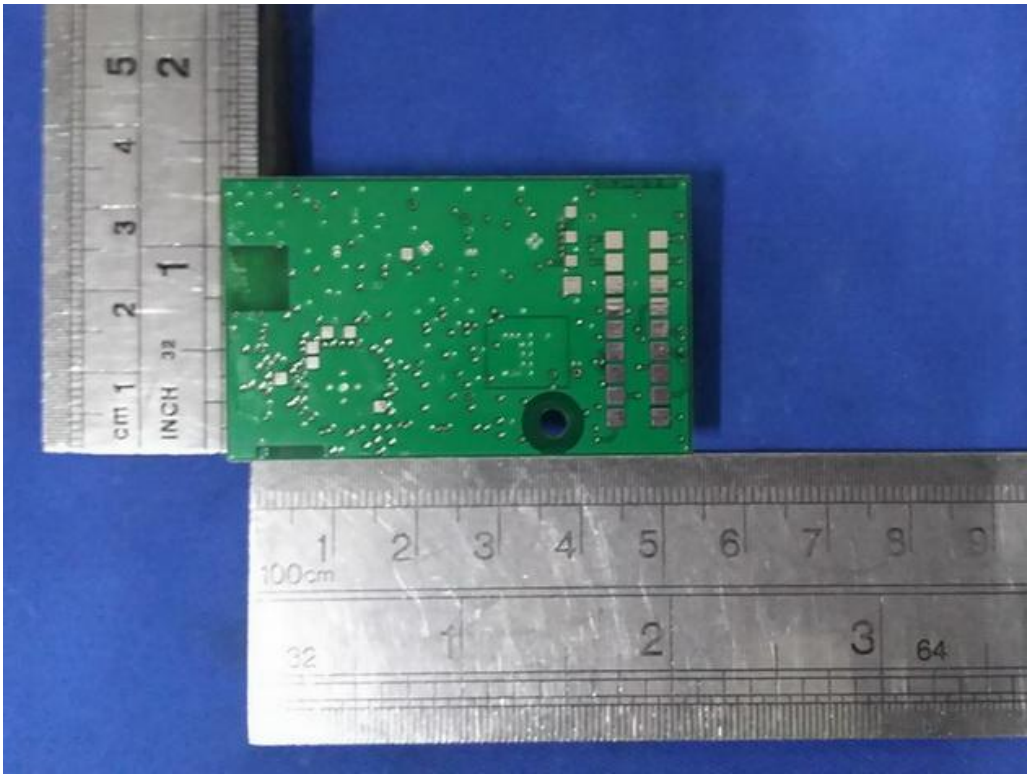


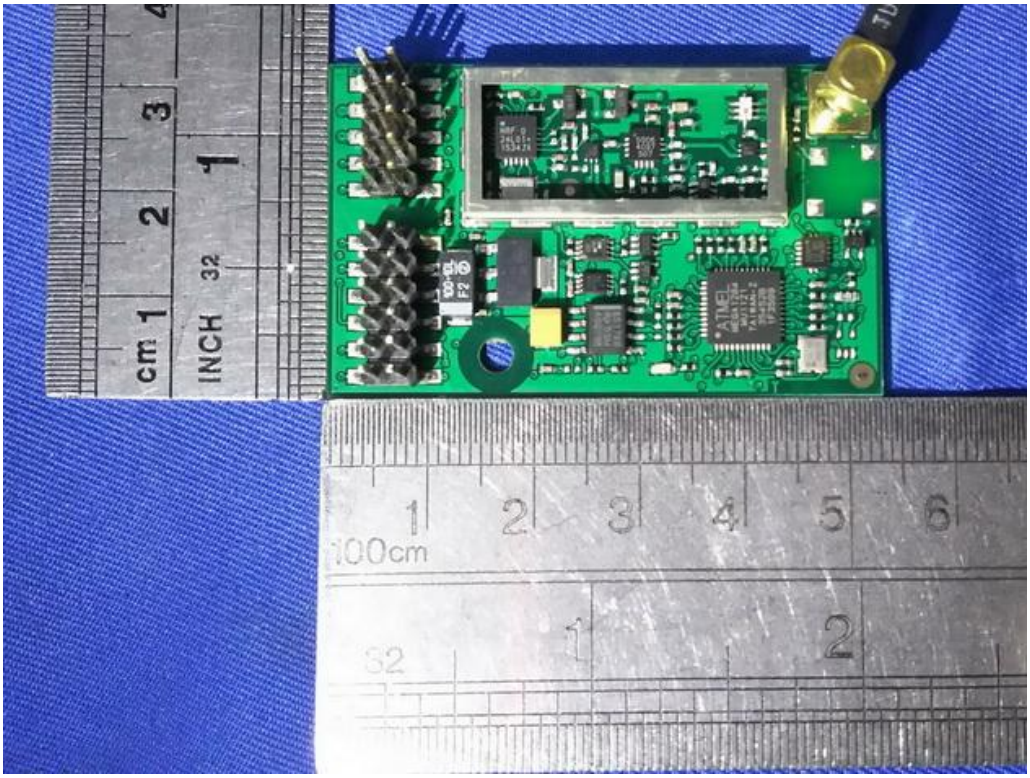



WIRELESS SOLUTION
MADE IN SWEDEN
A40890G4-O_G NANO TRX
SW 2.10R_BL2


W-DMX
Made In Sweden







END OF REPORT