



RF Test Report

For

Applicant Name: Zhongshan WS-lighting Company Limited
Address: No.156, Changan Nan Road, Henglan Town, Zhongshan City, Guangdong Province, China
EUT Name: Wireless charge lamp
Brand Name: N/A
Model Number: WS-S06
Series Model Number: WS-S06xy ("x" and "y" are variables, "x" Represents the serial number, It is represented by capital letters such as A, B, C . "y" Represents the version number, It is represented by number such as 1, 2, 3 .)

Issued By

Company Name: BTF Testing Lab (Shenzhen) Co., Ltd.
Address: F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

Report Number: BTF-SZ230716R-001
Test Standards: 47 CFR Part 15 Subpart C Section 15.247
FCC ID: 2BBZG-WS-S06
Test Conclusion: Pass
Test Date: Jun. 26, 2023 - Jul. 12, 2023
Date of Issue: Jul. 12, 2023

Prepared By: Elma.yang
Date: Jul. 12, 2023

Approved By: Ryan.CJ
Date: Jul. 12, 2023



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Revision History		
Version	Issue Date	Revisions Content
R_V0	Jul. 12, 2023	Original
Note:	Once the revision has been made, then previous versions reports are invalid.	

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1. Introduction

1.1 Identification of Testing Laboratory

Company Name:	BTF Testing Lab (Shenzhen) Co., Ltd.
Address:	F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China
Phone Number:	+86-0755-23146130
Fax Number:	+86-0755-23146130

1.2 Identification of the Responsible Testing Location

Test Location:	BTF Testing Lab (Shenzhen) Co., Ltd.
Address:	F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China
Description:	All measurement facilities used to collect the measurement data are located at F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China
FCC Registration Number:	518915
Designation Number:	CN1330

1.3 Laboratory Condition

Ambient Temperature:	20°C to 25°C
Ambient Relative Humidity:	45% to 55%
Ambient Pressure:	100 kPa to 102 kPa

1.4 Announcement

- (1) The test report reference to the report template version v0.
- (2) The test report is invalid if not marked with the signatures of the persons responsible for preparing, reviewing and approving the test report.
- (3) The test report is invalid if there is any evidence and/or falsification.
- (4) This document may not be altered or revised in any way unless done so by BTF and all revisions are duly noted in the revisions section.
- (5) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.
- (6) The laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant.

2. Product Information

2.1 Application Information

Company Name:	Zhongshan WS-lighting Company Limited
Address:	No.156,Changan Nan Road, Henglan Town, Zhongshan City, Guangdong Province, China

2.2 Manufacturer Information

Company Name:	Zhongshan WS-lighting Company Limited
Address:	No.156,Changan Nan Road, Henglan Town, Zhongshan City, Guangdong Province, China

2.3 General Description of Equipment under Test (EUT)

EUT Name	Wireless charge lamp
Under Test Model Name	WS-S06
Series Model Name	WS-S06xy (“x” and “y” are variables, “x” Represents the serial number, It is represented by capital letters such as A, B, C . “y” Represents the version number, It is represented by number such as 1, 2, 3 .)
Description of Model name differentiation	All the same except the model number.
Hardware Version	V1.0
Software and Firmware Version	V1.0

2.4 Technical Information

Modulation Technology	DCD
Modulation Type	FSK
Product Type	<input checked="" type="checkbox"/> Mobile <input type="checkbox"/> Portable <input type="checkbox"/> Fixed Location
Frequency Range	110-205KHz
Antenna Type	Coil Antenna
Antenna Gain [#]	0 dBi
Antenna Impedance	50Ω
Antenna System (MIMO Smart Antenna)	N/A

Note:

[#]: The antenna gain provided by the applicant, and the laboratory will not be responsible for the accumulated calculation results which covers the information provided by the applicant.

3. Summary of Test Results

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 15 Subpart C	Intentional Radiators
2	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

3.2 Summary of Test Result

No.	Description	FCC&IC Part No.	Test Result	Verdict	Remark
1	Antenna Requirement	15.203	--	Pass	--
2	AC Power Line Conducted Emission	15.207	ANNEX A.1	Pass	--
3	Spurious Emission	15.209(a)(f)	ANNEX A.2	Pass	--
4	20dB Bandwidth	15.215	ANNEX A.3	Pass	--

3.3 Uncertainty of Test

The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2 and TR100 028-1/-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

Measurement	Value
Occupied Channel Bandwidth	69 KHz
RF output power, conducted	0.87 dB
Power Spectral Density, conducted	0.69 dB
Unwanted Emissions, conducted	0.94 dB
All emissions, radiated(<1GHz)	4.12 dB
All emissions, radiated(>1GHz)	4.16 dB
Temperature	0.82 °C
Humidity	4.1 %

4. Test Configuration

4.1 Environment Condition

Environment Parameter	Selected Values During Tests			
	Temperature	Voltage	Relative Humidity	Ambient Pressure
Normal Temperature, Normal Voltage (NTNV)	20°C to 25°C	AC 120V/60Hz	30% to 60%	100 kPa to 102 kPa

4.2 Test Equipment List

Conducted Method Test						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
MXA Signal Analyzer	KEYSIGHT	N9020A	MY50410020	2022.11.24	2023.11.23	☑
WIDEBAND RADIO COMMUNICATION TESTER	Rohde & Schwarz	CMW500	161997	2022.11.24	2023.11.23	☑
ESG VECTOR SIGNAL GENERATOR	Agilent	E4438C	MY45094854	2022.11.24	2023.11.23	☑
MXG Vector Signal Generator	Agilent	N5182A	MY46240163	2022.11.24	2023.11.23	☑
Adjustable Direct Current Regulated Power Supply	Dongguan Tongmen Electronic Technology Co., LTD	etm-6050c	20211026123	2022.11.25	2023.11.24	☑
Programmable constant temperature and humidity box	ZZCKONG	ZZ-K02A	20210928007	2022.11.24	2023.11.23	☑
RF Control Unit	TST	TST-Full	S01	/	/	☑
RF Test software	TST	V2.0	/	/	/	☑

Radiated Method Test						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
SIGNAL ANALYZER	ROHDE&SCHWARZ	FSQ40	100010	2022.11.24	2023.11.23	☑
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI7	101032	2022.11.24	2023.11.23	☑
Log periodic antenna	SCHWARZBECK	VULB 9168	01328	2021.11.28	2023.11.27	☑
Horn Antenna	SCHWARZBECK	BBHA9170	01157	2021.11.28	2023.11.27	☑
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/	☑
RE Cable	REBES Talent	UF2-NMNM-10m	21101570	2022.11.24	2023.11.23	☑
RE Cable	REBES Talent	UF2-NMNM-2.5m	21101573	2022.11.24	2023.11.23	☑
RE Cable	REBES Talent	UF2-NMNM-1m	21101576	2022.11.24	2023.11.23	☑

Coaxial cable Multiflex 141	Schwarzbeck	N/SMA 0.5m	517386	2023.3.24	2024.3.23	<input checked="" type="checkbox"/>
RE Cable	Talent Microwave	A40-2.92M2.92 M-14M	22080539	2022.11.24	2023.11.23	<input checked="" type="checkbox"/>
RE Cable	Talent Microwave	A81-SMAMNM- 14M	22080538	2022.11.24	2023.11.23	<input checked="" type="checkbox"/>
Preamplifier	SCHWARZBECK	BBV9744	00246	2022.11.24	2023.11.23	<input checked="" type="checkbox"/>
Horn Antenna	Schwarzbeck	BBHA9120D	2597	2022.5.22	2024.5.21	<input checked="" type="checkbox"/>
Broadband Preamplifier	Schwarzbeck	BBV9718D	00008	2023.3.24	2024.3.23	<input checked="" type="checkbox"/>
Loop Antenna (9KHz-30MHz)	Schwarzbeck	FMZB1519B	014	2023.3.24	2024.3.23	<input checked="" type="checkbox"/>

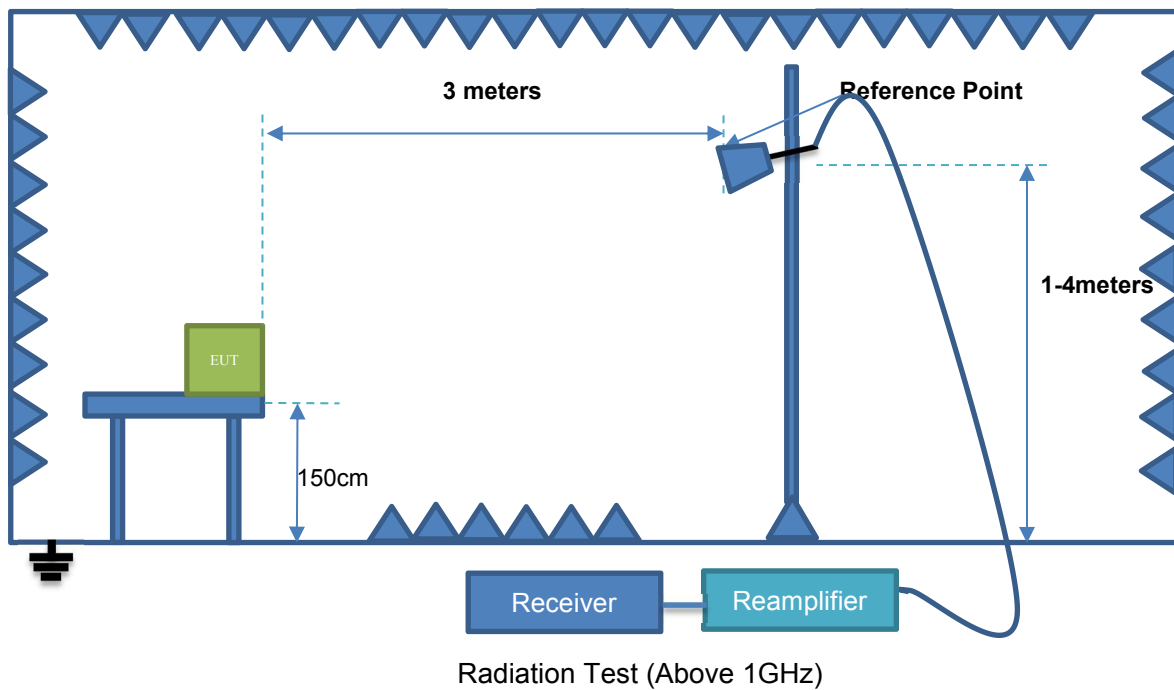
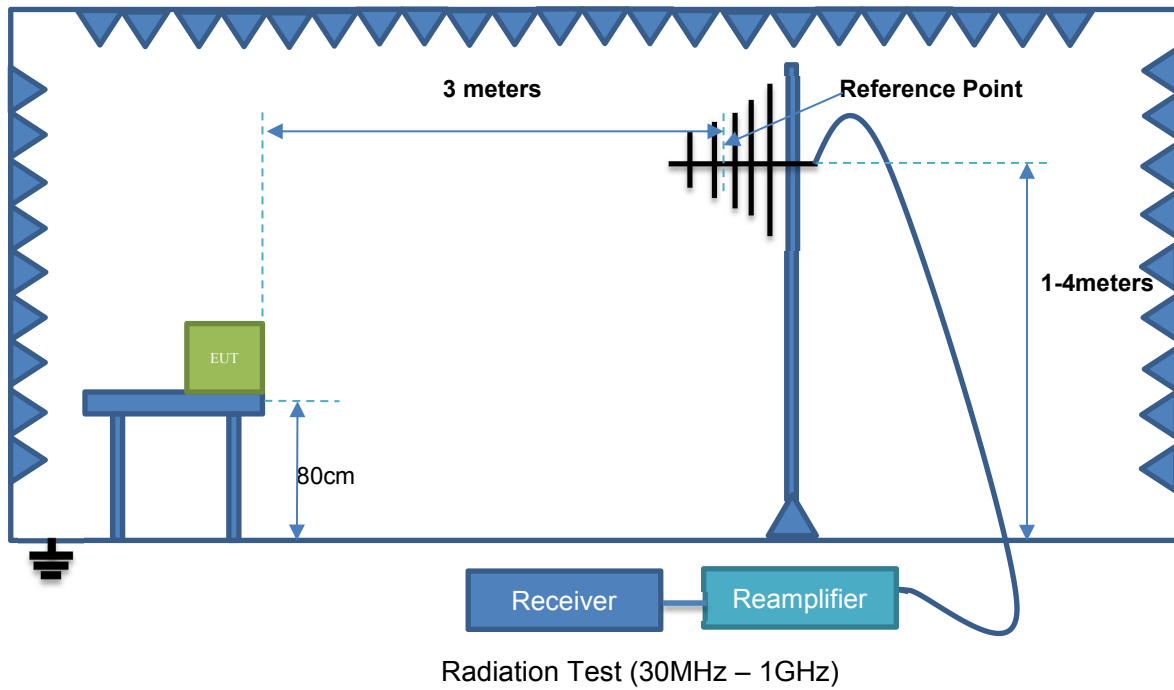
Conducted disturbance Test						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
EMI Receiver	ROHDE&SCHWARZ	ESCI3	101422	2022.11.24	2023.11.23	<input checked="" type="checkbox"/>
V-LISN	SCHWARZBECK	NSLK 8127	01073	2022.11.24	2023.11.23	<input checked="" type="checkbox"/>
LISN	AFJ	LS16/110VAC	16010020076	2022.11.24	2023.11.23	<input checked="" type="checkbox"/>
Coaxial Switcher	SCHWARZBECK	CX210	CX210	2022.11.24	2023.11.23	<input checked="" type="checkbox"/>
Pulse Limiter	SCHWARZBECK	VTSD 9561-F	00953	2022.11.24	2023.11.23	<input checked="" type="checkbox"/>
EZ EMC	Frad	EMC-CON 3A1.1+	/	/	/	<input checked="" type="checkbox"/>

4.3 Test Auxiliary Equipment

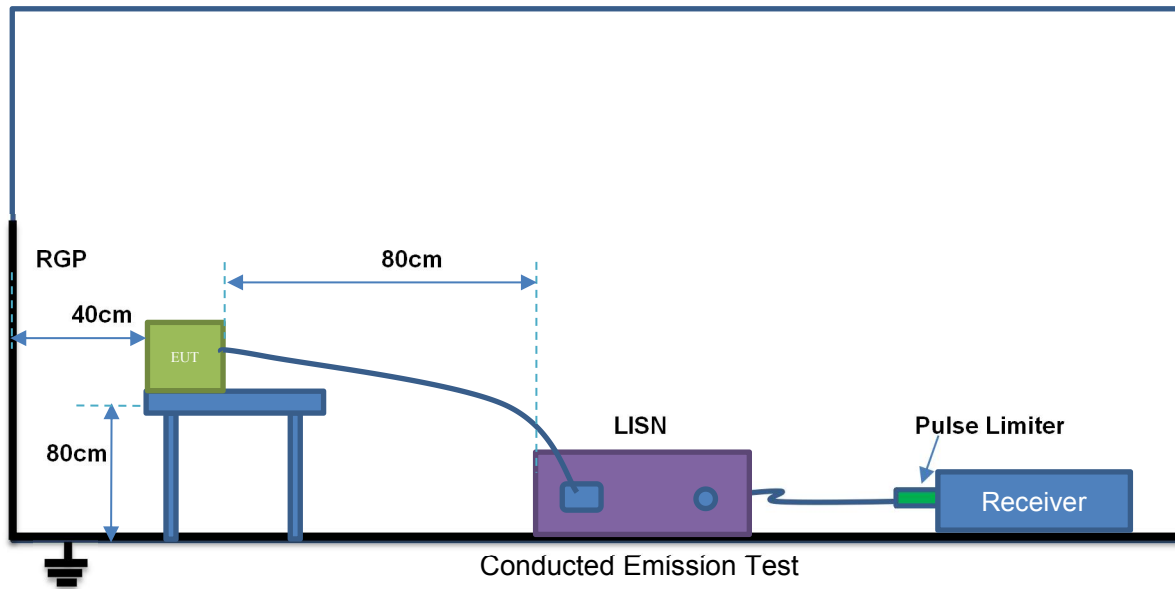
Description	Manufacturer	Model	Serial No.	Length	Description	Use
						<input checked="" type="checkbox"/>

4.4 Test Setup

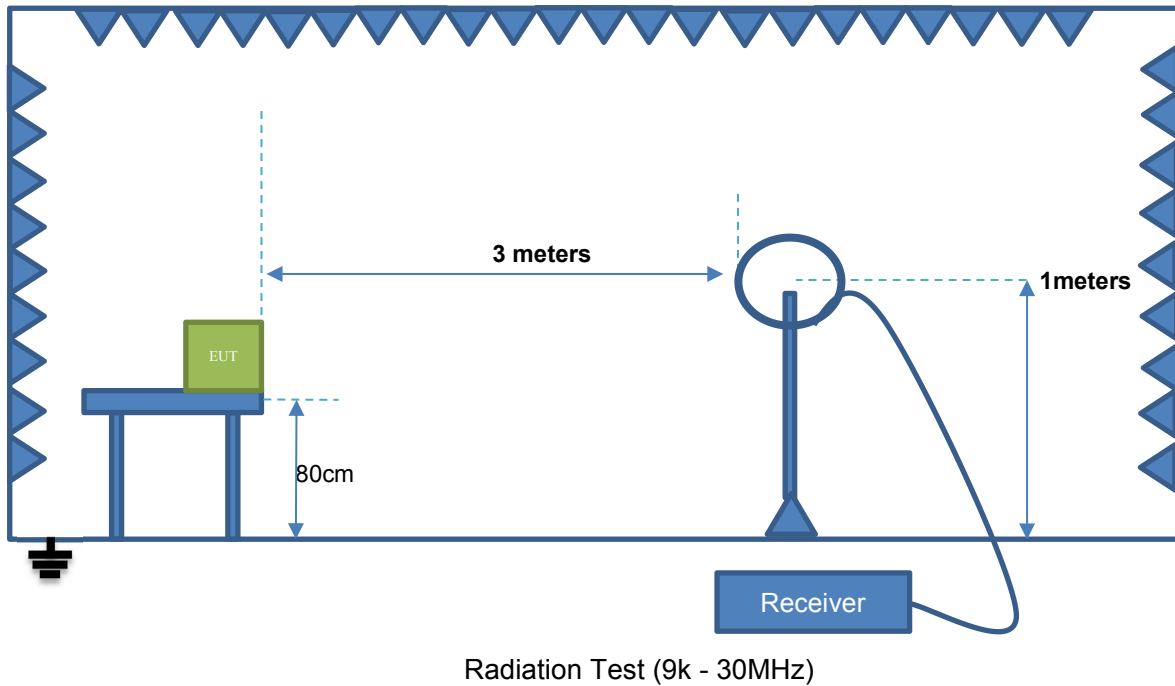
Test Setup 1



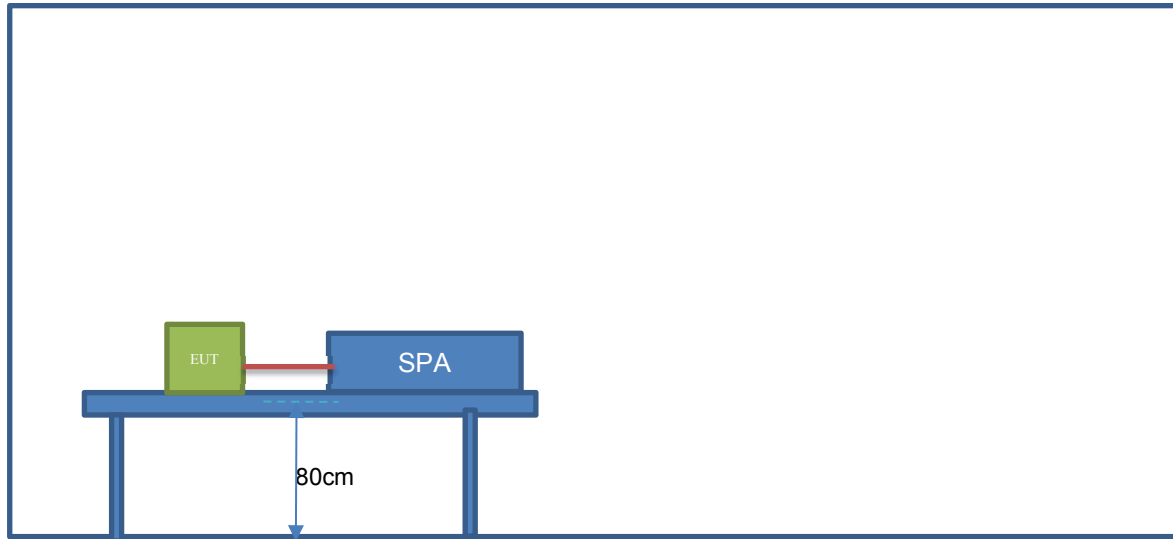
Test Setup 2



Test Setup 3



Test Setup 4



5. Test Items

5.1 Antenna Requirements

5.1.1 Relevant Standards

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of § 15.211, § 15.213, § 15.217, § 15.219, or § 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

If directional gain of transmitting antennas is greater than 6 dBi, the power shall be reduced by the same level in dB comparing to gain minus 6 dBi. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the FCC rule.

5.1.2 Antenna Anti-Replacement Construction

Protected Method	Description
The antenna is embedded in the product.	An embedded in antenna design is used.

Reference Documents	Item
Photo	Please refer to the EUT Photo documents.

5.1.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

5.2 Conducted Emission

5.2.1 Limit

FCC §15.207;

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 Ω line impedance stabilization network (LISN).

Frequency range (MHz)	Conducted Limit (dB μ V)	
	Quai-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
0.50 - 30	60	50

5.2.2 Test Setup

See section 4.5 for test setup description for setup 2. The photo of test setup please refer to ANNEX B

5.2.3 Test Procedure

The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. Refer to recorded points and plots below.

Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz) for which the device is capable of operation. A device rated for 50/60 Hz operation need not be tested at both frequencies provided the radiated and line conducted emissions are the same at both frequencies.

5.2.4 Test Result

Please refer to ANNEX A.1

NOTE:

1. Results (dB μ V) = Reading (dB μ V) + Factor (dB)

The reading level is calculated by software which is not shown in the sheet

2. Factor = Insertion loss + Cable loss

3. Over limit = Results – Limit.

5.3 Radiated Spurious Emission

5.3.1 Limit

FCC §15.209

Radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the radiated emission limits specified in FCC section 15.209(a). According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Measurement Distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

Note:

1. Field Strength ($\text{dB}\mu\text{V/m}$) = $20 \cdot \log[\text{Field Strength } (\mu\text{V/m})]$.
2. In the emission tables above, the tighter limit applies at the band edges.
3. For Above 1000 MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.
4. For above 1000 MHz, limit field strength of harmonics: 54dBuV/m@3m (AV) and 74dBuV/m@3m (PK).

5.3.2 Test Setup

See section 4.5 for test setup description for setup 1 and 3. The photo of test setup please refer to ANNEX B

5.3.3 Test Procedure

Since the emission limits are specified in terms of radiated field strength levels, measurements performed to demonstrate compliance have traditionally relied on a radiated test configuration. Radiated measurements remain the principal method for demonstrating compliance to the specified limits; however antenna-port conducted measurements are also now acceptable to demonstrate compliance (see below for details). When radiated measurements are utilized, test site requirements and procedures for maximizing and measuring radiated emissions that are described in ANSI C63.10 shall be followed.

Antenna-port conducted measurements may also be used as an alternative to radiated measurements for demonstrating compliance in the restricted frequency bands. If conducted measurements are performed, then proper impedance matching must be ensured and an additional radiated test for cabinet/case spurious emissions is required.

General Procedure for conducted measurements in restricted bands:

- a) Measure the conducted output power (in dBm) using the detector specified (see guidance regarding measurement procedures for determining quasi-peak, peak, and average conducted output power, respectively).
- b) Add the maximum transmit antenna gain (in dBi) to the measured output power level to determine the EIRP level (see guidance on determining the applicable antenna gain)
- c) Add the appropriate maximum ground reflection factor to the EIRP level (6 dB for frequencies ≤ 30 MHz, 4.7 dB for frequencies between 30 MHz and 1000 MHz, inclusive and 0 dB for frequencies > 1000 MHz).
- d) For devices with multiple antenna-ports, measure the power of each individual chain and sum the EIRP of all chains in linear terms (e.g., Watts, mW).
- e) Convert the resultant EIRP level to an equivalent electric field strength using the following relationship:

$$E = \text{EIRP} - 20\log D + 104.8$$

where:

E = electric field strength in dB μ V/m,

EIRP = equivalent isotropic radiated power in dBm D = specified measurement distance in meters.

- f) Compare the resultant electric field strength level to the applicable limit.

- g) Perform radiated spurious emission test.

Quasi-Peak measurement procedure

The specifications for measurements using the CISPR quasi-peak detector can be found in Publication 16 of the International Special Committee on Radio Frequency Interference (CISPR) of the International Electrotechnical Commission.

As an alternative to CISPR quasi-peak measurement, compliance can be demonstrated to the applicable emission limits using a peak detector.

Peak power measurement procedure:

Peak emission levels are measured by setting the instrument as follows:

- a) RBW = as specified in Table 1.
- b) VBW $\geq 3 \times$ RBW.
- c) Detector = Peak.
- d) Sweep time = auto.
- e) Trace mode = max hold.
- f) Allow sweeps to continue until the trace stabilizes. (Note that the required measurement time may be longer for low duty cycle applications).

Table 1—RBW as a function of frequency

Frequency	RBW
9-150 kHz	200-300 Hz
0.15-30 MHz	9-10 kHz
30-1000 MHz	100-120 kHz
> 1000 MHz	1 MHz

If the peak-detected amplitude can be shown to comply with the average limit, then it is not necessary to perform a separate average measurement.

Trace averaging across on and off times of the EUT transmissions followed by duty cycle correction:

If continuous transmission of the EUT (i.e., duty cycle ≥ 98 percent) cannot be achieved and the duty cycle is constant (i.e., duty cycle variations are less than ± 2 percent), then the following procedure shall be used:

- The EUT shall be configured to operate at the maximum achievable duty cycle.
- Measure the duty cycle, x , of the transmitter output signal as described in section 6.0.
- RBW = 1 MHz (unless otherwise specified).
- VBW $\geq 3 \times$ RBW.
- Detector = RMS, if $\text{span}/(\# \text{ of points in sweep}) \leq (\text{RBW}/2)$. Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If this condition cannot be satisfied, then the detector mode shall be set to peak.
- Averaging type = power (i.e., RMS).
 - As an alternative, the detector and averaging type may be set for linear voltage averaging.
 - Some instruments require linear display mode in order to use linear voltage averaging. Log or dB averaging shall not be used.
- Sweep time = auto.
- Perform a trace average of at least 100 traces.
- A correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle. The correction factor is computed as follows:
 - If power averaging (RMS) mode was used in step f), then the applicable correction factor is $10 \log(1/x)$, where x is the duty cycle.
 - If linear voltage averaging mode was used in step f), then the applicable correction factor is $20 \log(1/x)$, where x is the duty cycle.
 - If a specific emission is demonstrated to be continuous (≥ 98 percent duty cycle) rather than turning on and off with the transmit cycle, then no duty cycle correction is required for that emission.

NOTE: Reduction of the measured emission amplitude levels to account for operational duty factor is not permitted. Compliance is based on emission levels occurring during transmission - not on an average across

on and off times of the transmitter.

Determining the applicable transmit antenna gain:

A conducted power measurement will determine the maximum output power associated with a restricted band emission; however, in order to determine the associated EIRP level, the gain of the transmitting antenna (in dBi) must be added to the measured output power (in dBm).

Since the out-of-band characteristics of the EUT transmit antenna will often be unknown, the use of a conservative antenna gain value is necessary. Thus, when determining the EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2 dBi, whichever is greater. However, for devices that operate in multiple frequency bands while using the same transmit antenna, the highest gain of the antenna within the operating band nearest in frequency to the restricted band emission being measured may be used in lieu of the overall highest gain when the emission is at a frequency that is within 20 percent of the nearest band edge frequency, but in no case shall a value less than 2 dBi be used.

See KDB 662911 for guidance on calculating the additional array gain term when determining the effective antenna gain for a EUT with multiple outputs occupying the same or overlapping frequency ranges in the same band.

Radiated spurious emission test:

An additional consideration when performing conducted measurements of restricted band emissions is that unwanted emissions radiating from the EUT cabinet, control circuits, power leads, or intermediate circuit elements will likely go undetected in a conducted measurement configuration. To address this concern, a radiated test shall be performed to ensure that emissions emanating from the EUT cabinet (rather than the antenna port) also comply with the applicable limits.

For these cabinet radiated spurious emission measurements the EUT transmit antenna may be replaced with a termination matching the nominal impedance of the antenna. Procedures for performing radiated measurements are specified in ANSI C63.10. All detected emissions shall comply with the applicable limits.

The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. Mid channels on all channel bandwidth verified. Only the worst RB size/offset presented.

The power of the EUT transmitting frequency should be ignored.

All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz

VBW \geq RBW

Sweep = auto

Detector function = peak Trace = max hold

5.3.4 Test Result

Please refer to ANNEX A.2

NOTE:

1. Results (dBuV) = Reading (dBuV) + Factor (dB)

The reading level is calculated by software which is not shown in the sheet

2. Factor = Insertion loss + Cable loss

3. Over limit = Results – Limit.

5.4 BANDWIDTH TEST

5.4.1 Limit

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

5.4.2 Test Setup

See section 4.5 for test setup description for antenna port. The photo of test setup please refer to ANNEX B

5.4.3 Test Procedure

1. Set RBW = 100 Hz.
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission.

5.4.4 Test Result

Please refer to ANNEX A.3

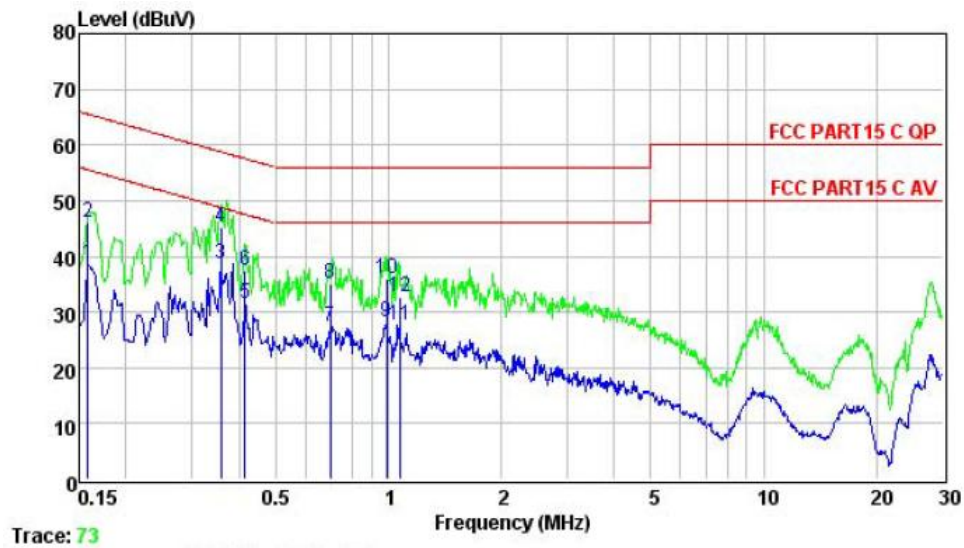
ANNEX A Test Results

A.1 Conducted Emission

Note 1: Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 60 Hz and 240 VAC, 50 Hz) for which the device is capable of operation. So, The configuration 120 VAC, 60 Hz and 240 VAC, 50 Hz were tested respectively, but only the worst configuration (120 VAC, 60 Hz) shown here.

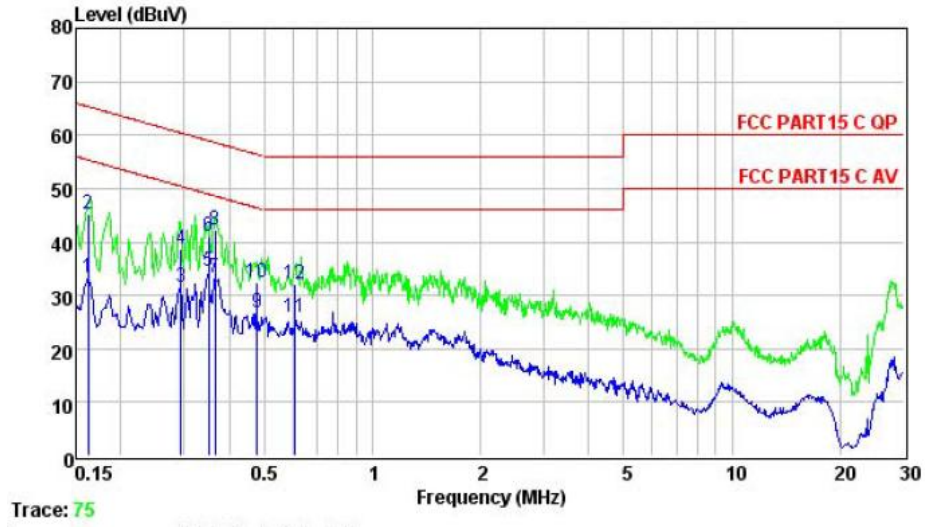
Test Data and plots.

PHASE L



	Freq	Level	Limit	Over	Remark
	MHz	dBuV	dBuV	Limit	
1	0.158	38.69	55.56	-16.87	Average
2	0.158	46.24	65.56	-19.32	QP
3	0.358	38.53	48.78	-10.25	Average
4	0.358	45.17	58.78	-13.61	QP
5	0.415	31.38	47.55	-16.17	Average
6	0.415	37.54	57.55	-20.01	QP
7	0.701	27.39	46.00	-18.61	Average
8	0.701	34.95	56.00	-21.05	QP
9	0.989	28.28	46.00	-17.72	Average
10	0.989	35.94	56.00	-20.06	QP
11	1.071	27.68	46.00	-18.32	Average
12	1.071	32.67	56.00	-23.33	QP

PHASE N



	Freq	Level	Limit	Over	Remark
	MHz	dBuV	dBuV	dB	
1	0.162	33.33	55.34	-22.01	Average
2	0.162	45.29	65.34	-20.05	QP
3	0.294	31.40	50.41	-19.01	Average
4	0.294	38.64	60.41	-21.77	QP
5	0.350	34.57	48.96	-14.39	Average
6	0.350	41.01	58.96	-17.95	QP
7	0.365	33.43	48.61	-15.18	Average
8	0.365	42.28	58.61	-16.33	QP
9	0.479	26.88	46.36	-19.48	Average
10	0.479	32.29	56.36	-24.07	QP
11	0.611	25.92	46.00	-20.08	Average
12	0.611	32.04	56.00	-23.96	QP

A.2 Radiated Spurious Emission

Note 1: The symbol of “--” in the table which means not application.

Note 2: For the test data above 1 GHz, according the ANSI C63.10-2013, where limits are specified for both average and peak (or quasi-peak) detector functions, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement.

Note 3: The EUT is working in the Normal link mode below 1 GHz. All modes have been tested and DH5-Hopping mode is the worst.

Note 4: Results (dBuV/m) = Original reading level of Spectrum Analyzer (dBuV/m) + Factor (dB)

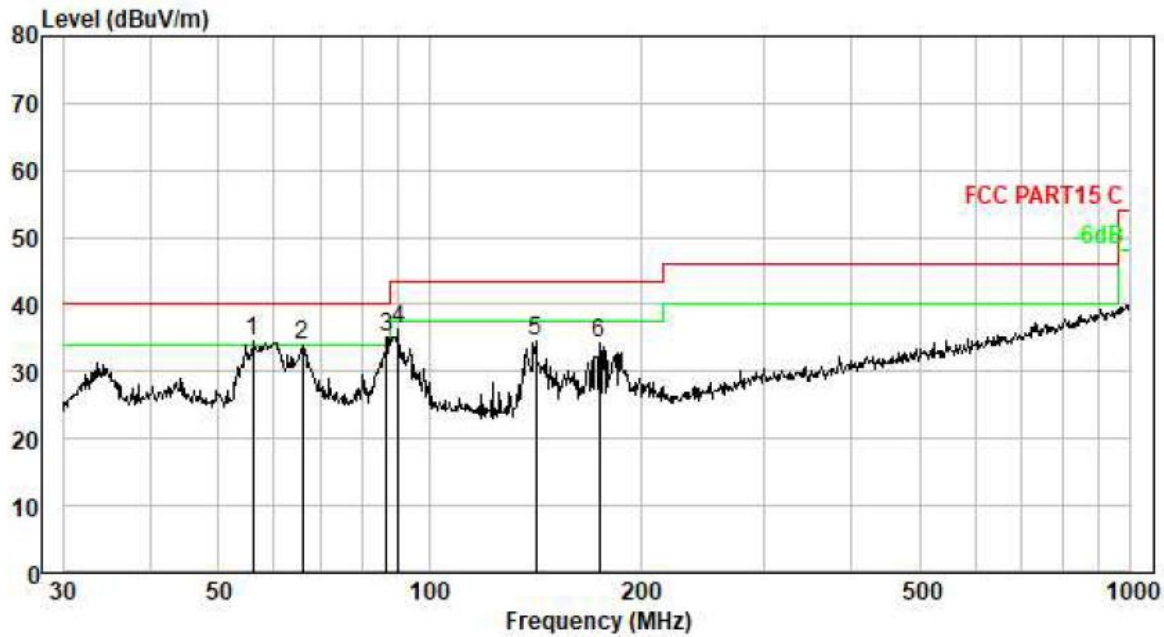
The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

(9 KHz ~ 30 MHz)

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(kHz)	(dBμV/m)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	
127.5	95.84	20.03	115.87	145.49	-29.62	PK
127.5	76.95	20.03	96.98	125.49	-28.51	AV
256.1	85.02	20.15	105.17	139.44	-34.27	PK
256.1	68.47	20.15	88.62	119.44	-30.82	AV
329.3	84.63	20.18	104.81	137.25	-32.44	PK
329.3	67.69	20.18	87.87	117.25	-29.38	AV
383.4	82.19	20.49	102.68	135.91	-33.23	PK
383.4	65.93	20.49	86.42	115.91	-29.49	AV
469.5	80.62	20.57	101.19	134.17	-32.98	PK
469.5	64.28	20.57	84.85	114.17	-29.32	AV
512.3	40.08	20.71	60.79	73.41	-12.62	QP
658.9	32.68	20.76	53.44	71.23	-17.79	QP
3128.85	28.21	21.93	49.77	69.54	-19.77	QP
4572.16	24.95	22.25	46.44	69.54	-23.1	QP

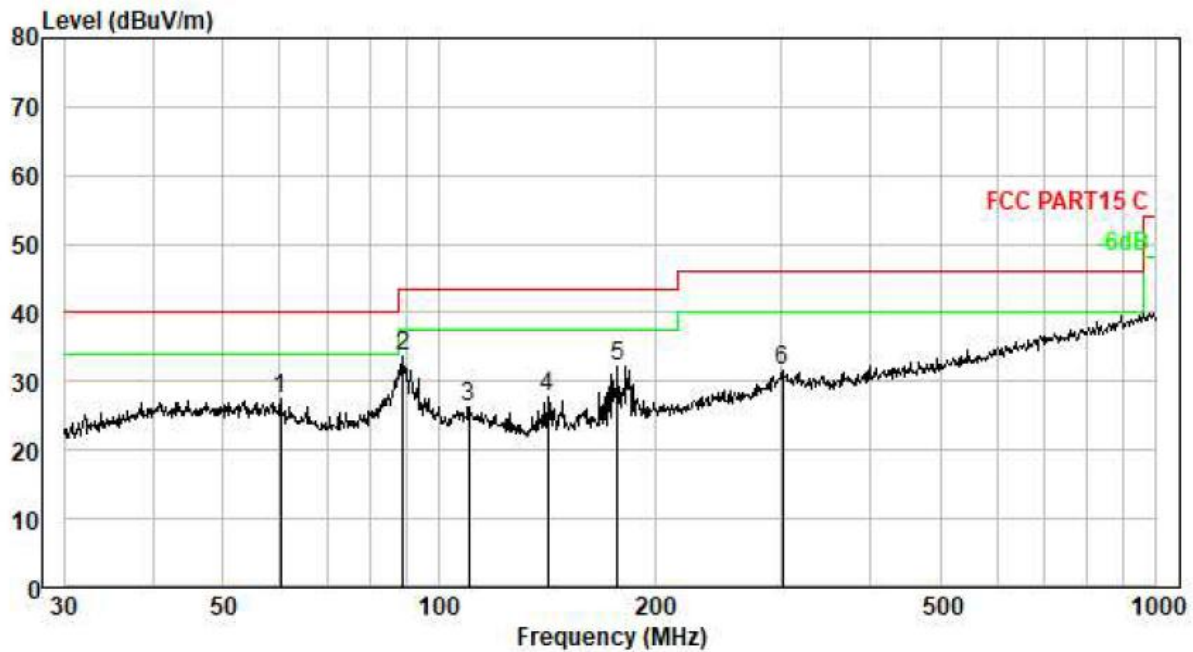
(30 MHz ~ 1GHz)

30 MHz to 1 GHz, ANT Vertical



No.	Freq MHz	Cable Loss dB	ANT Factor dB/m	Receiver Reading dBμV	Preamp Gain dB	Emission Level dBμV/m	Limit dBμV/m	Over Limit dB	Remark
1	56.001	0.47	12.08	22.11	0.00	34.66	40.00	-5.34	QP
2	65.803	0.53	10.32	23.21	0.00	34.06	40.00	-5.94	QP
3	86.807	0.64	9.84	24.62	0.00	35.10	40.00	-4.90	QP
4	90.220	0.65	9.93	25.83	0.00	36.41	43.50	-7.09	QP
5	141.826	0.88	8.46	25.11	0.00	34.45	43.50	-9.05	QP
6	174.424	0.99	9.52	23.74	0.00	34.25	43.50	-9.25	QP

30 MHz to 1 GHz, ANT Horizontor



No.	Freq MHz	Cable Loss dB	ANT Factor dB/m	Receiver Reading dBμV	Preamp Gain dB	Emission Level dBμV/m	Limit dBμV/m	Over Limit dB	Remark
1	60.069	0.50	11.68	15.40	0.00	27.58	40.00	-12.42	QP
2	88.964	0.65	9.88	23.10	0.00	33.63	43.50	-9.87	QP
3	110.182	0.74	11.18	14.29	0.00	26.21	43.50	-17.29	QP
4	141.826	0.88	8.46	18.48	0.00	27.82	43.50	-15.68	QP
5	177.509	1.00	9.68	21.61	0.00	32.29	43.50	-11.21	QP
6	301.422	1.28	14.32	16.01	0.00	31.61	46.00	-14.39	QP

A.3 BANDWIDTH TEST

Frequency (KHz)	20dB bandwidth (Hz)	99% bandwidth (Hz)	Result
127.5	380	344	Pass





ANNEX B TEST SETUP PHOTOS

Please reference attachment.

ANNEX C EUT EXTERNAL PHOTOS

Please reference attachment.

ANNEX D EUT INTERNAL PHOTOS

Please reference attachment.



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--END OF REPORT--