DEKRA Testing and Certification (Suzhou) Co., Ltd.
No.99 Hongye Rd., Suzhou Industrial Park, Suzhou, 215006, Jiangsu, China
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Test report No:
2090075R-RF-US-P06V05

TEST REPORT

FCC Rules&Requlations 47 CFR Chapter I - Part 15C & RSS-210 Issue 10

Product Name	Barcode Scanner
Trademark	Honeywell
Model and /or type reference	8690i
FCC ID	HD5-8690A
IC	1693B-8690A
Applicant's name / address	HONEYWELL INTERNATIONAL INC Honeywell Safety and Productivity Solutions 9680 OLD BAILES RD FORT MILL SC 29707-7539,USA
Test method requested, standard	FCC CFR Title 47 Part 15 Subpart C Section 15.225 RSS-210 Issue 10 RSS-Gen Issue 5
Verdict Summary	IN COMPLIANCE
Documented by (name / position & signature)	Kitty Li/Project Assistant
Reviewed by (name / position & signature)	Frank He/ Technical Supervisor
Approved by (name / position & signature)	Jack Zhang/ Supervisor
Date of issue	2020-11-13
Report template No	Template_FCC 15.225-RF-V1.0

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COMPETENCES AND GUARANTEES

DEKRA is a testing laboratory competent to carry out the tests described in this report.
In order to assure the traceability to other national and international laboratories, DEKRA has a calibration and maintenance program for its measurement equipment.

DEKRA guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated in the report and it is based on the knowledge and technical facilities available at DEKRA at the time of performance of the test.

DEKRA is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

IMPORTANT: No parts of this report may be reproduced or quoted out of context, in any form or by any means, except in full, without the previous written permission of DEKRA.

GENERAL CONDITIONS

Test Location	No. 99, Hongye Road, Suzhou Industrial Park Suzhou, 215006, P.R. China
Date(receive sample)	Sept. 02, 2020
Date (start test)	Sept. 27, 2020
Date (finish test)	Nov. 08, 2020

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or Competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA.

ENVIRONMENTAL CONDITIONS

The climatic conditions during the tests are within the limits specified by the manufacturer for the operation of the EUT and the test equipment. The climatic conditions during the tests were within the following limits:

Ambient temperature	15 °C – 35 °C
Relative Humidity air	30% - 60%

If explicitly required in the basic standard or applied product / product family standard the climatic values are recorded and documented separately in this test report.

POSSIBLE TEST CASE VERDICTS

Test case does not apply to test object	N/A
Test object does meet requirement	P (Pass) / PASS
Test object does not meet requirement	F (Fail) / FAIL
Not measured	N/M

ABBREVIATIONS

For the purposes of the present document, the following abbreviations apply:

EUT : Equipment Under Test
QP : Quasi-Peak
CAV : CISPR Average
AV : Average
CDN : Coupling Decoupling Network
SAC : Semi-Anechoic Chamber
OATS : Open Area Test Site
BW : Bandwidth
AM : Amplitude Modulation
PM : Pulse Modulation
HCP : Horizontal Coupling Plane
VCP : Vertical Coupling Plane
U_N : Nominal voltage
*T*x : Transmitter
*R*x : Receiver
N/A : Not Applicable
N/M : Not Measured

DOCUMENT HISTORY

Report No.	Version	Description	Issued Date
2090075R-RF-US-P06V05	V1.0	Initial issue of report.	错误!未找到引用源。
2090075R-RF-US-P06V05	V1.1	Page 6: Add RSS issue data.	2020-11-13

REMARKS AND COMMENTS

1. The equipment under test (EUT) does meet the essential requirements of the stated standard(s)/test(s).
2. These test results on a sample of the device are for the purpose of demonstrating Compliance with Part 15 Subpart C Paragraph 15.225 and RSS-210 Issue 10 (2019-12), RSS-Gen Issue 5 (2019-03).
3. The measurement result is considered in conformance with the requirement if it is within the prescribed limit, It is not necessary to account the uncertainty associated with the measurement result.
4. The test results presented in this report relate only to the object tested.
5. The test report shall not be reproduced without the written approval of DEKRA Testing and Certification (Suzhou) Co., Ltd.
6. This report will not be used for social proof function in China market.
7. DEKRA declines any responsibility with the following test data provided by customer that may affect the validity of result:
   - Chapter 1.1 General Description of the Item(s).

USED EQUIPMENT

AC Power Line Conducted Emission / TR-1					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
EMI Test Receiver	R&S	ESCI	100906	2020.04.18	2021.04.17
Two-Line V-Network	R&S	ENV 216	101189	2020.08.15	2021.08.14
Two-Line V-Network	R&S	ENV 216	101044	2020.04.18	2021.04.17
50ohm Coaxial Switch	Anritsu	MP59B	6200464462	N/A	N/A
50ohm Termination	SHX	TF2	7081402	2020.09.23	2021.09.22
Temperature/Humidity Meter	RTS	RTS-8S	TR1-TH	2020.08.13	2021.08.12
Quietek EMI V3(test software)	Quietek	N/A	N/A	N/A	N/A
Note: All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.					

Emission in non-restricted frequency bands / TR-8					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2020.08.15	2021.08.14
EXA Spectrum Analyzer	Keysight	N9010A	MY55370495	2020.04.17	2021.04.16
MXA Signal Analyzer	Keysight	N9020A	MY56060147	2020.08.15	2021.08.14
Temperature/Humidity Meter	RTS	RTS-8S	TR8-TH	2020.08.13	2021.08.12
Note: All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.					

Radiated Emission(Below 1GHz) / AC-3					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
EMI Test Receiver	R&S	ESCI	100176	2020.08.15	2021.08.14
Loop Antenna	R&S	HFH2-Z2	833799/003	2020.02.17	2021.02.16
Bilog Antenna	Teseq GmbH	CBL6112D	27613	2020.08.19	2021.08.18
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC3-C	2020.04.13	2021.04.12
Temperature/Humidity Meter	RTS	RTS-8S	AC3-TH	2020.08.13	2021.08.12
Quietek EMI V3(test software)	Quietek	N/A	N/A	N/A	N/A
Note: All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.					

UNCERTAINTY

Uncertainties have been calculated according to the DEKRA internal document. The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%, The Uncertainties is complice with standard required as below.

Test item	Uncertainty
AC Power Line Conducted Emission	± 2.02 dB
Peak Power Output	± 1.27 dB
Radiated Emission(30MHz~1GHz)	± 3.80 dB
RF antenna conducted test	± 1.27 dB
DTS Bandwidth	± 1kHz
Occupied Bandwidth	± 1kHz
Power Density	± 1.27 dB
Frequency Stability	± 100 Hz

1 GENERAL INFORMATION

1.1 General Description of the Item(s)

Product Name.....:	Barcode Scanner
Model No.....:	8690i
Trademark.....:	Honeywell
FCC ID.....:	HD5-8690A
IC .....:	1693B-8690A
Manufacturer.....:	1.HONEYWELL INTERNATIONAL INC Honeywell Safety and Productivity Solutions 2.Metro(Suzhou)Technologies Co.,Ltd
Manufacturer address.....:	1. 9680 OLD BAILES RD FORT MILL SC 29707-7539,USA 2. No.221 Xinghai street China-Singapore Suzhou Industrial Park

Wireless 9pecification.....:	NFC
Operating frequency range(s).....:	13.56 MHz
Type of modulation .....:	ASK
Number of channel .....:	1

Rated power supply.....:	Voltage and Frequency	
	☐	AC: 220 – 240 V, 50/60 Hz
	☐	AC: 100 – 240 V, 50/60 Hz
	☐	DC: 5 V
	☒	Battery: 3.7 V
Mounting position.....:	☐	Table top equipment
	☐	Wall/Ceiling mounted equipment
	☐	Floor standing equipment
	☒	Hand-held equipment
	☒	Other: Wearable equipment

Note: The General Description of the Item in clause 1 are provided and confirmed by the client.

2 DESCRIPTION OF TEST SETUP

2.1 Operating mode(s) used for tests

During the tests the following operating mode(s) has(have) been used.

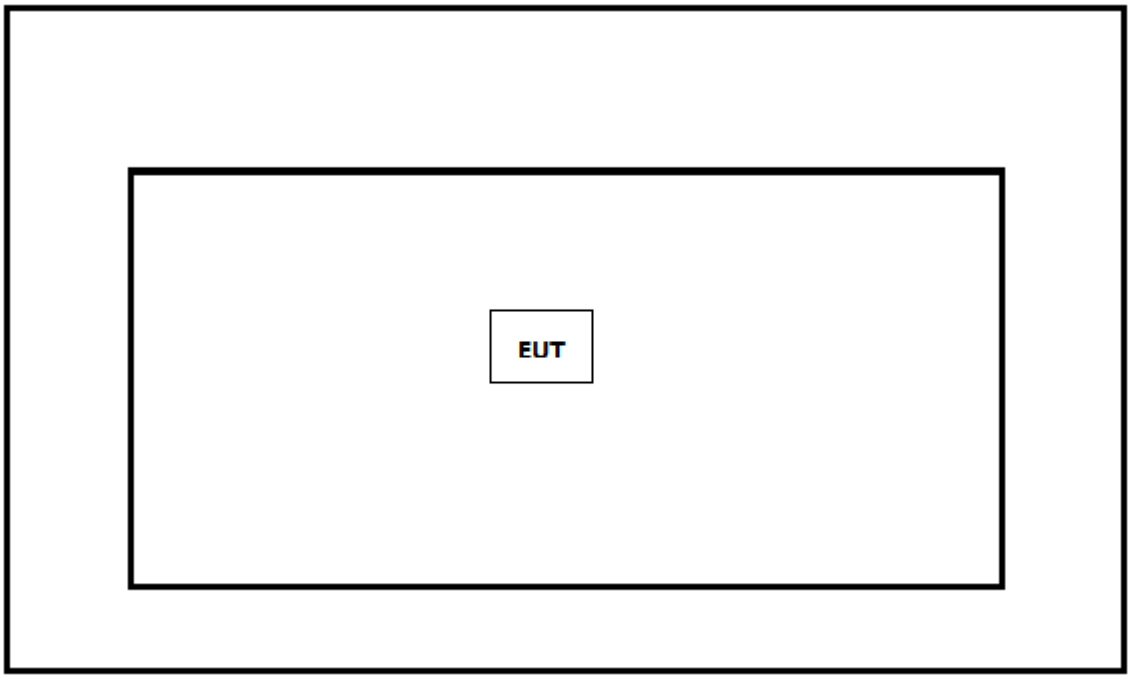
Test Mode	Mode 1: Transmit by NFC
	Mode 2: Simultaneous transmission.

2.2 Support / Auxiliary equipment / unit / Test software for the EUT

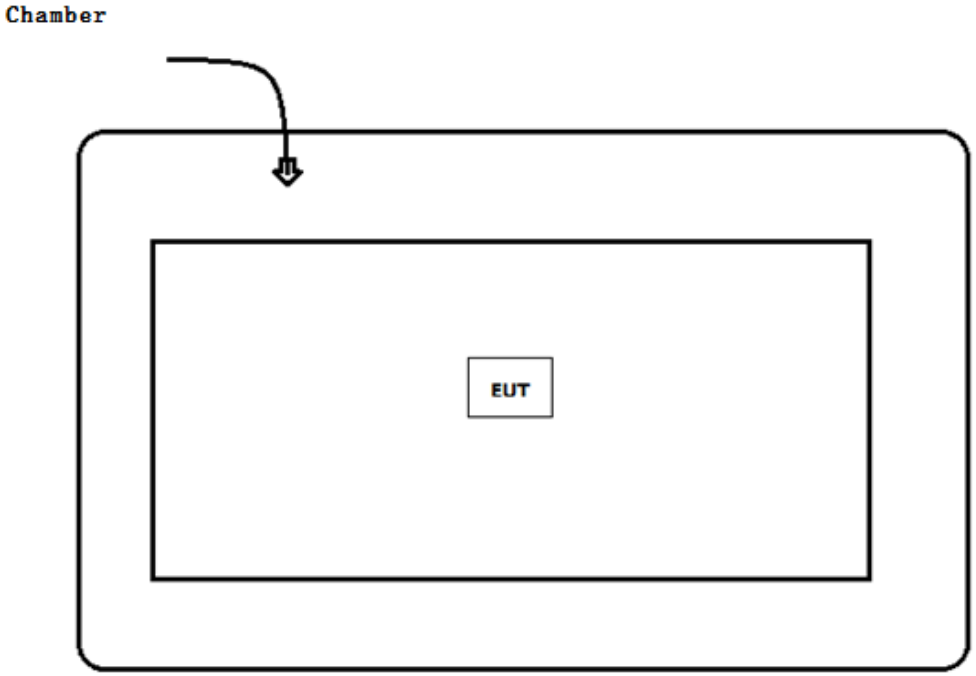
Auxiliary equipment	Type / Version	Manufacturer	Supplied by
N/A	N/A	N/A	N/A
software	Type / Version	Manufacturer	Supplied by
N/A	N/A	N/A	N/A

2.3 Test Configuration / Block diagram used for tests

Test setup Diagram- AC Line Conducted Emission Test



Test setup Diagram- Radiated Emission



2.4 Testing process

1	Setup the EUT as shown in Section 2.3.
2	Scan QR code with fixed frequency.
3	Verify that the EUT works properly.

3 VERDICT SUMMARY SECTION

This chapter presents an overview of standards and results. Refer to the next chapters for details of measured test results and applied test levels.

3.1 Standards

Standard	Year	Description
FCC CFR Title 47 Part 15 Subpart C Section 15.225	2020	Operation within the band 13.110-14.010 MHz
RSS-210 Issue 10	2019	Band 13.110-14.010 MHz

3.2 Overview of results

For FCC

Requirement – Test case	Basic standard(s)	Verdict	Remark
Conducted Emission	FCC CFR Title 47 Part 15 Subpart C Section 15.207	PASS	---
Field Strength of Fundamental	FCC CFR Title 47 Part 15 Subpart C Section 15.225(a)(b)(c)	PASS	---
Field Strength of Spurious	FCC CFR Title 47 Part 15 Subpart C Section 15.209 & 15.225(d)	PASS	---
Frequency Tolerance	FCC CFR Title 47 Part 15 Subpart C Section 15.225(e)	PASS	---
Channel Bandwidth	FCC CFR Title 47 Part 15 Subpart C Section 15.215(c)	PASS	---
Antenna Requirement	FCC CFR Title 47 Part 15 Subpart C Section 15.203	PASS	---
Supplementary information:			

For ISED

Requirement – Test case	Basic standard(s)	Verdict	Remark
Conducted Emission	RSS-Gen Issue 5 Section 8.8	PASS	---
Field Strength of Fundamental	RSS-210 Issue 10 Section B.6	PASS	---
Field Strength of Spurious	RSS-210 Issue 10, Section B.6 RSS-Gen Issue 5, Section 8.9	PASS	---
Frequency Tolerance	RSS-210 Issue 10 Section B.6	PASS	---
Channel Bandwidth	RSS-Gen Section 6.7	PASS	---
Antenna Requirement	RSS-Gen Section 8.3	PASS	---
Supplementary information:			

3.3 Test Facility

USA	**:**	**FCC Designation Number: CN1199**
Canada	**:**	**CAB identifier Number: CN0040**

4 TEST RESULTS

4.1 AC Power Line Conducted Emission	VERDICT: PASS

4.1.1 Limit

Standard	FCC Part 15 Subpart E Paragraph 15.207	
Frequency range [MHz]	Limit: QP [dB(μV)[1)]]	Limit: AV [dB(μV) [1)]]
0,15 - 0,50	66 – 56 [2)]	56 - 46 [2)]
0,50 - 5,0	56	46
5,0 - 30	60	50

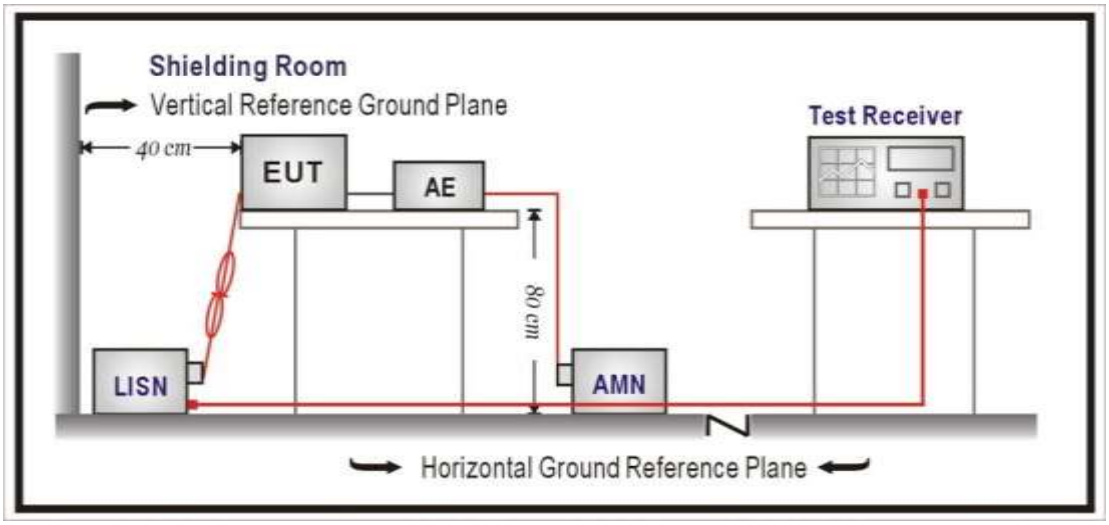
[1)] At the transition frequency, the lower limit applies.

[2)] The limit decreases linearly with the logarithm of the frequency.

NOTE 1: The exclusion band for transmitters shall be considered for transmitters operating at frequencies below 30 MHz.

NOTE 2: Where the AC output port is directly connected (or via a circuit breaker) to the AC power input port of the EUT the AC power output port need not to be tested.

4.1.2 Test Setup

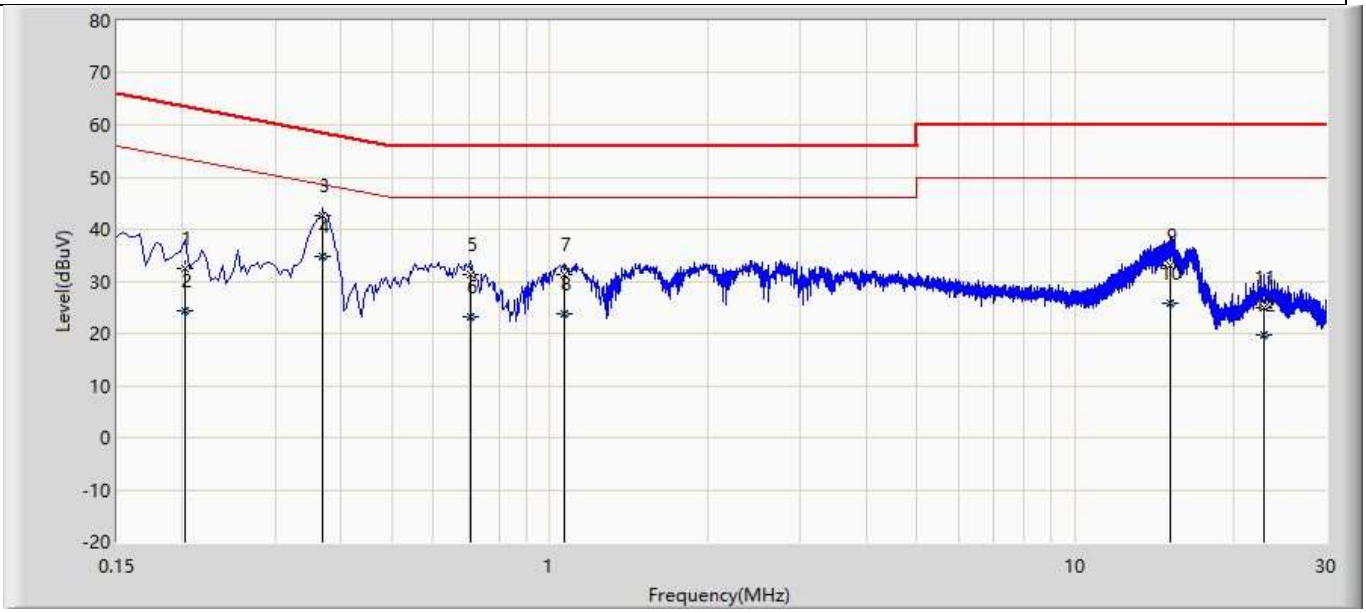


4.1.3 Test Procedure

	References Rule	Chapter	Item
☒	ANSI C63.10-2013	6.2	Standard test method for ac power-line conducted emissions from unlicensed wireless devices

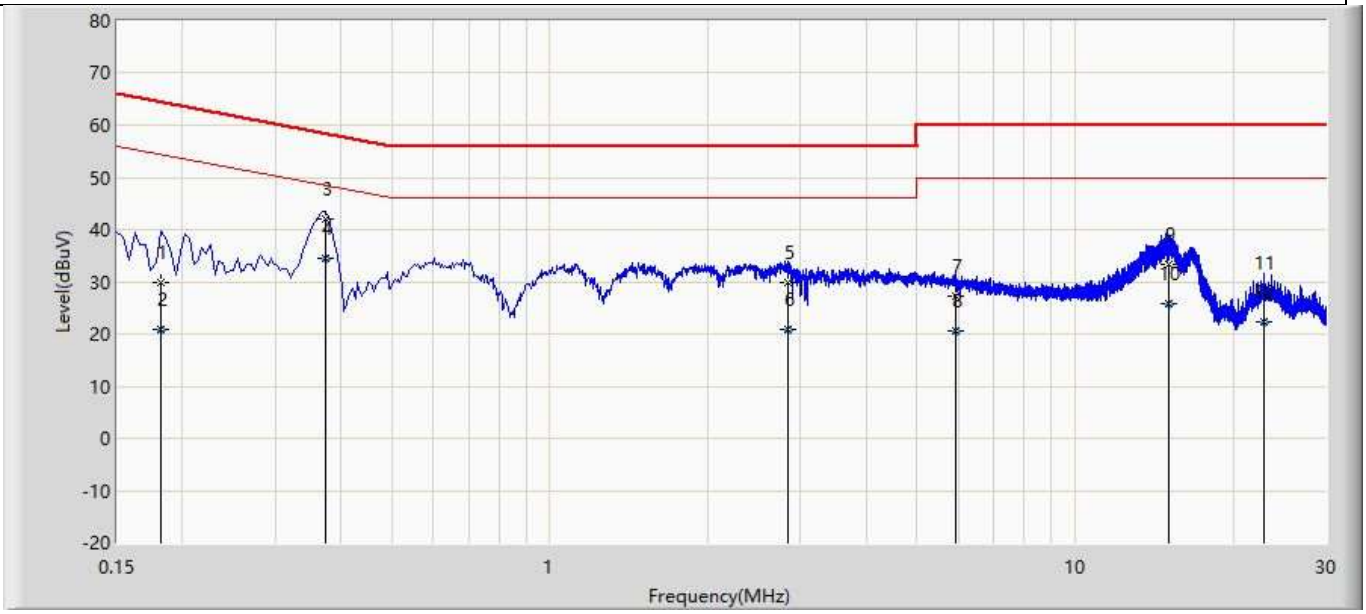
4.1.4 Test Data

Profile: 2090075R	Page No.: 9
Engineer: Pawn	
Site: TR1	Time: 2020/09/27 - 20:54
Limit: FCC_Part15.207_CE_AC Power_ClassB	Margin: 0
Probe: ENV216_101189(0.009-30MHz)	Polarity: Neutral
EUT: 8690i	Power: AC 120V/60Hz
Note: Mode 1	



No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1		0.202	32.436	22.786	-31.092	63.528	9.650	QP
2		0.202	24.415	14.765	-29.113	53.528	9.650	AV
3		0.370	42.511	32.854	-15.990	58.501	9.657	QP
4	*	0.370	34.815	25.158	-13.686	48.501	9.657	AV
5		0.706	31.268	21.599	-24.732	56.000	9.669	QP
6		0.706	23.271	13.603	-22.729	46.000	9.669	AV
7		1.062	31.335	21.645	-24.665	56.000	9.690	QP
8		1.062	23.833	14.143	-22.167	46.000	9.690	AV
9		15.170	32.950	22.831	-27.050	60.000	10.120	QP
10		15.170	25.875	15.755	-24.125	50.000	10.120	AV
11		22.926	24.987	14.614	-35.013	60.000	10.374	QP
12		22.926	19.802	9.428	-30.198	50.000	10.374	AV

Profile: 2090075R	Page No.: 10
Engineer: Pawn	
Site: TR1	Time: 2020/09/27 - 21:00
Limit: FCC_Part15.207_CE_AC Power_ClassB	Margin: 0
Probe: ENV216_101189(0.009-30MHz)	Polarity: Line
EUT: 8690i	Power: AC 120V/60Hz
Note: Mode 1	



No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1		0.182	29.946	20.274	-34.447	64.394	9.673	QP
2		0.182	20.988	11.315	-33.406	54.394	9.673	AV
3		0.374	41.931	32.250	-16.481	58.412	9.681	QP
4	*	0.374	34.435	24.754	-13.977	48.412	9.681	AV
5		2.834	29.928	20.168	-26.072	56.000	9.760	QP
6		2.834	20.955	11.195	-25.045	46.000	9.760	AV
7		5.902	27.350	17.493	-32.650	60.000	9.857	QP
8		5.902	20.683	10.826	-29.317	50.000	9.857	AV
9		15.074	33.364	23.235	-26.636	60.000	10.128	QP
10		15.074	25.770	15.642	-24.230	50.000	10.128	AV
11		22.906	27.762	17.377	-32.238	60.000	10.385	QP
12		22.906	22.398	12.012	-27.602	50.000	10.385	AV

4.2 E-field Emission	VERDICT: PASS

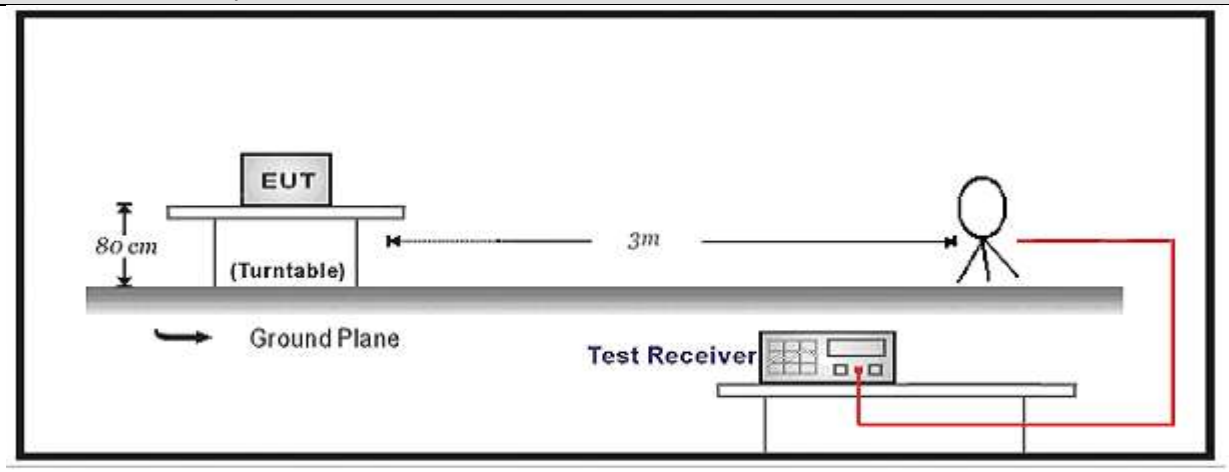
4.2.1 Limit

Standard	FCC Part 15 Subpart C Paragraph 15.225

(a) The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.
(b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.
(c) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.
(d) The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in §15.209.

4.2.2 Test Setup

Below 30MHz Test Setup:



4.2.3 Test Procedure

	References Rule		Chapter	Description
	☒	ANSI C63.10	6.4	Radiated emissions from unlicensed wireless devices below 30 MHz
	☐	ANSI C63.10	6.5	Radiated emissions from unlicensed wireless devices in the frequency range of 30 MHz to 1000 MHz
	☐	ANSI C63.10	6.6	Radiated emissions from unlicensed wireless devices above 1 GHz

4.2.4 Test Data

Frequency (MHz)	Measure Level (dBμV/m) (3m)	Loop Ant. Axis. (X/Y/Z)	Correction factor (dB)	Reading Level (dBμV/m) (3m)	Distance factor (dB)	Limit (dBμV/m) (30m)	Limit (dBμV/m) (3m)	Over Limit (dB)
13.562	68.423	X	29.406	39.017	40	84	124	55.577
13.562	70.354	Y	29.406	40.948	40	84	124	53.646
13.562	62.759	Z	29.406	33.353	40	84	124	61.241
13.313	54.336	Y	29.423	24.913	40	40.5	80.5	26.164
13.482	68.363	Y	29.410	38.953	40	50.5	90.5	22.137
13.824	65.759	Y	29.186	36.573	40	50.5	90.5	24.741
13.895	53.216	Y	29.384	23.832	40	40.5	80.5	27.284

Note1: Antenna Test Distance at 3 meters.

Note2: Measure Level=Reading Level+Correction factor.

Note3: Measurements were performed at 3m and the data was extrapolated to the specified measurement distance of 30m using the square of an inverse linear distance extrapolation factor (40 dB/decade) as specified in §15.31(f)(2). Extrapolation Factor = 40 $\log_{10}(30/3)$ = 40dB.

Note4: X axis is antenna orientation parallel and Y axis is perpendicular, Z axis is ground-papallel.

4.3 Radiated Emissions	VERDICT: PASS

4.3.1 Limit	
Standard	FCC Part 15 Subpart C Paragraph 15. 209

Restricted Band Emissions Limit

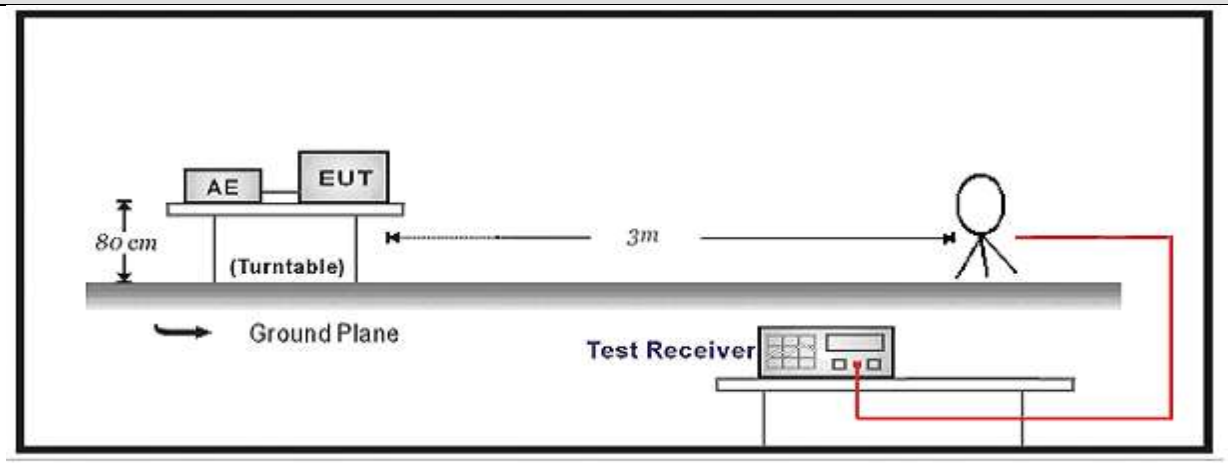
Frequency (MHz)	Field strength (μV/m)	Field strength (dBμV/m)	Measurement distance (m)
0.009 - 0.49	2400/F(kHz)	48.5 – 13.8	300(Note 1)
0.49 - 1.705	24000/F(kHz)	33.8 - 23	30(Note 1)
1.705 - 30	30	29.5	30(Note 1)
30 - 88	100	40	3(Note 2)
88 - 216	150	43.5	3(Note 2)
216 - 960	200	46	3(Note 2)
Above 960	500	54	3(Note 2)

Note 1: At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade).

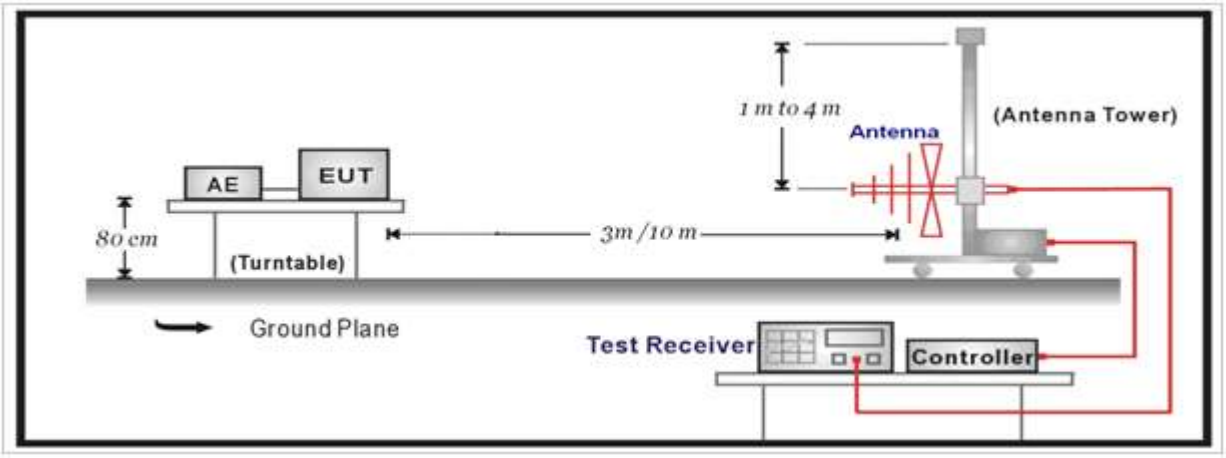
Note 2: At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 meters unless it can be further demonstrated that measurements at a distance of 30 meters or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).

4.3.2 Test Setup

Below 30MHz Test Setup:



30MHz-1GHz Test Setup:

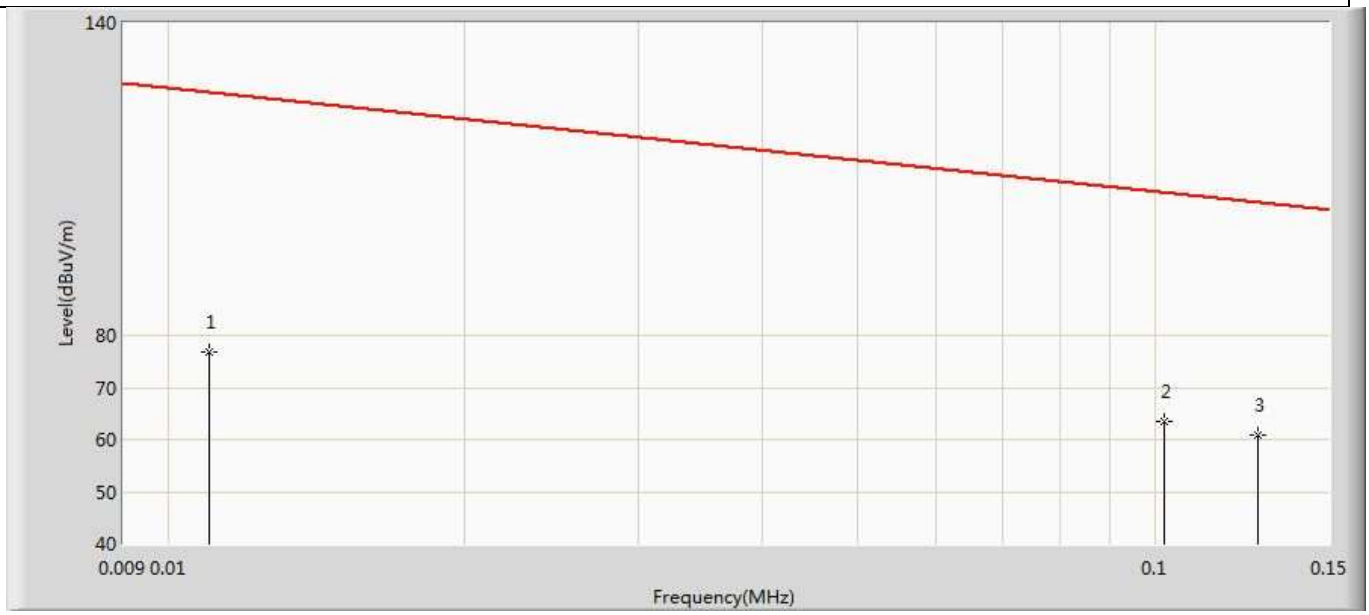


4.3.3 Test Procedure

	References Rule		Chapter	Description
	☒	ANSI C63.10	6.4	Radiated emissions from unlicensed wireless devices below 30 MHz
	☒	ANSI C63.10	6.5	Radiated emissions from unlicensed wireless devices in the frequency range of 30 MHz to 1000 MHz
	☐	ANSI C63.10	6.6	Radiated emissions from unlicensed wireless devices above 1 GHz

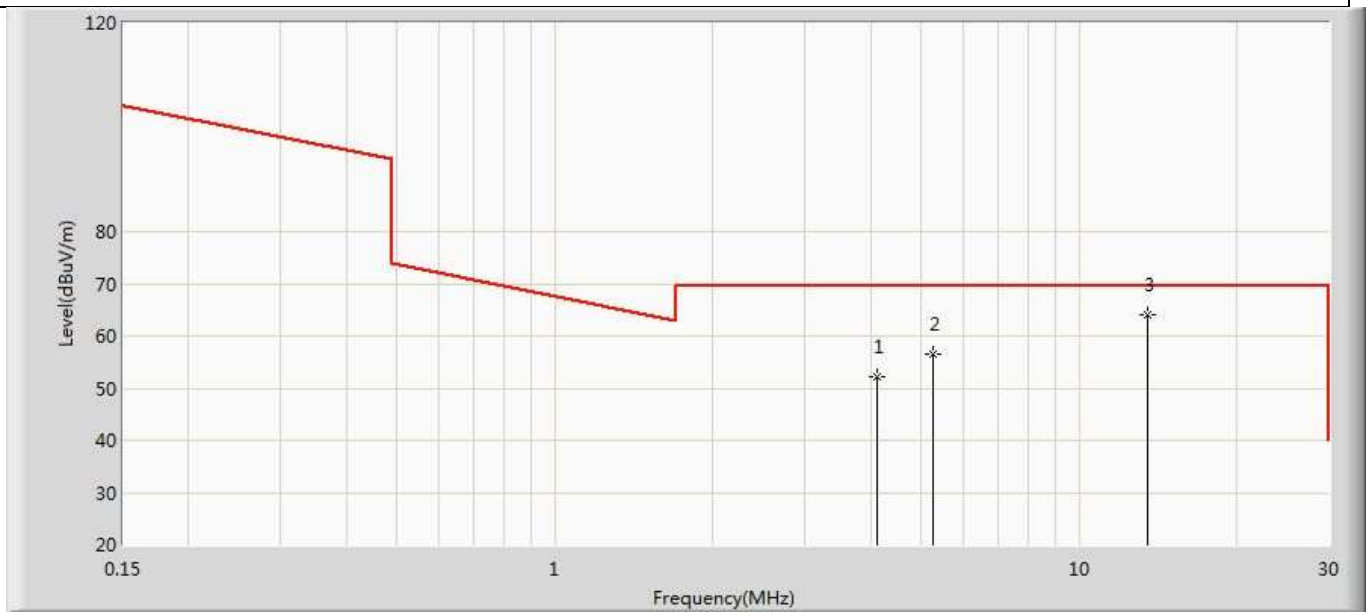
4.3.4 Test Data

Profile: 2090075R	Page No.: 1
Engineer: Tim.Cao	
Site: AC3	Time: 2020/11/08 - 18:42
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: HFH2-Z2_833799(0.009-30MHz)	Polarity: X axis
EUT: 8690i	Power:Battery
Note:Mode 1	



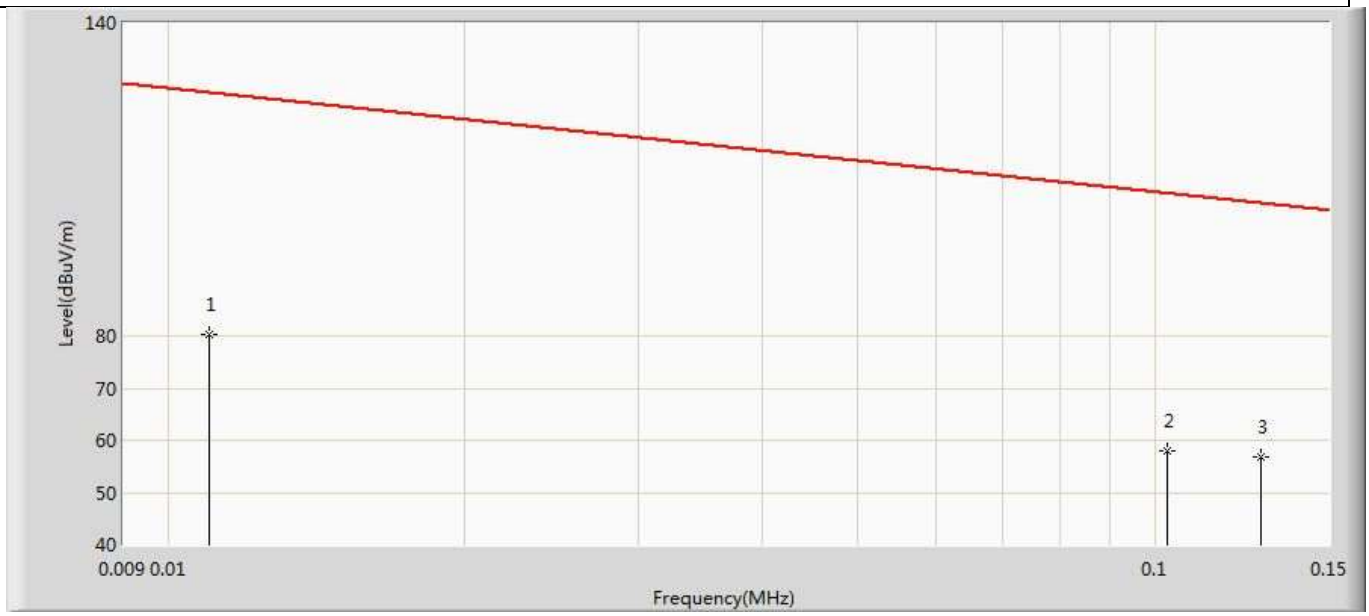
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		0.011	76.923	47.496	-49.835	126.758	29.427	PK
2	*	0.102	63.542	34.921	-43.882	107.424	28.621	PK
3		0.127	61.005	32.360	-44.517	105.521	28.645	PK

Profile: 2090075R	Page No.: 2
Engineer: Tim.Cao	
Site: AC3	Time: 2020/11/08 - 19:16
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: HFH2-Z2_833799(0.009-30MHz)	Polarity: X axis
EUT: 8690i	Power:Battery
Note:Mode 1	



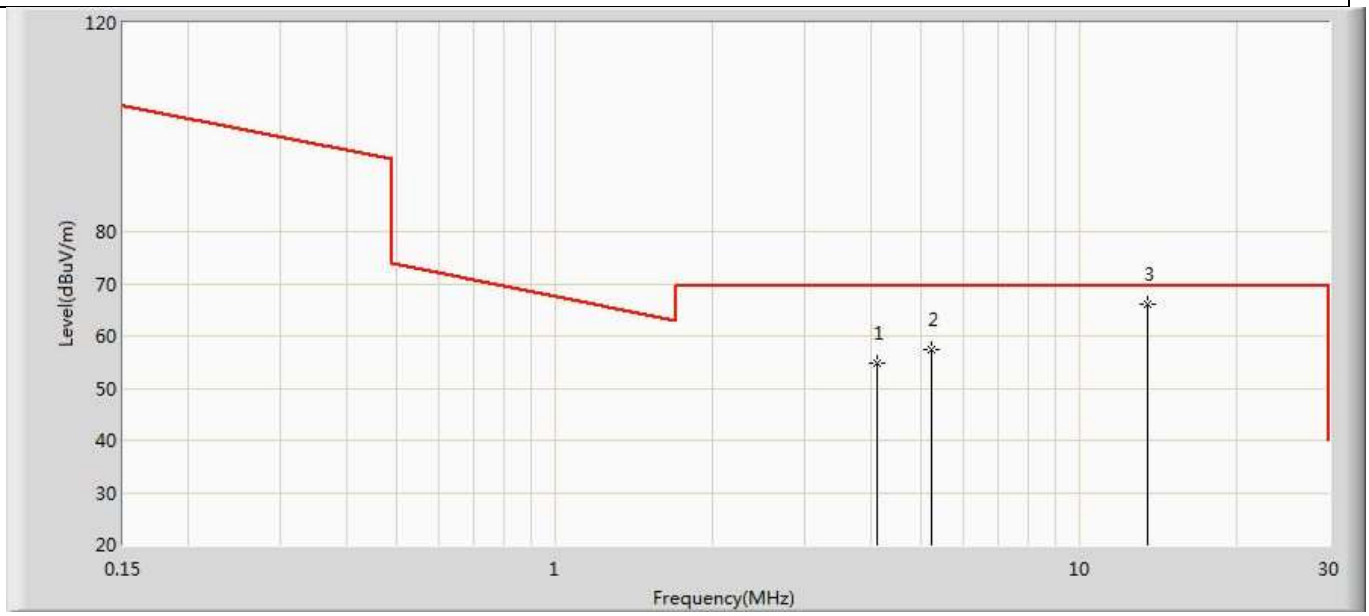
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4.132	52.262	22.408	-17.238	69.500	29.854	PK
2		5.264	56.458	26.505	-13.042	69.500	29.953	PK
3	*	13.562	64.056	34.650	-5.444	69.500	29.406	PK

Profile: 2090075R	Page No.: 3
Engineer: Tim.Cao	
Site: AC3	Time: 2020/11/08 - 19:22
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: HFH2-Z2_833799(0.009-30MHz)	Polarity: Y axis
EUT: 8690i	Power:Battery
Note:Mode 1	



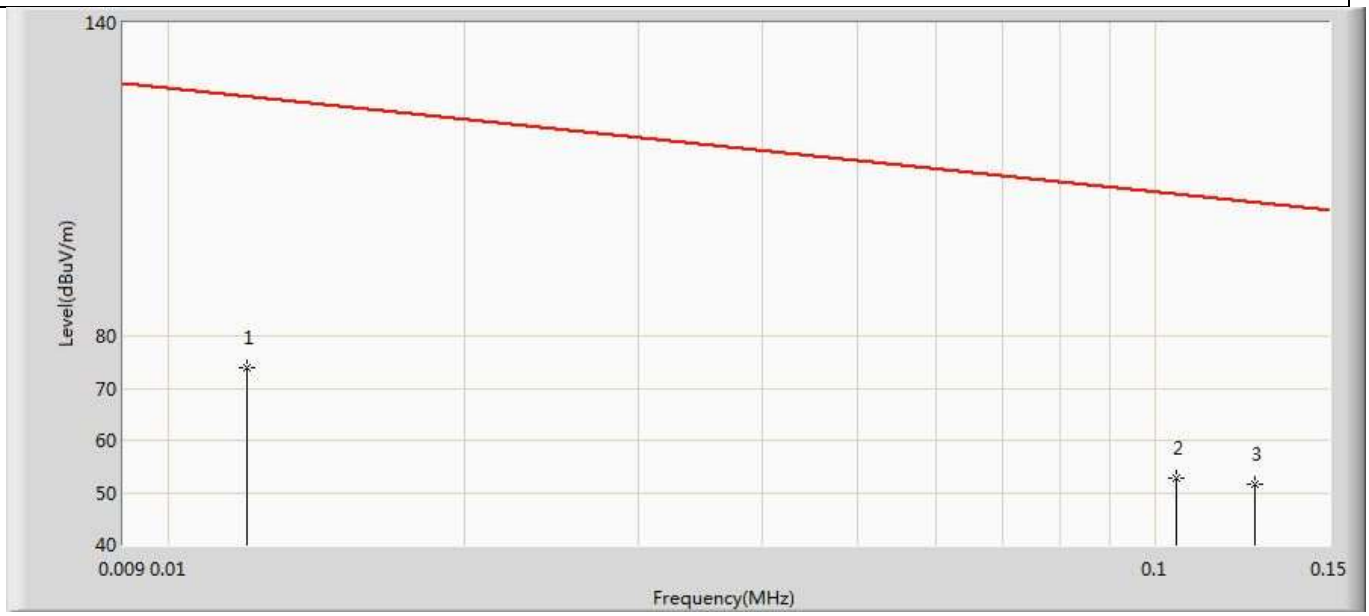
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	0.011	80.426	50.999	-46.332	126.758	29.427	PK
2		0.103	57.898	29.276	-49.442	107.340	28.622	PK
3		0.128	56.846	28.200	-48.607	105.453	28.646	PK

Profile: 2090075R	Page No.: 4
Engineer: Tim.Cao	
Site: AC3	Time: 2020/11/08 - 19:24
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: HFH2-Z2_833799(0.009-30MHz)	Polarity: Y axis
EUT: 8690i	Power:Battery
Note:Mode 1	



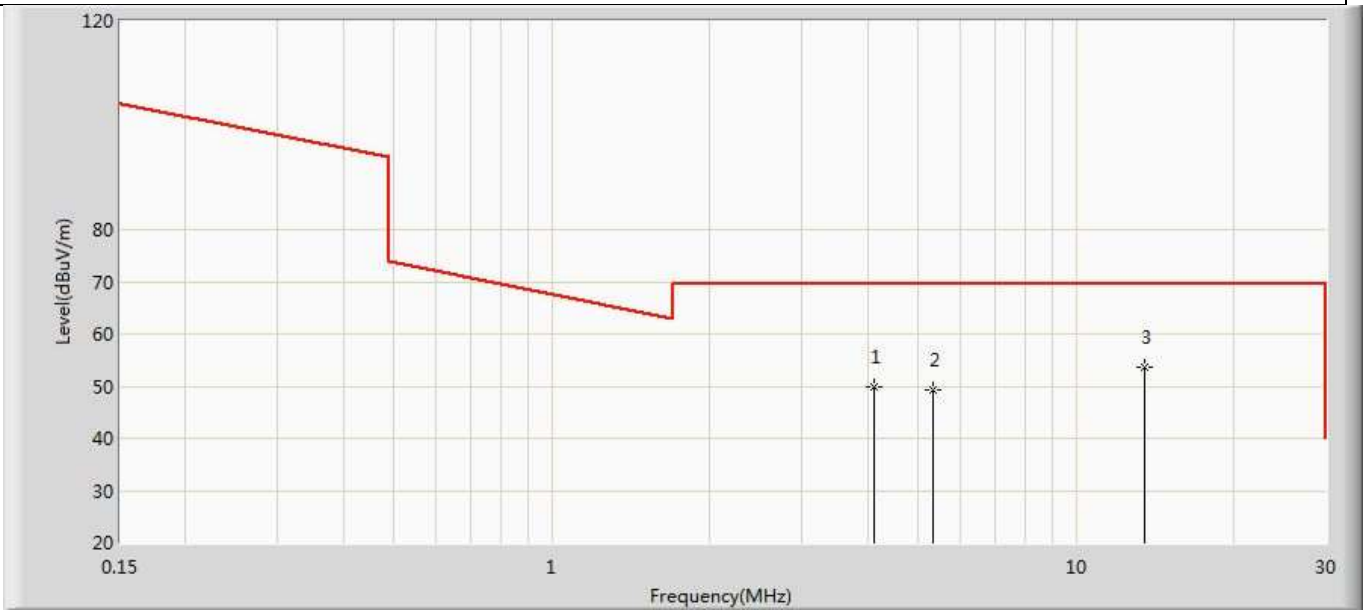
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4.120	54.702	24.852	-14.798	69.500	29.850	PK
2		5.227	57.309	27.358	-12.191	69.500	29.951	PK
3	*	13.562	65.958	36.552	-3.542	69.500	29.406	PK

Profile: 2090075R	Page No.: 5
Engineer: Tim.Cao	
Site: AC3	Time: 2020/11/08 - 19:25
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: HFH2-Z2_833799(0.009-30MHz)	Polarity: Z axis
EUT: 8690i	Power:Battery
Note:Mode 1	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	0.012	73.853	44.457	-52.149	126.003	29.396	PK
2		0.105	52.708	24.084	-54.465	107.173	28.624	PK
3		0.126	51.560	22.916	-54.030	105.590	28.644	PK

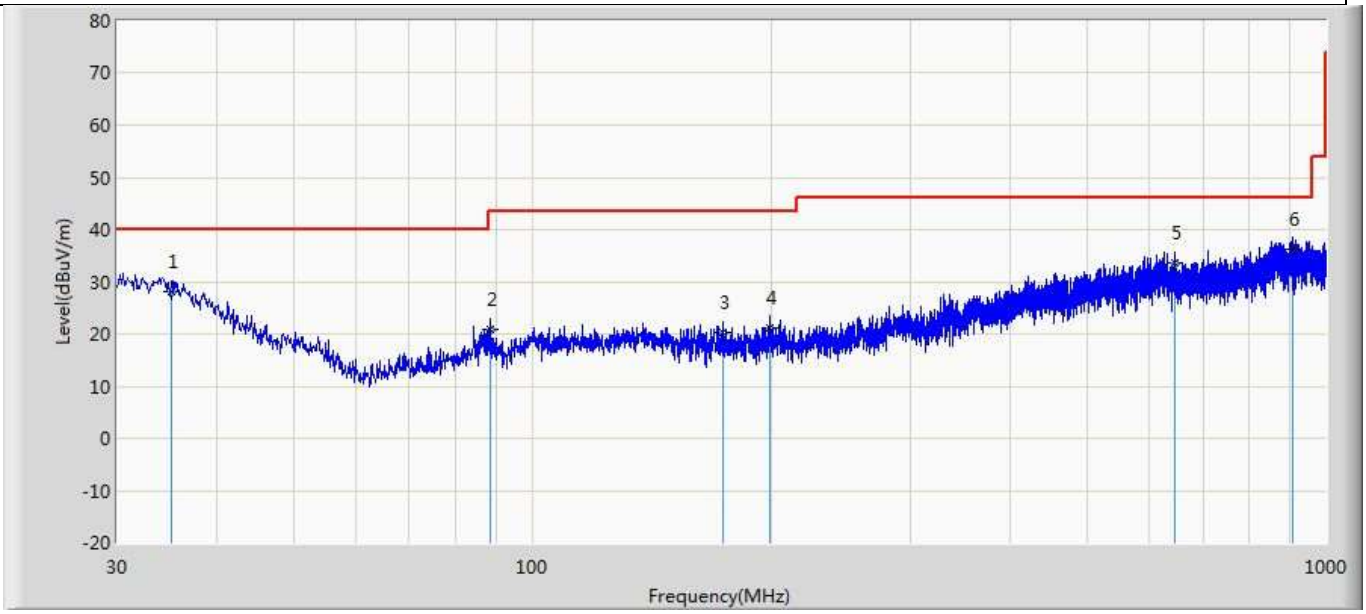
Profile: 2090075R	Page No.: 6
Engineer: Tim.Cao	
Site: AC3	Time: 2020/11/08 - 19:28
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: HFH2-Z2_833799(0.009-30MHz)	Polarity: Z axis
EUT: 8690i	Power:Battery
Note:Mode 1	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4.108	49.801	19.952	-19.699	69.500	29.849	PK
2		5.330	49.241	19.282	-20.259	69.500	29.959	PK
3	*	13.562	53.720	24.314	-15.780	69.500	29.406	PK

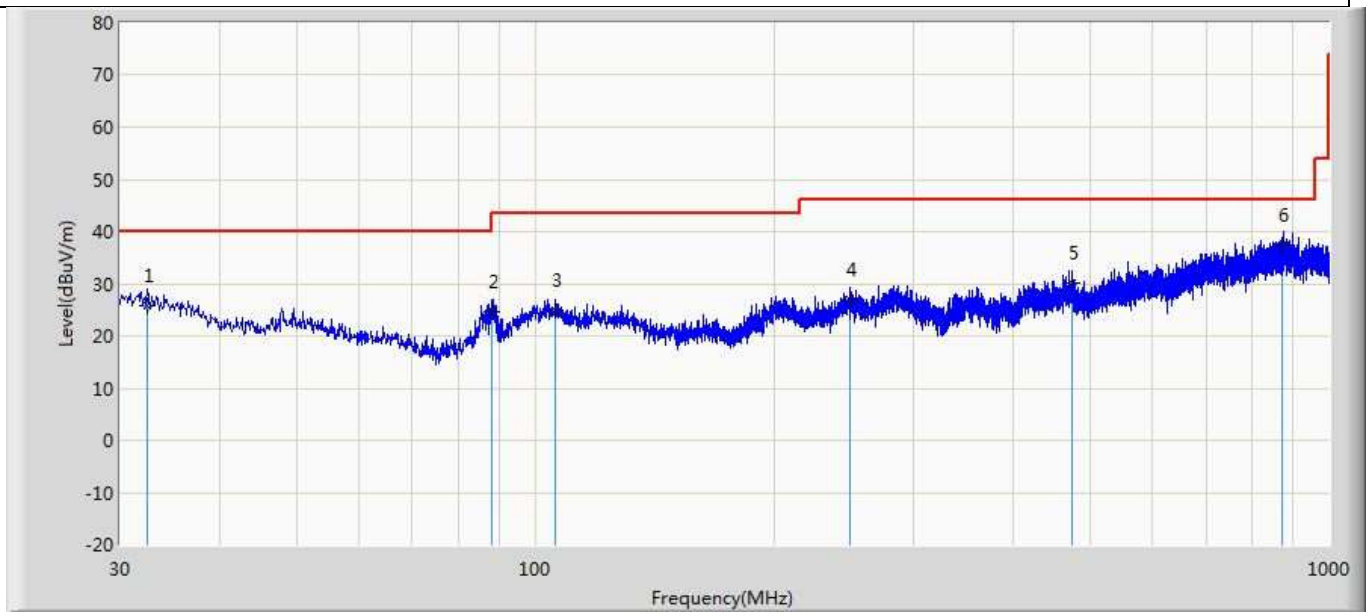
Note:
1. Measurement Level = Reading Level + Factor
2: X axis is antenna orientation parallel and Y axis is perpendicular, Z axis is ground-papallel.

Profile: 2090075R	Page No.: 1
Engineer: Yingfei.Wang	
Site: AC2	Time: 2020/09/22 - 20:16
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: AC2_3M(30-1000M)	Polarity: Horizontal
EUT: 8690i	Power: Battery
Note: Mode 1	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		35.092	28.076	1.258	-11.924	40.000	26.817	QP
2		88.564	20.749	6.987	-22.751	43.500	13.762	QP
3		174.045	20.218	3.123	-23.282	43.500	17.095	QP
4		199.023	21.161	3.458	-22.339	43.500	17.703	QP
5		644.616	33.668	5.485	-12.332	46.000	28.183	QP
6	*	906.759	36.172	3.458	-9.828	46.000	32.714	QP

Profile: 2090075R	Page No.: 2
Engineer: Yingfei.Wang	
Site: AC2	Time: 2020/09/22 - 20:28
Limit: FCC_Part15.209_RE(3m)_ClassB	Margin: 0
Probe: AC2_3M(30-1000M)	Polarity: Vertical
EUT: 8690i	Power: Battery
Note: Mode 1	

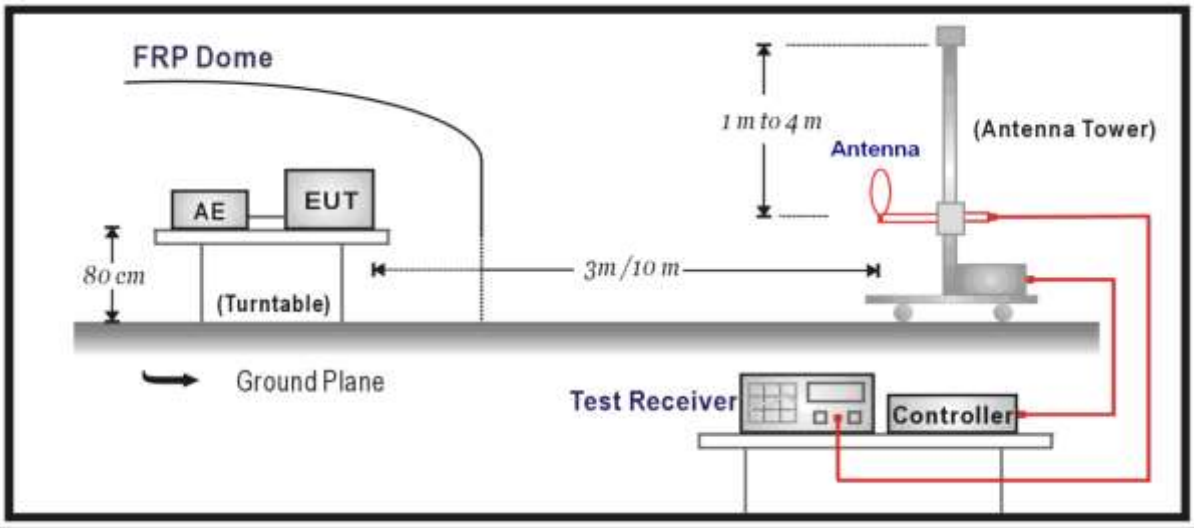


No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		32.425	25.903	2.698	-14.097	40.000	23.205	QP
2		88.200	24.643	7.984	-18.857	43.500	16.659	QP
3		106.024	25.019	3.012	-18.481	43.500	22.007	QP
4		248.977	26.901	2.589	-19.099	46.000	24.312	QP
5		475.473	30.098	3.984	-15.902	46.000	26.114	QP
6	*	873.051	37.397	4.516	-8.603	46.000	32.881	QP

4.4 Emission bandwidth	VERDICT: PASS

4.4.1 Limit	
Standard	FCC Part 15 Subpart C Paragraph 15.215
Within the band.	

4.4.2 Test Setup



4.4.3 Test Procedure

	Reference Rule	Chapter	Description
☒	ANSI C63.10	6.9.2	Occupied bandwidth—relative measurement procedure

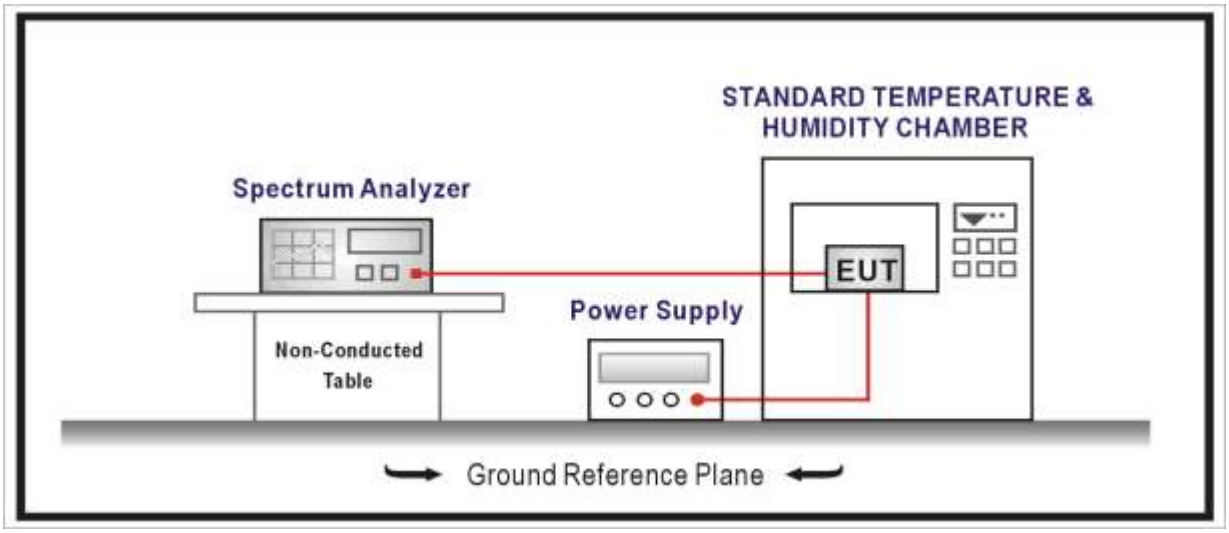
4.4.4 Test Data

Frequency (MHz)	Frequency Range Limit (MHz)	Result
13.56	13.553 ~ 13.567	Pass

4.5 Frequency Stability	VERDICT: PASS

4.5.1 Limit:	
Standard	FCC Part 15 Subpart C Paragraph 15.225(e)
☒	The frequency tolerance of the carrier signal shall be maintained within ±0.01% of the operating frequency over a temperature variation of −20 degrees to + 50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

4.5.2 Test Setup



4.5.3 Test Procedure

	References Rule		Chapter	Description
☒	ANSI C63.10		6.8	Frequency stability tests
	☒	ANSI C63.10	6.8.1	Frequency stability with respect to ambient temperature
	☒	ANSI C63.10	6.8.2	Frequency stability when varying supply voltage

4.5.4 Test Data

Frequency Stability under Temperature at 0min

Temperature Interval (℃)	Test Frequency (MHz)	Deviation (Hz)	Limit (ppm)	Result
-30	13.56	630	±100	Pass
-20	13.56	630	±100	Pass
-10	13.56	630	±100	Pass
0	13.56	630	±100	Pass
10	13.56	630	±100	Pass
20	13.56	630	±100	Pass
30	13.56	630	±100	Pass
40	13.56	630	±100	Pass
50	13.56	630	±100	Pass

Frequency Stability under Temperature at 2min

Temperature Interval (℃)	Test Frequency (MHz)	Deviation (Hz)	Limit (ppm)	Result
-30	13.56	630	±100	Pass
-20	13.56	630	±100	Pass
-10	13.56	630	±100	Pass
0	13.56	630	±100	Pass
10	13.56	630	±100	Pass
20	13.56	630	±100	Pass
30	13.56	630	±100	Pass
40	13.56	630	±100	Pass
50	13.56	630	±100	Pass

Frequency Stability under Temperature at 5min				
Temperature Interval (℃)	Test Frequency (MHz)	Deviation (Hz)	Limit (ppm)	Result
-30	13.56	630	±100	Pass
-20	13.56	630	±100	Pass
-10	13.56	630	±100	Pass
0	13.56	630	±100	Pass
10	13.56	630	±100	Pass
20	13.56	630	±100	Pass
30	13.56	630	±100	Pass
40	13.56	630	±100	Pass
50	13.56	630	±100	Pass

Frequency Stability under Temperature at 10min				
Temperature Interval (℃)	Test Frequency (MHz)	Deviation (Hz)	Limit (ppm)	Result
-30	13.56	630	±100	Pass
-20	13.56	630	±100	Pass
-10	13.56	630	±100	Pass
0	13.56	630	±100	Pass
10	13.56	630	±100	Pass
20	13.56	630	±100	Pass
30	13.56	630	±100	Pass
40	13.56	630	±100	Pass
50	13.56	630	±100	Pass

Frequency Stability under Voltage				
AC Voltage (V)	Test Frequency (MHz)	Deviation (Hz)	Limit (ppm)	Result
102	13.56	630	±100	Pass
120	13.56	630	±100	Pass
138	13.56	630	±100	Pass

4.6 Antenna Requirement	VERDICT: PASS

4.6.1 Limit:	
Standard	FCC Part 15 Subpart E Paragraph 15.203
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.	

4.6.2 Antenna Connector Construction:	
☒	The use of a permanently attached antenna
☐	The antenna use of a unique coupling to the intentional radiator
☐	The use of a nonstandard antenna jack or electrical connector
Please refer to the attached document “Internal Photograph” to show the antenna connector.	

5 TEST SETUP PHOTO AND EUT PHOTO	VERDICT: PASS

Remark: The test setup photo and EUT Photo please see appendix.

The End