



Test report No:
22A0289R-RF-US-P06V01

TEST REPORT

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

Product Name	Barcode scanner
Trademark	Honeywell
Model and /or type reference	HH1800
FCC ID	HD5-1800A
IC	1693B-1800A
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 (2019-12)
Verdict Summary	IN COMPLIANCE
Documented by (name / position & signature)	Tim Cao/Project Engineer <i>Tim Cao</i>
Approved by (name / position & signature)	Jack Zhang/ Supervisor <i>Jack Zhang</i>
Date of issue	2022-11-09
Report Version	V1.0
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)	Oct. 14, 2022
Date (start test)	Oct. 15, 2022
Date (finish test)	Nov. 01, 2022

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
22A0289R-RF-US-P06V01	V1.0	Initial issue of report.	2022-11-09

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);
 - Chapter 1.2 Antenna Informaion;
 - Chapter 1.3 Channel List.

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	2022.09.04	2023.09.03
Two-Line V-Network	R&S	ENV 216	101189	2022.07.01	2023.06.30
Two-Line V-Network	R&S	ENV 216	101044	2022.03.12	2023.03.11
50ohm Coaxial Switch	Anritsu	MP59B	6200464462	N/A	N/A
50ohm Termination	SHX	TF2	7081402	2022.09.18	2023.09.17
Temperature/Humidity Meter	RTS	RTS-8S	TR1-TH	2022.07.07	2023.07.06
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	2021.12.15	2022.12.14
EXA Spectrum Analyzer	Keysight	N9010A	MY55370495	2022.03.20	2023.03.19
MXA Signal Analyzer	Keysight	N9020A	MY56060147	2022.07.14	2023.07.14
Temperature/Humidity Meter	RTS	RTS-8S	RF-08	2022.07.07	2023.07.06

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	2022.07.10	2023.07.09
Loop Antenna	R&S	HFH2-Z2	833799/003	2022.02.20	2023.02.19
Bilog Antenna	Teseq GmbH	CBL6112D	27613	2022.08.28	2023.08.27
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC3-C	2022.03.30	2023.03.29
Temperature/Humidity Meter	RTS	RTS-8S	AC3-TH	2022.11.23	2023.11.22
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	± 1 kHz
Occupied Bandwidth	± 1 kHz
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. :	HH1800
Trademark :	Honeywell
FCC ID :	HD5-1800A
IC :	1693B-1800A

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

Rated power supply	Voltage and Frequency	
	<input type="checkbox"/>	AC: 200 – 240 V, 50/60 Hz
	<input type="checkbox"/>	AC: 100 – 240 V, 50/60 Hz
	<input checked="" type="checkbox"/>	DC: 5 V 0.5A
	<input type="checkbox"/>	Battery: 12-96VDC
Mounting position..... :	<input type="checkbox"/>	Table top equipment
	<input type="checkbox"/>	Wall/Ceiling mounted equipment
	<input type="checkbox"/>	Floor standing equipment
	<input checked="" type="checkbox"/>	Hand-held equipment
	<input type="checkbox"/>	Other: Vehicle-mounted equipment

1.2. Antenna information

Model No.	N/A		
Antenna manufacturer	N/A		
Antenna Delivery	<input checked="" type="checkbox"/> 1*TX+1*RX	<input type="checkbox"/> 2*TX+2*RX	<input type="checkbox"/> 3*TX+3*RX
Antenna technology	<input checked="" type="checkbox"/> SISO		
	<input type="checkbox"/> MIMO	<input type="checkbox"/> Basic	
		<input type="checkbox"/> CDD	
		<input type="checkbox"/> Sectorized	
		<input type="checkbox"/> Beam-forming	
Antenna Type	<input type="checkbox"/> External	<input type="checkbox"/> Dipole	
		<input type="checkbox"/> Sectorized	
	<input checked="" type="checkbox"/> Internal	<input type="checkbox"/> PIFA	
		<input checked="" type="checkbox"/> FPC	
		<input type="checkbox"/> Ceramic Chip Antenna	
		<input type="checkbox"/> Coil antenna	
		<input type="checkbox"/> Type F antenna	

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.

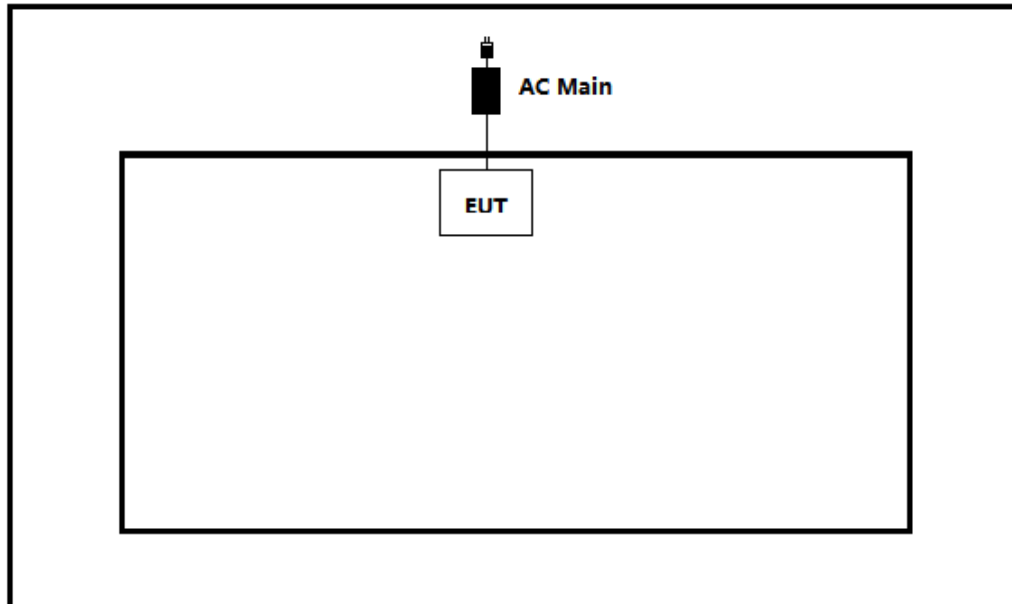
Test Mode	Mode 1: Transmit by NFC
-----------	-------------------------

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

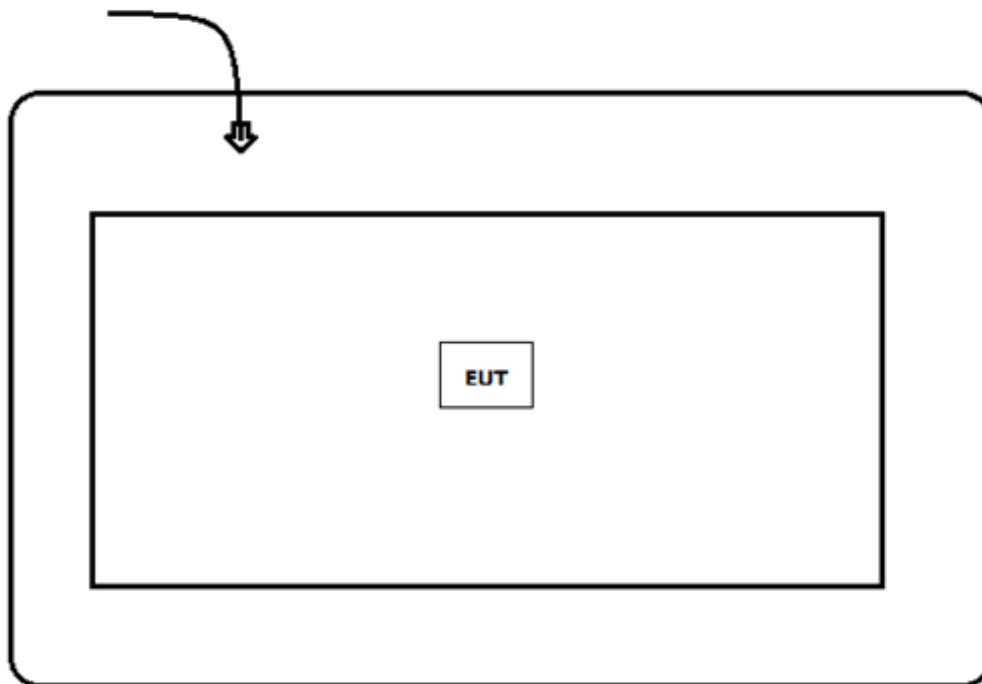
2.3 Test Configuration / Block diagram used for tests

Test setup Diagram- AC Line Conducted Emission Test



Test setup Diagram- Radiated Emission

Chamber



2.4 Testing process

1	Setup the EUT as shown in Section 2.3.
2	Execute the power on the EUT.
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	---
<u>Supplementary information:</u>			

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	---
<u>Supplementary information:</u>			

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: N/A
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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

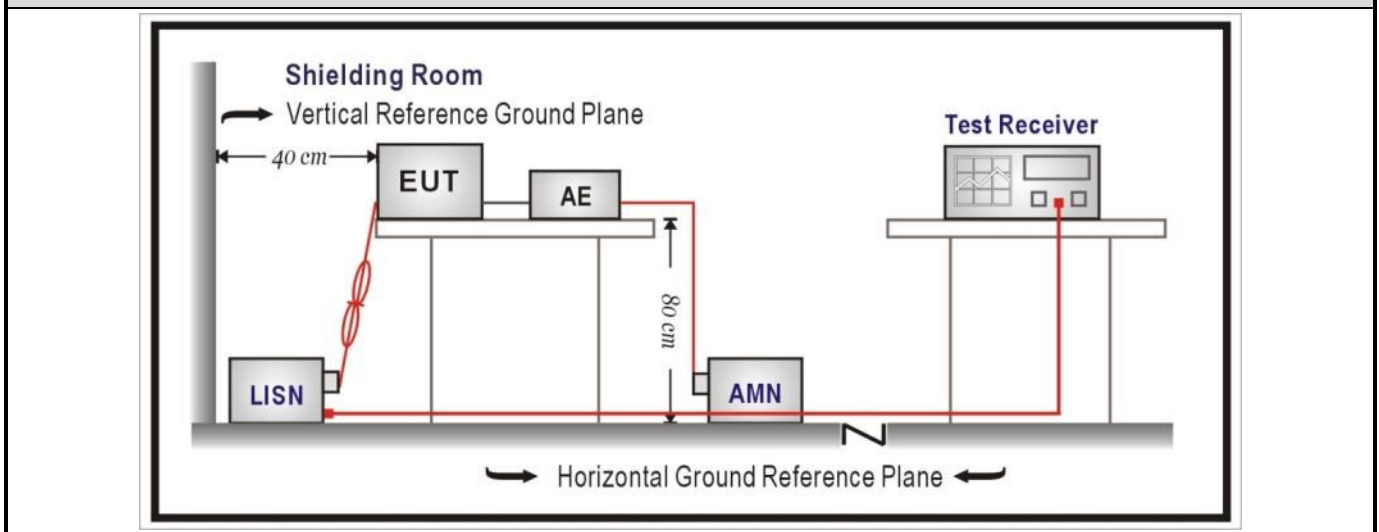
¹⁾ At the transition frequency, the lower limit applies.

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

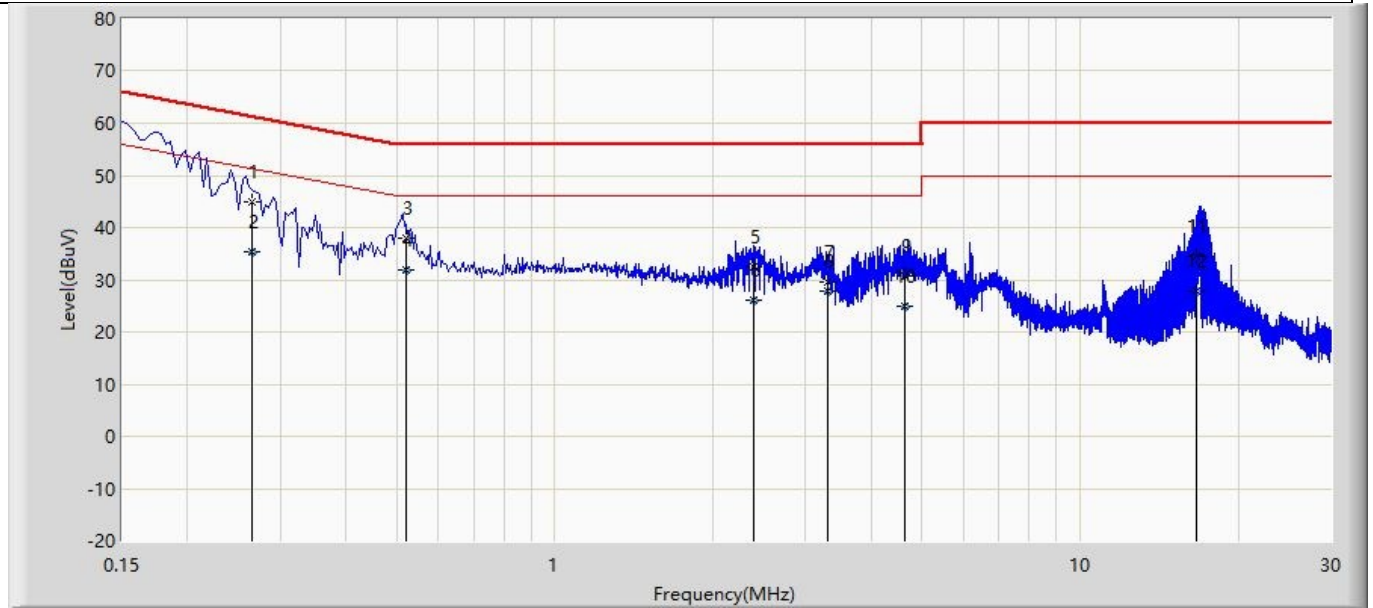


4.1.3 Test Procedure

	References Rule	Chapter	Item
<input checked="" type="checkbox"/>	ANSI C63.10-2013	6.2	Standard test method for ac power-line conducted emissions from unlicensed wireless devices

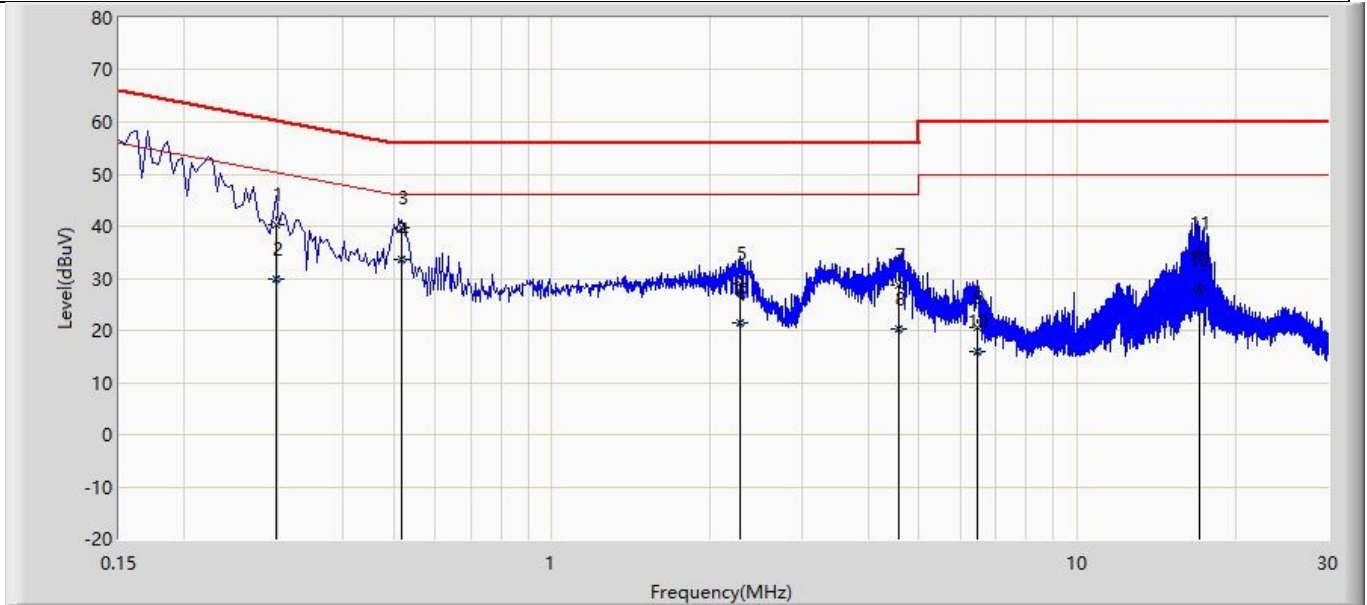
4.1.4 Test Data

Profile: 22A0289R	Page No.: 95
Engineer: Yu Liu	
Site: TR1	Time: 2022/10/30 - 04:24
Limit: FCC_Part15.107_CE_AC Power_ClassB	Margin: 0
Probe: ENV216_101190(0.009-30MHz)	Polarity: Neutral
EUT: Barcode scanner	Power: DC 5V
Note: Mode: N-Neutral	



No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1		0.266	44.919	35.330	-16.323	61.242	9.589	QP
2		0.266	35.499	25.910	-15.743	51.242	9.589	AV
3		0.520	37.999	28.375	-18.001	56.000	9.625	QP
4	*	0.520	31.758	22.133	-14.242	46.000	9.625	AV
5		2.386	32.323	22.630	-23.677	56.000	9.693	QP
6		2.386	26.136	16.442	-19.864	46.000	9.693	AV
7		3.298	29.503	19.767	-26.497	56.000	9.736	QP
8		3.298	27.863	18.127	-18.137	46.000	9.736	AV
9		4.642	30.713	20.923	-25.287	56.000	9.789	QP
10		4.642	24.839	15.049	-21.161	46.000	9.789	AV
11		16.686	34.406	24.216	-25.594	60.000	10.190	QP
12		16.686	27.942	17.752	-22.058	50.000	10.190	AV

Profile: 22A0289R	Page No.: 96
Engineer: Yu Liu	
Site: TR1	Time: 2022/10/30 - 04:28
Limit: FCC_Part15.107_CE_AC Power_ClassB	Margin: 0
Probe: ENV216_101190(0.009-30MHz)	Polarity: Line
EUT: Barcode scanner	Power: DC 5V
Note: Mode: L-Neutral	



No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1		0.298	40.186	30.584	-20.112	60.298	9.603	QP
2		0.298	29.832	20.229	-20.467	50.298	9.603	AV
3		0.518	39.708	30.082	-16.292	56.000	9.626	QP
4	*	0.518	33.650	24.024	-12.350	46.000	9.626	AV
5		2.278	29.129	19.441	-26.871	56.000	9.688	QP
6		2.278	21.525	11.837	-24.475	46.000	9.688	AV
7		4.570	28.724	18.926	-27.276	56.000	9.797	QP
8		4.570	20.149	10.351	-25.851	46.000	9.797	AV
9		6.446	20.463	10.579	-39.537	60.000	9.885	QP
10		6.446	15.950	6.066	-34.050	50.000	9.885	AV
11		17.071	34.657	24.484	-25.343	60.000	10.173	QP
12		17.071	27.868	17.695	-22.132	50.000	10.173	AV

4.2 E-field Emission	VERDICT: PASS
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4.2.1 Limit

Standard	FCC Part 15 Subpart C Paragraph 15.225
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(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.

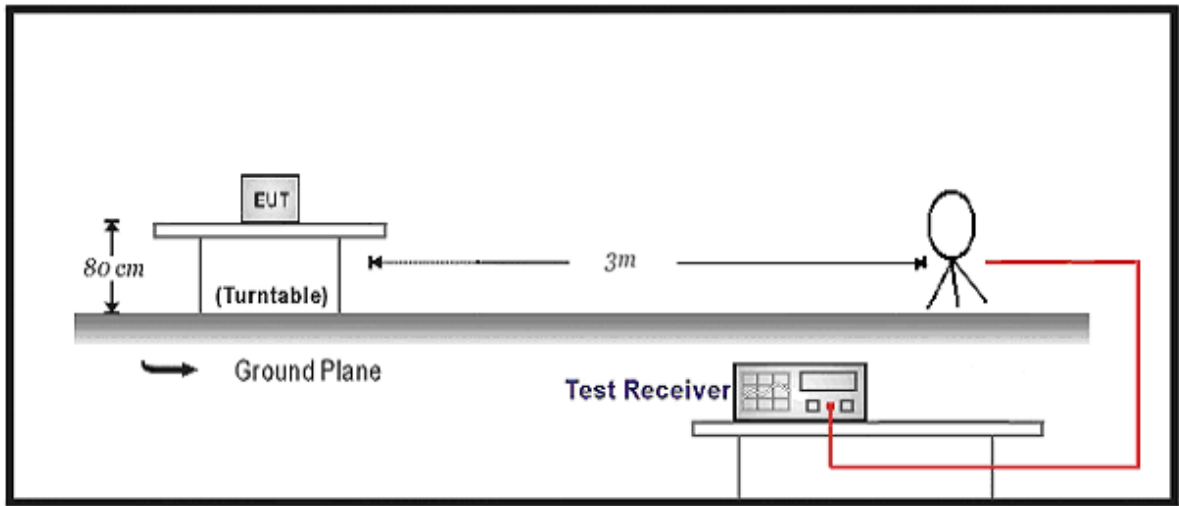
(b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

(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
<input checked="" type="checkbox"/>	ANSI C63.10	6.4	Radiated emissions from unlicensed wireless devices below 30 MHz
<input type="checkbox"/>	ANSI C63.10	6.5	Radiated emissions from unlicensed wireless devices in the frequency range of 30 MHz to 1000 MHz
<input type="checkbox"/>	ANSI C63.10	6.6	Radiated emissions from unlicensed wireless devices above 1 GHz

4.2.4 Test Data

Frequency (MHz)	Measure Level (dB μ V/m) (3m)	Loop Ant. Pol. (H/V)	Distance factor (dB)	Limit (dB μ V/m) (30m)	Limit (dB μ V/m) (3m)	Over Limit (dB)
13.560	57.825	H	40	84	124	-66.175
13.560	52.365	V	40	84	124	-71.635
13.372	42.256	H	40	40.5	80.5	-38.244
13.496	43.287	H	40	50.5	90.5	-47.213
13.645	45.247	H	40	50.5	90.5	-45.253
13.689	46.243	H	40	40.5	80.5	-34.257

Note1: Antenna Test Distance at 3 meters.

Note2: 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 = $40 \log_{10}(30/3) = 40\text{dB}$.

4.3 Radiated Emissions	VERDICT: PASS
-------------------------------	----------------------

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

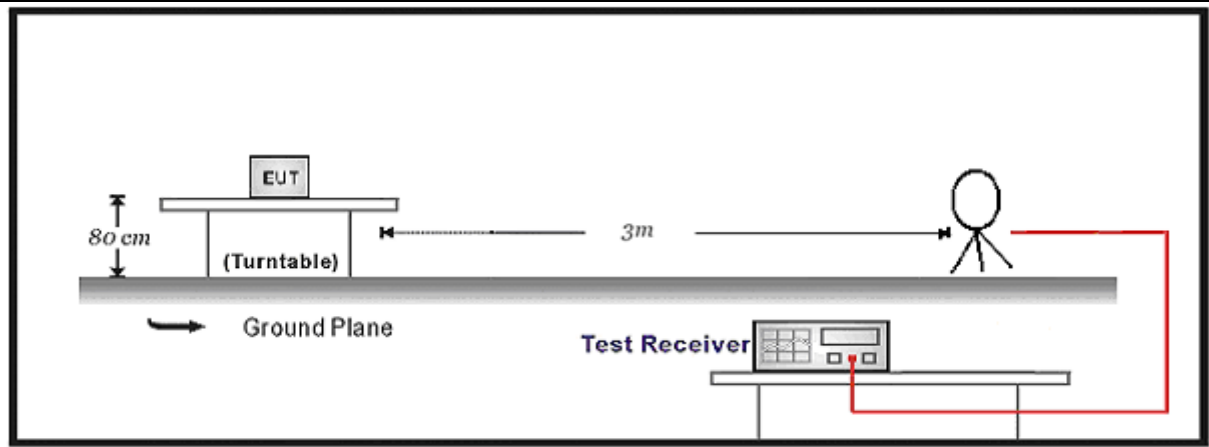
Restricted Band Emissions Limit			
Frequency (MHz)	Field strength (μ V/m)	Field strength (dB μ V/m)	Measurement distance (m)
0.009 - 0.49	2400/F(kHz)	48.5 – 13.8	300 _(Note 1)
0.49 - 1.705	24000/F(kHz)	33.8 - 23	30 _(Note 1)
1.705 - 30	30	29.5	30 _(Note 1)
30 - 88	100	40	3 _(Note 2)
88 - 216	150	43.5	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).

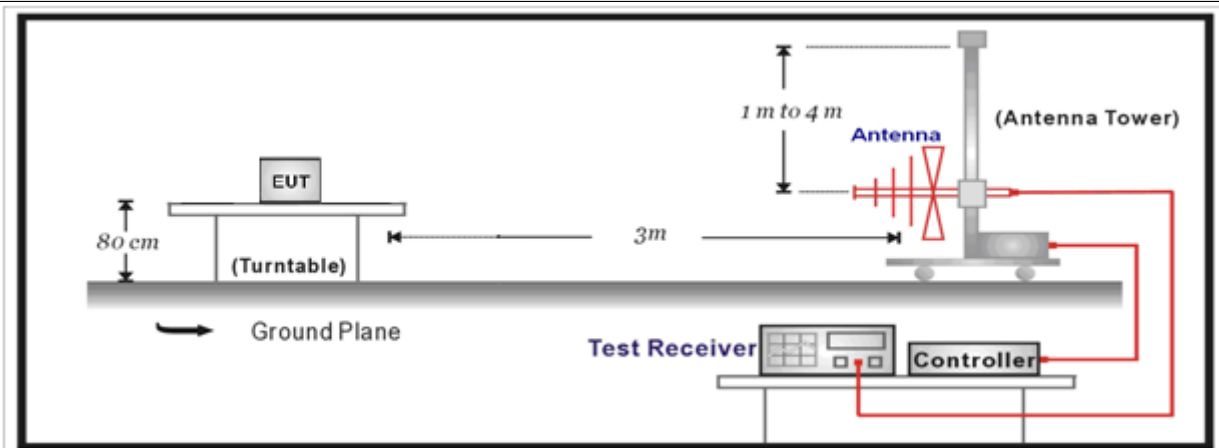
Note 2: At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated 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:



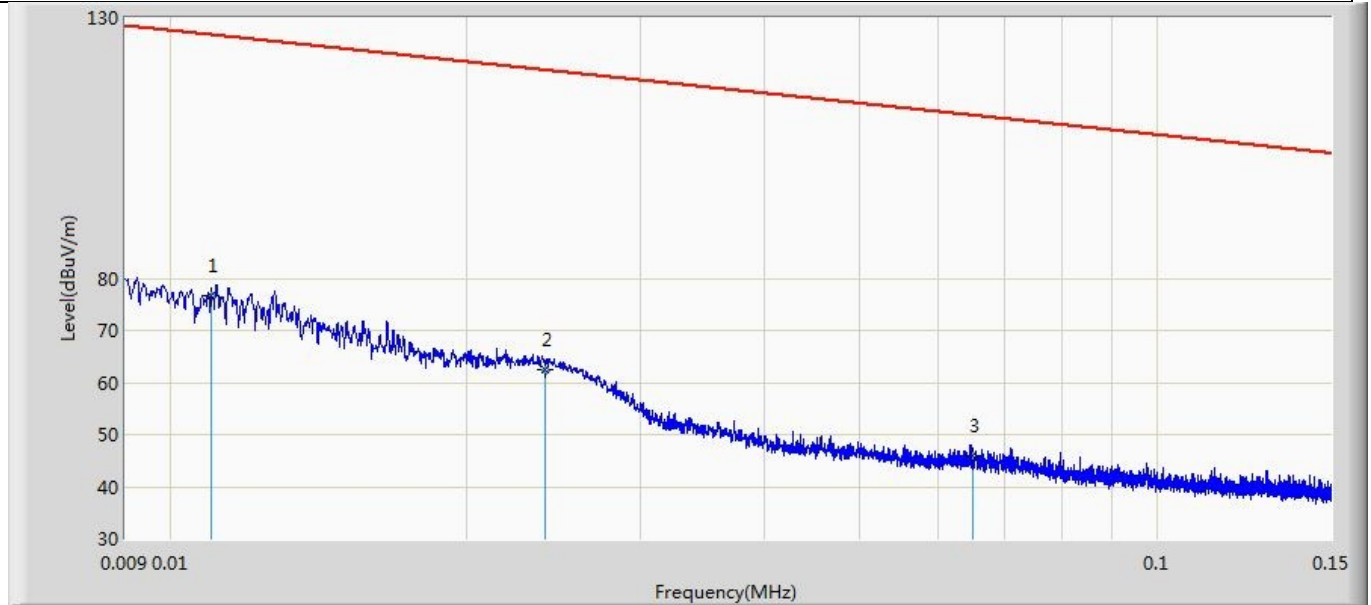
30MHz-1GHz Test Setup:



4.3.3 Test Procedure			
	References Rule	Chapter	Description
	<input checked="" type="checkbox"/> ANSI C63.10	6.4	Radiated emissions from unlicensed wireless devices below 30 MHz
	<input checked="" type="checkbox"/> ANSI C63.10	6.5	Radiated emissions from unlicensed wireless devices in the frequency range of 30 MHz to 1000 MHz
	<input type="checkbox"/> ANSI C63.10	6.6	Radiated emissions from unlicensed wireless devices above 1 GHz

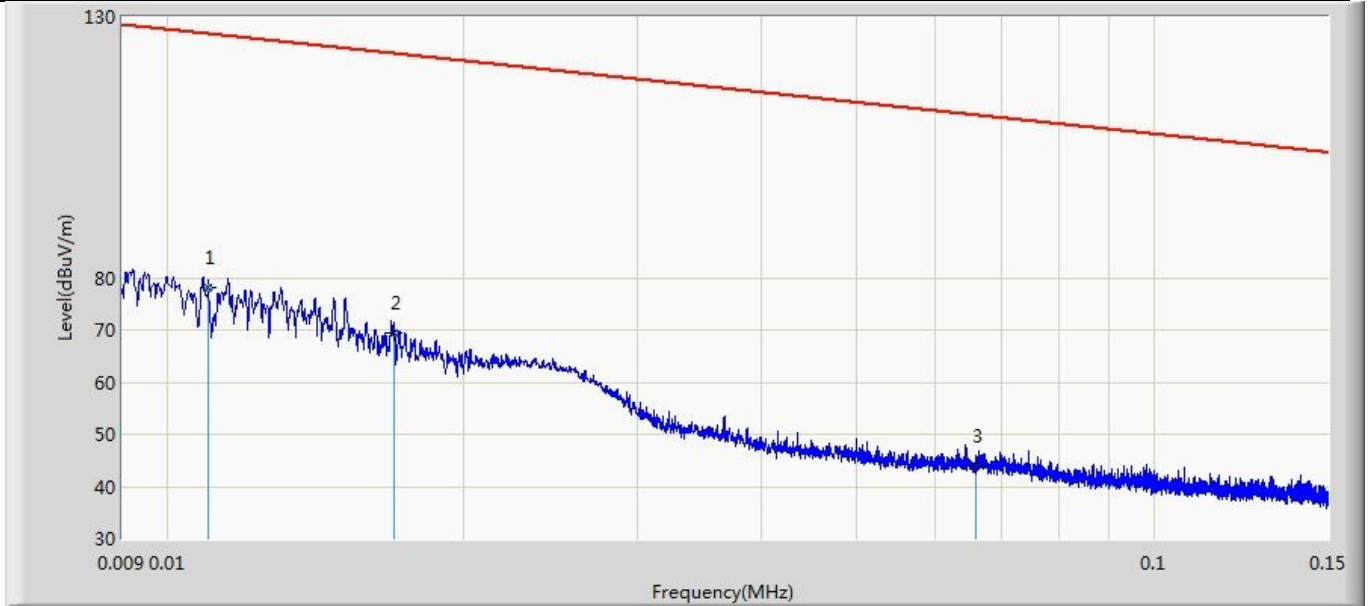
4.3.4 Test Data

Profile: 22A0289R	Page No.: 1
Engineer:YuLiu	
Site: AC3	Time: 2022/11/01 - 21:24
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: RF(0.009-30MHz)	Polarity: Horizontal
EUT: Barcode scanner	Power: DC 5V
Note: Mode 1: Transmit at 13.56MHz by NFC	



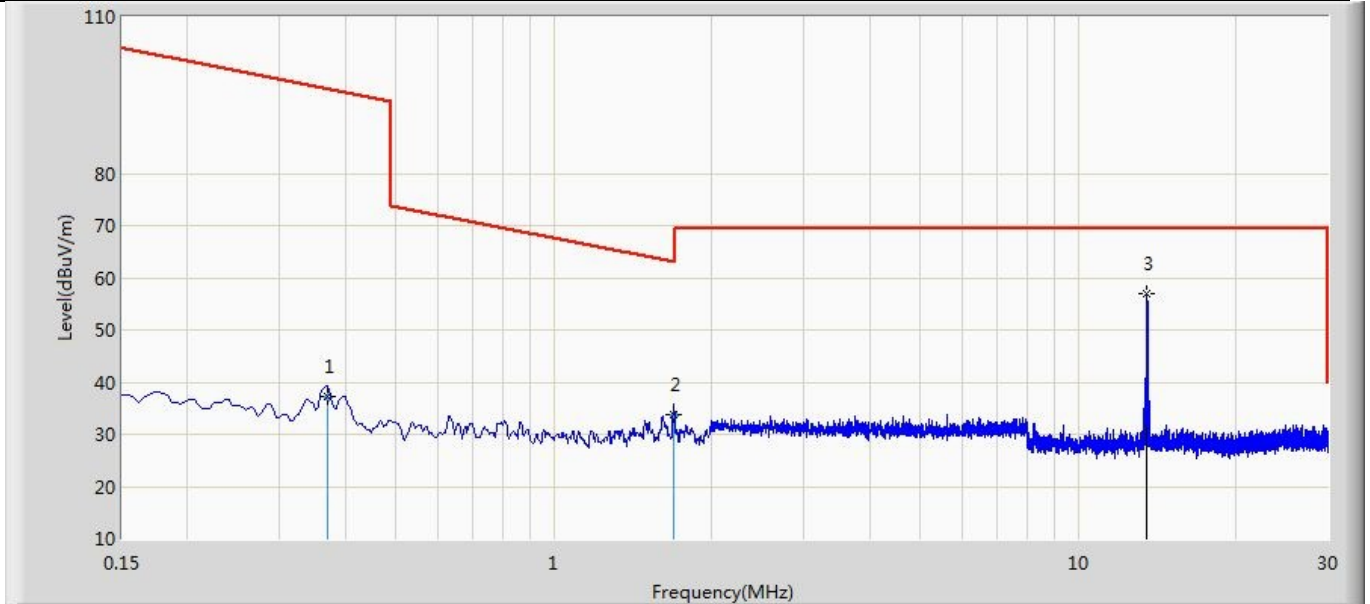
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	0.011	76.667	55.574	-50.090	126.758	21.094	QP
2		0.024	62.428	40.931	-57.557	119.985	21.497	QP
3		0.065	45.898	23.964	-65.438	111.336	21.934	QP

Profile: 22A0289R	Page No.: 2
Engineer: YuLiu	
Site: AC3	Time: 2022/11/01 - 21:32
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: RF(0.009-30MHz)	Polarity: Vertical
EUT: Barcode scanner	Power: DC 5V
Note: Mode 1: Transmit at 13.56MHz by NFC	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	0.011	78.174	57.581	-48.583	126.758	20.594	QP
2		0.017	69.520	48.740	-53.459	122.979	20.780	QP
3		0.066	44.040	22.607	-67.164	111.203	21.433	QP

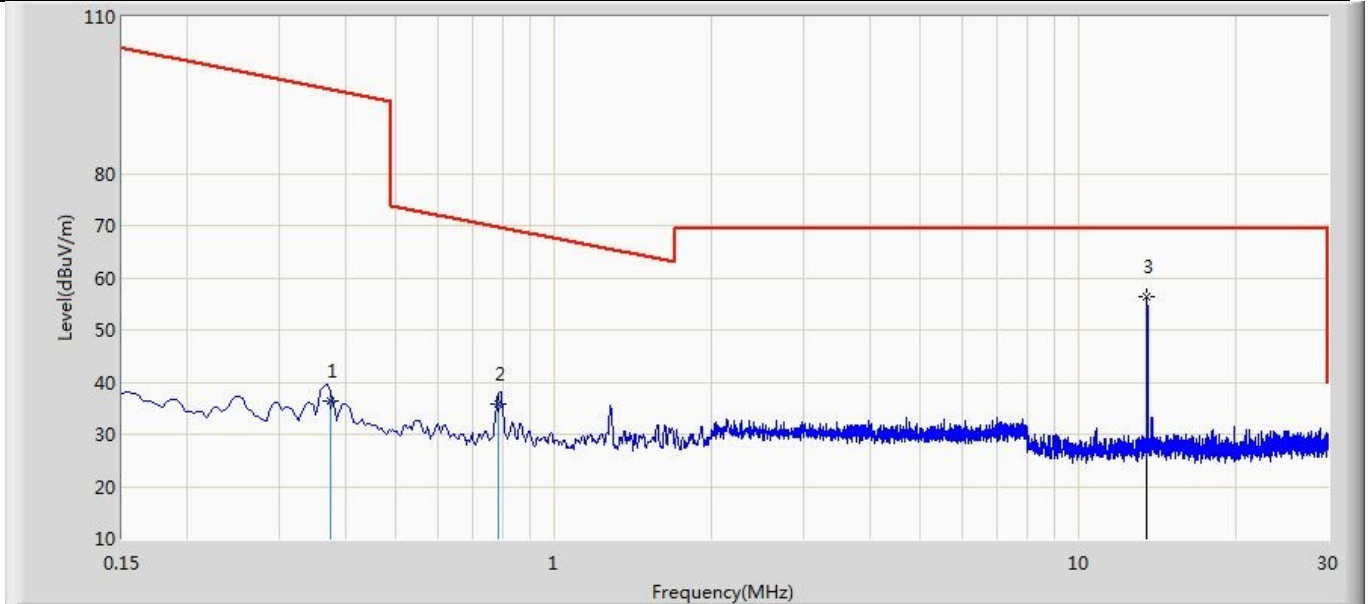
Profile: 22A0289R	Page No.: 3
Engineer: YuLiu	
Site: AC3	Time: 2022/11/01 - 21:33
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: RF(0.009-30MHz)	Polarity: Horizontal
EUT: Barcode scanner	Power: DC 5V
Note: Mode 1: Transmit at 13.56MHz by NFC	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		0.370	37.187	15.576	-59.051	96.239	21.612	QP
2		1.691	33.772	13.132	-29.299	63.071	20.641	QP
3	*	13.564	57.095	36.043	-12.405	69.500	21.052	PK

Note: The Mark 3 is the fundamental emission.

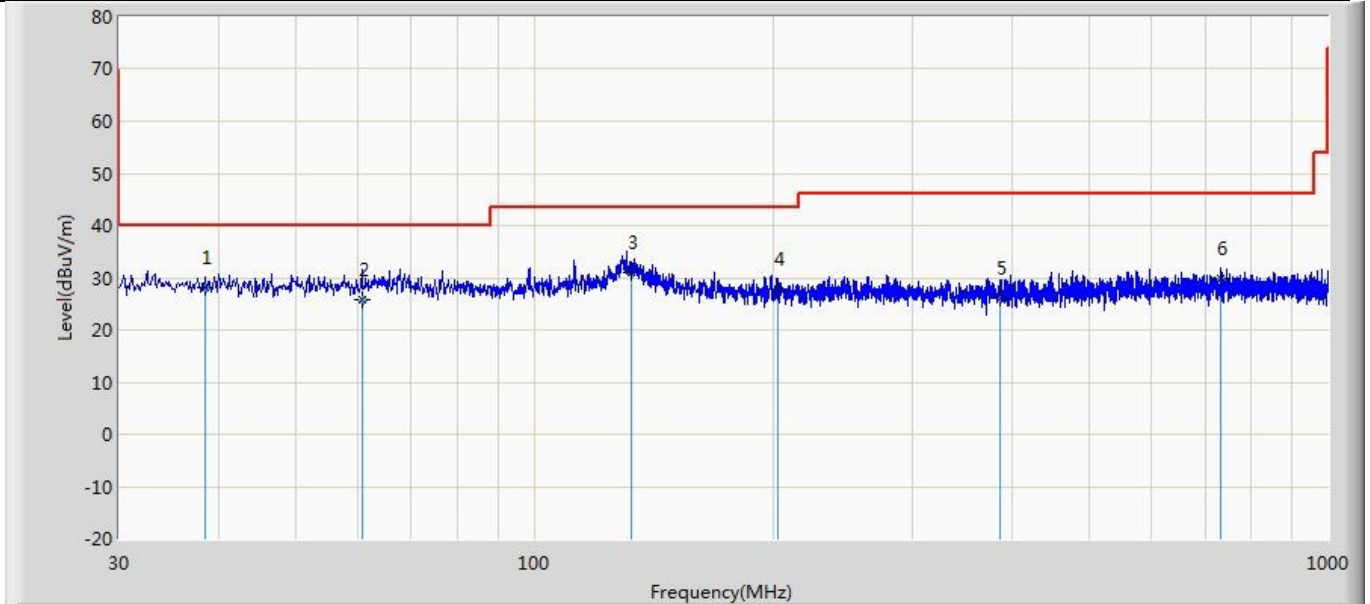
Profile: 22A0289R	Page No.: 4
Engineer: YuLiu	
Site: AC3	Time: 2022/11/01 - 21:38
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: RF(0.009-30MHz)	Polarity: Vertical
EUT: Barcode scanner	Power: DC 5V
Note: Mode 1: Transmit at 13.56MHz by NFC	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		0.374	36.341	15.233	-59.804	96.145	21.108	QP
2		0.784	35.850	15.750	-33.879	69.729	20.100	QP
3	*	13.564	56.435	35.883	-13.065	69.500	20.552	PK

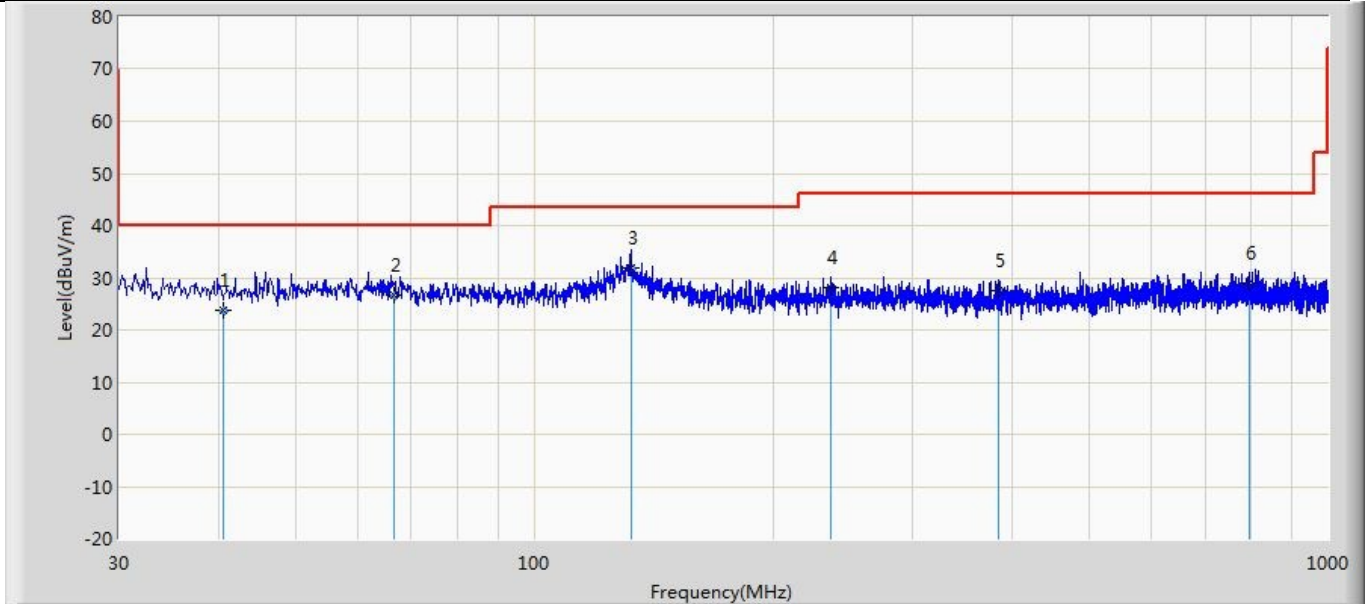
Note: The Mark 3 is the fundamental emission.

Profile: 22A0289R	Page No.: 5
Engineer: YuLiu	
Site: AC3	Time: 2022/11/01 - 21:56
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: RF(0.009-30MHz)	Polarity: Horizontal
EUT: Barcode scanner	Power: DC 5V
Note: Mode 1: Transmit at 13.56MHz by NFC	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	38.487	28.054	7.483	-11.946	40.000	20.571	QP
2		60.798	25.926	5.355	-14.074	40.000	20.571	QP
3		132.699	31.126	10.555	-12.374	43.500	20.571	QP
4		203.145	27.950	7.379	-15.550	43.500	20.571	QP
5		385.990	26.134	5.563	-19.866	46.000	20.571	QP
6		732.886	29.937	9.366	-16.063	46.000	20.571	QP

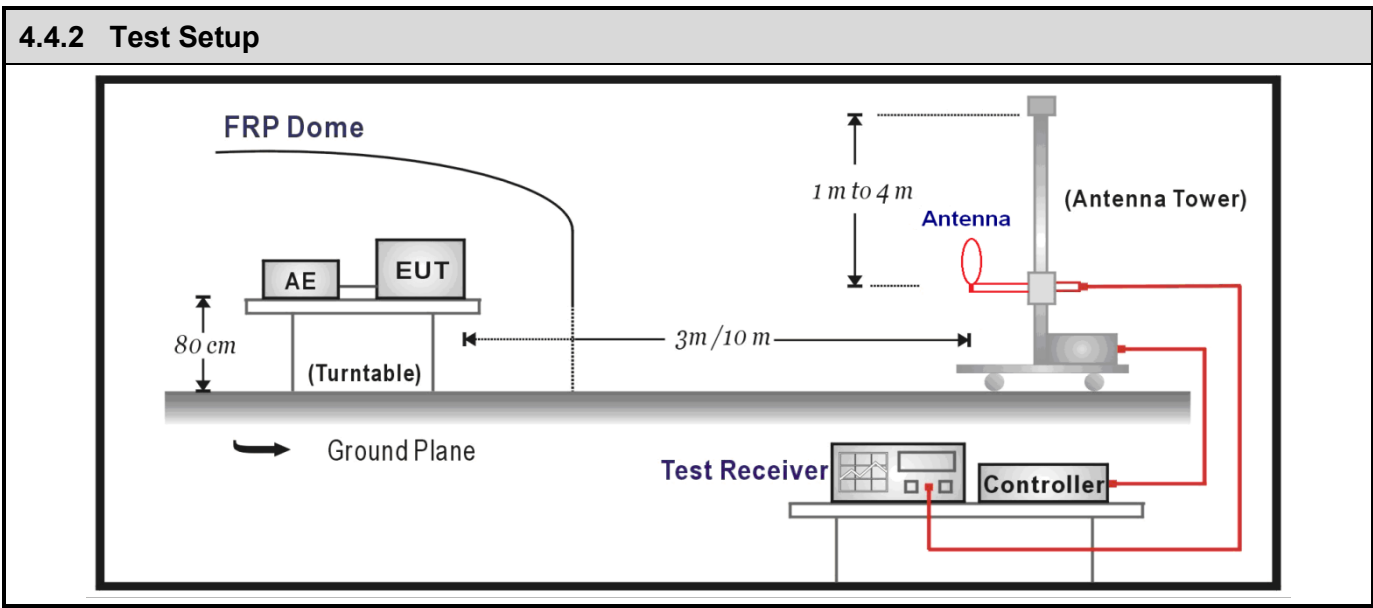
Profile: 22A0289R	Page No.: 6
Engineer: YuLiu	
Site: AC3	Time: 2022/11/01 - 22:00
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: RF(0.009-30MHz)	Polarity: Vertical
EUT: Barcode scanner	Power: DC 5V
Note: Mode 1: Transmit at 13.56MHz by NFC	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		40.549	23.764	3.693	-16.236	40.000	20.071	QP
2		66.739	26.685	6.614	-13.315	40.000	20.071	QP
3	*	132.456	31.814	11.743	-11.686	43.500	20.071	QP
4		236.731	28.002	7.931	-17.998	46.000	20.071	QP
5		385.263	27.469	7.398	-18.531	46.000	20.071	QP
6		796.300	28.873	8.802	-17.127	46.000	20.071	QP

4.4 Emission bandwidth	VERDICT: PASS
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4.4.1 Limit	
Standard	FCC Part 15 Subpart C Paragraph 15.215
Within the band.	



4.4.3 Test Procedure			
	Reference Rule	Chapter	Description
<input checked="" type="checkbox"/>	ANSI C63.10	6.9.2	Occupied bandwidth—relative measurement procedure

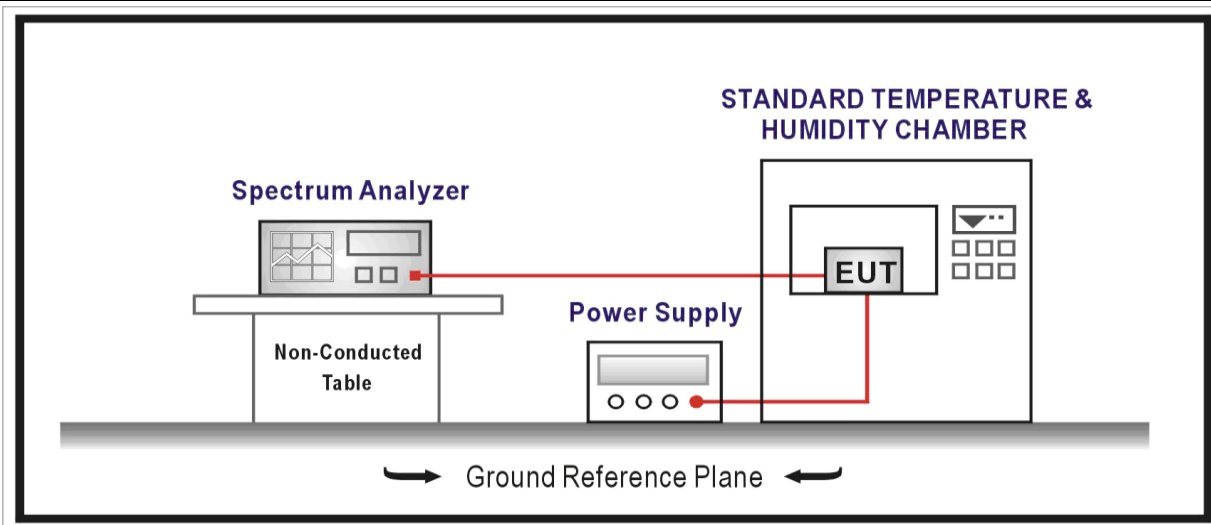
4.4.4 Test Data		
Frequency (MHz)	Frequency Range Limit (MHz)	Result
13.56	13.553 ~ 13.567	Pass
<p>The screenshot displays the Agilent Spectrum Analyzer interface for an Occupied Bandwidth (OBW) measurement. The main display shows a signal peak at 13.5587 MHz with a power level of -85.769 dBm. The center frequency is set to 13.560000 MHz, and the span is 100 kHz. The resolution bandwidth (Res BW) is 300 Hz, and the video bandwidth (VBW) is 1 kHz. The occupied bandwidth is measured as 3.519 kHz, and the total power is -60.2 dBm. The transmit frequency error is 584 Hz, and the OBW power is 99.00%. The x dB bandwidth is 4.488 kHz, and the x dB power is -26.00 dB. The interface also shows a status bar at the bottom with a 'STATUS' icon and the text 'Align Now, All required'.</p>		

4.5 Frequency Stability	VERDICT: PASS
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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 $\pm 0.01\%$ 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 (°C)	Test Frequency (MHz)	Deviation (Hz)	Limit (ppm)
0	13.56	100	±100
10	13.56	100	±100
20	13.56	100	±100
30	13.56	100	±100
35	13.56	100	±100

Frequency Stability under Temperature at 2min

Temperature Interval (°C)	Test Frequency (MHz)	Deviation (Hz)	Limit (ppm)
0	13.56	100	±100
10	13.56	100	±100
20	13.56	100	±100
30	13.56	100	±100
35	13.56	100	±100

Frequency Stability under Temperature at 5min

Temperature Interval (°C)	Test Frequency (MHz)	Deviation (Hz)	Limit (ppm)
0	13.56	100	±100
10	13.56	100	±100
20	13.56	100	±100
30	13.56	100	±100
35	13.56	100	±100

Frequency Stability under Temperature at 10min

Temperature Interval (°C)	Test Frequency (MHz)	Deviation (Hz)	Limit (ppm)
0	13.56	100	±100
10	13.56	100	±100
20	13.56	100	±100
30	13.56	100	±100
35	13.56	100	±100

Frequency Stability under Voltage			
DC Voltage (V)	Test Frequency (MHz)	Deviation (Hz)	Limit (ppm)
2.55	13.56	100	±100
3.00	13.56	100	±100
3.45	13.56	100	±100

4.6 Antenna Requirement	VERDICT: PASS
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4.6.1 Limit:

Standard	FCC Part 15 Subpart E Paragraph 15.203
<p>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.</p>	

4.6.2 Antenna Connector Construction:

<input checked="" type="checkbox"/>	The use of a permanently attached antenna
<input type="checkbox"/>	The antenna use of a unique coupling to the intentional radiator
<input type="checkbox"/>	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
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Remark: The test setup photo and EUT Photo please see appendix.

_____ The End _____