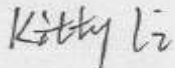
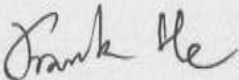
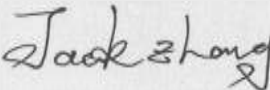




Test report No:
1972133R-RF-US-P06V02

FCC TEST REPORT

Product Name	8680i Advanced RFID
Trademark	Honeywell
Model and /or type reference	8680i RFID
FCC ID	HD5-8680C
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 15.247 ANSI C63.10: 2013 KDB558074 D01v05r02
Verdict Summary	IN COMPLIANCE
Documented By	Kitty Li /Project Assistant 
Tested by (name / position & signature)	Frank He/ Technical Supervisor 
Approved by (name / position & signature)	Jack Zhang/ Supervisor 
Date of issue	2019-09-05
Report template No	1972133R-RF-US-P06V02

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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.

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GENERAL CONDITIONS

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
Tx	: Transmitter
Rx	: Receiver
N/A	: Not Applicable
N/M	: Not Measured

DOCUMENT HISTORY

Report No.	Version	Description	Issued Date
1972133R-RF-US-P06V02	V1.0	Initial issue of report.	2019-09-05

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 15.247.
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, unless the specification, standard or customer have special requirements.
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.

USED EQUIPMENT

AC Power Line Conducted Emission / TR1

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
EMI Test Receiver	R&S	ESCI	100906	2019.03.04	2020.03.04
Two-Line V-Network	R&S	ENV216	101190	2019.06.09	2020.06.09
Two-Line V-Network	R&S	ENV216	101044	2019.06.15	2020.06.15
Current Probe	R&S	EZ-17	100678	2019.03.07	2020.03.07
50ohm Termination	SHX	TF2	07081402	2018.09.08	2019.09.08
50ohm Termination	SHX	TF2	07081403	2018.09.08	2019.09.08
50ohm Coaxial Switch	Anritsu	MP59B	6200464462	N/A	N/A
Temperature/Humidity Meter	RTS	RTS-8S	TR1-TH	2019.01.09	2020.01.09
Coaxial Cable	Suhner	RG 223	TR1-C1	2018.09.11	2019.09.11
Coaxial Cable	Suhner	RG 223	TR1-C2	2018.09.11	2019.09.11
Dekra test software	Dekra	-	-	-	-

Emissions in non-restricted frequency bands/ Occupied Bandwidth/ Fundamental emission output power Power Spectral Density / TR8

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2019.02.04	2020.02.03
EXA Spectrum Analyzer	Keysight	N9010A	MY55370495	2019.04.09	2020.04.08
MXA Signal Analyzer	Keysight	N9020A	MY56060147	2019.04.09	2020.04.08
Wideband Peak Power Meter	Anritsu	ML2495A	0905006	2018.10.14	2019.10.13
Power Sensor	Anritsu	MA2411B	0846014	2018.10.14	2019.10.13
Coaxial Cable	Woken	SFL402	F02-150410-044	2019.01.01	2019.12.31
Dekra test software	Dekra	-	-	-	-

Radiated Emission(30MHz-1GHz) / AC2

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
EMI Test Receiver	R&S	ESCI	100573	2019.03.04	2020.03.04
Bilog Antenna	Teseq GmbH	CBL6112D	27611	2019.06.09	2020.06.09
Loop Antenna	R&S	HFH2-Z2	833799/003	2019.01.28	2020.01.27
Temperature/Humidity Meter	RTS	RTS-8S	AC2-TH	2019.01.09	2020.01.09
Coaxial Cable	Huber+Suhner	RG 214	AC2-C	2019.02.28	2020.02.28
Dekra test software	Dekra	-	-	-	-

Radiated Emission / AC5(1GHz-40GHz)

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2019.01.04	2020.01.03
Preamplifier	Miteq	NSP1800-25	1364185	2019.05.06	2020.05.05
Preamplifier	QuieTek	AP-040G	CHM-0906001	2019.05.06	2020.05.05
DRG Horn	ETS-Lindgren	3117	00123988	2019.01.22	2020.01.21
Temperature/Humidity Meter	Zhichen	ZC1-2	AC5-TH	2019.01.04	2020.01.03
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C1	2019.03.02	2020.03.01
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C2	2019.03.02	2020.03.01
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	AC5-C3	2019.03.02	2020.03.01
Dekra test software	Dekra	-	-	-	-

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%

Test item	Uncertainty
AC Power Line Conducted Emission	9kHz~150kHz: 2.80dB 150kHz~30MHz: 2.40dB
Peak Power Output	± 1.27 dB
Radiated Emission(30MHz~1GHz)	Horizontal: 30MHz~200MHz: 3.50 dB 300MHz~1GHz: 3.60 dB Vertical: 30MHz~200MHz: 3.60 dB 300MHz~1GHz: 3.50 dB
Radiated Emission(1GHz~26.5GHz)	Horizontal: 1GHz~18GHz: 5.00 dB Vertical: 1GHz~18GHz: 4.80 dB
RF antenna conducted test	± 1.27 dB
Radiated Emission Band Edge	± 3.9 dB
DTS Bandwidth	± 150 Hz
Occupied Bandwidth	± 1 kHz

1 GENERAL INFORMATION

1.1 General Description of the Item(s)

Product Name..... :	8680i Advanced RFID
Model No. :	8680i RFID
Trademark	Honeywell
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 specifiction..... :	RFID
Operating frequency range(s)	907.25~920.75MHz
Type of Modulation :	PR-ASK
Channel Separation	0.5MHz
Number of channel..... :	28

Rated power supply	Voltage and Frequency	
	☐	AC: 220 – 240 V, 50/60 Hz
	☐	AC: 100 – 240 V, 50/60 Hz
	☒	DC: 3.8dc
	☐	Battery:
Mounting position..... :	☐	Table top equipment
	☐	Wall/Ceiling mounted equipment
	☐	Floor standing equipment
	☒	Hand-held equipment
	☐	Other:

1.2 Antenna Information

Antenna model / type number	N/A		
Antenna serial number	N/A		
Antenna Delivery	☒	1TX + 1RX	
	☐	2TX + 2RX	
	☐	Others:.....	
Antenna technology	☒	SISO	
	☐	MIMO	☐ CDD
			☐ Beam-forming
Antenna Type	☒	External	☐ Dipole
			☒ PCB
			☐ Sectorized
	☐	Internal	☐ Monopole
			☐ Type F antenna
			☐ Others.....
			Antenna Gain

1.3 Test date

Test Location	No. 99, Hongye Road, Suzhou Industrial Park Suzhou, 215006, P.R. China
Date(receive sample)	Jul. 25, 2019
Date (start test)	Jul. 25, 2019
Date (finish test)	Aug. 22, 2019

1.4 Channel List

RFID Working Frequency of Each Channel:							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
00	907.25 MHz	01	907.75 MHz	02	908.25 MHz	03	908.75 MHz
04	909.25 MHz	05	909.75 MHz	06	910.25 MHz	07	910.75 MHz
08	911.25 MHz	09	911.75 MHz	10	912.25 MHz	11	912.75 MHz
12	913.25 MHz	13	913.75 MHz	14	914.25 MHz	15	914.75 MHz
16	915.25 MHz	17	915.75 MHz	18	916.25 MHz	19	916.75 MHz
20	917.25 MHz	21	917.75 MHz	22	918.25 MHz	23	918.75 MHz
24	919.25 MHz	25	919.75 MHz	26	920.25 MHz	27	920.75 MHz

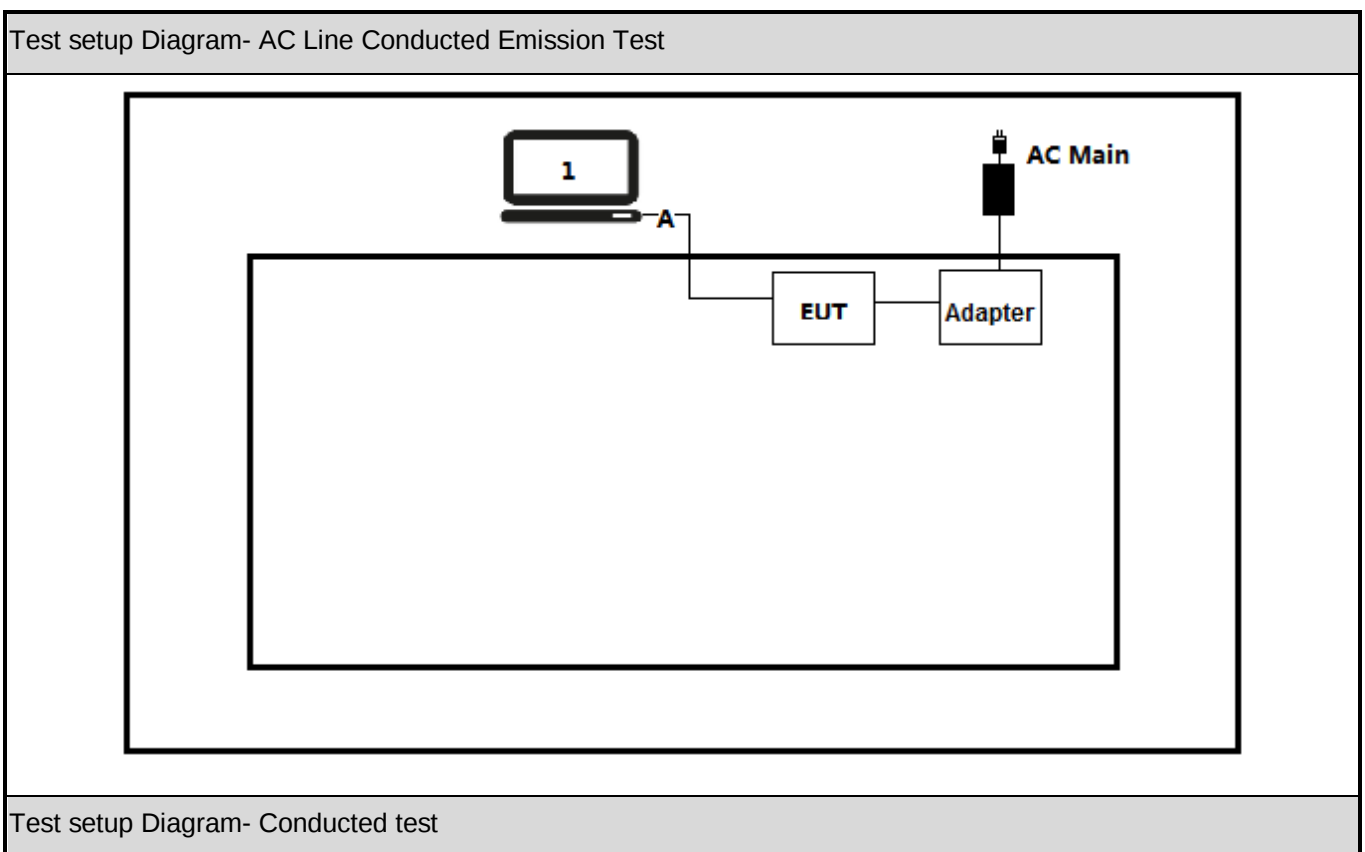
2 DESCRIPTION OF TEST SETUP

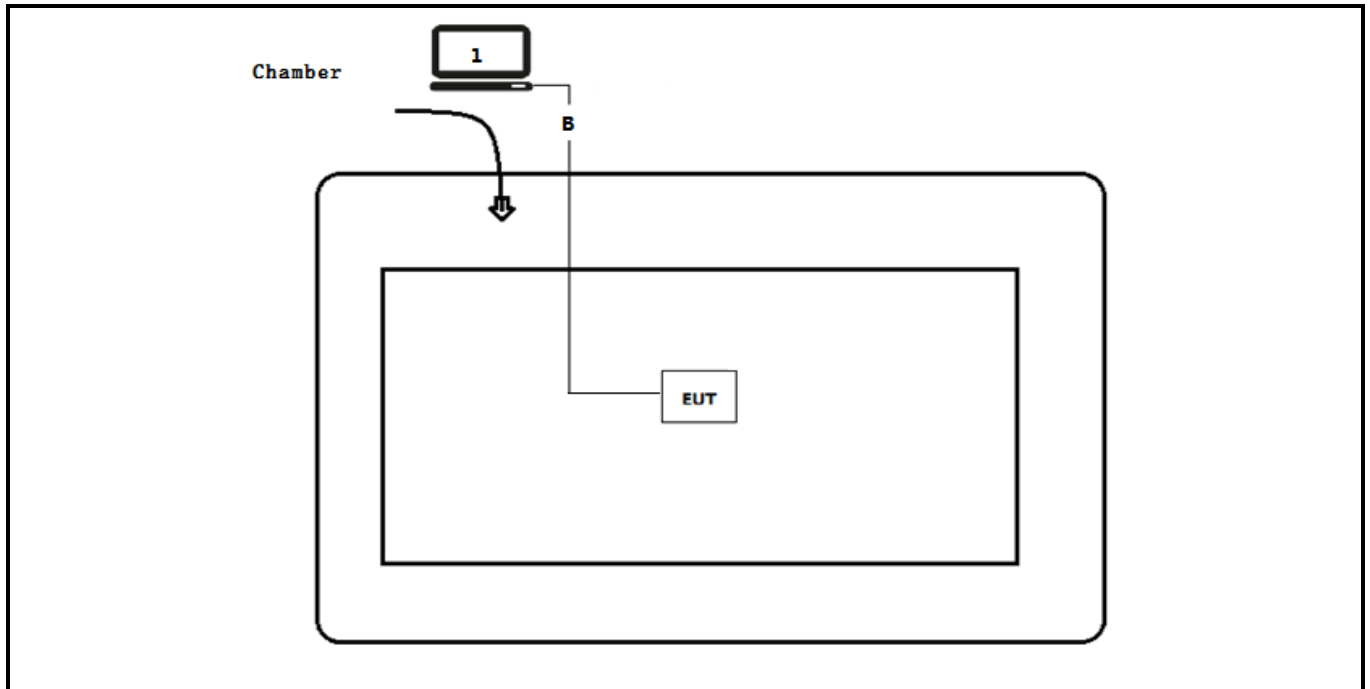
2.1 Operating mode(s) used for tests

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

Test Mode	Mode 1: Transmit by RFID
-----------	--------------------------

2.2 Test Configuration / Block diagram used for tests





2.3 Testing process

1	Setup the EUT as shown in Section 2.2.
2	Input the commands.
3	Configure the test mode, the test channel, and the data rate.
4	Start the continuous Transmitter.
5	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 15.247	2019	Operation within the bands 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz.
ANSI C63.10	2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
KDB 558074 D01V05r02	2019	Guidance for performing compliance measurements on Digital Transmission System (DTS) operating under section 15.247

3.2 Deviation(s) from the Standard(s) / Test Specification(s)

The following deviation(s) was / were made from the published requirements of the listed standards: N/A.

3.3 Overview of results

Requirement – Test case	Basic standard(s)	Verdict	Remark
AC Power Line Conducted Emission	FCC 15.207	PASS	---
Emissions in restricted frequency bands	FCC 15.247(b)(3)	PASS	---
Duty cycle	ANSI C63.10:2013	N/A	---
Emissions in non-restricted frequency bands	FCC 15.247(d), FCC 15.209	PASS	---
Radiated Emission Band Edge	FCC 15.247(d)	PASS	---
Fundamental emission output power	FCC 15.247(a)(1)(i)	PASS	---
20dB Bandwidth	FCC 15.247(a)(1)(i)	PASS	---
Carrier Frequency Separation	FCC 15.247(a)(1)(i)	PASS	---
Number of Hopping Frequencies	FCC 15.247(a)(1)(i)	PASS	---
Time of Occupancy (Dwell Time)	FCC 15.247(a)(1)(i)	PASS	---
Antenna Requirement	FCC 15.203	PASS	---

3.4 Test Facility

USA : FCC Designation Number: CN1199

4 TEST RESULTS

4.1 AC Power Line Conducted Emission	VERDICT: PASS
---	----------------------

4.1.1 Limit		
Standard	FCC Part 15 Subpart C 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

Note: This is not tested because it is battery powered.

4.2 Emissions in restricted frequency bands	VERDICT: PASS
--	----------------------

4.2.1 Limit			
Standard		FCC Part 15 Subpart C Paragraph 15.207	
Restricted Bands of operation			
Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (GHz)
0.090 – 0.110	16.42 – 16.423	399.9 – 410	4.5 – 5.15
0.495 – 0.505	16.69475 –16.69525	608 – 614	5.35 – 5.46
2.1735 – 2.1905	16.80425 – 16.80475	960 – 1240	7.25 – 7.75
4.125 – 4.128	25.5 – 25.67	1300 – 1427	8.025 – 8.5
4.17725 – 4.17775	37.5 – 38.25	1435 – 1626.5	9.0 – 9.2
4.20725 – 4.20775	73 – 74.6	1645.5 – 1646.5	9.3 – 9.5
6.215 – 6.218	74.8 – 75.2	1660 – 1710	10.6 – 12.7
6.26775 – 6.26825	108 – 121.94	1718.8 – 1722.2	13.25 – 13.4
6.31175 – 6.31225	123 – 138	2200 – 2300	14.47 – 14.5
8.291 – 8.294	149.9 – 150.05	2310 – 2390	15.35 – 16.2
8.362 – 8.366	156.52475 – 156.52525	2483.5 – 2500	17.7 – 21.4
8.37625 – 8.38675	156.7 – 156.9	2690 – 2900	22.01 – 23.12
8.81425 – 8.81475	162.0125 – 167.17	3260 – 3267	23.6 – 24.0
12.29 – 12.293	167.72 – 173.2	3332 – 3339	31.2 – 31.8
12.51975–12.52025	240 – 285	3345.8 – 3358	36.43 – 36.5
12.57675–12.57725	322 – 335.4	3600 – 4400	
13.36 – 13.41			

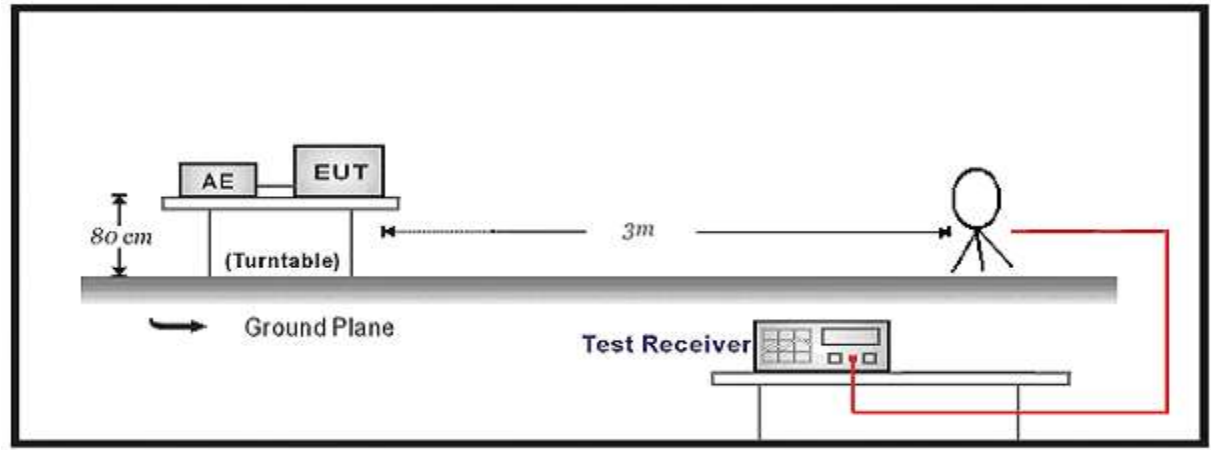
Restricted Band Emissions Limit			
Frequency (MHz)	Field strength (μ V/m)	Field strength (dB μ V/m)	Measurement distance (m)
0.009 - 0.49	2400/F(kHz)	48.5 – 13.8	300 _(Note 1)
0.49 - 1.705	24000/F(kHz)	33.8 - 23	30 _(Note 1)
1.705 - 30	30	29.5	30 _(Note 1)
30 - 88	100	40	3 _(Note 2)
88 - 216	150	43.5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

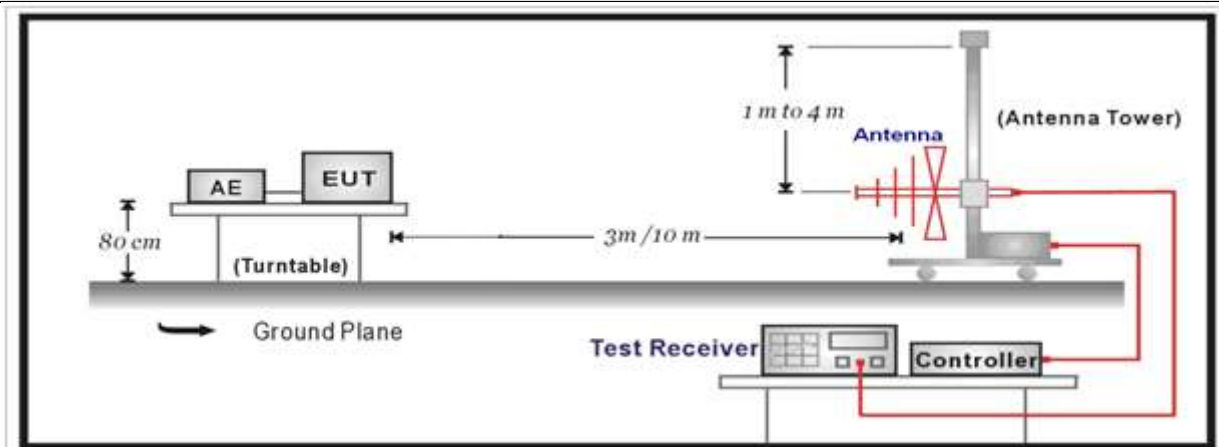
Note 2: At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated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

4.2.2 Test Setup

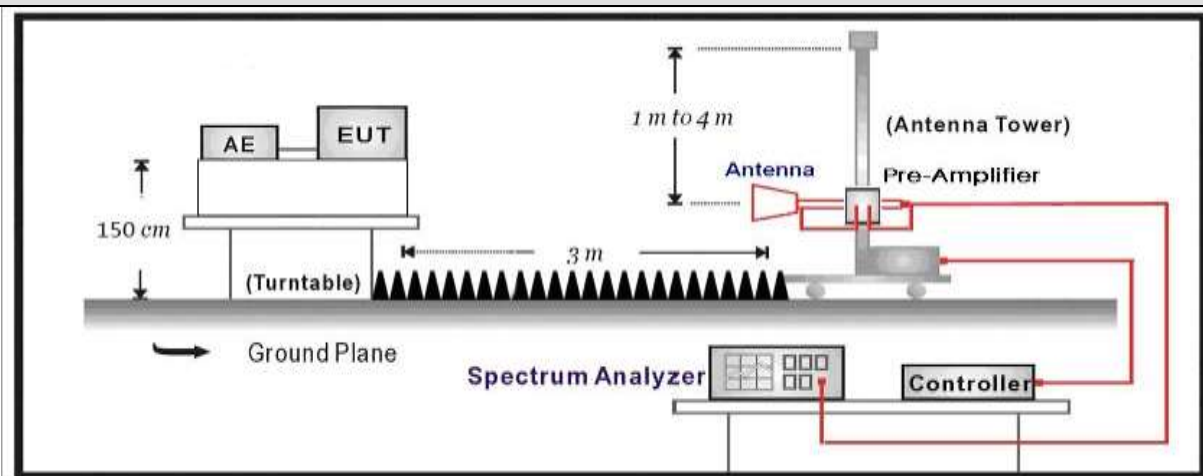
Below 30MHz Test Setup:



30MHz-1GHz Test Setup:



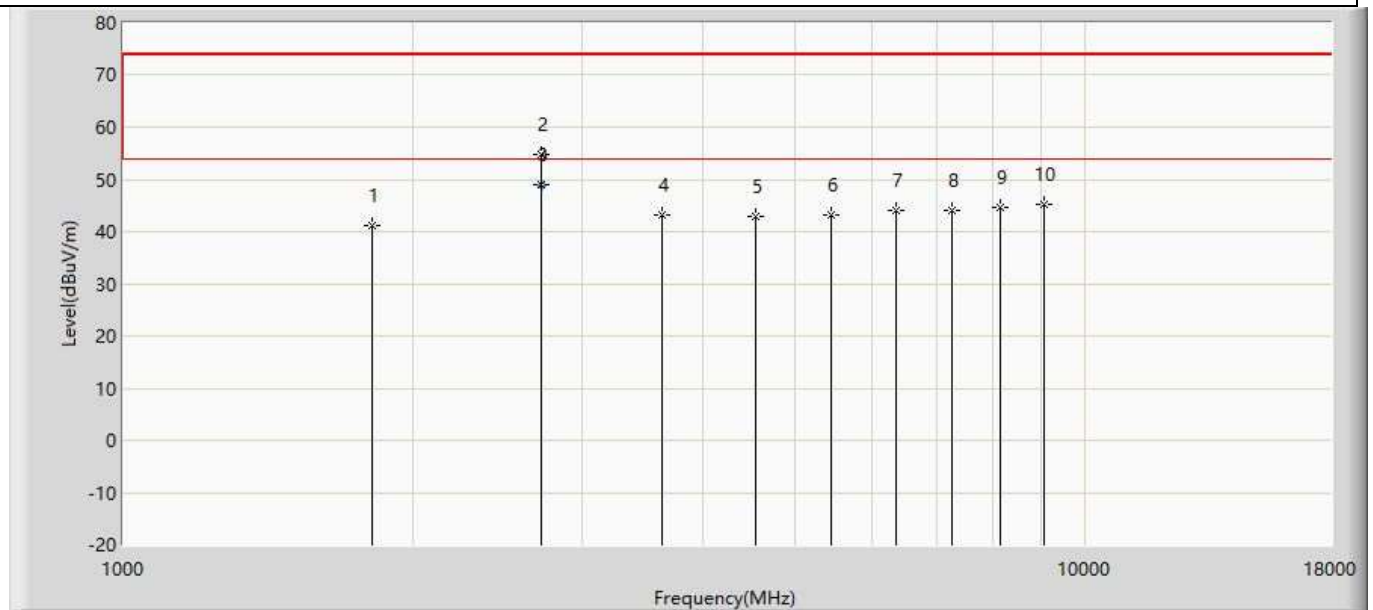
Above 1GHz Test Setup:



4.2.3 Test Procedure				
	References Rule		Chapter	Description
☒	ANSI C63.10		11.12	Emissions in restricted frequency bands
	☒	ANSI C63.10	11.12.1	Radiated emission measurements
	☒	ANSI C63.10	11.12.2.7	Radiated spurious emission test
	☒	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

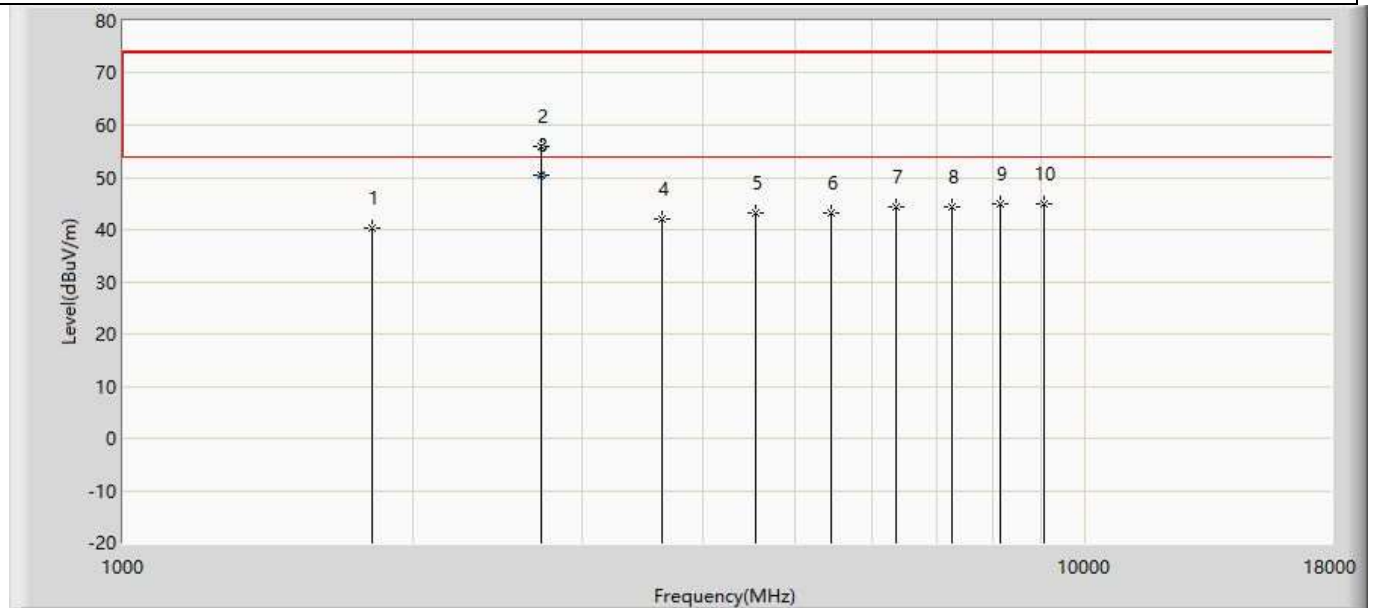
4.2.4 Test Data

Profile: 1972133R	Page No.: 69
Engineer: Pawn	
Site: AC5	Time: 2019/08/14 - 09:42
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT:8680i Advanced RFID	Power: DC 3.8V
Note: Mode1:Transmit at 907.25MHz by RFID	



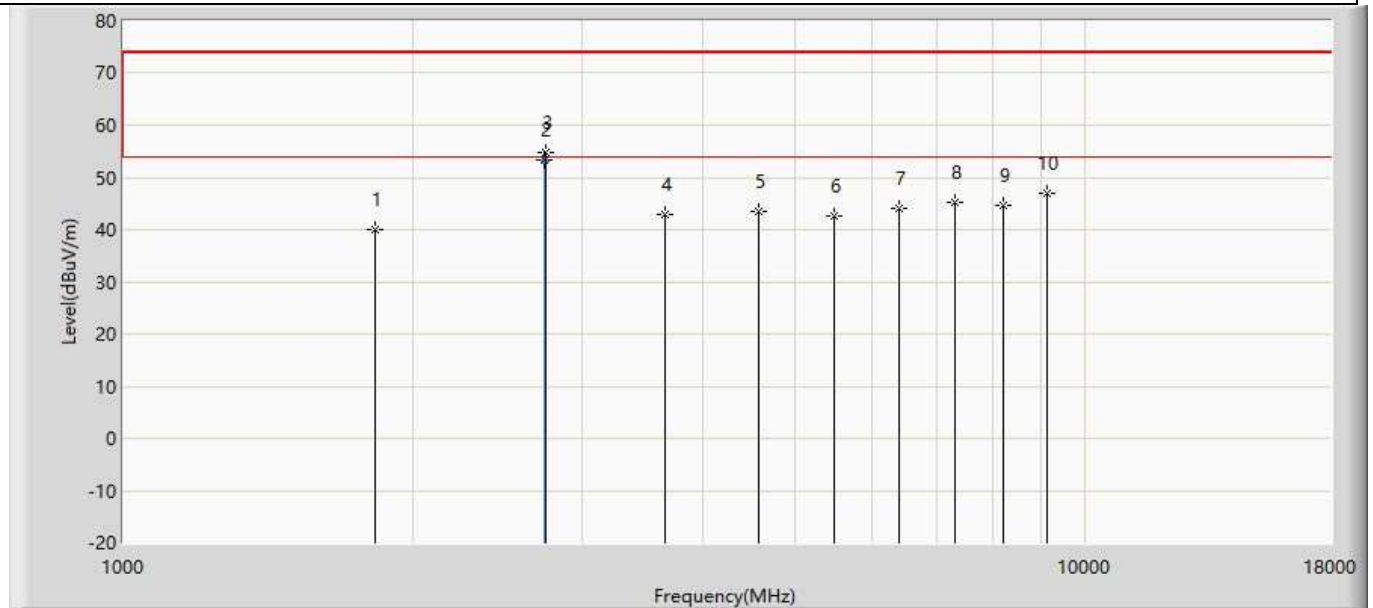
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		1814.500	41.177	41.829	-32.823	74.000	-0.652	PK
2		2717.000	54.795	52.577	-19.205	74.000	2.218	PK
3	*	2721.740	49.058	46.829	-4.942	54.000	2.229	AV
4		3629.000	43.141	39.933	-30.859	74.000	3.208	PK
5		4536.250	42.819	38.482	-31.181	74.000	4.337	PK
6		5443.500	43.152	37.397	-30.848	74.000	5.756	PK
7		6350.750	44.038	37.068	-29.962	74.000	6.969	PK
8		7258.000	44.202	36.672	-29.798	74.000	7.530	PK
9		8165.250	44.543	36.387	-29.457	74.000	8.156	PK
10		9072.500	45.224	36.819	-28.776	74.000	8.405	PK

Profile: 1972133R	Page No.: 70
Engineer: Pawn	
Site: AC5	Time: 2019/08/14 - 09:42
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT:8680i Advanced RFID	Power: DC 3.8V
Note: Mode1:Transmit at 907.25MHz by RFID	



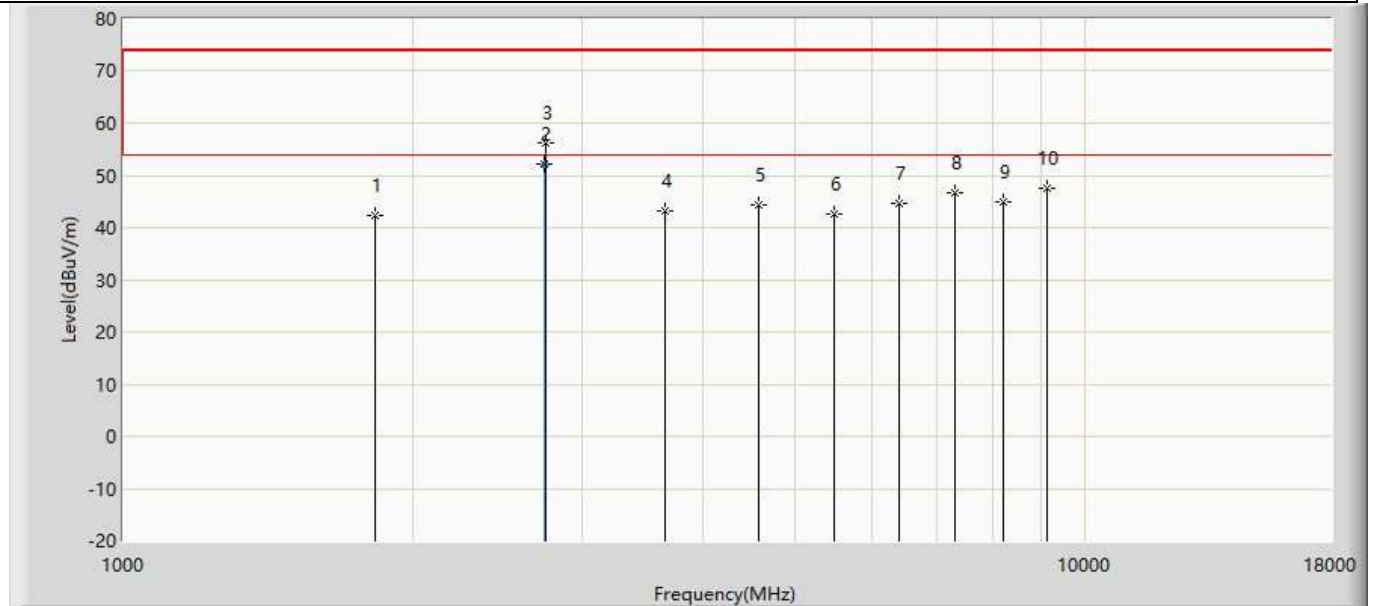
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		1814.500	40.420	41.072	-33.580	74.000	-0.652	PK
2		2717.000	55.834	53.616	-18.166	74.000	2.218	PK
3	*	2721.640	50.466	48.237	-3.534	54.000	2.229	AV
4		3629.000	42.066	38.858	-31.934	74.000	3.208	PK
5		4536.250	43.182	38.845	-30.818	74.000	4.337	PK
6		5443.500	43.172	37.417	-30.828	74.000	5.756	PK
7		6350.750	44.232	37.262	-29.768	74.000	6.969	PK
8		7258.000	44.456	36.926	-29.544	74.000	7.530	PK
9		8165.250	44.941	36.785	-29.059	74.000	8.156	PK
10		9072.500	44.923	36.518	-29.077	74.000	8.405	PK

Profile: 1972133R	Page No.: 71
Engineer: Pawn	
Site: AC5	Time: 2019/08/14 - 09:42
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT:8680i Advanced RFID	Power: DC 3.8V
Note: Mode1:Transmit at 914.25MHz by RFID	



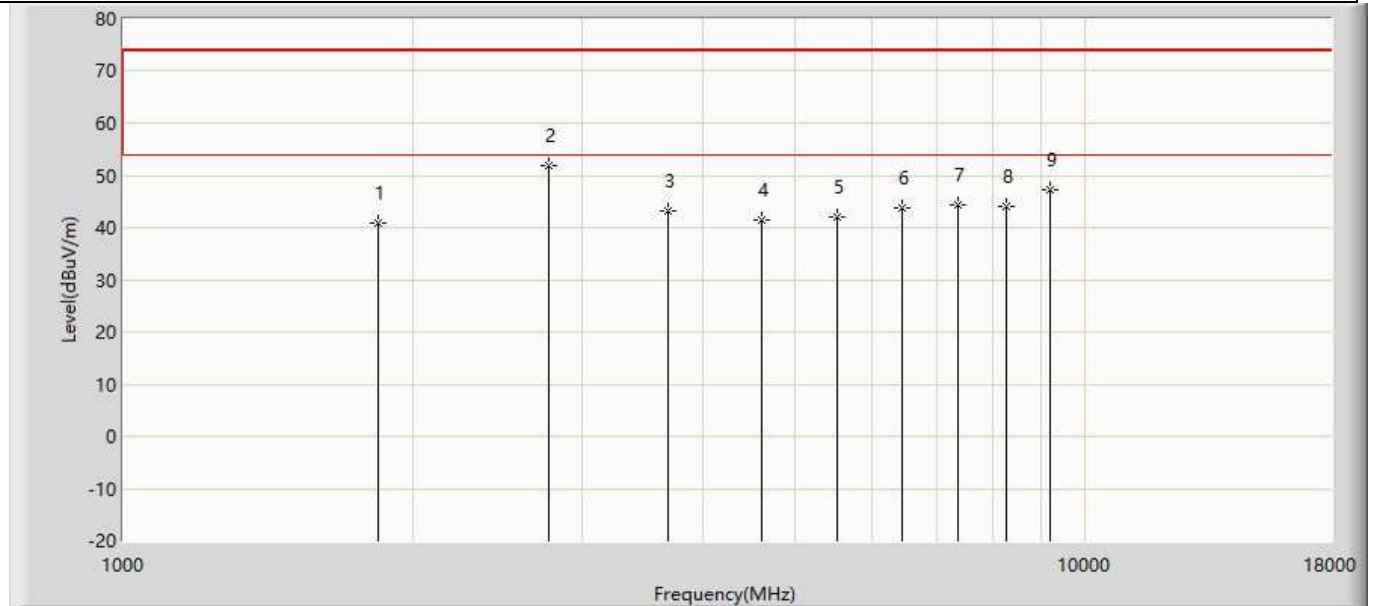
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		1828.500	39.882	40.198	-34.118	74.000	-0.316	PK
2	*	2742.720	53.197	50.910	-0.803	54.000	2.287	AV
3		2751.000	54.767	52.451	-19.233	74.000	2.316	PK
4		3657.000	42.885	39.549	-31.115	74.000	3.336	PK
5		4571.250	43.497	38.742	-30.503	74.000	4.755	PK
6		5485.500	42.666	36.743	-31.334	74.000	5.924	PK
7		6399.750	44.015	37.349	-29.985	74.000	6.667	PK
8		7314.000	45.120	37.514	-28.880	74.000	7.606	PK
9		8228.250	44.706	36.385	-29.294	74.000	8.321	PK
10		9142.500	47.023	38.008	-26.977	74.000	9.016	PK

Profile: 1972133R	Page No.: 72
Engineer: Pawn	
Site: AC5	Time: 2019/08/14 - 09:42
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT:8680i Advanced RFID	Power: DC 3.8V
Note: Mode1:Transmit at 914.25MHz by RFID	



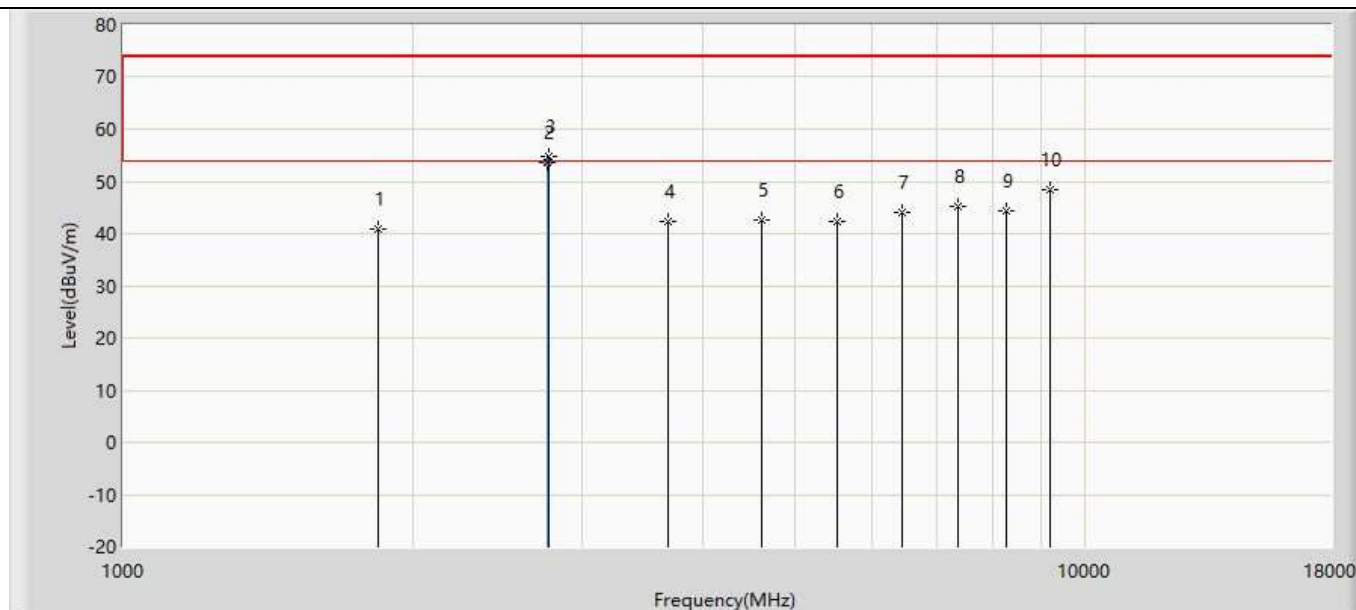
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		1828.500	42.208	42.524	-31.792	74.000	-0.316	PK
2	*	2742.780	52.234	49.947	-1.766	54.000	2.287	AV
3		2751.000	56.345	54.029	-17.655	74.000	2.316	PK
4		3657.000	43.319	39.983	-30.681	74.000	3.336	PK
5		4571.250	44.282	39.527	-29.718	74.000	4.755	PK
6		5485.500	42.570	36.647	-31.430	74.000	5.924	PK
7		6399.750	44.615	37.949	-29.385	74.000	6.667	PK
8		7314.000	46.637	39.031	-27.363	74.000	7.606	PK
9		8228.250	45.026	36.705	-28.974	74.000	8.321	PK
10		9142.500	47.439	38.424	-26.561	74.000	9.016	PK

Profile: 1972133R	Page No.: 73
Engineer: Pawn	
Site: AC5	Time: 2019/08/14 - 09:42
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT:8680i Advanced RFID	Power: DC 3.8V
Note: Mode1:Transmit at 920.75MHz by RFID	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		1841.500	40.754	40.922	-33.246	74.000	-0.167	PK
2	*	2768.000	51.906	49.786	-22.094	74.000	2.120	PK
3		3683.000	43.272	39.954	-30.728	74.000	3.318	PK
4		4603.750	41.551	36.913	-32.449	74.000	4.638	PK
5		5524.500	42.033	36.341	-31.967	74.000	5.692	PK
6		6445.250	43.736	36.787	-30.264	74.000	6.949	PK
7		7366.000	44.316	36.516	-29.684	74.000	7.800	PK
8		8286.750	44.035	35.942	-29.965	74.000	8.094	PK
9		9207.500	47.246	38.064	-26.754	74.000	9.183	PK

Profile: 1972133R	Page No.: 74
Engineer: Pawn	
Site: AC5	Time: 2019/08/14 - 09:42
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT:8680i Advanced RFID	Power: DC 3.8V
Note: Mode1:Transmit at 920.75MHz by RFID	



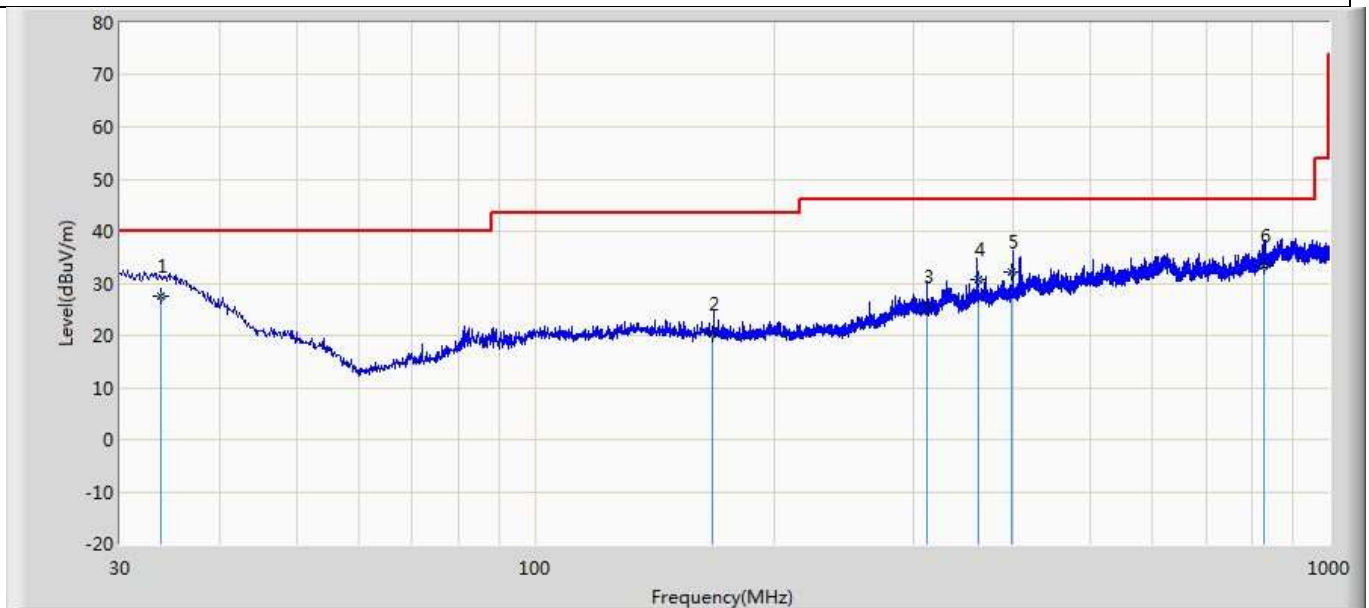
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		1841.500	40.962	41.130	-33.038	74.000	-0.167	PK
2	*	2762.220	53.672	51.486	-0.328	54.000	2.186	AV
3		2768.000	54.921	52.801	-19.079	74.000	2.120	PK
4		3683.000	42.403	39.085	-31.597	74.000	3.318	PK
5		4603.750	42.579	37.941	-31.421	74.000	4.638	PK
6		5524.500	42.221	36.529	-31.779	74.000	5.692	PK
7		6445.250	44.107	37.158	-29.893	74.000	6.949	PK
8		7366.000	45.160	37.360	-28.840	74.000	7.800	PK
9		8286.750	44.343	36.250	-29.657	74.000	8.094	PK
10		9207.500	48.497	39.315	-25.503	74.000	9.183	PK

Note:

1. Measured Level = Reading Level + Factor.
2. The test frequency range, 9kHz~30MHz, the worst case are at least 20dB below the limits, therefore no data appear in the report.
3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.
4. As the radiated emission was performed, so conducted emission was not tested.

The worst case of Radiated Emission below 1GHz:

Profile: 1972133R	Page No.: 18
Engineer: Pawn	
Site: AC2	Time: 2019/08/13
Limit: FCC_Part15.109_RE(3m)	Margin: 0
Probe: AC2_3M(30-1000M)	Polarity: Horizontal
EUT: 8680i Advanced RFID	Power: DC 3.8V
Note: Mode 1	

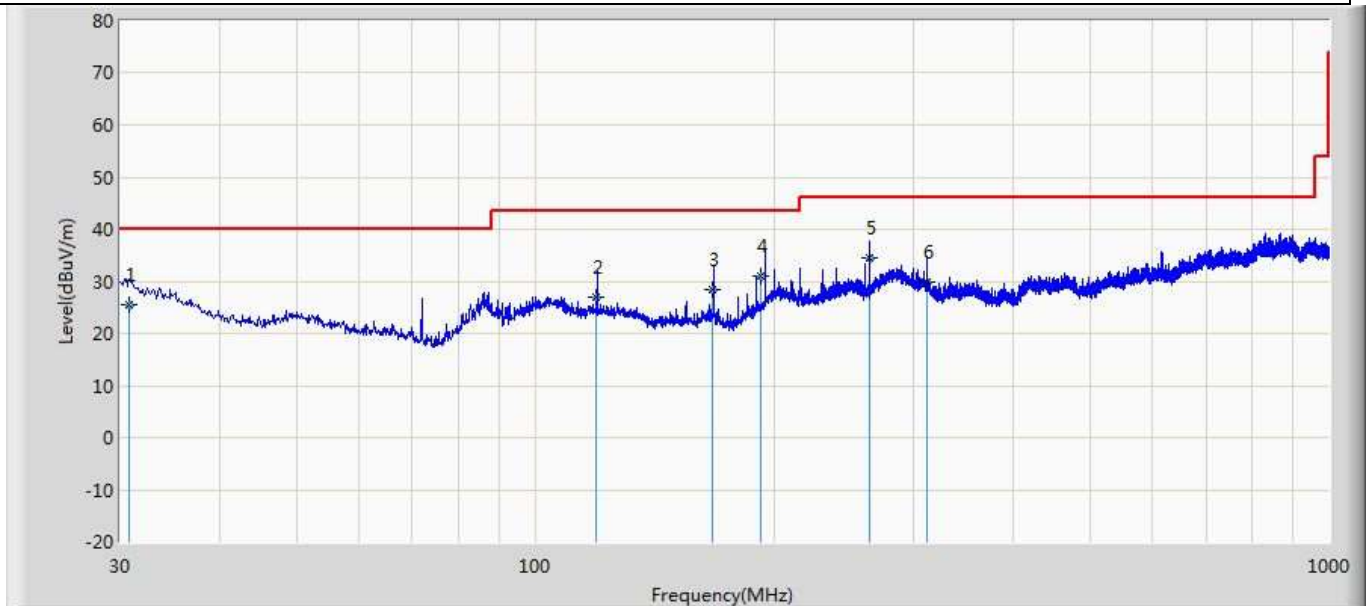


No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Probe (dB/m)	Cable (dB)	Amp (dB)	Ant Pos (cm)	Table Pos (deg)	Type
1	*	33.759	27.662	0.300	-12.338	40.000	20.703	6.659	0.000	100	53	QP
2		167.098	20.316	2.800	-23.184	43.500	10.248	7.268	0.000	100	203	QP
3		312.098	25.530	4.500	-20.470	46.000	13.370	7.660	0.000	100	38	QP
4		360.974	30.681	6.300	-15.319	46.000	16.560	7.821	0.000	100	187	QP
5		399.087	32.317	7.300	-13.683	46.000	17.072	7.946	0.000	100	80	QP
6		827.068	33.245	1.500	-12.755	46.000	22.671	9.074	0.000	100	8	QP

Note:

1. " * ", means this data is the worst emission level.
2. Measurement Level = Reading Level + Factor(Probe+Cable-Amp).

Profile: 1972133R	Page No.: 19
Engineer: Pawn	
Site: AC2	Time: 2019/08/13
Limit: FCC_Part15.109_RE(3m)	Margin: 0
Probe: AC2_3M(30-1000M)	Polarity: Vertical
EUT: 8680i Advanced RFID	Power: DC 3.8V
Note: Mode 1	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Probe (dB/m)	Cable (dB)	Amp (dB)	Ant Pos (cm)	Table Pos (deg)	Type
1		30.841	25.368	1.300	-14.632	40.000	17.439	6.629	0.000	100	34	QP
2		119.087	27.085	6.300	-16.415	43.500	13.783	7.002	0.000	100	55	QP
3		167.087	28.469	9.000	-15.031	43.500	12.202	7.268	0.000	100	249	QP
4		192.068	31.039	9.400	-12.461	43.500	14.315	7.324	0.000	100	74	QP
5	*	264.087	34.351	10.900	-11.649	46.000	15.866	7.584	0.000	100	36	QP
6		312.087	29.938	5.900	-16.062	46.000	16.378	7.660	0.000	100	109	QP

Note:

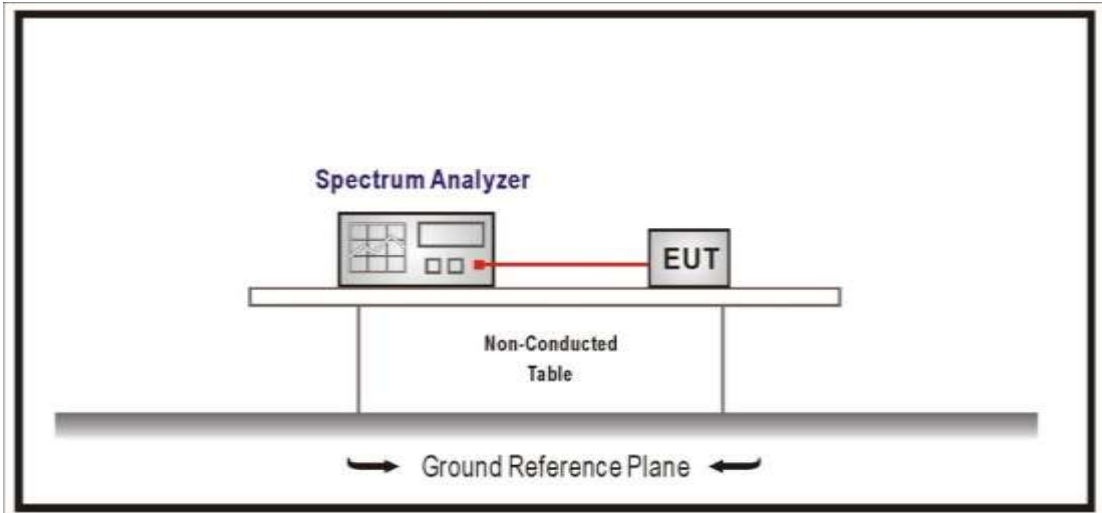
1. " * ", means this data is the worst emission level.
2. Measurement Level = Reading Level + Factor(Probe+Cable-Amp).

4.3 Emissions in non-restricted frequency band	VERDICT: PASS
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4.3.1 Limit	
Standard	FCC Part 15 Subpart C Paragraph 15.247(d)
RF Output power (Detection methods)	Limit(dB)
RF Output power(Average detector)	30dBc(Note1)
RF Output power(PK detector)	20dBc(Note2)

Note 1: If maximum conducted (average) output power was used to demonstrate compliance as described in 9.2, then the peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 30 dBc).

Note 2: If the maximum peak conducted output power procedure was used, then the peak output power measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 20 dBc).

4.3.2 Test Setup


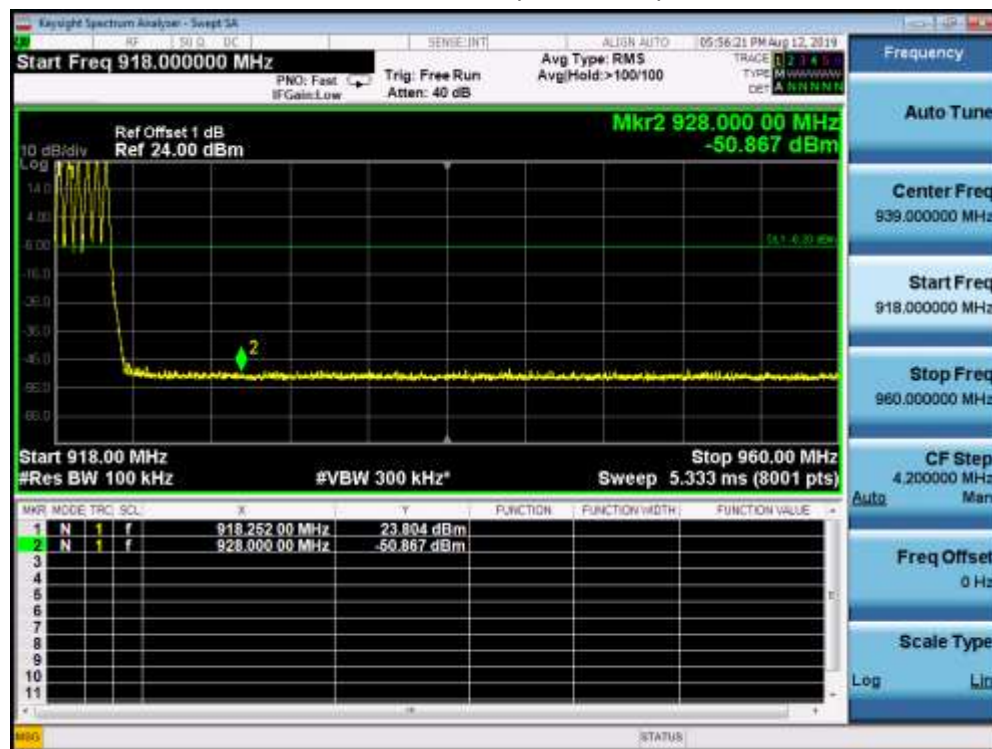
4.3.3 Test Procedure			
References Rule		Chapter	Description
☒	ANSI C63.10	11.11	Emissions in non-restricted frequency bands
☒	ANSI C63.10	11.11.1	General
☒	ANSI C63.10	11.11.2	Reference level measurement
☒	ANSI C63.10	11.11.3	Emission level measurement

4.3.4 Test Data

Mode	Channel	Test Frequency (MHz)	Maximum In-Band PSD[a] (dBm/100kHz)	Frequency (MHz)	Out-Band PSD[b] (dBm/100kHz)	[a]-[b] (dB)	Limit (dB)	Result
1	00	907.25	23.297	902	-52.198	75.495	>30	Pass
	27	920.75	23.827	928	-50.773	74.600	>30	Pass
Hopping Mode	00	907.25	23.35	902	-52.303	75.653	>30	Pass
	27	920.75	23.35	928	-50.867	74.217	>30	Pass

Note: The worst case of emissions in non-restricted frequency bands as below:

Mode 2 CH27(920.75MHz)

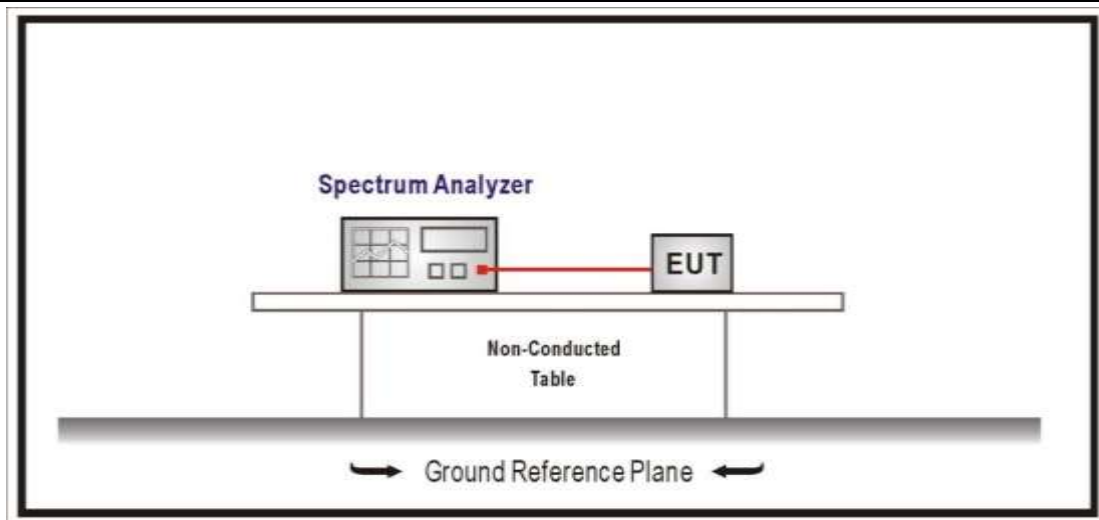


4.4 Duty cycle	VERDICT: PASS
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4.4.1 Limit

N/A

4.4.2 Test Setup



4.4.3 Test Procedure

References Rule	Chapter	Description
☒ ANSI C63.10	11.6	Duty cycle (D), transmission duration (T), and maximum power control level

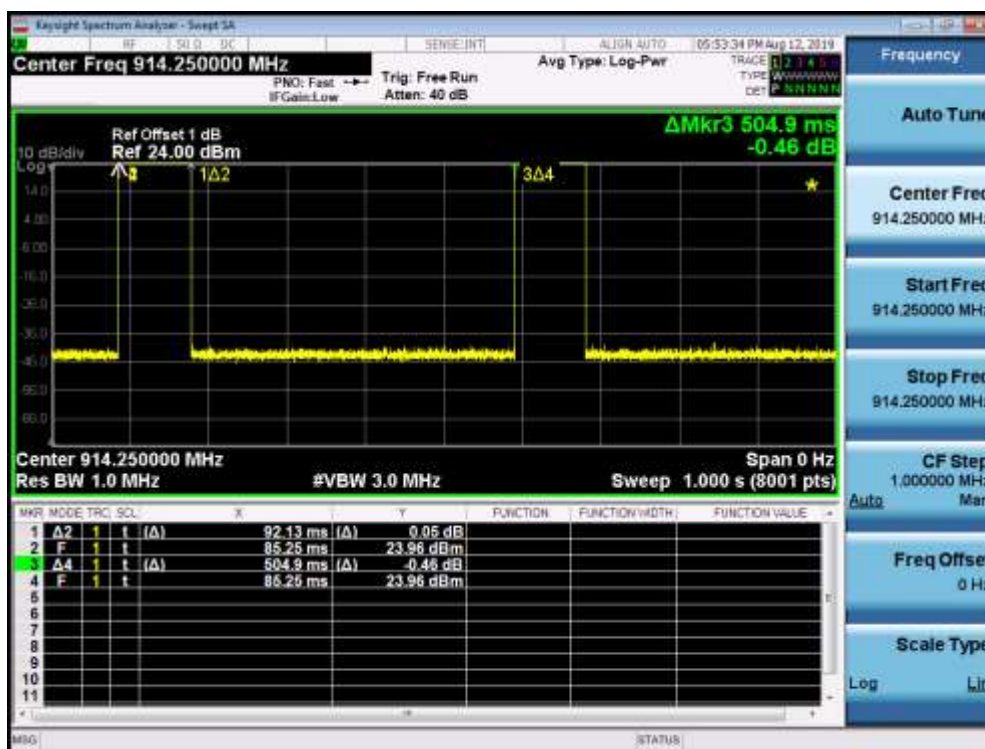
4.4.4 Test Data

Test Mode	Tx On (ms)	Tx Off (ms)	VBW	Tx On + Tx Off (ms)	Duty Cycle
1	92.13	412.77	30Hz	504.9	18.25%

Note 1: T means the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

Note 2: According to KDB 558074, when test for Radiated Emission Band Edge and Radiated Emission, for average detector set: $VBW \geq 1/T$ will be used.

Mode1



4.5 Radiated Emission Band Edge

VERDICT: PASS

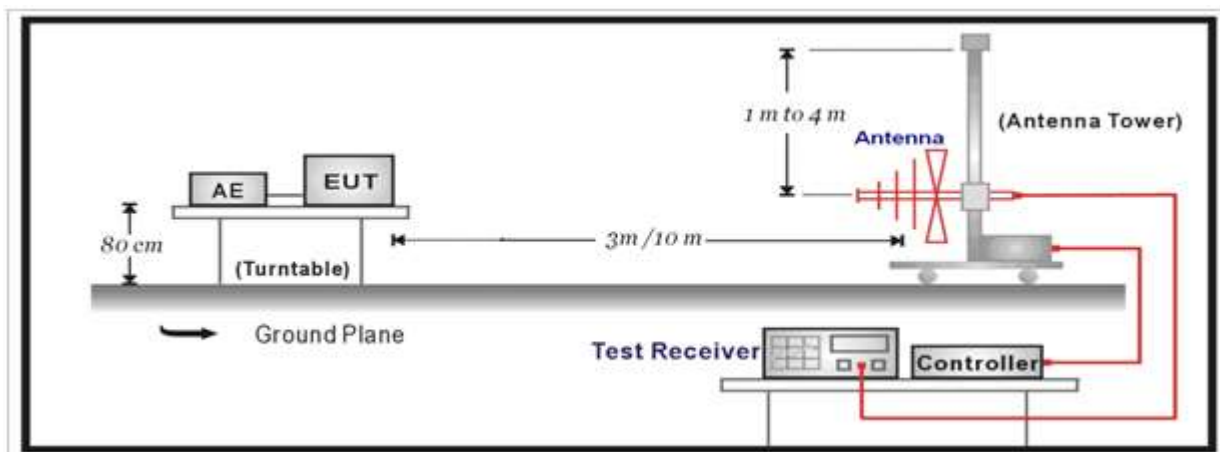
4.5.1 Limit

Standard		FCC Part 15 Subpart C Paragraph 15.247(d) , 15.209		
Frequency bands (MHz)	Detector	Limit (dB μ V/m)	RBW (kHz)	Distance (m)
608-614	PK	66	100	3
960-1240	AV	46	100	3

Note: The field strength of emissions appearing within these frequency bands shall not exceed the limits.

4.5.2 Test Setup

Below 1GHz Test Setup:

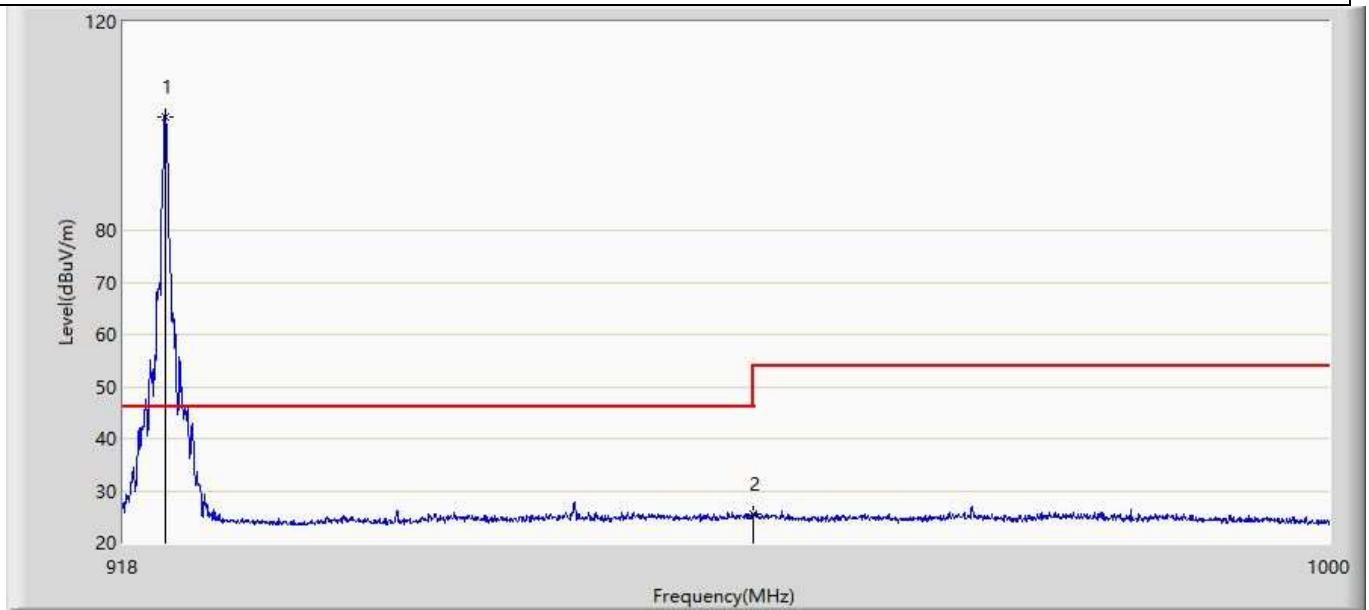


4.5.3 Test Procedure

	References Rule		Chapter	Description
☒	ANSI C63.10		6.10	Band-edge testing
	☒	ANSI C63.10	6.10.5	Restricted-band band-edge measurements
	☐	ANSI C63.10	6.10.6	Marker-delta method
☒	ANSI C63.10		11.12	Emissions in restricted frequency bands
	☒	ANSI C63.10	11.12.1	Radiated emission measurements
	☒	ANSI C63.10	11.12.2.7	Radiated spurious emission test
☐	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
	☐	ANSI C63.10	11.12.2	Antenna-port conducted measurements
		☒	ANSI C63.10	11.12.2.3 Quasi-peak measurement procedure
		☐	ANSI C63.10	11.12.2.4 Peak power measurement procedure
		☐	ANSI C63.10	11.12.2.5 Average power measurement procedures
		☐	ANSI C63.10	11.12.2.5.1 Trace averaging with continuous EUT transmission at full power
		☐	ANSI C63.10	11.12.2.5.2 Trace averaging across ON and OFF times of the EUT transmissions followed by duty cycle correction
		☐	ANSI C63.10	11.12.2.5.3 Reduced VBW averaging across ON and OFF times of the EUT transmissions with max hold

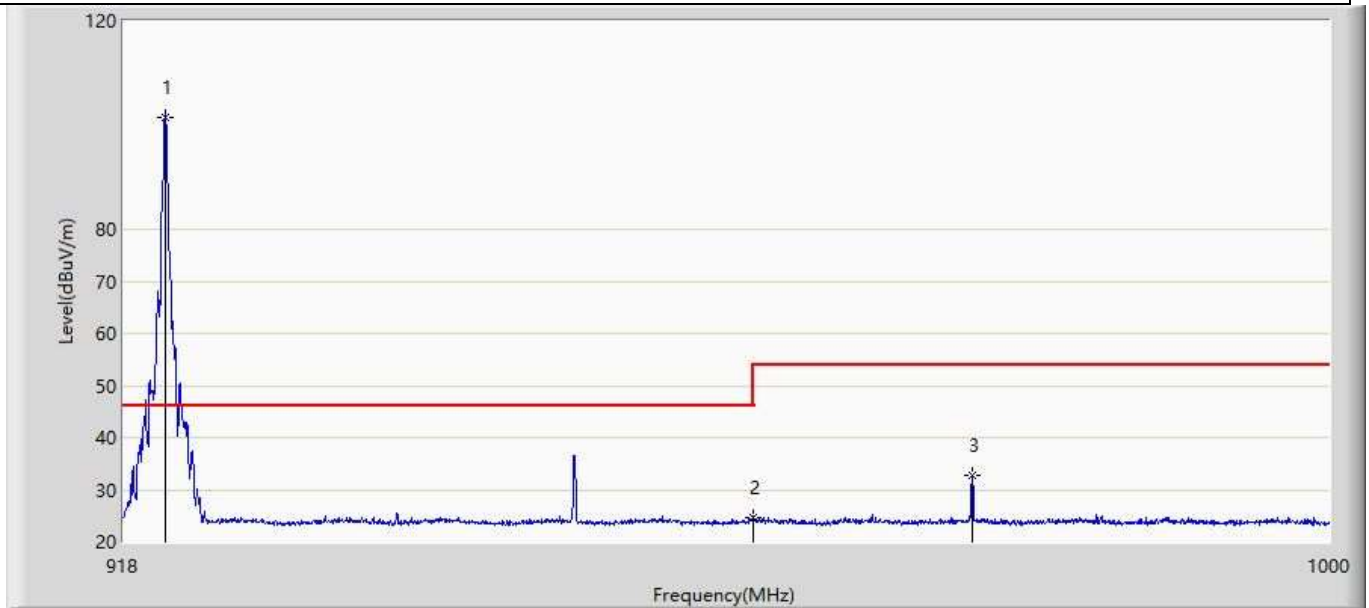
4.5.4 Test Data

Profile: 1972133R	Page No.: 65
Engineer: Pawn	
Site: AC5	Time: 2019/08/21 - 19:24
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055	Polarity: Horizontal
EUT: 8680i Advanced RFID	Power: DC 3.8V
Note: Mode1:Transmit at 920.75MHz by RFID	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	920.788	101.788	73.988	N/A	N/A	27.800	QP
2		960.000	25.544	-2.256	-20.456	46.000	27.800	QP

Profile: 1972133R	Page No.: 66
Engineer: Pawn	
Site: AC5	Time: 2019/08/21 - 19:24
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055	Polarity: Vertical
EUT: 8680i Advanced RFID	Power: DC 3.8V
Note: Mode1:Transmit at 920.75MHz by RFID	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	920.788	101.373	73.573	N/A	N/A	27.800	QP
2		960.000	24.701	-3.099	-21.299	46.000	27.800	QP
3		974.990	32.783	4.983	-21.217	54.000	27.800	QP

4.6 Fundamental emission output power

VERDICT: PASS

4.6.1 Limit

Standard		FCC Part 15 Subpart C Paragraph 15.247 (b)(2)(3)(4); (c)(1)(2)	
☒	$25 \leq \text{Hopping Number} < 50$	☒	GTX < 6dBi
		☐	GTX > 6dBi
☐	Hopping Number ≥ 50	☐	GTX < 6dBi
		☐	GTX > 6dBi

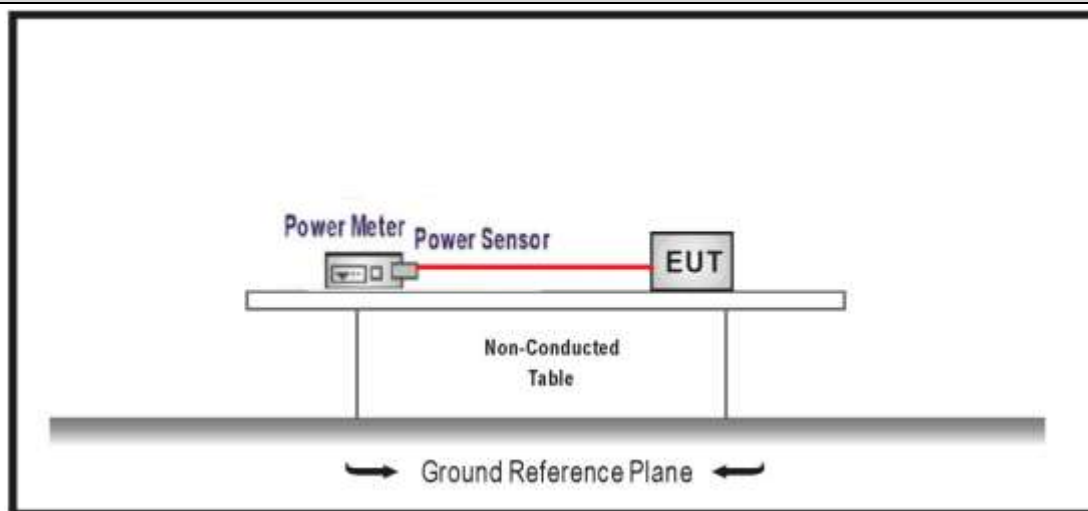
Note 1: GTX directional gain of transmitting antennas.

Note 2: Pout is maximum peak conducted output power .

Note 3: For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section.

Note 4: For antenna gain which is higher than 6dBi, refer to paragraph (b)4 and (c)(1)(2) of this section.

4.6.2 Test Setup



4.6.3 Test Procedure

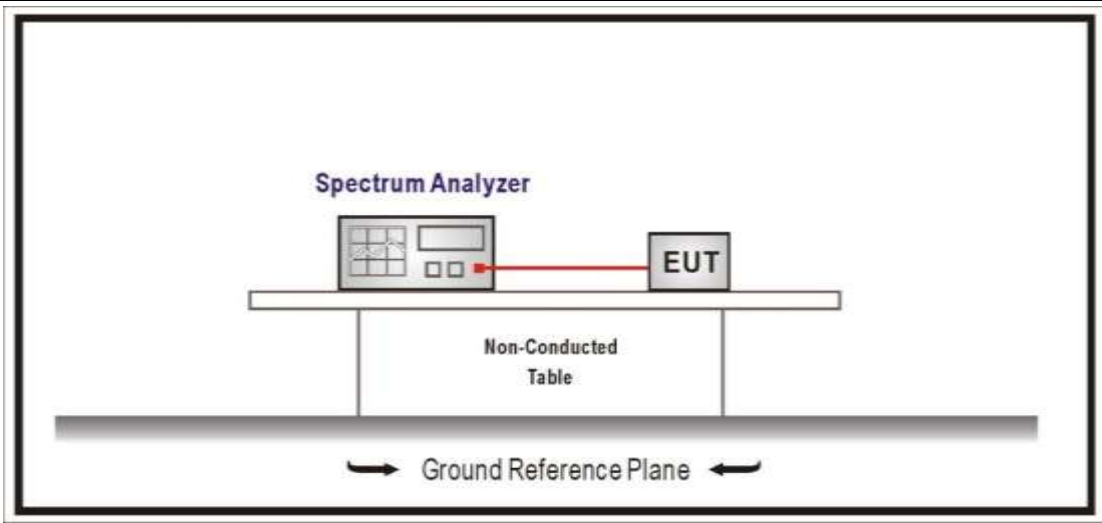
	References Rule			Chapter	Description		
☒	ANSI C63.10			11.9	Fundamental emission output power		
	☐	ANSI C63.10			11.9.1	Maximum peak conducted output power	
		☐	ANSI C63.10		11.9.1.1	RBW ≥ DTS bandwidth	
		☐	ANSI C63.10		11.9.1.2	Integrated band power method	
		☐	ANSI C63.10		11.9.1.3	PKPM1 Peak power meter method	
	☒	ANSI C63.10			11.9.2	Maximum conducted (average) output power	
		☐	ANSI C63.10		11.9.2.2	Measurement using a spectrum analyzer (SA)	
			☐	ANSI C63.10		11.9.2.2.2	Method AVGSA-1(Duty cycle≥98%)
			☐	ANSI C63.10		11.9.2.2.3	Method AVGSA-1A(Duty cycle≥98%)
			☐	ANSI C63.10		11.9.2.2.4	Method AVGSA-2(Duty cycle≤98%)
			☐	ANSI C63.10		11.9.2.2.5	Method AVGSA-2A(Duty cycle≤98%)
			☐	ANSI C63.10		11.9.2.2.4	Method AVGSA-3
			☐	ANSI C63.10		11.9.2.2.5	Method AVGSA-3A
		☒	ANSI C63.10			11.9.2.3	Measurement using a power meter (PM)
			☒	ANSI C63.10		11.9.2.3.1	Method AVGPM
			☐	ANSI C63.10		11.9.2.3.2	Method AVGPM-G



4.6.4 Test Data					
Mode	Channel	Test Frequency (MHz)	Power Output (dBm)	Limit (dBm)	Result
1	00	907.25	23.24	≤24	Pass
	14	914.25	23.58	≤24	Pass
	27	920.75	23.47	≤24	Pass

4.7 20dB Bandwidth	VERDICT: PASS
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4.7.1 Limit	
Standard	FCC Part 15 Subpart C Paragraph 15.247 (a)(1)
☐	For frequency hopping systems operating in 2400-2483.5 MHz band, within frequency range.
☒	For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies.
☐	For frequency hopping systems operating in 5725-5850 MHz band, the maximum 20 dB bandwidth of the hopping channel is 1 MHz.

4.7.2 Test Setup
 The diagram illustrates the test setup. A Spectrum Analyzer and an EUT (Equipment Under Test) are connected by a red cable. They are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane, indicated by a double-headed arrow.

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

4.7.4 Test Data

Mode	CH.	Test Freq. (MHz)	99% Occupied Bandwidth (MHz)	20dB Occupied Bandwidth (MHz)	Limit (kHz)	Result
1	00	907.25	358.08	341.7	250~500	Pass
	14	914.25	361.89	341.1	250~500	Pass
	27	920.75	359.13	340.5	250~500	Pass

Note : The worst case of Occupied Bandwidth as below in next page:

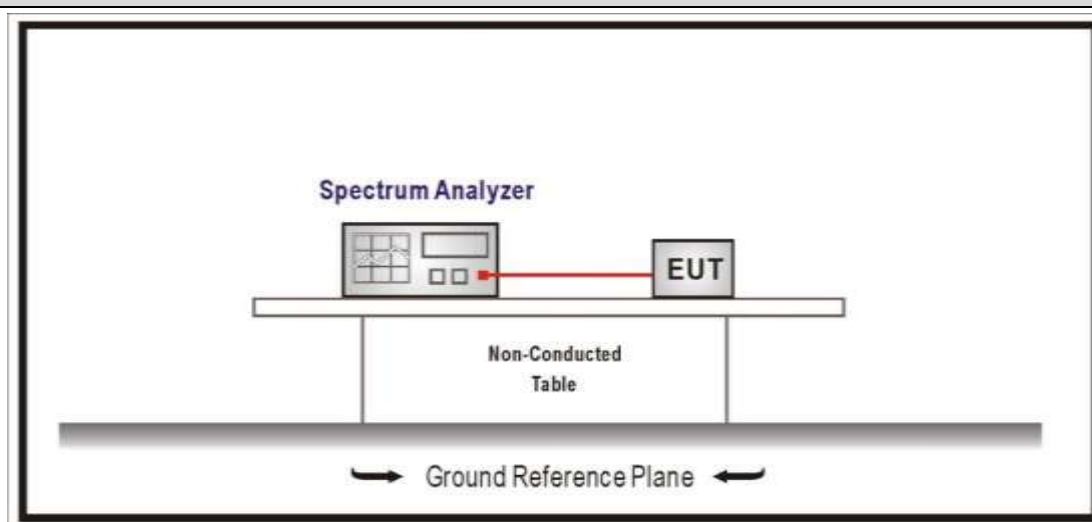
Mode 1 CH14 (914.25MHz)



4.8 Carrier Frequency Separation	VERDICT: PASS
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4.8.1 Limit	
Standard	FCC Part 15 Subpart C Paragraph 15.247 (a)(1)
☒	Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.
☐	Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel.
☐	The 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period;
☒	The 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.
☐	Frequency hopping systems operating in the 5725-5850 MHz band shall use at least 75 hopping frequencies. The maximum 20 dB bandwidth of the hopping channel is 1 MHz.

4.8.2 Test Setup



4.8.3 Test Procedure

	Reference Rule	Chapter	Description
☒	ANSI C63.10	7.8.2	Carrier frequency separation

4.8.4 Test Data

Mode	CH.	Test Freq. (MHz)	Carrier Frequency Separation (kHz)	Limit (kHz)	Result
1	00	907.25	500	341.7	Pass
	14	914.25	500	341.1	Pass
	27	920.75	500	340.5	Pass

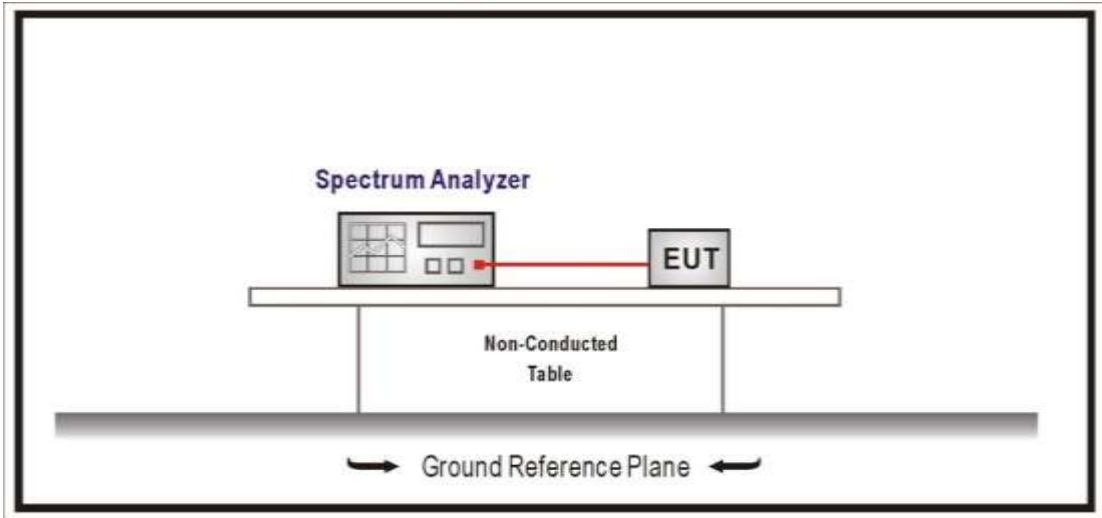
Note : The worst case of Occupied Bandwidth as below in next page:

Mode 1 CH00 (907.25MHz)



4.9 Number of Hopping Frequencies	VERDICT: PASS
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4.9.1 Limit	
Standard	FCC Part 15 Subpart C Paragraph 15.247(a)(1)(iii)
☐	For frequency hopping systems operating in the 2400-2483.5 MHz band shall use at least 15 hopping frequencies.
☐	For frequency hopping systems operating in 902-928 MHz band, if the 20 dB bandwidth of the hopping channel is less than 250 kHz, shall use at least 50 hopping frequencies.
☒	For frequency hopping systems operating in 902-928 MHz band, if the 20 dB bandwidth of the hopping channel is higher than 250 kHz, shall use at least 25 hopping frequencies.
☐	For frequency hopping systems operating in the 5725-5850 MHz band shall use at least 75 hopping frequencies.

4.9.2 Test Setup
 The diagram illustrates the test setup. A Spectrum Analyzer and an EUT (Equipment Under Test) are placed on a Non-Conducted Table. They are connected by a red cable. Below the table is a Ground Reference Plane, indicated by a horizontal line with arrows pointing outwards.

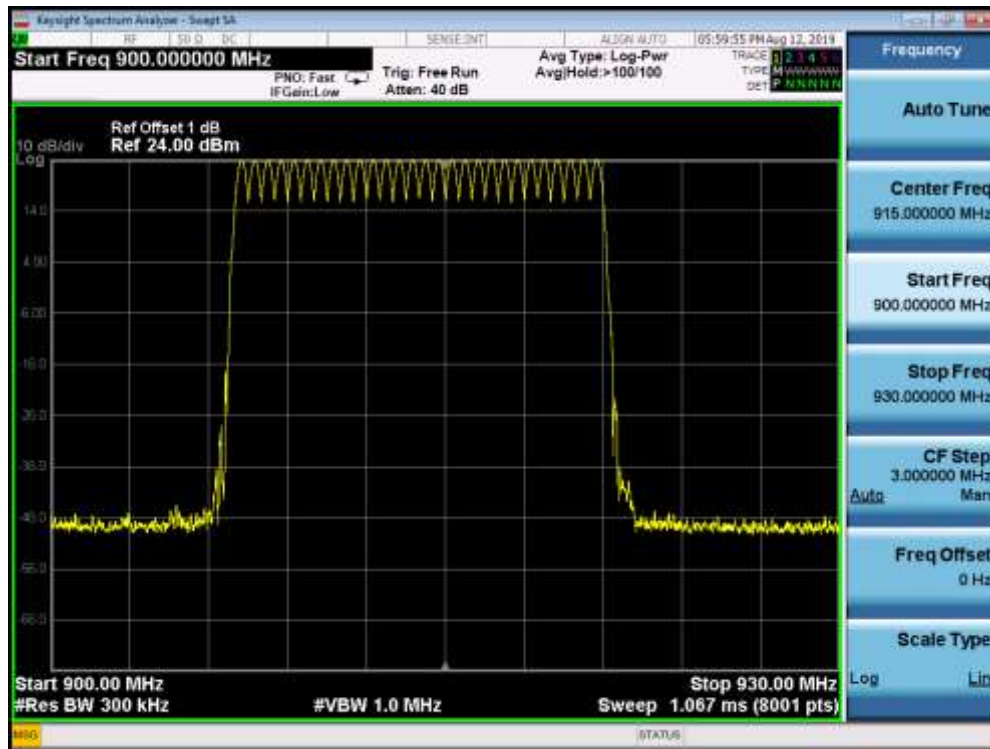
4.9.3 Test Procedure			
	Reference Rule	Chapter	Description
☒	ANSI C63.10	7.8.3	Number of Hopping Frequencies

4.9.4 Test Data

Mode	CH.	Freq. band (MHz)	Number of Hopping Frequencies	Limit	Result
1	00~27	907.25~920.75	28	>25	Pass

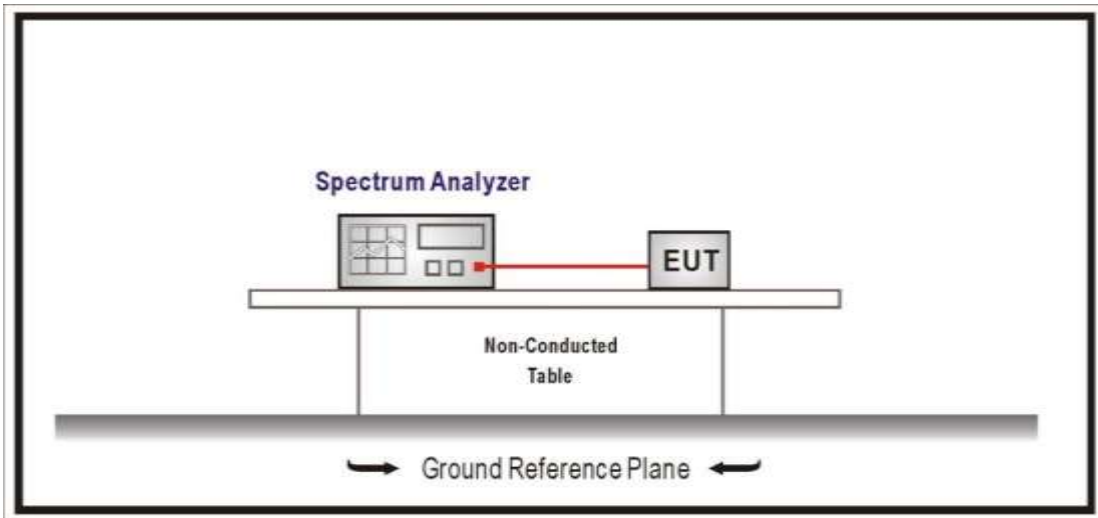
Note : The worst case of Occupied Bandwidth as below in next page:

Mode 1



4.10 Time of Occupancy (Dwell Time)	VERDICT: PASS
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4.10.1 Limit	
Standard	FCC Part 15 Subpart C Paragraph 15.247(a)(1)(iii)
☐	Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.
☐	For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period
☒	For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period.
☐	Frequency hopping systems operating in the 5725-5850 MHz band shall use at least 75 hopping frequencies. The maximum 20 dB bandwidth of the hopping channel is 1 MHz. The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 30 second period.

4.10.2 Test Setup
 The diagram illustrates the test setup. A Spectrum Analyzer and the Equipment Under Test (EUT) are connected by a red cable. They are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane, indicated by a double-headed arrow.

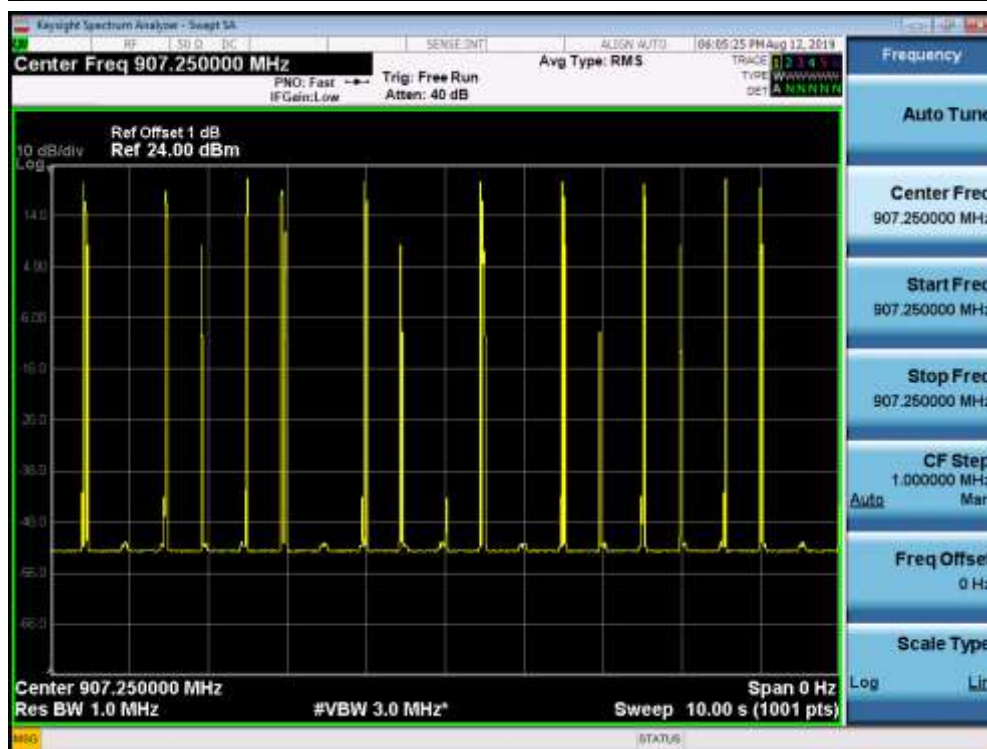
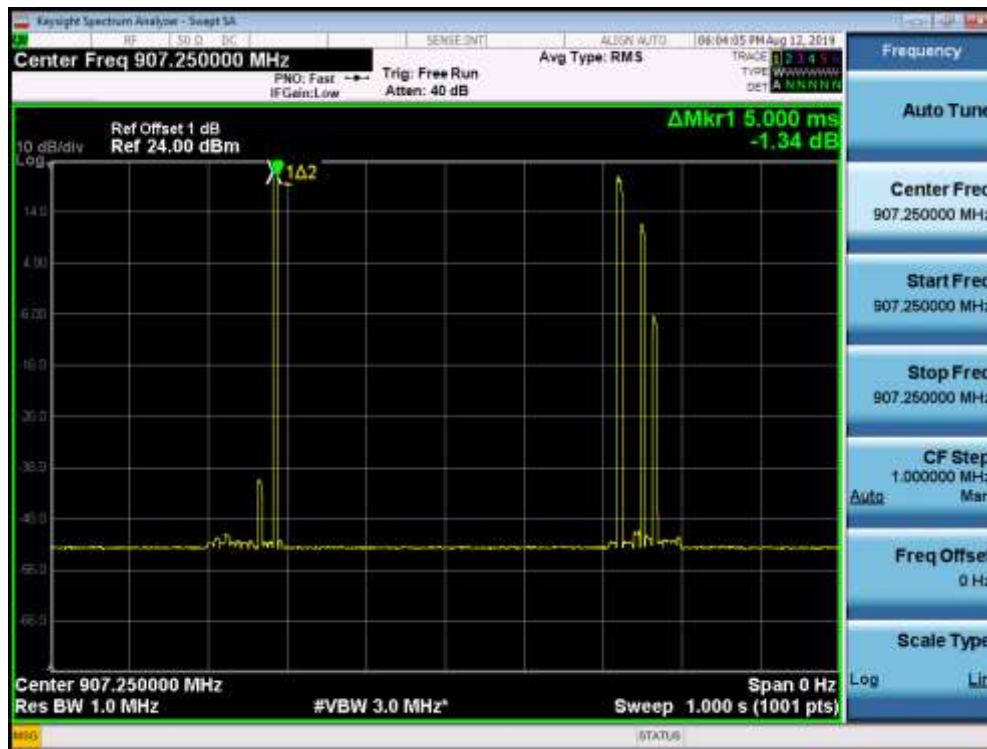
4.10.3 Test Procedure			
	Reference Rule	Chapter	Description
☒	ANSI C63.10	7.8.4	Time of Occupancy (Dwell Time)

4.10.4 Test Data

Mode	CH.	Test Freq.	Time of Occupancy (ms)	Limit (ms)	Result
1	00	907.25	50	≤400	Pass

Note : The worst case of Occupied Bandwidth as below in next page:

Mode 1



4.11 Antenna Requirement	VERDICT: PASS
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4.11.1 Limit:	
Standard	FCC Part 15 Subpart C 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.	

4.11.2 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.	



4.12 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 _____