

FCC Test Report

Product Name	Parafait RF Tag Reader 1
Model No.	PARARFTRDR001
FCC ID	G7H-SPRFTR001

Applicant	Semnox Solutions Private Limited
Address	No.4-1-145, 3rd Floor, Punja Building Annexe M G Road, Lalbagh, Mangalore 575003

Date of Receipt	Dec. 10, 2019
Issued Date	Oct. 26, 2020
Report No.	19C0167R-RFUSP17V01
Report Version	V1.0



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration of the equipment and evaluated measurement uncertainty herein.

This report must not be used to claim product endorsement by TAF or any agency of the government.

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Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Test Report

Issued Date: Oct. 26, 2020

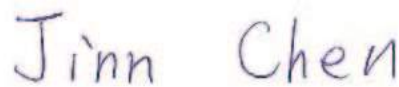
Report No.: 19C0167R-RFUSP17V01



Product Name	Parafait RF Tag Reader 1
Applicant	Semnox Solutions Private Limited
Address	No.4-1-145, 3rd Floor, Punja Building Annexe M G Road, Lalbagh, Mangalore 575003
Manufacturer	Semnox Solutions Private Limited
Model No.	PARARFTRDR001
FCC ID.	G7H-SPRFTR001
EUT Rated Voltage	DC 5V
EUT Test Voltage	DC 5V
Trade Name	Parafait
Trademark	Semnox
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C ANSI C63.4: 2014, ANSI C63.10: 2013
Test Result	Complied

Documented By

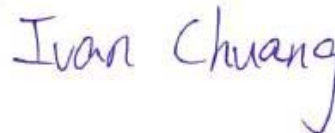
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(Senior Adm. Specialist / Jinn Chen)

Tested By

:



(Senior Engineer / Ivan Chuang)

Approved By

:



(Director / Vincent Lin)

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Revision History

Report No.	Version	Description	Issued Date
19C0167R-RFUSP17V01	V1.0	Initial issue of report.	2020-10-26

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Parafait RF Tag Reader 1
Trade Name	Parafait
Trademark	Semnox
Model No.	PARARFTRDR001
FCC ID	G7H-SPRFTR001
Frequency Range	13.56MHz
Modulation	ASK
Antenna Type	Coil Antenna

Frequency of Each Channel:

Channel	Frequency
Channel 1:	13.56 MHz

Note:

1. This device is a Parafait RF Tag Reader 1 with a built-in 13.56MHz transceiver.
2. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.225.
3. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

Test Mode	Mode 1: Transmit
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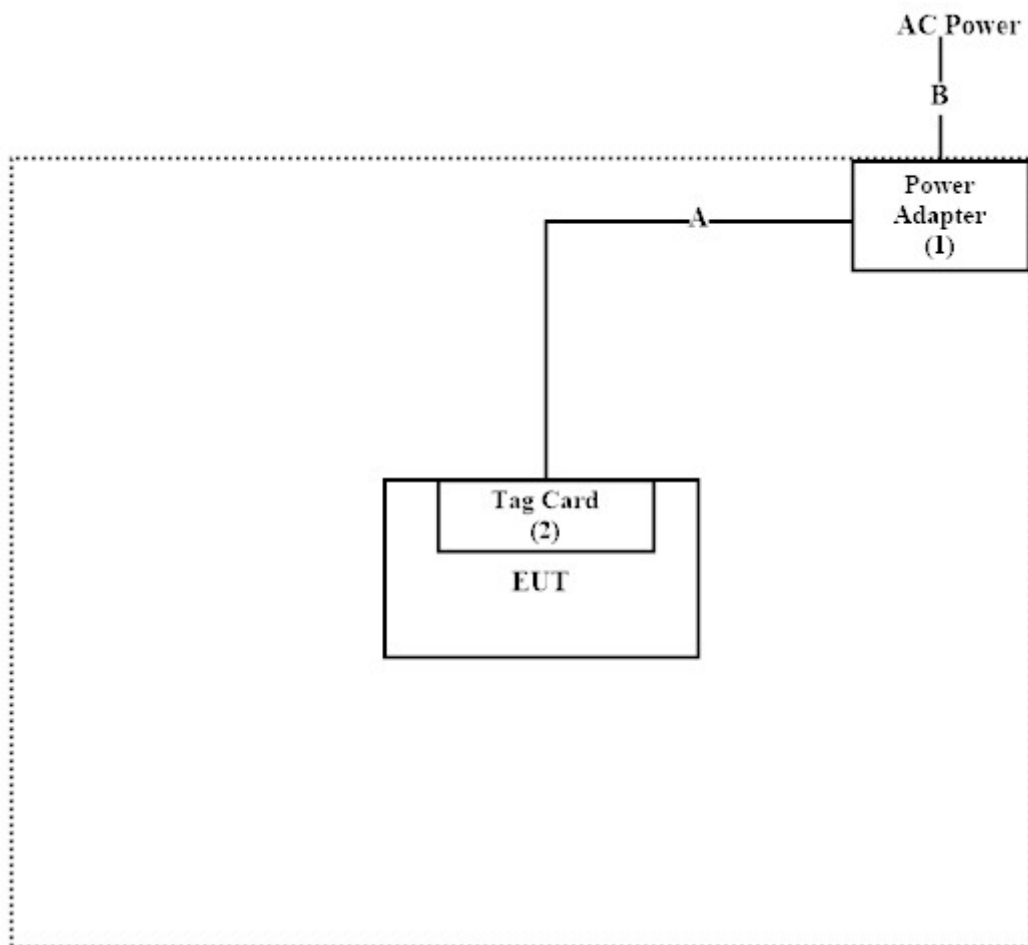
1.2. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

	Product	Manufacturer	Model No.	Serial No.	Power Cord
1	Power Adapter	Apple	A1385	N/A	N/A
2	Tag Card	Semnox	F08	N/A	N/A

Signal Cable Type		Signal cable Description
A	USB Cable	Shielded, 1.7m
B	Power Cable	Non-shielded, 1.8m

1.3. Configuration of tested System



1.4. EUT Exercise Software

1. Setup the EUT as shown in Section 1.3.
2. Use tag card to trigger EUT for signal transmitting.
3. Configure the test mode, the test channel, and the data rate.
4. Press “OK” to start the continuous Transmit.
5. Verify that the EUT works properly.

1.5. Test Facility

Ambient conditions in the laboratory:

Performed Item	Items	Required	Actual
Conducted Emission	Temperature (°C)	10~40 °C	21.3 °C
	Humidity (%RH)	10~90 %	42.1 %
Radiated Emission	Temperature (°C)	10~40 °C	22.5 °C
	Humidity (%RH)	10~90 %	55.7 %
Conductive	Temperature (°C)	10~40 °C	23.5 °C
	Humidity (%RH)	10~90 %	56 %

USA : FCC Registration Number: TW0023

Canada : IC Registration Number: 25880

Site Description : Accredited by TAF
Accredited Number: 3023

Test Laboratory : DEKRA Testing and Certification Co., Ltd
Address : No.159, Sec. 2, Wenhua 1st Rd., Linkou Dist.,
New Taipei City 24457, Taiwan, R.O.C.

Phone number : 886-2-2602-7968
Fax number : 866-2-2602-3286
Email address : info.tw@dekra.com
Website : <http://www.dekra.com.tw>

1.6. List of Test Equipment

For Conduction measurements /ASR1

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	EMI Test Receiver	R&S	ESR7	101601	2020.05.28	2021.05.27
X	Two-Line V-Network	R&S	ENV216	101306	2020.03.25	2021.03.24
X	Two-Line V-Network	R&S	ENV216	101307	2020.04.17	2021.04.16
X	Coaxial Cable	Quietek	RG400_BNC	RF001	2020.05.24	2021.05.23

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with "X" are used to measure the final test results.
3. Test Software version : DEKRA Testing System V1.2.

For Conducted measurements /ASR3

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	Temperature Chamber	KSON	THS-D4T-100	A0606	2020.04.22	2021.04.21
X	Spectrum Analyzer	R&S	FSV40	101149	2019.12.16	2020.12.15

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with "X" are used to measure the final test results.

For Radiated measurements /ACB1

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	Loop Antenna	AMETEK	HLA6121	49611	2020.03.16	2021.03.15
X	Bi-Log Antenna	SCHWARZBECK	VULB9168	9168-953	2020.01.03	2021.01.02
	Horn Antenna	ETS-Lindgren	3117	00203800	2019.12.12	2020.12.11
	Horn Antenna	Com-Power	AH-840	101087	2020.06.08	2021.06.07
X	Pre-Amplifier	EMCI	EMC001330	980316	2020.06.23	2021.06.22
	Pre-Amplifier	EMCI	EMC051835SE	980311	2020.06.23	2021.06.22
	Pre-Amplifier	EMCI	EMC05820SE	980310	2020.06.24	2021.06.23
	Pre-Amplifier	EMCI	EMC184045SE	980314	2020.06.10	2021.06.09
	Filter	MICRO TRONICS	BRM50702	G251	2020.09.17	2021.09.16
	Filter	MICRO TRONICS	BRM50716	G188	2020.09.17	2021.09.16
X	EMI Test Receiver	R&S	ESR7	101602	2019.12.16	2020.12.15
X	Spectrum Analyzer	R&S	FSV40	101148	2020.03.16	2021.03.15
X	Coaxial Cable	SUHNER	SUCOFLEX 106	RF002	2020.07.03	2021.07.02
	Mircoflex Cable	HUBER SUHNER	SUCOFLEX 102	MY3381/2	2020.06.10	2021.06.09

Note:

1. Loop Antenna is calibrated every two year, the other equipments are calibrated every one year.
2. The test instruments marked with "X" are used to measure the final test results.
3. Test Software version : DEKRA Testing System V1.2.

1.7. Uncertainty

Uncertainties have been calculated according to the DEKRA internal document, and is described in each test chapter of this report.

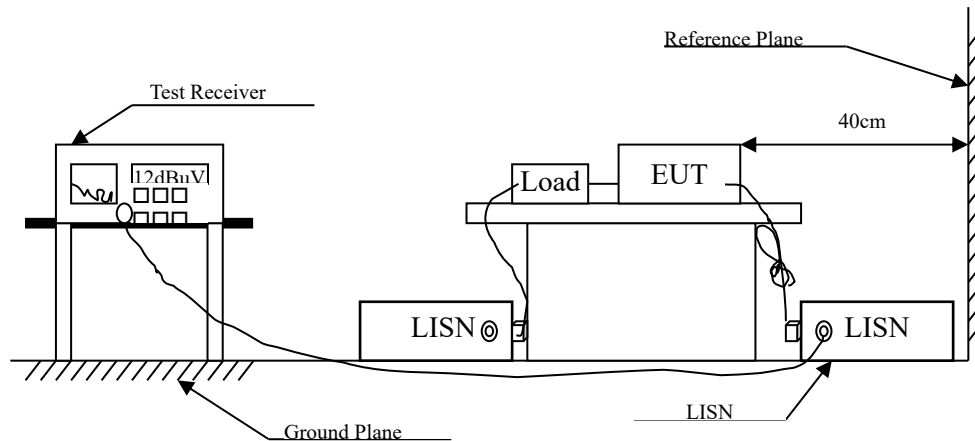
The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%.

Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Test item	Uncertainty	
Conducted Emission	$\pm 3.42 \text{ dB}$	
Radiated Emission	Under 1GHz $\pm 4.06 \text{ dB}$	Above 1GHz $\pm 3.73 \text{ dB}$
Band Edge	Under 1GHz $\pm 4.06 \text{ dB}$	Above 1GHz $\pm 3.73 \text{ dB}$
Frequency Tolerance	$\pm 682.83 \text{ Hz}$	

2. Conducted Emission

2.1. Test Setup



2.2. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBuV) Limit		
Frequency MHz	Limits	
	QP	AV
0.15 - 0.50	66-56 _(註)	56-46 _(註)
0.50-5.0	56	46
5.0 - 30	60	50

2.3. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

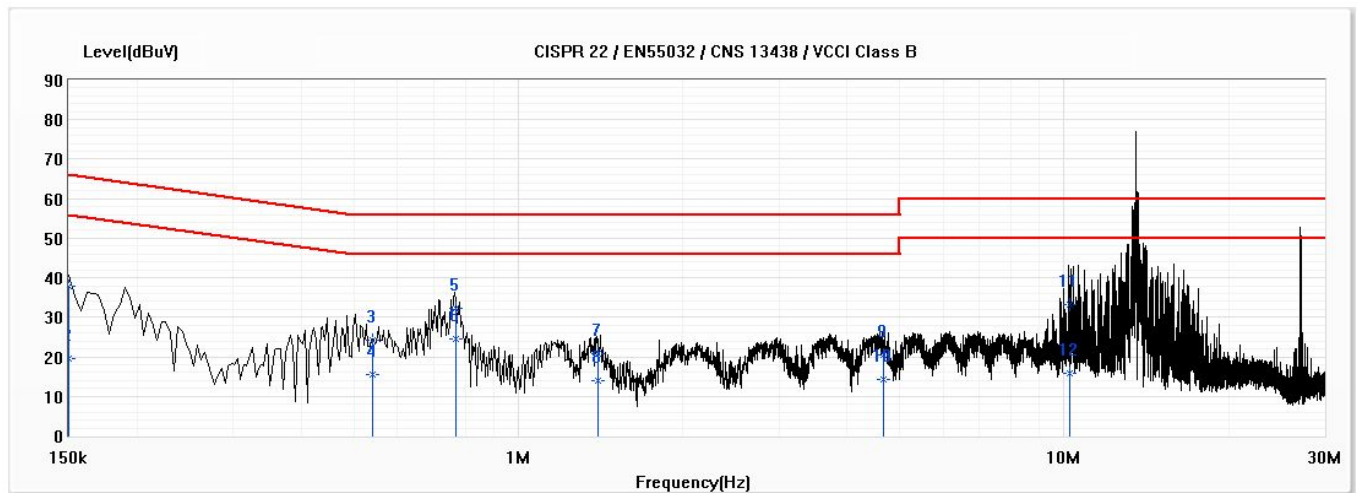
Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement.

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

2.4. Test Result of Conducted Emission

Product : Parafait RF Tag Reader 1
 Test Item : Conducted Emission Test
 Test date : 2020/09/25
 Test Mode : Mode 1: Transmit

L1



No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	0.15	37.83	66.00	-28.16	28.17	9.66	QP
2	0.15	19.62	56.00	-36.38	9.96	9.66	AV
3	0.541	24.36	56.00	-31.64	14.69	9.66	QP
4	0.541	15.49	46.00	-30.51	5.83	9.66	AV
5	0.768	32.29	56.00	-23.71	22.61	9.68	QP
*6	0.768	24.46	46.00	-21.54	14.78	9.68	AV
7	1.399	20.88	56.00	-35.12	11.18	9.70	QP
8	1.399	14.05	46.00	-31.95	4.35	9.70	AV
9	4.666	20.33	56.00	-35.67	10.54	9.79	QP
10	4.666	14.43	46.00	-31.57	4.65	9.79	AV
11	10.251	33.13	60.00	-26.87	23.24	9.89	QP
12	10.251	15.82	50.00	-34.18	5.92	9.89	AV

Remark:

1. "*" means this data is the worst emission level; "!" means this data is over limit.
2. Emission Level=Reading Level + Correct Factor(Correct Factor=LISN Factor+Cable Loss).
3. Margin=Emission Level-Limit

Product : Parafait RF Tag Reader 1
 Test Item : Conducted Emission Test
 Test date : 2020/09/25
 Test Mode : Mode 1: Transmit

N



No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	0.15	37.91	66.00	-28.08	28.24	9.67	QP
2	0.15	19.25	56.00	-36.74	9.58	9.67	AV
3	0.474	24.69	56.44	-31.75	15.02	9.67	QP
4	0.474	13.41	46.44	-33.03	3.74	9.67	AV
5	0.767	29.43	56.00	-26.57	19.75	9.68	QP
6	0.767	23.13	46.00	-22.87	13.45	9.68	AV
7	1.383	19.54	56.00	-36.46	9.83	9.70	QP
8	1.383	14.69	46.00	-31.31	4.99	9.70	AV
9	2.947	20.73	56.00	-35.27	10.98	9.75	QP
10	2.947	15.77	46.00	-30.23	6.02	9.75	AV
*11	11.017	40.92	60.00	-19.08	30.99	9.93	QP
12	11.017	23.34	50.00	-26.66	13.41	9.93	AV

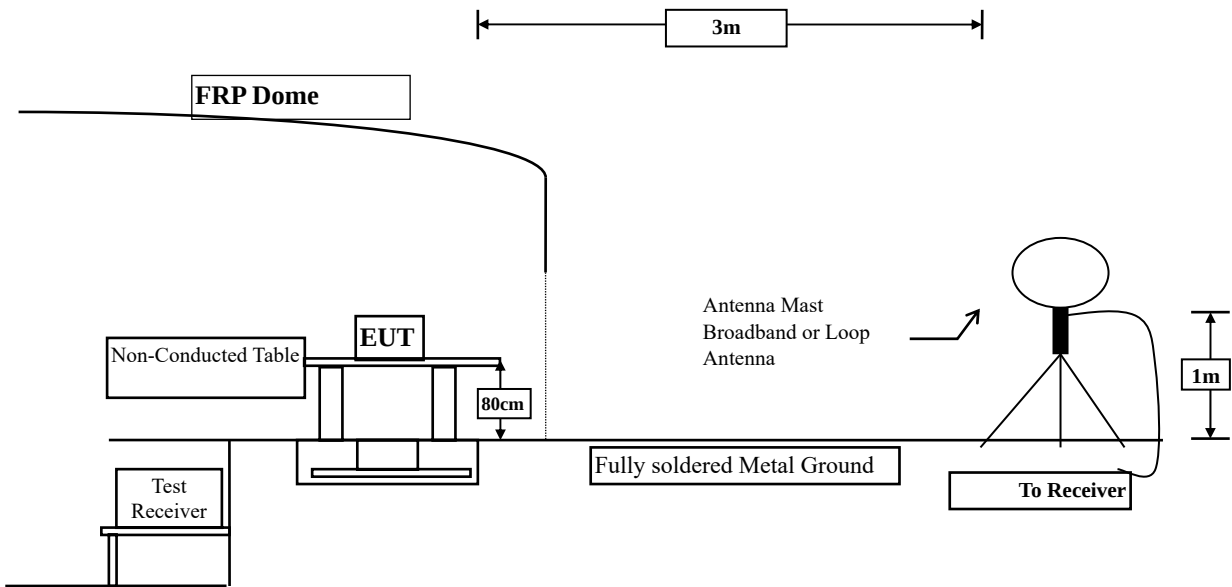
Remark:

1. "*" means this data is the worst emission level; "!" means this data is over limit.
2. Emission Level=Reading Level + Correct Factor(Correct Factor=LISN Factor+Cable Loss).
3. Margin=Emission Level-Limit

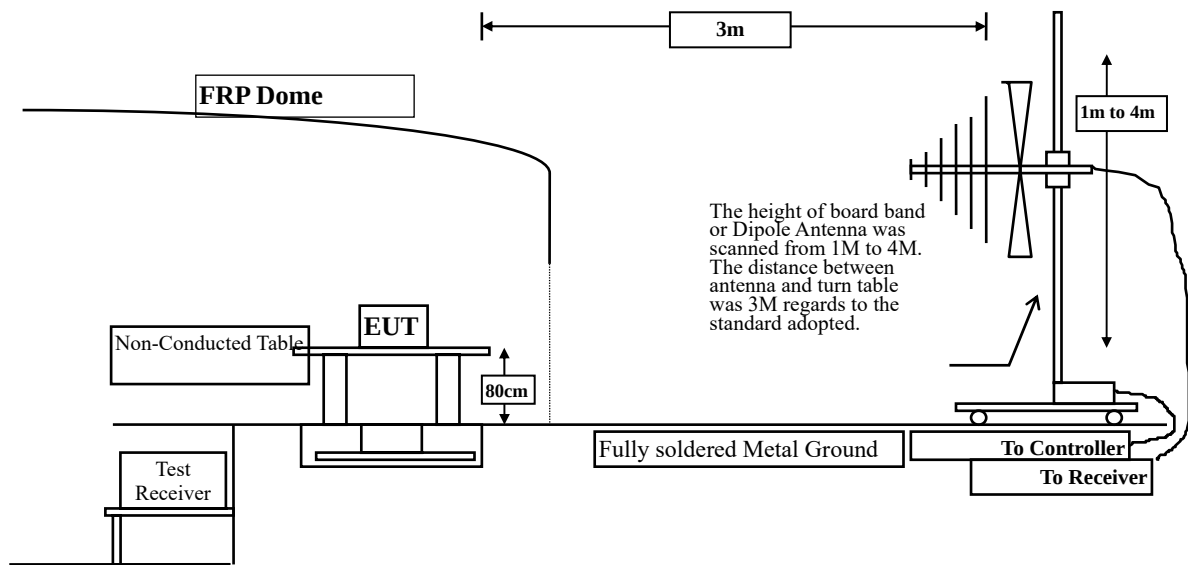
3. Radiated Emission

3.1. Test Setup

9kHz~30MHz



30MHz~1GHz



3.2. Limits

► Fundamental electric field strength Limit

FCC Part 15 Subpart C Paragraph 15.225 Limits				
Fundamental Frequency MHz	Field strength of fundamental			
	uV/m	Distance (meter)	dBuV/m	Distance (meter)
13.553 – 13.567	15848	30	124	3
13.410 – 13.553 and 13.567 – 13.710	334	30	90.47	3
13.110 – 13.410 and 13.710 – 14.010	106	30	80.50	3
Outside of the 13.110 – 14.010	See 15.209 Limits			

Remarks : 1. RF Voltage (dBuV) = 20 log RF Voltage (uV)

2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
3. The emission limit in this paragraph is based on measurement instrumentation employing an average detector.

➤ Spurious electric field strength Limit

FCC Part 15 Subpart C Paragraph 15.209 Limits			
Frequency MHz	uV/m	dBuV/m	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	See Remark ¹	300
0.490-1.705	24000/F(kHz)	See Remark ¹	30
1.705-30	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

Remarks :

1. RF Voltage (dBuV) = 20 log RF Voltage (uV)
2. In the Above Table, the tighter limit applies at the band edges.
3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

3.3. Test Procedure

Fundamental electric field strength:

The EUT and its simulators are placed on a turn table which is 1 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum electric field strength.

The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna which is 1 meter above ground. All X-axis, Y-axis and Z-axis polarization of the antenna are set on measurement.

Spurious electric field strength:

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C6310: 2013 on radiated measurement.

On any frequency the radiated limits shown are based upon the use of measurement instrumentation employing an average detector function. When average radiated emission measurement are included emission measurement below 1000 MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.

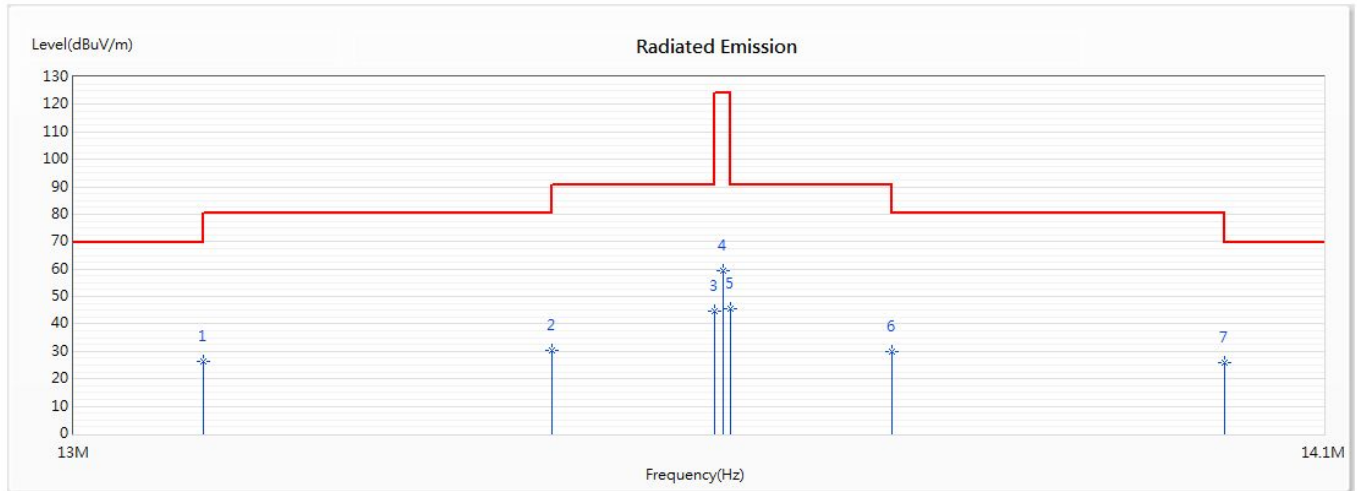
The bandwidth below 30MHz setting on the field strength meter is 9kHz and above 30MHz is 120kHz.

The frequency range from 9kHz to 10th harmonics is checked.

3.4. Test Result of Radiated Emission

Product : Parafait RF Tag Reader 1
 Test Item : Fundamental Radiated Emission
 Test date : 2020/10/05
 Test Mode : Mode 1: Transmit

X-axis - HORIZONTAL



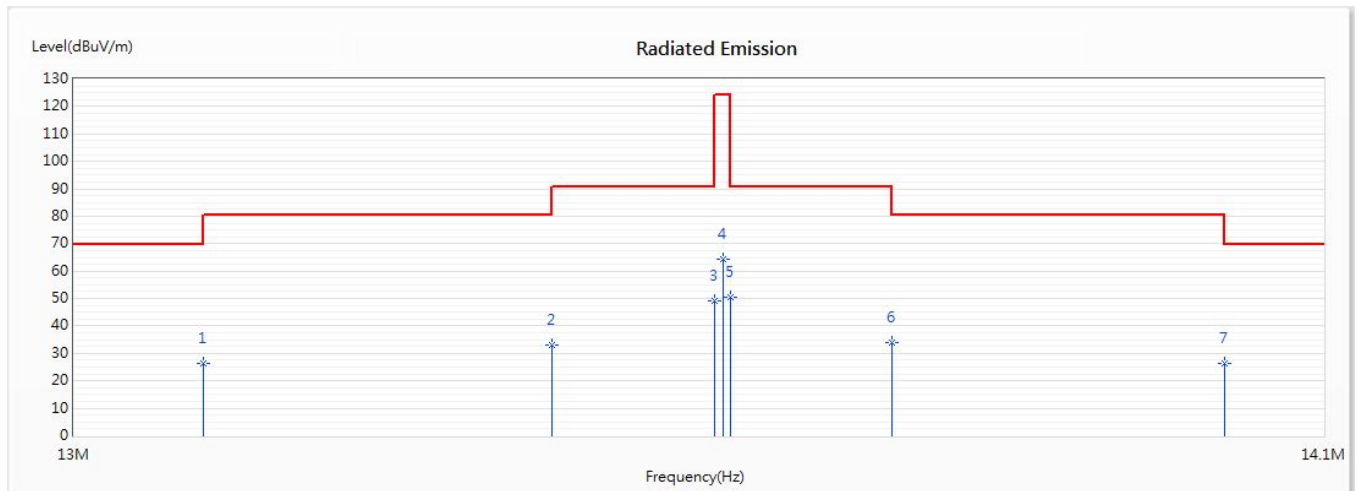
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	13.11	26.29	69.50	-43.21	4.03	22.26	QP
2	13.41	30.19	80.50	-50.31	7.92	22.27	QP
3	13.553	44.64	90.47	-45.83	22.36	22.28	QP
4	13.56	59.63	124.00	-64.37	37.35	22.28	QP
5	13.567	45.78	90.47	-44.69	23.50	22.28	QP
6	13.71	30.11	80.50	-50.39	7.82	22.29	QP
7	14.01	26.12	69.50	-43.38	3.82	22.30	QP

Note:

1. Fundamental Limit=84dBuV/m + 40*Log (30(m)/3(m))=124dBuV/m.
2. All Readings below 1GHz are Quasi-Peak, above are average value.
3. "*" means the worst emission level.
4. Emission Level = Reading Level + Correct Factor.

Product : Parafait RF Tag Reader 1
 Test Item : Fundamental Radiated Emission
 Test date : 2020/10/05
 Test Mode : Mode 1: Transmit

X-axis - VERTICAL



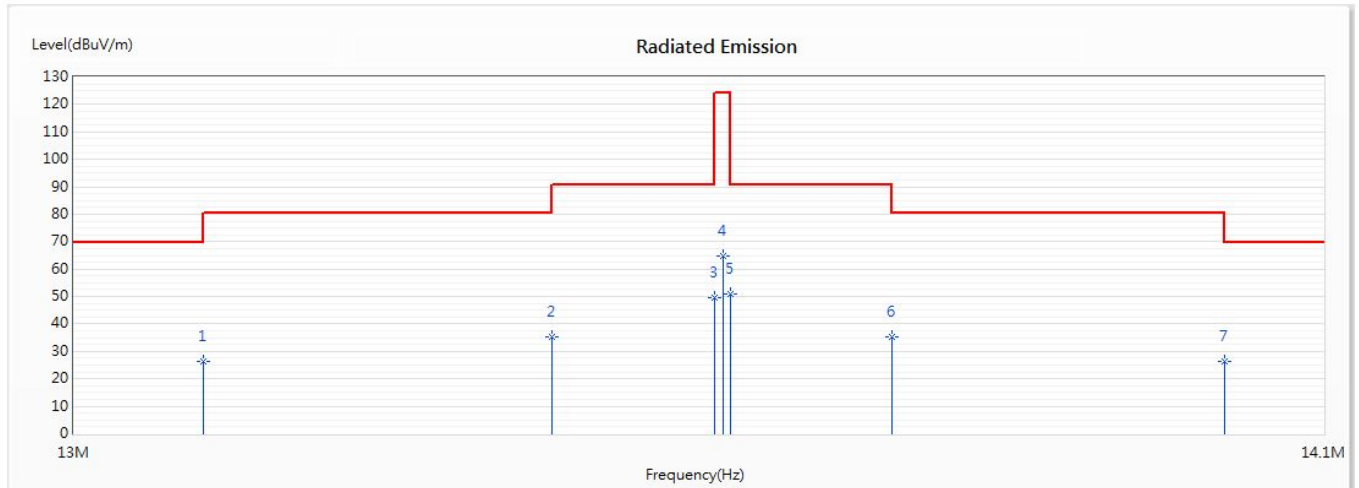
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	13.11	26.25	69.50	-43.25	3.99	22.26	QP
2	13.41	33.28	80.50	-47.22	11.01	22.27	QP
3	13.553	49.21	90.47	-41.26	26.93	22.28	QP
4	13.56	64.25	124.00	-59.75	41.97	22.28	QP
* 5	13.567	50.39	90.47	-40.08	28.11	22.28	QP
6	13.71	33.95	80.50	-46.55	11.66	22.29	QP
7	14.01	26.22	69.50	-43.28	3.92	22.30	QP

Note:

1. Fundamental Limit = $84 \text{ dBuV/m} + 40 \cdot \log(30 \text{ m} / 3 \text{ m}) = 124 \text{ dBuV/m}$.
2. All Readings below 1GHz are Quasi-Peak, above are average value.
3. "*" means the worst emission level.
4. Emission Level = Reading Level + Correct Factor.

Product : Parafait RF Tag Reader 1
 Test Item : Fundamental Radiated Emission
 Test date : 2020/10/05
 Test Mode : Mode 1: Transmit

Y-axis - HORIZONTAL



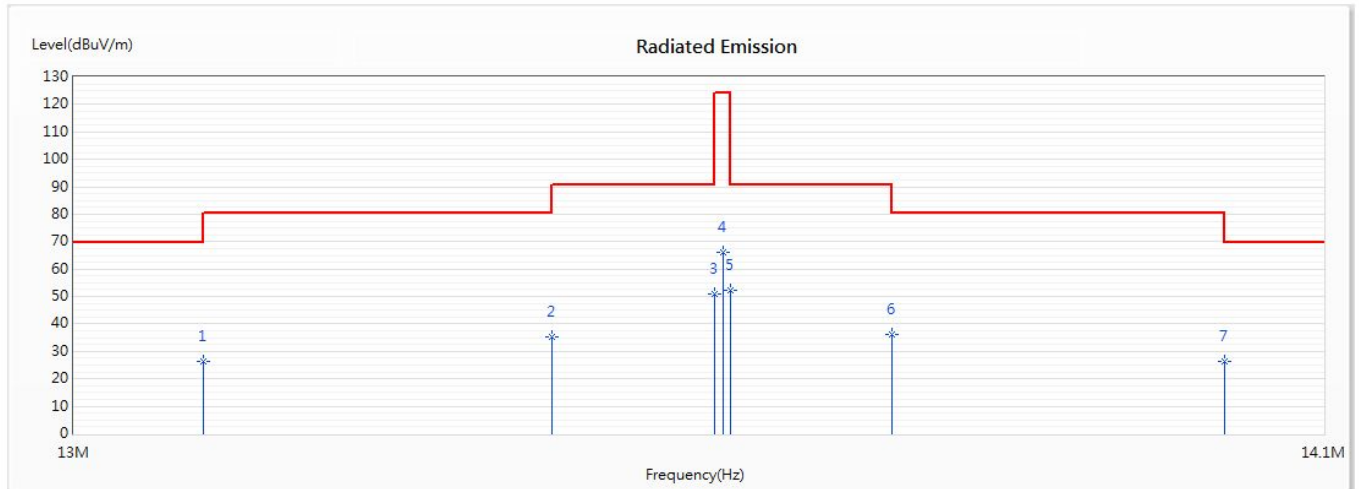
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	13.11	26.25	69.50	-43.25	3.99	22.26	QP
2	13.41	35.13	80.50	-45.37	12.86	22.27	QP
3	13.553	49.81	90.47	-40.66	27.53	22.28	QP
4	13.56	64.80	124.00	-59.20	42.52	22.28	QP
* 5	13.567	50.97	90.47	-39.50	28.69	22.28	QP
6	13.71	35.11	80.50	-45.39	12.82	22.29	QP
7	14.01	26.17	69.50	-43.33	3.87	22.30	QP

Note:

1. Fundamental Limit=84dBuV/m + 40*Log (30(m)/3(m))=124dBuV/m.
2. All Readings below 1GHz are Quasi-Peak, above are average value.
3. "*" means the worst emission level.
4. Emission Level = Reading Level + Correct Factor.

Product : Parafait RF Tag Reader 1
 Test Item : Fundamental Radiated Emission
 Test date : 2020/10/05
 Test Mode : Mode 1: Transmit

Y-axis - VERTICAL



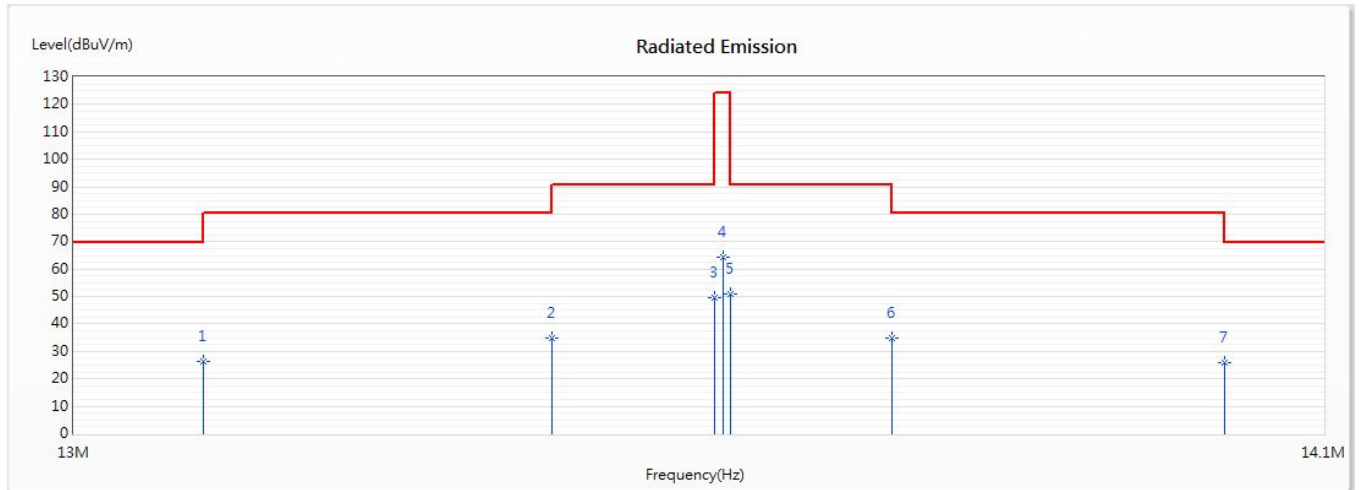
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	13.11	26.42	69.50	-43.08	4.16	22.26	QP
2	13.41	35.49	80.50	-45.01	13.22	22.27	QP
3	13.553	51.02	90.47	-39.45	28.74	22.28	QP
4	13.56	66.02	124.00	-57.98	43.74	22.28	QP
* 5	13.567	52.18	90.47	-38.29	29.90	22.28	QP
6	13.71	36.02	80.50	-44.48	13.73	22.29	QP
7	14.01	26.16	69.50	-43.34	3.86	22.30	QP

Note:

1. Fundamental Limit=84dBuV/m + 40*Log (30(m)/3(m))=124dBuV/m.
2. All Readings below 1GHz are Quasi-Peak, above are average value.
3. "*" means the worst emission level.
4. Emission Level = Reading Level + Correct Factor.

Product : Parafait RF Tag Reader 1
 Test Item : Fundamental Radiated Emission
 Test date : 2020/10/05
 Test Mode : Mode 1: Transmit

Z-axis- HORIZONTAL



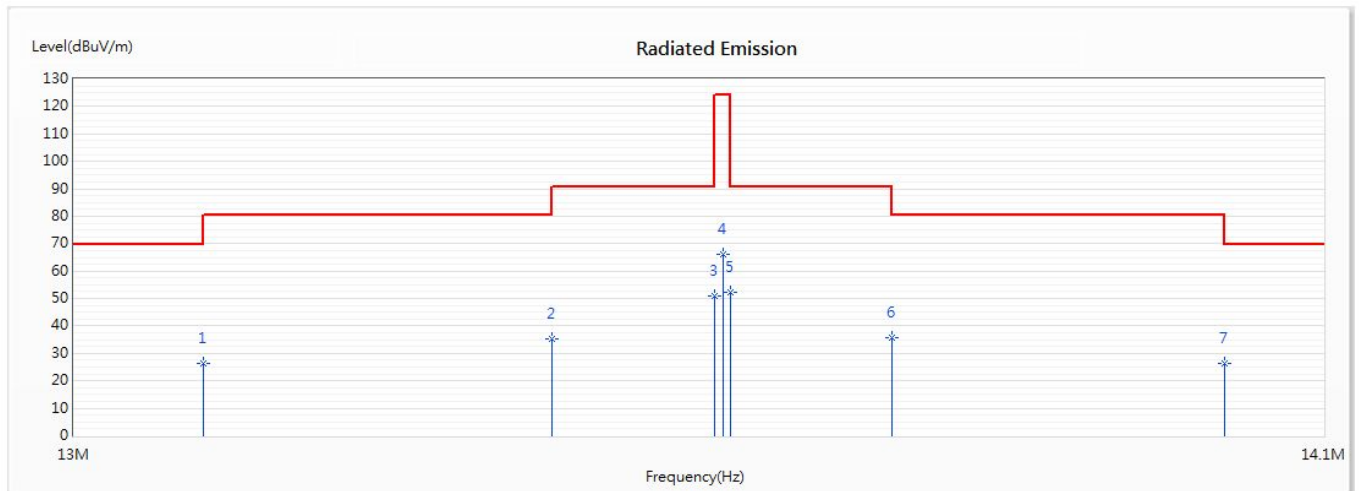
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	13.11	26.19	69.50	-43.31	3.93	22.26	QP
2	13.41	34.87	80.50	-45.63	12.60	22.27	QP
3	13.553	49.57	90.47	-40.90	27.29	22.28	QP
4	13.56	64.53	124.00	-59.47	42.25	22.28	QP
* 5	13.567	50.72	90.47	-39.75	28.44	22.28	QP
6	13.71	35.03	80.50	-45.47	12.74	22.29	QP
7	14.01	26.12	69.50	-43.38	3.82	22.30	QP

Note:

1. Fundamental Limit=84dBuV/m + 40*Log (30(m)/3(m))=124dBuV/m.
2. All Readings below 1GHz are Quasi-Peak, above are average value.
3. "*" means the worst emission level.
4. Emission Level = Reading Level + Correct Factor.

Product : Parafait RF Tag Reader 1
 Test Item : Fundamental Radiated Emission
 Test date : 2020/10/05
 Test Mode : Mode 1: Transmit

Z-axis - VERTICAL



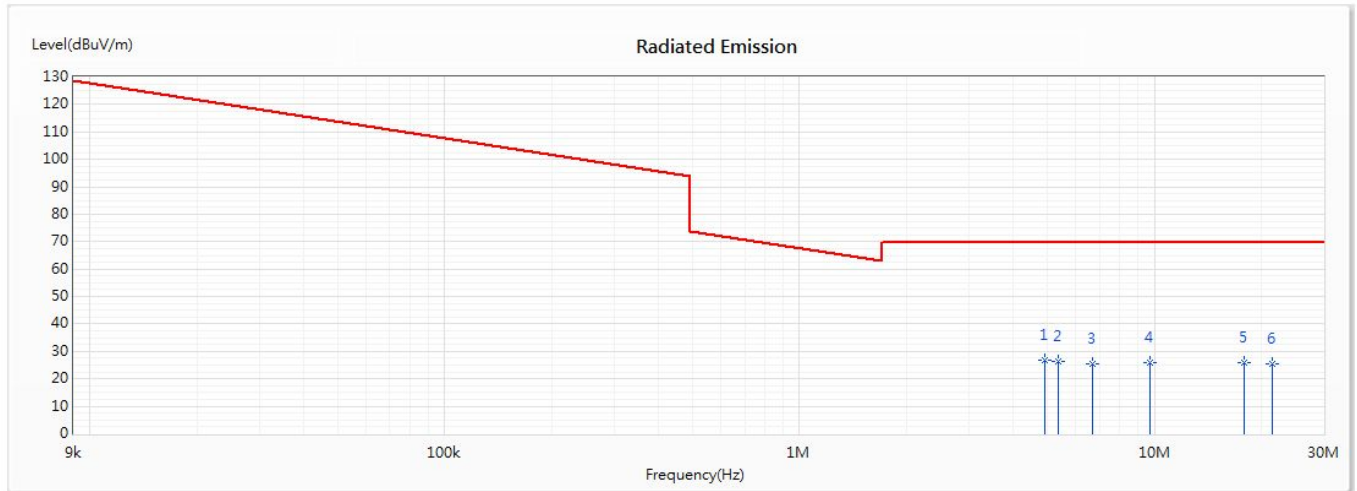
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	13.11	26.21	69.50	-43.29	3.95	22.26	QP
2	13.41	35.33	80.50	-45.17	13.06	22.27	QP
3	13.553	50.91	90.47	-39.56	28.63	22.28	QP
4	13.56	65.93	124.00	-58.07	43.65	22.28	QP
* 5	13.567	52.08	90.47	-38.39	29.80	22.28	QP
6	13.71	35.84	80.50	-44.66	13.55	22.29	QP
7	14.01	26.25	69.50	-43.25	3.95	22.30	QP

Note:

1. Fundamental Limit = $84 \text{ dBuV/m} + 40 \cdot \log(30 \text{ m} / 3 \text{ m}) = 124 \text{ dBuV/m}$.
2. All Readings below 1GHz are Quasi-Peak, above are average value.
3. "*" means the worst emission level.
4. Emission Level = Reading Level + Correct Factor.

Product : Parafait RF Tag Reader 1
 Test Item : General Radiated Emission Data (below 30MHz)
 Test date : 2020/10/05
 Test Mode : Mode 1: Transmit

Horizontal



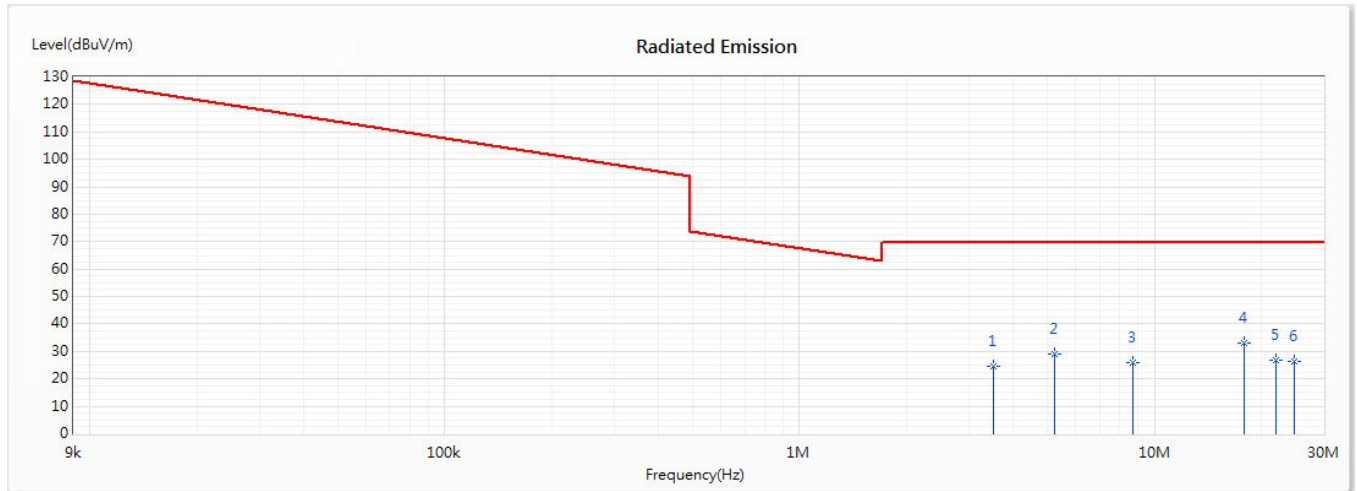
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	4.928	26.60	69.54	-42.94	5.83	20.77	QP
2	5.347	26.25	69.54	-43.29	5.36	20.89	QP
3	6.667	25.50	69.54	-44.04	4.27	21.23	QP
4	9.696	25.90	69.54	-43.64	3.88	22.02	QP
5	17.854	25.74	69.54	-43.80	3.25	22.49	QP
6	21.423	25.31	69.54	-44.23	2.64	22.67	QP

Note:

1. Limit=29.54dBuV/m + 40*Log (30(m)/3(m))=69.54dBuV/m.
2. All Readings below 1GHz are Quasi-Peak, above are average value.
3. "*" means the worst emission level.
4. Emission Level = Reading Level + Correct Factor.

Product : Parafait RF Tag Reader 1
 Test Item : General Radiated Emission Data (below 30MHz)
 Test date : 2020/10/05
 Test Mode : Mode 1: Transmit

Vertical



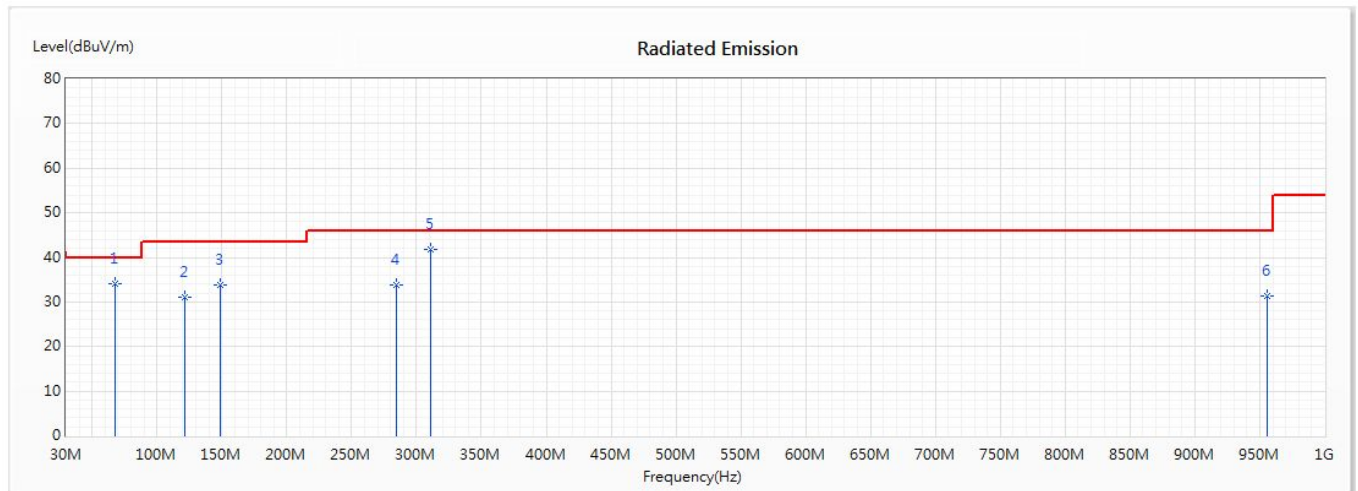
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	3.518	24.68	69.54	-44.86	4.55	20.13	QP
2	5.227	28.84	69.54	-40.70	7.98	20.86	QP
3	8.706	25.99	69.54	-43.55	4.23	21.76	QP
* 4	17.974	32.91	69.54	-36.63	10.41	22.50	QP
5	22.082	26.65	69.54	-42.89	3.95	22.70	QP
6	24.872	26.54	69.54	-43.00	3.70	22.84	QP

Note:

1. Limit=29.54dBuV/m + 40*Log (30(m)/3(m))=69.54dBuV/m.
2. All Readings below 1GHz are Quasi-Peak, above are average value.
3. "*" means the worst emission level.
4. Emission Level = Reading Level + Correct Factor.

Product : Parafait RF Tag Reader 1
 Test Item : General Radiated Emission Data (above 30MHz)
 Test date : 2020/10/05
 Test Mode : Mode 1: Transmit

Horizontal



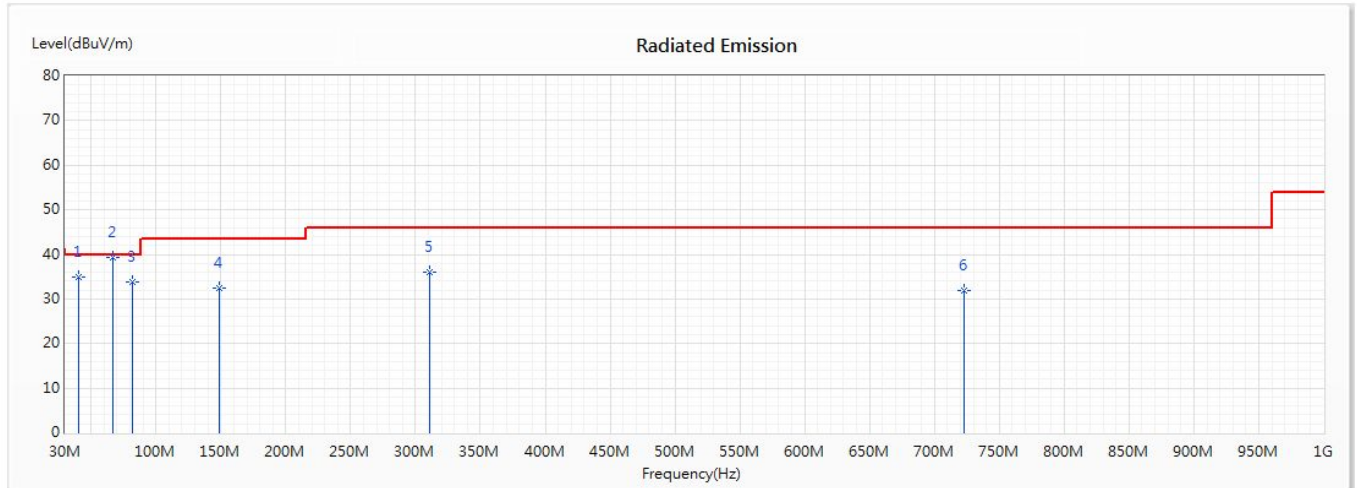
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	67.83	33.99	40.00	-6.01	46.36	-12.37	QP
2	121.18	31.19	43.50	-12.31	44.26	-13.07	QP
3	148.34	33.77	43.50	-9.73	44.15	-10.38	QP
4	284.14	33.95	46.00	-12.05	43.24	-9.29	QP
* 5	311.3	41.85	46.00	-4.15	50.46	-8.61	QP
6	955.38	31.39	46.00	-14.61	28.77	2.62	QP

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. "*" means the worst emission level.
3. Emission Level = Reading Level + Correct Factor

Product : Parafait RF Tag Reader 1
 Test Item : General Radiated Emission Data (above 30MHz)
 Test date : 2020/10/05
 Test Mode : Mode 1: Transmit

Vertical



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	40.67	34.94	40.00	-5.06	45.76	-10.82	QP
* 2	66.86	38.20	40.00	-1.80	50.46	-12.26	QP
3	81.41	33.93	40.00	-6.07	49.10	-15.17	QP
4	148.34	32.51	43.50	-10.99	42.89	-10.38	QP
5	311.3	36.08	46.00	-9.92	44.69	-8.61	QP
6	722.58	31.87	46.00	-14.13	32.42	-0.55	QP

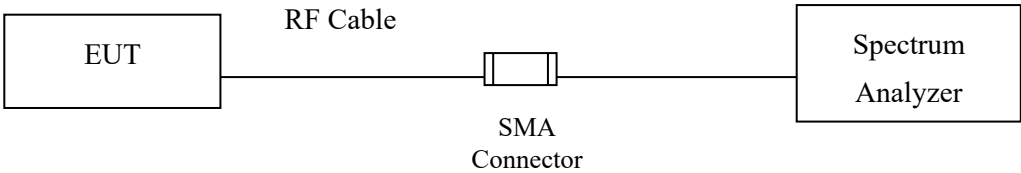
Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. "*" means the worst emission level.
3. Emission Level = Reading Level + Correct Factor

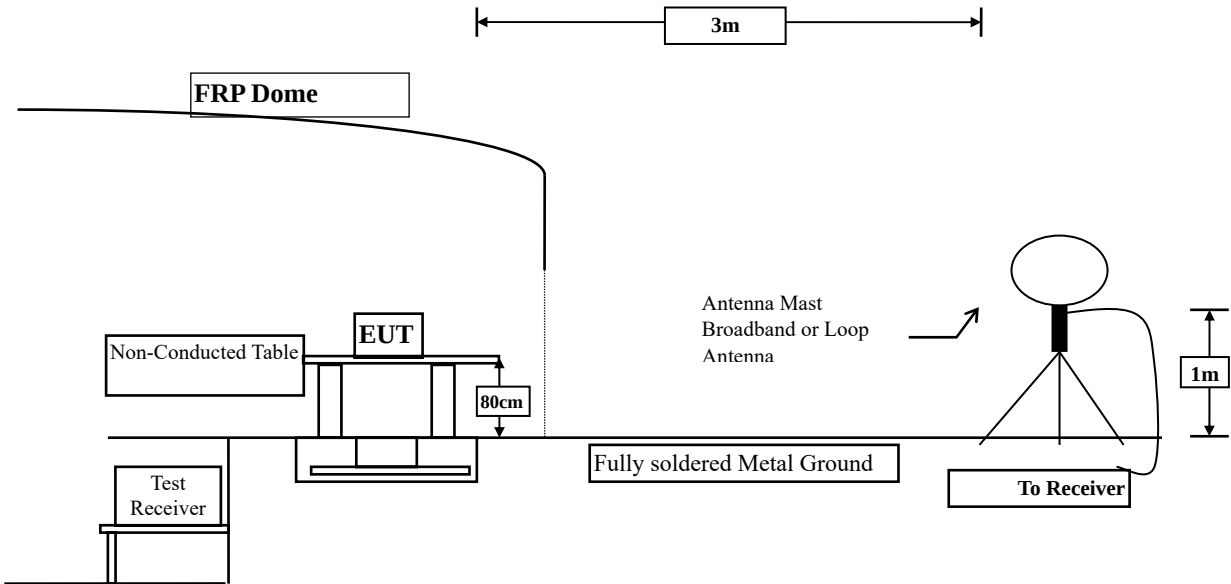
4. Band Edge

4.1. Test Setup

RF Conducted Measurement:



RF Radiated Measurement:



4.2. Limits

In any 9 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 50 dB below that in the 9 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

4.3. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

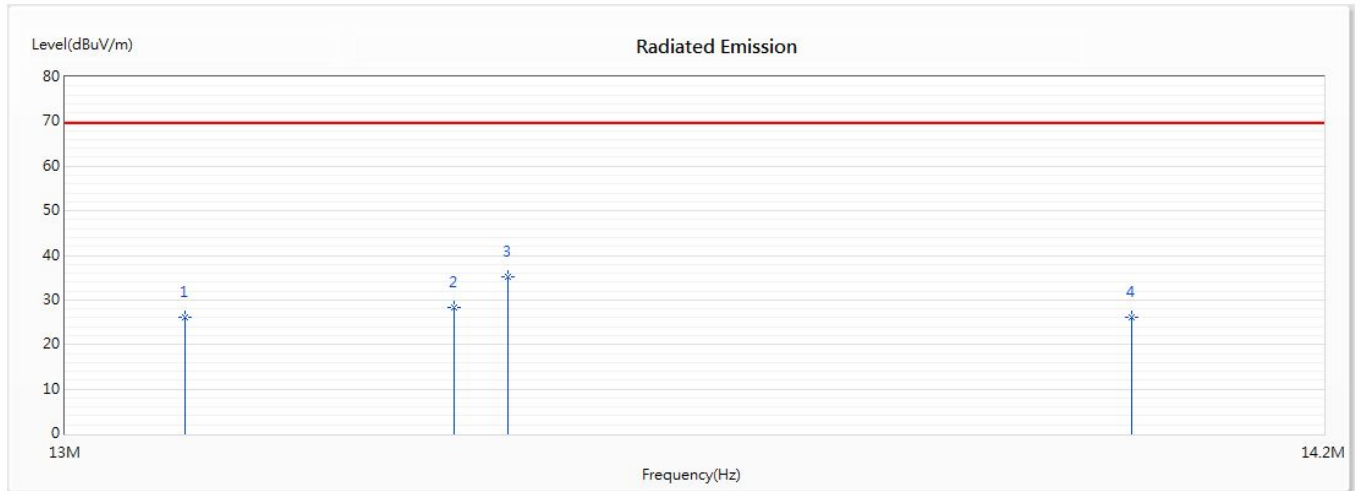
Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10: 2013 on radiated measurement.

The bandwidth below 30MHz setting on the field strength meter is 9kHz and above 30MHz is 120kHz.

4.4. Test Result of Band Edge

Product : Parafait RF Tag Reader 1
 Test Item : Band Edge Data
 Test date : 2020/10/05
 Test Mode : Mode 1: Transmit

HORIZONTAL



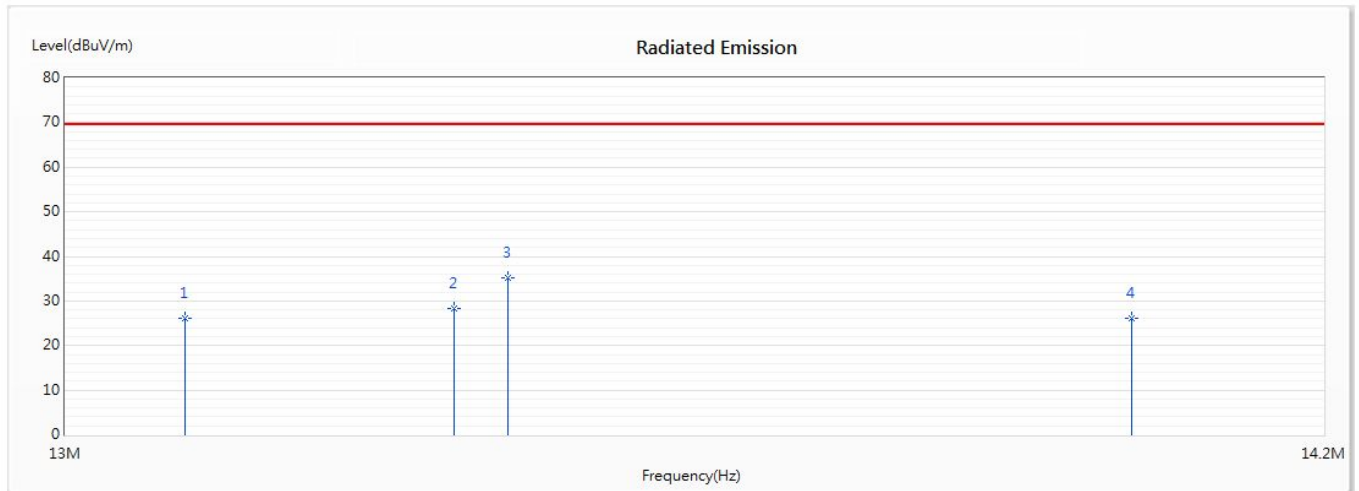
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	13.11	26.02	69.54	-43.52	3.76	22.26	QP
2	13.36	28.20	69.54	-41.34	5.93	22.27	QP
* 3	13.41	35.11	69.54	-34.43	12.84	22.27	QP
4	14.01	26.02	69.54	-43.52	3.72	22.30	QP

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Emission Level = Reading Level + Correct Factor.

Product : Parafait RF Tag Reader 1
 Test Item : Band Edge Data
 Test date : 2020/10/05
 Test Mode : Mode 1: Transmit

VERTICAL



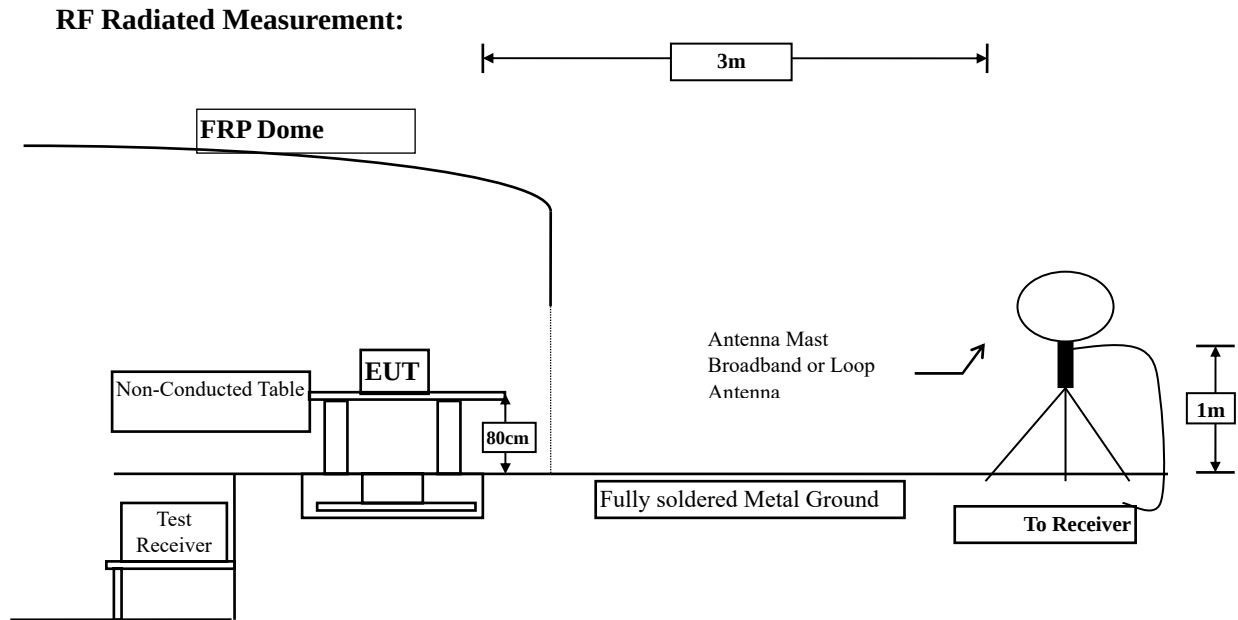
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	13.11	26.21	69.54	-43.33	3.95	22.26	QP
2	13.36	28.32	69.54	-41.22	6.05	22.27	QP
* 3	13.41	35.16	69.54	-34.38	12.89	22.27	QP
4	14.01	26.12	69.54	-43.42	3.82	22.30	QP

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Emission Level = Reading Level + Correct Factor.

5. 20dB Bandwidth

5.1. Test Setup



5.2. Limits

§15.215

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

§15.225

Operation within the band 13.11MHz ~ 14.010MHz.

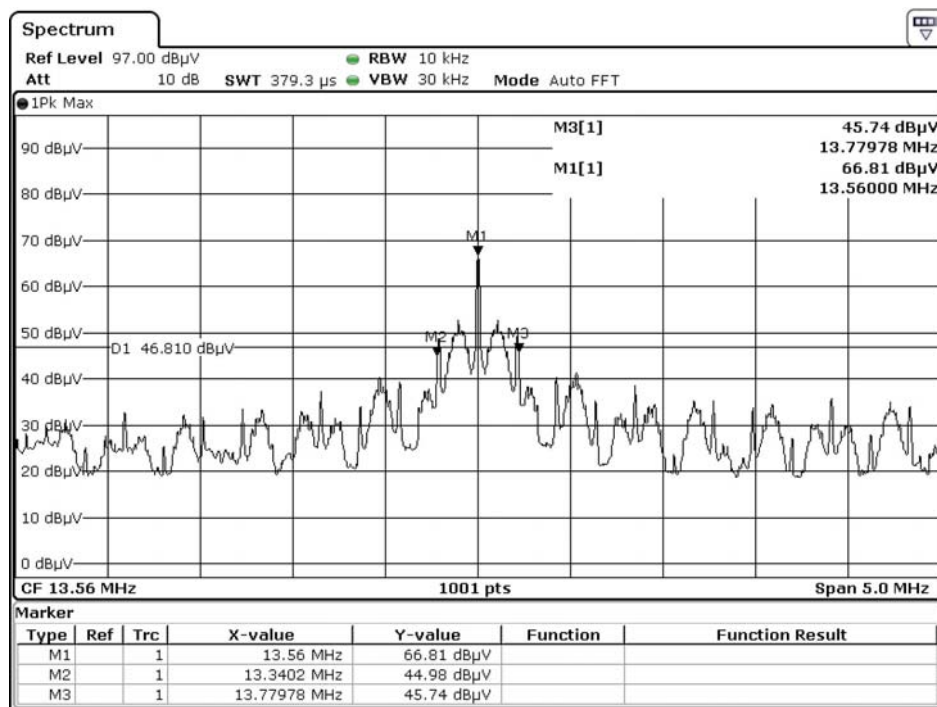
5.3. Test Procedure

The spectrum analyzer connects to the receiver antenna and setting the RBW = 10KHz, the VBW is set to 3 times or more than RBW.

5.4. Test Result of 20dB Bandwidth

Product : Parafait RF Tag Reader 1
 Test Item : 20dB Bandwidth
 Test date : 2020/10/23
 Test Mode : Mode 1: Transmit

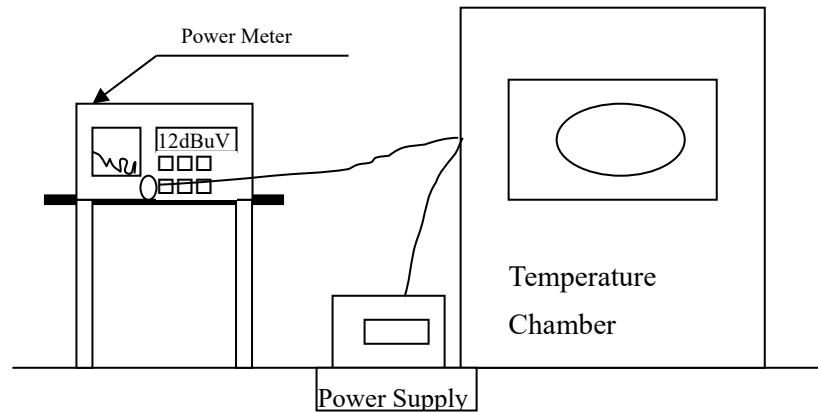
Test Frequency (MHz)	Measurement Level (MHz)	Limit (MHz)	Result
13.56	13.3402	>13.11	PASS
	13.7798	<14.01	
20dB Bandwidth	0.4396	--	



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6. Frequency Tolerance

6.1. Test Setup



6.2. Limits

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency.

6.3. Test Procedure

The over 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.

6.4. Test Result of Frequency Stability

Product : Parafait RF Tag Reader 1
 Test Item : Frequency Tolerance
 Test Site : Temperature Chamber
 Test date : 2020/10/18
 Test Mode : Mode 1: Transmit

Temperature (°C)	Voltage (V)	Observe Time	Declared Frequency (MHz)	Read Frequency (MHz)	Tolerance (%)	Limit (%)
20	5	start	13.56	13.56014	0.001032	±0.01 %
		2mins	13.56	13.56014	0.001032	
		5mins	13.56	13.56014	0.001032	
		10mins	13.56	13.56014	0.001032	
20	5.75	start	13.56	13.56014	0.001032	±0.01 %
		2mins	13.56	13.56014	0.001032	
		5mins	13.56	13.56014	0.001032	
		10mins	13.56	13.56014	0.001032	
20	4.25	start	13.56	13.56014	0.001032	±0.01 %
		2mins	13.56	13.56014	0.001032	
		5mins	13.56	13.56014	0.001032	
		10mins	13.56	13.56014	0.001032	
50	5	start	13.56	13.56007	0.000516	±0.01 %
		2mins	13.56	13.56007	0.000516	
		5mins	13.56	13.56007	0.000516	
		10mins	13.56	13.56007	0.000516	
40	5	start	13.56	13.56007	0.000516	±0.01 %
		2mins	13.56	13.56007	0.000516	
		5mins	13.56	13.56007	0.000516	
		10mins	13.56	13.56007	0.000516	
30	5	start	13.56	13.56014	0.001032	±0.01 %
		2mins	13.56	13.56014	0.001032	
		5mins	13.56	13.56014	0.001032	
		10mins	13.56	13.56014	0.001032	

10	5	start	13.56	13.56000	0.000000	± 0.01 %
		2mins	13.56	13.56000	0.000000	
		5mins	13.56	13.55900	-0.007375	
		10mins	13.56	13.56050	0.003687	
0	5	start	13.56	13.56021	0.001549	± 0.01 %
		2mins	13.56	13.56021	0.001549	
		5mins	13.56	13.56021	0.001549	
		10mins	13.56	13.56021	0.001549	
-10	5	start	13.56	13.56021	0.001549	± 0.01 %
		2mins	13.56	13.56021	0.001549	
		5mins	13.56	13.56021	0.001549	
		10mins	13.56	13.56021	0.001549	
-20	5	start	13.56	13.56021	0.001549	± 0.01 %
		2mins	13.56	13.56021	0.001549	
		5mins	13.56	13.56021	0.001549	
		10mins	13.56	13.56021	0.001549	

7. EMI Reduction Method During Compliance Testing

No modification was made during testing.