

NCC Test Report

Equipment : RFID module
Brand Name : HID
Model No. : OMNIKEY 5127CK MINI
Standard : LP0002 Section 2.8(2016-08-23)
Operating Band : 125 kHz
Applicant : 神基科技股份有限公司
新竹科學工業園區新竹縣寶山鄉研發二路 1 號 4 樓

The product sample received on Jul. 11, 2017 and completely tested on Jul. 18, 2017. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by:



Phoenix Chen / Assistant Manager



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Appendix A. Test Photos

Photographs of EUT v01

Summary of Test Result

Conformance Test Specifications					
Report Clause	Ref. Std. Clause	Description	Measured	Limit	Result
1.1.2	2.2	Antenna Requirement	Antenna connector mechanism complied	LP0002-2.2	Complied
3.1	2.3	AC Power-line Conducted Emissions	[dBuV]: 0.22MHz 51.70(Margin 11.09dB) - QP 42.66 (Margin 10.13dB) - AV	LP0002-2.3	Complied
3.2	2.8	Transmitter Radiated Unwanted Emissions	[dBuV/m at 3m]: 359.8MHz 35.44 (Margin 10.56dB) - PK	LP0002-2.8	Complied
3.3	-	Emission Bandwidth	99% Bandwidth: 11.69 [kHz] 20dB Bandwidth: 4.16 [kHz]	N/A	Complied
3.4	2.11	Receiver Radiated Unwanted Emissions	[dBuV/m at 3m]: 70.740MHz 31.25 (Margin 8.75dB) - PK	Restricted Bands: LP0002-2.8	Complied



SPORTON INTERNATIONAL INC.
TEL : 886-3-327-3456
FAX : 886-3-327-0973

1 General Description

1.1 Information

1.1.1 RF General Information

RF General Information			
Frequency		125 kHz	
Modulation	Ch. Frequency (kHz)	Channel Number	Field Strength (dBuV/m@3m)
OOK	125 kHz	1	66.05

1.1.2 Antenna Information

Antenna Category	
☒	Integral antenna (antenna permanently attached)
☐	Temporary RF connector provided
☒	No temporary RF connector provided Transmit chains bypass antenna and soldered temporary RF connector provided for connected measurement. In case of conducted measurements the transmitter shall be connected to the measuring equipment via a suitable attenuator and correct for all losses in the RF path.
☐	External antenna (dedicated antennas)
☐	Single power level with corresponding antenna(s).
☐	Multiple power level and corresponding antenna(s).

No.	Ant. Cat.	Ant. Type
1	Integral	Loop

1.1.3 Type of EUT

Identify EUT	
Presentation of Equipment	☒ Production ; ☐ Pre-Production ; ☐ Prototype
Type of EUT	
☐	Stand-alone
☒	Combined (EUT where the radio part is fully integrated within another device) Combined Equipment - Brand Name / Model No.: Getac / S410
☐	Plug-in radio (EUT intended for a variety of host systems) Host System - Brand Name / Model No.: ...
☐	Other:

Test Signal Duty Cycle

Operated Mode for Worst Duty Cycle	
☒	Operated normal mode for worst duty cycle
☐	Operated test mode for worst duty cycle
Test Signal Duty Cycle (x)	
☒	100.00%

1.1.4 EUT Operational Condition

Supply Voltage	☒ AC mains	☒ DC	
Type of DC Source	☒ External AC adapter	☒ From AC Source	☒ From Battery

1.2 Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ NCC LP0002 (2016-08-23)
- ♦ ANSI C63.10-2013
- ♦ ANSIC 63.4-2014

1.3 Testing Location Information

Testing Location				
☒	HWA YA	ADD : No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)		
		TEL : 886-3-327-3456 FAX : 886-3-327-0973		
Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
AC Conduction	CO04-HY	Bear	23.1°C / 55%	18/Jul/2017
RF Conducted	TH01-HY	Ryan	21.5°C / 63.5%	17/Jul/2017
Radiated Emission	03CH02-HY	Andy	23.2°C / 53.2%	17/Jul/2017

1.4 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor ($k=2$))

Measurement Uncertainty		
Test Item		Uncertainty
AC power-line conducted emissions		± 2.2 dB
Emission bandwidth		± 1.4 %
Unwanted emissions, conducted	9 – 150 kHz	± 0.38 dB
	0.15 – 30 MHz	± 0.42 dB
	30 – 1000 MHz	± 0.51 dB
All emissions, radiated	9 – 150 kHz	± 2.49 dB
	0.15 – 30 MHz	± 2.28 dB
	30 – 1000 MHz	± 2.56 dB
Temperature		± 0.8 °C
Humidity		± 3 %
DC and low frequency voltages		± 3 %
Time		± 1.4 %
Duty Cycle		± 1.4 %

2 Test Configuration of EUT

2.1 The Worst Case Modulation Configuration

Transmitter Mode	Field Strength (dBuV/m@3m)
RFID	66.05

2.2 Test Channel Frequencies Configuration

Modulation	Test Channel Frequencies (kHz)
OOK	125 kHz

2.3 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests	
Tests Item	AC power-line conducted emissions
Condition	AC power-line conducted measurement for line and neutral Test Voltage: 120Vac / 60Hz
Operating Mode	Operating Mode Description
1	Adapter Mode

The Worst Case Mode for Following Conformance Tests			
Tests Item	Emission Bandwidth Transmitter Radiated Unwanted Emissions Receiver Radiated Unwanted Emission		
Test Condition	Radiated measurement		
User Position	☐ EUT will be placed in fixed position.		
	☐ EUT will be placed in mobile position and operating multiple positions. EUT shall be performed three orthogonal planes.		
	☒ EUT will be a hand-held or body-worn battery-powered devices and operating multiple positions.		
Operating Mode	Operating Mode Description		
1	Adapter Mode		
Orthogonal Planes of EUT	X Plane	Y Plane	Z Plane
			
Worst Planes of EUT			V

2.4 Accessory and Support Equipment

Accessories Information				
AC Adapter 1	Brand Name	Chicony	Model Name	A15-120P1A
	Power Rating	I/P: 100-240Vac, 2.0A, O/P: 19Vdc, 6.32A, 120W		
	AC Power Cord	1.70meter, non-shielded cable, without ferrite core		
	DC Power Cord	1.75meter, shielded cable, with ferrite core		
Battery 1 (Main) - in all SKU	Brand Name	Getac	Model Name	BP-S410-Main-32/2040 S
	Power Rating	11.1Vdc, 4200mAh	Type	Li-ion
Battery 2 (2nd)-in SKU C	Brand Name	Getac	Model Name	BP-S410-2nd-32/2040 S
	Power Rating	11.1Vdc, 4200mAh	Type	Li-ion
RFID Module	Brand Name	HID	Model Name	OMNIKEY 5127CK MINI

Note: Regarding to more detail and other information, please refer to user manual.

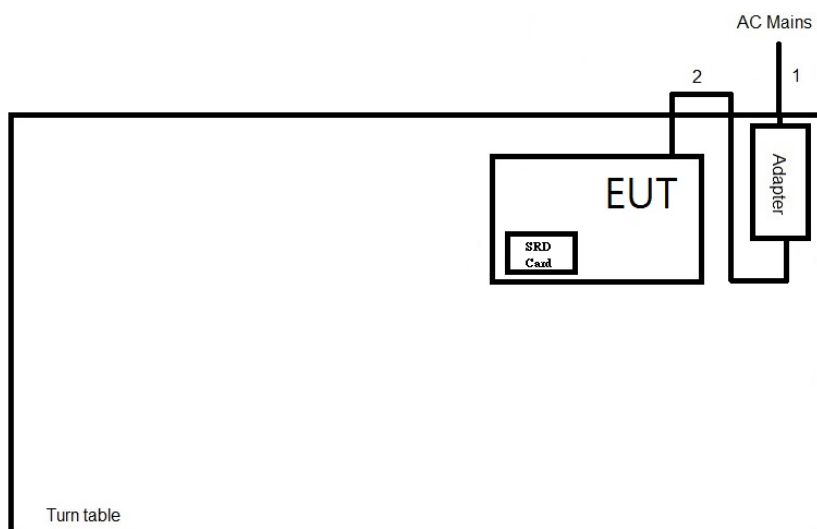
Support Equipment - AC Conduction			
No.	Equipment	Brand Name	Model Name
1	Switching Power Supply	-	-
2	SRD Card	-	-

Support Equipment - Radiated			
No.	Equipment	Brand Name	Model Name
1	LCD MONITOR	DELL	U2410f
2	iPod	APPLE	A1199
3	Mouse(USB)	ASUS	T4A126
4	USB 2.0 Flash	Kingston	1GB
5	USB 2.0 Flash	Transcend	4GB
6	Load	-	-
7	SRD Card	-	-
8	Switching Power Supply	-	-

Support Equipment - RF Conducted			
No.	Equipment	Brand Name	Model Name
1	SRD Card	-	-

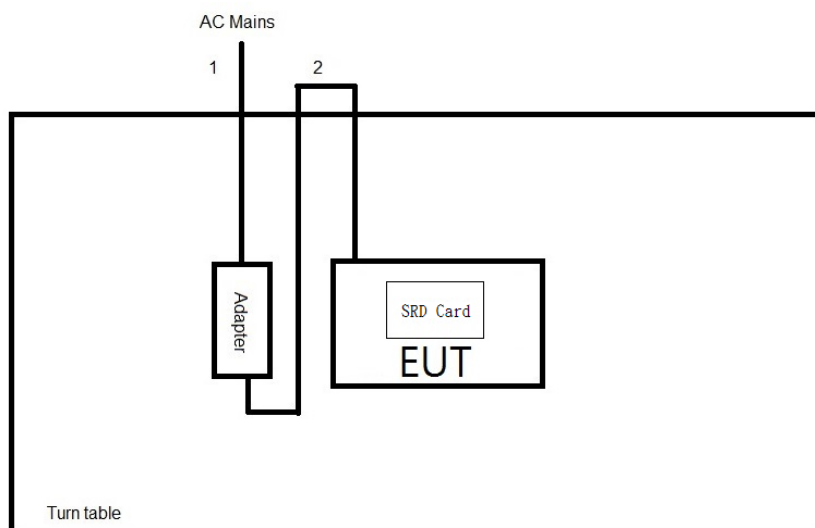
2.5 Test Setup Diagram

Test Setup Diagram – AC Line Conducted Emission Test

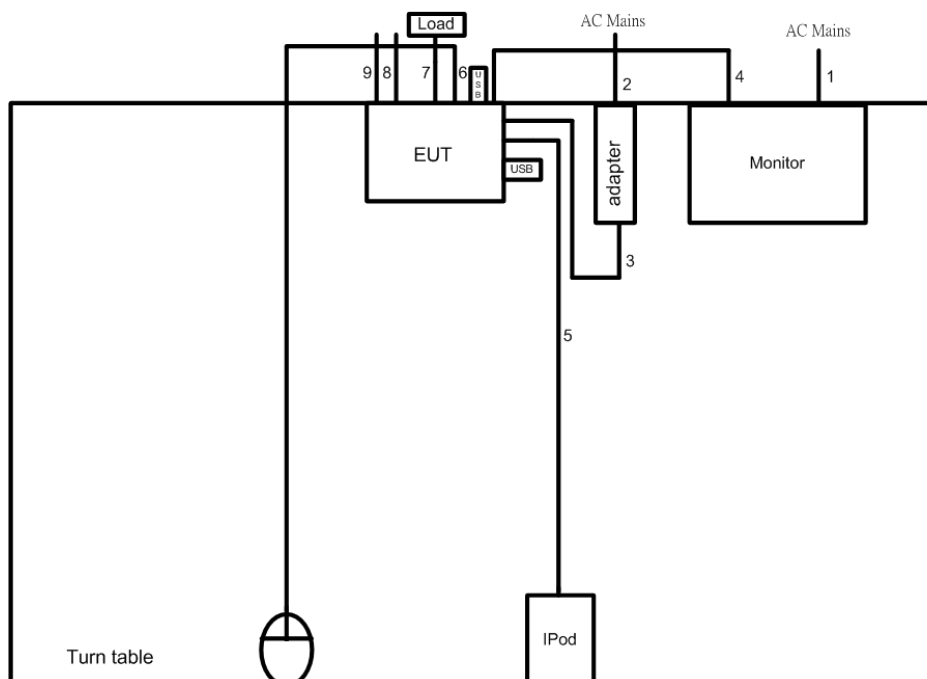


Item	Connection	Shielded	Length(m)	Remark
1	AC Power line	No	1.8	-
2	DC Power line	No	1.7	-

Test Setup Diagram - Radiated Test_TX Mode



Item	Connection	Shielded	Length(m)	Remark
1	AC Power line	No	1.8	-
2	DC Power line	No	1.7	-

Test Setup Diagram - Radiated Test_RX Mode


Item	Connection	Shielded	Length(m)	Remark
1	AC Power line	No	1.7	-
2	AC Power line	No	1.8	-
3	DC Power line	No	1.7	-
4	HDMI cable	No	1.5	-
5	USB cable	No	1.5	-
6	USB cable	No	1.5	-
7	RJ-45 cable	No	0.8	-
8	USB cable	No	2	-
9	Console cable	No	2	-

3 Transmitter Test Result

3.1 AC Power-line Conducted Emissions

3.1.1 AC Power-line Conducted Emissions Limit

AC Power-line Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

Note 1: * Decreases with the logarithm of the frequency.

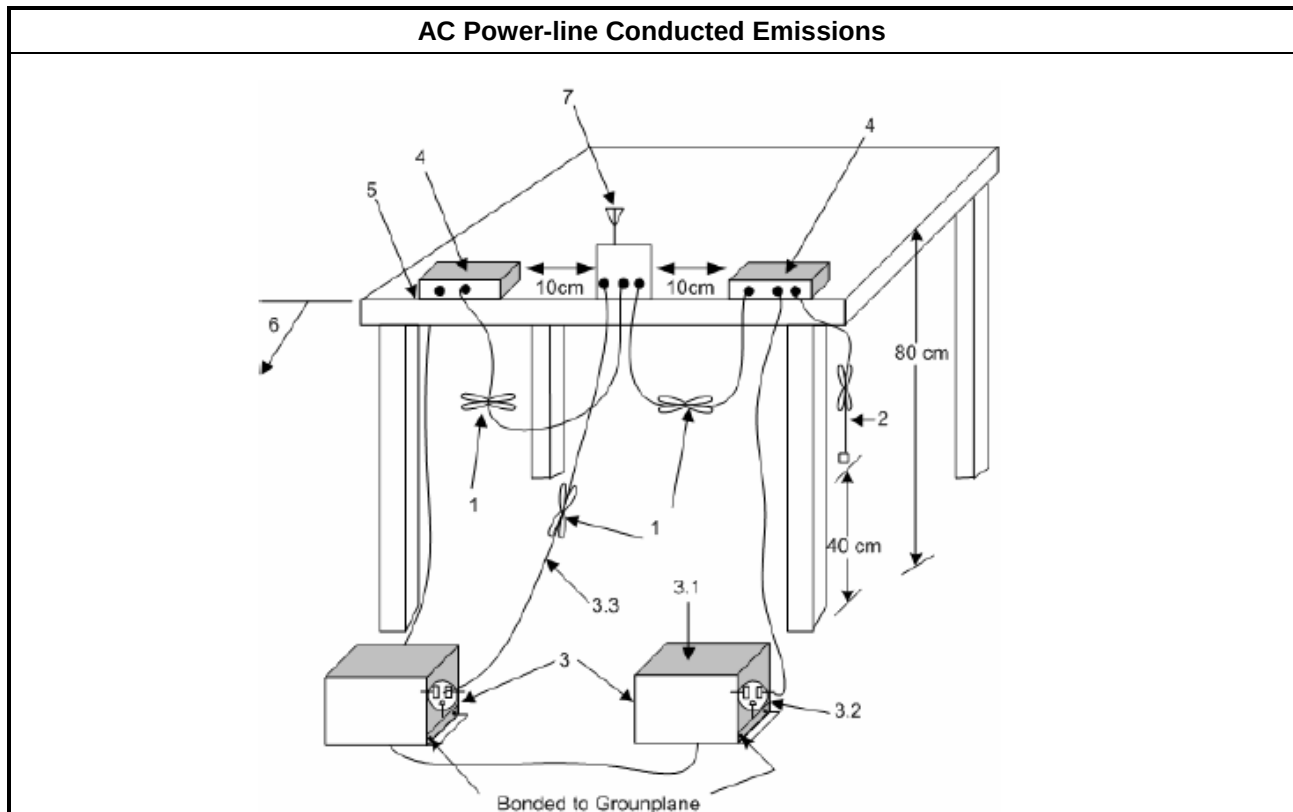
3.1.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

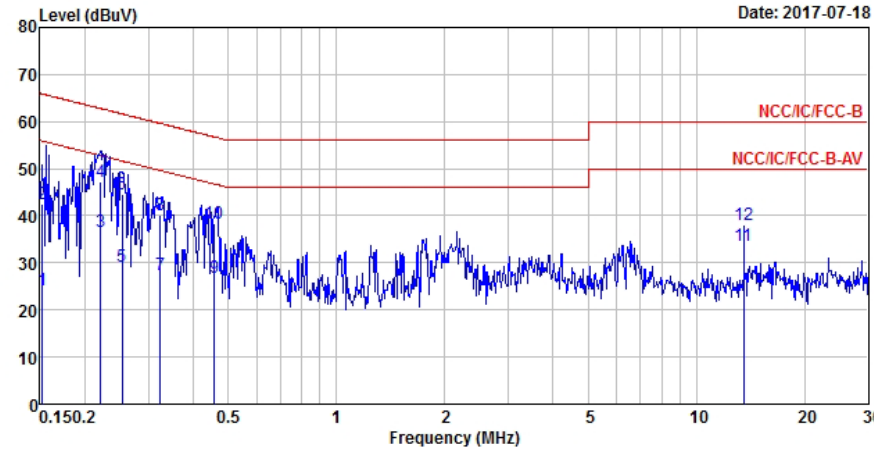
3.1.3 Test Procedures

Test Method	
☒	Refer as ANSI C63.10-2013, clause 6.2 for AC power-line conducted emissions.
☒	If AC conducted emissions fall in operating band, then following below test method confirm final result.
☐	Accept measurements done with a suitable dummy load replacing the antenna under the following conditions: (1) Perform the AC line conducted tests with the antenna connected to determine compliance with LP0002-2.3 limits outside the transmitter's fundamental emission band; (2) Retest with a dummy load to determine compliance with LP0002-2.3 limits within the transmitter's fundamental emission band.
☒	For a device with a permanent antenna operating at or below 30 MHz, accept measurements done with a suitable dummy load, in lieu of the permanent antenna under the following conditions: (1) Perform the AC line conducted tests with the permanent antenna to determine compliance with the LP0002-2.3 limits outside the transmitter's fundamental emission band; (2) Retest with a dummy load in lieu of the permanent antenna to determine compliance with the LP0002-2.3 limits within the transmitter's fundamental emission band.

3.1.4 Test Setup



3.1.5 Test Result of AC Power-line Conducted Emissions

AC Power-line Conducted Emissions Result								
Operating Mode	1			Power Phase			Neutral	
Ch. Frequency (kHz)	125 kHz							
Level (dBUV)  Frequency (MHz) Date: 2017-07-18								
	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.15	24.35	-31.52	55.87	14.53	9.60	0.22	Average
2	0.15	42.58	-23.29	65.87	32.76	9.60	0.22	QP
3	0.22	36.55	-16.24	52.79	26.62	9.66	0.27	Average
4 MAX	0.22	47.26	-15.53	62.79	37.33	9.66	0.27	QP
5	0.25	29.20	-22.44	51.64	19.31	9.66	0.23	Average
6	0.25	44.66	-16.98	61.64	34.77	9.66	0.23	QP
7	0.32	27.53	-22.09	49.62	17.73	9.64	0.16	Average
8	0.32	40.26	-19.36	59.62	30.46	9.64	0.16	QP
9	0.46	26.77	-19.95	46.72	17.05	9.62	0.10	Average
10	0.46	38.32	-18.40	56.72	28.60	9.62	0.10	QP
11	13.56	33.68	-16.32	50.00	23.67	9.81	0.20	Average
12	13.56	38.14	-21.86	60.00	28.13	9.81	0.20	QP

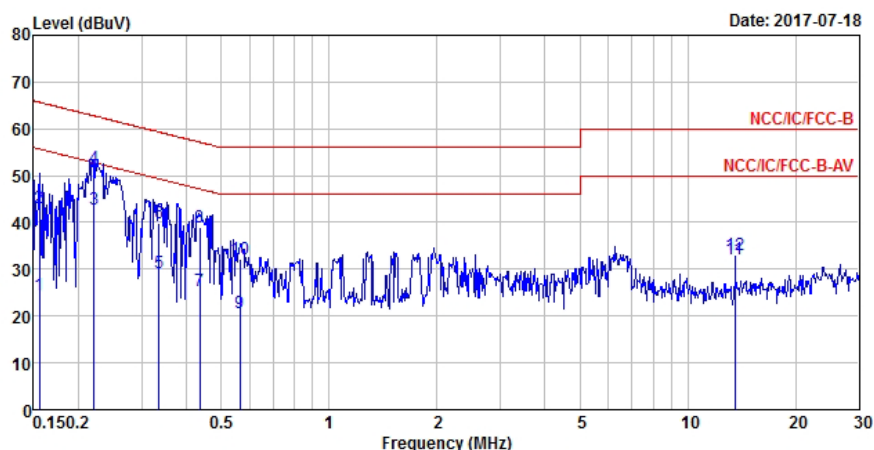
Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)

Note 3: When emissions are in operating band over limits, retest with a dummy load for final in-band results

AC Power-line Conducted Emissions Result

Operating Mode	1	Power Phase	Line
Ch. Frequency (kHz)	125 kHz		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.16	24.56	-31.13	55.69	14.67	9.66	0.23	Average
2	0.16	43.24	-22.45	65.69	33.35	9.66	0.23	QP
3 MAX	0.22	42.66	-10.13	52.79	32.74	9.65	0.27	Average
4	0.22	51.70	-11.09	62.79	41.78	9.65	0.27	QP
5	0.34	29.27	-20.04	49.31	19.45	9.67	0.15	Average
6	0.34	39.92	-19.39	59.31	30.10	9.67	0.15	QP
7	0.44	25.27	-21.88	47.15	15.49	9.68	0.10	Average
8	0.44	39.02	-18.13	57.15	29.24	9.68	0.10	QP
9	0.56	20.60	-25.40	46.00	10.84	9.66	0.10	Average
10	0.56	32.23	-23.77	56.00	22.47	9.66	0.10	QP
11	13.56	32.32	-17.68	50.00	22.31	9.81	0.20	Average
12	13.56	33.11	-26.89	60.00	23.10	9.81	0.20	QP

Note 1: ">20dB" means emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found emissions (No emissions were detected.)

Note 3: When emissions are in operating band over limits, retest with a dummy load for final in-band results.

3.2 Transmitter Radiated Emissions

3.2.1 Transmitter Radiated Emissions Limit

Transmitter Radiated Emissions Limit			
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1: Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. 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 of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

Note 2: Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below 30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more 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). The test report shall specify the extrapolation method used to determine compliance of the EUT.

Note 3: the frequency bands 9-90 kHz, 110-490 kHz measurements employing an average detector and other below 1GHz measurements employing a CISPR quasi-peak detector.

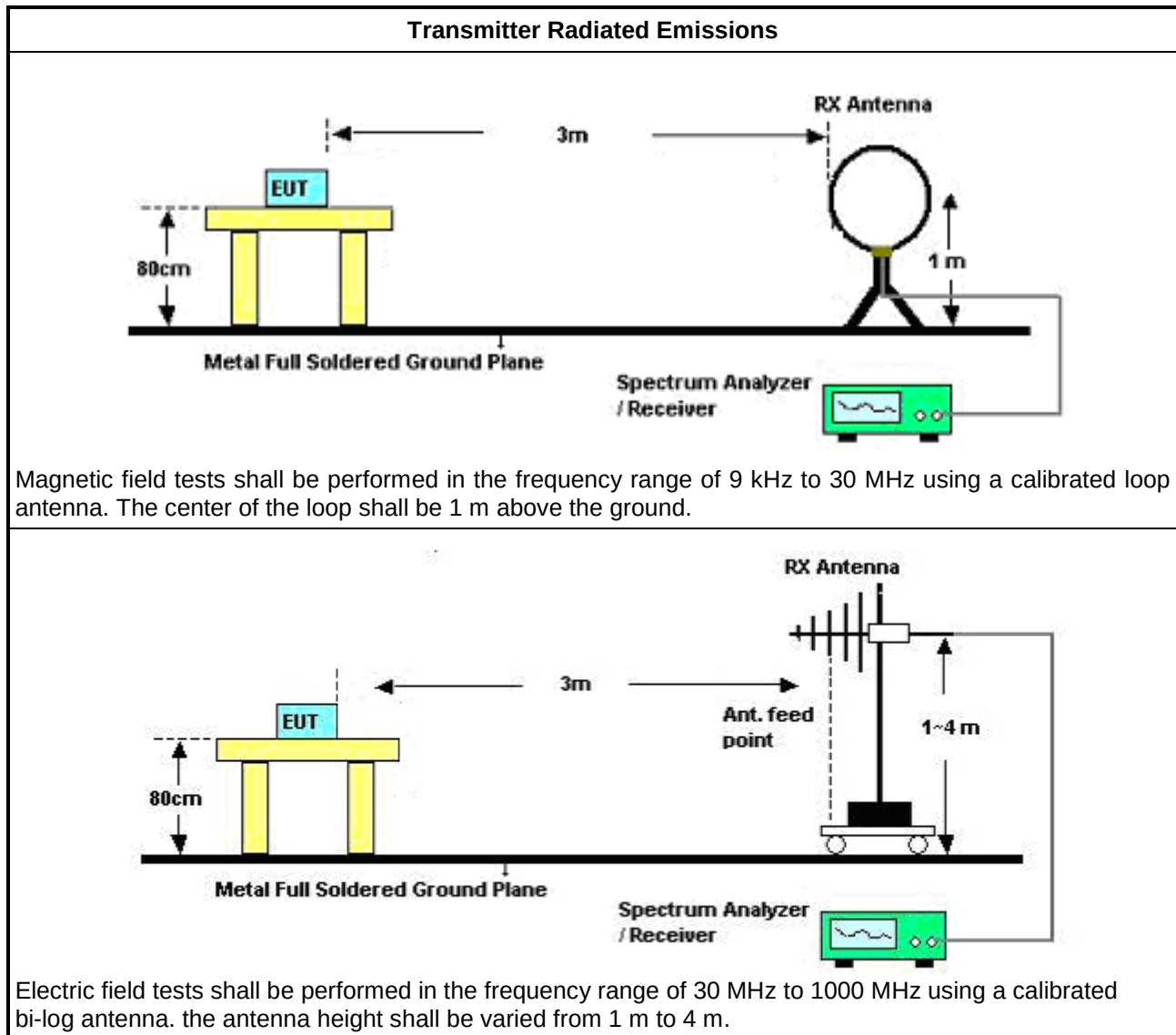
3.2.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

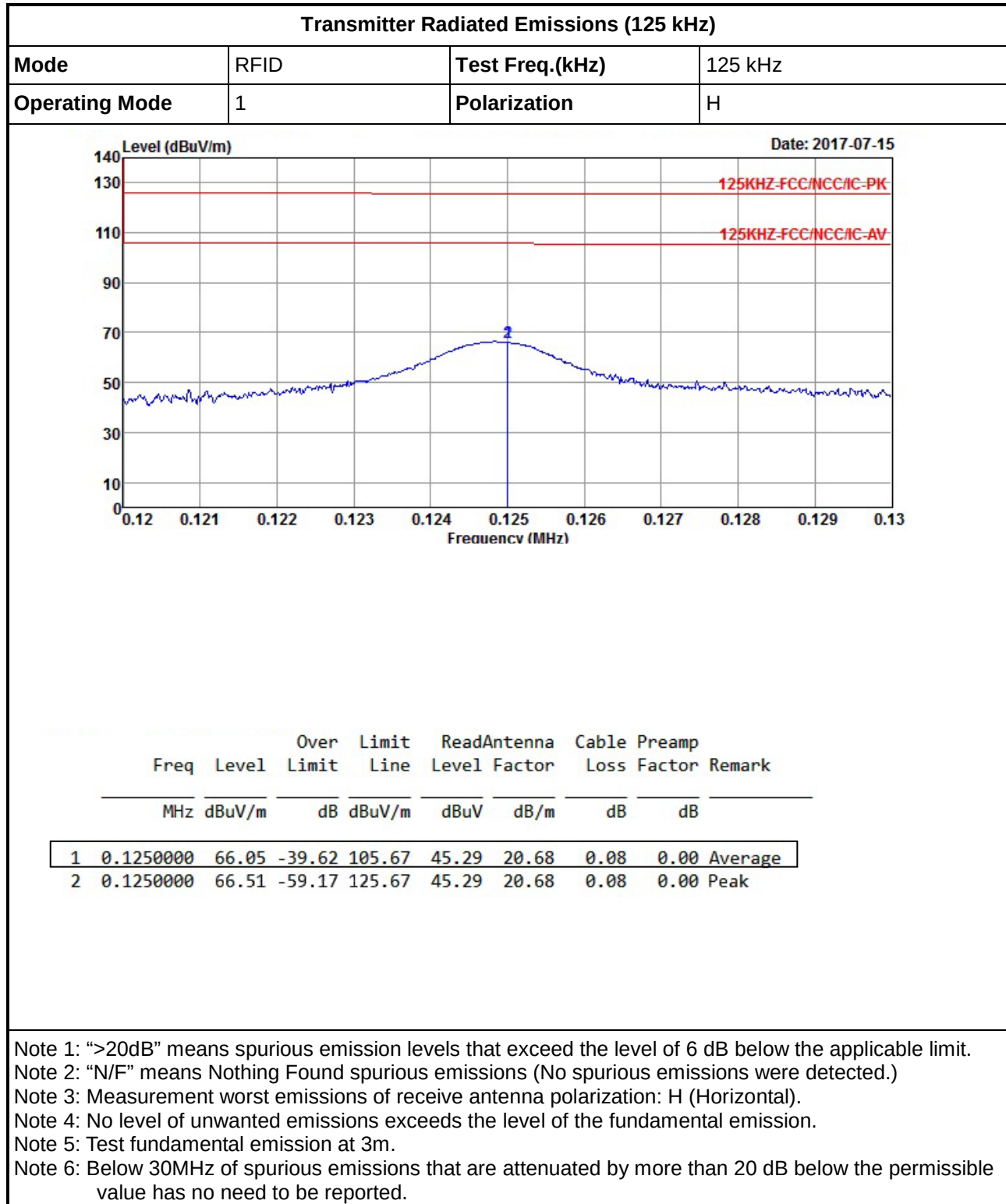
3.2.3 Test Procedures

Test Method	
☒	Refer as ANSI C63.10, clause 6.5 for radiated emissions from 30 MHz to 1 GHz and test distance is 3m.
☒	Refer as ANSI C63.10, clause 6.4 for radiated emissions from below 30 MHz. The frequency bands 9-90 kHz, 110-490 kHz measurements employing an average detector and other below 30MHz measurements employing a CISPR quasi-peak detector. Test distance is 3m.
☒	At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the requirements; 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 following below methods. Note: If fundamental emission level is smaller than noise at 3m , we will change distance to 1m.
☐	The results shall be extrapolated to the specified distance by making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor.
☒	The results shall be by using the square of an inverse linear distance extrapolation factor (40 dB/decade).
☒	For radiated measurement. Loop antenna was rotated about the horizontal and vertical axis and the equipment to be measured and the test antenna shall be oriented to obtain the maximum emitted field strength level.
☒	The any unwanted emissions level shall not exceed the fundamental emission level.
☒	All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

3.2.4 Test Setup

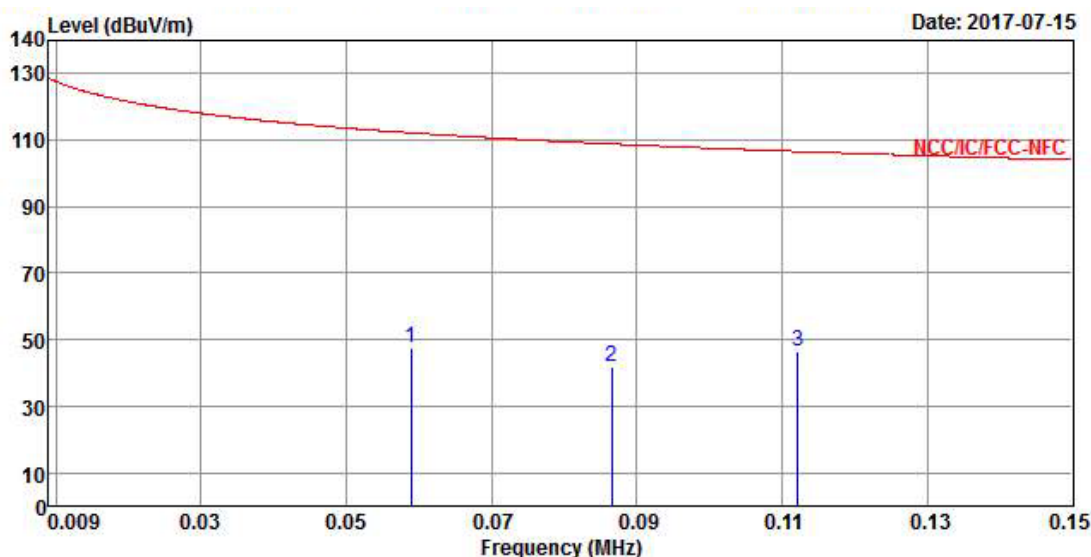


3.2.5 Transmitter Radiated Emissions (Below 30MHz)



Transmitter Radiated Emissions (9kHz~150kHz)

Mode	RFID	Test Freq.(kHz)	125 kHz
Operating Mode	1	Polarization	H



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Factor	Preamp Loss	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB
1	0.059	47.30	-64.90	112.20	26.21	21.03	0.06	0.00 Peak
2	0.087	41.61	-67.25	108.86	20.73	20.81	0.07	0.00 Peak
3	0.112	46.34	-60.27	106.61	25.58	20.69	0.07	0.00 Peak

Note 1: ">20dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

Note 3: Measurement worst emissions of receive antenna polarization: H (Horizontal).

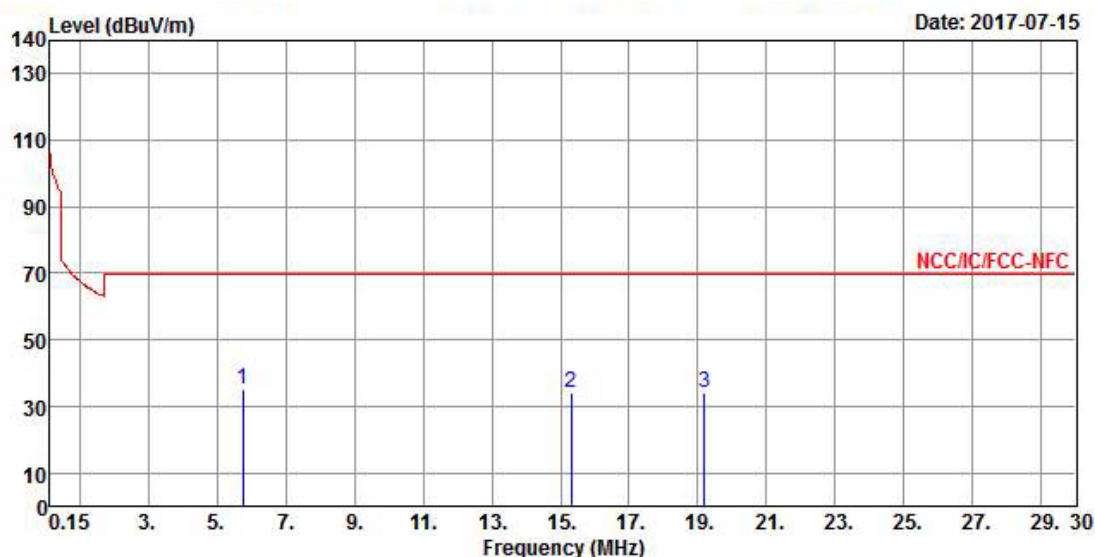
Note 4: No level of unwanted emissions exceeds the level of the fundamental emission.

Note 5: Except fundamental emission, other emissions from digital circuitry used to control additional panel functions or display capabilities other than the touch panel radio transmission. While disable touch panel radio transmission, other emissions have the same levels. Therefore other emissions level could be exceed the fundamental emission level.

Note 6 : Below 30MHz of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

Transmitter Radiated Emissions (150kHz~30MHz)

Mode	RFID	Test Freq.(kHz)	125 kHz
Operating Mode	1	Polarization	H



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Factor	Preamp Loss	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB
1	5.762	35.00	-34.54	69.54	13.75	20.82	0.43	0.00 Peak
2	15.314	34.20	-35.34	69.54	11.67	21.98	0.55	0.00 Peak
3	19.194	34.07	-35.47	69.54	11.13	22.33	0.61	0.00 Peak

Note 1: ">20dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

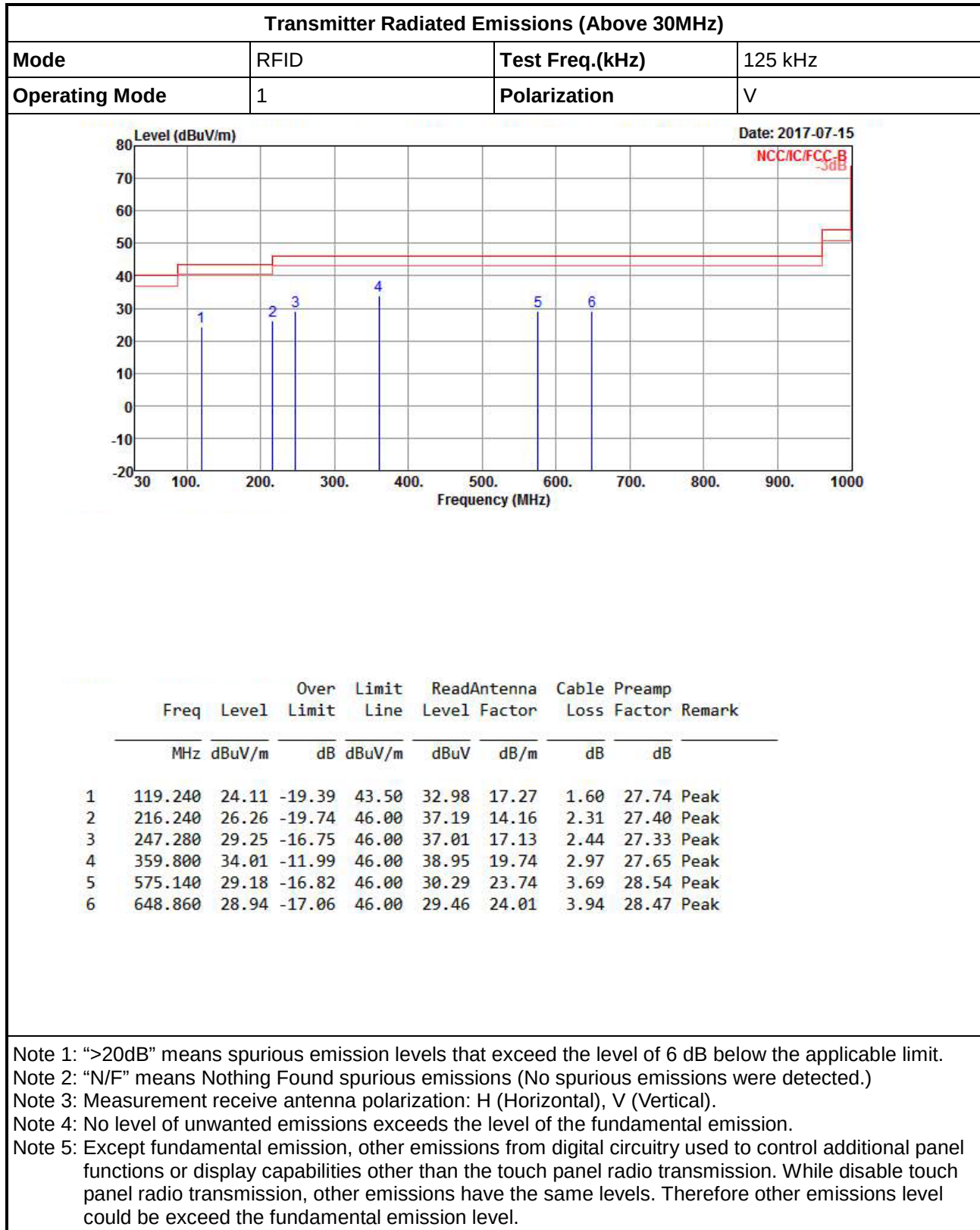
Note 3: Measurement worst emissions of receive antenna polarization: H (Horizontal).

Note 4: No level of unwanted emissions exceeds the level of the fundamental emission.

Note 5: Except fundamental emission, other emissions from digital circuitry used to control additional panel functions or display capabilities other than the touch panel radio transmission. While disable touch panel radio transmission, other emissions have the same levels. Therefore other emissions level could be exceed the fundamental emission level.

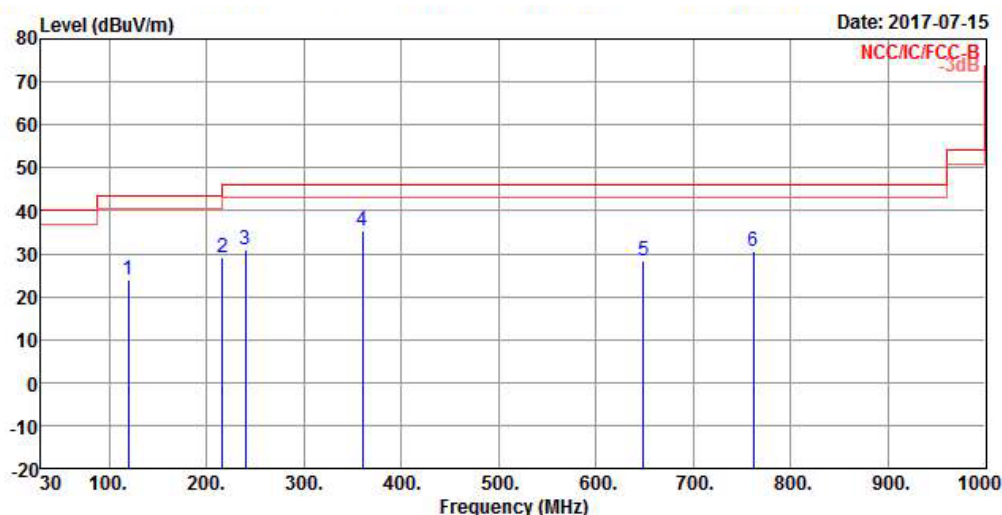
Note 6 : Below 30MHz of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

3.2.6 Transmitter Radiated Emissions (Above 30MHz)



Transmitter Radiated Emissions (Above 30MHz)

Mode	RFID	Test Freq.(kHz)	125 kHz
Operating Mode	1	Polarization	H



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB
1	119.240	24.08	-19.42	43.50	32.95	17.27	1.60	27.74 Peak
2	216.240	29.04	-16.96	46.00	39.97	14.16	2.31	27.40 Peak
3	239.520	30.80	-15.20	46.00	39.39	16.35	2.41	27.35 Peak
4	359.800	35.44	-10.56	46.00	40.38	19.74	2.97	27.65 Peak
5	648.860	28.36	-17.64	46.00	28.88	24.01	3.94	28.47 Peak
6	761.380	30.43	-15.57	46.00	29.59	24.77	4.26	28.19 Peak

Note 1: ">20dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical).

Note 4: No level of unwanted emissions exceeds the level of the fundamental emission.

Note 5: Except fundamental emission, other emissions from digital circuitry used to control additional panel functions or display capabilities other than the touch panel radio transmission. While disable touch panel radio transmission, other emissions have the same levels. Therefore other emissions level could be exceed the fundamental emission level.

3.3 Emission Bandwidth

3.3.1 Emission Bandwidth Limit

Emission Bandwidth Limit
N/A

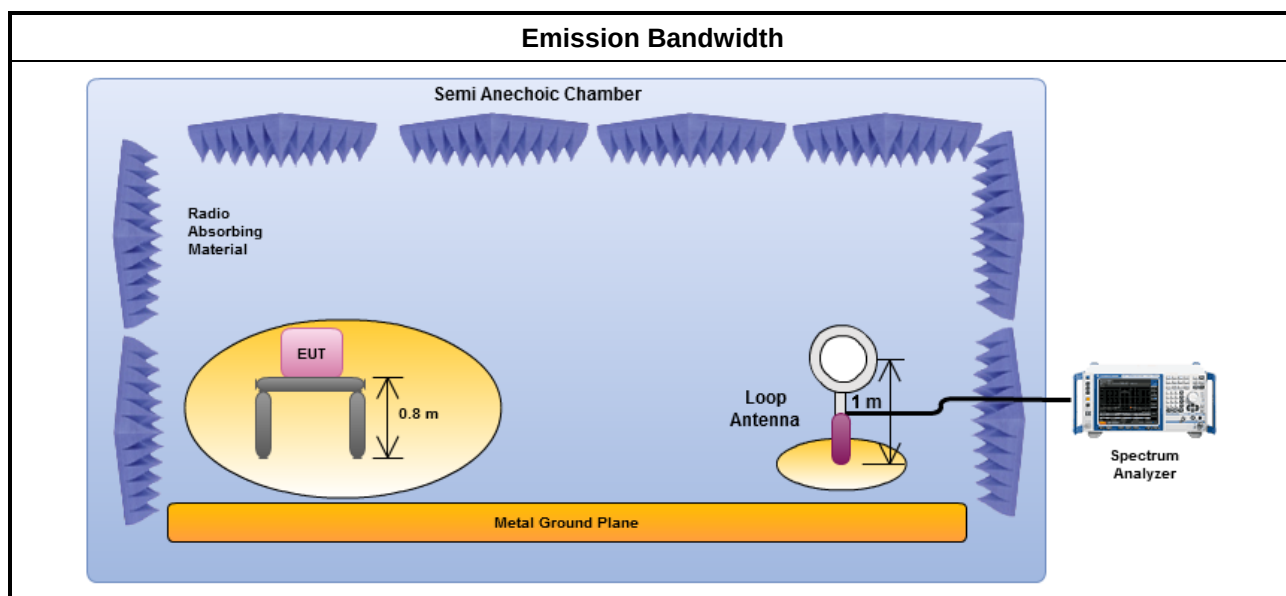
3.3.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.3.3 Test Procedures

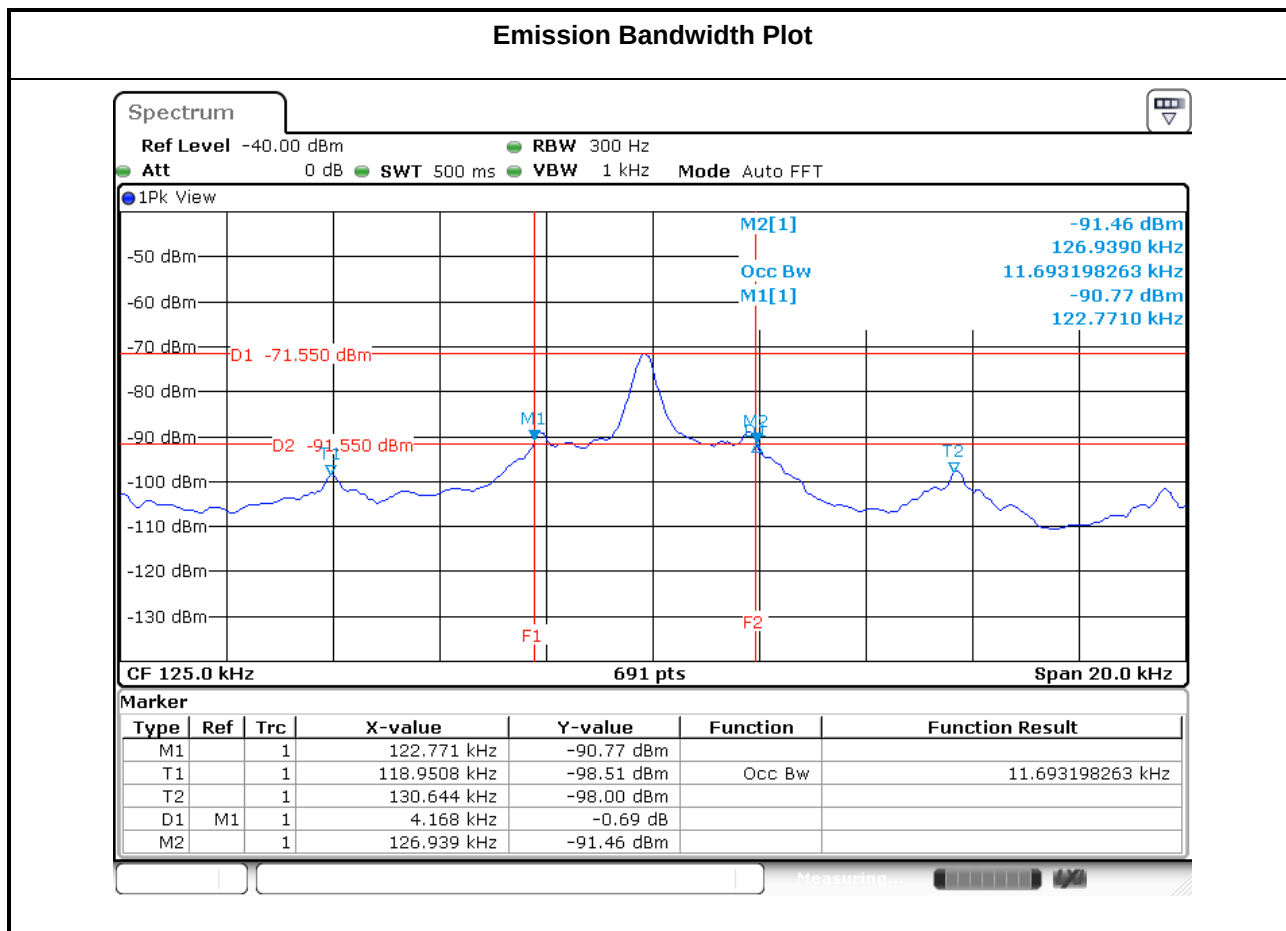
Test Method
☒ For the emission bandwidth refer ANSI C63.10, clause 6.9.3 for occupied bandwidth testing.
☒ For radiated measurement. Loop antenna was rotated about the horizontal and vertical axis and the equipment to be measured and the test antenna shall be oriented to obtain the maximum emitted field strength level.

3.3.4 Test Setup



3.3.5 Test Result of Emission Bandwidth

Occupied Channel Bandwidth Result			
Transmitter Mode	Frequency (kHz)	99% Bandwidth (kHz)	20dB Bandwidth (kHz)
RFID	125	11.69	4.16
Limit		N/A	
Result		Complied	



3.4 Receiver Radiated Spurious Emissions

3.4.1 Receiver in Radiated Spurious Emissions Limit

Restricted Spurious Emissions Limit			
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1: Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. 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 of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

Note 2: Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below 30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more 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). The test report shall specify the extrapolation method used to determine compliance of the EUT.

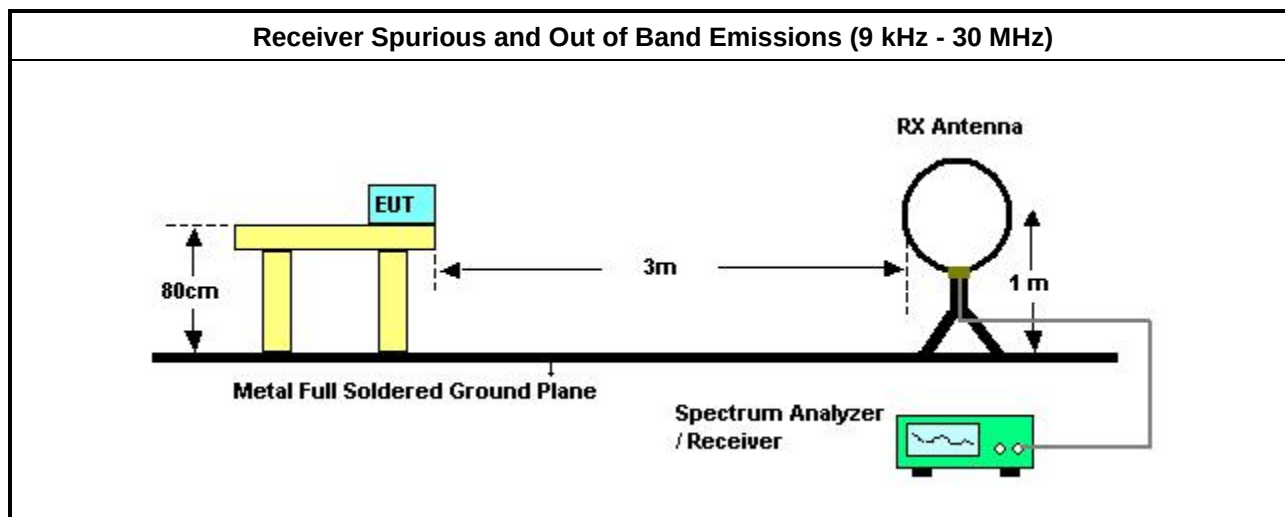
3.4.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

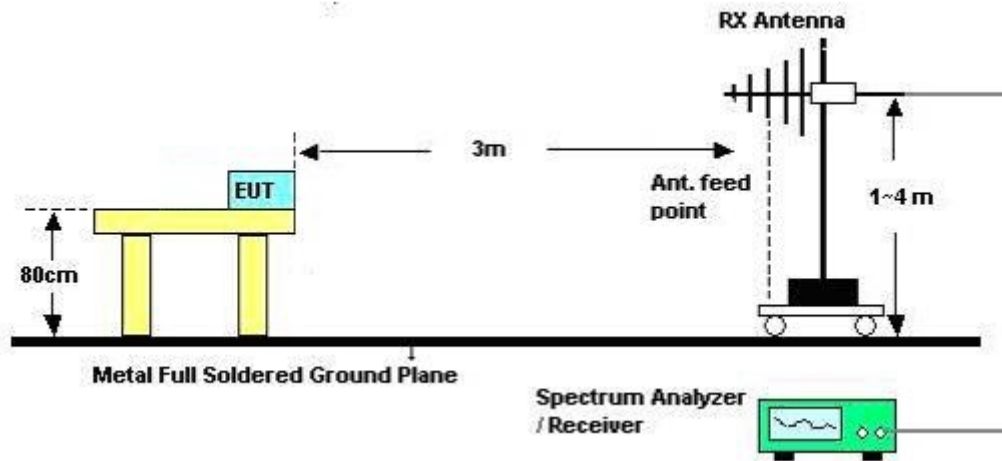
3.4.3 Test Procedures

Test Method	
☒	The search for spurious emissions shall be from the lowest frequency internally generated or used in the receiver (e.g. local oscillator, intermediate or carrier frequency), or 30 MHz, whichever is higher, to at least 3 times the highest tuneable or local oscillator frequency, whichever is higher, without exceeding 40 GHz.
☒	Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. 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 of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).
☒	For radiated measurement, refer as KDB558074, clause 12.2.7.
☒	Refer as ANSI C63.4, clause 8.3.1.1 and 8.3.2.1 for radiated emissions from below 30 MHz.
☒	Refer as ANSI C63.4, clause 8.3.1.1 and 8.3.2.1 for radiated emissions from 30 MHz-1 GHz. For the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the QP-Limit so that the QP level does not need to be reported in addition.
☐	Refer as ANSI C63.4, clause 8.3.1.2 and 8.3.2.2 for radiated emissions from above 1 GHz. For the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.
☒	All amplitude of spurious emissions that are attenuated by more than 30 dB below the permissible value has no need to be reported.

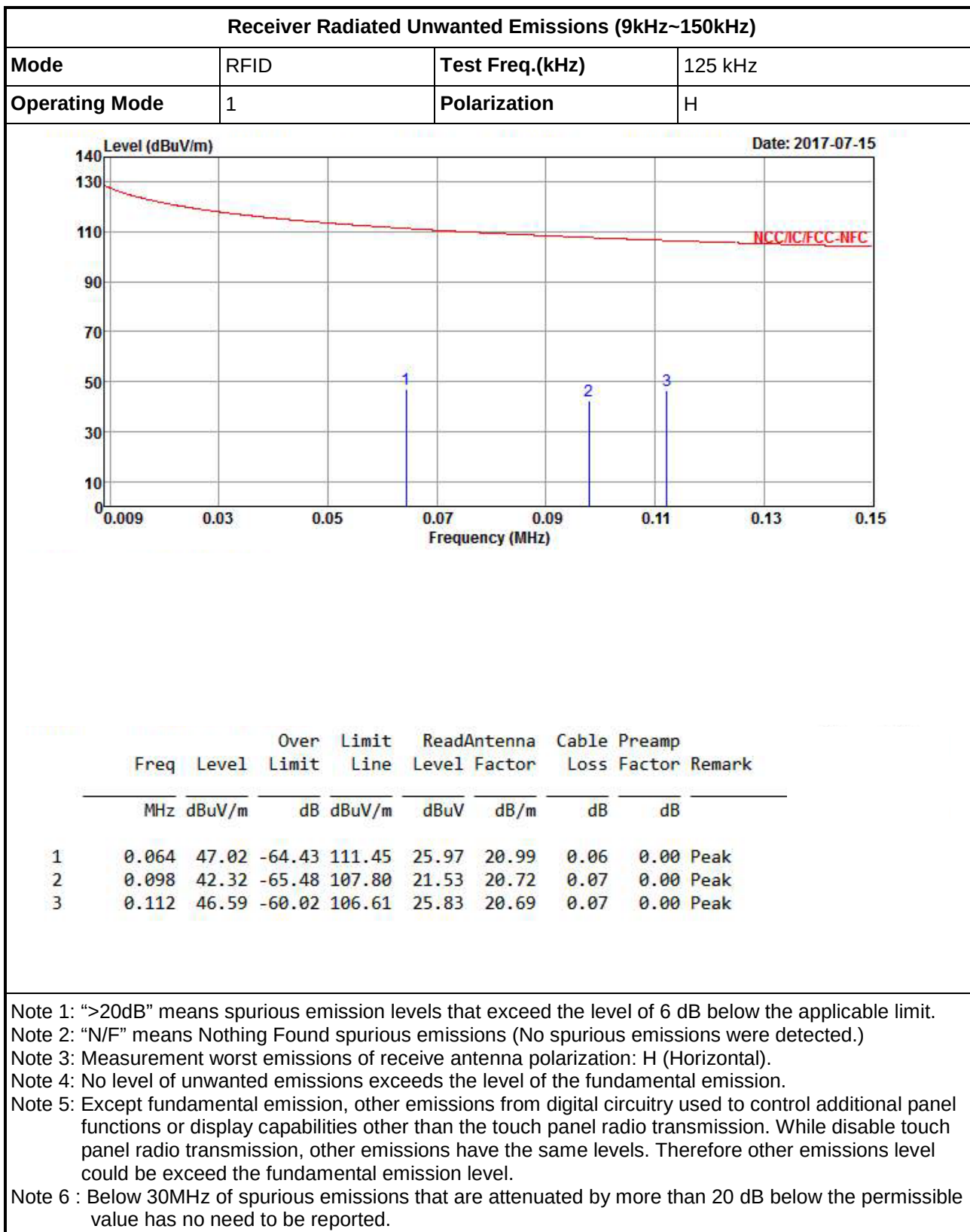
3.4.4 Test Setup



Receiver Radiated Unwanted Emissions (below 1GHz)

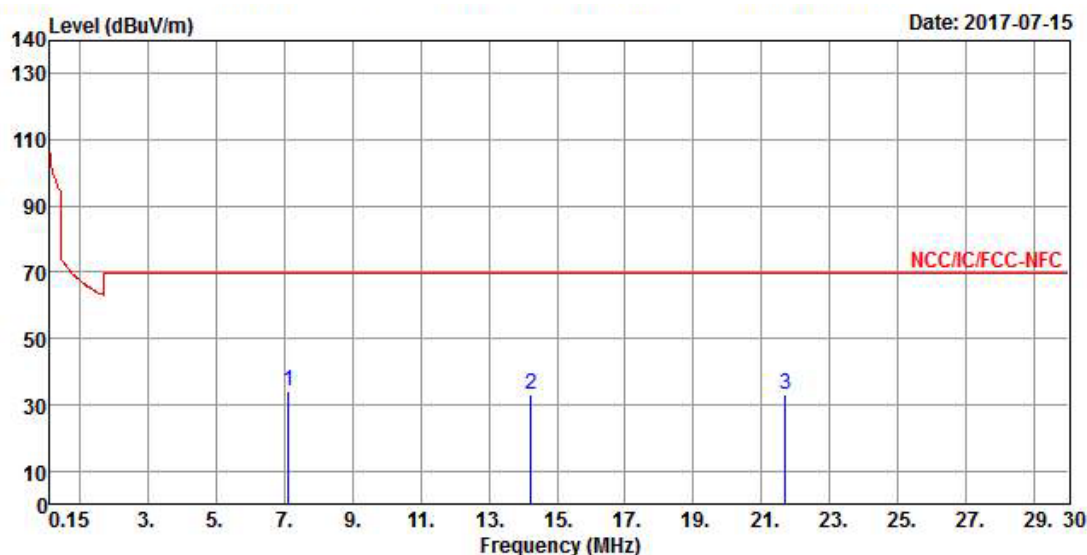


3.4.5 Receiver Radiated Unwanted Emissions (Below 30MHz)



Receiver Radiated Unwanted Emissions (150kHz~30MHz)

Mode	RFID	Test Freq.(kHz)	125 kHz
Operating Mode	1	Polarization	H



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Loss	Preampl Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB
1	7.135	33.98	-35.56	69.54	12.48	21.04	0.46	0.00 Peak
2	14.239	32.96	-36.58	69.54	10.54	21.88	0.54	0.00 Peak
3	21.702	33.15	-36.39	69.54	10.07	22.45	0.63	0.00 Peak

Note 1: ">20dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

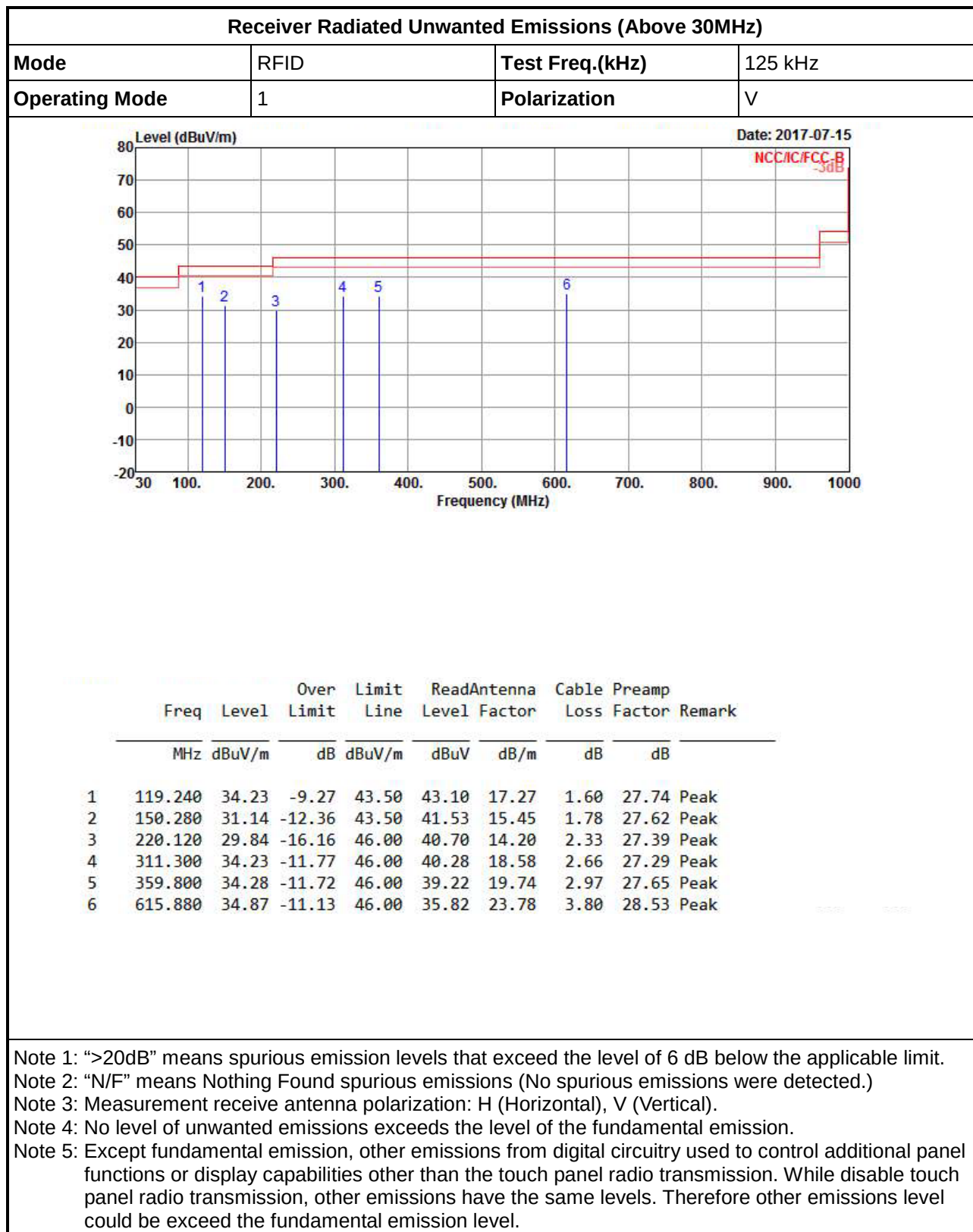
Note 3: Measurement worst emissions of receive antenna polarization: H (Horizontal).

Note 4: No level of unwanted emissions exceeds the level of the fundamental emission.

Note 5: Except fundamental emission, other emissions from digital circuitry used to control additional panel functions or display capabilities other than the touch panel radio transmission. While disable touch panel radio transmission, other emissions have the same levels. Therefore other emissions level could be exceed the fundamental emission level.

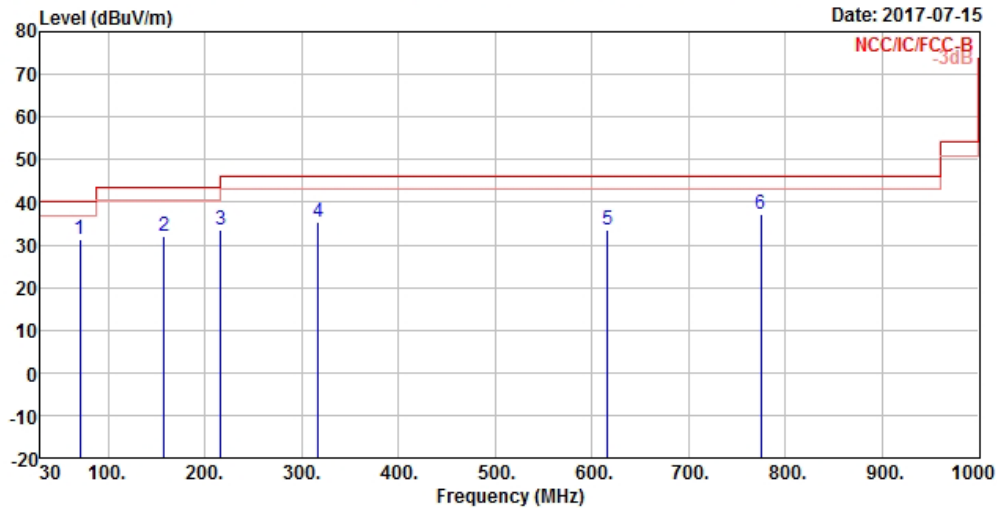
Note 6 : Below 30MHz of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

3.4.6 Test Result of Receiver Radiated Unwanted Emissions (Above 30MHz)



Receiver Radiated Unwanted Emissions (Above 30MHz)

Mode	RFID	Test Freq.(kHz)	125 kHz
Operating Mode	1	Polarization	H



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Factor	Preamplifier Loss	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB
1	70.740	31.25	-8.75	40.00	46.21	11.51	1.19	27.66 Peak
2	158.040	31.95	-11.55	43.50	42.54	15.15	1.86	27.60 Peak
3	216.240	33.41	-12.59	46.00	44.34	14.16	2.31	27.40 Peak
4	317.120	35.36	-10.64	46.00	41.34	18.65	2.70	27.33 Peak
5	615.880	33.34	-12.66	46.00	34.29	23.78	3.80	28.53 Peak
6	774.960	37.03	-8.97	46.00	36.04	24.78	4.36	28.15 Peak

Note 1: ">20dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical).

Note 4: No level of unwanted emissions exceeds the level of the fundamental emission.

Note 5: Except fundamental emission, other emissions from digital circuitry used to control additional panel functions or display capabilities other than the touch panel radio transmission. While disable touch panel radio transmission, other emissions have the same levels. Therefore other emissions level could be exceed the fundamental emission level.

4 Test Equipment and Calibration Data

Instrument for AC Conduction

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date
EMC Receiver	R&S	ESR3	102052	9KHz ~ 3.6GHz	29/Apr/2017	28/Apr/2018
LISN	R&S	ENV216	101295	9kHz ~ 30MHz	15/Nov/2016	14/Nov/2017
RF Cable-CON	HUBER+SUHNER	RG213/U	07611832020001	9kHz ~ 30MHz	24/Oct/2016	23/Oct/2017
AC POWER	APC	AFC-11005G	F310050055	47Hz~63Hz 5~300V	NCR	NCR
Impuls Begrenzer Pulse Limiter	R&S	ESH3-Z2	100921	10 kHz ~ 30 MHz	21/Oct/2016	20/Oct/2017

NCR: No Calibration Require.

Instrument for Conducted Test

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date
Spectrum Analyzer	R&S	FSV 40	101013	9kHz~40GHz	30/Dec/2016	29/Dec/2017
Loop Antenna	TESEQ	HLA 6120	31244	9 kHz~30 MHz	02/Mar/2017	01/Mar/2018

Instrument for Radiated Test

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date
3m Semi Anechoic	SIDT FRANKONIA	SAC-3M	03CH02-HY	30MHz-1GHz	21/Oct/2016	20/Oct/2017
Amplifier	Agilent	8447D	2944A11149	100KHz-1.3GHz	29/Jun/2016	28/Jun/2018
Spectrum Analyzer	R&S	FSP40	100593	9KHz - 40GHz	26/Oct/2016	25/Oct/2017
RF Cable-R03m	Jye Bao	RG142	CB017	9kHz ~ 1GHz	26/Jan/2017	25/Jan/2018
Bilog Antenna	SCHAFFNER	CBL6112B	2723	30MHz-1GHz	01/Oct/2016	30/Sep/2017
Loop Antenna	TESEQ	HLA 6120	31244	9 kHz~30 MHz	02/Mar/2017	01/Mar/2018
Receiver	R&S	ESU-26	100422/026	20Hz ~ 26.5GHz	21/Sep/2016	20/Sep/2017