



FCC RADIO TEST REPORT

FCC ID : 2AF82-TD0350H
Equipment : Panel PC
Brand Name : Qbic
Model Name : TD-035XXX, (where X can be 0-9, A-Z or blank)
Applicant / Manufacturer : Qbic technology Co., Ltd
26F. -12, No.99, Sec.1, Xintai 5th Rd., Xizhi Dist.,
New Taipei City 221, Taiwan(R.O.C)
Standard : 47 CFR FCC Part 15.231

The product was received on Jun. 22, 2018, and testing was started from Jul. 09, 2018 and completed on Jul. 12, 2018. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, 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 report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

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



Approved by: Allen Lin

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)



Table of Contents

HISTORY OF THIS TEST REPORT	3
SUMMARY OF TEST RESULT	4
1 GENERAL DESCRIPTION	5
1.1 Information.....	5
1.2 Testing Applied Standards	7
1.3 Testing Location Information	7
1.4 Measurement Uncertainty	7
2 TEST CONFIGURATION OF EUT.....	8
2.1 The Worst Case Modulation Configuration	8
2.2 Test Channel Frequencies Configuration.....	8
2.3 The Worst Case Measurement Configuration	8
2.4 Accessory and Support Equipment	9
2.5 Test Setup Diagram	10
3 TRANSMITTER TEST RESULT	11
3.1 AC Power-line Conducted Emissions	11
3.2 Transmitter Radiated Emissions	15
3.3 Emission Bandwidth	23
4 TEST EQUIPMENT AND CALIBRATION DATA.....	25

Appendix A. Test Photos

Photographs of EUT v01



History of this test report

Report No.	Version	Description	Issued Date
FR843031AO	01	Initial issue of report	Jul. 27, 2018

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
1.1.2	15.203	Antenna Requirement	PASS	-
3.1	15.207	AC Power-line Conducted Emissions	PASS	-
3.2	15.209	Transmitter Radiated Unwanted Emissions	PASS	-
3.3	15.215(c)	Emission Bandwidth	PASS	-

Reviewed by: **Sam Tsai**

Report Producer: **Ann Hou**

1 General Description

1.1 Information

1.1.1 RF General Information

NFC Chip	Brand Name	Model Name
	NXP	66301

RF General Information			
Frequency		125 kHz	
Modulation	Ch. Frequency (kHz)	Channel Number	Field Strength (dBuV/m@3m)
OOK	125	1	63.81

1.1.2 Antenna Information

Antenna Category	
<input checked="" type="checkbox"/>	Integral antenna (antenna permanently attached)
<input type="checkbox"/>	Temporary RF connector provided
<input checked="" type="checkbox"/>	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.
<input type="checkbox"/>	External antenna (dedicated antennas)
<input type="checkbox"/>	Single power level with corresponding antenna(s).
<input type="checkbox"/>	Multiple power level and corresponding antenna(s).

Antenna General Information		
No.	Ant. Cat.	Ant. Type
1	Integral	Loop

1.1.3 Type of EUT

Identify EUT	
Presentation of Equipment	<input checked="" type="checkbox"/> Production ; <input type="checkbox"/> Pre-Production ; <input type="checkbox"/> Prototype
Type of EUT	
<input checked="" type="checkbox"/>	Stand-alone
<input type="checkbox"/>	Combined (EUT where the radio part is fully integrated within another device) Combined Equipment - Brand Name / Model No.: ...
<input type="checkbox"/>	Plug-in radio (EUT intended for a variety of host systems) Host System - Brand Name / Model No.: ...
<input type="checkbox"/>	Other:

1.1.4 Test Signal Duty Cycle

Operated Mode for Worst Duty Cycle	
<input checked="" type="checkbox"/>	Operated normal mode for worst duty cycle
<input type="checkbox"/>	Operated test mode for worst duty cycle
Test Signal Duty Cycle (x)	
<input checked="" type="checkbox"/>	100.00%

1.1.5 EUT Operational Condition

Supply Voltage	<input checked="" type="checkbox"/> AC mains	<input checked="" type="checkbox"/> DC	
Type of DC Source	<input checked="" type="checkbox"/> External AC adapter	<input checked="" type="checkbox"/> From Host System	<input type="checkbox"/> 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:

- ♦ 47 CFR FCC Part 15
- ♦ ANSI C63.10-2013

1.3 Testing Location Information

Testing Location				
<input checked="" type="checkbox"/>	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 site Designation No. TW1190 with FCC.				
<input type="checkbox"/>	JHUBEI	ADD : No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County, Taiwan (R.O.C.)		
		TEL : 886-3-656-9065	FAX : 886-3-656-9085	
Test site Designation No. TW0006 with FCC.				

Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
AC Conduction	CO04-HY	Jeremy Lin	22.8°C / 60%	12/Jul/2018
RF Conducted	TH01-HY	Randy Shih	23.2°C / 61%	09/Jul/2018
Radiated Emission	03CH09-HY	Andy Hsu	22.8°C / 59%	10/Jul/2018

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))

Test Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	3.6 dB	Confidence levels of 95%
Radiated Emission (9kHz ~ 30MHz)	3.0 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	4.3 dB	Confidence levels of 95%
Conducted Emission	1.3 dB	Confidence levels of 95%
Temperature	0.7 °C	Confidence levels of 95%
Humidity	4 %	Confidence levels of 95%

2 Test Configuration of EUT

2.1 The Worst Case Modulation Configuration




Transmitter Mode	Field Strength (dBuV/m@3m)
RFID	63.81

2.2 Test Channel Frequencies Configuration

Modulation	Test Channel Frequencies (kHz)
OOK	125

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		
Test Condition	Radiated measurement		
User Position	<input type="checkbox"/> EUT will be placed in fixed position.		
	<input type="checkbox"/> EUT will be placed in mobile position and operating multiple positions. EUT shall be performed three orthogonal planes.		
	<input checked="" type="checkbox"/> 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				
AC Adapter 1	Brand Name	SOY	Model Name	SOY-0500200-090
	Power Rating	I/P: 100 - 240Vac, 0.5A, O/P: 5Vdc, 2 A		
AC Adapter 1	Brand Name	PHIHONE	Model Name	PSAF10R-050Q
	Power Rating	I/P: 100 - 240Vac, 0.3A, O/P: 5Vdc, 2.0 A		
USB Cable	Brand Name	NA	Model Name	389G175GZAAFAMOOHF
	Signal Line	3 meter, non-shielded cable, without ferrite core		

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

Support Equipment - AC Conduction			
No.	Equipment	Brand Name	Model Name
1	RFID Card	-	-

Note: Support equipment No.1 was provided by customer.

Support Equipment - RF Conducted			
No.	Equipment	Brand Name	Model Name
1	RFID Card	-	-
1	AC Power Source	GW	APS-9102

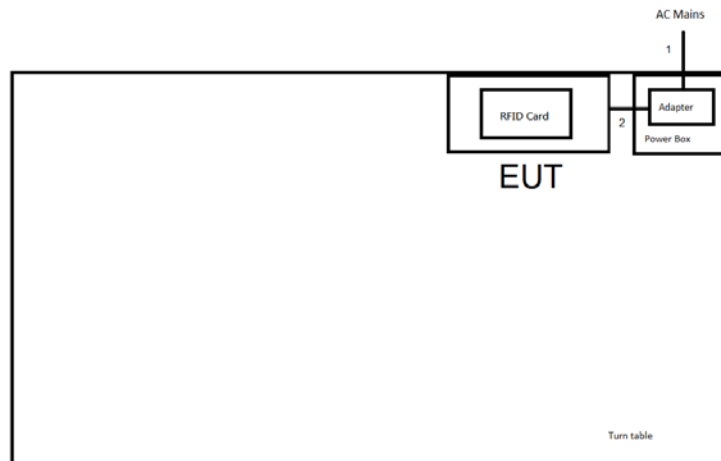
Note: Support equipment No.1 was provided by customer.

Support Equipment - Radiated			
No.	Equipment	Brand Name	Model Name
1	RFID Card	-	-

Note: Support equipment No.1 was provided by customer.

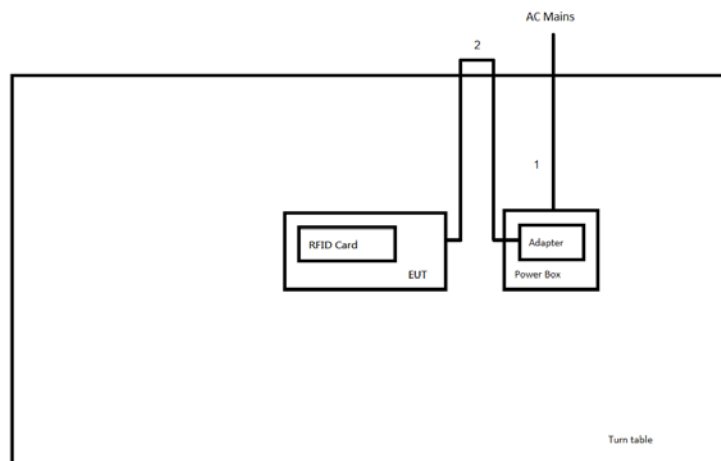
2.5 Test Setup Diagram

Test Setup Diagram – AC Line Conducted Emission Test



Item	Connection	Shielded	Length
1	AC Power line	No	1.8m
2	USB cable	No	3m

Test Setup Diagram - Radiated Test



Item	Connection	Shielded	Length(m)
1	AC Power line	No	1.8m
2	USB cable	No	3m

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.

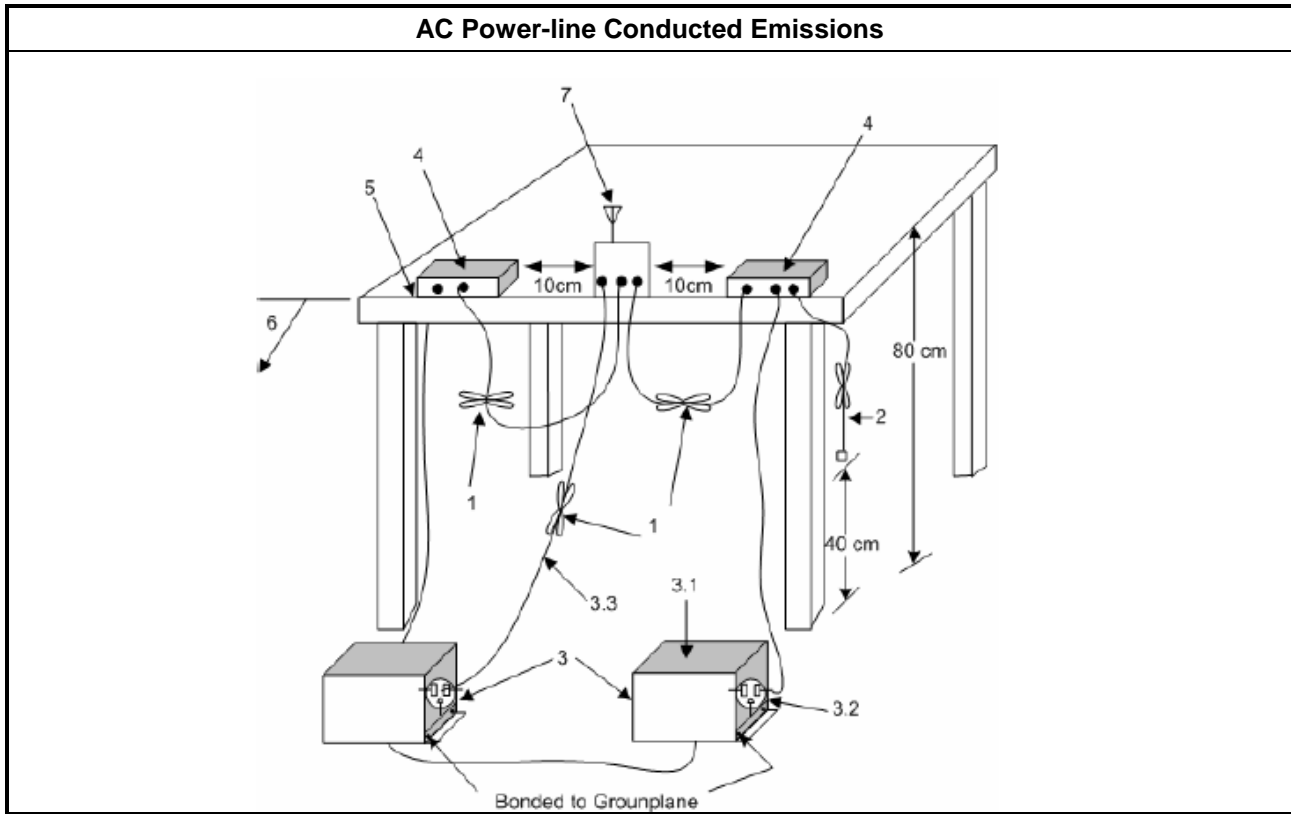
3.1.2 Measuring Instruments

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

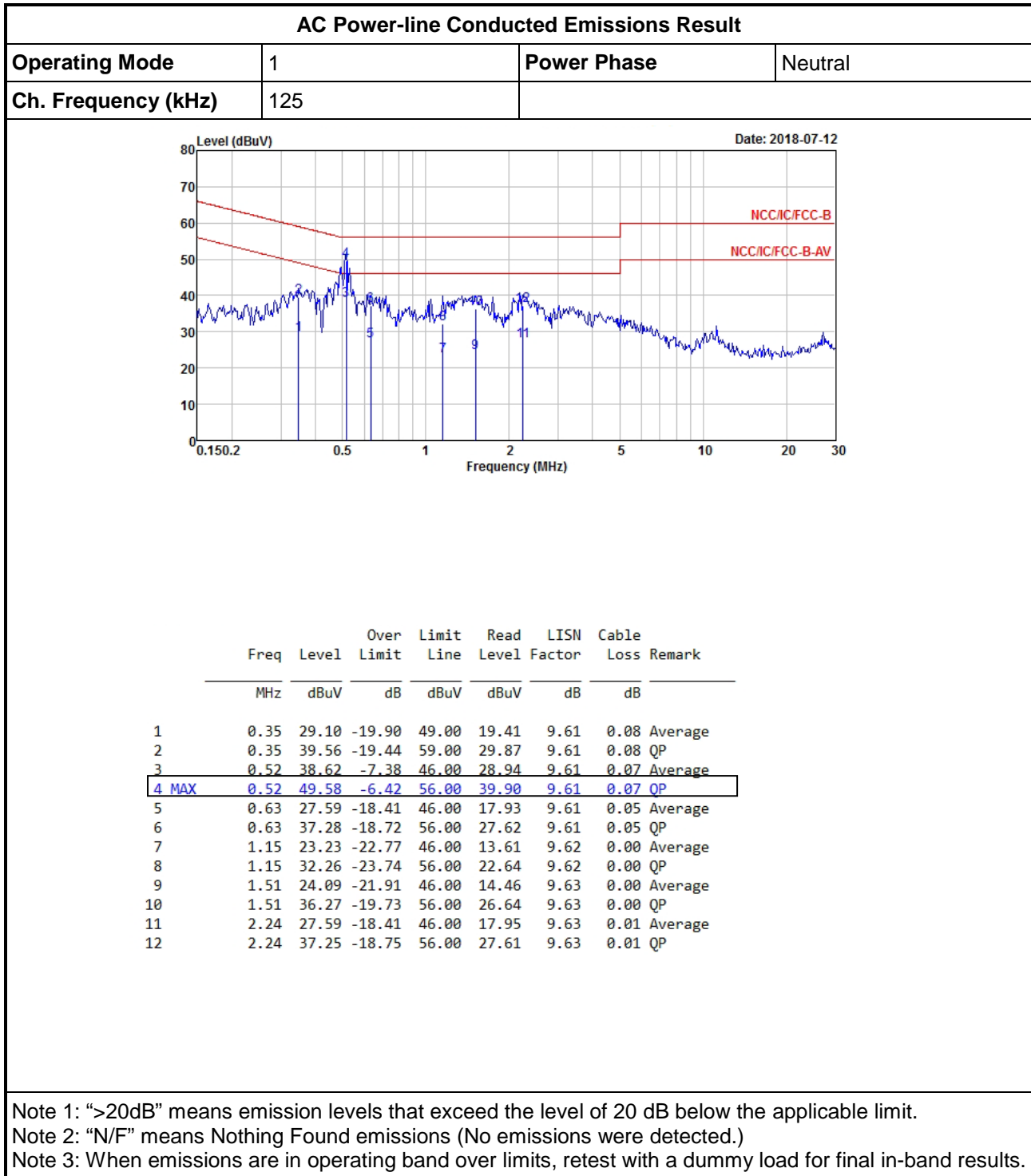
3.1.3 Test Procedures

Test Method	
<input checked="" type="checkbox"/>	Refer as ANSI C63.10-2013, clause 6.2 for AC power-line conducted emissions.
<input checked="" type="checkbox"/>	If AC conducted emissions fall in operating band, then following below test method confirm final result.
<input type="checkbox"/>	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 FCC 15.207 limits outside the transmitter's fundamental emission band; (2) Retest with a dummy load to determine compliance with FCC 15.207 limits within the transmitter's fundamental emission band.
<input checked="" type="checkbox"/>	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 FCC 15.207 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 FCC 15.207 limits within the transmitter's fundamental emission band.

3.1.4 Test Setup

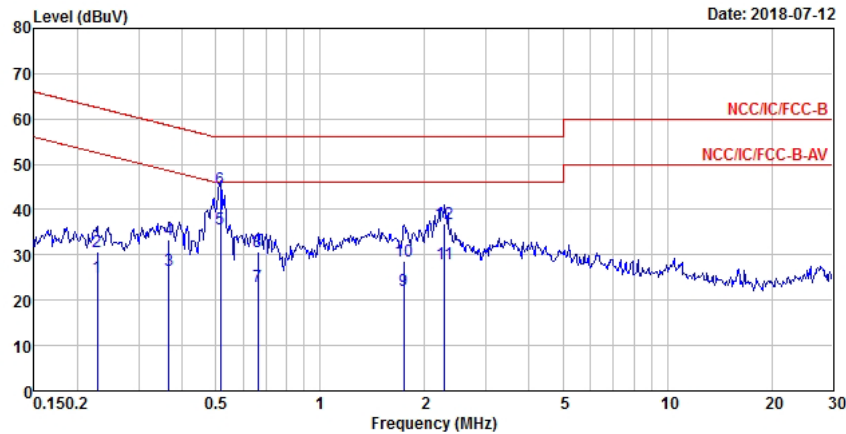


3.1.5 Test Result of AC Power-line Conducted Emissions



AC Power-line Conducted Emissions Result

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



	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.23	25.15	-27.37	52.52	15.51	9.62	0.02	Average
2	0.23	30.65	-31.87	62.52	21.01	9.62	0.02	QP
3	0.37	26.48	-22.08	48.56	16.78	9.61	0.09	Average
4	0.37	33.33	-25.23	58.56	23.63	9.61	0.09	QP
5 MAX	0.52	35.73	-10.27	46.00	26.05	9.61	0.07	Average
6	0.52	44.61	-11.39	56.00	34.93	9.61	0.07	QP
7	0.66	23.12	-22.88	46.00	13.46	9.61	0.05	Average
8	0.66	30.65	-25.35	56.00	20.99	9.61	0.05	QP
9	1.74	22.04	-23.96	46.00	12.42	9.62	0.00	Average
10	1.74	28.75	-27.25	56.00	19.13	9.62	0.00	QP
11	2.28	28.06	-17.94	46.00	18.42	9.62	0.02	Average
12	2.28	36.95	-19.05	56.00	27.31	9.62	0.02	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.

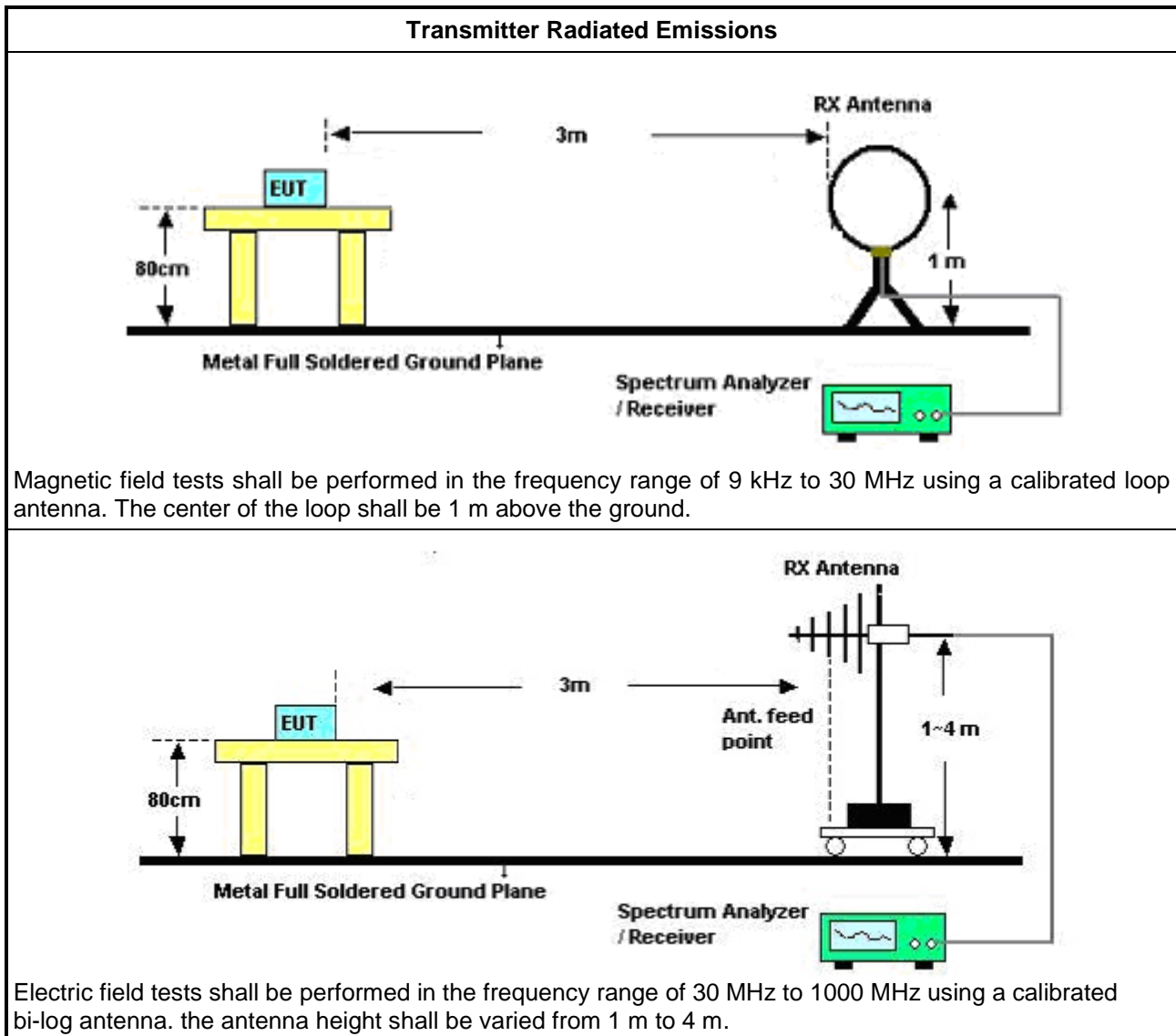
3.2.2 Measuring Instruments

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

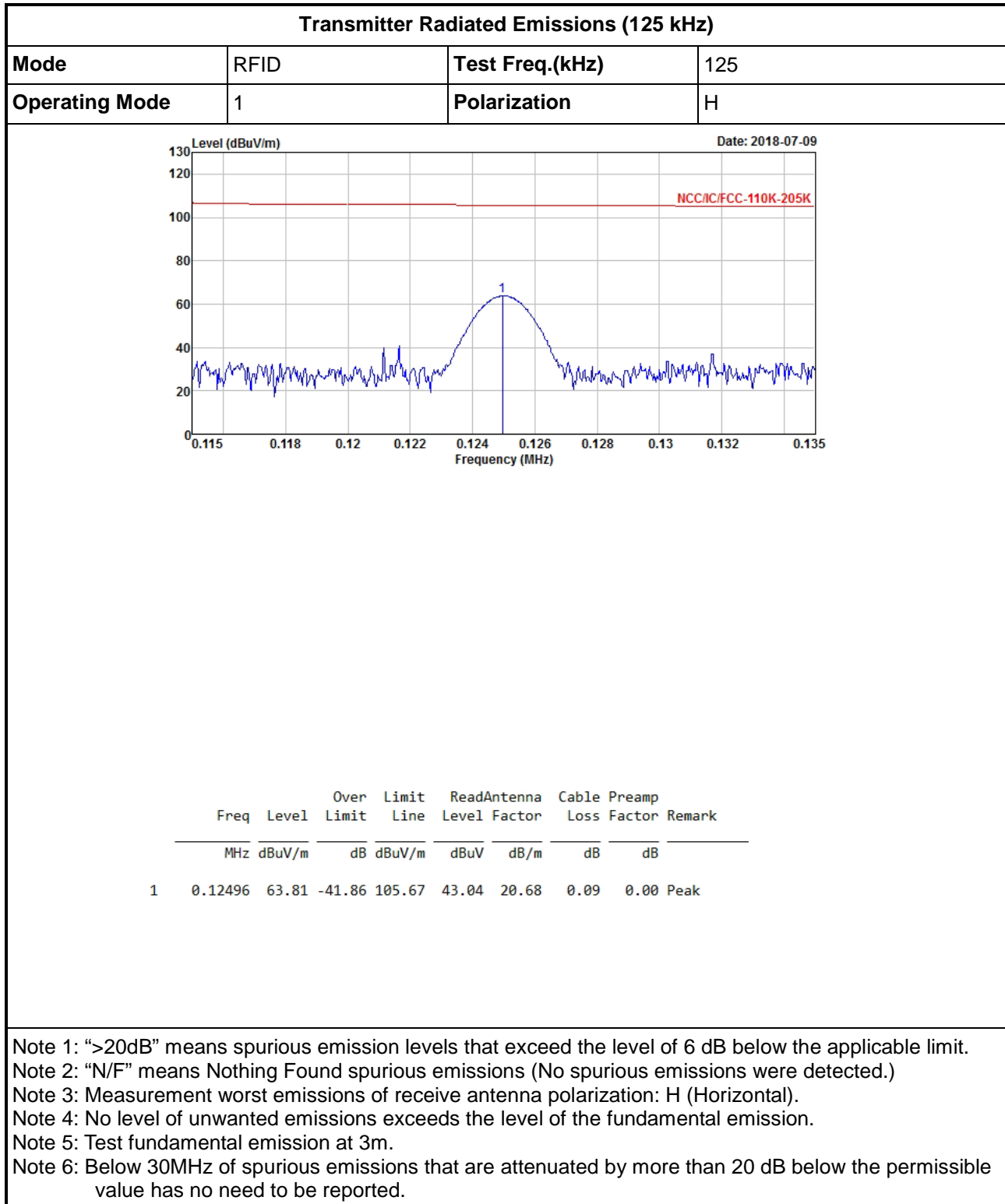
3.2.3 Test Procedures

Test Method	
<input checked="" type="checkbox"/>	Refer as ANSI C63.10, clause 6.5 for radiated emissions from 30 MHz to 1 GHz and test distance is 3m.
<input checked="" type="checkbox"/>	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.
<input checked="" type="checkbox"/>	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.
<input type="checkbox"/>	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.
<input checked="" type="checkbox"/>	The results shall be by using the square of an inverse linear distance extrapolation factor (40 dB/decade).
<input checked="" type="checkbox"/>	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.
<input checked="" type="checkbox"/>	The any unwanted emissions level shall not exceed the fundamental emission level.
<input checked="" type="checkbox"/>	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

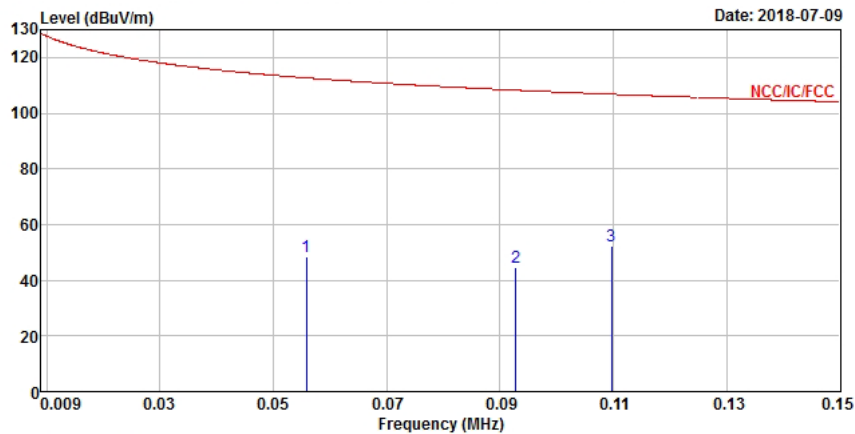


3.2.5 Transmitter Radiated Emissions (Below 30MHz)



Transmitter Radiated Emissions (9kHz~150kHz)

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



	Freq	Level	Over Limit	Limit Line	ReadAntenna	Cable	Preamp	
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	Loss	Factor Remark
1	0.05581	48.30	-64.37	112.67	27.18	21.05	0.07	0.00 Peak
2	0.09275	44.68	-63.58	108.26	23.84	20.76	0.08	0.00 Peak
3	0.10967	52.12	-54.69	106.81	31.35	20.69	0.08	0.00 Peak

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

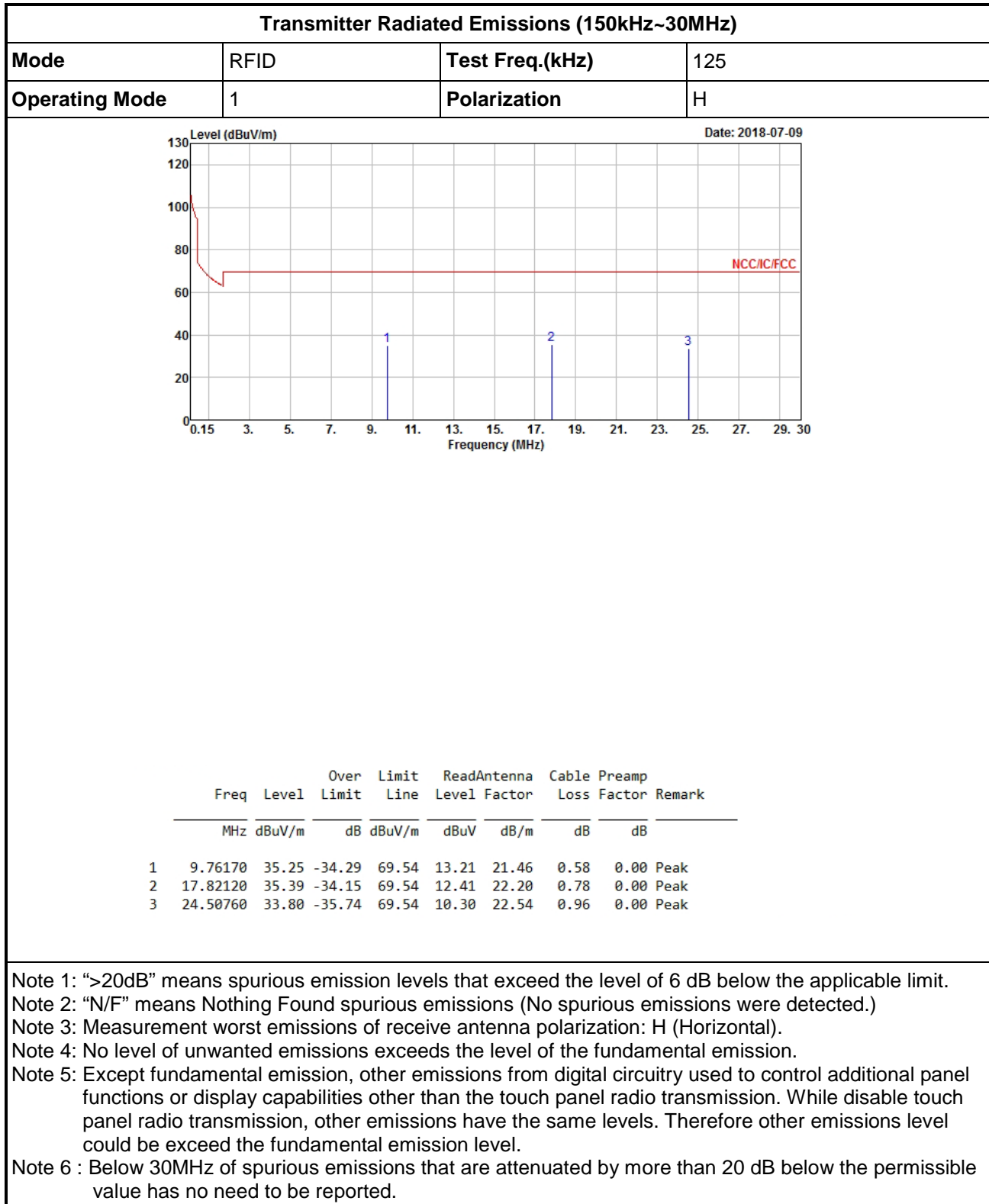
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

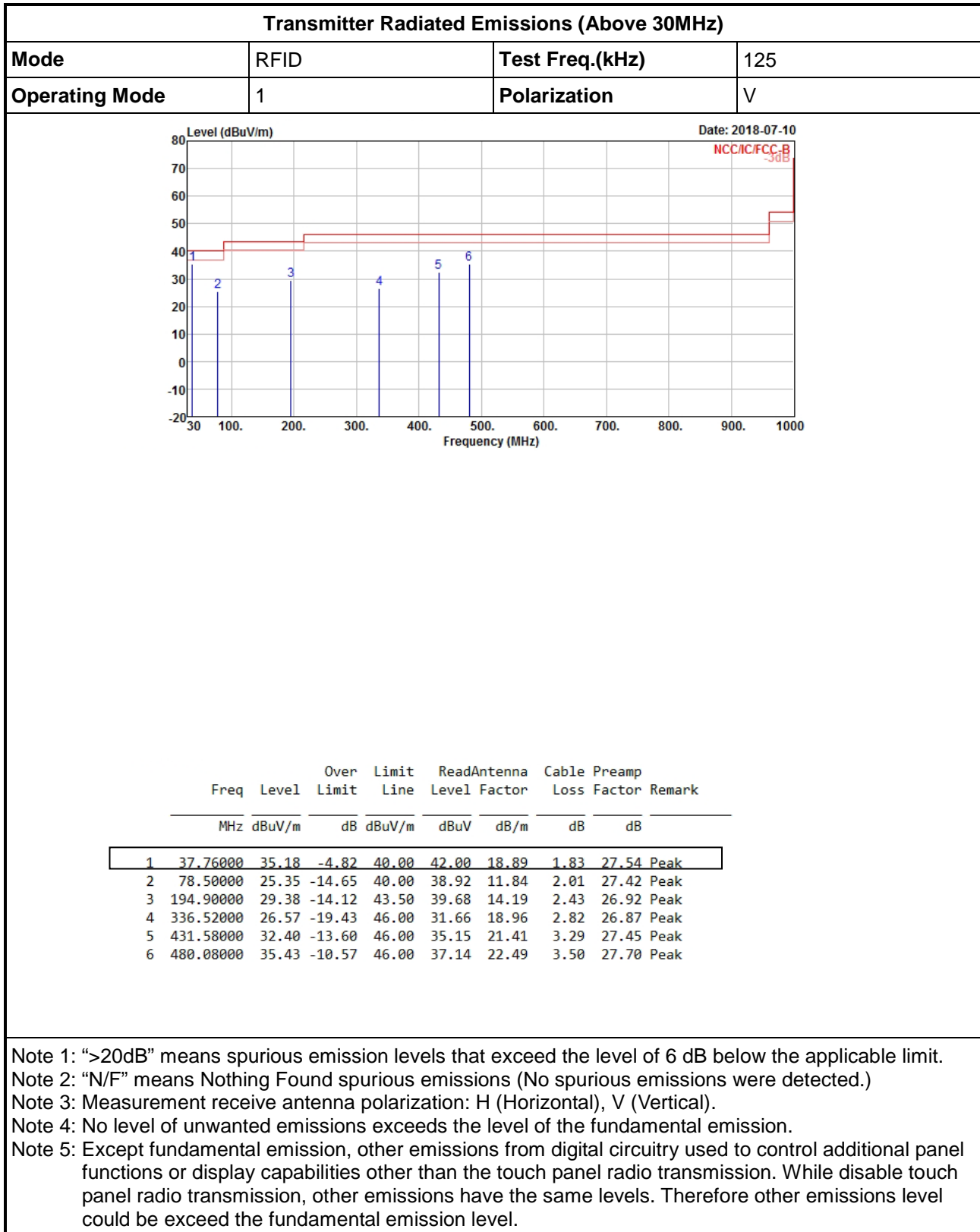
Note 3: Measurement worst emissions of receive antenna polarization: H (Horizontal).

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.

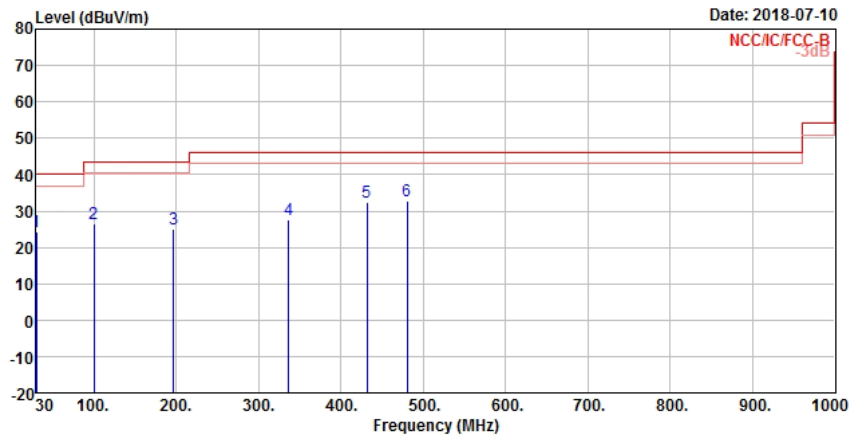
Note 6 : Below 30MHz of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.



3.2.6 Transmitter Radiated Emissions (Above 30MHz)


Transmitter Radiated Emissions (Above 30MHz)

Mode	RFID	Test Freq.(kHz)	125
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	30.00000	24.40	-15.60	40.00	26.78	23.48	1.71	27.57 Peak
2	99.84000	26.42	-17.08	43.50	35.75	16.05	1.98	27.36 Peak
3	196.84000	25.18	-18.32	43.50	35.35	14.28	2.46	26.91 Peak
4	336.52000	27.52	-18.48	46.00	32.61	18.96	2.82	26.87 Peak
5	431.58000	32.41	-13.59	46.00	35.16	21.41	3.29	27.45 Peak
6	480.08000	32.75	-13.25	46.00	34.46	22.49	3.50	27.70 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

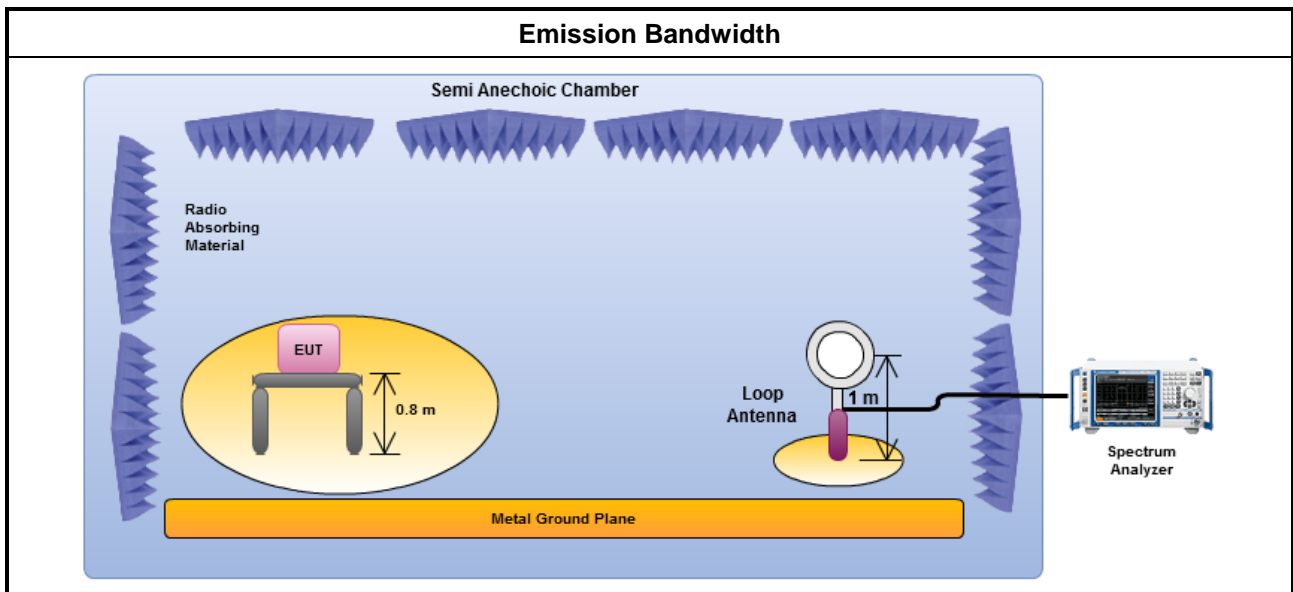
3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

Test Method
<input checked="" type="checkbox"/> For the emission bandwidth refer ANSI C63.10, clause 6.9.3 for occupied bandwidth testing.
<input checked="" type="checkbox"/> 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.

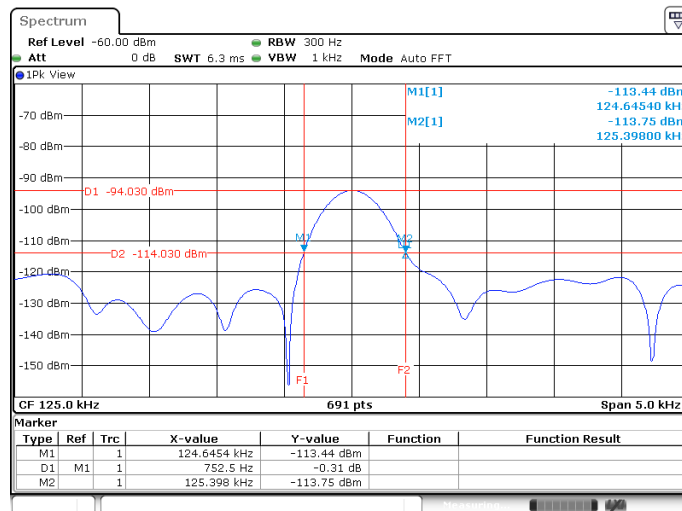
3.3.4 Test Setup



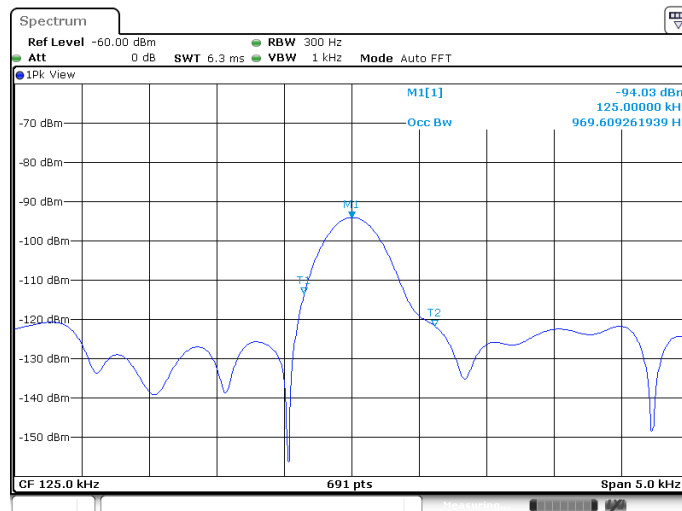
3.3.5 Test Result of Emission Bandwidth

Occupied Channel Bandwidth Result			
Modulation Mode	Frequency (kHz)	20dB Bandwidth (kHz)	99% Bandwidth (kHz)
RFID	125	0.75	0.97
Limit		N/A	
Result		Complied	

Emission Bandwidth Plot - 20dB Bandwidth



Emission Bandwidth Plot - 99% Bandwidth





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	102051	9KHz ~ 3.6GHz	03/May/2018	02/May/2019
LISN	R&S	ENV216	101295	9kHz ~ 30MHz	17/Nov/2017	16/Nov/2018
RF Cable-CON	HUBER+SUHNER	RG213/U	07611832020001	9kHz ~ 30MHz	06/Oct/2017	05/Oct/2018
AC POWER	APC	AFC-11005G	F310050055	47Hz~63Hz 5~300V	NCR	NCR
Impuls Begrenzer Pulse Limiter	SCHWARZBECK	VTSD 9561-F	9561-F041	9 kHz ~ 30 MHz	12/Oct/2017	11/Oct/2018

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	05/Feb/2018	04/Feb/2019
Loop Antenna	TESEQ	HLA 6120	31244	9 kHz~30 MHz	29/Mar/2018	28/May/2019
Temp. and Humidity Chamber	Giant Force	GTH-225-20-SP-SD	MAA1112-007	-20 ~ 100°C	22/May/2018	21/May/2019

Instrument for Radiated Test

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date
3m Semi Anechoic Chamber	TDK	SAC-3M	03CH09-HY	30MHz ~ 1GHz	23/Apr/2018	22/Apr/2019
3m Semi Anechoic Chamber	TDK	SAC-3M	03CH09-HY	1GHz ~ 18GHz	14/Jun/2018	13/Jun/2019
Amplifier	EMC	EMC9135	980232	9KHz~1GHz	27/Apr/2018	26/Apr/2019
EXA Signal Analyzer	KEYSIGHT	N9010A	MY54200885	10Hz ~ 44GHz	20/Jul/2017	19/Jul/2018
Bilog Antenna & 5dB Attenuator	TESEQ & MTJ	CBL6111D & MTJ6102-05	35418 / 3	30MHz~1GHz	09/Sep/2017	08/Sep/2018
Loop Antenna	TESEQ	HLA 6120	31244	9k-30MHz	29/Mar/2018	28/Mar/2019
RF Cable-R03m	Jye Bao	RG142	CB031	9kHz ~ 1GHz	1/Feb/2018	31/Jan/2019