

FCC - TEST REPORT

Report Number : **68.950.15.176.01** Date of Issue: November 5, 2015

Model : **JioPay 2800**

Product Type : **POS**

Applicant : **KanhaTech Solutions Pvt Ltd**

Address : **No 74, Prestige Feroze Building, 4th Floor, Cunningham road,**
Bangalore

Production Facility : **KanhaTech Solutions Pvt Ltd**

Address : **No 74, Prestige Feroze Building, 4th Floor, Cunningham road,**
Bangalore

Test Result : ☒ **Positive** ☐ **Negative**

Total pages : **19**

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2 Details about the Test Laboratory

Details about the Test Laboratory

Test Site 1

Company name: TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park,
Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052,
P. R. China

FCC Registration Number: 502708

IC Registration No: 10320A-1

Telephone: 86 755 8828 6998
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3 Description of the Equipment Under Test

Product:	POS
Model no.:	JioPay 2800
Brand Name:	JioPay
FCC ID:	2AFXJ-JIOPAY2800
Rating:	DC 3.7V by Li-ion Battery or 5VDC,2.0A (Charged by an external power adapter Adapter input:100-240VAC, 50/60Hz, 0.5A Adapter output:5.0V, 2.0A)
RF Transmission Frequency:	13.56MHz
Modulation:	ASK
Antenna Type:	Integral Antenna
Antenna Gain:	0dBi
Description of the EUT:	The Equipment Under Test (EUT) is a POS with NFC function which operated at 13.56MHz.

4 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C 10-1-2014 Edition	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators

5 Summary of Test Results

Technical Requirements				
FCC Part 15 Subpart C				
Test Condition		Pages	Test Site	Test Result
§15.207	Conducted emission AC power port	9	Site 2	Pass
§15.209 §15.225(d)	Radiated unwanted emissions	13	Site 2	Pass
§15.225(a) §15.225 (b) §15.225 (c)	Field strength of fundamental emissions	14	Site 2	Pass
	Field strength outside the allocated band emissions		Site 2	Pass
§15.225(e)	Frequency tolerance	16	Site 2	Pass
§15.215(c)	20dB Bandwidth	17	Site 2	Pass

Note 1: N/A=Not Applicable.

Note 2: The EUT uses an integral antenna, which gain is 0dBi. In accordance to §15.203, It is considered sufficiently to comply with the provisions of this section.

6 General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: 2AFXJ-JIOPAY2800 complies with Section 15.207, 15.209, 15.215, 15.225 of the FCC Part 15, Subpart C Rules.

SUMMARY:

All tests according to the regulations cited on page 5 were

■ - Performed

□ - **Not** Performed

The Equipment Under Test

■ - **Fulfills** the general approval requirements.

□ - **Does not** fulfill the general approval requirements.

Sample Received Date: August 11, 2015

Testing Start Date: August 12, 2015

Testing End Date: August 25, 2015

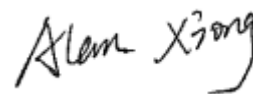
TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch

Reviewed by:

Prepared by:



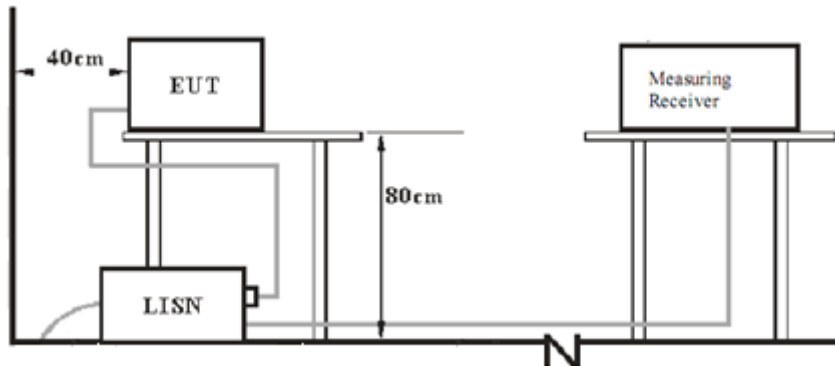
John Zhi
EMC Project Manager



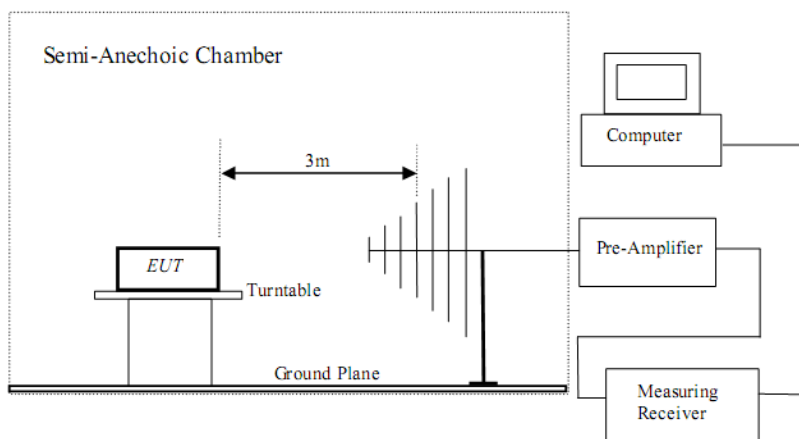
Alan Xiong
EMC Project Engineer

7 Test Setups

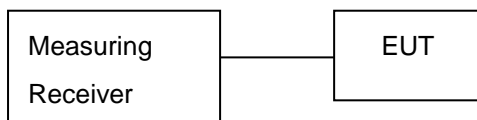
7.1 AC Power Line Conducted Emission test setups



7.2 Radiated test setups



7.3 Conducted RF test setups



8 Test Methodology

8.1 Conducted Emission on AC power port

Test Method

1. The EUT was placed on a table, which is 0.8m above ground plane
2. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.).
3. Maximum procedure was performed to ensure EUT compliance
4. A EMI test receiver is used to test the emissions from both sides of AC line

Limit

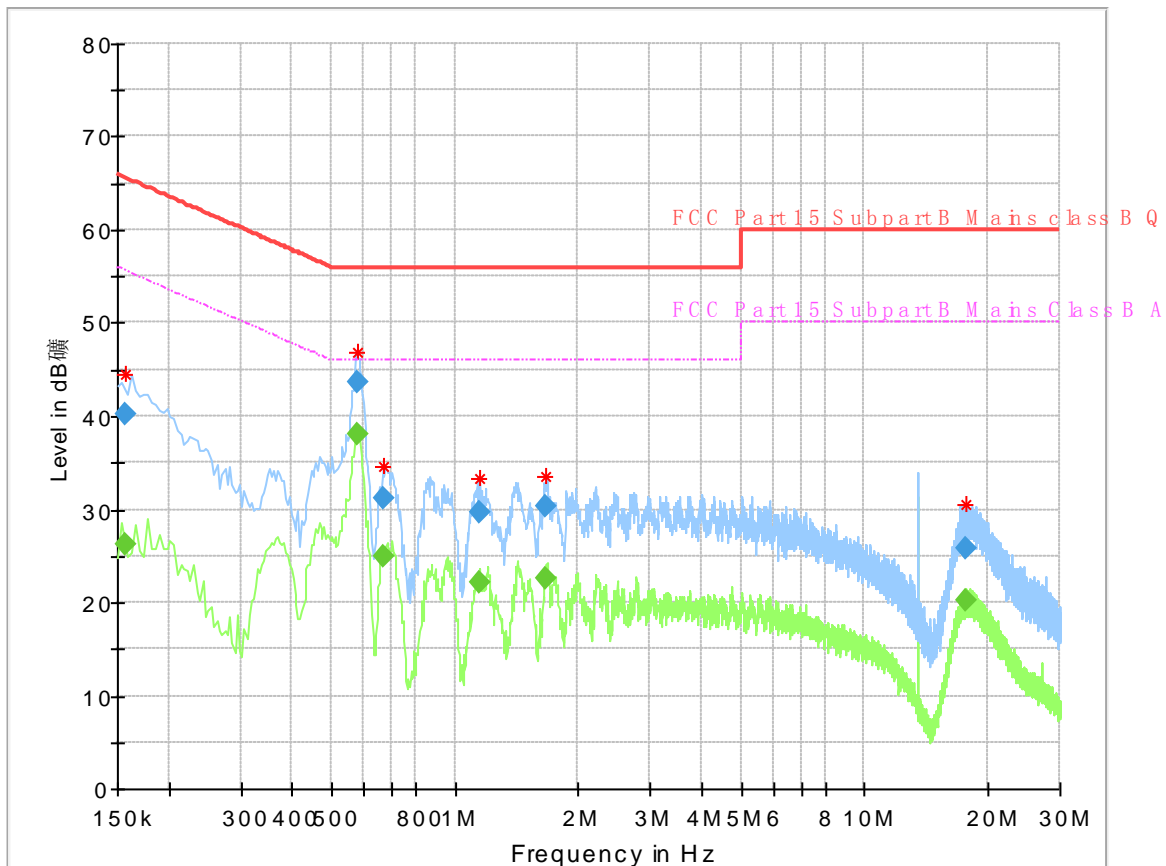
According to §15.207, conducted emissions limit as below:

Frequency MHz	QP Limit dB μ V	AV Limit dB μ V
0.150-0.500	66-56*	56-46*
0.500-5	56	46
5-30	60	50

Decreasing linearly with logarithm of the frequency

Conducted Emission

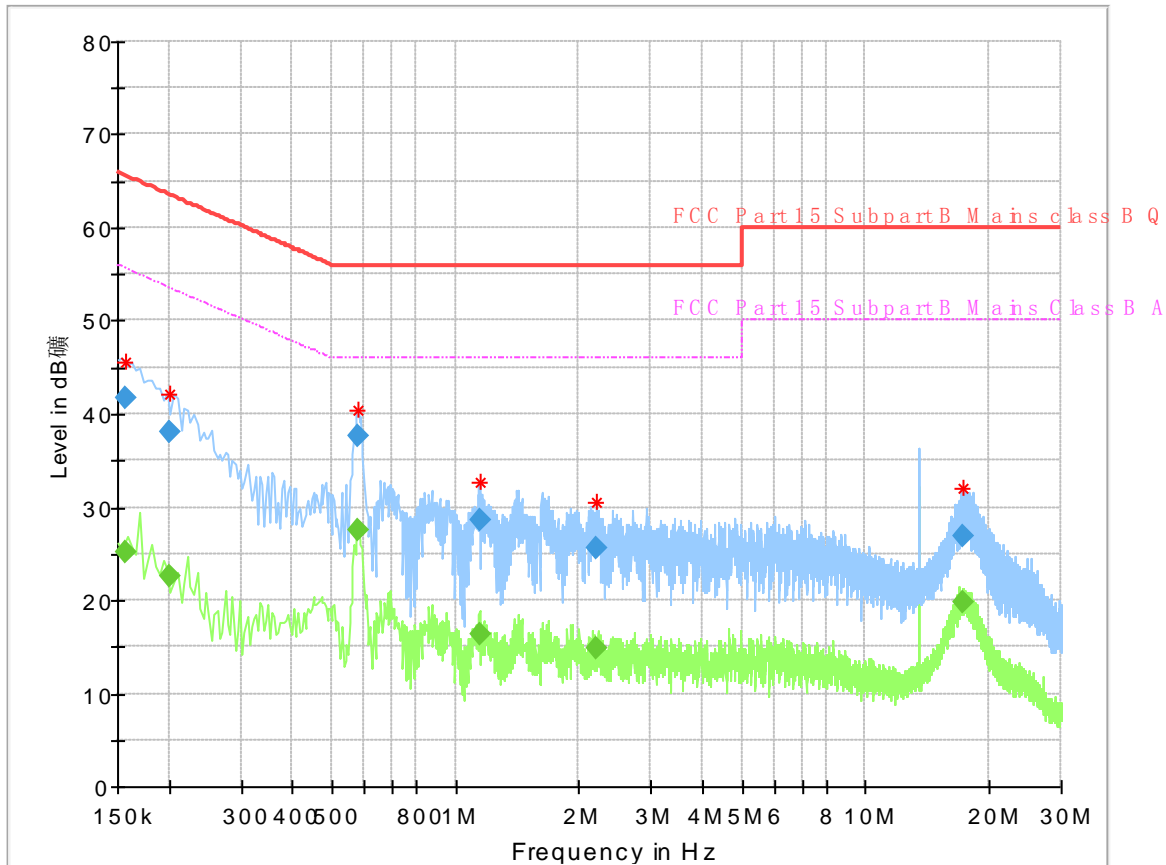
Product Type : POS
 M/N : JioPay 2800
 Operating Condition : Charging and Transmitting
 Test Specification : Line
 Comment : AC 120V/60Hz



Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)
0.157500	---	26.20	55.59	29.39	L1	9.6
0.157500	40.30	---	65.59	25.29	L1	9.6
0.578500	---	38.10	46.00	7.90	L1	10.0
0.578500	43.74	---	56.00	12.26	L1	10.0
0.669500	---	25.01	46.00	20.99	L1	10.0
0.669500	31.22	---	56.00	24.78	L1	10.0
1.145500	---	22.22	46.00	23.78	L1	9.8
1.145500	29.69	---	56.00	26.31	L1	9.8
1.657500	---	22.61	46.00	23.39	L1	9.8
1.657500	30.28	---	56.00	25.72	L1	9.8
17.713500	---	20.18	50.00	29.82	L1	10.1
17.713500	25.75	---	60.00	34.25	L1	10.1

Conducted Emission

Product Type : POS
 M/N : JioPay 2800
 Operating Condition : Charging and Transmitting
 Test Specification : Neutral
 Comment : AC 120V/60Hz



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.157500	---	25.13	55.59	30.46	N	9.6
0.157500	41.82	---	65.59	23.77	N	9.6
0.201500	---	22.62	53.55	30.93	N	9.8
0.201500	38.07	---	63.55	25.48	N	9.8
0.577500	---	27.59	46.00	18.41	N	10.0
0.577500	37.73	---	56.00	18.27	N	10.0
1.145500	---	16.25	46.00	29.75	N	9.8
1.145500	28.67	---	56.00	27.33	N	9.8
2.201500	---	14.85	46.00	31.15	N	9.8
2.201500	25.62	---	56.00	30.38	N	9.8
17.370500	---	19.80	50.00	30.20	N	10.1
17.370500	26.82	---	60.00	33.18	N	10.1

8.2 Radiated Unwanted Emission

Test Method

The sample was placed 0.8m above the ground plane on a standard emission test site *. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations for frequency above 30MHz. And for frequency below 30MHz, a loop antenna is used to measure the field strength. The emissions worst-case are shown in Test Results of the following pages.

*On a standard emission test site with a metal ground plane filed with the FCC pursuant to section 2.948 of the FCC rules.

The measuring bandwidth is:

Frequency of Emission(MHz)	RBW/VBW
0.009-0.15	100/300Hz
0.15-30	10/30KHz
30-1000	100/300KHz

Limit:

Frequency Range(MHz)	Field Strength(Microvolts/meter)	Field Strength(dBμV/m) @3m
0.009-0.49	2400/F(KHz) @300m	129-94
0.49-1.705	24000/F(KHz) @30m	74-63
1.705-30	30 @30m	70
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Note: Where the limits have been defined at one distance, and a signal level measured at another, the limits have been extrapolated using the following formula:

Extrapolation(dB)=40*log10(Measuring Distance/Specified Distance) below 30MHz

Extrapolation(dB)=20*log10(Measuring Distance/Specified Distance) above 30MHz

Measuring Result:

Investigate frequency range	Frequency	Emission Level	Polarization	Limit	Detector	Result
MHz	MHz	dBuV/m	(H/V)	dBμV/m		
0.009-30	--	--	--	--	--	--
0.009-30	--	--	--	--	--	--
30-1000	79.71	18.32	Horizontal	40.00	QP	Pass
30-1000	97.42	18.99	Horizontal	43.50	QP	Pass
30-1000	362.16	24.38	Horizontal	46.00	QP	Pass
30-1000	49.89	24.97	Vertical	40.00	QP	Pass
30-1000	80.44	25.19	Vertical	40.00	QP	Pass
30-1000	96.93	24.46	Vertical	43.50	QP	Pass

8.3 Field strength of fundamental emissions & outside the allocated band emissions

Test Method

The sample was placed 0.8m above the ground plane on a standard emission test site *. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating turntable, a loop antenna is used to measure the field strength. The emissions worst-case are shown in test results of the following pages.

The measuring bandwidth is:

Frequency of Emission(MHz)	RBW/VBW
13.11-14.01	10/30KHz

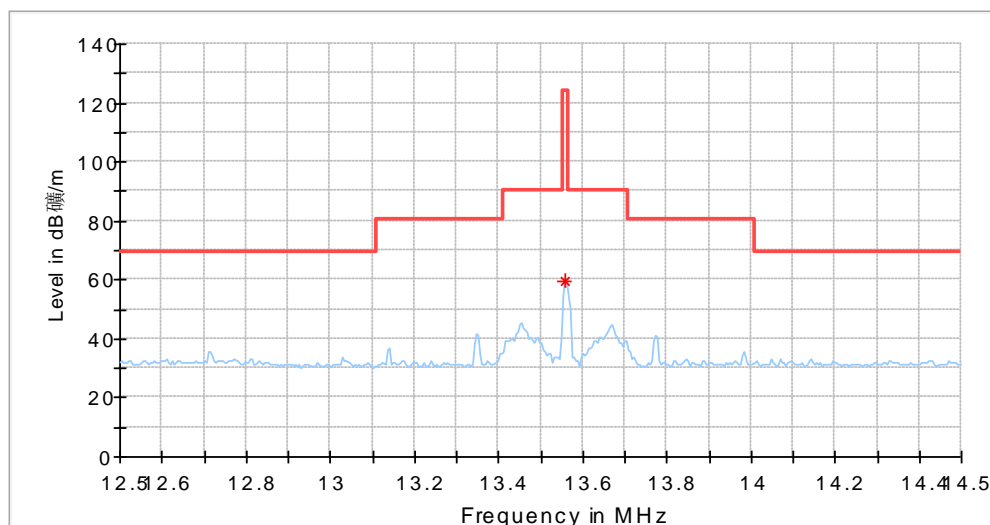
Limit:

Frequency Range(MHz)	Field Strength(Microvolts/meter)	Field Strength(dBμV/m) @3m
13.56±0.007	+15,848	124
13.410 to 13.553 13.567 to 13.710	+334	90
13.110 to 13.410 13.710 to 14.010	+106	81

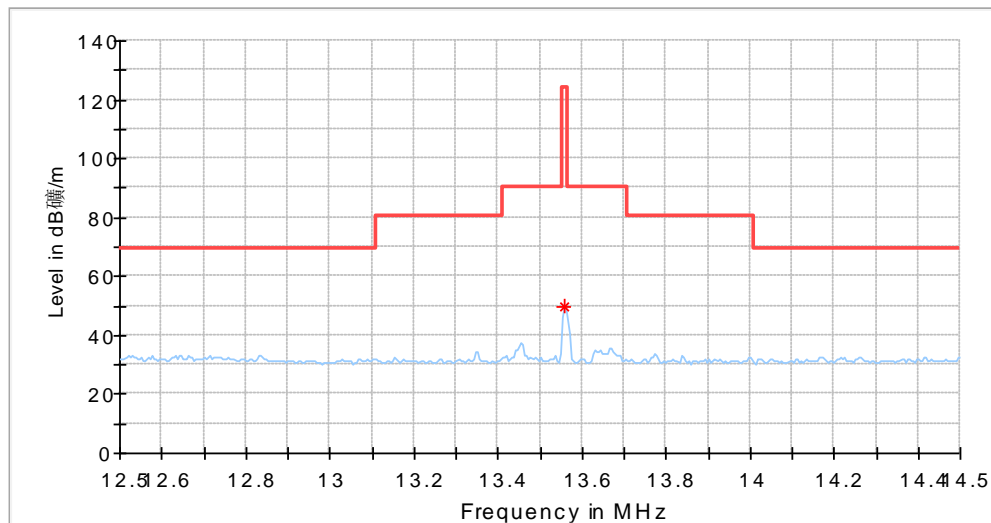
Note: Where the limits have been defined at one distance, and a signal level measured at another, the limits have been extrapolated using the following formula:

Extrapolation(dB)=40*log10(Measuring Distance/Specified Distance) below 30MHz

Measuring Result:



Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Azimuth (deg)	Corr. (dB)
13.559886	59.41	---	---	H	34.0	20.0



Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Azimuth (deg)	Corr. (dB)
13.559886	49.44	---	---	V	343.0	20.0

8.4 Frequency tolerance

Test Method

The transmitter output signal was picked up by receiver antenna connected to the test receiver, while the receiver antenna was placed within a thermostat to keep in temperature rang from -20 to 50 Celsius degrees.

Limit:

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

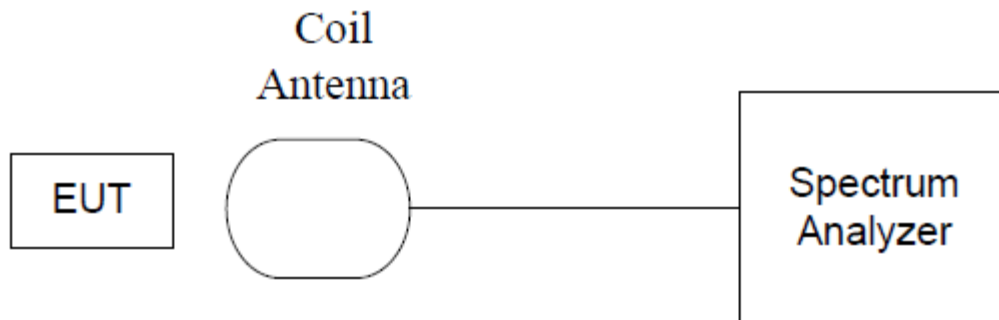
Test result:

Test conditions	Carrier frequency	Carrier frequency tolerance
NVLT	13.561071	+0.0079%
NVHT	13.561138	+0.0084%
NTLV	13.560261	+0.0019%
NTHV	13.559169	-0.0061%

8.5 20dB Bandwidth

Test method:

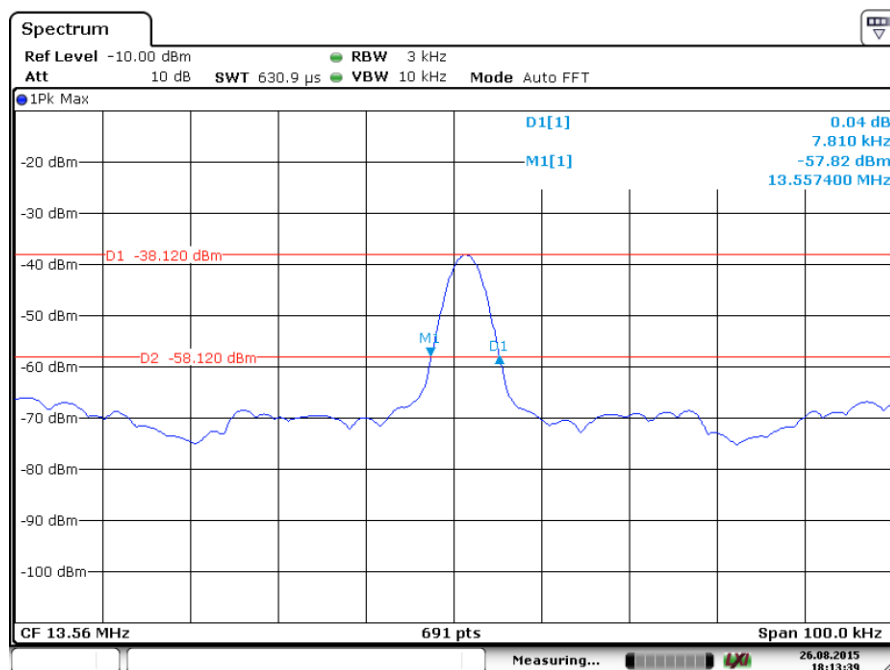
The Transmitter output signal was picked up by coil antenna to the spectrum analyzer.



Limit:

The 20dB bandwidth shall be less than 80% of the permitted frequency band. For equipment operated at 13.56MHz of clause 15.225, the permitted frequency range is 13.553-13.567MHz, so the limit is 11.2 KHz

Measuring result:



9 Systems test configuration

Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.(SHIELD)	S/N(LENGTH)
RFID IC card	--	--	--

10 Test Equipment List

List of Test Instruments

	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
CE	EMI Test Receiver	Rohde & Schwarz	ESR 3	101782	2016-7-24
	LISN	Rohde & Schwarz	ENV4200	100249	2016-7-24
	LISN	Rohde & Schwarz	ENV216	100326	2016-7-24
	ISN	Rohde & Schwarz	ENY81	100177	2016-7-24
	ISN	Rohde & Schwarz	ENY81-CA6	101664	2016-7-24
	High Voltage Probe	Rohde & Schwarz	TK9420(VT9420)	9420-58	2016-7-24
	RF Current Probe	Rohde & Schwarz	EZ-17	100816	2016-7-24
RE	Signal Analyzer	Rohde & Schwarz	FSV40	101031	2016-7-24
	Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	708	2016-7-31
	Horn Antenna	Rohde & Schwarz	HF907	102295	2016-7-24
	Wideband Horn Antenna	Q-PAR	QWH-SL-18-40-K-SG	12827	2017-10-21
	Pre-amplifier	Rohde & Schwarz	SCU 18	102230	2016-7-24
	Pre-amplifier	Rohde & Schwarz	SCU 40A	100432	2016-7-24
	Fully Anechoic Chamber	TDK	8X4X4	--	2019-5-29
Conducted	Signal Analyzer	Rohde & Schwarz	FSV40	101030	2016-7-24

11 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

System Measurement Uncertainty	
Test Items	Extended Uncertainty
Uncertainty for Conducted Emission 150kHz-30MHz (for test using AMN ENV216 or ENV4200)	3.50dB
Uncertainty for Radiated Spurious Emission 25MHz-3000MHz	Horizontal: 4.95dB; Vertical: 5.02dB;
Uncertainty for Radiated Spurious Emission 3000MHz-18000MHz	Horizontal: 4.89dB; Vertical: 4.88dB;
Uncertainty for Radiated Spurious Emission 18000MHz-40000MHz	Horizontal: 4.93dB; Vertical: 4.92dB;
Uncertainty for Conducted RF test with TS 8997	Power level test involved: 2.04dB Frequency test involved: 1.1×10^{-7}