DEKRA Testing and Certification, S.A.U.
Parque Tecnológico de Andalucía,
c/ Severo Ochoa nº 2 · 29590 Campanillas · Málaga · España
C.I.F. A29 507 456

Nº 51/LE147

Test report No:
NIE: 57478RRF.006

Test report
USA FCC Part 15.225, 15.209
CANADA RSS-210, RSS-Gen

(*) Identification of item tested	Secure Smartphone.
(*) Trademark	Bittium
(*) Model and /or type reference	Tough Mobile 2
Other identification of the product	HW version: 0302 SW version: 40.1 FCC ID: V27SD-61 IC: 3282B-SD61
(*) Features	LTE • 3GPP Rel12 • FDD/TDD Cat13/5, • DL 400Mbit/s, • UL 75 Mbit/s UMTS/HSPA • 3GPP rel8, HSPA+, • DL 42 Mbit/s, • UL 5.76 Mbit/s GSM/GPRS/EDGE Complementary Radios • Wi-Fi 802.11 a/b/g/n/ac (2.4 and 5 GHz), 2 x 2 MIMO • BT 5.0 • NFC
Applicant	BITTIUM WIRELESS OY Ritaharjuntie 1, 90590 Oulu, Finland
Test method requested, standard	USA FCC Part 15.225 (10–1–18 Edition): Operation within the band 13.110 -14.010. USA FCC Part 15.209 (10–1–18 Edition): Radiated emission limits, general requirements. CANADA RSS-210 Issue 9 (August 2016). CANADA RSS-Gen Issue 5 (April 2018). ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.

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Summary	IN COMPLIANCE
Approved by (name / position & signature)	A. Llamas RF Lab. Manager  Firmado digitalmente por ALEJANDRO LLAMAS RODRIGUEZ Fecha: 2019.08.12 10:35:50 +02'00'
Date of issue	2019-08-12
Report template No	FDT08_22 (*) "Data provided by the client"

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Competences and guarantees

DEKRA Testing and Certification is a testing laboratory accredited by the National Accreditation Body (ENAC - Entidad Nacional de Acreditación), to perform the tests indicated in the Certificate No. 51/LE 147.

DEKRA Testing and Certification is a FCC-recognized accredited testing laboratory with appropriate scope of accreditation that include testing performed in this test report.

DEKRA Testing and Certification is an ISED-recognized accredited testing laboratory with appropriate scope of accreditation that include testing performed in this test report.

In order to assure the traceability to other national and international laboratories, DEKRA Testing and Certification has a calibration and maintenance program for its measurement equipment.

DEKRA Testing and Certification guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at DEKRA Testing and Certification at the time of performance of the test.

DEKRA Testing and Certification is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

General conditions

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA Testing and Certification S.A.U.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA Testing and Certification S.A.U. and the Accreditation Bodies.

Uncertainty

Uncertainty (factor k=2) was calculated according to the DEKRA Testing and Certification S.A.U. internal document PODT000.

Data provided by the client

The following data has been provided by the client:

1. Information relating to the description of the sample ("Identification of the item tested", "Trademark", "Model and/or type reference tested").

2. The sample of Tough Mobile 2 consists of a Secure Smartphone targeted for professional use where High Security is required.

DEKRA Testing and Certification S.A.U. declines any responsibility with respect to the information provided by the client and that may affect the validity of results.

Usage of samples

Samples undergoing test have been selected by: The client.

- Sample S/01 is composed of the following elements:

Control Nº	Description	Model	Serial Nº	Reception
57478C/032	Mobile Phone	Tough Mobile 2	--	2018/11/26

Sample S/01 has undergone the following test(s): All CONDUCTED tests indicated in appendix A.

- Sample S/02 is composed of the following elements:

Control Nº	Description	Model	Serial Nº	Reception
57478C/032	Mobile Phone	Tough Mobile 2	--	2018/11/26
57478C/033	USB Cable	--	--	2018/11/26
57478C/034	AC/DC Adaptor	--	--	2018/11/26
57478C/039	Headphones	--	--	2018/11/26

Sample S/02 has undergone the following test(s): All RADIATED tests indicated in appendix A.

Test sample description

<table>
<tr><td rowspan="2">Ports…… :</td><td rowspan="2">Port name and description</td><td colspan="4">Cable</td></tr>
<tr><td>Specified max length [m]</td><td>Attached during test</td><td>Shielded</td><td>Coupled to patient(3)</td></tr>
<tr><td></td><td>Not provided data.</td><td></td><td>☐</td><td>☐</td><td>☐</td></tr>
<tr><td>Supplementary information to the ports…… :</td><td colspan="5"></td></tr>
<tr><td rowspan="3">Rated power supply ……:</td><td colspan="2" rowspan="2">Voltage and Frequency</td><td colspan="4">Reference poles</td></tr>
<tr><td>L1</td><td>L2</td><td>L3</td><td>N</td><td>PE</td></tr>
<tr><td>☐</td><td>AC:</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td></tr>
<tr><td></td><td>☒</td><td>DC: 3.8 Vdc</td><td colspan="5"></td></tr>
<tr><td>Rated Power ……:</td><td colspan="6">Not provided data.</td></tr>
<tr><td>Clock frequencies ……:</td><td colspan="6">Not provided data.</td></tr>
</table>

Other parameters.....:	FCC ID: V27SD-61 IC: 3282B-SD61			
Software version .....:	40.1			
Hardware version.....:	0302			
Dimensions in cm (W x H x D)....:	Not provided data.			
Mounting position.....:	☐	Table top equipment		
	☐	Wall/Ceiling mounted equipment		
	☐	Floor standing equipment		
	☒	Hand-held equipment		
	☐	Other:		
Modules/parts .....:	Module/parts of test item		Type	Manufacturer
	Not provided data.			
Accessories (not part of the test item) .....:	Description		Type	Manufacturer
	Not provided data.			
Documents as provided by the applicant.....:	Description		File name	Issue date
	Not provided data.			

(3) Only for Medical Equipment

Identification of the client

BITTIUM WIRELESS OY
Ritaharjuntie 1, 90590 Oulu, Finland

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2018-11-28
Date (finish)	2019-03-08

Document history

Report number	Date	Description
57478RRF.006	2019-08-12	First release

Environmental conditions

In the control chamber, the following limits were not exceeded during the test:

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 20 % Max. = 75 %

In the semianechoic chamber, the following limits were not exceeded during the test.

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 20 % Max. = 75 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

In the chamber for conducted measurements, the following limits were not exceeded during the test:

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 20 % Max. = 35 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

Remarks and comments

The tests have been performed by the technical personnel: Miguel Ángel Torres, Juan Carlos Fuentes, José Alberto Aranda, José Gabriel Pendón, Francisco José Alcaide and Ignacio Cabra.

Used instrumentation:

Conducted measurements:

		Last Calibration	Due Calibration
1.	Chamber HERAEUS VMT 04/35	2018/06	2020/06
2.	Spectrum Analyzer ROHDE AND SCHWARZ FSW50	2018/02	2020/02
3.	DC Power Supply AGILENT TECHNOLOGIES N5744A	---	---
4.	Spectrum Analyzer PSA 3Hz-26.5 GHz AGILENT TECHNOLOGIES E4440A	2017/10	2019/10
5.	DC Power Supply 40V/40A Rohde & Schwarz NGPE40	2018/02	2021/02
6.	Multimeter FLUKE 179	2018/06	2019/06

Radiated measurements:

		Last Calibration	Due Calibration
1.	Semianechoic Absorber Lined Chamber ETS LINDGREN FACT 3 200 STP	N.A.	N.A.
2.	EMI Test Receiver 7 GHz ROHDE AND SCHWARZ ESR7	2017/08	2019/08
3.	Active Loop Antenna HEWLETT PACKARD 11966A	2018/06	2020/06
4.	RF Pre-amplifier, 38 dB, 30 MHz-6 GHz BONN ELEKTRONIK BLNA 0360-01N	2018/07	2019/07
5.	Biconical/Log Antenna 30 MHz - 6 GHz ETS LINDGREN 3142E	2018/07	2021/07

Testing verdicts

Not applicable:	N/A
Pass:	P
Fail:	F
Not measured:	N/M

Summary

FCC Part 15.225, 15.209 CANADA RSS-210, RSS-Gen Requirement – Test case	Verdict	Remark
15.225 Subclause (a) / RSS-210 Clause B.6 (a). Field strength of emissions within the band 13.553 - 13.567 MHz	P	
15.225 Subclause (b) / RSS-210 Clause B.6 (b). Field strength of emissions within the band 13.410 - 13.553 MHz and 13.567 – 13.710 MHz	P	
15.225 Subclause (c) / RSS-210 Clause B.6 (c). Field strength of emissions within the band 13.110 - 13.410 MHz and 13.710 – 14.010 MHz	P	
15.225 Subclause (d) / RSS-210 Clause B.6 (d). Field strength of emissions outside of the band 13.110 MHz -14.010 MHz	P	
15.225 Subclause (e) / RSS-210 Clause B.6. Frequency tolerance of the carrier signal	P	
Supplementary information and remarks: None.		

Appendix A: Test results.

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TEST CONDITIONS

POWER SUPPLY (V):

Vn: 3.8 Vdc
Vmin: 3.6 Vdc (*)
Vmax: 4.2 Vdc (*)

Type of Power Supply: Rechargeable Battery.

Type of Antenna: Magnetic loop antenna.

TEMPERATURE (ºC):

Tn: +15 to + 35.
Tmin: -20 (*)
Tmax: +55 (*)

The subscripts ‘n’, ‘min’ and ‘max’ indicate temperature test conditions (normal, minimum and maximum respectively).

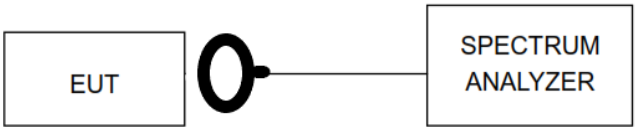
(*): Declared by applicant.

TEST FREQUENCY:

Nominal Operating Frequency: 13.56 MHz

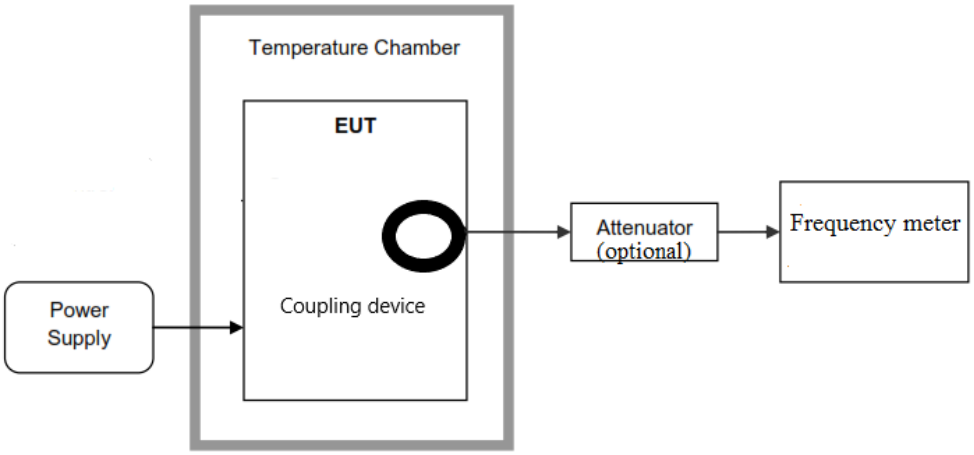
CONDUCTED MEASUREMENTS

The equipment under test was set up in a shielded room and it is directly connected to the spectrum analyzer through a coupling device.



Coupling device

For frequency stability test the EUT was placed inside a climatic chamber and connected to a frequency meter using a low loss cable and a coupling device. An external DC power supply was connected to the EUT for voltage variation test.



RADIATED MEASUREMENTS

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna (Loop antenna for the range between 9 kHz to 30 MHz and Bilog antenna for the range between 30 MHz to 200 MHz) is situated at a distance of 3 m.

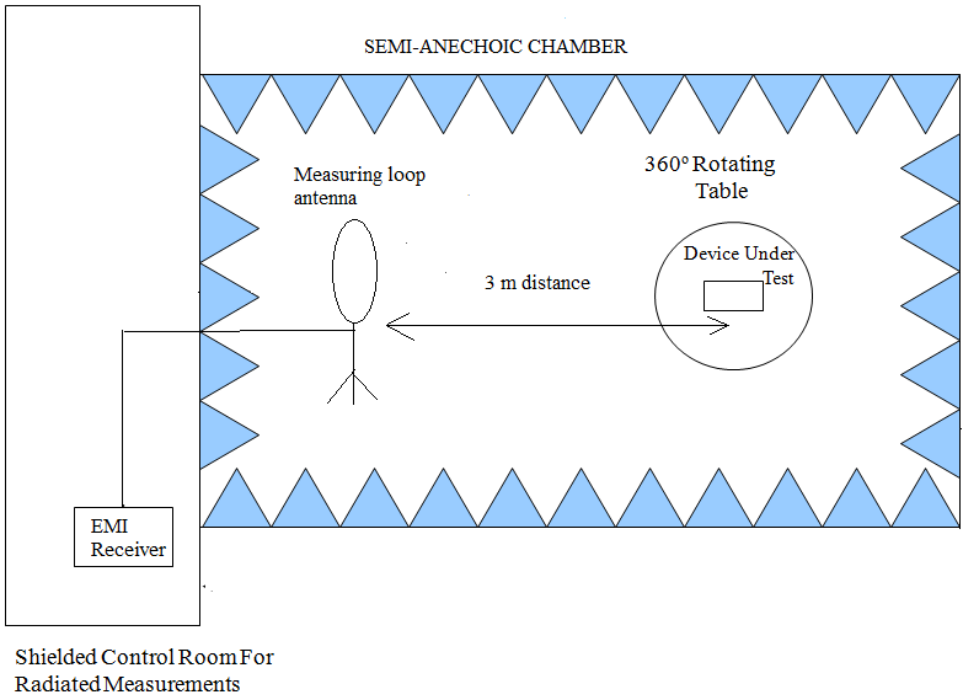
For radiated emissions in the range 9 kHz to 30 MHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 40 dB per decade is used to normalize the measured data for determining compliance.

The equipment under test was set up on a non-conductive platform above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360º and in the range between 30 MHz and 200 MHz the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

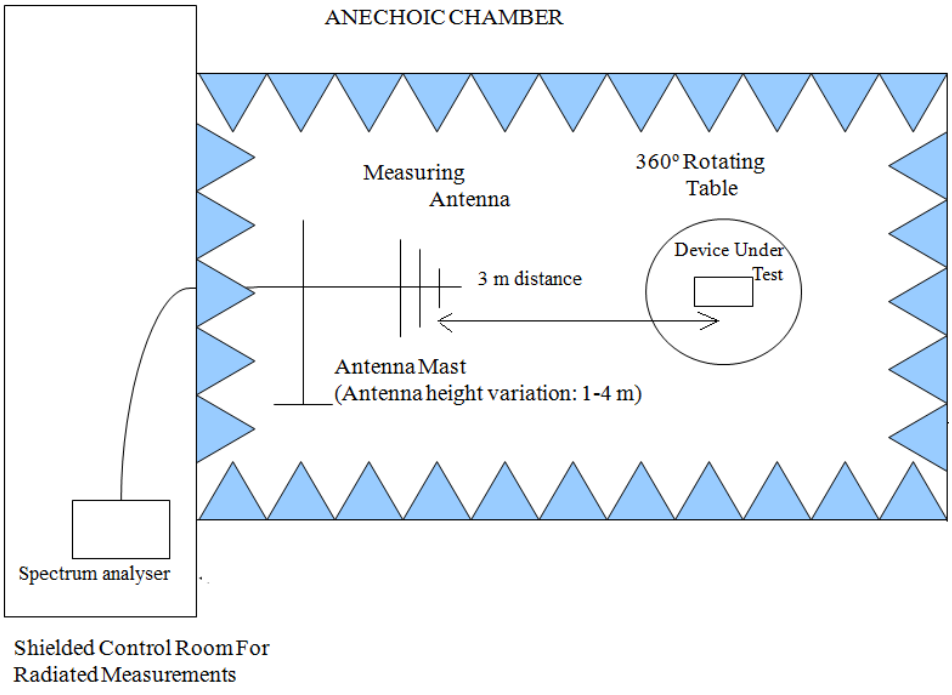
In the range between 9 kHz and 30 MHz the measurements were made in the three different orientation planes of the loop antenna to determine the maximum received field.

In the range between 30 MHz and 200 MHz the measurements were made in both horizontal and vertical planes of polarization.

Radiated measurements setup 9 kHz to 30 MHz.



Radiated measurements setup 30 MHz to 200 MHz.



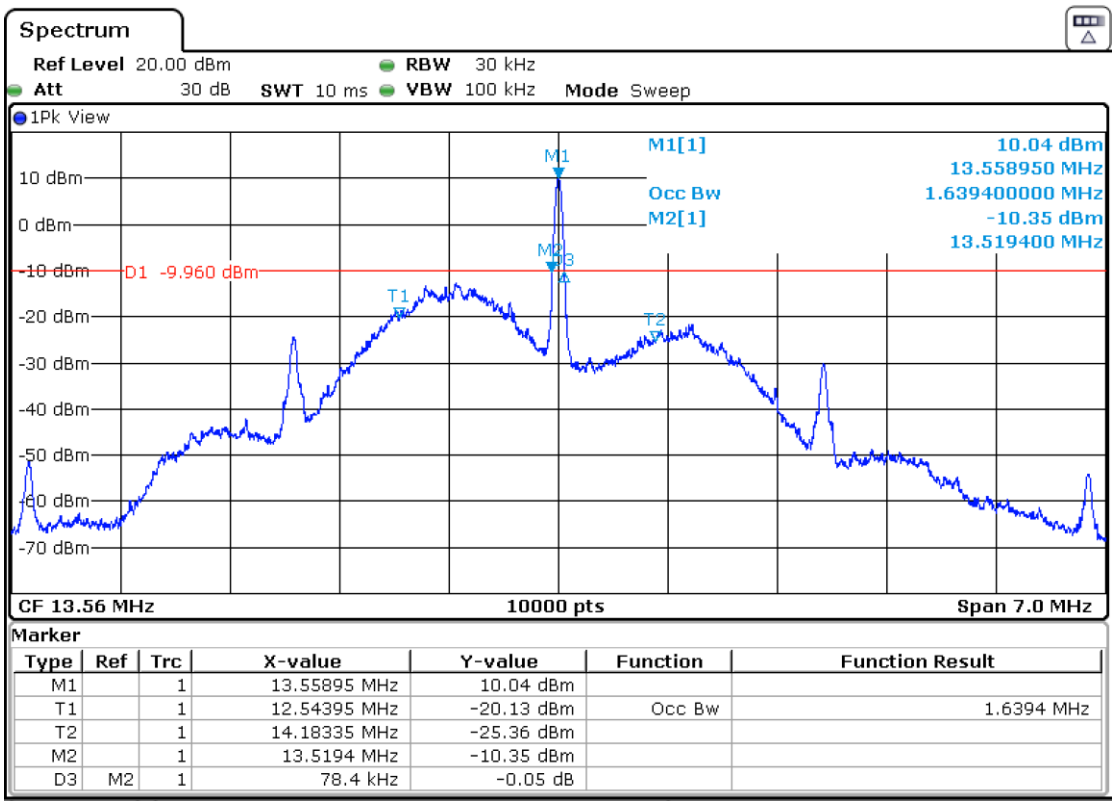
Occupied Bandwidth

RESULTS:

99 % Occupied Bandwidth and 20 dB Bandwidth.

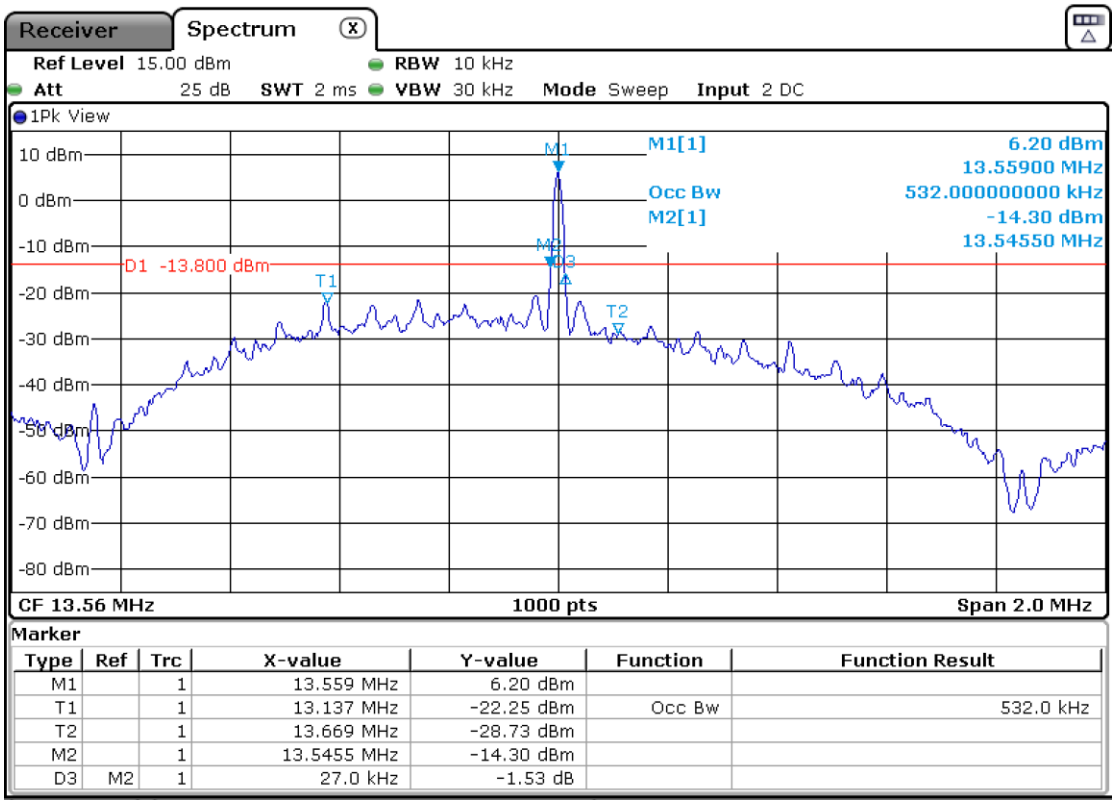
- **NFC mode ISO 14443A (worst case 848 kbps)**

Operation Mode	99% Occupied Bandwidth (kHz)	20 dB Bandwidth (kHz)
NFC mode ISO 14443A	1639.4	78.4
Measurement uncertainty (kHz)	<±0.65	



- **NFC mode ISO 14443B (worst case 848 kbps)**

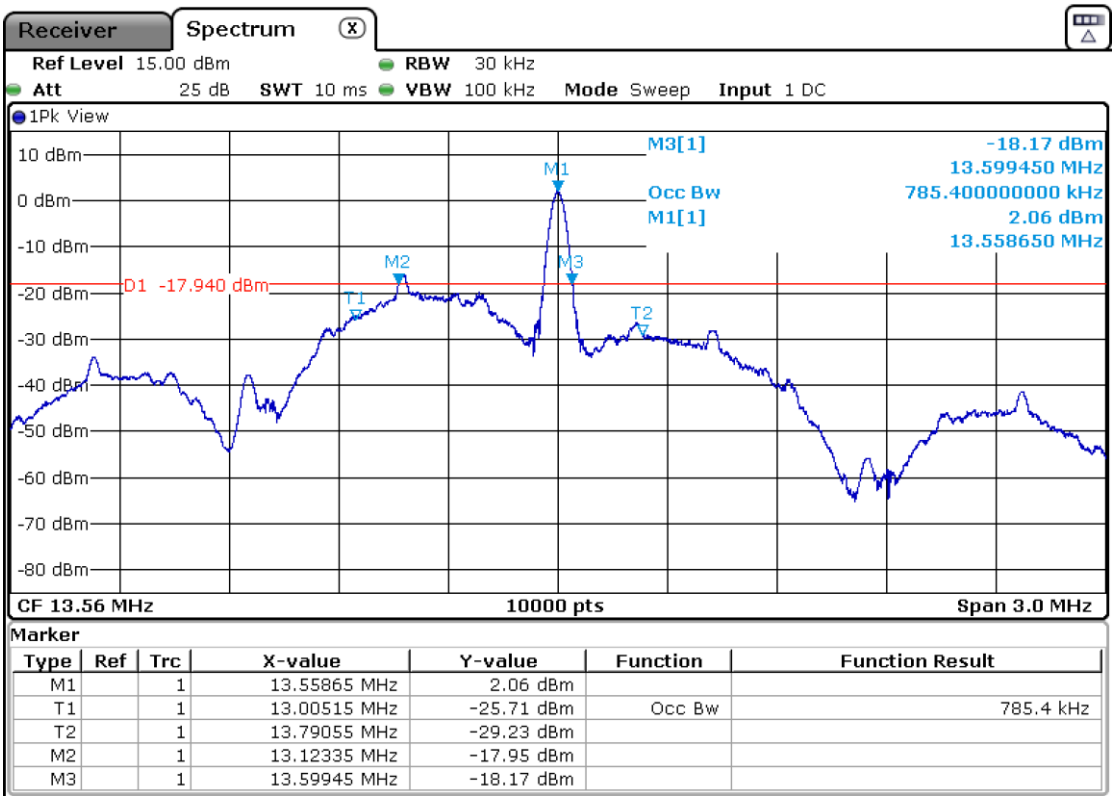
Operation Mode	99% Occupied Bandwidth (kHz)	20 dB Bandwidth (kHz)
NFC mode ISO 15693	532	27.0
Measurement uncertainty (kHz)	<±0.40	



Verdict: PASS

- **NFC mode ISO 15693 (worst case 424Kbps)**

Operation Mode	99% Occupied Bandwidth (kHz)	20 dB Bandwidth (kHz)
NFC mode ISO 15693	785.4	476.1
Measurement uncertainty (kHz)	<±0.40	



Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	13.55865 MHz	2.06 dBm		
T1		1	13.00515 MHz	-25.71 dBm	Occ Bw	785.4 kHz
T2		1	13.79055 MHz	-29.23 dBm		
M2		1	13.12335 MHz	-17.95 dBm		
M3		1	13.59945 MHz	-18.17 dBm		

Verdict: PASS

Section 15.225 Subclause (a) / RSS-210 Clause B.6 (a). Field strength of emissions within the band 13.553 -13.567 MHz

SPECIFICATION:

The field strength of any emissions within the band 13.553 – 13.567 MHz shall not exceed 15,848 microvolts/meter (84 dBµV/m) at 30 meters.

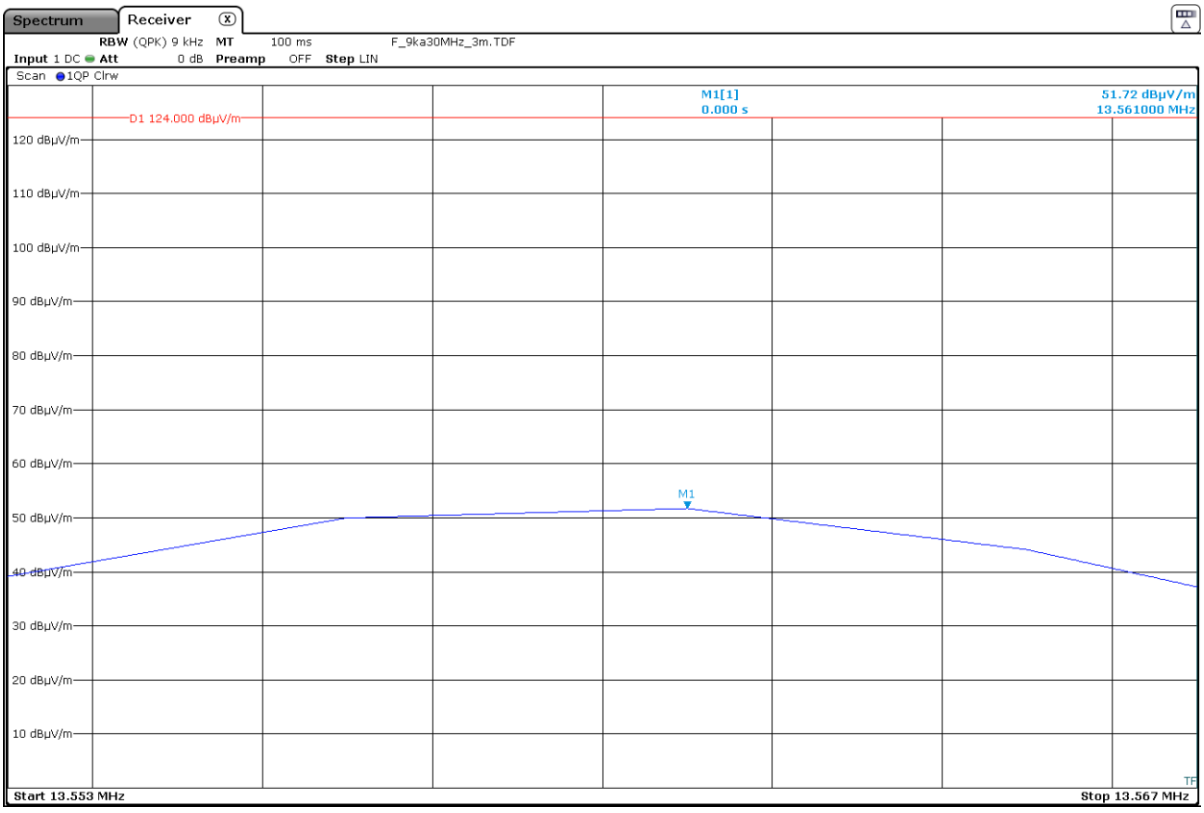
RESULTS:

Measurement distance: 3 meters.

- **NFC mode ISO 14443A (worst case 106Kbps)**

The maximum field strength of fundamental emission:

Frequency (MHz)	Maximum field strength (dBµV/m) measured at 3 m (quasi-peak detector)	Maximum field strength (dBµV/m) extrapolated to 30 m (40 dB/decade)
13.561	51.72	11.72
Measurement uncertainty (dB)	<±3.44	



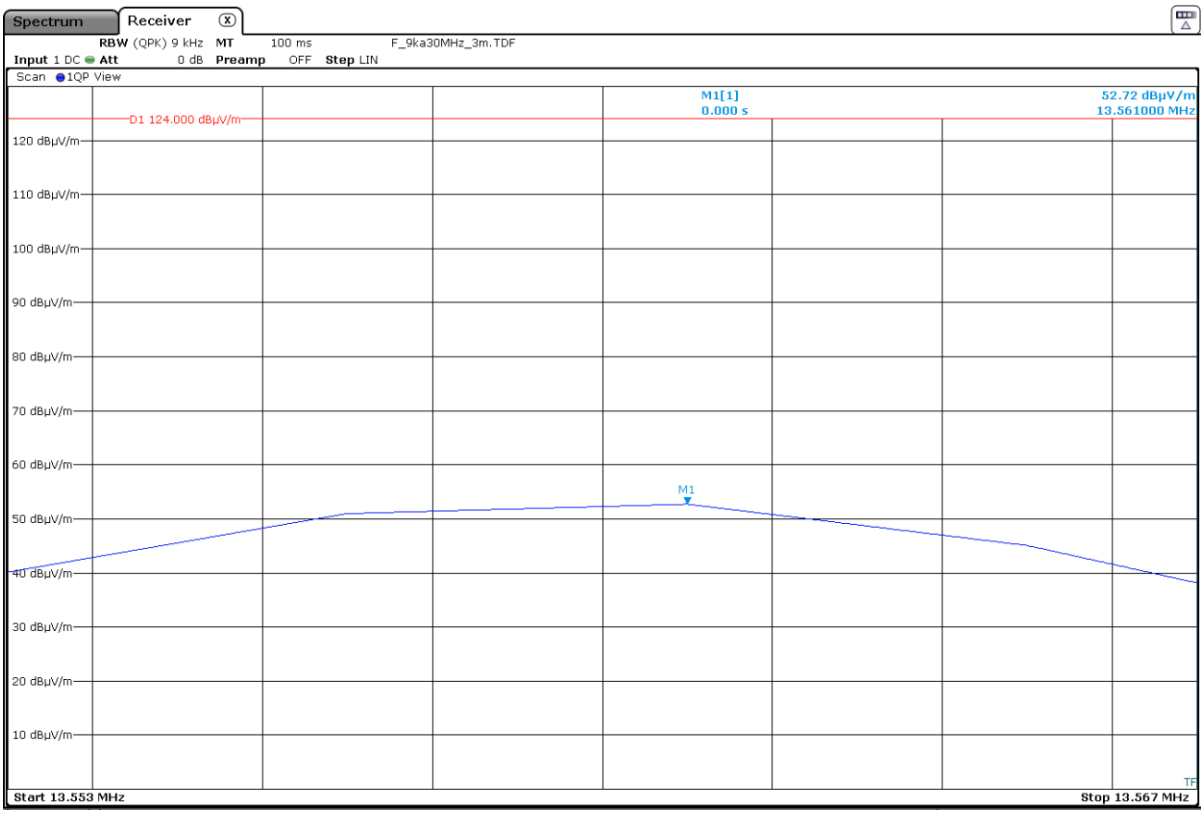
The limit shown in the above plot is extrapolated to 3 meters

Verdict: PASS

- **NFC mode ISO 14443B (worst case 106Kbps)**

The maximum field strength of fundamental emission:

Frequency (MHz)	Maximum field strength (dBµV/m) measured at 3 m (quasi-peak detector)	Maximum field strength (dBµV/m) extrapolated to 30 m (40 dB/decade)
13.561	52.72	12.72
Measurement uncertainty (dB)	<±3.44	



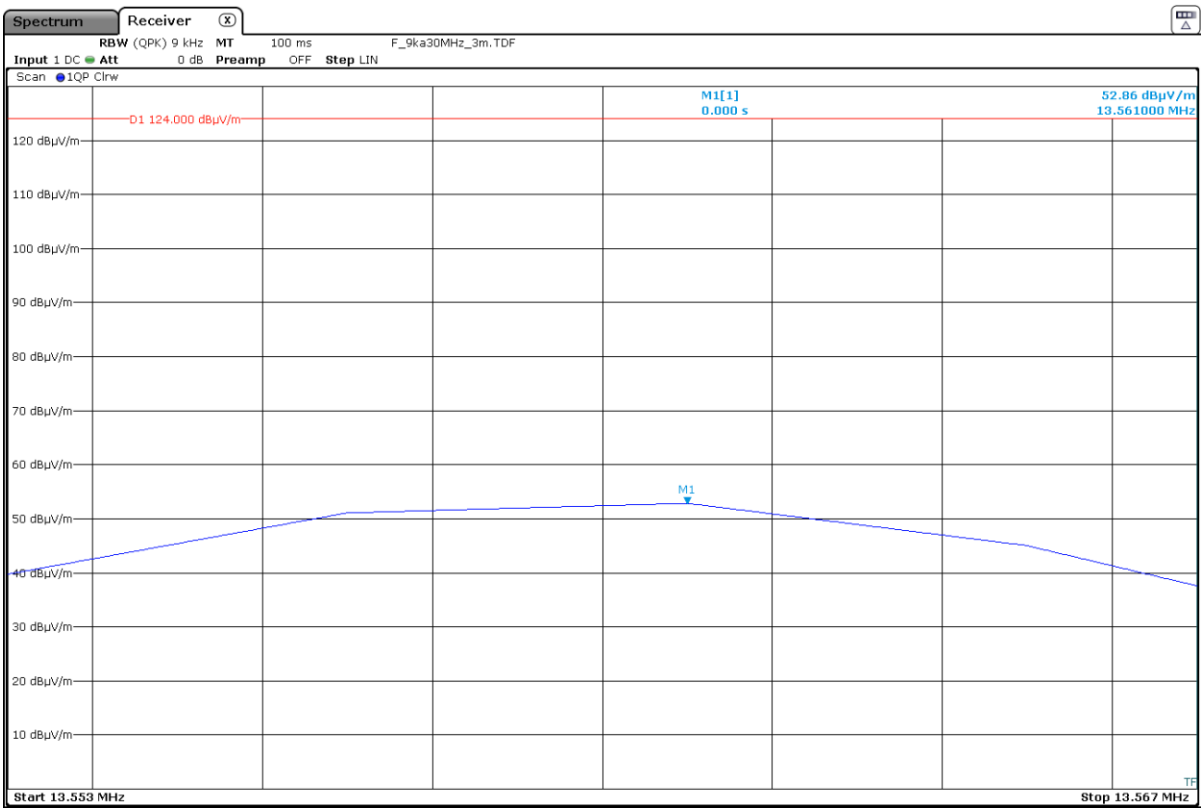
The limit shown in the above plot is extrapolated to 3 meters

Verdict: PASS

- **NFC mode ISO 15693 (worst case 212Kbps)**

The maximum field strength of fundamental emission:

Frequency (MHz)	Maximum field strength (dBµV/m) measured at 3 m (quasi-peak detector)	Maximum field strength (dBµV/m) extrapolated to 30 m (40 dB/decade)
13.561	52.86	12.86
Measurement uncertainty (dB)	<±3.44	



The limit shown in the above plot is extrapolated to 3 meters

Verdict: PASS

Section 15.225 Subclause (b) / RSS-210 Clause B.6 (b). Field strength of emissions within the band 13.410 - 13.553 MHz and 13.567 - 13.710 MHz

SPECIFICATION:

Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter (50.47 dBµV/m) at 30 meters.

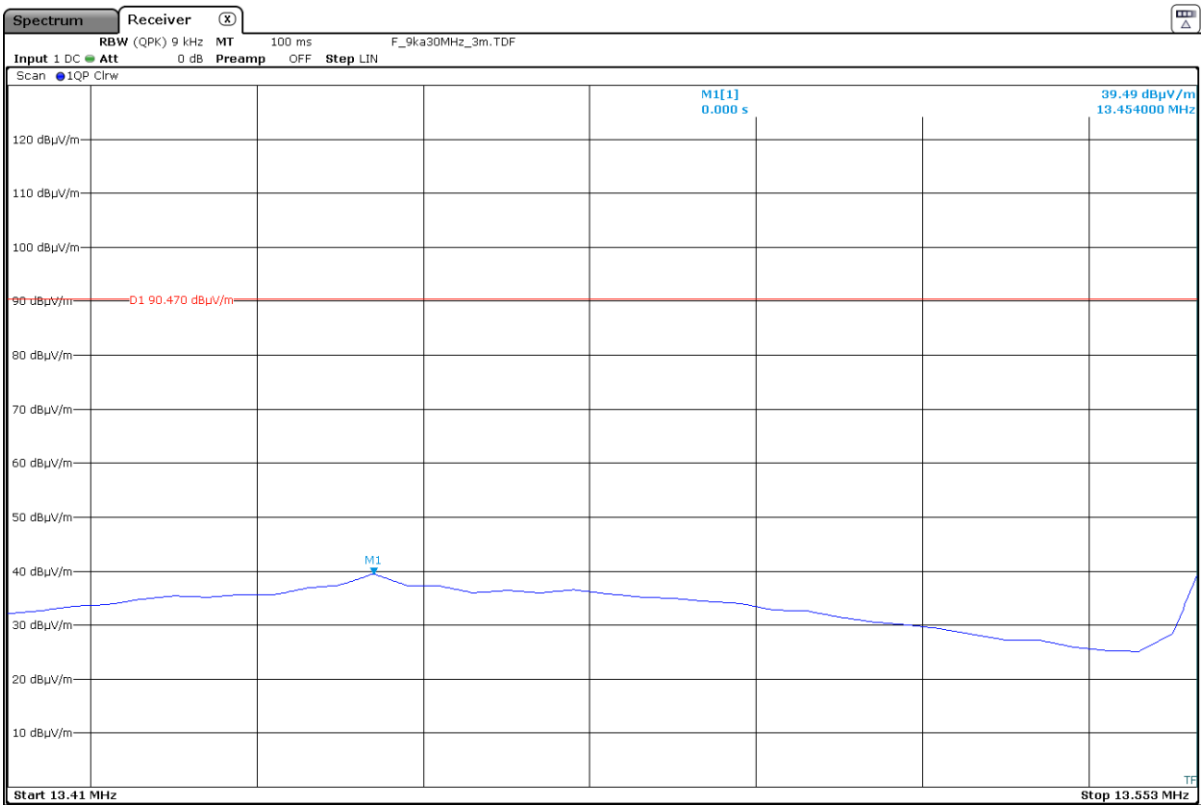
RESULTS:

Measurement distance: 3 meters.

- Band 13.410 - 13.553 MHz

- **NFC mode ISO 14443A (worst case 106Kbps)**

Frequency (MHz)	Maximum field strength (dBµV/m) measured at 3 m (quasi-peak detector)	Maximum field strength (dBµV/m) extrapolated to 30 m (40 dB/decade)
13.454	39.49	-0.51
Measurement uncertainty (dB)	<±3.44	

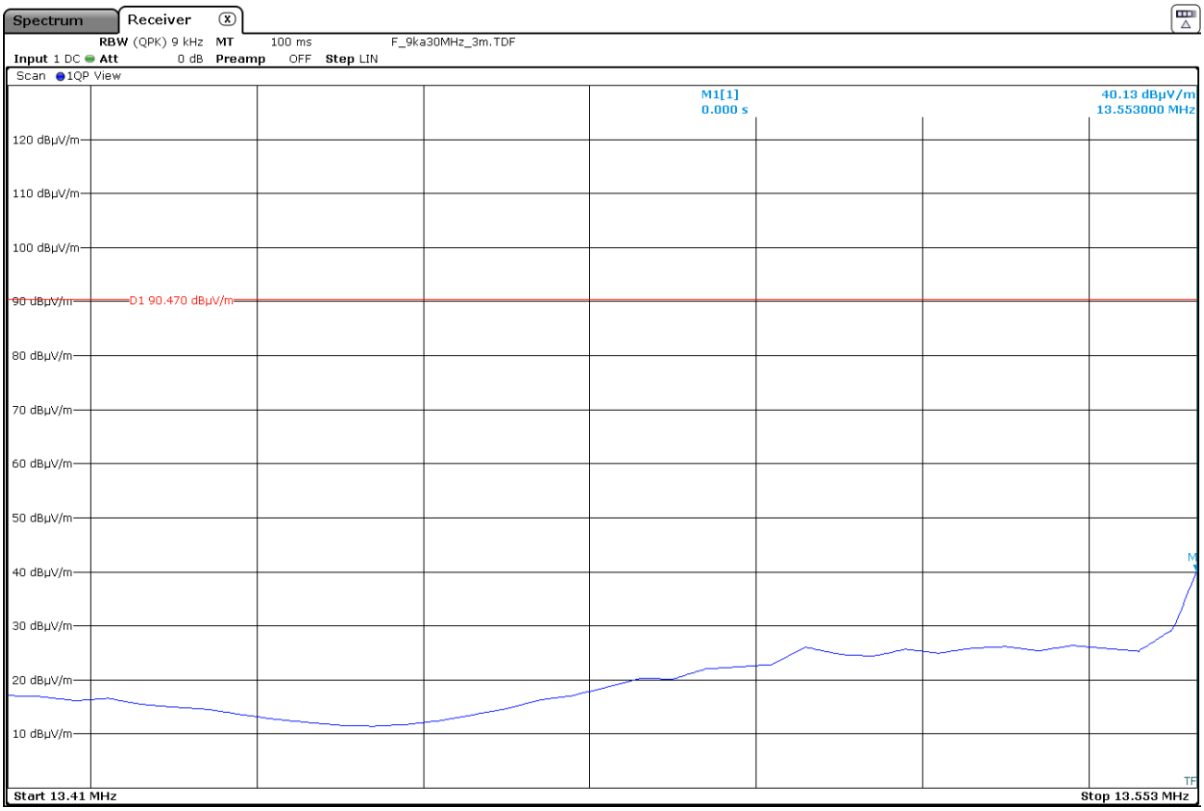


The limit shown in the above plot is extrapolated to 3 meters

Verdict: PASS

- **NFC mode ISO 14443B (worst case 106Kbps)**

Frequency (MHz)	Maximum field strength (dBµV/m) measured at 3 m (quasi-peak detector)	Maximum field strength (dBµV/m) extrapolated to 30 m (40 dB/decade)
13.553	40.13	0.13
Measurement uncertainty (dB)	<±3.44	

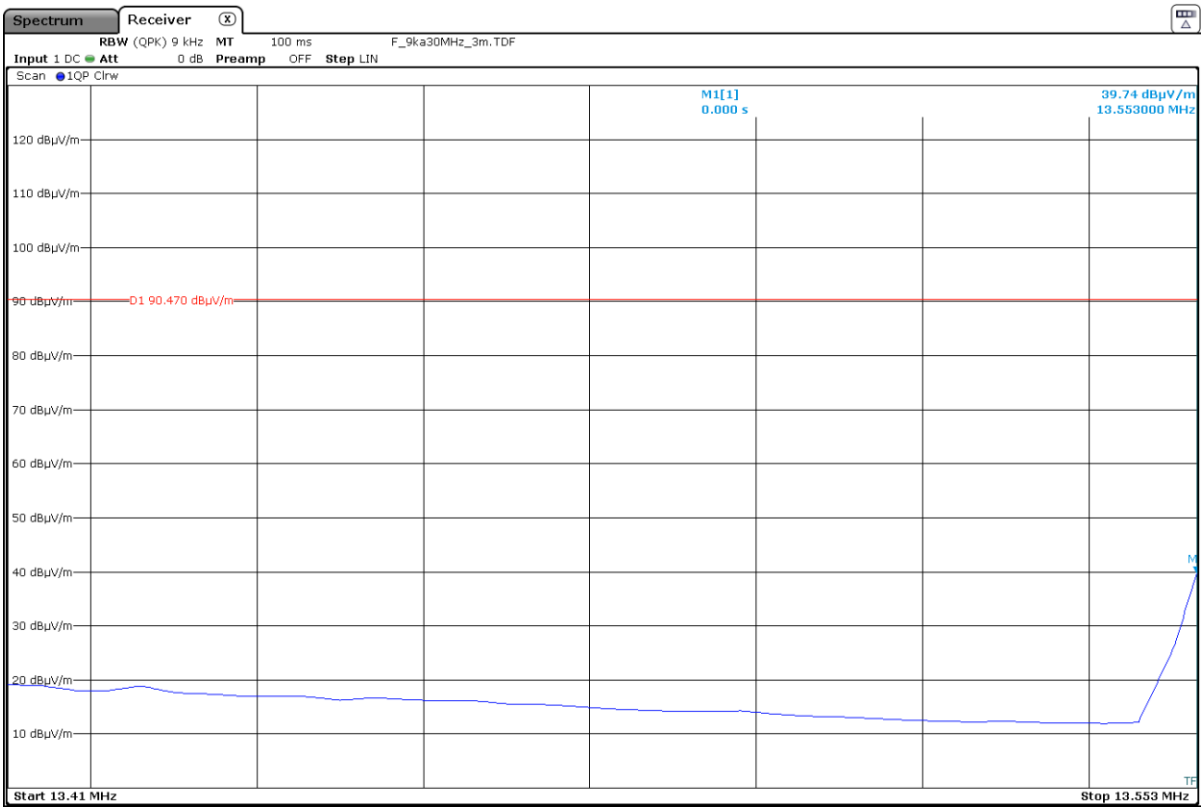


The limit shown in the above plot is extrapolated to 3 meters

Verdict: PASS

- **NFC mode ISO 15693 (worst case 212Kbps)**

Frequency (MHz)	Maximum field strength (dBµV/m) measured at 3 m (quasi-peak detector)	Maximum field strength (dBµV/m) extrapolated to 30 m (40 dB/decade)
13.553	39.74	-0.26
Measurement uncertainty (dB)	<±3.44	



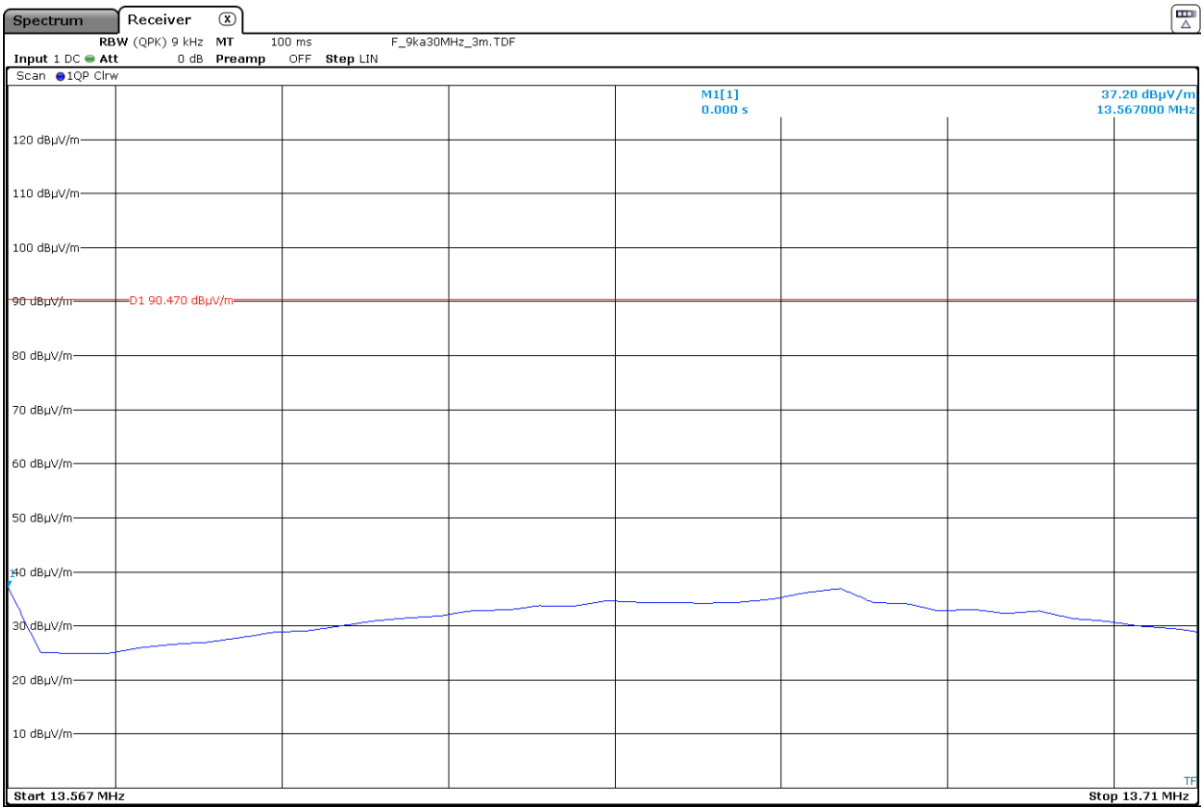
The limit shown in the above plot is extrapolated to 3 meters

Verdict: PASS

- Band 13.567-13.710 MHz

- **NFC mode ISO 14443A (worst case 106Kbps)**

Frequency (MHz)	Maximum field strength (dBµV/m) measured at 3 m (quasi-peak detector)	Maximum field strength (dBµV/m) extrapolated to 30 m (40 dB/decade)
13.567	37.2	-2.8
Measurement uncertainty (dB)	<±3.44	

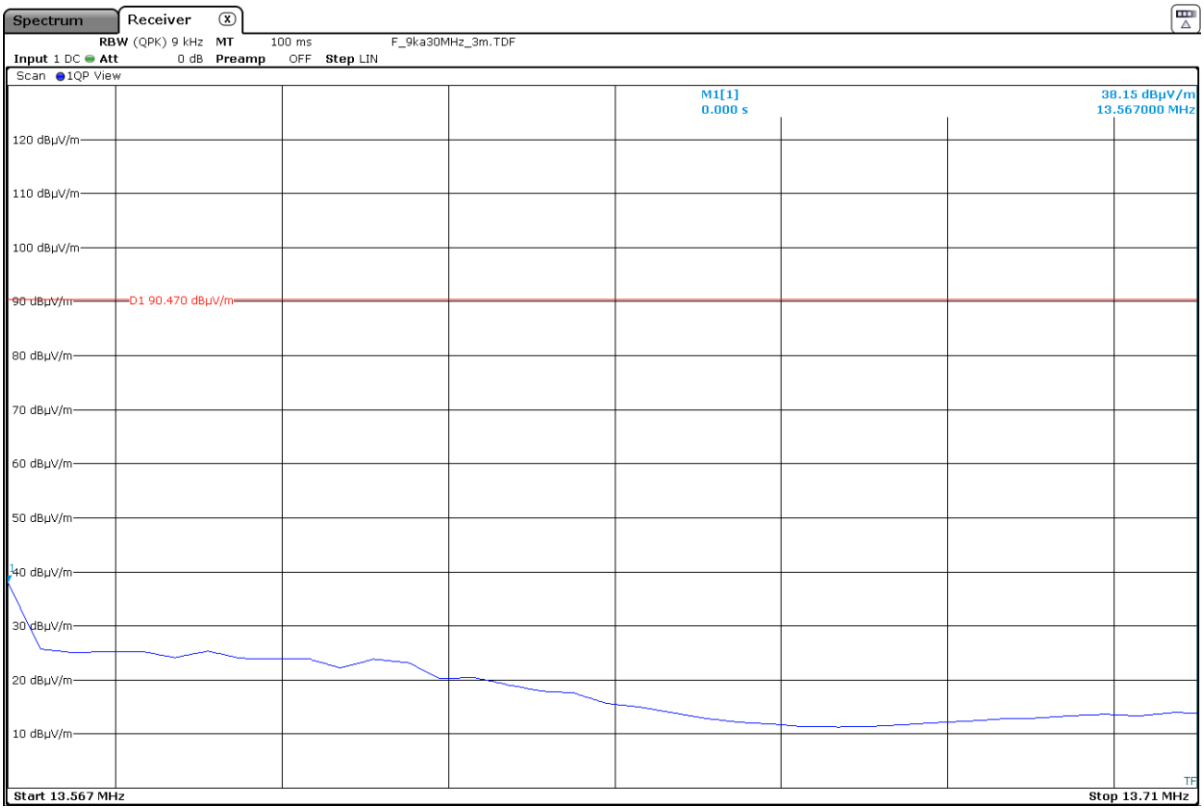


The limit shown in the above plot is extrapolated to 3 meters

Verdict: PASS

- **NFC mode ISO 14443B (worst case 106Kbps)**

Frequency (MHz)	Maximum field strength (dBµV/m) measured at 3 m (quasi-peak detector)	Maximum field strength (dBµV/m) extrapolated to 30 m (40 dB/decade)
13.567	38.15	-1.85
Measurement uncertainty (dB)	<±3.44	

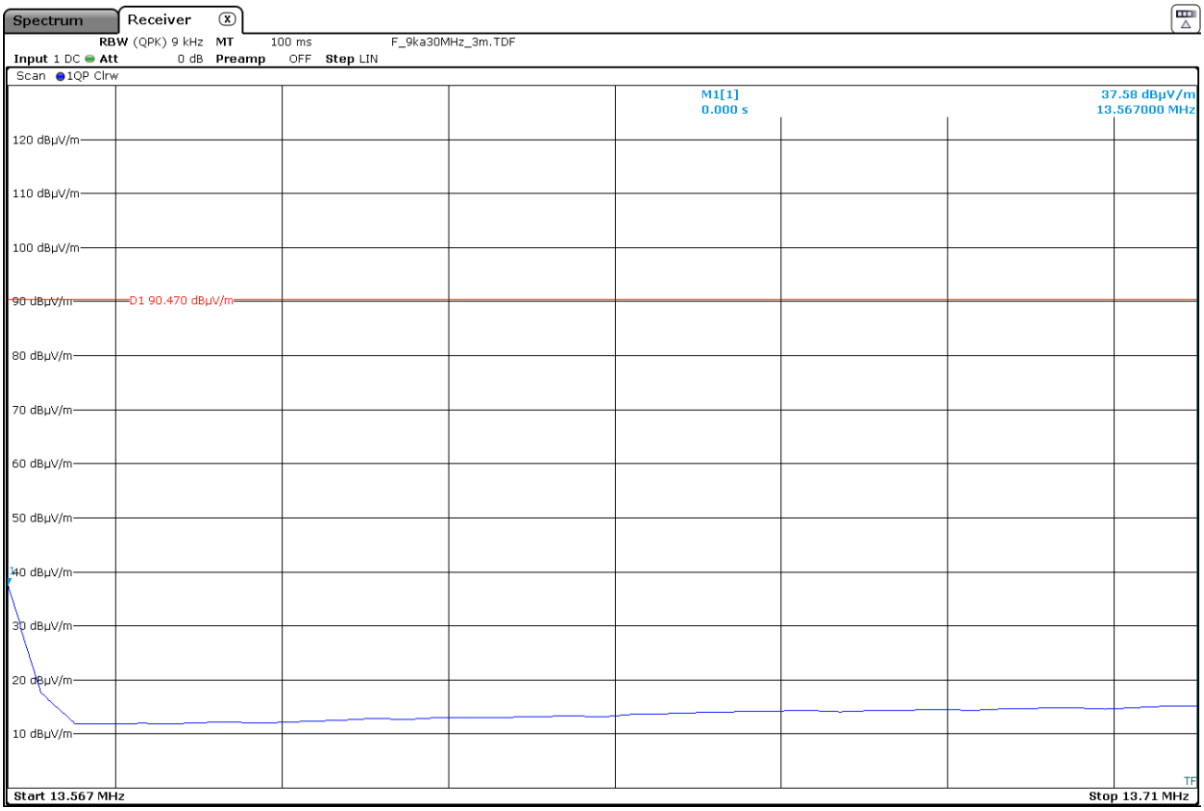


The limit shown in the above plot is extrapolated to 3 meters

Verdict: PASS

- **NFC mode ISO 15693 (worst case 212Kbps)**

Frequency (MHz)	Maximum field strength (dBµV/m) measured at 3 m (quasi-peak detector)	Maximum field strength (dBµV/m) extrapolated to 30 m (40 dB/decade)
13.567	37.58	-2.42
Measurement uncertainty (dB)	<±3.44	



The limit shown in the above plot is extrapolated to 3 meters

Verdict: PASS

Section 15.225 Subclause (c) / RSS-210 Clause B.6 (c). Field strength of emissions within the band 13.110 - 13.410 MHz and 13.710 - 14.010 MHz

SPECIFICATION:

Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz, the field strength of any emissions shall not exceed 106 microvolts/meter (40.51 dBµV/m) at 30 meters.

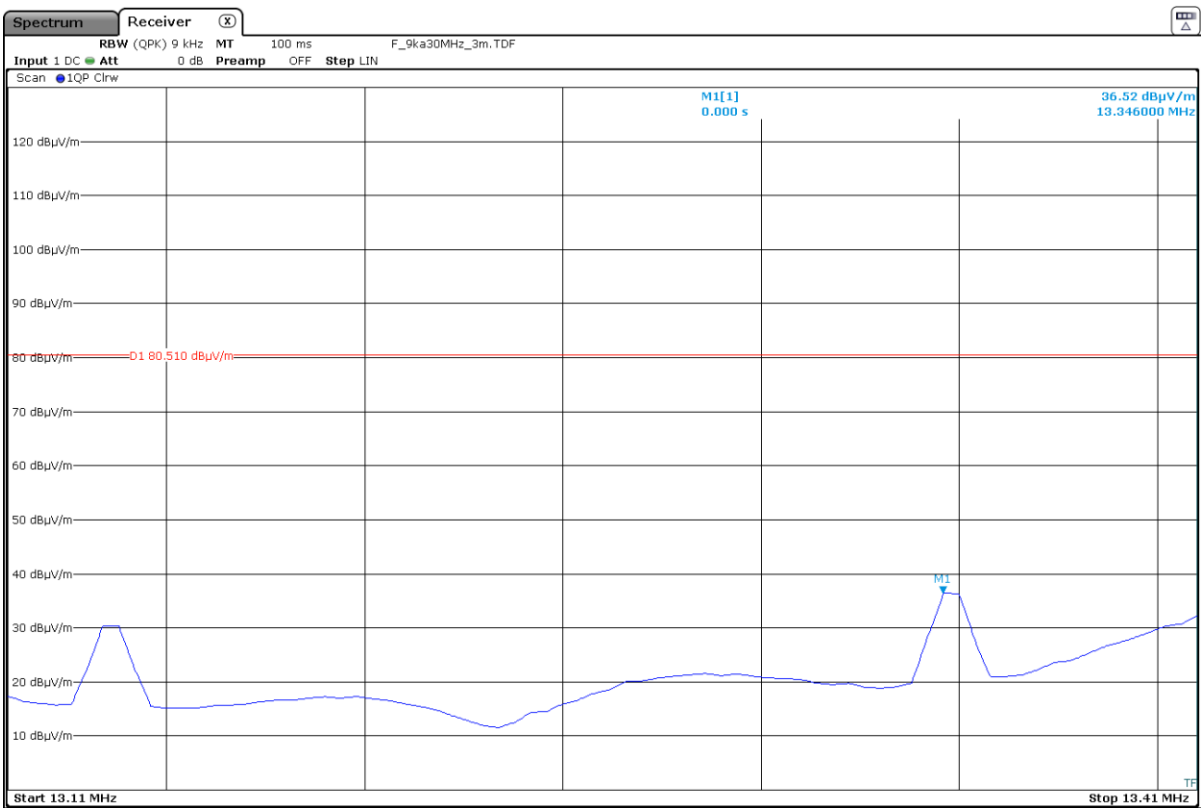
RESULTS:

Measurement distance: 3 meters.

- Band 13.110-13.410 MHz

- **NFC mode ISO 14443A (worst case 106Kbps)**

Frequency (MHz)	Maximum field strength (dBµV/m) measured at 3 m (quasi-peak detector)	Maximum field strength (dBµV/m) extrapolated to 30 m (40 dB/decade)
13.346	36.52	-3.48
Measurement uncertainty (dB)	<±3.44	

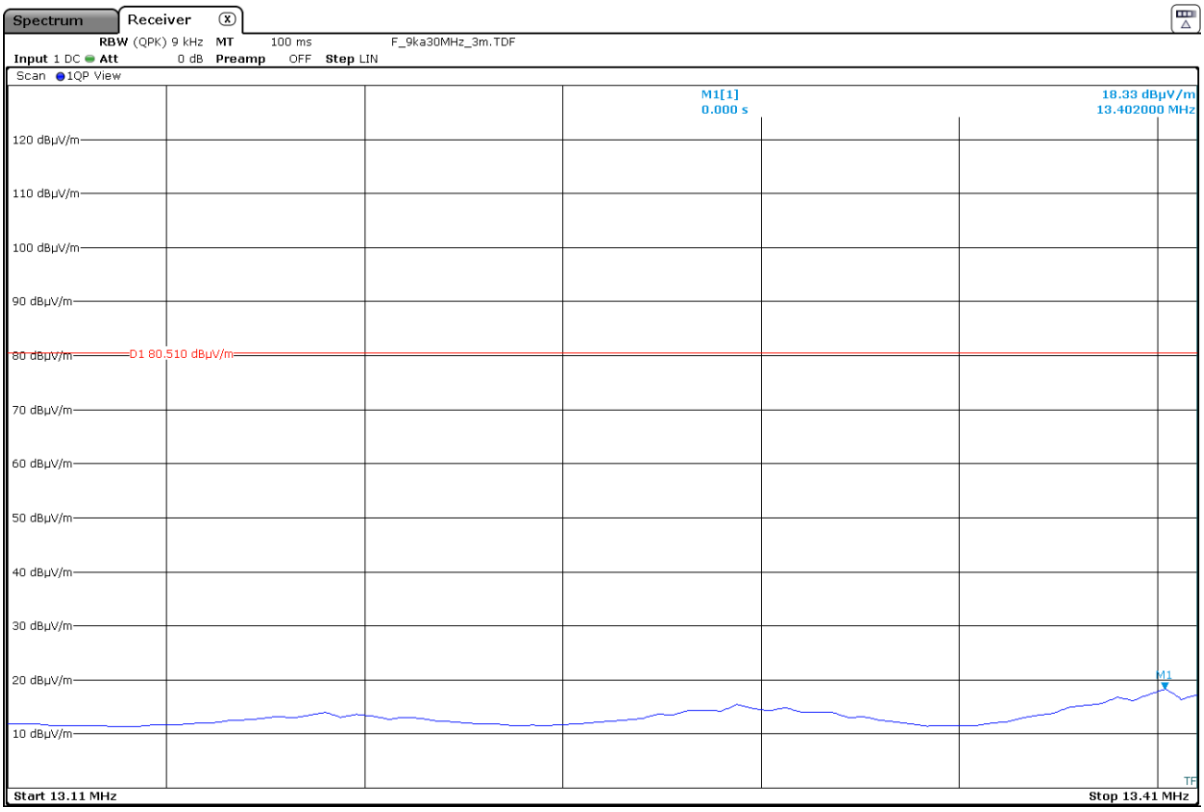


The limit shown in the above plot is extrapolated to 3 meters

Verdict: PASS

- **NFC mode ISO 14443B (worst case 106Kbps)**

Frequency (MHz)	Maximum field strength (dBµV/m) measured at 3 m (quasi-peak detector)	Maximum field strength (dBµV/m) extrapolated to 30 m (40 dB/decade)
13.402	18.33	-21.67
Measurement uncertainty (dB)	<±3.44	

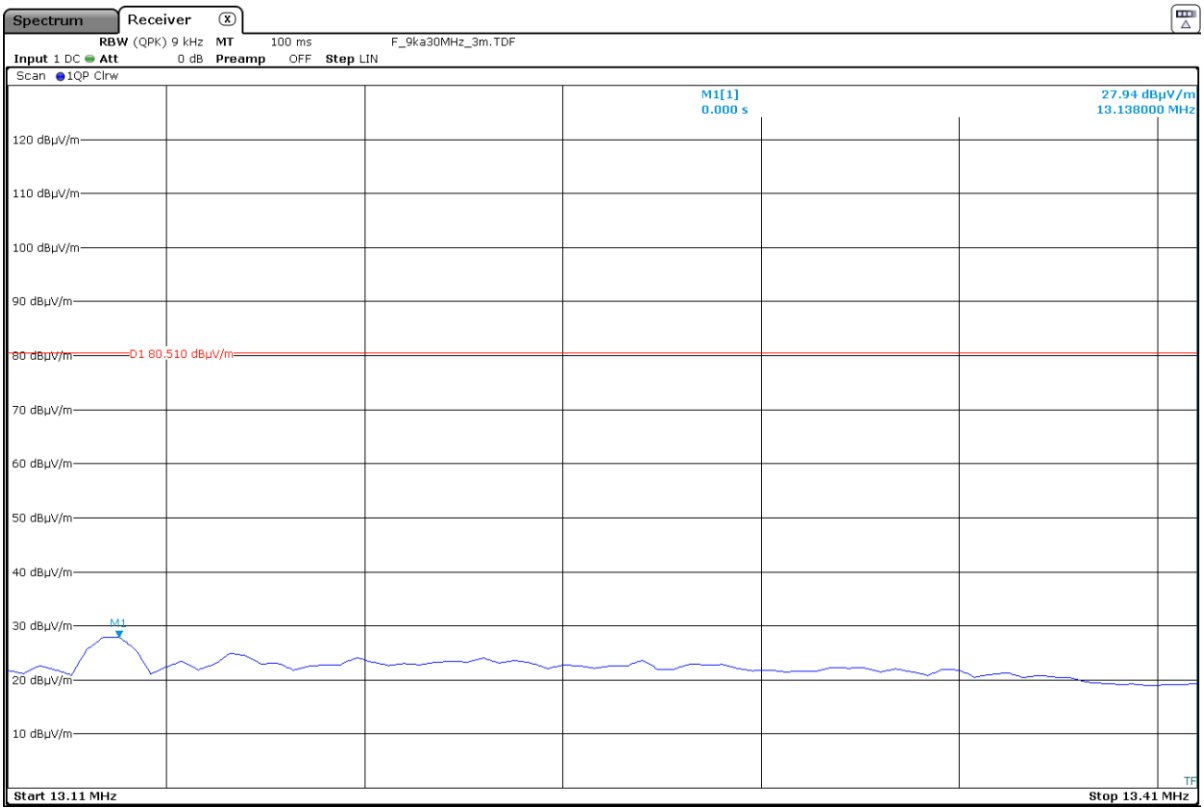


The limit shown in the above plot is extrapolated to 3 meters

Verdict: PASS

- **NFC mode ISO 15693 (worst case 212Kbps)**

Frequency (MHz)	Maximum field strength (dBµV/m) measured at 3 m (quasi-peak detector)	Maximum field strength (dBµV/m) extrapolated to 30 m (40 dB/decade)
13.138	27.94	-12.06
Measurement uncertainty (dB)	<±3.44	



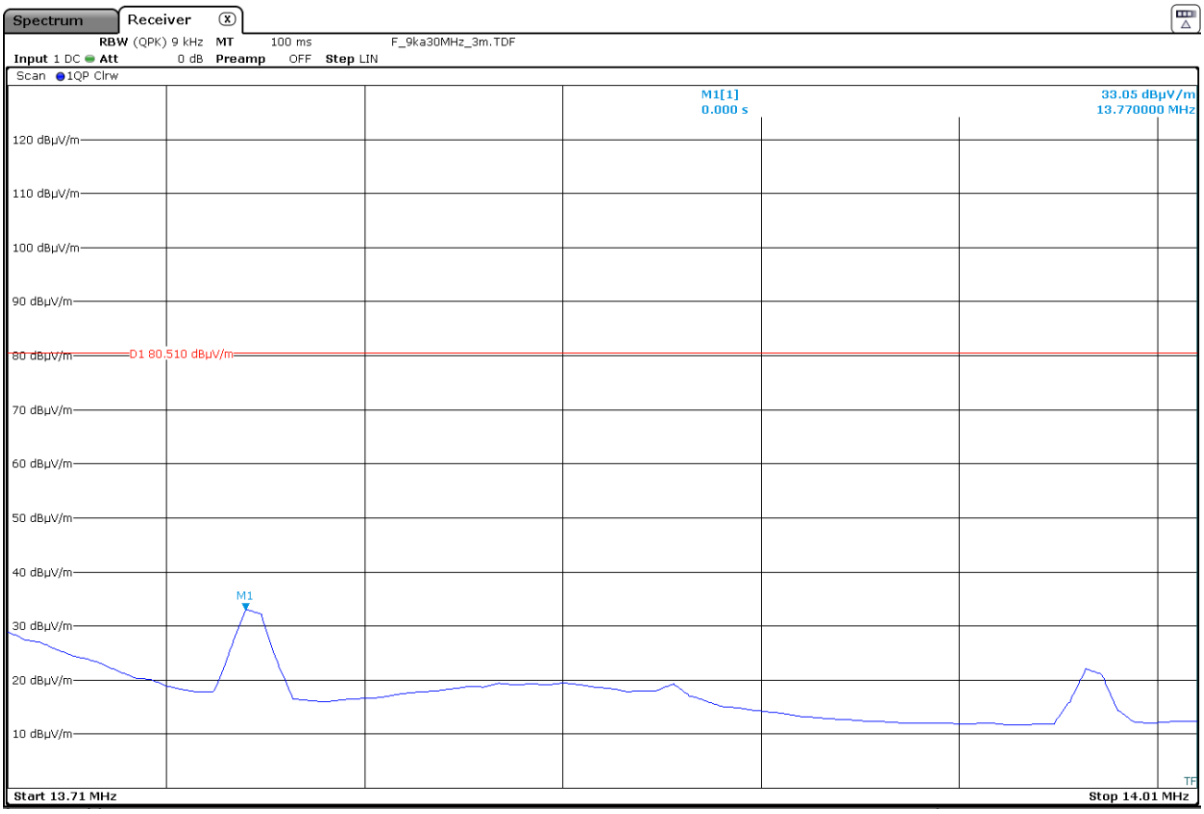
The limit shown in the above plot is extrapolated to 3 meters

Verdict: PASS

- Band 13.710-14.010 MHz

- **NFC mode ISO 14443A (worst case 106Kbps)**

Frequency (MHz)	Maximum field strength (dBµV/m) measured at 3 m (quasi-peak detector)	Maximum field strength (dBµV/m) extrapolated to 30 m (40 dB/decade)
13.770	33.05	-6.95
Measurement uncertainty (dB)	±3.44	

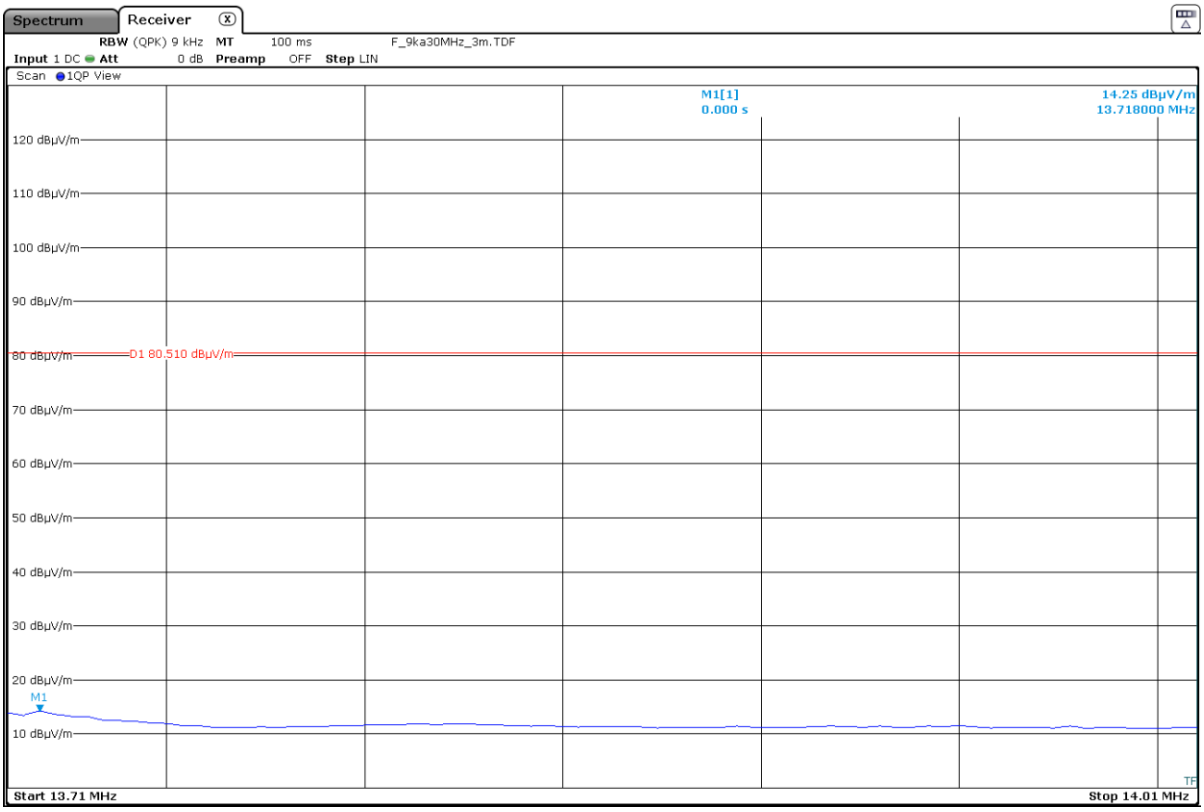


The limit shown in the above plot is extrapolated to 3 meters

Verdict: PASS

- **NFC mode ISO 14443B (worst case 106Kbps)**

Frequency (MHz)	Maximum field strength (dBµV/m) measured at 3 m (quasi-peak detector)	Maximum field strength (dBµV/m) extrapolated to 30 m (40 dB/decade)
13.718	14.25	-25.75
Measurement uncertainty (dB)	±3.44	

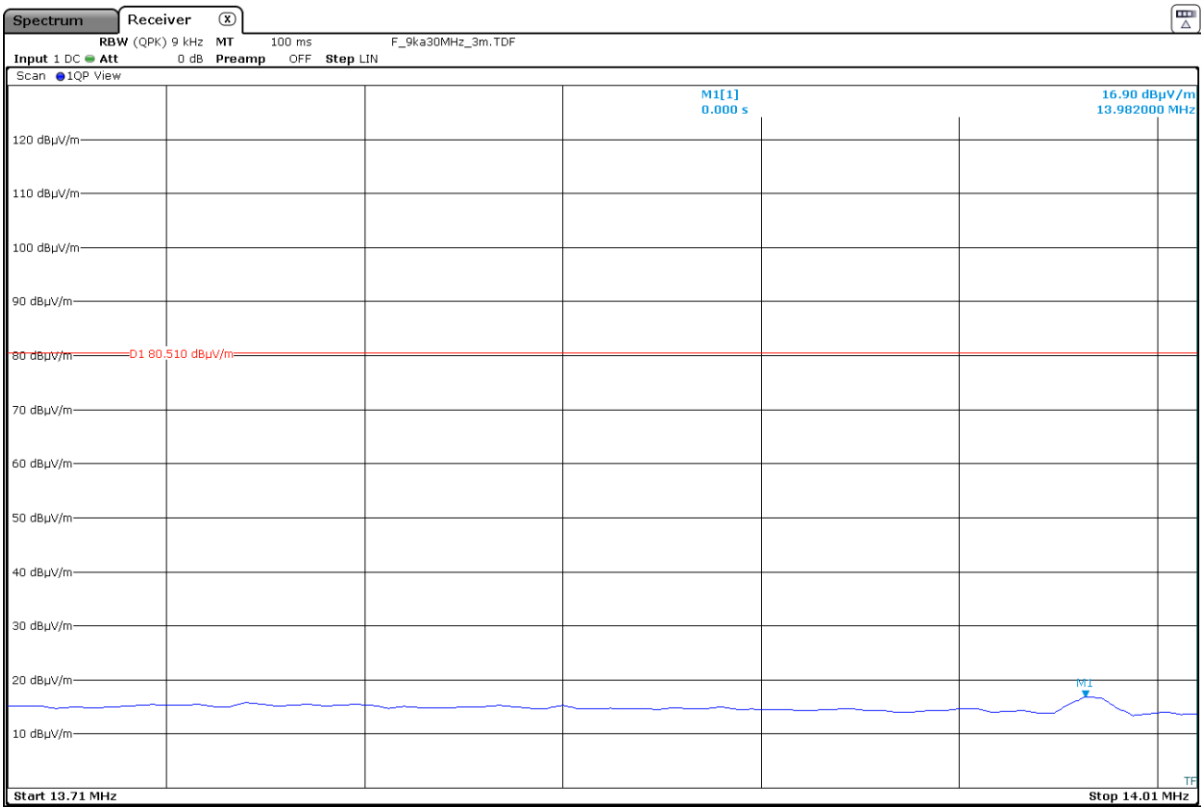


The limit shown in the above plot is extrapolated to 3 meters

Verdict: PASS

- **NFC mode ISO 15693 (worst case 212Kbps)**

Frequency (MHz)	Maximum field strength (dBµV/m) measured at 3 m (quasi-peak detector)	Maximum field strength (dBµV/m) extrapolated to 30 m (40 dB/decade)
13.982	16.9	-23.1
Measurement uncertainty (dB)	±3.44	



The limit shown in the above plot is extrapolated to 3 meters

Verdict: PASS

Section 15.225 Subclause (d) / RSS-210 Clause B.6 (d). Field strength of emissions outside of the band 13.110 - 14.010 MHz

SPECIFICATION:

Field strength of any emissions appearing outside of the band 13.110 MHz - 14.010 MHz band shall not exceed the general radiated emission limits in 15.209/RSS-Gen:

Frequency Range (MHz)	Field strength (µV/m)	Field strength (dBµV/m)	Measurement distance (m)
0.009-0.490	2400/F(kHz)	-	300
0.490-1.705	24000/F(kHz)	-	30
1.705 - 30.0	30	29.54	30
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
Above 960	500	54	3

RESULTS:

All tests were performed in a semi-anechoic chamber at a distance of 3 m.

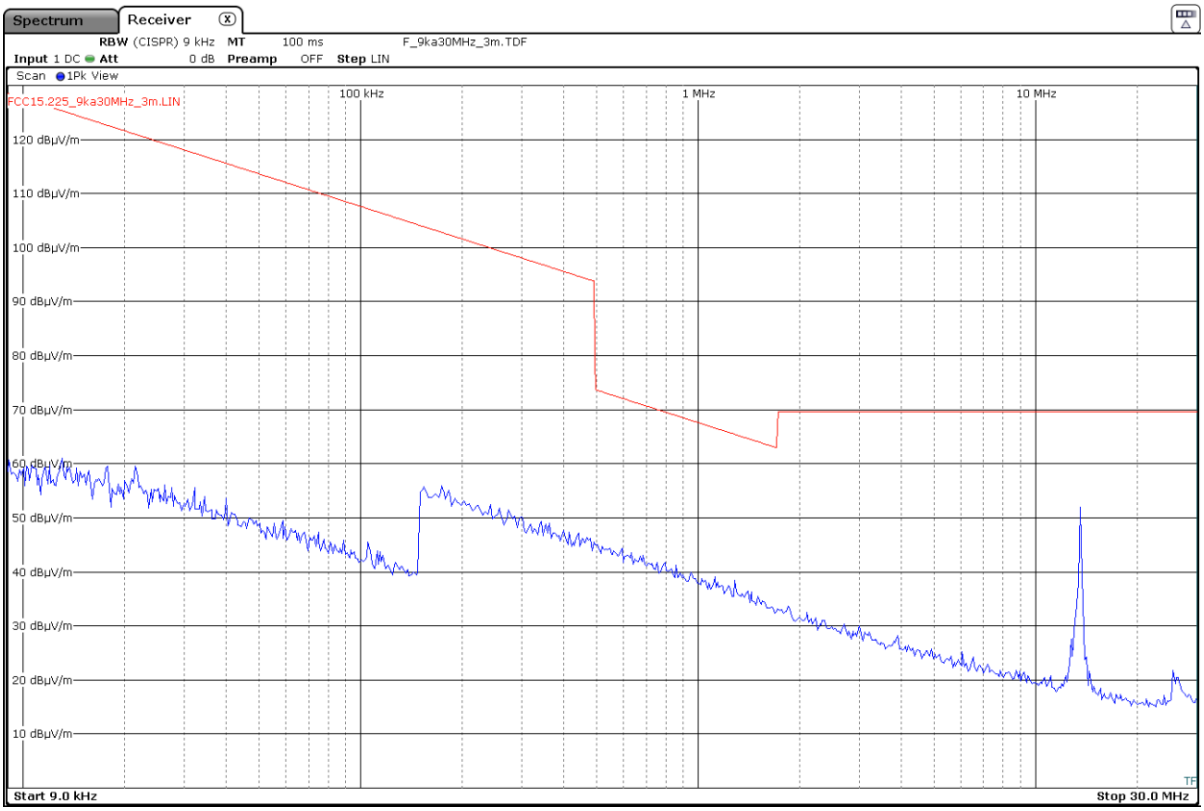
The spectrum was inspected from 9 kHz to 200 MHz searching for spurious signals.

The field strength is calculated by adding correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifier gain.

- Frequency range 9 kHz - 30 MHz:

- **NFC mode ISO 14443A (worst case 106Kbps)**

No spurious frequencies were found at less than 20 dB of the limit.

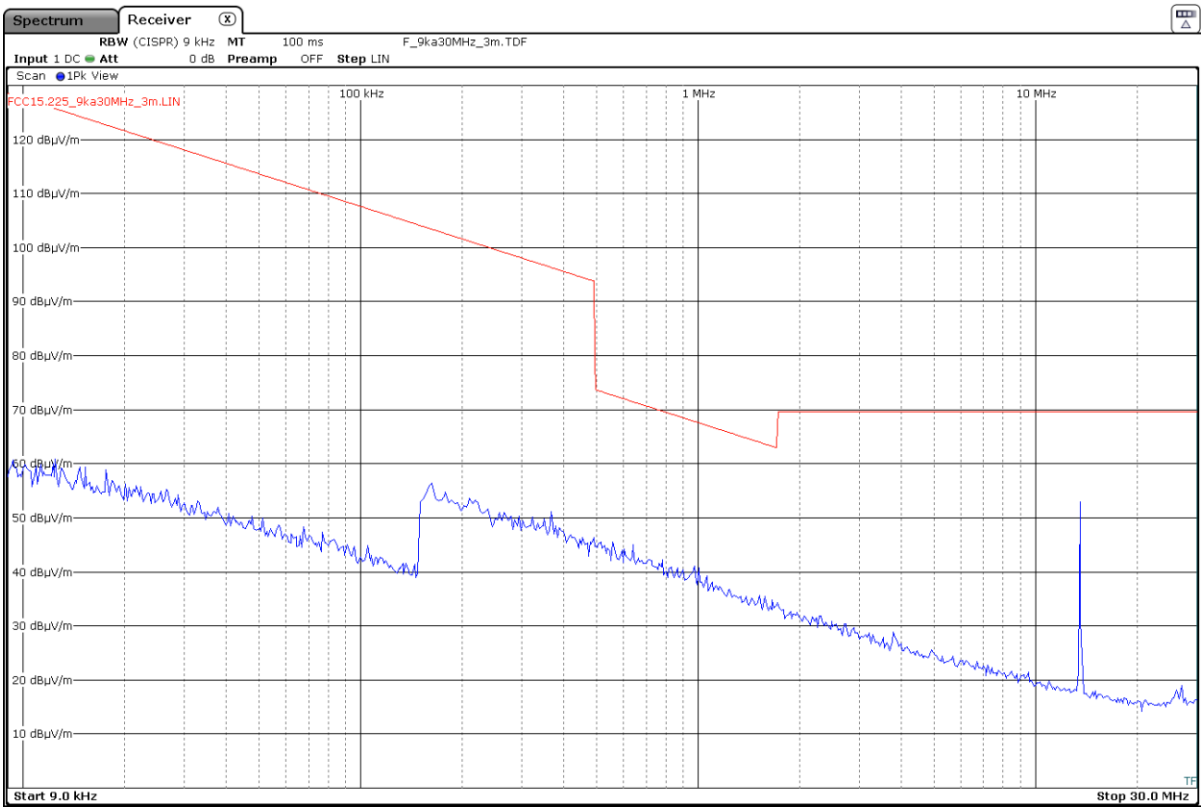


The limits shown in the above plot are extrapolated to 3 meters. The highest peak corresponds to the carrier level.

Resolution bandwidth:
200 Hz for 9 kHz ≤ f ≤ 150 kHz
9 kHz for 150 kHz ≤ f ≤ 30 MHz

- **NFC mode ISO 14443B (worst case 106Kbps)**

No spurious frequencies were found at less than 20 dB of the limit.

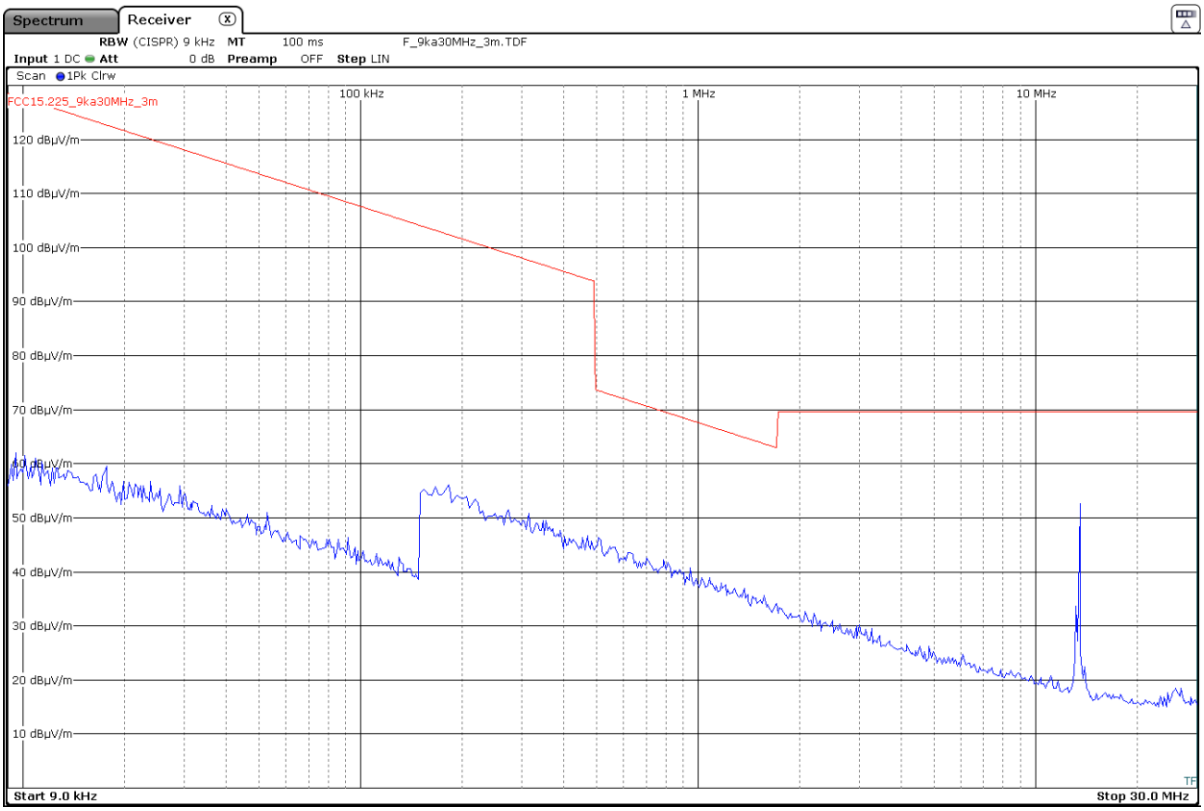


The limits shown in the above plot are extrapolated to 3 meters. The highest peak corresponds to the carrier level.

Resolution bandwidth:
200 Hz for 9 kHz ≤ f ≤ 150 kHz
9 kHz for 150 kHz ≤ f ≤ 30 MHz

- **NFC mode ISO 15693 (worst case 212Kbps)**

No spurious frequencies were found at less than 20 dB of the limit.



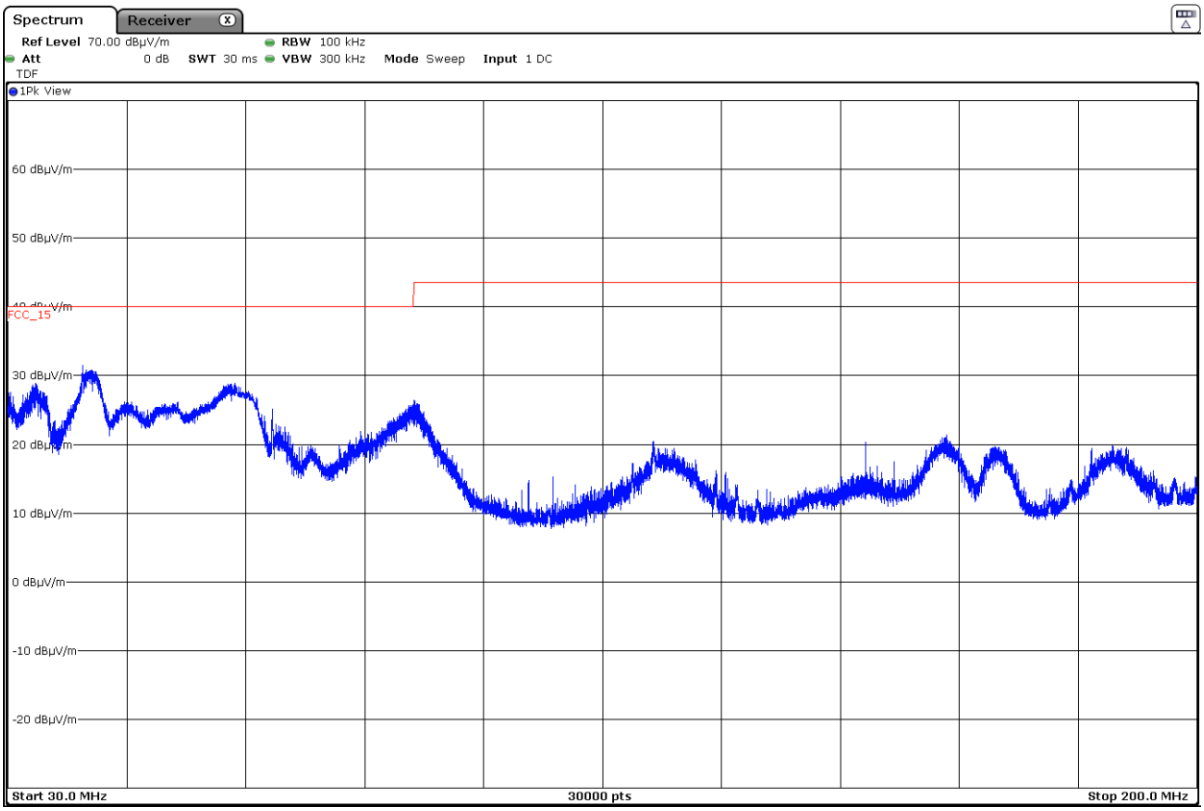
The limits shown in the above plot are extrapolated to 3 meters. The highest peak corresponds to the carrier level.

Resolution bandwidth:
200 Hz for 9 kHz ≤ f ≤ 150 kHz
9 kHz for 150 kHz ≤ f ≤ 30 MHz

- Frequency range 30 - 200 MHz

- **NFC mode ISO 14443A (worst case 106Kbps)**

Spurious frequency (MHz)	Detector	Emission Level (dBµV/m)	Polarization	Measurement Uncertainty (dB)
33.9072	Quasi peak	23.1	V	<± 3.88
40.7355	Quasi peak	26.6	V	<± 3.88
67.8108	Quasi peak	22.9	V	<± 3.88

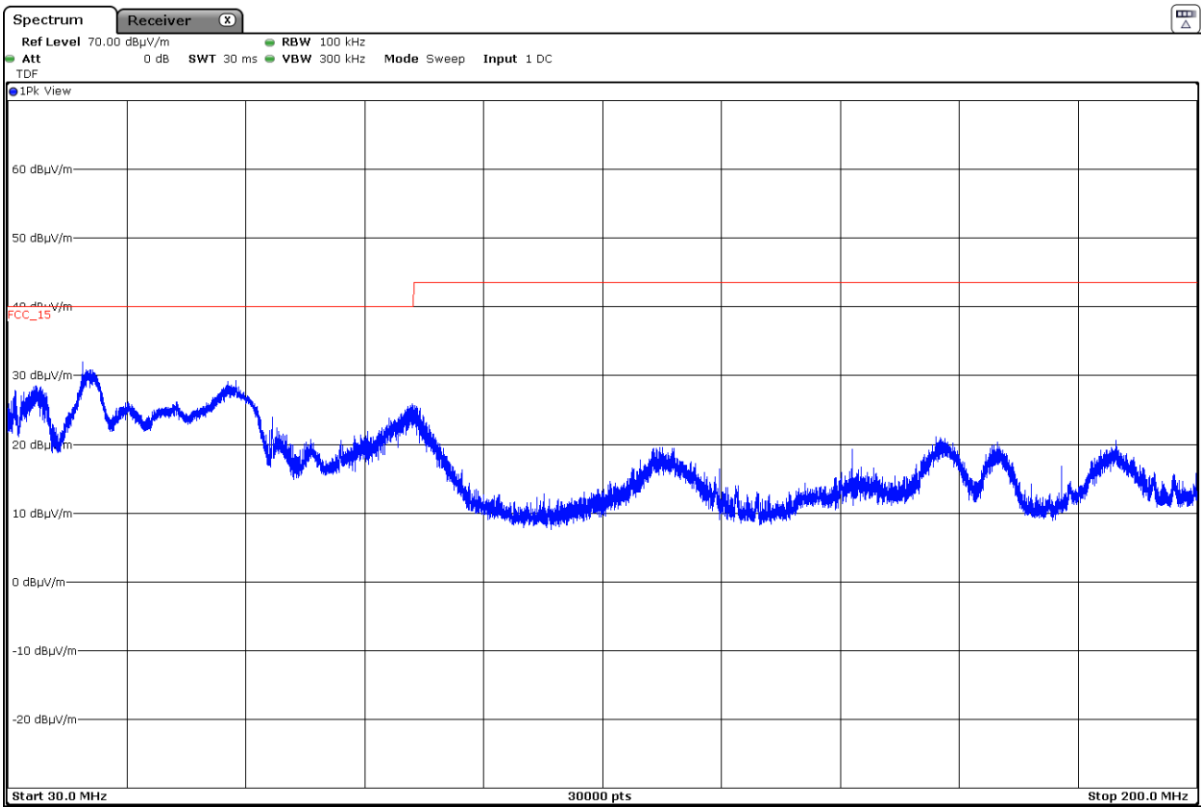


The above plot shows the results of the scan using peak detector.

Verdict: PASS

- **NFC mode ISO 14443B (worst case 106Kbps)**

Spurious frequency (MHz)	Detector	Emission Level (dBµV/m)	Polarization	Measurement Uncertainty (dB)
34.0148	Quasi peak	22.9	V	<± 3.88
40.6732	Quasi peak	28.2	V	<± 3.88
62.6145	Quasi peak	26.0	V	<± 3.88
67.7995	Quasi peak	22.9	V	<± 3.88
87.7972	Quasi peak	21.3	V	<± 3.88

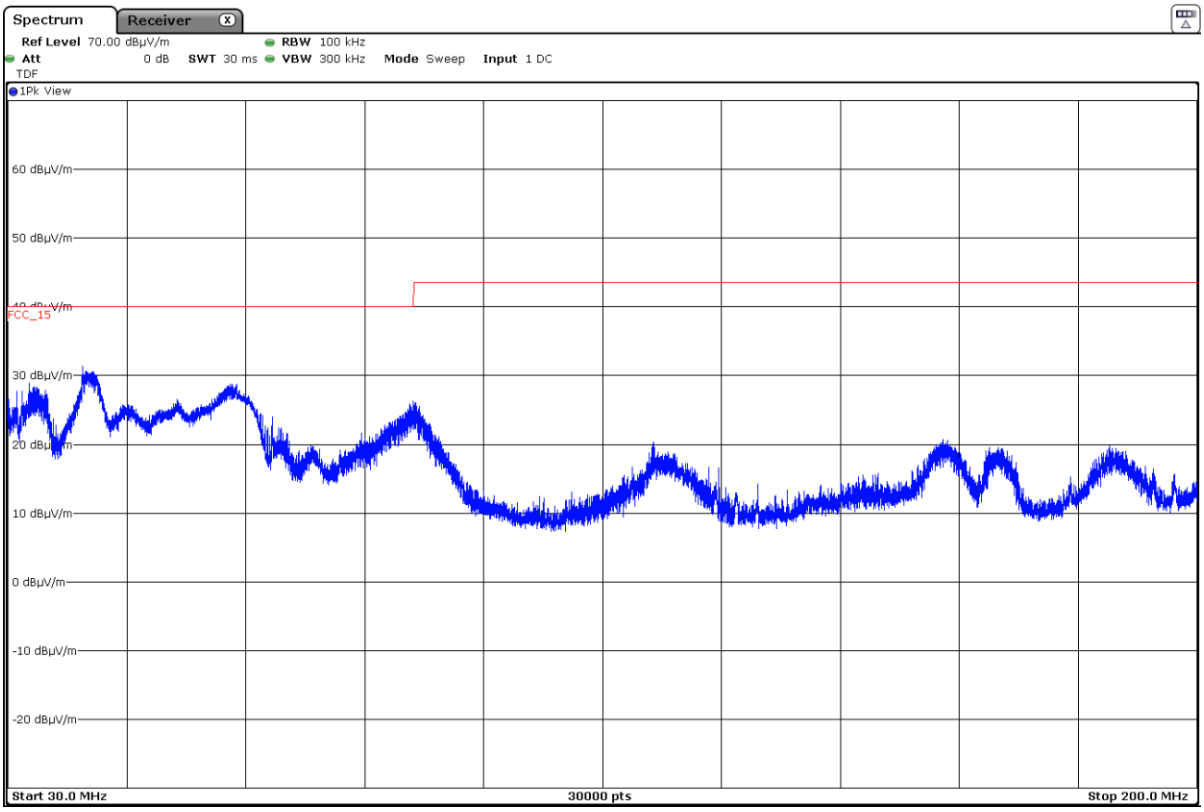


The above plot shows the results of the scan using peak detector.

Verdict: PASS

- **NFC mode ISO 15693 (worst case 212Kbps)**

Spurious frequency (MHz)	Detector	Emission Level (dBµV/m)	Polarization	Measurement Uncertainty (dB)
33.0118	Quasi peak	21.7	V	<± 3.88
40.6448	Quasi peak	27.3	V	<± 3.88
61.8212	Quasi peak	24.9	V	<± 3.88
67.7995	Quasi peak	22.6	V	<± 3.88
87.9332	Quasi peak	20.4	V	<± 3.88



The above plot shows the results of the scan using peak detector.

Verdict: PASS

Section 15.225 Subclause (e) / RSS-210 Clause B.6. Frequency tolerance of the carrier signal

SPECIFICATION:

The frequency tolerance of the carrier signal shall be maintained within +/- 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 hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.

RESULTS:

Nominal Operating Frequency: 13.56 MHz.

- **NFC mode ISO 14443A (worst case 106Kbps)**

  - Frequency stability over temperature variations:

Temperature (ºC)	Frequency Error (Hz)	Frequency Error (%)
+50	313	0.002308
+40	250	0.001844
+30	250	0.001844
+20	250	0.001844
+10	238	0.001755
0	213	0.001571
-10	192	0.001416
-20	200	0.001475

  - Frequency stability over voltage variations:

DC Supply	Voltage (V)	Frequency Error (Hz)	Frequency Error (%)
Vmax	4.2	225	0.001659
Vmin (*)	3.6	215	0.001586

(*): Operating end point specified by the manufacturer.

Verdict: PASS

- **NFC mode ISO 14443B (worst case 106Kbps)**

- Frequency stability over temperature variations:

Temperature (ºC)	Frequency Error (Hz)	Frequency Error (%)
+50	375	0.002765
+40	375	0.002765
+30	350	0.002581
+20	350	0.002581
+10	300	0.002212
0	250	0.001844
-10	250	0.001844
-20	250	0.001844

- Frequency stability over voltage variations:

DC Supply	Voltage (V)	Frequency Error (Hz)	Frequency Error (%)
Vmax	4.2	235	0.001733
Vmin (*)	3.6	238	0.001755

(*): Operating end point specified by the manufacturer.

Verdict: PASS

- **NFC mode ISO 15693 (worst case 212Kbps)**

- Frequency stability over temperature variations:

Temperature (ºC)	Frequency Error (Hz)	Frequency Error (%)
+50	375	0.002765
+40	350	0.002581
+30	350	0.002581
+20	350	0.002581
+10	300	0.002212
0	250	0.001844
-10	250	0.001844
-20	275	0.002028

- Frequency stability over voltage variations:

DC Supply	Voltage (V)	Frequency Error (Hz)	Frequency Error (%)
Vmax	4.2	245	0.001807
Vmin (*)	3.6	245	0.001807

(*): Operating end point specified by the manufacturer.

Verdict: PASS