



FCC RF Test Report

APPLICANT : Sony Mobile Communications Inc.
EQUIPMENT : GSM/WCDMA/LTE Phone+Bluetooth, DTS/UNII a/b/g/n and NFC
BRAND NAME : Sony
FCC ID : PY7-98591H
STANDARD : FCC Part 15 Subpart C §15.225
CLASSIFICATION : (DXC) Low Power Communication Device Transmitter

This is a variant report which is only valid together with the original test report. The testing was completed on Nov. 11, 2016. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in 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: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager



SPORTON INTERNATIONAL INC.

No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C.



TABLE OF CONTENTS

SUMMARY OF THE TEST RESULT4

1. GENERAL INFORMATION.....5

1.1 Applicant..... 5

1.2 Manufacturer 5

1.3 Product Feature of Equipment Under Test 5

1.4 Product Specification of Equipment Under Test 6

1.5 Modification of EUT 6

1.6 Testing Location 7

1.7 Applicable Standards..... 7

2. TEST CONFIGURATION OF EQUIPMENT UNDER TEST8

2.1 Descriptions of Test Mode 8

2.2 EUT Operation Test Setup 8

3. TEST RESULTS.....9

3.1 Radiated Emissions Measurement 9

3.2 Antenna Requirements..... 12

4. LIST OF MEASURING EQUIPMENT13

APPENDIX A. TEST RESULTS OF RADIATED TEST ITEMS

A1. Results of Radiated Emissions (9 kHz~30MHz)

A2. Results of Radiated Emissions (30MHz~1GHz)

APPENDIX B. VERIFICATION OF RADIATED SPURIOUS EMISSIONS AT OPEN-AREA TEST SITE

B.1 Results of Radiated Emissions (9 kHz~30MHz)

APPENDIX C. ORIGINAL REPORT



SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart C				
Part	FCC Rule	Description of Test	Result	Under Limit
3.1	15.225(d) 15.209	Radiated Emissions	Complies	1.67 dB at 40.680 MHz for Peak
3.2	15.203	Antenna Requirements	Complies	-

Test Items	Uncertainty	Remark
Radiated Emissions (30MHz~1000MHz)	±5.70dB	Confidence levels of 95%



1. GENERAL INFORMATION

1.1 Applicant

Sony Mobile Communications Inc.

4-12-3 Higashi-Shinagawa, Shinagawa-ku, Tokyo, 140-0002, Japan

1.2 Manufacturer

Sony Mobile Communications Inc.

4-12-3 Higashi-Shinagawa, Shinagawa-ku, Tokyo, 140-0002, Japan

1.3 Product Feature of Equipment Under Test

GSM/WCDMA/LTE, Bluetooth, DTS/UNII, a/b/g/n, GPS, and NFC

Standards-related Product Specification	
Antenna Type / Gain	PIFA Antenna type with gain -0.80 dBi

Remark: This is a variant report. All the test cases were performed on original report which can be referred to Sporton Report Number FR692208-01D.

EUT Information List			
HW Version	SW Version	S/N	Performed Test Item
A	0.85	RQ3002L4R4	Radiated Spurious Emission

Accessory List	
AC Adapter 1	Model No. : UCH20
	S/N : 1215W48600011
Earphone 1	Model No. : MH410c
	S/N: 1632A86300007A6
USB Cable	Model No. : UCB20
	S/N : 1625A912000332E

Note:

- Above EUT list and accessory list used are electrically identical per declared by manufacturer.
- Above the accessories list are used to exercise the EUT during test.
- For other wireless features of this EUT, test report will be issued separately.



1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Frequency Range	13.553 ~ 13.567MHz
Channel Number	1
Type of Modulation	ASK

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.5 Modification of EUT

No modifications are made to the EUT during all test items.



1.6 Testing Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1022 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C. TEL: +886-3-3273456 / FAX: +886-3-3284978
Test Site No.	Sporton Site No. 03CH07-HY
Test Engineer	Jess Wang
Temperature	21~22°C
Relative Humidity	49~50%

Note: The test site complies with ANSI C63.4 2014 requirement.

Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No. 30-2, Dingfu Tsuen, Linkou District, New Taipei City, Taiwan 244, R.O.C. TEL: +886-2-2603-5367 / +886-2-2601-1640 FAX: +886-2-2601-1695
Test Site No.	Sporton Site No. OS03-LK
Test Engineer	Eric Jeng
Temperature	21~23°C
Relative Humidity	51~53%

Note: The test site complies with ANSI C63.4 2014 requirement.

1.7 Applicable Standards

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

- ♦ FCC Part 15 Subpart C §15.225
- ♦ ANSI C63.10-2013



2. TEST CONFIGURATION OF EQUIPMENT UNDER TEST

2.1 Descriptions of Test Mode

Investigation has been done on all the possible configurations.

The following table is a list of the test modes shown in this test report.

Test Items	
Radiated Emissions 9kHz~30MHz	Radiated Emissions 30MHz~1GHz

The worst type (type F) declared by manufacturer was used and recorded in this report.

2.2 EUT Operation Test Setup

The EUT was programmed to be in continuously transmitting mode.

The ancillary equipment, NFC card, is used to make the EUT (NFC) continuously transmit at 13.56MHz and is placed around 2 cm gap to the EUT.



3. TEST RESULTS

3.1 Radiated Emissions Measurement

3.1.1 Limit

The field strength of any emissions which appear outside of 13.110 ~14.010MHz band shall not exceed the general radiated emissions limits.

Frequencies (MHz)	Field Strength (µV/m)	Measurement Distance (meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Measuring Instrument Setting

The following table is the setting of receiver.

Receiver Parameter	Setting
Attenuation	Auto
Frequency Range: 9kHz~150kHz	RBW 200Hz for QP
Frequency Range: 150kHz~30MHz	RBW 9kHz for QP
Frequency Range: 30MHz~1000MHz	RBW 120kHz for Peak

Note: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz. Radiated emission limits in these two bands are based on measurements employing an average detector.

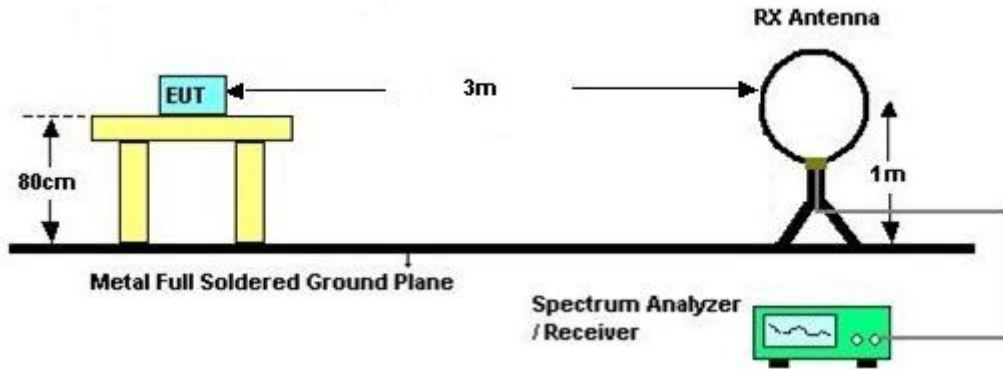


3.1.4 Test Procedures

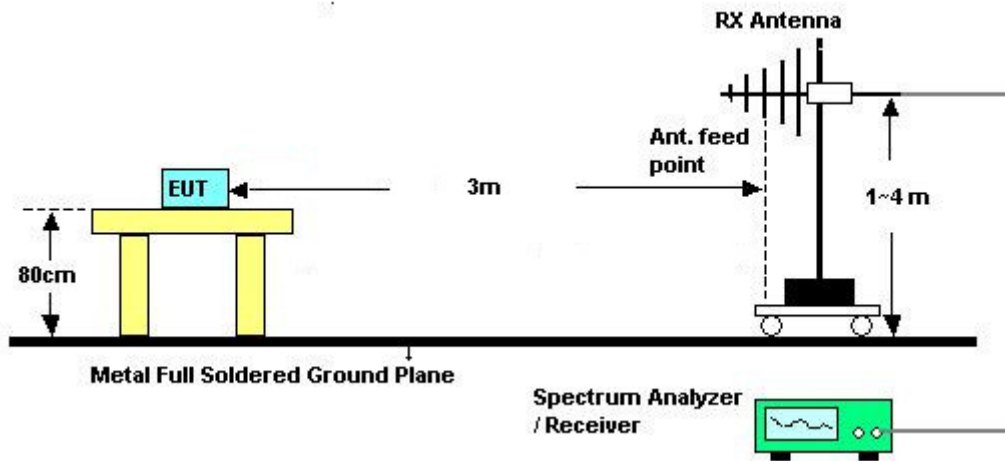
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
7. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. Antenna Requirements

3.1.5 Test Setup

For radiated emissions below 30MHz



For radiated emissions above 30MHz



3.1.6 Test Result of Radiated Emissions Measurement

Please refer to Appendix A.



3.2 Antenna Requirements

3.2.1 Standard Applicable

Except for special regulations, the Low-power Radio-frequency Devices must not be equipped with any jacket for installing an antenna with extension cable. An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited.

The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the FCC rule.

3.2.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.



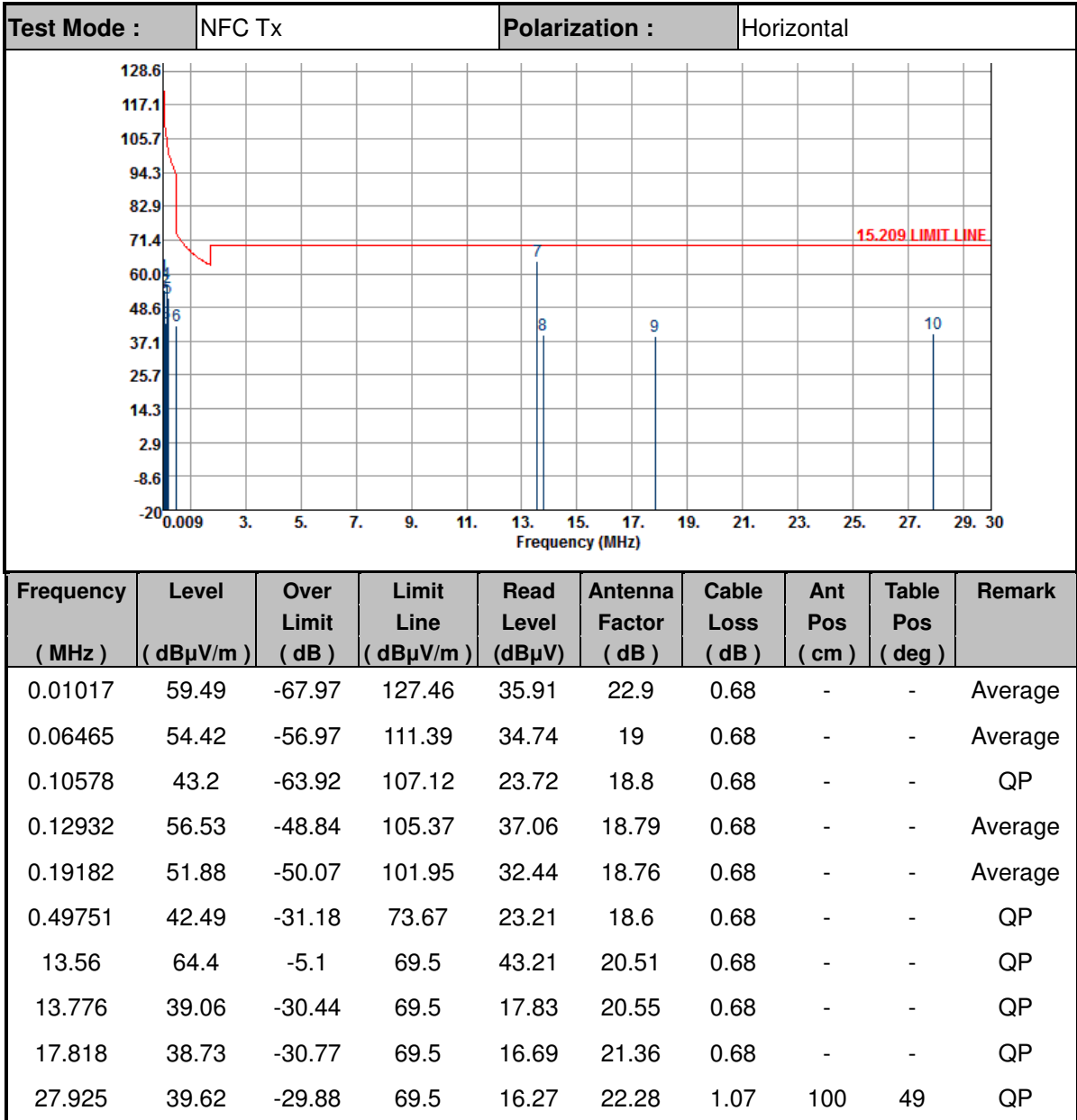
4. LIST OF MEASURING EQUIPMENT

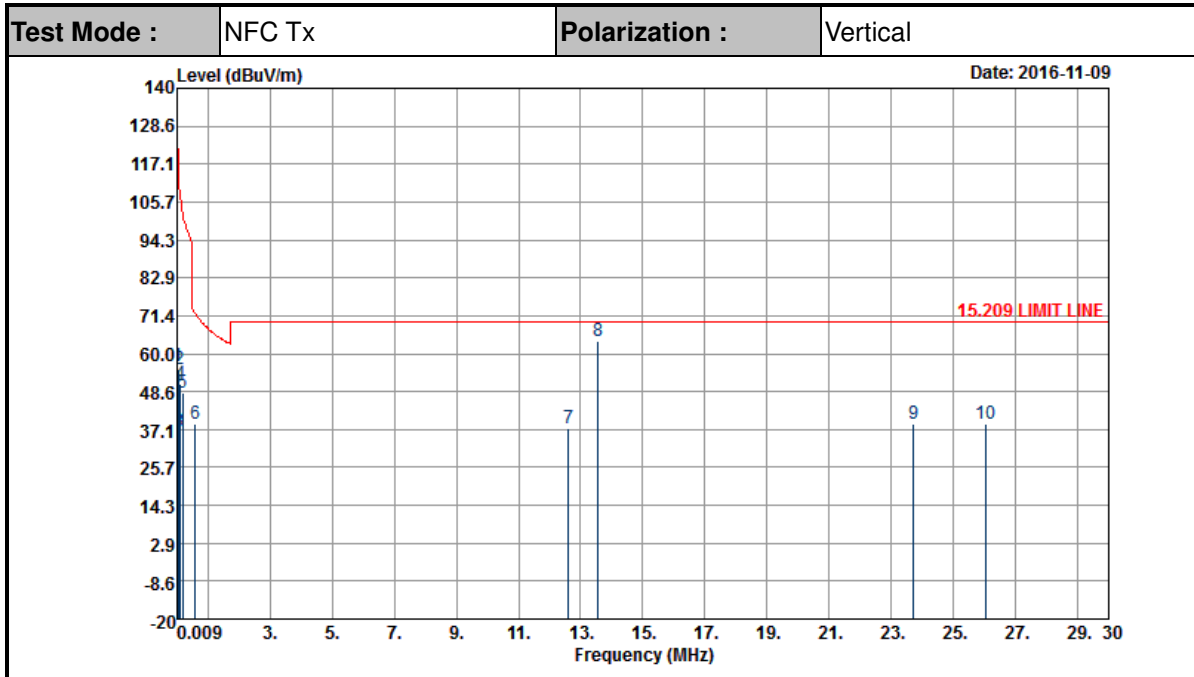
Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Bilog Antenna	TESEQ	CBL 6111D&0080 0N1D01N-06	35419&03	30MHz to 1GHz	Jan. 13, 2016	Nov. 09, 2016	Jan. 12, 2017	Radiation (03CH07-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Sep. 02, 2015	Nov. 09, 2016	Sep. 01, 2017	Radiation (03CH07-HY)
EMI Test Receiver	Keysight	N9038A(MX E)	MY5413008 5	20Hz ~ 8.4GHz	Oct. 26, 2016	Nov. 09, 2016	Oct. 25, 2017	Radiation (03CH07-HY)
Preamplifier	COM-POWER	PA-103A	161241	10MHz-1GHz	Mar. 18, 2016	Nov. 09, 2016	Mar. 17, 2017	Radiation (03CH07-HY)
Spectrum Analyzer	Agilent	N9010A	MY5347011 8	10Hz~44GHz	Feb. 27, 2016	Nov. 09, 2016	Feb. 26, 2017	Radiation (03CH07-HY)
Hygrometer	Testo	608-H1	34897197	N/A	N/A	Nov. 09, 2016	N/A	Radiation (03CH07-HY)
Filter	Wainwright	WHK20 /1000C7/40S S	SN1	20M High Pass	Sep. 26, 2016	Nov. 09, 2016	Sep. 25, 2017	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY8420952 1	30MHz~1GHz	Dec. 03, 2015	Nov. 09, 2016	Dec. 02, 2016	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY8420952 1	9KHz~30MHz	Dec. 03, 2015	Nov. 09, 2016	Dec. 02, 2016	Radiation (03CH07-HY)
Controller	ChainTek	Chaintek 3000	N/A	Control Turn table	N/A	Nov. 09, 2016	N/A	Radiation (03CH07-HY)
Controller	Max-Full	MF7802	MF7802083 68	Control Ant Mast	N/A	Nov. 09, 2016	N/A	Radiation (03CH07-HY)
Antenna Mast	Max-Full	MFA520BS	N/A	1m~4m	N/A	Nov. 09, 2016	N/A	Radiation (03CH07-HY)
Turn Table	ChainTek	Chaintek 3000	N/A	0~360 Degree	N/A	Nov. 09, 2016	N/A	Radiation (03CH07-HY)
Test Software	Audix	E3	6.2009-8-24 (sporton)	N/A	N/A	Nov. 09, 2016	N/A	Radiation (03CH07-HY)
Open Area Test Site	SPORTON	OATS-10	OS03-LK	30 MHz ~ 1 GHz 10m, 3m	May 21, 2016	Nov. 11, 2016	May 20, 2017	Radiation (OS03-LK)
Spectrum Analyzer	R&S	FSP 7	100641	9 kHz ~ 7 GHz	Jun. 23, 2016	Nov. 11, 2016	Jun. 22, 2017	Radiation (OS03-LK)
Test Receiver	R&S	ESCS 30	836858/024	9 kHz ~ 2.75 GHz	Jun. 24, 2016	Nov. 11, 2016	Jun. 23, 2017	Radiation (OS03-LK)
Turn Table	EMCO	2080	9711-2021	0 ~ 360 degree	NCR	Nov. 11, 2016	NCR	Radiation (OS03-LK)
Antenna Mast	EMCO	2075	9711-2115	1 m ~ 4 m	NCR	Nov. 11, 2016	NCR	Radiation (OS03-LK)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Sep. 02, 2015	Nov. 11, 2016	Sep. 01, 2017	Radiation (OS03-LK)
Preamplifier	COM-POWER	PA-103A	161241	10MHz-1GHz	Mar. 18, 2016	Nov. 11, 2016	Mar. 17, 2017	Radiation (OS03-LK)
Test Software	Audix	E3	4	N/A	N/A	Nov. 11, 2016	N/A	Radiation (OS03-LK)



Appendix A. Test Results of Radiated Test Items

A1. Results of Radiated Spurious Emissions (9 kHz~30MHz)





Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
0.01318	56.18	-69.03	125.21	32.6	22.9	0.68	-	-	Average
0.06465	55.41	-55.98	111.39	35.73	19	0.68	-	-	Average
0.09372	36.73	-71.44	108.17	17.25	18.8	0.68	-	-	QP
0.11844	50.69	-55.44	106.13	31.22	18.79	0.68	-	-	Average
0.19148	48.07	-53.89	101.96	28.63	18.76	0.68	-	-	Average
0.59514	38.74	-33.37	72.11	19.39	18.67	0.68	-	-	QP
12.608	37.67	-31.83	69.5	16.67	20.32	0.68	-	-	QP
13.56	63.61	-5.89	69.5	42.42	20.51	0.68	-	-	QP
23.722	38.76	-30.74	69.5	15.67	22.02	1.07	-	-	QP
26.045	38.78	-30.72	69.5	15.55	22.16	1.07	100	220	QP

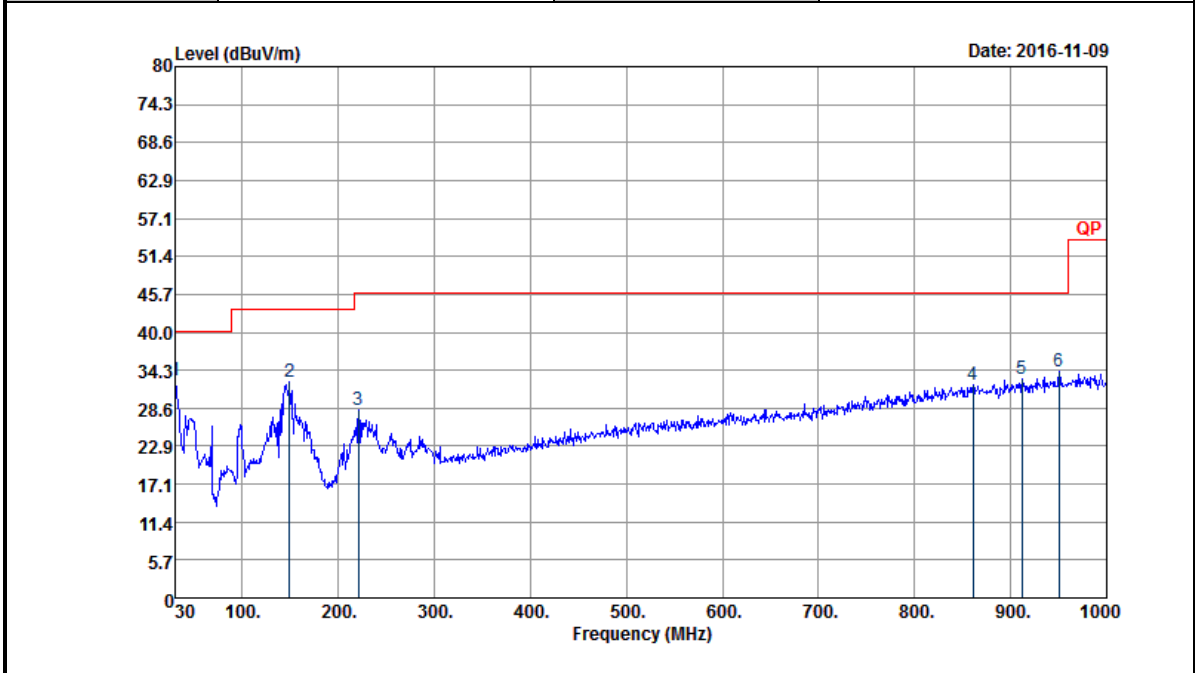
Note:

1. 13.56 MHz is fundamental signal which can be ignored.
2. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
3. Distance extrapolation factor = 40 log (specific distance / test distance) (dB);
4. Limit line = specific limits (dBμV) + distance extrapolation factor.

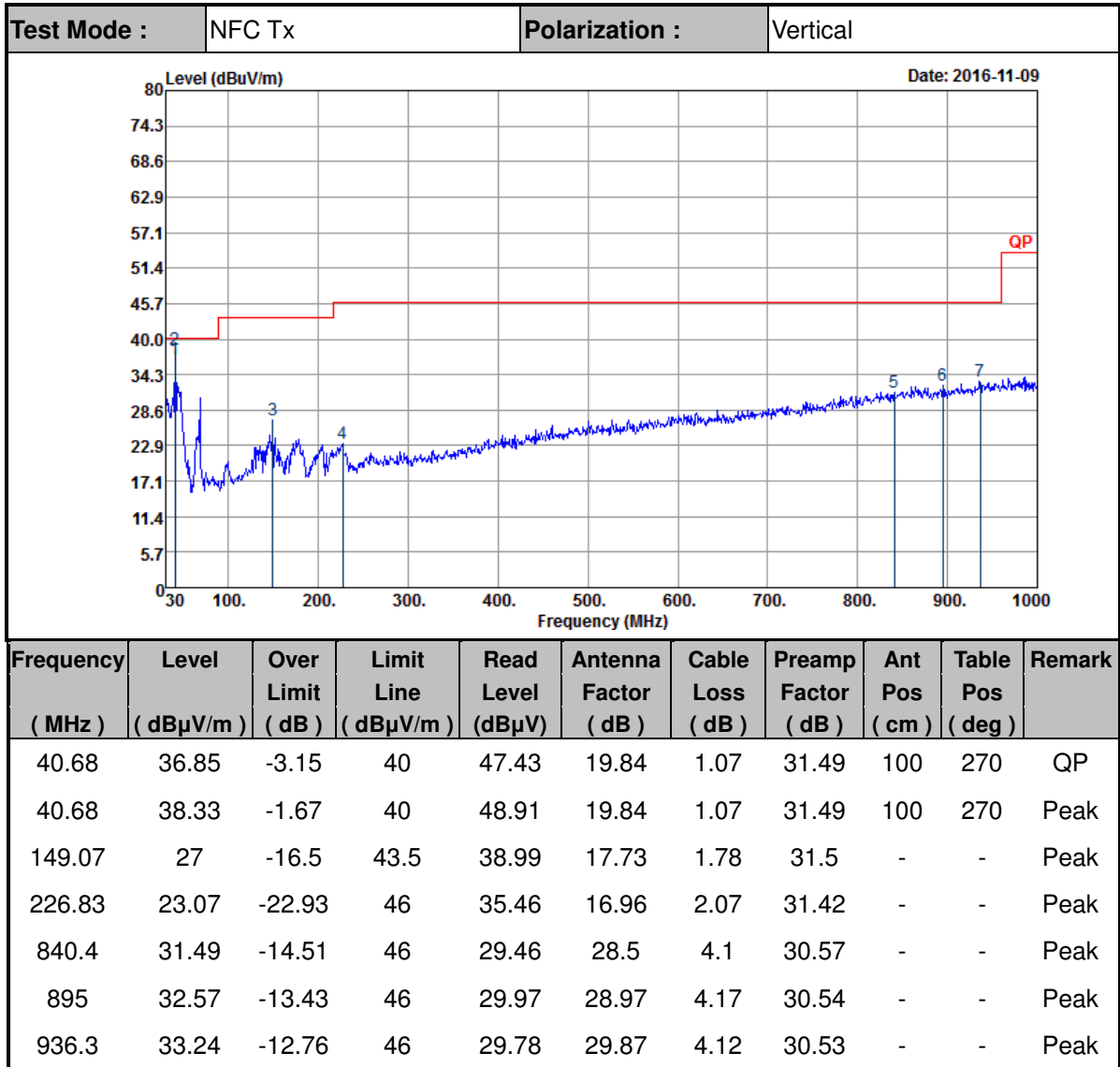


A2. Results of Radiated Spurious Emissions (30MHz~1GHz)

Test Mode :	NFC Tx	Polarization :	Horizontal
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Frequency (MHz)	Level (dB μ V/m)	Over Limit (dB)	Limit Line (dB μ V/m)	Read Level (dB μ V)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30	32.74	-7.26	40	37.02	26	1.07	31.35	100	147	Peak
149.07	32.58	-10.92	43.5	44.57	17.73	1.78	31.5	-	-	Peak
221.16	28.23	-17.77	46	41.12	16.48	2.07	31.44	-	-	Peak
860.7	32.2	-13.8	46	29.83	28.76	4.17	30.56	-	-	Peak
911.8	33.02	-12.98	46	30.16	29.28	4.12	30.54	-	-	Peak
950.3	34.01	-11.99	46	30.27	30.2	4.07	30.53	-	-	Peak



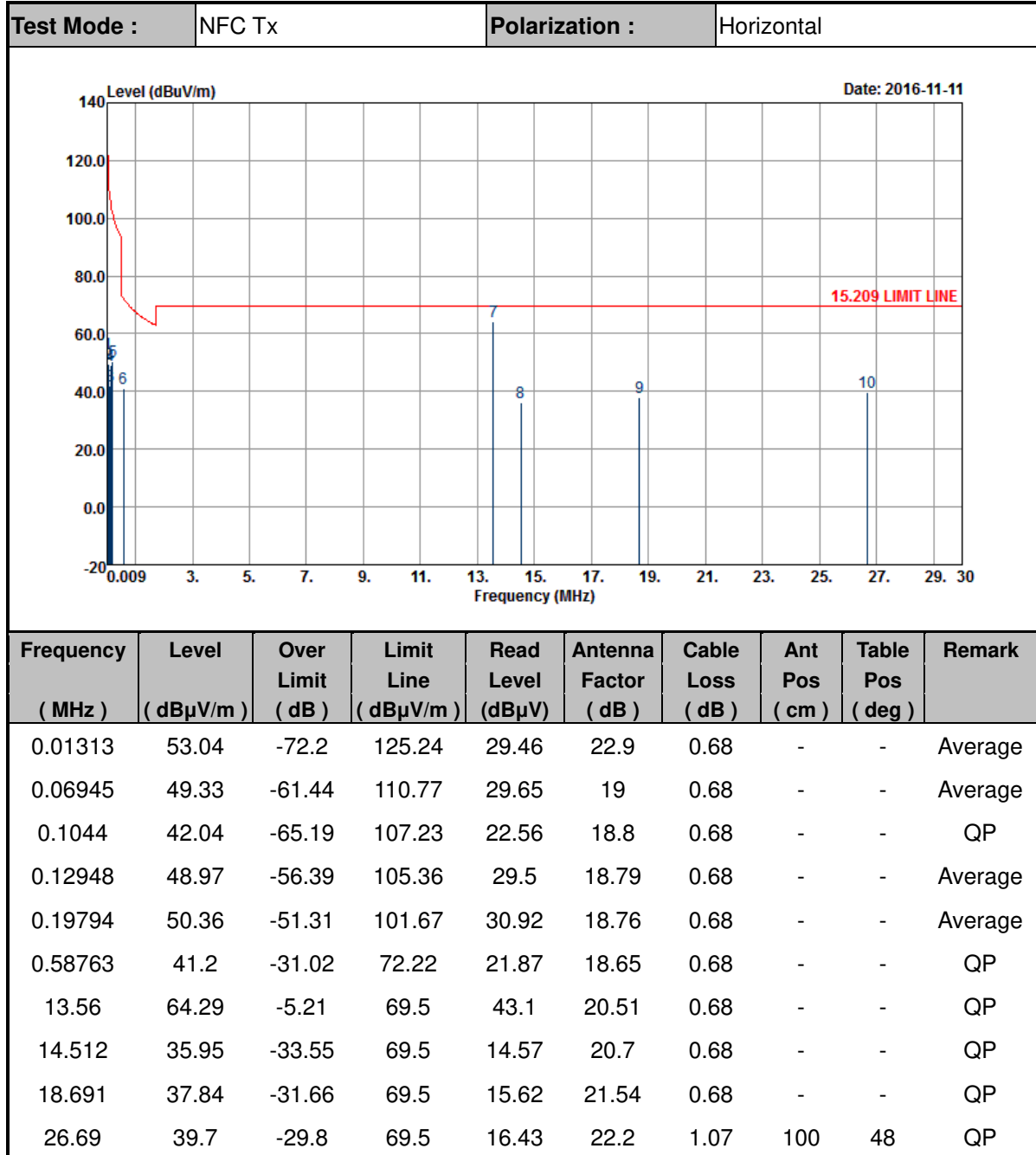
Note:

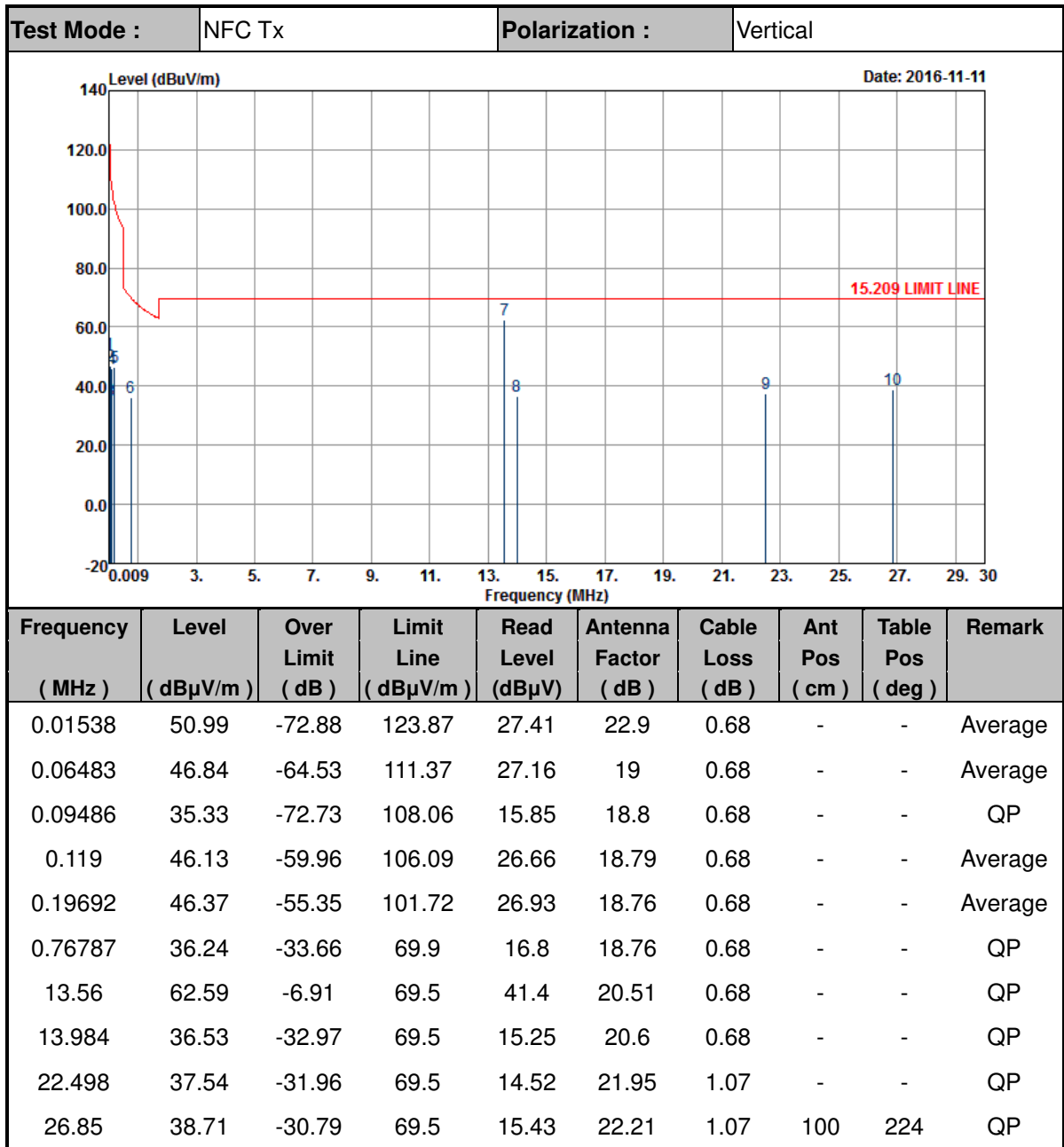
1. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
2. Emission level (dBμV/m) = 20 log Emission level (μV/m).
3. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor= Level.



Appendix B. Verification of Radiated Spurious Emissions at open-area test site

B.1 Results of Radiated Emissions (9 kHz~30MHz)





Note:

1. 13.56 MHz are fundamental signal which can be ignored.
2. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
3. Distance extrapolation factor = 40 log (specific distance / test distance) (dB);
4. Limit line = specific limits (dBuV) + distance extrapolation factor.
5. The test distance between the receiving antenna and the EUT is 3meter.



Appendix C. Original Report

Please refer to Sporton report number FR692208-01D