



FCC RADIO TEST REPORT

FCC ID : PY7-58237R
Equipment : GSM/WCDMA/LTE Phone with BT, DTS/UNII
a/b/g/n/lac, NFC, FM receiver and GNSS
Brand Name : SONY
Applicant : Sony Corporation
1-7-1 Konan Minato-ku Tokyo, 108-0076 Japan
Manufacturer : Sony Corporation
1-7-1 Konan Minato-ku Tokyo, 108-0076 Japan
Standard : FCC Part 15 Subpart C §15.225
Test Date(s) : Feb. 06, 2022

We, Sporton International Inc. (Kunshan), 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. (Kunshan), the test report shall not be reproduced except in full.

Jason Jia

Reviewed by: Jason Jia / Supervisor

Alex Wang

Approved by: Alex Wang / Manager



Sporton International Inc. (Kunshan)
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People's Republic of China



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History of this test report

Report No.	Version	Description	Issued Date
FR1D0404D	01	Initial issue of report	Feb. 11, 202
FR1D0404D	02	Updated Section 3 Spot Check Instructions and spot check data	Mar. 07, 2022

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
-	15.207	AC Power Line Conducted Emissions	-	See Note
-	15.215(c)	20dB Spectrum Bandwidth	-	See Note
	2.1049	99% OBW Spectrum Bandwidth	-	See Note
-	15.225(e)	Frequency Stability	-	See Note
4.1	15.225(a)(b)(c)	Field Strength of Fundamental Emissions	Pass	Max level 18.85 dB μ V/m at 13.560 MHz
4.2	15.225(d) 15.209	Radiated Spurious Emissions	Pass	Under limit 9.93 dB at 34.85MHz
4.3	15.203	Antenna Requirements	Pass	-

Note: Refer to information of Section 3 Spot Check Evaluation.

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

1. General Description

1.1 Product Feature of Equipment Under Test

GSM/WCDMA/LTE, Bluetooth, DTS/UNII a/b/g/n/ac, NFC, FM Receiver, and GNSS

Standards-related Product Specification	
Antenna Type	Loop Antenna

Remark: The above EUT's information was declared by manufacturer. Please refer to Comments and Explanations in report summary.

1.2 Modification of EUT

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

1.3 Testing Location

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Site	Sporton International Inc. (Kunshan)		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158 FAX : +86-512-57900958		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	03CH02-KS	CN1257	314309
Test Engineer	Yoke Si		
Temperature	21~22°C		
Relative Humidity	41~42%		



1.4 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
- ♦ FCC KDB 414788 D01 Radiated Test Site v01r01
- ♦ ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

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.

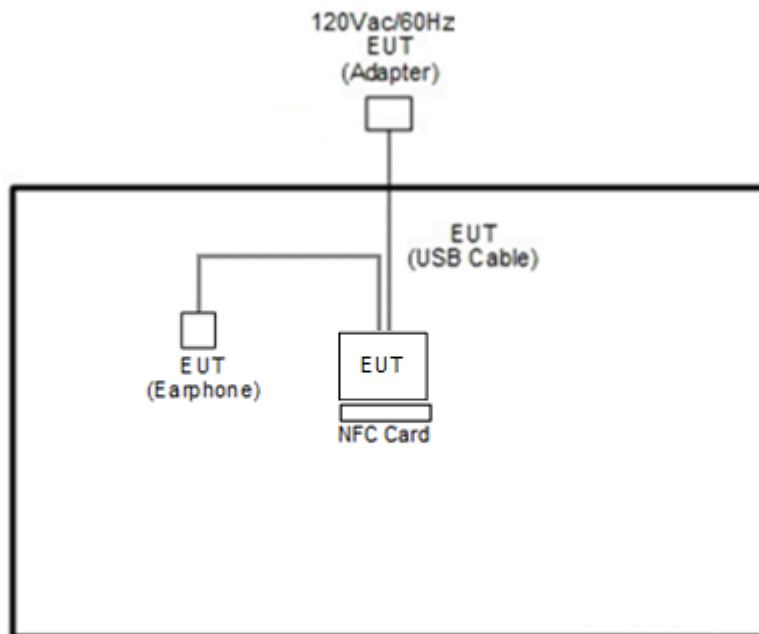
Test Items
Radiated Emissions 30MHz~1GHz

The NFC test is performed with app “NFC PRBS Test Mode” installed in the mobile phone. It can enable continuous transmission with type F tag respectively.

The EUT pre-scanned in four NFC type, A, B, F, V. The worst type (type F) was recorded in this report. For radiated measurement, the measured emission level of the EUT was maximized by rotating the EUT on a turntable, adjusting the orientation of the EUT and EUT antenna in three orthogonal axis (X: flat, Y: portrait, Z: landscape), and adjusting the measurement antenna orientation, following C63.10 exploratory test procedures and find Y plane as worst plane.

2.2 Connection Diagram of Test System

<For Radiated Emissions Measurement with NFC Card>





2.3 Table for Supporting Units

Item	Equipment	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
1.	NFC Card	N/A	N/A	N/A	N/A	N/A

2.4 EUT Operation Test Setup

The EUT was programmed to be in continuously transmitting mode.

With tag: The ancillary equipment, NFC card, is used to make the EUT (NFC) continuously transmitting signal (Power Level: Default) at 13.56MHz and is placed around 1 cm gap to the EUT.



3. Spot Check Evaluation

3.1 Introduction Section

This application for certification is leveraging the data reuse procedures from KDB 484596 D01 based on reference FCC ID PY7-34943G/ PY7-81713C to cover variant model FCC ID PY7-58237R (this model). The major difference between the parent/reference model and the variant model are NFC chipset change and the difference bands supported on cellular circuits. All other circuitry and features are identical.

For details, please refer to Theory of operation Appendix B.

Sony Corporation takes full responsibility that the test data as referenced in this report represent compliance for this FCC ID.

3.2 Difference Section

Difference between PY7-81713C (lead) and PY7-58237R (this model):

Sony Corporation, hereby declares the differences between PY7-81713C (lead) and PY7-58237R (this model) are related to the cellular part, other functions are not affected. Therefore the NFC report/data of PY7-81713C (lead) may represent for PY7-58237R (this model).

3.3 Spot Check Verification Data Section

Radiated spurious emission test against the variant model based on the worst-case condition from the original model was performed in this filing and the verification test results similar to the original FCC ID. All tests meet FCC technical limits. Detail spot check test result can be found in the variant model report, please refer to the detail section table in section 3.4.

Summary of the spot check:

Test Item	Mode	PY7-81713C Worst Result	PY7-58237R Worst Result	Difference (dB)
Fundamental field strength (dBuV/m) @ 3m	NFC	17.60	18.85	1.25

3.4 Reference detail Section

Rule Part	Equipment Class	Wireless Technology	Frequency Band (MHz)	Original FCC ID	Original Report	Variant Model FCC ID	Variant Model Report
15C	DXX	NFC	13.56	PY7-81713C	Part 15C (FR1D0403D)	PY7-58237R	Part 15C (FR1D0404D)

4. Test Results

4.1 Field Strength of Fundamental Emissions and Mask Measurement

4.1.1 Limit

Rules and specifications	FCC CFR 47 Part 15 section 15.225	
Description	Compliance with the spectrum mask is tested with RBW set to 9kHz.	
Freq. of Emission (MHz)	Field Strength (μV/m) at 30m	Field Strength (dBμV/m) at 30m
1.705~13.110	30	29.5
13.110~13.410	106	40.5
13.410~13.553	334	50.5
13.553~13.567	15848	84.0
13.567~13.710	334	50.5
13.710~14.010	106	40.5
14.010~30.000	30	29.5

Remark:

1. Emission level (dBμV/m) = 20 log Emission level (μV/m).
2. The field strength test result is in 3m test distance, follow test rules the test data use distance extrapolation factor and reported in this report at 30m test result.
3. Distance extrapolation factor = 40 log (specific distance / test distance) (dB).

4.1.2 Measuring Instruments

See list of measuring instruments of this test report.

4.1.3 Test Procedures

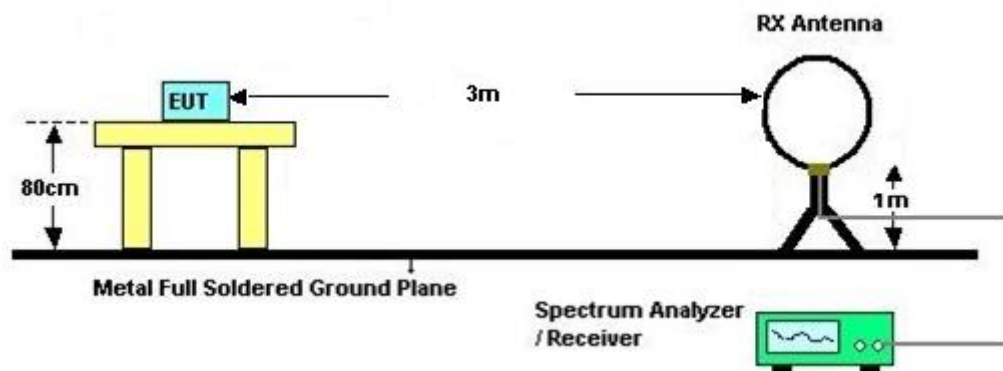
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the loop receiving antenna mounted antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the receiving antenna was fixed at one meter above ground to find the maximum emissions field strength.
4. For Fundamental emissions, use the receiver to measure QP reading.
5. 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.

6. Compliance with the spectrum mask is tested with RBW set to 9 kHz.

4.1.4 Test Setup

For radiated test below 30MHz



4.1.5 Test Result of Field Strength of Fundamental Emissions and Mask

Please refer to Appendix A.

4.2 Radiated Emissions Measurement

4.2.1 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 (μ V/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

4.2.2 Measuring Instruments

See list of measuring instruments of this test report.

4.2.3 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

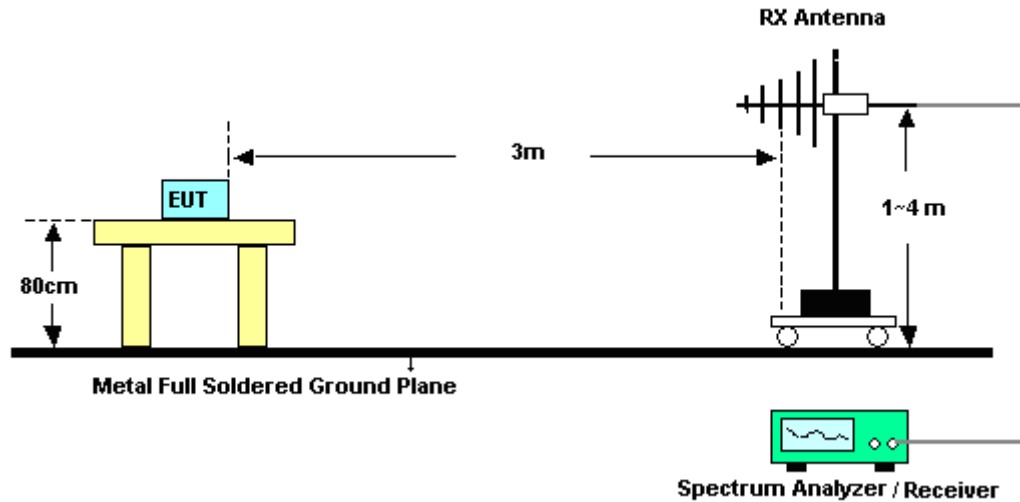
Note: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz and 110-490 kHz. Radiated emission limits in these two bands are based on measurements employing an average detector.

4.2.4 Test Procedures

7. 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.
8. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
9. 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.
10. 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.
11. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
12. 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.
13. In case the emission is lower than 30 MHz, loop antenna has to be used for measurement and the recorded data shall be QP measured by receiver.

4.2.5 Test Setup

For radiated test above 30MHz



4.2.6 Test Result of Radiated Emissions Measurement

Please refer to Appendix A.

Remark:

1. There is adequate comparison measurement of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.
2. According to C63.10 radiated Test, the EUT pre-scanned horizontal, vertical, and ground-parallel three polarization's, the worst case is horizontal & vertical polarization, test data of two mode was reported.



4.3 Antenna Requirements

4.3.1 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 rule.

4.3.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.



5. List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz;Ma x 30dBm	Oct. 16, 2021	Feb. 06, 2022	Oct. 15, 2022	Radiation (03CH02-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY553705 28	10Hz-44G,MAX 30dB	Oct. 16, 2021	Feb. 06, 2022	Oct. 15, 2022	Radiation (03CH02-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 30, 2021	Feb. 06, 2022	Oct. 29, 2022	Radiation (03CH02-KS)
Bilog Antenna	TeseQ	CBL6111D	44483	30MHz-1GHz	Dec. 22, 2021	Feb. 06, 2022	Dec. 21, 2022	Radiation (03CH02-KS)
Amplifier	SONOMA	310N	187289	9KHz-1GHz	Apr. 13, 2021	Feb. 06, 2022	Apr. 12, 2022	Radiation (03CH02-KS)
AC Power Source	Chroma	61601	616010002 473	N/A	NCR	Feb. 06, 2022	NCR	Radiation (03CH02-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Feb. 06, 2022	NCR	Radiation (03CH02-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Feb. 06, 2022	NCR	Radiation (03CH02-KS)

NCR: No Calibration Required



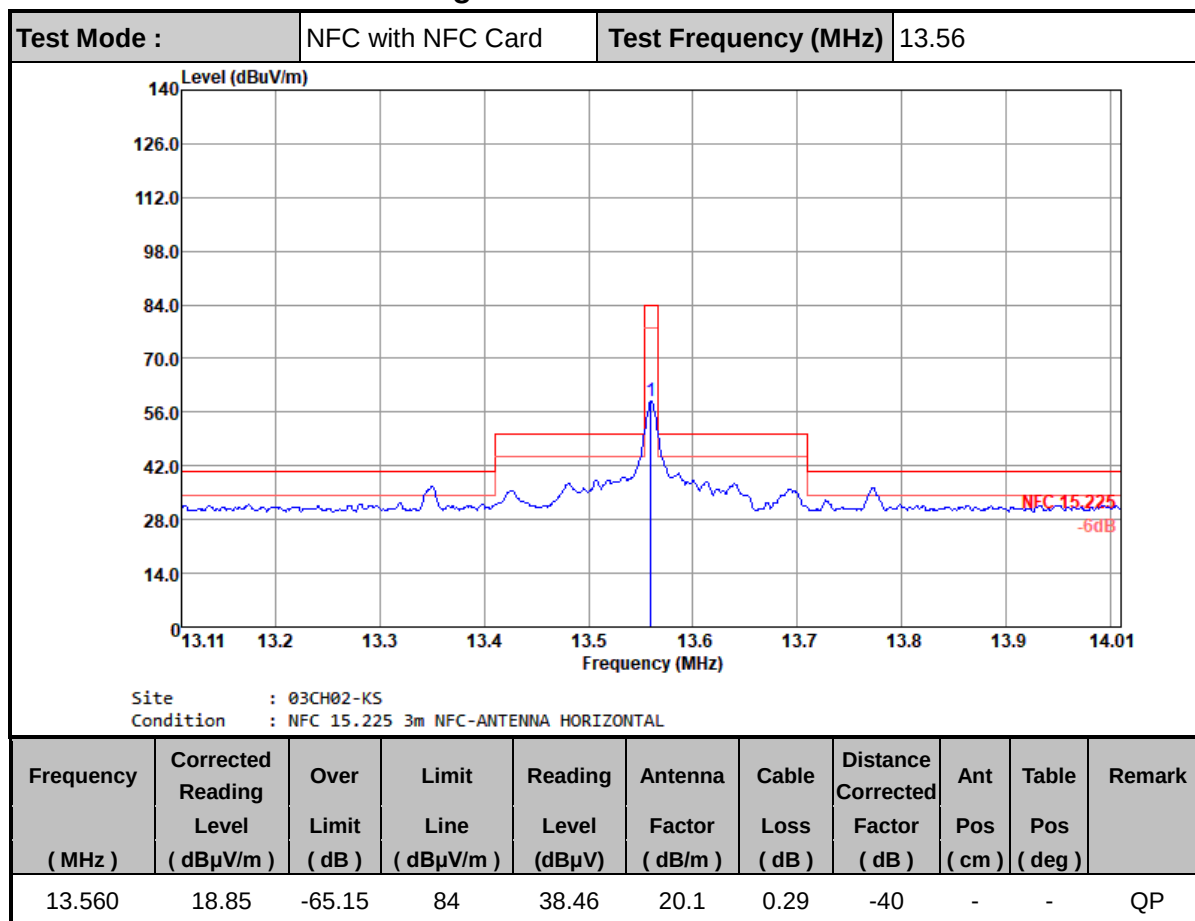
6. Uncertainty of Evaluation

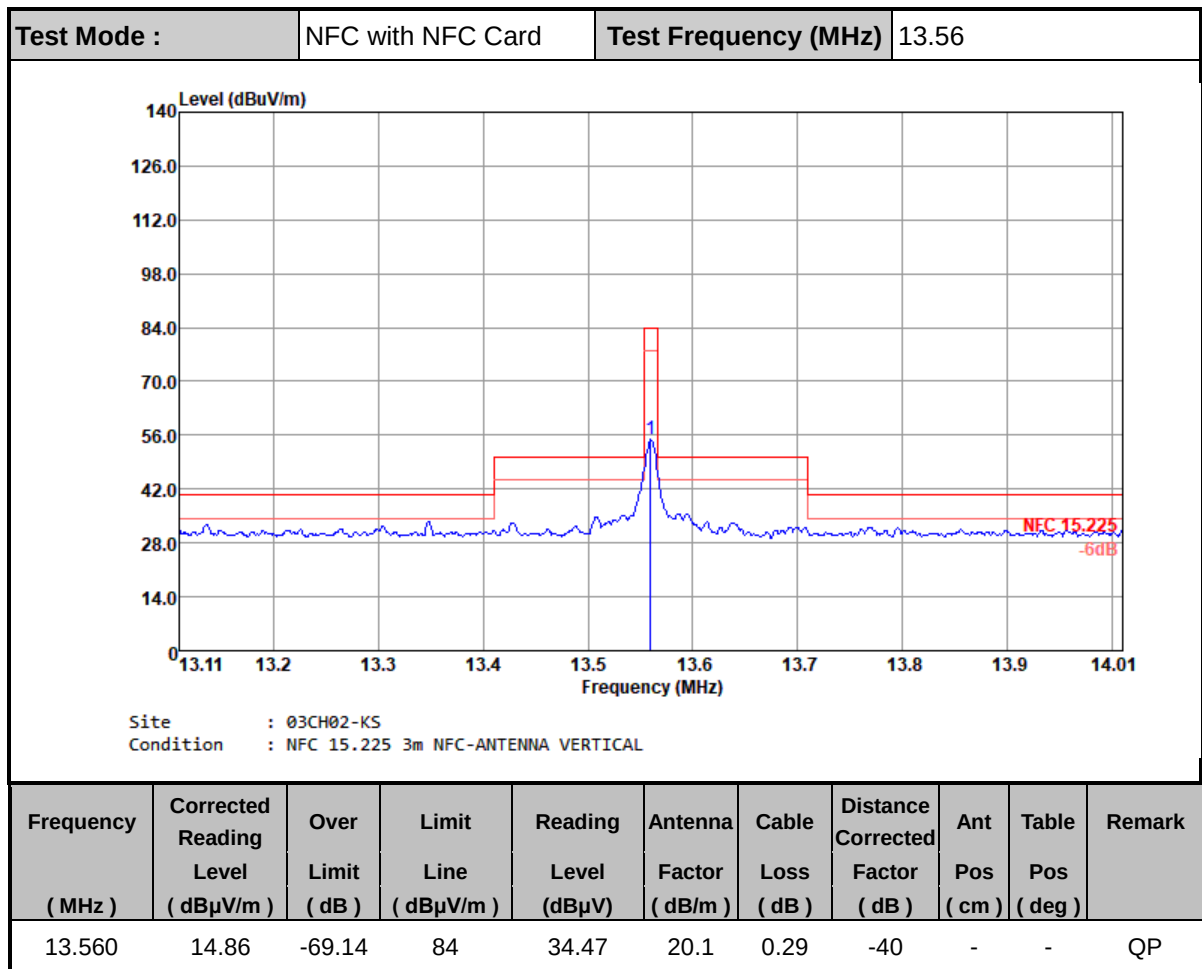
Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	4.9dB
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Appendix A. Test Results of Radiated Test Items

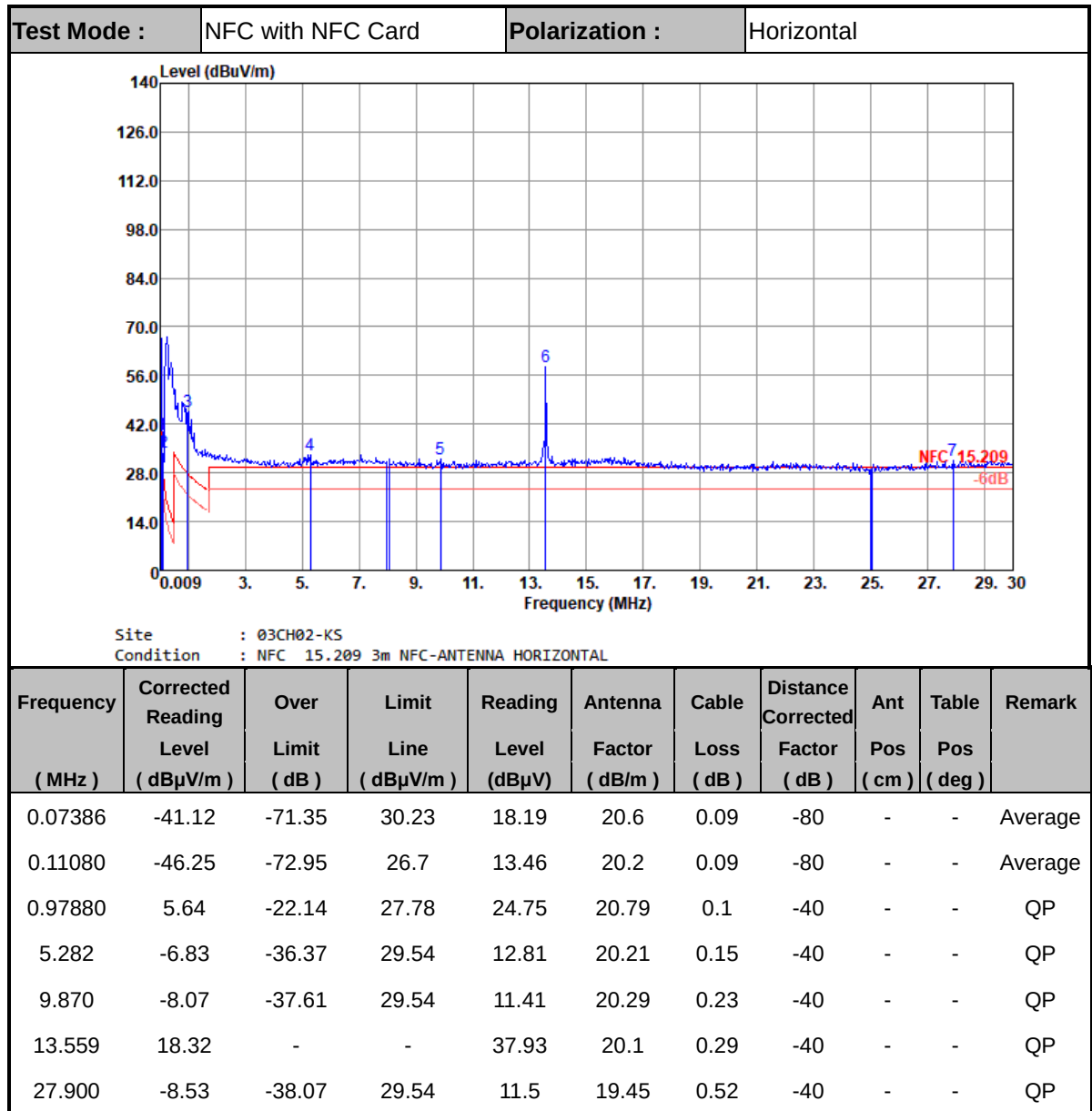
A1. Test Result of Field Strength of Fundamental Emissions

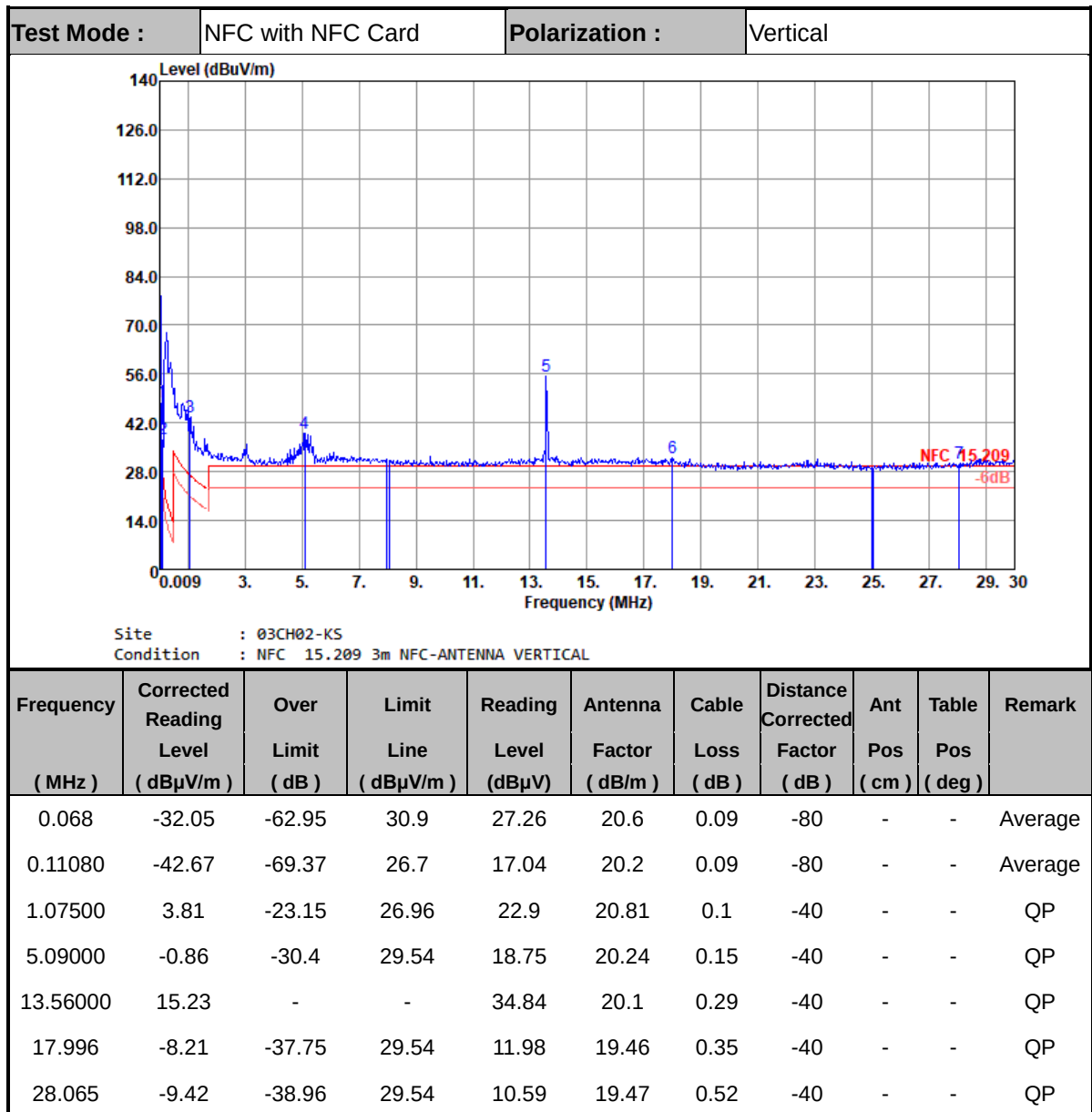



Note:

1. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
2. Distance extrapolation factor = 40 log (specific distance / test distance) (dB)
3. Corrected Reading Level (dBuV/m) = Measured Reading Level (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) + Distance Corrected factor
4. For 15.225 (b), (c) and (d) frequency of emission, the final test results are more than 40dB below the limit line, so the high emission frequencies are not remark.

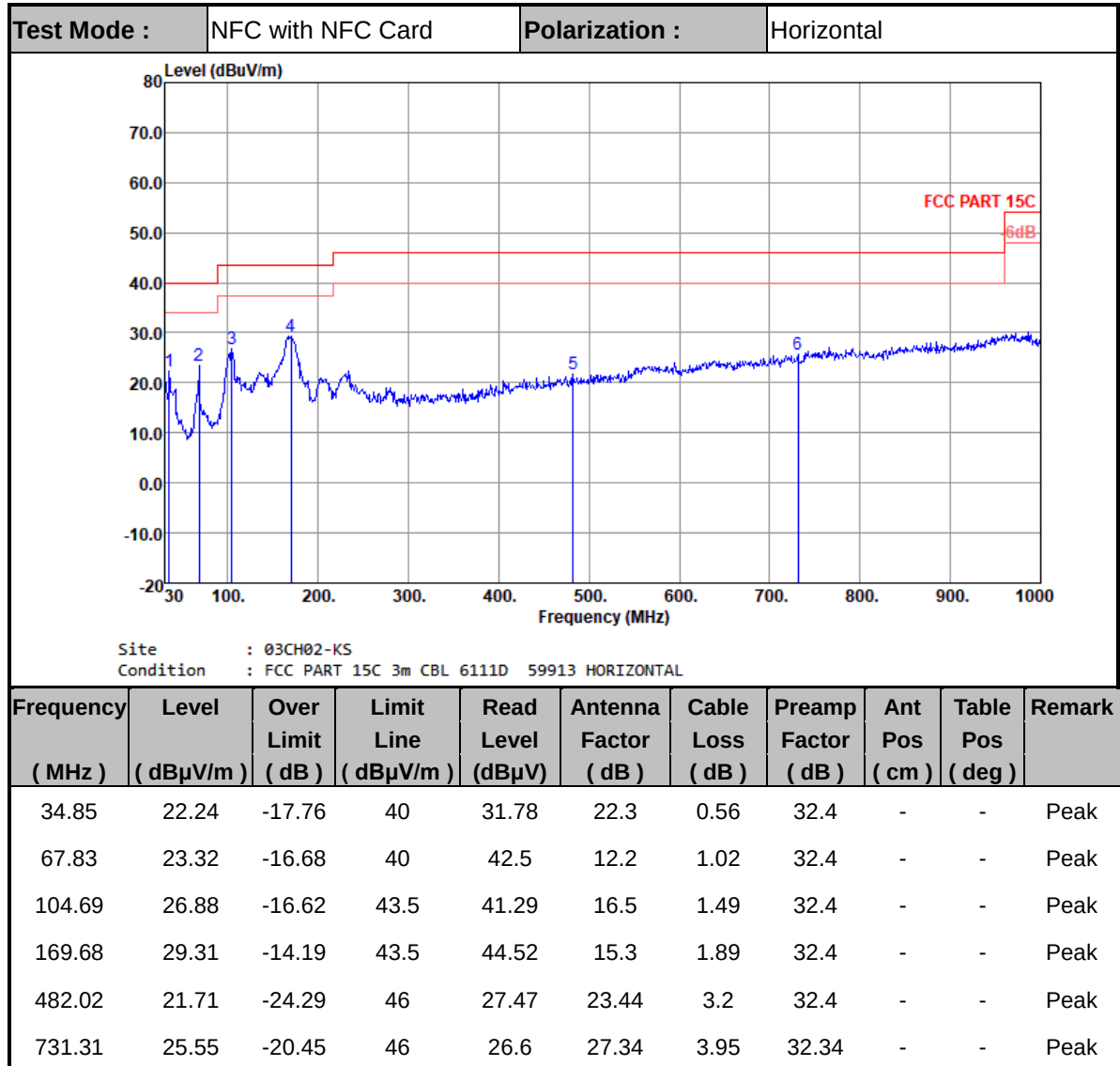
A2. Results of Radiated Spurious Emissions (9 kHz~30MHz)

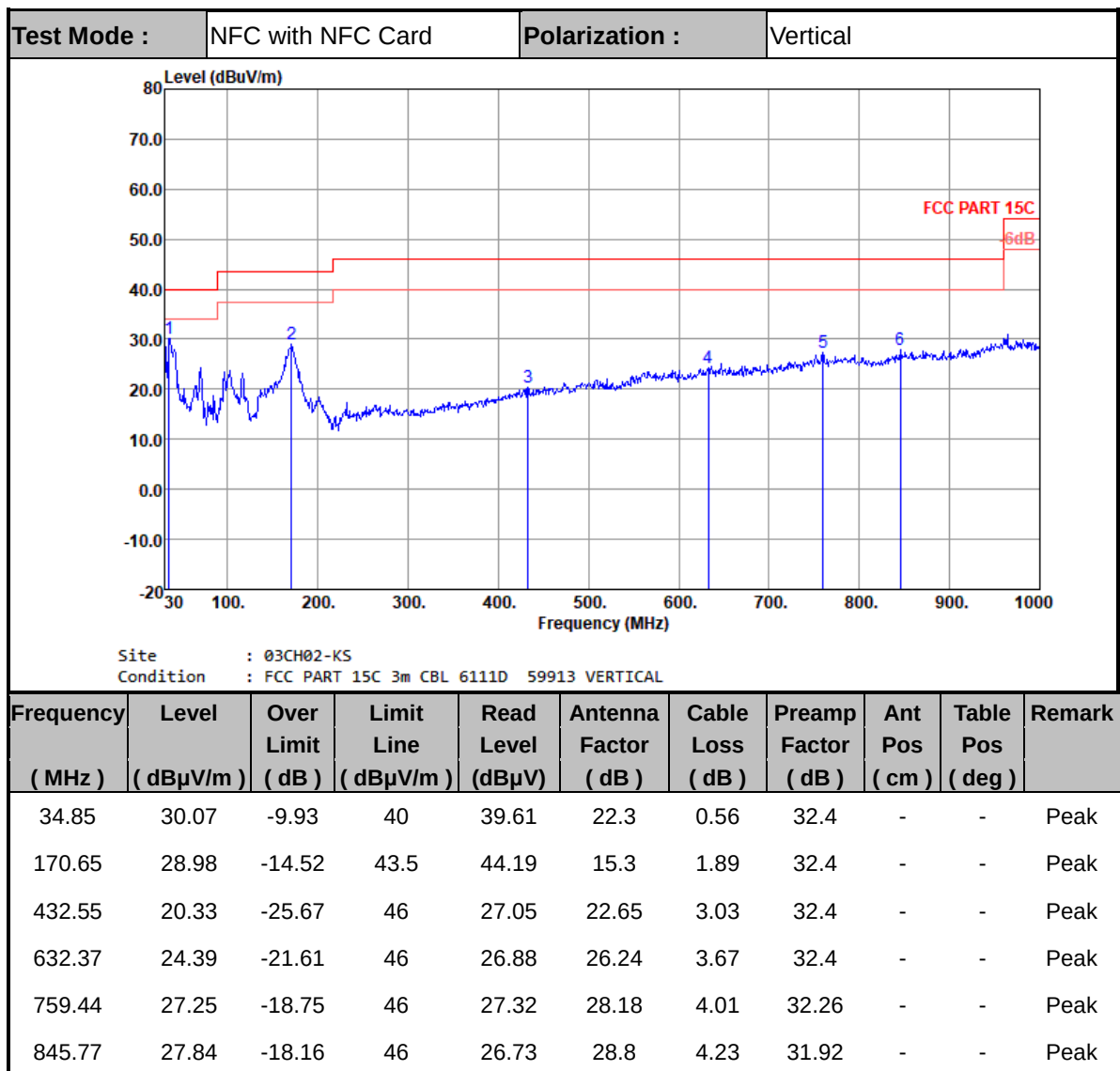



Note:

1. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
2. Distance extrapolation factor = 40 log (specific distance / test distance) (dB)
3. Corrected Reading Level (dBuV/m) = Measured Reading Level (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) + Distance Corrected factor
4. 13.56 MHz is fundamental signal which can be ignored

A3. Results of Radiated Spurious Emissions (30MHz~1GHz)




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.

————THE END————