

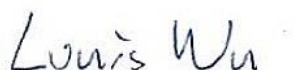


NCC RADIO TEST REPORT

Equipment : RFID Module
Brand Name : HID
Model Name : OMNIKEY 5127CK Reader Core
Applicant : 神基科技股份有限公司
新竹科學工業園區新竹縣寶山鄉研發二路 1 號 4 樓
Standard : NCC LP0002 (2020-07-01)

The product was received on Mar. 19, 2021 and testing was started from May 21, 2021 and completed on Jun. 23, 2021. We, Sporton International Inc. Wensan Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures NCC LP0002 (2020-07-01) 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. Wensan Laboratory, the test report shall not be reproduced except in full.



Reviewed by: Louis Wu

Sporton International Inc. Wensan Laboratory

No. 58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.)

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History of this test report

Report No.	Version	Description	Issued Date
TR151344A	01	Initial issue of report	Jun. 25, 2021
TR151344A	02	Revise information of support unit	Jun. 30, 2021

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	LP0002 3.3	AC Power Line Conducted Emissions	Pass	Under limit 13.55 dB at 3.757MHz
3.2	-	20dB Spectrum Bandwidth	Pass	-
	-	99% OBW Spectrum Bandwidth	Reporting only	-
3.3	LP0002 4.2.1.3	Frequency Stability	Pass	-
3.4	LP0002 4.2.1.1	Field Strength of Fundamental Emissions	Pass	Max level 18.66 dB μ V/m at 13.560 MHz
3.5	LP0002 3.6 4.2.1.2	Radiated Spurious Emissions	Pass	Under limit 6.13 dB at 745.860MHz
3.6	LP0002 3.2	Antenna Requirements	Pass	-
Annex A	LP0002 3.9	Receiver Radiated Emission	Pass	Please refer to Annex A

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.

Reviewed by: Yun Huang

Report Producer: Amy Chen

1. General Description

1.1 Product Feature of Equipment Under Test

RFID.

Product Specification subjective to this standard				
Tx / Rx Frequency		13.56 MHz		
Type of Modulation		ASK		
Antenna Information				
Antenna	Brand Name	Anjie	Peak Gain	N/A
	Model Name	TF1-ANT;LF+HF RFID Ant, B360 RFIDC ,Anjie	Type	Loop Antenna

Remark:

1. The detail internal, external and transmit antenna photo please refer to Sporton report no.: EP151344.
2. The above EUT's information was declared by manufacturer. Please refer to Comments and Explanations in report summary.

Specification of Accessory		
AC Adapter	Brand Name	Chicony
	Model Name	A15-090P1A
Battery	Brand Name	Getac
	Model Name	BP3S2P3450P-02
Capacitive stylus	Brand Name	Getac
	Model Name	34088620001, S410G2

The product was installed into Notebook (Brand Name: Getac, Model Name: S410G4) during test, which can be referred the following information:

Host Sample Information	
DVT SKUs	S410G4 SKU A
CPU	Tiger Lake QS-3-i7-None-vPro
Display Resolution	FHD
Discrete Graphics	MXM
Wifi/BT	Support(AX201)
Touch	Support
Sunlight Readable	Support
Main Storage	SSD 1TB
Battery	Main
2nd Storage	Not Support
Webcam	Support
Smart Card	Support
Option I/O Ports	NA
Discrete GPS	Support(EM9190)
Finger Print	Support
Contactless Smart Card(NFC)	Support
WWAN	Support(EM9190)

1.2 Modification of EUT

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

1.3 Testing Location

Test Site	Sporton International Inc. Wensan Laboratory		
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855		
Test Site No.	Sporton Site No.		
	TH05-HY	CO07-HY	03CH11-HY
Test Engineer	Oscar Chi	Howard Huang	Fu Chen and Troye Hsieh
Temperature	22~24°C	23~26°C	19.3~20.6°C
Relative Humidity	53~55%	40~50%	67.3~67.8%

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

FCC designation No.: TW3786

1.4 Applicable Standards

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

- ♦ NCC LP0002 (2020-07-01)
- ♦ 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. The TAF code is not including all the FCC KDB listed without accreditation.

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.

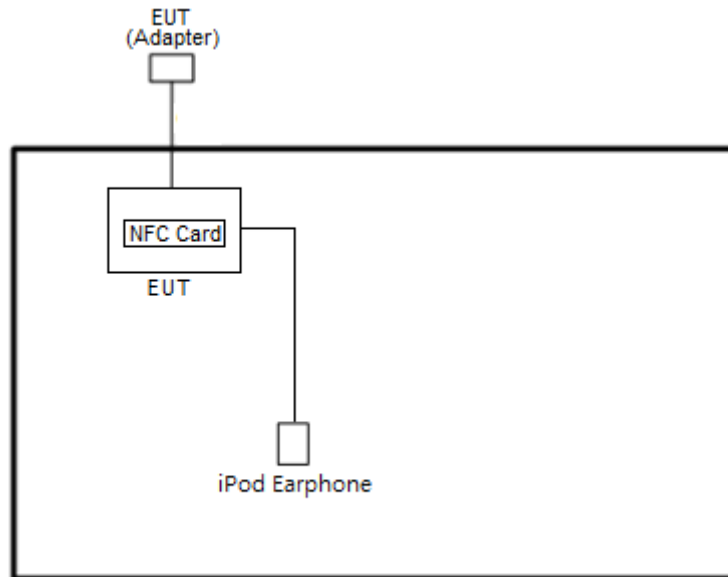
Test Items	
AC Power Line Conducted Emissions	Field Strength of Fundamental Emissions
20dB Spectrum Bandwidth	Frequency Stability
Radiated Emissions 9kHz~30MHz	Radiated Emissions 30MHz~1GHz

The EUT pre-scanned in four NFC type, A, B, F, V. The worst type (type F) was recorded in this report.

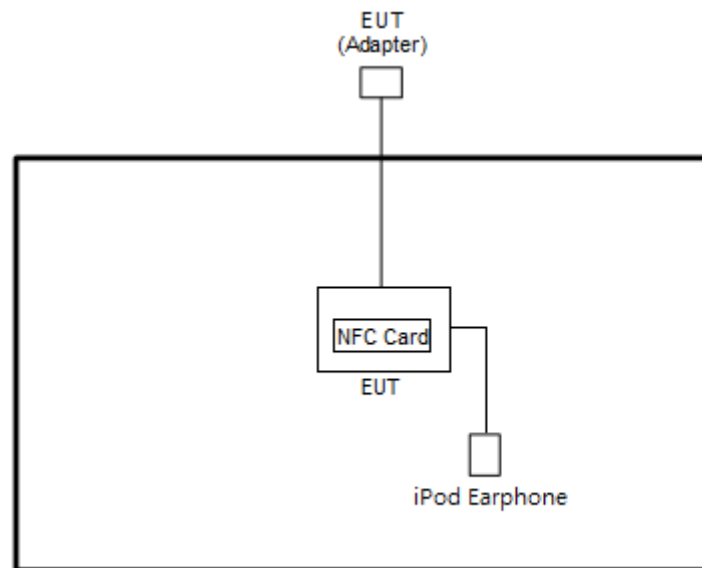
Test Cases	
AC Conducted Emission	Mode 1: RFID Link (13.56MHz) + Earphone + AC Adapter

2.2 Connection Diagram of Test System

<AC Conducted Emission Mode>



<NFC Tx Mode>



2.3 Table for Supporting Units

Item	Equipment	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
1.	iPod Earphone	Apple	A1285 Earphone	Verification	Unshielded, 1.0 m	N/A
2.	NFC Card	Metro Taipei	Easy Card	N/A	N/A	N/A

Remark: Applicant has ensured support unit would not be attached with the product on the market, support unit is provided by lab for testing.

2.4 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 transmitting signal (Power Level: Default) at 13.56MHz and is placed around 0 cm gap to the EUT.

3. Test Results

3.1 AC Power Line Conducted Emissions Measurement

3.1.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi-Peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

For terminal test result, the testing follows FCC KDB 174176.

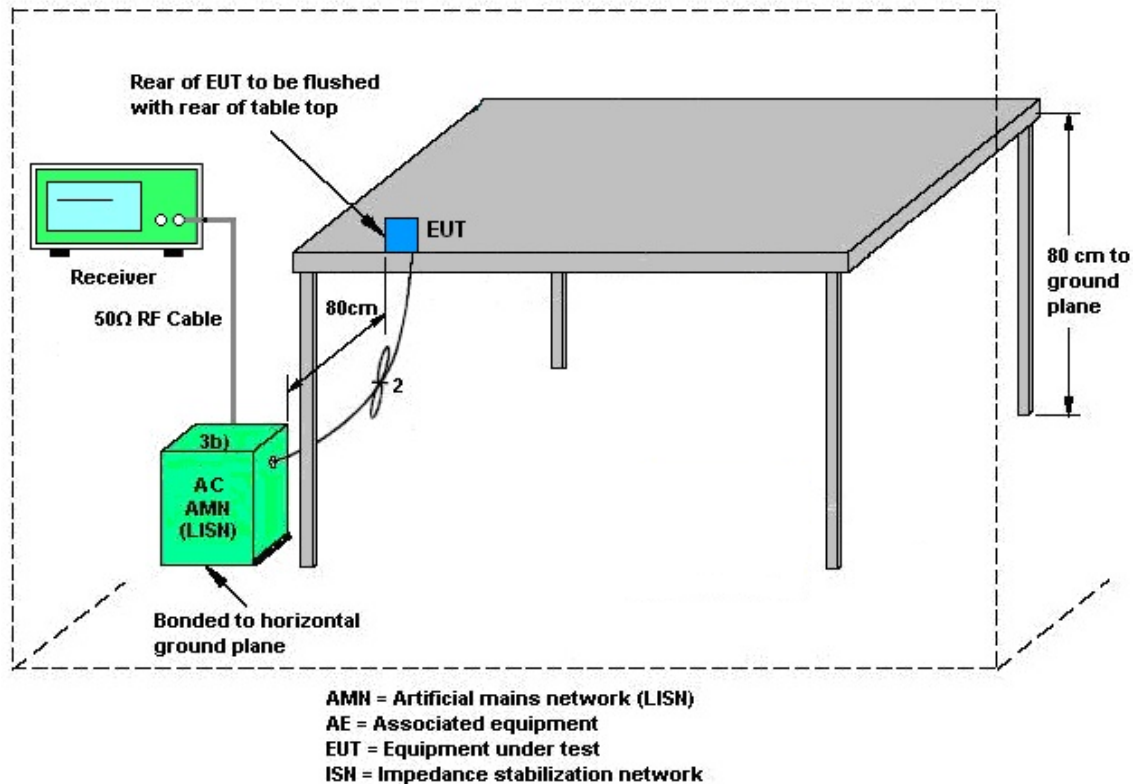
3.1.2 Measuring Instruments

See list of measuring equipment of this test report.

3.1.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN shall be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

3.1.4 Test setup



3.1.5 Test Result of AC Conducted Emission

Please refer to Appendix A.

Note:

(1) with antenna

Remark: 13.560MHz is the NFC RF fundamental signal.

(2) with dummy load

Remark: Only the fundamental NFC signal needs to be retested per C63.4.

3.2 20dB and 99% OBW Spectrum Bandwidth Measurement

3.2.1 Limit

Intentional radiators must be designed to ensure that the 20 dB and 99% emission bandwidth in the specific band 13.553~13.567 MHz.

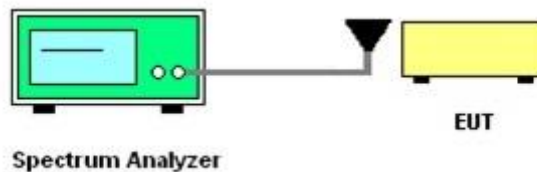
3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.2.3 Test Procedures

1. The spectrum analyzer connected via a receive antenna placed near the EUT in peak Max Hold Mode.
2. The resolution bandwidth of 1 kHz and the video bandwidth of 3 kHz were used.
3. Measured the spectrum width with power higher than 20 dB below carrier.
4. Measured the 99% OBW.

3.2.4 Test Setup



3.2.5 Test Result of Conducted Test Items

Please refer to Appendix B.

3.3 Frequency Stability Measurement

3.3.1 Limit

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% (100ppm) 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 by using a new battery.

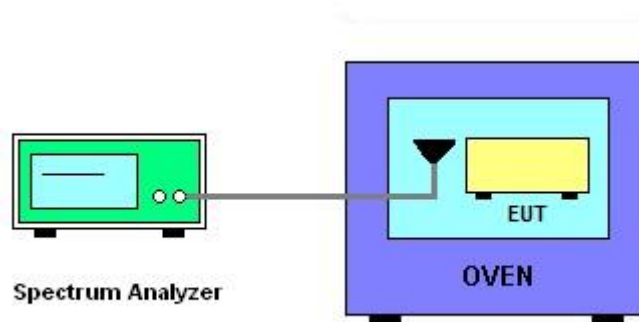
3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

3.3.3 Test Procedures

1. The spectrum analyzer connected via a receive antenna placed near the EUT.
2. EUT has transmitted signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire emissions bandwidth.
4. Set RBW = 1 kHz, VBW = 3 kHz with peak detector and maxhold settings.
5. The f_c is declaring of channel frequency. Then the frequency error formula is $(f_c - f)/f_c \times 10^6$ ppm and the limit is less than ± 100 ppm.
6. Extreme temperature rule is -20°C~50°C.

3.3.4 Test Setup



3.3.5 Test Result of Conducted Test Items

Please refer to Appendix B.

3.4 Field Strength of Fundamental Emissions and Mask Measurement

3.4.1 Limit

Rules and specifications	NCC LP0002 4.2.1.1			
Description	Compliance with the spectrum mask is tested with RBW set to 9kHz.			
Freq. of Emission (MHz)	Field Strength ($\mu\text{V/m}$) at 30m	Field Strength (dB $\mu\text{V/m}$) at 30m	Field Strength (dB $\mu\text{V/m}$) at 10m	Field Strength (dB $\mu\text{V/m}$) at 3m
13.553~13.567	15848	84.0	103.08	124.0

Remark:

1. 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.
2. Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB)

3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

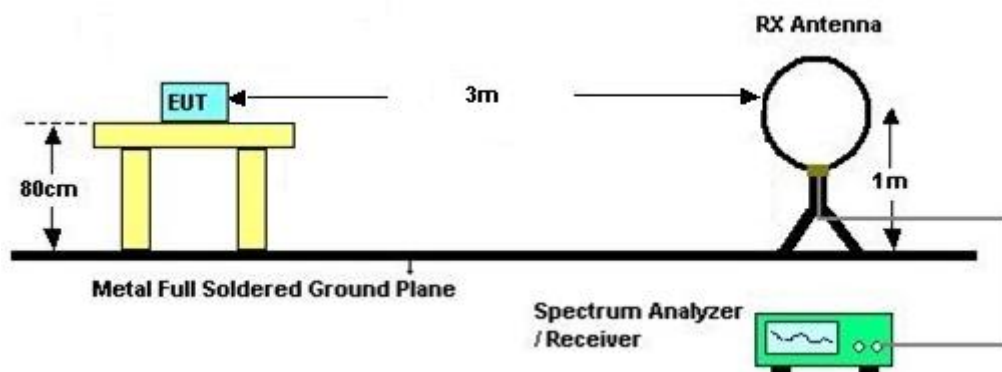
3.4.3 Test Procedures

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.

Note: Emission level (dBμV/m) = 20 log Emission level (μV/m).

3.4.4 Test Setup

For radiated test below 30MHz



3.4.5 Test Result of Field Strength of Fundamental Emissions and Mask

Please refer to Appendix C.

3.5 Radiated Emissions Measurement

3.5.1 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

3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

3.5.3 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

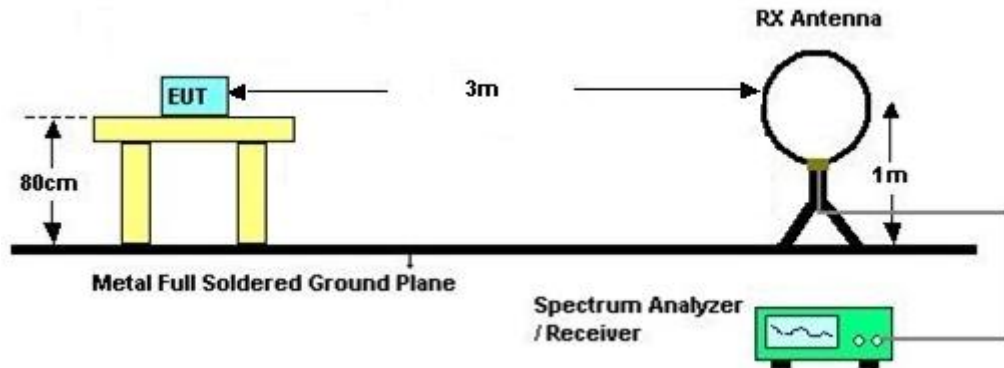
Note: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz and 110-490 kHz. Radiated emission limits in these two bands are based on measurements employing an average detector.

3.5.4 Test Procedures

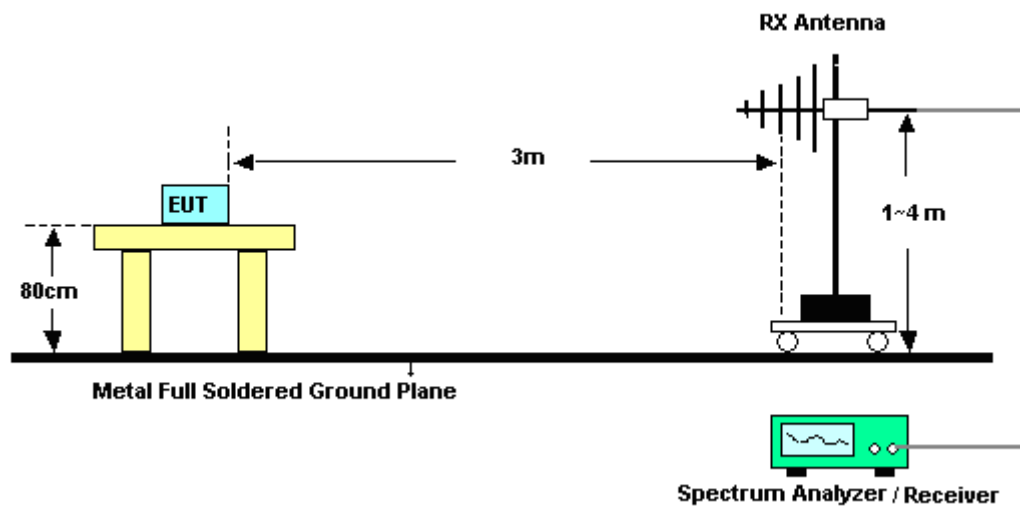
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting 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 30 MHz, loop antenna has to be used for measurement and the recorded data shall be QP measured by receiver.

3.5.5 Test Setup

For radiated test below 30MHz



For radiated test above 30MHz



3.5.6 Test Result of Radiated Emissions Measurement

Please refer to Appendix C.

Remark: 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.

3.6 Antenna Requirements

3.6.1 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 LP0002 Section 3.2.

3.6.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.



4. List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Software	Audix	E3 6.2009-8-24	RK-001053	N/A	N/A	Jun. 15, 2021~ Jun. 16, 2021	N/A	Radiation (03CH11-HY)
Amplifier	SONOMA	310N	187312	9kHz~1GHz	Dec. 02, 2020	Jun. 15, 2021~ Jun. 16, 2021	Dec. 01, 2021	Radiation (03CH11-HY)
Bilog Antenna	TESEQ	CBL 6111D & N-6-06	35414 & AT-N0602	30MHz~1GHz	Oct. 11, 2020	Jun. 15, 2021~ Jun. 16, 2021	Oct. 10, 2021	Radiation (03CH11-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Jan. 04, 2021	Jun. 15, 2021~ Jun. 16, 2021	Jan. 03, 2022	Radiation (03CH11-HY)
Controller	EMEC	EM 1000	N/A	Control Turn table & Ant Mast	N/A	Jun. 15, 2021~ Jun. 16, 2021	N/A	Radiation (03CH11-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1~4m	N/A	Jun. 15, 2021~ Jun. 16, 2021	N/A	Radiation (03CH11-HY)
Turn Table	EMEC	TT 2000	N/A	0~360 Degree	N/A	Jun. 15, 2021~ Jun. 16, 2021	N/A	Radiation (03CH11-HY)
EMI Test Receiver	Keysight	N9038A(MXE)	MY57290111	20MHz~8.4GHz	Dec. 11, 2020	Jun. 15, 2021~ Jun. 16, 2021	Dec. 10, 2021	Radiation (03CH11-HY)
Filter	Wainwright	WHK20/1000C 7/40SS	SN2	20M High Pass	Sep. 14, 2020	Jun. 15, 2021~ Jun. 16, 2021	Sep. 13, 2021	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4PE	9kHz-30MHz	Mar. 11, 2021	Jun. 15, 2021~ Jun. 16, 2021	Mar. 10, 2022	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4PE	30M-18G	Mar. 11, 2021	Jun. 15, 2021~ Jun. 16, 2021	Mar. 10, 2022	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY2859/2	30MHz-40GHz	Mar. 11, 2021	Jun. 15, 2021~ Jun. 16, 2021	Mar. 10, 2022	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY4274/2	30MHz-40GHz	Mar. 11, 2021	Jun. 15, 2021~ Jun. 16, 2021	Mar. 10, 2022	Radiation (03CH11-HY)
Hygrometer	TECPEL	DTN-303B	TP200880	QA-3-031	Oct. 22, 2020	Jun. 15, 2021~ Jun. 16, 2021	Oct. 21, 2021	Radiation (03CH11-HY)
Hygrometer	TECPEL	DTN-303B	TP140325	N/A	Nov. 18, 2020	Jun. 15, 2021~ Jun. 16, 2021	Nov. 17, 2021	Radiation (03CH11-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	May 21, 2021	N/A	Conducted (TH05-HY)
Hygrometer	Testo	608-H1	34893241	N/A	Mar. 03, 2021	May 21, 2021	Mar. 02, 2022	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP30	101329	9kHz~30GHz	Sep. 03, 2020	May 21, 2021	Sep. 02, 2021	Conducted (TH05-HY)
Temperature Chamber	ESPEC	SH-641	92013720	-40℃~90℃	Sep. 14, 2020	May 21, 2021	Sep. 13, 2021	Conducted (TH05-HY)
AC Power Source	ACPOWER	AFC-11003G	F317040033	N/A	N/A	Jun. 23, 2021	N/A	Conduction (CO07-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	Jun. 23, 2021	N/A	Conduction (CO07-HY)
Pulse Limiter	SCHWARZBE CK	VTSD 9561-F N	9561-F N00373	9kHz-200MHz	Nov. 02, 2020	Jun. 23, 2021	Nov. 01, 2021	Conduction (CO07-HY)
RF Cable	HUBER + SUHNER	RG 214/U	1358175	9kHz~30MHz	N/A	Jun. 23, 2021	N/A	Conduction (CO07-HY)
Two-Line V-Network	TESEQ	NNB 51	45051	N/A	Feb. 01, 2021	Jun. 23, 2021	Jan. 31, 2022	Conduction (CO07-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102317	9kHz~3.6GHz	Sep. 11, 2020	Jun. 23, 2021	Sep. 10, 2021	Conduction (CO07-HY)

5. Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.2 dB
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Uncertainty of Radiated Emission Measurement (9 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	3.4 dB
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	4.4 dB
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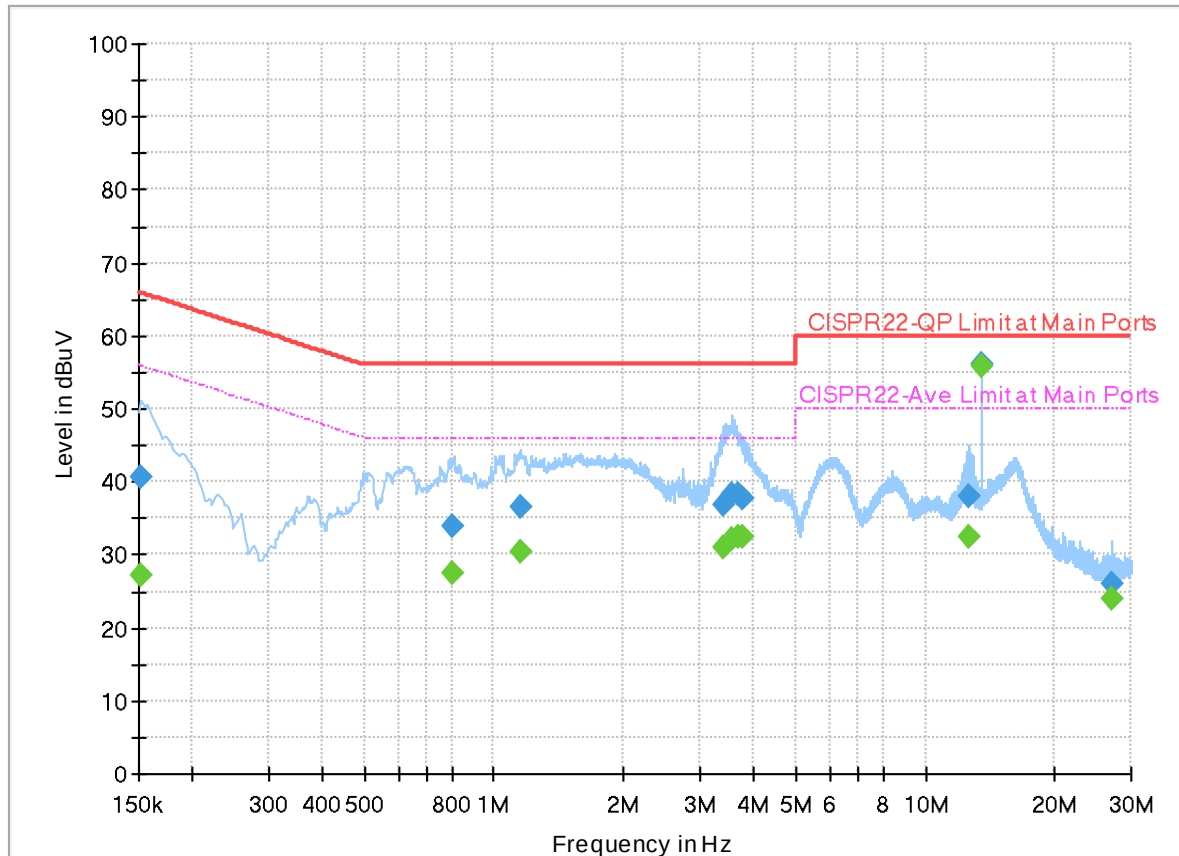
Appendix A. Test Results of Conducted Emission Test

Test Engineer :	Howard Huang	Temperature :	23~26°C
		Relative Humidity :	40~50%

Original

Report NO : 151344
 Test Mode : Mode 1
 Test Voltage : 110Vac/60Hz
 Phase : Line

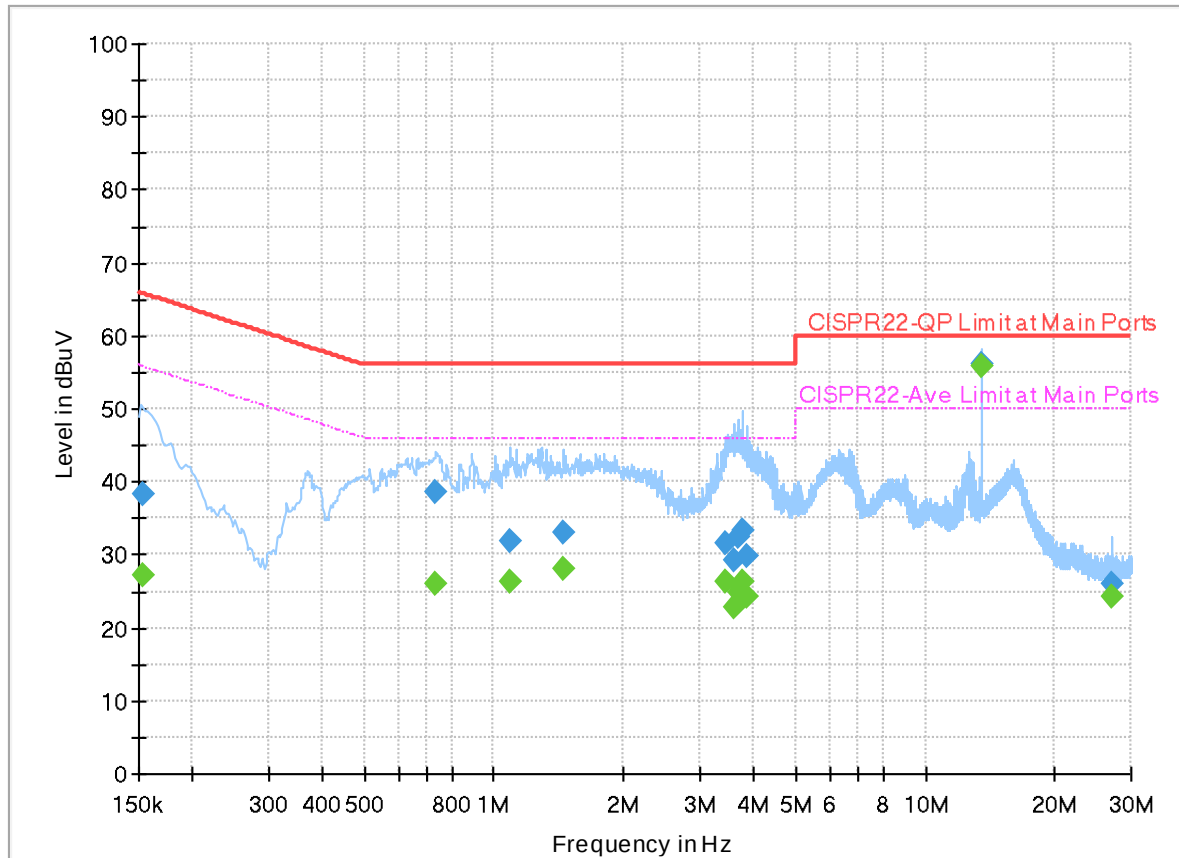
Full Spectrum

**Final Result**

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.151620	---	27.33	55.91	28.58	L1	OFF	20.0
0.151620	40.75	---	65.91	25.16	L1	OFF	20.0
0.804300	---	27.54	46.00	18.46	L1	OFF	20.0
0.804300	33.90	---	56.00	22.10	L1	OFF	20.0
1.151250	---	30.45	46.00	15.55	L1	OFF	20.0
1.151250	36.65	---	56.00	19.35	L1	OFF	20.0
3.414750	---	30.94	46.00	15.06	L1	OFF	20.1
3.414750	36.77	---	56.00	19.23	L1	OFF	20.1
3.570630	---	32.25	46.00	13.75	L1	OFF	20.1
3.570630	38.41	---	56.00	17.59	L1	OFF	20.1
3.666750	---	32.39	46.00	13.61	L1	OFF	20.1
3.666750	38.19	---	56.00	17.81	L1	OFF	20.1
3.756750	---	32.45	46.00	13.55	L1	OFF	20.1
3.756750	37.83	---	56.00	18.17	L1	OFF	20.1
12.652890	---	32.45	50.00	17.55	L1	OFF	20.2
12.652890	37.92	---	60.00	22.08	L1	OFF	20.2
13.560000	---	55.78	50.00	-5.78	L1	OFF	20.2
13.560000	56.20	---	60.00	3.80	L1	OFF	20.2
27.120000	---	24.02	50.00	25.98	L1	OFF	20.2
27.120000	25.90	---	60.00	34.10	L1	OFF	20.2

Report NO : 151344
 Test Mode : Mode 1
 Test Voltage : 110Vac/60Hz
 Phase : Neutral

Full Spectrum



Final Result

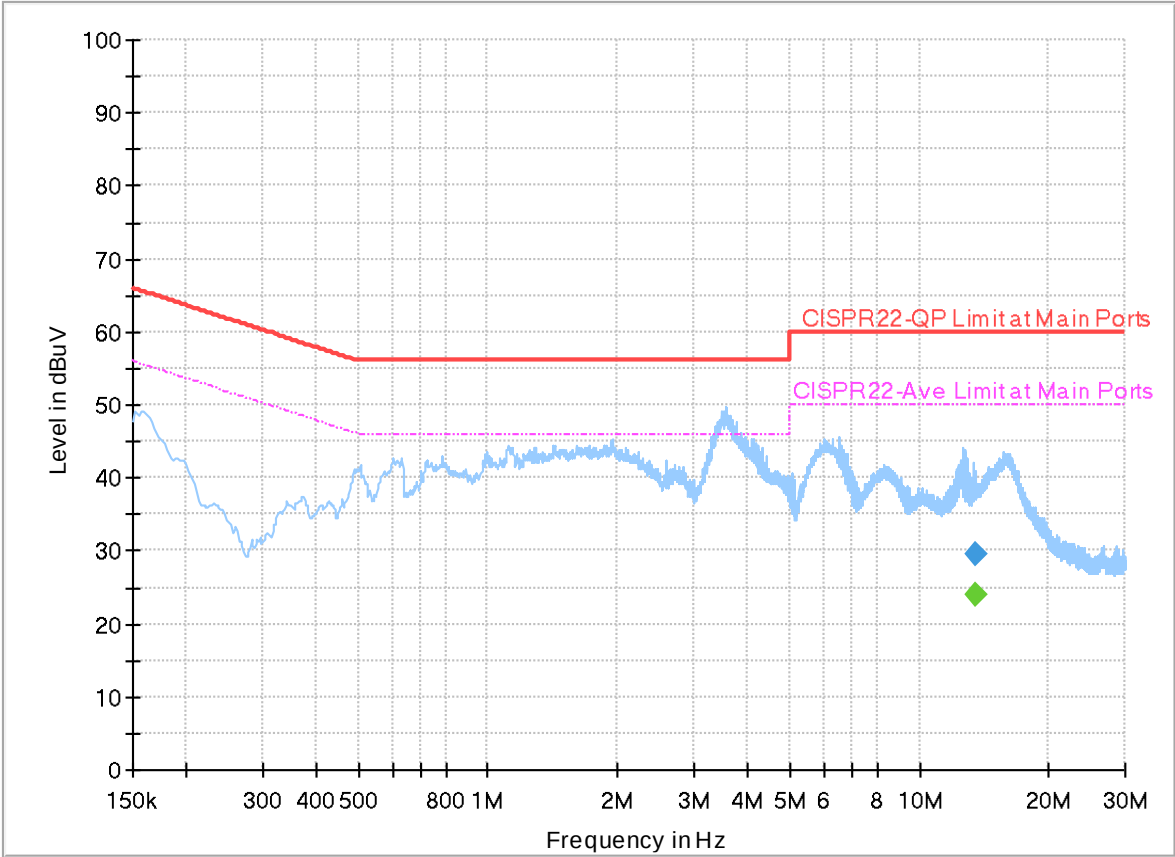
Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152790	---	27.13	55.85	28.72	N	OFF	20.0
0.152790	38.17	---	65.85	27.68	N	OFF	20.0
0.732840	---	26.01	46.00	19.99	N	OFF	20.0
0.732840	38.61	---	56.00	17.39	N	OFF	20.0
1.087350	---	26.39	46.00	19.61	N	OFF	20.0
1.087350	32.00	---	56.00	24.00	N	OFF	20.0
1.455000	---	27.99	46.00	18.01	N	OFF	20.0
1.455000	33.14	---	56.00	22.86	N	OFF	20.0
3.445350	---	26.29	46.00	19.71	N	OFF	20.1
3.445350	31.47	---	56.00	24.53	N	OFF	20.1
3.585930	---	22.75	46.00	23.25	N	OFF	20.1
3.585930	29.24	---	56.00	26.76	N	OFF	20.1
3.693660	---	24.80	46.00	21.20	N	OFF	20.1
3.693660	32.35	---	56.00	23.65	N	OFF	20.1
3.773400	---	26.33	46.00	19.67	N	OFF	20.1
3.773400	33.44	---	56.00	22.56	N	OFF	20.1
3.853500	---	24.26	46.00	21.74	N	OFF	20.1
3.853500	29.85	---	56.00	26.15	N	OFF	20.1
13.560000	---	55.83	50.00	-5.83	N	OFF	20.2
13.560000	56.21	---	60.00	3.79	N	OFF	20.2
27.120000	---	24.33	50.00	25.67	N	OFF	20.3
27.120000	26.16	---	60.00	33.84	N	OFF	20.3

Terminal

Report NO :
Test Mode :
Test Voltage :
Phase :

151344
Mode 1
110Vac/60Hz
Line

Full Spectrum

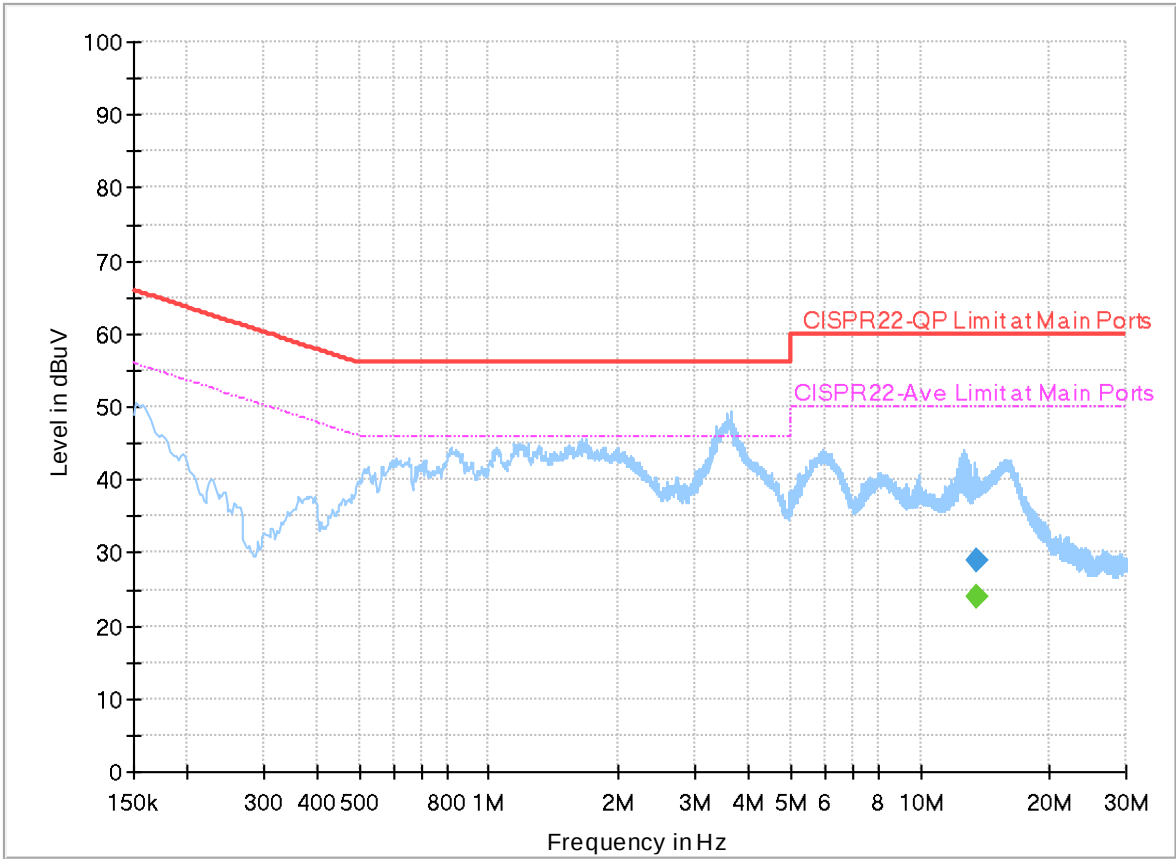


Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
13.560000	---	24.10	50.00	25.90	L1	OFF	20.2
13.560000	29.41	---	60.00	30.59	L1	OFF	20.2

Report NO : 151344
Test Mode : Mode 1
Test Voltage : 110Vac/60Hz
Phase : Neutral

Full Spectrum

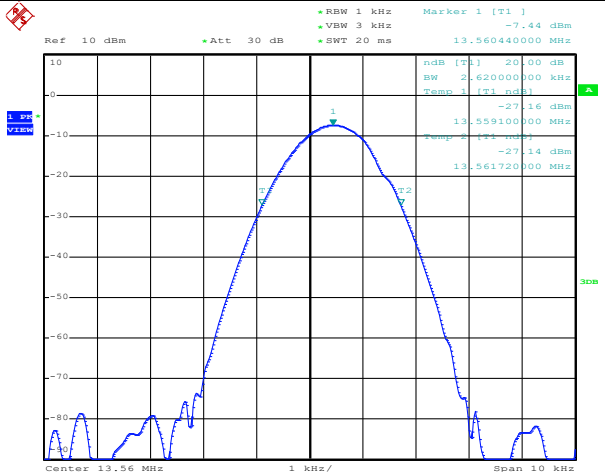
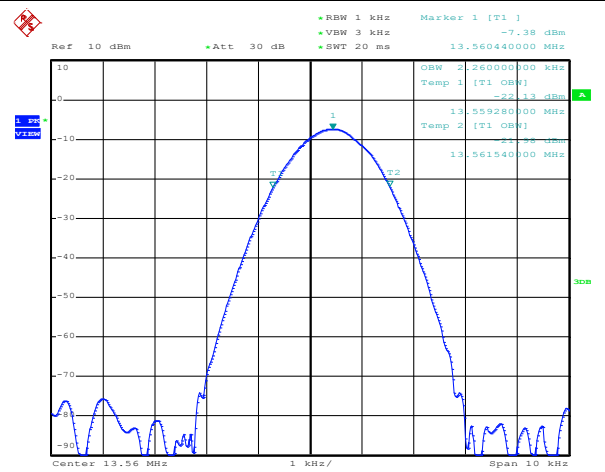


Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
13.560000	28.99	---	60.00	31.01	N	OFF	20.2
13.560000	---	24.12	50.00	25.88	N	OFF	20.2

Appendix B. Test Results of Conducted Test Items

B1. Test Result of 20dB Spectrum Bandwidth

Test mode		Test Frequency (MHz)	
NFC Tx		13.56	
 Ref 10 dBm Att 30 dB RBW 1 kHz VBW 3 kHz SWT 20 ms Marker 1 [T1] 13.560440000 MHz -7.44 dBm ndB [T1] 20.00 dB BW 2.620000000 kHz Temp 1 [T1 dBm] -27.16 dBm 13.559100000 MHz Temp 2 [T1 dBm] -27.14 dBm 13.561720000 MHz Center 13.56 MHz 1 kHz/ Span 10 kHz Date: 21.MAY.2021 16:39:36		 Ref 10 dBm Att 30 dB RBW 1 kHz VBW 3 kHz SWT 20 ms Marker 1 [T1] 13.560440000 MHz -7.38 dBm OBW 2.260000000 kHz Temp 1 [T1 OBW] -27.13 dBm 13.559280000 MHz Temp 2 [T1 OBW] -27.38 dBm 13.561540000 MHz Center 13.56 MHz 1 kHz/ Span 10 kHz Date: 21.MAY.2021 16:38:35	
20dB Bandwidth (kHz)	2.620	99% OccupiedBW(kHz)	2.260
Frequency range (MHz)	$f_L > 13.553$	13.55910	Test Result
	$f_H < 13.567$	13.56172	Complies

Remark: Because the measured signal is CW adjusting the RBW per C63.10 would not be practical since measured bandwidth will always follow the RBW and the result will be approximately twice the RBW.

**B2. Test Result of Frequency Stability**

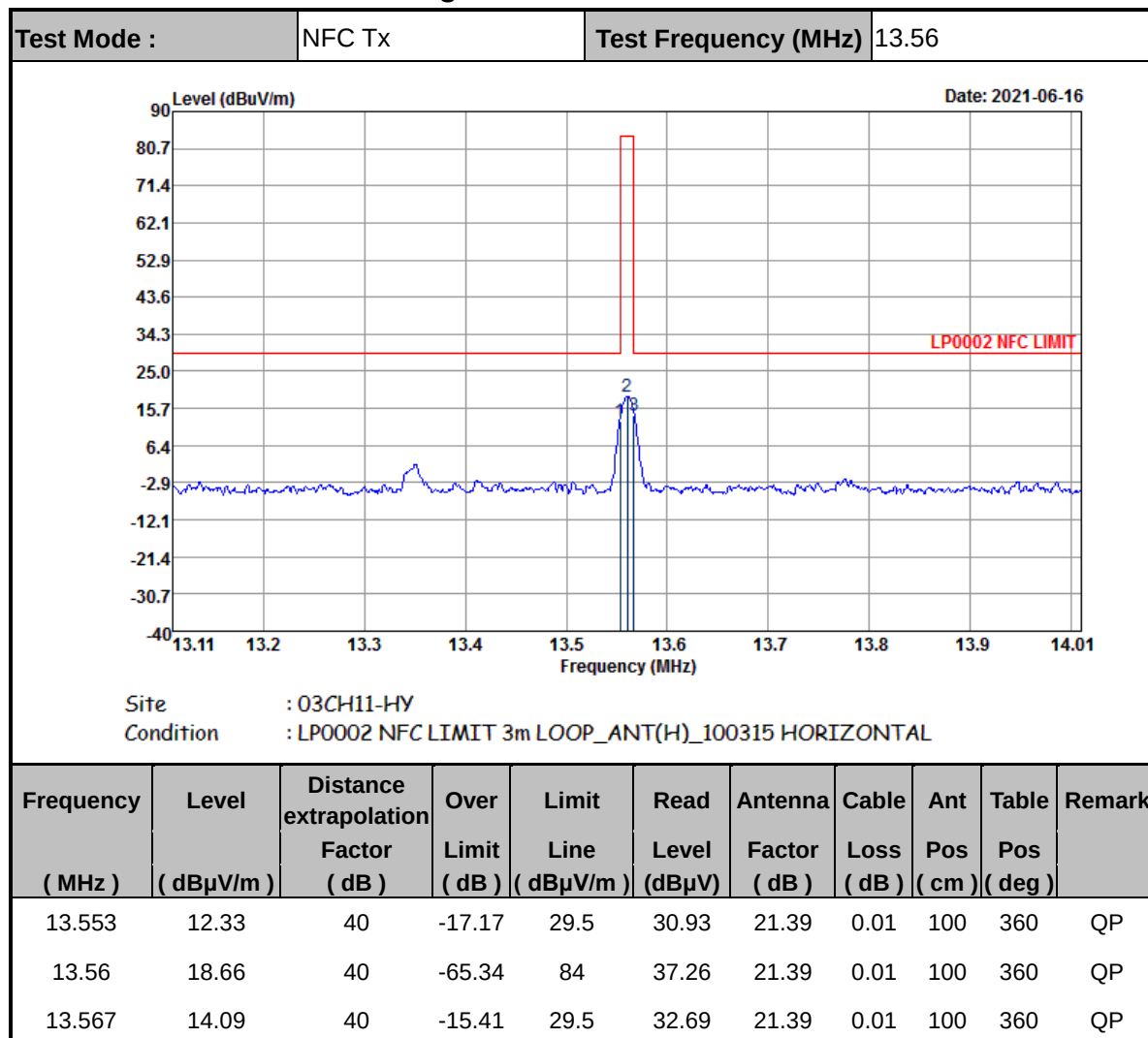
Voltage vs. Frequency Stability		Temperature vs. Frequency Stability		
Voltage (Vac)	Measurement Frequency (MHz)	Temperature (°C)	Time	Measurement Frequency (MHz)
110	13.560410	-20	0	13.560500
93.5	13.560400		2	13.560500
126.5	13.560410		5	13.560500
			10	13.560500
		-10	0	13.560480
			2	13.560480
			5	13.560480
			10	13.560480
		0	0	13.560440
			2	13.560440
			5	13.560440
			10	13.560440
		10	0	13.560410
			2	13.560410
			5	13.560420
			10	13.560410
		20	0	13.560410
			2	13.560400
			5	13.560420
			10	13.560410
		30	0	13.560420
			2	13.560400
			5	13.560400
			10	13.560380
		40	0	13.560380
			2	13.560380
			5	13.560380
			10	13.560380

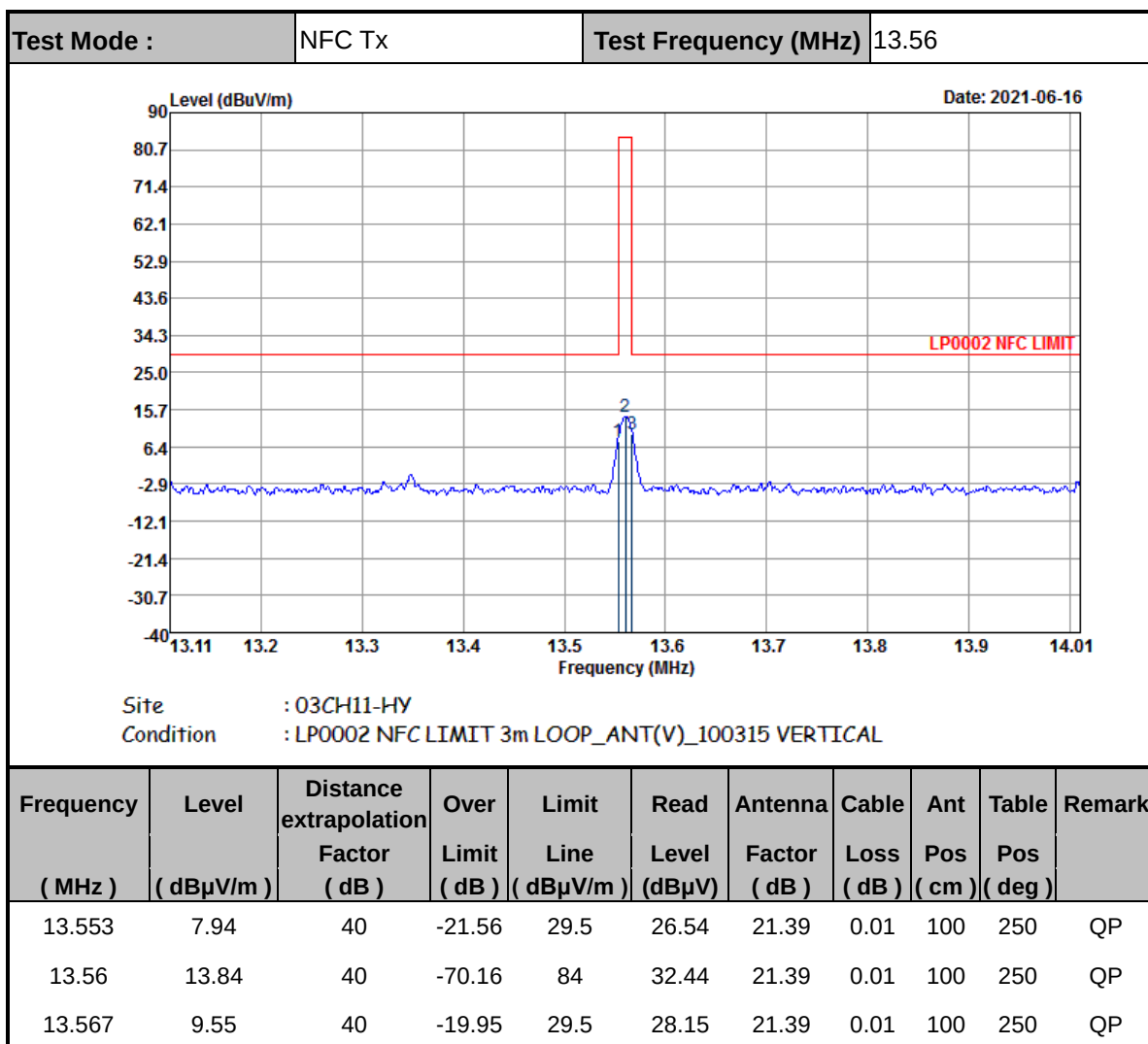


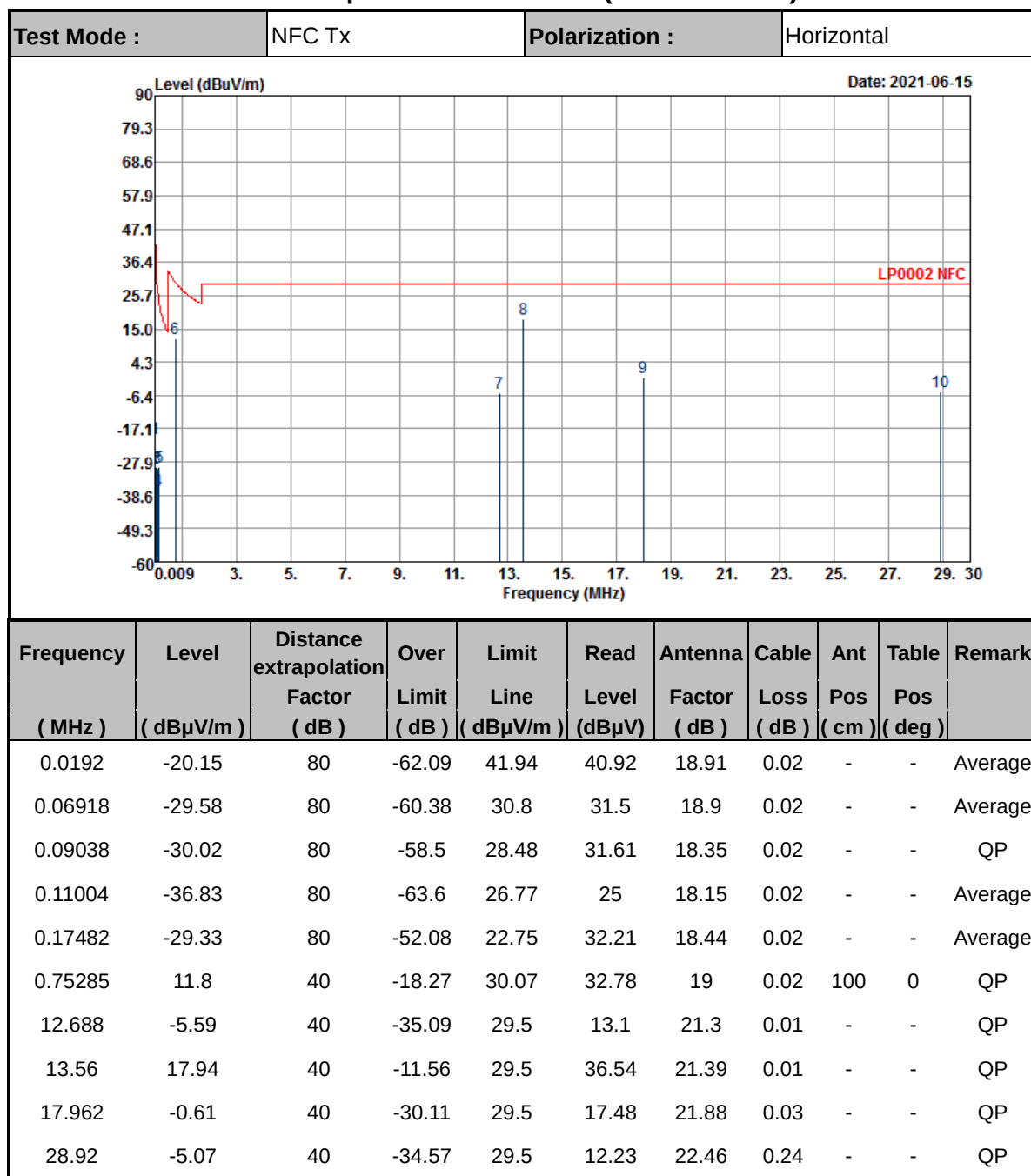
Voltage vs. Frequency Stability		Temperature vs. Frequency Stability		
Voltage (Vac)	Measurement Frequency (MHz)	Temperature (°C)	Time	Measurement Frequency (MHz)
		50	0	13.560380
			2	13.560380
			5	13.560380
			10	13.560380
Max.Deviation (MHz)	0.000410	Max.Deviation (MHz)		0.000500
Max.Deviation (ppm)	30.2360	Max.Deviation (ppm)		36.8732
Limit	FS < ±100 ppm	Limit		FS < ±100 ppm
Test Result	PASS	Test Result		PASS

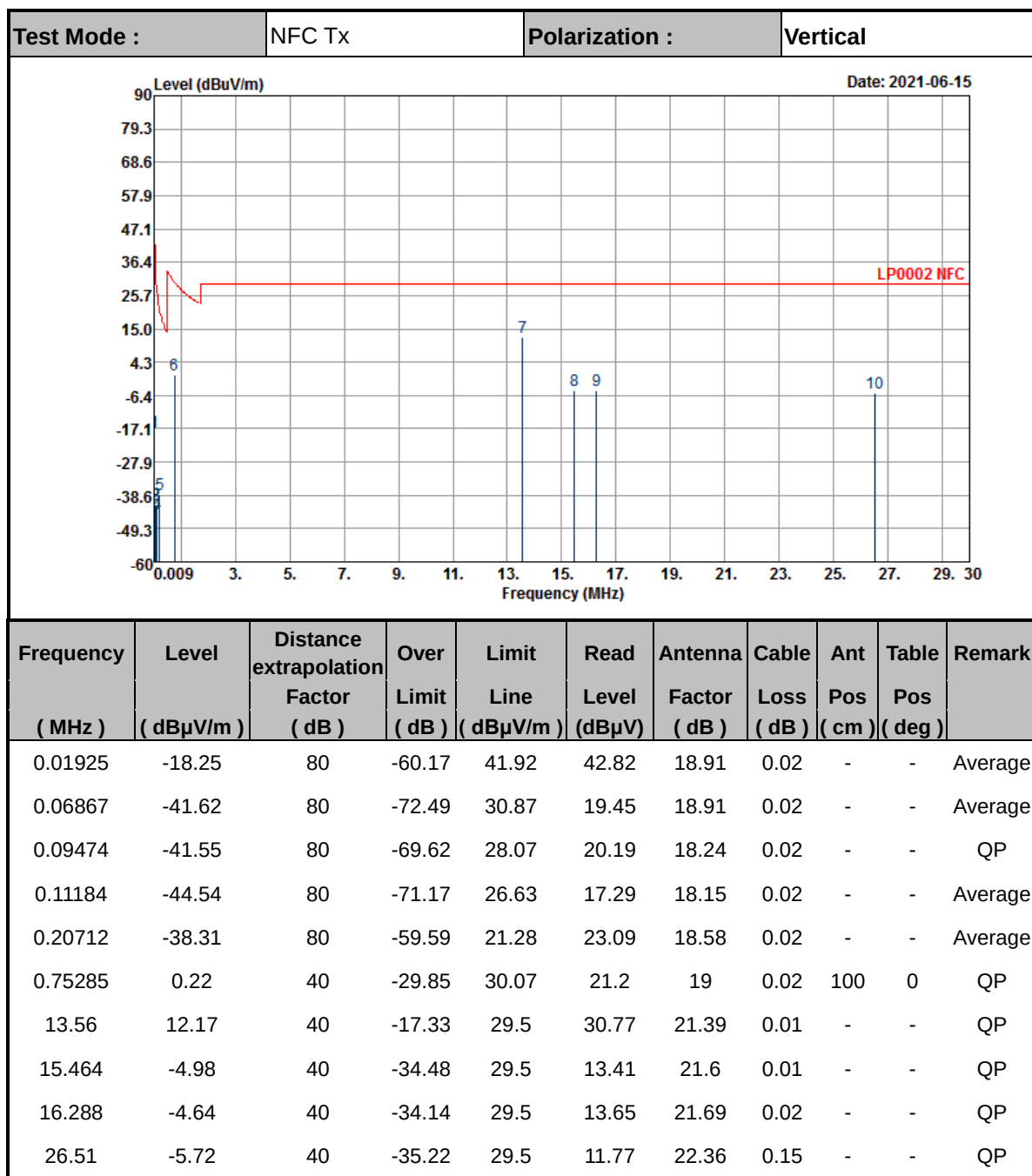
Appendix C. Test Results of Radiated Test Items

C1. Test Result of Field Strength of Fundamental Emissions

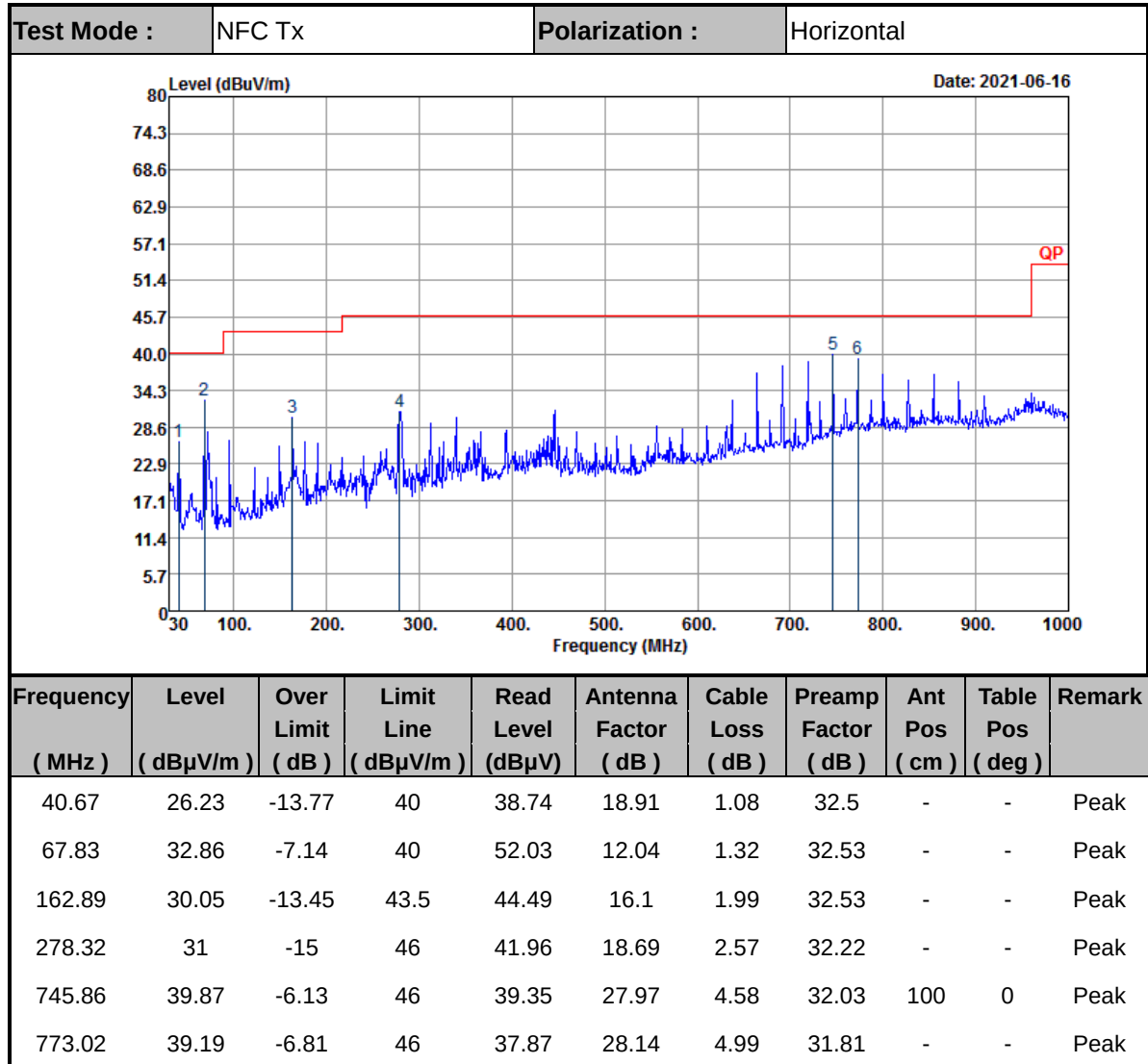


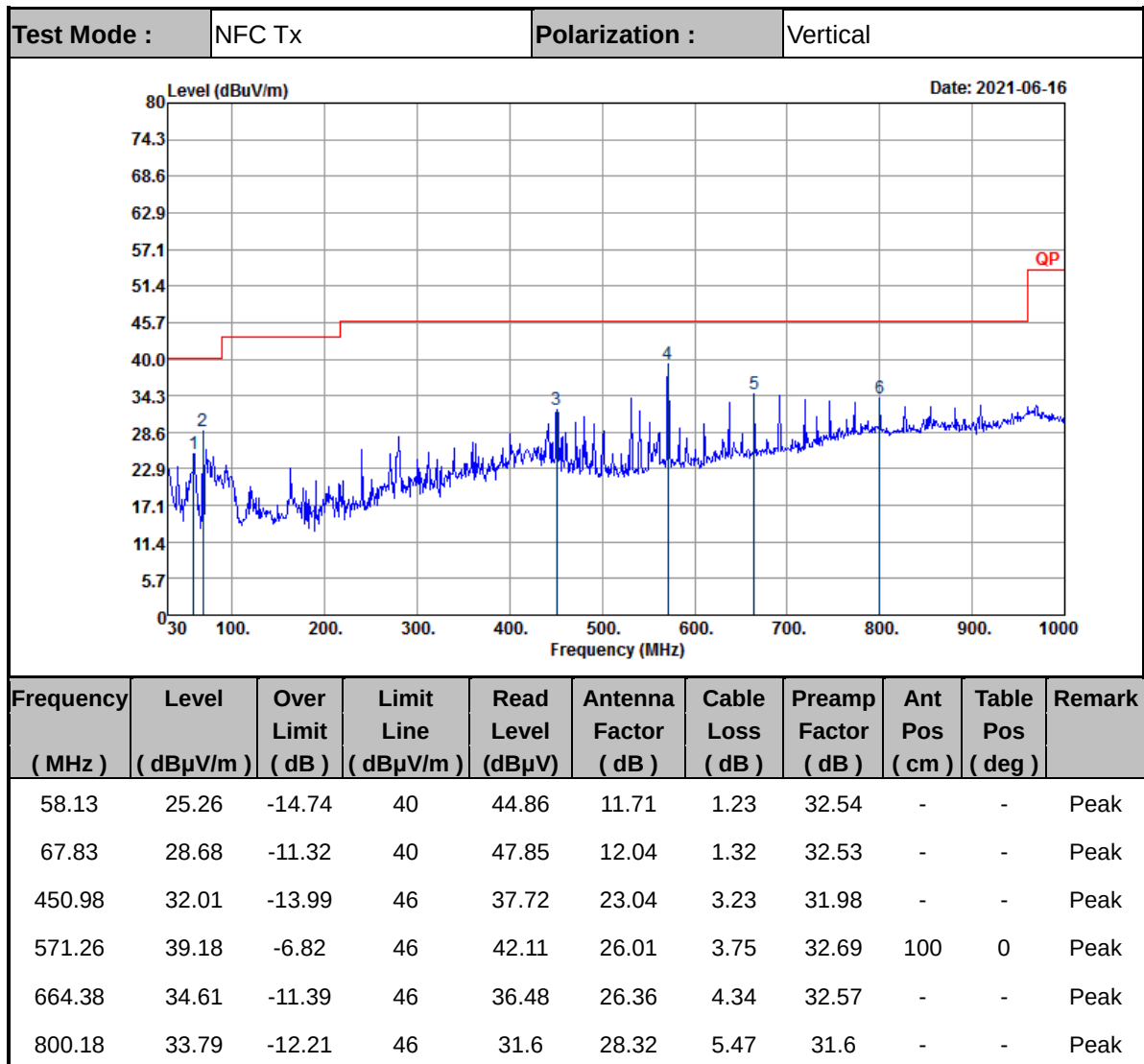


C2. Results of Radiated Spurious Emissions (9 kHz~30MHz)



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 = $40 \log (\text{specific distance} / \text{test distance})$ (dB)
3. Limit line = specific limits (dBμV) + distance extrapolation factor
4. 13.56 MHz is fundamental signal which can be ignored

C3. 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.

Annex. A Receiver Radiated Emission Measurement

A.1 Limit of Receiver Radiated Emission

Frequency (MHz)	Field Strength (microvolts/meter)	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

A.2 Measuring Instruments

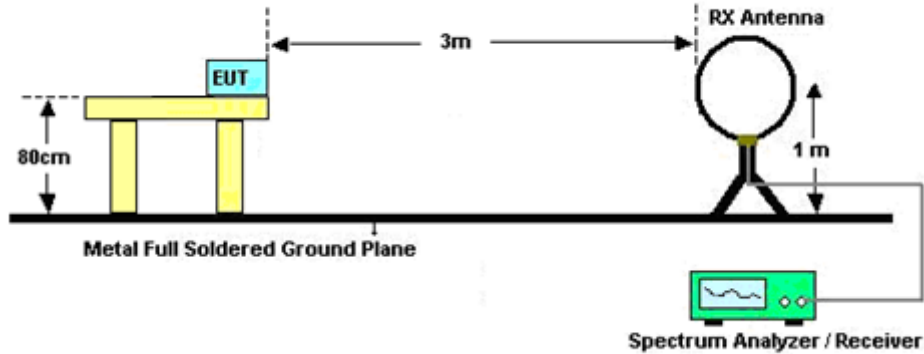
See list of measuring equipment of this test report.

A.3 Test Procedures

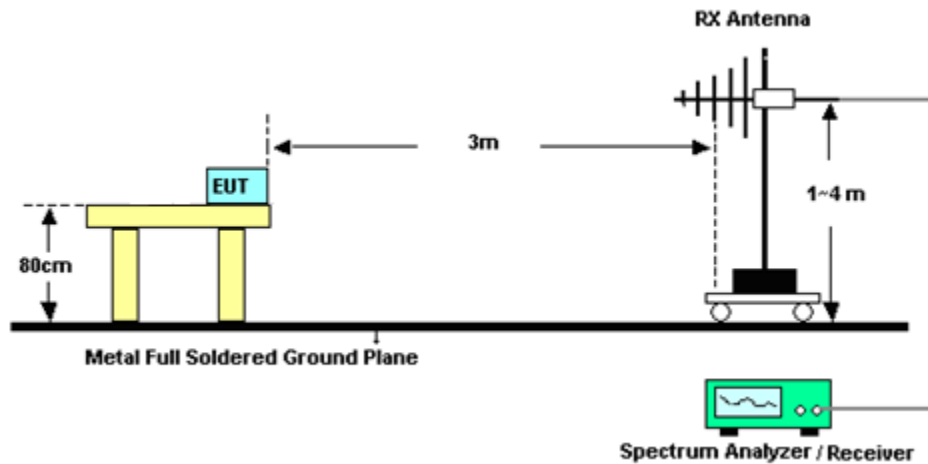
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna is a Bi-Log antenna and its height is adjusted between one to four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode (RBW=120kHz/VBW=300kHz for frequency below 1GHz; RBW=1MHz VBW=3MHz (Peak), RBW=1MHz/VBW=10Hz (Average) for frequency above 1GHz).
7. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, peak values of EUT will be reported. Otherwise, the emission will be repeated by using the quasi-peak method and reported.
8. Emission level (dBμV/m) = 20 log Emission level (μV/m)
9. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

A.4 Test Setup

For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz

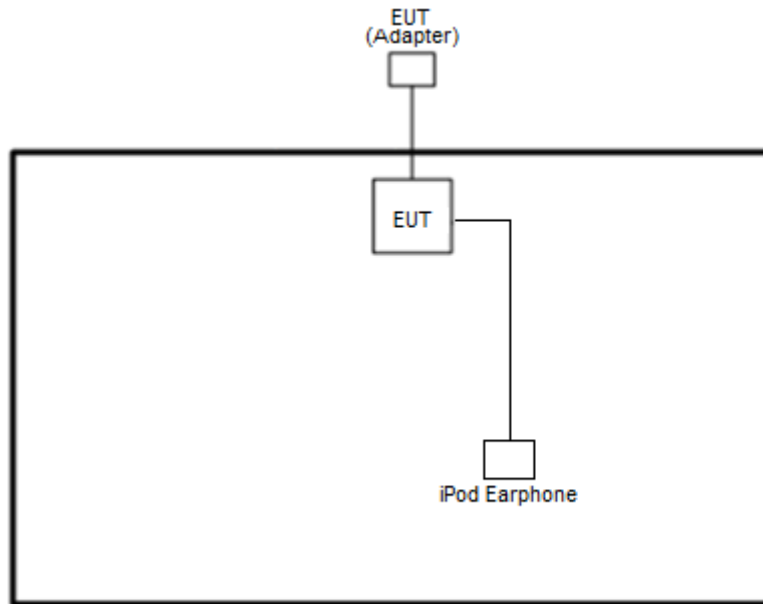


A.5 Test Result of Receiver Radiated Spurious Emissions (9kHz ~ 30MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per NCC LP0002 section 6.13 was not reported.

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.

A.6 Connection Diagram of Test System



A.7 Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
1.	iPod Earphone	Apple	A1285 Earphone	Verification	Unshielded, 1.0 m	N/A

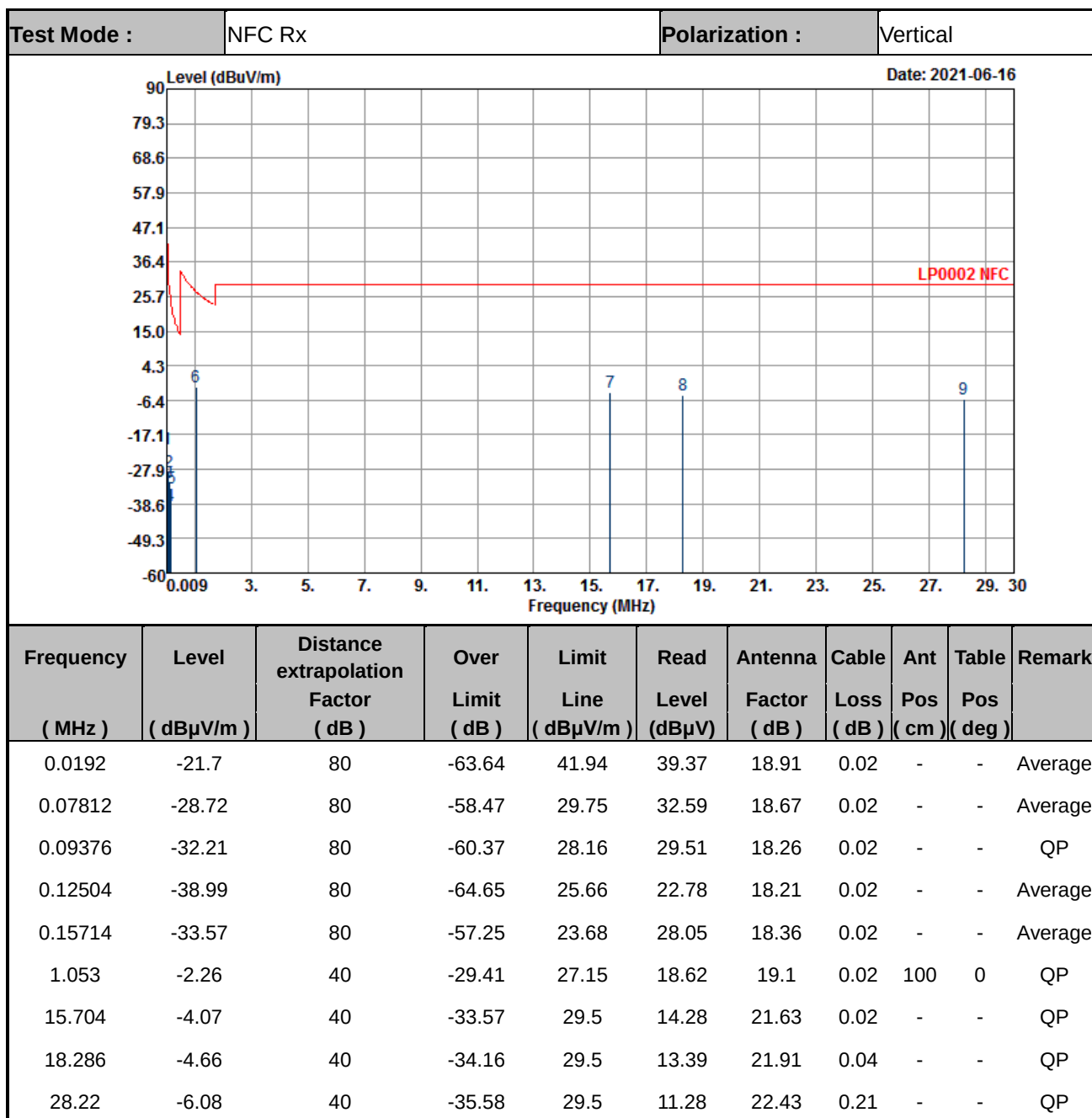
Remark: Applicant has ensured support unit would not be attached with the product on the market, support unit is provided by lab for testing.

A.8 Test Result Results of Receiver Radiated Spurious Emissions

Test Engineer :	Fu Chen and Troye Hsieh	Temperature :	19.3~20.6°C
		Relative Humidity :	67.3~67.8%
Frequency :	854.500 MHz	Margin :	Under 6.91 dB

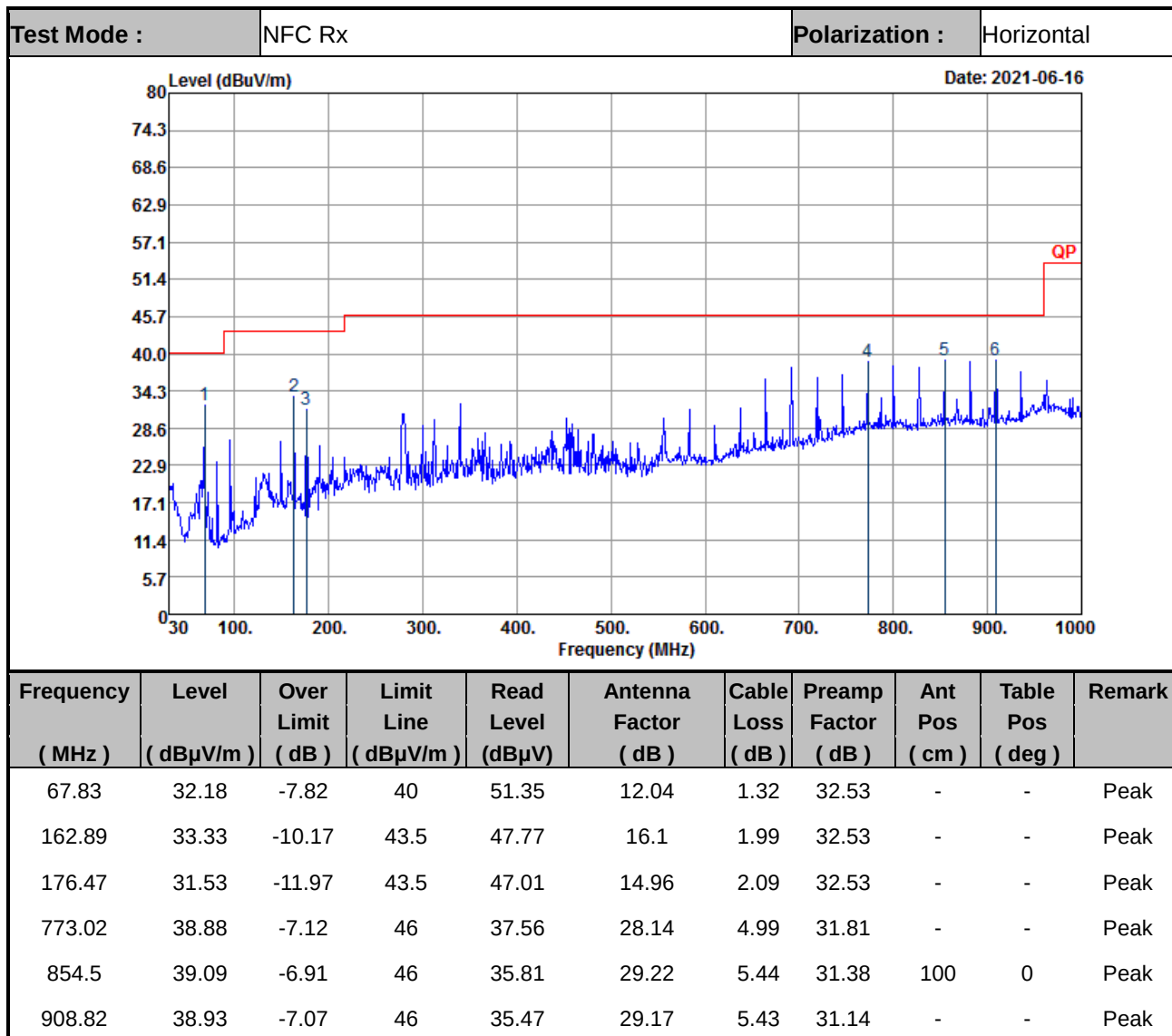
<For 9 kHz ~ 30 MHz>

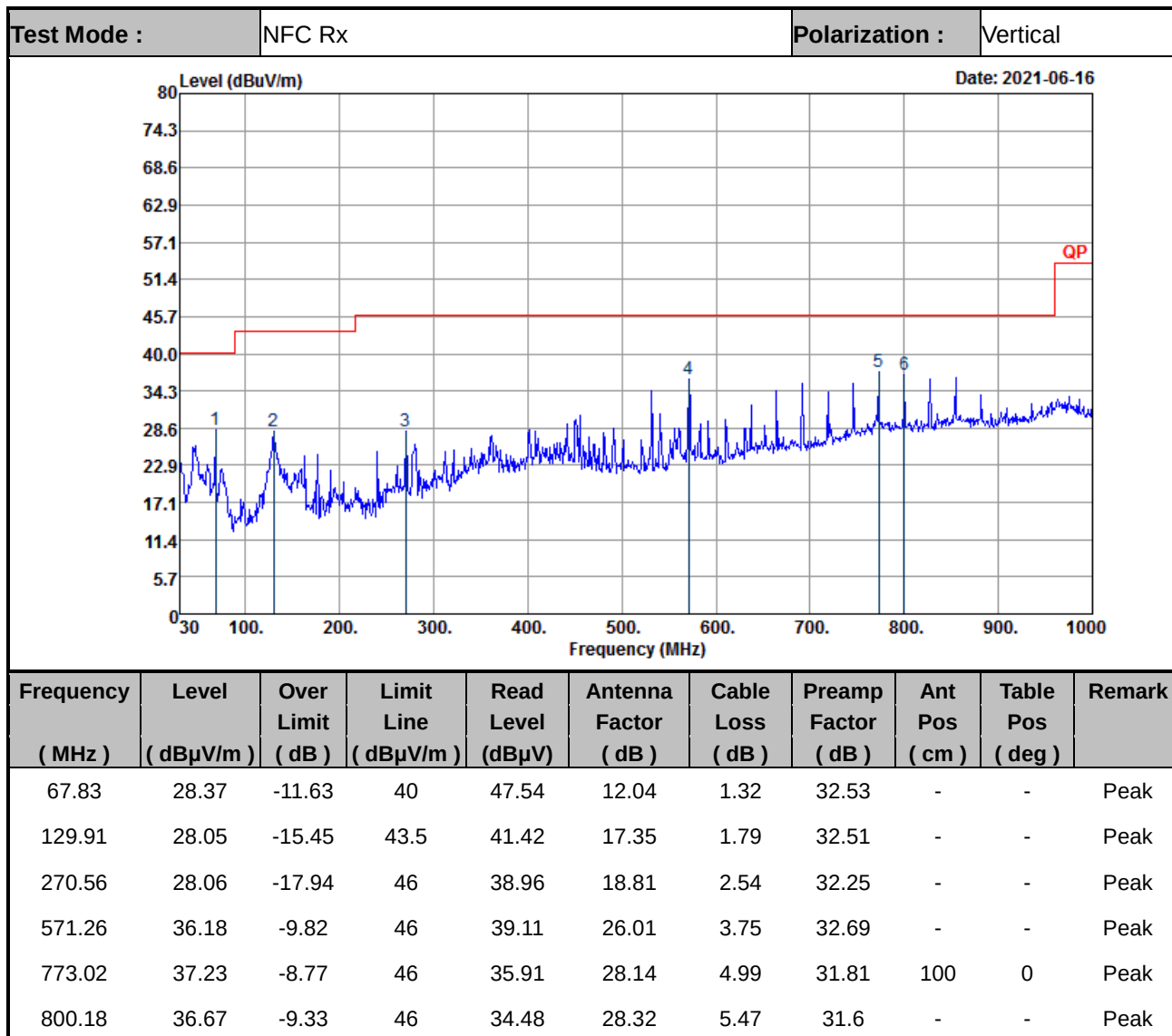
Test Mode :		NFC Rx				Polarization :		Horizontal			
Level (dBuV/m) Date: 2021-06-16											


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 = $40 \log (\text{specific distance} / \text{test distance})$ (dB);
3. Limit line = specific limits (dBμV) + distance extrapolation factor.

<For 30 MHz ~ 1 GHz>




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.