FCC RADIO TEST REPORT

FCC ID	:	**2AP6E-PROXYPRO-01**
Equipment	:	**Proxy Reader Pro**
Brand Name	:	**Proxy**
Model Name	:	**Proxy Reader Pro**
Applicant	:	**Proxy Technologies, Inc.** **500 3rd St, San Francisco, CA 94107**
Manufacturer	:	**Wistron NeWeb Corp.** **20 Park Avenue II, Hsinchu Science Park,** **Hsinchu 308, Taiwan,R.O.C**
Standard	:	**FCC Part 15 Subpart C §15.209**

The product was received on Jan. 26, 2019 and testing was started from Mar. 27, 2019 and completed on Apr. 03, 2019. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, 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 report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The test results in this variant report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Approved by: Jones Tsai

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)

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History of this test report

Report No.	Version	Description	Issued Date
FR912611B	01	Initial issue of report	Apr. 08, 2019

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	2.1049	20dB Bandwidth	Reporting Only	-
3.1	2.1049	99% Occupied Bandwidth	Reporting Only	-
3.2	15.209	Radiated Emission	Pass	Under limit 7.23 dB at 48.900 MHz
-	15.207	AC Conducted Emission	Not Required	-
3.3	15.203	Antenna Requirements	Pass	-

Remark:

1. Not required means after assessing, test items are not necessary to carry out.

2. This is a variant report. All the test cases were performed on original report which can be referred to Sporton Report Number FR841912B. Based on the original report, only worst case was verified.

3. Detail changes list as below :

V1.0 > V1.2:

V1.1 change note.

For indicator leds, used a step up voltage converter to convert from 3.3V to 5V, then supply leds.

1. Modifying HF matching cap will change the HF reading range.
2. Modifying LF antenna will change LF reading range.

V1.2 change note.

For indicator leds, used 5V to supply leds directionally.

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: Wii Chang

Report Producer: Yimin Ho

1. General Description

1.1. Feature of Equipment Under Test

RFID

Product Specification subjective to this standard	
Antenna Type	RFID: Loop Antenna

1.2. Modification of EUT

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

1.3. Test Location

Test Site	SPORTON INTERNATIONAL INC.	
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978	
Test Site No.	**Sporton Site No.**	
	TH03-HY	03CH07-HY

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

FCC Designation No. TW1190

1.4. Applied Standards

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

- FCC Part 15 Subpart C §15.209
- ANSI C63.10-2013

Remark: All test items were verified and recorded according to the standards and without any deviation during the test.

2. Test Configuration of Equipment Under Test

2.1. Test Mode

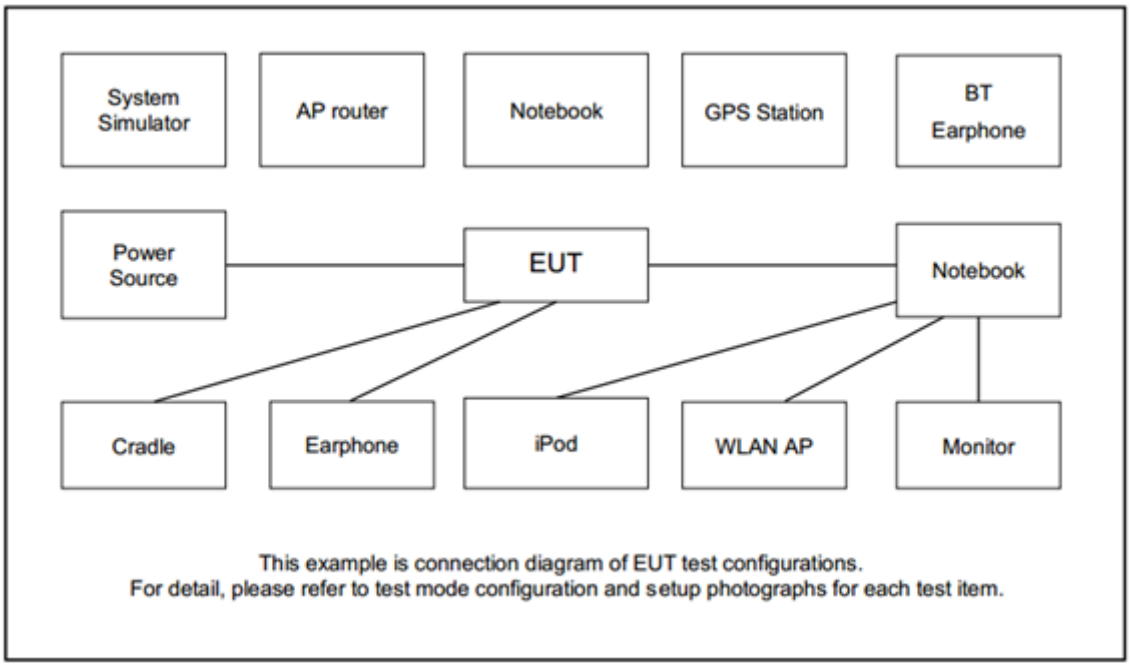
The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

Frequency range investigated: radiation (9 kHz to the 1000 MHz).

For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Y plane) were recorded in this report.

Test Items	Function Type
Radiated Emission	Mode 1 : RFID Tx (125 kHz)

2.2. Connection Diagram of Test System



2.3. Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	RFID Card (125kHz)	N/A	N/A	N/A	N/A	N/A

3. Test Result

3.1. 20dB and 99% Occupied Bandwidth Measurement

3.1.1. Limit of 20dB and 99% Occupied Bandwidth

Reporting only

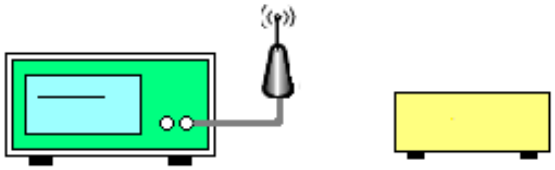
3.1.2. Measuring Instruments

See list of measuring equipment of this test report.

3.1.3. Test Procedures

1. The 20dB bandwidth is measured with a spectrum analyzer connected via a receiver antenna placed near the EUT in peak Max hold mode.
2. Use the following spectrum analyzer settings for 99 % Bandwidth measurement.
3. For Bandwidth measurement, the RBW is set 1-5% of the emission bandwidth, and set the Video bandwidth (VBW) ≥ 3 * RBW, Sweep = 20ms.
4. Measure and record the results in the test report.

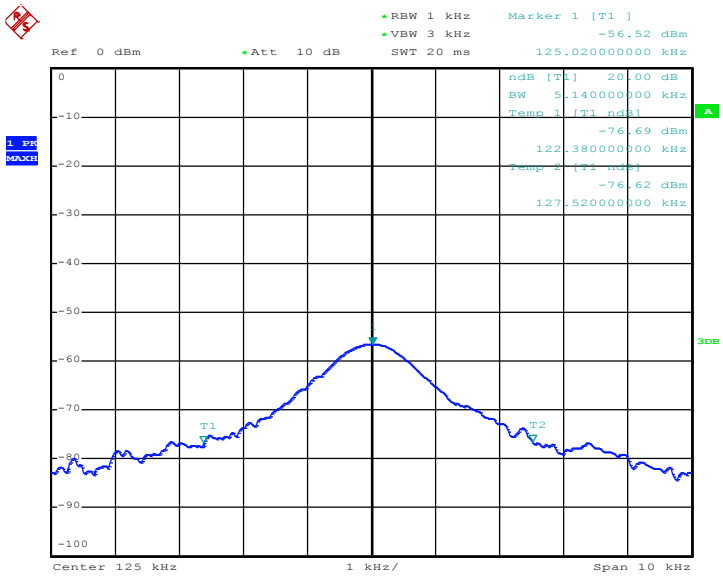
3.1.4. Test Setup



3.1.5. Test Result of 20dB and 99% Bandwidth

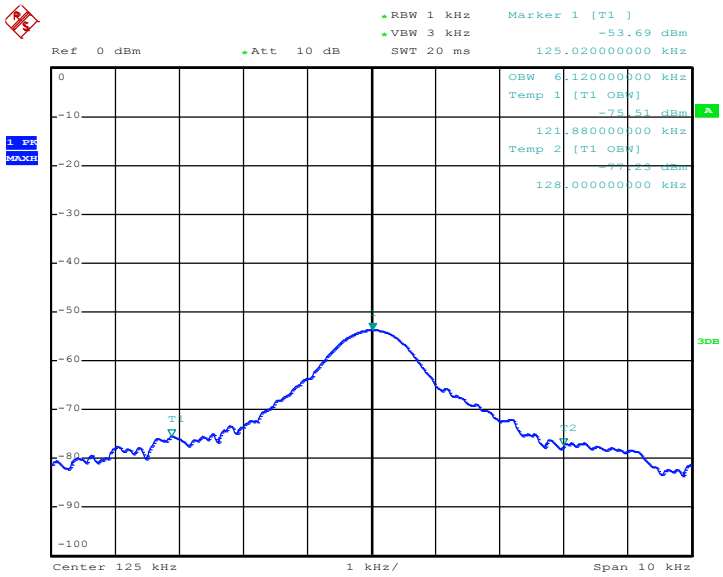
Test Engineer :	George Chen	Temperature :	22~24℃
		Relative Humidity :	53~55%

20 dB Bandwidth Plot



Date: 29.MAR.2019 14:37:23

99% Occupied Bandwidth Plot



Date: 29.MAR.2019 14:34:53

3.2. Radiated Emission

3.2.1. Limit of Radiated Emission

The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

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

3.2.2. Measuring Instruments

See list of measuring equipment of this test report.

3.2.3. Measuring Instrument Setting

The following table is the setting of receiver.

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

3.2.4. Test Procedures

<9kHz-30MHz>

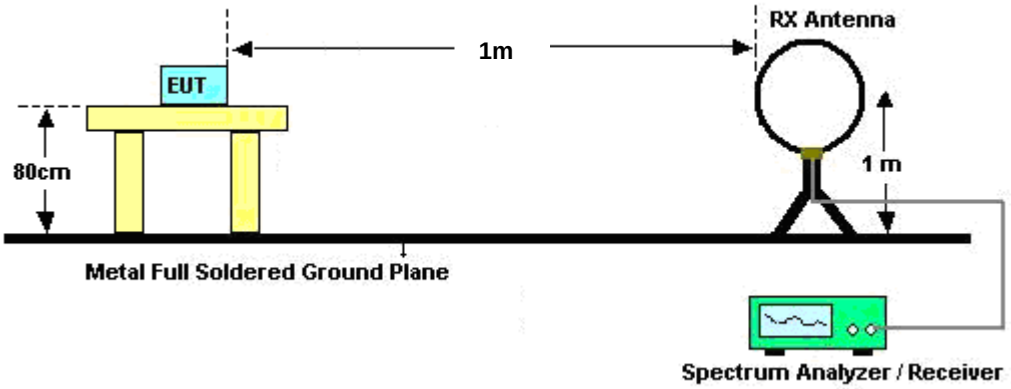
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the loop receiving antenna mounted antenna tower was placed 1 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was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

<30MHz-1GHz>

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 1 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.

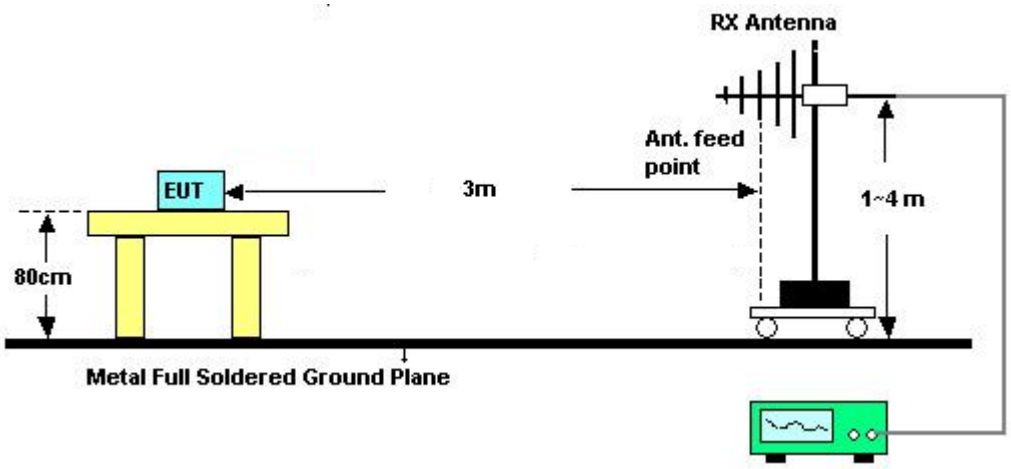
3.2.5. Test Setup of Radiated Emission

For radiated emissions below 30MHz



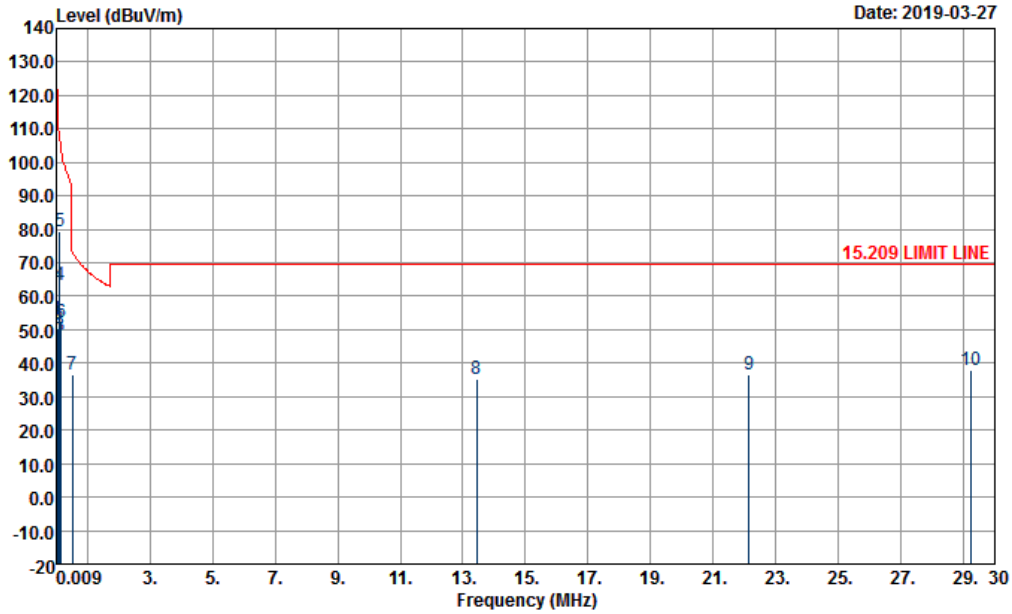
Note: There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

For radiated emissions above 30MHz



3.2.6. Test Result of Radiated Emission (9kHz ~ 30MHz)

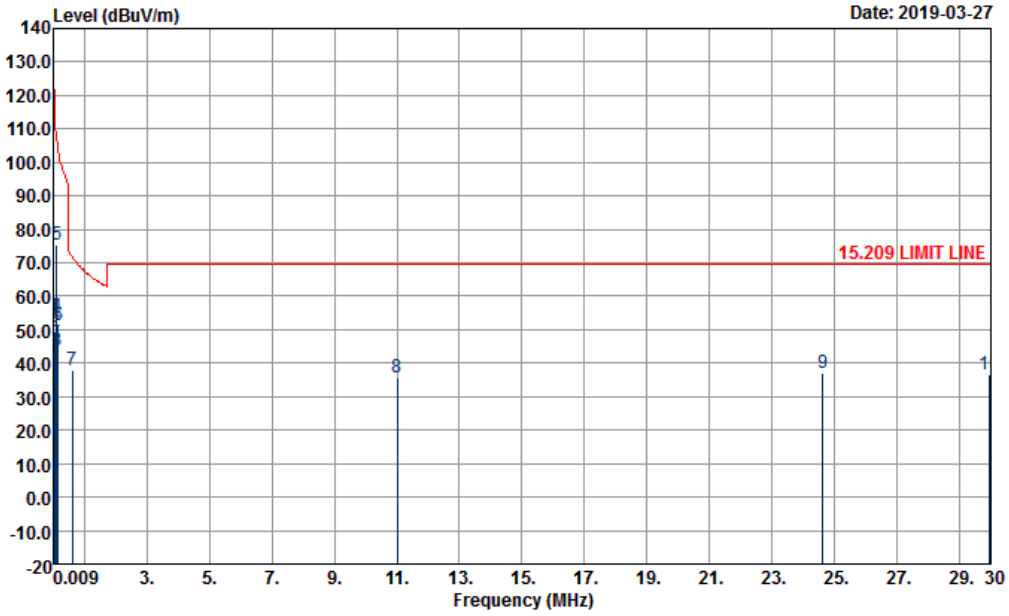
Test Engineer :	Jesse Wang and Stan Hsieh	Temperature :	21~23°C
Polarization :	Horizontal	Relative Humidity :	51~53%
Remark:	#5 is fundamental signal.		



Site : 03CH07-HY
Condition : 15.209 LIMIT LINE 3m LOOP_ANT(H)_100315 HORIZONTAL
Project : 912611

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	cm	deg	
1	0.01	52.94	-75.48	128.42	32.37	20.01	0.56	---	---	Average
2	0.06	50.21	-61.20	111.41	29.75	19.90	0.56	---	---	Average
3	0.11	48.18	-58.62	106.80	27.73	19.89	0.56	---	---	QP
4	0.12	63.38	-42.31	105.69	42.95	19.87	0.56	---	---	Average
5	0.13	79.52			59.09	19.87	0.56	---	---	Average
6	0.15	52.30	-51.57	103.87	31.90	19.84	0.56	---	---	Average
7	0.53	36.62	-36.54	73.16	16.26	19.80	0.56	---	---	QP
8	13.44	35.28	-34.22	69.50	14.92	19.80	0.56	---	---	QP
9	22.14	36.80	-32.70	69.50	15.24	20.37	1.19	---	---	QP
10	29.24	38.06	-31.44	69.50	16.64	20.23	1.19	100	0	QP

Test Engineer :	Jesse Wang and Stan Hsieh	Temperature :	21~23°C
Polarization :	Vertical	Relative Humidity :	51~53%
Remark:	#5 is fundamental signal.		

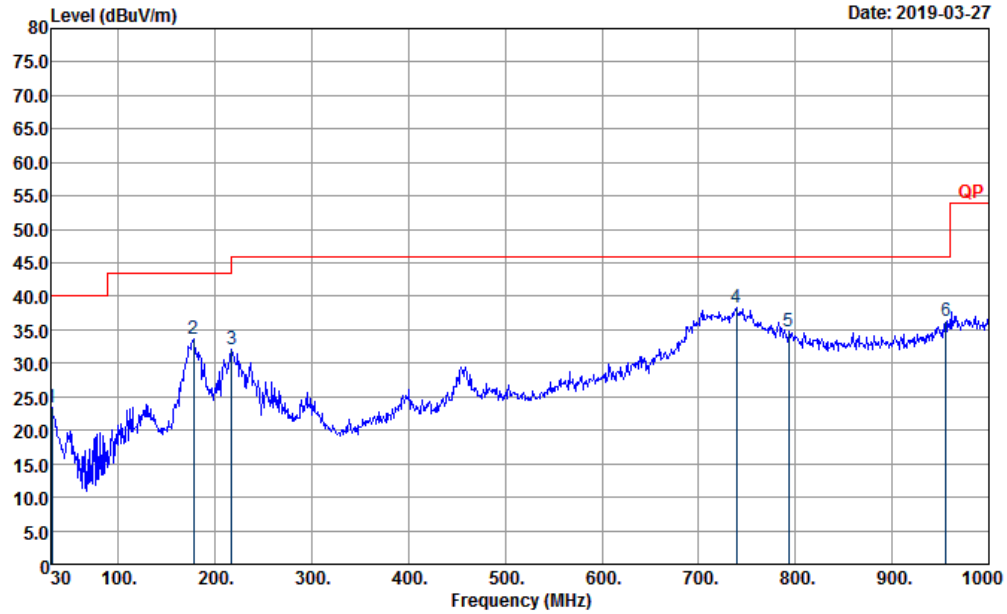


Site : 03CH07-HY
Condition : 15.209 LIMIT LINE 3m LOOP_ANT(V)_100315 VERTICAL
Project : 912611

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	cm	deg	
1	0.01	53.90	-73.56	127.46	33.33	20.01	0.56	---	---	Average
2	0.06	49.52	-61.88	111.40	29.06	19.90	0.56	---	---	Average
3	0.11	43.56	-63.24	106.80	23.11	19.89	0.56	---	---	QP
4	0.11	54.13	-52.55	106.68	33.68	19.89	0.56	---	---	Average
5	0.13	75.43			55.00	19.87	0.56	---	---	Average
6	0.15	51.31	-52.62	103.93	30.91	19.84	0.56	---	---	Average
7	0.63	37.84	-33.84	71.68	17.51	19.77	0.56	---	---	QP
8	11.02	35.54	-33.96	69.50	15.23	19.75	0.56	---	---	QP
9	24.62	37.11	-32.39	69.50	15.49	20.43	1.19	100	0	QP
10	29.94	36.74	-32.76	69.50	15.42	20.13	1.19	---	---	QP

3.2.7. Test Result of Radiated Emission (30MHz ~ 1000MHz)

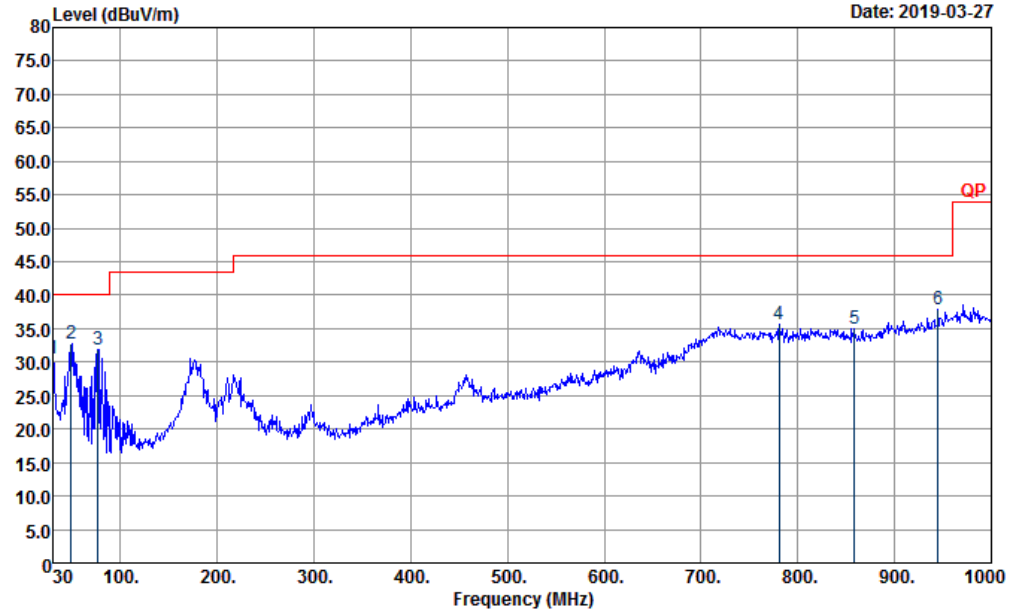
Test Engineer :	Jesse Wang and Stan Hsieh	Temperature :	21~23°C
Polarization :	Horizontal	Relative Humidity :	51~53%



Site : 03CH07-HY
Condition : QP 3m LF-ANT-35419(6) HORIZONTAL
Project : 912611

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	31.08	23.36	-16.64	40.00	28.26	24.09	1.19	30.18	---	---	Peak
2	177.69	33.66	-9.84	43.50	46.45	15.13	2.07	29.99	---	---	Peak
3	216.84	32.05	-13.95	46.00	44.57	15.26	2.18	29.96	---	---	Peak
4	738.90	38.39	-7.61	46.00	36.17	27.64	4.11	29.53	100	0	Peak
5	792.80	34.70	-11.30	46.00	31.76	27.97	4.33	29.36	---	---	Peak
6	955.90	36.36	-9.64	46.00	29.45	30.69	4.74	28.52	---	---	Peak

Test Engineer :	Jesse Wang and Stan Hsieh	Temperature :	21~23°C
Polarization :	Vertical	Relative Humidity :	51~53%



Site : 03CH07-HY
Condition : QP 3m LF-ANT-35419(6) VERTICAL
Project : 912611

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	30.00	30.62	-9.38	40.00	35.01	24.60	1.19	30.18	---	---	Peak
2	48.90	32.77	-7.23	40.00	46.66	15.07	1.19	30.15	100	0	Peak
3	76.44	31.96	-8.04	40.00	47.59	12.93	1.55	30.11	---	---	Peak
4	780.90	35.65	-10.35	46.00	32.74	27.98	4.33	29.40	---	---	Peak
5	858.60	34.94	-11.06	46.00	30.56	28.98	4.48	29.08	---	---	Peak
6	944.70	37.89	-8.11	46.00	31.67	30.08	4.74	28.60	---	---	Peak

3.3. Antenna Requirements

3.3.1. 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.

3.3.2. 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
Programmable Power Supply	GW Instek	PSS-2005	EL883644	Voltage:0~20V; Current:0~5A	Dec. 06, 2017	Mar. 29, 2019	Dec. 05, 2019	Conducted (TH03-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP30	101329	9kHz~30GHz	Jun. 29, 2018	Mar. 29, 2019	Jun. 28, 2019	Conducted (TH03-HY)
Temperature Chamber	ESPEC	SU-641	92013721	-30℃ ~70℃	Dec. 06, 2017	Mar. 29, 2019	Dec. 05, 2019	Conducted (TH03-HY)
Bilog Antenna	Schaffner	CBL6111C&N-6-06	2725&AT-N0601	30MHz~1GHz	Jan. 10, 2019	Mar. 27, 2019 ~Apr. 03, 2019	Jan. 09, 2020	Radiation (03CH07-HY)
EMI Test Receiver	Agilent	N9038A (MXE)	MY53290053	20Hz to 26.5GHz	Jan. 23, 2019	Mar. 27, 2019 ~Apr. 03, 2019	Jan. 22, 2020	Radiation (03CH07-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Jan. 11, 2019	Mar. 27, 2019 ~Apr. 03, 2019	Jan. 10, 2020	Radiation (03CH07-HY)
Preamplifier	COM-POWER	PA-103A	161241	10MHz-1GHz	May 21, 2018	Mar. 27, 2019 ~Apr. 03, 2019	May 20, 2019	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY24971/4,MY28655/4	9KHz~30MHz	Feb. 26, 2019	Mar. 27, 2019 ~Apr. 03, 2019	Feb. 25, 2020	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY28655/4,MY24971/4,MY15682/4	30MHz~1GHz	Feb. 26, 2019	Mar. 27, 2019 ~Apr. 03, 2019	Feb. 25, 2020	Radiation (03CH07-HY)
Software	Audix	E3 6.2009-8-24	80504004656H	N/A	N/A	Mar. 27, 2019 ~Apr. 03, 2019	N/A	Radiation (03CH07-HY)
Antenna Mast	Max-Full	MFA520BS	N/A	1m~4m	N/A	Mar. 27, 2019 ~Apr. 03, 2019	N/A	Radiation (03CH07-HY)
Turn Table	ChainTek	Chaintek 3000	N/A	0~360 Degree	N/A	Mar. 27, 2019 ~Apr. 03, 2019	N/A	Radiation (03CH07-HY)

5. Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (9 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.4**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.7**