FCC EMI TEST REPORT

FCC ID	**:**	**XRAFB413**
Equipment	**:**	**Wireless Activity Tracker**
Brand Name	**:**	**Fitbit**
Model Name	**:**	**FB413**
Applicant	**:**	**FITBIT, INC. 199 FREMONT, 14TH FLOOR, SAN FRANCISCO, CA**
Manufacturer	**:**	**FITBIT, INC. 199 FREMONT, 14TH FLOOR, SAN FRANCISCO, CA**
Standard	**:**	**FCC 47 CFR Part 15 Subpart B**

The product was received on Oct. 02, 2018 and testing was started from Oct. 05, 2018 and completed on Nov. 15, 2018. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI C63.4-2014 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 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: Joseph Lin

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
FC892505-05	01	Initial issue of report	Oct. 29, 2018
FC892505-05	02	Add a description of the worst plane in Section 2.1 and modify description of point 4 in Section 3.2.3.	Nov. 15, 2018

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.107	AC Conducted Emission	Pass	Under limit 16.02 dB at 0.440 MHz
3.2	15.109	Radiated Emission	Pass	Under limit 9.63 dB at 39.450 MHz

Reviewed by: Louis Wu

Report Producer: Yimin Ho

1. General Description

1.1. Product Feature of Equipment Under Test

Bluetooth-LE

Product Specification subjective to this standard	
Antenna Type	Bluetooth-LE: Monopole Antenna

1.2. Modification of EUT

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

1.3. Test Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1093 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

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.**	
	CO05-HY	03CH06-HY

1.4. Applicable Standards

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

- FCC 47 CFR Part 15 Subpart B
- ANSI C63.4-2014

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

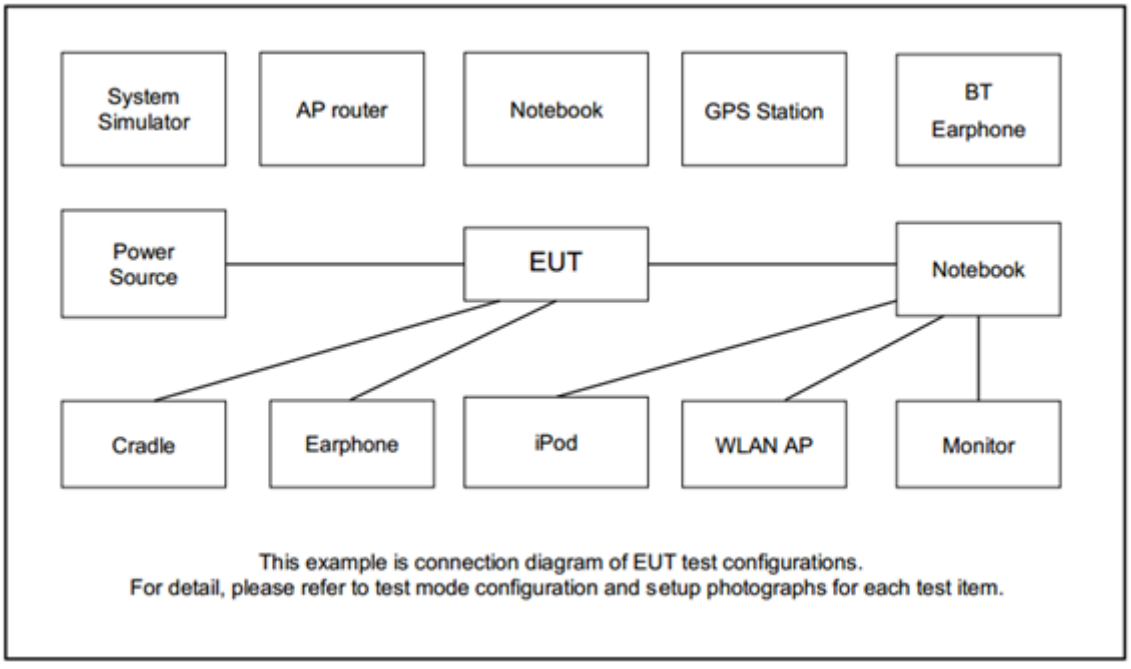
2. Test Configuration of Equipment Under Test

2.1. Test Mode

The EUT has been associated with peripherals pursuant to ANSI C63.4-2014 and configuration operated in a manner tended to maximize its emission characteristics in a typical application.
Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (30MHz to the 5th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Z plane) were recorded in this report

Test Items	Function Type
AC Conducted Emission	Mode 1: Bluetooth-LE Idle + Charging Cable + Adapter + Metal Strap Mode 2: Bluetooth-LE Idle + Charging Cable + Adapter + Rubber Strap
Radiated Emissions	Mode 1: Bluetooth-LE Idle + Charging Cable + Adapter + Metal Strap Mode 2: Bluetooth-LE Idle + Charging Cable + Adapter + Rubber Strap
Remark: **1.** The worst case of AC is mode 1; only the test data of this mode was reported. **2.** The worst case of RE is mode 2; only the test data of this mode was reported.	

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.	BLE 4.2 USB Dongle	CYPRESS	CY5677	FCC DoC	N/A	N/A
2.	Notebook	Dell	Latitude 5570	FCC DoC	N/A	AC I/P：Unshielded, 1.2m DC O/P：Shielded, 1.8m
3.	Notebook	Asus	P2410U	FCC DoC	N/A	AC I/P：Unshielded, 1.2m DC O/P：Shielded, 1.8m
4.	Adapter	HUAWEI	HW-059200UHQ	FCC DoC	NA	NA

2.4. EUT Operation Test Setup

The EUT was synchronized with the BCCH, and had been continuous receiving mode by setting paging reorganization of the system simulator.

1. Execute “CySmartSetup” to make the EUT attached with Bluetooth Dongle.
2. Turn off hibernate mode.
3. Turn on vibrate mode.
4. Turn on heartbeat detection mode.

3. Test Result

3.1. Test of AC Conducted Emission Measurement

3.1.1 Limits 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 (dBuV)	
	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.

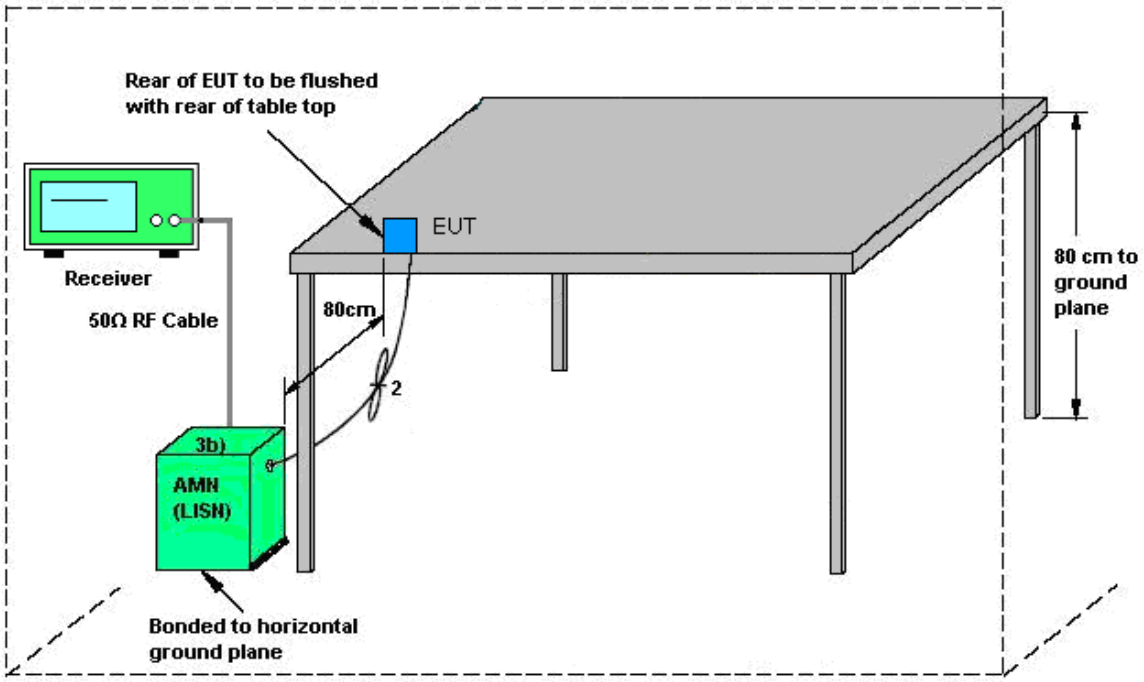
3.1.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedure

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room 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 should 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



AMN = Artificial mains network (LISN)
AE = Associated equipment
EUT = Equipment under test
ISN = Impedance stabilization network

3.1.5 Test Result of AC Conducted Emission

Please refer to Appendix A.

3.2. Test of Radiated Emission Measurement

3.2.1. Limit of Radiated Emission

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

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

3.2.2. Measuring Instruments

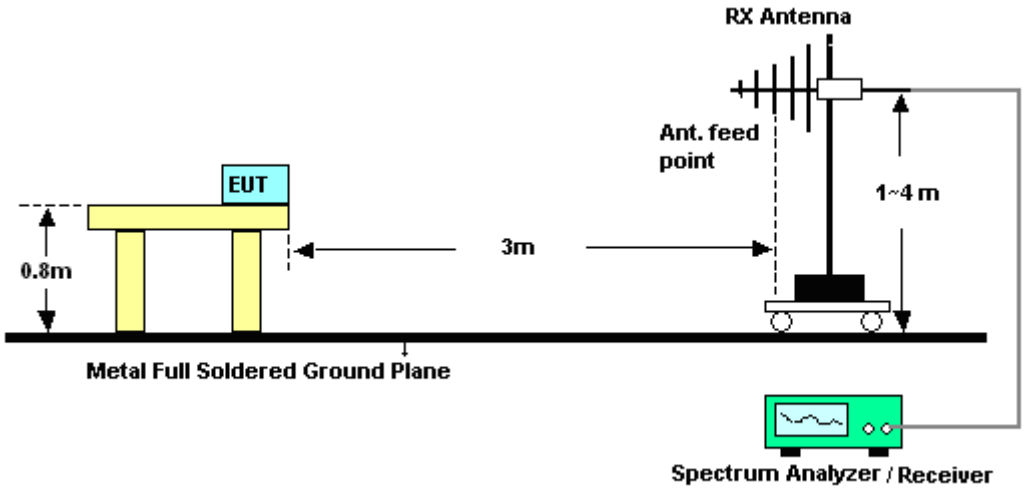
Refer a test equipment and calibration data table in this test report.

3.2.3. Test Procedures

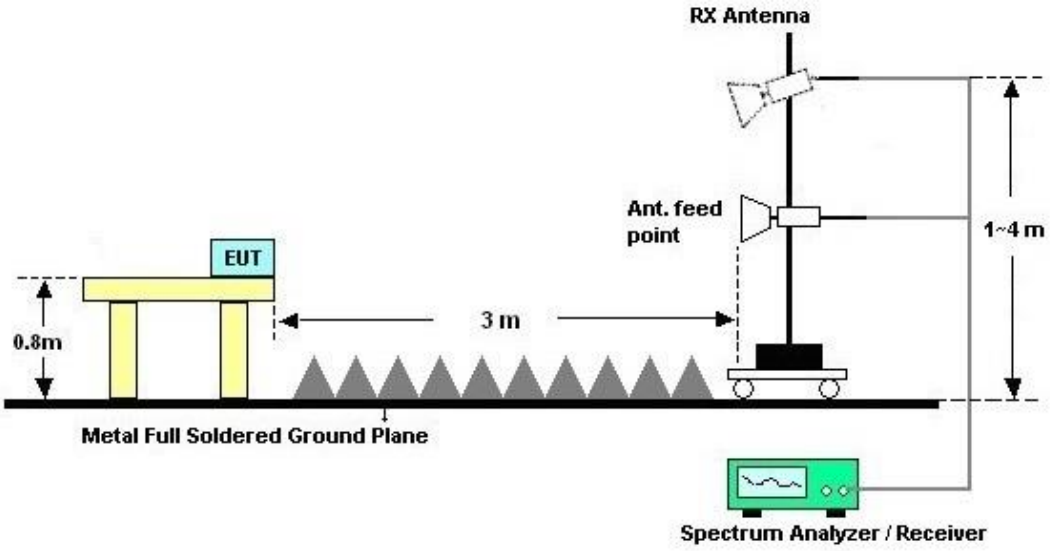
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna 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

3.2.4. Test Setup of Radiated Emission

For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.2.5. Test Result of Radiated Emission

Please refer to Appendix B.

4. List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Oct. 05, 2018	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	9KHz~3.6GHz	Dec. 08, 2017	Oct. 05, 2018	Dec. 07, 2018	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Nov. 30, 2017	Oct. 05, 2018	Nov. 29, 2018	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	Oct. 05, 2018	N/A	Conduction (CO05-HY)
LF Cable	HUBER + SUHNER	RG-214/U	LF01	N/A	Jan. 03, 2018	Oct. 05, 2018	Jan. 02, 2019	Conduction (CO05-HY)
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100851	N/A	Jan. 03, 2018	Oct. 05, 2018	Jan. 02, 2019	Conduction (CO05-HY)
Bilog Antenna	Schaffner	CBL6111C&N-6-06	2725&AT-N0601	30MHz~1GHz	Oct. 14, 2017	Oct. 05, 2018	Oct. 13, 2018	Radiation (03CH06-HY)
Bilog Antenna	Schaffner	CBL6111C&N-6-06	2725&AT-N0601	30MHz~1GHz	Oct. 13, 2018	Nov. 15, 2018	Oct. 12, 2019	Radiation (03CH06-HY)
EMI Test Receiver	Rohde & Schwarz	ESU26	100472	20Hz~26.5GHz	Jan. 04, 2018	Oct. 05, 2018 ~ Nov. 15, 2018	Jan. 03, 2019	Radiation (03CH06-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1156	1GHz~18GHz	Aug. 24, 2018	Oct. 05, 2018	Aug. 23, 2019	Radiation (03CH06-HY)
Preamplifier	SONOMA	310N	186713	9kHz~1GHz	May 02, 2018	Oct. 05, 2018 ~ Nov. 15, 2018	May 01, 2019	Radiation (03CH06-HY)
Preamplifier	MITEQ	AMF-7D-00101800-30-10P	1850117	1GHz ~ 18GHz	May 24, 2018	Oct. 05, 2018	May 23, 2019	Radiation (03CH06-HY)
Antenna Mast	MF	MF-7802	MF780208212	1m~4m	N/A	Oct. 05, 2018 ~ Nov. 15, 2018	N/A	Radiation (03CH06-HY)
Turn Table	INN-CO	DS2000	420/650/00	0-360 degree	N/A	Oct. 05, 2018 ~ Nov. 15, 2018	N/A	Radiation (03CH06-HY)
Test Software	AUDIX	e3	6.2009-8-24(k5)	N/A	N/A	Oct. 05, 2018 ~ Nov. 15, 2018	N/A	Radiation (03CH06-HY)
RF Cable	HUBER+SUHNER/UTIFLEX	SUCOFLEX 104 / UFA210A	MY24966/4 / LF-01	30MHz-1GHz	Nov. 24, 2017	Oct. 05, 2018 ~ Nov. 15, 2018	Nov. 23, 2018	Radiation (03CH06-HY)
RF Cable	Infinet/Sunhner	LL142/SF104	CA3601-3601-HLL	1GHz-26GHz	Nov. 24, 2017	Oct. 05, 2018	Nov. 23, 2018	Radiation (03CH06-HY)
Filter	Microwave	H1G013G1	SN477215	1.0G High Pass	Dec. 07, 2017	Oct. 05, 2018	Dec. 06, 2018	Radiation (03CH06-HY)
Filter	Wainwright	WLKS1200-8SS	SN3	1.2G Low Pass	Nov. 21, 2017	Oct. 05, 2018 ~ Nov. 15, 2018	Nov. 20, 2018	Radiation (03CH06-HY)

5. Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.2**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.9**

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.7**

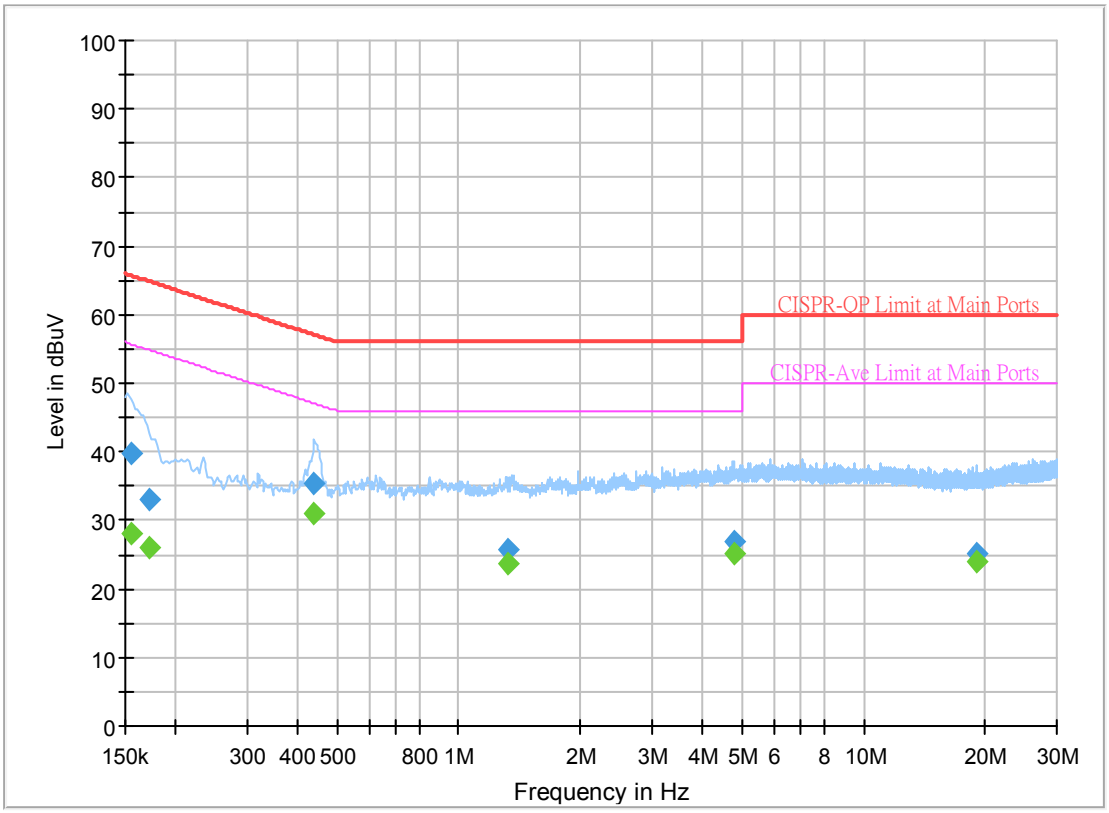
Appendix A. AC Conducted Emission Test Results

Test Engineer :	Jimmy Chang	**Temperature :**	24~26℃
		Relative Humidity :	51~54%

EUT Information

Report NO :	892505-05
Test Mode :	Mode 1
Test Voltage :	120Vac/60Hz
Phase :	Line

Full Spectrum



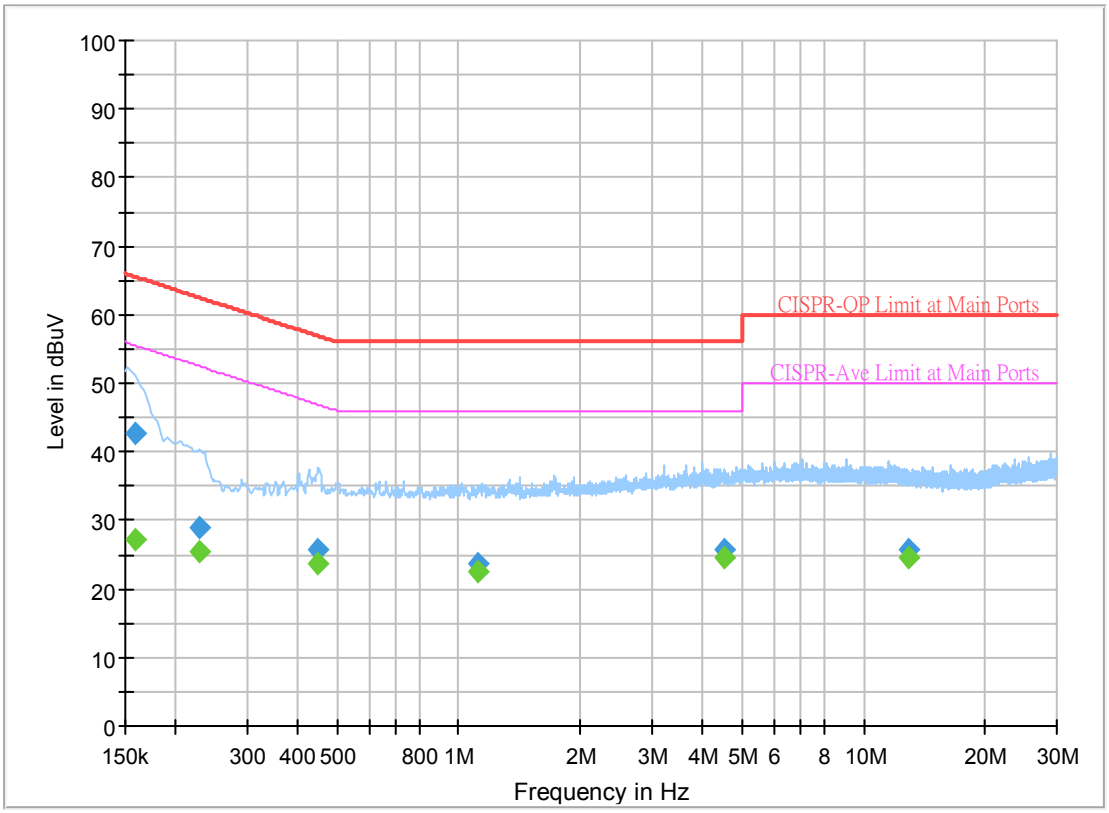
Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.154500	---	27.93	55.75	27.82	L1	OFF	19.5
0.154500	39.66	---	65.75	26.09	L1	OFF	19.5
0.172500	---	26.11	54.84	28.73	L1	OFF	19.5
0.172500	32.93	---	64.84	31.91	L1	OFF	19.5
0.440250	---	31.04	47.06	16.02	L1	OFF	19.5
0.440250	35.51	---	57.06	21.55	L1	OFF	19.5
1.315500	---	23.66	46.00	22.34	L1	OFF	19.6
1.315500	25.63	---	56.00	30.37	L1	OFF	19.6
4.764750	---	25.21	46.00	20.79	L1	OFF	19.7
4.764750	26.78	---	56.00	29.22	L1	OFF	19.7
19.043250	---	24.11	50.00	25.89	L1	OFF	20.2
19.043250	25.12	---	60.00	34.88	L1	OFF	20.2

EUT Information

Report NO :	892505-05
Test Mode :	Mode 1
Test Voltage :	120Vac/60Hz
Phase :	Neutral

Full Spectrum

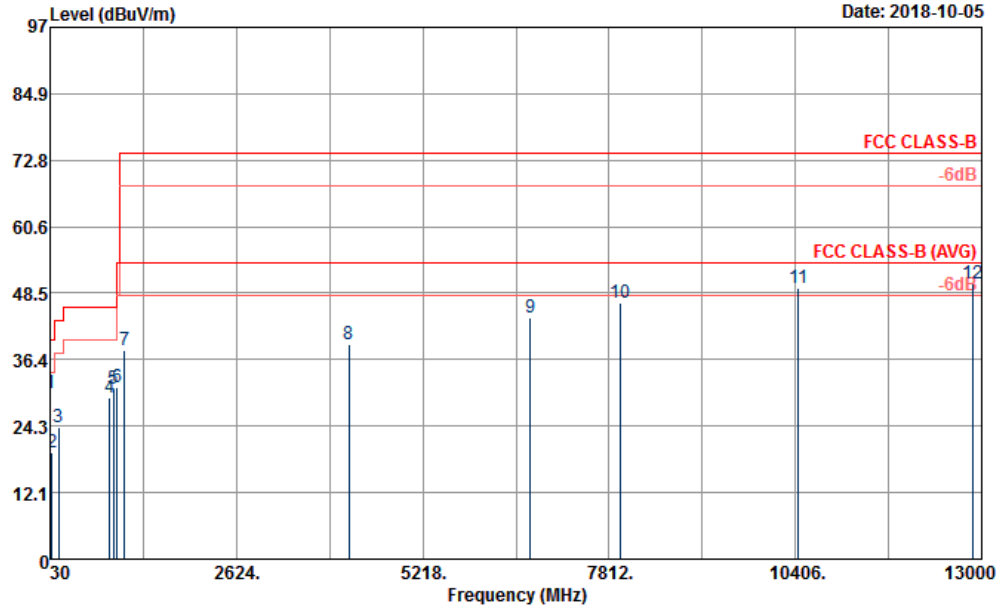


Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.159000	---	27.28	55.52	28.24	N	OFF	19.5
0.159000	42.60	---	65.52	22.92	N	OFF	19.5
0.228750	---	25.36	52.50	27.14	N	OFF	19.5
0.228750	28.84	---	62.50	33.66	N	OFF	19.5
0.449250	---	23.76	46.89	23.13	N	OFF	19.5
0.449250	25.62	---	56.89	31.27	N	OFF	19.5
1.110750	---	22.47	46.00	23.53	N	OFF	19.6
1.110750	23.66	---	56.00	32.34	N	OFF	19.6
4.535250	---	24.58	46.00	21.42	N	OFF	19.7
4.535250	25.62	---	56.00	30.38	N	OFF	19.7
12.972750	---	24.68	50.00	25.32	N	OFF	20.0
12.972750	25.74	---	60.00	34.26	N	OFF	20.0

Appendix B. Radiated Emission Test Result

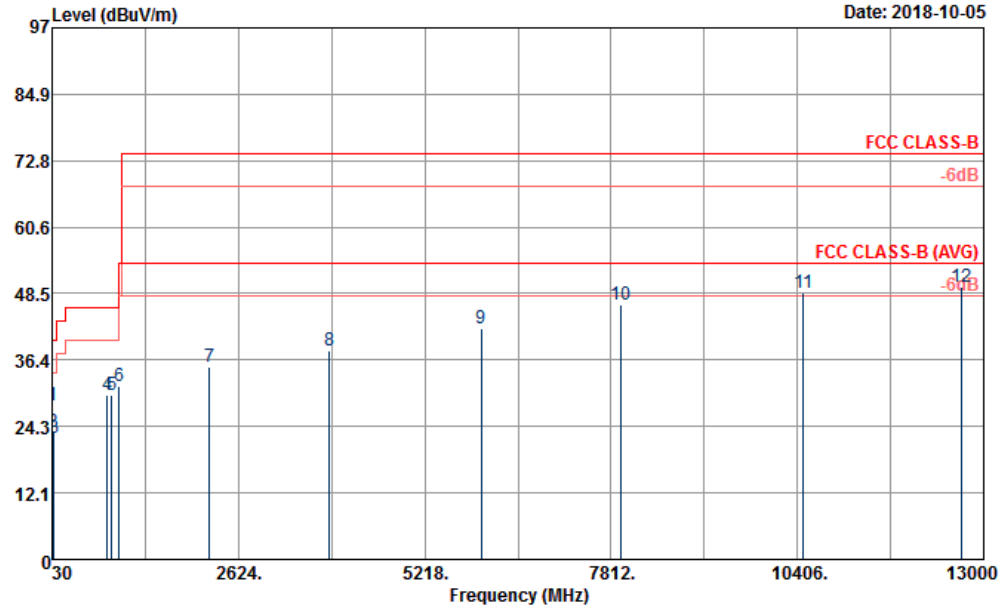
Test Engineer :	Eric Jeng	**Temperature :**	23~25°C
		Relative Humidity :	52~55%
Test Distance :	3m	**Polarization :**	Horizontal



Site : 03CH06-HY
Condition : FCC CLASS-B 3m 9120D_1156_180824 HORIZONTAL
Project : 892505-05
Power : 120Vac/60Hz
Mode : Mode 2

	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	39.45	30.37	-9.63	40.00	42.14	19.21	0.79	31.77	100	23	Peak
2	57.81	19.34	-20.66	40.00	38.22	11.80	1.08	31.76	---	---	Peak
3	144.21	24.11	-19.39	43.50	37.30	16.95	1.58	31.72	---	---	Peak
4	855.80	29.48	-16.52	46.00	28.17	28.92	4.02	31.63	---	---	Peak
5	911.10	30.96	-15.04	46.00	28.97	29.16	4.17	31.34	---	---	Peak
6	959.40	31.27	-14.73	46.00	26.95	31.07	4.17	30.92	---	---	Peak
7	1066.00	38.18	-35.82	74.00	70.29	24.83	4.59	61.53	---	---	Peak
8	4188.00	39.11	-34.89	74.00	60.77	30.00	9.51	61.17	---	---	Peak
9	6718.00	44.13	-29.87	74.00	55.73	34.33	12.73	58.66	---	---	Peak
10	7968.00	46.79	-27.21	74.00	53.52	37.23	13.89	57.85	---	---	Peak
11	10450.00	49.54	-24.46	74.00	51.21	40.00	16.00	57.67	---	---	Peak
12	12880.00	50.17	-23.83	74.00	50.76	39.18	19.02	58.79	100	0	Peak

Test Engineer :	Eric Jeng	**Temperature :**	23~25°C
		Relative Humidity :	52~55%
Test Distance :	3m	**Polarization :**	Vertical



Site : 03CH06-HY
Condition : FCC CLASS-B 3m 9120D_1156_180824 VERTICAL
Project : 892505-05
Power : 120Vac/60Hz
Mode : Mode 2

	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	39.45	28.20	-11.80	40.00	39.97	19.21	0.79	31.77	100	154	Peak
2	48.36	23.32	-16.68	40.00	39.16	14.90	1.02	31.76	---	---	Peak
3	60.24	22.21	-17.79	40.00	41.38	11.50	1.08	31.75	---	---	Peak
4	798.40	29.89	-16.11	46.00	29.75	28.12	3.90	31.88	---	---	Peak
5	860.00	30.11	-15.89	46.00	28.65	29.04	4.04	31.62	---	---	Peak
6	959.40	31.51	-14.49	46.00	27.19	31.07	4.17	30.92	---	---	Peak
7	2220.00	35.22	-38.78	74.00	61.31	28.17	6.84	61.10	---	---	Peak
8	3894.00	38.15	-35.85	74.00	60.69	29.67	9.39	61.60	---	---	Peak
9	6002.00	42.14	-31.86	74.00	56.06	32.50	11.78	58.20	---	---	Peak
10	7956.00	46.37	-27.63	74.00	53.17	37.20	13.88	57.88	---	---	Peak
11	10492.00	48.61	-25.39	74.00	50.15	40.00	16.08	57.62	---	---	Peak
12	12694.00	49.84	-24.16	74.00	50.85	38.70	18.88	58.59	100	77	Peak

THE END