FCC TEST REPORT

Reference No. : **G-45-2019-01502**

Applicant : **Franklin Technology Inc.**

Equipment Under Test (EUT) :

Product Name : Mobile Hotspot

Model Name : T9

Applied Standards : **FCC Part 15 Subpart B**

ANSI C 63.4:2014

FCC ID : **XHG-R717**

Date of Receipt : **May 7, 2019**

Date of Test : **May 15, 2019 ~ June 19, 2019**

Date of Issue : **July 23, 2019**

Test Results : **Complied**

Tested by : ----------
Yongtae Yu

Reviewed by : ----------
Paul Kang

Remarks :
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Contents

Revision History

Revision	Report Number	Description
0	F690501/RF-EMC004893(G)	Initial
1	F690501/RF-EMC004893-1(G)	Added tested results.
2		

1. General Information

1.1 Client Information

Applicant : Franklin Technology Inc.
- Address of Applicant : 906(Gasan-Dong, JEI Platz), 186, Gasan digital 1-ro, Geumcheon-gu, Seoul, Korea(08502).

Manufacturer : Franklin Technology Inc.
- Address of Manufacturer : 906(Gasan-Dong, JEI Platz), 186, Gasan digital 1-ro, Geumcheon-gu, Seoul, Korea(08502).

1.2 Test Laboratory

Name and Address : SGS Korea Co., Ltd.
- Giheung 1 Laboratory : 35, Giheungdanji-ro 121beon-gil, Giheung-gu, Yongin-si, Gyeonggi-do, Republic of Korea
- Giheung 2 Laboratory : 23, Giheungdanji-ro 24beon-gil, Giheung-gu,Yongin-si, Gyeonggi-do, Republic of Korea
- Gunpo Laboratory : 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, 15807, Republic of Korea.

Phone : + 82 31 428 5700
Fax : + 82 31 427 2370
e-mail : paul.kang@sgs.com

1.3 General Information of E.U.T.

Classification	Description
Product Name	Mobile Hotspot
Model Name	T9
Serial No.	None
Highest Internal Frequency	5 825 ㎒
EMI Classification	Class B
Test Voltage	120 V~, 60 ㎐(for Travel Adapter)
Operating Voltage	3.8 Vd.c.
Operating Temperature	(-)10 ℃ ~ (+)55 ℃
H/W Version	P1+
S/W Version	R717F21.FR.264

1.4 Operating Modes and Conditions

Operating Mode	Percussor
1) Charging mode	Charging status
2) WCDMA Idle + WLAN Idle + Charging	WCDMA Idle + WLAN Idle + Charging
3) LTE Idle + WLAN Idle + Charging	LTE Idle + WLAN Idle + Charging

1.5 Auxiliary Equipments

Description	Model	Serial No.	Manufacturer
WIDEBAND RADIO COMMUNICATION TESTER	CMW500	-	R&S

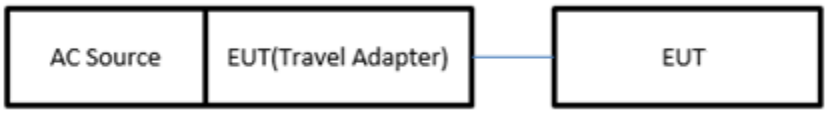
1.6 Cable List

Start		END		Cable Spec.		Used core
Name	I/O Port	Name	I/O Port	Length	Shield	
AC Source	AC OUT	EUT (Travel Adapter)	DC IN	-	-	-
EUT (Travel Adapter)	DC OUT	EUT (Main unit)	DC OUT	1.5	Unshield	No

1.7 System Configurations

Description	Model	Serial No.	Manufacturer
Travel Adapter	APS-V010050200W-G	DC190331-00220	Shenzhen ACT Industrial Co., Ltd.
Main Board	-	-	-

1.8 Test System Layout



1.9 Modifications

- There was no modified item during the test.

1.10 Applicable Standards for Testing

Standards	Status	Deviation
FCC Part 15 Subpart B	Applicable	No Deviation

1.11 Summary of Test Results

Test Item	Basic Standards	Results
Conducted Emission	ANSI C 63.4:2014 FCC Part 15 Subpart B	Complied
Radiated Emission	ANSI C 63.4:2014 FCC Part 15 Subpart B	Complied

Note: Test methods of all test items are performed according to the basic standards in this table.

EMISSION

2.1 Test Results

Test Items	Basic Standards	Test Results
Conducted Emission	ANSI C 63.4:2014 FCC Part 15 Subpart B	**Complied**
Radiated Emission	ANSI C 63.4:2014, FCC Part 15 Subpart B	**Complied**

2.2 Test Method and Limits

2.2.1 Test Method

Test Items	Measuring Frequency Range	RBW	Measuring Distance
Conducted Emission	0.15 ㎒ ~ 30 ㎒	9 ㎑	-
Radiated Emission	30 ㎒ ~ 1 ㎓	120 ㎑	10 m&3 m
	Above 1 ㎓	1 ㎒	3 m

2.2.2 Test Limits

-Conducted Emission Limits at Mains Port

Frequency Range	Limits(dB(㎶))		Class
	Quasi-peak	Average	
0.15 ㎒ ~ 0.5 ㎒	79	66	**Class A**
0.5 ㎒ ~ 30 ㎒	73	60	
0.15 ㎒ ~ 0.5 ㎒	66 to 56	56 to 46	**Class B**
0.5 ㎒ ~ 5 ㎒	56	46	
5 ㎒ ~ 30 ㎒	60	50	

Note : The lower limit shall apply at the transition frequencies. The limit decreases linearly with the logarithm of the frequency in the range 0.15 ㎒ to 0.5 ㎒.

-Radiated Emission Limits below 1 ㎓

Frequency Range	Limits(dB(㎶/m))	Class
	Quasi-peak	
30 ㎒ ~ 88 ㎒	39.1	**Class A**
88 ㎒ ~ 216 ㎒	43.5	
216 ㎒ ~ 960 ㎒	46.4	
960 ㎒ ~ 1 ㎓	49.5	
30 ㎒ ~ 88 ㎒	40	**Class B**
88 ㎒ ~ 216 ㎒	43.5	
216 ㎒ ~ 960 ㎒	46	
960 ㎒ ~ 1 ㎓	54	

-Radiated Emission Limits above 1 ㎓（3m method）

Frequency Range	Limits(dB(㎶/m))		Class
	Average	Peak	
Above 1 ㎓	59.5	79.5	**Class A**
Above 1 ㎓	54	74	**Class B**

2.3 Conducted Emission

The initial preliminary exploratory scans were performed over the measuring frequency range(0.15㎒ to 30 ㎒) using a max hold mode incorporating a Peak detector and Average detector and using the software of ES-K1(Version V1.71 from R&S). The final test data was measured using a Quasi-Peak detector and Average detector.

2.3.1 Test Equipments

Description	Model No.	Manufacturer	S/N	Cal Due. Date
Two-Line V-Network	ENV216	R & S	100190	2020.05.14
Test Receiver	ESCI 7	R & S	100911	2020.02.20

Note : The calibration period of every equipment is 1 year.

2.3.2 Test Site

Shield Room in Gunpo Laboratory

2.3.3 Environment Conditions and data

- Conducted Emission at AC Mains Port

Temperature : (minimum 23.4, maximum 23.5) ℃
Humidity : (minimum 36.0, maximum 36.0) %R.H.
Atmospheric Pressure : (100.1) ㎪

Test Date : May 27, 2019

- Test Mode : Charging

Freq. (㎒)	LISN (dB)	CL (dB)	Line (P/N)	Q/P				A/V			
				Limit (dB㎶)	Level (dB㎶)	Result (dB㎶)	Margin (dB)	Limit (dB㎶)	Level (dB㎶)	Result (dB㎶)	Margin (dB)
0.43	9.70	0.17	N	57.18	26.83	36.70	20.48	47.18	17.43	27.30	19.88
0.55	9.70	0.16	N	56.00	27.04	36.90	19.10	46.00	20.34	30.20	15.80
0.55	9.60	0.17	H	56.00	30.73	40.50	15.50	46.00	23.33	33.10	12.90
0.67	9.70	0.17	N	56.00	29.93	39.80	16.20	46.00	21.93	31.80	14.20
0.67	9.60	0.17	H	56.00	33.73	43.50	12.50	46.00	26.33	36.10	9.90
0.73	9.70	0.17	N	56.00	31.33	41.20	14.80	46.00	24.53	34.40	11.60
0.73	9.60	0.17	H	56.00	35.13	44.90	11.10	46.00	27.93	37.70	8.30
0.75	9.70	0.18	N	56.00	29.32	39.20	16.80	46.00	22.52	32.40	13.60
0.76	9.60	0.18	H	56.00	33.12	42.90	13.10	46.00	26.22	36.00	10.00
0.93	9.70	0.17	N	56.00	25.23	35.10	20.90	46.00	18.93	28.80	17.20
0.93	9.63	0.17	H	56.00	27.20	37.00	19.00	46.00	21.80	31.60	14.40
0.96	9.66	0.18	H	56.00	26.46	36.30	19.70	46.00	21.06	30.90	15.10

Measurement Uncertainty : 3.21 ㏈ (The confidential level is about 95%, *k*=2)

Note : • Line (H) : Hot • Line (N) : Neutral
• CL: Cable Loss • LISN : LISN Factor
• Result = Level + CL + LISN • Margin = Limit – Result

See Appendix A (Conducted Emission at AC Mains Port)

2.4 Radiated Emission

The initial preliminary exploratory scans were performed at 3 ㎙ distance over the measuring frequency range(30 ㎒ to 13 ㎓) using a max hold mode incorporating a Peak detector and using the software of EMC32(Version 8.50.0 from R&S) and EP5RE(Version Ver3.10.20 from TOYO). The final test data was measured using a Quasi-Peak detector below 1 ㎓ at 3 ㎙ distance and a Peak and Average detector above 1 ㎓ at 3 ㎙ distance. Measurements were made with the antenna positioned in both the horizontal and vertical planes of polarization. The antenna height was varied from 1 m to 4 m and the EUT was rotated 360° to find the maximum emitting point for each frequency.

2.4.1 Test Equipments

Description	Model No.	Manufacturer	S/N	Cal Due. Date
Double Ridged Horn Antenna	HF907	R & S	100208	2020.10.24
Horn Antenna	BBHA9170	SCHWARZBECK	BBHA9170223	2020.09.10
Signal Conditioning Unit	SCU 18	R & S	10117	2019.08.07
Test Receiver	ESU26	R & S	100109	2020.01.31
Bilog Antenna (KOLAS)	VULB9163	SCHWARZBECK	01126	2020.03.26
Amplifier	8447F	HP	2944A03909	2019.08.07
PREAMPLIFIER	JS44-18004000-35-8P	MITEQINC	1546891	2020.05.13

Note : Only the calibration period of Antennas is 2 years but the period of every equipment is 1 year.

2.4.2 Test Site

3m SEMI-ANECHOIC CHAMBER Gunpo Laboratory (Below 1 ㎓, Above 1 ㎓)

2.4.3 Environment Conditions and data

- Below 1 ㎓

Temperature : (minimum 20.1, maximum 20.2) ℃
Humidity : (minimum 30.0, maximum 30.0) %R.H.
Atmospheric Pressure : (101.4) ㎪

Test Date : May 15, 2019

- Above 1 ㎓

Temperature : (minimum 22.4, maximum 22.6) ℃
Humidity : (minimum 48.0, maximum 49.0) %R.H.
Atmospheric Pressure : (101.1) ㎪

Test Date : June 19, 2019

- Below 1 ㎓ (3 m method)

- Test Mode : Charging

Freq. (㎒)	Level (dB(㎶))	Pol. (H/V)	A (°)	H (cm)	AF (dB/m)	CL (dB)	Amp. (dB)	Result (dB(㎶/m))	Limit (dB(㎶/m))	Margin (dB)
101.90	28.50	V	196	200	17.79	1.94	27.70	20.53	43.50	22.97
101.90	29.40	V	196	200	17.79	1.94	27.70	21.43	43.50	22.07
531.73	28.60	V	27	100	23.40	6.22	28.53	29.69	46.00	16.31
681.19	28.30	H	73	200	25.20	6.64	28.52	31.62	46.00	14.38
837.57	27.90	V	158	200	27.05	5.84	28.22	32.57	46.00	13.43
945.40	27.90	H	285	100	28.00	6.38	27.82	34.46	46.00	11.54

- Test Mode : WCDMA Idle + WLAN Idle + Charging

Freq. (㎒)	Level (dB(㎶))	Pol. (H/V)	A (°)	H (cm)	AF (dB/m)	CL (dB)	Amp. (dB)	Result (dB(㎶/m))	Limit (dB(㎶/m))	Margin (dB)
60.94	39.80	H	125	100	18.22	1.43	27.78	31.67	40.00	8.33
131.56	40.70	V	32	400	14.30	2.36	27.64	29.72	43.50	13.78
181.29	42.10	H	40	300	15.33	3.96	27.41	33.98	43.50	9.52
204.99	46.50	H	72	100	16.50	3.93	27.29	39.64	43.50	3.86
265.34	45.90	V	312	100	18.11	4.21	27.17	41.05	46.00	4.95
457.24	42.50	H	247	200	21.94	5.55	28.33	41.66	46.00	4.34

- Test Mode : LTE Idle + WLAN Idle + Charging

Freq. (㎒)	Level (dB(㎶))	Pol. (H/V)	A (°)	H (cm)	AF (dB/m)	CL (dB)	Amp. (dB)	Result (dB(㎶/m))	Limit (dB(㎶/m))	Margin (dB)
60.84	41.10	H	145	200	18.25	1.43	27.78	33.00	40.00	7.00
130.59	42.10	H	342	200	14.34	2.35	27.64	31.15	43.50	12.35
182.25	42.50	V	33	100	15.43	3.98	27.41	34.50	43.50	9.00
202.99	46.40	V	126	400	16.62	3.93	27.29	39.66	43.50	3.84
265.44	45.80	V	242	300	18.11	4.21	27.17	40.95	46.00	5.05
457.01	42.30	H	256	100	21.94	5.54	28.33	41.45	46.00	4.55

Measurement Uncertainty (Horizontal) : 5.31 ㏈ (The confidential level is about 95%, *k*=2)
Measurement Uncertainty (Vertical) : 5.73 ㏈ (The confidential level is about 95%, *k*=2)

Note 1: • AF = Antenna Factor • CL = Cable Loss • Amp = Amplifier Gain
• POL H = Horizontal • POL V = Vertical • A : Angle
• H : Height • Margin = Limit – Result • Result = Level + AF + CL – Amp

- Above 1 ㎓ (3 m method)

- Test Mode : Charging

Freq. (㎒)	Level (dBμV)	Pol. (H/V)	A (°)	H (cm)	AF (dB)	CL (dB)	Amp. (dB)	CF (dB)	F/S (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Peak Detector											
1389.58	46.30	H	146	100	24.90	9.90	45.89	0.00	35.21	74.00	38.79
3545.04	43.20	H	311	100	32.08	12.79	45.05	0.00	43.02	74.00	30.98
5379.63	43.20	H	224	100	34.52	14.75	45.58	0.00	46.89	74.00	27.11
8031.62	43.30	H	255	100	36.53	19.72	46.28	0.00	53.27	74.00	20.73
14773.54	42.50	V	339	100	40.71	22.69	44.49	0.00	61.41	74.00	12.59
17911.46	42.90	H	360	100	44.60	25.14	46.20	0.00	66.44	74.00	7.56
Average Detector											
1389.58	32.70	H	146	100	24.90	9.90	45.89	0.00	21.61	54.00	32.39
3545.04	29.70	H	311	100	32.08	12.79	45.05	0.00	29.52	54.00	24.48
5379.63	29.70	H	224	100	34.52	14.75	45.58	0.00	33.39	54.00	20.61
8031.62	28.80	H	255	100	36.53	19.72	46.28	0.00	38.77	54.00	15.23
14773.54	28.10	V	339	100	40.71	22.69	44.49	0.00	47.01	54.00	6.99
17432.88	29.00	H	360	100	43.93	24.17	46.20	0.00	50.90	54.00	3.10

- Test Mode : WCDMA Idle + WLAN Idle + Charging

Freq. (㎒)	Level (dBμV)	Pol. (H/V)	A (°)	H (cm)	AF (dB)	CL (dB)	Amp. (dB)	CF (dB)	F/S (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Peak Detector											
3415.26	45.10	H	34	100	32.00	12.83	45.18	0.00	44.75	74.00	29.25
4411.96	44.60	V	145	200	33.95	13.55	45.51	0.00	46.59	74.00	27.41
6635.27	40.50	H	302	100	35.64	16.37	45.93	0.00	46.58	74.00	27.42
9014.41	41.50	H	322	100	37.23	17.98	46.10	0.00	50.61	74.00	23.39
12112.34	44.20	V	222	100	38.22	20.22	44.94	0.00	57.70	74.00	16.30
16415.51	43.20	V	32	100	42.26	23.24	45.79	0.00	62.91	74.00	11.09
Average Detector											
3415.26	30.10	H	34	100	32.00	12.83	45.18	0.00	29.75	54.00	24.25
4411.96	32.10	V	145	200	33.95	13.55	45.51	0.00	34.09	54.00	19.91
6635.27	29.50	H	302	100	35.64	16.37	45.93	0.00	35.58	54.00	18.42
9014.41	28.60	H	322	100	37.23	17.98	46.10	0.00	37.71	54.00	16.29
12112.34	29.40	V	222	100	38.22	20.22	44.94	0.00	42.90	54.00	11.10
17432.88	29.10	V	32	100	43.93	24.17	46.20	0.00	51.00	54.00	3.00

- Test Mode : LTE Idle + WLAN Idle + Charging

Freq. (MHz)	Level (dBμV)	Pol. (H/V)	A (°)	H (cm)	AF (dB)	CL (dB)	Amp. (dB)	CF (dB)	F/S (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Peak Detector											
3541.98	41.20	V	125	100	32.07	12.78	45.06	0.00	40.99	74.00	33.01
4542.65	43.20	V	101	200	33.51	13.71	45.64	0.00	44.78	74.00	29.22
6754.25	40.50	H	2	200	35.87	16.82	45.95	0.00	47.24	74.00	26.76
12141.56	39.40	H	63	100	38.28	20.17	44.93	0.00	52.92	74.00	21.08
15424.11	38.60	H	235	200	40.90	22.96	44.40	0.00	58.06	74.00	15.94
16458.24	40.20	H	312	100	42.42	23.20	45.82	0.00	60.00	74.00	14.00
Average Detector											
3541.98	29.30	V	125	100	32.07	12.78	45.06	0.00	29.09	54.00	24.91
4542.65	29.80	V	101	200	33.51	13.71	45.64	0.00	31.38	54.00	22.62
6754.25	30.50	H	2	200	35.87	16.82	45.95	0.00	37.24	54.00	16.76
12141.56	31.20	H	63	100	38.28	20.17	44.93	0.00	44.72	54.00	9.28
15424.11	30.60	H	235	200	40.90	22.96	44.40	0.00	50.06	54.00	3.94
17432.88	28.80	H	312	100	43.93	24.17	46.20	0.00	50.70	54.00	3.30

Measurement Uncertainty (Horizontal) : 5.73 dB (The confidential level is about 95%, *k*=2)
Measurement Uncertainty (Vertical) : 5.85 dB (The confidential level is about 95%, *k*=2)

Note 1: • AF = Antenna Factor • CL = Cable Loss • Amp = Amplifier Gain
• POL H = Horizontal • POL V = Vertical • A : Angle
• H : Height • Margin = Limit – Result • Result = Level + AF + CL – Amp

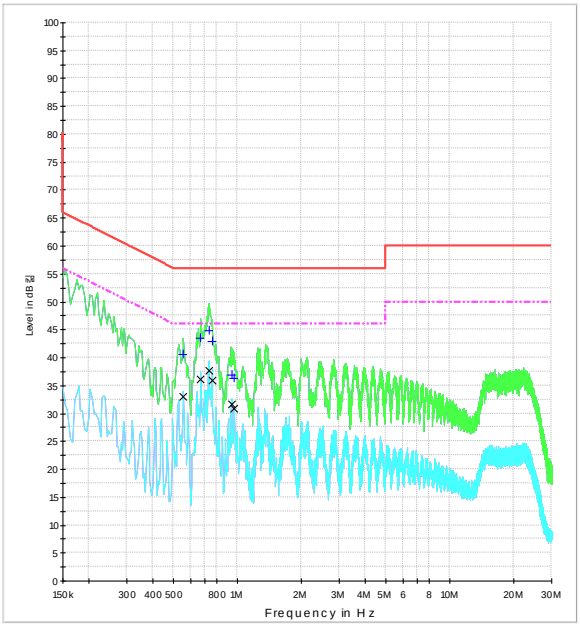
Note2. We have also tested from 18 GHz ~30 GHz and found no emission.

See Appendix B (Radiated Emission)

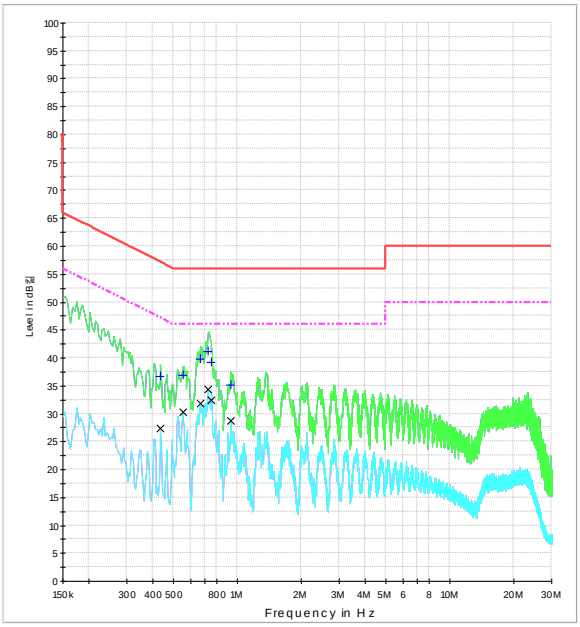
Appendix A : Conducted Emission at Mains Port

- Test Mode : Charging

Hot



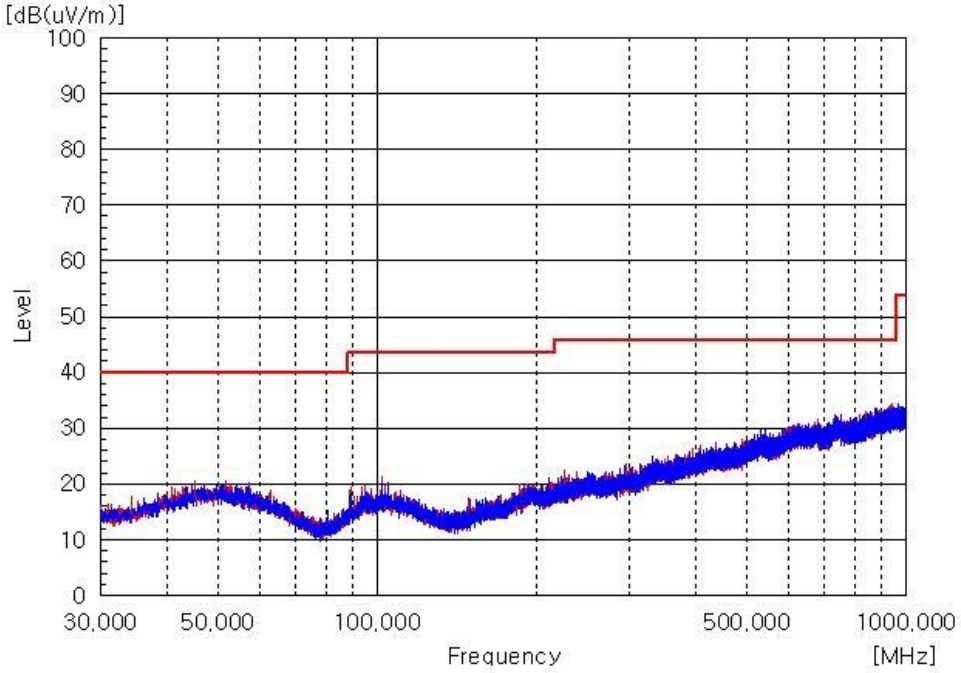
Neutral



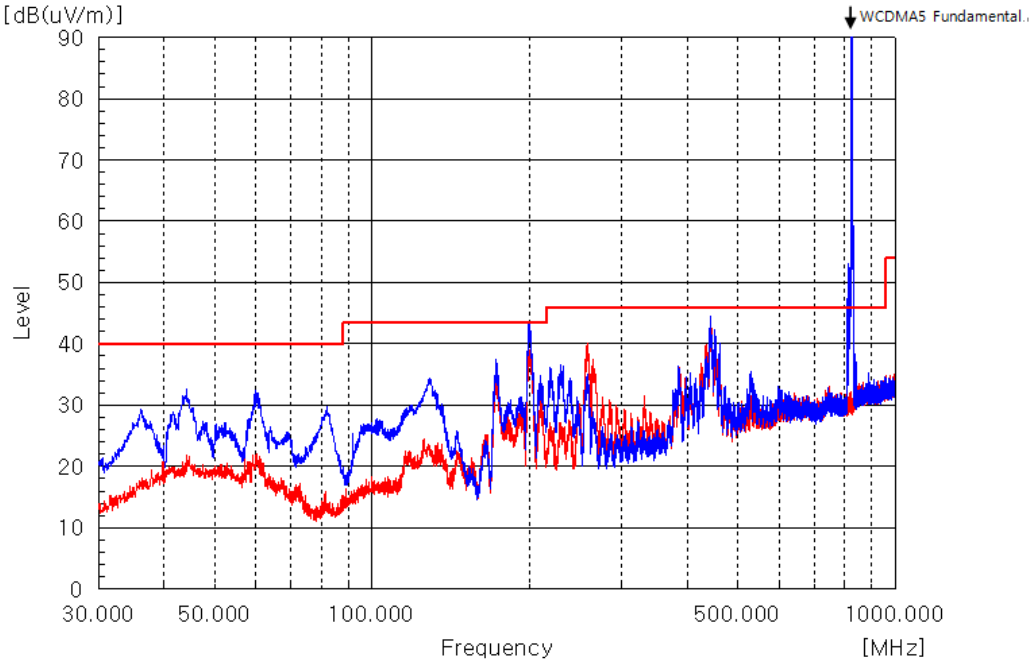
Appendix B : Radiated Emission

Below 1 ㎓

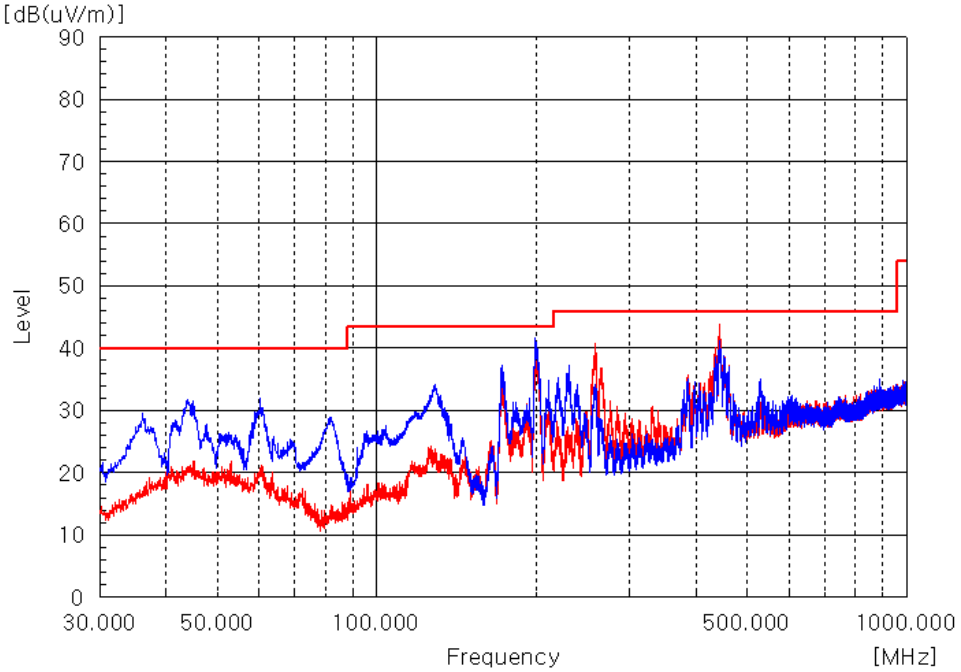
- Test Mode : Charging



- Test Mode : WCDMA Idle + WLAN Idle + Charging

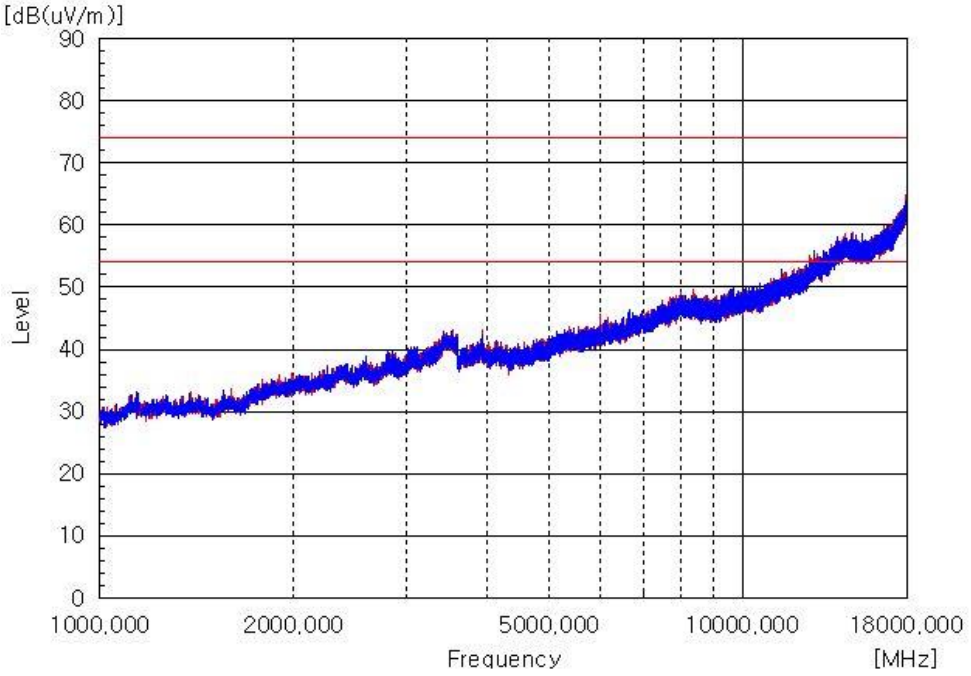


- Test Mode : LTE Idle + WLAN Idle + Charging

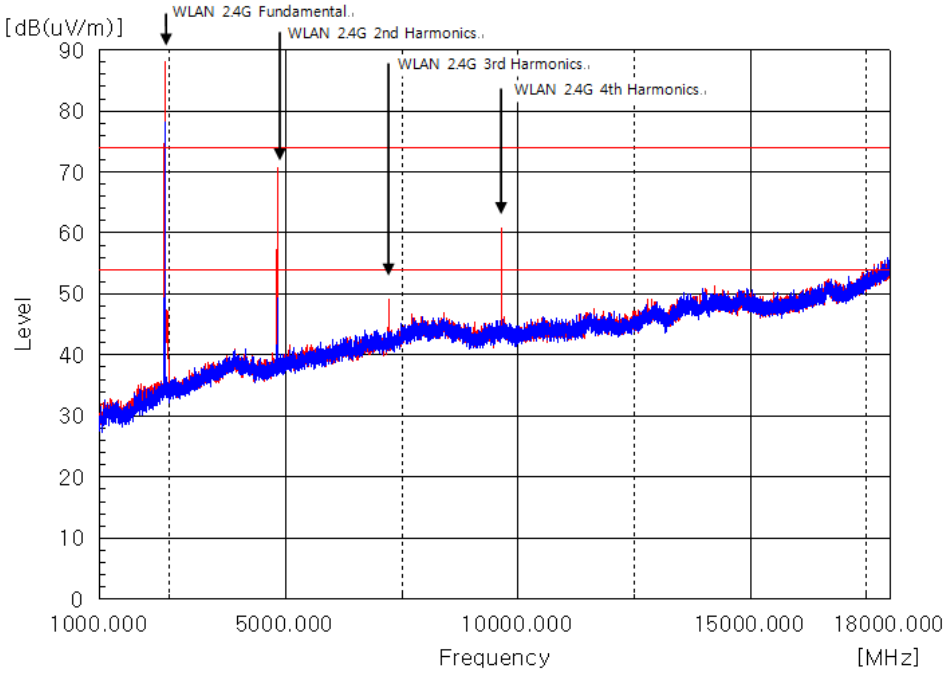


Above 1 ㎓

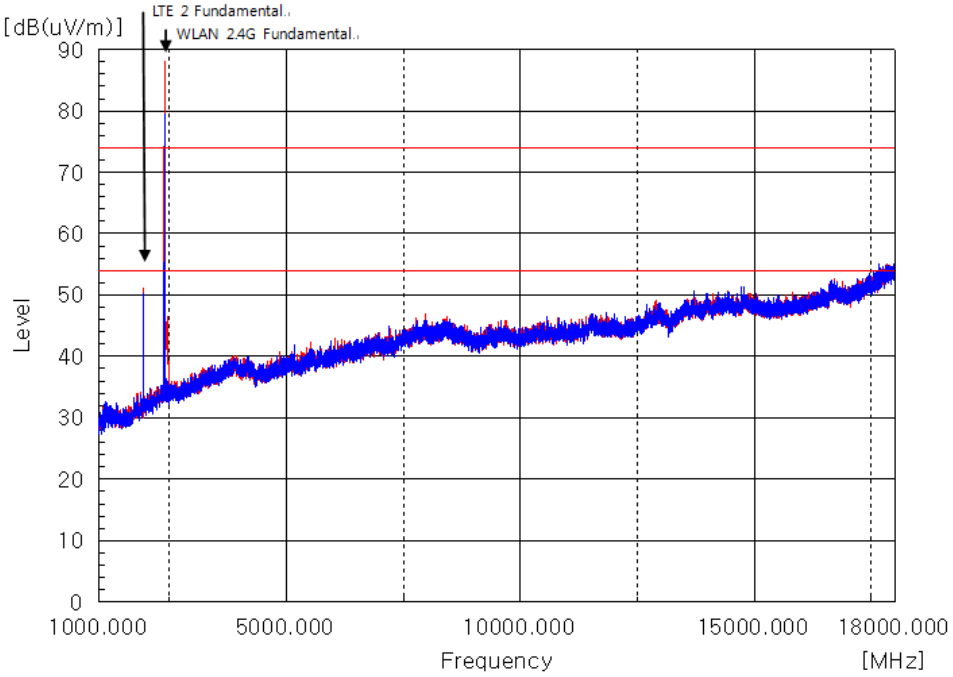
- Test Mode : Charging



- Test Mode : WCDMA Idle + WLAN Idle + Charging



- Test Mode : LTE Idle + WLAN Idle + Charging



- End of the Report -