



TEST REPORT

KCTL Inc. 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-31-285-0894 FAX: 82-505-299-8311 www.kctl.co.kr		Report No.: KR18-SRF0072-D Page (1) of (31)	
1. Client ◦ Name : DXM Co.,Ltd. ◦ Address : (Baekseok-dong, Ilsan technotown), 1003. 138, Ilsan-ro, Ilsandong-gu, Goyang-si, Gyeonggi-do, Korea ◦ Date of Receipt : 2017-08-02			
2. Use of Report : -			
3. Name of Product and Model : WIRELESS CHARGERBASE / WPT			
4. Manufacturer and Country of Origin : DXM Co.,Ltd. / Korea			
5. FCC ID : 2AQ4PWPT			
6. IC : 24541-WPT			
7. Date of Test : 2018-01-11 to 2018-01-12			
8. Test Standards : FCC Part 15 Subpart C, 15.209 IC RSS-216 Issue 2, RSS-Gen Issue 5			
9. Test Results : Refer to the test result in the test report			
Affirmation	Tested by Name : Seonjun Yun (Signature)		Technical Manager Name : Seungyong Kim (Signature)
2019-02-26			
KCTL Inc.			
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REPORT REVISION HISTORY

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1. Client information

Applicant: DXM Co.,Ltd.
Address: (Baekseok-dong, Ilsan technotown), 1003. 138, Ilsan-ro, Ilsandong-gu, Goyang-si, Gyeonggi-do, Korea
Telephone number: +82 70 4804 8272
Contact person: Seunghyeon Kim / qa@dxm.co.kr

Manufacturer: DXM Co.,Ltd.
Address: (Baekseok-dong, Ilsan technotown), 1003. 138, Ilsan-ro, Ilsandong-gu, Goyang-si, Gyeonggi-do, Korea



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2. Laboratory information

Address

KCTL Inc.

65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea

Telephone Number: +82 31 285 0894

Facsimile Number: +82 505 299 8311

FCC Site Designation No: KR0040, FCC Site Registration No: 687132

VCCI Registration No. : R-3327, G-198, C-3706, T-1849

Industry Canada Registration No. : 8035A

KOLAS NO.: KT231

SITE MAP



3. Description of E.U.T.

3.1 Basic description

Applicant	DXM Co.,Ltd.
Address of Applicant	(Baekseok-dong, Ilsan technotown), 1003. 138, Ilsan-ro, Ilsandong-gu, Goyang-si, Gyeonggi-do, Korea
Manufacturer	DXM Co.,Ltd.
Address of Manufacturer	(Baekseok-dong, Ilsan technotown), 1003. 138, Ilsan-ro, Ilsandong-gu, Goyang-si, Gyeonggi-do, Korea
Type of equipment	WIRELESS CHARGERBASE
Basic Model	WPT
Serial number	N/A

3.2 General description

Frequency Range	150 kHz ~ 175 kHz
Type of Modulation	ASK
Power supply	DC 5 V
Type of Antenna	Loop coil Antenna
RF power setting	Referred the measuring instrument from manufacturer

Note : The above EUT information was declared by the manufacturer.

3.3 Support equipment

Client device	Model	FCC ID
DUAL BAND CURING LIGHT	CGD	N/A

Note : Client device supports only receiver function of WPT system and it is consisted of a set with EUT.

3.4 Test configurations

In order to check all kinds of possible configurations, EUT was evaluated with appropriate client and under each charging condition as below table.

EUT Mode	Description
Charging Mode with Client device (Model : CGD, FCC ID : N/A)	Less than 1 % of Battery
	Less than 50 % of Battery
	100 % full charging of Battery

Note : The above EUT information was declared by the manufacturer.

3.5 Normal and extreme test conditions

- Ambient Conditions

	Temperature [°C]	Relative humidity [%]
Requirement for tests	15 to 35	20 to 75
Ambient Conditions	23	51

-Test Conditions

Test Condition	Temperature [°C]	Voltage [V]
NTNV	23	5

Note 1 : N:Normal T:Temperature V:Voltage

4. Summary of test results

4.1 Standards & results

FCC Rule Reference	IC Rule Reference	Parameter	Report Section	Test Result
15.203	-	Antenna Requirement	5.1	C
15.209	RSS-216 Issue 2, 6.2.2.2	Field Strength of Fundamental and Spurious Emission	5.2	C
2.1049	RSS-Gen Issue 5, 6.7	20 dB Bandwidth and Occupied Bandwidth	5.3	C
15.207	RSS-Gen Issue 5, 8.8	AC Power Line Conducted Emission	5.4	C
Note ₁): C = Complies, NC = Not Complies, NT = Not Tested, NA = Not Applicable				

Note: Measurement methods used to test this device are ANSI C63.10:2013

4.2 Measurement Uncertainty

Measurement Item	Expanded Uncertainty $U = kU_c (k = 2)$	
Radiated Spurious Emissions	9 kHz ~ 30 MHz	+2.42 dB, -2.42 dB
	30 MHz ~ 300 MHz:	+4.94 dB, -5.06 dB
		+4.93 dB, -5.05 dB
	300 MHz ~ 1 000 MHz:	+4.97 dB, -5.08 dB
		+4.84 dB, -4.96 dB

5. Test results

5.1 Antenna Requirement

5.1.1 Regulation

According to §15.203, 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 a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

5.1.2 Result

-Complied

The transmitter has permanently attached Loop Coil Antenna (internal antenna) on board.

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5.2 Field Strength of Fundamental and Spurious Emission

5.2.1 Regulation

According to §15.209(a), Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field strength ($\mu V/m$)	Measurement distance (m)
0.009 - 0.490	2 400/F(kHz)	300
0.490 - 1.705	24 000/F(kHz)	30
1.705 - 30	30	30
30 - 88	100**	3
88 - 216	150**	3
216 - 960	200**	3
Above 960	500	3

**Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54–72 MHz, 76–88 MHz, 174–216 MHz or 470–806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §15.231 and 15.241.

5.2.2 Measurement Procedure

Test Procedures for emission from 9 kHz to 30 MHz

- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- Then antenna is a loop antenna is fixed at one meter above the ground to determine the maximum value of the field strength. Both parallel and perpendicular of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Quasi Peak and Average Detect Function and Specified Bandwidth with Maximum Hold Mode.

Test Procedures for emission from above 30 MHz

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site below 1 GHz. The table was rotated 360 degrees to determine the position of the highest radiation.
2. During performing radiated emission below 1 GHz, the EUT was set 3 meters away from the Interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The antenna is a bi-log antenna and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Note;

RADIATED EMISSION TEST SITES FOR MEASUREMENTS FROM 9 kHz TO 30 MHz

According to exploratory test no any obvious emission were detected from 9 kHz to 30 MHz. Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open area test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.

5.2.3 Test Result

Test Condition: Refer to the clause 3.5 Normal and extreme test conditions

- Complied

1. Measured value of the Field strength of spurious Emissions (Radiated)
2. The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.
3. All radiated testing was measured in one orthogonal EUT position (X-axis)
4. For IC, it used the limits of the magnetic field strength from CISPR 11 2004 table 3b.

Table 3b – Limits of the magnetic field strength

Frequency range MHz	Limits in dB(μA/m) at 3 m distance Quasi-peak
0,009 to 0,070	69
0,070 to 0,1485	69 Decreasing linearly with logarithm of frequency to 39
0,1485 to 4,0	39 Decreasing linearly with logarithm of frequency to 3
4,0 to 30	3
NOTE The limits of Table 3b apply to induction cooking appliances for commercial use and those for domestic use with a diagonal diameter of more than 1,6 m. Measurements are performed at 3 m distance with a 0,6 m loop antenna as described in 5.5.2.1 of CISPR 16-1. The antenna shall be vertically installed, with the lower edge of the loop at 1 m height above the floor.	

- Field Strength of Fundamental Test data

FCC

- Charging Mode (Less than 1 % of Battery)

Frequency [MHz]	Reading [dB(μV)]	Pol. [V/H]	Cable Loss [dB]	Amp Gain [dB]	Antenna Factor [dB]	Factor [dB]	3m Field Strength [dB(μV/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
0.154	77.60	H	-0.05	-32.75	19.60	-13.20	64.40	-15.60	23.85	39.45

- Charging Mode (Less than 50 % of Battery)

Frequency [MHz]	Reading [dB(μV)]	Pol. [V/H]	Cable Loss [dB]	Amp Gain [dB]	Antenna Factor [dB]	Factor [dB]	3m Field Strength [dB(μV/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
0.158	78.90	H	-0.05	-32.75	19.60	-13.20	65.70	-14.30	23.63	37.93

- Charging Mode (100 % full charging of Battery)

Frequency [MHz]	Reading [dB(μV)]	Pol. [V/H]	Cable Loss [dB]	Amp Gain [dB]	Antenna Factor [dB]	Factor [dB]	3m Field Strength [dB(μV/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
0.161	78.70	H	-0.05	-32.75	19.60	-13.20	65.50	-14.50	23.47	37.97

Note1. Factor = Cable loss + Amp gain + Antenna factor

Note2. According to §15.31 (f)(2);

Result at 300 m (dB μV/m) = 3 m Field Strength Result (dB μV/m) - 40log(300/3) (dB μV/m).

Note3. The limit above was calculated based on table of §15.209 (a).

IC

- Charging Mode (Less than 1 % of Battery)

Frequency [MHz]	Reading [dB(μV)]	Pol. [V/H]	Cable Loss [dB]	Amp Gain [dB]	Antenna Factor [dB]	Factor [dB]	Result [dB μA/m]	Limit [dB μA/m]	Margin [dB]
0.154	77.60	H	-0.05	-32.75	19.60	-13.20	12.90	38.12	25.22

- Charging Mode (Less than 50 % of Battery)

Frequency [MHz]	Reading [dB(μV)]	Pol. [V/H]	Cable Loss [dB]	Amp Gain [dB]	Antenna Factor [dB]	Factor [dB]	Result [dB μA/m]	Limit [dB μA/m]	Margin [dB]
0.158	78.90	H	-0.05	-32.75	19.60	-13.20	14.20	38.12	23.92

- Charging Mode (100 % full charging of Battery)

Frequency [MHz]	Reading [dB(μV)]	Pol. [V/H]	Cable Loss [dB]	Amp Gain [dB]	Antenna Factor [dB]	Factor [dB]	Result [dB μA/m]	Limit [dB μA/m]	Margin [dB]
0.161	78.70	H	-0.05	-32.75	19.60	-13.20	14.00	38.12	24.12

Note1. Factor = Cable loss + Amp gain + Antenna factor

Note2. According to ANSI C63.10"2013,

For measurement below 30 MHz conversion factor from E-field to H-field is considered as free-space

Impedance $[1 \mu V/m = (1/377 \Omega) \times 1 \mu A/m] = -51.50 \text{ dB}$

Note3. Reading values above 30 MHz are peak values. If the values are 3 dB lower than the limit specified, then they would be retested by using quasi-peak detector.

Note4. Actual(dB μA/m) at 3 m = Reading(dB μV) + AF(dB/m) + CL(dB) + Conversion factor (dB) of Reading (dB μV) + AF(dB/m) + AMP(dB) + CL(dB).

Note5. The test was measured at a distance of 3 m.

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**FCC****- Spurious Emission Test data**

- According to §15.31 (f)(2)
 - 300 m Result (dB μ V/m) = 3 m Result (dB μ V/m) - 40log(300/3) (dB μ V/m)
 - 30 m Result (dB μ V/m) = 3 m Result (dB μ V/m) - 40log(30/3) (dB μ V/m)
- Spurious emissions for all channels and modes were investigated and almost the same below 1 GHz.
- According to §15.31(o), emission levels are not report much lower than the limits by over 20 dB.

- Below 1 GHz data

- Charging Mode (Less than 1 % of Battery)

Frequency [MHz]	Receiver Bandwidth [kHz]	Pol. [V/H]	Reading [dB(μ V)]	Cable Loss [dB]	Amp Gain [dB]	Antenna Factor [dB]	Factor [dB]	Result [dB(μ V/m)]	Limit [dB(μ V/m)]	Margin [dB]
Average DATA. Emissions below 1 GHz										
0.33	9	H	56.30	-0.06	-32.74	19.60	-13.20	43.10	97.23	54.13
0.49	9	H	55.20	0.03	-32.73	19.60	-13.10	42.10	93.80	51.70
Quasi-Peak DATA. Emissions below 1 GHz										
0.65	9	H	48.80	0.03	-32.73	19.60	-13.10	35.70	71.35	35.65
0.81	9	H	47.00	0.12	-32.72	19.60	-13.00	34.00	69.43	35.43
0.98	9	H	47.40	0.12	-32.72	19.60	-13.00	34.40	67.78	33.38
33.52	120	V	40.40	1.15	-40.18	23.03	-16.00	24.40	40.00	15.60
80.08	120	H	51.00	1.89	-33.30	13.11	-18.30	32.70	40.00	7.30
105.54	120	V	40.90	2.20	-37.07	17.07	-17.80	23.10	43.50	20.40
122.76	120	H	40.30	2.38	-36.04	18.16	-15.50	24.80	43.50	18.70
188.96	120	V	35.10	3.02	-33.66	15.24	-15.40	19.70	43.50	23.80
354.47	120	V	33.20	4.25	-34.41	20.56	-9.60	23.60	46.00	22.40
877.17	120	H	30.30	6.92	-30.24	26.32	3.00	33.30	46.00	12.70
888.09	120	V	30.60	6.97	-30.07	26.40	3.30	33.90	46.00	12.10

- Charging Mode (Less than 50 % of Battery)

Frequency [MHz]	Receiver Bandwidth [kHz]	Pol. [V/H]	Reading [dB(μV)]	Cable Loss [dB]	Amp Gain [dB]	Antenna Factor [dB]	Factor [dB]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
Average DATA. Emissions below 1 GHz										
0.32	9	H	54.30	-0.06	-32.74	19.60	-13.20	41.10	97.50	56.40
0.48	9	H	55.30	0.03	-32.73	19.60	-13.10	42.20	93.98	51.78
Quasi-Peak DATA. Emissions below 1 GHz										
0.64	9	H	46.40	0.03	-32.73	19.60	-13.10	33.30	71.48	38.18
0.80	9	H	47.50	0.13	-32.73	19.60	-13.00	34.50	69.54	35.04
0.95	9	H	44.40	0.12	-32.72	19.60	-13.00	31.40	68.05	36.65
56.92	120	V	35.20	1.56	-28.88	12.82	-14.50	20.70	40.00	19.30
117.66	120	V	33.70	2.33	-36.63	18.10	-16.20	17.50	43.50	26.00
174.17	120	V	26.56	2.89	-32.45	15.46	-14.10	12.40	43.50	31.10
255.89	120	H	21.20	3.55	-35.67	18.32	-13.80	7.40	46.00	38.60
310.94	120	V	34.00	3.96	-34.63	19.47	-11.20	22.80	46.00	23.20
875.72	120	V	20.10	6.92	-31.13	26.31	2.10	22.20	46.00	23.80

- Charging Mode (100 % full charging of Battery)

Frequency [MHz]	Receiver Bandwidth [kHz]	Pol. [V/H]	Reading [dB(μV)]	Cable Loss [dB]	Amp Gain [dB]	Antenna Factor [dB]	Factor [dB]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
Average DATA. Emissions below 1 GHz										
0.31	9	H	55.50	-0.06	-32.74	19.60	-13.20	42.30	97.78	55.48
0.47	9	H	55.00	0.03	-32.73	19.60	-13.10	41.90	94.16	52.26
Quasi-Peak DATA. Emissions below 1 GHz										
0.63	9	H	47.50	0.03	-32.73	19.60	-13.10	34.40	71.62	37.22
0.79	9	H	47.50	0.13	-32.73	19.60	-13.00	34.50	69.65	35.15
63.10	120	V	43.70	1.65	-28.91	12.36	-14.90	28.80	40.00	11.20
138.03	120	V	34.50	2.54	-33.84	17.40	-13.90	20.60	43.50	22.90
193.32	120	V	45.20	3.06	-34.13	15.27	-15.80	29.40	43.50	14.10
349.86	120	V	30.60	4.22	-34.47	20.45	-9.80	20.80	46.00	25.20
954.65	120	V	33.70	7.28	-29.57	26.99	4.70	38.40	46.00	7.60

Note1. Factor = Cable loss + Amp gain + Antenna factor

IC

- Spurious Emission Test data

1. In accordance with CISPR 11 criteria, the conformity must be determined by converting the measured data into a specified distance using an inverse factor of 20 dB / decade in the frequency range.
2. Since the measured data is actually 3 m, the measurement data should be converted to a specified distance using an inverse factor of 20 dB / decade to determine suitability.

CISPR 11 © IEC:2003

Table 4 – Electromagnetic radiation disturbance limits for group 2, class B equipment measured on a test site

Frequency band MHz	Electric field Measurement distance 10 m		Magnetic field Measurement distance 10 m Quasi-peak limits dB(μA/m)
	Quasi-peak limits dB(μV/m)	Average limits ^a dB(μV/m)	
0,15 to 30	–	–	39 Decreasing linearly with logarithm of frequency to 3
30 to 80,872	30	25	–
80,872 to 81,848	50	45	–
81,848 to 134,786	30	25	–
134,786 to 136,414	50	45	–
136,414 to 230	30	25	–
230 to 1 000	37	32	–
^a The average limits apply to magnetron driven equipment only. If magnetron driven equipment exceeds the quasi-peak limit at certain frequencies, then the measurement shall be repeated at these frequencies with the average detector and the average limits specified in this table apply.			

- Below 1 GHz data

- Charging Mode (Less than 1 % of Battery)

Frequency [MHz]	Receiver Bandwidth [kHz]	Pol. [V/H]	Reading [dB(μV)]	Cable Loss [dB]	Amp Gain [dB]	Antenna Factor [dB]	Factor [dB]	Result [dB μA/m]	Limit [dB μA/m]	Margin [dB]
Average DATA. Emissions below 1 GHz										
0.33	9	H	56.30	-0.06	-32.74	19.60	-13.20	-8.40	33.75	42.15
0.49	9	H	55.20	0.03	-32.73	19.60	-13.10	-9.40	31.01	40.41
Quasi-Peak DATA. Emissions below 1 GHz										
0.65	9	H	48.80	0.03	-32.73	19.60	-13.10	-15.80	29.08	44.88
0.81	9	H	47.00	0.12	-32.72	19.60	-13.00	-17.50	27.51	45.01
0.98	9	H	47.40	0.12	-32.72	19.60	-13.00	-17.10	26.28	43.38
33.52	120	V	40.40	1.15	-40.18	23.03	-16.00	-27.10	19.54	46.64
80.08	120	H	51.00	1.89	-33.30	13.11	-18.30	-18.80	19.54	38.34
105.54	120	V	40.90	2.20	-37.07	17.07	-17.80	-28.40	19.54	47.94
122.76	120	H	40.30	2.38	-36.04	18.16	-15.50	-26.70	19.54	46.24
188.96	120	V	35.10	3.02	-33.66	15.24	-15.40	-31.80	19.54	51.34
354.47	120	V	33.20	4.25	-34.41	20.56	-9.60	-27.90	26.54	54.44
877.17	120	H	33.30	6.92	-30.24	26.32	3.00	-15.20	26.54	41.74
888.09	120	V	30.60	6.97	-30.07	26.40	3.30	-17.60	26.54	44.14

- Charging Mode (Less than 50 % of Battery)

Frequency [MHz]	Receiver Bandwidth [kHz]	Pol. [V/H]	Reading [dB(μV)]	Cable Loss [dB]	Amp Gain [dB]	Antenna Factor [dB]	Factor [dB]	Result [dB μA/m]	Limit [dB μA/m]	Margin [dB]
Average DATA. Emissions below 1 GHz										
0.32	9	H	54.30	-0.06	-32.74	19.60	-13.20	-10.40	33.89	44.29
0.48	9	H	55.30	0.03	-32.73	19.60	-13.10	-9.30	31.17	40.47
Quasi-Peak DATA. Emissions below 1 GHz										
0.64	9	H	46.40	0.03	-32.73	19.60	-13.10	-18.20	29.20	47.40
0.80	9	H	47.50	0.13	-32.73	19.60	-13.00	-17.00	27.66	44.66
0.95	9	H	44.40	0.12	-32.72	19.60	-13.00	-20.10	26.44	46.54
56.92	120	V	35.20	1.56	-28.88	12.82	-14.50	-30.80	19.54	50.34
117.66	120	V	33.70	2.33	-36.63	18.10	-16.20	-34.00	19.54	53.54
174.17	120	V	26.56	2.89	-32.45	15.46	-14.10	-39.04	19.54	58.58
255.89	120	H	21.20	3.55	-35.67	18.32	-13.80	-44.10	26.54	70.64
310.94	120	V	34.00	3.96	-34.63	19.47	-11.20	-28.70	26.54	55.24
875.72	120	V	20.10	6.92	-31.13	26.31	2.10	-29.30	26.54	55.84

- Charging Mode (100 % full charging of Battery)

Frequency [MHz]	Receiver Bandwidth [kHz]	Pol. [V/H]	Reading [dB(μV)]	Cable Loss [dB]	Amp Gain [dB]	Antenna Factor [dB]	Factor [dB]	Result [dB μA/m]	Limit [dB μA/m]	Margin [dB]
Average DATA. Emissions below 1 GHz										
0.31	9	H	55.50	-0.06	-32.74	19.60	-13.20	-9.20	33.98	43.18
0.47	9	H	55.00	0.03	-32.73	19.60	-13.10	-9.60	31.23	40.83
Quasi-Peak DATA. Emissions below 1 GHz										
0.63	9	H	47.50	0.03	-32.73	19.60	-13.10	-17.10	29.27	46.37
0.79	9	H	47.50	0.13	-32.73	19.60	-13.00	-17.00	27.73	44.73
63.10	120	V	43.70	1.65	-28.91	12.36	-14.90	-22.70	19.54	42.24
138.03	120	V	34.50	2.54	-33.84	17.40	-13.90	-30.90	19.54	50.44
193.32	120	V	45.20	3.06	-34.13	15.27	-15.80	-22.10	19.54	41.64
349.86	120	V	30.60	4.22	-34.47	20.45	-9.80	-30.70	26.54	57.24
954.65	120	V	33.70	7.28	-29.57	26.99	4.70	-13.10	26.54	39.64

Note1. Factor = Cable loss + Amp gain + Antenna factor

Note2. According to 7.2.3 of CISPR 11:2004,

Actual(dB μA/m) at 10m = Actual(dB μV/m) at 3m + 20log(3/10)(dB μV/m)

Actual(dB μV/m) at 3m = Actual(dB μA/m) at 10m - 20log(3/10)(dB μV/m)

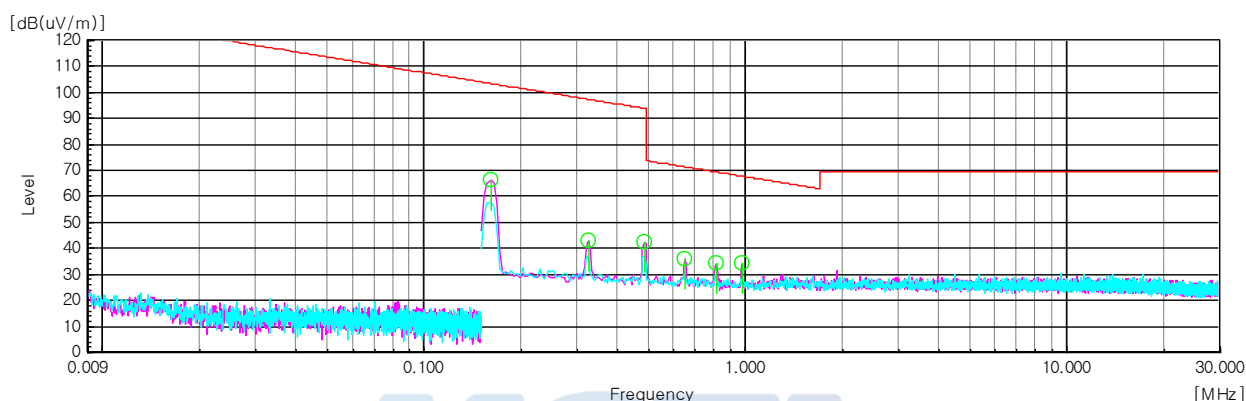
Note3. The test was measured at a distance of 3 m.

5.2.4 Test Plot

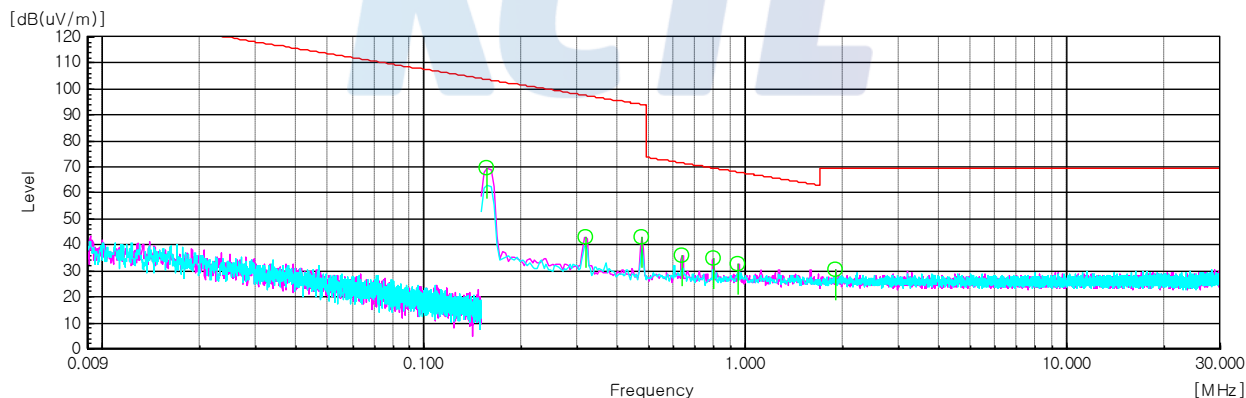
Plot of Field Strength of Fundamental and Spurious Emission (Radiated)

- 9 kHz ~ 30 MHz data

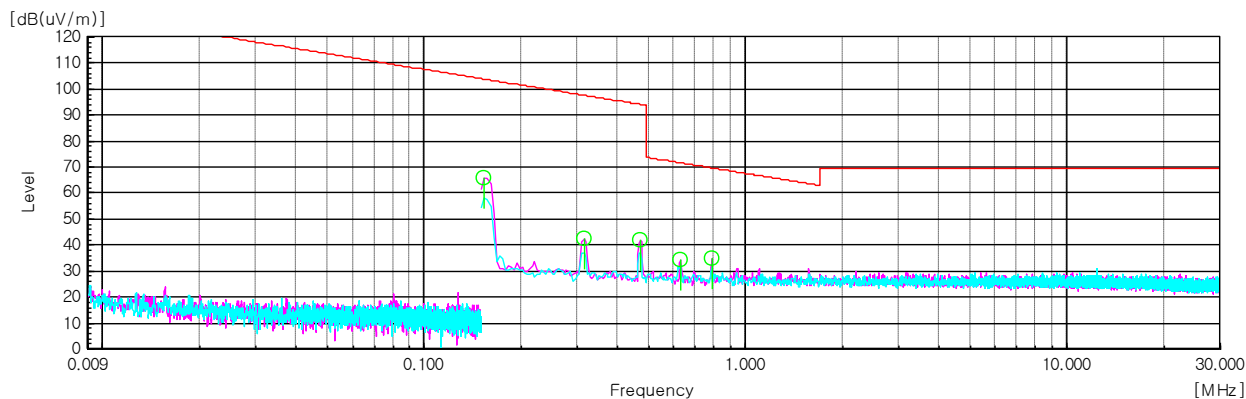
- Charging Mode (Less than 1 % of Battery)

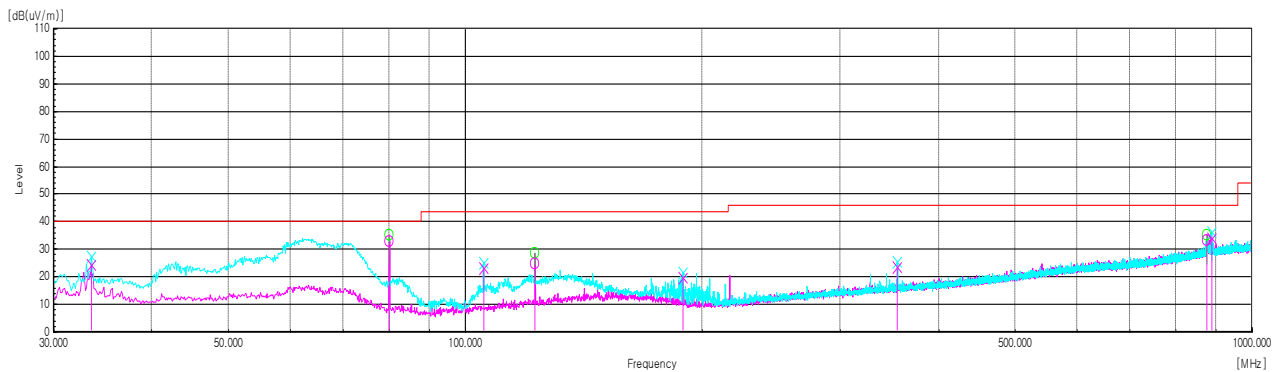
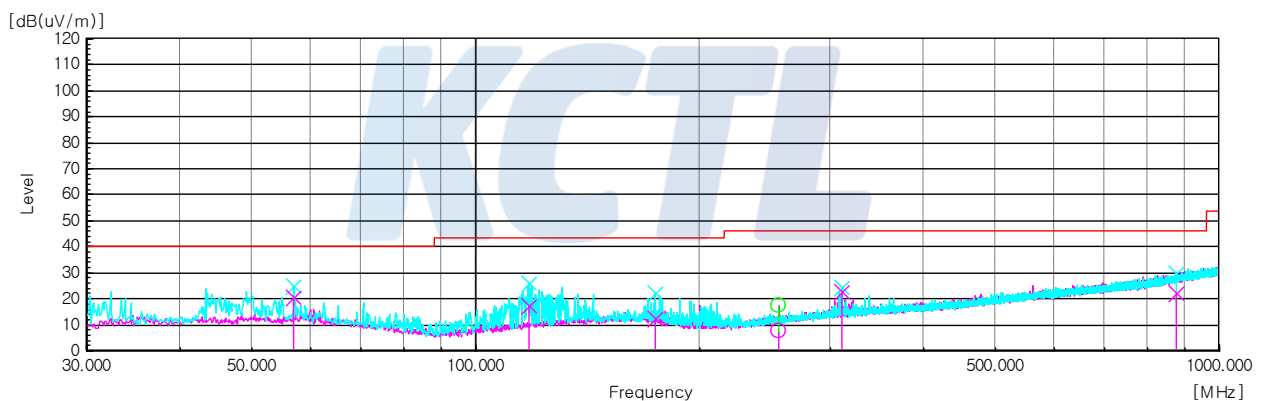
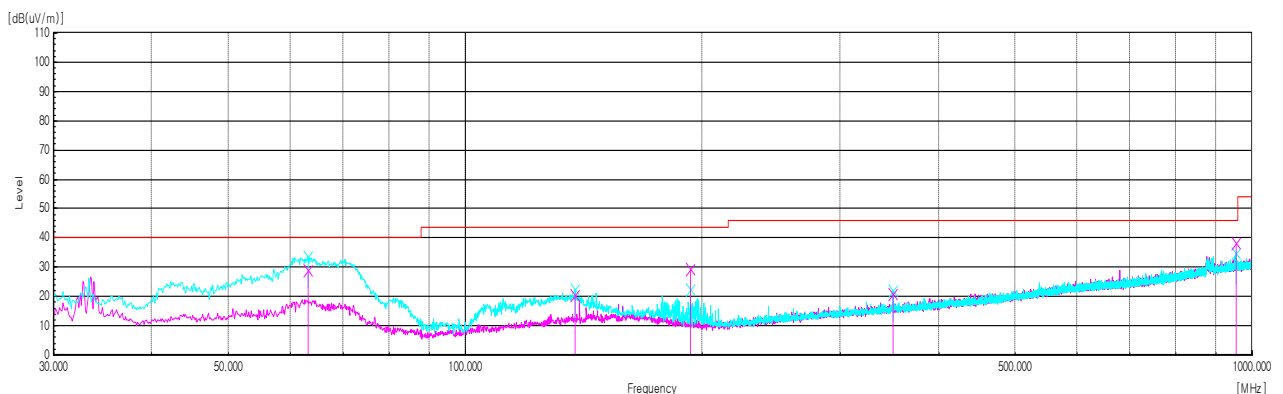


- Charging Mode (Less than 50 % of Battery)



- Charging Mode (100 % full charging of Battery)



- 30 MHz ~ 1 GHz data**- Charging Mode (Less than 1 % of Battery)****- Charging Mode (Less than 50 % of Battery)****- Charging Mode (100 % full charging of Battery)**

5.3 20 dB Bandwidth and Occupied Bandwidth

5.3.1 Regulation

For reporting purpose only

5.3.2 Measurement Procedure

- 20 dB Bandwidth

- Span = set to capture all products of the modulation process, including the emission skirts.
RBW = 1 ~ 5 % of the OBW, VBW = RBW, Sweep = auto, Detector = peak, Trace = max hold.
- The marker-to-peak function to set the mark to the peak of the emission. Use the marker-delta function to measure 20 dB down one side of the emission. Reset the function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is 20 dB bandwidth of the emission.

- Occupied Bandwidth

The transmitter shall be operated at its maximum carrier power measured under normal test conditions.

- The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.
- The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the occupied bandwidth (OBW) and video bandwidth (VBW) shall be approximately 3x RBW.

A peak, or peak hold, may be used in place of the sampling detector as this may produce a wider bandwidth than the actual bandwidth (worst-case measurement). Use of a peak hold may be necessary to determine the occupied bandwidth if the device is not transmitting continuously.

The trace data points are recovered and are directly summed in linear power level terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points (starting at the highest frequency, at the right side of the span, and going down in frequency). This frequency is then recorded.

The difference between the two recorded frequencies is the 99% occupied bandwidth.

5.3.3 Test Result

Test Condition: Refer to the clause 3.5 Normal and extreme test conditions

- Complied

Test Mode	20 dB Bandwidth [Hz]	Occupied Bandwidth [Hz]	Results
Charging Mode (Less than 1 % of Battery)	89.90	260.49	reporting purpose
Charging Mode (Less than 50 % of Battery)	99.90	231.55	reporting purpose
Charging Mode (100 % full charging of Battery)	69.90	217.08	reporting purpose

Note¹⁾: Becasuse the measured signal is CW/CW-like, 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

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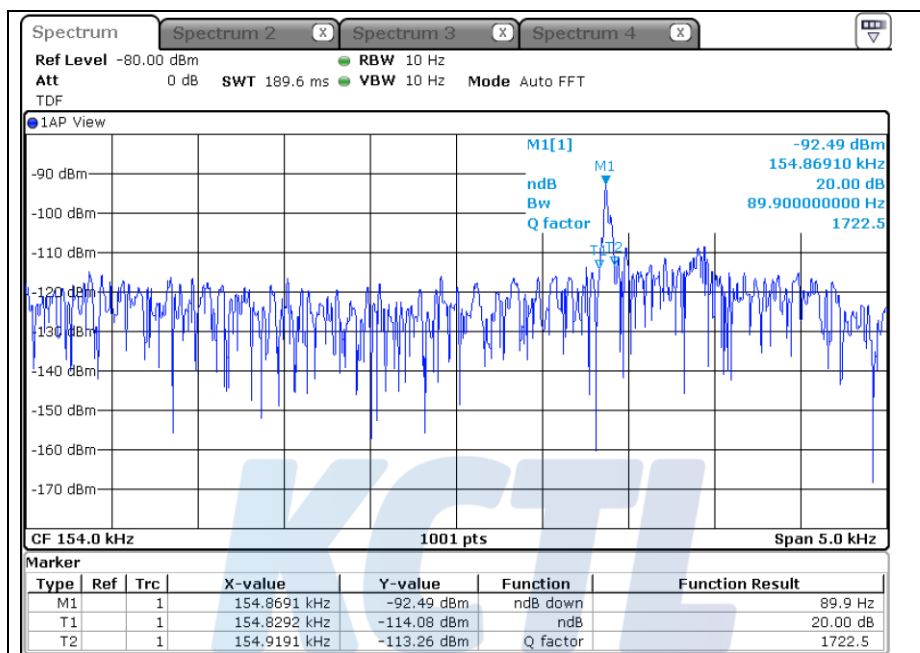
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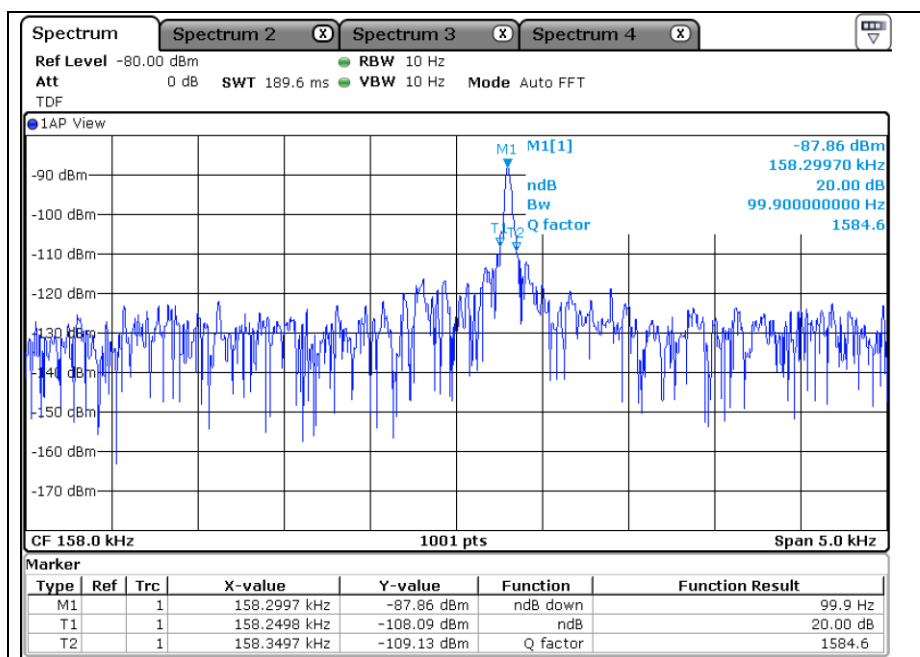
5.3.4 Test Plot

Plot of 20 dB Bandwidth

- Charging Mode (Less than 1 % of Battery)



- Charging Mode (Less than 50 % of Battery)



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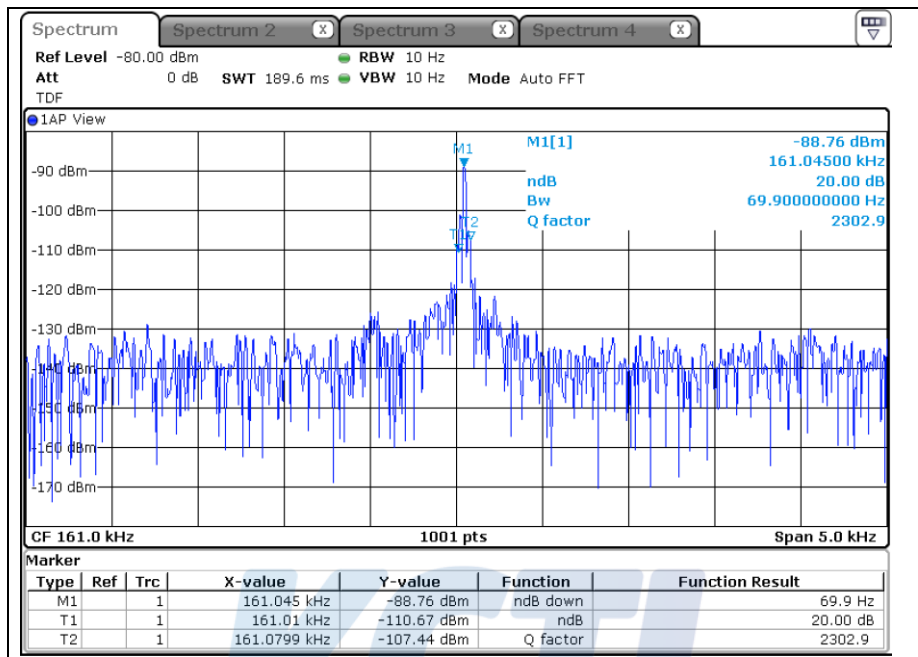
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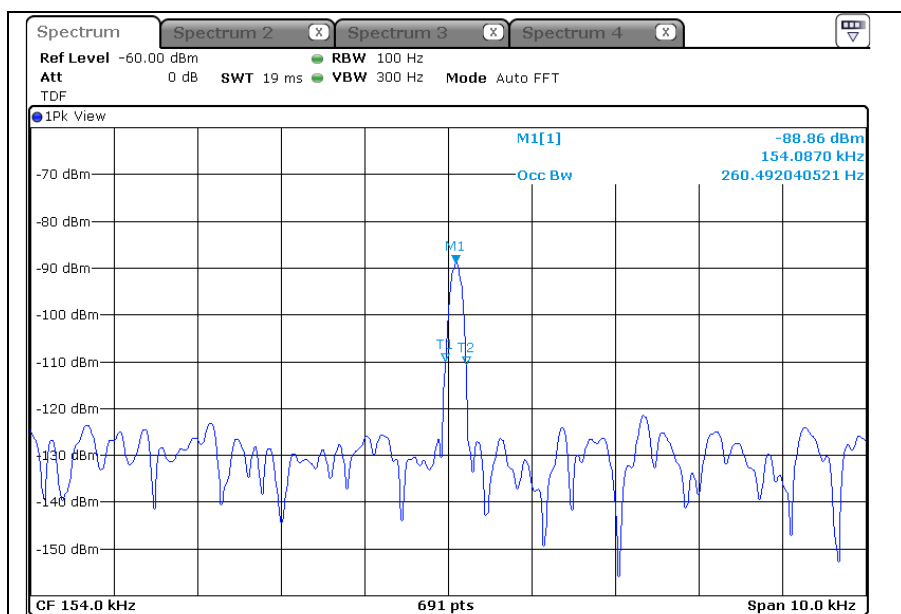
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- Charging Mode (100 % full charging of Battery)



Plot of Occupied Bandwidth (Conducted)

- Charging Mode (Less than 1 % of Battery)



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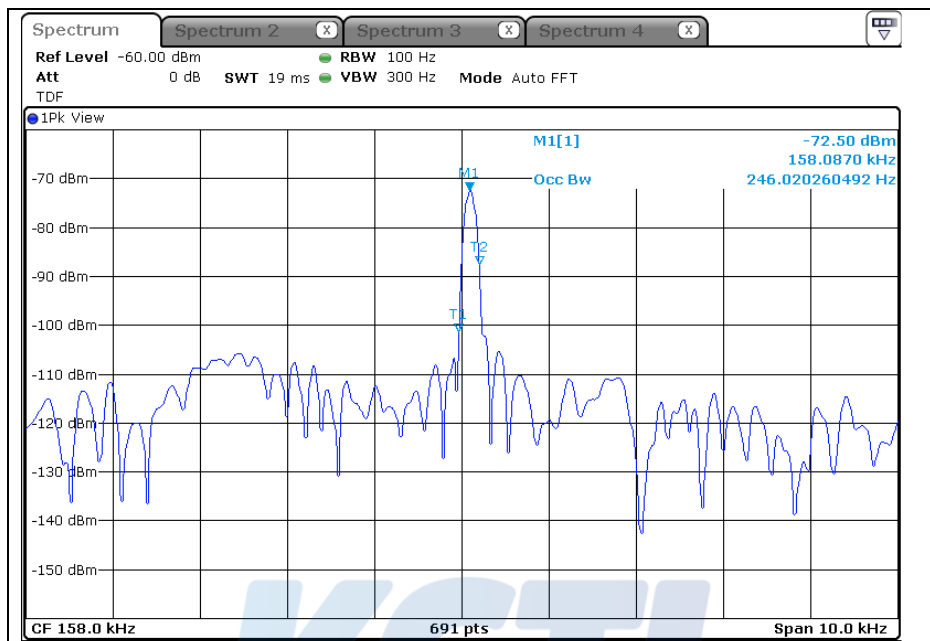
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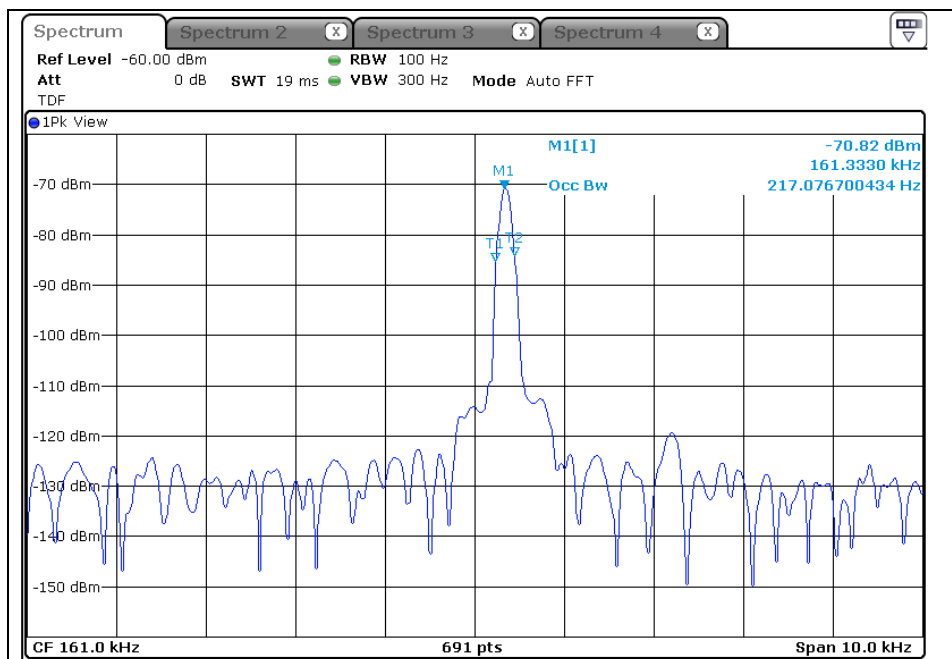
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- Charging Mode (Less than 50 % of Battery)



- Charging Mode (100 % full charging of Battery)



5.4 Conducted Emission

5.4.1 Regulation

According to §15.207(a), for an intentional radiator 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, as measured using a 50 μ H/50 Ω line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

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.

According to §15.107(a), for unintentional device, except for Class A digital devices, line conducted emission limits are the same as the above table.

5.4.2 Measurement Procedure

- 1) The EUT was placed on a wooden table of size, 1 m by 1.5 m, raised 80 cm in which is located 40 cm away from the vertical wall and 1.5m away from the side wall of the shielded room.
- 2) Each current-carrying conductor of the EUT power cord was individually connected through a 50 Ω /50 μ H LISN, which is an input transducer to a Spectrum Analyzer or an EMI/Field Intensity Meter, to the input power source.
- 3) Exploratory measurements were made to identify the frequency of the emission that had the highest amplitude relative to the limit by operating the EUT in a range of typical modes of operation, cable position, and with a typical system equipment configuration and arrangement. Based on the exploratory tests of the EUT, the one EUT cable configuration and arrangement and mode of operation that had produced the emission with the highest amplitude relative to the limit was selected for the final measurement.
- 4) The final test on all current-carrying conductors of all of the power cords to the equipment that comprises the EUT (but not the cords associated with other non-EUT equipment is the system) was then performed over the frequency range of 0.15 MHz to 30 MHz.
- 5) The measurements were made with the detector set to PEAK amplitude within a bandwidth of 10 kHz or to QUASI-PEAK and AVERAGE within a bandwidth of 9 kHz. The EUT was in transmitting mode during the measurements.

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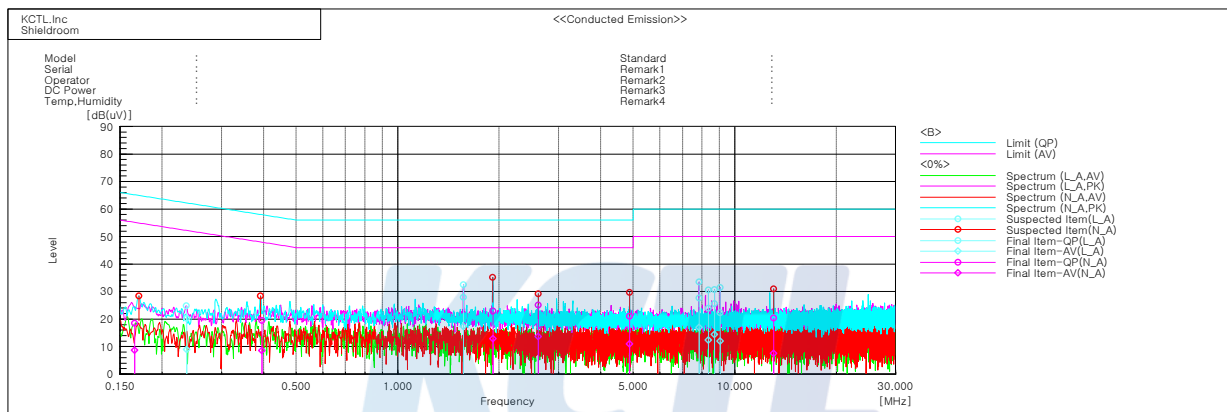
5.4.3 Test Result

Test Condition: Refer to the clause 3.5 Normal and extreme test conditions

- Complied

Figure 6. plot of Conducted Emission

- Charging Mode (Less than 1 % of Battery)



Final Result

--- L_A Phase ---										
No.	Frequency	Reading QP	Reading CAV	c.f	Result QP	Result CAV	Limit QP	Limit AV	Margin QP	Margin CAV
	[MHz]	[dB(uV)]	[dB(uV)]	[dB]	[dB(uV)]	[dB(uV)]	[dB(uV)]	[dB(uV)]	[dB]	[dB]
1	0.23656	10.5	-0.8	9.8	20.3	9.0	62.2	52.2	41.9	43.2
2	1.56743	17.8	7.3	10.1	27.9	17.4	56.0	46.0	28.1	28.6
3	7.83393	17.6	7.0	10.0	27.6	17.0	60.0	50.0	32.4	33.0
4	8.35433	13.8	2.2	10.1	23.9	12.3	60.0	50.0	36.1	37.7
5	8.70076	15.4	4.2	10.1	25.5	14.3	60.0	50.0	34.5	35.7
6	9.05487	12.2	1.9	10.1	22.3	12.0	60.0	50.0	37.7	38.0

--- N_A Phase ---										
No.	Frequency	Reading QP	Reading CAV	c.f	Result QP	Result CAV	Limit QP	Limit AV	Margin QP	Margin CAV
	[MHz]	[dB(uV)]	[dB(uV)]	[dB]	[dB(uV)]	[dB(uV)]	[dB(uV)]	[dB(uV)]	[dB]	[dB]
1	0.16591	8.2	-1.7	10.3	18.5	8.6	65.2	55.2	46.7	46.6
2	0.39539	9.5	-1.5	10.0	19.5	8.5	57.9	47.9	38.4	39.4
3	1.91598	12.7	2.7	10.2	22.9	12.9	56.0	46.0	33.1	33.1
4	2.61122	15.0	3.6	10.1	25.1	13.7	56.0	46.0	30.9	32.3
5	4.87547	10.9	0.9	10.1	21.0	11.0	56.0	46.0	35.0	35.0
6	13.05234	10.1	-2.7	10.2	20.3	7.5	60.0	50.0	39.7	42.5

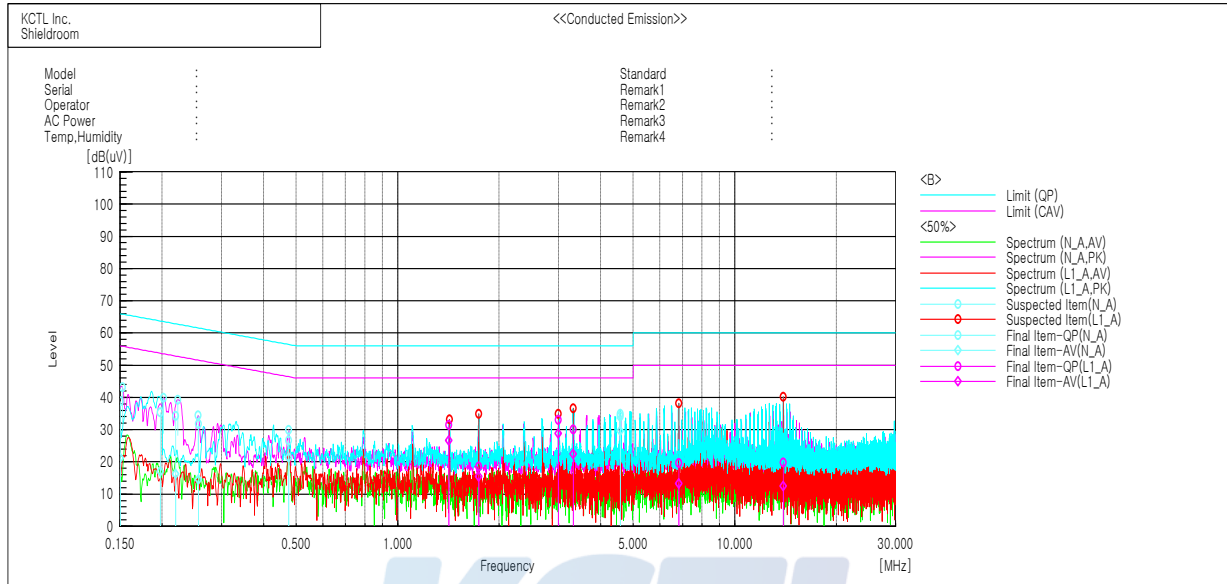
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KCTL**- Charging Mode (Less than 50 % of Battery)****Final Result****--- N_A Phase ---**

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading CAV [dB(μV)]	c.f [dB]	Result QP [dB(μV)]	Result CAV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin CAV [dB]
1	0.15021	28.9	11.2	9.9	38.8	21.1	66.0	56.0	27.2	34.9
2	0.19757	25.3	7.0	10.0	35.3	17.0	63.7	53.7	28.4	36.7
3	0.21916	24.4	6.5	9.8	34.2	16.3	62.9	52.9	28.7	36.6
4	0.25632	22.1	4.8	9.7	31.8	14.5	61.5	51.5	29.7	37.0
5	0.47536	16.5	11.2	10.1	26.6	21.3	56.4	46.4	29.8	25.1
6	4.57064	24.0	19.5	10.0	34.0	29.5	56.0	46.0	22.0	16.5

--- L1_A Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading CAV [dB(μV)]	c.f [dB]	Result QP [dB(μV)]	Result CAV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin CAV [dB]
1	1.41871	21.5	16.7	9.9	31.4	26.6	56.0	46.0	24.6	19.4
2	1.74014	8.6	5.6	9.9	18.5	15.5	56.0	46.0	37.5	30.5
3	2.99604	23.0	18.8	9.9	32.9	28.7	56.0	46.0	23.1	17.3
4	3.31961	20.1	12.5	9.9	30.0	22.4	56.0	46.0	26.0	23.6
5	6.81829	9.5	3.2	10.1	19.6	13.3	60.0	50.0	40.4	36.7
6	13.91277	9.1	1.8	10.6	19.7	12.4	60.0	50.0	40.3	37.6

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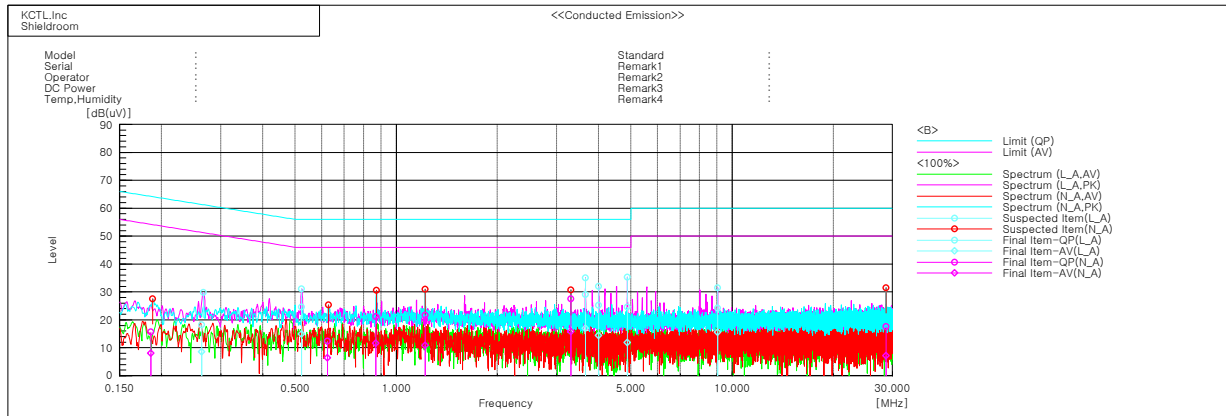
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- Charging Mode (100 % full charging of Battery)



Final Result

L_A Phase									
No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading CAV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result CAV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]
1	0.26339	8.4	-1.3	9.8	18.2	8.5	61.3	51.3	43.1
2	0.52206	14.6	4.9	10.0	24.6	14.9	56.0	46.0	31.4
3	3.6565	19.0	7.0	10.0	29.0	17.0	56.0	46.0	27.0
4	3.99912	15.2	4.4	10.0	25.2	14.4	56.0	46.0	30.8
5	4.87216	14.6	1.9	10.0	24.6	11.9	56.0	46.0	31.4
6	9.05559	14.1	5.5	10.1	24.2	15.6	60.0	50.0	35.8

N_A Phase									
No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading CAV [dB(μV)]	c. f [dB]	Result QP [dB(μV)]	Result CAV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]
1	0.18607	5.5	-2.2	10.2	15.7	8.0	64.2	54.2	48.5
2	0.62317	2.4	-3.6	10.0	12.4	6.4	56.0	46.0	43.6
3	0.86931	11.1	1.6	10.0	21.1	11.6	56.0	46.0	34.9
4	1.21801	11.4	0.6	10.2	21.6	10.8	56.0	46.0	34.4
5	3.30941	17.4	5.6	10.1	27.5	15.7	56.0	46.0	28.5
6	28.72081	6.8	-3.7	10.8	17.6	7.1	60.0	50.0	42.4

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6. Test equipment used for test

	Equipment Name	Manufacturer	Model No.	Serial No.	Next Cal. Date
■	DC Power Supply	Agilent	E3632A	MY40017108	19.05.14
■	Loop Antenna	R&S	HFH2-Z2	100355	20.01.31
■	Bilog Antenna	SCHWARZBECK	VULB9168	440	19.10.23
■	Attenuator	HP	8491B	22891	18.08.24
■	Amplifier	SONOMA	310N	344922	18.08.25
■	EMI Test Receiver	R&S	ESCI7	100732	18.08.24
■	Signal Generator	R & S	SMR40	100007	19.05.15
■	Vector Signal Generator	R&S	SMBV100A	257566	19.01.05
■	EMI TEST RECEIVER	R&S	ESCI	100001	18.08.24
■	TWO-LINE V-NETWORK	R&S	ENV216	101358	18.08.01
■	Cable Assembly	Gigalane	RF-400	-	-

