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TEST REPORT

of

FCC Part 15 Subpart C §15.209

FCC ID: A3LEPP6300

1. Equipment Under Test	:	WIRELESS CHARGER
2. Model Name	:	EP-P6300
3. Variant Model Name(s)	:	-
4. Applicant	:	Samsung Electronics Co., Ltd.
5. Manufacturer	:	Samsung Electronics Co., Ltd.
6. Date of Receipt	:	2020.07.24
7. Date of Test(s)	:	2020.08.03 ~ 2020.08.27
8. Date of Issue	:	2020.08.27

In the configuration tested, the EUT complied with the standards specified above. This test report does not assure KOLAS accreditation.

1) The results of this test report are effective only to the items tested.
2) The SGS Korea is not responsible for the sampling, the results of this test report apply to the sample as received.

Tested by: Murphy Kim

Technical Manager: **Hyunchae You**

SGS Korea Co., Ltd. Gunpo Laboratory

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1. General Information

1.1. Testing Laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)
- 10-2, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807
- 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807
- Designation number: KR0150

All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.

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1.2. Details of Applicant

Applicant : Samsung Electronics Co., Ltd.
Address : 19 Chapin Rd., Building D, Pine Brook, New Jersey, United States, 07058
Contact Person : Chun, Jenni
Phone No. : +1 973 808 6362

1.3. Details of Manufacturer

Company : Samsung Electronics Co., Ltd.
Address : Yen Phong 1 Industrial park, Yen Phong District Bac Ninh Province, VIETNAM

1.4. Description of EUT

Kind of Product	WIRELESS CHARGER	
Model Name	EP-P6300	
Power Supply	DC 9.0 V	
Operation Mode	2 W, 4.5 W, 7.5 W	
Frequency Range	136.5 ㎑ ~ 139.5 ㎑	Ant.1, Ant.2, Ant.3
	144.5 ㎑ ~ 147.5 ㎑	Ant.4, Ant.5, Ant.6, Ant.7
Antenna Type	Loop Coil Antenna	

1.5. Declaration by the Manufacturer

- The EUT has 7 loop coil antennas.
- 6 coils for 2 pairs of devices, 1 independent coil for smart watch.
- Product is designed to operate only 3 coils at a time and can charge maximum 3 devices simultaneously.

1.6. Test Equipment List

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Interval	Cal. Due
Spectrum Analyzer	R&S	FSV30	103210	Dec. 05, 2019	Annual	Dec. 05, 2020
Signal Generator	R&S	SMBV100A	255834	Jun. 03, 2020	Annual	Jun. 03, 2021
Amplifier	H.P.	8447F	2944A03909	Aug. 06, 2020	Annual	Aug. 06, 2021
Loop Antenna	Schwarzbeck Mess-Elektronik	FMZB 1519	1519-039	Aug. 22, 2019	Biennial	Aug. 22, 2021
Bilog Antenna	Schwarzbeck Mess-Elektronik	VULB9163	396	Mar. 21, 2019	Biennial	Mar. 21, 2021
Test Receiver	R&S	ESU26	100109	Feb. 18, 2020	Annual	Feb. 18, 2021
Turn Table	Innco systems GmbH	DS 1200 S	N/A	N.C.R.	N/A	N.C.R.
Controller	Innco systems GmbH	CONTROLLER CO3000-4P	CO3000/963/38 330516/L	N.C.R.	N/A	N.C.R.
Anechoic Chamber	SY Corporation	L × W × H (9.6 m × 6.4 m × 6.6 m)	N/A	N.C.R.	N/A	N.C.R.
Coaxial Cable	RFONE	SFX086-NMNM-5M (5 m)	20200323001	Aug. 10, 2020	Semi-Annual	Feb. 10, 2021
Coaxial Cable	RFONE	PL520-NMNM-10M (10 m)	20200324001	Aug. 10, 2020	Semi-Annual	Feb. 10, 2021
Test Receiver	R&S	ESCI 7	100911	Feb. 19, 2020	Annual	Feb. 19, 2021
Two-Line V-Network	R&S	ENV216	100190	May 08, 2020	Annual	May 08, 2021
Shield Room	SY Corporation	L × W × H (6.5 m × 3.5 m × 3.5 m)	N/A	N.C.R.	N/A	N.C.R.

▶ **Support Equipment**

Description	Manufacturer	Model	FCC ID
Samsung Mobile Phone	Samsung Electronics Co., Ltd.	SM-G973U1	A3LSMG973U
Bluetooth Headset	Samsung Electronics Co., Ltd.	SM-R170	A3LSMR170L, A3LSMR170R
Smart Wearable Device	Samsung Electronics Co., Ltd.	SM-R500	A3LSMR500
C type USB Cable	Samsung Electronics Co., Ltd.	EP-DA705BBE, EP-DA705BWE	-
TRAVEL ADAPTER	DONGYANG E&P	EP-TA800	-

1.7. Sample Calculation

Where relevant, the following sample calculation is provided:
Field strength level (dBμV/m) = Measured level (dBμV) + Antenna factor (dB) + Cable loss (dB) + (AMP (dB))

1.8. Worst Case of Test Configurations

Charging mode with client device	Mode					Description
Model: SM-G973U1 FCC ID: A3LSMG973U Model: SM-R170 FCC ID: A3LSMR170L, A3LSMR170R Model: SM-R500 FCC ID: A3LSMR500	2 W		4.5 W		7.5 W	1 % of battery 50 % of battery 99 % of battery
	Ant 1 ~ 3	Ant 4 ~ 7	Ant 1 ~ 3	Ant 4 ~ 6	Ant 7	
	136.5 ㎑ ~ 139.5 ㎑	144.5 ㎑ ~ 147.5 ㎑	136.5 ㎑ ~ 139.5 ㎑	144.5 ㎑ ~ 147.5 ㎑	144.5 ㎑ ~ 147.5 ㎑	

Note;

EUT was investigated with client device under normal charging condition as above then worst value was only reported.

1.9. Summary of Test Results

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15 Subpart C		
Section	**Test Item(s)**	**Result**
15.209	Radiated Emission, Spurious Emission and Field Strength of Fundamental	Complied
2.1049	20 ㏈ Bandwidth	Complied
15.207	AC Power Line Conducted Emission	Complied

Note;

Due to the frequency range of the device is less than 1 ㎒, so we perform Middle frequency according to 15.31 requirement.

1.10. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Parameter	Uncertainty
20 ㏈ Bandwidth	± 9.66 ㎑
AC Conducted Emission	± 3.45 ㏈
Radiated Disturbance, 9 ㎑ to 30 ㎒	± 3.59 ㏈
Radiated Disturbance, below 1 ㎓	± 5.88 ㏈

Uncertainty figures are valid to a confidence level of 95 %.

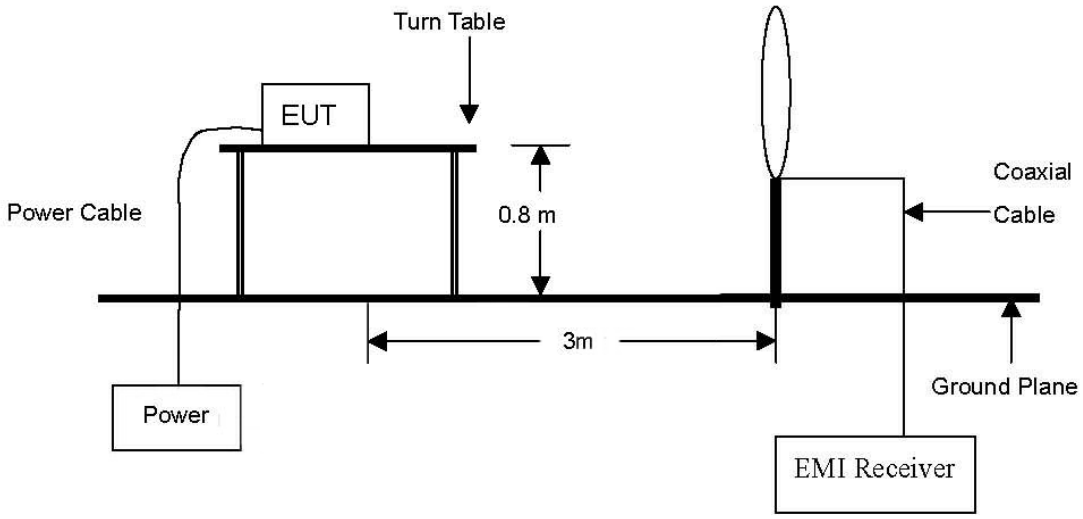
1.11. Test Report Revision

Revision	Report Number	Date of Issue	Description
0	F690501-RF-RTL001112	2020.08.27	Initial

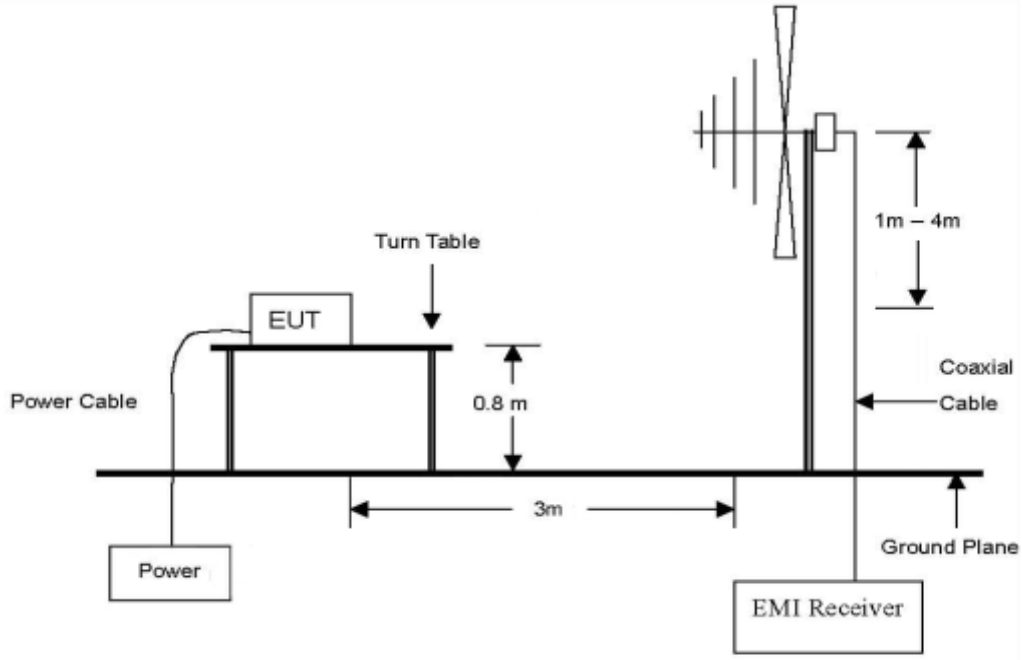
2. Field Strength of Fundamental and Spurious Emission

2.1. Test Setup

The diagram below shows the test setup that is utilized to make the measurements for emission from 9 ㎑ to 30 ㎒.



The diagram below shows the test setup that is utilized to make the measurements for emission from 30 ㎒ to 1 ㎓.



2.2. Limit

2.2.1. Radiated emission limits, general requirements

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 (㎒)	Field Strength (microvolts/meter)	Measurement Distance (meter)
0.009-0.490	2 400/F(㎑)	300
0.490-1.705	24 000/F(㎑)	30
1.705-30.0	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 ㎒, 76-88 ㎒, 174-216 ㎒ or 470-806 ㎒. however, operation within these frequency bands is permitted under other sections of this part, e.g., §§15.231 and 15.241

2.3. Test Procedures

Radiated emissions from the EUT were measured according to the dictates of ANSI C63.10:2013.

2.3.1. Test Procedures for emission from 9 ㎑ to 30 ㎒

a. 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.
b. 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.
c. 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.
d. The test-receiver system was set to Quasi Peak and Average Detect Function and Specified Bandwidth with Maximum Hold Mode.

2.3.2. Test Procedures for emission from 30 ㎒ to 1 000 ㎒

a. 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.
b. During performing radiated emission below 1 ㎓, the EUT was set 3 meters away from the interference receiving antenna, which was mounted on the top of a variable-height antenna tower. During performing radiated emission above 1 ㎓, the EUT was set 3 meter away from the interference-receiving antenna.
c. The antenna is a broadband 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.
d. 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.
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

2.4. Field Strength of Fundamental Test Result

Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 % R.H.

The following table shows the highest levels of radiated emissions on between polarizations of horizontal and vertical.

Test Condition: 2 W Operating mode with client device (1 % battery status of client device)

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB㎶/m) at 3 m	Actual (dB㎶/m) at 300 m	Limit (dB㎶/m) at 300 m	Margin (dB)
Ant. 1 (136.5 ㎑ ~ 139.5 ㎑)									
0.138	70.50	Average	H	17.80	0.06	88.36	8.36	24.81	16.45
Ant. 6 (144.5 ㎑ ~ 147.5 ㎑)									
0.146	71.70	Average	H	17.80	0.06	89.56	9.56	24.32	14.76
Ant. 7 (144.5 ㎑ ~ 147.5 ㎑)									
0.146	44.90	Average	H	17.80	0.06	62.76	-17.24	24.32	41.56
Ant. 1 & 6 & 7 (136.5 ㎑ ~ 139.5 ㎑ & 144.5 ㎑ ~ 147.5 ㎑)									
0.138	71.80	Average	H	17.80	0.06	89.66	9.66	24.81	15.15
0.146	72.00	Average	H	17.80	0.06	89.86	9.86	24.32	14.46
Ant. 3 & 6 & 7 (136.5 ㎑ ~ 139.5 ㎑ & 144.5 ㎑ ~ 147.5 ㎑)									
0.138	59.10	Average	H	17.80	0.06	76.96	-3.04	24.81	27.85
0.146	69.30	Average	H	17.80	0.06	87.16	7.16	24.32	17.16

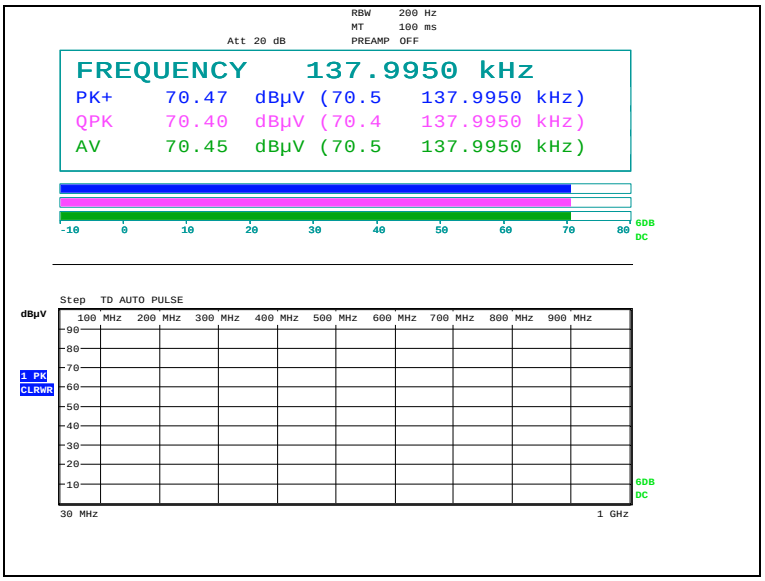
Remark;

1. According to §15.31(f)(2),
   - 300 m Result (dB㎶/m) = 3 m Result (dB㎶/m) - 40log (300/3) (dB㎶/m).
2. According to field strength table of general requirement in §15.209(a), field strength limits below 1.705 ㎒ were calculated as below.
   - 9 ㎑ to 490 ㎑: 20log (2 400 / F (㎑)) at 300 m (dB㎶/m)
   - 490 ㎑ to 1.705 ㎒: 20log (24 000/F (㎑)) at 30 m (dB㎶/m)
3. According to §15.209(d), the measurements were tested by using Quasi peak detector except for the frequency bands 9-90 ㎑, 110-490 ㎑ and above 1 ㎓ in these three bands on measurements employing an average detector.
4. The limit above was calculated based on table of §15.209(a).

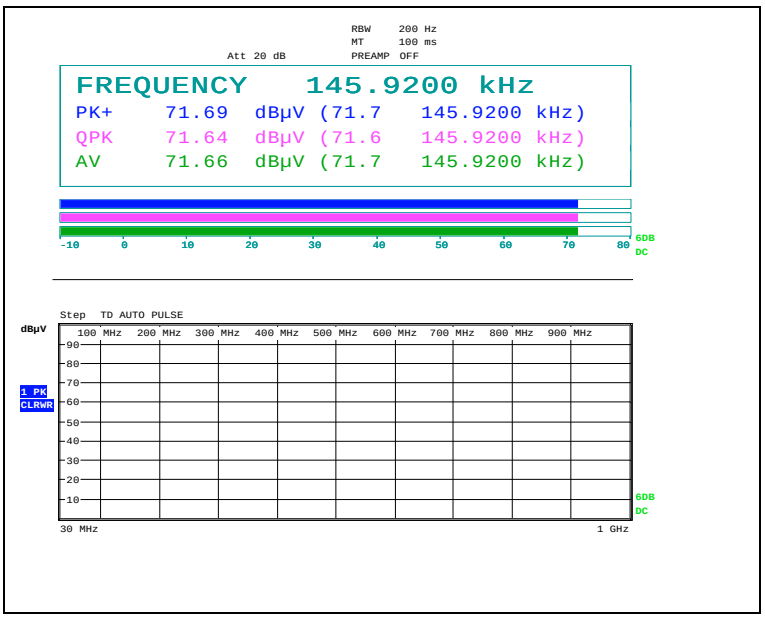
- Test plots

Test Condition: 2 W Operating mode with client device (1 % battery status of client device)

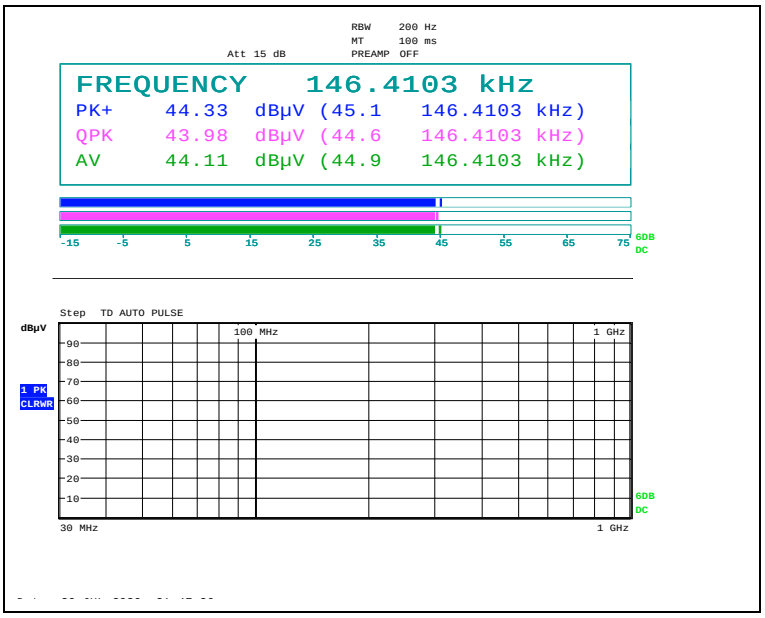
Ant. 1 (136.5 ㎑ ~ 139.5 ㎑)



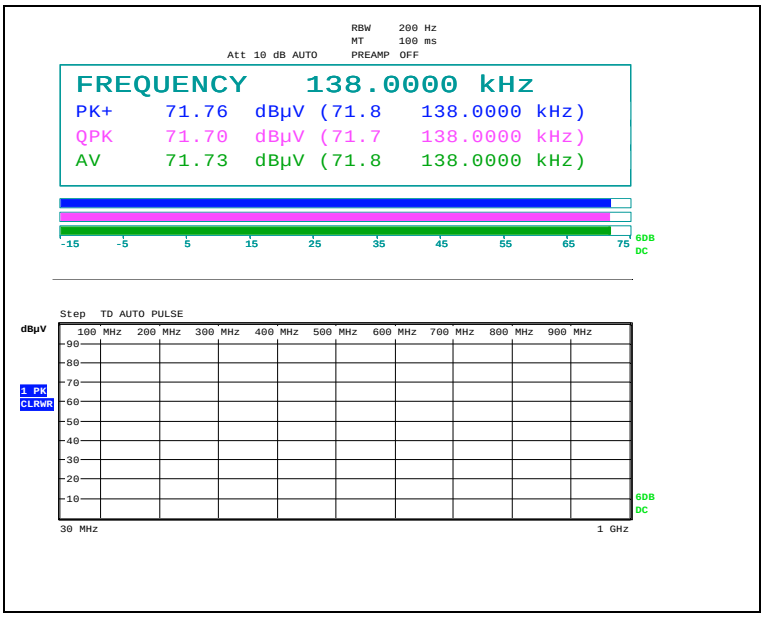
Ant. 6 (144.5 ~ 147.5 ㎑)

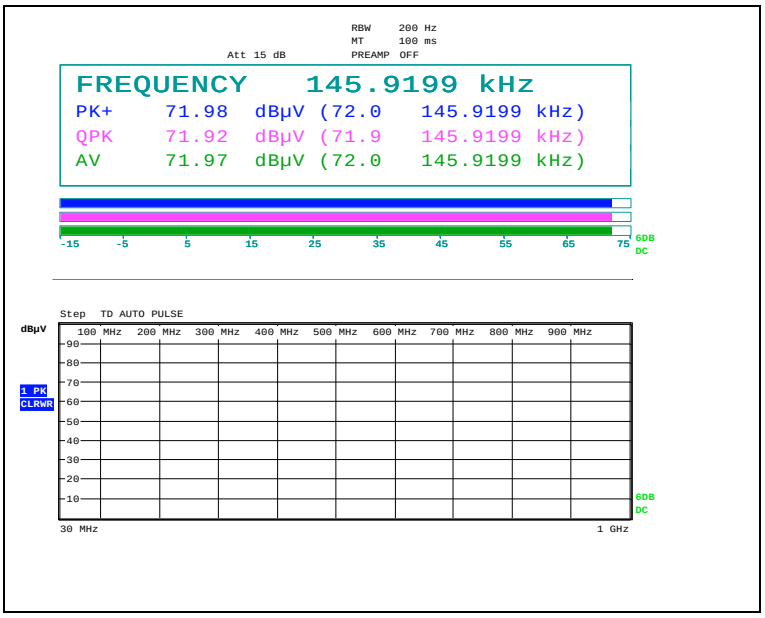


Ant. 7 (144.5 ㎑ ~ 147.5 ㎑)

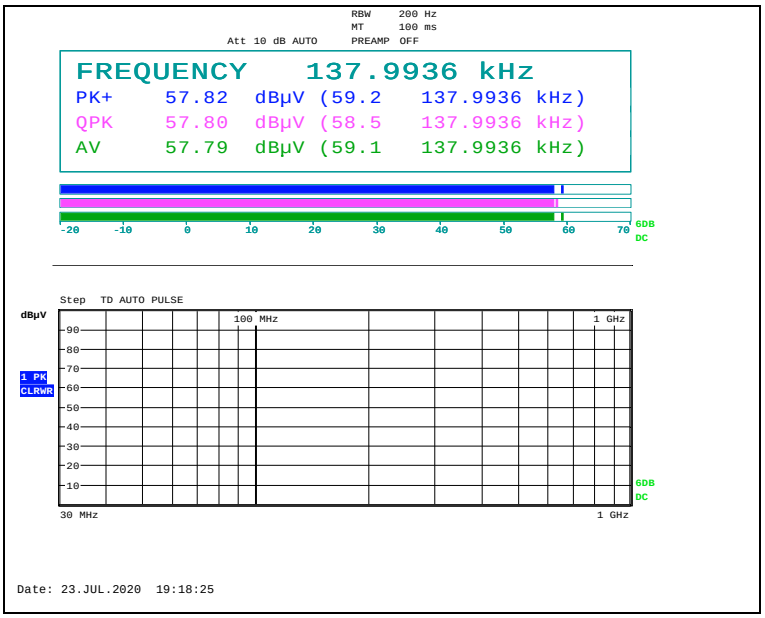


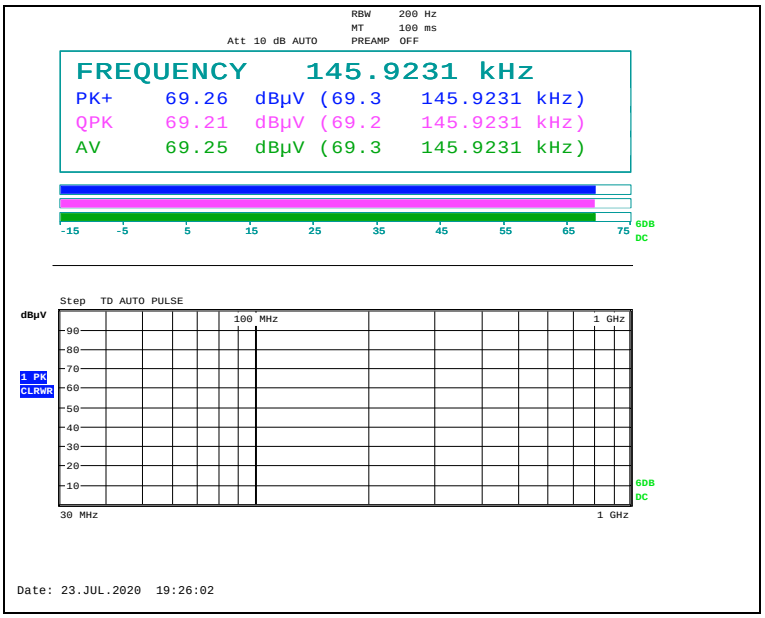
Ant. 1 & 6 & 7 (136.5 ㎑ ~ 139.5 ㎑ & 144.5 ㎑ ~ 147.5 ㎑)





Ant. 3 & 6 & 7 (136.5 ㎑ ~ 139.5 ㎑ & 144.5 ㎑ ~ 147.5 ㎑)





2.5. Spurious Emission Test Result

Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 % R.H.

The following table shows the highest levels of radiated emissions on between polarizations of horizontal and vertical.

Test Condition: 2 W Operating mode with client device (1 % battery status of client device)

Ant. 1 (136.5 ㎑ ~ 139.5 ㎑)

Below 30 ㎒

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dB㎶/m) at 3 m	Actual (dB㎶/m) at 300 m or 30 m	Limit (dB㎶/m) at 300 m or 30 m	Margin (dB)
0.035	37.20	Average	H	17.89	0.02	55.11	-24.89	36.72	61.61
0.084	16.80	Average	H	17.82	0.03	34.65	-45.35	29.12	74.47
0.414	49.60	Average	H	17.74	0.13	**67.47**	-12.53	15.26	27.79
0.691	39.03	Quasi Peak	H	17.85	0.17	57.05	17.05	30.81	13.76
0.965	33.70	Quasi Peak	H	18.07	0.21	51.98	11.98	27.91	15.93
1.241	26.30	Quasi Peak	H	18.12	0.22	44.64	4.64	25.73	21.09

Above 30 ㎒

Radiated Emissions			Ant	Correction Factors		Total	Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP + CL (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
37.52	35.20	Peak	V	18.86	-26.98	27.08	40.00	12.92
55.87	34.90	Peak	V	19.14	-26.72	27.32	40.00	12.68
92.24	35.10	Peak	V	15.75	-26.25	24.60	43.50	18.90
96.45	33.70	Peak	V	16.55	-26.20	24.05	43.50	19.45
837.49	36.50	Peak	H	27.30	-22.77	41.03	46.00	4.97
Above 900.00	Not detected	-	-	-	-	-	-	-

Ant. 6 (144.5 ㎑ ~ 147.5 ㎑)

Below 30 ㎒

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dB㎶/m) at 3 m	Actual (dB㎶/m) at 300 m or 30 m	Limit (dB㎶/m) at 300 m or 30 m	Margin (dB)
0.035	37.40	Average	H	17.89	0.02	55.31	-24.69	36.72	61.41
0.084	16.80	Average	H	17.82	0.03	34.65	-45.35	29.12	74.47
0.437	51.80	Average	H	17.73	0.13	**69.66**	-10.34	14.79	25.13
0.730	40.10	Quasi Peak	H	17.88	0.17	58.15	18.15	30.34	12.19
1.021	34.20	Quasi Peak	H	18.10	0.21	52.51	12.51	27.42	14.91
1.314	29.10	Quasi Peak	H	18.13	0.22	47.45	7.45	25.23	17.78

Above 30 ㎒

Radiated Emissions			Ant	Correction Factors		Total	Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP + CL (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
36.51	35.90	Peak	V	18.40	-27.00	27.30	40.00	12.70
54.70	34.50	Peak	V	19.46	-26.74	27.22	40.00	12.78
96.08	34.20	Peak	H	16.51	-26.20	24.51	43.50	18.99
102.87	32.90	Peak	H	17.10	-26.12	23.88	43.50	19.62
Above 200.00	Not detected	-	-	-	-	-	-	-

Ant. 7 (144.5 ㎑ ~ 147.5 ㎑)

Below 30 ㎒

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dB㎶/m) at 3 m	Actual (dB㎶/m) at 300 m or 30 m	Limit (dB㎶/m) at 300 m or 30 m	Margin (dB)
0.035	37.00	Average	H	17.89	0.02	**54.91**	-25.09	36.72	61.81
0.046	14.80	Average	H	17.88	0.02	32.70	-47.30	34.35	81.65
0.440	23.90	Average	H	17.73	0.13	41.76	-38.24	14.74	52.98
0.905	19.80	Quasi Peak	H	18.02	0.20	38.02	-1.98	28.47	30.45

Above 30 ㎒

Radiated Emissions			Ant	Correction Factors		Total	Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP + CL (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
38.85	35.60	Peak	V	19.53	-26.96	28.17	40.00	11.83
57.89	34.80	Peak	V	18.63	-26.69	26.74	40.00	13.26
98.75	37.60	Peak	V	16.88	-26.16	28.32	43.50	15.18
837.24	37.10	Peak	H	27.30	-22.77	41.63	46.00	4.37
Above 900.00	Not detected	-	-	-	-	-	-	-

Ant. 1 & 6 & 7 (136.5 ㎑ ~ 139.5 ㎑ & 144.5 ㎑ ~ 147.5 ㎑)

Below 30 ㎒

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dB㎶/m) at 3 m	Actual (dB㎶/m) at 300 m or 30 m	Limit (dB㎶/m) at 300 m or 30 m	Margin (dB)
0.035	37.00	Average	H	17.89	0.02	54.91	-25.09	36.72	61.81
0.092	19.20	Quasi Peak	H	17.81	0.03	37.04	-2.96	48.33	51.29
0.292	33.10	Average	H	17.80	0.11	51.01	-28.99	18.30	47.29
0.414	50.60	Average	H	17.74	0.13	**68.47**	-11.53	15.26	26.79
0.690	41.30	Quasi Peak	H	17.85	0.17	59.32	19.32	30.83	11.51
1.021	39.30	Quasi Peak	H	18.10	0.21	57.61	17.61	27.42	9.81

Above 30 ㎒

Radiated Emissions			Ant	Correction Factors		Total	Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP + CL (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
38.16	37.20	Peak	V	19.18	-26.97	29.41	40.00	10.59
56.23	36.10	Peak	V	19.05	-26.72	28.43	40.00	11.57
91.84	35.10	Peak	V	15.64	-26.25	24.49	43.50	19.01
102.02	35.00	Peak	H	17.10	-26.12	25.98	43.50	17.52
480.04	33.50	Peak	H	22.60	-24.53	31.57	46.00	14.43
Above 500.00	Not detected	-	-	-	-	-	-	-

Ant. 3 & 6 & 7 (136.5 ㎑ ~ 139.5 ㎑ & 144.5 ㎑ ~ 147.5 ㎑)

Below 30 ㎒

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dB㎶/m) at 3 m	Actual (dB㎶/m) at 300 m or 30 m	Limit (dB㎶/m) at 300 m or 30 m	Margin (dB)
0.018	28.70	Average	H	17.89	0.02	54.91	-25.09	36.72	61.81
0.026	27.30	Average	H	17.81	0.03	37.04	-2.96	48.33	51.29
0.035	36.00	Average	H	17.80	0.11	51.01	-28.99	18.30	47.29
0.437	46.70	Average	H	17.74	0.13	**68.47**	-11.53	15.26	26.79

Above 30 ㎒

Radiated Emissions			Ant	Correction Factors		Total	Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP + CL (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
36.79	37.40	Peak	V	18.52	-26.99	28.93	40.00	11.07
56.39	38.00	Peak	V	19.02	-26.72	30.30	40.00	9.70
191.34	32.20	Peak	V	16.37	-24.98	23.59	43.50	19.91
480.00	33.20	Peak	H	22.60	-24.53	31.27	46.00	14.73
829.77	36.00	Peak	H	27.09	-22.81	40.28	46.00	5.72
906.52	36.00	Peak	H	28.23	-22.49	41.74	46.00	4.26

Remark;

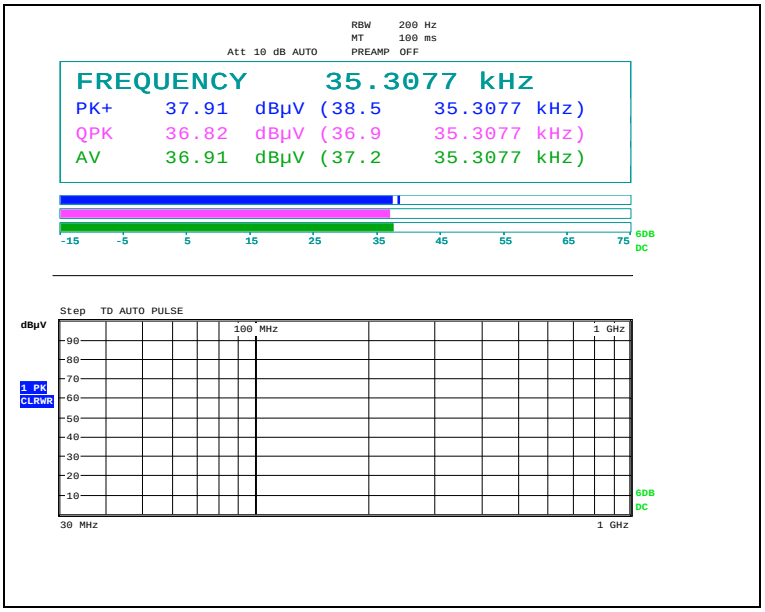
1. According to §15.31 (f)(2),
   - 300 m Result (dB㎶/m) = 3 m Result (dB㎶/m) - 40log (300/3) (dB㎶/m)
   - 30 m Result (dB㎶/m) = 3 m Result (dB㎶/m) - 40log (30/3) (dB㎶/m)
2. According to field strength table of general requirement in §15.209 (a), field strength limits below 1.705 ㎒ were calculated as below.
   - 9 ㎑ to 490 ㎑: 20log (2 400 / F (㎑)) at 300 m (dB㎶/m)
   - 490 ㎑ to 1.705 ㎒: 20log (24 000 / F (㎑)) at 30 m (dB㎶/m)
3. According to §15.209 (d), the measurements were tested by using Quasi peak detector except for the frequency bands 9-90 ㎑, 110-490 ㎑ and above 1 ㎓ in these three bands on measurements employing an average detector.
4. The limit above was calculated based on table of §15.209 (a).
5. Radiated spurious emission measurement as below 30 ㎒.
   (Actual (dB㎂/m) at 3m = Reading (dB㎶) + AF (dB/m) + CL (dB))
6. Radiated spurious emission measurement as above 30 ㎒.
   (Actual (dB㎂/m) = Reading (dB㎶) + AF (dB/m) + CL (dB) + AMP (dB))
7. According to §15.31(o), emission levels are not report much lower than the limits by over 20 dB.

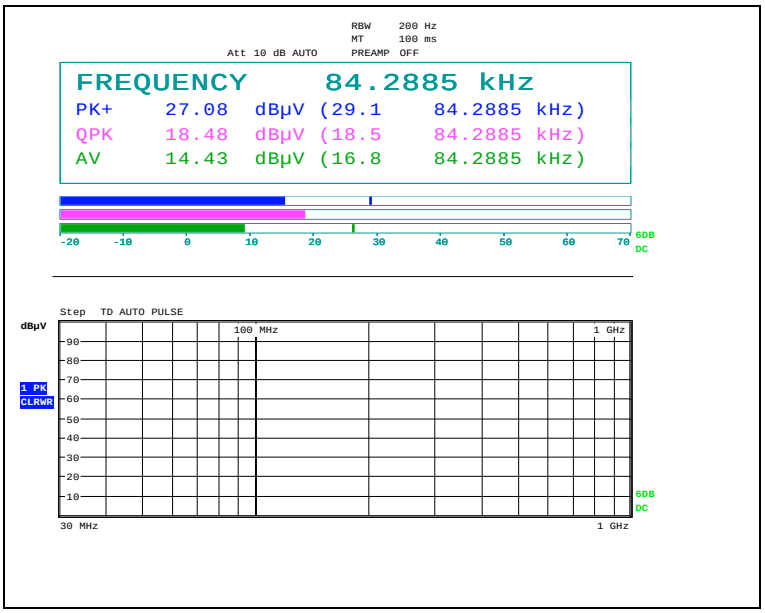
Test Condition: 2 W Operating mode with client device (1 % battery status of client device)

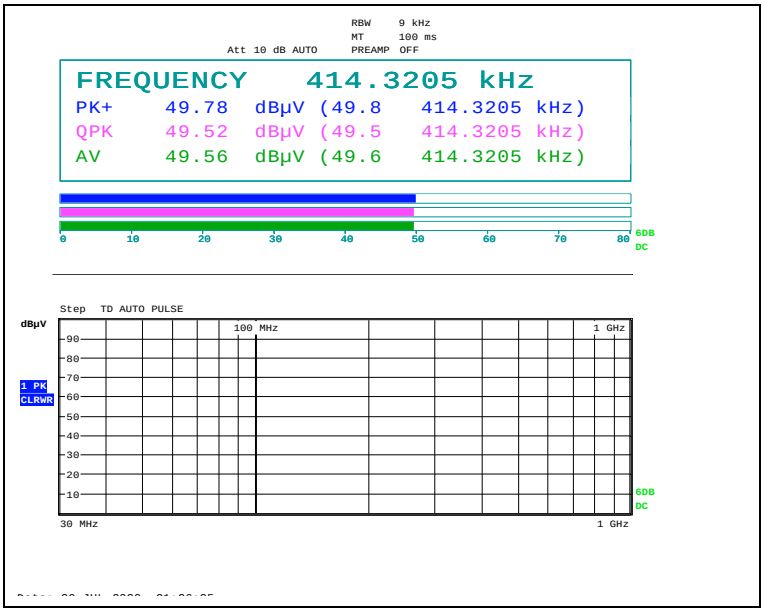
- Test plots

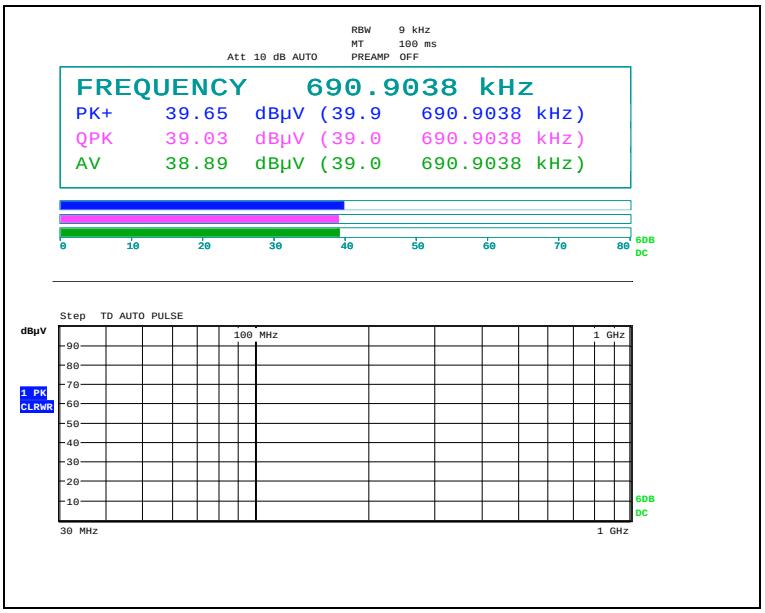
Ant. 1 (136.5 ㎑ ~ 139.5 ㎑)

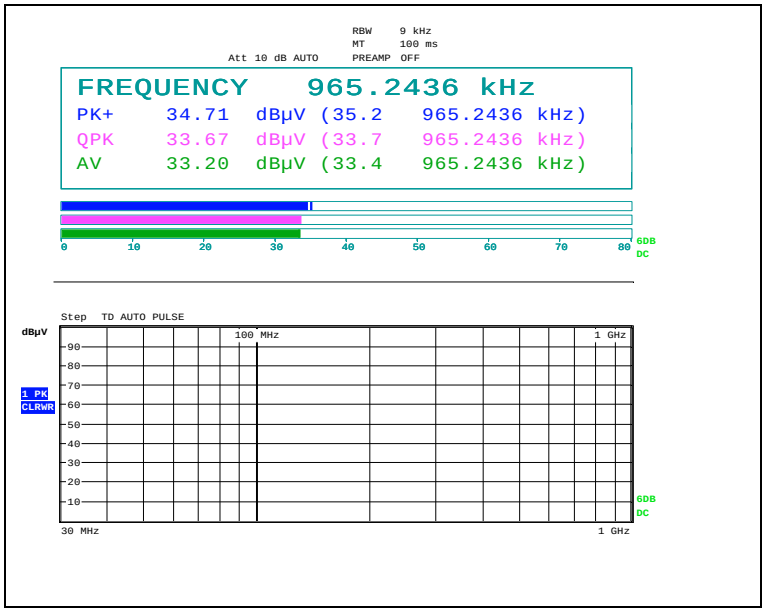
Below 30 ㎒

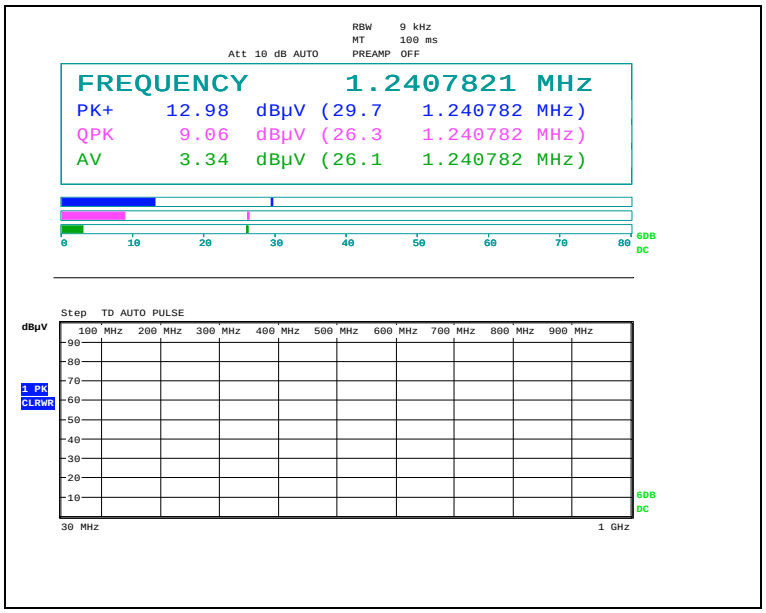




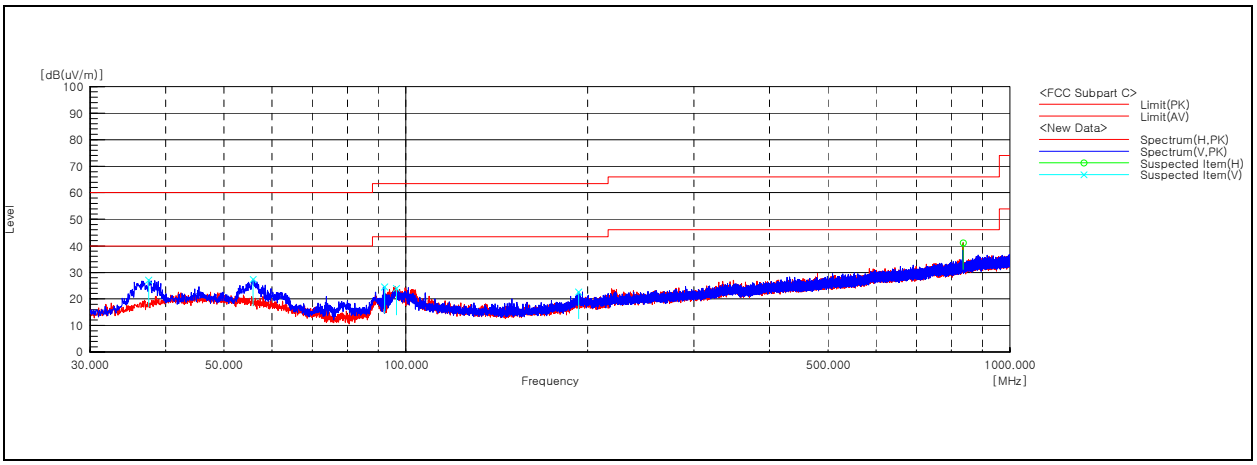

RBW 9 kHz
MT 100 ms
Att 10 dB AUTO PREAMP OFF
FREQUENCY 414.3205 kHz
PK+ 49.78 dBµV (49.8 414.3205 kHz)
QPK 49.52 dBµV (49.5 414.3205 kHz)
AV 49.56 dBµV (49.6 414.3205 kHz)
0 10 20 30 40 50 60 70 80
6DB
DC
Step TD AUTO PULSE
dBµV
100 MHz
1 GHz
1 PK
CLRWR
90 80 70 60 50 40 30 20 10
6DB
DC
30 MHz
1 GHz


RBW 9 kHz
MT 100 ms
Att 10 dB AUTO PREAMP OFF
FREQUENCY 690.9038 kHz
PK+ 39.65 dBµV (39.9 690.9038 kHz)
QPK 39.03 dBµV (39.0 690.9038 kHz)
AV 38.89 dBµV (39.0 690.9038 kHz)
0 10 20 30 40 50 60 70 80
6DB
DC
Step TD AUTO PULSE
dBµV
100 MHz
1 GHz
1 PK
CLRWR
90 80 70 60 50 40 30 20 10
6DB
DC
30 MHz
1 GHz


RBW 9 kHz
MT 100 ms
Att 10 dB AUTO PREAMP OFF
FREQUENCY 965.2436 kHz
PK+ 34.71 dBµV (35.2 965.2436 kHz)
QPK 33.67 dBµV (33.7 965.2436 kHz)
AV 33.20 dBµV (33.4 965.2436 kHz)
0 10 20 30 40 50 60 70 80
6DB
DC
Step TD AUTO PULSE
dBµV
100 MHz
1 GHz
90 80 70 60 50 40 30 20 10
1 PK
CLRWR
6DB
DC
30 MHz
1 GHz


RBW 9 kHz
MT 100 ms
Att 10 dB AUTO PREAMP OFF
FREQUENCY 1.2407821 MHz
PK+ 12.98 dBµV (29.7 1.240782 MHz)
QPK 9.06 dBµV (26.3 1.240782 MHz)
AV 3.34 dBµV (26.1 1.240782 MHz)
0 10 20 30 40 50 60 70 80
6DB
DC
Step TD AUTO PULSE
dBµV
100 MHz 200 MHz 300 MHz 400 MHz 500 MHz 600 MHz 700 MHz 800 MHz 900 MHz
90 80 70 60 50 40 30 20 10
1 PK
CLRWR
6DB
DC
30 MHz
1 GHz

Above 30 ㎒

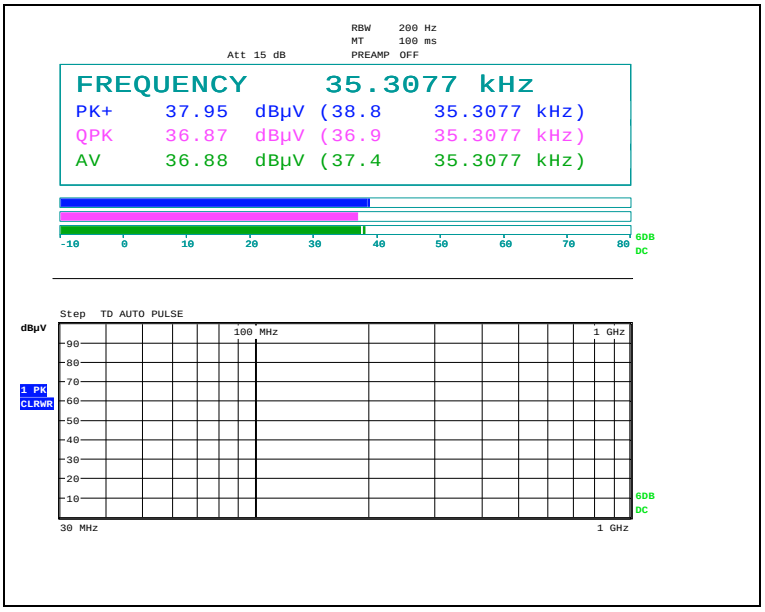


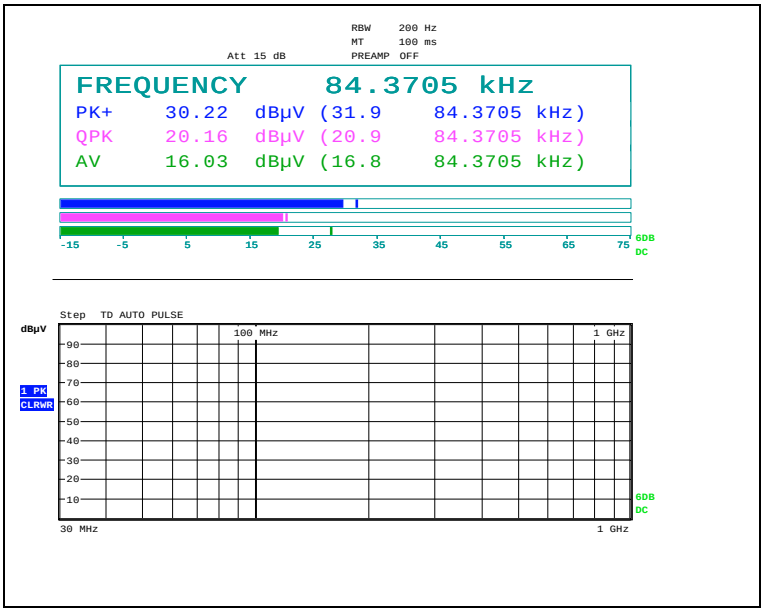
Remark;

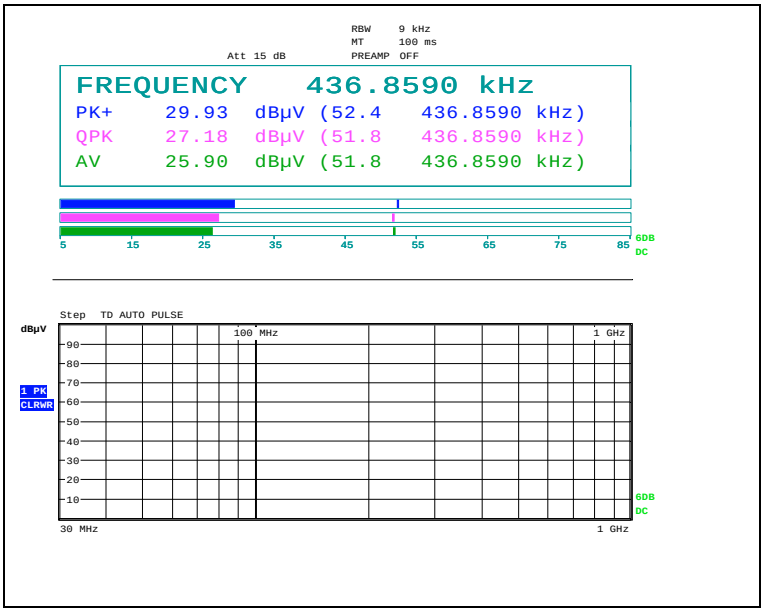
- Traces shown in the plot were made by using a peak detector.

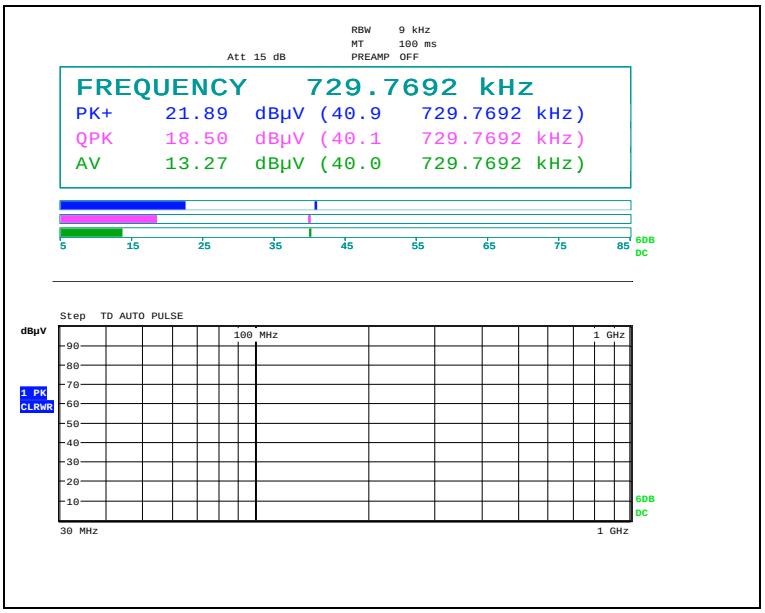
Ant. 6 (144.5 ㎑ ~ 147.5 ㎑)

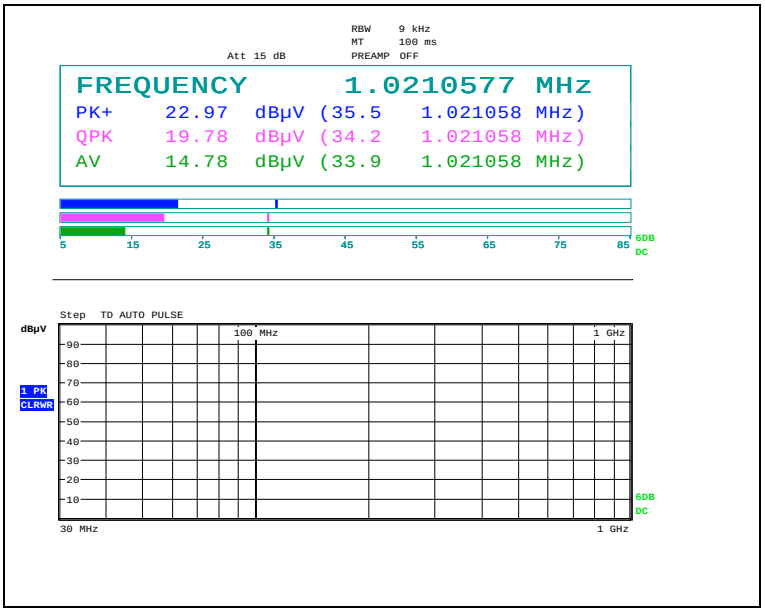
Below 30 ㎒

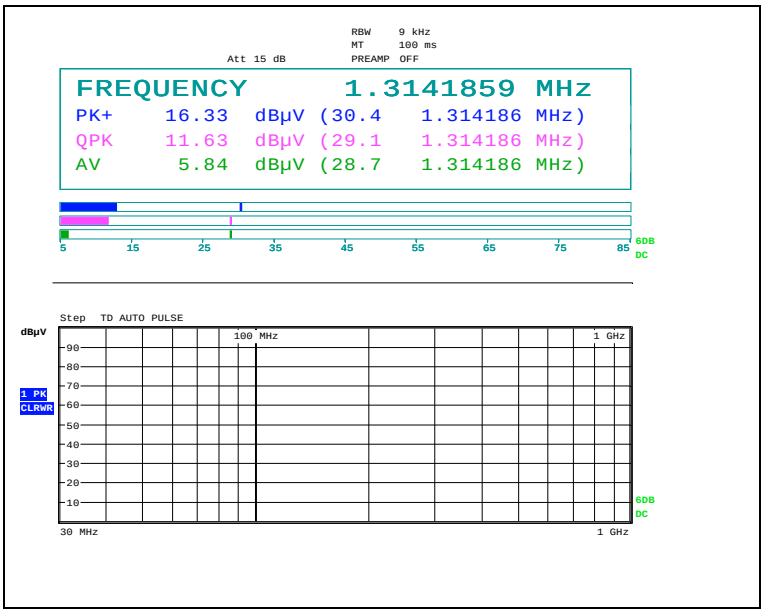




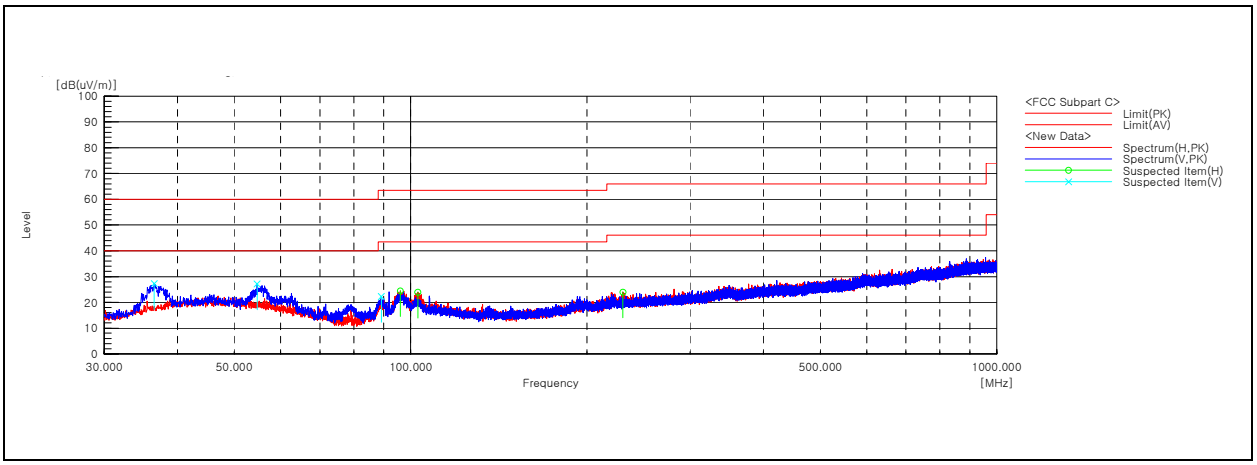

RBW 9 kHz
MT 100 ms
Att 15 dB PREAMP OFF
FREQUENCY 436.8590 kHz
PK+ 29.93 dBµV (52.4 436.8590 kHz)
QPK 27.18 dBµV (51.8 436.8590 kHz)
AV 25.90 dBµV (51.8 436.8590 kHz)
5 15 25 35 45 55 65 75 85
6DB
DC
Step TD AUTO PULSE
dBµV
100 MHz
1 GHz
1 PK
CLRWR
90 80 70 60 50 40 30 20 10
6DB
DC
30 MHz
1 GHz


RBW 9 kHz
MT 100 ms
Att 15 dB PREAMP OFF
FREQUENCY 729.7692 kHz
PK+ 21.89 dBµV (40.9 729.7692 kHz)
QPK 18.50 dBµV (40.1 729.7692 kHz)
AV 13.27 dBµV (40.0 729.7692 kHz)
5 15 25 35 45 55 65 75 85
6DB
DC
Step TD AUTO PULSE
dBµV
100 MHz
1 GHz
1 PK
CLRWR
90 80 70 60 50 40 30 20 10
6DB
DC
30 MHz
1 GHz


RBW 9 kHz
MT 100 ms
Att 15 dB PREAMP OFF
FREQUENCY 1.0210577 MHz
PK+ 22.97 dBµV (35.5 1.021058 MHz)
QPK 19.78 dBµV (34.2 1.021058 MHz)
AV 14.78 dBµV (33.9 1.021058 MHz)
5 15 25 35 45 55 65 75 85
6DB
DC
Step TD AUTO PULSE
dBµV
100 MHz
1 GHz
1 PK
CLRWR
90 80 70 60 50 40 30 20 10
6DB
DC
30 MHz
1 GHz


RBW 9 kHz
MT 100 ms
Att 15 dB PREAMP OFF
FREQUENCY 1.3141859 MHz
PK+ 16.33 dBµV (30.4 1.314186 MHz)
QPK 11.63 dBµV (29.1 1.314186 MHz)
AV 5.84 dBµV (28.7 1.314186 MHz)
5 15 25 35 45 55 65 75 85
6DB
DC
Step TD AUTO PULSE
dBµV
100 MHz
1 GHz
1 PK
CLRWR
90 80 70 60 50 40 30 20 10
6DB
DC
30 MHz
1 GHz

Above 30 ㎒

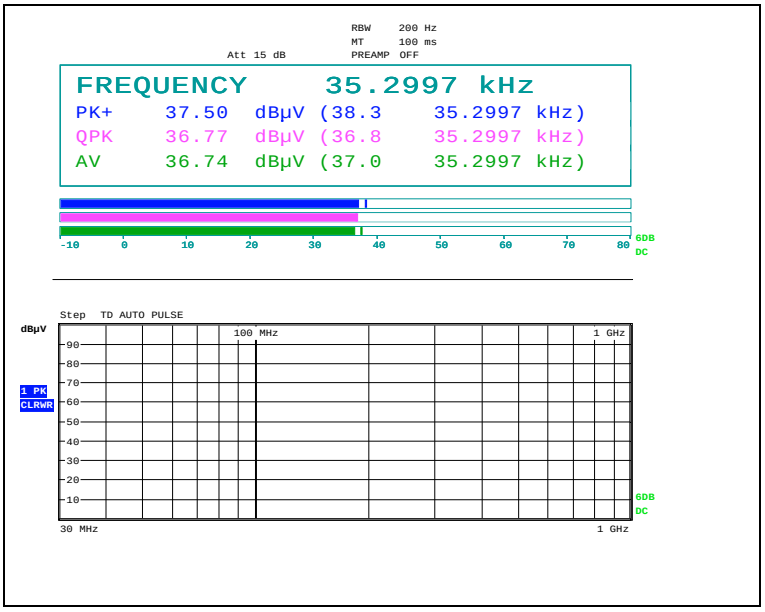


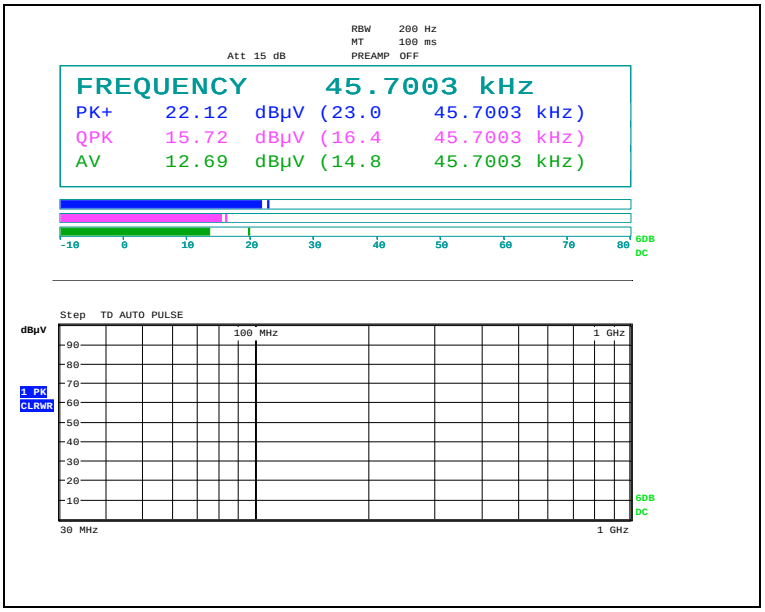
Remark;

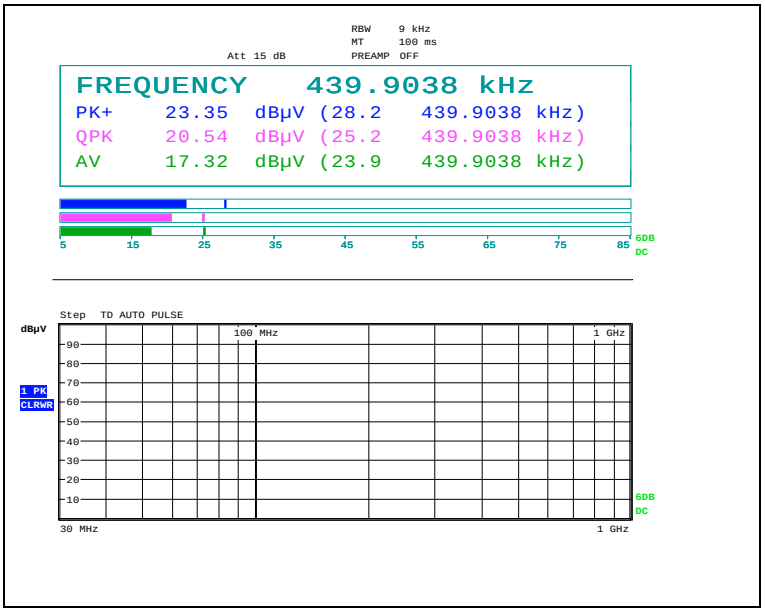
- Traces shown in the plot were made by using a peak detector.

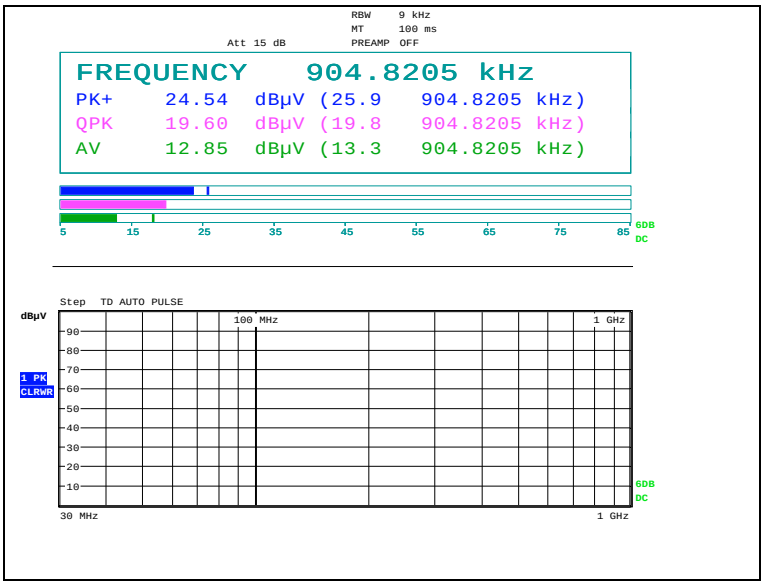
Ant. 7 (144.5 ㎑ ~ 147.5 ㎑)

Below 30 ㎒

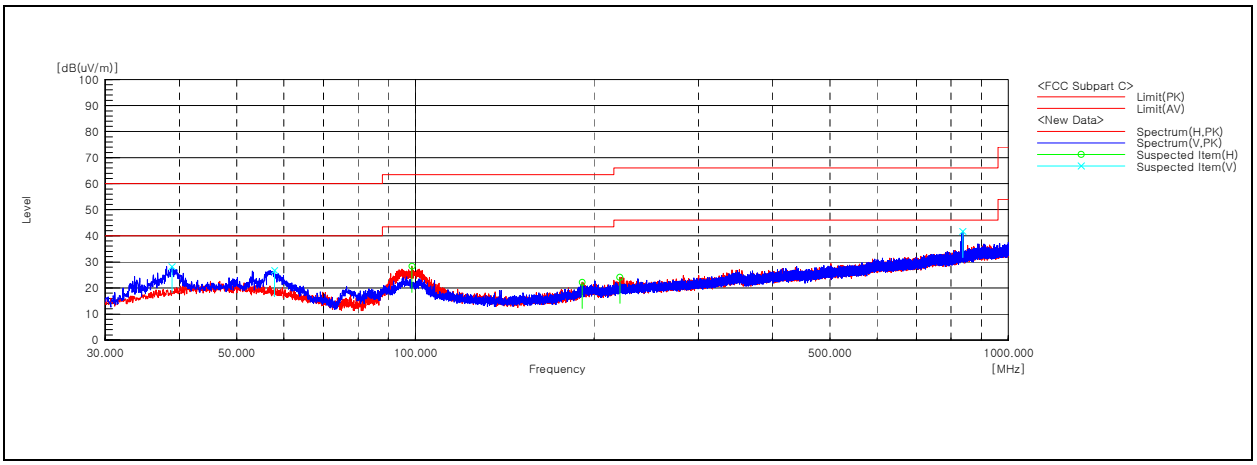





RBW 9 kHz
MT 100 ms
Att 15 dB PREAMP OFF
FREQUENCY 439.9038 kHz
PK+ 23.35 dBµV (28.2 439.9038 kHz)
QPK 20.54 dBµV (25.2 439.9038 kHz)
AV 17.32 dBµV (23.9 439.9038 kHz)
5 15 25 35 45 55 65 75 85
6DB
DC
Step TD AUTO PULSE
dBµV
100 MHz
1 GHz
90 80 70 60 50 40 30 20 10
1 PK
CLRWR
6DB
DC
30 MHz
1 GHz


RBW 9 kHz
MT 100 ms
Att 15 dB PREAMP OFF
FREQUENCY 904.8205 kHz
PK+ 24.54 dBµV (25.9 904.8205 kHz)
QPK 19.60 dBµV (19.8 904.8205 kHz)
AV 12.85 dBµV (13.3 904.8205 kHz)
5 15 25 35 45 55 65 75 85
6DB
DC
Step TD AUTO PULSE
dBµV
100 MHz
1 GHz
90 80 70 60 50 40 30 20 10
1 PK
CLRWR
6DB
DC
30 MHz
1 GHz

Above 30 ㎒

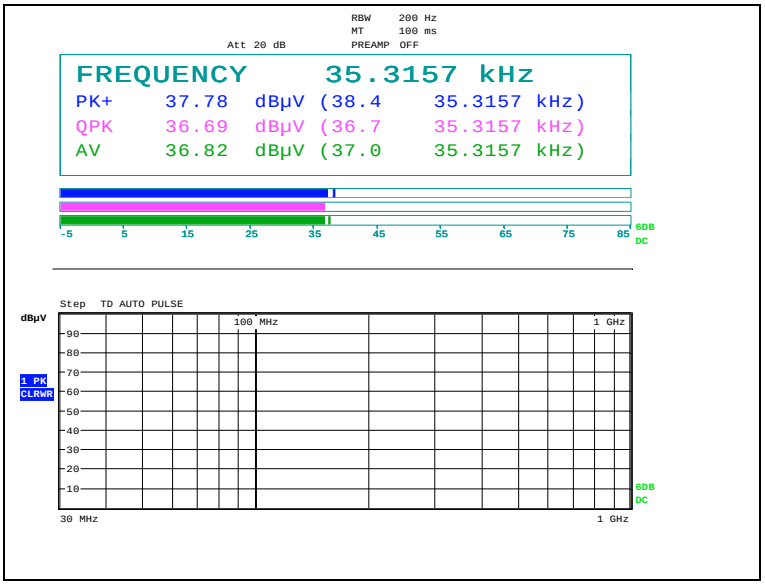


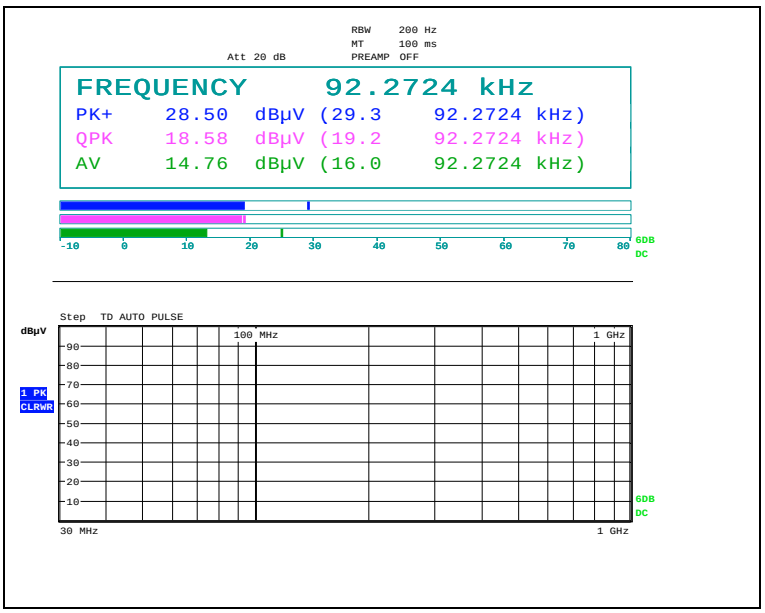
Remark;

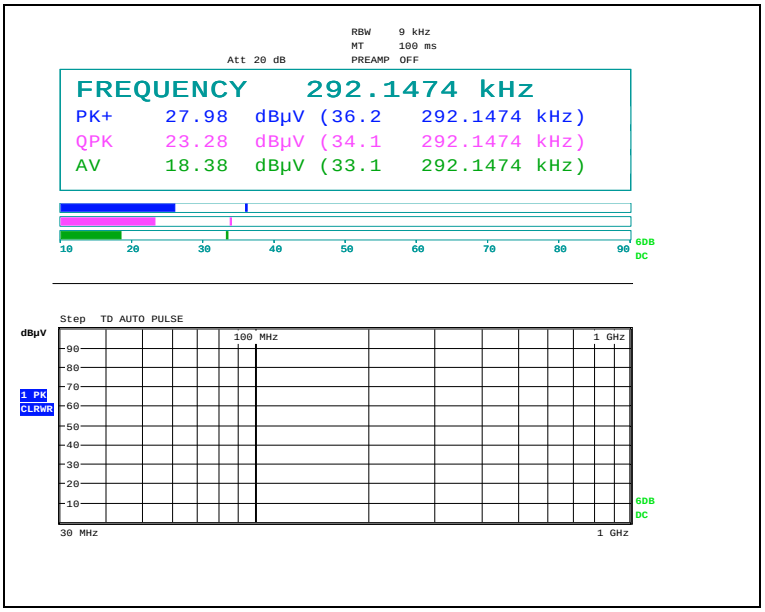
- Traces shown in the plot were made by using a peak detector.

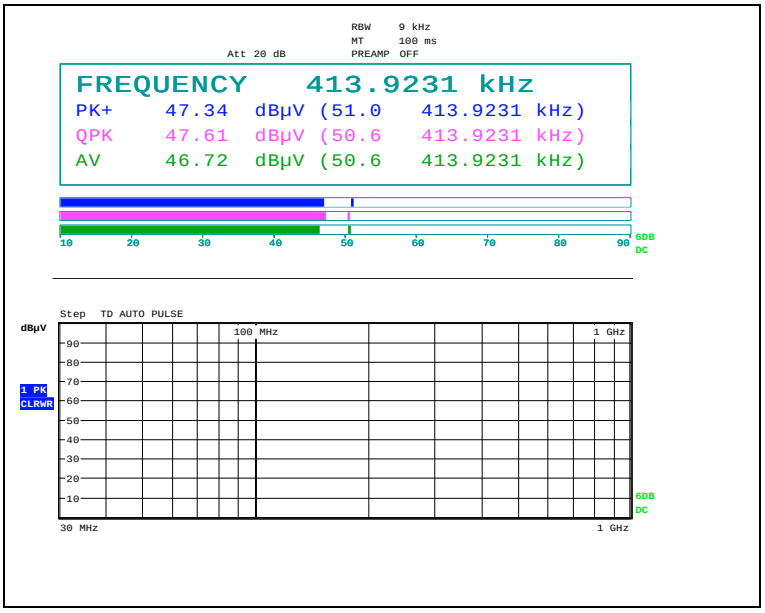
Ant. 1 & 6 & 7 (136.5 ㎑ ~ 139.5 ㎑ & 144.5 ㎑ ~ 147.5 ㎑)

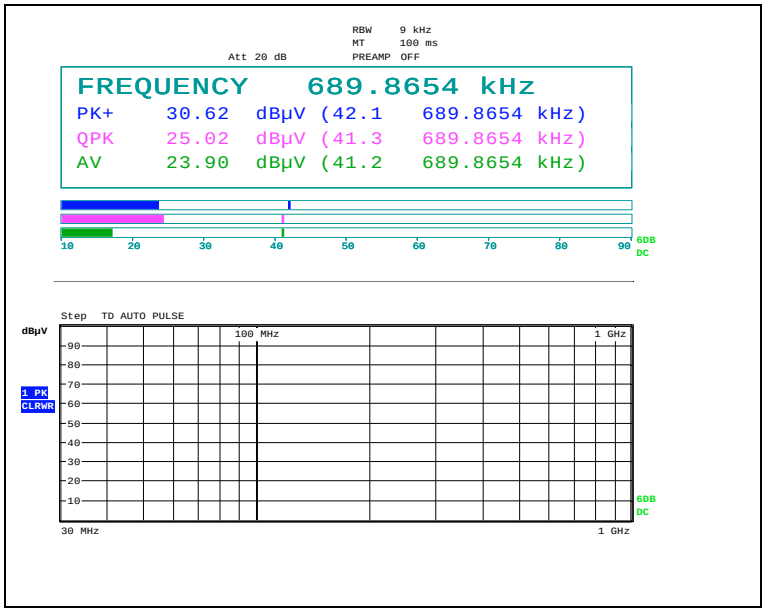
Below 30 ㎒

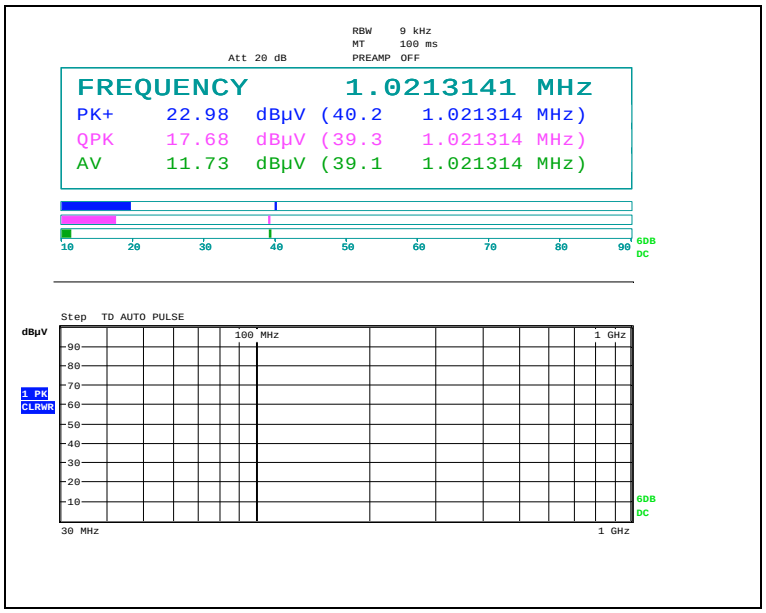




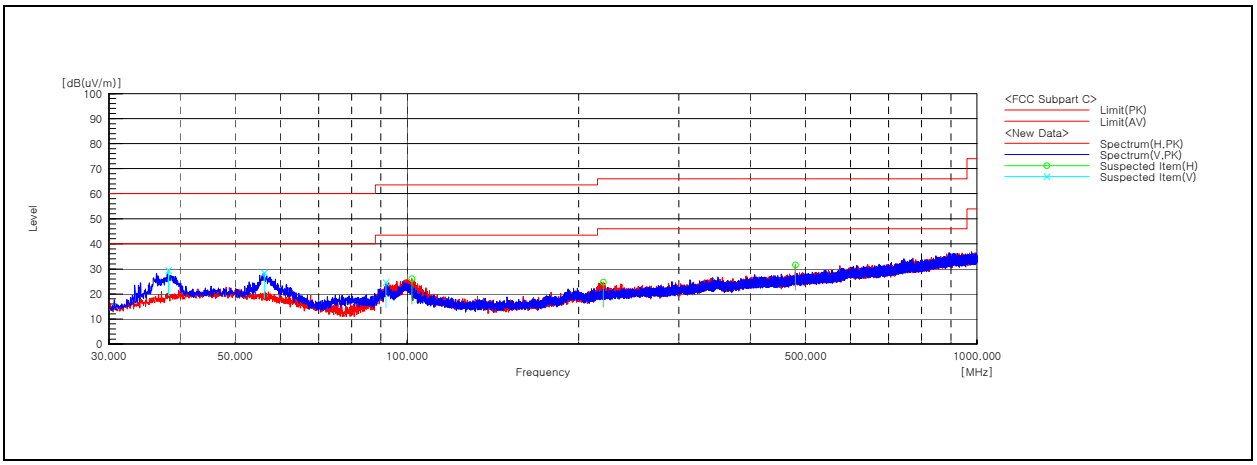

RBW 9 kHz
MT 100 ms
Att 20 dB
PREAMP OFF
FREQUENCY 292.1474 kHz
PK+ 27.98 dBµV (36.2 292.1474 kHz)
QPK 23.28 dBµV (34.1 292.1474 kHz)
AV 18.38 dBµV (33.1 292.1474 kHz)
10 20 30 40 50 60 70 80 90
6DB
DC
Step TD AUTO PULSE
dBµV
100 MHz
1 GHz
90 80 70 60 50 40 30 20 10
1 PK
CLRWR
6DB
DC
30 MHz
1 GHz


RBW 9 kHz
MT 100 ms
Att 20 dB
PREAMP OFF
FREQUENCY 413.9231 kHz
PK+ 47.34 dBµV (51.0 413.9231 kHz)
QPK 47.61 dBµV (50.6 413.9231 kHz)
AV 46.72 dBµV (50.6 413.9231 kHz)
10 20 30 40 50 60 70 80 90
6DB
DC
Step TD AUTO PULSE
dBµV
100 MHz
1 GHz
90 80 70 60 50 40 30 20 10
1 PK
CLRWR
6DB
DC
30 MHz
1 GHz


RBW 9 kHz
MT 100 ms
Att 20 dB PREAMP OFF
FREQUENCY 689.8654 kHz
PK+ 30.62 dBµV (42.1 689.8654 kHz)
QPK 25.02 dBµV (41.3 689.8654 kHz)
AV 23.90 dBµV (41.2 689.8654 kHz)
10 20 30 40 50 60 70 80 90
6DB
DC
Step TD AUTO PULSE
dBµV
100 MHz
1 GHz
90 80 70 60 50 40 30 20 10
1 PK
CLRWR
6DB
DC
30 MHz
1 GHz


RBW 9 kHz
MT 100 ms
Att 20 dB PREAMP OFF
FREQUENCY 1.0213141 MHz
PK+ 22.98 dBµV (40.2 1.021314 MHz)
QPK 17.68 dBµV (39.3 1.021314 MHz)
AV 11.73 dBµV (39.1 1.021314 MHz)
10 20 30 40 50 60 70 80 90
6DB
DC
Step TD AUTO PULSE
dBµV
100 MHz
1 GHz
90 80 70 60 50 40 30 20 10
1 PK
CLRWR
6DB
DC
30 MHz
1 GHz

Above 30 ㎒

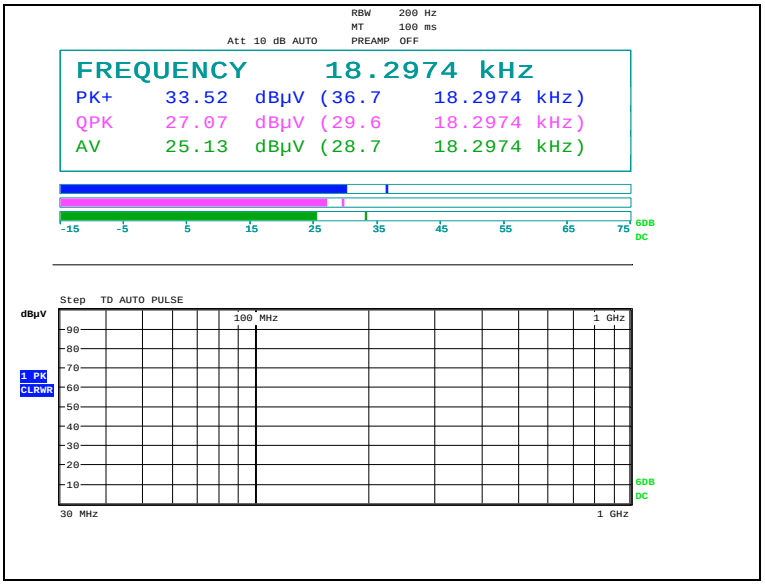


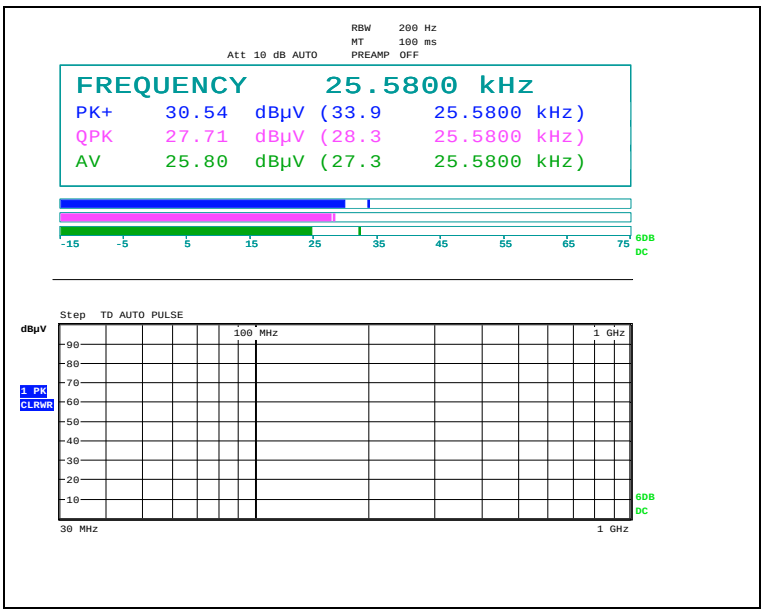
Remark;

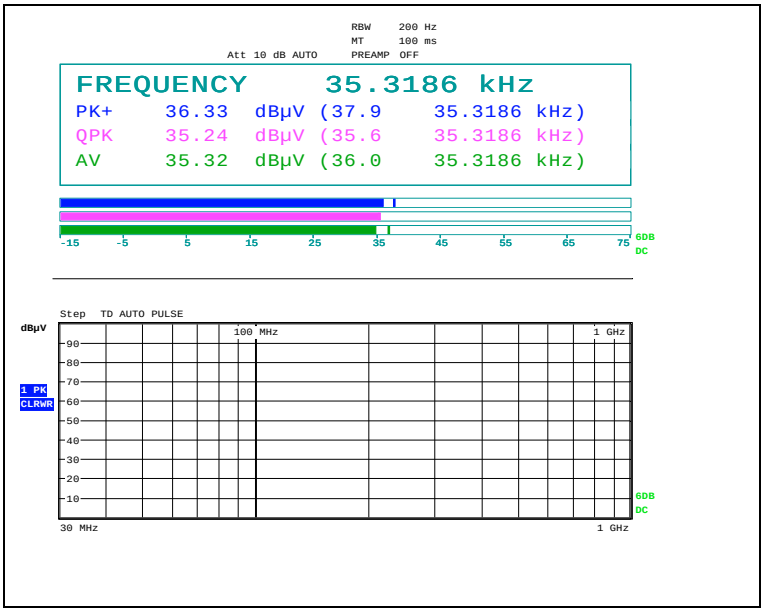
- Traces shown in the plot were made by using a peak detector.

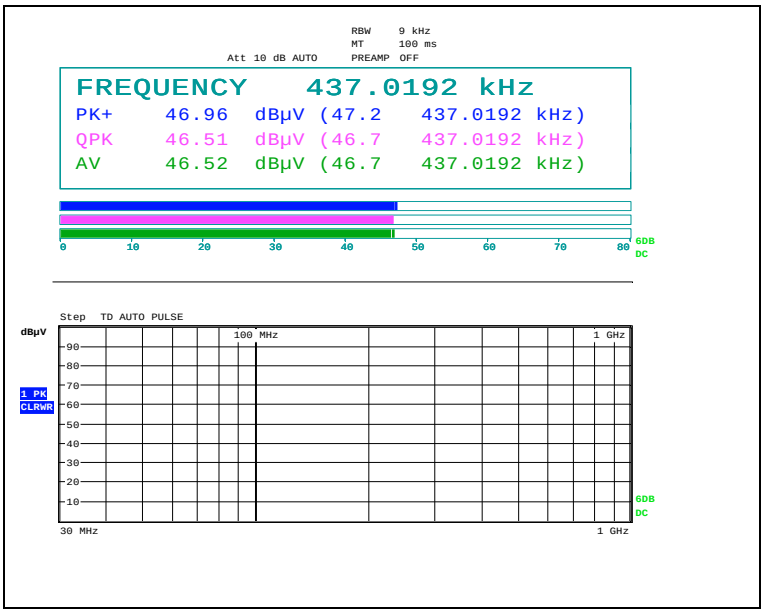
Ant. 3 & 6 & 7 (136.5 ㎑ ~ 139.5 ㎑ & 144.5 ㎑ ~ 147.5 ㎑)

Below 30 ㎒

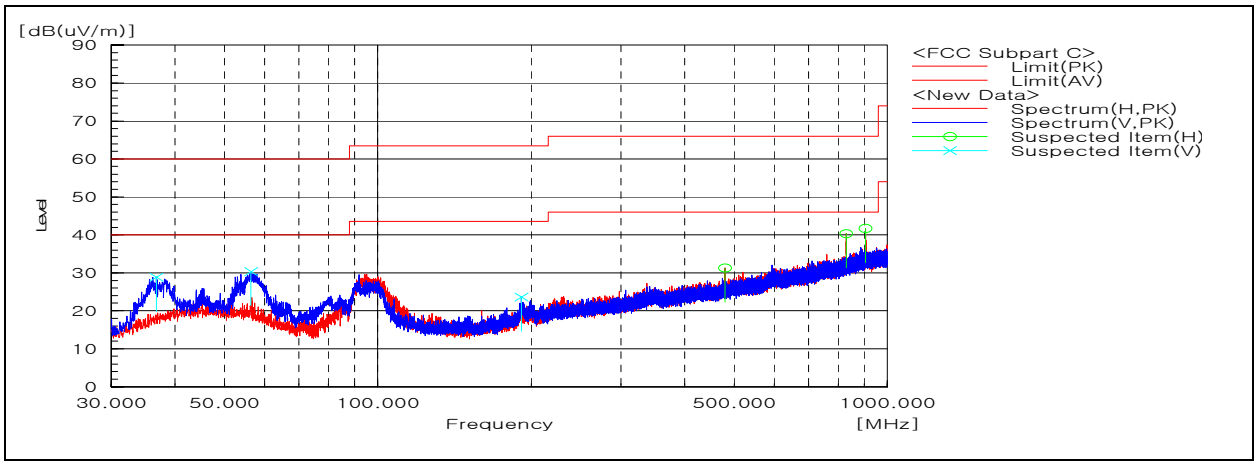





RBW 200 Hz
MT 100 ms
Att 10 dB AUTO PREAMP OFF
FREQUENCY 35.3186 kHz
PK+ 36.33 dBµV (37.9 35.3186 kHz)
QPK 35.24 dBµV (35.6 35.3186 kHz)
AV 35.32 dBµV (36.0 35.3186 kHz)
-15 -5 5 15 25 35 45 55 65 75
6DB
DC
Step TD AUTO PULSE
dBµV
100 MHz
1 GHz
1 PK
CLRWR
90 80 70 60 50 40 30 20 10
6DB
DC
30 MHz
1 GHz


RBW 9 kHz
MT 100 ms
Att 10 dB AUTO PREAMP OFF
FREQUENCY 437.0192 kHz
PK+ 46.96 dBµV (47.2 437.0192 kHz)
QPK 46.51 dBµV (46.7 437.0192 kHz)
AV 46.52 dBµV (46.7 437.0192 kHz)
0 10 20 30 40 50 60 70 80
6DB
DC
Step TD AUTO PULSE
dBµV
100 MHz
1 GHz
1 PK
CLRWR
90 80 70 60 50 40 30 20 10
6DB
DC
30 MHz
1 GHz

Above 30 ㎒

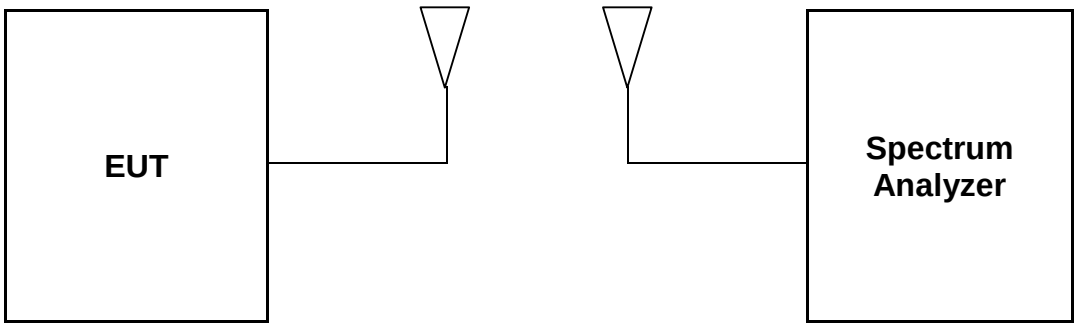


Remark;

- Traces shown in the plot were made by using a peak detector.

3. 20 dB Bandwidth

3.1. Test Setup



3.2. Limit

None; for reporting purposed only

3.3. Test Procedure

a. Span = set to capture all products of the modulation process, including the emission skirts. RBW = 200 Hz, VBW = 200 Hz, Sweep = auto, Detector = peak, Trace = max hold.
b. 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.

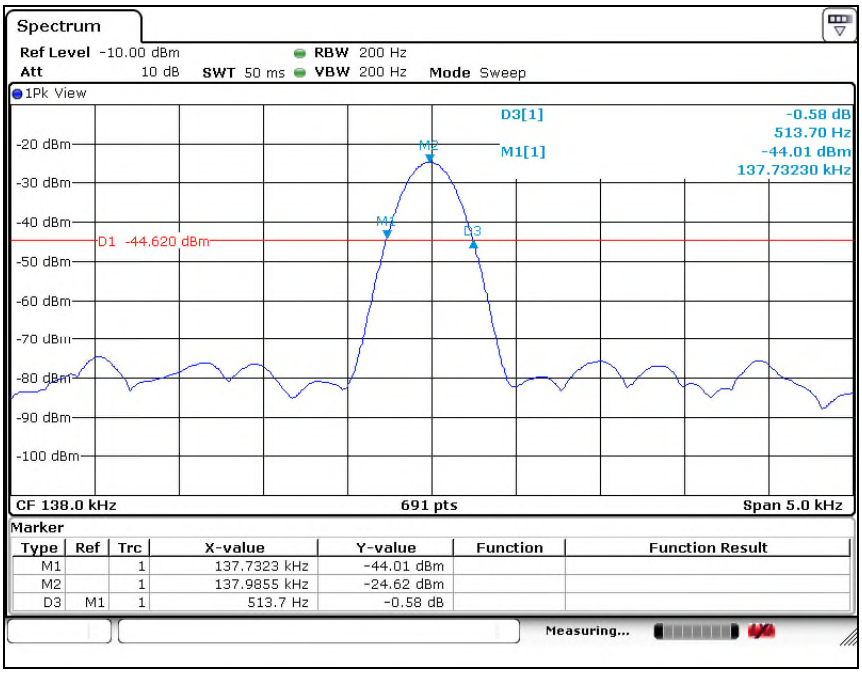
3.4. Test Result

Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 % R.H.

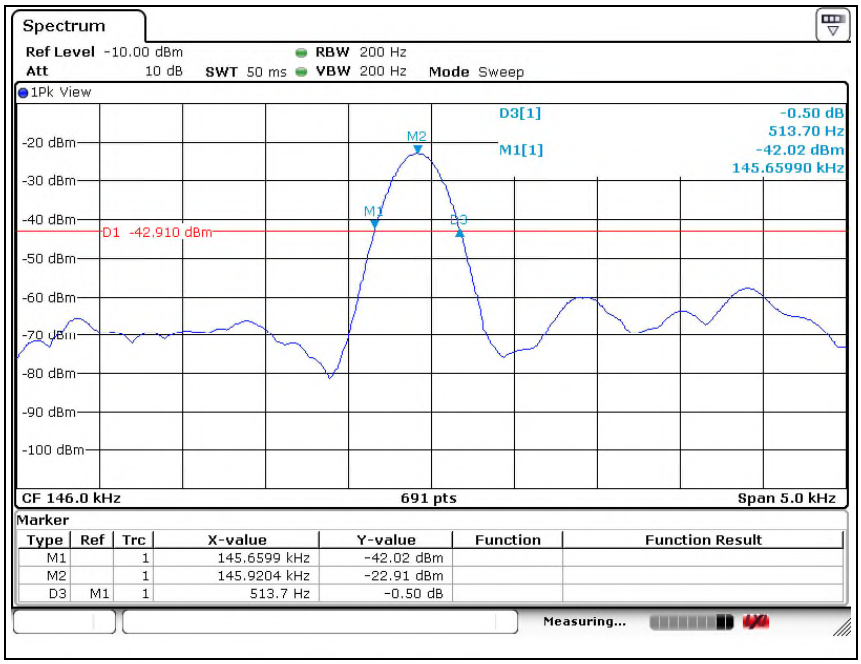
Test Condition		Frequency (㎑)	EUT Status	20 ㏈ Bandwidth (㎑)	Limit
2 W	Ant. 1	136.5 ~ 139.5	With client device (1 % battery status of client device)	0.514	Reporting proposed only
	Ant. 6	144.5 ~ 147.5		0.514	
	Ant. 7	144.5 ~ 147.5		0.536	
	Ant. 1 & Ant. 6 & Ant. 7	136.5 ~ 139.5		0.507	
		144.5 ~ 147.5		0.521	
	Ant. 3 & Ant. 6 & Ant. 7	136.5 ~ 139.5		0.514	
		144.5 ~ 147.5		0.514	

Test Condition: 2 W Operating mode with client device (1 % battery status of client device)

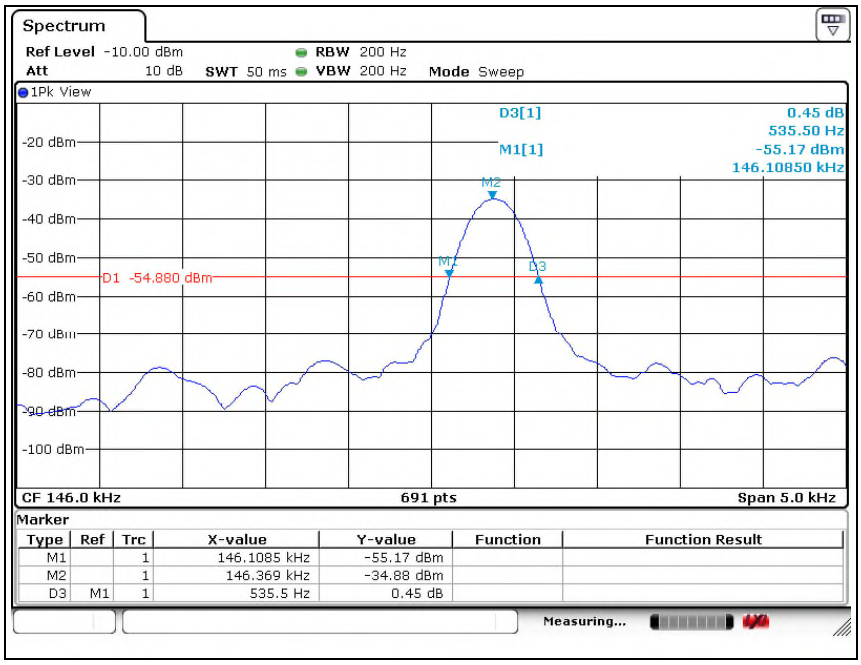
Ant. 1 (136.5 ㎑ ~ 139.5 ㎑)



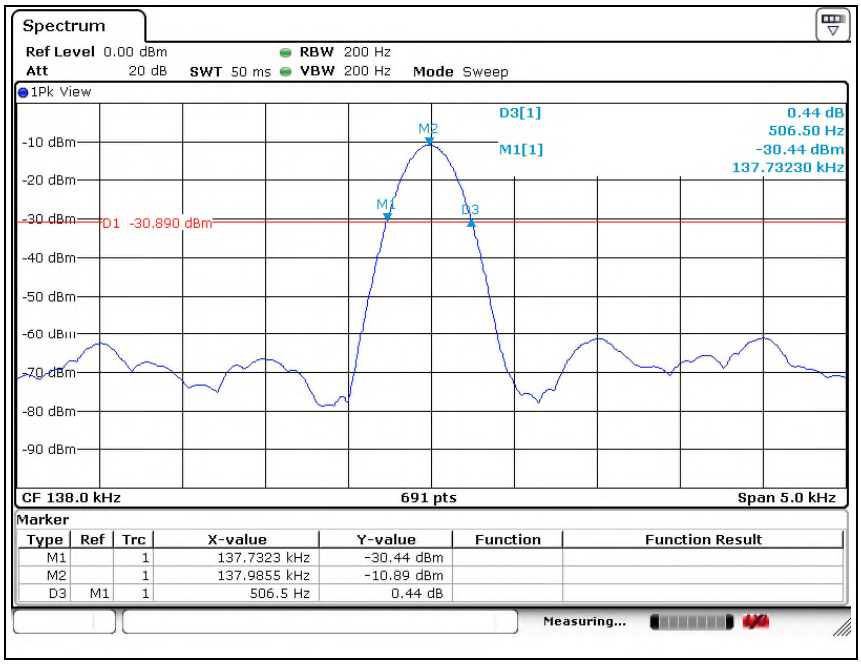
Ant. 6 (144.5 ㎑ ~ 147.5 ㎑)

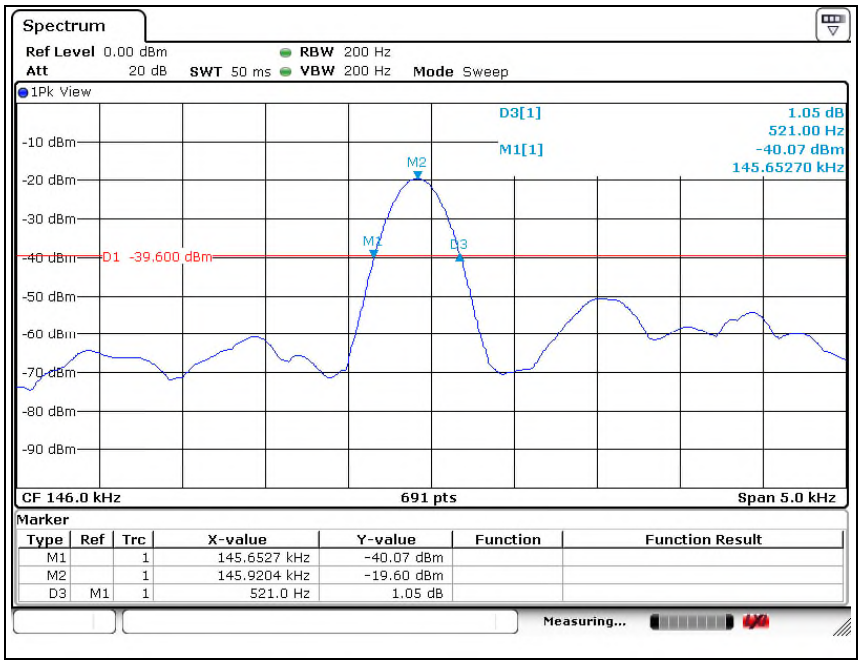


Ant. 7 (144.5 ㎑ ~ 147.5 ㎑)

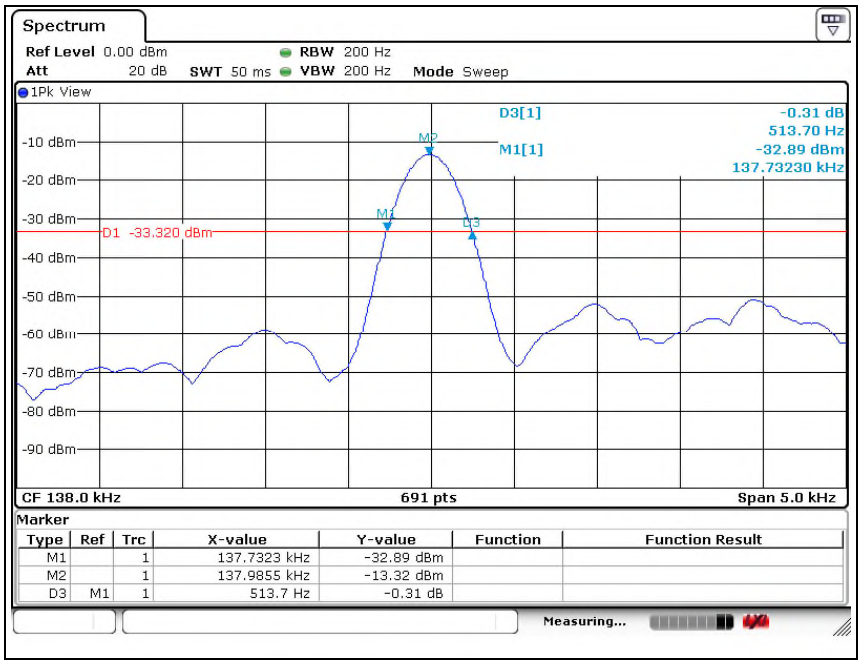


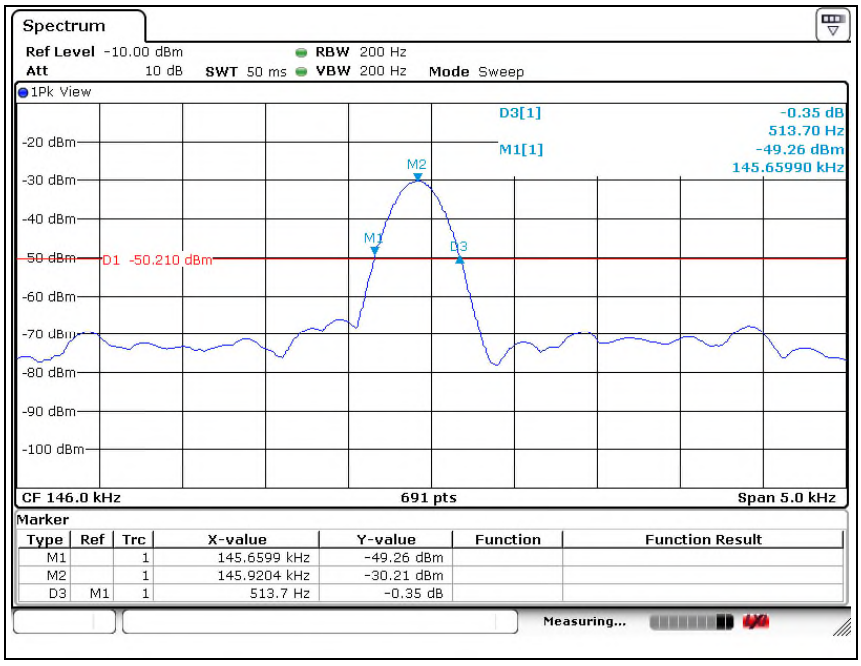
Ant. 1 & 6 & 7 (136.5 ㎑ ~ 139.5 ㎑ & 144.5 ㎑ ~ 147.5 ㎑)





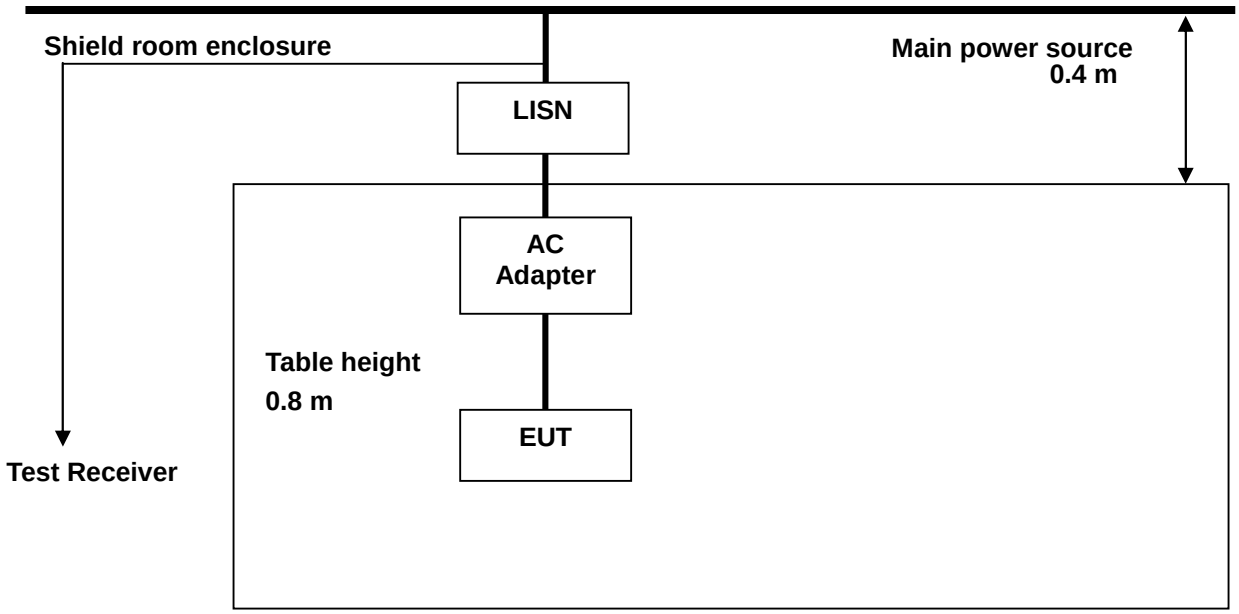
Ant. 3 & 6 & 7 (136.5 ㎑ ~ 139.5 ㎑ & 144.5 ㎑ ~ 147.5 ㎑)





4. AC Power Line Conducted Emission

4.1. Test Setup



4.2. Limit

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 ㎑ to 30 ㎒, shall not exceed the limits in the following table, as measured using a 50 μH /50 ohms line impedance stabilization network (LISN).
Compliance with the provision 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 (㎒)	Conducted limit (㏈㎶)	
	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.

4.3. Test Procedures

AC conducted emissions from the EUT were measured according to the dictates of ANSI C63.10:2013

1. The test procedure is performed in a 6.5 m × 3.5 m × 3.5 m (L × W × H) shielded room. The EUT along with its peripherals were placed on a 1.0 m (W) × 1.5 m (L) and 0.8 m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.
2. The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room.
3. All peripherals were connected to the second LISN and the chassis ground also bounded to the horizontal ground plane of shielded room.
4. The excess power cable between the EUT and the LISN was bundled. The power cables of peripherals were unbundled. All connecting cables of EUT and peripherals were moved to find the maximum emission.

4.4. Test Results

The following table shows the highest levels of conducted emissions on both phase of Hot and Neutral line.

Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 % R.H.

Frequency range : 0.15 ㎒ – 30 ㎒
Measured Bandwidth : 9 ㎑

Test Condition: 2 W Operating mode with client device (1 % battery status of client device)

Ant. 1 (136.5 ㎑ ~ 139.5 ㎑)

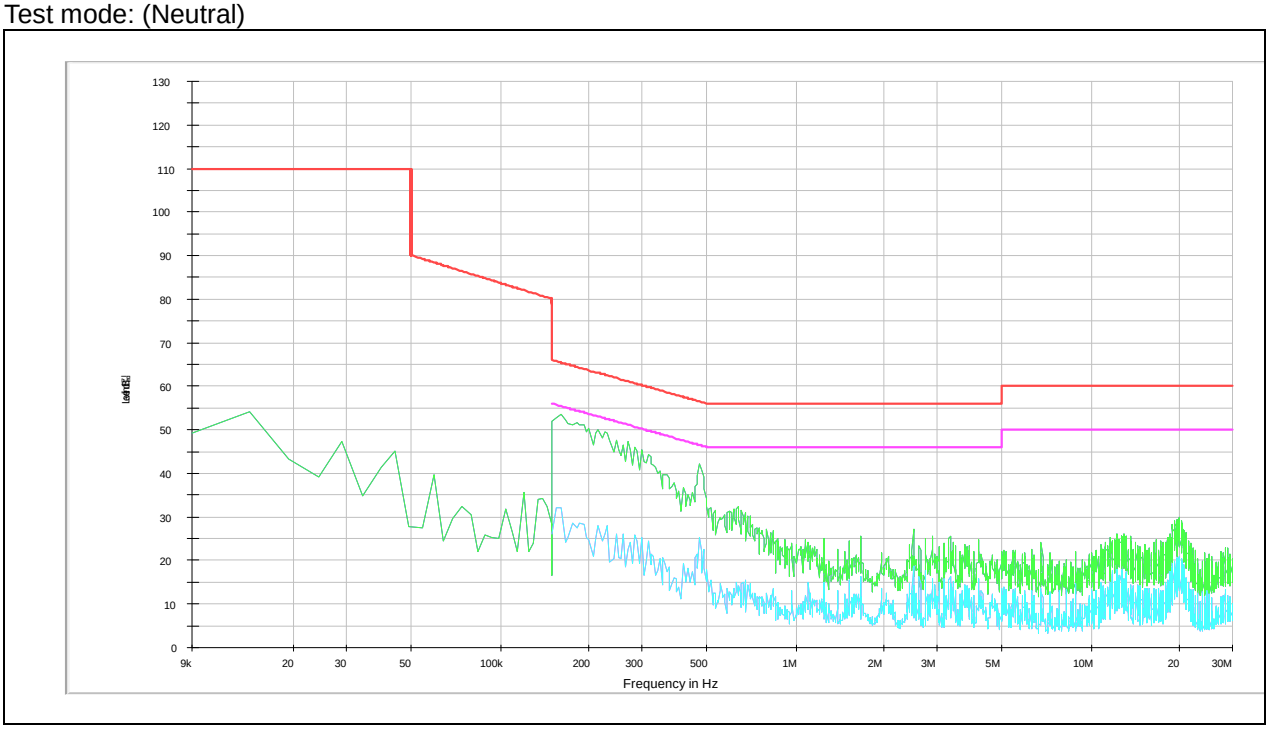
FREQ.	LEVEL (dBμV)		LINE	LIMIT (dBμV)		MARGIN (dB)	
(㎒)	Q-Peak	Average		Q-Peak	Average	Q-Peak	Average
0.16	50.40	33.30	N	65.46	55.46	15.06	22.16
0.47	39.90	25.10	N	56.51	46.51	16.61	21.41
1.66	22.30	16.40	N	56.00	46.00	33.70	29.60
2.49	25.00	18.40	N	56.00	46.00	31.00	27.60
12.19	22.80	17.80	N	60.00	50.00	37.20	32.20
19.83	24.90	20.30	N	60.00	50.00	35.10	29.70
0.16	49.10	37.90	H	65.46	55.46	16.36	17.56
0.48	34.50	20.80	H	56.34	46.34	21.84	25.54
1.24	16.50	11.90	H	56.00	46.00	39.50	34.10
2.49	19.30	14.00	H	56.00	46.00	36.70	32.00
13.03	17.10	13.30	H	60.00	50.00	42.90	36.70
19.05	21.70	16.70	H	60.00	50.00	38.30	33.30

Remark;

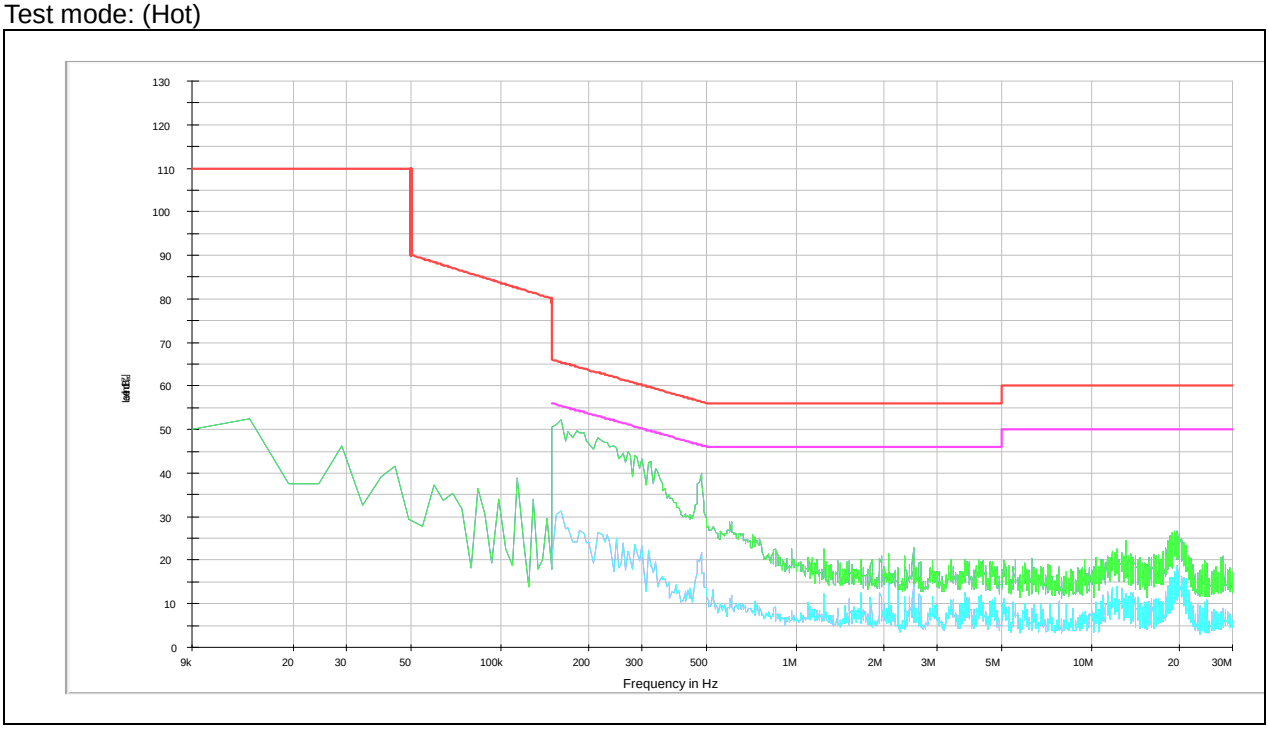
1. Line (H): Hot, Line (N): Neutral
2. Each charging mode with client device (1 %, 50 % and 99 % of battery) was tested.
   As worst condition, charging mode with client device (1 %) is reported.
3. The limit for Class B device(s) from 150 ㎑ to 30 ㎒ are specified in section of the Title 47 CFR.
4. Traces shown in plot were made by using a peak detector and average detector.
5. Deviations to the Specifications: None.

- Test plots

Test mode: (Neutral)



Test mode: (Hot)



Ant. 6 (144.5 ㎑ ~ 147.5 ㎑)

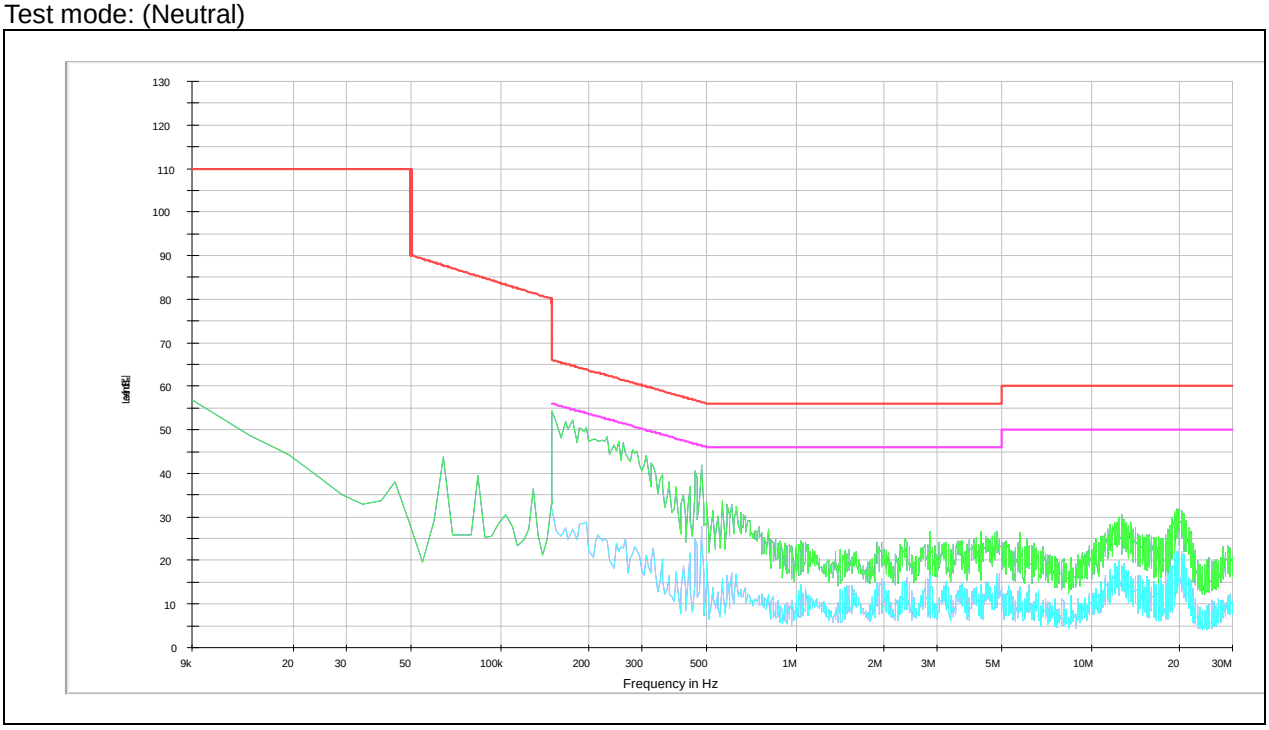
FREQ.	LEVEL (dB㎶)		LINE	LIMIT (dB㎶)		MARGIN (dB)	
(㎒)	Q-Peak	Average		Q-Peak	Average	Q-Peak	Average
0.15	51.20	35.30	N	66.00	56.00	14.80	20.70
0.48	40.60	28.30	N	56.34	46.34	15.74	18.04
0.57	28.40	14.10	N	56.00	46.00	27.60	31.90
4.71	17.70	11.00	N	56.00	46.00	38.30	35.00
12.51	22.70	15.20	N	60.00	50.00	37.30	34.80
19.61	27.10	18.50	N	60.00	50.00	32.90	31.50
0.15	51.60	38.90	H	66.00	56.00	14.40	17.10
0.48	36.20	23.30	H	56.34	46.34	20.14	23.04
0.94	12.50	7.40	H	56.00	46.00	43.50	38.60
4.90	17.60	12.10	H	56.00	46.00	38.40	33.90
12.35	20.90	15.20	H	60.00	50.00	39.10	34.80
19.12	18.50	10.90	H	60.00	50.00	41.50	39.10

Remark;

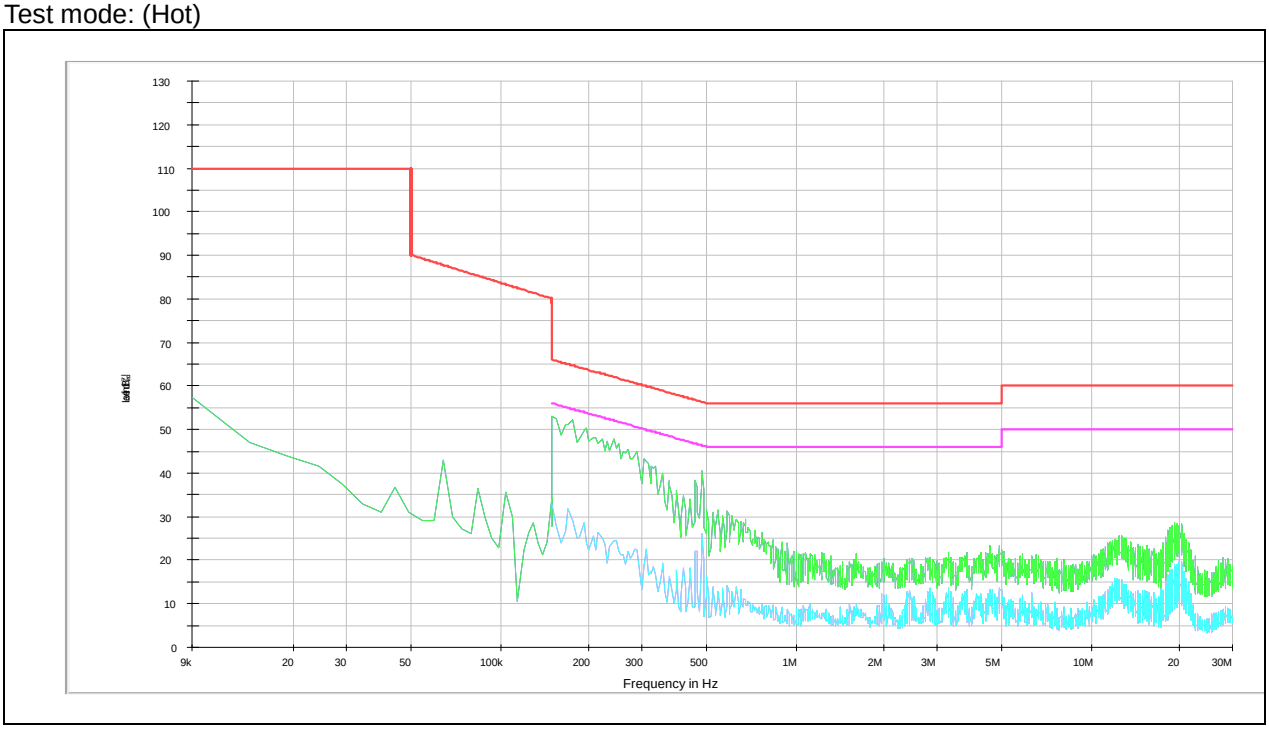
1. Line (H): Hot, Line (N): Neutral
2. Each charging mode with client device (1 %, 50 % and 99 % of battery) was tested.
   As worst condition, charging mode with client device (1 %) is reported.
3. The limit for Class B device(s) from 150 ㎑ to 30 ㎒ are specified in section of the Title 47 CFR.
4. Traces shown in plot were made by using a peak detector and average detector.
5. Deviations to the Specifications: None.

- Test plots

Test mode: (Neutral)



Test mode: (Hot)



Ant. 7 (144.5 ㎑ ~ 147.5 ㎑)

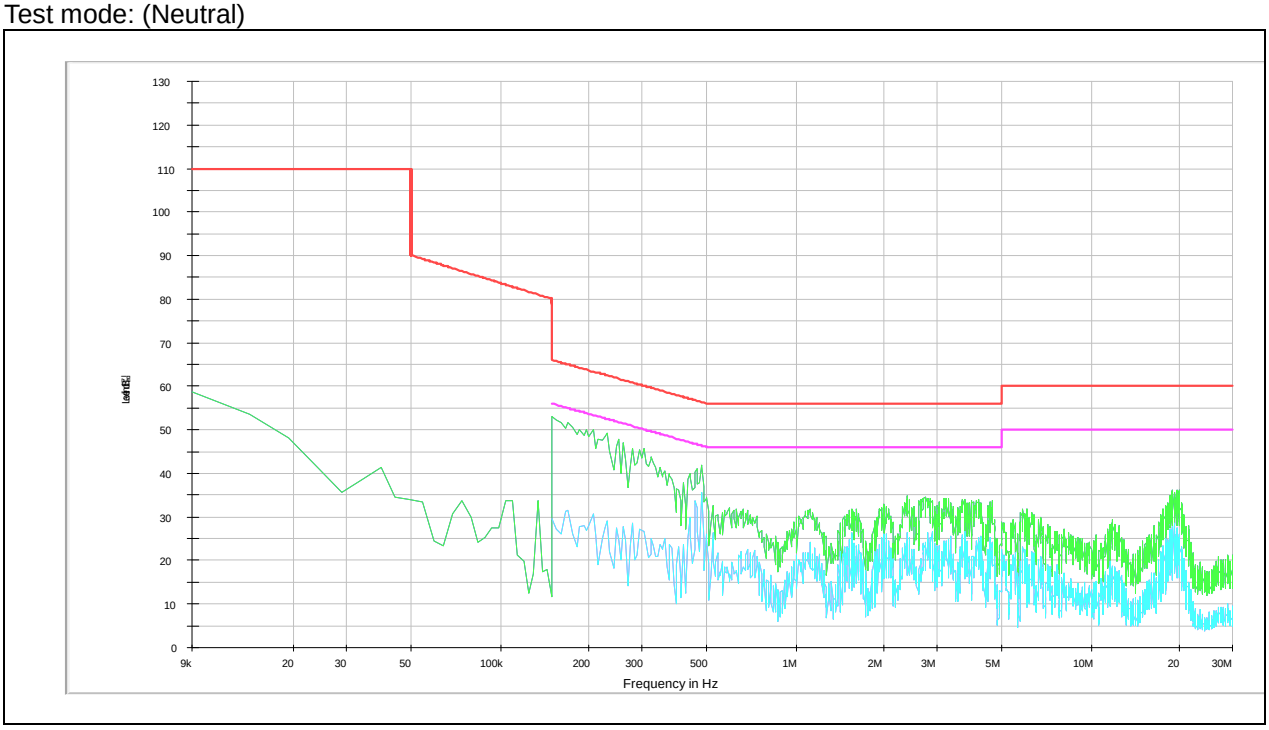
FREQ.	LEVEL (dBμV)		LINE	LIMIT (dBμV)		MARGIN (dB)	
(㎒)	Q-Peak	Average		Q-Peak	Average	Q-Peak	Average
0.15	50.80	32.20	N	66.00	56.00	15.20	23.80
0.48	42.00	36.20	N	56.34	46.34	14.34	10.14
1.08	26.50	19.80	N	56.00	46.00	29.50	26.20
2.72	29.90	21.90	N	56.00	46.00	26.10	24.10
11.88	22.80	16.00	N	60.00	50.00	37.20	34.00
19.34	32.10	24.70	N	60.00	50.00	27.90	25.30
0.16	51.20	42.80	H	65.46	55.46	14.26	12.66
0.48	41.90	33.60	H	56.34	46.34	14.44	12.74
1.61	24.70	19.70	H	56.00	46.00	31.30	26.30
2.80	23.80	17.70	H	56.00	46.00	32.20	28.30
11.33	18.70	12.60	H	60.00	50.00	41.30	37.40
18.42	25.80	20.30	H	60.00	50.00	34.20	29.70

Remark;

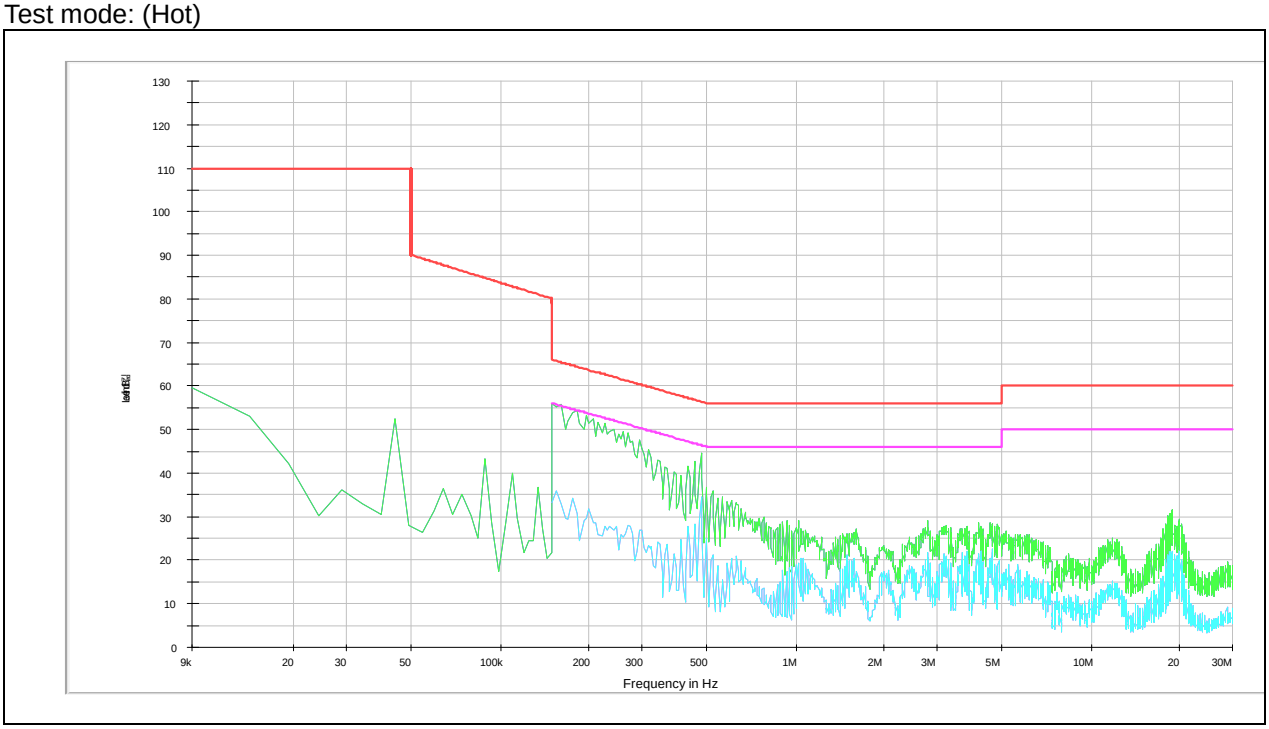
1. Line (H): Hot, Line (N): Neutral
2. Each charging mode with client device (1 %, 50 % and 99 % of battery) was tested.
   As worst condition, charging mode with client device (1 %) is reported.
3. The limit for Class B device(s) from 150 ㎑ to 30 ㎒ are specified in section of the Title 47 CFR.
4. Traces shown in plot were made by using a peak detector and average detector.
5. Deviations to the Specifications: None.

- Test plots

Test mode: (Neutral)



Test mode: (Hot)



Ant. 1 & 6 & 7 (136.5 ㎑ ~ 139.5 ㎑ & 144.5 ㎑ ~ 147.5 ㎑)

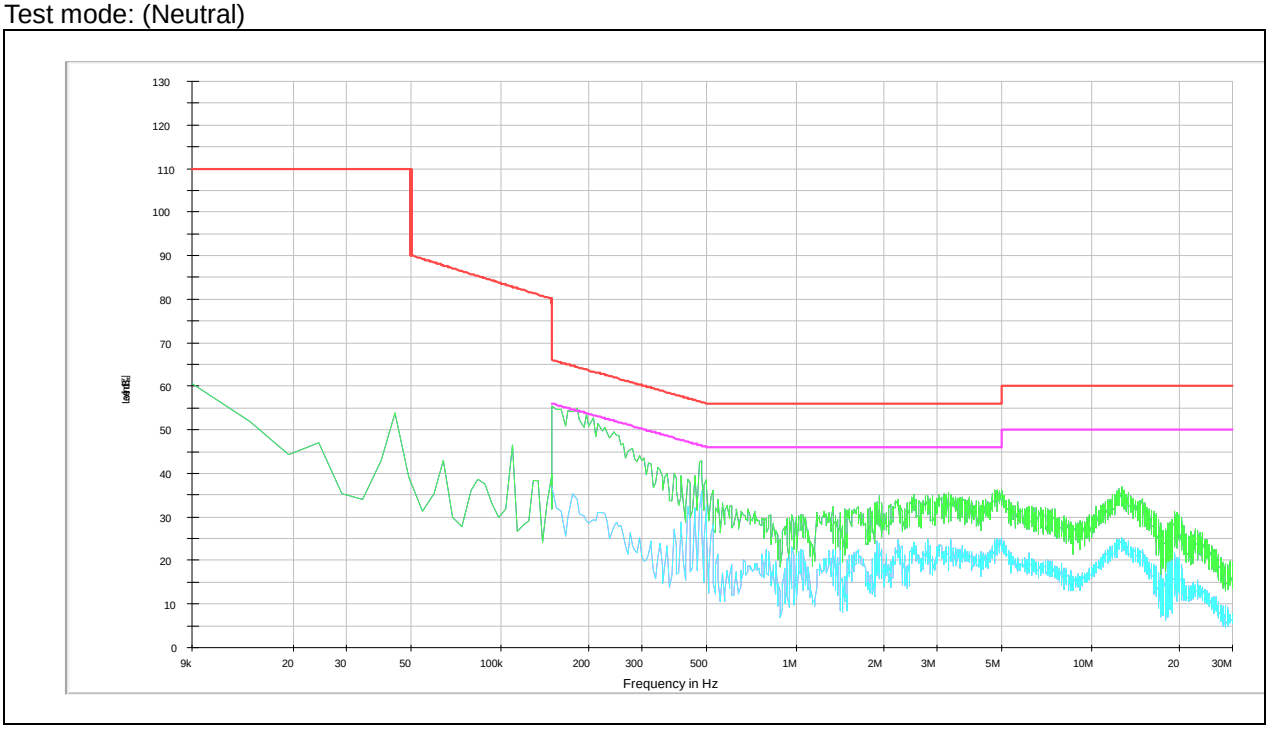
FREQ.	LEVEL (dBμV)		LINE	LIMIT (dBμV)		MARGIN (dB)	
(㎒)	Q-Peak	Average		Q-Peak	Average	Q-Peak	Average
0.15	55.50	49.40	N	66.00	56.00	10.50	6.60
0.47	40.80	35.50	N	56.51	46.51	15.71	11.01
1.92	31.70	24.70	N	56.00	46.00	24.30	21.30
4.73	31.70	23.20	N	56.00	46.00	24.30	22.80
12.53	31.80	24.50	N	60.00	50.00	28.20	25.50
19.23	28.10	19.80	N	60.00	50.00	31.90	30.20
0.15	56.00	37.20	H	66.00	56.00	10.00	18.80
0.46	44.00	32.30	H	56.69	46.69	12.69	14.39
1.58	21.90	17.70	H	56.00	46.00	34.10	28.30
4.88	25.90	19.60	H	56.00	46.00	30.10	26.40
12.93	25.70	20.30	H	60.00	50.00	34.30	29.70
19.61	22.50	15.70	H	60.00	50.00	37.50	34.30

Remark;

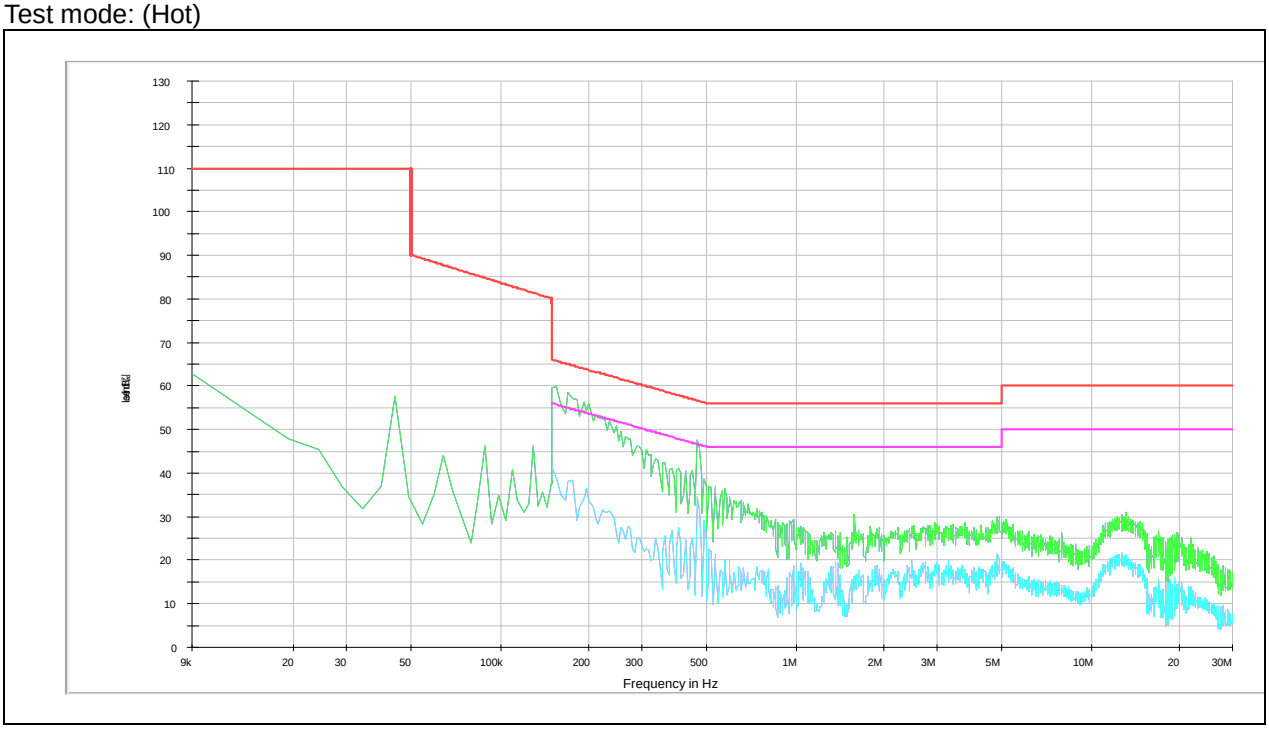
1. Line (H): Hot, Line (N): Neutral
2. Each charging mode with client device (1 %, 50 % and 99 % of battery) was tested.
   As worst condition, charging mode with client device (1 %) is reported.
3. The limit for Class B device(s) from 150 ㎑ to 30 ㎒ are specified in section of the Title 47 CFR.
4. Traces shown in plot were made by using a peak detector and average detector.
5. Deviations to the Specifications: None.

- Test plots

Test mode: (Neutral)



Test mode: (Hot)



Ant. 3 & 6 & 7 (136.5 ㎑ ~ 139.5 ㎑ & 144.5 ㎑ ~ 147.5 ㎑)

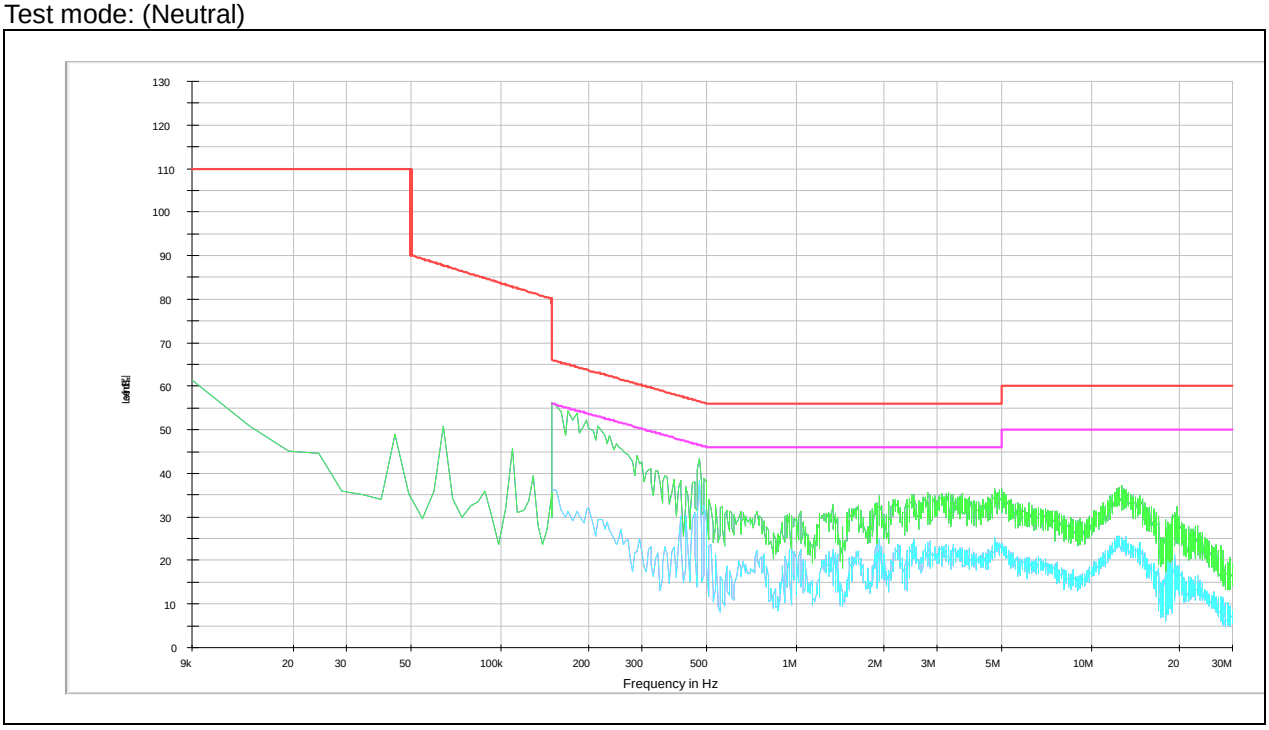
FREQ.	LEVEL (dBμV)		LINE	LIMIT (dBμV)		MARGIN (dB)	
(㎒)	Q-Peak	Average		Q-Peak	Average	Q-Peak	Average
0.16	53.80	40.70	N	65.46	55.46	11.66	14.76
0.47	42.10	37.40	N	56.51	46.51	14.41	9.11
1.91	30.30	21.60	N	56.00	46.00	25.70	24.40
4.74	32.50	23.30	N	56.00	46.00	23.50	22.70
12.50	32.40	25.00	N	60.00	50.00	27.60	25.00
19.21	27.10	19.60	N	60.00	50.00	32.90	30.40
0.16	53.50	39.40	H	65.46	55.46	11.96	16.06
0.47	44.30	34.10	H	56.51	46.51	12.21	12.41
3.27	25.30	19.00	H	56.00	46.00	30.70	27.00
4.90	26.70	20.00	H	56.00	46.00	29.30	26.00
12.33	26.50	21.30	H	60.00	50.00	33.50	28.70
19.18	22.90	16.60	H	60.00	50.00	37.10	33.40

Remark;

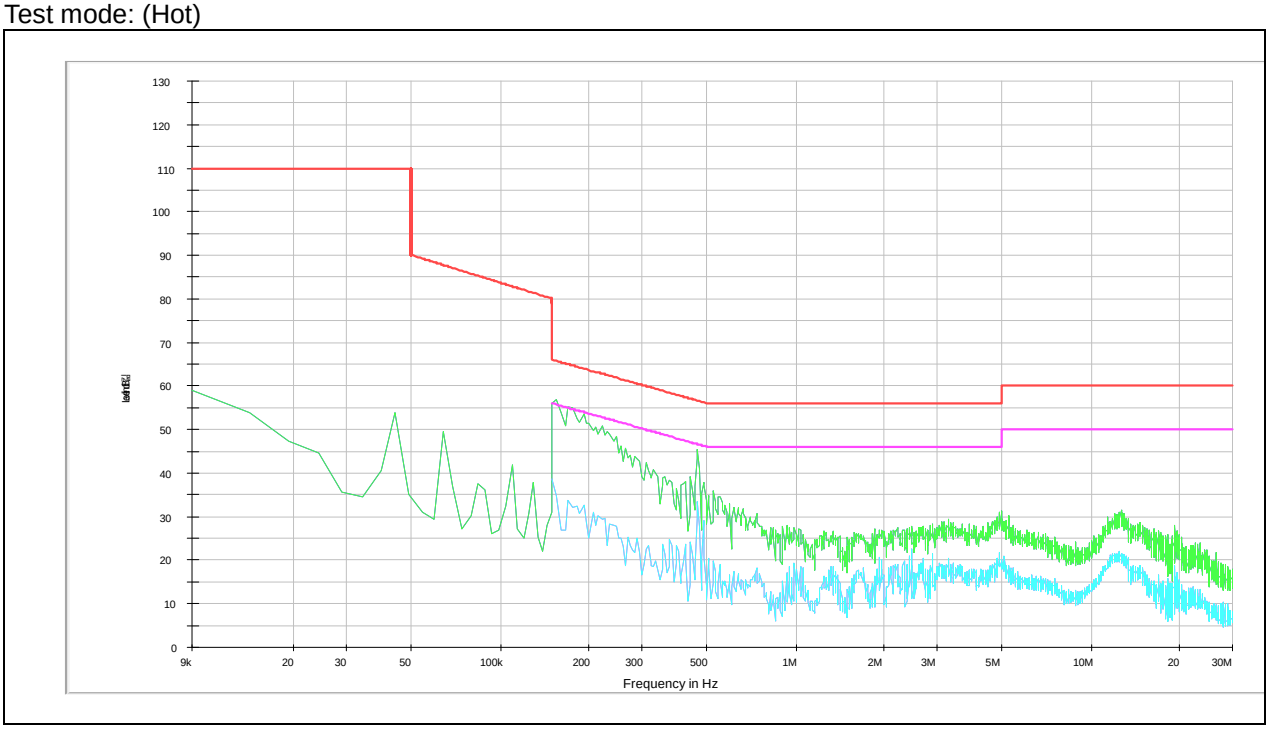
1. Line (H): Hot, Line (N): Neutral
2. Each charging mode with client device (1 %, 50 % and 99 % of battery) was tested.
   As worst condition, charging mode with client device (1 %) is reported.
3. The limit for Class B device(s) from 150 ㎑ to 30 ㎒ are specified in section of the Title 47 CFR.
4. Traces shown in plot were made by using a peak detector and average detector.
5. Deviations to the Specifications: None.

- Test plots

Test mode: (Neutral)



Test mode: (Hot)



- End of the Test Report -