

TEST REPORT

of

FCC Part 15 Subpart C §15.209

FCC ID : A3LEPPG950

Equipment Under Test : WIRELESS CHARGER
Model Name : EP-PG950
Applicant : Samsung Electronics Co., Ltd.
Manufacturer : Samsung Electronics Co., Ltd.
Date of Receipt : 2017.01.17
Date of Test(s) : 2017.01.23 ~ 2017.03.03
Date of Issue : 2017.03.03

In the configuration tested, the EUT complied with the standards specified above.

Tested By:


Patrick Kang

Date:

2017.03.03

Technical
Manager:


Logan Lee

Date:

2017.03.03

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RTT5041-20(2015.10.01)(3)

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A4(210 mm x 297 mm)

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1. General information

1.1. Testing laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)

- Wireless Div. 2FL, 10-2, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807

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>.

Phone No. : +82 31 688 0901

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1.2. Details of applicant

Applicant : Samsung Electronics Co., Ltd.

Address : 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Republic of Korea

Contact Person : Song, Keum-Su

Phone No. : +82 31 279 8141

1.3. Description of EUT

Kind of Product	WIRELESS CHARGER	
Model Name	EP-PG950	
Power Supply	DC 5.0 V, DC 9.0 V	
Frequency Range	DC 5.0 V Wireless Charger (ANT1 : 110 kHz ~ 148 kHz) (ANT2 : 110 kHz ~ 148 kHz) (ANT3 : 110 kHz ~ 148 kHz)	DC 9.0 V Wireless Charger (ANT1 : 130 kHz ~ 148 kHz) (ANT2 : 130 kHz ~ 148 kHz) (ANT3 : 135 kHz ~ 148 kHz)
Antenna Type	Inductive loop coil antenna	

1.4. Declarations by the manufacturer

- The EUT has 3 loop coil antennas and can't transmit simultaneously.

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1.5. Test Equipment List

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Interval	Cal. Due
Spectrum Analyzer	R&S	FSV30	103102	Jun. 08, 2016	Annual	Jun. 08, 2017
Signal Generator	R&S	SMBV100A	255834	Jun. 20, 2016	Annual	Jun. 20, 2017
DC Power Supply	R&S	HMP2020	019922876	Apr. 26, 2016	Annual	Apr. 26, 2017
Test Receiver	R&S	ESU26	100109	Mar. 07, 2016	Annual	Mar. 07, 2017
Loop Antenna	Schwarzbeck Mess-Elektronik	FMZB 1519	1519-039	Aug. 19, 2015	Biennial	Aug. 19, 2017
Turn Table	INNCO systems GmbH	DS 1200 S	N/A	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.
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.
Test Receiver	R&S	ESCI 7	100911	Dec. 20, 2016	Annual	Dec. 20, 2017
Two-Line V-Network	R&S	ENV216	100190	Dec. 21, 2016	Annual	Dec. 21, 2017
Controller	Innco systems GmbH	CONTROLLER CO3000-4P	CO3000/963/3 8330516/L	N. C. R.	N/A	N.C.R.

► Support equipment

Description	Manufacturer	Model	FCC ID
Samsung Mobile Phone	Samsung Electronics Co., Ltd.	SM-G930F	A3LSMG930F

1.6. Sample calculation

Where relevant, the following sample calculation is provided:

Field strength level (dB μ V/m) = Measured level (dB μ V) + Antenna factor (dB) + Cable loss (dB)

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1.7. Worst case of 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 configuration	Mode	Description
Charging Mode with client device (Model : SM-G930F, FCC ID : A3LSMG930F)	Ant 1	Less than 1 % of battery
		Less than 50 % of battery
		100 % full charging of battery
	Ant 2	Less than 1 % of battery
		Less than 50 % of battery
		100 % full charging of battery
	Ant 3	Less than 1 % of battery
		Less than 50 % of battery
		100 % full charging of battery

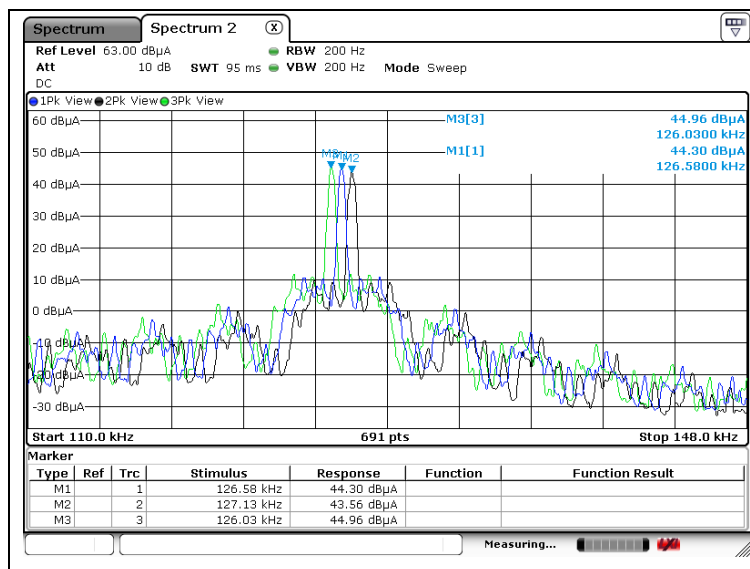
EUT setup configuration:

- The EUT can be capable of charging one client at a time.
- The measurement is performed with a typical WPT client device on the power transfer zone.

Operating configurations:

Client device (SM-G930F)

- While the client device was in airplane mode (Trace#2 "M2")
- While the client device was connected to an active data connection (Trace#3 "M3")
The device was tested under all modes and bands like 2G and 3G.
In the result, **PCS GSM / GPRS1900 / 1 TX** was found in **Middle channel**.
- While the wireless charger is charging with the client device turned off. (Trace#1 "M1")



Plot – fundamental emission comparison

- The level of Trace#3 was more than Trace#1 and 2 so Trace#3 was selected.
- Trace#3 as **PCS GSM / GPRS1900 / 1 TX** which was found in **Middle channel** should be tested with the client device as a worst case.

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1.7. Summary of Test Results

The EUT has been tested according to the following specifications:

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

1.8. Test Report Revision

Revision	Report number	Date of Issue	Description
0	F690501/RF-RTL010863	2017.02.23	Initial
1	F690501/RF-RTL010863-1	2017.03.03	Added data for radiated band edge.

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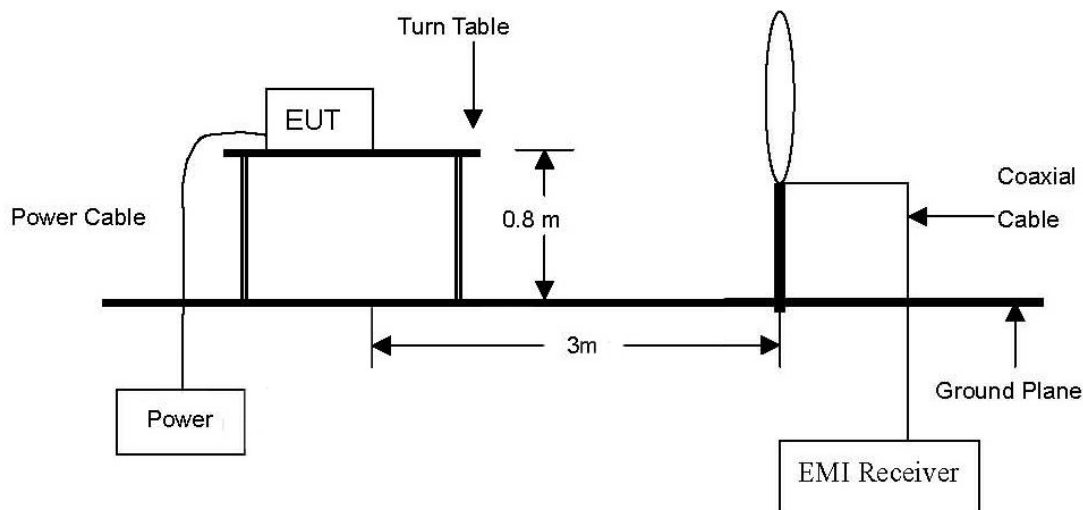
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2. Field Strength of Fundamental and Spurious Emission

2.1. Test Setup

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



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 (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meter)
0.009 - 0.490	2 400/F(kHz)	300
0.490 - 1.705	24 000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100**	3
88 - 216	150**	3
216 - 960	200**	3
Above 960	500	3

** 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., Sections §15.231 and §15.241

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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 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 Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note;

Although these tests were performed other than open field test site, adequate comparison measurements were confirmed against 30 meter open field 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 937606.

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2.4. Field Strength of Fundamental Test Result

Ambient temperature : $(23 \pm 1) ^\circ\text{C}$
Relative humidity : 47 % R.H.

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical. The field strength of spurious emission was measured in one orthogonal EUT position (x-axis). Definition of DUT for a orthogonal plane was described in the test setup photo.

Test Mode : Ant1 in DC 5 V condition

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m) at 300 m	Margin (dB)
Charging mode with client (less than 1 % battery status)									
0.116	62.40	Average	H	19.59	0.05	82.04	2.04	26.32	24.28
Charging mode with client (less than 50 % battery status)									
0.115	62.30	Average	H	19.59	0.05	81.94	1.94	26.39	24.45
Charging mode with client (100 % battery status)									
0.116	62.50	Average	H	19.59	0.05	82.14	2.14	26.32	24.18

Note;

- 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).
- According to §15.209 (d), the measurements were tested by using Quasi peak detector except for the frequency bands 9 – 90 kHz, 110 – 490 kHz and above 1 GHz in these three bands on measurements employing an average detector.
- The limit above was calculated based on table of §15.209 (a).

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Test Mode : Ant2 in DC 5 V condition

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m) at 300 m	Margin (dB)
Charging mode with client (less than 1 % battery status)									
0.115	58.50	Average	H	19.59	0.05	78.14	-1.86	26.39	28.25
Charging mode with client (less than 50 % battery status)									
0.115	58.30	Average	H	19.59	0.05	77.94	-2.06	26.39	28.45
Charging mode with client (100 % battery status)									
0.116	57.90	Average	H	19.59	0.05	77.54	-2.46	26.32	28.78

Note;

- 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).
- According to §15.209 (d), the measurements were tested by using Quasi peak detector except for the frequency bands 9 – 90 kHz, 110 – 490 kHz and above 1 GHz in these three bands on measurements employing an average detector.
- The limit above was calculated based on table of §15.209 (a).

Test Mode : Ant3 in DC 5 V condition

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m) at 300 m	Margin (dB)
Charging mode with client (less than 1 % battery status)									
0.128	69.90	Average	H	19.59	0.06	89.55	9.55	25.46	15.91
Charging mode with client (less than 50 % battery status)									
0.128	69.80	Average	H	19.59	0.06	89.45	9.45	25.46	16.01
Charging mode with client (100 % battery status)									
0.128	68.00	Average	H	19.59	0.06	87.65	7.65	25.46	17.81

Note;

- 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).
- According to §15.209 (d), the measurements were tested by using Quasi peak detector except for the frequency bands 9 – 90 kHz, 110 – 490 kHz and above 1 GHz in these three bands on measurements employing an average detector.
- The limit above was calculated based on table of §15.209 (a).

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A4(210 mm x 297 mm)

Test Mode : Ant1 in DC 9 V condition

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m) at 300 m	Margin (dB)
Charging mode with client (less than 1 % battery status)									
0.131	67.50	Average	H	19.58	0.07	87.15	7.15	25.26	18.11
Charging mode with client (less than 50 % battery status)									
0.131	67.60	Average	H	19.58	0.07	87.25	7.25	25.26	18.01
Charging mode with client (100 % battery status)									
0.131	67.70	Average	H	19.58	0.07	87.35	7.35	25.26	17.91

Note;

- 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).
- According to §15.209 (d), the measurements were tested by using Quasi peak detector except for the frequency bands 9 – 90 kHz, 110 – 490 kHz and above 1 GHz in these three bands on measurements employing an average detector.
- The limit above was calculated based on table of §15.209 (a).

Test Mode : Ant2 in DC 9 V condition

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m) at 300 m	Margin (dB)
Charging mode with client (less than 1 % battery status)									
0.131	62.60	Average	H	19.58	0.07	82.25	2.25	25.26	23.01
Charging mode with client (less than 50 % battery status)									
0.131	62.70	Average	H	19.58	0.07	82.35	2.35	25.26	22.91
Charging mode with client (100 % battery status)									
0.131	62.70	Average	H	19.58	0.07	82.35	2.35	25.26	22.91

Note;

- 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).
- According to §15.209 (d), the measurements were tested by using Quasi peak detector except for the frequency bands 9 – 90 kHz, 110 – 490 kHz and above 1 GHz in these three bands on measurements employing an average detector.
- The limit above was calculated based on table of §15.209 (a).

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Test Mode : Ant3 in DC 9 V condition

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m) at 300 m	Margin (dB)
Charging mode with client (less than 1 % battery status)									
0.137	70.30	Average	H	19.58	0.07	89.95	9.95	24.87	14.92
Charging mode with client (less than 50 % battery status)									
0.137	70.20	Average	H	19.58	0.07	89.85	9.85	24.87	15.02
Charging mode with client (100 % battery status)									
0.137	70.20	Average	H	19.58	0.07	89.85	9.85	24.87	15.02

Note;

1. 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).
2. According to §15.209 (d), the measurements were tested by using Quasi peak detector except for the frequency bands 9 – 90 kHz, 110 – 490 kHz and above 1 GHz in these three bands on measurements employing an average detector.
3. The limit above was calculated based on table of §15.209 (a).

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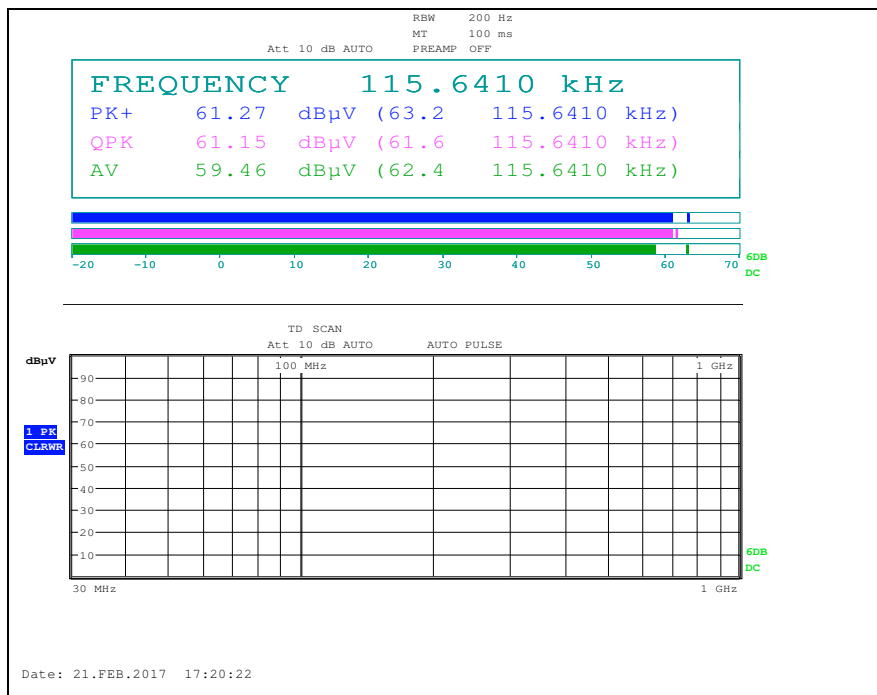
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A4(210 mm x 297 mm)

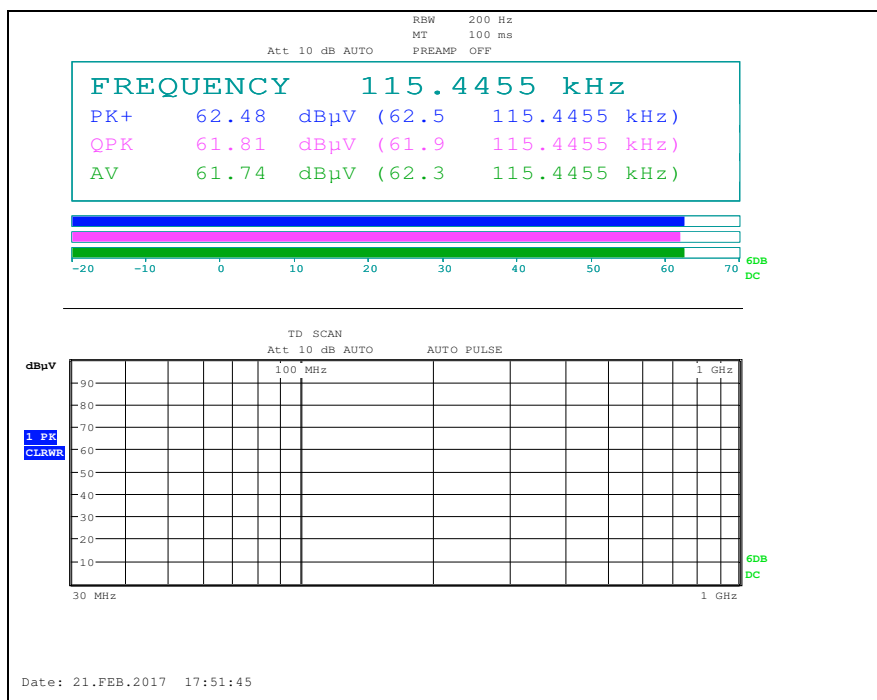
Test plots

Test Mode : Ant1 in DC 5 V condition

Charging mode (less than 1 % battery status of client device)



Charging mode (less than 50 % battery status of client device)



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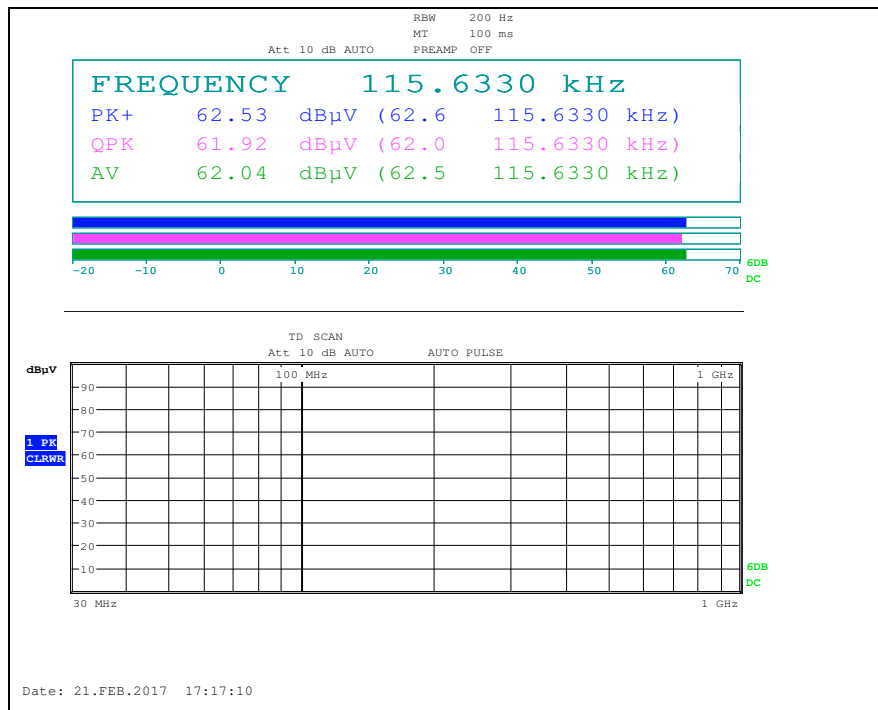
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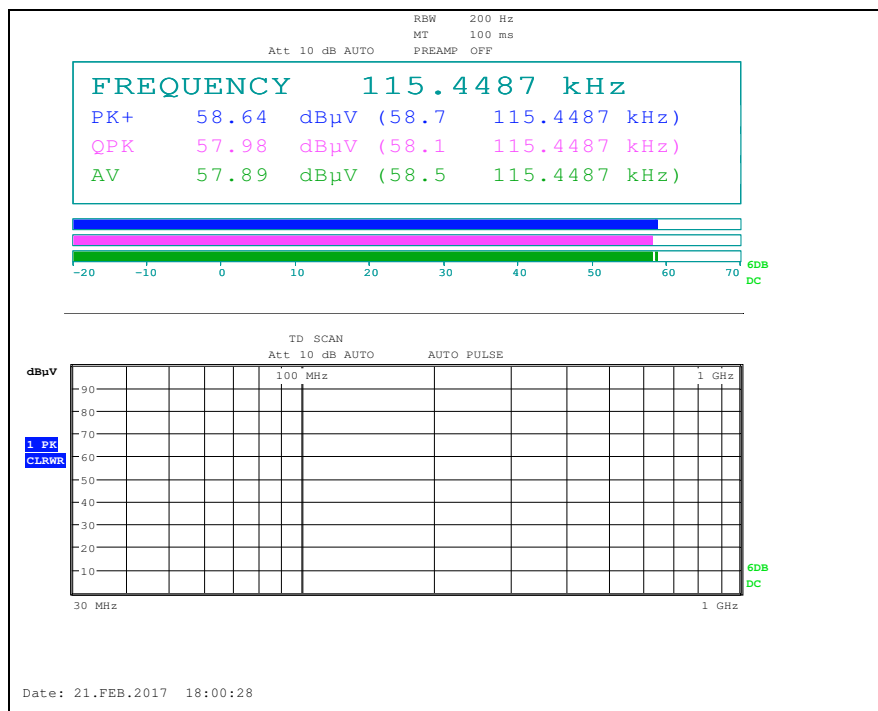
A4(210 mm x 297 mm)

Charging mode (100 % battery status of client device)



Test Mode : Ant2 in DC 5 V condition

Charging mode (less than 1 % battery status of client device)



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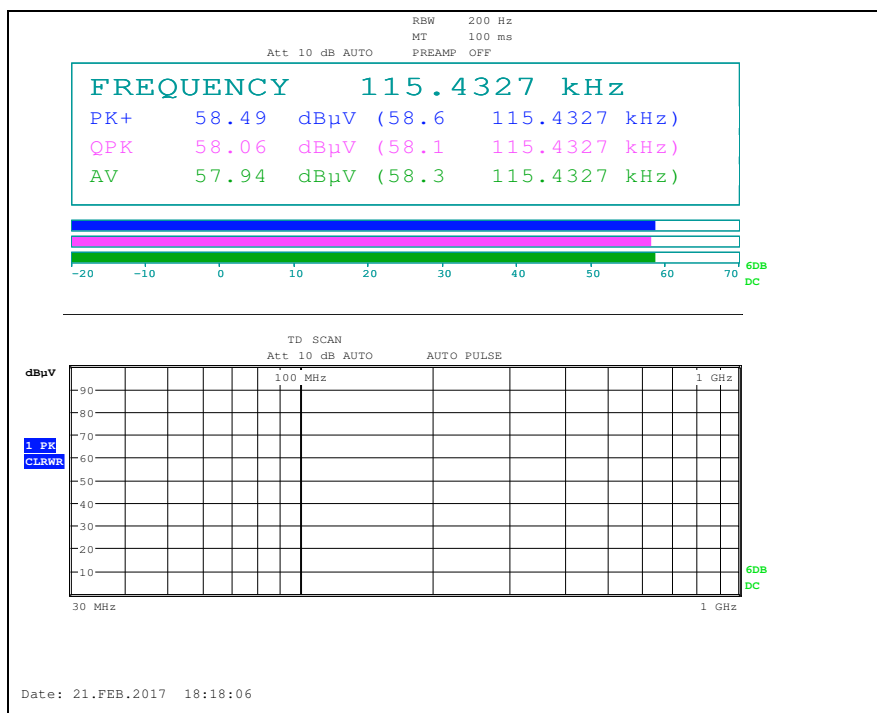
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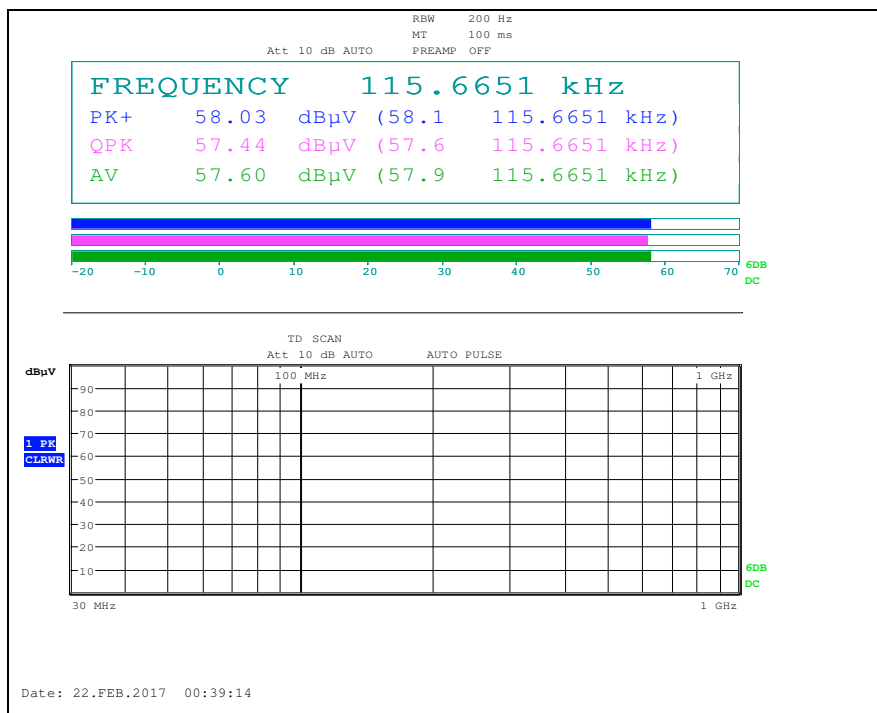
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Charging mode (less than 50 % battery status of client device)



Charging mode (100 % battery status of client device)



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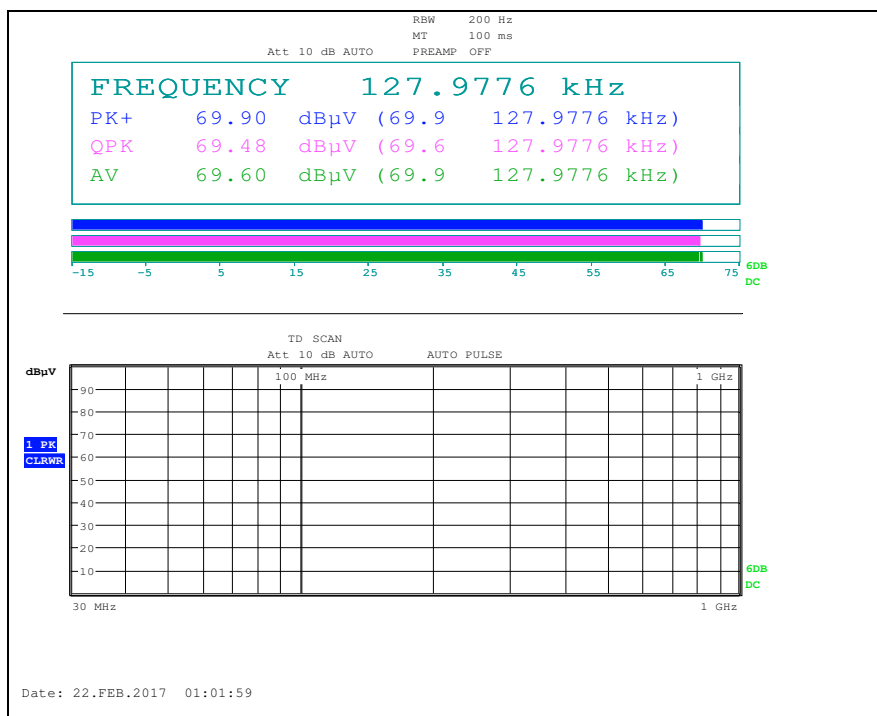
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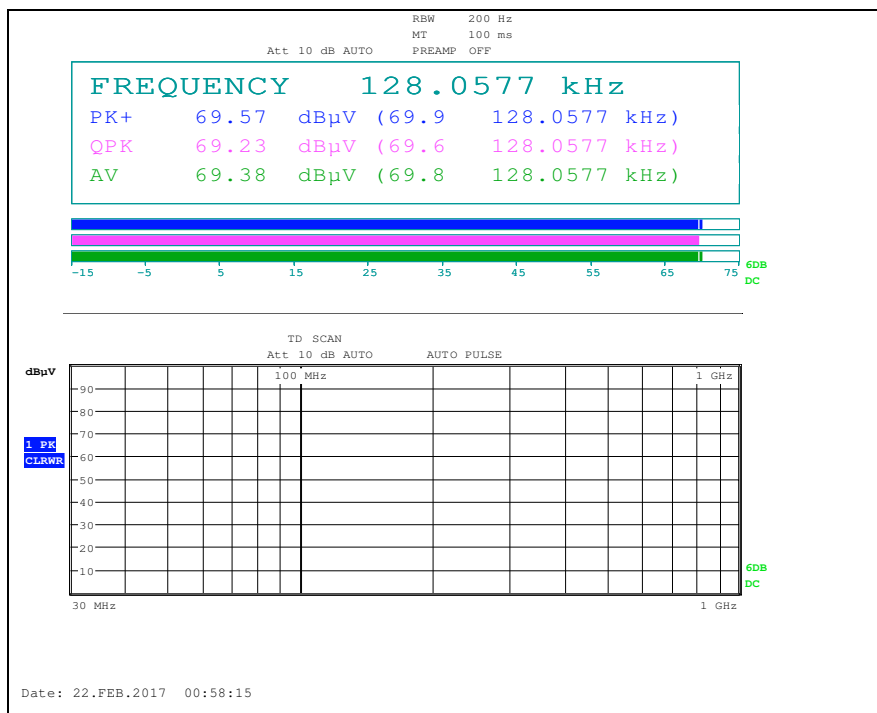
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Test Mode : Ant3 in DC 5 V condition

Charging mode (less than 1 % battery status of client device)



Charging mode (less than 50 % battery status of client device)



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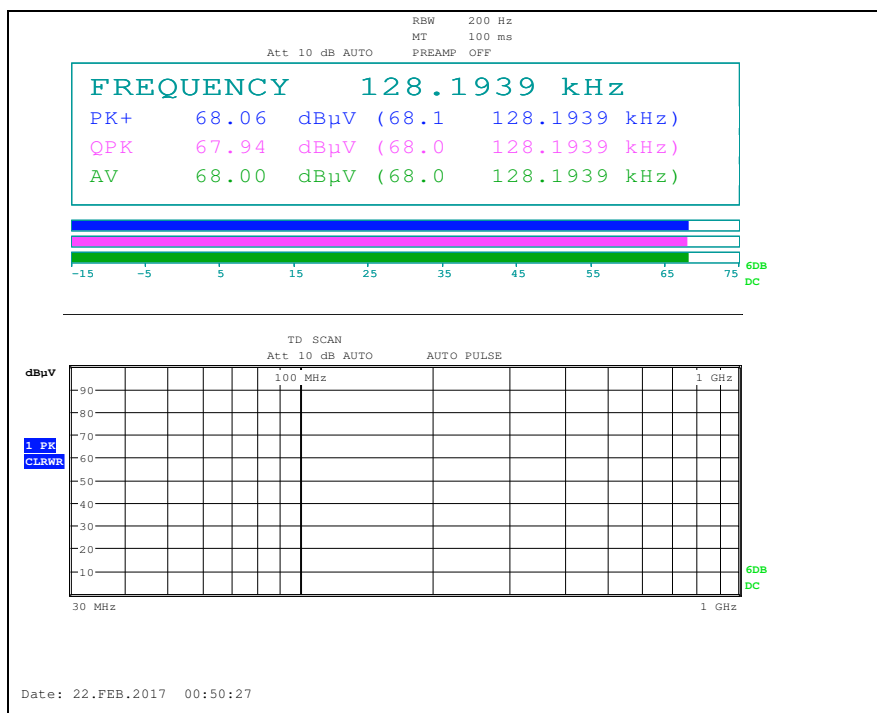
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Charging mode (100 % battery status of client device)

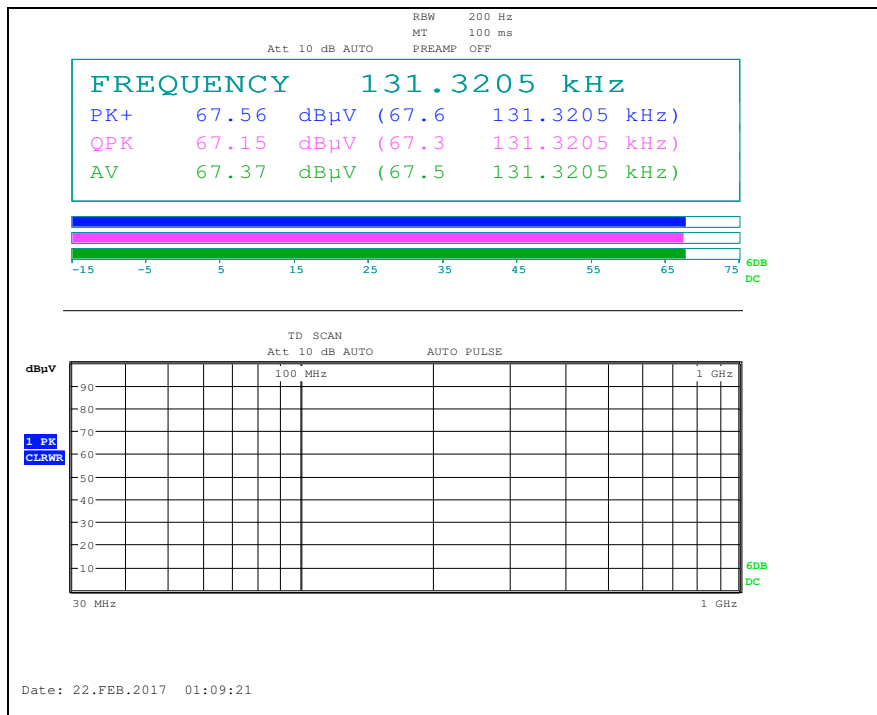


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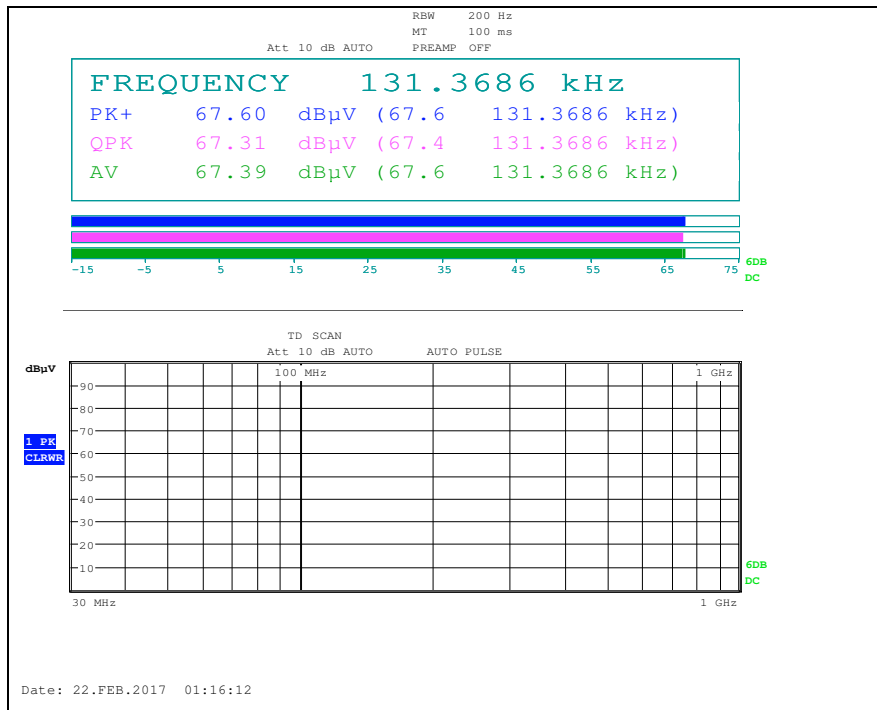
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

Test Mode : Ant1 in DC 9 V condition

Charging mode (less than 1 % battery status of client device)



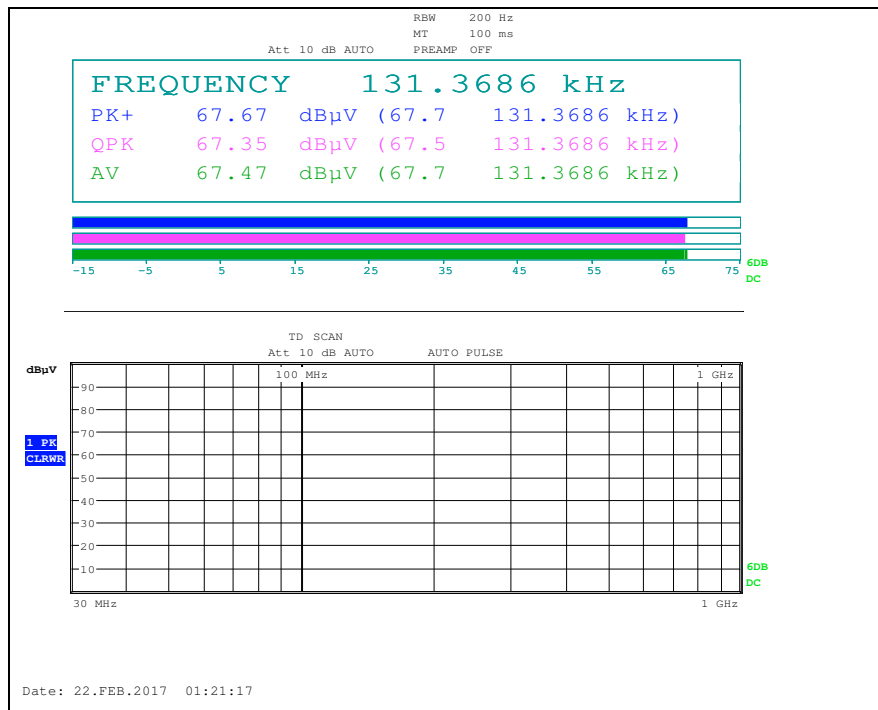
Charging mode (less than 50 % battery status of client device)



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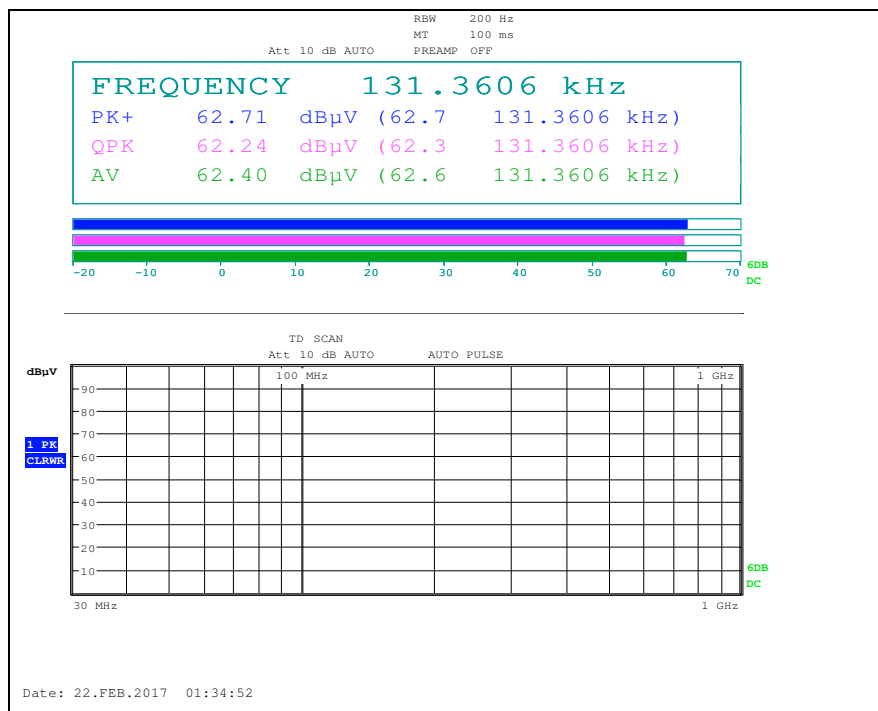
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

Charging mode (100 % battery status of client device)



Test Mode : Ant2 in DC 9 V condition

Charging mode (less than 1 % battery status of client device)



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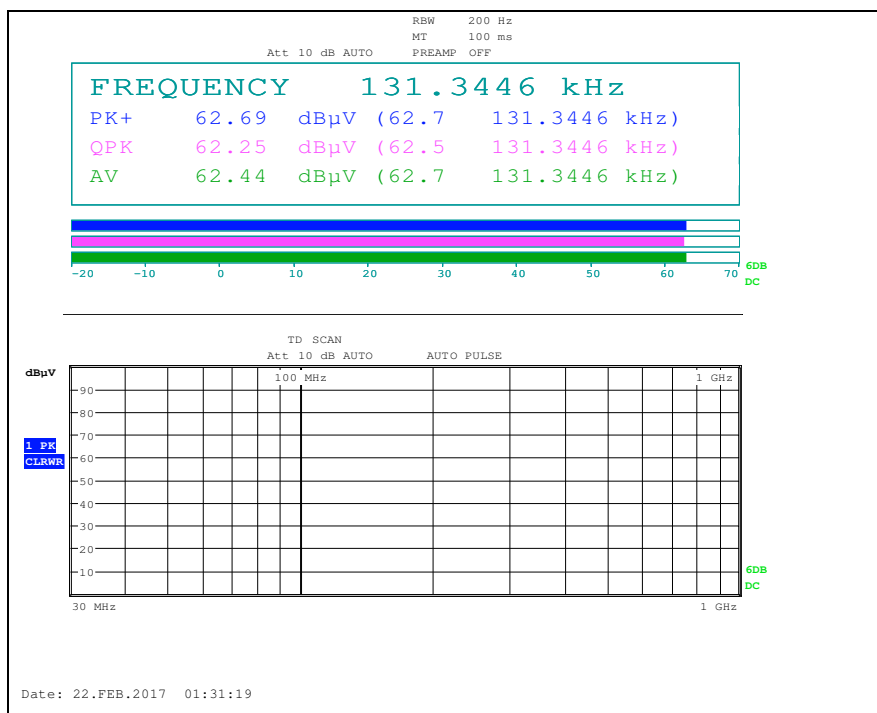
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

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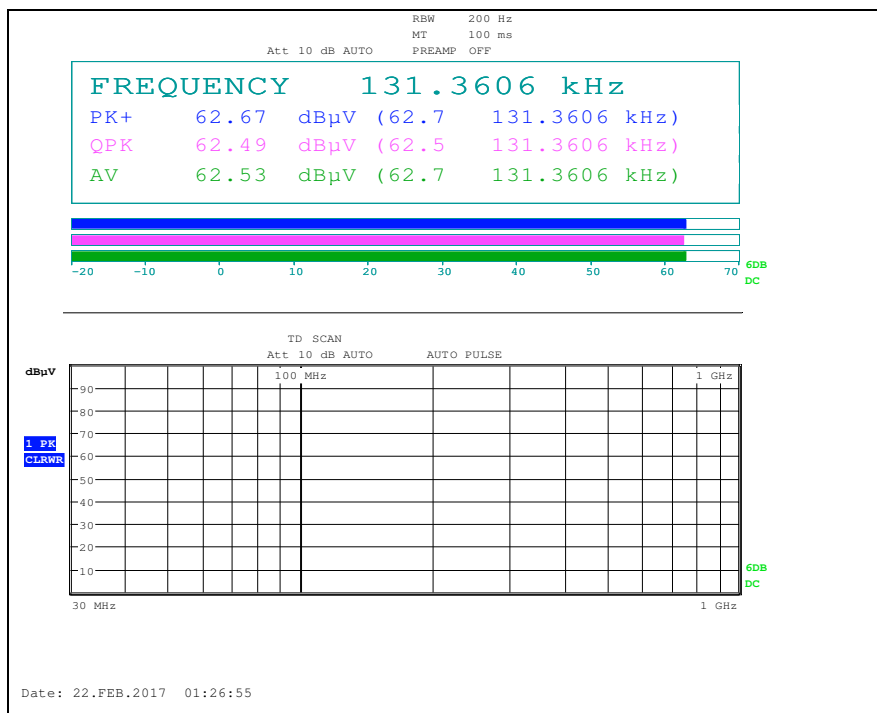
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

Charging mode (less than 50 % battery status of client device)



Charging mode (100 % battery status of client device)



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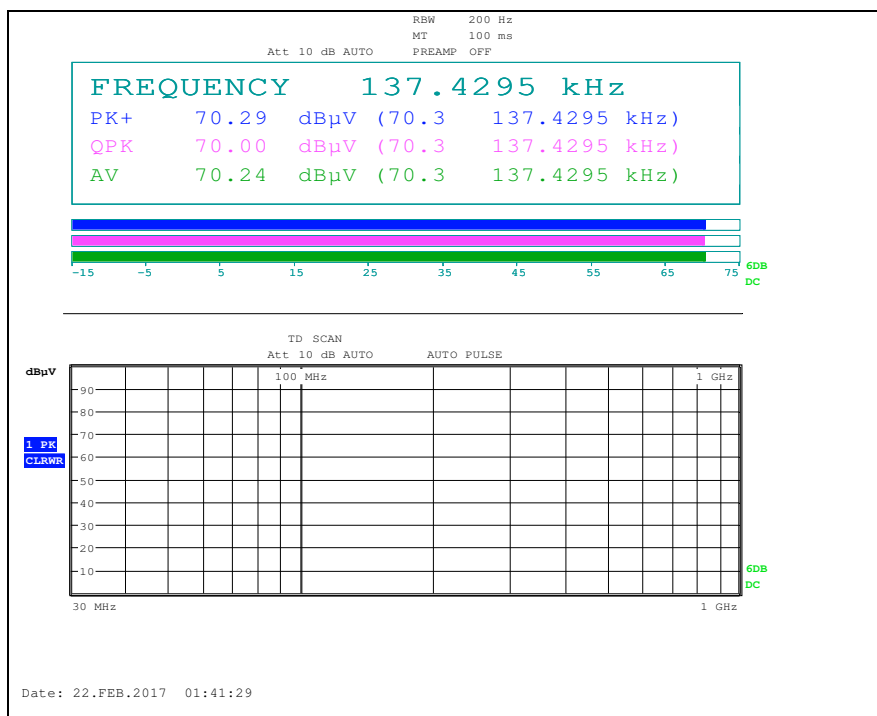
RTT5041-20(2015.10.01)(3)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

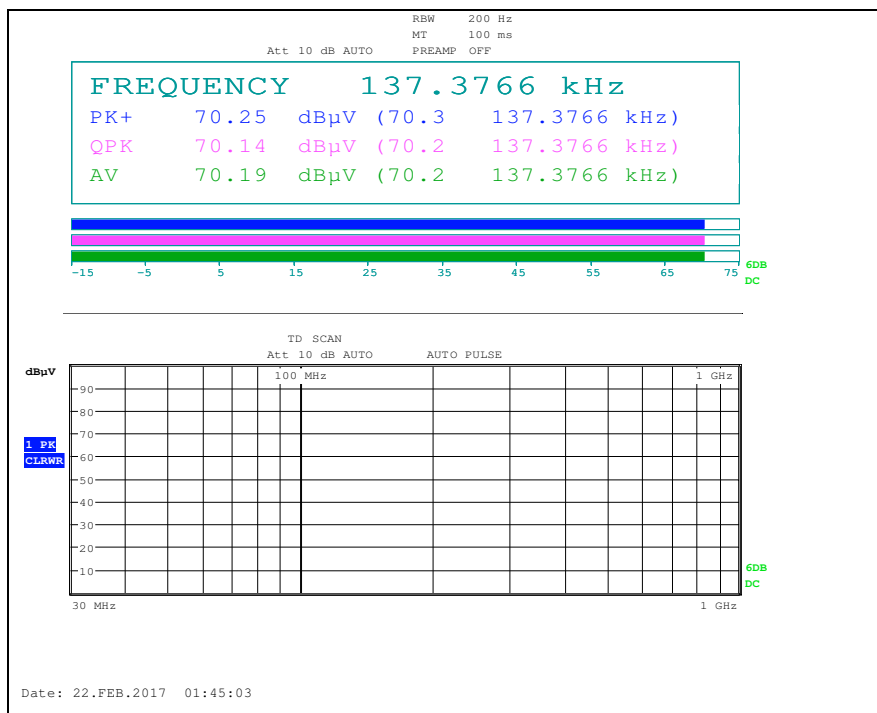
A4(210 mm x 297 mm)

Test Mode : Ant3 in DC 9 V condition

Charging mode (less than 1 % battery status of client device)



Charging mode (less than 50 % battery status of client device)



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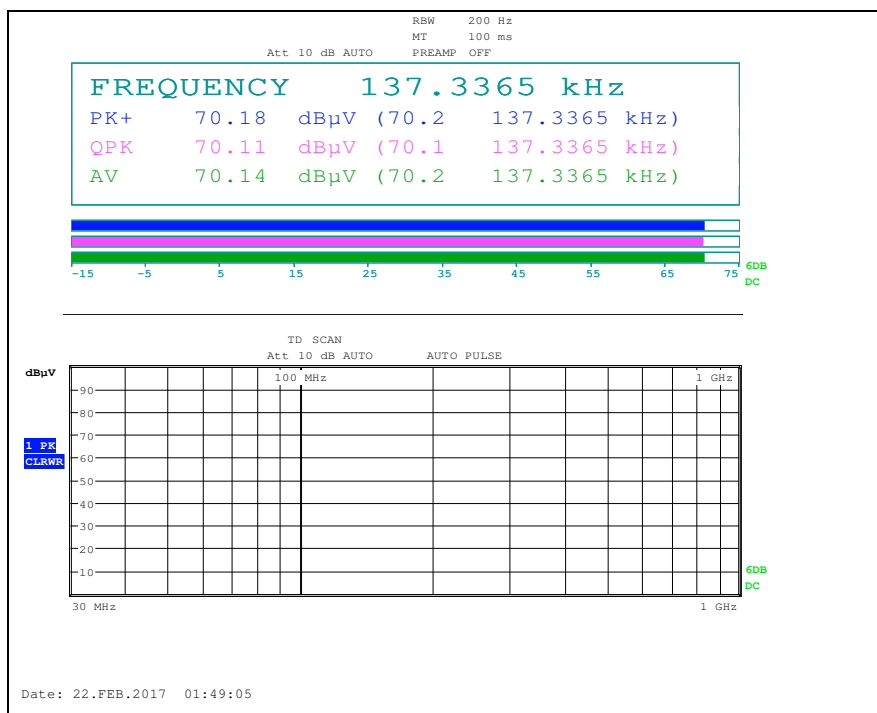
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

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A4(210 mm x 297 mm)

Charging mode (100 % battery status of client device)



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2.5. Spurious Emission Test Result

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

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

Test Mode : Ant1 in DC 5 V condition

Charging mode with client device (less than 1 % battery status)

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m) at 300 m	Margin (dB)
0.105	12.70	Quasi Peak	H	19.60	0.04	32.34	-47.66	27.18	74.84
0.150	19.00	Quasi Peak	H	19.58	0.08	38.66	-41.34	24.08	65.42

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m) at 300 m	Margin (dB)
0.069	22.90	Average	H	19.66	0.03	42.59	-37.41	30.83	68.24
0.346	37.10	Average	H	19.48	0.25	56.83	-23.17	16.82	39.99
Above 0.400	Not detected	-	-	-	-	-	-	-	-

Charging mode with client device (less than 50 % battery status)

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m) at 300 m	Margin (dB)
0.109	15.70	Quasi Peak	H	19.60	0.05	35.35	-44.65	26.86	71.51
0.150	14.90	Quasi Peak	H	19.58	0.08	34.56	-45.44	24.08	69.52

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m) at 300 m	Margin (dB)
0.058	21.20	Average	H	19.68	0.03	40.91	-39.09	32.34	71.43
0.347	39.00	Average	H	19.48	0.25	58.73	-21.27	16.80	38.07
Above 0.400	Not detected	-	-	-	-	-	-	-	-

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Charging mode with client device (100 % battery status)

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m) at 300 m	Margin (dB)
0.109	15.50	Quasi Peak	H	19.60	0.05	35.15	-44.85	26.86	71.71
0.150	21.20	Quasi Peak	H	19.58	0.08	40.86	-39.14	24.08	63.22

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Actual (dB μ V/m) at 300 m	Margin (dB)
0.074	24.80	Average	H	19.65	0.03	44.48	-35.52	30.22	65.74
0.348	37.30	Average	H	19.48	0.25	57.03	-22.97	16.77	39.74
Above 0.400	Not detected	-	-	-	-	-	-	-	-

Note;

- 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)
- According to field strength table of general requirement in §15.209 (a), field strength limits below 1.705 MHz were calculated as below.
- 9 kHz to 490 kHz : 20log(2 400 / F (kHz)) at 300 m (dB μ V/m)
- According to §15.209 (d), the measurements were tested by using Quasi peak detector except for the frequency bands 9 – 90 kHz, 110 – 490 kHz and above 1 GHz in these three bands on measurements employing an average detector.

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Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

Test Mode : Ant2 in DC 5 V condition
Charging mode with client device (less than 1 % battery status)

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m) at 300 m	Margin (dB)
0.109	15.80	Quasi Peak	H	19.60	0.05	35.45	-44.55	26.86	71.41
0.150	17.50	Quasi Peak	H	19.58	0.08	37.16	-42.84	24.08	66.92

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m) at 300 m	Margin (dB)
0.067	21.00	Average	H	19.67	0.03	40.70	-39.30	31.08	70.38
0.347	42.00	Average	H	19.48	0.25	61.73	-18.27	16.80	35.07
Above 0.400	Not detected	-	-	-	-	-	-	-	-

Charging mode with client device (less than 50 % battery status)

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m) at 300 m	Margin (dB)
0.091	20.40	Quasi Peak	H	19.62	0.04	40.06	-39.94	28.42	68.36
0.150	16.70	Quasi Peak	H	19.58	0.08	36.36	-43.64	24.08	67.72

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m) at 300 m	Margin (dB)
0.067	21.00	Average	H	19.67	0.03	40.70	-39.30	31.08	70.38
0.347	41.60	Average	H	19.48	0.25	61.33	-18.67	16.80	35.47
Above 0.400	Not detected	-	-	-	-	-	-	-	-

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Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

Charging mode with client device (100 % battery status)

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m) at 300 m	Margin (dB)
0.091	20.10	Quasi Peak	H	19.62	0.04	39.76	-40.24	28.42	68.66
0.150	16.90	Quasi Peak	H	19.58	0.08	36.56	-43.44	24.08	67.52

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Actual (dB μ V/m) at 300 m	Margin (dB)
0.050	28.10	Average	H	19.70	0.03	47.83	-32.17	33.62	65.79
0.347	43.80	Average	H	19.48	0.25	63.53	-16.47	16.80	33.27
Above 0.400	Not detected	-	-	-	-	-	-	-	-

Note;

- 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)
- According to field strength table of general requirement in §15.209 (a), field strength limits below 1.705 MHz were calculated as below.
- 9 kHz to 490 kHz : 20log(2 400 / F (kHz)) at 300 m (dB μ V/m)
- According to §15.209 (d), the measurements were tested by using Quasi peak detector except for the frequency bands 9 – 90 kHz, 110 – 490 kHz and above 1 GHz in these three bands on measurements employing an average detector.

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Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

Test Mode : Ant3 in DC 5 V condition
Charging mode with client device (less than 1 % battery status)

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m) at 300 m	Margin (dB)
0.105	14.70	Quasi Peak	H	19.60	0.04	34.34	-45.66	27.18	72.84
0.150	27.20	Quasi Peak	H	19.58	0.08	46.86	-33.14	24.08	57.22

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m) at 300 m	Margin (dB)
0.051	32.80	Average	H	19.70	0.03	52.53	-27.47	33.45	60.92
0.384	44.70	Average	H	19.46	0.29	64.45	-15.55	15.92	31.47
Above 0.400	Not detected	-	-	-	-	-	-	-	-

Charging mode with client device (less than 50 % battery status)

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m) at 300 m	Margin (dB)
0.092	19.20	Quasi Peak	H	19.62	0.04	38.86	-41.14	28.33	69.47
0.150	22.30	Quasi Peak	H	19.58	0.08	41.96	-38.04	24.08	62.12

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m) at 300 m	Margin (dB)
0.051	33.10	Average	H	19.70	0.03	52.83	-27.17	33.45	60.62
0.385	44.50	Average	H	19.46	0.29	64.25	-15.75	15.90	31.65
Above 0.400	Not detected	-	-	-	-	-	-	-	-

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RTT5041-20(2015.10.01)(3)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

Charging mode with client device (100 % battery status)

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m) at 300 m	Margin (dB)
0.092	18.20	Quasi Peak	H	19.62	0.04	37.86	-42.14	28.33	70.47
0.150	22.20	Quasi Peak	H	19.58	0.08	41.86	-38.14	24.08	62.22

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Actual (dB μ V/m) at 300 m	Margin (dB)
0.067	22.00	Average	H	19.67	0.03	41.70	-38.30	31.08	69.38
0.384	42.83	Average	H	19.46	0.29	62.58	-17.42	15.92	33.34
Above 0.400	Not detected	-	-	-	-	-	-	-	-

Note;

- 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)
- According to field strength table of general requirement in §15.209 (a), field strength limits below 1.705 MHz were calculated as below.
- 9 kHz to 490 kHz : 20log(2 400 / F (kHz)) at 300 m (dB μ V/m)
- According to §15.209 (d), the measurements were tested by using Quasi peak detector except for the frequency bands 9 – 90 kHz, 110 – 490 kHz and above 1 GHz in these three bands on measurements employing an average detector.

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Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

Test Mode : Ant1 in DC 9 V condition
Charging mode with client device (less than 1 % battery status)

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m) at 300 m	Margin (dB)
0.096	22.90	Quasi Peak	H	19.61	0.04	42.55	-37.45	27.96	65.41
0.150	33.50	Quasi Peak	H	19.58	0.08	53.16	-26.84	24.08	50.92

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m) at 300 m	Margin (dB)
0.081	16.70	Average	H	19.64	0.04	36.38	-43.62	29.43	73.05
0.394	46.10	Average	H	19.45	0.29	65.84	-14.16	15.69	29.85
Above 0.400	Not detected	-	-	-	-	-	-	-	-

Charging mode with client device (less than 50 % battery status)

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m) at 300 m	Margin (dB)
0.107	14.80	Quasi Peak	H	19.60	0.05	34.45	-45.55	27.02	72.57
0.150	37.50	Quasi Peak	H	19.58	0.08	57.16	-22.84	24.08	46.92

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m) at 300 m	Margin (dB)
0.081	14.90	Average	H	19.64	0.04	34.58	-45.42	29.43	74.85
0.394	46.10	Average	H	19.45	0.29	65.84	-14.16	15.69	29.85
Above 0.400	Not detected	-	-	-	-	-	-	-	-

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RTT5041-20(2015.10.01)(3)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

Charging mode with client device (100 % battery status)

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m) at 300 m	Margin (dB)
0.093	13.00	Quasi Peak	H	19.61	0.04	32.65	-47.35	28.23	75.58
0.150	38.70	Quasi Peak	H	19.58	0.08	58.36	-21.64	24.08	45.72

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Actual (dB μ V/m) at 300 m	Margin (dB)
0.067	22.10	Average	H	19.67	0.03	41.80	-38.20	31.08	69.28
0.394	46.00	Average	H	19.45	0.29	65.74	-14.26	15.69	29.95
Above 0.400	Not detected	-	-	-	-	-	-	-	-

Note;

- 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)
- According to field strength table of general requirement in §15.209 (a), field strength limits below 1.705 MHz were calculated as below.
- 9 kHz to 490 kHz : 20log(2 400 / F (kHz)) at 300 m (dB μ V/m)
- According to §15.209 (d), the measurements were tested by using Quasi peak detector except for the frequency bands 9 – 90 kHz, 110 – 490 kHz and above 1 GHz in these three bands on measurements employing an average detector.

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RTT5041-20(2015.10.01)(3)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

Test Mode : Ant2 in DC 9 V condition
Charging mode with client device (less than 1 % battery status)

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m) at 300 m	Margin (dB)
0.109	22.40	Quasi Peak	H	19.60	0.05	42.05	-37.95	26.86	64.81
0.150	34.30	Quasi Peak	H	19.58	0.08	53.96	-26.04	24.08	50.12

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m) at 300 m	Margin (dB)
0.081	22.30	Average	H	19.64	0.04	41.98	-38.02	29.43	67.45
0.394	49.10	Average	H	19.45	0.29	68.84	-11.16	15.69	26.85
Above 0.400	Not detected	-	-	-	-	-	-	-	-

Charging mode with client device (less than 50 % battery status)

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m) at 300 m	Margin (dB)
0.093	14.70	Quasi Peak	H	19.61	0.04	34.35	-45.65	28.23	73.88
0.150	28.80	Quasi Peak	H	19.58	0.08	48.46	-31.54	24.08	55.62

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m) at 300 m	Margin (dB)
0.083	23.20	Average	H	19.63	0.04	42.87	-37.13	29.22	66.35
0.394	48.90	Average	H	19.45	0.29	68.64	-11.36	15.69	27.05
Above 0.400	Not detected	-	-	-	-	-	-	-	-

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Charging mode with client device (100 % battery status)

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m) at 300 m	Margin (dB)
0.091	14.60	Quasi Peak	H	19.62	0.04	34.26	-45.74	28.42	74.16
0.150	28.80	Quasi Peak	H	19.58	0.08	48.46	-31.54	24.08	55.62

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Actual (dB μ V/m) at 300 m	Margin (dB)
0.084	25.70	Average	H	19.63	0.04	45.37	-34.63	29.12	63.75
0.394	49.20	Average	H	19.45	0.29	68.94	-11.06	15.69	26.75
Above 0.400	Not detected	-	-	-	-	-	-	-	-

Note;

- 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)
- According to field strength table of general requirement in §15.209 (a), field strength limits below 1.705 MHz were calculated as below.
- 9 kHz to 490 kHz : 20log(2 400 / F (kHz)) at 300 m (dB μ V/m)
- According to §15.209 (d), the measurements were tested by using Quasi peak detector except for the frequency bands 9 – 90 kHz, 110 – 490 kHz and above 1 GHz in these three bands on measurements employing an average detector.

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RTT5041-20(2015.10.01)(3)

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A4(210 mm x 297 mm)

Test Mode : Ant3 in DC 9 V condition
Charging mode with client device (less than 1 % battery status)

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m) at 300 m	Margin (dB)
0.093	16.30	Quasi Peak	H	19.61	0.04	35.95	-44.05	28.23	72.28
0.150	22.00	Quasi Peak	H	19.58	0.08	41.66	-38.34	24.08	62.42

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m) at 300 m	Margin (dB)
0.067	22.10	Average	H	19.67	0.03	41.80	-38.20	31.08	69.28
0.412	52.80	Average	H	19.44	0.31	72.55	-7.45	15.31	22.76
Above 0.500	Not detected	-	-	-	-	-	-	-	-

Charging mode with client device (less than 50 % battery status)

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m) at 300 m	Margin (dB)
0.093	16.60	Quasi Peak	H	19.61	0.04	36.25	-43.75	28.23	71.98
0.150	31.20	Quasi Peak	H	19.58	0.08	50.86	-29.14	24.08	53.22

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m) at 300 m	Margin (dB)
0.067	22.40	Average	H	19.67	0.03	42.10	-37.90	31.08	68.98
0.412	52.60	Average	H	19.44	0.31	72.35	-7.65	15.31	22.96
Above 0.500	Not detected	-	-	-	-	-	-	-	-

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Charging mode with client device (100 % battery status)

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Limit (dB μ V/m) at 300 m	Margin (dB)
0.097	17.40	Quasi Peak	H	19.61	0.04	37.05	-42.95	27.87	70.82
0.149	31.60	Quasi Peak	H	19.58	0.08	51.26	-28.74	24.14	52.88

Radiated Emissions			Ant.	Correction Factors		Total		Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	Ant. (dB/m)	Cable (dB)	Actual (dB μ V/m) at 3 m	Actual (dB μ V/m) at 300 m	Actual (dB μ V/m) at 300 m	Margin (dB)
0.067	22.70	Average	H	19.67	0.03	42.40	-37.60	31.08	68.68
0.412	52.40	Average	H	19.44	0.31	72.15	-7.85	15.31	23.16
Above 0.500	Not detected	-	-	-	-	-	-	-	-

Note;

- 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)
- According to field strength table of general requirement in §15.209 (a), field strength limits below 1.705 MHz were calculated as below.
- 9 kHz to 490 kHz : 20log(2 400 / F (kHz)) at 300 m (dB μ V/m)
- According to §15.209 (d), the measurements were tested by using Quasi peak detector except for the frequency bands 9 – 90 kHz, 110 – 490 kHz and above 1 GHz in these three bands on measurements employing an average detector.

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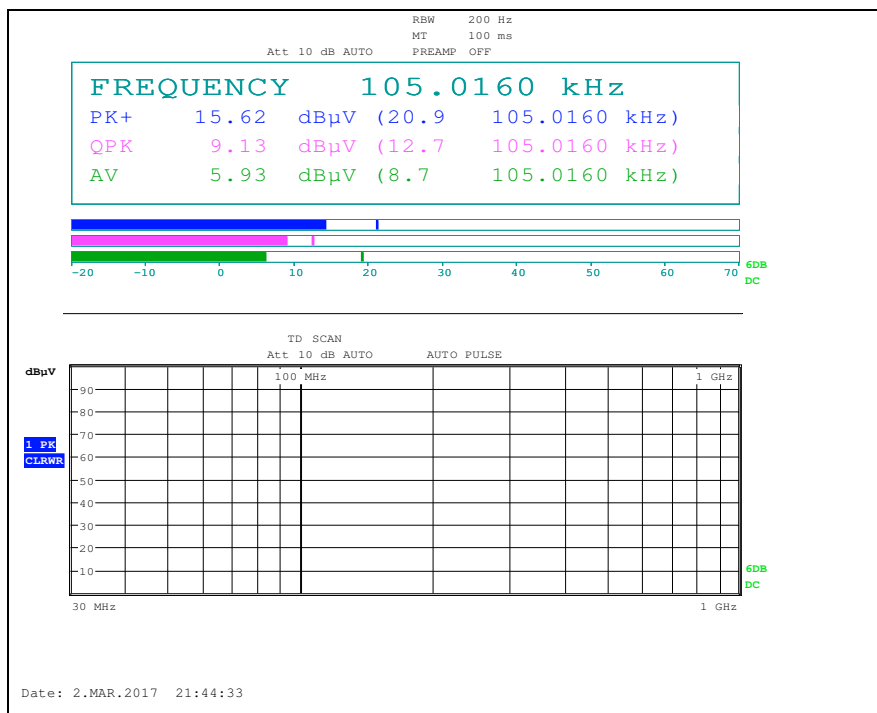
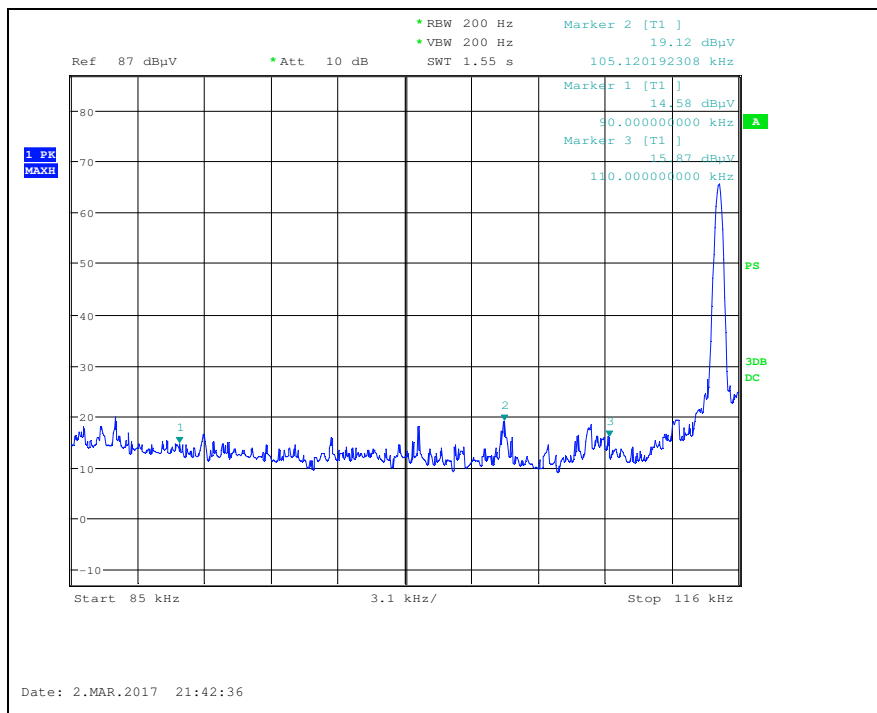
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A4(210 mm x 297 mm)

Test plots (Band Edge)

Test Mode : Ant1 in DC 5 V condition

Charging mode (less than 1 % battery status of client device)



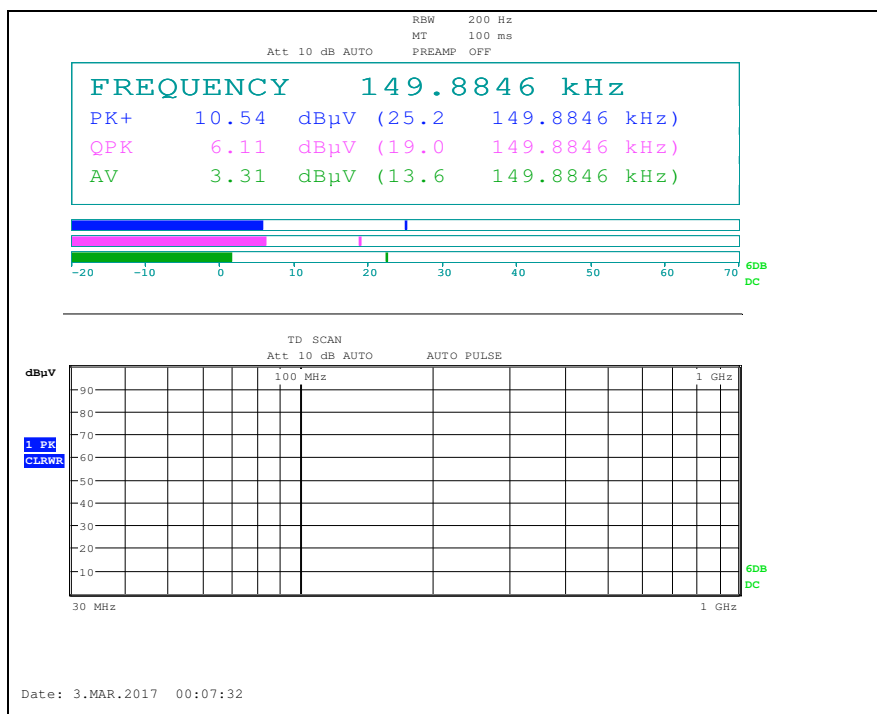
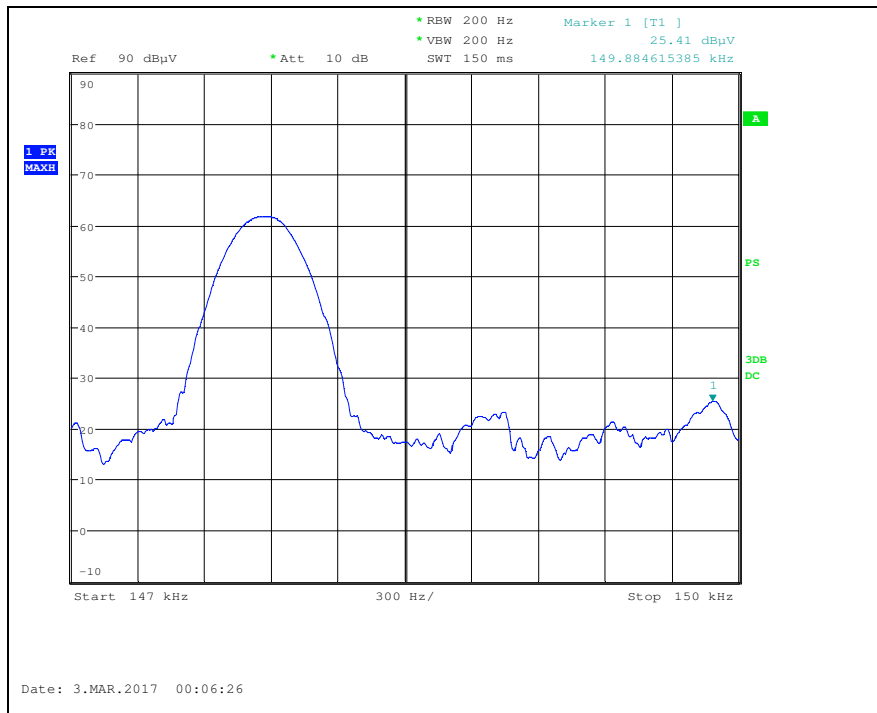
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A4(210 mm x 297 mm)



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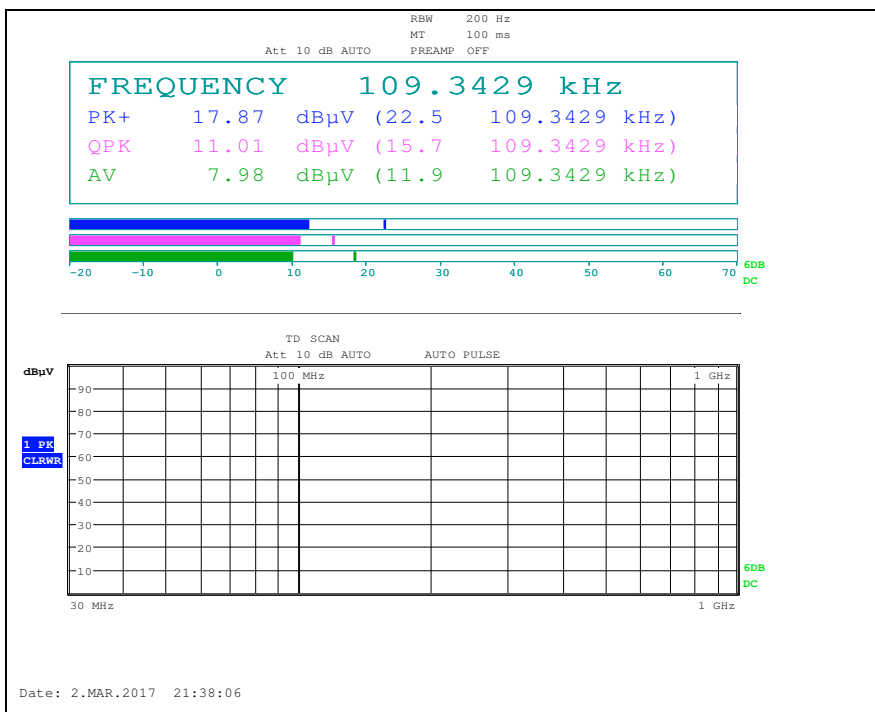
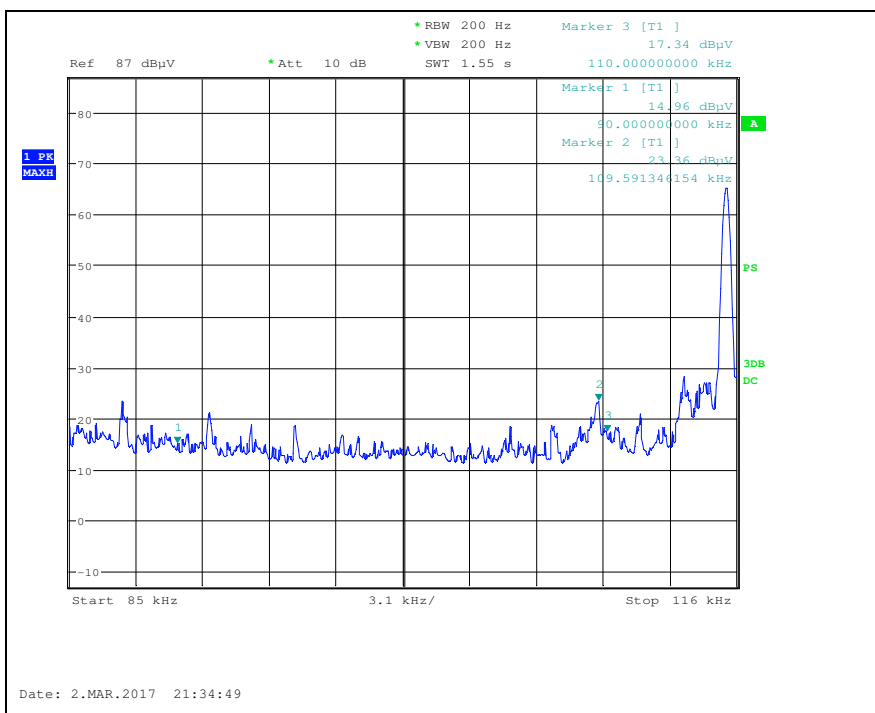
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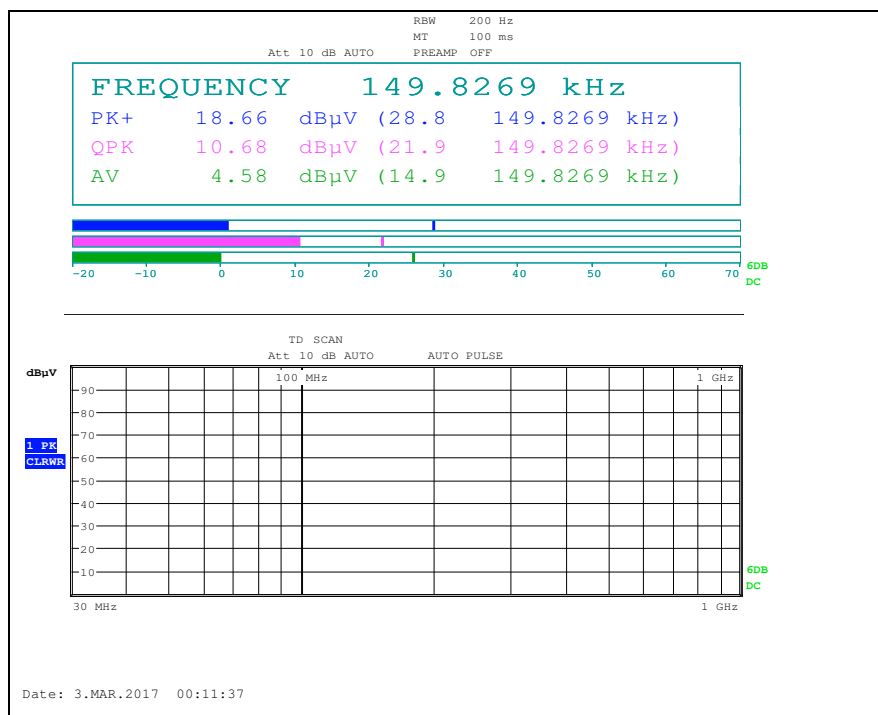
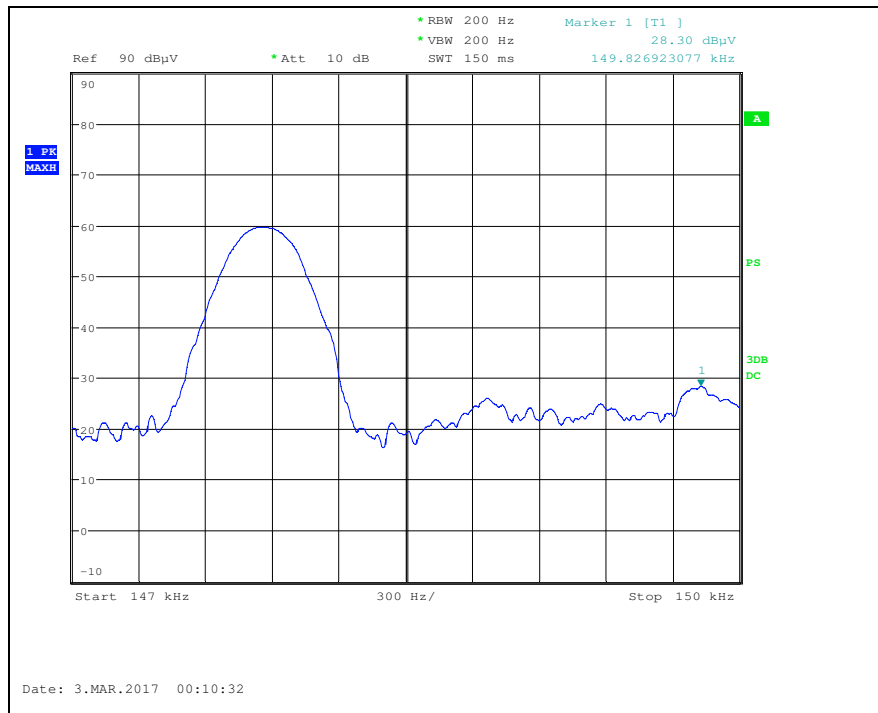
A4(210 mm x 297 mm)

Charging mode (less than 50 % battery status of client device)



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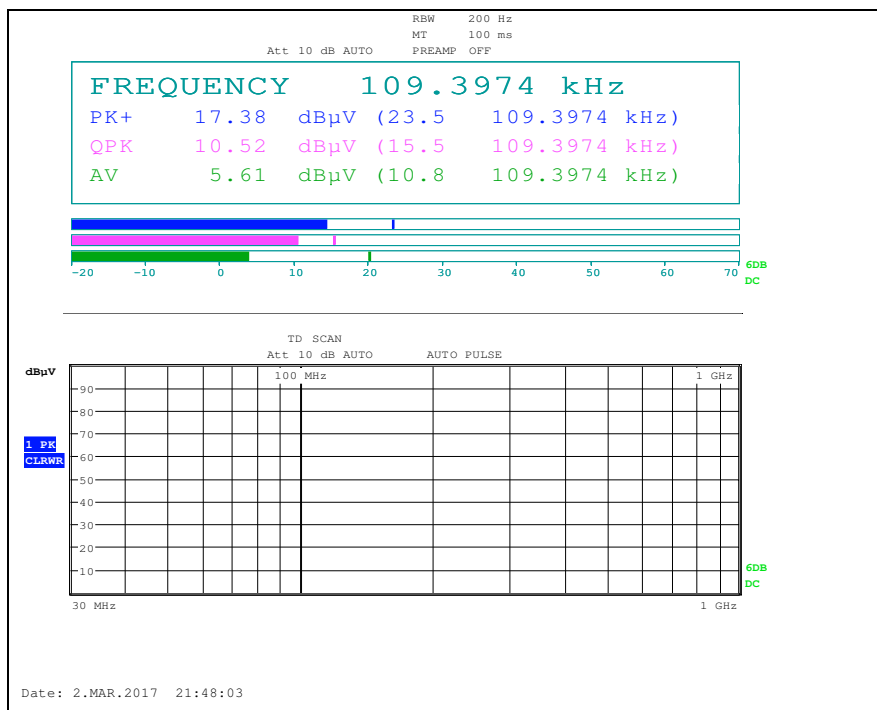
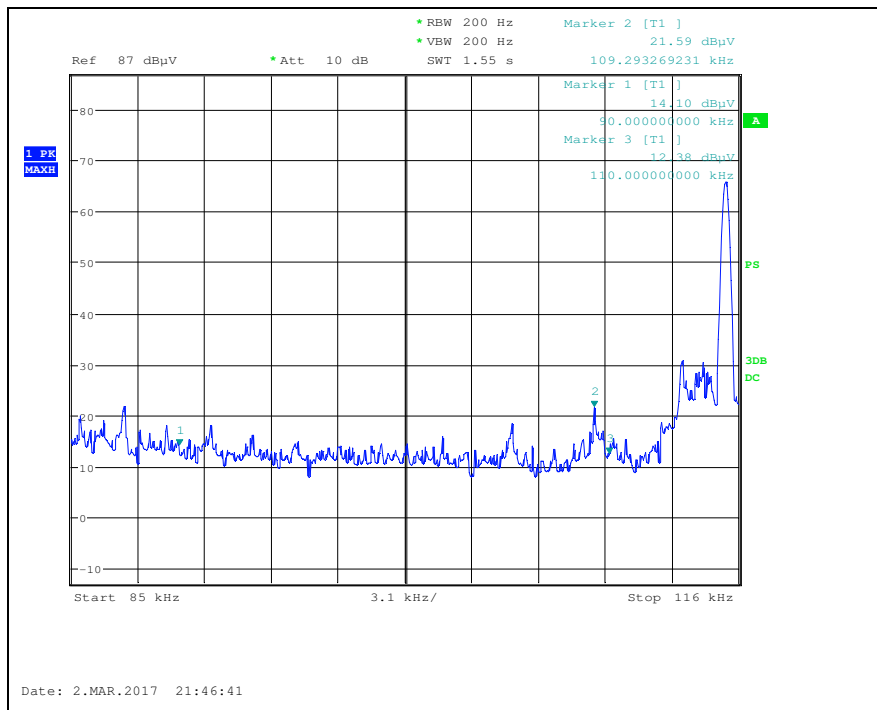
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A4(210 mm x 297 mm)

Charging mode (less than 100 % battery status of client device)



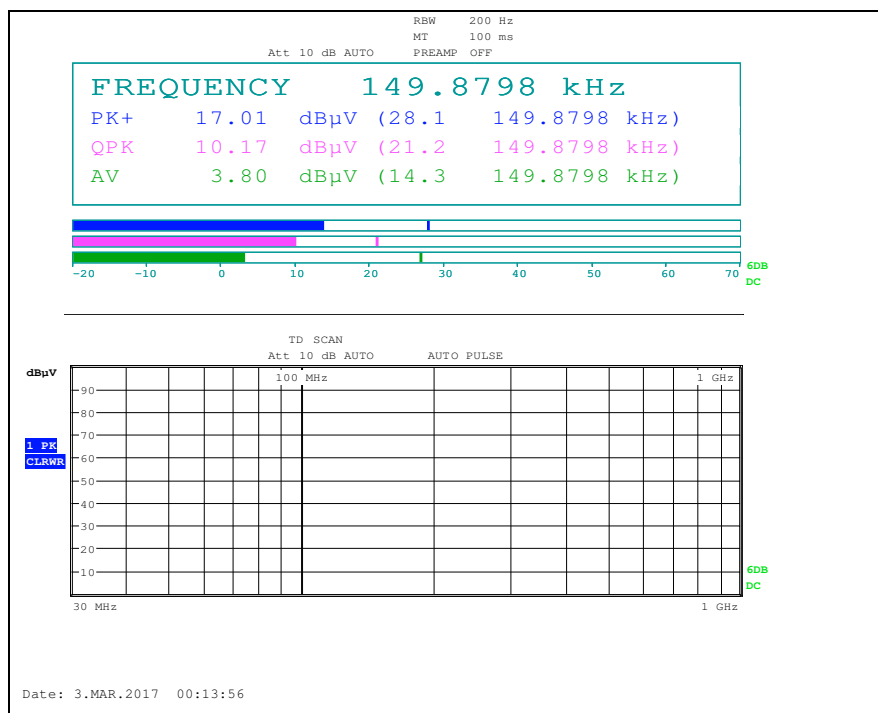
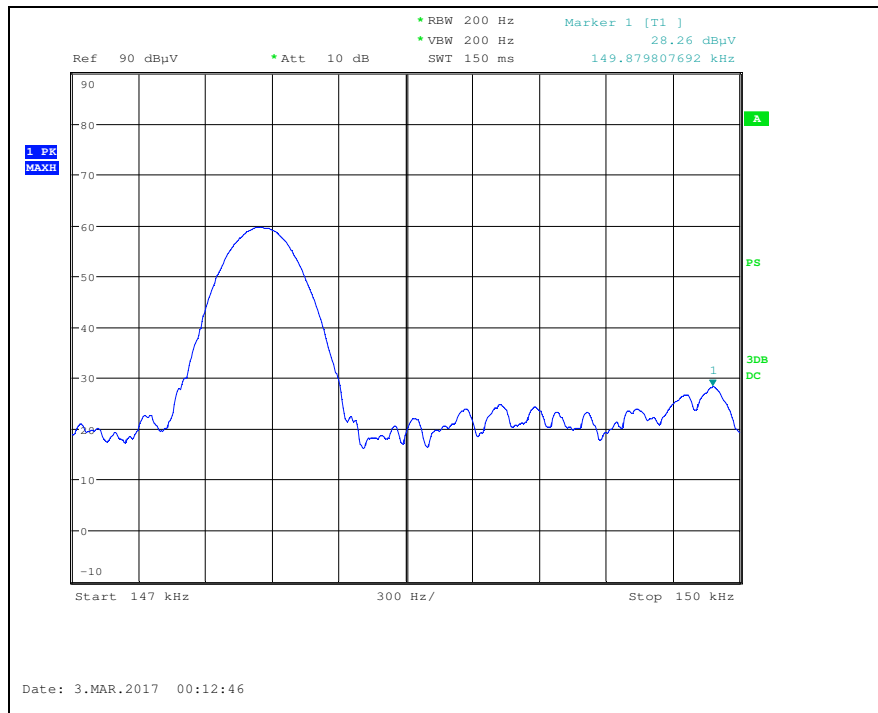
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A4(210 mm x 297 mm)



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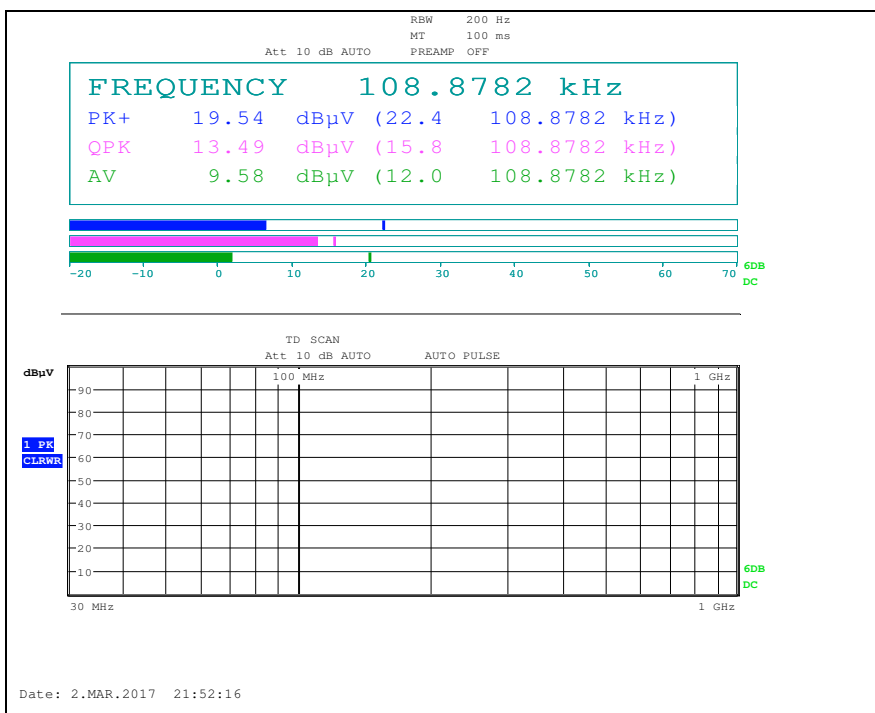
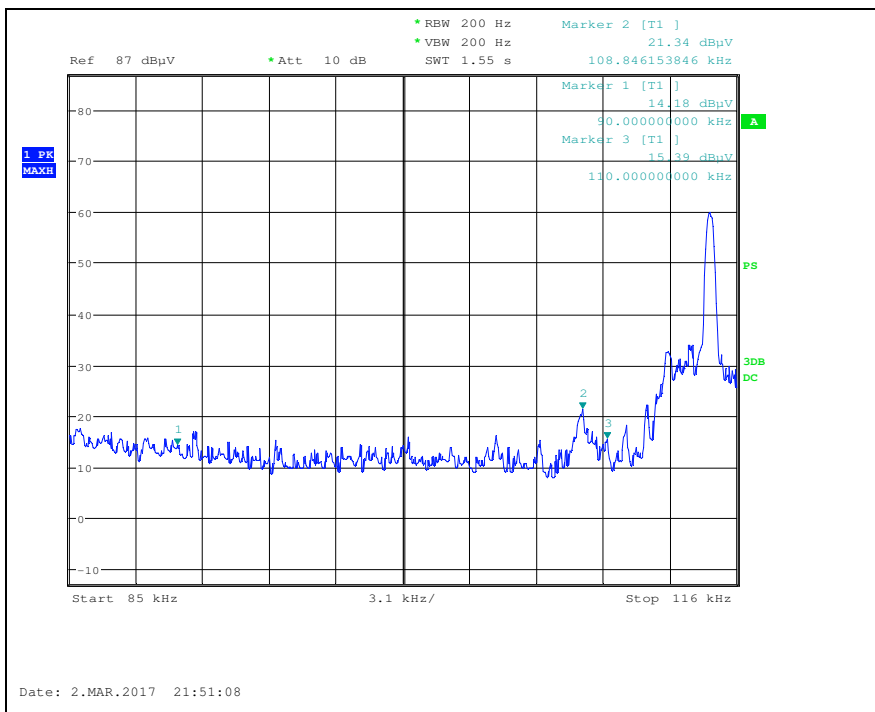
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A4(210 mm x 297 mm)

Test Mode : Ant2 in DC 5 V condition
Charging mode (less than 1 % battery status of client device)



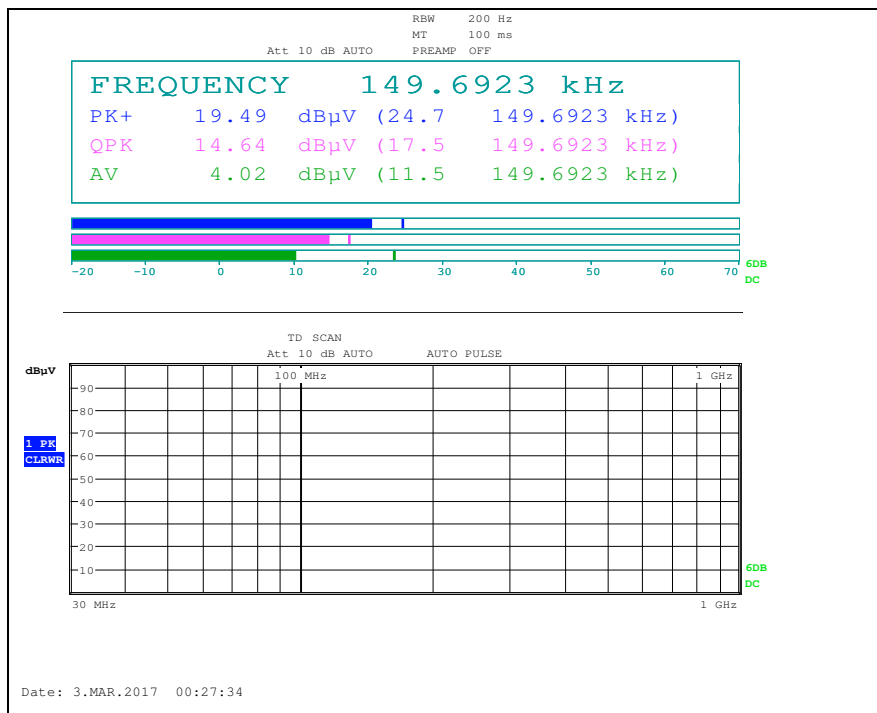
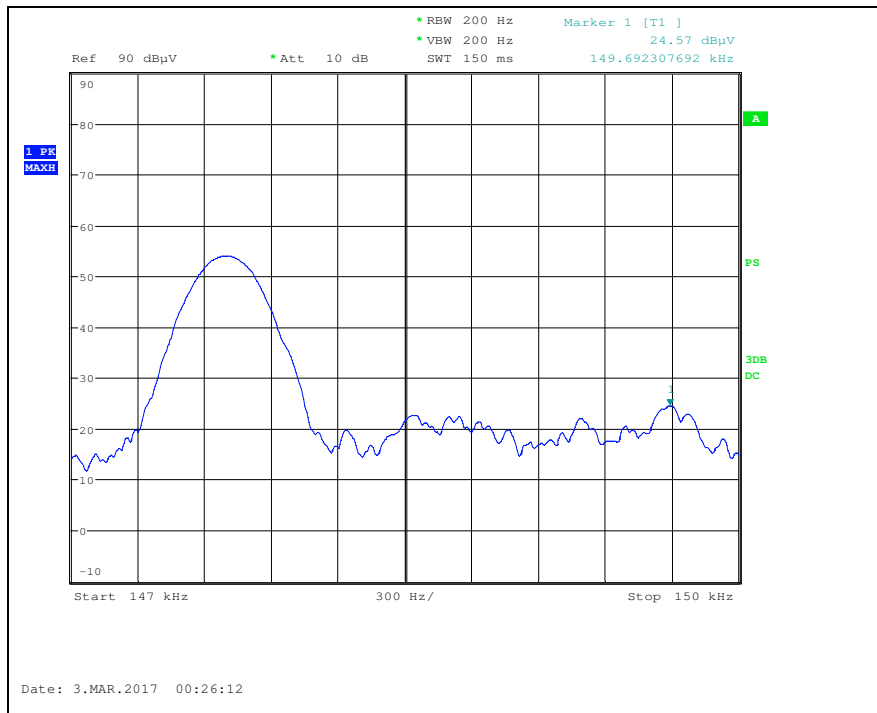
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A4(210 mm x 297 mm)



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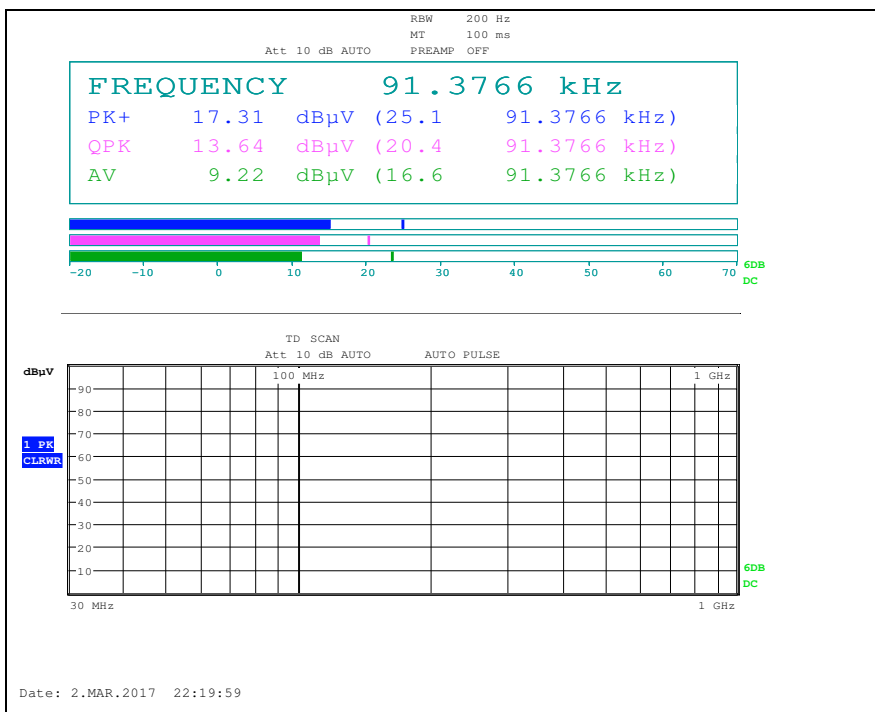
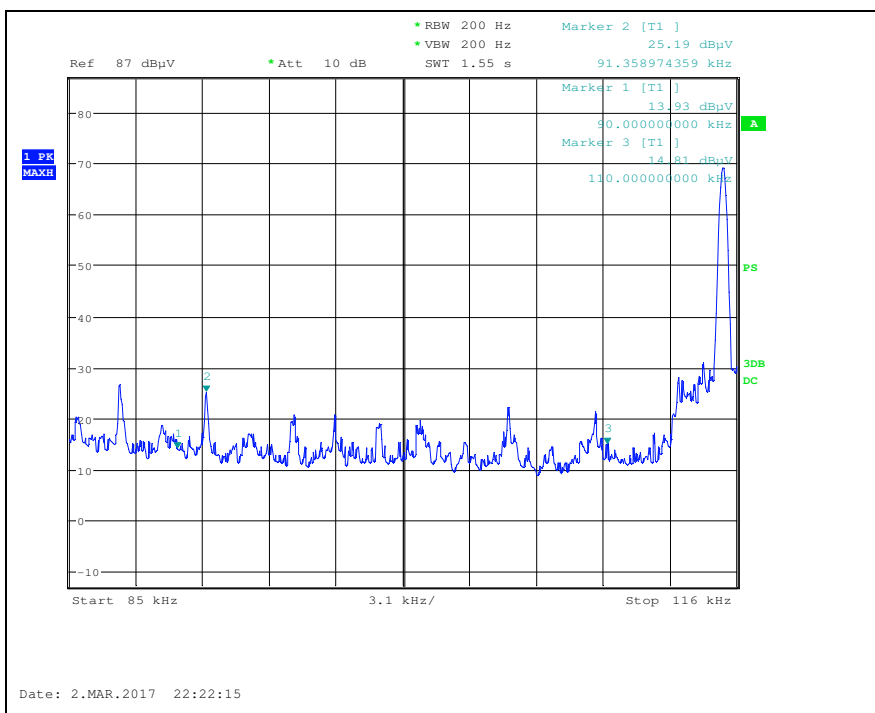
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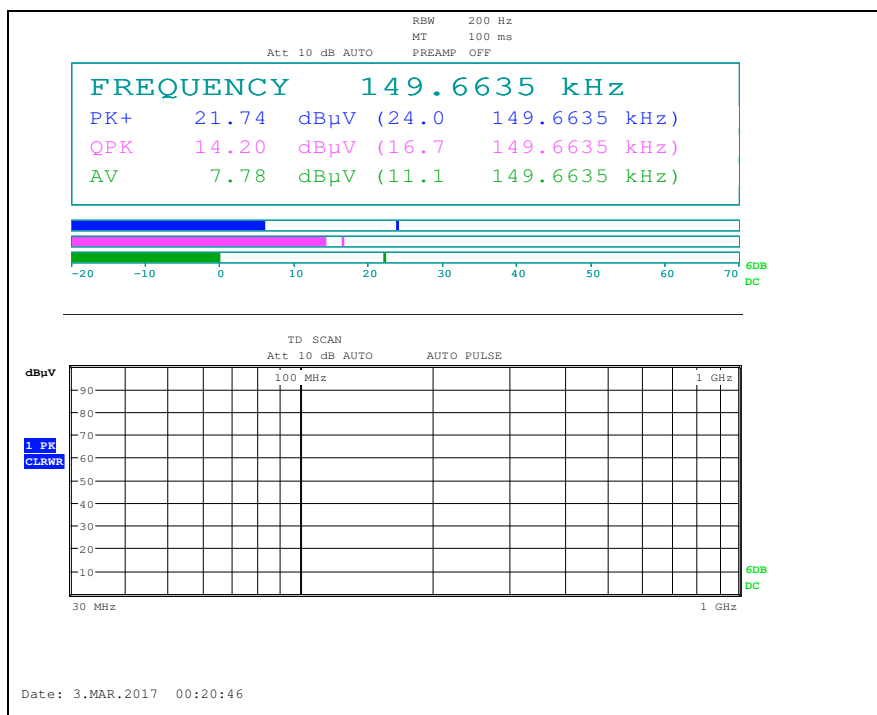
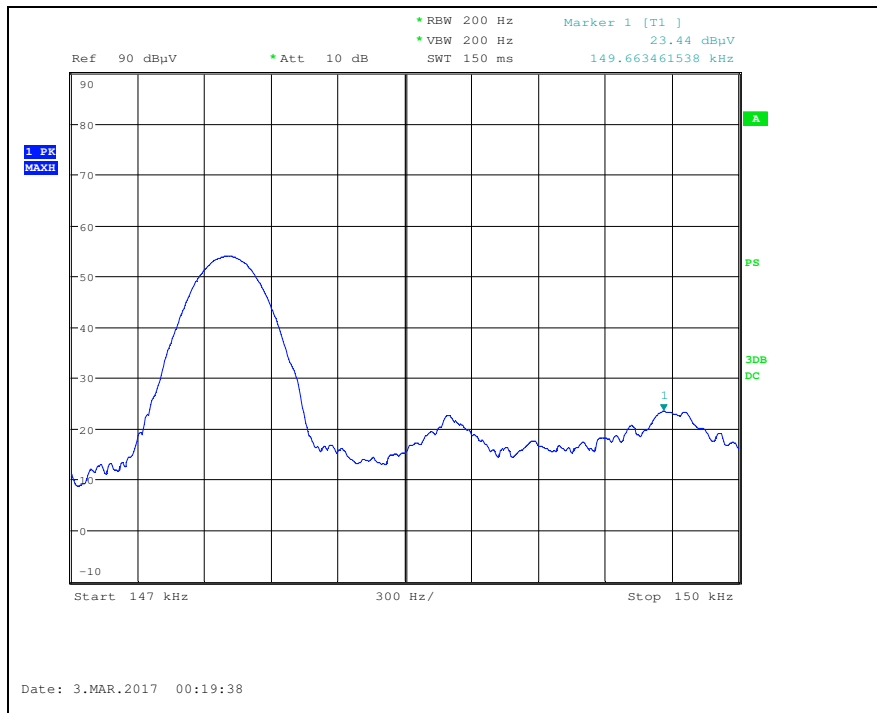
A4(210 mm x 297 mm)

Charging mode (less than 50 % battery status of client device)



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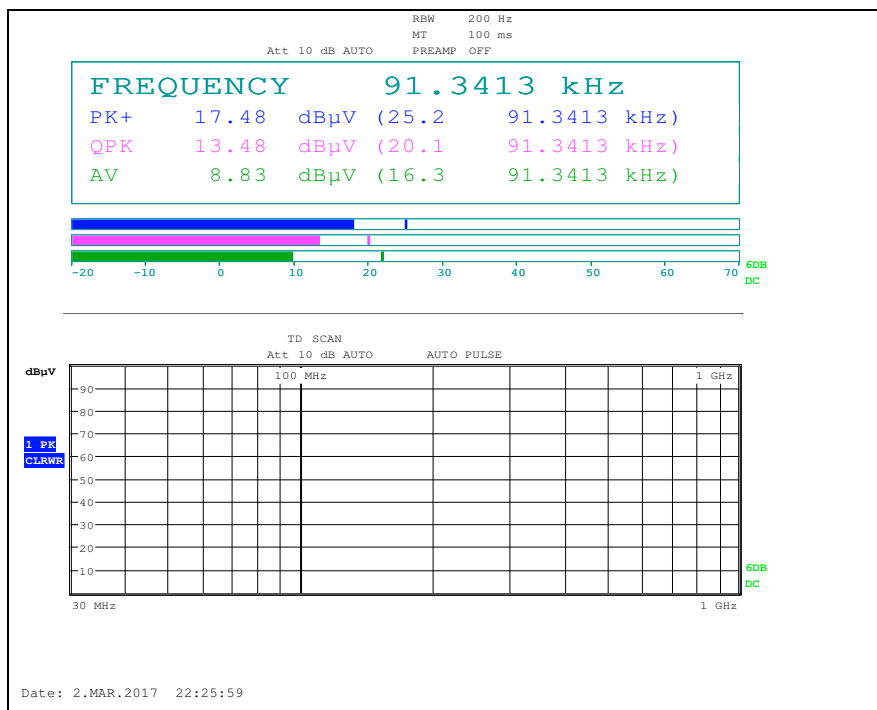
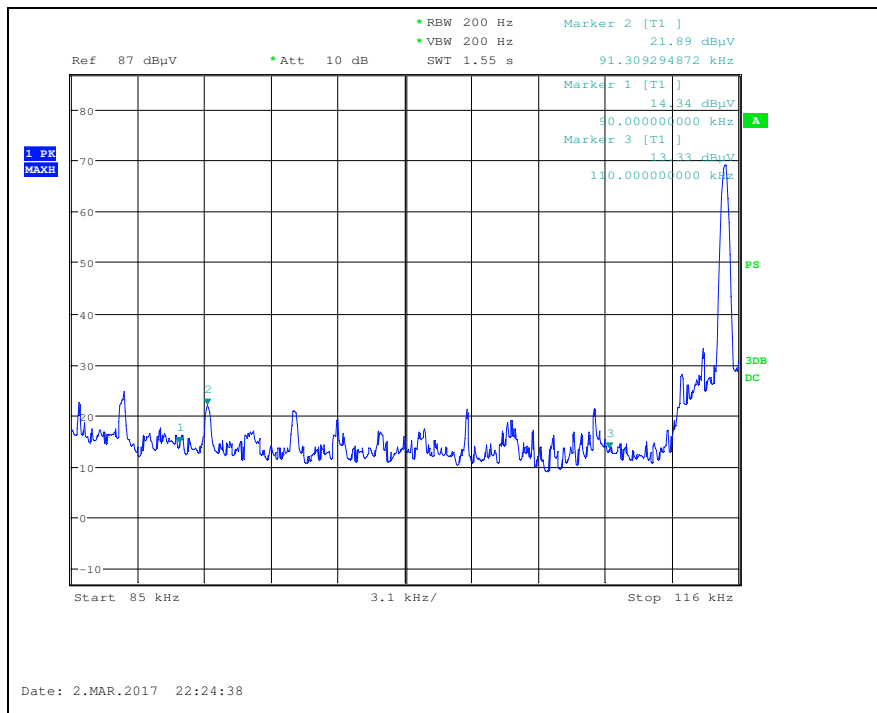
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A4(210 mm x 297 mm)

Charging mode (less than 100 % battery status of client device)



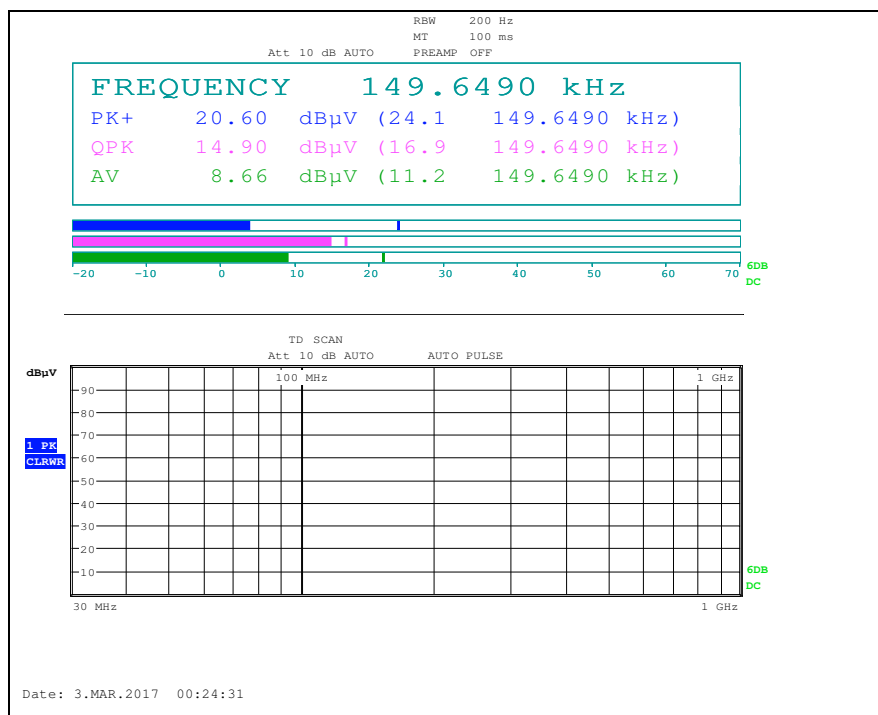
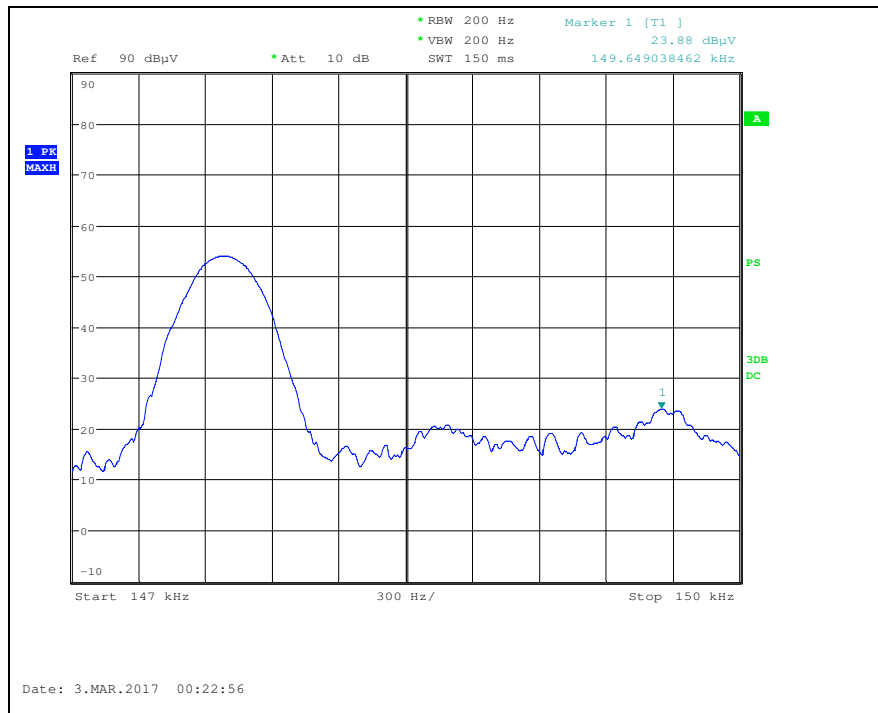
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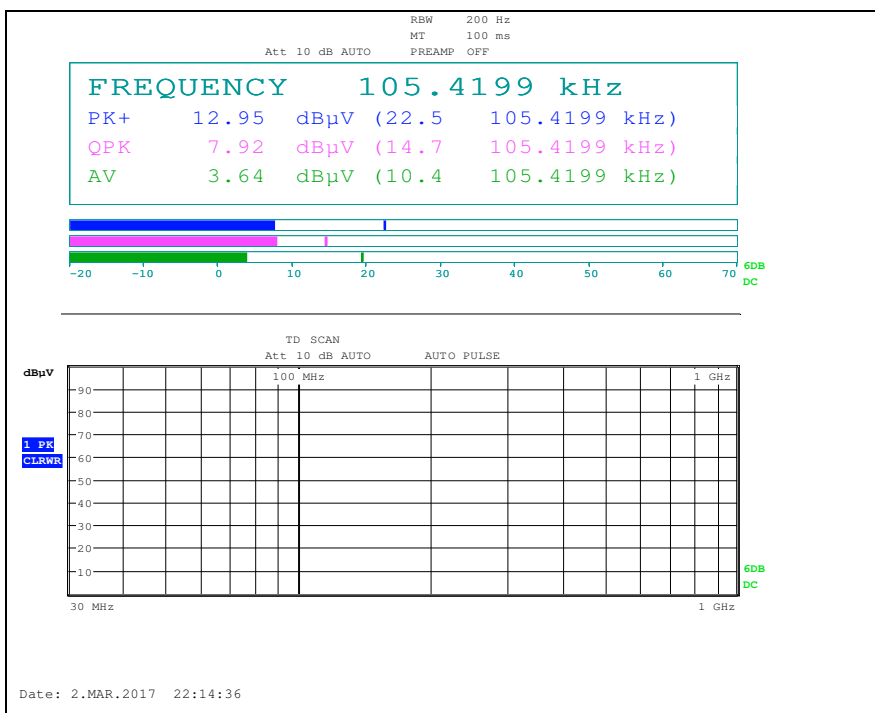
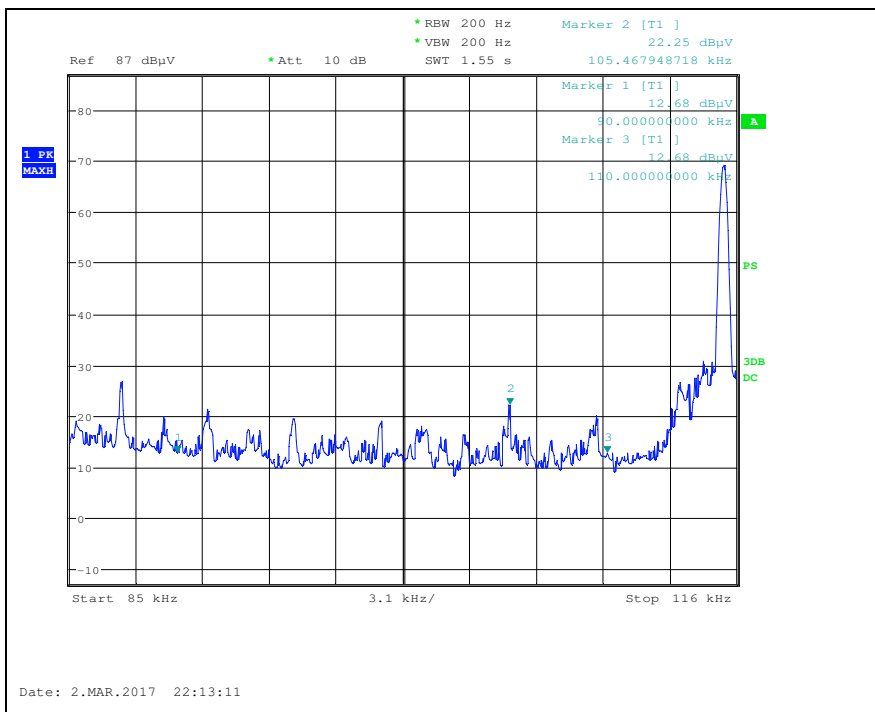
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A4(210 mm x 297 mm)



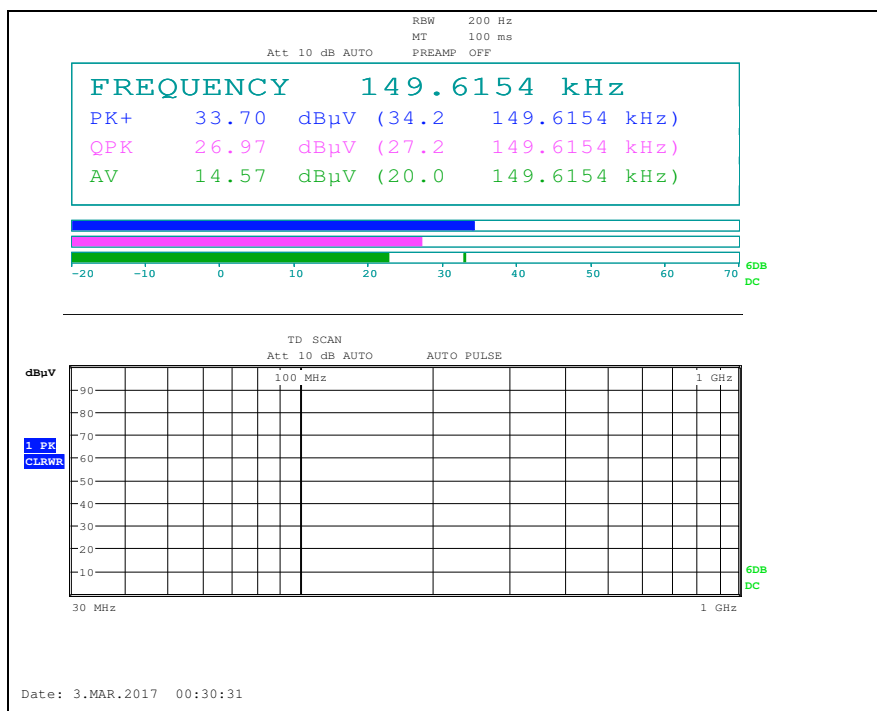
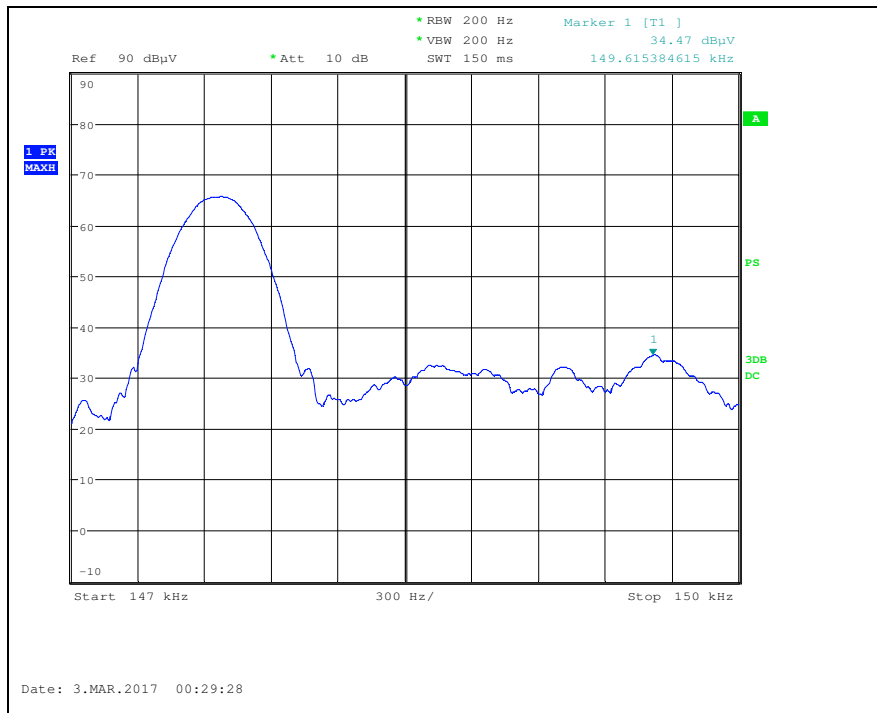
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Test Mode : Ant3 in DC 5 V condition
Charging mode (less than 1 % battery status of client device)



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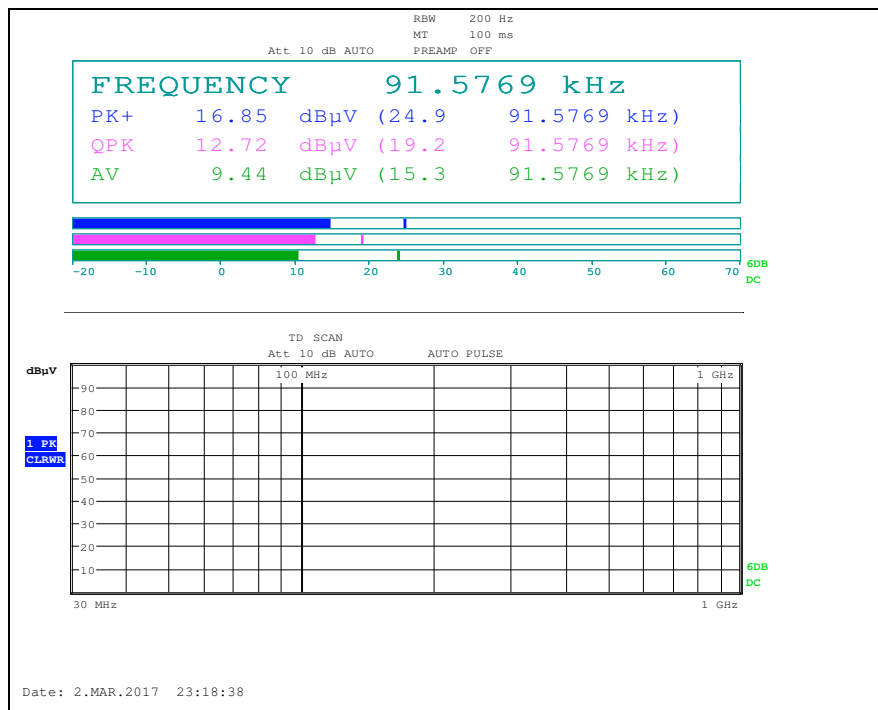
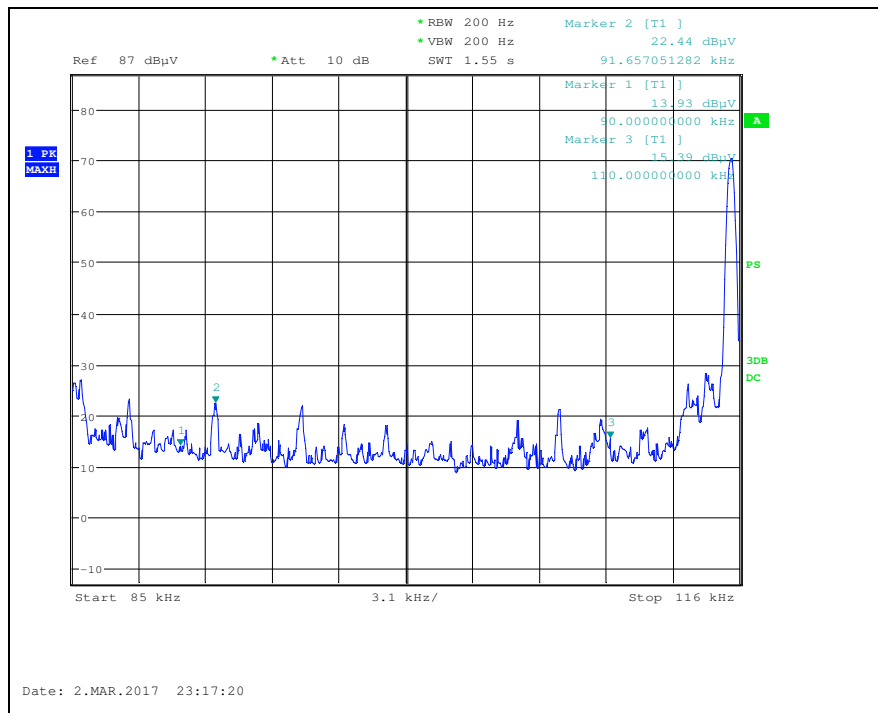
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A4(210 mm x 297 mm)

Charging mode (less than 50 % battery status of client device)



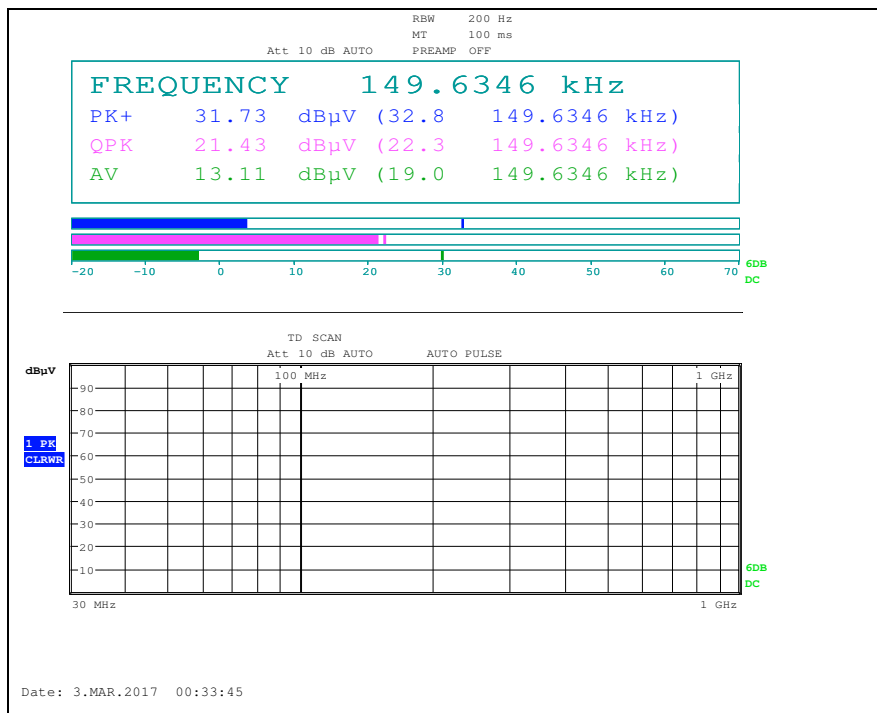
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A4(210 mm x 297 mm)



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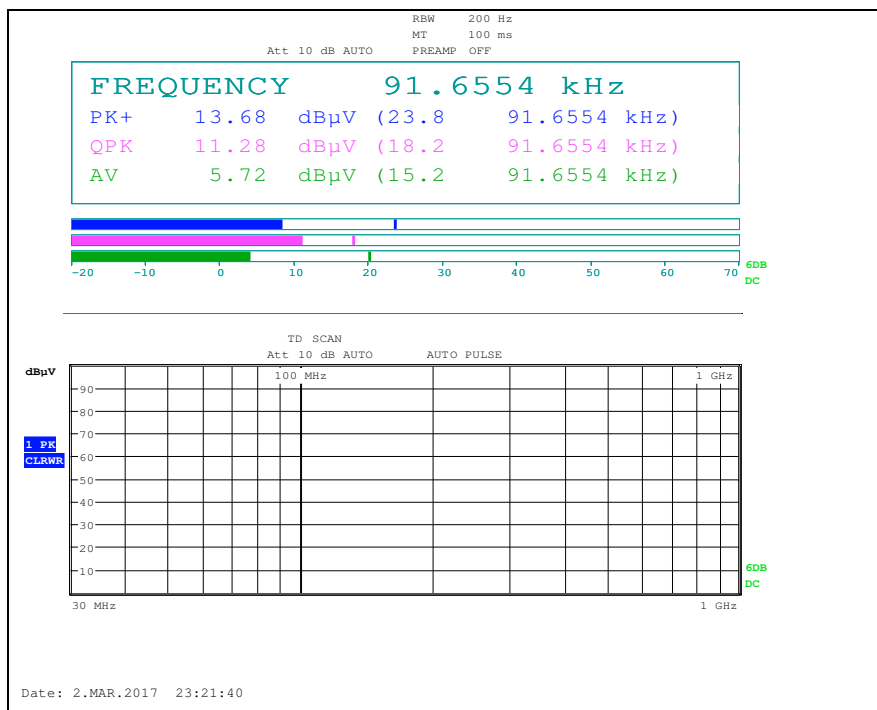
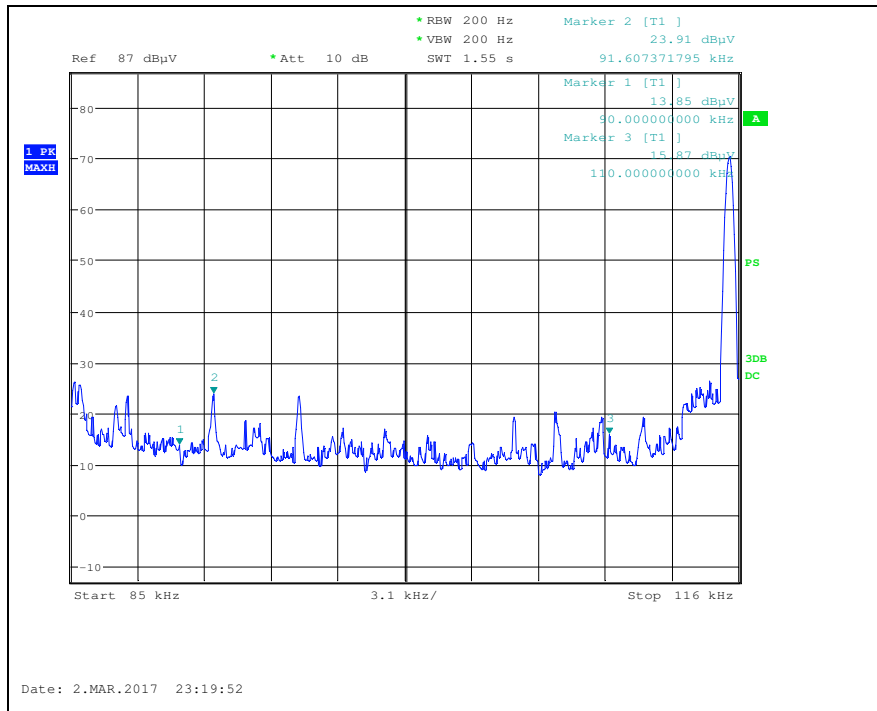
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A4(210 mm x 297 mm)

Charging mode (100% battery status of client device)



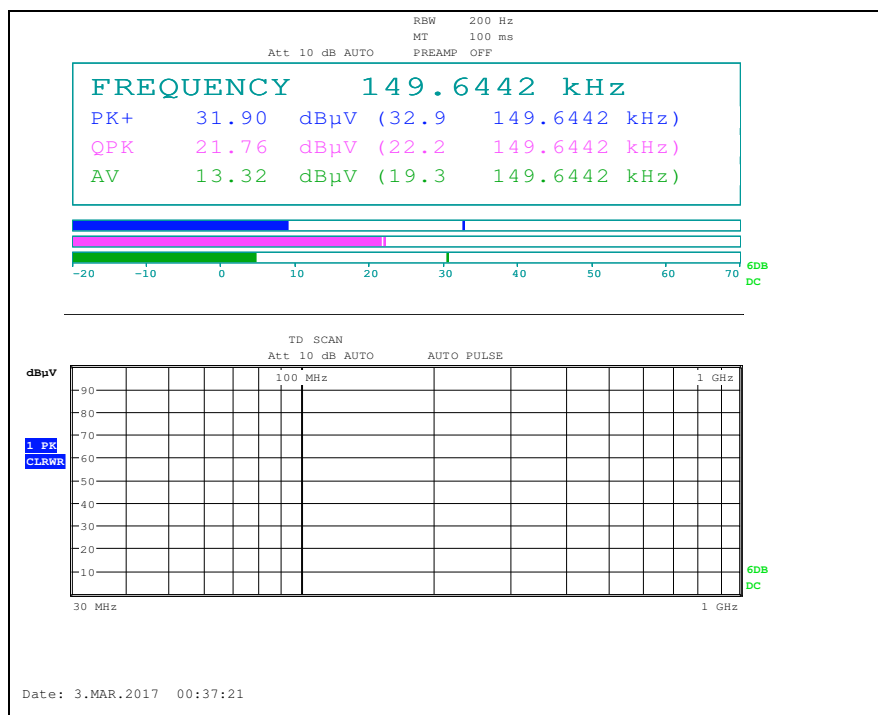
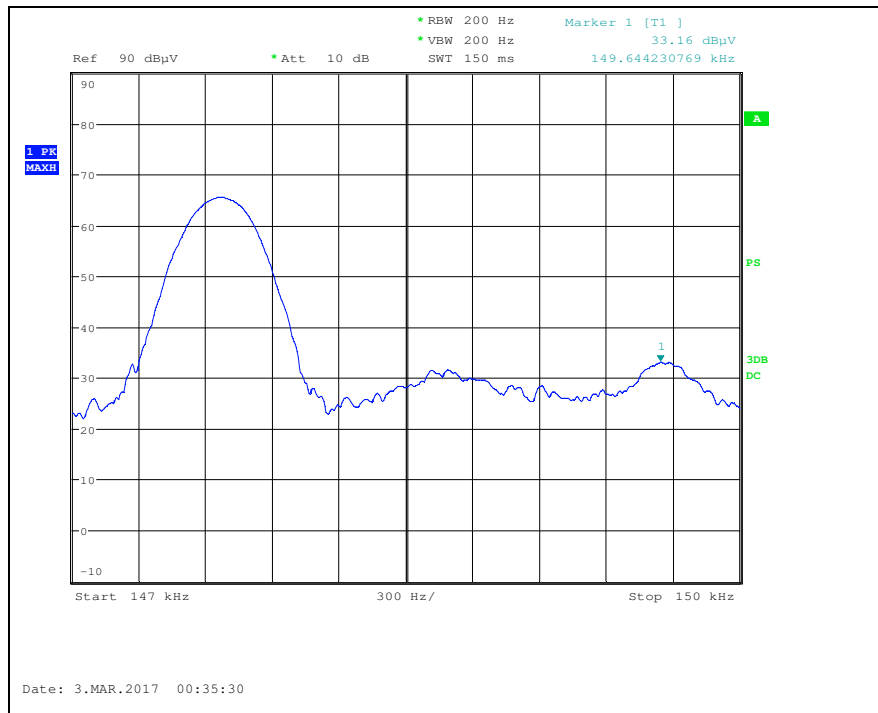
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RTT5041-20(2015.10.01)(3)

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A4(210 mm x 297 mm)



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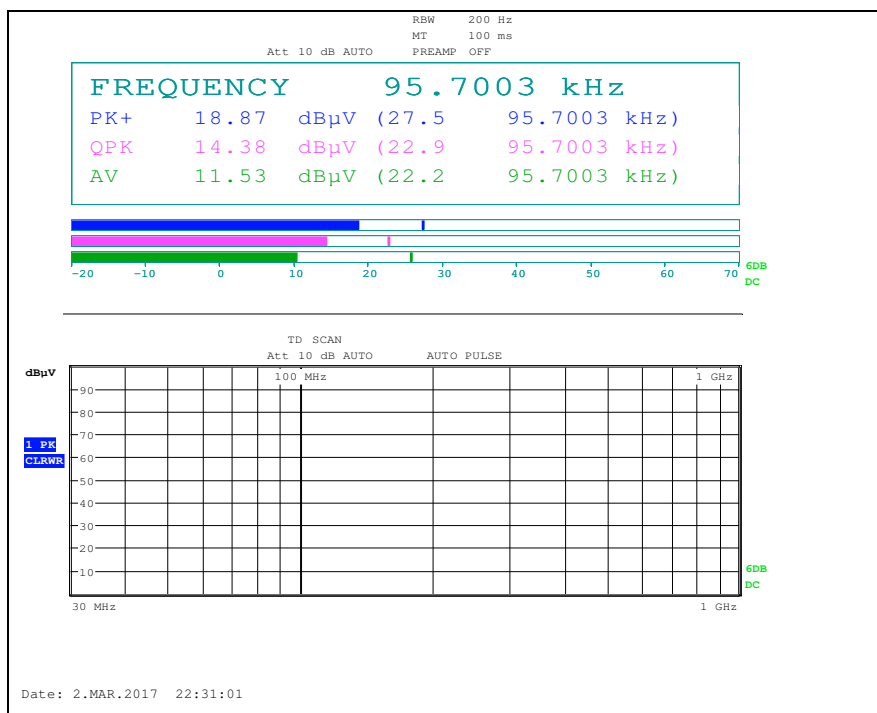
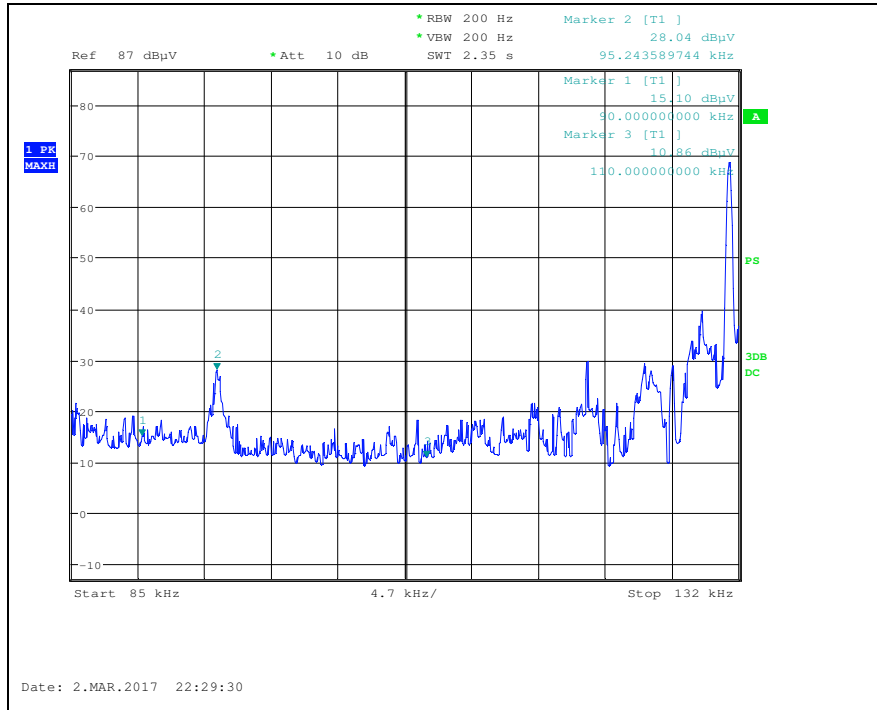
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

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A4(210 mm x 297 mm)

Test Mode : Ant1 in DC 9 V condition
Charging mode (less than 1 % battery status of client device)



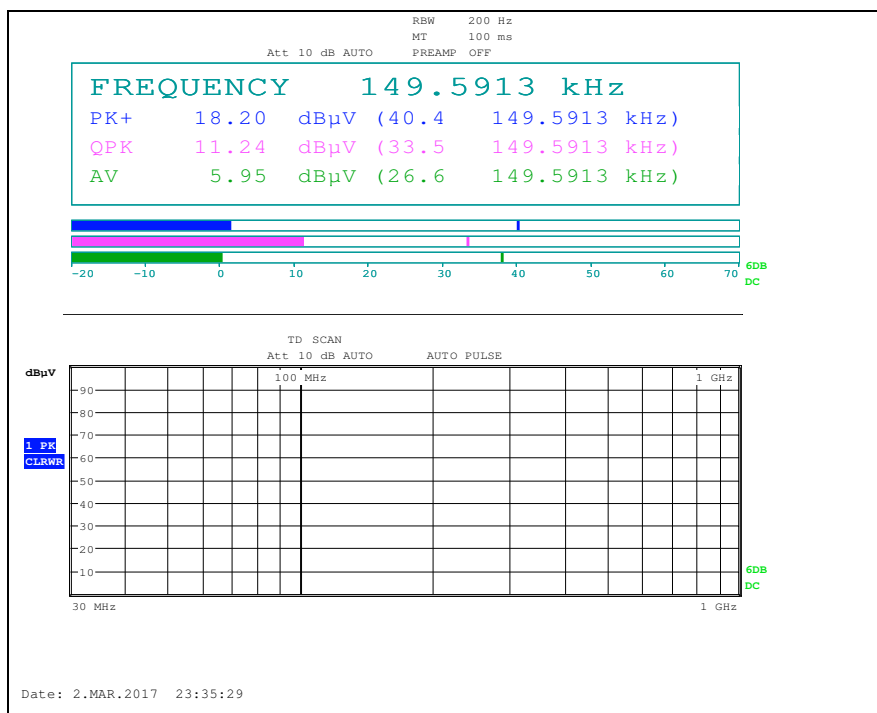
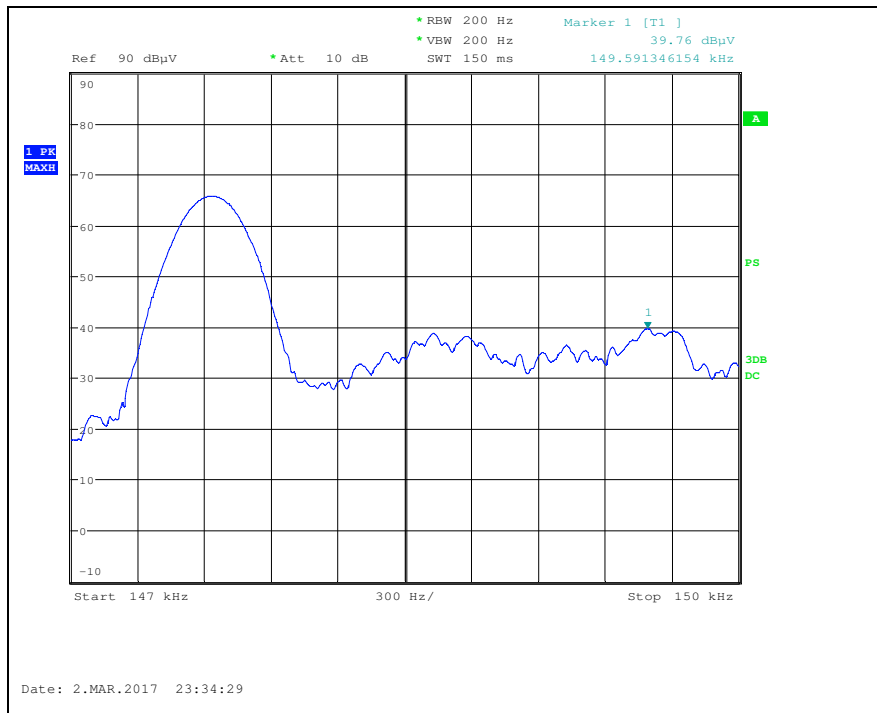
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A4(210 mm x 297 mm)



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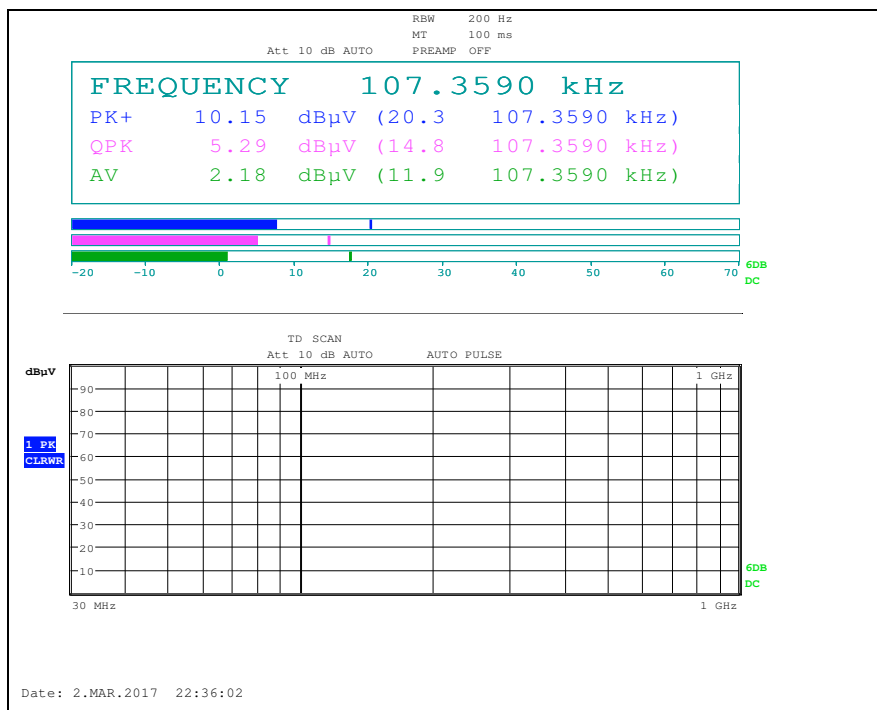
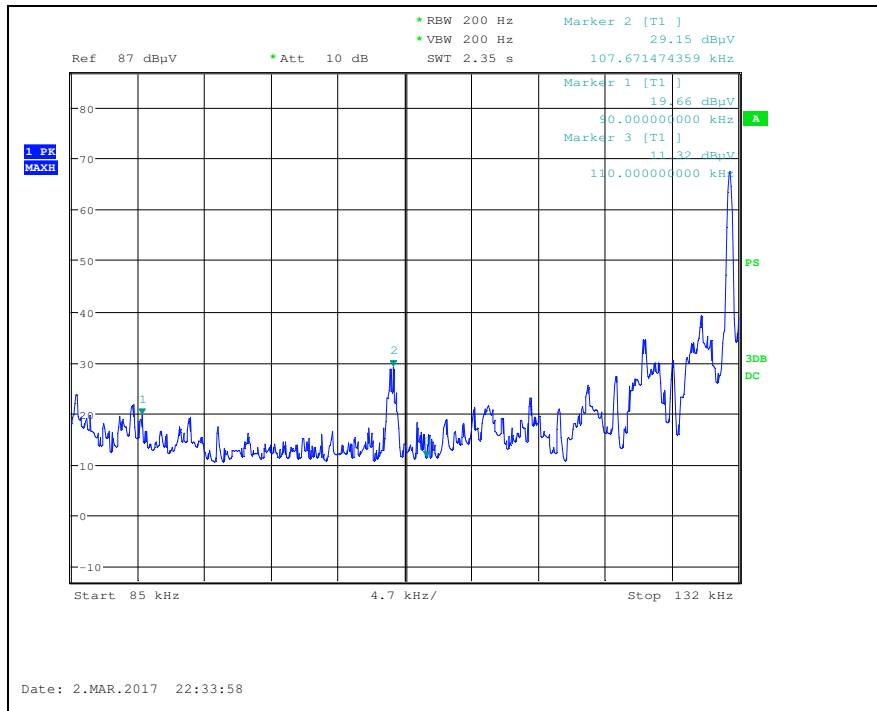
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

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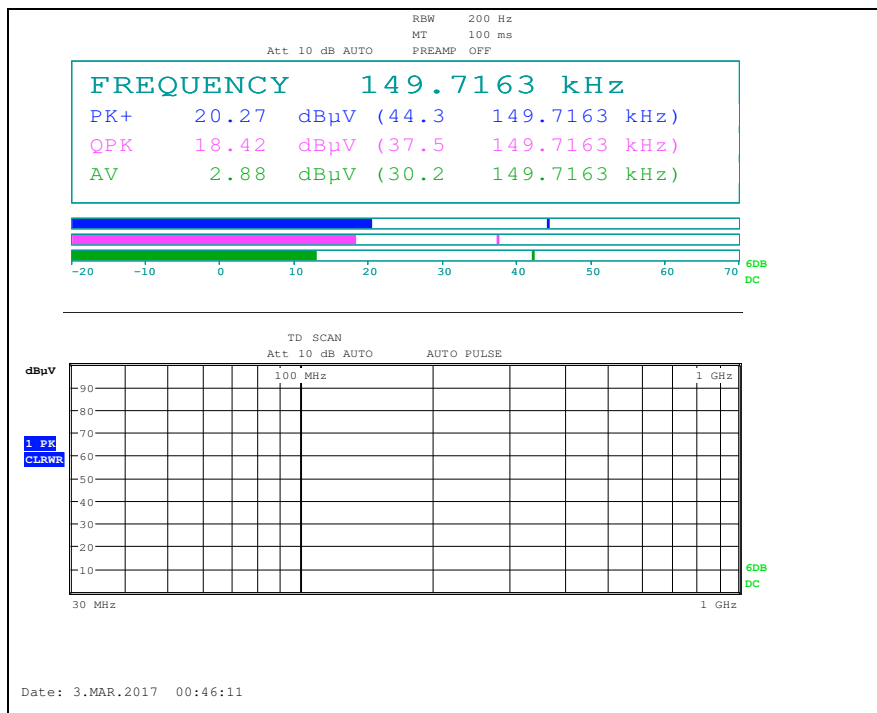
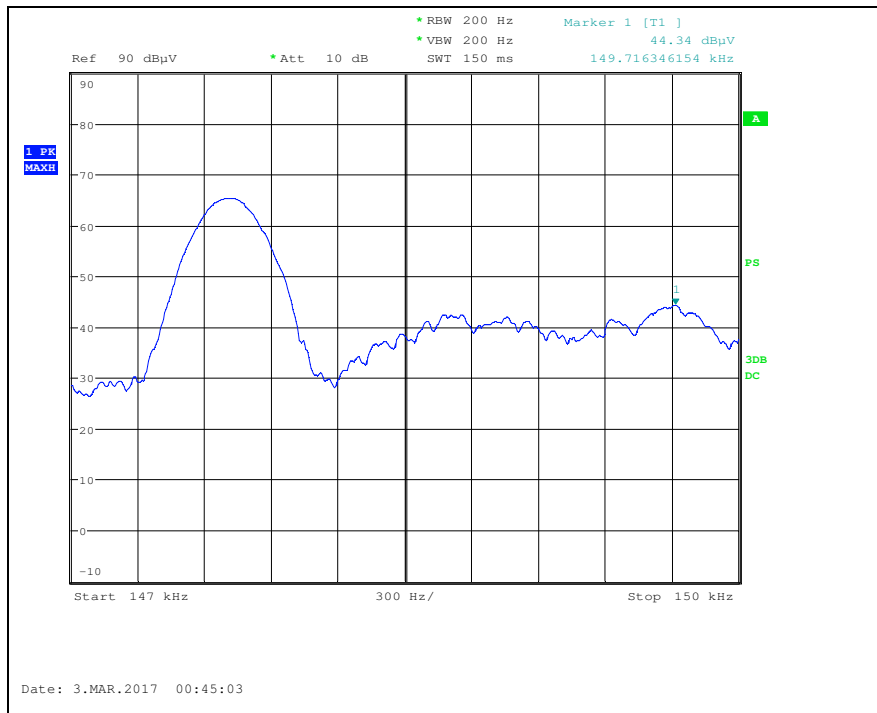
A4(210 mm x 297 mm)

Charging mode (less than 50 % battery status of client device)



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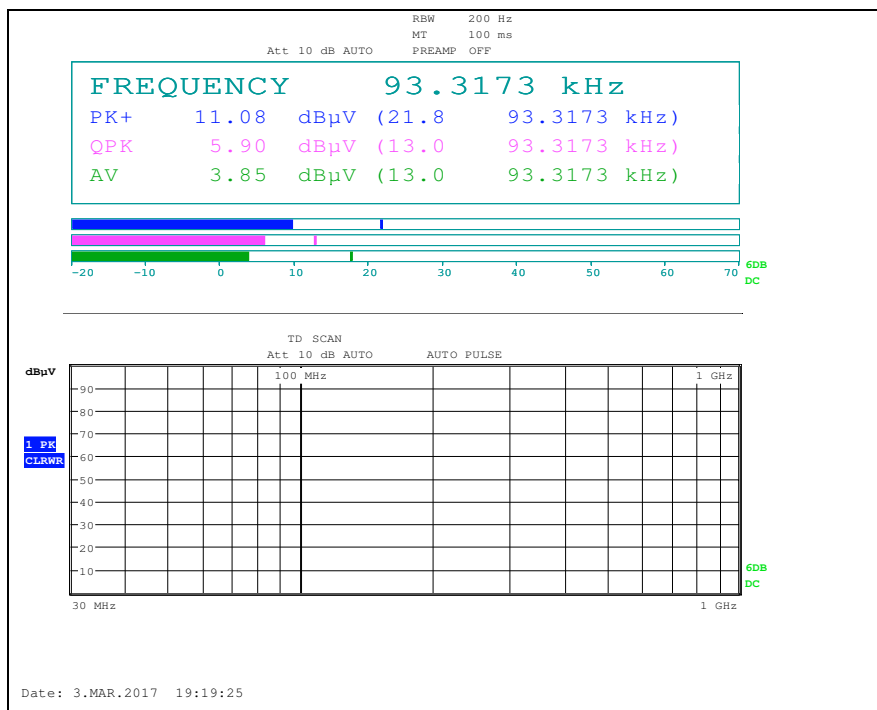
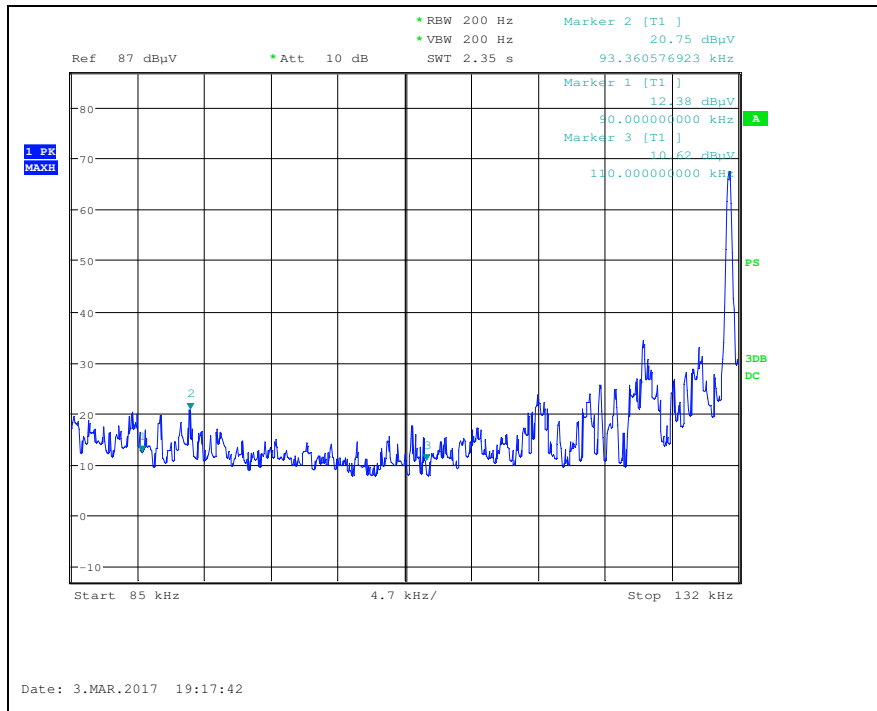
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

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A4(210 mm x 297 mm)

Charging mode (100% battery status of client device)



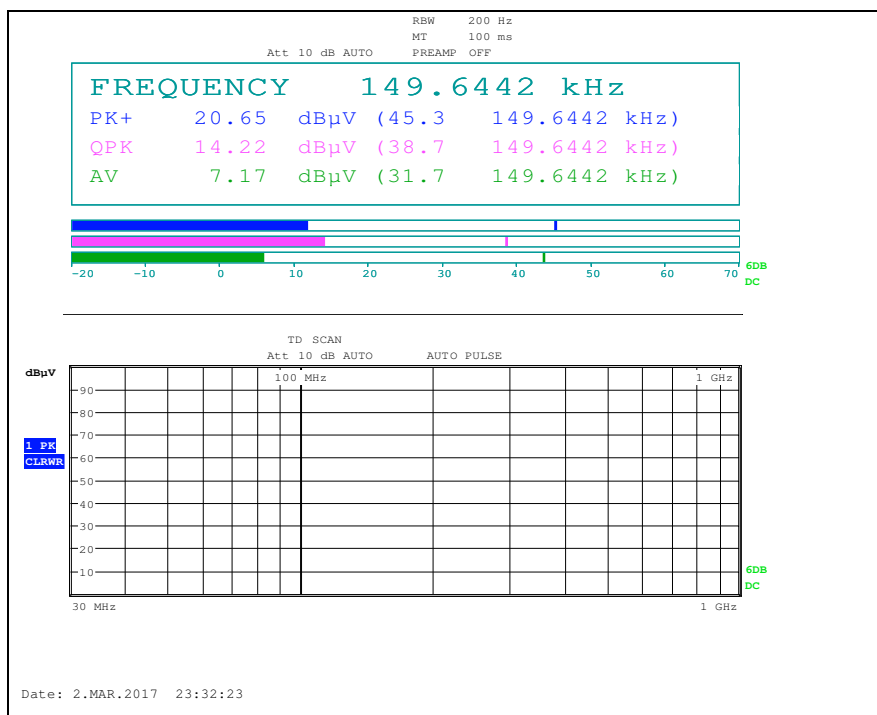
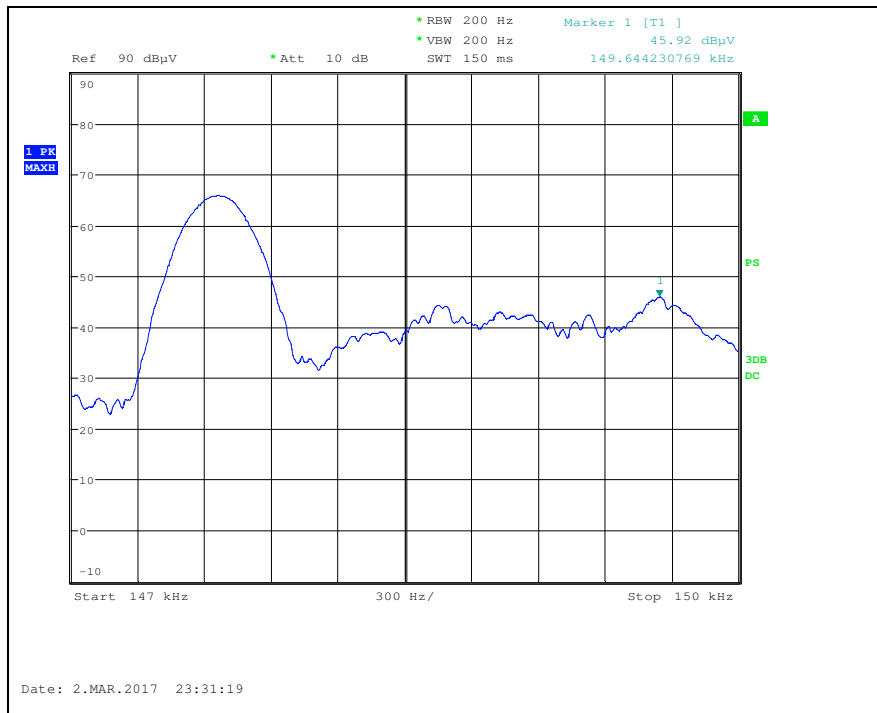
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A4(210 mm x 297 mm)



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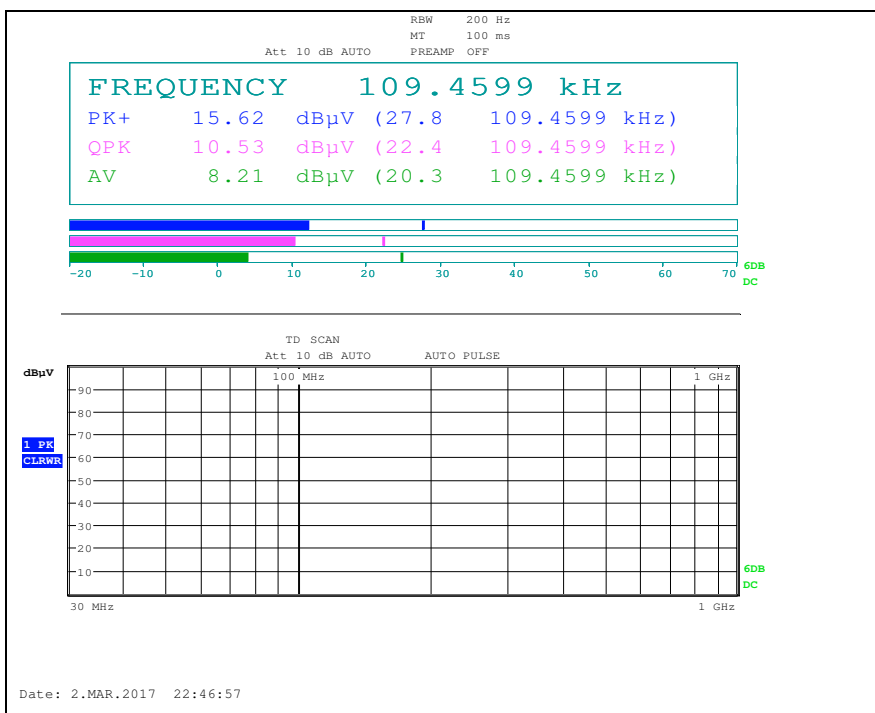
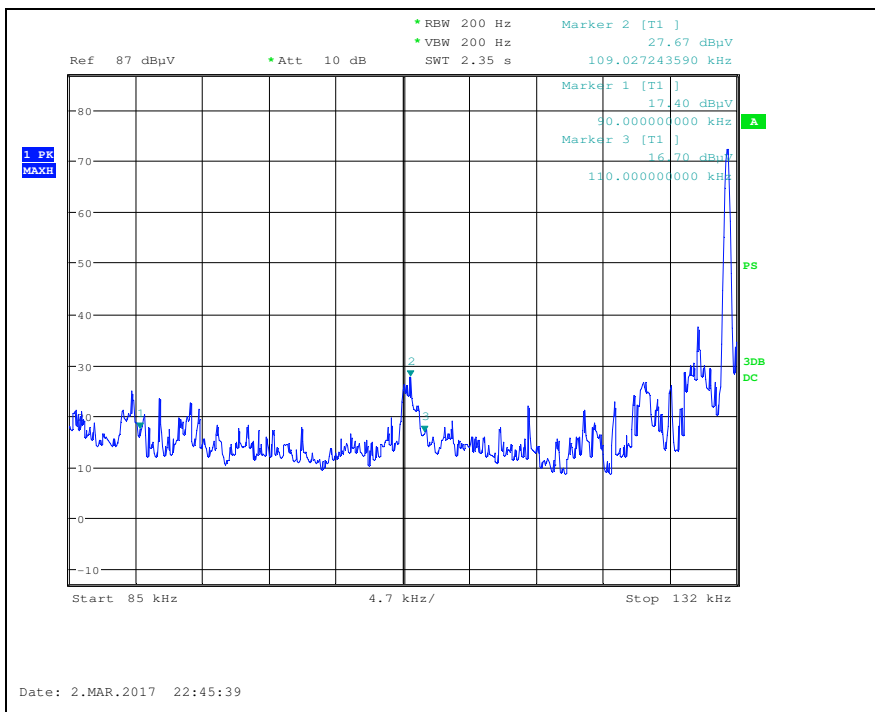
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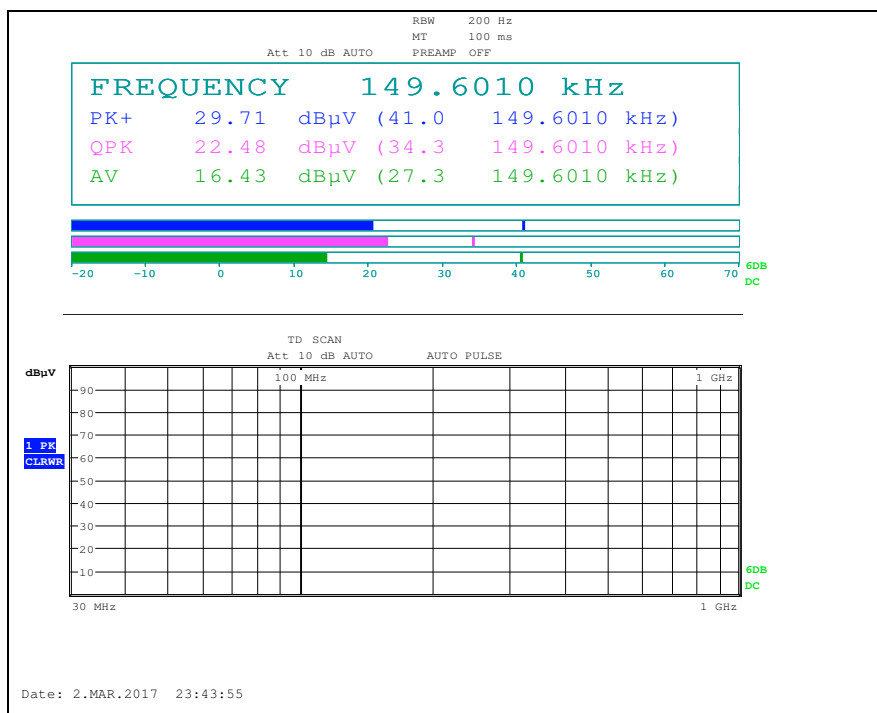
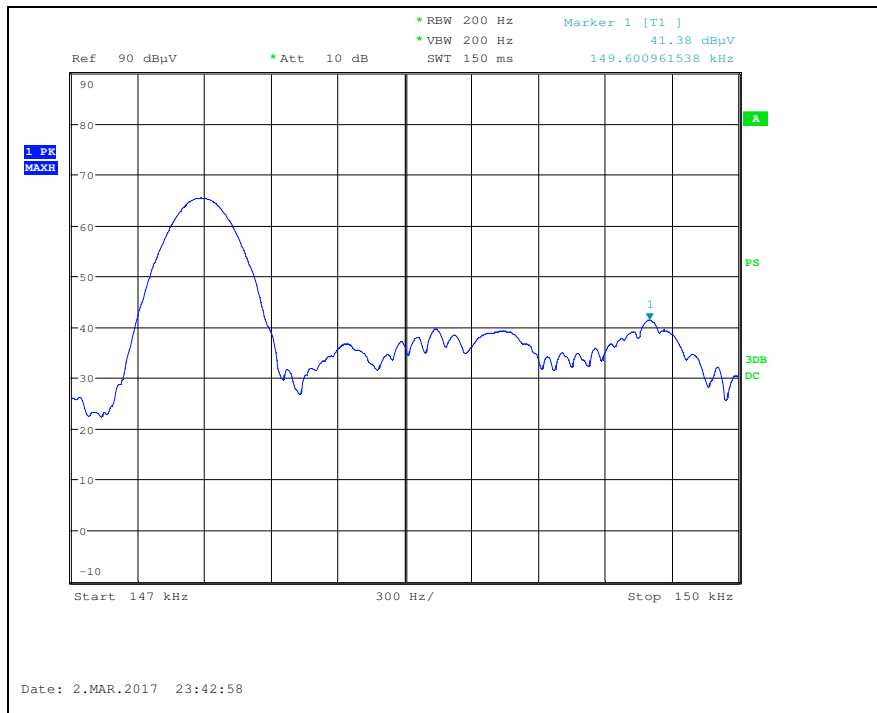
A4(210 mm x 297 mm)

Test Mode : Ant2 in DC 9 V condition
Charging mode (less than 1 % battery status of client device)



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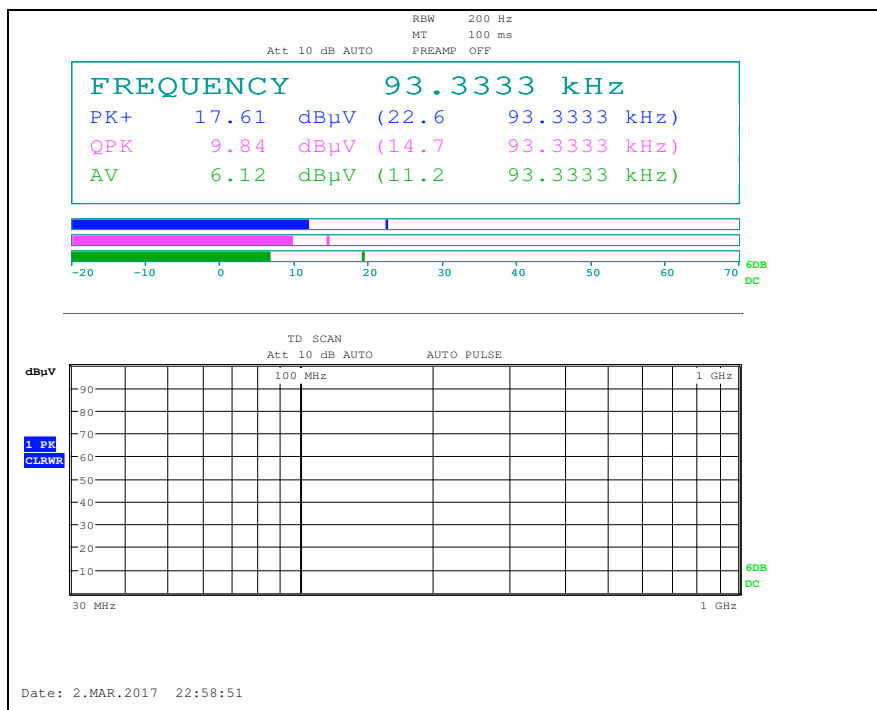
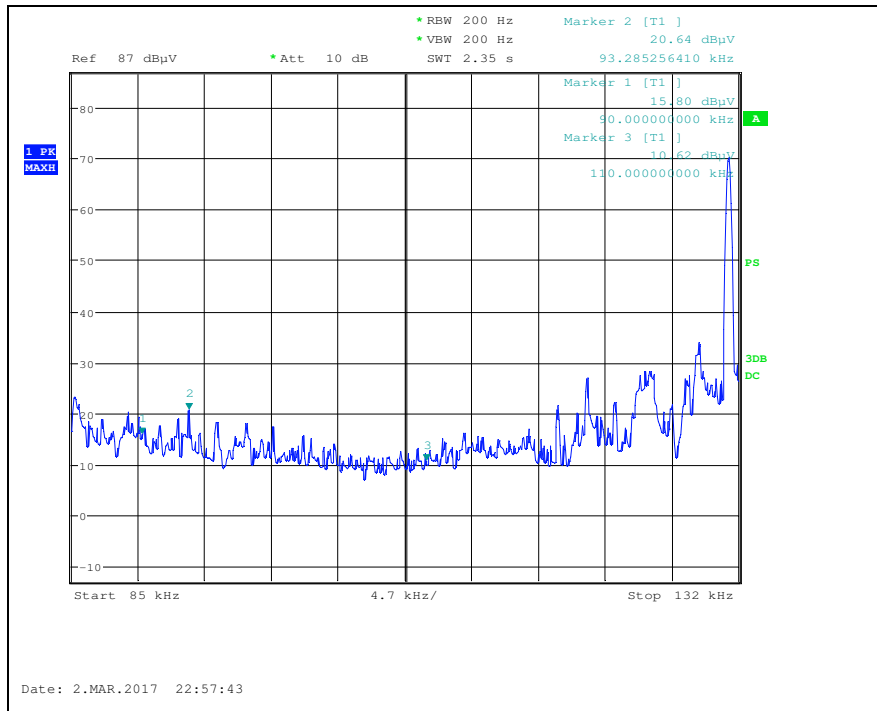
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A4(210 mm x 297 mm)

Charging mode (less than 50 % battery status of client device)



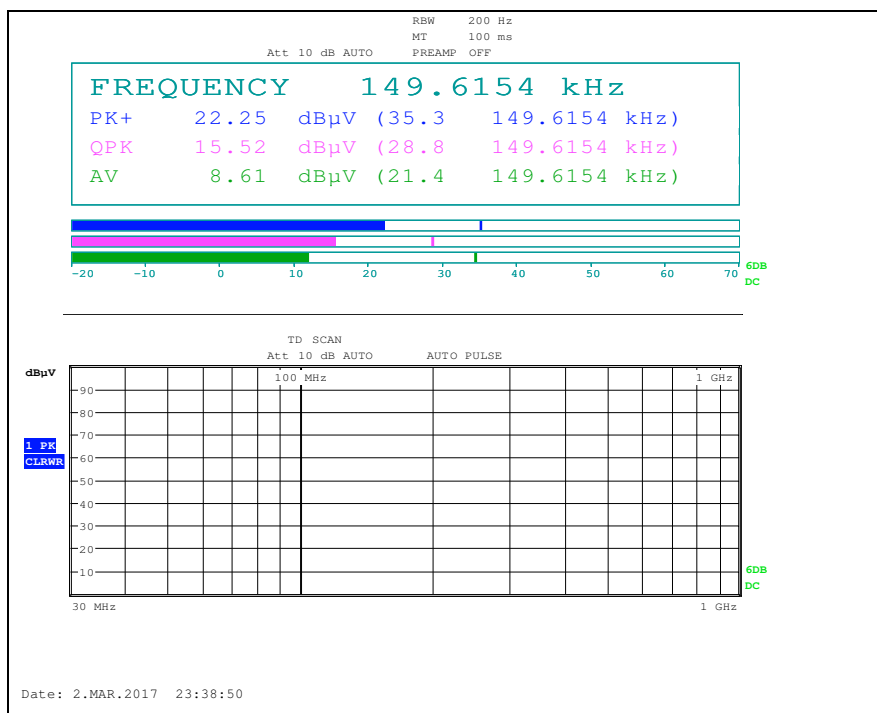
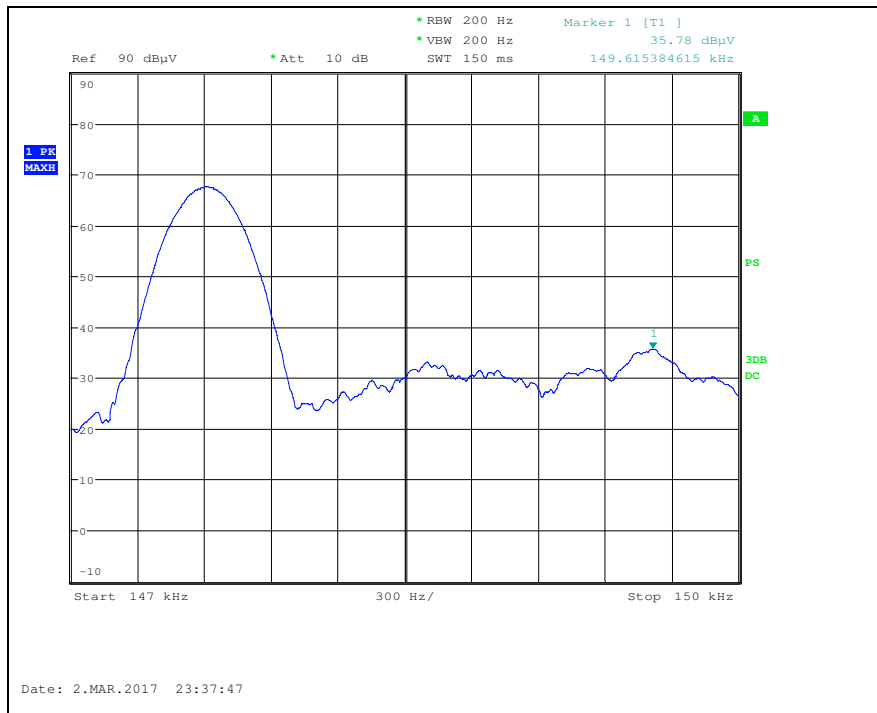
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A4(210 mm x 297 mm)



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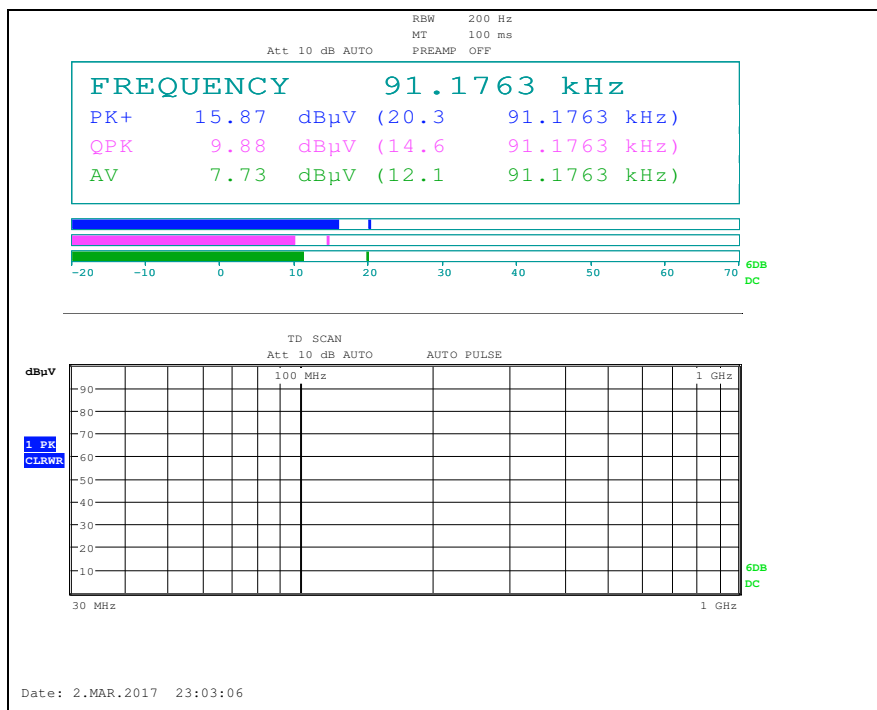
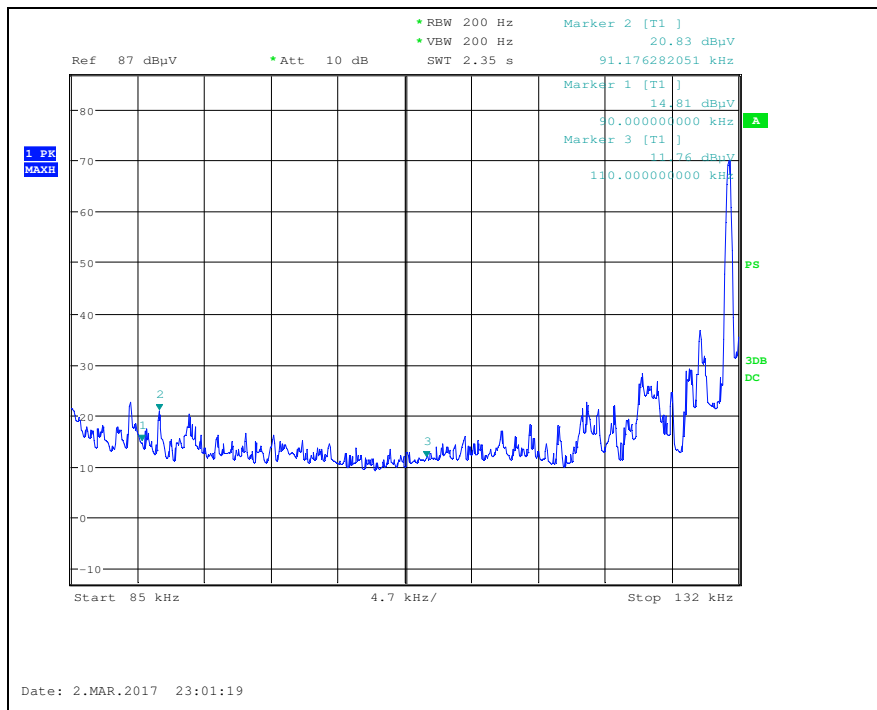
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

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A4(210 mm x 297 mm)

Charging mode (100% battery status of client device)



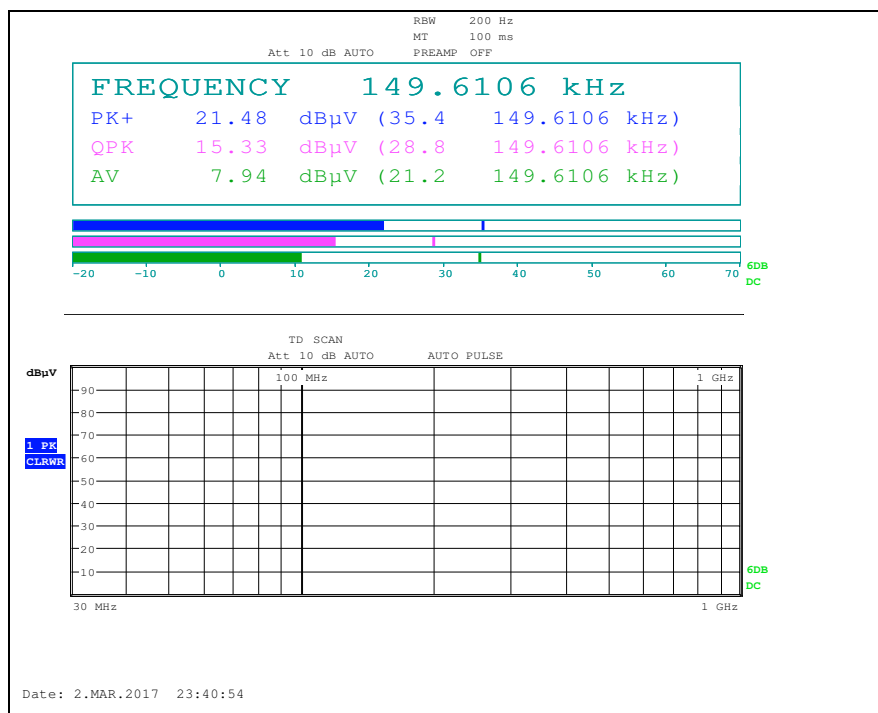
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A4(210 mm x 297 mm)



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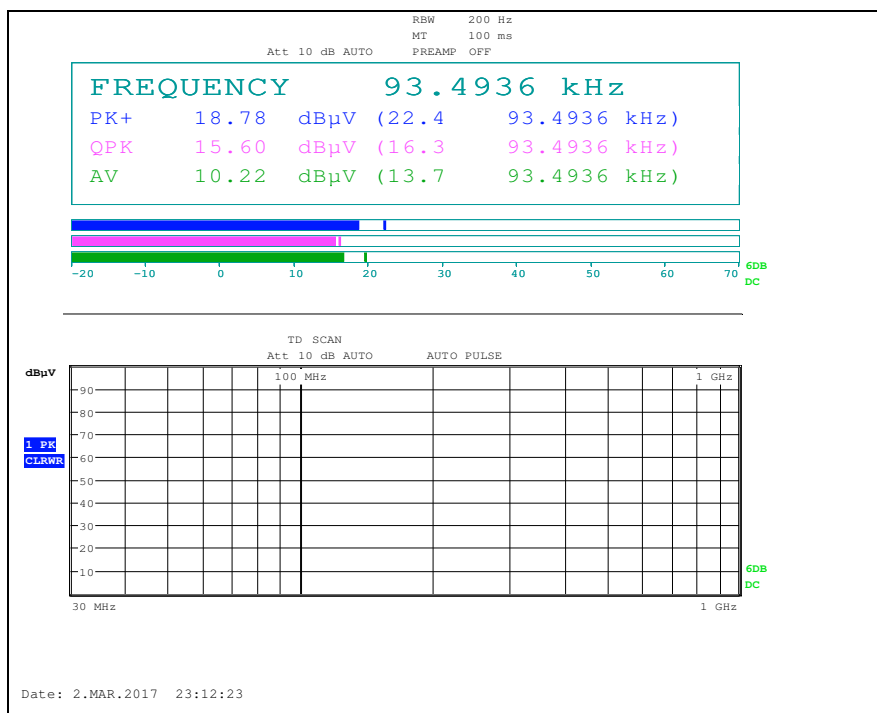
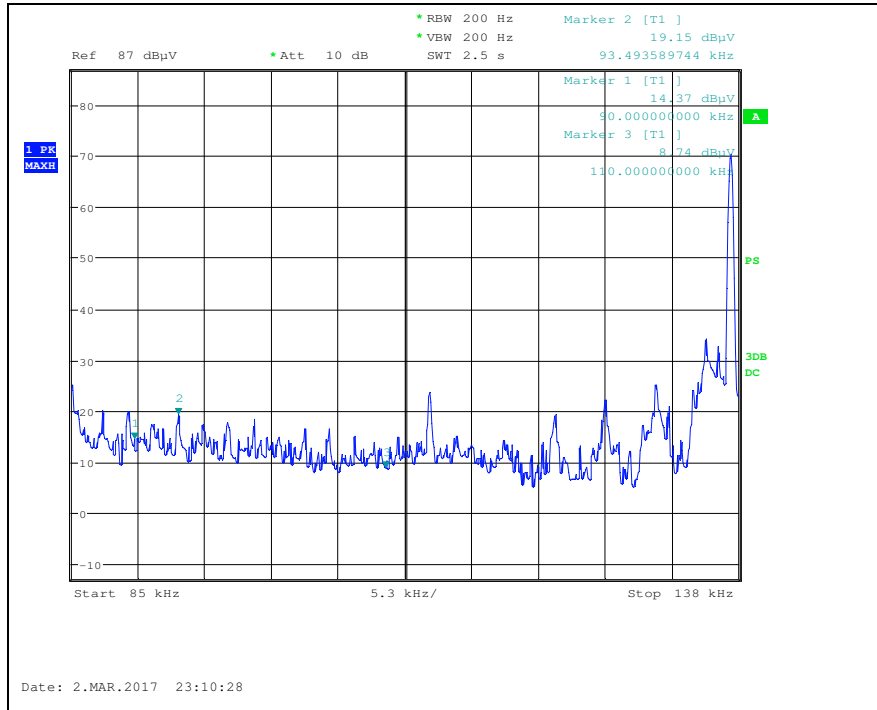
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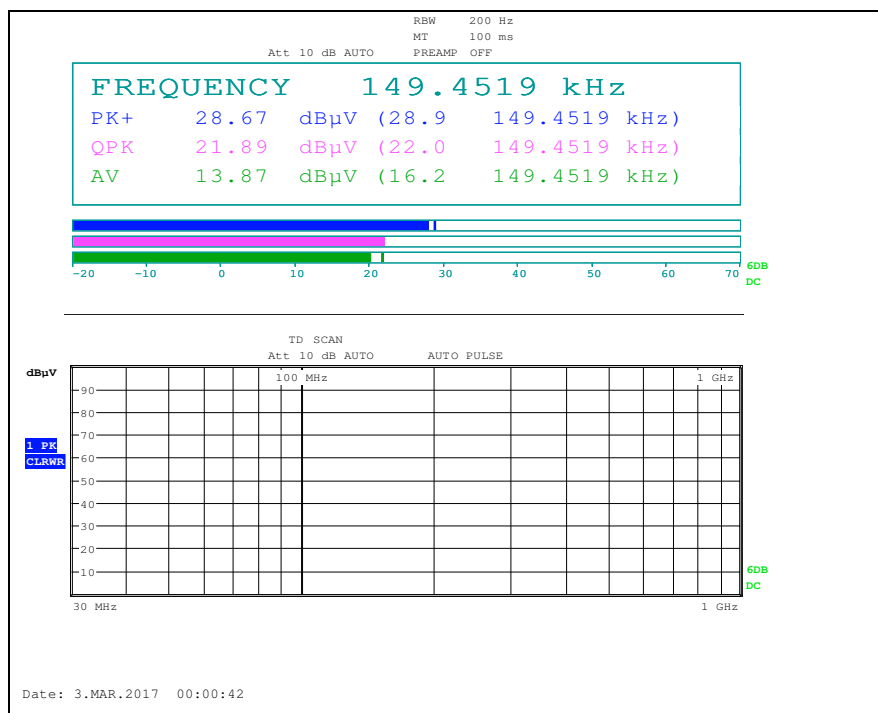
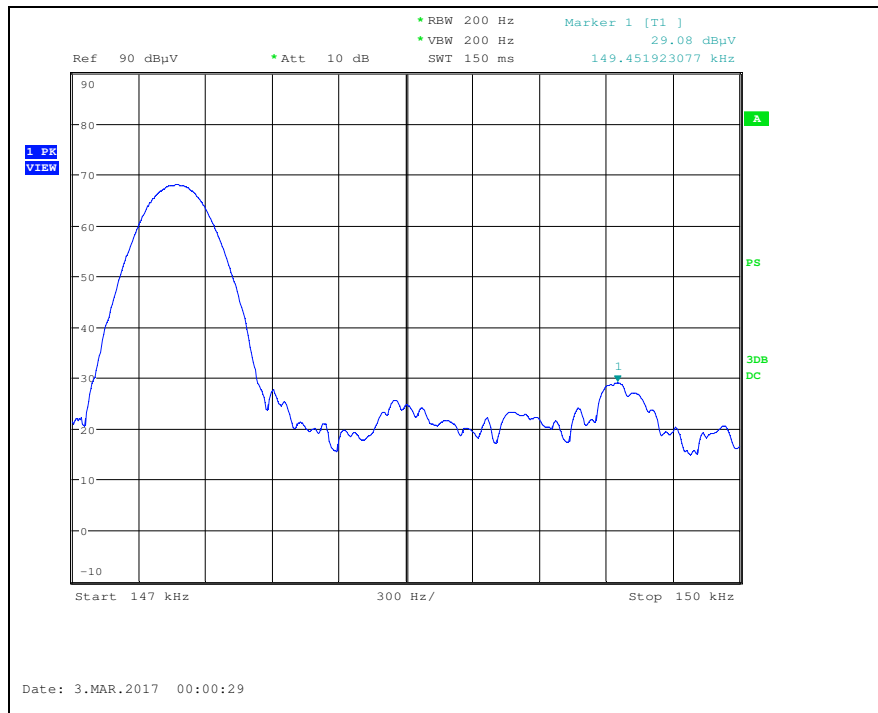
A4(210 mm x 297 mm)

Test Mode : Ant3 in DC 9 V condition
Charging mode (less than 1 % battery status of client device)



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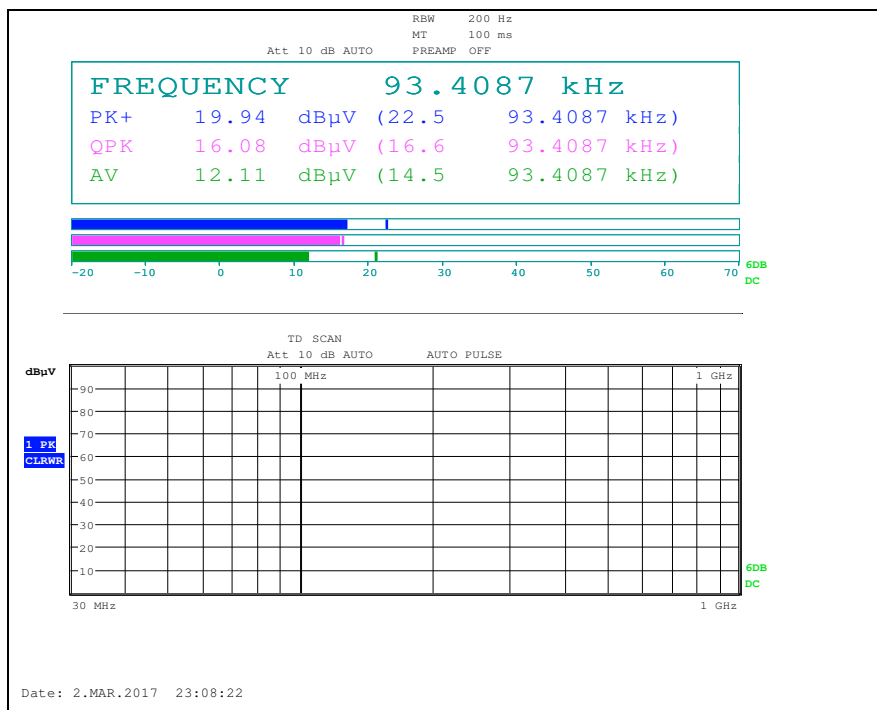
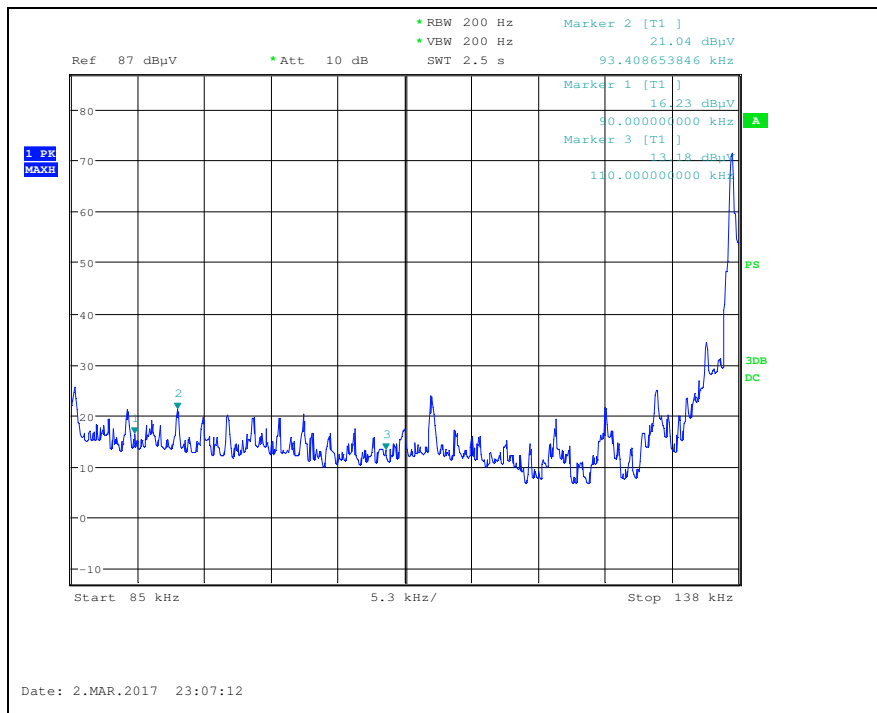
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

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A4(210 mm x 297 mm)

Charging mode (less than 50 % battery status of client device)



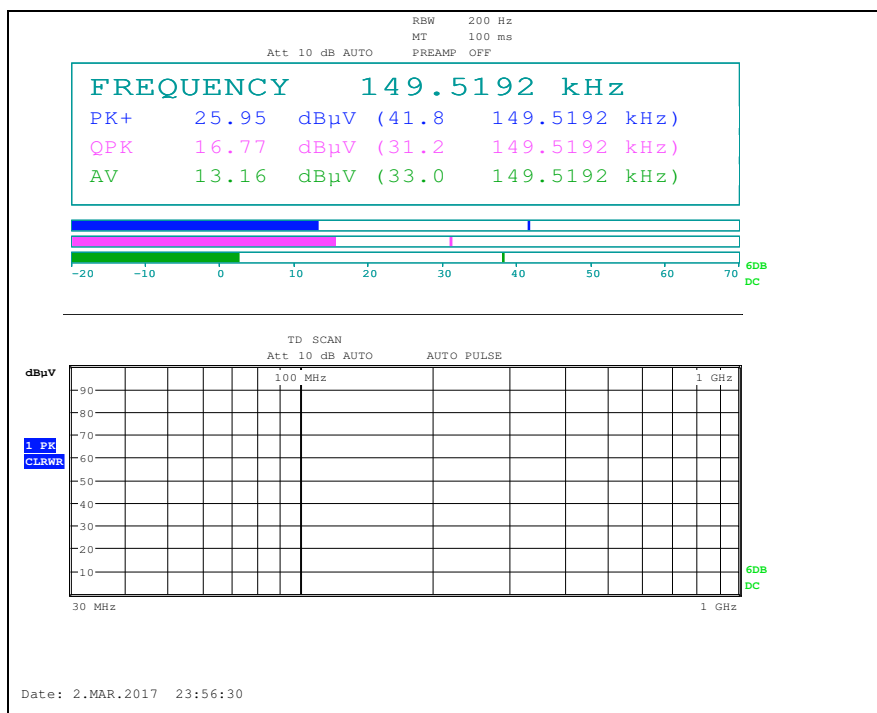
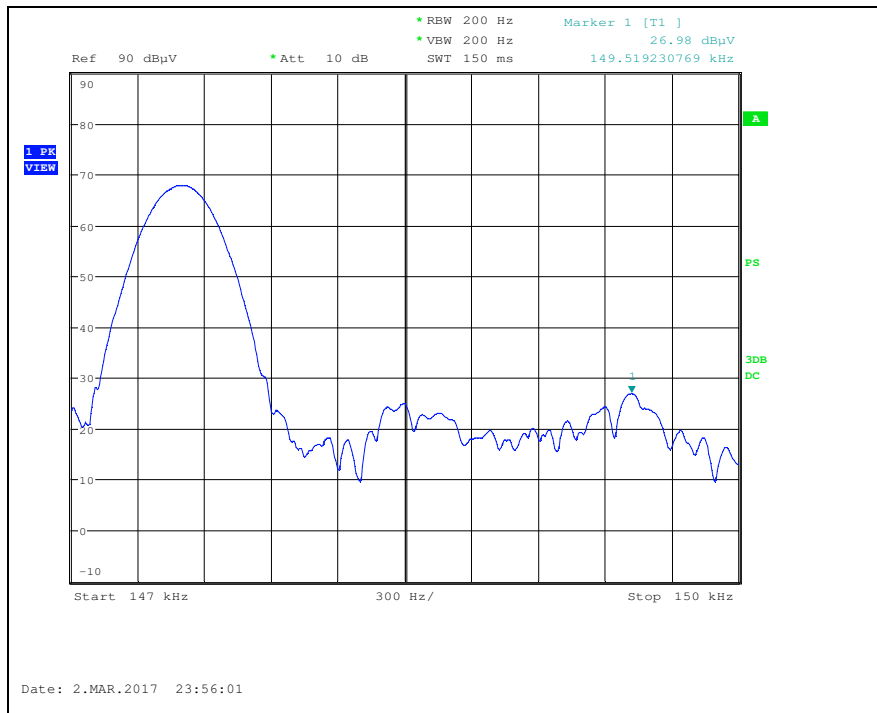
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A4(210 mm x 297 mm)



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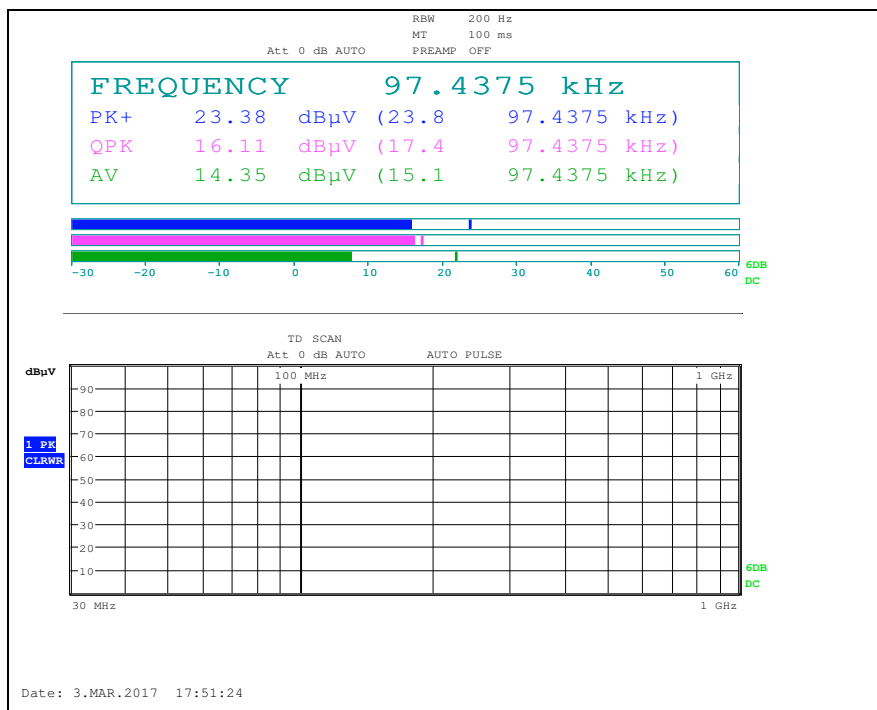
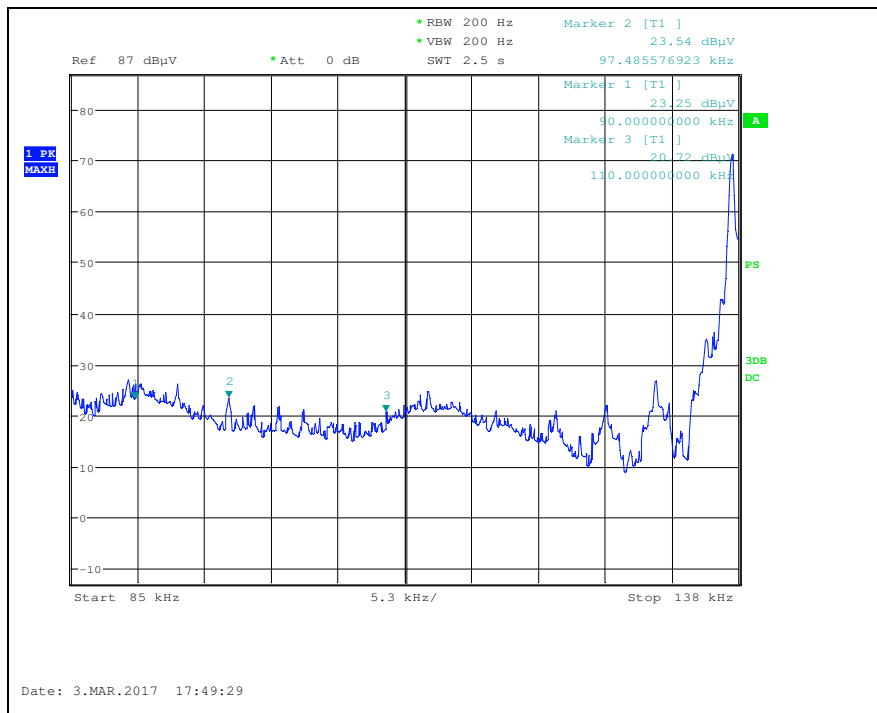
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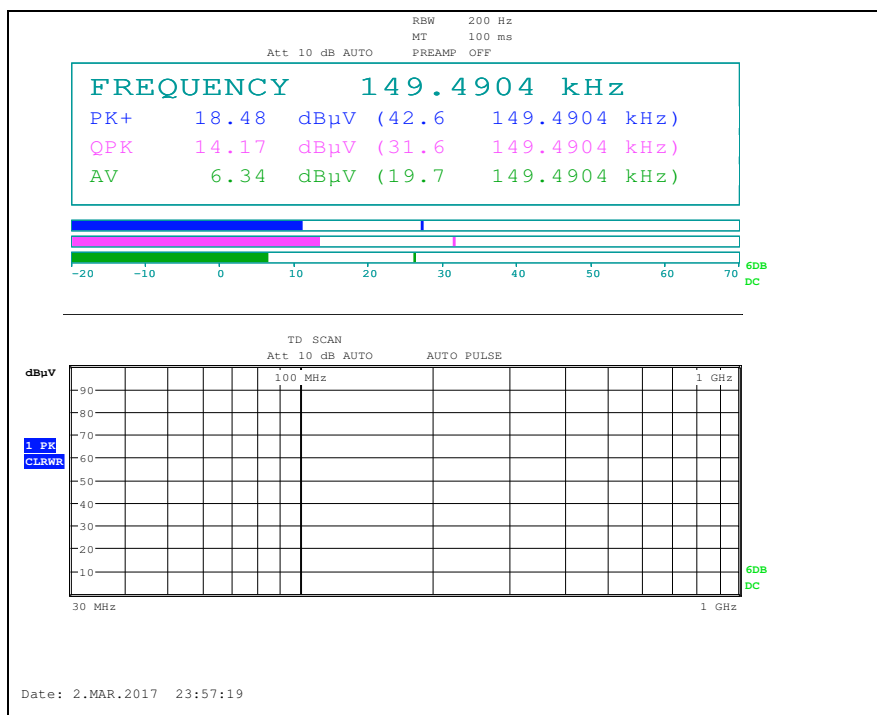
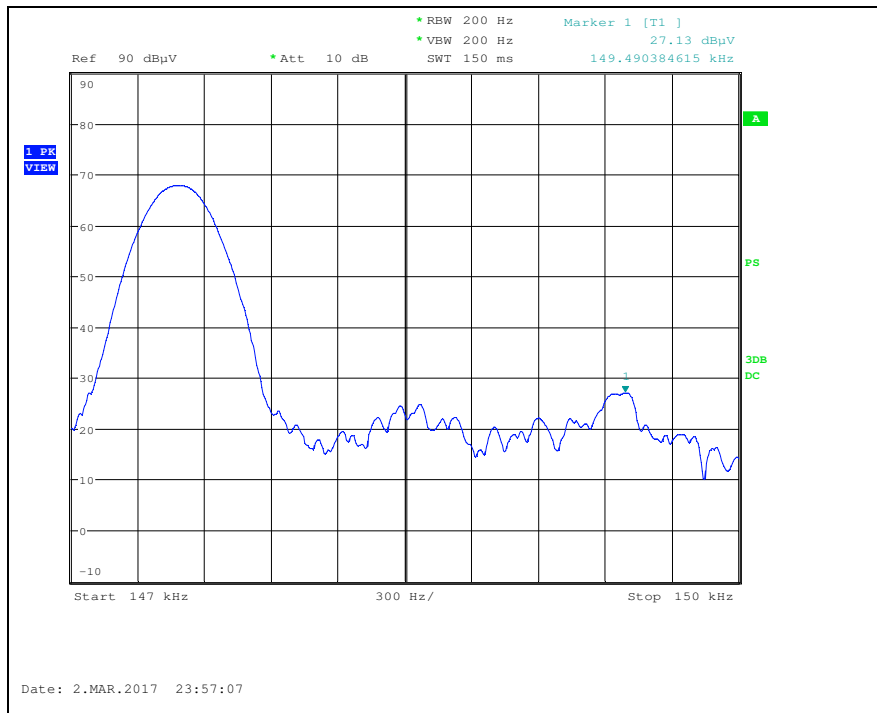
A4(210 mm x 297 mm)

Charging mode (100% battery status of client device)



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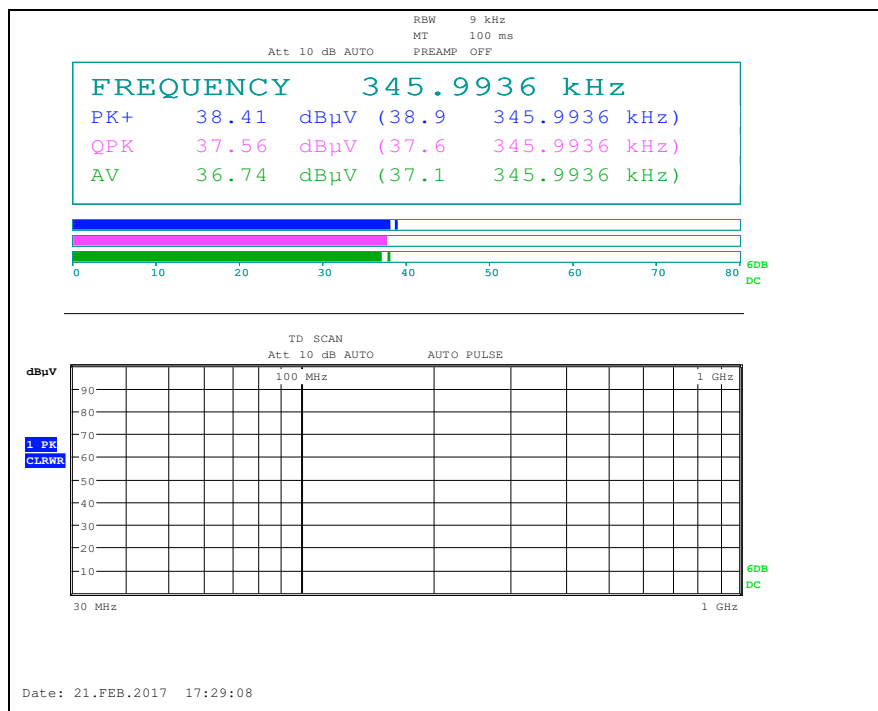
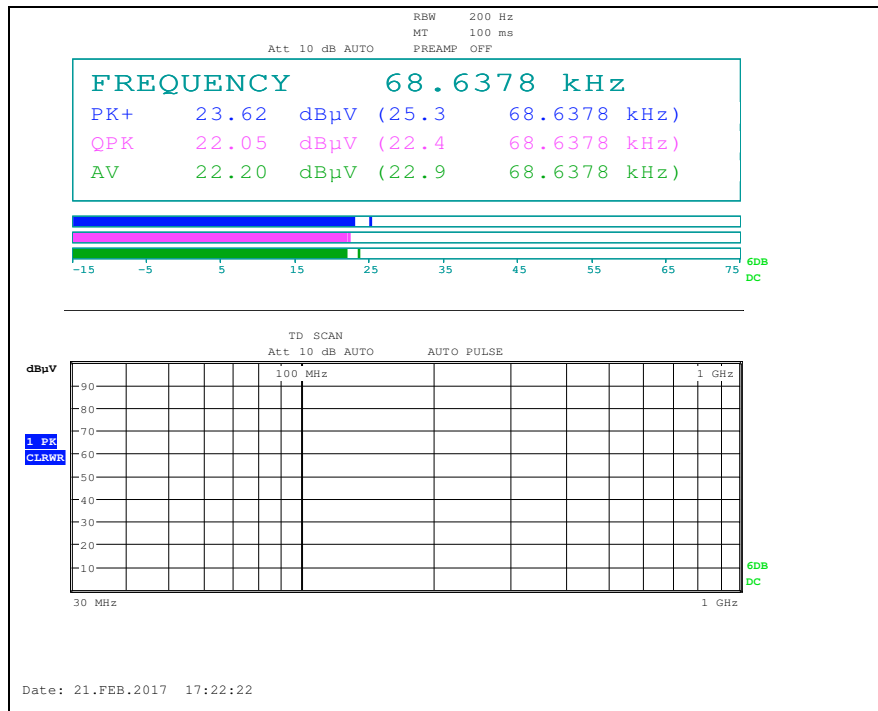
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

Test plots (Spurious)

Test Mode : Ant1 in DC 5 V condition

Charging mode (less than 1 % battery status of client device)



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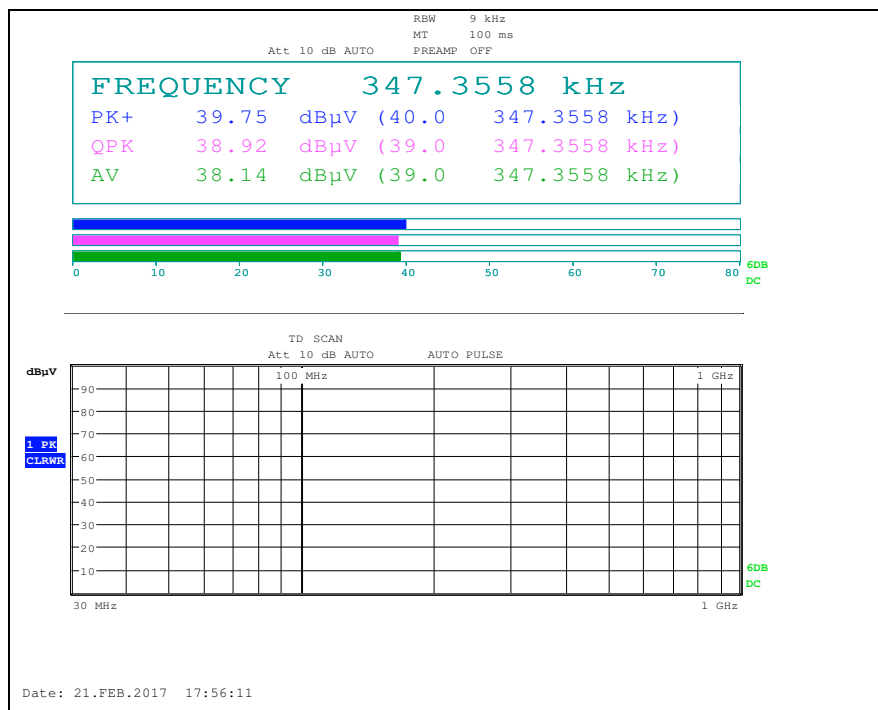
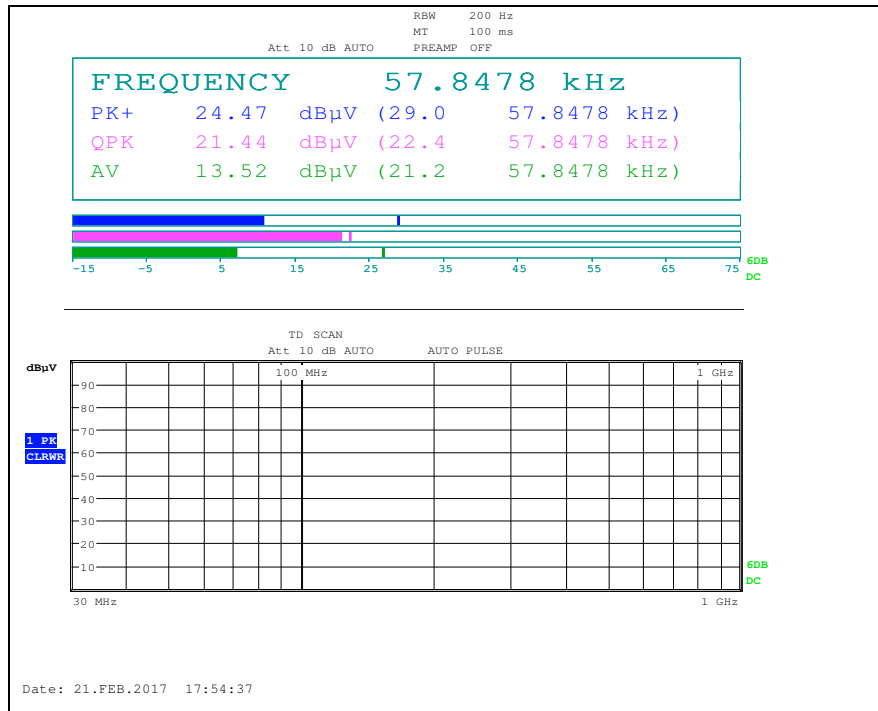
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A4(210 mm x 297 mm)

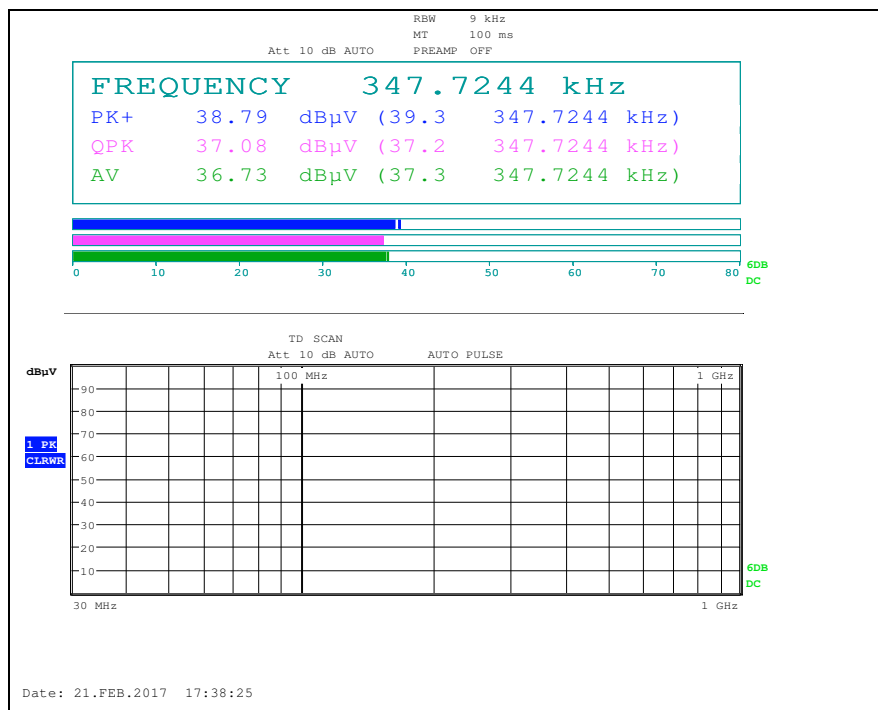
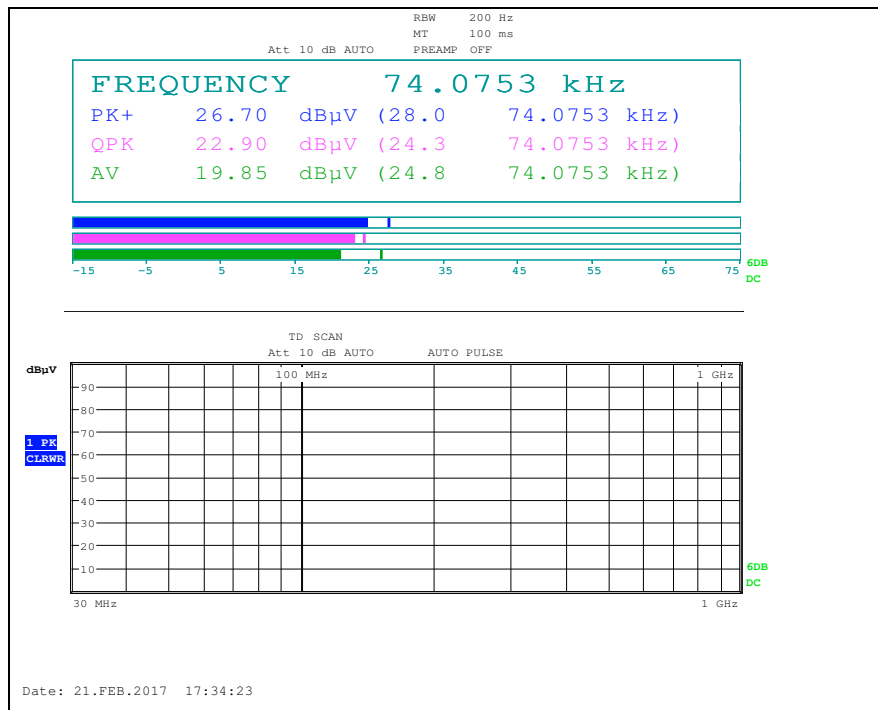
Charging mode (less than 50 % battery status of client device)



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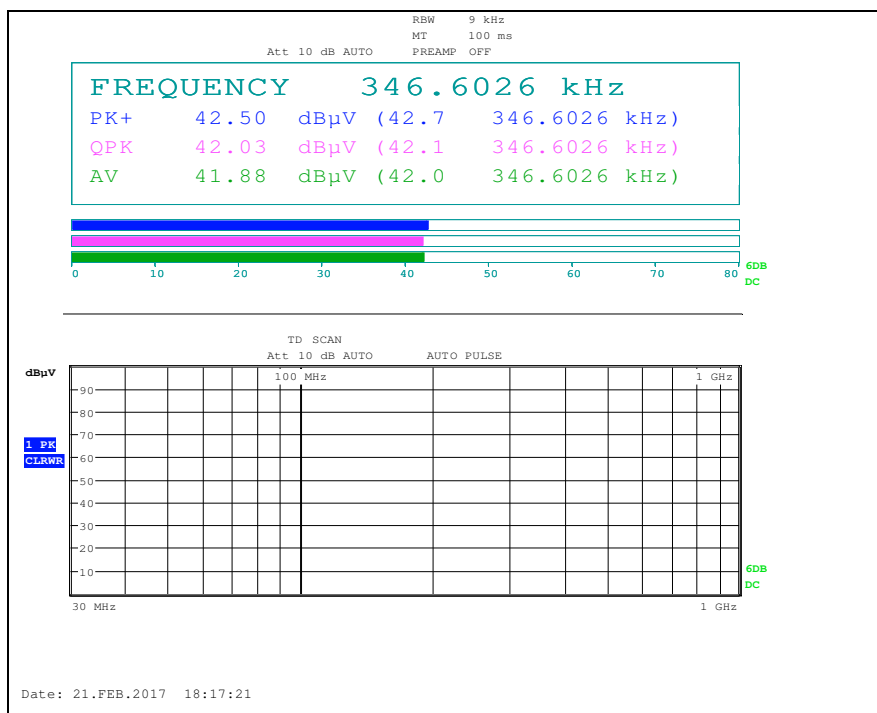
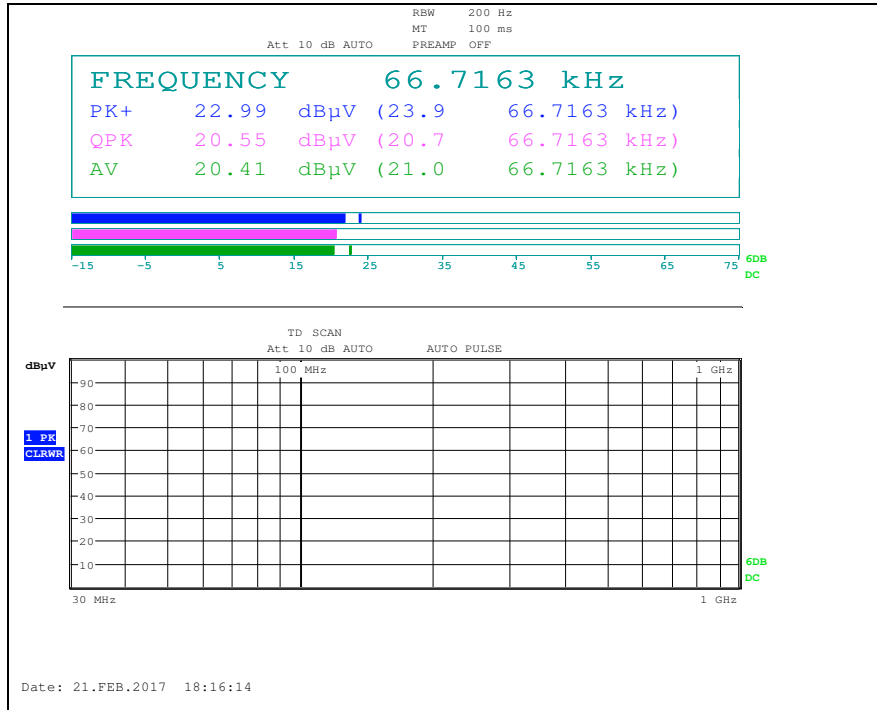
Charging mode (less than 100 % battery status of client device)



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Test Mode : Ant2 in DC 5 V condition
Charging mode (less than 1 % battery status of client device)



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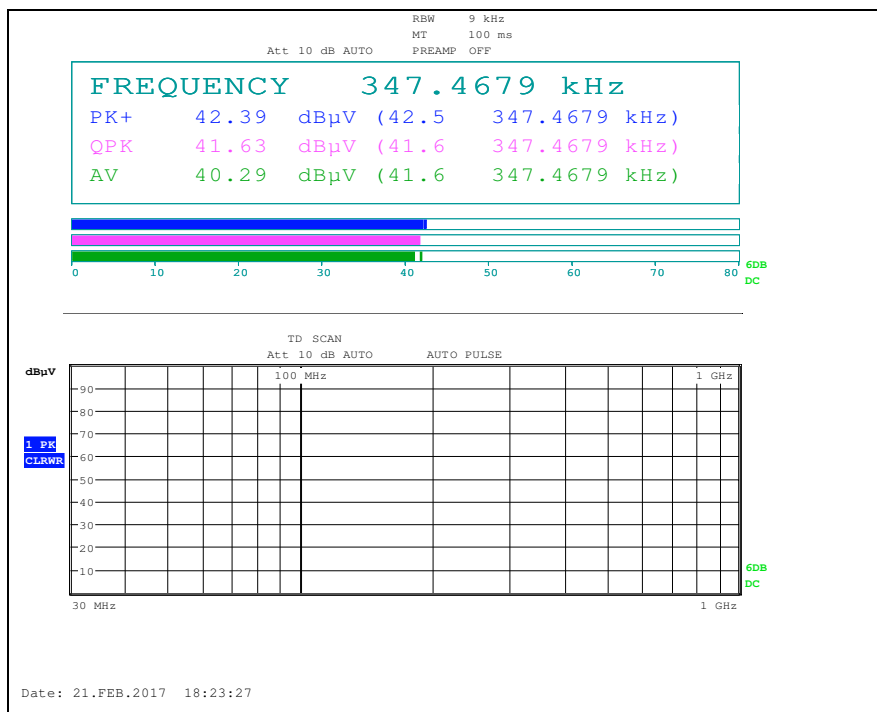
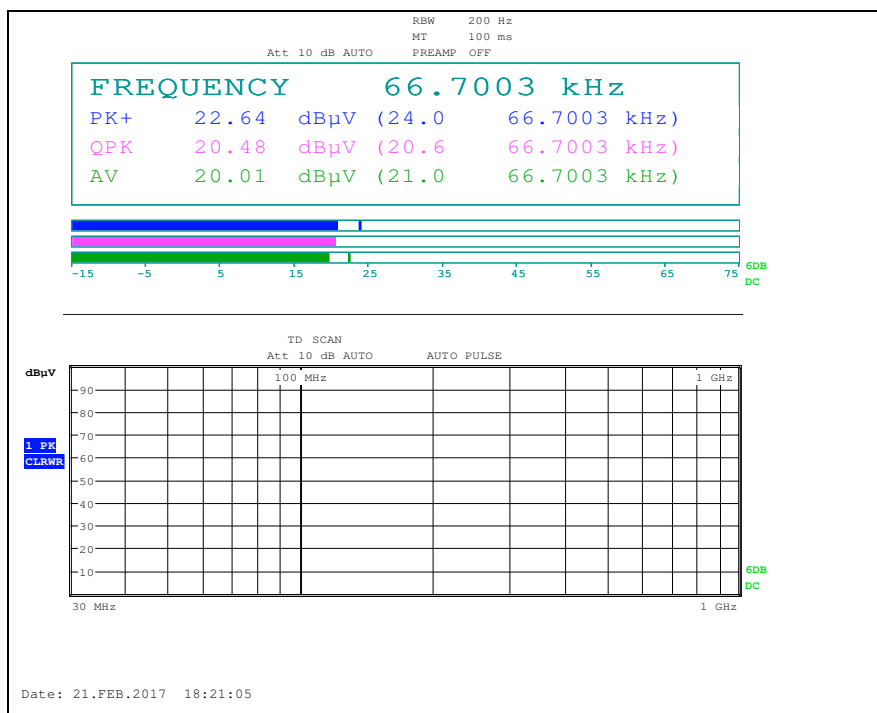
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A4(210 mm x 297 mm)

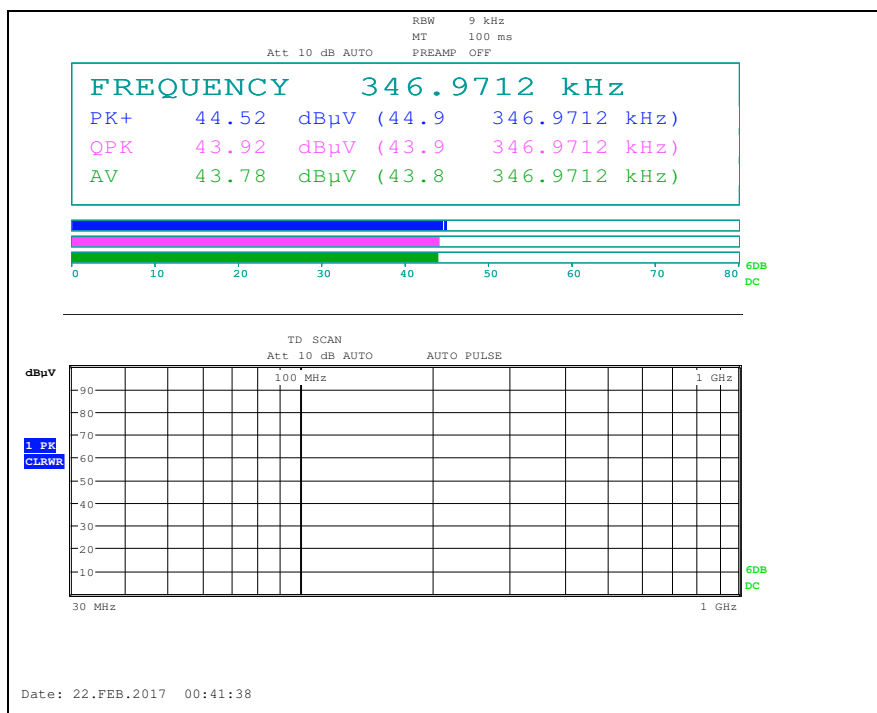
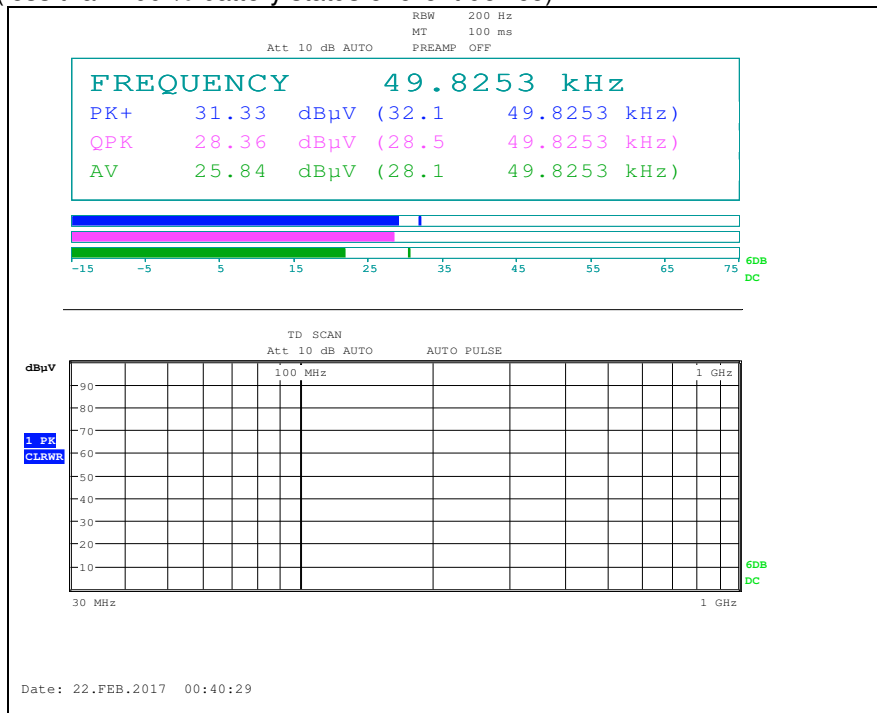
Charging mode (less than 50 % battery status of client device)



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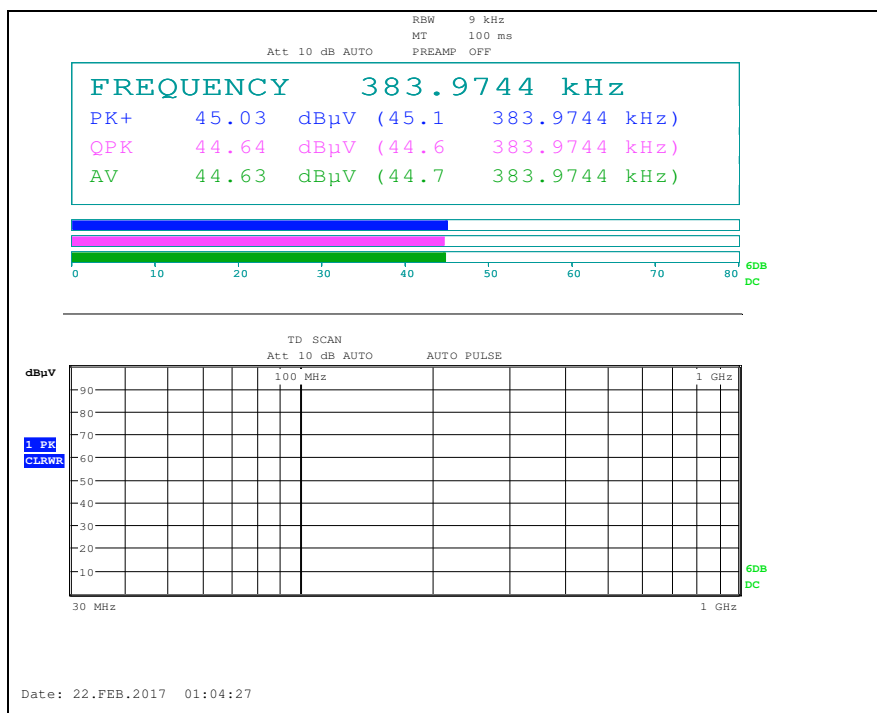
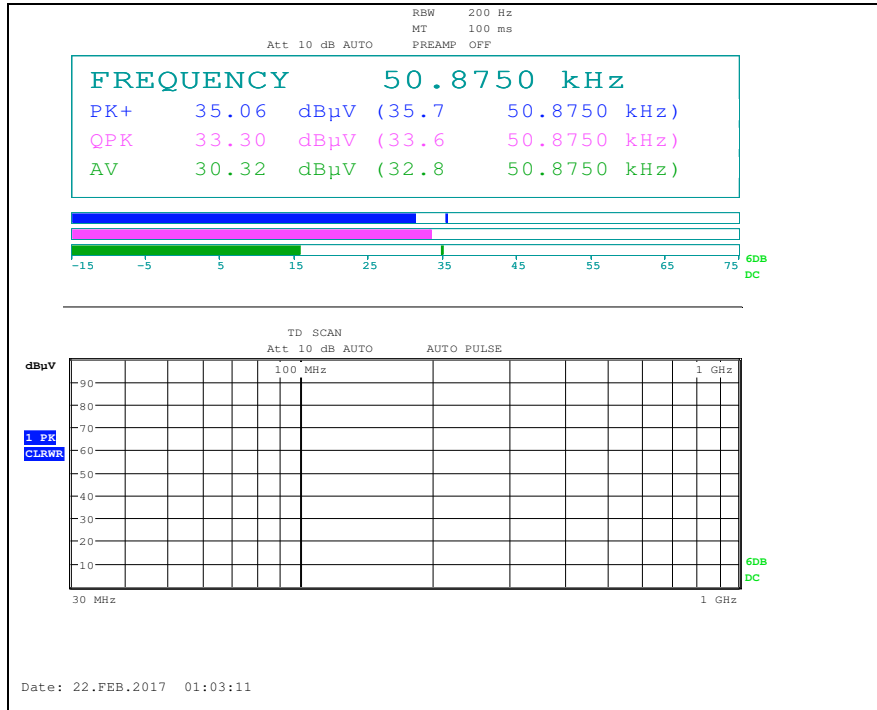
Charging mode (less than 100 % battery status of client device)



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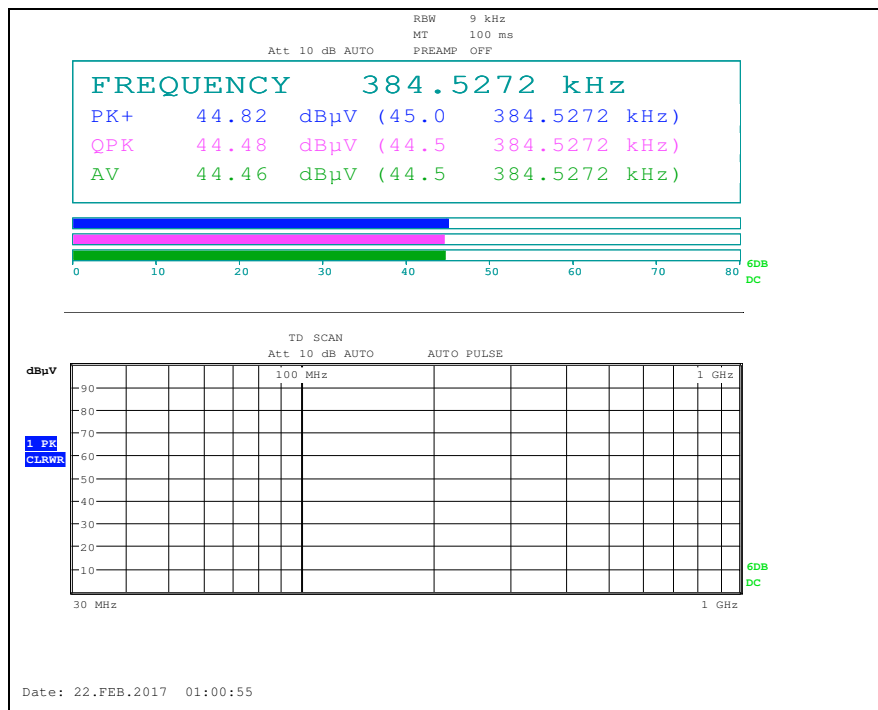
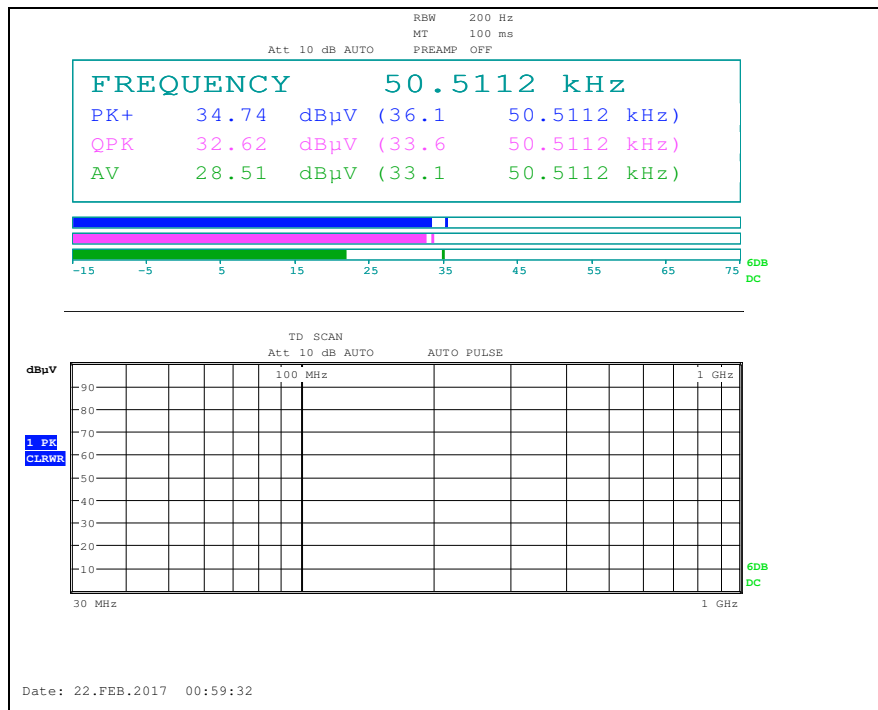
Test Mode : Ant3 in DC 5 V condition
Charging mode (less than 1 % battery status of client device)



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Charging mode (less than 50 % battery status of client device)



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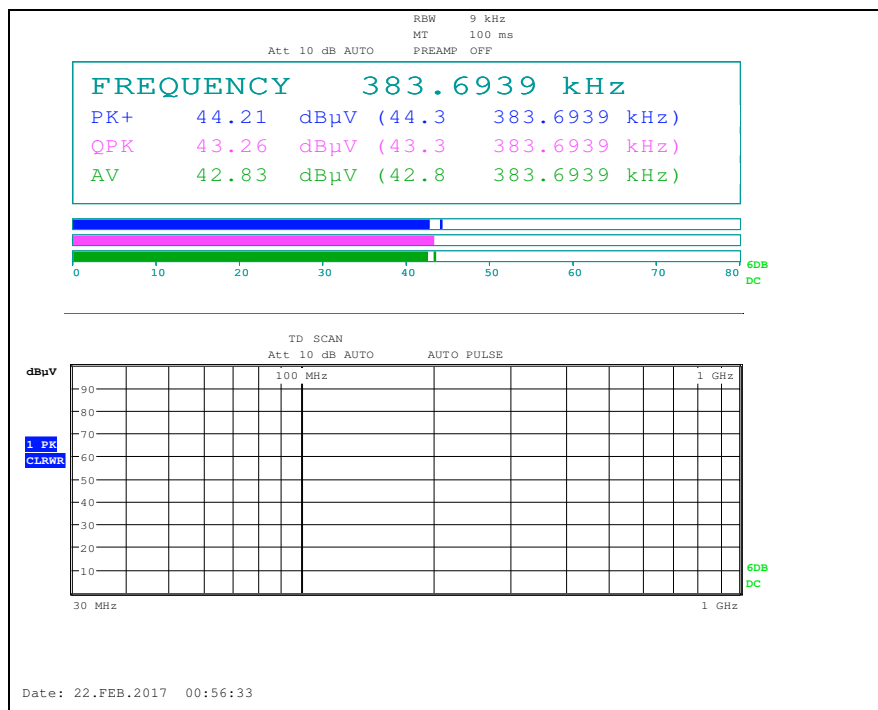
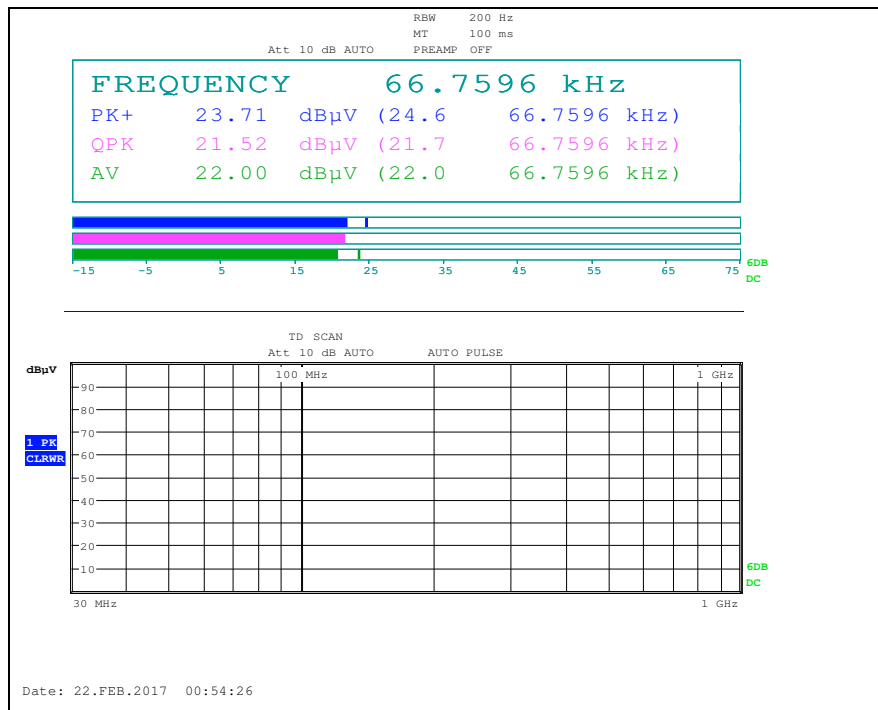
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-20(2015.10.01)(3)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

Charging mode (100% battery status of client device)



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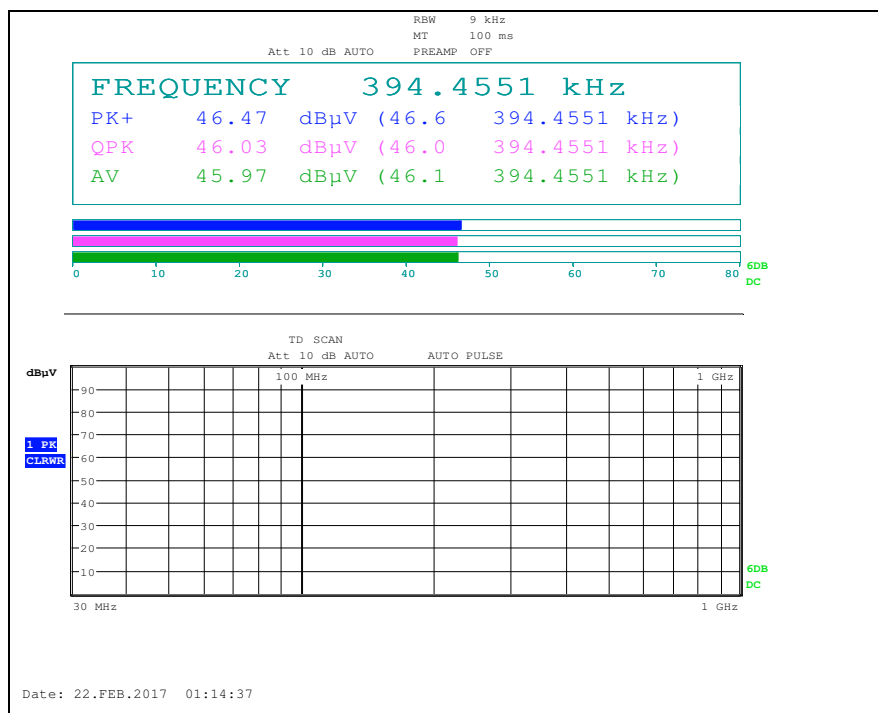
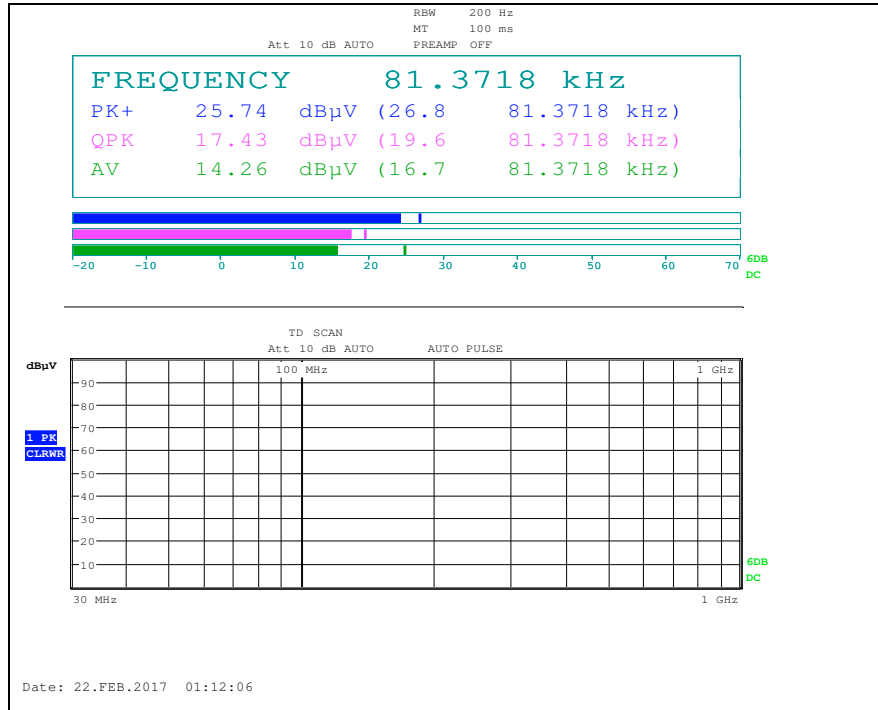
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

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A4(210 mm x 297 mm)

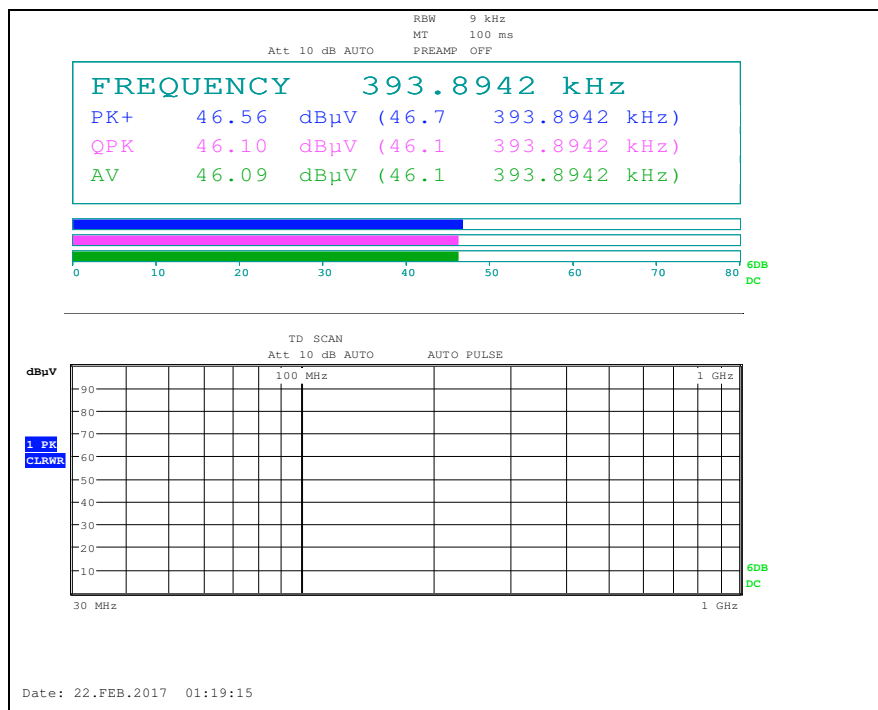
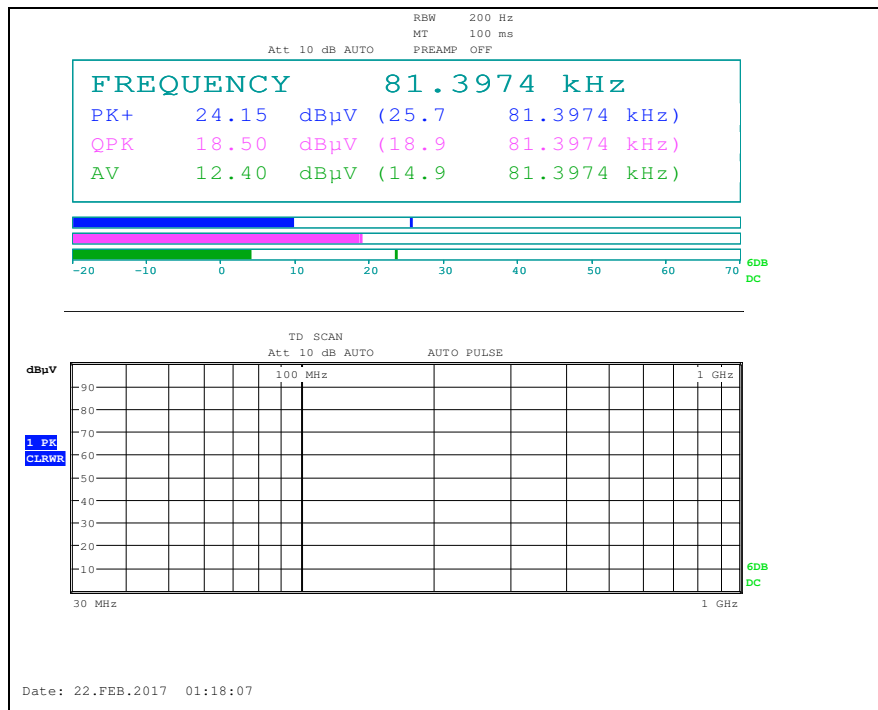
Test Mode : Ant1 in DC 9 V condition
Charging mode (less than 1 % battery status of client device)



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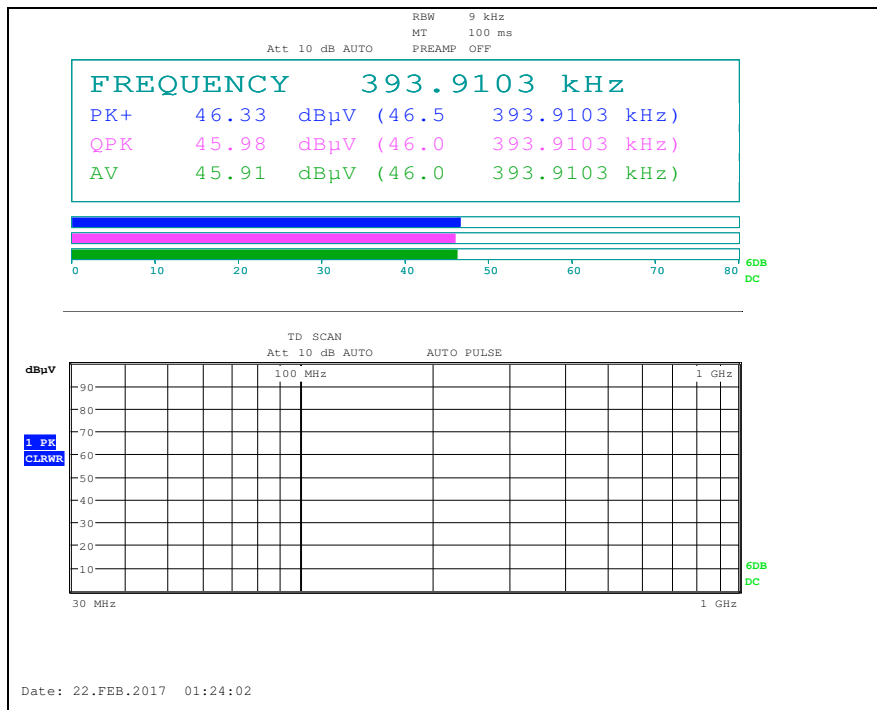
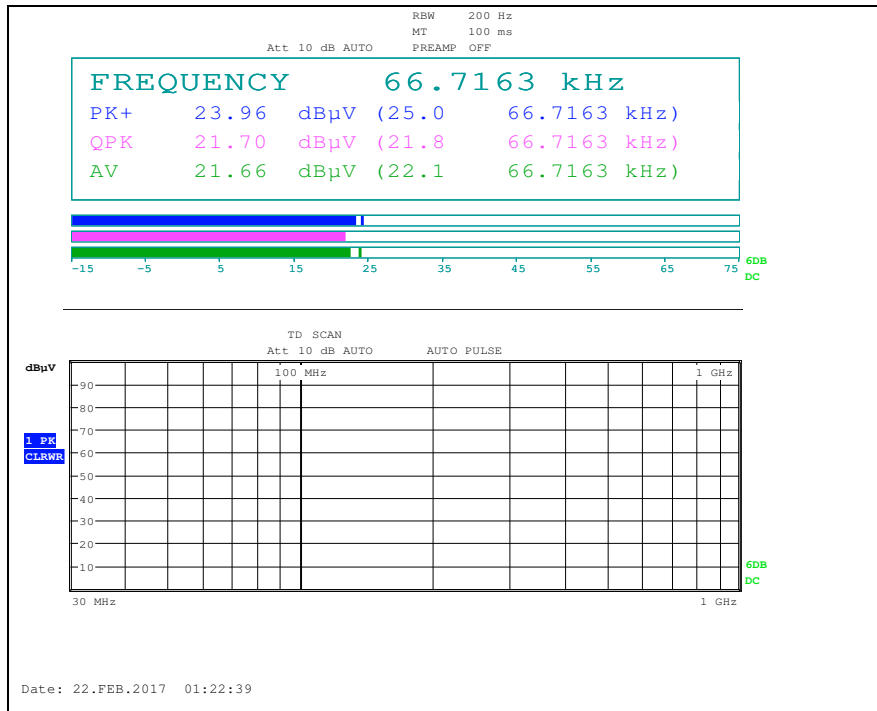
Charging mode (less than 50 % battery status of client device)



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Charging mode (100% battery status of client device)



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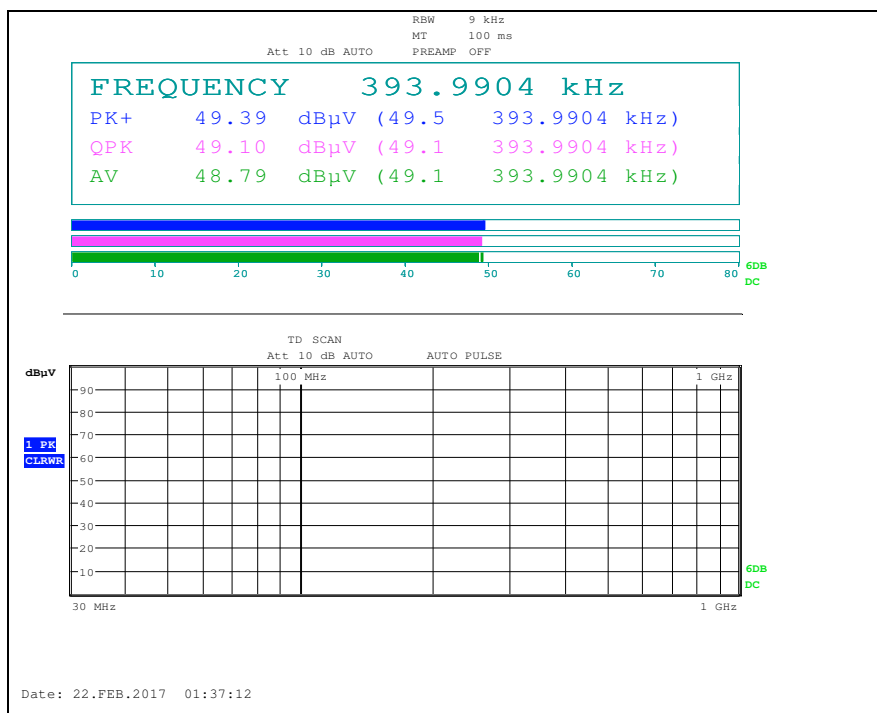
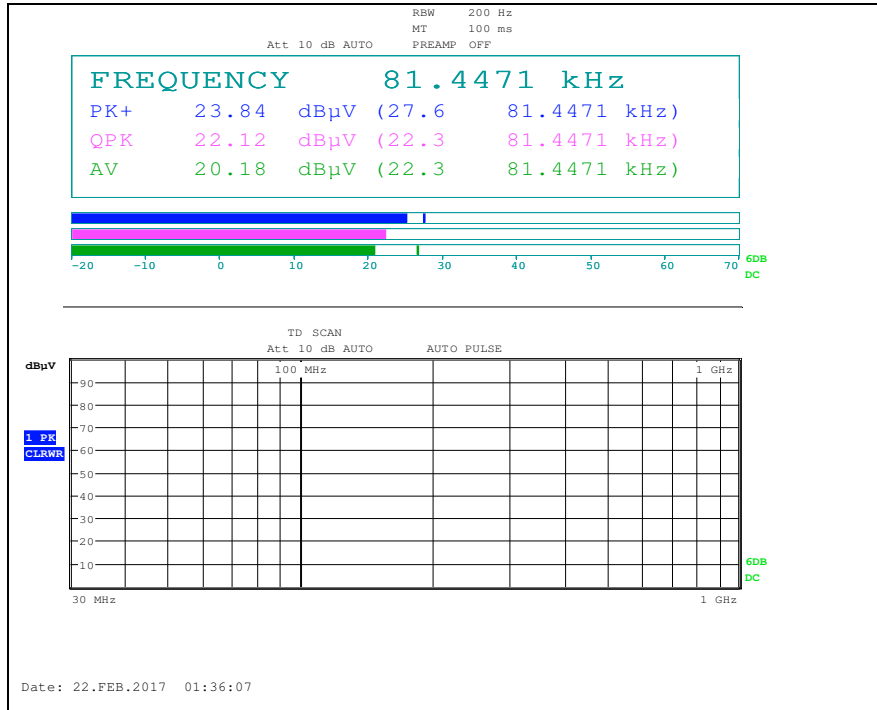
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

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A4(210 mm x 297 mm)

Test Mode : Ant2 in DC 9 V condition
Charging mode (less than 1 % battery status of client device)



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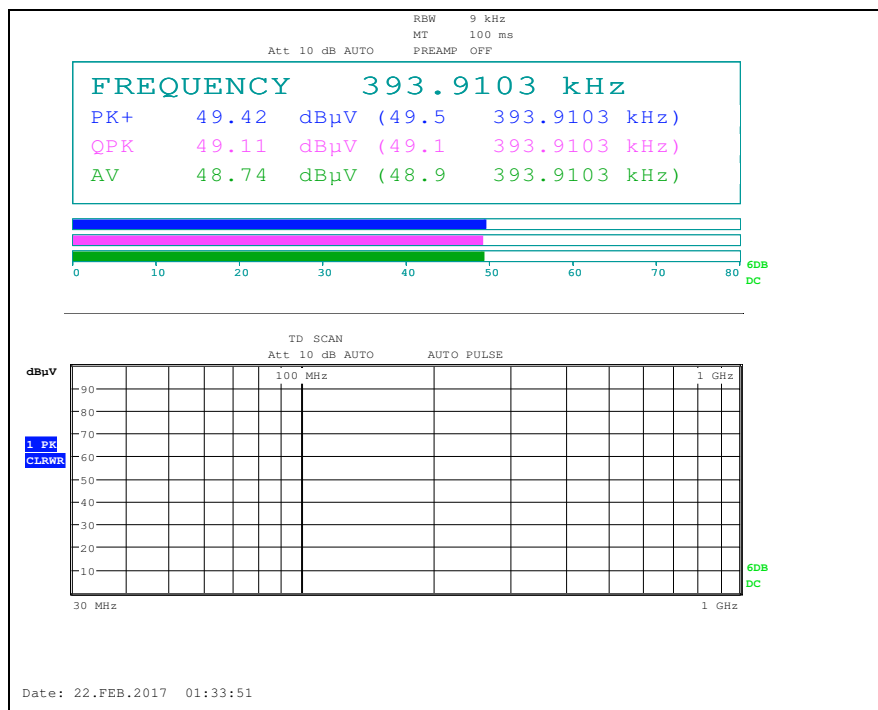
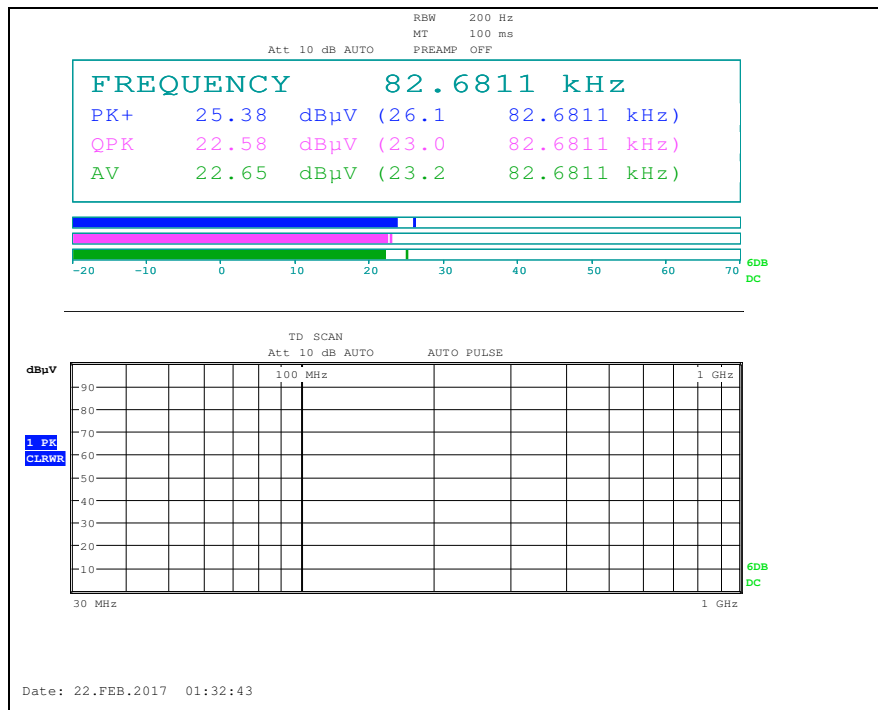
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

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Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

Charging mode (less than 50 % battery status of client device)



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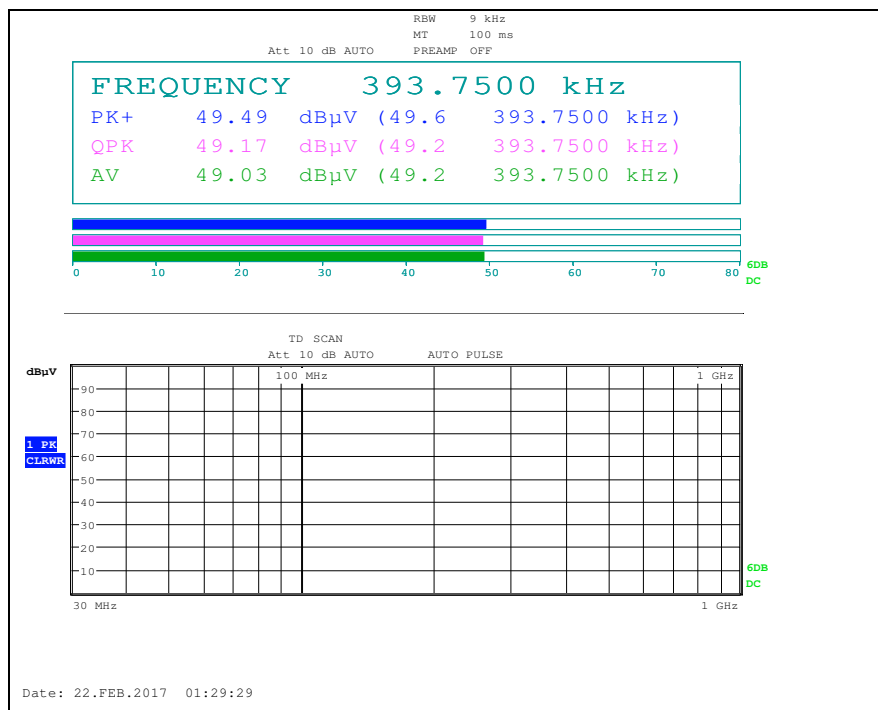
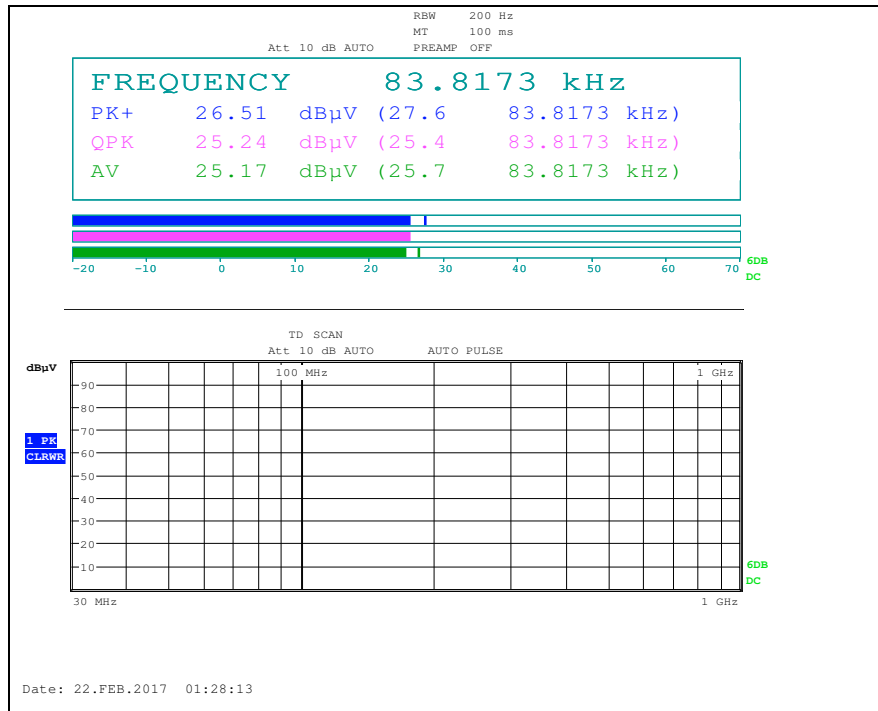
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

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Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

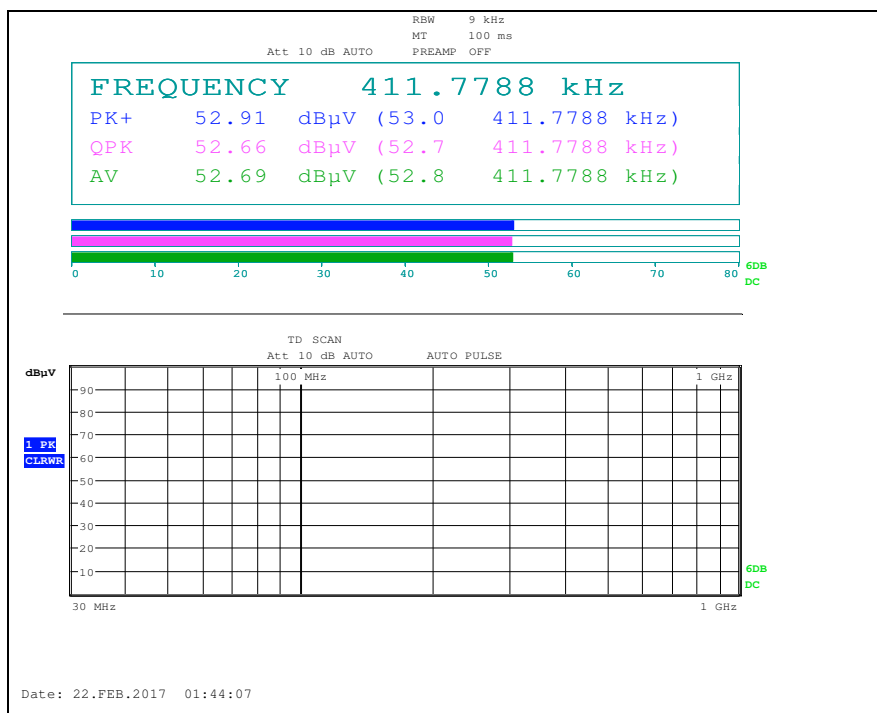
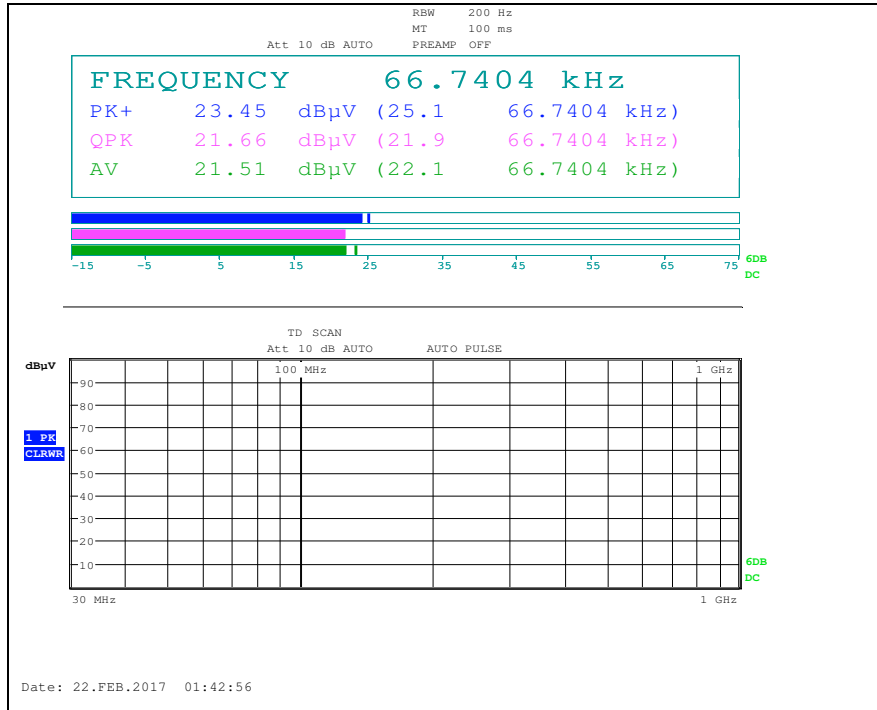
Charging mode (100% battery status of client device)



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Test Mode : Ant3 in DC 9 V condition
Charging mode (less than 1 % battery status of client device)



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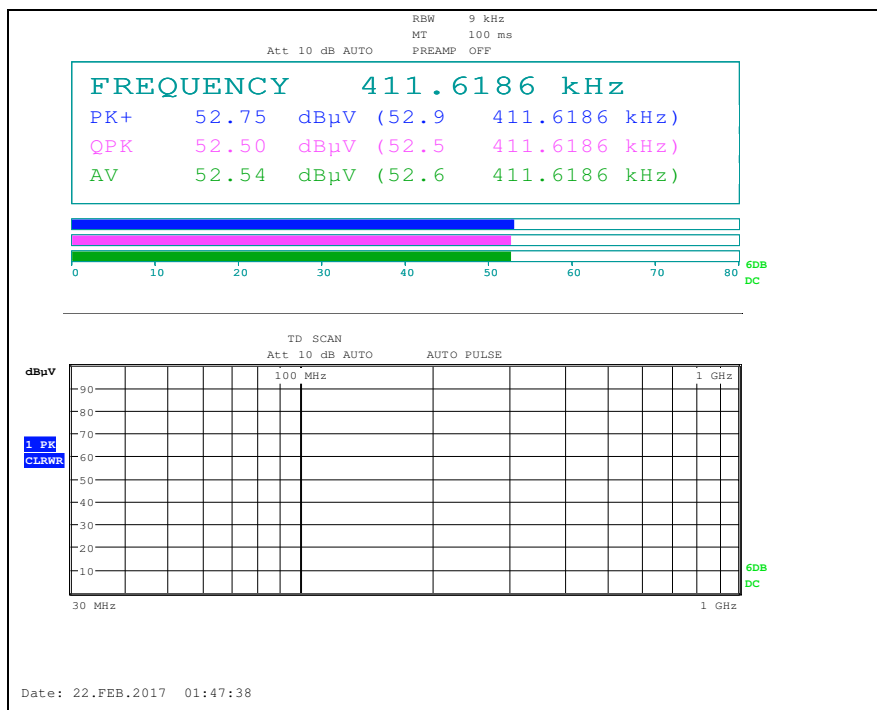
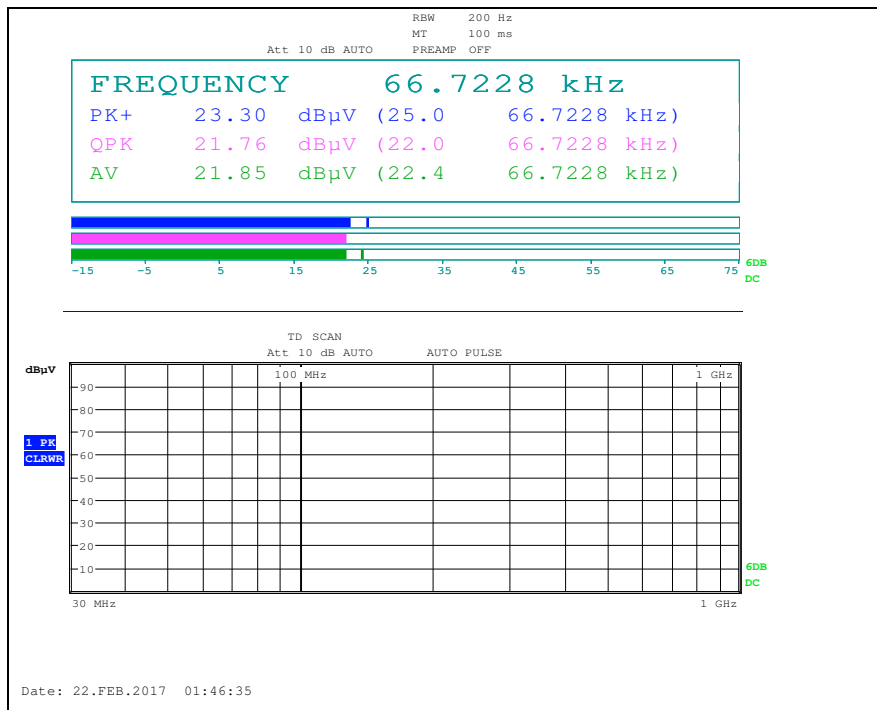
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A4(210 mm x 297 mm)

Charging mode (less than 50 % battery status of client device)



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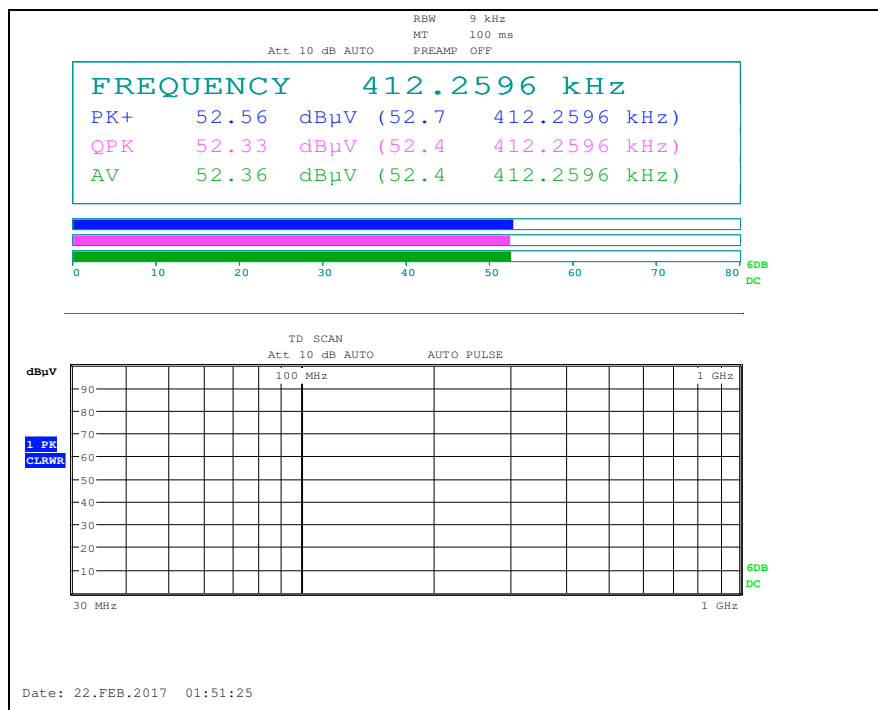
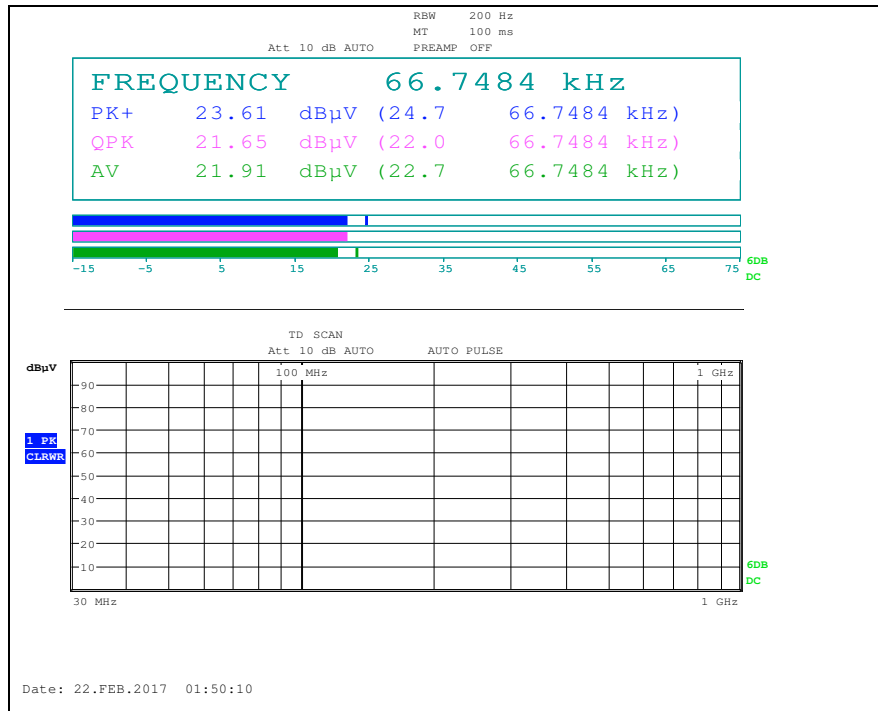
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

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A4(210 mm x 297 mm)

Charging mode (100% battery status of client device)



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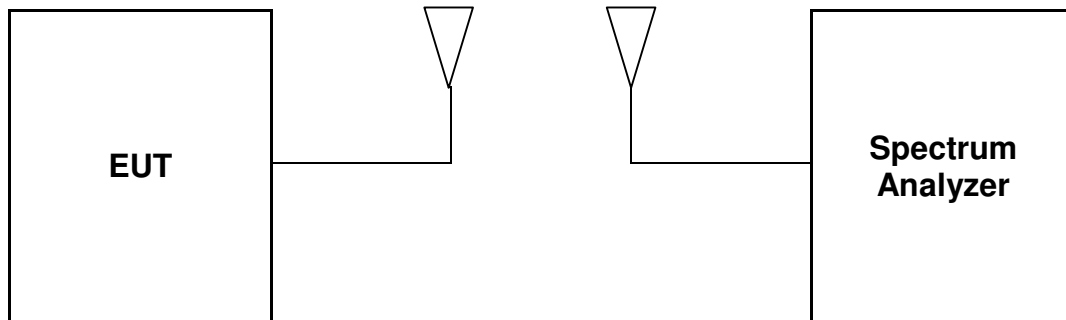
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A4(210 mm x 297 mm)

3. 20 dB Bandwidth

3.1. Test Setup



3.2. Limit

None; for reporting purposed only

3.3. Test Procedure

- a. Span = between 2 to 5 times the 20 dB Bandwidth,
RBW = in the range of 1 % to 5 % of the 20 dB Bandwidth,
VBW = approximately 3 x RBW, 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.

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A4(210 mm x 297 mm)

3.4. Test Result

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

-DC 5 V

Test condition	EUT status	20 dB Bandwidth (Hz)	Limit
Ant 1	With client device (100 % battery status)	42.330	Reporting proposed only
Ant 2	With client device (100 % battery status)	49.560	Reporting proposed only
Ant 3	With client device (100 % battery status)	31.480	Reporting proposed only

-DC 9 V

Test condition	EUT status	20 dB Bandwidth (Hz)	Limit
Ant 1	With client device (100 % battery status)	35.460	Reporting proposed only
Ant 2	With client device (100 % battery status)	32.200	Reporting proposed only
Ant 3	With client device (100 % battery status)	56.620	Reporting proposed only

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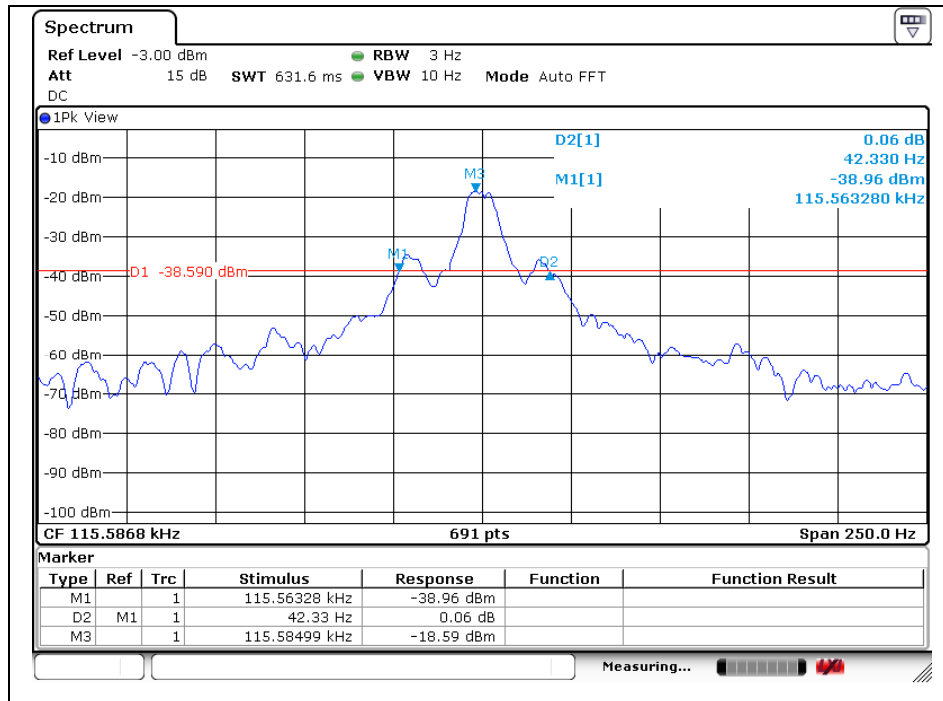
RTT5041-20(2015.10.01)(3)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

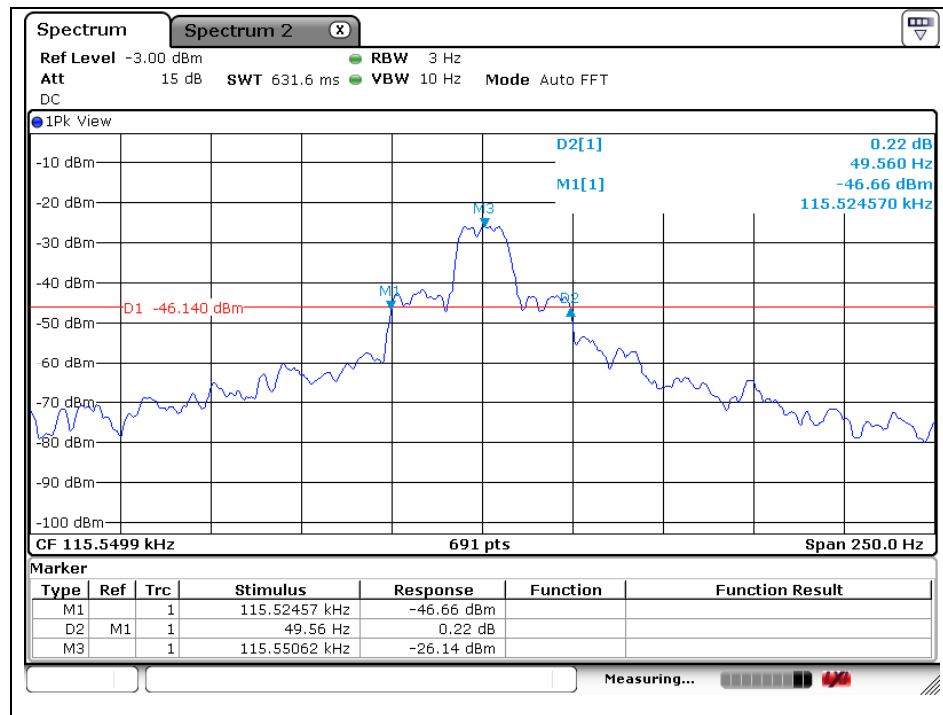
A4(210 mm x 297 mm)

20 dB Bandwidth

Test Mode : Ant1 in DC 5 V condition



Test Mode : Ant2 in DC 5 V condition



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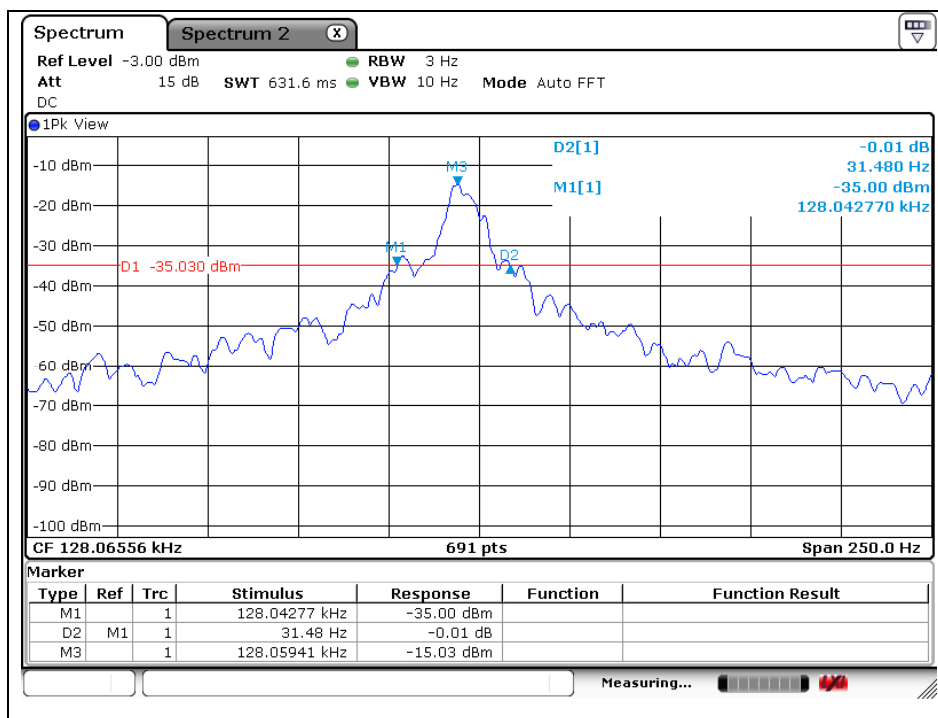
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

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A4(210 mm x 297 mm)

Test Mode : Ant3 in DC 5 V condition



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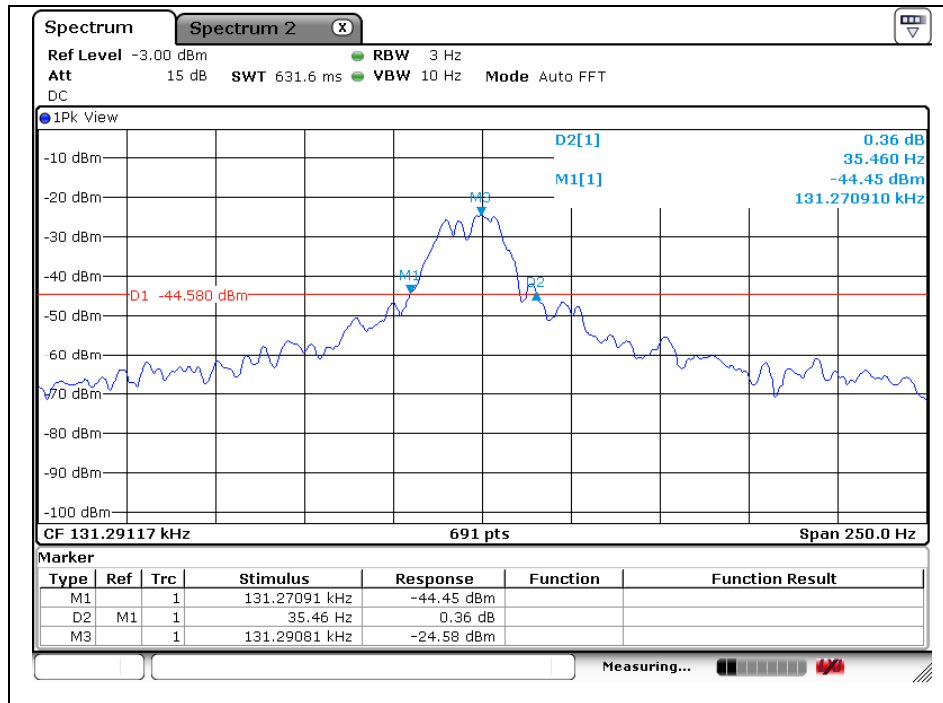
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-20(2015.10.01)(3)

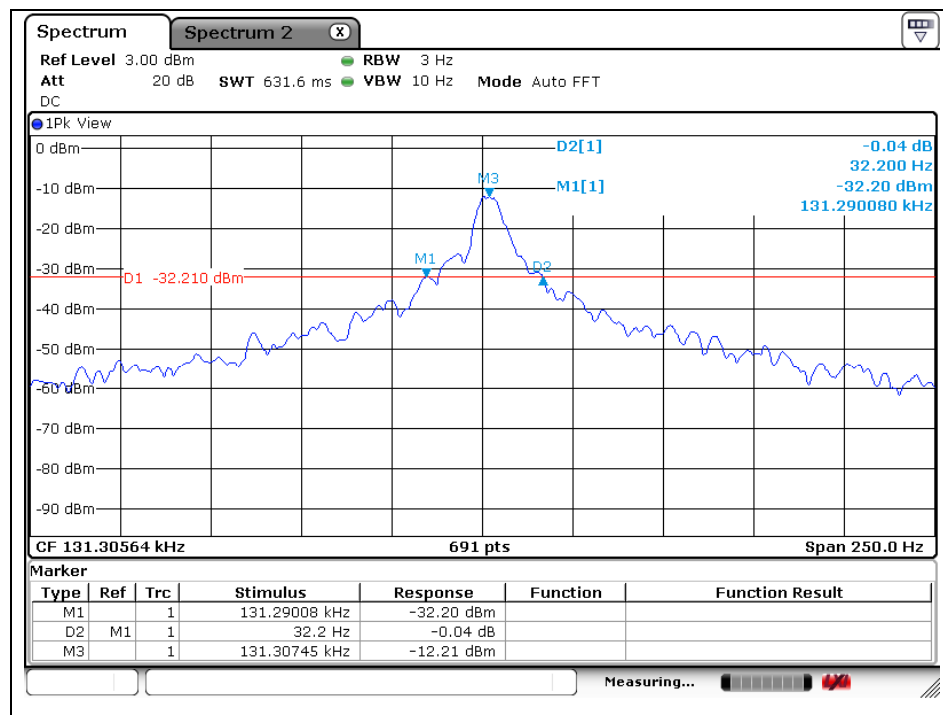
Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

Test Mode : Ant1 in DC 9 V condition



Test Mode : Ant2 in DC 9 V condition



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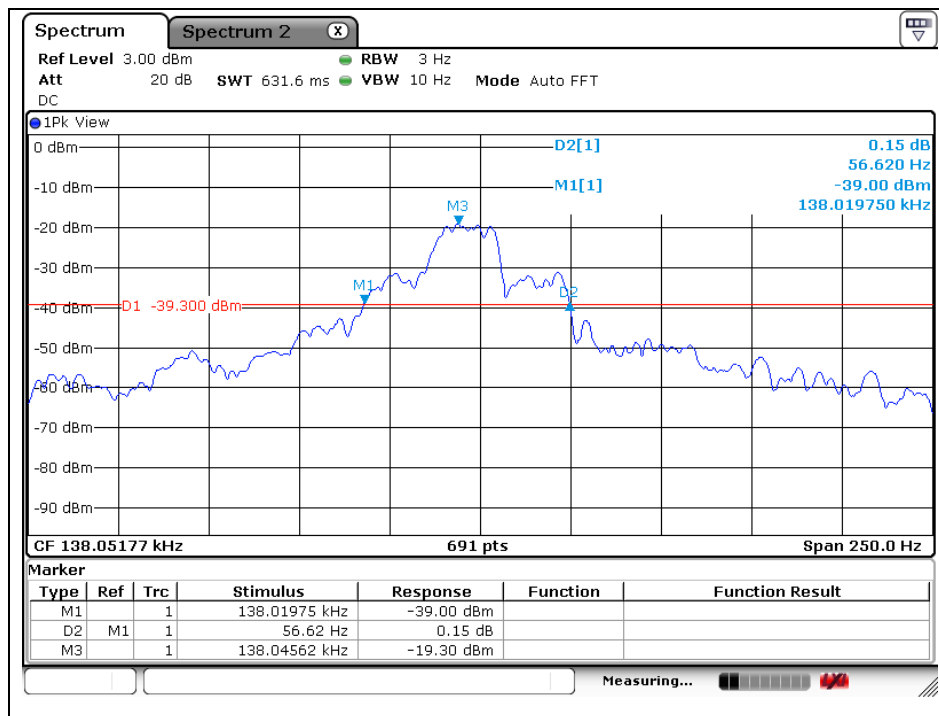
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

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A4(210 mm x 297 mm)

Test Mode : Ant3 in DC 9 V condition



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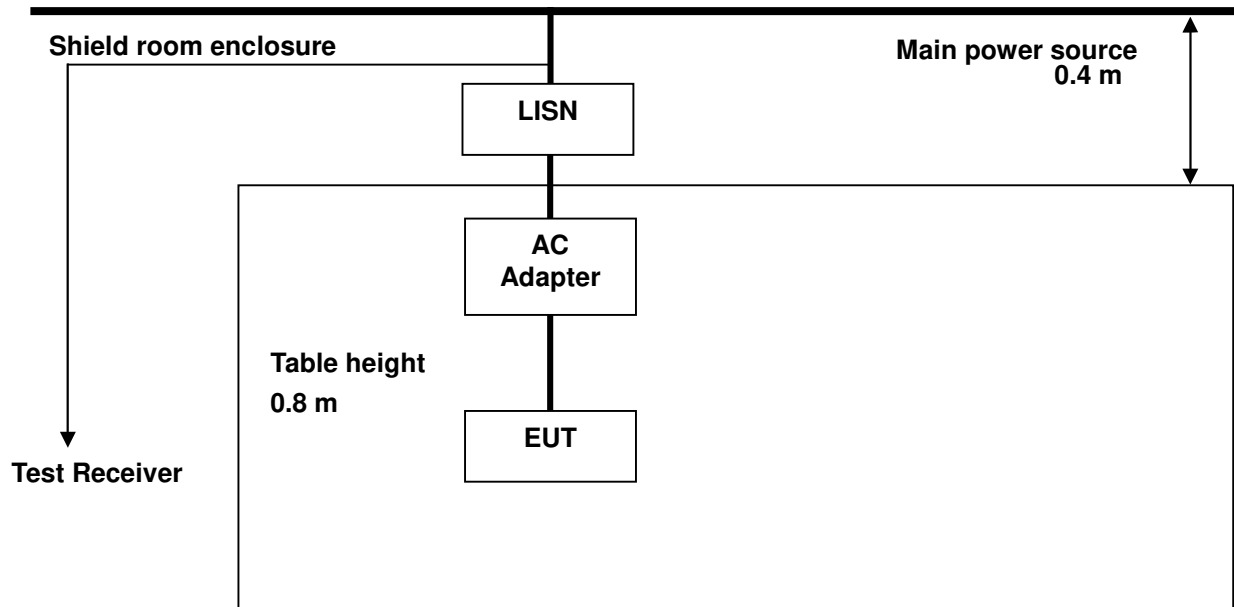
RTT5041-20(2015.10.01)(3)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

4. Transmitter 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 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H / 50 ohm line impedance stabilization network (LISN).

Compliance with the provision of this paragraph shall be on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower applies at the boundary between the frequency ranges.

Frequency of Emission (MHz)	Conducted limit (dB μ V)	
	Quasi-peak	Average
0.15 – 0.50	66 - 56*	56 - 46*
0.50 – 5.00	56	46
5.00 – 30.0	60	50

* Decreases with the logarithm of the frequency.

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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.

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A4(210 mm × 297 mm)

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) °C
Relative humidity : 47 % R.H.

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

Test Mode: Ant 1 in DC 5 V condition

Charging mode with Client device (less than 1 % status)

FREQ. (MHz)	LEVEL(dBμV)		LINE	LIMIT(dBμV)		MARGIN(dB)	
	Q-Peak	Average		Q-Peak	Average	Q-Peak	Average
0.45	28.60	18.90	N	56.88	46.88	28.28	27.98
0.92	32.20	24.50	N	56.00	46.00	23.80	21.50
1.59	31.10	22.80	N	56.00	46.00	24.90	23.20
3.50	29.80	19.20	N	56.00	46.00	26.20	26.80
4.96	31.20	22.00	N	56.00	46.00	24.80	24.00
16.80	39.40	28.70	N	60.00	50.00	20.60	21.30
0.35	31.80	21.70	H	58.96	48.96	27.16	27.26
0.46	38.40	31.60	H	56.69	46.69	18.29	15.09
1.35	31.70	20.60	H	56.00	46.00	24.30	25.40
2.22	34.40	24.30	H	56.00	46.00	21.60	21.70
4.31	36.20	26.90	H	56.00	46.00	19.80	19.10
16.21	38.20	26.40	H	60.00	50.00	21.80	23.60

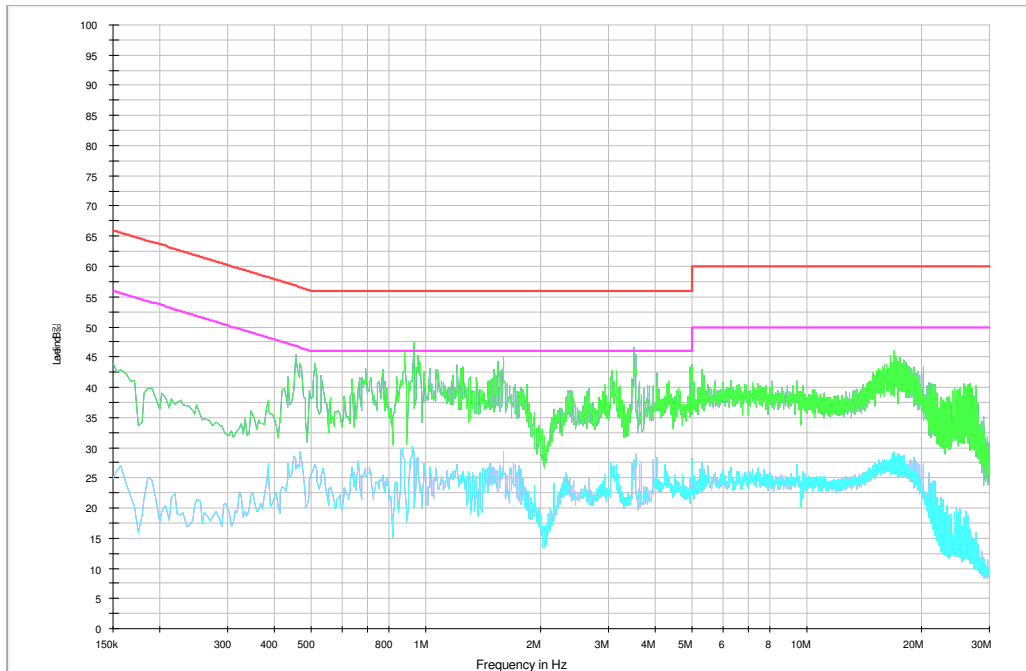
Note;

- Line (H): Hot, Line (N): Neutral
- All antennas of operation and charging mode with client device (1 %, 50 %, and 100 % of battery) were tested.
As worst condition, charging mode with client device (1 %) is reported.
- The limit for Class B device(s) from 150 kHz to 30 MHz are specified in Section of the Title 47 CFR.
- Traces shown in plot were made by using a peak detector and average detector.
- Deviations to the Specifications: None.

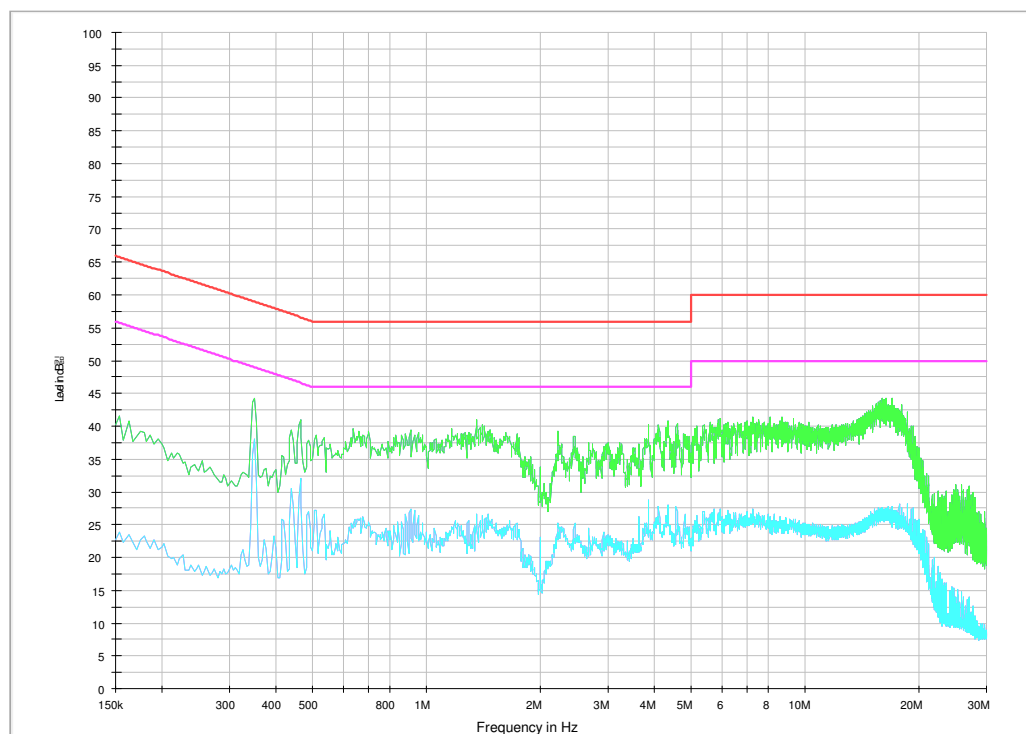
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Test mode: (Neutral)



Test mode: (Hot)



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Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

Test Mode: Ant 2 in DC 5 V condition
Charging mode with Client device (less than 1 % status)

FREQ. (MHz)	LEVEL(dB μ V)		LINE	LIMIT(dB μ V)		MARGIN(dB)	
	Q-Peak	Average		Q-Peak	Average	Q-Peak	Average
0.47	38.80	26.80	N	56.51	46.51	17.71	19.71
1.10	33.10	20.40	N	56.00	46.00	22.90	25.60
1.40	33.70	24.70	N	56.00	46.00	22.30	21.30
2.95	33.80	22.90	N	56.00	46.00	22.20	23.10
5.76	36.10	25.40	N	60.00	50.00	23.90	24.60
24.47	33.50	15.00	N	60.00	50.00	26.50	35.00
0.51	33.80	24.20	H	56.00	46.00	22.20	21.80
0.88	25.10	15.10	H	56.00	46.00	30.90	30.90
3.52	31.90	20.20	H	56.00	46.00	24.10	25.80
6.73	36.60	26.50	H	60.00	50.00	23.40	23.50
10.82	31.50	21.00	H	60.00	50.00	28.50	29.00
14.43	30.90	20.70	H	60.00	50.00	29.10	29.30

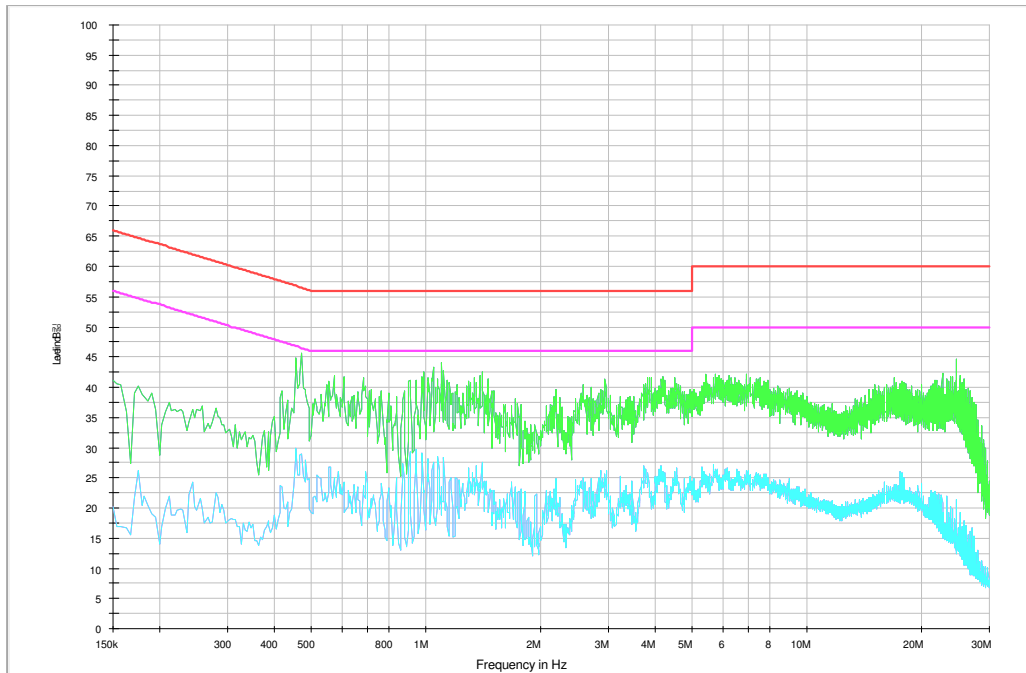
Note;

- Line (H): Hot, Line (N): Neutral
- All antennas of operation and charging mode with client device (1 %, 50 %, and 100 % of battery) were tested.
As worst condition, charging mode with client device (1 %) is reported.
- The limit for Class B device(s) from 150 kHz to 30 MHz are specified in Section of the Title 47 CFR.
- Traces shown in plot were made by using a peak detector and average detector.
- Deviations to the Specifications: None.

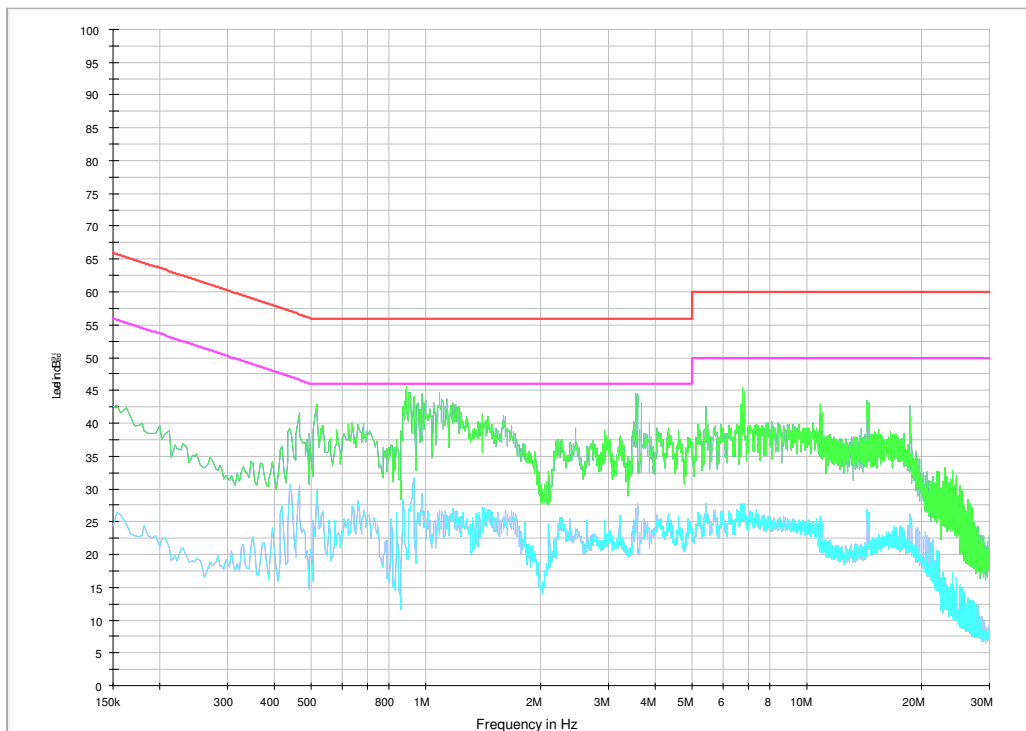
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Test mode: (Neutral)



Test mode: (Hot)



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Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

Test Mode: Ant 3 in DC 5 V condition
Charging mode with Client device (less than 1 % status)

FREQ. (MHz)	LEVEL(dB μ V)		LINE	LIMIT(dB μ V)		MARGIN(dB)	
	Q-Peak	Average		Q-Peak	Average	Q-Peak	Average
0.45	30.90	21.50	N	56.88	46.88	25.98	25.38
0.97	34.80	25.50	N	56.00	46.00	21.20	20.50
1.45	31.00	20.40	N	56.00	46.00	25.00	25.60
2.90	33.40	25.00	N	56.00	46.00	22.60	21.00
5.76	35.50	25.10	N	60.00	50.00	24.50	24.90
16.70	33.20	24.50	N	60.00	50.00	26.80	25.50
0.47	41.10	32.20	H	56.51	46.51	15.41	14.31
0.97	38.40	29.40	H	56.00	46.00	17.60	16.60
2.77	35.90	26.30	H	56.00	46.00	20.10	19.70
3.99	37.90	29.10	H	56.00	46.00	18.10	16.90
6.02	35.00	25.90	H	60.00	50.00	25.00	24.10
16.45	32.30	22.00	H	60.00	50.00	27.70	28.00

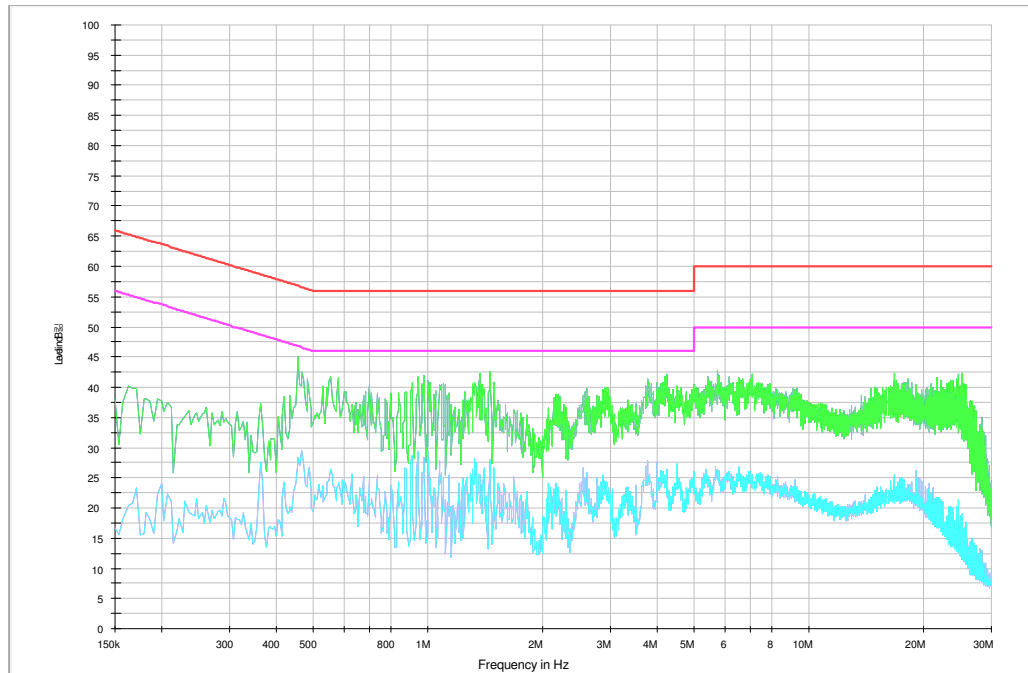
Note;

- Line (H): Hot, Line (N): Neutral
- All antennas of operation and charging mode with client device (1 %, 50 %, and 100 % of battery) were tested.
As worst condition, charging mode with client device (1 %) is reported.
- The limit for Class B device(s) from 150 kHz to 30 MHz are specified in Section of the Title 47 CFR.
- Traces shown in plot were made by using a peak detector and average detector.
- Deviations to the Specifications: None.

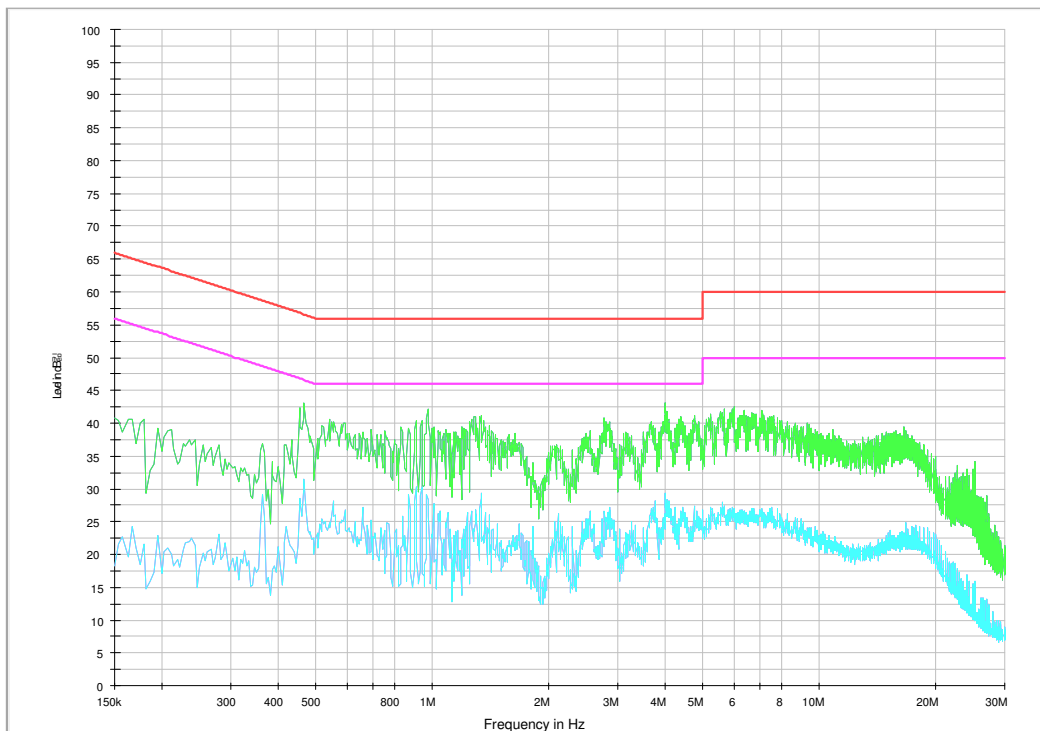
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Test mode: (Neutral)



Test mode: (Hot)



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RTT5041-20(2015.10.01)(3)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

Test Mode: Ant 1 in DC 9 V condition
Charging mode with Client device (less than 1 % status)

FREQ. (MHz)	LEVEL(dB μ V)		LINE	LIMIT(dB μ V)		MARGIN(dB)	
	Q-Peak	Average		Q-Peak	Average	Q-Peak	Average
0.68	39.60	27.30	N	56.00	46.00	16.40	18.70
0.99	40.00	32.90	N	56.00	46.00	16.00	13.10
1.31	38.80	26.40	N	56.00	46.00	17.20	19.60
2.21	36.90	19.30	N	56.00	46.00	19.10	26.70
3.09	35.50	19.90	N	56.00	46.00	20.50	26.10
16.85	29.90	18.50	N	60.00	50.00	30.10	31.50
0.70	25.00	10.80	H	56.00	46.00	31.00	35.20
1.30	41.90	26.30	H	56.00	46.00	14.10	19.70
2.21	40.70	21.10	H	56.00	46.00	15.30	24.90
3.07	40.70	25.80	H	56.00	46.00	15.30	20.20
4.15	37.90	22.60	H	56.00	46.00	18.10	23.40
14.15	31.90	23.40	H	60.00	50.00	28.10	26.60

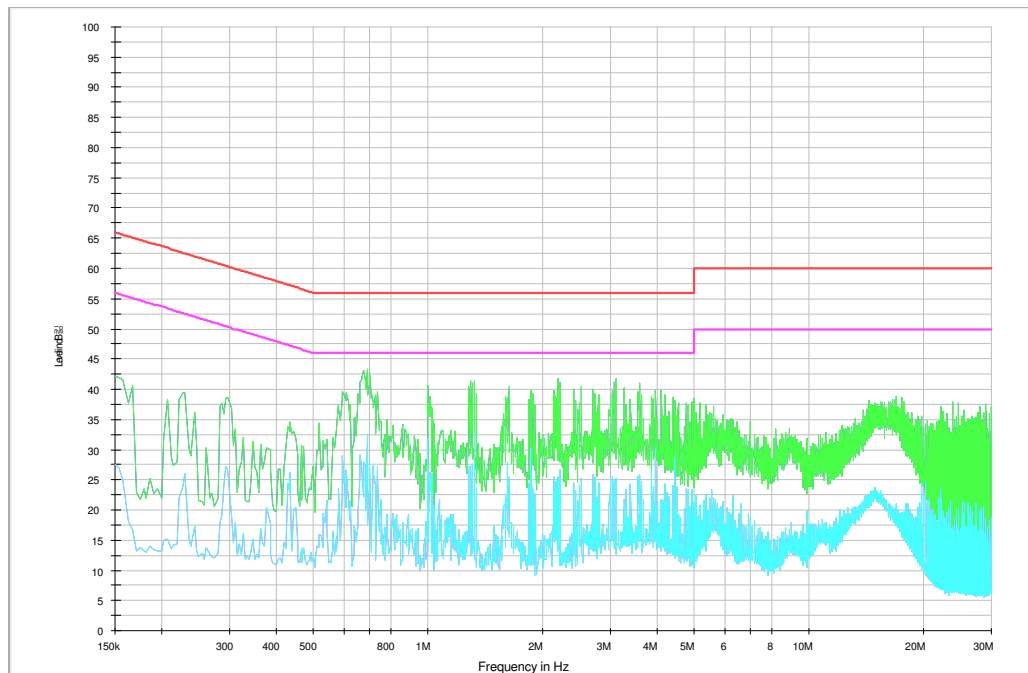
Note;

- Line (H): Hot, Line (N): Neutral
- All antennas of operation and charging mode with client device (1 %, 50 %, and 100 % of battery) were tested.
As worst condition, charging mode with client device (1 %) is reported.
- The limit for Class B device(s) from 150 kHz to 30 MHz are specified in Section of the Title 47 CFR.
- Traces shown in plot were made by using a peak detector and average detector.
- Deviations to the Specifications: None.

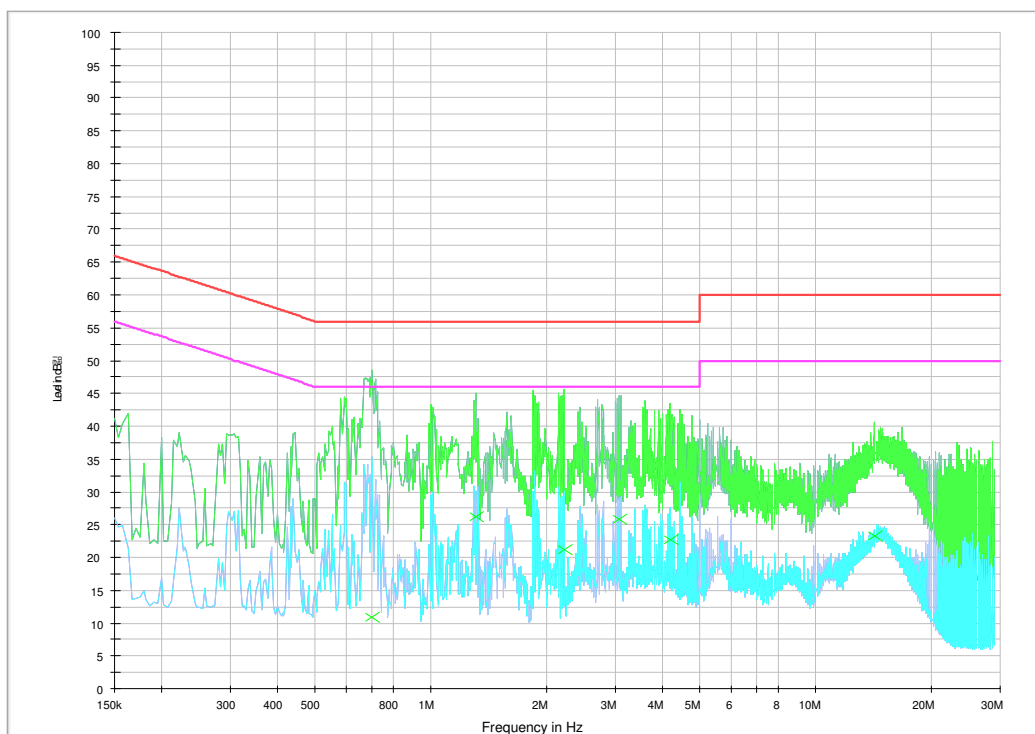
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Test mode: (Neutral)



Test mode: (Hot)



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RTT5041-20(2015.10.01)(3)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

Test Mode: Ant 2 in DC 9 V condition
Charging mode with Client device (less than 1 % status)

FREQ. (MHz)	LEVEL(dB μ V)		LINE	LIMIT(dB μ V)		MARGIN(dB)	
	Q-Peak	Average		Q-Peak	Average	Q-Peak	Average
0.44	37.10	26.80	N	57.06	47.06	19.96	20.26
0.71	40.80	26.30	N	56.00	46.00	15.20	19.70
1.27	37.30	22.70	N	56.00	46.00	18.70	23.30
1.57	39.10	24.90	N	56.00	46.00	16.90	21.10
2.39	38.40	24.00	N	56.00	46.00	17.60	22.00
16.31	30.80	20.60	N	60.00	50.00	29.20	29.40
0.42	40.80	27.60	H	57.45	47.45	16.65	19.85
0.71	44.00	32.10	H	56.00	46.00	12.00	13.90
1.56	42.40	28.30	H	56.00	46.00	13.60	17.70
2.39	41.70	27.90	H	56.00	46.00	14.30	18.10
3.35	39.70	24.60	H	56.00	46.00	16.30	21.40
14.60	32.80	24.40	H	60.00	50.00	27.20	25.60

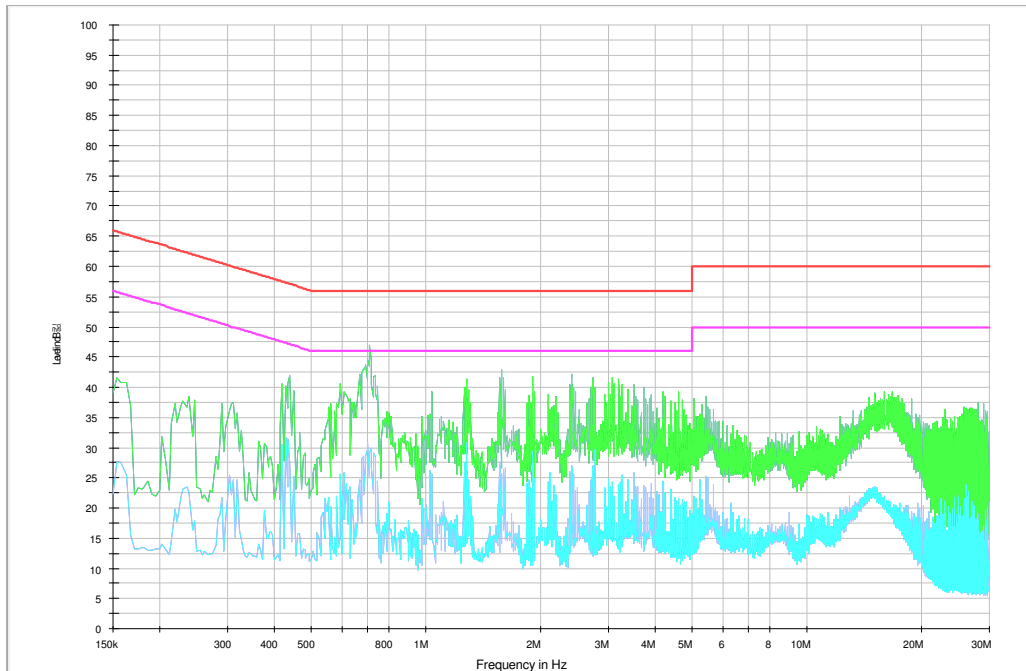
Note;

- Line (H): Hot, Line (N): Neutral
- All antennas of operation and charging mode with client device (1 %, 50 %, and 100 % of battery) were tested.
As worst condition, charging mode with client device (1 %) is reported.
- The limit for Class B device(s) from 150 kHz to 30 MHz are specified in Section of the Title 47 CFR.
- Traces shown in plot were made by using a peak detector and average detector.
- Deviations to the Specifications: None.

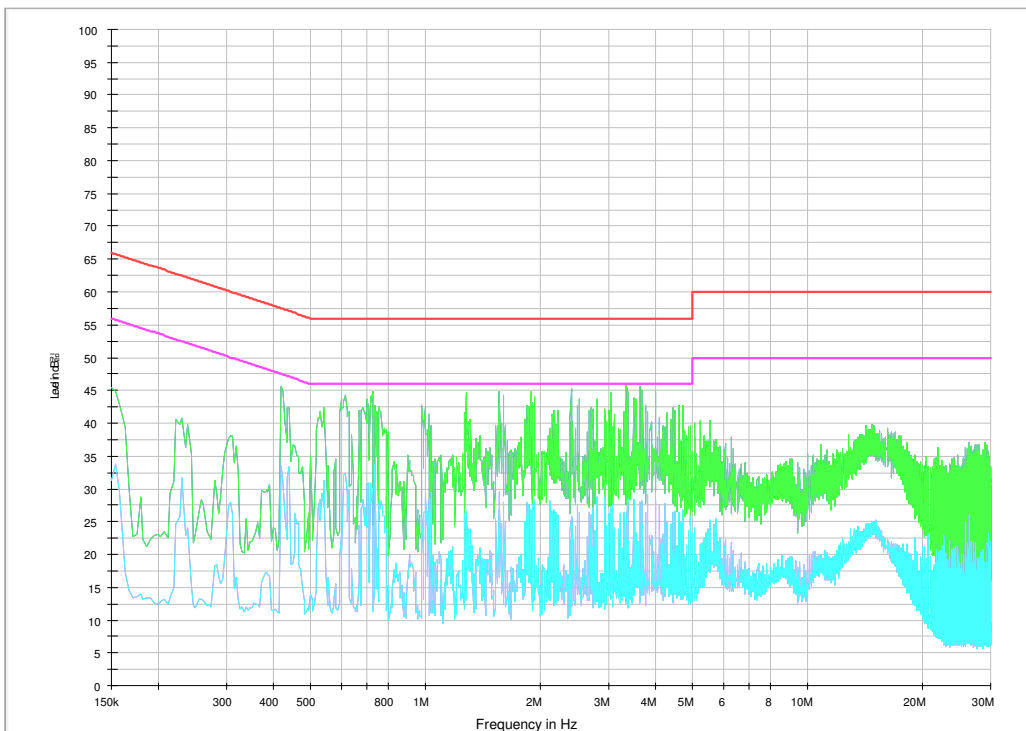
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Test mode: (Neutral)



Test mode: (Hot)



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RTT5041-20(2015.10.01)(3)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

Test Mode: Ant 3 in DC 9 V condition
Charging mode with Client device (less than 1 % status)

FREQ. (MHz)	LEVEL(dB μ V)		LINE	LIMIT(dB μ V)		MARGIN(dB)	
	Q-Peak	Average		Q-Peak	Average	Q-Peak	Average
0.16	37.40	26.00	N	65.46	55.46	28.06	29.46
0.42	34.80	28.00	N	57.45	47.45	22.65	19.45
0.69	40.50	30.20	N	56.00	46.00	15.50	15.80
2.59	40.60	29.70	N	56.00	46.00	15.40	16.30
5.87	23.80	14.80	N	60.00	50.00	36.20	35.20
17.13	29.90	18.20	N	60.00	50.00	30.10	31.80
0.42	38.50	30.00	H	57.45	47.45	18.95	17.45
0.70	45.30	31.20	H	56.00	46.00	10.70	14.80
1.10	35.60	21.40	H	56.00	46.00	20.40	24.60
2.41	31.20	18.10	H	56.00	46.00	24.80	27.90
3.85	28.60	17.60	H	56.00	46.00	27.40	28.40
16.51	30.60	20.40	H	60.00	50.00	29.40	29.60

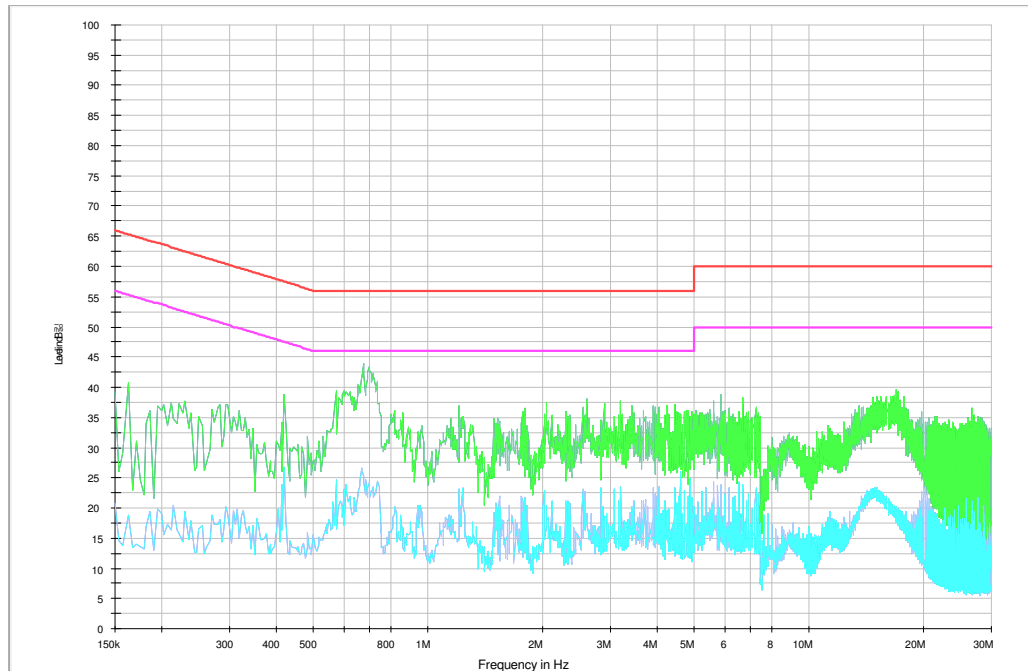
Note;

- Line (H): Hot, Line (N): Neutral
- All antennas of operation and charging mode with client device (1 %, 50 %, and 100 % of battery) were tested.
As worst condition, charging mode with client device (1 %) is reported.
- The limit for Class B device(s) from 150 kHz to 30 MHz are specified in Section of the Title 47 CFR.
- Traces shown in plot were made by using a peak detector and average detector.
- Deviations to the Specifications: None.

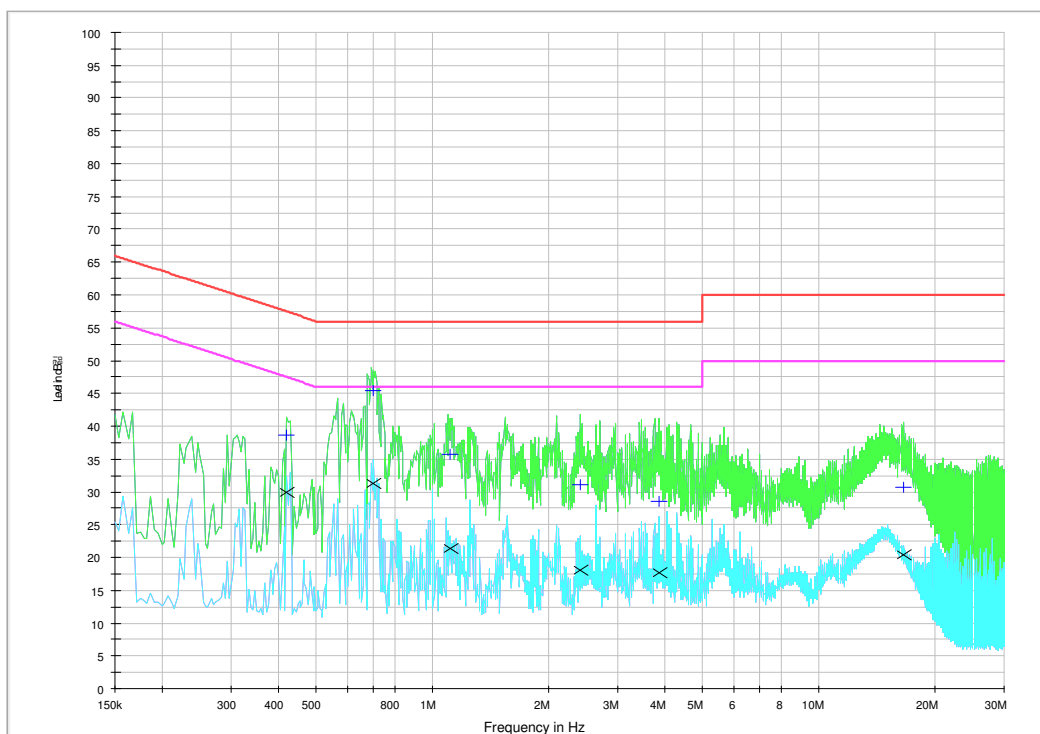
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Test mode: (Neutral)



Test mode: (Hot)



- End of the Test Report -

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RTT5041-20(2015.10.01)(3)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)