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TEST REPORT

of

FCC Part 15 Subpart C §15.209

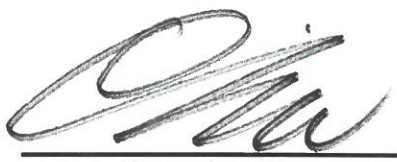
FCC ID: 2AV76-NMOK-101W

1. Equipment Under Test	:	WIRELESS POWER CHARGING SYSTEM
2. Model Name	:	NMOK-101W
3. Variant Model Name(s)	:	(-)
4. Applicant	:	NIDEC MOBILITY KOREA CORPORATION
5. Manufacturer	:	NIDEC MOBILITY KOREA CORPORATION
6. Date of Receipt	:	2020.03.06
7. Date of Test(s)	:	2020.03.20 ~ 2020.04.22
8. Date of Issue	:	2020.04.29

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:  **Jinhyoung Cho**

Technical Manager:  **Hyunchae You**

SGS Korea Co., Ltd. Gunpo Laboratory

Table of Contents

Page

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	:	NIDEC MOBILITY KOREA CORPORATION
Address	:	790-12, Bogaewonsam-ro, Bogae-myeon, Anseong-si, Gyeonggi-do, South Korea, 17507
Contact Person	:	Nam, Sang-Il
Phone No.	:	+82 2 850 5789

1.3. Details of Manufacturer

Company	:	Same as applicant
Address	:	Same as applicant

1.4. Description of EUT

Kind of Product	WIRELESS POWER CHARGING SYSTEM	
Model Name	NMOK-101W	
Power Supply	DC 13.5 V	
Frequency Range	5 W	Ant. 1: 120 ㎑ Ant. 2: 120 ㎑ Ant. 3: 120 ㎑
	10 W	Ant. 1: 120 ㎑ Ant. 2: 120 ㎑ Ant. 3: 120 ㎑
Antenna Type	Inductive loop coil antenna	

1.5. Declaration by the Manufacturer

- The EUT has 3 loop coil antennas with one amplifier, and only one antenna can transmit at once.

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	259067	Jun. 10, 2019	Annual	Jun. 10, 2020
DC Power Supply	Agilent	U8002A	MY53150029	Jun. 10, 2019	Annual	Jun. 10, 2020
Test Receiver	R&S	ESU26	100109	Feb. 18, 2020	Annual	Feb. 18, 2021
Amplifier	H.P.	8447F	2944A03909	Aug. 07, 2019	Annual	Aug. 07, 2020
Loop Antenna	Schwarzbeck Mess-Elektronik	FMZB 1519	1519-039	Aug. 22, 2019	Biennial	Aug. 22, 2021
Bilog Antenna	Schwarzbeck Mess-Elektronik	VULB 9163	396	Mar. 21, 2019	Biennial	Mar. 21, 2021
Antenna Master	Innco systems GmbH	MA4640-XP-ET	MA4640/536/38330516/L	N.C.R.	N/A	N.C.R.
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	CO3000/963/38330516/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	SUCOFLEX	104 (3 m)	MY3258414	Jan. 28, 2020	Semi-annual	Jul. 28, 2020
Coaxial Cable	SUCOFLEX	104 (10 m)	MY3145814	Jan. 28, 2020	Semi-annual	Jul. 28, 2020

▶ Support **Equipment**

Description	Manufacturer	Model	FCC ID
Samsung Mobile Phone	Samsung Electronics Co., Ltd.	SM-G900L	A3LSMG900S
		SM-G955N	A3LSMG955N

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)

1.8. Worst Case of Test Configurations

Charging mode with client device	Mode		Description
Model: SM-G900L FCC ID: A3LSMG900S	5 W	10 W	1 % of battery 50 % of battery 99 % of battery
Model: SM-G955N FCC ID: A3LSMG955N	Ant. 1 Ant. 2 Ant. 3	Ant. 1 Ant. 2 Ant. 3	

Note;

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

1.9. Summary of Test Result

The EUT has been tested according to the following specification:

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	N/A[1)]

Note;

1) The AC power line test was not performed because the EUT use battery power for operation and which do not operate from the AC power lines.

1.10. Measurement Uncertainty

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

Parameter	Uncertainty
Occupied Bandwidth	± 9.66 ㎑
Radiated Disturbance, 9 ㎑ to 30 ㎒	± 3.59 ㏈
Radiated Disturbance, below 1 ㎓	± 5.88 ㏈

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

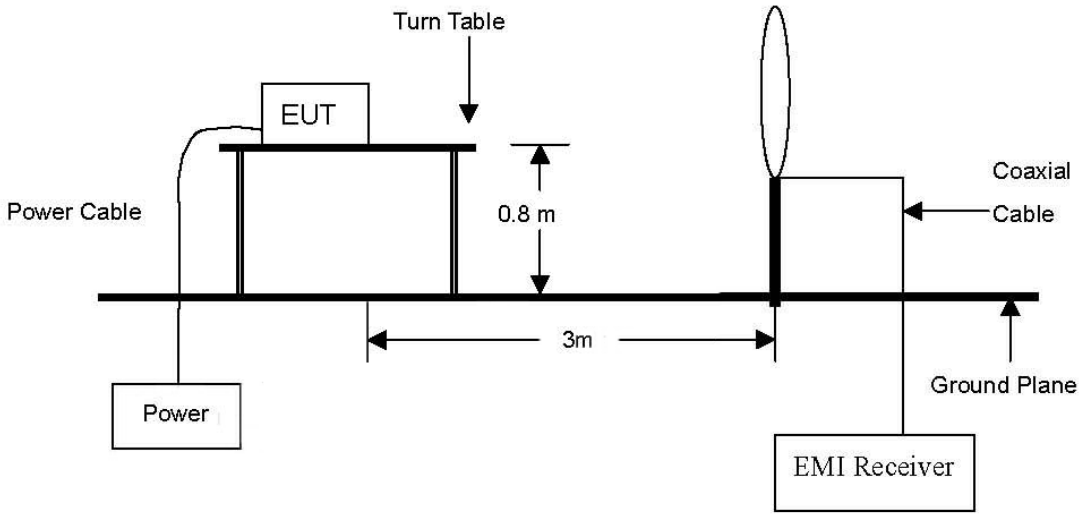
1.11. Test Report Revision

Revision	Report Number	Date of Issue	Description
0	F690501-RF-RTL000607	2020.04.29	Initial

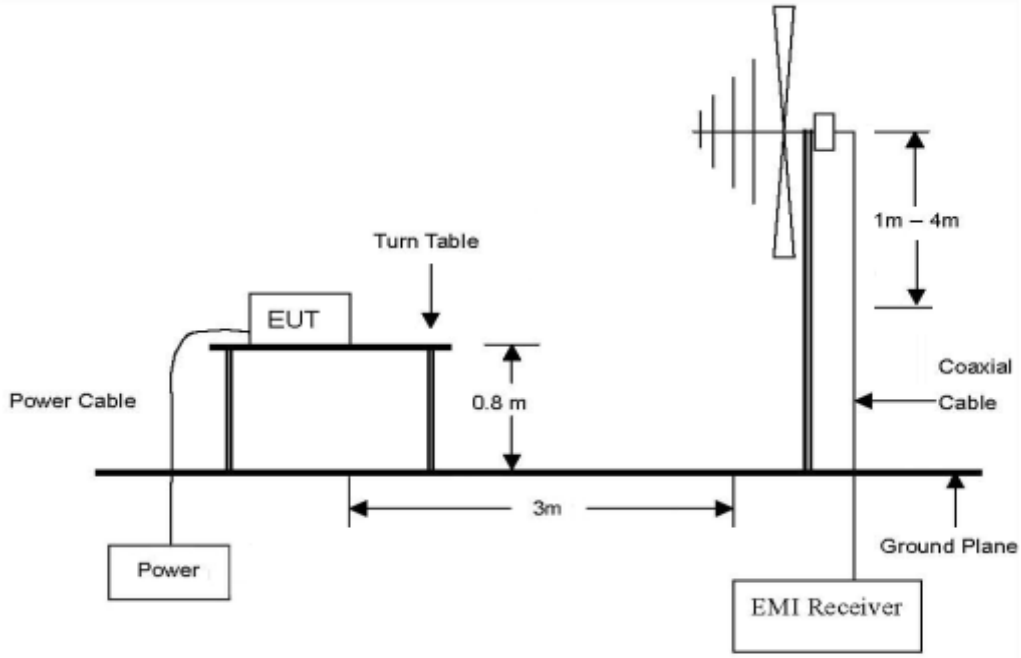
2. Field Strength of Fundamental and Spurious Emission

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 both polarizations of horizontal and vertical.

Test Condition: 5 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									
0.121	66.60	Average	H	17.80	0.07	84.47	4.47	25.95	21.48
Ant. 2									
0.121	60.10	Average	H	17.80	0.07	77.97	-2.03	25.95	27.98
Ant. 3									
0.121	73.20	Average	H	17.80	0.07	91.07	11.07	25.95	14.88

Test Condition: 10 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									
0.121	70.30	Average	H	17.80	0.07	88.17	8.17	25.95	17.78
Ant. 2									
0.121	62.20	Average	H	17.80	0.07	80.07	0.07	25.95	25.88
Ant. 3									
0.121	68.40	Average	H	17.80	0.07	86.27	6.27	25.95	19.68

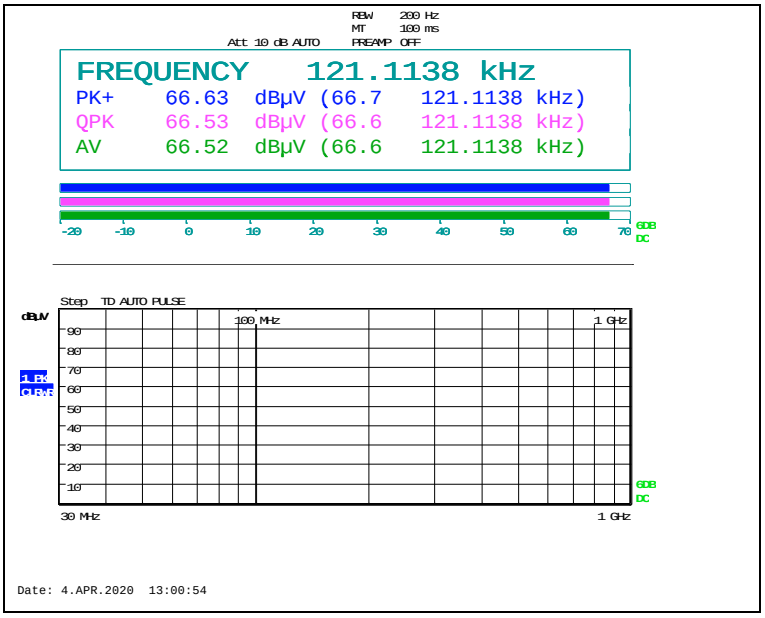
Remark;

1. According to §15.31(f)(2),
   - 300 m Result (dBμV/m) = 3 m Result (dBμV/m) - 40log (300/3) (dBμV/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 ㎑: 20 log (2 400 / F (㎑)) at 300 m (dBμV/m)
   - 490 ㎑ to 1.705 ㎒: 20log (24 000/F (㎑)) at 30 m (dBμV/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).

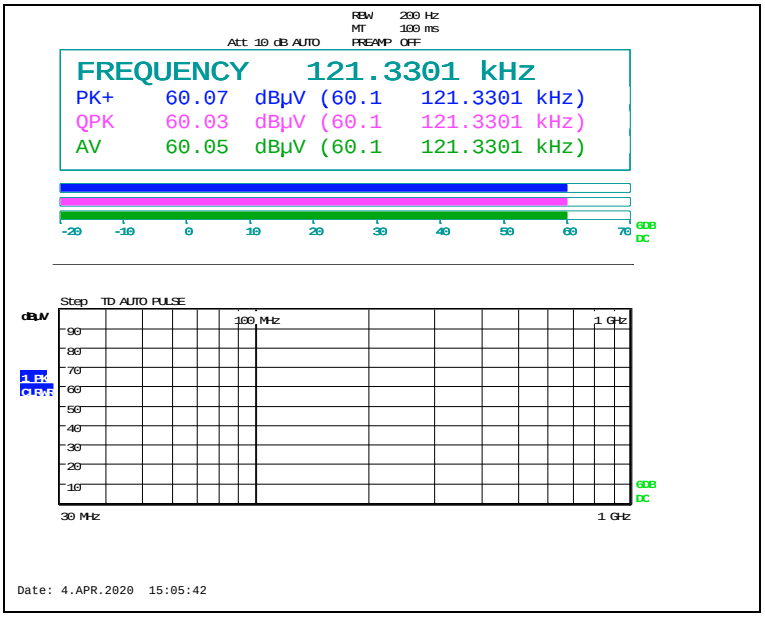
- **Test plots**

Test Condition: 5 W Operating mode with client device (1 % battery status of client device)

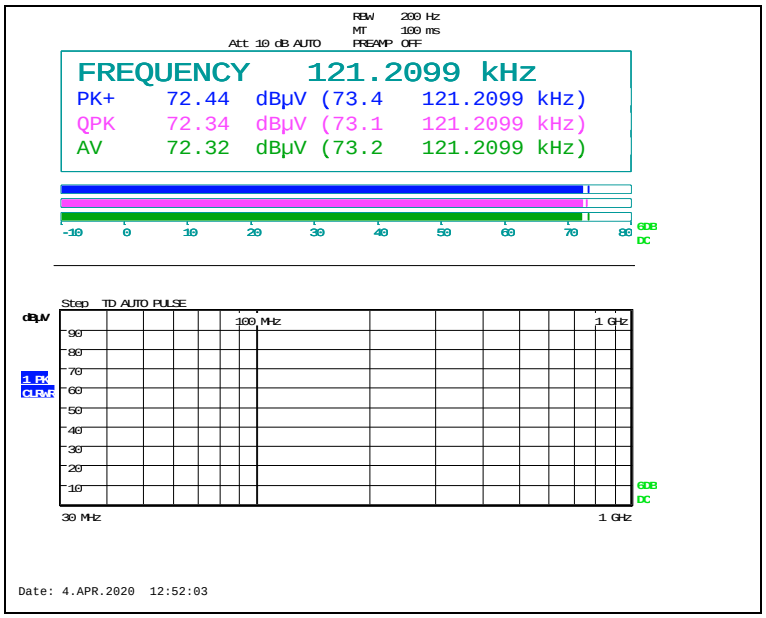
Ant. 1



Ant. 2

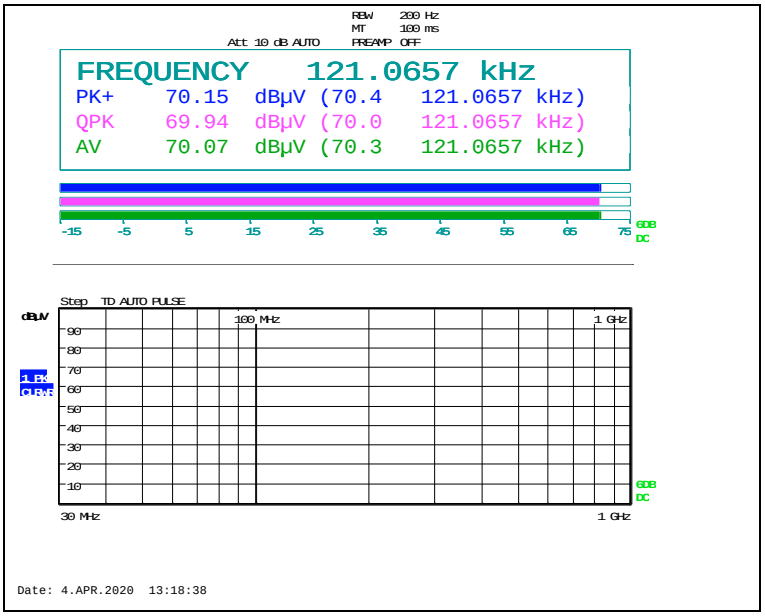


Ant. 3

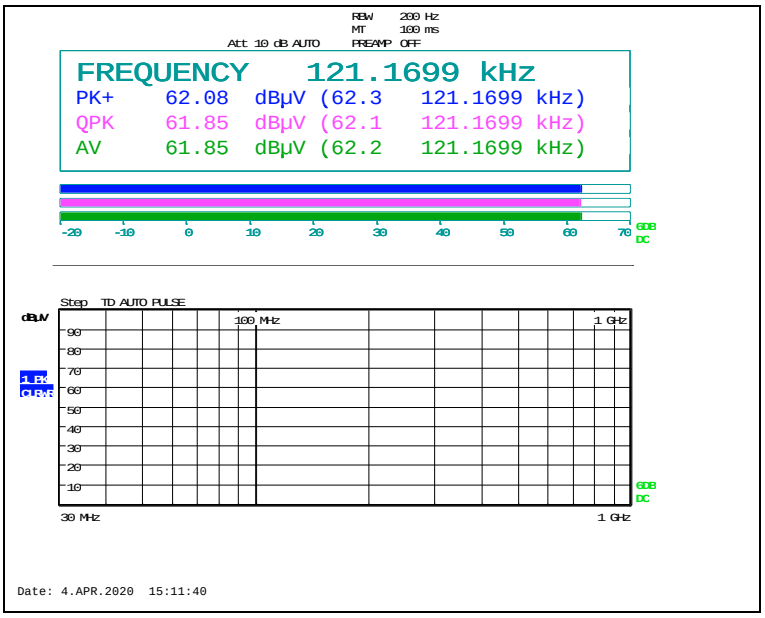

RBW 200 Hz
MT 100 ms
Att 10 dB AUTO PREAMP OFF
FREQUENCY 121.2099 kHz
PK+ 72.44 dBµV (73.4 121.2099 kHz)
QPK 72.34 dBµV (73.1 121.2099 kHz)
AV 72.32 dBµV (73.2 121.2099 kHz)
-10 0 10 20 30 40 50 60 70 80
dB
DC
Step TD AUTO PULSE
dBµV
100 MHz
1 GHz
90
80
70
60
50
40
30
20
10
30 MHz
1 GHz
Date: 4.APR.2020 12:52:03

Test Condition: 10 W Operating mode with client device (1 % battery status of client device)

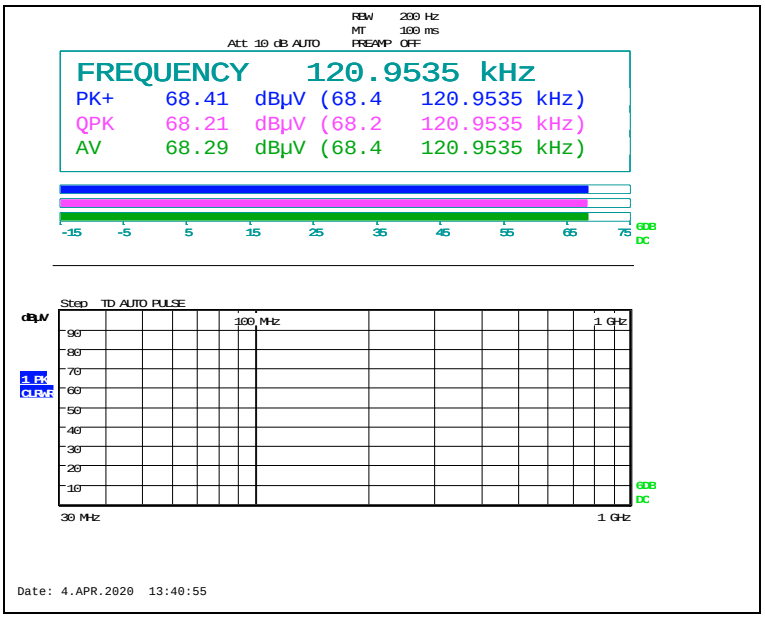
Ant. 1



Ant. 2



Ant. 3


RBW 200 Hz
MT 100 ms
Att 10 dB AUTO PREAMP OFF
FREQUENCY 120.9535 kHz
PK+ 68.41 dBµV (68.4 120.9535 kHz)
QPK 68.21 dBµV (68.2 120.9535 kHz)
AV 68.29 dBµV (68.4 120.9535 kHz)
-15 -5 5 15 25 35 45 55 65 75
dB
DC
Step TD AUTO PULSE
dBµV
100 MHz
1 GHz
90
80
70
60
50
40
30
20
10
30 MHz
1 GHz
dB
DC
Date: 4.APR.2020 13:40:55

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: 5 W Operating mode with client device (1 % battery status of client device)

Ant. 1

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)
0.022	27.51	Average	H	18.14	0.02	45.67	-34.33	40.76	75.09
0.045	23.80	Average	H	17.88	0.03	41.71	-38.29	34.54	72.83
0.090	21.10	Quasi peak	H	17.81	0.05	38.96	-41.04	28.52	69.56
0.244	14.60	Average	H	17.80	0.13	32.53	-47.47	19.86	67.33
0.291	11.40	Average	H	17.80	0.14	29.34	-50.66	18.33	68.99

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)
32.02	41.90	Peak	V	15.81	-26.70	31.01	40.00	8.99
104.65	37.90	Peak	V	17.00	-25.37	29.53	43.50	13.97
124.54	38.90	Peak	H	14.89	-25.29	28.50	43.50	15.00
204.88	45.10	Peak	H	16.61	-25.08	**36.63**	43.50	6.87
296.91	42.40	Peak	H	19.20	-24.91	36.69	46.00	9.31
508.57	34.60	Peak	V	23.17	-24.36	33.41	46.00	12.59
Above 600.00	Not detected	-	-	-	-	-	-	-

Ant. 2

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)
0.023	33.80	Average	H	18.11	0.02	51.93	-28.07	40.37	68.44
0.045	26.50	Average	H	17.88	0.03	44.41	-35.59	34.54	70.13
0.089	17.00	Average	H	17.82	0.05	34.87	-45.13	28.62	73.75
0.150	16.40	Average	H	17.80	0.09	34.29	-45.71	24.08	69.79
0.341	8.60	Average	H	17.78	0.16	26.54	-53.46	16.95	70.41

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)
31.98	41.10	Peak	V	15.79	-26.70	30.19	40.00	9.81
124.58	39.30	Peak	H	14.88	-25.29	28.89	43.50	14.61
204.92	43.70	Peak	H	16.61	-25.08	35.23	43.50	8.27
293.36	43.50	Peak	H	19.13	-24.91	37.72	46.00	8.28
503.32	34.60	Peak	V	23.07	-24.39	33.28	46.00	12.72
837.69	35.80	Peak	V	27.30	-22.42	**40.68**	46.00	5.32
Above 900.00	Not detected	-	-	-	-	-	-	-

Ant. 3

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)
0.023	35.60	Average	H	18.11	0.02	53.73	-26.27	40.37	66.64
0.044	13.90	Average	H	17.88	0.03	31.81	-48.19	34.74	82.93
0.083	11.50	Average	H	17.82	0.05	29.37	-50.63	29.22	79.85
0.363	39.80	Average	H	17.77	0.17	57.74	-22.26	16.41	38.67
0.453	7.80	Average	H	17.72	0.20	25.72	-54.28	14.48	68.76

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)
31.98	41.20	Peak	V	15.79	-26.70	**30.29**	40.00	9.71
128.62	35.40	Peak	H	14.64	-25.28	24.76	43.50	18.74
204.96	41.30	Peak	H	16.60	-25.08	32.82	43.50	10.68
229.05	40.70	Peak	H	17.68	-25.03	33.35	46.00	12.65
293.36	41.90	Peak	H	19.13	-24.91	36.12	46.00	9.88
508.61	34.10	Peak	V	23.17	-24.36	32.91	46.00	13.09
Above 600.00	Not detected	-	-	-	-	-	-	-

Test Condition: 10 W Operating mode with client device (1 % battery status of client device)

Ant. 1

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)
0.019	26.44	Average	H	18.23	0.02	44.69	-35.31	42.03	77.34
0.035	23.42	Average	H	17.89	0.02	41.33	-38.67	36.72	75.39
0.064	6.00	Average	H	17.85	0.04	23.89	-56.11	31.48	87.59
0.152	17.70	Average	H	17.80	0.09	35.59	-44.41	23.97	68.38
0.244	20.40	Average	H	17.80	0.13	38.33	-41.67	19.86	61.53

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)
30.27	43.10	Quasi peak	V	15.23	-26.73	31.60	40.00	8.40
93.94	32.80	Peak	V	16.18	-25.28	23.70	43.50	19.80
227.23	39.40	Peak	H	17.64	-25.03	32.01	46.00	13.99
440.31	33.70	Peak	V	22.09	-24.54	31.25	46.00	14.75
831.91	33.20	Peak	H	27.18	-22.46	37.92	46.00	8.08
888.05	33.90	Peak	H	27.86	-22.18	**39.58**	46.00	6.42
Above 900.00	Not detected	-	-	-	-	-	-	-

Ant. 2

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)
0.023	40.50	Average	H	18.11	0.02	58.63	-21.37	40.37	61.74
0.045	33.50	Average	H	17.88	0.03	51.41	-28.59	34.54	63.13
0.068	26.30	Average	H	17.85	0.04	44.19	-35.81	30.95	66.76
0.090	17.80	Average	H	17.81	0.05	35.66	-44.34	28.52	72.86
0.266	13.70	Average	H	17.80	0.13	31.63	-48.37	19.11	67.48
0.357	12.00	Average	H	17.77	0.17	29.94	-50.06	16.55	66.61

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)
30.28	46.10	Peak	V	15.23	-26.73	**34.60**	40.00	5.40
125.79	35.80	Peak	V	14.80	-25.29	25.31	43.50	18.19
228.89	42.50	Peak	H	17.68	-25.03	35.15	46.00	10.85
453.08	31.60	Peak	V	21.94	-24.52	29.02	46.00	16.98
504.21	32.20	Peak	V	23.08	-24.39	30.89	46.00	15.11
Above 600.00	Not detected	-	-	-	-	-	-	-

Ant. 3

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)
0.023	31.60	Average	H	18.11	0.02	49.73	-30.27	40.37	70.64
0.045	24.70	Average	H	17.88	0.03	42.61	-37.39	34.54	71.93
0.090	20.71	Quasi peak	H	17.81	0.05	38.57	-41.43	28.52	69.95
0.150	17.51	Average	H	17.80	0.09	35.40	-44.60	24.08	68.68
0.341	8.40	Average	H	17.78	0.16	26.34	-53.66	16.95	70.61

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)
30.12	48.50	Peak	V	15.21	-26.73	**36.98**	40.00	3.02
125.79	34.30	Peak	V	14.80	-25.29	23.81	43.50	19.69
226.18	39.80	Peak	H	17.62	-25.03	32.39	46.00	13.61
364.81	34.10	Peak	H	20.29	-24.74	29.65	46.00	16.35
510.07	31.80	Peak	V	23.20	-24.35	30.65	46.00	15.35
888.05	30.90	Peak	H	27.86	-22.18	36.58	46.00	9.42
Above 900.00	Not detected	-	-	-	-	-	-	-

Remark;

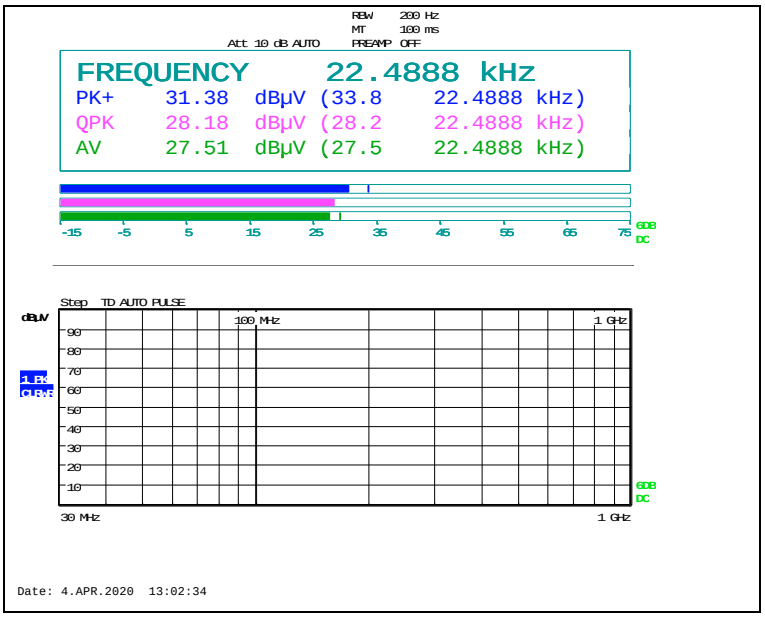
1. According to §15.31(f)(2)
   - 300 m Result (dB㎶/m) = 3 m Result (dB㎶/m) - 40log(300/3) (dB㎶/m)
   - 30 m Result (dB㎶/m) = 3 m Result (dB㎶/m) - 40log(30/3) (dB㎶/m)
2. According to field strength table of general requirement in §15.209 (a), field strength limits below 1.705 ㎒ were calculated as below.
   - 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 at 3m = Reading + AF + CL)
6. Radiated spurious emission measurement as above 30 ㎒.
   (Actual = Reading + AF + AMP + CL)

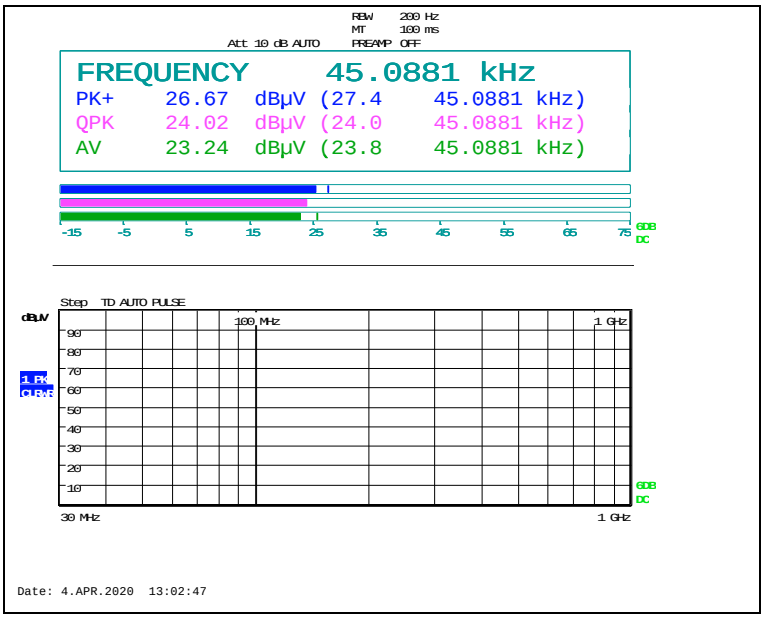
Test Condition: 5 W Operating mode with client device (1 % battery status of client device)

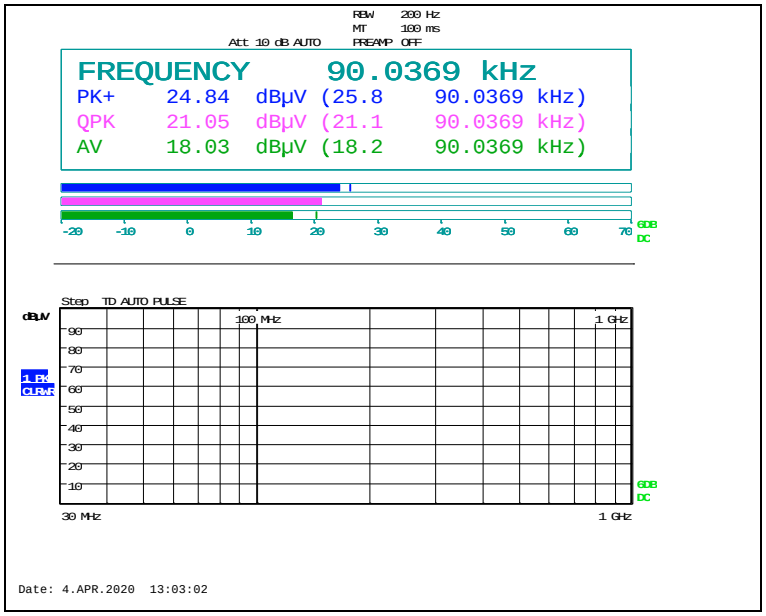
- Test plots

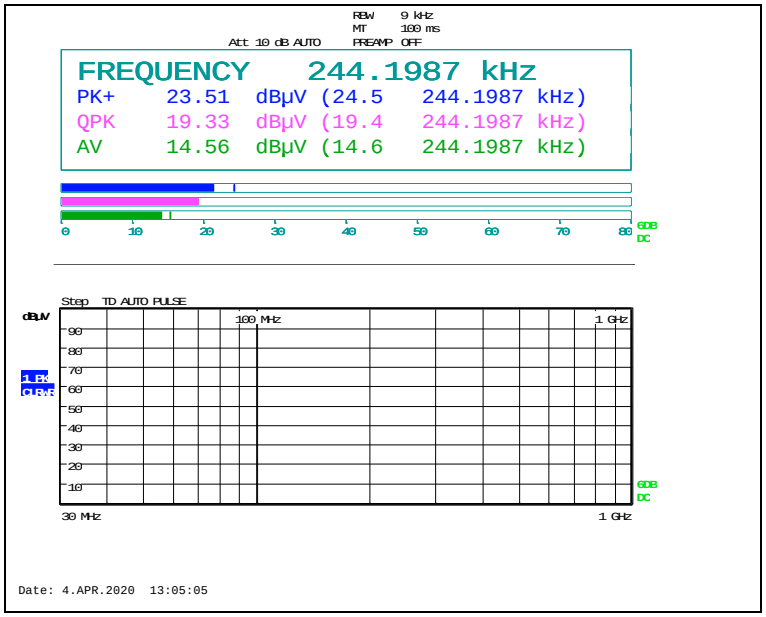
Ant. 1

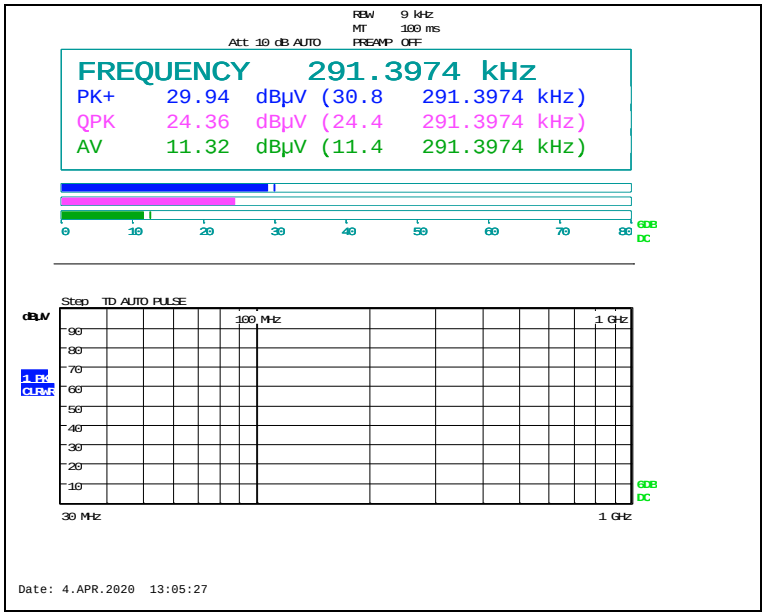
Below 30 ㎒



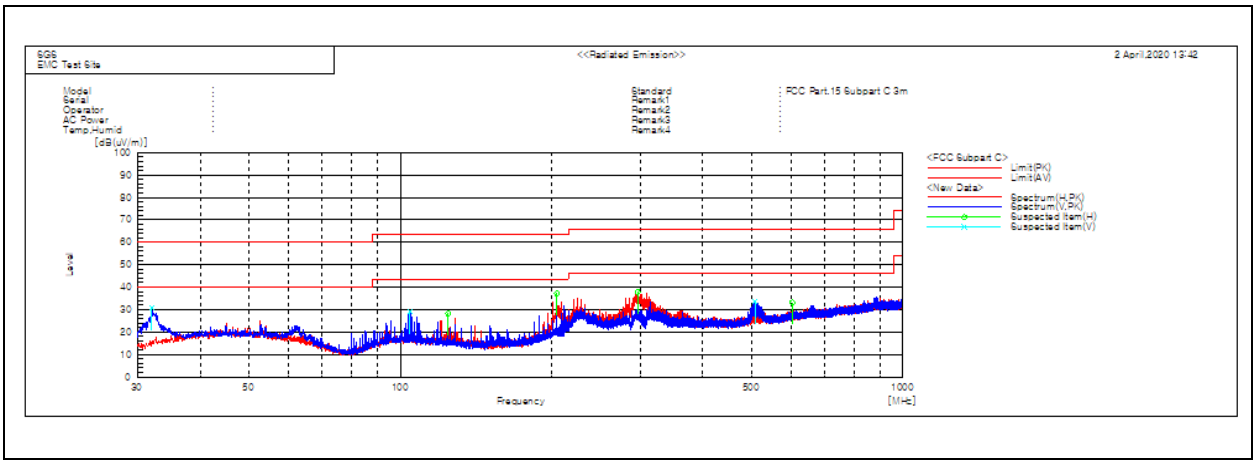



RBW 200 Hz
MT 100 ms
Att 10 dB AUTO PREAMP OFF
FREQUENCY 90.0369 kHz
PK+ 24.84 dBµV (25.8 90.0369 kHz)
QPK 21.05 dBµV (21.1 90.0369 kHz)
AV 18.03 dBµV (18.2 90.0369 kHz)
-20 -10 0 10 20 30 40 50 60 70
60B DC
Step TD AUTO PULSE
dBµV
100 MHz
1 GHz
90 80 70 60 50 40 30 20 10
60B DC
30 MHz
1 GHz
Date: 4.APR.2020 13:03:02


RBW 9 kHz
MT 100 ms
Att 10 dB AUTO PREAMP OFF
FREQUENCY 244.1987 kHz
PK+ 23.51 dBµV (24.5 244.1987 kHz)
QPK 19.33 dBµV (19.4 244.1987 kHz)
AV 14.56 dBµV (14.6 244.1987 kHz)
0 10 20 30 40 50 60 70 80
60B DC
Step TD AUTO PULSE
dBµV
100 MHz
1 GHz
90 80 70 60 50 40 30 20 10
60B DC
30 MHz
1 GHz
Date: 4.APR.2020 13:05:05



Above 30 ㎒

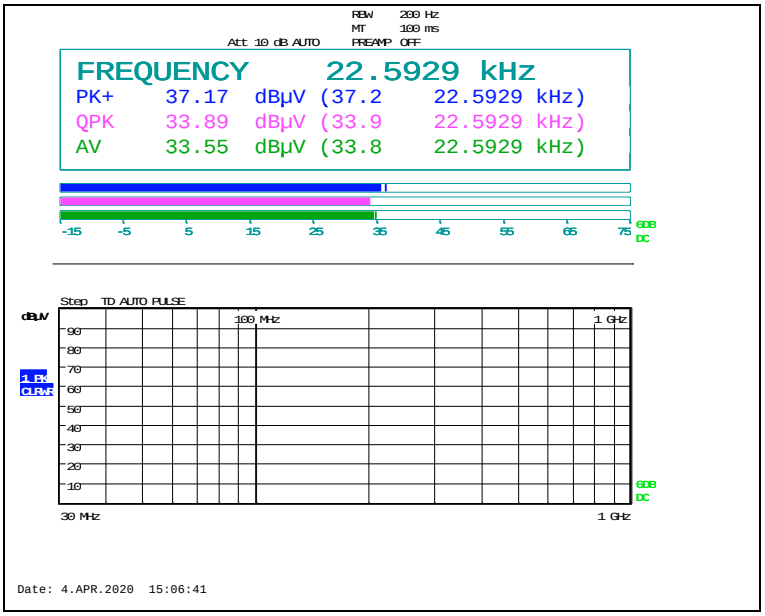


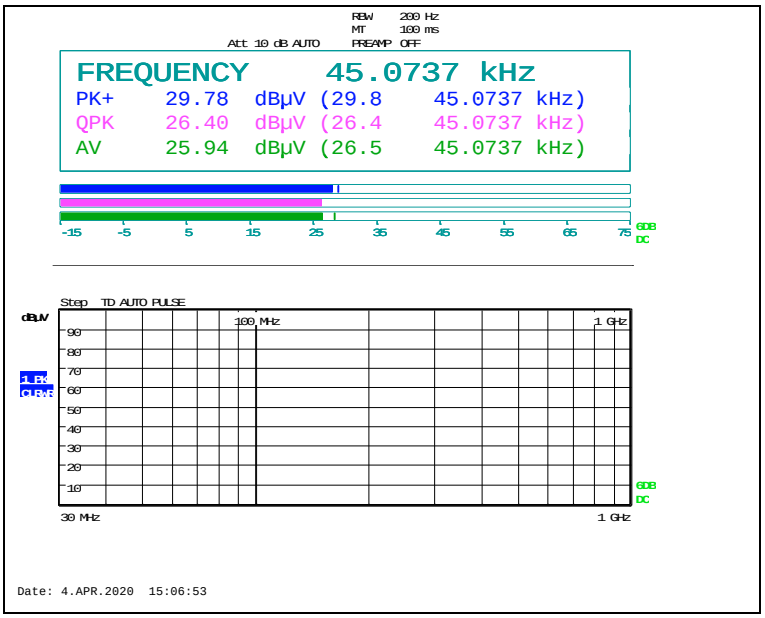
Remark;

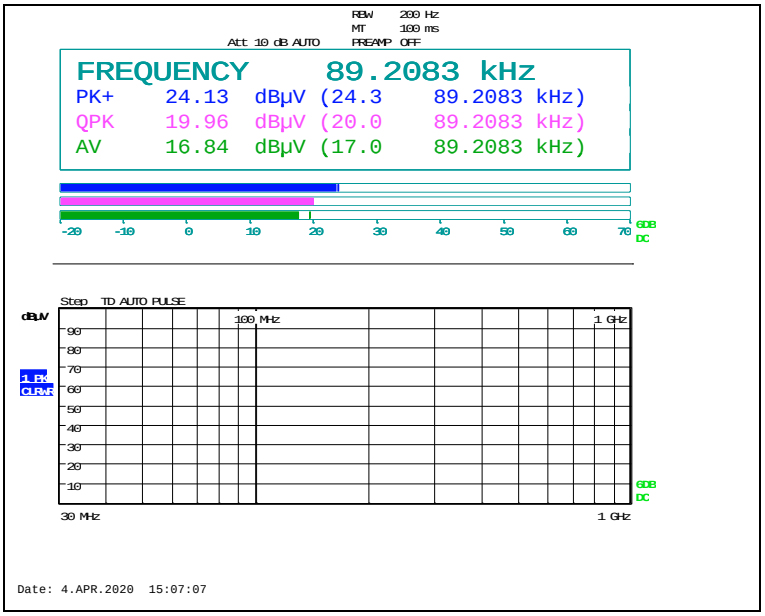
- Traces shown in the plot were made by using a peak detector.

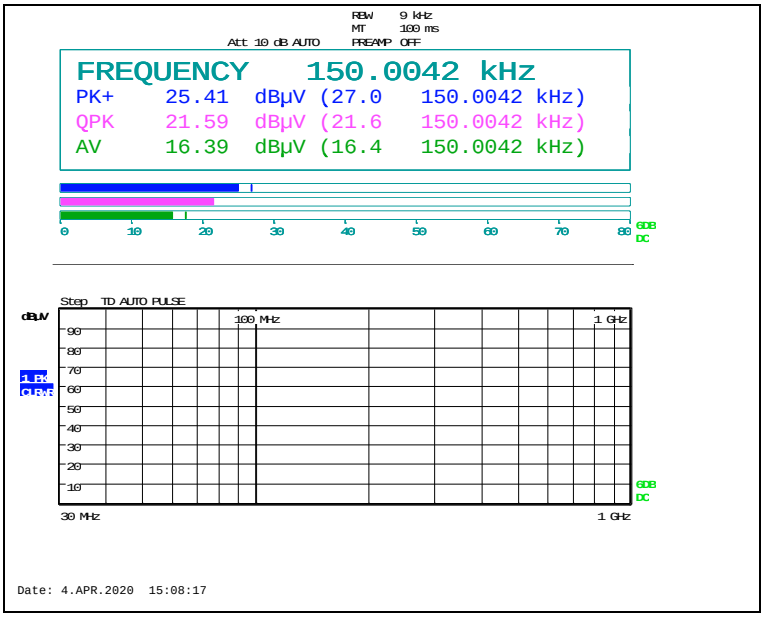
Ant. 2

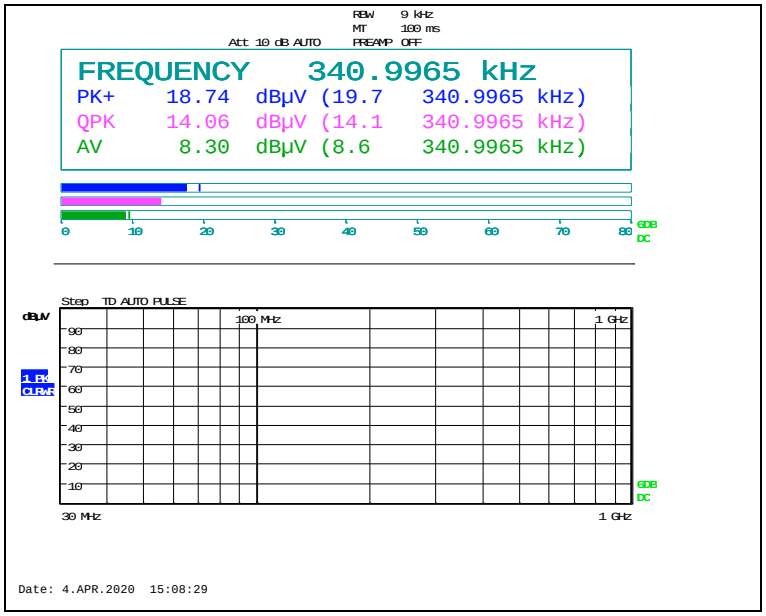
Below 30 ㎒



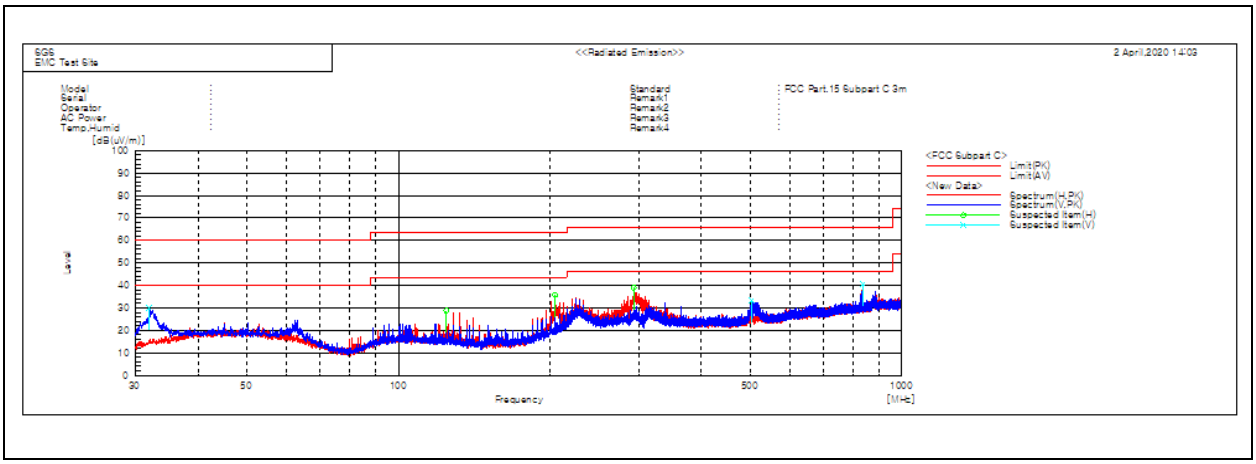



RBW 200 Hz
MT 100 ms
Att 10 dB AUTO PREAMP OFF
FREQUENCY 89.2083 kHz
PK+ 24.13 dBµV (24.3 89.2083 kHz)
QPK 19.96 dBµV (20.0 89.2083 kHz)
AV 16.84 dBµV (17.0 89.2083 kHz)
-20 -10 0 10 20 30 40 50 60 70
6DB
DC
Step TD AUTO PULSE
dBµV
100 MHz
1 GHz
90 80 70 60 50 40 30 20 10
6DB
DC
30 MHz
1 GHz
Date: 4.APR.2020 15:07:07


RBW 9 kHz
MT 100 ms
Att 10 dB AUTO PREAMP OFF
FREQUENCY 150.0042 kHz
PK+ 25.41 dBµV (27.0 150.0042 kHz)
QPK 21.59 dBµV (21.6 150.0042 kHz)
AV 16.39 dBµV (16.4 150.0042 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
6DB
DC
30 MHz
1 GHz
Date: 4.APR.2020 15:08:17



Above 30 ㎒

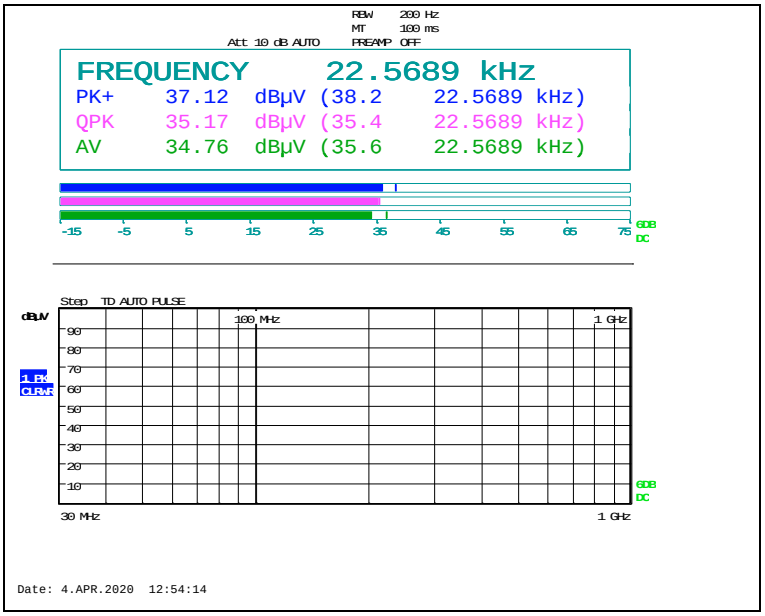


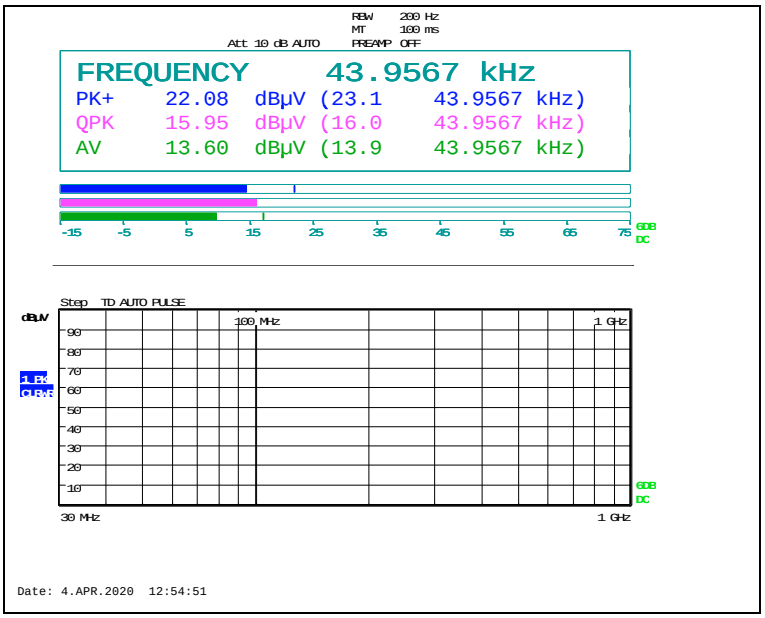
Remark;

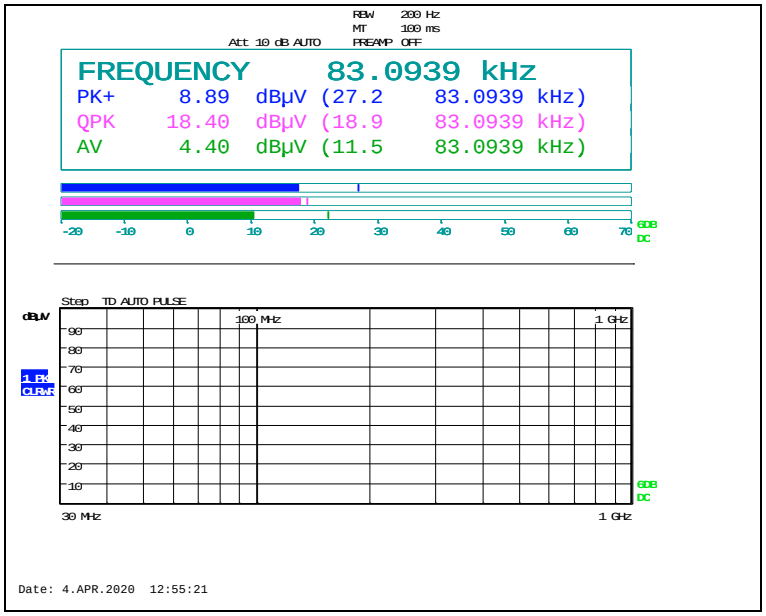
- Traces shown in the plot were made by using a peak detector.

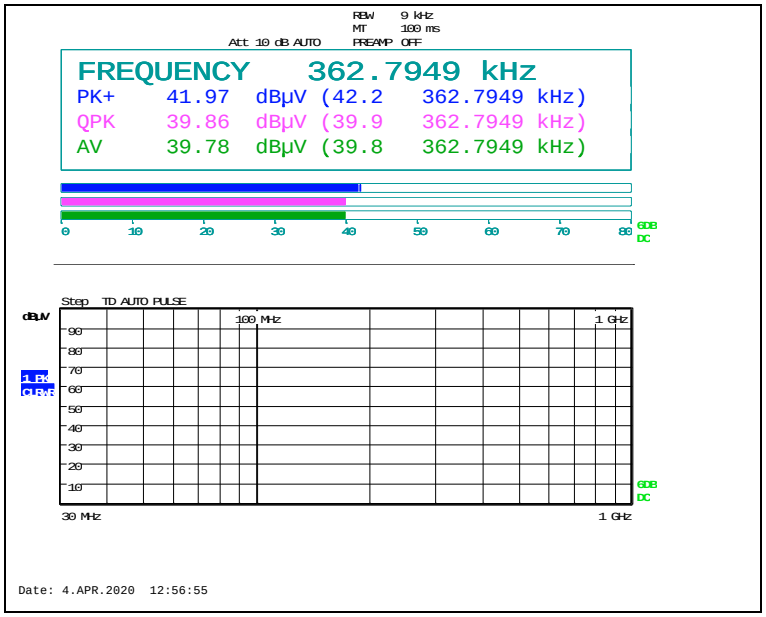
Ant. 3

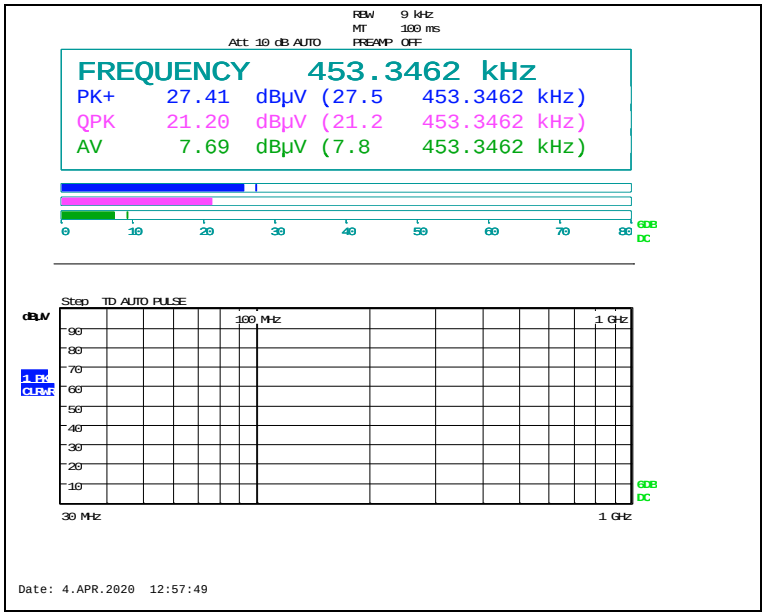
Below 30 ㎒



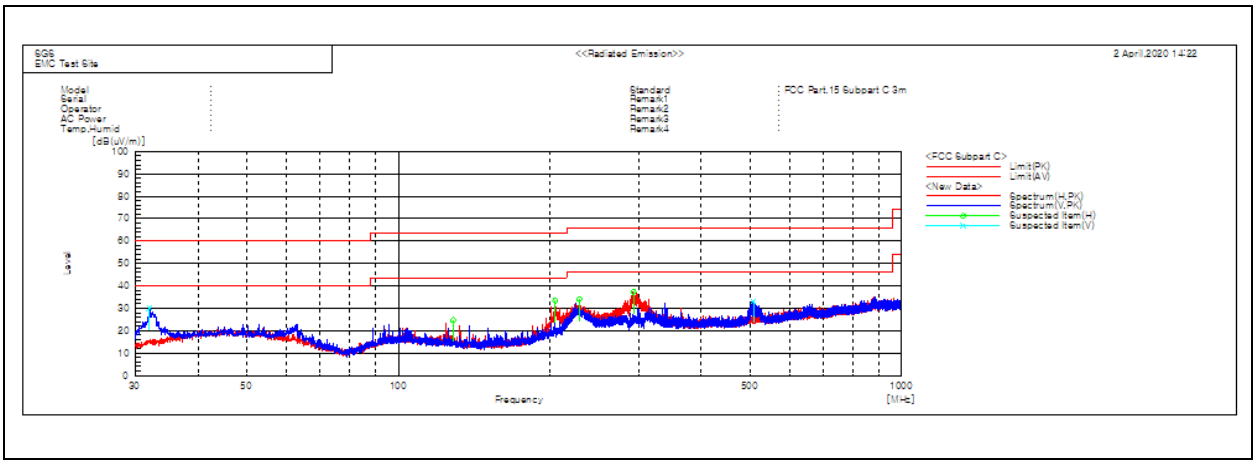



RBW 200 Hz
MT 100 ms
Att 10 dB AUTO PREAMP OFF
FREQUENCY 83.0939 kHz
PK+ 8.89 dBµV (27.2 83.0939 kHz)
QPK 18.40 dBµV (18.9 83.0939 kHz)
AV 4.40 dBµV (11.5 83.0939 kHz)
-20 -10 0 10 20 30 40 50 60 70
60B DC
Step TD AUTO PULSE
dBµV
100 MHz
1 GHz
90 80 70 60 50 40 30 20 10
60B DC
30 MHz
1 GHz
Date: 4.APR.2020 12:55:21


RBW 9 kHz
MT 100 ms
Att 10 dB AUTO PREAMP OFF
FREQUENCY 362.7949 kHz
PK+ 41.97 dBµV (42.2 362.7949 kHz)
QPK 39.86 dBµV (39.9 362.7949 kHz)
AV 39.78 dBµV (39.8 362.7949 kHz)
0 10 20 30 40 50 60 70 80
60B DC
Step TD AUTO PULSE
dBµV
100 MHz
1 GHz
90 80 70 60 50 40 30 20 10
60B DC
30 MHz
1 GHz
Date: 4.APR.2020 12:56:55



Above 30 ㎒



Remark;

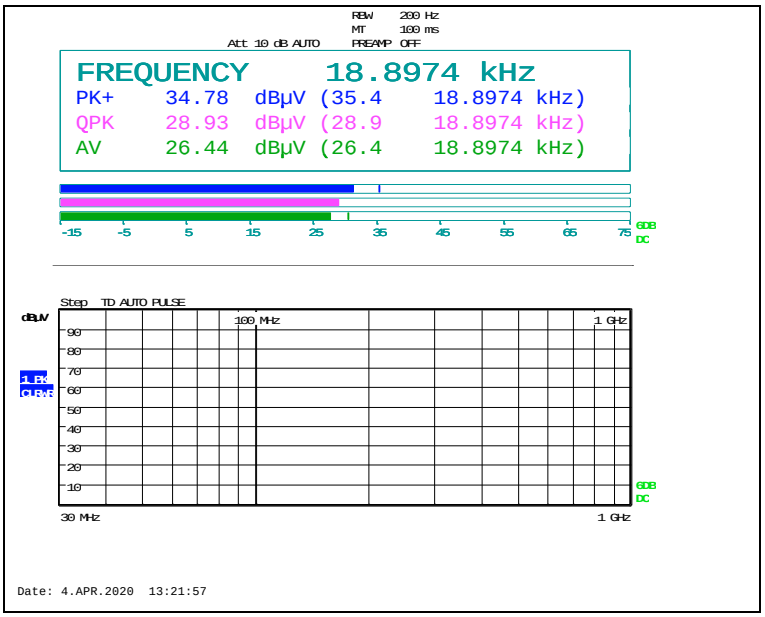
- Traces shown in the plot were made by using a peak detector.

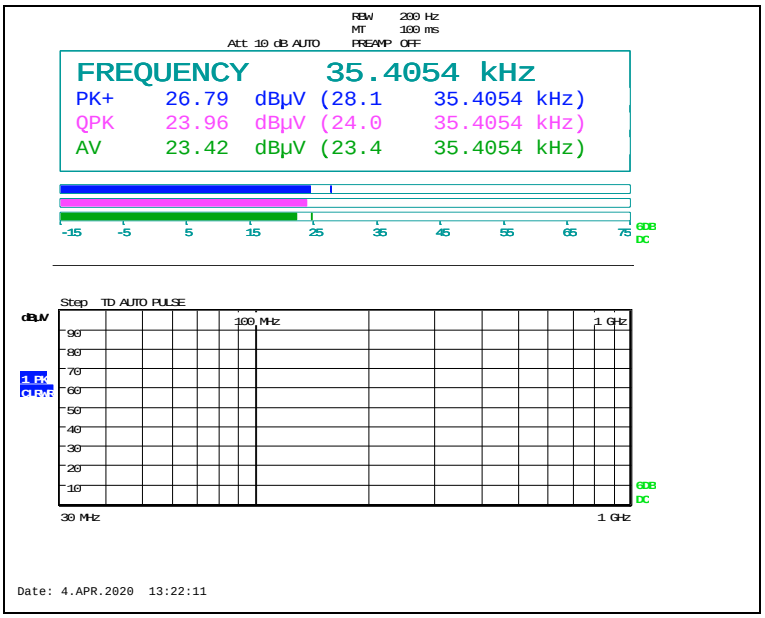
Test Condition: 10 W Operating mode with client device (1 % battery status of client device)

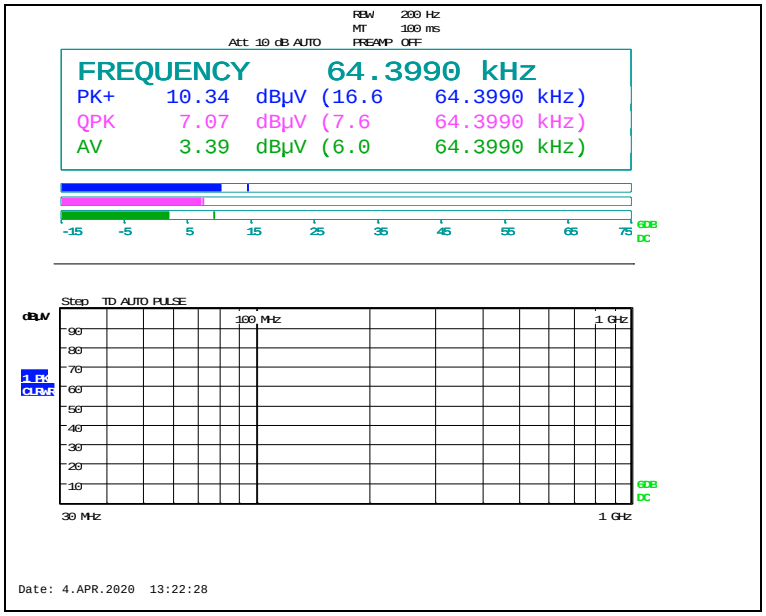
- Test plots

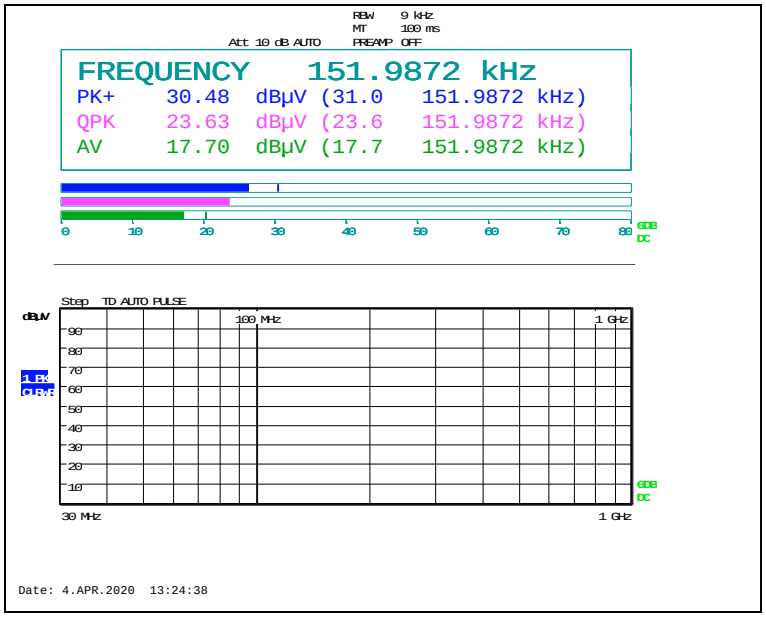
Ant. 1

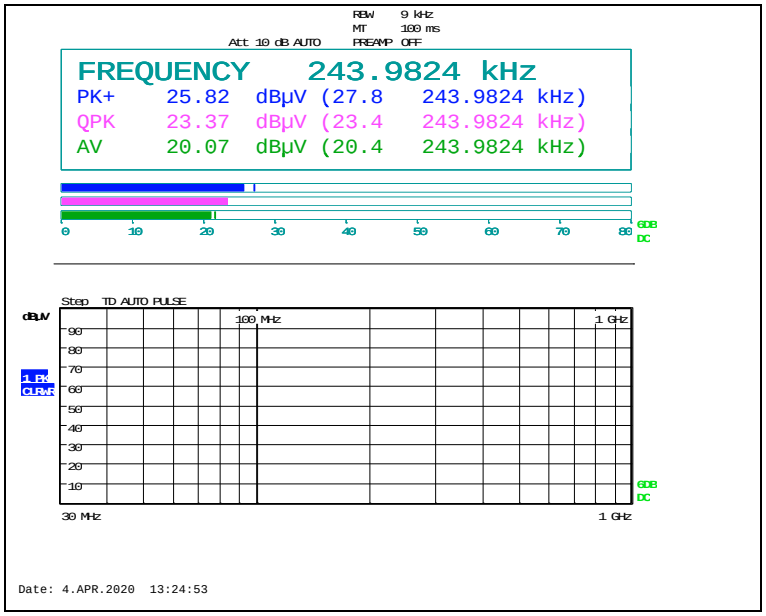
Below 30 ㎒



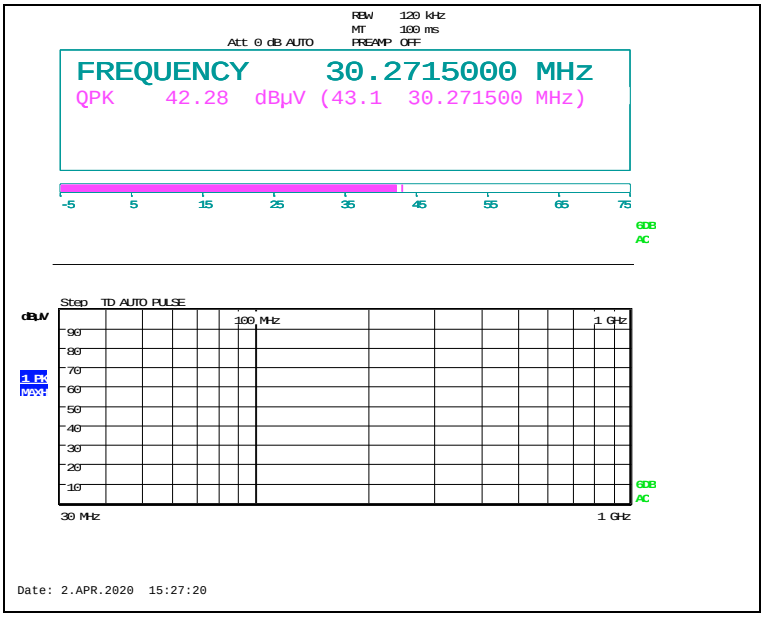


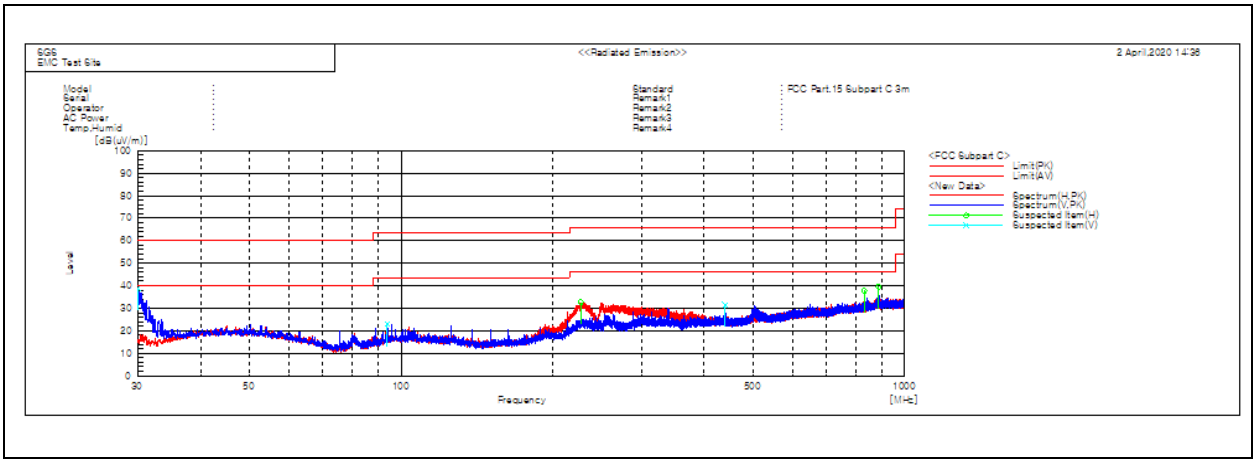

RBW 200 Hz
MT 100 ms
Att 10 dB AUTO PREAMP OFF
FREQUENCY 64.3990 kHz
PK+ 10.34 dBµV (16.6 64.3990 kHz)
QPK 7.07 dBµV (7.6 64.3990 kHz)
AV 3.39 dBµV (6.0 64.3990 kHz)
-15 -5 5 15 25 35 45 55 65 75
60B
DC
Step TD AUTO PULSE
dBµV
100 MHz
1 GHz
90
80
70
60
50
40
30
20
10
60B
DC
30 MHz
1 GHz
Date: 4.APR.2020 13:22:28


RBW 9 kHz
MT 100 ms
Att 10 dB AUTO PREAMP OFF
FREQUENCY 151.9872 kHz
PK+ 30.48 dBµV (31.0 151.9872 kHz)
QPK 23.63 dBµV (23.6 151.9872 kHz)
AV 17.70 dBµV (17.7 151.9872 kHz)
0 10 20 30 40 50 60 70 80
60B
DC
Step TD AUTO PULSE
dBµV
100 MHz
1 GHz
90
80
70
60
50
40
30
20
10
60B
DC
30 MHz
1 GHz
Date: 4.APR.2020 13:24:38


RBW 9 kHz
MT 100 ms
Att 10 dB AUTO PREAMP OFF
FREQUENCY 243.9824 kHz
PK+ 25.82 dBµV (27.8 243.9824 kHz)
QPK 23.37 dBµV (23.4 243.9824 kHz)
AV 20.07 dBµV (20.4 243.9824 kHz)
0 10 20 30 40 50 60 70 80
60B
DC
Step TD AUTO PULSE
dBµV
100 MHz
1 GHz
90
80
70
60
50
40
30
20
10
60B
DC
30 MHz
1 GHz
Date: 4.APR.2020 13:24:53

Above 30 ㎒



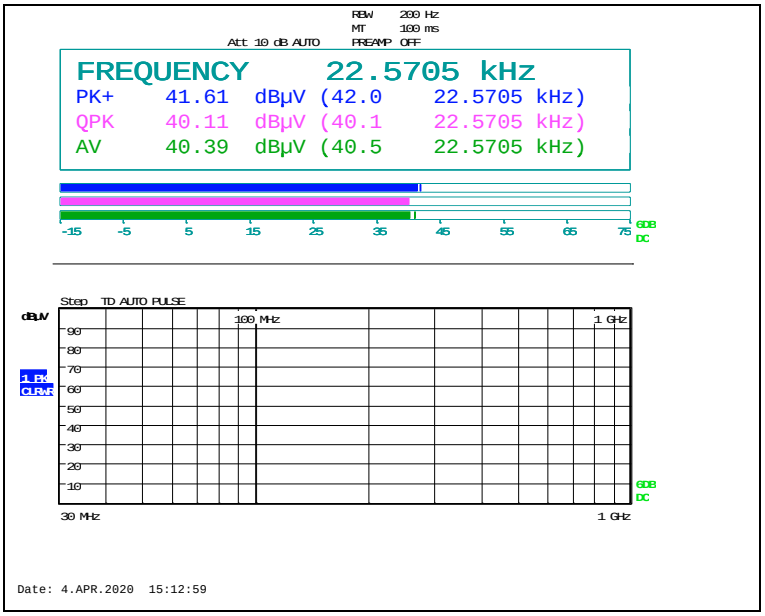


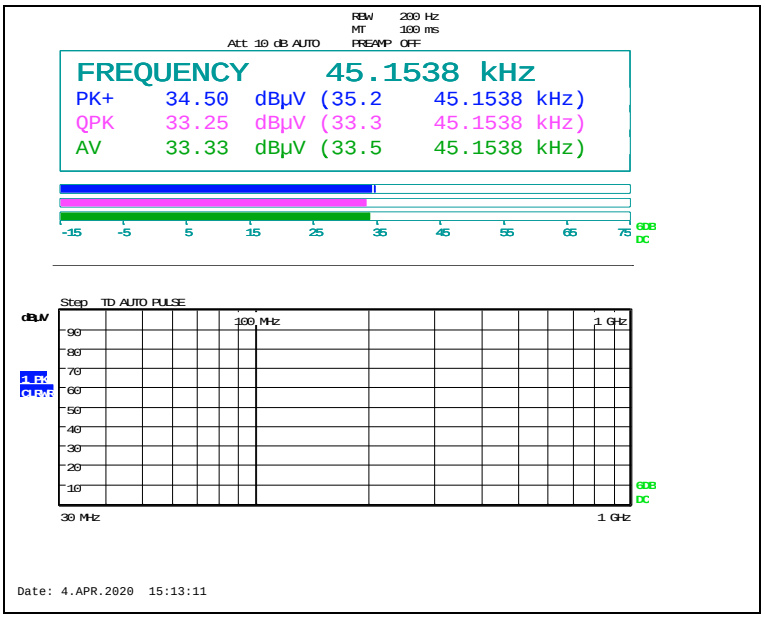
Remark;

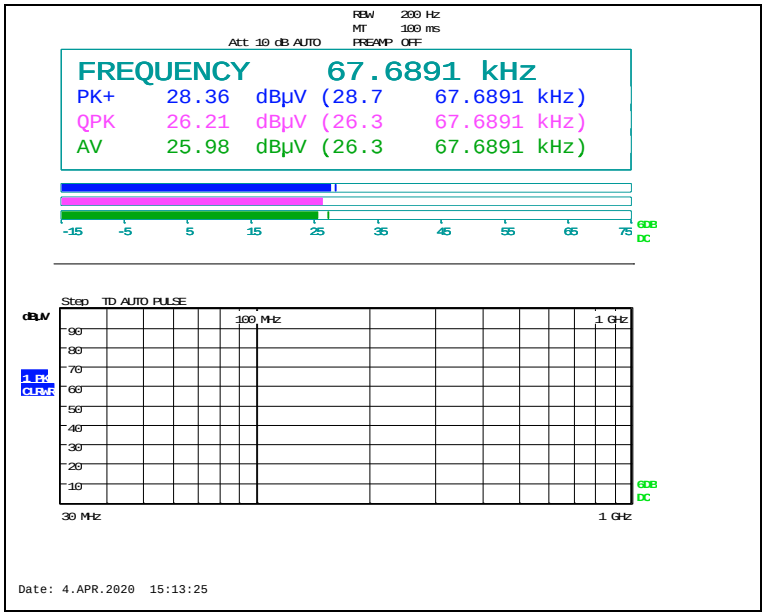
- Traces shown in the plot were made by using a peak detector.

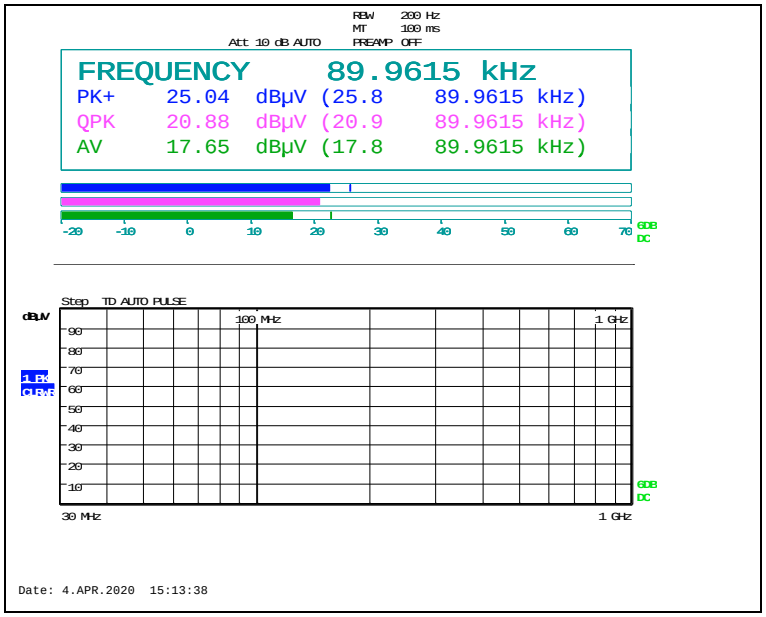
Ant. 2

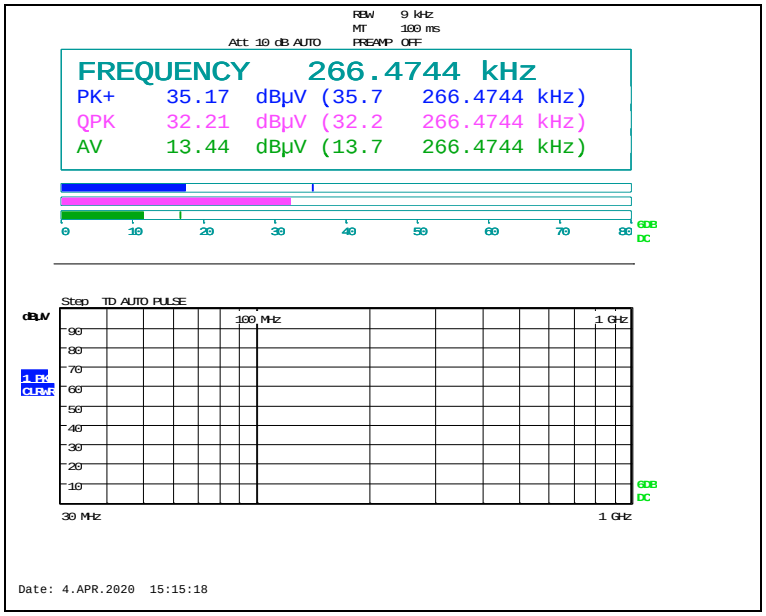
Below 30 ㎒

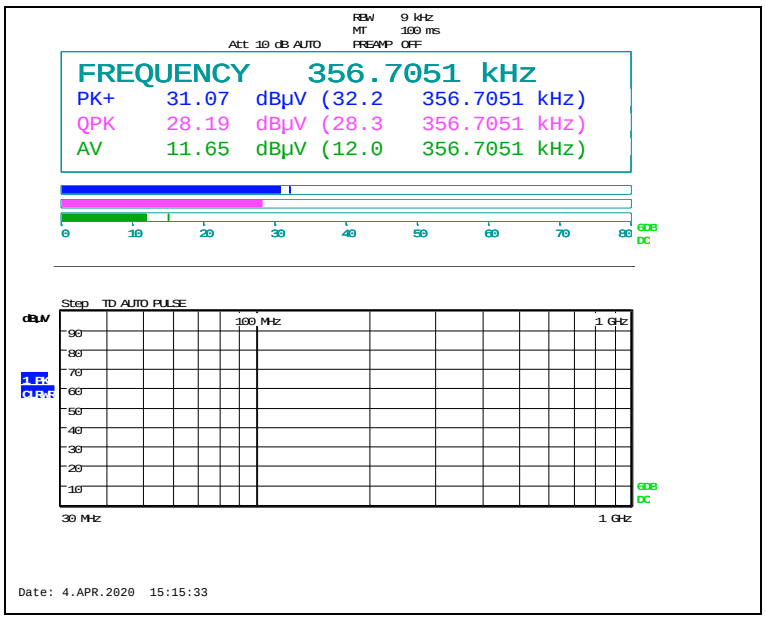




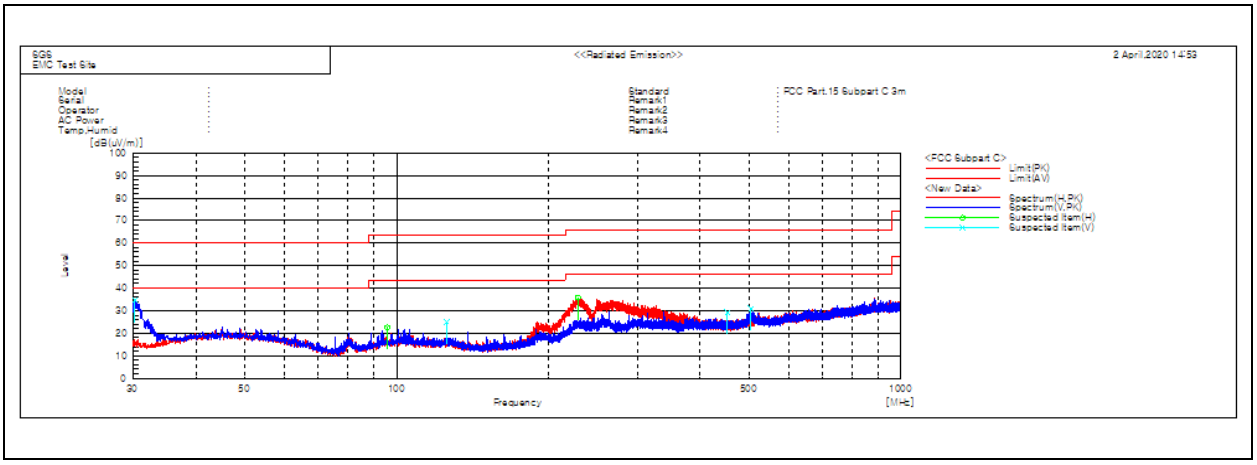

RBW 200 Hz
MT 100 ms
Att 10 dB AUTO PREAMP OFF
FREQUENCY 67.6891 kHz
PK+ 28.36 dBµV (28.7 67.6891 kHz)
QPK 26.21 dBµV (26.3 67.6891 kHz)
AV 25.98 dBµV (26.3 67.6891 kHz)
-15 -5 5 15 25 35 45 55 65 75
60B
DC
Step TD AUTO PULSE
dBµV
100 MHz
1 GHz
90
80
70
60
50
40
30
20
10
60B
DC
30 MHz
1 GHz
Date: 4.APR.2020 15:13:25


RBW 200 Hz
MT 100 ms
Att 10 dB AUTO PREAMP OFF
FREQUENCY 89.9615 kHz
PK+ 25.04 dBµV (25.8 89.9615 kHz)
QPK 20.88 dBµV (20.9 89.9615 kHz)
AV 17.65 dBµV (17.8 89.9615 kHz)
-20 -10 0 10 20 30 40 50 60 70
60B
DC
Step TD AUTO PULSE
dBµV
100 MHz
1 GHz
90
80
70
60
50
40
30
20
10
60B
DC
30 MHz
1 GHz
Date: 4.APR.2020 15:13:38


RBW 9 kHz
MT 100 ms
Att 10 dB AUTO PREAMP OFF
FREQUENCY 266.4744 kHz
PK+ 35.17 dBµV (35.7 266.4744 kHz)
QPK 32.21 dBµV (32.2 266.4744 kHz)
AV 13.44 dBµV (13.7 266.4744 kHz)
0 10 20 30 40 50 60 70 80
60B
DC
Step TD AUTO PULSE
dBµV
100 MHz
1 GHz
90 80 70 60 50 40 30 20 10
60B
DC
30 MHz
1 GHz
Date: 4.APR.2020 15:15:18


RBW 9 kHz
MT 100 ms
Att 10 dB AUTO PREAMP OFF
FREQUENCY 356.7051 kHz
PK+ 31.07 dBµV (32.2 356.7051 kHz)
QPK 28.19 dBµV (28.3 356.7051 kHz)
AV 11.65 dBµV (12.0 356.7051 kHz)
0 10 20 30 40 50 60 70 80
60B
DC
Step TD AUTO PULSE
dBµV
100 MHz
1 GHz
90 80 70 60 50 40 30 20 10
60B
DC
30 MHz
1 GHz
Date: 4.APR.2020 15:15:33

Above 30 ㎒

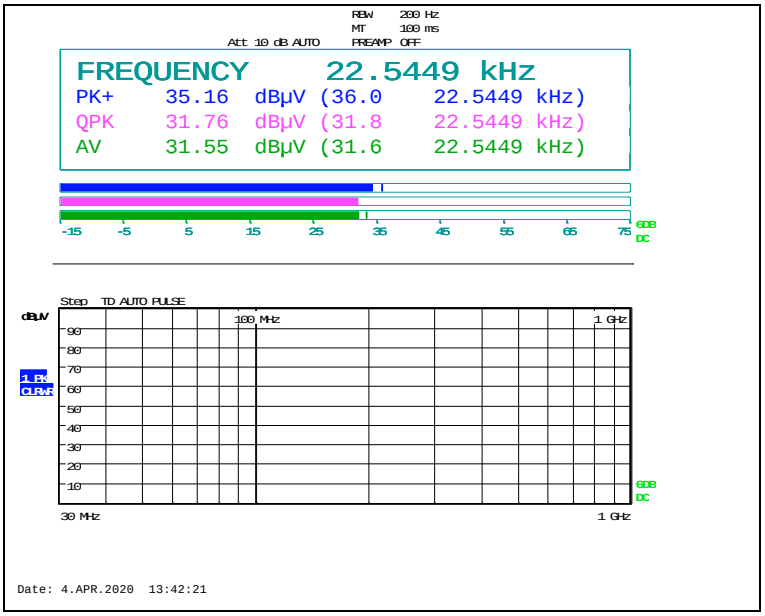


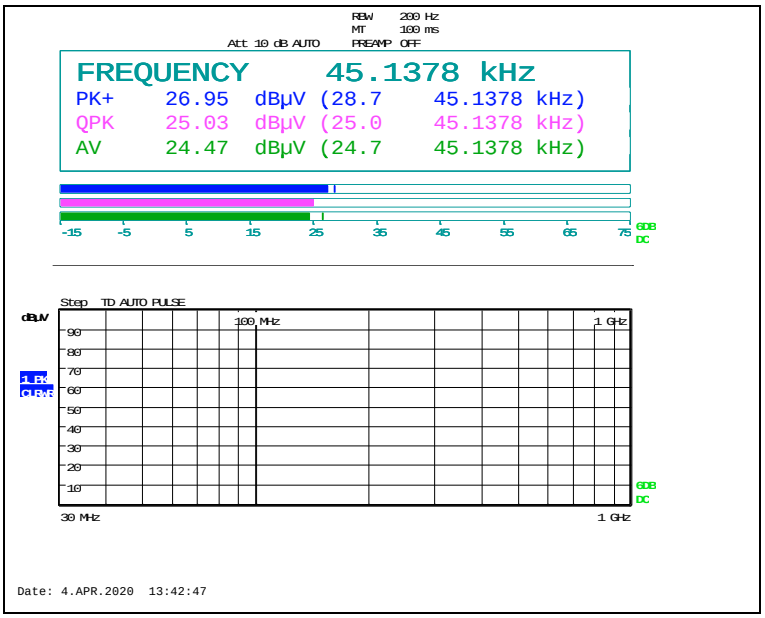
Remark;

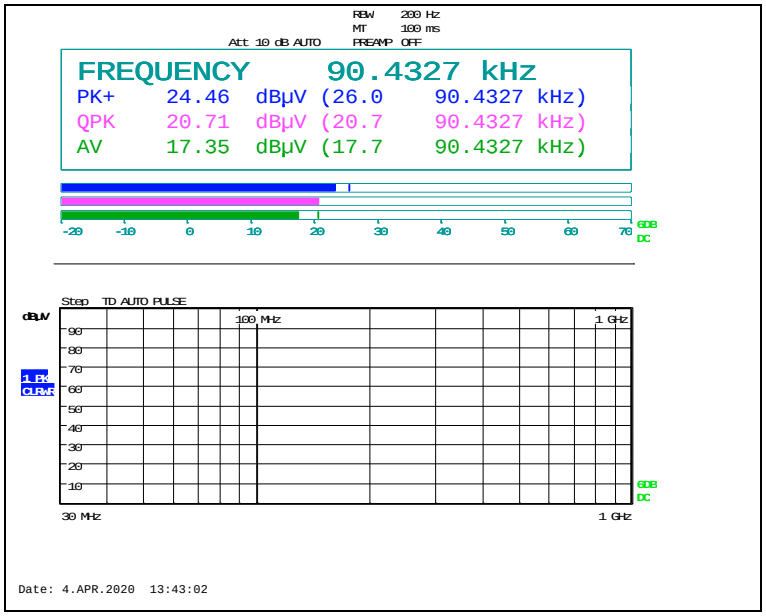
- Traces shown in the plot were made by using a peak detector.

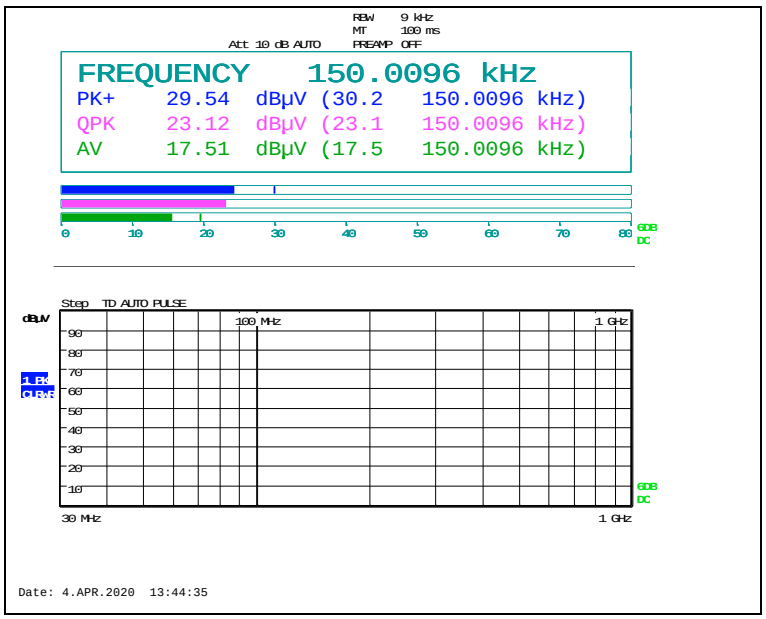
Ant. 3

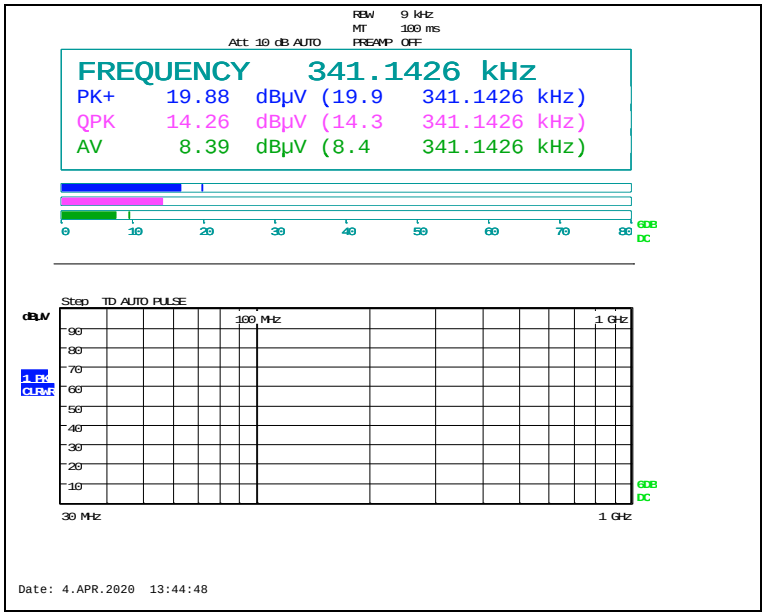
Below 30 ㎒



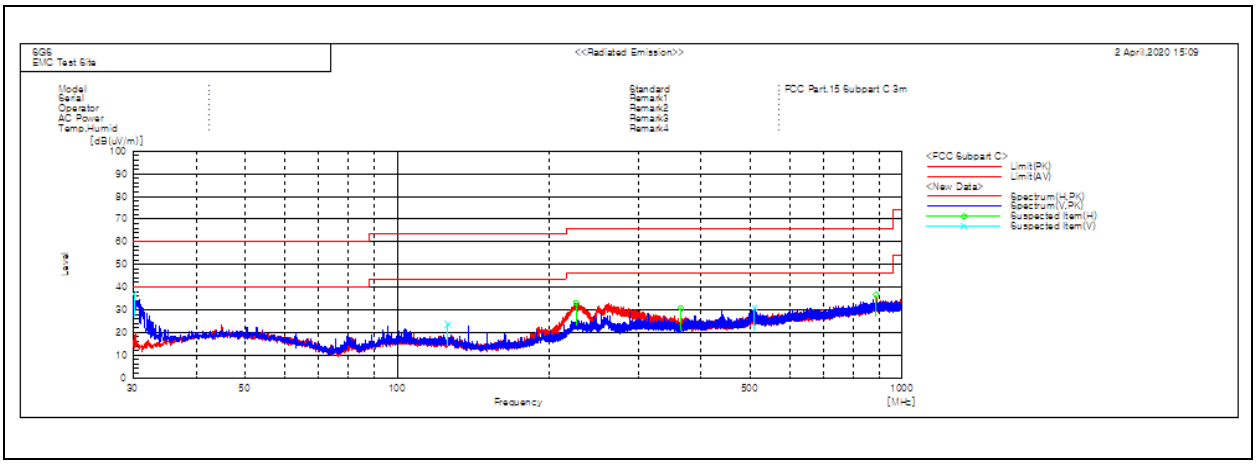



RBW 200 Hz
MT 100 ms
Att 10 dB AUTO PREAMP OFF
FREQUENCY 90.4327 kHz
PK+ 24.46 dBµV (26.0 90.4327 kHz)
QPK 20.71 dBµV (20.7 90.4327 kHz)
AV 17.35 dBµV (17.7 90.4327 kHz)
-20 -10 0 10 20 30 40 50 60 70
60B DC
Step TD AUTO PULSE
dBµV
100 MHz
1 GHz
90 80 70 60 50 40 30 20 10
30 MHz
1 GHz
Date: 4.APR.2020 13:43:02


RBW 9 kHz
MT 100 ms
Att 10 dB AUTO PREAMP OFF
FREQUENCY 150.0096 kHz
PK+ 29.54 dBµV (30.2 150.0096 kHz)
QPK 23.12 dBµV (23.1 150.0096 kHz)
AV 17.51 dBµV (17.5 150.0096 kHz)
0 10 20 30 40 50 60 70 80
60B DC
Step TD AUTO PULSE
dBµV
100 MHz
1 GHz
90 80 70 60 50 40 30 20 10
30 MHz
1 GHz
Date: 4.APR.2020 13:44:35



Above 30 ㎒

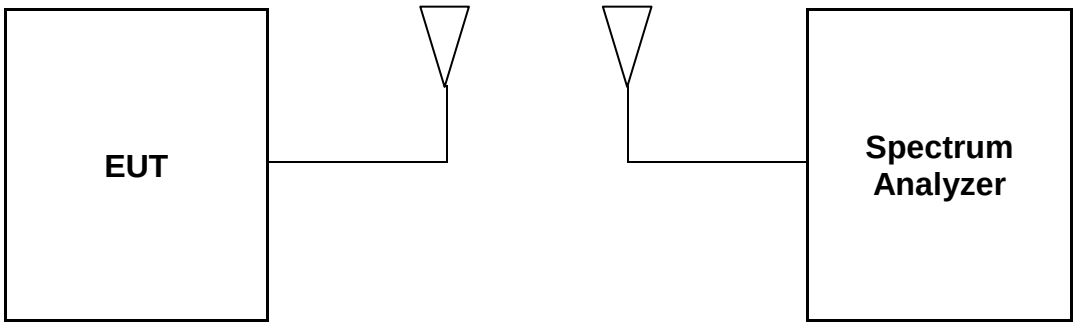


Remark;

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

3. 20 ㏈ 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 ㎐, VBW = 200 ㎐, 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 ㏈ 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 ㏈ bandwidth of the emission.

3.4. Test Result

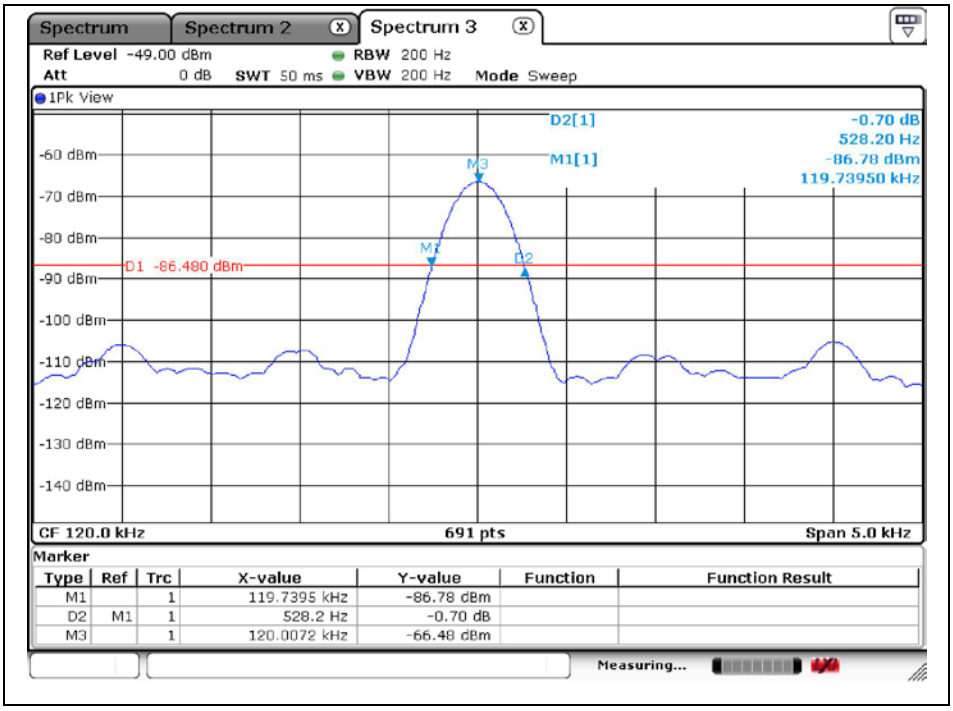
Ambient temperature : (23 ± 1) ℃
Relative humidity : 47 % R.H.

Test Condition		EUT Status	20 dB Bandwidth (㎑)	Limit
5 W	Ant. 1	With client device (1 % battery status of client device)	0.528	Reporting proposed only
	Ant. 2		0.528	
	Ant. 3		0.528	
10 W	Ant. 1		0.521	
	Ant. 2		0.536	
	Ant. 3		0.528	

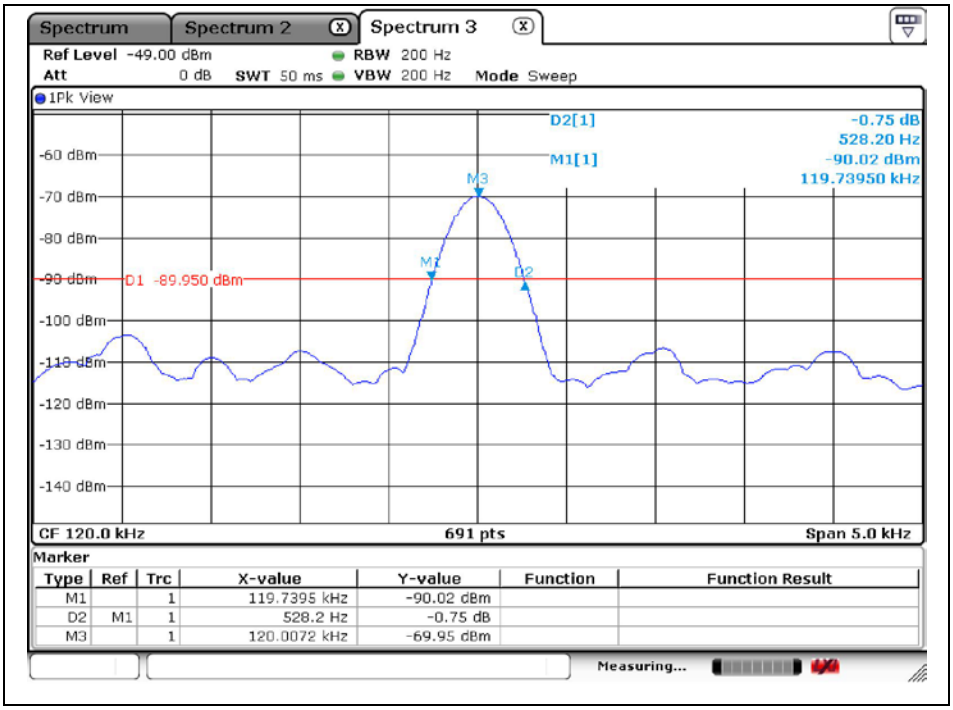
Test Condition: 5 W Operating mode with client device (1 % battery status of client device)

- Test plots

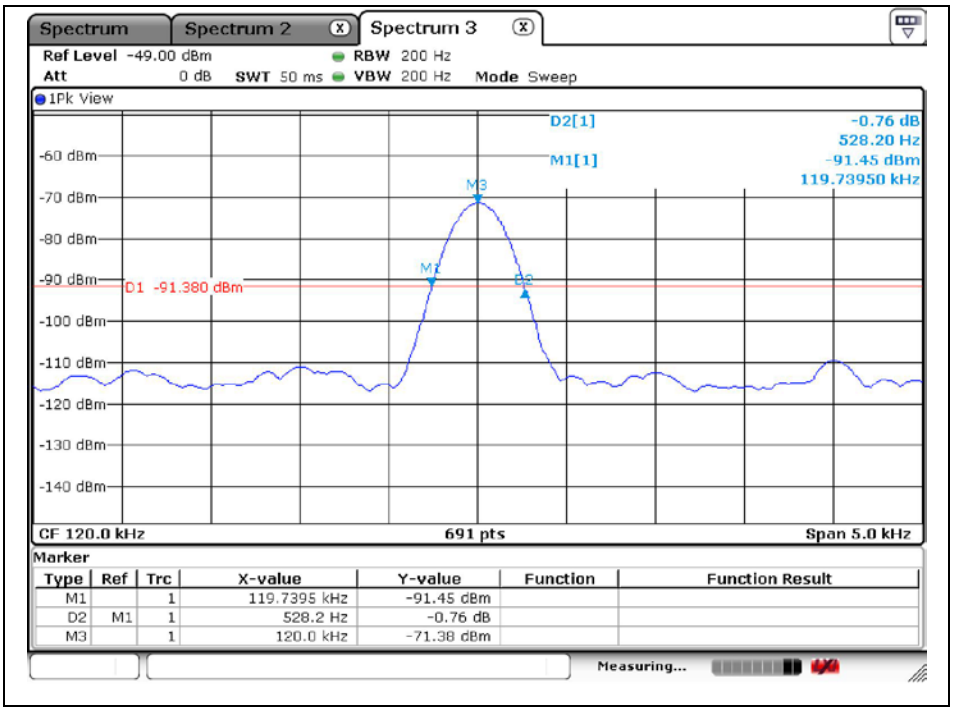
Ant. 1



Ant. 2

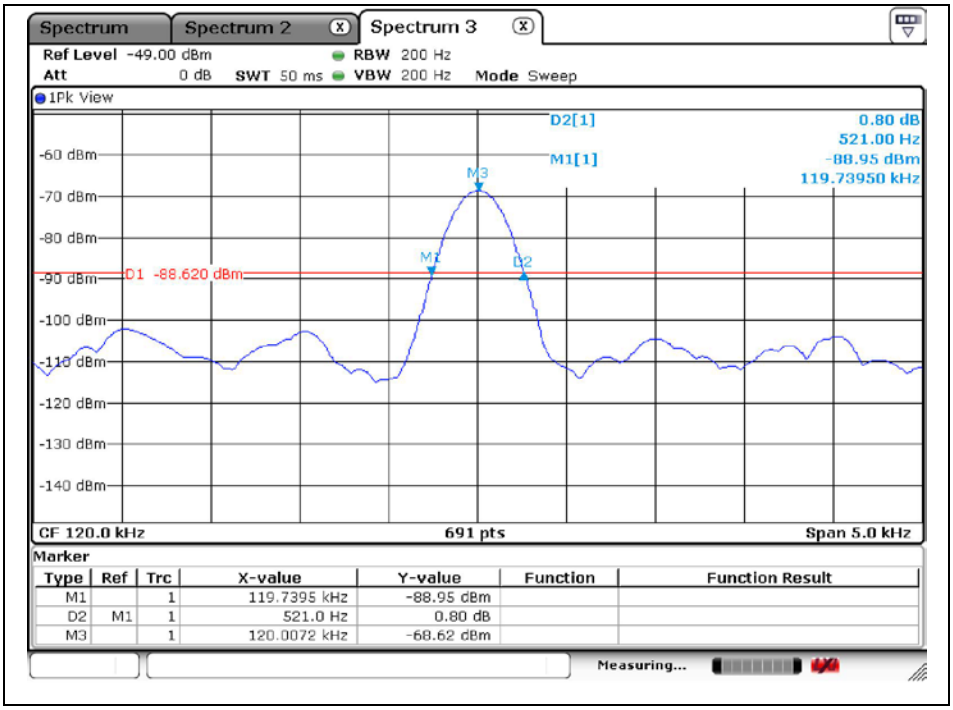

Spectrum
Spectrum 2
Spectrum 3
Ref Level -49.00 dBm
RBW 200 Hz
Att 0 dB
SWT 50 ms
VBW 200 Hz
Mode Sweep
1Pk View
D2[1] -0.75 dB
528.20 Hz
M1[1] -90.02 dBm
119.73950 kHz
D1 -89.950 dBm
CF 120.0 kHz
691 pts
Span 5.0 kHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 119.7395 kHz -90.02 dBm
D2 M1 1 528.2 Hz -0.75 dB
M3 1 120.0072 kHz -69.95 dBm
Measuring...

Ant. 3

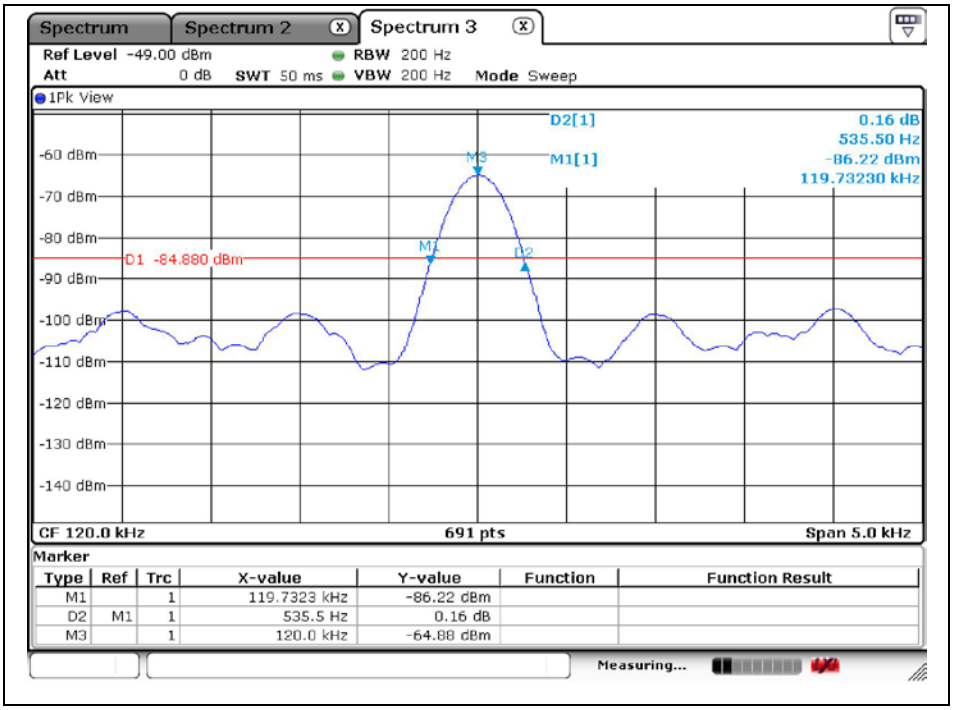

Spectrum
Spectrum 2
Spectrum 3
Ref Level -49.00 dBm
RBW 200 Hz
Att 0 dB
SWT 50 ms
VBW 200 Hz
Mode Sweep
1Pk View
D2[1] -0.76 dB
528.20 Hz
M1[1] -91.45 dBm
119.73950 kHz
D1 -91.380 dBm
CF 120.0 kHz
691 pts
Span 5.0 kHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 119.7395 kHz -91.45 dBm
D2 M1 1 528.2 Hz -0.76 dB
M3 1 120.0 kHz -71.38 dBm
Measuring...

Test Condition: 10 W Operating mode with client device (1 % battery status of client device)

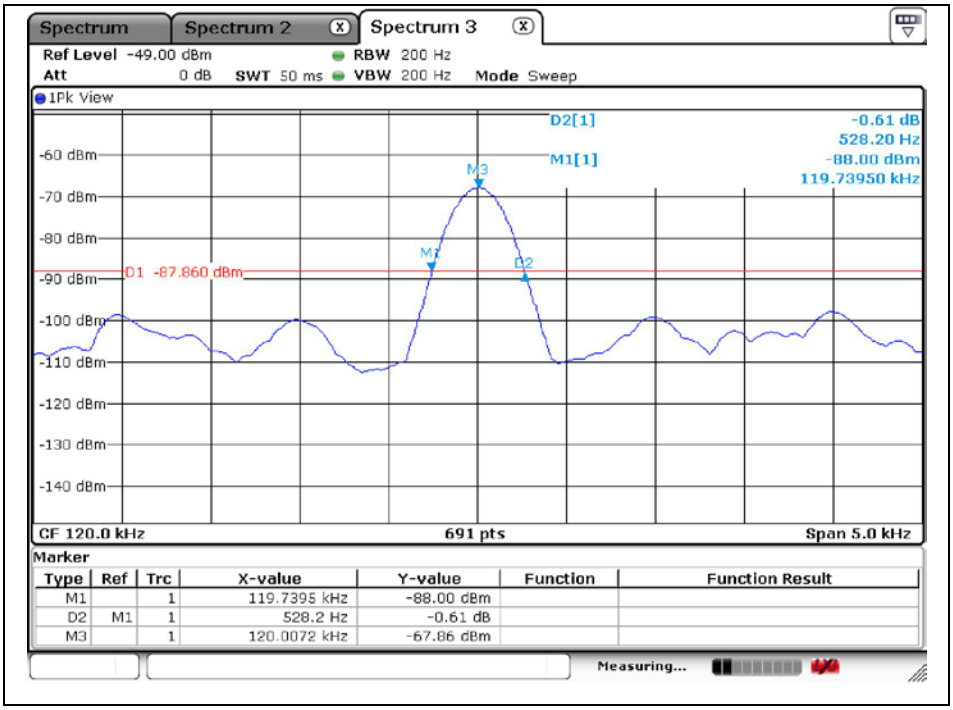
Ant. 1



Ant. 2



Ant. 3



- End of the Test Report -